

JUKI

1-Needle Lockstitch Machine with Automatic Thread Trimmer

DDL-8500-7

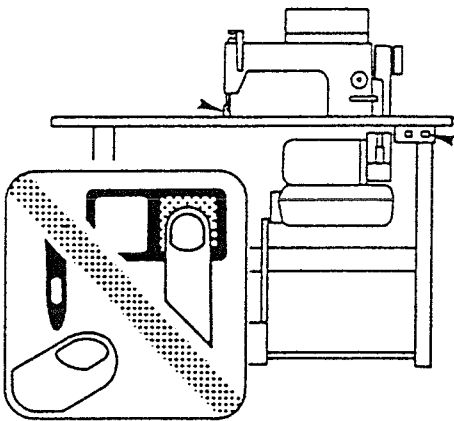
ENGINEER'S MANUAL

PREFACE

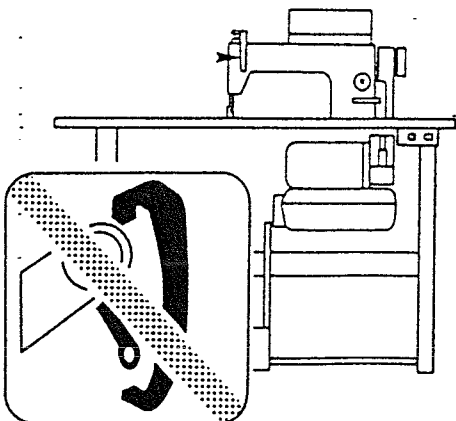
This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the sewing machines. This manual presents detailed explanation of the adjusting procedures, etc. which are not covered by the Instruction Manual intended for the maintenance personnel and operators at a sewing factory. It is advisable to use the Engineer's Manual in combination with the pertinent Instruction Manual and Parts List when servicing the sewing machines of these models.

CAUTION

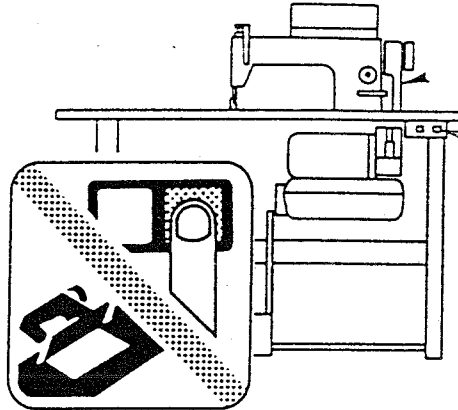
1. Keep your hands away from the needle when the power switch is turned ON or while the machine is operating.



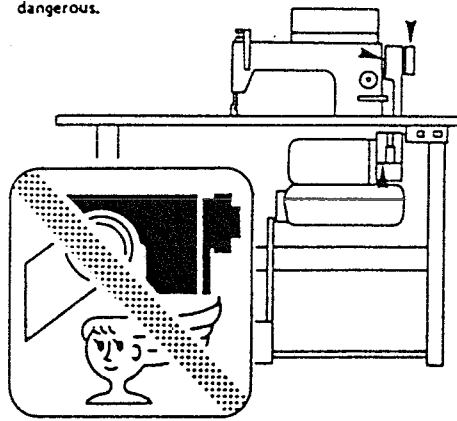
2. Do not put your fingers into the thread take-up cover while the machine is operating.



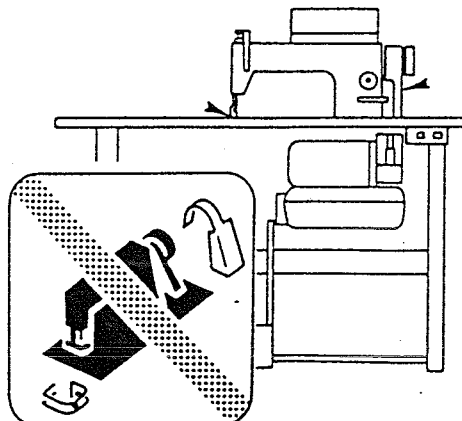
3. Be sure to turn the power switch OFF before tilting the machine head or removing the V belt.



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.



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1. GENERAL

1-1. Features

- 1) The sewing speed can be changed continuously from low to high by adjusting the level of depression of the pedal, contributing to higher efficiency.
- 2) Performs automatic reverse feed stitching at the start and end of sewing.
When the front part of the pedal is depressed, the machine carries out reverse feed stitching at constant speed, assuring consistent quality.
- 3) The pressure required for depressing the front and back parts of the pedal can be adjusted to suit each operator.
- 4) A operation panel mounted on the machine head enables the operator to easily check ON/OFF of the main switch and automatic reverse stitch at start/end, and stitching patterns selected. This feature virtually eliminates chances for operational mistakes.
- 5) A synchronizer is included in the handwheel to ensure easy operation.
- 6) The max. sewing speed control variable resistor is mouned on the operation panel. This contributes to easier operation.

1-2. Specifications

Model		DDL-8500-7 Standard		DDL-8500A-7 for light-weight materials	DDL-8500H-7 for heavy-weight materials	
		Cotton thread	Synthetic thread			
1	Sewing speed	5,000 s.p.m.	4,000 s.p.m.	4,000 s.p.m.	3,500 s.p.m.	
2	Stitch length	0 to 4 mm (0" to 0.159")			0 to 5 mm (0" to 0.197")	
3	Needle bar stroke	30.7 mm (1.209")		29 mm (1.141")	35 mm (1.373")	
4	Needle (standard)	DB x 1 #14	DB x 1 #9, #10, #11	DA x 1 #11	DA x 1 #9, #10	DB x 1 #19 to #23 DP x 5 #19 to #23
			DB x 1 KN #9, #10, #11		DA x 1 KN #9, #10	
5	Presser foot pressure	4 to 5 kg		4 to 5 kg	5 to 7 kg	
6	Presser foot lift (by knee lifter) (by hand lifter)	Standard 10 mm (0.394") 5.5 mm (0.216")		Max. 13 mm (0.511")		
7	Presser foot	Exclusive hinging presser foot				
8	Feed dog	3-row teeth (feed dog tilt adjustable)		4-row teeth (feed dog tilt adjustable)	3-row teeth (feed dog tilt adjustable)	
9	Height of feed dog	0.75 to 0.85 mm (0.030" to 0.033")		0.7 to 0.8 mm (0.027" to 0.031")	1.0 mm (0.039")	
10	Feed system	Swing type				
11	Thread take-up	Link-type				
12	Thread take-up stroke	Standard 107 mm (4.212") (Max. 112 mm (4.409") to Min. 105 mm (4.133"))			Max. 115 mm (4.527") to Min. 108 mm (4.252")	
13	Lubrication	Fully automatic				
14	Oil return	By plunger pump				
15	Lubricant	NEW DEFRIX OIL NO. 1				
16	Wiper	Equipped as standard device on DDL-8500-0B , DDL-8500-WB			Equipped	
17	Automatic reverse stitching device	Equipped as standard device				
18	Motor	AC servo motor				
19	Motor output	Related output 400W, Max. output 550W				
20	Power supply	3-phase or single-phase				
21	Solenoid drive power supply	31VDC				
22	Max. speed adjustment range	200 s.p.m. to max. speed				
23	Needle up/down stop selector switch	The machine normally stops with its needle down. By setting this switch, the machine can be stopped with its needle up.				
24	Auto-lifter	Option				

1-3. Applications

1) Standard models

Extensively used for light- to medium-weight general fabrics in men's suits, ladies' wear, working wear, student's uniforms, etc. Cotton or synthetic thread of #80 to #30 is generally used.

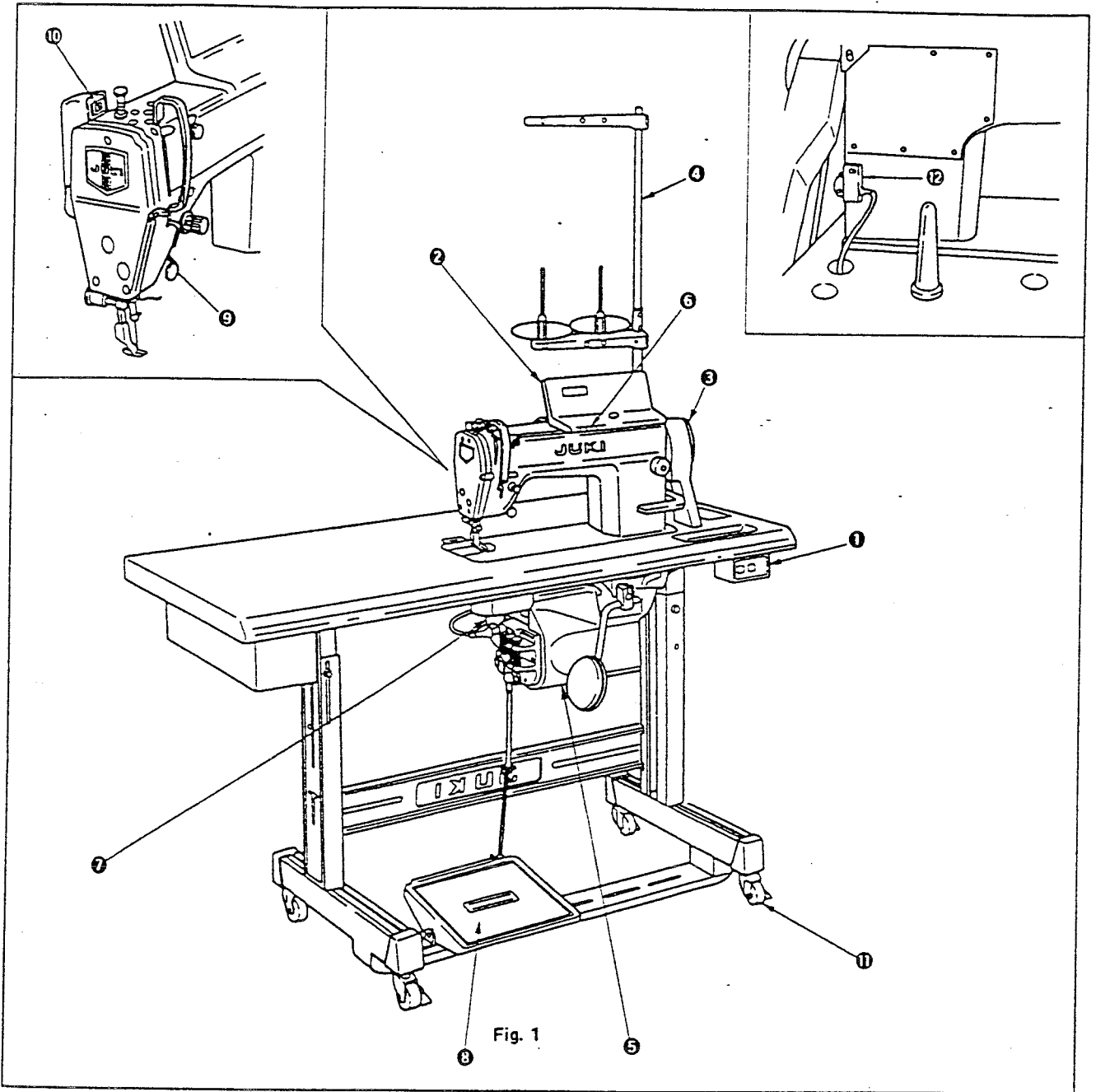
2) NA-type machines for light-weight materials

Suited for relatively light-weight materials from tetoron broadcloth to silky materials and georgette in men's shirts, blouses, etc. Cotton or synthetic thread of #80 to #50 is mainly used for these models.

Needle	Size	Thread	Materials	Application
DB x 1	#9	#80	Georgette, nylon, T/C broadcloth	Extremely light-weight materials
	#11	#80 ~ #60	General broadcloth, light-weight knit	Light-weight materials
	#14	#60 ~ #50	Wool, cotton gaberdine, drill	General fabrics
	#16	#50 ~ #30	Overcoats	Medium-weight materials
	#18	#30 ~ #20	Denim	Heavy-weight materials
DB x 1 KN	#9	#80	Georgette, nylon, T/C broadcloth	Extremely light-weight materials
	#10	#60	General broadcloth, light-weight knit	Light-weight materials
	#12	#50	Wool cotton gaberdine, drill	General fabrics
DA x 1	#8 ~ #9	#80	Georgette, nylon, T/C broadcloth	Extremely light-weight materials
	#11	#60	General velvet, light-weight knit	Light-weight materials
	#14	#50	Wool, cotton gaberdine, drill	General fabrics

2. OPERATION

2-1. Name of each component



- | | |
|---------------------------|---|
| ① Power switch | ⑧ Pedal |
| ② Operation panel | ⑨ One-touch type reverse feed switch |
| ③ Synchronizer | ⑩ Wiper |
| ④ L-shaped thread stand | ⑪ Adjusting screw for levelling the stand or caster |
| ⑤ PSC box | ⑫ Resistor pack |
| ⑥ Max. speed control knob | |
| ⑦ Motor | |

- ⑫ Power switch
Power switch of the motor, PSC and operation panel.
- ⑬ Operation panel
Automatic reverse feed stitching, the stitch number of pattern sewing, etc. are set through this operation panel.
- ⑭ Synchronizer
Built inside the sewing machine pulley and used to detect the upper and lower positions of the needle and transmit input signal to the PSC box.
- ⑮ L-shaped thread stand
- ⑯ PSC box
Comprises a circuit to control the sewing machine and motor, an output circuit to operate the elements (thread trimming solenoid, reverse feed solenoid, etc.), a pedal sensor to sense pedal operation, and a power circuit to actuate the elements.
- ⑰ Max. speed control knob (Max. sewing speed control variable resistor)
Allows analog a adjustment of the maximum sewing speed, eliminating the need for motor pulley change.
- ⑱ Motor
Operates the machine at high speed medium speed low speed in response to the signals received from the PSC box.
- ⑲ Pedal
The front and back parts of the pedal are depressed to control the sewing speed and to actuate the thread trimmer, presser foot lifter (AK85 type only), etc.
- ⑳ One-touch type reverse feed switch
Used by hand to perform reverse feed stitching.
- ㉑ Wiper
Wipes out the needle thread after thread trimming in response to the wiper signal received from the PSC box.
- ㉒ Adjusting screw for levelling the stand or caster
Used to perform adjustment so that the table stands on the floor flatly to minimize variable during operation.
- ㉓ Resistor pack
Automatic identification of the type of machine head.

2-2. Test run

1) Operation at the time of turning the power switch ON

When the power switch is turned on, if the needle is not in its upper stop position, the machine rotates until its needle reaches the upper stop position, and then stops with its needle up.

