JUKI

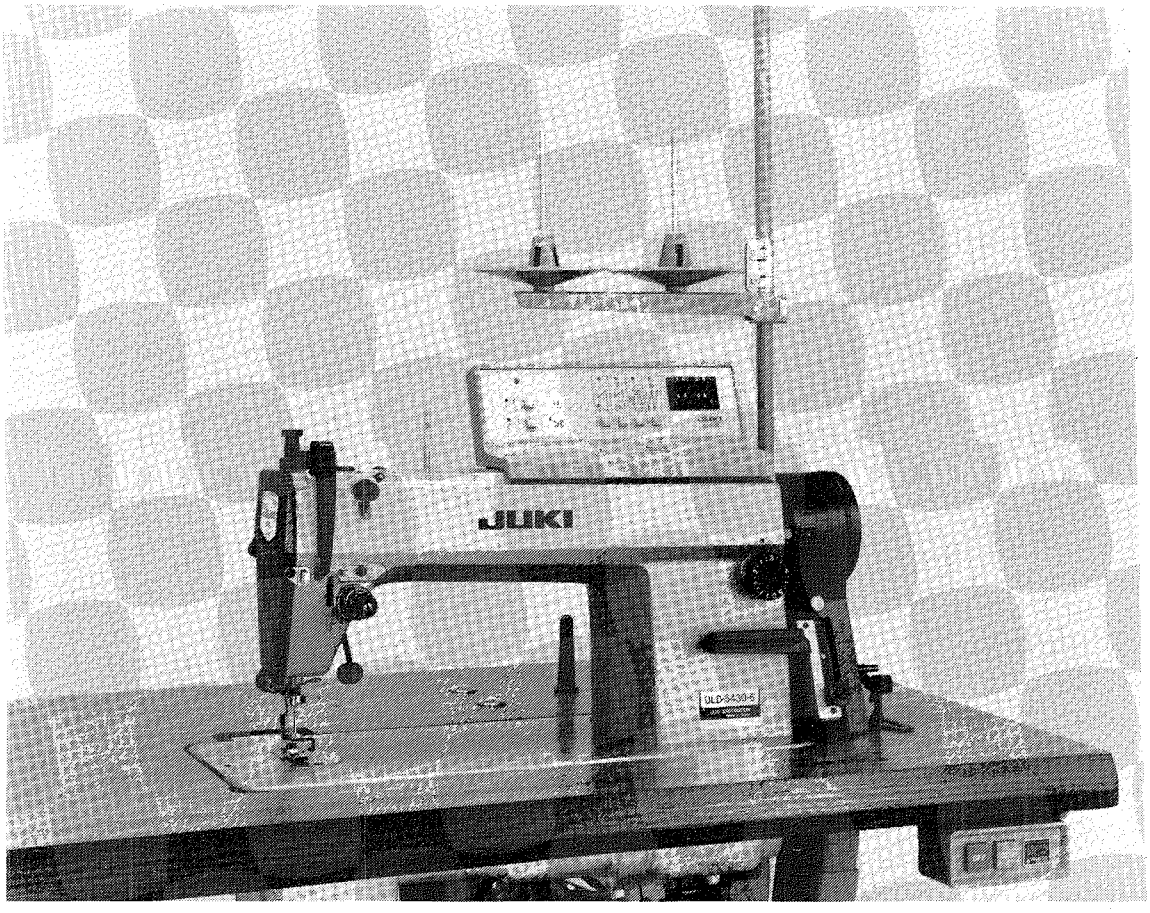
1-Needle, Differential Feed Lockstitch Machine

DLD-5430

1-Needle, Differential feed Lockstitch Machine with an Automatic Thread Trimmer

DLD-5430-4
DLD-5430-6

ENGINEER'S MANUAL



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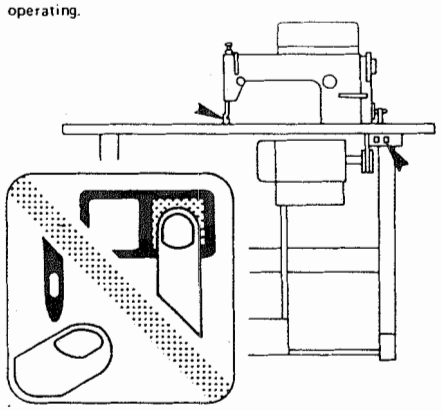
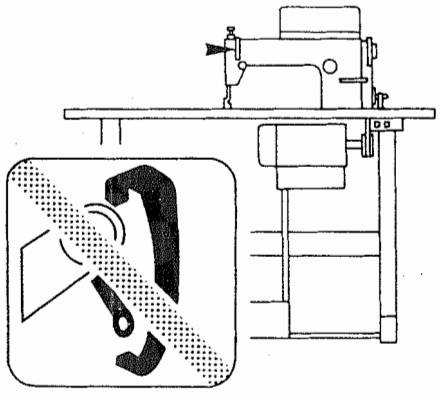
OPERATION PRECAUTIONS

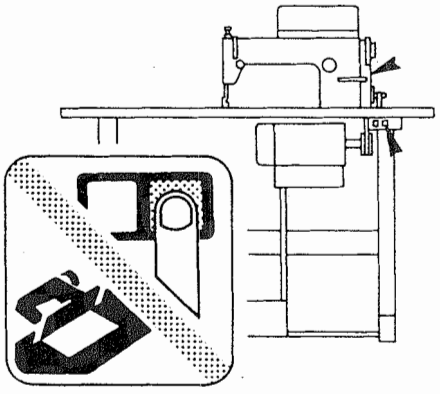
1. Keep your hands away from the needle when the power switch is turned ON or while the machine is operating.



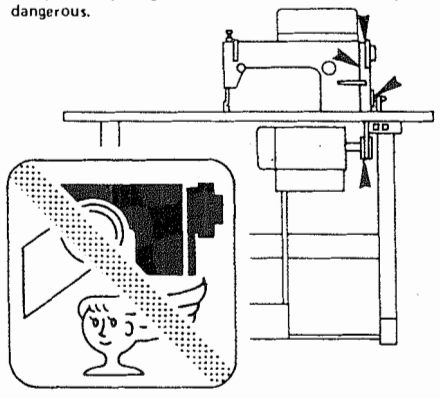
2. Do not put your fingers into the thread take-up cover while the machine is operating.



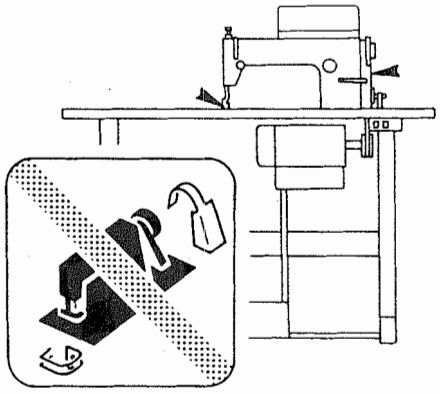
3. Be sure to turn the power switch OFF before tilting the machine head or removing the V belt.



4. During operation, be careful not to allow your or any other person's head or hands to come close to the handwheel, V belt, bobbin winder or motor. Also, do not place anything close to them. Doing so may be dangerous.



5. If your machine is provided with a belt cover, finger guard or any other protectors, do not operate your machine with any of them removed.



PREFACE

This Engineer's Manual first explains the "Standard adjustments" and contains basic information on how to adjust this machine. The assembling procedure is then explained. All personnel engaged in the maintenance or repair of the DLD-5430 or DLD-5430-6, -4 should read the section on "Standard adjustments" which contains important information on the maintenance of the DLD-5430 and DLD-5430-6, -4.
When carrying out maintenance work on this machine, refer to the Instruction Manual and Parts List, as well as this Engineer's Manual.

CONTENTS

1. SPECIFICATIONS

(1) Mechanical specifications

Item	Specification	
Type	DLD-5430	DLD-5430-6, -4
Model name	1-needle, differential feed lockstitch machine	1-needle, differential feed lockstitch machine with an automatic thread trimmer
Applications	Stretching and shirring in light- to medium-weight material	
Sewing speed	Max. 4,500 s.p.m. (Normal 4,000 s.p.m.)	
Stitch length	Main feed: 5 mm (0.197″) Differential feed: 7.5 mm (0.295″)	
Differential feed ratio	For shirring stitches: 1:1.5 (Max. 1:3*) * When the differential feed ratio is set to the maximum for shirring, set the stitch length to 2.5 mm (0.098″) or less. For stretching stitches: 1:0.5	
Hook	Self-lubricating full rotary hook	
Thread take-up	Link type Stroke: Standard 107 (4.213″) (105 (4.134″) to 112 (4.409″) mm)	
Needle bar stroke	30.7 mm (1.209″)	
Needle	DB x 1 #9 ~ #18 (Standard DB x 1 #14)	
Pressure of the presser foot	4 to 5 kg	
Lift of the presser foot	5.5 mm (0.217″)	
Lift of the knee lifter	Standard 10 mm (0.394″) Max. 13 mm (0.512″)	
Feeding method	By means of a feed regulating link (popularly called the "swing method")	
Lubrication	Fully self-lubricating	
Circulation	By the plunger pump	
Lubricating oil	New Defrix No. 1	
Thread trimming device	Not equipped	Horizontal cutter
Wiper	Not equipped	Side wiper (-WB, -WO)
Automatic reverse feed stitching	Not equipped	Equipped (-WB, -OB)
Auto-lifter	Not equipped	AK-30, 31, 33, 34 ..... -6, -4 type AK-35, 36 (EFKA motor etc.) ..... 4 type
Motor	Clutch motor	AC servo motor (-6 type) Electro-stop motor (-4 type)
Sewing area	From the needle entry point to the root of the arm: 262 mm (10.315″)	
Weight of the sewing machine head	29 kg	31 kg

(2) Sewing speed

Select the optimum sewing speed from the values in the following table in accordance with the stitch length specified.

Stitch length (scale on the dial)	Sewing speed
5 mm (0.197″) or less	3,000 s.p.m. or less
4 mm (0.157″) or less	3,500 s.p.m. or less
3 mm (0.118″) or less	4,500 s.p.m. or less

2. APPLICATIONS

This machine has many applications for light- to medium-weight general fabric.
It can generally be used for men's wear, ladies' wear, work uniforms and student uniforms. The standard types of thread that can be used with this machine are cotton thread and synthetic thread, #30 through #80.

Needle	Count	Thread	Material	Application
DBx 1	#9	#80	Georgette, T/C broadcloth	Light-weight materials
	#11	#60	Wool, general broadcloth	General fabrics
	#14	#50	Drill, cotton gaberdine	
	#16	#50 to #30	Overcoats, denim	Medium-weight materials
	#18			

3. USING THE DIFFERENTIAL FEED RATIO ADJUSTMENT MECHANISM

(Changing the differential feed ratio)

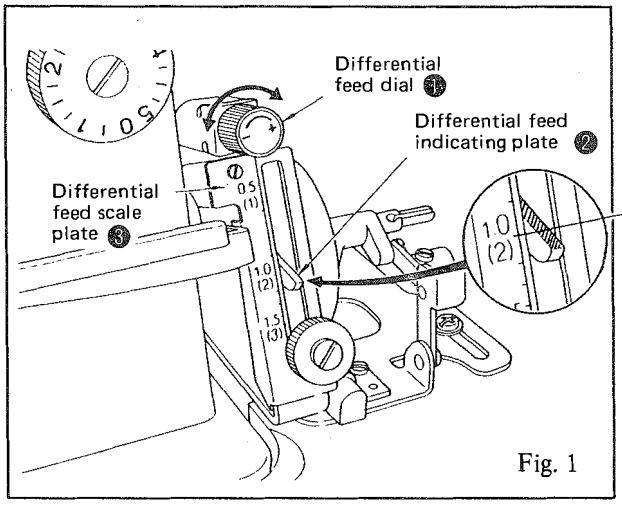


Fig. 1

Change the differential feed ratio by turning differential feed dial ❶ and aligning differential feed indicating plate ❷ with the scale showing the value desired on the differential feed scale plate ❸ .

[Caution]
Read the value where the scale on the differential feed scale plate is aligned with the top face (shown by slanted lines) of the differential feed indication plate.

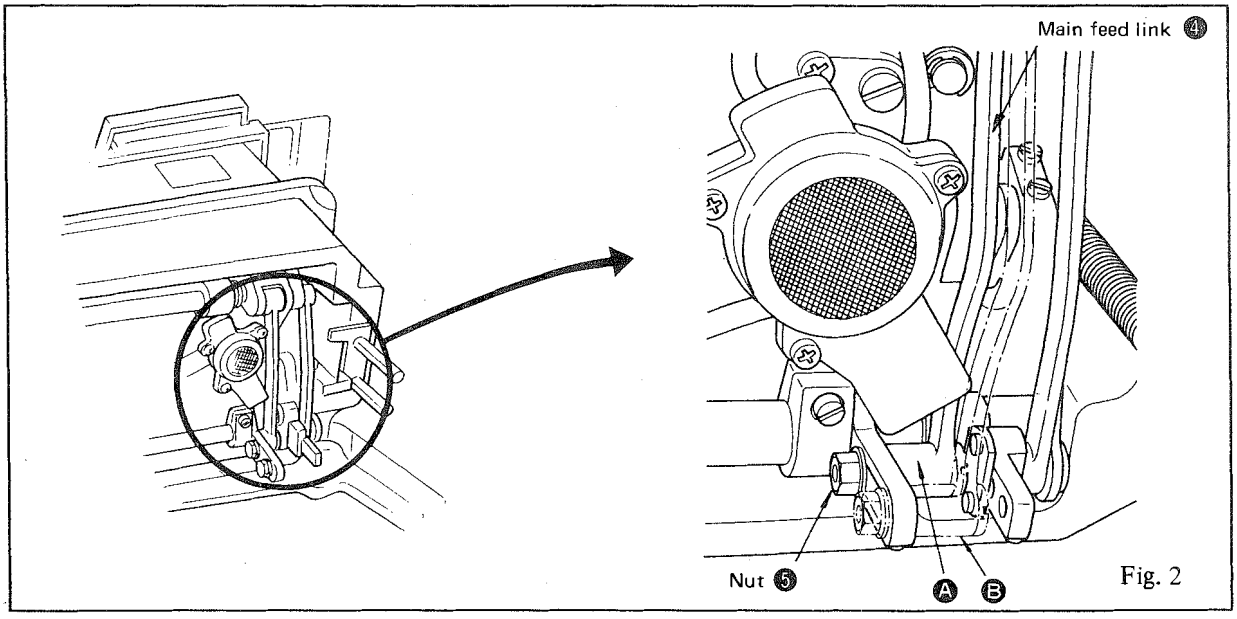


Fig. 2

(1) For the case where the feed amount of the main feed dog is set to between 1 (0.039") and 5 (0.197") mm.

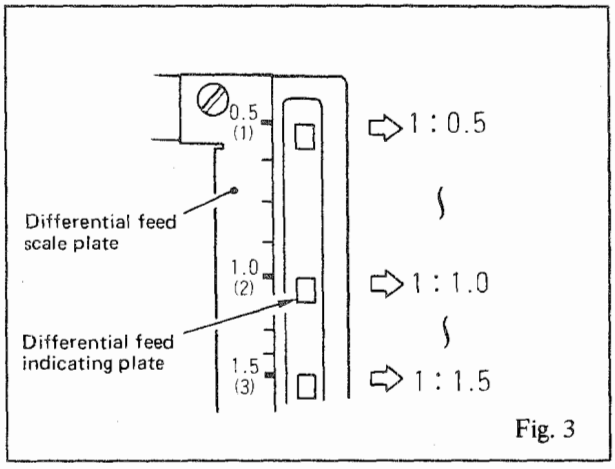


Fig. 3

1) Ⓐ indicates the standard position of the main feed link ㊹. The traveling distance of the main feed dog should now be 1 mm (0.039") to 5 mm (0.197").
2) Turning the differential feed dial ㊶ in the direction of the (+) sign will increase the amount of travel of the differential feed dog. Turning the dial in the direction of the (−) sign will decrease it.
3) If the amount of travel of the main feed dog is taken as "1", it will be possible to adjust the amount of travel of the differential feed dog in the range of x 0.5 to x 1.5.

(2) For the case where the feed amount of the main feed dog is set to between 1/2 (0.039"/0.079") and 5/2 (0.197"/0.079") mm (shirring stitches only)

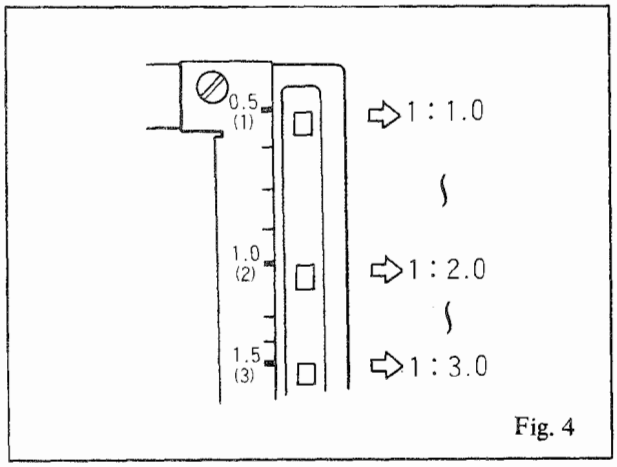


Fig. 4

1) If a differential feed ratio larger than that described in 1. is required, loosen nut ㊺ and move main feed link ㊹ to position Ⓑ.
The amount of travel of the main feed dog should now be half that of the value indicated on the feed regulating dial, and the ratio between the top feed amount and the differential feed amount will be the value in parentheses indicated on the differential feed scale plate.

