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IDENTIFIERS Military Curriculum Project; *Sewing Machine Repairers

ABSTRACT

This teaching guide, student study guide, and student workbook are designed for self- or group-paced instruction in skill and knowledge areas needed for sewing maintenance. They constitute one of a number of military-developed curriculum packages selected for adaptation to vocational instruction and curriculum development in a civilian setting. The instructor materials include an outline of student qualitative requirements and a plan of instruction detailing criterion objectives, duration of the lessons, and support materials needed. Student materials include objectives, information (text), references, and activities or written exercises. The scope of training includes structural and functional features, inspection, timing, adjustment, troubleshooting malfunctions, and overhaul of sewing machines used in the repair of parachutes, fabric, and leather materials. (MEK)

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ED183827

Military Curricula for Vocational & Technical Education

SEWING MACHINE MAINTENANCE

18-3

THE NATIONAL CENTER
FOR RESEARCH IN VOCATIONAL EDUCATION
THE OHIO STATE UNIVERSITY

This military technical training course has been selected and adapted by The Center for Vocational Education for "Trial Implementation of a Model System to Provide Military Curriculum Materials for Use in Vocational and Technical Education," a project sponsored by the Bureau of Occupational and Adult Education, U.S. Department of Health, Education, and Welfare.

MILITARY CURRICULUM MATERIALS

The military-developed curriculum materials in this course package were selected by the National Center for Research in Vocational Education Military Curriculum Project for dissemination to the six regional Curriculum Coordination Centers and other instructional materials agencies. The purpose of disseminating these courses was to make curriculum materials developed by the military more accessible to vocational educators in the civilian setting.

The course materials were acquired, evaluated by project staff and practitioners in the field, and prepared for dissemination. Materials which were specific to the military were deleted, copyrighted materials were either omitted or approval for their use was obtained. These course packages contain curriculum resource materials which can be adapted to support vocational instruction and curriculum development.

Military Curriculum Materials Dissemination Is . . .

an activity to increase the accessibility of military-developed curriculum materials to vocational and technical educators.

This project, funded by the U.S. Office of Education, includes the identification and acquisition of curriculum materials in print form from the Coast Guard, Air Force, Army, Marine Corps and Navy.

Access to military curriculum materials is provided through a "Joint Memorandum of Understanding" between the U.S. Office of Education and the Department of Defense.

The acquired materials are reviewed by staff and subject matter specialists, and courses deemed applicable to vocational and technical education are selected for dissemination.

The National Center for Research in Vocational Education is the U.S. Office of Education's designated representative to acquire the materials and conduct the project activities.

Project Staff:

Wesley E. Budke, Ph.D., Director
National Center Clearinghouse

Shirley A. Chase, Ph.D.
Project Director

What Materials Are Available?

One hundred twenty courses on microfiche (thirteen in paper form) and descriptions of each have been provided to the vocational Curriculum Coordination Centers and other instructional materials agencies for dissemination.

Course materials include programmed instruction, curriculum outlines, instructor guides, student workbooks and technical manuals.

The 120 courses represent the following sixteen vocational subject areas:

- Agriculture
- Aviation
- Building & Construction Trades
- Clerical Occupations
- Communications
- Drafting
- Electronics
- Engine Mechanics
- Food Service
- Health
- Heating & Air Conditioning
- Machine Shop
- Management & Supervision
- Meteorology & Navigation
- Photography
- Public Service

The number of courses and the subject areas represented will expand as additional materials with application to vocational and technical education are identified and selected for dissemination.

How Can These Materials Be Obtained?

Contact the Curriculum Coordination Center in your region for information on obtaining materials (e.g., availability and cost). They will respond to your request directly or refer you to an instructional materials agency closer to you.

CURRICULUM COORDINATION CENTERS

EAST CENTRAL
Rebecca S. Douglass
Director
100 North First Street
Springfield, IL 62777
217/782-0759

NORTHWEST
William Daniels
Director
Building 17
Airdustrial Park
Olympia, WA 98504
206/753-0879

MIDWEST
Robert Patton
Director
1515 West Sixth Ave.
Stillwater, OK 74704
405/377-2000

SOUTHEAST
James F. Shill, Ph.D.
Director
Mississippi State University
Drawer DX
Mississippi State, MS 39762
601/325-2510

NORTHEAST
Joseph F. Kelly, Ph.D.
Director
225 West State Street
Trenton, NJ 08625
609/292-6562

WESTERN
Lawrence F. H. Zane, Ph.D.
Director
1776 University Ave.
Honolulu, HI 96822
808/948-7834

The National Center Mission Statement

The National Center for Research in Vocational Education's mission is to increase the ability of diverse agencies, institutions, and organizations to solve educational problems relating to individual career planning, preparation, and progression. The National Center fulfills its mission by:

- Generating knowledge through research
- Developing educational programs and products
- Evaluating individual program needs and outcomes
- Installing educational programs and products
- Operating information systems and services
- Conducting leadership development and training programs

FOR FURTHER INFORMATION ABOUT
Military Curriculum Materials
WRITE OR CALL

Program Information Office
The National Center for Research in Vocational Education
The Ohio State University
1960 Kenny Road, Columbus, Ohio 43210
Telephone: 614/486-3655 or Toll Free 800/848-4815 within the continental U.S. (except Ohio)

THE NATIONAL CENTER FOR RESEARCH IN VOCATIONAL EDUCATION
The Ohio State University · 1960 Kenny Road · Columbus, Ohio 43210
Tel. (614) 486-3655
Cable: CIVOCEDOSU/Columbus, Ohio

Military Curriculum Materials for Vocational and Technical Education

Information and Field Services Division

The National Center for Research in Vocational Education

SEWING MACHINE MAINTENANCE

C3AZR 42753

Developed by:

United States Air Force

Development and Review Dates:

October 1978

Occupational Area:

Textiles and Clothing

Target Audiences:

Grades 11 - Adult

Print Pages: 98

Microfiche: 2

Availability:

Curriculum Coordination Centers

Contents:

Block I

Sewing Machine

Maintenance

Type of Materials:	Lesson Plans:	Programmed Text:	Student Workbook:	Handouts:	Text Materials:	Audio-Visuals:
	•	•		•		

Instructional Design:	Performance Objectives:	Tests:	Review Exercises:	Additional Materials Required:
	•	•	•	

Type of Instruction:	Group Instruction:	Individualized:
	•	•

X Materials are recommended but not provided.

Course Description:

This course contains both teacher and student materials. The printed instructor materials include an outline of student qualitative requirements and a plan of instruction detailing the units of instruction, criterion objectives, duration of the lessons, and support materials needed. Student materials follow the plan of instruction. Both the student workbook and study guide begin each lesson with objectives.

The material is designed for self- or group-paced instruction. Most of the materials can be adapted for individualized instruction.

SEWING MACHINE MAINTENANCE
(USAF C3AZR42753)

Table of Contents

POI C3AZR42753 000

(PDS Code CXL)

PLAN OF INSTRUCTION

(Technical Training)

SEWING MACHINE MAINTENANCE

CHANUTE TECHNICAL TRAINING CENTER

10 October 1978-Effective 10 October 1978 with class 781010

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DEPARTMENT OF THE AIR FORCE
Headquarters, Air Training Command
Randolph Air Force Base, Texas 78148

CTS 52-C3AZR42753 000
(PDS Code CXL)
25 July 1978

SEWING MACHINE MAINTENANCE

1. Purpose. This course training standard as prescribed in ATCR 52-17:

a. Establishes the tasks, knowledges, and proficiency level of training to be provided by Course C3AZR42753 000, Sewing Machine Maintenance.

b. Provides the basis for the development of more detailed training materials and objectives and training evaluation instruments for the course.

2. Course Description. The course covered by this standard is designed to provide training for Air Force maintenance personnel, AFSC 42753 73, in the skills and knowledges necessary to perform sewing machine maintenance. The scope of training includes structural and functional features, inspection, timing, adjustment, troubleshooting malfunctions, and overhaul of sewing machines used in the repair of parachutes, fabric and leather materials.

NOTE: Trainees entering this course at a level below that specified in AFM 50-5, or other established prerequisites, cannot be expected to achieve the levels indicated.

3. Qualitative Requirements. Attachment 1 contains the list of tasks, knowledges, and proficiency referenced in paragraph 1.

4. Recommendations. Comments and recommendations are invited concerning quality of ATC training and graduates, (AFR 50-38). Use this CTS as a reference and address correspondence to ATC/TT, Randolph AFB, Texas 78148.

OFFICIAL

JOHN W. ROBERTS, General, USAF
Commander

D. S. WEART, Colonel, USAF
Director of Administration

1 Attachment
Qualitative Requirements

This supersedes CTS CH52-2ASR58251 000, 10 June 1975.

Group OPR: 3340 TCHTG/TTML
OPR & Approval Date: CTTC/TTGXW, 31 August 1978
DISTRIBUTION: X

AAC/DPT-2; ADCOM/DPXTF-2; AFAFC/RMH-1; AFCS/DPATE-2; AFLC/DPMTT-2; AFRES/TSSR-1; AFSC/DPAT-1; ATC/DPAEO-1; ATC/TTQC-1; AU/DPAT-3; CINCPACAF/DPATM-1; CINCSAC/DPAT-2; CINCUSAFE/DPAT-3; MAC/DPATJ-4; NGB/DPT-1; TAC/DPPTT-2; USAFSS/DPAC-2; Chanute, 3340 TCHTG-25; TTGXW-2; TTGXR-1; TTS-1.

QUALITATIVE REQUIREMENTS

CTS 52-C3AZR42753 000

PROFICIENCY CODE KEY

	SCALE VALUE	DEFINITION: The individual
TASK PERFORMANCE LEVELS	1	Can do simple parts of the task. Needs to be told or shown how to do most of the task. (EXTREMELY LIMITED)
	2	Can do most parts of the task. Needs help only on hardest parts. May not meet local demands for speed or accuracy. (PARTIALLY PROFICIENT)
	3	Can do all parts of the task. Needs only a spot check of completed work. Meets minimum local demands for speed and accuracy. (COMPETENT)
	4	Can do the complete task quickly and accurately. Can tell or show others how to do the task. (HIGHLY PROFICIENT)
TASK KNOWLEDGE LEVELS	a	Can name parts, tools, and simple facts about the task. (NOMENCLATURE)
	b	Can determine step by step procedures for doing the task. (PROCEDURES)
	c	Can explain why and when the task must be done and why each step is needed. (OPERATING PRINCIPLES)
	d	Can predict, identify, and resolve problems about the task. (COMPLETE THEORY)
SUBJECT KNOWLEDGE LEVELS	A	Can identify basic facts and terms about the subject. (FACTS)
	B	Can explain relationship of basic facts and state general principles about the subject. (PRINCIPLES)
	C	Can analyse facts and principles and draw conclusions about the subject. (ANALYSIS)
	D	Can evaluate conditions and make proper decisions about the subject. (EVALUATION)

– EXPLANATIONS –

* A task knowledge scale value may be used alone or with a task performance scale value to define a level of knowledge for a specific task. (Examples: b and 1b)

** A subject knowledge scale value is used alone to define a level of knowledge for a subject not directly related to any specific task, or for a subject common to several tasks.

– This mark is used alone instead of a scale value to show that no proficiency training is provided in the course, or that no proficiency is required at this skill level.

X This mark is used alone in course columns to show that training is not given due to limitations in resources.

Tasks, Knowledge and Proficiency Level	
1. Locate Structural and Functional Features	3c
2. Practice Safety Precautions	3c
3. Inspect Sewing Machines	3c
4. Troubleshoot Sewing Machine Malfunctions	3c
5. Make Minor and Periodic Adjustments Related to Operational Maintenance	3c
6. Time Sewing Machines	3c
7. Perform Major Overhaul	3c

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DEPARTMENT OF THE AIR FORCE
Chanute Technical Training Center (ATC)
Chanute Air Force Base, Illinois 61868

PLAN OF INSTRUCTION C3AZR42753 000
(PDS Code CXL)
10 October 1978

FOREWORD

1. PURPOSE: This publication is the plan of instruction (POI) when the pages shown on Page A are bound into a single document. The POI prescribes the qualitative requirements for Course Number 3AZR42753 000, Sewing Machine Maintenance, in terms of criterion objectives and teaching steps presented by units of instruction and shows duration, correlation with the training standard, and support materials and guidance. When separated into units of instruction, it becomes Part I of the lesson plan. This POI was developed under the provisions of ATCR 52-7, Plans of Instruction and Lesson Plans.

2. COURSE DESIGN/DESCRIPTION. The instructional design for this course is Group Pacing. The course trains Air Force personnel who possess AFSC 42753/73 or equivalent civilian experience, in the skills and knowledges necessary to perform sewing machine maintenance. Training includes structural and functional features; inspection, timing, adjustment, troubleshooting malfunctions, and overhaul of sewing machines used in the repair of parachutes, fabric and leather materials. In addition, MT training is provided on commander's calls/ briefings, etc.

3. TRAINING EQUIPMENT. The number shown in parentheses after equipment listed as Training Equipment under SUPPORT MATERIALS AND GUIDANCE is the planned number of students assigned to each equipment unit.

4. REFERENCE. This plan of instruction is based on Course Training Standard 3AZR42753 000, 25 July 1978, and Course Chart 3AZR42753 000, 25 July 1978

FOR THE COMMANDER

Thomas J. Lapos

THOMAS J. LAPOS, Colonel, USAF
Commander, 3340 Technical Training Group

Supersedes Plan of Instruction 2ASR58251, 23 July 1975.

OPR: 3340 Technical Training Group
DISTRIBUTION: Listed on Page A

NOTE: PAGES 1 & 2 OF PLAN OF INSTRUCTION ARE MISSING; HOWEVER ALL MATERIAL IS INCLUDED.

PLAN OF INSTRUCTION/LESSON PLAN PART I			
NAME OF INSTRUCTOR		COURSE TITLE: Sewing Machine Maintenance 5	
BLOCK NUMBER: I	BLOCK TITLE: Sewing Machine Maintenance		
1	COURSE CONTENT		2 TIME
2. Structural and Functional Features of the 31-15 Sewing Machine a. Given a class 31 sewing machine, a diagram of the machine, and an applicable technical publication, locate structural and functional features of the sewing machine IAW technical publication specifications. CTS: 1 Meas: PC			1

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)	
SIGNATURE AND DATE	SIGNATURE AND DATE

PLAN OF INSTRUCTION NUMBER	DATE	PAGE NO.
C3AZR42753 000	10 Oct 1978	3

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COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-102, Structural and Functional Features of the 31-15 Sewing Machine
3AZR42753-WB-102, Structural and Functional Features of the 31-15 Sewing Machine
TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

Audio Visual Aids
Charts, Structural and Functional Features of the 31-15 Sewing Machine

Training Equipment
Class 31 Sewing Machine (1)

Training Methods
Discussion/Demonstration (.5 hr)
Performance (.5 hr)

Instructional Guidance
Discuss and demonstrate the structural and functional features of the Class 31 sewing machine. Have students locate the structural and functional features of the class 31 machine. Students will use 3AZR42753-SG-102 and complete 3AZR42753-WB-102. Student accomplishment of the objective will be checked using WS/R/3AZR42753/102.

PLAN OF INSTRUCTION/LESSON PLAN PART I

NAME OF INSTRUCTOR	COURSE TITLE	
	Sewing Machine Maintenance	7
BLOCK NUMBER	**BLOCK TITLE**	
I	Sewing Machine Maintenance	

1 COURSE CONTENT	2 TIME
3. Inspection, Timing, Adjustment, and Major Overhaul of the 31-15 Sewing Machine	8
a. Given a class 31 sewing machine, applicable technical publication, and handtools, inspect, time, and adjust the class 31 sewing machine IAW specifications in the technical publication, while observing all safety precautions. STS: 2, 3, 5, 6 Meas: PC	
b. Given a class 31 sewing machine, applicable technical publication, and handtools, overhaul the class 31 sewing machine IAW specifications listed in the technical publication, while observing all safety precautions. CTS: 2, 3, 5, 6, 7 Meas: PC	

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)

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COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-103, Inspection, Timing, Adjustment, and Major Overhaul of the 31-15 Sewing Machine
3AZR42753-WB-103, Inspection, Timing, Adjustment, and Major Overhaul of the 31-15 Sewing Machine
TO 34Y7-1-101

Audio Visual Aids
Charts, Inspection, Timing, Adjustment, and Major Overhaul of 31-15 Sewing Machine

Training Equipment
Class 31 Sewing Machine (1)
Tool Kit (1)

Training Methods
Discussion/Demonstration (2 hrs)
Performance (6 hrs)

Instructional Guidance
Discuss shop procedures and safety precautions related to sewing machine maintenance. Discuss inspection, timing, and adjustment procedures of the 31-15 sewing machine. Demonstrate to the students how to inspect, time, and make adjustments to the sewing machine. Discuss the steps involved to complete a major overhaul of the 31-15 sewing machine. Demonstrate how to overhaul the sewing machine by completing one step at a time. Have the students perform a major overhaul on the sewing machine, completing each step as demonstrated by the instructor. Emphasize how a properly overhauled machine can reduce down time and prolong the life of the machine. Students will use 3AZR42753-SG-103 and complete 3AZR42753-WB-103.

PLAN OF INSTRUCTION/LESSON PLAN PART I

NAME OF INSTRUCTOR	COURSE TITLE
	Sewing Machine Maintenance 9
BLOCK NUMBER I	**BLOCK TITLE** Sewing Machine Maintenance

1 COURSE CONTENT	2 TIME
4. Troubleshooting the 31-15 Sewing Machine	3
a. Given applicable technical publication, handtools, and a class 31 sewing machine containing five malfunctions, use troubleshooting procedures IAW the technical publication to correct four of the five malfunctions in the sewing machine, while observing all safety precautions. CTS: 2, 4 Meas: PC	

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)

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COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-104, Troubleshooting the 31-15 Sewing Machine
3AZR42753-WB-104, Troubleshooting the 31-15 Sewing Machine
3AZR42753-HO-104, Troubleshooting the 31-15 Sewing Machine
TO 34Y7-1-101

Audio Visual Aids
Charts, Troubleshooting of the 31-15 Sewing Machine

Training Equipment
Class 31 Sewing Machine (1)
Tool Kit, (1)

Training Methods
Discussion (1 hr)
Performance (2 hrs)

Instructional Guidance
Discuss malfunctions that frequently occur during operation of the class 31-15 sewing machine. Place troubleshooting malfunctions in the machines that are listed in 3AZR42753-HO-104. Have the students resolve mechanical problems placed in the sewing machine by the instructor. Emphasize how proper troubleshooting procedures can conserve time, money, and materials. Students will use 3AZR42752-SG-104 and complete 3AZR42753-WB-104.