2) How to operate the pedal

As shown below, the pedal is operated in four steps:

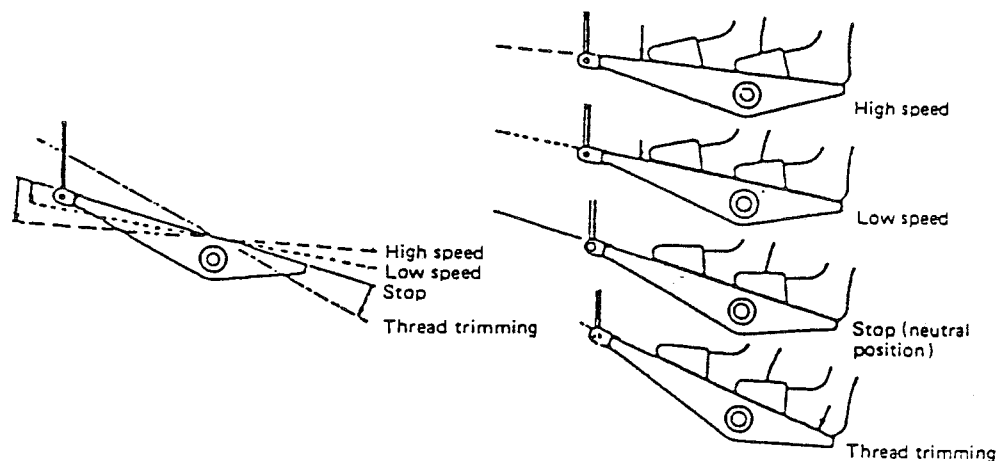


Fig. 2

- ① When the front part of the pedal is trodden lightly, the machine will start to run at low speed.
- ② When the front part of the pedal is trodden further, the machine will sew at high speed. (However, when the automatic reverse feed switch has been turned ON, the machine will not run at high speed until the reverse feed is completed.)
- ③ When the pedal is returned to the stop (neutral) position, the machine will stop with its needle up or down as set using the needle up/down selector switch.
- ④ When the back part of the pedal is trodden, the thread trimmer will be actuated, and the machine will stop with its needle up.
 - The proper thread trimming action will not be disturbed even when the pedal is returned to the neutral position immediately after the machine starts thread trimming. When the front part of the pedal is trodden immediately after the machine starts thread trimming, the proper thread trimming action will not be prevented either. In this case, however, the safety circuit will operate, so that the machine will not run even after the thread trimming has been completed. Therefore, the pedal must be returned to the neutral position once.
 - In a model provided with a wiper (DDL-5550N-7 type), the wiper will be actuated.

3-3. Adjusting the wiper (DDL-8500-7 type)

1) Adjusting the position of the wiper

Adjust the position of the wiper according to the thickness of materials to be sewn as follows:

- (1) Turn the handwheel in the normal rotational direction to align white dot ① on the handwheel with red dot ② on the machine arm.
- (2) Insert wiper ③ into wiper driving shaft ④ until the vertical clearance between the wiper edge and the needle point is 2 mm (0.079"), and until the parallel clearance between the needle center and the straight inside face of the wiper is 1 mm (0.039").
Press wiper collar ⑤ against wiper ③, and securely tighten wiper adjustment screw ⑥.

Note: Do not loosen the wiper solenoid setscrew.
When the wiper is not used, turn the wiper seesaw switch OFF.

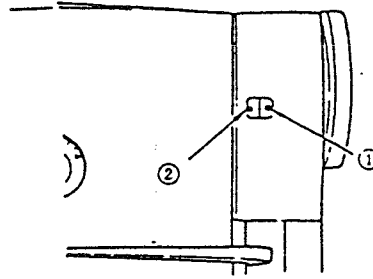


Fig. 7

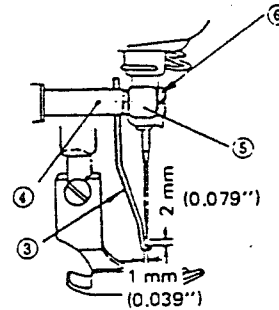


Fig. 8

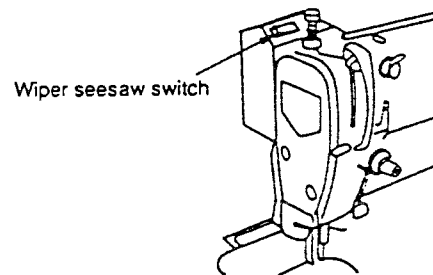
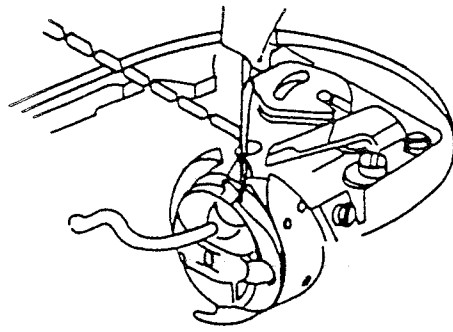
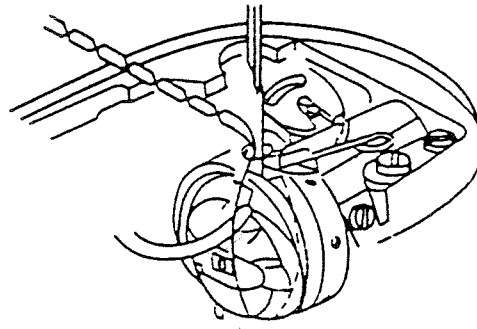


Fig. 9

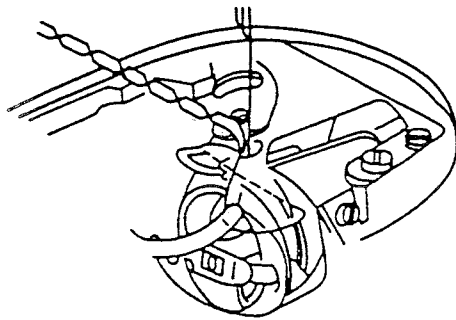
3-4. Theory of thread trimming



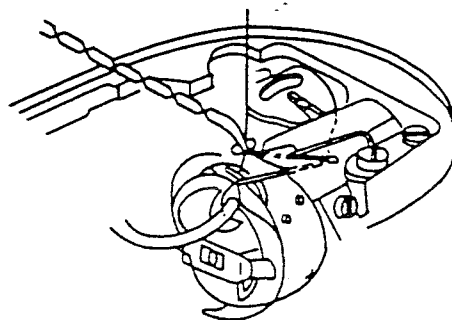
1. The blade point of the sewing hook catches the needle thread.



2. The moving knife spreads the threads.
(goes back)



3. The moving knife hooks the needle and bobbin threads (advances).



4. The threads are trimmed.

Fig. 10

3-5. Thread trimming sequence

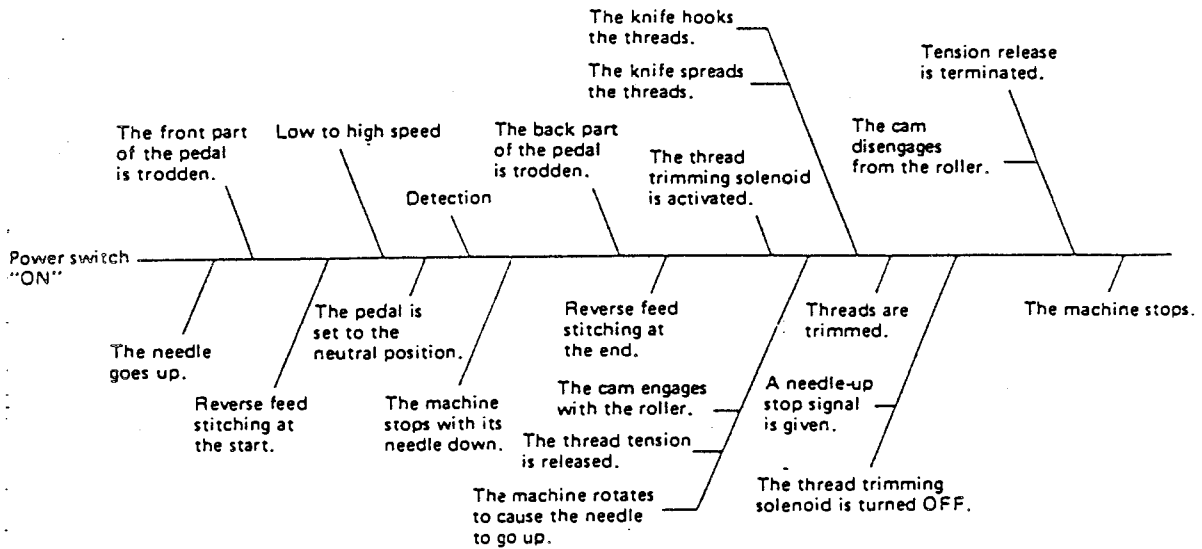


Fig. 11

Note: The above chart assumes that the switches for automatic reverse feed stitching at the start and end have been set to "ON".

3-6. Adjusting the timing of the thread trimmer cam

1) How to adjust the timing

The timing of the thread trimmer cam for cotton and synthetic threads can be obtained simply by aligning the marker dot on the machine arm and the marker dot on the handwheel.

Tilt the machine head, manually turn the handwheel until the thread take-up lever almost reaches its highest position, and press thread take-up picker ① in Fig. 12 to the right by finger. This causes the cam roller to fit in the groove of the thread trimmer cam. With this condition maintained, turn the handwheel in the direction opposite to the normal rotational direction, and you will find a position in which the handwheel no longer turns. Then, adjust the cam timing so that marker dot ① (Fig. 13) on the machine arm is aligned with marker dot ② (Fig. 13) on handwheel as shown in Fig. 13. This provides the proper cam timing for cotton and synthetic threads.

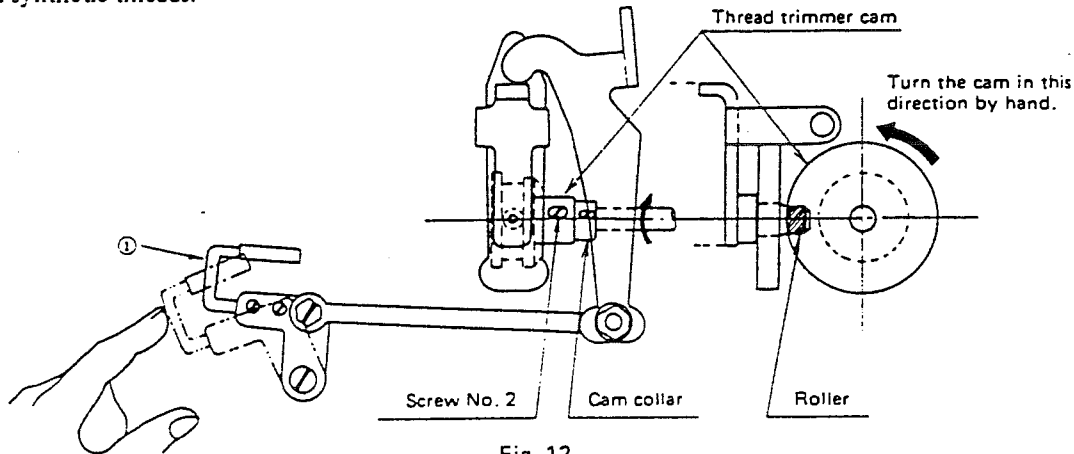


Fig. 12

2) How to adjust the timing of the thread trimmer cam

Loosen screw No. 1 first, and then screw No. 2 (Fig. 12), and align red marker dot ② on the handwheel with red marker dot ① on the machine arm.

Fit the cam roller in the groove of the cam while pressing thread take-up picker ① (Fig. 12) to the right. Manually turn only the cam (do not turn the hook driving shaft) in the direction opposite from the normal rotation of the hook driving shaft (see the arrow in Fig. 12) until a position in which the cam goes no further is reached. In

this position, press the cam against the thrust collar of the thread trimmer cam (Fig. 12), and retighten the screw No. 2 first and then the screw No. 1. If the cam collar has not been moved, press the thread trimmer cam against the cam collar, and retighten the screw No. 2 first and then the screw No. 1.

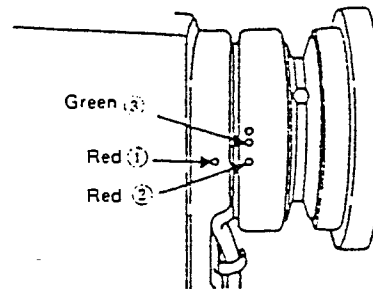


Fig. 13

- (Ref.) 1. The dots engraved on the handwheel provide the standard cam timings. It is possible to obtain a timing which is approx. 2° earlier than that for cotton or synthetic thread, or a timing which is approx. 5° later than that for cotton or synthetic thread. In this case, however, confirm that the moving knife securely separates the two threads below the throat plate bottom surface. If a cam timing is too early or too late, the thread remaining on the needle may become too short, causing the needle thread to slip off the needle immediately after thread trimming. Also, the cam roller may fail to fit in the groove of the thread trimmer cam.
2. The thread trimmer cam timings for cotton and synthetic threads are basically the same. However, if the following problems are presented when using a thinner synthetic thread:
- ① A few beginning stitches are skipped.
 - ② Thread slips off the needle at the start of sewing.
- Perform the following adjustment for special synthetic threads: (of a small number count)
- ① Align marker dot ① (Fig. 13) on the machine arm with green marker dot ③ (Fig. 13) on the handwheel.
 - ② Use the soft start function for the first starting stitch.

Caution: Adjustment ① is not applicable for a thread with a large number count.

3-7. Positioning the moving knife

1) Proper position of the moving knife

The correct position of the moving knife when the moving knife has gone back farthest is such that the tip of the moving knife is 3 to 3.5 mm (0.118" to 0.138") away from the center of the needle. If the retreat of the moving knife is not enough, the knife may fail to catch the needle or bobbin thread at the time of thread trimming. On the contrary, if the moving knife retreats excessively, the moving knife may hit the feed dog. To avoid these problems, be sure to accurately position the moving knife.

The standard moving knife home position is obtained by bringing the periphery of the moving knife in contact with the V groove of the knife mounting base.

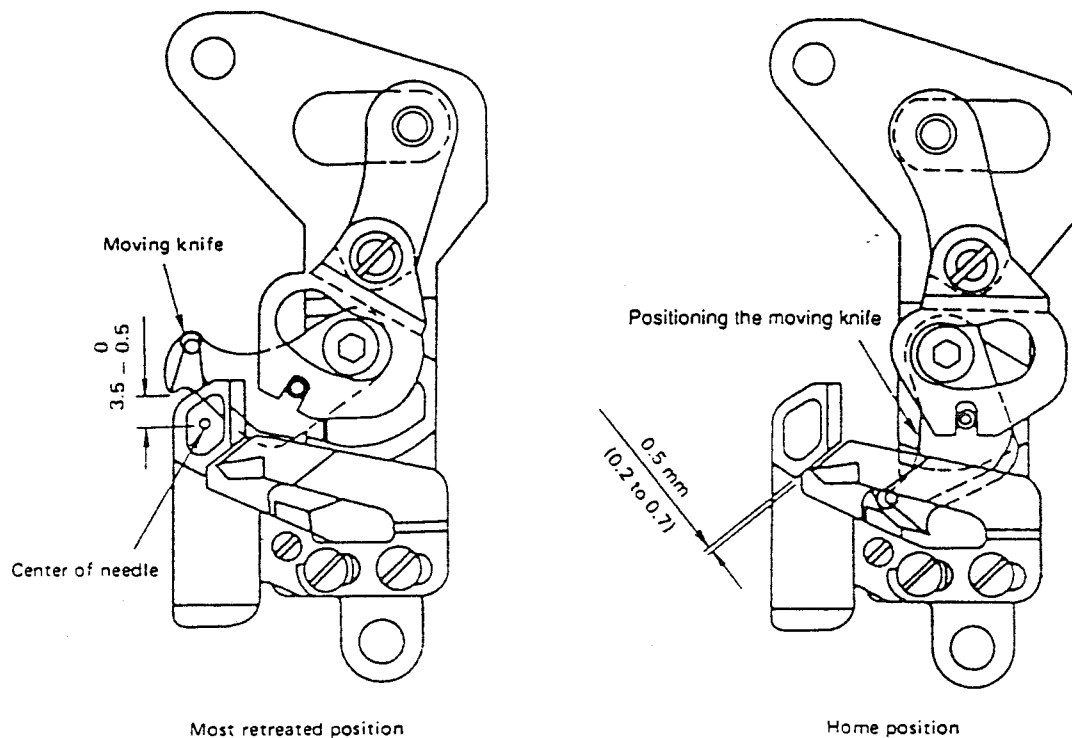


Fig. 14

2) How to position the moving knife

The position of the moving knife is adjusted by changing the lateral position of link driving magnet pin ① (Fig. 15) while the machine is at rest.

