

SINGER
402W100 & 402W101

USE ONLY **SINGER*** OILS and LUBRICANTS

They insure freedom from lubricating trouble and give longer life to sewing equipment

*The following are the correct lubricants for the
212w and 402w Machines:*

TYPE A — MANUFACTURING MACHINE OIL, LIGHT GRADE

When a stainless oil is desired, use:

TYPE C — MANUFACTURING MACHINE OIL, STAINLESS, LIGHT GRADE

OTHER **SINGER** LUBRICANTS

TYPE E — THREAD LUBRICANT

For lubricating the needle thread of sewing machines for stitching fabrics or leather where a thread lubricant is required.

TYPE F — MOTOR OIL

For oil lubricated motors and plain bearings in power tables and transmitters.

NOTE: All of the above oils are available in 1 quart, 1 gallon and 5 gallon cans or in 55 gallon drums.

BALL BEARING LUBRICANT

This pure grease is specially designed for the lubrication of ball bearings and ball thrust bearings of motors and electric transmitters, ball bearing hangers of power tables, etc. Furnished in 1 lb. and 4 lb. tins.

3034w

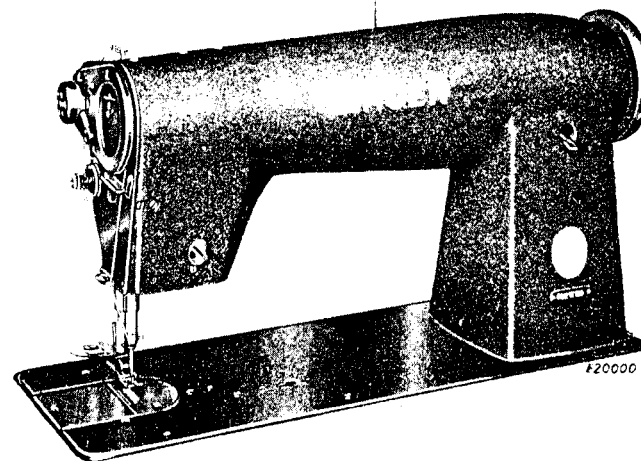
INSTRUCTIONS

FOR USING AND ADJUSTING

SINGER*

SEWING MACHINES

402w100 and 402w101



SINGLE NEEDLE

LOCK STITCH

COMPOUND FEED

*A TRADE MARK OF

THE SINGER MANUFACTURING COMPANY

TO ALL WHOM IT MAY CONCERN:

The improper placing or renewal of the Trade Mark "SINGER" or any other of the Trade Marks of The Singer Manufacturing Company (all of which are duly Registered Trade Marks) on any machine that has been repaired, rebuilt, reconditioned, or altered in any way whatsoever outside a SINGER factory or an authorized SINGER agency is forbidden.

THE IMPORTANCE OF USING
SINGER* PARTS AND NEEDLES
IN SINGER MACHINES

The successful operation of SINGER machines can only be assured if SINGER parts and needles are used. Supplies are available at all SINGER Shops for the Manufacturing Trade, and mail orders will receive prompt attention.

SINGER Needles should be used
in SINGER Machines
These Needles and their Containers
are marked with the
Company's Trade Mark "SIMANCO.*" 1

Needles in Containers marked
"FOR SINGER MACHINES"
are NOT SINGER made needles. 2

Copyright, U. S. A.
1914, 1915, 1922, 1926, 1935, 1940, 1941, 1944, 1946, 1947, 1948, 1950 and 1951
by The Singer Manufacturing Company
All Rights Reserved for All Countries

3

DESCRIPTION

Machine 402W100 is a long arm, high speed, single needle, lock stitch machine equipped with a double rotary thread take-up. It is designed for stitching work shirts, overalls, raincoats and clothing generally.

It has a compound feeding mechanism consisting of a needle feed and a drop feed which are simultaneously adjustable for stitches from 4 to 30 per inch.

It has a belt driven, automatically lubricated rotary sewing hook on a horizontal axis.

The needle bar stroke is $1\frac{7}{16}$ inches and the maximum presser bar lift is $\frac{3}{8}$ inch.

Machine 402W101 for stitching shirts, collars and cuffs and light and medium clothing. Maximum stitch 6 to the inch, needle bar stroke $1\frac{13}{64}$ inches. Maximum presser bar lift $\frac{1}{4}$ inch, otherwise same as Machine 402W100.

SPEED

The speed recommended for these machines is 4500 R.P.M., depending on the material being stitched and the length of stitch. It is advisable to run a new machine slower than the maximum speed for the first few minutes to allow time for the oil to reach the moving parts. The balance wheel turns over from the operator.

SETTING UP

The drip pan should be attached with its right end even with the right end of the cut-out and low enough in the cut-out to avoid interference with the knee lifter rod A, Fig. 2.

Fig. 2 shows the correct location of the knee lifter. The knee lifter bracket should be assembled so that the lifter rod A does not strike the drip pan. The screw slots in the bracket provide the necessary adjustment. The stop stud B, Fig. 2 should be set to stop the action of the knee lifter as soon as the presser foot is raised enough to trip the hand lifter.

CAUTION: Do not start a machine, not even to test the speed, until it has been thoroughly oiled as instructed on page 4.

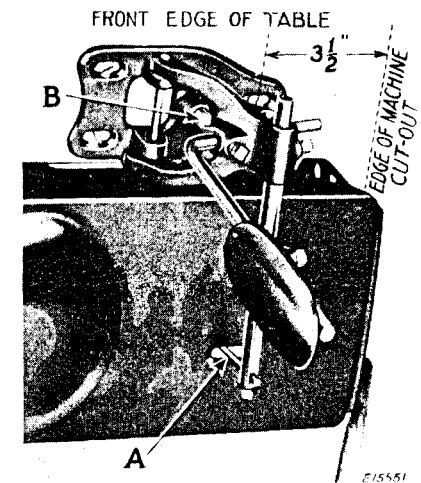


Fig. 2. Position of Knee Lifter Under Table

OILING THE MACHINE

Use "TYPE A" or "TYPE C" OIL, sold only by Singer Sewing Machine Company for 241, 400w and 410w Machines. See inside front cover for description of these oils.

A reservoir in the bed of the machine supplies oil to the sewing hook race and to the bearings and eccentrics on the hook driving shaft (except the rear ball bearing). The other lubrication points are reached by eight oil holes, marked with red. See "X-Ray" view of machine on pages 18 and 19.

BEFORE STARTING THE MACHINE, fill the oil reservoir (through the oil gauge hole) to the top mark on the oil gauge **E**, Fig. 3.

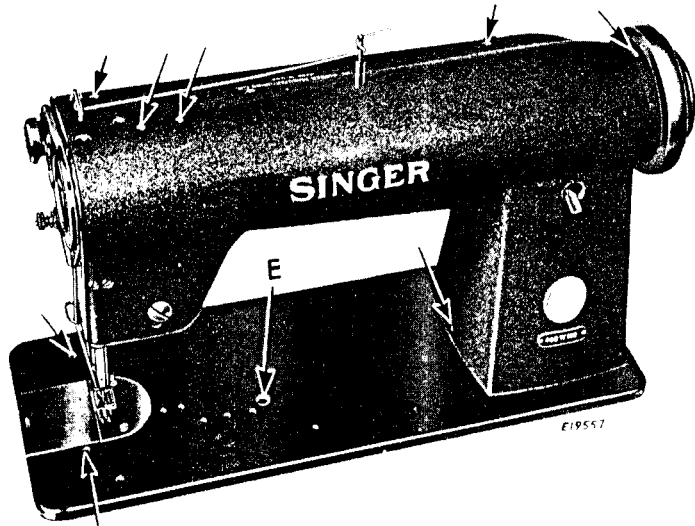


Fig. 3. Showing the Nine Oiling Points on the Machine

While it may not be necessary to add oil to the reservoir every day, the oil level must be checked DAILY and filled to the high mark. Never allow the oil level to drop below the lower mark on the oil gauge.

AT THE BEGINNING OF EACH WORKING DAY, turn the balance wheel until the needle is ALL THE WAY UP, and place A FEW DROPS of oil in each of the eight oil holes indicated by the arrows in Fig. 3.

NEEDLES

Needles for Machine 402w100 are of Class and Variety 135x25, which are made in sizes 11, 12, 13, 14, 16, 18, 19, 20 and 21.

Needles for Machine 402w101 are of Class and Variety 135x1, which are made in sizes 11, 12, 13, 14, 15, 16, 17, 18, 19, 20 and 21.

The above needles regularly have nickel finish but can be supplied with chromium finish if ordered.

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.

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, 135x25 Needles"

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

THREAD

Left twist thread should be used in the needle. Either right or left twist thread can be used in the bobbin.

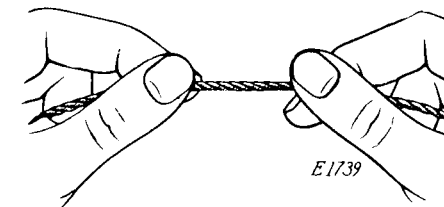


Fig. 4. How to Determine the Twist

Hold the thread as shown above. Turn the thread over toward you between the thumb and forefinger of the right hand; if left twist the strands will wind tighter; if right twist, the strands will unwind.

