

SINGER

CLASS 251

SERVICE MANUAL

AND

PARTS LIST

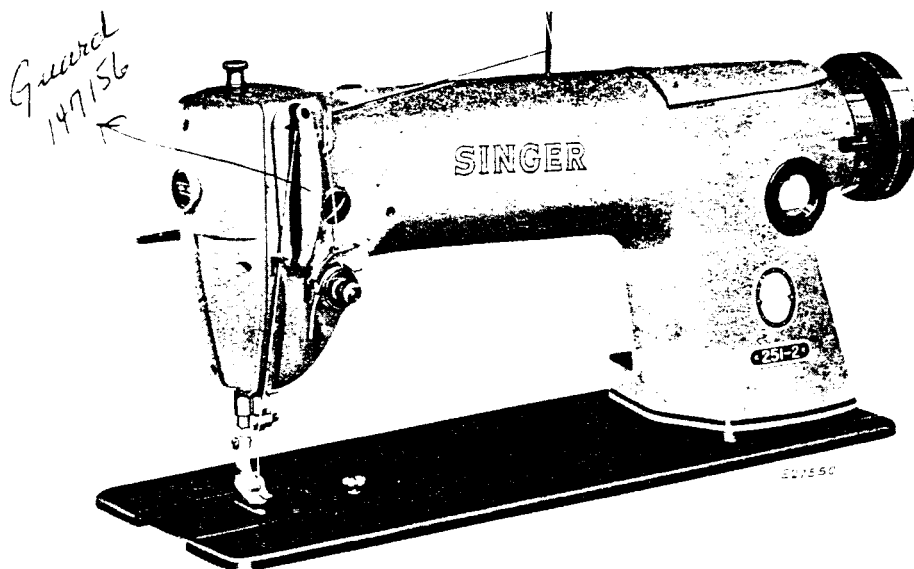
FOR

SINGER** MACHINES OF CLASS 251

SINGLE NEEDLE

LOCK STITCH

AUTOMATIC OILING SYSTEM



CAUTION—See that the oil reservoir is filled as instructed on page 6 before running the machine, even to test the speed. Special attention is also called, to the hook lubricating instructions on page 7.

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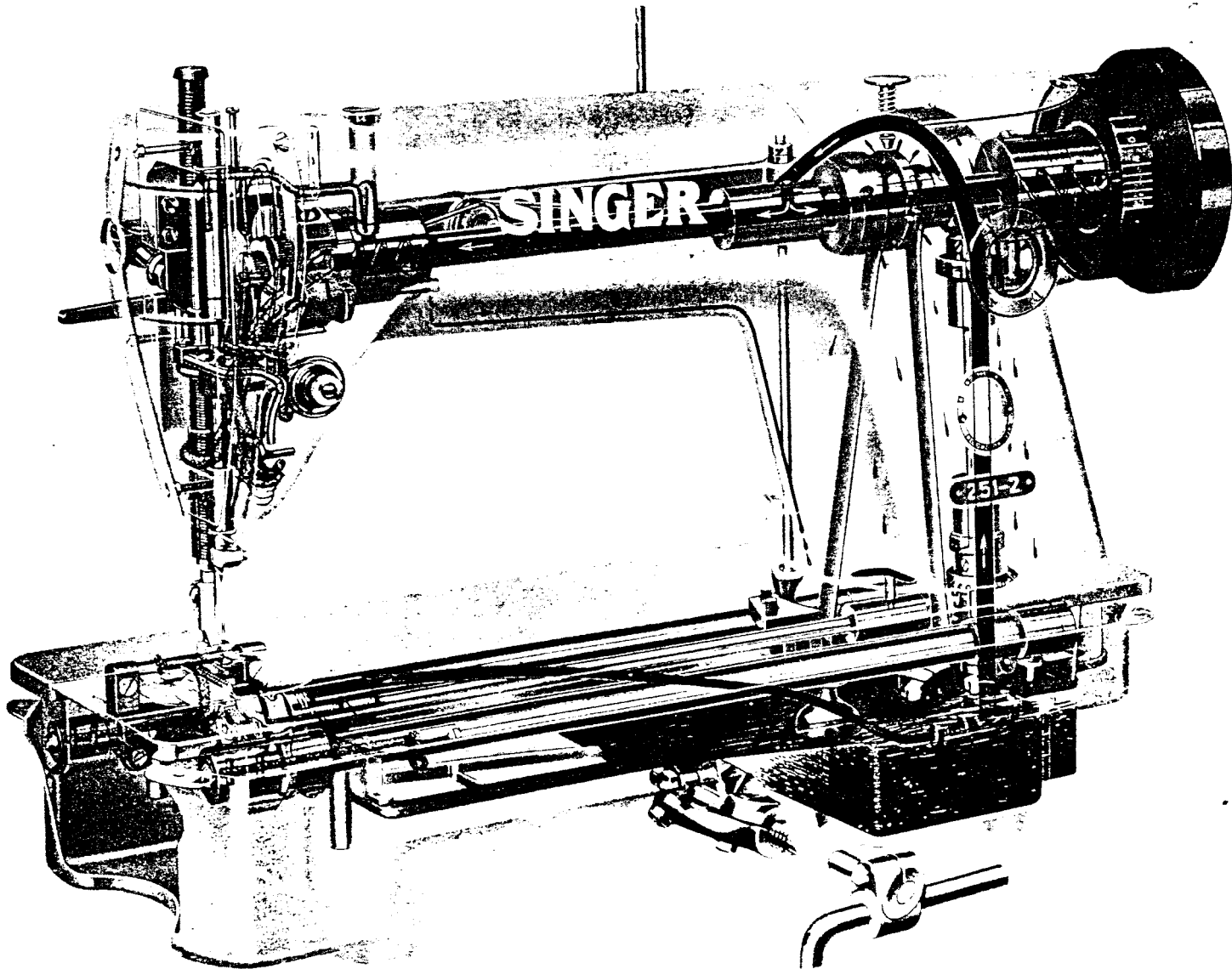


FIG. 2. X-RAY VIEW OF MACHINES OF CLASS 251
(LUBRICATING SYSTEM SHOWN IN SOLID BLACK)

FOREWORD

This book contains complete information covering operation, adjustment, parts list, attachments and special fittings for **Machines of Class 251**. Descriptions and exploded views of all parts assemblies on **pages 45 to 194** inclusive, will be found helpful when ordering any part of the machine requiring renewal.

DESCRIPTION

Machines of Class 251 produce top quality, straight-line, single-needle, lock stitching in fabrics as fine as ladies' lingerie or as heavy as mens' overcoating.

General Features

Federal Stitch Type #301.

High Speed (see chart on **page 4**). Maximum speed dependent upon nature of work and ability of operator.

Gear driven, lubricated, Rotary Sewing Hook on horizontal axis makes two revolutions for each stitch.

Upper gears are spiral-bevel. Lower gears are hypoid-bevel.

Hook Shaft mounted .160 inch forward of vertical axis of Needle Bar for improved stitch formation.

Drop Feed guided by mounted journal bearings to prevent side movement of Feed Dog.

Length of stitch determined by a Push-Button Stitch Regulator on top of machine arm. Regulator includes Locking Device to prevent changing of stitch length during machine operation: (For maximum possible stitch length, see chart on **page 4**). Stitch Length Indications on Machine Pulley are in view of operator.

Automatic Lubricating System (see X-Ray View on opposite page). Centrifugal Pump delivers oil under pressure from Reservoir to all principal bearings. Oil wicks lubricate bearing surfaces in head end of machine and return excess oil to Reservoir. Oil Guard covers entire path of Take-up Lever.

Oil Flow Window, in direct view of operator, reveals circulation of oil inside machine arm.

Machine Dimensions: Bed length **18-3/4** inches, width 7 inches. Space at right of Needle 11 inches.

Machine Head is supported by Machine Base and Oil Reservoir, designed to fit the cutout in table.

Machine Pulley **147016**. Outside diameter of belt groove **2.90** inches for **3/8** inch V-belt. Effective diameter for **5/16** inch round leather belt is **2-3/8** inches.

When the machine is in operation, the top of the machine pulley must always turn over toward the operator.

Knee Lifter, regularly furnished, is an integral part of the Machine Base and Reservoir.

SPECIAL CHARACTERISTICS OF MACHINES OF CLASS 251

| MACHINES (CLASS AND VARIETY) | | | | |
|---|--|--|--|------------------------------|
| | 251-1 | 251-2 | 251-3 | 251-3 (HEAVY) |
| TYPE OF MATERIAL | Light-Weight | Medium-Heavy to Light-Weight | Heavy to Light-Weight | Extra-Heavy to Light-Weight |
| MAXIMUM SPEED† (R.P.M.) | 5000 | 5000 | 4300 | 4300 |
| MAXIMUM STITCH LENGTH | 7 per inch | 5-1/2 per inch | 5-1/2 per inch | 5-1/2 per inch |
| NEEDLE BAR STROKE (inches) | 1-9/64 | 1-13/64 | 1-7/16 | 1-7/16 |
| PRESSER BAR LIFT (inch) | 9/32 | 5/16 | 3/8 | 7/16 |
| NEEDLES: CLASS AND VARIETY | 88 X 9 | 16 X 257 | 16 X 257 | 16 X 261 |
| SIZES RECOM- MENDED | 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21 and 22 | 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23 and 24 | 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23 and 24 | 16, 18, 19, 21, 22 and 23 |

†Dependent upon nature of material and ability of operator.

SETTING UP

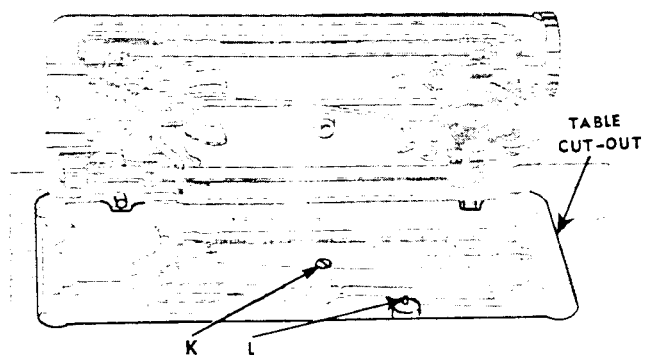


Fig. 3. Installation of Machine on Base

When shipped, the base is held to the machine by a **single bolt** through the bottom of the base. **Discard this bolt** and plug the hole by inserting from inside the base, the special cap screw **K**, Fig. 3, furnished with the machine.

The base fits into a standard table cut-out, as shown in Fig. 3 and rests on the four corners **without fastening**.

Rasp the edges of the cutout, if necessary, **as the base must slide in without driving** and must be located so that the **machine head does not touch the table** when it is placed on the base.

Use shims on the corners, if necessary, to prevent the base from rocking. The base should also be **level in both directions** so that the oil level will be accurately indicated by the marks in the base.

See that the plunger **L**, Fig. 3 is in place inside the base, before putting the machine on the base.

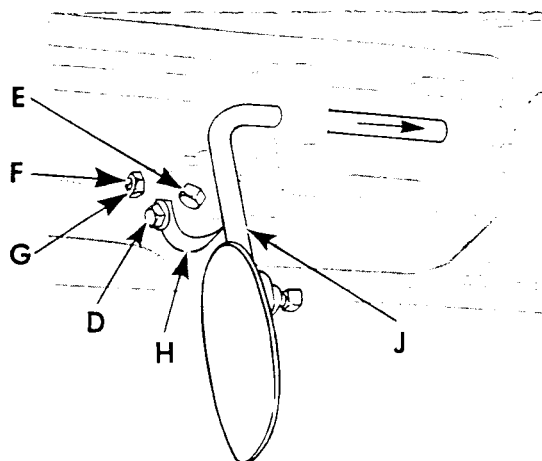


Fig. 4. Installation of Knee Lifter on Machine Base

The machine head rests on the cork gasket in the base and is not fastened. **The machine hinges must not support the head** except when it is tilted back.

The knee lifter is shipped assembled to the base, except for the knee plate and lever **J**, Fig. 4. After the base is in position, loosen the set screws **D** and **E**, Fig. 4 and slide the shaft forward to the position shown in Fig. 4. Attach the knee lifter lever **J**. Set the stop screw **F** so that there is **only a little play of the lifter before it starts to lift the presser bar**, then hold the screw and tighten lock nut **G**. Set the rear stop dog **H** to allow the presser bar to be just raised to its limit but not enough to permit further strain on the knee lifter parts or to permit the action of the knee lifter to lift the machine from its base.

CAUTION:—Before starting the machine, it must be thoroughly oiled, in accordance with the instructions on **page 6**.

SPEED

The maximum speed recommended for Machines **251-1** and **251-2** is **5000** revolutions per minute and for Machine **251-3**, **4300** revolutions per minute according to the material being sewn and the type of work being done. (See chart on opposite page.)

It is advisable to operate these machines at a **more moderate speed the first few days**, after which they can be operated at maximum speed.

LUBRICATION

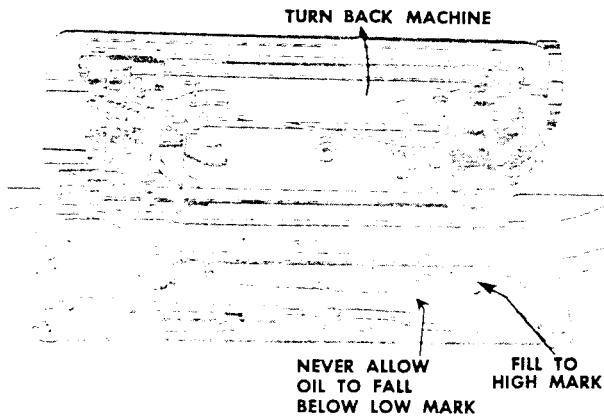


Fig. 5. Oil Reservoir

Machines of Class 251 have an automatic lubricating system in which oil is circulated by means of a centrifugal pump from a reservoir in the base. X-Ray view of machine on **page 2** illustrates automatic circulation of oil in this machine.

BEFORE STARTING THE MACHINE the oil reservoir must be filled with "**TYPE A**" or "**TYPE C**" OIL, sold by Singer Sewing Machine Company. "**TYPE C**" OIL is used when an oil is desired which will produce a minimum of stain on fabrics, even after a long period of storage.

Tip the machine back on its hinges and fill the oil reservoir as instructed in **Fig. 5**.

When a machine is **NEW** or has been idle for several weeks it is advisable to remove the face plate and oil the needle bar and take-up bearings. Oil the hook assembly by hand and check the oil flow, as instructed on **page 7**. The automatic oiling system will function efficiently, **after the first few minutes** and continue to lubricate all bearings.

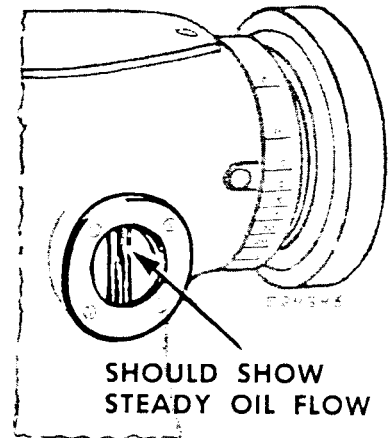


Fig. 6. Oil Flow Window

When in operation, the oil level in the reservoir should be inspected at least twice a month or as often as necessary, to keep it from going below the **LOW** mark, see **Fig. 5**, in the reservoir.

CAUTION: Correct lubrication is indicated by a continuous stream of oil passing the oil flow window while machine is running, as shown in **Fig. 6**.

Should this oil flow become erratic, **STOP the machine and do not run the machine again** until the oil flow has been restored.

At least twice each month check the oil level in the reservoir.

Never allow oil level to drop below LOW mark, shown in **Fig. 5**.

Oil your bobbin winder occasionally by applying a few drops of oil to the oil well in bobbin winder, as shown in **Fig. 15**, **page 12**.

See instructions, covering Oil Removing Wick Assembly, on **pages 38 to 41**.

ADJUSTMENT OF ROTATING HOOK OIL FLOW REGULATOR

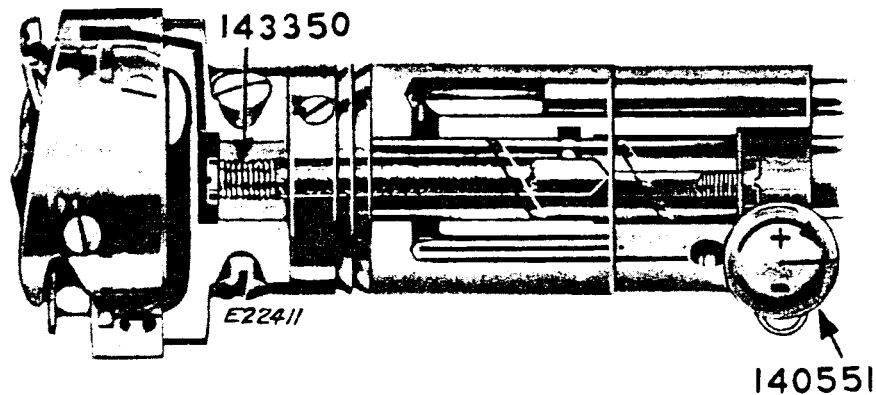


Fig. 7. Oil Flow Regulator in Hook Shaft Bushing

The sewing hook is automatically lubricated. The flow of oil is controlled by Oil Flow Regulator **140551**, Fig. 7.

The Oil Flow Regulator **140551** is set at the factory for automatic lubrication of the hook under average sewing conditions.

Turn Regulator Thumb Screw (see **140551**, Fig. 7) **clockwise to increase** the flow of oil to the hook as indicated by the (+) sign under its arrow on the head of the thumb screw.

Turn Regulator Thumb Screw **counterclockwise to decrease** the flow, as indicated by the (−) sign under its arrow on the head of the thumb screw.

To determine whether the oil is properly flowing to the hook, withdraw the bed slide and hold a piece of thin paper under the hook while the machine runs for ten seconds. There should be a pattern of three oil sprays on the paper; two light lines on the outside and one heavier spray in the center. If there is no trace of oil or an excessive amount of oil on paper, adjust the Oil Flow Regulator, as instructed above, or replace the oil filter **143350**, Fig. 7, in the head of the hook shaft, as instructed on **page 28**.

HINTS FOR PERFECT OPERATION

If the sewing hook should become excessively warm, it may be due to an insufficient supply of oil to the hook (see instructions, above, for adjusting Oil Flow Regulator).

Keep the **oil level** in the oil reservoir at the **HIGH** mark.

Clean out any lint or other waste around the hook, around the needle slot in the bobbin case holder and between the feed rows on the under side of the throat plate.

Clean out any lint or other foreign matter that may have collected around oil return passages, particularly at oil return hole in rear arm shaft bushing.

When in operation, the **top of the machine pulley must always turn over toward** the operator.

Always keep the bed slides **closed** when the machine is in operation.

Do not run the machine with the presser foot resting on the feed without some fabric under the presser foot.