- ① Loosen the lock nut of link driving magnet pin ① (Fig. 15)
- ② Move the link driving magnet pin to the right or left to make the V groove (Fig. 14) meet the periphery of the moving knife, referring to the home position shown in Fig. 14.
- ③ Retighten the lock nut of the link driving magnet pin when the proper position of the moving knife has been obtained. As the link driving magnet pin is moved to the right, the retreat of the moving knife increases. As it is moved to the left, the retreat of the moving knife decreases.

3) When the moving knife can not be properly positioned merely by adjusting the position of the link driving magnet pin.

- ① Loosen adjusting nut of link driving magnet pin ① (Fig. 15)
- ② Adjust so that the center of the link driving magnet pin aligns with V groove ③ of the knife driving shaft ②, (Fig. 15) and fix link driving magnet pin by tightening the lock nut.
- ③ Loosen two screws ⑤ (Fig. 15) of the knife driving shaft stopper ④ (Fig. 15).
- ④ Move the knife driving shaft ② (Fig. 15) to make the periphery of the moving knife meet the V groove of the mounting base (Fig. 14), and fix knife driving shaft stopper ④ (Fig. 15) by tightening two screws ⑤ (Fig. 15).

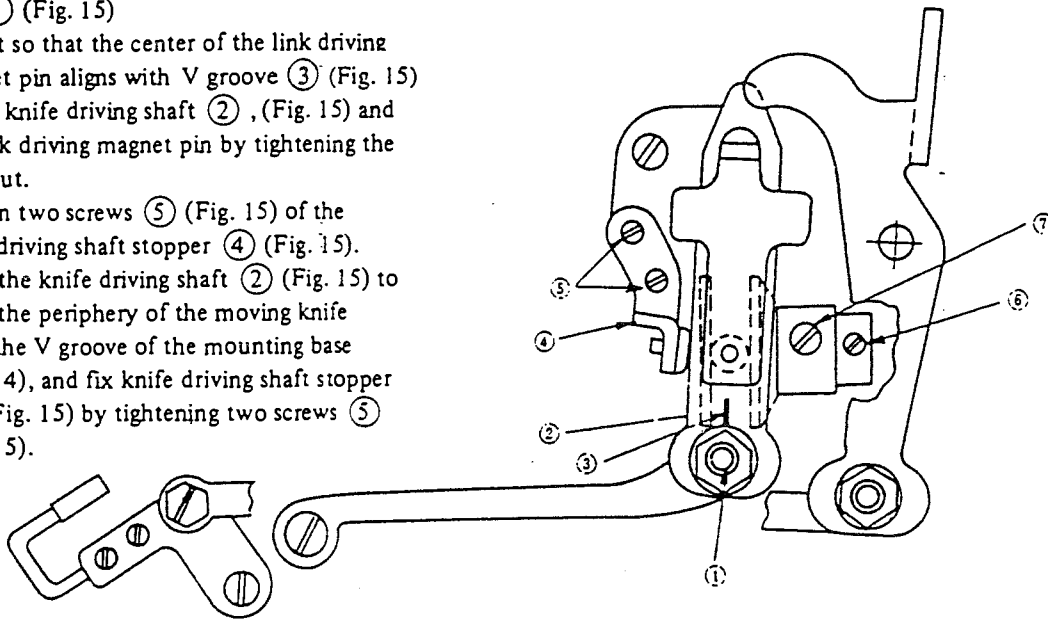


Fig. 15

- ⑤ Loosen the two screws of thread trimmer cam ⑦ (Fig. 15) and cam collar ⑥ (Fig. 15).
- ⑥ Align red dot ② (Fig. 13) on the handwheel with red dot ① (Fig. 13) on the machine arm.
- ⑦ Manually turn the cam until screw No. 2 ⑦ (Fig. 15) faces toward you. Then press the thread take-up picker to the right.
- ⑧ Move the cam to the right or left to engage the cam with the cam roller.
- ⑨ With the cam engaged with the cam roller, turn the cam in the direction of the arrow toward you) until it stops, while lightly pulling the cam to the right.
- ⑩ Tighten screw No. 2 ⑦ (Fig. 15) of the cam for preliminary installation.
- ⑪ Then confirm:
 - a) that the specified marker dots on the machine arm and handwheel are in alignment,
 - b) the roller smoothly fits in the cam groove, and
 - c) the retreat of the knife has been set to 3 to 3.5 mm (0.118" to 0.138").
- ⑫ Securely tighten the two screws of the cam.
- ⑬ Press the thrust collar against the cam and fix it by tightening the screw.

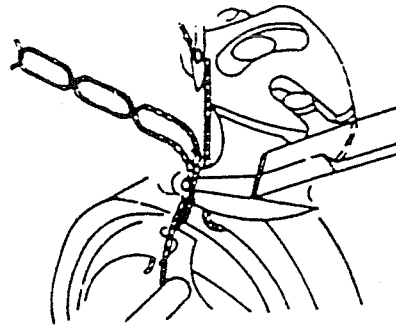


Fig. 16

- Note:
- Note that a minute change in the lateral position of the knife driving shaft will greatly affect the retreat of the knife.
 - Confirm that the moving knife spreads the threads as shown in Fig. 16.

3-8. Installing the counter knife

Refer to Fig. 17 for proper installation of the counter knife. The standard distance from the blade point of the counter knife to the knife thread guide, which is positioned so that the needle enters the center of its opening, is 0.5 mm (0.019"). At this time, the blade point of the counter knife is about 4 mm (0.157") away from the center of the needle. The blade point of the counter knife is located 0.6 mm (0.0236") above the installing surface as shown in Fig. 18.

The sharpness of the counter knife depends upon the installing angle of the blade tip of the counter knife. The proper overlap of the counter knife blade with that of the moving knife will provide the best sharpness.

Whenever the counter knife has been readjusted or replaced, be sure to check the sharpness of the counter knife, and adjust the installing angle of the counter knife. The installing position of the counter knife can be moved to the right from the standard position.

When the counter knife has been installed in such a position, the needle and bobbin threads to be pulled out become correspondingly longer, and also the timing of thread trimming is delayed, resulting in an increased length of the thread remaining on the needle after thread trimming (Fig. 20).

When using synthetic thread, the timing of thread trimming can be delayed by moving the counter knife to the right. In this case, the timing of the thread trimmer cam must also be adjusted.

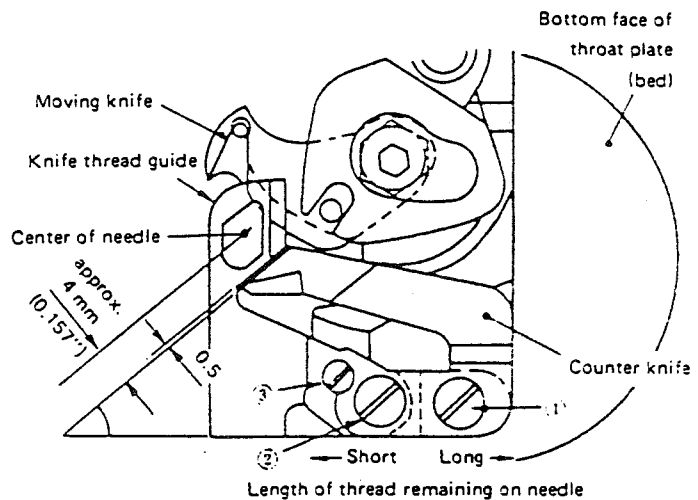


Fig. 17

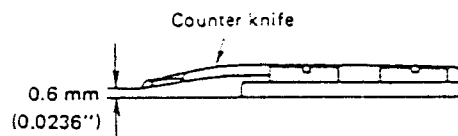


Fig. 18

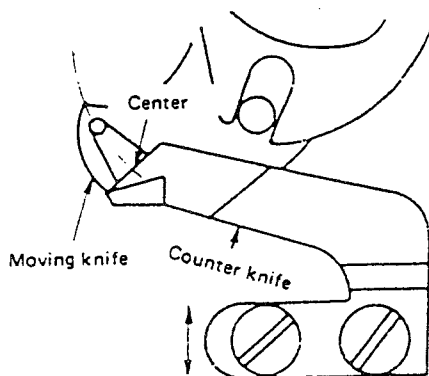


Fig. 19

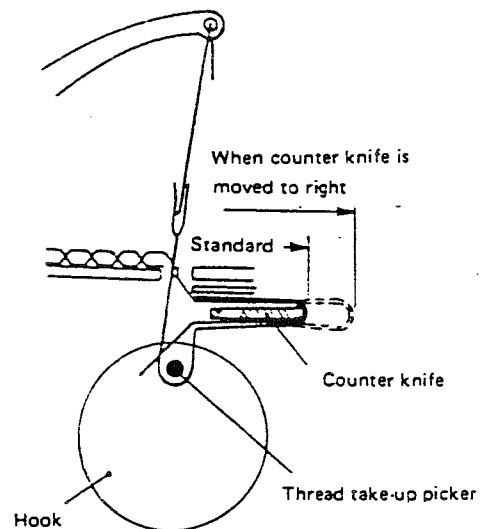


Fig. 20

Properly installing the knife thread guide

Install the knife thread guide so that the needle enters exactly the center of its opening.

3-9. Adjusting the floating amount of the tension disc No.2

1) How to check the floating amount

Check whether the tension disc No. 2 floats 0.5 to 1 mm (0.019" to 0.039") when thread take-up picker ① (Fig. 12) is pressed to the right with the thread take-up lever located slightly below its highest position and the presser foot lifted.

2) How to adjust the floating amount

- ① To increase the floating amount, loosen screw ① (Fig. 21), and move tension release wire ② to the right.
- ② To decrease the floating amount, loosen screw ①, and move tension release wire ② to the left. After adjustment, securely tighten screw ①.

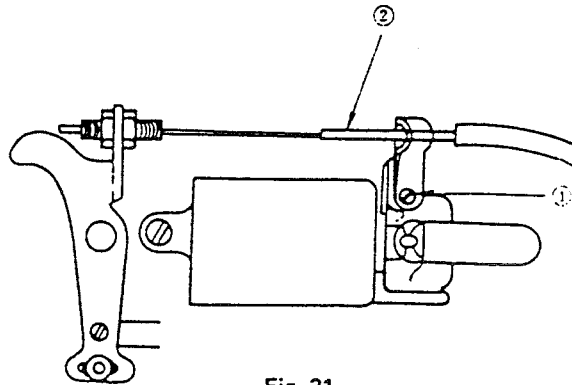


Fig. 21

3-10. Sharpening the counter knife

The most important factor of the sharpness of the thread trimmer is the shape of the blade tip of the counter knife. In most cases, the sharpness of the thread trimmer can be improved by merely sharpening the blade of the counter knife.

For proper thread trimming, the blade of the counter knife must be brought into contact with the blade of the moving knife.

- The sharpness of the thread trimmer is improved simply by sharpening "A" shown in Fig. 22 (Pay attention to the angle shown in Fig. 22).

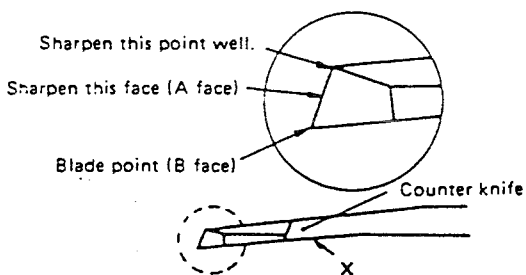


Fig. 22

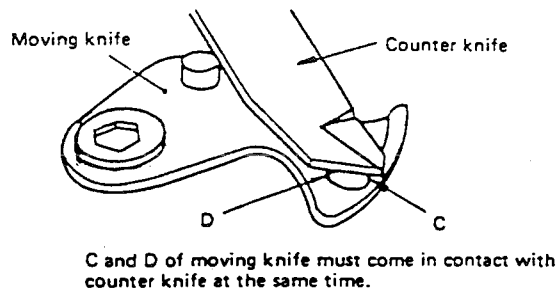


Fig. 23

- The thread trimmer also becomes dull when "B" is worn and rounded. Take care not to change the angle when sharpening the blade edge.
- If the thread trimmer is still dull even after the blade of the counter knife has been sufficiently sharpened, it is because the two points of the moving knife fail to contact with the blade of the counter knife at the same time. In this case, correct the tilt of the counter knife.

Note: The contact of the moving knife with the counter knife can also be improved by changing the angle shown by the arrow in Fig. 24. When "D" side shown in Fig. 23 is dull, decrease this angle. When "C" side is dull, increase the angle.

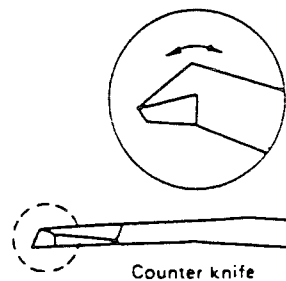


Fig. 24

3-11. Replacing the moving knife (DDL-5550N-7 type)

Remove the moving knife in the following order:

- 1) Loosen screw ① (Fig. 26).
- 2) Remove hinge screw ③ (Fig. 25) using 3 mm (0.118") Allen key ④ (Fig. 25).
- 3) Remove forked hinge screw ① (Fig. 25). Lift forked base ② for knife (Fig. 25), and remove the moving knife pin from the forked base for knife.
- 4) After removing the moving knife pin, slide the moving knife to the left, and remove it from the bottom face of the forked base for knife.

Assemble the moving knife unit by reversing the above order.

After tightening the hinge screw of the moving knife, move the moving knife by hand to confirm that it moves smoothly without play. Securely insert the pin for knife forked base into the forked base for knife, and tighten the hinge screw for knife forked base. Confirm that the knife is actuated when knife driving shaft ② (Fig. 26) is moved to the right and left.