PLAN OF INSTRUCTION/LESSON PLAN PART I	
NAME OF INSTRUCTOR	COURSE TITLE: Sewing Machine Maintenance
BLOCK NUMBER: I	BLOCK TITLE: Sewing Machine Maintenance

1. COURSE CONTENT	2. TIME
5. Structural and Functional Features of the 111W Series Sewing Machine a. Given a 111W series sewing machine, a diagram of the machine, and an applicable technical publication, locate structural and functional features of the sewing machine IAW technical publication specifications. CTS: 1 Meas: PC	1

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)	
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COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-105, Structural and Functional Features of the 111W Sewing Machine
3AZR42753-WB-105, Structural and Functional Features of the 111W Sewing Machine
TO 34Y7-1-101

Audio Visual Aids
Charts, Structual and Functional Features of 111W Series Sewing Machine

Training Equipment
Class 111W Sewing Machine (1)
Trainer, Sewing Machine, 2680 (6)

Training Methods
Discussion (.5 hr)
Performance (.5 hr)

Instructional Guidance
Use trainer to demonstrate the structural and functional features of the 111W series sewing machine. Have students locate the structural and functional features of the sewing machine. Students will use 3AZR42753-SG-105 and complete 3AZR42753-WB-105. Student accomplishment of the objective will be checked using WS/P/3AZR42753/105.

PLAN OF INSTRUCTION/LESSON PLAN PART I

NAME OF INSTRUCTOR	COURSE TITLE: Sewing Machine Maintenance 13
BLOCK NUMBER: I	BLOCK TITLE: Sewing Machine Maintenance

1 COURSE CONTENT	2 TIME
6. Inspection, Timing, and Adjustment of the 111W Series Sewing Machine	8
a. Given a class 111W sewing machine, applicable technical publication and handtools, inspect, time, and adjust the 111W sewing machine IAW specifications in the technical publication, while observing all safety precautions. CTS: 2, 3, 5, 6 Meas: PC	

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)

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COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-106, Inspection, Timing, and Adjustment of the 111W Series Sewing Machine
3AZR42753-WB-106, Inspection, Timing, and Adjustment of the 111W Series Sewing Machine
TO 34Y7-1-101

Audio Visual Aids
Charts, Inspection, Timing, and Adjustment of 111W Series Sewing Machine

Training Equipment
Class 111W Sewing Machine (1)
Trainer, Sewing Machine, 2680 (6)
Tool Kit (1)

Training Methods
Discussion/Demonstration (2 hrs)
Performance (6 hrs)

Instruction Guidance
Using the trainer, discuss and demonstrate the inspection, timing, and adjustment steps of the 111W series sewing machine. Have the students perform preventive maintenance and the three timing steps on the class 111W sewing machine. Students will use 3AZR42753-SG-106 and complete 3AZR42753-WB-106.

PLAN OF INSTRUCTION/LESSON PLAN PART I

NAME OF INSTRUCTOR	COURSE TITLE	
	Sewing Machine Maintenance	15
BLOCK NUMBER	**BLOCK TITLE**	
I	Sewing Machine Maintenance	

1 COURSE CONTENT	2 TIME
7. Major Overhaul of the 111W Series Sewing Machine. a. Given a 111W series sewing machine, applicable technical publication, and handtools, perform a major overhaul of the 111W series sewing machine IAW specifications stated in the technical publication, while observing all safety precautions. CTS: 2, 5, 6, 7 Meas: PC	15

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)

SIGNATURE AND DATE	SIGNATURE AND DATE

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PLAN OF INSTRUCTION/LESSON PLAN PART I (Continuation Sheet)

COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-107, Major Overhaul of the Class 111W Series Sewing Machine
3AZR42753-WB-107, Major Overhaul of the Class 111W Series Sewing Machine
3AZR42753-HO-107, Overhaul of the Class 111W Series Sewing Machine
3AZR42753-HO-107A, Major Overhaul of the Class 111W Series Sewing Machine
TO 34Y7-1-101

Audio Visual Aids
Charts, Major Overhaul of the Class 111W Series Sewing Machine

Training Equipment
Class 111W Sewing Machine (1)
Trainer, Sewing Machine, 2680 (6)
Tool Kit (1)

Training Methods
Discussion/Demonstration (4 hrs)
Performance (11 hrs)

Instructional Guidance
Use trainer to discuss and demonstrate the steps involved in performing major overhaul of the class 111W sewing machine. Have the students complete an overhaul of the sewing machine, completing each step as demonstrated by the instructor. Stress how a properly overhauled machine can conserve time and material. Students will use 3AZR42753-SG-107, 3AZR42753-HO-107A, and complete 3AZR42753-WB-107.

PLAN OF INSTRUCTION/LESSON PLAN PART I

NAME OF INSTRUCTOR	COURSE TITLE: Sewing Machine Maintenance 17
BLOCK NUMBER: I	BLOCK TITLE: Sewing Machine Maintenance

1. COURSE CONTENT	2. TIME
8. Troubleshooting the 111W Series Sewing Machine	6
a. Given applicable technical publication, handtools, and a 111W series sewing machine containing five malfunctions, use troubleshooting procedures IAW the technical publication to correct four of the five malfunctions in the sewing machine, while observing all safety precautions. CTS: 2, 4 Meas: PC	

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)

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COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-108, Troubleshooting the Class 111W Sewing Machine
3AZR42753-WB-108, Troubleshooting the Class 111W Sewing Machine
3AZR42753-HO-108, Troubleshooting the Class 111W Sewing Machine
TO 34Y7-1-101

Audio Visual Aids
Charts, Troubleshooting Class 111W Sewing Machine

Training Equipment
Class 111W Sewing Machine (1)
Trainer, Sewing Machine, 2680 (6)
Toolkit (1)

Training Methods
Discussion (1 hr)
Performance (5 hrs)

Instructional Guidance
Using the trainer, demonstrate proper troubleshooting procedures for the 111W sewing machine. Have students remove mechanical problems placed in the sewing machine by the instructor. Students will use 3AZR42753-SG-108, 3AZR42753-HO-108, and complete 3AZR42753-WB-108.

PLAN OF INSTRUCTION/LESSON PLAN PART I

NAME OF INSTRUCTOR	COURSE TITLE	
	Sewing Machine Maintenance	19
BLOCK NUMBER	**BLOCK TITLE**	
I	Sewing Machine Maintenance	

1 COURSE CONTENT	2 TIME
9. Structural and Functional Features of Special Sewing Machines	3
a. Given special purpose sewing machines, diagrams of the machines, and applicable technical publications, locate the structural and functional features of the special purpose sewing machines IAW technical publication specifications.	

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)

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ATC FORM OCT 75 133 PREVIOUS EDITION IS OBSOLETE

COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-109, Structural and Functional Features of Special Sewing Machines
3AZR42753-WB-109, Structural and Functional Features of Special Sewing Machines
TO 34Y7-1-101
TO 34Y7-2-1, Singer Sewing Machine 7-33
TO 34Y7-9-1, Singer Sewing Machine 17W15
Catalog Number 101R, Union Special Industrial Sewing Machine

Audio Visual Aids
Charts, Structural and Functional Features of Special Purpose Sewing Machines

Training Equipment
Class 7-33 Sewing Machine (1)
Class 17W15 Sewing Machine (6)
Class 47W70 Sewing Machine (6)
Class 61800H Union Special Sewing Machine (1)

Training Methods
Discussion/Demonstration (1 hr)
Performance (2 hrs)

Instructional Guidance
Discuss and demonstrate structural and functional features of the special purpose sewing machines. Explain needles and thread use, needle size, varieties, and threading the machine head. Have students locate the structural and functional features of the sewing machines. Students will use 3AZR42753-SG-109 and complete 3AZR42753-WB-109. Student accomplishment of the objective will be checked using WS/P/3AZR42753/109.

PLAN OF INSTRUCTION/LESSON PLAN PART I

NAME OF INSTRUCTOR	COURSE TITLE: Sewing Machine Maintenance 21
BLOCK NUMBER: I	BLOCK TITLE: Sewing Machine Maintenance

1 COURSE CONTENT	2 TIME
10. Inspection, Timing, and Adjustment of Special Sewing Machines	7
a. Given special purpose sewing machines, applicable technical publications, and handtools, inspect, time, and adjust the sewing machines IAW specifications in the technical publications, while observing all safety precautions. CTS: 2, 3, 5, 6 Meas: PC	

SUPERVISOR APPROVAL OF LESSON PLAN (PART II)

SIGNATURE AND DATE	SIGNATURE AND DATE

PLAN OF INSTRUCTION NUMBER	DATE	PAGE NO.
C3AZR42753 000	10 Oct 1978	19

ATC FORM OCT 75 133 PREVIOUS EDITION IS OBSOLETE

COURSE CONTENT

SUPPORT MATERIALS AND GUIDANCE

Student Instructional Materials
3AZR42753-SG-110, Inspection, Timing, and Adjustment of Special Sewing Machines
3AZR42753-WB-110, Inspection, Timing, and Adjustment of Special Sewing Machines
TO 34Y7-1-101
TO 34Y7-2-2
TO 34Y7-9-1
Catalog Number 101R

Audio Visual Aids
Charts, Inspection, Timing, and Adjustment of Special Purpose Sewing Machines

Training Equipment
Class 7-33 Sewing Machine (1)
Class 17W15 Sewing Machine (6)
Class 47W70 Sewing Machine (6)
Class 61800H Union Special Sewing Machine (1)
Toolkit (1)

Training Methods
Discussion/Demonstration (1 hr)
Performance (6 hrs)

Instructional Guidance
Discuss and demonstrate the inspection, timing, and adjustment steps for the special sewing machines. Have the students complete the inspection, timing, and adjustment steps on the special sewing machines. Students will use 3AZR42753-SG-110 and complete 3AZR42753-WB-110.

11.	Course Critique and Graduation	1
12.	PMD: End of Course Appointments and Predeparture Safety Briefing	2

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Technical Training

Sewing Machine Maintenance

SEWING MAGHINE MAINTENANCE

7 August 1972

CHANUTE TECHNICAL TRAINING CENTER (ATC)

OPR: TWS
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CONTENTS

August 1969

NOTE: PAGES 1-4 OF STUDY GUIDE ARE MISSING; HOWEVER ALL MATERIAL IS INCLUDED.

Life Support Systems Branch
Chanute AFB, Illinois

~~2ASR58130-6-30-102~~

SHOP PROCEDURES AND SAFETY PRECAUTIONS

OBJECTIVES

Upon completing this unit of instruction, you will be able to perform shop procedures and safety precautions during operation and/or maintenance of sewing machines.

INTRODUCTION

When operating and/or performing maintenance on sewing machines, it is very important to you and everyone concerned that good safe practices and shop procedures be followed.

The most important possession you have is your life and well being. It should not be jeopardized in any way.

INFORMATION

Many of our activities during each day are filled with accidents waiting to happen. Most accidents can be prevented if we plan our habits and routines with safety in mind. So let's see what we individually can do to live a longer and less painful life. Perhaps the best place to start this study of safety is with good housekeeping habits.

GOOD HOUSEKEEPING IS THE FIRST LAW OF ACCIDENT PREVENTION

Some people are recognized for their neatness. Everything they have is tidy. Everything they do is neat and orderly. Neatness is a part of them. On the other hand, some of us constantly look like we slept in our uniforms, like we were miles from the nearest barber, like our work area is an auto cemetary. How we appear to others and how we do things reflects our inner personalities. We have standards which are the result of our home environment. We carry such standards into every phase of life. All of our actions reflect our upbringing. Standards are adjustable - they can be learned. In fact, that's just what we are attempting in this course you are taking to cover the acceptable standards that are to be followed when operating and/or performing maintenance on sewing machines.

SAFETY PRECAUTIONS TO FOLLOW WHEN USING OR PERFORMING MAINTENANCE ON SEWING MACHINES

The following precautions should be observed while performing maintenance or operating sewing machines in order to prevent injury to the operator or damage to the machines.

. KEEP THE FINGERS OUT FROM UNDER THE PRESSER FOOT/FEET WHILE THE MOTOR IS RUNNING.

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DO NOT OPERATE THE MACHINE WITHOUT MATERIAL UNDER THE PRESSER FOOT/ FEET, AS THIS WILL DULL THE FEED DOG.

DO NOT CHANGE THE BOBBIN WHILE THE MOTOR IS RUNNING.

BE SURE THE BED SLIDES ARE CLOSED BEFORE OPERATING THE MACHINE AS THE FINGERS OR THE MATERIAL MAY COME IN CONTACT WITH THE ROTARY HOOK AND SERIOUS DAMAGE MAY BE THE RESULT.

KEEP THE FINGERS AT THE SIDE OF THE NEEDLE. NOT IN FRONT.

HOLD BOTH THE NEEDLE AND BOBBIN THREADS TAUT WHEN STARTING TO SEW.

WHEN WINDING A BOBBIN, BE CERTAIN THAT THE PRESSER FOOT/FEET IS/ARE RAISED AND THAT THE NEEDLE IS NOT THREADED.

DO NOT START SEWING UNTIL THE MOTOR HAS HAD SUFFICIENT TIME TO ATTAIN FULL SPEED.

DO NOT TRY TO PUSH OR PULL THE MATERIAL AS IT IS BEING FED THROUGH THE MACHINE. THE NEEDLE WILL BEND OR BREAK.

OPERATE THE MACHINE AT A LOW RATE OF SPEED TO AVOID MAKING LINES THAT ARE NOT STRAIGHT.

BE SURE TO TURN THE MOTOR SWITCH OFF ANY TIME YOU LEAVE THE MACHINE.

DO NOT TURN THE BALANCE WHEEL BACKWARD A FULL TURN OR THE THREAD WILL BREAK.

USE THE PROPER TYPE OF THREAD AND CORRECT SIZE AND CLASS OF NEEDLES.

WHEN TILTING THE MACHINE HEAD BACK, BE SURE THAT IT LIES SECURELY AGAINST THE MACHINE HEADREST PIN. INJURY TO YOUR HANDS MAY RESULT IF THE MACHINE HEAD FALLS FORWARD. KEEP YOUR HANDS AWAY FROM THE EDGE OF THE OPENING WHILE THE HEAD IS BACK.

BE CAREFUL NOT TO PLACE THE FINGERS UNDER THE NEEDLE AFTER THE SWITCH HAS BEEN TURNED OFF, BEGAUSE THE MOTOR TAKES A LONG TIME TO RUN DOWN AND COULD INJURE THE OPERATOR IN SUCH A SITUATION.

SHOP HAZARDS

Shop safety begins with shop layout. If the Survival Equipment Shop is set up in accordance with the proper technical manuals and official Air Force Diffinitive Drawings plus sound local standards, safety is built in.

Accidents do occur in the Survival Equipment Shop - the direct cause is human carelessness. A few causes are listed here.

1. Failure to maintain orderly racks and storage shelves, resulting in objects falling on someone.

2. Tripping over things on the floor.

3. Improper lifting.

4. Unintentionally hitting others with objects.

5. Failing to use proper guards on machines, such as our electrical fabric cutter.

6. Improper grounded electrical equipment.

7. Using tools improperly. Make sure the necessary tools and equipment are included in the work area.

Many men have needlessly suffered permanent injury or died because somebody else "needed" a laugh. Horseplay has no business in productive work areas.

REFERENCES

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines, Book One, Part Two.

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Life Support Systems Branch
Chanute AFB, Illinois

3AZR42753
~~2ASR58150-6~~-SG-10

STRUCTURAL AND FUNCTIONAL FEATURES OF 31-15 SEWING MACHINES

OBJECTIVES

Upon completing this unit of instruction, you will be able to analyze and identify the structural and functional features of the Class 31-15 Sewing Machines.

INTRODUCTION

The 31-15 sewing machine is smaller and lighter than most of the other machines used in Survival Equipment Shops. The manufacturer calls the 31-15 a "tailoring" machine which gives a clue to the type of material it is designed to sew. It is used to sew and repair clothing, uniforms, shirts, flying clothing, skirts, underwear, jackets, light tentage and similar materials.

These many uses should make it obvious that every one concerned with operating or maintaining the sewing machine must have some knowledge of how the machine works.

INFORMATION

PREPARATION AND OPERATION OF MACHINE

A good repairman must know more than just how to turn his machines on and off. He must know certain structural features of his machine and how it functions to do the job required.

Functional Features

The Class 31 Machine makes the US standard lockstitch at a maximum recommended speed of 2200 stitches per minute. It has an oscillating shuttle which operates in an upright position and is equipped with a drop feed which moves the material through the machine from front to back as it sews. The front of the machine is that side nearest the operator as he is in the position to sew.

NEEDLES. It is very important that the proper needle be used to insure good machine operation. The selection of needles by class, variety and size for different machines and materials is necessary in order to eliminate thread breakage, needle breakage, skipped stitches and fraying of the thread.

Needles for the various machine classes are selected and ordered by needle number and size. The needle numbers consist of a class number and a variety number separated by an "X"; for example; the class 16X87 variety needles are used in Class 31 Machines. The Class XX (16) describes the shank, figure 1, and the variety number (87) describes the length and type of point

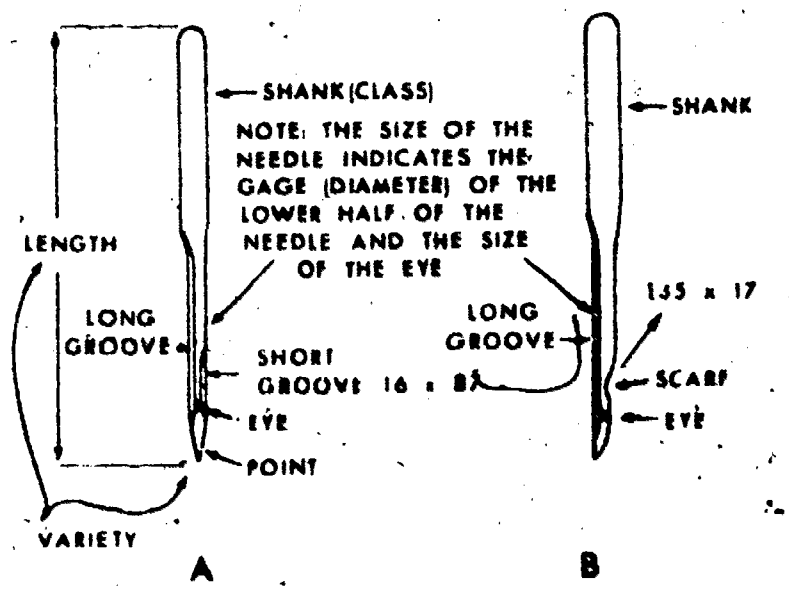

Figure 1. Sewing Machine Needles.

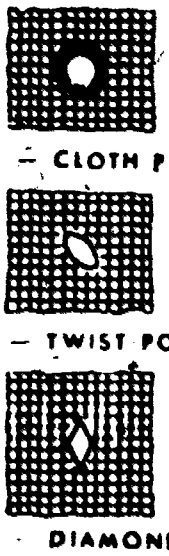

Figure 2. Openings Made By Needle Points.

(cloth point or cutting point). Odd numbers (87) indicate cloth point needles and even numbers (88) indicate cutting point needles. Cloth point needles are round sharp-pointed needles used for sewing cloth, since they do not cut the strands as they are forced between the woven threads of the fabric. Many different varieties of cutting point needles are available, but they are used only for cutting heavy leather. Figure 2 shows the shape of the openings made in the material by the cloth point (A), twist point (B), and the diamond point (C). Figure 2A illustrates why it is important that a round pointed needle be used in cloth. Figure 2B and C shows how cutting point needles will cut the warp and filler threads.

