

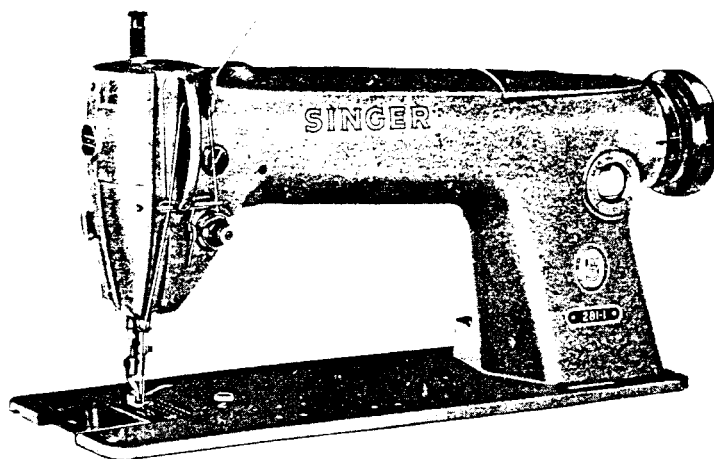
SINGER
281-1,-3-,21

SINGER*

Service Manual

Machines

281-1, 281-3 and 281-21



Regulation View - Machine 281-1

THE SINGER COMPANY

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TO ALL WHOM IT MAY CONCERN:

The improper placing or renewal of the Trademark SINGER* or any other of the Trademarks of The Singer Company (all of which are duly Registered Trademarks) 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.

DESCRIPTION OF MACHINES

Machines 281-1, 281-3 and 281-21 are high speed, single needle, lockstitch machines designed for sewing a wide variety of fabrics ranging from light weight to heavy weight.

Outstanding straight line stitching is produced by these machines in materials such as wash-and-wear, synthetic and natural fabrics.

General Features

Balanced, air cooled, rotating hook. Horizontal axis.

Lint wiper keeps lint and abrasive matter from accumulating on hook.

Drop feed consisting of pendant link feed with feed leveling hinge pin.

Pendant link feed mechanism maintains longer feeding cycle.

Three plain superfinished bearings support the arm shaft.

Fully automatic lubricating system with oil flow window in direct view of operator.

Knee lifter mechanism integral with machine base and oil reservoir.

Independent light fixture mount.

Federal stitch type 301.

Improved needle thread guard and other thread handling parts. Disc tension.

Machine pulley 147139 for 3/8 inch V-belt.

Variations of Machine Varieties

Machine 281-1

Light weight to medium-heavy weight fabrics.

Needle bar stroke, 1-13/64 inches.

Presser bar lift, 5/16 inch.

Maximum stitch length: Feed eccentric stop screw, regularly furnished, limits the maximum stitch length to 7 stitches per inch. A stop screw for 5-1/2 stitches per inch will be furnished when specified on order.

Space at right of needle, 11 inches.

Machine 281-3

Light weight to extra-heavy weight fabrics.

Needle bar stroke, 1-7/16 inches.

Presser bar lift: Regularly furnished with 3/8 inch lift for sewing light weight to heavy weight fabrics. Available on order with 7/16 inch lift for sewing extra-heavy weight fabrics.

Maximum stitch length, 5-1/2 stitches per inch. Space at right of needle, 11 inches.

Machine 281-21

Light weight to medium-heavy weight fabrics.

Needle bar stroke, 1-13/64 inches.

Presser bar lift, 9/32 inch.

Maximum stitch length: Feed eccentric stop screw, regularly furnished, limits the maximum stitch length to 7 stitches per inch. A stop screw for 5-1/2 stitches per inch will be furnished when specified on order.

Space at right of needle, 8 inches.

INSTALLATION

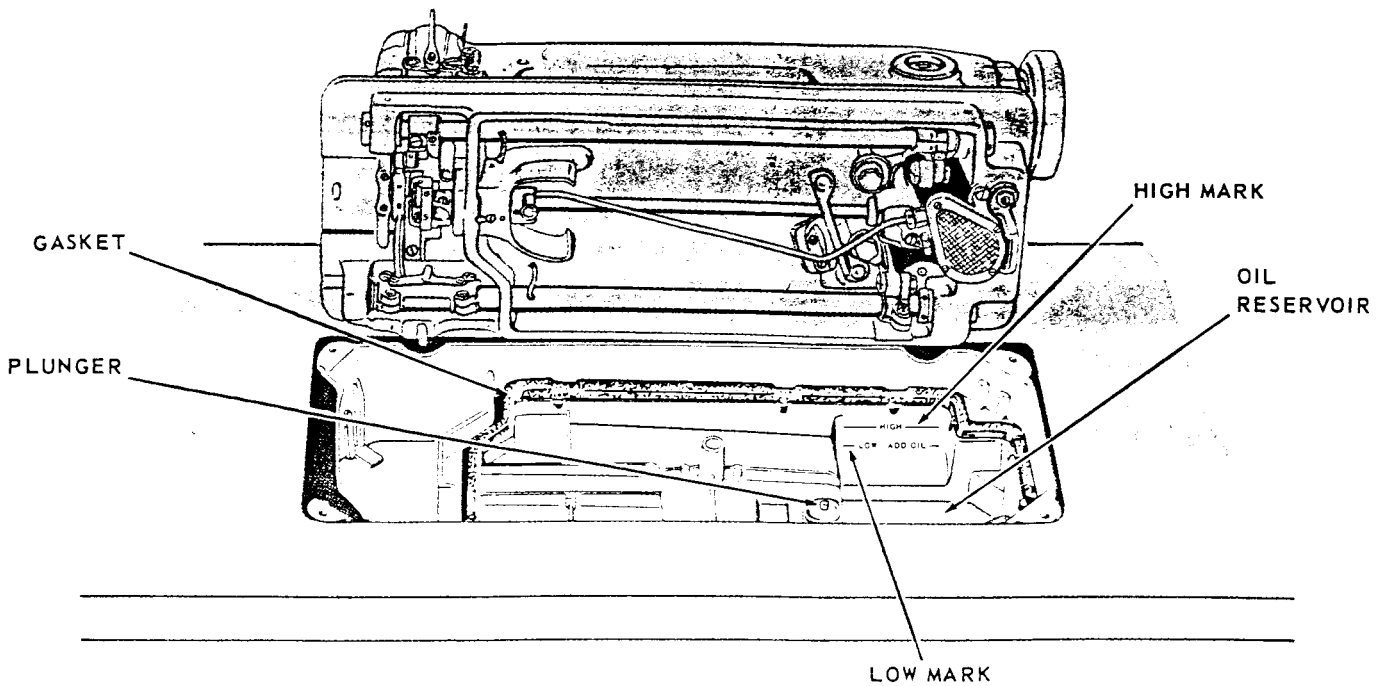


Fig. 2. Machine Base and Oil Reservoir

See that plunger is in place, as shown in Fig. 2, before placing machine on base.

Machine base and oil reservoir fits into standard table cut-out and rests on four corners without bolting. Rasp edges of cut-out, shown in Fig. 2, if necessary, so that machine does not touch table when placed on base.

Use shims on corners, when required to insure that base is level, so that oil level will be accurately indicated by marks on base.

Machine head is not fastened but should rest on cork gasket in base. Machine hinge pins must not support the head except when machine is tilted back.

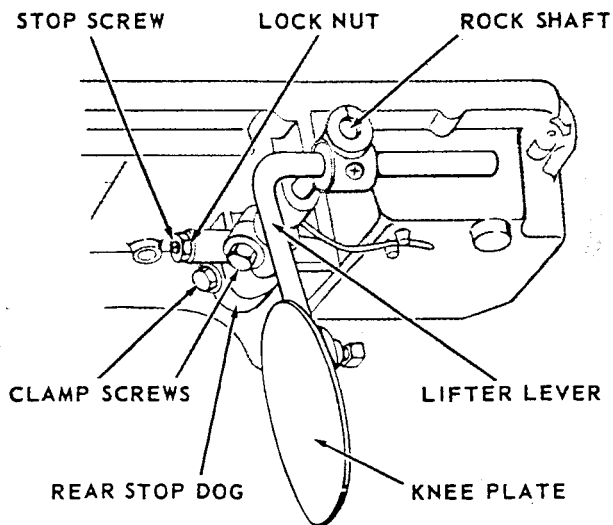


Fig. 3. Knee Lifter

THE KNEE LIFTER

Knee lifter is shipped assembled to the base except for the knee plate and lifter lever.