4. STANDARD ADJUSTMENTS

Standard adjustments

(1) Height of the needle bar

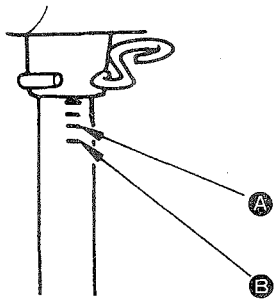


Fig. 5

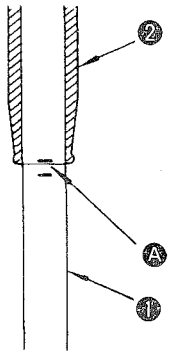


Fig. 6

Adjust so that engraved marker line A is aligned with the bottom end of needle bar lower bushing 2 when the needle bar 1 is in the lowest position of its stroke.

(2) Timing relationship between the needle and the hook

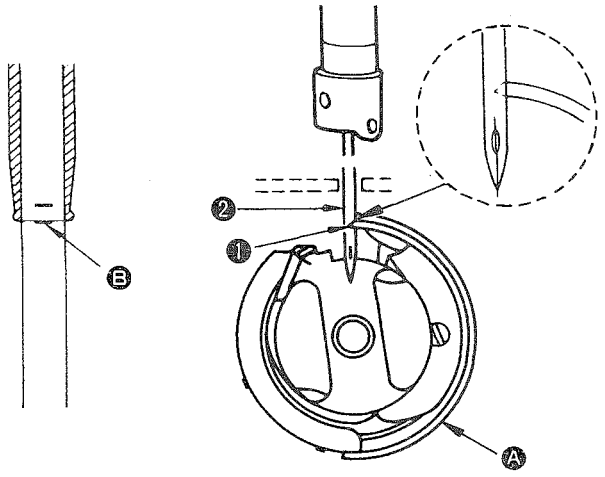


Fig. 8

Adjust so that blade point 1 of the hook is aligned with the center of needle 2 when the needle bar goes up from its lowest position and the bottom end of the needle bar lower bushing is aligned with engraved marker line B .
Now, the standard clearance between the needle and the blade point of the hook is approximately 0.04 to 0.1 mm (0.002″ to 0.004″).

(3) Height of the feed dog

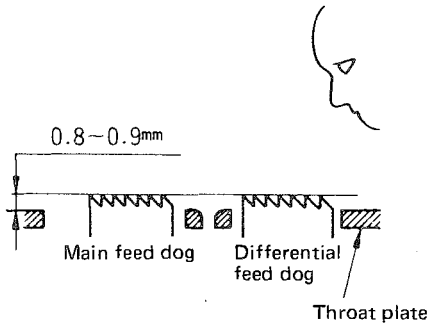
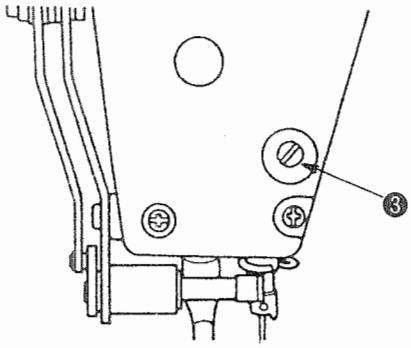
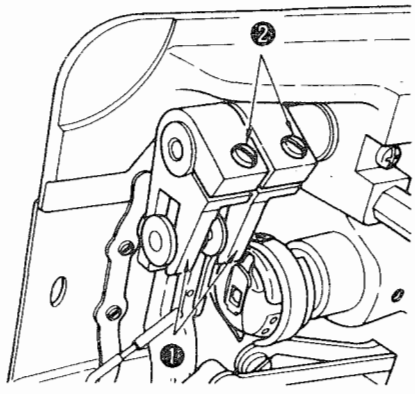


Fig. 9

The feed dog should protrude 0.8 to 0.9 mm (0.031″ to 0.035″) from the throat plate.

How to adjust	Results of improper adjustment
 Loosen setscrew ❸ connecting the needle bar and make the adjustment. Fig. 7	○ Changing the height of the needle bar may affect the feed timing, hook timing etc., so it is better not to change the height of the needle bar. Be sure not to adjust the height of the needle bar except for when the type of needle is changed.
Loosen the setscrew in the hook and make the adjustment.	○ Too big a clearance between the needle and the blade point of the hook may cause stitch skipping or thread breakage. ○ If the clearance between the needle and the blade point of the hook is too small, the needle may damage the blade point. ○ If the timing of the hook is made faster, a well-tensioned seam may be obtained, but stitch skipping may result. ○ If the timing of the hook is delayed, isolated idling loops or stitch skipping will be prevented. ○ When using a sewing machine head unequipped with a thread trimmer, make an adjustment by taking the lower of the two engraved marker lines as a yardstick to make a standard adjustment.
 Loosen setscrews ❷ in feed driving fork ❶, and make the adjustment by moving the feed bar up and down. Fig. 10	○ If the feed dog is positioned too high, the needle may move from side to side, causing it to bend or break. If the feed dog is positioned too low, the feeding force may decrease, resulting in excessively condensed stitches. The higher the feed dog is positioned, the higher the feeding force will be. In this case, however, puckering is likely to occur.

(4) Feed timing

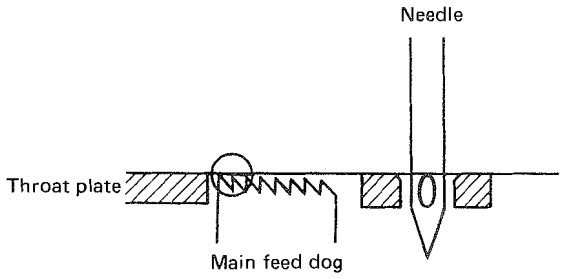


Fig. 11

The top end of the needle eyelet should be aligned with the throat plate when the first and second tooth of the main feed dog come down from the surface of the throat plate while the needle is descending.

(5) Oscillation of the feed dog (Adjusting the longitudinal position of the feed dog)

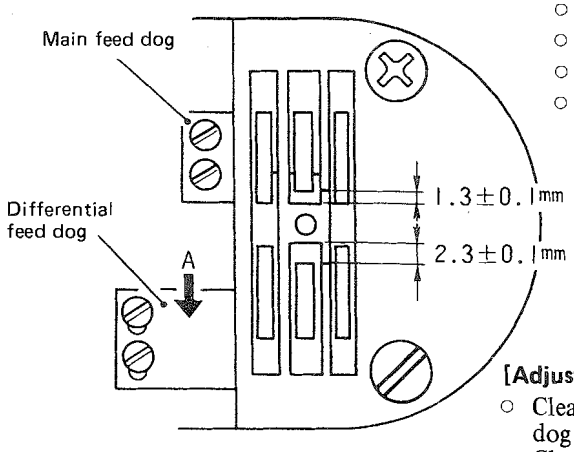


Fig. 13

[Conditions]

- ○ Set the feed regulating dial to the largest value on the scale.
- ○ Maximize the differential feed ratio for stretching (1:0.5).
- ○ Move the differential feed dot to side A.
- ○ The radius of the main feed arm should be minimized. (Set the main feed arm to the top end of the slot.)

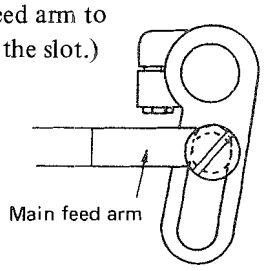


Fig. 14

[Adjustment values]

- ○ Clearance between the intermediate tooth of the main feed dog and the throat plate: Min. 1.3 ± 0.1 mm (0.051″±0.004″)
- ○ Clearance between the intermediate tooth of the differential feed dog and the throat plate: Min. 2.3 ± 0.1 mm (0.091″±0.004″)

(6) Positioning the differential feed arm slide

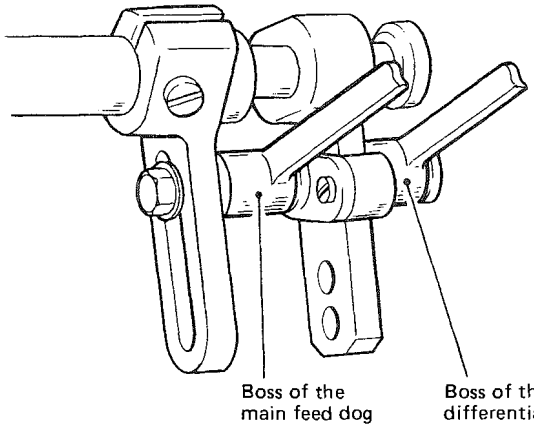


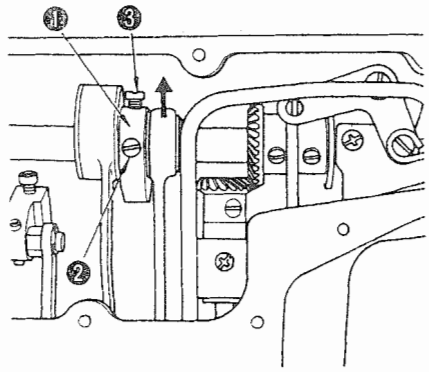
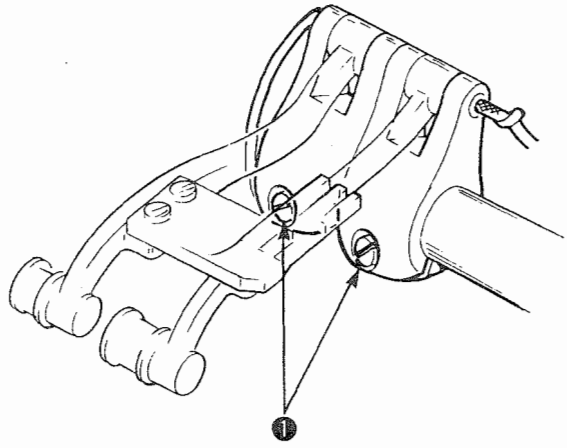
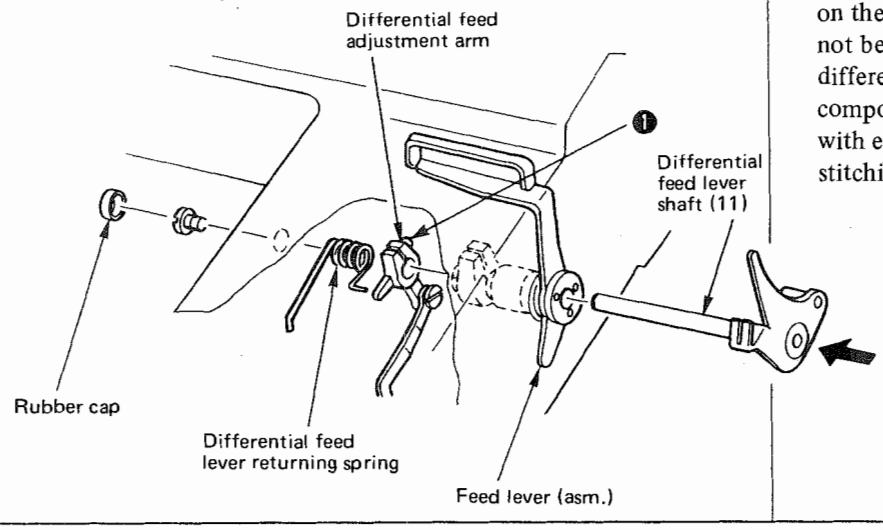
Fig. 15

[Conditions]

- ○ Set the feed regulating dial to the largest value on the scale.
- ○ Differential feed ratio : 1:1
- ○ The radius of the main feed arm should be minimized. (Set the main feed arm to the top end of the slot.)
- ○ The standard adjustment should be made with this side of the feed dog at the end of its stroke.

[Adjustment value]

- ○ The boss of the main feed link should be aligned with the boss of the differential feed dog.

How to adjust	Results of improper adjustment
 Fig. 12 Loosen the two setscrews in the eccentric feed cam ❶ and make the adjustment. Before tightening the setscrews, temporarily tighten setscrew No. 2 ❷ and determine the position of the feed. Then firmly tighten setscrew No. 1 ❸, followed by setscrew No. 2 ❷.	○ If the feed dog comes down earlier than the standard timing, split threads, isolated idling loops and side-to-side needle movements will decrease. However, loose stitches may occur.
Loosen the setscrews ❶ in the base of the main feed base and the differential feed base. Then make the adjustment. 	○ If the clearance between the throat plate and the intermediate tooth of the main feed dog or between the throat plate and the intermediate tooth of the differential feed dog is inadequate, the feed dog may come in contact with the throat plate, bed etc. * The differential feed dog is moved in direction A and then attached. However, if the stitch length is set to a smaller value and the distance between the main feed dog and the differential feed dog is decreased in shirring stitching, the differential feed dog can be moved in the reverse direction of A. In this case, be sure to carefully check that there is no contact between the relevant components during reverse feed stitching. Be careful also when the stitch length or differential feed ratio is changed.
Loosen the clamping screw ❶ in the differential feed adjustment arm and make the adjustment. 	○ If the position of the differential feed slide fails to coincide with the value on the differential feed scale, it will not be possible to obtain the desired differential feed ratio, or the relevant components may come in contact with each other during shirring stitching.

(7) Adjusting the stitch length for the normal feed and reverse feed

[Conditions]
- ○ The radius of the main feed arm should be minimized.
- ○ Scale on the feed regulating dial : 3 mm (0.118″)
- ○ Differential feed ratio : 1:1
- ○ Pressure of the presser foot : 4 kg

While turning the handwheel, feed a sheet of paper by 10 stitches in the normal direction and the reverse feed direction. Normal feed pitch/Reverse feed pitch = 90 to 105%

* Use a small piece of paper.

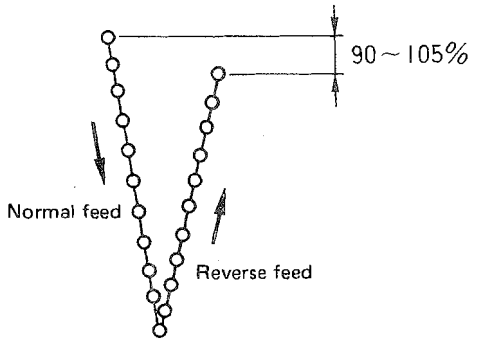
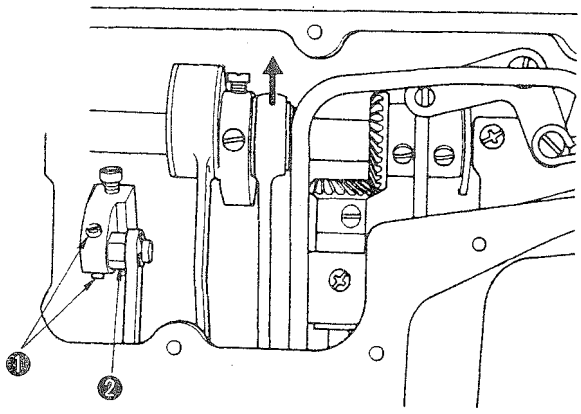
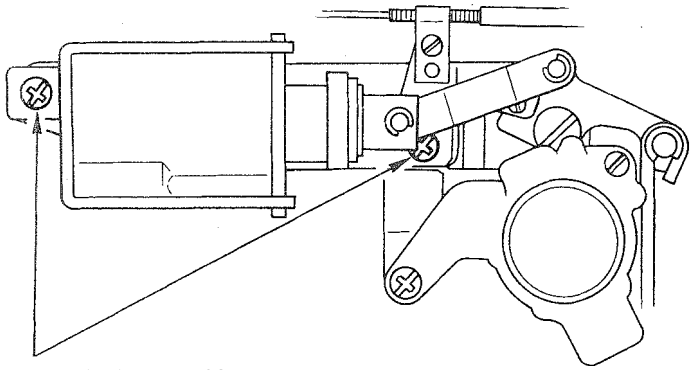


Fig. 16

(8) Adjusting the position of the reverse feed solenoid

[Conditions]
- ○ Set the feed regulating dial to the largest value on the scale.
- ○ The radius of the main feed arm should be minimized.
- ○ Differential feed ratio : 1:1

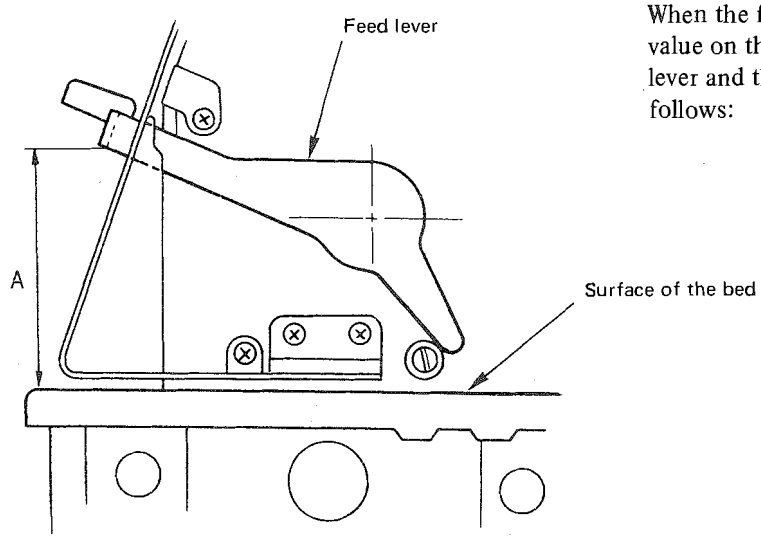
Adjust so that the amount of feed in the automatic reverse feed mode is 3.1 mm (0.122″).

