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ABSTRACT

This text is a rate training manual designed to provide enlisted men of the Ship's Serviceman rating with basic information concerning the various ship's service specialties. The text is divided into four parts. Part 1 discusses areas common to the administration of all ship's service activities. The remaining sections are divided into the specialties within the Ship's Serviceman rating: Part 2, Laundryman; Part 3, Tailor; and Part 4, Barber. Each part contains sections which deal with the operation and management of the particular service activity and its basic processes and procedures, including equipment operation and routine maintenance. A subject index is included. (AG)

SHIP SERVICEMEN'S HANDBOOK

PREFACE

This text is a rate training manual designed to provide enlisted men of the Ship's Serviceman rating with basic information concerning the various ship's service specialties.

The text is divided into four parts. Part I discusses areas common to the administration of all ship's service activities, including the supervision and training of personnel. The bulk of the text is divided into the specialties within the Ship's Serviceman rating: Laundryman, Part II; Tailor, Part III, and Barber, Part IV. Each part contains sections which deal with the operation and management of the particular service activity and its basic processes and procedures, including equipment operation and routine maintenance.

This text was prepared by the Training Publications Division, Naval Personnel Program Support Activity, Washington, D.C., for the Bureau of Naval Personnel. Technical assistance was furnished by the Navy Resale System Office, Brooklyn, New York; Naval Ship Engineering Center; Naval Supply Center, San Diego, California, and the Laundry Service Teams, Norfolk, Virginia and San Diego, California.

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THE UNITED STATES NAVY

GUARDIAN OF OUR COUNTRY

The United States Navy is responsible for maintaining control of the sea and is a ready force on watch at home and overseas, capable of strong action to preserve the peace or of instant offensive action to win in war.

It is upon the maintenance of this control that our country's glorious future depends; the United States Navy exists to make it so.

WE SERVE WITH HONOR

Tradition, valor, and victory are the Navy's heritage from the past. To these may be added dedication, discipline, and vigilance as the watchwords of the present and the future.

At home or on distant stations we serve with pride, confident in the respect of our country, our shipmates, and our families.

Our responsibilities sober us; our adversities strengthen us.

Service to God and Country is our special privilege. We serve with honor.

THE FUTURE OF THE NAVY

The Navy will always employ new weapons, new techniques, and greater power to protect and defend the United States on the sea, under the sea, and in the air.

Now and in the future, control of the sea gives the United States her greatest advantage for the maintenance of peace and for victory in war.

Mobility, surprise, dispersal, and offensive power are the keynotes of the new Navy. The roots of the Navy lie in a strong belief in the future, in continued dedication to our tasks, and in reflection on our heritage from the past.

Never have our opportunities and our responsibilities been greater.

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PART I—ADMINISTRATION

Chapter 1—Administration of Ship's Service Activities

CHAPTER 1

ADMINISTRATION OF SHIP'S SERVICE ACTIVITIES

There are many types of service activities authorized for ships. The number of these to be found aboard a particular ship is governed by such factors as size and type of ship, number of personnel assigned, and space available. A destroyer, for example, cannot provide all the services available on a carrier.

All ships with Supply Corps officers have at least the basic three activities: laundry, barbershop, and vending machine. Vending machines are discussed in Ship's Serviceman 3 & 2, NAVPERS 10286-F. As the size increases, the range of service activities may expand to include a tailorshop and drycleaning facility. For the majority of ships the expenses incurred in operating the service activities are paid from profits derived from sales in the ship's store resale activities.

The commanding officer may decide to collect a monthly laundry and drycleaning charge to cover the cost of operating all service activities. This is the only charge authorized; no charge can be made for haircuts or other services. Commanding officers seldom require such a collection except at times when store profits are insufficient to cover costs.

Service activities are administered by the ship's store component of the supply department. On ships with Supply Corps officers the supply officer or one of his designated assistants acts as the ship's store officer. On ships without Supply Corps officers, the commanding officer appoints an officer to act as the ship's store officer. Each service activity is supervised by a Ship's Serviceman specialist (Barber, Tailor, Laundryman).

Ship's Servicemen probably contribute more to the welfare and contentment of men in the Navy than any other rating. Service is their watchword. You can be sure that the overall morale of your ship will be greatly increased when efficient laundry and drycleaning services, tailoring, and barbering are furnished.

You must remember that as a Ship's Serviceman, you are performing a service. In performing this service, you should acquire the habit of doing quality work and of being fair and considerate. Always establish good customer relations by turning out quality work and by treating the customer as you would like to be treated.

MAINTENANCE OF EQUIPMENT

As a Ship's Serviceman in charge of one of the service activities, it will be your responsibility to ensure that all machinery in your respective activity is carefully examined for loose nuts, bolts, parts, connections, and the like, before beginning operations. This inspection each morning is especially important afloat where machinery is subject to a high degree of continuous ship operation.

A thorough inspection of machinery should also be made after firing the guns and upon completion of any structural tests to which the ship may be subjected.

Even though the actual maintenance of equipment located in ship service spaces is the responsibility of the engineering department, supervisors and equipment operators should ensure that regularly scheduled maintenance is performed on the equipment. You should create and maintain a good and effective relationship with those in the engineering department who are responsible for this maintenance.

Personnel other than maintenance men are not permitted to make repairs other than routine adjustments. Under no circumstances should the speed of machinery be maintained in excess of that prescribed by the manufacturer.

SUPERVISORY RESPONSIBILITIES

A service activity supervisor should set aside a definite portion of his time for checking the work being processed in the activity under his charge. This includes the work of each person, for only by checking the finished product and the method by which the work was done, can you find out why the work is satisfactory or not up to par.

The important thing to remember about supervision is that your men will respect you

for your interest in them and in the work your section does. They will not take pride in their work unless you exhibit interest and pride as an example to them. They will not resent constructive criticism if they feel you have their interest at heart and treat them with respect. Talk to them quietly, preferably in privacy. If you shout at people or reprimand them in the presence of other workers, the effect is usually bad. Be positive, but be fair.

Another responsibility of supervisors is training. By observing your men at work, you can determine what they should learn about the job. Most of your instruction will be given on-the-job, but sometimes you may find other types of instruction more suitable. The next few sections discuss some of the basic methods.

WHAT YOUR MEN SHOULD LEARN

Your men should learn to do all types of work in their specialty. The first thing you must find out, therefore, is what each man can do. You can learn this from his record, by talking with him, by observing him at work, and by checking his finished work.

Refer to the qualifications listed in the Manual of Qualifications for Advancement NAVPERS 18068-B. Here you will find the things the worker in your specialty must be able to do in order to advance in rating. Your training should therefore be geared to these objectives; but it need not be entirely limited by them.

The rate column of the quals gives you some guidance in establishing the order of teaching, but you will have to break each subject down further. Some subjects have a natural priority. Safety regulations fall in this category, and so do the precautions designed to prevent damage to the articles serviced and to the machinery used in servicing such articles.

Set up a timetable. Ask yourself, "How much skill should the man have? How much skill is he capable of obtaining? By what date?"

Start with the easier tasks and move toward the more difficult. Give the trainee time to learn one thing thoroughly before you start him on something new.

GETTING READY TO INSTRUCT

Like any other important job, instruction requires forethought and preparation. When you know what you want to teach, the next step is to select the most suitable method of instruction. For instance, are you going to recommend a book for the trainees to study, give them a demonstration, or provide a job instruction sheet and let them teach themselves? The choice will depend on the subject you wish to teach. For example, laundry operations lend themselves to demonstrations supplemented by study of textbooks and technical manuals. In a large plant you may occasionally give a demonstration formally to a group. You may also use the demonstration method for teaching one individual. Since most laundry instruction is on-the-job instruction, you will find the ability to give a good demonstration a distinct asset.

In preparing for a demonstration, as for any other type of lesson, ask yourself first what background knowledge the trainees need in order to understand and learn what you plan to present. See that your trainees have the necessary knowledge before you give the demonstration.

Next, analyze exactly what you are going to do. Make a list of all the equipment and materials you will need. Break the process down into its component steps. Write these steps down to make sure that in your familiarity with the subject you have not overlooked something.

Below is a sample plan for a demonstration for Laundrymen.

PLAN FOR DEMONSTRATION

Subject: Removal of chewing gum from items of uniform.

Background required: Acquaintance with spotting board and spotting tools. Practice in handling spatula, spotting brush, and steam gun. Instruction in correct way to sponge.

Materials:
- Squares of cotton duck (white uniform material) and wool (blue uniform material)
- Spatula, spotting brush
- Blotter or absorbent cloth
- Spotting board and steam gun
- Turpentine
- Hot water
- Detergent
- Dry-cleaning solvent
- Two pans

Preliminary explanation

The base of chewing gum is likely to be chicle gum or paraffin. Sugar and flavoring may also be present. Often a large portion of the gum can be removed mechanically from the surface of the cloth. Next the gum or paraffin that has penetrated the cloth should be dissolved in appropriate solvent. If any sugar stains remain they should be removed by sponging with water, or by washing or dry cleaning, as appropriate.

Demonstration:

A. Removal of gum from washable fabric
   1. Display square of white duck with gum stuck to it.
   2. Place on spotting board and lift off with spatula as much gum as possible.
   3. Use spotting brush to remove as much of remainder as possible.
   4. Spot with turpentine.
   5. Make suds with detergent and hot water in pan, and wash square. (This should remove all traces of gum stain.)

B. Removal of gum from woolen fabric
   1. Display woolen square with gum stuck to it.
   2. Use spotting tools, as before, to remove as much of gum mechanically as possible. (This can be used as a review of the previous part of the demonstration by asking the trainees to tell what should be done next. Remind trainees to use special care to avoid matting woolen fabric.)
   3. Spot with turpentine.
   4. Use steam gun to remove remaining stain; or sponge with water.
   5. Use air to blow material dry.
   6. If any spot or ring remains, rinse in pan of dry-cleaning solvent and dry again. (Spot should now be entirely removed.)

REPETITION AND PRACTICE

Notice that in the demonstration plan above, it is suggested that parts of section B may be used to review section A. To ensure that the trainee retains all steps in a process, it is often best to repeat a demonstration in four stages. These are:

1. The instructor performs the demonstration, carefully explaining each step as he does it.
2. The instructor repeats the demonstration, but this time the trainee tells him how to do each step.
3. The trainee performs the operation, telling at each step what he should do next. (The instructor watches, avoiding interruption unless necessary to prevent serious consequences, but makes mental notes to discuss later.)
4. The trainee practices, at first with close supervision, and later with less and less, as he progresses.

PROCUREMENT OF SUPPLIES

Authorized supplies for ship's service activities at the time new construction and Reserve fleet ships are commissioned are included in the Ship's Store Initial Stock List, prepared by the Navy Resale System Office (NRSO), Brooklyn. Replacements for these supplies as they are used are procured by the supply officer and/or ship's store office. Your part in procurement is to provide information about the items and amounts needed.

Your normal sources of information about supplies and vendors are contract bulletins issued by designated Navy purchasing activities ashore. Consult these bulletins in making up your list of supplies. Vendors listed in the bulletins usually are located close at hand, making purchasing and delivery convenient.

Procure and use standard stock laundry supplies listed in Appendix I. Standard stock items listed in Appendix I are less expensive than commercial items and their use will result in savings that will increase your ship's Welfare and Recreation fund.

Refer to NAVSUP Publication 487 (Ship's Store Afloat) for any additional information.

COMPUTING REQUIREMENTS

In computing supply requirements before departure from home port, personnel in the supply office must take into consideration the following: (1) supplies in storage; (2) time for which supplies are to be stocked; (3) endurance of each item; (4) source from which each item

is to be procured; (5) lead time; and (6) availability of supplies enroute. Your estimates will be more helpful to them if you understand these factors and keep them in mind in making your own calculations. The following explanation of each item will assist you in providing the information the supply officer needs.

Item (1) is determined from inventories and stock records.

The ship's destination and length of the cruise will determine item (2).

The general rule is that, on departure, supplies should be sufficient to last at least 90 days. An important exception to this rule applies to low cube, low weight, and low cost items (deployed load items). These usually are not carried by forward support activities but should be loaded in quantities sufficient to support the ship for the duration of the cruise.

Item (3), endurance, is the length of time it will take you to use a capacity load of the item.

The procurement source, item (4), is important because not all supplies are available from sources in the ship's home port. If it is necessary to procure them from a distant city, it will take longer to get them. If time is insufficient for normal requisitioning and delivery, it may be necessary to initiate the request by telephone or to make special arrangements for delivery. Keep in mind that the supply office is procuring supplies for the entire ship and that they will appreciate your saving them these special jobs, if possible, by making your needs known early.

Lead time, item (5), is the length of time it takes to get the item aboard after it is requisitioned. For you it determines how low you can allow your stock of an item to become before you put in a request for replacements. Never wait until you are out, or nearly out, of an item before requisitioning more. Always be sure you have enough to carry you through the lead time, plus a little more to allow for emergencies.

It is a good thing to know whether supplies will be available enroute, item (6); but for laundry and dry-cleaning supplies, you will not normally rely on such sources. An emergency might arise, however, that would necessitate procuring supplies from other than the usual sources.

ESTIMATING YOUR NEEDS

To estimate supplies needed, you require two sets of facts—(1) the amount of each item on hand and (2) the rate of use. Both types of information are available from the Stock Record Cards (NAVSUP Form 464) on file in the supply office. For example, figure 1-1 is a Stock Record Card for laundry detergent covering a 3-months' period. The card shows that 6 drums of detergent were on hand on 1 January and that 10 drums were issued to the laundry between that date and 1 April. It also shows receipt of 8 drums during the period. So the amount on hand as of 1 April is 4 drums, and the rate of use is 10 drums for the 90-day period. According to this rate, you will need 6 more drums to bring your stock up to a 90-day supply.

Be sure, however, that this rate is typical. Usage data are usually established by taking figures for a 6-months' period. Consider the destination of your ship and the type of assignment, and adjust your estimate accordingly. If the ship is going into a hot climate, for instance, there will be a good deal more laundry than if the weather is cool. If the ship is going to a port where her personnel will be involved in numerous social functions, this also will affect the volume of your work and the endurance of your supplies. The length of stay in such a port will determine how many white uniforms you will have to wash.

OBTAINING SUPPLIES FROM THE STOREROOM

Before supplies can be issued to a service activity from the ship's bulk storeroom, the appropriate form must be prepared and signed by the responsible persons. The form used and the exact procedure differ according to whether or not the ship has a Supply Corps officer assigned as supply officer.

In the discussion that follows, procedures for obtaining supplies for use in the laundry are used as examples. Similar procedures are used to procure supplies for other service activities.

SHIPS WITH SUPPLY CORPS OFFICERS

If the ship has a Supply Corps officer, the laundry supervisor takes or sends a list of supplies needed to the supply office. This list usually is written on a plain sheet of paper, since it is intended only to furnish the information for preparing the form, which is done in

DATE MO.	DATE DA.	VOUCHER NO	REC. FROM EXPEND. TO	RECEIVED	EXPENDED	BALANCE IN BULKROOM OR WAREHOUSE	TOTAL BALANCE
1	1	INV.	B.F				6
1	4	#1	Laundry		2		4
1	30	#3	Laundry		2		2
2	2	801	Laundry	8			10
2	15	#4	Laundry		2		8
3	2	#6	Laundry		2		6
3	30	#7	Laundry		2		4
4	1	INV.	B.F				4

DATE MO.	DATE DA.	VOUCHER NO.	REC. FROM EXPEND. TO	RECEIVED	EXPENDED	BALANCE IN BULKROOM OR WAREHOUSE	TOTAL BALANCE

ACCOUNT: 51000 | UNIT OF ISSUE: 25 LB DR | DEPARTMENT: Cost | LOW LIMIT: As Required | COST PRICE: $6.50 | SELLING PRICE:

ARTICLE: Detergent, Laundry | STOCK NO.: 7930-929-1219 | ORDERED: | CARD NO.:

STOCK RECORD (SHIP'S STORES AND COMMISSARY STORES)— NAVSUP Form 464.

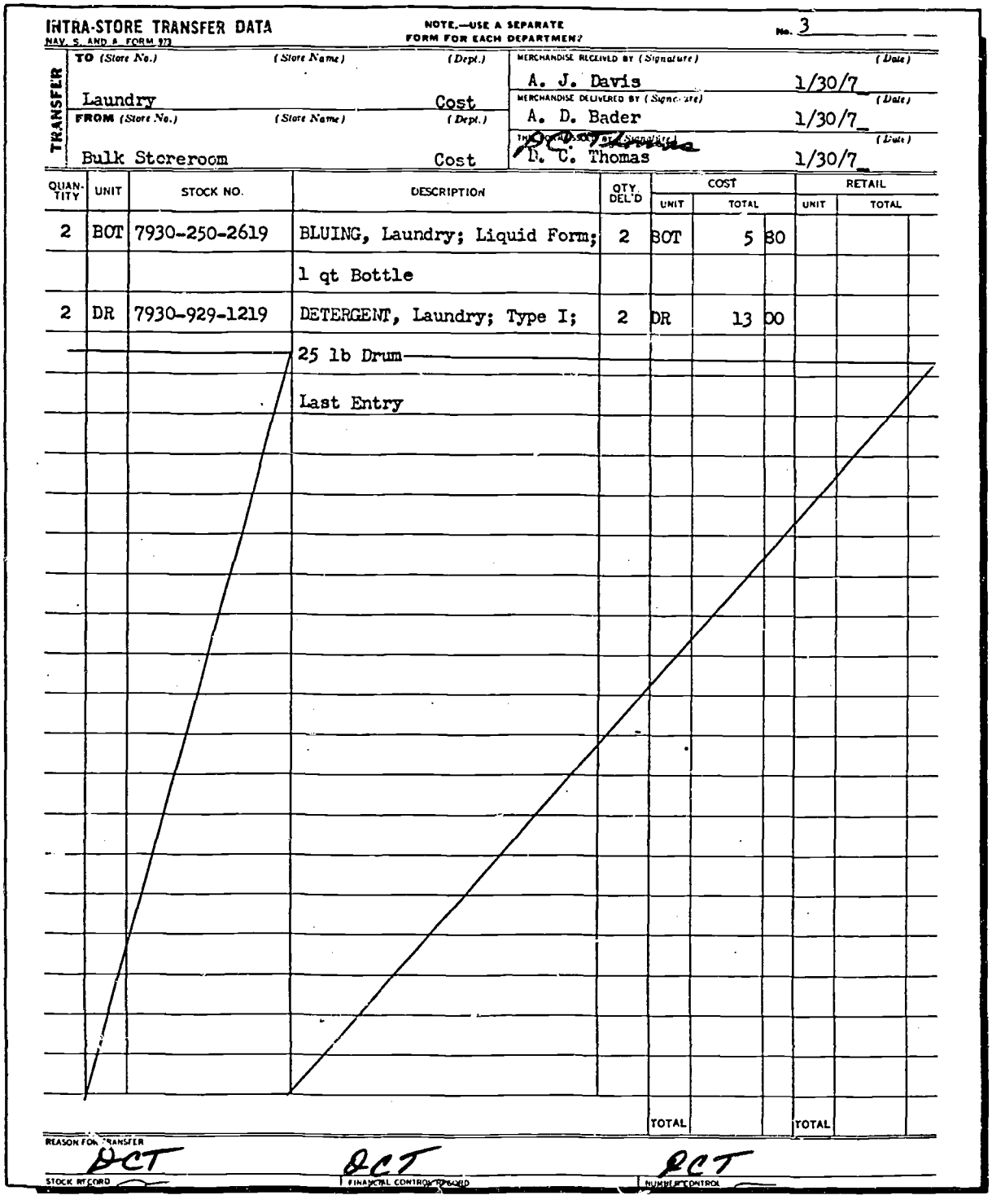
43.25

Figure 1-1.—Stock Record Card, NAVSUP Form 464, showing receipt and issue of laundry detergent.

the supply office. The form used in Intrastore Transfer Data (NAVSUP Form 973), which is prepared in triplicate. (See fig. 1-2.) Upon completion, the form is assigned a number from the Number Control (NAVSUP Form 980). The use of this Number Control is required unless the autographic machine multiple copy is used with the three-part preserialized NAVSUP Form 973. The Form 973 must be signed by the accountable officer or designated officer assistant, or office Storekeeper if so designated.

The original and triplicate of the Form 973 are forwarded to the bulk storeroom, and the duplicate is given to the Laundryman. The Storekeeper in the bulk storeroom indicates on the original and triplicate the amounts issued and signs the original, which he then returns to the supply office. He delivers the supplies to the laundry. There the amounts received are noted on the duplicate form by the Laundryman, who then signs the duplicate and returns it to the supply office. When the signed original and duplicate copies are received in the supply office, the quantities issued are compared with the quantities received. If no discrepancies are noted, the Laundryman signs the original, and the duplicate copy is returned to him. A file of these copies should be kept as proof of supplies received.

When the service activity and the bulk storeroom are operated by the same person, the NAVSUP Form 973 is not prepared for breakouts from the bulk storeroom to the service activity. At the end of the accounting period, one NAVSUP Form 973 is prepared with data taken from NAVSUP Form 464.



INTRA-STORE TRANSFER DATA
NAV. S. AND A. FORM 973

NOTE.—USE A SEPARATE FORM FOR EACH DEPARTMENT

No. 3

TRANSFER

TO (Store No.) (Store Name) (Dept.)
Laundry Cost

FROM (Store No.) (Store Name) (Dept.)
Bulk Storeroom Cost

MERCHANDISE RECEIVED BY (Signature) (Date)
A. J. Davis 1/30/7_

MERCHANDISE DELIVERED BY (Signature) (Date)
A. D. Bader 1/30/7_

THIS ORDER BY (Signature) (Date)
D. C. Thomas 1/30/7_

QUANTITY	UNIT	STOCK NO.	DESCRIPTION	QTY. DEL'D	COST UNIT	COST TOTAL	RETAIL UNIT	RETAIL TOTAL
2	BOT	7930-250-2619	BLUING, Laundry; Liquid Form;	2	BOT	5 80		
			1 qt Bottle					
2	DR	7930-929-1219	DETERGENT, Laundry; Type I;	2	DR	13 00		
			25 lb Drum					
			Last Entry					
					TOTAL		TOTAL	

REASON FOR TRANSFER
DCT DCT DCT
STOCK RECORD FINANCIAL CONTROL RECORD NUMBER CONTROL

43.2

Figure 1-2.—Intra-Store Transfer Data form, NAVSUP Form 973, covering issue of laundry supplies.

SHIPS WITHOUT SUPPLY CORPS OFFICERS

Aboard ships without Supply Corps Officers, a NAVSUP Form 973 is also used to get service activity supplies from the bulk storeroom. The NAVSUP Form 973 is prepared in triplicate. The person receiving the supplies signs the original and duplicate to acknowledge receipt and the issuing Storekeeper signs the original and triplicate. The signed NAVSUP Form 973 is distributed as follows: (1) original to the Navy Finance Center, Cleveland, with the transmittal of vouchers for each accounting period; (2) duplicate to the Storekeeper issuing the supplies; and (3) triplicate to the person receiving the supplies.

The NAVSUP Form 973 is not required when the service activity and the bulk storeroom are operated by the same person. At the end of the accounting period, one NAVSUP Form 973 is prepared with data taken from NAVSUP Form 209.

STORAGE OF SUPPLIES FOR SERVICE ACTIVITIES

Storage space aboard ship usually is limited, so plan before you stow in order to use the space you have as efficiently as possible.

Heavy items used in the laundry should be stowed as near the laundry as possible to prevent unnecessary handling and as a matter of convenience.

Bottled items must be protected from breakage. Stow small items in bins or boxes to prevent loss. Such items as net pins, nets, twine, marking tape, and laundry bags should be kept under lock and key.

Rust remover, marking machine cleaning compound, and other similar items are harmful to the skin, and should be stowed in a location where someone who does not know about their harmful effects will not get into them and injure himself.

Take special precautions when stowing any form of chemicals that are used for spot and stain removal, or for bleaching. Store such items in COOL, DRY locations.

Protect paper from heat and moisture. Textiles, also, must be protected from heat and moisture and direct contact with steam pipes and similar hot objects. Keep liquids covered to prevent evaporation. The solvent in marking ink, in particular, tends to evaporate when the ink is exposed to the atmosphere. Most chemical compounds and soaps, especially soap powder, absorb moisture when exposed to the atmosphere when the humidity is high.

Gold braid, buttons, cap devices, insignia, and rating badges should be kept wrapped separately in nontarnishing paper, when possible. Do not use a rubber band to hold such items together, as all rubber bands and certain wrapping paper contain sulphur, which tarnishes gilt or gold articles, especially braid and thread.

Leather should be stowed in a cool, dry place and inspected periodically. Leather is subject to mildew, especially in a tropical climate; also, leather may become too dry.

CLEANLINESS AND SANITATION

Cleanliness and sanitation are practiced throughout the Navy, and are particularly necessary in service activities. Adherence to the rules of cleanliness is important not only because regulations require it but for the benefit of personnel working in laundry/drycleaning, barbershop, and tailorshop spaces and to those to whom service is rendered.

Unclean spaces reflect upon your supervisory capabilities, create personnel and fire hazards, and are not tolerated by the medical department.

If your space is clean and orderly, it will be reflected in the quality of your work. This can be accomplished only by training personnel to observe clean personal and working habits.

PART II—LAUNDRYMAN

CHAPTER 2

LAUNDRY ORGANIZATION AND MANAGEMENT

You learned in Ship's Serviceman 3 & 2 that a supply department afloat has four components: (1) disbursing, (2) food service, (3) stores, and (4) ship's store. The ship's laundry and the drycleaning plant are under the services branch of the ship's store component. They are services provided by the supply department, by direction of the commanding officer, for the benefit of the ship's crew.

LAUNDRY PERSONNEL

The organization of a ship's laundry varies with the size of a ship. A small ship, for example, may have a Ship's Serviceman 2 in charge of the laundry and two Ship's Servicemen 3 assigned as Laundrymen. These three men receive, wash, and issue clothing. They do everything necessary in the laundry. A large ship, on the other hand, has a much larger laundry organization. A new Navy carrier may have as many as 50 Ship's Service Laundrymen working in the laundry. A guide for determining number of personnel required to perform the laundry function is one laundryman for every 75 men in the crew.

There are more Navy ships with small laundry operations than there are with large laundries, of course; but the purpose of this book is to give you the complete picture of your job in a large or a small laundry, for during your service in the Navy you most likely will have duty in both types.

Figure 2-1 shows the organization of the laundry aboard a large carrier. This is a functional chart showing how the various tasks performed in the laundry are organized and administered. In a large laundry such as this, each section would have its own personnel, although men might be moved from one section to another from time to time to accommodate the workload or to provide training and experience. In a small laundry, all these functions will still have to be performed with fewer personnel and less working space. The result is likely to be a simpler organization chart, with each man performing more kinds of tasks.

Figure 2-2 shows a layout of a laundry on board one of the Navy's new submarine tenders.

LAUNDRY SUPERVISOR

On a small ship, the Ship's Servicemen in charge of the laundry is responsible to his immediate superior for the complete operation. There may be no experienced laundry officer available to provide guidance. On a large ship, on the other hand, the ship's store officer may operate the laundry under the supervision of the supply officer; or he may have an assistant supply officer in charge of the services branch who operates the laundry under his direction. In either instance, however, the supervisor of the laundry has a position comparable to that of a civilian manager or a Navy shore laundry. His responsibilities are many and varied, in accordance with the size of the laundry he supervises.

The Ship's Serviceman supervising the laundry orders supplies, sees that the laundry is kept clean, and that the equipment is properly maintained, assigns and trains laundry personnel, perpares laundry schedules, ensures an even flow of work through the plant, maintains the standard of quality required on the ship, and does whatever is necessary to make the operation efficient. All of these duties are covered fully in various chapters of this text.

OTHER LAUNDRY PERSONNEL

All Laundrymen should be able to do well all work in the laundry, so that emergency situations can be met with minimum shifting of personnel. In other words, if part of the laundry crew is absent for some reason, the remaining members should be able to double up and get the laundry work accomplished satisfactorily.

TRAINING LAUNDRY PERSONNEL

There are good laundrymen in the fleet today, not only because of their natural ability

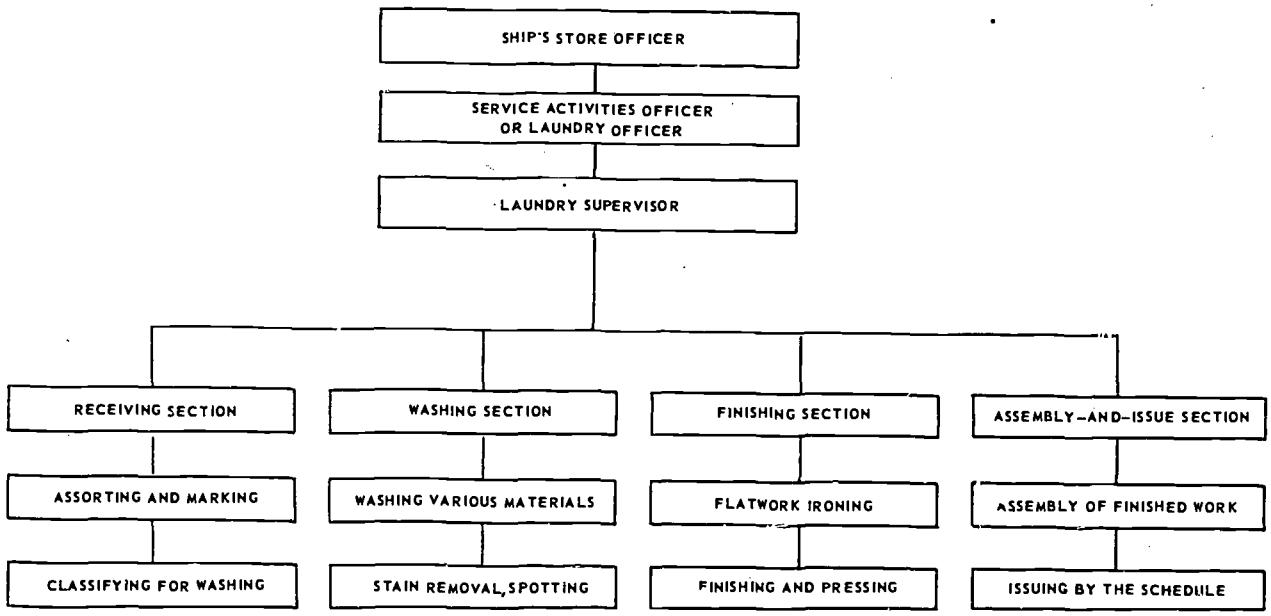


Figure 2-1.—Laundry organization chart for a large carrier.

and previous experience, but because the Navy has given them good laundry training. A trainee who is only mildly interested often comes to take a real interest in learning about his job and in doing things the right way because of the example and instruction of his supervisor. On the other hand, even the best potential laundry operator can be discouraged from using his ability by careless training.

IMPORTANCE OF TRAINING

Throughout part II, the importance of correct operating procedures is stressed along with the consequences of faulty operations. Repeatedly the following facts emerge:

- Laundry and dry-cleaning equipment will not perform efficiently unless operated correctly, and if operated incorrectly it is easily damaged.
- Replacements are expensive and not always easily available.
- An efficiently operating laundry is vital to the welfare and morale of the ship's company.
- The articles being laundered are valuable and often not easily replaced if damaged or destroyed.
- Faulty or careless operation can easily injure operating personnel.

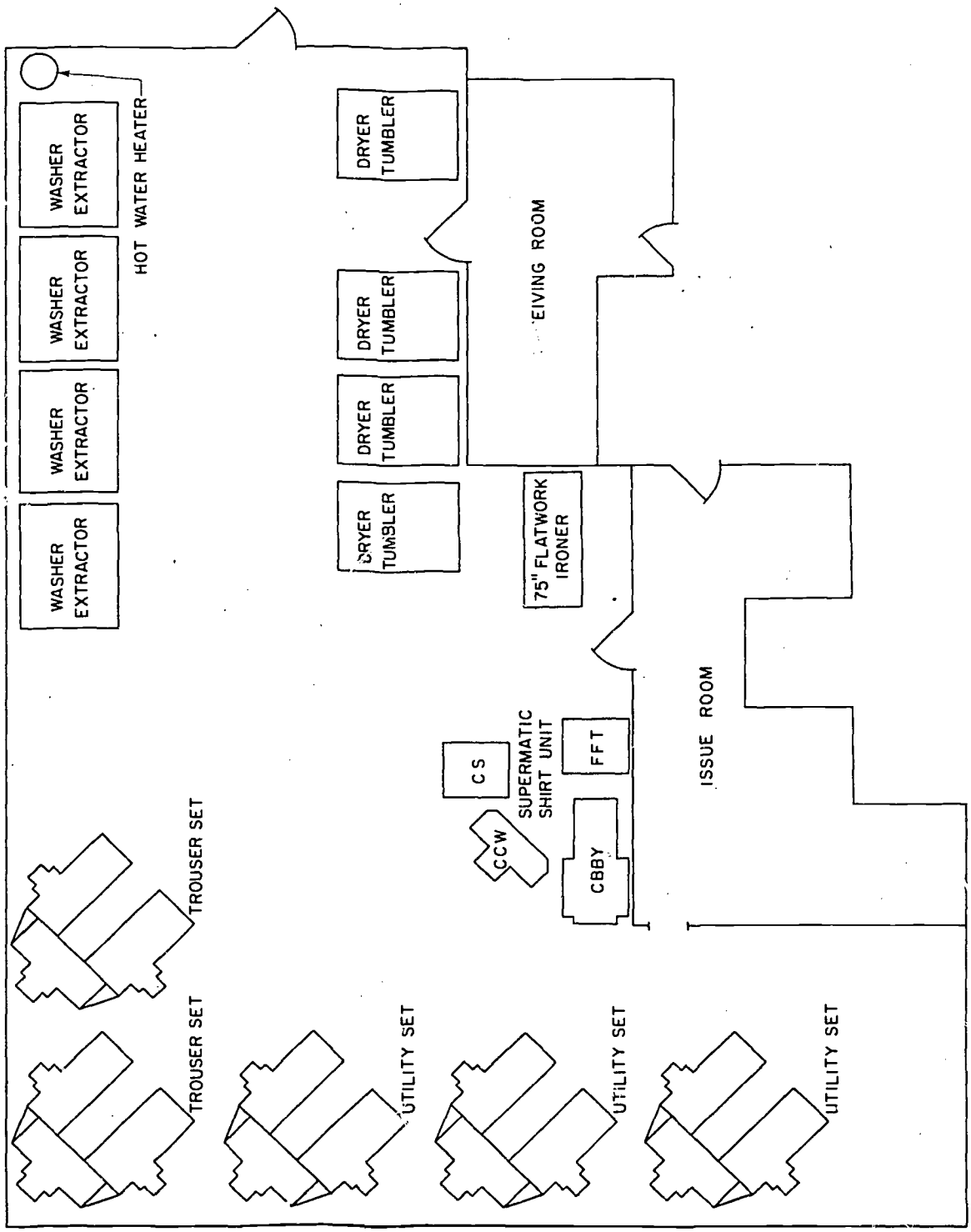
In the face of these facts, training assumes a position of major importance among the duties of a laundry supervisor. Nothing that he does is more important than making sure that his men know how to handle their machines and supplies correctly and form habits of doing their work so as to protect the machines, the articles laundered or cleaned, and their own safety.

The more time you spend on training, the less you will have to spend on troubleshooting and the fewer the mistakes for which you will have to answer. If you expect to meet your schedule and turn out good finished work, it is to your advantage to have your men as well trained as possible.

Training assumes an especially important place among your administrative duties when many of your men are TAD, and on a short tour of laundry duty, as is a normal practice on larger ships.

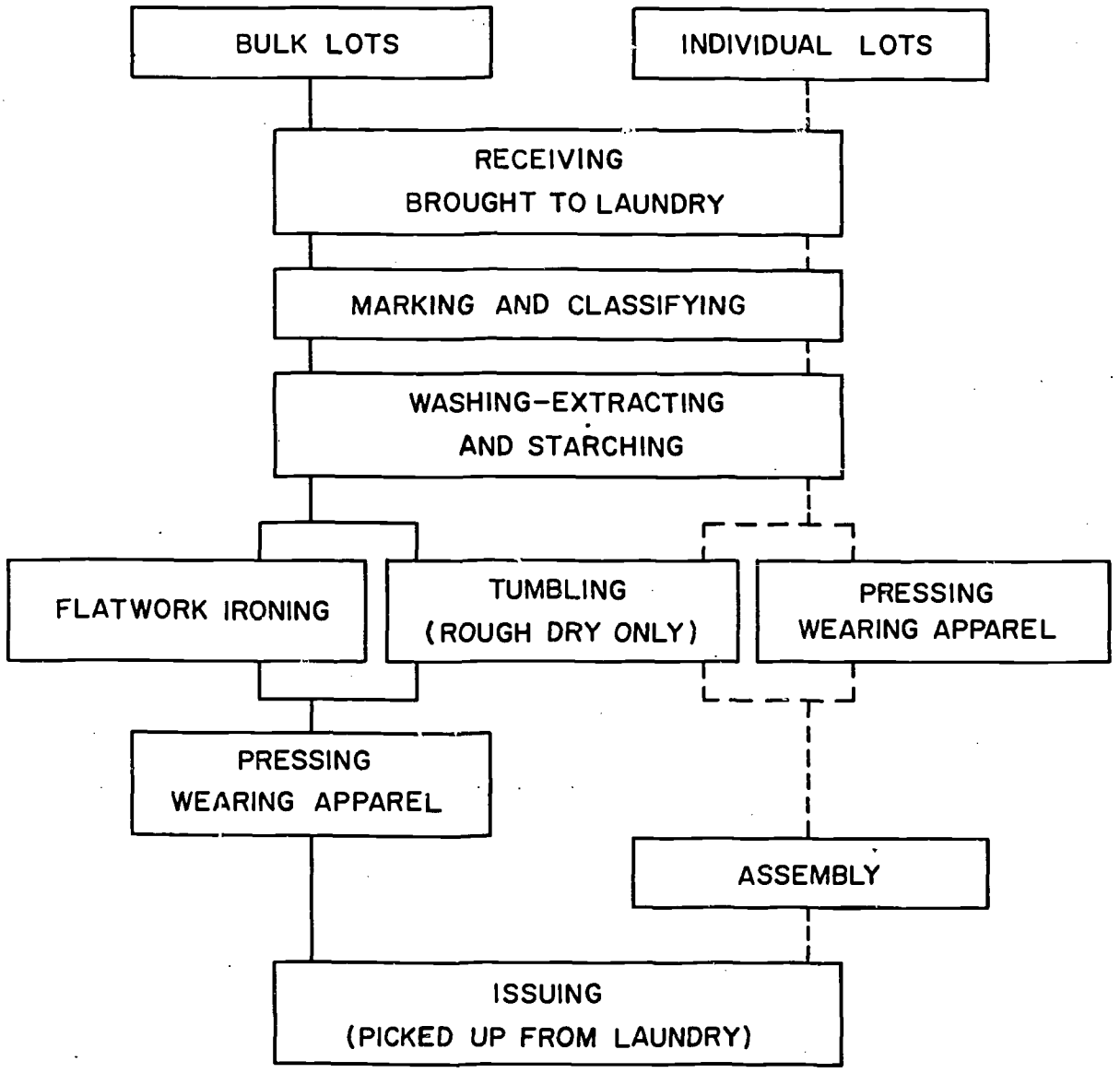
STEPS IN PROCESSING LAUNDRY

Articles to be laundered are delivered to the ship's laundry either in BULK lots or in



155.106

Figure 2-2.—Layout of a laundry on board a tender.



22.3

Figure 2-3.—Flow chart of laundry operations.

INDIVIDUAL BUNDLES. Bulk lots include division laundry (crew's personal clothing), flatwork (both towels and linens from storerooms, officers' and CPO messes, and sickbay), and service laundry (special clothing items of Commissarymen, Stewards, Barbers, Hospitalmen, Messmen, and fountain personnel, such as aprons and work uniforms). Individual lots include officers' and CPO's personal clothing.

Figure 2-3 lists the various steps in processing laundry. The solid black line running from the BULK LOTS block, top left, to the ISSUING block at the bottom shows the steps in processing BULK laundry. The broken line on

the right side of the chart connects all types of work accomplished on INDIVIDUAL LOTS.

Marking, classifying, starching, pressing (in most instances), and assembly are additional steps in the processing of individual bundles. Individual lots do not go through flatwork ironing, but officers', chief petty officers', and crews' flatwork is handled in bulk in the flatwork lots.

Division laundry is handled in bulk, as it is brought to the laundry. Flatwork lots include both towels, which are tumbled, and bed and table linens, which are ironed. Service lots are ironed.

LAUNDRY SHIFTS

The laundry workload, combined with the capacity of the laundry equipment and the number and competence of laundry personnel available, determines how many hours per week the ship's laundry must operate. However, in order to divide the workload equitably among the personnel and to establish normal working hours for them, a laundry is generally operated in shifts.

A laundry shift normally lasts 8 hours. Your laundry may operate one or two shifts per day or even more if the workload requires.

You must have sufficient experienced personnel to man each shift, so that the work you turn out will be satisfactory. If the number of experienced personnel is not adequate to operate the desired number of shifts, laundry strikers should be assigned to assist them; but do not permit strikers to operate machines on their own until they have been properly instructed. Never try to operate an additional shift unless you have enough qualified personnel to serve as supervisors.

LAUNDRY SCHEDULES

The laundry supervisor prepares the laundry schedule for the approval of his immediate superior. Suppose you are a Ship's Serviceman 2 and must prepare a schedule for your laundry. What factors will you use in preparing it? Some that you must consider are:

1. Amount of work which must be processed weekly
2. Capacity of your laundry equipment
   a. Washers, or washer-extractors
   b. Tumbler dryer
   c. Flatwork ironer
   d. Laundry presses
3. Number and competence of laundry crew

Let us now consider these factors and find out why they have a bearing on your laundry schedule.

AMOUNT OF WORK PROCESSED WEEKLY

To get a rough idea of how much work your laundry may be required to process weekly, get the total number of ship's crew and multiply it by 24 (the average number of pounds of laundry which may be expected to be processed weekly for each member of the crew). For example, if your ship has 3000 officers and enlisted men assigned for duty, your laundry workload for each week can be anticipated to average 72,000 pounds (3,000 x 24). It can be anticipated that approximately 70 percent of the work load will require tumbling, 5 percent will require flatwork ironing, and 25 percent will require pressing. Thus, of the 72,000 pounds, 50,400 pounds can be expected to be tumbled, 3,600 pounds ironed, and 18,000 pounds pressed.

CAPACITY OF LAUNDRY EQUIPMENT

The capacity of the equipment determines how much tumbled work can be handled in a day; how much flat work; and how much press work. The capacity of the equipment depends not only on its rated capacity, but also on the efficiency and size of the laundry crew, as you'll learn next. If there are 6 centers of production, for example, and 4 men to operate them, 2 units will be idle at any given time.

SIZE AND COMPETENCE OF LAUNDRY CREW

Laundering is one of the shipboard jobs that must be done whether you have sufficient personnel or not. Your problem will usually be primarily one of scheduling so as to make the best use of the personnel available and to spread the workload as fairly as possible. In doing this, keep in mind that all operations should be SUPERVISED by TRAINED personnel, but that these trained men need not PERFORM all tasks. If your workload is very heavy, a request for additional hands may be granted, but the men you receive will probably be untrained.

Lot	Individuals or Organization	Delivered by	Delivery	Hour of pickup
INDIVIDUAL	Officers and Chief Petty Officers	Stewardsmen	Mon. -Tues. -Wed.	(1000)
		Ind. C. P. O. 's	Th. -Fri. -Sat.	(1000)
		Individuals	Th. -Fri. -Sat.	(1000)
DIVISION (Bulk)	No. 1	Laundry P. O. 's . .	Monday	0800
	No. 2	do	do	1130
	No. 3	do	do	1600
	No. F	do	Tuesday	0800
	No. H	do	do	1130
	No. V	do	do	1600
	No. 4	do	Wednesday	0800
	No. 5	do	do	1130
	No. 6	do	do	1600
	No. A	do	Thursday	0800
	No. C	do	do	1130
	No. E	do	do	1600
	No. G	do	Friday	0800
	No. L	do	do	1130
	No. M	do	do	1600
	No. S	do	do	1600
	No. R	do	Saturday	0800
	No. B	do	do	1130
	No. N	do	do	1600
FLATWORK (Bulk)	Wardroom	Stewardsmen	Monday	1100
	Staterooms	do	Wednesday	1000
	C. P. O. Mess . .	Messmen	Friday	1000
	Sick Bay	Hospitalmen	Tu. -Th. -Sat.	1000
SERVICE (Bulk)	Commissarymen . . .	One of same	Daily	0900
	Stewardsmen . . .	do	do	0900
	Barbers	do	do	1100
	Fountain Men . . .	do	do	1300
	Hospitalmen . . .	do	do	1500

22.64

Figure 2-4.—Sample laundry schedule.

You will then need to work out a schedule that divides your trained men as effectively as possible to direct the work of the others. This may be accomplished by running two shifts or even two shifts with a cross-shift.

If you have insufficient trained men, you will have to provide training. If this must be done hurriedly to handle an emergency, don't try to teach every task to every trainee. Instruct a few in each task and let them rotate later for more complete training. Operation of a well planned training program is, of course, a responsibility of the laundry supervisor. With an adequate training program, you may be able to avoid some personnel shortages.

TIME SCHEDULES

Time schedules for the laundry operation are as follows:

1. INDIVIDUAL WORK will be picked up from the laundry at 1500 on the day following delivery.
2. DIVISION LOTS presented at the laundry at 0800 will be picked up at 1300 on the day of delivery, lots presented at 1130 will be picked up at 1630 the day of delivery, and lots presented at 1600 will be picked up at 1030 the following day.
3. FLATWORK lots will be picked up at 1530 the day of delivery.
4. SERVICE LOTS presented at 0900 will be picked up at 1430 on the day of delivery, lots presented at 1100 will be picked up at 1600 on the day of delivery, lots presented at 1300 will be picked up at 0900 the following day, and lots presented at 1500 will be picked up at 1030 the following day.
5. Late deliveries to the laundry will be processed at the convenience of the laundry and not under the schedule indicated.

SERVICE RENDERED

Services rendered will be as follows:

1. INDIVIDUAL LOTS will be tumbled, except shirts and uniforms, which will be starched and pressed. Undershirts and handkerchiefs will be passed through the flatwork ironer, or tumbled.

DIVISION LOTS will be tumbled except shirts and uniforms which will be pressed as schedule permits.

3. FLATWORK LOTS will include bath towels and flatwork. The towels will be tumbled; and flatwork, such as bed and table linens, will be ironed or pressed when possible.
4. SERVICE LOTS will be ironed on the presses or tumbled, as equipment permits. Work uniforms will be the only personal apparel included in these lots.
5. At the discretion of the laundry, if tumbler production is behind, work to be tumbled will sometimes be run through the flatwork ironer or pressed.

METHOD OF DELIVERY

The method of delivery to the laundry will be as indicated below:

1. OFFICERS' AND CHIEF PETTY OFFICERS' bundles will be processed daily in accordance with the schedules posted in the wardroom and C.P.O. quarters. A laundry list will accompany each bundle. The customer's count should be entered in the proper column.
2. EACH DIVISION will deliver its work in two groups, one containing all white work and one with dungarees and black socks. All division articles will be properly stenciled before delivery to the laundry.

Items to be pressed will be placed in a separate division bag.

3. FLATWORK will be delivered in bulk for each source listed under flatwork lots (fig. 2-4).
4. EACH SERVICE ACTIVITY will deliver its laundry in bulk.

22.65

Figure 2-5.--Sample laundry instructions.

BEST TYPE OF LAUNDRY SCHEDULE

The best type of laundry schedule is the one which best fulfills the laundry requirements of your ship. Some ships' laundries have successfully used daily schedules; that is, they arrange to have part of all laundry from divisions delivered to the laundry each day for processing instead of once or twice per week. The problem of stowing soiled bundles--always a troublesome one—is partially eliminated by the daily schedule. The amount of work-in-process is reduced, and better delivery schedules can be developed. It also eliminates bad odors in living quarters from soiled clothing, and therefore helps morale. On the other hand, the laundry workload on some ships may not justify a daily schedule—the amount of water and soaps or detergents used may be unnecessarily heavy, and equipment may be used more than necessary.

SAMPLE LAUNDRY SCHEDULE

Your laundry schedule should show such things as: (1) type of lot, (2) individuals and groups to whom the lots belong, (3) the men who

deliver the lots, (4) day and hour of delivery, and (5) hour of pickup. Study the sample schedule in figure 2-4. A sample set of accompanying instructions showing typical time of pickup, method of delivery, and service rendered is given in figure 2-5. If preparing a set for your ship, you will, of course, modify it according to circumstances. A ship's laundry schedule should be flexible and varied as shipboard conditions require.

INSTRUCTIONS FOR HANDLING INDIVIDUAL BUNDLES

Bundles received daily in the laundry from officers and chief petty officers are considered as one lot of individually marked bundles. If you have more bundles in the daily lots than available assembly bins, it is best to set up two lots daily. You can then assemble and check out the bundles in the first lot before work from the second lot comes to the assembly bins. Twenty bundles in a lot are easy to handle. Never put more than fifty bundles in one lot.

The number of bundles you should put in a lot will be affected by the classification of the items in the bundles. Classification, about which you will learn more in chapter 3, is the separation of a bundle of laundry according to color, type of fabric, and degree of soil; i.e., white cottons, other white or light-colored fabrics, light cottons with heavy stains, dark-colored cottons, and so forth. Since this classification is made for the purpose of washing like articles together, the largest class in the lot should not exceed the washer capacity (or a multiple thereof).

LAUNDRY LIST FOR INDIVIDUAL BUNDLES

Ship's laundries generally use a mimeographed laundry list (fig. 2-6) to suit their specific needs. Normally, the form contains blanks at the top for the name of the ship, name of customer, rank or rate, file number or service number, date, and laundry mark. There is usually space for a CUSTOMER'S-COUNT column and a PLANT-COUNT column, aligned with the list of articles.

The patron fills in the lines at the top of the laundry list, and enters the number of each article in the appropriate block. He puts the laundry list with his laundry, and turns it over

SHIP'S STORE LAUNDRY LIST
NAV. S. AND A. FORM [illegible] (REV. [illegible]) NO. ______

Name ______

Address ______

Serial No. ______ (Laundry Mark)

Date ______

WEIGHT	LOT	PIN	PIN HDKFS.	PIN SOCKS	MARKER	CHECKER

QUANTITY	ARTICLES		TOTAL
	Aprons, house ☐ cook ☐		
	Bath mats		
	Bathrobes		
	Blankets, cotton, single ☐ double ☐		
	Blankets, wool, single ☐ double ☐		
	Bed pads, small ☐ large ☐		
	Bedspreads, cotton ☐ fancy ☐		
	Belts		
	Blouses, short sleeve ☐ long ☐		
	Cap covers		
	Coats, wh ☐ kh ☐ gr ☐		
	Collars		
	Coveralls		
	Dresses		
	Dungarees		
	Field scarfs ☐ ties ☐		
	Handkerchiefs		
	Hats, white ☐ sailor ☐		
	Jackets, mess		
	Jumpers, wh ☐ dun ☐		
	Laundry bags		
	Mattress covers		
	Napkins		
	Pajamas, cotton ☐ silk ☐		
	Pillow covers		
	Sheets, bed		
	Shirts, wh ☐ kh ☐ gr ☐		
	Shirts, dun ☐ sweat ☐		
	Shower curtains		
	Slips, cotton ☐ rayon ☐		
	Socks, pair, cotton ☐ wool ☐		
	Tablecloths, large ☐ small ☐		
	Towels, bath		
	Towels, hand ☐ dish ☐		
	Trousers, wh ☐ kh ☐ gr ☐		
	Underdrawers, cotton ☐ wool ☐		
	Undershirts, cotton ☐ wool ☐		
	Uniforms, Nurse ☐ Wave ☐		
	Union suits, cotton ☐ wool ☐		
	Washcloths		
	Dry tumble service (No. lbs.) @		
	Bulk work (No. lbs.) @		
	Wet-wash service (No. lbs.) @		
		TOTAL	

22.4
Figure 2-6.—Ship's Store Laundry List.

to a wardroom steward or to the laundry receiving clerk.

HANDLING BULK LOTS

Each enlisted man is responsible for stenciling his own clothing. The laundry petty officer in each division should accept only properly stenciled clothing. Both black and white stencil inks usually are available in the ship's store.

Proper stenciling of clothing ensures its proper distribution from the laundry. Stenciling can be accomplished easily with a small, hard-bristle brush.

LAUNDRY CONTROL LIST FOR THE CREW

If the laundry petty officer wants a control of the items turned in by and returned to each man, he can list all articles sent across the top of a sheet of paper and write the men's names in a column down the left side of the sheet. He should then enter the number of each article sent by each man in the box opposite the name and below the article. When the articles are returned to an individual he should check them off the list. If all articles are properly stenciled before they are sent to the laundry, this type of control will generally be unnecessary.

IDENTIFICATION WITHIN THE LAUNDRY

Your problems of identification are confined to: (1) bulk lots, (division or organization) and (2) items in individual bundles (officers' and CPOs'). Each of these is considered separately in the following pages.

You need a good system in the ship's laundry for identifying and controlling all articles brought to you for processing. In figure 2-7 Laundrymen are at work in the receiving room. One man is checking items in, and the other is marking them with the marking machine. Some finished laundry is visible in the metal bins.

IDENTIFICATION OF BULK LOTS

You do not have to identify individual items in bulk lots brought to the laundry, but you do need to put some type of marker with each lot, so that you can identify it during any phase of processing. You can make your own markers,

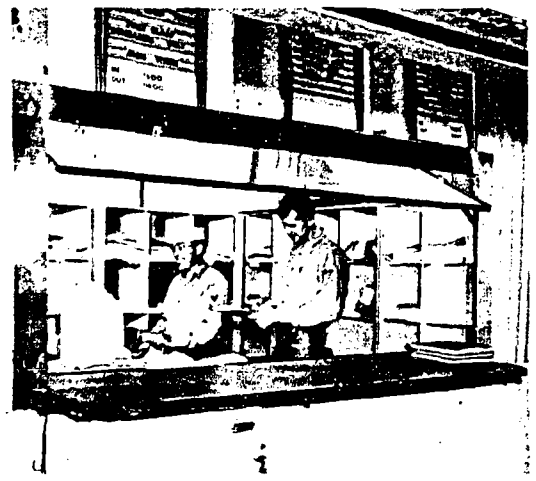


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Figure 2-7.—Laundrymen at work in receiving room.

or flags, from a duck fabric, cut about 8 to 12 inches square and hemmed. Then stencil one marker for each division, service group, or any activity which brings bulk work to you. When bulk lots are brought to the laundry, put the proper identification markers on them. You can use the same markers week after week. Inexpensive squares of washable paper, or fiber in colors, are available from laundry supply houses and are an accepted means of identification.

In the event you are required to split a lot, put the right markers on every part of it. All markers remain with lots and portions of lots during the complete washing and processing cycle. Put the marker in the washer with the load, and identify the load on the shell of the washer with chalk. If it is necessary that you put more than one lot in the washer, to get full capacity, use a proper size laundry net for the smallest lot. When more than one net is required for the same lot, use a marker for each net.

USE OF LAUNDRY NETS

Laundry nets are frequently used for identifying items either in bulk lots or individual bundles. They are open-mesh bags made from cotton or nylon in which the clothes are placed for washing. Nylon nets have generally replaced

cotton nets. They resist chemicals better than cotton and thus last longer. They also increase the payload.

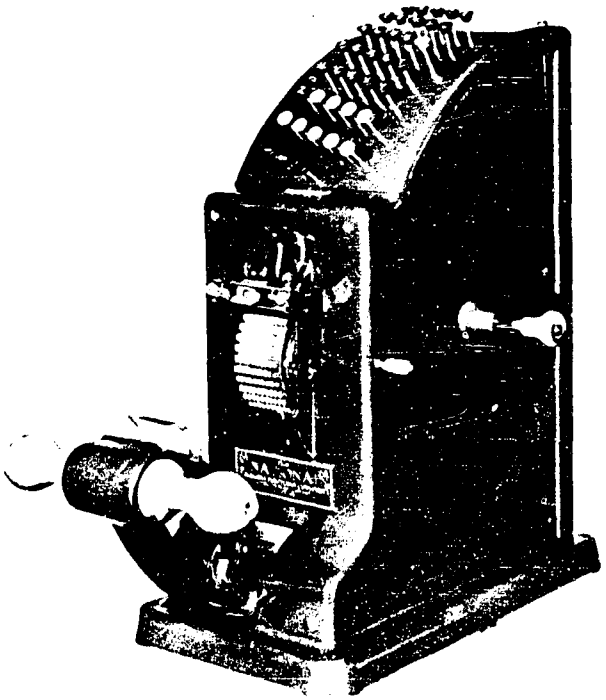
You can do effective washing with laundry nets, provided you do not overload them. You must give the water and soap a chance to get at the clothes in order to remove soil. Check the maximum loads recommended for laundry nets below.

Nets are especially useful for separating small items, such as handkerchiefs or socks from the larger articles. There are two general types of nylon nets—woven and knitted. Woven nets do not stretch and thus retain their size; knitted nets have a tendency to stretch and increase in size. For this reason, their capacities are given within a range, as follows:

Size in Inches	Capacity in Pounds
9 x 15 or 10 x 15	2-4
24 x 36	8-12

IDENTIFICATION OF ITEMS IN BUNDLES

The procedure for identifying items in individual bundles described in detail herein has been used successfully in shipboard operation. You may be able to modify this procedure to fit your own needs. The steps in the procedure are as follows:



22.6

Figure 2-8.—National ink-type laundry marking machine.

1. Work on ONLY ONE individual bundle at a time; this prevents mixing of items from several bundles.

2. Remove the laundry list from the bundle and determine from the individual's name and serial number what the laundry mark will be. This mark is made from the first letter of the individual's surname and the last four numbers (figures) of his file number or service number. For example, the laundry mark for LTJG Albert J. Perry, O12368, would be P-2368; and that of GMC Jesse B. Jones, 530-45-38, would be J-4538. This is the standard type of laundry mark used throughout the Navy.

3. Set the individual's laundry mark on the marking machine and stamp it across the face of his laundry list. Check the mark for accuracy. This list now denotes ownership of laundry in the bundle.

4. Count every article in the laundry bundle and enter the number in the correct block on his laundry list. If your count does not agree with that of the customer, request the senior Laundryman to recheck it. When the senior Laundryman's count is in disagreement with that of the customer, he should enter the correct count on the laundry list, circle the customer's count, and then notify him of the change, through whoever brought in the laundry.

5. Check each article for a correct legible mark. If there is no mark, put ONE ONLY in the proper place (explained later). Do NOT mark such items as bath towels, wet articles, or dark-colored fabrics. Use pronged marking tags on these items. These tags are narrow strips of cloth approximately 1 inch long with metal fasteners in the ends. Push the metal fasteners through the material and press them flat on the other side. Enter the correct identification on the tags.

6. When finished with one bundle, clear the laundry marking machine by setting all type to the neutral position. You are then ready to start on another bundle.

Location of the Laundry Mark

There is a standard spot for the laundry mark on each article. If the mark is correctly placed in this location, the receiving clerk can check items in easily and quickly; and he can also check and assemble finished articles without unfolding them. The locations of laundry marks are as follows:

- DRAWERS.—On the inside of the waist band, left off center of the label.
- HANDKERCHIEFS.—Do NOT mark. Put them in a net and identify with a marked strip tag, placed on the inside or pinned on the outside. Some handkerchiefs are made of fine linen and are expensive. A mark is ugly when used on such articles and exposed to view.
- SHIRT.—On the inside neckband of shirts, at the center, well below the fold of the collar.
- TROPICAL SHORTS.—On the inside waist band of shorts, right side, in line with the outside leg seam.
- SOCKS.--Socks are not marked; instead, marks should be put on a piece of sheeting and then placed inside a standard 10" x 15" laundry net used for washing the socks. The socks should be untied and loose in the net. A separate net should be used for each individual.
- UNDERSHIRTS.—On the inside, one inch to the left of the label.

LAUNDRY MARKING MACHINES

Navy ships' laundries at the present time use two kinds of laundry marking machines: (1) those which use ink, and (2) those which use ribbons. Both types are discussed in this chapter.

INK-TYPE LAUNDRY MARKING MACHINES

One ink-type laundry marking machine currently used in ships' laundries is the National Model 15, illustrated in figure 2-8. This machine prints six or more characters and is operated by type keys. As indicated in the figure, it has eight rows of type keys, which set the type wheels to the desired mark.

A second type of ink laundry marking machine still used in ships' laundries is the LEVER-PRINCIPLE marking machine. It has levers on the top-front of the machine for setting the type wheels to the desired mark. This

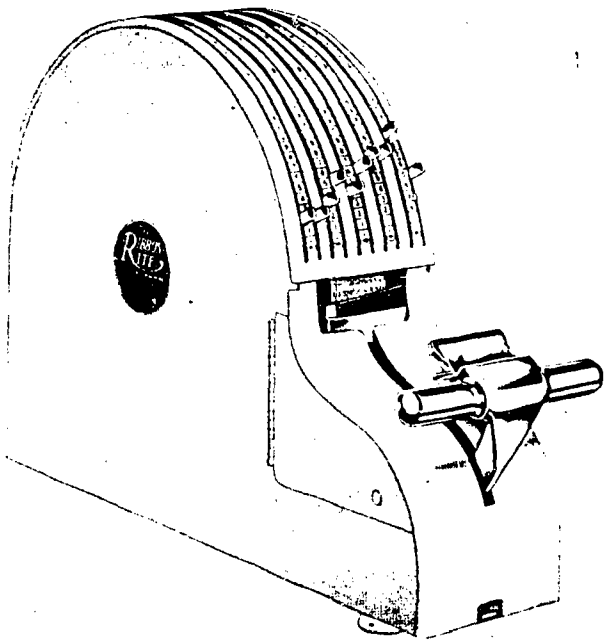


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Figure 2-9.—Ribbonrite laundry marking machine.

is also a National marking machine. It prints six or more characters. This machine uses the same principle of operation as the Ribbonrite machine illustrated in figure 2-9, except that the Ribbonrite uses a ribbon instead of ink.

Setting and Clearing

To set the National Model 15 marking machine, press down and hold with one finger of the right hand the desired type key. With the left hand, push the type setting lever on the left side of the machine until it stops. First release the lever, and then the key. Continue in this manner until you have set up the laundry mark in full. You are then ready to mark items. To clear the machine, push the return lever at the right side as far as it will go.

The procedure for setting a lever-type laundry marking machine is as follows:

1. Start at the left of the machine and move the indicator lever to the first letter of the mark (on front top of machine).

2. Move the second lever to the dash (—), used between the first letter of the surname

and the first number of the service number used in the mark.

3. Continue with the 3rd, 4th, 5th, and 6th levers to set up the last 4 numbers of the service number.

Clear this machine by moving the indicator levers to the BLANK position.

Marking

The procedure for marking laundry is the same for MOST types of marking machines.

1. Put the item to be marked underneath the tension plate and over the platen. The tension plate holds the item in place, so that the laundry mark can be placed exactly where you want it.
2. Raise the printing lever forward with both hands to bring the item to be marked in contact with the type. For best results, use a steady push on the lever.
3. Check the mark for clarity. If it is not clear, bring the lever up a second time. If the mark is not satisfactory now, the machine needs inking.

How to Ink a Laundry Marking Machine

To ink a laundry marking machine, proceed as follows:

1. Press the printing lever slightly toward the marking machine.
2. Lift up on the end pins of the tie bar of the inking arms and remove the ink pad holder. Do NOT remove the sponge rubber on which it rests.
3. With an ink dropper, completely saturate the center of the pad with ink. There should be no white spots left on the pad, but do not use TOO MUCH ink. If you do, remove it from the sides with a blotter.
4. Put the ink pad holder back in position on the inking arm.
5. To ink the upper (contact) pad, press the printing lever toward the machine and contact the type with the lower pad.
6. Raise the upper pad holder and saturate the center of the pad with the ink dropper.
7. Lower the upper pad holder to its normal position.

For the most satisfactory operation, change the ink pad of the marking machine frequently. The lower pad does not require re-inking as often as the upper pad.

Laundry Marking Inks.—There are several types of marking inks, but the type you use in the laundry is for marking cloth only. Follow instructions carefully. It is a fast-drying ink which can be used for hand marking with a pen or on the ink pad of the marking machine.

Stenciling ink is also fast drying, but it cannot be used on a marking machine. It should be used with a stencil. Apply it with a brush or any other suitable applicator.

Indelible ink has been tried for marking clothes. It is unsatisfactory, however, because it is too thin and dries too slowly.

RIBBON-TYPE LAUNDRY MARKING MACHINES

A laundry marking machine which uses a ribbon instead of ink eliminates the probability of getting ink on clothes while marking, or of spilling the ink when handling it for re-inking. Some ships' laundries are currently using the Ribbonrite marking machine, illustrated in figure 2-8. This is the 590-6 model.

The Ribbonrite machine uses the LEVER-PRINCIPLE for setting the mark. The levers are attached directly to the type wheels, each of which contains all numerals and the complete alphabet.

Operating Ribbon-Type Machines

Some things to remember when you are operating a Ribbonrite marking machine are:

1. To prevent wrinkling of the ribbon, keep the printer arm down when you set the type handles.
2. Use both hands to operate the machine. Use a complete stroke and make quick, sharp contact with the article being marked.
3. Unfold shirt collars before you mark them.

CARE AND MAINTENANCE OF LAUNDRY MARKING MACHINES

A certain amount of care and maintenance must be given to laundry marking machines to keep them in good working order and to extend their usefullness.

HOW TO CLEAN INK-TYPE LAUNDRY MARKING MACHINES

The recommended procedure for cleaning a laundry marking machine is given by steps. Type wheels, in particular, must be kept clean.

1. Brush ink from the type several times a day before it hardens. The manufacturer of the machine provides a type-cleaning brush.

2. Remove the type wheels once per week and soak them overnight in a special cleaning compound. Proceed as follows:

a. Remove the inking arm tie bar.

b. Remove the four screws which hold the front plate and then take it off the machine.

c. Use the return lever on the right side of the machine to set all type wheels on BLANK.

d. Loosen the screw on the left side of the machine which holds the type wheel shaft in position. Hold the type in the left hand and use the right hand on the nickel-plated knob on the right side of the machine to pull out the type wheel shaft.

e. Leave all type wheels in the drum. Secure them in the drum with a long string.

f. Put the type wheels and the drum in the cleaning solution for an overnight soaking. Let the string hang over the side of the container which holds the cleaning solution, so that you do not have to put your hands into the solution to remove the type wheels.

g. The next morning, take hold of the end of the string wrapped around the type wheels and remove them from the cleaning solution.

h. Put the set of type, and the drum, under a hot water spigot to remove the dissolved lint and ink from the type wheels. The water pressure should be strong.

i. If after this procedure any ink or dirt remains on the type wheels, use the brush to finish the cleaning.

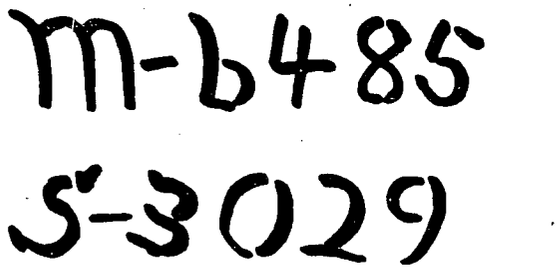
j. Put the type wheels back into the machine in the same manner as you took them out, in reverse order.

CLEANING THE RIBBONRITE MARKING MACHINE

Keep all parts of the marking machine clean, type faces in particular. Proceed as follows:

1. Bring the type levers to the full FORWARD position.

2. Depress the clip on the back of the cover (bottom) and unlock it in front.



22.8

Figure 2-10.—Pen marking.

3. Raise the index handles to bring the type into the most accessible position and clean it with the wire brush provided by the manufacturer for this purpose.

4. Another way to clean the type is to remove the type assembly and use a steam gun. To remove the assembly, take out the pin inserted through the shaft channels over the shaft.

LUBRICATION OF MARKING MACHINES

Type wheels of laundry marking machines must be oiled regularly. If they work hard or screech, they need oil. Care must be exercised in oiling, however, to prevent oil from getting on the type and ink pad. The oil will wash out marks made by type.

Two things are important in oiling the type wheels: (1) position of the wheels at the time of oiling, and (2) the instrument used to put the oil in the proper place. There is a little V-shaped groove on each side of the opening in the front cover plate of the machine through which the type wheels come out when you are using the machine. When the wheels are in proper position for oiling, this V-shaped groove lines up with another V-shaped groove in the type wheel drum.

Do not squirt oil on the wheels, or down between them. Use a pipe cleaner in this manner:

1. Put a few drops of oil on the pipe cleaner and place it in the groove, full length.

2. Next move the type setting lever, so that each type wheel will revolve over the pipe cleaner. This procedure lubricates the type wheels at the point where they rub on the drum.

There is a pin on the side of the type wheel drum which fits into a recess on the front cover of the machine. Its purpose is to keep the drum

from rotating in the machine, and it also keeps the oil groove in the type drum in the right position for oiling. Be sure this pin is always in the recess provided for it.

REPLACING PARTS

When parts of the machine become worn, they should be replaced with new ones. Keep a supply of the most used repair parts on hand. A manufacturer's instruction manual is furnished for each laundry marking machine. The mechanic who works on the machine should also have a copy of this instruction book. Do not try to replace a broken type wheel, or do any mechanical work on the machine, unless it is absolutely necessary. Always request that the work be accomplished by a trained man from the engineering department.

PEN MARKING

An ordinary penholder may be used for pen marking. The marking penpoint is turned up on the end. The point is flat and is at an angle with the length of the point. There is no hole in the slit of a marking pen.

In marking with a pen, wrap the material around the first two fingers and hold it secure with the thumb and third finger, or place it flat on a table or any smooth surface and hold it tight with the fingers.

Dip the pen in the marking ink and get enough ink to mark six or seven letters, no more. If there is an excessive amount of ink on the pen it will cause smearing.

Hold the penholder between the thumb and the index finger, almost at a right angle with the material. Then pull downward, toward the palm of the hand, with the penpoint in contact with the material. Make straight lines with a slight back-hand slant. Use as many downward strokes as necessary to complete a letter or number. See figure 2-10.

This discussion of the ships' laundry has been general. It has attempted to give the Ship's Serviceman supervisor of a laundry examples of laundry organization, laundry schedules, and methods and procedures of operating. The organization and management of the ship's laundry varies with different types of ships. In a sense there is no real standard organization, or standard operating procedure, which will work for all laundries or even for any laundry under all conditions. The schedule of laundry work, as you learned, will vary in accordance with the needs of the ship, as will many of the methods and procedures. On your ship, most of what has been discussed in this chapter may be applicable; on other ships, variations in procedure may be necessary. You and your immediate superior will have to decide what is best for your laundry.

CHAPTER 3

FIBERS AND FABRICS

A Laundryman is concerned with fibers and fabrics. When he launders or dry cleans a particular fabric he must know what fibers compose it and how they are affected by soap solutions, dry cleaning solvents, and such conditions as light, heat, moisture, and mechanical action. He must know which fabrics should be washed, and which should be dry-cleaned; and what cleaning processes are suitable for various fabrics. He must know, for example, what type of soap or detergent is suitable for washing cotton or linen, and which is best for wool or silk. At times he may have to wash or clean fabrics made with synthetic fibers, or a mixture of different fibers. In this case, he must know what soaps or detergents are safe for washing, or if it is dry-cleaned, what chemicals and procedures to use.

In this chapter you will learn how fibers and fabrics are classified. You will also learn how fibers may be identified, and how they are affected by such things as acids, alkalis, oxidizing agents, sunlight, heat, moisture, and mechanical action.

A fiber is a slender, threadlike structure which can be processed directly (felted) into cloth, or spun into yarn or thread (several yarns twisted together), which in turn may be woven or knitted into cloth. A fabric is a woven, knitted or felted cloth. There are many different fibers and fabrics, as you will learn in the next paragraphs.

CLASSIFICATION OF FIBERS

Our classification of fibers takes into consideration their origin and chemical composition. As you will learn in chapter 4, the chemical elements in fibers determine what procedures you must use to wash and clean them. The different classes are:

1. Natural:
   a. ANIMAL.—Animal fibers have their origin in animal life and include wool, hair, and silk. The chemical substances in these fibers are mainly proteins.
   b. VEGETABLE.—Vegetable fibers have their origin in plant life, and the ones with which you will be concerned most in the laundry are cotton and linen. Hemp, jute, and sisal, however, belong in this class. The content of vegetable fibers is primarily cellulose.
2. Manufactured:
   a. MINERAL.—Mineral fibers are made from fine strands of glass or metal. Molten glass or metal is forced through spinnerets (fine jets) to make the strands. Tinsel thread, asbestos, fiberglass, and steel wool are examples of mineral fibers.
   b. RAYON.—Rayon is put in a class by itself because it is not a true synthetic. It is manufactured from such natural fibers as cotton or wood, as explained later.
   c. SYNTHETICS.—True synthetic fibers are built up from various chemical compounds. Nylon, dacron, orlon, dynel, and vicara are a few types. The process for manufacturing is essentially the same—liquid solutions are forced through spinnerets to form fine fibers, or filaments—in each case, with slight variations, which are explained in the discussion for each kind of fiber. (See fig. 3-1 for further information on manufactured fibers.)

CLASSIFICATION OF FABRICS

Fabrics differ from one another in basically two respects: first, in the type of fiber or fibers which compose them, and second, in the method or process by which they are fabricated. A fabric may be made of all cotton, linen, wool, silk, or other fibers discussed above, or it may be a combination of two or more different fibers. Moreover, the fiber or fibers used in its fabrication may have been woven, knitted, or felted to produce the fabric. In identifying fabrics on the basis of their fiber composition, we speak of FIBER CONTENT, in which each

Fiber	General Information	Chemical Composition
RAYON:		
Viscose	Begins to decompose in the 350-400°F. range. Weaker when wet by about 55%.	Regenerated cellulose made from wood pulp or cotton linters, caustic soda, carbon disulfide and sulphuric acid.
Cupra-ammonium	Stretch spun. Weaker wet than dry by 45%. 20 million lbs. produced yearly.	Regenerated cellulose made from cotton linters, copper sulfate, ammonia and sulfuric acid.
Cordura	A high-tenacity rayon	
Fiber E	A special high-tenacity rayon used in carpeting, drapery and upholstering fabrics.	
ACETATE:	Fuses and shines at 100 lbs. steam pressure. Soluble in acetone and glacial acetic acid. Weaker when wet by about 40%.	Cellulose acetate made from cotton linters, glacial acetic acid, acetic anhydride and acetone
Estron	A generic name like rayon or nylon.	
POLYAMIDE:		
Nylon	A polyamide. Melts 450° -480° F. Melted and spun. Soluble in concentrated formic acid, and in hydrochloric acid. About 11% weaker when wet.	Hexamethylene diamine and adipic acid
ACRYLIC:		
Orlon	Acrylic polymer. Melts at 450°F. Soluble in dimethyl formamide. Loses 8% of strength when wet.	Acrylonitrile. Splendid resistance to weathering and chemical attack
Dynel	Acrylic co-polymer. Melts at 275°F. Softens at a lower degree than 275°F. Produced as white and dope-dyed staple.	Acrylonitrile 40% and vinyl chloride 40%
Acrilan	Acrylic co-polymer. Acrilan CN-33 is the code name of a new type of fiber with better dyeing qualities.	Acrylonitrile 45% and vinyl acetate 15%
X-51	Acrylic co-polymer	Acrylonitrile and methyl methacrylate

22.67.1

Figure 3-1.—Manufactured fibers.

Fiber	General Information	Chemical Composition
POLYESTER:		
Dacron	Polyester. Melts at 450°-480°F. Spun while molten and stretched. Made as Terylene in England and Canada.	Synthetized from terephthalic acid and ethylene glycol, producing polyethylene terephthalate.
PROTEIN:		
Vicara	Corn protein. Not affected by temperature up to 350°F. Melts at 470°F. Not affected by alkalies. Can be bleached with acidified sodium chloride	Corn protein dissolved in caustic soda, purified and reprecipitated as fiber in acid bath. Hardened with formaldehyde. Blended with wool and other fibers.
Adril	A product made from peanuts	
GLASS:		
Fiberglas Vitron	Glass. Has wide industrial usage. Will not burn. Strength begins to decrease at 600°F.	Color obtained by coating fiber with resin or protein film and coloring the film by dyeing or printing. Used in curtains and drapes. Cannot be machine washed.
POLYETHYLENE:		
Wynene Reevon	Polyethylene. Shrinks at 156°F. Softens at 225-235°F.	Used in upholstery, shoe, filter, and handbag fabrics.
POLYVINYL:		
Saran Velvon	Polyvinylidene co-polymer. Melts within the 240-280°F. range.	Vinyl chloride 15% and vinylidene chloride 85%. Used for covers and similar materials.
Vinyon N	Same properties as dynel but is a filament, not staple. Used for fisherman's nets, filter cloth, thread, and so forth.	Acrylonitrile 40% and vinyl chloride 60%
Vinyon HH	Co-polymer of vinyl chloride and vinyl acetate. Shrinks at 150° F. and melts at 260°F.	

22.67.2

Figure 3-1.—Manufactured fibers—continued.

fiber used is expressed in terms of the percentage comprising the fabric; e.g., 40% wool-60% cotton. In identifying fabrics on the basis of the process used in their fabrication, we employ the following basic classification:

1. WEAVE—A fabric formed on a loom by interlacing yarns or threads placed crosswise to each other. The fundamental weaves are plain, twill, and stain. All other weaves, no matter how intricate, use one of these basic weaves in their composition. There are many variations on the basic principle which make different types of fabric surfaces and fabric strengths.

2. KNIT—A fabric formed by interlocking series of loops of one or more yarns. Originally done by hand, it is now turned out by machine in mass production. Basic knits include the plain, stockinette, and rib knit.

3. FELT—A Fabric built up by the interlocking of fibers by a suitable combination of mechanical work, chemical action, moisture, and heat, without weaving or knitting.

FIBER IDENTIFICATION

It is the first method of classifying fabrics. that of fiber content, with which you as a Laundryman will be primarily concerned. There are several ways to find out what fibers compose a fabric. First, read the manufacturer's label on the garment, if there is one. It specifies the fiber content of the fabric and you can depend on its accuracy. Second, you can tell to a limited extent what fibers make up a fabric by its appearance and feel. This method of identification, however, is not very accurate, though you can use it with some competency through experience. Third, the most positive method for identifying types of fibers is a laboratory analysis of the fabric. Such a test, of course, is impractical aboard ship, so you'll have to use some other method to check fibers in a particular fabric. This method, the fourth one, is the BURNING TEST.

To make the burning test, pull a thread or two, or clip a small piece of fabric from an unexposed seam of the material and unravel the yarns in the piece. Then test each type of yarn by holding one end and burning the other end with a match. By observing (1) the way in which the fiber burns, (2) the odor given off in burning, and (3) the appearance of the ash, and comparing observations made with the burning test chart, you will have an adequate indication as to the identity of the fabric you are handling. See figure 3-2 for the burning test chart.

HOW LAUNDERING AND DRYCLEANING AFFECT FIBERS

Unless you take precautions, one or more of several kinds of damage may be suffered by a fabric during the washing or cleaning process. Among these are loss of tensile strength, loss of color, shrinkage, and felting. Some kinds of damage may be caused by using too strong a chemical, or the wrong chemical. The fibers can also be damaged by excessive water temperatures, too much mechanical action in the washer, too high ironing or pressing temperature, and careless handling.

The discussion in the following pages is designed to show you how the laundering process affects different types of fibers.

COTTON AND LINEN FIBERS

Cotton and linen are grouped together in this discussion because their laundering characteristics are practically the same—their reactions to chemical cleaning agents are similar.

The cotton fiber is a flat, twisted ribbon with thickened edges. It is obtained from the white protective hairs that cover the seeds of the cotton plant. The length of a fiber varies from 3/4 to 2 1/2 inches. A cross section of a cotton fiber under a microscope shows that it is a collapsed tube with an inner canal, which absorbs and retains acids, alkalis, and soaps, and thus makes the job of rinsing more difficult.

Chemically, cotton consists almost entirely of cellulose, which is a carbohydrate composed of carbon, hydrogen, and oxygen.

Linen is obtained from the stalks of the flax plant and is one of the earliest known textile fibers. A linen fiber appears as a straight, smooth rod with a bamboo-like structure, which is due to cross markings on the fibers. These cross markings indicate that fibers have been joined together. One fiber may be as much as 3 1/2 feet in length. It is stiffer and straighter than a cotton fiber, and it also has more luster and strength. It is a good conductor of heat, and for this reason linen fabrics are desired for summer clothing. They readily conduct body heat to the atmosphere.

All mineral acids—hydrochloric, sulphuric, and phosphoric—are harmful to cotton and linen fibers. At full strength, they destroy the

Fiber	How it Burns	Odor	Appearance of Ash
PURE SILK	Small flame; will not smoulder after flame is out.	Burning feathers	Round, black bead that will not pulverize
WEIGHTED SILK	Will not burn after flame is removed; it chars.	Burning feathers	Leaves skeleton ash which glows like red-hot wire in a flame.
WOOL	Sizzles; small flickering flame. Will not smoulder when flame is out.	Burning hair	Irregular, black brittle ash
COTTON	Yellow flame of more intensity than silk or wool but less than rayon; smoulders with creeping ember.	Burning paper	Small, fluffy-gray ash
CELLULOSE ACETATE	Fairly rapid flare. Do not hold in flame but close enough to get melting effect.	Sharp, acrid odor	Hard, black bead that cannot be pulverized
NYLON	Goes out as soon as flame is removed.	Burning sealing wax	Hard, amber-colored bead that cannot be pulverized
ARALAC	Similar to wool	Like wool	Like wool
REGENERATED RAYON	Very rapidly; sometimes leaves creeping ember.	Burning wood	No ash

22.68

Figure 3-2.—Burning test for fibers.

fibers, but in weak solutions they can be used safely. If you have occasion to use mineral acids on cotton and linen, be sure to rinse them completely from the fabric to prevent subsequent damage.

Cotton and linen fibers withstand well the oxidizing effect of laundry bleaches when used in controlled amounts. Alkalis used in soaps have little or no ill effect on them, but they should be rinsed thoroughly from the fabrics after washing is completed. High temperatures do not ordinarily affect cotton and linen fibers, although they often do affect colors.

WOOL FIBERS

The best wool fibers come from lambs approximately 8 months old; technically, however, wool includes any soft hair. For example, mohair comes from the angora goat, and alpaca comes from the llama and the camel. Rabbit hair is also classed as wool.

A wool fiber is wavy and has a scaly surface. The scales latch onto each other and cause wool fabrics to felt and shrink when subjected to heat, too much mechanical action, or alkaline solutions.

Wool fabrics are of two kinds, woolen and worsted. Woolen fabrics are made from short, loosely twisted wool fibers. Worsteds are made from smooth, long hand-twisted wool fibers. Ordinary wool fabric has a nap on the surface, but a worsted has no nap.

Woolens are not normally damaged by the acids mentioned above, nor by most mild cleaning solutions. Strong alkalis destroy wool, and ordinary laundry bleach turns it yellow. High temperatures damage wool. Too much mechanical action during the washing process is also detrimental.

RAYON

Rayon is produced from the cellulose of cotton or wood. The cotton fibers, or wood pulp, are treated with caustic soda, filtered, and mixed with carbon disulfide. This solution is then aged for a definite period and forced through spinnerets to form fibers.

When wet, rayon is ductile and subject to damage when tension is applied to the fabric. It holds up well under temperatures as high as 400° F. It can be washed in a fairly strong alkali and is not affected by laundry bleaches and sours.

CELLULOSE ACETATE

Cellulose acetate is made from cellulose and acetic acid. At one time it was called by the same name as rayon, but is now classified separately because it reacts differently. Unlike rayon, cellulose acetate dissolves in acetone and glacial acetic acid, and it will melt under a hot iron or in a hot dryer. It is about 40 percent weaker when wet.

NYLON

The elements in nylon are adipic acid and hexamethylene diamine. When the filaments come from the spinnerets they are twisted to form yarn, which are then stretched by running over a system of rollers to strengthen them.

Nylon is used in shirts, nurses' uniforms, sail cloth, parachute cloth, loading nets, socks, underwear, and so on. Because of their strength, nylon fibers are used frequently with other fibers to make a strong fabric.

When wet, the strength of nylon is reduced by approximately 11 percent. It is soluble in concentrated acids, but withstands temperatures up to 450° F. although distortion of the fabric will occur in the 200° F. range. Colored nylon fibers blended with wool sometimes bleed their color on the wool fibers because they dry rapidly and draw water from the wool fibers.

DACRON

Dacron is made from terephthalic acid and ethylene gycol. It is used in shirts, ties, blouses, curtains, socks, sweaters, and with many different fibers to form blends. Dacron and wool, for example are used rather extensively in suits, to improve the appearance and reduce wrinkling.

A satisfactory ironing temperature for dacron is 275° F; but when it is heat-set to prevent shrinkage, it can be ironed at lower temperatures. It melts at a temperature around 480° F. It is highly resistant to most chemicals used in the laundering process, and is just about as strong wet as dry. Unlike nylon, it shows very little heat yellowing. It can recover from wrinkling. It absorbs much moisture but dries quickly. Unlike cotton or rayon, however, it loses strength if exposed too long to sunlight.

ORLON

Orlon is used for shirts, suits, lingerie, curtains, sportswear, rainwear, and in various blends with wool and other fabrics. One effect of this blending is to strengthen the fabric; for example, a fabric of 75% wool and 25% orlon is stronger than a fabric of 100% wool.

Orlon resists wrinkling in use, although it will form wrinkles in an extractor. A blend of 50% wool or acetate, and 50% orlon has the ability to resist and/or recover from wrinkling, as does a blend of 80% orlon and 20% cotton.