Do not run the machine when both bobbin case and needle are threaded unless there is material under the presser foot.

Do not try to aid the machine by pulling the fabric lest you bend the needle. The machine feeds the work without assistance.

NEVER TOUCH THE STITCH REGULATOR PLUNGER WHILE THE MACHINE IS RUNNING.

NEEDLES

The **size** of the needle to be used should be determined by the size of the thread which must pass freely through the eye of the needle. Rough or uneven thread, or thread which passes with difficulty through the eye of the needle, will interfere with the successful use of the machine. (See chart on **page 4** to determine Size as well as Class and Variety of needle required.)

A **bent** needle may cause the machine to skip stitches, or it may make it difficult for the operator to keep a perfectly even margin. In many cases, a run-off will take place.

A **hook or burr** on the needle point will result in a finish that looks blurred and when short stitches are used (20 to 22 per inch), some materials may be cut.

Check needles often to make sure that defects are not present.

Orders for needles must specify the **Quantity** required, the **Size** number, also the **Class** and **Variety** numbers, separated by an **x**.

The following is an example of an intelligible order:

"100 No. 16, 88 x 9 Needles."

The best stitching results will be obtained by using needles sold by Singer Sewing Machine Company.

The above needles are regularly furnished with nickel finish but are also available with chromium finish if so ordered.

TO SET THE NEEDLE

Turn the machine pulley over toward the operator until the needle bar moves to its highest point.

After loosening needle set screw, insert needle **UP** into needle bar **AS FAR AS IT WILL GO**, as instructed in **Fig. 8**.

The single continuous groove of the needle **MUST** face the left end of the machine, as shown in **Fig. 8**.

Securely tighten needle set screw.

NOTE: The needle is held in place, in Machines 251-2 and 251-3, by means of a **needle clamp**, instead of the set screw in needle bar shown in **Fig. 8**.

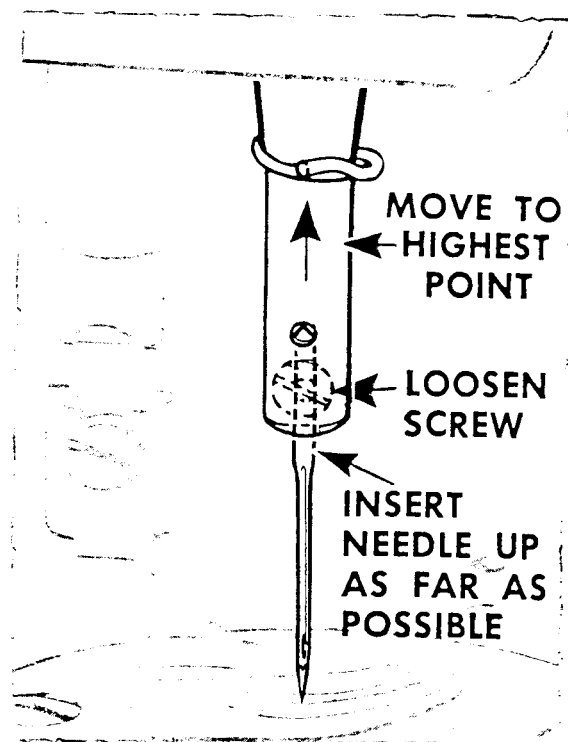


Fig. 8. Setting the Needle
(Machine 251-1)

THREAD

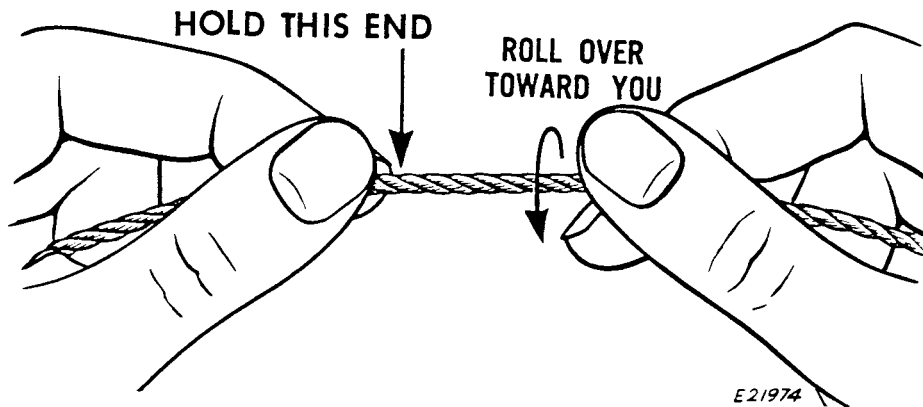


Fig. 9. How to Determine the Twist

On Machines of Class 251- use only left twist thread in the needle. Either right or left twist thread can be used in the bobbin.

To determine the thread twist, hold the thread as

shown in Fig. 9. Then roll the thread over toward you— if the strands of the thread wind tighter, the thread is left twist; if the strands unwind or separate, the thread is right twist.

RELATIVE SIZES OF NEEDLES AND THREAD

The following sizes of needles and thread are **recommended** according to the class of work:

| SIZES OF NEEDLES | CLASSES OF WORK | SIZES OF COTTON, LINEN OR SILK |
|------------------|---|---|
| 8 to 14 | Shirtings, Sheetings, Calicoes, Muslins, Silks, Dress Goods and all classes of general work with light and medium weight fabrics. | 60 to 80 Cotton A and B Silk |
| 16 and 17 | All kinds of heavy Calicoes, light Woolen Goods, heavy Silk, Seaming, Stitching, etc. | 40 to 60 Cotton C Silk |
| 18 | Tickings, Upholstery, Woolen Goods, Trousers, Boys' Clothing, Cloaks, etc. | 30 to 40 Cotton D Silk |
| 19 and 20 | Heavy Woolens, Tickings, Bags, Heavy Coats, Trousers, Heavy Clothing generally. | 20 to 30 Cotton E Silk 60 to 80 Linen |
| 21 to 24 | Bags, Coarse Cloths and Heavy Goods. | 16 to 20 Cotton 40 to 60 Linen |

UPPER THREADING

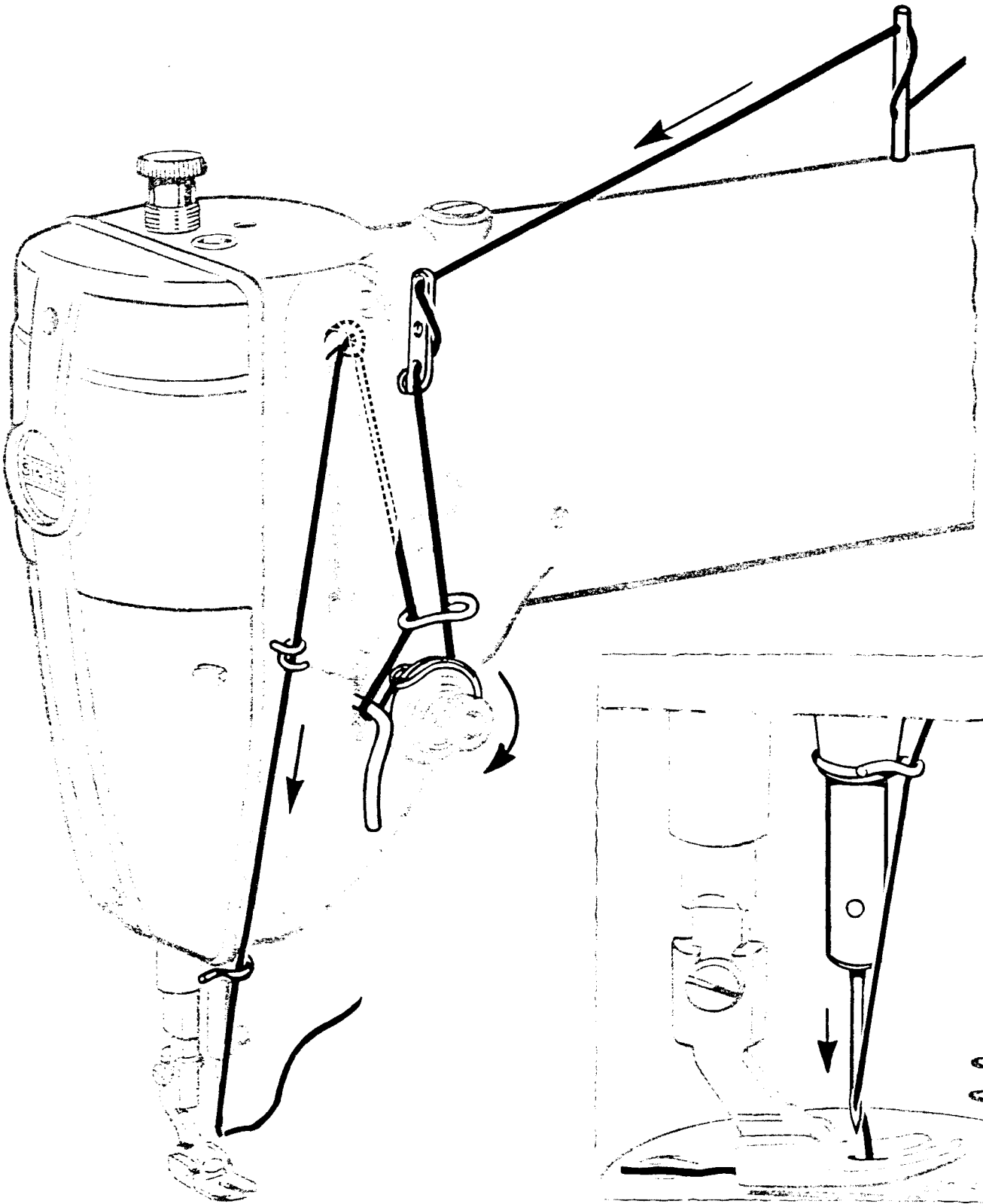


Fig. 10. Upper Threading

Fig. 11. Threading the Needle

First, turn the machine pulley over toward the operator until needle is at its highest point, then pass the needle thread from the unwinder through the

threading points in the order shown in **Figs. 10** and **11**.

Draw about two inches of thread through the eye of the needle with which to start sewing.

TO REMOVE THE BOBBIN

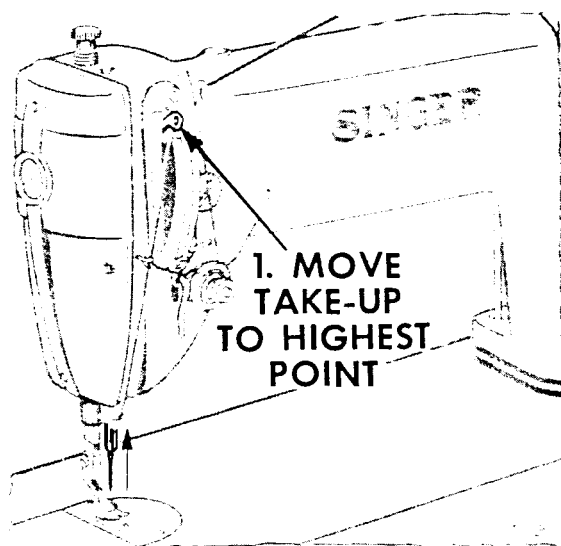


Fig. 12. Preparation

Turn machine pulley over toward operator, until needle thread take-up lever is at highest point, as shown in Fig. 12.

Reach beneath bed of machine with left hand and remove bobbin, as instructed in Figs. 13 and 14.

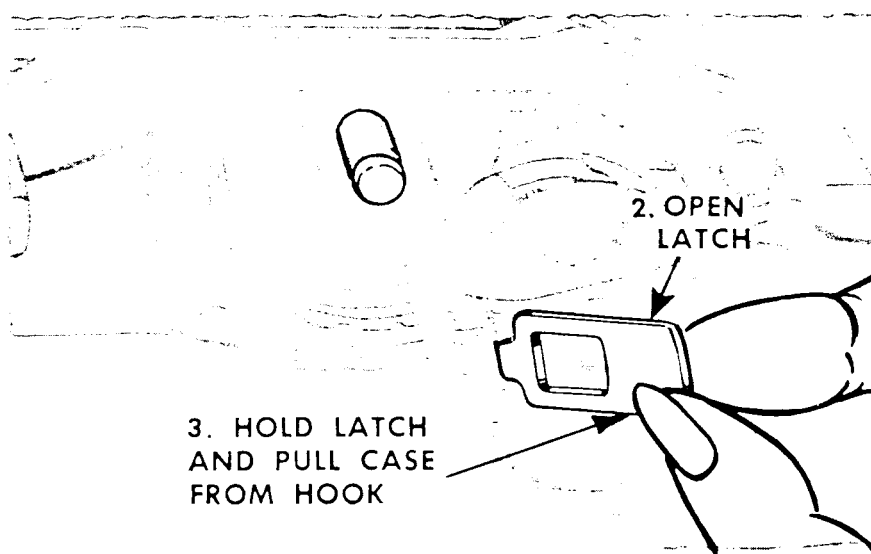


Fig. 13. Removing Bobbin Case from Sewing Hook

NOTE: While latch is kept open, bobbin will be retained in bobbin case.

To remove bobbin from the bobbin case, release latch and turn open end of bobbin case downward. Bobbin will drop out, as shown in Fig. 14.

4. RELEASE LATCH

5. BOBBIN DROPS OUT

Fig. 14. Removing Bobbin

TO WIND THE BOBBIN

See Fig. 15

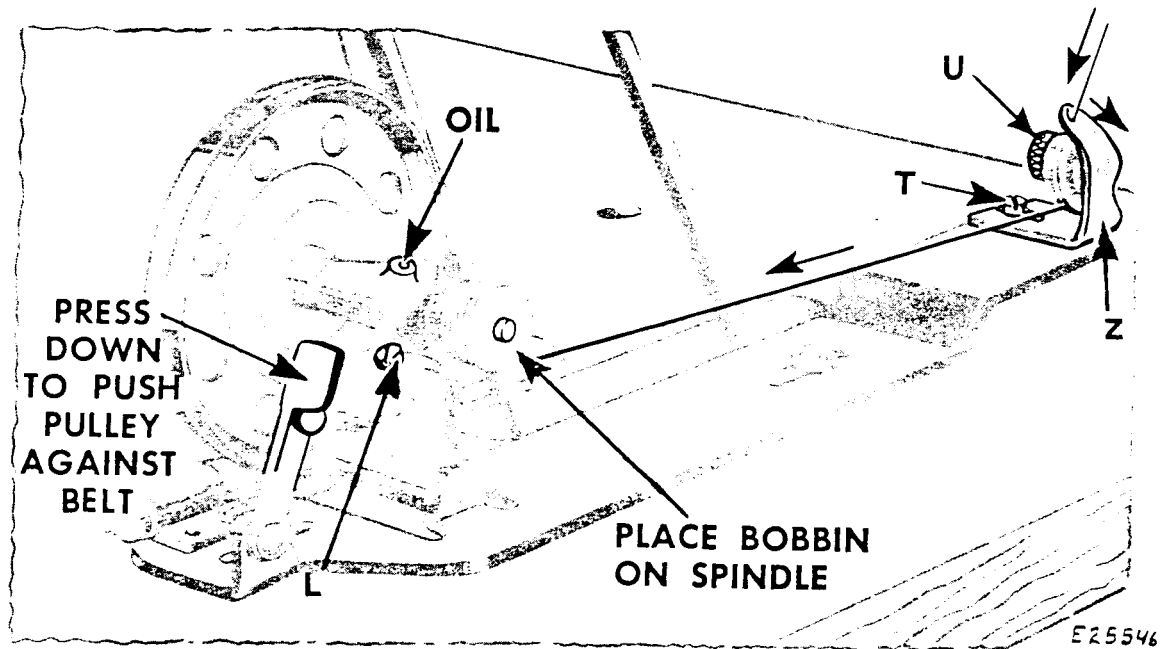


Fig. 15. Winding the Bobbin

Fasten bobbin winder to table with its driving pulley in front of the machine belt, as shown above, so that bobbin winder driving pulley will make firm contact with machine belt when thumb latch is pressed down and pulley will be released from contact with belt when sufficient thread has been wound upon the bobbin.

Place bobbin on spindle, pushing it on as far as it will go and pass thread through threading points, as shown above.

Wind end of thread around the bobbin a few times. Press down on thumb latch, pushing driving pulley over against belt, as shown in Fig. 15. Start machine.

Bobbin winder will stop automatically, when the amount of thread for which it is regulated is wound

upon the bobbin. For more thread on bobbin, turn screw L inward; for less thread on bobbin, turn screw L outward.

When winding a bobbin with fine thread, a light tension should be used. Adjust the knurled nut U, Fig. 15, to regulate the tension.

If thread winds unevenly on bobbin, loosen screw T and move tension bracket Z to the left or right, as required. Tighten screw T.

Bobbins can be wound while the machine is stitching.

NOTE: Occasionally apply a few drops of oil to the oil well, shown in Fig. 15, on top of the bobbin winder frame.

TO THREAD THE BOBBIN CASE

Hold the bobbin so that the thread will unwind in the direction shown in **Fig. 16**.

Hold the bobbin case as shown in **Fig. 16** and place the bobbin into it.

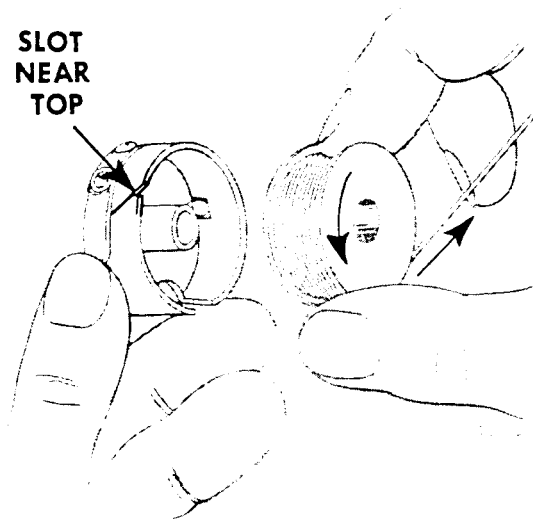


Fig. 16. Placing Bobbin in Bobbin Case

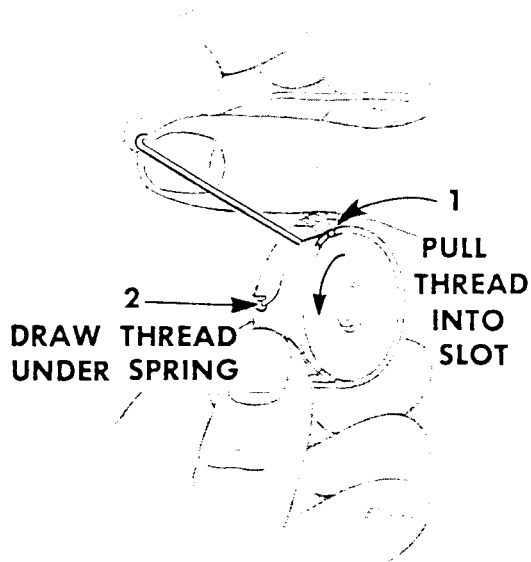


Fig. 17. Pulling the Thread into the Slot

Draw the thread into the delivery eye at the end of the tension spring, as shown in **Fig. 18**.