Machine needles have a long groove on one side and either a short groove or a scarf on the opposite side, figure 1. The purpose of the grooves is to allow the thread to fall back into the needle when it enters the material to prevent the thread from breaking or fraying; therefore, it is important that the long groove is placed in the machine properly. Most of the machines require the long groove to the left, but on different class machines, the direction varies with the position of the bobbin assemblies. On Class 31 machines, the long groove is placed to the left.

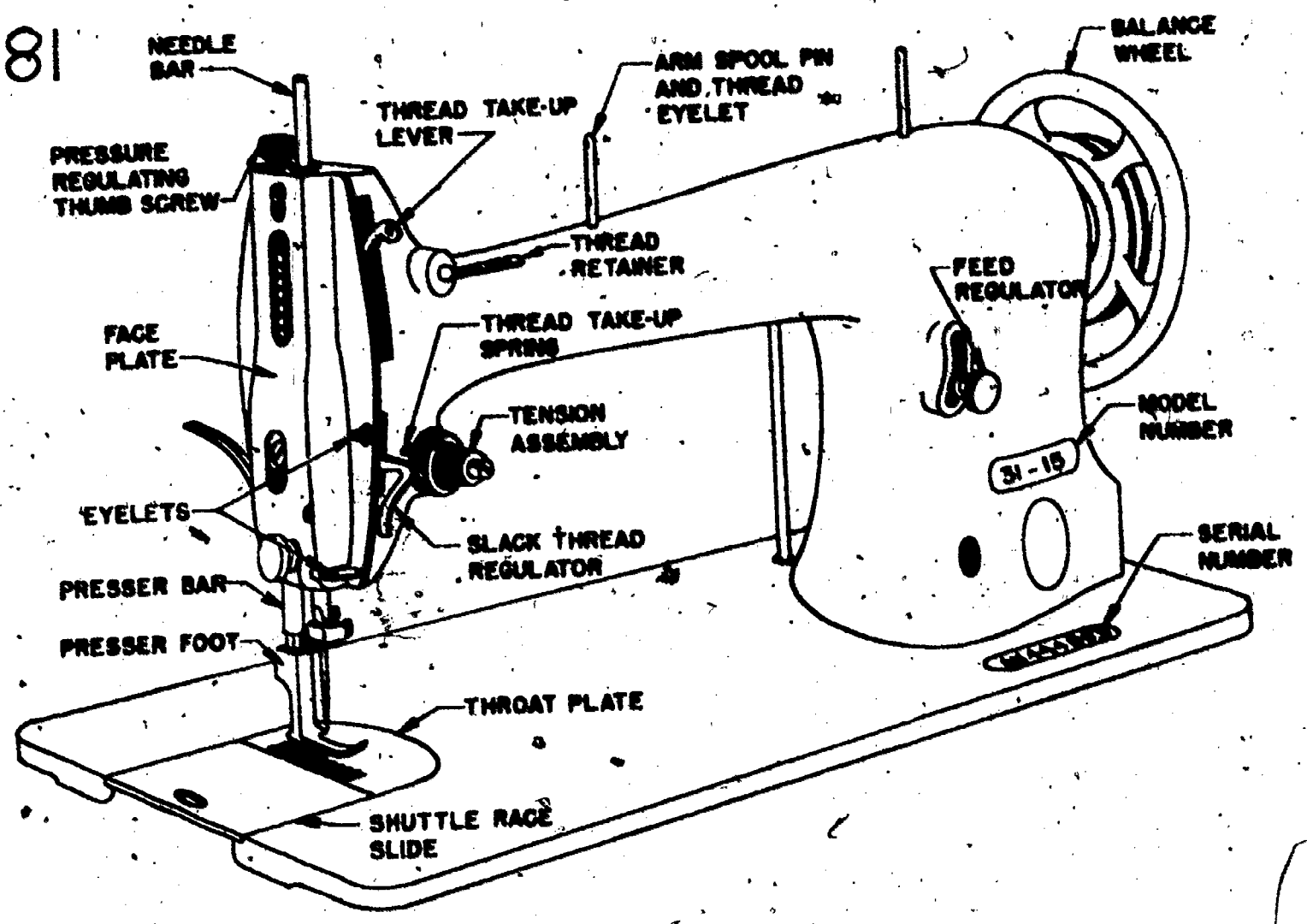

Figure 3. 31-15 Sewing Machine (Front View).

Needles are sized by the diameter or gage of the needle, figure 1 and the needle eye. The selection of the correct size needle is determined by the size and type of thread and material used. The thread must pass freely through the eye of the needle in order to prevent thread fraying or breaking. The sizes of the 16X87 needles range from size 14 to 23; however, most sewing operations required may be accomplished by using sizes 18 through 22. The needle size number increases with the diameter of the needle; therefore, size 18 needles are used for lighter weight materials than size 22.

The condition of the point should be checked before starting to sew. A dull round needle acts the same as a cutting needle. It will cut or pull threads and may weaken the seam. The condition of the needle may be checked by sliding the fingernail over the point. If it scratches or catches the nail, the needle should be replaced with a new one. The technical order for the machine will give instructions of a more detailed nature.

FUNCTIONS OF PARTS OF MACHINE. Figure 3 shows the location of the operating parts of the 31-15 sewing machine. Refer to this figure to identify the parts of the list that follows. The names and the functions of the main parts of the Class 31 machine are:

a. Needle Bar: Holds the needle and also carries the thread to the oscillating shuttle where the lockstitch is formed.

b. Thread Takeup Lever: Removes the slack in the needle thread after the lockstitch is formed at the oscillating shuttle and pulls enough thread from the spool to make the next stitch.

c. Pressure Regulating Thumb Screw: Regulates the pressure on the presser foot to make sufficient pressure needed to hold the material securely.

d. Faceplate: Covers and protects the mechanism of the presser foot and needle bar.

e. Eyelets: Guides the thread from the takeup lever to the needle.

f. Presser Bar: Holds the presser foot.

g. Presser Foot: Holds presser on the material while the machine is forming the stitch.

h. Shuttle Race Slide: Covers the shuttle race assembly.

i. Throat Plate: Surrounds the feed dog and keeps the material from slipping after the feed dog has been adjusted to the proper height.

j. Slack Thread Regulator: Regulates the slack in the thread when the needle is descending.

k. Tension Assembly: Regulates the tension on the needle thread so that the lockstitch may be adjusted properly.

l. Thread Takeup Spring: Removes sufficient slack from the needle thread when the needle is descending to prevent the needle from splitting its thread.

m. Thread Retainer: Removes sufficient slack from the needle thread when the needle is descending to prevent the needle from splitting its thread.

n. Arm Spool Pin and Thread Eyelets: Used for placing small spools of thread on the machine or for guiding thread as it comes from the large cones.

o. Balance Wheel: Provides a connection between the driving unit and the sewing machine head.

p. Feed Regulator: Used to regulate the length of the feed to determine the number of stitches per inch.

q. Model Number: Number indicating the machine model or the class, place of manufacture and modifications of the machine.

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r. Serial Number: Manufacturer's serial number of the machine.

s. Feed Dog: Feeds the materials through the machine.

t. Presser Bar Hand Lift: Hand lever for lifting the presser foot.

REFERENCES

Study:

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

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3AZR42753
~~2ASR58150-6~~-SG-103

Life Support Systems Branch
Chanute AFB, Illinois

INSPECTION, TIMING, ADJUSTMENT AND MAJOR OVERHAUL OF THE 31-15 SEWING MACHINES

OBJECTIVES

Upon completing this unit of instruction you will be able to inspect, time, adjust, and overhaul Class 31-15 Sewing Machines.

INFORMATION

1. Detailed information concerning inspection of components of the sewing machine for serviceable condition and procedures on when preventive maintenance is to be performed. Study TO 34Y7-1-101, Book One Part Two Section III, and Part Three Sections X and XI.

2. Step by step procedures for accomplishing the following items listed concerning the 31-15 Sewing Machines. Study TO 34Y7-1-101, Book One Part Two Section VI, and Part Three Section XIII Paragraphs 46 thru 49.

Timing Needle with Shuttle

Timing Feed Dog with Needle

Adjusting Stitches per Inch

Adjusting Feed Dog

3. Detailed procedures for overhaul of the sewing machine consisting of disassembly and reassembly of the following items listed on 31-15 Sewing Machines. Study TO 34Y7-1-101, Book One Part Three Section XIII Paragraphs 50 thru 52, and Part Five Section XV Paragraph 55.

Face Assembly

Shuttle Race Assembly

Thread Tension Controller

REFERENCES

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

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Life Support Systems Branch
Chanute AFB, Illinois

3AZR 42753
~~2ASR50150-6~~-SG-10

TROUBLESHOOTING OF CLASS 31-15 SEWING MACHINES

OBJECTIVES

When you have completed this study guide you will be able to determine and remove malfunctions that frequently occur when operating the 31-15 Sewing Machine.

INFORMATION

General troubleshooting information which can be of help in determining and removing the causes of trouble that may develop in the machine. Read TO 34Y7-1-101, Book One, Part Three, Section XII.

REFERENCES

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

STRUCTURAL AND FUNCTIONAL FEATURES OF THE 111W SEWING MACHINES

OBJECTIVE

Upon completing this unit of instruction, you will be able to analyze and identify the structural and functional features of the Class 111W Series Sewing Machines.

INTRODUCTION

Class 111 Sewing Machines are one-line (single needle) lockstitch machines designed to sew medium weight materials and are capable of sewing at a speed of approximately 2900 stitches per minute. A lockstitch machine is the only type of machine used in making strong and durable finished seams. With each individual stitch a half of a square knot is formed in the bobbin assembly by a rotary hook on the 111 machines. This high speed machine is used for sewing heavy textiles, webbing, tentage, upholstery, and flat leather articles.

INFORMATION

Sewing machines are identified by symbols which are located on the upright arm of the machine head. Each symbol is made up of two or three parts. In the case of the 111 class of machine, the 111 specifies the machine class. The second part "W" denotes the place of manufacture. The third part (152, 153, or 155) determines the number of modifications or improvements made on this class of machine. The 111 also designates the machine as a single needle (one line) machine. A 112 machine is a two needle (two line) machine.

There are various feeding mechanisms used on sewing machines. Some 111 machines are equipped with a compound feed alone, such as the 111W151, and others are equipped with a combination of compound feed and alternating presser feet such as the 111W152 and 111W155. The various feeding mechanisms most commonly used on machines are:

Needle Feed: The needle alone moves the material the regular length of a stitch, while the presser foot holds the material in place on the throat plate.

Drop Feed: The feed dog moves the material the regulated length of a stitch while the presser foot holds the material against the feed dog.

Compound Feed: Consists of the needle feed and the drop feed. Some compound feed machines are equipped with alternating presser feet. The alternating presser is an additional presser foot which holds the material alternately with the compound feed. This type of feed is used on class 111 machines.

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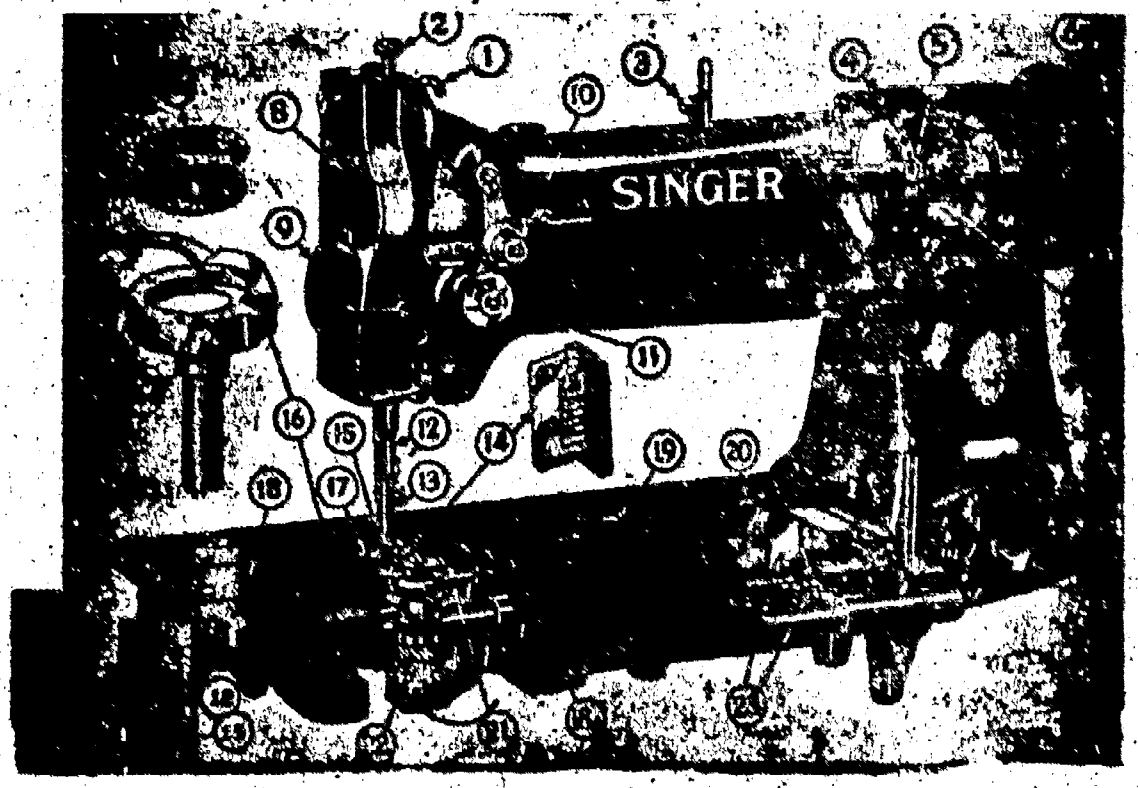
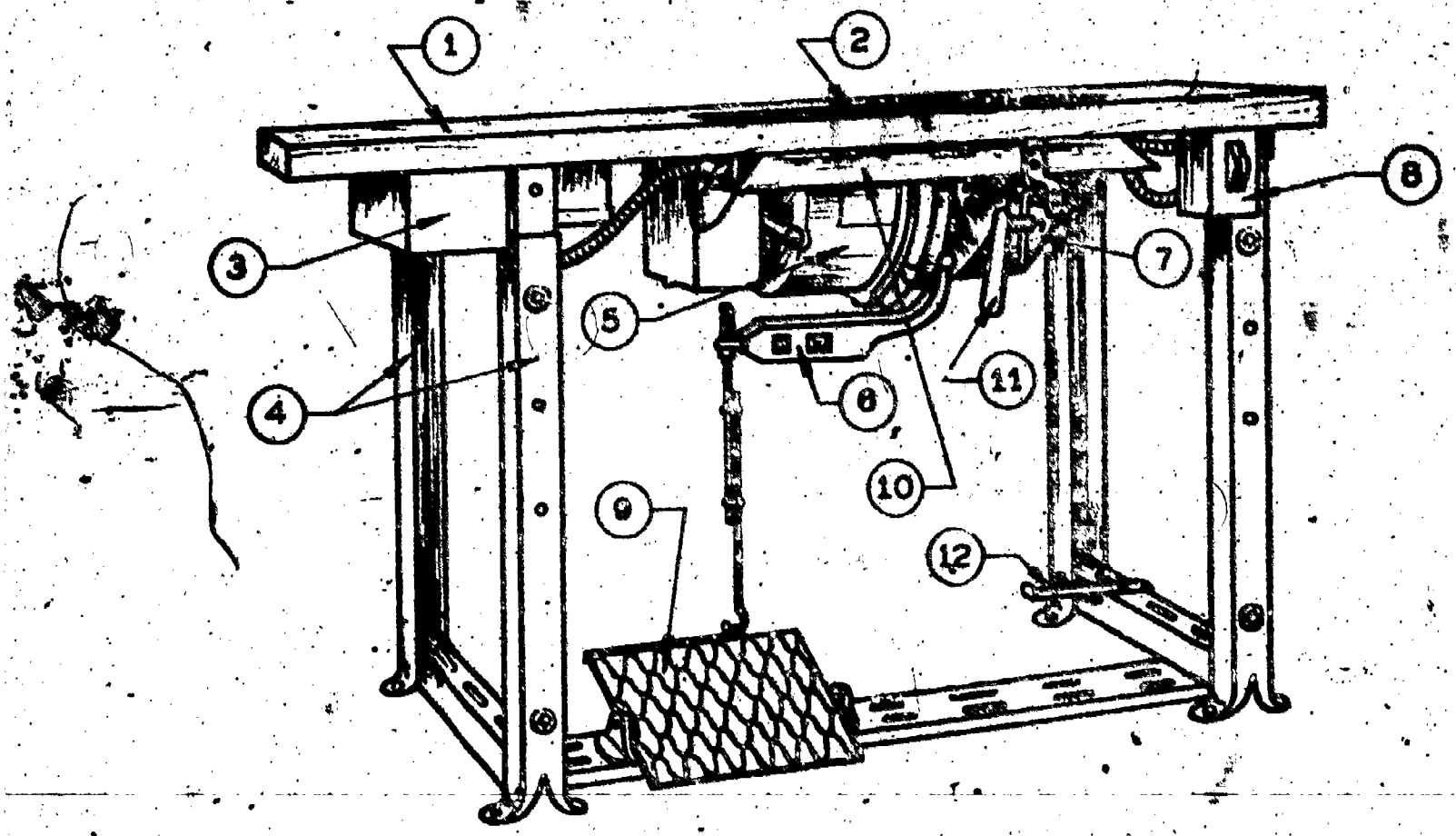


Figure 4. Sewing Machine Head, Type 111W-152.



1. Table Top.
2. Opening in Table Top for Sewing Machine Head.
3. Tool and Thread Drawer.
4. Adjustable Sewing Machine Stand.
5. Adjustable Sewing Machine Motor with Clutch.
6. Extension Clutch Arm.
7. Motor Belt Guard.
8. Motor Switch.
9. Treadle Clutch Foot Pedal.
10. Oil Drip Pan.
11. Machine Foot Knee Lifting Lever.
12. Oil Can Bracket.

Figure 5. Class 111 Machine Stand.

Figure 4 shows a class 111 machine head and its features, and table 6-1 lists the functions of the features.

Figure 5 shows a class 111 machine stand and its features.

	NAME	FUNCTION
1.	Thread Take-Up Lever	Pulls the needle thread against the tension disc after the lock stitch is formed at the rotary hook (16) and pulls sufficient thread from the spool to make the next stitch.
2.	Vibrating Presser-Bar Tension Regulating Screw	Regulates the pressure on the pressure foot (13). Only sufficient pressure is to hold the material securely.
3.	Lifting Presser-Bar Tension Regulating Screw	Regulates the pressure on the alternating presser foot (15).
4.	Arm Cap	Enables the operator to make the internal adjustments and protects the inside from dust.
5.	Feed Indicating Disc	Indicates the number of stitches per inch which is being made by the machine.
6.	Balance Wheel	Provides a connection between the driving unit and the sewing machine head.
7.	Arm-And-Hook Driving-Shaft Connection Belt	Connect the upper arm shaft with the hook-driving shaft.
8.	Face Plate	Covers and protects the mechanism of the two presser feet and needle bar (12).
9.	Needle-Thread Lubricator	Lubricates the thread when sewing leather. LLubrication of the thread prevents it from fraying and prevents the needle from becoming hot when sewing at high speed.
10.	Needle-Thread Tension	Regulates the tension on the needle thread so that the lock stitch may be adjusted properly.
11.	Needle-Thread Controller Spring Assembly	Removes sufficient slack from the needle thread when the needle is descending to prevent the needle from splitting the thread.
12.	Needle Bar	Holds the needle and carries the thread to the rotary hook (16) where the lock stitch is formed.
13.	Vibrating Presser-Foot	Holds the material in place while the alternating presser foot (15) rises to make another stitch.
14.	Feed Dog	Feeds the material from the under side.
15.	Alternating Presser-Foot	Holds the material in place while the vibrating presser foot (13) and feed dog (14) go forward to get material for the next stitch.
16.	Rotary-Hook Assembly	Contains the mechanism which forms the lock stitch by using the needle and bobbin threads.