Loosen the two clamp screws shown in Fig. 3 and slide the rock shaft forward to position shown. Attach lifter lever.

Set the stop screw, Fig. 3, so that there is only a little play in the lever before it starts to lift the presser bar. Then tighten lock nut on stop screw.

Set the rear stop dog to allow the presser bar to be raised to its limit and tighten the two clamp screws.

CAUTION: Do not operate machine until it has been thoroughly lubricated in accordance with the following instructions.

LUBRICATION

Before starting machine, the oil reservoir must be filled to **HIGH MARK** shown in Fig. 2

Use SINGER OIL "TYPE A" or "TYPE C". Use "TYPE C" OIL when an oil is desired which will produce a minimum of stain on fabrics even after a long period of storage.

Do not use additives in sewing machine oil, as they may cause a reduction in normal oil flow that can result in damage to machine.

Should the oil flow, passing through the oil flow window as shown in Fig. 4, stop or become erratic, **STOP MACHINE AND DO NOT RUN AGAIN** until the cause has been eliminated.

Check oil level often to keep it from going below low mark.

The Oil Flow Regulator

Lubrication of the sewing hook is automatically controlled by the oil flow regulator shown in Fig. 5.

Regulator is set at the factory for lubrication under average sewing conditions.

To determine whether oil is properly flowing to the hook, run machine for approximately one minute to establish a uniform rate of flow. Then open the bed slide, hold a piece of paper under the hook and run the machine for about ten seconds. There should be a distinct line of oil on paper, beneath the hook bearing, with a fine spray on each side of this line.

If there is no trace of oil or an excess of oil on the paper, turn oil flow regulator to right or left to increase or decrease the flow of oil, as shown in Fig. 5.

Machine must run at least one minute between adjustments to insure uniform oil flow.

If the proper rate of flow cannot be obtained by turning the regulator inspect the oil flow mechanism as follows:

Remove needle, bobbin and bobbin case from machine.

Remove bracket screw and position finger shown in Fig. 5.

Loosen two hook body screws and turn machine pulley until feed bar reaches its highest point.

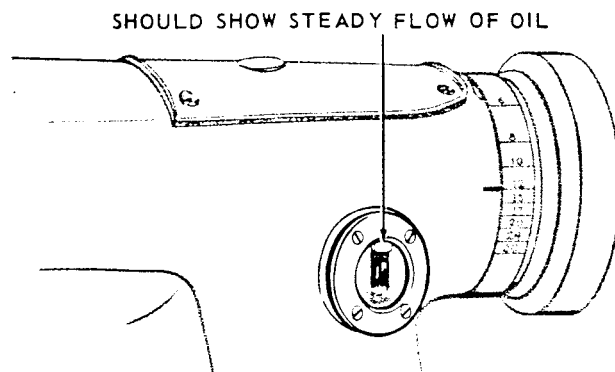


Fig. 4. Oil Flow Window

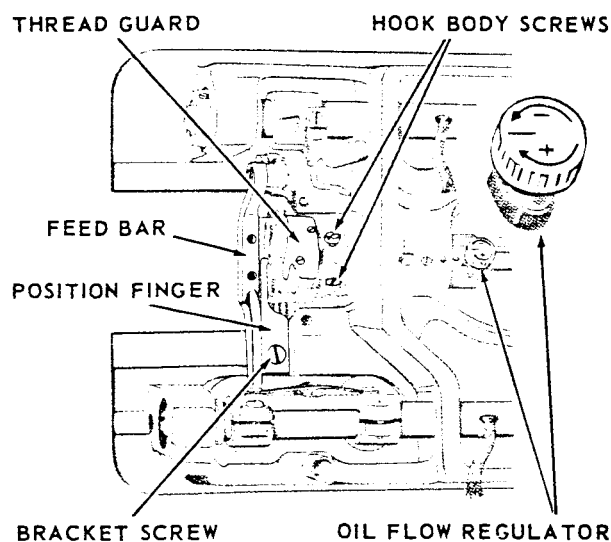


Fig. 5. Oil Flow Regulator

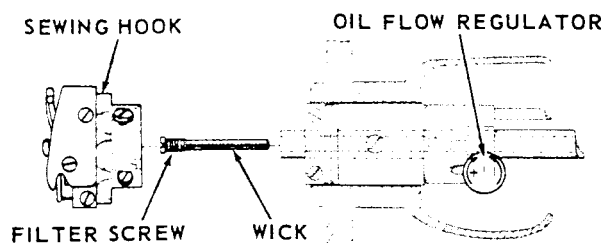


Fig. 6. Sewing Hook Filter Screw and Wick

Turn the sewing hook until thread guard is at the bottom as shown in Fig. 5 and slide hook from shaft. Loosen filter screw shown in Fig. 6 and check to see if wick has become detached or clogged.

Inspect all passages for dirt and lint accumulation. Replace wick if necessary.

Assemble sewing hook and position finger to machine.

Re-check oil flow as previously instructed.

CLEANING

Using a short bristle brush (not point of scissors or other sharp instrument), remove lint and other waste from around sewing hook, from between feed rows and underside of throat plate and from all other operating points.

Tilt machine back on hinges. Wrap clean rag around magnet, shown in Fig. 7, on oil pump body and pull accumulated foreign particles from magnet.

Wipe exterior of machine dry with a soft cloth.

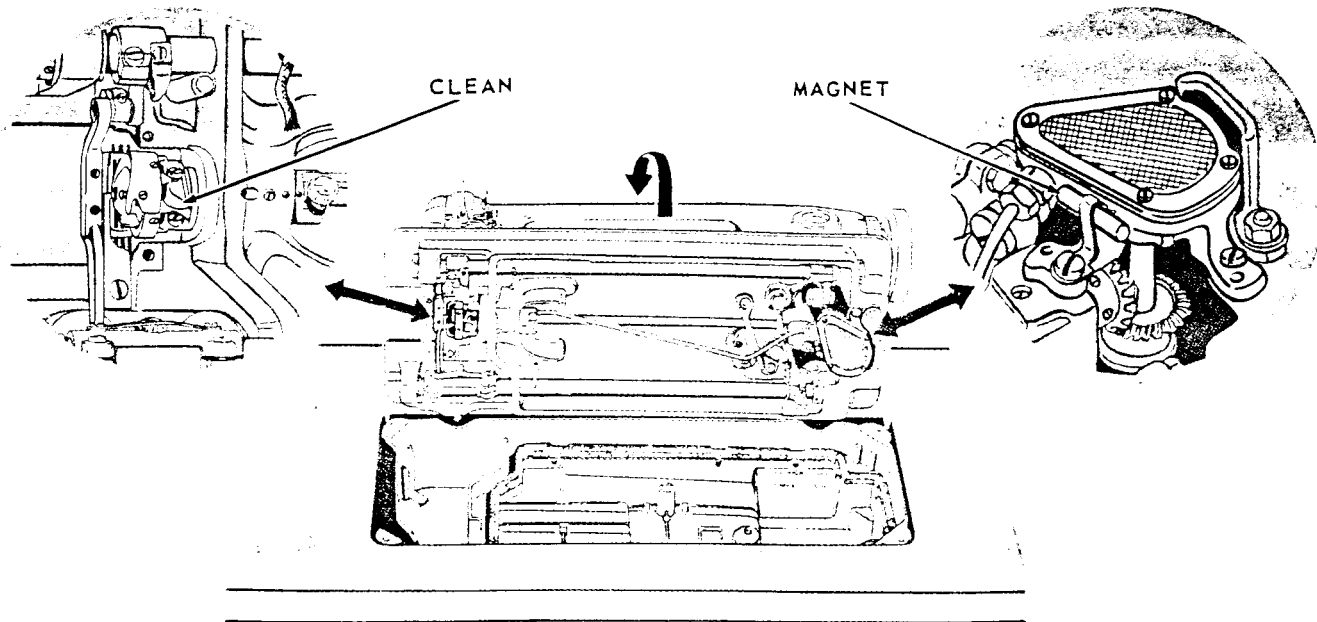


Fig. 7. Magnet on Oil Pump Body

SPEED

Maximum speed for machine 281-1 and 281-21 is 6000 stitches per minute.