How to adjust	Results of improper adjustment
 Fig. 17 Loosen two setscrews ❶ in the feed adjustment base pin and make the adjustment by turning feed adjustment base pin ❷.	○ If the normal feed pitch is not equal to the reverse feed pitch, a stitch failure may occur in reverse feed stitching.
 Setscrews in the solenoid Fig. 18 ○ Loosen the two setscrews in the solenoid and make the adjustment. Temporarily fix the solenoid and adjust the reverse feed solenoid by lightly tapping it. After making the adjustment, confirm that the plunger moves without becoming twisted.	○ If the solenoid is moved too far to the left, the stitch length in reverse feed stitching may be 3 mm (0.118″) or less. If the solenoid is moved too far to the right, the suction force of the solenoid will decrease, and the stitch length for reverse feed stitching may change from the specified length.

(9) Height of the feed lever

< For a sewing machine without an automatic reverse feed capability >

DLD-5430, DLD-5430-6, DLD-5430-6-W0

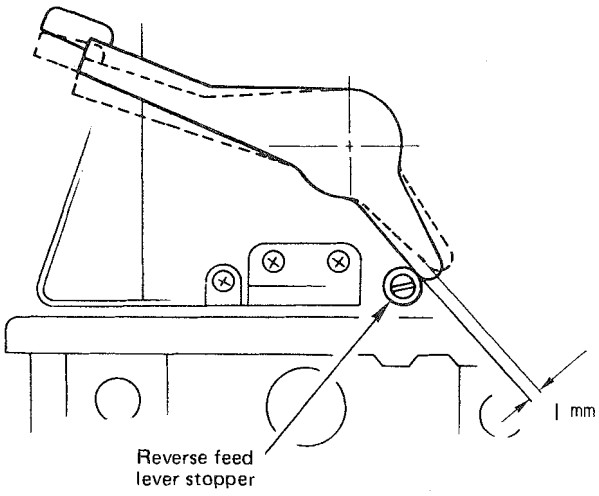


When the feed regulating dial is set to the largest value on the scale, distance A between the feed lever and the top face of the bed should be as follows: DLD-5430 : A = 65.5
DLD-5430-6 : A = 64.5

Fig. 19

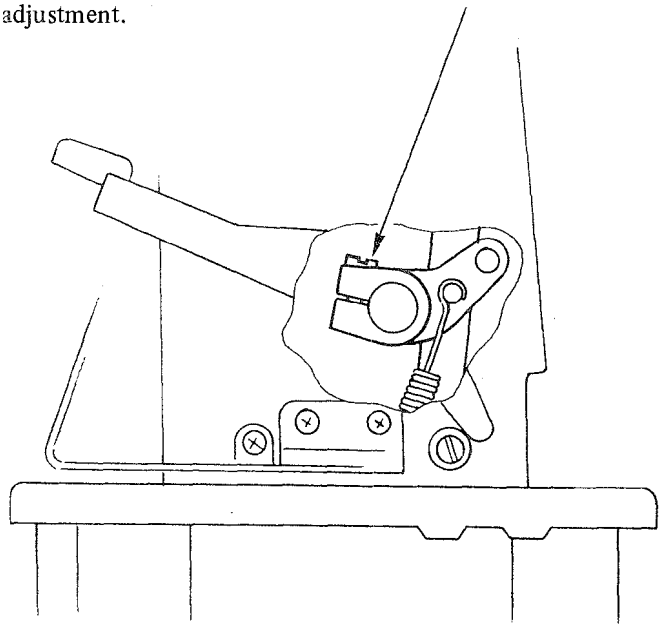
< For a sewing machine with an automatic reverse feed capability >

DLD-5430-6-0B, DLD-5430-6-WB

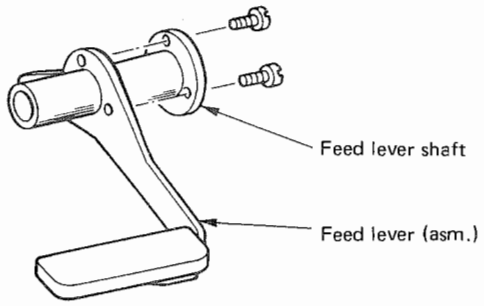
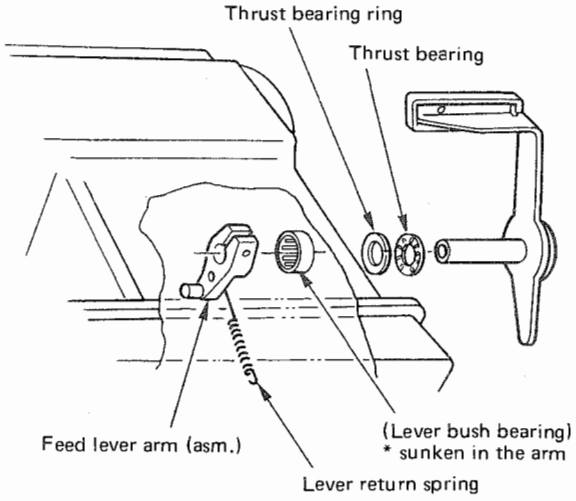
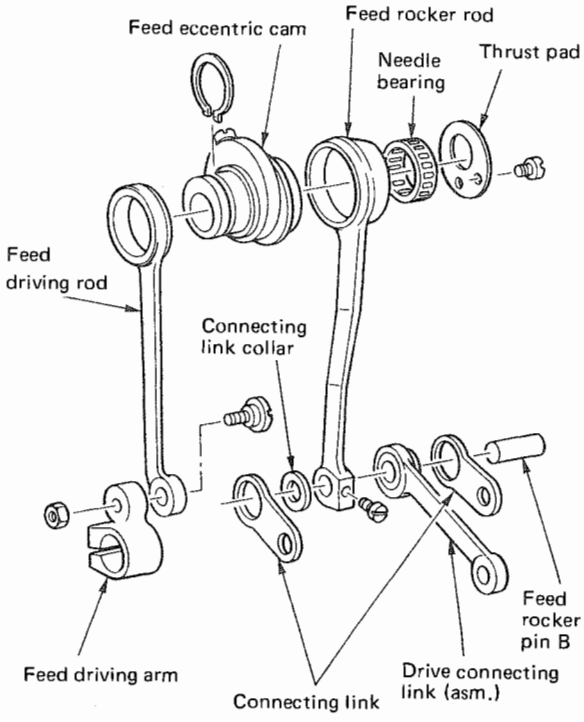


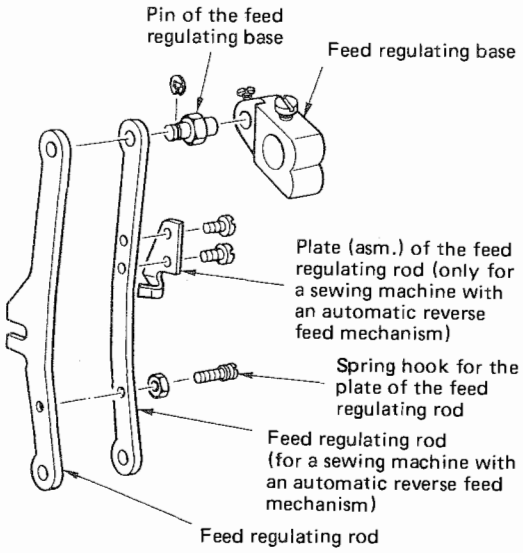
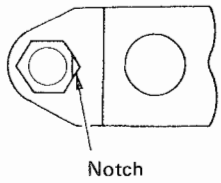
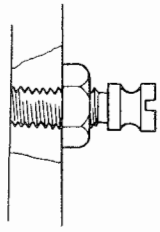
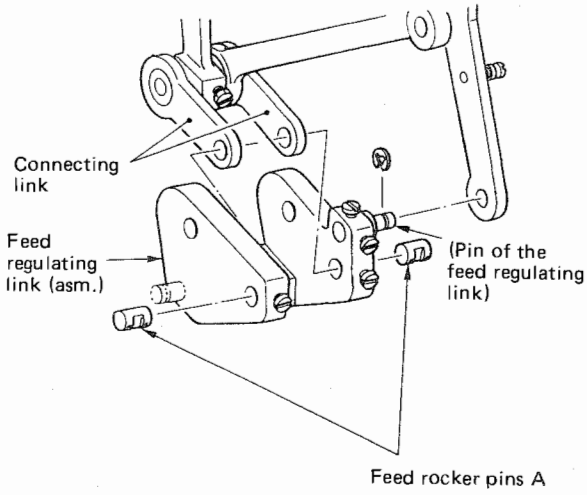
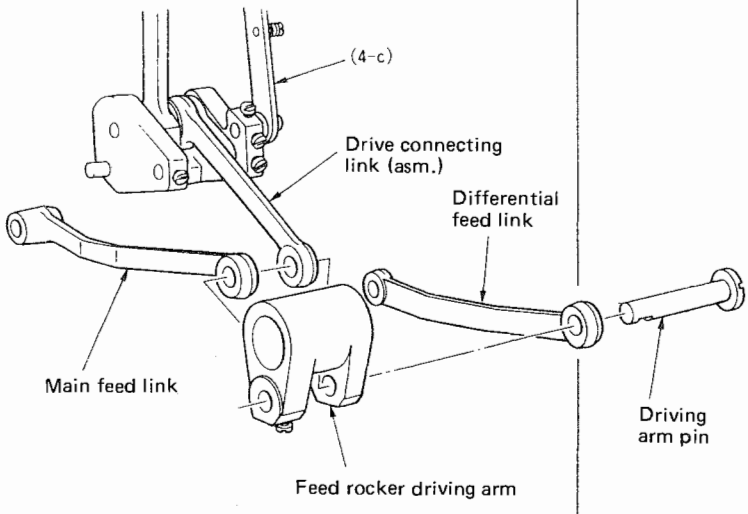
When the feed regulating dial is set to the largest value on the scale, a play of 1 mm (0.039″) should be obtained between the claw of the feed lever and the reverse feed lever stopper.

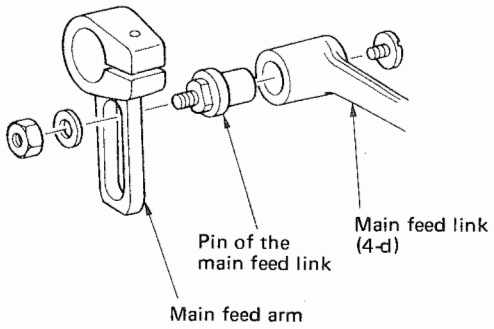
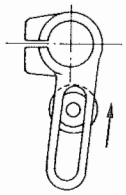
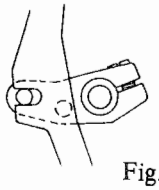
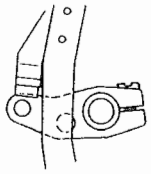
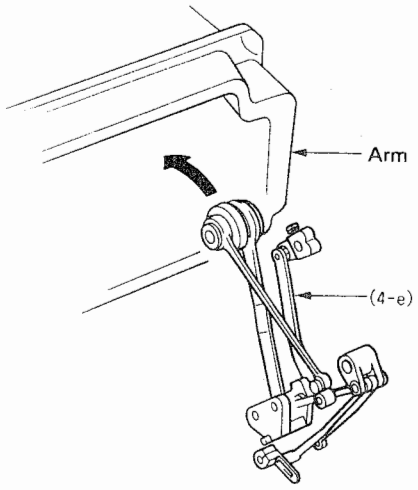
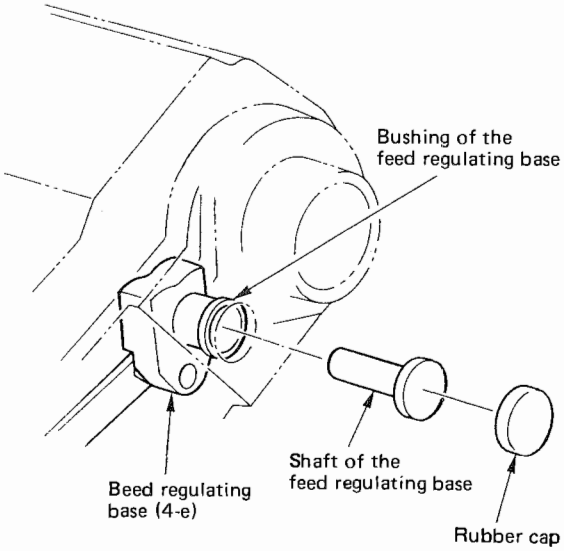
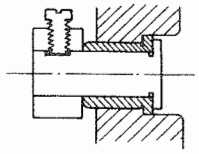
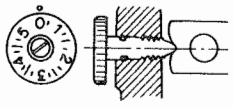
Fig. 20

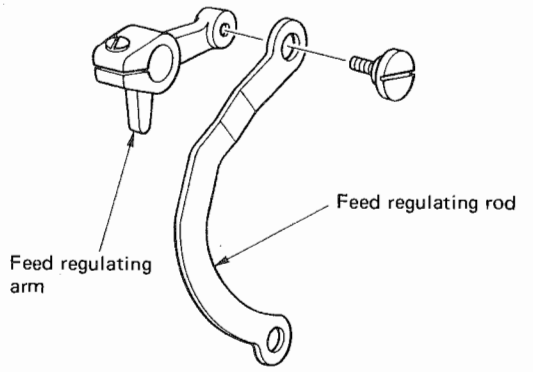
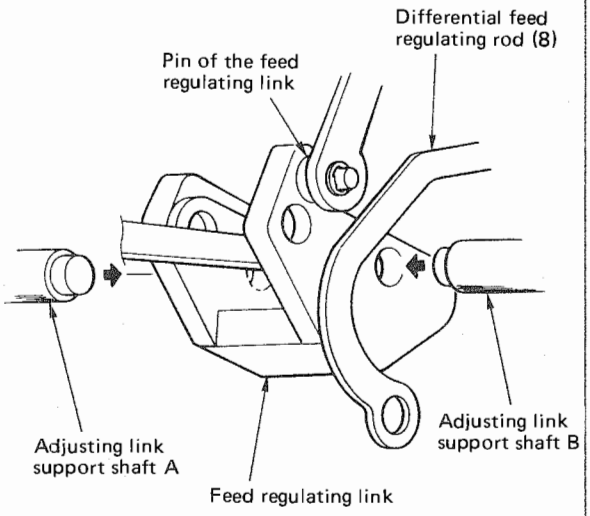
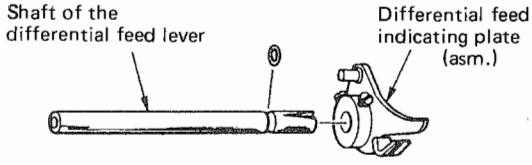
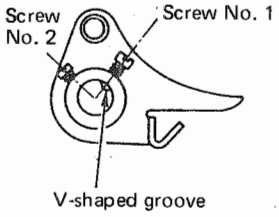
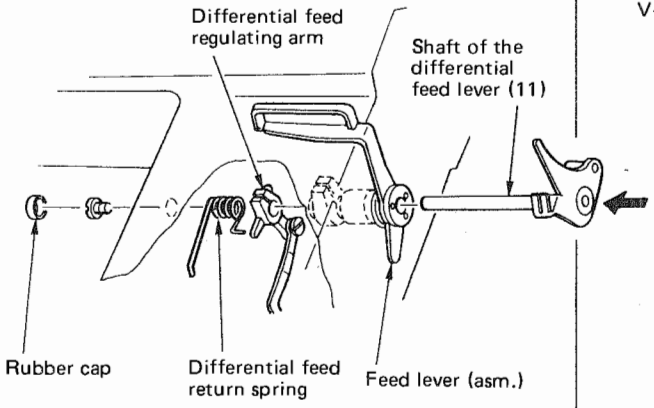
How to adjust	Results of improper adjustment
○ Loosen the clamping screw ❶ in the feed lever and make the adjustment.  Fig. 21	○ If the feed lever is not correctly positioned, the amount of feed may be changed from the value specified, or the feed lever may come in contact with other components. ○ If there is too much play between the claw of the feed lever and the reverse feed lever stopper, the amount of rev reverse feed will be decreased. As a result, there will be an abnormal operating noise, or the components may break.

