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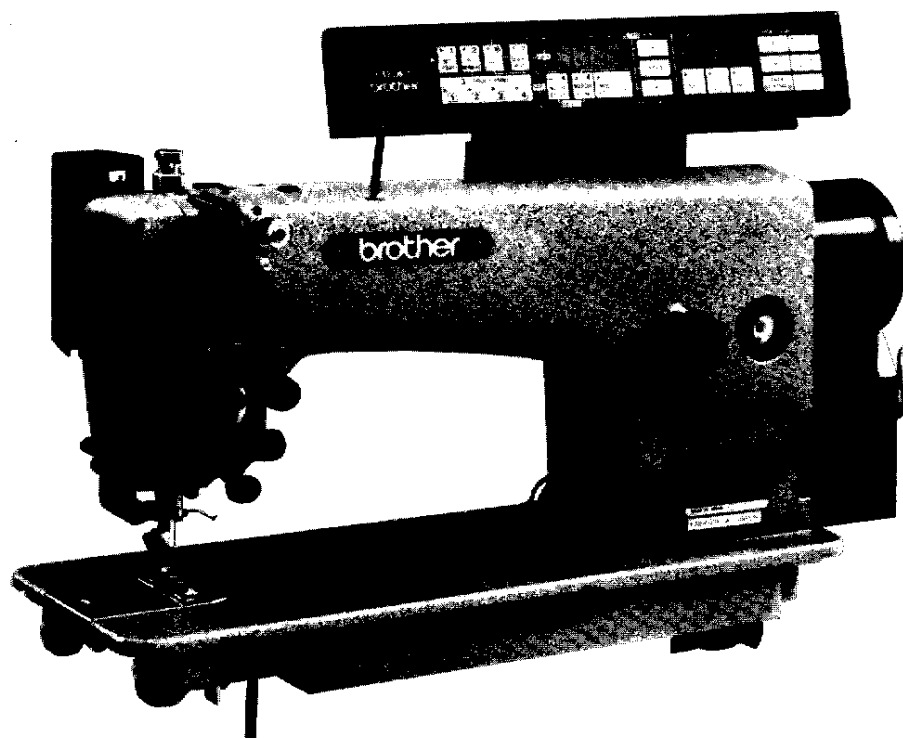
SERVICE MANUAL

FOR

DB2-B791

DB2-B7910

HIGH SPEED SINGLE NEEDLE
NEEDLE FEED LOCK STITCH MACHINE
WITH AUTOMATIC THREAD TRIMMER



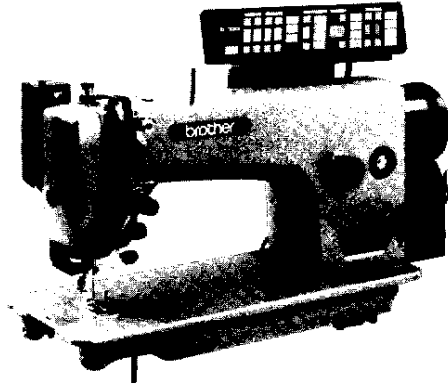
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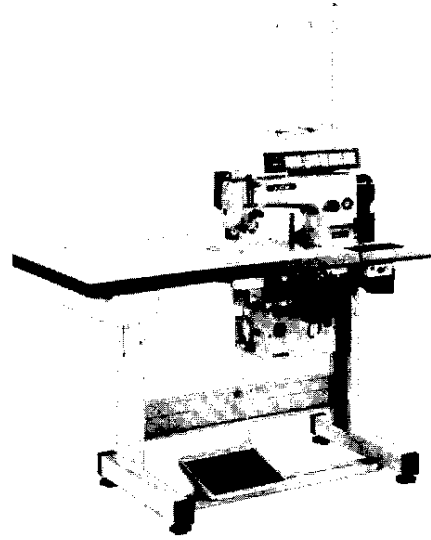
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SPECIFICATIONS

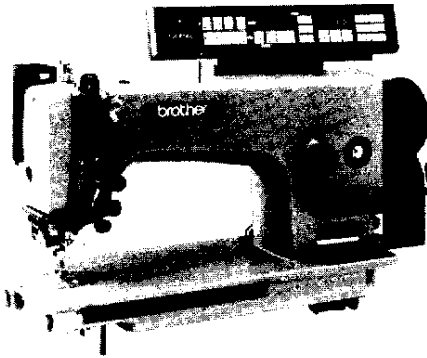
DB2-B791



DB2-B7910



DB2-B7910



- 0 [Standard]
- 3 [Thread trimmer · Quick back]
- 4 [Thread trimmer · Thread wiper · Quick back]
- 7 [Thread trimmer · Thread wiper · Quick back · Automatic presser foot lifter (Air type)]
- 9 [Thread trimmer · Thread wiper · Quick back · Automatic presser foot lifter (Solenoid type)]

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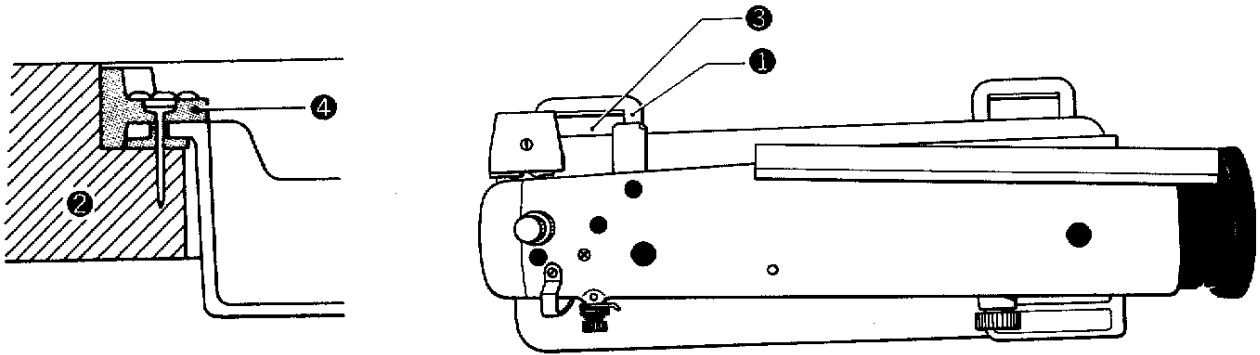
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		DB2-B791		DB2-B791		DB2-B7910	
		Standard		Thread trimmer		Thread trimmer (with ply sensor)	
Specification		-013	-015	-□13	-□15	-□23	-□25
Application		Medium materials	Thick materials	Medium materials	Thick materials	Medium materials	Thick materials
Sewing speed		4,500 spm	3,500 spm	4,000 spm	3,500 spm	4,000 spm	3,500 spm
Maximum stitch length		4 mm	5 mm	4 mm	5 mm	4 mm	5 mm
Presser foot height	Presser bar lifter lever	6 mm					
	Knee lifter	13 mm					
	Automatic presser bar lifter			8 mm			
Feed dog height		0.8 mm	1.2 mm	0.8 mm	1.2 mm	0.8 mm	1.2 mm
Needle DB x 1		#11-#18	#19-#22	#11-#18	#19-#22	#11-#18	#19-#22

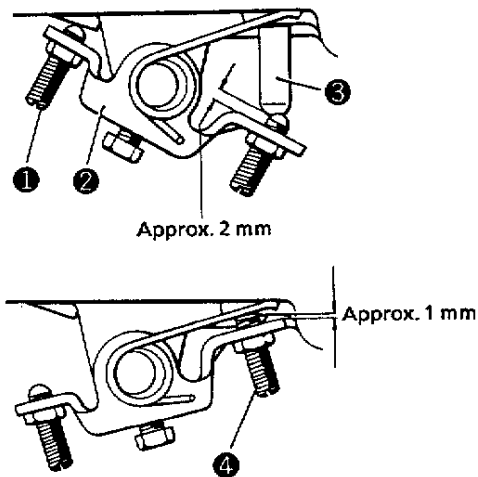
INSTALLATION

1. Machine head



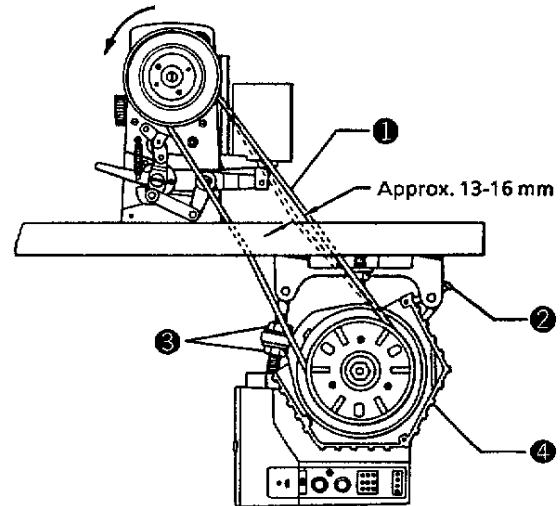
Put the head hinges ① into the holes of the bed and adjust them to the rubber hinge ③ of the table ②. Place the machine head onto the head cushions ④ at the four corners.

2. Knee lifter bell crank stopper



- (1) Adjust the screw (L) ① so that the gap between the knee lifter plate ② and the knee lifter complying bar ③ is approximately 2 mm.
- (2) Adjust the screw (R) ④ so that the gap between the knee lifter plate ② and the oil pan is approximately 1 mm when the knee lifter cover is pushed.

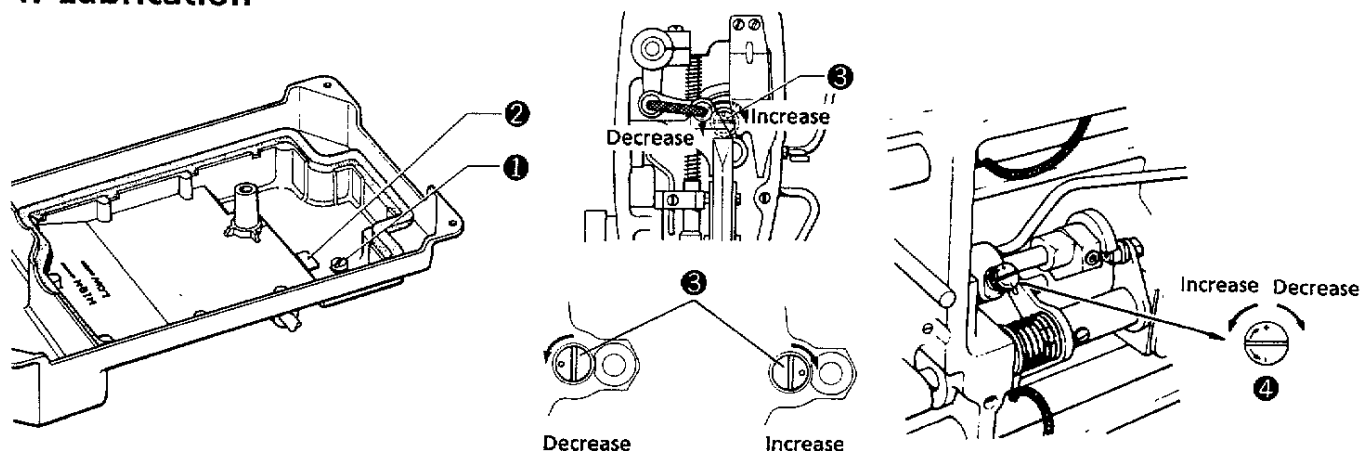
3. Belt



- (1) After tilting the machine head until it stops, hang the belt ① on both the motor pulley and the machine pulley.
- (2) By loosening the screw ② and the two nuts ③, adjust the position of the motor ④ so that the belt deflection is 13-16 mm when the belt is pressed by hand.

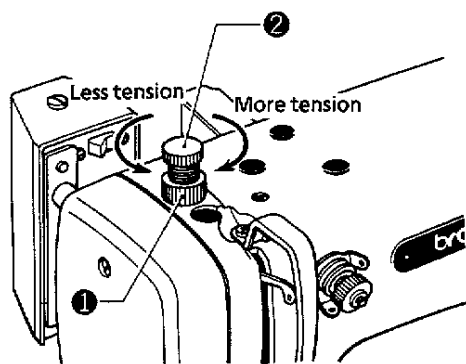
OPERATION

1. Lubrication



- (1) Slowly pour oil into the oil pan to the level of the HIGH mark. If the oil level falls below the LOW mark, add more oil.
- (2) If the oil becomes contaminated, remove the oil by removing the oil cover screw ①.
- (3) Wipe off any contamination from the magnet ② and the oil pan.
※ Use the oil specified by BROTHER: Hi White 70.
- (4) After removing the face plate, adjust oil absorption by turning the oil regulating valve ③.
- (5) After tilting the machine head until it stops, adjust oil absorption by turning the oil adjusting screw ④.

2. Pressure on materials

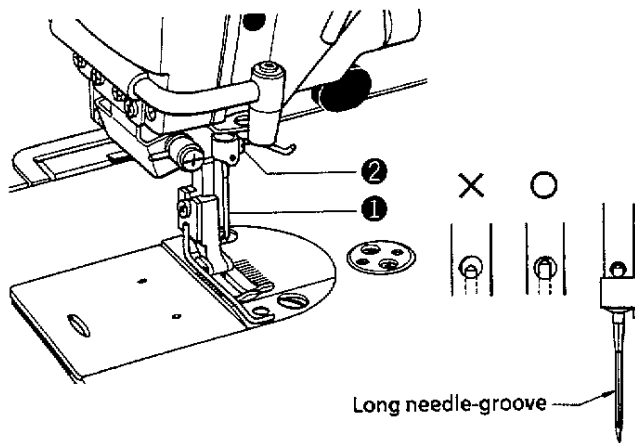


The pressure on a material during sewing must be as weak as possible, but strong enough that the material does not slip.

To adjust the pressure, turn the presser adjustment screw ②.

※ Loosen the nut ① before adjustment.

3. Needle

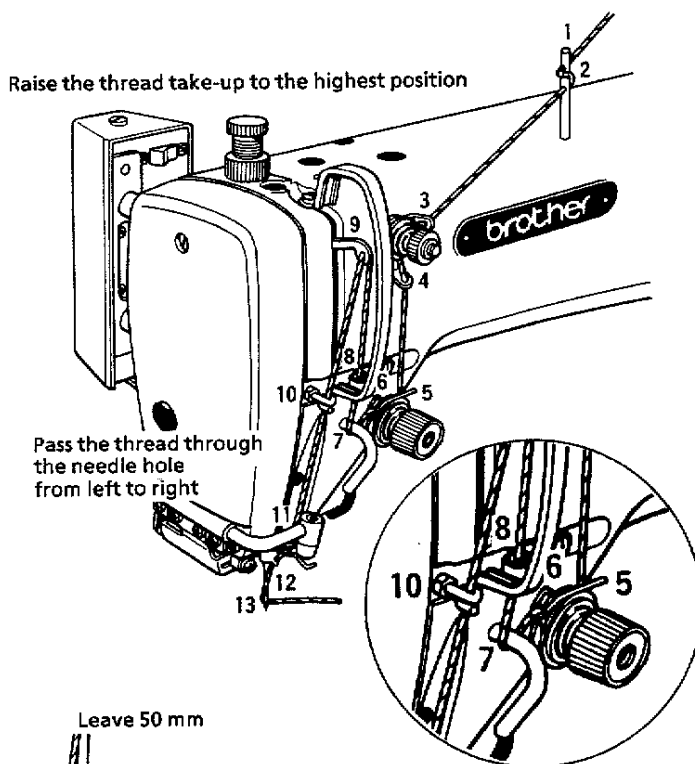


Insert the needle ① completely, making sure that the long groove of the needle is on the left. Tighten it with the screw ②.

※ Use needle DB x #1.

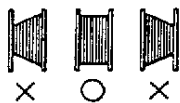
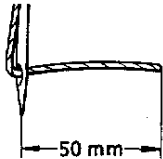
4. Threading

1. Needle threading

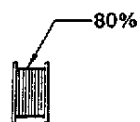


Pass the thread through the needle hole from left to right

Leave 50 mm



The thread leader



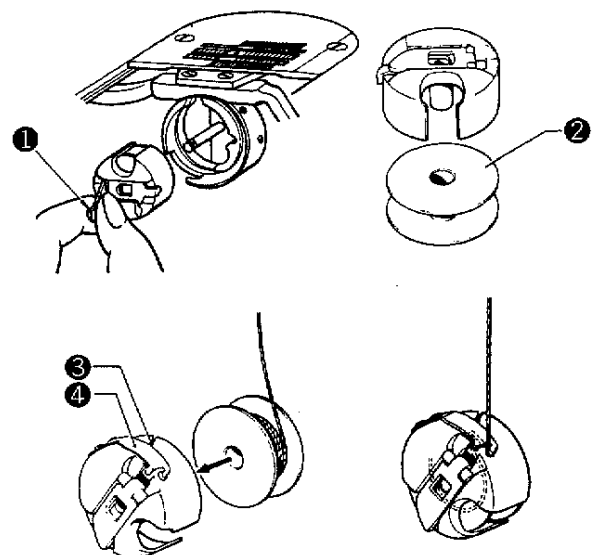
2. Bobbin threading

[Removal]

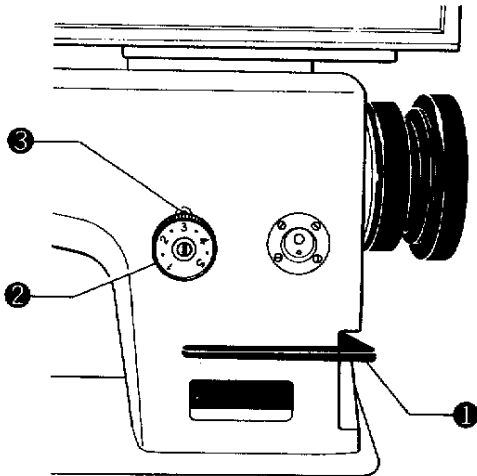
Remove the bobbin case ① by pulling its tab. Then remove the bobbin ② by releasing the tab.

[Installation]

- (1) Set the bobbin ② into the bobbin case ①.
- (2) Put the thread into the slot ③ and then slide the thread under the bobbin case tension spring ④.
- (3) Pull out the thread from the bobbin case tension spring ④.



5. Stitch length

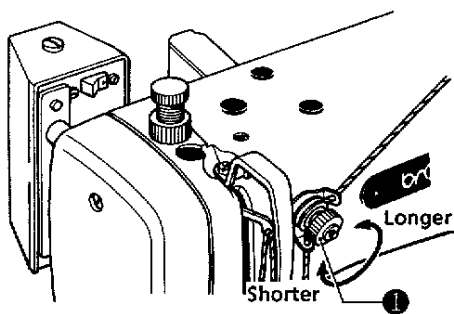


- While pushing the reverse feed lever ① halfway down, turn the dial ② until the desired number is aligned with the pin ③ at the top, and release the reverse feed lever ①.

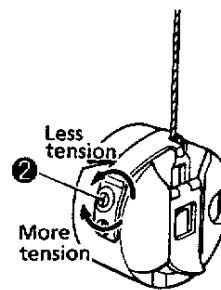
※ The larger the number is, the longer the stitch length is.

- The reverse stitching device is an automatic-resetting type; a material is fed in reverse when the reverse feed lever ① is pressed, and forward again when it is released.

6. Thread tension



Adjust the needle thread length after the thread is trimmed to 35-40 mm by turning the tension control nut ①.



Adjust the bobbin thread tension by turning the spring adjusting screw ② so that the bobbin case does not slip down of its own weight from the bobbin thread when it is suspended from the end of the thread held by hand.

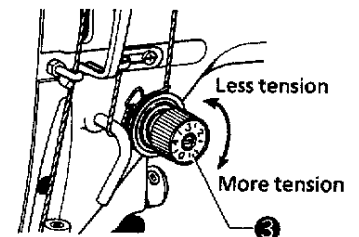
Stitches when the needle thread tension is too low



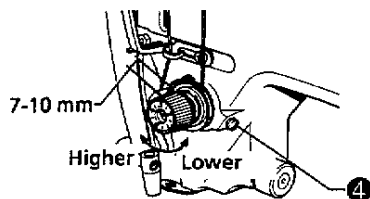
Stitches when the needle thread tension is too high



Correct stitches



After lowering the presser foot, adjust the needle thread tension by turning the tension nut ③.



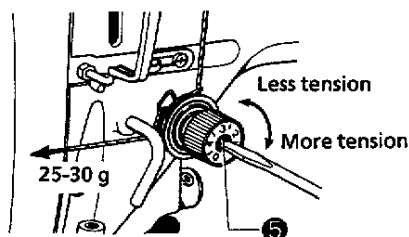
[Thread take-up spring]

- The standard operation height of the thread take-up spring is 7-10 mm.

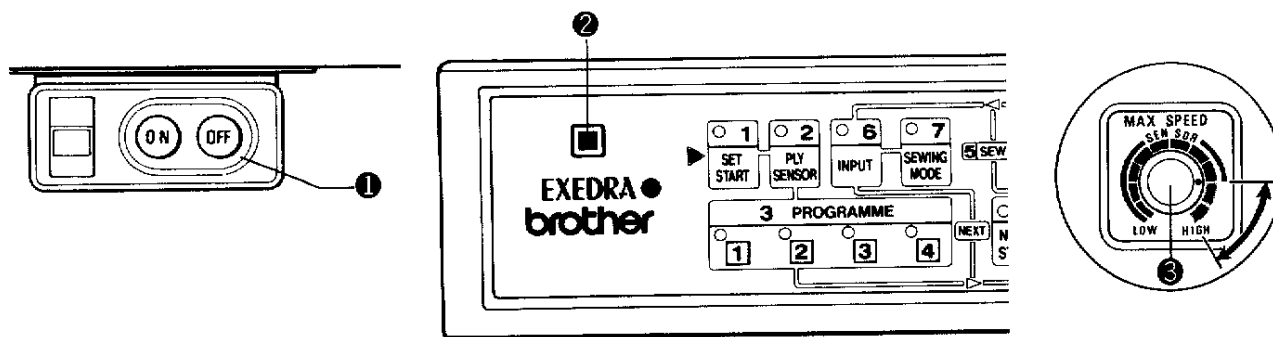
To adjust the height of the thread take-up spring, loosen the screw ④ and turn the upper tension regulator bracket assembly.

- The standard tension at this time is 25-30 g.

To adjust the thread take-up spring tension, turn the tension stud ⑤ using a screwdriver.



7. Sewing speed setting

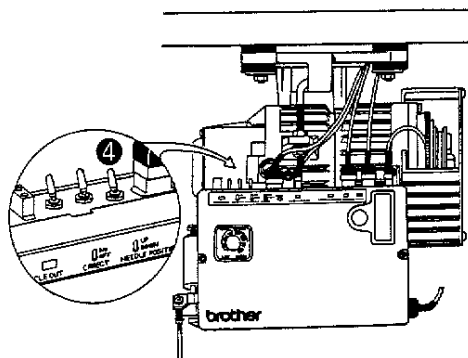


Set the power switch ① to ON. The indicator ② goes on.