Maximum speed for Machine 281-3 is 5000 stitches per minute.

It is advisable to operate new machines at a speed of 500 stitches less than maximum, for the first 100 hours of operation.

NEEDLES

Machines 281-1 and 281-3

Use SINGER* Needle, Catalog 1955, in sizes ranging from 8 to 22.

Machine 281-21

Use SINGER* Needle Catalog 1361, in sizes ranging from 8 to 22.

Size of needle to be used should be determined by weight of thread and type of material being sewn.

Orders for needles should specify quantity required, size number and catalog number.

For example:

100 No. 16, Catalog 1361 Needles

SETTING THE NEEDLE

Turn machine pulley over toward operator until needle bar reaches highest point as shown in Fig. 8.

Loosen needle clamping screw. Insert needle into needle bar as far as it will go, with long groove of needle to the left and eye of needle directly in line with arm of machine. Then tighten the clamping screw.

THREAD

Left twist thread should be used in needle.

Either right or left twist thread may be used in bobbin.

Thread twist is determined by holding thread as shown in Fig. 9 and twirling thread over toward you. If left twist, strands will wind tighter. If right twist, strands will unwind or separate.

Rough or uneven thread, or thread which passes through needle eye with difficulty, will interfere with successful operation of the machine.

UPPER THREADING

Turn machine pulley over toward operator until needle bar is at highest point.

Pass thread through threading points indicated in Fig. 10. Draw approximately two inches of thread through needle eye with which to start sewing.

