



**WB 302 U 406**

**Instruction manual**

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# CONTENTS

DESCRIPTION OF MACHINES -----	1
INSTALLATION -----	2
LUBRICATION -----	2
CLEANING -----	4
SPEED -----	4
NEEDLES -----	4
SETTING THE NEEDLE -----	4
THREAD -----	4
THREADING THE MACHINE -----	5
THREAD TENSIONS -----	6
PRESSURE ON MATERIALS -----	6
STITCH LENGTH REGULATION -----	6
LOOPER POSITION -----	8
LOOPER TIMING AND NEEDLE BAR SETTING -----	8
NEEDLE BAR POSITIONING -----	8
PRESSER BAR LIFT -----	9
POSITION OF SPREADER POINTS -----	9
FEED BAR HEIGHT SETTING -----	10
FEED DOG ADJUSTMENT -----	10
TIMING FEED LIFT ECCENTRIC -----	11
POSITIONING LOOP DEFLECTOR -----	11
SETTING THE NEEDLE GUARDS -----	11
ADJUSTING NEEDLE THREAD TAKE-UP -----	12
ADJUSTING NEEDLE THREAD TENSION RELEASER -----	12
ADJUSTING LOOPER THREAD TAKE-UP -----	12







## DESCRIPTION OF MACHINES

Elliptical bed machines 302U201, 302U206 and 302U406 perform high speed, two thread chain stitching on a wide variety of medium and heavy weight fabrics.

### General Features

Elliptical bed overhangs base, allowing tubular work to be stitched.

Sliding cover encloses elliptical bed.

Arm shaft is mounted with ball bearing in front and rear.

Belt driven bed shaft is mounted in ball bearing at rear and needle bearing in front.

Machine base also serves as a drip pan with a glass, oil-sump jar.

Face plate is hinged to facilitate threading and oiling.

All threading is done on operator's side of machine.

Vibrating looper thread take-up is non-winding.

Needle bar connecting link, needle bar rock frame, needle bar rock frame driving connection and spreader driving connection are all mounted on needle bearings.

Needle bar stroke: 1-1/4 inches.

Presser bar lift: 5/16 inch.

Bed Dimensions: 16-3/4 inches long, 7 inches wide. Top of bed is 7 inches above table.

Space at right of needle bar: 10 inches.

Space at left of needle bar to edge of bed: 2-1/4 inches.

Federal stitch type 401.

### Special Features of Individual machines

#### MACHINE 302U201

Two needles, two loopers.

Compound Feed-Combination of needle feed and drop feed prevents the slipping of the upper and lower plies of material and assists in two or more plies being fed evenly.

Made in gauges from 3/16 inch to 2 inches. Standard gauge are 1-3/8 inch.

#### MACHINE 302U206

Two needles, two loopers.

Puller Feed-Combination of needle feed and continuous close coupled gear driven puller feed.

Length of stitch: 4 to 12 per inch (regularly fitted for 9 stitches per inch).

Made in gauges from 3/6 inch to 2 inches. Standard gauges are 1-1/4 inches and 1-1/2 inches.

#### MACHINE 302U406

Four needles, four loopers.

Puller Feed-Combination of needle feed and continuous close coupled gear driven puller feed .

Length of stitch: 4 to 12 per inch (regularly fitted for 9 stitches per inch).

Standard gauge are 1/4 , 1, 1/4 inch. Minimum spacing between any two adjacent needles is 3/16 inch.



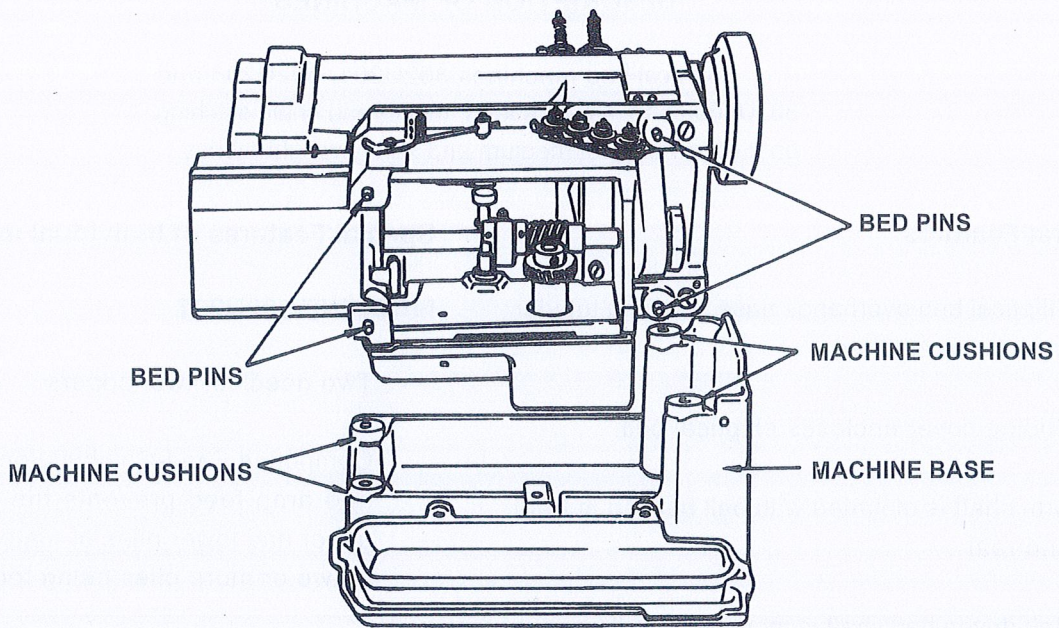


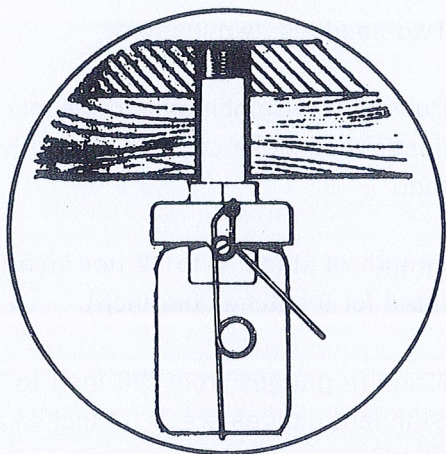
Fig. 2. Installation

### INSTALLATION

Fasten machine base to table with hole for oil drain jar aligned with hole in table. Attach oil drain jar.

Set Machine onto machine base by inserting bed pins into machine cushions as shown in Fig. 2.

Connect foot lifter lever to foot lifter treadle with chain furnished for this purpose.