TO REMOVE THE BOBBIN

Turn the balance wheel over from you until the needle moves up to its highest position. Draw back the slide in the bed of the machine. Reach

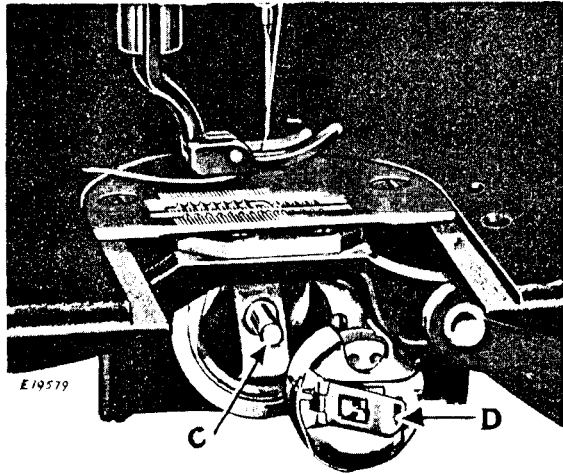


Fig. 5. Removing the Bobbin

under the table and open the bobbin case latch **D**, Fig. 5 and, by means of this latch, remove the bobbin case from the sewing hook.

While the latch remains open, the bobbin will be retained in the bobbin case. Release the latch, turn the open end of the bobbin case downward and the bobbin will drop out.

TO WIND THE BOBBIN

(See Fig. 6)

Fasten the bobbin winder to the table with its driving pulley in front of the machine belt, so that the pulley will drop away from the belt when sufficient thread has been wound upon the bobbin.

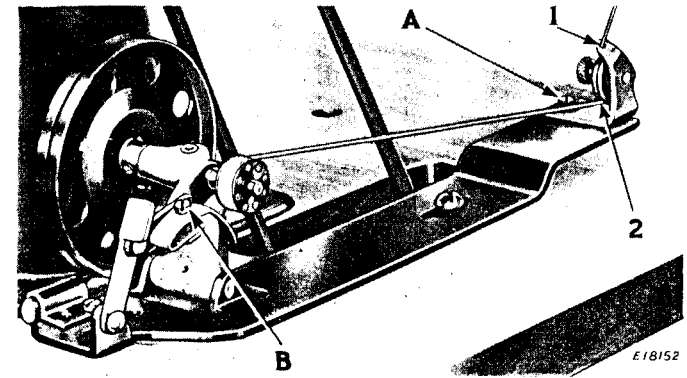


Fig. 6. Winding the Bobbin

Place the bobbin on the bobbin winder spindle and push it on as far as it will go.

Pass the thread down through the thread guide **1** in the tension bracket, around the back of, and between, the tension discs **2**. Then wind the end of the thread around the bobbin a few times in the direction shown in Fig. 6, push the bobbin winder pulley over against the machine belt and start the machine.

When sufficient thread has been wound upon the bobbin, the bobbin winder will stop automatically.

If the thread does not wind evenly on the bobbin, loosen the screw **A** in the tension bracket and move the bracket to the right or left as may be required, then tighten the screw.

The amount of thread wound on the bobbin is regulated by the screw **B**. To wind more thread on the bobbin, turn the screw **B** inwardly. To wind less thread on the bobbin, turn this screw outwardly.

Bobbins can be wound while the machine is stitching.

When winding a bobbin with fine thread, a light tension should be used.

TO THREAD THE BOBBIN CASE

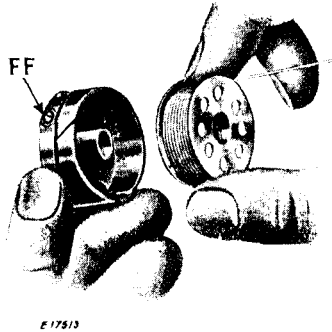


Fig. 7

With the left hand hold the bobbin case as shown in Fig. 7, the slot in the edge being near the top, and place the bobbin into it.

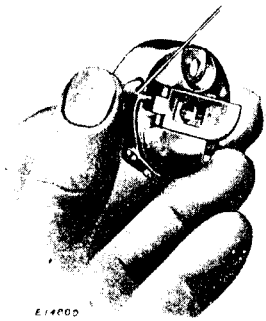


Fig. 9

Then pull the thread into the slot in the edge of the bobbin case as shown in Fig. 8; draw the thread under the tension spring and into the delivery eye at the end of the tension spring. See Fig. 9.

Hold the bobbin between the thumb and forefinger of the right hand, as shown in Fig. 7, the thread drawing on the top from the left toward the right.

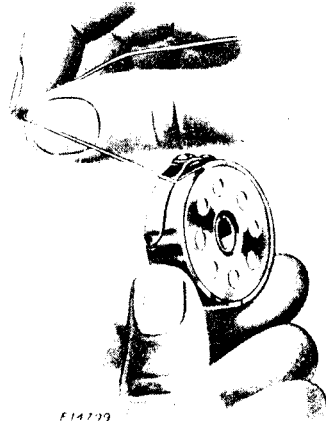


Fig. 8

TO REPLACE THE BOBBIN CASE

After threading, take the bobbin case by the latch and place the bobbin case on the center stud C, Fig. 5 of the bobbin case holder; release

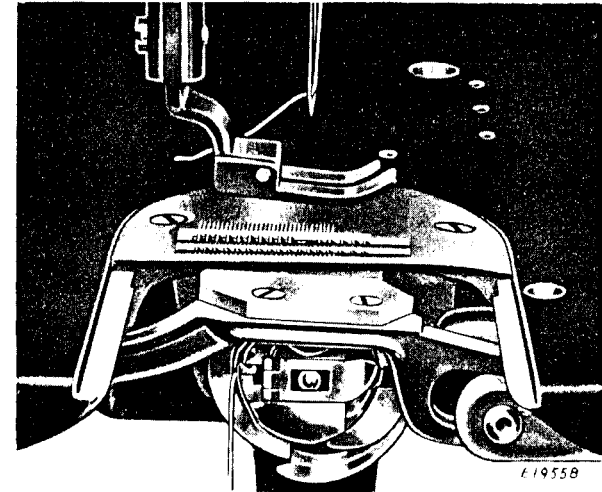


Fig. 10. Bobbin Case Threaded and Replaced

the latch and press the bobbin case back until the latch catches the groove near the end of the stud. See Fig. 10. Allow about two inches of thread to hang free, and replace the slide in the bed of the machine.

TO SET THE NEEDLE

Turn the balance wheel over from you until the needle bar moves up to its highest point; loosen the screw at the lower end of the needle bar and put the needle up into the bar or clamp as far as it will go, with the long groove of the needle toward the left and the eye of the needle directly in line with the arm of the machine, then tighten the screw.

UPPER THREADING

(See Fig. 11)

As soon as an operator has become accustomed to threading this machine, the thread can be passed from the thread retainer at the top, down to the needle with a single continuous motion.

Turn the balance wheel over from you until the two pins P in the rotary take-up are directly toward the front, as shown in Fig. 11 inset.

Pass the thread from the unwinder through the top hole 1 in the pin on top of the machine, then around and through the lower hole 2 in the pin, thence through the three holes 3, 4 and 5† in the thread retainer. Hold the thread with the right hand near the thread retainer while passing the thread, with the left hand, downward into the inner slot 6

(guiding it into the hole 7) and on down in front of the tension discs 8, around between the tension discs into the take-up spring 9 and under the thread pull-off 10 then over through the slot 11, allowing the thread to fall in place over the take-up discs. Now release the thread with the right hand, and pass it down through the guides (12, 13 and 14), then from left to right through the eye of the needle 15. Leave about three inches of thread with which to commence sewing.

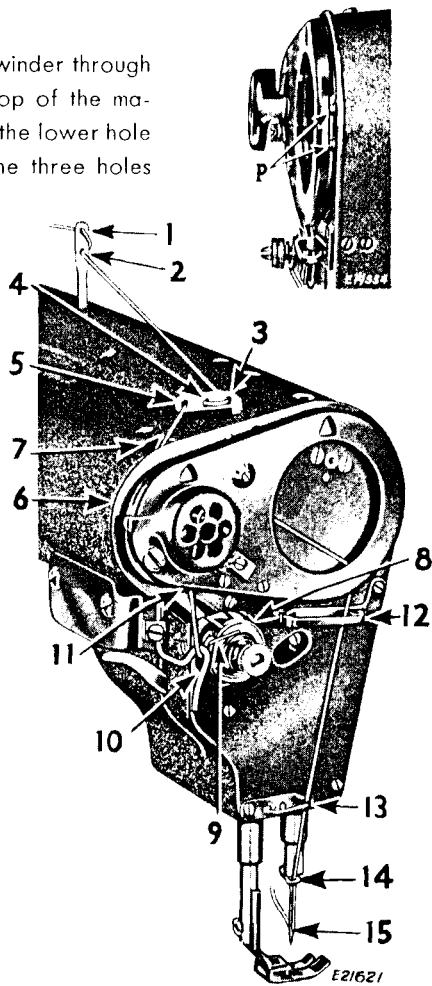


Fig. 11. Threading the Needle

†NOTE. The thread retainer 5 should be turned so that the thread leads through the center of hole 7.