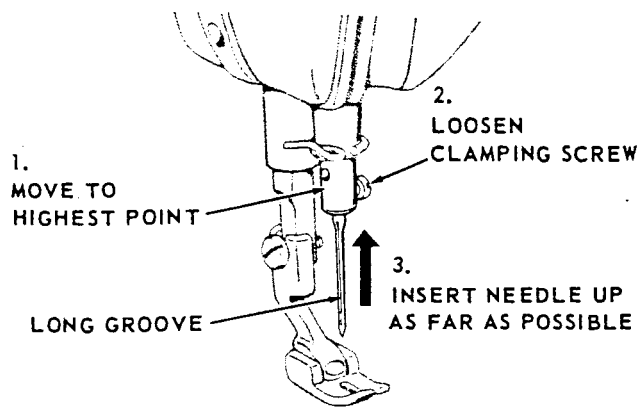


Fig. 8. Setting the Needle

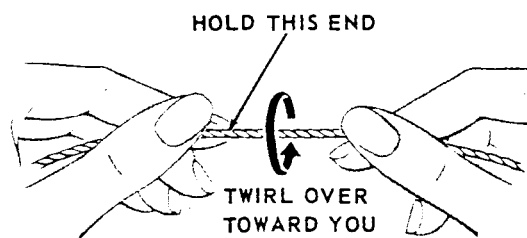


Fig. 9. Determining Thread Twist

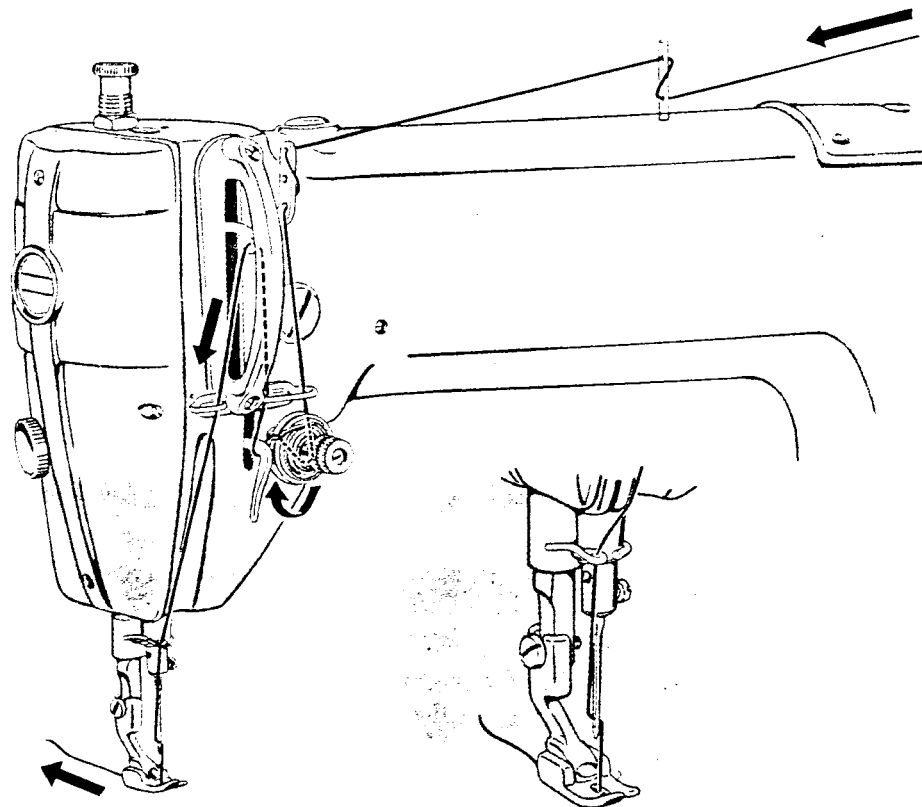


Fig. 10. Upper Threading

LOWER THREADING

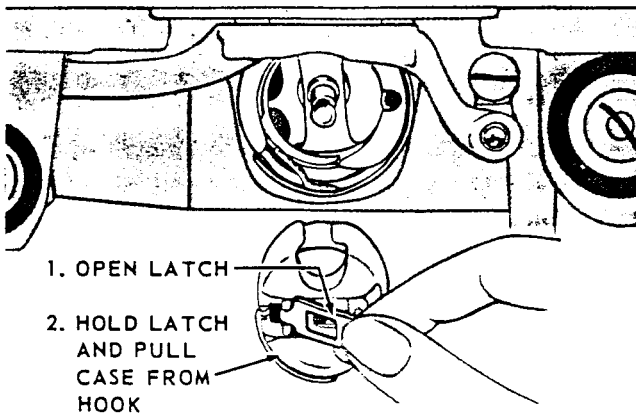


Fig. 11. Removing Bobbin Case

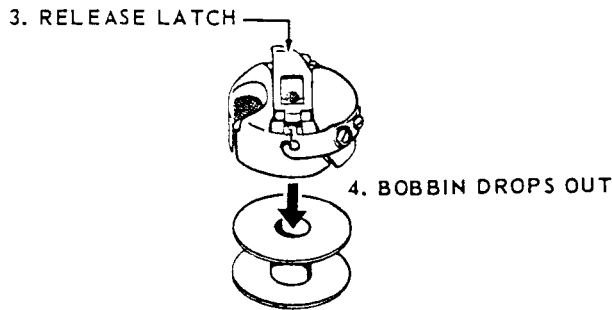


Fig. 12. Removing Bobbin

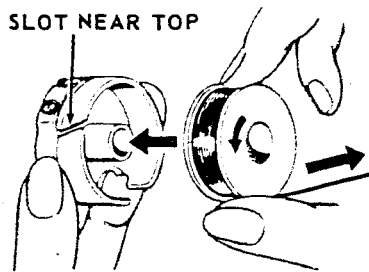


Fig. 13. Replacing Wound Bobbin

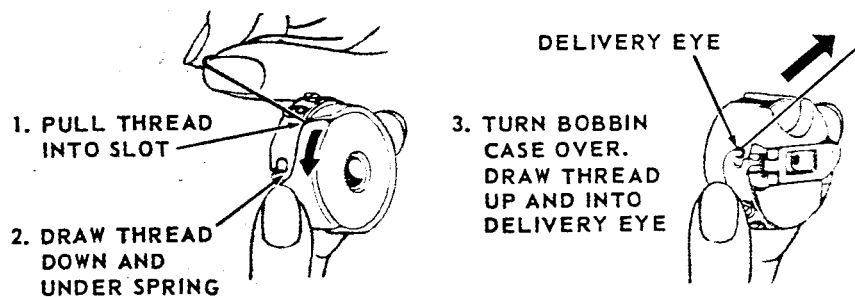


Fig. 14. Threading Bobbin Case

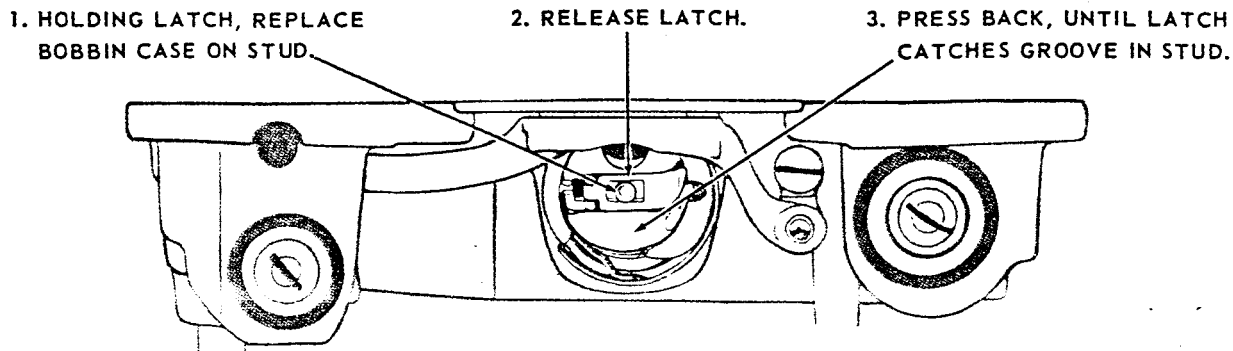


Fig. 15. Replacing Bobbin Case

Bobbin Removal

Turn machine pulley over toward operator until needle bar is at highest point.

Reach beneath bed of machine with left hand and remove bobbin case from machine as shown in Fig. 11.

Release latch and bobbin will drop out of case, as shown in Fig. 12.

Threading Bobbin Case

Hold bobbin so that thread will unwind in the direction shown in Fig. 13. Hold bobbin case as shown and place bobbin into it.

Pull thread into slot and under tension spring, shown in Fig. 14, so that thread enters delivery eye at end of spring.

Bobbin Case Replacement

Place bobbin case on center stud of bobbin case holder and release latch. Place bobbin case back until latch catches near end of stud as shown in Fig. 15. Draw about two inches of thread from bobbin to start the sewing.

ADJUSTING THE TENSION

Tension on thread should be as light as possible while still sufficient to set stitches correctly in material.

Regulate needle thread tension, as instructed in Fig. 16. Make certain presser foot is **DOWN** during tension adjustment.

Tighten lock nut to maintain tension adjustment.

Regulate bobbin thread tension as instructed in Fig. 17.

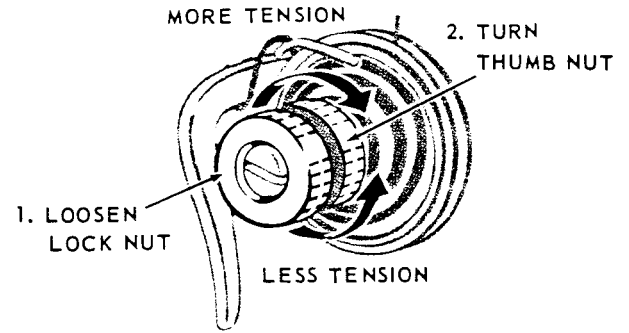


Fig. 16. Needle Thread Tension

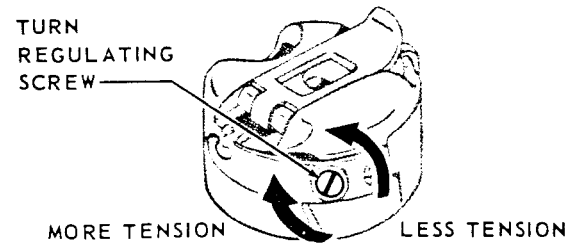


Fig. 17. Bobbin Thread Tension

ADJUSTING THE PRESSURE

Correct presser foot pressure helps insure proper feeding of material.

Pressure should be as light as possible while still sufficient to insure correct feeding of material.

Regulate as instructed in Fig. 18 with presser foot down.

Pressure regulating thumb screw is fitted with lock nut.

Tighten lock nut to maintain pressure adjustment.

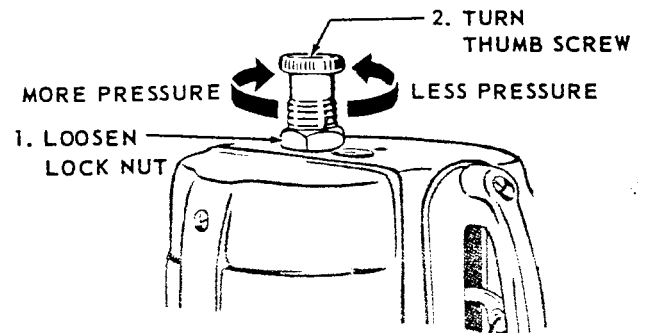


Fig. 18. Presser Foot Pressure

REGULATING THE STITCH LENGTH

Changes in stitch length should never be attempted while the machine is running.

See page 3 for information on maximum stitch length for your machine.

Regulate the stitch length, as instructed in Fig. 19.

Button mentioned in Step 4, Fig. 19, drops into notch with an audible click.

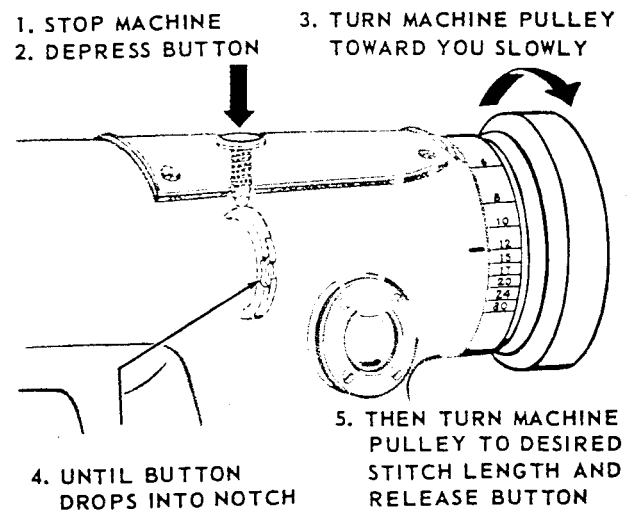


Fig. 19. Regulating the Stitch Length

PREVENTING UNAUTHORIZED CHANGES IN STITCH LENGTH

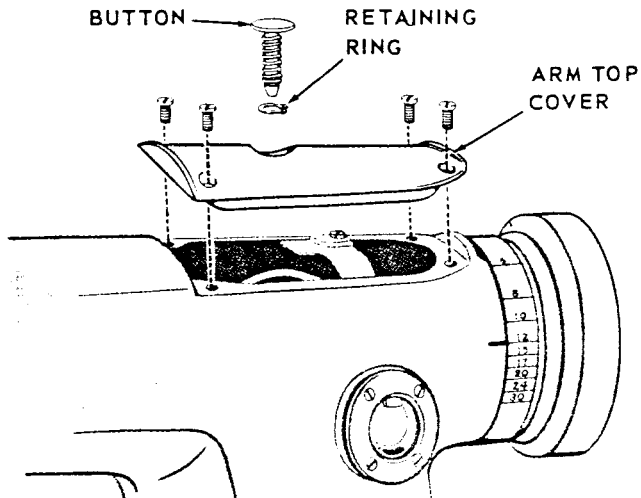


Fig. 20. Removing Stitch Length Regulator Button

Stitch regulator button may be removed by loosening the four screws and removing arm top cover, shown in Fig. 20.