Orlon fibers are not affected by common laundry supplies. Sunlight and atmosphere have little effect on them. Shrinkage in boiling water is low and, if properly heat-set, they will not shrink further when pressed. They have a low moisture pick-up and dry rapidly, but they have a tendency to turn yellow when pressed at 300 to 330° F. Industrial orlon fabrics resist heat, weathering, and industrial acids. For this reason, they are good for such things as awnings,

Fiber	Detergent at Laundry Concentration* pH 10.0 to 11.2	Bleach at Laundry Concentration of 100 Parts Per Million	Laundry Sour at pH 5.0	Effect of Pressing (100 pounds steam pressure gives pressing temperature of 338°F.)	Stoddard Solvent and Perchlorethylene	Effect of Sunlight
Acetate	Resistant	Good bleaching agent	Resistant	Shines at about 275°F. Sticks to iron at 350°F. to 375°F.	Resistant, but is soluble in acetone, phenol, and glacial acetic acid (1)	More resistant than viscose, but is degraded by sunlight
Acrilan	Resistant	Of no value (see 2)	Resistant	Sticking point 455°F.	Safe to use	Loses strength gradually
Cotton	Resistant	Good bleaching agent	Resistant	Starts to decompose at 302°F. Not harmed on press as evaporating moisture cools fabric	Resistant. Cotton should be washed, not dry cleaned	Loses strength gradually
Dacron	Resistant	Of no value	Resistant	Melts at 480°F.	Safe to use	Loses strength gradually
Dynel	Resistant	Of no value	Resistant	Fusing starts at about 246°F.	Safe to use. Soluble in hot acetone and in dimethyl formamide	Darkens. Some strength loss
Nylon	Resistant	Of no value	Resistant	Yellows at 300°F. Melts at 482°F.	Safe to use. Soluble in concentrated formic or 20% hydrochloric acid	Good resistance for bright yarns; less for semi-dull
Orlon	Resistant	Of no value	Resistant	Yellows at 300 to 330° F. Sticking point 455 to 480°F.	Safe to use	Resistant
Vicara	Resistant	Acidified sodium chlorite is required. Laundry bleach chlorinates and yellows Vicara	Resistant	No effect up to 350°F. Melts at 470°F.	Safe to use	Loses strength slowly
Viscose	Resistant	Good bleaching agent	Resistant	Decomposes at 350 to 400°F.	Safe to use	Loses strength gradually
Wool	Resistant up to pH 10.5 at laundry concentrations. Soluble in hot 5% potassium hydroxide solution.	Chlorinates and yellows wool. Hydrogen peroxide or sodium perborate are satisfactory bleaching agents	Resistant	Decomposes at 266°F.	Safe to use	Loses strength gradually

* The pH Scale measures the activity of an acid or base in a solution. This is explained in full in chapter 4.
(1) Fortisan is insoluble in acetone
(2) The acrylic fibers are bleached with hot acidified sodium chlorite solutions under mill conditions. Method is not recommended for laundry use because of chlorine dioxide fumes that are released.
(3) The acrylic fibers are soluble in dimethyl formamide

Figure 3-3.—Fiber laundering characteristics.

DYNEL

Dynel fabrics are used in blankets, draperies, knit sweaters, and in blends with other fibers. Because they resist alkalis and acids, they are also used to make shirts and coveralls for men who work with chemicals.

Dynel dries very quickly and is fire-resistant. It is warm, and is as strong wet or dry. It resists clothes moths and carpet larvae, and is not affected by mildew or fungus growths of any nature. Most chemicals used in washing have no effect on it. Dynel resists sunlight. In dry cleaning it can be spotted with any of the usual chemicals except acetone, which dissolves the fibers.

Boiling water does not affect dynel fibers, but a pressing temperature higher than 240° F. results in serious shrinkage. Dynel hose cannot be dried on closed steam-heated stocking forms, as the forms shrivel them.

ACRILAN

Acrilan fibers are made by forcing a mixture of 85% acrylonitrile and 15% vinyl acetate through spinnerets. They are light cream in color and have a semidull luster. They are used principally in blends.

Acrilan fibers do not shrink when heat-set. They have good resistance against chemicals used in the laundry, and also against moths, mildew, and sunlight. Because of their moth resisting quality, acrilan fibers are used with wool fibers to increase the usefulness, or life span of the cloth.

GLASS FIBERS

Glass fibers are made by forcing molten glass through spinnerets with steam under high pressure. The fibers, about 9 inches long, are passed through a burst of flame to evaporate moisture and are then gathered on a revolving drum. The accumulation of SLIVER (as it is called) follows grooved wheels and is wound on revolving spools. Spinning and weaving are then carried out on ordinary textile machinery.

Because they do not burn, glass fibers are used for curtains and drapes, gloves, and various other articles.

Never wash glass fibers in the washing machines. The recommended procedure for washing is to soak them in water in which a mild soap has been dissolved. You may dunk the material in water, but DO NOT rub it. Rinse in clear water to which you have added a few drops of mineral oil, to add luster to the fibers. You can also lay glass fabric on a flat surface and clean it by hand with a sponge.

After you dry glass fabrics by hanging, you can iron them with a press or iron at a low heat temperature.

Figure 3-3 offers further information on manufactured fibers.

C.R.F. FABRIC

C.R.F. (crease resistant finish) fabric is treated with synthetic resins or other chemicals to resist wrinkles. Little ironing is needed, and drying time is shortened.

POLYESTER

Polyester resists wrinkling in use, although it will form wrinkles when not hung or folded evenly after tumbling; pressing should be done when the garment is slightly damp. Polyester fabrics are affected by the use of common laundry supplies, e.g., strong alkalis, bleach, and high water temperatures will remove the synthetic resins. However, it can be washed in formulas designed for permanent press fabrics.

Check your manufacturers labels for the type of blend.

CHAPTER 4
WASHING AND STARCHING

The washing process is a series of baths during which soil is loosened from the fabric, suspended in the water, and finally rinsed away. Several baths are usually necessary to effect complete soil removal.

To assist in suspending soil, soap and alkali are used in the first baths. These are called suds baths and their number varies with the type of work and the amount of soil in the clothes. The action of the soap is assisted by agitation of the water and the clothes. The rest of the operation consists of rinse baths. These baths should remove any remaining soil and the remaining soap suds, so that the last rinse is practically clear.

In washing white cottons, bleach is used with the last suds bath to remove stains and maintain whiteness.

A sour bath is used after the other rinses to neutralize the alkalinity and to decompose any remaining traces of bleach still in the load. No more rinses should be added after the sour bath. A combination sour/blue product is preferred.

GENERAL DESCRIPTION OF WASHERS

A laundry washing machine has two basic parts: (1) the outer shell, and (2) the revolving cylinder within the shell. The shell holds the water and cleaning ingredients. The cylinder holds the clothes. It is supported on bearings built into each end of the cylindrical outer shell, and is revolved on a horizontal axis by a motor. It is perforated to allow water and suds in the bottom of the shell to enter it, saturate the clothes, and then clean them during the running process.

The water level in a washer is expressed in inches, and represents the depth of water from the bottom of the revolving cylinder. See figure 4-1. In other words, it's the amount of water on the inside of the cylinder that counts. A water gage or top of the washer shell indicates the water in the cylinder in either inches or gallons.

Note in figure 4-1 the four ribs secured to the inside of the cylinder. These ribs are not the same in number or size in all washers. They are equally spaced and are parallel with the axis of the cylinder. They lift the clothes as the cylinder revolves and drop them into the water. This mechanical action helps the water and cleaning elements to saturate the clothes and to loosen and suspend the soil in them.

As shown in figure 4-1, the outer shell has sliding doors on the upper half of the front portion. You can slide these doors open to put clothes into and remove them from the cylinder, which also has sliding doors that must be lined up with those in the shell. See figure 4-2. The lid to the supply door of the left half of the first machine is open. The lids to both supply doors on the second machine are closed. The supply door (lid) can be lifted up to add soap, starch, blue, and bleach to the machine.

The sliding doors on the cylinder and on the outer shell have safety switches which cut off the power and automatically apply the brake when the doors are opened. These are variations in these safety systems, as you'll find out later. However, for safety's sake, turn off the power when loading and unloading.

When you have the shell and cylinder doors open for loading or unloading, to prevent small items from falling between the shell and the cylinder, swing the hinged metal strips at the bottom of the shell door frame over the space between the cylinder and the shell.

Some washers have an automatic device which prevents the cylinder from moving when it is lined up with the shell door, but the cylinders in other machines will move when the cylinder doors are open. Therefore, be sure to secure all latches to doors before you start the machine.

Another important feature of washing machines is that they have a device which reverses the cylinder after it has run from 3 to 7 revolutions in one direction. Reversing the direction of the cylinder during the washing process prevents tangling of clothes and increases the mechanical action in the cylinder. Cylinders

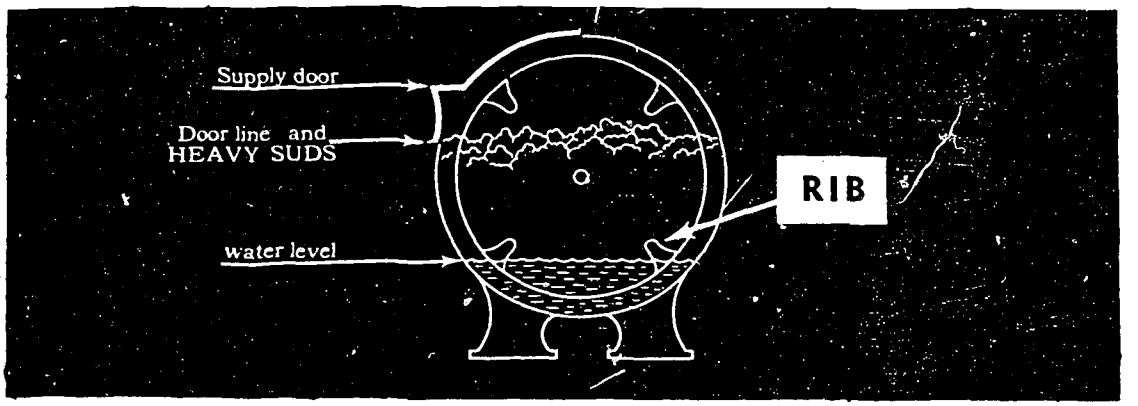


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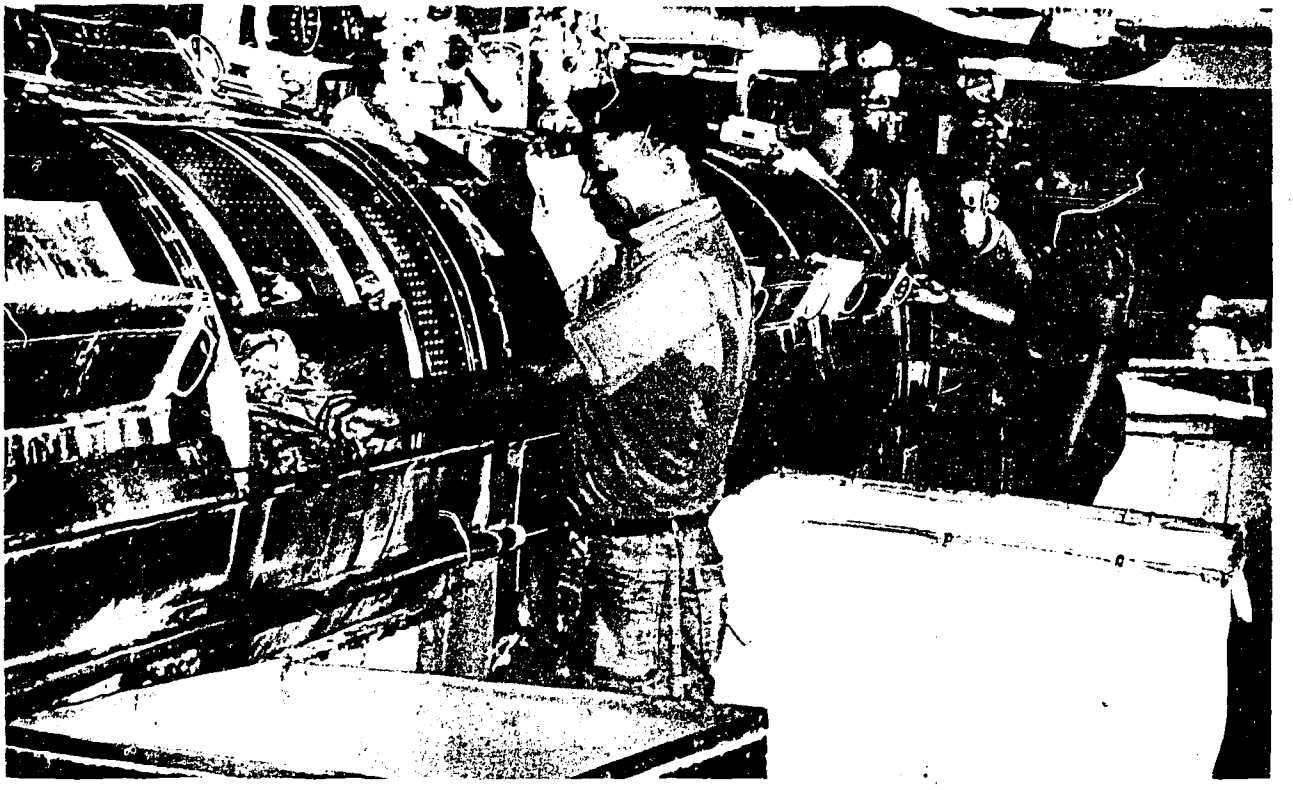
Figure 4-1.—Water and suds levels in washer.



22.10

Figure 4-2.—Sliding shell and cylinder doors on a washer.

normally revolve at 20 to 25 revolutions per minute.

Washers in ships' laundries vary in size and characteristics. Size is expressed in terms of the diameter and length of the cylinder. The diameter of the older-type washers varies from 20 to 42 inches, and the length varies from 20 to 84 inches.

Size of Washer	Maximum dry load (Pounds)
20 by 20	15
24 by 24	25
24 by 36	40
36 by 36	110
36 by 54	165
42 by 54	225
42 by 72	300
42 by 84	350

Size of Washer-Extractor	Maximum dry load (Pounds)
30 by 16	25
36 by 18	50
36 by 22	60
42 by 18	75
40 by 30	100
42 by 30	135
42 by 38	150
42 by 44	200
48 by 44	250
54 by 42	300
60 by 36	350
60 by 42	375

155.107

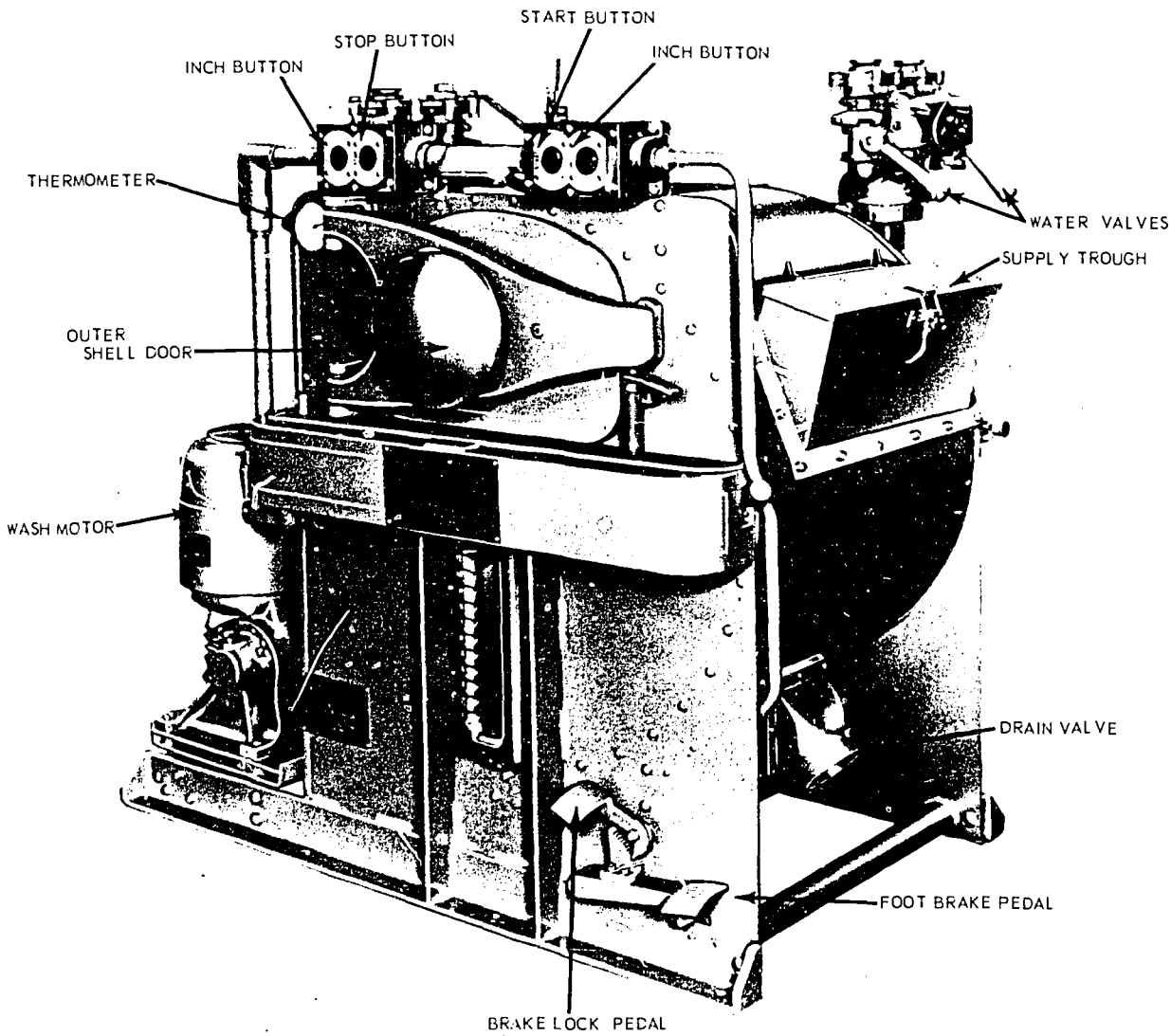
Figure 4-3.—Maximum dry load for various-sized washers and washer-extractors.

Figure 4-3 gives the standard sizes of washers and the weight of the maximum dry load which may be used in each.

OPERATION OF THE WASHER

Although construction details of the various washers used afloat vary, the principle of operation is the same. Listed below are the general steps to follow in operating the washer. Refer to the manufacturer's instruction manual for additional information on the operation.

1. Open shell door.
2. Turn on switch.
3. Rotate cylinder with the INCHING button, and stop when cylinder door is approximately opposite shell door opening.
4. Inch cylinder into exact position opposite shell door.
5. TURN OFF SWITCH. Do not trust the shell door safety switch.
6. Open cylinder door.
7. Bring the apron into position over gap between cylinder and shell doors.
8. Load washer to RATED CAPACITY ONLY. Overloading a washing machine is one of the chief causes of breakdowns, as a greater strain is placed on all moving parts, particularly the motor, than the manufacturer intended. Overloading also results in poor washing, because the water and cleaning solution do not have adequate space and sufficient agitation to remove soil. Underloading on the other hand, results in a waste of water and cleaning supplies. You should therefore weigh every load of clothes for each compartment in the cylinder. This is very important.
9. Swing apron down and out of the way.
10. Close cylinder door. Be certain it is securely latched and that latch handles are in latch wells.
11. Close shell door.
12. Turn switch on.
13. Start cylinder.
14. See that dump valve is closed.
15. Add water to the proper level and at the proper temperature, as indicated on the gages. If water is not hot enough, use steam to bring it to the desired temperature. Alkali and detergents should be added to the machine prior to raising water temperatures to prevent the setting of stains.
16. Add soap or detergent, as prescribed by the washing formula, through the supply door. If the soap or formula is liquid, add it when the cylinder is going down and toward you; if the soap is dry, add it when the cylinder is coming upward.
17. Start timing bath (follow formula).
18. When time of bath has elapsed, release the dump valve. (The cylinder should still be running, unless you are washing woolens.)
19. Permit sufficient time for water to drain from the shell after water level gage reads zero, and then close the dump valve.
20. Repeat steps 15-19 until the washing formula is completed. (See formulas later in this chapter.)



22.11X

Figure 4-4.—Combination washer-extractor.

21. After last bath, leave dump valve open for more complete drainage.

WASHER-EXTRACTOR

After washing is completed, the water must be extracted from the clothes. Chapter 5 discusses this process when it is performed by a separate machine. Some of the newer models, however, perform both processes.

The washer-extractor washes clothes and then immediately extracts the water from them by centrifugal force in the same cylinder. A separate extract motor spins the cylinder in one direction at high speed to remove the water. This type of machine has several important advantages for the shipboard laundry. (1) it saves floor space; (2) it speeds up the washing cycle for each load; (3) by extracting after each rinse bath, it reduces the number of rinses required;

and (4) the final warm rinse helps to speed up drying and ironing, and (5) it eliminates the time and labor required to transfer wet work from washer to extractor.

Study the washer-extractor illustrated in figure 4-4. Most of the important features, or parts, of the machine are indicated with arrows.

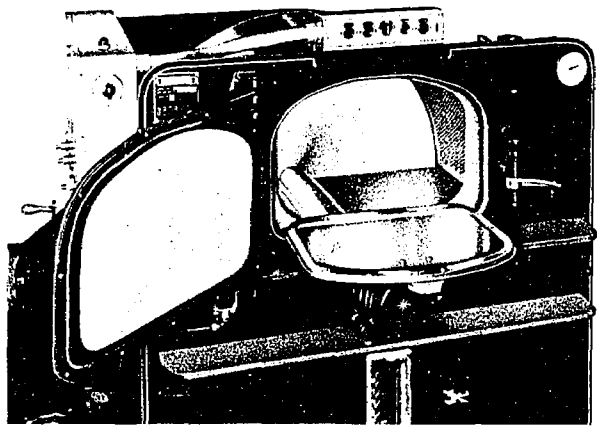
The tub of this washer is cylindrical and made of stainless steel. Its opening is on the end. The cylinder is also of stainless steel, and is secured to the drive shaft which passes through the middle of the tub and is supported by bearings in each end. Some cylinders have one partition, secured to the drive shaft, which provides two compartments; others have Y partitions, which give three compartments. Each compartment has a hinged door which opens downward, as illustrated in figure 4-5, to bridge the space between the cylinder and front tub head and form a loading or unloading platform. The door to each compartment is kept closed by a simple snap latch.

The wash motor has a reversing cylinder speed for washing and also a nonreversing intermediate speed for draining wash water. When you open the drain valve, you automatically cut off the current for the reversing speed and cut in the current for the intermediate speed. As the motor revolves the cylinder faster in the same direction, it drains the water from the tub quicker.

Figure 4-6 shows the rear view of a combination washer-extractor. Some of the important parts are indicated by arrows.

SAFETY DEVICES

Safety devices on washers and washer-extractors conform to Navy specifications. The tub door, for example, is fastened with latches connected to a safety switch which cuts off the current and applies the break when you open the door. As a safety measure, however, it is best not to trust the safety device when loading and unloading. TURN OFF THE ELECTRIC CURRENT. START and STOP buttons are provided on the control panel, and there are INCH buttons for getting the cylinder into the correct position for loading and unloading. When the cylinder is thus spotted, an automatic safety switch on the wash motor prevents it from moving farther. The magnetic reversing control is enclosed in a metal cabinet as a protection for the control itself and also as a safety measure. All safety devices are intended to protect you.



22.12X

Figure 4-5.—Cylinder compartment of washer-extractor open for loading.

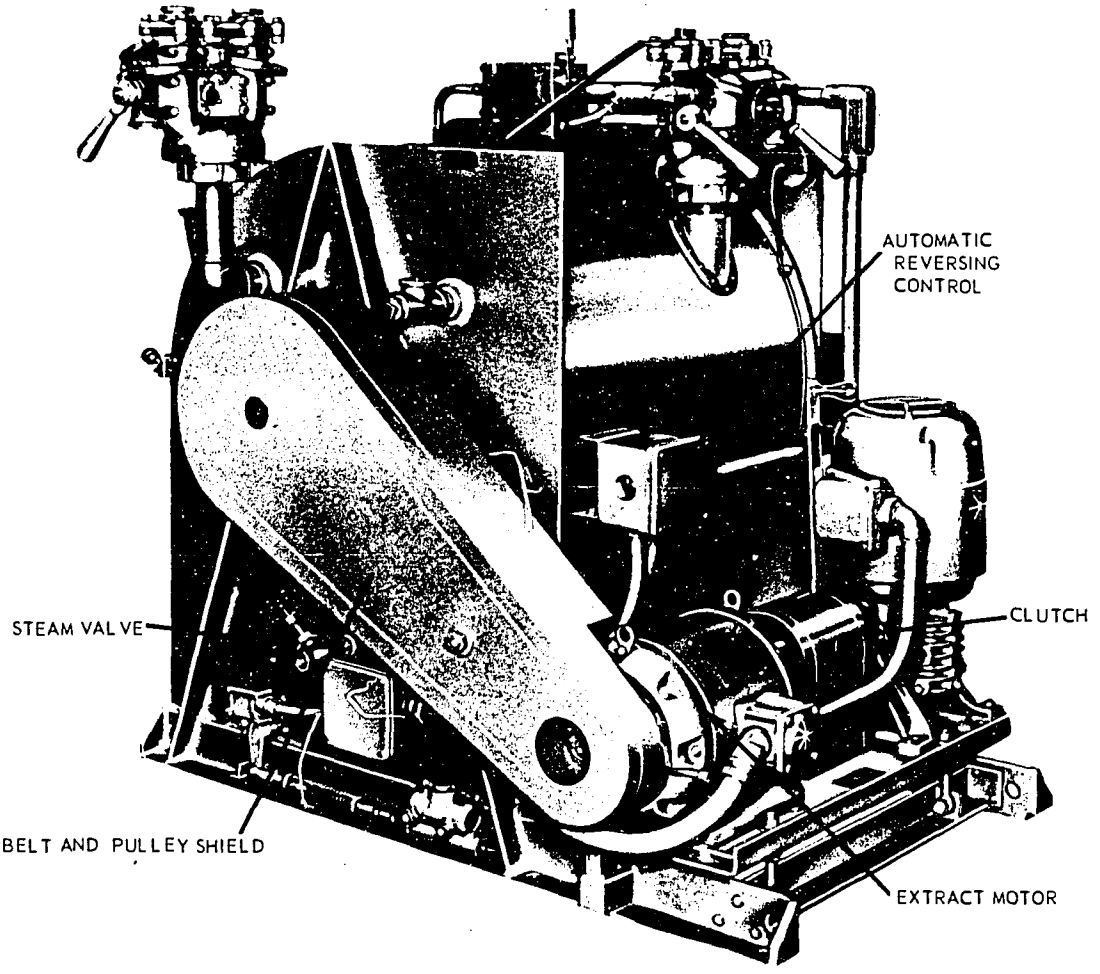
Understand them thoroughly and ensure that they are ALWAYS functioning properly.

CARE AND MAINTENANCE

The washer, or washer-extractor, is a very important piece of equipment. It is also costly. If it breaks down, time and money are consumed, perhaps unnecessarily, and the ship's company may be subjected to inconveniences. Too much emphasis, therefore, cannot be placed upon proper care and maintenance of the washing machine.

The senior Laundryman and all operators are responsible for the care of washers and washer-extractors. CARE has reference to the manner in which you handle the machine, and how clean you keep it. In a word, the washer should be kept as clean inside and outside as possible. Soap solutions and hot water help to keep the inside clean and sanitary, but scum and other accumulations should be removed daily from the exterior.

An oxalic acid solution made by dissolving 1/2 pound of oxalic acid crystals in a gallon of water can be used to keep the outside of the tub clean and bright. Use a rag or brush to apply the solution. Rub vigorously, and then rinse with clean water. A fine abrasive powder, such as pumicestone, sprinkled on the damp cloth will help to remove grease and film from the tub.



22.13X

Figure 4-6.—Combination washer-extractor (rear view).

The washer should be inspected at regular intervals to ensure that:

- It is still level.
- All bolts, nuts, and screws are tight.
- Water, steam, and dump valves are tight and do not leak.
- Latches on the cylinder doors are operating properly, and bolts are tight.
- The brake is properly adjusted.
- All bearings and moving parts are clean and lubricated.
- The thermometers are accurate.
- Motors are cleaned and oiled.
- Switches are properly adjusted and working correctly.
- The timers are in good working order.
- All electric controls are functioning.
- The clutch operates smoothly.
- Water level gages are correct.

The operator of a washer should know his machine. He should study the manufacturer's instruction book and the machine itself until he is able to recognize when any part of the

machine is not operating properly. He should promptly report any necessary adjustment or repairs required on the washer to the "A" division.

WASH WATER

Water is the most important item used in a laundry. Not only is it needed in quantity, but the quality of water used has an important effect on the washing process.

At sea, where quantities of suitable wash water are always subject to greater limitations than ashore, you may not always have enough soft water available. To conserve fresh water, you may be required to use sea water.

When water comes from clouds as rain or snow it picks up carbon dioxide gas. As the water seeps through the ground, the carbon dioxide gas dissolves limestone and some other substances; and the water collects calcium and magnesium salts. These salts are in the form of bicarbonates, chlorides, nitrates, and sulfates. The kind and quantity of these substances is determined by the soil the water passes through. Water that contains any appreciable quantity of salts is HARD water. SOFT water is rain water that has not picked up salts from the earth, or water that has had these substances removed or neutralized. Since it contains the greatest concentration of salts, SEA water is the hardest of all wash waters.

TYPES OF HARD WATER

In laundry terminology, hardness in water is the power to kill soap. When soap is added to hard water, the calcium and magnesium salts in the water combine with the soap to form insoluble LIME SOAPS. These soaps then unite (precipitate) in the form of a sticky, insoluble deposit. This reaction kills the soap and makes it useless for washing, and the sticky deposit traps dirt and puts it back on the fabric in the form of scum. If no dirt is present, the scum is white and is seen as a film on the clothes.

There are two types of water hardness:

1. TEMPORARY HARDNESS.—Water which contains calcium and magnesium bicarbonates is called TEMPORARY HARD, because these elements can be removed by boiling. Scale on the inside of steam kettles and steam boilers is due to the precipitation of insoluble carbonates as the hard water is boiled. If it were possible for you to boil all the water used for washing, you would need no other method for eliminating temporary hardness. This is not usually possible aboard ship, however, and you must use another method to make the water soft.

2. PERMANENT HARDNESS—Water which contains calcium and magnesium chlorides, which are NOT affected by boiling, is said to be PERMANENTLY HARD. Permanent hardness requires special treatment with chemicals or by distillation.

HOW TO SOFTEN WATER

The methods generally used to soften water are considered in the next paragraphs. They are known as the BASE-EXCHANGE and DISTILLATION methods.

The base-exchange method softens water when the compounds of calcium and magnesium in the water are exchanged for compounds of sodium, which do not cause hardness. The sodium is contained in the form of a sand called zeolite, a natural mineral known as sodium aluminum silicate. When hard water is run through the zeolite sand, calcium and magnesium in the water change places with the sodium. Eventually, the zeolite loses its strength, but it can be regenerated (renewed) by the addition of sodium chloride (salt), which converts it to the original state.

Distillation is the process whereby water is boiled and the vapor cooled by running it through pipes immersed in a cold solution to reconvert it to water. Distillation is used to make sea water usable for a ship's boilers and other shipboard uses. Sea water distillate is not pure water, but it contains ONLY about 1/20,000 of its original concentration of salts.

SOAPS AND DETERGENTS

Two types of soap are used in ships' laundries: high-titer and low-titer. Although each is used under different conditions, both perform the main job of washing—to loosen soil from clothes and suspend it in the wash water until it is removed from the machine. The kind of material to be washed and the type of soil to be removed determine the appropriate type of soap to use.

TYPES OF SOIL

Three types of soil must be removed by the washing process. The first consists of soluble

soils such as starches, fruit juices, and sugars. The second type includes the soils INSOLUBLE in water: earth, soot, oils, paint, and fats. The third type consists of colored stains such as dye, blood, medicinal stains, and rust.

Water removes soils which are soluble in it. Soap removes many kinds of insoluble particles and holds them in suspension in the water. Alkali in soap chemically changes some substances in soils and makes them soluble. Some colored stains can be removed entirely by water alone; others require suds baths or special treatment.

PROPERITES OF SOAPS

A soap is slightly alkaline; that is, it has some of the alkali left in it that was used in its manufacture. A completely neutral soap would have very little soil removal power. In the pure state, without additional alkali as a builder, a soap is fully effective in SOFT water only. Calcium and magnesium salts in hard water precipitate (separate) soap from the water and render it ineffective. Most soaps will not dissolve in salt water, and therefore are practically useless for salt-water washing. An acid solution breaks a soap down and deposits its original fats and oils (from which it was made) back on the clothes.

In general, soaps are made by the saponification of fatty acids with an alkali. The fatty acids come from various animal and vegetable fats (fatty acids and glycerides) such as tallow, lard, coconut oil, palm oil, cottonseed oil, olive oil, fish oil, and many others.

MEANING OF TITER

The titer of a soap is defined as the temperature (in degrees centigrade) at which the fatty acids will melt, and is indicative of the temperature range at which the soap will do its best work. Titer values for the commonly known soaps range from about 20° C or below for a low-titer soap and to about 42° C for a high-titer soap. These values correspond to washing temperatures of 140° F to 160° F for the high-titer and 120° F and below for the low-titer.

Low-titer soap is best suited for low-temperature washing for colored goods, woolens, rayons, silks, and all fabrics ordinarily damaged by high temperatures. Low-titer soap is readily soluble at a low temperature. High-titer soap, on the other hand, dissolves readily only at high temperature. High-titer soaps will not break down at high temperatures; low-titer soaps will. High-titer soaps are therefore usually used for washing white cotton goods, dungarees, and so forth, which requires a high temperature (sometimes boiling) to remove soil from them.

SOAP BUILDERS

A built soap is mixed with an alkali of predetermined proportion. The alkali protects the soap from breaking down, it helps the soap to GET AT the soil, and it has some cleansing properties of its own (limited in extent).

Use of alkaline agents (soap builders) should be limited to those washes that require them. They should be used only in small quantity and not at all on some fabrics. If too much builder is used, extra rinses are required to get the alkali out of the clothes. Besides, the extra quantity of alkali has a tendency to reduce the tensile strength of all fabrics.

The principal soap builders are the phosphates, sodas, and silicates. They include sodium bicarbonate, borax, sodium carbonate, sodium silicate, and sodium metasilicate. Some form of sodium silicate is the alkali most commonly used as a builder. In addition to its good qualities as a builder, it also has emulsifying properties. Trisodium Phosphate is especially good for removal of paint. Sodium metasilicate is an alkali which is safe for use on cotton and linen fibers. Borax is a very mild alkali, and is good for neutralizing the acidity in silks and rayon before soap is added.

Amount of Builder

Soap builders recommended for the ship's laundry are listed in Ship's Store Afloat Catalog and Appendix I of this text. They should be stocked aboard ship for use with certain types of water, or when you do not have commercially prepared built soaps or detergents. A good built soap contains 2 or 3 pounds of neutral soap and 1 pound of builder. This amount should be increased slightly for greasy loads. If soap and builder are ever used on silk and wool, it is recommended that 1 part of builder be used to 4 parts of neutral soap.

REQUIREMENTS OF A GOOD LAUNDRY SOAP

A good laundry soap should have the qualities listed below.

- It should be suitable for the particular load of clothes in the washer; that is, for the type of fabric to be washed and the degree and kind of soil.
- It should be soluble in wash water at the temperature required for the load of clothes.
- It should rinse easily from the fabrics being washed.

DETERGENTS

Detergents are sometimes referred to as synthetic detergents or synthetic soaps. The term synthetic, in its broadest sense, refers to the synthesis (building up) of materials to form a product different from natural substances. A detergent, as the term is generally used, is entirely different from a soap.

Detergents now on the market may be divided into three classes, in accordance with their physical mixtures: (1) true, or 100 percent synthetic material; (2) mixtures of alkalies and synthetics, and perhaps some minor ingredients; and (3) promoted synthetics (mixtures of synthetics, alkalies, and other materials designed to increase or promote one particular property of the detergent).

The Navy procures detergents in accordance with Military Specification MIL-D-12182, type I for soft or hard water use, type II for use with sea water.

In fresh water, a detergent performs like an ordinary soap. Unlike ordinary soap, however, it does not form insoluble soap CURDS with hard water; and it is equally as efficient in hard and sea water as in fresh water. Detergents are little affected by alkalies or acids and are effective in hot or cold water.

Cotton and linen absorb alkalies in soaps and soap builders in minute quantities only, but wool has a great affinity for alkalies and absorbs large quantities of them. For this reason, detergents without builder are much better for washing woolens and silks. Check the fiber laundering characteristics chart in chapter 3 for the effects of detergents on synthetics.

A Laundryman ordinarily judges the strength or amount of soap in wash water by the amount of suds it produces. Such is not the case with all detergents. Some produce a froth but no suds. It is therefore important that the amount of detergent used be accurately measured. Follow the washing formula, or the directions given by the manufacturer of the product.

WASHING FORMULAS

Washing formulas given on pages 43—48 have been tested in laundries aboard ship and in naval research facilities and found satisfactory for the type of work indicated.

To determine the correct amount of chemicals for your washer, multiply each 100 pound capacity or fraction thereof by the amount of chemicals in the "supplies" column of your formulas.

WASHING FORMULAS (100-Pound Load Basis)
Using Type I Detergent—For Washing Cotton Fabrics in Soft and Hard Water.

White Fabrics—Heavy Soil

Operation	Water Depth Inches	Temperature °F.	Time (minutes)	Supplies
Break suds	4	140	5	12 to 16 oz. sodium metasilicate (anhydrous) plus 4 to 6 oz. stock detergent
Hot suds	4	160	10	6 to 8 oz. sodium metasilicate (anhydrous) plus 4 to 6 oz. stock detergent.
Bleach	4	160	10	Add 1 to 2 oz. of 15 percent available chlorine dry bleach

WASHING FORMULAS (100-Pound Load Basis)
Using Type I Detergent—For Washing Cotton Fabrics in Soft and Hard Water (Continued)

White Fabrics—Heavy Soil (Continued)

Operation	Water Depth Inches	Temperature °F.	Time (minutes)	Supplies
Rinse	6	160	5	No supplies
Rinse	6	tap	5	No supplies
Rinse	6	tap	5	Sour (2 oz.) and blue
Starch (if required).	2	120	10	8 to 12 oz. of starch (instant dry type)
White Fabrics—Normal Soil				
Break suds	4	150	10	12 to 16 oz. sodium metasilicate (anhydrous) plus 6 to 8 oz. stock detergent
Bleach	4	160	10	Add 1 to 2 oz. of 15 percent available chlorine dry bleach
Rinse	6	160	5	No supplies
Rinse	6	tap	5	No supplies
Rinse	6	tap	5	Sour (1 to 2 oz.) and blue
Starch (if requires).	2	120	10	8 to 12 oz. of starch (instant dry type)
Dungarees, Khakis, Wiping Towels				
Break suds	4	140	10	12 to 16 oz. sodium metasilicate (anhydrous) plus 6 to 8 oz. stock detergent
Hot suds	4	160	10	6 to 8 oz. sodium metasilicate (anhydrous) plus 4 to 6 oz. stock detergent
Rinse	6	160	5	No supplies
Rinse	6	tap	5	No supplies
Rinse	6	tap	5	Sour (2 oz.)
Starch (if required).	2	120	10	8 to 12 oz. of starch (instant dry type)

WASHING FORMULAS (100-Pound Load Basis)
Using Type II Detergent.

Washing Woolens in Soft or Hard Water

Operation	Type of Water	Water Depth Inches	Temperature °F.	Time (Minutes)	Supplies
Suds bath . .	- - -	4-5	tap to 95°	5	8 to 10 oz. stock detergent
Second suds.	- - -	4-5	tap to 95°	5	4 to 5 oz. stock detergent
Rinse	- - -	6	tap to 95°	5	No supplies
Rinse	- - -	6	tap	3	No supplies
Rinse	- - -	6	tap	3	Sour (2 oz.) optional
Washing Woolens in Sea Water					
Suds bath . .	sea	4-5	tap	5	12 to 16 oz. stock detergent
Second suds.	sea	4-5	tap	5	6 to 8 oz. stock detergent
Rinse	sea	6	tap	5	No supplies
Rinse	fresh	6	tap	3	No supplies
Rinse	fresh	6	tap	3	Sour (2 oz.) optional
Washing Cottons in Sea Water					
Suds bath . .	sea	4-5	120°	5	12 to 16 oz. stock detergent
Second suds.	sea	4-5	140°	10	6 to 8 oz. stock detergent
Third suds	sea	4-5	140°	10	4 to 6 oz. stock detergent
Rinse	sea	6	140°	5	No supplies
Rinse	fresh	6	120°	5	No supplies
Rinse	fresh	6	tap	5	Sour (2 oz.) optional

RECOMMENDED FORMULAS
Using Commercial Supplies

White Work—Moderate Soil

Operation	Water Level Inches	Water Temperature (°F)	Time (M)	Supplies[3]
Break suds[1]	5	140	8	Soap or detergent and builder
Suds and bleach . .	5	150	8	Soap or detergent and bleach
Rinse	10	160	3	- - -
Rinse	10	120	3	- - -
Blue[2]	10	90	5	Blue
Sour	3	90	5	Sour

[1]A 20-second intermediate extraction should follow the BREAK, and the first rinse.
[2]If you use a commercial product which has combined the BLUE and the SOUR, follow the operating instructions listed on the container of the product.
[3]As prescribed by the manufacturer of the product used.

White Work—Heavy Soil

Operation	Water Level Inches	Water Temperature (°F)	Time (M)	Supplies[3]
Break[1]	5	150	8	Soap or detergent and builder
Second suds bath .	5	160	8	Soap or detergent
Suds bath & bleach	5	150	8	Soap or detergent and bleach
Rinse bath	10	160	3	- - -
Rinse bath	10	140	3	- - -
Rinse bath	10	120	3	- - -
Blue bath	10	90	5	Blue
Sour bath[2]	3	90	5	Sour

[1]Use the extractor for 20 seconds after the break and the first rinse.
[2]If a combined blue-sour product is used, follow the manufacturer's instructions.
[3]As prescribed by the manufacturer of the product used.

Colored Work—Moderate Soil

Operation	Water Level Inches	Water Temperature (°F)	Time (M)	Supplies[3]
Break suds[1] . . .	5	100-120	8	Detergent and builder
Second suds	5	100-120	8	Detergent only
First rinse	10	100-120	3	- - -
Second rinse	10	100-120	3	- - -
Sour bath	3	90	5	Sour

[1]Follow the break and the first rinse with a 20-second extraction.
[3]As prescribed by the manufacturer of the product used.

RECOMMENDED FORMULAS
Using Commercial Supplies (Continued)

Colored Work—Heavy Soil

Operation	Water Level Inches	Water Temperature (°F)	Time (M)	Supplies[3]
Break suds[1]	5	100-120	8	Detergent and builder
Second suds	5	100-120	8	Detergent only
Third suds	5	100-120	8	Detergent only
First rinse	10	100-120	3	- - -
Second rinse	10	100-120	3	- - -
Third rinse	10	100-120	3	- - -
Sour bath	3	90	5	Sour

[1]Follow all three suds baths and the first rinse with a 20-second extraction. Note that the formula for colored work (heavy soil) has one extra suds bath and one extra rinse, to help remove the heavy soil. The supplies are the same.
Use a water conditioner such as polypyrophosphate for all of the above formulas, in the amounts required by the water conditions. This conditioner softens the water and makes the washing operation more effective.
[3]As prescribed by the manufacturer of the product used.

Greasy Coveralls and Wiping Towels

Operation	Water Level[1] Inches	Water Temperature (°F)	Time (M)	Supplies[3]
Break suds	6	170-190	15-20	Soap or detergent plus strong builder
Flush	12	160-190	3	- - -
Second suds bath .	6	160	5-7	Soap and builder
First rinse	10	160	3	- - -
Second rinse	10	160	3	- - -
Third rinse	10	140	3	- - -
Fourth rinse	10	120	3	- - -
Sour bath	3	100	5	Sour to pH 5.0

[1]Use a water conditioner, as required.
[3]As prescribed by the manufacturer of the product used.

Polyester/Cotton—Moderate

Operation	Water Level Inches	Water Temperature (°F)	Time (M)	Supplies
Break suds	6	150	7	Synthetic alkali detergent; nonionic
Bleach	6	150	8	Organic
Rinse	14	150	2	- - -
Spin	- - -	- - -	1	- - -

RECOMMENDED FORMULAS
Using Commercial Supplies (Continued)

Polyester/Cotton—Moderate (Continued)

Operation	Water Level Inches	Water Temperature (°F)	Time (M)	Supplies
Rinse	14	130	2	- - -
Sour	6	100	4	Fluorescent blue/sour
Final Spin	- - -	- - -	3	- - -

Note: 1 - Formula time does not include drain and fill time.
2 - For heavy soil include additional break/suds for 3 minutes.
3 - For amounts of various supplies used refer to your manufacturer's instructions.

Cotton—Moderate Soil

Operation	Water Level Inches	Water Temperature (°F)	Time (M)	Supplies
Break suds	4	160-170	7	Synthetic alkali detergent; non-ionic
Suds	4	160-170	7	Synthetic alkali detergent; non-ionic
Bleach	4	160	7	Organic
Rinse	8	160	2	- - -
Spin	- - -	- - -	1	- - -
Rinse	8	170	2	- - -
Sour	8	140	3	Fluorescent blue/sour

Note: 1 - For amounts of various supplies used refer to your manufacturer's instructions.

SUDS BATHS

A suds bath should remove soil from fabrics. The first step in creating a suds bath is WETTING OUT, or saturating the clothes with water and the soap or detergent solution. Then you wash the clothes in the suds bath. The number of suds baths required for a load is dependent upon the amount and type of soil in the clothes. Two suds baths may be sufficient for lightly soiled clothes, but additional baths may be required for heavy soil. Follow the recommendations of the washing formula for each type of load. You can also check the water at the end of each suds bath for the amount of soil remaining in the clothes. Collect a sample of the wash water in a bottle.

SUDS LEVELS AND TEMPERATURES

Suds levels recommended in the washing formulas are based upon years of experience in ships' laundries. Normally, suds baths should be run at relatively low water levels in order to get sufficient mechanical action and to conserve the use of water and soap. Use a higher water level for woolens, however, in order to reduce agitation. You will learn about washing woolens a little later in this chapter.

Temperatures in laundry washing range from tap water, 70° to 80° F, to hot water, which goes as high as 180° F. Follow the temperatures listed in the formulas. If the water is not hot enough and you will need steam to heat it,

add a little less water than specified for the load, for the steam will raise the water level. The temperature of the water should always be CORRECT before cleaning solutions (soap, detergent, or bleach) are added.

Temperature ranges in the formulas apply to the highest temperature reached during the washing cycle. They are applicable to the suds baths because they are usually attained and maintained after the first suds. You will note in some of the formulas that the first suds bath has a lower temperature than the second. The reason for this is that time is required to build up and maintain a suds bath temperature, and too high a temperature in the first suds for some loads would set such stains as blood. Loads with heavy soil and no apparent blood stain can safely stand a higher starting temperature, but it is best to start at a lower temperature and increase it after the load has run for 2 or 3 minutes.

BUILDING THE SUDS BATHS

After the proper water temperature has been reached, a suds bath should be built up by the addition of soap or detergent, normally with builder. The amount of soap or detergent varies with each load. For this reason, measured additions of built soap are not prescribed in formulas. You should therefore add the soap gradually until you build the proper suds. Soap is excessive and therefore wasted when the suds run out the supply door. Add liquid solutions when the cylinder is going DOWN. To prevent dry soaps or detergents from clinging to and building up on the inside of the outer shell, add them when the cylinder is going UP.

On the break, or first bath, the addition of a cleaning agent lowers the water level, because the soap increases the penetration of the water and more of it goes into the load. Enough water should be added to bring it up to the proper level. This called water of saturation and does not affect the water level shown on the gage, for this is a measure of free water only. Additions of supplies on subsequent suds baths do not affect the water level.

Since the rinses do not remove all alkali, each succeeding suds will normally require less soap or detergent to get the desired strength.

HARDWATER WASHING

When you must wash with hard water, find out how hard it is and adjust your procedures accordingly. The oil and water king of your ship can tell you the degree of hardness. Water with 6 to 12 grains of hardness per U.S. gallon is moderately hard. Hardness above 12 is very hard.

Use detergent for hardwater washing if possible. Increase the PROPORTION of builder to detergent in accordance with the increased hardness of the water. You will probably need a larger quantity of detergent also, but remember that the harder the water the more alkali you will need to make any given quantity of detergent or soap effective. Use phosphate water softening agents. They will reduce the amount of detergents required.

SALT WATER WASHING

To conserve fresh water supplies, it may be necessary on occasions that you use sea water for washing. When this is necessary, use Type II detergent. Two formulas are presented which have been tested for effective salt water washing.

Even though you must use sea water for washing, use fresh water for the last two rinses.

WOOL WASHING

Generally, you will not wash woolen clothing in the ship's laundry. Men should be instructed not to put their blues into the laundry because of the danger of their accidentally getting in with cottons and being ruined. You may find it necessary, however, to wash blankets or other woolens. If so, proceed as prescribed by the recommended formula.

Water at tap temperature will not damage wool fibers. Hold mechanical agitation to a minimum to prevent shrinkage. This is why you should stop the machine when filling and draining water, and run it at low speed and for short periods.

IMPREGNATED CLOTHING

On occasion you may be called upon to launder impregnated clothing. When such is the case, use Type II detergent at a maximum water temperature of 90 degrees F. High water temperature, strong soaps, and alkalies will destroy the impregnite. If possible, water from the ship's evaporators should be used and a good suds built up before adding the clothing.

The clothes should be washed for 15 minutes at the customary suds level, changing the solution every five minutes. When washing the jumpers and overalls, the washer should not be stopped during the draining and refilling operations. However, with the wool gloves and cotton-wool socks, the washer should be stopped for draining and refilling. After the three five-minute SUDSINGS, the clothes should be rinsed three times with clear water at 90 degrees F. (32° C.), allowing three minutes for each rinse.

Drying temperature must not exceed 155 degrees F. Clothing must be tumbled at room temperature for a period of 10 minutes before removal from the tumbler.

BLEACHING

Bleach has a dual function in the normal washing process:

1. It removes yellow color from and gives whiteness to fabrics.
2. It assists in the removal of some stains from fabrics.

Bleach also has a third benefit: It helps to sterilize clothes by killing some of the bacteria on them.

The natural color of white fabrics is somewhat yellow. Manufacturers remove this color with bleach before selling fabrics. Through normal use and continued washing, however, fabrics have a tendency to become yellow. For this reason, the proper amount of bleach should be added to the last suds bath.

Although bleaching is a common practice in laundries to keep cottons and linens white, it is not a substitute for good washing. Indeed, when washing is properly accomplished, very little bleach is required.

If improperly used, bleach in concentrated form damages fibers. Study the fiber laundering characteristics chart in chapter 3 to find out how bleach affects fibers, including synthetics.

LAUNDRY BLEACH

The Navy no longer authorizes the use of calcium hypochlorite bleach in the ship's laundry. A laundry bleach conforming to Specification O-B-420 is authorized. This laundry bleach contains a minimum of 15 percent available chlorine and is available in 25-pound boxes under FSN 6850-063-2842. The laundry bleach conforming to Specification O-B-420 is less hazardous than calcium hypochlorite with respect to producing fire when in contact with oxidizable materials. However, labeling instructions for this bleach still indicate the need for keeping it out of contact with combustible materials.

COLOR STRIPPERS

Color strippers are used to remove dye from fabrics. The one on your SUPPLY LIST is a hydrosulphite compound (handle with extreme care) that is safe on fabrics and which strips fugitive colors evenly from fabric when used in the washwheel or by hand.

Color strippers are ineffective against vat dyes. These dyes have been precipitated in the fabric and are therefore FAST and difficult to remove.

You can make a satisfactory color stripper by dissolving 5 ounces of glacial acetic acid in 15 gallons of water.

Refer to the detailed instructions for removing dyes from fabrics in the stain removal chart in chapter 10.

RINSING PROCEDURE

You already have learned that the function of rinses is to remove soil and cleaning solutions from clothes after each suds bath. Poor rinsing results in grayness, disagreeable odors, harsh finish, and generally poor quality work.

The number of rinses varies from 2 to 5 (5 for netted loads). Such factors as the condition of the load (amount of soil) and amount of soaps or detergents used determine the number of rinses required. Dirty dungarees, for example, require more rinses than lightly soiled linens.

Under normal conditions, follow the washing formula with respect to the number of rinses, the rinse water levels, water temperature, and time of running. If you are using a built soap, use your judgment as to how many rinses are required to eliminate the soil.

Regardless of the number of rinses given to a load of clothes, it is impossible to remove all alkalinity from the load with water alone. This must be done with a laundry sour.

LAUNDRY SOUR

A laundry sour is an acid that is safe to use on fabrics. It should be added to the last rinse to neutralize remaining alkalies and to dissolve

iron and other metallic salts which cause rust or a yellow discoloration. If left in fabrics, an alkali causes odor and discoloration after drying.

Another reason for giving a sour in the last rinse is that it removes sodium bicarbonate, normally in rinse water. Even though all the alkalinity is rinsed out, the sodium bicarbonate remains. It is not injurious to fabrics in itself; but when subjected to the heat of flatirons, presses, and flatwork ironers, it is converted to sodium carbonate which is quite alkaline and can cause injury to fabrics if in sufficient concentration.

Souring also decomposes any oxidizing bleach left in a load, prevents discoloration, and helps to sterilize the clothes. In addition, it sets acid dyes often used in bright colored fabrics, and preserves the tensile strength of fibers. Sour also removes rust stains.

There are many different laundry sours of varying strength, including acetic acid, fluosilic acid, hydrofluoric acid, and several types of fluoride (ammonium, sodium acid, and sodium silico). Fluoride is generally used. The sour is also combined at times in the powdered form with powdered blue.

At present, your ship's laundry stocks a fluoride sour, and also the combined sour and blue powder. The recommended amount of this sour per 100 pounds is prescribed by the formula used. However, always follow the directions of the manufacturer in using a sour, including the combined form (blue and sour). Oversouring is uneconomical and damages fabrics. On the other hand, undersouring gives poor color because of incomplete neutralization of the alkali.

SOURING PROCEDURE

The fluoride type of sour is effective in removing iron and rust stains. Oxalic acid also removes iron and rust stains (ch. 9) but it should not be used in the washer. If you do use oxalic acid to remove bad iron and rust stains, be sure to rinse it thoroughly from the fabric after it has accomplished its purpose.

Add the sour along the FULL LENGTH of the supply door when the cylinder is going DOWN.

REMEMBER, oversouring is uneconomical and damages fabrics. In the case of sick bay linen, oversouring can cause skin irritation. Oversouring can cause clothing to stick to the press heads and flatwork ironer rolls.

BLUE OPERATION

Bluing is the process of adding a faint-blue tint to the surface of clothes to neutralize yellow color. In a sense, it is surface dyeing. It is not, however, a COVER-UP for poor washing. In fact, an application of blue to soiled fabrics makes them look less white.

TYPES OF BLUE

There are three types of blue:

1. Sour type, which requires the use of souring, and is altered by alkali rinses.
2. Nonsour type, which does not require souring and is not altered by dilute alkalies. It is altered, however, by dilute acids.
3. Sour-nonsour type, which is a combination of the first two types.

The steps in the bluing process are as follows.

1. After the sour bath has run for 5 minutes, stop the machine and add 10 to 12 inches of cold water. (Blue does its best work in cold water.) Then run the machine 1 FULL minute to equalize water temperature.
2. As the cylinder of the machine is turning TOWARD you, add the blue solution (for 50 to 100 lb load, as the case may be) along the entire length of the supply door, so that the blue will have a chance to saturate the fibers of all items in the machine.
3. Run washer 5 minutes.
4. Drain water from machine.

STARCHING PROCESS

Starch is applied to wearing apparel and other linens to give them BODY, smoothness, and an improved appearance. When raw starch granules are heated in water, they swell up and break their outer layers. Their inner portions then dissolve in the water and form a smooth, creamy liquid. When this liquid starch is applied to damp fabrics and dried by ironing, it makes them firm and smooth. Starched shirt collars and cuffs, for example, have body and a finished look. The amount of firmness, of course, can be regulated by the amount and type of starch used. Some starches have borax and/or other substances added to make them more effective.

At one time considerable starch was used in wearing apparel. At present, the amount used has been so reduced that starching is often referred to as SIZING. In the ship's laundry, shirts, trousers, and coats are usually sized.

Starch comes from corn, wheat, rice, and potatoes. Potato and wheat starches give a touch, pliable stiffness. Corn gives a rigid, brittle starch. Rice gives a medium stiffness. At present, your ship's laundry stocks only an instant, wheat-corn starch which may be added directly to the washer. Boiling is not required, as was the case with the starches previously used in the laundry.

HOW TO APPLY STARCH

Starch may be applied to articles by hand-dipping or in the washing machine. The machine does the job quicker, and for most starching in the ship's laundry it is a satisfactory method.

The amount of starch required depends upon the amount of starch desired in a load, or article. Use the amount recommended by the formula used.

For starching shirts with the washer, follow the procedure outlined below.

1. Do not drain the sour/blue bath. Reduce to a low suds water level with the water at 90° F. Add the proper amount of starch. At one time white and colored shirts were starched separately, but experience has shown that they can be starched satisfactorily together.

2. Run the machine 10 minutes, long enough to allow the starch to penetrate the shirts.

3. Drain the starch from the machine while it is running, to prevent the starch from settling on the load.

4. If you wish to remove starch from the bodies of shirts, raise the water level at the end of the starch run to 8 or 10 inches and then dump it immediately. The collars and cuffs, since they have two or more layers of material, will retain the starch.

CHAPTER 5
EXTRACTING AND DRYING

Most of the water which remains in clothes after rinsing must be removed before you iron them. As you learned in chapter 4, the combination washer-extractor has a special motor and a clutch arrangement for extracting water from washed clothes. Ships' laundries which do not have the combination machine have a separate extractor. To distinguish it from the washer-extractor, we designate it in this chapter as the single-unit extractor.

As you'll learn in chapter 6, flatwork can be ironed in the damp state direct from the extractor. For satisfactory ironing of wearing apparel and some other articles, however, the extractor leaves too much moisture in these materials. The machine used in the ship's laundry to remove the amount of moisture necessary from different types of materials to ensure good ironing is called the drying tumbler.

This chapter discusses different types of extractors and dryers and how to use and care for them properly.

SINGLE-UNIT EXTRACTOR

An extractor has an outer shell—called a curb--and a load-carrying compartment, the basket (sometimes called cylinder). The metal curb is secured to a heavy metal base, which must be bolted to the concrete deck of the laundry. Otherwise, because of vibration produced by the basket as it runs at high speed, the extractor would not remain in position and could cause serious damage. A solid-curb extractor is illustrated in figure 5-1. This one has the curb and base molded in one piece for greater rigidity. Important parts are indicated with arrows, with appropriate explanations in blocks.

The basket of the extractor is made of stainless steel, with perforated sides and a solid metal bottom connected with the driving spindle. V-belts from the motor fit into grooves on the spindle assembly. When the motor drives the basket at high speed (hundreds of revolutions per minute), centrifugal force literally throws the water in the clothes out through the perforations in the basket into the curb, whence it is carried away by a drain pipe.

Extractors vary in size and capacity. The size most used in ships' laundries has a basket 26 inches in diameter with a capacity of 50 pounds.

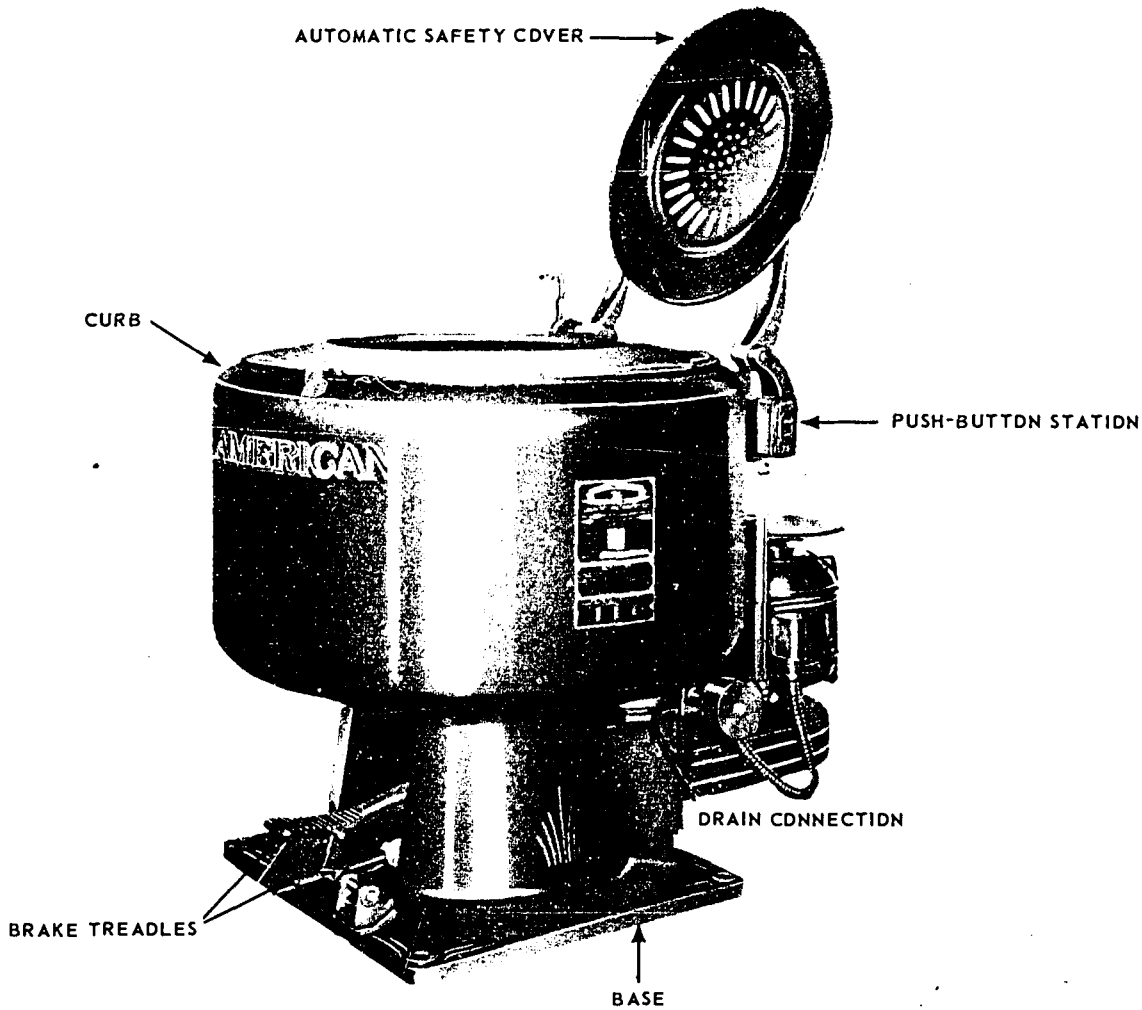
Before you operate an extractor you should understand its construction and the special features built into it. Because of its high operating speed, safety devices are essential to protect both the machine and the operator. These are explained in the next few pages. Study them carefully. If the manufacturer's operating manual for the machine is available (as it should be), study it also; and request assistance on anything you do not understand. An extractor can be a very dangerous piece of equipment if not handled correctly.

AUTOMATIC SAFETY COVER

Extractors now in use in ships' laundries have safety covers to the curb. The safety cover cuts off current to the motor when it is open and cuts it back on when it is closed. It is hinged on brackets bolted to the rear of the curb, and is perforated (sometimes slotted also) to allow free circulation of air in the basket. Refer to figure 5-2 as you study the following paragraphs describing the operation of the safety cover.

The letter (B) in figure 5-2 shows the top of the locking bar in the OPEN position. This bar extends upward through a stationary disc cast as part of the left hinge bracket (A). A matching slotted disc is mounted on the outer end of the hinge pin and turns with it when the cover is raised or lowered.

When you close the safety cover, you align the matching disc in the left hinge bracket and allow the lug at the top of the locking bar to drop into the slot in the disc on the hinge pin. As the locking bar moves downward, it operates the interlock lever (C) and closes the limit switch (electrical interlock), thereby providing



22.14X

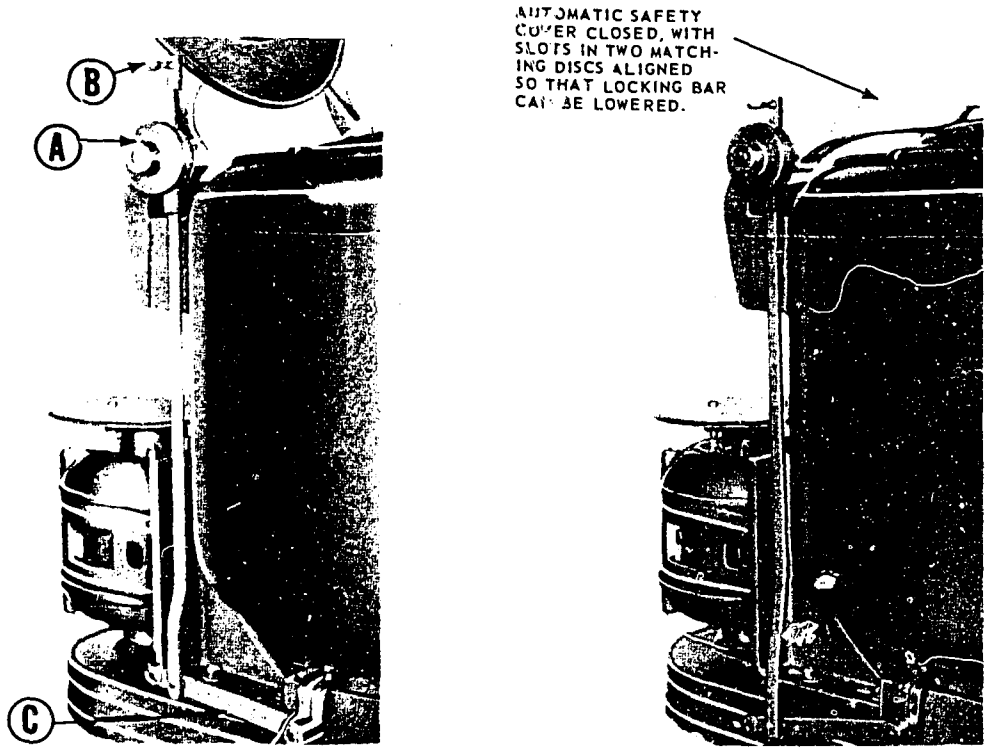
Figure 5-1.—Solid curb extractor.

electric current to the motor. The motor will therefore run when the safety cover is closed, but it receives no current and will not operate when the safety cover is open.

CENTRIFUGAL SAFETY INTERLOCK

The centrifugal safety interlock prevents the operator of an extractor from opening the safety cover when the basket is running. It works in this manner: The spindle sheave assembly has three grooves in the top which slope outward and upward from the center. Each groove contains a hardened steel ball. An aluminum safety ring mounted above the steel balls is free to move up and down on a collar on the top of the spindle sheave, but a lock ring on the collar limits upward movement of the ring.

The complete assembly is composed of the spindle bearing, the safety interlock, automatic balancing device, and the sheave (wheel pulleys) on which the triple belt fits.



22.15X

Figure 5-2.—Locking mechanism for safety cover of extractor.

Figure 5-3 shows the spindle sheave assembly, the safety bumper ring on the collar of the basket, and the construction of the basket. The three metal rings around the basket add strength and rigidity.

When the basket is rotating, the steel balls are thrown outward in their channels by centrifugal force and raise the safety ring. In the raised position, this ring blocks movement of the interlock lever connected to the lower end of the locking bar for the safety cover (fig. 5-2). This makes it impossible to lift the locking bar to open the safety cover until the basket has practically stopped. Before the operator of the extractor can open the cover, he must TURN OFF current to the motor and WAIT until the basket has almost stopped running.

SAFETY BUMPER RING

The safety bumper ring, indicated by an arrow in figure 5-3, prevents damage to the basket and the curb while the basket is balancing itself after you first start the machine. It is a heavy rubber ring attached to the collar of the basket bottom. The basket is like a top with respect to the manner in which it runs. At low speed, it has a tendency to wobble from side to side; but at high speed it runs on a true perpendicular plane. If the weight of the load in the basket is not equally distributed, however, it is much more difficult for the basket to balance itself.

The balancing device of the extractor is built with the spindle bearing of the solid curb extractor. When the basket is loaded unevenly, a circular flange on the outside of the spindle bearing exerts pressure on rubber balance rings held under compression above and below the bearing. These balance rings help to hold the spindle and spindle bearing in a vertical (upright) position and thus reduce vibration of the basket. Figure 5-4 shows that the balancing device enables the basket, spindle, and spindle sheave to move out of the vertical position so that the basket may run smoothly with slightly unbalanced loads.

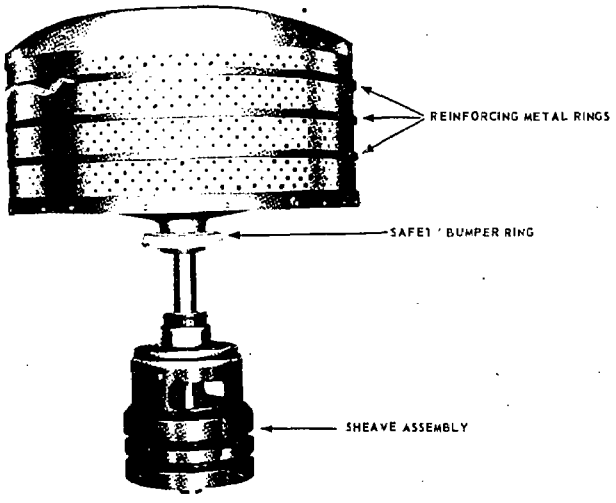


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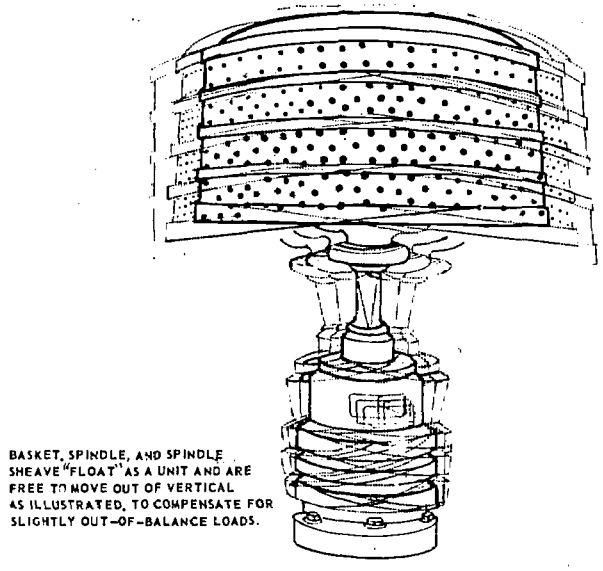
Figure 5-3.—Basket, spindle sheave assembly, and safety bumper ring.



22.17X

Figure 5-4.—Balancing device on spindle of basket.

SELF-LOCKING BRAKE

The brake on the extractor is shown in figure 5-1. The large pedal is connected with the brake band on the spindle, and also to an electrical interlock. When you depress the pedal, you apply pressure to the brake band and also disconnect the electrical interlock. The extractor, therefore, will NOT run when the brake is on.

The small pedal to the right of the brake is the lock-and-release pedal. This pedal automatically locks the brake when the brake pedal is depressed. To release the brake, you simply step on the small lock-and-release pedal. The brake pedal then connects the electrical interlock.

OPERATING THE EXTRACTOR

Procedures for operating an extractor are given in the following paragraphs. Variations for the washer-extractor are explained.

1. Load the basket to its rated capacity. Do NOT strain the motor and other parts of the machine by overloading. It is best to load a few articles at a time. NEVER grab up all you can hold in both hands. Start at a spot against the wall of the basket and continue all the way around. Then start with another cycle of clothes, and continue in this manner until you have only a hole about 6 inches in diameter left at the center of the basket. You should be able to look all the way to the bottom of the basket after you have finished the load. Be sure to distribute the weight of the load EVENLY all the way around the basket, so that the machine will be able to balance the load without undue difficulty and strain. If the bumper ring hits the curb too much, or too long, it is a sign that the automatic balancing device cannot balance the load. When this is the case, stop the machine and reload the basket.

2. Set the timer for the desired extracting time. Normally, it is about 10 minutes. Maximum is 15 minutes.

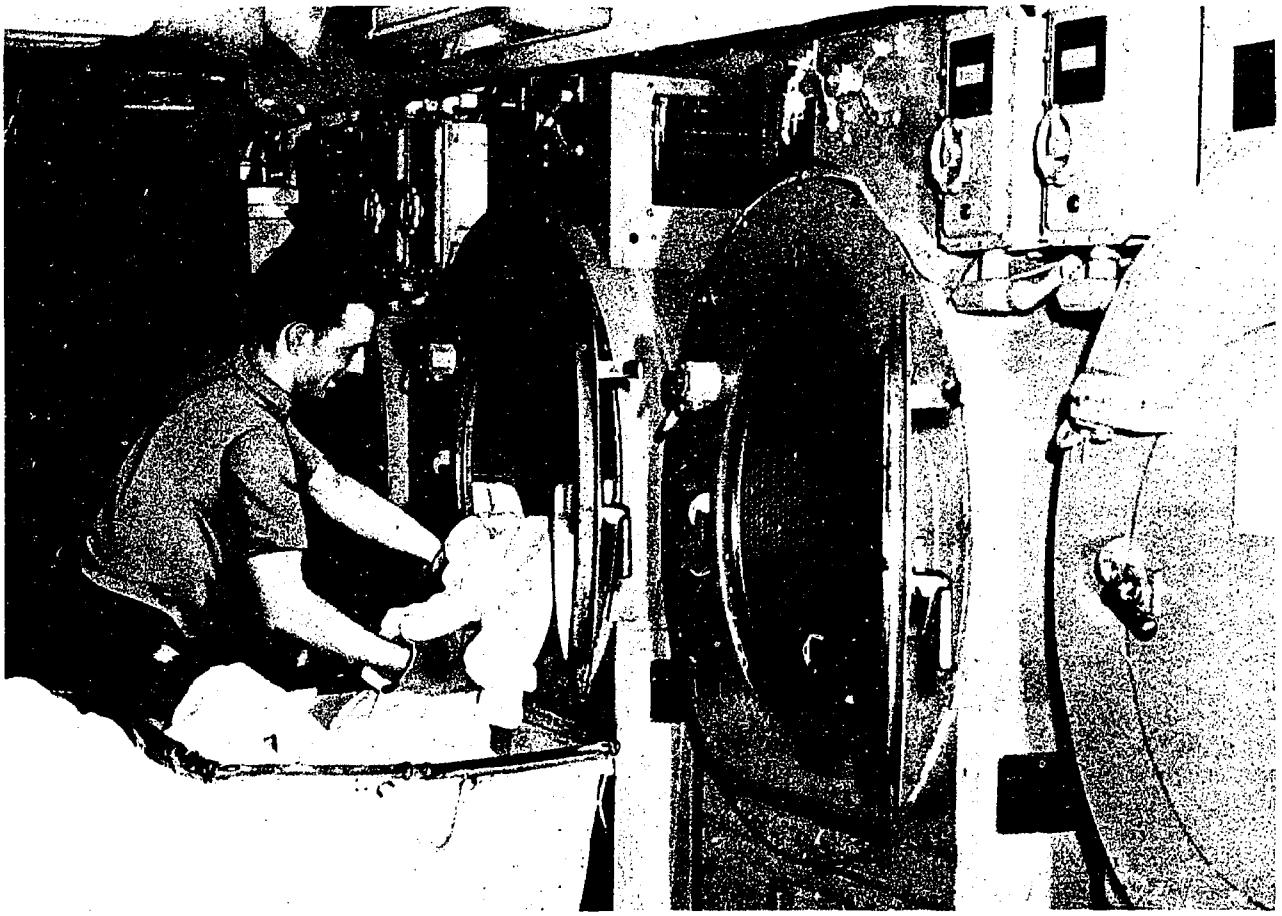
3. Close the safety cover of the machine.

4. Depress brake pedal to release brake.

5. Press START button on the control panel. On the washer-extractor, shift the clutch to the EXTRACT position before you depress the start button for extracting. This movement changes the direction of the basket to COUNTERCLOCKWISE.

6. If necessary to stop the single-unit extractor during the extracting cycle, depress the stop button and apply the foot brake.

7. If there is excessive vibration in the washer-extractor, a vibration control on the machine automatically cuts off current to the motor. This happens when the load gets into



22.18

Figure 5-5.—Battery of drying tumblers.

an unbalanced position. To correct the difficulty, refill the machine with water, run for about 3 minutes, drain and restart with the extracting cycle.

8. When the automatic timer sounds, push the stop button on the control panel and apply the foot brake.

9. In the single-unit extractor, when the basket stops, open the safety cover and remove the load. In the washer-extractor, open the tub door and spot the basket with the INCH buttons. You must do this for each compartment.

CARE AND MAINTENANCE OF EXTRACTORS

The basket of an extractor requires special care. Wash it with a good laundry soap and rinse with clean water. Do NOT use an abrasive or scouring powder. Such substances grind the surface and leave a greasy deposit of metal dust, which is not only difficult to remove but causes streaks on clothes.

Study the instruction manual. Perform minor maintenance yourself—tightening of nuts and screws--but report promptly requirements for all other maintenance. See that maintenance and lubrication charts are followed.

Engineering personnel should check the extractor at regular intervals and perform the following maintenance:

- Clean and oil bearings and all moving parts.
- Adjust and oil foot brake.
- Check the operation of the lock-and-release pedal.

- Clean and oil motor, as necessary.
- Adjust tension on driving V-belts. Replace as necessary.
- Check safety devices.

DRYING TUMBLER

A battery of drying tumblers is illustrated in figure 5-5. These have 37" x 30" baskets with a capacity of 50 pounds each. There are many different sizes of tumblers, but this is the size generally used in ships' laundries.

The door to the drying tumbler on the right is closed, with the safety lock on and the door latch in the CLOSED position. The doors of the second and third dryers are open, and the perforated baskets are visible. Note that you load and unload from the end, just as with the washer-extractor. The two rectangular boxes between the first and second machines (top) are electrical control boxes.

Note the steam coil assembly on top of the machine. The coils look like the tubes in an automobile radiator. The sides of the steam box are open, so that the exhause fan can pull outside air over the coils to heat it for drying the clothes. Check the lever on the front of the steam coil box. By means of this lever you can open or close the valve to control the amount of hot air admitted to the basket at a specific time.

Each drying tumbler has an exhaust fan enclosed in the bottom of the machine. This fan exhausts air from the tumbler enclosure, and outside air then rushes through the open sides of the heat coil box, where it is heated by the steam pipes. It then enters the basket through the perforations and dries the clothes. The exhaust fan removes the air from the basket and forces it out through an exhaust duct. This completes the cycle.

TIMER

The drying tumbler has a timer that eliminates guesswork in drying. The operator can set it for the desired time for a particular load. When the time elapses the alarm sounds.

LINT SCREEN AND CLEANER

Old-type drying tumblers have large lint screens in the back of the dryer housing. They collect much lint and require cleaning every 4 hours during normal operation. Because of their size, these screens are rather difficult to handle and clean. New-type dryers, however, have smaller lint screens which are generally easier to remove and clean. One type of machine has self-revolving brushes which remove lint from the screen and deposit it on a removable piece of canvas.

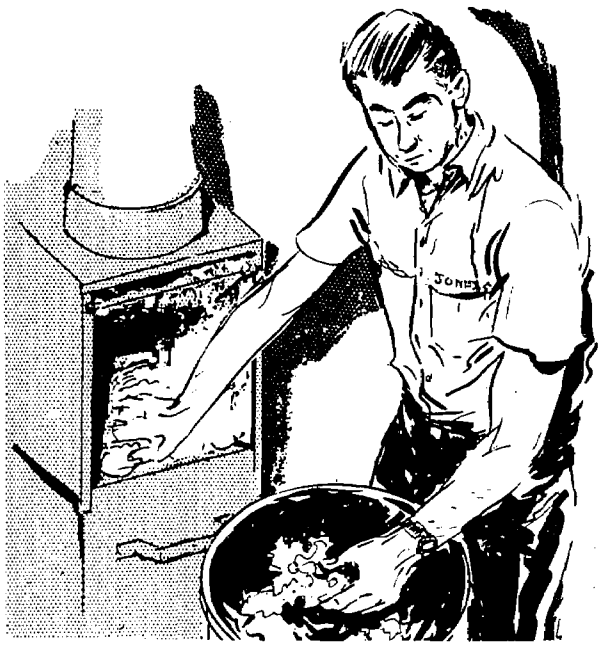


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Figure 5-6.—Laundryman removing lint from lint box.

Figure 5-6 shows a Laundryman removing lint from a machine that has the lint box at the rear. The lint screen is removable and can be cleaned quickly with a stiff bristled brush.

Figure 5-7, shows a Laundryman cleaning the screen of another type of machine. He is turning the handle connected to a rod of the same length as the screen. Several adjustable brushes as long as the rod are attached to it. As the operator turns the handle on the rod, the brushes pass over the lint screen and remove the lint.

STEAM COILS

Steam coils should be examined daily for the presence of lint. Any lint present must be removed.

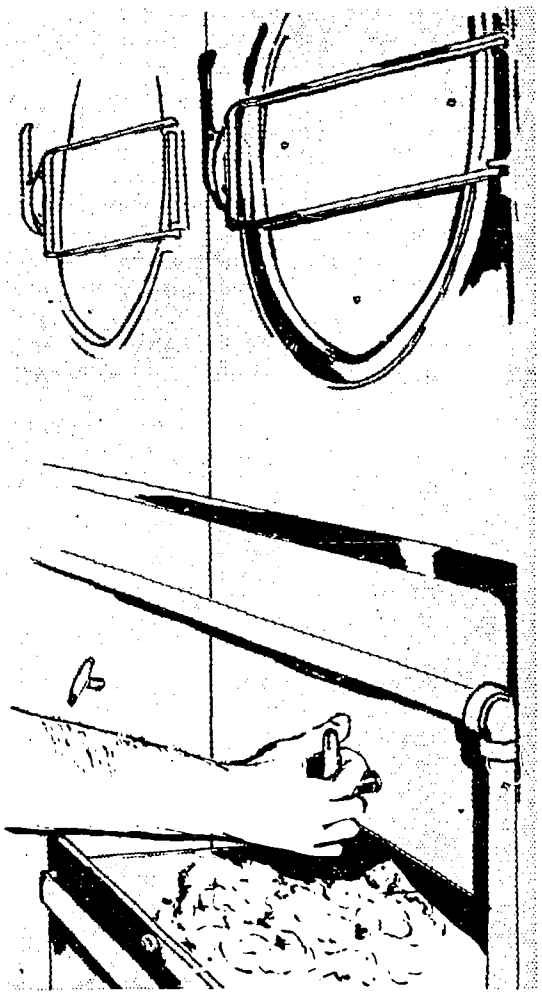

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Figure 5-7.—Laundryman cleaning lint screen.

OPERATING THE DRYING TUMBLER

Before using a newly installed dryer, run it several minutes to remove dirt and dust from the interior. Then clean the basket of foreign matter and/or oil by filling it with clean rags and running the machine for about 5 minutes. It is then ready to use.

The procedure for operating a drying tumbler is as follows:

1. Open damper to exhaust line.
2. Close lint box door (old-type machines).
3. Open steam return line valve.
4. Open partially the steam inlet valve. Heat machine SLOWLY. Do not admit too much steam into steam lines at first. This causes sudden expansion of metal pipes with consequent loud crackling.
5. When machine is thoroughly heated, completely open steam inlet valve.
6. Load basket with correct weight of clothes. DO NOT OVERLOAD, but, at the same time, DO NOT UNDERLOAD. An overload puts too much strain on the machine and blocks the passage of air through the clothes too much, interfering with drying in the normal drying time. Too few clothes in the basket allow the air to pass through too fast, resulting in inefficient operation of the machine. A correct load of clothes creates enough of a baffle, or hindrance, to the passage of air to result in adequate drying during the time allowed.
7. Close basket door.
8. Set timer, for approximately 20 minutes. Drying time depends upon steam conditions, weight and texture of load, and amount of moisture left. Standard tumbler performance should not exceed 1 minute per pound (dry weight). Late model machines (CT3) can dry almost 2 pounds of clothes in a minute.
9. Turn manual switch ON. Motor will start.
10. When timer alarm sounds, open door and remove load.

CAUTION: Do not use a drying temperature above 150° F on synthetic materials. As you learned in chapter 3, high temperatures cause permanent damage to synthetics.

- Tumble all dryer loads for 10 minutes with dampers set to deliver air at room temperatures before removal of clothing.
- To avoid possible combustion, remove all laundered items from dryers upon completion of drying cycles.
- Man laundry spaces after dryer is last emptied to ensure no residual build-up of heat in all filled bags/hampers. Clothes should be stored loose to allow air to circulate.

CARE AND MAINTENANCE OF DRYING TUMBLERS

Always keep your drying tumbler free of lint. Lint is a fire hazard. Besides, clothes will not dry properly unless the lint screen is clean enough to allow free passage of air through the machine.

If you have a dryer with a self-cleaning screen, check it every time you remove lint from the canvas to determine how well the brushes are doing the job. When they become worn, they require adjustment to make them strike the screen with enough force as they revolve to remove lint. Eventually they require replacements.

Small screens on dryers without self-cleaning screens require manual cleaning rather frequently. Experience in operating the machine under normal conditions tells you how often to clean the lint screen. It is also a good idea to clean the lint box each time you clean the screen.

Use a vacuum cleaner or a compressed air jet to remove lint deposits from heater chambers and air passages in the dryer. If lint is left to accumulate, spontaneous combustion may result, or the flow of air will be restricted.

Other maintenance you can perform on the drying tumbler includes:

- Checking switches and dampers to determine how well they work.
- Keeping nuts and screws tight.
- Reporting maintenance requirements to your supervisor promptly.

The engineering department should check the drying tumbler at regular intervals for accumulations of lint in air passages and the lint box, faulty opening and closing of dampers, leaks in the steam valves or lines, and the general condition of the machine. Engineering personnel should lubricate the tumbler and make major overhauls in accordance with the recommendations of the manufacturer.

DRYING IMPREGNATED CLOTHING

When you are drying impregnated clothing, take the following measures to prevent spontaneous combustion of impregnated protective clothing when it is being removed from the laundry drying tumbler. Drying of impregnated protective clothing must be done carefully since excessive heat will cause loss of impregnite and may also destroy the clothing. It is important that the temperature of protective clothing be kept no higher than 155 degrees F.; any higher temperature will damage the fabric.

The clothing should be removed from the tumbler at once after drying is completed. Clothing removed from the dryer should immediately be separated and folded. Drying may also be accomplished by hanging the clothing on a line, but precautions should be observed against the exposure to direct sunlight.

Impregnated clothing should never be ironed or drycleaned. It can normally be laundered three times before its protective qualities become inadequate, but representative samples of the clothing should be tested after each laundering to determine whether it should be reimpregnated. In order to facilitate the laundering of protective clothing under this limiting condition, it is necessary that laundry drying tumblers be modified and operated as outlined herein.

One tumbler on each ship should be modified for laundering protective clothing and only tumblers so modified should be used for this purpose.