TO PREPARE FOR SEWING

With the left hand hold the end of the needle thread, leaving it slack from the hand to the needle, turn the balance wheel over from you until

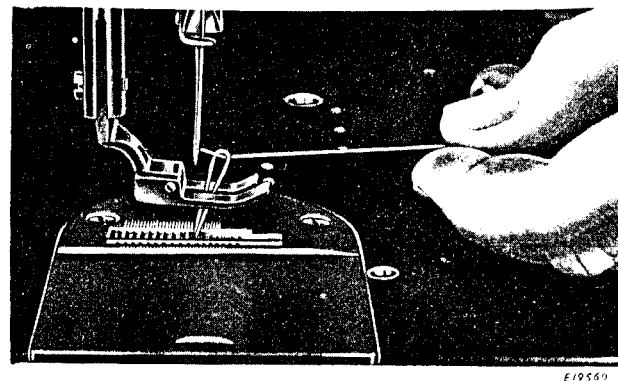


Fig. 12. Drawing up the Bobbin Thread

the needle moves down and up again to its highest point, thus catching the bobbin thread; draw up the needle thread and the bobbin thread will come up with it through the hole in the feed dog. See Fig. 12. Lay both threads back under the presser foot.

TO COMMENCE SEWING

Place the material beneath the presser foot, lower the presser and commence to sew, turning the balance wheel over from you.

TO REMOVE THE WORK

Stop the machine when the needle bar has just started to descend or with the two pins P, Fig. 11 in the rotary take-up directly toward the front. In this position the take-up will not unthread the needle when the machine is started. Raise the presser foot, draw the work back and cut the threads close to the work.

With the feed dog and presser foot down, there should be a slight free motion in the hand lifter lever so that the presser foot will rest on the work during operation of the machine.

INSTRUCTIONS FOR USE OF THREAD SEVERING DEVICE

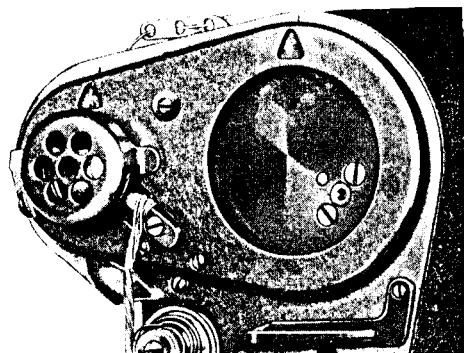


Fig. 13

Operator grasps loops of thread and severs them across sharpened edge of Thread Severing Finger, as shown in Fig. 14.

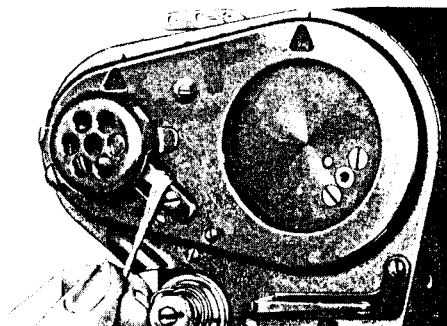


Fig. 14

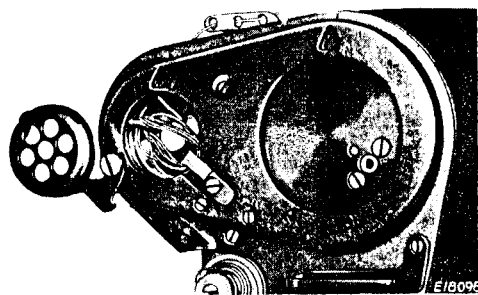


Fig. 15

At low speed, loops of thread may remain over the tapered pin of the small take-up disc. When this occurs, the operator opens the guard, as shown in Fig. 15, removes the loop from the tapered pin and severs them as described above. Usually the machine will clear itself when it is again started.

TENSIONS

For ordinary stitching, the needle and bobbin threads should be locked in the center of the thickness of the material, thus:



Fig. 16. Perfect Stitch

If the tension on the needle thread is too tight, or if that on the bobbin thread is too loose, the needle thread will lie straight along the upper surface of the material, thus:

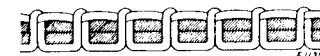


Fig. 17. Tight Needle Thread Tension

If the tension on the bobbin thread is too tight, or if that on the needle thread is too loose, the bobbin thread will lie straight along the under side of the material, thus:



Fig. 18. Loose Needle Thread Tension

TO REGULATE THE TENSIONS

THE TENSION ON THE NEEDLE THREAD SHOULD BE REGULATED ONLY WHEN THE PRESSER FOOT IS DOWN. Having lowered the presser foot, turn the small thumb nut at the front of the tension discs over to the right to increase the tension. To decrease the tension, turn this thumb nut over to the left.

The tension on the bobbin thread is regulated by the large screw FF, Fig. 7 in the tension spring on the outside of the bobbin case. To increase the tension, turn this screw over to the right. To decrease the tension, turn this screw over to the left.

When the tension on the bobbin thread has been once properly adjusted, it is seldom necessary to change it, as a correct stitch can usually be obtained by varying the tension on the needle thread.

TO REGULATE THE PRESSURE ON THE MATERIAL

The pressure of the presser foot on the material is regulated by the screw **F**, **Fig. 19** in the top of the arm. Turn this screw to the right to increase the pressure or to the left to decrease the pressure.

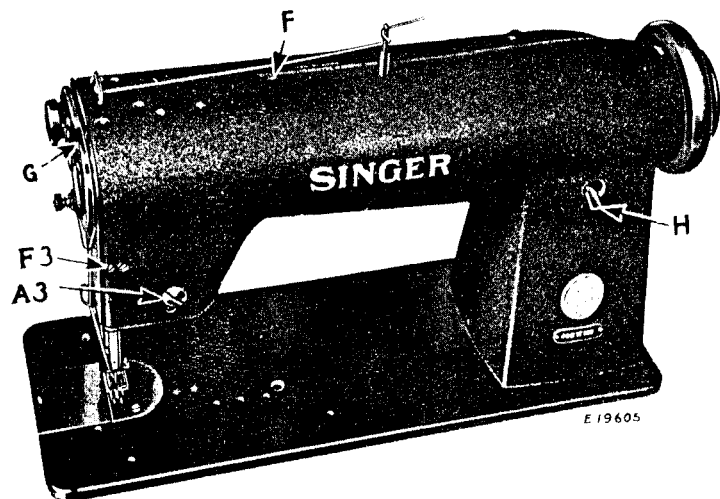


Fig. 19. Stitch Regulator and Indicator

TO REGULATE THE LENGTH OF STITCH

To change the length of stitch, raise the stitch regulating lever **H**, **Fig. 19**, and at the same time turn the balance wheel slowly until the pawls enter the notches in the stitch eccentrics. (If the pawls do not enter the notches when the stitch regulating lever is raised to its highest position, it may be necessary to turn the balance wheel slightly forward and backward to assist the pawls in finding the notches in their respective eccentrics.) Still holding the stitch regulating lever in a raised position, continue to turn the balance wheel a part of a revolution until the number of the length of stitch desired appears in the hole **G**, **Fig. 19**, over the large take-up disc, then release the stitch regulating lever **H**. **The needle feed and drop feed are thus simultaneously adjusted to produce the same length of stitch.**

DO NOT TOUCH THE LEVER "H" WHILE THE MACHINE IS RUNNING.

HINTS FOR PERFECT OPERATION

Follow instructions and oil machine regularly.

The balance wheel must always turn away from the operator.

Do not run machine with bobbin case only partly inserted.

Do not run the machine with the presser foot resting on the feed without cloth 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 help the machine by pulling the fabric lest you bend the needle. The machine feeds the work without assistance.

The slide over the bobbin case should be kept closed when the machine is in operation.

Do not press on the knee lifter lever while the machine is in operation, as this might prevent the work from feeding properly.

Occasionally remove the accumulation of lint from around the hook and from between the feed rows beneath the throat plate. Excessive lint around the sewing hook will cause thread breakage and lint accumulating between the feed rows beneath the throat plate will ultimately prevent proper feeding of the material.

Thread breakage can be caused by the following:

A damaged needle.

The needle may be bent, have a damaged point, thread groove or eye may be sharp or needle may be worn to such an extent that it should be replaced.

Sewing hook may have sharp point or there may be nicks or roughness on the hook point and thread guard as a result of accidental breaking of needles. A sharp hook point and nicks should be polished smooth.

The bobbin case holder should ride freely and smoothly within the rotating hook. A rough bobbin case holder bearing rib should be polished to overcome this difficulty and the flow of oil to the hook should be adjusted to give sufficient oil to prevent recurrence of this condition.