Remove retaining ring near tip of button allowing button to be withdrawn.

Hole in top cover should then be filled by inserting plug screw 140607 which may be obtained at additional charge.

Replace arm top cover.

Inspect and adjust the machine, when it is required, in the order given.

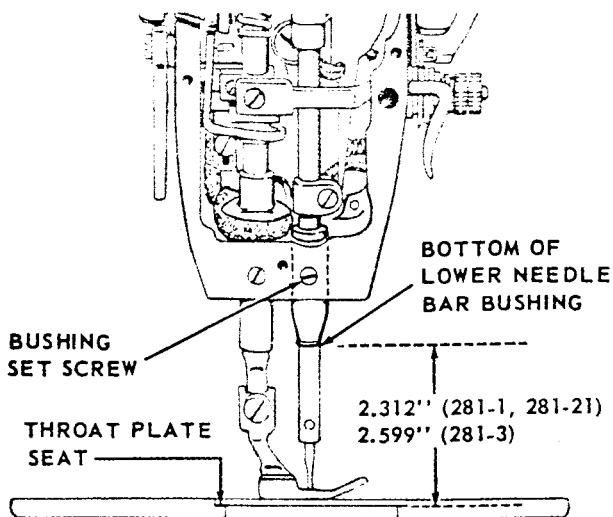


Fig. 21. Correct Setting: Needle Bar Bushing

SETTING THE LOWER NEEDLE BAR BUSHING

Gauge distance from throat plate seat to bottom of lower needle bar bushing, as shown in Fig. 21, is - - -

2.312 inches for Machines 281-1 and 281-21.
2.599 inches for Machine 281-3.

Raise or lower needle bar bushing, as required to obtain correct height setting, after loosening bushing set screw shown in Fig. 21.

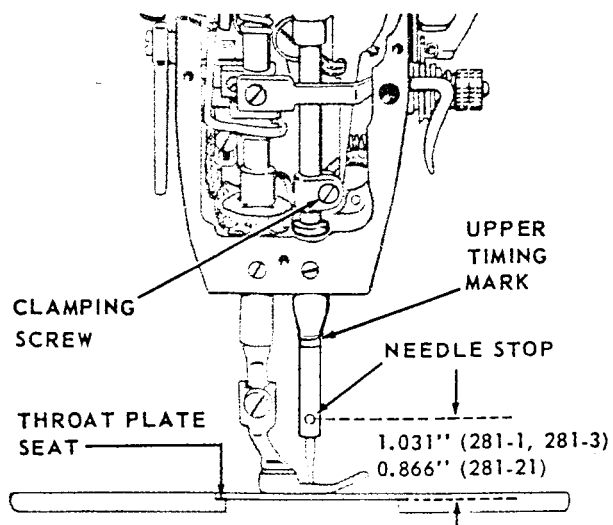


Fig. 22. Correct Height: Needle Bar

SETTING THE NEEDLE BAR HEIGHT

Remove face plate, slide plate and throat plate.

When needle bar is at its lowest point (during rotation of machine pulley), the gauge distance from throat plate seat to needle stop in needle bar, as shown in Fig. 22, is - - -

1.031 inches for Machines 281-1 and 281-3.
0.866 inch for Machine 281-21.

When needle bar is set at correct height, **UPPER TIMING MARK** on needle bar will be level with bottom of lower needle bar bushing.

To set needle bar height, remove face plate, slide plate and throat plate from machine. Loosen needle bar clamping screw shown in Fig. 22. Raise or lower needle bar as may be required. Securely tighten clamping screw. Replace all other parts previously removed.

TIMING THE MACHINE

Timing the machine consists of first adjusting the radial position of sewing hook with relation to movement of needle bar and needle thread take-up lever, to make certain that loop of thread formed by needle will be correctly taken by point of hook at proper time.

The check spring and feed are then timed to synchronize their motions with needle and hook movement.

TIMING THE SEWING HOOK

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

Turn machine pulley over toward operator until needle bar reaches its lowest point and rises to position where **LOWER TIMING MARK** on needle bar is level with bottom of lower needle bar bushing, as shown in Fig. 23.

At this position, point of sewing hook should be at center of needle, as shown in inset, in Fig. 23.

Loosen two hook body screws shown and turn hook on shaft as required to bring point of hook to center of needle. See Fig. 24.

Make certain that hub of hook is against oil retaining collar and tighten hook body screws.

Check clearance between needle and hook point, in accordance with the following instructions.

SETTING THE CLEARANCE BETWEEN NEEDLE AND HOOK POINT

Check to see that needle is properly seated in needle bar and time sewing hook as previously instructed.

Point of sewing hook should pass needle as closely as possible without striking or deflecting needle. A clearance of about the thickness of a piece of note paper (approximately .005 inch), as shown in Fig. 25, is sufficient.

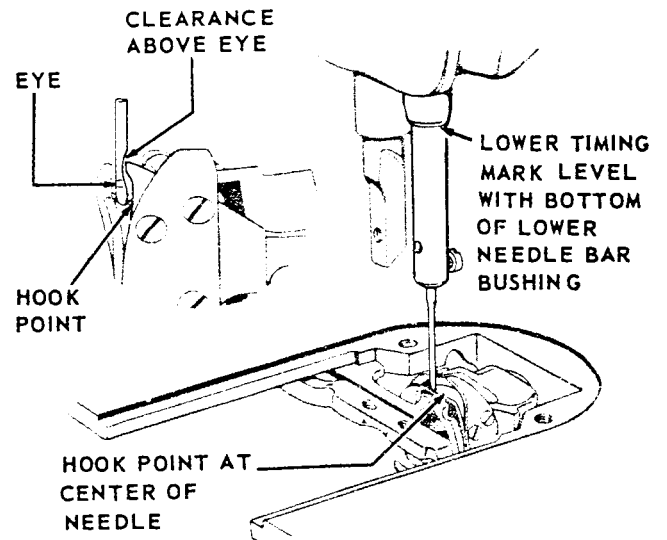


Fig. 23. Hook Point at Center of Needle

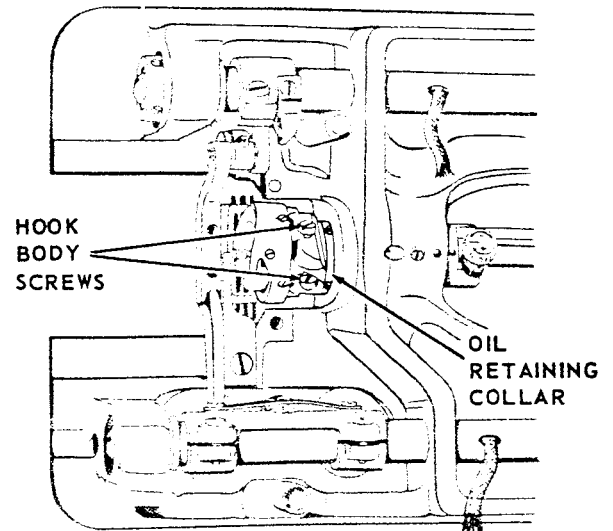


Fig. 24. Hook Body Screws

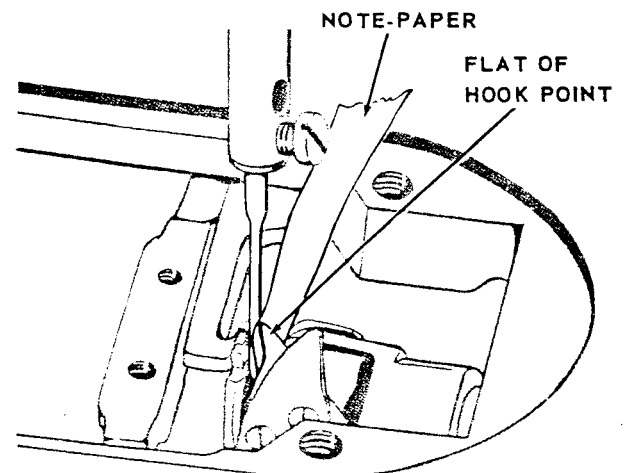


Fig. 25. Clearance Between Needle and Hook

SETTING THE CLEARANCE BETWEEN NEEDLE AND HOOK POINT (Continued)

To move hook point toward or away from needle, first remove slide plate, throat plate and bobbin case. Then, loosen the two bevel gear screws shown in Fig. 26 and loosen bushing set screw shown in Fig. 27.

