SINGER
191 D

Service Manual
SINGER*

191 D
Machine

THE SINGER COMPANY

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TO SET NEEDLE BAR AT CORRECT HEIGHT

PREPARATION:

Remove face plate, slide plate and throat plate. See that needle is correctly set in needle bar.

Lower end of bushing (1), Fig. 2 must be set as shown in Fig. 2. To reset bushing, loosen screw (2).

CHECK:

When needle bar is at its lowest point (during rotation of machine pulley), UPPER TIMING MARK on needle bar should be level with lower end of bushing (1).

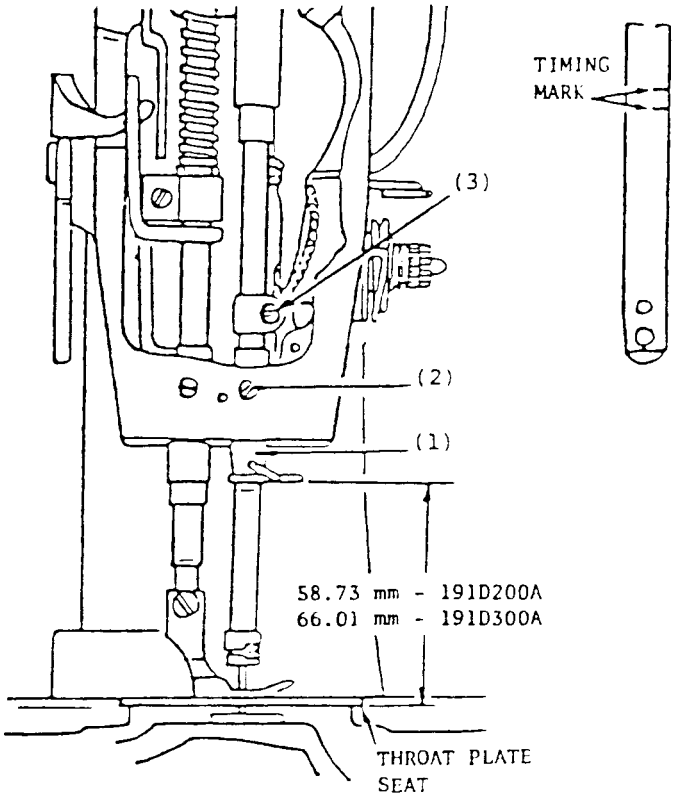

Fig. 2

SETTING:

Loosen clamping screw (3), Fig. 2. Raise or lower needle bar so that UPPER TIMING MARK is level with lower end of bushing (1). Then securely tighten screw (3).

Check timing of sewing hook as instructed on page 5.

Replace throat plate and slide plate.

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

TO SET CHECK SPRING HEIGHT

PREPARATION:

Thread the machine and place a lightweight material under presser foot.

CHECK:

Turn machine pulley over toward operator slowly. When take-up lever begins to rise, check spring (4), Fig. 3 makes a slight dip and a return to its higher position. Later, as take-up lever approaches top of stroke, check spring (4) should be drawn all the way down; setting the stitch. As lever descends, check spring (4) returns to rest.

SETTING:

Loosen screw (5), Fig. 3. Turn stud (6), Fig. 3 (at the same time turning entire tension assembly) either over toward left to lower check spring and decrease its movement, or over toward right to raise check spring and increase its movement. Securely tighten set screw (5).

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

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

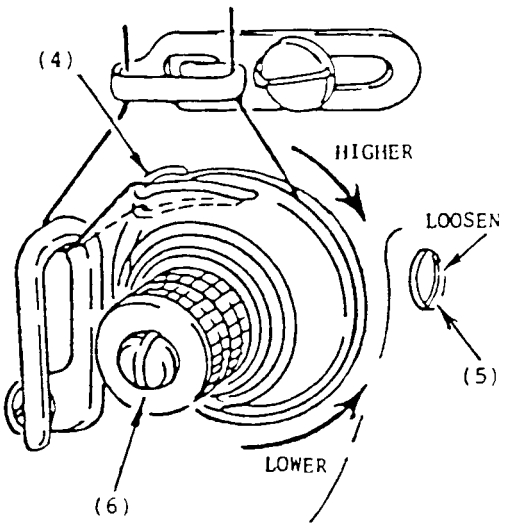

Fig. 3

TO SET CHECK SPRING TENSION

PREPARATION:

Thread the machine. Securely tighten set screw (5), Fig. 4. Make certain thumb nut is on stud (6), Fig. 4.

CHECK:

Tension on check spring (4), Fig. 4, should be sufficient to ensure action at top speed; but still light enough to permit itself to be drawn all the way down (as take-up lever approaches height of stroke) before any thread is drawn through the tension discs.

SETTING:

Using a large screwdriver in slot of stud (6), turn stud either over toward left to decrease tension or over to right to increase it, as shown.

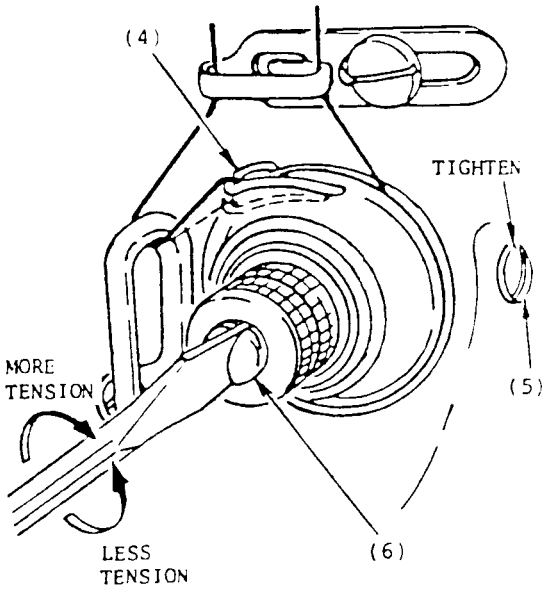

Fig. 4

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

TO SET PRESSER BAR AT CORRECT HEIGHT

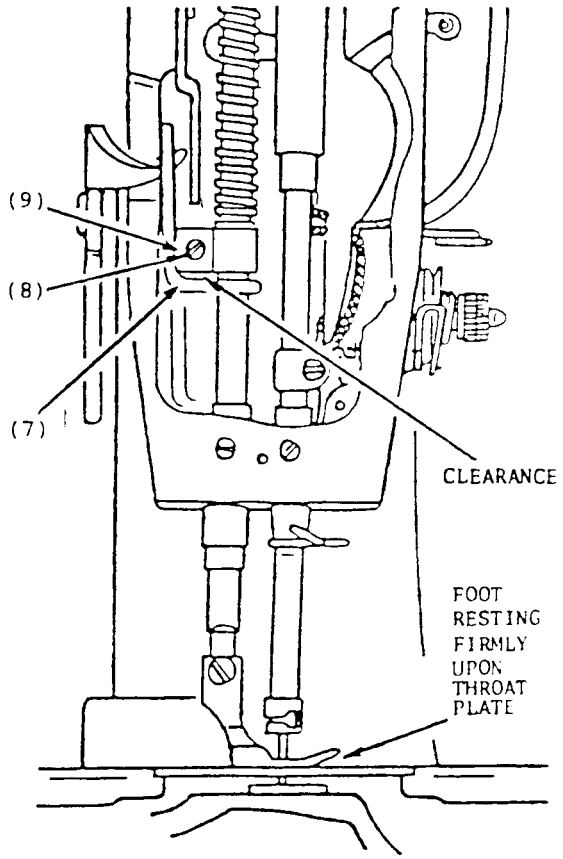

Fig. 5

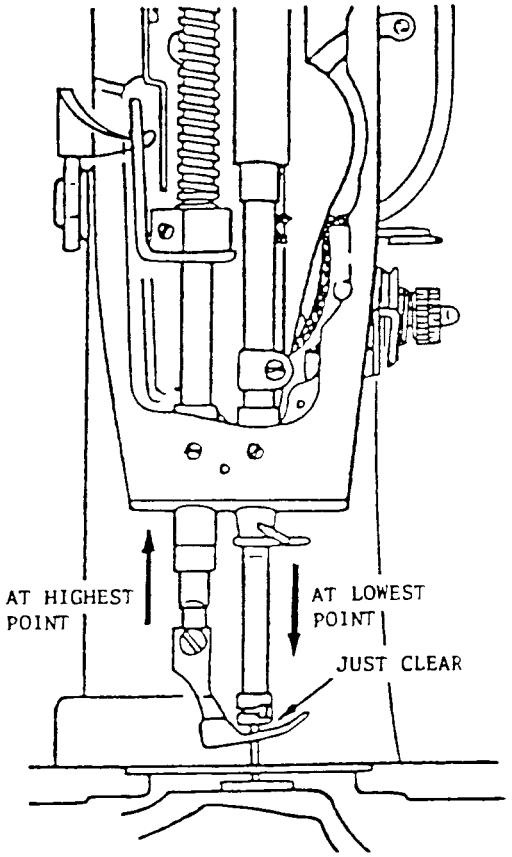

Fig. 6

PREPARATION:

Remove face plate and slide plate.