TUMBLER DRIER HEATER COILS

The heater coils of tumbler driers are generally arranged in two banks with separate steam connection to each bank. In most cases valves are provided on both the inlet and drain side of each bank. If the tumbler or tumblers selected are not presently equipped with a shut-off valve on each side of at least one bank of coils, valves for this purpose should be installed by the ship's maintenance division. When laundering protective clothing, one bank of heater coils should be shut off at both the inlet and the drain connection. This should reduce the maximum drying temperature, when using 100-pound steam pressure, approximately 45 degrees F. which will bring the temperature down to within a safe operating range. If your ship uses 35-pound steam pressure, the temperature will be reduced a lesser amount, but it will be well within the safe operating range.

THERMOMETER

In order to facilitate operating tumbler driers under the above conditions, thermometer, FSN 6685-242-2212, 6685-242-2220, or 6685-242-2216, should be installed in the air discharge duct from the tumbler cylinder in a position where it can be easily read by the operator. These thermometers have a range of 30 degrees F. to 240 degrees F.

OPERATING PROCEDURES WHEN DRYING IMPREGNATED CLOTHING

When drying impregnated clothing in the tumbler, the operating procedure should be as follows:

1. Close the steam intake valve and the drain valve on one bank of heater coils.
2. Thoroughly clean the lint screens.
3. Close the cold air damper and open the warm air damper (on open end tumblers). Set dampers on side loading tumblers so that no air will be recirculated.
4. Without any load in the cylinder, operate the tumbler for 15 minutes admitting steam to only one bank of heater coils and observe that the temperature does not exceed 155 degrees F. Adjust dampers if necessary. When this condition is met, the tumbler is ready for operation.
5. After the clothing has been washed and extracted, place a normal load in the tumbler and operate the tumbler until it is satisfactorily dry, but in no case should the temperature of the exhaust air exceed 150 degrees F. After drying, protective clothing must be allowed to cool completely before packing or storing in order to prevent undesirable reactions.

CHAPTER 6
FLATWORK IRONING

The main items of laundry flatwork aboard a Navy ship are bed linens and tablecloths. For pressing these, a flatwork ironer is installed on ships that have sufficient requirement for this piece of equipment. On this ironer (sometimes called a mangle) the flatwork is ironed damp just as it comes from the extractor. Often, too, the ironer can handle additional work and is used for finishing such things as handkerchiefs, hand towels, aprons, undershirts, and white trousers and jumpers. This use of the ironer lightens the work of the drying tumblers and produces a better finish than rough drying.

On ships without flatwork ironers, some of the flatwork, such as the table linen, is pressed on a laundry press of the type described in chapter 7. The rest of the work is rough dried.

You will probably serve at some time on a ship that has a flatwork ironer, and therefore are expected to know how to operate one correctly. As with other machines in the laundry, you should know what care and maintenance is your responsibility and what jobs are performed by engineering personnel. This chapter covers correct procedures for operation of the ironer and for the maintenance tasks that are your responsibility. It also covers the safety precautions that will help you avoid breakdowns and dangerous accidents.

Flatwork ironers currently used in ships' laundries are not all exactly alike, but they all work on the same principle. This chapter describes the ironer and its operation and maintenance in general. Two of the newer types are shown in the illustrations.

DESCRIPTION OF THE IRONER

The type of flatwork ironer used on Navy ships consists of a steam heated cylinder against which the flatwork is pressed by means of three padded rollers. The work is carried into the ironer on feed ribbons that lead it over the cylinder. At the rear an apron presses it against the under side of the cylinder and returns it to the front. Steam to heat the cylinder is provided by the ship's steam line, and the motor is electrically driven.

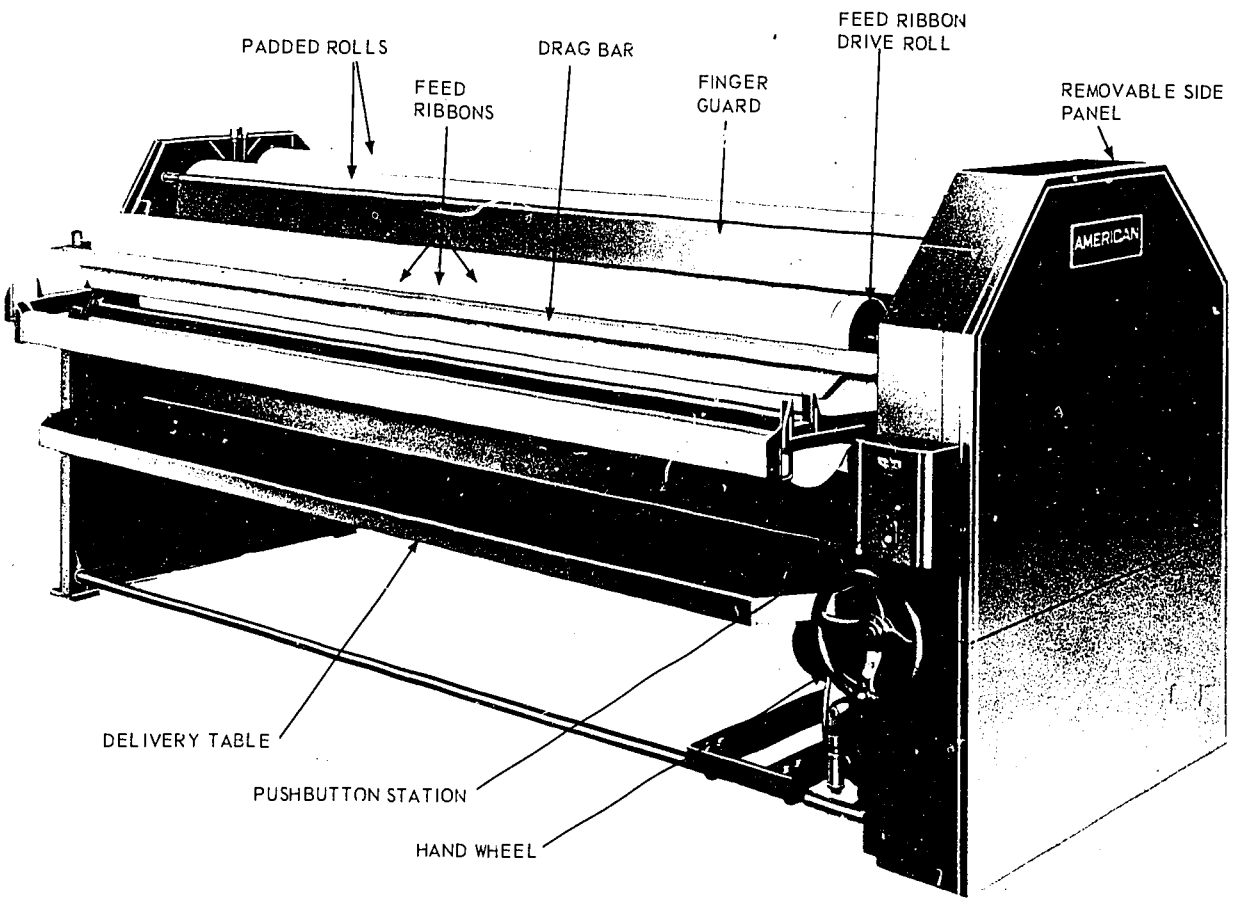
In the ironer shown in figure 6-1, the parts with which you are mainly concerned are labeled. Other parts, not so clearly seen and not labeled, are the motor, which is below at the right, and the parts housed on the two frames that support the cylinder and rollers. The drive gears are housed in the right frame, and the left end has a combined inlet and outlet steam joint. The condensate (steam reconverted to water) is collected by a trap connected to the outlet part of the steam joint.

Maintenance of the motor, gears, and steam connections is the responsibility of engineering personnel; and if you suspect that adjustment or repair is needed in these areas, you should notify the engineering department. As the operator, you will be responsible for following correct operating procedures and for making adjustments to roll pressure, changing the feed ribbons, removing and replacing roll padding and covers, changing and adjusting the apron, and keeping the cylinder, rolls, and apron clean. We will, therefore, examine those parts of the machine more closely.

The cylinder is 16" in diameter. The size of the machine is designated by the length of the cylinder, which represents the width of material the machine will take without folding. Currently, ironers used on Navy ships have either 50" or 85", or 100" cylinders.

The three ironing rolls, mounted above the steam cylinder, are 6 3/8" in diameter when padded. They have spring pressure adjustments at each end. Each roll operates at a different pressure, the front roll having the greatest pressure and the rear roll the least. The large handwheel at the right is for increasing and decreasing pressure.

Feed ribbons are spaced close together so as to carry all parts of a large piece of work like a sheet or bedspread evenly into the ironer. One of the hazards of operating early types of mangles was the possibility of the operator's hand being drawn into the machine and crushed between the hot cylinder and the rollers. As a



22.21X

Figure 6-1.—Flatwork ironer used in ship's laundries.

protection, modern machines have a finger guard that prevents the hands of the operator from getting near the rolls. This guard also prevents damage to work through careless feeding. If anything thicker than flatwork touches the guard, the limit switch on the right frame opens automatically and cuts off current to the motor.

The apron is a cloth conveyor belt the width of the machine. It travels around a series of small rollers located under the cylinder.

OPERATING THE FLATWORK IRONER

Men who operate a flatwork ironer should have the manufacturer's instruction manual available. You should break out the manual and study it before you operate any ironer for the first time, and afterwards keep it at hand for reference.

PREPARING A NEW IRONER FOR USE

Before you use a new ironer, you must remove the protective coating placed on the cylinder by the manufacturer. To do this, run a piece of heavy paper (absorbent) into the machine under light roll pressure. Stop the machine and turn on the steam until the coating melts and is absorbed by the paper. Then remove the paper and wipe the remainder of the

coating from the cylinder with a clean rag. Do this before the cylinder cools. Clean the apron and rolls of all foreign material that may have collected in transit.

Another necessary preliminary to using a new ironer is to have it checked and adjusted by the engineering department.

Before each period of use, make sure that the ironer is thoroughly clean. When you finish using it, you should leave it clean, but check it again the next time you use it to be certain that nothing has gotten in that would soil the flatwork.

HEATING THE IRONER

A flatwork ironer should always be heated before you start to feed it. Heating of the cylinder is done while the padded rolls and apron are not in contact with the cylinder.

Heating the Cylinder

1. Heat the cylinder slowly. Allow 45 minutes from the time you start heating until the machine is ready to operate.

2. Open the valve bypassing the steam trap, then partially open the main steam valve to heat the cylinder slowly. If you turn the steam on full force while the cylinder and machine are cold, the sudden expansion of the cold cylinder could cause it to warp or split. The frame of the ironer where the steam line is connected could also be damaged by excessive vibration caused by sudden expansion of the cold metal.

3. Leave the bypass valve open for 30 minutes. Then close it and fully open the main steam valve. The cylinder is now hot and the full force of the steam will not damage it.

Heating the Rollers

When the cylinder is heated, you are ready to heat the rollers. Turn the handwheel clockwise to apply light pressure. Then depress the start button and run the ironer empty for about 15 minutes to heat the padded rolls thoroughly.

DO NOT START FEEDING UNTIL THE CYLINDER AND ROLLS ARE THOROUGHLY HEATED.

PRESSURE CONTROL

Turning the handwheel clockwise brings the padded rolls in contact with the cylinder and at the same time raises the return apron into operating position. The same handwheel clears the rolls and apron from the cylinder when turned counterclockwise.

Turn the wheel carefully, applying just enough pressure to produce a desirable finish. Too much pressure will damage the padding of the rollers and cause undue wear on the bearings and excessive strain on the driving mechanism. Once you determine the right amount of pressure for good work, you can set the wheel at the same point for almost all your work.

The pressure should be released whenever the machine is to be idle for 10 minutes or longer. Otherwise, heat from the cylinder will scorch the roll padding and the apron.

NEVER RUN THE MACHINE WITH THE PRESSURE OFF. To do so will damage the apron.

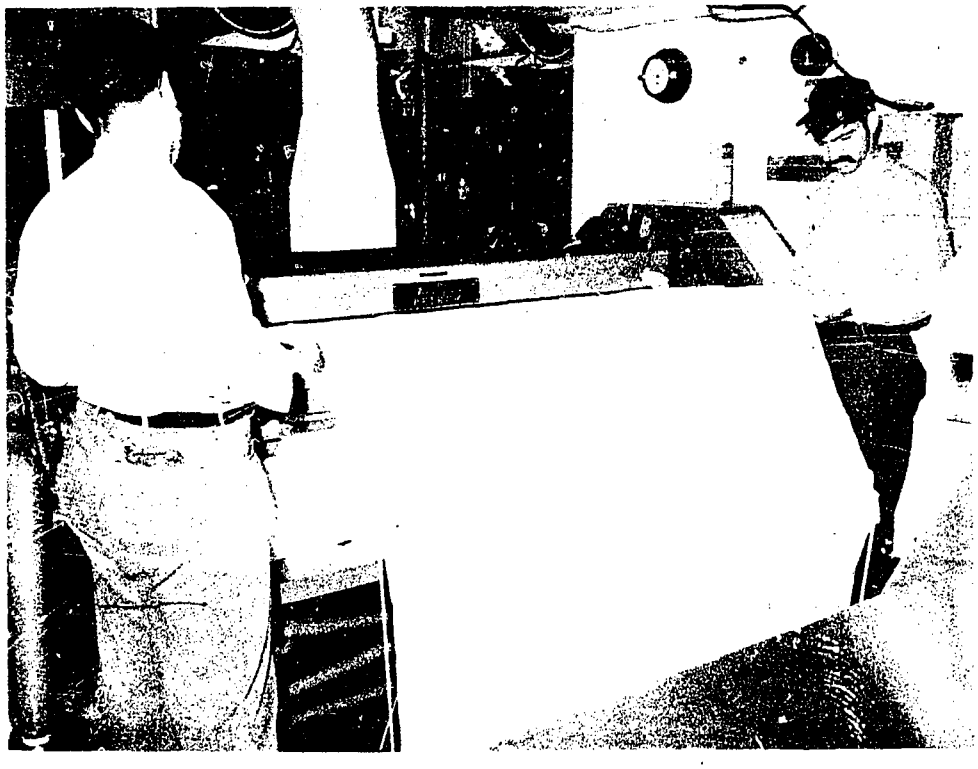
FEEDING THE IRONER

Flatwork comes from the extractor full of wrinkles and must be shaken out by hand before feeding it into the ironer. Two men should handle large pieces, being careful not to pull the fabric too much in shaking. Otherwise, they may tear it. The shakeout serves to prepare work for feeding into the machine, and precludes the possibility of ironing heavy wrinkles or folds into the material.

To facilitate feeding, a quantity of work should be shaken out and laid over the edge of the laundry basket, or on a table within easy reach for the operators. If you are using a small ironer that requires folding of large pieces, shake them out and fold immediately.

Check on the amount of dampness in the pieces before feeding. They should come out of the ironer dry and, to accomplish this, some adjustment of the extracting time may be necessary. If they are not extracted long enough, they will come out of the ironer still damp; and if extracted too long they will come out with a rough, dry appearance. Do not let flatwork sit around in the laundry baskets after it is removed from the extractor. Iron it immediately while it is at the proper stage of dampness, or cover with plastic or other material to retain a proper amount of moisture.

Feed flatwork into the ironer WRONG SIDE UP, so that the smooth or "right" side comes into contact with the cylinder. This gives a smooth finish to the outside or "right side" of



22.22(155A)

Figure 6-2.—Laundrymen feeding flatwork ironer.

the flatwork. Fold this side out as the work comes from the machine.

Feeding Large Items

Two men should feed sheets, bedspreads, and other large items into a 75" ironer. See figure 6-2, noting especially the position of the men's hands. In starting the piece through the ironer, each man grasps a top corner with the hand nearest the ironer, stretching the forward edge between them so that it enters the machine straight and smooth. Each man uses his other hand to straighten the front edge as it enters the ironer. After the feed roll ribbons pick up the spread, they use both hands to hold the spread firm and straight as it passes through the ironer. As the spread comes out, the men take it by the edges again and fold it. The ironer shown in figure 6-2 has a safety screen over the padded rolls. This screen can also be installed on the machine shown in figure 6-1.

On the 50" ironer the large flatwork must be folded to pass through. Less pressure may then be necessary, and two passes through the ironer may be required to dry the fabric. On the second pass, turn the piece so that the opposite side comes into contact with the cylinder. Both halves of the side folded out will then have the same shiny finish.

Feeding Small Items

When feeding small articles into the flatwork ironer, use the entire length of the

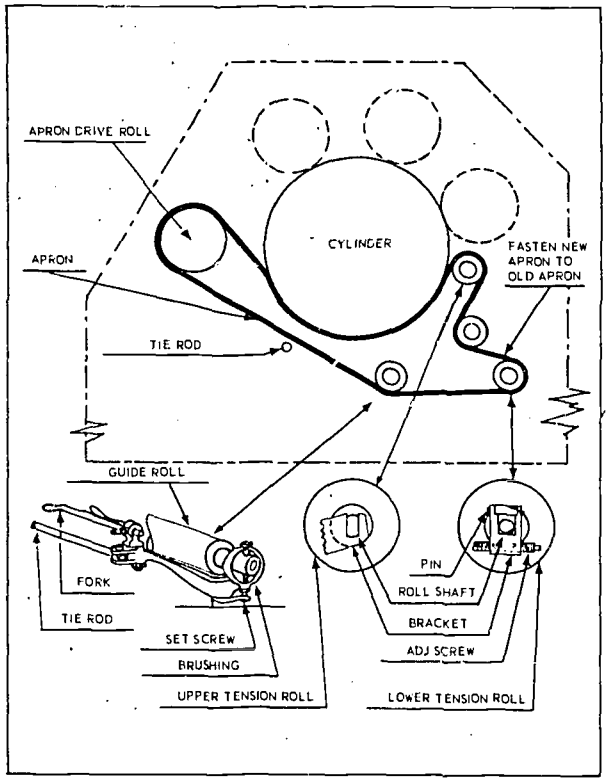


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Figure 6-3.—Diagram for replacing apron on flatwork ironer.

cylinder. If you continually feed small items into the ironer at one or two spots, you will soon wear the padding on the rolls more at these points and your work will come out unsatisfactory. The only way to correct this difficulty is to repad the rolls.

Pressing Items of Uniform

Before feeding trousers or jumpers into the ironer, release the roll pressure enough to allow for the double thickness of the material and for the buttons. Feed white jumpers and trousers inside out. Jumpers should go into the ironer bottom first so that you can straighten the sleeves and collar as the garment enters the machine. For a small ironer, fold the jumper down the middle with the back on the outside. When it is turned right side out, the crease down the center of the collar will be up, as it should be. Straighten trouser legs so that the creases will be along the seams, and lay the legs together. Feed into the ironer bottoms first, smoothing out the upper part as much as possible. Some wrinkles cannot be prevented, but get the garment as smooth as possible. Jumpers and trousers probably will need to go through the ironer twice to dry them satisfactorily.

This method of pressing enlisted white uniforms is, of course, preferable only to rough drying. The presses described in chapter 7 do a much better job.

SECURING THE IRONER

Upon completion of work, stop the motor. Close the main steam valve tight. The bypass valve may be opened to speed the cooling.

When closing down, the padded rolls and the apron should be entirely free of the cylinder. To help preserve the padding of the rollers, a piece of heavy duck may be run into the ironer between all three rolls, the apron, and the cylinder. Run it in before you release the pressure, and then when you next use the ironer, remember to apply pressure before you run the cloth out. Whether you insert the cloth or not, release the pressure before securing the ironer.

CARE AND MAINTENANCE YOU PERFORM

Earlier in this chapter the maintenance tasks of the Laundryman were listed. Before starting any of these be sure you know how to do the work. Consult the manufacturer's instruction manual unless you have done the task on this machine recently. Under ordinary circumstances, do not undertake jobs that are the responsibility of engineering personnel.

CARE OF STEAM CYLINDER

When cleaning the cylinder, run a paraffined cloth through the ironer about twice a day. Cut a strip of cloth about 3 feet wide and as long as the cylinder. Sprinkle half of the strip generously with powdered paraffin (or shavings of solid paraffin) and fold the other half over it. Then run it through the heated ironer, folded edge first. The cloth can be re-used as long as the wax lasts.

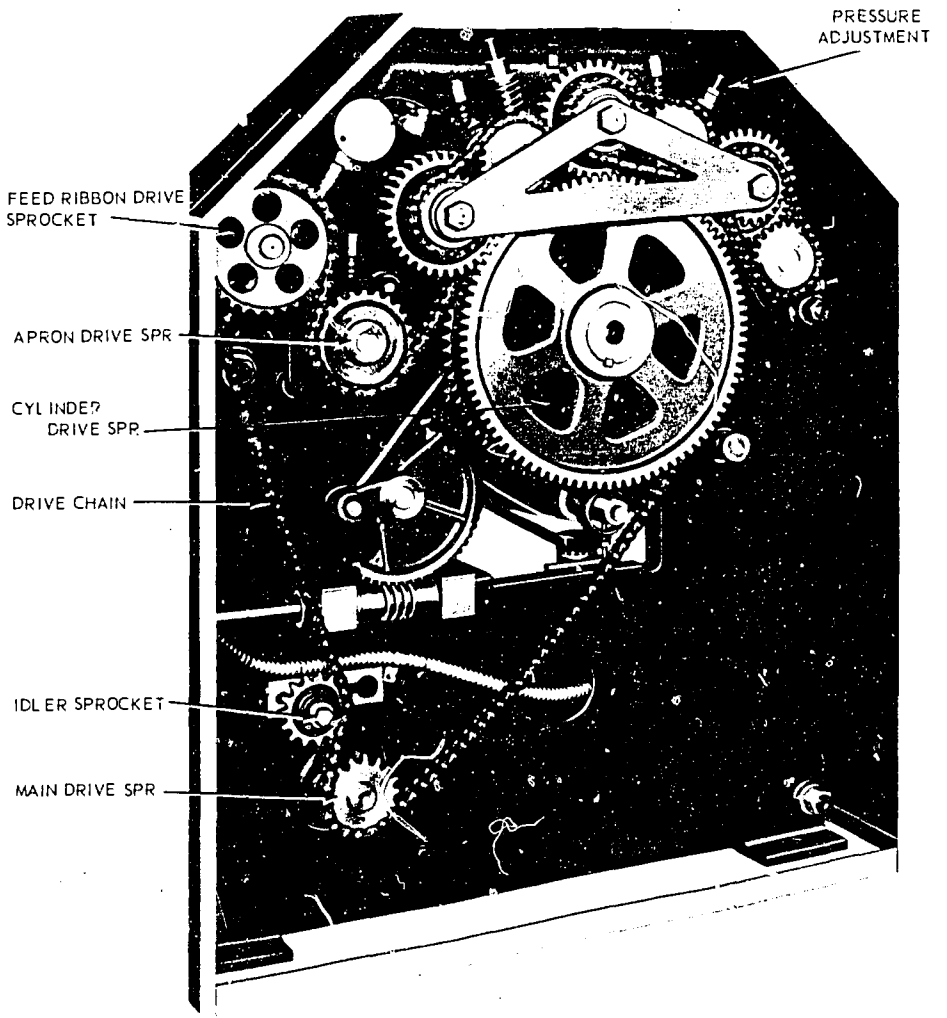

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Figure 6-4.—Pressure roll adjustments and gears in right-hand frame.

CARE AND REPLACEMENT OF APRON

After a certain amount of use, the return apron stretches. Remove the stretch by making equal adjustments on both ends of the rolls. Eventually, however, it becomes stretched and worn beyond satisfactory use and must be replaced. Figure 6-3 shows you how to replace it.

The heavy line running over the apron drive roll, under the cylinder, and over the tension rolls is the path of the ironer apron. Change it in the manner outlined below.

1. Fasten the new apron to the old one at the point shown.
2. Cut old apron.
3. Run machine long enough to pull new apron around rolls.
4. Remove old apron.
5. Insert wire through clipper lace on new apron.
6. Apply pressure to rolls with handwheel. See figure 6-1.

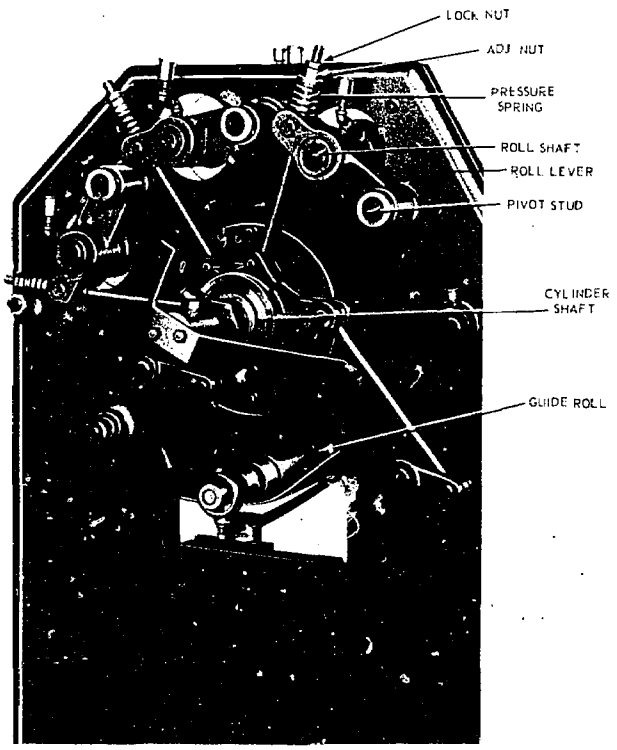

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Figure 6-5.—Mechanism on left-hand frame of flatwork ironer.

7. Turn screws on apron tension rolls until tension on apron is correct. Note location of tension rolls in figure 6-3, and location of adjustment screws. See figures 6-4 and 6-5 for location of these screws.

An arrow in figure 6-3 points to the position of the apron guide roll on the ironer. It is directly beneath the cylinder and prevents the apron from getting out of position and shifting laterally across the face of the cylinder.

HOW TO REPAD IRONER ROLLS

Change the padding on ironer rolls when it is scorched and burned out, or when resiliency is lost. This can be determined by applying finger pressure to the roll circumference. If an impression cannot be made, the padding is no longer resilient and is in need of replacement. The length of its life is dependent upon the type of material and the amount of use of the ironer. The roll covering should be changed when it is badly scorched.

The material recommended by the manufacturer (table 6-1) for repadding ironer rolls of the ironer illustrated in figure 6-1 is given in table 6-1.*

Table 6-1.

Article	Quantity	Size
Muslin	3 pieces	45" x 52"
Knitted padding (1/4")	3 pieces	90" x 48"
Muslin	3 pieces	72" x 52"
Apron duck (4-ply) . .	1 piece	50" x 87"
Duck for bib	1 piece	26 1/2 x 50"
Ribbons	19	1/2 x 35"
Apron drive roll duck (#12)	1 piece	21" x 52"

Steps in the repadding of ironer rolls are as follows:

1. Relieve roll pressure and apron tension with the handwheel.
2. Remove worn covering, and clean rolls thoroughly.
3. Lower the cleaned rolls to a position 3/8" above the cylinder.
4. Apply a coat of glue 2" to 3" wide on the full length of the first roll. Then stick one edge of the 45" x 52" muslin binder to the glued portion and wrap it around the roll, in the direction OPPOSITE TO the rotation of the wheel. When put on in this manner, the roll will keep the muslin tight as it runs.
5. Follow the procedure in step No. 4 for the second and third rolls.
6. Apply one piece of the 1/4" knitted padding to each roll. Allow a 12" lap under the muslin binder.
7. Put a 72" muslin top cover on each roll. Allow a 12" lap under the knitted padding.

Tear the muslin binder and remove the selvage to get a straight edge. DO NOT CUT. To prevent wrinkles, carefully feed the covering around the rolls. When the roll covers become discolored or worn, change them witnout delay.

*Ribbons and duck for apron and bib are also included in this list.

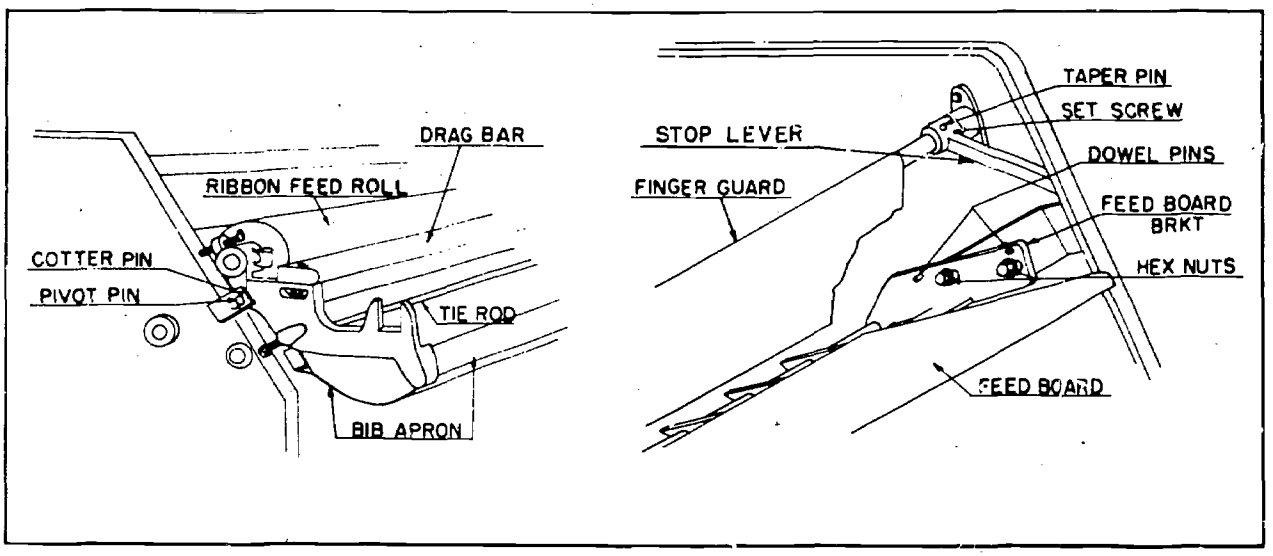

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Figure 6-6.—Diagram for replacing feed ribbons on flatwork ironer.

Newly padded ironer rolls should measure 6 3/8" in diameter. Measure them with a caliper or a steel tape. Release the pressure on the rolls and measure each one in the middle and at each end. If the circumference is approximately 20" for all three measurements, the padding on the rolls is fairly uniform all over. If, however, there is an appreciable difference in the three measurements, you'll have to remove the padding and start over.

After you complete the padding of the rolls, adjust them to uniform pressure in the manner indicated below.

1. Turn the handwheel counterclockwise to raise the padded rolls clear of the cylinder. See figure 6-1.

2. Remove cover to housing on right frame of ironer (see fig. 6-4). Then loosen nuts on all spring mechanisms (right and left ends figs. 6-4 and 6-5) for pressure rolls to release tension on the springs. Then tighten each nut as much as possible by hand. With an appropriate wrench, give the nuts for the No. 1 roll TWO COMPLETE TURNS, and the nuts of the No. 2 roll ONE COMPLETE TURN. Leave the nuts for the No. 3 roll FINGER TIGHT.

3. Turn the handwheel until the padded rolls come into contact with the cylinder.

4. Turn on the steam and heat the cylinder and rolls thoroughly.

5. Start the ironer and run it for 30 minutes or until the padding is packed snugly to the rolls.

6. If the rolls do not have enough pressure on them after the 30-minute run, turn the nuts clockwise 1/6 turn at a time until you get the desired pressure. Be sure to give the nuts at each end the SAME NUMBER OF TURNS. When pressure is satisfactory, tighten the locknuts over the adjusting nuts.

Some ship's laundries use asbestos padding and an asbestos-type material as a cover for repadding ironer rolls. It lasts much longer than the material listed above for repadding and re-covering.

HOW TO REPLACE FEED RIBBONS

The life of feed ribbons can be prolonged by cleaning them with a brush and cleaning fluid occasionally. Eventually, however, they must be replaced. The steps in the procedure are:

1. Wipe excess grease and oil from ends of the ribbon feed drive roll.

2. Remove the bib apron and the drag bar. These are fastened with two hexagonal nuts.

3. Cut old ribbons and remove them.

4. Remove the upper right-hand panel section. See figure 6-4.

5. Loosen the drive chain.
6. Remove the cotter pin and the pivot pin. Then swing the finger guard back over the first padded roll.
7. Remove the two dowel pins and the hexagonal head bolt which fasten the feed board brackets to the frame bracket and remove the feed board. See figure 6-6.
8. Place a small wood block (3" x 4") midway of the front tie rod to support the ribbon feed roll.
9. Remove the cotter pin from the lefthand ribbon feed drive roll bearing pivot pin; then remove the pivot pin, and the bearing from the roll shaft. You can then balance the roll on the wood block.
10. Place the feed board on top of the drive roll and balance it in this position.
11. Loop the feed ribbons over the drive roll and feed table.
12. Move the wood block to the left end, and then place the ribbons in the correct position.
13. Remove the wood block and replace the bearing on the left end of the roll shaft. Replace the pivot pin and the cotter pin.
14. Replace all parts and adjust ribbon tension and the drive chain.

WEEKLY AND SEMIANNUAL MAINTENANCE

WEEKLY

Once a week the engineering department should perform the following maintenance on the flatwork ironer:

1. Check steam and drain connections and steam traps.
2. Inspect safety guard and interlock switch.
3. Check oil lubrication fittings, and fill oil and grease cups.
4. Tighten nuts and screws.
5. Check all moving parts.

SEMIANNUAL

Twice each year the engineering department should:

1. Remove gear guards, belt guards, and sprocket chain guards and inspect gears, sprocket chains, and belts, and make necessary adjustments and repairs. Replacements should be made if necessary.
2. Adjust tension of sprocket chains and V-belts.
3. Check trunnion and roller bearings and and intermediate bearings.
4. Check for loose nuts and screws.
5. Clean all parts of machine.

TROUBLE SHOOTING

If your flatwork ironer fails to turn out satisfactory work, use the guide below for trouble shooting:

TROUBLE	PROBABLE CAUSE
1. Flatwork does not dry.	Work not properly extracted. Low steam pressure on ironer.
2. Flatwork becomes discolored after passing through ironer.	Work too damp. Check extraction time. Excessive amount of supplies. Washing supplies not rinsed from work. Improper cleaning and waxing of cylinder.
3. Flatwork curls up or rolls when fed into ironer.	Work too damp. Work oversoured. Ironer not waxed.
4. Flatwork wrinkled or rough.	Work allowed to air dry before ironing. (Cover damp work when not ironed immediately.) Careless feeding into ironer. Incorrect roll pressure.
5. Apron does not run true or "travels."	Unequal tension adjustment on both sides. Ironer not level.

CHAPTER 7

PRESSING AND FINISHING

Uniform shirts, trousers, and coats must be pressed before they are worn. Most ships' laundries have the presses and auxiliary equipment necessary to accomplish this work to the extent listed in NAVSUP Publication 487 paragraph 1103. This includes hand and puff irons. This chapter covers the pressing of cotton uniforms only. HOT HEAD presses (uncovered polished steel) heated with steam are used to press cotton fabrics, because these fabrics can withstand high temperatures. You learned in chapter 3 that wool fibers cannot withstand a high temperature, and garments made of wool must therefore be pressed on presses with covered heads and bucks. The procedure for doing this is discussed in Chapter 9, "Dry Cleaning." Attempts have been made in Navy laundries to press blue uniforms on laundry presses, with disastrous results. The uniforms were damaged beyond further usefulness.

DESCRIPTION OF LAUNDRY PRESSES

A laundry press consists of a stationary padded buck fastened to a rigid metal frame. The head of the press is made of polished metal, and is lowered by a pneumatic system operated by compressed air. Live steam is admitted to the head to heat it, and the condensed steam is carried away by a drain pipe. A steam trap prevents live steam from entering the drainage system. A table for holding a garment undergoing pressing is secured to the frame of the press beneath the buck.

The press shown in figure 7-1 is air operated. It is a utility press with a 51-inch head. Since it is fully automatic, it has no levers or pedals. The air buttons for lowering and locking the head are on the front of the table, the top ones. Both hands must be used to press both buttons at the same time. The release buttons are immediately beneath the buttons used for closing the head. The head can be released by depressing either the right or the left release button.

The buck of a press is your work table. Its size and shape vary in accordance with the function for which it was designed. Unlike the head, it is padded in a specific way for satisfactory pressing. This padding must be in good condition at the time, and must be changed when scorched, uneven, or worn. The amount and condition of padding affect head pressure, and you must readjust this pressure to get the amount required for good pressing.

TYPES OF PRESSES

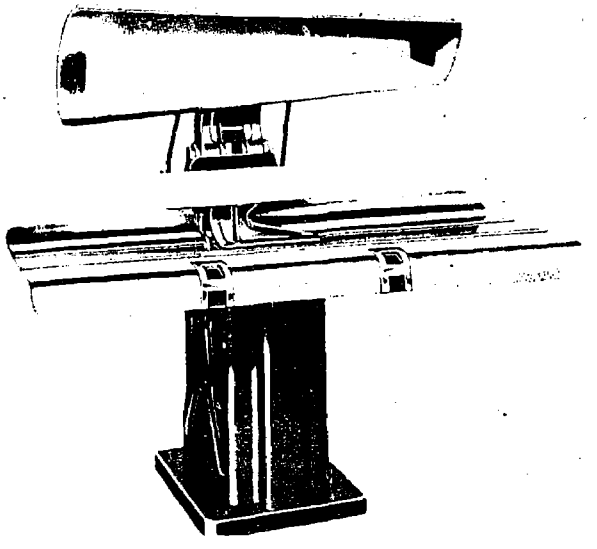
The types of presses usually installed in ships' laundries are as follows:

1. Tapered head—for general pressing of wearing apparel.
2. Rectangular head—for general pressing of wearing apparel.
3. Triple head—for pressing a shirt's collar and cuffs simultaneously.
4. Sleeve—two lay
5. Sleeve form—for removing wrinkles from shirt sleeves.
6. Yoke
7. Mushroom
8. Body and bosom
9. Puff iron—for removing wrinkles from shoulders of shirts and coats.
10. Cabinet double-single form—for pressing front, back, and yoke in one operation.
11. Cabinet bag sleever.
12. Rotomatic unit—consisting of two components—one consisting of 10 trouser topping presses, and one consisting of five trouser legging.

Most ships will have the first two presses listed, but only carriers, tenders, and repair ships may have the others listed above.

AUXILIARY PRESSING EQUIPMENT

Auxiliary equipment for pressing and finishing consists of hand irons, ironing boards, and spray guns attached to press units. Hand irons enable a laundryman to do a better job of pressing coats and shirts. Figure 7-2 shows a laundryman using a hand iron. A spray gun is



22.28X

Figure 7-1.—Air operated laundry press.

essential for dampening garments which are too dry for good pressing. Cold water is used. A small amount of water sprayed on the last part of a garment pressed is necessary to compensate for the moisture lost while other parts are being pressed on the hot press. The use of a spray gun is also important when you are using the steam heated sleeve forms, or a puff iron. After you apply the mist you can smooth out the wrinkles while the heat of the press is drying the sleeves and/or shoulders.

PRESS LAYOUTS

When two or more presses are placed together so that garments may be alternately pressed on each machine by one operator, the group of presses is called a unit. In large laundries separate units are used for shirts and for coats and pants. The placement of presses within a unit, or the placement of units in the laundry, is called the layout of the equipment. The layout of all laundry equipment is done by NAVSHIPSYSCOM, and changes should not be made without prior approval.

Illustration 7-3 shows a laundryman working on a shirt unit. He has a shirt on the left press,

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Figure 7-2.—Laundryman using a hand iron.

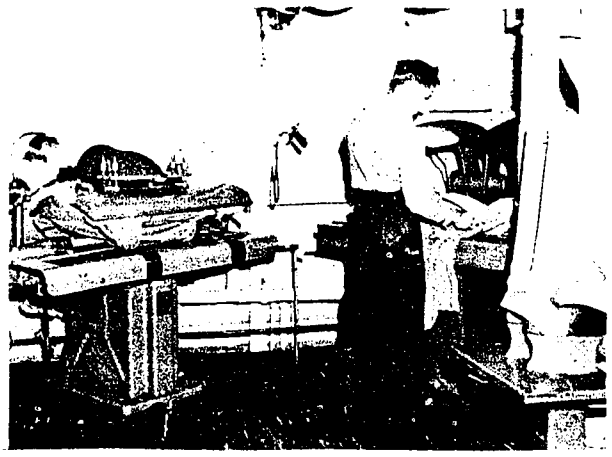

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Figure 7-3.—Shirt unit layout.

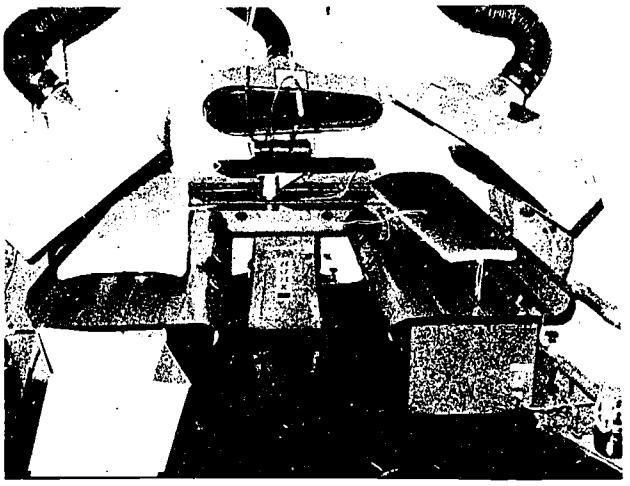

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Figure 7-5.—Press layout for one operator.

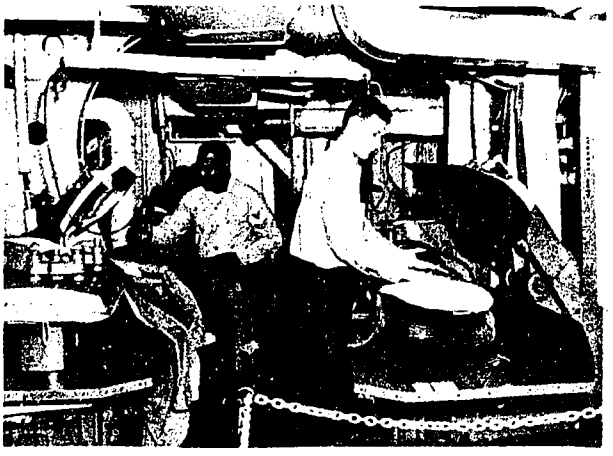

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Figure 7-4.—Press layout for two pressers.

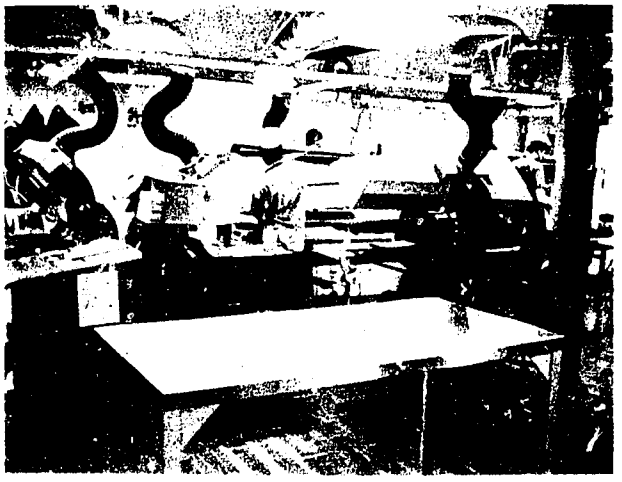

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Figure 7-6.—Layout of presses on a replenishment oiler.

with the head down. Note that this is a special type press, with a special form for the collar.

On the right, front, he has the sleeves of a shirt on a sleeve form. These metal forms are tapered to fit the sleeves. While these two shirts are being pressed, the laundryman is putting the collar and cuffs of a third shirt on a collar-and-cuff press in the rear of the unit. A spray gun is visible next to the back bulkhead. The presses in this unit are so set up that one operator can handle them with the most efficiency.

Illustration 7-4 shows two laundrymen operating four presses in a parallel layout. Each laundryman is operating two presses. Note that two diagonally placed presses have the heads closed on shirts while the operators are putting shirts on the other two. By using this system of working, they keep out of each other's way. The laundryman on the left is using a spray gun on a shirt back. These are utility presses.

In figure 7-5 you see presses of a different type in another unit. The one in the rear is

called a utility oval shaper, which is designed for topping of trousers, slacks, and small lays of wearing apparel. The two large presses are used for fronts and backs of coats and shirts, especially the backs.

Another type of press layout is shown in figure 7-6. This picture was taken aboard a replenishment oiler (AOR). Several presses are visible, and on the left you will see a portion of a collar-and-cuff press and a shirt folding table.

MAINTENANCE OF PRESSES

The laundry manager and operators should perform only minor maintenance on presses, but they should see that lubrication and repair records are maintained on each machine. You should study the manufacturer's instructions for each machine, and know how to oil them and make minor adjustments. You should also know that the steam pressure should be 100 pounds per square inch. Some of the presses have pressure gages. The air pressure on air-operated presses should be 75 to 95 pounds per square inch. In addition, engineering personnel should give the presses a hydrostatic test (resistance to explosion) once per year. This test should be for 150 pounds per square inch for 1 minute.

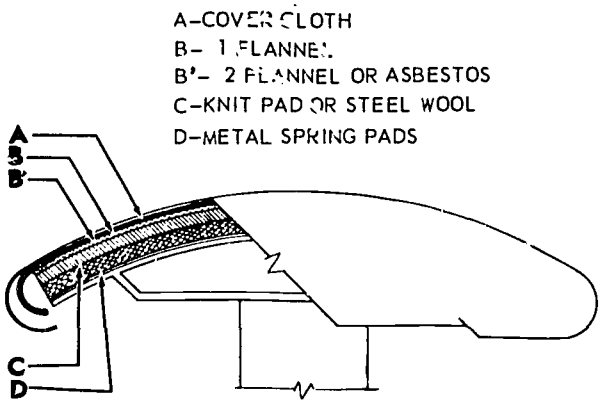
SAFETY FEATURES

Be sure that safety devices on laundry presses are maintained in proper working condition at all times. These include gages, valves, and pushbuttons on air-operated presses. The arrangement of pushbuttons on air-operated presses is such that both hands must be used to close the press and, therefore, the hands of the operator can not be caught in the press. In no case should valves be bypassed or left permanently open.

HOW TO PAD BUCKS

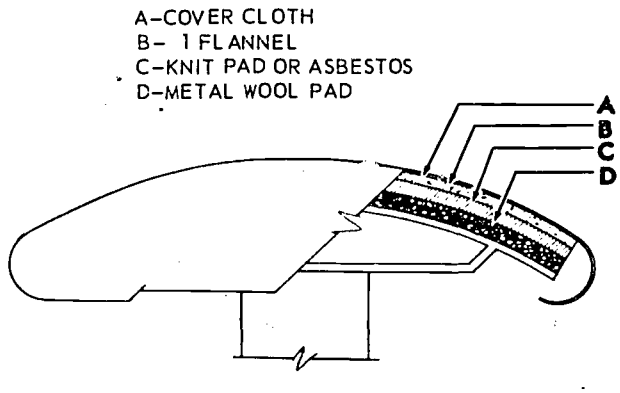
Padding on a buck should be uniformly thick. It should be free of low places or lumps. If this is not true, the quality of pressing will be poor. When the padding becomes uneven, lumpy, scorched, or too thin (less than 3/4" thick), replace it. The procedure for doing this on different types and makes of presses varies but slightly. Some presses are equipped with spring pads, others are not. Usually, a collar and cuff press is not. The materials required for padding bucks, as recommended by most manufacturers, include:

1. Metal spring pad, or steel wool pads.
2. Steel (over a spring pad).



22.34X

Figure 7-7.—Padding and metal spring pads on buck.



22.35X

Figure 7-8.—Padding and metal wool pads on buck.

3. Fine-mesh screen and a piece of double-faced flannel, or two pieces of double-faced flannel.

4. Covercloth, usually ready-made of nylon, dacron, or some other type of synthetic material. Asbestos is optional. Sometimes it is used between the flannel and the steel wool pad.

5. Buck cover hooks or tension springs (generally), for holding cover tight beneath the buck.

The procedure for padding the buck is simple. Unclamp or unhook the cover beneath the buck and remove all of the old padding. Then start with the metal spring pad, or steel wool pads, listed in number 1 above and follow with all the other items listed. Refer to figure 7-7 for a diagramatic arrangement of the materials on the buck when metal spring pads are used.

The materials used over metal wool pads placed next to the buck vary slightly from those used on a metal spring pad. Metal wool pads of different thickness, however, are used on presses which have spring pads on the bucks. When ordering metal wool pads, therefore, specify whether you want them for a press with spring pads. Check figure 7-8 for the procedure of padding bucks when metal spring pads are not used.

Synthetic covers last longer than cotton covers. The drawstring in the cover helps to hold the padding in place, but the tension springs on the clamps or hooks beneath the buck hold it firmly in place. They give an even pull all around the cover.

When two layers of flannel are used in the padding, change one layer each week. Put the new layer on the bottom and the used layer on top. You can wash double-faced flannel and reuse it. If it shrinks, use it on a smaller buck. If it becomes hard, apply steam to the surface and work with the hand until it becomes pliable. Tumbling also makes it pliable. If you use just one layer of flannel in the padding, change it every week, or at least every other week. Judge by the workload.

Change the knitted padding when it becomes scorched or burned out. No set time can be given for changing it, but under normal operating conditions it should be changed about once a month. Steel wool padding lasts for 1 year under normal usage (40-60 hours per week).

Change covers when they become soiled or badly scorched.

Table 7-1 lists the guide-lines in proper padding and covering of laundry presses.

Table 7-1.—Press Padding and Covering Standards

FLAT BED PRESSES—With Spring Padding (not including collar & cuff presses)

1. Metal Buck of Press—wipe clean each time metal pad is changed.
2. Plate of Coil Springs—make sure screen wire is in good condition each time metal pad is changed.
3. Metal Press Pad—when purchasing make sure to designate "for use over springs."
   METAL PAD REPLACEMENT SCHEDULE
   a. 36" to 54" long presses:
      (1) Large ships, 36 months.
      (2) Small ships, 48 months.
   b. Small or topper presses:
      (1) Large ships, 30 months.
      (2) Small ships, 36 months.
4. Treated Asbestos Boot (brown color)—replace when it breaks up only.
5. 50 oz. felted (punched) nylon pad—replace each time press cover is changed.
6. Nylon Press Cover (non-skid finish)—replace when it develops hole in top.

FLAT BED PRESSES—Without Spring Padding (not including collar & cuff presses)

1. Metal Buck of Press—wipe clean each time metal pad is changed.
2. Metal Press Pad—when purchasing make sure to designate "for use on bare buck."
   METAL PAD REPLACEMENT SCHEDULE
   a. 36" to 54" long presses:
      (1) Large ships, 36 months.
      (2) Small ships, 48 months.

Table 7-1.—Press Padding and Covering Standards (Continued)

FLAT BED PRESSES—Without Spring Padding (not including collar & cuff presses)—Continued

b. Small or topper presses:
   (1) Large ships, 30 months.
   (2) Small ships, 36 months.
3. Treated Asbestos Boot (brown color)—replace when it breaks up only.
4. 50 oz. felted (punched) nylon pad--replace each time cover is changed.
5. Nylon Press Cover (non-skid finish)—replace when it develops hole in top.

COLLAR & CUFF PRESSES (if press has coil springs remove them, except if press is Ajax model MTH—on this one springs must be used on collar buck only.)

1. Metal Buck of Press—wipe clean each time metal pad is changed.
2. Metal Press Pad—when purchasing make sure to designate "for use on bare buck."
   METAL PAD REPLACEMENT SCHEDULE
   a. Large ships, 24 months.
   b. Small ships, 30 months.
3. 50 oz. felted (punched) nylon pad—replace at 40 hours actual press operation.
4. Nylon Press Cover (non-skid finish)—replace under any of following conditions:
   a. Develops hole, or
   b. Saturated with starch, or
   c. Becomes stained or dirty so that shirts would be soiled.

AJAX MODEL CS SLEEVE PRESSES—Expander blade type.

Bucks of Press:
1. Metal Buck of Press—wipe clean each time covers are changed.
2. Metal Press Pads—when purchasing buy in sets and designate "for use on bare buck."
   METAL PAD REPLACEMENT SCHEDULE
   a. Large ships, 24 months.
   b. Small ships, 30 months.
3. Nylon Press cover (slick finish) With 30 oz. Woven Nylon Flannel Sewn In—replace when cover develops hole.

Expander Blades:
1. Metal Blade—wipe clean each time it is covered.
2. Combination Cover/Pad (one piece) with 21 oz. Woven Nylon Flannel Build Up—replace when it develops hole. Designate if ring & bolt or hook fastener.

AJAX MODEL CBS SLEEVE PRESSES—Air Bag Type

1. Metal Buck of Press
2. Plate of Coil Springs—make sure screen wire over springs is in good condition each time metal pad is changed.
3. Special Metal Pad (brown cloth covered)—Purchase "for use over springs."
   METAL PAD REPLACEMENT SCHEDULE
   a. Large ships, 24 months.
   b. Small ships, 30 months.
4. Nylon Press Covers (slick finish) With Reinforced Air Bags—replace when covers or air bags develop hole.

Table 7-1.—Press Padding and Covering Standards (Continued)

UNIPRESS MODEL MSA-A SLEEVE PRESSES

Bucks of Press:

1. Metal Buck of Press—wipe each time metal pad is changed.
2. Metal Press Pads—when purchasing be sure to designate "for use on bare bucks."
   METAL PAD REPLACEMENT SCHEDULE
   a. Large ships, 24 months.
   b. Small ships, 30 months.
3. Nylon Press Covers (slick finish) With 21 oz. Woven Nylon Flannel Sewn In—change when cover develops hole.

Expander Blades:

1. Metal Blade—wipe clean each time it is covered.
2. Combination Cover/Pad (one piece)—replace when it develops hole. When purchasing be sure to designate if blade has lock rod extension for short sleeves.

AJAX BOSOM/BODY PRESSES—On all purchases for these presses it is critically necessary to designate which style bucks are on press: 20" Std., 18" Std., Military 1, Military 2. Mere model number will NOT suffice.

1. Metal Buck of Press.
2. Plate of Coil Springs ON FRONT SIDE ONLY—make sure screen wire over springs is in good condition each time metal pad is changed.
3. Metal Press Pad—when purchasing designate "for use over springs."
   METAL PAD REPLACEMENT SCHEDULE
   a. Single buck units, 36 months.
   b. Double buck units, 42 months.
4. 50 oz. Woven Nylon Flannel Pad—change each time cover is changed.
5. Dacron Press Cover with Spring Supported Yoke Bag—change when cover or air bags develop hole.

UNIPRESS CABINET SHIRT UNITS—BOSOM/BODY

1. Metal Buck of Press
2. Plate of Coil Springs—make sure screen wire over springs is in good condition each time metal pad is changed.
3. Asbestos Screen Cloth (white)—replace each time metal pad is changed.
4. Metal Press Pad. In purchase designate "for use over springs."
   METAL PAD REPLACEMENT SCHEDULE
   a. Single buck units, 36 months.
   b. Double buck units, 42 months.
5. 30 oz. Woven Nylon Flannel Pad—change each time cover is changed.
6. Nylon Press Cover (non-skid finish)—change when cover develops hole.

Expander Blades: Solid metal type.

1. Metal Blade—wipe clean each time it is covered.
2. Combination Cover/Pad (one piece)—change when it develops hole.

Expander Blades: Split across center type.

1. Metal Blade—wipe clean each time it is covered and padded.
2. 30 oz. Woven Nylon Flannel Pad—change each time cover is changed.
3. Stretch Dacron Cover (MUST stretch lengthwise about 2" but none sidewise)—change when cover develops hole.

Trouble 12	Probable Cause	Remedy
Rough dry	Scorched or compressed padding	Replace padding
	Improper pressure adjustment	Adjust for maximum pressure
Garments damp	Low steam pressure	Check supply pressure
	Steam trap inoperative	If cold to the touch, trap is not working properly
Press head does not close	Insufficient air pressure	Check pressure at compressor
	Leaky piston cup in operating cylinder	While operator is depressing pushbuttons, determine if air is blowing out around piston stem. If so, replace cup.
	Plugged strainer on air line leading to press	Clean strainer
	Detective Master Valve	Repair Master Valve
Press head does not open (Test with Timer and Hand Release Buttons)	Poorly lubricated operating cylinder	Lubricate cylinder
	Poorly lubricated bearings	Check all bearing points of lever system
	Defective Timer	Repair Timer
Head opens slowly	Dry bearings in lever assembly	Lubricate bearings
Press head closes slowly	Insufficient lubrication in operating cylinder	Lubricate cylinder
	Insufficient air pressure	Check supply pressure
	Dry bearings in lever assembly	Lubricate bearings
	Leaky piston cup in operating cylinder	While operator is depressing pushbuttons, determine if air is blowing out around piston stem. If so, replace cup.
	Plugged strainer on air line leading to Press	Clean strainer
	Defective Master Valve	Repair Master Valve
Press head closes with a jar	Worn or broken linkage between Hydraulic Check and Press	Check manually and replace
	Hydraulic Check out of adjustment	Adjust Governor
Press head opens with a jar	Broken Hydraulic Check	If fault does not lie in adjustment replace Hydraulic Check
	Improperly adjusted throttle valve on main air line	Check and adjust to reasonable speed
Press head does not lock	Clogged port hole in cylinder	Remove pipe plug and clean
	Improper pressure adjustment	Adjust pressure

Figure 7-9.—Maintenance trouble shooting chart. 22.76

WEEKLY MAINTENANCE

The engineering department should perform the following weekly maintenance on laundry presses:

1. Check lubrication fittings, and fill oil cups to proper level. Replace lubrication fittings that have been broken or removed.
2. Check operation of the head to find out if it returns smoothly to the fully upright position without shock when released. Adjust counter-balance springs, shock absorber cylinder, and air vent as necessary.
3. Tighten loose nuts and screws.
4. Inspect steam and drain connections for tightness. Adjust leaky valves.
5. Make certain steam traps are functioning properly, to ensure uniform heating of the head and buck without undue loss of steam.
6. Check the amount of pressure required on foot pedals of manually operated presses to lock the head in the pressing position. Excessive padding on the buck may require extra pressure on the foot pedal to lock the head.
7. On air-operated presses, check the following:
   a. Operation of air control valves. All must function properly.
   b. Cleanliness of strainer in air line.
   c. Cleanliness of mufflers.
   d. Setting of pressure and locking adjustments.

SEMIANNUAL MAINTENANCE

Twice per year the engineering department should perform the maintenance listed below on laundry presses.

1. Make all inspections, checks, and adjustments outlined in the maintenance section of the applicable manufacturer's instruction manual. Repairs should be made as necessary, and badly worn parts should be replaced.
2. On air-operated presses, the following additional work should be accomplished:
   a. Remove and clean all air filters in a suitable solvent.
   b. Examine cups on closing and pressure cylinders. Replace if badly worn.

TROUBLE SHOOTING

A trouble shooting chart of the type shown in figure 7-9 should be posted in the laundry. It lists troubles you may have with presses, the probable cause, and the remedy.

HOW TO OPERATE A PRESS

Examine the cover and padding of a press before you heat it. Then check the head pressure by making several presses on it. If the padding is bad, do not use the press until it is repadded. If the cover is unsatisfactory, replace with a new one.

Heat a laundry press gradually. Turn the steam valve partially open for 20 minutes and then open it completely. The press is then ready for use.

You have already learned that you lower the heads of air-operated presses with the finger pushbuttons on the table. Do NOT use the press unless both head lowering buttons are operating. Study the instruction manual to find out how to adjust head pressure, or have it adjusted.

The time required to press and dry a garment satisfactorily is dependent upon the following:

1. Type of material.
2. Moisture in the material.
3. Steam pressure (less than 100 p.s.i. will require longer time).
4. Effectiveness of steam trap in carrying away condensed steam, to allow unrestricted flow of live steam into head chamber.
5. Head pressure.

An article with a rough, dry appearance, usually requires more than normal pressing time. Be certain, of course, that the article is damp enough when you start to press it. If it lacks sufficient moisture for good pressing, add a fine spray to it with the spray gun. For normal pressing, keep the head down for about 15 seconds. Experience in pressing will enable you to tell when to add dampness to a garment before you press it, and how long it will take to press that particular type of material.

PRESS LAYS

In machine pressing, each garment is finished by a series of LAYS. Each lay is a position of the garment on the buck, and the series

1. COLLAR AND CUFFS

Satisfactory Work Through Correct Procedure

2. RIGHT SHOULDER

3. LEFT SHOULDER

4. YOKE

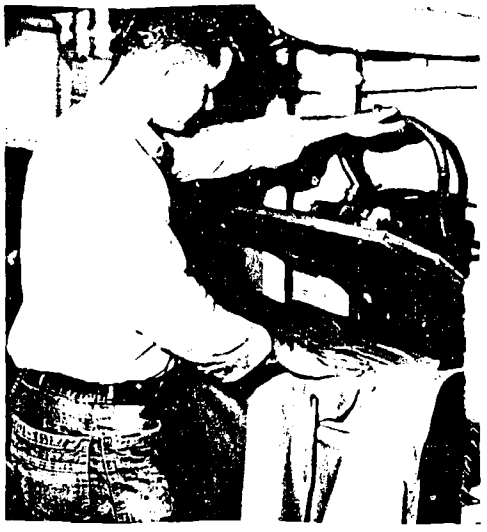
5. BACK--RIGHT

6. BACK--FULL

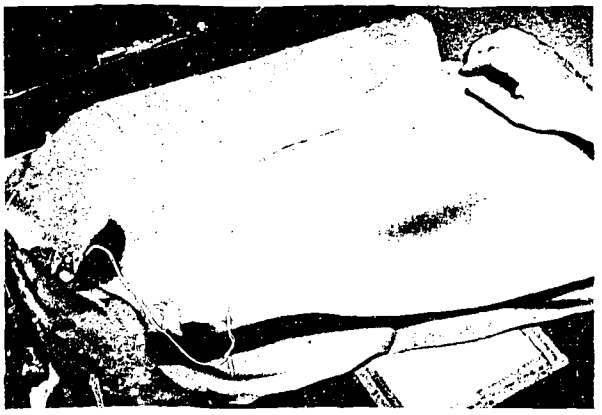
Figure 7-10.—Lays for pressing a shirt. 22.36

7. LEFT SIDE, AND BAC

8. LEFT FRONT--FLAP UP



9. LEFT FRONT--FLAP DOWN.



10. RIGHT SIDE, AND BACK

11. RIGHT FRONT--FLAP UP

12. RIGHT FRONT--FLAP DOWN

13. PRESSING SLEEVES ON SLEEVE FORMER.

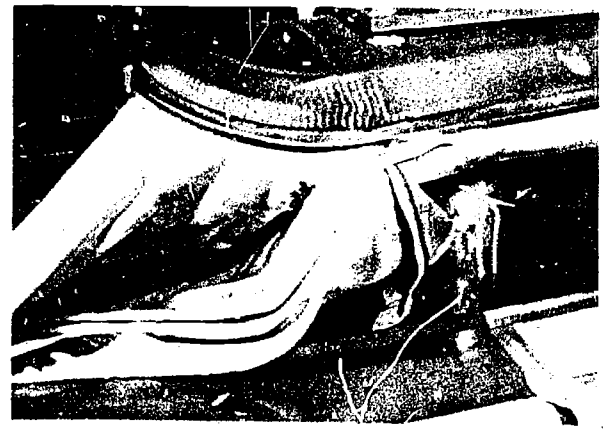
22.37

Figure 7-10.—Lays for pressing a shirt—Continued.

1. PUTTING POCKETS INSIDE

2. REMOVING WRINKLES FROM POCKETS

3. LEFT FRONT.



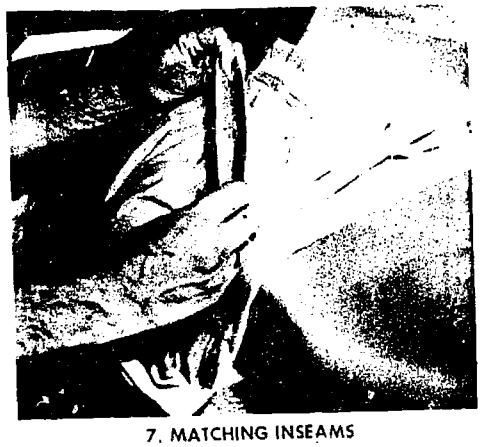
4. RIGHT FRONT

5. BACK POCKET RIGHT

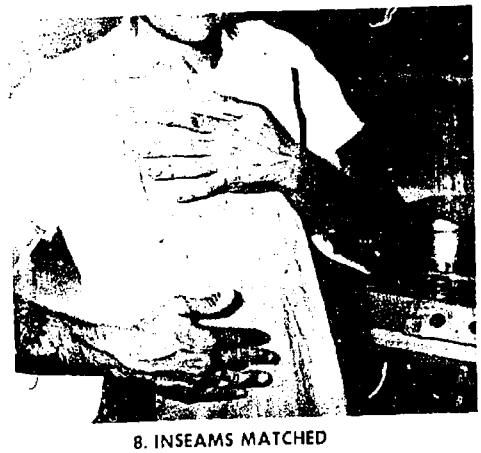
6. BACK POCKET LEFT

22.39.1

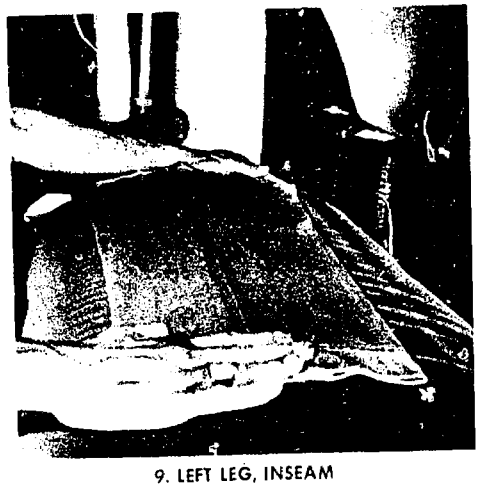
Figure 7-11.—Lays for pressing pants.



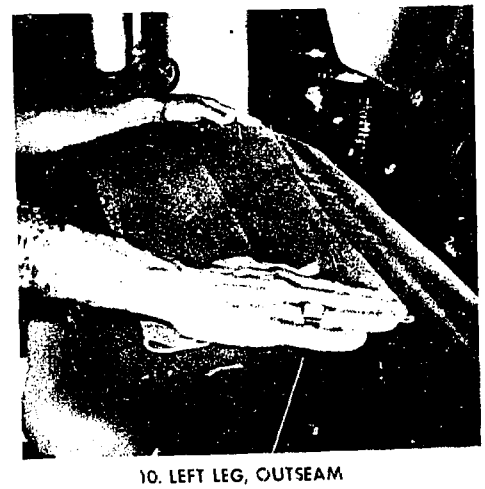
7. MATCHING INSEAMS



8. INSEAMS MATCHED

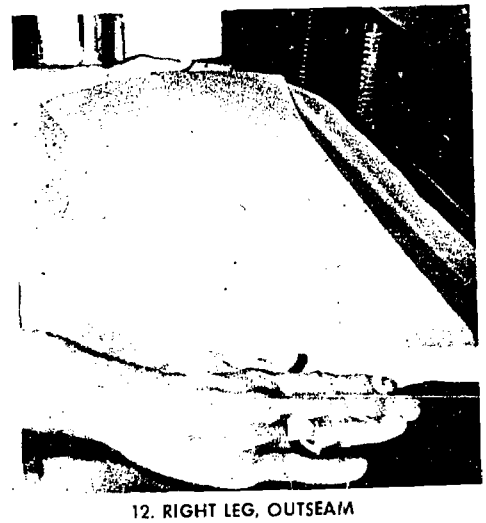


9. LEFT LEG, INSEAM



10. LEFT LEG, OUTSEAM

11. RIGHT LEG, INSEAM

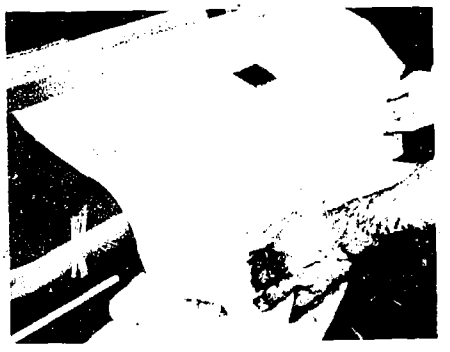


12. RIGHT LEG, OUTSEAM

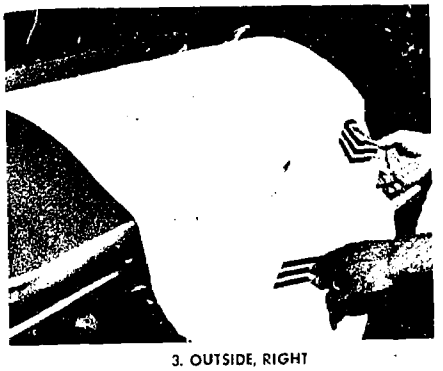
22.39.2

Figure 7-11.—Lays for pressing pants—Continued.

1. COLLAR

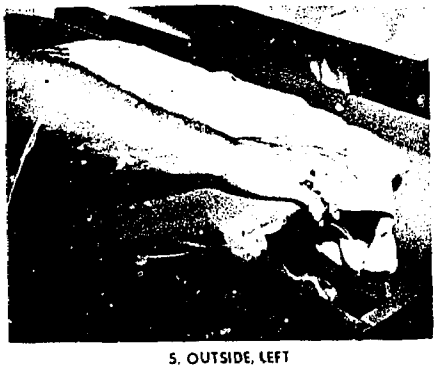


2. INSIDE, RIGHT

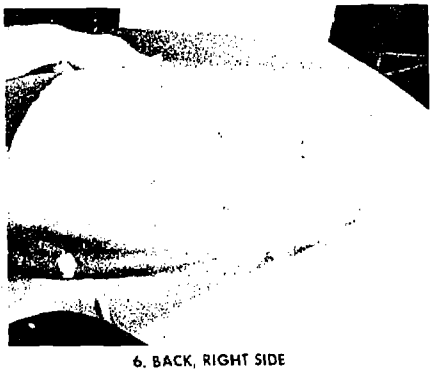


3. OUTSIDE, RIGHT

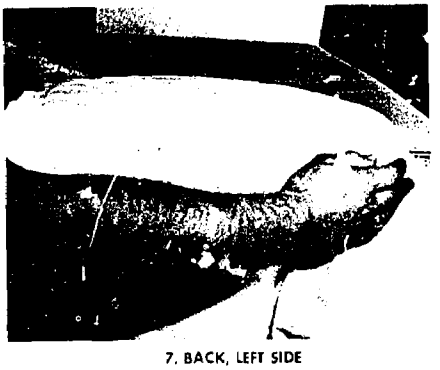
4. INSIDE, LEFT



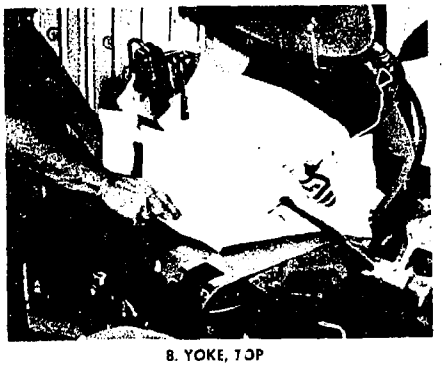
5. OUTSIDE, LEFT



6. BACK, RIGHT SIDE



7. BACK, LEFT SIDE



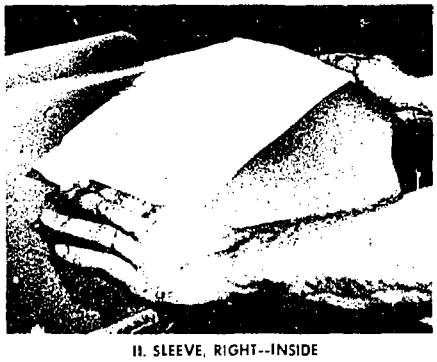
8. YOKE, TOP

22.40.1

Figure 7-12.—Lays for pressing a white coat.

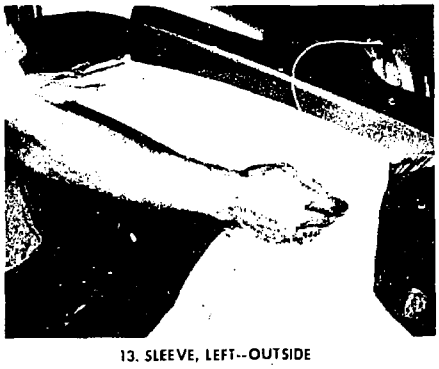
9. YOKE, INSIDE

10. SLEEVE, RIGHT--OUTSIDE



11. SLEEVE, RIGHT--INSIDE

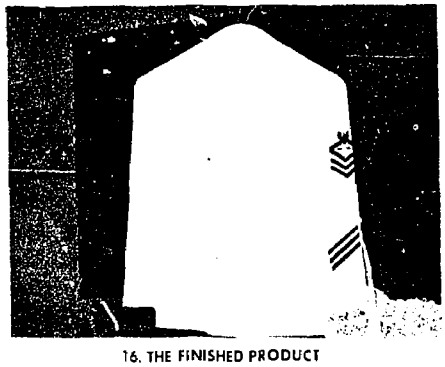
12. SLEEVE, LEFT--INSIDE



13. SLEEVE, LEFT--OUTSIDE

14. BALLING RIGHT SLEEVE WITH PUFF IRON

15. BALLING LEFT SLEEVE WITH PUFF IRON



16. THE FINISHED PRODUCT

22.40.2

Figure 7-12.—Lays for pressing a white coat—Continued.

should cover the entire garment. Out of the way places which cannot be pressed with the machine should be smoothed out with a puff or hand iron.

Sequences of lays for shirts, trousers, and coats are described in the following pages. The ones given are considered the minimum for each article when quality pressing is desired. The lays, however, are not standard with all pressers. For example, some laundrymen use two lays for pressing the front of shirts, one with the pocket flap up and the other with the flap down. Other pressers use one lay, with the flap down, and get acceptable work. The size of the press also determines the number of lays on shirt and coat backs, and so on for large surfaces. When determining the proper sequence of lays for a garment, take into consideration the following:

1. The minimum number of lays required to do the work satisfactorily.
2. Logical sequence of lays, for easier and quicker handling.
3. Part of garment to be pressed last, to prevent damage to finish of most conspicuous parts of the garment when worn.

The lays given for different articles below are now used in ships' laundries. The following lays for shirts, coats, and trousers do not include the use of a puff or hand iron for touch-up work on places difficult to reach with the press. When available, use these irons as necessary to get quality work. A garment which is nearly finished, however, should not be handled too much in doing touch-up work; that is, not to such an extent that you damage the finish.

PRESS LAYS FOR SHIRTS

Illustration 7-10 gives the sequence of lays for pressing a shirt on presses generally available in ships' laundries. The first lay shows the collar and cuffs properly placed on the press. (NOTE: If this first step is improperly done, the result will be broken buttons and wrinkled material. Your supply officer and the laundry crew receive criticism when this happens.) Some pressers press the yoke first on this press and then the collar and cuffs. The second lay is for the right shoulder. Note how the presser holds the shirt with both hands. Then comes the left shoulder, followed by the lay for the yoke.

All other lays for pressing a shirt follow in sequential order, as listed. Note the pull the laundryman is exerting on the shirt sleeves on the sleeve form. After he has removed all wrinkles from the sleeves, he can press the shoulders on the puff iron. He needs the spray gun to get the correct dampness when using the sleeve form and puff iron.

Folding Shirts

Two different types of shirt-folding tables are used in ships' laundries.

The folding mechanism of one type of machine is hydraulically controlled, and the COLLARIGHT (former) is air operated, normally by a foot pedal. This machine folds the shirt and the operator places a paper band around the body of the shirt to hold it from coming apart.

Another type of shirt-folding table has a collar former and a metal plate over which the front parts of the shirt can be folded to get the correct form. The metal plate is hinged at the left and can be raised and lowered as desired. Folding with this equipment is manual; the laundryman does everything. The procedure for doing the work is illustrated in figure 8-2. It was put in the discussion of assembly of material in chapter 8 because it emphasizes the importance of careful handling of finished laundry.

PRESS LAYS FOR TROUSERS

Check illustration 7-11 for the lays used in pressing trousers. The first thing to do before you press trousers is to straighten out the pockets, and the first two lays show how to do this. Another important thing in pressing the legs is matching of inseams. Steps 7 and 8 show how this is done.

PRESS LAYS FOR COATS

The lays for pressing a white coat are given in figure 7-12. The first step shows a laundryman pressing the collar on a collar-and-cuff press. If you do not have this type of press, use a utility press for this lay. Your attention is particularly called to the procedure for pressing the yoke on a special yoke press in step 8, and also the procedure for BALLING the

shoulders and tops of sleeves on a puff iron in steps 14 and 15. It is generally best to add a fine mist to the shoulders as soon as you place them on a puff iron, to get them damp enough for easy removal of wrinkles. The heat from the iron then dries the shoulders and renders them wrinkle-free.

FINISHING CAP COVERS, GARRISON CAPS, AND TIES

Finish cap covers on a puff iron, if available. You can also press them with a hand iron, and press the band on the small end of a press.

You can press garrison caps in two lays on any type of press. Use one lay for each side. Do NOT press caps with leather bands on a laundry press. The leather will not withstand the temperature of the hot head.

When pressing ties, cut a cardboard form that will fit inside to hold them straight. Then press with two lays, one for each side. Do not press wool worsted ties on a laundry press. Use a press in the dry-cleaning plant, with a covered head.

CHAPTER 8

ASSEMBLY AND ISSUE

In this chapter we are concerned with assembly and handling of articles both in individual bundles and in bulk lots. Bulk lots which are tumbled can be loaded directly into the laundry bags in which they were brought to the laundry. Such is not the case, however, with items in an individual's bundle. This is a matter of (1) careful handling, (2) thorough inspections, and (3) accurate counting. Each of these is discussed briefly. To avoid mixups of articles, process one lot at a time.

CAREFUL HANDLING

Handle finished laundry with care. Collect it promptly and place it in the proper bin. Do not permit folded shirts, for example, to pile up on work tables or shelves over tables. Check figure 8-1. The shirts on this table have accumulated to such an extent that they may slide off to the deck and become soiled or marked. When finished work is soiled or wrinkled by rough or careless handling, reworking is the usual result.

Some ships' laundries have shirt folding equipment on tables in the assembly room. Figure 8-2 shows a laundryman using one of them. The procedure for folding a shirt illustrates the importance of careful handling because each step must be made in sequential order and in a careful manner. The sleeves, for example, must be folded in a specific way. Study each step in the illustration.

All finished laundry should be handled with care. Shirts are merely used as an example. No shirt, or any other article, should be returned to its owner unless it represents the best quality of work and care your laundry can give it. Streaks, stains, broken buttons, or any blemishes on finished work, are usually inexcusable and should be corrected before returning the article to its owner.

THOROUGH INSPECTIONS

When you receive finished work in the assembly room, check each piece for cleanliness, stains, scratches, marks, or any type of blemish. Charter 7, Pressing and Finishing, gives the standards of quality for finished work. These are the things you must look for when inspecting laundry. A shirt, for example, should have a QUALITY LOOK; that is, it should be thoroughly clean, free of blemishes, smoothly ironed, and have the proper creases. What applies to the inspection of shirts, of course, applies to every article. Remember that you have the ultimate responsibility of approving laundry returned to its owner.

If you come across finished articles that do not pass inspection, set them aside for reprocessing. The procedure for handling SEND-BACKS is explained later in the chapter.

ACCURATE COUNTING

As you know, every individual expects to receive back from the laundry all articles he presented to it for laundering. The way to ensure getting all articles in an individual's bundle back to him is to assign him a separate bin and correspond identification mark on finished

22.42

Figure 8-1.—Folded shirts on shelf in ship's laundry.

articles with the ticket as you bin them. Attach officers' laundry lists to the bins in alphabetical order for easy processing. Use numerals where initials are duplicated.

ASSEMBLING INDIVIDUAL BUNDLES

When you receive items from a lot of laundry in process, prior to assembly of articles, place the individual's ticket on the front of each bin and then proceed to put the finished articles as marked in the proper bin. Check figure 8-3. After all articles in an individual bundle have been binned, it is best to wrap and tie the bundle immediately. Attach the laundry list firmly to the bundle, under the wrapping string, or fastened to the wrapping with glue or tape. Should you be unable to wrap a bundle immediately, fold the laundry list and put it between the first two articles in the bundle in the bin, with the folded edge out. A glance at this bin later will tell you that the laundry is satisfactory and all accounted for and is ready for wrapping.

The procedure for assembling individual bundles follows:

1. When items in the bin correspond to the items listed on the individual ticket, remove the items from the bin with the ticket and check them against the laundry list again. This is a double check to make certain that no article has disappeared from the bin.
2. Put the heaviest articles in a laundry bundle on the bottom. Save the shirts for the top. Pair them, with the collar of one shirt next to the bosom of another. An odd shirt should be placed face down on the bottom of the shirt stack. The weight on pressed and folded shirts should be light.
3. Wrap the bundle and fasten it securely, but NOT tight. If a string is used instead of wrapping tape, do not tie it so tight that it will crush the laundry.
4. Put the laundry list under the wrapping string, on the end where it will be visible when the bundle is placed among other bundles. If wrapping tape was used, tape or paste the laundry list on the end of the bundle.

ASSEMBLY OF BULK WORK

Since bulk lots include both tumbled and pressed work, the lots should be delivered to the laundry in separate division bags, each bag to be marked "pressing" or "tumbling." Divisional dungarees or whites to be pressed should be turned inside out; this would be helpful for the press operator, since trousers are pressed on the reverse side. After finishing, divisional press work should be bundled in lots of 10 shirts or 10 trousers for easier checking against the items listed on the receiving log.

Flatwork lots include bath towels which are tumbled or ironed and folded, and flatwork which is ironed (sheets, etc.) and folded.

Stack similar items in the same stack, so that they can be tied with a heavy string and be easily carried. Mattress covers, for example, should be put into one stack and towels in another.

Tie the stacks and put them into the same laundry bags in which they were presented to the laundry. Then put the bags in the issue room for pickup as scheduled. Remember what was said in chapter 4 about clean laundry bags.

HOW TO HANDLE SENDBACKS

Sendbacks are articles in individual bundles and bulk lots which must be sent back for reprocessing. Put an article sent back for reprocessing in a net so that it can be reworked immediately. Because sendbacks hold up delivery of laundry, they should receive special attention, so that you can make delivery on schedule. Recheck on them occasionally to make certain the desired work is being accomplished. If laundry is torn or is damaged in any other way, if the work desired cannot be accomplished, or the finished work cannot be delivered on schedule, make appropriate notes and inform the laundry officer immediately. It is easier for him to explain before the owner receives the bad news than afterward.

ISSUING LAUNDRY

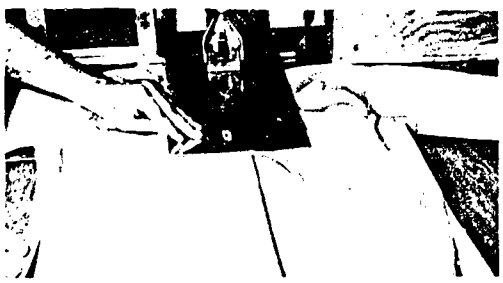
Issue finished laundry in accordance with the schedule. Provide space for laundry that is ready for issue. You need shelves or tables for wrapped bundles and space for laundry bags. In case you have a special room for receiving and issuing, put finished bundles neatly on shelves in alphabetical order. Hang trousers and coats on hangars.

1. PICK UP SHIRT BY COLLAR

2. PLACE SHIRT ON FOLDING TABLE, BACK DOWN, BUTTON FRONT

3. PLACE SHIRT FACE DOWN ON COLLAR HOLDER

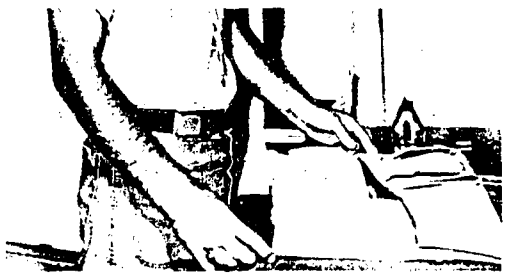
4. FORM CREASE CAREFULLY IN BACK



5. BRING FOLDING FORM DOWN OVER TOP OF BACK

6. FOLD TAIL UP TO BOTTOM OF FORM

7. FOLD RIGHT SLEEVE OVER FORM



8. FINISH RIGHT SLEEVE FOLD

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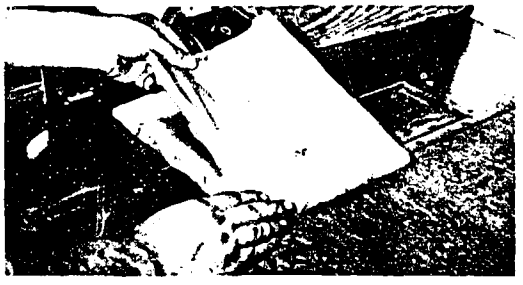
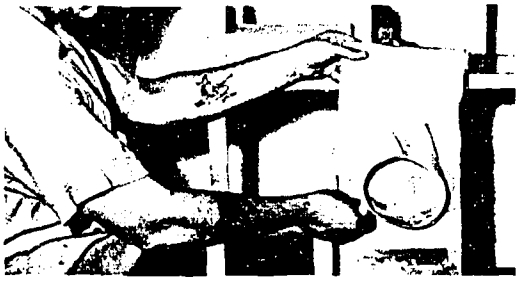
Figure 8-2.—Procedure for folding a shirt.

9. FOLD LEFT SLEEVE--SAME AS RIGHT

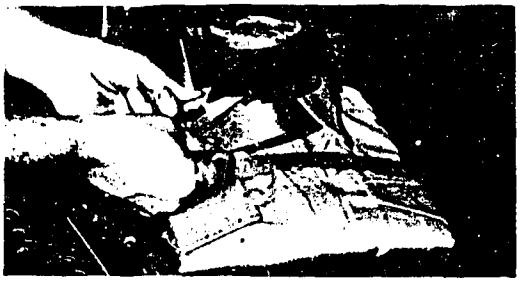


10. FOLD LOWER HALF OF SHIRT UP OVER FORM

11. PLACE PAPER BAND AROUND SHIRT

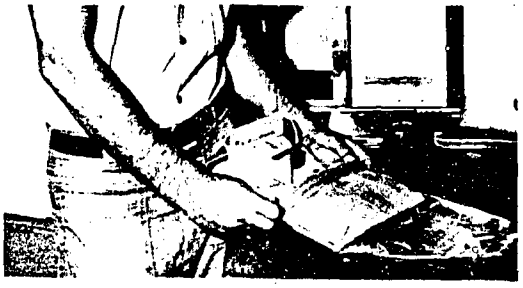


12. REMOVE SHIRT FROM FORM



13. INSERT CARDBOARD AROUND COLLAR

14. FOLD CARDBOARD INSIDE COLLAR



15. DRAW CELLOPHANE BAG OVER SHIRT

16. FOLD AND CLOSE END OF BAG

22.44

Figure 8-2.—Procedure for folding a shirt—Continued.