Sewing speed increases when the speed control ③ is turned clockwise (HIGH); it decreases when the control ③ is turned counterclockwise (LOW).

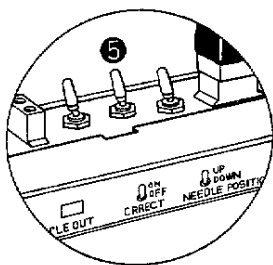
The sewing speed varies from 215 spm to an adjustable maximum speed.

8. Sensor sensitivity setting



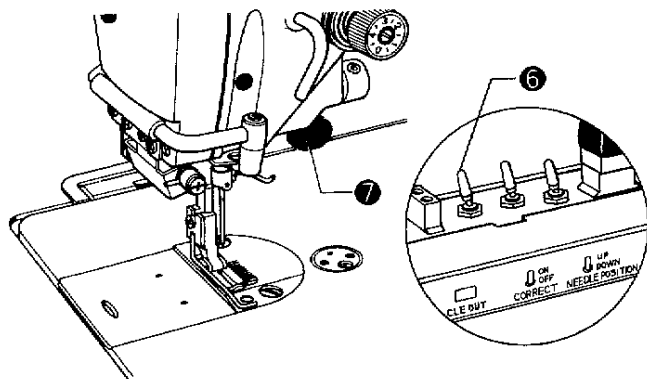
- In most cases, set the sensitivity control switch ④ to THIN.
- When thick materials are sewn, set the sensitivity control switch ④ to THICK.

9. Needle stop position setting



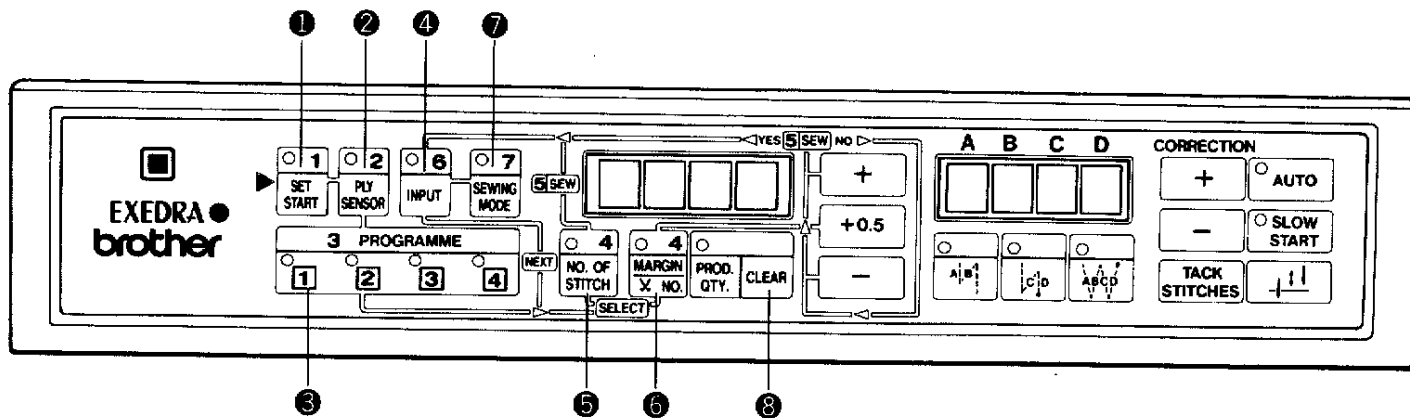
- To stop the needle (release the treadle) under the needle plate when sewing, set the needle position switch ⑤ to DOWN.
- To stop the needle (release the treadle) above the needle plate when sewing, set the needle position switch ⑤ to UP.

10. Correction stitching setting



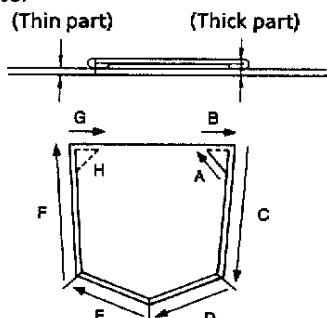
- When the correction switch ⑥ is set ON, the machine sews a material in the correction stitching mode (215 spm) if the actuator ⑦ is pressed while the machine is stopped. If the actuator ⑦ is pressed during operation, the machine enters the reverse stitching mode.

12. Sewing examples



1. Pocket sewing

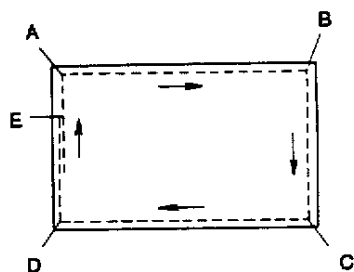
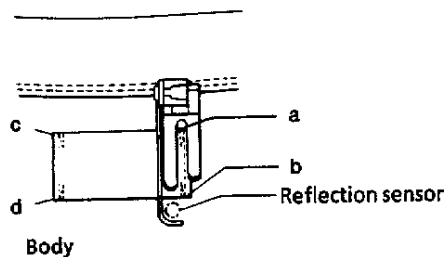
Ply sensor



— Material edge sewing --- Stitch number sewing

- (1) Press the SET START key ①. Its indicator goes on.
 - (2) Set the material (thin part of the body) under the presser foot and press the PLY SENSOR key ②. Its indicator blinks, then goes on.
 - (3) Set the pocket (thick part of the body) under the presser foot and press the PLY SENSOR key ②. Its indicator blinks, then goes off.
 - (4) Press one of the PROGRAMME keys ③.
 - (5) Set the margin-to-seam width using the [+], [+0.5], or [-] keys.
 - (6) After sewing seam A, lift the presser foot and press the INPUT key ④.
 - (7) Press the NO. OF STITCH key ⑤. Its indicator goes on.
 - (8) After sewing three stitches in seam B, lift the presser foot and press INPUT key ④.
 - (9) Press the MARGIN key ⑥. Its indicator goes on.
 - (10) Set the margin-to-seam width.
 - (11) After sewing seam C, lift the presser foot and press the INPUT key ④.
 - (12) Sew seams D, E and F repeating steps (10) and (11).
 - (13) Press the NO. OF STITCH key ⑤.
 - (14) After sewing three stitches at seam G, lift the presser foot and press the INPUT key ④.
 - (15) After sewing to the end of seam H, trim the thread and press the INPUT key ④.
 - (16) Press the SEWING MODE key ⑦.
- The programmed pattern can now be sewn automatically.

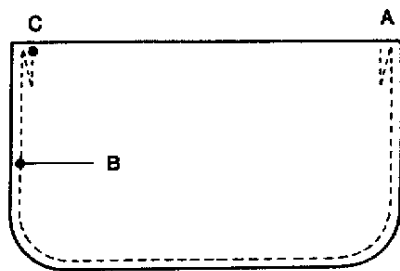
2. Name tag attaching



- (1) Press the SET START key ❶. Its indicator goes on.
- (2) Set the material (thin part of the body) under the presser foot and press the PLY SENSOR key ❷. Its indicator blinks, then goes on.
- (3) Set a name tag (thick part of the body) under the presser foot and press the PLY SENSOR key ❷. Its indicator blinks, then goes off.
- (4) Press one of the PROGRAMME keys ❸.
- (5) Set the name tag so that its sewing start position is under the needle.
 - When the PLY SENSOR indicator is turned on, press the NO. OF STITCH key ❹. (Seams a to b and c to d)
 - When the PLY SENSOR indicator is turned off, set the margin-to-seam width. (Seam A to D through B and C)
- (6) Sew to the edge of the name tag, and press the INPUT key ❺.
- (7) When the margin-to-seam width is the same at A, B, C and D, continue sewing and press the INPUT key ❺ at each stop position.
- (8) When sewing is to be stopped halfway (position E), follow the procedures below:
 - 1) Press the NO. OF STITCH key ❹.
 - 2) Sew to position E.
 - 3) Trim the thread.
 - 4) Press the INPUT key ❺.
- (9) Press the SEWING MODE key ❶.

The programmed pattern can now be sewn automatically.

3. Flap sewing

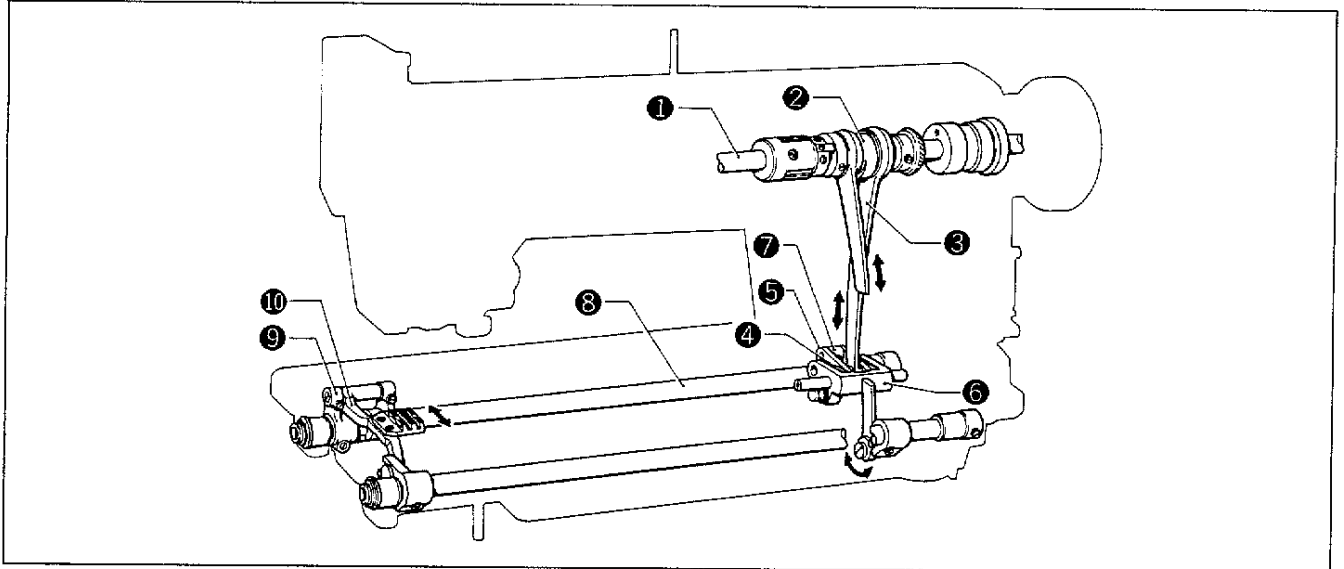


- (1) Press the SET START key ❶. Its indicator goes on.
- (2) Set the material (thin part of the body) under the presser foot and press the PLY SENSOR key ❷. Its indicator blinks, then goes on.
- (3) Set the material (thick part of the body) under the presser foot and press the PLY SENSOR key ❷. Its indicator blinks, then goes off.
- (4) Press one of the PROGRAMME keys ❸.
- (5) Press the NO. OF STITCH key ❹.
- (6) Sew from sewing start position A to position B.
- (7) Press the INPUT key ❺.
- (8) Press the CLEAR key ❸ (to release the temporary stop of the machine at position B).
- (9) Press the MARGIN key ❹.
- (10) Set the margin-to-seam width.
- (11) After sewing to material edge position C and the thread is trimmed, press the INPUT key ❺.
- (12) Press the SEWING MODE key ❶.

The programmed pattern can now be sewn automatically.

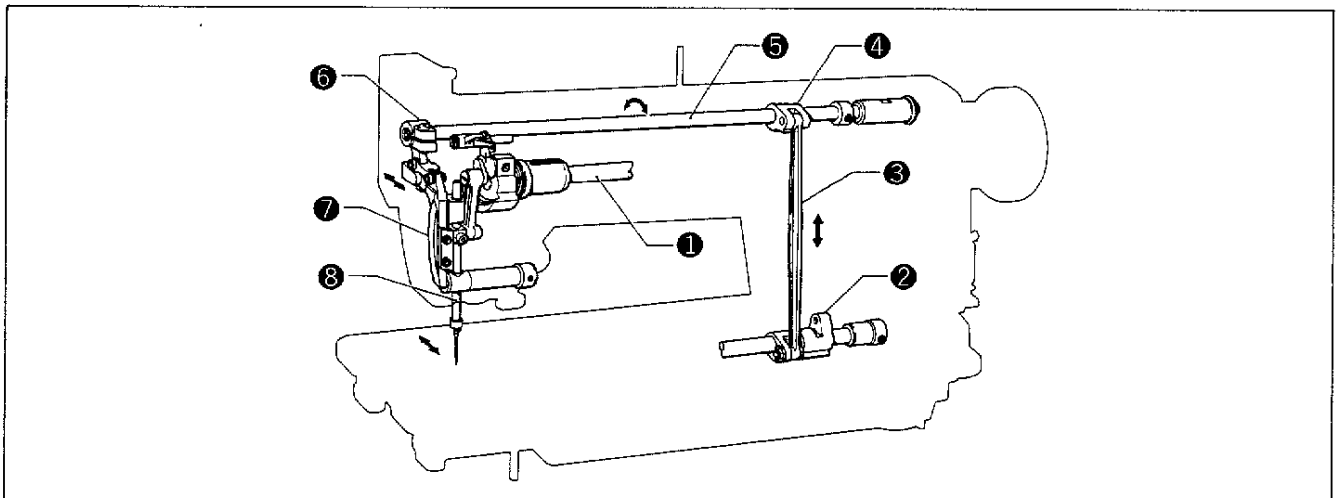
MECHANICAL DESCRIPTIONS

1. Feed lock mechanism



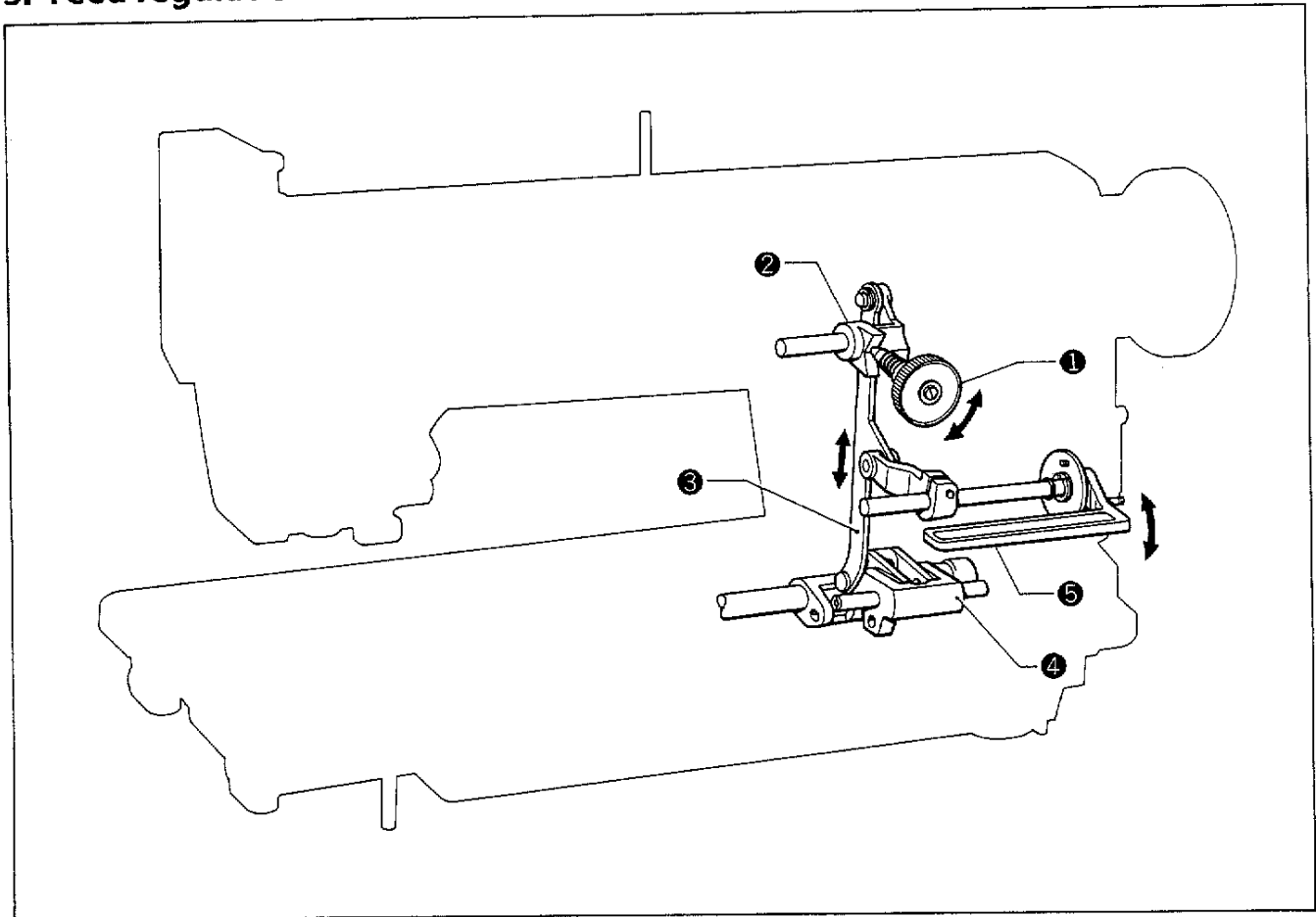
- (1) Rotating the upper shaft ① moves the level feed connecting rod ③ up and down via the eccentric wheel ②.
- (2) The bottom end of the level feed connecting rod ③ is attached to the level feed link ④ and level feed arm link ⑤. The level feed link ④, whose one end is supported by the feed regulator ⑥, swings back and forth.
- (3) The horizontal motion of the level feed arm link ⑤ swings the level feed arm ⑦ back and forth.
- (4) The motion of the level feed arm ⑦ moves the feed bracket ⑩ back and forth via the horizontal feed shaft ⑧ and the horizontal feed bracket arm ⑨.
- (5) Changing the inclination of the feed regulator ⑥ effects the amount of horizontal motion of the level feed arm link ⑤ via the level feed link ④.

2. Needle feed mechanism



- (1) Rotating the upper shaft ① moves the needle feed connecting rod ② up and down via the feed rock shaft arm ③.
- (2) The motion of the needle feed connecting rod ② swings the needle feed arm ④ back and forth.
- (3) The motion of the needle feed arm ④ is transmitted to the needle bar bracket ⑦ via the needle bar shaft ⑤ and the needle feed arm assembly ⑥. The needle bar bracket ⑦ moves the needle bar ⑧ back and forth.

3. Feed regulation mechanism



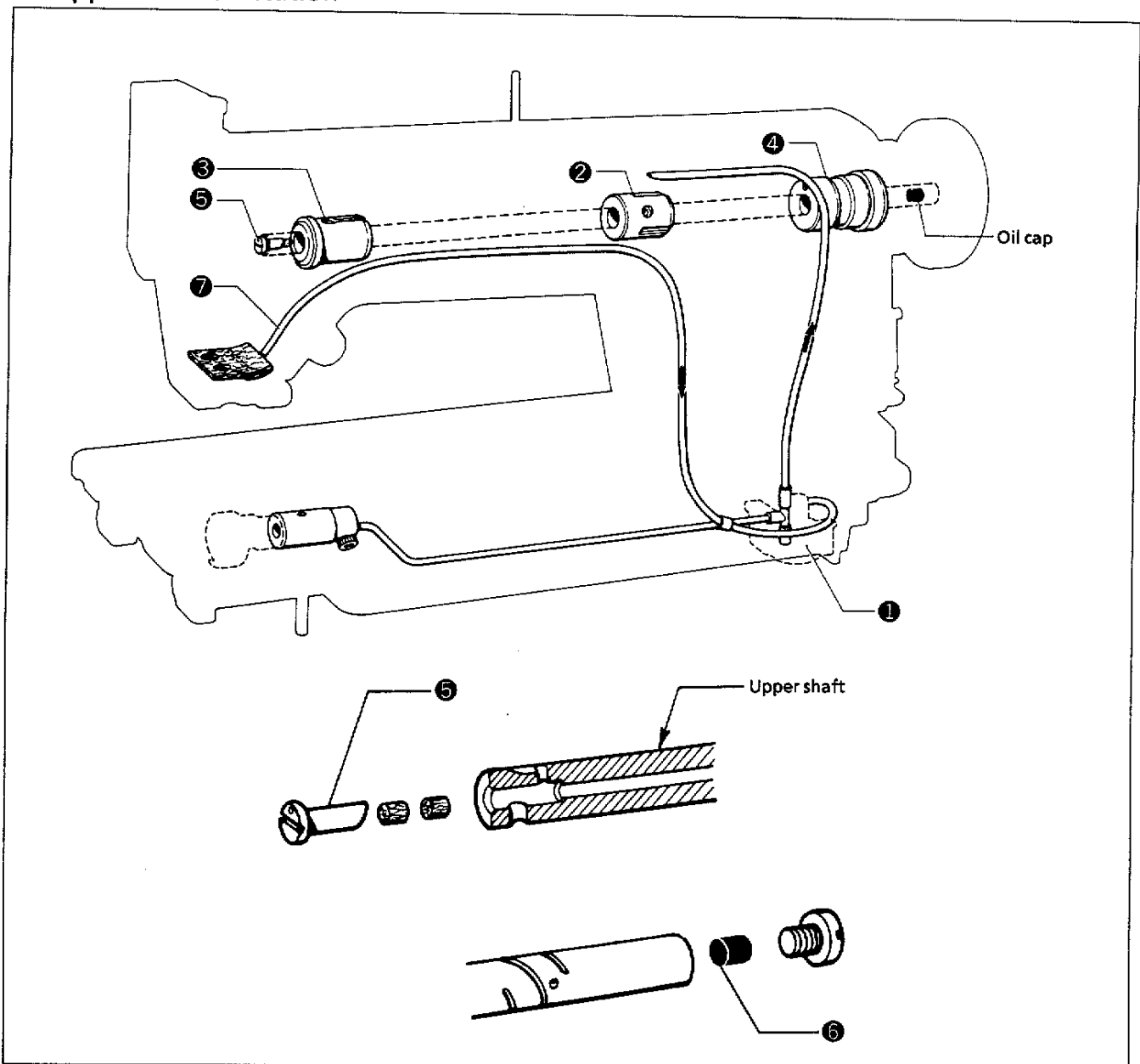
(1) Turning the feed regulating dial ① changes the inclination of the feed regulator ②.

(2) Because the feed regulator ② is attached to the feed regulator assembly ④ by the feed regulator connecting lever ③, the inclination of the feed regulator assembly ④ can be changed. Changing inclination decides the feed amount of the feed lock mechanism and the needle feed mechanism.

Pressing the reverse lever ⑤ reverses the the inclination of the feed regulator assembly ④ to feed a material in reverse.