**3. DRAW
THREAD
INTO DELIVERY
EYE**

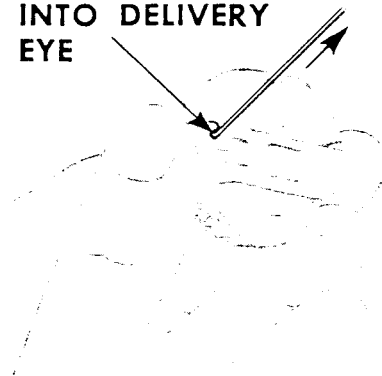


Fig. 18. Drawing the Thread Under the Tension Spring

TO REPLACE THE BOBBIN CASE

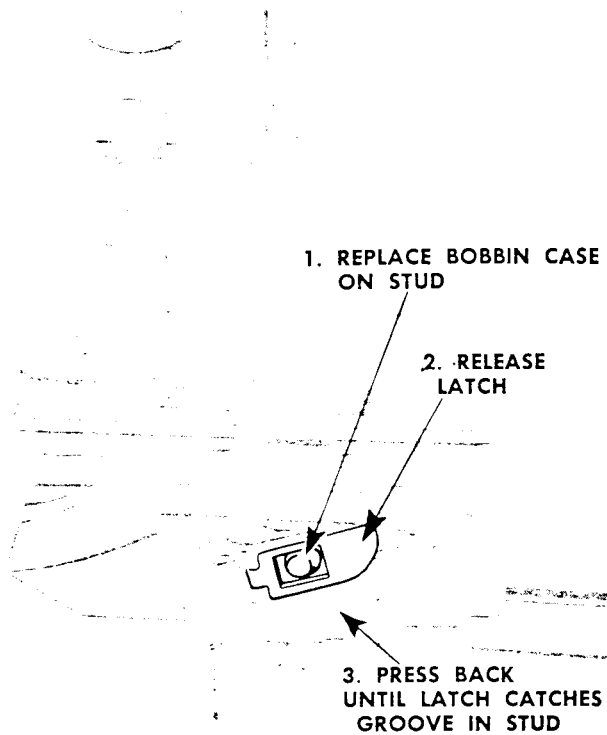


Fig. 19. Bobbin Case Threaded and Replaced

After threading, take bobbin case by latch in the left hand and place bobbin case on center stud of bobbin case holder, as instructed in Fig. 19. Release latch. Press bobbin case back until latch catches groove near end of stud. Allow about two inches of thread to hang free.

TO PREPARE FOR SEWING

Hold slack end of needle thread loosely and turn machine pulley over toward you until needle moves down and up again to its highest point, catching bobbin thread. Draw up needle thread; bobbin thread will come up with it through hole in throat plate, as shown in Fig. 20. Lay both threads back under presser foot.

TO PREPARE FOR SEWING

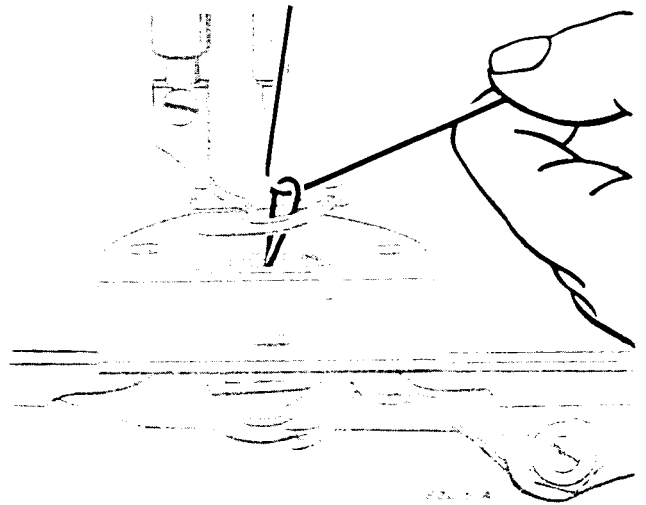


Fig. 20. Drawing Up the Bobbin Thread

TO START SEWING

Place material beneath the presser foot and start to sew, turning the machine pulley over toward you.

TO REMOVE THE WORK

1. Let the thread take-up lever rest at its highest point.
2. Raise the presser foot.
3. Draw the work toward the rear until it is clear of the needle.
4. Cut the threads close to the goods.

TENSIONS

EXPLANATION

For ordinary stitching, tension on needle and bobbin threads should be **balanced** so that, if you cut straight down through center of line of stitching and look at it from the side, the line of stitching would appear with **needle and bobbin threads locked in center** of thickness of material like this.



Fig. 21. Perfect Stitch

When there is too much tension on needle thread or not enough on bobbin thread, needle thread can not be pulled down into material, as required and poor stitching results. The **needle thread will lie on top** of material like this:



Fig. 22. Too Tight Needle Thread Tension

When there is too much tension on bobbin thread and not enough on needle thread, you get the reverse of the condition shown in Fig. 22, above, but the stitching is just as poor. The **bobbin thread will lie on bottom** of material like this:



Fig. 23. Too Loose Needle Thread Tension

REGULATION

Needle Thread—

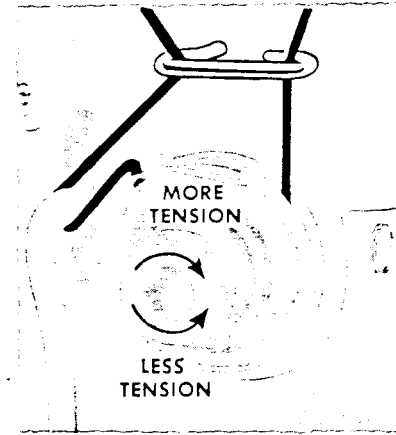


Fig. 24. Regulating Needle Thread Tension

First, regulate needle thread tension only when **presser foot is down**.

Tension on needle thread should be just enough to set stitch properly in material.

Having lowered presser foot, turn thumb nut at the front of tension discs either over toward right or left, as required. See instructions in Fig. 24.

Bobbin Thread—

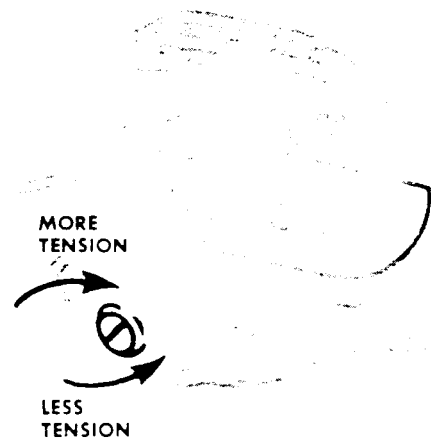


Fig. 25. Regulating Bobbin Thread Tension

When tension on bobbin thread has been properly adjusted for ordinary stitching a correct stitch can usually be obtained to suit the work in process by **varying tension on needle thread only**.

For average sewing, tension on bobbin thread should be **very light**.

To regulate tension on bobbin thread, remove the bobbin case and turn screw in tension spring, as instructed in Fig. 25.

TO REGULATE THE LENGTH OF STITCH

CAUTION: DO NOT ATTEMPT TO CHANGE STITCH LENGTH WHILE MACHINE IS RUNNING.

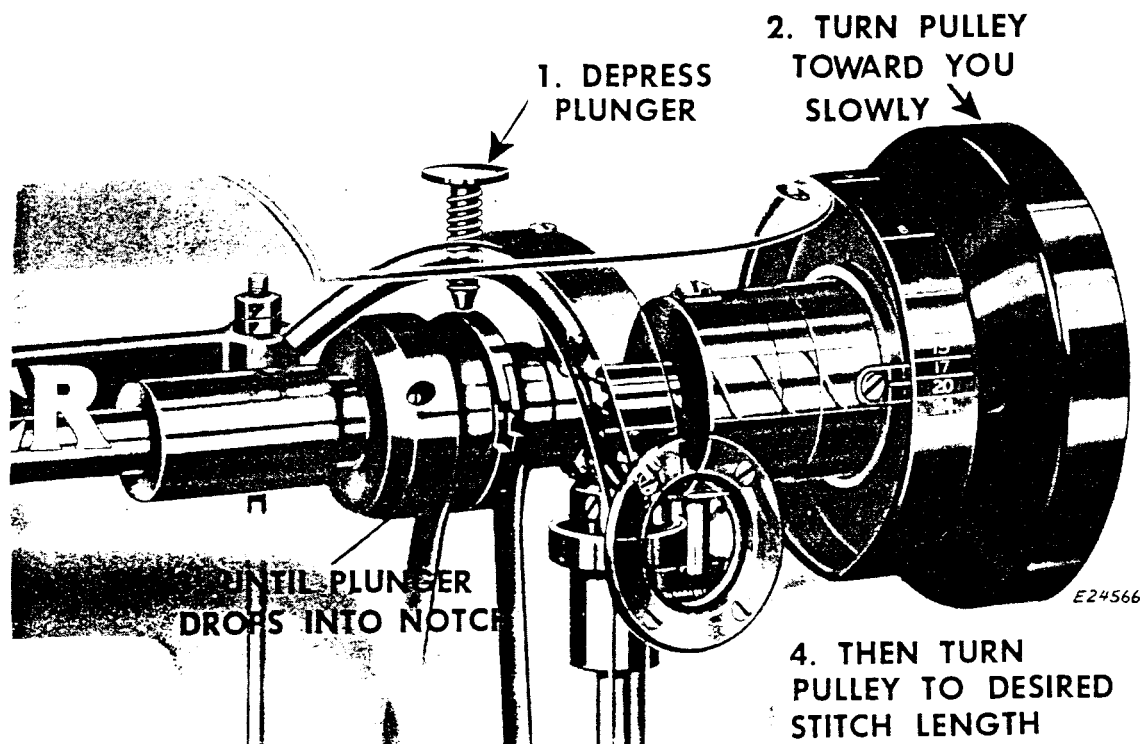


Fig. 26. Regulating Length of Stitch

To change the length of stitch, **stop the machine**—then depress plunger, as instructed in **Fig. 26**, and turn machine pulley slowly over toward you by hand until plunger enters notch in eccentric (you will hear it click). Then, still depressing plunger, turn machine pulley until number indicating the number of stitches per inch you want is opposite mark on front of arm. Then release plunger.

A setting of 17 stitches per inch is shown in **Fig. 26** although you can set the machine to make as few as 5-1/2 stitches to the inch or as many as 30 (see chart on page 4.)

Never depress the plunger while the machine is running!

TO PREVENT OPERATOR FROM CHANGING STITCH LENGTH

The stitch regulator plunger (see 1 in **Fig. 26**) can be removed to prevent an unauthorized person from changing stitch length.

To remove the plunger, first remove the top cover. Then remove the retaining ring near the tip of the plunger, allowing the plunger to be withdrawn. The hole in the top cover should then be filled by inserting a plug screw 140607, which can be obtained at an additional charge. Replace top cover.

TO REGULATE THE PRESSURE ON THE MATERIAL

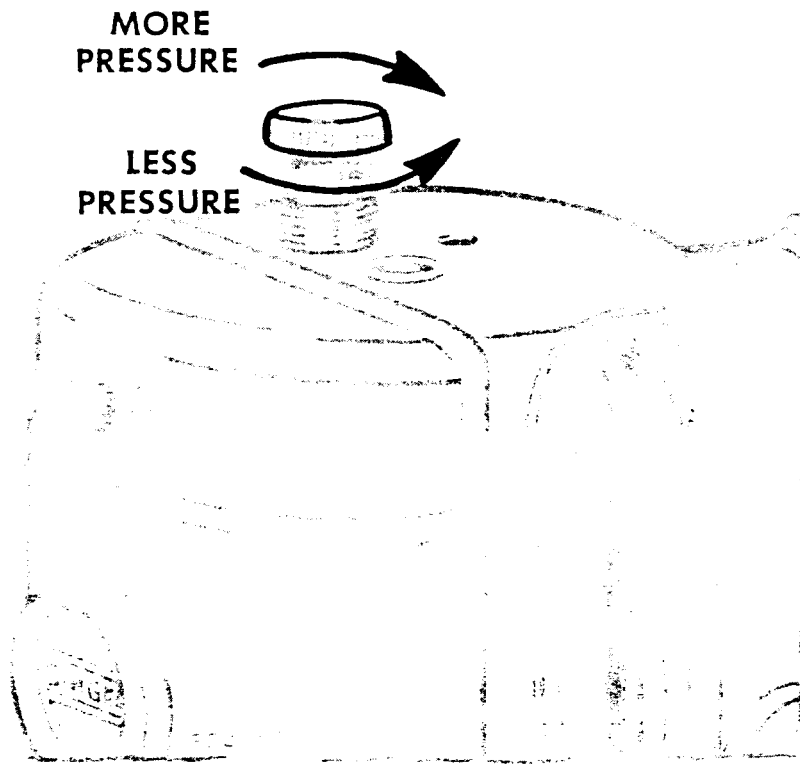


Fig. 27. Regulating the Pressure on the Material

The correct presser foot pressure helps feed the work properly. You can regulate the amount of pressure by means of the thumb screw, as shown in **Fig. 27**.

The pressure on the material should be as **light** as possible, while still sufficient to insure proper feeding.

To increase the pressure turn the thumb screw downward (clockwise). To reduce the pressure turn this screw upward (counterclockwise). The pressure is correct when the work moves steadily and smoothly without stalling.

NOTE:—The instructions on the following pages are for Service Representatives only.

To insure proper timing and avoid unnecessary repetition these instructions should be followed in the order given.

TO SET THE NEEDLE BAR AT THE CORRECT HEIGHT

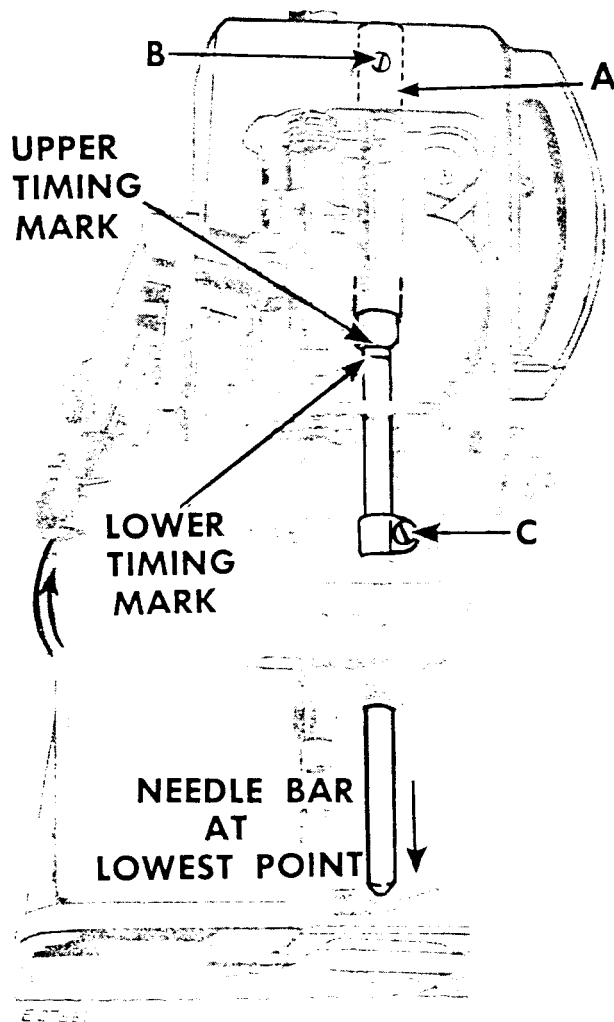


Fig. 28. Setting Needle Bar Height on Machines with Timing Marks Aligned with UPPER Needle Bar Bushing

PREPARATION:

Remove face plate, slide plate and throat plate. See that needle is correctly set in needle bar, as instructed on page 8.

NOTE:

FOR MACHINES ON WHICH TIMING MARKS SHOULD ALIGN WITH UPPER NEEDLE BAR BUSHING—

Top of bushing A, Fig. 28 must be flush with top of casting, as shown in Fig. 28. To reset bushing, loosen screw B and raise or lower bushing, as required.

FOR MACHINES ON WHICH TIMING MARKS SHOULD ALIGN WITH LOWER NEEDLE BAR BUSHING—

Lower end of bushing K, Fig. 29 must be set as shown in Fig. 29. To reset bushing, loosen screw L.

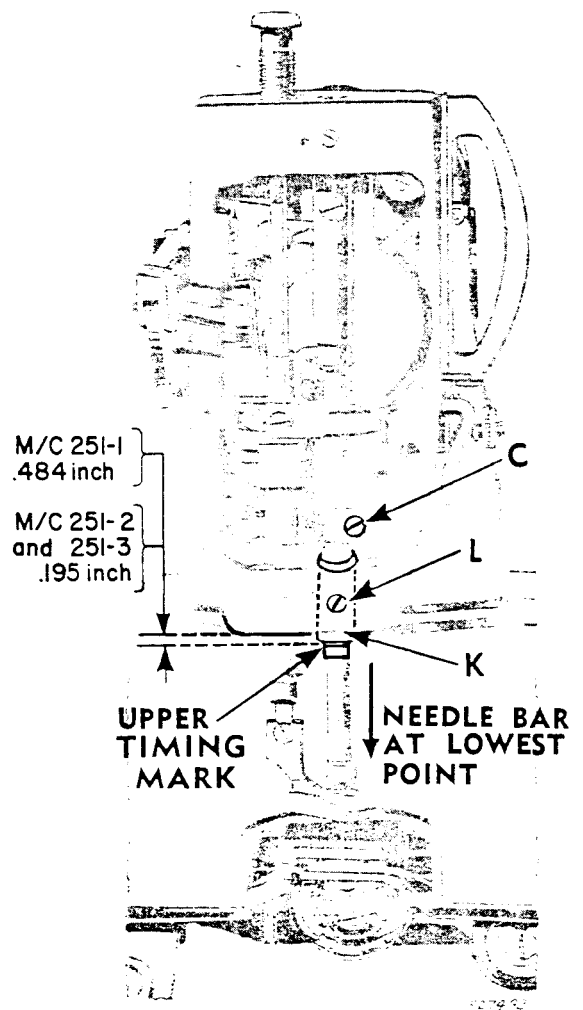


Fig. 29. Setting Needle Bar Height on Machines with Timing Marks Aligned with LOWER Needle Bar Bushing

CHECK:

When needle bar is at its lowest point (during rotation of machine pulley), **UPPER TIMING MARK** on needle bar should be level with lower end of bushing.

Check timing of hook as instructed on page 21.

SETTING:

Loosen clamping screw C, Figs. 28 and 29. Raise or lower needle bar so that **UPPER TIMING MARK** is level with lower end of bushing. Then securely tighten screw C.