MAKE CERTAIN THAT BEVEL GEARS ARE KEPT IN MESH CONSTANTLY UNTIL THEIR SCREWS ARE SECURELY RETIGHTENED.

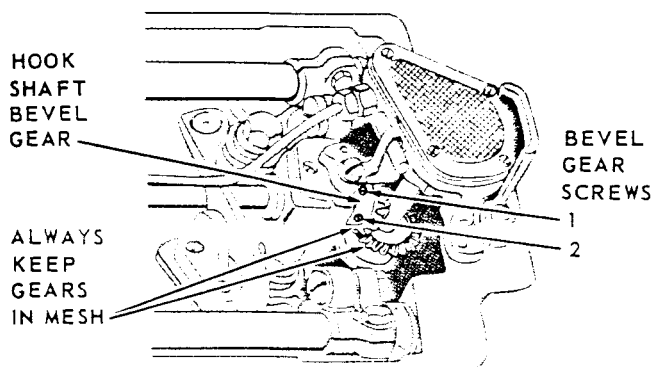


Fig. 26. Bevel Gear Screws

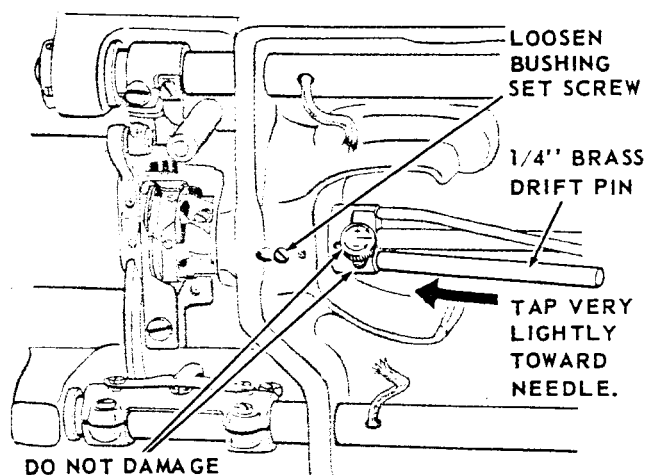


Fig. 27. Position of Drift Pin when Moving Hook Toward Needle

Using a light mallet and a 1/4 inch brass drift pin, move hook assembly toward or away from needle as required. Figs. 27 and 28 show correct placement of drift pin. **TAP VERY LIGHTLY** to avoid damaging hook assembly.

Securely tighten bushing set screw.

Remove all end play from hook shaft by moving hook assembly firmly against front hook shaft bushing and, at the same time, moving hook shaft bevel gear toward sewing hook end of shaft.

Tighten screw 1, Fig. 26, on bevel gear. Securely tighten bevel gear screw 2, Fig. 26.

Replace all parts previously removed.

Check thread clearance between position finger and bobbin case, as instructed next.

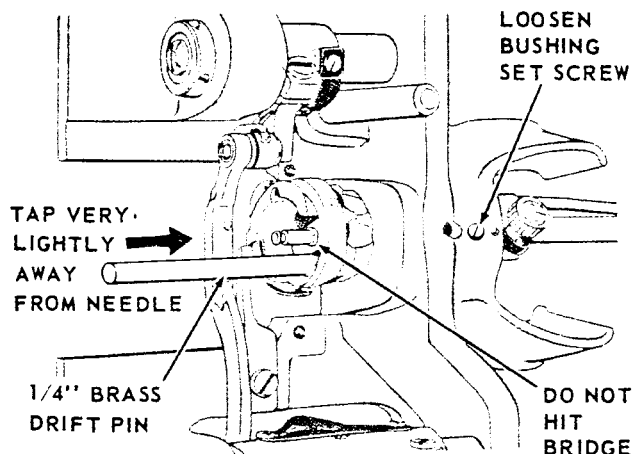


Fig. 28. Position of Drift Pin when Moving Hook Away from Needle

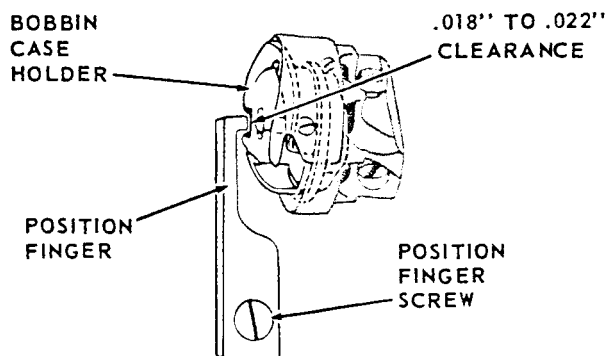


Fig. 29. Position Finger

SETTING THE POSITION FINGER

Clearance between position finger and bobbin case holder should be just sufficient to allow thread to pass through easily. Normally an .018 to .022 inch clearance, as shown in Fig. 29, is required. If necessary, bend position finger **CAREFULLY** to achieve this setting.

Top surface of the position finger must be kept level with the top surface of the bobbin case holder.

STRINGING THE NEEDLE GUARD

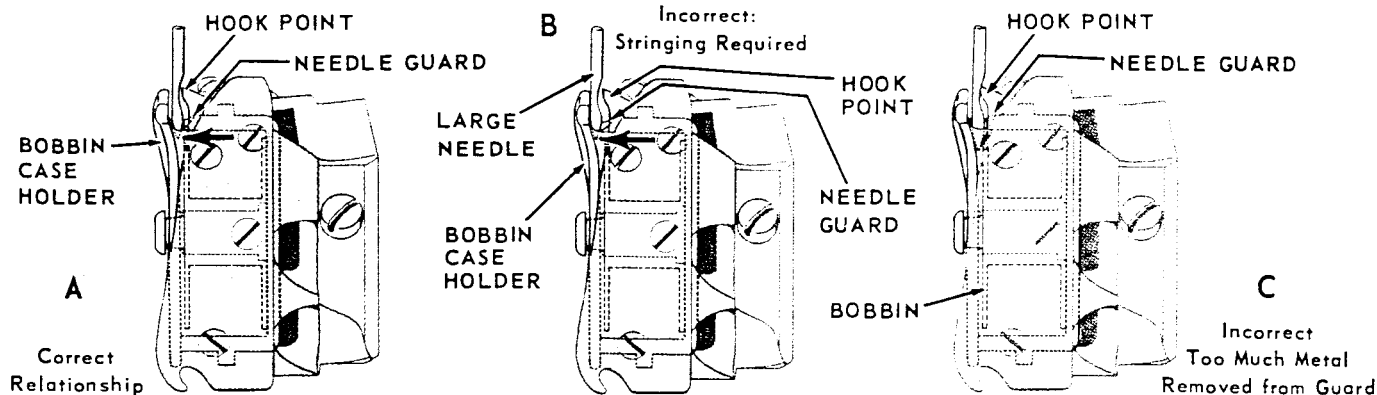


Fig. 30. Needle Guard at Loop-Taking Time

The needle guard on the bobbin case holder, shown in Figs. 30 and 33, should prevent needle from contacting hook or bobbin case at any time. See Fig. 30 (A) for correct relationship. When large needles (size 20 or larger) are used, needle guard may deflect needle too far toward left resulting in damage to needle. See Fig. 30 (B). To avoid this, it may be necessary to string the needle guard in accordance with the following instructions.