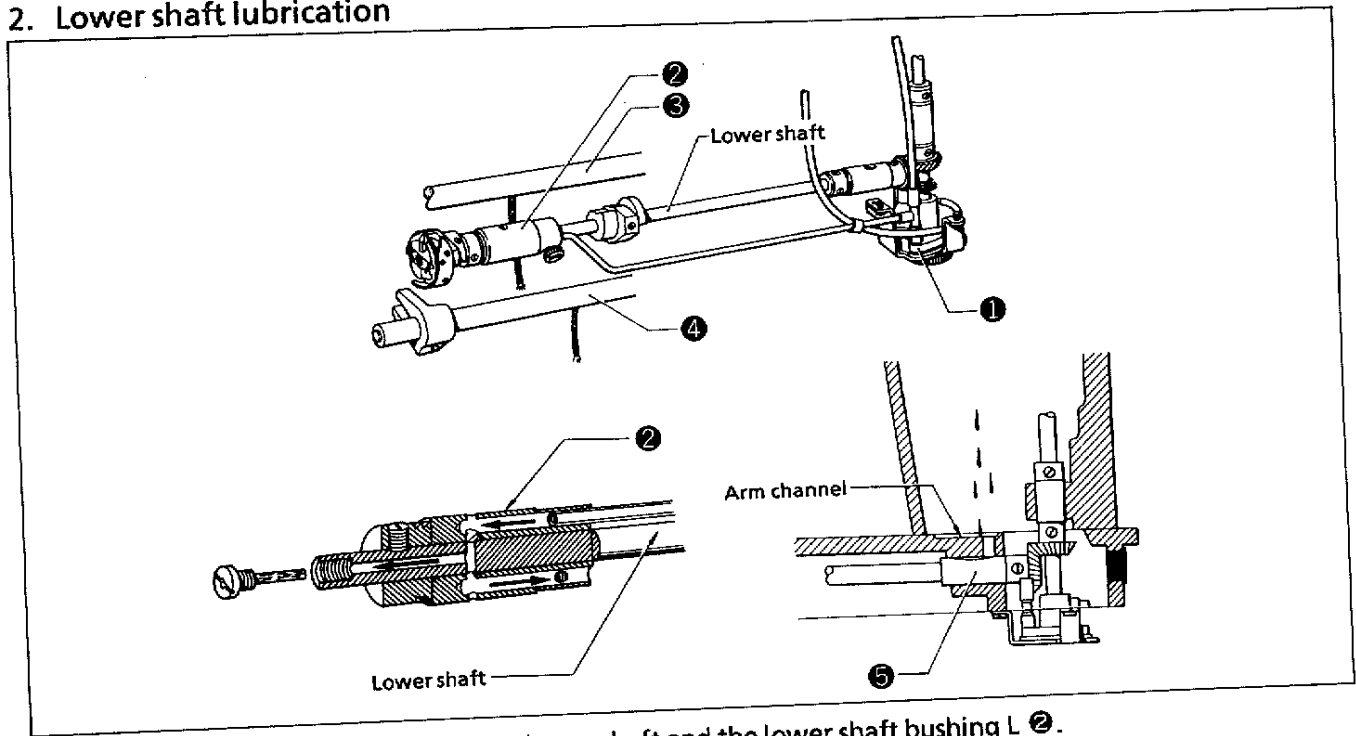
4. Lubrication mechanism

1. Upper shaft lubrication



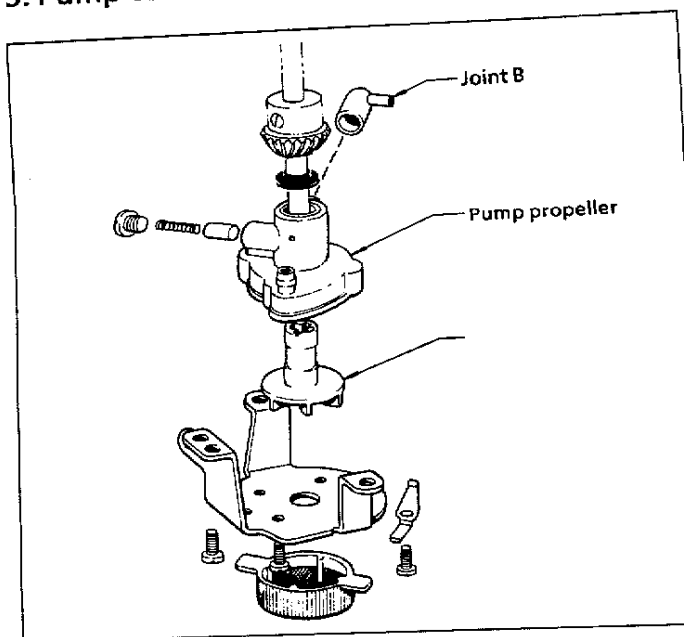
- (1) Oil fed by the pump ① enters the upper shaft from the upper shaft bushing M ② to lubricate upper shaft bushings L ③ and R ④.
- (2) The oil regulating valve ⑤ is provided on the left end of the upper shaft to lubricate the thread take-up crank and the needle take-up lever.
- (3) An oil cap ⑥ in the pulley clamp screw on the right end of the upper shaft prevents oil overflow.
- (4) Oil which collects in the portion of the body with the needle mechanism is absorbed by the pump ① via the felt pad and the oil tube ⑦.

2. Lower shaft lubrication



- (1) Oil fed by the pump ① lubricates the lower shaft and the lower shaft bushing L ②.
- (2) Some of the oil at the lower shaft bushing L ② flows through the lower shaft to lubricate the rotary hook.
Oil shed from the lower shaft bushing L ② returns to the oil pan.
- (3) Oil absorbed by the wick lubricates the horizontal feed shaft ③ and feed lifting rock shaft ④.
- (4) Oil sprayed inside the vertical portion of the body lubricates the lower shaft bushing R ⑤, the horizontal feed shaft ③ and the feed lifting rock shaft ④ through the channel in the arm.

3. Pump construction

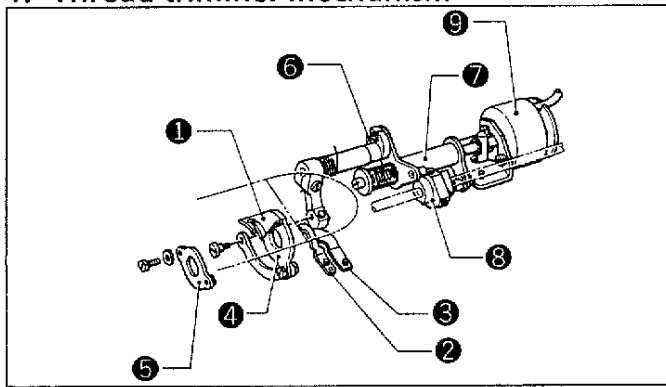


The rotation of the pump propeller attached to the end of the vertical shaft sucks up oil through the hole in the center, and the oil is fed to the lubrication tubes through the ports in the pump body.

The plunger attached to the pump body sucks oil collected in the portion of the body with the needle mechanism.

5. Thread trimmer mechanism

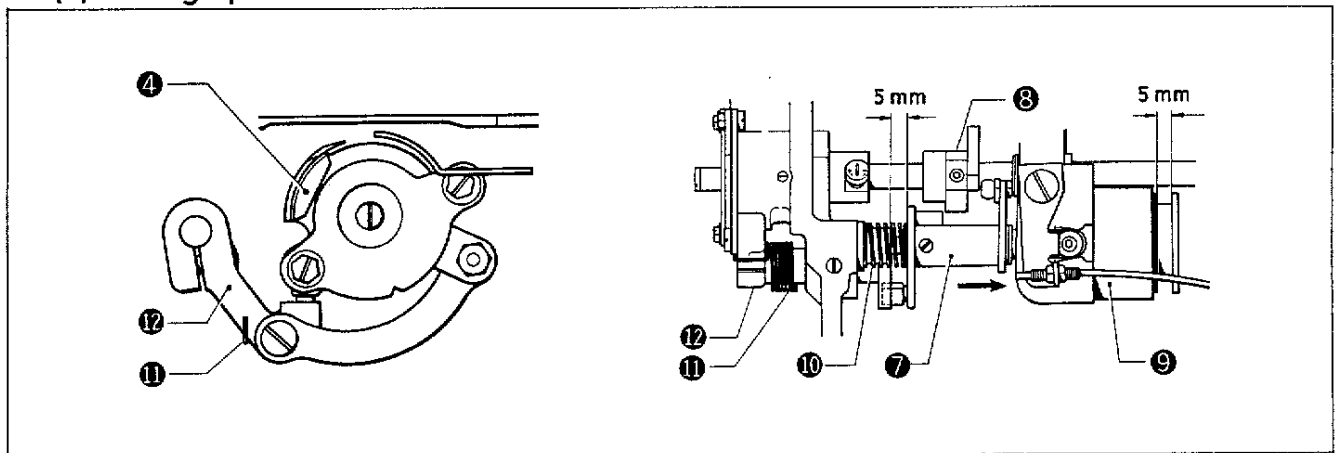
1. Thread trimmer mechanism



The thread trimmer mechanism consists of the movable knife ①, fixed knife ②, lower thread finger ③, movable knife holder ④, knife holder presser ⑤, forked shaft ⑥, thread trimming cam lever assembly ⑦, thread trimming clutch ⑧ and thread trimming solenoid ⑨.

2. Thread trimming operation (The five figures below and on the next page show the thread trimmer without the rotary hook assembly.)

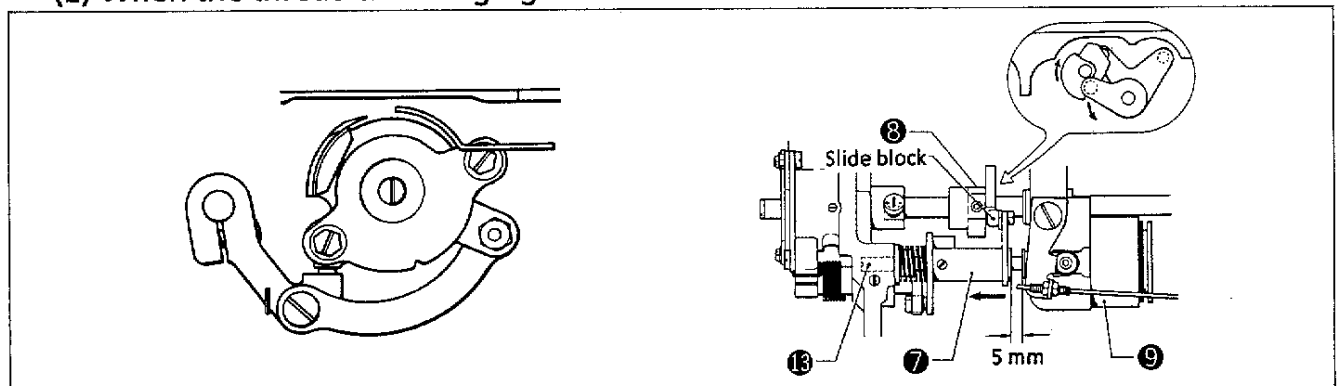
(1) During operation



The thread trimming cam lever spring ⑩ presses the thread trimming cam lever assembly ⑦ against the thread trimming solenoid ⑨. Because the thread trimming cam lever assembly ⑦ does not engage with the thread trimming clutch ⑧, the movable knife holder ④ does not function.

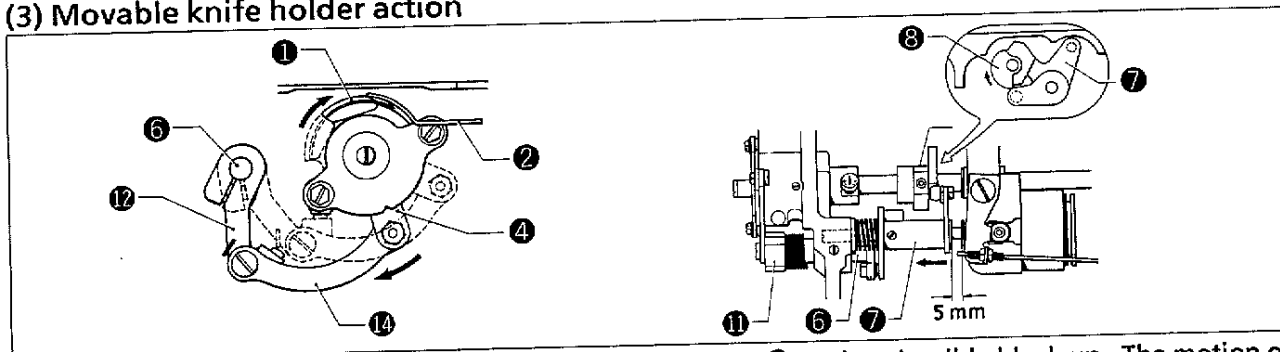
The thread trimming lever spring ⑪ presses the thread trimmer lever ⑫ to prevent the movable knife holder ④ from shifting.

(2) When the thread trimming signal is turned on



When the treadle is heeled back and the thread trimming signal is turned on, the thread trimming solenoid ⑨ activates, which presses the thread trimming cam lever stud ⑬. The slide block of the thread trimming cam lever assembly ⑦, secured by the thread trimming cam lever stud ⑬, is pushed above the circumference of the thread trimming clutch ⑧.

(3) Movable knife holder action

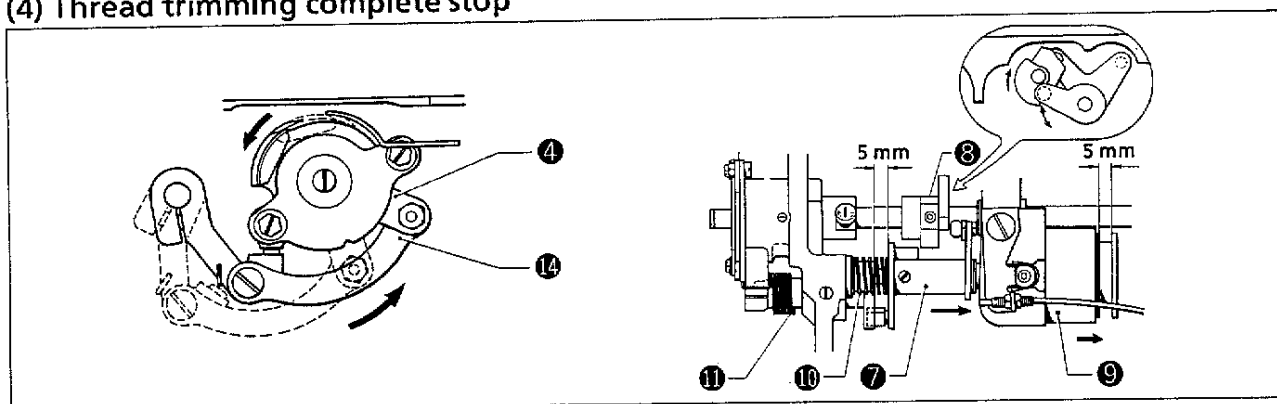


By the rotation of the lower shaft, the thread trimming clutch ③ pushes the slide block up. The motion of the slide block is transmitted to the forked shaft ⑤ via the thread trimming cam lever assembly ⑦.

The motion is then relayed to the thread trimming rod ⑭ and the movable knife holder ④ via the thread trimming lever ⑫ connected to the forked shaft ⑤.

The movable knife ① attached to the movable knife holder ④ moves in the direction of the arrow and overlaps the fixed knife ②.

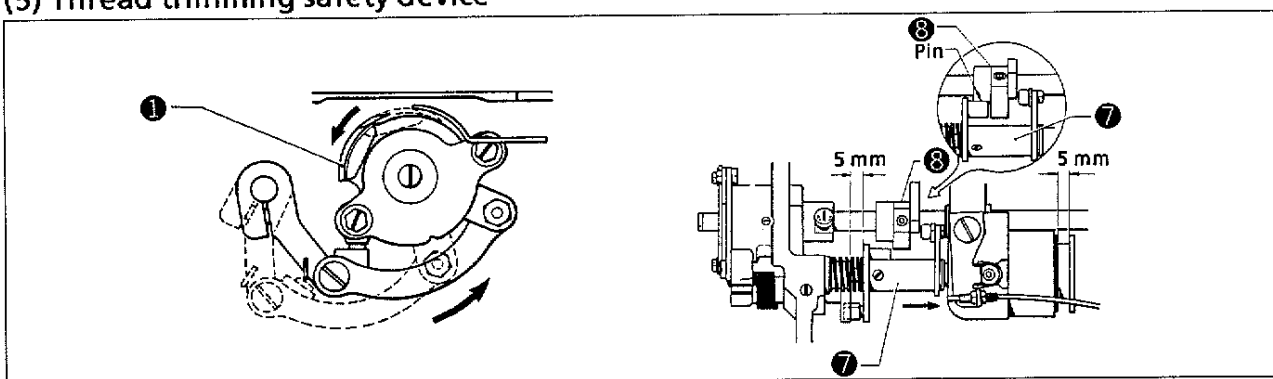
(4) Thread trimming complete stop



When the thread trimming signal is turned off, the thread trimming solenoid ⑨ retracts and the thread trimming cam lever spring ⑩ pushes the thread trimming cam lever assembly ⑦. Then the slide block of the thread trimming cam lever assembly ⑦ moves away from the thread trimming clutch ③ and returns to its original position.

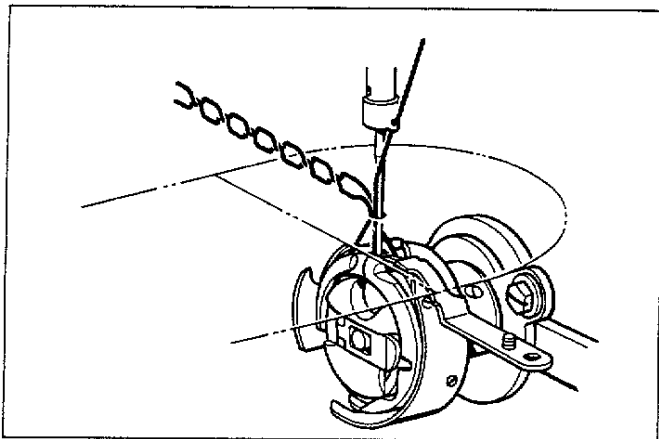
The thread trimming lever spring ⑪ returns the thread trimming rod ⑭ and the movable knife holder ④ to their original positions (in the direction of the arrow).

(5) Thread trimming safety device

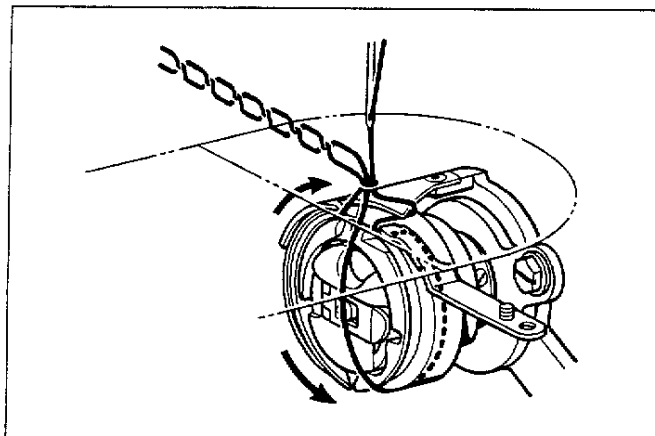


If the movable knife ① does not completely retract, the pin of the thread trimming cam lever assembly ⑦ and the thread trimming clutch ③ automatically carry the movable knife ① to a position where it will not strike the needle.

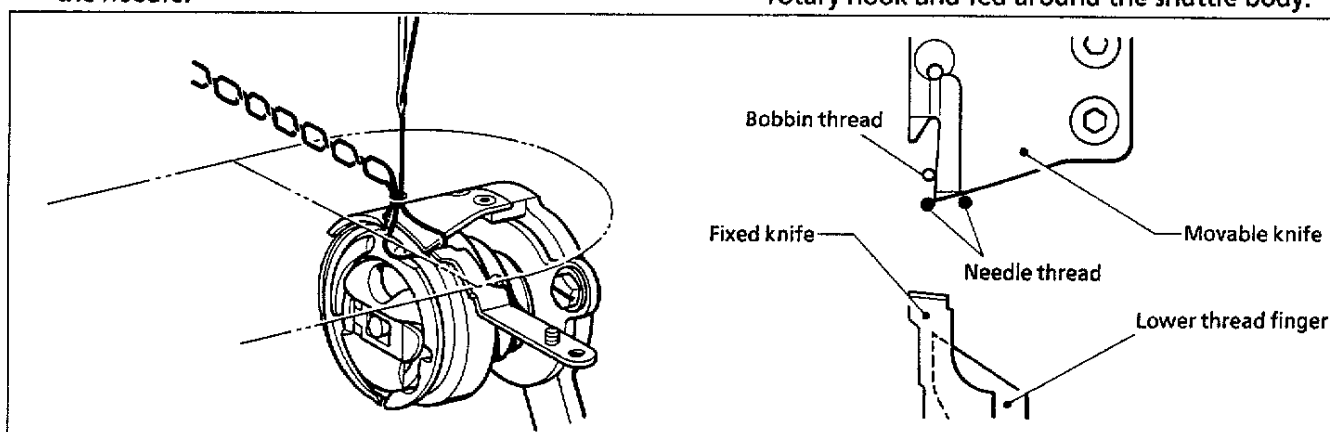
3. Needle and bobbin threads trimming



(1) When the needle rises 2 mm (2.2 mm with thick materials) above from its lowest position, the rotary hook point catches the loop formed by the needle.

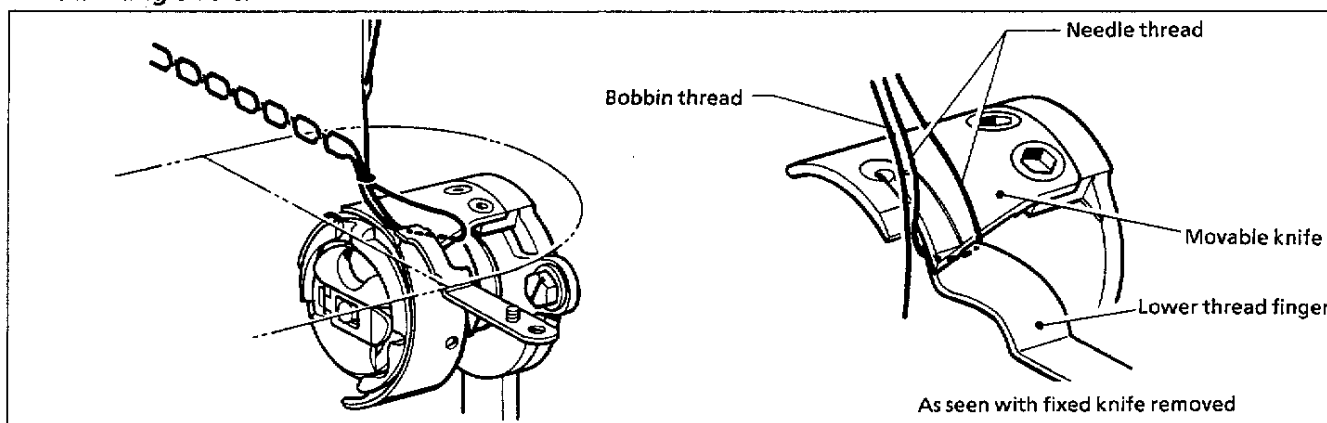


(2) When the thread trimming signal is turned on, the thread trimming clutch drives the movable knife. The needle thread is caught by the rotary hook and fed around the shuttle body.