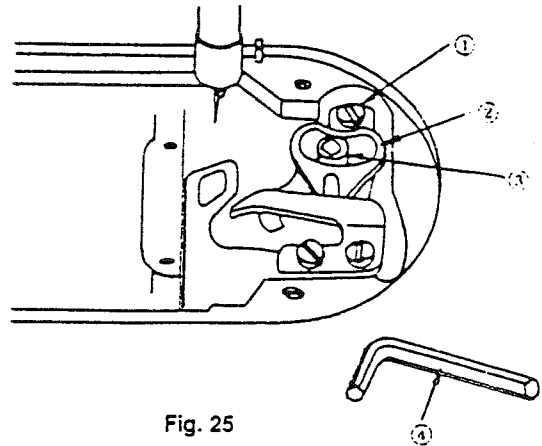


Fig. 25

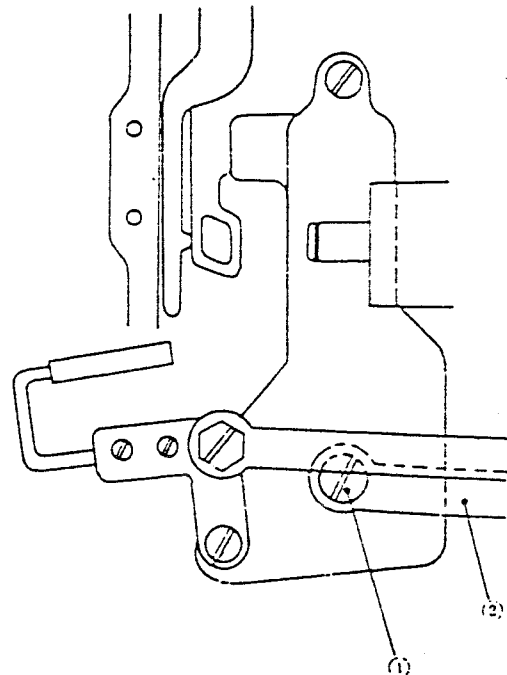


Fig. 26

3-12. Replacing the knife thread guide

Change the knife thread guide by loosening screws ② and ③, with screw ① (Fig. 17) left tightened. If the installing angle of the counter knife has been disturbed, readjust it in accordance with 3-8. "Installing the counter knife".

3-13. Adjusting the thread take-up picker

If thread take-up picker ③ (Fig. 27) enters the bobbin case too deeply at the time of thread trimming, the bobbin does not turn, and the bobbin thread is cut too short, causing stitch skipping at the start of sewing. On the contrary, if the entrance of the thread take-up picker into the bobbin case is not enough, the needle thread slips off the tip of the thread take-up picker at the time of thread trimming. As a result, the thread remaining on the needle after trimming becomes too short, causing the thread to slip off the needle.

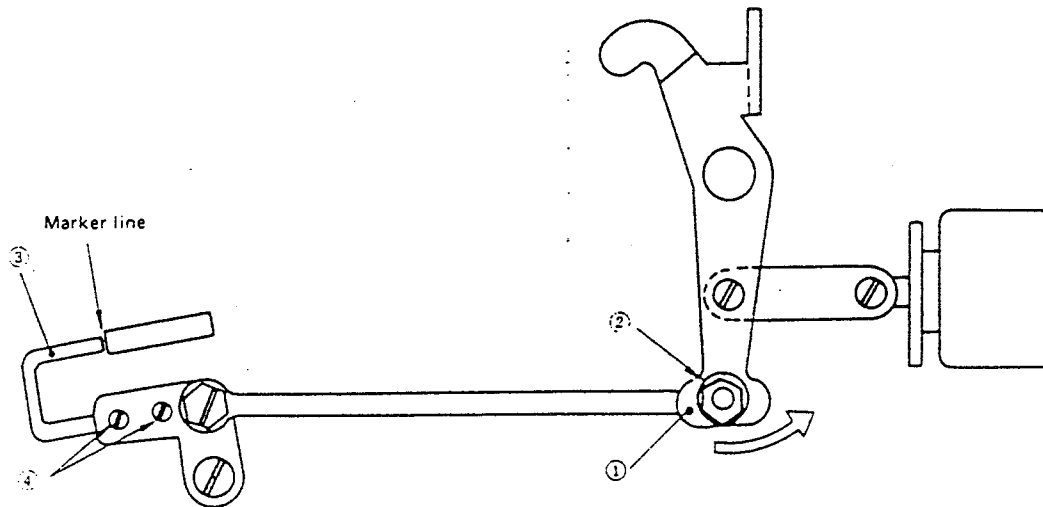


Fig. 27

1) Positioning the thread take-up picker

With clutch disc ① (Fig. 27) pushed in the direction of arrow (to the right), make adjustment so that the bobbin thread can be pulled out smoothly.

At this time, perform the adjustment so that a clearance of 1.0 to 1.5 mm (0.04" to 0.059") is provided between the tip of the thread take-up picker (bobbin winder trip latch) and the middle of the top recess of the bobbin case, and also the rear end of the bobbin winder trip latch is aligned with the marker line of the thread take-up picker. (Fig. 28)

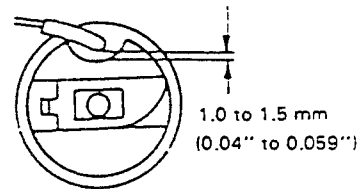


Fig. 28

2) How to adjust the position of the thread take-up picker

After loosening screws ④ (Fig. 27), adjust so that the tip of the thread take-up picker (bobbin winder trip latch) is positioned as shown in Fig. 28. To adjust the entrance of the thread take-up picker into the bobbin case, move stopper ② (Fig. 27). After completion of the above adjustment, retighten the nut of the stopper.

The standard position of the stopper is such that, with the clutch disc pushed to the right, the end of the picker is in parallel to the hook driving shaft.

3-14. Adjusting the clutch disc and thread trimmer solenoid

The thread trimmer solenoid stroke is 6 mm (0.236"). Position the clutch disc and solenoid so that, when the thread trimmer solenoid is actuated, clearance A becomes 0.1 mm (0.004") to 0.5 mm (0.019"). Then tighten setscrews ⑩ (Fig. 30).

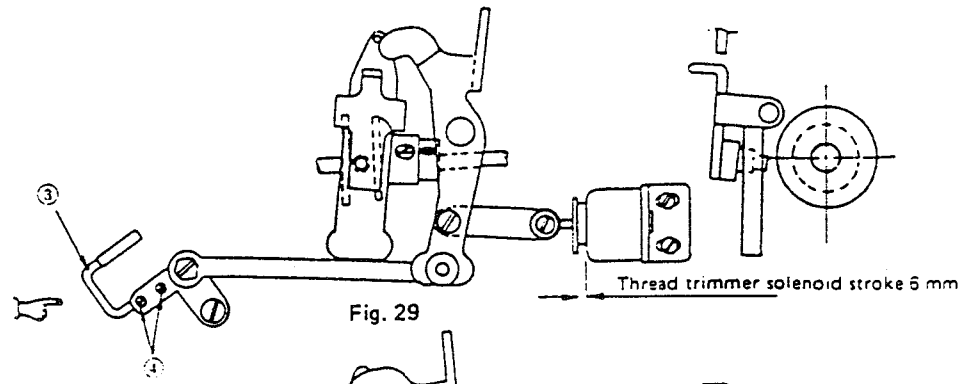


Fig. 29

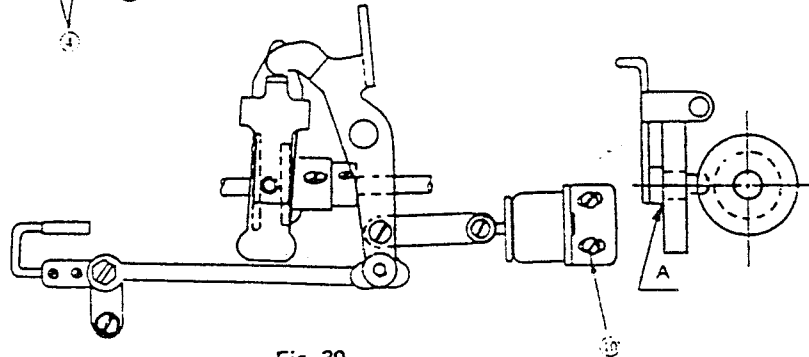


Fig. 30

3-15. How to adjust the thread trimmer control plate

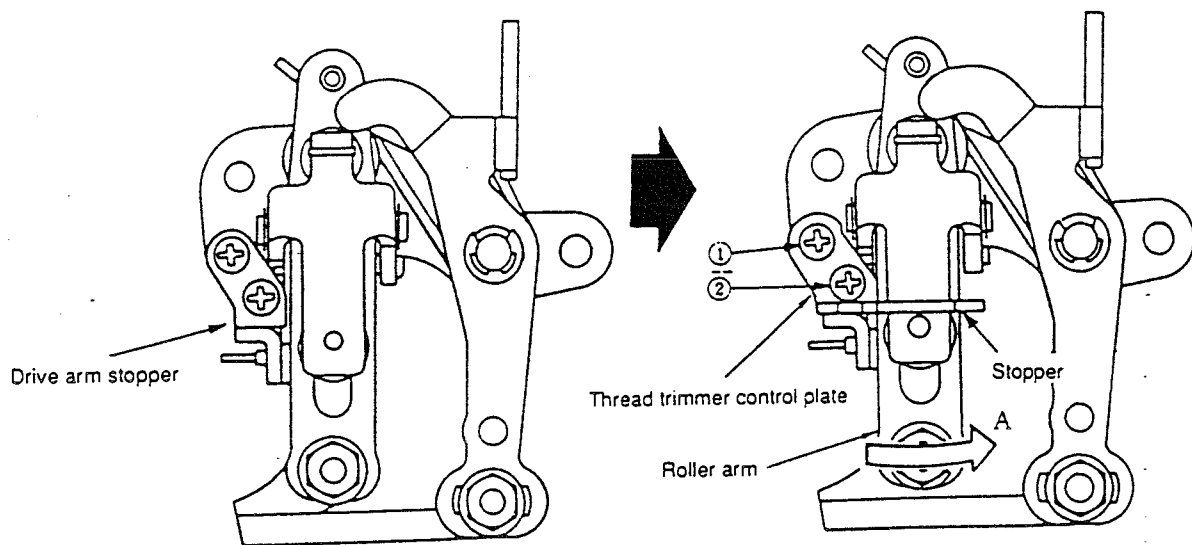


Fig. 31

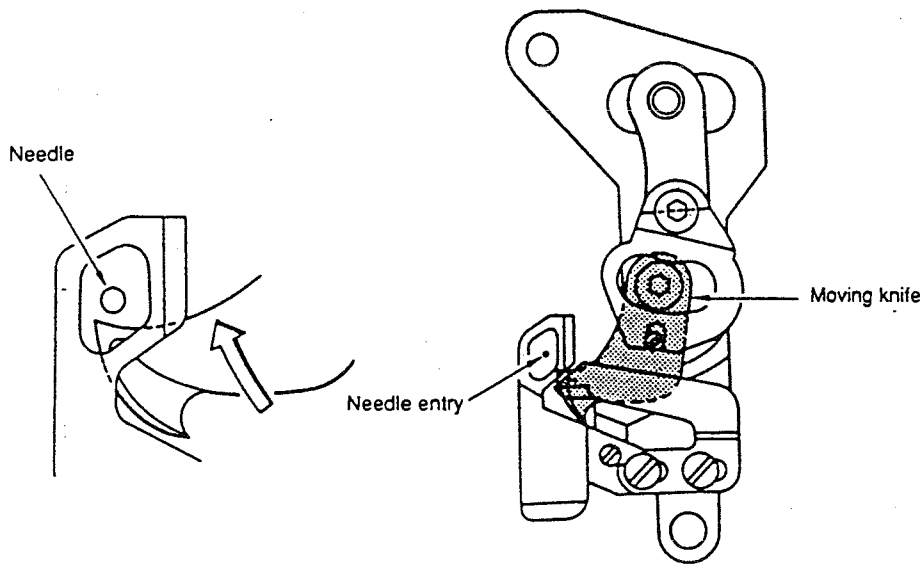


Fig. 32

- 1) Press the roller arm in the direction of arrow A until it is pressed against the stopper of the thread trimmer control plate.
- 2) At this time, adjust screws ① and ② so that the stopper works at a position where the moving knife does not reach the needle entry.

3-16. Installing and removing the knife mounting base

Removing knife mounting base ① (Fig. 33) in the following sequence:

- 1) Remove the hook.
- 2) Loosen hinge screw ② (Fig. 33), and remove hinge screw ③ (Fig. 33).
- 3) Remove hinge screws ④ (Fig. 33) and ⑤ (Fig. 33), then, the knife mounting base can be removed.

* To install the knife mounting base, reverse the above sequence.

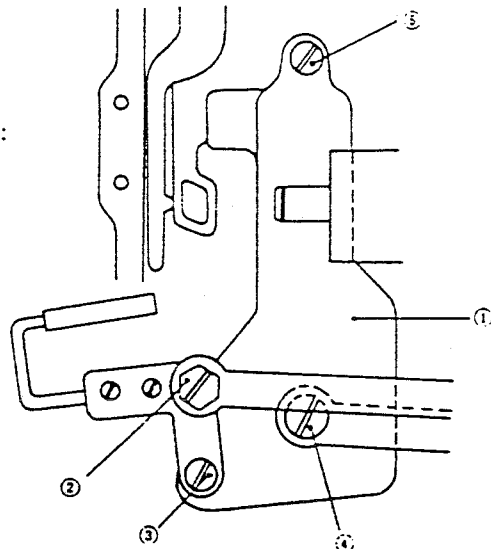


Fig. 33

3-17. Positioning the one-touch type reverse feed switch lever

There is no specified height for one touch reverse feed switch lever ①, and therefore the one-touch type reverse feed switch lever may be positioned at any height suited for each operator.

Loosen screw ② and move the switch lever up and down to obtain a suitable height.

Retighten the screw after adjustment.

Note: This switch is sometimes abbreviated to "B. T. SW" (Back tack switch).

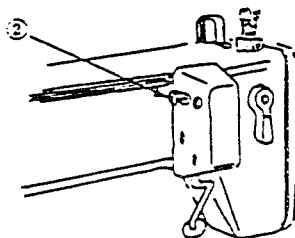


Fig. 35

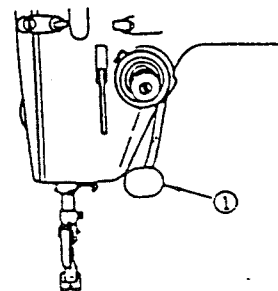


Fig. 34

3-18. How to replace the synchronizer

If the synchronizer fails, the needle will not stop in the upper or lower position when the machine stops, causing the safety circuit to be put into operation, or the machine will keep on running at high speed when it should stop. Replace a faulty synchronizer in the following sequence. Note that the synchronizer is always changed together with the pulley.

- 1) Removing the belt cover, loosen two setscrews ① of the pulley to remove the pulley.