CHECK:

1. When presser foot rests firmly upon throat plate (with feed dog below throat plate) there should still be some clearance between guide bracket (9), Fig. 5 and lifting lever link (7), as shown in Fig. 5.
2. When presser foot is at its highest point and needle bar is at its lowest, top of presser foot should clear lower end of needle bar, as shown in Fig. 6.

SETTING:

Loosen clamping screw (8), Fig. 5. Raise or lower guide bracket (9), as required. Securely tighten screw (8).

TO TIME THE SEWING HOOK AND ALSO SET THE SEWING HOOK SIDEWISE IN RELATION TO THE NEEDLE

PREPARATION:

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

CHECK:

When lower timing mark on needle bar is level with lower end of lower needle bar bushing (1), the point of the sewing hook should be at the center of the needle, as shown in Fig. 7.

Also, when point of sewing hook passes needle, clearance between hook point (10), Fig. 8 and needle should be approximately equal to thickness of a piece of ordinary notepaper (about .13 mm), as shown in Fig. 9.

NOTE: Not only point of sewing hook but entire "FLAT" of hook point should clear scarf on needle blade. Normally, a .5 mm clearance is provided between hub of hook and oil retaining collar.

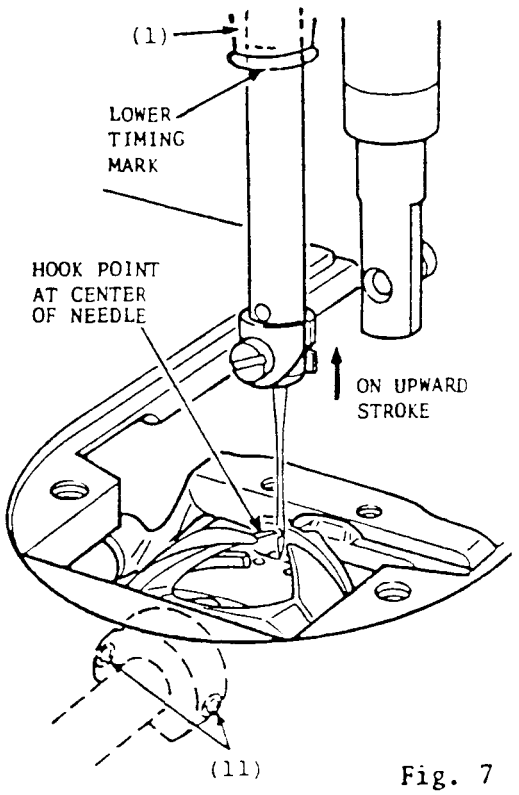

Fig. 7

SETTING:

Loosen two set screws (11), Fig. 7 in hub of hook. Then retighten one of the set screws very lightly so that the sewing hook can still be turned on the shaft.

Hold shaft immovable and turn hook as required to bring point of hook to center of needle as shown in Fig. 7 and at the same time adjust clearance between needle and hook point as shown in Fig. 9.

Tighten set screws (11) lightly, turn machine pulley to make certain the sewing hook is correctly set in relation to the needle. Then securely tighten set screws (11).

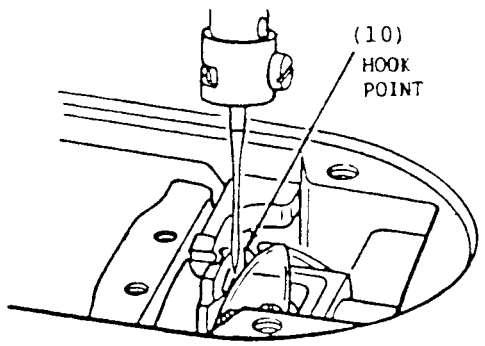

Fig. 8

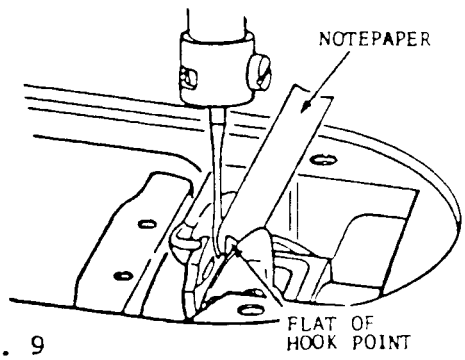

Fig. 9

FEED REVERSE LEVER

Before the machine leaves the factory, the spring tension of the feed reverse lever is set at an appropriate tension for easy and comfortable sewing operation.

If it is necessary to adjust the feed reverse lever spring tension, tip machine back and loosen feed reverse lever spring retainer screw (13) holding the spring retainer (12) on the machine leg. Move spring retainer (12) up or down, as required, and firmly tighten screw (13).

The lighter the tension, the easier it is to operate the feed reverse lever, however the tension should be set a little heavier for maximum stitch length and high speed sewing.

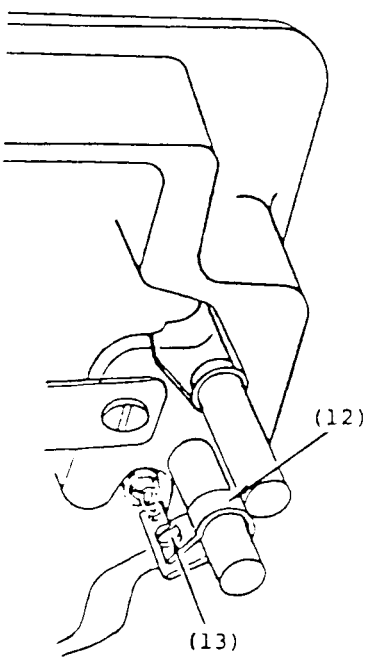

Fig. 10

FEED REGULATING DIAL

Normally, the machine is adjusted to sew a maximum stitch length of 4.2 mm. This however, can be changed to 5 mm (5 s.p.i.) by relocating the feed regulating dial serration plate (14) in the recess on the reverse side of the feed regulating dial, as shown in Fig. 11.

When feed regulating dial serration plate (14) has been relocated in the recess on the reverse side of the dial, replace dial on machine and turn dial until feed reverse lever becomes immovable, then check that graduation "0" on the dial is in 12 o'clock position. If adjustment is necessary, loosen feed regulating dial cap screw and turn dial clockwise or counterclockwise, as required. Securely tighten the cap screw.

CAUTION: Make sure the feed dog clears the front and rear edges of the throat plate slots when maximum stitch length is changed to 5 mm.

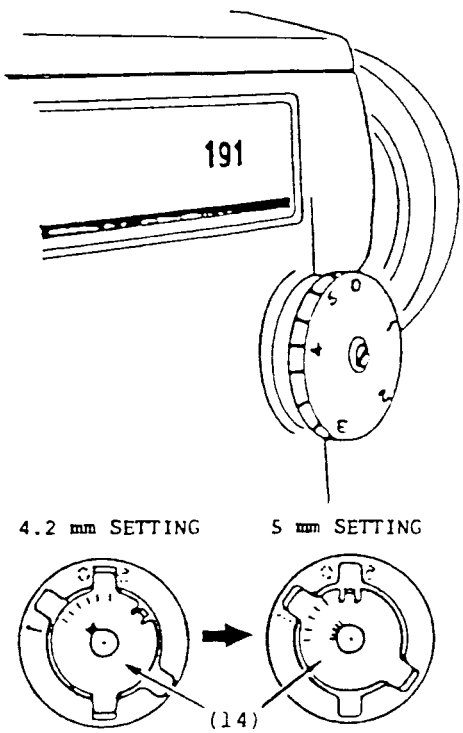

Fig. 11

TO TIME THE FEED

Before the machine leaves the factory, the feed and feed lifting eccentric is set for average sewing conditions; having the timing mark (15) (for 191D200A) or timing mark (16) (for 191D300A) align on the timing mark (17) provided on the arm shaft.

If for any reason, it is necessary to alter the timing of feed and feed lifting eccentric, the eccentric should be adjusted and locked in desired setting with set screws (18) and (19), Fig. 12.