OIL DRAIN JAR

### LUBRICATION

These machines have an automatic oiling system consisting of a hollow arm shaft and hollow bed shaft which act as reservoirs. Oil is delivered by centrifugal force, through small jets in the shafts, to all principle bearings when the machine is operating.

Oil holes are provided for lubricating movable parts in contact which are not lubricated from the reservoirs.

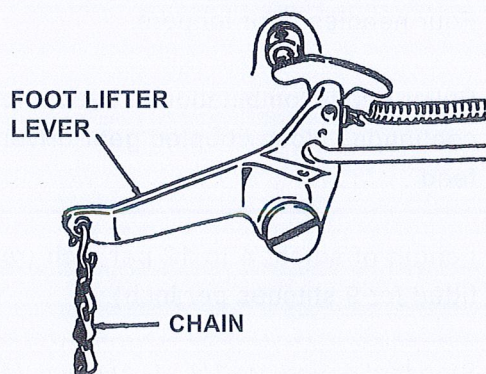


Fig. 3. Foot Lifter Lever



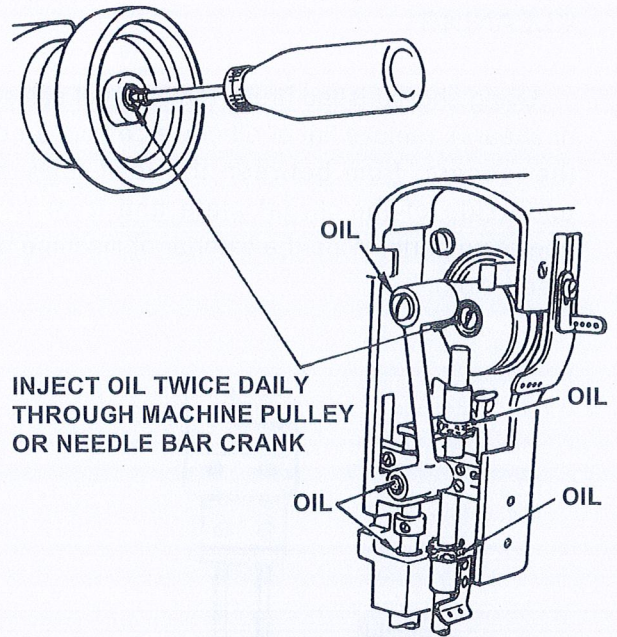
**Complete Lubrication of Machine is Necessary Before Operation**

Use stainless water-white straight mineral oil.

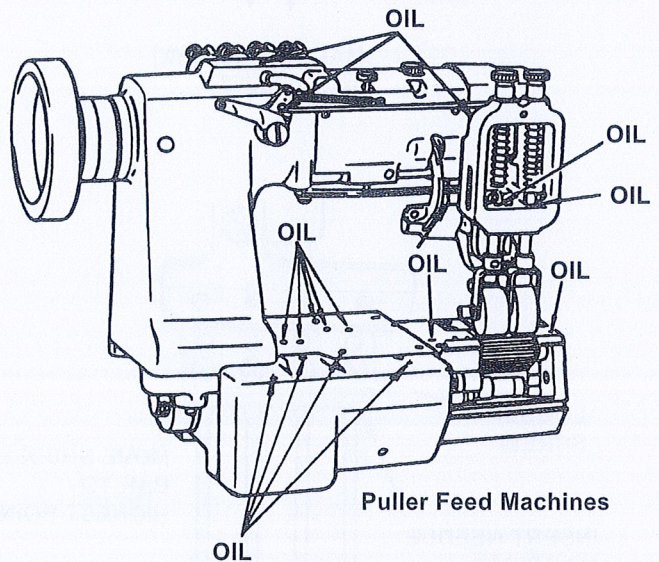
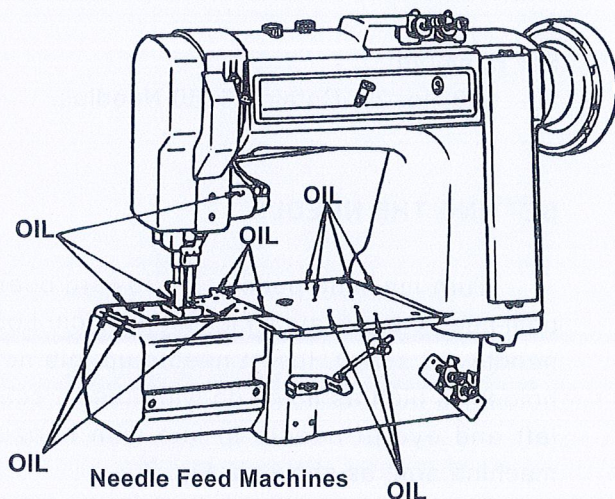
Arm shaft reservoir is filled through oil hole at end of machine pulley or at end of needle bar crank as shown in Fig. 4.

Needle bar connecting link needle bearings, connecting stud and needle bar bearings are readily accessible for lubrication under face plate as shown in Fig. 4.

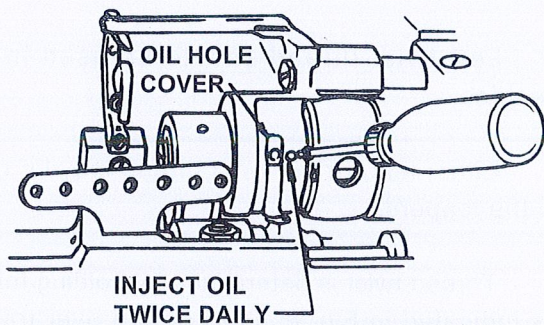
Needle bar rock frame needle bearings are lubricated through oil hole indicated in Fig. 5.



**Fig. 4. Arm Shaft Reservoir**



**Fig. 5. Lubricating the Machine**



**Fig. 6. Bed Shaft Reservoir**

Bed shaft reservoir is filled through hole under looper driving crank oil hole cover, Fig. 6, or through oil at end of bed shaft connection belt pulley.

Moving parts under bed may be lubricated through holes in bed surface or by removing bed plates. Other moving parts in contact under bed and at rear of machine are provided with oil holes for efficient lubrication.

A machine in continuous use should be lubricated twice daily.



## CLEANING

Using short bristled brush (not point of scissors or shears), remove lint or other waste from around the loopers, from between the feed rows and underside of the throat plate and from other operating parts. Wipe the exterior of machine with a soft cloth.