NEVER TOUCH THE STITCH REGULATOR LEVER **H, **FIG. 19**, WHEN THE MACHINE IS RUNNING.**

INSTRUCTIONS FOR ADJUSTERS AND MACHINISTS

TIMING THE MACHINE

The parts are in their proper timing on the various shafts when the locating screws are in the shaft splines provided for them. These locating screws are the first screws appearing when the shafts are revolved in their normal direction of rotation.

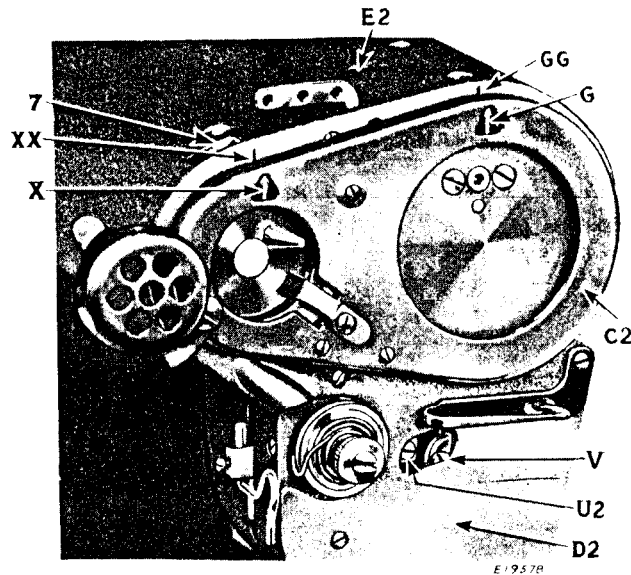


Fig. 21. Showing Timing Marks on Take-Up Discs and Face Plate

The arm shaft and the auxiliary take-up shaft with their component parts are in time with each other when the arrow **G**, Fig. 21, on the large take-up disc is in line with the mark **GG**, Fig. 21, on the face plate and the arrow **X**, Fig. 21, on the small take-up disc is in line with the mark **XX**, Fig. 21, on the face plate.

To time the arm shaft and the hook driving shaft and their component parts with each other, proceed as follows:

1. Remove the needle.
2. Loosen the screw in the feed regulating crank **W1**, Fig. 22. Then press the crank **W1** against the feed driving eccentric **U1**, Fig. 22, and turn the balance wheel until the pawl drops into the notch in the feed driving eccentric **U1**. Continue to turn the balance wheel in the reverse direction of its normal rotation as far as possible. When this is done, there should be no feed movement of the feed dog.

3. Loosen the two screws **X1**, Fig. 37, in the pulley **Y1**, Fig. 37.

4. Raise the stitch regulating lever **H**, Fig. 19, and at the same time turn the balance wheel slowly until the pawl drops into the notch in the needle bar rock frame driving eccentric **B3**, Fig. 39. Continue to hold the stitch regulating lever **H** in a raised position and at the same time turn the balance wheel in the reverse direction of its normal rotation as far as possible. When this is done, there should be no feed movement of the needle bar.

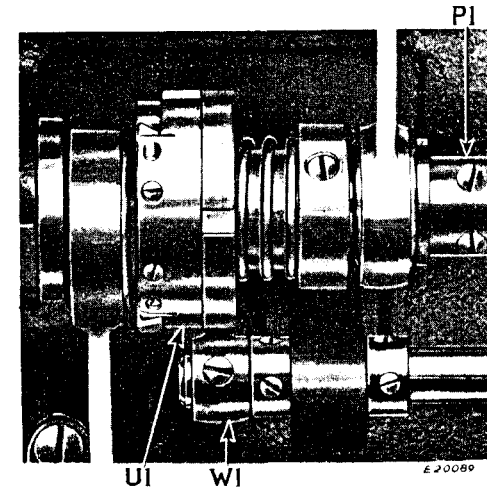
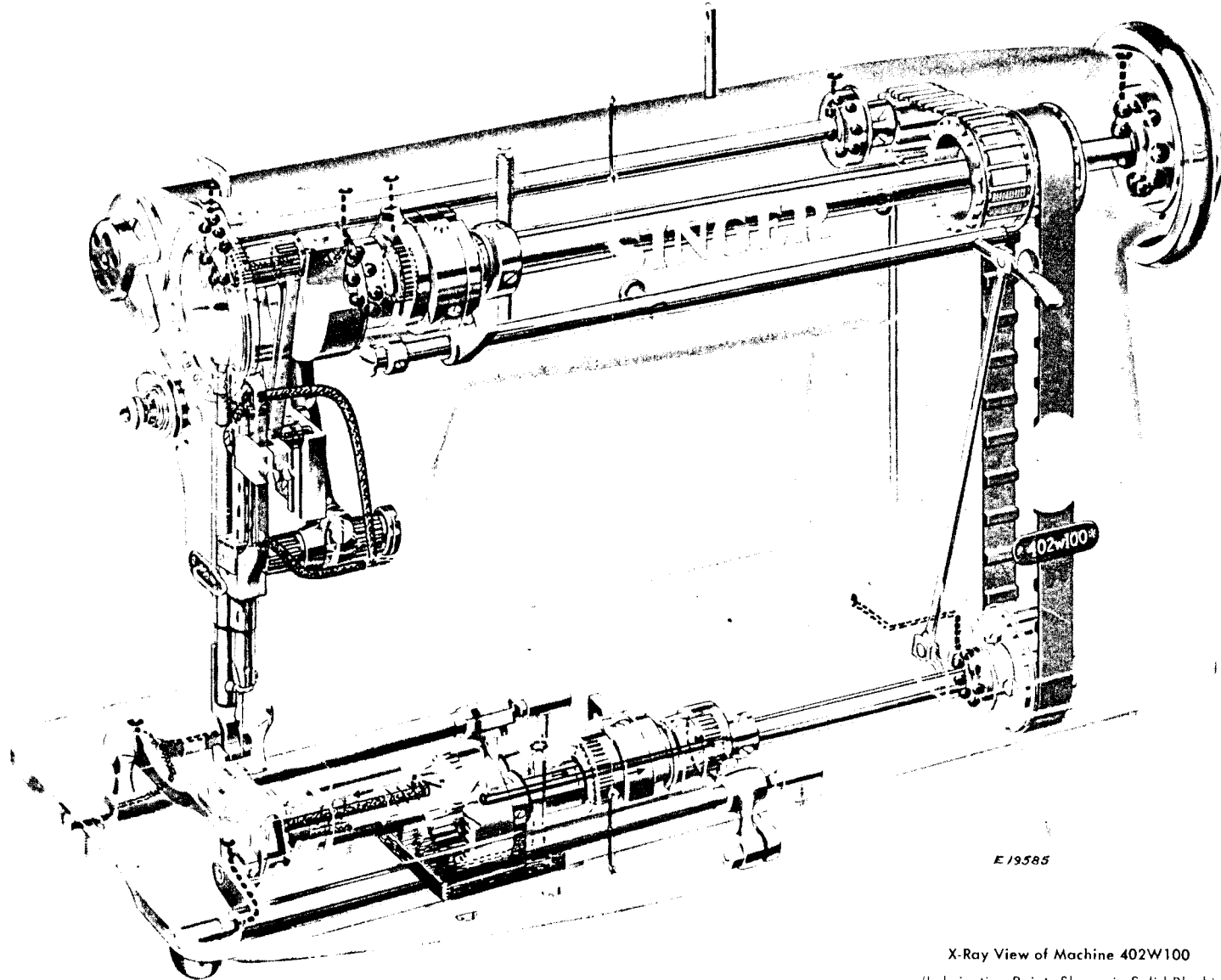


Fig. 22. Feed Driving Eccentric (U1)
and Feed Regulating Crank (W1)

5. While the stitch regulating lever **H**, Fig. 19, is still raised, insert a screwdriver in the hole beneath the lever to hold the lever in its highest position. Then press the feed regulating crank **W1**, Fig. 22, against the feed driving eccentric **U1**, Fig. 22, and turn **only** the hook driving shaft at **P1**, Fig. 22, until the pawl on the crank **W1** drops into the notch in the feed driving eccentric **U1**. While holding the pawl in the notch, press the pulley **Y1**, Fig. 37, against the ball bearing and tighten the two screws **X1**, in the pulley. The arm shaft and hook driving shaft are now correctly timed with each other.

NOTE: If the arm shaft connection belt was disengaged from the lower belt pulley, it should be re-engaged in any convenient position previous to attempting to time the arm shaft and hook driving shaft. After step 4, as outlined above, has been completed, it may be necessary to reposition the connection belt on the lower belt pulley so that the screws are accessible when the stitch regulating lever **H**, Fig. 19 can cause the pawl to engage the needle bar rock frame driving eccentric **B3**, Fig. 39. Then proceed as in Item 5.



E 19585

X-Ray View of Machine 402W100
(Lubrication Points Shown in Solid Black)

TO ADJUST THE THREAD TAKE-UP SPRING AND PULL-OFF

The horizontal part of the thread pull-off L, Fig. 23, should be set about 1/4 inch below the bottom of the holder JJ, Fig. 23. The pull-off can be raised or lowered after loosening the set screw J.