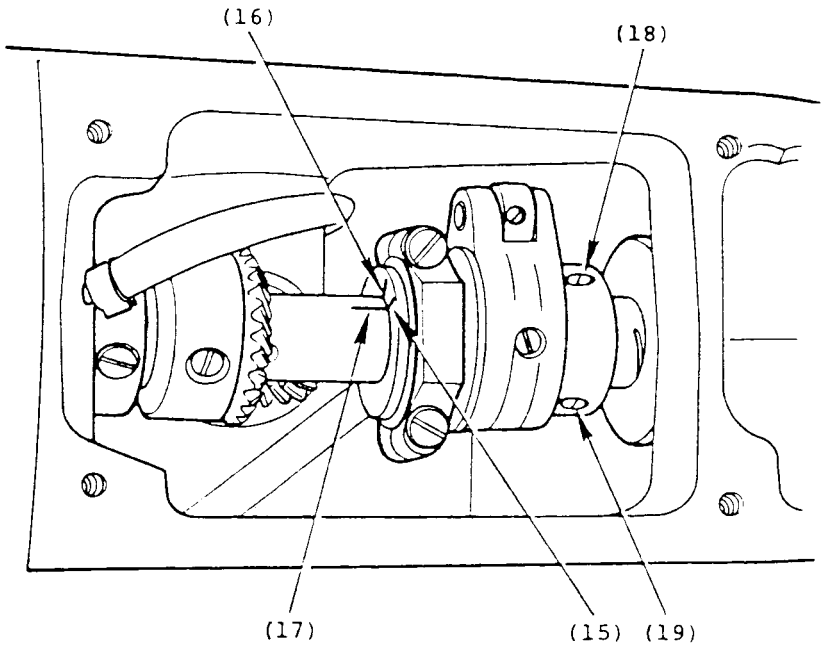

Fig. 12

NOTE: When making above adjustment, push the eccentric lightly to the right so that feed rock shaft crank connecting rod (20), feed connecting link (21), feed regulator (22), and feed regulator hinge stud (23) are lightly in contact with each respective part with no binding or excessive play between the parts. (Fig. 13)

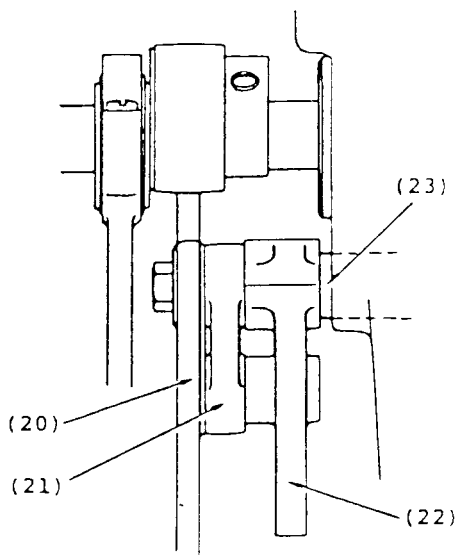

Fig. 13

TO SET FEED DOG AT CORRECT HEIGHT

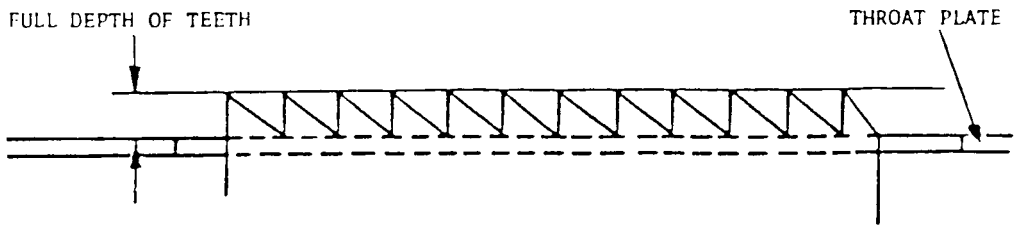

Fig. 14

When the feed dog is at its highest position, approximately the full depth of all the teeth should project above the top surface of the throat plate, as shown in Fig. 14.

Before checking the height of the feed dog, set the machine for the longest stitch.

To adjust, loosen the clamping screw (24), Fig. 15, and raise or lower the feed dog (which is fastened to the feed bar (25), Fig. 15) as required. Then securely tighten screw (24).

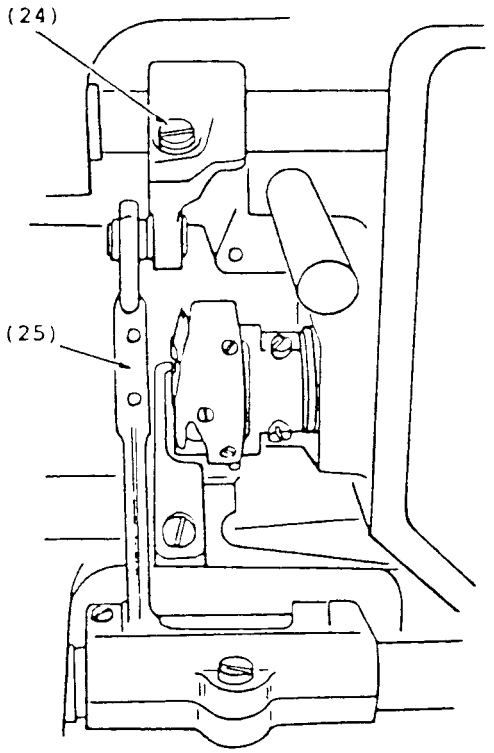

Fig. 15

If it is found necessary to adjust the feed dog height due to the material being sewn and/or exchanging the feed dog and throat plate, it should be adjusted in the manner explained above.

NOTE: Feed Dog should not contact edges of the throat plate slots during its movement but should be located centrally in relation to the front, rear and sides of the throat plate slots.

INSTRUCTIONS
FOR
REMOVAL AND REPLACEMENT
OF
PRINCIPAL ASSEMBLIES

CAUTION TO MECHANICS

Machines of Class 191D are made with extreme precision in machining and assembly, and the "Superfinish" process provides microscopically smooth bearing surfaces. Therefore, special care should be taken not to permit any misalignment of parts or to cause any scratches or nicks on the bearing surfaces by careless assembly or handling of parts. Any such damage might render the machine incapable of the long, trouble-free service for which it is designed.

TO REMOVE THE SEWING HOOK

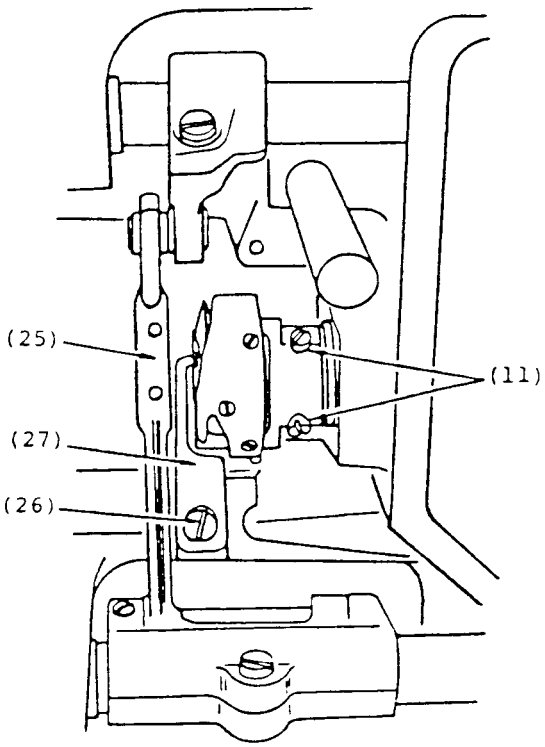

Fig. 16

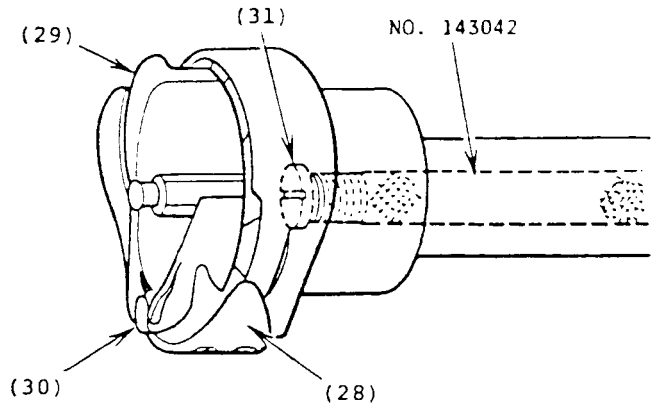

Fig. 17

Remove the needle, slide plate, throat plate and bobbin case. Remove the screw (26), Fig. 16 and the bobbin case holder position bracket (27), Fig. 16. Loosen the two set screws (11), Fig. 16 in the hub of the hook and turn the machine pulley over toward the operator until the feed bar (25) is raised to its highest point.