22.45

Figure 8-3.—Laundry in bins in assembly room.

22.46

Figure 8-4.—Delivery of an individual bundle.

Issue laundry to authorized persons only, those designated on the schedule, or to individual owners. Ensure that proper signatures are obtained and that the count reflected is accurate. This is necessary to establish validity in laundry claims. Figure 8-4 shows a laundryman delivering a laundry bundle to its owner. Any problems encountered in issuing laundry to officers, chiefs, Stewards, or other personnel should be reported to your immediate supervisor.

CHAPTER 9
DRYCLEANING AND FINISHING

Because some fabrics are damaged by washing in water, it is best to dryclean them—that is, wash them in some other substance that will cleanse them without damage. Generally a petroleum, synthetic, or fluoro-carbon solvent is used.

Carriers, tenders, repair ships, and some other Navy ships have drycleaning plants. Tenders and repair ships usually provide drycleaning service for the ships to which they render other services.

ORGANIZATION AND MANAGEMENT

The ship's drycleaning plant, like the laundry, is a service in the supply department under the supervision of the ship's store officer. The number of Ship's Servicemen and strikers assigned depends upon the workload and the equipment. On carriers and tender types, where the plant is much larger than on other ships, there may be a supervisor, an assistant supervisor, and six to ten additional men.

The petty officer assigned as supervisor is responsible for preparation of the drycleaning schedule, procurement of supplies, training of personnel, and the entire operation of the plant, as well as for cooperation with engineering personnel in maintenance of the equipment. The supervisor assigns the other personnel so as to accomplish the work as efficiently as possible, and rotates them as feasible to give them experience in all tasks the plant performs.

DRY-CLEANING SCHEDULE

As in the laundry, a schedule is necessary for controlling the delivery, processing, and issue of drycleaning. To prepare such a schedule, start with a flow chart of all operations through which articles to be drycleaned must pass from the time they are received until they are ready for issue. (See fig. 9-1.) Then review each stage to determine time, space, equipment, and operating personnel required, and any other factors that will affect your schedule. Important points to consider are:

SPACE.—Limitation of space requires rigid control of the schedule from the standpoint of receipt and issue, so that the section can handle the maximum amount of work in the space available. Do not receive more dry weight than can be processed in one normal working day, except under very unusual conditions.

DELIVERY AND PICKUP.—It is necessary to define clearly the responsibility for both delivery and pickup.

TYPES OF SERVICES.—If services include cleaning of items other than regular uniform clothing, those items should be clearly defined,

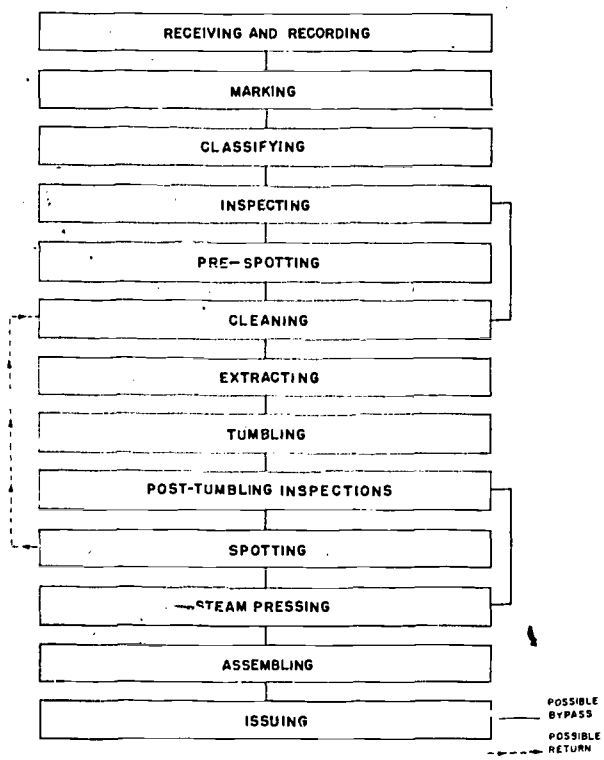


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Figure 9-1.—Drycleaning flow chart.

U.S.S. _____

DRY CLEANING LIST

(SERIAL NUMBER)

NAME _____ RANK/RATE _____

FILE OR SERVICE NO	DIVISION	AMOUNT

DATE	MARKER	CHECKER	LOT

CUS. COUNT	PLANT COUNT	ARTICLE	GRN.	BL.	KH.	UNIT PRICE	AMOUNT
		JUMPERS, ENLISTED	X		X		
		TROUSERS, ENLISTED	X		X		
		COATS, OFFICER OR CPO					
		TROUSERS, OFFICER OR CPO					
		RAINCOAT	X				
		PEACOAT	X		X		
		OVERCOAT	X		X		
		CAP—COVER OR GARRISON					
		NECKTIES/NECKERCHIEF	X		X		
		SHIRTS, WOOL	X				
		LINING, OVERCOAT	X		X		

REMARKS:

CASHIER'S STUB

AMOUNT

(SERIAL NUMBER)

CUSTOMER'S RECEIPT

(SERIAL NUMBER)

22.48

Figure 9-2.—Drycleaning list (A).

U.S.S. _____

DRY CLEANING LIST

(SERIAL NUMBER)

NAME _____ RANK/RATE _____

FILE OR SERVICE NO.	DIVISION	CLEANING MARK

IN CHECKER	DATE

IN CK.	OUT CK.	ARTICLE	GRN	BL	KH	UNIT	AMOUNT
		JUMPERS, ENLISTED	X		X		
		TROUSERS, ENLISTED	X		X		
		COATS, OFFICER OR CPO					
		TROUSERS, OFFICER OR CPO					
		RAINCOAT	X				
		PEACOAT	X		X		
		OVERCOAT	X		X		
		CAP—COVER OR GARRISON					
		NECKTIES/NECKERCHIEF	X		X		
		SHIRTS, WOOL	X				
		LINING, OVERCOAT	X		X		

REMARKS:

TOTAL

1 PLANT CONTROL

2 FINANCIAL CONTROL

3 CUSTOMER'S RECEIPT

22.49

Figure 9-3.—Drycleaning list (B).

and the days when such services are available should be listed. This phase of the schedule may have to be flexible, especially for the tender-type ship—which will be offering services to ships alongside when in port, but only to her own ship's company when underway. Never schedule services for large lots of such items as flags or foul weather jackets at a time just preceding a personnel inspection. Plan to receive and service some articles of uniform clothing in each day's schedule.

DEADLINE FOR RECEIPT.—It is advisable to set a deadline for receipt of articles at not later than 0900 daily. This is very important. Most Navy drycleaning units have a washer with two compartments, and these compartments must be loaded with equal dry weight loads of garments of the same type material. Equal loading of the two compartments is critical, since even one-fourth pound variation may cause vibration. By requiring delivery prior to 0900, the sorters can easily sort the articles into proper loaders and keep the washer operating to capacity without having to wait for sufficient articles of one type to make a load.

GROUP OR CLASS SCHEDULING.—The type of drycleaning performed aboard ship lends itself easily to group or class scheduling. Because of the uniformity of articles received,

and since each washer load must be of a similar material, it is quite logical to schedule officer and CPO khakis one day, foul weather jackets, flags, and officer and CPO blues another day. This plan, or a similar one, will bring in articles that can be divided into not more than two or three material groups for each day of work.

READJUSTMENT OF SCHEDULE.—With experience, you will be able to set up and adjust the schedule to meet specific conditions. For planning purposes, allow one and one-half hours per washer load for processing. For example, if the compartments in the washer carry 15 pounds each, the time to allow in making a schedule is one and one-half hours for each 30 pounds of dry weight. This means that a washer can process six loads, or 180 pounds dry weight, in one 9-hour work day with a petroleum unit. With a synthetic unit 1 1/2 loads per hour can be produced. By computing the average weight of each article and the number of such articles per man which will likely be received for dry cleaning, you can determine the number of persons who can be served in one day's schedule.

DRY-CLEANING LIST

A drycleaning list is a record of dry cleaning processed for an individual. A sample is shown in figure 9-2. Such a list saves time and work in receiving and issuing, and also reduces the probability of misplacing articles. You can use it to check off finished work returned to the assembly room.

There is no standardized dry-cleaning list. Prepare yours to meet the needs of your plant. Include the following:

TOP SPACE.—Have lines for name and rank or rate, date, file or service number.

BODY.—List of articles normally cleaned and blank space for additions.

COLUMN HEADS.—Have one column with proper head for customer's count and a second column for the plant's count. If you have your men make out the list, use IN COUNT and OUT COUNT for the column heads, as illustrated in figure 9-3.

COST COLUMNS.—These are necessary at the right of the form only when a charge is made for dry cleaning.

DRY-CLEANING TAGS

Several types of drycleaning tags may be used. They may be either blank cloth or solvent resistant paper tags which can be marked with solvent resistant ink or a marking machine. The most popular marking tag is the premarked type shown in figure 9-4.

A solvent resistant marker has a master tag and five detachable tags. It comes in various colors—one for each day of the week—and is numbered from 1 to 1000. Each detachable tag has the same patron number as the master tag. The procedure for using this tag follows.

1. Detach and pin a section of one tag to each article presented by a patron. You may staple it to the article. If a patron has three articles, fasten a detachable tag to each item and leave the two remaining attached to the master.

2. Attach the master and remaining sections to the dry-cleaning list. When the patron returns for his finished work, check the master tag. The two remaining detachable tags tell you he brought three articles to the dry-cleaning plant.

3. If a patron has more than five articles, use two marking tags. Use all five detachable tags from the one master and as many as required from the second. If three detachable tags remain on one master and none on the other, you know the patron has seven articles in his drycleaning.

RECEIVING AND IDENTIFYING

Two methods for receiving and identifying drycleaning are discussed briefly below. Use the one which best fulfills your needs. Revise as necessary.

METHOD A.—Each patron fills out the list, removes the receipt stub at the bottom, and

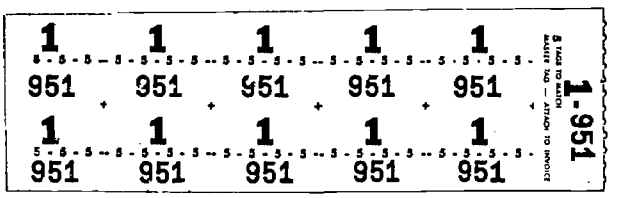

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Figure 9-4.—Drycleaning tab.

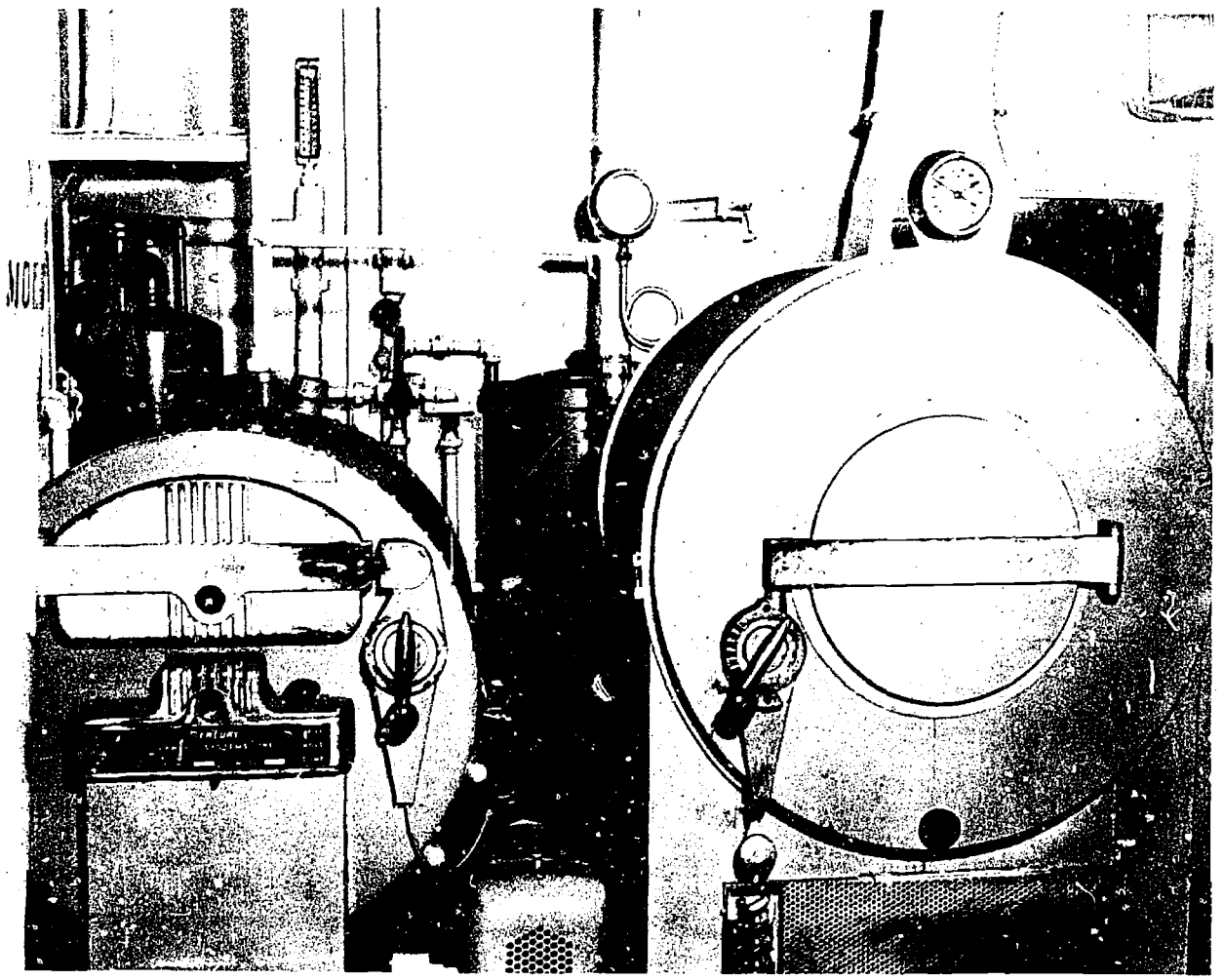

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Figure 9-5.—"Cold" type of drycleaning unit.

attaches the list to his bundle. The receiving clerk then tags each article in the bundle with a section of premarked tag and staples the master(s) of the tag set and unused tags to the patron's dry-cleaning list.

METHOD B.—Receiving clerk prepares an original and one copy of drycleaning list, gives copy to patron, and puts original with articles to be cleaned.

INSPECTING AND CLASSIFYING

Inspect each article received for detachable uniform insignia, and for items in pockets. Put such items in an envelope and attach it to the patron's drycleaning list. Return pockets to proper position before cleaning. If spots show up on an article, send it first to the spotter.

If time permits, determine whether any buttons or buckles are missing or loose, and note spots, tears, or any other marks. Spots discovered at this time should be removed before article is cleaned. Note whether the article has a belt. Care in preliminary examination will avoid trouble later.

The two most important things to consider when classifying items for dry cleaning are: (1) color, and (2) lint quality of the material. For best results, classify uniforms as follows:

1. Officer and CPO blues
2. Officer and CPO khakis
3. Enlisted blues

There may be occasions when you need other groupings for flight clothing and Marine uniforms. Classify table covers, drapes, flags, and so on, according to color, material, and lint quality. Put ties and neckerchiefs by colors into separate bags and clean them with officer and CPO blues or khakis.

Foul weather jackets, face masks, winter helmets, and winter trousers may be cleaned together.

Although they have many different colors, signal flags may be cleaned in the same group. Transfer of lint among flags is not detrimental to their use.

Do NOT drycl.an impregnated, rubberized or oiled articles, or articles manufactured wholly or in part from leather. Drycleaning solvents damage such materials beyond repair or use.

When articles are classified, divide them into 15-pound bundles for loading (for 15-pound compartments).

A record of pounds cleaned and number of loads daily is maintained to determine the number of pounds cleaned per gallon of solvent and the cost per pound cleaned.

PRESPOTTING

Before drycleaning, all articles should be examined for spots, and all spots that are discovered should be analyzed and given appropriate treatment.

Study the spot carefully to determine what substance caused it, because this will determine what spotting agent and what methods should be used in removing it.

Treating the spot may not always remove it entirely but usually should break it up sufficiently that it will come out completely during the cleaning process.

You will note that the flow chart (fig. 9-1) shows both prespotting and post-spotting steps. The latter step is necessary in case anything has been missed earlier. If, however, it is necessary to post-spot an article, it must go back to be re-cleaned so as to remove the chemical used in spotting. An efficient dry-cleaning plant does such a good job of pre-spotting that post-spotting is held to a minimum.

A detailed discussion of spotting is given in chapter 10.

DRY-CLEANING EQUIPMENT

Drycleaning, in spite of its name, is a washing process. Steps in the process are roughly similar to those for washing with water, but the differences are important.

The clothes are washed in a washer-extractor adapted to the use of a solvent other than water. Soaps are used, but these, too, are of a special kind, suited to the solvent. The washing, rinsing, extracting, and drying processes all take place, but all are different from those in water washing.

WASHER-EXTRACTOR

Several types of dry-cleaning washers are in use currently aboard Navy ships. In general, they are of two types: (1) those that perform only the washing and extracting, after which the load is removed to a tumbler for drying, and (2) those designed to perform the complete cycle of washing, extracting, and tumbling.

The fact that heat is necessary to the drying process has given to this second type of unit the name "hot unit," while the first type of washer-extractor is conversely described as a "cold unit." Safe operation requires that only a nonflammable solvent be used in the hot type. Some of the cold type units use petroleum solvents. However, regardless of the type used, petroleum solvents are no longer authorized for use on board ship.

Each type has its advantages. The hot unit simplifies the job by eliminating handling of the clothes from one machine to the other. This type of unit also requires less space, which is an advantage aboard ship. The fact that the hot unit uses only nonflammable solvent also makes it preferable afloat.

For a large plant, however, or one with a very heavy workload, the hot unit is too slow because of the length of run required for drying. In plants where the workload creates a tight time schedule, therefore, separate machines for washing and for drying can be used with greater efficiency than can the hot unit type.

Figure 9-5 shows a shipboard drycleaning plant with a cold unit and a tumbler. The washer-extractor is on the left. Figures 9-6 and 9-7 are front and rear views of a hot unit.

The newer machines of both types are completely automatic; that is, controls are set at the beginning of the run so that the machine carries out its complete cycle of operations

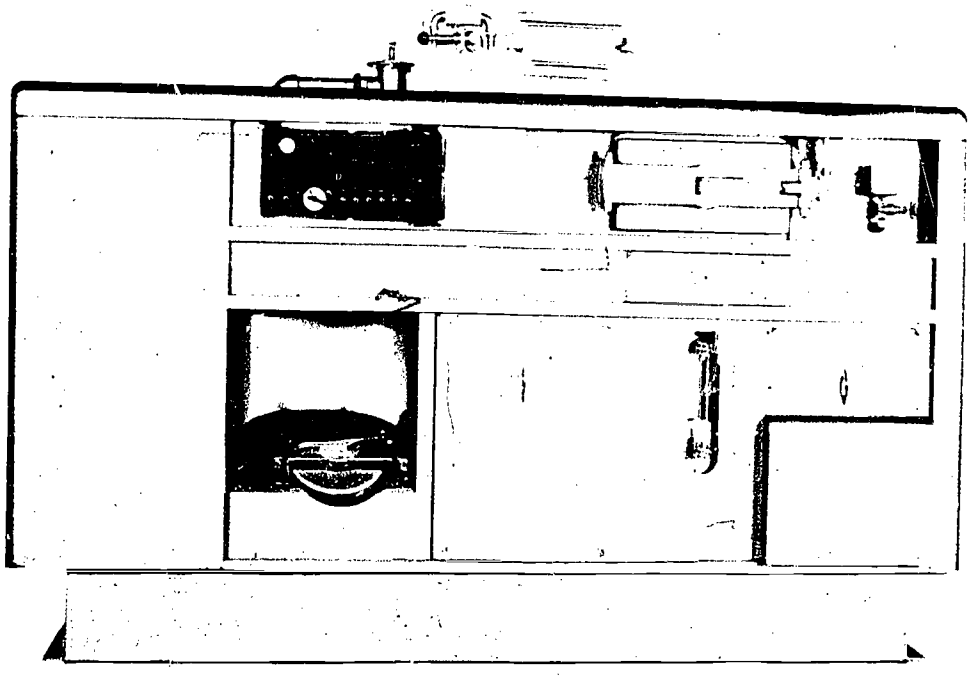

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Figure 9-6.—"Hot" type of drycleaning unit (front view).

without further action by the operator. This makes your work easier than with the older type of machine, but it is still necessary that you understand what takes place so as to know what to expect of the machine and how to troubleshoot if necessary.

Figure 9-5 shows the three main parts of the washer-extractor most clearly. There are (a) the washer itself, (b) the filter, and (c) the distilling unit.

Basically, what happens in all the automatic machines is this:

1. The load is placed in the washer basket, where solvent, aided by soap and the motion of the machine, carries on the initial washing process.

2. The solvent travels in a cycle through the washing basket into the filter—where much of the impurity it has collected is removed—and back into the washer, where it rinses the load.

3. A portion of the solvent is drained off after passing through the filter. This solvent enters the distilling unit, where it is completely purified. This is done by heating it until it vaporizes. The vapor is then run over cold pipes to change its temperature rapidly and return it to a liquid state. After distilling, it again enters the washing cycle. By this means the total amount of solvent in the machine is maintained at an acceptable level of purity for a long time. Some of the older machines have stills that operate separately, in which case the entire amount of solvent in the machine is run through the still during a period when the washer is not in operation.

4. At the end of the washing-rinsing period, the flow of solvent is automatically shut off and the machine spins to extract the solvent from the load.

These four steps complete the cycle of the cold unit; whereas, the hot unit then continues with the tumbling and drying.

Each model of washer-extractor has its own manufacturer's technical manual, a copy of which should be available for your study and use as a reference in operating the machine. These manuals give detailed instructions about loading and starting the machine and other steps the operator needs to know. Do not attempt to operate any machine without these specific instructions.

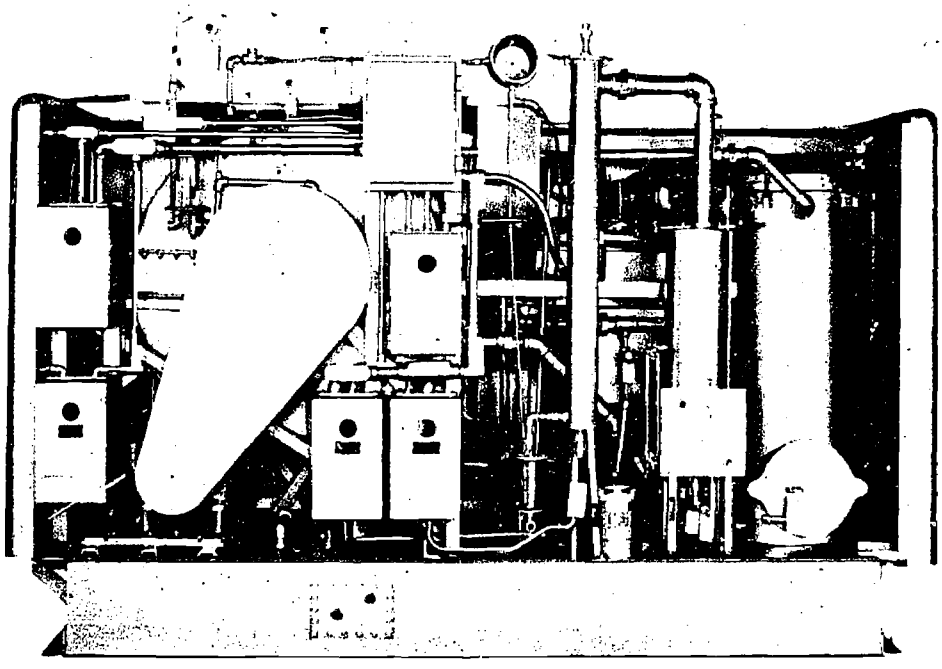

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Figure 9-7.—"Hot" type of drycleaning unit (rear view).

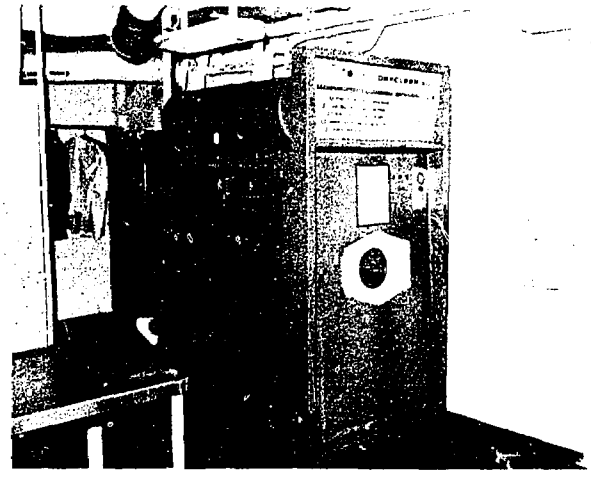

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Figure 9-8.—Turboclene drycleaning machine.

TURBOCLENE DRYCLEANING MACHINE MODEL FDC-4

The Navy is presently installing a new completely automatic drycleaning machine on board some of i ships. The machine is known as the Turboclene Model FDC-4 (fig. 9-8). It is a compact system which uses Valclene drycleaning fluid. It is a hot type machine which carries on its various functions in a manner slightly different from that described earlier. Clothes are first cleaned in drycleaning fluid. After draining and extracting the solvent from the clothes, a vacuum is used to remove the remaining solvent. The cleaning solvent is completely distilled after each cycle to provide clean pure solvent for the next load. Hot water is circulated through a coil in the still to heat the solvent. The solvent vapors are condensed in the water cooled condenser and stored in the storage tank for the next cycle. Efficient solvent recovery is achieved by passing all solvent laden air through a low temperature refrigeration system. Valclene 350, a solvent detergent solution, is automatically added to the cleaning solvent each cycle, to provide the correct mixture for proper drycleaning.

Turboclene Operators Instructions

The NAVSHIPS Technical Manual furnished with the equipment, together with the operating

instructions on the front panel sign, provide the operator with sufficient information to safely and economically operate and maintain the turboclene drycleaning machine.

The daily and weekly check lists outlined in the NAVSHIPS Technical Manual furnished with the equipment must be followed carefully to assure continuous high performance and to avoid loss of warranties.

The trouble shooting hints, listed below, outline the simple problems which the operator may encounter and the possible corrections he may take. Trouble which goes beyond the scope of the technical manual should be referred to the authorized service representatives.

Trouble Shooting Hints.—The trouble shooting information discussed below is for use by the operator to locate and correct simple things which might otherwise require a service call and lost operating time. An open fill plug, open electrical switch, or hand valve incorrectly positioned could cause trouble. Make sure that the proper hand valves are closed tight. Hot and cold water feed valves should be fully opened.

Typical Trouble	Possible Cause	Correction
Machine will not start.	1. Service switch is down. Drycleaner is out of service.	1. If machine is operable switch to IN SERVICE.
	2. Front door is not closed.	2. Close door securely.
	3. Insufficient solvent in storage tank.	3. Wait a few minutes for still to function.
	4. Lack of hot water to operate still.	4. (a) Check hot water switch. (b) Plug HOT WATER VALVE into panel connector. (c) Open feed valve. (d) Check boiler.
	5. No cooling water pressure.	5. Open feed valve.
	6. Insufficient solvent in system to fill storage tank Side 1 and operate float switch.	6. Add necessary amount of solvent.
	7. No electrical power to machine.	7. Check circuit breakers, fuses, and switches.
Drycleaning Machine starts. There is no vacuum in cleaning cylinder. Timer does not advance to cleaning cycle.	1. Door is not closed properly.	1. Remove obstruction and close door securely.
	2. Lint filter cover is off or leaking air.	2. Fasten cover with all six (6) wing screws. Clean mating surfaces. Tighten all screws evenly to get good seating.
	3. Oil fill plug is opened or leaking.	3. Tighten plug. Check that "O" ring is not missing.
	4. Filter on inlet to Pump 1 is opened or leaking.	4. Tighten closing ring. Check "O" ring. Clean mating surfaces.
	5. Drain valve is leaking.	5. Check drain valve.

Typical Trouble	Possible Cause	Correction
Long drying cycle.	1. Heavy garments, quilted or leather garments. Overload.	1. Normal. Dry sensor has extended the cycle.
	2. Lint filter is loaded.	2. Clean lint filter.
	3. Filter to Pump 1 is blocked.	3. Clean element. Replace if necessary.
	4. Air leak around front door gasket.	4. (a) Clean impacted soil. (b) Clean mating surfaces. (c) Replace door gasket if damaged.
	5. Leaking drain valve.	5. Stop machine. Check drain valve.
Excessively long time to recover enough solvent to start next run.	1. Hot water is not circulating.	1. (a) Hot water valve plug not connected to rear panel. (b) Circulating pump not operating. (c) Reset safety thermostats.
	2. Hot water temperature low.	2. Check boiler operation.
	3. Insufficient water.	3. Clean "Y" strainer.
	4. Excessive dirt in still.	4. Clean still.
	5. Cooling water is off.	5. Open feed valve fully.
	6. Hot water coil is airbound.	6. Bleed air from pipe lines.
Basket does not turn.	1. Belt is loose.	1. Reset tension.
	2. Pulleys not aligned after readjustment and belt slips.	2. Align pulleys to get uniform tension across full width of belt.
	3. Belt has oil, grease or dressing.	3. Use solvent to clean belt. Replace belt if necessary.
	4. Particles embedded in "V" grooves.	4. Clean if possible. Replace if necessary.
	5. Belt off.	5. Replace belt.
Automatic oiler fails to operate. Oil does not circulate.	1. Leak at oil fill cap.	1. Tighten fill cap. Replace "O" ring if necessary.

Complete Shut Down of Drycleaner

If the machine is not going to be used for periods of time, it may be taken out of service. The solvent may be safely left in the machine but should be removed if the machine is going to be moved.

WHEN TURNING OFF THE UTILITIES:

1. First turn off hot water.
2. Turn off electricity only when distillation has stopped.

WHEN TURNING UTILITIES ON:

1. First turn on cooling water and electricity.
2. Turn on hot water.

Failure to follow these procedures may cause solvent losses.

Calculation of Solvent Cost

Accurate records have to be maintained in order to calculate the cost for solvent and detergent. Keep a permanent record each week of the following information:

1. Date
2. A = Number of cycles of operation (differences in counter at the start and finish of each day).
3. B = Pounds of detergent-solvent additive mixture used (difference in the weight of the additive container at the start and finish of each day).
4. C = Record the storage tank solvent level change.

Calculation For Solvent and Detergent Costs

1. Cost of additive per pound x B pounds used = total cost of additive.
2. Cost of solvent per pound x C pounds of solvent change in tank = total cost of solvent.
3. Use one of the following calculations: Total cost of additive - total cost of solvent gained (if tank level increased) = total cost for solvent and detergent.
4. Total cost divided by number of loads equals cost per load.

Example

A = 100 cycles of operation
B = 32 pounds of additive at $0.72 per pound
C = 4 pounds solvent increase at $0.69 per pound

1. $ 0.72 per pound
   x 32 pounds of additive
   144
   216
   $23.04 total cost of additive

2. $0.69 per pound
   x 4 pounds solvent increase in storage
   $2.76 tank
   total cost of solvent increase

3. $23.04
   -2.76
   $20.28 total cost for 100 loads

Cost per load = $20.28 ÷ 100 = $0.20 per load

DRYCLEANING SOLVENTS

Only synthetic solvents are authorized on board. The most commonly used is perchlorethylene.

Solvent is taken aboard in large drums. The washer-extractor is filled with solvent by personnel from the engineering department. Eventually, through use, the solvent in the machine reduces below the level necessary for operation. Before adding solvent, check carefully to see if the solvent in the system should be distilled. You must have clean solvent to produce clean clothes. You should check the amounts in the storage tank from time to time and ensure that it is refilled as necessary. It is normally necessary to remind the sales office when the quantity of solvent is reaching a level at which procurement of a new supply should be initiated.

A new drycleaning fluid called VALCLENE has been developed. It is based on a fluorocarbon solvent with a built-in detergent additive.

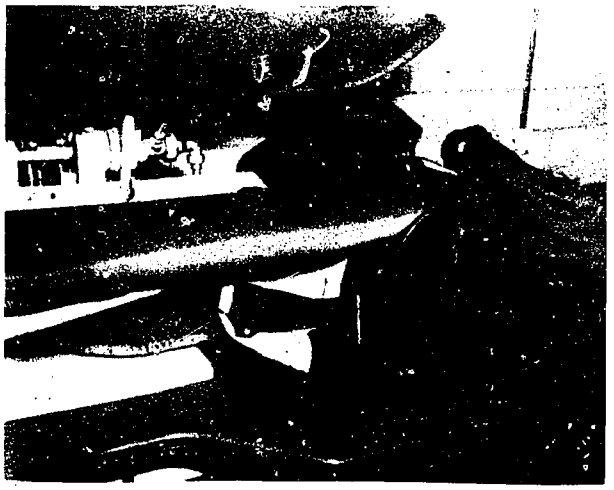
The turboclene drycleaning machine utilizes VALCLENE dry cleaning solvent. VALCLENE's high rate of vaporization and low boiling point permit rapid drying at ambient temperatures plus distillation. This eliminates the need for recovery tumblers to dry garments and recover solvent vapors

The mildness of VALCLENE over perchlorethylene, coupled with the efficient vacuum drying system in Turboclene, presents a system that is highly safe for a wide range of natural and synthetic fabrics: suedes and leathers, included.

There is little possibility of retention of residual solvent in garments, and VALCLENE has no unpleasant odor. Although VALCLENE is far less toxic than perchlorethylene, the Laundryman should still observe safety precautions regarding ventilation of drycleaning spaces.

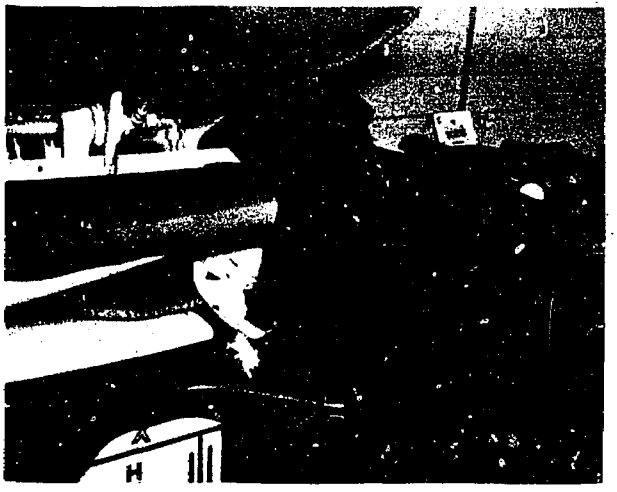
SOAPS FOR DRYCLEANING

Soap is used with both synthetic and petroleum solvents. Soap is added to the solvent to assist in stain removal and to enable the addition of controlled amounts of moisture. Each manufacturer of soaps furnishes detailed instructions as to its use, and a test kit, to ensure the proper ratio of soap to solvent. The stocking of specific soaps requires close cooperation



LAY 1 – LEFT FLY FRONT

LAY 2 – LEFT SIDE POCKET



LAY 3 – LEFT HIP POCKET

LAY 4 – CENTER SEAM

119.35

Figure 9-9.—Lays for pressing officers' trouser tops.

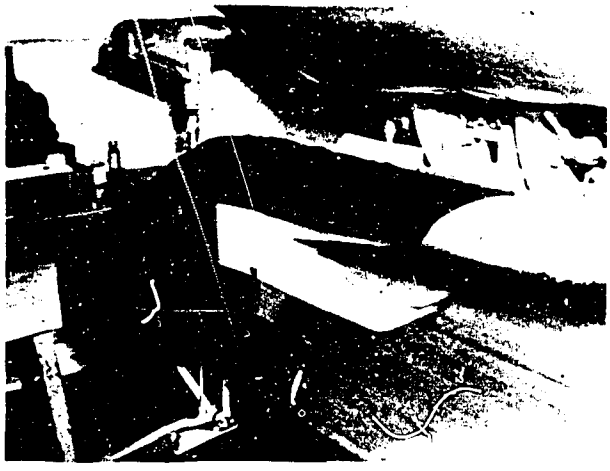
between you and the sales office, to ensure proper levels of supply on hand.

Avoid using more than the required amount. Otherwise, you will produce two results, both undesirable: (1) you will unnecessarily increase the cost of cleaning operations (Remember, this reduces ship's store profits which provide the recreation fund.); (2) you will actually produce a less satisfactory cleaning job. Excess soap increases the amount of fatty acid in the solvent so that it does its job less effectively.

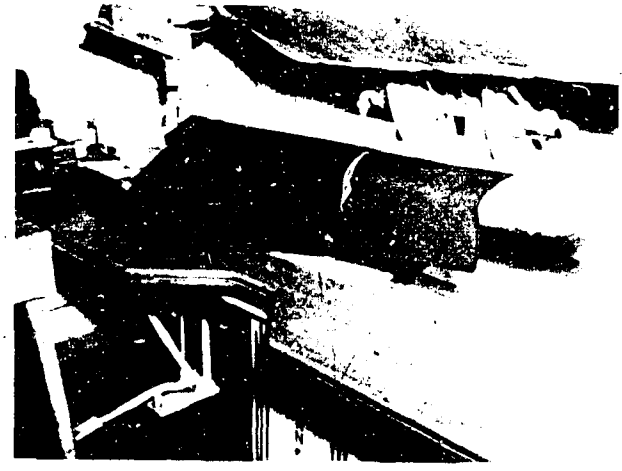
PRECOATING FILTER

In the filter unit, the solvent is forced through a series of screens which have been coated with filter powder (diatomaceous earth). This powder is highly absorbent and has the capacity of removing very fine foreign substances from the solvent, leaving it relatively clean when it leaves the filter.

Before operations begin each day, the screen must be freshly coated with filter powder. This is done according to the directions provided in



LAY 1 – LEFT LEG FRONT PORTION



LAY 2 – LEFT LEG FRONT CREASE

LAY 3 – LEFT LEG REAR CREASE

119.36

Figure 9-10.—Lays for pressing officers' trouser legs.

the manufacturer's technical manual for your particular machine.

At the end of the day's operations, while the machine is being cooled down, the filter can be shaken down, following the manufacturer's directions. The sediment is allowed to settle in the filter until morning.

During long continuous operation, the impurities absorbed by the filter powder may contaminate it so that the solvent no longer passes through as easily as it should. This creates too much pressure in the filter, causing the machine to operate with reduced effectiveness. To avoid this situation, it may be necessary to shake the filter down during operation. Consult the technical manual for directions.

After the filter pre-coat has been applied and after the solvent shows clear in the sight glass, activated carbon should be added to the solvent and circulated through the system while no garments are being cleaned. Activated carbon is useful in removing color and other impurities from the solvent. Each manufacturer of activated carbon (trade names, Darco, Norit,

Klean, and others) furnishes detailed instructions for its use.

OPERATION OF STILL

Whether the still operates automatically or not, be careful to see that it is working properly and that instructions in the manufacturer's technical manual are followed precisely. Otherwise, you may be in serious trouble before you know it.

The vapors from perchlorethylene are toxic, and even the small amounts that arise through incidental evaporation from the washer can accumulate until they pollute the air in drycleaning spaces, with the result that operators begin to feel sick and dizzy and to lose coordination. The still can create a more serious hazard because it is constantly converting quantities of solvent into vapor for the purpose of purifying it. If the machine is working properly, the cooling system promptly reconverts this vapor to liquid. If, however, the cooling system becomes faulty or ceases to operate, the vapor will build up pressure inside the distilling unit and eventually will escape into the air in amounts sufficient to be seriously harmful or even fatal to operating personnel. So it is essential that you check the still frequently when it is operating to see that the cooling system is working properly.

Note: For the above reason, it is extremely important to keep drycleaning spaces properly ventilated.

TUMBLING AND AERATING

Whether the drying step takes place in the same machine or in a separate tumbler, the process is essentially the same.

In addition to fluffing and drying, the drycleaning tumbler must also deodorize. Many conditions govern the time required to deodorize, and it is therefore impossible to predetermine the tumbling time required for each load. Steam pressure, room temperature, exhaust duct installation, types of garments, and condition of solvent are some of the factors to consider. Silks deodorize faster than woolens, woolen coats with shoulder padding deodorize slower than trousers. Experience will be the best guide; however, the drycleaning formula should include a basic breakdown of tumbling time for each type of garment.

Precautions to Protect Fabrics

In tumbling especially, but also in all other phases of drycleaning, all personnel should remember that they are handling special fabrics and special garments. These articles are dry cleaned because of this special fabric or special construction. Therefore, drycleaning personnel must never forget that excessive mechanical action, excessive heat, or excessive moisture applied during any phase of the drycleaning process may shrink or damage the fabric. What is desirable for one fabric may be excessive for another. Know your drycleaning formula and the manufacturer's technical manual thoroughly and apply that knowledge to the special handling of each individual type of clothing. Time of run and amount of heat are of great importance in any operation.

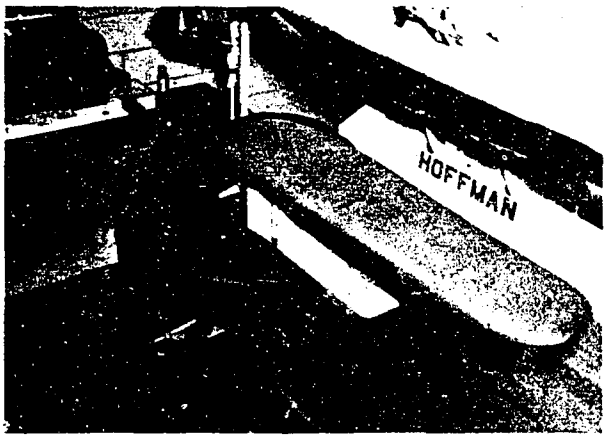
Steam is used to provide the necessary heat in the tumbling operation. Steam coils warm the flow of air in the tumbler. If this flowing air is heated above 140° F, which is sometimes desirable, and there is an appreciable amount of moisture present in woolen garments, it will cause objectionable shrinkage. This moisture may be present from two sources. One is high humidity in the atmosphere; the other is excessive water in the drycleaning soap solution.

The tumbling operation in drycleaning is normally done in three steps. The following table represents average tumbler operation during the three steps for the three basic material groups based on construction of fabric only.

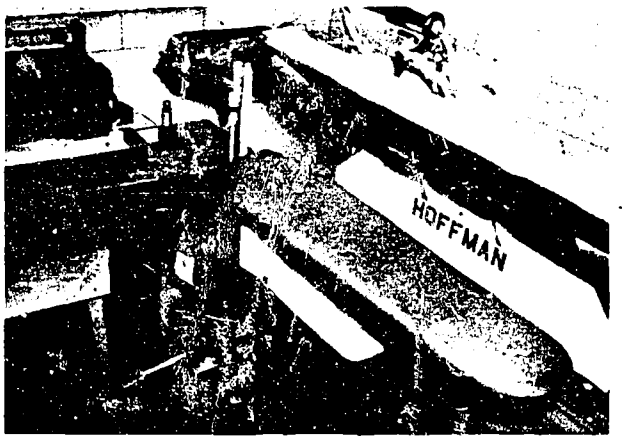
1. Silks and whites.	Five minutes cold; dry at low temperature (120° F); finish with five minutes cold.
2. Soft woolens and drapes.	Five minutes cold; dry at 140° F; finish with five minutes cold.
3. Tightly woven woolens.	Five minutes cold with steam; dry at higher temperature (160°F); finish five minutes cold or five minutes cold with steam.

Ventilation

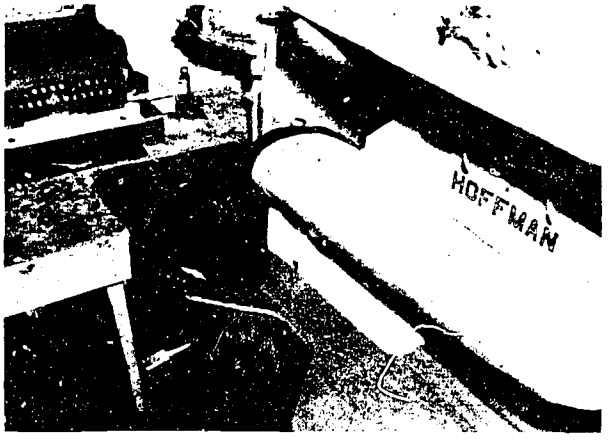
Because of the noxious fumes from synthetic solvents and the fire hazard connected with



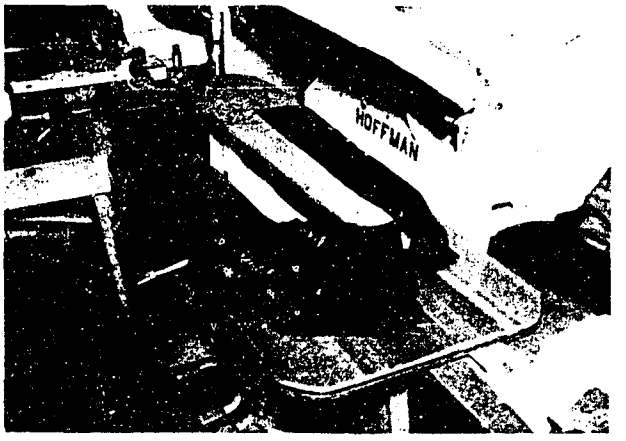
LAY 1 – LEFT SIDE OF COLLAR



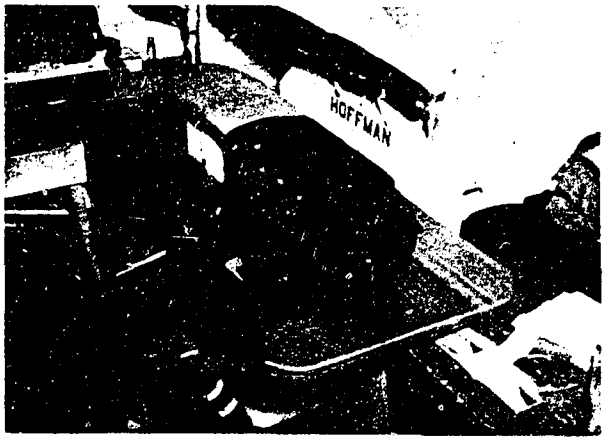
LAY 2 – RIGHT SIDE OF COLLAR



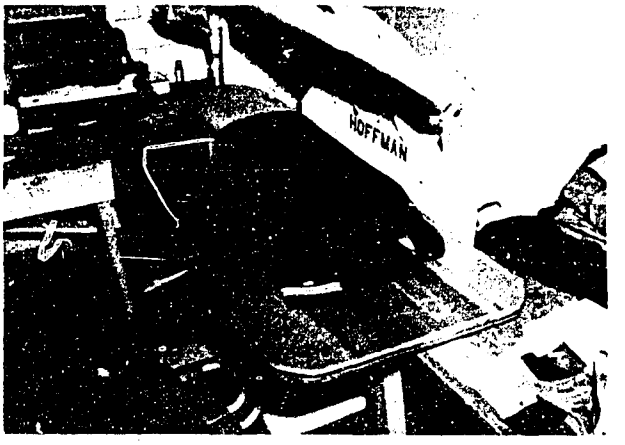
LAY 3 – CENTER SEAM OF COLLAR



LAY 4 – RIGHT FRONT EDGE

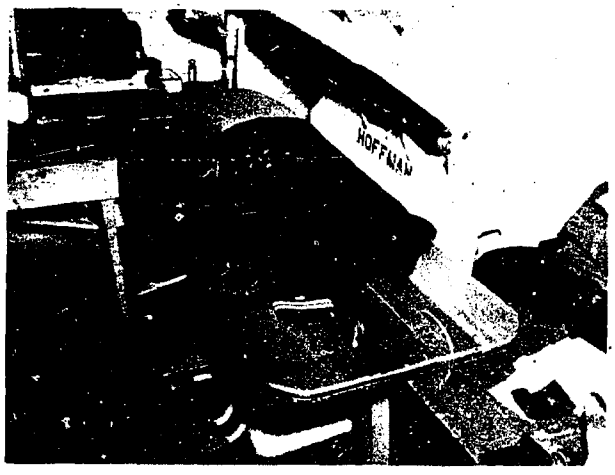


LAY 5 – RIGHT SIDE AND POCKET



LAY 6 – RIGHT HALF OF BACK

Figure 9-11.—Lays for pressing officers' sack coats. 119.37.1



LAY 7 – CENTER SEAM OF BACK

LAY 11 – COAT FACINGS

LAY 13 – SLEEVES, ROLLED

119.37.2

Figure 9-11.—Lays for pressing officers' sack coats—Continued.

petroleum solvents, dry-cleaning tumblers are equipped with many safety features. The operator must become thoroughly familiar with the manufacturer's technical manual in this respect, and should make a careful check of these safety features periodically to ensure safe operation. Thorough ventilation of the drycleaning spaces is essential as a protection for operating personnel.

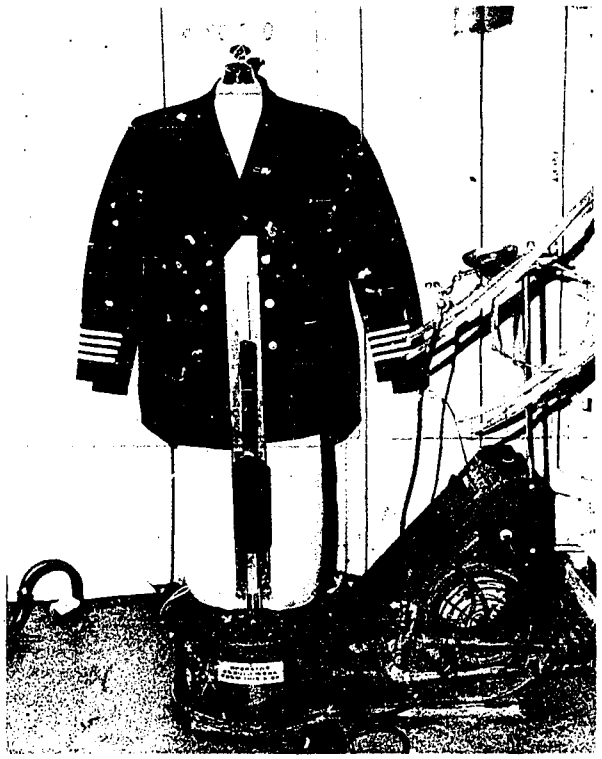
When you start to take clothes from the tumbler, check them for odor. If you still detect the solvent odor, continue tumbling long enough to eliminate it.

POST TUMBLING INSPECTION AND SPOTTING

After tumbling, check each article for spots and other imperfections. Have spots removed by the spotter. Remember, however, that articles spotted at this stage MUST BE FLUSHED OR RECLEANED to remove spotting chemicals.

Never press clothes with spots in them, for the heat used in pressing will so set the stains that removal will be difficult—if not impossible.

Clothes acceptable for pressing should be either hung or arranged neatly on the table or the hamper to avoid unnecessary wrinkling.



155.110

Figure 9-11A.—Steam-air finisher.

After inspection of Enlisted Men's trousers and Enlisted Men's jumpers, turn on reverse side for pressing operation.

DRYCLEANING PRESSES

Drycleaning presses have perforated metal heads and bucks through which steam is admitted by the operator. The heads are normally covered with a perforated, thin, metal mask, which is sometimes also covered with a moleskin type of fabric to prevent a gloss on pressed articles. The bucks are usually padded and are then covered with a perforated metal mask and a cloth covering.

Presses used for drycleaning are operated either manually or by compressed air. Air operated presses have control buttons on the left and right sides of the table. When the operator presses both buttons at the same time, he admits compressed air to the hydraulic system which lowers the hot head on the buck. He can release the head by depressing either the left or right control button. Manually operated presses have foot pedals at the base of the frame, and hand valves on top of the head.

These presses also have vacuum lines connected with the heads and bucks to remove steam from the pressed article. When the steam vapor is removed, the heat of the press dries the article faster and helps to remove wrinkles and retain smoothness and creases.

STEAM PRESSING

The pressing of woolen uniforms should not be done on HOT HEAD presses (uncovered polished steel). Woolen fabrics cannot withstand high temperatures.

CAUTION is required when pressing fabrics containing high percentages of either DACRON polyester fabric or ORLON acrylic fiber, because control of temperature, pressure, and time are important. For best results 100 percent "Dacron" or "Orlon" fabrics should be pressed at temperatures around 275° F with low mechanical pressure and short intervals of time. In blends of "Dacron" with wool, higher temperature may be used provided the mechanical pressure and contact time are kept at a minimum. Improper pressing techniques may result in shine, watered, clouded, or frosted appearance, needle holes, and difficulty in altering the finished garment at some later date. If high steam pressures are used, it is doubtful that pressed seams can subsequently be altered. Permanent damage results from the defects discussed above, as they cannot be removed by sponging or other treatment.

PRESS LAYS

In machine pressing, each garment is finished by a series of lays. Each lay is a position of the garment on the buck, and the series should cover the entire garment. Places on the garment which cannot be pressed with the machine should be smoothed out by inserting a puff (pad) and pressing the spot against the head of the press or by using a hand iron.

All pressers do not follow the same pattern for pressing the same article. Generally, however, there is not much variation in different lays. Sequences of lays for officers' trouser tops and legs, officers' sack coats, enlisted men's trousers, and enlisted men's jumpers are described in the following pages. The ones given are considered the minimum for each article when quality pressing is desired.

PRESS LAYS FOR OFFICERS' TROUSER TOPS

Illustration 9-9 gives the sequence of lays for pressing officers' trouser tops.

With the fly open (lay No. 1), draw the left trouser top over the small end of the buck, having the fly front almost even with the front edge of the buck. Steam by using the head and applying light pressure, then dry thoroughly with the vacuum.

Again place the left trouser top on the small end of the buck as shown in lay No. 2. The pocket should be in the center of the buck. Straighten out the pocket and make certain that the outer edge is even and drawn together. Steam, press, and dry the lay.

In lay No. 3, the left side pocket is even with the front edge of the machine and the back center seam is even with the rear edge of the buck. The left hip pocket lies in the center of the buck. Steam the material lightly and pull the pocket together.

In making lay No. 4, draw the trouser top over the small end of the buck so that the end of the buck fits well down into the seat of the trousers and the back seam is directly in the center of the buck. Apply steam and light pressure and vacuum dry.

In making lay Nos. 5, 6, and 7, continue on around the trouser top, pressing the right side. These lays are not illustrated as they correspond closely to lays 3, 2, and 1.

OFFICERS' TROUSERS LEGS

Lays for pressing officers' trouser legs are given in figure 9-10. The first step is to place the front portion of the left leg on the buck—crotch at the large end, the inside of the leg facing upward, the seams lying on the center of the buck (see lay No. 1). Ensure that one seam rests upon the other for the entire length of the leg. Apply steam to soften the material, and straighten the knee.

Lay the left leg, as shown in lay No. 2, on the front of the buck so that the front crease is in the center of the buck and the top of the trouser is at the large end of the buck in a line with the second or third button of the fly (or, if zippered, 2 or 3 inches from the bottom), in position so the crease will extend upward as far as possible.

In lay No. 3, move the trouser leg to the rear of the buck so that the back crease is lying on the center of the buck. The leg should be placed so that at least 4 inches of the seat will be creased. Extend the crease as high as possible without wrinkling the crotch.

Lay Nos. 4 (right leg, front portion), 5 (right leg front crease), and 6 (right leg rear crease) are substantially the same as lays 1, 2, and 3 of figure 9-10.

OFFICERS' SACK COATS

Check illustration 9-11 for the lays used in pressing officers' sack coats.

As shown in lay No. 1, place the left side of the coat collar and the left lapel on the rear of the large end of the buck, and press. This operation shrinks the collar at the gorge seam, restoring the shape of the garment where it tends to stretch, from the seam at the shoulder down to about 5 inches below the gorge seam.

Lay No. 2 is similar to lay No. 1 except that the right side of the collar and the right lapel are pressed. Make this lay on the front of the large end of the buck. Lays Nos. 1 and 2 serve to restore the balance of the coat so that the left and right front hang evenly.

After creasing the two sides of the collar, place the collar on the large end of the buck (see lay No. 3) so that the center is on the center line of the buck. In most cases the collar is stretched while being worn. Distribute the extra fullness over the length of the collar, and steam freely.

In lay No. 4, place the right front of the coat at an angle in order to bring out the chest. Never stretch the front of the coat; gather in the front slightly and shrink it to the proper length. Steam well before applying pressure, then vacuum dry.

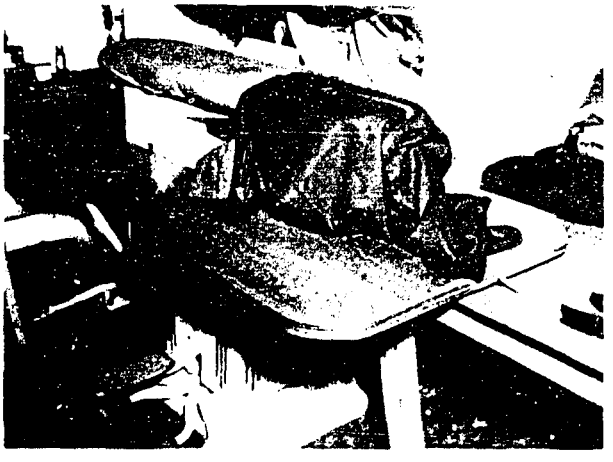
See that the pocket is smooth. Move the coat forward on the buck for lay No. 5. The small end of the buck fits into the chest about 1 inch below the armhole pit, and within 2 or 3 inches of the side seam. (See illustration.) Any fullness on the dart seam should be taken in between the pocket and the armhole pit.

In lay No. 6, place the right half of the back on the buck so that the lay is about 1 inch from the right armhole and about 2 inches below the collar. The side seam slants in from the armhole; the bottom of the seam is about 4 inches from the front edge of the buck.

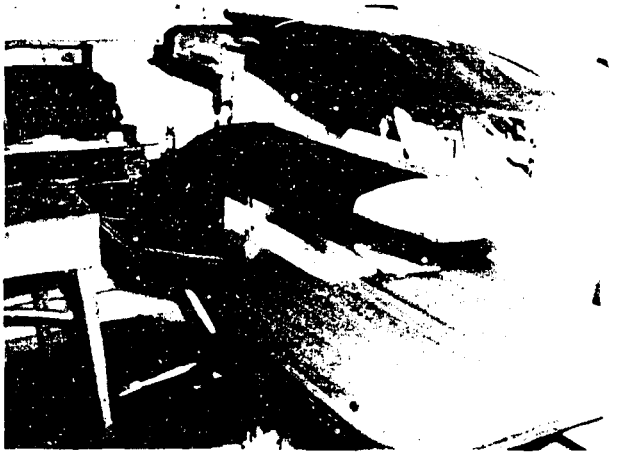
The center seam in the back of the coat should be placed in the center line of the buck for lay No. 7. See that the bottom edge of the

LAY 1 – LEFT SIDE FRONT

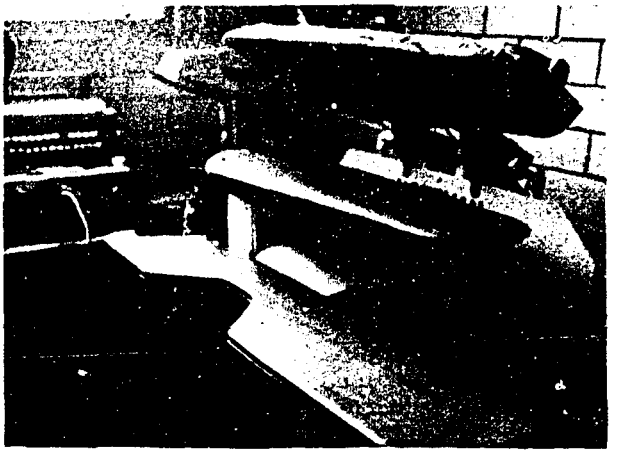
LAY 2 – LEFT SIDE BACK



LAY 3 – CENTER SEAM



LAY 6 – LEFT LEG FRONT PORTION



LAY 7 – LEFT LEG OUTSIDE PORTION

119.38

Figure 9-12.—Lays for pressing enlisted men's trousers.

under-collar is placed even with the edge of the buck. Any fullness in the center seam between the shoulders should be taken in.

Continue on around the coat, making lay No. 8 (left half of coat back), lay No. 9 (left side and pocket), and lay No. 10 (left front edge) to correspond to lays 6, 5, and 4.

Place the right facing of the coat front on the buck, facing up as shown in lay No. 11. This lay takes in the coat edge from the bottom of the coat to a point below the gorge seam. Lay No. 12, for the left facing, is the same as No. 11.

Insert sleeve former as shown in lay No. 13 and place on buck of press. Bring the press head down for light contact only and steam from head and buck and then apply vacuum until dry. Turn sleeve over without removing former and repeat on other side. The same methods are applied for the right sleeve. Visible creases from previous pressing can be removed by rubbing on buck and steaming with former still in the sleeve. For stubborn creases, wet with a damp cloth, allow to dry, and press as above.

Fit the shoulder pad into the sleeve head at the back seam. After spreading the fullness evenly, apply steam, then hold lightly against the head allowing the heat to press out the fullness. Next follow around to the front of the sleeve, getting in far enough to take care of the wrinkles. Work out the wrinkles in the other shoulder.

ENLISTED MEN'S TROUSERS

Figure 9-12 illustrates the sequence of lays for pressing enlisted men's trousers.

Turn trousers inside out for entire pressing operation. Place left front of trousers on small end of buck, smooth out the flap and then apply steam and vacuum dry. See lay No. 1.

In lay No. 2, the left side back is placed on the small end of the buck, even with the side crease. Smooth out all wrinkles, apply steam freely, vacuum dry.

In making lay No. 3, draw the trouser top over the small end of the buck so that the end of the buck fits well into the seat of the trousers and the back seam is directly in the center of the buck. Apply steam and light pressure and vacuum dry.

In making lay No. 4 and lay No. 5, continue on around the trouser top. These lays are not illustrated as they correspond closely to lays Nos. 2 and 1.

In lay No. 6, place the front portion of the left leg on the buck, crotch at the large end. With the seam facing up, running parallel to inside crease, apply light pressure and vacuum dry.

Lay the left leg, as shown in lay No. 7, at the rear of the buck, so the outside crease is in the center of the buck in line with the bottom of flap, to avoid crushing buttons. Apply steam fully to take out fullness of knee and vacuum dry.

Lay No. 8—Right leg front portion, and lay No. 9—right leg outside crease, are substantially the same as lay Nos. 7 and 6.

ENLISTED MEN'S JUMPERS

Illustration 9-13 gives the sequence of lays for pressing enlisted men's jumpers.

Turn jumper inside out for entire pressing operation. Place body of jumper on center of buck applying light pressure, steam, and vacuum dry. See lay No. 1.

Place right side of jumper on small end of buck (lay No. 2), extending from shoulder to bottom. Insert right hand into shoulder seam, smoothing out wrinkles. Apply steam and vacuum dry.

In lay No. 3, place center of the jumper on small end of buck about 6 inches above the vee. Apply light pressure, steam, and vacuum dry.

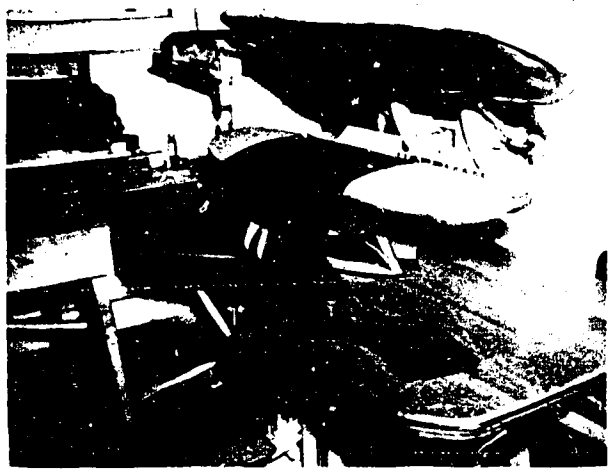
Lay No. 4 is pressed in the same manner as lay No. 2.

Place sleeve in center of small end of buck as illustrated in lay No. 5, making sure creases will correspond with body crease and shoulder crease. Smooth out all wrinkles by applying light pressure so as to avoid crushing buttons on cuffs.

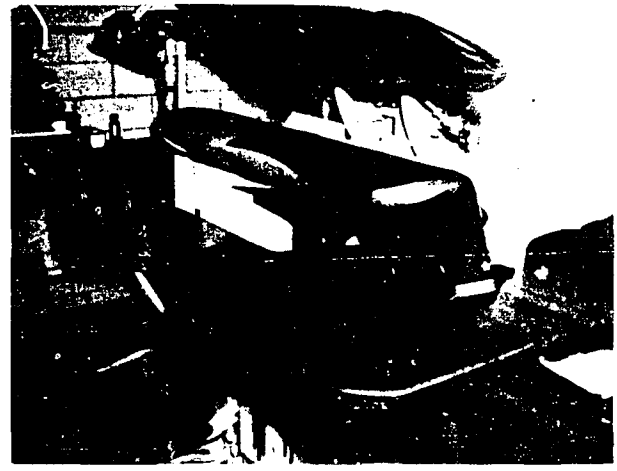
Lay No. 6 is pressed in the same manner as lay No. 5.

In lay No. 7, place collar in center of buck and fold the sides to meet in the center as shown in lay No. 7. Apply plenty of pressure. Then fold the collar again so that the two outside creases are matched evenly. Place on center of buck and apply plenty of pressure. See lay No. 8.

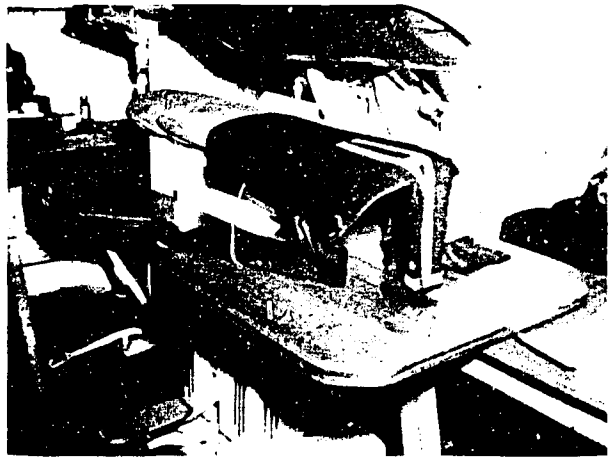
In lay No. 9, fold jumper in center so that both sides of jumper match. Place center fold on buck, apply light pressure, steam freely, and vacuum dry.



LAY 1 – BODY OF JUMPER



LAY 2 – RIGHT SIDE OF JUMPER



LAY 3 – CENTER OF JUMPER

LAY 5 – LEFT SLEEVE

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Figure 9-13.—Lays for pressing enlisted men's jumpers.

BRIDGE COATS AND PEACOATS

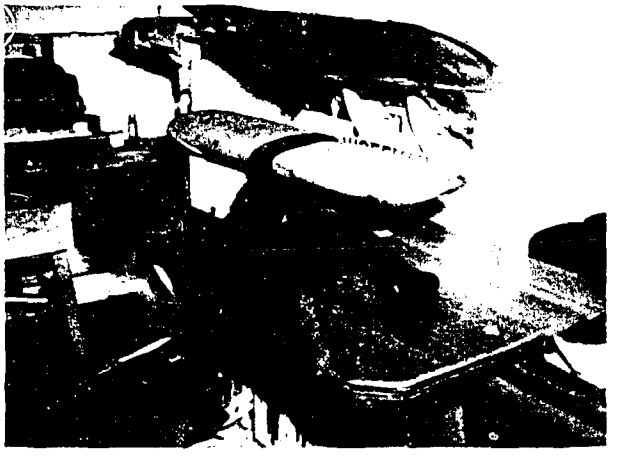
Bridge coats and peacoats should not be pressed. To obtain best results with this type of material, it is only necessary to steam it. Lay the garment on the buck and apply steam, using a soft brush at the same time to bring up the nap. After the garment has been well steamed, apply vacuum to dry.

The lays for steaming these garments are the same as for pressing an officer's sack coat.

HAND IRON

While most of the pressing is done on the pressing machine, a hand iron is used for certain special jobs. The two principal uses of the hand iron are to OPEN (flatten) seams and to

LAY 7 – COLLAR



LAY 8 – COLLAR

LAY 9 – CENTER CREASE

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Figure 9-13.—Lays for pressing enlisted men's jumpers—Continued.

smooth out silk scarfs and neckerchiefs. When opening a seam, the material must be dampened with a sponge before ironing. This helps prevent scorching, and also makes it possible to iron the seam out flat.

Silk has a tendency to wrinkle when steam is applied to it. Unless scarfs and neckerchiefs are handled very carefully on the pressing machine, they have to be finished with a hand iron. Two precautions must be taken when ironing silk. First, slightly dampen the material; second, be sure the iron is not too hot.

ASSEMBLING AND ISSUING

When you complete the pressing of clothes, get them ready for issuing. Use the drycleaning lists for assembling articles into customer groups. The number on the master tag(s) attached to the drycleaning list corresponds to the numbers of various articles in a customer's bundle. Put the tags in numerical order and collect all articles belonging to the respective master tags. Be sure that all articles written on the customer's drycleaning list are present

and accounted for. Then check to see that all buttons are intact, and that belts and buckles are present. Missing buttons should be replaced, and all belts and buckles presented to the laundry should be returned with the cleaned article or replaced when lost. Keep a supply of raincoat buckles on hand.

After you collect and check all items which belong in a customer's bundle, attach the drycleaning list and put the items on the assembly and/or issue rack in numerical order. Most assembly racks are divided into sections: 0 to 9, 10 to 19, etc., or A to D, E to K, and so on.

As stated previously, the time for pickup by authorized persons is indicated on the drycleaning schedule. The hours are stated by divisions and activities, and staggered to prevent congestion in the pickup line. Delivery periods should be at stated periods which will not interfere with active drycleaning processes in the department. Experience in a drycleaning department soon indicates what issuing procedures are best for that particular plant.

CARE AND MAINTENANCE OF DRYCLEANING UNIT

Keep the surfaces of machines in the drycleaning unit free of dust. Wash them with hot water and soap, or a safe solvent. A light coat of wax applied to the surface of new machines helps to keep dirt from adhering to them.

Check for accumulations of lint on coils when you remove the lint bag in the evening. Once each week, open and inspect the cleanout at the top of the coil housing. Remove the cleanout above the damper housing to eliminate lint.

Check the cleanout back of the fan, and the fan wheel, for lint accumulations. Be on the alert for solvent and grease leaks. Occasionally, check the timer with a watch. See that maintenance and lubrication charts are followed, and report requirements for maintenance to your supervisor.

CHAPTER 10

REMOVAL OF SPOTS AND STAINS

Spots and stains that resist ordinary washing or dry cleaning processes usually can be removed by special treatment suited to the substance and the fabric. This treatment is called SPOTTING, and the man who administers it is called a SPOTTER. Laundry and dry-cleaning personnel distinguish between spots and stains in the following fashion: A spot, such as might be caused by foods, blood, grease, or ink, is not a stain unless it has become "set" in the material. This "setting" usually results from the application of heat or from certain chemical reactions. Once set, the spot becomes a stain, which cannot be removed without some injury to the fabric. In many cases the injury is so minor that removal is still well worth while. In other instances, the risk of damage to the fabric is so serious that it is better to leave the stain in.

WHAT A SPOTTER SHOULD KNOW

Spotting requires considerable knowledge and skill. A spotter must identify the substance that caused the spot or stain, and he must know what cleaning agents and what types of treatment will remove it. Since the various fibers used in fabrics respond very differently to cleaning agents and methods of treatment, he must know how to determine what fibers compose a fabric. (See ch. 3.) In dealing with colored materials, he must also consider how an agent or treatment will affect the dye. Finally, he must understand the equipment and tools of a spotter and be able to use them so as to get the best possible results.

Many of the fabrics the spotter handles will be expensive. Serious damage to any of them will mean financial loss as well as definite inconvenience for the owner. The spotter should therefore know before he attempts to remove a spot or stain that the substances and methods he intends to use will not destroy the fabric or ruin its appearance.

When in doubt as to whether a spot or stain can be removed without serious damage to the material, the spotter should contact the owner, discuss the problem, and get his advice. If the owner is not available the supervisor should be informed and his advice obtained before starting the work. Damage to an expensive item will probably result in ill feeling and a laundry claim.

SPOTTING IN SHIPBOARD LAUNDRIES

Most ship's laundries are concerned only with spotting washable fabrics. In ships that have drycleaning facilities, stain removal for both washable and drycleanable garments should be handled by the drycleaning spotter.

As has already been indicated, early identification and treatment of some spots is necessary if they are to be prevented from becoming stains. Desirable as this may be, the workload of a ship's laundry does not permit examination of every item for possible spots. Certain precautions, however, can and should be taken.

For instance, blood-stained and grossly soiled articles, if possible, should be hand washed before they are sent to the laundry. In the case of items from the sick bay, laundry personnel may be able to take care of the advance rinsing, but the sick bay laundry petty officer should cooperate by keeping the stained items separate from the rest of the laundry.

On ships with dry cleaning sections, better spotting service can be given if a garment is tagged by the owner with a note identifying the cause of the spot. This information makes the spotter's work easier, faster, and more accurate. It also alerts him to do spotting before dry cleaning.

Unless the above special precautions are taken, however, the spotter's work in a shipboard drycleaning plant will be done largely after dry cleaning. Items that will be pressed should be examined for spots or stains before pressing to prevent the spot from being set by the heat of pressing.

If stained articles frequently arrive for washing or dry-cleaning without being hand washed or tagged, it might be appropriate for

the laundry supervisor to prepare a brief notice for all hands, tactfully pointing out the importance of this cooperation by the owner for successful removal of the stain. Such a notice could be forwarded, via the supply officer, for publication in the plan of the day.

SPOTTING TOOLS AND EQUIPMENT

Spotting tools and equipment consist of: (1) spotting board assembly, (2) spotting brushes, (3) spatulas, (4) chamois, (5) towels, (6) cheesecloth, (7) blotters, (8) steam hose, (9) spotting bottles, (10) magnifying glass, and (11) drying cabinet (in some instances). The following discussion of spotting tools and equipment is not all-inclusive, but it is in sufficient detail to give you a general understanding of the operations.

SPOTTING BOARD

A spotting board is the spotter's work table. It is shaped like an ironing board to provide large and small work spaces for different sized articles. It is secured to a heavy metal base to hold it firm; and is composed of a sleeveboard, a garment tray, an air and/or steam spotting gun, and a chemical tray.

Figure 10-1 shows one type of spotting board currently used on Navy ships. The work table is made of stainless steel, with space at the large end for frequently used spotting chemicals and formulas. A flanged edge prevents the bottles from sliding or slipping off the table. The small end of the board is perforated to admit hot air, or for vacuuming steam and/or solutions from garments.

Note the small spotting board over the large one. It is fastened by a swivel joint to a metal arm which is secured to the large end of the main board by means of another swivel joint. These two joints enable the spotter to swing the small spotting board out over the large one for use and to push it back toward the bulkhead to get it out of the way when he uses the small board. The entire top surface of the small board is covered with perforated metal to allow hot air to enter or to enable the spotter to vacuum solutions from articles.

The perforated area of the spotting board must be taken apart and steam-cleaned everyday to remove excessive chemicals and dyes.

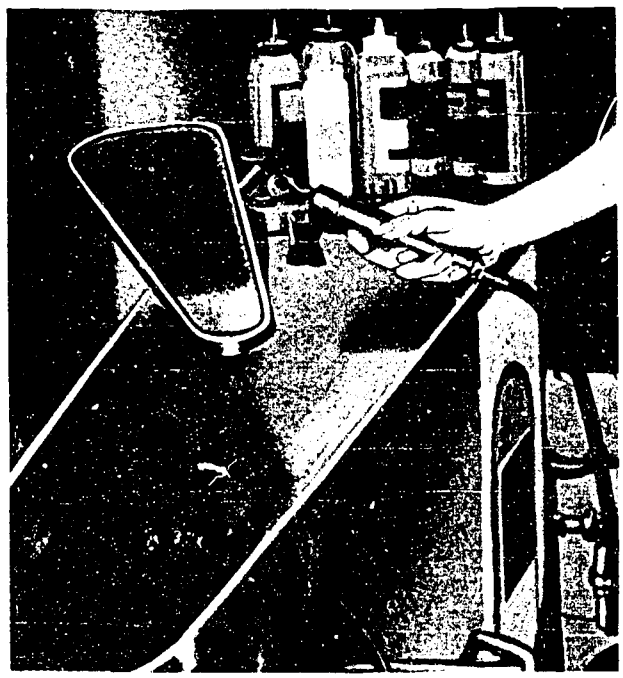

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Figure 10-1.—Spotting board.

Sleeveboard

The sleeveboard is mounted about six inches above the level of the main spotting board. The sleeveboard, like the main spotting board, also has a flushing and tamping area. The sleeveboard is attached to the main board by a movable arm, which can be adjusted. This board is used when working out stains on sleeves and other small areas. Clean sleeveboard just like main spotting board.

Garment Tray

The garment tray is under the main spotting board, midway between the board and the floor. The tray must always be clean; otherwise the garment resting in it will be soiled.

Chemical Tray

The chemical tray is where all the basic spotting agents are placed.

Steam Gun

The steam gun is used for wool, silk, and synthetics for removing spots and stains. The steam is adjusted so that a slight pressure on the steam pedal provides steam, and more pressure will provide hot water or wet steam. If compressed air is piped to the spotting board, it too will come through the gun when the appropriate foot pedal is depressed. When vacuum is piped to the spotting board, it too is controlled by a foot pedal. However, the vacuum is piped to the perforated area of the board to dry and hold the garment in place while spotting. The steam gun must be held about 4 to 5 inches above the garment. If the gun is held closer than 4 inches from the fabric, the steam or air pressure at 70—80 pounds per square inch can cause permanent damage to the fabric. At 70—80 pounds per square inch, the temperature of the steam coming out of the gun is over 300° F. The action of the spotting chemicals is greatly accelerated by an increase in temperature. This could cause permanent damage to the fabric and could result in color loss. At a 1/2-inch distance the gun produces 212° F, at a 2-inch distance the gun produces 165° F, at 4 to 5 inches the chemical reaction will decrease the danger of bleeding the dyes. The spotting gun should be held perpendicular when blowing chemicals or spots through the fabric and at a 45° angle when blowing spots off garments. Before using the steam gun, aim the gun towards the deck and depress the steam pedal to remove excess condensation. The steam gun must be cleaned daily to remove all chemicals from the nozzle.

SPOTTING BRUSHES

Spotting brushes usually come in two sizes and two colors—3-inch and 2-inch, black and white—and are made of nylon bristles. The spotting brushes are used to help break up stains so spotting agents can penetrate into and around them. When using the brush for mechanical action, try tamping, but be sure that the bristles hit flat, to prevent them from damaging the fabric. After using the brush, always clean it with the steam gun.

SPATULA

The spotter's spatula is made of stainless steel, bone, or ivory and is about one inch wide and five inches long. It is usually pointed at one end while rounded at the other end. It is used to manipulate the chemicals, softening action and to get better penetration. Never put too much pressure on the spatula, and never use the pointed end, because it will dig and distort the fabric. Use the rounded shoulder for better and safer results.

CHAMOIS AND TOWELS

A thick, heavy chamois is used for absorbing water and spotting solutions as they are removed from fabrics. The chamois should be spread smoothly over the portion of the spotting board being used at the time. A medium-weight turkish towel serves the same purpose. By absorbing cleaning chemicals, particularly acids, the absorbent prevents pitting of the spotting board. Keep chamois skins or turkish towels available for this purpose.

CHEESECLOTH AND BLOTTERS

Cheesecloth, being soft and absorbent, is used in spotting for feathering out—picking up all the moisture around a spot just removed. Unless you do this, rings will form. Chamois, because of its heavy texture, is not good for feathering out.

You can use blotters for absorbing materials rinsed from a garment. You can use them also to test the resistance of dyes in fabrics to cleaning chemicals and/or spotting agents. Put a small portion of fabric on a blotter and apply the chemical or spotting agent. The amount of coloring matter dissolved by the chemical and absorbed by the blotter indicates the effect of the chemical on the dye.

MAGNIFYING GLASS

When in doubt about the substance that caused a spot or stain, a spotter may examine it under a magnifying glass. Although an inexperienced spotter may get little results with a magnifying glass at first, he should continue using it. Through practice he will learn to identify various substances as they appear when magnified.

DRYING CABINET

Most ships' laundries will not have drying cabinets. If you have one, however, you will find it useful, especially when the workload is

heavy. It should be large enough to handle the work, and tall enough for the longest garments. It should also be well ventilated so as to speed up drying, and the temperature in it should be from 100° F to 120° F.

SPOTTING BOTTLES AND CHEMICALS

The best type of spotting bottle is the squeeze type with a dropper top. See figure 10-1. By gently squeezing a bottle, the spotter can add the amount of cleaning chemical or solution he desires for a particular spot. Glass bottles with medicine-dropper glass stoppers can be used for spotting agents, but they are not as convenient and satisfactory as the squeeze bottle.

CHEMICALS

The chemicals generally used to remove spots and stains are listed in table 10-1. Their characteristics and uses are given, and also the precautions you should take with them.

Table 10-1.—Chemicals Used in Spotting

Name	Characteristics	Uses	Precautions
Acetic acid, 28% . .	Clear, colorless liquid, pungent odor	To neutralize alkalis; to restore color; as general spotting agent	Bleeds basic dyes.
Acetone	Colorless, volatile liquid with agreeable odor; flammable	Solvent for stains from oils, resins, paints, varnishes, and nail polishes	Dissolves cellulose acetate and some basic dyes.
Ammonia	Colorless liquid of water and dissolved ammonia gas; evaporates	To neutralize acids; to restore color	Bleeds acid dyes and some direct dyes; at full strength, yellows white silk or wool.
Amyl acetate	Colorless liquid banana odor; flammable	Solvent for paint, lacquer, nail polish	Chemically pure is harmless; commercial or technical grade may damage cellulose acetate.
Amyl alcohol	Clear, colorless liquid; flammable	Solvent for formaldehyde resins	Harmless to all fabrics; bleeds some basic dyes.
Benzaldehyde	Colorless, fragrant, volatile liquid	Removes black ink, hair dye, and some types of shoe polish	Affects cellulose acetate; bleeds some basic dyes.
Digestive agents. . . (Powders and liquids)	Enzymes which convert albumins, starches, and sugars into simpler compounds which can be removed	Explained in table 10-2	Safe on all fabrics and dyes unaffected by water
Hydrochloric acid .	Clear, colorless or slightly yellow, pungent liquid	Diluted, to remove dye and ink stains, and metallic soap stains	Concentrated, it injures all fabrics and bleeds basic dyes.
Hydrogen peroxide . (3%)	Clear, colorless liquid	Spot bleaching; and small areas, on spotting board	Safe in dilute form.
Oxalic Acid	Powder	Removes rust	Poison.

Table 10-1.—Chemicals Used in Spotting—Continued

Name	Characteristics	Uses	Precautions
Potassium iodide .	White crystalline or powdered substance	Removal of silver nitrate and other silver stains	Safe on all fabrics and dyes. Should be rinsed well.
Sodium chloride . . Common Salt	White, powdered or granular substance	Helps to remove blood and fruit stains	Safe on all fabrics if properly rinsed. Has setting action on direct dyes.
Sodium hypochlorite . . .	Clear, colorless, or slightly yellow liquid	Bleach for vegetable and synthetic fibers; to remove blood, blue stains, grass stains, indelible pencil, mildew and molds, medicine, and perspiration stains	Discolors animal fibers. Strong solutions will injure vegetable fibers. Follow treatment with a sour.
Sodium thiosulfate.	Whitish, slightly opaque, crystalline substance	To remove iodine stains	Safe on all fabrics and dyes if rinsed well after using.
1,1,1-Trichloroethane (Methyl chloroform) . . .	Colorless, nonflammable liquid	General spotting agent for oil and grease stains	Safe on all fabrics. If warm, may bleed cellulose acetate dyes.

SPOTTING METHODS

Spots and stains are removed by one or more of four processes: (1) solution, (2) emulsification, (3) chemical action, and (4) mechanical action. These processes are basic to all washing and dry cleaning, but they are applied in a more specialized way by the spotter.

SOLUTION

A solution is a mixture of two substances, the SOLVENT and the SOLUTE, in which the solute disperses uniformly throughout the solvent—or to say it another way, the solute dissolves in the solvent.

The most common way of removing soils and spots from fabrics is to dissolve them. Water is the solvent used in washing. In Navy drycleaning, as we have seen in Chapter 9, the solvent chiefly used is perchlorethylene.

Water-Solvent Spots

Some substances, such as sugar, fruit juices, black coffee, blood, and albumin (e.g., eggwhite) will dissolve in water. In general, solubility is increased by a rise in the temperature of the water, which is why we use warm or hot water for washing. A few substances, however, are less soluble at high temperatures and will precipitate a stain on the fabric. Blood, as has already been said, is one of these. In washing white articles (ch. 4), the break suds is kept at a low temperature so as to remove as many as possible of the spots that might be set by higher temperatures. Sugar, black coffee, and many other substances dissolve more easily in hot water. Many water-solvent spots, then, can be expected to come out in the ordinary washing processes.

The dry-cleaning process will not remove certain water-solvent spots and these must be

removed, either before or after dry cleaning, by using water or steam. If the garment has been tagged by the owner to indicate the cause of the spot, removal can take place before cleaning. This practice has the advantage of helping to avoid a ring around the place where the spot was and is called pre-spotting. If not tagged, however, the spot will probably not be discovered and identified until the garment is examined between the cleaning and pressing operations. If the spot is clearly caused by blood or some other substance known to be set by heat, cool water should be used to remove it. Otherwise, the steam gun should probably be used.

Spots Requiring Other Solvents

Some substances will not dissolve either in water or in the regular dry cleaning solvent but can be dissolved by spotting with other cleaning agents. In table 10-2 a number of the recommended materials are solvents. For example, see the treatment for removal of gum or resin and the recommendation for removal of paint from wool or silk.

Rinsing

When a substance has been dissolved, the solution must be rinsed out of the fabric. In washing and dry cleaning, the rinsing steps take care of this. In spotting, it is usually done with the steam spotting gun. If you have no steam spotting gun, sponge the spot carefully.