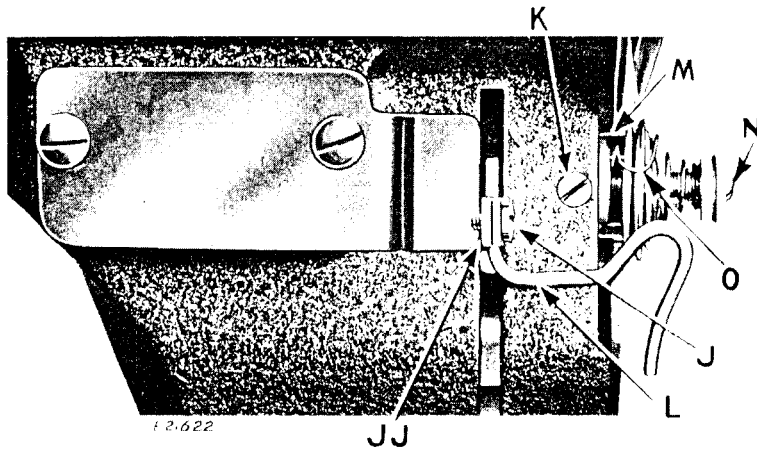


Fig. 23. Take-Up Spring Adjustments

The take-up spring should usually have just enough movement so that it will be through acting and will rest against the upper end of spring regulator M when the eye of the needle is about 1/16 inch above the goods on the downward stroke of the needle. After loosening the set screw K, the tension will turn with the stud N and the spring regulator may be turned to the required position.

The tension on the thread take-up spring O is regulated by turning the tension stud N to the right to increase the tension, or to the left to decrease the tension when screw K has been tightened.

The tension on the thread take-up spring should have sufficient tension to ensure its action at high speed. However, the tension should be light enough so that the spring will move all the way down before any thread is pulled through the tension discs, heavier thread requiring more tension to insure good thread control.

The above instructions apply to average operation. Adjustments in both setting and tension may have to be made to suit special conditions.

PRESSER BAR ADJUSTMENTS

To remove side-play of the presser foot, loosen the two screws G3, Fig. 24 and bring the guide block against the presser bar position guide JJ, Fig. 23 and firmly tighten the screws G3.

The presser bar bushing T, Fig. 24, should be set so that its bottom end projects about 7/8 inch below the bottom of the arm S, Fig. 24.

The presser bar position guide U should be set about 5/32 inch above the top of the bushing when the presser foot is down on the throat plate.

To align the presser foot with the needle, have the presser foot down on the throat plate, hold the presser bar position guide at JJ, Fig. 23, from slipping either up or down, loosen screw U2, Fig. 24, move the presser foot to the desired position and retighten the screw.

With the feed dog and presser foot down, there should be a slight free motion in the hand lifter level so that the presser foot will rest on the work during operation of the machine.

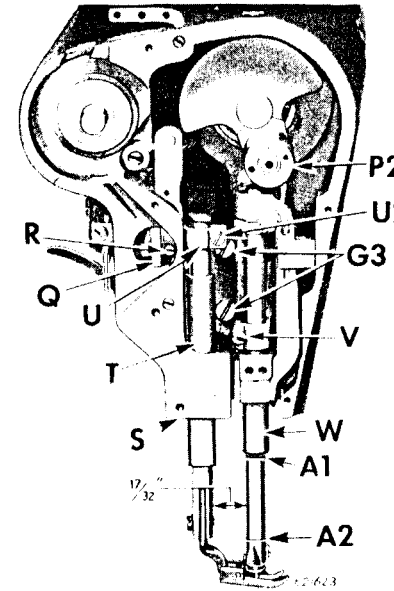


Fig. 24. Face Plate Removed

ADJUSTMENT OF THE TENSION RELEASER

The tension releaser Q, Fig. 24 automatically releases the spring pressure on the tension discs when the presser bar is raised. The releaser may be moved up or down to release the tension earlier or later, by loosening the screw R, Fig. 24. When stitching on heavy material, the releaser should be set lower than when on light work to prevent stitching with a released tension while sewing heavy material.

TO SET THE NEEDLE BAR AT THE CORRECT HEIGHT

See that the needle is pushed up into the needle bar as far as it will go.

When the needle bar is at its highest position, the lower timing mark **A2** should be just visible at the lower end of the needle bar bushing **W**, Fig. 25. If the needle bar is not correctly set, loosen the screw **V**, Fig. 25, in the needle bar connecting stud and move the needle bar to the correct position, then securely tighten the screw **V**.

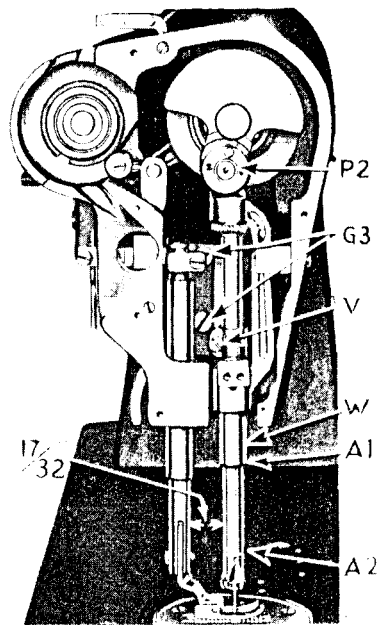


Fig. 25. Setting Needle Bar

TO SET A NEEDLE BAR WHICH HAS NO TIMING MARKS

Set the needle bar when at the **bottom** of its stroke so that the eye of the needle is above the needle guard of the bobbin case holder just enough to allow freedom for the thread, as shown in Fig. 28.

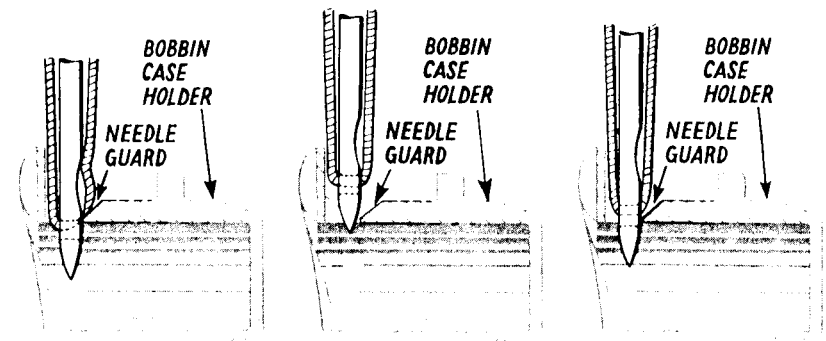


Fig. 26
Needle Too Low
When At Bottom
of Stroke

Fig. 27
Needle Too High
When At Bottom
of Stroke

Fig. 28
Correct Height
of Needle
When At Bottom
of Stroke

Turn the balance wheel in the normal direction of rotation to cause the needle to rise .100" (1/10 of inch) from its lowest position. In this position, the hook timing mark ϕ on the large take-up will be in line with the mark **GG**, Fig. 21 on the face plate. Then set the hook so that its point is at the center of the needle and positioned as described on page 24.

TIMING THE SEWING HOOK

First see that the needle bar is correctly set as instructed above. Remove presser foot, slide plate, throat plate, bobbin case, feed dog and bobbin case holder position finger. Rotate the bobbin case holder about one-half turn so that it is clear of the needle.

To determine whether the hook is correctly timed, place a new needle in the machine, then turn the top of the balance wheel over from you until the needle bar has started to rise from its lowest position and the upper timing mark **A1**, Fig. 25, is just visible at the lower end of the needle bar bushing **W**, Fig. 25. In this position, the hook timing mark ϕ on the large take-up will be in line with the mark **GG**, Fig. 21 on the face plate.

With the needle bar in this position, the point of the sewing hook should be at the center of the needle as shown at C1, Fig. 29 and in the inset.

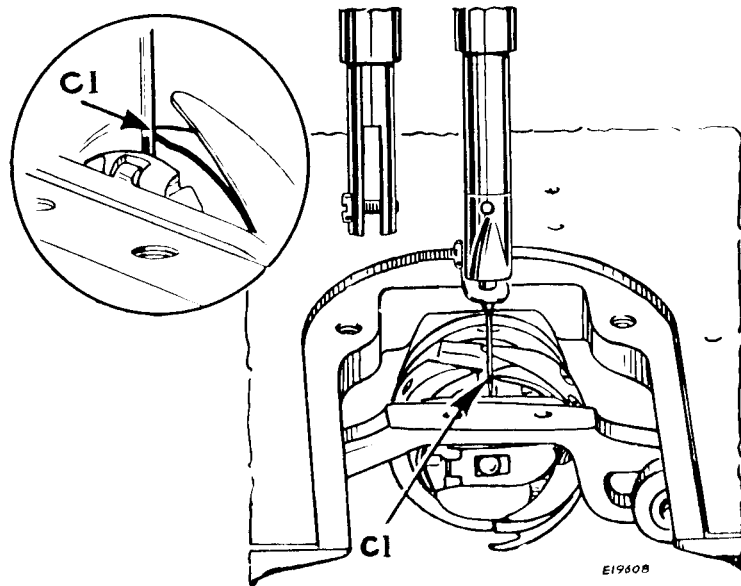


Fig. 29. Timing Sewing Hook

If the hook time is incorrect, loosen the two screws H1, Fig. 34 in the hub of the hook and turn the hook on its shaft to bring into correct timing.