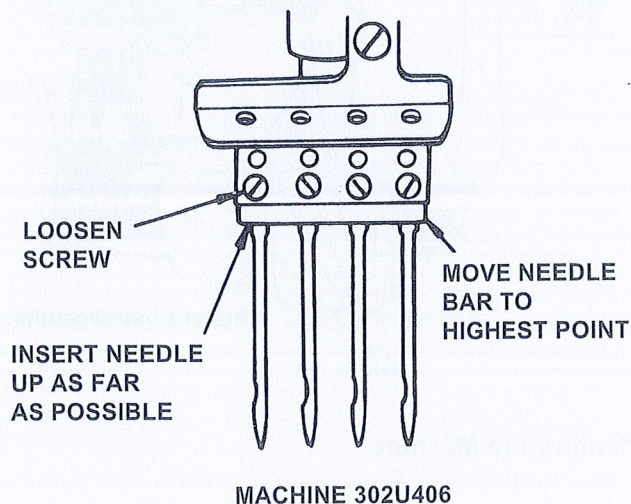
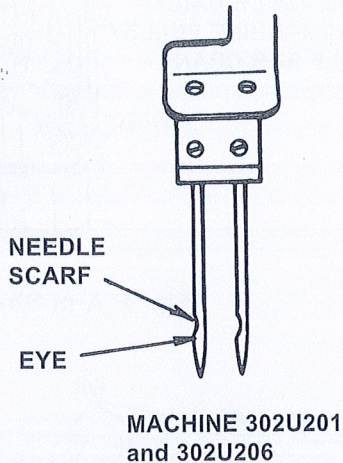
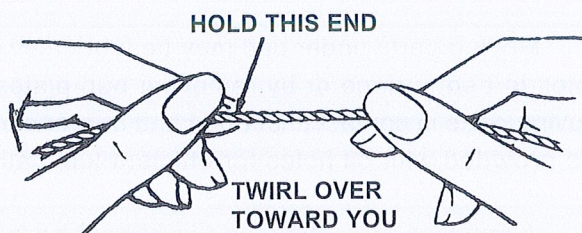


Fig. 7. Setting the Needle



## SPEED

Maximum speed for these machines is 4500 stitches per minute. Operating speed depends on material sewn and operation performed.

New machines should run at a speed of 500 stitches per minute less than maximum speed for the first 100 hours of operation.

## NEEDLES

Use Singer Needle, Catalog 3260, in sizes ranging from 14 to 25.

Size of needle for an operation is determined by size of thread used and type of material sewn.

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

For Example:

100 No. 22, Catalog 3260 Needles.

## SETTING THE NEEDLE

Turn machine pulley over toward operator until needle bar is at its highest position. Loosen needle set screw. Insert needle up into needle holder as high as it will go with needle scarf to left and eye of needle in line with horizontal machine arm, as shown in Fig. 7.

## THREAD

Left twist thread should be used in the needles.

Either left or right twist thread may be used in the loopers.

Thread twist is determined by holding thread as indicated in Fig. 8. Twirl thread over toward you with thumb and forefinger of right hand. If left twist thread, strands will wind tighter. If right twist thread, strands will unwind or separate.



## THREADING THE MACHINE

### Upper Threading

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

Pass thread through threading points indicated in Fig. 9.

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

The 302U201, 302U206 and 302U406 are all threaded as indicated in Fig. 9.

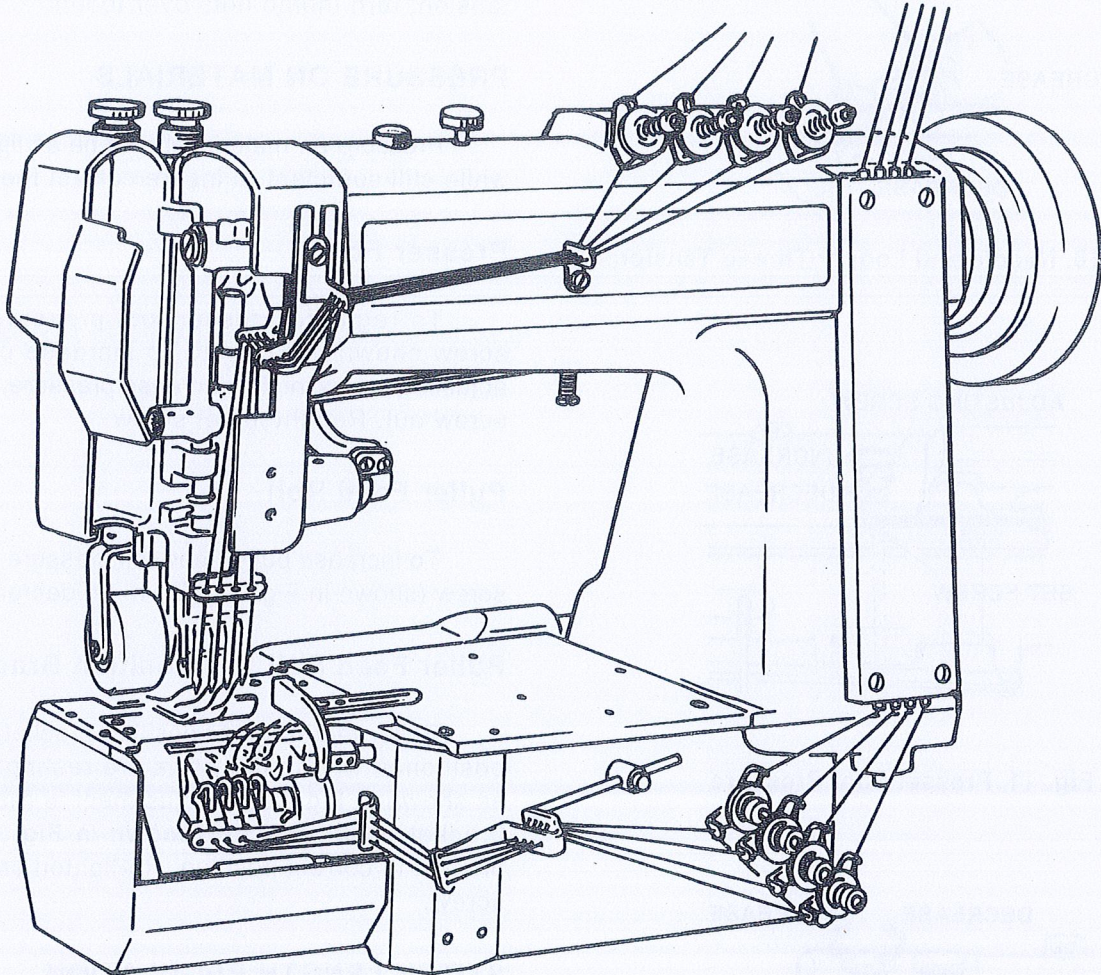
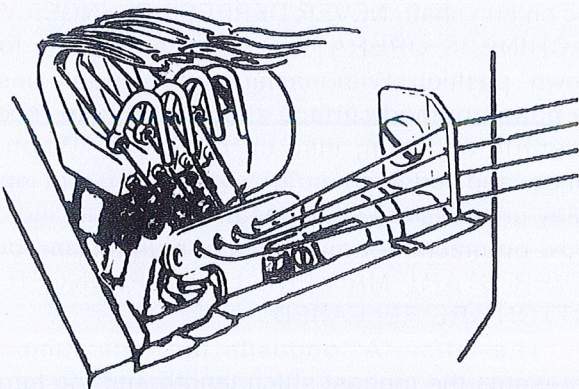


Fig. 9. Threading the Machine



### Lower Threading

Turn machine pulley over toward operator until needle bar is at its highest position. Pass thread through threading points indicated in Fig. 9. When threading looper, insert wire threader into front of looper eye shown at left. With threading tweezers, drop thread into wire threader opening and draw wire threader toward you from back to front through the looper eye. Draw about two inches of thread through looper to start sewing.