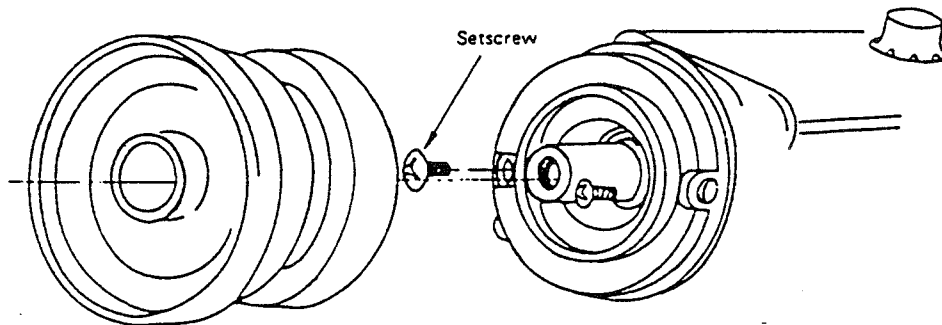


Fig. 36

- 2) Remove the cord setscrew ③ and two setscrews ② of the stator mounting base to remove the stator.
- 3) Fix a new stator by the setscrews.
- 4) The stator mounting base is made of plastics. Tighten the setscrews with approx. 15 kg.cm torque.
- 5) Retighten the cord setscrew.
- 6) Install the pulley so that the screw No. 1 contacts the flat part of the main shaft, and a $1 \text{ mm} \pm 0.2 \text{ mm}$ ($0.039'' \pm 0.008''$) clearance is provided between the stator mounting base and the end face of the pulley as shown in the figure.
- 7) Turn the pulley by hand to check it for smooth rotation.
- 8) Install the cord, and attach the V belt to the pulley. Then confirm that there is no contact between the V belt and the cord.
- 9) With the needle set in the lower position, turn on the power switch. The machine will then operate until the needle has gone up fully. If the needle stop position at that time is considerably deviated from the standard, check the position of the pulley setscrew.
- 10) Run the machine at low speed to check for any frictional noise. After reinstalling the belt cover, check for frictional noise again.
- 11) Adjust the upper and lower needle stop positions by the setscrew of the magnet mounting base of the pulley.

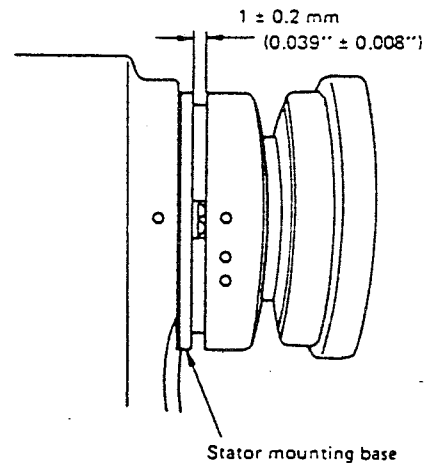


Fig. 37

3-19. Adjusting the auto-lifter (AK95, AK96, AK97, AK98) (optional)

1) How to use the AK95, AK97

- ① When it is necessary to raise the presser foot during a sewing cycle, stop sewing, and then depress the knee switch.
- ② The moment you release the knee switch, the presser foot comes down.

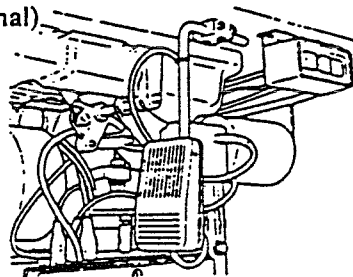


Fig. 38 :

2) How to use the AK96, AK98

- ① Refer to 2-2-3).

3) Adjusting the Auto-lifter stroke

- ① Loosen locknut ① .
- ② Loosen the locknut of stopper (A) ② , and lower the stopper (A) fully downward.
- ③ Under the condition described in step ② above, actuate the solenoid, and check whether the presser foot lift is about 10 mm (0.394") or not. If the presser foot lift exceeds 10 mm (0.394"), turn the plunger counterclockwise. If the lift is lower than 10 mm (0.394"), turn the plunger clockwise to adjust it to 10 mm (0.394").
- ④ Actuate the solenoid to raise stopper (A) ② until it comes in contact with the oil reservoir.
- ⑤ Turn the knee switch OFF, and raise stopper (A) ② an additional turn.
- ⑥ Tighten the locknut of stopper (A) ② and locknut ① .
- ⑦ Raise stopper (B) ⑥ until it comes in contact with the oil reservoir. Adjust the clearance between rod ③ coming out of the oil reservoir and the indented part of lifter lever ④ to about 1 mm (0.039").
- ⑧ Tighten the locknut of stopper (B) ⑥ .

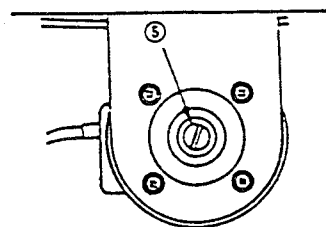
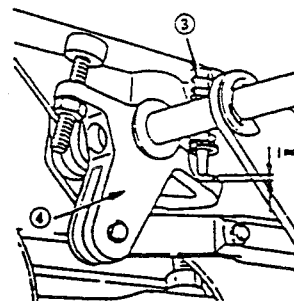
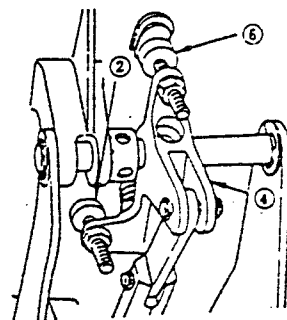
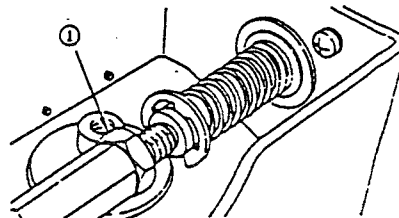


Fig. 39

(Precaution) The presser foot lift can be changed simply by moving stopper (A) ② up or down. However, if the presser foot pressure is too high, the presser foot may fail to go up. So, whenever changing the presser foot lift, repeat steps from ① to ⑧ .

3-20. Adjusting the auto-lifter (AK84, AK85, AK86, AK87) to be attached to the side plate

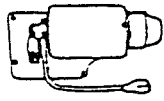
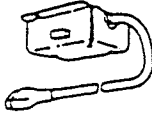

	AK device asm.	Flyback resistor (asm.)	Knee switch asm.	Machine head used	Motor used
					
AK84	○		○	-7 type	KFL type SC- \times motors, motors A from other companies
AK85	○			-7 type	PFL type SC- \times motors, motors A from other companies
AK86	○	○	○	-7 type	KFL type EC- \times to - \times motors, motors B from other companies
AK87	○	○		-7 type	PFL type EC- \times to - \times motors, motors B from other companies

Fig. 40

(Caution) * Motors A from other companies mean motor which do not require a flyback circuit in the auto-lifter solenoid.
 * Motors B from other companies mean motor which require a flyback circuit in the auto-lifter solenoid.

1) Assembling procedure (when the auto-lifter is separately purchased)

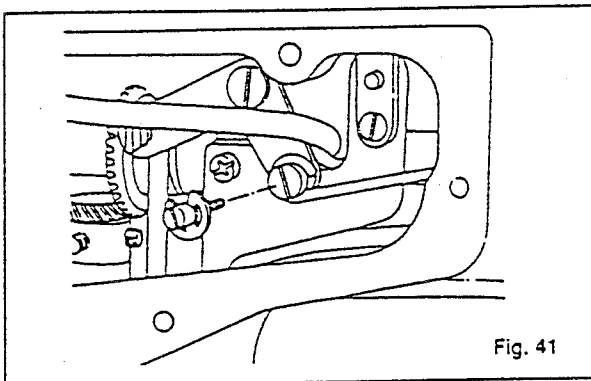


Fig. 41

Remove the side plate from the sewing machine.
 Replace the hinge screw in the knee lifter crossbar with the knee lifter crossbar pin supplied with the unit.

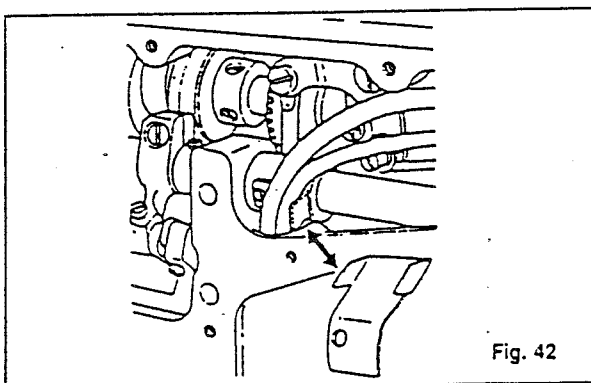


Fig. 42

If your sewing machine has the side plate with a boss, replace the pipe support supplied with the unit.

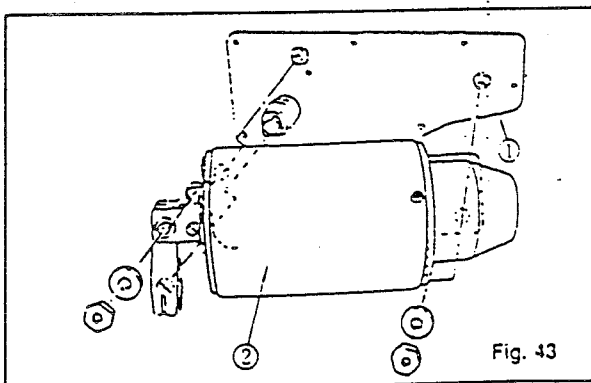


Fig. 43

Remove side plate (asm.) ① and solenoid (asm.) ② from the device and detach them from each other.

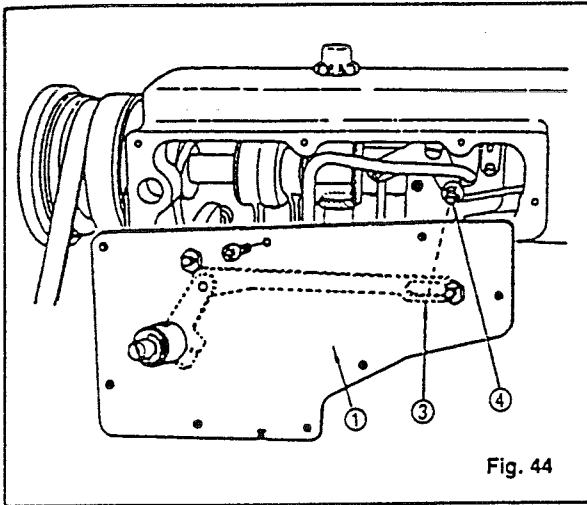


Fig. 44

Attach side plate (asm.) ① to the sewing machine. At this time, attach the side plate (asm.) so that the slot in solenoid link ③ is fitted over pin ④ for the crossbar of the knee lifter.

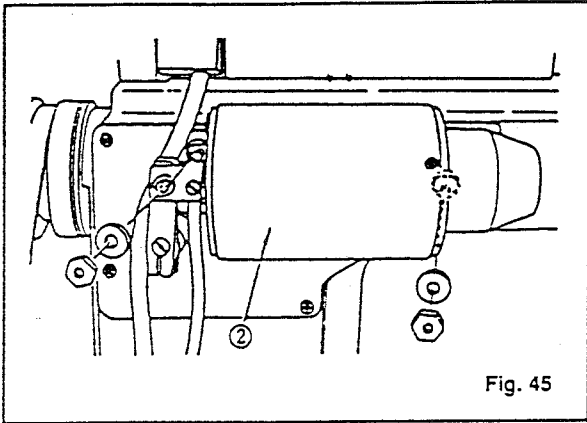


Fig. 45

Attach solenoid (asm.) ② in position.

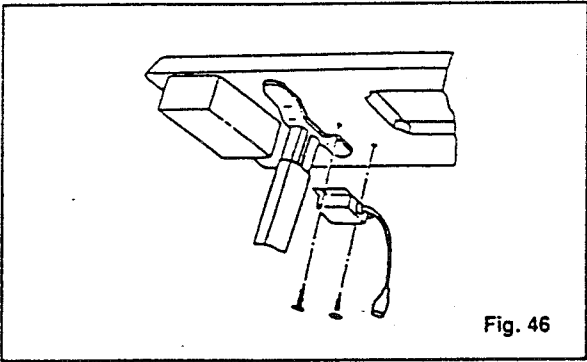


Fig. 46

Attach the flyback resistor (asm.) to the bottom face of the table as illustrated in the figure. (Only for AK86 and AK87)

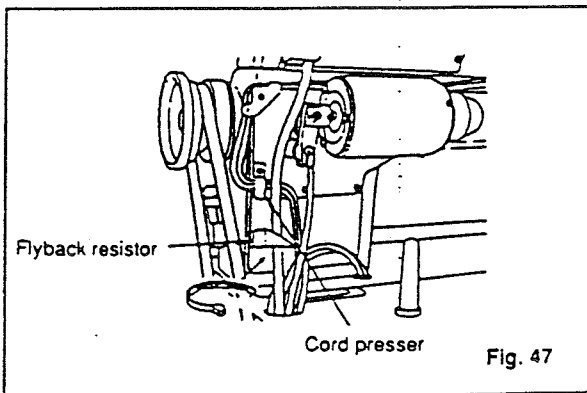


Fig. 47

Bind the cords coming from the operation panel using the cable clip band so that they do not come in contact with the moving parts.

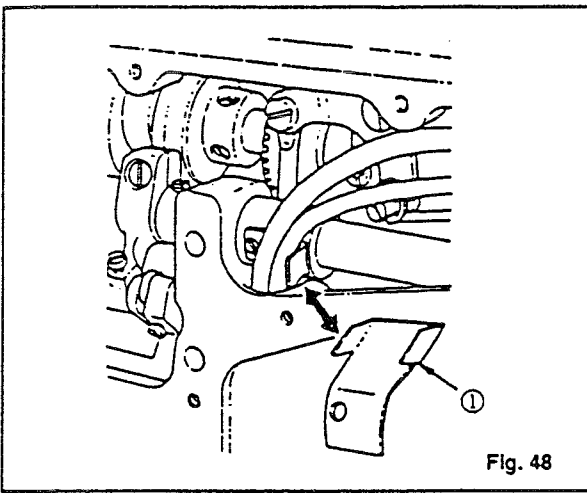


Fig. 48

- 2) When the unit is separately delivered
When the unit is separately delivered, it is supplied with pipe support ① as standard. This means that the unit is also adaptable to the sewing machine with a thread trimmer such as DLU-5490N.

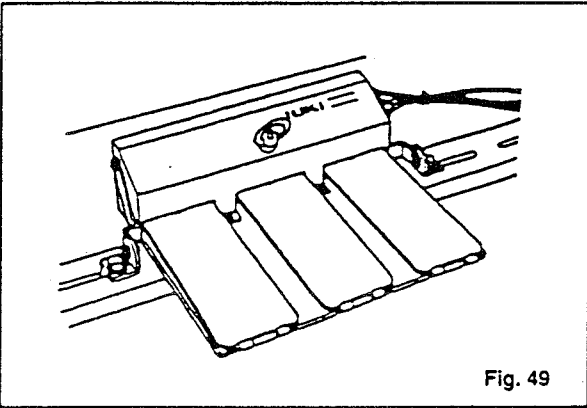


Fig. 49

- 3) To use the unit with the PK70 (3-pedal unit)
To use the unit in combination with the PK70, be sure to specify AK85 or AK87.