(3) The movable knife tip enters the triangular loop formed by the rotary hook point under the needle plate, and the loop spreading occurs. At this point the needle thread take-up is raised slightly above from its lowest position (the upper shaft has turned approximately 330°), and the needle thread is spread by the movable knife as shown in the figure above.

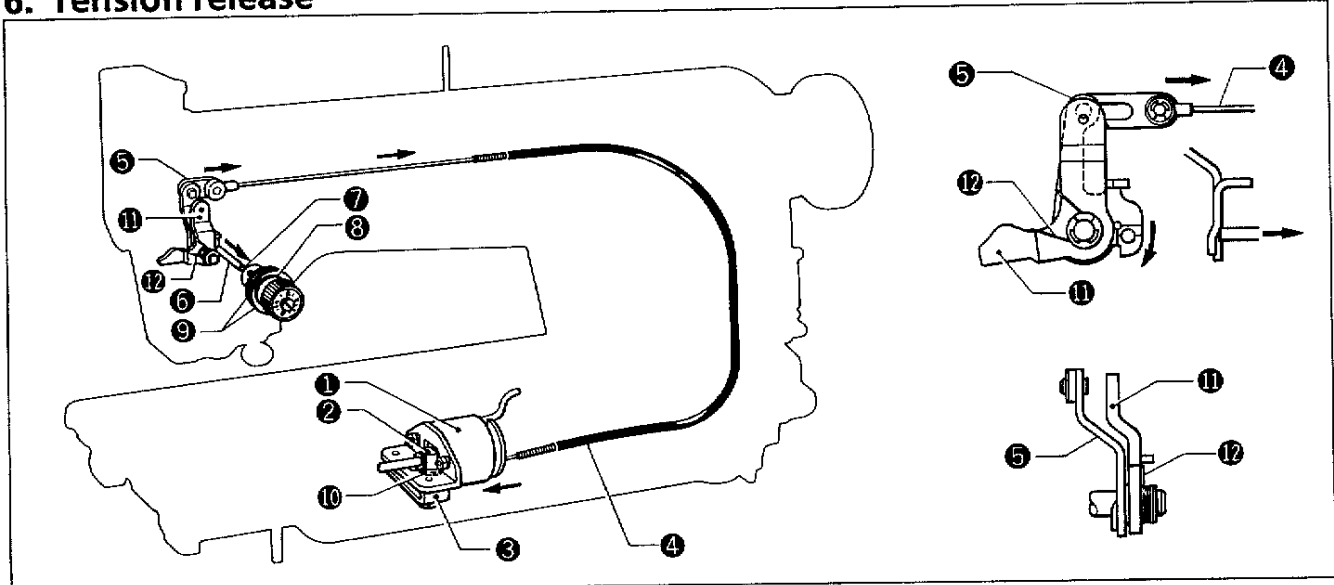
If the timing of the movement is too early, loop spreading is not performed properly and results in thread trimming errors.



(4) The needle and bobbin threads caught by the movable knife in step (3) are gradually spread by the movable knife and lower thread finger to be cut by the fixed knife tip. At this time, the needle thread take-up approaches the top of its stroke.

When the movable knife is spreading the needle thread, the tension release relieves the needle thread tension to prevent excessive tension and to enable the needle thread to be extended smoothly.

6. Tension release



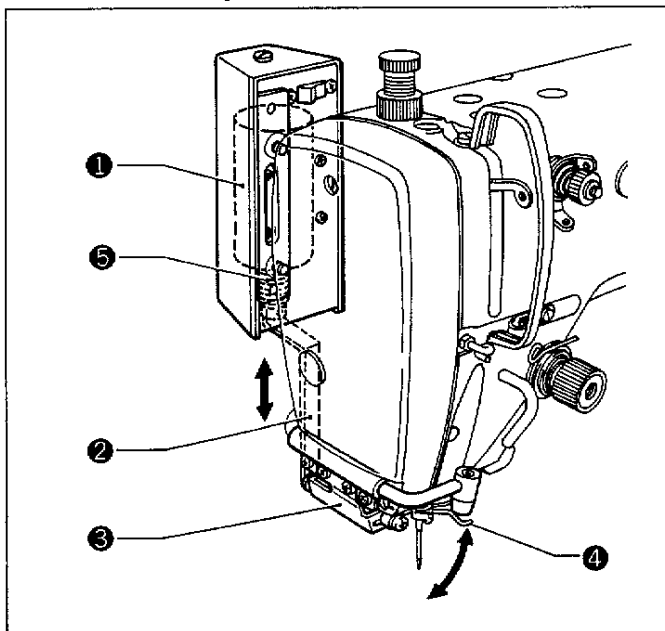
- (1) The thread trimming solenoid ① operates when the thread trimming signal is turned on.
- (2) The solenoid lever ②, attached to the end of the thread trimming solenoid ①, pushes the tension releasing lever ③.
- (3) The tension release wire ④ relays the motion of tension releasing lever ③ to the thread tension releasing plate ⑤.
- (4) The side of the thread tension releasing plate ⑤ presses the tension release bar ⑥.
- (5) The tension release bar ⑥ presses up the tension release pin ⑦ and the tension disc presser ⑧.
- (6) The tension disc presser ⑧ presses up the tension disc ⑨.
- (7) When the thread trimming signal is turned off, the solenoid lever ②, the tension releasing lever ③ and the tension release wire return to their original positions.

(The tension releasing spring ⑩ forces the tension releasing lever ③ all the way back.)

※ When the presser foot is raised with the knee lifter, the knee lifter lifting lever ⑪ presses the thread tension releasing plate ⑤. The subsequent action is the same as steps (4) through (7) above.

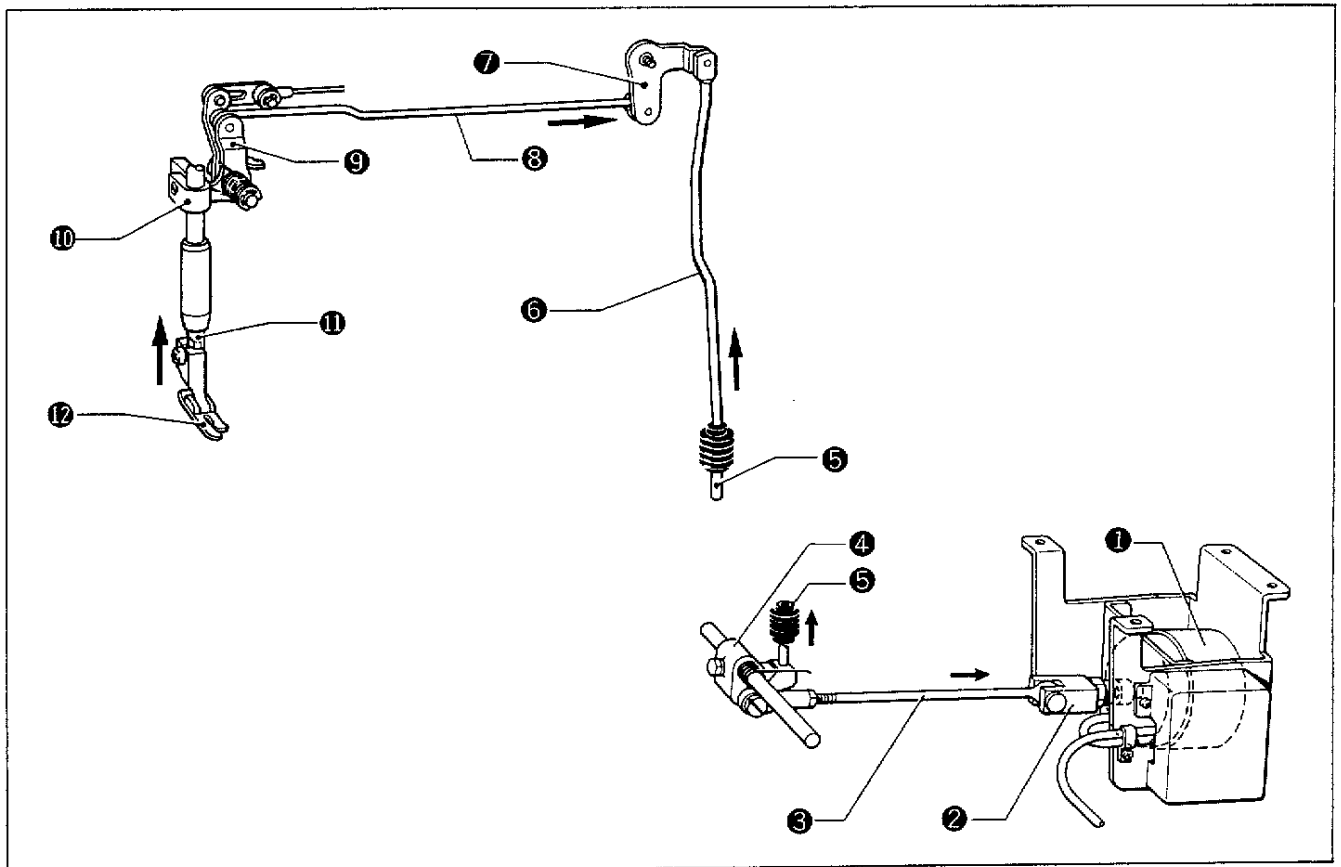
When the presser foot is lowered, the presser lifter lever spring ⑫ returns the thread tension releasing plate ⑤ to its original position.

7. Thread wiper (subclasses -400, -900)



- (1) When the thread wiper signal is turned on after thread trimming is completed, the thread wiper solenoid ① lifts the thread wiper rod ②.
- (2) The thread wiper rod ② drives the thread wiper crank assembly ③, attached to the end of the thread wiper rod ②.
- (3) The thread wiper ④, attached to the end of the thread wiper crank assembly ③, wipes the thread.
- (4) When the thread wiper signal is turned off, the thread wiper spring ⑤ returns the thread wiper solenoid ① to its original position.

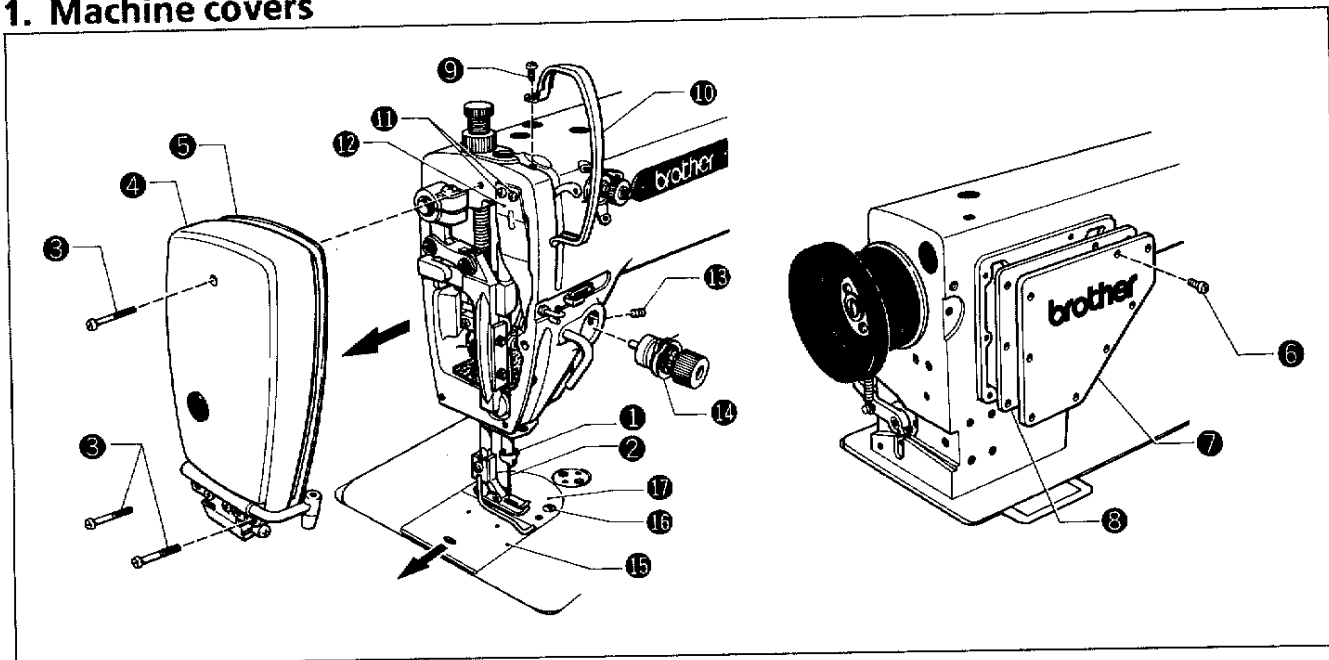
8. Automatic presser bar lifter (subclasses -900)



- (1) The presser foot lifting solenoid ① moves the link joint ② and the presser foot lifter regulating rod ③ when the knee switch is pressed.
- (2) The presser foot lifter regulating rod ③ pushes up the knee lifter complying bar ⑤ via the presser foot lifting link ④.
- (3) The knee lifter complying bar ⑤ moves up the presser bar guide bracket ⑩ via the knee lifter bar ⑥, the knee lifter lever ⑦, the knee lifter connector ⑧ and the knee lifter lifting lever ⑨.
- (4) The presser bar ⑪ and the presser foot ⑫, attached to the presser bar guide bracket ⑩, are lifted.

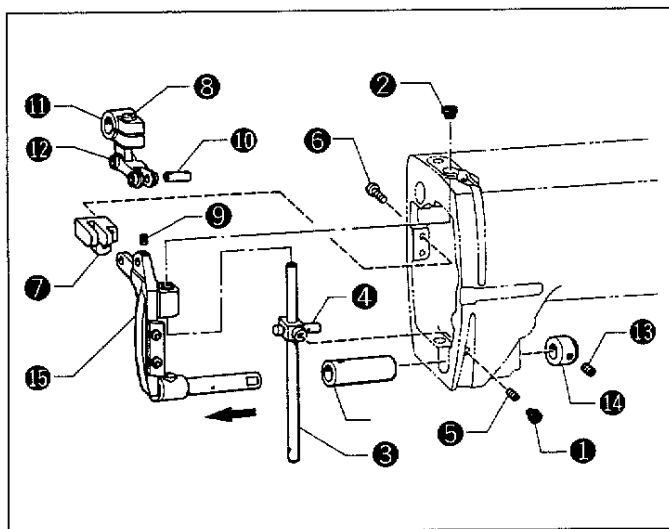
DISASSEMBLY

1. Machine covers



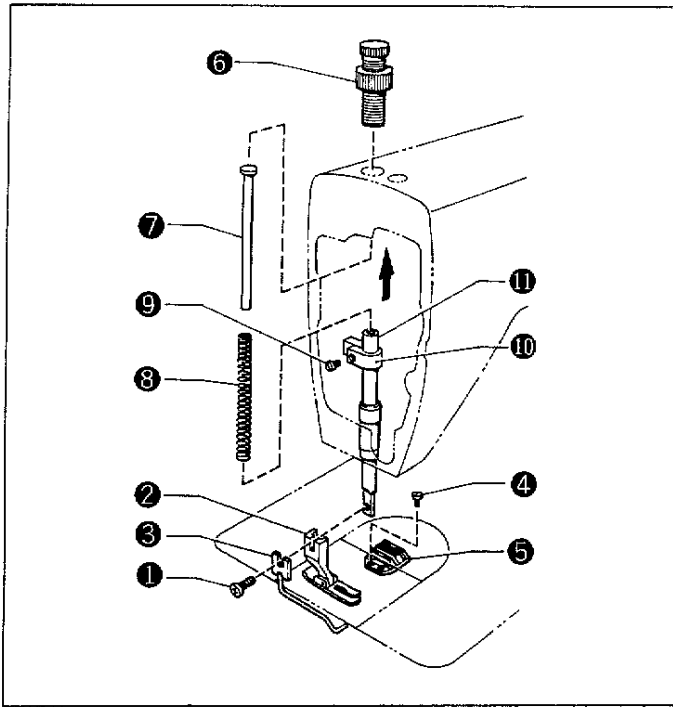
- (1) Loosen the screw ① and remove the needle ②.
 - (2) Remove the three screws ③, then remove the face plate ④ and the face plate packing ⑤.
 - (3) Remove the eight screws ⑥, then remove the rear cover ⑦ and the rear cover packing ⑧.
 - (4) Remove the screw ⑨ and the thread take-up cover ⑩.
 - (5) Remove the two screws ⑪ and the oil stopper plate ⑫.
 - (6) Loosen the screw ⑬ and remove the upper tension regulator ⑭.
 - (7) Remove the slide plate ⑮.
 - (8) Remove the two screws ⑯ and the needle plate ⑰.
- ※ The thread wiper is mounted on the face plate ④.

2. Needle bar mechanism



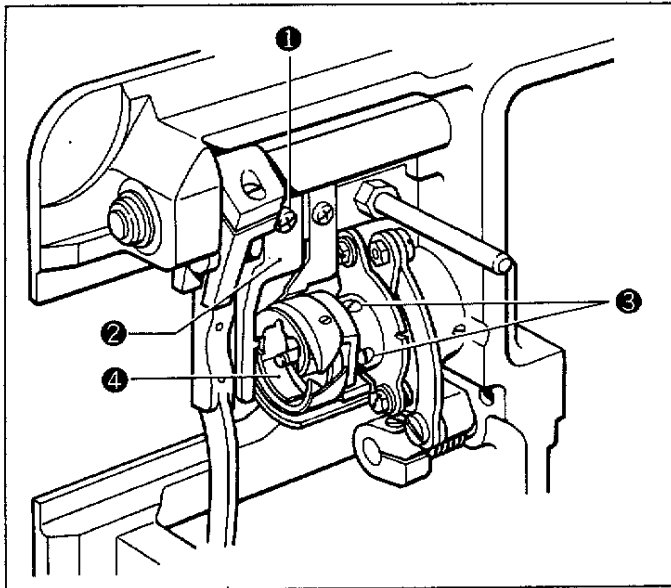
- (1) Remove the oil caps ① and ②.
- (2) Set the needle bar ③ at the lowest position by turning the machine pulley. Loosen the screw ⑤ of the needle bar clamp ④ and remove the needle bar upward.
- (3) Remove the two screws ⑥ and the needle bar bracket guide ⑦.
- (4) Loosen the screws ⑧ and ⑨. Remove the stud ⑩, the needle feed arm ⑪ and the needle feed link ⑫.
- (5) Loosen the screw ⑬ and remove the set collar ⑭. Remove the needle bar bracket to the left.

3. Presser foot mechanism



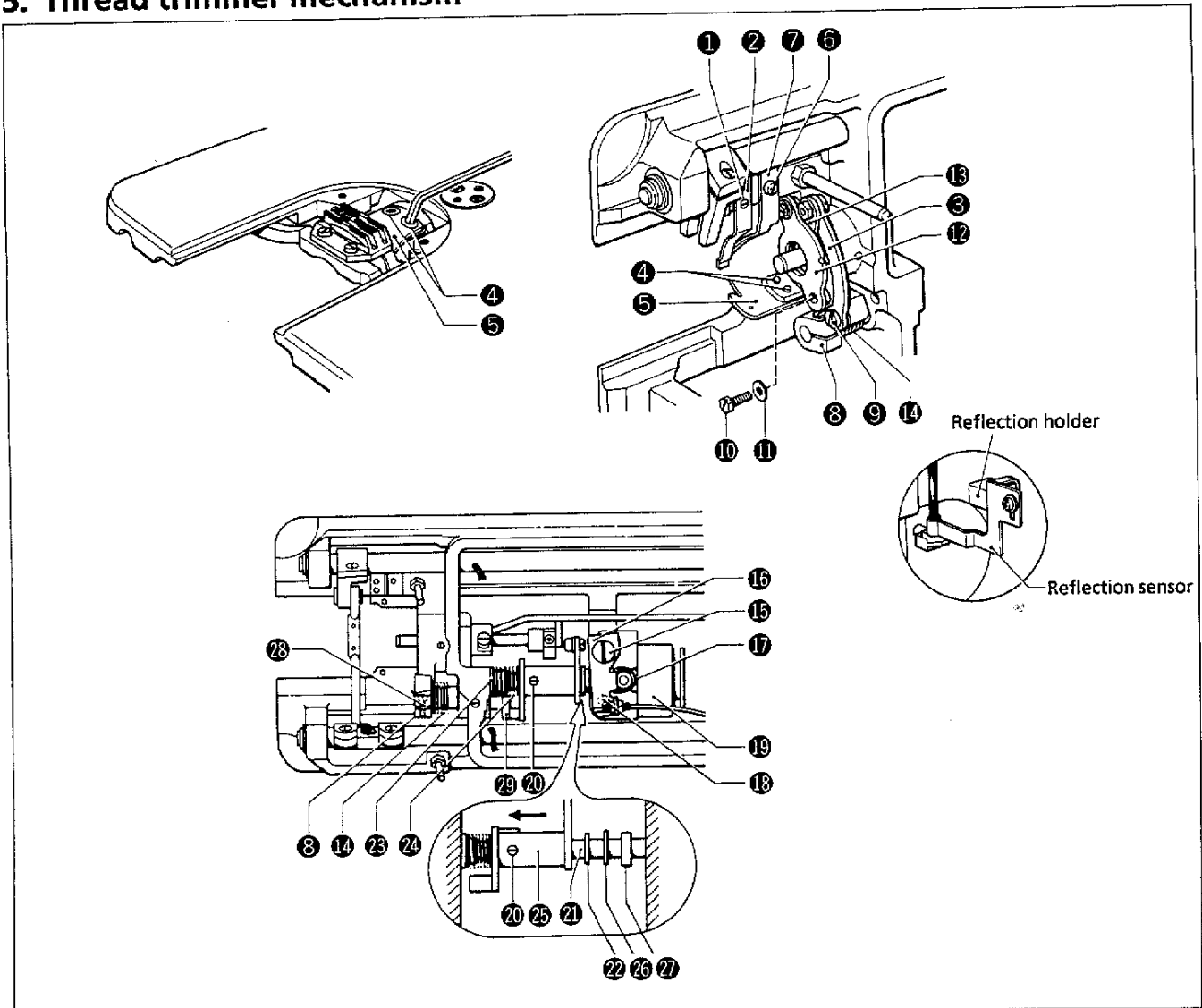
- (1) Remove the screw ❶, the presser foot ❷ and the sensor guard ❸.
- (2) Remove the two screws ❹ and the feed dog ❺.
- (3) Remove the presser adjusting screw ❻, the presser spring guide ❼ and the presser spring ❽.
- (4) Loosen the screw ❾ and remove the presser bar from the presser bar guide bracket ❿.