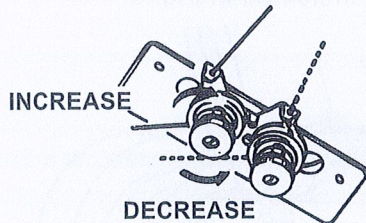
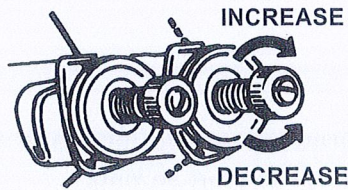


Fig. 10. Needle and Looper Thread Tensions

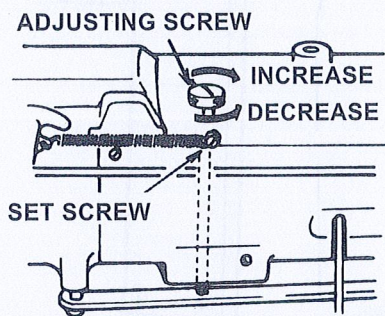


Fig. 11. Presser Foot Pressure

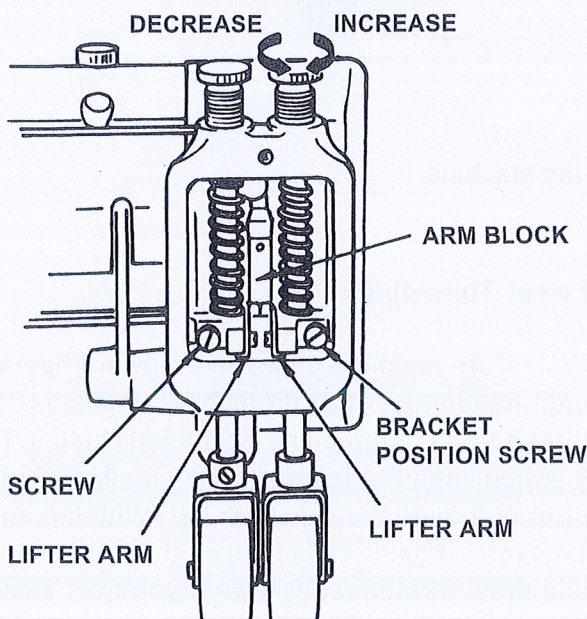


Fig. 12. Puller Feed Rolls

## THREAD TENSIONS

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

### Regulate Needle Thread Tensions Only When Presser Foot is Down

Needle thread tension and looper thread tension are regulated by thumb nuts shown in Fig. 10. To increase tension, turn thumb nuts over to right. To decrease tension, turn thumb nuts over to left.

## PRESSURE ON MATERIALS

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

### Presser Foot

To regulate presser foot pressure, loosen set screw shown in Fig. 11. To increase pressure, turn adjusting screw in. To decrease pressure, turn adjusting screw out. Retighten set screw.

### Puller Feed Roll

To increase puller feed roll pressure, turn adjusting screw (shown in Fig. 12) down. To decrease, turn up.

### Puller Feed Roll Bar Position Brackets

Puller feed roll bar position brackets are correctly positioned when lifter arms are resting on arm block as shown in Fig. 12. If adjustment is required, loosen bracket position screw shown in Fig. 12 and lower bracket to correct position. Re-tighten bracket position screw.

## STITCH LENGTH REGULATION

### 302U201—Compound Feed

To regulate stitch length, depress plunger on machine arm shown in Fig. 13 and turn machine pulley until plunger drops into recess in eccentric adjusting disc on arm shaft. NEVER DEPRESS PLUNGER WHEN MACHINE IS OPERATING. Turn plunger to lock in "Down" position. With machine pulley in this position, the button on bed surface should drop into recess in eccentric adjusting disc on bed shaft. When both plunger and button are in "Down" position, turn machine pulley until desired stitch length is opposite indicating arrow on machine arm. Release plunger and button. NEVER START MACHINE UNTIL PLUNGER AND BUTTON ARE RELEASED.

The letter "A" opposite the indicating arrow represents the longest stitch length and the letter "L" represents the shortest stitch length.