Replace throat plate and slide plate.

When replacing the face plate, make certain that the screw holes in the face plate gasket are aligned with the respective screw holes in the face plate; avoiding injury to the gasket and consequent oil leakage.

TO SET CHECK SPRING

HEIGHT

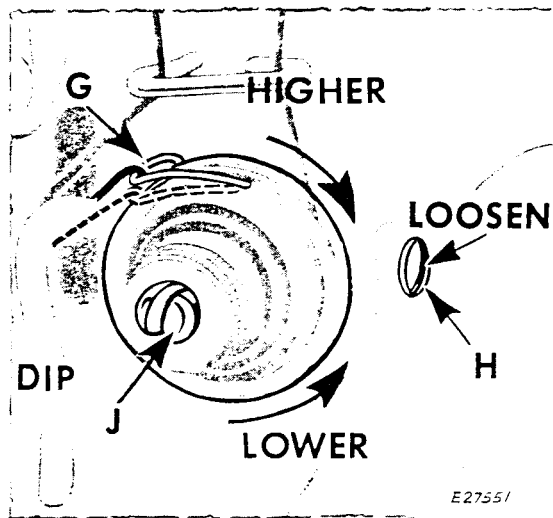


Fig. 30. Setting Height of Check Spring

PREPARATION:

Thread the machine.

CHECK:

Turn machine pulley over toward operator slowly. When take-up lever begins to rise, check spring **G**, Fig. 30 makes a slight dip and a return to its higher position. Later, as take-up lever approaches top of stroke, check spring **G** should be drawn all the way down; setting the stitch. As lever descends, check spring **G** returns to rest.

SETTING:

Loosen screw **H**, Fig. 30. Turn stud **J**, Fig. 30 (at the same time turning entire tension assembly) either over toward **left to lower check spring and decrease** its movement, or over toward **right to raise check spring and increase** its movement. Securely tighten set screw **H**.

NOTE:

Under certain conditions of tacking, it may be necessary to set the check spring higher than it is otherwise normally set.

CAUTION:

Check spring height setting must be checked each time a different foot is applied to machine.

TENSION

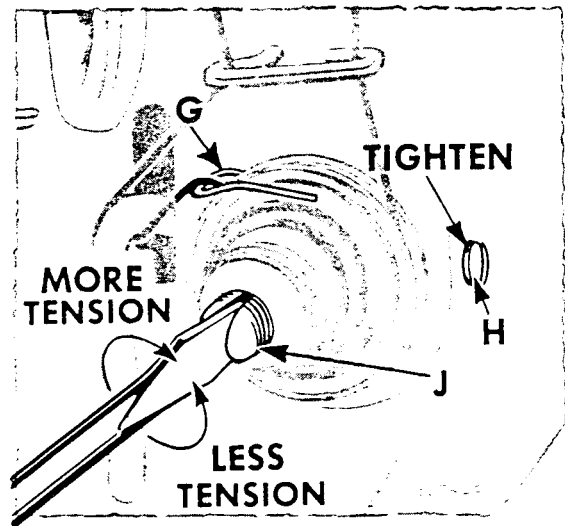


Fig. 31. Adjusting Tension on Check Spring

PREPARATION:

Thread the machine. Securely tighten set screw **H**, Fig. 31. Make certain thumb nut is on stud **J**, Fig. 31.

CHECK:

Tension on check spring **G**, Fig. 31, should be sufficient to ensure action at top speed; but still light enough to permit itself to be drawn all the way down (as take-up lever approaches height of stroke) before any thread is drawn through the tension discs.

SETTING:

Using a large screwdriver in slot of stud **J**, turn stud either over toward **left to decrease** tension or over to **right to increase** it, as shown.

NOTE:

The tension on the check spring may require different settings depending upon the size of thread used. Heavier thread requires more tension to ensure correct thread control.

TO SET THE PRESSER BAR AT THE CORRECT HEIGHT

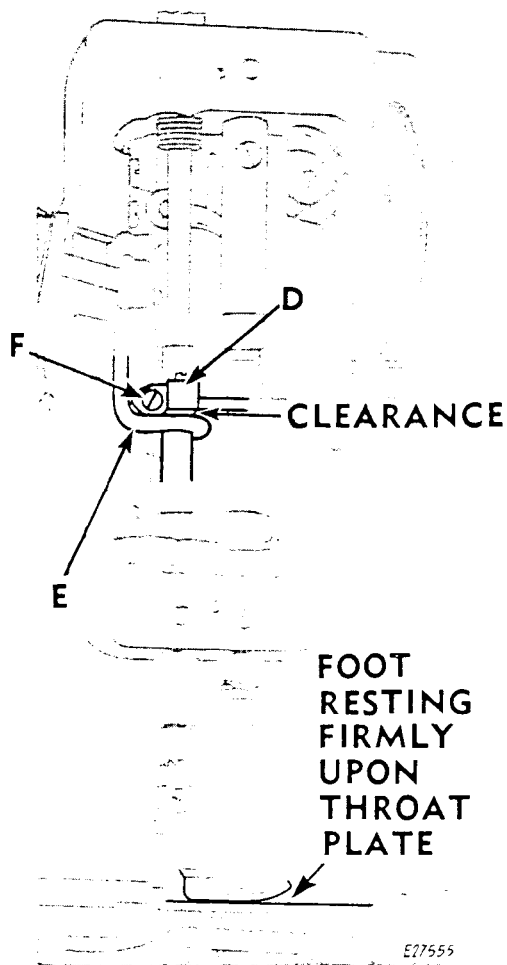


Fig. 32. Checking Height of Presser Bar

PREPARATION:

Remove face plate and slide plate.

CHECK:

1. When presser foot rests firmly upon throat plate (with feed dog below throat plate) there should still be some clearance between guide bracket **D**, **Figs. 32** and **32A** and lifting bracket **E**, as shown in **Figs 32** and **32A**.
2. When presser foot is at its highest point and needle bar is at its lowest, top of presser foot should clear lower end of needle bar, as shown in **Fig. 33**.

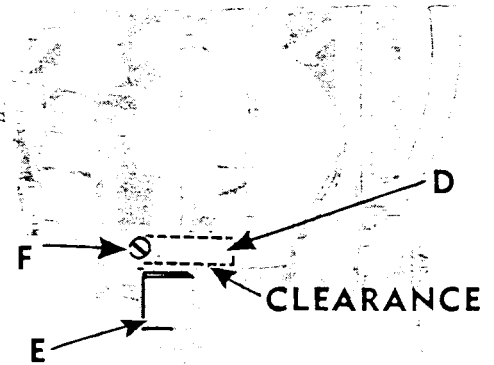


Fig. 32A. Required Clearance on Machines with Latest Type Lifting Bracket

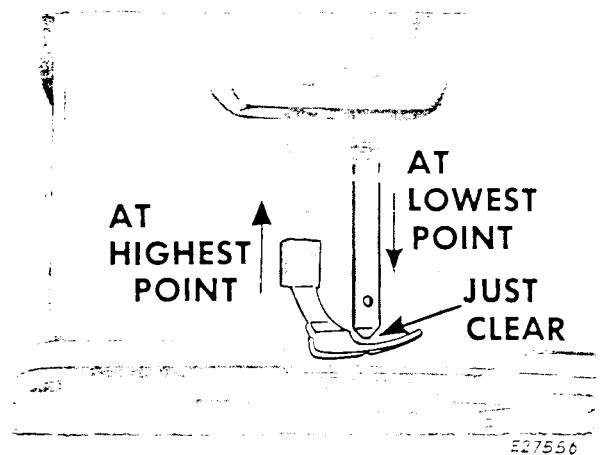


Fig. 33. Setting Presser Bar at Correct Height

SETTING:

Loosen clamping screw **F**, **Figs. 32** and **32A**. Raise or lower guide bracket **D**, as required. Securely tighten screw **F**.

CAUTION:

Whenever guide bracket has been moved on presser bar, inspect the check spring for correct setting, as instructed on **page 19**.

TO TIME THE SEWING HOOK

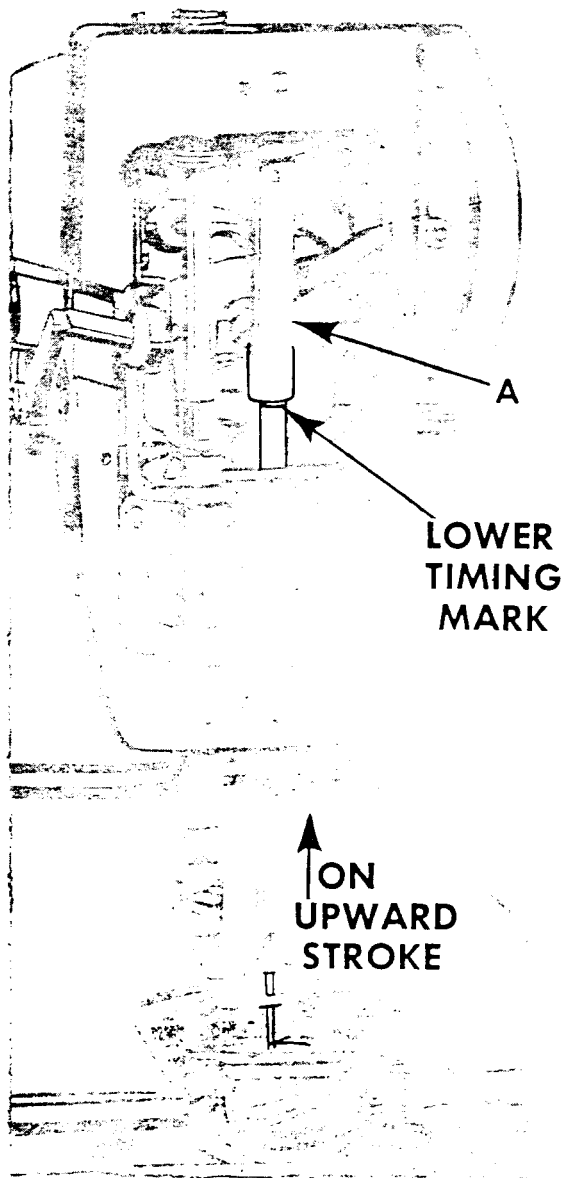


Fig. 34. Checking the Timing of the Hook
(Viewed from Front)

E27559

PREPARATION:

Remove presser foot, slide plate, throat plate and feed dog.

Remove face plate on machines on which timing marks are on upper half of needle bar.

CHECK:**ON MACHINES ON WHICH TIMING MARKS ARE ON UPPER HALF OF NEEDLE BAR—**

When lower timing mark on needle bar is level with lower end of upper needle bar bushing A as shown in Fig. 34, the point of the sewing hook should be at the center of the needle, as shown in enlarged view in Fig. 35.

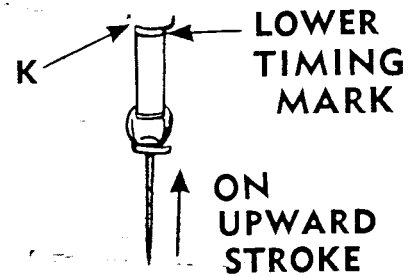


Fig. 34A. Checking the Timing of the Hook on Machines with Timing Marks at Lower End of Needle Bar

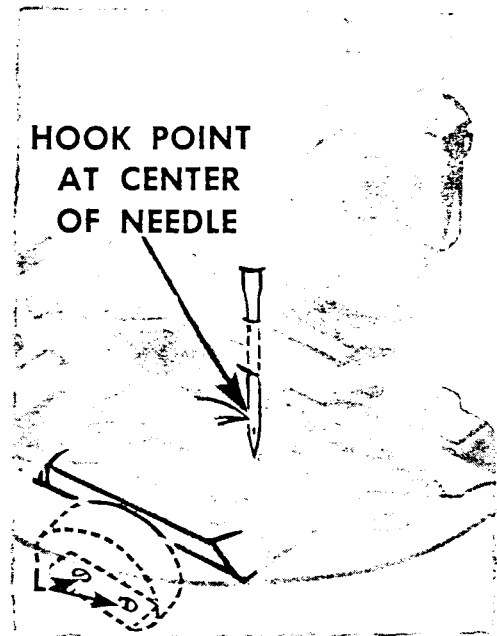


Fig. 35. Timing the Hook
(Viewed from Rear)

ON MACHINES ON WHICH TIMING MARKS ARE ON LOWER HALF OF NEEDLE BAR—

When lower timing mark on needle bar is level with lower end of lower needle bar bushing K as shown in Fig. 34A, the point of the sewing hook should be at the center of the needle, as shown in Fig. 35.

TIMING:

Loosen two set screws L, Fig. 35 in hub of hook. Turn hook on its shaft, as required to bring point of hook to center of needle, as shown above.

Make certain that hub of hook is against oil-retaining collar; then securely tighten screws L.

TO SET THE SEWING HOOK SIDEWISE IN RELATION TO THE NEEDLE

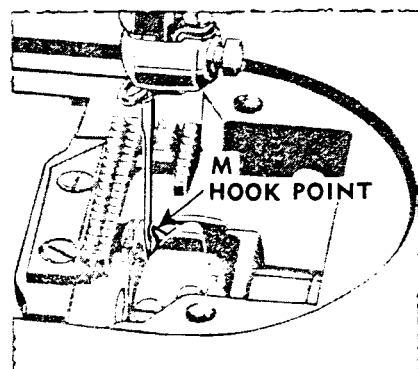


Fig. 36. Hook Point
Passing the Needle

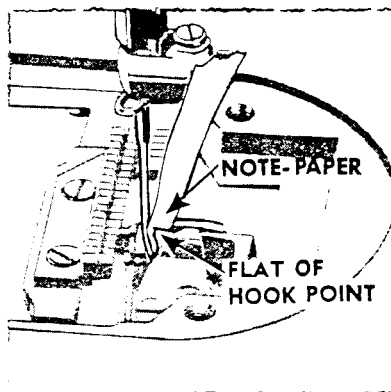


Fig. 37. Flat of Hook
Point Clearing the
Needle Scarf

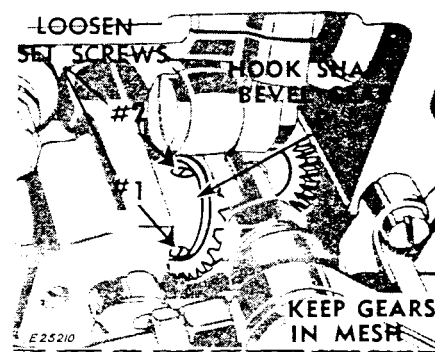


Fig. 38. Preparation
for Setting:
Loosening Bevel Gear

PREPARATION:

Remove slide plate, throat plate and bobbin case. Seat needle correctly in needle bar, as instructed on **page 8**. Time the sewing hook as instructed on **page 21**.

CHECK:

When point of sewing hook passes needle, clearance between hook point **M**, **Fig. 36** and needle should be approximately equal to thickness of a piece of ordinary notepaper (about .005 inch), as shown in **Fig. 37**.

NOTE:

Not only point of sewing hook but entire "FLAT" of hook point should clear scarf on needle blade.

SETTING:

Loosen screws **#1** and **#2** in hub of hook shaft bevel gear **P**, **Fig. 38**.

Loosen hook shaft bushing set screw **N**, **Fig. 40**, **page 23**.

CAUTION:

MAKE CERTAIN THAT THE TWO BEVEL GEARS ARE KEPT IN MESH UNTIL SET SCREWS **#1** AND **#2** ARE SECURELY RETIGHTENED.

Using a light mallet and a 1/4 inch brass drift pin, as shown in **Figs. 39** and **40**, move hook assembly either toward or away from needle, as required.

TAP VERY LIGHTLY on drift pin to avoid injury to hook assembly.

Securely tighten screw **N**, **Fig. 40**.

Remove all end shake from hook shaft by pushing the hook assembly firmly against front hook shaft bushing and, at the same time, pushing hook shaft bevel gear **P**, **Fig. 38** toward the hook on the shaft. Then securely tighten screw **#1**, **Fig. 38**; then screw **#2**.

Replace bobbin case, throat plate and slide plate.