EMULSIFICATION

In washing and sometimes in dry cleaning, the solvent is assisted by a soap or detergent. These substances are emulsifiers. They are needed because certain substances, for instance, grease, will cling to the fabric instead of dispersing in the solvent. The emulsifier forms a layer around the particles of grease that is more easily soluble than the grease. This principle is used in spotting also.

Table 10-2.—Spot and Stain Removal Chart

GROUP NO. 1—Albuminous and Simple Food Stains.

Spot	Appearance	Removal Steps
(1) Food	Built up, dark, turns white when scratched	Step No. 1 (A) Dampen area with water or steam. (B) Apply neutral lubricant. (C) Tamp with brush, flush with water or steam.
(2) Starches	Built up	
(3) Perspiration	Absorbed	Step No. 2 (A) Dampen area with water or steam. (B) Apply ammonia (WHITE MATERIAL ONLY). (C) Tamp with brush, flush with water or steam.
(4) Blood	Dull, absorbed, reddish brown	
(5) Mud	Dull, absorbed	
(6) Discharge	Absorbed, built up, dark or white	Step No. 3 (A) Dampen area with water or steam. (B) Apply wet spotter. (C) Tamp with brush, flush with water or steam.
(7) Glue	Built up	
(8) Ice Cream	Dull, absorbed	Step No. 4 (A) Dampen area with water or steam. (B) Apply digest powder. (C) Leave digester on stain for at least 15 min. (D) Flush with water or steam.
(9) Sweets	Built up, dark to white	

Table 10-2.—Spot and Stain Removal Chart—Continued

GROUP 2—Stains Containing Tannin.

Spot	Appearance	Removal Steps
(1) Coffee	Dull, Absorbed	Step No. 1 (A) Dampen the area with water. (B) Apply neutral lubricant. (C) Tamp with brush, flush with water or steam. Step No. 2 (A) Dampen area with water (B) Apply neutral lubricant and 28% acetic acid. (C) Tamp with brush, flush with water or steam. Step No. 3 (A) Dampen the area with cold water. (B) Apply the general formula. (C) Tamp with brush, flush with cold water only. Step No. 4 (A) Dampen the area with water or steam. (B) Apply rust remover. (C) Never allow rust remover to come into contact with the spotting board. (D) Flush with water or steam. Step No. 5 (A) Dampen the area with water or steam. (B) Apply digest powder. (C) Allow digester to remain on stain for at least 15 min. (D) Flush with water or steam. Step No. 6 (A) Dampen the area with water or steam. (B) Spot bleach (Oxidizing). (C) Flush with water or steam.
(2) Tea	Absorbed	
(3) Liquor	Dull, Absorbed	
(4) Beer	Dull, Absorbed, ring around the outside	
(5) Soft drinks	Absorbed	
(6) Fruit juices	Dull, Absorbed	
(7) Medicine	Absorbed	
(8) Grass	Smeared, dull, absorbed	

GROUP NO. 3—3 Miscellaneous Stains—Dye, Ink (Wet and Dry), and Rust.

Stain	Appearance	Removal Steps
(1) Ink (non-permanent)	Absorbed	Step No. 1 (A) Dampen area with water. (B) Apply rust remover—if ink iron tannate or gallate. (C) Flush area with water or steam. Step No. 2 (A) Dampen area with water. (B) Apply neutral lubricant and acetic acid. (C) Absorb ink with a blotter. (D) Flush area with water or steam.
(2) Ink (permanent)	Absorbed	
(3) Dye stains	Absorbed	

Table 10-2.—Spot and Stain Removal Chart—Continued

GROUP NO. 3—3 Miscellaneous Stains—Dye, Ink (Wet and Dry), and Rust.—Continued

Stain	Appearance	Removal Steps
		Step No. 3 (A) Dampen area with cold water. (B) Apply general formula. (C) Tamp with brush. (D) Flush out with water or steam. Step No. 4 (A) Dampen area with water. (B) Apply neutral lubricant and ammonia. (C) Absorb with a blotter. (D) Flush area with water or steam. (E) Dry area completely. (F) Bleach (reducing).
(4) Rust	Absorbed, reddish color	Step No. 1 (A) Flush area with water or steam. (B) Apply rust remover. (C) Flush area with water or steam.

CHEMICAL ACTION

In chemical action, two or more substances combine to produce one or more totally new substances. This is what happens when you use an acid to remove an alkaline spot or use an alkali, like ammonia or sodium bicarbonate, on an acid. When you apply ammonia to an acid stain, the two substances react chemically to form a soluble salt that can be rinsed out of the fabric. Bleaches remove color through chemical action.

Chemicals must always be used very carefully because of the danger that they will affect the dye or will damage the fibers. Note that in several instances in table 10-2 it is recommended that other methods be tried first and the chemicals resorted to only for persistent stains.

MECHANICAL ACTION

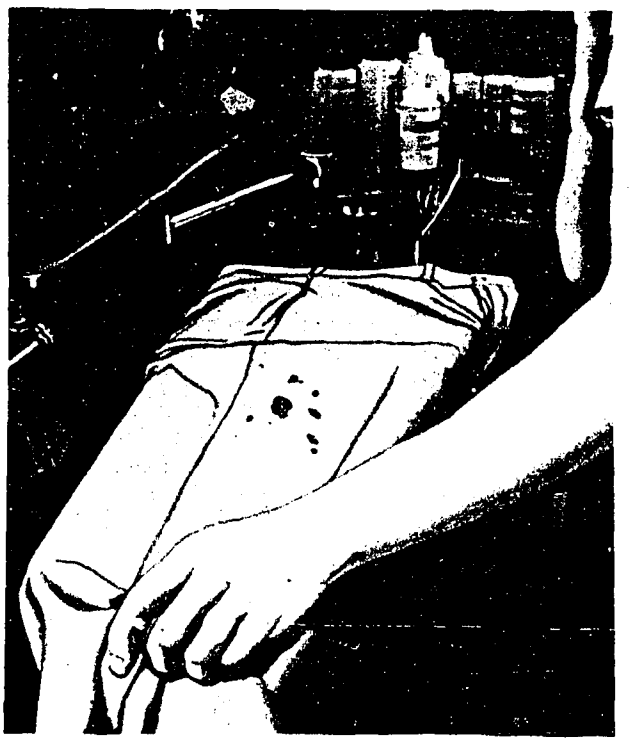
Mechanical action is both the simplest method of spot removal and an aid to all other methods. A simple dust spot can be removed by brushing, or gum sometimes may be lifted off so well with a spatula that almost no spot is left. When other methods are used for cleaning, some kind of mechanical action is always necessary. In washing or dry cleaning, the washer is agitated; in spotting, you use a brush, a spatula, a sponge, or a spray gun to work the cleansing agent into the fabric. Rinsing also involves mechanical action.

The important thing to remember about all mechanical action is that it tends to wear or damage the fabric. Never use more force than is necessary and continue the action only as long as necessary. Consider how the various fibers react to mechanical action (for instance, felting of wool) and avoid actions that will injure them. The spatula particularly can cause damage to fabric when not used properly.

STAIN REMOVAL PROCEDURES

In figure 10-2 the spotter has pulled one leg of a pair of trousers over the spotting board ready to begin work. Notice that he has the leg stretched fairly tight, to hold it in place when he is using a spatula or a brush. A spray gun is visible directly in front of the small spotting board, which is pushed back toward the bulkhead. The spray gun is connected by a hose to a container of cleaning solution sitting on the deck in front of the spotting board. The holder for the steam gun is directly in front of the bottles of cleaning solutions.

Now for some specific DO's and DON'T's that he (and you) should observe.



22.58

Figure 10-2.—Removal of spots from trouser leg.

1. Stain removal should take place under the best possible light conditions and with adequate ventilation. Special care should be observed when using flammable substances to ensure the absence of flames or sparks. Methyl chloroform is nonflammable, but must not be used under conditions of poor ventilation because its vapors are toxic.

2. Examine the spot to determine, if possible what substance caused it. Use the magnifying glass.

3. Unless you have reason to think the spot was caused by something that steam would set, use the steam gun first. It is the simplest treatment and least likely to harm the fabric. Even if it doesn't remove all of the spot, it may take out some of it and make the rest of the job easier.

4. Before applying a cleaning agent consider how it will affect the fabric. If you are in doubt about the fibers in the fabric, it may be advisable to test them to determine what they are.

5. If in doubt about the effect of an agent on a fabric, make a test on some hidden portion. Don't take chances of ruining the article by guesswork.

6. Hypocholorite bleach should never be applied to any material containing silk, wool, mohair, or other animal fiber.

7. Concentrated and warm solutions of alkalies should never be applied to animal fibers.

8. Rayon articles should never be treated with organic solvents unless resistance to the treatment is assured by a preliminary test on an unexposed portion of the garment.

9. When using potassium permanganate solution, use an equal amount of magnesium sulfate with it. Caustic potash is one of the products formed when stains are treated with permanganate. Magnesium sulfate reacts with caustic potash as soon as it is formed and prevents the textile from being injured.

10. Apply a small amount of the cleaning formula with a squeeze bottle or a spray gun, and allow it time to start to act on the spot.

11. Use a spatula to help the cleaning formula to penetrate the spot. Rub the spatula back and forth across the spot. Use short, smooth strokes. If a substance, such as gum, adheres to the surface, it may be gently removed with the spatula. Figure 10-3 shows you one way to hold the spatula. Be careful not to apply too much pressure, particularly on the point, or you will damage the fabric. Use the side of the point as much as possible.

12. Follow with the spotting brush. Variations in holding the brush depend upon the length of the bristles, the size and length of the handle, and the amount of pressure you wish to apply. It is best to have all the bristles strike the fabric at the same time, and use smooth, even pressure when working the brush back and forth. Too much pressure on the toe, heel, or sides of the brush may damage the fabric.

13. Always avoid excessive friction. This is especially important when treating silk and rayon fabrics. Where some friction becomes necessary, it is sometimes desirable to work on the wrong side of the garment.

22.59

Figure 10-3.—One way to hold a spatula.

14. Do NOT use a spatula on silk or synthetic material. The pressure you can apply on it without doing damage to the fabric is insufficient to do any good.

15. Remove spots and stains from delicate fabrics by placing the stained portion over a pad of clean cloth or a white blotter and applying the cleaning solution with a squeeze bottle. A medicine dropper or clean sponging pad may also be used.

16. Allow sufficient time for a cleaning solution to penetrate, but remove it as soon as possible to prevent damage. If removal agents are allowed to dry in fabrics or are pressed in them, they will probably discolor and/or damage the material. Therefore, be certain all cleaning agents are thoroughly rinsed from the materials as quickly as possible.

SPOTTING FORMULAS

The spotting formulas listed in table 10-3 are the ones generally used for removing spots and stains, for the purpose indicated. They are included in this chapter for your information, in case you do not have satisfactory commercial products. All ingredients of these formulas are generally available aboard ship.

Table 10-3.—Spotting Formulas

Formula	Chemical Composition	When Used
General Formula	Amyl acetate . . . . . 1 part Glacial acetic acid 99% . . 1/2 part Lactic acid . . . . . 1 part Oxalic acid crystals (by weight) . . . . . 1/2 part Synthetic methanol . . . . . 1 part	Used with water to remove ink, tannin, berry, lipstick, and dyestuff stains, or stains that contain dyestuff. Safe on all fabrics when cold, but not on all dyestuffs.
Paint remover	Chloropicrin . . . . . (Use as prescribed by the manufacturer)	Good for removing all kinds of paint and similar substances. Evaporates completely.
Prespotting soap	Ammonia (26°) . . . . . 1/2 part Hexalin . . . . . 2 parts Oleic acid . . . . . 3 parts Water (distilled) . . . . . 1 1/2 parts (Can use plain water.)	Used on paint, oil, tar, road oil, and asphalt to prevent SETTING during the dry cleaning process. Blood and tannin stains should be removed by water before you dry clean.

Table 10-3.—Spotting Formulas.—Continued

Formula	Chemical Composition		When Used
Wet spotters	Acetone	1 part	Wet and dry solvents are used to remove soil, paint oils, and greases.
	Castile soap	6 parts	
	Chloroform	1 part	
	Ethyl acetate	1 part	For very severe stains, or large areas, DO NOT USE wet spotters.
	Synthetic methanol	1 part	
	Water	1 part	

CHAPTER 11

DECONTAMINATING AND DISINFECTING

In event of nuclear, biological, or chemical attack, clothing worn by monitoring and decontamination crews will probably become contaminated. In addition, clothing worn by other personnel and clothing in storage may be contaminated. The ship or station laundry can be used for decontaminating certain types of clothing, provided suitable precautions and procedures are observed.

This chapter covers general procedures for all types of decontamination in the laundry and specific directions for each of the three types of agents. It also treats briefly the subject of disinfecting sick bay laundry. It covers ordinary garments such as work clothing and items of uniform and such special clothing as boots, rubber clothes, and wet weather and cold weather clothing. Leather items, such as shoes, cannot be effectively decontaminated in the laundry, and so are not discussed here. Present decontamination procedures are not considered to be completely effective against all agents, especially the newer nerve gases. Clothing should, therefore, always be tested after processing for the presence of an agent.

The procedures contained in this chapter are the most up to date as this book goes to press. Later procedures may be found in NAVSUP directives on the subject.

It is assumed here that you are already familiar with the general training in defense against NBC agents which are covered in the Military Requirements courses. It may be advisable for you to review the appropriate chapters in these courses before studying this chapter, because the Military Requirements courses cover the basic principles of NBC defense, whereas here we are concerned with applying some of those principles to the laundry and its operation.

GENERAL DECONTAMINATION INSTRUCTIONS

Successful defense against any type of NBC attack requires advance planning and organization—predesignated teams that can go into action quickly because their members know what to do and how to do it. Provisions must be made for quick identification of contamination so as to know what measures to take against it. Personnel must be protected as much as possible. Clean spaces must be protected from contamination. Special attention must be given to protection of such items of general use as the water system and supplies of food and clothing. Let us see how these basic necessities apply to decontamination in the laundry.

RESPONSIBILITIES IN DECONTAMINATION

In all types of decontamination, laundry personnel will be working with and to some extent under the direction of the damage control assistant or the medical officer.

Damage control personnel will be responsible for initial monitoring and for identifying the contamination. Probably the clothing to be decontaminated will be brought to the laundry by damage control personnel. The damage control officer will issue whatever protective clothing you may need and any monitoring equipment you may need to use during or following decontamination. Damage control personnel should be able to give you advice and aid in preventing the spread of contamination within your spaces.

The medical officer will be a source of advice especially in matters relating to biological contamination. You may also be called upon to cooperate with the medical department in case of a shipboard epidemic, whether caused by biological attack or not. Other emergencies may require special processing of sick bay laundry. In all these cases, the medical officer will be responsible for determining the type of microorganism to be destroyed and the measures required for its destruction.

The responsibilities of the laundry supervisor and his personnel in these cooperative efforts include the following:

1. Applying knowledge of fibers and fabrics in determining the effects of proposed decontamination measures. (There is no point, for example, in spending time processing a piece of clothing if the process chosen will destroy the article for further usefulness.)
2. Knowing what can be done in the laundry with existing equipment and supplies.
3. Keeping current on the best methods of decontamination and using the best methods feasible when called upon.

PROTECTIVE MEASURES

The laundry supervisor must apply, and see that his men apply, the general rules for self-protection and for preventing spread of the contamination.

Protection of Personnel

Care must be taken to prevent or minimize the contamination of personnel engaged in the cleansing of contaminated clothing. Suitable protective clothing, such as protective masks, rubber gloves, rubber boots, and protective aprons or coveralls must be worn. Remember that shirt cuffs should extend inside the tops of gloves and that trousers cuffs should be secured by cord or be tucked into the tops of boots or heavy socks. If protective masks are not available, a large clean handkerchief tied around the nose and mouth will help considerably. Check with the responsible damage control personnel about the possible need for other protective hand covering.

Avoid eating, drinking, or smoking while handling contaminated materials. In other words, do everything you can to keep the contaminants from entering your body.

Protection of Clean Spaces

Limit as much as possible the laundry space devoted to decontamination procedures. Contaminated articles should come into the laundry in closed containers which limit the spread of the contaminating agents. The contaminated articles should be transferred as directly as possible to a washer. If necessary to store, keep away from other laundry. Do not use more washers for decontamination than circumstances require.

ALWAYS WASH CONTAMINATED ARTICLES SEPARATELY FROM OTHER LAUNDRY.

Disposal of Wash Water

Water used during the decontamination of radiologically contaminated clothing will be contaminated, for the process does not neutralize or destroy the radioactivity but only physically removes the radioactive material. Biological or chemical agents also are likely to leave some contamination in the water, depending on the efficiency of the decontamination procedure. Precautions, therefore, should be taken to see that used water is not spilled on the deck. Since laundry drains carry the water almost directly out of the ship, contaminated water in the drainage system is not a serious problem. The drain will be cleaned by the same process that decontaminates the interior of the washer. In a laundry at an advanced base, waste water must be disposed of so as not to present a hazard. The main thing for the Laundryman to remember is to cooperate with those in charge of the base drainage system.

WASHING PROCEDURES AND FORMULAS

To ensure adequate decontamination, follow closely the procedures outlined in this chapter, especially in regard to the types and quantities of supplies. Some allowance may be made for time of cycles and water temperatures, but water levels and supplies used should be as specified. As indicated earlier, this chapter gives the directions current as this book goes to press, but it is your responsibility to keep up with improvements that may be made in these directions through NAVSUP directives.

The procedures and formulas given here have been developed for use with most common sizes of washers used afloat and ashore. They may, however, be adapted for use by other types of equipment by applying the appropriate tables.

Supplies Used in Decontamination

Several of the supplies specified in the decontamination formulas which appear as figures in this chapter are at present not carried in the supply system. In these instances, representative commercial trade names are listed.

All supplies, with the exception of detergents and sours, should be dissolved in water and diluted before introduction into the washer. All liquid supplies should be added while the cylinder is moving down.

Extracting and Drying

After laundering, garments should be extracted and dried following standard laundry procedures, with the exception of the drying cycle for impregnated clothing.

RADIOLOGICALLY CONTAMINATED CLOTHING

The radioactive materials encountered on contaminated clothing may have been deposited in the form of dry particles, slurry, or in liquid solution, and therefore may be loosely deposited on the clothing, embedded in the cloth fibers, or entrapped in grease or soil adhering to the garments.

METHODS OF RADIOLOGICAL DECONTAMINATION

The methods of decontamination of clothing are brushing or vacuuming, washing, and aging. In some cases brushing or vacuuming may reduce dry contamination to the permissible level. Washing, in most cases, will be adequate even if brushing has not been effective. Aging will in time reduce the contamination to a negligible level, depending upon the decay rate and amount of radioactive contamination. Aging, however, is time-consuming, requires suitable storage space, and presents a potential personnel hazard. Brushing and aging are briefly treated here, but washing procedures are your main concern.

A trained radiological monitor should be present for monitoring of personnel, clothing, areas, and establishment of safety precautions. The clothing should be monitored and segregated according to radiation levels.

BRUSHING

Ordinary brushing, shaking, or vacuuming will in many cases remove a considerable amount of loose contamination from clothing. If you do this work, do it in the open air—not in the laundry or anywhere else below decks unless a space has been designated for this purpose.

The following safety precautions should be observed with brushing:

1. Wear protective mask and suitable clothing.
2. Brush (or shake) from the windward side of the contaminated item.
3. Take care that transfer of contamination to clean areas or to other personnel does not occur.
4. Have your work and yourself checked by monitor.
5. Decontaminate yourself immediately after work if there is any possibility that you are contaminated.

Aging

Clothing which is to be decontaminated by aging should be stored in designated areas where it will not constitute a hazard, and marked to indicate that it is radioactively contaminated. The length of time it must be stored will depend on the type of contamination and the radiation levels. The progress of the aging process should be determined by periodic monitoring.

REMOVING RADIOACTIVE MATTER BY WASHING

Clothing should be monitored before being brought into the laundry. If above a certain level of radioactivity it will have to be thrown away. If salvageable, it should be subdivided according to whether it is above or below a tolerance level which will be established by the damage control officer. Finally, it should be classified according to standard laundry procedures. Laundering procedures discussed below should be used, depending upon the level of radioactivity.

Clothing Below Tolerance Level

Clothing contaminated below the tolerance level should be laundered to remove loose contamination that might otherwise be a hazard if swallowed or inhaled. Laundering formula A or B may be used or any good multiple suds formula employing synthetic detergent. The water levels for washers of various diameters are given in table 11-1. The dry load of clothing should be in accordance with table 11-2. The total amounts of supplies required are given in tables 11-3 and 11-4. It should be noted that

FORMULA A

Laundering of Cotton Clothing Contaminated Below the Tolerance Level With Radioactive Contamination

Operation	Water Level (Table 11-1)	Time Minutes	Temperature °F	Supplies (see Table 11-3)
Suds	L1	5	100	Synthetic detergent (0.18 oz/gal.)
Suds	L1	10	130	Synthetic detergent (0.09 oz/gal.)
Suds	L1	10	140	Synthetic detergent (0.06 oz/gal.)
Rinse . . .	L2	5	140	None
Rinse . . .	L2	5	120	None
Rinse . . .	L2	5	100	Sour (0.046 oz/gal.)

FORMULA B

Laundering of Woolen Clothing Contaminated Below the Tolerance Level With Radioactive Contamination

Operation	Water Level (Table 11-1)	Time Minutes	Temperature °F	Supplies (see Table 11-4)
Suds	L3	5	100	Synthetic detergent (0.13 oz/gal.)
Suds	L3	5	100	Synthetic detergent (0.07 oz/gal.)
Rinse . . .	L4	3	100	None
Rinse . . .	L4	3	100	None
Rinse . . .	L4	3	100	None

TABLE 11-1

Water Levels

Diameter of washer (inches)	Water Levels (inches)			
	L1	L2	L3	L4
24	3	6	8	12
36	3	6	12	18
42	4	8	18	21

TABLE 11-2

Load and Water Capacities of Washers
(Water Capacities Are With Full Load of Dry Clothing)

Washer size D X L	Capacity Pounds	Gallons of Water at Indicated Levels						
		3"	4"	6"	8"	12"	18"	21"
25 X 24	25	17	-	22	26	35	-	-
24 X 36	40	24	-	31	36	48	-	-
36 X 36	110	47	-	56	-	77	103	-
36 X 54	165	71	-	84	-	116	150	-
42 X 54	225	-	106	-	128	-	185	193
42 X 64	265	-	121	-	145	-	207	216
42 X 72	300	-	136	-	163	-	230	241
42 X 84	350	-	159	-	190	-	267	281

TABLE 11-3

Supplies for Formula A

Washer Size	Load (lbs.)	Synthetic Detergent Oz.			
		1st Suds	2nd Suds	.3rd Suds	Sour (oz.)
24 x 24	25	3	1.5	1	1
24 x 36	40	4	2	1.5	1.5
26 x 36	110	8	4	3	3
36 x 54	165	13	6.5	4	4
42 x 54	225	19	9.5	6	6
42 x 64	265	22	11	7	7
42 x 74	300	24	12	8	8
42 x 84	350	29	14.5	10	9

TABLE 11-4

Supplies for Formula B

Washer Size	Load (lbs.)	Synthetic Detergent, Oz.	
		1st Suds	2nd Suds
24 x 24	25	3	1.5
24 x 36	40	5	2.5
36 x 36	110	10	5
36 x 54	165	15	7.5
42 x 54	225	24	12
42 x 64	265	27	13.5
42 x 72	300	30	15
42 x 84	350	35	17.5

FORMULA C

Laundering of Clothing Contaminated Above the Tolerance With Radiological Contamination

Operation	Water Level (Table 11-1)	Time Minutes	Temperature °F	Supplies (see Table 11-5)
Suds	L3	5	90-100	Synthetic detergent (0.17 oz./gal.)
Acid	L4	5	140	Citric Acid (1.14 oz./gal.)
Acid	L4	4	140	Citric Acid (0.57 oz./gal.)
Chelate ..	L3	5	140	Chelating Agent* (.37 oz./gal.)
Chelate ..	L3	5	140	Chelating Agent* (.18 oz./gal.)
Rinse ...	L4	3	140	None
Rinse ...	L4	3	140	None
Sour	L4	5	Tap	Laundry Sour (.027 oz./gal.)

Note: For woolens, temperatures not to exceed 100°F and the washer should be stopped during draining and refilling.
*In addition to amount required to soften water.

TABLE 11-5

Supplies for Formula C.

Washer Size	Load (lbs)	Suds Syn. Detergent. (Oz.)	Acid (Oz.)		Chelate (Oz.)		Sour (Oz.)
			1st	2nd	1st	2nd	
24 x 24	24	4	40	20	10	5	1
24 x 36	40	6	55	27.5	13	6.5	1.5
36 x 36	110	13	117	58.5	28	14	3
36 x 54	165	20	171	85.5	43	21.5	4
42 x 54	225	31	220	110	68	34	5
42 x 64	265	35	246	123	77	38.5	6
42 x 72	300	39	278	139	85	42.5	7
42 x 84	350	45	320	160	98	49	8

the quantities to be used are dependent on the size of the washer.

Clothing Above Tolerance Level

Clothing contaminated above the tolerance level should be laundered using formula C. The water levels to be used are given in table 11-1. The supplies required are given in table 11-5. The successful removal of radioactive materials from contaminated clothing requires the use of chelating agents, which are chemical compounds with the ability to hold metallic ions in suspension and prevent their redeposition. A recommended organic chelating agent is the tetrasodium salt of ethylene diamine tetra acetic acid (Versene, powder or beads). Inorganic phosphates which may be used as the chelating agent include sodium hexametaphosphate (Calgon) and sodium tetraphosphate (Quadrafos). The quantities specified in table 11-5 should be increased by the amount required to soften the volume of water in the washer. The additional quantities for this purpose, listed below, are required only if shore water rather than ship's evaporated water is used:

Versene, 1 ounce per 83 grains of total water hardness

Calgon, 1 ounce per 31 grains of total water hardness

Quadrafos, 1 ounce per 24 grains of total water hardness

(Remember that the oil and water king of your ship can tell you how hard the water is.)

An example of the method used to determine the total amount required to be added for softening of the water in the washer is as follows:

An 8-inch water level in a 24 x 24 washer will contain 26 gallons of water. If the water being used has a hardness of 10 grains per gallon, the total hardness of the 26 gallons is 260 grains.

$$260 \div 83 = 3.13$$

Therefore, approximately 3 ounces of Versene should be used to overcome the hardness of the water. This would be in addition to the specified quantity of chelating agent as indicated in table 11-5.

Monitoring and Re-washing

After extracting and drying, the clothing should be monitored, using standard survey instruments. If the contamination is not reduced sufficiently after three launderings, the clothing should be disposed of or stored for aging.

Washing Special Items

Impermeable or rubberized items such as gloves, boots, and rainwear may be decontaminated by hosing and scrubbing with a detergent solution.

CHEMICALLY CONTAMINATED CLOTHING

Clothing may be contaminated with chemical agents in the form of splashes, droplets, or absorbed vapor. Items contaminated with large visible splashes should be segregated and treated separately. After being decontaminated, the clothing should be tested for presence of agents, using a detector kit.

METHODS OF CHEMICAL DECONTAMINATION

Clothing may be decontaminated using one of the following methods, in accordance with the order of preference indicated:

1. Expose to air for as long a period as practicable, followed by laundering using formula D or E. Formula D should be used for woolen items and for Clothing, Chemical Warfare Protective, CC-2 Impregnated. Formula E should be used for cotton clothing. The appropriate water levels are given in table 11-1. The supplies required are given in tables 11-6 and 11-7. It will be noted that two chlorine compounds are listed: Super Tropical Bleach (STB), and high test calcium hypochlorite (HTH), which is the standard laundry item. Either one may be used; however, care must be taken to ensure that the correct amounts are employed. The load of dry clothing according to washer size may be found in table 11-2. If clothing is still contaminated after laundering, the process should be repeated. If contaminated after the second laundering, the clothing should be discarded. The chlorine compounds (STB or HTH) used in the laundering procedure will bleach colored garments and may have a tendency to damage woolen materials.

2. Launder without airing, using formulas D or E as described above.

FORMULA D

Laundering of Woolen and Impregnated Clothing
Contaminated With BW or CW Agents

Operation	Water Level (Table I)	Time Minutes	Temperature °F		Supplies (see Table 11-6)
			Woolens	Impreg. Clothing	
Suds . . .	L3	5	100	90	Detergent (0.13 oz./gal.) STB (1.1 oz./ gal.) or HTH (.47 oz./ gal.)
Suds . . .	L3	5	100	90	Detergent (0.07 oz./gal.)
Rinse . . .	L4	3	100	90	None
Rinse . . .	L4	3	100	90	None
Rinse . . .	L4	3	100	90	None

Note: The dryer temperatures for impregnated clothing should not exceed 155°F.

FORMULA E

Laundering of Unimpregnated Cotton Clothing
Contaminated With BW or CW Agents

Operation	Water Level (Table I)	Time Minutes	Temperature °F	Supplies (see Table 11-7)
Suds . . .	L2	5	100	Detergent (0.18 oz/gal) STB (1.1 oz/gal) or HTH (.47 oz/ gal)
Suds . . .	L2	10	130	Detergent (0.09 oz/gal)
Suds . . .	L2	10	140	Detergent (0.06 oz/gal)
Rinse . .	L3	5	140	None
Rinse . .	L3	5	120	None
Rinse . .	L3	5	100	Sour (0.046 oz/ gal)

TABLE 11-6

Supplies for Formula D.

Washer Size	Load (lbs)	1st Suds Detergent (Oz)	+ STB (Oz)	or HTH (Oz)	2nd Suds Detergent (Oz)
24 x 24	25	3	29	12	1.5
24 x 36	40	5	40	17	2.5
36 x 36	110	10	85	36	5
36 x 54	165	15	128	55	7.5
42 x 54	225	24	204	87	12
42 x 64	265	27	228	97	13.5
42 x 72	300	30	253	108	15
42 x 84	350	35	294	126	17.5

TABLE 11-7

Supplies for Formula E.

Washer Size	Load (lbs)	1st Suds Detergent (Oz)	+ STB (Oz)	or HTH (Oz)	2nd Suds Detergent (Oz)	3rd Suds Detergent (Oz)	Sour (Oz)
24 x 24	25	4	24	10.5	2	1.5	1
24 x 36	40	6	34	14.5	3	2	2
36 x 36	110	10	62	26	5	3.5	4
36 x 54	165	15	92	40	7.5	5	6
42 x 54	225	23	140	60	11.5	8	9
42 x 64	265	26	160	68	13	9	10
42 x 72	300	29	179	77	14.5	10	12
42 x 84	350	34	209	89	17	11	13

3. Boil in water for 30 minutes.

4. Expose the clothing to hot air circulation in the tumbler dryer.

Method 4 should only be considered for clothing contaminated with absorbed vapors or the more volatile agents. This procedure is considered to be the least desirable and is not recommended for use by forces afloat as it will, in effect, expose nearby personnel, and perhaps much of the ship, to gas contamination. If used by shore stations, adequate precautions should be taken to prevent the exposure of personnel to the toxic exhaust fumes from the dryer.

Processing Special Items

Impermeable or rubberized items such as boots, gloves, and rainwear may be decontaminated by immersion in a solution of 1 1/2 ounces of calcium hypochlorite (HTH) per gallon of water for a period of 2 to 4 hours, depending on instructions from damage control personnel.

BIOLOGICALLY CONTAMINATED CLOTHING

Biologically contaminated clothing is that which has been exposed to bacteriological agents in the form of bacteria, viruses, or similar agents. In many instances the same methods may be used for biological decontamination as for chemical decontamination.

METHODS OF BIOLOGICAL DECONTAMINATION

The following procedures in the order of preference may be used for the decontamination of biologically contaminated clothing:

1. First, laundering using formulas D and E. The procedure to be followed is the same as for chemical decontamination.
2. Second, autoclaving at 253° F for 15 minutes. This method is a surgical sterilizing procedure and is suitable only for cottons.

In addition to the above, various disinfectants may be used, such as ethylene oxide and methyl bromide. Care should be taken with these materials, however, as most of them are toxic or explosive.

Impermeable items, such as rubber boots, gloves, or aprons may be decontaminated by boiling in water for 15 minutes.

PROCESSING SICK BAY LINENS

In event of an epidemic or other special situation requiring the laundry to disinfect quantities of sick bay linens, the medical officer will furnish information about effective measures for disinfecting or sterilizing.

Disinfecting and Sterilizing

At this point you should distinguish between the terms DISINFECT and STERILIZE.

DISINFECT means to reduce contamination from biological agents below the level of danger for ordinary use (whether contamination is the result of enemy action or of contact with a sick person or a carrier of germs).

STERILIZE means to kill all living organisms on the material. Sterilization is necessary for materials to be used in surgery. Once articles have been sterilized, they must be carefully protected from handling or even exposure to air, so that they will not be recontaminated.

Using the Washer to Disinfect

Usually you will not be confronted with the problem of achieving and maintaining absolute sterility in articles washed. You may, however, be asked to assist the medical department in disinfecting sick bay linens that require strenuous measures to kill the germs contaminating them. Sometimes special equipment is available for this purpose, but if not, disinfecting can be accomplished in the washer by using very high temperatures or by adding quarternary ammonium to the last rinse. The proportion of the compound to be added is 3 or 4 ounces per 100 pounds of clothes. Since wool blankets cannot be washed at a higher water temperature than that recommended in formula D without serious damage, it is best to use ammonium compound for washing them if more than ordinary disinfecting is required.

To use the washer for disinfecting by high temperature, add steam to the usual amount of rinse water. Bring the temperature up to 180° F or whatever temperature the medical officer recommends.

CAUTION: After using the washer for disinfecting at a high temperature, have it lubricated. The high temperature melts the grease at the bearings and causes it to run out.

Protection Against Re-Contamination

In all disinfecting, great care must be taken to protect materials from becoming recontaminated. Sick bay linens, including bed linens, towels, bed gowns, and uniforms of sick bay personnel, should all be given special protection to keep them clean. They should be handled as little as possible and then only by persons who are thoroughly clean and healthy. Don't let anyone with a cold, a boil, or any other infectious condition handle sick bay linens.

Put clean linens into clean laundry bags or baskets or wrap them in clean paper. Never put them into the insanitary containers they came out of.

Take precautions to see that they are not dropped on the deck or otherwise contaminated through careless handling.

CLEANUP AFTER DECONTAMINATION

In the process of decontamination, laundry spaces, equipment, and personnel will probably

become contaminated to some extent. Once the operation is finished, cleanup should be as prompt as possible and as thorough as necessary.

WASHING MACHINES

To remove contaminants from the interior of a washing machine, run it through a complete cycle with very hot water and a heavy suds of detergent. The outside of the machine should be cleaned by the methods used for the laundry space and other equipment.

MOVABLE EQUIPMENT

Movable items, such as laundry baskets, should be scrubbed with a suds of detergent (or whatever cleaning agent is recommended by damage control personnel). After decontamination, the articles should be placed in clean spaces.

LAUNDRY SPACES

Conventional cleaning methods, such as scrubbing, wiping, and rinsing will probably be sufficient for decontaminating laundry spaces. Clean the uppermost surfaces first and work down. Rinse swabs frequently in clean water. Monitor the swabs at intervals and dispose of them when the contamination reaches a level near that of the surface being cleaned. Clean access openings in ventilation ducts by running swabs through them.

PERSONNEL

Immediately after completing a decontamination, personnel should undress, bathe, shampoo their hair, and dress in clean clothing. The clothing worn during decontamination should be monitored to see whether it needs decontaminating and should, in any event, be washed before wearing again.

CHAPTER 12

PORTABLE LAUNDRY EQUIPMENT

The Navy requires portable laundry facilities for its advanced bases. The unit currently used has incorporated into it the experience gained from operating older types of portable laundries. Some advanced bases which do not have portable laundries procure usable machinery and set it up in a building adjacent to the mess hall, so that hot water and steam from that source can be used to operate it.

This chapter discusses the equipment in a portable laundry and how to operate and care for it. It also covers laundry organization on advanced bases, and the duties of personnel in such a laundry.

PORTABLE LAUNDRY UNIT

A typical portable laundry unit is illustrated in figure 12-1. Each section of the unit is marked. The washer-extractor of the unit shown is 40" x 30" and has a three pocket (Y type) cylinder made of corrosion-resistant metal. The tumbler dryer of the model shown is 30" long and has a 37" cylinder. The type of steam generator generally used has a capacity of 690 pounds of steam per hour. A larger size gives 1000 pounds per hour. The generator burns 80 octane gasoline or No. 2 fuel oil. It will probably be necessary to make adjustments to the generator if you change from one fuel to the other.

The complete portable laundry unit occupies a space 4' x 20'. Additional space, of course, is required for storage of fuel and all types of supplies, for receiving and stowing, and for working. The laundry can be set up in a building or in an open field, with adequate protection from the weather.

Figure 12-2 shows the rear view of the laundry.

Facilities required for the portable laundry include:

- Clean water—3500 gallons for the washer and 200 gallons for the steam generator during eight hours of normal operation.
- Electrical current—208 volts, 60 cycle, three phase.
- Concrete foundation for washer-extractor. This machine creates strong vibration and requires a firm footing.
- Fuel—No. 2 fuel oil or 80 octane gasoline for steam generator.
- Adequate waste disposal. The best plan is to have a concrete floor in the laundry room, with a drain pipe under it. The floor can be constructed at the same time that the foundation for the machines is poured and will make cleaning much easier. The drain pipe can be connected with the base drainage system.

PORTABLE LAUNDRY ORGANIZATION

Just as aboard ship, the supply officer is responsible for operating the laundry. In some locations he may have an assistant supply officer to operate it for him. There are four jobs in the laundry to be performed by Ship's Servicemen and strikers. They are: (1) supervisor, (2) presorter, (3) machine operator, and (4) final sorter and assembler. The duties of these people are generally the same in all advanced base laundries. Each job is discussed briefly.

LAUNDRY SUPERVISOR

As in a ship's laundry, the supervisor of a portable laundry is responsible for its operation. As a laundry manager, he is responsible for:

- Procurement of supplies and other essentials.
- Preparation of laundry schedule.
- Training of laundry personnel.
- Maintenance of laundry records.
- Operation of steam generator. (This is entirely the responsibility of the laundry supervisor.)
- Maintenance of laundry machinery; that is, he should know what minor maintenance he should perform and, from his study of the manufacturer's manual, when to request maintenance from the engineering department.

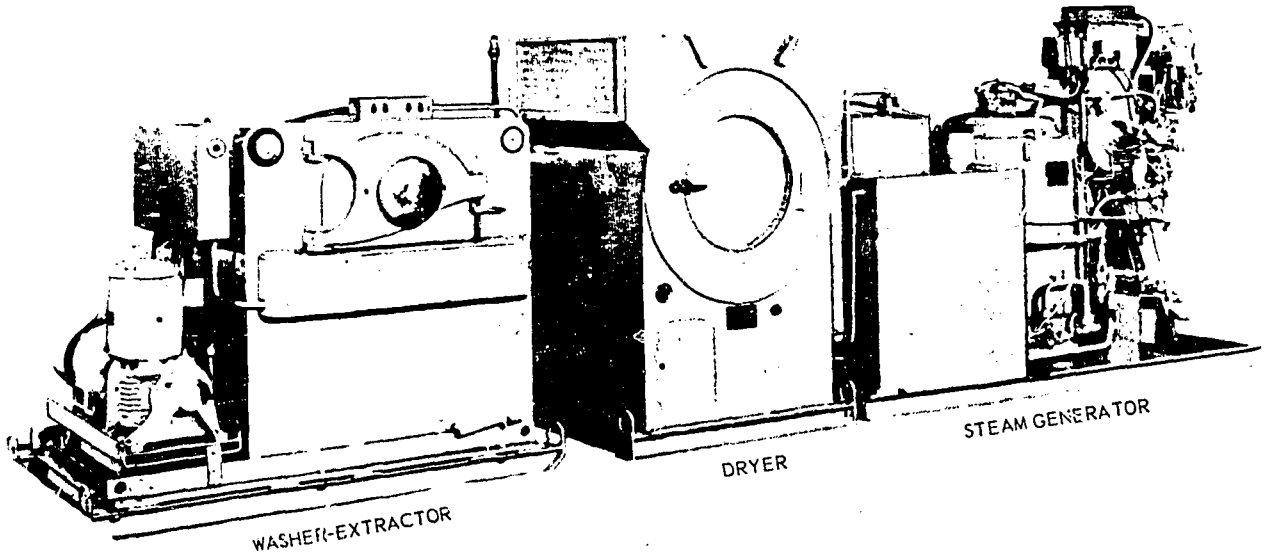


Figure 12-1.—Advanced base portable laundry unit (front view). 22.60X

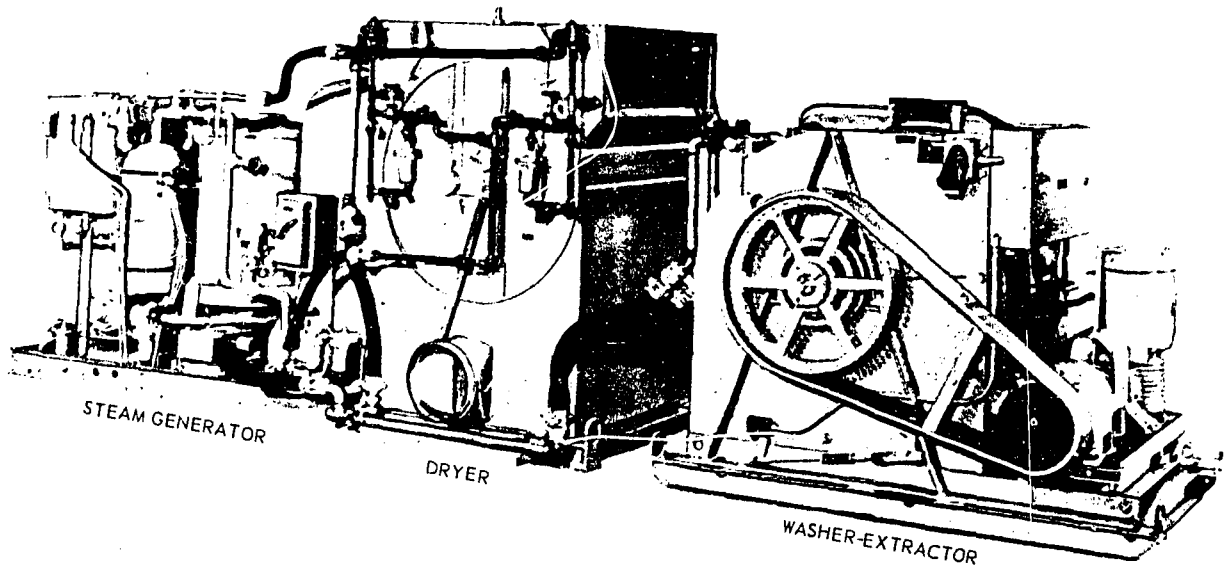


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Figure 12-2.—Advanced base portable laundry unit (rear view).

Standards and procedures for operating in advanced base laundry will obviously vary in different situations. Plan your schedule to adapt the personnel and facilities available in the best possible manner to the laundry needs of the base. Use your judgment and follow the instructions of your superior. When suitable, use procedures recommended for shipboard operation, particularly when your laundry has other equipment, such as a steam press.

DUTIES OF A PRESORTER

A presorter in a portable laundry works under the supervisor and generally does the following:

- Removes bales or boxes of clothing from the soiled clothing storage area to the classification and identification area.
- Opens the bales or boxes and properly identifies each garment or lot.
- Classifies clothes by lots for washing.
- Weighs clothes for washing (normally 20 lbs per unit to fit pockets in the washer).
- Puts unit weight on, or in, each unit of clothing and delivers it to the washer-extractor area.
- Maintains a record sheet for each bale or box of clothing, to show the quantity of each type of garment and the identification number.
- Signs the record sheet and delivers it to the supervisor, along with the identification numbers.

DUTIES OF A MACHINE OPERATOR

A machine operator works for the laundry supervisor and does such work as is assigned him. His primary duties include:

- Keeping the machines clean.
- Performing such minor maintenance as is necessary.
- Seeing that machines are kept in excellent repair.
- Informing his supervisor of maintenance requirements on machines.
- Selecting the washing formula, soap or detergent, and builder, suitable for a particular classification.
- Operating washer-extractor.
- Operating drying tumbler.
- Keeping area around machines clean.

DUTIES OF A FINAL SORTER

A final sorter is responsible to the laundry supervisor for:

- Taking clothes (in tote boxes) from the drier area to the assembly area.
- Assembling finished work under proper identification number, or ownership.
- Checking amount of clothing received from dryer with the record sheet, also noting any torn, damaged, or mutilated article and the cause for such condition.
- Signing the record sheet.
- Placing garments in containers for issuing, or wrapping them in bundles.
- Delivering processed containers or bundles of clothes to the processed storage area, with record sheet, and receiving tallies.

OPERATING THE WASHER-EXTRACTOR

The procedures for operating the washer-extractor in a portable laundry unit are similar to those for the washer-extractor discussed in chapter 4. There are some differences, however, in the operation of the two machines. The washer in the portable unit has three pockets in the cylinder, with a capacity of 20 pounds for each pocket. In operating the machine, you should follow the recommendations of the manufacturer for loads in each pocket. The weight in each pocket should be the same, so that the cylinder will run smoothly and without strain on the bearings. For such items as hand towels, the manufacturer states that the amount of the load in each pocket may be increased; but the bulk of articles in each pocket should not be so great as to prevent sufficient agitation of the clothes in the suds water. Study the manufacturer's instruction manual for further operating instructions.

WASHING FORMULAS AND SOAPS

Washing formulas discussed in chapter 4 of this text may be used in the portable laundry shown in figure 12-1. As you know, your wash water determines the washing ingredients you must use to get a proper suds for the load to be washed; that is, cotton, woolens, and so on.

Refer to Chapter 4 of this text for the general procedure for operating the washer-extractor.

UNLOADING WASHER-EXTRACTOR

A mechanical door interlock in the washer-extractor prevents opening of the door while the cylinder is running. When cylinder stops running, open outer shell door by pressing the lock handle down. Use the INCH buttons to get each compartment door open, in turn, for unloading. When a door is in position, step on the brake pedal and then release inch buttons. Release

latches on compartment doors and unload clothes into tote boxes or containers.

OPERATING THE TUMBLER DRYER

The recommended procedure for operating the tumbler dryer follows:

1. Slowly open steam valves between steam generator and dryer coils.
2. Allow 10 minutes for dryer to warm up, with cylinder empty.
3. Load cylinder to rated capacity. DO NOT overload.
4. Close and secure tumbler door.
5. Pull starting knob on front of machine OUT. High speed fan and cylinder now start rotating at the proper speeds. Moisture and lint are discharged through an opening in the rear of the tumbler. A vent pipe can be used to carry the discharge away from the washing area.
6. Check thermometer on front of dryer. When it reaches 185° F the clothes should be fully dried.
7. Tumble all dryer loads for 10 minutes with dampers set to deliver air at room temperatures before removal of clothing.
8. Stop dryer.
9. Open tumbler door and remove clothes from cylinder.

SAFETY PRECAUTIONS

Safety devices are built into the machines in the portable laundry unit. These protect both the operator and the machines. Safety interlocks prevent opening of the washer-extractor and tumbler doors when the cylinders are rotating. Thermometers show water temperatures. Brake pedals cut off current when depressed.

In operating the portable laundry, do the following:

- Study the manufacturer's instruction book, and then follow it.
- Keep area around all machines clean.
- Watch temperature and pressure gages on steam generator. If they do not keep within the safety ranges indicated, cut off the fuel supply and have them checked by engineering personnel.
- DON'T take chances with the gasoline. Keep it in an air-tight metal drum in an enclosure or in the shade. High temperatures cause expansion and evaporation. When drawing gasoline out and when filling the burner tank, be careful not to spill it, especially not on hot pipes. Your burner may have a fuel line which connects with a metal fuel drum. Do NOT smoke when handling fuel.
- Teach and emphasize safety in the entire laundry operation.

CARE AND MAINTENANCE OF EQUIPMENT

What has been said previously in this text about the maintenance of laundry equipment applies to units in the portable laundry. It is important that all laundry personnel understand the machines and how they operate, so that they can perform minor maintenance and know when to ask for qualified help for matters requiring more mechanical knowledge. Study the manufacturer's instruction manual for each machine, and be certain you really understand it.

Aboard ship you have no responsibility for the generation of steam for the laundry. When operating a portable laundry, however, one of your duties is CARE and MAINTENANCE of the steam generator. It is not a complex machine, but it can be a dangerous one unless you understand how to operate it. When engineering personnel are available, request that they perform all major maintenance and repair work.

PART III—TAILOR

CHAPTER 13

TAILORSHOP MANAGEMENT AND OPERATION

As a Ship's Serviceman in charge of the tailorshop, you will be responsible to the supply officer and/or ship's store officer for the satisfactory operation of the shop.

TAILORSHOP PERSONNEL

The organization of a ship's tailorshop varies with the size of a ship. Destroyer-type ships and smaller do not have tailorshop facilities. On large ships two, three, or more tailors may be assigned to the shop.

TAILORSHOP SUPERVISOR

The Ship's Serviceman in charge of the tailorshop is responsible to his immediate supervisor for the complete operation. He orders supplies, ensures that the tailorshop is kept clean and that the equipment is properly maintained, assigns and trains tailorshop personnel, prepares tailorshop schedules, maintains a high standard of quality workmanship, and takes steps necessary to ensure efficient operation.

SCOPE OF WORK

The scope of work to be undertaken by the tailorshop should be limited to pressing, basic repairs, minor alterations, and sewing on insignia. The type of work that can be done depends on the adequacy of equipment and trained personnel, complement of the ship, and operating conditions to which the ship may be subjected. No attempt should be made to perform major alterations, or to manufacture articles of any kind, unless equipment, time, personnel, and conditions permit.

DIVISION OF WORK

The work in tailorshops may be divided into three basic categories; i.e. hand sewing, machine sewing, and pressing. In small shops where only one or two Tailors are assigned, each repair job should be completed in its entirety by the Tailor undertaking the job, provided he is trained in all phases of tailoring. Where personnel are untrained, and in shops employing three or more Tailors, greater efficiency is attained and personnel are more easily trained by dividing the repair jobs into the basic categories. If personnel are adequate, the work should be subdivided into the several components of the basic categories and each Tailor or striker assigned to the performance of a particular division or subdivision. Personnel should be rotated from operation to operation so that each Tailor will become proficient in all phases of tailoring. The same policy is applicable to various types of pressing jobs.

The operation of the press during the entire day should be determined by the pressing workload and by the need for conservation of steam. Unless the workload demands, the steam should not be turned on until sufficient pressing jobs have accumulated during the day to warrant such action, at which time all pressing may be performed within a limited period. The benefits of this policy are readily apparent in tropical climates.

RECEIPT AND DELIVERY OF WORK

The receipt of articles for repair or pressing, and the pickup by the customer, should be restricted to specified hours of the day so that a continuous flow of work may be achieved. A deviation from this practice may be made when sufficient personnel are available so that receiving and pickup may be handled without interruption of the actual tailorshop work.

CHARGE FOR SERVICES

Usually, aboard ship, there are no charges for services performed in such activities as the laundry and the barbershop. When there are no charges, money to operate these service activities is derived from profits generated through vending machines and the retail activities.

There may, however, be cases where sufficient profits are not generated to cover the cost of operation of the service activities. If this is the case, the commanding officer may direct cash collections to be made monthly as prescribed by the NAVSUP Publication P-487. The monthly collection cannot be used to pay for ribbons, gold lace, rating badges, and like materials; these costs must be borne by individual patrons.

LUBRICATION OF SEWING MACHINES AND PRESSES

The Tailor in charge of the shop should ensure that the sewing machines are lubricated each morning. The sewing machine motor should be oiled semimonthly. Weekly lubrication of the steam press is sufficient for normal usage.

Manufacturers' lubrication charts should be strictly followed.

RECORDS

Records should be kept of all tailoring work received and delivered. One method is to use a standard ruled blank book or a columnar pad on which all work is logged in and out. The recipient of completed work signs the log. Standard tailor tags serve the same purpose and may be substituted for the log. These records are needed for establishing production figures and are useful also in case a claim is received that an article has been lost.

TAILORSHOP SUPPLIES

Tailorshop supplies consist of minor equipment and consumable supplies. Minor equipment includes: hangers, shears (pinking and tailor), tapes (measuring), thimbles, and yardsticks. The consumable items include: buttons, chalk, needles, pins, tags (tailor), thread, and zippers.

See chapter I of this text for information on procurement of ship's tailorshop equipment and supplies.

TRAINING TAILORSHOP PERSONNEL

Tailors in the Fleet must be trained on board ships. It is seldom that strikers have had previous experience in tailor work. A striker who is only mildly interested often comes to take a real interest in learning about his job and in doing things the right way because of the example and instruction of his supervisor. On the other hand, even the best potential Tailor striker can be discouraged from using his ability by careless training.

When instructing and training tailorshop personnel, follow the procedure outlined in chapter 1.

CHAPTER 14

MAINTENANCE AND OPERATION OF EQUIPMENT

The service equipment located in tailorshops aboard Navy ships is designed specifically to provide pressing, basic repairs, minor alterations, and application of insignia. The equipment discussed and illustrated in this chapter is representative of the models generally used. To ensure safe and efficient operation, it is important to maintain the equipment in proper working order and to use it correctly.

DESCRIPTION OF COMBINATION COTTON-WOOL GARMENT UTILITY PRESS

The general arrangement of a manually operated utility press Model No. SXCO-56 is illustrated in figure 14-1. The press consists of a welded formed-steel frame, lever system, upper and lower pressing members with necessary padding, valves, and piping.

FRAME

The frame, or pedestal, is of welded formed steel, having a base provided with three holddown bolts for securely attaching the press to deck mounting saddle.

LEVER SYSTEM

The lever system consists of a pedal and a series of levers which includes two toggle joints which are subject to substantial straightening by action of the foot pedal. The pedal travel should not exceed 9 inches and should exert a maximum pressure of 1500 pounds between the head and the buck. The pressure is subject to variation by use of a handwheel, mounted on the head carrying member, which shortens or lengthens the lever system.

The lever system is fitted with springs to provide the necessary counterbalancing effect to the head or upper pressing member. Springs are so designed as to give an easy application of pressure and a fast return of the head to the full open position without further effort by the operator beyond that of depressing a finger tip release lever. Means are provided in the lever system to hold the head closed until the finger tip release lever is depressed. A shock absorber is fitted to the lever system to provide a rapid opening of the head with ultimate checking to a smooth, silent stop.

The system is designed to provide a clearance between the two pressing members, when open, 14 3/4 inches at the front and 6 3/4 inches at the rear. The minimum distance between the buck and backboard is 6 3/8 inches.

HEAD

The upper pressing member, or head, is of cast aluminum, concave in shape, and has a pressure chamber for heating and a spray chamber. The spray chamber is for moistening purposes.

The surface of the spray chamber is machined and polished so that cotton garments may be pressed without the use of a press plate. The spray chamber surface is perforated to make it possible to have spray steam for pressing woolens.

The head is provided with connections for steam feed and return. It overlaps the buck a sufficient amount so that garments being pressed will not be marked at the point where the outer edge of buck and head contact.

The head is mounted on a welded steel carrying member connected to the lever system. A molded plastic operating handle, supported on metal brackets away from the head, is provided to move the head downward. The handle is provided with flanges at the ends to prevent the operator's hands from contacting the heated metal brackets.

BUCK

The lower pressing member, or buck, is of cast aluminum, convex in shape and has a pressure chamber for heating and a spray chamber for moistening purposes. The spray chamber

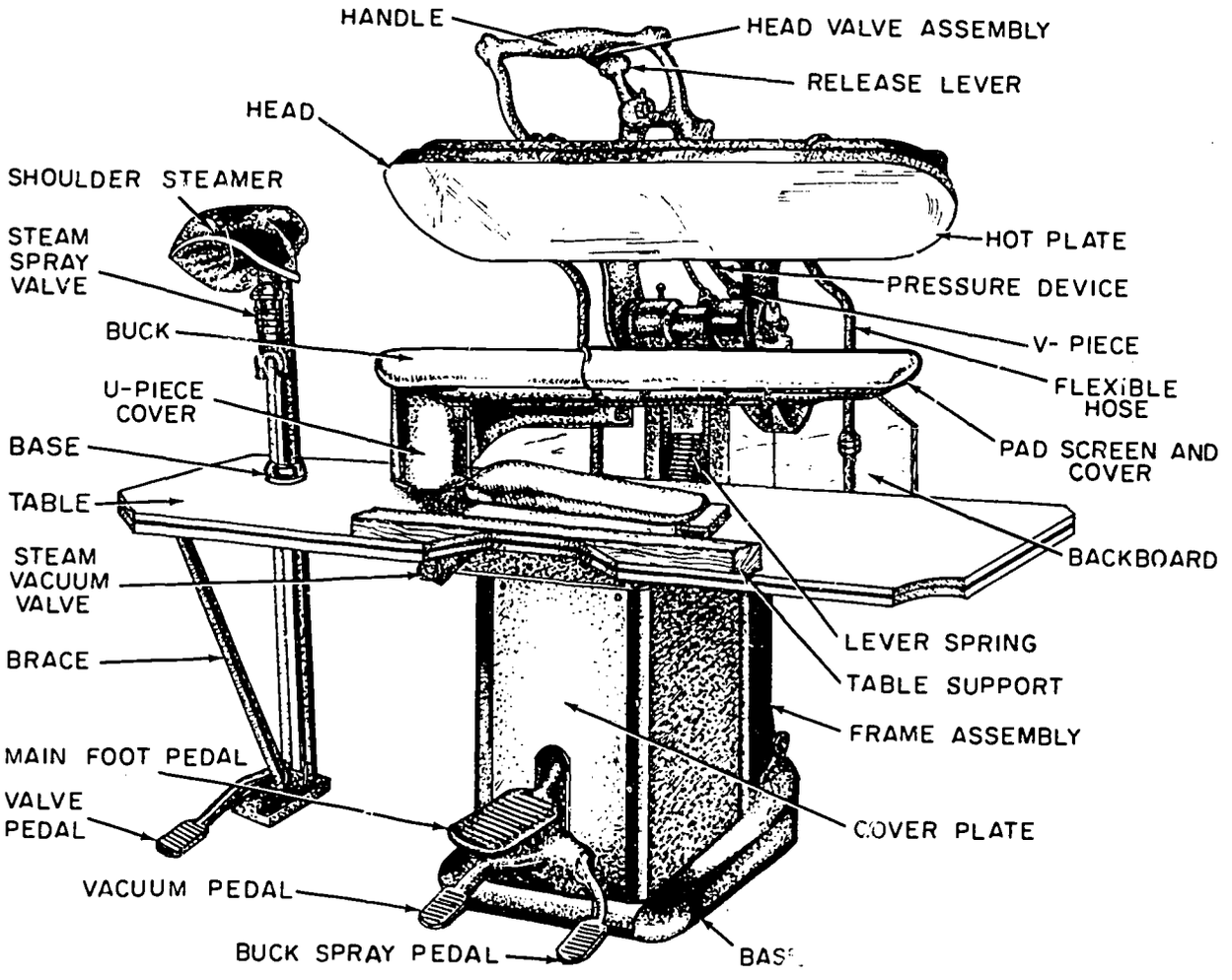


Figure 14-1.—Tailorshop press with shoulder steamer.

is formed by securing a perforated plate to the surface of the buck which contacts the garments.

The buck is provided with connections for steam feed and return and vacuum for drying purposes. It is mounted on a welded steel support connected to the frame so the pressing surface is approximately 40 1/2 inches above the floor plane.

VALVE

A packless steam valve is fitted to the head. It delivers steam nearly free of retained moisture to the spray chamber. The valve is so designed that it can operate while the operator's hands are on the molded plastic handle of the head carrying member.

A similar packless steam valve, pedal operated, delivers steam nearly free of moisture to the buck spray chamber. The valve is so arranged as to direct the steam uniformly over the entire pressing surface.

The buck is also fitted with a steam ejector-type suction device which permits withdrawal of surplus steam and moisture from garments during and after pressing. The suction device is pedal-operated and is connected by a pipe to the spray chamber.

The suction created by a steam ejector is capable of operating a negative pressure of 4

inches of water when 65 pounds of dry steam is available and a 3-inch cup and manometer are used for measuring.

The pipe from the suction device to the buck is normally closed to prevent loss of spray steam. The suction device is provided with a valve which opens when the suction device operating pedal is pressed. Horizontal check valves are provided in the return line to prevent the withdrawing of condensate from the pressing member when either the head or buck valve is operated.

PADDING

Buck padding consists of a brass screen, two pieces of knitted cotton padding, a pad of table felt, and a drawstring type of covering. The padding is used to cover an aluminum press plate, which has a knurled surface and is provided with suitable springs for positioning on the head. The padding is provided to prevent shine when woolen garments are being pressed.

SHOULDER STEAMER

A pedal operated shoulder steamer is mounted on the rear left-hand corner of the table. (See fig. 14-1.) It is used for steaming sleeve heads and shoulders of woolen garments. The steamer consists of a pressure casting having a steam spray valve mounted on a support fastened to the floor and secured to the worktable. A pedal-operated valve delivers steam, nearly free of retained moisture, to the spray chamber. The valve allows a uniform, gentle spray of steam on the pressing surface.

TABLE

The table is constructed of wood and is attached to a metal backboard which helps support the work and prevents contact of the work with the levers, piping, and frame of the machine.

PIPING

Pipe is of steel and fittings are of malleable iron. A globe valve is furnished at the steam feed connection, and a bucket type steam trap, having a 3-valve bypass, is furnished for attachment to the steam return connection. Steam feed return connections for the head are connected to the piping with flexible brass hose.

SPECIFICATIONS

Presses installed in tailorshops aboard Navy ships have the following specifications:

Pressing Surface Size	
Overall Length	43 Inches
Wide End	12 3/4 Inches
Narrow End	9 3/4 Inches
Weight	625 Pounds
Steam Connections	
Feed	1/2 Inch Inside pipe size (I.P.S.)
Drain	1/2 Inch I.P.S.
Vacuum Connection	1 1/4 Inches I.P.S.
Steam Pressure	
For Most Effective Woolen Pressing	65 Pounds
For Cottons	80-100 Pounds

OPERATION OF MANUALLY OPERATED PRESSES

The following paragraphs explain the operation of the SXCO-56 manually operated utility press. Other manually operated utility presses have similar operating procedures.

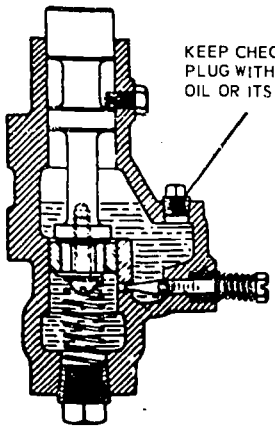
STEAM LINE

The bypass valve of the trap assembly should be open. The two remaining valves of the trap should be closed. Open the steam feed line gradually, allowing the pressing members to heat slowly. When they are partially heated, close the bypass valve and open the other two valves in the trap. When the press is thoroughly heated open the steam valve fully.

Do not open the steam valve too much before the pressing members are thoroughly heated. Such action may cause the pressure chambers to rupture.

CONTROLS

The press may be closed by means of the foot lever, or by bringing the head forward by



NOTE:
THE HEAD-CARRYING MEMBER ROTATES ON ROLLER BEARINGS. THE STEAM ARMS SHOULD BE REMOVED YEARLY TO MAKE CERTAIN OF LUBRICATION. REPACK BEARING WITH NEUTRAL BEARING GREASE HAVING A HIGH MELTING POINT. NO OTHER POINTS ON HOFFMAN UTILITY GARMENT PRESS REQUIRE LUBRICATION AS ALL BEARINGS ARE EQUIPPED WITH BRONZE GRAPHITE GROOVED OILLESS BUSHINGS. ANY OILING OF THESE BEARINGS WILL RESULT IN SERIOUS DAMAGE TO THE BUSHINGS.

119.1

Figure 14-2.—Lubrication chart—SXCO-56 combination cotton-wool utility press.

hand with the final closing and locking of the head accomplished by the main foot pedal.

The press may be opened by pressing the small hand lever conveniently located near the head handle. This allows the head to raise automatically to its full open position.

Vacuum may be supplied by depressing the small foot pedal to the left of the main foot pedal.

Steam spray may be supplied from the buck or lower pressing surface by depressing the small foot pedal to the right of the main foot pedal. Steam spray is supplied from the head or upper pressing surface by pressing downward on the finger tip control lever on the valve convenient to the head handle.

The pressing machine is constructed to operate under 100 pounds of steam pressure, but the accepted range of pressure for the best operation of the machine is 60-65 pounds. A reducer valve, located in the main steam line leading to the pressing machine, reduces the steam pressure in that line to within this range of 60-65 pounds.

If the reducer valve fails to operate properly, a safety valve goes into operation. The safety valve is located in the main steam line between the pressing machine and the reducer valve. Should the reducer valve fail, the safety valve will limit the steam pressure entering the pressing machine to 100 pounds.

In emergencies, the main steam valve is to be closed by the operator. This is an additional precautionary device used only when the reducer valve and the safety valve fail. The main steam valve is located in the main steam line at a point which is readily accessible to the operator. When closed it completely stops all steam from entering the pressing machine.

SAFETY PRECAUTIONS

Never bring the head down on the buck while trying to smooth out the garment. The operator's hand can be seriously burned if he is careless when operating the pressing machine.

MAINTENANCE OF THE SXCO-56 UTILITY PRESS

The following maintenance is recommended for the SXCO-56 utility press.

GENERAL INSTRUCTIONS

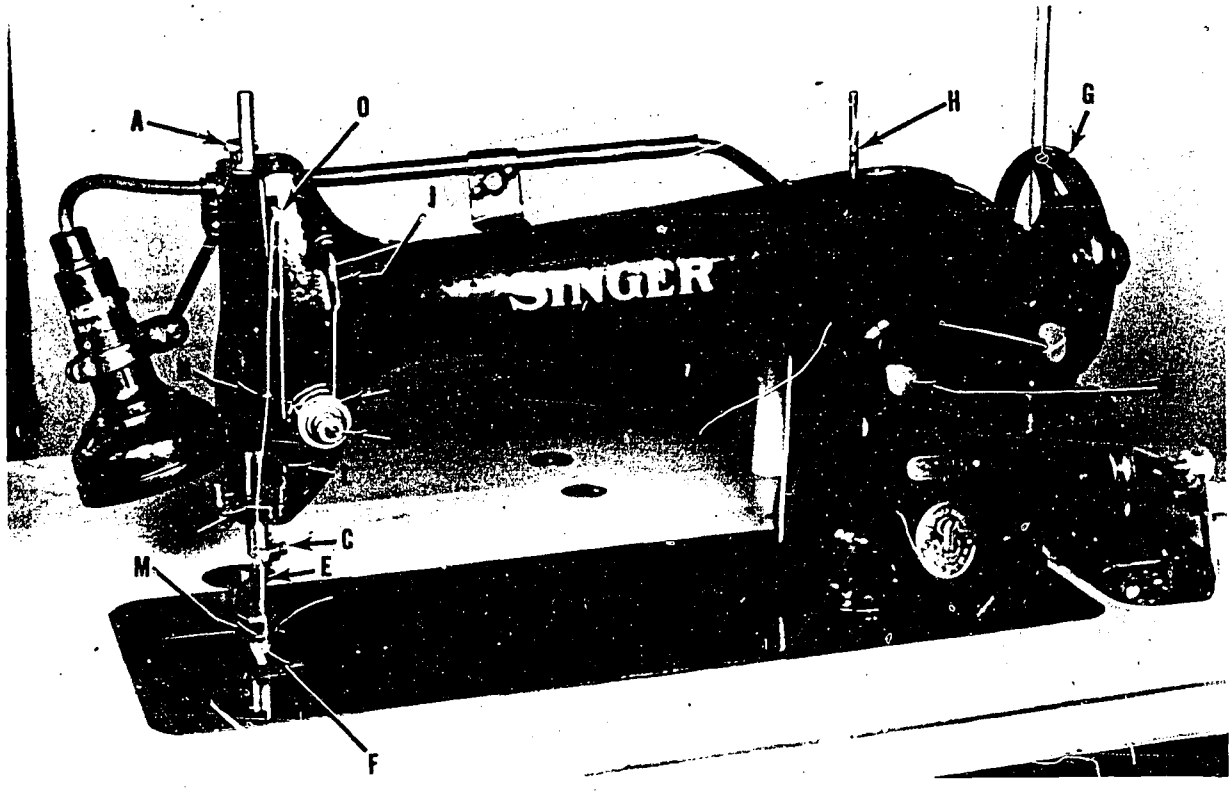
The press should be kept clean and free from lint and dust. Check all steam connections weekly. Be sure padding covers are clean and all padding is in good condition. Check the steam trap for proper functioning.

LUBRICATION

All levers are provided with a type bushing that requires no lubrication. The main shaft of the head-carrying member is equipped with roller bearings. These bearings are packed with a high melting point neutral grease before leaving the factory. Approximately every 2 years, the cover plates on the head carrying member should be removed and the bearing repacked. Figure 14-2 shows the hydraulic shock absorber which is used to check the opening of the head. The oil level in the check should be maintained, as shown in figure 14-2.

SPRING ADJUSTMENT

If the press is kept in proper alignment, it should not be necessary to change the lever



A. Pressure-control screw
B. Tension-adjusting nut
C. Needle clamp
D. Stitch-length regulator
E. Needle
F. Feed Dog
G. Handwheel
H. Spool spindle
J. Thread retainer
K. Thread take-up spring
L. Thread guide
M. Presser foot
N. Thread guide
O. Thread take-up lever
P. Thread guide

43.16(155)

Figure 14-3.—Singer sewing machine, model 31-15, Navy standard type.

DUTIES OF A PRESORTER

A presorter in a portable laundry works under the supervisor and generally does the following:

- Removes bales or boxes of clothing from the soiled clothing storage area to the classification and identification area.
- Opens the bales or boxes and properly identifies each garment or lot.
- Classifies clothes by lots for washing.
- Weighs clothes for washing (normally 20 lbs per unit to fit pockets in the washer).
- Puts unit weight on, or in, each unit of clothing and delivers it to the washer-extractor area.
- Maintains a record sheet for each bale or box of clothing, to show the quantity of each type of garment and the identification number.
- Signs the record sheet and delivers it to the supervisor, along with the identification numbers.

DUTIES OF A MACHINE OPERATOR

A machine operator works for the laundry supervisor and does such work as is assigned him. His primary duties include:

- Keeping the machines clean.
- Performing such minor maintenance as is necessary.
- Seeing that machines are kept in excellent repair.
- Informing his supervisor of maintenance requirements on machines.
- Selecting the washing formula, soap or detergent, and builder, suitable for a particular classification.
- Operating washer-extractor.
- Operating drying tumbler.
- Keeping area around machines clean.

DUTIES OF A FINAL SORTER

A final sorter is responsible to the laundry supervisor for:

- Taking clothes (in tote boxes) from the drier area to the assembly area.
- Assembling finished work under proper identification number, or ownership.
- Checking amount of clothing received from dryer with the record sheet, also noting any torn, damaged, or mutilated article and the cause for such condition.
- Signing the record sheet.
- Placing garments in containers for issuing, or wrapping them in bundles.
- Delivering processed containers or bundles of clothes to the processed storage area, with record sheet, and receiving tallies.

OPERATING THE WASHER-EXTRACTOR

The procedures for operating the washer-extractor in a portable laundry unit are similar to those for the washer-extractor discussed in chapter 4. There are some differences, however, in the operation of the two machines. The washer in the portable unit has three pockets in the cylinder, with a capacity of 20 pounds for each pocket. In operating the machine, you should follow the recommendations of the manufacturer for loads in each pocket. The weight in each pocket should be the same, so that the cylinder will run smoothly and without strain on the bearings. For such items as hand towels, the manufacturer states that the amount of the load in each pocket may be increased; but the bulk of articles in each pocket should not be so great as to prevent sufficient agitation of the clothes in the suds water. Study the manufacturer's instruction manual for further operating instructions.

WASHING FORMULAS AND SOAPS

Washing formulas discussed in chapter 4 of this text may be used in the portable laundry shown in figure 12-1. As you know, your wash water determines the washing ingredients you must use to get a proper suds for the load to be washed; that is, cotton, woolens, and so on.

Refer to Chapter 4 of this text for the general procedure for operating the washer-extractor.

UNLOADING WASHER-EXTRACTOR

A mechanical door interlock in the washer-extractor prevents opening of the door while the cylinder is running. When cylinder stops running, open outer shell door by pressing the lock handle down. Use the INCH buttons to get each compartment door open, in turn, for unloading. When a door is in position, step on the brake pedal and then release inch buttons. Release

Needles

Needles for machine 31-15, when used on a power table, are of class and variety 16 x 87, and when used on a foot power stand are of class and variety 16 x 73. The needles are furnished in sizes Nos. 12, 14, 16, 17, 18, 19, 21, 22, and 23.

The size of the needle to be used should be determined by the size of the thread which must pass freely through the eye of the needle. If rough or uneven thread is used, or if it passes through the eye of the needle with difficulty, the machine will not function satisfactorily.

Threads

Because right-twist thread unwinds and breaks in a machine needle, left-twist thread should always be used in the needles of this machine. However, right-twist thread may be used in bobbins only if standard left-twist is not available for both bobbins and needles. To determine the twist of a thread, hold the thread as shown in figure 14-4. Turn the thread over toward you between the thumb and forefinger of the right hand; if left twist, the strands will wind tighter; if right twist, the strands will unwind.

OPERATOR CONTROLS AND ADJUSTMENTS

Operator controls and adjustments to the model 31-15 sewing machine are discussed below.

Motor Switch

A toggle or push switch which turns the machine on and off is located on the left side of the machine stand.

After the switch is turned on wait a few seconds to allow the motor to attain full speed before starting the sewing machine. Also see that the motor is stopped before removing or replacing the sewing machine driving belt.

MOTOR CLUTCH PEDAL

The motor is connected to the motor driving pulley by a clutch, which is operated by the pedal or foot treadle. To connect the motor with the machine, press this pedal. If the brake on the clutch does not stop the machine promptly, it may be adjusted for a close fit.

Knee Lifter

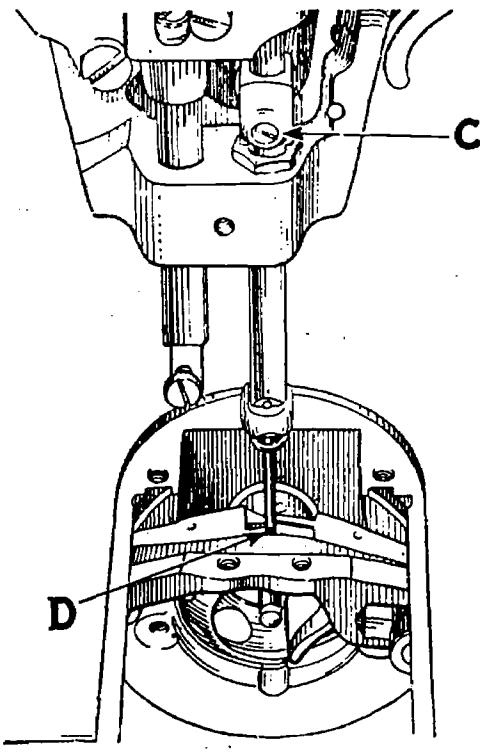
The presser foot can be raised by operating the knee lifter to the right. This knee lifter connects with a knee lifting lever on the bottom of the head of the machine. A knee lifting lever push rod runs up and behind the arm of the machine to the presser foot.

Hand Lifting Lever

The presser foot may also be lifted and locked in its raised position by the hand lever. After the presser foot has been locked in its raised position it may be released by pressing the knee lifter to the right.

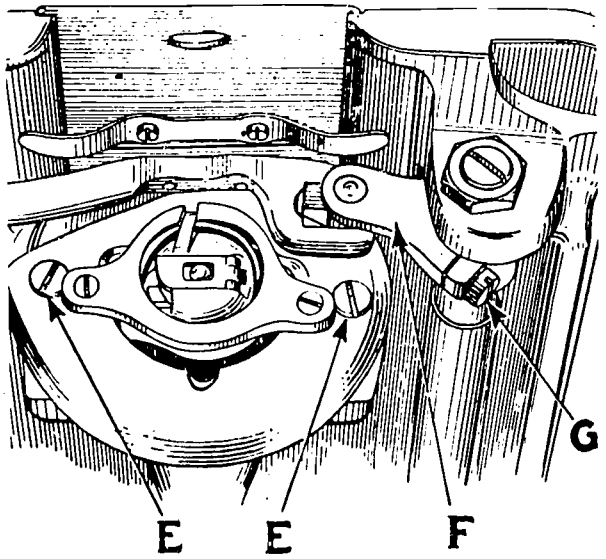
Presser Foot

The pressure of the presser foot upon the material enables the feed dog to push the



119.3

Figure 14-5.—Needle and shuttle correctly timed.



119.4

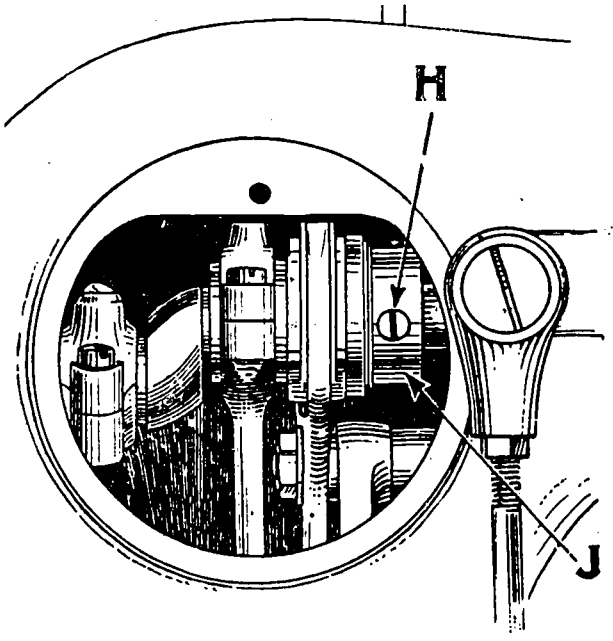
Figure 14-6.—Adjustment for raising and lowering the feed dog.

material forward each time the needle goes up. For the needle to make an even stitch, the material must move forward at a uniform speed. If the pressure is too light, the dog does not feed the material, the needle hits in one place on the material, and the bobbin thread knots up. If the pressure is too great, the feed dog is worn unnecessarily and feeds the bottom fabric faster than the upper fabric. The pressure on the presser foot is regulated by the thumbscrew on top of the machine. To increase the pressure, turn the thumbscrew to the right; to decrease the pressure, turn it to the left.

Time Needle With Shuttle

Push the needle up into the needle clamp as far as it will go. Turn the balance wheel over toward you until the point of the shuttle reaches the center of the needle on the upward stroke of the needle bar. When the shuttle is in this position, the needle bar should have risen 1/10 inch and the top of the eye of the needle should be 1/16 inch below the point of the shuttle, as shown at D, in figure 14-5.

If the eye of the needle is not the correct distance below the point of the shuttle, loosen the screw (C, in fig. 14-5) in the needle bar connecting stud and move the needle bar up or



119.5

Figure 14-7.—Adjustment for timing feeding mechanism.

down, as may be required, then securely tighten the screw (C).

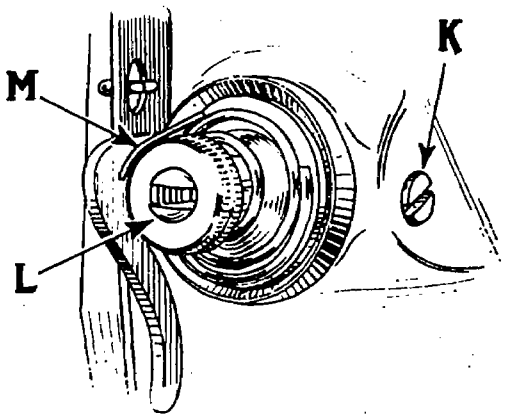
Remove and Replace Shuttle Race

Turn the balance wheel toward you until the needle bar moves up to its highest point. Take out the two screws (E, fig. 14-6) that hold the shuttle race in position and remove the shuttle race. Then remove the shuttle from the shuttle race.

When replacing the shuttle race, have the needle bar at its highest point and turn the shuttle in the race so that it correctly engages the shuttle driver, then securely fasten the shuttle race in position by means of the two screws (E) in figure 14-6.

Raise or Lower Feed Dog

The feed listing rock shaft crank (F, fig. 14-6) should be set so that when it raises the feed bar to its highest point, slightly less than the full depth of the teeth project through the slots in the throat plate. To raise or lower the



119.6
Figure 14-8.—Adjustment of thread takeup spring.

feed dog, loosen the clamping screw (G, fig. 14-6) and move the feed lifting rock shaft crank (F, fig. 14-6) until the feed dog is set at the required height, then securely tighten the clamping screw (G, fig. 14-6).

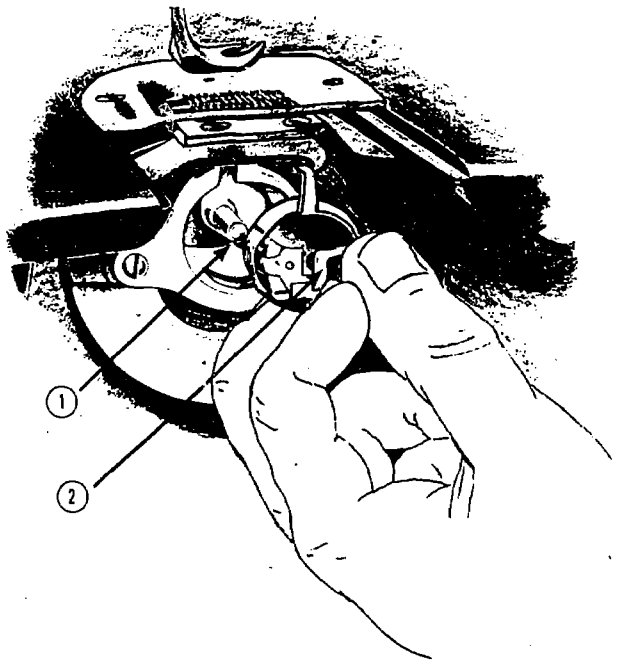
Time Feeding Mechanism

The feeding mechanism should be timed so that the feed dog finishes its feeding movement (away from the operator) when the thread takeup lever (O, fig. 14-3) is at its highest point. The feed should always finish its feeding movement before the needle reaches the cloth on its downward stroke.

When it is necessary to time the feeding mechanism, press the stitch regulator (D, fig. 14-3) down to its lowest point for the longest stitch and turn up the round cover plate at the back of the machine. Loosen the feed eccentric setscrew (H, fig. 14-7), and turn the feed eccentric (J, fig. 14-7) until the feed is correctly timed as instructed above, then securely tighten the setscrew (H, fig. 14-7).

Adjust Thread Takeup Spring

The thread takeup spring (M, fig. 14-8) should be set so that when the eye of the needle reaches the cloth on the downward stroke of the needle bar, the spring will be through acting and will rest against the stop on the thread takeup spring regulator. The tension on the thread takeup spring should be just sufficient to take up the slack of the needle thread until the



80.85(155)
Figure 14-9.—Removing the bobbin.

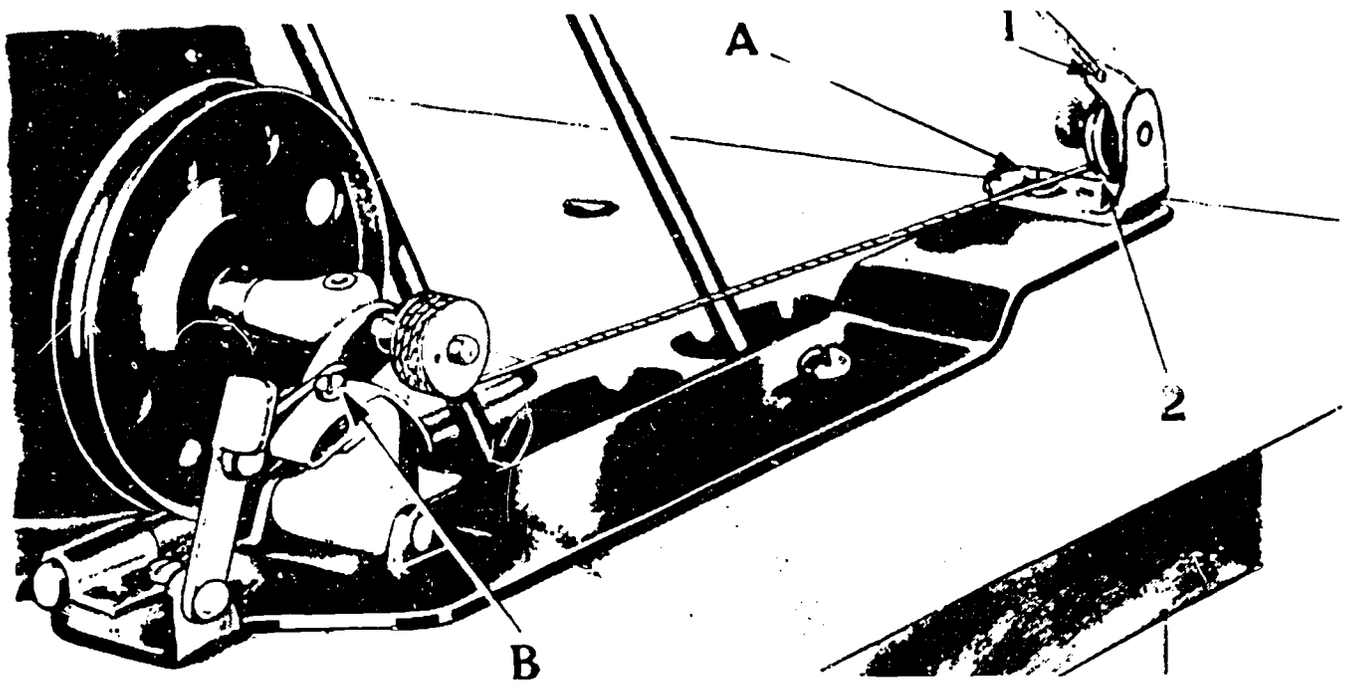
eye of the needle reaches the goods in its descent.

If the thread takeup spring is not correctly set, loosen the setscrew (K, fig. 14-8) in the arm of the machine, and turn the tension stud (L, fig. 14-8) to the right for more movement of the spring or to the left for less movement. When the spring is correctly set, securely tighten the set screw (K, fig. 14-8).