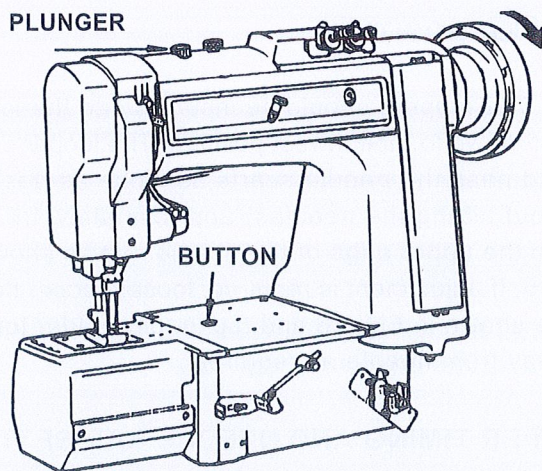


Fig. 13. Stitch Length Regulation

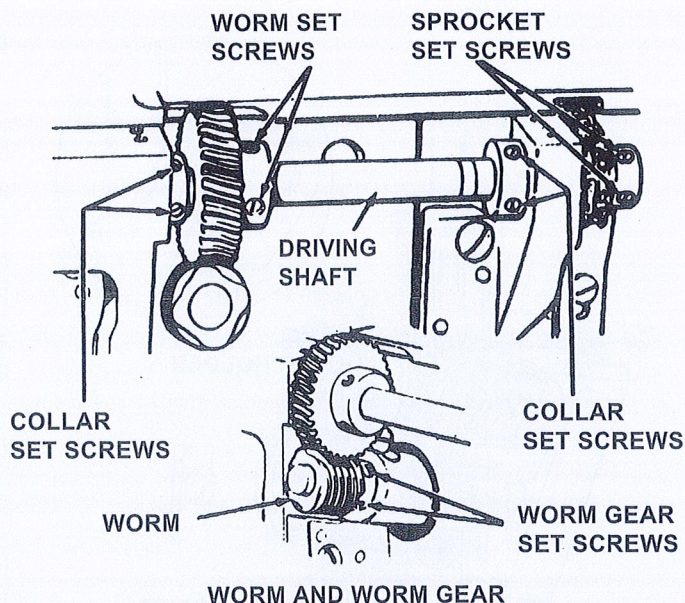


Fig. 14. Puller Stitch Length Regulation

### 302U206 and 302U406—Puller Feed

Puller feed stitch length is regulated by changing the worm and worm gear shown in Fig. 14. These puller feed machines are regularly furnished with a worm and worm gear for 9 stitches per inch but can be fitted for stitch lengths ranging from 4 to 12 per inch. To change puller feed stitch length worm and worm gear, first remove cover from rear of machine. Loosen collar set screws, worm gear set screws, worm set screws and sprocket set screws. Slide driving shaft to right far enough to allow for removal of worm and worm gear. Place new worm on cross shaft and turn worm in operating direction so that first set screw is tightened into flat of cross shaft. Tighten the other worm set screw, also. Place worm gear on driving shaft in a position engaged with worm and set shaft in brackets so that end of shaft is flush with end of sprocket as shown in Fig. 14. Tighten worm gear set screws and sprocket set screws. Set collars against brackets to remove end play as shown in Fig. 14 and tighten collar set screws.

### Synchronizing Needle Feed with Puller Feed

Depress plunger on machine arm shown in Fig. 15 and turn machine pulley until plunger drops into recess in eccentric adjusting disc. NEVER DEPRESS PLUNGER WHEN MACHINE IS OPERATING. Then turn machine pulley toward operator to increase stitch length, or away from operator to decrease stitch length. Release plunger. NEVER START MACHINE UNTIL PLUNGER IS RELEASED. Repeat this procedure to gradually increase or decrease the needle feed stitch length until it matches puller feed stitch length.

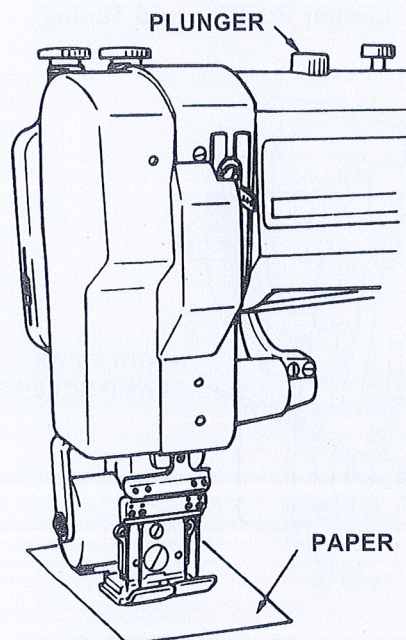


Fig. 15. Synchronizing Needle Feed With Puller Feed

One method of determining whether needle feed is synchronized with puller feed is by using an ordinary sheet of paper. Raise puller feed rolls and presser foot and place paper in sewing position. Lower puller feed rolls and presser foot onto paper. Rotate machine pulley by hand through a few stitching cycles. In needle feed is synchronized with puller feed, the holes in the paper produced by the needles will be the same size as the needles. If the needle feed is not synchronized with the puller feed, the needles will tear the paper, producing oblong shaped holes. Continue adjusting needle feed in this way until the needles produce circular holes of their own size in the paper.



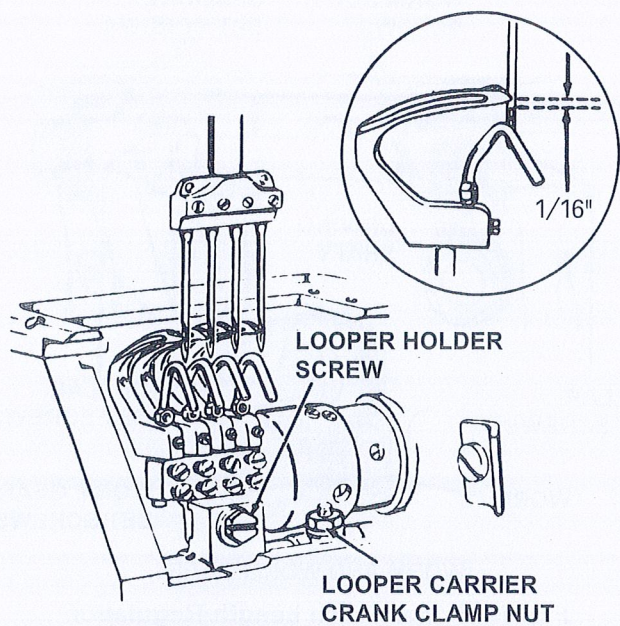


Fig. 16. Looper Position and Timing

## LOOPER POSITION

The loopers should be inserted into the looper holder, down to their lowest position. The looper points should pass the needle scarfs as close as possible (without hitting the needles) approximately 1/6 inch above the upper edge of the needle eye as shown in Fig. 16. If adjustment is required, loosen looper holder screw shown in Fig. 16 and tap looper holder toward or away from needle as required.

## LOOPER TIMING AND NEEDLE BAR SETTING

When looper timing mark "LT" on machine pulley is opposite indicating arrow on machine arm, the looper point should be at the center of the needle blade. If adjustment is required, loosen looper carrier crank clamping nut shown in Fig. 16 and move looper carrier forward or backward to correct position.

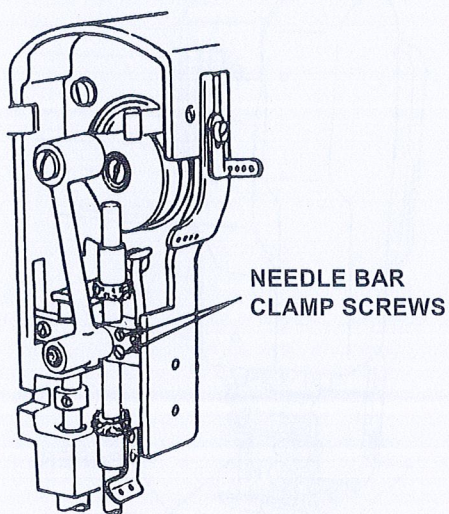


Fig. 17. Setting Needle Bar

With looper point at the center of needle blade, the needle bar height is correct when the upper edge of the needle eye is about 1/16 inch below the looper point. If adjustment is required, loosen needle bar clamping screws shown in Fig. 17 and raise or lower needle bar to correct position.