Turn the sewing hook until the thread guard (28), is at the bottom, as shown in Fig. 17. Turn the bobbin case holder (29), Fig. 17 until the notch (30) is also near the bottom, as shown in Figs. 17 and 18. The sewing hook can then be removed from the hook shaft.

TO REPLACE OIL FILTER 143042

While the sewing hook is off the shaft, it is advisable to replace the oil filter 143042, Fig. 17 in the end of the hook shaft. Unscrew the filter from the center of the shaft at (31), Fig. 17 and replace with a complete new filter 143042.

TO REPLACE THE SEWING HOOK

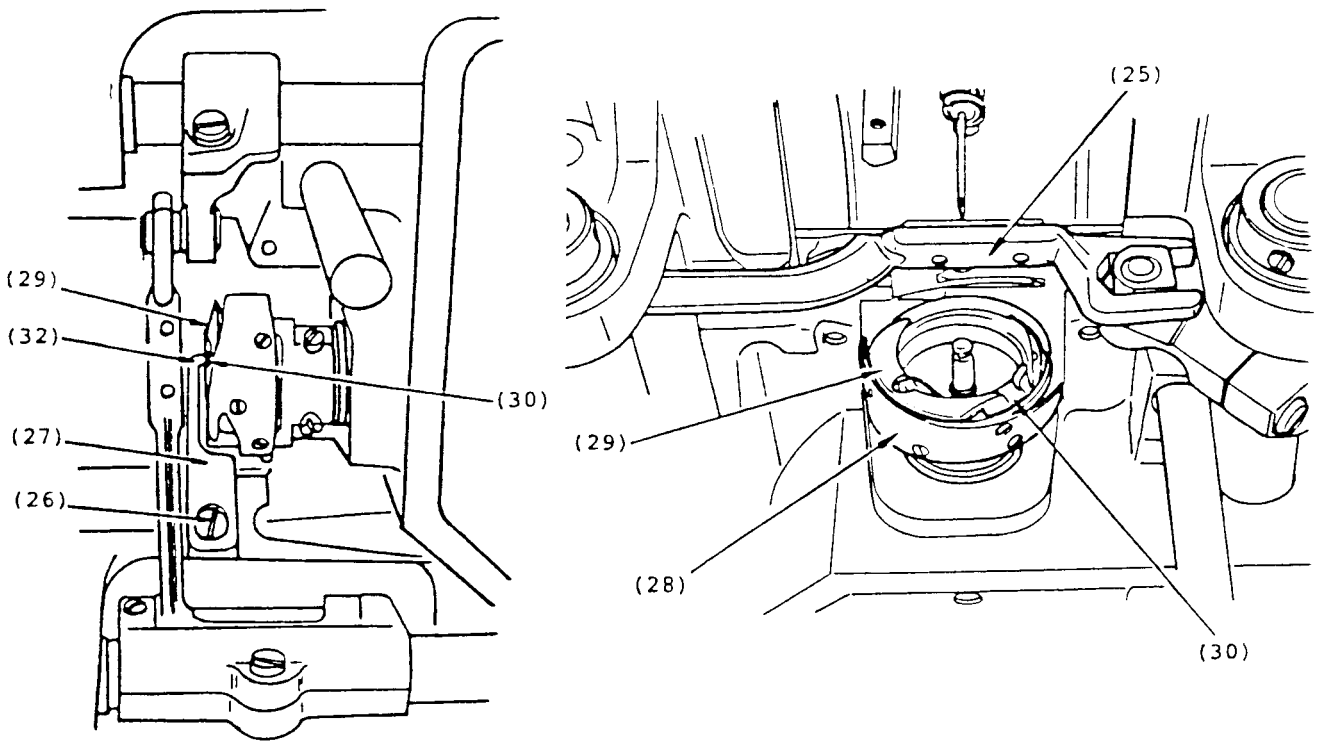

Fig. 18

When placing a new sewing hook on the shaft, have the sewing hook thread guard (28) at the bottom and the bobbin case holder (29) turned to the position shown in Fig. 18, so that the hook will clear the feed bar (25).

Place the hook in position on the shaft and turn the bobbin case holder (29) until the notch (30) is at the top, as shown in sketch at left above. Replace the bobbin case holder position bracket (27), making certain that the finger (32) (see above) enters the notch (30) at the top of the bobbin case holder. Then securely fasten the position finger by means of the screw (26).

Replace the needle. Time the sewing hook, as instructed on page 5. Replace the bobbin case, throat plate and slide plate.

TO REMOVE AND REPLACE THE HOOK SHAFT

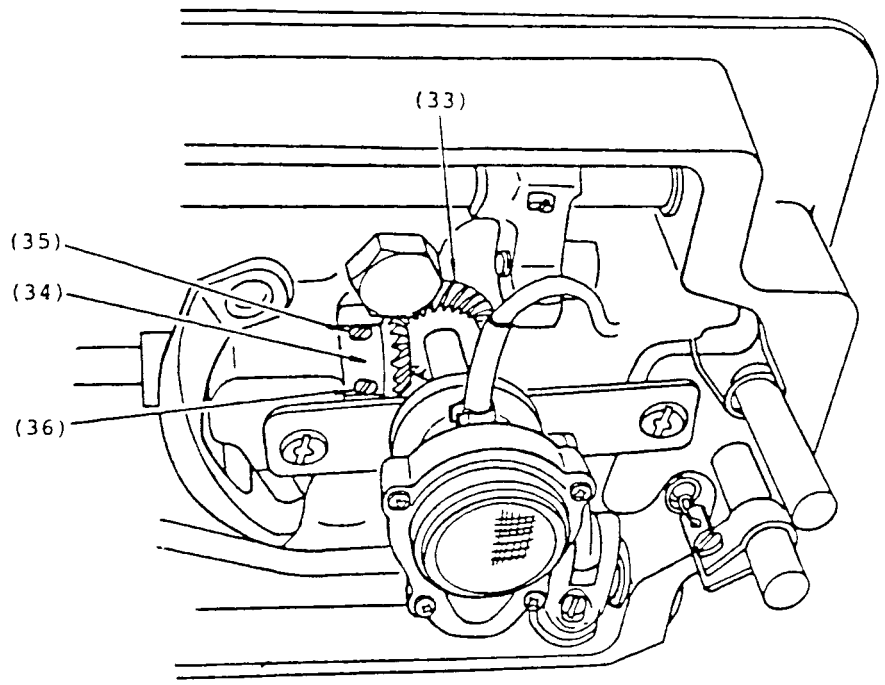

Fig. 19

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

1. Remove the sewing hook, as instructed on page 9.

2. Mark the two lower bevel gears (33) and (34), Fig. 19, with chalk or crayon, on one tooth of one gear and the corresponding space for that tooth in the other gear. This is important, as these gears may become separated during removal of shaft. These marks will then make it possible to obtain the original mating position of the gears.

3. Loosen the two set screws (35) and (36) in hook shaft bevel gear. While holding the two gears (33) and (34) in mesh, as instructed in Fig. 19, withdraw the old hook shaft and INSERT THE NEW SHAFT.

4. Replace the sewing hook, as instructed on page 10.

5. Make certain that set screw (35) seats over flat on the hook shaft. Remove all end shake from hook shaft, pushing gear (34), Fig. 19, toward the hook on the shaft. Securely tighten first set screw (35), then securely tighten the second screw (36)

6. Time the sewing hook as instructed on page 5.

NOTE: Set screw (35) is the first of the two set screws to appear on the hub of the bevel gear (34) as the machine pulley is turned over toward operator.

THE OIL PUMP

TO REMOVE:

1. Remove oil tubes (40), (41) and (42) while holding open the oil tube clamps (37), (38) and (39), with a small screwdriver, just enough to permit removal of the oil tubes.