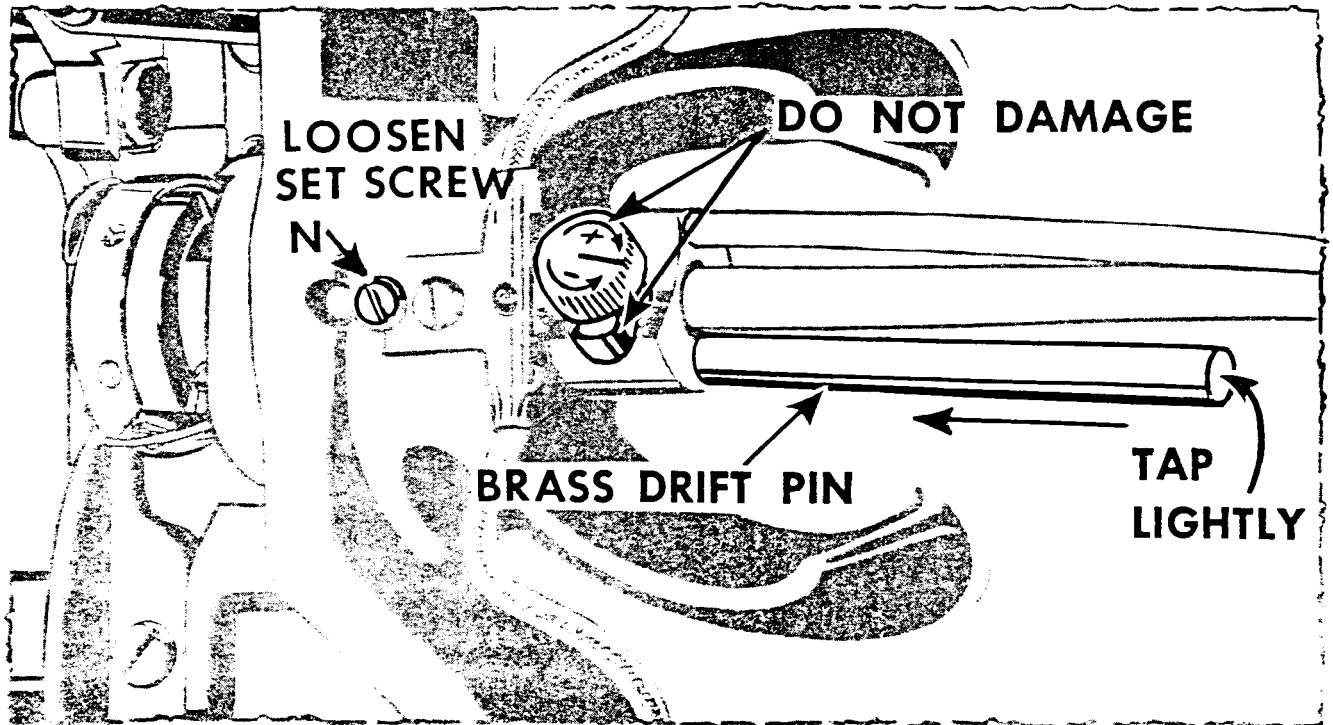


Fig. 39. Moving Sewing Hook Assembly Toward the Needle

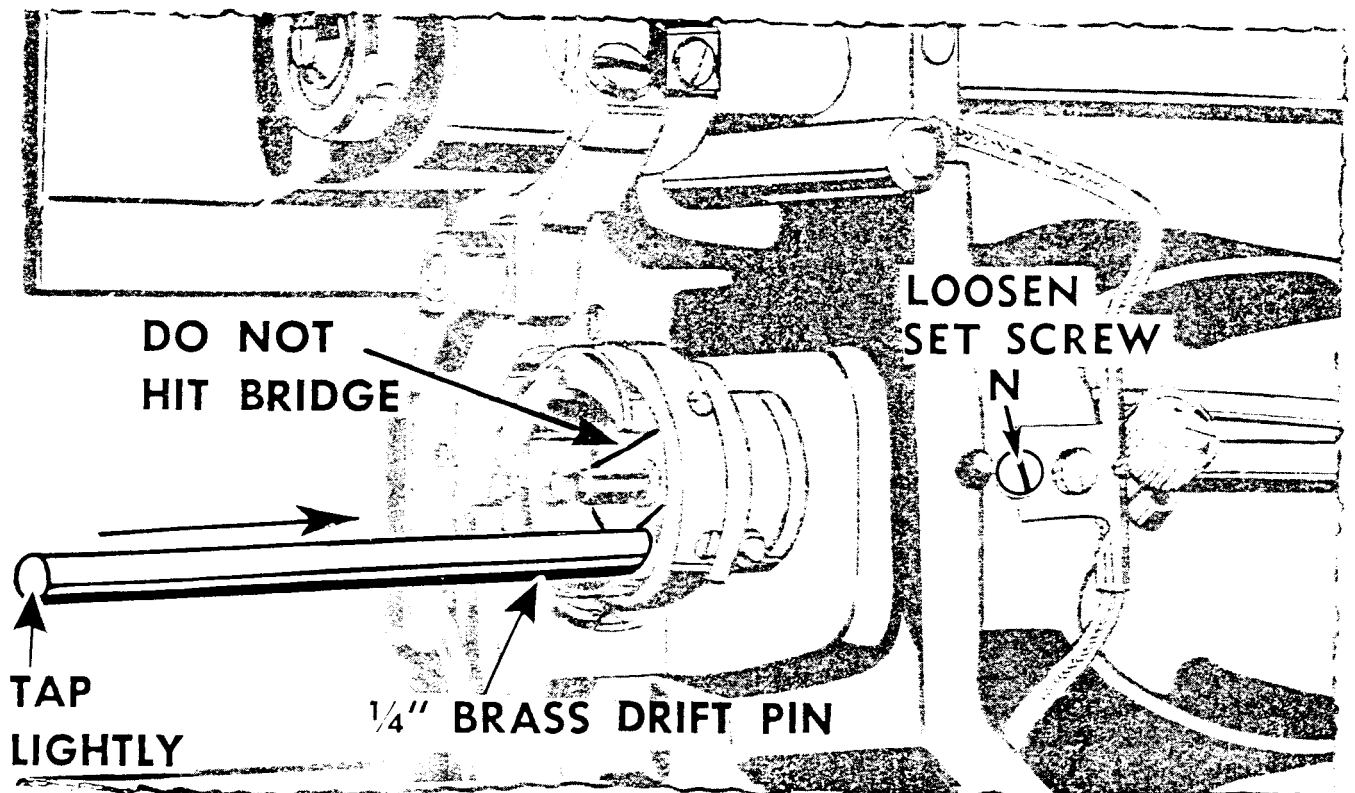


Fig. 40. Moving Sewing Hook Assembly Away from the Needle

TO TIME THE FEED

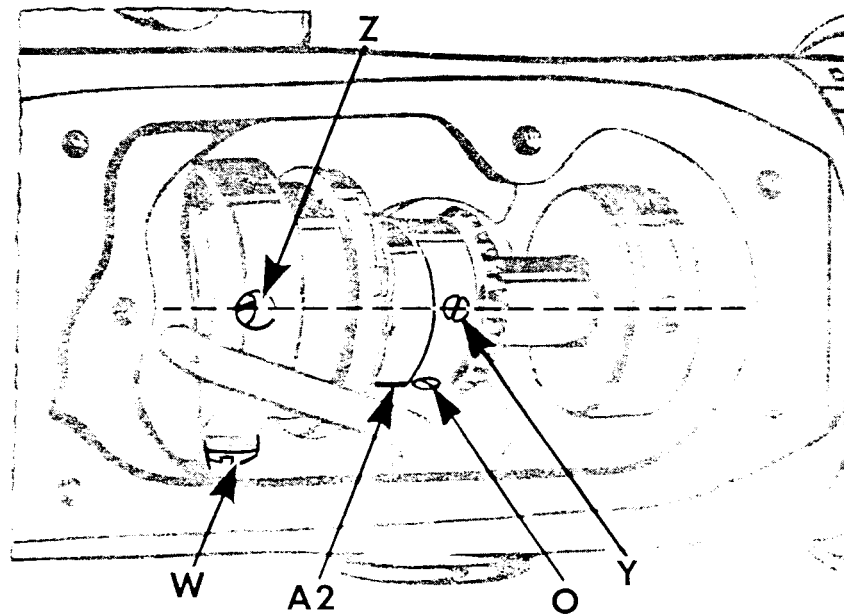


Fig. 41. Timing the Feed

Before the machine leaves the factory, the feed lifting eccentric-and-bevel-gear and the feed eccentric are both set for **average sewing conditions**; having the timing screw in each eccentric enter groove provided for it in the arm shaft.

As the grooves in the arm shaft are not visible to the adjuster, the machine pulley should be turned over toward operator until feed lifting eccentric connecting rod **A2**, **Fig. 41** is at its **lowest** position. Timing screw **Y**, **Fig. 41** will then be on **top** of feed lifting eccentric-and-bevel-gear. Loosen timing screw **Y** and set screw **O** and, while maintaining this position of the gear, turn arm shaft until timing screw, as it is slowly tightened, can be felt to drop into its groove in arm shaft. Securely tighten timing screw **Y** and set screw **O**.

Feed eccentric timing screw **Z**, **Fig. 41** appears immediately after large stop screw **W**, **Fig. 41**, when feed eccentric is rotated over **toward** operator.

Feed eccentric should be set for average sewing conditions, by having this timing screw **Z** **exactly** in line with timing screw **Y**, as shown in **Fig. 41**. Thus, as timing screw **Z** is tightened it will drop into its groove in arm shaft which is in line with groove provided for feed lifting eccentric-and-bevel-gear timing screw **Y**. Securely tighten timing screw **Z** and the two set screws in feed eccentric.

If for any reason, it is necessary to alter the timing of either eccentric, timing screw should be removed and eccentric locked in desired setting by means of set screws only.

NOTE: Whenever the timing of the feed is changed, sewing hook should be checked for necessary adjustment also, as instructed on **page 21**.

TO SET THE FEED DOG AT THE CORRECT HEIGHT

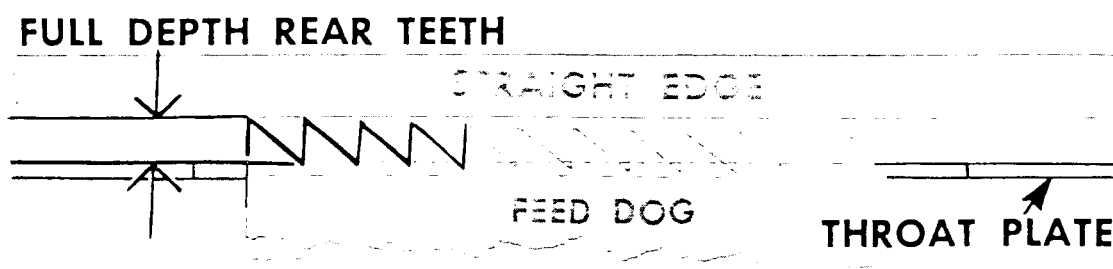


Fig. 42. Showing Feed Dog at Correct Height

When the feed dog is at its **highest** position, approximately the **full depth** of the **rear teeth** of the feed dog should project above the top surface of the throat plate, as shown in Fig. 42.

Before checking the height of the feed dog, set the machine for the **longest** stitch, as instructed on page 16.

To adjust, loosen the clamping screw **B2**, Fig. 43 and raise or lower the feed dog (which is fastened to the feed bar **C2**, Fig. 43) as required. Then securely tighten screw **B2**.

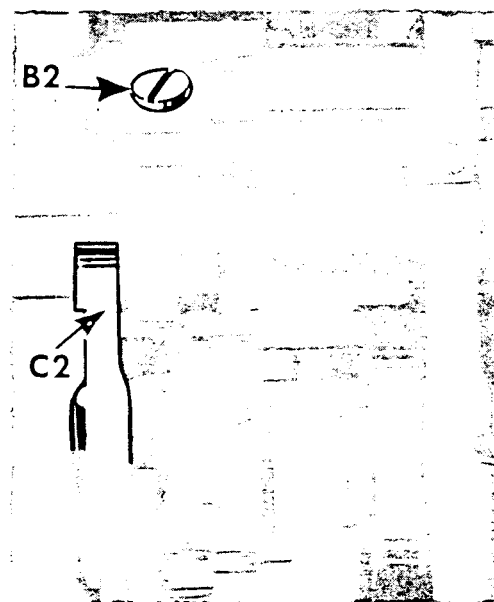


Fig. 43. Adjusting Height of Feed Dog

THE FEED DOG ECCENTRIC STOP SCREW

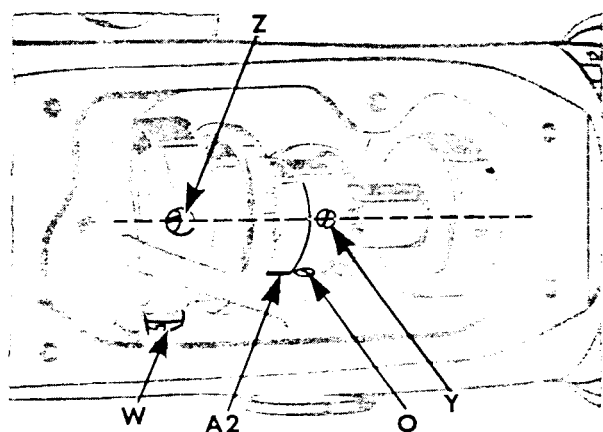


Fig. 44. Feed Eccentric Stop Screw

The machine is prevented from making longer stitches than a predetermined maximum by the Stop Screw **W**, Fig. 44 in the feed eccentric.

Feed eccentric stop screw **140256**, furnished with Machine **251-1**, permits a maximum length of seven stitches per inch.

Stop screw **140258**, for 14 stitches per inch or shorter, can also be used.

Machines **251-2** and **251-3** are regularly fitted with stop screw **140257** permitting a maximum length of 5-1.2 stitches per inch, but either **140256** (7 stitches per inch) or **140258** (14 stitches per inch) can be used.

INSTRUCTIONS

FOR

REMOVAL AND REPLACEMENT

OF

PRINCIPAL ASSEMBLIES

CAUTION TO MECHANICS

Machines of Class 251- are made with extreme precision in machining and assembly, and the "**Superfinish**" process provides microscopically smooth bearing surfaces. Therefore, special care should be taken not to permit any misalignment of parts or to cause any scratches or nicks on the bearing surfaces by careless assembly or handling of parts. Any such damage might render the machine incapable of the long, trouble-free service for which it is designed.

TO REMOVE THE SEWING HOOK

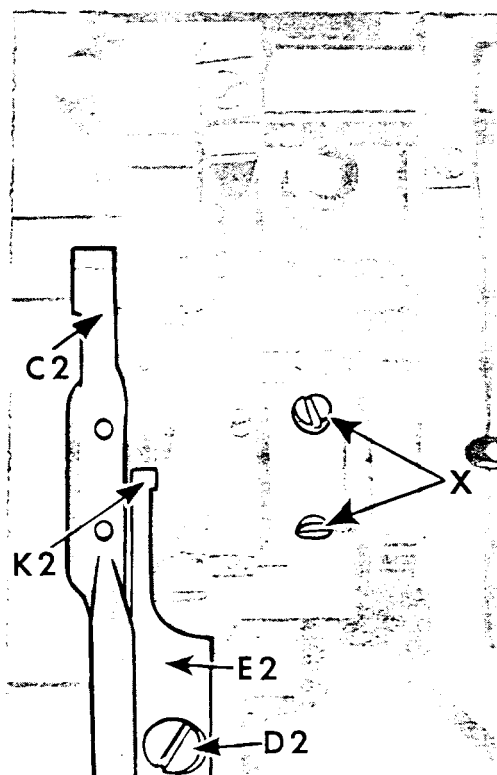


Fig. 45. Removing Sewing Hook

Remove the needle, slide plate, throat plate and bobbin case. Remove the screw **D2**, Fig. 45 and the bobbin case holder position bracket **E2**, Fig. 45. Loosen the two set screws **X**, Fig. 45 in the hub of the hook and turn the machine pulley over toward the operator until the feed bar **C2** is raised to its **highest** point.

Turn the sewing hook until the thread guard **F2**, is at the **bottom**, as shown in Fig. 46. Turn the bobbin case holder **G2**, Fig. 46 until the notch **J2** is also near

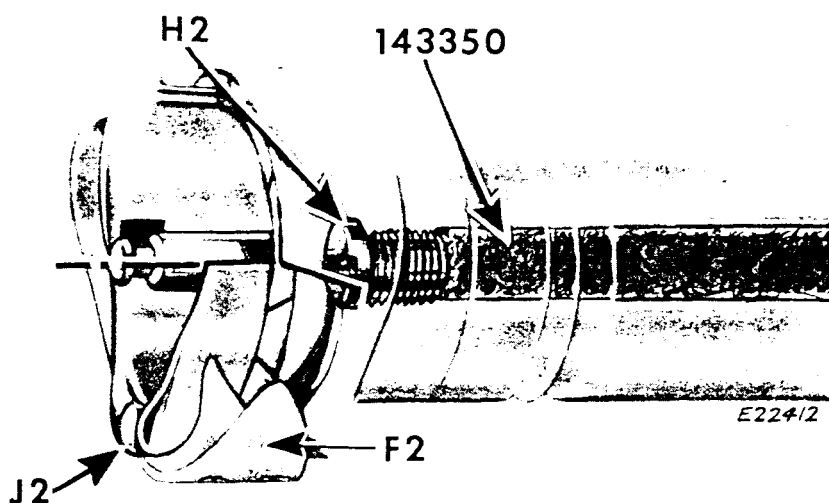


Fig. 46. Replacing Oil Filter

the bottom, as shown in Figs. 46 and 47. The sewing hook can then be removed from the hook shaft.

TO REPLACE OIL FILTER 143350

While the sewing hook is off the shaft, it is advisable to **replace the oil filter 143350**, Fig. 46, in the end of the hook shaft. Unscrew the filter from the center of the shaft at **H2**, Fig. 46 and replace with a complete new filter **143350**.

TO REPLACE THE SEWING HOOK

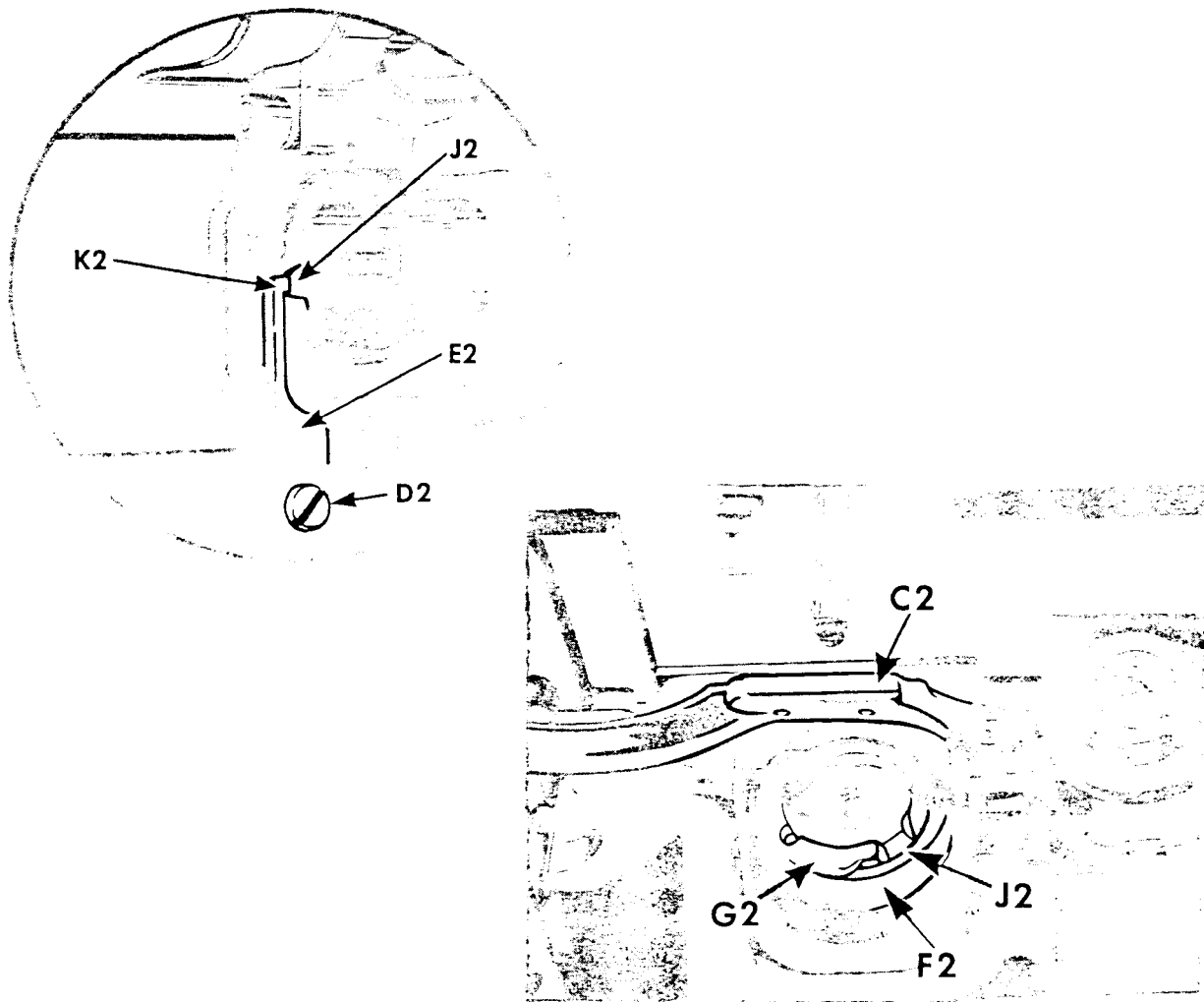


Fig. 47. Replacing Sewing Hook (Correct Position of Thread Guard and Bobbin Case Holder)

When placing a new sewing hook on the shaft, have the sewing hook thread guard **F2** at the bottom and the bobbin case holder **G2** turned to the position shown in **Fig. 47**, so that the hook will clear the feed bar **C2**.