Table 1. Features of the Class 111 Machine and Their Functions.

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16A.	Bobbin	Contains the lower thread used in forming the lock stitch.
16B.	Bobbin-Case Retainer-Hook Gib	Holds the bobbin case in the lock assembly.
16C.	Needle-Deflecting Hook Washer	Holds the bobbin case in the lock assembly.
17.	Throat Plate	Surrounds the feed dog and keeps the material from slipping after the feed dog has been adjusted to the proper height.
18 - 18A.	Bed Slides	Covers the feed eccentric and rotary hook assembly on each side of the throat plate.
19.	Feed Indicator Plunger	Used in connection with the feed indicater td regulate the number of stitches per inch desired.
20.	Safety-Clutch Lock Stud	Re-engages the needle with the hook driving assembly after clearing a thread jam.
21.	Bobbin-Case Opener	Prevents thread from jamming underneath the throat plate on the bobbin case base.
22.	Rotary-Hook Saddle Complete	The rotary hook (16) is operated by the spiral driving pinion gear (22) which in turn is operated by the hook driving gear located on the hook driving shaft.
23.	Rotary-Hook and Connection Belt Timing Place and Arrows	Used to time the arm shaft with the hook driving shaft.

Table 1. Features of the Class 111 Machine and Their Functions (Cont'd).

REFERENCE

Study TO 34Y7-1-101

3AZR42753
~~3ASRS8150-6~~-SG-106

Life Support Systems Branch
Chanute AFB, Illinois

INSPECTION, TIMING, AND ADJUSTMENT OF 111W SERIES SEWING MACHINES

OBJECTIVES

Upon completion of this unit of instruction you will be able to inspect, time, and adjust the Class 111W Series Sewing Machines.

INTRODUCTION

The Class 111W Series Sewing Machines require periodic inspections prior to and during actual operation of the machines. The preventive maintenance procedures are performed to keep the sewing machine in serviceable condition for maximum performance during operation of the machines.

INFORMATION

PERFORMING INSPECTION TIMING STEPS

Each technician is required to know certain maintenance procedures. The following inspection timing steps and adjustments will be used to maintain the sewing machine in working condition. There are three inspection timing steps; each step should be completed in sequence.

Timing Arrows

Alignment of the arrows is the first timing step. It is necessary to time the arrow on the collar of the hook driving shaft with the arrow on the timing plate so the fabric is not fed through the machine until the needle is above the fabric.

Raising and Lowering the Needle Bar

This is the second timing step. The needle bar must be set to proper length to complete proper timing procedures. There are two small marks 1 7/8 inches above the bottom of the needle bar which are 3/32 inches apart on the 111W152, 153, and 154 sewing machines; 2 1/8 inches above the bottom of the needle bar on the 111W155 sewing machines.

The top mark indicates the length of the needle bar. This procedure will position the needle bar at the proper specified length so the lock stitch may be formed during operation. If the needle bar is not marked, use a needle bar "T" gauge of local manufacture.

The lower mark on the needle bar indicates the distance the needle bar travels on its upward stroke, as the hook passes the needle. The hook point should pass approximately 1/16 inch above the top of the needle eye. In this position, the hook will pick

91 up the needle thread and begin to form the lock stitch.

Timing Hook with Needle

This is the third timing step. The point of the hook will be approximately 1/16" above the top of the eye of the needle when correctly timed. Timing the rotary hook sometimes can be accomplished by moving the hook driving gear left or right to center the point of the rotary hook on the needle. However, if timing can not be accomplished as stated above, the rotary hook assembly should be removed and reinstalled.

PERFORMING ADJUSTMENTS

Raising or Lowering Feed Dog

The feed is raised or lowered as required to make it stand a distance of a full tooth above the throat when the feed dog is at its highest position.

Adjust Presser Bars

The lifting and vibrating presser bars are adjusted so that they are spaced 19/64th inches apart on the 111W152, 153, and 154 Sewing Machines and 21/64th apart on the 111W155 Sewing Machines. Adjusting the space between the presser bars is to be accomplished with the machine set to sew zero stitches per inch.

Adjust Relative Lift of Presser Feet

When the vibrating and lifting presser feet are correctly adjusted, both feet will alternately rise an equal distance during the walking motion of the presser feet.

Adjusting the Tension Assembly and Controller Spring

This assembly is composed of two separate tension control devices. The upper tension assembly may be adjusted to apply tension to the needle thread; the lower thread controller assembly has a spring which is used to remove slack from the needle thread.

The tension assembly may be adjusted by the thumb nut on the tension stud. The thread controller is adjusted by setting tension on the spring and alignment of the spring stop.

REFERENCES

Study

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines', Book Two Part Three

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Life Support Systems Branch
Chanute AFB, Illinois

MAJOR OVERHAUL OF THE CLASS 111W SERIES SEWING MACHINES

OBJECTIVES

Upon completion of this unit of instruction you will be able to perform major overhaul of the Class 111W Series Sewing Machines.

INTRODUCTION

Major overhaul of the 111W Series Sewing Machines requires a complete disassembly and reassembly of major components of the machines. Components that may require disassembly and reassembly when performing major overhaul are:

FACE ASSEMBLY

UPPER SHAFTS

HOOK DRIVING SHAFT

FEED DRIVING ROCK SHAFT

TENSION AND THREAD CONTROLLER ASSEMBLY

INFORMATION

The face assembly consists of the lifting presser bar, vibrating presser bar, needle bar rock frame, and thread take-up lever assemblies.

The upper shafts consists of the arm shaft, lifting rock shaft, and needle bar rock frame rock shaft.

The hook driving shaft assembly contains the hook driving gear pulley, timing collar, hook driving shaft lock ratchet, feed driving eccentric, feed driving connection, hook driving gear, and feed lifting cam.

Components of the feed driving rock shaft are feed bar, feed driving crank, and rotary hook saddle.

Read TO 34Y7-1-101, Book Two, Part Five, Section XV for detailed instructions concerning disassembly and reassembly of the face assembly, upper shafts, hook driving shaft, and feed driving rock shaft assemblies.

The tension controller assembly consists of tension thumb nut and spring; tension release washer and disc (two each); tension release plunger, stud, and release lever.

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The thread controller assembly consists of the thread controller thumb nut, spring, stud, disk and spring stop.

Read TO 34Y7-1-101, Book Two, Part Three, Section XII, Paragraph 119 for step by step procedures concerning disassembly and reassembly of the thread and tension controllers.

REFERENCES

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

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Life Support Systems Branch
Chanute AFB, Illinois

3Y2X42757
~~2ASR58150-6-SG-109~~

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TROUBLESHOOTING CLASS 111W SEWING MACHINES

OBJECTIVES

When you have completed this study guide you will be able to determine and remove malfunctions that frequently occur when operating the 111W series sewing machine.

INFORMATION

General troubleshooting information which can be of help in determining and removing the causes of trouble that may develop in the machine, read 2ASR58150-6-HO-109 and TO 34Y7-1-101, Book Two Part Three Section XII Paragraph 108.

REFERENCES

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

Life Support Systems Branch
Chanute AFB, Illinois

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~~2ASR58150-6-SG-110~~

STRUCTURAL AND FUNCTIONAL FEATURES OF 7-33, 17W15, 47W70, and 61800H SEWING MACHINES

OBJECTIVES

Upon completion of this unit of instruction you will be able to identify and analyze structural and functional features of the 7-33, 17W15, 47W70 and 61800H sewing machines.

INTRODUCTION

The 7-33, 17W15, 47W70, and 61800H Sewing Machines are designed to do a specific job. Although the structural and functional features are similar on all sewing machines, each has some features that differ from others.

INFORMATION

CLASS 7-33 SEWING MACHINE

The 7-33 sewing machine is a single needle, lock stitch machine designed for sewing heavy canvas and webbing. It is equipped with drop feed, alternating presser feet and an oscillating shuttle.

Stitch regulation ranges in length from 2 to 8 stitches per inch. Maximum speed is 550 stitches per minute. Needles used on the 7-33 are, class and variety 7X1 or 7X5 for sewing cloth and 7X2 or 7X6 for sewing leather. Needle sizes range from size 16 to size 31.

Study TO 34Y7-2-1 for information concerning structural and functional features of the 7-33 sewing machine.

CLASS 17W15 SEWING MACHINE

The 17W15 sewing machine is a zig zag machine designed for seizing ends of small and medium size ropes and sewing parachute suspension line on or in a parachute canopy. It is a single needle, lock stitch machine with a vibrating needle and a transverse (vertical, with bobbin facing front of machine) rotary hook.

The forward stitch and the sideway throw may be adjusted with the sideway throw adjusted to a maximum length of 1/4 inch. The maximum recommended speed is 1,000 stitches per minute. Needles used on the machine are, class and variety 134X1, sizes 10 to 26.

Study TO 34Y7-9-1 for information concerning structural and functional features of the 17W15 sewing machine.

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CLASS 47W70 SEWING MACHINE

The model 47W70 sewing machine is a darning machine designed for repairing clothing, parachutes, etc. Included in the design is a round bed designed for sewing tubular articles of clothing.

A rotary hook works in conjunction with a single needle to form the lock stitch. Operators must move the material back and forth under the needle as the 47W70 has no feeding mechanism. Needles used on the machine are, class and variety 126X3, sizes 10 to 24.

Study TO 34Y7-1-101, Book Three, Part One and Two for information concerning structural and functional features of the 47W70 Darning Machine.

CLASS 61800H UNION SPECIAL SEWING MACHINE

The 61800H union special sewing machine is designed for light, medium, and heavy duty work. It is a single needle, lock stitch machine with compound feed and a rotary hook. The machine is provided with an oil reservoir for automatic lubrication of the rotary hook assembly. Manual lubrication of the head and face assembly is required.

Length of the stitch may be adjusted as necessary and maximum recommended speed is 4000 R.P.M. Needles used on the machine are, type 182GA, sizes 044, 048, 054, 060 and 067.

Study Catalog 101R, Union Special Industrial manual for information concerning structural and functional featuers of the 61800H Union Special sewing machine.

REFERENCES

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

TO 34Y7-2-1, Singer Sewing Machine, 7-33

TO 34Y7-9-1, Singer Sewing Machine, 17W15

Catalog number 101R, Union Special Industrial Sewing Machine Manual

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~~2AGR50150~~ 6-SG-11D

INSPECTION, TIMING, AND ADJUSTMENT OF THE 7-33, 17W15, 47W70, and 61800H SEWING MACHINES

OBJECTIVES

Upon completing this unit of instruction you will be able to inspect, time, and make adjustments to the Class 7-33, 17W15, 47W70, and 61800H Sewing Machines.

INTRODUCTION

Sewing machines are like automobiles, both require periodic inspections and preventative maintenance. The 7-33, 17W15, 47W70, and Union Special 61800H sewing machines should be inspected daily prior to, during and after operation to keep them in serviceable operating condition.

INFORMATION

CLASS 7-33 SEWING MACHINE

Procedures for performing preventive maintenance concerning oiling and cleaning the sewing machine. Instructions for timing the machine such as setting the needle bar; setting the shuttle to or from the needle (with relation to the needle); timing the feed dog with the needle.

Information for making the following adjustments to the sewing machine; how to regulate tension on needle and bobbin thread, length of stitch, and regulate pressure on the material.

Study TO 34Y7-2-1, for information concerning inspection, timing and adjustment of the 7-33 Sewing Machine.

CLASS 17W15 SEWING MACHINE

General information on preventive maintenance, oiling and cleaning the sewing machine. Adjusting the length of the forward stitch, side adjustment of the needle (vibration of the needle), and tension on needle and bobbin thread.

Step by step procedures for raising or lowering the feed dog. Timing the needle bar, rotary hook, and setting the hook in relation to the needle (closer or away from the needle).

Study TO 34Y7-9-1 for information concerning inspection, timing, and adjustment of the 17W15 sewing machine.

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CLASS 47W70 SEWING MACHINE

General information concerning preventive maintenance and oiling procedures for the sewing machine.

Step by step procedures for timing the machine consisting of timing hook with needle, raising or lowering the needle bar, setting hook to or from needle, and adjusting the thread controller.

Study TO 34Y7-1-101, Book Three, Part Three for information concerning inspection, timing, and adjustment of the 47W70 sewing machine.

CLASS 61800H UNION SPECIAL SEWING MACHINE

General information concerning preventive maintenance and oiling procedures for the Union Special Sewing Machine.

Step by step procedures for timing the machine consisting of setting the needle bar, timing the hook, setting the feed dog height. Adjusting hook opener finger and thread controller spring.

Study Catalog Number 101R, information concerning inspection, timing, and adjustment of Class 61800H Union Special Sewing Machine.

REFERENCES

TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

TO 34Y7-2-1, Singer Sewing Machine 7-33

TO 34Y7-9-1, Singer Sewing Machine 17W15

Catalog Number 101R, Union Special Industrial Sewing Machine

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PREPARE THE MAN

23

WORKBOOK 3ABR42353 ~~2ASR58150~~-6-WB-100

Technical Training

Sewing Machine Maintenance

SEWING MACHINE MAINTENANCE

10 August 1972

CHANUTE TECHNICAL TRAINING CENTER (ATC)

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CONTENTS

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~~2ASR58150-6-WB-102~~ 25

SHOP PROCEDURES AND SAFETY PRECAUTIONS

OBJECTIVES

After completing this workbook you will be able to perform shop procedures and safety precautions required during operation and/or maintenance on sewing machines.

EQUIPMENT

	Basis of Issue
Machine, Sewing, 31-15	1/student
Machine, Sewing, 111W Series	1/student
TO 34Y7-1-101, Book One, Part Two	1/student

PROCEDURES

Using Class 31-15 and 111W Series Sewing Machines and TO 34Y7-1-101, Book One Part Two, answer the following questions concerning safety precautions to be followed when operating and/or performing maintenance of machines.

QUESTIONS

1. Why is it important that material be under the presser foot/ feet when operating the sewing machine?

2. List the procedures the operator should follow when making adjustments to sewing machines such as removing needles or bobbins?

3. What causes the needle to bend or break when material is being fed?

4. What procedures must be complied with when tilting the machine head back to perform maintenance?

26 5. List five shop hazards that contribute to accidents in the Survival Equipment Shop?

a.

b.

c.

d.

e.

REFERENCES

2ASR58150-6-SG-102, Shop Procedures and Safety Precautions
TO 34Y7-1-101, Clothing and Textile Repair Sewing Machines

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2ASR58150-6-WB-102 27

STRUCTURAL AND FUNCTIONAL FEATURES OF 31-15 SEWING MACHINES

OBJECTIVES

When you have completed this workbook you will be able to identify structural and functional features of the Class 31-15 sewing machines.

EQUIPMENT

	Basis of Issue
Machine, Sewing, 31-15	1/student

PROCEDURES

Using Class 31-15 Sewing Machines, study guide, workbook, and TO 34Y7-1-101, list the structural and functional features of the sewing machine head by identifying the parts in figure 1 and filling in the blank spaces provided.

Identify general sewing machine data applicable to various types of sewing machines, Table 1.

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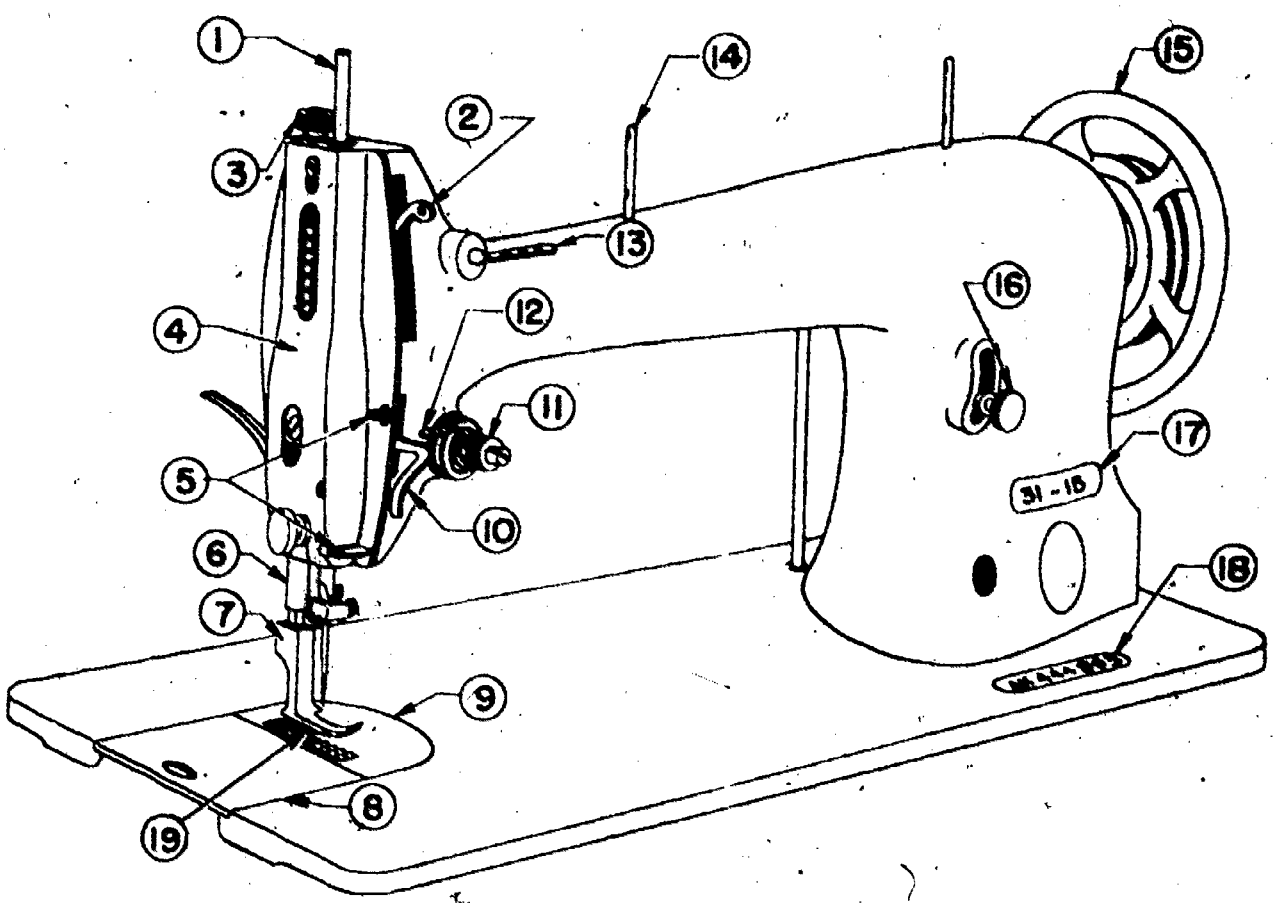

Figure 1. Structural and Functional Features of 31-15 Sewing Machines.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____

Machine Model	Needles			Maximum Speed	Presser Bar Spacing	Type Feed	Stitch Forming Mechanism	Bobbin Rotation	Weight Material Used
	New Mfg Cat. Nr	Old Class & Variety	Sizes						
7-33	5211	7X1 7X5	18-27 28-31	550	N/A	Drop W/ Alt Pr	OS	CC	Heavy
17W15	2901	134X1	10-24	1000	N/A	Drop	RH	C	Light/Med
29K73	3741	29X3	9-25	500	N/A	Univ Upper	OS	CC	Light/Med
31-15	2055	16X87	7-25	2200	N/A	Drop	OS	C	Light
47W70	3303	126X3	12-23	2800	N/A	N/A	RH	CC	Light
111W152	3355	135X17	10-26	2900	19/64"	Compound W/Alt Pr	RH	CC	Medium
111W153	3355	135X17	10-26	2900	19/64"	Compound W/Alt Pr	RH	CC	Medium
111W154	4506	126X11	10-27	2900	19/64"	Compound W/Alt Pr	RH	CC	Medium
111W155	3355	135X17	10-26	3500	21/64"	Compound W/Alt Pr	RH	CC	Medium
212W140	1901	135X7	7-25	4000	17/32"	Compound	RH	CC	Light/Med
251-11	1361	88X9	8-22	5000	N/A	Drop	RH	CC	Light/Med
251-12	2270	16X257	8-25	5000	N/A	Drop	RH	CC	Light/Med
251-13	2270	16X257	8-25	4300	N/A	Drop	RH	CC	Light/Hev
61800H	180GL 182GA	N/A	.032, .067 .044, .067		29/64"	Compound	RH	CC	Light/Med

RH Rotary Hook OS Oscillating Shuttle C Clockwise CC Counterclockwise W/Alt Pr With Alternating Pressers

Table 1. General Sewing Machine Data.