2. Remove two oil pump screws (43).

3. Carefully pull the entire oil pump off the lower end of the upright arm shaft.

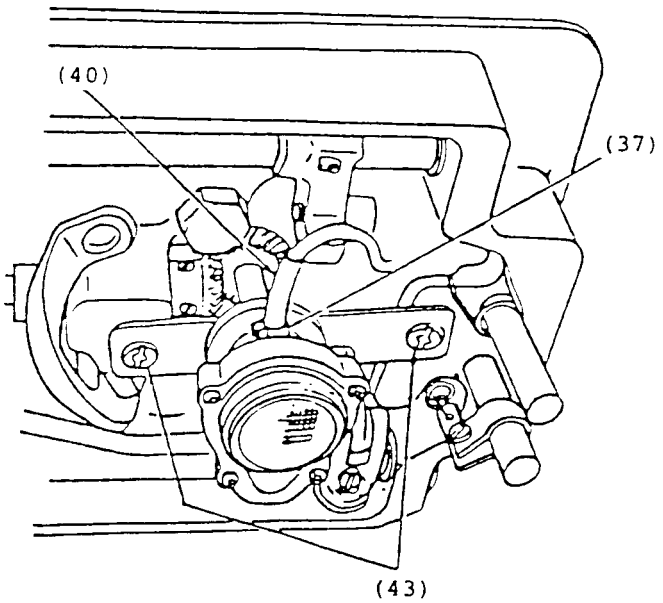

Fig. 20

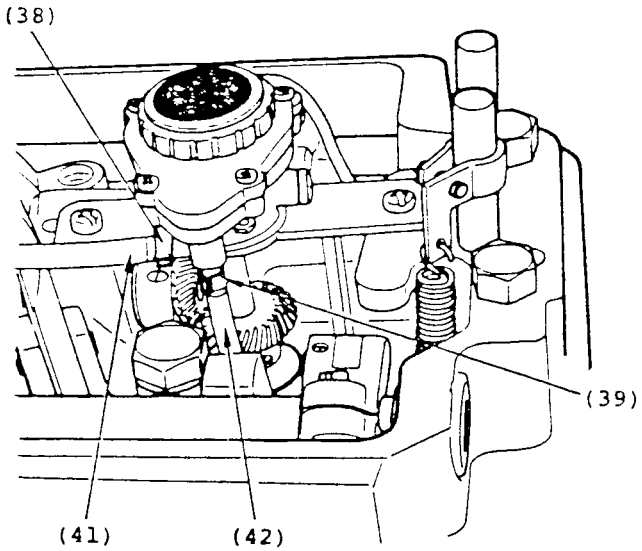

Fig. 21

TO REPLACE:

1. Replace oil pump on lower end of upright arm shaft and turn machine pulley slowly to check that the lug at the bottom of the hole in the impeller (44) is engaged in the slot provided for it on the lower end of upright arm shaft. (Fig. 22)

2. Replace the two oil pump screws (43), Fig. 20. Make certain that machine turns freely as screws are tightened.

3. Replace oil tubes (40), (41) and (42), pushing them as far as they will go on each respective nipples provided for them on the oil pump while holding the oil tube clamps (37), (38) and (39) open as instructed under oil pump removal.

   NOTE: Check that the oil tubes are not in contact with other movable parts.

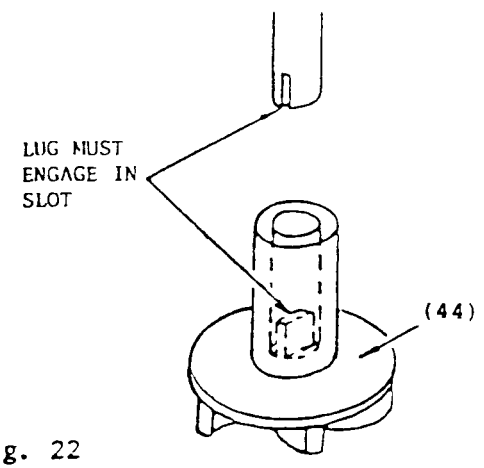

Fig. 22

TO REMOVE AND REPLACE THE UPRIGHT ARM SHAFT (See Fig. 23)

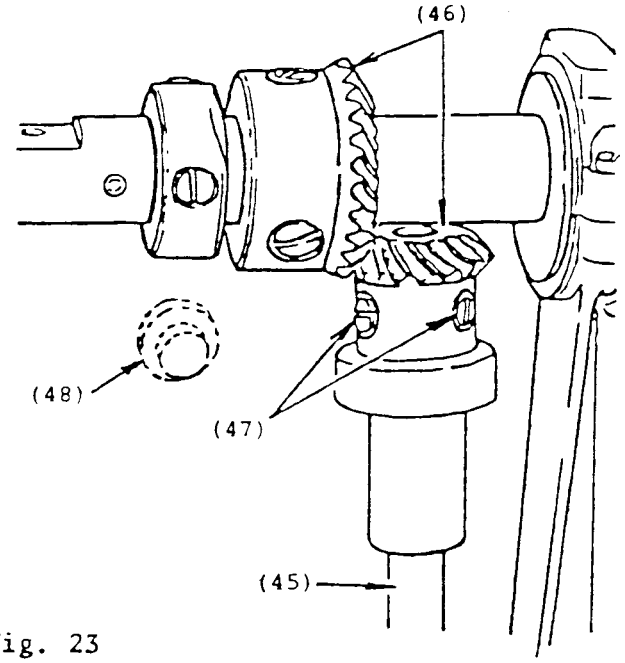

Fig. 23

REMOVAL:

If it is found necessary to remove the upright arm shaft (45), it should be removed in the following manner:-

1. Remove oil pump, as instructed on page 12.
2. Follow the instructions in Steps 2 and 3 for removal of hook shaft on page 11 except that, instead of removing hook shaft, merely remove hook shaft bevel gear (33), Fig. 19.
3. Remove arm top cover.
4. Mark the two bevel gears (46), with chalk or crayon on one tooth of one gear and the corresponding space between the teeth of the other gear so that these gears may be re-assembled in their original relative positions without difficulty, if necessary.
5. Loosen set screws (47) in bevel gear at upper end of upright arm shaft. To loosen set screws (47), remove screw (48) in the rear of the arm and insert screwdriver through the hole.
6. While holding upper bevel gears (46) in mesh, draw upright arm shaft (45) down and out of machine.

REPLACEMENT:

1. Before installing upright arm shaft, make certain it has the bevel gear (33), Fig. 19, correctly fastened at the lower end of shaft.
2. Insert upright arm shaft up through upper bevel gear, as shown in Fig. 23.

3. Turn shaft so that one of the two set screws (47) will bear upon the upper gear flat on the shaft and tighten the set screws (47).
4. Replace and set hook shaft bevel gear as instructed in Step 5 on page 11.
5. Replace oil pump, as instructed on page 12.
6. Replace top cover.

TO REMOVE AND REPLACE THE NEEDLE BAR (See Fig. 24)

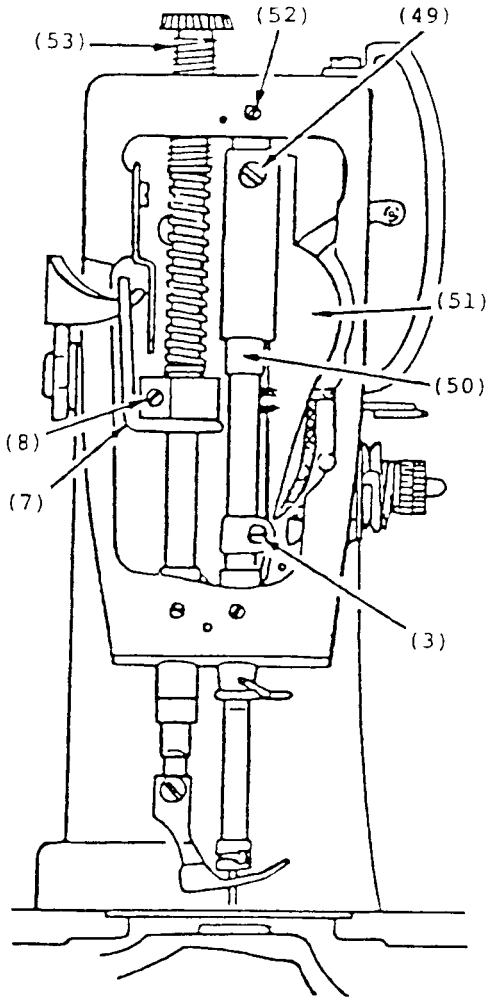

Fig. 24

Remove the needle bar in the following manner:-

1. Remove needle, needle set screw and needle bar thread guard.
2. Remove face plate.
3. Loosen clamping screw (3).
4. Loosen screw (49) sufficiently to allow needle bar to pass, then slip needle bar up through both needle bar bushings and out of machine.

NOTE: If it becomes necessary to remove upper needle bar bushing (50) first remove screw (49) and take-up lever oil guard (51). Then loosen set screw (52) and drive bushing (50) down and out of head of machine. Use a 10 mm driving pin.

Before replacing needle bar, replace upper needle bar bushing (50), by driving it down into hole provided for it in head of the machine. Make certain top of bushing (50) is level with top of arm. Tighten set screw (52).

Replace the needle bar in the following manner:-

1. Slip needle bar down through both bushings in head of the machine. Tighten screw (3).
2. Replace needle bar thread guard, needle set screw and needle.
3. Set needle bar at correct height and replace face plate as instructed in page 2.
4. Replace oil guard (51) and fasten it securely to bushing with set screw (49).