Place the hook in position on the shaft and turn the bobbin case holder **G2** until the notch **J2** is at the top, as shown in circular inset above. Replace the bobbin

case holder position bracket **E2**, making certain that the finger **K2** (see inset) enters the notch **J2** at the top of the bobbin case holder. Then securely fasten the position finger by means of the screw **D2**.

Replace the needle. Time the sewing hook, as instructed on **page 21**. Replace the bobbin case, throat plate and slide plate.

TO REMOVE AND REPLACE THE HOOK SHAFT

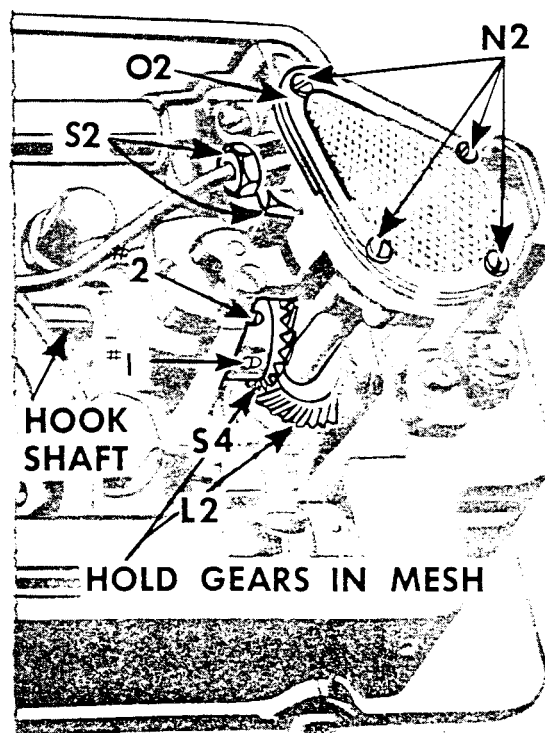


Fig. 48. Removing and Replacing Hook Shaft

Remove and replace the hook shaft in the following manner:—

1. Remove the sewing hook, as instructed on page 28.
2. Mark the two lower bevel gears L2 and S4, Fig. 48, with chalk or crayon, on one tooth of one gear and the corresponding space for that tooth in the other gear. **This is important**, as these gears may become separated during removal of shaft. These marks will then make it possible to obtain the original mating position of the gears.
3. Loosen the two set screws #1 and #2 in hook shaft bevel gear. **While holding the two gears L2 and S4 in mesh**, as instructed in Fig. 48, withdraw the old hook shaft and **INSERT THE NEW SHAFT**.

NOTE: Set screw #1 is the first of the two set screws to appear on the hub of the bevel gear S4 as the machine pulley is turned over toward operator.

4. Replace the sewing hook, as instructed on page 29.
5. Make certain that set screw #1 seats over flat on the hook shaft. Remove all end shake from hook shaft, by pushing hook firmly against front hook shaft bushing and, at the same time, pushing gear S4, Fig. 48 toward the hook on the shaft. Securely tighten first set screw #1, then securely tighten the second screw #2.
6. Time the sewing hook as instructed on page 21.

THE OIL PUMP

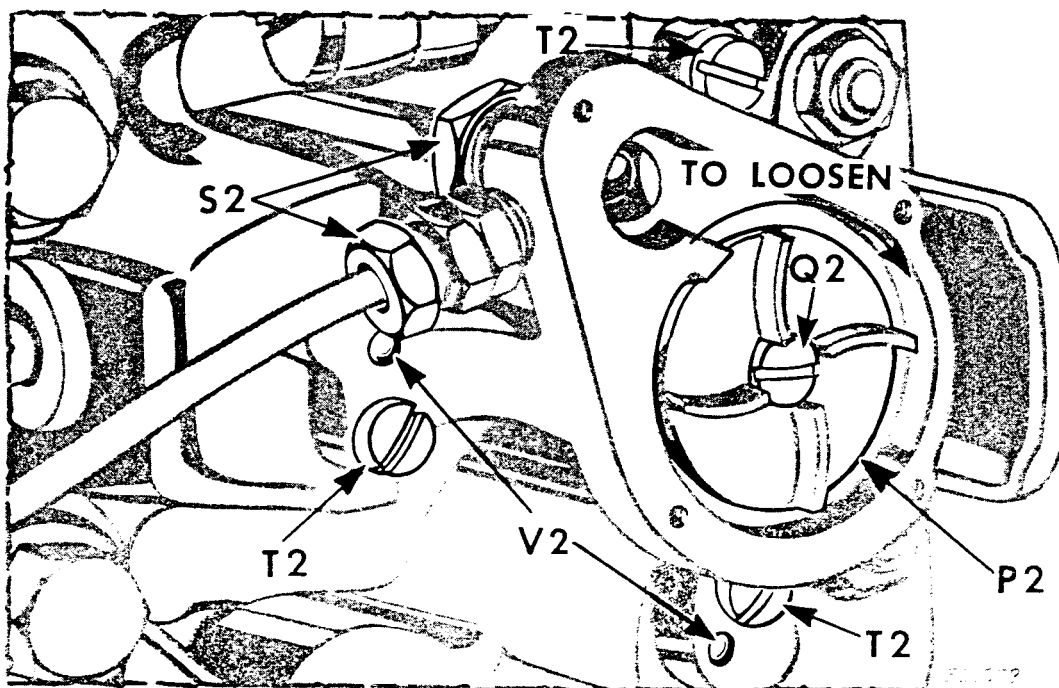


Fig. 49. Oil Pump

TO REMOVE

1. Loosen the two oil pipe clamping sleeve nuts **S2**, **Fig. 49**.
2. Remove the four screws **N2**, **Fig. 48**.
3. Remove the screen frame, screen and oil pump cover **O2**, **Fig. 48**.
4. Remove the locking screw **Q2**, **Fig. 49**.
5. Remove the impeller **P2**, by turning it over toward the **RIGHT** (clockwise) to loosen it, as instructed in **Fig. 49**.

CAUTION:—The impeller **P2** is designed to be screwed to the shaft by means of a **LEFT-HAND THREAD** and must be turned over toward the right to be loosened. Avoid damage to this impeller, as the efficient automatic lubrication of the machine is dependent upon it.

6. Remove the three screws **T2**.
7. Carefully pull the oil pump body off the lower end of the upright arm shaft.

TO REPLACE

1. Place oil pump body on underside of machine bed, so that position pins **V2**, slip into proper holes in machine casting, as shown above.
2. Replace and securely tighten the three screws **T2**. Make certain that machine turns freely as screws are tightened.
3. Carefully replace impeller **P2**, turning it over toward the **LEFT** to screw it on arm shaft (see **CAUTION** at left).
4. Make certain that impeller **P2** is not so tight that it will bind arm shaft. Make certain also that impeller clears both top and bottom of interior of oil pump body, then lock it in position by means of locking screw **Q2**.
5. Replace pump cover, screen and frame **O2** and four screws **N2**, **Fig. 48**. Securely tighten screws **N2**.
6. Replace two oil pipes in oil pump body, as shown above, and securely tighten sleeve nuts **S2**.

TO REMOVE AND REPLACE THE UPRIGHT ARM SHAFT

(See Fig. 50)

REMOVAL:

If it is found necessary to remove the upright arm shaft **K3**, it should be removed in the following manner:—

1. Remove oil pump, as instructed on **page 31**.
2. Follow the instructions in **Steps 2 and 3** for removal of hook shaft on **page 30** except that, instead of removing hook shaft, merely remove hook shaft bevel gear **S4**, **Fig. 48**.
3. Remove arm top cover.
4. Remove screw **L3** and oil lead **M3**.
5. Remove four cap screws **N3**.
6. Remove oil flow window cap **O3**, window **P3**, oil flow body **R3** with two gaskets **Q3**.
7. **Mark the two bevel gears **S3**, with chalk or crayon, on one tooth of one gear and the corresponding space between the teeth of the other gear so that these gears may be re-assembled in their original relative positions without difficulty, if necessary.**
8. Loosen set screws **T3** in bevel gear at upper end of upright arm shaft.
9. Make certain bevel gear at lower end of upright arm shaft is fastened securely. Then while holding upper bevel gears **S3** in mesh, draw upright arm shaft down and out of machine.

REPLACEMENT:

1. Before installing upright arm shaft, make certain it has the bevel gear **L2**, **Fig. 48** correctly fastened at the **lower** end of shaft.

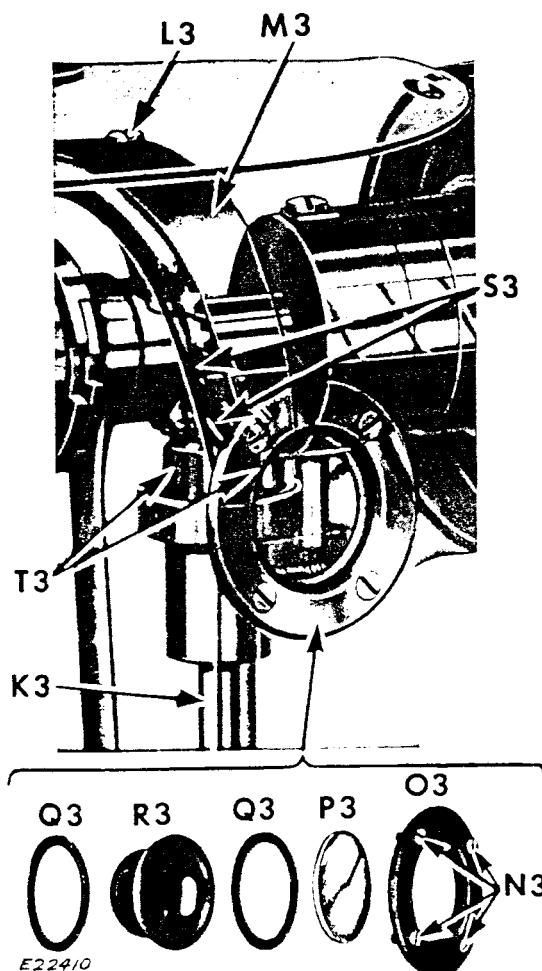


Fig. 50. Removing Upright Arm Shaft

2. Insert upright arm shaft up through upper bevel gear, as shown in **Fig. 50**.
3. Turn shaft so that one of the two set screws **T3** will bear upon the upper gear flat on the shaft and tighten the set screws **T3**.
4. Replace and set hook shaft bevel gear as instructed in **Step 5** on **page 30**.
5. Replace oil pump, as instructed on **page 31**.
6. Replace oil flow window assembly, in the order shown in **Fig. 50**.
7. Replace oil lead **M3** and arm top cover.

TO REMOVE AND REPLACE THE NEEDLE BAR

(See Fig. 51)

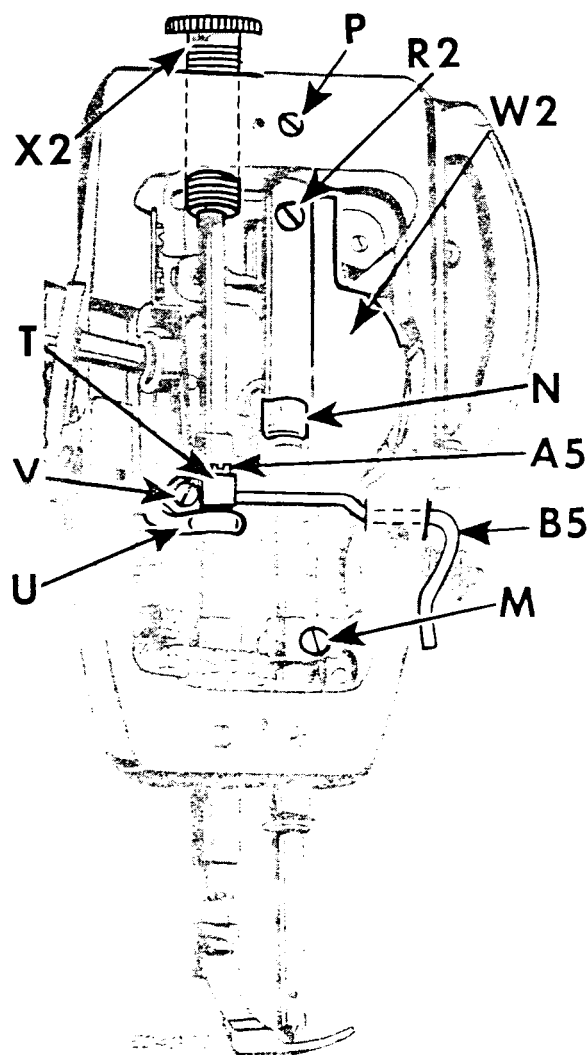


Fig. 51. Removing and Replacing Needle Bar and Presser Bar

Remove the needle bar in the following manner:—

1. Remove needle and needle set screw (or needle clamp).
2. Remove face plate.
3. Loosen clamping screw **M**.
4. Loosen screw **R2** sufficiently to allow needle bar to pass, then slip needle bar up through both needle bar bushings and out of machine.

NOTE: If it becomes necessary to remove upper needle bar bushing **N**, first remove screw **R2** and take-up lever oil guard **W2**. Then loosen set screw **P** and drive bushing **N** down and out of head of machine. Use a 13/32 inch driving pin.

Before replacing needle bar, replace upper needle bar bushing **N**, by driving it down into hole provided for it in head of the machine. Make certain top of bushing **N** is level with top of arm. Tighten set screw **P**.

Replace needle bar in the following manner:—

1. Slip needle bar down through both bushings in head of the machine. Tighten screw **M**.
2. Replace needle clamp and needle. See page 8.
3. Set needle bar at correct height and replace face plate, as instructed in last paragraph on page 18.
4. Replace oil guard **W2** and fasten it securely to bushing with set screw **R2**.

TO REMOVE AND REPLACE THE PRESSER BAR

To remove the presser bar:—

1. Remove presser foot and face plate.
2. Remove presser bar pressure regulating thumb screw, **X2**, with pressure bar guide from head of the machine.
3. Loosen clamping screw **V** about one turn (just enough to make it loose). Loosen screw **A5** and slip guide bracket **T** up off presser bar and out of machine.
4. Slide presser bar up through lifting bracket **U**, Fig. 51 and bushing and out of machine.

To replace the presser bar:—

1. Slip presser bar down through lifting bracket **U**, Fig. 51 and lower presser bar bushing.
2. Replace guide bracket **T** as shown in Fig. 51.
3. Replace presser foot.
4. Replace presser bar pressure regulating thumb screw **X2** with presser bar guide.
5. Set the presser bar at the correct height, as instructed on page 20.
6. Tighten screw **V**.
7. Tighten screw **A5**; making sure that slack thread regulator **B5** just clears the casting. Replace face plate, as instructed on page 18.

TO REMOVE THE NEEDLE THREAD TAKE-UP

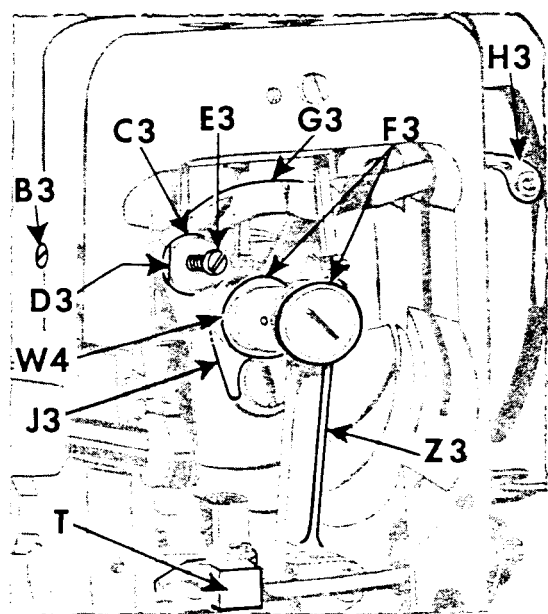


Fig. 52. Removing Needle Thread Take-up

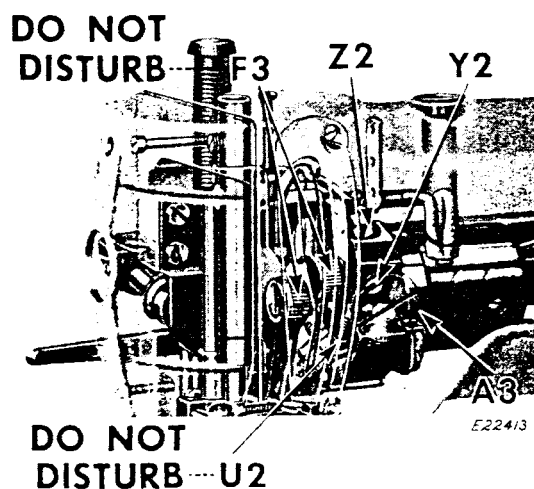


Fig. 53. Needle Bar Crank

Remove needle thread take-up in the following manner:—

1. Remove face plate and arm hole plug **A3**, Fig. 53 from machine.
2. Remove needle bar, upper needle bar bushing, presser bar pressure regulating thumb screw **X2**, Fig. 51, page 33, and guide bracket **T**, Fig. 52 as instructed on page 35.
3. Turn machine pulley as required to reach screw **Y2**, Fig. 53, in needle bar crank through hole left by removal of plug **A3**. Loosen set screw **Y2**.
4. Using wrench **146057** (through same hole) and turning machine pulley as required, loosen the large hexagon head clamping screw **Z2**, Fig. 53, on needle bar crank.

CAUTION: DO NOT DISTURB the smaller hexagon head position screw **U2**, Fig. 53, which holds the needle bar crank at its correct position on the horizontal arm shaft.

5. Loosen small set screw **B3**, Fig. 52 in the rear of the arm of the machine.

6. Insert a face plate screw **E3**, Fig. 52 in the tapped hole in center of stud **C3**, Fig. 52 and, while holding back the needle thread take-up link inside the head at **G3**, Fig. 52, pull upon the screw **E3** until the stud **C3** is removed. Remove face plate screw from stud.

NOTE: Extractor Tool Serial 222226 may be used instead of face plate screw at **E3**, Fig. 52, to pull hinge stud **C3**.

7. Back the end of the take-up **H3**, Fig. 52 toward the inside of the machine, turning the machine pulley as required until the take-up is free of the slot provided for it.
8. The needle thread take-up link assembly (including parts **F3**, **G3**, **H3**, **J3**, **Z3** and **W4**) can now be pulled free of the needle bar crank **WITHOUT DISTURBING THE NEEDLE BEARINGS WITHIN THE THREAD TAKE-UP CRANK AT F3**, Fig. 53.