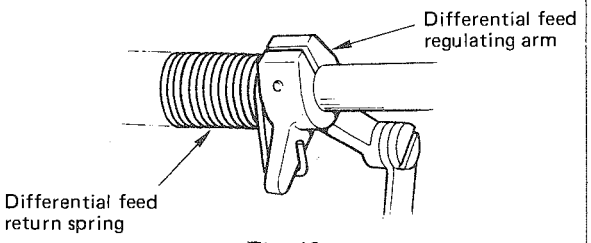
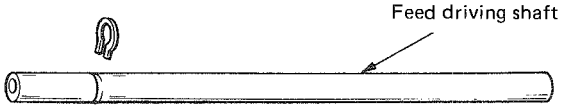
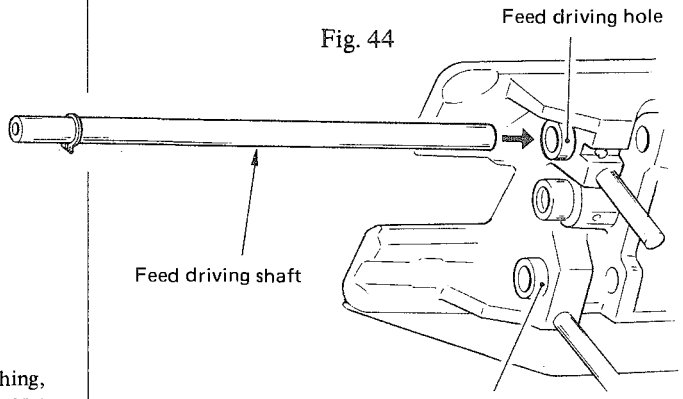
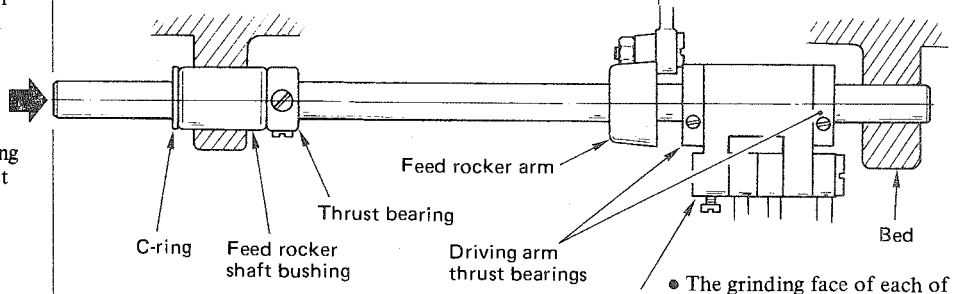
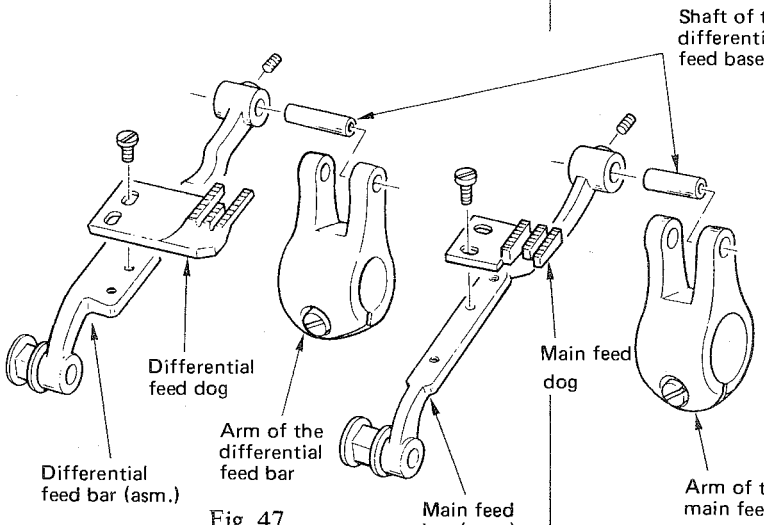
5. ASSEMBLING

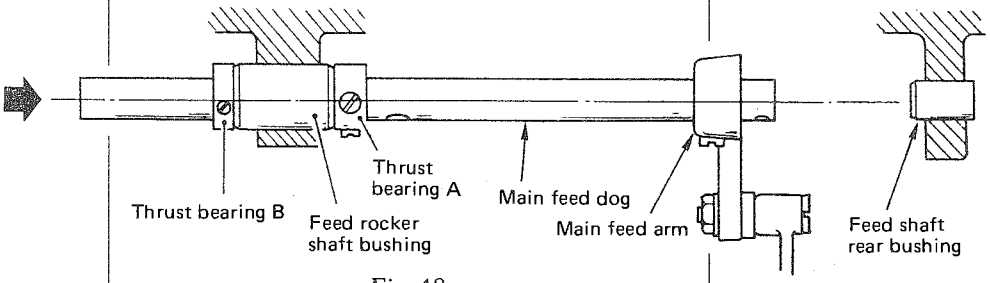
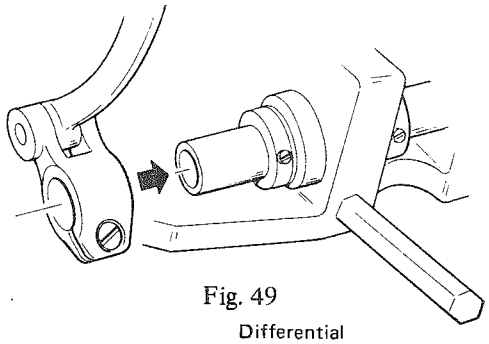
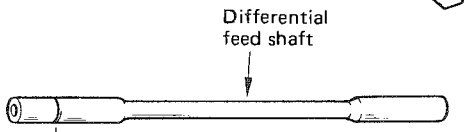
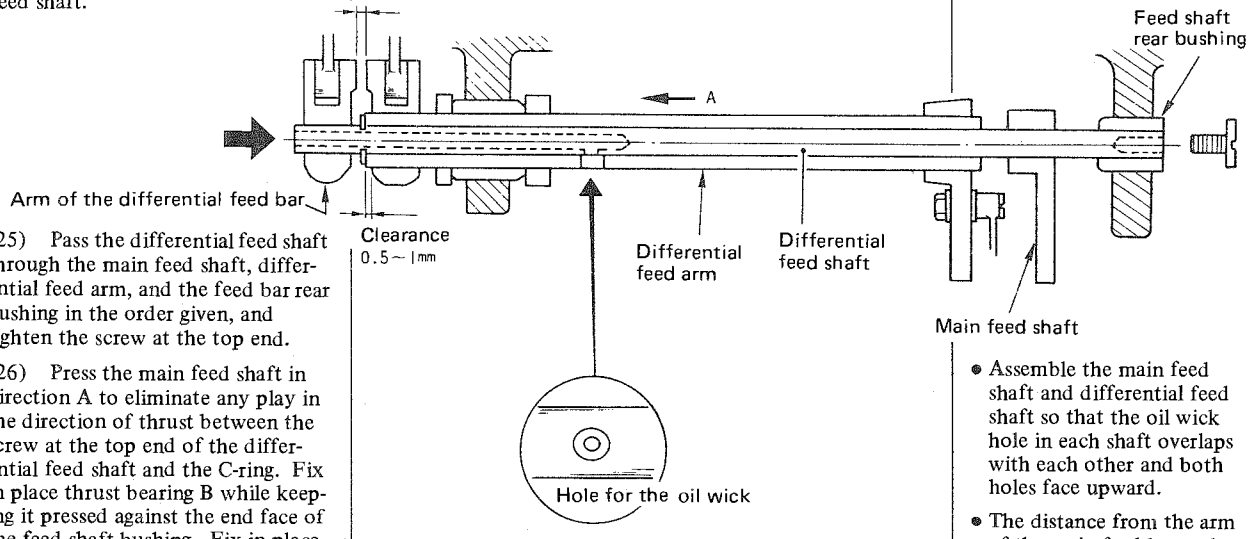
Assembling procedure	Figures for reference	Caution during assembly
(1) Pre-assembly Assemble the feed lever shaft and the feed lever (asm.), and tighten the three screws provided. (2) Sub-assembly Hook the lever return spring onto the feed lever arm (asm.).	 Fig. 22	
(3) Insert the thrust bearing and thrust bearing ring into the feed lever shaft. Then pass the lever bush bearing (sunken in the arm) around the shaft. Attach the feed lever arm (asm.) to the lever shaft inside the arm.	 Fig. 23	
(4) Pre-assembly (4-a) Pre-assemble the components around the feed eccentric cam. Attach the feed driving arm to the feed driving rod using the hinge screw and nut provided. Then insert the feed driving rod into the feed eccentric cam, fixing them in place using the C-ring provided. Insert the needle bearing into the feed eccentric cam, pass them in the feed rocker rod, and then fix in place the thrust pad of the feed eccentric cam using the screw provided. Pass the feed rocker pin B through the connecting link, drive connecting link, feed rocker rod, connecting link collar and the connecting link in the order given. Then attach the feed rocker pin to the feed rocker rod using the screw provided. Now carefully check that both ends of feed rocker pin B do not protrude from the connecting link.	 Fig. 24	• In the above state, the connecting link collar is not fixed in place. So be careful not to allow it to drop.

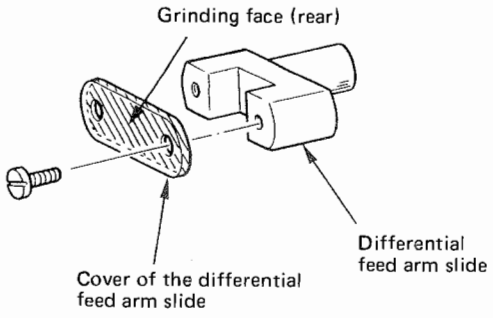
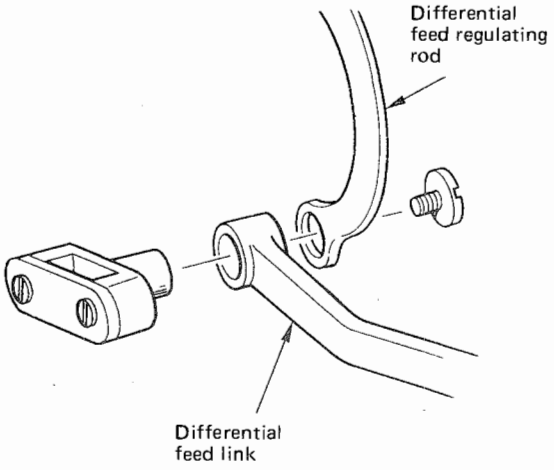
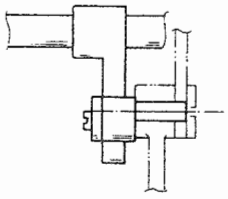
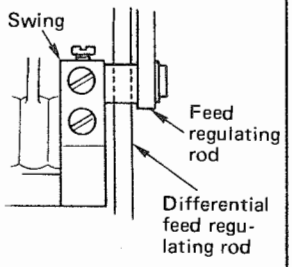
Assembling procedure	Figures for reference	Caution during assembly
(4-b) Insert the pin of the feed regulating base into the feed regulating base, and temporarily fix them in place using the two screws provided. Attach the spring hook of the feed regulating rod to the feed regulating rod using the nut provided (if the sewing machine has an automatic reverse feed capability, you should also fix the feed regulating plate in position using the two screws provided). Then attach them to the feed regulating rod using the E-ring provided.	 Fig. 25	• Temporarily tighten the feed regulating pin so that it points in the direction shown Fig. 26.  Fig. 26 • Assemble the spring hook of the feed regulating rod so that it is flush with the end face of the feed regulating rod.  Fig. 27
(4-c) Pre-assemble the components assembled in (4-a) in the feed regulating link (asm.). Attach the connecting link to the forked section of the feed regulating link (asm.) (commonly called "swing"). After aligning the hole in the connecting link with the hole in the feed regulating link, insert feed rocker pins A through the holes, taking care of the direction of insertion of the flat part on the indented section of each pin. Then fix them in place using the screw provided. Attach the components assembled in (4-b) on the pin of the feed regulating link (asm.), and fix them in place using the E-ring provided.	 Fig. 28	• When fixing the pin of the feed driving arm in place, be sure to eliminate any play in the direction of thrust so that the differential feed link moves without any play.
(4-d) Fit the drive connecting link (asm.) (4-c) and the main feed link into the forked part of the feed fork driving arm. Insert the pin of the driving arm through the differential feed link and the feed rocker driving arm (drive connecting link and the differential feed link) in the order given. Attach the flat part of the indented section of the driving arm pin to the above components and tighten them using the screw provided.	 Fig. 29	

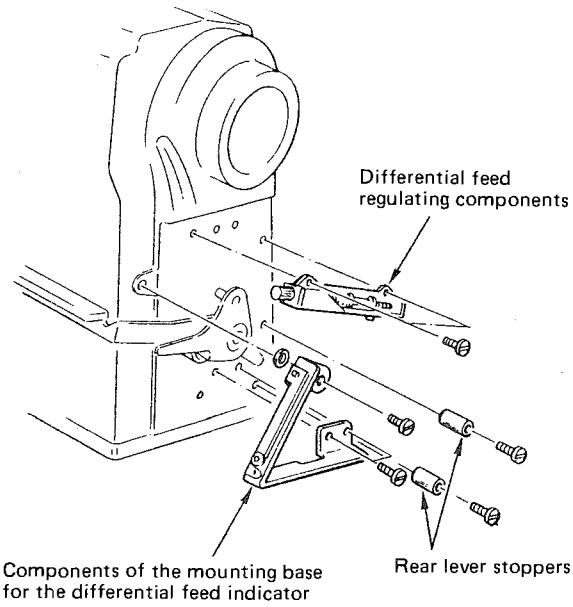
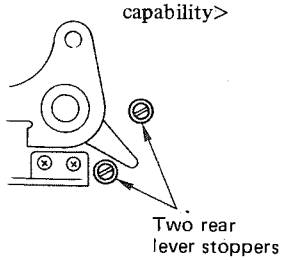
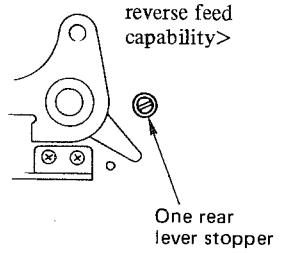
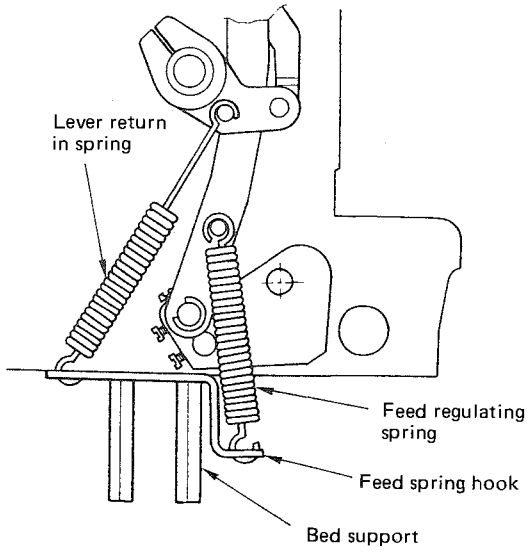
Assembling procedure	Figures for reference	Caution during assembly
(4-e) Insert the pin of the main feed link into the slot in the main feed arm and fix them in place using the nut and washer provided. Place the main feed link over the pin of the main feed link, and fix them in place in the direction of thrust using the screw provided.	 Fig. 30	• The standard position of the pin of the main feed link is obtained when the pin is pressed against the edge of the slot on the shaft side.  Fig. 31 • The positional relationship between the claw of the feed regulating rod and the pin of the feed lever arm (asm.) should now be as follows: <For a sewing machine with no automatic reverse feed capability> The pin should fit in the forked part.  Fig. 33 <For a sewing machine with an automatic reverse feed capability> The pin should be positioned under the claw.  Fig. 34
(5) Place the unit assembled in (4) inside the arm, taking care of the direction of insertion and holding the unit with the feed eccentric cam and the feed regulating base facing away from you.	 Fig. 32	
(6) Pass the shaft of the feed regulating base through the feed regulating base and fix them in place, eliminating any play in the direction of thrust. Cover the hole using a rubber cap.	 Fig. 35	<Sectional view>  Fig. 36 • Correctly align the "0" on the dial with the position where the feed regulating base will not move any further.  Fig. 37
(7) Attach the feed regulating dial to the feed regulating base using the feed regulating screw. Set the dial to "0".		