The point of the hook should pass the needle as closely as possible without actually touching it. This is equal to about the thickness of a piece of ordinary note paper. The hook should be placed on the shaft as far as it will go. If it is necessary to move the hook sidewise, loosen the set screw J1, Fig. 34 and move the bushing K1, Fig. 34, with the hook assembly as required, tapping it to the right or prying it to the left with a screwdriver against the bed casting.

TO DETERMINE CORRECT RELATIONSHIP OF NEEDLE GUARD TO NEEDLE

The function of the needle guard Fig. 30 of the bobbin case holder is to prevent the hook point from coming into contact with the needle at

loop-taking time in case the needle is deflected sidewise toward the hook point. However, it will, at this time, cause little or no deflection of the needle, as shown in Fig. 30.

When the needle guard is correctly related to the needle, it will deflect the needle slightly to the left as the needle approaches its lowest position.

It will sometimes be necessary to string the needle guard as shown in Fig. 32, to provide additional clearance for the needle. Before doing this, the machine should be properly adjusted as previously described. Check the settings in the following order:

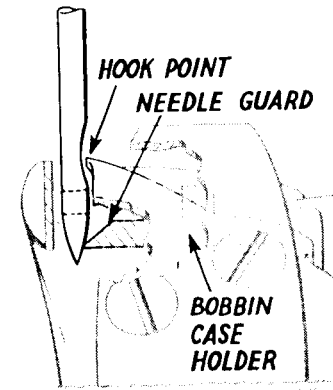


Fig. 30. Showing Correct Relationship of Needle Guard and Sewing Hook Point to Needle at Loop-Taking Time

1. See that needle bar is set at correct height. See page 22.

2. Make sure that sewing hook is accurately timed. See page 23.

3. See that clearance between sewing hook point and needle is correct.

4. Rotate bobbin case holder to its normal position and replace position finger.

5. Check position of bobbin case position finger Fig. 31. The clearance between position finger and bobbin case holder should be just sufficient to allow thickness of thread to pass through easily. Normal setting is for approximately .020 inch clearance, as shown in Fig. 31. The finger should also be level with top of bobbin case holder.

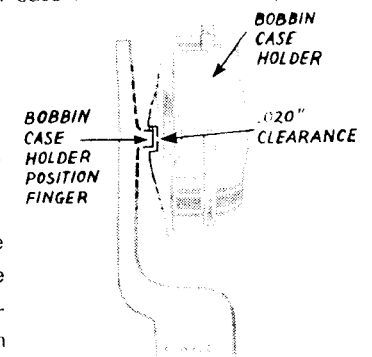


Fig. 31. Showing Thread Clearance Between Bobbin Case Position Finger and Bobbin Case Holder

When it is necessary to provide more clearance for needle, remove bobbin case holder from hook and remove a slight amount of metal from needle guard, by using a 3/16 inch strip of very fine emery cloth (about # 320), holding one end of the emery

cloth in a vise and rubbing the edge of the needle guard along the strip, as shown in Fig. 32. Extreme care must be taken not to remove too much metal as this will allow the hook point to rub the needle, causing wear or

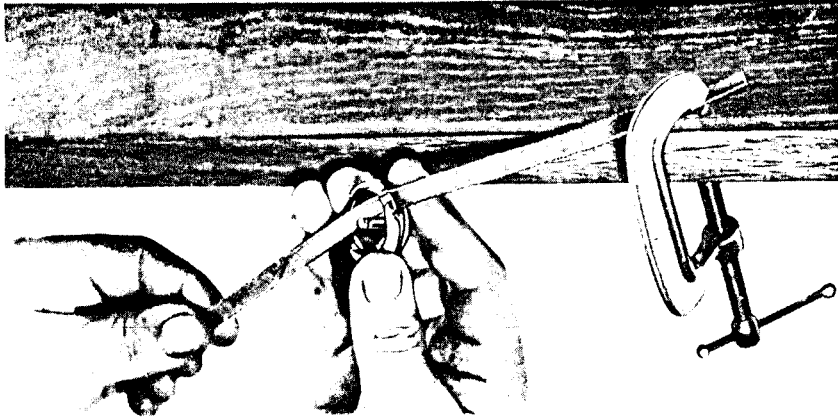


Fig. 32. Stringing Needle Guard of Bobbin Case Holder

damage and thus necessitate replacing the hook and the bobbin case holder. Removing too much metal from the guard can expose the bobbin, permitting the needle to strike it, as shown in Fig. 33, and become damaged or broken and to also damage the bobbin. Be sure to clean bobbin case holder thoroughly before replacing it.

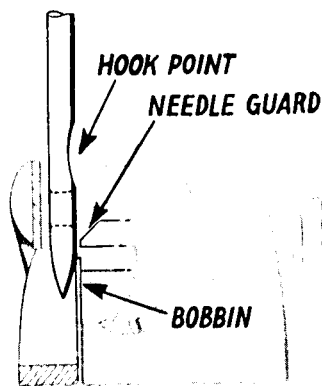


Fig. 33. Showing Needle Striking Bobbin Due to Removal of Too Much Metal From Needle Guard

TO REMOVE AND REPLACE THE SEWING HOOK

Remove the needle, slide plate and bobbin case. Take out the screw F1, Fig. 34, and remove the bobbin case holder position bracket G1. Loosen the two set screws at H1 in the hub of the hook, then turn the balance wheel over from you until the feed bar AA, Fig. 35, is raised to its highest point. Turn the sewing hook until the thread guard DD is at the bottom, as shown in Fig. 35, and turn the bobbin case holder BB until it is in the position shown in Fig. 35. The sewing hook can then be removed from the hook shaft.

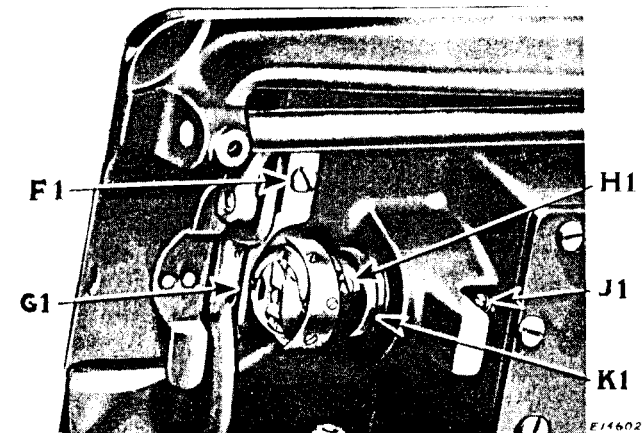


Fig. 34. Removing Hook

When placing a new sewing hook on the shaft, have the thread guard DD of the hook at the bottom and the bobbin case holder BB turned to the position shown in Fig. 35, so that the hook will clear the feed bar AA.

When the hook is in position on the shaft, time as instructed on pages 22 and 23. Then turn the bobbin case holder BB until the notch CC is at the top, then replace the bobbin case holder position bracket, being careful to see that the position stud G1, Fig. 34, enters the notch at the top of the bobbin case holder, as shown in Fig. 34, then securely fasten the position bracket by means of the screw F1.

CAUTION: The hook and bobbin case complete for machines of the 402W Class differs from that used in the 400W Class Machines. Therefore, these 400W machine parts must not be used in the 402W Machines.

TO REMOVE THE SEWING HOOK SHAFT

Remove the sewing hook as previously instructed. Loosen the pinch screw in the feed lifting rock shaft crank **N1**, Fig. 37, and drop the feed bar **AA**, Fig. 35, down out of the way. Loosen the bushing set screw **J1**, Fig. 34, and withdraw the bushing and hook shaft assembly as shown in Fig. 36. Take out the two screws **H2**, Fig. 36, and remove the end bearing **G2**, Fig. 36, then withdraw the shaft and gear.

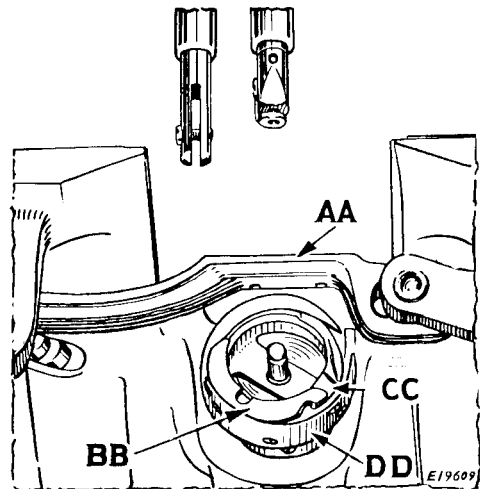


Fig. 35. Showing Correct Position of Thread Guard (DD) and Bobbin Case Holder (BB) for Removal of Sewing Hook

When assembling the hook shaft bushing, see that the thrust washer on the hook shaft has its small end toward the gear. The end bearing **G2**, Fig. 36, can be moved endwise enough to control the end play of the hook shaft before tightening the two screws **H2**, Fig. 36. When replacing this unit in the machine, be sure that the set screw enters the spline in the bottom of the bushing. See page 28 when resetting the feed lifting rock shaft.