NOTE: If the needle bearings at **F3**, Fig. 53, are accidentally disturbed, they must be reassembled so that there are exactly 18 bearings in each of the two assemblies.

TO REPLACE THE NEEDLE THREAD TAKE-UP

Replace the needle thread take-up in the following manner:—

1. Make sure that the wearing plate **J3** is in place and **undamaged** on the face of the needle bar crank, as shown in **Fig. 52**.
2. Place the needle thread take-up link **G3** and take-up **H3** in the head of the machine so that the stud **W4**, **Fig. 52** in the center of the linkage slips into the hole provided for it in the needle bar crank, as shown in **Fig. 52**.
3. Slip the upper end of the take-up **H3** through the slot provided for it in the head of the machine.
4. Insert stud **C3** through needle thread take-up lever link **G3** and into its hole into the machine casting so that the **flat on the stud faces the rear** of the machine. The mark **D3** on the stud indicates the position of this flat. **Fig. 52** shows the stud with the mark **D3** in the correct position. **DO NOT INSERT THE STUD TO ITS FULL DEPTH AT THIS TIME.** There should be about **.010** inch to **.015** inch side play of the take-up lever link **G3** on the stud, until final adjustment is made in **Step 15**.
5. Turn the set screw **B3** inward lightly against the flat on the stud **C3**. **DO NOT TIGHTEN** screw **B3** until final adjustment is made in **Step 15**.
6. Turn machine pulley as required to make set screw **Y2** in needle bar crank accessible through hole at **A3**, **Fig. 53** in front of machine head.
7. Insert a screwdriver through this hole and, while turning stud **W4** by hand to find its flat, turn set screw **Y2** until it bears tightly upon the flat.
8. Turn screw **Y2** back, just enough to "break it loose."
9. Make certain that assembly **F3** is firmly against, but does not bind, wearing plate **J3**. Test for side play by pushing take-up lever **H3** gently right and left; there should be **.001** to **.002** inch side shake between lever and wearing plate.
10. Move thread take-up crank inward or outward in needle bar crank, as required, to obtain clearance.
11. Using wrench **146057**, through same hole and turning machine pulley as required, **tighten** hexagon head screw **Z2** lightly.
12. Loosen set screw **Y2**.
13. Securely tighten clamping screw **Z2**.
14. Securely tighten set screw **Y2**.
15. Push hinge stud **C3** fully into machine casting and securely tighten set screw **B3**.
16. Turn machine pulley slowly, by hand, at least one complete revolution; testing take-up for binding, end shake and noise. If binding occurs, re-check clearance between take-up and wearing plate **J3** and between hinge stud **C3** and machine casting.
17. Replace guide bracket **T** in head of machine, as shown in **Fig. 52**.
18. Replace presser bar pressure regulating thumb screw **X2**, **Fig. 51**, page 33.
19. Replace and adjust upper needle bar bushing and needle bar with their accessories, as instructed on **pages 18 and 33**.
20. Replace and securely tighten arm hole plug **A3**.
21. Replace the face plate (see instructions at bottom of **page 18**).

TO REMOVE AND REPLACE ARM SIDE SHIELD WICK, NEEDLE BAR WICK AND NEEDLE BAR CONNECTING STUD WICK

(See Fig. 54)

Arm side shield wick may be removed, after removing face plate and two screws **U3**. Lift arm side shield **V3** up and out of machine.

When replacing arm side shield wick, make sure that lower end of wick drops into oil pool beneath needle bar crank and that the two upper wick loops are located **as close as possible to the needle bearings at F3, Fig. 55 without touching them**. Then replace and securely tighten screws **U3**.

To remove needle bar wick and connecting stud wick, move take-up lever **H3**, so that it does not interfere with removal of oil guard **W2**. Then remove face plate and screw **R2**; lift take-up oil guard **W2**, with the two wicks, up and out of machine.

When replacing the oil guard **W2**, which carries the needle bar wick and connecting stud wick, make sure that lower end of the stud wick drops into oil pool behind lower needle bar bushing and that the loop of needle bar wick is placed behind the needle bar, as shown in **Fig. 54**.

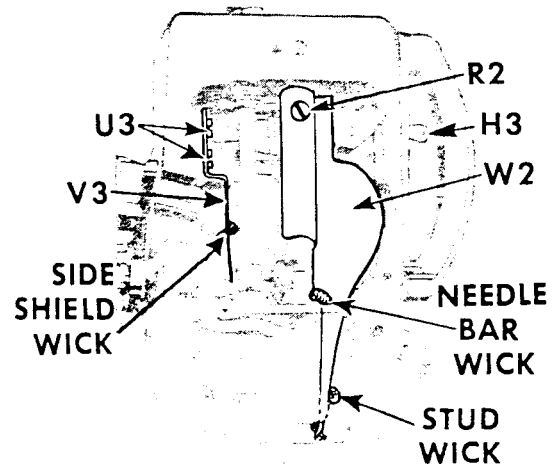


Fig. 54. Arm Side Shield Wick, Needle Bar Wick and Connecting Stud Wick

TO REMOVE OIL WICK HOLDER

(See Fig. 55)

Oil wick holder includes two oil wick leaders (see **Fig. 56**) and an oil wick for the needle bar link and for the two sets of needle bearings in the thread take-up as shown in **Fig. 55**. It is removed in the following manner:—

1. Remove face plate, needle bar and upper needle bar bushing from the machine, as instructed on **page 33**.
2. Remove upper section of presser bar, as instructed on **page 33**.
3. Remove holder screw **W3**.
4. Pulling gently, draw entire oil wick holder assembly out of the head of the machine.

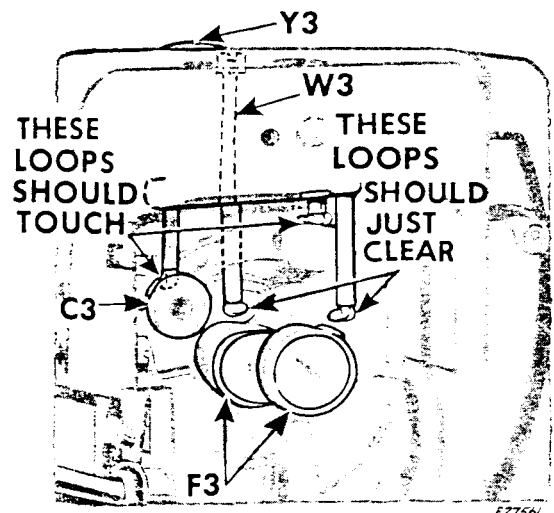


Fig. 55. Wick Loops for Needle Bar Link and Thread Take-up

TO INSTALL NEW OIL WICK HOLDER

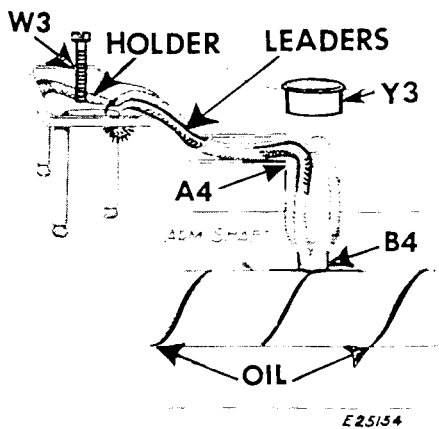


Fig. 56. Replacing Oil Wick Holder
(Correct Installation)

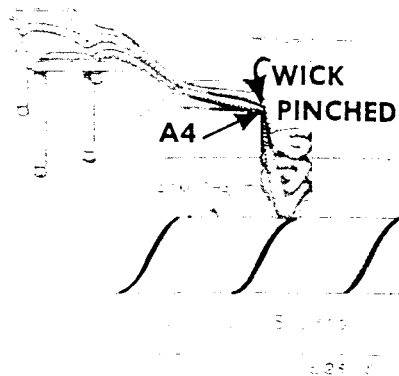


Fig. 57. Incorrect
Installation

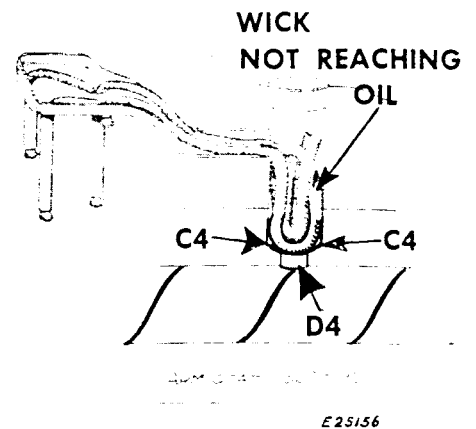


Fig. 58. Incorrect
Installation

1. Remove old oil wick holder as instructed at bottom of **page 36**.
2. Remove top arm plug **Y3**, **Fig. 56**. (Use a sharp-bladed screwdriver or a small chisel to pry plug **Y3** from arm casting.)
3. Insert two oil wick leaders into arm casting, as shown in **Fig. 56**, so that wick is **slack over edge of casting at point A4**, **Fig. 56**. This will insure free passage of oil. Use tweezers through the plug hole at **Y3** to loop the wick and bring it into positive contact with the arm shaft approximately at the point **B4** shown in **Fig. 56**.
4. When oil wick leaders are correctly installed, replace holder screw **W3**, **Fig. 56**.
5. Adjust the three oil wick loops in holder (see **Figs. 55 and 56**), so that **two of the loops come as close as possible to, without touching, the two sets of needle bearings F3** while the third wick loop makes **positive contact with the wick inside the stud C3**, in the needle bar link, as shown in **Fig. 55**.
6. Securely tighten holder screw **W3**.
7. Replace arm top plug **Y3**.
8. Replace upper section of presser bar, upper needle bar bushing and needle bar, as instructed on **page 33**.
9. Replace face plate, as instructed in last paragraph on **page 18**.

NOTE: DO NOT FORCE the wick leaders **down too tightly against the edge A4** of the casting, as shown in **Fig. 57**, as this will decrease the flow of oil from the arm shaft to the needle bar link and take-up bearings.

CAUTION: If the bottom of either oil wick leader is caught on the ledge as shown at **C4**, **Fig. 58**, no oil can be taken up by the wick to be carried to the needle bar link and thread take-up bearing, where it is needed. Make sure that the oil wick leaders are

OIL-REMOVING WICK ASSEMBLY (HEAD END) COMPLETE 147056

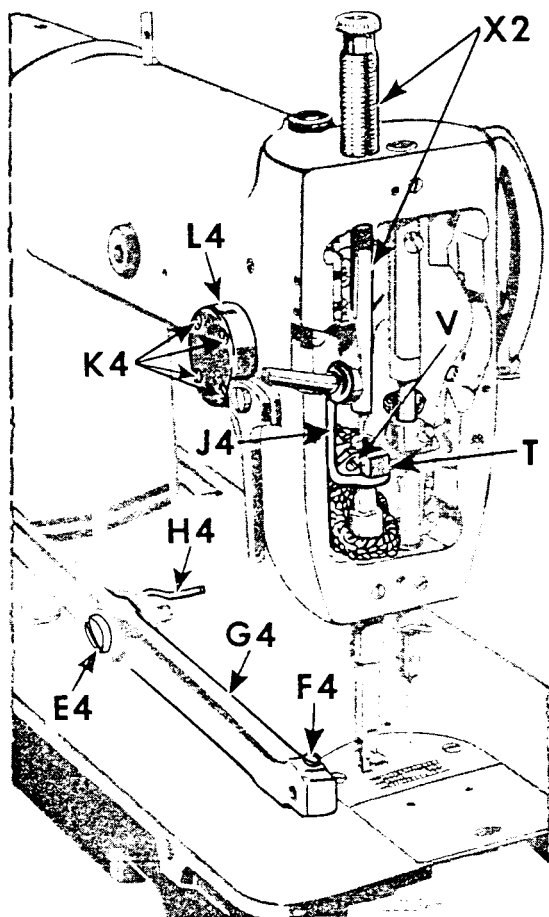


Fig. 59. Preparing to Remove Oil-Removing Wick

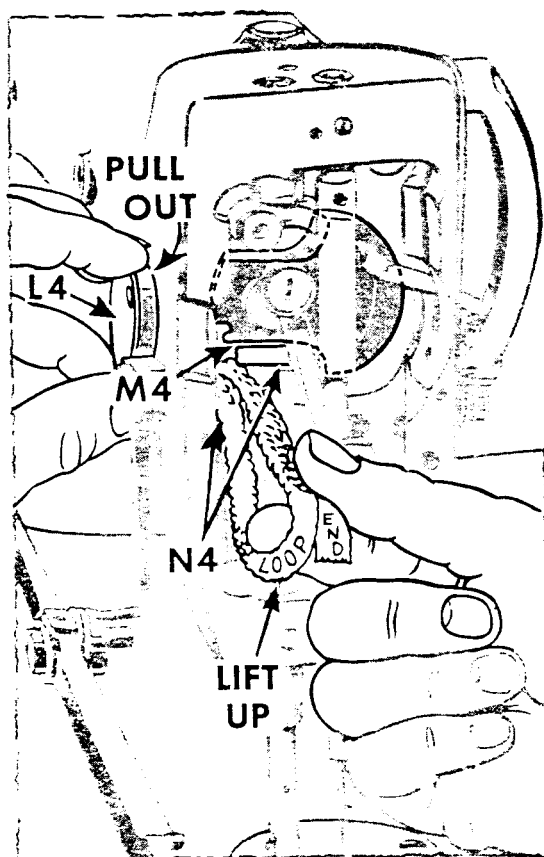


Fig. 60. Removing Oil-Removing Wick Assembly 147056

DESCRIPTION

Oil-removing wick assembly, **Complete 147056**, shown in **Fig. 61** is designed to remove excess oil from the head of the machine arm.

When filling the machine reservoir, use **"TYPE A"** or **"TYPE C"** OIL, sold by Singer Sewing Machine Company. If inferior oil is used, absorption of the excess oil by this wick may be reduced considerably. The consequent leakage of accumulated oil will then cause serious damage to materials being sewn. For further instructions on oiling, see **inside front cover of this book** and **pages 2, 6, 7 and 31**.

Additional sets of the oil-removing wick, wick holder body and spring, as shown in **Fig. 61**, will be furnished on order.

PREPARATION FOR REMOVAL—

(See Fig. 59)

1. Remove face plate.
2. Loosen presser foot lifting lever hinge screw **E4**, and presser foot lifting lever link stud screw **F4**.
3. Remove head end of presser foot lifting lever **G4** with spring **H4**, from the machine arm.
4. Remove presser foot screw and presser foot and presser bar thumb screw **X2**, with upper section of presser bar.
5. Remove arm side shield with wick, as instructed on **page 36**.
6. Loosen screw **V** and remove guide bracket **T**, as instructed on **page 33**.
7. Remove presser bar lifting link **J4**, with stud.
8. Loosen four screws **K4**, in the oil removing hinge plate and cover **L4**.

REMOVAL—

(See Fig. 60)

1. Turn machine pulley over toward the operator, until the needle bar crank is in the position shown at **M4**.
2. Lift wick LOOP up and off lower presser bar bushing and lift wick END out of oil pool behind needle bar bushing, as shown in **Fig. 60**.
3. Simultaneously push upward against wick and wick holder at **N4**, while pulling outward gently on hinge plate and cover **L4**, as shown in **Fig. 60**, removing hinge plate and cover with oil-removing wick and holder body from the machine.

OIL-REMOVING WICK ASSEMBLY (continued)

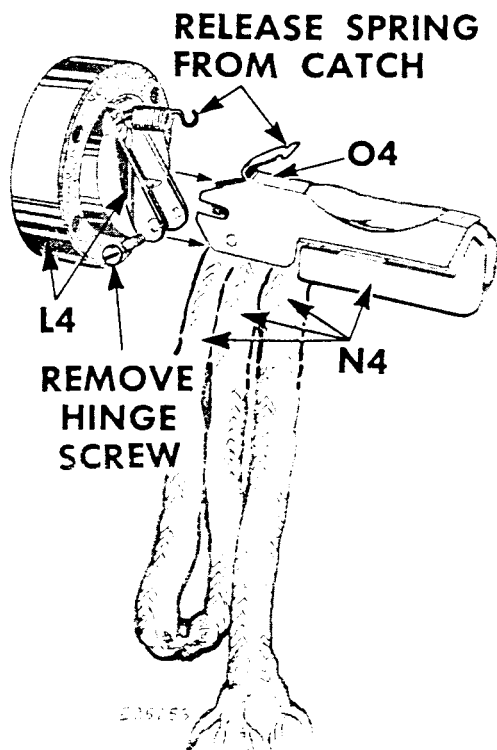


Fig. 61. Disassembly of Oil Removing Wick (Showing Oil-Removing Wick Holder Body and Spring 147108)

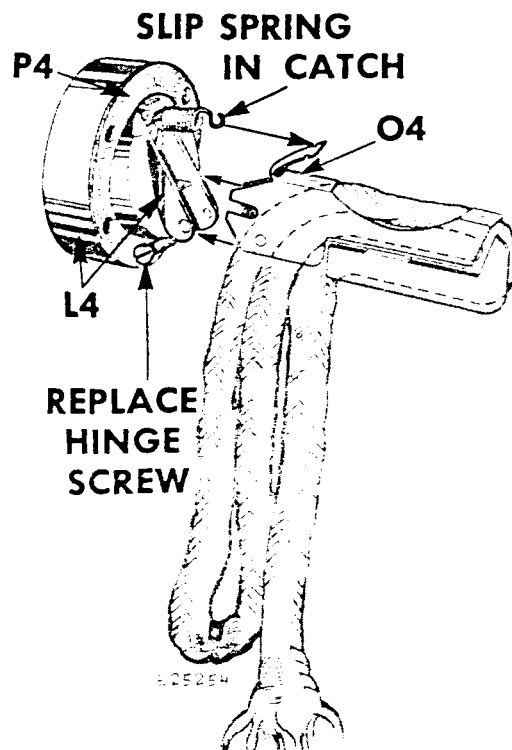


Fig. 62. Installing New Oil-Removing Wick (with Holder) in Assembly 147056

DISASSEMBLY—

1. Release end of spring from catch on the holder body O4, as instructed in Fig. 61.
2. Remove hinge screw, as instructed in Fig. 61.
3. Oil-removing wick and holder N4 may then be removed from hinge plate and cover L4, as shown in Fig. 61.

CAUTION: Before inserting a new oil removing wick, it must be saturated with oil.

ASSEMBLY—

(See Fig. 62)

1. Insert **open end** of holder body O4, (with new Wick) into hinge plate and cover L4.
2. Replace and securely tighten hinge screw as instructed in Fig. 62.
3. Slip end of spring into catch on holder body O4, as instructed in Fig. 62.
4. Place gasket P4 on hinge plate and cover L4.
5. Align the screw holes in the gasket P4 with the screw holes in the cover L4 and insert the four screws K4, Fig. 66, page 41 through cover and gasket to hold the gasket in place.