To increase the tension on the thread takeup spring (M, fig. 14-8), loosen the tension screw stud (L, fig. 14-8) and force the takeup spring from the recess in the regulator to the right, between the regulator and the tension disks, until the required tension is obtained, then securely tighten the tension screw stud and force the spring back into its position in the regulator recess. To decrease the tension, force the spring to the left, between the regulator and the tension disks.

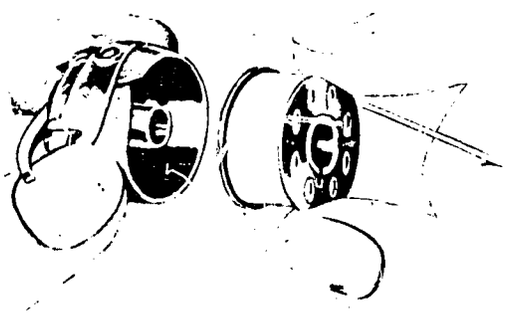
OPERATION

The following operational instructions are recommended for the model 31-15 sewing machine.



80.86(155)

Figure 14-10.—Winding the bobbin.



80.87.1(155)

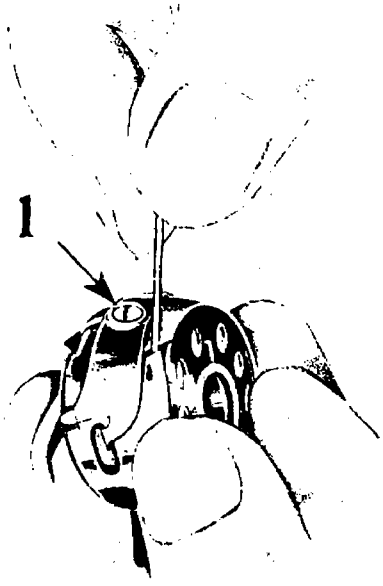
Figure 14-11.—Threading the bobbin case, step I.

Removing Bobbin

Turn the balance wheel over toward you until the needle moves up to its highest point. Draw out the slide in the bed of the machine, reach down with the thumb and forefinger of the left hand, open the bobbin case latch (2, fig. 14-9) and lift out the bobbin case. While the latch remains open, release the bobbin case. Release the latch, turn the open end of the bobbin case downward, and the bobbin will drop out.

Winding Bobbin

See figure 14-10. Fasten the bobbin winder to the table with its driving pulley in front of



80.87.2(155)
Figure 14-12.—Threading the bobbin case, step II.

80.87.3(155)
Figure 14-13.—Threading the bobbin case, step III.

the machine belt, so that the pulley will drop away from the belt when sufficient thread has been wound upon the bobbin.

Pass the thread down through the thread guide (1) in the tension bracket, around the back and between the tension disks (2). Then wind the end of the thread around the bobbin a few times, push the bobbin winder-pulley over against the machine belt and start the machine.

When sufficient thread has been wound upon the bobbin, the bobbin winder will stop automatically.

If the thread does not wind evenly on the bobbin, loosen the screw (A) in the tension bracket and move the bracket to the right or left as may be required, then tighten the screw.

The amount of thread wound upon the bobbin is regulated by the screw (B). To wind more thread on the bobbin, turn the screw (B) inwardly. To wind less thread on the bobbin, turn the screw outwardly. Bobbins can be wound while the machine is stitching.

Threading Bobbin Case

Hold the bobbin between the thumb and forefinger of the right hand, the thread drawing on from the left toward the right (see fig. 14-11).

With the left hand hold the bobbin case as shown in figure 14-11, the slot in the edge being near the top, and place the bobbin into it.

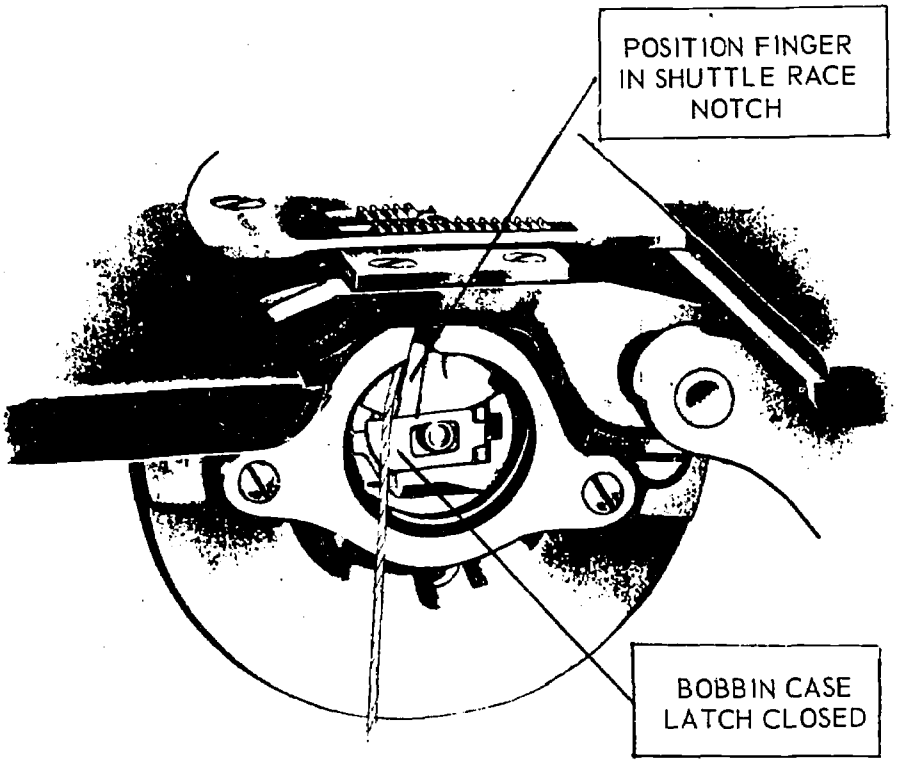
Then pull the thread into the slot in the edge of the bobbin case (see fig. 14-12), draw the thread down under the tension spring and into the delivery eye at the end of the tension spring (see fig. 14-13).

Replacing Bobbin Case

After threading, take the bobbin case by the latch, holding it between the thumb and forefinger of the left hand, place the bobbin case on the center stud (1, fig. 14-9) of the shuttle body with the position finger opposite the notch at the top of the shuttle race, release the latch and press the bobbin case back until the latch catches the groove near the end of stud (see fig. 14-14).

To Set Needle

Turn the balance wheel toward you until the needle bar moves up to its highest point; loosen the screw (C, fig. 14-3) in the needle clamp as far as it will go, with the eye of the needle



80.87.4(155)

Figure 14-14.—Bobbin case threaded and replaced.

directly in line with the arm of the machine, then tighten the screw.

Threading Needle

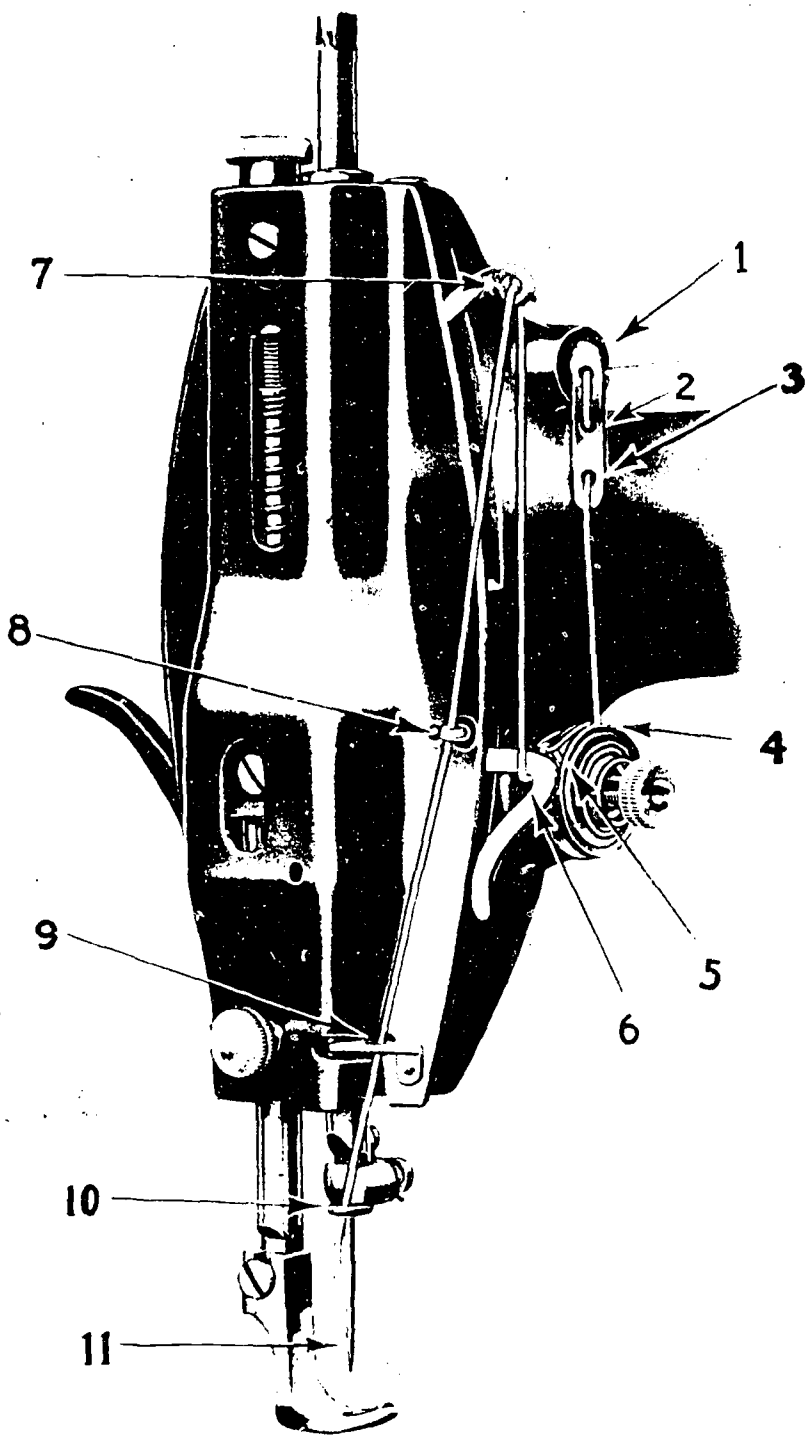
See figure 14-15. Pass the thread from the unwinder, or from the spool on the spool pin, at the right on the top of the machine, from right to left through the top hole (1) in the thread retainer, from left to right through the middle hole (2) in the thread retainer, and from right to left through the bottom hole (3) in the thread retainer, down under from right to left between the tension disks (4), into the thread takeup spring (5), under the tension thread guard (6), up and from right to left through the hole in the end of the thread take-up lever (7), and down through eyelets (8), (9), (10), and (11) as shown in figure 14-15. Draw about two inches of thread through the eye of the needle before sewing.

Preparation for Sewing

With the left hand, hold the end of the needle thread, leaving it slack from the hand to the needle, and turn the balance wheel over toward you until the needle moves down and up again to its highest point, thus catching the bobbin thread; draw up the needle thread, and the bobbin thread will come up with it through the hole in the throat plate (see fig. 14-16). Lay both threads back under the presser foot.

Inserting Work

Raise the presser foot, place the edge of the material beneath the presser foot, lower the presser foot, turn the balance wheel by hand until the needle is in the material, and press on the treadle to engage the clutch with the motor. The balance wheel should turn over toward you while the machine is operating.



80.84(155)

Figure 14-15.—Threading the needle.

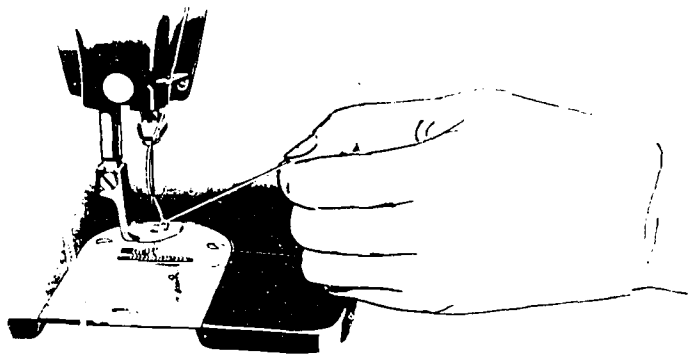


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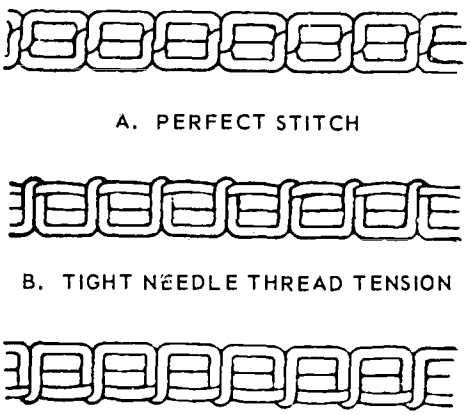
Figure 14-16.—Drawing up the bobbin thread.



80.88(155)

Figure 14-17.—Effect of tension on stitch.

Sewing

While you are sewing, hold the work flat, but do not pull on the material. Let the feed carry the work evenly under the presser foot and needle. If the operator pulls on the fabric, the needle bends, strikes the throat plate, and is either dulled or, more likely, broken. When the needle is about to cross a seam or other unusually thick or uneven place in the work, disengage the clutch, and hand-turn the machine over the rough place; otherwise, the needle may be broken or thrown out of time. If the material is especially thick, the tension on the presser foot should be decreased by turning the pressure regulating thumbscrew (A, fig. 14-3) to the left.

Removing Work From Machine

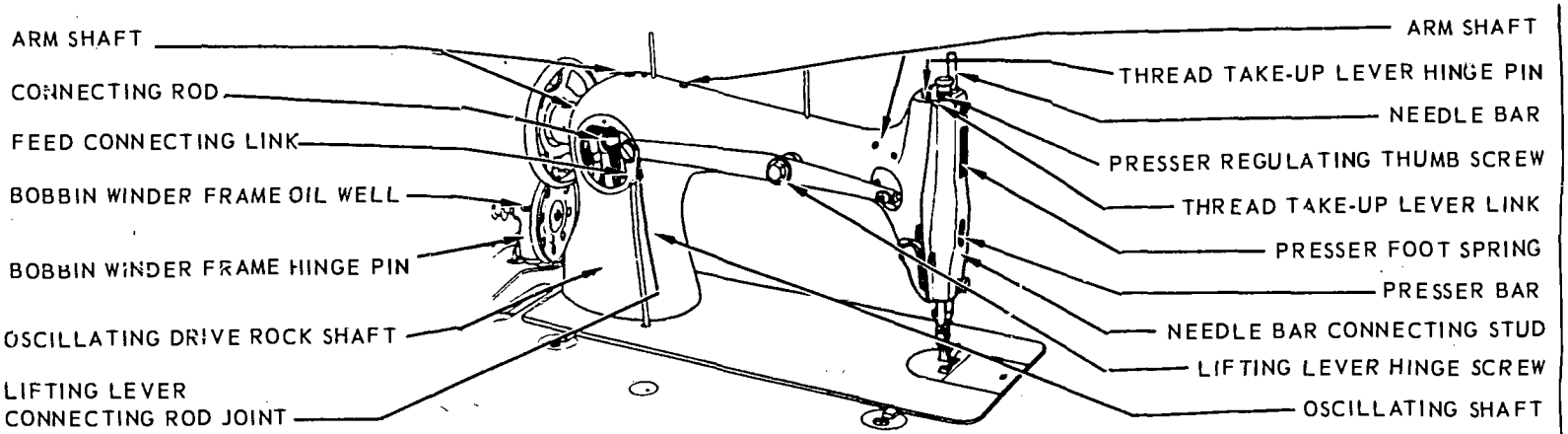
When a seam has been completed, take your foot off the foot treadle to stop the machine. With your right hand, turn the balance wheel until the thread takeup lever is at its highest point, and raise the presser foot by operating the knee lifter. Then with your left hand draw the work straight behind the presser foot, and break or cut the thread so that about 3 inches remain under the presser foot.

Tensions

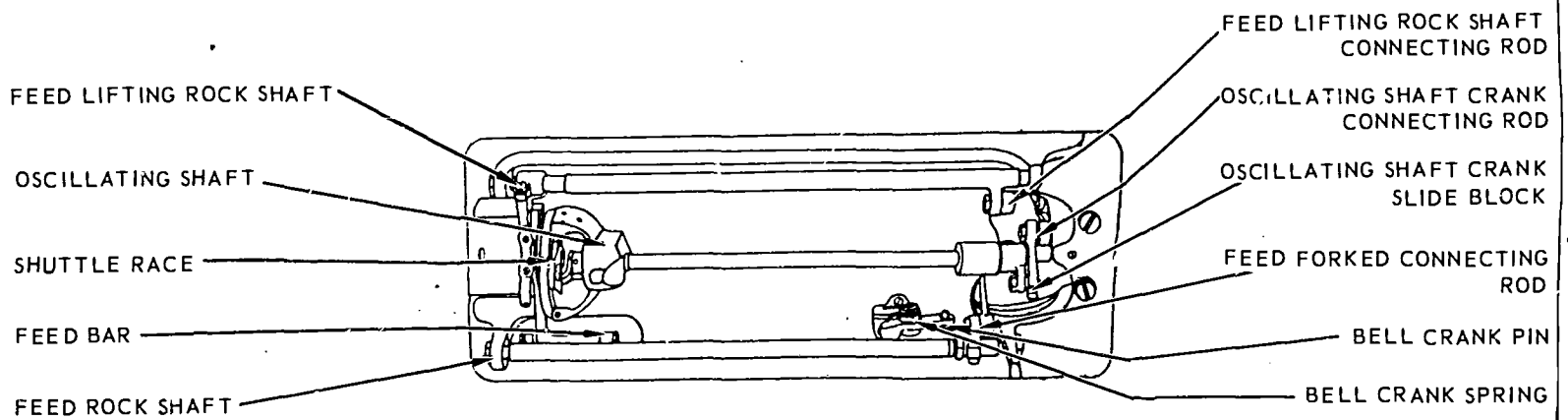
For ordinary stitching, the needle and bobbin threads should be locked in the center of the thickness of the material as illustrated in A, figure 14-17. If the tension on the needle thread is too tight, or if that on the bobbin thread is too loose, the needle thread will lie straight along the upper surface of the material, as illustrated in B, figure 14-17.

If the tension on the bobbin thread is too tight, or if that on the needle thread is too loose, the bobbin thread will lie straight along the under side of the material, as illustrated in C, figure 14-17.

The tension on the needle thread should only be regulated when the presser foot is down. Having lowered the presser foot, turn the small thumb nut (B, fig. 14-3) at the front of the tension disks over to the right to increase the



HEAD ASSEMBLY, SEEN FROM REAR



BED ASSEMBLY, SEEN FROM BELOW

80.89(155)

Figure 14-18.—Lubrication chart for model 31-15 sewing machine.

tension. To decrease the tension, turn the screw over to the left.

The tension on the bobbin thread is regulated by the screw (1, fig. 14-12) in the bobbin case tension spring. To increase the tension, turn the screw to the right. To decrease the tension, turn the screw to the left.

When the tension on the bobbin thread is properly adjusted, it is seldom necessary to change it, as a correct stitch can usually be obtained by varying the tension on the needle thread.

Length of Stitch

The length of stitch is regulated by the thumbscrew (D, fig. 14-3) in the slot on the front of the upright part of the arm. To lengthen the stitch, loosen the thumbscrew and move it downward. To shorten the stitch, loosen the thumbscrew and move it upward. When the desired length of stitch has been obtained, tighten the thumbscrew.

Pressure on Material

The pressure on the material is regulated by the thumbscrew (A, fig. 14-3) on the top of the machine. To increase the pressure, turn the thumbscrew over to the right. To decrease the pressure, turn the thumbscrew over to the left. The pressure should be only heavy enough to enable the feed to move the work along evenly.

LUBRICATION

The lubrication chart (fig. 14-18) prescribes lubrication maintenance for a model 31-15 sewing machine. Detailed lubrication instructions are discussed in the following paragraphs.

Face Assembly

Twice daily, add one to three drops of lubricating oil to the following moving parts:

1. Needle bar
2. Needle bar connecting stud
3. Presser bar
4. Presser foot spring
5. Presser regulating thumbscrew
6. Thread takeup lever hinge pin
7. Thread takeup lever link

Every week, remove the faceplate, clean the assembly, and lubricate the following moving parts with two or three drops of lubricating oil:

1. Needle bar connecting stud roller
2. Thread takeup lever crank
3. Thread takeup lever hinge pin
4. Thread takeup lever link hinge pin

Arm Assembly

Twice a day, add one to three drops of lubricating oil to the following moving parts:

1. Arm shaft (to be lubricated through four oilholes)
2. Feed connecting link. (Loosen the thumbscrew in the round cover plate on the back of the upright and turn the cover plate up to lubricate link.
3. Feed lifting rock shaft crank connecting rod
4. Lifting lever connecting rod joint
5. Lifting lever hinge screw
6. Oscillating rock shaft
7. Oscillating shaft

Bed Assembly

Twice a day, lubricate the following moving parts with one to three drops of lubricating oil:

1. Bell crank pin
2. Bell crank spring
3. Feed bar
4. Feed drive connecting rod
5. Feed lifting connecting rod
6. Feed lifting rock shaft
7. Feed rock shaft
8. Oscillating shaft
9. Oscillating shaft crank connecting rod
10. Oscillating shaft crank slide block

Bobbin Winder Assembly

Every day, add one or two drops of lubricating oil to the bobbin winder frame oil well and bobbin winder frame hinge pin.

Shuttle Race

Twice a day, lubricate the shuttle bearing in the shuttle race with two drops of lubricating oil. At the same time, rub two or three drops of oil over the surface of the shuttle race itself. Every week, remove the shuttle body from the shuttle race; clean, lubricate, and replace it.

SAFETY PRECAUTIONS

When making adjustments such as removing needle or bobbins or performing other adjustments which bring the fingers under the needle, cut off the motor or remove the driving belt. While operating the machine, at all times be careful to keep fingers away from the needles.

CHAPTER 15
BASIC SEWING

Much of the sewing a Navy tailor does is handwork or requires handwork both before and after machine work. Hand sewing seems a very simple process, but like everything else, it has its right and wrong methods.

PREPARING TO SEW

Both the quality of your work and the speed with which you turn it out will benefit if you prepare for the job properly before you begin. Such matters as the lighting and the position in which you sew are important, as are also the ready availability of appropriate supplies.

LIGHTING

Adequate light is necessary not only for the speed and quality of your work but also to protect your eyes. Whether natural or artificial, the light should come from your left, so position yourself or your light fixture accordingly.

POSITION

The position in which you sit to sew will have a definite effect on the fatigue you will experience from a long period of sewing. It can also affect the speed at which you work and in some instances the quality of your sewing. Use a chair of a shape and height that permits you to sit comfortably and to make maximum use of the table on which you have placed your sewing materials. This means more than having such equipment as scissors, spools of thread, and pins conveniently within reach. It also includes being able to rest the article on which you are working on the table. If you are sewing something large and heavy, such as an overcoat or a blanket, resting it on the table will help you to avoid awkwardness and fatigue. Also, for some types of work, a firm, flat surface is desirable; e.g., for aligning the edges of a seam before pinning.

Some tailors find it comfortable, when sewing by hand, to sit with one leg crossed over the other and to rest their work on the thigh.

SEWING SUPPLIES

Make sure before you begin to sew that you have the right supplies at hand and in good condition. For replenishing these items, consult ship's store personnel. Tailor shop supplies are listed in the Ship's Store Contract Bulletins.

At least one type of scissors and one type of shears are needed for any Navy tailor shop, and others are desirable for special uses. These and various other necessary items are described below.

Scissors

Scissors have ring handles and are intended to be operated with thumb and one finger. A pair of scissors about 5 inches long, with medium thin blades should be used for cutting thread, clipping, trimming, and for ripping seams. Buttonhole scissors have a small gap in the blade so that they can make the small cut needed for a stitched buttonhole. (See fig. 15-1.)

Shears

Shears have one bow handle in which at least two fingers may be inserted, providing better cutting leverage than can be obtained with scissors. Shears are needed for cutting out garments or for making any other long cuts, especially if the cloth is heavy. Even if the tailor shop sewing consists only of repairs and alterations, you will still need a good pair of cutting shears. These should be 7 or 8 inches long and heavy enough to cut evenly through heavy cloth. The type with bent handles makes cutting easier because the fabric need not be lifted from the table. There are extra heavy shears for cutting heavy fabrics. Pinking shears are a time-saver if used for cutting out a garment because they give the seam edge a nonraveling finish. If you are left-handed, you should requisition left-handed shears.

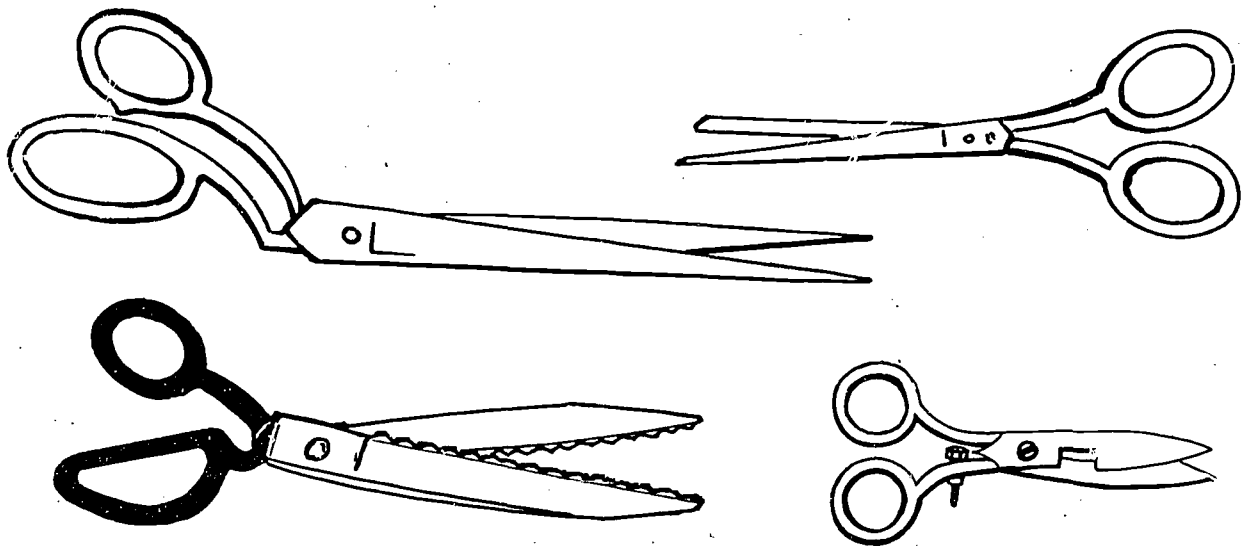


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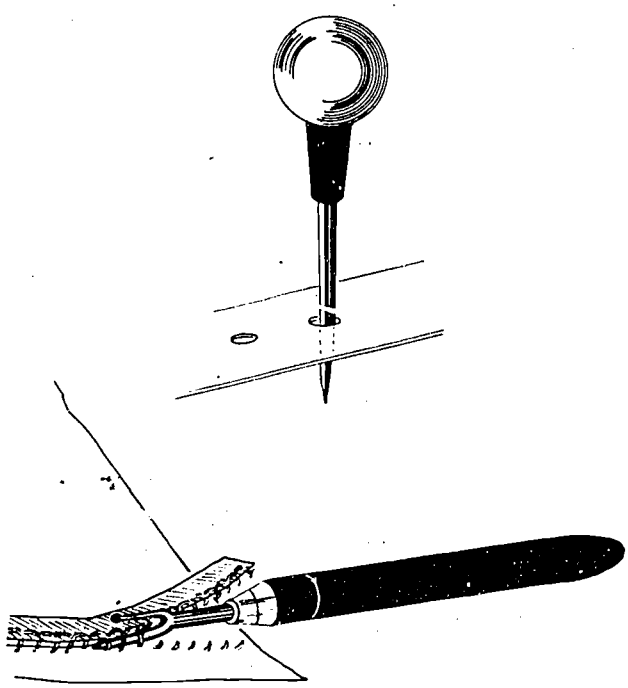
Figure 15-1.—Types of scissors and shears.



155.1

Figure 15-2.—Seam ripper and stiletto

Care of Scissors and Shears

The scissors and shears stocked by the Navy are of high quality and should last a long time if properly cared for. Avoid dropping them, and make it a practice to use them only for the purpose for which they were intended. Don't expose them unnecessarily to dampness, and if they become damp, wipe them promptly with a clean, dry cloth. If they become dull they can be sharpened, using equipment in the ship's machine shop. If you know how to sharpen them yourself, you should do so, but if you do not, consult machine shop personnel.

Seam Ripper

The seam ripper is a useful tool for the Navy tailor shop because of the volume of alterations the shop performs. It is a safer tool for ripping than a razor blade because it has a handle and its blade is protected (see fig. 15-2).

Stiletto

A stiletto, or awl, is used for punching holes for hand embroidered eyelets. (See fig. 15-2.)

Pins

Straight pins can be requisitioned in 1/2-pound boxes. Use pins liberally to hold your work in place and decrease the amount of basting. Use only new, clean pins so as not to soil the fabric, and keep your pins clean by dropping them back into the box when you remove them

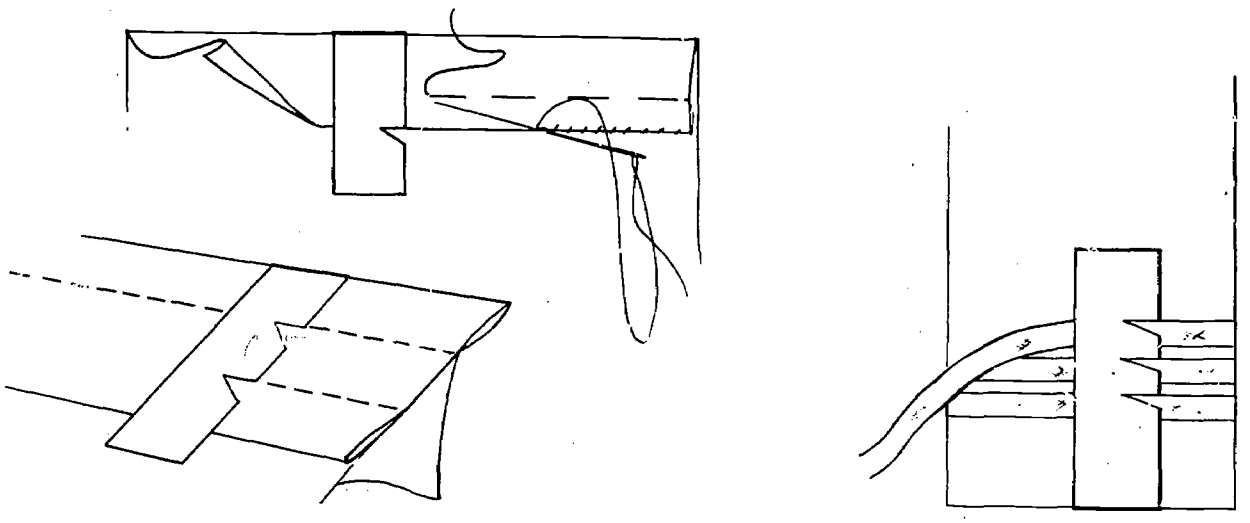


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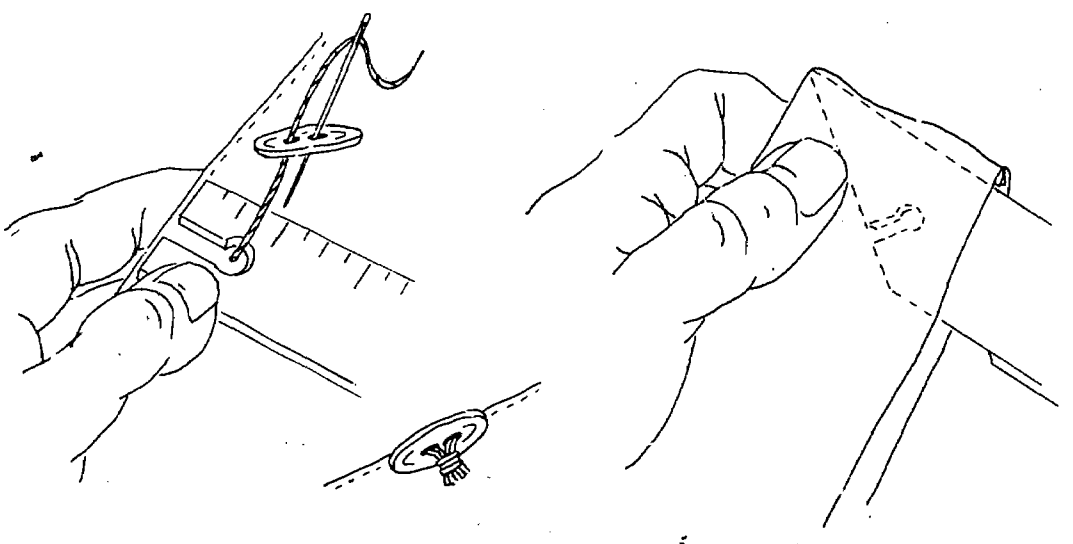
Figure 15-3.—Notched card for measuring.



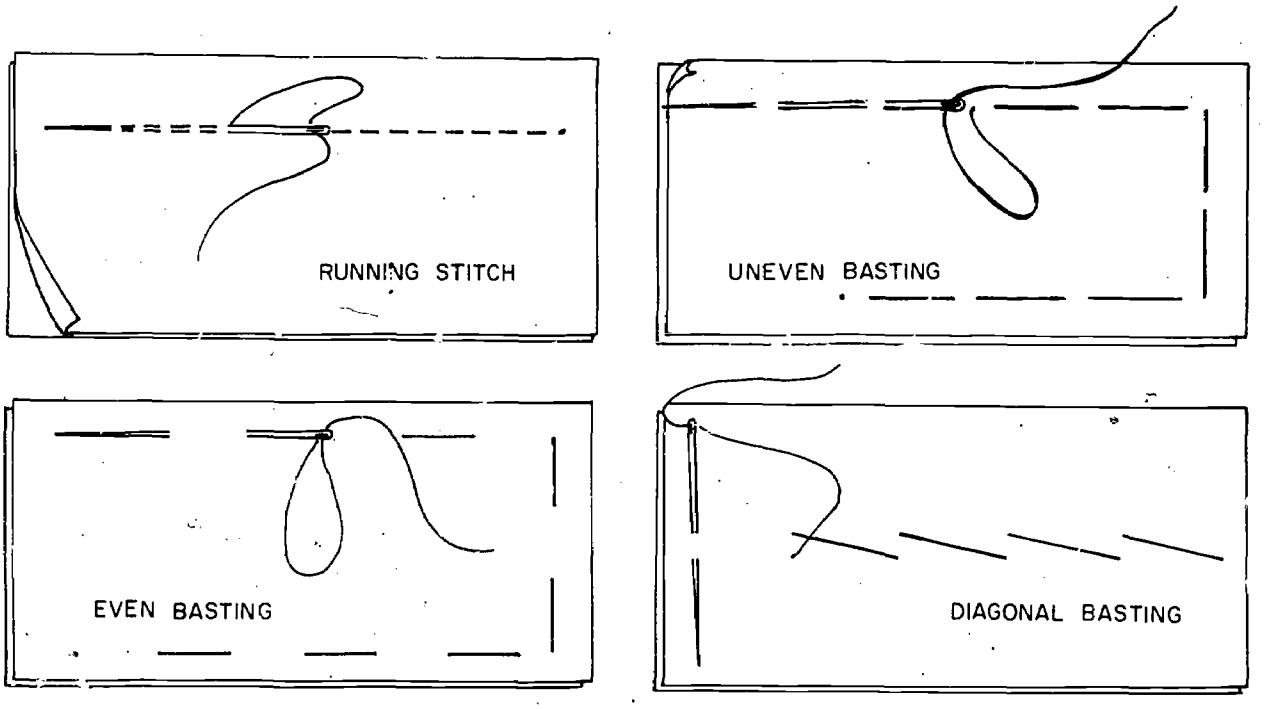
155.2

Figure 15-4.—Point turner and button gauge.

from the fabric. Avoid using dull or coarse pins, since these also may damage the fabric.

Needles

Use the right size of needle for the work you are doing. A fine fabric requires a fine needle and thread, and a heavy fabric a large needle and coarser thread. Using too heavy a needle is likely to damage the fabric. Some needles have a large eye, which makes them easier to thread. Long needles are best for basting. Keep your packages of unused needles closed so that the black paper inside the package will more effectively serve its purpose of protecting the needles from rust and stains. If needles become rusty, they can be cleaned by running them through an emery ball—a small bag of emery powder. A pincushion packed with steel wool serves the same purpose.



119.9

Figure 15-5.—Running stitch and types of basting stitches.

Thread

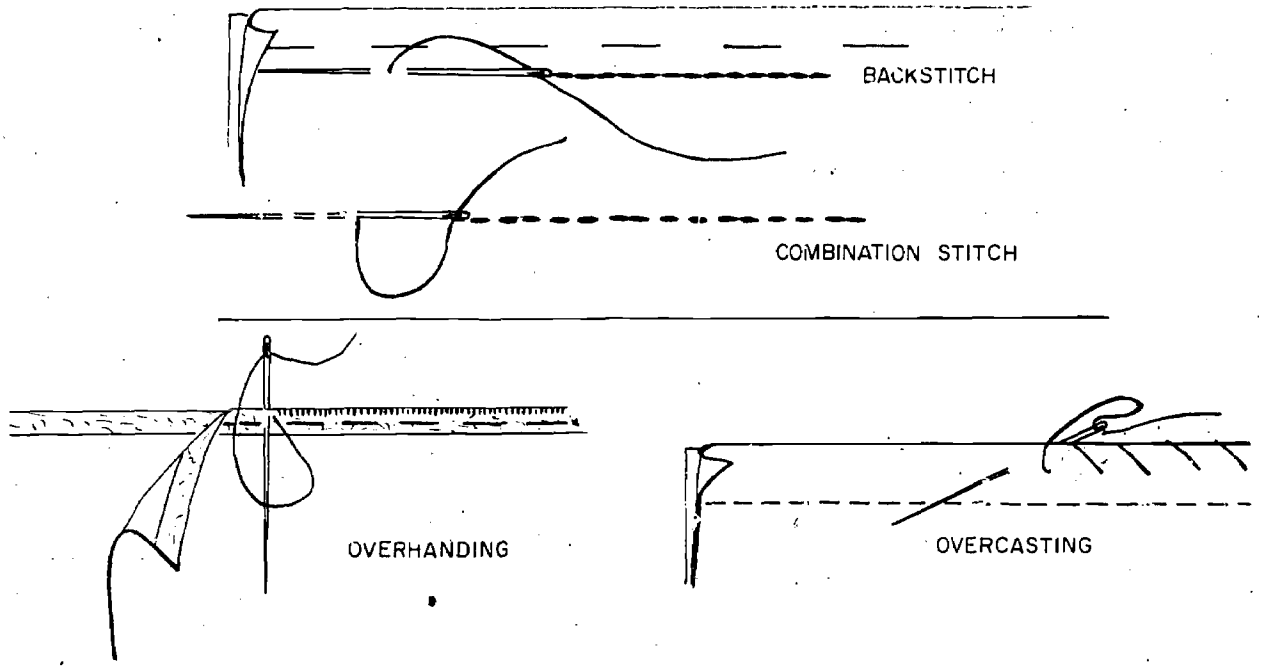
Since you will usually be sewing on fairly heavy articles, the thread (and the needles) will generally be fairly heavy. For wools, cottons, linens, silks, and some blended fabrics, mercerized cotton thread is most commonly used. The synthetic fabrics and blends of natural and man-made fibers usually are stitched with nylon or dacron thread, although silk or mercerized cotton may be used. For some purposes you may need special types of heavy duty thread, some of it made of linen. For basting, use a thread that is easily seen—white on dark and dark on white.

Thimble

Learn to use a thimble. Select one that fits the middle finger of your right hand. It protects your finger and makes sewing easier. In pushing the needle, or a pin, through the cloth, the pressure usually is exerted against the side of the thimble. You can also use the thimbled finger to crease edges. If your thimble develops rough edges that break the thread, you can smooth it off with a light file, such as a nail file.

Measuring Equipment

Sewing requires accurate measurements, and no one needs to be more conscious of this fact than the Navy tailor who must sew striping on uniform sleeves. Keep appropriate measuring devices on hand, and use them consistently. The two most necessary types are the measuring tape, made of cloth, and the wooden yardstick. A thin 6-inch ruler divided into eighths of an inch on one side and into fourths on the other is useful also for measuring such things as distance between stripes and widths of certain types of seams. Another measuring device that you can easily make is a notched card for ensuring even spacing, as between stripes or buttonholes. Use any fairly stiff card or piece of cardboard about 4 or 5 inches long and 2 inches wide. Mark the space needed by a notch, measuring from one end of the card, or by two notches, measuring the distance between them. See figure 15-3.



119.10

Figure 15-6.—Back stitch, combination stitch, overcasting and overhandling.

Tailor's Chalk

Tailor's chalk is used to mark joinings and to indicate alterations. You should have both white and black chalk on hand.

Point Turner and Button Gauge

A small but very useful tool is the point turner and button gauge. It is a plastic ruler about 4" by 1". At one end is a sharp pointed angle for pointing cut collar points (as described later in this chapter). It also has two oval slots used to give the proper thread shank in sewing on buttons (see fig. 15-4).

Other Sewing Supplies

Keep on hand adequate supplies of the various types and colors of buttons and zippers for the garments you will be expected to repair. Before you start a repair job make sure that you have any items of this type that you will need. Small embroidery hoops are desirable for embroidering stars.

THREADING THE NEEDLE

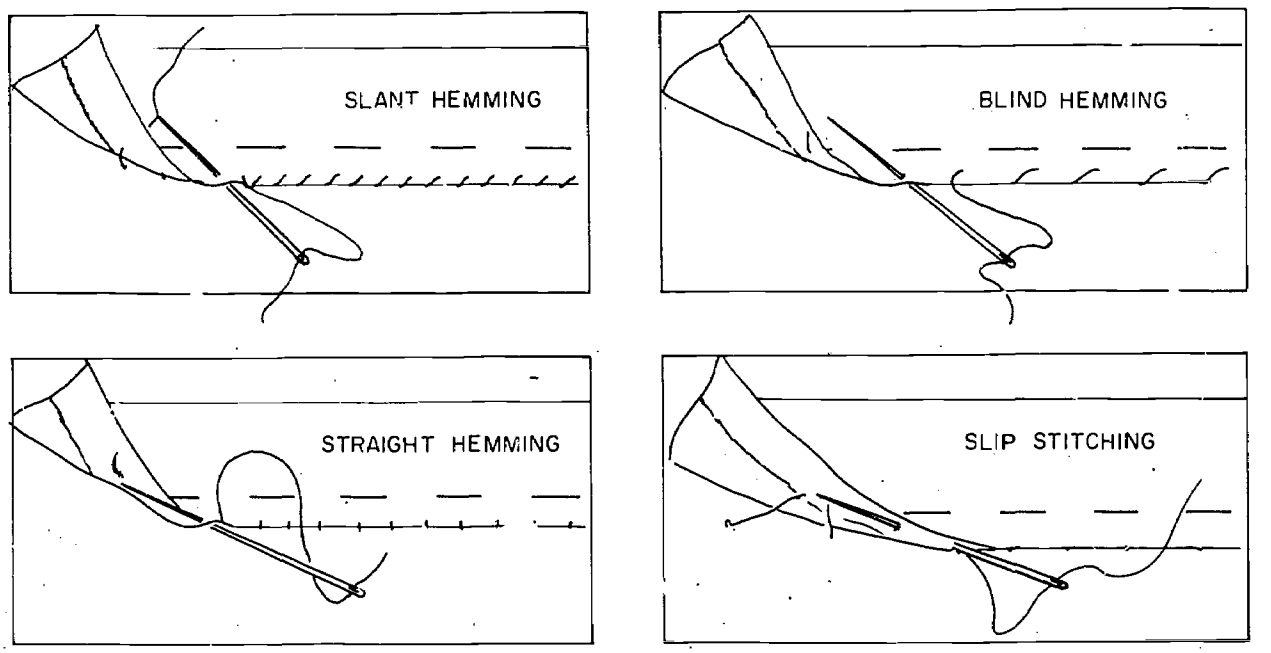
To thread a needle, hold the needle between the thumb and index finger of one hand and a clean-cut end of the thread in the other. Insert the thread through the needle's eye. Too long a thread is a nuisance, for it requires a longer sweep of your arm in sewing, and knots are likely to form. A knot in the end is sufficient for basting and for gathering, but for handsewn seams it is best to secure the beginning with several small back stitches.

TYPES OF STITCHES

There are several basic types of stitches that are used in various ways for handsewing or combined with machine work. Those given below are the ones a Navy tailor is most likely to need.

RUNNING STITCH

The running stitch is one of the simplest and the basis of certain others. See figure 15-5.



119.11

Figure 15 7.—Hemming stitches.

Keep a straight line and make the stitches of even length.

BASTING

Even Basting

The simplest basting stitch is a long, even running stitch. It is used when preparing a garment for fitting or when preparing seams for machine work. Baste rather than pin when you are working on material that tends to stretch or "crawl."

Uneven Basting

A faster method of basting than the even stitch is the running stitch which is twice as long on top as even basting with a short stitch underneath. (See fig. 15-5.) This is a good stitch for holding two or more thicknesses of heavy cloth in place for machine stitching.

Diagonal Basting

A long diagonal stitch on the top of the fabric with a short straight crosswise stitch underneath is used back of an even-basting line with fabrics that show a marked tendency to "crawl" under the machine presser foot.

BACK STITCH

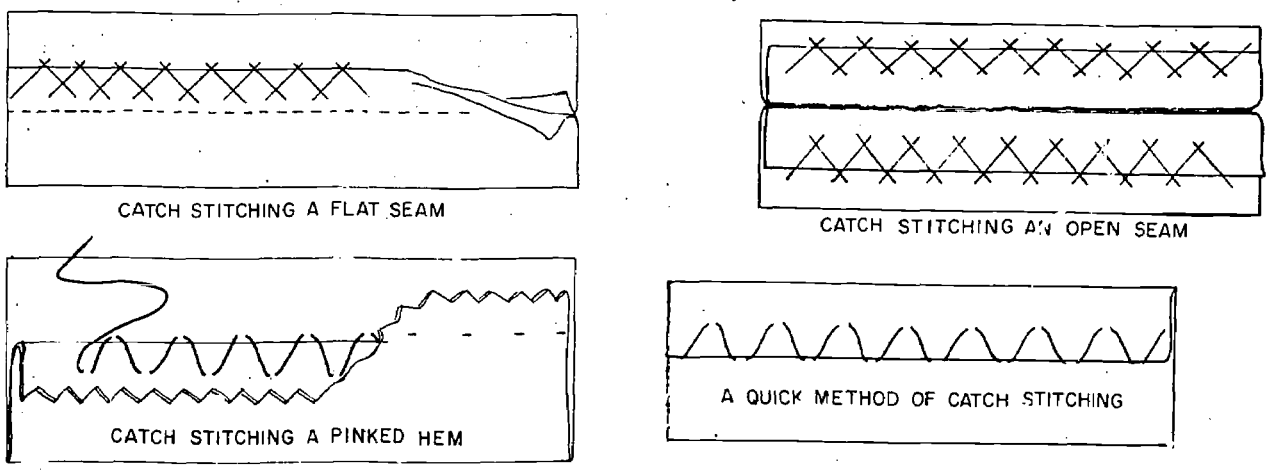
The back stitch is sometimes called "machine stitch" because on the top side it looks very much like machine stitching. It is made by taking a short stitch underneath, then carrying the needle back on top to the point where you began and taking another stitch underneath twice as long as the first one. Again carry the needle back to where the first top stitch ended and take another stitch twice as long underneath. Repeat this step for the length of the stitching. (See fig. 15-6.) This is a very strong stitch, but is not particularly attractive on the under side. Use a short needle.

Combination Stitch

Instead of taking a back stitch each time, take three or four running stitches, then a back stitch, then three or four more running stitches. This is somewhat stronger than a plain running stitch.

OVERCASTING

To finish seam edges, use a fine needle and take over-and-under stitches about 1/8 inch



119.12

Figure 15-8.—Catch stitching.

deep alongthe edge of the cloth on a slant to the line of stitching. Do not draw the thread tight. (See fig. 15-6)

Overhanding is the overcasting stitch, taken straight rather than slanted. It makes a strong flat seam for joining two selvage edges. Baste the two thicknesses together first; otherwise they are likely to slip with this type of sewing so that one side will be fuller than the other. The stitches should be as short as possible and not drawn too taut.

HEMMING STITCHES

A hemming stitch is used for fastening down hems and for felling seams or lining. There are several modifications of the stitch. Which one you use will depend on the strength required and on the importance of keeping the sewing as nearly invisible as possible.

In hemming it is important to keep the stitches even and true and as small as possible on the right side. Their length on the wrong side depends on the weight of the material. The thread must not be drawn too tight, but neither can it be left loose. Use as fine needle and thread as appropriate for the material.

Slant Hemming

In slant hemming, each stitch is slanted on both the right and wrong sides. (See fig. 15-7.) To make the stitch, place the hem over the forefinger and under the middle finger of the left hand and hold it down with the thumb. Instead of using a knot in your thread, catch a short end of the thread under your first stitches. Take up only a few threads that will show on the right side, and then catch your needle through the folded edge of the hem. If you start a new thread, catch both the old and the new thread under your hem. At both beginning and end of the thread take two or three stitches on top of each other.

Straight Hemming

If an edge is to be held close with stitches that should show as little as possible, modify the slant hemming as shown in figure 15-7. Insert the needle through the fold of the hem, bringing it straight down and taking up only a thread or two that will show on the right side. Slant the needle and bring it up through the edge of the hem again a little distance from the first stitch. This is a good stitch for felling linings in coats.

Blind Hemming

When the stitches should be invisible on the right side but may show on the under side, a blind hemming stitch may be used. Take up only part of one thread in the material, then insert the needle through the fold of the hem. Repeat this, using rather a long stitch on the wrong side. (See fig. 15-7.) This is not a strong hemming stitch.

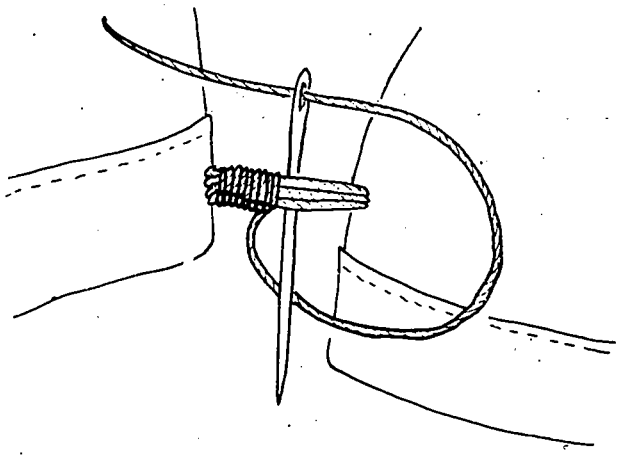


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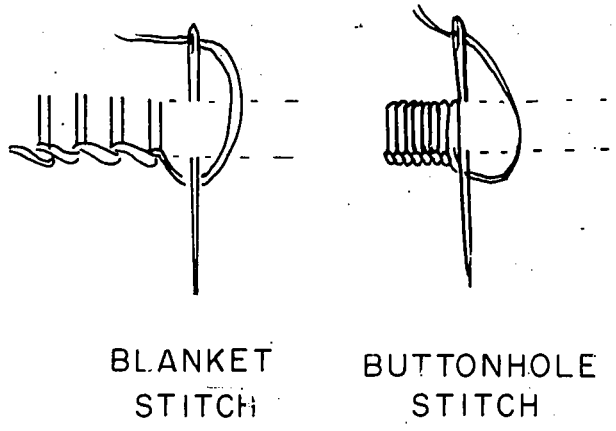
Figure 15-9.—French tack.



119.13

Figure 15-11.—Blanket and buttonhole stitch.

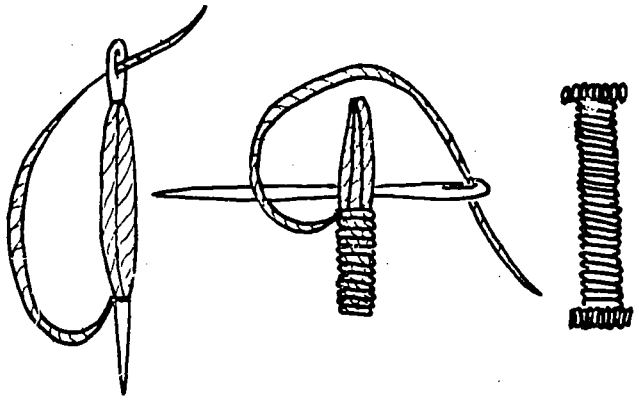


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Figure 15-10.—Bar tack.

Slip Stitching

To slip stitch a hem, bring the needle through the folded edge, then take up part of a thread below. Then let the needle slip through the under side of the fold bringing it out through the crease as far along as possible. (See fig. 15-7.) This type of hem is practically invisible on both sides, but it is not strong.

CATCH STITCHING OR CROSS STITCHING

Seam edges may be fastened down by hand with a catch stitch, one version of which is a modification of the embroidery cross stitch. This stitch moves from left to right instead of the usual right to left. Use a knot in your thread and draw the needle through from under the edge to be fastened down. Take up a thread or two of the main material beyond the edge, letting your thread lie on top of the needle as you draw it through the fabric. Cross over to the edge and take up a few threads there. Repeat. (See fig. 15-8.)

The catch stitch may be used for hemming heavy materials, if the edge is pinked. The pinked edge is catch stitched down without turning anything under. (See fig. 15-8.) A quick method of catch stitching can be done from right to left without crossing, simply by catching first the edge to be held down, then the main material without crossing the threads. (See fig. 15-8.) This method is not as strong as the cross stitch.

FRENCH TACK

In altering or repairing some garments it is necessary to anchor linings or shoulder pads to the main part of the garment so that there is ease and distance between the two. For this you should use a French tack. The tack is made by taking a small stitch in one of the two sections to be joined, one in the other, leaving a small amount of thread between. (About 1/2 inch should be left between shoulder pad and coat and about 1 inch between lining and coat at the hem. Repeat the stitch about 4 to 6 times;

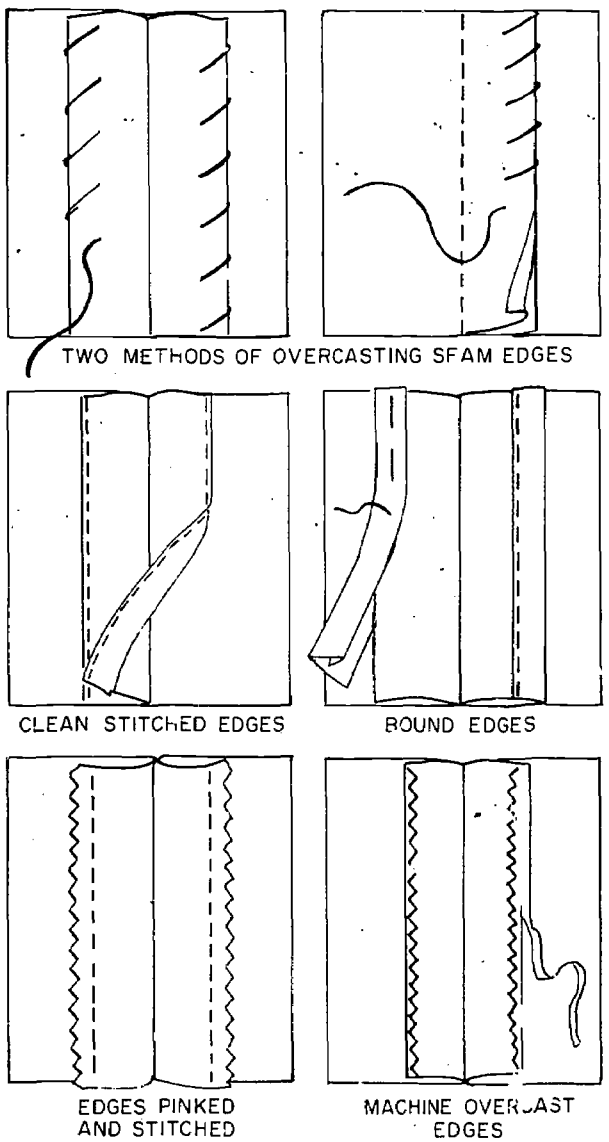

Figure 15-12.—Methods of finishing seam edges.

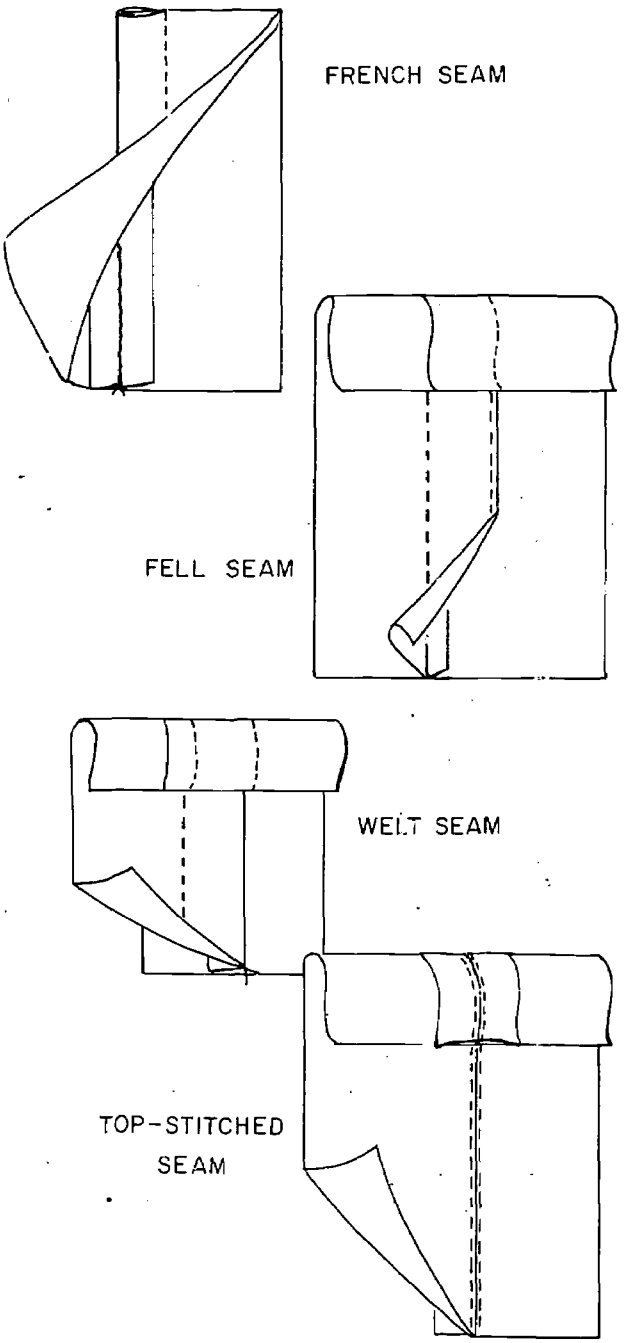

Figure 15-13.—French, fell, and welt seams.

then blanket stitch over the strands, keeping the stitches firm. (See fig. 15-9.)

BAR TACK

Some coat linings have an inverted pleat down the back which should be caught in at the neck and waistline to help the garment retain its shape. This is done with a bar-tack. To make a bar-tack take several stitches across the pleat about 1/4" to 3/8" long. Overhand the group of threads, picking up a few threads of the fabric underneath. Finish the bar by making

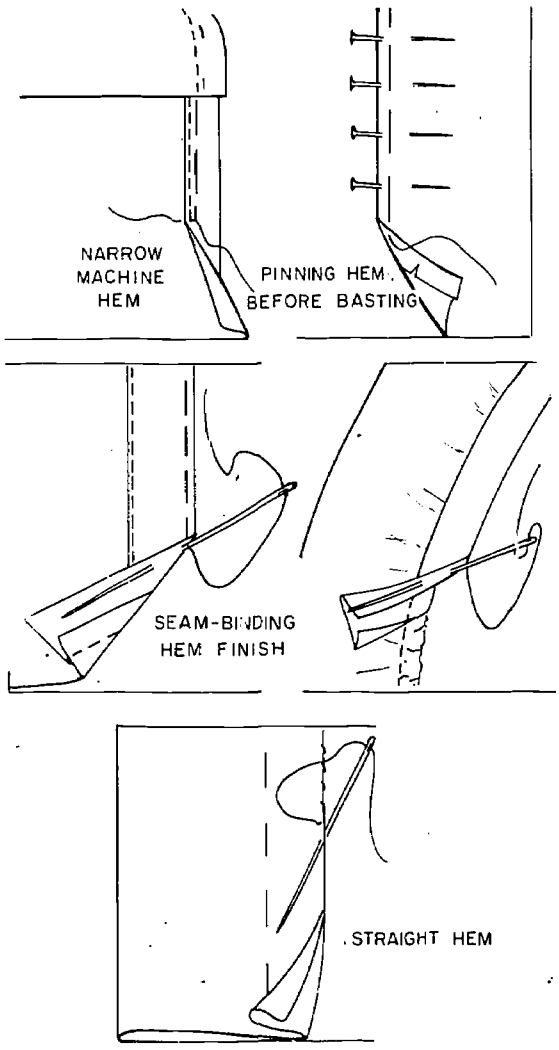

Figure 15-14.—Hems.

tiny bar-tacks across each end. (See fig. 15-10.) Bar-tacks can also be used to secure ends of pockets or plackets.

BUTTONHOLE OR BLANKET STITCH

The blanket stitch, so-named because it is sometimes used for finishing the edges of blankets, is also used for making buttonholes and eyelets.

To make the stitch, begin at the left and work toward the right. Use a tiny back stitch to fasten your thread rather than a knot. Then

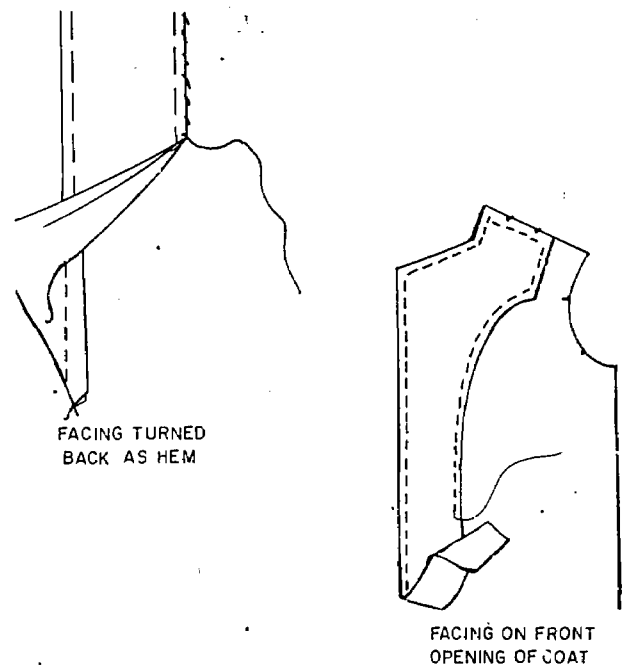

Figure 15-15.—Facings.

put the needle into the material from the upper side at whatever depth from the edge you want the finish to cover. For a buttonhole the stitch should be about 1/8 inch deep. Bring the needle down over the thread so as to cross it, thereby forming an edge of thread along the edge of the cloth. Figure 15-11 shows the blanket stitch. For buttonholes and eyelets, the stitches should be placed tight together to form a firm edge. See chapter 16 for further direction for making buttonholes and eyelets.

MACHINE STITCHES

Buttonholing and some of the other finishing stitches can be done with attachments provided with the sewing machine. Use the operator's manual for the machine to select the appropriate stitch and attachment and determine how it is made.

SEAMS

A seam is a joining of two edges of cloth. The basic types are described in this section,

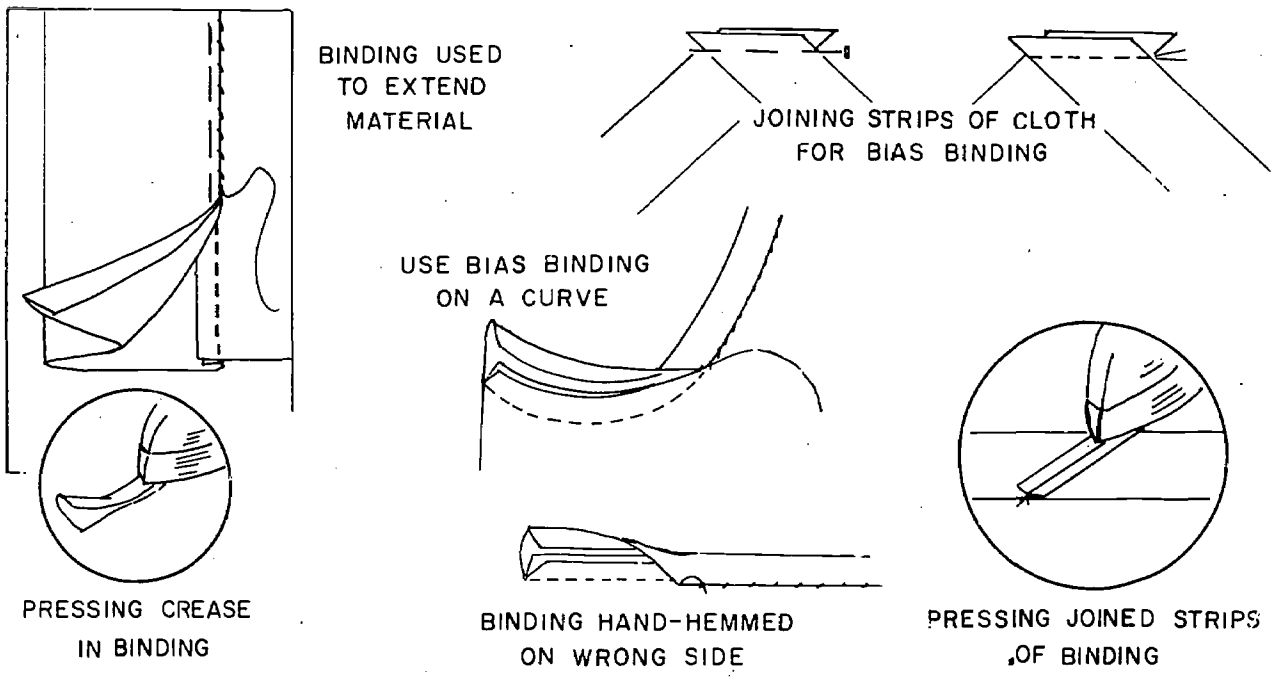

Figure 15-16.—Bindings.

with the names by which they are most commonly known. You may know some of them by other names.

GENERAL INSTRUCTIONS

Baste or pin a seam together before you begin to sew. How closely it should be pinned, or whether basting is necessary should be determined by the type of seam and the type of material. Materials that tend to "crawl" should be basted or very closely pinned.

In joining materials, use care not to draw or pull them. Lay the material flat on the table for basting.

When joining a bias edge to a straight edge, place the bias edge on top and pin it to the straight edge. Then baste the seam together before sewing. Be careful not to draw or stretch the bias edge. If both edges are bias, as in an armhole, ease them together carefully. Work with the sleeve on top.

Press seams as you make them. Short seams require pressing as much as long ones. Press on the wrong side of the fabric, with as many seams as possible opened out flat. Remember that pressing is not ironing; most fabrics should be protected with a pressing cloth. Do not iron heavily. To avoid marks on the right side along the edge of seams, especially in woolens, silks, or synthetic materials, place a strip of paper under the seam edge.

SIMPLE SEAM

The simple seam is the basis of all the others. Baste or pin the two pieces of material together with the right side inside. Stitch just inside of the basting or pins—or just outside. The width of the seam will depend on the type of material and partly on the location of the seam in the garment. In some locations, such as around armholes, seams can not be very wide without causing unnecessary bulk. Long straight seams in heavy material may be fairly wide. In finer materials, seams should generally be narrower. The width of the seam will also be affected to some extent by whether or not the material frays easily. Usually, however, fraying is prevented by finishing the raw edges in one of the ways described later in this chapter.

For some materials and some locations, no finish is needed on the raw edges of the seam.

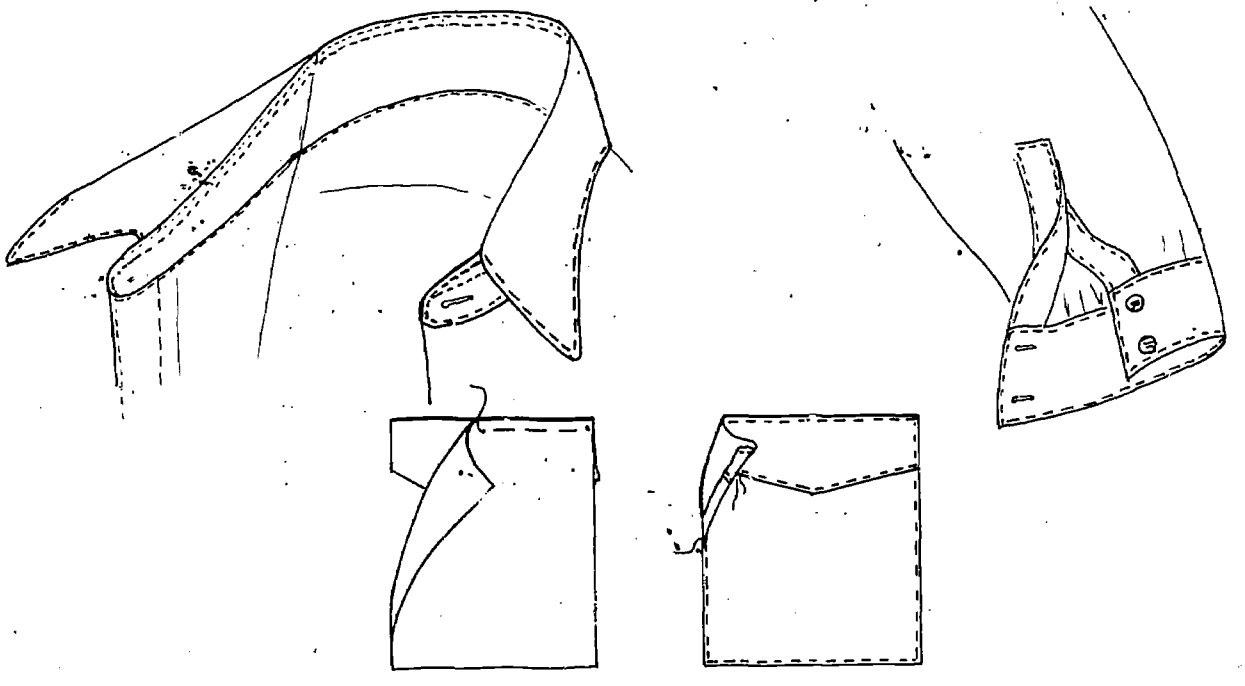

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Figure 15-17.—Finishing collars, cuffs, and pocket flaps.

If there is danger of the edges fraying, there are several things that may be done. Mention has already been made of the use of pinking shears in cutting out the garment so that the edges are pinked before the seam is sewed. Overcasting seam edges has also been mentioned. The two raw edges may be pressed flat and each overcast, or they may be pressed together and overcast in that position. The cross stitch may also be used for finishing the edges.

Another method of finishing seam edges is "clean-stitching." Each raw edge is turned under about 1/8 of an inch and stitched, holding the edge free of the garment. See figure 15-12. In heavier materials the edges may be protected by a line of machine stitching close to the edge without turning anything under. It is easier to do this machine stitching before the seam is put together. Sometimes pinked edges are also stitched.

Bound Seam

The edges of a simple seam may also be protected with seam binding, either the bias or the flat type. The edges should be pressed open and the binding applied as shown in figure 15-12, or the edges may be bound before the seam is made.

Top-Stitched Seam

A simple seam may be pressed open, then turned to the right side of the garment and a row of stitching run down each side of the seam (see fig. 15-13).

FRENCH SEAM

The French seam may be the most appropriate type if a narrow seam is required and the material is not too heavy. This seam begins with a simple seam made with the raw edges on the right side of the material. Trim the edges close. Then turn the seam, placing the right sides of the material together and creasing or pressing along the stitching. Sew another seam from the wrong side. The raw edges will now be inside the seam. (See fig. 15-13.)

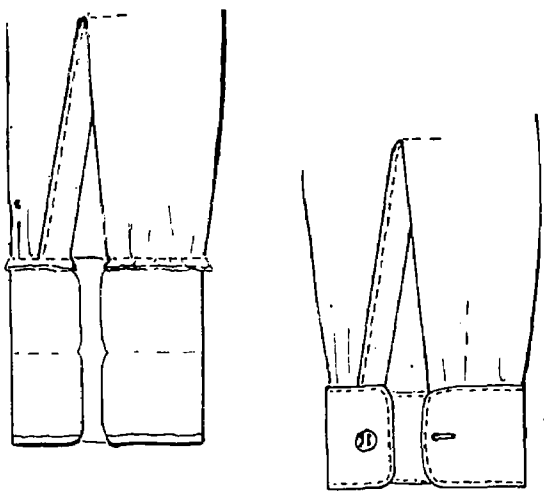

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Figure 15-18.—Attaching cuffs.

FELL SEAM

A fell seam is commonly used for shirts and wash trousers. Begin by making a simple seam about 1/2 inch wide, with the raw edges on the right side. Trim off one edge to about 1/8 inch width. Turn the other over it, turn under 1/8 inch, crease, and baste or pin in place, and press. Stitch on the right side close to the edge. (See fig. 15-13.) Baste or pin the edge down and press it down before stitching.

WELT SEAM

A seam frequently used for garments such as coats, that are made of sturdy material, is the welt seam. Make a simple seam on the wrong side of the fabric. Press the seam open with the two raw edges together. Cut the inside edge to within a scant 1/4 inch of the stitching. Press the wide edge down over the narrow one and baste in place. (See fig. 15-13.) Stitch in place from the right side. This leaves one raw edge on the wrong side, but if the garment is to be lined the edge will be covered. In an unlined coat this edge may be bound.

HEMS

To make a hem, first determine what length the finished item (e.g., sleeve or trouser leg) should be. Turn back the remaining material, making sure that the hemline is straight. Baste or pin the hem along the edge. Turn under the edge of the hem, and baste or pin it in place. A hem usually is hand sewn with one of the hemming stitches described in this chapter, although some hems, such as in cotton work garments, may be stitched on the sewing machine. When hemming anything that flares, you will have to make small folds in the edge to take up the extra width. (See fig. 15-14.) With some materials it is best not to turn the edge of the hem under. Instead seam binding may be stitched to the edge of the hem and then hemmed down.

FACINGS

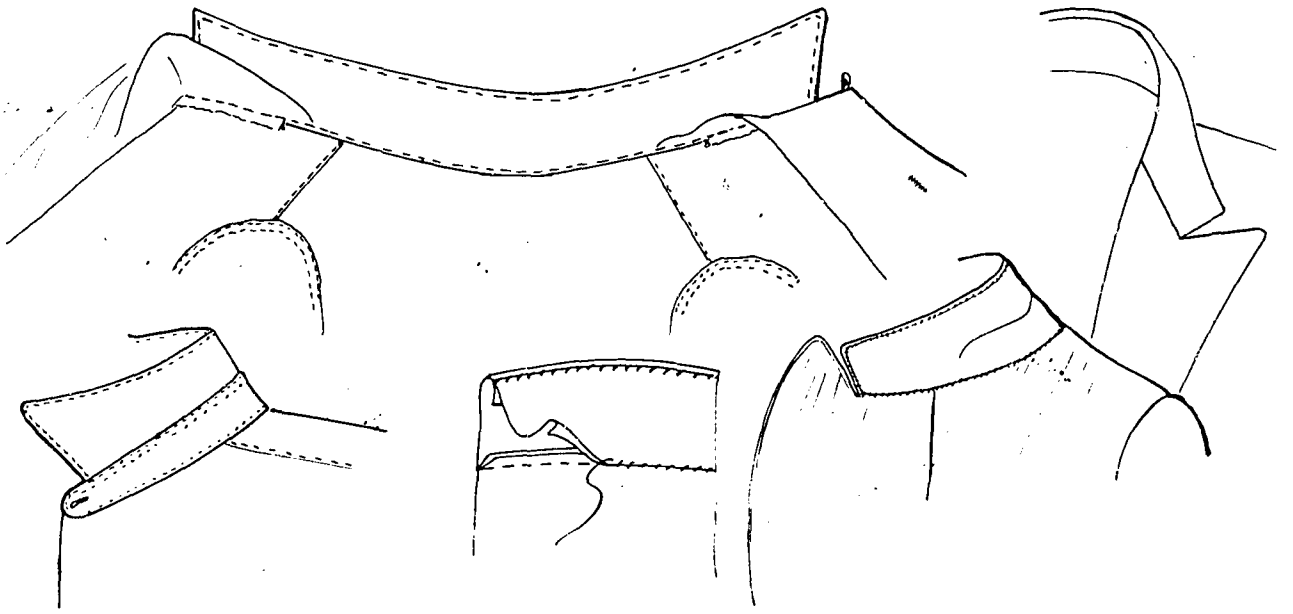
A facing is a piece of material sewed on a garment edge and turned back to give a finish and to make the edge lie more smoothly. The width of the facing is determined mainly by its location. Facings at the front closing of a coat usually are several inches wide. (See fig. 15-15.)

To make a facing, sew the piece of material on the edge of the garment with the raw edges on the under side. Open the seam and press the facing back against the garment. If the facing is used as a hem, turn a little of the garment over instead of putting the crease directly on the hem, so that the seam will not show at the edge. Turn the edge of the facing under 1/4 inch and hem with an appropriate hemming stitch. A facing on a front closing usually is not hemmed down but is held by seams or hems at top and bottom and possibly lightly tacked between. The edge may be bound, pinked, or stitched as appropriate. In a lined coat the edge of the lining is attached to the facing.

BINDINGS

A binding may be very narrow or it may be very wide, as in the case of a blanket binding. Usually it is folded snugly over the cut edge of the garment or blanket, but it can be put on so as to extend the edge by the depth of the binding.

Narrow binding may be put on with one stitching by creasing it down the middle and inserting the raw edge of the garment between the two halves. Some sewing machines are equipped to sew that kind of binding on without basting. Otherwise it should be basted. Another way of putting on a binding is to sew one edge on with the raw edges on the right side of the garment.



155.5

Figure 15-19.—Attaching collars.

Turn the binding over the edges, turn under about 1/4 inch and stitch it down so as to cover the first seam. A variation of this is to sew the first seam with the raw edges on the wrong side. Then turn the binding over and sew down by hand on the wrong side, covering the seam. Use a hemming stitch.

Bindings may be purchased in various materials and widths, or you can cut your own. They may be cut either on the straight of the material or on the bias. Either a straight or a bias binding may be used on a straight edge, but usually a bias binding is best for a curved or bias edge. Straight bindings generally have selvage edges so they may be sewed on flat with nothing turned under. Bias bindings come folded and pressed. If making your own bindings, you will find it worth while to fold and press them. Figure 15-16 shows methods of applying bindings and how to join two pieces of bias binding.

STITCHING COLLARS, CUFFS, AND FLAPS

Parts of a garment that are made double, such as collars, cuffs, and pocket flaps, frequently are given a finished look by a row of stitching near the edge. The under and upper sides are first sewed together, then turned with the seam inside, and stitched together again on the outside close to the edge. (See fig. 15-17.) This may be done before attaching to the rest of the garment.

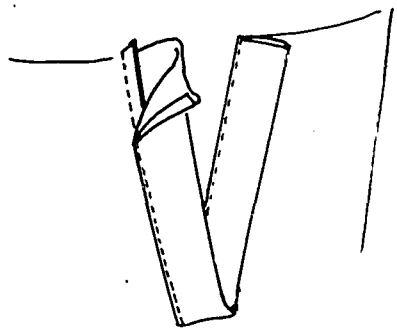
ATTACHING COLLARS AND CUFFS

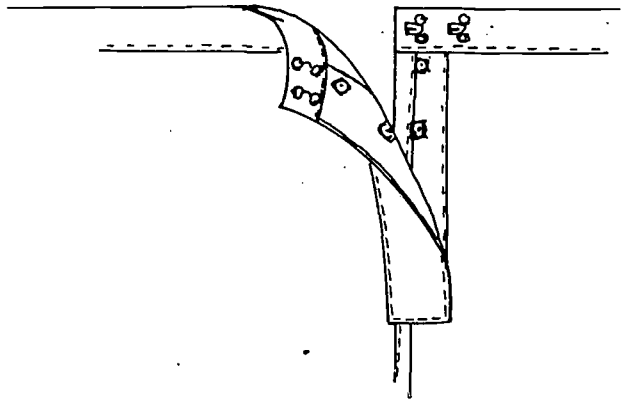
To attach shirt cuffs, sew the under side of the cuff to the sleeve with the raw edge on the right side. Turn the cuff over the seam, folding under about 1/4 inch of the edge. Baste in place so as just to cover the first seam. Stitch on the right side. (See fig. 15-18.)

Since collars are made to fold back over the garment, it is possible to conceal the stitching if that is desired. Shirt collars are attached in two different ways, depending on whether the collar is intended to be open or closed.

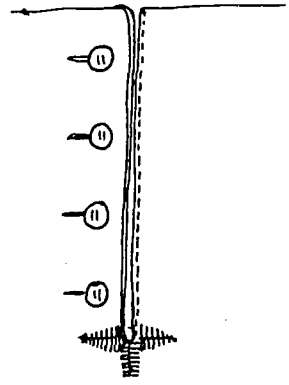
The open shirt collar may be cut either in one piece and folded over, or, in two pieces (see fig. 15-19). The facings for the shirt front may be cut separately or, more commonly, as a part of the shirt front. After stitching the collar together on the wrong side, turn right

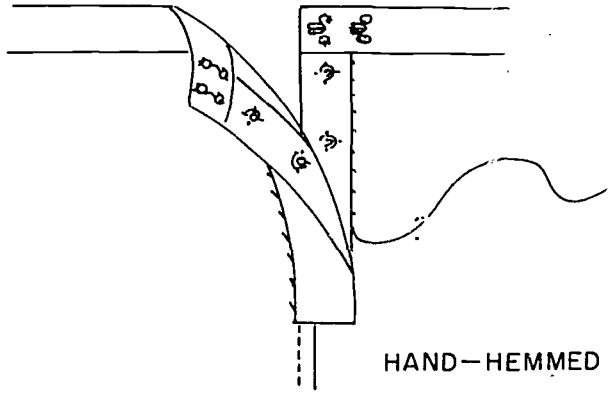
MACHINE–STITCHED SLEEVE PLACKET FROM INSIDE





MACHINE STITCHED PLACKET MADE WITH BINDING AND FACING





HAND–HEMMED PLACKET

PLACKET WITH CROWSFOOT FINISH

119.21

Figure 15-20.–Plackets.

side out, using a point turner to push the points out sharply. Press down and stitch around the outside for finish. Baste and stitch the lower layer of the collar to the shirt, being careful to align the center of the collar with the center of the shirt back. Turn the front facings wrong side out over the collar and baste down. Turn under the edge of the upper collar to cover the seam around the neck (see fig. 15-19). Stitch all the way around. When the facing is turned right side out, all raw edges will be covered.

The closed collar on a man's shirt usually is sewed to a band as shown in figure 15-19. The band is stitched to the shirt with the raw edges on the right side, then turned over to cover the edges and stitched down on the right side.

For coat collars the process is reversed, the upper side being sewed on first with the raw edges under the collar. The under side is then stitched in place by hand, using a short hemming stitch. The needle should not pierce the upper side of the collar. On a heavy wool coat, the collar may be made less bulky by cutting the underside from a lighter weight material. The two pieces of the collar are sewed together first, turning a little of the top side under so that the seam is not directly on the crease (see fig. 15-19). The remainder of the process is the same as for any other coat collar.

PLACKETS

There are two basic ways to make a placket. The simplest, which is frequently used for shirt sleeves, is done with one strip of material twice the length of the opening and about 1 1/2 to 2 inches wide. Stitch this strip up one side of the sleeve opening and down the other side as shown in figure 15-20 with the raw edge on the right side. Turn under 1/4 inch of the strip and stitch it down on the right side so as just to cover the seam. The placket will lie more smoothly if you stitch it to the sleeve at the top of the opening as shown in figure 15-17.

A more tailored looking placket, and one that produces a smoother closing, is made by sewing a binding on one side of the opening and a facing on the other. In this case the binding should extend the edge of garment to form the base on which buttons or other fasteners are sewed. The faced side of the opening is the top. To help make the placket inconspicuous, the bottom ends of the facing and binding may be stitched together on the under side with no stitching showing on top. A stronger placket may be made by stitching across the bottom of the opening. Sometimes a crowsfoot finish is used.

CHAPTER 16

ALTERATIONS AND REPAIRS

This chapter discusses the procedures for making alterations and repairs on naval uniforms, and repairs you might be required to make on other articles, such as blankets, coats, foul weather jackets, mattress covers, sheets and pillow cases, shirts, and trousers.

CONSTRUCTION OF UNIFORMS

Uniforms used by personnel in the U.S. Navy are made in accordance with military specifications. These specifications are intended for the guidance of tailors who manufacture uniforms and of naval personnel who inspect them for quality. They may also be used by Navy Tailors who repair or alter uniforms.

The specifications list all details concerning materials (buttons, thread, fasteners, seams, cloth, labels, etc.) authorized. They also give detailed directions for making each item of clothing.

ALTERATIONS

One of the most advanced and technical parts of your job is FITTING garments to the customer, and properly marking needed alterations. Changes to be made are indicated with tailor's chalk, pins, basting thread, or a combination of these. Be sure the wearer is standing erect but not unnaturally so. The aim is to have the garment fit the customer as he normally carries himself, so be careful of his posture. Each Tailor tends to develop his own system of marking and pinning, although in a large shop standardized methods are necessary. You should take your cue from the senior Tailor. Watch him, because he knows what he is doing.

COATS

The need for frequent pressing cannot be overemphasized, because it is essential to good sewing and tailoring. Never cross two seams without pressing both of them open.

For difficult coat alterations, more than one fitting may be needed. In shoulder work the coat should be refitted after the shoulder and underarm seams are basted. If shoulder pads are to be replaced, they should be made first and slipped into place for each fitting. Check the coat, back and front, to be sure it hangs straight from the shoulders. Be sure the sleeves hang straight from the armhole, without folds or wrinkles.

If the back of the coat is to be reshaped, it will be necessary to open the hem and the seams. Minor alterations can be marked ahead of time, but a major job normally requires that you pin-fit after the hems and seams have been opened and pressed.