30

State the functions of the following parts of the 31-15 Sewing Machine.

1. Thread Take-up Lever.

2. Presser Foot.

3. Throat Plate.

4. Slack Thread Regulator.

5. Tension Assembly.

6. Balance Wheel.

7. Feed Regulator.

8. Feed Dog.

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INSPECTION, TIMING, ADJUSTMENT AND MAJOR OVERHAUL OF THE 31-15 SEWING MACHINES

OBJECTIVES

When you have completed this workbook you will be able to answer questions concerning inspection, timing, adjustment, and overhaul of the Class 31-15 Sewing Machines IAW technical publications.

EQUIPMENT

None

PROCEDURES

Exercise 1

Write the answer to the following questions concerning inspection, timing, and making adjustments to the sewing machine.

1. After removing a new machine from its crate, what should it be inspected first?

2. When is preventive maintenance performed on the 31-15?

3. What is used to lubricate the 31-15?

4. How often should the 31-15 be oiled when in constant use?

5. Describe how to complete the two timing steps on the 31-15?

a.

b.

6. What type of feed mechanism does the 31-15 have?

32

7. What is the difference between the needle eye and the shuttle point when the machine is properly timed?

8. What type fluid is recommended for cleaning sewing machines?

9. Describe the proper position of the feed dog mechanism when it is adjusted properly?

10. Explain the procedures involved in timing the feed dog with the needle?

11. What is the proper height of the feed dog?

12. How do you adjust the 31-15 sewing machine to sew its longest stitch?

Exercise 2

Write the answers to the following questions concerning major overhaul of the 31-15 sewing machine.

1. What three major assemblies make up the face assembly of the 31-15 sewing machine?

a.

b.

c.

2. List the five(5) components that are attached to the presser bar assembly on the 31-15 sewing machine?

a.

b.

c.

d.

e.

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3. How is the thread take-up lever held in position in the face assembly of the 31-15 sewing machine?

4. What is the most important thing to remember about the cap screw that secures the thread take-up lever?

5. When replacing the needle bar assembly, what is the first step that must be accomplished?

6. With the presser foot raised to the "up" position and the needle bar timed and lowered to the lowest position, the presser bar should be adjusted to allow how much clearance between the bottom of the needle bar thread guide and the top of the presser foot?

7. What position should the needle bar be in when removing the shuttle race assembly from the sewing machine?

8. Describe the position of the shuttle driver (in relation to the bed of the sewing machine) when removing or installing the shuttle race assembly?

9. What will cause the point of the shuttle body to clip the needle when installed in the sewing machine?

10. Where is the bobbin case position plate installed on the shuttle race body?

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TROUBLESHOOTING OF THE 31-15 SEWING MACHINES

OBJECTIVES

After you have completed this workbook you will be able to resolve mechanical problems that frequently occur during sewing machine operation.

EQUIPMENT

	Basis of Issue
Machine, Sewing, 31-15	1/student

PROCEDURES

Using Class 31-15 Sewing Machines, study guide, workbook, and TO 34Y7-1-101, Book One, Part Three, Section XII, answer the following questions concerning troubleshooting malfunctions that occur on the sewing machines.

QUESTIONS

1. List five(5) probable causes for needle breakage?

   a.

   b.

   c.

   d.

   e.

2. What are the results most likely to be when you are sewing and the presser foot is loose or out of line?

3. What causes the needle to strike the shuttle race cap on the 31-15 sewing machine?

4. What must be done to prevent the feed dog from striking the throat plate?

35

5. Explain what would happen if the operator leaves the feed regulator thumb screw loose when operating the sewing machine?

6. What is most likely to happen if the thread or bobbin tension is too tight when sewing on the 31-15 sewing machine?

7. Explain why it is important to remove sharp edges from the shuttle, bobbin, bobbin case or needles?

8. What adjustment is made to prevent the skipping of stitches?

9. How is the needle installed in the sewing machine?

10. Describe what would most likely happen if the bobbin case

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STRUCTURAL AND FUNCTIONAL FEATURES OF THE 111W SERIES SEWING MACHINE

OBJECTIVES

When you have completed this workbook you will be able to identify the structural and functional features of the 111W series sewing machines.

EQUIPMENT

	Basis of Issue
Machine, Sewing Class 111W	1/student

PROCEDURES

Using class 111W sewing machine, study guide, workbook and TO 34Y7-1-101, list the structural and functional features of the sewing machine head and sewing machine stand by identifying the parts in figures 2 and 3.

Write the answers to questions pertaining to the structural and functional features of the class 111W series sewing machine in exercise 2.

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Exercise 1

1. Identify the parts of the sewing machine head.

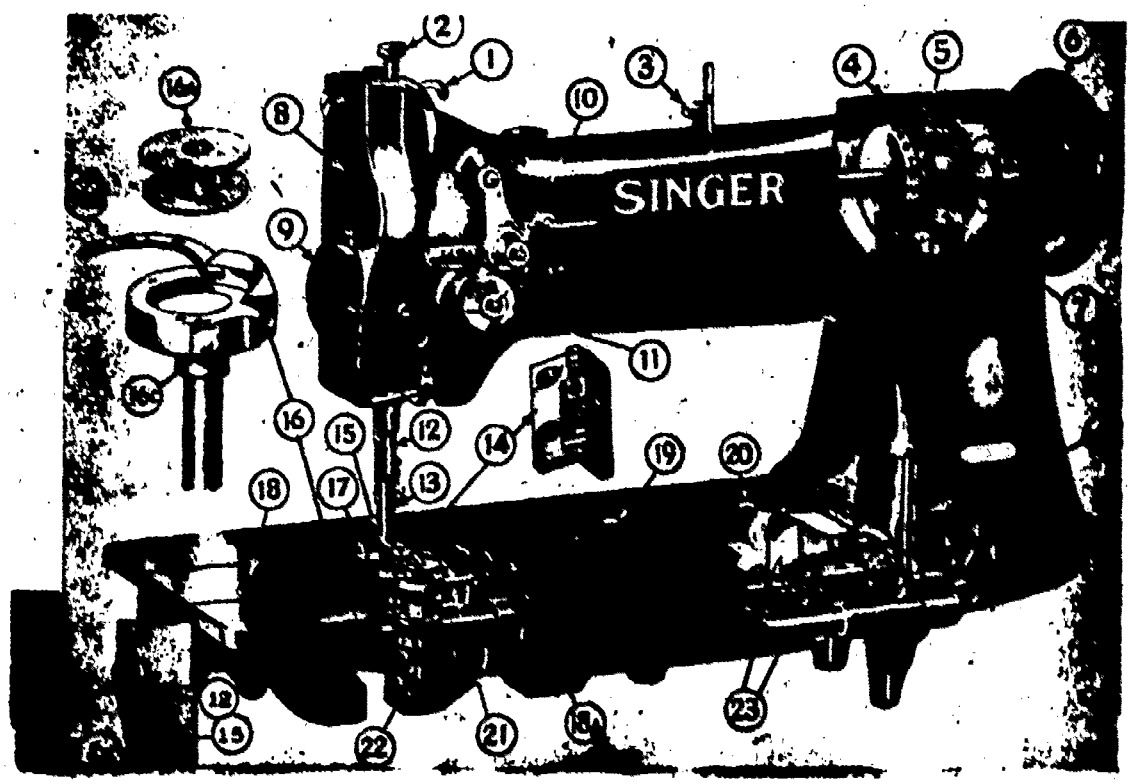

Figure 2. Sewing Machine Head, Type 111W-152.

1 _____
2 _____
3 _____
4 _____
5 _____
6 _____
7 _____
8 _____
9 _____
10 _____
11 _____
12 _____
13 _____
14 _____
15 _____
15A _____
16 _____
16A _____
16B _____
16C _____
17 _____
18 _____
18A _____
19 _____
20 _____
21 _____
22 _____
23 _____

2. Identify the parts of the sewing machine stand.

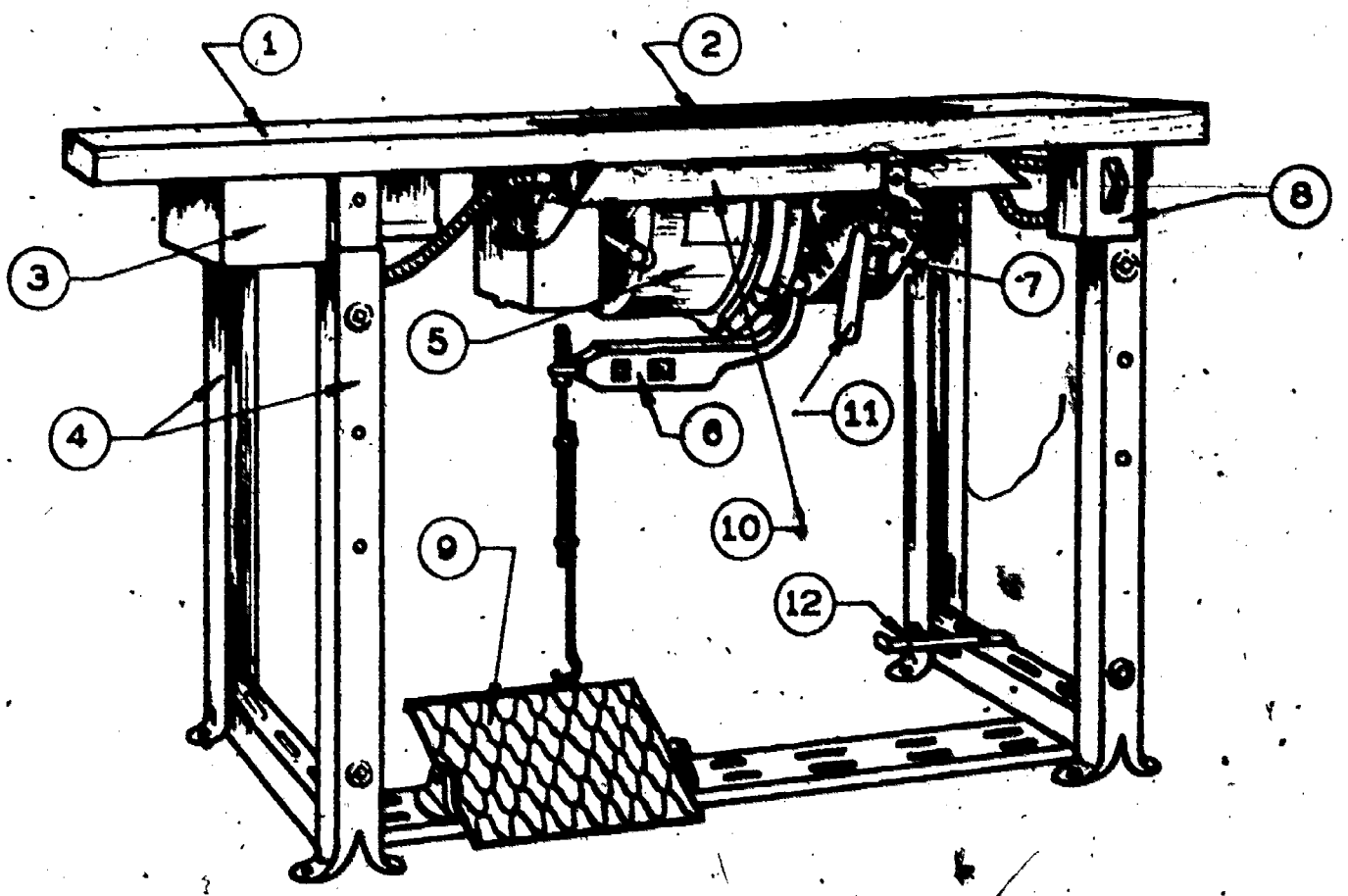

Figure 3. Sewing Machine Stand.

1 _____ 7 _____

2 _____ 8 _____

3 _____ 9 _____

4 _____ 10 _____

5 _____ 11 _____

6 _____ 12 _____

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Exercise 2

1. What type of stitch does the class III sewing machine sew?

2. What parts of the machine are used to form the stitch?

3. Explain what the machine symbol means.

4. What type feeding mechanism does the 111W152 and the 111W155 use?

5. What part of the needle does the term "class" refer to?

6. What part of the needle does the term "variety" refer to?

7. What class and variety needle is used in the 111W152 sewing machine?

8. Where is the stitch regulating button located on the 111W152 sewing machine?

9. What is the function of the safety clutch?

10. What is the function of the thread controller spring?

INSPECTION TIMING AND ADJUSTMENT OF 111W SERIES SEWING MACHINES

OBJECTIVES

After completing this workbook you will be able to inspect, time and adjust the class 111W sewing machine.

EQUIPMENT

	Basis of Issue
Machine, Sewing, 111W Series	1/student
Handtools	1/student
Can, Sewing Machine, Oil	1/2 students
Cloth, Lint Free	1/student
Container, Parts	1/student

PROCEDURES

Using a class 111W sewing machine, study guide, workbook and TO 34Y7-1-101, perform the inspection, preventive maintenance, timing and adjustment steps.

CLASS III SEWING MACHINE MAINTENANCE

Cleaning

Exercise 1

1. Clean the machine head, oil pan, machine stand, and motor casing with a clean lint free cloth.

2. Clean the hard to reach parts of the machine with a medium soft bristle brush.

Lubricating

1. Wipe oil holes and surrounding surfaces clean before oiling.

2. Oil the moving parts indicated by arrows in figure 4 twice daily with mineral oil that has a low pour point. Use one to three drops of oil at each oiling point.

3. Add oil to oil well (figure 5-A) as needed to lubricate the upper hook bearing.

4. Oil the felt pad (figure 5-B) on the side of the bobbin case when needed. When the pad is light green it needs oil. When the pad is wet it is nearly black. This pad lubricates the hook race.

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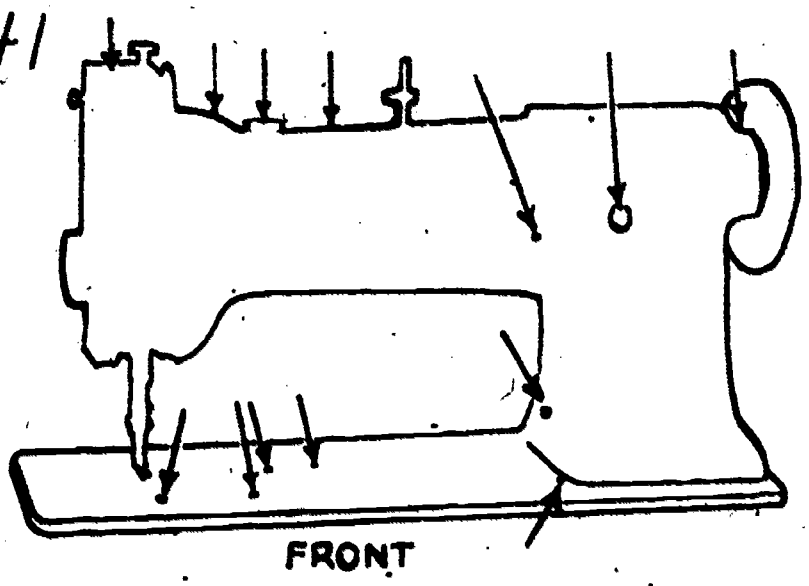

Figure 4. Oiling Points on the 111 Sewing Machine.

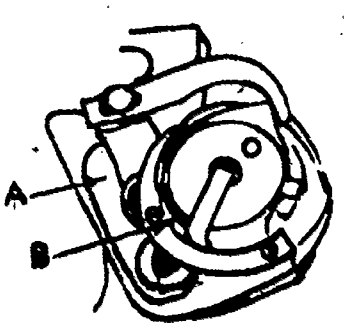

Figure 5. Hook Race and Bearing Lubrication.

5. If the thread lubricator is used, fill the reservoir to 1/8 inch below the filler hole.

Changing a Needle

1. Turn the balance wheel until the needle reaches its highest position.

2. Loosen the setscrew (figure 10A) in the needle bar and remove the needle.

3. Replace the needle in the needle bar and insert it as far as it will go. The long groove of the needle must face the left side of the machine.

4. Tighten the setscrew (figure 10A).

Setting Feed Indicating Disk

1. Set the machine to sew 8 stitches per inch as described in exercise titled "Setting Stitches Per Inch."

2. Sew a scrap of material for a few inches.

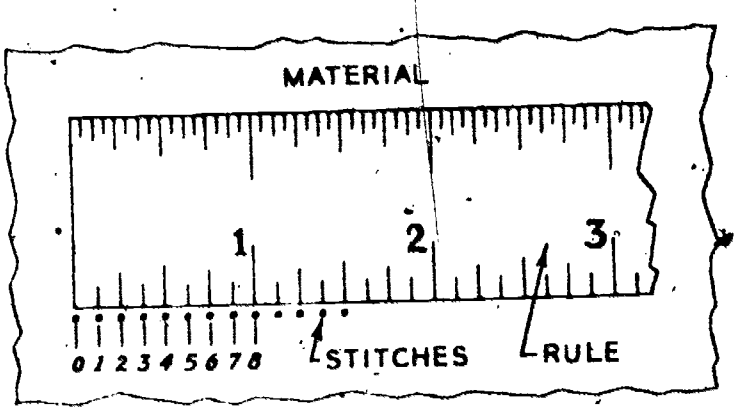

Figure 6. Checking Stitches Per Inch.