4. Rotary hook mechanism



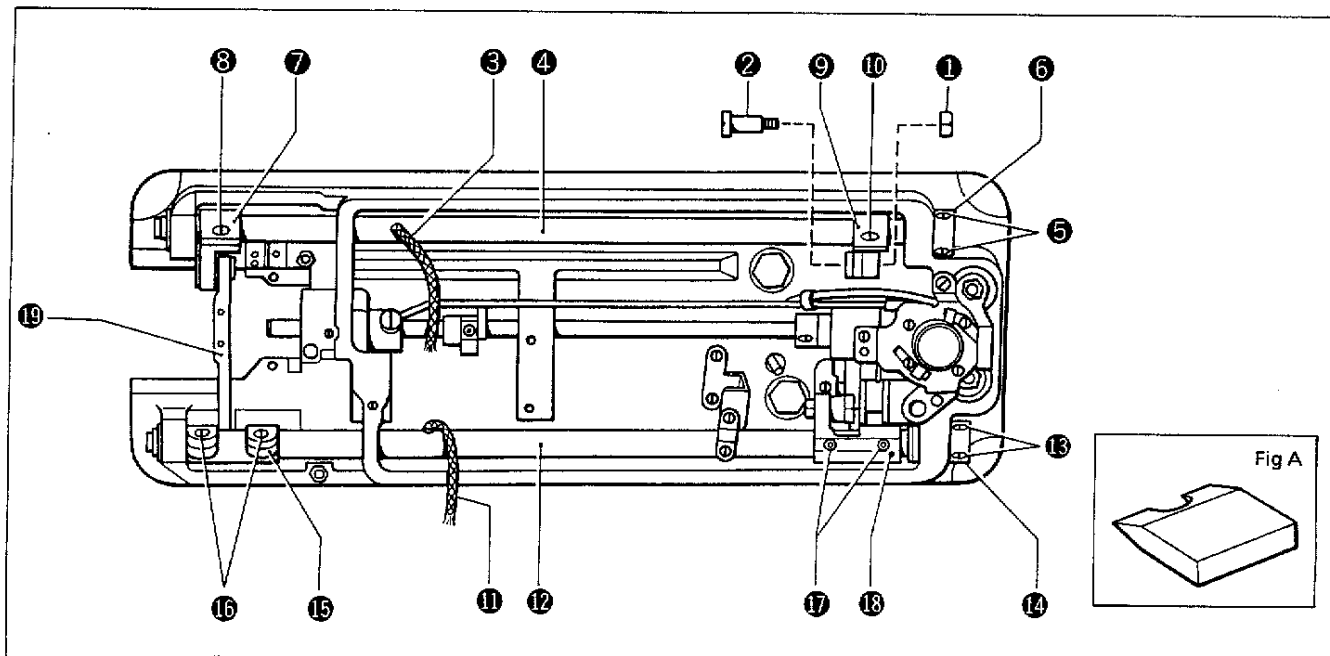
- (1) Tilt the machine head until it stops.
- (2) Remove the screw ❶ and the bobbin case holder position bracket ❷.
- (3) Loosen the three screws ❸ and remove the rotary hook assembly ❹.

5. Thread trimmer mechanism



- (1) Remove the screw ① and the fixed knife ②.
- (2) Press the thread trimming rod ③ in the direction of the arrow until the two screws ④ are visible.
- (3) Remove the screws ④ and the movable knife ⑤.
- (4) Remove the screw ⑥, the reflection holder, the lower thread finger ⑦ and the reflection sensor assembly.
- (5) Remove the stud screw ⑧ securing both the thread trimming lever ⑨ and the thread trimming rod ③.
- (6) Remove the two bolts ⑩ and the washer ⑪, the knife holder presser assembly ⑫, the movable knife holder ⑬ and the thread trimming rod ③.
- (7) Remove the thread trimming lever spring ⑭ from the thread trimming lever ⑨.
- (8) Remove the stud screw ⑮, the tension releasing lever ⑯ and the tension releasing spring ⑰.
- (9) Remove the screw ⑱ and the thread trimming solenoid ⑲.
 ※ If the thread trimming solenoid is not to be removed, lightly tighten the screws ⑱ and ⑮.
- (10) Loosen the screw ⑳ and remove the snap ring ㉒ by moving the thread trimming cam lever stud ㉑ in the direction of the arrow.
- (11) Remove the thread trimming cam lever stud ㉑ to the right (in the direction of the thread trimming solenoid).
- (12) Remove the collar ㉓, the thread trimming cam lever spring ㉔, the thread trimming cam lever assembly ㉕, the washer ㉖ and the cushion ㉗.
- (13) Loosen the screw ㉘ and remove the thread trimming lever ⑨, the thread trimming lever spring ⑭ and the forked shaft ㉙.

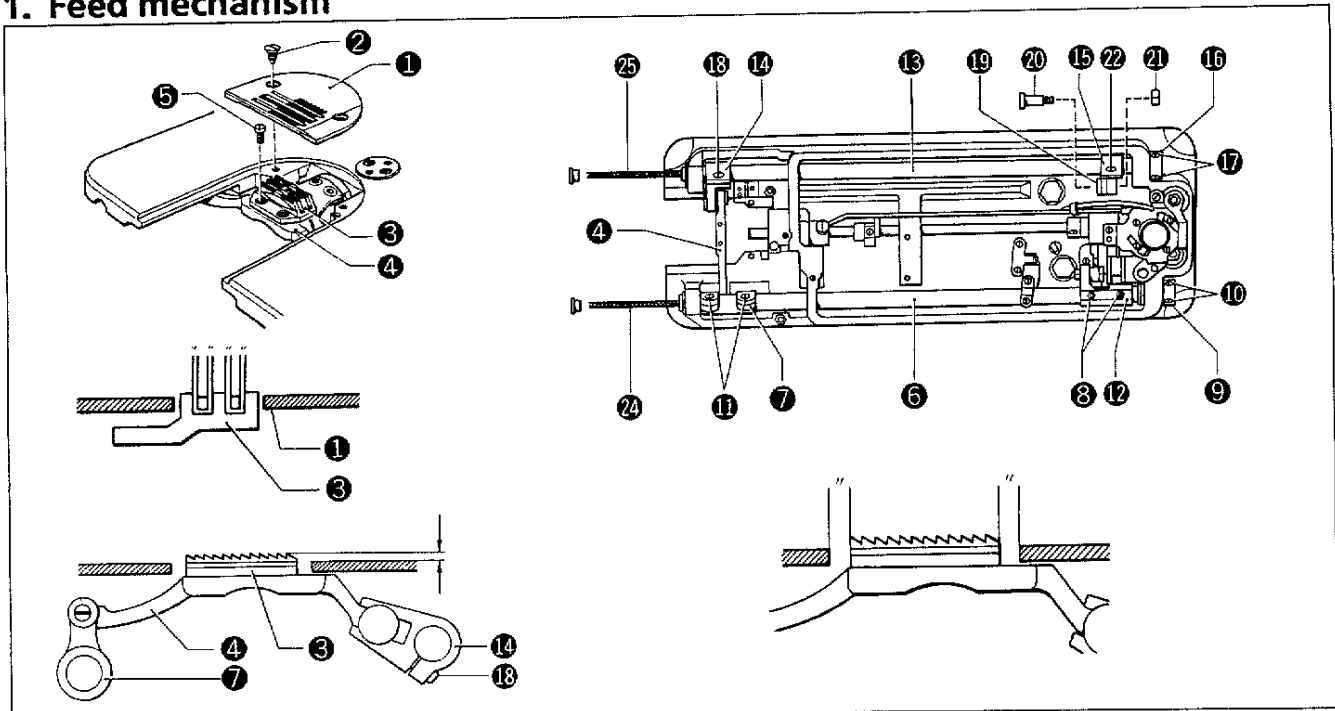
6. Feed mechanism



- (1) Loosen the nut ① and remove the stud screw ②.
- (2) Remove the wick ⑪ from the feed lifting rock shaft ④.
- (3) Loosen the two screws ⑤ and remove the set collar ⑥.
- (4) Loosen the screw ③ securing the feed lifting crank ⑦. Loosen the screw ⑩ of the feed lifting rock shaft crank ⑨.
- (5) Insert a wedge (in Fig. A) into the grooves of the feed lifting crank ⑦ and the feed lifting feed crank ⑨ and then remove the feed lifting feed shaft ④. (The feed lifting crank ⑦ and the feed lifting rock shaft ④ come off.)
- (6) Remove the wick ⑪ from the horizontal feed shaft ⑫.
- (7) Loosen the two screws ⑬ and remove the set collar ⑭.
- (8) Loosen the two screws ⑮ of the horizontal feed bracket arm ⑮. Loosen the two screws ⑮ of the feed rock shaft arm ⑰.
- (9) Insert a wedge (in Fig. A) into the grooves of the horizontal feed bracket arm ⑮ and the feed rock shaft arm ⑰, then remove the horizontal feed shaft ⑫. (The horizontal feed bracket arm ⑮ comes off.)
(The feed bracket assembly ⑱ is attached to the horizontal feed bracket arm ⑮.)

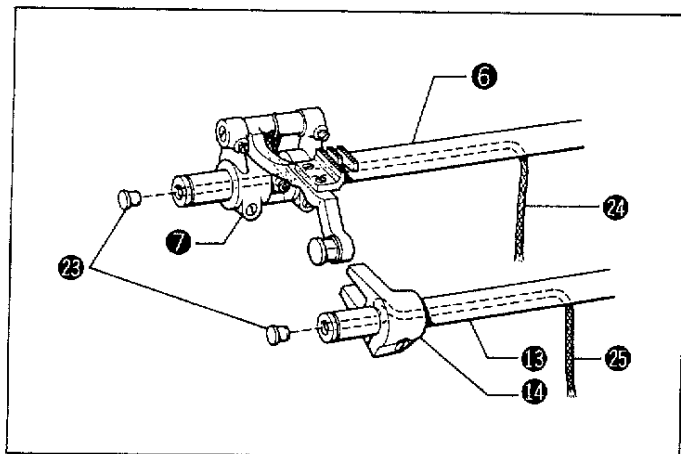
ASSEMBLY

1. Feed mechanism



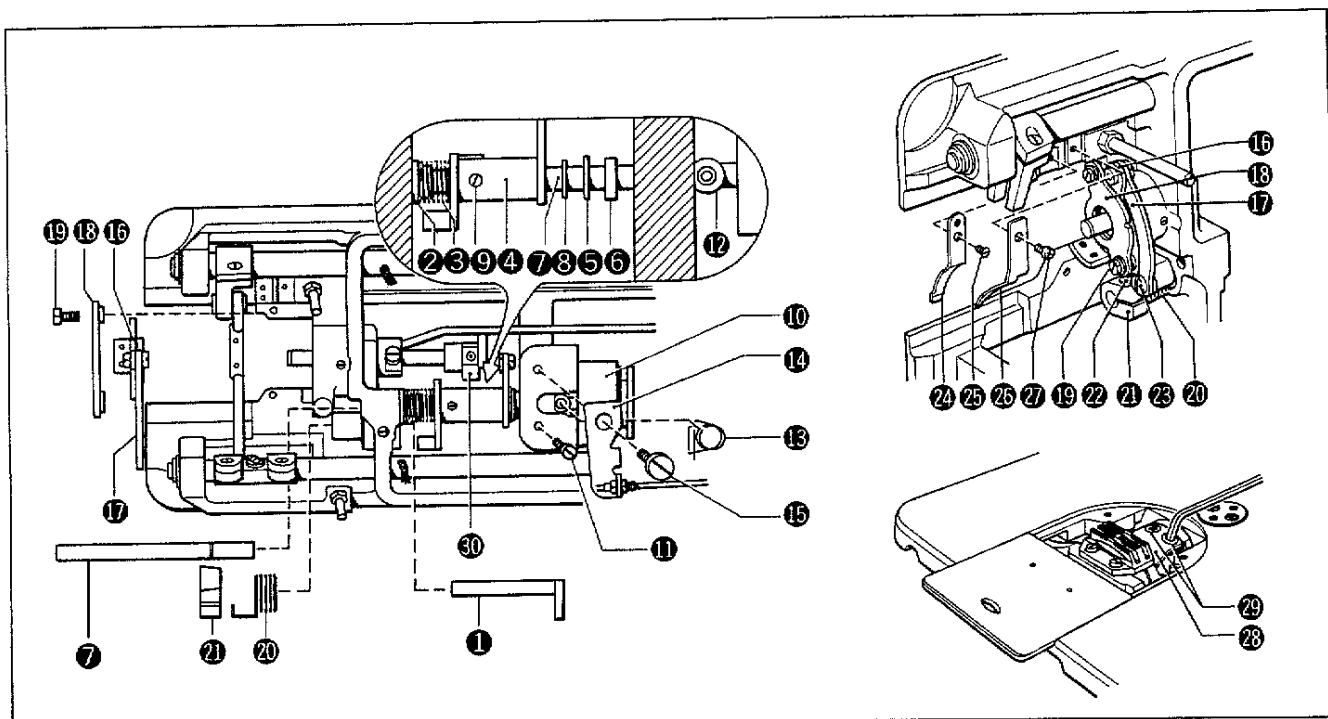
- (1) Secure the needle plate ① with the two screws ②.
- (2) Tilt the machine head until it stops.
- (3) Secure the feed dog ③ to the feed bracket assembly ④ with the two screws ⑤.
- (4) Insert the horizontal feed shaft ⑥ into the horizontal feed bracket arm ⑦ and the feed rock shaft arm ⑧. Then secure the horizontal feed shaft ⑥ with the set collar ⑨ and the two screws ⑩ so that it moves easily, but is not loose.
- (5) Center the feed dog ③ in the groove in the needle plate ① and secure it with the two screws ⑪, which are in the horizontal feed bracket arm ⑦.
- (6) Tighten the two screws ⑫ so that the feed rock shaft arm ⑧ moves easily.
- (7) Insert the feed rock shaft arm ⑩ into the feed lifting crank assembly ⑭ and the feed lifting rock shaft crank ⑮. Then secure the feed rock shaft arm ⑩ with the set collar ⑯ and the two screws ⑰ so that it moves easily, but is not loose.
- (8) Put the slide block of the feed bracket assembly ④ into the feed lifting crank ⑭ and tighten the screw ⑱.
- (9) Secure the feed lifting rock shaft crank ⑮ and the vertical feed connecting rod ⑲ with the stud screw ⑳ and the nut ㉑.
- (10) Secure the feed lifting rock shaft crank ⑮ with the screw ㉒.
- (11) Minimize the feed per stroke and turn the machine pulley.
- (12) Adjust the feed dog ③ to extend 0.8 mm (subclass -3) or 1.2 mm (subclass -5) above the needle plate upper surface by loosening the screw ⑱.
- (13) Maximize the feed per stroke, and turn the machine pulley.
- (14) Adjust the feed dog ③ so that it is centered both left-right and front-back of the groove of the needle plate by loosening the two screws ⑪.
 - ※ Make sure the pulley turns easily. Tighten the screws firmly.
 - ※ When the horizontal feed shaft and the feed rock shaft arm are removed, always pass the wick into these shafts to lubricate the horizontal feed bracket arm ⑦ and feed lifting crank ⑭.

[Wick insertion]



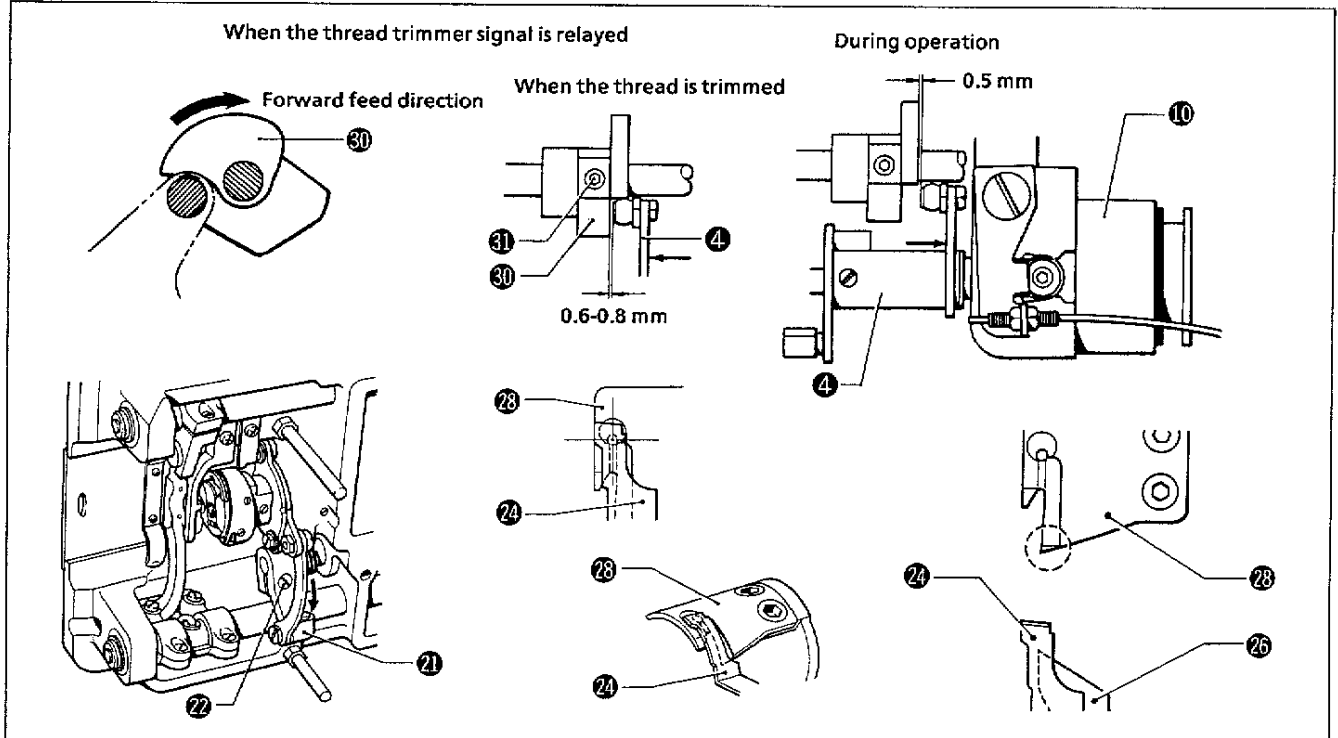
- (1) Remove the oil cap ⑦ from the horizontal feed shaft ⑥.
- (2) Insert the wick ② into the horizontal feed shaft ⑥ until one end of the wick ② aligns with the end face of the horizontal feed shaft ⑥.
- (3) Attach the oil cap ⑦.
- (4) Put the oil cap of the horizontal feed bracket arm ⑦ on the horizontal feed shaft.
- (5) Remove the oil cap ⑭ from the feed rock shaft arm ⑬.
- (6) Insert the wick ⑤ into the feed rock shaft arm ⑬ until one end of the wick ⑤ aligns with the end face of the shaft ⑬.
- (7) Attach the oil cap ⑭.
- (8) Pull out the wick ⑤ from the feed rock shaft arm ⑬ to contact the slide block on the feed bracket assembly.

2. Thread trimmer mechanism



- (1) Remove the needle plate.
- (2) Place the collar ⑩ on the forked shaft ① and the forked shaft bushing.
- (3) Place the collar ②, the thread trimming cam lever spring ③, the thread trimming cam lever assembly ④, the washer ⑤, and the cushion ⑥ on the thread trimming cam lever stud ⑦.
- (4) Place the snap ring E6 ⑧ on the thread trimming cam lever stud ⑦.
- (5) Tighten the screw ⑨ in the thread trimming cam lever assembly ④.
Be careful of the screw stop on the thread trimming cam lever stud ⑦.
- (6) Secure the thread trimming solenoid ⑩ with the screw ⑪.
Be sure the solenoid lever ⑫ lightly touches the stud ⑦.
- (7) Place the tension releasing spring ⑬ on the solenoid lever ⑫.
- (8) Secure the tension releasing lever ⑭ with the stud screw ⑮ and washer.
- (9) Install the movable knife holder ⑯ (the thread trimming rod ⑰) in the arm bed and secure the knife holder presser ⑱ with the bolt ⑲ and washer.
- (10) Place the thread trimming lever spring ⑳ and the thread trimmer lever ㉑ on the forked shaft ①, and tighten the screw ㉒.
- (11) Secure the thread trimming rod ⑰ and the thread trimmer lever ㉑ with the stud screw ㉓.
- (12) Secure the fixed knife ㉔ in the arm bed with the screw ㉕.
- (13) Secure the lower thread finger ㉖ in the arm bed with the screw ㉗.
- (14) Secure the movable knife ㉘ to the movable knife holder ⑯ with the screw ㉙. Hook the thread trimming lever spring ㉚ on the thread trimmer lever ㉑.
 - ※ Make sure the lower thread finger ㉖ does not strike the movable knife ㉘.
 - ※ Check the position of the thread trimming clutch ㉛.
 - ※ In model DB2-B7910, install the reflection holder after installing the lower thread finger.

[Thread trimmer timing adjustment]



1. Thread trimming clutch position

Turn the machine pulley until the needle bar is raised 5 mm above from its lowest position. At this time, press the thread trimming solenoid ⑩ by hand so that the slide block contacts the indent of the thread trimming clutch ⑩, and then lightly tighten the screw ⑪. When the thread trimming solenoid ⑩ is returned to its original position (released), adjust the thread trimming clutch ⑩ by loosening the screw ⑪ so that the spacing of the side faces between the thread trimming clutch ⑩ and the slide block is 0.6-0.8 mm. (Tighten the screw ⑪ at approximately 40 kg/cm.)