OIL-REMOVING WICK ASSEMBLY (continued)

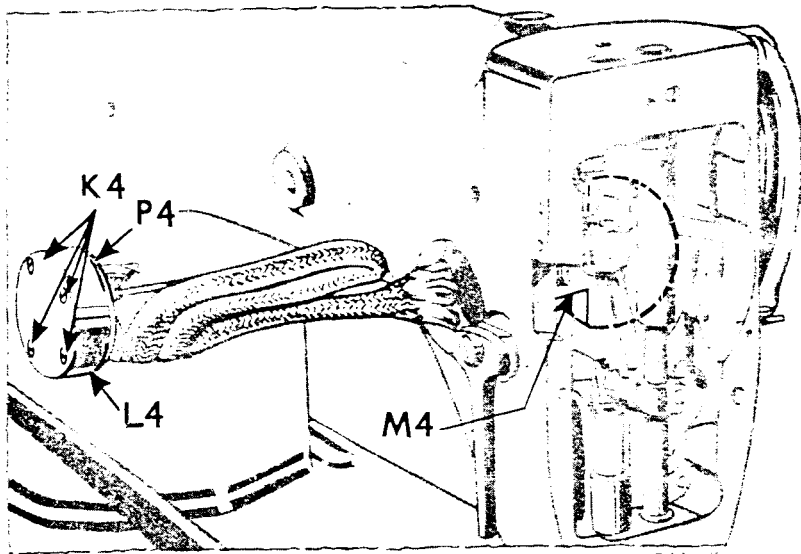


Fig. 63. Replacing Oil-Removing Wick and Holder in Head of Machine

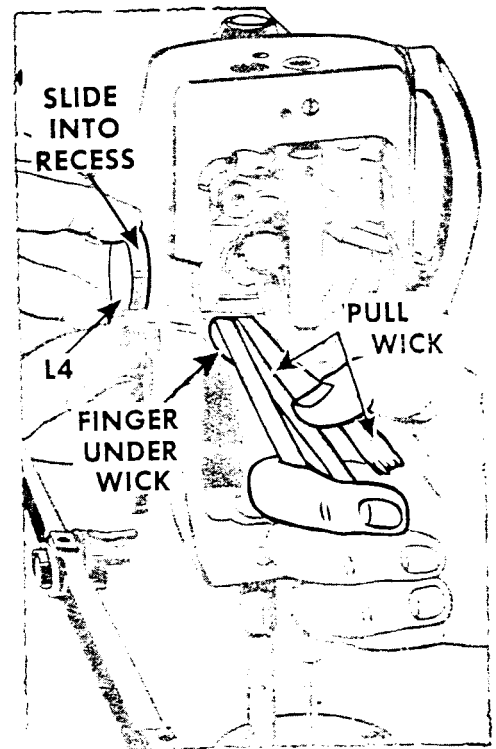


Fig. 64. Pulling Wick into Machine

REPLACEMENT—

1. Turn machine pulley over toward operator until the needle bar crank is in the position shown at **M4**, Fig. 63.
2. Fold oil-removing wick along the side of the holder body, as shown in Fig. 63 and insert oil-removing wick, holder and hinge plate into head of machine.
3. Place index finger under wick and holder body and simultaneously pull the oil-removing wick, as required, sliding the hinge plate and cover **L4** fully into its recess in the head of the machine, as shown in Fig. 64.
4. Securely tighten the four screws **K4**, Fig. 63.
5. Check the entire assembly to make certain that the holder body (see **O4**, Figs 61 and 62) hinges freely under the needle bar crank.

OIL-REMOVING WICK ASSEMBLY (continued)

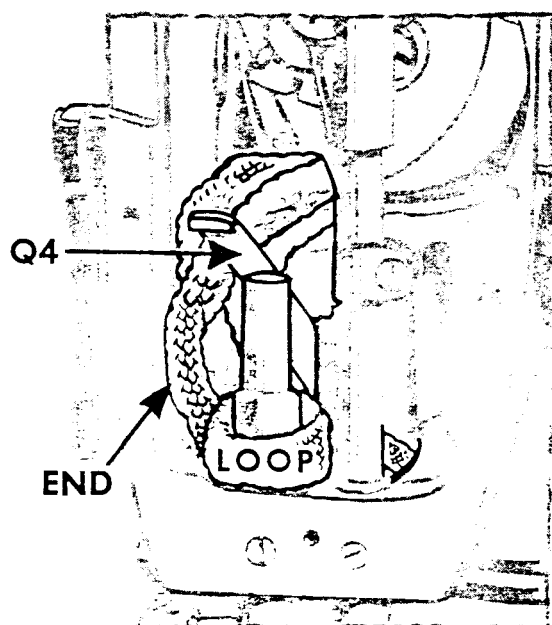


Fig. 65. Location of Wick Loop and Wick End in Machine Head

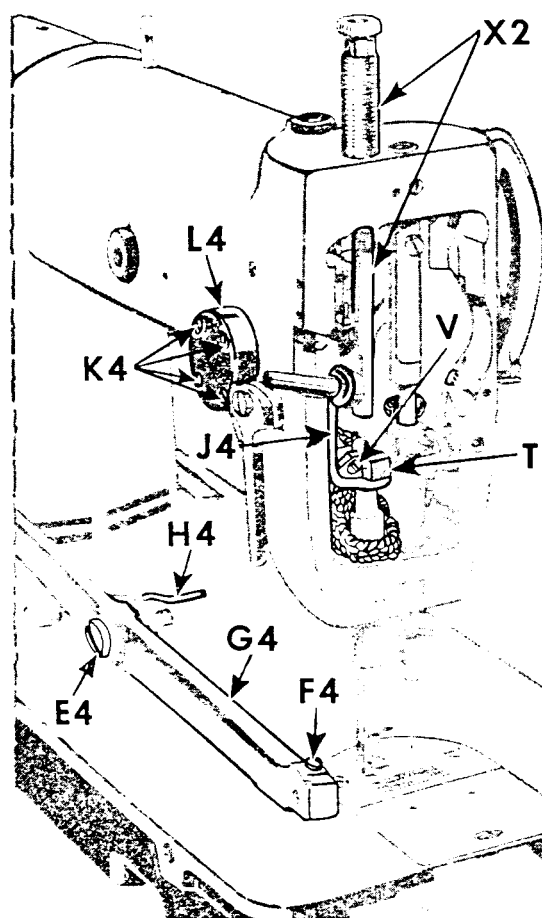


Fig. 66. Replacement of Other Parts in Head of Machine

LOCATION OF WICKS—

1. Replace END of wick behind tension releasing lever **Q4** and into oil pool behind lower needle bar bushing, as shown in **Fig. 65**.
2. Replace LOOP behind and then under tension releasing lever **Q4** and out over lower presser bar bushing, as shown in **Fig. 65**.

REPLACEMENT OF OTHER PARTS

1. Replace presser bar lifting link **J4**, **Fig. 66** with stud.
2. Replace guide bracket **T**, **Fig. 66**. (See page 33, also.) Tighten screw **V**, **Fig. 66**.
3. Replace arm side shield with wick, as instructed on page 36.
4. Replace upper half of presser bar and presser bar thumb screw **X2**, **Fig. 66**.
5. Replace presser foot and presser foot screw.
6. Place presser foot lifting lever **G4**, **Fig. 66** with spring **H4** on machine arm and fasten lever to arm with hinge screw stud **E4**, **Fig. 66**.
7. Tighten screw **F4**, **Fig. 58**.
8. Replace face plate as instructed on page 18.

THE ARM SHAFT

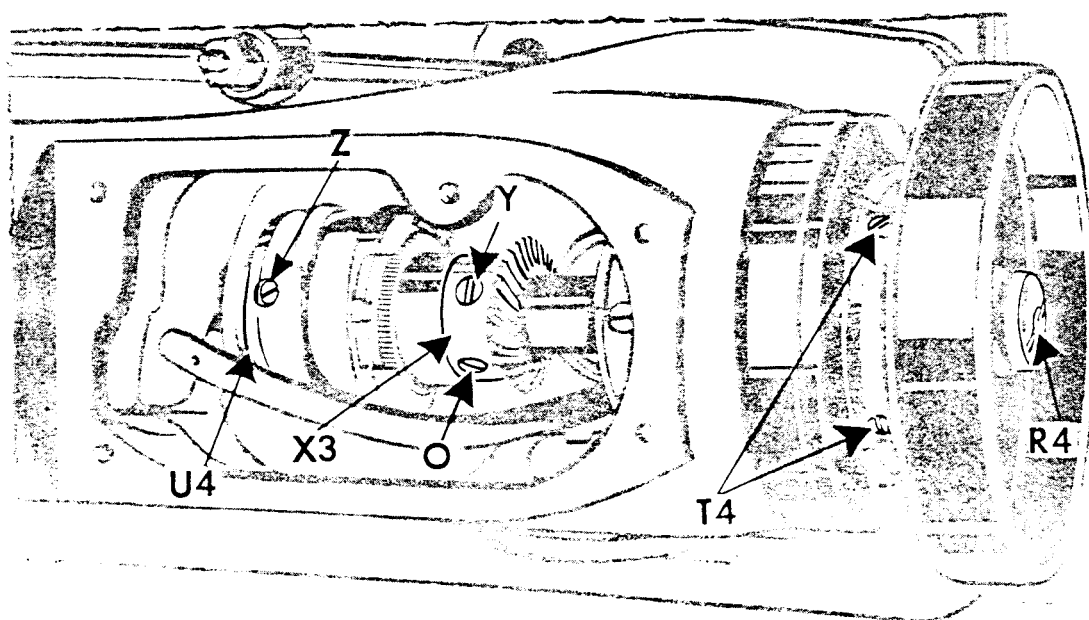


Fig. 67. Loosening the Feed Eccentric

REMOVAL—

(See Figs. 67 to 69)

1. Remove the face plate.
2. Remove the arm side shield and wick and the thread take-up oil guard, as instructed on **page 36**.
3. Remove the needle bar, upper needle bar bushing, presser foot and presser bar, as instructed on **page 33**.
4. Remove entire thread take-up lever assembly, as instructed on **page 34**.
5. Remove the oil-removing wick, as instructed on **pages 38 and 39**.
6. Set the machine at any stitch length **except the longest or the shortest** (see instructions on **page 16**) to prevent binding of the arm shaft during removal and replacement.
7. Loosen the four screws in the arm top cover and remove the arm top cover.
8. Remove the oil lead that is fastened to the casting just beneath the arm top cover.
9. Remove the feed timing screw **Y**, **Fig. 67** and loosen the set screw **O**, **Fig. 67**, in the feed-lifting-eccentric-and-bevel-gear, **X3**, **Fig. 67**.
10. Remove the timing screw **Z** and loosen set screws in the feed eccentric **U4**, **Fig. 67**.
11. Remove arm shaft screw **R4**, **Fig. 67** from machine pulley end of arm shaft.
12. Loosen the two set screws **T4**, **Fig. 67** and remove the machine pulley.
13. Turn the needle bar crank until it is in the position shown at **M4**, **Fig. 69**, to prevent crank from disturbing the three wick loops in holder **W4**, **Fig. 69** during removal of arm shaft.

THE ARM SHAFT (continued)

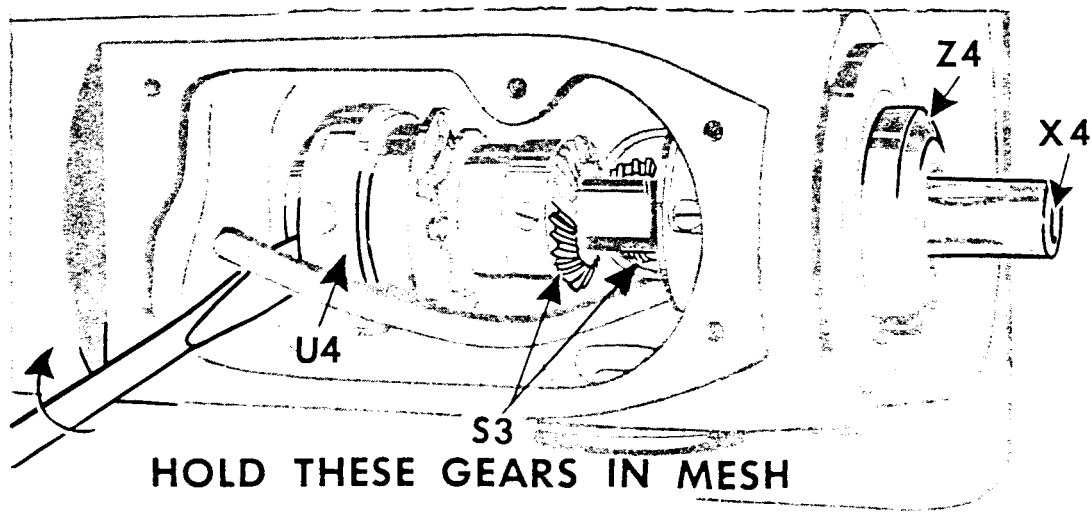


Fig. 68. Removing the Arm Shaft

REMOVAL (Continued)

CAUTION: The feed-timing-bevel-gears at S3, Fig. 68 have been lapped together at the factory and **should be kept in mesh** (as instructed in Fig. 68) throughout the removal and replacement of the arm shaft.

14. While maintaining needle bar crank M4 at position shown in Fig. 69, hold these gears in mesh by holding the blade of a large screwdriver between the arm casting and the feed eccentric U4, as shown in Fig. 68; then push the end of the arm shaft X4, Fig. 67 through the bushing Z4, Fig. 67.

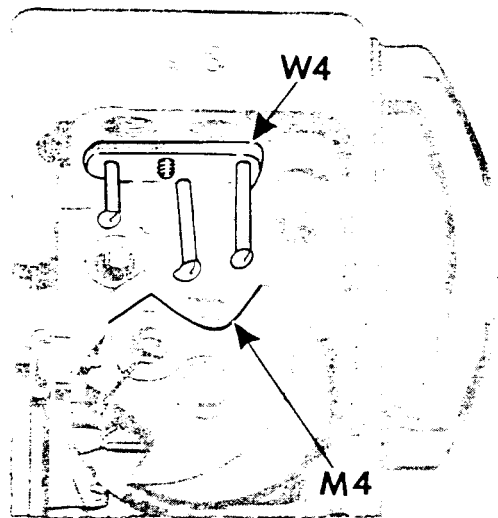


Fig. 69. Position of Needle Bar Crank, During Removal of Shaft

15. Using another shaft (or a drift pin of the same diameter as the arm shaft on these machines), push the arm shaft X4 further through the machine (still keeping the gears at S3 in mesh). This temporary shaft must be pushed sufficiently far into the machine to **hold the entire gear and feed eccentric mechanism in position** upon it until the new arm shaft is installed.

16. Finally grasp the needle-bar-crank-end of the arm shaft firmly at the face plate end and pull the arm shaft straight out of the machine.

THE ARM SHAFT (continued)

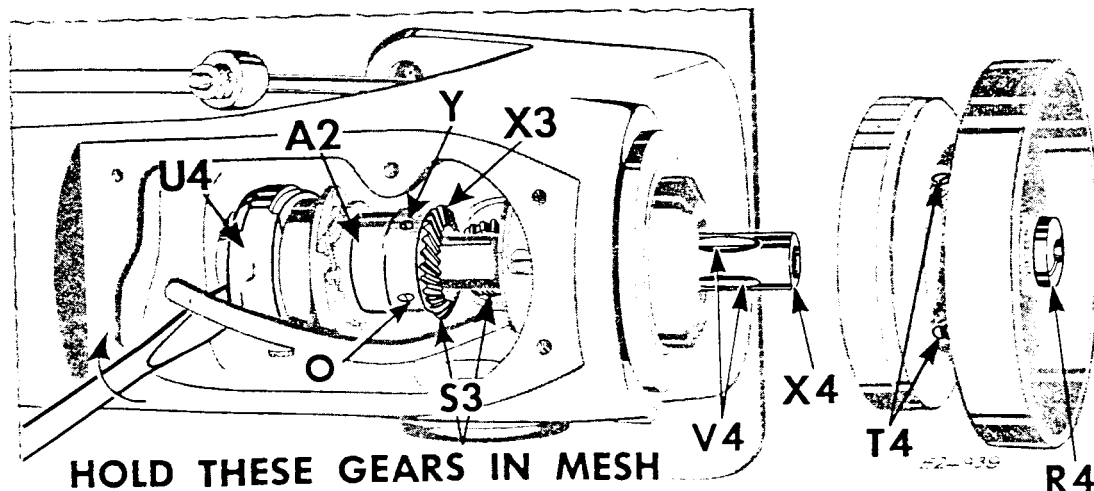


Fig. 70. Replacing the Arm Shaft

REPLACEMENT—

(See Fig. 70)

CAUTION: Make certain that the OIL-REMOVING WICK ASSEMBLY is out of the machine.

1. Insert the machine-pulley-end of the arm shaft into the arm shaft bushing at the head of the machine arm.
2. Make certain that the needle bar crank is turned to the position shown in Fig. 69, clearing the three wick loops in holder W4.
3. While still holding the bevel gears at S3 in mesh, with a screwdriver, as shown in Fig. 70, push the arm shaft X4 straight through the machine arm, the feed eccentric U4 and the feed-eccentric-and-bevel-gear X3, Fig. 70. (A light tapping with the palm of the hand, against the needle bar crank end, may be required.)
4. Replace machine pulley so that the two set screws T4 will locate over the two grooves V4 on the shaft and securely tighten set screws T4.
5. Replace and tighten the arm shaft screw R4 sufficiently to remove all end play of the shaft **without binding**. Test the arm shaft for freedom in rotation.
6. Move bevel gear X3 toward machine pulley and securely tighten feed timing screw Y.
7. Place the first finger of one hand on one side of the arm shaft and the first finger of the other hand on the other side of the arm shaft so that both fingers contact the bevel gear (on vertical shaft) that mates with the gear X3. Feel for slight backlash. If there is no backlash, loosen timing screw Y and set screw O. Lightly tap gear X3 away from mating gear until there is just a slight amount of backlash. Then securely tighten timing screw Y and the set screws in gear X3. Re-check the backlash.
8. Using a screwdriver, as shown in Fig. 70, move feed eccentric U4 as close as possible to the connecting rod A2, Fig. 70 and tighten the timing screw and two set screws in eccentric U4.
9. Check the adjustment and timing of parts disturbed and correct where necessary, according to the instructions on pages 18 through 25.
10. Replace the oil-removing wick assembly, as instructed on pages 39 and 41.
11. Replace thread take-up, as instructed on page 35.
12. Replace presser bar and presser foot, as instructed on page 33.
13. Replace the upper needle bar bushing and the needle bar, as instructed on page 33.
14. Replace thread take-up oil guard W2, Fig. 54, page 36.
15. Replace arms side shield and wick, as instructed on page 36.
16. Replace the oil lead beneath the arm top cover.
17. Replace the arm top cover and tighten its four screws.
18. Replace the face plate and tighten its four screws, as instructed on page 18.