Assembling procedure	Figures for reference	Caution during assembly
(8) Pre-assembly Attach the differential feed regulating arm to the differential feed regulating rod using the hinge screw provided.	 Fig. 38	
(9) Insert support shafts A and B of the feed regulating link into the holes in the bed. (10) Insert support shafts A and B into the feed regulating link, allowing the differential feed regulating rod assembled in (8) to pass between the hole through which the pin of the differential feed regulating link (asm.) passes and the hole through which support shaft B passes. Determine the position of the rod in the direction of thrust so that the feed regulating link moves without any hindrance. Then fix support shafts A and B in place using the screw provided.	 Fig. 39	• The screws for the differential feed indicating plate (asm.) should be positioned as illustrated in Fig. 41 with regard to the V-shaped groove in the plate (asm.).
(11) Pre-assembly Attach the O-ring to the shaft of the differential feed lever and temporarily fix in place the differential feed indicating plate (asm.).	 Fig. 40	 Fig. 41
(12) Pass the shaft of the differential feed lever through the feed lever (asm.) (feed lever shaft), differential feed regulating arm and the differential feed return spring in the order given. Loosen the temporarily tightened setscrews in the differential feed indicating plate. Tighten the screw at the top end of the shaft of the differential feed lever. Press the screw at the top end and the differential feed indicating plate (asm.) from both ends so as to eliminate any play. Then tighten the screws in the differential feed indicating plate, starting with screw No. 1, then screw No. 2. Now fix the rubber cap in place.	 Fig. 42	

Assembling procedure	Figures for reference	Caution during assembly
(13) Hook the differential feed return spring onto the differential feed regulating arm. (14) Pre-assembly Fit the C-ring onto the feed driving shaft. (15) Pass the feed driving shaft through the feed driving hole in the bed. • Pass the feed driving shaft through the feed shaft bushing, thrust bearing, feed driving arm, driving arm thrust bearing, feed rocker driving arm, driving arm thrust bearings and the hole in the bed in the order given. (16) Place the feed shaft bushing between the C-ring and the thrust bearing. Eliminating any play, tighten the screw in the thrust bearing. (17) Fix in place the two driving arm thrust bearings, allowing the feed rocker arm to move smoothly. (18) Tighten the clamping screw in the feed rocker arm, allowing the feed rocker arm to move smoothly. (19) Pre-assembly Connect the main feed dog and the arm of the main feed bar with the main feed bar. (20) Pre-assembly Connect the differential feed dog and the arm of the differential feed bar with the differential feed bar.	 Fig. 43  Fig. 44  Fig. 45  Fig. 46  Fig. 47	• The grinding face of each of the three thrust bearings should face the feed shaft bushing and the feed rocker driving arm.

Assembling procedure	Figures for reference	Caution during assembly
(21) Fix the throat plate on the bed using the two setscrews provided. (22) Pass the main feed shaft through thrust bearing B, feed shaft bushing, thrust bearing A, and the main feed arm in the order given.	 Fig. 48	• The grinding face of the thrust bearing should face the main feed bushing. • During disassembly, the screw in thrust bearing B should not be loosened, otherwise re-assembly will be difficult.
(23) Insert the arm of the main feed bar into the main feed shaft.	 Fig. 49	
(24) Pre-assembly Fit the C-ring onto the differential feed shaft.	 Fig. 50	
(25) Pass the differential feed shaft through the main feed shaft, differential feed arm, and the feed bar rear bushing in the order given, and tighten the screw at the top end. (26) Press the main feed shaft in direction A to eliminate any play in the direction of thrust between the screw at the top end of the differential feed shaft and the C-ring. Fix in place thrust bearing B while keeping it pressed against the end face of the feed shaft bushing. Fix in place thrust bearing A while keeping it pressed against the end face of the feed shaft bushing. (27) Pass the differential feed bar arm through the differential feed shaft.	 Fig. 51	• Assemble the main feed shaft and differential feed shaft so that the oil wick hole in each shaft overlaps with each other and both holes face upward. • The distance from the arm of the main feed bar and the arm of the differential feed bar to the end face of the main feed shaft should both be 0.5 to 1 mm (0.020" to 0.039").

Assembling procedure	Figures for reference	Caution during assembly
(28) Determine the thrusting positions of the arm of the main feed bar and the differential feed arm, aligning the slot in the throat plate with the feed dog. Then temporarily fix them in place. (Permanently fix them in place after determining the longitudinal direction of the feed dog.) (29) Insert the two feed rocker forks into the feed rocker shaft. Determine the thrusting position of the feed rocker shaft referring to the positions of the rollers in the main feed bar and the differential feed bar. Then temporarily fix them in place. (Permanently fix them in place after determining the height of the feed dog.) (30) Pre-assembly Attach the differential feed arm slide to the cover of the differential feed slide using the two setscrews provided. (31) Pass the differential feed arm slide through the differential feed link, then through the differential feed regulating rod. Now tighten the thrusting screw. (32) Insert the differential feed arm slide into the differential feed arm and determine the thrusting position, allowing the differential feed arm to move smoothly. Tighten the clamping screw in the differential feed arm. (33) Temporarily tighten the clamping screw in the differential feed regulating arm, allowing the differential feed arm slide to slide smoothly. (Tighten up the clamping screw while aligning the differential feed arm slide with the scale.)	 Fig. 52  Fig. 53	• Since the differential feed arm slide is eccentric, be careful of the direction.  Fig. 54 • The differential feed regulating arm and the differential feed arm should be positioned in the direction of thrust. The differential feed regulating rod should not be pressed against the feed regulating link and the feed regulating rod.  Fig. 55

Assembling procedure	Figures for reference	Caution during assembly
(34) Attach the components related to the differential feed regulating mechanism around the lifter shaft outside the arm.	 Fig. 56	• Attach the rear lever stoppers as illustrated. <For a sewing machine with an automatic reverse feed capability>  Fig. 57 <For a sewing machine without an automatic reverse feed capability>  Fig. 58
(35) Fix the feed spring hook in place using the bed support. Then hook the feed regulating spring and the lever returning spring.	 Fig. 59	

6. THREAD TRIMMING

(1) Checking and adjusting the thread trimmer components

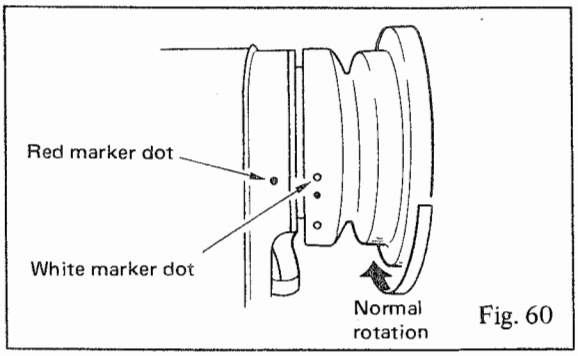


Fig. 60

[Before making the adjustment]
When the power to the sewing machine is turned ON, the sewing machine will stop with the red marker dot on the machine arm aligned with the white marker dot on the pulley. (If the red and white marker dots are not aligned with each other when the sewing machine stops, adjust the position of the magnet mounting base of the handwheel.)
Turn OFF the power to the sewing machine with the red marker dot aligned with the white marker dot, and verify the following check points **a** through **e**.

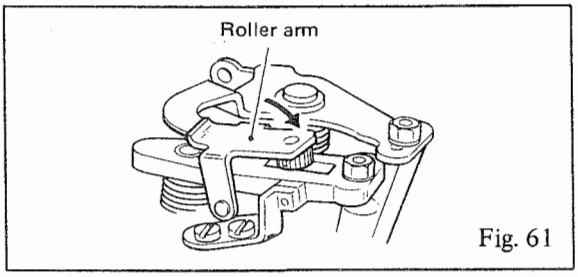


Fig. 61

① Check point **a**
Press the roller arm in the direction of the arrow and check that the thread trimmer unit moves smoothly.

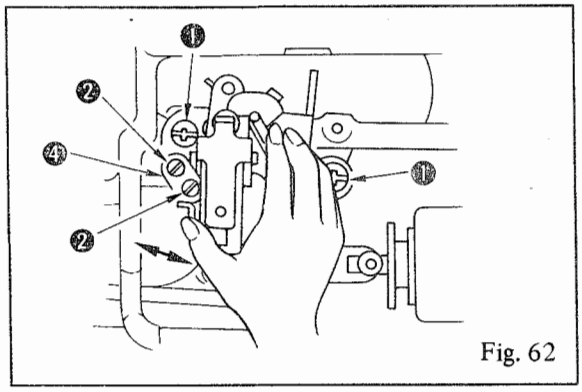


Fig. 62

[Adjustment procedure for when the thread trimmer unit is unable to move smoothly]
Firmly tighten two setscrews ❶ with the thread trimmer unit pressed down. Loosen two setscrews ❷ in stopper ❸, and adjust so that the thread trimmer unit moves smoothly under the roller arm. Then firmly tighten two setscrews ❷.

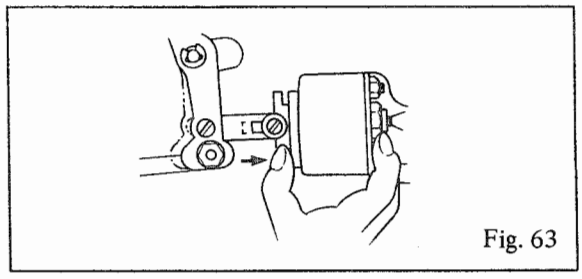


Fig. 63

② Manually turn ON the thread trimming solenoid and check points **b** through **e**.

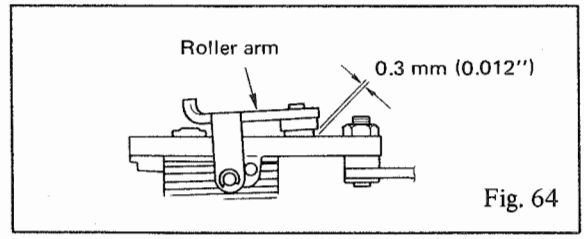


Fig. 64

③ Check point **b**
Confirm that there is a clearance of 0.3 ± 0.2 mm (0.012" ± 0.008") (as thick as one or two sheets of paper).

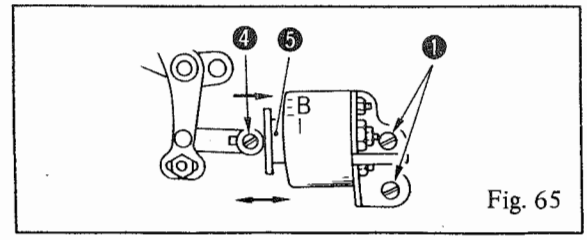


Fig. 65

[Adjustment procedure for when the clearance is inappropriate]
Loosen two setscrews ❶ in the solenoid, and adjust the clearance by moving the main unit of the solenoid to the left or right. Then tighten setscrews ❶.

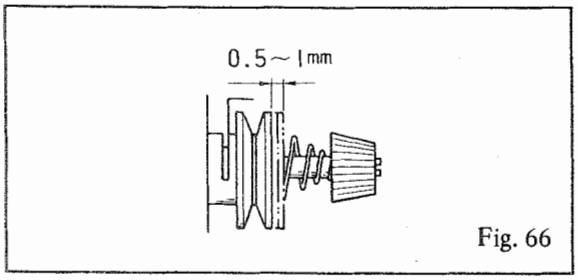


Fig. 66

④ Check point **c**
Verify that the tension disc floats properly.

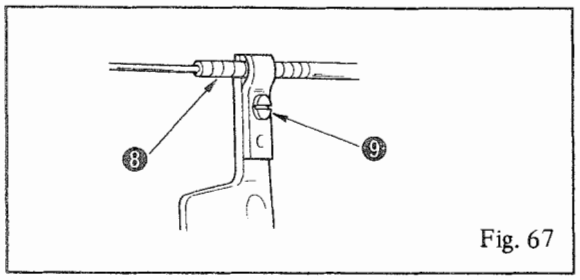


Fig. 67

[Adjustment procedure for when the tension disc does not float properly]
1) Loosen screw ❾ and move wire tube ❽ to the left or right to allow the tension disc to float properly.

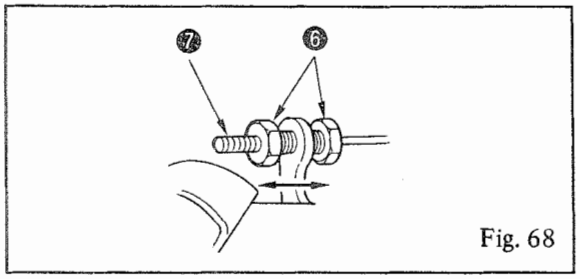


Fig. 68

2) If the tension disc still does not float properly after the adjustment described above has been made, loosen two nuts ❻, and make an adjustment by moving wire screw ❼ to the left or right.

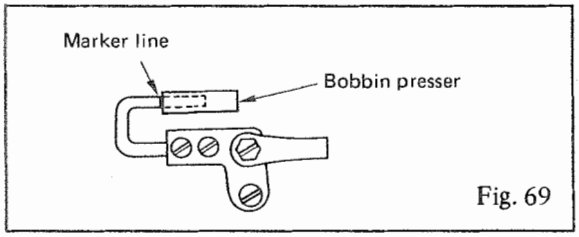


Fig. 69

⑤ Check point **d**
Check that the picker comes in contact with the bobbin presser parallel to it and that the marker line on the picker reaches the bobbin presser.

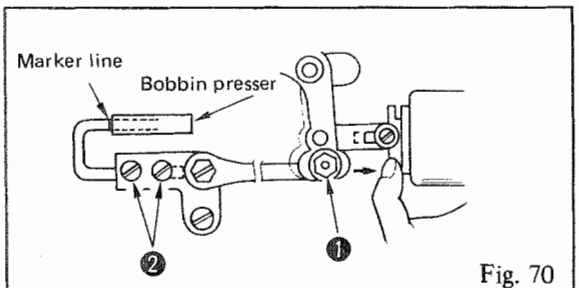


Fig. 70

[Adjustment procedure for when the picker is unable to come in contact with the bobbin presser]
Loosen nut ❶ and move the picker to the left or right so that it is positioned at right angles to the bobbin. Then, using two setscrews ❷, adjust so that the marker line on the picker reaches the bobbin presser.

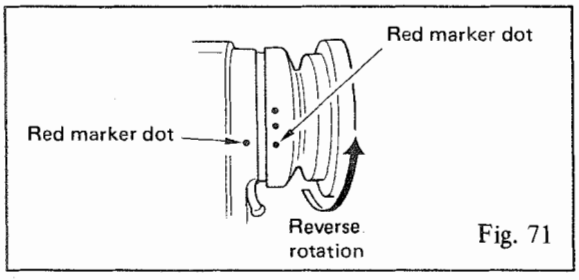


Fig. 71

⑥ Check point **e**
Turn the pulley in the reverse direction and check that the machine stops with the red marker dot on the pulley aligned with the red marker dot on the machine arm.

(2) Adjusting the timing of a malfunctioning the thread trimmer cam

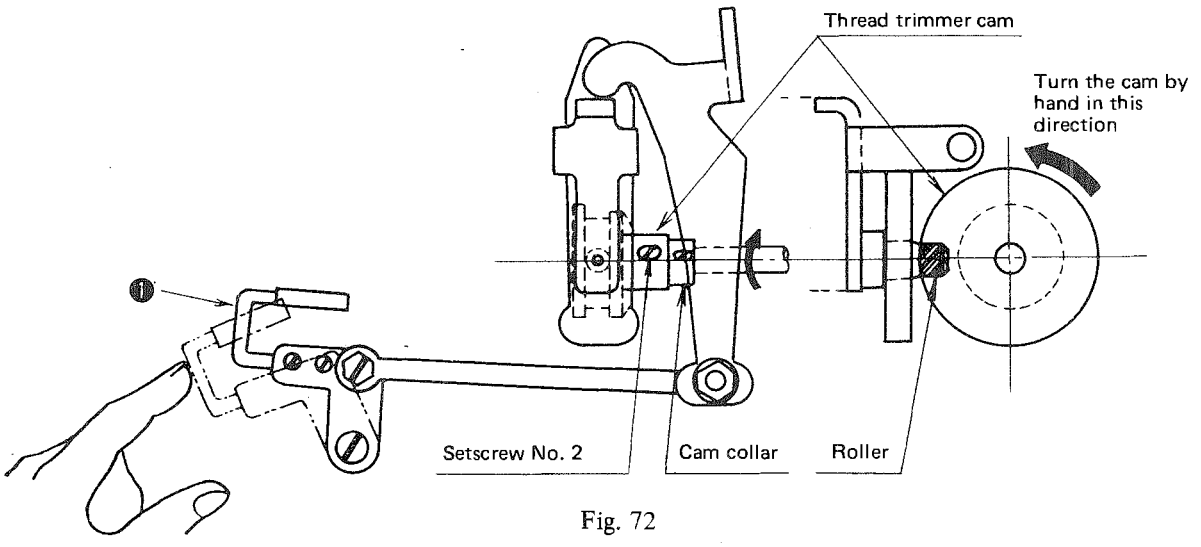


Fig. 72

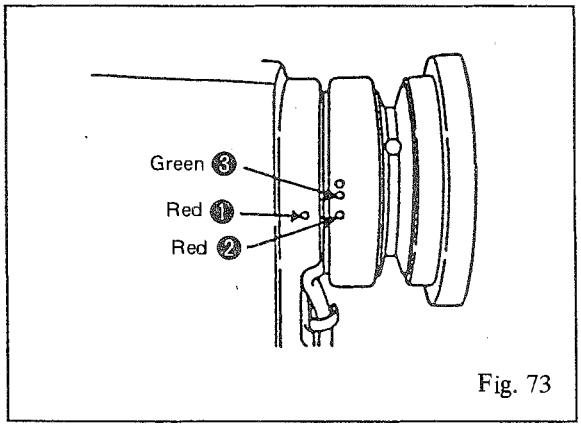


Fig. 73

[Adjusting the timing of the thread trimmer cam]
Loosen the two setscrews in the thread trimmer cam (Fig. 72), starting with setscrew No. 1, followed by setscrew No. 2.
Then align red marker dot ❶ on the machine arm with red marker dot ❷ on the pulley, as illustrated in Fig. 73. Pressing the bobbin thread presser (❶ in Fig. 72), allow the cam to engage with the roller. Using your fingertip, turn the cam in reverse to the normal direction of rotation of the hook driving shaft (in the direction of the arrow in Fig. 72) until it can go no further. The hook driving shaft should be kept stopped. Now press the cam against the roller (Fig. 72) and tighten setscrew No. 2, followed by setscrew No. 1.
If the cam collar has not been moved for the purpose of adjustment, press the thread trimmer cam against the cam, tighten setscrew No. 2 and then setscrew No. 1.