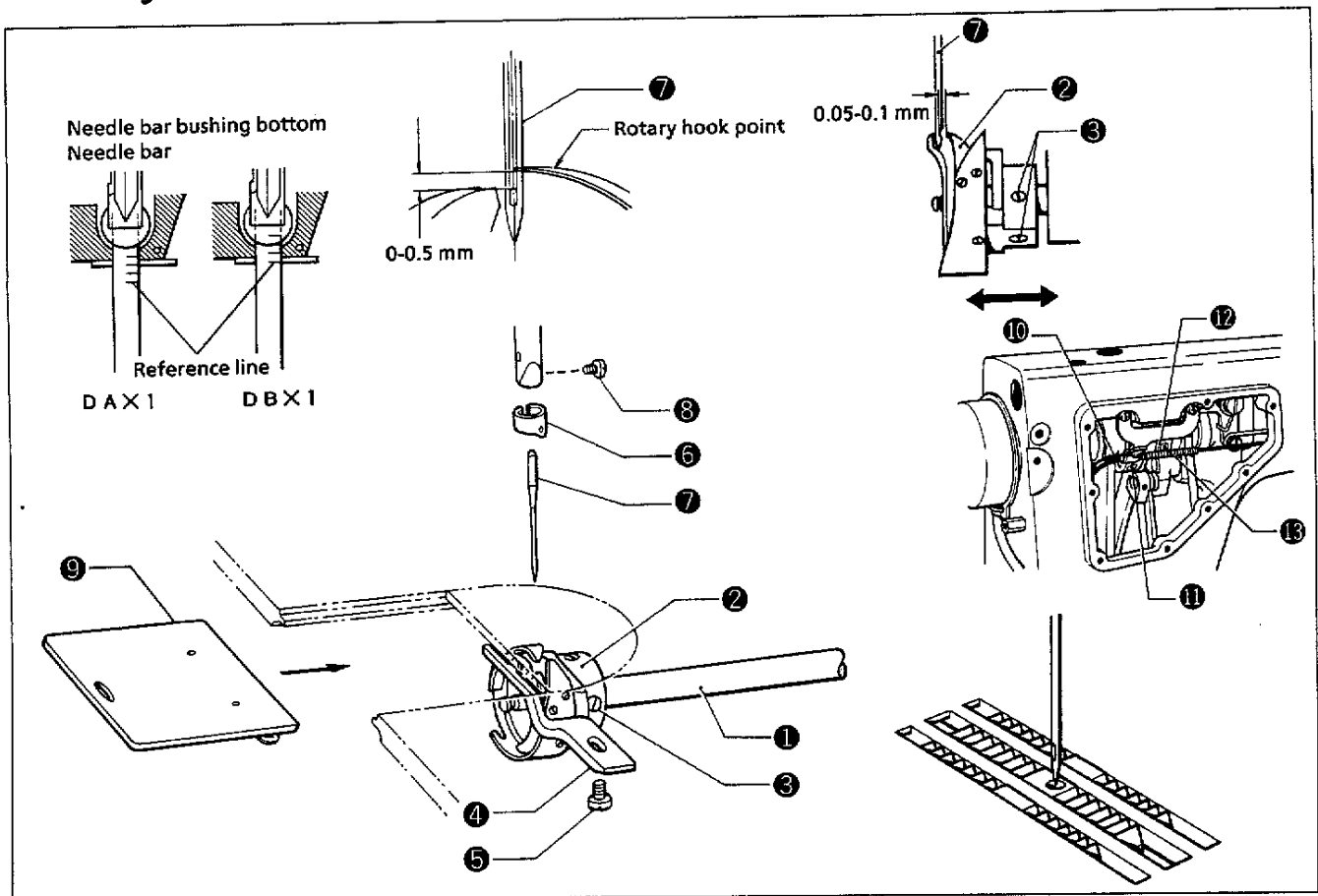
2. Movable knife, fixed knife position

The fixed knife ②④ and the movable knife ②③ must overlap when the slide block of the thread trimming cam lever ④ is lifted to the top of the thread trimming clutch ⑩.

To adjust the position of the knives, shift the thread trimmer lever ②①, and then tighten the screw ②②.

※ Set the lower thread finger ②⑤ under the movable knife ②③.

3. Rotary hook mechanism



- (1) Place the rotary hook ② on the lower shaft ① and tighten the screw ③.
- (2) Secure the bobbin case holder position bracket ④ with the screw ⑤.
- (3) Place the needle bar thread guide ⑥ and secure the needle ⑦ with the screw ③.
- (4) Adjust the timing between the needle ⑦ and the rotary hook ②.

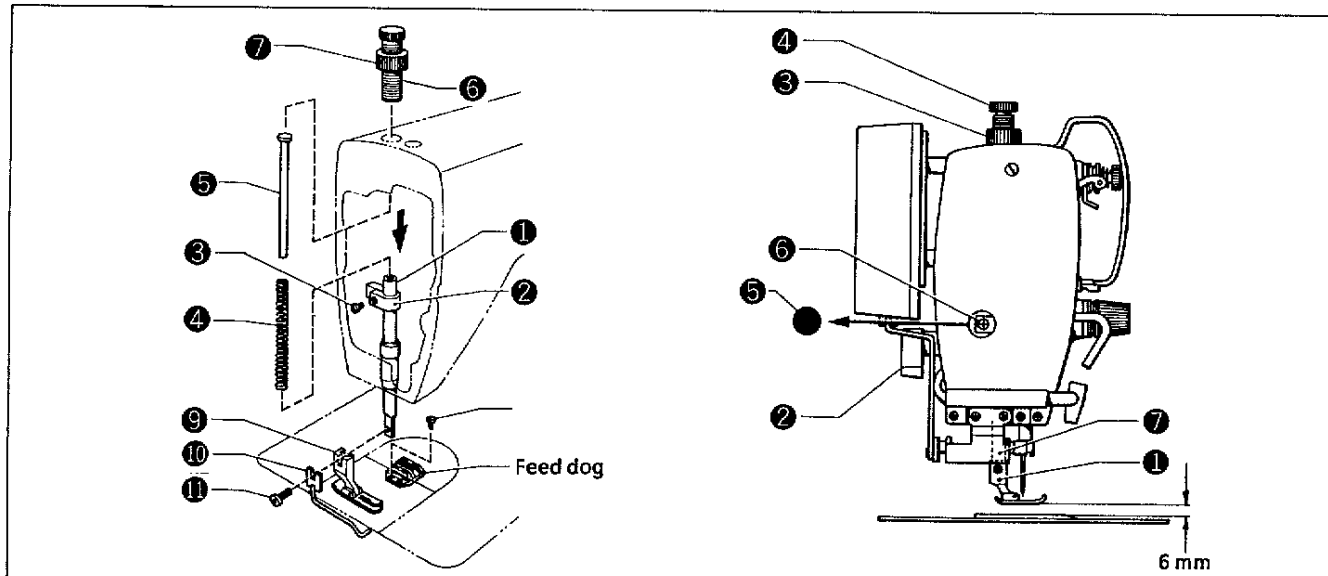
Raise the needle bar 2 mm above from its lowest position by turning the machine pulley (2.2 mm when sewing thick materials). At this time, align the rotary hook point with the needle center (see the reference line in the figure above). Spacing between the rotary hook point and the top of the needle hole is 0-0.5 mm. Adjust the gap between the needle ⑦ and the rotary hook point to 0.05-0.1 mm.

- (5) Install the needle plate.
- (6) Install the slide plate ⑧.
- (7) Adjust the feed timing.
- (8) Set the feed amount to 0.
- (9) Turn the pulley towards the machine front. When the feed dog descends from the top of its stroke and is aligned with the upper surface of the needle plate, the needle tip should be aligned with the upper surface of the needle plate.

To adjust the timing, turn the level feed eccentric wheel ⑩ and the feed lifting eccentric wheel ⑫ by loosening the screw ⑪ of the wheel ⑩ and the screw ⑬ of the wheel ⑫.

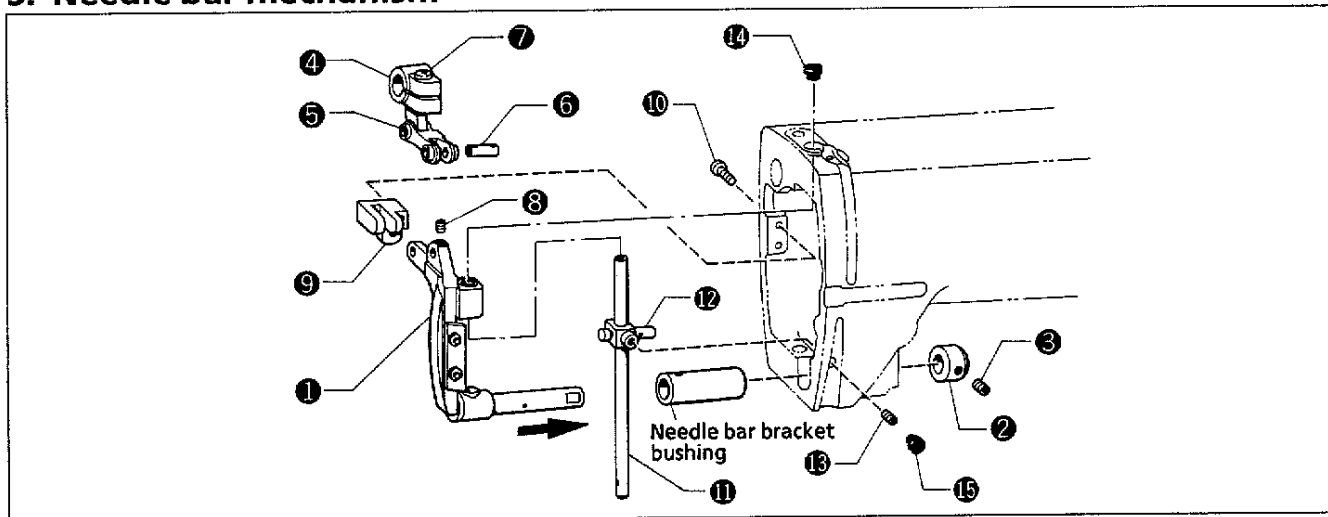
- ※ In model DB2-B7910, install the needle plate in (5) after putting the reflection sensor into the sensor hole. Also position the reflection sensor.
- ※ Make sure the gap between the bobbin case holder position bracket ④ and the rotary hook ② is sufficient to allow the thread to pass easily.
- ※ Make sure the rotary hook ② does not strike the lower thread finger.

4. Presser foot mechanism



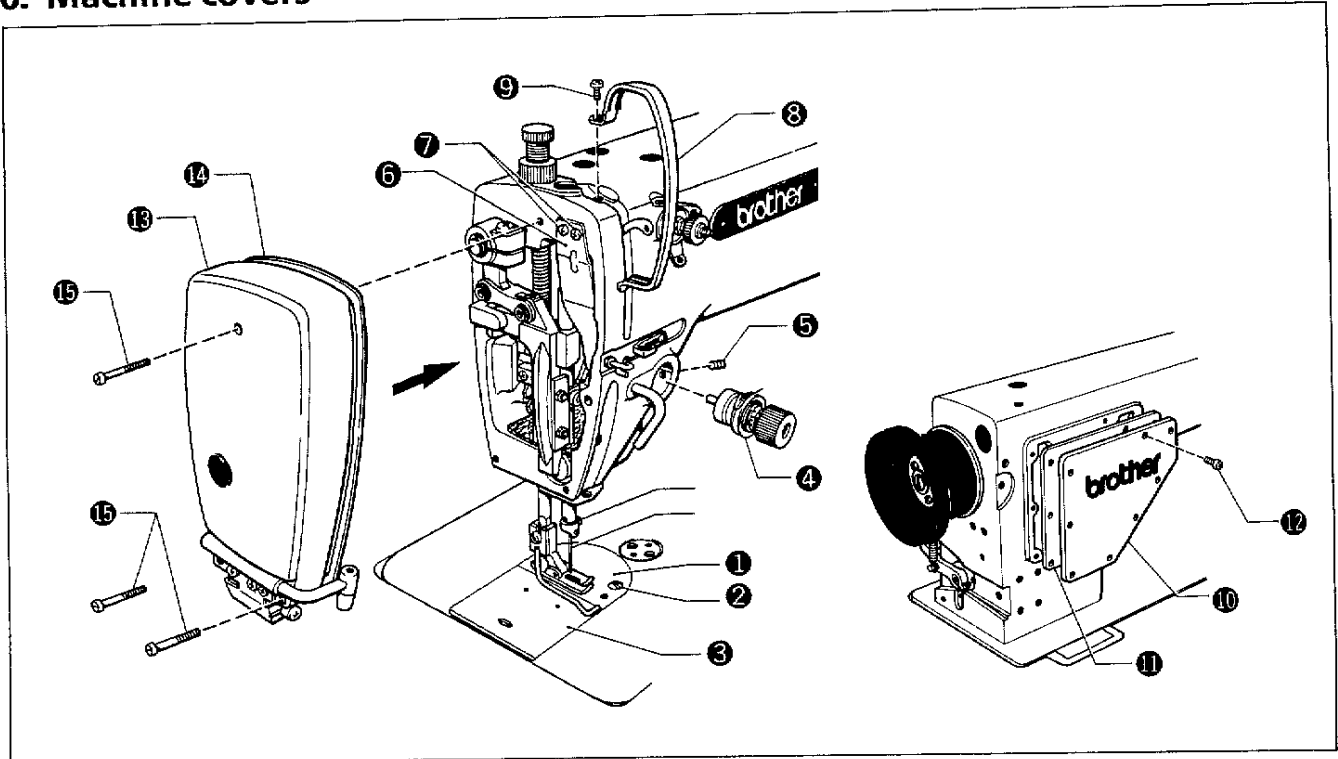
- (1) Insert the presser bar ① into the presser bar guide bracket ② from above the arm and lightly tighten the screw ⑥.
- (2) Insert the presser spring guide ⑤ into the presser spring ④ and secure it with the presser adjusting screw ⑥ and the nut ⑦.
- (3) After raising the presser bar ① using the presser bar lifter ⑧, secure the presser foot ⑨ and the sensor guard ⑩ with the screw ⑪.
- (4) Adjust the presser foot ⑨ to approximately 6 mm above the needle plate by removing the face plate cap ⑫ and loosening the screw ③. Then fasten the screw ③.

5. Needle bar mechanism



- (1) Insert the needle bar bracket ① into the needle bar bracket bushing and the set collar ②. Then fasten the screw ③.
- (2) Secure the needle feed arm ④ and the needle feed link ⑤ through the stud ⑥ to the needle bar bracket ① with the screws ⑦ and ⑧.
- (3) Secure the needle bar bracket guide ⑨ with the two screws ⑩.
- (4) Insert the needle bar ⑪ into the needle bar clamp ⑫ from above the arm, and fasten the screw ⑬.
- (5) Install the oil caps ⑭ and ⑮.

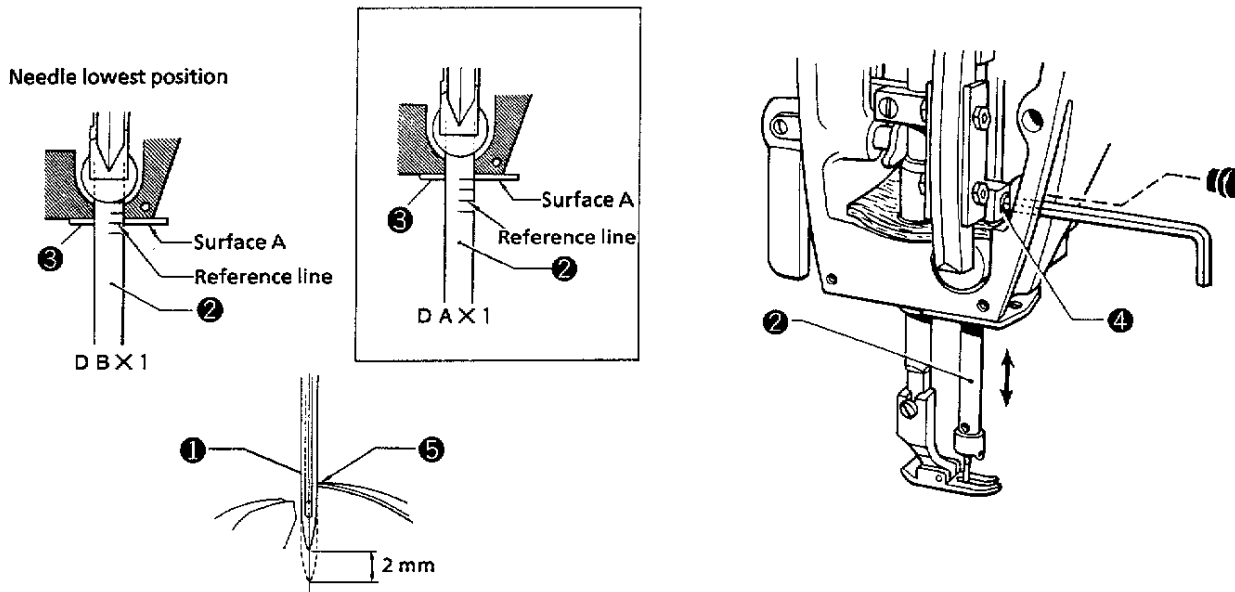
6. Machine covers



- (1) Secure the needle plate ① with the two screws ③. Install the slide plate ④.
- (2) Secure the upper tension regulator ④ with the screw ⑤.
- (3) Secure the oil stopper plate ⑥ with the two screws ⑦.
- (4) Secure the thread take-up cover ⑧ with the screw ⑨.
- (5) Secure the rear cover ⑩ and the rear cover packing ⑪ with the eight screws ⑫.
- (6) Secure the face plate ⑬ and the face plate packing ⑭ with the three screws ⑮.

ADJUSTMENT

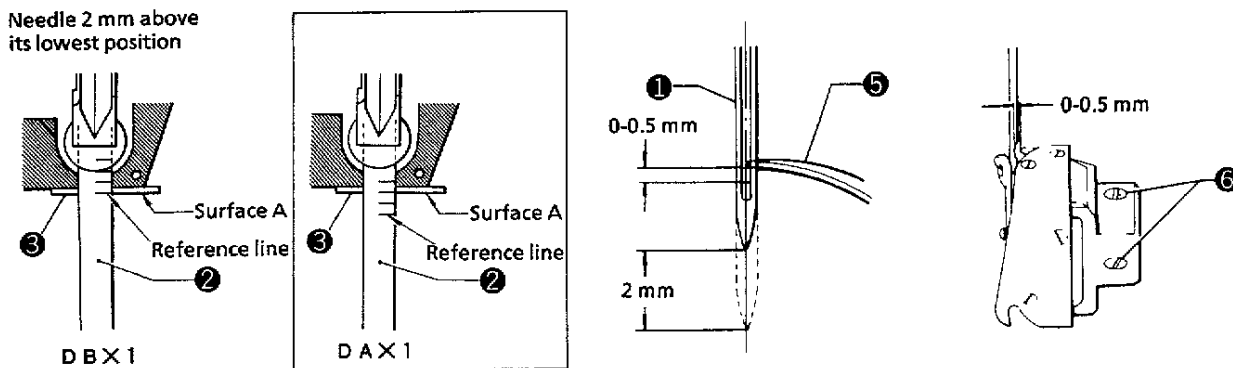
1. Needle bar height



Slowly turn the machine pulley to lower the needle ① to its lowest position. Make sure the second reference line from the bottom on the needle bar ② aligns with surface A of the needle bar oil rejector cover ③. (Needle: DB x #1)

To adjust the needle bar height, loosen the screw ④. Then align the second reference line from the bottom of the needle bar ② with surface A of the needle bar oil rejector cover ③. Then firmly tighten the screw ④.

2. Rotary hook position

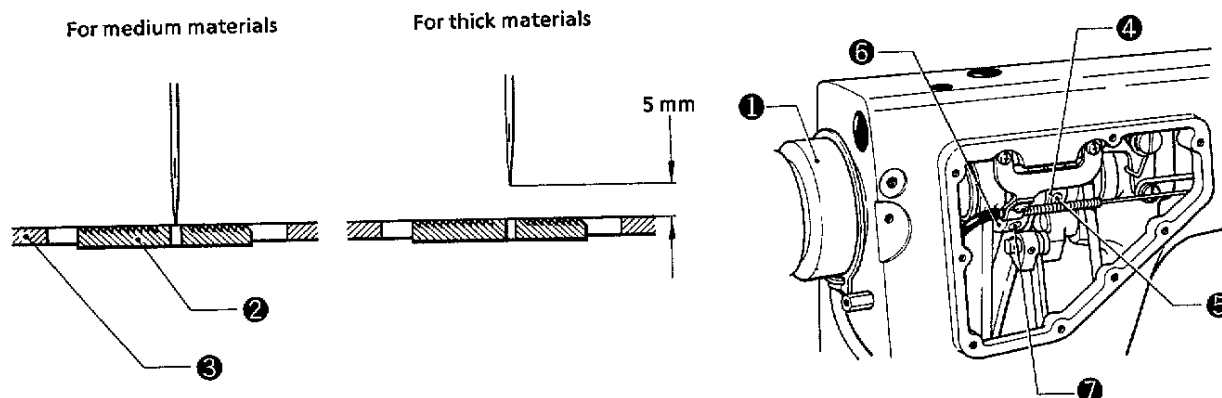


Align the bottom reference line of the needle bar ② with surface A of the needle bar oil rejector cover ③ by turning the machine pulley slowly. At this time, make sure that the rotary hook point ⑤ aligns with the needle center ①, and that the gap between the top edge of the needle ① hole and the rotary hook point ⑤ is 0-0.5 mm.

To adjust the gap, loosen the screw ⑥ and then align the rotary hook point ⑤ with the needle center ①. Adjust the gap between the rotary hook point ⑤ and the needle ① to 0-0.05 mm. Then firmly tighten the screw ⑥.

※ Always perform the rotary hook lubrication adjustment after replacing the rotary hook.

3. Feed timing



- (1) Turn the machine pulley ① toward the machine front until the feed dog ② descends and the tips of the feed dog ② align with the upper surface of the needle plate ③. At this time, check that the needle tip is as indicated below.

For thin materials: The needle tips align with the tips of the feed dog ② (and the upper surface of the needle plate ③).

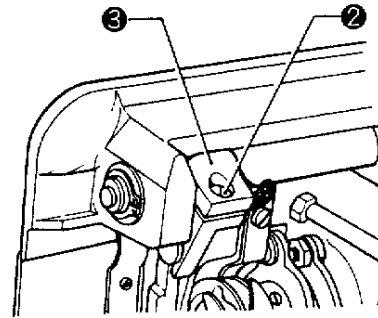
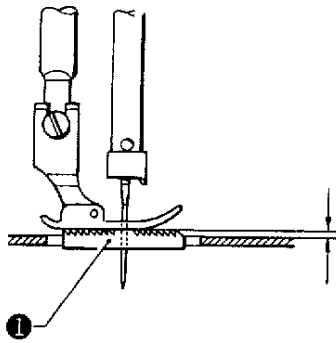
For thick materials: There is a 5 mm gap between the needle tip and the upper surface of the needle plate ③.

- (2) To adjust the timing, loosen the screw ⑤ of the feed lifting eccentric wheel ④ and the screw ⑦ of the level feed eccentric wheel ⑥.

If the feed dog descends below the needle plate too soon, turn the feed lifting eccentric wheel ④ and the level feed eccentric wheel ⑥ opposite to its normal rotation. If the feed dog is delayed, turn the wheels slightly forward.

- (3) Tighten the screws ⑤ and ⑦.