4. STANDARD ADJUSTMENT

Standard adjustment

4-1 Height of the needle bar

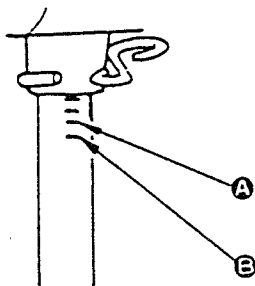


Fig. 50

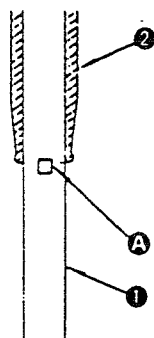


Fig. 51

When the needle bar is in the lowest position of its stroke, align marker line **A** engraved on needle bar **1** with the bottom end of needle bar lower bushing **2**.

4-2 Needle-to-hook relationship

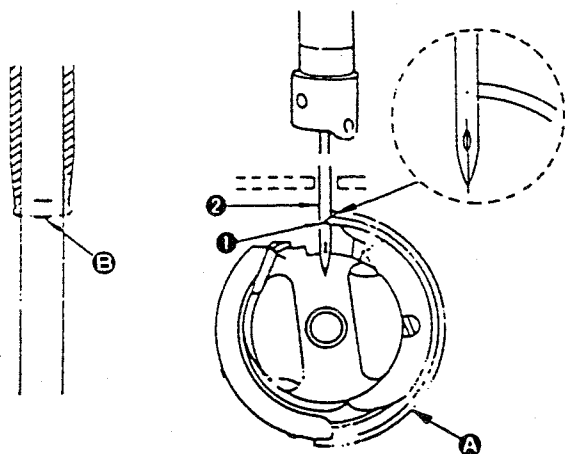


Fig. 53

When marker line **B** engraved on the needle bar, which ascends from the lowest position of its stroke, meets the bottom end of the needle bar bushing, align blade point **1** of the hook with the center of needle **2**. The standard clearance provided between the needle and the blade point of the hook is approximately 0.04 (0.002") to 0.1 (0.004") mm.

4-3 Height of the feed dog

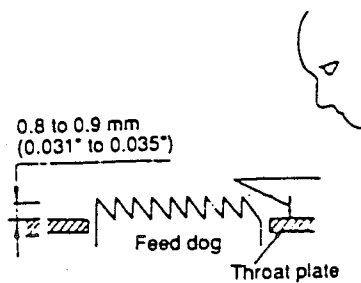
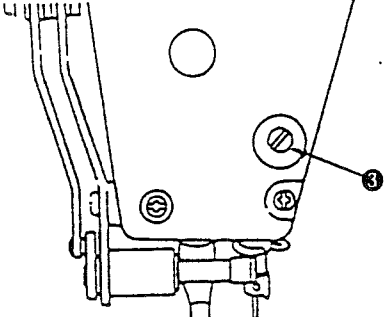
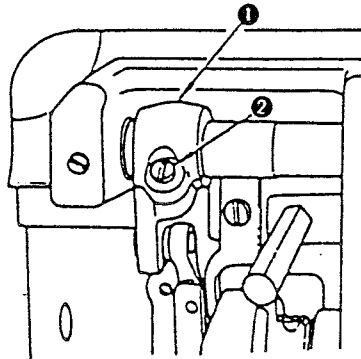


Fig. 54

The jutting amount of the feed dog from the throat plate is 0.8 (0.031") to 0.9 (0.035") mm.

How to adjustment	Results of improper adjustment
 <p data-bbox="707 262 958 388">Loosen screw ③ in the needle bar bracket and adjust the height of the needle bar.</p> <p data-bbox="459 676 531 703">Fig. 52</p>	<ul data-bbox="1007 235 1437 451" style="list-style-type: none"> • Changing the height of the needle bar is not recommended since it affects the feed timing and hook timing. So, it is advisable not to adjust the height of the needle bar in any case other than the case of changing the type of needle.
<p data-bbox="261 808 883 865">Loosen the screw in the hook and adjust the needle-to-hook relationship.</p> <p data-bbox="261 871 845 898">Standard 110-38650 (with a needle guard 111-41355)</p> <p data-bbox="261 913 949 1060">(Caution) In case of the hook with a needle guard, the needle may come in excessive contact with the hook in accordance with thickness of the needle. So, be careful. (Especially when a #14 needle or thicker needle is used)</p>	<ul data-bbox="1007 808 1437 1417" style="list-style-type: none"> • If the clearance provided between the needle and the blade point of the hook is too large, thread breakage will be likely to occur. • If the clearance provided between the needle and the blade point of the hook is too small, the needle may damage the blade point of the hook. • If the hook timing is excessively advanced, well-tensed seam will be produced but stitch skipping will be likely to occur. • If the hook timing is excessively retarded, isolated idling loops and stitch skipping will not be likely to occur. • For the machine head without a thread trimmer, adjust the needle-to-hook timing using the bottom end of the marker line as reference standard.
 <p data-bbox="723 1480 941 1659">Loosen screw ② in feed diving fork ① and adjust the height of the feed dog by moving the feed bar up or down.</p> <p data-bbox="442 1879 515 1906">Fig. 55</p>	<ul data-bbox="1007 1480 1437 1785" style="list-style-type: none"> • If the height of the feed dog is excessive, the needle may fray causing the needle to bend or break. On the contrary, if it is insufficient, efficiency of feed will be impaired. In this case, stitch gathering will be likely to occur. Increasing the height of the feed dog increases efficiency of feed. However, doing so increases frequency of puckering.

Standard adjustment

4-4 Feed timing

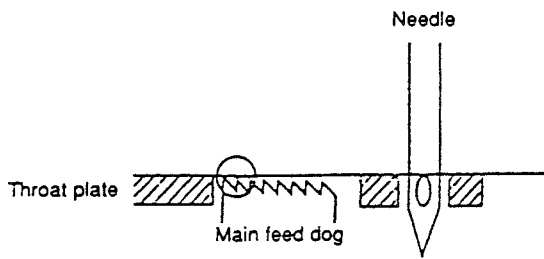


Fig. 56

The standard feed timing is obtained under the state where the top end of the descending needle eyelet aligns with the top surface of the throat plate at the moment when one or two teeth at the front of the main feed dog come down under the top surface of the throat plate.

4-5 Adjusting the normal and reverse feed stitch length

- Condition ● Stitch length on stitch dial: 3 mm (0.118")
 ● Presser foot pressure: 4 kg

Normal/reverse feed stitch length ratio: Normal feed stitch length/reverse feed stitch length = 90 to 105%

4-6 Miscellaneous

1. Relation between the height of the presser spring regulator and the presser foot pressure

Presser foot pressure (kg)		1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
Height of presser spring regulator (mm)	Spring: A type B1505-227-T00A	40	36	33	30	27	24	21	19	—	—	—
	Spring: Standard type B1505-227-000A	—	42	40	38	37	35	34	32	30	28	26

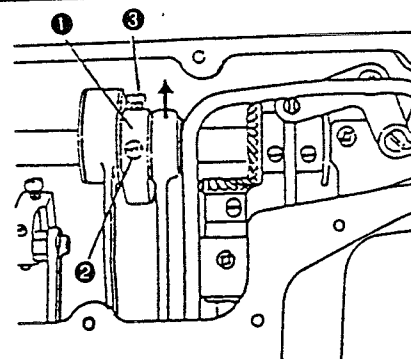
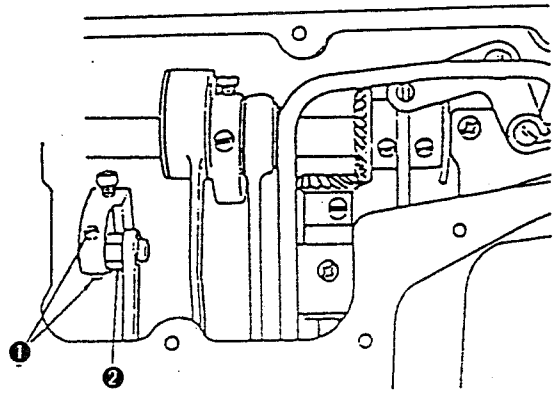
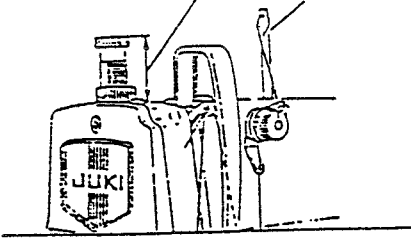
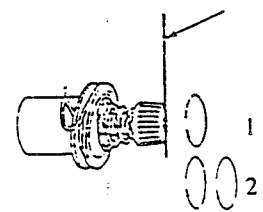
* Height of the presser spring regulator is measured from the top surface of the machine arm to the top end of the presser spring regulator.

2. Relation between the position of the thread tension controller nut (extent of tightening) and the thread tension

Position of the thread tension controller nut		0	1	2	3	4	5	6	7	8	9	10
Tetron #80	Tension controller spring: A type D3129-555-D00	9g	15	30	40	55	75	85	105	120	150	190
	Tension controller spring: Standard type D3129-012-A00	10g	24	48	75	105	120	150	180	240	—	—
Spun #80	Tension controller spring: A type D3129-555-D00	12g	15	25	40	50	65	80	100	120	145	190
	Tension controller spring: Standard type D3129-012-A00	12g	22	45	65	85	110	135	160	210	—	—

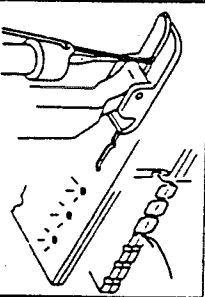

* Position of the thread tension controller nut : "0" is the position when the end face of the nut meets the top end of the tension controller. Tighten the nut by one revolution from the "0" position to reach position "1" or two revolutions to reach position "2".


* The table above gives the results when using #80 tetron and spun thread. If the thread count is changed from #80 to #50, the thread tension changes within the range of 5 to 10 g. This amount of change occurs when tightening the nut by five rotations or more (higher tension).

How to adjustment	Results of improper adjustment
 <p data-bbox="677 126 991 420">Loosen the two screws in feed eccentric cam ①, and adjust the feed timing. To tighten the screws, temporarily tighten screw No. 2 ② first and determine the position of the cam, then firmly tighten screws No. 1 ③ and No. 2 ② in the written order.</p> <p data-bbox="446 504 528 535">Fig. 57</p>	<ul style="list-style-type: none"> * If the feed dog comes down under the top surface of the throat plate earlier than the standard feed timing, frequency of fine-split of thread, isolated idling loops and needle sway may be reduced. In this case, however, loose stitches may result.
 <p data-bbox="594 997 677 1029">Fig. 58</p> <p data-bbox="247 1029 958 1092">Loosen two screws ① in the feed adjusting base pin and adjust the normal/reverse feed stitch length by turning pin ②.</p>	<ul style="list-style-type: none"> * If the normal and reverse feed stitch lengths are not uniform, stitch failure may occur during reverse feed stitching.
<p data-bbox="545 1123 925 1155">* Height of presser spring regulator</p>  <p data-bbox="528 1438 611 1470">Fig. 59</p>  <ul style="list-style-type: none"> * The position where the end face of the nut meets the top end of the tension post is taken as "0". 1 * The position reached by turning the nut by one revolutions is "1" or by two revolutions is "2". <p data-bbox="545 1879 627 1911">Fig. 60</p>	<ul style="list-style-type: none"> * Bobbin case without idling prevention spring B1837-012-0A0 * Aluminum bobbin case B9117-552-A00 <p data-bbox="1024 1491 1453 1648">Refer to the description for Part No. BJ055520T0A given in the Lockstitch Machine Gauge Manual II for the components around the needle of subclass models in detail.</p>

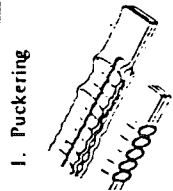

5. TROUBLES AND CORRECTIVE MEASURES

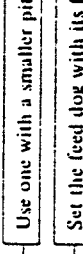
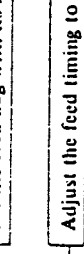
(Mechanical components)

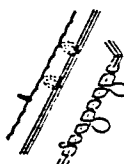
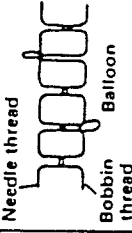
Trouble	Cause (1)	Cause (2)	Corrective measures
1. One or a few stitches are skipped at the start of sewing. 	1-1). The thread remaining on the needle after thread trimming is too short.	1)-A. The needle thread tension becomes too high at the time of thread trimming due to some trouble in the needle thread path. 1)-B. The tension of the tension disc No. 1 is too high. 1)-C. The floating amount of the tension disc No. 2 at the time of thread trimming is insufficient.	Check the needle thread path. Remove thread entangled with thread guide pin, or correct the position of the thread guide on the thread stand or other troubles. Reduce the tension by turning counterclockwise the tension nut of the tension disc No. 1. Check whether a tension disc floats 0.5 mm (0.019") to 1 mm (0.039") when the thread take-up picker is pressed in to the right, and if not, correct it by the adjusting nuts Fig. 21 ① and ② on the bottom surface of the bed. Also check whether the discs are released in parallel, and if not, turn the tension spring 180°, or correct the tilt of the spring.
		1)-D. The cam timing is too early. 1)-E. The thread slips off the needle at the time of thread trimming due to improper position of the thread take-up picker.	Check and correct the cam timing in accordance with 3-6. Check for loosened setscrew of the thread take-up picker.
	1)-F. The counter knife is located too close to the needle, or the blade point is too sharp.		Removing the throat plate, check and correct the position of the counter knife, or check for any scratch on the moving knife (Refer to 3-8).
	1)-G. There are scratches on the knife thread guide, moving knife, or hook.		Check the hole of the knife thread guide and hook for scratches or burrs, and if a scratch or burr has been found, buff it. If buffing does not correct the trouble, replace the components.
	1)-H. The standard cam timing is too early.		Correct the timing for a synthetic thread (special)
1-2). The needle, throat plate, or presser foot used is not correct, or the presser foot pressure is too low.		2)-A. The presser foot can not hold the needle thread because "a" dimension of the relief at "b" of the presser foot is too large. 	Check "a" and "b" of the presser foot, and "A" of the throat plate. <ul style="list-style-type: none"> o When synthetic thread is used for tricot "a" < 0.8 mm (0.031"), and radius of "A" and "b" < 0.3 mm (0.012"). o When synthetic thread is used, "a" shall be smaller than 1.2 mm (0.047"), and there shall be no relief at "b" and "A". o For cotton thread, the relief at "a", "b" and "A" should be minimized as long as good tightness of stitches is obtained. o The smaller the relief at "a", "b", and "A", the better for lighter-weight or coarser fabrics, more slippery thread, or smaller stitch length.