1) The marker dot on the handwheel indicates the position for the standard cam timing. It is therefore possible to quicken the cam timing by adjusting the position by about 2 degrees, or to delay it by adjusting the position by about 5 degrees, when using a cotton or synthetic thread. In this case, however, confirm that the moving knife is capable of cutting the needle thread into two under the throat plate. If the cam timing is too fast or too slow, the needle thread remaining on the tip of the needle will be too short, and the needle thread may slip off the needle eyelet immediately after thread trimming. In addition, an inappropriate cam timing may prevent the roller from entering the groove in the thread trimmer cam.
2) In principle, the timing of the thread trimmer cam is the same for both cotton thread and synthetic thread. However, if the problems described below frequently occur when a synthetic thread of a small number count etc. is used, a further adjustment will be required for the synthetic (special) thread (of a small number count).

<Problems>

① One or several stitches skip at the sewing start.
② The thread slips off the needle eyelet at the sewing start.

<Adjustment>

① Align the red marker dot (❶ in Fig. 73) on the machine arm with the green marker dot (❸ in Fig. 73) on the handwheel.
② Sew the first stitch at the sewing start in the soft start mode (800 s.p.m.).

[Caution] Adjustment ❶ is not applicable for a thread with a large number count.

(3) Confirming the amount of backward travel of the moving knife

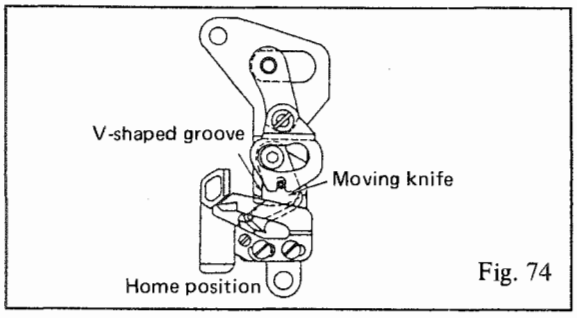


Fig. 74

① Check point **a**
The end of the V-shaped groove in the knife mounting base should be aligned with the tip of the moving knife when the moving knife is in its home position (when it does not trim the thread).

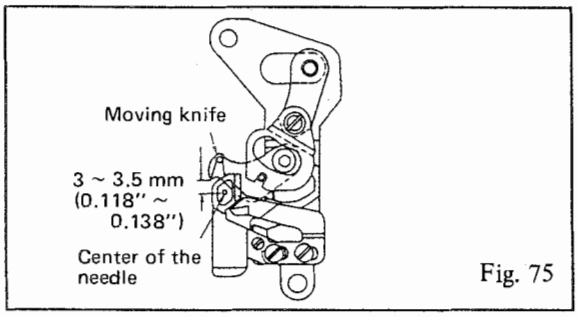


Fig. 75

② Check point **b**
Turn the pulley until the moving knife reaches the point furthest back. Now check that there is a clearance of 3 (0.118") to 3.5 (0.138") mm between the center of the needle and the tip of the moving knife.

(4) Adjusting the amount of backward travel of the moving knife

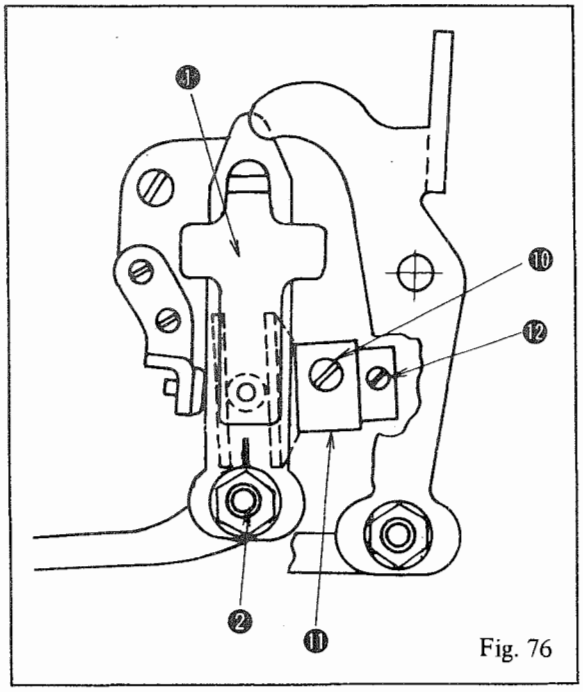
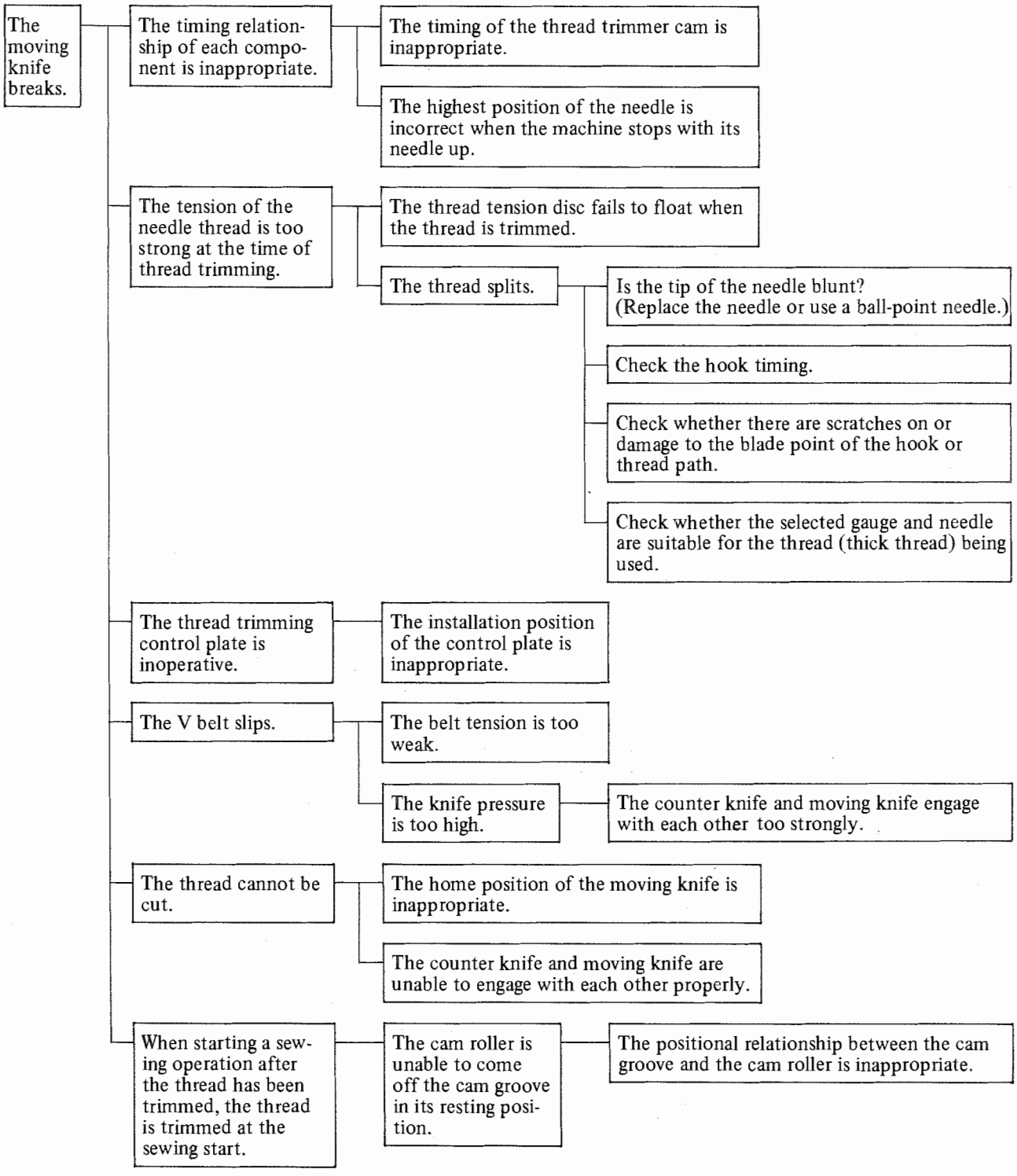


Fig. 76

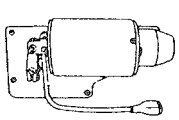
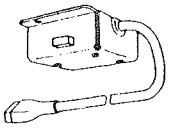
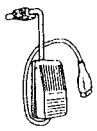
1) Remove the throat plate.
2) Turn the pulley toward you from the lowest point of its stroke until the tip of the needle is raised slightly above the top surface of the throat plate (the thread take-up lever should now be near the highest point of its stroke). While maintaining this condition, press the picker arm against the hook (bobbin).
3) While continuing to maintain the conditions described in 2), turn the pulley toward you to move the moving knife. Adjust to obtain a clearance of 3 to 3.5 mm (0.118" to 0.138") between the center of the needle and the tip of the moving knife, as mentioned in 3.②, when the moving amount of the pulley reaches the maximum in terms of its home position.
4) Loosen nut ❷ and move it to the left or right to change the home position of the moving knife.

(5) Breakage of the moving knife



7. AUTO-LIFTER (AK-33, -34, -35, -36)

Adjusting the auto lifter with the side plate (AK-33, -34, -35, -36)

	AK auto lifter asm.	Flyback resistor (asm.)	Knee switch asm.	Machine head	Motor used
					
AK-33	○	○	○	-6 type	JUKI's KFL type motor or motor A of another company
AK-34	○	○			JUKI's PFL type motor or motor A of another company
AK-35	○			-4 type	Motor B of another company.
AK-36	○		○	-4 type	

(Note) 1. Motor A of another company is not provided with a flyback circuit for the auto lifter magnet.
2. Motor B of another company is provided with a flyback circuit for the auto lifter magnet.

Fig. 77

(1) Assembling the auto lifter (when purchased as an optional device)

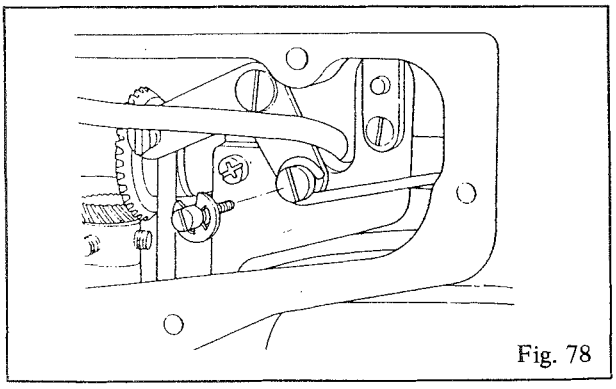


Fig. 78

Remove the side plate of the sewing machine, and replace the hinge screw in the knee lifter horizontal bar on the sewing machine with the pin of the knee lifter horizontal bar supplied with the auto lifter.

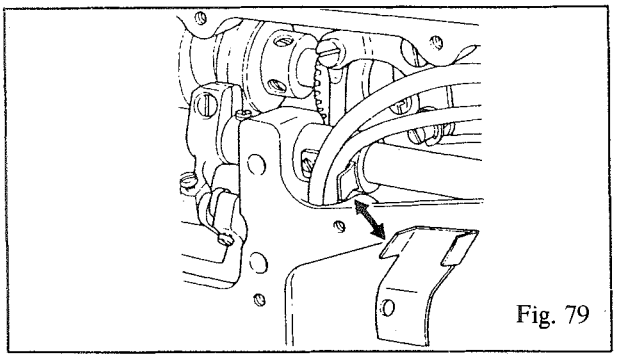


Fig. 79

If the sewing machine being used is provided with a boss on the side plate section, replace the boss with the pipe support plate supplied with the auto lifter.

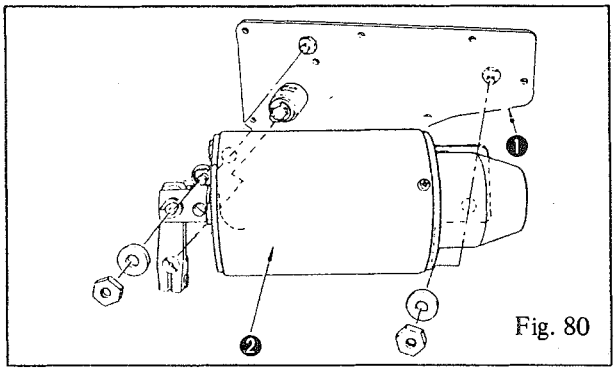


Fig. 80

Remove side plate (asm.) ❶ from solenoid (asm.) ❷ of the auto lifter.

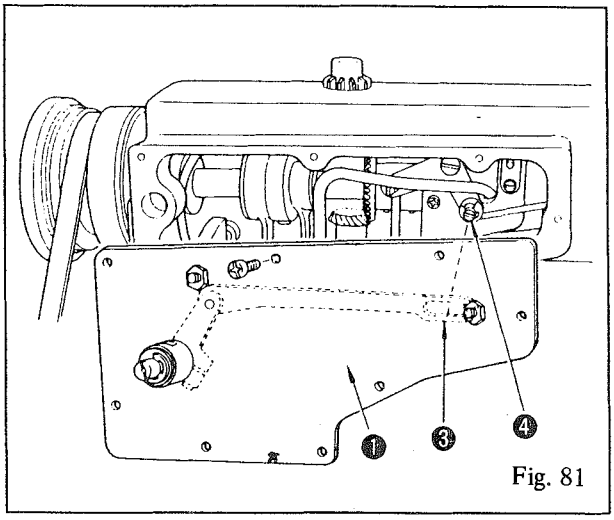


Fig. 81

Attach side plate (asm.) ❶ to the sewing machine. The slot in solenoid link ❸ should now be set on pin ❹ of the knee lifter horizontal bar.

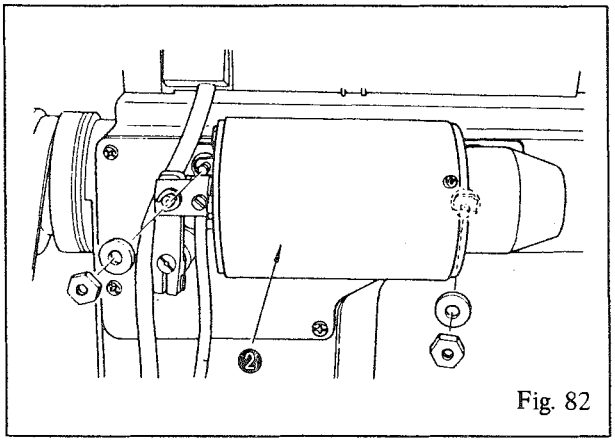


Fig. 82

Attach solenoid (asm.) ❷ to the sewing machine.

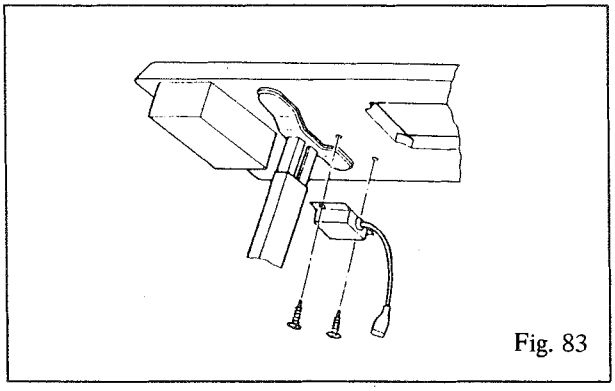


Fig. 83

Attach the flyback resistor (asm.) onto the reverse side of the machine table, as illustrated.

Note: The flyback resistor (asm.) is not required for the AK-35 or -36 of the auto-lifter.