TO ADJUST ROTATING HOOK SHAFT BUSHING (Pressure Lubricating Type)

The hook shaft bushing contains a regulating screw **V2**, Fig. 36, for controlling the oil supplied to the sewing hook raceway. Turning in the screw **V2** increases the amount of oil supplied to the hook; backing this screw out decreases the amount supplied. Normal adjustment is accomplished by turning this screw in all the way, then backing it out again about 2-1/2 turns. Less than 2-1/2 turns may be required if continuous runs are being made or material with considerable sizing is being stitched.

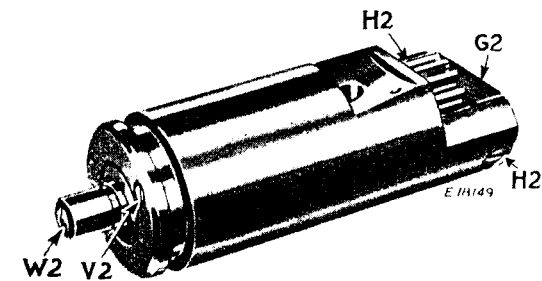


Fig. 36. Adjustment of Oil Flow Regulator in Hook Shaft Bushing

The oil wick complete No. 270176, **W2**, Fig. 36, carried by the hook shaft, at the sewing hook end, should be replaced occasionally as it may become clogged by lint and dirt from the oil.

If an excess of oil is being delivered to the hook and cannot be controlled by the metering screw **V2**, Fig. 36, check to be sure that the oil wick has not become detached from the filter screw **W2**, Fig. 36, and that the filter screw is securely tightened. Inspect all oil passages in the shaft and bushing to see that they have not become clogged with lint or dirt. If oil wick is too loose, too much oil will flow to the hook raceway.

To test for delivery of oil to the hook, run the machine at normal speed for one minute to remove any excess of oil and to establish a uniform rate of flow. Without stopping the machine, hold a small piece of white paper underneath the hook for 15 seconds without moving the paper during the interval. Remove the paper and inspect. If the paper does not show an oil streak about 1/32" wide, insufficient oil is being delivered to the hook. The most efficient method of testing oil delivery to hook is to remove hook and hold paper under end of hook shaft with machine running at full speed for 15 seconds; the oil streak should then be about 1/16" wide.

TO REMOVE AND REPLACE THE HOOK DRIVING SHAFT

Slip the belt off the lower pulley Y1, Fig. 37, then loosen the two set screws X1, Fig. 37, and remove the pulley from the shaft. Loosen the four set screws in the feed and feed lifting eccentrics, U1, and P1, Fig. 37, and the two set screws at R1, Fig. 37, in the internal gear. Do not loosen the screw in the collar V1, Fig. 37. Withdraw the shaft with ball bearing from the pulley end.

When replacing the shaft, push it in, being sure the feed eccentrics are on the shaft in their proper order, until the snap ring on the ball bearing seats on the casting, then tighten the gear screws R1. Before tightening the screws in the feed eccentric U1, the feed eccentric should be pushed to the left as far as it will go.

Tighten the screws in the feed eccentric U1, Fig. 37, having the first screw (as the shaft is turned away from you) enter the groove in the shaft. Then move the feed lifting eccentric to the left as far as it will go and tighten the screws in the eccentric P1, with the first or upper set screw in the groove in the shaft. Replace pulley Y1 and belt. Then retune the shaft as instructed on pages 18 and 19.

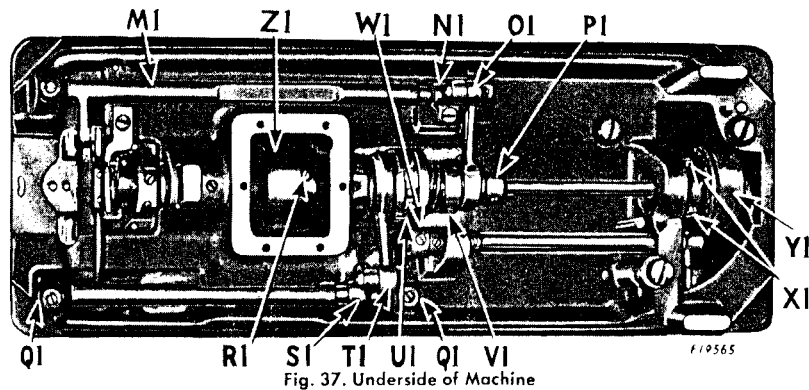


Fig. 37. Underside of Machine

If it is found necessary to replace the ball bearing on the hook driving shaft, or to reset or replace the hook driving shaft bushing, note that the ball bearing is correctly positioned when the pulley Y1, Fig. 37, is flush with the ball bearing on one side and its hub is flush with the end of the shaft on the other. With the ball bearing in this position, place the shaft in the machine and assemble the internal gear Z1, Fig. 37, with its inner face flush with the end of the shaft. The hook driving shaft bushing will be correctly positioned when end play has been removed from the shaft by setting the bushing against the hub of the internal gear.

If the feed rock shafts have been disturbed, the small ends of the connections O1 and T1, Fig. 37, should be disconnected while setting the eccentrics, and enough side play left for the connections so that their free ends can be moved sidewise about 1/32 to 1/16 inch. See paragraph on feed mechanism on page 32 before assembling the rock shaft connections.

FEED MECHANISM

Adjust the stitch regulator lever as instructed on page 14 so that there is no feed movement and remove the presser foot, feed dog and throat plate. The needle bar and needle should now be in line with the center of the machine bed. This can be determined by applying a standard throat plate such as 52033 from a drop feed machine such as the 400w. The needle should enter the center of the throat plate needle hole or the space between the needle bar and presser bar should be 17/32 inch. A piece of sheet metal 17/32 inch wide may be used to determine the correct distance. If the position of the needle bar is found to be incorrect, loosen two screws G3, Fig. 25, in the needle bar guide block, remove the cap screw A3, Fig. 19, and loosen the pinch screw thus uncovered. While this pinch screw is loose, move the needle bar forward or backward until the needle enters the center of the throat plate needle hole or until the distance between the needle bar and presser bar is 17/32 inch.

Securely tighten the pinch screw and replace the cap screw A3, Fig. 19. Tighten the screws G3, Fig. 25 to screw the needle bar connecting stud guide block back in a position so that the needle bar driving connection can move up and down freely.

THIS POSITION OF THE NEEDLE IN THE LINE OF FEED, WHEN ON THE SHORTEST POSSIBLE STITCH, SHOULD ALWAYS BE MADE BEFORE ATTEMPTING TO SET THE HEIGHT OF THE NEEDLE BAR OR TO ACCOMPLISH THE TIMING OF THE SEWING HOOK. UNDER NO CONDITIONS SHOULD THIS POSITIONING OF THE NEEDLE IN THE LINE OF FEED BE OTHERWISE SET SINCE THREAD BREAKAGE AND IMPROPER THREAD HANDLING WILL RESULT.

The feed dog is lined up with the slots in the throat plate by moving the bearing centers at Q1, Fig. 37, to right or left. It may be centered lengthwise so it will not strike the ends of the slots when making the longest stitch, by loosening the clamp screw in the feed rock shaft crank S1, Fig. 37.

After removing the feed driving or feed lifting rock shafts, the cranks S1 or N1, Fig. 37, should be adjusted to right or left until they line up perfectly with the free ends of the connections when the latter are exactly midway between their two extreme side play positions. The cone bearings O1 and T1, Fig. 37, should then be adjusted by first turning the cone screws down tight and then backing them off one quarter of a turn, locking them in position with the lock nut. This gives a perceptible amount of play in the connection which is necessary for all clearance.

TO SET THE FEED DOG AT THE CORRECT HEIGHT

The feed dog may be raised or lowered by loosening the pinch screw in the feed lifting crank N1, Fig. 37. The feed dog is usually set so that it shows a full tooth above the throat plate when at its highest position. See that there is no lint packed between the feed dog and throat plate.