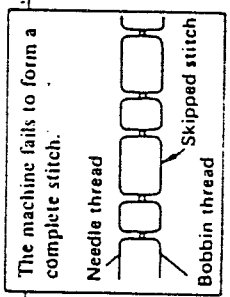
Trouble	Cause (1)	Cause (2)	Corrective measures
		<p>2)-B. The relief at "A" of the throat plate needle hole is too large.</p> 	
		<p>2)-C. The needle is too thick.</p>	<p>A thinner needle is better as long as sufficient tightness of stitches is obtained.</p>
		<p>2)-D. The needle hole in the throat plate is too large.</p>	<p>Replace the throat plate by one with a smaller needle hole.</p>
		<p>2)-E. The presser foot pressure is insufficient.</p>	<p>Increase the pressure of the presser foot, with care taken not to cause the feed power to decrease or stitches to jam.</p>
	<p>1-3). The blade point of the hook fails catch the needle thread (stitch skipping).</p>	<p>3)-A. The timing between the needle and the hook is bad.</p>	<p>Check whether the height of the needle bar is correct, and if not, readjust it to the marker line on the needle bar (2.0 mm) (0.079"). For knit and similar materials, delay the timing by slightly lowering the needle bar.</p>
		<p>3)-B. The tension and stroke of the take-up spring and too high and too large.</p>	<p>Reduce the tension and the stroke (standard stroke: 5 to 7 mm (0.197" to 0.276")).</p>
		<p>3)-C. The blade point of the hook has worn out.</p>	<p>Correct the blade point, or replace the hook.</p>
		<p>3)-D. The needle is improperly installed.</p>	<p>Properly install the needle. If the needle has been bent, replace it.</p>
<p>1-4). The bobbin thread at the start of a seam line is too short.</p>	<p>4)-A. The free end of the bobbin thread is pulled into the bobbin due to racing of the bobbin.</p>	<p>4)-B. The pressure of the bobbin case holder positioning finger is too high.</p>	<p>Increase the pressure of the bobbin case holder positioning finger. Increase the bobbin thread tension. Decrease the pressure of the bobbin case holder positioning finger, and check for racing of the bobbin. Eliminate the scratch or burr, or replace the hook.</p>
	<p>4)-C. A scratch or burr on the hook cuts the bobbin thread short.</p>		

6. TROUBLES AND CORRECTIVE MEASURES (Sewing performance)

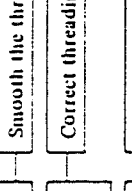
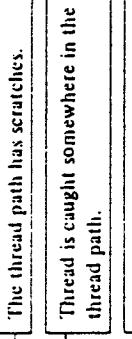
Trouble	Description	Cause (1)	Cause (2)	Corrective measures
<p>1. Puckering</p> 	<p>Wrinkles developed around stitches due to stitch shrinkage or uneven material feed.</p> 	<p>The needle is too thick.</p> <p>The needle and bobbin thread tensions are too high.</p> <p>Problem with the presser foot</p> <p>Material flaps.</p>	<p>The thread path is unsmooth.</p> <p>The hook timing is too late.</p> <p>The feed timing is too early.</p> <p>The thread take-up lever stroke is too large.</p> <p>The thread take-up spring stroke is too small.</p> <p>The thread used is frictional.</p> <p>The presser foot pressure is too high.</p> <p>The bottom of the presser foot sole is unsmooth.</p> <p>The material is difficult to feed.</p> <p>The needle hole in the throat plate is too large.</p> <p>The relief of the presser foot sole is too large.</p> <p>The presser foot is not parallel to the throat plate.</p> <p>The needle point is dull.</p>	<p>Use a thin needle as much as possible. Use a KN needle (standard needle). (Example DB x 1 #11 - DB x JKN #9)</p> <p>Smooth the thread path.</p> <p>Advance the hook timing as long as no stitch skipping occurs.</p> <p>Delay the feed timing with respect to the needle motion.</p> <p>Move the arm thread guide to the right to decrease the length of thread pulled out by the thread take-up lever.</p> <p>Increase the stroke</p> <p>Use the silicone oil lubricant device.</p> <p>Minimize the pressure as long as smooth material feed is assured.</p> <p>Buff the presser foot sole.</p> <p>Use a Teflon presser foot or relax presser foot.</p> <p>Use a throat plate with a smaller needle hole.</p> <p>Use a presser foot with a smaller or no relief.</p> <p>Replace the presser foot or presser bar.</p> <p>Replace the needle.</p>

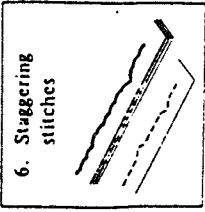
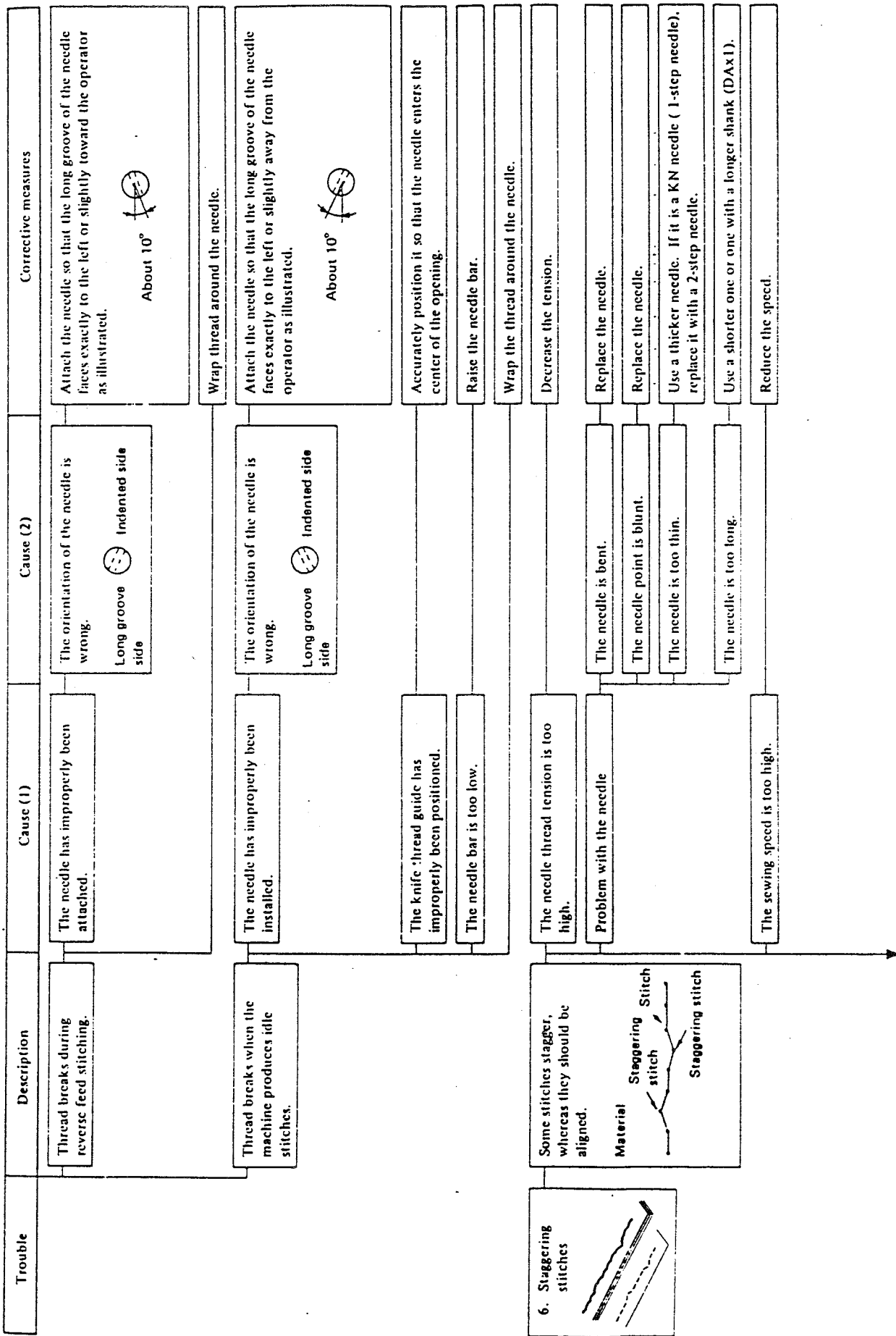
Trouble	Description	Cause (1)	Cause (2)	Corrective measures
		Problem with the feed dog	The feed dog is too high.	Lower the feed dog as long as sufficient feed power is maintained.
			The top edges of the feed dog teeth are worn.	Sharpen the top edges.
			The feed dog tooth pitch is too large.	Use one with a smaller pitch.
			The feed dog tilt is not correct.	Adjust the tilt so that the front end of the feed dog is higher than the rear end.
			The feed dog has poor parallelism.	Replace the feed dog.
		The sewing speed is too high.		Reduce the speed.
		Miscellaneous		Use the cloth puller.
				Pull the material back by hand.
				Use an aluminum bobbin (part No. B9117552A00)
2. Uneven material feed		Problem with the feed dog	The feed dog is too high.	Lower the feed dog as long as sufficient feed power is ensured.
			The top edges of the feed dog teeth are worn.	Sharpen the top edges.
			The feed dog pitch is too large.	Use one with a smaller pitch.
			The tilt of the feed dog is not correct.	Set the feed dog with its front down.
			The feed timing is too late.	Adjust the feed timing to the standard timing.
		Problem with the presser foot	The presser foot pressure is too high.	Minimize the pressure as long as material is properly fed.
			The presser foot sole is unsmooth.	Buff the sole.
			The material is difficult to feed.	Use a Teflon presser foot or a nitax presser foot.
		The sewing speed is too high.		Reduce the speed.

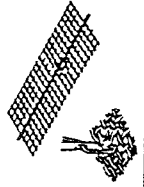
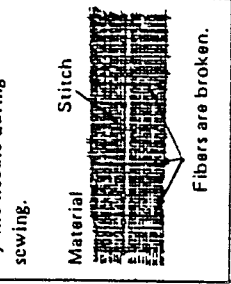
Trouble	Description	Cause (1)	Cause (2)	Corrective measures
<p>3. "Balloon" stitches (loose stitches and looping)</p> 	<p>Thread knots are formed on either side of material as a random thread loop.</p> 	<p>The thread tensions are not high enough.</p> <p>The thread take-up spring has been misadjusted.</p>	<p>Increase the tensions.</p> <p>Increase the stroke.</p> <p>Increase the tension.</p> <p>Readjust so that the spring does not touch the arm.</p>	
		<p>The thread take-up lever stroke is too large.</p> <p>Problem with the hook</p>	<p>The stroke is too small.</p> <p>The tension is weak.</p> <p>The spring comes in contact with the machine arm.</p> <p>The hook timing is too early.</p> <p>The hook timing is too late.</p> <p>The clearance between the hook and bobbin case opening lever is too small.</p> <p>The hook lubrication is inadequate.</p> <p>The hook motion is unsmooth.</p> <p>The thread path is unsmooth.</p> <p>The thread path has scratches.</p> <p>Thread is caught somewhere in the thread path.</p> <p>The bobbin thread is caught due to poor fit between the bobbin and bobbin case.</p> <p>Thread has not properly been wound around the bobbin.</p>	<p>Move the arm thread guide to the right to decrease the length of thread pulled out by the thread take-up lever.</p> <p>For a cotton or spun thread, adjust it to the standard timing or to a slightly later timing.</p> <p>For a synthetic thread, adjust it to the standard timing or to a slightly earlier timing.</p> <p>Increase the clearance.</p> <p>Adequately lubricate the hook.</p> <p>Replace the hook.</p> <p>Smooth the thread path.</p> <p>Smooth the thread path.</p> <p>Correct the threading.</p> <p>Replace the bobbin or bobbin case</p> <p>The winding tension was too high or low.</p>

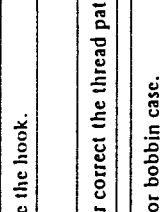
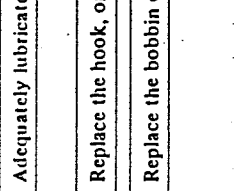
Trouble	Description	Cause (1)	Cause (2)	Corrective measures
4. Stitch skipping	 <p>The machine fails to form a complete stitch.</p>	<p>Problem with feed</p> <p>Problem with the presser foot</p> <p>Problem with the thread tension controller</p> <p>The needle hole in the throat plate is too small.</p> <p>The needle is too thin for the thread used.</p> <p>Problem with the needle</p>	<p>The tension spring of the bobbin case is faulty.</p> <p>The thread in the bobbin case races.</p> <p>The feed timing is bad, or the feed dog is too low.</p> <p>The presser foot is too high.</p> <p>The presser foot sole has little or no relief (for thicker thread or larger stitch length).</p> <p>The thread tension discs are loose.</p> <p>The needle point has a burr.</p> <p>The needle is bent.</p> <p>The needle orientation is wrong.</p> <p>The needle point is blunt.</p> <p>The needle is too thick or thin for the thread used.</p>	<p>Replace the bobbin case.</p> <p>To prevent bobbin racing, use a bobbin with spring for prevention of racing or put a thin cloth in the bobbin case.</p> <p>For cotton or spun thread, adjust the feed timing slightly later than the standard timing, and adjust it slightly earlier than the standard for synthetic thread. Increase the feed dog height (up to 1 mm (0.039")).</p> <p>Correct the height.</p> <p>Use one with a larger relief.</p> <p>Properly adjust the tension release timing.</p> <p>Use a throat plate with a larger needle hole.</p> <p>Change the needle or thread.</p> <p>Replace the needle. (It is advisable to use a ball-point needle for synthetic thread.)</p> <p>Replace the needle.</p> <p>Properly attach the needle.</p> <p>Replace the needle.</p> <p>Replace the needle.</p>

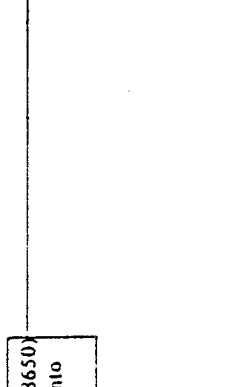
Trouble	Description	Cause (1)	Cause (2)	Corrective measures
		Problem with the hook	The hook point is blunt or worn.	Correct the hook point or replace the hook.
			The hook timing is bad.	Correct the timing. (The proper timing depends on the type of material and thread. In general, the timing should be set earlier for synthetic thread or heavy-weight material, and it should be set later for light-weight material.)
			The needle bar height is wrong.	Properly adjust it with respect to the hook point. (In general, the needle bar should be set higher for synthetic thread, and it should be set lower for light-weight material.)
			The clearance between the hook point and needle is wrong.	Minimize the clearance.
			Uneven loops are formed.	Wrap the thread around the needle.
	The needle thread tension is too high.			Decrease the tension. Use the silicone oil lubricating device.
	The sewing speed is too high.			Reduce the sewing speed.
	The feed timing is bad. (The needle bends.)			Correct the feed timing.
	The thread take-up spring has been misadjusted.		The stroke is too large.	Decrease the stroke.
			The tension is too high.	Decrease the tension.
	The material flaps.		The presser foot is not in close contact with the material.	Correct the presser foot height.
			The needle hole in the throat plate is too large.	Use one with a smaller needle hole.
			The relief of the presser foot sole is too large.	Use one with a smaller relief or with no relief.
			The presser foot is not parallel to the throat plate.	Replace the presser foot or presser bar.