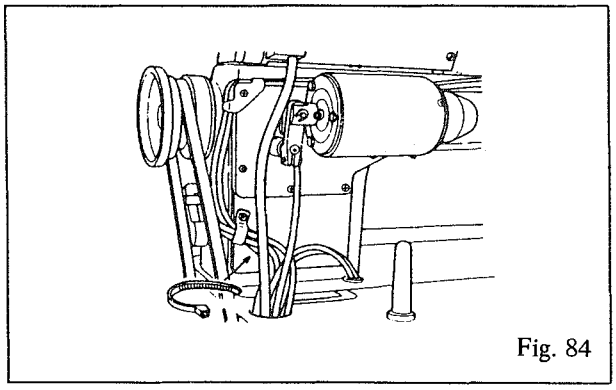


Fig. 84

Bundle together the control panel cables using the band supplied with the auto lifter so as to prevent from touching the moving section.

(2) Assembling the auto lifter when delivered separately

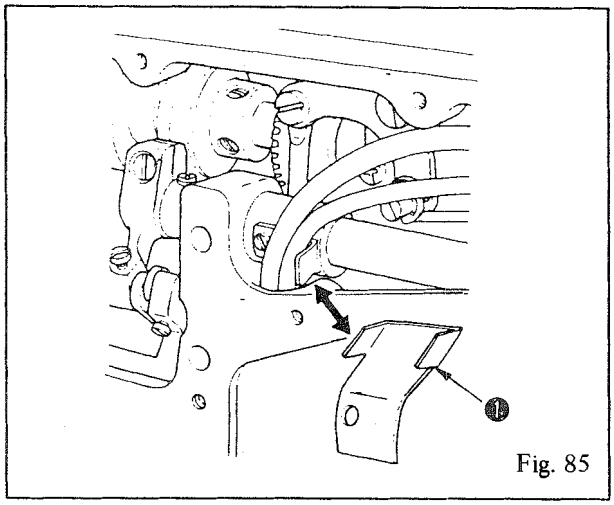


Fig. 85

The separately delivered auto lifter comes with pipe support ❶.
It can therefore be used with sewing machines with an automatic thread trimmer, including the DLU-5490.

(3) When using the PK-18 (three-pedal unit) with an auto lifter

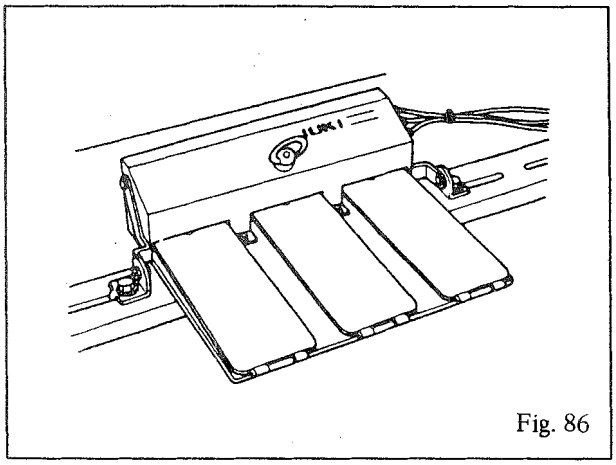


Fig. 86

Use the AK-34 auto lifter with the PK-18.

(4) DIP switches and table showing how to select the functions

The DIP switches (for the SC Series of sewing machine controllers) and the functions are described in Table 1.

[Caution] FLNS of SW5-3 is used only when the auto lifter is driven by an air cylinder. In all other cases, the switch should be set to its OFF position.

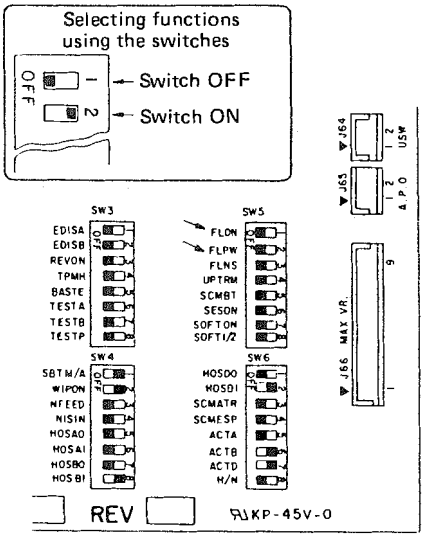


Fig. 87

SW5-1 FLON	SW5-2 FLPW	Operation
OFF	OFF	In this case, the presser foot goes up only when the knee switch or pedal switch is operated.
ON	OFF	In this case, the presser foot is kept raised for 60 seconds after the thread has been trimmed or the pattern has been sewn.
OFF	ON	This setting is invalid.
ON	ON	In this case, the presser foot goes up after no predetermined period of time once the thread has been trimmed or the pattern has been sewn. If the switches are set in this state, be sure to instruct the operator to make it a rule to turn OFF the power switch whenever he/she leaves the sewing machine.

Table 1

(5) Correspondence between the auto-lifter and the electrical components of the motor using the SC Series of controllers

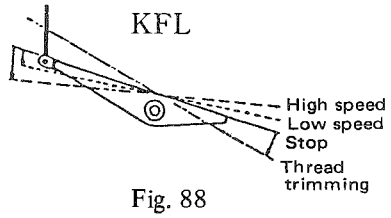


Fig. 88

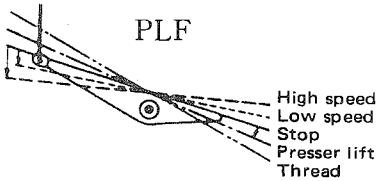


Fig. 89

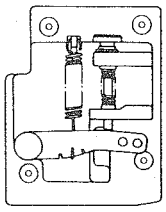
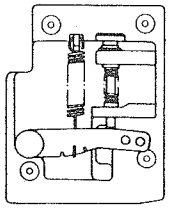
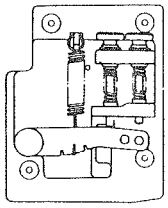
	FL not provided	KFL	PFL
Pedal sensor section			
Transistor circuit board for the AK (on the FL)	Not provided	Provided	Provided

Fig. 90

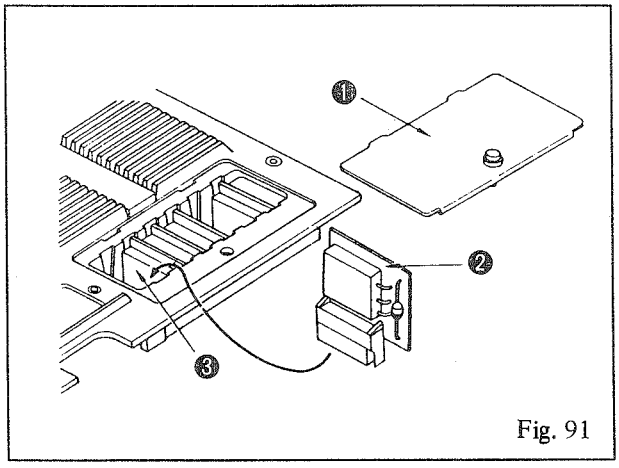


Fig. 91

To modify a sewing machine not provided with an FL to one with a KFL, transistor circuit board asm. (M42013010A0) ❷ is required. Remove top cover ❶ from the electrical box and assemble transistor circuit board asm. ❷ on FL ❸ .

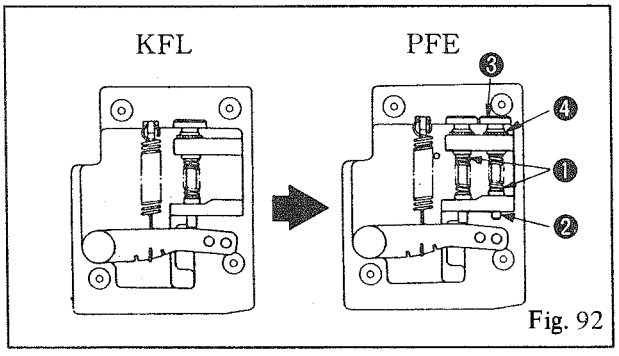


Fig. 92

To modify a sewing machine with a KFL to one with a PFL, the following components and additional adjustments are required.

	Part No.	Part name	Q'ty
1	M2007120A0U	Press-back spring (B)	2
2	M2008110000	Press-back spring shaft	1
3	M2009110000	Pressure adjustment screw for the press-back spring	1
4	M2010110000	Pressure adjustment nut for the press-back spring	1

Table 2

[Caution] The press-back spring for the KFL and that for the PFL are different.

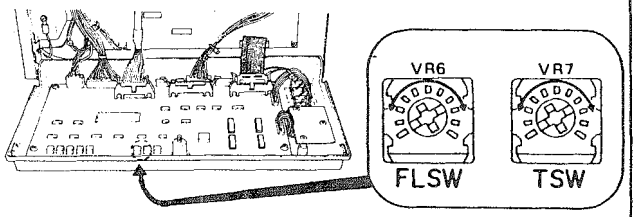


Fig. 93

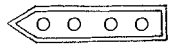
Adjust sensor dials TSW and FLSW as illustrated in Fig. 93.

	VR No.	VR dial code	Functions
(I)	VR7	TSW	The presser lift operation is performed between the neutral position and the thread trimming position of the pedal. Consequently, the stroke between these two positions should be lengthened. Set the stroke to 5.2 ± 1 mm (0.205″ ± 0.039″) using the pedal connection hole (inside). • A clockwise turn of the dial increases the stroke.
(II)	VR6	FLSW	Depressing the back part of the pedal will actuate the same operation as with the knee switch of the auto lifter. Set the stroke to 1.5 ± 1 mm (0.059″ ± 0.039″) using the pedal connection hole (inside). • A clockwise turn of the dial increases the stroke. If the dial is turned counterclockwise too far, the presser foot may remain raised when the pedal is in neutral.

Table 3

(6) Miscellaneous

① 4P connectors or the motor



Connector P48

1. FL SW RTN	White	FL switch
2. FL SW	Black	
3. FL	Red	FL solenoid
4. FL COM	Green	Operating voltage, 34Vdc Approx. 5.4Ω

Fig. 94

② Sealant

The screws and bushes in the side plate have been permanently fixed in place using an adhesive sealant, LOCKTITE 262. Never disassemble them.

8. PF-7 PARTIAL SHIRRING DEVICE [Part made to order]

(1) Assembling the oil pan

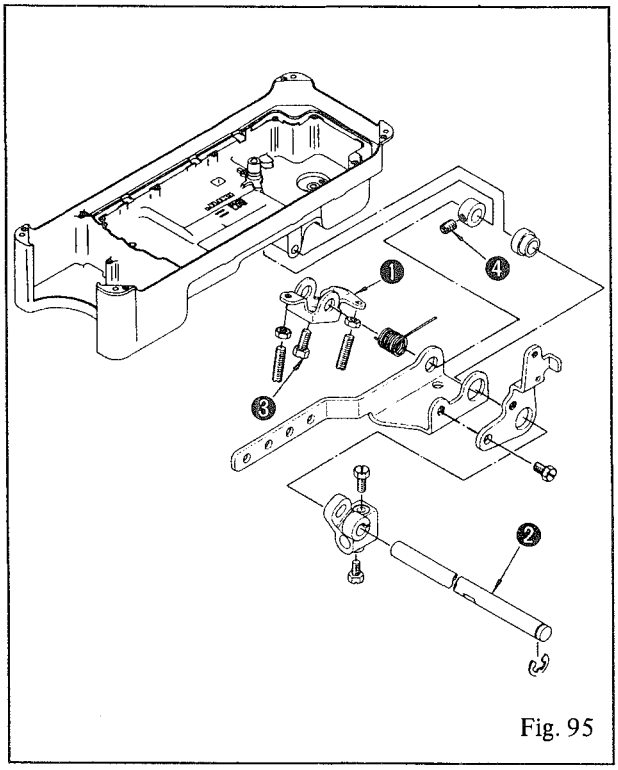


Fig. 95

If the PF-7 has been purchased as an option, re-install the oil pan, as illustrated. (Fig. 95 shows an example of how to assemble the oil pan for a sewing machine with a knee lifter for the presser foot. To change the method of lifting the presser foot for the above sewing machine so that the presser foot is raised by means of the foot pedal switch, first assemble the oil pan as illustrated in Fig. 95, and then make a re-adjustment referring to the Instruction Manual.

1) To attach knee pad rotating arm ❶ to knee pad horizontal shaft ❷, tighten hexagonal bolt ❸ of the knee pad rotating arm after fitting it in the screw hole in the knee pad horizontal shaft.
2) Tighten the thrust collar using screw ❹ after fitting it onto the flat section of knee pad horizontal shaft ❷.
3) After assembling the oil pan, check that horizontal shaft ❷ of the knee lifter rotates smoothly. If it does not, re-adjust the position where the thrust collar is fixed in place.

(2) Installing the partial shirring device

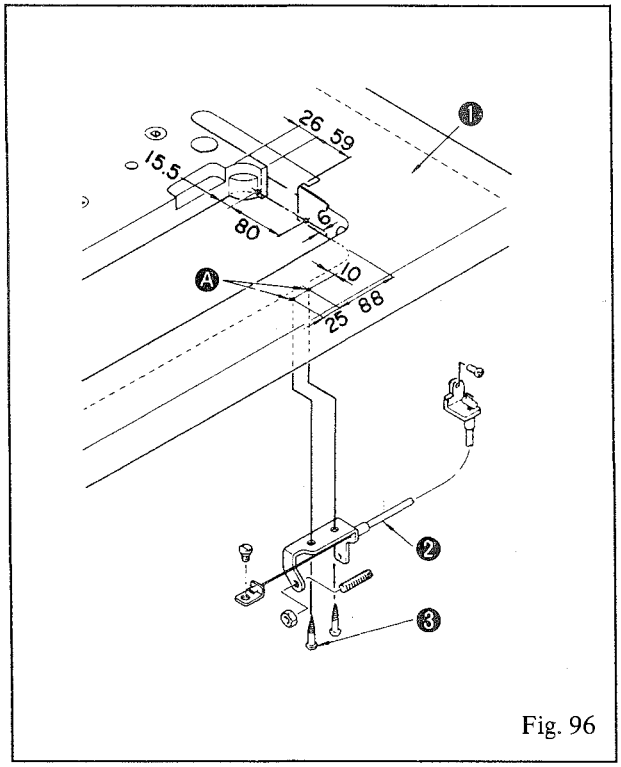


Fig. 96

[Installation procedure]

1) Drill two guide holes Ⓐ for wooden screws ❸ in reverse side ❶ of the table.
2) Attach partial shirring wire set ❷ to Ⓐ using wooden screws ❸.
3) Install the oil pan for the PF-7 on the table.

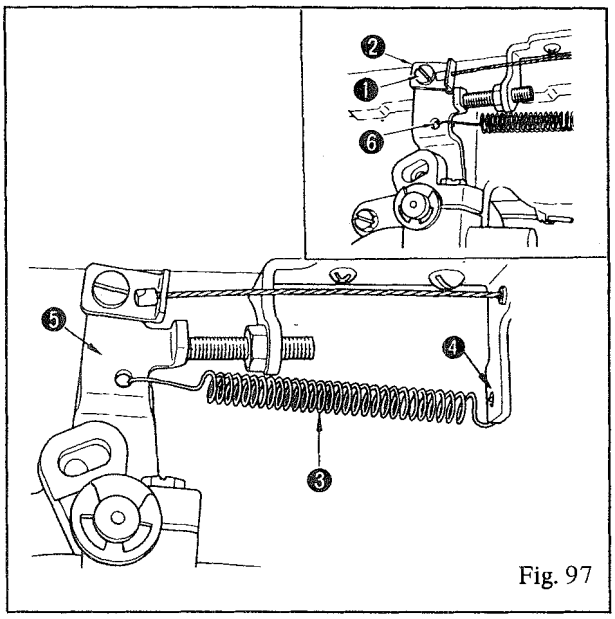


Fig. 97

4) Connect wire support plate ❷ using hinge screw ❶ .

5) Hook partial shirring returning spring ❸ into hole ❹ and then hook it into hole ❻ in driving arm ❺ .

* Hang a piece of thick thread from the hook of the spring on the anchor side and pull the spring using the thread so that it can be easily hooked into the hole.

[Caution] Since the spring pressure is very high, be careful when hooking the spring.

6) Locate the knee pad in a position convenient for the operator and then fix it in place.

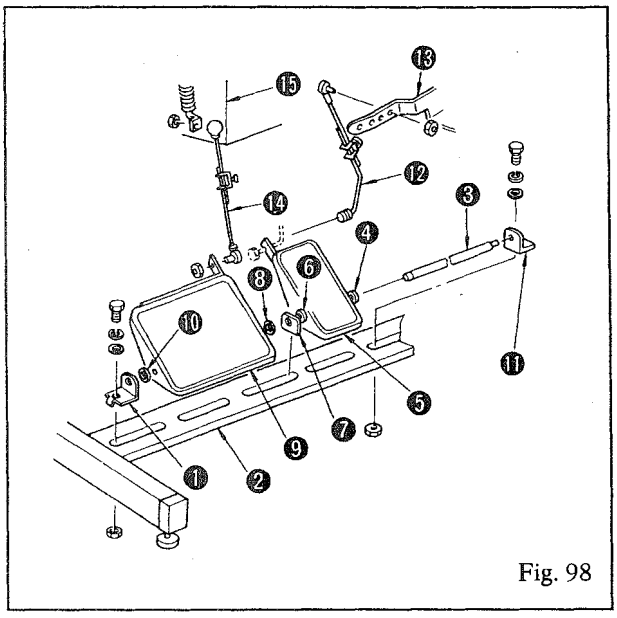


Fig. 98

7) Fix in place bearing ❶ to the far right of groove ❷ in the lower support.