3. Use a rule and count the actual number of stitches per inch being sewn. Place the first stitch at the edge of the rule and count the stitches as shown in figure 6. If the actual count and the number in the hole in the machine arm are the same, the feed indicating disk is properly set. If the actual count is different, set the indicator disk.

4. To set the indicator disk, loosen the arm capscrew and slide back the arm cap on the top of the machine head, exposing the feed indicating disk with numbers engraved on the edge.

5. Loosen the indicator disk setscrew with 1/8" wide cabinet screwdriver until the disk will turn only when finger pressure is applied.

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6. Turn the indicating disk with the fingers until the number indicating the actual number of stitches now being sewn appears in the indicator opening in the head casting.

7. Tighten the indicating disk setscrew.

8. Reset the machine to sew 8 stitches per inch.

9. Check the accuracy of your setting by sewing and counting the stitches.

10. If your setting is not correct, repeat steps 4 through 7 and recheck.

Exercise 2

Machine Timing Part 1 - Alignment of Arrows

1. Tilt the machine back on its hinges.

2. Turn balance wheel toward operator (in same direction it turns when machine is sewing) until thread take-up lever reaches its highest position.

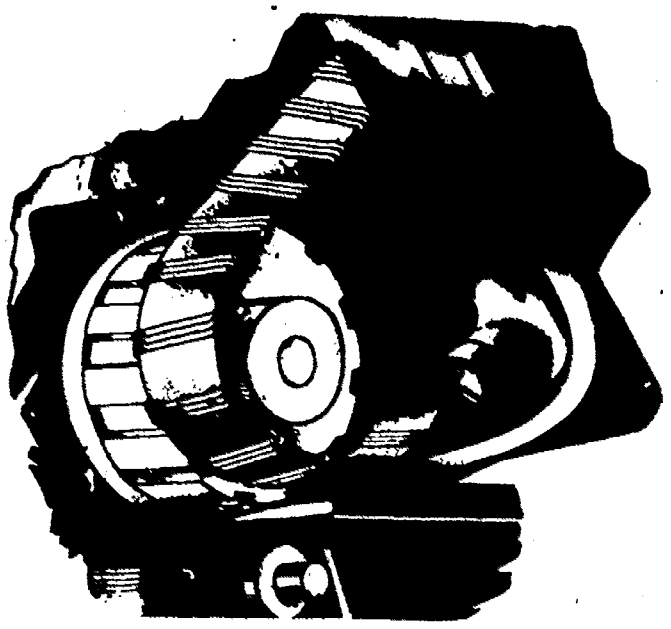


Figure 7. Removal of Arm Shaft Connection Belt from Lower Pulley

3. Check alignment of arrows A and B in figure 8.

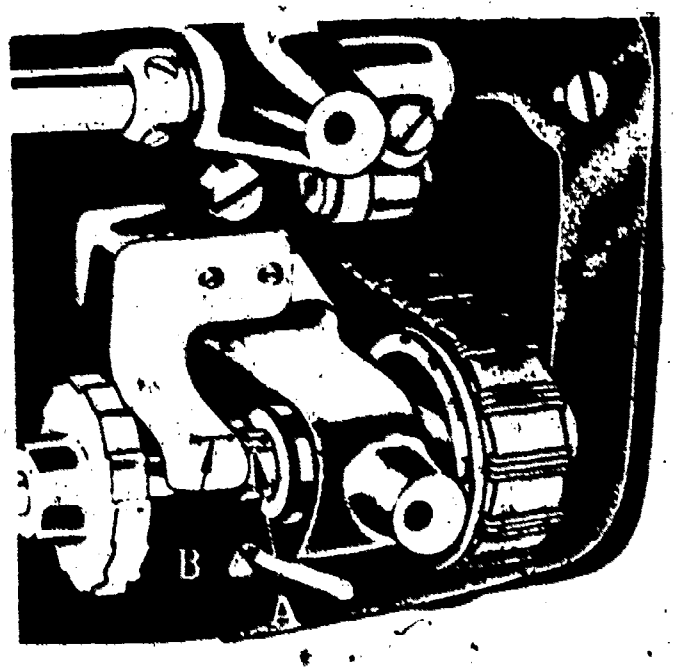
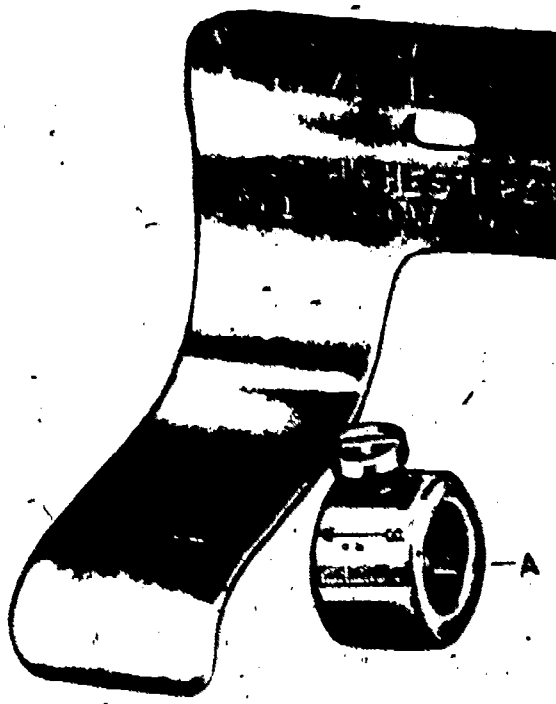


Figure 8. Alignment of Arrows.

4. If arrows are not in line, remove connection belt from lower pulley, figure 7.



A. Collar B. Plate

Figure 9. Arm Shaft Connection Belt Timing Collar and Plate.

45

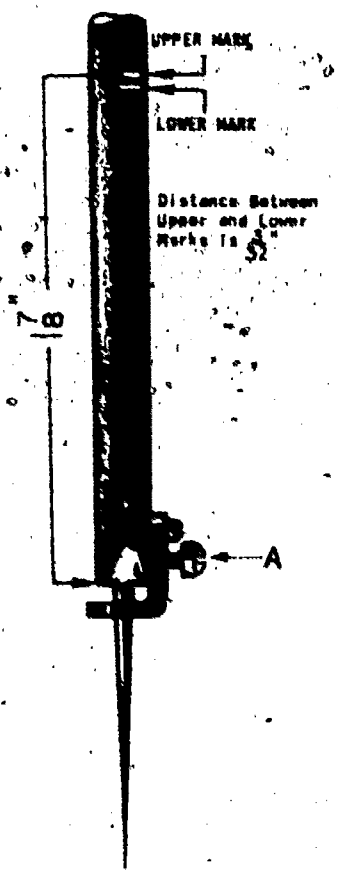


Figure 10. Marks on the Needle Bar of the 111W152 Sewing Machine.

5. Turn lower pulley by hand until the arrow, on timing collar, figure 8A, is in direct line with arrow, figure 8B on timing plate.

6. Replace connection belt by hand. After replacing belt, give balance wheel a full turn and check arrows again. Arrows sometimes slip out of line when replacing belt.

Part 2A - Setting a Marked Needle Bar

1. Loosen screw holding needle (figure 10A) on needle bar.

2. Insert needle up into needle bar as far as it will go with the long groove to the left. Check class of needle for specific machine with which you are working. See needle chart.

3. Tighten screw.

4. Loosen screw on faceplate and turn plate up. Do not move the plate until the screw is loosened.

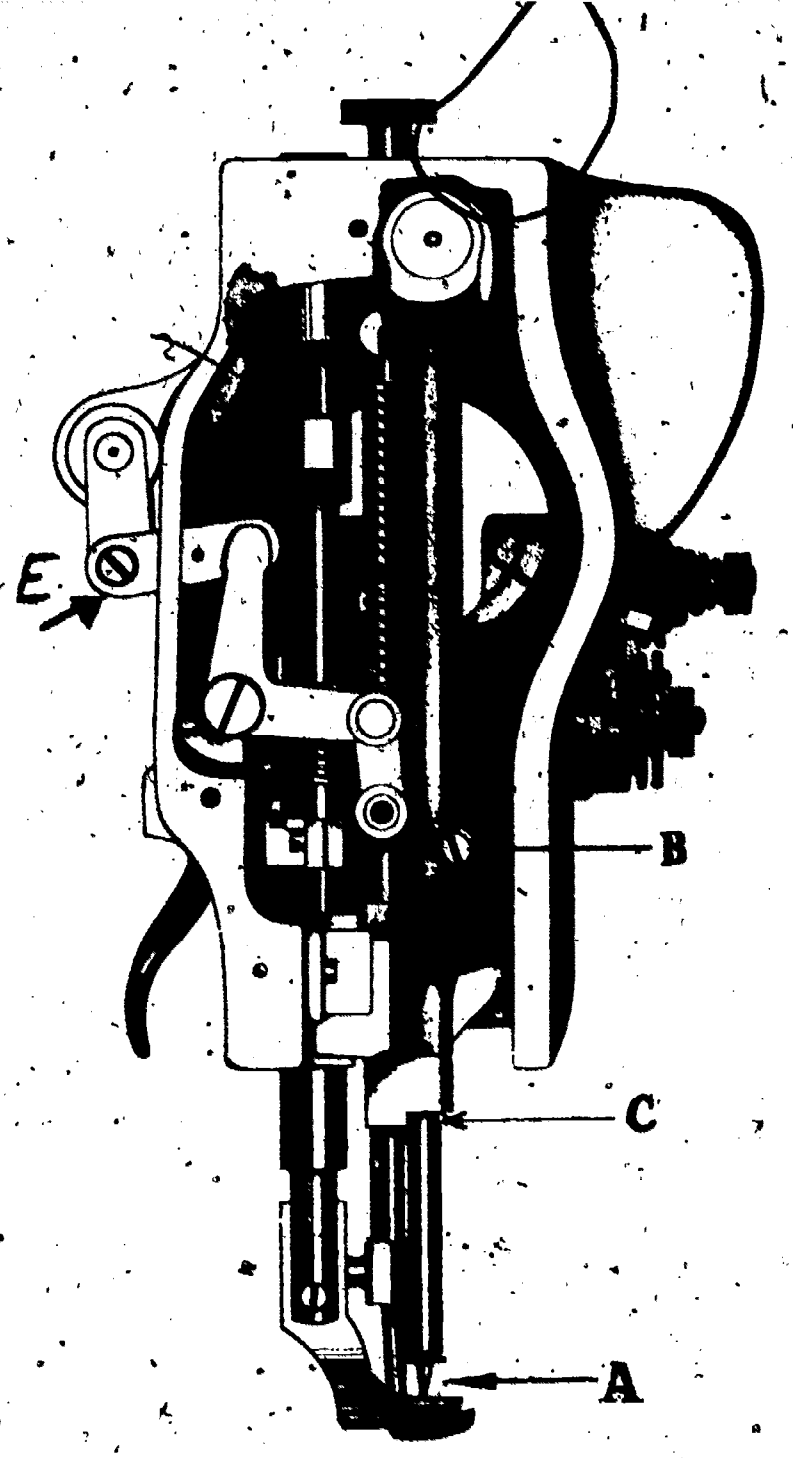


Figure 11. Setting the Needle Bar.

5. Tighten screw on faceplate.

6. Turn balance wheel so that screw (figure 11B) is at its lowest position and in the recess of the needle bar rocker frame.

7. Loosen screw and adjust the needle bar. The position of the alignment marks on the needle bar is shown in figure 10. Align the needle bar so that the upper mark is first visible at the edge of the needle bar rocker frame (figure 11C). It is imperative that the needle eye be in a parallel line with the length of the machine. If it is not directly in alignment, the machine will skip stitches or may not sew at all.

47 8. Tighten screw (figure 11B).

9. Inspect by rechecking procedure 1 through 8 to see that setting of the needle bar is correct.

Part 2B - Setting an Unmarked Needle Bar

If the needle bar is unmarked, the needle has to be synchronized with the rotary hook in order to locate the proper position for the needle bar.

1. Remove needle from the machine and inspect for proper class by referring to needle chart.

2. Inspect needle for sharpness by sliding fingernail over point.

3. Inspect straightness of needle by rolling on flat surface.

4. Insert proper class of needle into needle bar. Be sure needle is inserted as far as it will go into needle bar before tightening screw and the eye and the scarf correctly located.

5. Remove throat plate and feed dog.

6. Turn the balance wheel toward you until the point of the rotary hook comes around in position in direct line with the needle. With rotary hook in this position, screw (figure 11B) will be in position for loosening.

7. Looser screw (figure 11B).

8. Adjust needle bar so that needle eye will be 1/16 inch below the point of the rotary hook.

9. Tighten screw (figure 11B).

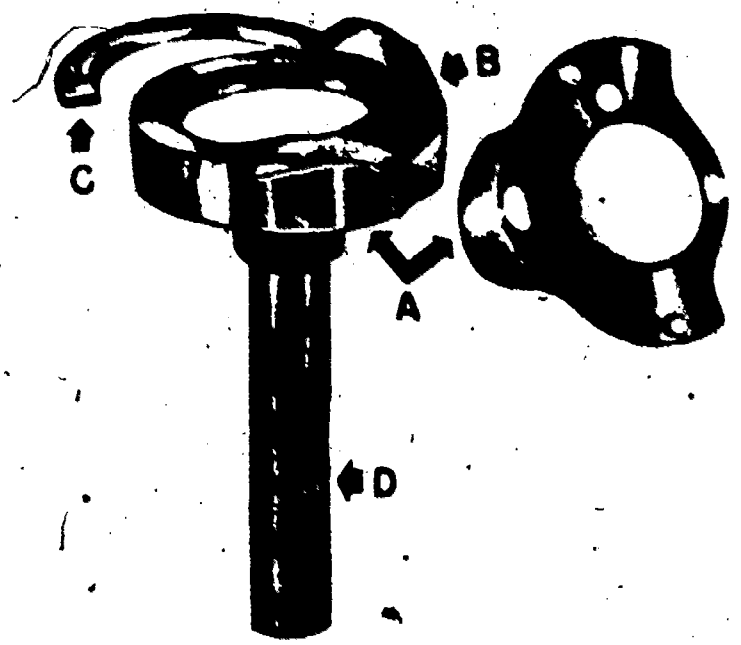
10. Check proper adjustment by turning balance wheel by hand.

11. Replace feed dog and throat plate.

Part 3 - Timing the Rotary Hook

When the lower mark on the needle bar is just visible at the end of the needle bar housing on the upward stroke of the needle, the point of the rotary hook should be as close as possible to the needle and 1/16 inch above the eye of the needle.

1. Remove the throat plate and feed dog.



A. Needle Guard Washer.
B. Rotary Hook.
C. Bobbin Case Retainer Hook Gib.
D. Groove.

Figure 12. Rotary Hook Assembly.

2. Turn balance wheel full turn until the hook point is at center of needle. The point of the rotary hook should run as close to the needle (within the scarf) as possible. This prevents the point of the hook from cutting into the thread. The needle guard washer (figure 12A) prevents the rotary hook from striking the needle by pushing the needle point slightly out of the path of the hook.

3. Tilt machine head back on hinges.

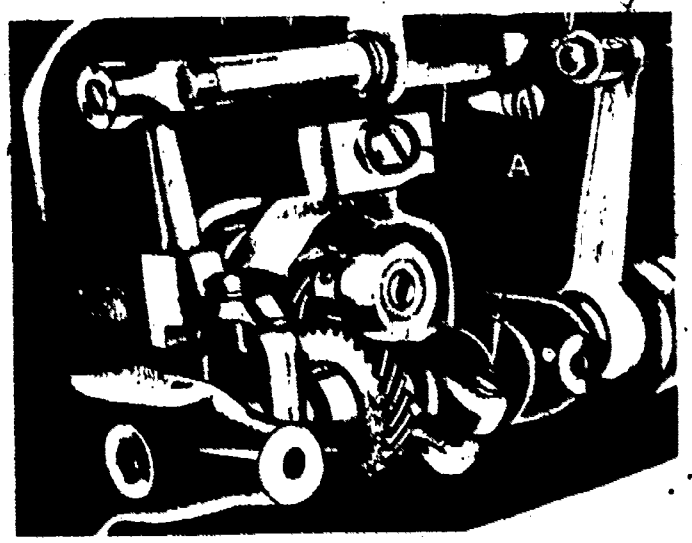


Figure 13. Adjustment of Rotary Hook.

49 4. Loosen screw (figure 13A).

5. Move the hook saddle to the right about 1/8 inch by tapping with end of screwdriver handle.

6. Tighten screws (figure 13A).

7. Turn balance wheel by hand. Observe relative location of hook point with needle.

8. Loosen screws (figure 13A).

9. Adjust hook saddle so that point of hook is correct distance from needle.

10. Check correct distance of rotary hook from needle by turning balance wheel by hand. The needle guard washer (figure 12A) should just barely strike the side of the needle and deflect the needle enough to allow the point of the rotary hook to pass through the scarf of the needle. When the lower mark on the needle bar is even with the housing on the up stroke of the needle, the rotary hook point should be as close as possible to the needle and 1/16 inch above the needle eye.

11. Remove lifting presser foot and bobbin case opening lever.

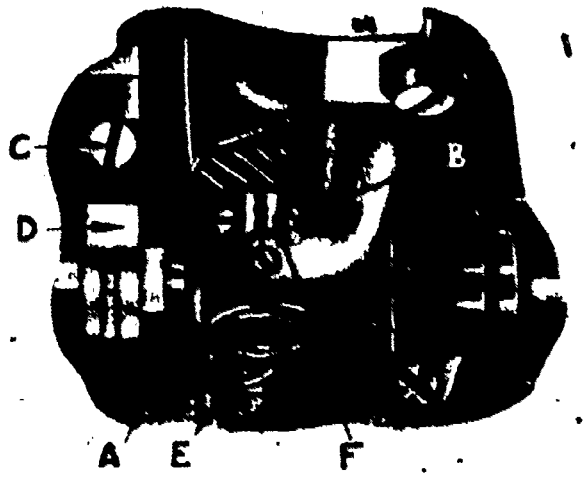


Figure 14. Underneath View Showing Hook Saddle, Hook Driving Pinion, and Feed Dog Adjustment.

12. Remove screws A and B, figure 14 in hook driving pinion.

13. Remove rotary hook assembly.

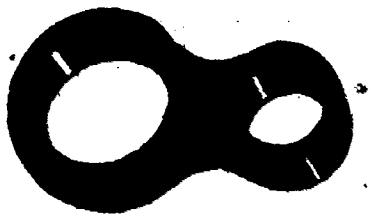


Figure 15. Hook Saddle Component
Bobbin Case Opener Lever Link.

14. Remove bobbin case opener lever link, (figure 15).

15. Center hook driving gear (figure 14E).

16. Turn balance wheel until lower mark on needle bar is even with the housing on the up stroke of needle.

17. Replace pinion gear (figure 14E). Space between screw holes of pinion gear should be centered on bottom bushing screw of hook saddle.