TROUSERS

Trousers may need to be adjusted for good fit and better wear. Adjustments that you may have to make are lengthening and shortening legs, letting out or taking in the seat, and letting out the crotch.

Lengthening and Shortening Trousers

Uniform trousers that have been previously fitted should have a hem of at least 2 inches. To lengthen such trousers, you should first rip out the hem. Steam press to take out creases. Then proceed as follows using figure 16-1 as a guide.

1. Mark and trim for a hem.
2. Before the hem is stitched in place sew on the wear guard as illustrated.
3. Then hem the trousers securely by hand. Be careful that no stitches show on the outside of the trouser leg.

To shorten the trousers rip the hem. Steam press to take out creases as before. Mark and trim for at least a 2-inch hem and continue the same procedure as for lengthening.

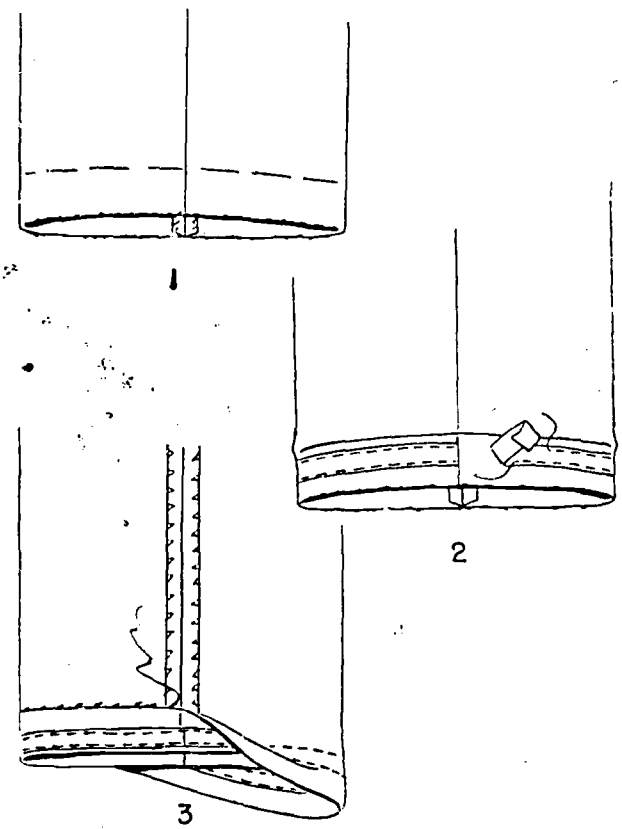


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Figure 16-1.—Lengthening or shortening trousers.

Slimming and Pegging of Trousers

The following steps should be taken when you are slimming or pegging uniform trouser legs:

Slimming:

1. Turn trousers on reverse side.
2. Place trousers on flat work table, right leg down.
3. Fabric should be flat and smooth.
4. Establish length of trousers on inner seam (chalk).
5. Mark (chalk) at right cuff length 1/2 of the amount of the total to be slimmed (tapered); e.g., for a 2-inch taper measure one inch from inner seam (right side).
6. Follow the measurement up to 12 inches from crotch.
7. Chalk mark should curve (narrow) from 12 inch mark to point of crotch.
8. Fold equal amount of fabric from left side of seam.
9. Pin at several points to hold in place.
10. Sew (machine) seam from crotch down.
11. At point of length, sew at 45° angle toward inner seam.
12. Cut excess fabric from seam, leaving 1 inch (selvage) excess on each side of seam.

Pegging:

When you are pegging a pair of trousers, follow the procedures outlined above for slimming except that measurements are taken from knee down whereas slimming is from crotch down.

Cuff Shortening of Permanent Press Trousers

Civilian type permanent press trousers are manufactured pre-cuffed according to customer size. However, there will be times when shortening of trousers will become necessary. (Lengthening of trousers is not recommended because of the way permanent press trousers are made.) Steps for shortening cuffs are shown below:

1. Place both trouser legs evenly on flat work table.
2. Cut (scissor) both cuffs above finished end.
3. Shorten unfinished trouser legs to desired length.
4. Replace cuffs and sew to shortened trouser leg. Be careful that no stitches show on outside of trouser cuffs.

Letting Out or Taking in the Seat

At the back rise of most trousers there is a generous seam allowance. Reseam along the back rise to make the seat smaller or larger as required. Do this before you rip out the old stitching, then rip the old seam, and steam press the new seam.

When there is some doubt about the fit, baste the new seam line, rip out the old stitching, and fit the trousers before stitching by machine.

Letting Out the Crotch

Rip the inseams down from the crotch point about 12 inches. Then open the back and front rise slightly—just so the seam allowances of the inseams are free. You should find plenty of seam there for this purpose if the trousers have not been let out before.

Let out the seam as needed and resew, tapering off to meet the old stitching lines of the inseams. Press open, then reseam the front and back rise, and press again.

ALTERING SKIRTS

Needed changes in seams are marked with pins while the skirt is being worn. Have the skirt carefully removed to retain the pins and mark the alterations with colored thread for ease of handling and recognition. Distribute the adjustment in a skirt as evenly as possible among the seams. (Only minor adjustments near the waistline can be made in front seams of the six-gored uniform skirt because of the pockets that cross the seams, so most of the alteration must be made in the side seams.)

When taking in a skirt, mark with a line of basting stitch down each gore just inside the row of pins, being careful to sew through only one thickness of cloth. The pins can now be removed, the waistband and zipper removed, and the old seam ripped and pressed flat. If the alterations extend as far down as the widest point of the hips, the hem must also be ripped. Match the two lines of basting stitches together and baste the new seam just outside them (where the pins were). From the lowest point of the alteration, continue basting the new seam the same distance from the old to the bottom of the skirt. Stitch the seam and press open before replacing zipper and waistband.

In letting out a skirt, mark with pins the distance along the seams where the skirt must be let out. After the skirt is removed, measure the customer with a measuring tape to determine how large the skirt should be at the waist, at the widest point of the hips, and at a point halfway between. Measure the skirt at these points to determine how much it must be let out, and divide this amount between the side seams. Remove the waistband and zipper, and rip the hem. Baste in the new seams, following the same procedure for the lower part of the skirt as when taking in. Stitch the new seams. Sponge lightly to remove the marks of stitching. Press the seams open before replacing the zipper and waistband.

Usually it is advisable to measure the hem after the skirt is altered because the change in fit may modify the length.

REPAIR PROCEDURES

There are several methods of repairing garments, depending on the nature, extent, and location of the damage and the type of fabric to be repaired. Cotton working uniforms are usually repaired by patching or seaming, and these two methods are sometimes used for other types of garments. The more valuable the fabric the greater the effort to keep the repair job from showing. Soft materials, especially woolens, can often be darned so that the work is hardly noticeable. A firm material, such as serge or gabardine, will show a darn but can be rewoven by an experienced reweaver. If you are not experienced, and especially if the hole is at all large, you should consider patching the garment or suggest to the owner that he may prefer a professional reweaving job.

Before you rip, cut, or stitch, make sure you have on hand appropriate mending materials. Make sure that you have thread, lining cloth, buttons and other materials that match as nearly as possible those in the uniforms in hand.

PATCHING

Any one of three types of patches may be used for repair. These types are discussed in the following paragraphs.

Zigzag Patch

This type of patch is used almost exclusively for the repair of small holes or abrasions. A piece of material is placed under the hole and a series of stitches are run to and fro, covering the entire surface of the damage. It is important that the stitches be close together. The appearance of the patch can be materially improved by marking a square over the hole and keeping the stitches within the boundaries of this square. See figure 16-2. Variation of the zigzag patch is used in repair of blankets. In this case, a square is marked off as close to the edges of the hole or damage as possible. The damaged square is then cut out along the chalk lines. A piece of blanket material is placed under the cutout square, marked and cut out,

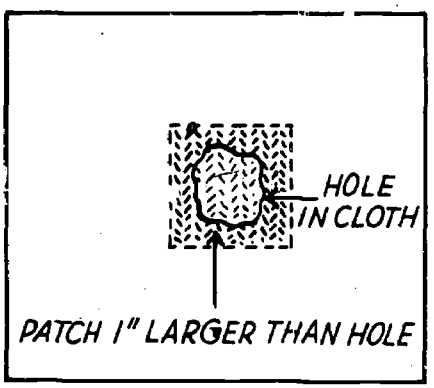

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Figure 16-2.—Zigzag patch.

forming a patch the same size as the cutout damaged portion. The four corners of the patch are then tacked to the four cutout corners of the blanket. Starting at one corner, a zigzag stitch is made on all four sides of the patch.

Simple Patch

In the case of larger holes, a simple patch is used. In making a simple patch, the edges of a square of matching material are folded under 1/4 inch and the patch placed squarely over the damage in such a manner that the folded edges extend at least 1/2 inch beyond the hole on each side. A stitch is then run along the four folded edges. To make this type of patch stronger and improve its appearance, the material is turned face down and the hole is trimmed square to within 1/2 inch of the patch. The corners are notched 1/4 inch and the edges are then folded under and stitched down.

Set-in Patch

To sew a set-in patch, the hole or damage is cut square or rectangular as the case may be (depending upon the shape of the hole), and the corners are notched 1/4 inch. A piece of matching material is then cut 1 inch larger than the hole. The patch is placed face up, and the damaged piece of material is placed upon it in such a manner that the cutout square is directly over the patch. In the case of twill faced fabrics, care must be exercised so that the diagonal lines of the twill are continuous and unbroken where the materials are joined. The right hand edge of the cutout square is folded back to the point of the cutout notches. The newly formed edge of the damaged material is then brought flush with the edge of the patch and the edges joined by a simple seam starting at a point one stitch above and to the left of the top notch and running it to a point one stitch below and to the left of the bottom notch. At this point the needle is left piercing the material, and using the needle as a pivot the material is given a quarter turn to the right. We are now in a position to repeat the procedure as outlined in the folding and seaming of the first edge. The third and fourth edges are accomplished in a similar manner, except that in the fourth edge the seam is run beyond the notch.

REPLACEMENT

A better way of concealing the repair job than patching is removal of the damaged section to existing lines of seams, pleats, or stitching. A seam is ripped open, or a cut is made under a pleat or along a row of stitching. The section to be replaced is used as a pattern for cutting a new section, which is then basted and stitched in place, most of the seam either following original seam lines or being concealed by a pleat or a line of stitching. In this type of repair the twill of the material should also be carefully matched.

SEAMING

The easiest method of repair is by use of the simple seam. See figure 16-3. This may be used in case of a straight tear or two tears at right angles to each other when only a small amount of material is missing. To execute this type of repair, the material is folded at the tear and a simple seam is run along the tear starting from a point 1 inch above the seam and gradually increasing the width of the seam to 1/4 inch at the center, then tapering off to a point 1 inch beyond the tear.

REWEAVING

Reweaving is a much finer job than darning, and when done by a skilled reweaver can hardly be seen. It is done by threading a fine needle with thread ravelled from an edge of the material, inserting the needle inside a broken warp thread of the garment about half an inch from the hole, and weaving across to pick up the broken thread on the other side. Draw the

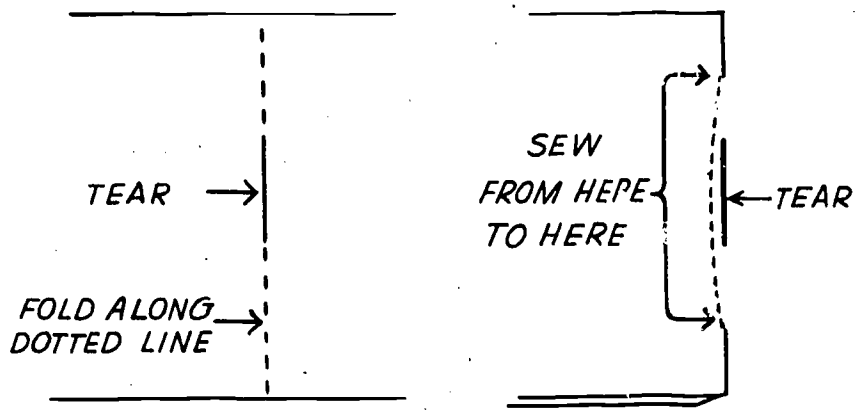

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Figure 16-3.—Repairing with a simple seam.

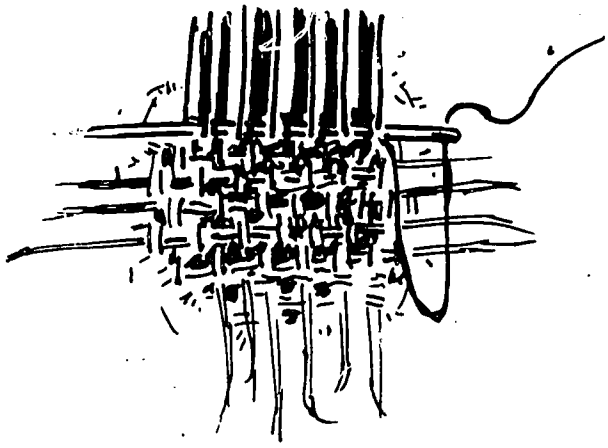

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Figure 16-4.—Reweaving.

needle through the twist of the thread for about half an inch; then cut the thread fairly close to the material. Replace each warp thread in the same manner. Then do the same for the woof threads, weaving the needle over and under in as close an imitation of the original weave as possible. (See fig. 16-4.) Weave from the right side, but start and finish on the wrong side.

DARNING

Darning also is an over-and-under weaving process, but usually does not attempt the exact replacement of thread for thread. In darning you do not cut the thread after each crossing, but take a small stitch and weave back in the opposite direction, drawing the hole together very slightly. To produce a smooth, flat darn, care must be taken to avoid drawing the thread too tightly or leaving it too loose. Embroidery hoops can be used for holding the material in place.

Sometimes a carefully made darn can be used to strengthen a worn place and prevent it from breaking through.

BLANKETS

When blankets have small holes, the zigzag darn is used. Both sides will appear the same.

To repair a large hole or burn, a variation of the zig-zag patch is used. A square is marked off as close to the edge of the hole or damage as possible. The damaged square is then cut out along the chalk lines. A piece of blanket material is then placed under the cutout square, marked and cut out, forming a patch the same size as the cutout damaged portion. The four corners of the patch are then tacked to the four cutout corners of the blanket. Starting at one corner, a zig-zag stitch is made on all four sides of the patch.

Sometimes a blanket has small holes along the edge or, in some cases, the edges may be frayed. Such repairs are made by shearing off frayed edges and using the binder of the sewing machine. Small holes in a blanket may also be darned or rewoven if the value of the blanket warrants the time required for this method.

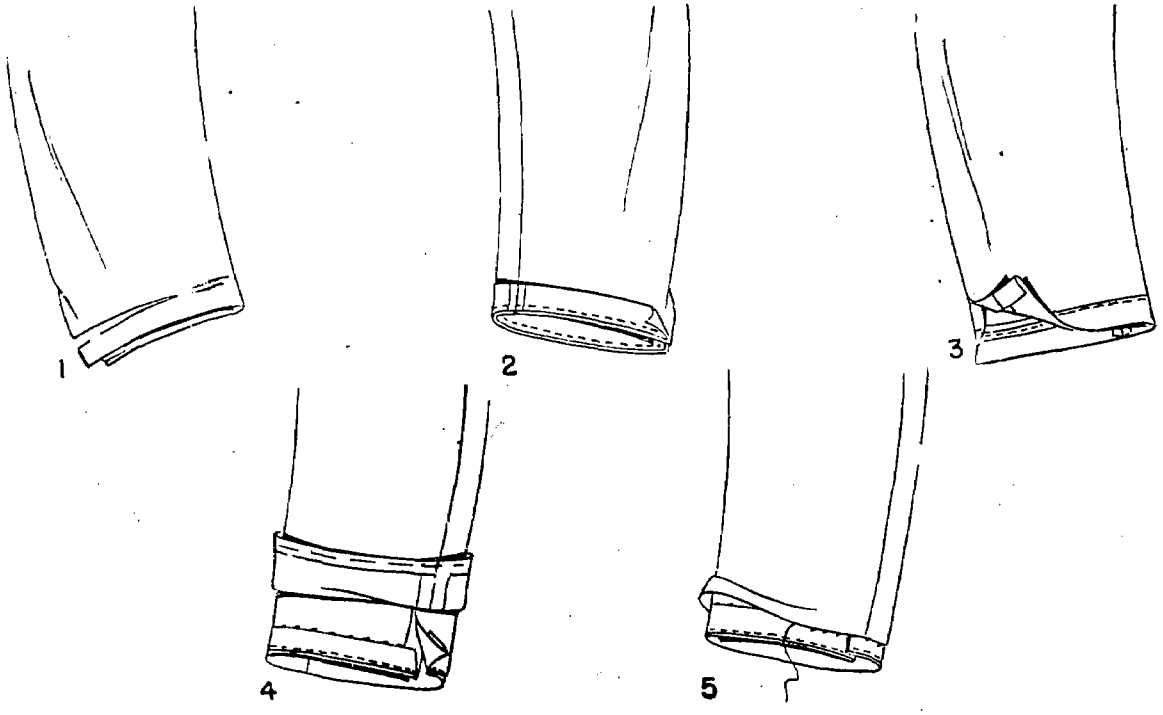

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Figure 16-5.—Repairing frayed sleeve edges.

MATTRESS COVERS, SHEETS, AND PILLOW CASES

In making repairs on mattress covers, sheets, and pillow cases, the zigzag and simple patch are used almost exclusively. When small holes are to be repaired the zigzag patch is used, the simple patch being used for larger holes. In the case of a long tear the seaming method is used with one variation. After the tear has been seamed, the article being repaired is turned over so that the edges of the seam are face up. A piece of white tape 2 inches longer than the tear is placed directly over the seam, hiding it completely. Care is taken to fold under the ends of the tape. A stitch is then run along the sides and ends of the tape, making a neat repair job.

COATS

Coats are frequently in need of repair. Below are some of the common types of damage, with directions for their repair.

Buttonholes frequently require repairs. In some cases only one or two stitches are broken. These can be repaired by taking several stitches where necessary. However, in most cases, it is necessary to remake the entire buttonhole. The stitches of the old buttonhole are removed with a seam ripper and the buttonhole trimmed of loose ends. Then, a new buttonhole is made. The method of making buttonholes is described later in this chapter.

FRAYED SLEEVE EDGES

Frayed sleeve edges are common in coats. These may be easily repaired entirely by machine, merely by taking a seam along the bottom of the sleeve. To do this, turn the sleeve inside out and rip the sleeve lining at the cuff. Take out the cotton fabric stay inside. Turn down the sleeve hem. Brush and scrape out all lint and soil. Then proceed in the following manner using figure 16-5 as a guide.

1. Cut through the crease exactly on the line of wear. Trim off the worn parts of both the sleeve and the inside facing. Keep a straight even line as you cut.

2. Pin and baste the facing back to the sleeve, right sides together. Match seam and

press lines. Take a very small seam, no more than one-eighth inch deep. Press the seam open.

3. With the facing turned down, stitch it by machine very close to the seam line. This line of stitching keeps the seam flat so that it won't roll to the outside.

4. Turn the facing up inside the sleeve and baste it so that the seam line and machine stitching are just inside the sleeve.

Fold and finish the sleeve as it was before it was ripped open. Be careful to turn in all raw edges so that none will show. With a loose stitch, tack the facing to the sleeve.

5. Sew the lining back in place. Press the sleeves.

ARMHOLE AND SLEEVE LININGS

After constant wearing, the armhole lining of a coat will invariably become damaged. Sometimes the damage may be only broken stitches in the armhole felling. In this case the sleeve lining will be resewed to the armhole by means of the straight hemming stitch or felling stitch as described in chapter 15. In some cases, however, the sleeve lining at the armhole may become torn or frayed. When such is the case, it is necessary to join a piece to the sleeve lining. This is accomplished by ripping the felling stitches in the armhole and making a simple patch with a piece of matching lining as described earlier in this chapter. After this has been done the sleeve lining is refelled to the armhole.

On occasion you may be required to reline sleeves. When this is the case, rip the sleeve lining apart from the coat at the armhole and the cuff. Pull out the loose threads that tack the seams of the lining and the coat together. A sleeve has two seams, because uniform coat sleeves are made from two pieces. Pin open the seams of one sleeve lining—the least worn—or cut exactly on the stitching lines. Press each of the two pieces so that they may be used as patterns in cutting the new linings. Shrink and press the new lining material unless it is known to be preshrunk.

Before you cut, compare the size of the old lining pieces with the measurements of the coat sleeve. It may be that the rayon in the old lining has shrunk so that the new lining needs to be cut a little larger. If so, make the allowance for shrinkage. If you have cut the old lining on the stitching or if the seams have frayed, add about five-eighths of an inch for each seam, and 1 inch or more as turn-up at the cuff. See figure 16-6.

1. Seam the lining. Press the seams open. Stitch by machine around the top of the sleeve, with slightly less than the five-eighths inch allowed for a seam. This will hold the edge firm as you turn under and baste the five-eighths inch allowance. Press.

2. Turn the coat sleeve inside out. Pull the lining over it. Turn up and baste the amount allowed at the lower edge. Pin in place around the cuff. Slip stitch to the coat. As you pull the lining up towards the armhole, tack the lining and coat seams together at the back of the sleeve with loose basting stitches.

3. Fit and pin the lining smoothly around the armhole. Finish neatly with small stitches.

FOUL WEATHER JACKETS

Whenever the yoke or armholes in a foul weather jacket are damaged, the damaged area is removed and replaced. The seams near the damaged portion are ripped, and cut out. Using the cutout damaged piece as a pattern, a new piece is cut and joined to the garment. The original seams are then restitched.

In replacing collars on these jackets, it is advisable to use a serviceable collar removed from an unserviceable jacket. If this is not possible, a new collar should be made. To accomplish this, the damaged collar is removed, and using it as a pattern, the new top collar and under collar are cut, and joined together. The collar is then sewed to the jacket, seaming the under collar to the face side of the yoke first.

Small tears and holes often can be repaired by using the simple seam, zigzag patch, or simple patch.

SHIRTS: WHITE, BLUE, AND KHAKI

Shirts, white, blue, and khaki are repaired as described in the following paragraphs.

COLLARS

In the case of frayed or worn shirt collars, the collar should be turned. This is accomplished by ripping the stitches joining the collar to the collar stand. The frayed or worn portion is then zig-zagged, the stitch penetrating only the collar stay and the original top collar. The

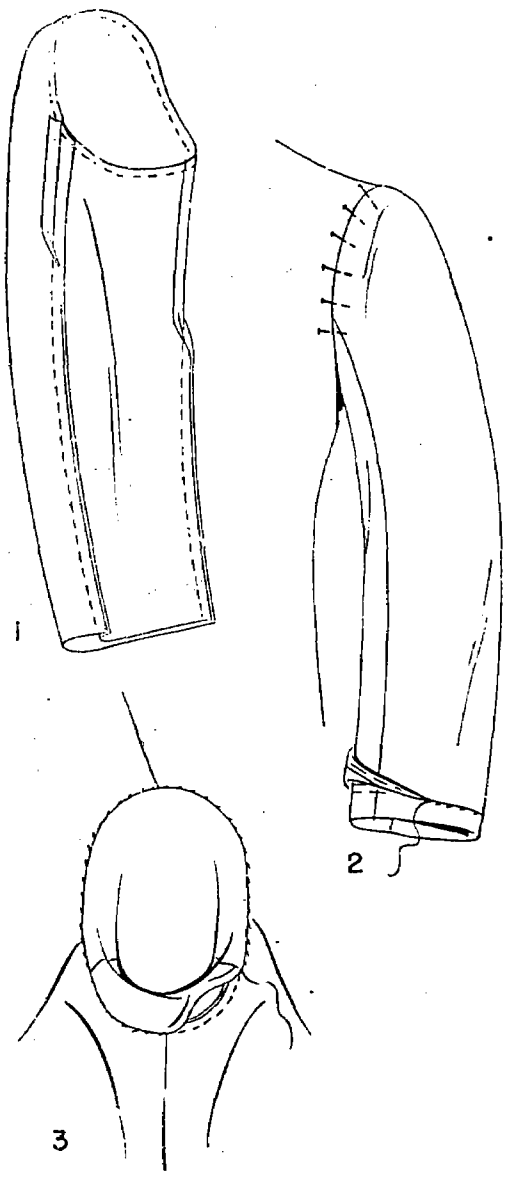

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Figure 16-6.—Relining sleeves.

collar is then rejoined to the collar stand using the original under collar as the new top collar.

ELBOWS

To make an elbow patch on a shirt sleeve, stitches at the top of the sleeve placket are ripped out. The worn portion is reinforced using a zig-zag stitch and the patch set on. The patch should be uniform in shape. A rectangular piece of material is cut 4 inches x 6 inches and the corners cut off 1 inch to form a hexagon or shape similar to that of the shirt pocket. The edges are folded under 1/4 inch and the patch is set to the shirt sleeve, the straight edge as the bottom, well under sleeve placket, and a double stitching 1/4 inch apart run along the folded edge. When this is completed, the top of the sleeve placket is restitched to the shirt sleeve.

TROUSER REPAIR

The procedures for repairing trouser seats, side pockets, hip pockets, frayed or worn edge on trouser fly, worn or frayed trouser cuffs, and damaged knees are discussed in the following paragraphs.

TROUSER SEATS, KHAKI AND WHITE

In repairing worn or frayed seats on khaki or white trousers, a form of set-in patch is used. The patch is cut oval in shape, somewhat similar to the seat reinforcement piece commonly known as a saddle seat on breeches. To accomplish this, the seat seam is ripped from a point above the damage down to the crotch. The inseam at the crotch is then ripped on both sides, a distance of 4 or 5 inches. The damaged area is then cut out on both sides in the shape described above. Using the two pieces as patterns, two patches are cut from matching material, allowing 1/2 inch of material for seaming, care being exercised to see that the twill lines on the original pieces and the patches are then overedged to prevent raveling or fraying. The patches are then sewed to the seat using a simple seam. The seams are pressed open and a stitch run along each side of the seam. The inseam at the crotch and the seat seam are then rejoined as they were originally and pressed open. Care must be taken that the seams of the patches at the top and in the crotch join evenly.

TROUSER SEATS, ENLISTED MEN'S

Seats are replaced in enlisted men's trousers by using a simple patch, the patch extending from the seat seam to the outside seam of the legs. To accomplish this, the seat seam and outside seam are ripped to a point 1 inch above and below the damaged portion. A piece of

matching material is then cut double the size required. The edges of the pieces are then folded under 1/4 inch and sewed over the seat 1/2 inch above and below the damaged area. The garment is then turned inside out and, as in the case of the simple patch, the damaged material is trimmed to within 1 1/2 inch of the first stitch. The new edges are then folded under 1/4 inch and a stitch run along the edges of the fold. The seat seam and outside seams formed by the new seat are then joined as they were originally.

FRAYED POCKET EDGES

The method of repairing frayed edges on side pockets of trousers depends on the degree of damage.

Slightly Frayed

If the edges of side pockets are worn, but not along the full length of the opening, rip the inside facing apart from the pocket edge a little beyond the worn part. When the wear is slight, you need only turn in the worn edges, slip stitch them together and finish the same as before. If the edges are more worn, trim off the worn parts of both the facing and the pocket edge, but be very careful to keep a straight line. Reseam the facing to the pocket edge by machine, taking a very tiny seam. Then roll the seam line so it is barely inside the pocket opening, baste, and press. The pocket edge is then stitched by machine once or twice, depending upon how it was finished originally.

Entire Edge Frayed

If the pocket is worn along the entire edge, cut the bars at each end and rip the seams open a little, just above and below the pocket. Rip the facing apart from the pocket mouth. Trim off the worn part, being careful to keep a straight line, then reseam. If the facing is worn deeply, rip the other side of it away from the pocketing and turn that side out to the pocket edge. Then reseam the facing to the pocket mouth with right sides of the two pieces together. Turn the facing back into the pocket with the seam line just inside. Baste, press, and stitch as it was before you ripped it. Resew the seams above and below the pocket. Then bar pocket ends by stitching back and forth to strengthen them.

HIP POCKET

There are several ways in which to repair hip pockets on trousers, depending upon the type and degree of damage. Should the material over the piping be frayed or worn, it should be repaired by turning the damaged material under the piping. If the extent of damage to the pocket is too great, a set-in patch of matching material should be made and a new pocket constructed. This is accomplished by ripping the outer seam from a point slightly above the waist band stitch, to a point above the lower side pocket bar (tack). A rectangular piece of material, containing the hip pocket, is then cut out. It is advisable to cut the material from the outside seam to a point 1 inch beyond the pocket and from the top of the waist band to the center of the side pocket. The patch is set in as described earlier in this chapter, the top seam coinciding with the waist band stitch. The seams on the patch are then pressed open and a new hip pocket constructed.

REPLACING INSIDE POCKET

The first thing to be done when replacing the inside pocket is to turn the trousers inside out and rip out the stitching that holds the pocket to the waist band. Cut a paper pattern for the pocket. Mark the side that is to be laid on the fold when you cut the new pocket. Allow about three-eighths inch for seams when you cut.

Cut off the old pocket next to the two facings just inside the pocket mouth. This leaves in some of the old pocketing that is stitched back of the facing. If this part of the old pocket were ripped out, it would be more difficult to put in the new one.

After the above has been completed, proceed as follows:

1. Turn under the seam allowance along one side of new pocket. Baste and stitch it back of the facing, over the old pocketing, as illustrated in figure 16-7. French-seam the lower edge of the pocket and retrace the stitching at the corners.

2. Smooth and pin in place the other side of the pocket—the side that lies next to the trousers. Pin this along the edge of the other facing. It will be necessary to trim off or turn under a little more of the pocketing on this side. Baste, and stitch twice by machine.

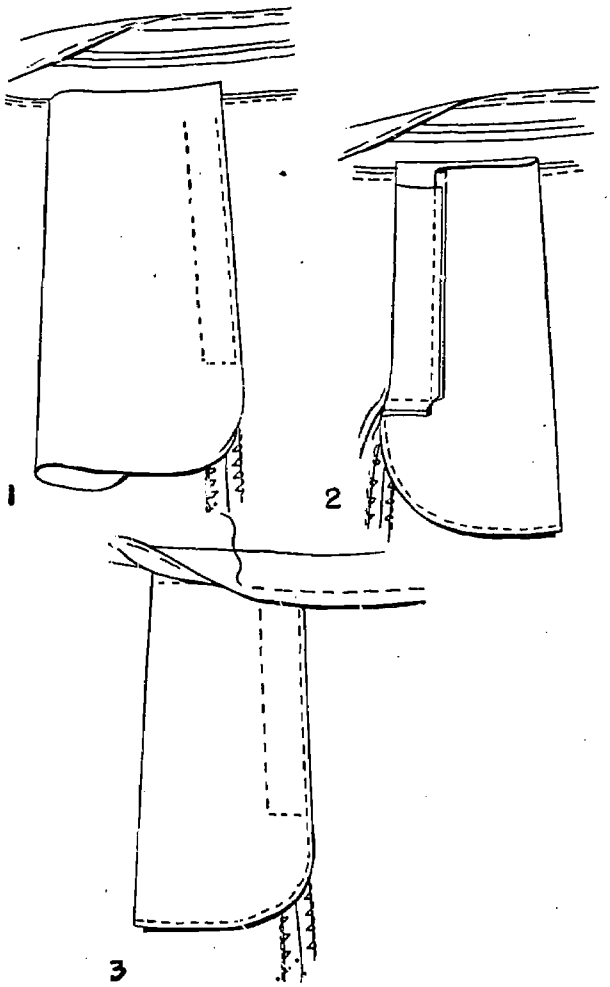

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Figure 16-7.—Replacing inside pocket.

INSIDE POCKET REPAIRS

If the inside pocket has only a small hole in the corner, restitch the lower edge of the pocket above the hole. Do not cut off the pocket below the stitching.

Half Pocket Repair

If only the lower part of the pocket is worn out, make a half pocket repair. Proceed in the following manner, using figure 16-8 as a guide.

1. Cut off the worn part of the pocket. Lay the folded edge of this old pocket bottom on a length-wise fold of new pocketing. Cut a new half pocket, adding three-eighths inch for seams

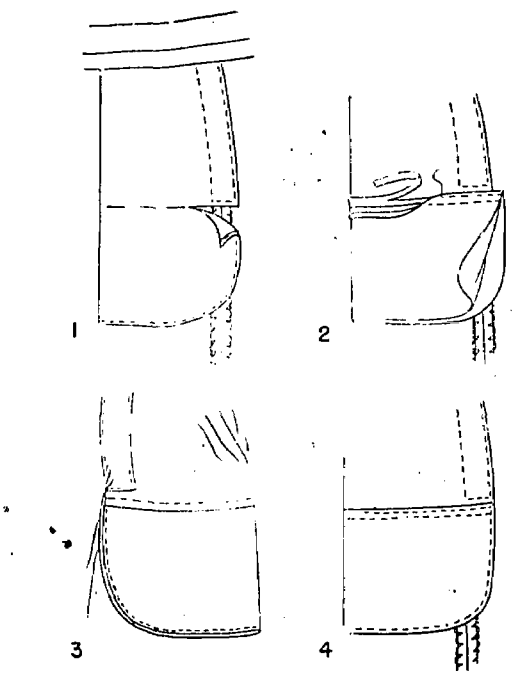

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Figure 16-8.—Half pocket repair.

at the side and twice this amount for the top edge, which will be seamed to the old pocket.

2. Sew the new half pocket to the old with the seam outside. Press this seam up, trim away the under half, and finish as a flat fell. This keeps the inside of the pocket smooth and comfortable to use.

3. Turn the pocket inside out. Take a one-eighth inch seam around the side and bottom.

4. Turn the pocket back into the trousers and finish as a french seam by stitching one-fourth inch from the edge. Fasten off the threads at the end of the stitching.

Remember to keep the pockets on both sides of the trousers exactly the same length.

FLY

In repairing a frayed or worn edge on a trouser fly, it is necessary to rip out the crotch seam and tacks. The fly is turned back and a larger seam is taken on the fly lining and the front of the trousers. Any excess material should be trimmed and the tacks between the buttonholes replaced and the fly stitched to the front of the trousers.

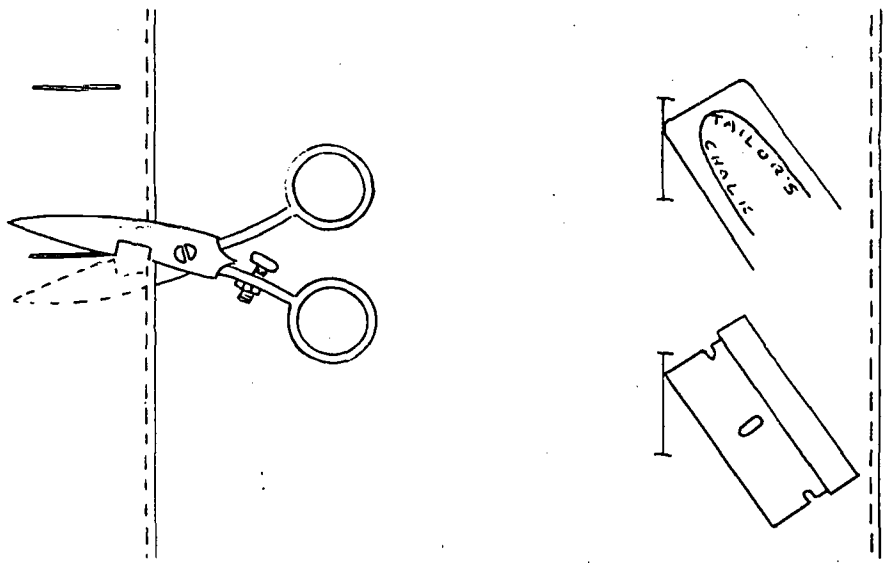

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Figure 16-9.—Cutting buttonholes.

WORN OR FRAYED TROUSER CUFFS

Worn or frayed trouser cuffs are repaired by taking a seam along the bottom of the trousers, thereby shortening the trousers slightly. This is accomplished by ripping the stitch of the cuff on the trousers. The cuff is then folded over the trousers in such a manner that the cuff will be on the outside of the trousers and a seam is run along the edge of the fold. The cuff is then turned down and the seam is raised by running a stitch along the edge of the fold that is formed. When this has been completed, the cuff is turned up so that the seam at the bottom of the trousers will not show on the outside of the trousers and a seam is then run along the edge of the cuff.

KNEES

Damaged knees on these trousers are repaired by using a simple patch. To repair a damaged knee, the inseam and outseam are ripped; the distance depending upon the size of the damaged or worn portion. The damaged portion is then removed by cutting straight across the leg of the suit. Using this as a pattern a piece of matching material is cut, allowing 1/2 inch at the top and bottom for seaming. The new piece is then joined to the seat leg at the top and bottom. The inseam and outseam are then restitched with the same type of seam.

FASTENERS FOR GARMENTS

Replacing fasteners will be part of the repair work you will do on various garments. Sometimes, too, in making alterations, you will need to construct new closings.

ATTACHING BUTTONS

When preparing material to receive buttons, you must be careful to determine whether or not the button thread is to pass through the lining, if any. Also, better results will be obtained if material is completely pressed before the buttons are attached.

To determine location of buttons, the garment should be in correct position on the wearer. Pin together the front opening and mark the locations of the buttons by passing pins through the buttonholes. It is often desirable to thread-mark the location of each button.

For attaching the buttons, use heavy thread, matched to the button or to the material. Use the thread double. Tie a small knot at the end

of the thread and take a small stitch on the right side of the coat at the previously marked point. Conceal the knot by pulling it through one part of the fabric, and then take a small stitch in the same place.

Now run the thread through the button and begin sewing through the button and fabric with a loose, even stitch until there are enough strands to assure strength. Bring the last stitch through the fabric under the button. Now wind the thread around the strands between button and fabric until there is a strong, neat thread shank. Fasten the thread firmly into the fabric and cut off.

For heavy garments a small button may be placed on the inside of the material to provide firmer support for the thread. When this is done, sew through the large button, the fabric, and the small reinforcing button with each stitch. Sewing through material and lining produces a stronger job, but care must be taken with the stitches that show through. These should be short and neatly made and the fabric should not pucker under them.

Sewing buttons might seem like a pretty minor thing, but it's just as important to the final job as anything else you do.

BUTTONHOLES AND EYELETS

When making a line of buttonholes, turn back the edge of the garment or, if a facing is to be used, sew on the facing and turn it back. Pin exactly in place, creasing the edge. Using a notched card, mark the distance between the buttonholes, placing a pin accurately in line with each notch. With chalk and ruler draw a line exactly the length of the buttonhole. Cut one buttonhole at a time, and cut along a thread. If the buttonholes are at a right angle to the edge of the garment, cut them with buttonhole scissors if you have them. Buttonholes that run parallel with the edge of the garment cannot be cut with buttonhole scissors. Instead use small, sharp pointed scissors, or place a piece of cardboard under the cloth and cut with a razor blade. In any event the cutting must be done with extreme care to ensure that the buttonhole is straight and not too large. (See fig. 16-9.)

Before beginning the buttonhole stitch, strengthen the buttonhole with a strand of thread along the edges to prevent the material from stretching. Bring the needle up through the cloth at one end of the cut and, allowing the thread to lie along the edge of the cut, take a small stitch at the opposite end. Do the same along the other side, ending with a small stitch or two where you started. Do not use a knot in your thread, but fasten the first end with your last stitches. If the material is inclined to fray, or when working a buttonhole through several thicknesses where the material may slip, overcast the edges before buttonholing.

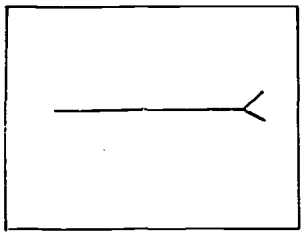
A buttonhole may be made with a bar at one end and the other end rounded. Figure 16-10 shows both methods, the round end type being the one most commonly used by tailors. Work the first side of the buttonhole, using the buttonhole stitch described in chapter 15. Place your stitches as close together as possible and be careful to keep them of even length. The edge formed by the thread should lie exactly along the edge of the material. When you reach the first end, make several short stitches close together at the end of the slit to form a bar. (see fig. 16-10.) Place several buttonhole stitches over the bar, then continue working the other side. A second bar may be made at the other end, or you can slant the stitches to make a round end.

Eyelets are formed by punching a small round hole in the material. Make tiny running stitches around the hole to reinforce the material, then finish the edge with a buttonhole stitch. The loop of thread may be either around the inside of the eyelet, as with the buttonhole, or around the outside (see fig. 16-10).

ATTACHING SLIDE FASTENERS

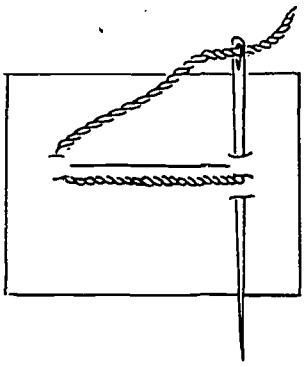
The slide fastener or zipper is an extremely useful device, but unless put on the garment properly will only become a nuisance. Usually you will be replacing a zipper that has been damaged or one that you have removed preparatory to altering the garment. Before you rip the zipper out, note carefully how it was put in so that you can reproduce the process.

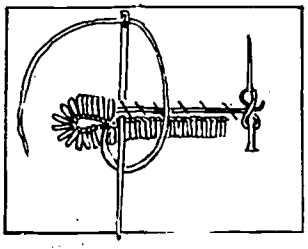
When sewing in a slide fastener, always work with the zipper closed. It is best to work with the garment inside out, being careful, however, that each step is correct and smooth. It is handy to lightly baste the two edges of the fly or placket opening together before fitting in the zipper. Baste the zipper in before finally stitching it.



CUT FOR TAILOR'S BUTTONHOLE

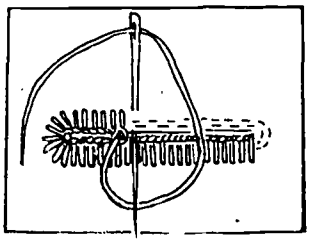
STITCHES FOR STRENGTHENING

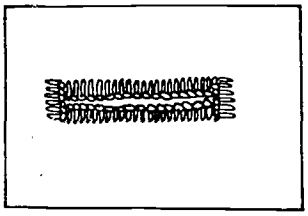




WORKING TAILOR'S BUTTONHOLE

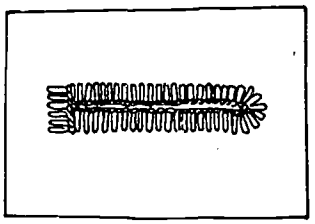
STRENGTHENING AND REWORKING OLD BUTTONHOLE

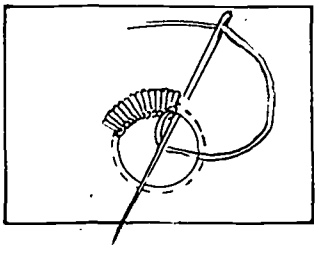




BUTTONHOLE WITH BARS AT BOTH ENDS

TAILOR'S BUTTONHOLE FINISHED





TWO METHODS OF EMBROIDERING EYELETS

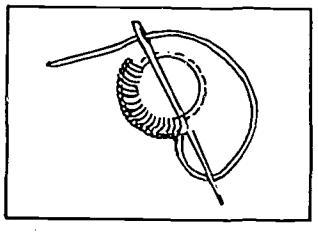


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Figure 16-10.—Working buttonholes and eyelets.

SNAPS AND HOOKS AND EYES

Snap fasteners must be carefully spaced and positioned so that they will match on closure. A simple "overcasting" through each hole is enough to make them secure, taking care not to allow the stitches to show through on the right side of the fabric.

Hooks and eyes must be chosen to match the needs of the garment. Small fine hooks and eyes are used for fine fabrics or narrow closings—coarser ones are used for heavier fabric or larger closings. Use enough hooks and eyes to keep the opening properly closed up. Match them carefully so that, on closure, the material will lie flat. Round eyes are used when the garment edges just meet. Straight eyes are employed when the edges overlap. A small hook carefully concealed on the under side of the cloth, and hooking into a loop made of thread instead of a metal eye, is very inconspicuous. Sew hooks and eyes on securely, taking care that the stitches don't go all the way through the material.

MISCELLANEOUS OPERATIONS

Discussed below are some of the miscellaneous operations that you will be required to do as a daily routine, or on occasion.

SEWING ON RATING BADGES

Chief petty officers' rating badges are sewed on the left sleeve of coats, midway between the shoulder and elbow. They are applied to the outer side of the sleeve midway between the front and back creases, using thread the color of the uniform.

Gold rating badges are sewed on by hand with a blind stitch. All other rating badges should be sewed on by hand stitching or with two rows of machine stitching one-eighth inch apart.

Rating badges for enlisted men other than chief petty officers are sewed on the left sleeve of jumpers and shirts midway between the shoulder and elbow, so that the rear edge of the badge coincides with the side view center line of the sleeve. On the blue working jacket and the peacoat, rating badges are sewed on the left sleeve midway between the shoulder and elbow and centered on the outer face of the sleeve. All rating badges are sewed on with two rows of plain machine stitching one-eighth inch apart, using thread the color of the uniform, except that dungaree rating badges may be applied by hot iron.

SEWING ON GOLD LACE

The first step in sewing gold lace is to rip the outside seam of the sleeve to the elbow, then remove old lace using a seam ripper or a razor blade. (Clean the old gold lace if it is to be reused.) Turn the sleeve inside out and press flat. Then on the right side, draw a chalk line across the sleeve 2 inches from the bottom of the sleeve. This line is used as a guide to sew on the first stripe. All other stripes are sewn one-quarter inch apart. After all the stripes are sewn on, press the sleeve. Close the seam and press. Again turn the sleeve inside out, attach the lining, return to the right side, and press.

Care should be taken to use a very small needle with a sharp point so that the thread in the lace will not be cut. The tension spring on the sewing machine should be loosened until the top thread shows on the underside of the cloth with a large stitch.

Embroidered devices that are worn on the outer face of the sleeve are centered midway between front and rear creases and one-quarter inch above the uppermost sleeve stripe. Refer to the United States Navy Uniform Regulations, 1959, before placing line and staff corps devices on the sleeve.

A metal base synthetic gold material has been approved by the Navy Clothing and Textile Research Unit, Natick Laboratories, Natick, Massachusetts. The synthetic gold has replaced the two percent plus 4 percent gold and is being used exclusively at Navy Exchange Tailor Shops.

OTHER INSIGNIA

For all other insignia refer to the U.S. Navy Uniform Regulations, 1959, for proper positioning before you sew them on.

RESTRIPING COLLAR OF DRESS JUMPER

To restripe a dress jumper, have the blouse right side out. Press collar flat, then start to stripe from inside of V. Sew with long stitch. This long stitch will enable you to remove the stripe easily.

TO TAPE CUFFS

When taping cuffs leave jumper wrong side out. This enables you to have the cuff round, which makes it much easier to sew the stripes on. See U.S. Navy Uniform Regulations for positioning and blocking off of stripes.

TO MAKE STARS

To make stars you must first cut or get a star pattern, using small embroidery hoops to hold material in position. White embroidery thread, 6 strands, is preferred. Crisscross the stitches. In completing the stars, the end of the thread should always be in the center of the star.

MAKEUP OF RIBBONS

Ribbons may be sewed to uniforms or arranged on a bar or bars to be attached to the uniform. They are worn in a single row of one, two, or three ribbons. When more than three ribbons are authorized, assemble them in horizontal rows of three each. If not in multiples of three, the uppermost row should contain the lesser number, the center of this row to be over the center of the one below it. There should be no intervals between ribbons or rows of ribbons. On men's uniforms they are worn with the lower edge of the bottom row centered approximately one-quarter inch above the left breast pocket. On women's blue and white uniforms, one or two rows of ribbons must be worn centered on the left pocket flap. If there are more than two rows, the first row (or more if necessary) is placed above the flap. On the light blue jacket, ribbons are worn in relatively the same position as on the blue and the white coats.

Ribbons should not be covered with transparent covering or impregnated with preservatives which will change their appearance.

The ribbons are arranged by precedence from top down and from inboard outboard. A minimum of six ribbons must be worn by those possessing six or more; all may be worn if desired. (See Navy and Marine Corps Awards Manual.)

MAKEUP OF MEDALS

Large medals are worn on Full Dress Uniforms. They are mounted on holding bars of the following sizes: 1 3/8 inches, 2 3/4 inches, and 4 1/8 inches. One medal may be mounted on the 1 3/8-inch bar, two on the 2 3/4-inch bar, and three, but not more than five, on the 4 1/8-inch bar. Each row of medals must be 3 1/4 inches long from the top of the ribbons to the bottom of the medals, so that the bottom of the medals dress in a horizontal line. When more than one row is worn, no row should contain a lesser number of medals than the row above. Except for the uppermost row, all rows must contain the same number of medals, three medals side by side or up to five medals overlapping. See table 16-1. Overlapping must be equal and the right or inboard medal must show in full. Upper rows of medals, if worn, must be mounted so these medals cover the suspension ribbons of the medals below.

The arrangement of medals must be worn by precedence from top down and from inboard outboard.

For information on mounting miniature medals refer to Chapter 10, Section 3, U.S. Navy Uniform Regulations, 1959.

CLEANING ARTICLES OF UNIFORM

To prevent damage to the fabric, uniform accessories should be removed from the garment prior to cleaning, such as metal clasps, buttons, et cetera. Sew-on insignias may be left on the garment; however, the area should be flushed thoroughly with water to remove any traces of cleaning solution that may be left in the garment.

Uniform accessories such as buttons, embroidered insignia, gold lace, and metal insignia may be cleaned as prescribed below.

BUTTONS

Buttons sometimes turn green when the gold plating is worn off and the copper base becomes covered with green copper carbonate due to exposure to moist air. This can be removed by rubbing gently with acetic acid or any substance containing this acid, such as vinegar, followed by thorough washing in fresh water.

EMBROIDERED INSIGNIA

Embroidered insignia may be kept bright by occasional scrubbing with a nail brush and ammonia which has been diluted with water. This should be done as soon as there are any signs of tarnishing or corrosion. If corrosion has been allowed to continue until it has gained a foothold, the device cannot be restored to its original condition.

GOLD LACE

Gold lace will rapidly tarnish and deteriorate if in contact with or hung near any substance

Table 16-1.—Table for wearing large medals

Number of Medals to be worn	Prescribed Number of Rows	Number Medals Per Row			
		Top Row	2nd Row	3rd Row	4th Row
1-5	1 row only	1-5			
6	2	3	3		
7	2	3	4		
8	2	4	4		
9	2	4	5		
10	2	5	5		
11	3	3	4	4	
12	3	4	4	4	
13	3	3	5	5	
14	3	4	5	5	
15	3	5	5	5	
16	4	4	4	4	4
↓ and so on					

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containing sulphur, such as rubber or ordinary manila wrapping paper. It can be cleaned by dipping it in a solution of potassium cyanide and rinsing it thoroughly with water. CAUTION: Potassium cyanide is a powerful poison, and extreme care must be exercised when using it. Never under any circumstances use it when hands bear cuts or scratches. Do not inhale its fumes. Gold lace may also be cleaned by nontoxic instant silver polishes and certain liquid cleaners available commercially. Your ship's store officer will order these for you. When commercial cleaners are used, always comply with the manufacturer's instructions.

METAL INSIGNIA

The gold parts of metal insignia may be cleaned by washing with soap and water or by rubbing with any kind of polishing cloth; the sterling silver parts can be cleaned with any silver polish.

ORDERING OF MINIATURE MEDALS AND UNIFORM ACCESSORIES

The Naval Uniform Shop, Brooklyn, New York has a direct delivery service for miniature medals and uniform accessories. It has been found that special ordering of medals and uniform accessories not normally stocked has in some cases been uneconomical and time consuming. Therefore, placing of orders with the Naval Uniform Shop provides improved service.

A supply of order blanks, instructions for their use, and a cost price list will be forwarded upon submitting a requisition to the Naval Uniform Shop, 3rd Avenue and 29th Street, Brooklyn, New York 11232.

PART IV—BARBER

CHAPTER 17

BARBERSHOP MANAGEMENT AND OPERATION

As a Ship's Serviceman in charge of the ship's barbershop, you are a manager. You are responsible to the supply officer for the satisfactory operation of the shop. And you are responsible to your customers, the officers and crew, for providing quality haircuts in a clean shop, meeting their reasonable desires for their appearance with attention and courtesy. See figure 17-1 for an example of a ship's barbershop.

SUPPLY DEPARTMENT INSTRUCTION

After consulting with the medical officer and the senior Ship's Serviceman, the supply officer issues a special instruction for the operation of the barbershop. The commanding officer approves and signs this instruction. Study carefully the sample supply department instruction for barbershop operation shown in figure 17-2.

SHOP SANITATION

The general principles concerning barbershop sanitation are listed in the supply department instruction. Sanitation and hygiene are discussed fully in chapter 21. As the PO in charge of the shop, you are responsible for the maintenance of a high state of sanitation. You must ensure compliance with the joint supply medical department instruction relative to sanitation by all barbers in the shop.

PLANNING SHOP OPERATION

Efficiency of operation does not come about automatically. You must plan for it. Planning is one of the principles of good management.

It is essential that you plan for such things as the procurement of barbering supplies and any additional equipment needed. You must plan the training of barbers—type, how much, when. You must plan for the scheduling of work in the shop. And you must do whatever other planning is necessary to operate the shop in accordance with instructions.

EQUIPMENT AND SUPPLIES

Original major equipment for the barbershop is installed by the Ship Systems Command. Additions or changes may be made only by authority of the supply officer or approval granted by Ship Systems Command, through the commanding officer.

Supplies required in the operation of the barbershop are listed in the Ship's Store Afloat Stock Catalog and in Contract Bulletins. Requisition procedures are outlined in Part I, chapter 1.

INSTRUCTING AND TRAINING

Some of the men assigned duty in the ship's barbershop may have had previous experience in the trade; but some of them will have had little or no experience as barbers. Some who are experienced barbers may need instruction in Navy barbering. You must instruct and train them all to perform their duties in accordance with the ship's standards.

Decide what instruction and training each man needs in order to perform his duties well and prepare for advancement. If you have more than one barber to train at a time, you may provide some group instruction, but if you do this, be sure that all members of the group need the subject you are covering. Do not consume the time of all barbers for the sake of one. Instead, give each special help as needed.

In addition to this handbook and the training courses Ship's Serviceman 3 & 2 and Ship's Serviceman 1 & C, you can use as sources of training material various official publications. The Manual for Naval Preventive Medicine, for example, will provide material on skin diseases and hygiene. For material not available from Navy or other government sources, a carefully chosen commercial publication may serve as an appropriate source. The supply officer can assist you in obtaining such reference texts.

If you decide to give group instruction, plan each lesson carefully so that you know exactly what you are going to do and so as to use the

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Figure 17-1.—A ship's barbershop.

instruction period most effectively. The procedure outlined below has proved successful in training naval personnel in performance of tasks.

1. Explain how to do a particular thing—cutting hair, shaving the neck, sterilizing instruments, and so forth. Demonstrate each step in the operation.

2. Repeat the demonstration, but this time have the students explain how to perform each step.

3. Have the students perform the tasks under your supervision. Correct mistakes on the spot.

4. Continue this process until the particular task can be performed without difficulty. Perfection will come with practice.

Build the student's pride in quality work by emphasizing the importance of good barbering and a well-run barbershop in maintaining both smart military appearance and good morale among the ship's company. Encourage the trainees to work toward their own advancement by making full use of their opportunities for study and practice.

PERSONNEL

The appearance and conduct of barbershop personnel are both very important. Appearance and personal hygiene are discussed fully in chapter 21, but personal conduct should be further emphasized.

CONDUCT

The Navy evidenced the value placed on the services of the barber and his contribution to the appearance, welfare, and contentment of the crew, when it dignified the barber's status with a petty officer rating. In qualifying for a rating, the barber must display qualities of leadership, integrity, and skill consistent with petty officer requirements. Military courtesy must be observed toward all who visit the barbershop. You, as the supervisor, should provide an example of the kind of conduct you expect from the other barbers.

As the manager of a barbershop, you should be concerned about maintaining reasonable quietness and a business-like atmosphere. The number of patrons in the shop at any one time should be controlled, and loafers should not be allowed.

A Navy man should never accept tips or gratuities for the performance of duties for which he has been assigned or rated. A barber should courteously refuse tips offered him. All personnel are entitled to quality service from a barber. No one should feel that services prohibited to other patrons may be procured by giving gratuities to a barber.

TYPES OF HAIRCUTS

Traditionally, Navy barbershops offer two types of haircuts—SHORT and CONSERVATIVE. However, at the present time the Navy does not prescribe nor distinguish among styles of haircuts. Hair styles may vary widely so long as they are within prescribed criteria and are neatly maintained. The determination of hair styles, within the criteria detailed below, is an individual decision. The following is an excerpt

SUPPLY DEPARTMENT ORDER NUMBER

The SH in charge of the ship's barbershop will operate the shop in accordance with the following:

A. GENERAL:
1. No keys to the barbershop spaces will be carried ashore. Keys will be secured in the individual key locker maintained in the supply office for this purpose.
2. All services are free; TIPPING is prohibited.
3. Hours of operation are as prescribed by the commanding officer.
4. An appointment sheet will be kept by each barber and authorized personnel may sign for haircuts at any time open in the day's schedule.

B. PERSONNEL:
1. Barbers will be immaculately clean at all times.
2. Each barber will wash his hands thoroughly with soap and hot water before attending each person.
3. Barbers will be clean shaven and will keep hair neatly cut and groomed.
4. Nails will be clean and well-trimmed at all times.
5. A barber having infections or diseases of a communicable nature will not attend a patron of the barbershop.
6. Barbers will not smoke while attending patrons.
7. Each barber will wear a clean, well-pressed barber's jacket at all times in the shop.
8. Barbers will be inspected weekly by the medical officer.

C. EQUIPMENT AND SPACES:
1. All tools and implements will be kept thoroughly clean and sterilized at all times.
   a. The sterilizing cabinets, maintained sterile by a fumigant approved by the medical officer, will contain all metal instruments when not in use.
   b. Clipper heads will be sterilized after each use.
   c. Combs will be used in rotation. After each comb is used, it will be sterilized in accordance with specifications of the medical officer and remain in the sterilizing cabinet while another comb is used on the next patron.
   d. Strops and hones will be kept clean at all times. No razor will be stropped or honed before it is sterilized.
   e. A clean towel will be used for each patron.
      (1) No towel will be used twice without laundering.
      (2) Dirty linen will be sent to the laundry daily.
2. No alum or other astringent in stick form will be used on any patron.
3. The barbershop will be kept clean at all times.
   a. Bulkheads, overheads, furniture, and other fixtures will be kept clean and free from dust.
   b. Decks will be swept or mopped thoroughly each day. Hair will be swept as often as necessary and before securing shop each night.
   c. A complete field day will be held, as directed, each week.

D. CONDUCT:
1. All services will be rendered in a friendly and courteous manner, and military etiquette will be maintained at all times.
2. Any customer with a skin eruption of any type will be politely refused services until he obtains a statement from the medical officer that he can be served.
3. Failure of personnel to conduct themselves in accordance with prescribed rules will result in disciplinary action.

Submitted:
Supply Officer
Approved by:
Medical Officer
Commanding Officer

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Figure 17-2.—A supply department instruction.

of CNO Z-Gram 70, and it will be your guide for giving haircuts to Navy personnel.

"(1) Hair will be neat, clean, trimmed, and present a groomed appearance. Hair will not touch the collar except for the closely cut hair at the back of the neck and that will present a tapered appearance. Hair in front will be groomed so that it does not fall below the eyebrows when a person is uncovered and it will not bush out below the band of properly worn headgear. In no case shall the bulk or length of hair interfere with the proper wearing of any military headgear. The exact maximum length of the hair is no longer specified.

(2) If an individual chooses to wear sideburns, they will be neatly trimmed. Sideburns will not extend below the bottom of the earlobe, will be of even width (not flared), and will end with a clean-shaven horizontal line."

SHAVING

When time permits, barbers should shave the neck of a patron who received a haircut. A complete shave is not authorized except for personnel in the sick bay who are unable to shave themselves.

SCHEDULING APPOINTMENTS

The purpose of scheduling appointments in the barbershop is to provide better service for patrons, who have neither the time nor the inclination to wait in line a long time for a haircut.

All personnel aboard ship should receive haircuts every 2 weeks. This means that your appointment schedule should be so made that it will accomplish all the barbering work within this period.

In scheduling haircuts, you should take into consideration:

1. The number of personnel aboard.
2. The number and competency of barbers.
3. The daily workload of each barber.
4. Space available for patrons to wait. (Usually not more than two should wait for each barber.)

A barber can usually give a satisfactory haircut in 20 minutes. Therefore, if he is busy all the time during an 8-hour period, he can give 24 haircuts. No barber, however, should be expected to give 24 haircuts per day. He needs time for personal hygiene, sterilizing barbering instruments, and for assisting in general shop sanitation—to say nothing of rest periods and the noon meal.

The two systems recommended for scheduling appointments for the barbershop are the APPOINTMENT SYSTEM and the DIVISION SCHEDULE.

APPOINTMENT SYSTEM

Appointment schedule sheets are marked off for a definite number of haircuts for each barber during the day. Every barber maintains his own sheet and posts it the day previous to the time the haircut is to be received or early in the morning on the day patrons apply. There is a space for the signature of each patron, opposite the hour of the day he selects.

The appointment system works fairly well, though on occasions patrons fail to report for appointments and throw your schedule off. Occasionally, an unclaimed period may be claimed by another patron. If you experience too much difficulty with broken appointments, you can report the offenders to the supply officer, who can report their names to the cognizant division officer.

The patron who makes what he thinks is a proper appointment and finds no barber to serve him is understandably upset. Make sure the procedures you follow are well known by the patrons and are followed explicitly by all barbers.

DIVISION SCHEDULE

The division schedule allows a definite number of hours during which personnel in a particular division may receive service in the ship's barbershop. The division petty officer controls the scheduling of appointments and sends a certain number to the barbershop at a time. This method of scheduling prevents broken appointments, but it is generally not preferred over the appointment system.

CHAPTER 18
EQUIPMENT AND TOOLS

BARBER CHAIRS

Barber chairs must meet Navy specifications, and they are installed in accordance with the Ship Systems Command allowance list. If a good chair is given reasonable care, it will last indefinitely. Follow the instructions pertaining to care and maintenance in the handbook which comes with each chair. Proper care of the hydraulic mechanism of the chair is especially important, and only the oil prescribed by the manufacturer should be used on it.

CLIPPERS

Hand and electric clippers are used in the ship's barbershop. Hand clippers, as the name implies, are operated manually; electric clippers have a small electric motor which moves the movable blade back and forth over the stationary blade.

ELECTRIC CLIPPERS

Two types of electric clippers are used in ship's store barbershops, the ROTARY MOTOR and the MAGNETIC VIBRATOR MOTOR. See figures 18-2 and 18-3.

Both types of electric clippers are used; but since the magnetic vibrator motor has a tendency to overheat when used fairly constantly, most barbers prefer the rotary motor type.

Electric Clipper Blades

Listed below by their size, cutting length, or purpose are some of the electric clipper blades that are available in the open market. Of those listed, sizes 000 and 1 are the most widely used in ship's store barbershops. Sizes 14 and 18 are very useful when cutting curly or wiry hair.

Size of Blade	Blade Cutting Length or Purpose
Finisher	For hairline around the ear and down the neck.
0000	Cuts hair equal to shaving
000	Cuts hair very close
00	Leaves hair 1/64" long
0	Leaves hair 1/32" long
0A	Leaves hair 3/64" long
1	Leaves hair 1/8" long
1A	Leaves hair 5/32" long
1 1/2	Leaves hair 3/16" long
2	Leaves hair 1/4" long
18	Staggered tooth—Leaves hair 1/8" long
14	Staggered tooth—Leaves hair 1/4" long

CARE AND MAINTENANCE

The serviceable life of clippers can be prolonged by proper maintenance. Follow instructions in handbooks which are included by the manufacturer at the time of purchase.

The cutting heads of electric clippers must be removed after each using, cleaned, and disinfected in the prescribed manner. Add a few drops of the recommended oil to the cutting blades before using them again.

The motor of the magnetic-vibrator clipper requires but a drop of oil every 3 or 4 months, but the motor of the rotary-motor-driven clipper should be oiled regularly once per week. Whenever any other maintenance is required, follow the manufacturer's instructions, or call the electrical shop.

ELECTRIC BARBER SHEAR

The electric barber shear illustrated in figure 18-4 is presently being authorized for use in ship's store barber shops. The electric shear is an excellent tool to use when you are cutting and styling curly hair.

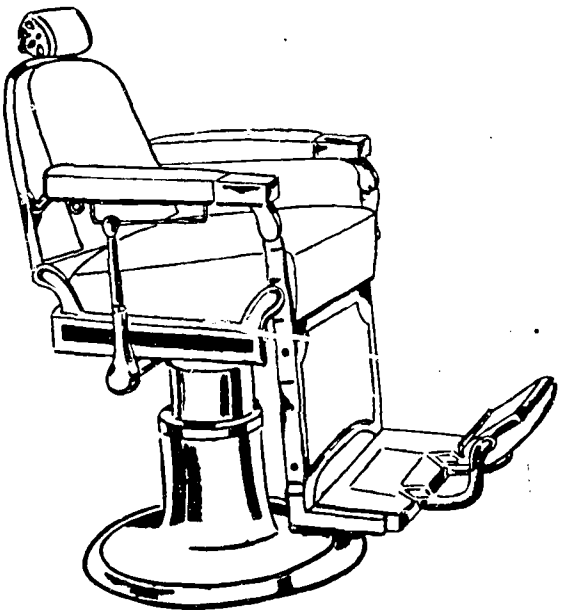

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Figure 18-1.—Barber chair.

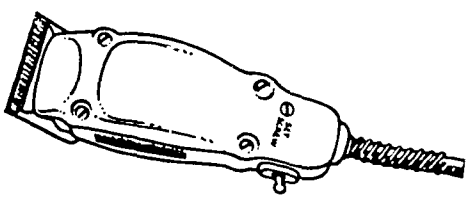

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Figure 18-2.—Electric clipper (magnetic vibrator).

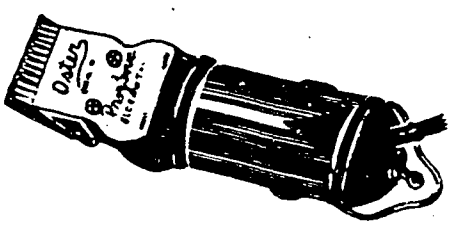

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Figure 18-3.—Electric clipper (rotary).

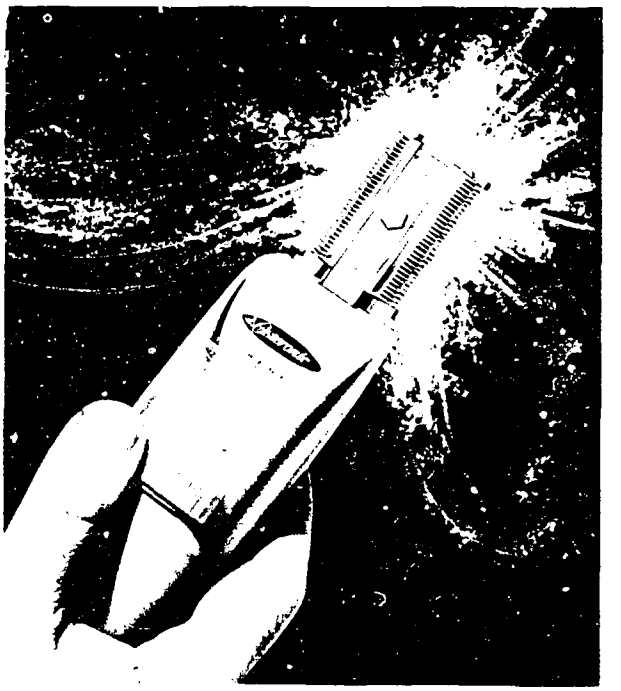

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Figure 18-4.—Electric barber shear.

The mating faces of the cutting blades and the tension spring guide should be oiled several times each day. When cleaning the cutting blades, dip the blade ONLY into kerosene or coal oil, and do this while running. Then wipe the blade completely dry and apply a thin film of oil before cutting hair.

HAND SHEARS

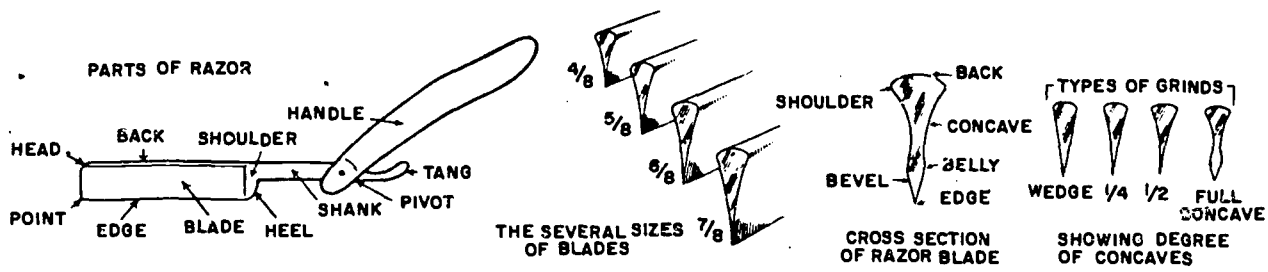
There are two types of barbers' hand shears: the German type without finger brace and the French type with the finger brace. The French type is the most widely used.

BLADE LENGTH

The blade length of shears is not standardized. The 7 or 7-1/2 inch blades, however, are generally preferred.

GRINDS

Although the polished or smooth grind (knife edge) and the coarse grind are available, most



155.13

Figure 18-5.—Nomenclature, degree of concaves, and sizes of razors.

barbers prefer shear blades with a medium grind.

CARE

Shears require proper care and maintenance for long life and service, just as do the clippers. After each using, they must be washed with soap and water, and then sterilized. Whenever necessary, the blades must be reground. For ease of operation and long life of shears, add a drop of oil to the blades where they are fastened together after each cleaning. Lubrication prevents friction and wear.

RAZORS

SIZES

In general, razors are measured in eighths, such as 4/8, 5/8, 6/8, or 7/8. The 5/8 size is used most frequently.

GRIND

The type of grind refers to the shape of the blade. It may be either a wedge shape or hollow grind. Because it is more easily sharpened and is lighter, the hollow grind is preferred to the wedge-shaped blade.

POLISH

The final polish on a razor, the finish, may be plain steel, crocus (polished), or nickel plated. Since the plated razors often conceal an inferior steel, they do not find as much favor with barbers as the plain or polished steel surfaces.

MAINTENANCE

To maintain a razor's cutting quality, care must be taken to prevent corrosion of the fine cutting edge. The razor, too, must be cleaned and sterilized. It must also be stropped and honed whenever necessary. If the blades of razors are coated with a film of castor oil when they are not in use, the life of the instruments will be almost indefinite. For best results, a barber should have enough razors to allow for proper care and maintenance, as indicated in chapter 21.

Figure 18-5 gives such information on razors as nomenclature, degree of concaves, and sizes.

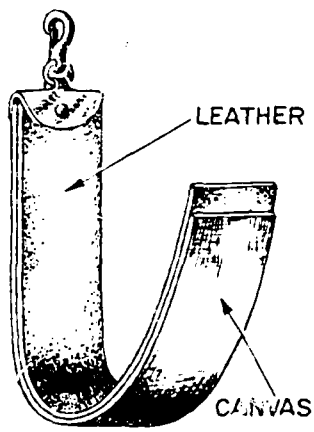
HONES

A hone is an abrasive, impregnated, rectangular block which is capable of cutting steel, and is used to fashion the proper cutting edge on a razor blade.

WATER HONES

The so-called water hone is a natural, or quarried, stone. It is clay colored and soft, in comparison with hard stones. Since it is soft in texture and contains no alkali, it retains moisture; and when water is added to the surface of a piece of slate stone, called the rubber, can be used to create a gritty substance on the surface of the hone. This gritty substance helps to sharpen the blade when it is honed. Lather may be used instead of water, or the two may be combined.

Although the water hone is slow-cutting, it has retained its popularity with barbers because of the very fine edge it can produce. Some



155.14

Figure 18-6.—Set of strops.

barbers use a fast-cutting hone at first and finish with the slow-cutting water hone.

BELGIAN HONE

The Belgian hone is so designated because it is quarried in the natural state from yellow-colored rock in Belgium. It is a fine-cutting stone, somewhat faster than the water hone. The cutting surface of the hone is light-yellow colored, supported on the bottom by red-colored rock. Either water or lather may be used on it when honing a razor.

SYNTHETIC HONES

Synthetic hones are manufactured. Silicon carbide, impregnated with fine particles of steel, is generally the substance used in them. The Swaty hone is synthetic, deriving its name from Austria, where it is manufactured. It does not contain as much gritty substance as some of the American synthetic stones, which are perhaps the fastest cutting hones made, but it is generally popular with barbers. It may be used dry or with lather. Most hones of this type have a grayish, metallic color.

RAZOR STROPS

A razor strop is a piece of leather or canvas used for putting an edge on a razor. One end of the strop has a swivel ring for holding the strop on a hook, and for ease of turning

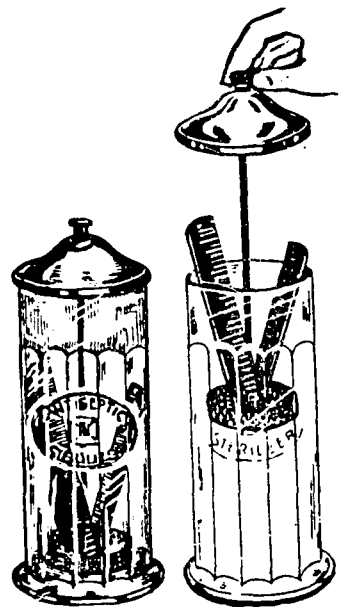


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Figure 18-7.—Sterilizing jar with tray.

from one side to the other. The width is usually about 3 inches, and the length varies from 15 inches up, generally.

CANVAS STROPS

The canvas strop is made by weaving silk and linen into a coarse material. Unless the canvas strop is of high quality, it will not put a lasting edge on a razor. This strop must be thoroughly broken in and carefully maintained thereafter. You will learn how to do this in chapter 19.

LEATHER STROPS

Good leather strops are made from high-quality, flexible leather. A poor strop will not put a fine cutting edge on a razor. The kinds of leather used in making strops are: Russia shell, heavy Russia, lighterweight shell, and horsehide. Leather strops are no longer imported from Russia but are made in the United States, generally from horsehide and cowhide. The Russian type of tanning is used to produce the typical red corrugated finish.

Russia Shell

This strop is made from the hide on the rump of a horse and is high in quality. Since few strops can be cut from one hide, it is quite expensive. Little or no work, however, is required in conditioning the strop. For this reason, plus the fact that it always remains smooth, it is a favorite with barbers.

Russian Strop

This strop is made from cowhide and is one of the best available. Unlike the Russia shell, however, it requires considerable work to break it in, as discussed in chapter 19.

Horsehide Strop

The horsehide strop is the least desirable of leather strops. It has a fine grain and gets too smooth after a little use, making it difficult for the barber to put a good edge on a razor.

SET OF STROPS

A SET consists of a canvas strop on one side and a leather strop on the other side, fastened together at one end with a metal clamp to which the swivel ring is attached. Since most barbers prefer to use the canvas strop along with the leather strop, this arrangement of having two strops together is convenient. See figure 18-6.

CARE AND MAINTENANCE

This topic is discussed along with preconditioning of strops in chapter 19, Honing and Stropping.

LATHER MACHINE

The lather machine provides warm lather at the touch of the hand upon the lather valve. An electric motor makes the lather and dispenses it. An electric heating element keeps it warm.

In using the lather machine in tropical climates, some instances of overheating of the soap have been reported. To prevent such overheating, some barbers have had an electrician install a hand-operated switch which controls the heating element without interfering with the operation of the machine. Thus, there is power on the machine at all times, enabling barbers to get lather and, at the same time, to control the temperature of the soap solution.

Keep the lather machine clean and sanitary by washing it frequently with soap and water. If you have mechanical trouble, call the electrical shop. For safety during rough weather, it is best to have this machine secured to the shelf where it is kept.

Shaving mugs and brushes are no longer authorized for use in Navy barbershops, for sanitary reasons.

STERILIZING EQUIPMENT

Since all barbering tools must be sterilized, it is essential that the ship's barbershop have necessary sterilizing equipment, some types of which are discussed below.

JARS AND TRAYS

Most barbers use sterilizing jars and trays for sterilizing shears, combs, and razors. Prescribed Navy sterilizing solution must be used, and must be changed daily. This type of sterilizer is shown in figure 18-7. Note that the top of the sterilizer is connected to the bottom tray with a small connecting rod, which enables the barber to withdraw tools from the solution without putting his fingers into it.

STERILIZING CABINETS

Sterilizing cabinets are constructed of steel, generally, and have shelves or compartments for placing combs, shears, razors, and clipper heads. A 10 per cent solution of formalin sterilizes the instruments, as discussed in chapter 21.

The two types of sterilizing cabinets generally used are the wet and the dry. Both types are satisfactory, though most ships' barbershops use the dry sterilizer.

CHAPTER 19
HONING AND STROPPING

Honing a razor properly is an art which is acquired through practice and the application of scientific principles. Skillful honing requires a knowledge of the proper strokes and the ability to execute them properly. Every good barber prides himself on his ability to maintain his own instruments, and you undoubtedly have a desire to acquire the skills and know-how in barbering which will enable you to become an expert.

PREPARING THE HONE

The razor and the hone both should be warm, at room temperature, before you start honing. When warm steel is put on a cold stone, or used with cold lather or cold water, it contracts and interferes with your efforts to get a perfect edge. If the razor is cold when you put it on a warm stone, or used with hot water or lather, it expands.

WATER HONE

To prepare a water hone for honing, moisten it with water and lather. Then rub the smaller stone or slate, called the rubber, over it briskly with a rotary movement. Continue with the rubbing process until you get a thin paste of grit on the hone. You are then ready to begin honing.

BELGIAN HONE

Since the Belgian hone is a faster-cutting stone than the water hone, no slate stone (rubber) is generally used on it to produce a gritty substance for sharpening the razor faster. In fact, some barbers prefer to use the hone DRY at first to liven up the blade of the razor. For best results, clean the surface of the hone of dust or foreign matter before applying lather to it. Reapply lather as necessary during the honing process.

TECHNIQUE OF HONING

The main object in honing is to attain a perfect cutting edge. Therefore, it is essential that you use an equal number of smooth, even strokes on each side of the blade, applied at the proper angle and with equal pressure. This is very important. If an old razor is available, use it to practice the various cutting movements. You will have no fear of damaging it and therefore will make greater initial progress. Practice the cutting movements until you get the FEEL of the honing technique; this is the beginning of proficiency.

TURNING THE RAZOR

The technique of turning the razor without turning the wrist is necessary in honing. You must be able to do this to ensure the same angle and equal pressure on the blade on both sides. Practice this technique until you master it.

HOLDING THE RAZOR

Take a look at figure 19-1. Grasp the shank of the razor with the thumb and forefinger, as indicated. Allow the second and third fingers to encircle the handle loosely, and exert counterpressure, or uplift, on the lower side of the handle with the little finger. If you hold the razor in this manner, you will be able to roll it at the end of each stroke on the hone without turning the wrist.

THE FIRST STROKE

Hole the razor in the manner just described, and lay the blade on the far end of the hone with the cutting edge pointing towards the body. With the blade flat on the surface of the hone, draw it diagonally across the hone toward the body. At the end of the first stroke, the head and point of the blade should be at the end of the hone closest to the body. At this point, the blade

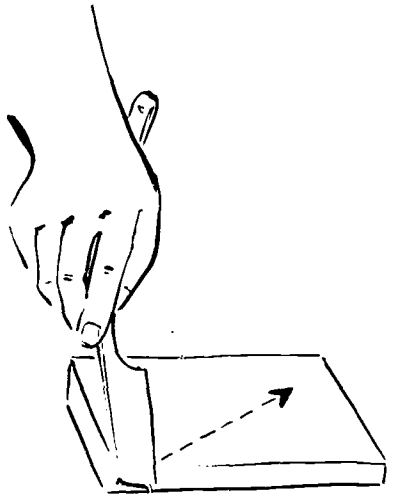

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Figure 19-1.—How to hold the razor for honing.

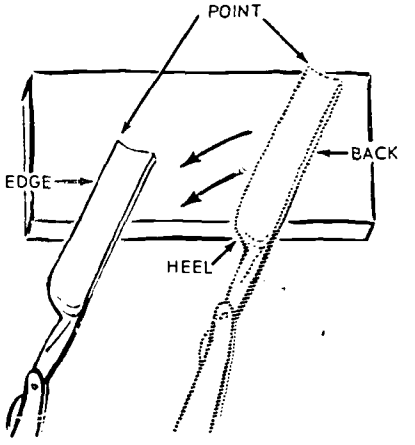

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Figure 19-2.—First position and stroke.

should be rolled over on the back, until the reverse edge gently touches the hone, and pushed inward on the hone until the point and head of the blade approach the left edge of the hone, as shown in figure 19-2.

THE SECOND STROKE

Begin the second stroke in honing with the back of the razor blade on the end of the hone closest to the body, as shown in figure 19-3. The second stroke is a duplication of the first, except that the direction of the diagonal is reversed, as illustrated.

In making both strokes be careful to maintain an even pressure from the heel to the point of the blade. If the razor is very dull, use more pressure on the first strokes. In succeeding strokes, gradually reduce the pressure as the razor takes an edge. If you keep your razors reasonably sharp, you will not need much pressure on the blades in honing them.

TESTING THE CUTTING EDGE

You can find out when a razor has been sufficiently honed by TESTING THE CUTTING EDGE. To do this, moisten the thumbnail with water or lather and pull the razor blade gently over it, as indicated in figure 19-4. It takes practice, however, to test the razor's edge in this manner. You must develop a delicate sense of touch.

Through practice, you will be able to determine the type of edge you have on your razor.

Since saliva is insanitary, do not moisten the thumb with it. Use water.

The types of edges which you may have on your razor after honing are:

1. Rough. This edge is an indication that you have overhoned the razor. When you draw it across the damp thumbnail it will have a tendency to stick, and will produce a gritty and disagreeable sensation.

2. Coarse. A coarse edge has a tendency to dig in or drag as you draw the blade across the thumbnail. The sensation is grating.

3. Blunt. If the edge of the razor blade is blunt, it will pass smoothly over the thumbnail without any sensation.

4. Keen. When the razor blade digs in and produces a drag, with a smooth sensation, as you draw it over the thumbnail, you have a keen edge. This is the type of edge you must have.

You can also test the cutting edge of the razor by moistening the ball of the thumb with water and pulling the blade gently over it, as shown in figure 19-5.

OVERHONING

An overhoned razor will have what is known as a WIRE EDGE. To overcome this difficulty,

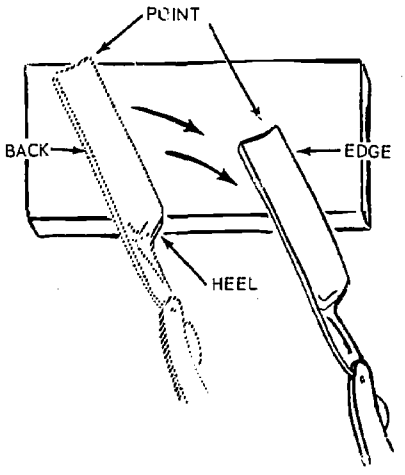

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Figure 19-3.—Second position and stroke.

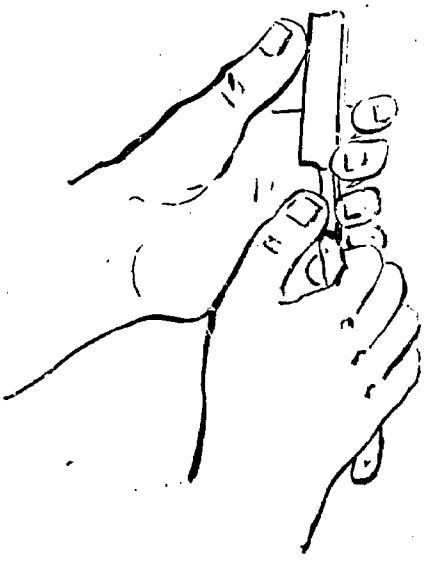

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Figure 19-5.—Another method of testing cutting edge of razor blade.

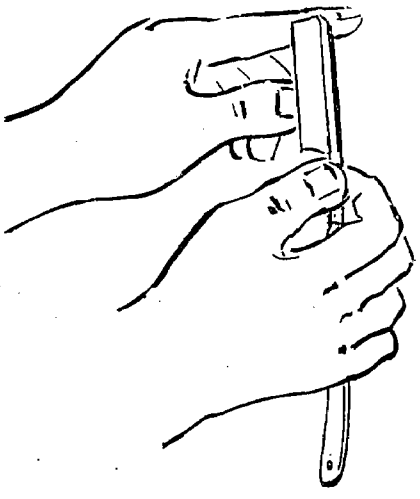

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Figure 19-4.—Testing cutting edge of razor blade.

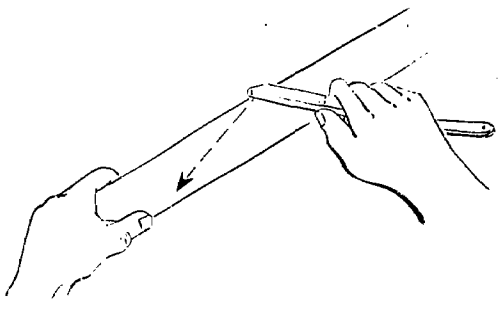

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Figure 19-6.—The first stroke in stropping.

back hone the razor; that is, reverse the stroke. Draw the razor backward diagonally across the hone. A few strokes of back honing, followed by a few strokes of light, regular honing will usually put the razor in shape.

If you are unable to remove a wire edge by back honing, carefully draw the blade a number of times over a small piece of wet wood. This process will make the razor dull and you will then have to start the honing process anew. After a little experience you will have little or no difficulty with a wire edge on your razor.

CARE OF HONE

Some new hones are rough and require conditioning to get them in shape for honing. To make the surface of a rough stone smooth, put water on it and rub with a pumice stone. Older

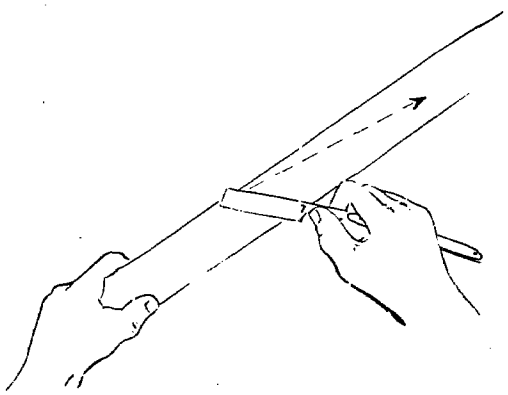

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Figure 19-7.—The second stroke in stropping.

hones occasionally will become imbedded with particles of steel from the razor and must be worked smooth in the same manner. Check the surface of the hone after reworking for imbedded particles of steel and smoothness. If the hone is not smooth, continue working with the pumice stone until all the steel is removed.