8) Pass pedal shaft ❸ from ❹ to ❿ , and fix in place bearing ⓫ to the far right of the groove taking care not to allow any lateral play.

9) Connect step board ❺ (small) to pedal connecting arm ⓭ using lower connecting rod ⓬ .

10) Connect step board ❾ (large) with motor ⓯ using connecting rod ⓮ . Connecting rod ⓮ will now be tilted, but it will not affect the operation of the machine.

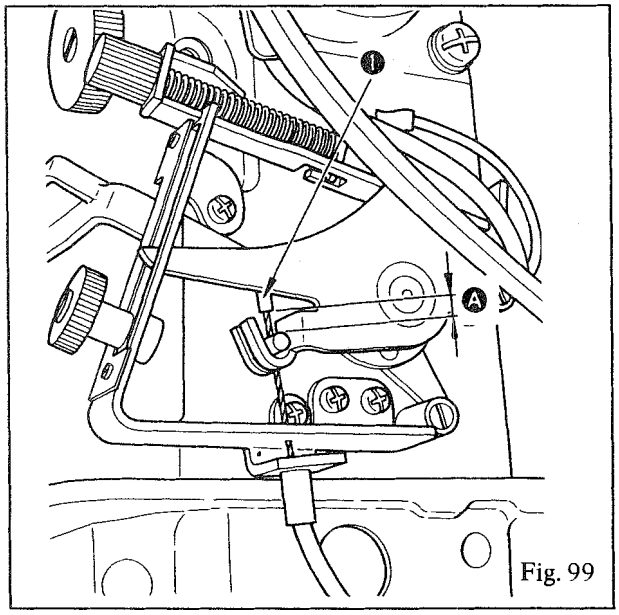


Fig. 99

11) Pass the end of partial shirring wire ❶ between the notch in the table and the oil pan until it appears above the table. Then attach the end of the partial shirring wire to the machine head.
Adjust so that there is no play with the wire when the differential feed indicating plate indicates 0.5 (1) and the pedal is released.

9. ATTACHMENTS (Pleating attachment)

(1) Q036

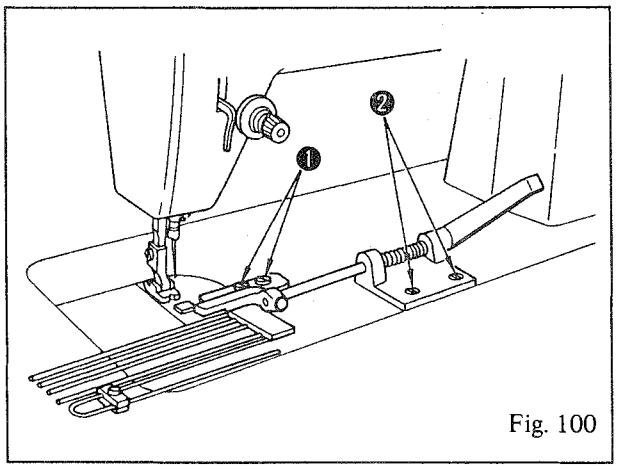


Fig. 100

If this attachment is used with the sewing machine, only the lower cloth will be pleated in accordance with the length of the differential feed ratio, which means that there is a difference between the top feed amount and the bottom feed amount.
This attachment is installed on the machine using two setscrews ① and two setscrews ② .
(part No. MAQ036000A0)

(2) Z061

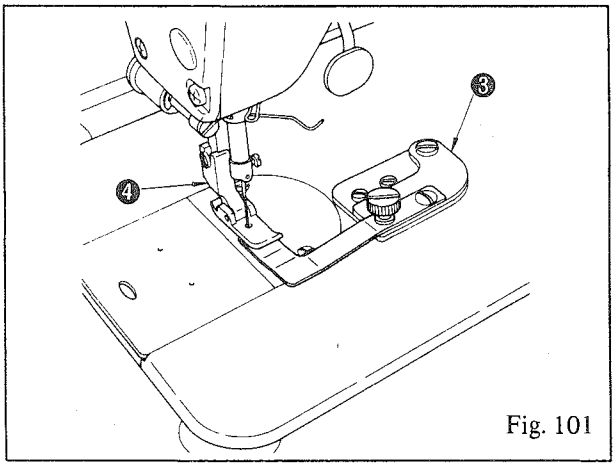
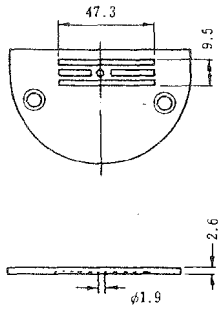


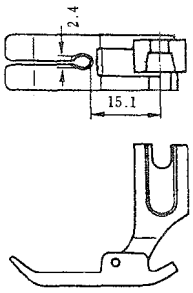
Fig. 101

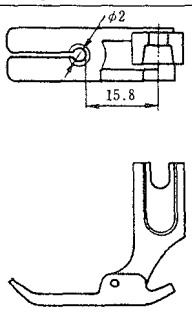
This attachment can also be used with separation plate (MAZ061000A0) ③ combined with hinging presser (B15244310A0) ④ supplied with the machine.

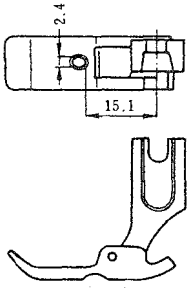
10. GAUGE TABLE

Throat plate	Presser foot

Standard	D1109-436-D00
	

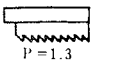
Standard	D1524-430-0A0
	

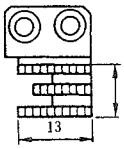
For synthetic thread	B1524-432-0A0
	

For shirring stitches	B1524-431-0A0
	

Main feed dog

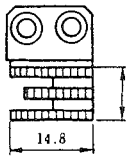
Standard — B1613-430-A00





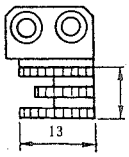
For light-weight material — B1613-432-C00

When this type of main feed dog is used, the amount of feed should be set to 2 mm (0.079") or less.

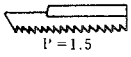


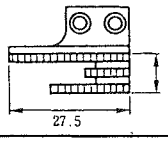
For shirring stitches — B1613-436-000

Main feed dog with teeth running in the opposite direction to the standard main feed dog (B1613-430-A00).

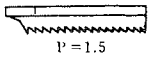


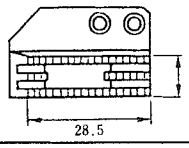
For lockstitches — B1613-431-A00





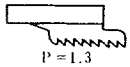
For lockstitches — B1613-432-E00

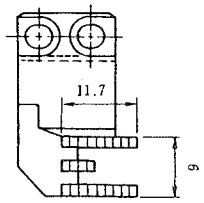




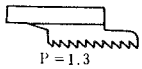
Differential feed dog

Standard — B1613-432-A00-A

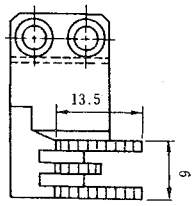




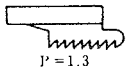
For light-weight material — B1613-432-D00A



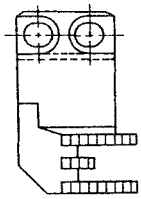
When this type of main feed dog is used, the amount of feed should be set to 2 mm (0.079") or less.



For stretched stitches — B1613-430-B00A

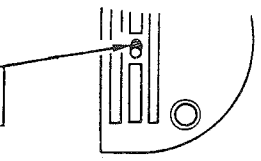


Differential feed dog with teeth running in the opposite direction to the standard main feed dog (B1613-432-A00A).

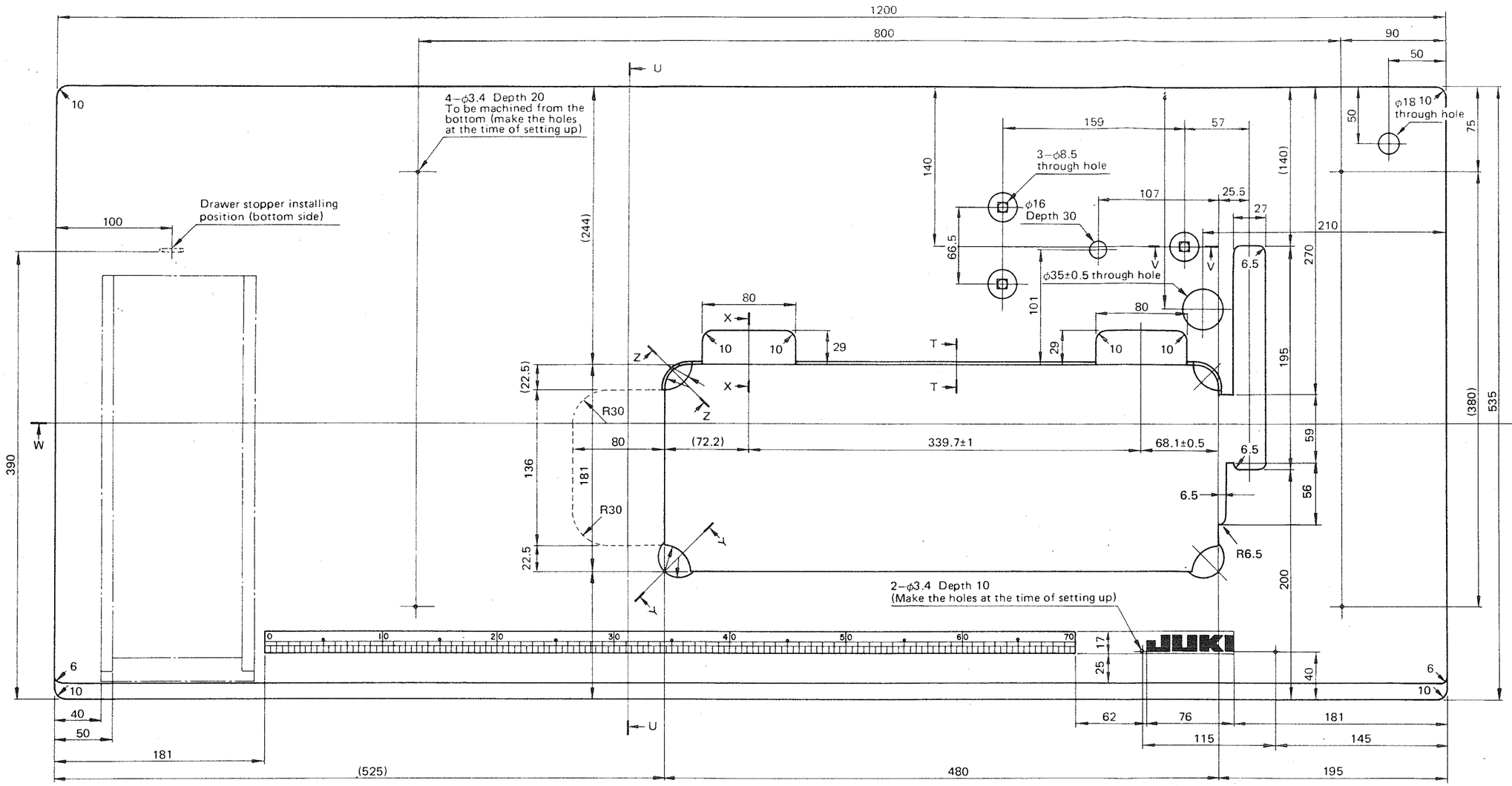


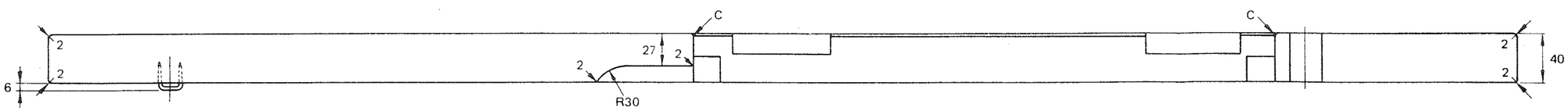
11. TROUBLESHOOTING

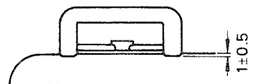
Trouble	Cause (1)	Cause (2)	Checking procedure and adjustment method
1. The material gets clogged up in the case of automatic reverse feed stitching.	The radius of the main feeding arm is too large. As a result, shirring stitches are made.		Decrease the radius of the main feeding arm.
2. The stitch length specified by the dial cannot be obtained in actual sewing.	The radius of the main feeding arm is too large.	The top feed amount is restricted. As a result, shirring stitches are made.	
	Inappropriate adjustment of the ratio of the normal feed stitch length to the reverse feed stitch length.		Refer to the explanation on how to adjust the stitch length for normal feed and reverse feed.
	The pressure of the presser foot is inappropriate.		Adjust the pressure of the presser foot.
	Improper adjustment of the height of the feed dog		Refer to the explanation on the height of the feed dog.
	The position of "0" on the scale has been moved.		Adjust the position of "0" on the scale.
3. The differential feed function does not work.	Improper adjustment of the positions of the differential feed arm slide and the differential feed dial.		Adjust the position of the differential feed arm slide.
	The height of the differential feed dog is inadequate.	Improper adjustment of the position of the feed driving fork (on the differential feed side)	Refer to the explanation on the height of the feed dog.
	Inappropriate radius of the main feed arm		Adjust the radius of the main feed dog.
	The types of feed dog and presser foot being used are not suitable for the type of stitching or type of material.		Refer to the gauge table.
4. The stitches are excessively condensed at the sewing start.	Inappropriate adjustment of the longitudinal position of the feed dog		Refer to the explanation on the oscillation of the feed dog.

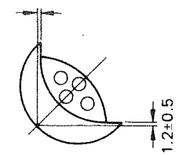
Trouble	Cause (1)	Cause (2)	Checking procedure and adjustment method
5. The reverse feed function does not work.	Poor cable connections		Check the cable connections or replace the cables.
	Defective reverse feed solenoid		Replace the solenoid.
	Due to the incorrect installation of the reverse feed solenoid, the reverse feed solenoid is pressed against other components.		Adjust the reverse feed solenoid.
	Due to the incorrect installation of the feed components, they are pressed against each other.		Adjust the positions of contact or the degree of thrust of the feed components.
6. Isolated idling loops occur when sewing the overlapped section of the material.	The needle thread does not come off the overlapped section of the material, thereby impairing the formation of well-tensioned, uniform stitches.		Decrease the pressure of the presser foot.
			Increase the height of the feed dog.
			Delay the feed timing.
			Use the presser foot, throat plate and feed dog for lockstitching. Presser foot B15240120A0 Throat plate B1109012A00 Feed dog B1613012A00
			Open up the needle hole in the throat plate. 
7. The thread breaks or splits when the overlapped section of the material is being sewn.	The blade point of the hook is unable to catch the loop properly.	The loop cannot be made with consistency since the material under the presser foot is floppy, when the presser foot runs on or runs off the overlapped section of the material.	Use the presser foot for lockstitching. (B15240120A0)
8. Stitches are skipped at the sewing start.	The loop is not made with consistency at the sewing start. (When a synthetic or thin thread is used.)		Use the presser foot for synthetic thread. (Refer to the gauge table.)
			(Turn ON the soft start function.)

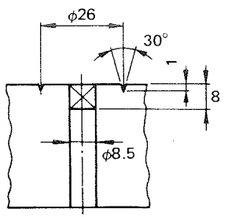
DLD-5430, -5430-6, -4 TABLE DIMENSIONS Part No. 11398609

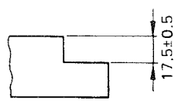


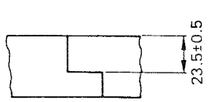


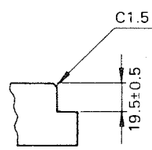


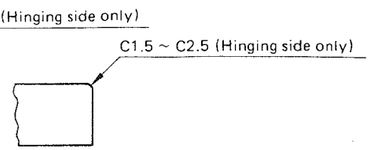












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JUKI CORPORATION
HEAD OFFICE
2-1, 8-CHOME, KOKURYO-CHO,
CHOFU-CITY, TOKYO, JAPAN
BUSINESS OFFICE
23-3, KABUKI-CHO 1-CHOME,
SHINJUKU-KU, TOKYO 160, JAPAN
CABLE : JUKI TOKYO
TELEX : J22967, 232-2301
PHONE : 03(205)1188, 1189, 1190

Please do not hesitate to contact our distributors or agents in your area for further informations when necessary.

※Appear and specification listed in this instruction manual are subjected to change without notice.

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