ADJUSTING THE FEED DRIVING ECCENTRIC

The feed driving eccentric U1, Fig. 38, is provided with an adjustable section L2, Fig. 38, which can be adjusted to take up any loose motion

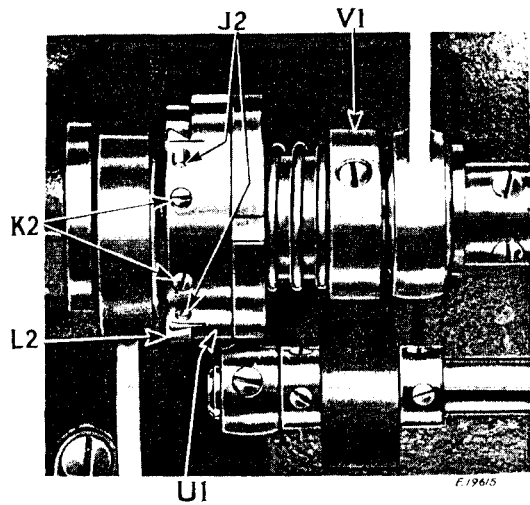


Fig. 38. Feed Eccentric

between the feed driving eccentric and the eccentric body. To adjust the section L2, loosen the two locking screws J2, Fig. 38, in the eccentric body, then turn in the two adjusting screws K2, Fig. 38, against the adjustable section until all play is eliminated and the eccentric fits snugly in the slot in the eccentric body. Securely tighten the two locking screws J2. By tightening the adjusting screws K2 firmly, the eccentric will be locked so that the stitch length cannot be changed by unauthorized persons.

A spring held by the collar V1, Fig. 38, presses against the feed driving eccentric cam to prevent it from moving out of position while the machine is operating. The collar V1 should ordinarily be set flush with the end of the hub of the eccentric body.

TO ADJUST THE NEEDLE BAR ROCK FRAME DRIVING ECCENTRIC

This eccentric is located on the arm shaft at B3, Fig. 39, and is adjusted in the same manner as the feed driving eccentric U1, Fig. 38, located on the bed shaft as instructed on page 32. The eccentric B3 and its two locking screws and two adjusting screws can be reached through the opening in the back of the machine after removing the cover C3, Fig. 39.

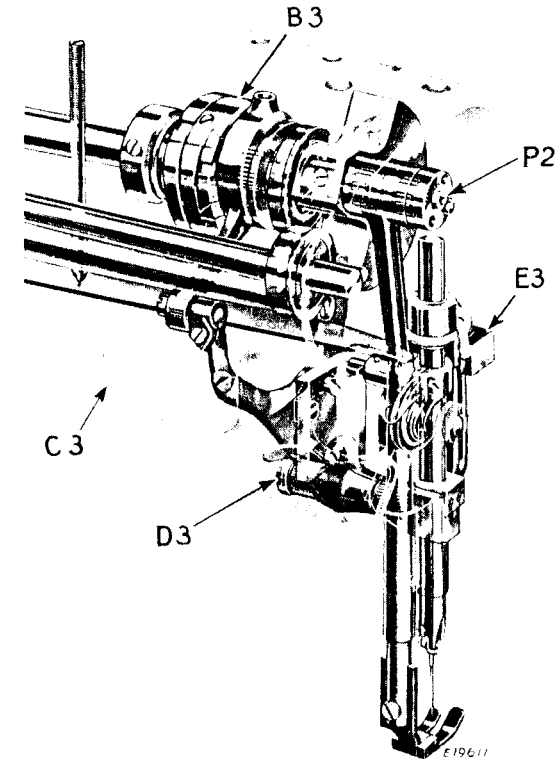


Fig. 39. X-Ray View Showing Needle Bar
Rock Frame Driving Eccentric (B3)

TO REMOVE AND REPLACE THE ARM SHAFT CONNECTION BELT

Remove the needle to avoid damaging it while the arm and hook shafts are out of time. Work the belt off the lower pulley Y1, Fig. 37.

Loosen the two screws in the groove of the balance wheel and remove the balance wheel and the ball bearing which comes out with the wheel. Lift the belt up and draw it out around the arm shaft through the space normally occupied by the ball bearing.

Replace the belt through the ball bearing hole. After placing the belt over the upper pulley M2, Fig. 40, replace the balance wheel. To remove all end play from the shaft, lightly tighten the set screws in the balance wheel and press against the screws in the large rotary thread take-up

disc to hold the arm shaft in position. Tap the balance wheel into position with the palm of the hand, then tighten screws firmly. Depress the regulating lever **H**, Fig. 19, and turn the balance wheel and lower belt pulley until both the upper and lower stitch regulating eccentrics have been engaged. Bring the arm shaft connection belt into contact with lower belt pulley to determine their proper relationship, then release the stitch regulating lever so that the balance wheel may be turned to roll the belt on to the lower belt pulley in its proper position. Proceed to time the machine as instructed on pages 18 and 19.

CAUTION: Do not pinch the belt in handling, as this will permanently kink the wire reinforcements making the belt unfit for use.

TO REMOVE AND REPLACE THE SMALL TAKE-UP SHAFT CONNECTION BELT

Remove the arm shaft connection belt as instructed on page 33 then slip the take-up belt **O2**, Fig. 40, off the pulleys, being careful not to

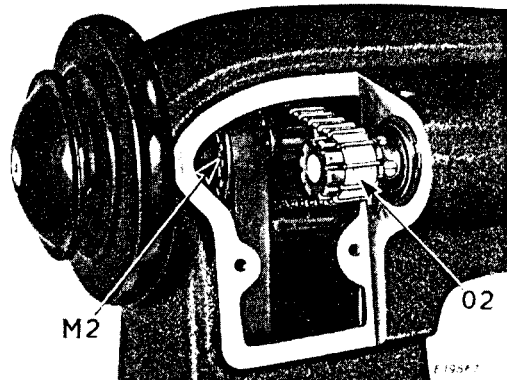


Fig. 40. Rear Arm Cover Removed

place too much sidewise strain on the arm shaft while it is unsupported by the rear bearings. When replacing the belt, have the arrows **G** and **X** on both take-up discs in line with their respective timing marks **GG** and **XX** as shown in Fig. 21. Replace the small belt **O2**, Fig. 40, on both pulleys, then replace the long belt as instructed on page 33.

TO REMOVE AND REPLACE THE SMALL TAKE-UP SHAFT

The small take-up shaft must be removed from the balance wheel end of the machine. Remove the take-up belt **O2**, Fig. 40, as instructed above. Remove the take-up guard **C2**, Fig. 21, and loosen the set screw, through the hole **7**, Fig. 21, in the top of the arm, which holds the small take-up disc. Remove the shaft with the rear ball bearing and the pulley intact.

The front and rear ball bearings for replacement on the small take-up shaft will be a tight fit. The front ball bearings should be placed on the shaft before it is assembled in the machine. To get the correct position, force it on the shaft until flush with the hub of the small rotary take-up and after placing the shaft in the machine with the snap ring of the front

ball bearing against its seat, force the rear ball bearing on until all end play has been eliminated.

When replacing the belt **O2**, make certain that the set screws in the small pulley are accessible when the take-up discs are at their timing positions.

TO REMOVE THE ARM SHAFT

The arm shaft must be removed from the face plate end of the machine and under no circumstances should an attempt be made to separate the needle bar crank from the shaft, as they are manufactured as a unit for accuracy. Remove face plate **D2**, Fig. 21, and associated parts. Remove the needle bar crank stud **P2**, Fig. 24, and the needle bar connecting link by loosening the two set screws reached through the hole **E2**, Fig. 21, in the top of the arm. (If for any reason the needle bar guide block is disturbed, it must be aligned properly when assembling the machine.)

Loosen the small screw in the center of the screw **D3**, Fig. 39, then remove the screw **D3**.

Remove the screw **F3**, Fig. 19, and block **E3**, Fig. 39, then withdraw the needle bar rock frame as a unit complete with the needle bar, oil wicking and needle bar connecting stud. Remove the cover **C3**, Fig. 39, at the back of the machine and loosen the set screws in the eccentric **B3**, Fig. 39.

Remove the belts as instructed on pages 33 and 34 and loosen the spot screw and set screw in pulley **M2**, Fig. 40. Then withdraw the arm shaft and crank from the needle bar end. If it is found necessary to replace the ball bearing, it should be forced onto the shaft until the slip ring is flush with the needle bar crank.

INSTRUCTIONS ON BALL BEARINGS AND NEEDLE BEARINGS

There are five ball bearings and eight needle bearings in this machine that will give long, trouble-free life with reasonable care. Oiling instructions given on page 4 should be followed carefully. Care should be taken to see that no foreign matter gets into these bearings when handling them out of the machine.

The ball bearings on the forward end of the arm shaft, the rear end of the small take-up driving shaft, and the rear end of the hook driving shaft are forced on into their correct position at the factory and should not be removed except for replacement. When replacing them, make certain that the shielded side is always out and that they are a tight fit on their respective shafts.

The ball bearing on the balance wheel is also a forced fit. Tools for removing the balance wheel from the machine and for removing this bearing can be procured from the SINGER Agencies if needed.

The eight needle bearings should receive the same care as the ball bearings and should not be removed from their respective housings except for replacement. They should be replaced by pressing on the numbered end of the outside shell as any pressure on the unnumbered end of the shell will distort them and cramp the bearings. After this, care should be taken to see that the needle bearings roll freely in their respective housings.