When not in use, keep the hone in a cloth bag or an appropriate box in a drawer of your cabinet. Such care will protect it from scratches, falls, and dirt.

PRECONDITIONING OF STROPS

A razor strop must be put in condition before it is ready for use. Follow the procedure outlined below in conditioning your strops.

CANVAS STROP

Although canvas strops are machine-finished at the factory, they usually require additional work to put them in first-class condition. Drive a nail in a flat board to which you can fasten the swivel end of the strop, or fasten it by some means to the top of your work cabinet. Grasp the other end of the strop with one hand and hold it tight. With the other hand, rub a bar of soap over the strop, using enough pressure to work the soap into the grain of the canvas.

Lay the cake of soap aside and, while still holding the strop taut with one hand, rub the strop briskly with a smooth bottle in the other hand. Exert just enough pressure on the bottle to rub off the soap on the surface. Repeat this process several times, rubbing long enough each time to make the soap dry and flake off.

Continue this breaking-in process daily until the strop is thoroughly broken in. If it becomes rough later, use the same process to put it in condition.

RUSSIA SHELL

This is the fine-quality leather strop discussed previously in Chapter 18 as requiring no breaking in.

RUSSIAN STROP

Use bar strop, saddle soap, or lather to break this strop in. Most barbers use a thick lather. Rub the soap, or lather, into the leather with the palm of the hand or a smooth glass bottle. Like the canvas strop, this strop requires a daily finish until it is thoroughly broken in.

STROPPING

Even though you did a fine job of honing and put a fine edge on your razor, it still is not sharp enough for a smooth shave. It requires a good stropping to smooth the whetted edge. A well-stropped razor gives a smooth, even-cutting feeling on the skin.

TECHNIQUE OF STROPPING

In honing a razor, the cutting edge of the blade moves forward. In stropping a razor, the back of the blade moves forward, at a slight angle.

Attach the swivel end of the strop to the barber chair and grasp the other end with the left hand. Hold it taut, close to the left side and hip high. Guard against sagging. Take the razor well up in the hand with the side of the thumb resting on the shank and the first and second fingers on the opposite side of the shank. Circle the handle with the other fingers, as illustrated in figure 19-6. If you hold the razor in this fashion you can easily roll it.

Much practice is required to learn to roll the blade without turning the hand over. First practice turning the razor in your hand and then continue slowly on the strop. You will not be able to strop a razor expertly until you acquire this skill.

THE FIRST STROKE

Start the first stroke at the top of the strop. The top is the part which is fastened to the barber chair. Draw the razor straight over the surface. Keep it perfectly flat. Use long diagonal strokes, and apply equal pressure from point to heel, enough to give a draw. Some barbers use a stroke from 12 to 18 inches long. Upon completion of the first stroke, roll the razor between the fingers to turn it on the back of the blade. Do not lift the razor from the strop and do not turn the hand over.

THE SECOND STROKE

Start the second stroke at the end of the strop in your hand. It is then made in the same manner as the first stroke. Be careful to apply just as much pressure on the second stroke as on the first. Always keep the back and the edge of the blade perfectly flat on the surface on the strop, as shown in figure 19-7.

TESTING THE EDGE

Test the edge of the stropped razor by moistening the end of the index finger or the ball of the thumb with water. Then hold the razor in the right hand and draw the finger or thumb lightly over the edge, as indicated previously in figure 19-5. Use care to prevent cutting of the finger, or thumb. Proficiency will be developed through practice.

If the edge of the razor seems a bit rough, or has a disagreeable feeling, it needs further stropping. If the edge is dull, it will not stick or draw. If the edge feels smooth but does not cut into the flesh it is an indication that it needs more canvas stropping, followed by a few strokes on the leather. The correct edge has a keen, drawing sensation. It is ready for use.

CHAPTER 20

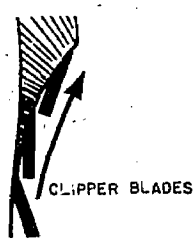
HAIRCUTTING

The foundation of a good haircut lies in expert clipper and shear work. Besides, skill in the use of the clipper and shear greatly reduces the time required to turn out a good haircut.

It is difficult to discuss styles of haircuts, and certainly any directions can make no claim to preciseness, for there are actually as many types of haircuts as there are heads to wear them. Thus, the artistry of the barber is called for in shaping the cut to the patron's head and in suiting personal tastes.

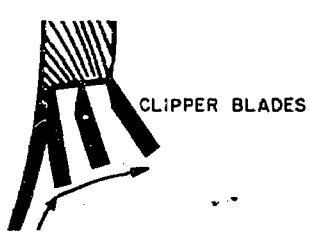
Navy barbershops must follow the criteria detailed in the U.S. Navy Uniform Regulations. Also, see Chapter 17 of this text.

This chapter first discusses general techniques for using the major haircutting tools, the electric clipper, the electric shear, the hand shears, and the comb. Later sections give specific instructions and step-by-step illustrations for the use of the electric clipper and the electric barber shear in cutting specific types of hair. These sections are followed by directions for completing the haircut with a neck shave and, finally, a discussion of safety precautions in haircutting.



155.24

Figure 20-1.—Correct method of tapering the clipper line.



155.25

Figure 20-2.—Incorrect method of tapering the clipper line.

GENERAL USE OF HAIRCUTTING TOOLS

The following paragraphs give you general techniques for use of haircutting tools.

THE ELECTRIC CLIPPER

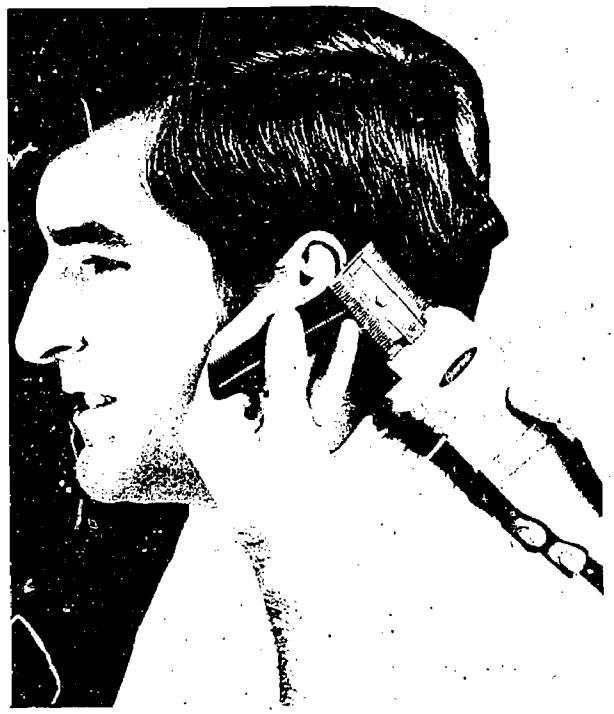
An experienced barber is able to use the electric clipper for most of his haircutting, using the hand shears and comb for the smoothening process, and the hand shears for top hair.

It is not difficult to make a gradual, even taper with a clipper, provided you start in the right manner. Start the clipper with the cutting edge at the base of the neck. See figures 20-1 and 20-2. At the point where the taper should begin, gradually tilt the clipper until the blade flattens against the surface. Then gradually tilt the blade until the clipper rides on the heel as you withdraw it from the hair.

With a little practice, you will soon learn how to make a smooth, even taper with the

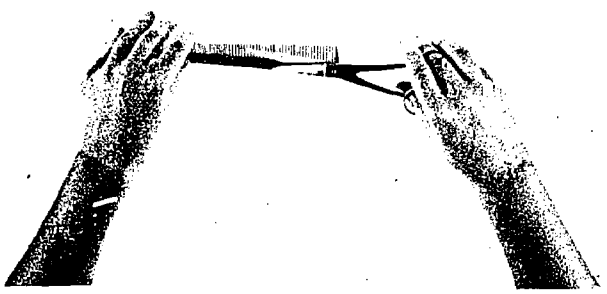
155.26

Figure 20-3.—Using electric clipper over the comb.



155.170

Figure 20-4.—Using electric shear over the comb.



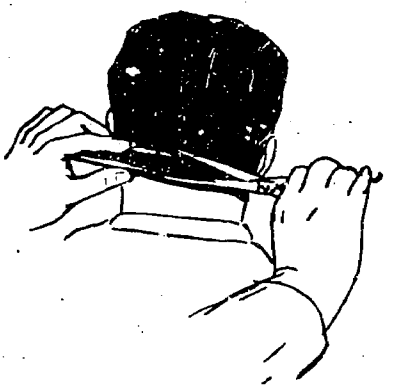
155.27

Figure 20-5.—How to hold the shears.

electric clipper. You will also become proficient in using the clipper over the comb for cutting side and top hair. See figure 20-3. You can save time in this manner and still give a good haircut.

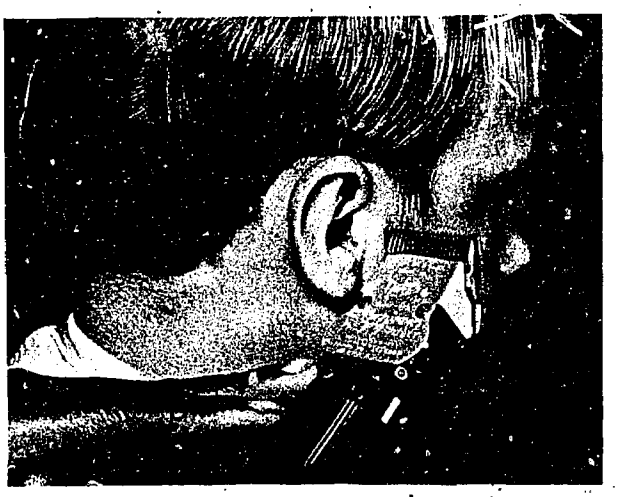
THE ELECTRIC SHEAR

With practice you will be able to use the electric shear for a regular haircut, shaping a



155.28

Figure 20-6.—Position of barber using shears and comb on the neck.



155.113

Figure 20-7.—Position of clipper in front of ear right side.

full head of hair, or hair styling. The electric shear may be used right- or left-handed. You can cut with the comb or freehanded. You can cut in any direction, up, down, with the grain of the hair, against it, or over it. See figure 20-4. Remember that the electric shear is an additional tool for use by the progressive barber. It does not replace any other barber tool.

COMB AND HAND SHEARS

When holding the hand shears, put the small finger on the finger brace, and brace the shank with the two forefingers. See figure 20-5.

155.114

Figure 20-8.—Position of clipper in back of ear right side.

155.116

Figure 20-10.—Back of head taper.

155.115

Figure 29-9.—Position of clipper left side.

155.117

Figure 20-11.—Graduating the taper, rear of head, right side.

Grasp the comb between the thumb and forefinger with the left hand, teeth pointing upward, at the juncture of the fine and coarse teeth. Bend the other three fingers over the fine part of the comb. You can easily manipulate the comb with this grip, and easily turn it to comb the hair downward.

Check the position of the barber using shears and comb on the neck, as indicated in figure 20-6. Stand somewhat to the left of the working point of the shears. Extend the right arm and point the shears horizontally left. Study the figure. If you stand in this position, you have an easy view of the exact point of contact with the patron's hair. In getting the right position, do not overlook the factor of comfort, or the free and easy feeling.

155.118

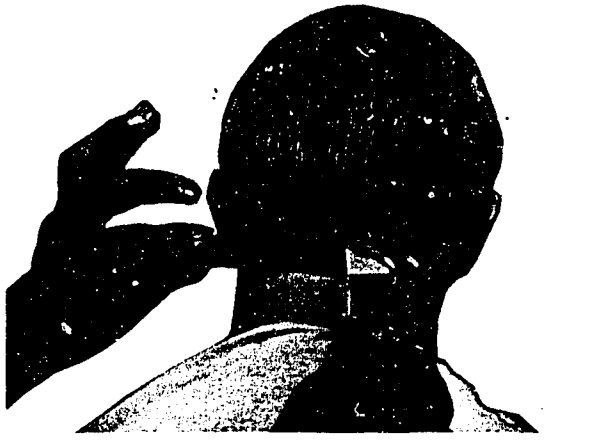
Figure 20-12.—Graduating the taper, rear of head, left side.

155.120

Figure 20-14.—Continuing the taper of neck hairline.

155.119

Figure 20-13.—Tapering the bottom of neck hairline.



155.121

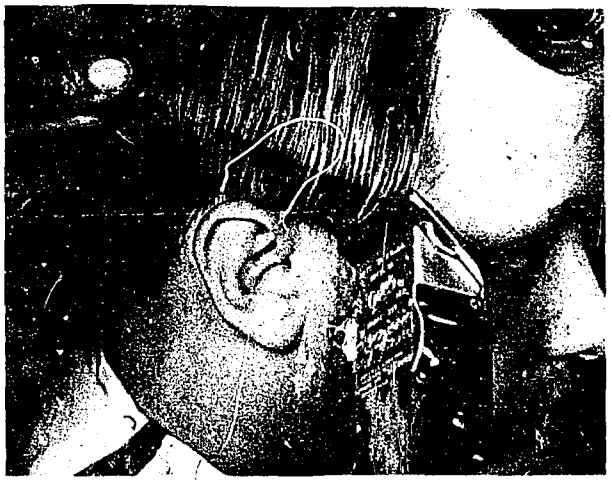
Figure 20-15.—An even taper from right to left.

CUTTING HAIR WITH A CLIPPER

In the following paragraphs you will find step-by-step illustrations showing the use of the clipper on straight hair and on wavy and curly hair.

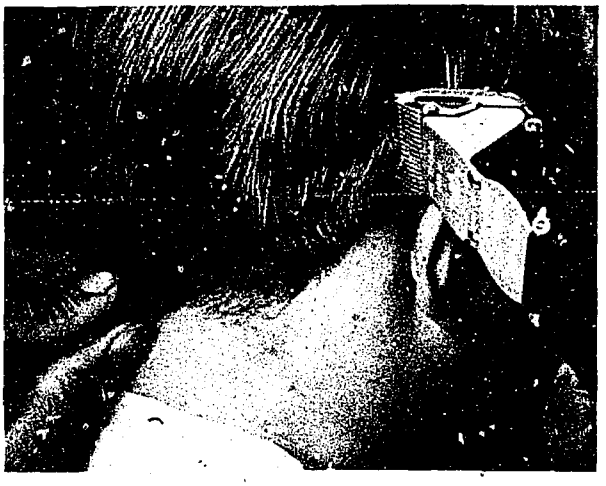
STRAIGHT HAIR

Steps 1 through 6 provide a general manner in which the electric clipper is used to cut straight hair.



155.122

Figure 20-16.—Tapering front right side.

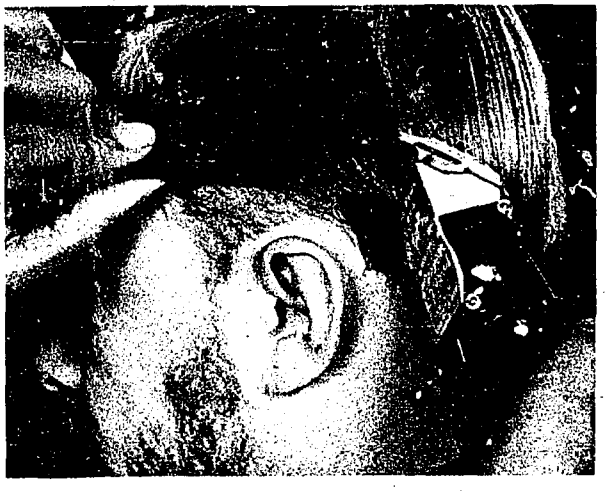


155.124

Figure 20-18.—Tapering back of head right side.

155.123

Figure 20-17.—Desired height of the taper.



155.125

Figure 20-19.—Tapering back of head left side.

Step 1

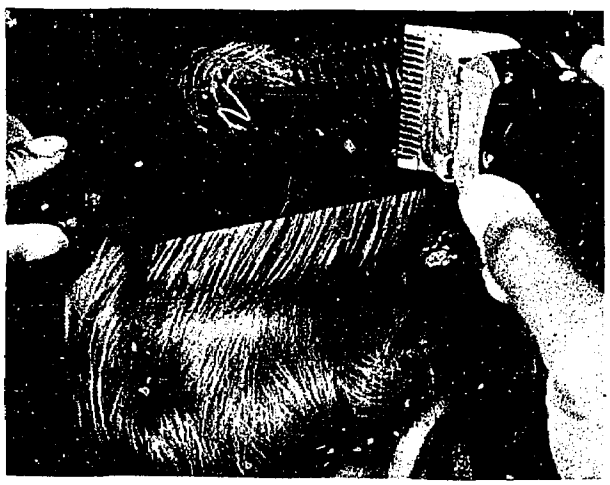
Using the No. 1 blade, give the patron a line-up around the ears. You accomplish this procedure by holding the barber clippers in such a manner as to allow the teeth of the clipper blades to trim the edges of patron's natural hairline around the ear. See figure 20-7.

Step 2

The clippers are angled in a horizontal position for the line-up. The cutting section of the blade should be facing in an "upward" direction, making it possible to begin trimming the edges of the right sideburns. To follow the proper cutting procedure, the cutting blade

155.126

Figure 20-20.--Topping right side to top of the head.



155.127

Figure 20-21.—Topping the back of the head.

should be facing either in a downward position or toward the patron's hairline requiring an up and down, back and forth movement. The lining method will depend upon the patron's direction of hair growth. See figure 20-3. The same procedure is followed for the left side as shown in figure 20-9.

155.128

Figure 20-22.—Finished hair cut rear view.

Step 3

After lining both sides of the patron's head, taper the back of the head as shown in figure 20-10. The taper must be evenly graduated and should not be higher than the bottom of the patron's ear lobes. See figures 20-11 and 20-12. For the majority of patrons, the ear lobes are in line with each other. By using your imagination, form a line from one ear lobe to the other. This is done so you can get some sort of an idea and sense of judgment on the location of the taper and where it should end. The distance between the natural hairline and the end of the taper should be about one and one-half inches.

Step 4

Continuing the use of the No. 1 blade and the fine end of a regular comb, begin tapering from

155.129

Figure 20-23.—Finished haircut side view.

155.130

Figure 20-24.—Topping the hair using the fingers, comb, and shears.

the bottom of the neck hairline to the end of the taper (Fig. 2-13). To properly taper, use the clipper and comb method. This is done by tilting the comb teeth out at an angle and placing the cutting edge of the clippers on the desired location of the comb. See figure 20-14. The clipper should glide smoothly across the comb and aid in presenting an even taper from right to left as shown in figure 20-15. The patron's head should have an evenly graduated tapered appearance from the sides to the back of the head.

Step 5

When cutting the sides, begin tapering up from the sideburns using the clipper over the comb method as in figure 20-16. Tilt the comb at an angle so as to form a tapered cut at the desired height of the taper as shown in figure 20-17. Continue tapering to the back right side of the head to present an even appearance that blends in with the back of the head taper. See figure 20-18. Repeat the above procedure for the left side of the head as shown in figure 20-19.

Step 6

Topping. Cutting the top requires the use of a "flat top comb." As a barber you should always remember to work from right to left, and from front to back. See figures 20-20 and 20-21. Using the flat top comb, comb the desired amount of hair and hold, allowing the amount to be cut to protrude between the teeth of the comb. Then place the cutting blade over the comb, begin cutting. Use the No. 1 blade for the top of the head cutting. To finish the job, switch to the 000 blade. The 000 blade evens out the uneven places of the taper that the larger blades are unable to get close enough to cut. See figures 20-13 and 20-15. The 000 blade gives the patron's hair the almost perfect,

155.131

Figure 20-25.—Fork-type comb.

155.132

Figure 20-26.—Curly hair front view.

clean, even cut look. See figures 20-22 and 20-23. Topping can be accomplished by the use of fingers, regular comb, and shears as illustrated in figure 20-24.

WAVY AND CURLY HAIR

Wavy and curly hair requires the same cutting steps and most of the same procedures as for straight hair. However, be very careful when you are cutting wavy and curly hair to prevent the skinned look. Curly hair requires much time to remove the bulkiness in hair. Blend in the hair without leaving lines or a skinned look, using various strokes and positions of shaping without removing much hair.

Combs play an important part in cutting and styling wavy and curly hair. The type of comb used depends a great deal on the texture of the hair, the style of the haircut, and the length of the hair. For a short haircut you can use a regular comb even with very curly hair. If tightly curled hair is at all long, however, it tangles easily. For a haircut that is even moderately long, therefore, you should use a fork-type comb like the one shown in figure 20-25. This comb has teeth that are far apart, making it a more satisfactory tool for untangling tight curls like those shown in figures 20-26 and 20-27.

Before the cutting process begins, the hair must be properly combed into its proper place as illustrated in figures 20-28 and 29-29. When hair is not properly combed, an uneven cut will result, leaving the hair longer in places. Cutting with the grain normally gives the best results.

Step 1

With the No. 1 blade, begin lining around the ears from right to left. See figure 20-30. Then from behind the right ear first moving forward, line up to the point where you left off to the right of the ear as shown in figure 20-31. The

155.133

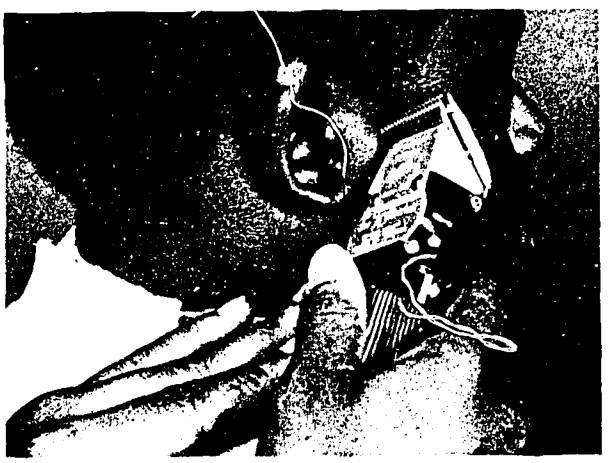
Figure 20-27.—Curly hair side view.

155.135

Figure 20-29.—Combing the hair with a fork-type comb side view.

155.134

Figure 20-28.—Combing the hair with a fork-type comb front view.



155.136

Figure 20-30.—Position of the clipper in front of the ear right side.

same procedure is repeated for the left side of the head. See figure 20-32.

Step 2

When you have completed the lining of both sides of the head, begin tapering (fine hairs off) the neck, stopping at the ear lobe level. See figure 20-33. Do not cut upward, this type of hair is easily gapped. When cutting it, the taper must be light, not taking much off, and should be done with a comb and clippers as shown in figure 20-34.

Step 3

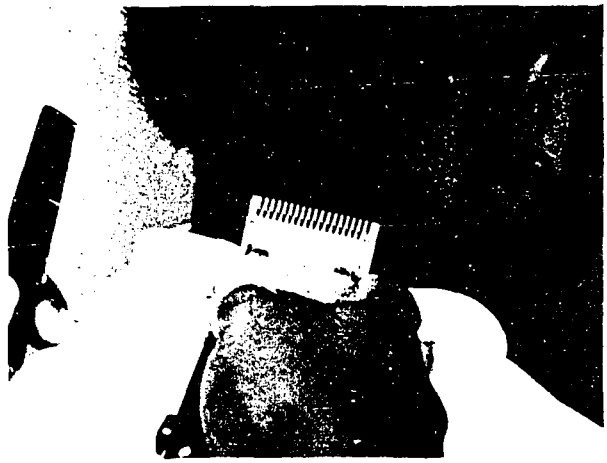
Cut the hair using the freehand method from the back right side of the head to the front right

155.137

Figure 20-31.—Position of the clipper in back of the ear right side.

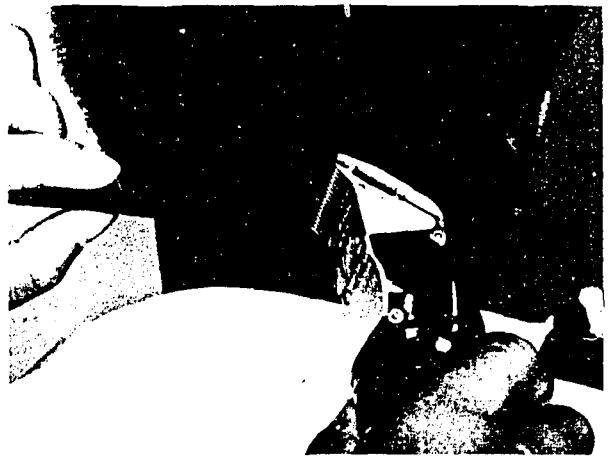
155.138

Figure 20-32.—Position of the clipper left side.



155.139

Figure 20-33.—Tapering the back of the head.



155.140

Figure 20-34.—Finishing the taper.

side of the head. See figures 20-35 and 20-36. After each complete forward motion, start again moving to the left side of the starting spot previously cut (fig. 20-37). Then cut from the back to the front in an even, well tapered and well rounded manner as shown in figures 20-38 and 20-39. Continue from the right side of the head to the left side of the head. See figure 20-40.

Step 4

For finishing, use the 000 blade. Begin lining around the top of the ear as shown in figure 20-41. Complete the full line from behind the right ear up and around to the top of the ear. See figure 20-42.

155.141
Figure 20-35.—Cutting free hand from the back right side.

155.143
Figure 20-37.—Cutting free hand back of the head.

155.142
Figure 20-36.—Cutting free hand front right side.

155.144
Figure 20-38.—Cutting free hand top right side.

Step 5

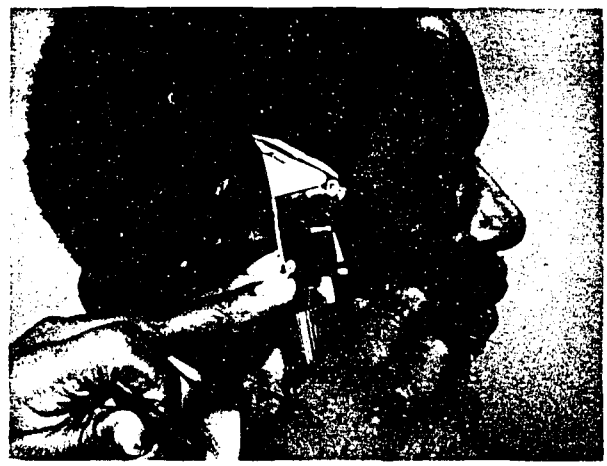
Taper up the back of the neck cleaning up the small hairs (fig. 20-43). The taper should give an appearance as shown in figure 20-44.

If your patron desires a "complete line" around the front, begin by lining in front of the sideburns up and around the head. See figure 20-45.

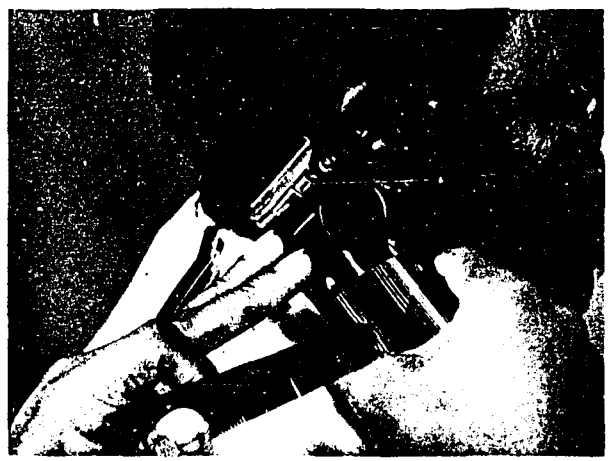
155.145
Figure 20-39.—Completed taper right side.

155.146
Figure 20-40.—Tapering left side of head.

The finished product should be neat, even, and rounded as illustrated in figures 20-46 through 20-49.



155.147
Figure 20-41.—Lining around the top of the ear.

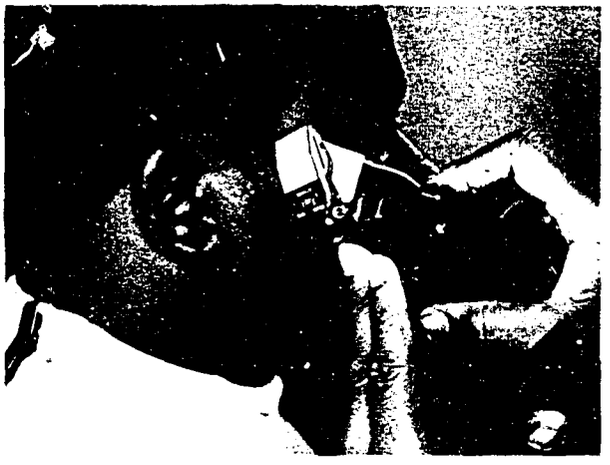


155.148
Figure 20-42.—Completing full line taper around the ear.

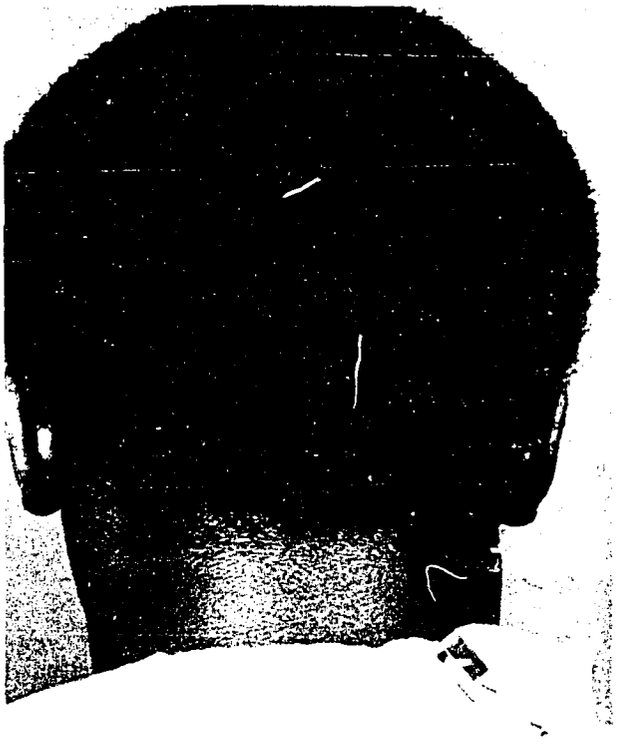
CUTTING HAIR WITH AN ELECTRIC SHEAR

As presented here, each hair type has a series of illustrations for right side, left side, top, and back. These illustrations are not intended as rigid directions; each barber develops his own working procedures. Rather, they are intended to suggest techniques that

155.149
Figure 20-43.—Tapering the back of the neck.



155.151
Figure 20-45.—Lining up and around the front of the head.



155.150
Figure 20-44.—Completed back of the neck taper.

155.152
Figure 20-46.—Finished product side view.

155.153

Figure 20-47.—Finished product left front view.

155.154

Figure 20-48.—Finished product rear to front side view.

you will find helpful in mastering your electric barber shear. In each case, the model shown has already been outlined around the ears.

In figure 20-50, straight and wavy hair are illustrated. The flexibility of the electric barber shear is illustrated in figure 20-51. Notice the relative positions of the comb and shear, and the direction of electric shear movement.

STRAIGHT HAIR

RIGHT SIDE.—The white arrows show the direction of movement of the electric shear (generally short arcs or light, straight strokes). See figure 20-52. Notice the absence of lines as barber shears seem to avoid them with no effort.

LEFT SIDE.—Similar treatment is given to the left side. The barber operates with wrist action rather than action of the whole arm. See figure 20-53.

TOP.—The bulk is removed a little at a time with light, arched strokes of the wrist, using a "flat top" comb (fig. 20-54).

BACK.—Barber works along the comb to remove excess bulk, working forward to taper the back neckline. See Picture No. 5 of figure 20-55 for a completed haircut from the back.

WAVY HAIR

RIGHT SIDE.—As a barber, one of your greatest challenges is to prevent the "skinned look" when removing bulk on wavy hair. Picture No. 1 of figure 20-56 shows the model's right side before the hair is cut. You can take off small amounts of hair, exercising control with natural wrist action over a comb. Short wrist-movement strokes rapidly gives the desired result, as shown in Picture No. 5 of figure 20-56.

155.155
Figure 20-49.—Finished product front view.

LEFT SIDE.—As shown in Picture No. 1 of figure 20-57, the left side of the model requires as much removal of bulk as the right side. Similar strokes over a small comb once again achieve the desired effect as shown in Picture No. 4 of figure 20-57.

TOP.—Extremely wavy hair of the model shown in figure 20-58 would normally require much time and effort to properly remove bulk from the top. Instead, use the electric shear with a large "flat top" comb when working on the top. This method allows you to remove the required amount of hair and to blend top to sides without skinning or leaving lines. Picture No. 5 of figure 20-58 shows finished result.

BACK.—Using the small comb, remove small amounts of hair, shaping the hair without removing too much. Notice the different positions of hand and shear illustrated in figure 20-59. The shear does not present problems to a left-handed barber.

CURLY HAIR

Techniques for using the electric barber shear in cutting curly hair are depicted and described in the illustrations that follow. Four types of hair styles are covered, the natural look, the long trim, the close trim, and the "Quo Vadis." Steps in cutting each of these styles are shown in a series of illustrations with accompanying explanation, figures 20-60 through 20-63.

NECK SHAVE

Although some barbers use fine clipper blades for cutting the hair around the ears and on the neck and dispense with the shave, the job is not as smooth as when the neck is shaved. The outline made around the ears with a razor adds a touch which can not be achieved with the clipper alone.

Upon completion of the haircut, apply warm lather along the hairline, around the ears, and down the back of the neck. Using the fine teeth of the comb, straighten the hairs over the outline.

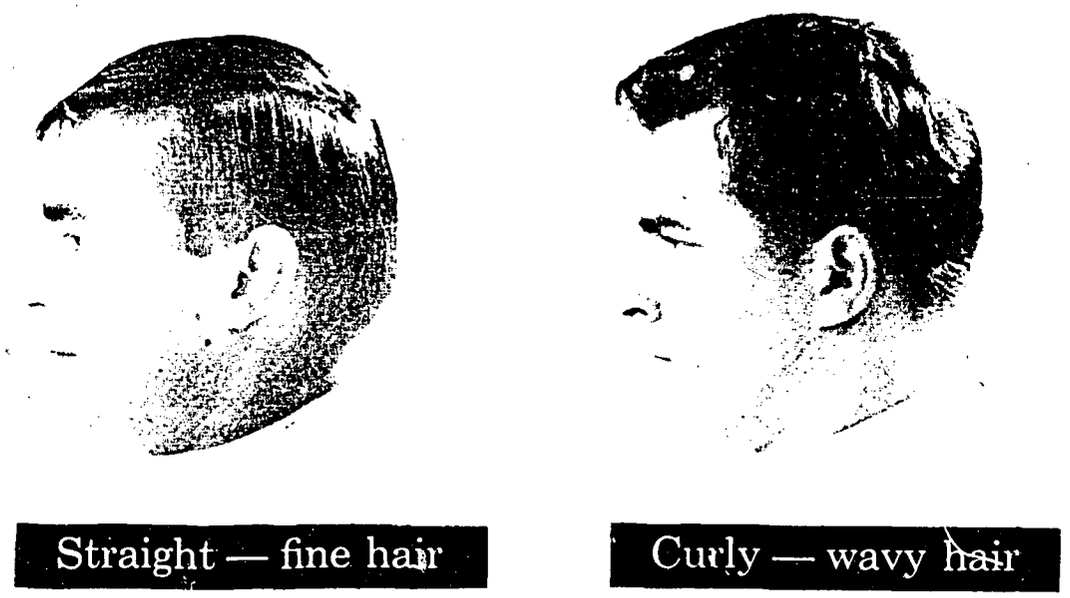
As indicated in figure 20-64, using the free-hand stroke, start to shave at the right temple. Follow through with this stroke, shaving around the ear and working down the side of the neck.

Using the REVERSE BACK HAND STROKE, make the outline level above the left ear, with the corner of the eye. Change to the FREE HAND STROKE over the ear and down the back of the ear. Clean the lather from the razor and continue down the side of the neck, using the REVERSE BACK HAND stroke. See figure 20-65.

When finished with the neck shaving, remove all lather with a warm, damp towel. Then part the hair properly and comb it carefully. Dust off any loose excess hair around the neck before removing the chair cloth.

SAFETY PRECAUTIONS

As a Navy barber, you must observe safety rules in all your work. You must think in terms of safety—what you should do to protect yourself and your customers. But you must do



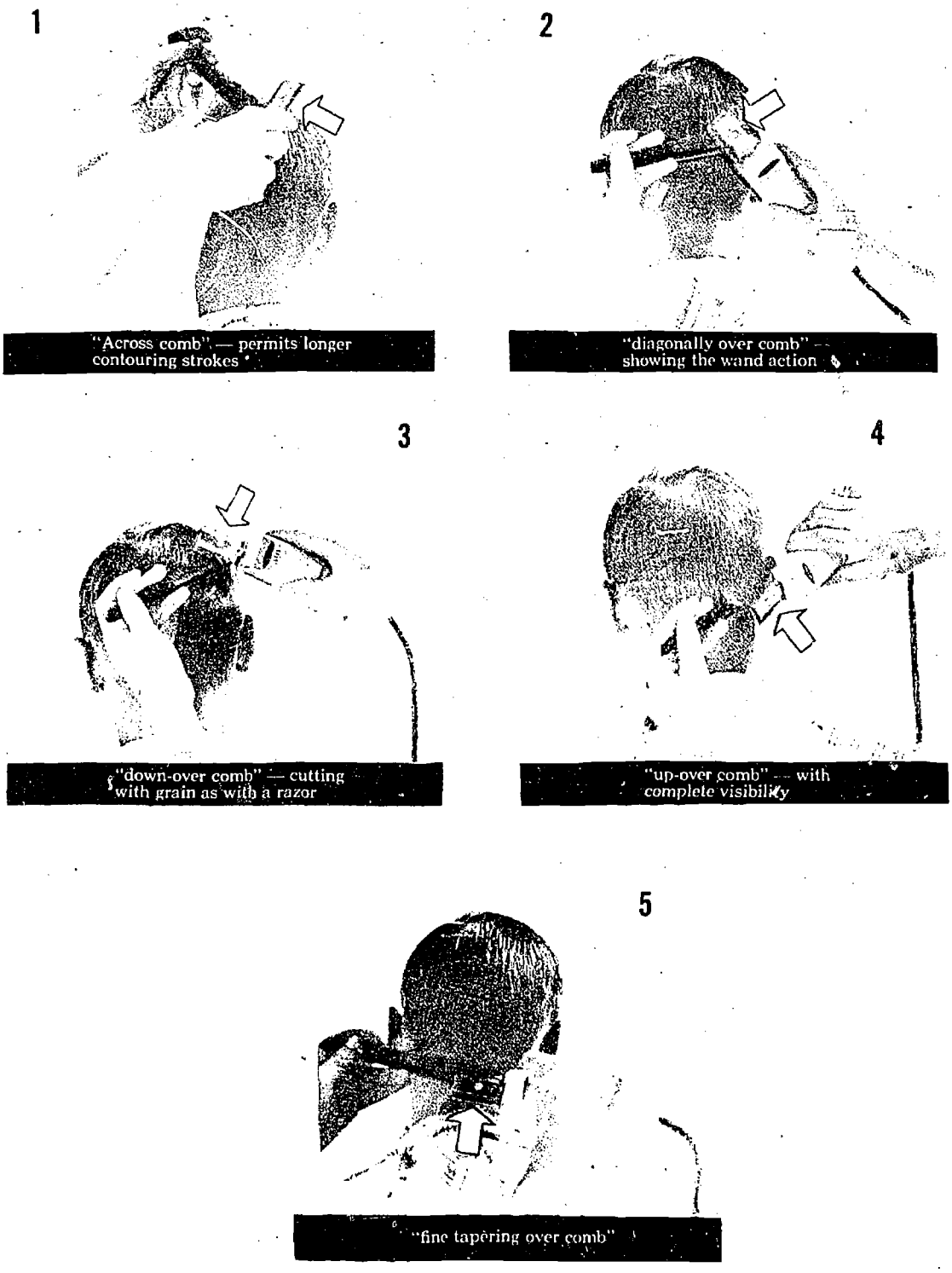
155.156

Figure 20-50.—Straight hair and wavy hair.

more than think. You must PRACTICE SAFETY in the barbershop.

What safety precautions should you take when cutting hair and shaving the neck? Below are some suggestions.

- Turn the barber chair to a position which will not permit the customer to see people in the passageway. If he sees them, he may call to or talk with them, causing a distraction to you while cutting his hair.
- When not in use, keep your tools stored in the sterilizing cabinet or in a drawer, properly wrapped or in a special container or position. If they are left on top of your working cabinet they will not remain sanitary, and chances are you will injure your hands or fingers on them.
- Be very careful when making the outline around the ears with the shears, so that you do not cut the skin with the sharp tips.
- Pay particular attention to the use of the razor when shaving around the ears and the neck. Most small cuts are made by lack of proper care in handling the razor.
- Permit no distractions from other customers in the barbershop.
- If a customer is accidentally injured, send him to the sick bay, and report the accident to the officer of the deck.
- Aboard ship stow your gear in such a manner that they will not be damaged by the roll of the ship.
- Make sure that the chair locking device functions properly.



155.157

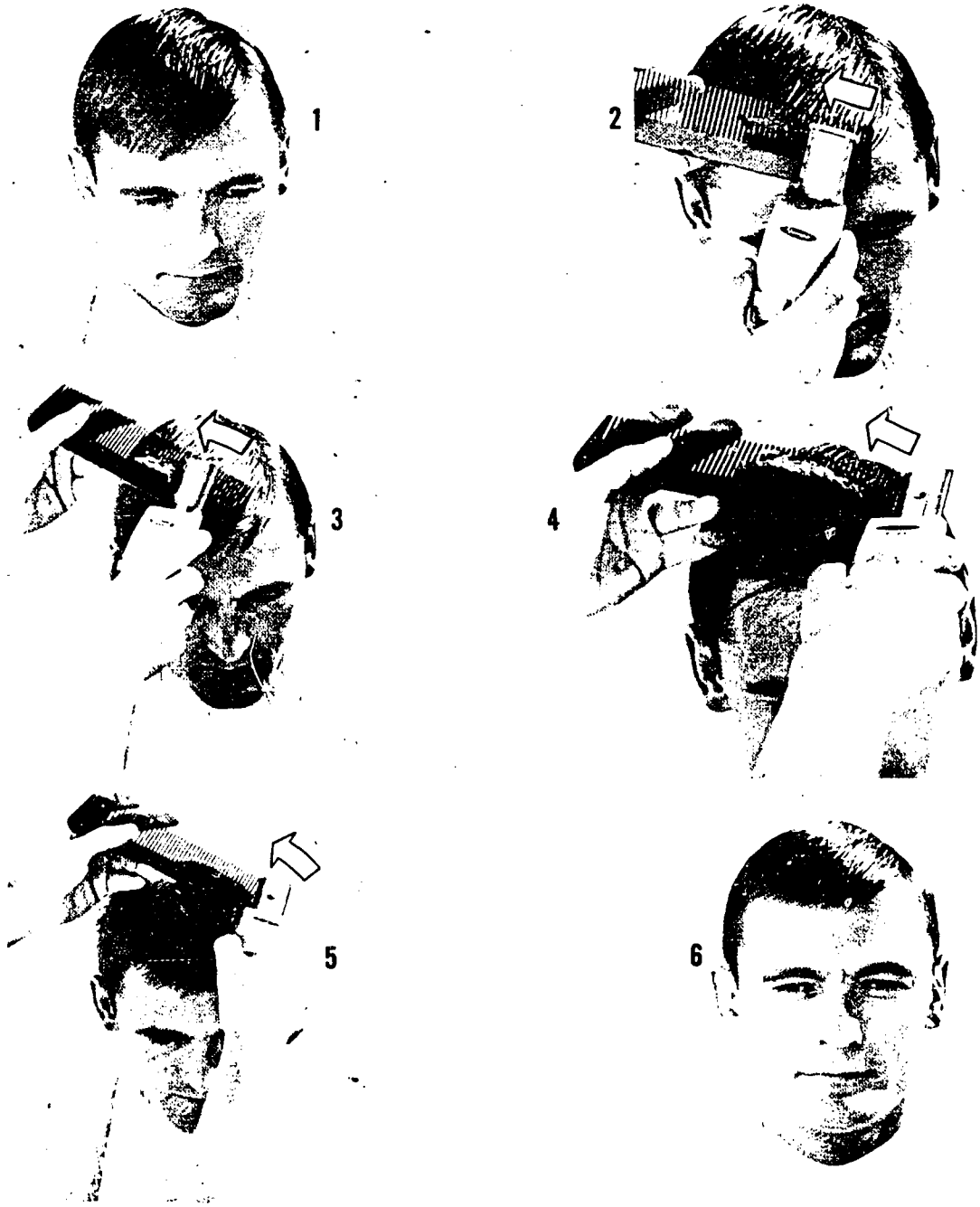
Figure 20-51.—The flexibility of the electric barber shear.

155.158

Figure 20-52.—Right side.

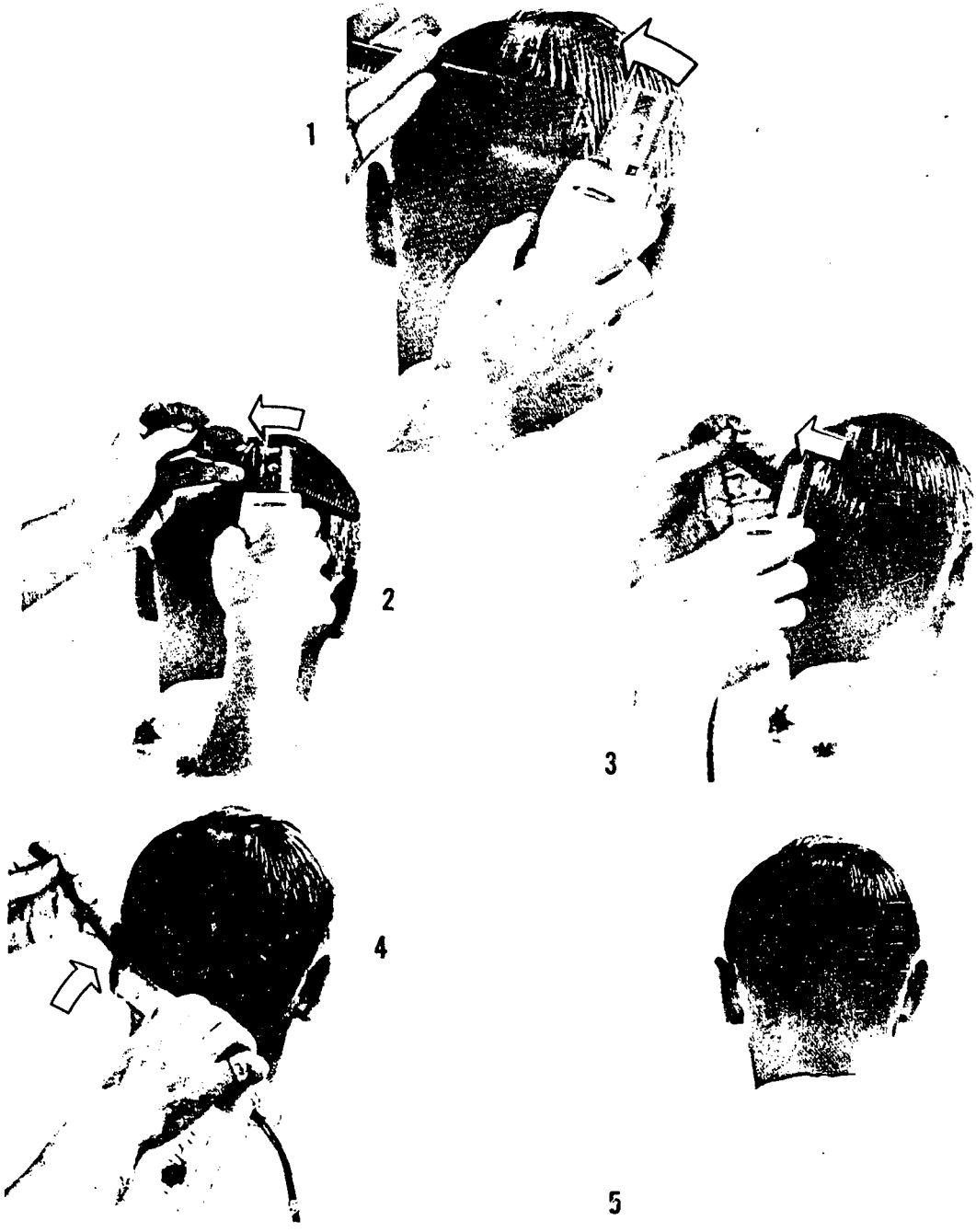
155.159

Figure 20-53.—Left side.



155.160

Figure 20-54.—Top.



155.161.1

Figure 20-55.—Back.

155.162.1

Figure 20-56.—Right side.

155.163.1

Figure 20-57.—Left side.

155.164.1

Figure 20-52.—Top.

155.165.1

Figure 20-59.—Back.

Man's Natural

When styling the man's natural, comb the hair outward and you will find that when curly hair is combed outward it will appear uneven. To achieve a smooth even appearance proceed as noted and illustrated in figure 20-60.

1 Comb with a fork-type comb.

2 The Natural is styled with a neckline. The 000 blade is used for this.

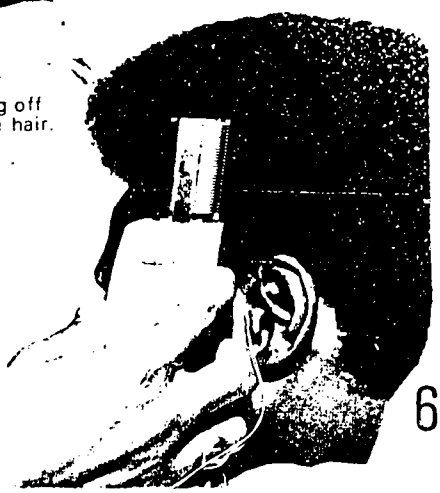
3 Begin cutting upward on the back of the head.

155.166.1

Figure 20-60.—The man's natural.

4 Continue cutting upward, cutting off approximately one-eighth of the hair.

5 Hold the blade at an angle which will give roundness to the finished creation.



6 Use the shear in a more straight up-and-down position on the rather thin hair in front.

7 Note the angle of the blade. This position must be used in order to achieve the desired roundness

8 Continue cutting forward, using the previous method.

155.166.2

Figure 20-60.—The man's natural.--Continued

9 At this point the left side of the head has been cut, but the right side has not. This back view shows how smooth the shear will cut.

10 The front view shows the half cut head. Note that when the hair is completely cut, the rough edges still must be trimmed away.

11 The point of the shear is used to remove all hair which stands out over the hairline.

12 Continue around the ear, using the previous steps.

13 Shaping the front of the sideburn.

155.166.3

Figure 20-60.—The man's natural.—Continued

14 Styling the hair along the front of the forehead.

15 Styling the hair at the corner of the forehead.

16 Use the shear in a straight-up position to style the long hair which might stand out across the top of the head. In this position the shear can be manipulated back and forth.

17 To complete the styling, the shear is used to finish the smoothness and evenness of the hair.

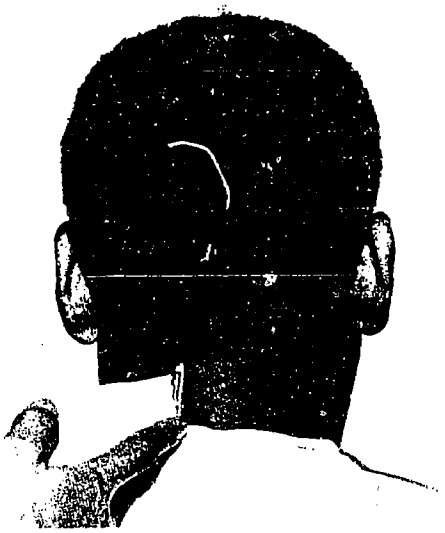
18 Final picture. The finished creation.

155.166.4

Figure 20-60.—The man's natural.—Continued

The Long Trim

The "long trim" is a combination of long hair and long taper. The clipper is used to cut the taper; styling is effected with the electric shear.



1 Comb the hair from front to back. With the 000 blade, start at the bottom of the taper and cut a line across the neck.

2 With the 0 blade, cut upward for another ⅛-inch.

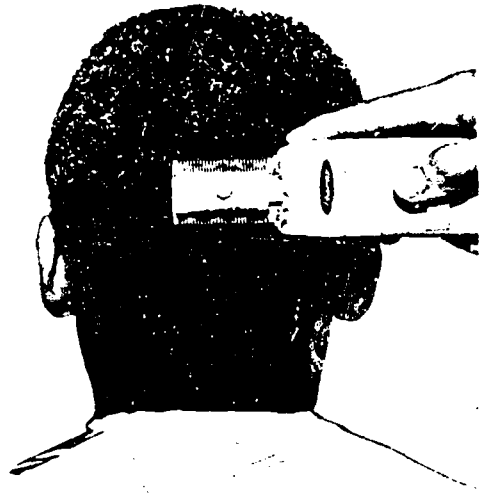
3 With the 0A blade, continue tapering.

4 Begin styling with the shear on top of the head, cutting from front to back. The shear is used freehand. Pressure will control the amount of hair to be taken off.

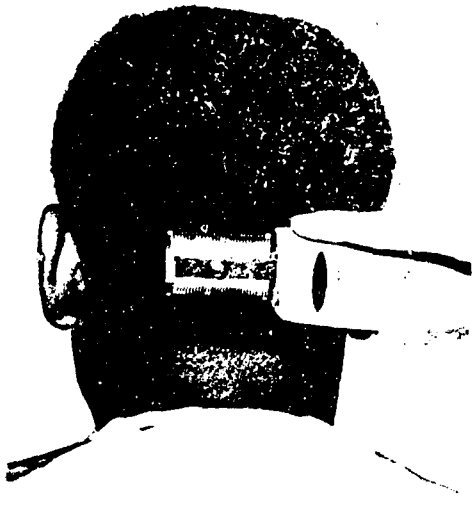
155.167.1

Figure 20-61.—The long trim.

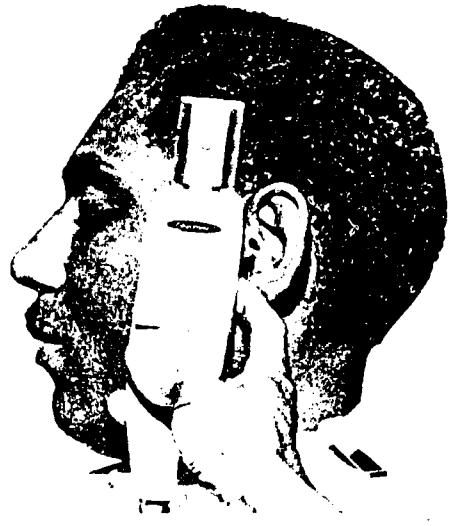
5 With the blade tilted slightly downward, continue cutting toward the back.



6 Hold the blade in an up-and-down position.



7 Approaching the bottom of the taper, apply pressure to the blade in order to cut all wild hairs that might hang over the short taper.



8 When cutting the side, hold the shear in a straight-up position, cutting from front to back.

155.167.2

Figure 20-61.—The long trim.—Continued

9 At this point, the shear begins to follow tne head contour.

10 The back section of the head is cut using the shear in circular movements, to achieve a rounded effect.

11 Touch up the hair styling.

12 Final picture. The finished product.

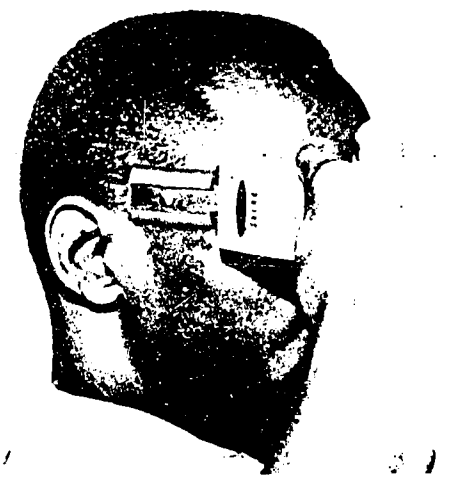
155.167.3

Figure 20-61.—The long trim.—Continued

The Close Trim

The "close trim" (commonly called the "clippers all around") is always cut with the grain of the hair, except when tapering the neck. The electric barber shear may be used here in skin-to-hair tapering, for convenience and time-saving. As shown, the back of the shear rests on the scalp.

1 Comb the hair from front to back. Beginning on the right side of the head, cut downward with the grain of the hair



2 Continue cutting downward, shaping the sideburns.

3 Hold the shear in an upward position and taper from front to back.

4 Continue cutting, following the growth of the hair.

155.168.1

Figure 20-62.—The close trim.

5 Note the shear at this point. Pressure should be applied to the blade near the hairline.

6 Applying pressure to the blade enables the blade to cut hairs standing out along the hairline.

7 Tilt the shear forward to achieve closer cutting with the downward motion. Neck tapering begins at this point. For the first time the shears begin cutting against the grain of the hair.

8 The first cut must begin at the bottom of the taper and continue upward to the lower tip of the ear lobe.

9 Continue around the neck, using the same procedures.

155.168.2

Figure 20-62.—The close trim.—Continued

The Quo Vadis

The "quo vadis" is a close cut, normally cut extremely close on the sides.

1 The Oster Cordless Clipper is used to taper the neck. Begin with the 000 blade and cut upward to the bottom of the ear.

2 Using the 0 blade, continue cutting upward for ⅛-inch.

3 Complete neck tapering using the 0A blade. Note the clipper position and the degree of turning in previous steps. This is done to apply pressure to the outer blade, thus achieving perfect tapering along the hairline.

4 Hold the shear in a flat position, resting on the head. Cut from back to front. Begin cutting at the point where hair starts growing forward.

155.169.1

Figure 20-63.—The Quo Vadis.

5 Continue around.

7 Place the shear on center back of the head when cutting forward.

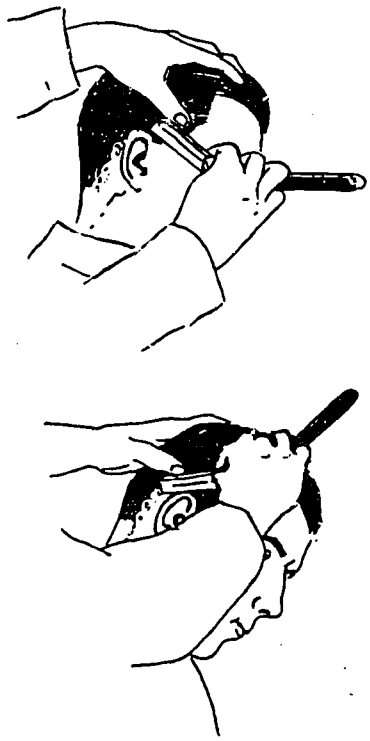
6 Hold the shear flat on the head as cutting continues forward, taking off as much hair as the blade will cut.

8 Hair on top is very wavy. Therefore it is often necessary to repeat the stroke in order to achieve a smooth effect.

9 Final picture. The finished product.

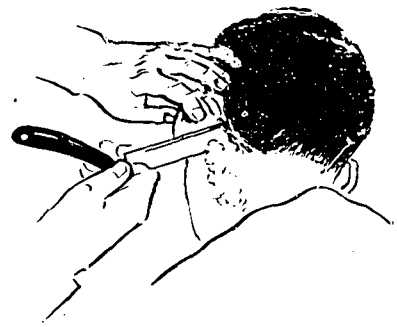
155.169.2

Figure 20-63.—The Quo Vadis.—Continued



155.36

Figure 20-64.—Shaving around right ear.



155.37

Figure 20-65.—Shaving around left ear.

CHAPTER 21
SKIN DISEASES AND THEIR PREVENTION

This chapter will help you become familiar with the general structure of the skin, scalp, and hair and with the common diseases and parasites that afflict these areas. While you should definitely not be trying to diagnose diseases, a certain amount of basic knowledge will help you to recognize danger signals and alert you to conditions that should be referred to the medical officer. The latter part of the chapter is concerned with personal and professional hygiene which barbers must practice to prevent the spread of diseases through the barbershop.

SKIN AND SCALP

The skin is the outer covering of the body. It is soft and strong, pliable, and durable. Because of the nerve endings responsive to touch and pain in the skin, it is an important organ of sensation. It is an organ of excretion and absorption—it assists the kidneys in throwing off body wastes. It is a poor conductor of heat—it protects the body from cold and diseases. If the skin is punctured or destroyed, an entrance into the body is provided for disease germs.

The scalp is that portion of the skin which covers the top of the head. The scalp is thicker than any skin on the body except that on the heel. Long hairs of different hues and textures grow on the scalp, and certain fungi and diseases afflict it. As a barber, you will be vitally concerned with these afflictions.

LAYERS OF SKIN

The main divisions of the skin are:

1. The EPIDERMIS, the outermost portion (epithelium).
2. The DERMIS, the second division, or corium.
3. The SUBDERMIS, the third division, or subcutaneous tissue.

The epidermis is the outside defense mechanism of the body, for the body can live but a short time when this layer of skin is destroyed. It has several layers of cells but no blood vessels. The bottom layer is known as the germinating layer—it is the only layer of the epidermis which has the power to reproduce and give new life. In contrast with the bottom layer, the outer layer of the epidermis constantly sheds its cells—in bathing, shaving, shampooing, and so forth. They are rubbed off with nearly every motion.

Under the epidermis is the dermis or the true skin. It is thicker than the epidermis and consists of highly sensitive connective tissues arranged in the form of a network. These tissues contain the blood vessels, oil glands, sweat glands, fatty tissue, lymphatics, and little pockets called hair follicles. The dermis also contains the papillae, elevations of blood vessels and nerve endings, giving the skin a keen sense of touch.

The fibers of the dermis are elastic by nature and thus give the skin its elasticity.

The subdermis, or subcutaneous tissue, is a continuation of the dermis. It is composed of more blood vessels, sweat glands, nerves, lymphatics, and parts of the hair follicles of deeply seated hairs.

The dermis and subdermis portions of the skin can hold from one-half to two-thirds of the blood in the body. For this reason, hot applications to the body withdraw a large amount of blood from the internal circulation. Cold air, or cold applications, on the other hand, cause blood vessels on the surface of the skin to contract, forcing the blood from the skin into deeper blood vessels.

Sweat Glands

Sweat glands are appendages of the skin which help the kidneys discharge waste from the body and which cool the body by perspiration. There are hundreds of them to every square inch of the body's surface, but they are most abundant under the armpits, on the forehead, in the palms of the hands, and on the soles of the feet.

Sweat glands are tubular in shape and their deeper portions are coiled in balls in the subdermis. A meshwork of capillaries surrounds these coils and only the membranes of their cell walls separate them from the cavity of the glandular tubes.

Sweat glands are amply supplied with secretory nerve fibers. Their activity may be increased by external heat (hot towels), strong emotions, muscular exercise, and various drugs. Profuse sweating, for example, is usually caused by a high external temperature or muscular activity.

Oil Glands

Oil glands are attached to the hair follicles and are found all over the body except on the palms of the hands and the soles of the feet. There may be as many as 6 attached to 1 hair follicle, and as many as 2 million on the surface of the body.

Oil glands secrete a fatty substance that oils the skin and makes it soft and pliable. It lubricates the hair and prevents it from becoming brittle. It also helps to remove waste materials, and protects the skin from wind, sunburn, and cold.

The output of these glands seems to be stimulated by an increased blood supply to the gland and a rise in temperature. The quantity and quality of fat in food also affects their output. Unlike the sweat glands, oil glands do not come under direct nervous influence.

HAIR

Hairs are slender, cylindrical structures embedded in the depressions or pockets of the dermis known as hair follicles. Each follicle has one or more muscles which contract and compel the hair to assume a more upright position. At the bottom of the hair follicle is a cone-shaped elevation known as the papilla, which is the gateway through which nourishment passes from the blood stream to the hair. The papilla is actually the productive organ of the hair. The cells which grow on top of the papilla form the bulb of the hair. Since a hair must have nourishment, it will die if separated from the papilla.

The lengthwise divisions of the hair are the bulb, the root, the shaft, the point, and the tapered end of the upper extremity. The cross sections, or layers of a hair, are called cuticle, cortex, and medulla, beginning with the cuticle on the outside.

The color of hair is due to a pigment. Absence of this pigment results in white hair. The shape of hairs gives them certain characteristics. They may be round and straight, oval and wavy, and flat, curly or kinky.

Hair serves three important purposes: (1) as a protection against weather and injury, (2) as a heat preserver, and (3) as a promoter of beauty.

GENERAL CONDITIONS OF SKIN AND HAIR

As a barber, it is necessary that you be able to recognize healthy and unhealthy conditions of the skin and hair. This ability you will develop through study and experience. You have just learned that the epidermis constantly sheds its cells in the form of scales; that the sweat glands throw off wastes in perspiration; and that the oil glands give off an oily substance which keeps the skin soft and pliable.

Scales shed by the epidermis, on all portions of the body except the scalp, rub or fall off naturally, or during bathing. On the scalp, however, they are held by the hairs. If the oil from the oil glands is allowed to remain on the scalp too long, it mixes with these scales. Added to this mixture is the waste matter given off by sweat glands of the scalp.

When all these wastes, mingled with dust and any other foreign matter, are allowed to accumulate and cake on the surface of the scalp, the hair follicles become clogged and the hair is choked. Thus deprived of air and nourishment, and unable to live under such hampered conditions, the hair dies (atrophies) and falls out. New hairs will continue to grow back for a while; but if the condition is allowed to exist for a long time, the hairs give up the struggle for life and die. Permanent baldness is the result.

Healthy Skin and Hair Conditions

Healthy Skin.—The characteristics of healthy skin are:

- Good, healthy color
- Smooth surface
- Freedom from disease
- Flexibility

Healthy Hair.—Healthy hair is characterized by:

- Glossiness or sheen
- Normal quantity—a full head of hair (A full head of hair should be taken to mean fairly even coverage of the scalp. The thickness or thinness of a healthy coverage varies from person to person.)
- Elasticity—healthy hair will stretch about one-fifth of its natural length and will spring back when released
- Rate of growth—healthy hair grows from 1/8 to 1/4 inch every 10 days
- Freedom from parasites or diseases

Unhealthy Skin and Hair

Unhealthy Skin.—Unhealthy skin can best be characterized by:

- Tightness
- Eruptions
- Pallor or sallowness
- Roughness
- Lines
- Excessive dryness or oiliness

The causes of unhealthy skin are lack of personal cleanliness, improper diet, indigestion and systemic disorders, poor blood circulation, improper glandular activity, or some type of disease.

Unhealthy skin is further characterized by the presence of lesions. A lesion is a change in the normal condition of the skin through injury or disease. Symptoms of lesions are a burning or itching sensation and changes in the normal appearance of the skin.

Unhealthy Hair.—The characteristics of unhealthy hair are the opposite of those of healthy hair. Unhealthy hair:

- Is dry and brittle.
- Grows slowly.
- Is dull in color.
- Has excessive split ends.
- Shows abnormal shedding.
- Results in bald spots, or baldness.
- May have excessive oiliness.

DISEASES AND PARASITES OF THE SKIN AND SCALP

Diseases of the skin and scalp are grouped below: NONCONTAGIOUS ailments and CONTAGIOUS diseases and parasites. Some of the latter, such as lice, are not diseases in the usual sense of the word. Some of the parasites and diseases pertain primarily to the scalp, while some affect other parts of the skin.

NONCONTAGIOUS AILMENTS

A number of skin and scalp ailments are not communicated from one person to another. Those of greatest concern to the barbers are described below.

Ailments of the Sweat Glands

The most common disorders of the sweat glands are:

1. Excessive sweating. Excessive sweating (when not caused by exercise or external heat) results from a functional disorder of the sweat glands, such as nervous disturbance.
2. Lack of perspiration. Lack of perspiration is often caused by fever or certain skin diseases. The skin becomes dry and sensitive to external irritants. Emollients such as olive oil and skin cream soothe the skin and aid in curing this ailment.
3. Offensive odor of the perspiration. This ailment may be caused by a functional disturbance of the kidneys, or by certain bacteria which contaminate the sweat. Frequent bathing with plenty of warm water and soap aid in eliminating the odor. Antiseptic lotions and powders, and salt baths, are also helpful. If the odor continues in spite of these hygienic measures, the person should consult the medical officer.

URIDROSIS is the presence in the sweat of urinous material, producing the characteristic odor of urine. Although this disorder is not contagious, the sufferer should be urged to report to the medical officer because the condition indicates internal disorder.

4. Prickly heat. Prickly heat is an acute inflammation of the sweat glands where little blisters are formed. The blisters become red and the skin burns and itches. Excessive heat, especially moist, causes prickly heat. Dusting powders and alcohol rubs are helpful cures.
5. Sudamen, a noninflammatory disorder of the sweat glands. This ailment is characterized by many very small eruptions, pinpoint to pinhead size, of thin-walled and translucent vesicles. The trouble is caused by excessive sweating and the closing of the sweat ducts. Alcohol

rubs and washing with a rough cloth relieve this difficulty.

Ailments of the Oil Glands

The chief noncontagious ailments of the oil glands are:

1. Acne. Acne is an inflammatory disease of the skin which occurs in or around the oil glands. It affects the face chiefly, and is characterized by elevations of the skin, some of which may be inflamed and contain pus.

Acne has numerous causes, most of which are internal, such as glandular or digestive disturbances and nervous conditions. Irritating soaps or cosmetics, close shaving, poor hygiene, and fingering tend to aggravate the disturbance.

2. Blackheads. Blackheads are dark plugs of hardened oil and other matter in the mouths of oil glands. They may be caused by disorder of the gland, digestive disorders, or failure to keep the skin thoroughly clean. Regular washing with warm water and soap generally helps to clear them up, but if they are stubborn the medical officer should be consulted.

3. Wen, or sebaceous cyst. This is a disease of the oil gland resulting in a tumorlike formation. The cure for this ailment is electrolysis or an operation. Sebaceous cysts are generally found on the scalp, neck or back.

Dandruff

The term DANDRUFF is generally used rather loosely to describe any of several scalp conditions characterized by the presence of a quantity of white or grayish flakes or scales. We have said previously that the epidermis constantly sheds its scales. When there is an abnormal amount of shedding—or when the scalp becomes caked with scales—we call the condition dandruff.

Psoriasis

Psoriasis is a chronic inflammatory disease of the skin, sometimes encountered on the scalp. It is characterized by dry, red, round patches of various sizes, covered with overlapping silvery adherent scales. At times it extends beyond the hairline all over the head, giving rise to pinkish-dry, scaly, well-defined bands. If the scales are removed from the bands no pain is experienced; but the spot from which they were taken is red and bleeds easily.

Eczema

Eczema is an inflammation of the skin. It has many forms of dry or moist lesions and may be acute or chronic in nature. It generally begins in the form of a small sore, accompanied by itching, burning, and the discharge of scales or crusts. It occurs in both sexes and at all ages.

Although eczema is generally not a contagious disease, you should refer suspected victims to the medical officer and take the recommended precautions for diseases known to be contagious.

Hives

Hives is a skin disease characterized by itching and red elevations. The lesions vary in size, distribution, and intensity. Hives are an allergic reaction and frequently are caused by the individual's sensitivity to certain foods.

Application of a soda solution with a soft cloth or cotton pledget on the eruption alleviates the itching, but medical attention is required to eliminate the underlying causes.

Baldness

Baldness is the abnormal loss of hair from any cause. It usually affects the scalp, but it may affect any part of the body. There are several types of baldness. The reason for baldness, for the most part, is hereditary, though premature baldness may be caused by improper care of the scalp and hair or by certain diseases.

CONTAGIOUS DISEASES AND PARASITES

All of the diseases and parasites listed and discussed below are communicable.

Impetigo

Impetigo is a general term designating an eruption of pus spots which are capable of crusting over. Varying in numbers from 5 to 50, they arise over a red blister containing a clear fluid. The sores are soon surrounded by

a pink ring-like discoloration. Crusts, having the appearance of being plastered on the skin and extending slightly beyond the sores, usually form in drying. The freshly formed crust is a golden-yellow color, and there is no bleeding when the crust is removed or falls off. The infecting agent (streptococcus) spreads from one sore to the surrounding skin area, and it has been known to cover the entire face and scalp. More often, however, the sores localize on certain portions of the face. Infected fingers, hat bands, collars, towels, wash basins, and particularly shaving gear may transmit the disease.

Ringworm

A name applied to many different kinds of fungal infection of the skin. The medical term is TINEA, usually with a modifying term, such as TINEA TONSURONS (tinea of the scalp) or TINEA BARBAE (tinea of the beard). The latter is commonly called "barber's itch" because it was often spread by lack of cleanliness in the old-fashioned barbershop. The various types of tinea differ considerably in appearance, but any scaly, highly irritated patch of skin or scalp should be suspected and the sufferer referred to the medical officer, since any form of the disease is highly contagious.

Scabies

Scabies is the medical name for the ITCH, which is a highly contagious animal parasitic skin infection. It is caused by the ITCH MITE, which burrows under the skin, causing intense itching. Scratching the infected area may complicate the disorder by causing eczema.

Pediculosis Capitis

Pediculosis capitis is infestation of the scalp by the head louse, an animal parasite, which feeds on the scalp and causes irritated spots that itch.

The head louse is transmitted by infested hats, combs, or other personal articles. It thrives among persons who are careless about cleanliness and spreads from them to others.

The lice feed on the scalp, causing irritation which is made worse by scratching. Crusts are formed, which dry and cause a matting of the hair. Female lice produce ova or nits in large numbers and attach them to the hairs with a cement-like substance. The nits are white and translucent, and as many as 12 can be found on one hair. They hatch in from 3 to 7 days.

WHAT THE BARBER CAN DO ABOUT SKIN AILMENTS

The barber can do the following things concerning skin ailments:

- He can prevent the spread of contagious diseases in the barbershop through satisfactory personal hygiene and adequate shop sanitation. Everything about his person and uniform should be clean. His hands should be washed frequently. All barbering equipment should be sanitized in accordance with Navy requirements.
- He can urge a patron with a skin or scalp ailment to see the medical officer.
- He can emphasize the seriousness of contagious diseases and parasites to the patron as they affect him and as they may affect the ship's crew.
- He can stress the importance of cleanliness and other good hygienic practices in preventing skin ailments.

SANITATION AND HYGIENE

Sanitation means the use of sanitary measures or the science of sanitary conditions. The purpose of sanitation is the prevention of infections and diseases, whether it be in the galley or the ship's barbershop.

Hygiene means a system of principles or rules established and followed for the purpose or promoting health. Personal hygiene, for example, refers to the rules followed and the things an individual does to safeguard his health and to prevent spreading disease to others. The personal hygiene of a barber must be of a high standard.

Because sanitation and hygiene are both concerned with cleanliness and the prevention of diseases, they are frequently used as synonymous terms.

BACTERIA

If you understand bacteria and the effect they have upon individuals and life in general, you will understand and appreciate the significance of sanitation and hygiene in the barbershop.

Bacteria are the simplest forms of vegetable life. They are very small, single-celled organisms which can be seen only under a

microscope. Since they are very small, they are called microorganisms.

Bacteria are so small that as many as 1500 rod-shaped ones can find room on the head of a pin. Millions of them are inside and outside the human body. They are in the air, soil, and water. Thousands of them may be in one drop of water.

Types of Bacteria

There are two types of bacteria:

1. Pathogenic (commonly called germs). These bacteria are dangerous. They invade plants and animals and attempt to destroy them. As a result of their activity, diseases occur in the organisms or bodies attacked by them.

2. Nonpathogenic. Nonpathogenic bacteria are harmless. Some of them are even beneficial: nitrogen-fixing bacteria in the soil, bacteria in yeasts and beverages, and others. Life as we know it, in fact, could hardly exist without the nonpathogenic bacteria.

Although bacteria were discovered in 1683 by a lens grinder, Leeuwenhoek, of Delft, Holland, when he examined tartar from his teeth, it was not until the 19th century that Louis Pasteur demonstrated that CERTAIN SPECIES OF BACTERIA PRODUCE CERTAIN DISEASES.

Forms of Bacteria

Bacterium is a Latin word descended from the Greek word bakterion, meaning a rod or stick, which describes one of the classes of bacteria. The plural of bacterium is bacteria. Below are the three classes of bacteria:

1. Rod shape or bacillus
2. Round shape or coccus
3. Corkscrew shape or spirillum

The BACILLI (singular, bacillus) cause such diseases as typhoid fever, tuberculosis, and diphtheria. During times of scant food or other hardships the spores, which are the reproductive element of bacteria (comparable to seeds in other types of plants), encircle themselves with heavy membranes, in which condition they can stand excessive heat and cold and live for years.

The COCCI (singular, coccus) appear in groups as:

1. Staphylococci bacteria, which grow in clusters. They cause infections of various types.

2. Streptococci bacteria grow in chains. They are found in several types of throat and lung diseases, diseases of the digestive tract, and other ailments.

3. Diplococci, which grow in pairs and cause one type of pneumonia, mastoiditis, gonorrhea, one form of meningitis, and other diseases.

The SPIRILLA (singular, spirillum) are responsible for syphilis.

Reproduction

Bacteria reproduce rapidly under favorable conditions by multiplying. A single bacterium divides into two bacteria, which divide into two bacteria each. Under favorable conditions of temperature, moisture, and food, a bacterium divides every half hour. Bacteria thrive in damp, unclean surroundings.

Control

Fortunately, dangerous bacteria can be killed or kept within safe numbers through proper sanitation and adequate sterilization.

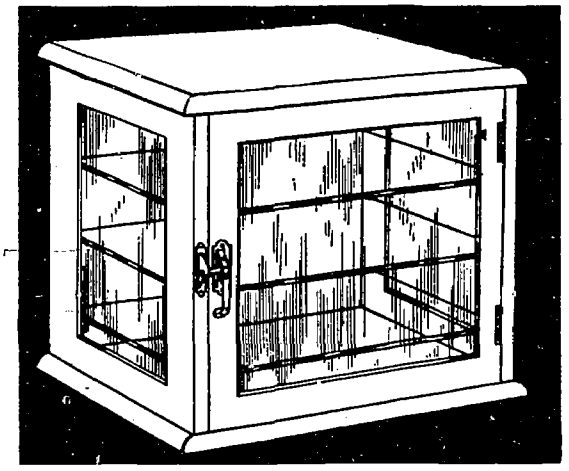
CHEMICAL AGENTS

Chemical agents are basically of two kinds: those that can be applied to skin and those which can be used on environmental surfaces. The first are generally referred to as antiseptics and the latter as disinfectants. Disinfectants are too strong to be applied to skin.

CHEMICAL DISINFECTANTS

Chemical disinfectants are germicidal solutions or substances which eliminate or reduce the number of bacteria. They must be used for adequate disinfection of barber instruments. The most commonly utilized chemical disinfectants for use in a barber shop are:

- Formalin (10 percent solution of formaldehyde)—Place small amount of formalin solution in a closed cabinet (fig. 21-1). Expose cleaned instruments to formalin vapors for 30 minutes to provide adequate disinfection. Method of choice for metallic instruments and clipper heads.
- Formaldehyde tablets--May be used as outlined above.



155.63

Figure 21-1.—A closed cabinet.

- Alcohol 70 percent—May be used for metallic instruments or combs.
- Wescondyne—Iodine base compound, preferred for disinfecting combs.
- Disinfectant, Germicide, Fungicide—A standard stock item useful for disinfecting combs.

Note: The use of Ultraviolet light for disinfection of barber instruments is not approved.

SANITARY PRACTICES

Sanitary practices pertain to the individual barber and the shop manager, and include everything they do to maintain a high state of sanitation in the shop.

A barber should be immaculately clean. He should keep his hair neatly cut and groomed. His fingernails should be clean and well trimmed. His uniform should be changed daily, or more often if necessary. His shoes should be shined. And he should pay particular attention to mouth and body odors. Use deodorants and mouth washes as necessary. A barber should wash his hands prior to attending each customer.

SANITARY REGULATIONS FOR BARBERSHOPS

The Manual of Naval Preventive Medicine requires that each barbershop have a copy of sanitary regulations posted in a conspicuous place, with a stipulation that all barbers at the naval installation read and agree to comply with the regulations.

Article 2-12 of the Manual of Naval Preventive Medicine states that:

1. Barbers will be free of symptoms of communicable disease.
2. Preemployment and periodic physical examinations will be required to ensure freedom from communicable disease, with special examinations conducted at the discretion of the medical officer.
3. Barbers must keep their persons and clothing clean when attending patrons, and will wear a washable outer coat or uniform.
4. Employees will wash their hands thoroughly with hot water and soap prior to attending each patron.

Even though a healthy skin is not easily penetrated by bacteria, if it has cuts, bruises, pimples, or any opening, there is a danger of infection from the hands, a dirty towel, or a comb, clipper, or razor that has not been disinfected. The only way to prevent such infection is through personal cleanliness and disinfected barbering tools.

Sanitary practices must be followed throughout the barbershop. Article 2-14 of the Manual of Naval Preventive Medicine gives a list of sanitary practices for the barbershop which you should keep posted at all times, as follows:

1. Therapeutic practices such as treating pimples, ingrown hair, et cetera, are prohibited.
2. The headrest of barber chairs will be covered with a clean sheet of paper or clean towel for each patron.
3. Freshly laundered towels will be used for each patron.
4. Only types of materials approved by the medical officer will be used to stop the flow of blood in case of "nicks." These materials will be applied only with freshly laundered towels or sterile cotton.
5. The treatment of eye conditions is prohibited.
6. Common hair brushes, dusters, shaving mugs, and shaving brushes are prohibited. The use of automatic dispensers or brushless shaving cream and clean towels, in lieu of brushes or dusters, is recommended.
7. Individual sanitary neck strips will be used for each patron.
8. Covering cloths will be laundered as often as necessary to ensure cleanliness at all times.

9. Barbers will not smoke while attending patrons.

10. Clean, sanitary receptacles will be provided for waste materials and used linen.

11. The removal of cut hair from the decks shall be done frequently by dustless methods.

CLEANING AND DISINFECTING COMBS

Every barber should have a minimum of six combs. After using a comb on one patron, place it in a special jar or container for insanitary combs; or, if time permits, clean and disinfect the comb immediately.

The proper way to clean and disinfect combs is outlined below.

1. Remove all hair from combs.
2. Wash combs with a small brush in hot, soapy water. Add some ammonia to the water, 1 tablespoonful of ammonia to a half gallon of water.
3. Rinse combs in warm water.
4. Place combs in a 10% solution of formalin for a minimum of 20 minutes.
5. Remove combs from the formalin solution and dry them with a clean towel.
6. Place combs in a closed cabinet, in which you keep a fresh 10% solution of formalin in an evaporating container.
7. Use the first-in-first-out policy when getting a disinfected comb from a closed cabinet.

This procedure involves some work but is not difficult. And it MUST be done. There is no other way to get a disinfected comb for each patron. There are no shortcuts in sanitation.

DISINFECTING METALLIC INSTRUMENTS

Article 2-15 of the Manual of Naval Preventive Medicine states that "razors, scissors, combs, and other tools will be thoroughly washed with soap and hot water to remove all film, oil, and debris immediately after use on each patron and will then be placed in the disinfecting cabinet or solution as applicable."

Some barbers use a 25 percent solution of formalin to which a small amount of glycerine (to prevent corrosion) has been added, to disinfect metallic instruments, after which they wipe them dry and place them in a closed container. A 10 percent solution of formalin, however, in an evaporating container in the closed container is satisfactory, provided the instruments are left in the cabinet for 30 minutes to 1 hour. The formalin must be changed as necessary, and at least ONCE a day.

For best results, clipper heads should be cleaned with hot, soapy water, rinsed, and dried before being placed in the disinfecting agent. However, if the heads are wiped clean and placed in the closed container for at least 30 minutes the fumes from the formalin solution therein will disinfect them. Follow the instructions of the medical officer.

A 70 percent solution of alcohol is also satisfactory for disinfecting razors.

Although utilizing the solution in conjunction with the closed cabinet is more time consuming, the results with metallic instruments are more satisfactory. When only the closed cabinet is used, there is a tendency to use inadequately disinfected instruments during rush periods.

Each barber should have enough metallic barbering instruments by type to allow for full disinfection of each after using.

APPENDIX I

LAUNDRY SUPPLIES AVAILABLE THROUGH THE NAVY SUPPLY SYSTEM

	Material	Specification	Stock Number
I.	DETERGENTS		
	Detergent, Laundry; Powder, Flake, Bead, or Granular Form; 25 lb. drum (Soft or Hard Water Use)	MIL-D-12182 Type I	7930-929-1219
	Detergent, Laundry; Powder, Flake, Bead, or Granular Form; 25 lb. drum (Soft, Hard, and Sea Water Use)	MIL-D-12182 Type II	7930-929-1221
II.	BUILDERS		
	Sodium Metasilicate, Anhydrous, Technical; 100 lb. drum	O-S-604	6810-281-2054
III.	BLEACHES		
	Bleach, Laundry; Organic Chlorine Powder; 15.5% Available Chlorine; 25 lb. box	O-B-420	6850-063-2842
IV.	COLOR STRIPPERS		
	Sodium Hydrosulfite; Powder; 1 lb. bottle	MIL-S-13985	6810-281-8799
V.	SOURS		
	Sour, Laundry; Dry; Sodium Silicofluoride and Sodium acid fluoride; 50 lb. drum	P-S-683	7930-291-8321
VI.	BLUING		
	Laundry; Liquid Form, 1 qt. bottle	OB-491	7930-250-2619
VII.	STARCHES		
	Instant Starch; Precooked, Ready to Use Instant (Lubricated); 50 lb. bag	JJJ-S-701	6810-841-6362

Appendix I—LAUNDRY SUPPLIES AVAILABLE THROUGH THE NAVY SUPPLY SYSTEM

Material	Specification	Stock Number
VIII. STAIN REMOVAL		
Acetic Acid, Glacial, Technical; 99.5%; 5 lb. bottle	O-A-76	6810-275-1215
Ammonium Hydroxide, Technical; 27%; 1 pt. bottle, 5 pt. bottle	O-A-451d, Type I	6810-584-3793 6810-222-9643
Cleaning Solvent (1,1,1 trichloroethane); 16 oz. can	O-T-620a	6810-664-0273
Hydrochloric Acid 31%; 5 pt./6 lb. bottle	OH-765	6810-222-9641
Magnesium Sulfate (Epsom Salts)	U.S.P.	Obtain from Sick Bay
Oleic Acid	U.S.P. grade	6505-153-8216
Oxalic Acid; 1 lb. bottle	O-O-690 Class 2	6810-264-3937

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