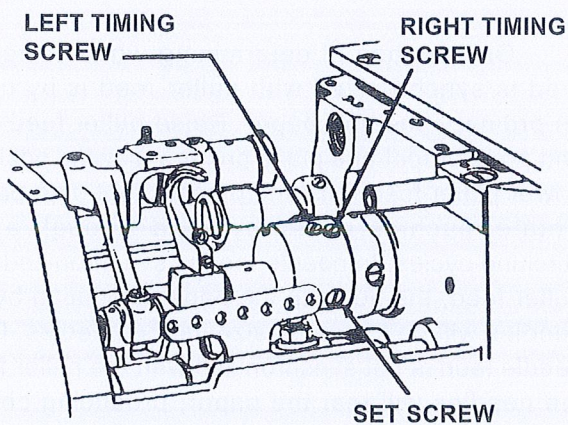


Fig. 18. Timing Set Screws

Turn machine pulley over until letter "G" is opposite indicating arrow on machine arm. At this position the looper point should again be at the center of the needle blade about 1/16 inch above the upper edge of the needle eye. When adjustment is required, loosen set screw indicated in Fig. 18. Then, loosening the right timing screw shown in Fig. 18 and tightening the left timing screw moves the looper point forward in its cycle with respect to the needle. Loosening the left timing screw and tightening the right timing screw moves the looper point backward in its cycle with respect to the needle. Adjust timing screws and looper carrier until the looper driving crank positions the looper point about 1/6 inch above the upper edge of the needle eye on its forward and reverse stroke.

## NEEDLE BAR POSITIONING

Needles should enter the needle holes of the feed dog or throat plate toward the front and centered with respect to the sides. To adjust, press needle bar rock frame, Fig. 19, against drive arm, and at the same time loosen the two driving arm clamp screws. Continue holding the rock frame against the drive arm, move needle bar to correct position and tighten two clamp screws.



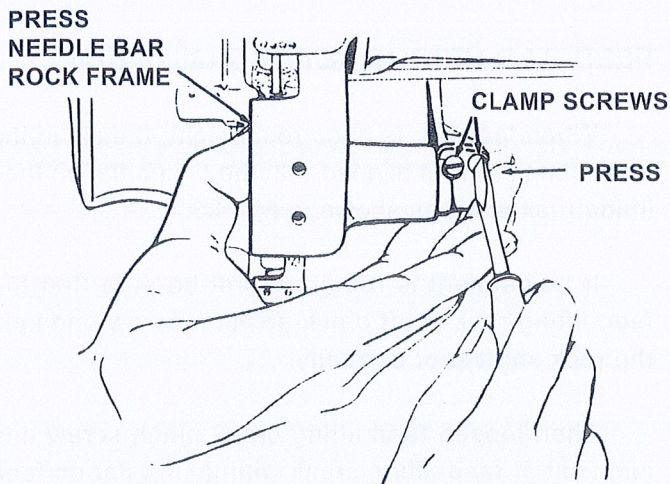


Fig. 19. Positioning Needle Bar Rock Frame

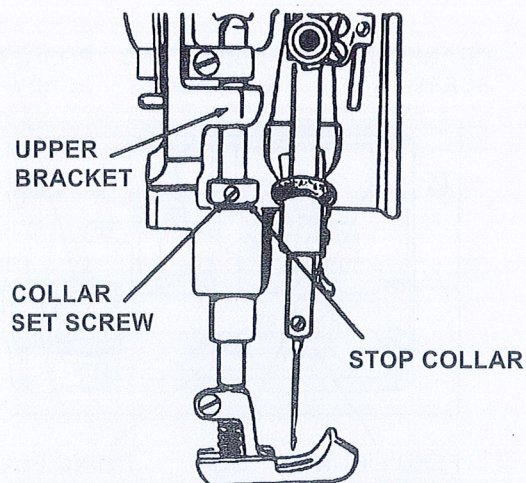


Fig. 20. Presser Bar Height Setting

### PRESSER BAR LIFT

When the presser foot is raised by the presser bar lifter and the needle is at its highest position, the point of the needle should not protrude below the presser foot.

To adjust, turn machine pulley over toward operator until needle is at its highest position. Loosen collar set screw, Fig. 20. Raise presser foot to the correct height, place stop collar against upper bracket, and tighten the screw.

### POSITION OF SPREADER POINTS

#### Spreader Points in Relation to Loopers

The correct height of the spreader points as the loopers pass on their forward stroke is opposite the upper edge of the thread groove at the left side of the loopers as indicated in Fig. 21.

The clearance between the spreader points and the loopers should be approximately a double thickness of ordinary paper.

If adjustment is required, loosen spreader holder set screws, shown in Fig. 21 and set spreader points at correct position.

#### Spreader Points in Relation to Needles

Turn machine pulley over until, on the downward stroke of the needle, the needle point and the spreader point are on the same level. The distance as illustrated in Fig. 22 between the spreader point and the looper point should then be approximately 1/16 inch. If adjustment is required, loosen spreader screw shown in Fig. 21 and move spreader points backward or forward as required. Re-tighten spreader screw.