TO REMOVE AND REPLACE THE PRESSER BAR

To remove the presser bar:-

1. Remove presser foot, face plate and presser bar pressure regulating thumb screw (53), with presser bar guide from head of the machine.
2. Loosen clamping screw (8) about one turn (just enough to make it loose).
3. Slide presser bar up through lifting lever link (7), Fig. 24, and bushing and out of machine.

To replace the presser bar:-

1. Slip presser bar down through lifting lever link (7) and the lower presser bar bushing. Check that there is some clearance between presser bar guide bracket and lifting lever link (7).
2. Replace presser foot and presser bar pressure regulating thumb screw (53) with presser bar guide.
3. Set presser bar at correct height, as instructed on page 4, and tighten clamping screw (8).

NEEDLE THREAD TAKE-UP

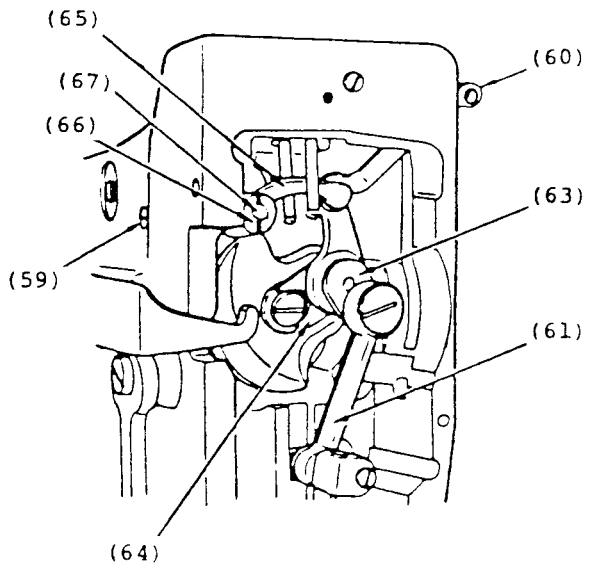

Fig. 25

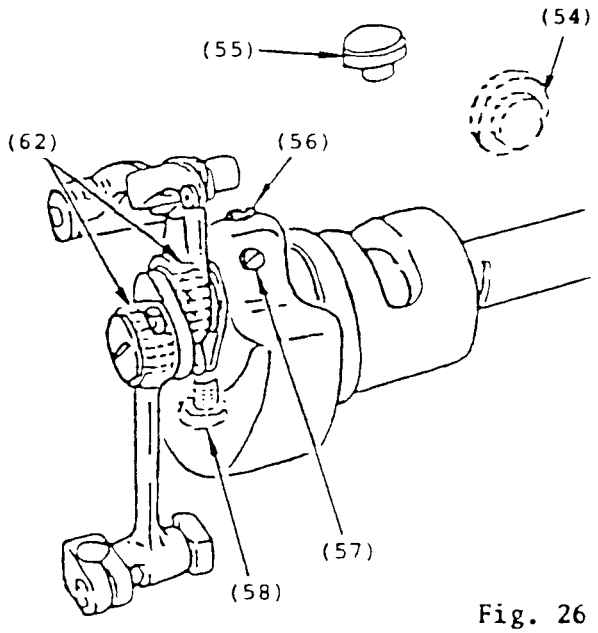

Fig. 26

To remove the needle thread take-up:-

1. Remove face plate, arm plug screw (large) (54) and arm plug screw (small) (55) from machine.
2. Remove needle bar, upper needle bar bushing, presser bar pressure regulating thumb screw, presser bar and guide bracket.

3. Turn machine pulley as required to reach screw (56), Fig. 26, in needle bar crank through hole left by removal of plug (54). Loosen set screw (56).

4. Turn machine pulley, as required, and through the same hole loosen set screw (57).

CAUTION: DO NOT DISTURB the smaller hexagon head position screw (58), Fig. 26, which holds the needle bar crank at its correct position on the horizontal arm shaft.

5. Loosen small set screw (59), Fig. 25, in the rear of the arm of the machine.

6. Turn machine pulley until thread take-up lever link (65) is at its lower dead point and remove thread take-up lever link (65) and thread take-up lever link hinge stud (66) taking care not to pull loose its wick (67) until the stud is removed.

7. Back the end of thread take-up lever (60), Fig. 25, toward the inside of the machine, turning the machine pulley as required, until the take-up is free of the slot provided for it.

8. The thread take-up lever link assembly, including parts (60), (61), (62), (63) and (64), can now be pulled free of the needle bar crank.

To replace the needle thread take-up:-

1. Make sure that the wearing plate (64) is in place and undamaged on the face of the needle bar crank, as shown in Fig. 25.

2. Turn machine pulley as required to make set screw (57) accessible through hole at (54), Fig. 26, in rear of machine head.

3. Assemble thread take-up lever link assembly, including parts (60), (61), (62), (63) and (64) to needle bar crank so that set screw (57) seats squarely on the flat provided for it on thread take-up crank (63), Fig. 26.

4. Insert screwdriver through arm plug screw hole (54) and securely tighten set screw (57).

5. Test for side play by pushing take-up lever (60) gently left and right; there should be 0.025 to 0.050 mm side shake between lever and wearing plate (64).

6. Move thread take-up crank inward or outward in needle bar crank, as required, to obtain clearance.

7. Slip the upper end of the take-up lever (60) through the slot provided for it in the head of the machine.

8. Turn machine pulley as required to make set screw (56) accessible through arm plug screw hole (54), Fig. 26, in rear of machine head.

9. Insert screwdriver through this hole (54) and securely tighten set screw (56).

10. Insert a fine flexible guide wire (piano wire) down through arm plug screw hole (55) and from right to left (machine pulley end to head end) through hole provided in arm casting for take-up lever link hinge stud.

11. Insert take-up lever link hinge stud (66) and its oil wick (67) through take-up lever link (65). Hook the ends of the oil wick (67) leading out of the stud to the guide wire, then insert stud (66) into its hole in the arm casting while pulling the oil wick leaders out through the arm plug screw hole (55) taking care not to pull it loose from the stud.

NOTE: Make sure that the take-up lever link hinge stud set screw (59) will bear squarely on the flat on stud (66) and that the stud is pushed fully into the arm casting.

12. Securely tighten set screw (59).

13. Push the two oil wick leaders back into arm plug screw hole (55) and down through hole in arm casting and into slot in arm shaft bushing taking care that wick is slack over the edges of the holes in the casting at point A to insure free passage of oil. (Fig. 27) Use tweezers through the screw hole (55) to loop the wick and bring it into positive contact with the arm shaft approximately at point B.

NOTE: DO NOT FORCE the wick leaders down too tightly against the edges of holes at point A, as shown in Fig. 28, as this will decrease the flow of oil from the arm shaft to the thread take-up lever link area.

CAUTION: If the bottom of either oil wick leader is caught on the ledge as shown at C, Fig. 29, no oil can be taken up by the wick to be carried to the thread take-up lever link area where it is needed. Make sure that the oil wick leaders are pushed all the way down into the smaller hole, without jamming, until they touch the arm shaft, as shown in Fig. 27.

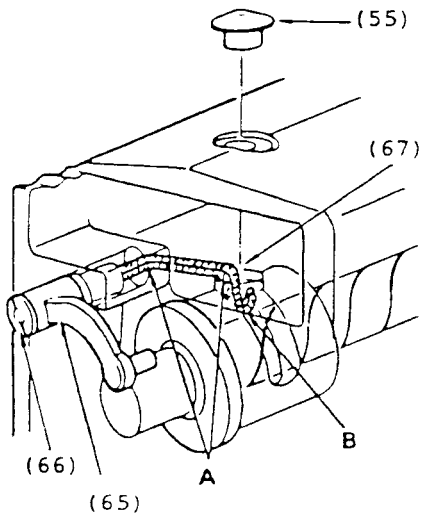

Fig. 27

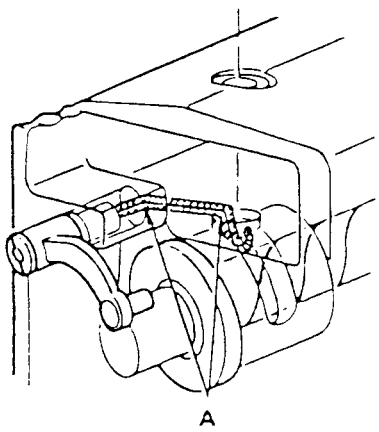

Fig. 28

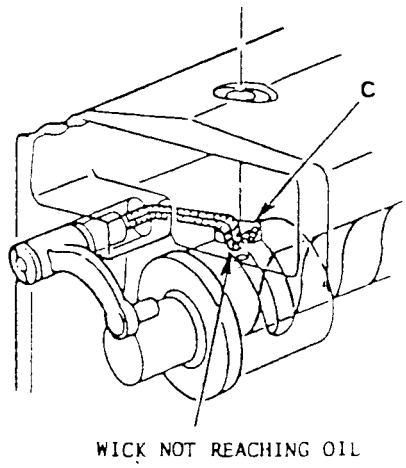

Fig. 29

14. Turn machine pulley slowly, by hand, at least one complete revolution testing take-up for binding, end shake and noise. If binding occurs, recheck clearance between take-up and wearing plate (64) and between hinge stud (66) and machine casting.