18. Insert rotary hook assembly in bottom of saddle assembly and pinion gear.

19. Turn balance wheel until needle bar is at highest point.

20. Remove rotary hook assembly from bottom of saddle.

21. Attach bobbin case opener lever link to rotary hook.

22. Insert rotary hook properly from top of machine. Be certain that a small hole on lever link is slipped over post (figure 16).

23. Turn balance wheel until lower mark on needle bar becomes even with housing on up stroke of needle.

24. Turn rotary hook with fingers until point becomes even with needle.

25. Check in left screw hole of pinion gear for groove (figure 12D) on rotary hook. If groove is not in hole, a mistake has been made in one of the preceding timing steps.

26. Insert screw in pinion gear. Screw with round end should be in hole that is over groove.

27. Give balance wheel a full turn and recheck hook point and needle eye.

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Figure 16. Hook Saddle Assembly.

28. Loosen screws in back of driving gear and move gear slightly to right if hook point is slow, or slightly to left if hook point is fast.

29. Tighten screws.

30. Check hook point and needle.

31. Continue to adjust driving gear to left or right until hook point is timed perfectly with needle.

32. Replace parts on machine in the following order: feed dog, throat plate, opener lever, and presser foot.

Exercise 3

Setting the Feed Dog

When feed dog is at its highest position it should show a full tooth above the throat plate.

1. Clean dust and line from throat plate and feed dog.

2. Lift presser foot by hand lifting lever.

3. Tilt machine head back on hinges.

4. Turn balance wheel toward you until feed dog is at its highest position.

5. Loosen screw (figure 14C).

6. Raise the feed dog bar (figure 14D) as high as it will go.

7. Tighten screw (figure 14C).

8. Turn balance wheel by hand. Do not force the balance wheel.

9. Loosen screw (figure 14C).

10. Lower feed bar as low as it will go.

11. Tighten screw (figure 14C).

12. Turn balance wheel by hand. Feed dog will not come up through opening in throat plate.

13. Loosen screw (figure 14C).

14. Readjust feed dog bar so that feed dog will show a full tooth above throat plate when it is at its highest position.

Releasing and Engaging the Safety Clutch

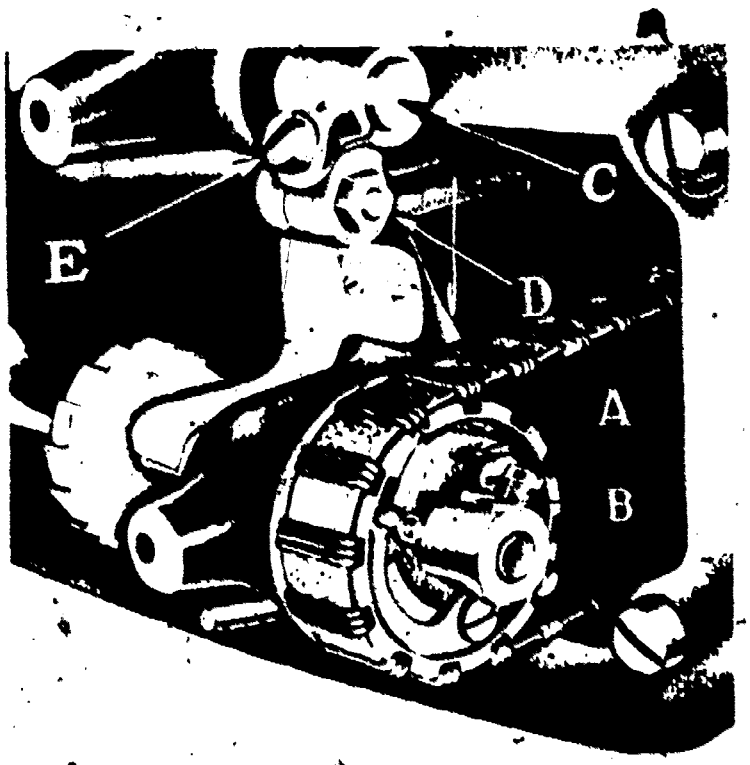


Figure 17. Safety Clutch.

53 1. To disengage the safety clutch, tilt the machine head back on its hinges to make the locking lever accessible.

2. Disengage the locking lever (figure 17A) by forcing it up out of the notch (figure 17B) with a large screwdriver.

3. Turn the balance wheel by hand. The hook shaft will not turn with the clutch disengaged.

4. To engage the safety clutch, turn the balance wheel away from you to line up the locking lever and the notch.

5. Use the plunger button and engage the clutch. If it does not engage, a large screwdriver may be used to move the locking lever into the notch.

Exercise 4

Adjustment of Presser Bars and Needle Bar

1. Hold down stitch-length indicator plunger and regulate machine to zero stitches per inch, by turning balance wheel BACKWARD until it locks.

2. Lift plunger and check feed dog. There should be no movement in the feed dog to front or back when balance wheel is turned forward.

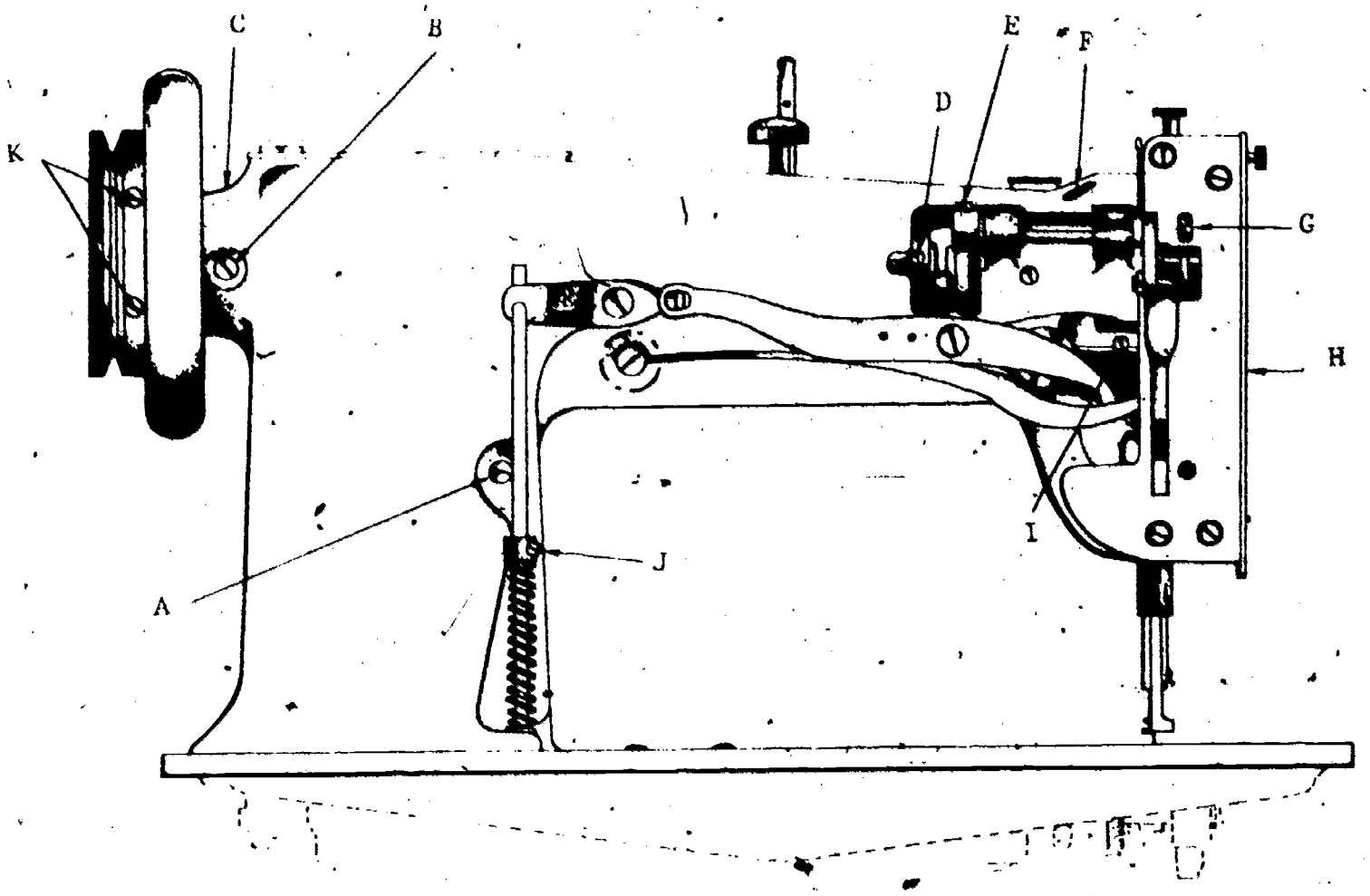
3. Set needle point even with the top of the throat plate.

4. Lower the presser foot.

5. Check the distance between vibrating and alternating presser feet with a bar gauge being sure that the gauge touches only the curved surface of both presser bars. The distance between presser bars should be 19/64" on the 111W152, 111W153, and 111W154. On a 111W155, the distance should be 21/64". If adjustment is needed, use a heavy screwdriver to loosen the feed driving crank pitch screw, with the gauge inserted between the alternating presser bar and the vibrating pressure bar. Hold both bars tightly against gauge and tighten the screw.

6. With the machine set at zero(0) stitches per inch and the needle point even with the top of the throat plate, check the position of the rock shaft crank. It should be parallel with the bed of the machine. If it is not parallel with the bed of the machine, loosen the pinch screw (figure 17E) and adjust the crank (figure 17C and D) parallel to the bottom surface of the bed of the sewing machine and tighten the pinch screw.

7. Check the position of the needle bar in relation to the needle opening in the feed dog by turning the balance wheel slowly forward. If the needle does not enter the center of the opening make the following adjustment.



A. Hole in Back of Arm for Reaching the Needle Bar Rock Shaft Clamping Screw.
B. Arm Shaft Bushing Set Screw.
C. Oil Hole.
D. Lifting Eccentric Connection Set Screw.
E. Lifting Eccentric Connectior Crank Pinch Screw.
F. Hole for Reaching Needle Bar Crank Set Screws.
G. Hole in Back of Face for Reaching the Presser Bar Position Guide Lever Pinch Screw.
H. Face Plate.
I. Presser Bar Lifting Bracket Pinch Screw for Holding Bracket.
J. Lifting Rod Spring Collar.
K. Balance Wheel Set Screws.

Figure 18. 111WL52 Sewing Machine, Back View.

55 8. Insert screwdriver through hole in head casting (figure 18A), and loosen screw in the needle bar rock frame rock shaft crank. This releases the needle bar and both presser bars. Adjust until needle enters center of opening in feed dog and tighten screw.

9. Recheck 19/64" clearance between presser bars. If clearance is incorrect, readjust as necessary.

Adjustment of Feed Eccentric Tension

Proper tension in the feed driving eccentric is necessary to hold the desired stitch length and at the same time allow change of stitch length by use of the feed regulating stud and balance wheel.

1. Test by holding down the feed regulating stud and by turning the balance wheel forward. It must turn with enough firm tension to hold stitch length.

2. If the wheel will not turn during this test or if the machine will not hold stitch length selected, loosen all four screws, adjust tension as desired by loosening or tightening the adjusting screws (which set at an angle to the shaft) and tighten setscrews. The feed driving eccentric is equipped with 4 small screws which you will easily find by observation. Two are adjusting screws and both adjusting screws have setscrews to hold them. The adjusting screws apply tension on the feed driving eccentric friction gib and the setscrews are tightened when the desired amount of tension is obtained. Several adjustments may be necessary to obtain desired results.

Exercise 5

Adjustment of Walking Motion of the Presser Feet

When the two presser feet of the 111W152 are correctly adjusted, both presser feet will alternately rise an equal distance.

1. Lower the lifting lever.

2. Turn the balance wheel toward you, watching the lifting motion of the presser feet.

3. Turn the balance wheel so the highest rising presser foot is on its downward motion, stopping above the throat plate one-half the distance from its highest point.

4. Use 6" common screwdriver and loosen setscrew (figure 18E). When presser foot has dropped, tighten setscrew.

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5. Turn the balance wheel and check walking movement of the presser feet.

6. If both presser feet do not rise an equal distance, readjust as necessary.

Adjustment of Presser Foot Lift

1. To obtain maximum lift for heavy fabric or thick seams, put both pressure feet at their lowest point of movement touching the throat plate.

2. Loosen lifting bar bracket screw (figure 18I). This may require a firm thrust and it may be necessary to lay the blade of your largest screwdriver horizontally on top of the bracket and exert downward pressure with the hands. Do not use a hammer.

3. Retighten screw (figure 18I).

4. Remove faceplate (figure 18H).

5. Loosen the lifting eccentric connection crank pinch screw (figure 18E).

6. Adjust the relative lift by rocking the lifting bell crank link (figure 11E) with your fingers until the desired lift is obtained.

7. Retighten the pinch screw (figure 11E).

Adjustment of Thread Controller Spring

1. To adjust tension of the controller spring, loosen the back setscrew and with a screwdriver, turn the slotted bolt counter-clockwise to increase tension and clockwise to decrease tension on the spring.

2. Retighten the back setscrew.

3. If the hook on the spring is set too high or too low, loosen the front setscrew and turn the heavy disk to left or right to set spring loop at desired height.

4. Retighten the front setscrew.

Inspection of Tension Disks

1. Remove knurled nut which holds tension disks in place on the thread tension bracket and remove the spring and disks carefully and lay them out so they may be returned in the same order.

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2. Inspect the disks for roughness or for grooves worn by the needle thread.

3. If grooves are present the disks should be replaced. Fine crocus cloth may remove any other roughness.

4. Reassemble in reverse order of disassembly.

STANDARD OF PERFORMANCE. Make sure that the small pin inside the hollow tension stud on which the disks rest is not missing. Its movement in removing disk tension when the presser bar lift is up may be detected by raising and lowering the hand lift slowly.

Inspection for Proper Position of Parts on Hook Driving Shaft

1. Check for proper position of setscrew. If it is important that a round ended setscrew be used, it will be indicated by a letter "S" on the collar or part where it is needed. Never insert a round ended setscrew unless there is a groove in the shaft.

2. Check the arm shaft connection belt timing collar, marked with the arrow, A, figure 8 to make sure it is not reversed on the hook driving shaft and that the setscrew rests on flat section of shaft.

3. Check the marked setscrew on the safety clutch pulley (figure 17) to make sure the setscrew engages a groove cut in the hook

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MAJOR OVERHAUL OF THE CLASS 111W SERIES SEWING MACHINE

OBJECTIVES

Upon completion of this workbook you will be able to identify the components of the major assemblies requiring disassembly and reassembly when performing major overhaul on the 111W series sewing machine.

EQUIPMENT

	Basis of Issue
Machine, Sewing, 111W Series	1/student

PROCEDURES

Using class 111W series sewing machine, study guide, workbook, handouts, charts and TO 34Y7-1-101, list the component parts of the major assemblies of the sewing machine by identifying the parts in figures 19 through 25 and filling in the blank spaces provided.

Exercise 1

Figure 19. 111W Face Assembly.

1. _____
2. _____
3. _____
4. _____
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9. _____
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24. _____
25. _____
26. _____

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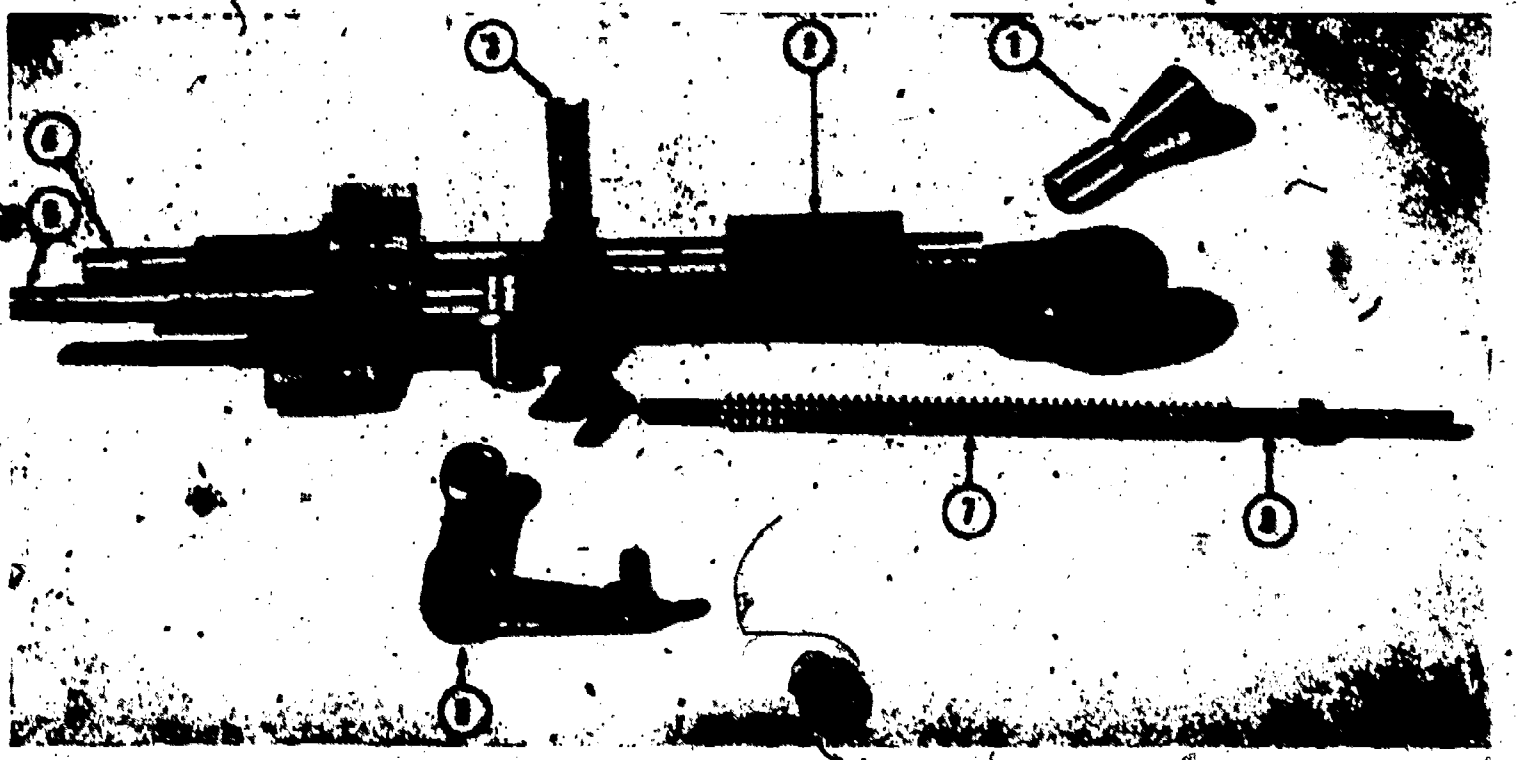