Trouble	Description	Cause (1)	Cause (2)	Corrective measures
<p>5. The needle thread breaks.</p> 	<p>The needle thread splits finely or breaks during sewing.</p> 	<p>Problem with the thread path (including the throat plate, feed dog and presser foot)</p> <p>The needle thread tension is wrong.</p> <p>The thread take-up spring has been misadjusted.</p> <p>Problem with the needle</p> <p>Problem with the hook</p>	<p>The thread path is unsmooth.</p> <p>The thread path has scratches.</p> <p>Thread is caught somewhere in the thread path.</p> <p>The tension is too high or low.</p> <p>Thread tension No. 1 is too low.</p> <p>The stroke is too large or small.</p> <p>The tension is too high or low.</p> <p>The needle is bent.</p> <p>The needle has scratches.</p> <p>The needle point is blunt.</p> <p>The needle orientation is wrong.</p> <p>The needle is too thin or thick for the thread used.</p> <p>The needle point is too sharp.</p> <p>The hook thread path has scratches.</p> <p>The hook point is blunt or worn.</p> <p>The clearance between the hook and the bobbin case opening lever is too small.</p> <p>The hook is inadequately lubricated.</p>	<p>Smooth the thread path.</p> <p>Smooth the thread path.</p> <p>Correct threading.</p> <p>Properly adjust the tension.</p> <p>Increase the tension so that the thread does not "jump".</p> <p>Properly adjust the stroke.</p> <p>Properly adjust the tension.</p> <p>Replace the needle.</p> <p>Replace the needle.</p> <p>Replace the needle.</p> <p>Properly attach the needle.</p> <p>Replace the needle.</p> <p>Use a ball-point needle (K N, S, J, B, U, Y, etc.).</p> <p>Smooth the thread path.</p> <p>Correct the hook point or replace the hook.</p> <p>Increase the clearance.</p> <p>Adequately lubricate it.</p>



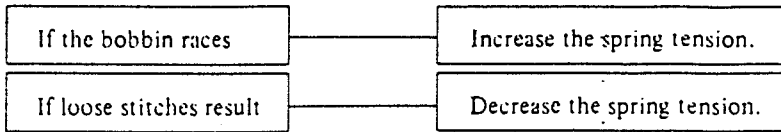
Trouble	Description	Cause (1)	Cause (2)	Corrective measures
7. Material fiber breaks.	 <p>Material fibers are broken by the needle during sewing.</p>  <p>Fibers are broken.</p>	<p>Problem with the feed dog</p> <p>Problem with the presser foot</p> <p>Problem with threading</p>	<p>The feed dog has poor parallelism.</p> <p>The feed dog has improperly been installed.</p> <p>The feed dog mounting base has a lateral play.</p> <p>The presser foot is too high.</p> <p>The presser foot has poor parallelism.</p> <p>The presser foot pressure is too low.</p> <p>The machine head has erroneously been threaded.</p> <p>Problem with the needle bar</p> <p>The needle generates much heat.</p> <p>The needle is too thick.</p> <p>The needle point is blunt.</p> <p>The needle point shape is unsuitable. (The type of needle is incorrect.)</p>	<p>Replace the feed dog.</p> <p>Properly install it.</p> <p>Remove the play.</p> <p>Correct the presser foot height.</p> <p>Replace the presser foot or presser bar.</p> <p>Increase the presser foot pressure.</p> <p>Correct the threading.</p> <p>Use the B1418227T00 or B1418552A00.</p> <p>Use the silicone lubricating device.</p> <p>Use as thin a needle as possible.</p> <p>Replace the needle.</p> <p>Use a ball-point needle. (KN, S, J, B, U, Y, etc.)</p>
		<p>The sewing speed is too high.</p> <p>Too much tension is applied to the material.</p> <p>The room humidity is too low.</p> <p>The feed pitch is too small.</p>	<p>The needle hole in the throat plate is too small.</p> <p>The presser foot pressure is too high.</p> <p>The feed dog is too high.</p>	<p>Reduce the speed. (to prevent the needle from generating heat)</p> <p>Use one with a larger needle hole.</p> <p>Minimize the presser foot pressure.</p> <p>Minimize the height.</p> <p>Keep the humidity at about 65% to prevent the needle from getting hot and to prevent static buildup from friction.</p> <p>Maximize the pitch as much as possible.</p>

Trouble	Description	Cause (1)	Cause (2)	Corrective measures	
<p>8. Irregular stitches</p> 	<p>Thread knots appear on either side of material at random.</p> 	<p>Problem with the hook</p> <p>Problem with the bobbin or bobbin case</p>	<p>The hook has been excessively or inadequately lubricated.</p> <p>The hook thread path is unsmooth.</p> <p>The bobbin thread cannot be pulled out smoothly due to poor fit between the bobbin and bobbin case.</p> <p>The bobbin has improperly been wound, and the bobbin thread cannot be pulled out smoothly.</p> <p>The bobbin in the bobbin case races.</p> <p>The tension control spring of the bobbin case is faulty.</p> <p>The bobbin has improperly been put in the bobbin case.</p>	<p>Adequately lubricate the hook.</p> <p>Replace the hook, or correct the thread path.</p> <p>Replace the bobbin or bobbin case.</p> <p>Correct the bobbin thread winding tension or the position of the bobbin winding tensioner.</p> <p>To prevent the bobbin from racing, use a bobbin with spring, or put a thin cloth in the bobbin case.</p> <p>Replace the bobbin case.</p> <p>Refer to "6. BOBBIN CASE WITH ANTI-RACING SPRING".</p>	<p>Increase the tensions.</p> <p>Correct the stroke.</p> <p>Correct the tension.</p> <p>Smooth the thread path.</p> <p>Smooth the thread path.</p> <p>Correct the threading.</p> <p>Use one with a smaller needle hole.</p> <p>Use one with a smaller or no relief.</p> <p>Replace the presser foot or presser bar.</p>
		<p>The needle and bobbin thread tensions are too low.</p> <p>The thread take-up spring has been misadjusted.</p> <p>Problem with the thread path</p>	<p>The stroke is too large or small.</p> <p>The tension is too high or low.</p> <p>The thread path is unsmooth.</p> <p>The thread path has scratches.</p> <p>Thread is caught somewhere in the thread path.</p> <p>The needle hole in the throat plate is too large.</p> <p>The relief of the presser foot sole is too large.</p> <p>The presser foot has poor parallelism.</p>		

Trouble	Description	Cause (1)	Cause (2)	Corrective measures
9. The bobbin has a scratch.	 <p data-bbox="520 1045 773 1346">The bobbin is scratched as illustrated, and a burr is left.</p>	<p data-bbox="398 1016 455 1325">The thread take-up lever stroke is too large.</p>	<p data-bbox="294 646 332 955">The feed dog has poor parallelism.</p> <p data-bbox="348 701 386 955">The presser foot is too high.</p>	<p data-bbox="299 394 327 590">Replace the feed dog.</p> <p data-bbox="348 306 376 590">Correct the presser foot height.</p> <p data-bbox="406 92 455 590">Move the arm thread guide to the right to decrease the length of thread pulled out by the thread take-up lever.</p> <p data-bbox="480 134 508 590">Use the D113-126-WA0 for the thread guide bar.</p> <p data-bbox="533 128 612 590">Use the 11141355 (old DAC-type hook) which has needle guard effect for a #11 needle. When using a thicker needle, correct the needle guard.</p>

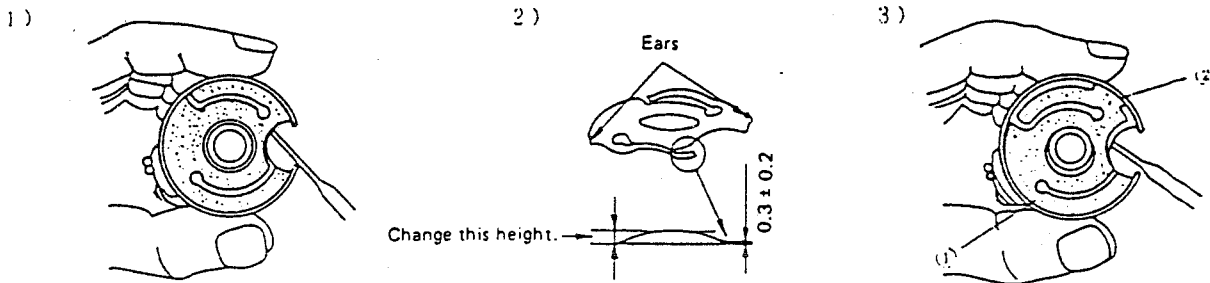
7. BOBBIN CASE WITH AN IDLING PREVENTION SPRING

The DDL-5550N-7 use bobbin cases with an idling prevention springs. Adjust the tension of the an idling prevention spring as follows:

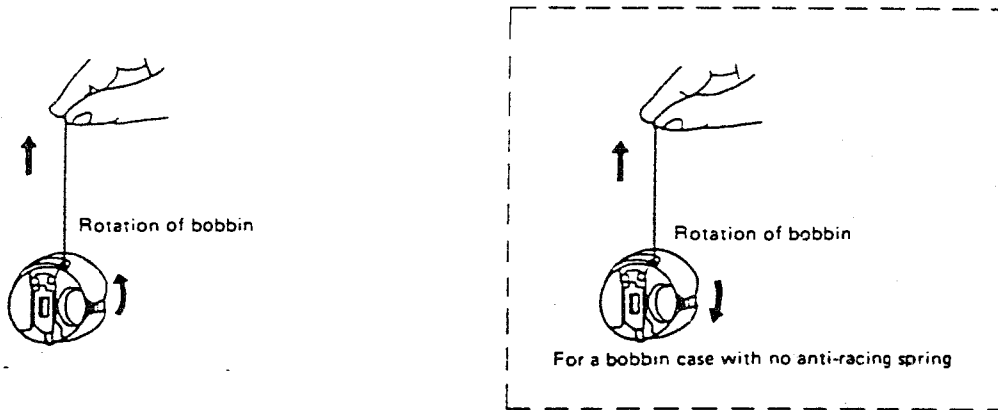


○ How to adjust the tension of the an idling prevention spring.

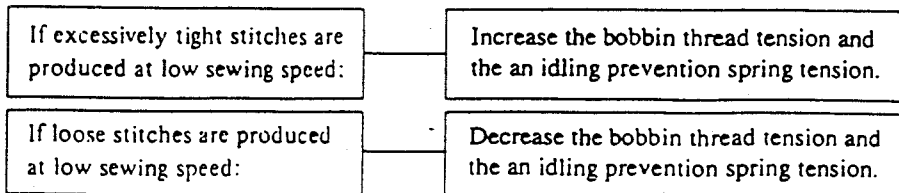
- 1) Remove the spring as illustrated below, using an old sewing machine needle. (At this time, hold the spring with your thumb to prevent it from jumping out.)
- 2) Adjust the spring pressure by changing the height of the arch of the spring.
- 3) Set ear ① first, and insert the sewing machine needle to push the central part of the spring, then set ear ②. (Bobbin case spring : Part No. D1837-555-BOB)



○ When using a bobbin case with an idling prevention spring, be sure to orient the bobbin as shown below:



How to correct irregular stitches produced at high/low speed



Note: If the bobbin races or if irregular stitches are produced at high/low sewing speed, it is advisable to use a bobbin case with an idling prevention spring.

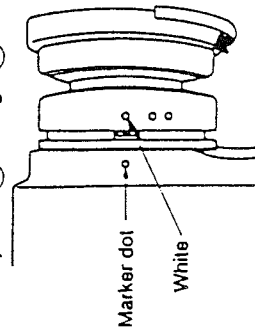
8. BRIEFLY CHECKING THE ADJUSTMENT OF THE THREAD TRIMMER OF AC SERVO SERIES

Confirm checkpoints ① through ⑥ following the procedure described below. It is basically required to adjust the points properly.

Start

Turn ON the power to the sewing machine, and the machine stops with the marker dot (red) engraved on the machine arm aligned with the marker dot (white) on the pulley.

Turn OFF the power to the machine with the marker dot (red) aligned with the marker dot (white). Now, confirm checkpoints ① through ⑤.

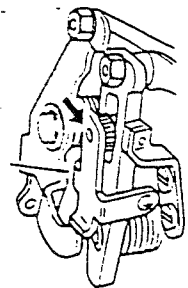


Marker dot
White

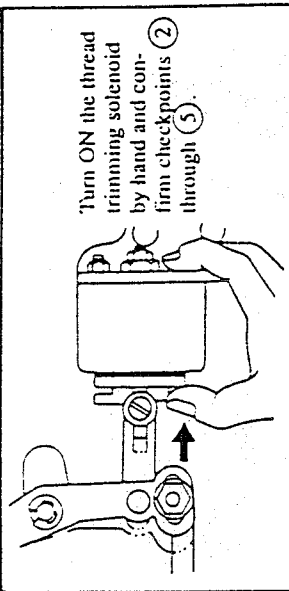
Normal direction of rotation

Checkpoint ①

Roller arm



Press the roller arm in the direction of the arrow to confirm that the roller arm smoothly projects and retracts.

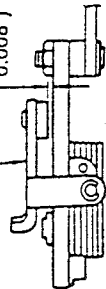


Turn ON the thread trimming solenoid by hand and confirm checkpoints ② through ⑤.

Checkpoint ②

0.3 ± 0.2 mm
($0.012'' \pm 0.008''$)

Roller arm

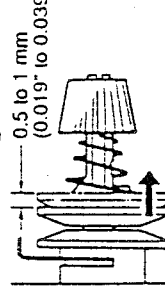


Confirm that a clearance of 0.3 ± 0.2 mm ($0.012'' \pm 0.008''$) (equivalent to thickness of one or two sheets of paper) is provided.



Checkpoint ③

0.5 to 1 mm
($0.019''$ to $0.039''$)

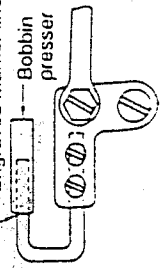


Confirm that the disk rises.



Checkpoint ④

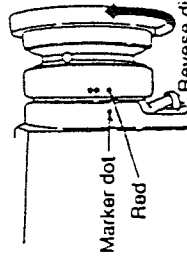
Engraved marker line



Confirm that the picker has reached the engraved marker line.



Checkpoint ⑤



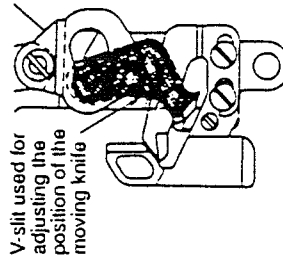
Turn the pulley in the reverse direction of rotation until it stops. Confirm that the marker dot (red) engraved on the machine arm is aligned with the marker dot (red) on the pulley. This is the correct timing of the thread trimming cam.

Reverse direction of rotation



Checkpoint ⑥

Check the backward travel amount of the moving knife. It can be checked in the two different procedures. It is recommended to take both procedures for more accurate adjustments.

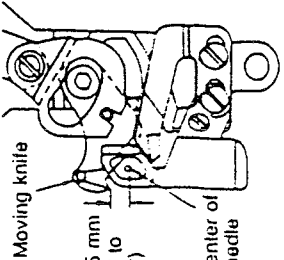


V-slit used for adjusting the position of the moving knife

Confirmation (1)

When the moving knife is in the home position, the V slit on the knife mounting base is aligned with the end of the moving knife.

Home position



Moving knife

3 to 3.5 mm
($0.118''$ to $0.137''$)

Confirmation (2)

Turn the pulley by hand to make the moving knife reach the backward travel end. Now, confirm that the top end of the moving knife is spaced 3 to 3.5 mm ($0.012''$ to $0.138''$) from the center of the needle.

When the knife is in the backward travel end