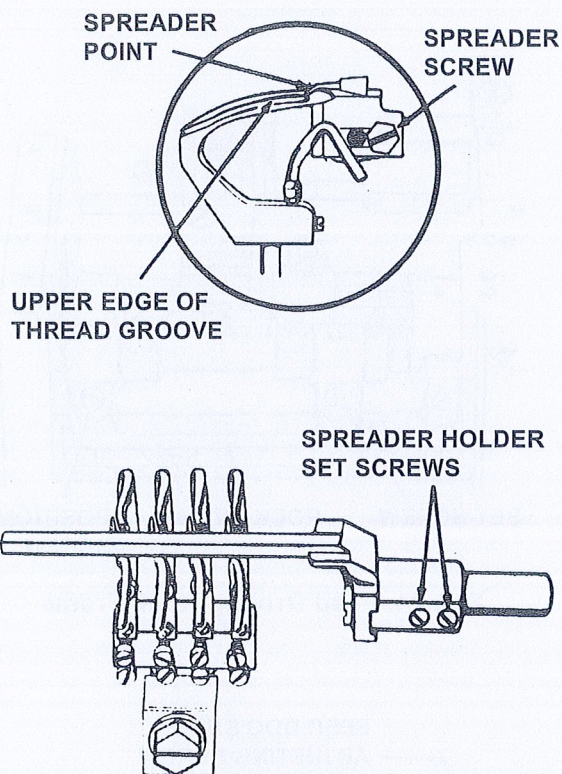


Fig. 21. Spreader Points in Relation to Loopers

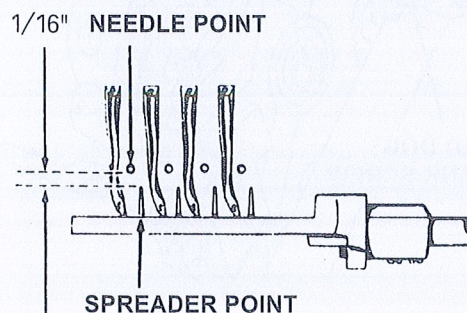


Fig. 22. Spreader Points in Relation to Needles



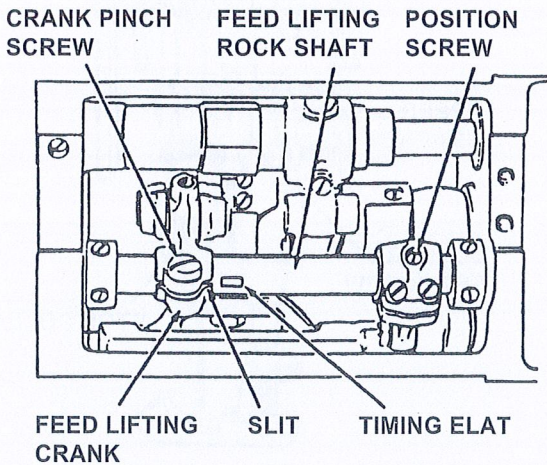


Fig. 23. Feed Bar Height Setting

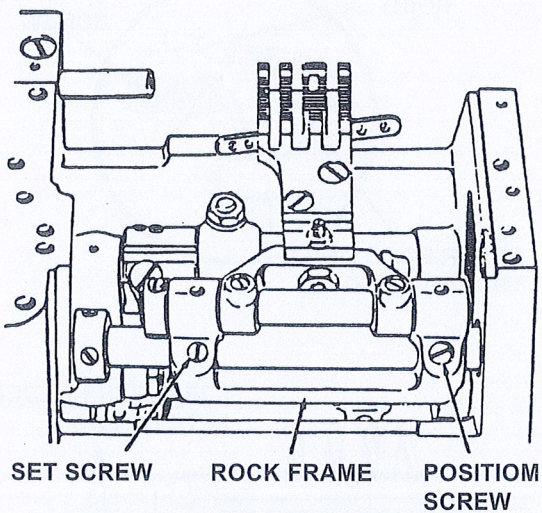


Fig. 24. Feed Driving Rock Frame

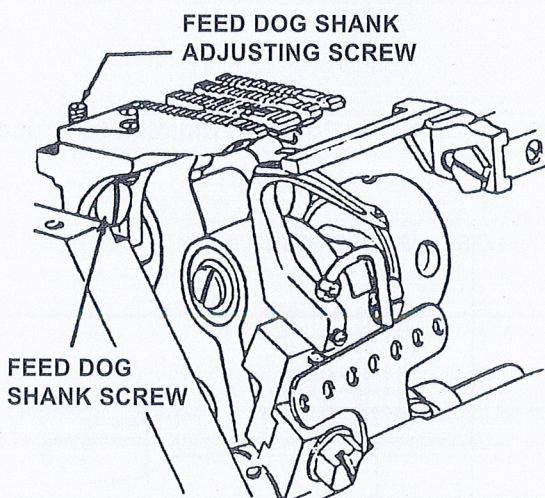


Fig. 25. Feed Dog and Shank Screw

## FEED BAR HEIGHT SETTING (302U201)

When feed bar is at correct height, the slit in the feed lifting crank is aligned with the timing flat on feed lifting rock shaft as shown in Fig. 23.

If adjustment is required, first be sure that the feed lifting rock shaft crank position screw engages the rock shaft spot correctly.

Then loosen feed lifting crank pinch screw and align slit of feed lifting crank with timing flat on feed lifting shaft. Re-tighten crank pinch screw.

## FEED DOG ADJUSTMENT (302U201)

### Lengthwise Setting

The feed dog is correctly adjusted when its movement is centralized between forward and rear ends of throat plate.

For adjustment, loosen position screw and set screw, Fig. 24, and move rock frame forward or backward to centralize the movement of the feed dog in the throat plate. Re-tighten set screw and position screw.

### Sidewise Setting

The feed dog should clear the sides of the throat plate with approximately the same distance on both sides. If adjustment is required, loosen position screw and set screw shown in Fig. 24 and feed lifting crank pinch screw shown in Fig. 23 and move assembly to correct position.

### Height Setting

The feed dog, at its highest position, should be limited to the projection of the full depth of teeth above the throat plate. It should be at its highest position when the needle is at its lowest position.

For adjustment, loosen feed dog shank screw shown in Fig. 25. To raise feed dog, turn feed dog shank adjusting screw, Fig. 25, down. To lower feed dog, turn feed dog shank adjusting screw up.



### TIMING FEED LIFT ECCENTRIC (302U201)

The feed lifting eccentric shown in Fig. 26 can be adjusted to permit the teeth of the feed dog to remain below the throat plate until the needle penetrates the material.

It is correctly adjusted when the edge of the looper driving crank lines up with the edge of the lubricating pad on the feed lifting eccentric as shown in Fig. 26.

Set screws, accessible through hole in feed driving connection, allow for adjustment when required.

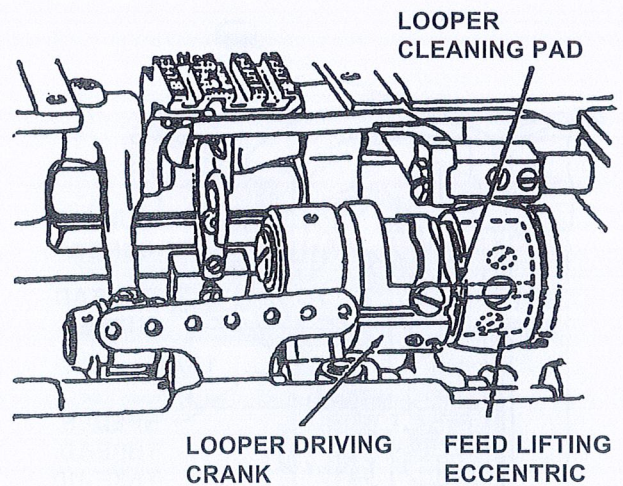


Fig. 26. Timing Feed Lift Eccentric

### POSITIONING LOOP DEFLECTOR (302U201)

Loop deflector, located on underside of feed dog, is correctly positioned when there is approximately a 1/32 inch clearance between needle and loop deflector as shown in Fig. 27.

Loop deflector screws shown in Fig. 27 allow for adjustment when required.