Figure 20. Needle Bar Rock Frame, 111W Series Sewing Machine

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

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Exercise 3

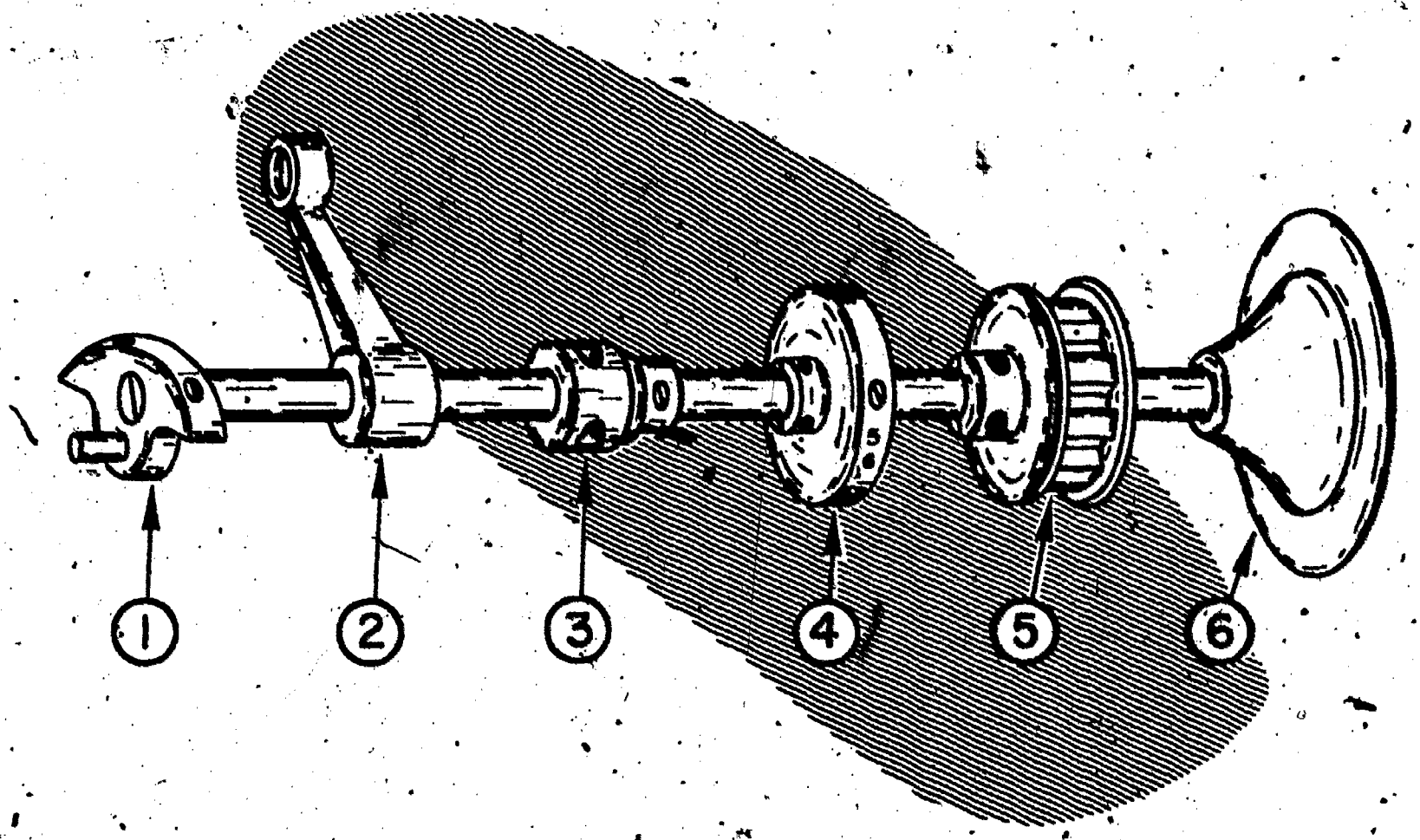

Figure 21. Arm Shaft Assembly, 111W Series Sewing Machine

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

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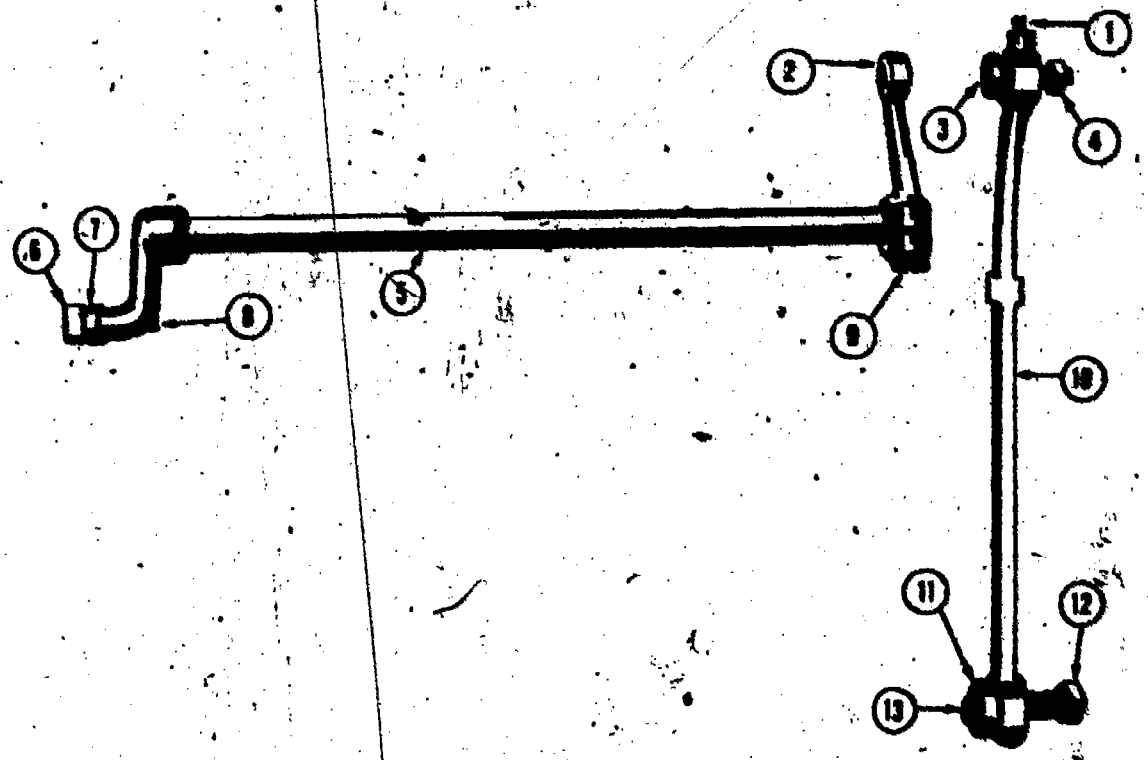

Figure 22. Needle Bar Rock Frame Rock Shaft Assembly 111W Series Sewing Machine.

1. _____
2. _____
3. _____
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11. _____
12. _____
13. _____

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Exercise 5

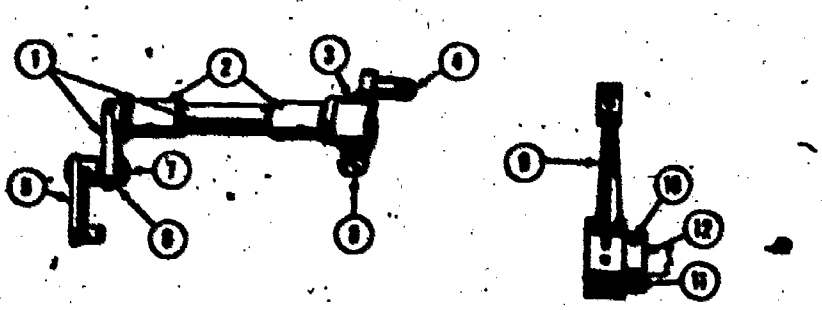

Figure 23. Lifting Rock Shaft Assembly, 111W Series Sewing Machine.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
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9. _____
10. _____
11. _____
12. _____

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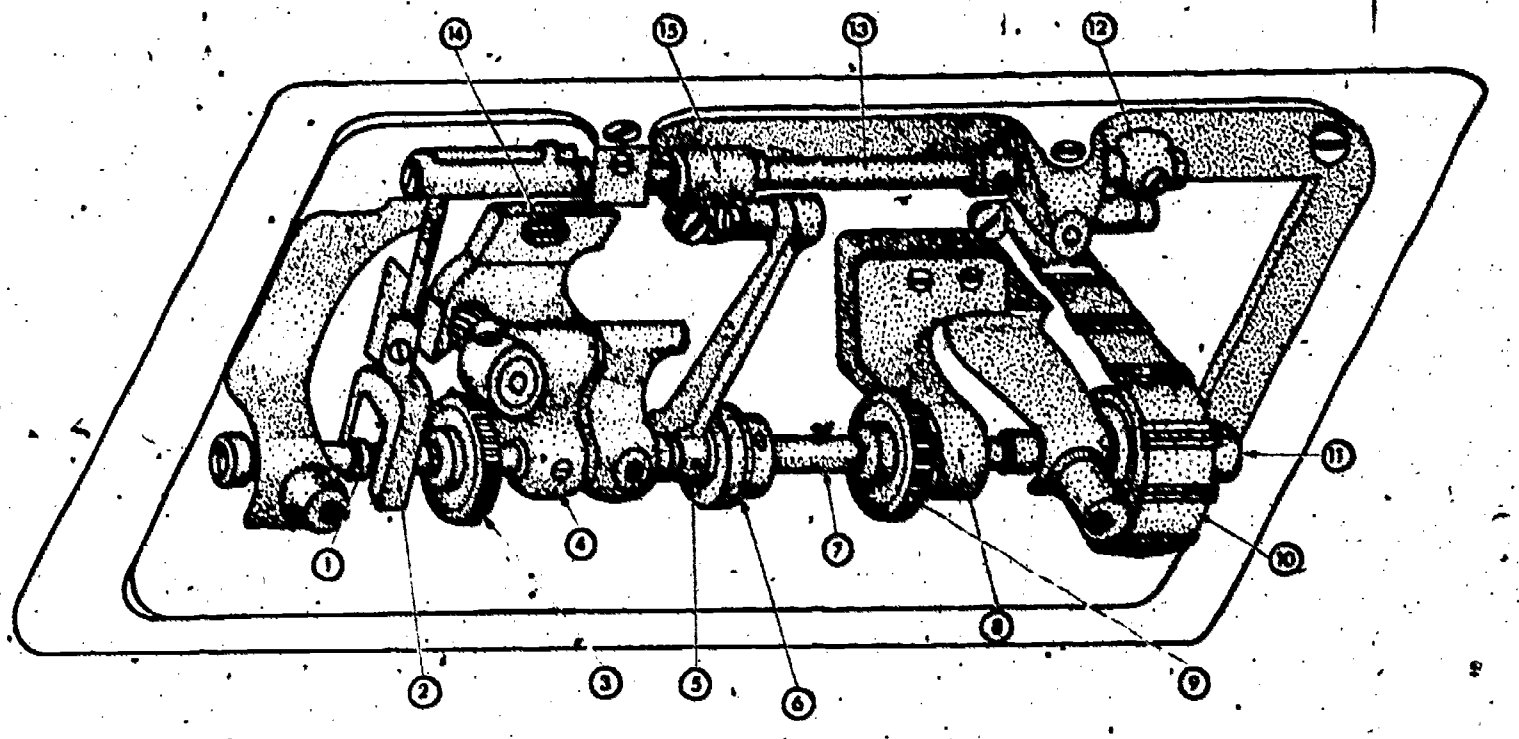

Figure 24. Hook Driving Shaft and Feed Driving Rock Shaft Assemblies, 111W Series Sewing Machine.

1. _____
2. _____
3. _____
4. _____
5. _____
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13. _____
14. _____
15. _____

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Exercise 7

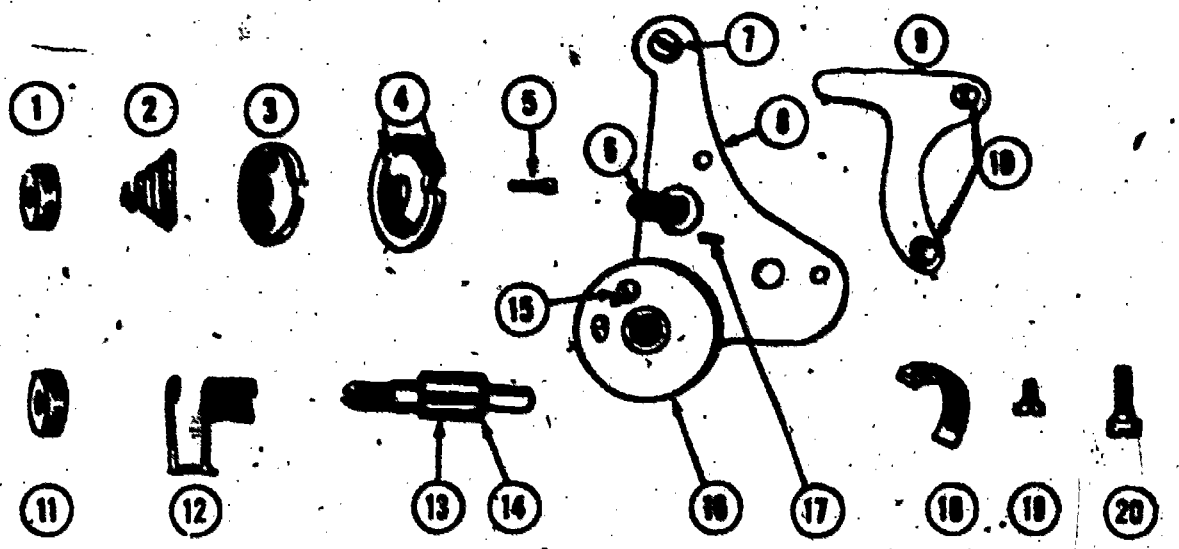

Figure 25. Tension and Thread Controller Assembly 111W Series Sewing Machine.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
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9. _____
10. _____
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12. _____
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19. _____
20. _____

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TROUBLESHOOTING OF 111W SERIES SEWING MACHINE

OBJECTIVES

After you have completed this workbook you will be able to resolve mechanical problems that frequently occur during sewing machine operation.

EQUIPMENT

	Basis of Issue
Machine, Sewing, 111W Series	1/student

PROCEDURES

Using class 111W series sewing machine, study guide, workbook, handout and TO 34Y7-1-101, Book Two, Part Three, Section XII, Paragraph 108, answer the following questions concerning troubleshooting malfunctions that may occur on the sewing machine.

QUESTIONS

1. List five probable causes for needle thread breakage during sewing machine operation.

   a.

   b.

   c.

   d.

   e.

2. What are the probable results of the rotary hook being set too far away from the needle?

   a.

   b.

3. What are the probable results of operator failure to hold needle and bobbin thread when starting to sew?

   a.

   b.

67 4. What is the probable cause of a sewing machine sewing backwards?

5. What action must be taken in the event of safety clutch disengages?

6. What is the probable result of using the wrong type oil for lubrication or allowing an accumulation of dirt and grit in the sewing machine?

7. What is the probable cause of material damaged by scuffing?

8. What action must be taken if a rotary hook deflecting washer is bent?

9. What is the probable result of needle thread slipping out of the tension disks?

10. What action must be taken if the needle is not in alignment with the rotary hook?

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STRUCTURAL AND FUNCTIONAL FEATURES OF 7-33, 17W15, 47W70, AND 61800H SEWING MACHINES

OBJECTIVES

After completion of this workbook you will be able to identify and analyze structural and functional features of the 7-33, 17W15, 47W70 and 61800H sewing machines.

EQUIPMENT

None

PROCEDURES

Complete the following exercises concerning structural and functional features for Class 7-33, 17W15, 47W70, and 61800H sewing machines.

Exercise 1

1. What type feed does the 7-33 sewing machine have?

2. What class and variety needle does the 7-33 require when sewing leather?

3. What type stitch forming mechanism does the 7-33 use?

4. Explain the operation of the feeding mechanism on the 7-33.

5. What position should the needle bar be in when removing the bobbin of the 7-33 sewing machine?

Exercise 2

1. What is the function of the pitman connection on the 17W15 sewing machine?

69 2. How is the forward motion of the stitch adjusted on the 17W15 sewing machine?

3. What class and variety needle is used on the 17W15 sewing machine?

4. What is the longest possible stitch formed by the sideway throw on the 17W15 sewing machine?

5. What type stitch forming mechanism does the 17W15 sewing machine use?

Exercise 3

1. Why is the 47W70 sewing machine designed with no feeding mechanism?

2. The 47W70 has two different length beds, when would you use the short bed?

3. What type stitch forming mechanism does the 47W70 use?

4. What is the function of the hand or knee lift lever on the 47W70 sewing machine?

5. What class and variety needle is used on the 47W70 sewing machine?

Exercise 4

1. What is the maximum size cord that may be used on the 61800H sewing machine?

2. What part of the sewing machine is lubricated automatically from the oil reservoir on the 61800H sewing machine?

3. What type needle is used on the 61800H sewing machine?

4. What type work is the 61800H sewing machine designed to sew?

5. In what direction does the bobbin rotate on the 61800H sewing machine?

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INSPECTION, TIMING, AND ADJUSTMENT OF THE 7-33, 17W15, 47W70 AND 61800H SEWING MACHINES

OBJECTIVES

Upon completing this unit of instruction, you will be able to inspect, time and make adjustments to Class 7-33, 17W15, 47W70 and 61800H Sewing Machines.

EQUIPMENT

None

PROCEDURES

Complete the following exercises for Class 7-33, 17W15, 47W70 and 61800H Sewing Machines.

Exercise 1

Class 7-33 Sewing Machines

1. Describe the steps that are to be complied with to set the needle bar?

2. Explain how the shuttle is adjusted for proper clearance between the shuttle point and the needle?

3. How should the feed dog be timed to complete its feeding action in relation to the thread take-up lever?

4. Why should all parts of the 7-33 which are in moveable contact be oiled?

5. Explain the steps that must be performed to time the feed dog?

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Exercise 2

Class 17W15 Sewing Machines

1. Which mark on the needle bar should be just visible when the needle bar is at its lowest position?

2. The point of the hook will be centered on the needle how far above the eye of the needle when timed?

3. Explain how to set a new needle bar which have no marks.

4. How far apart are the marks on a marked needle bar?

5. Describe the fourth timing step to be accomplished when timing the hook.

6. Explain how to set the point of the hook farther from the needle?

7. What does the first timing step consist of when timing the rotary hook?

Exercise 3

Class 47W70 Sewing Machines

1. Describe the position that the point of the rotary hook should be in when the needle bar rises 3/32 of an inch from its lowest position.

2. How do you set an unmarked needle bar to get the needle in proper time with the rotary hook?

3. Explain the procedures to follow for setting the hook to or from the needle?

4. What adjustment must be made if the point of the hook fails to catch the thread when properly timed with the needle?

Exercise 4

Class 61800H Union Special Sewing Machines

1. Why are there two sets of timing lines on needle bars for 61800H sewing machines?

2. What is the factory specified distance for spacing needle bar and presser bar?

3. How should the needle bar be positioned before setting the distance between needle bar and presser bar.

4. What is the approximate height of the feed dog teeth above the throat plate at its highest point of travel?

5. Approximately how far should the point of the rotary hook be above the needle eye when correctly timed?

6. How is timing of the hook with the needle accomplished?

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