Remove needle, slide plate, throat plate and bobbin case from machine.

Turn machine pulley until feed bar, Fig. 31, is at its highest point.

Remove position finger shown in Figs. 29 and 31.

Turn hook body to position shown in Fig. 31 and remove three small screws and hook section shown.

Turn bobbin case holder until position finger slot on thread guard is at location shown in Fig. 32. Slip bobbin case holder out of hook body.

Remove a slight amount of metal from needle guard by rubbing needle guard along a 1/8 inch strip of very fine emery cloth, as shown in Fig. 33.

EXTREME CARE should be taken to avoid removal of too much metal as this may permit needle to strike hook. See Fig. 30 (C). Bobbin case holder will then need replacement.

Clean bobbin case holder thoroughly before replacing it in hook body.

Replace all parts in reverse order instructed for removal.

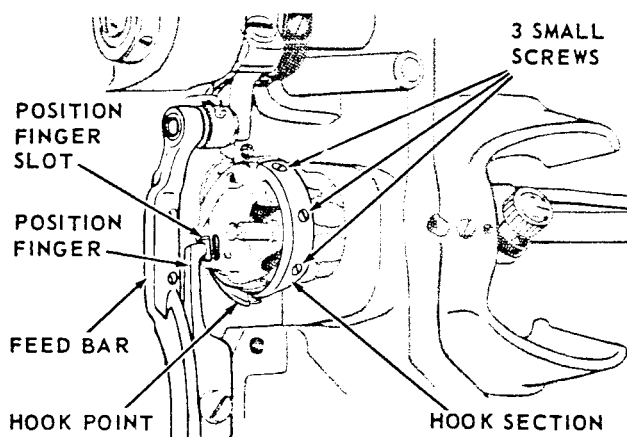


Fig. 31. Hook Section

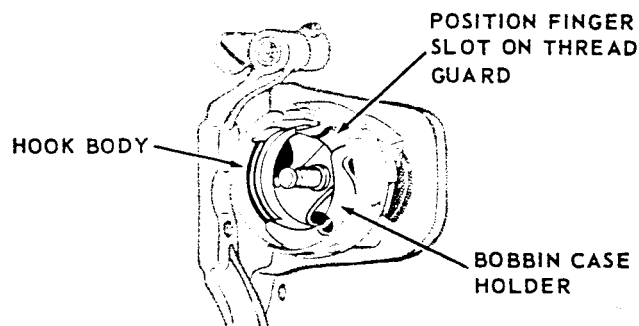


Fig. 32. Bobbin Case Holder

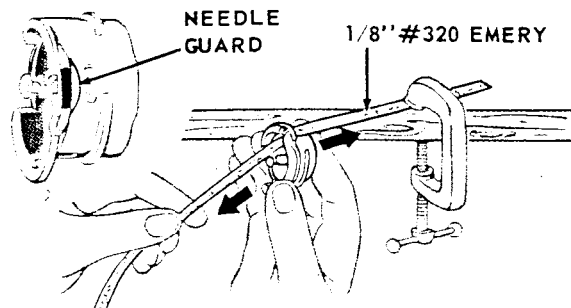


Fig. 33. Stringing Needle Guard

SETTING THE CHECK SPRING HEIGHT

Thread the machine. Turn machine pulley over slowly toward operator, observing check spring shown in Fig. 34.

When take-up lever begins to rise, check spring should make a slight dip and return to its higher position.

As take-up lever approaches top of its stroke, setting the stitch, check spring should be drawn all the way down.

As take-up lever descends, check spring should return to rest.

To increase or decrease height of check spring (which respectively increases or decreases its movement), loosen stud set screw shown in Fig. 34. Turn stud along with entire check spring assembly to set check spring height as required. Securely tighten set screw.

NOTE: Height setting should be checked each time a different presser foot is used with machine.

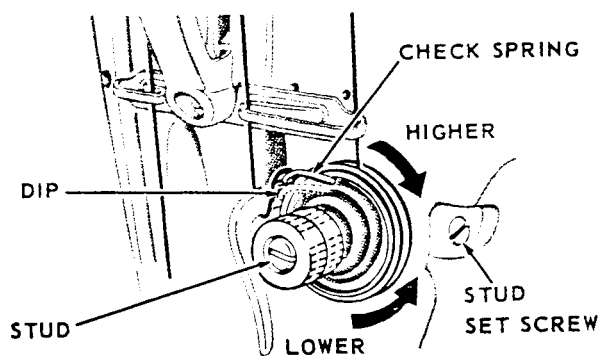


Fig. 34. Check Spring

SETTING THE CHECK SPRING TENSION

Tension on check spring should be sufficient to insure action at top speed but light enough to allow check spring to be drawn all the way down.

To adjust, first make certain that stud set screw shown in Fig. 34 is securely tightened. Then, using a screwdriver in slot of stud, turn stud alone toward left to decrease tension or toward right to increase tension.

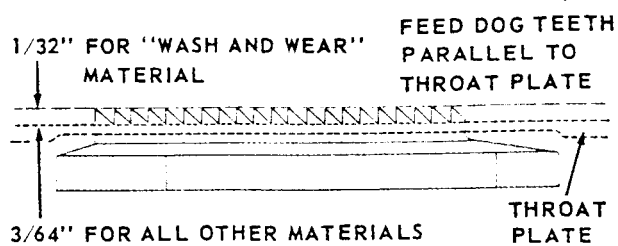


Fig. 35. Correct Height of Feed Dog

SETTING THE FEED DOG HEIGHT

Feed dog height should be adjusted with machine set for longest stitch. **ALL** the teeth of the feed dog should rise equally high above the throat plate, as shown in Fig. 35.

The correct height of feed dog for wash and wear fabrics is 1/32 inch above throat plate.

For all other fabrics the correct height is 3/64 inch above throat plate.

To set feed dog at correct height, loosen the two hex-head screws shown in Fig. 37.

To obtain a height of 3/64 inch above throat plate, turn hinge pin eccentric, Fig. 36, until flat on slotted end is at top as shown.

To obtain a height of 1/32 inch above throat plate, turn hinge pin eccentric until flat is at bottom.

To raise or lower the REAR END of feed dog, turn hinge pin eccentric out of set position, as required.

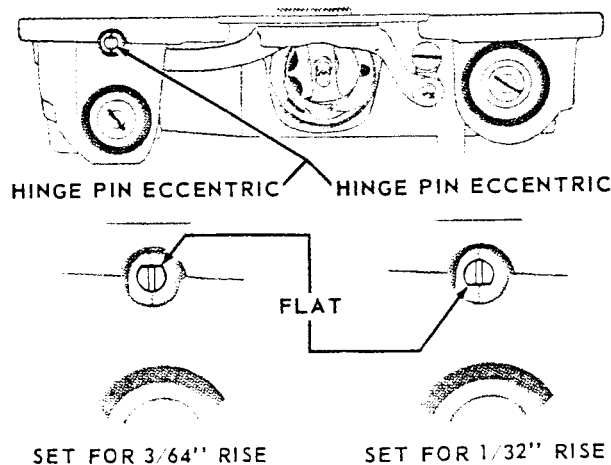


Fig. 36. Feed Bar Hinge Pin (Eccentric)

SETTING THE FEED DOG HEIGHT (Continued)

If desired height cannot be obtained as previously stated, loosen clamp screw on crank shown in Fig. 37. Raise or lower feed bar as required to obtain desired height. Securely tighten clamp screw.

Level the feed dog by means of hinge pin eccentric as previously instructed. Securely tighten the two hex-head screws shown in Fig. 37.

NOTE: Variations in feed dog height may sometimes be necessary to balance height in relation to presser foot pressure.