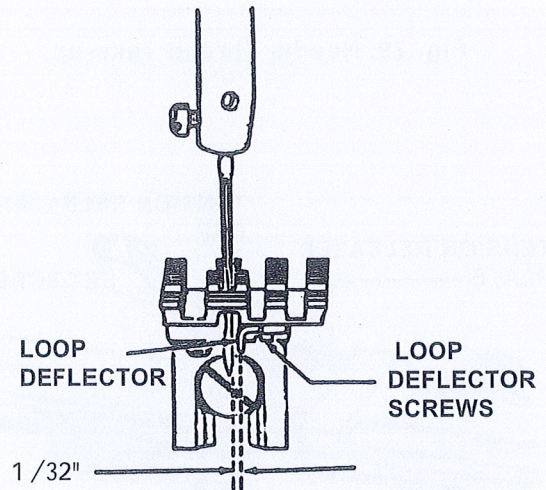


Fig. 27. Positioning Loop Deflector

### SETTING THE NEEDLE GUARDS

The needle guards are correctly set when the needles pass them as close as possible without hitting.

To adjust, turn machine pulley over toward operator until points of loopers are about to pass needles on their forward stroke.

Loosen needle guard set screws shown in Fig. 28 and turn needle guards as close as possible to the needles without touching. Tighten set screws.

Check by springing the needles to the left while turning the machine pulley to make certain that the looper points do not strike the needles.

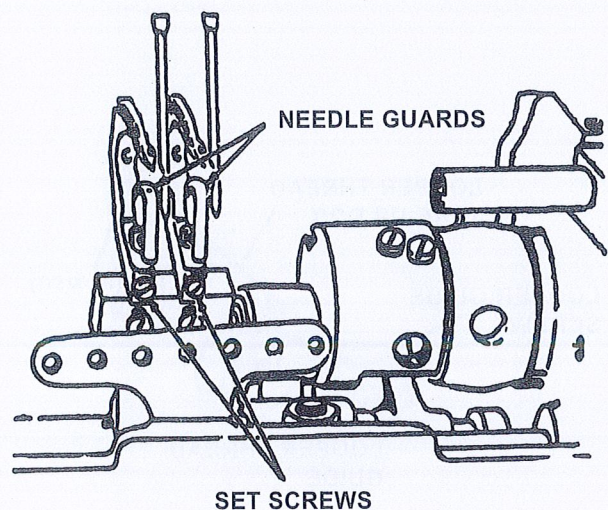


Fig. 28. Setting the Needle Guards



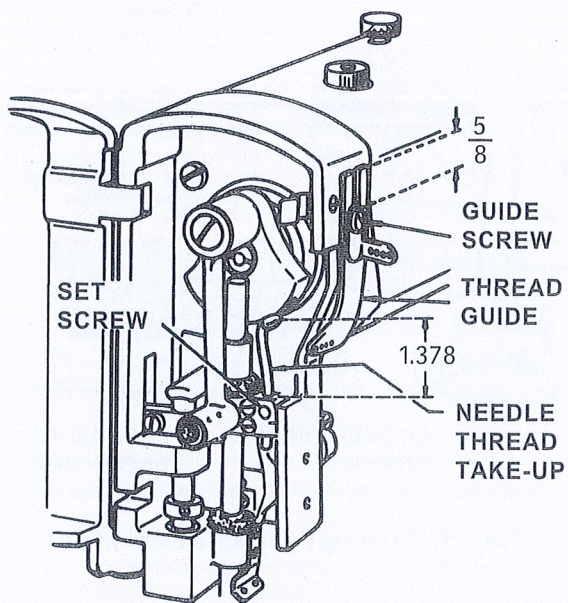


Fig. 29. Needle Thread Take-up

## ADJUSTING NEEDLE THREAD TAKE-UP

The needle thread take-up and thread guide may be adjusted to increase or decrease the amount of thread drawn at the top of the needle bar stroke. To increase the amount, loosen thread take-up set screw, Fig. 29, and raise take-up (or loosen guide screw and lower guide). To decrease the amount, reverse the adjustment by lowering the take-up or raising the guide.

For average sewing conditions, the guide should be set with upper end  $\frac{5}{8}$  inch above the guide screw. The thread take-up should be set with the lower end 1.378 inch below the bottom of its holder.

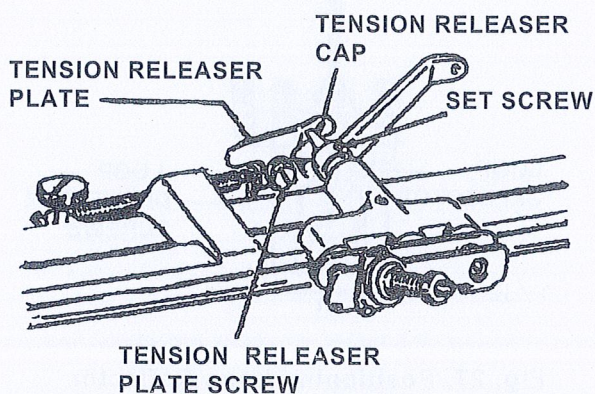


Fig. 30. Needle Thread Tension Release

## ADJUSTING NEEDLE THREAD TENSION RELEASER

When correctly adjusted, the tension releaser should release tension on needle thread when the presser foot is about  $\frac{1}{4}$  inch above throat plate. To adjust, loosen set screw, Fig. 30 and move tension releaser cap out for earlier release of tension, or in for later release. Tighten set screw. Tension releaser plate, Fig. 30, may also be adjusted to release tension at proper time.

## ADJUSTING LOOPER THREAD TAKE-UP

The looper thread take-up and guide may be adjusted for handling more or less thread, according to thickness of material and length of stitch, and to change the ratio of looper thread in the finished stitch.

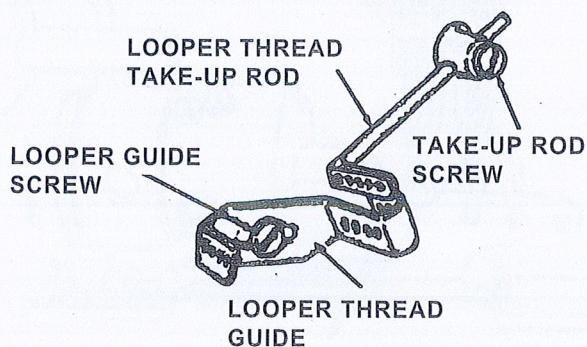


Fig. 31. Looper Thread Take-up

To change the amount of thread handled, loosen looper thread guide screw, Fig. 31 and looper thread take-up rod screw. Move thread guide and take-up rod to the left for more thread take-up, or to the right for less thread take-up. Tighten the two set screws making certain that the take-up rod passes through the center of the guide yoke.

To change the ratio of looper thread in finished stitch, loosen thread guide screw, Fig. 31, and lower the yoke (right end) of the thread guide for more thread. For less thread, raise right end of guide. Hold in position and tighten guide screw.