15. Replace guide bracket (9) in head of machine, as shown in Fig. 5.

16. Replace presser bar pressure regulating thumb screw (53), Fig. 24.

17. Replace and adjust upper needle bar bushing and needle bar with their accessories, as instructed on pages 2 and 14.

18. Replace and securely tighten arm plug screws (54) and (55).

19. Replace the face plate as instructed on page 2.

TO REMOVE AND REPLACE NEEDLE BAR WICK AND NEEDLE BAR CONNECTING STUD WICK

To remove needle bar wick and connecting stud wick, move take-up lever (60), so that it does not interfere with removal of oil guard (51). Then remove face plate and screw (49); lift take-up oil guard (51), with the top wicks, up and out of machine.

When replacing the oil guard (51), which carries the needle bar wick and connecting stud wick, make sure that lower end of the stud wick drops into oil pool behind lower needle bar bushing and that the loop of needle bar wick is placed behind the needle bar, as shown in Fig. 30.

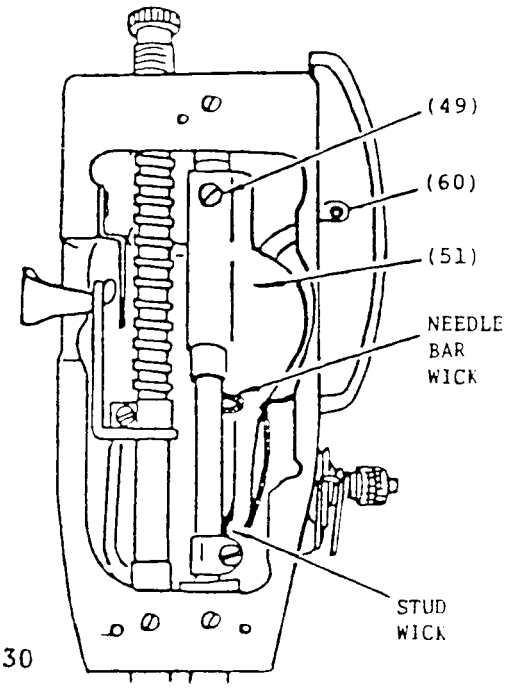

Fig. 30

TO REMOVE OIL WICK HOLDER

Oil wick holder includes two oil wick leaders for the two sets of needle bearings in the needle bar connecting link and thread take-up as shown in Fig. 31. It is removed in the following manner:-

1. Remove face plate, needle bar and upper needle bar bushing from machine, as instructed on page 14.
2. Remove oil wick holder screw (68).
3. Pulling gently, draw entire oil wick holder assembly out of the head of the machine.

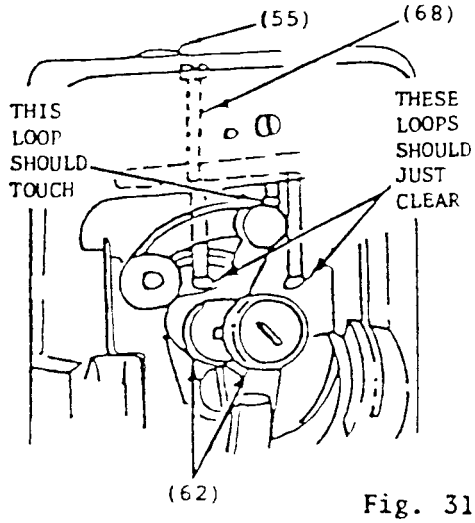

Fig. 31

TO INSTALL NEW OIL WICK HOLDER

1. Remove top arm plug screw (55), Fig. 26.
2. Insert two oil wick leaders into hole in arm casting, as shown in Fig. 32 so that wick is slack over edge of oil wick holder at point D. This will insure free passage of oil. Use a screwdriver through arm plug screw hole (55) and push the two oil wick leaders down into slot in arm shaft bushing so that the wicks are in contact with the oil wick leaders for thread take-up lever link hinge stud already in the slot.

3. When oil wick leaders are correctly installed, replace holder screw (68), Fig. 31.
4. Adjust the two oil wick loops in holder so that the two loops come as close as possible to, without touching, the two sets of needle bearings (62), as shown in Fig. 25.
5. Securely tighten oil wick holder screw (68).
6. Replace top arm plug screw (55).
7. Replace upper needle bar bushing and needle bar, as instructed on page 14.
8. Replace face plate, as instructed on page 2.

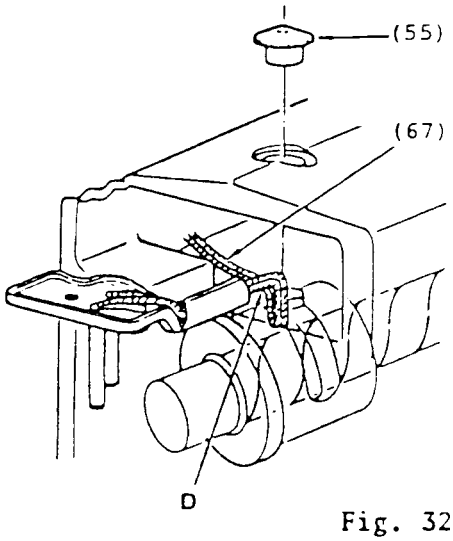

Fig. 32

THE ARM SHAFT

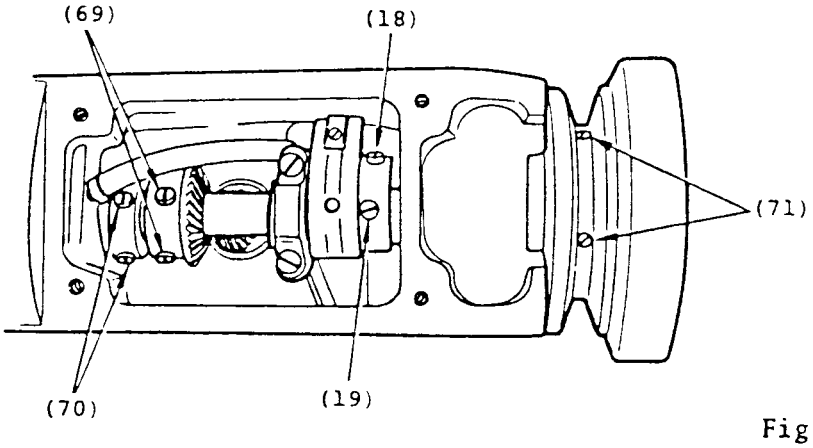

Fig. 33

REMOVAL:

1. Remove the face plate.
2. Remove the arm side shield and wick, and the thread take-up oil guard as instructed on page 18.
3. Remove the needle bar, upper needle bar bushing, presser foot and presser bar, as instructed on pages 14 and 15.
4. Remove entire thread take-up lever assembly, as instructed on pages 15 and 16.
5. Loosen the four screws in the arm top cover and remove the arm top cover.
6. Loosen set screws (18) and (19) in the feed and feed lifting eccentric.
7. Loosen the two set screws (69) in the bevel gear and the two set screws (70) in the thrust collar.
8. Loosen the two set screws (71), Fig. 33, and remove the machine pulley.

9. Turn the needle bar crank until it is in the position shown in Fig. 35 to prevent crank from disturbing the two wick loops in holder (72), Fig. 35, during removal of arm shaft.

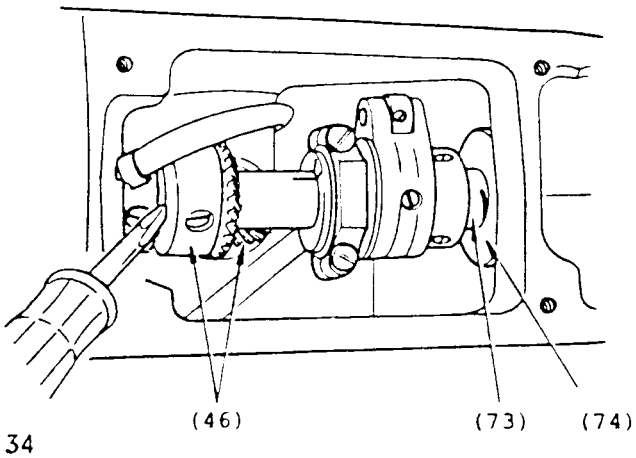

Fig. 34

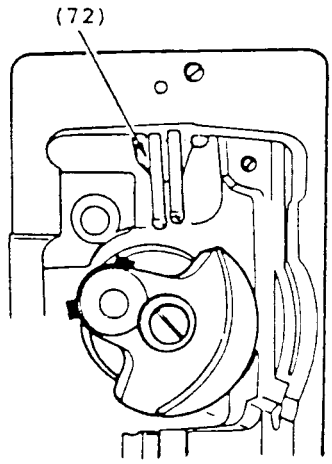

Fig. 35

10. While maintaining needle bar crank at position shown in Fig. 35, hold bevel gears in mesh by holding the blade of a large screwdriver between thrust collar and bevel gear, as shown in Fig. 34; then push the end of the arm shaft (73) through the bushing (74).