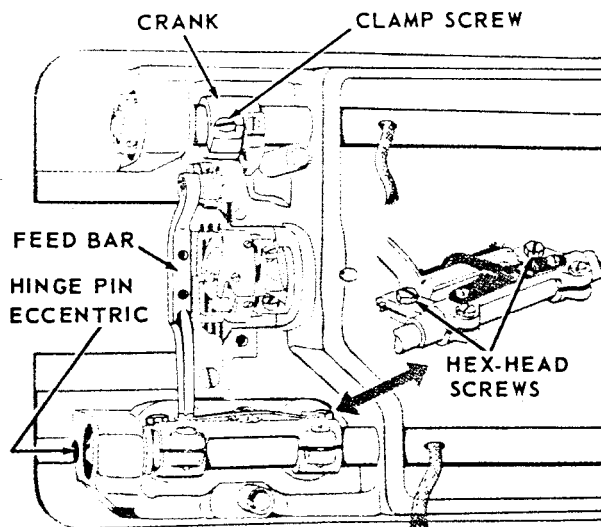


Fig. 37. Feed Bar and Crank

AVAILABLE FEED ECCENTRIC STOP SCREWS

Machine is prevented from making longer stitches than a predetermined maximum by a stop screw shown in Fig. 38, in the feed eccentric.

The following stop screws are available for these machines:

140256,	7	stitches per inch
140257,	5½	stitches per inch
140258,	14	stitches per inch
140568,	8	stitches per inch

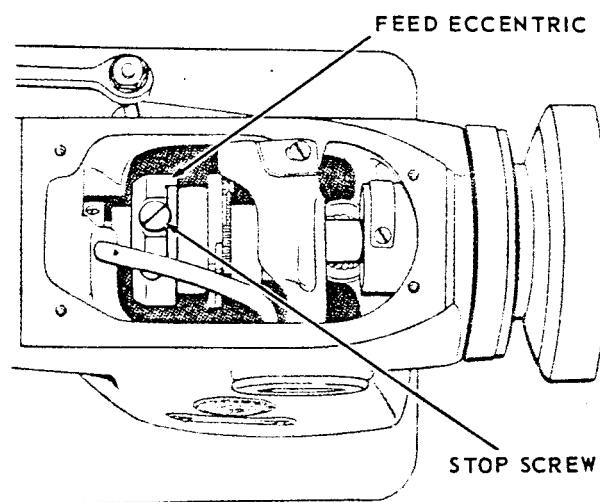


Fig. 38. Feed Eccentric Stop Screw

CENTRALIZING THE FEED DOG

Feed dog should never contact edges of throat plate but should move midway between sides of throat plate slots and maintain its movement equidistant from front and rear edges of throat plate slots.

Sidewise Setting

To move feed dog toward left or right, loosen the two clamp screws on feed bar carrier and the clamp screw on feed bar crank, shown in Fig. 39.

Move feed bar as required to position feed dog midway between sides of throat plate slots.

Make certain that feed dog height is correct as instructed previously.

Securely tighten all three clamp screws.

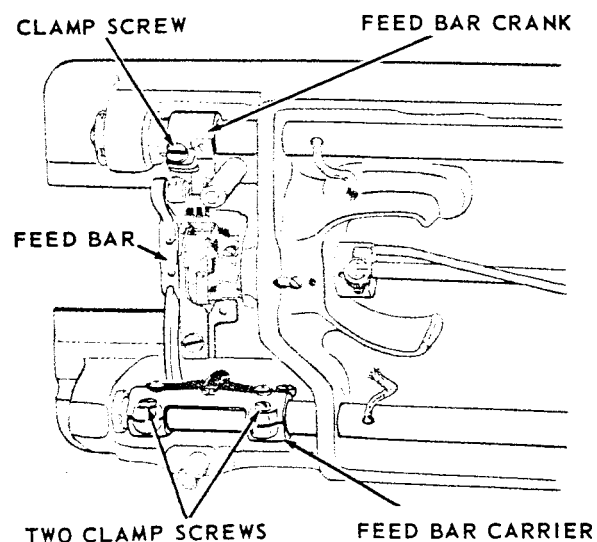


Fig. 39. Centralizing the Feed Dog

CENTRALIZING THE FEED DOG (Continued)

Lengthwise Setting

Set machine for longest stitch and loosen hex-head screw, shown in Fig. 40, on rock shaft.

Move feed bar carrier and rock shaft so that movement of feed dog is equidistant from front and rear

edges of throat plate slots.

Securely tighten hex-head screw.

Check linkage for freedom of movement to reduce wear and insure maximum efficiency.

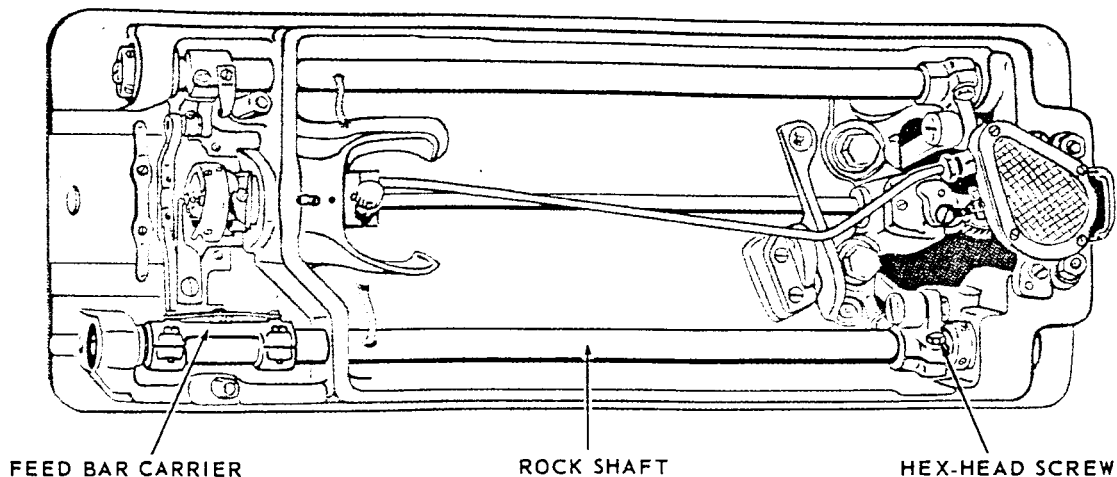


Fig. 40. Feed Bar Linkage

SETTING THE PRESSER BAR HEIGHT

When presser foot rests firmly on throat plate, with feed dog below throat plate, there should be a slight clearance between guide and lifting bracket, shown in Fig. 41.

When presser foot is raised to highest point and needle bar is at bottom of its stroke, top of presser foot should not contact needle bar.

To adjust for clearance between guide bracket and lifting bracket, remove large plug from face plate and loosen clamp screw thus made accessible.

This clamp screw is shown in Fig. 41. Face plate is removed in this illustration only to show entire presser bar assembly.

Raise or lower guide bracket as required.

Make certain that presser bar is correctly turned, with needle centered in needle slot (or between the toes) of presser foot then securely tighten clamp screw.

CAUTION: Whenever guide bracket has been moved on presser bar, inspect the check spring for correct setting as previously instructed.

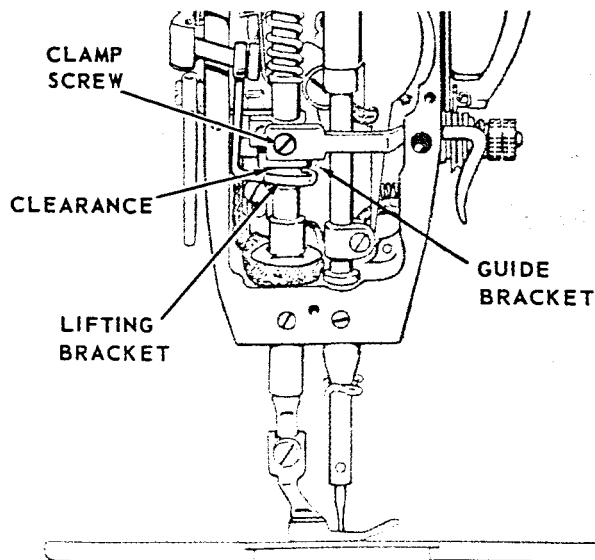


Fig. 41. Presser Bar Assembly