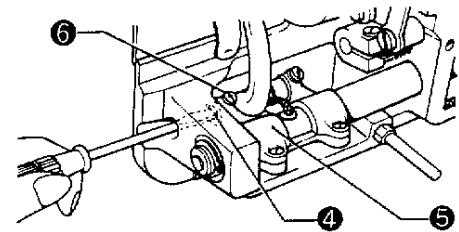
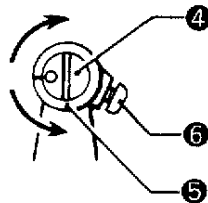
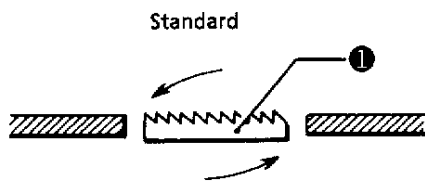
4. Feed dog height and angle



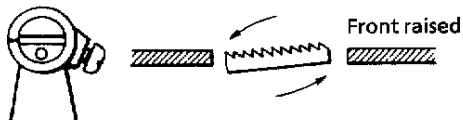
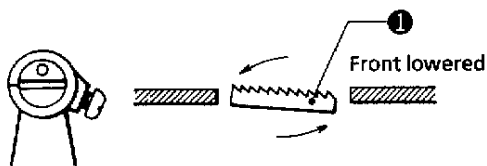
[Feed dog height]

- (1) The feed dog height when the feed dog ❶ is fully raised is 0.8 mm for thin and medium materials, and 1.2 mm for thick materials.
- (2) To adjust the feed dog height, loosen the screw ❷ when the feed dog ❶ is fully raised, and then rotate the feed lifting crank ❸ to move the feed bracket up and down.

[Feed dog angle]

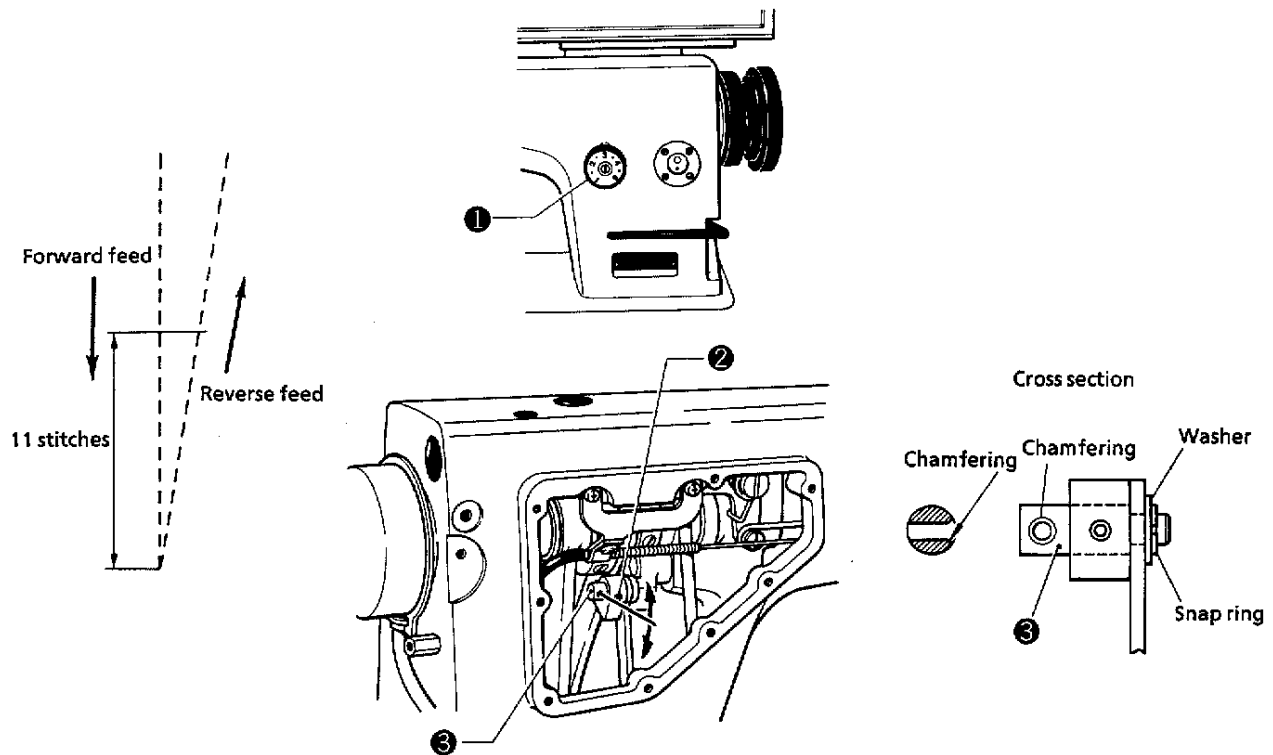


- (1) When the feed dog ❶ is fully raised, its angle is properly adjusted if the circle on the feed bracket shaft ❷ aligns with the index on the feed rock shaft arm ❸.
- (2) To adjust the feed dog ❶ angle, loosen the two screws ❹ and then rotate the feed bracket shaft ❷ within 90° in the directions indicated by the arrows.



- (3) To prevent puckering, lower the feed dog ❶ front.
 - (4) To prevent materials from slipping, raise the feed dog ❶ front.
- ※ After adjusting the feed dog ❶ angle, always adjust the feed dog height.

5. Forward and reverse feed stitch length



Forward and reverse feed stitch length are adjusted together.

(1) Set the feed regulating dial ① to mark 3.

(2) Sew 11 stitches forward and reverse at the inching speed (215 spm).

(3) Adjust as follows when the forward and reverse feed stitch lengths are different.

1) Remove the rear cover.

2) Loosen the screw ②.

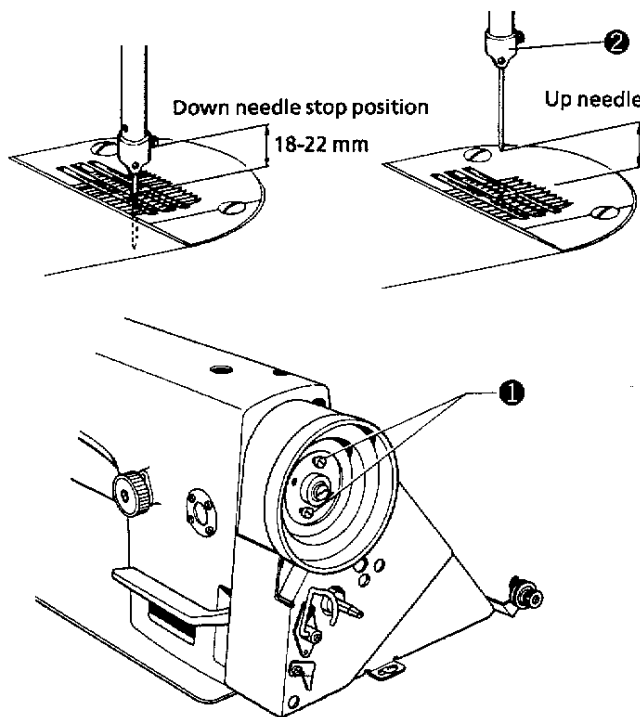
3) When the stitch length for forward feed is greater than for reverse feed, set the hole of the pin ③ lower.

When the stitch length for forward feed is less than for reverse feed, set the hole of the pin ③ upper.

※ Feed adjustment should reverse when the pin ③ is turned 180°.

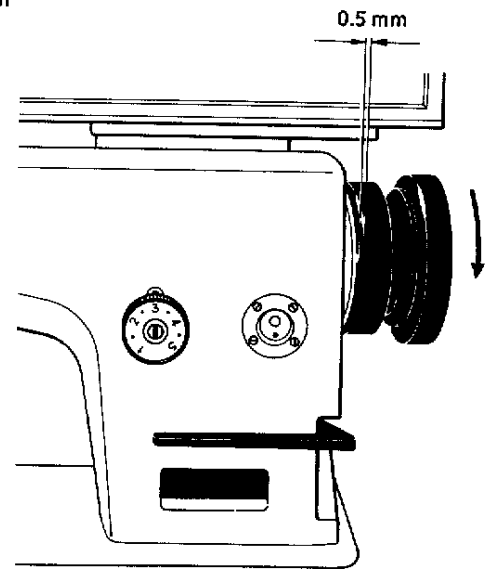
4) Firmly tighten the screw ②.

6. Synchronizer adjustment



For thin or medium materials
9.5-11.5 mm

For thick materials



The synchronizer includes the two elements which are used to detect the needle position. One of these elements is used to control the down needle stop position signal and the thread trimming signal.

When turning on the power and then stopping the machine in down needle stop position, there should be a 18-22 mm gap between the needle plate upper surface and the bottom edge of the needle set screw. When stopping the machine in up needle stop position, there should be 9.5-11.5 mm gap between the needle plate upper surface and the needle tip with thin or medium materials, and 10-12 mm gap with thick materials.

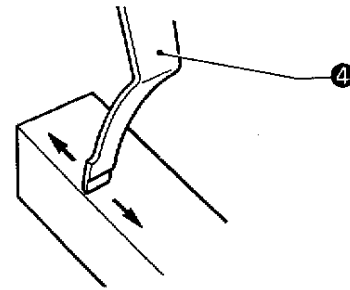
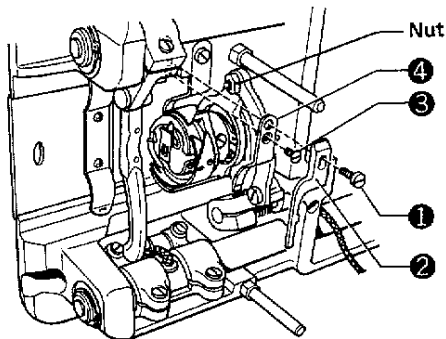
If the adjustment of needle stop position is necessary, refer to the procedure below.

[Up needle stop position adjustment]

- (1) Turn off the power.
- (2) Loosen the two screws ①.
- (3) To raise the needle bar ②, rotate the screws ① in the direction of normal pulley rotation. To lower the needle bar ②, rotate the screws ① in the opposite direction.
 - ※ The synchronizer is adjusted at the factory. Do not remove the synchronizer after removing the machine pulley.
 - ※ When installing the pulley, set a 0.5 mm gap between the pulley edge and the synchronizer.
 - ※ Do not adjust the down needle stop position.

7. Fixed knife and movable knife removal

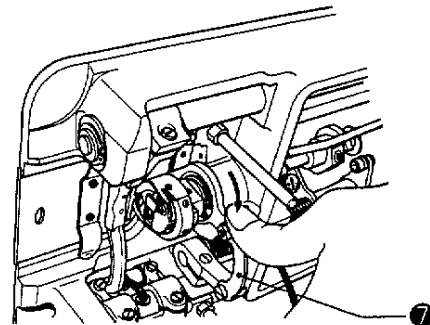
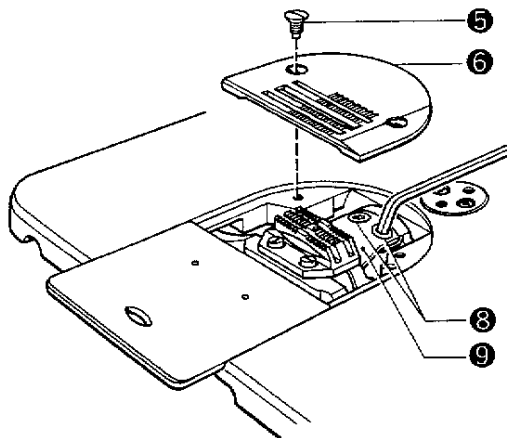
1. Fixed knife removal



※ If the knife ④ loses its sharpness, sharpen it as shown in the figure above.

- (1) Turn off the power.
- (2) Tilt the machine head until it stops.
- (3) Remove the screw ① and the bobbin case holder position bracket ②.
- (4) Remove the screw ③ and the fixed knife ④.

2. Movable knife removal

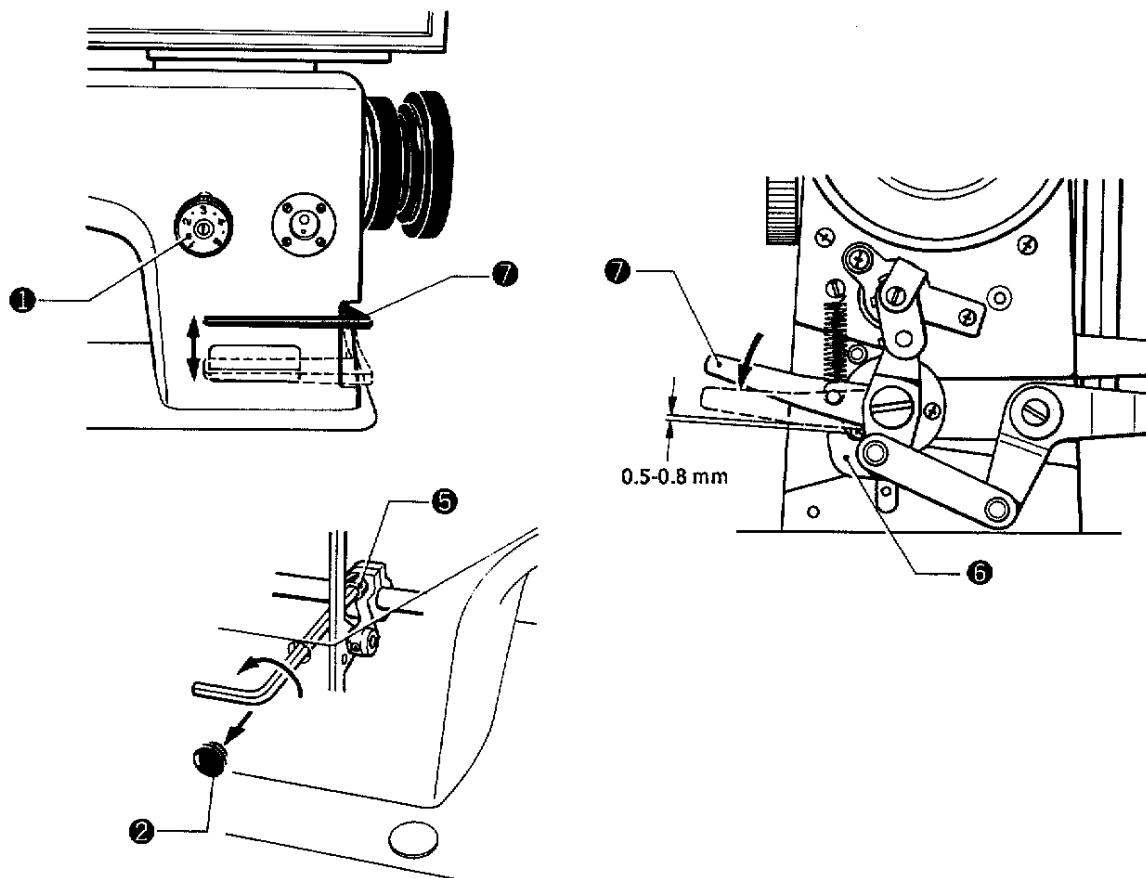


- (1) Raise the presser foot using the presser bar lifter.
- (2) Remove the screw ⑤ and the needle plate ⑥.
- (3) Turn the machine pulley until the needle bar reaches its highest position.
- (4) Press the thread trimming rod ⑦ by hand in the direction of the arrow until the screw ⑧ can be seen.
- (5) Remove the screws ⑧ and the movable knife ⑨.

※ Before removing the needle plate ⑥ and the movable knife ⑨, remove the needle.

※ Reassembly is performed by reversing the above procedure.

8. Servo solenoid adjustment



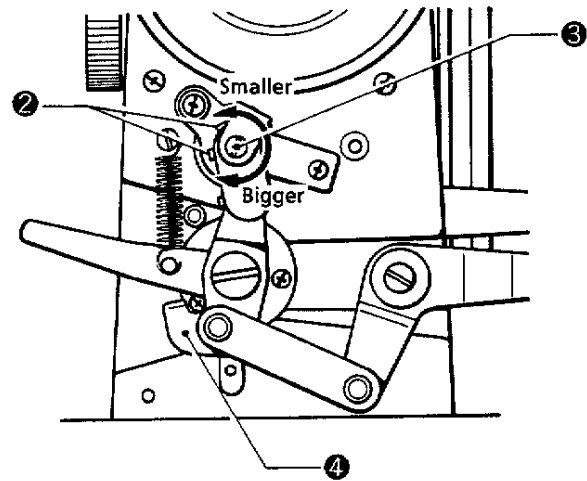
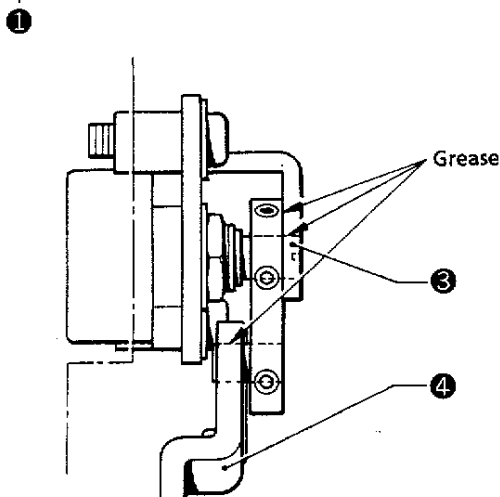
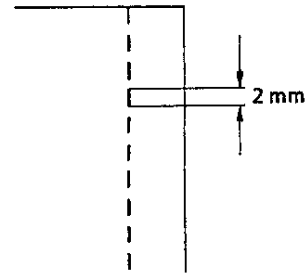
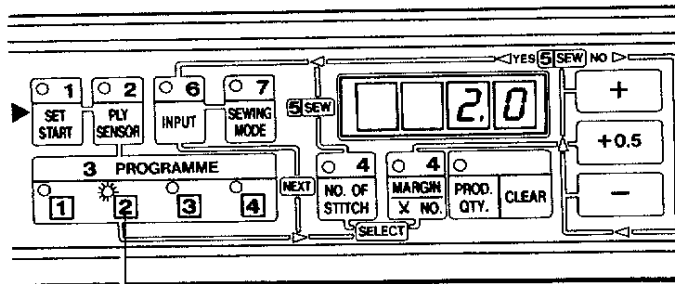
- (1) Set the feed regulating dial ① to its maximum.
- (2) Remove the oil cap ②.
- (3) After loosening the screw ⑤ from the oil cap ② hole using a hexagon wrench, adjust the gap between the reverse link lever assembly ⑥ and the reverse lever ⑦ to 0.5-1.0 mm using the reverse link lever assembly ⑥.

9. Potentiometer adjustment (B7910)

The feed dog height is set at the factory as indicated below.

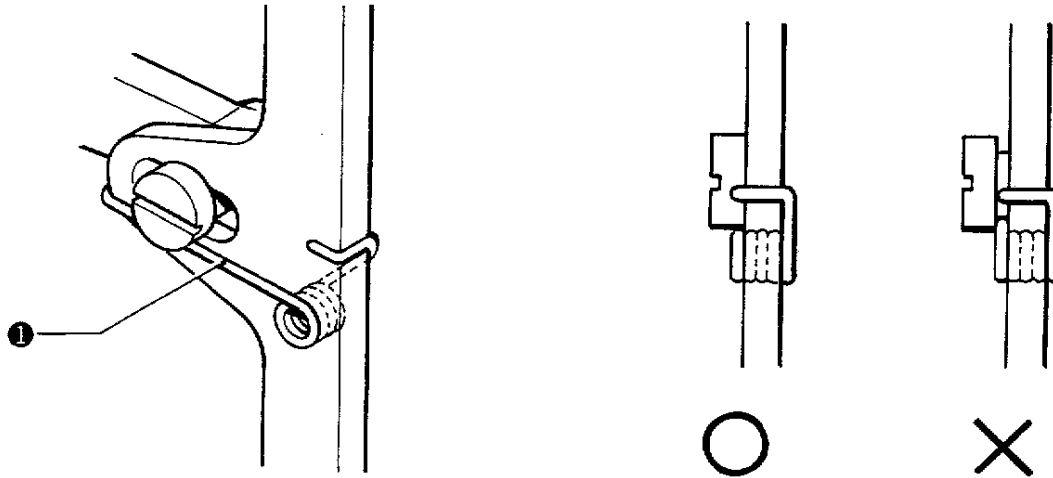
For medium materials (-3): 0.8 mm

For thick materials (-5): 1.2 mm



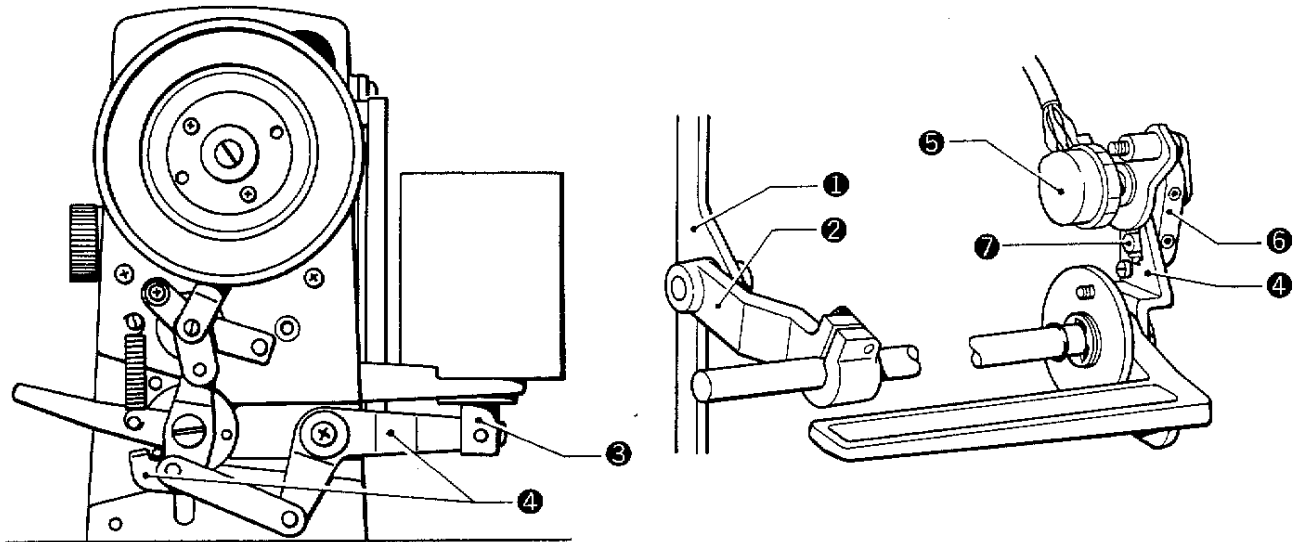
- 1 When PROGRAMME key No.2 is pressed while indicators No.1, 2, 6 and 7 are off (normal sewing mode), the pitch is indicated on the display.
 - 2 Make sure the actual pitch is the same as the indicated one (the actual pitch does not match with the indicated one if the feed dog height is changed). If it is different, adjust the potentiometer following the procedures below.
 - (1) After loosening the two screws ②, rotate the potentiometer ③. Then lightly tighten the screws ②. The indicated number is decreased when the potentiometer ③ is rotated clockwise.
 - (2) Sew several stitches.
 - (3) Repeat (1) and (2) to match the indicated pitch with the actual pitch.
 - (4) After the indicated pitch is matched, firmly tighten the screws ②.
- ※ Apply a small amount of grease on the branch of the reverse link lever assembly ④ and on the potentiometer ③.