11. Using another shaft (or a drift pin of the same diameter as the arm shaft on these machines), push the arm shaft (73) further through the machine (still keeping the gears at (46) in mesh). This temporary shaft must be pushed sufficiently far into the machine to hold the entire gear and feed eccentric mechanism in position upon it until the new arm shaft is installed. When inserting the temporary shaft (or a drift pin), make certain that every care is taken to avoid injury to the oil seal and ring in the arm shaft bushing (back) and consequent oil leakage.

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

REPLACEMENT:

1. Insert the machine pulley end of the arm shaft into the arm shaft bushing at the head of the machine arm.

2. Make certain that the needle bar crank is turned to the position shown in Fig. 35, clearing the two wick loops in oil wick holder (72).

3. While still holding the bevel gears at (46) in mesh with a screwdriver, as shown in Fig. 36, push the arm shaft (73) straight through the machine arm, thrust collar, bevel gear, and feed and feed lifting eccentric. When installing the new arm shaft, make certain that every care is taken to avoid injury to the ring and the oil seal in the arm shaft bushing.

4. Replace machine pulley on the arm shaft with the two set screws (71) located over the two grooves on the shaft and temporarily tighten the set screws.

5. Locate arm shaft collar in position as shown in Fig. 36 to eliminate end play of shaft and firmly tighten set screw (70). Test the arm shaft for freedom in rotation.

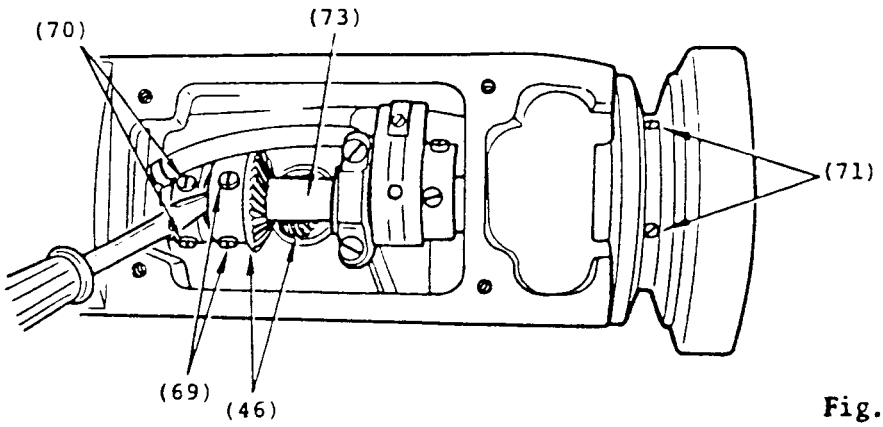

Fig. 36

6. Locate one of the two arm shaft (horizontal) bevel gear set screw (69) over flat on arm shaft and tighten set screw. Hold arm shaft bevel gear immovable by holding the machine pulley, and feel for backlash by moving the arm shaft (upright) bevel gear with fingers. If there is no backlash, loosen set screw (69) and lightly tap bevel gear away from mating gear until there is just a slight amount of backlash. Then securely tighten the two set screws (69) in bevel gear. Recheck the backlash.
7. Set feed and feed lifting eccentric, as instructed on page 7.
8. Replace thread take-up lever assembly.
9. Replace upper needle bar bushing and needle bar.
10. Replace presser bar and presser foot.
11. Replace thread take-up oil guard and arm side shield and wick.
12. Check the adjustment and timing of parts disturbed and correct where necessary.
13. Replace arm top cover and tighten its four screws.
14. Adjust machine pulley inward or outward, as required, so that bobbin winder pulley will just sufficiently press against machine pulley when bobbin winder is set for thread winding.
15. Replace face plate.

THE BOBBIN WINDER

REMOVAL:

1. Remove arm top cover.
2. Remove bobbin winder spring (75), Fig. 37.
3. Remove bobbin winder bracket screw stud (76) and bobbin winder assembly (77) from arm top cover.

REPLACEMENT:

1. Replace bobbin winder assembly (77) and tighten screw stud (76). Check bobbin winder assembly for freedom in movement.

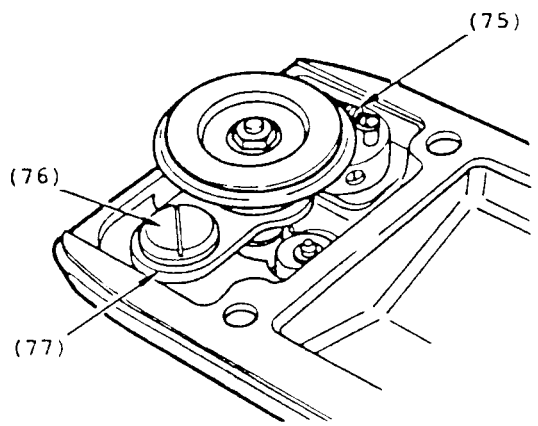

Fig. 37

2. Replace bobbin winder spring (75).

3. Check that the bobbin winder bracket (78) comes into contact with the actuating cam (79), Fig. 38, and spindle (80) lightly contact the eccentirc bobbin winder stopper (81) and quickly stop its rotation when bobbin winder is released from engagement at completion of thread winding. If the spindle is not in contact, or if it is pressing too strongly against the stopper, turn stopper as required, until spindle is in proper contact with the stopper.

4. Replace arm top cover.

5. Engage bobbin winder for thread winding, turn machine pulley and check that bobbin winder pulley (82) is properly in contact with machine pulley to rotate the bobbin winder spindle (80). If adjustment is necessary, move machine pulley inward or outward as required, so that bobbin winder pulley will just sufficiently press against the machine pulley to rotate the bobbin winder spindle.

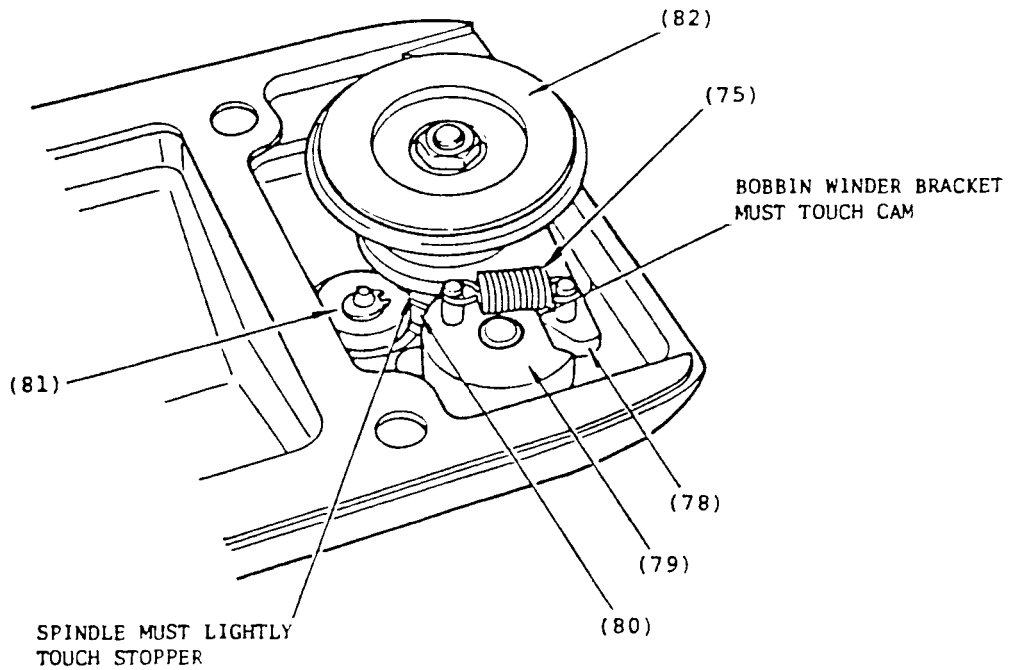

Fig. 38