10. Spring installation (B7910)



The spring ① absorbs the vibration sound produced by the servo solenoid. Install as in the figure above.

11. Feed mechanism weight check (B7910)



Raise the presser foot and then set the feed regulating dial to its maximum.

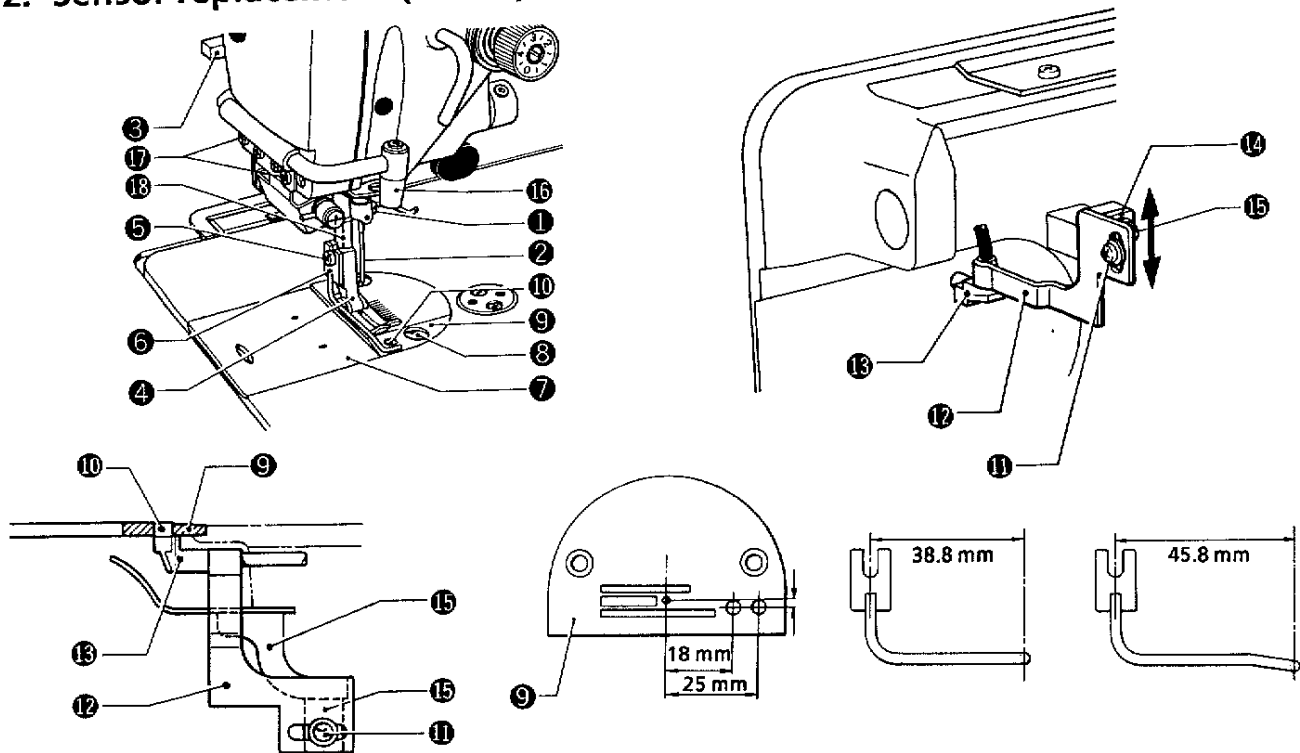
Check that the reverse lever returns to its original position by itself after pushing the reverse lever down slowly.

If it does not, check the following points:

- (1) The feed regulator connecting lever ① and the feed regulator bracket ② were attached properly during installation.
- (2) The servo solenoid and the reverse link lever assembly ④ were attached properly during installation.
- (3) The potentiometer ⑤ and the potentiometer lever ⑥ were attached properly during installation.
- (4) The branch of the reverse link lever assembly ④ and the potentiometer pin ⑦ were attached properly during installation.

The reverse lever could get stiff and might not return because of the reasons above.

12. Sensor replacement (B7910)



[Removal]

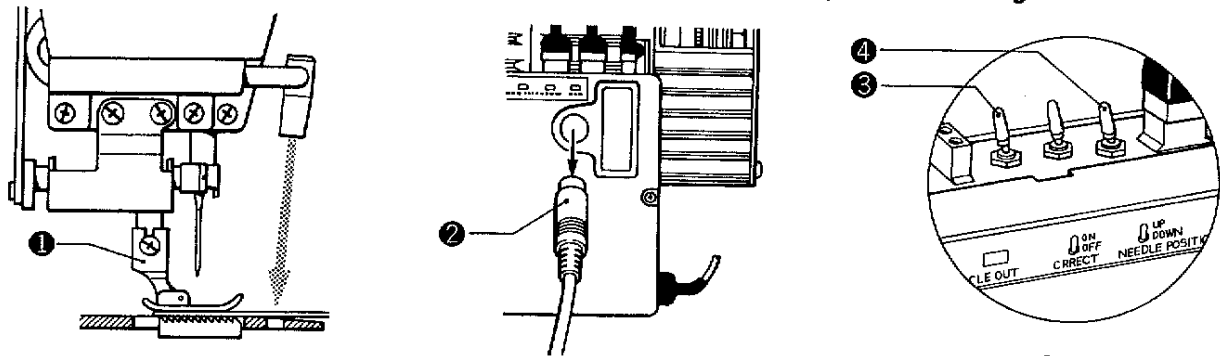
- (1) Remove the needle ② by loosening the screw ①.
- (2) Raise the presser foot ④ using the presser bar lifter ③.
- (3) After loosening the screw ⑤, remove the sensor guard ⑥ and the presser foot ④.
- (4) Slide the slide plate ⑦ in the direction of the arrow.
- (5) Remove the screw ⑧ and the needle plate ⑨.
 - ※ Do not damage the cover ⑩ when removing the needle plate ⑨.
 - ※ Drill a sensor hole with a diameter of 4.2 mm into a needle plate that is available on the market. The distance between the needle hole and the sensor can be changed in the range of 18-25 mm.
 - ※ There are two types of sensor guards: one is for sensors whose distance to the needle hole is 18 mm. The other is for sensors whose distance to the needle hole is 25 mm.

[Installation]

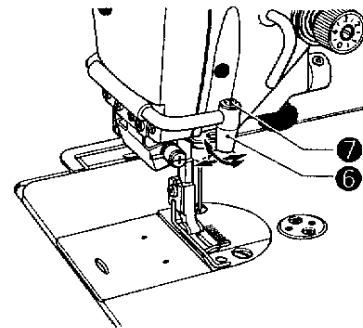
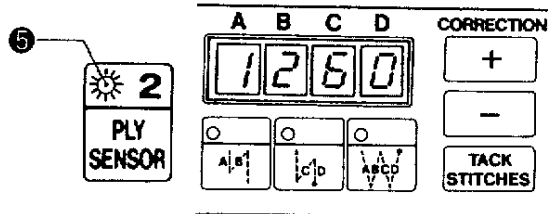
- (1) Tilt the machine head until it stops.
- (2) Move the plate (R) ⑫ in the direction of the arrow by loosening the screw ⑩.
- (3) Put the plate (M) ⑬ into the sensor hole in the needle plate ⑨ and then install the needle plate ⑨. (The right-left adjustment of the sensor position can be done by loosening the screw ⑭ and then moving the setting bracket ⑮.)
- (4) Fasten the screw ⑧. (Check the front and back gap and the right and left gap between the needle plate ⑨ and the feed dog.)
- (5) Align the photo-cell ⑩ with the hole of the needle plate and fasten the screw ⑪.
- (6) Secure the presser foot ④ and the sensor guard ⑥ on the presser bar ⑬ with the screw ⑤.
- (7) Secure the needle ② with the screw ①.

13. Sensor position adjustment

The photo-cell position needs to be adjusted when the reflection sensor position is changed.



Distance indication



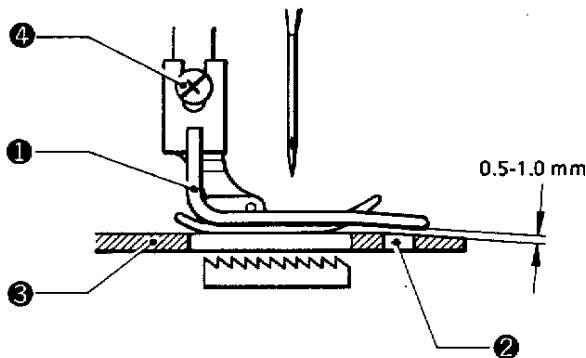
- (1) Turn off the power.
- (2) Set a material under the presser foot ❶ (on the sensor).
 - ※ The photo-cell position might not be properly adjusted without materials.
- (3) Disconnect the synchronizer cord ❷.
- (4) Set the correction switch ❸ to ON.
- (5) Set the sensitivity control switch ❹ to THIN.
- (6) Turn on the power. The ply sensor indicator ❺ should blink.

Adjust the position of the photo-cell ❸ so that the number indicated on the display is at its maximum. The number should be at least 1260 (1260 is indicated when no material is on the presser foot).

[Adjustment]

- (1) Move the photo-cell ❸ slightly right and left or back and forth by loosening the screw ❷.
- (2) Secure the photo-cell ❸ with the screw ❷ when the indicated number is at its maximum.
 - ※ It takes about 5 seconds to indicate the number.

[Cautions for installing the sensor guard]



The sensor guard ❶ is used to prevent fingers from getting into the plate (R) ❷ and to prevent materials from getting uneven.

When the feed dog is under the needle plate, adjust the gap between the upper surface needle plate ❸ and the bottom of the sensor guard ❶ to 0.5-1 mm, using the screw ❹.

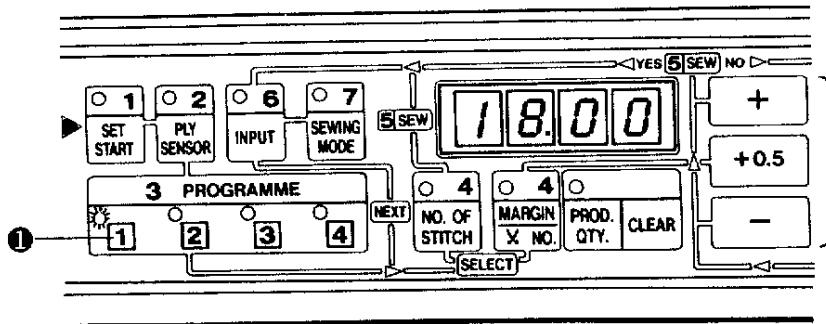
※ The machine may not stop if fingers are put in the sensor.

14. Indication adjustment of the distance between the needle hole and the sensor (B7910)

Match the actual distance between the needle hole and the sensor with the indicated number on the display, if the sensor position is changed.

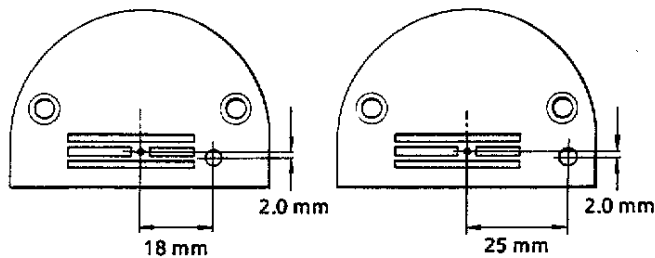
The machine does not stop at a material edge without this adjustment.

The distance is measured when the feed amount is 0.

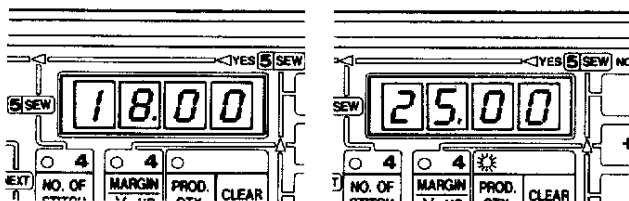


- (1) The distance is indicated when PROGRAMME key No.1 is pressed, while indicators No.1, 2, 6 and 7 are off (normal sewing mode).
- (2) At this time, the number can be changed using the [+], [0.5] or [-] keys to match it with the actual pitch.

[The distance between the needle hole and the sensor]



Distance indication



When drilling a sensor hole on a needle plate that is available on the market, measure the distance between the needle hole and the sensor in order to indicate it on the display.

Example: change the distance 25 mm to 18 mm.

- (1) Set indicators No.1, 2, 6 and 7 to off.
- (2) Press PROGRAMME key No.1 to indicate 25.00.
- (3) Change the number by pressing the [-] key continuously until it is 18.00.
- (4) Press PROGRAMME key No.1 to make the number disappear.

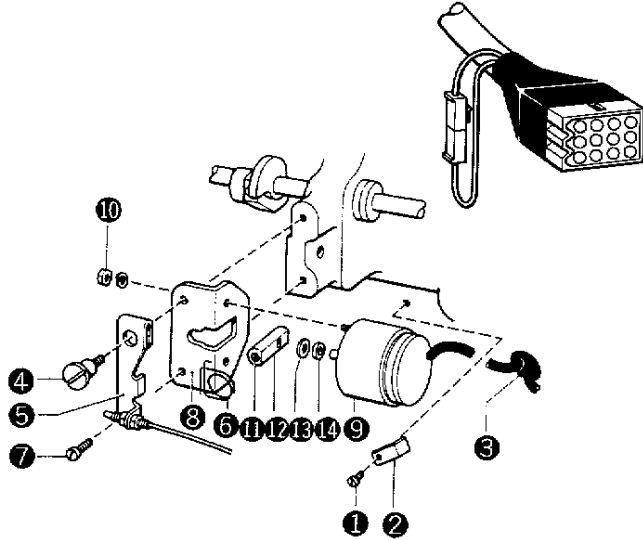
REPLACEMENTS

1. Solenoid replacements

Remember where the solenoid cords are attached when disconnecting them.

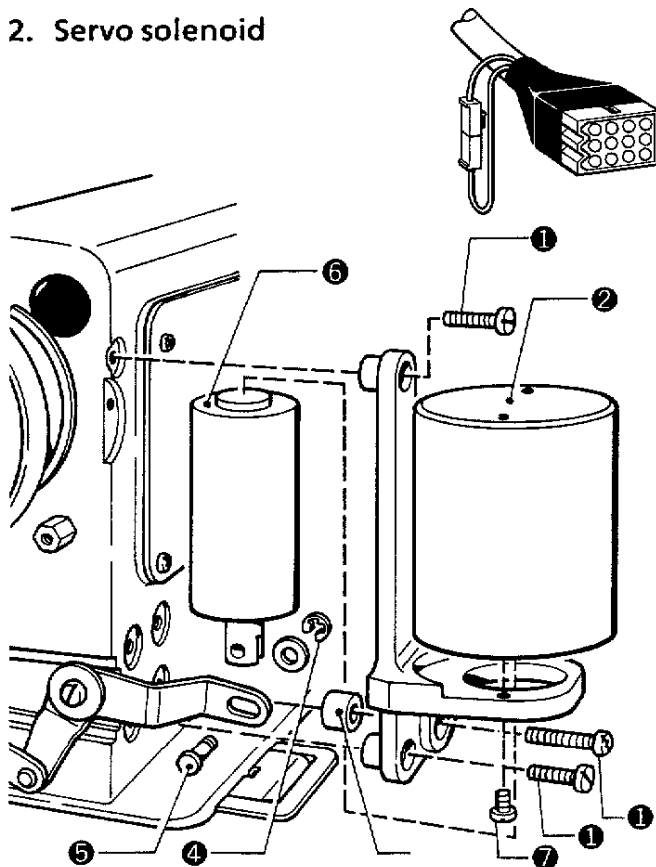
Installation is the reverse of removal.

1. Thread trimming solenoid



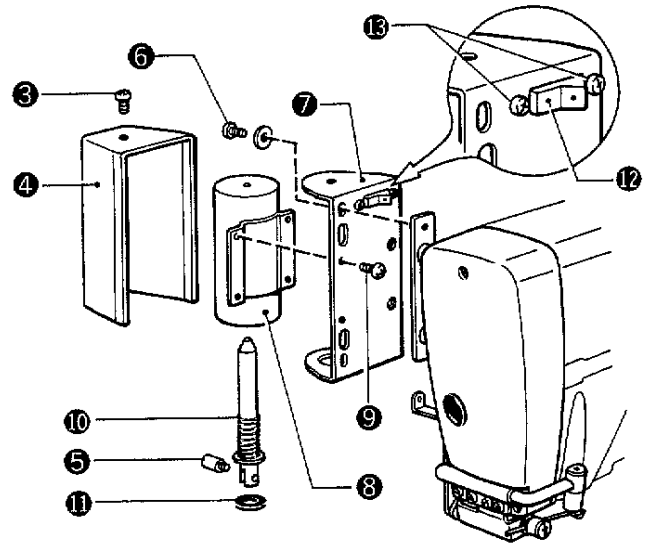
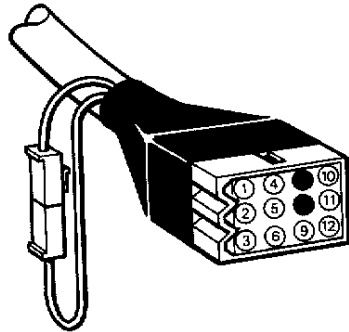
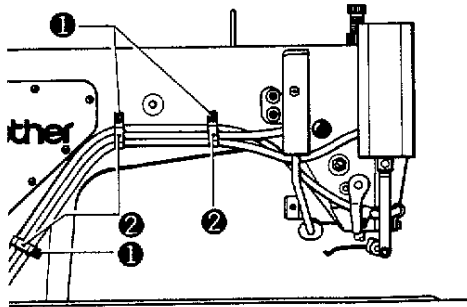
- (1) Disconnect the terminal pin (male) from pins 4 and 5 of the nylon connector 12P.
- (2) Tilt the machine head until it stops.
- (3) Loosen the screw ①. Disconnect the cord from the cord holder ②.
- (4) Remove the cord from the cord bushing ③.
- (5) Remove the stud screw ④, the thread trimming solenoid, the tension releasing lever ⑤ and the tension releasing spring ⑥.
- (6) Remove the screw ⑦ to remove the thread trimming solenoid bracket ⑧ along with the thread trimming solenoid ⑨.
- (7) Remove the thread trimming solenoid ⑨ by removing the two nuts ⑩.
- (8) Remove the solenoid lever ⑫, the washer ⑬ and the cushion ⑭ by loosening the screw ⑪.
- (9) Replace the thread trimming solenoid (code: S02815-001).

2. Servo solenoid



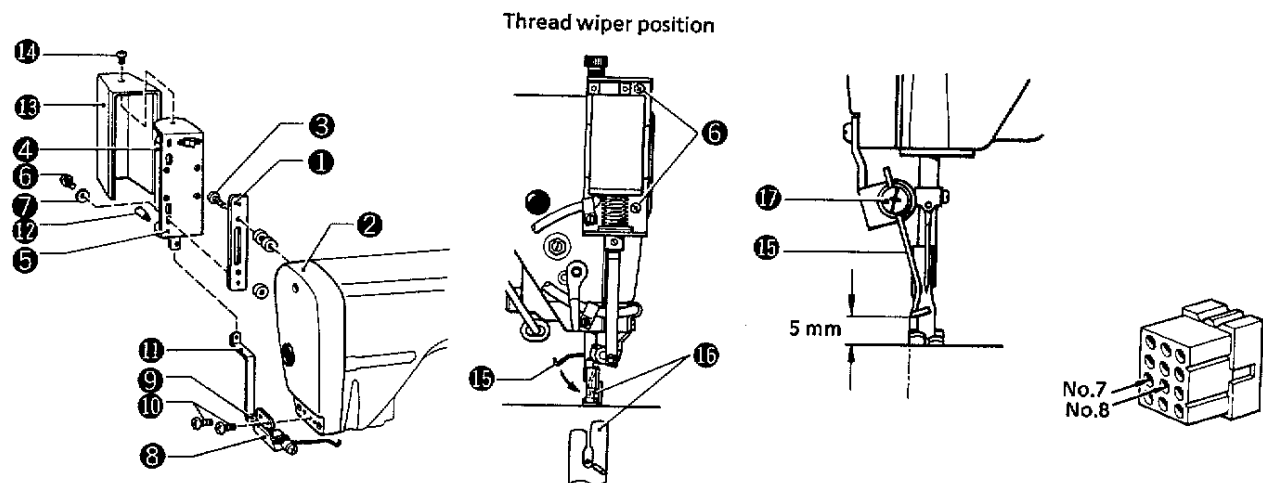
- (1) Disconnect the terminal pin (male) from pins 10 and 11 of the nylon connector 12P.
- (2) Remove the three screws ① to remove the servo solenoid ② and the solenoid bracket ③.
- (3) Remove the snap ring ④, the pin ⑤ and the plunger ⑥.
- (4) Remove servo solenoid ② by removing the two screws ⑦.
- (5) Replace the servo solenoid assembly (code: S11179-001).

3. Thread wiper solenoid, thread wiper switch



- (1) Disconnect the terminal pin (male) from pins 7 and 8 of the nylon connector 12P.
- (2) Remove the cords from the three cord holders ② by loosening the three screws ①.
- (3) Remove the solenoid cover ④ by removing the screw ⑤.
- (4) Remove the plunger pin ⑥.
- (5) Remove the two screws ⑥ to remove the solenoid setting bracket ⑦ and the thread wiper solenoid ③.
- (6) After removing the four screws ⑥, remove the thread wiper solenoid ③, thread wiper spring ⑩ and plunger stopper ⑪ together.
- (7) Remove the thread wiper spring ⑩ and the plunger stopper ⑪.
 - ※ The thread wiper switch ⑫ is replaced by removing the screw ③, the solenoid cover ④ and the two screws ⑥.
- (8) Replace the thread wiper solenoid (code: S02661-101).

2. Thread wiper



[Installation]

- (1) Secure the solenoid setting plate ① on the side of the face plate ② with the screw ③.
- (2) Secure the thread wiper solenoid assembly ④ and the solenoid setting bracket ⑤ to the solenoid setting plate ① with the screw ⑥ and washer ⑦.
- (3) Secure the thread wiper shaft plate ⑧ and the thread wiper crank assembly ⑨ to the face plate ② with the two bolts ⑩.
- (4) Attach the plunger to the thread wiper rod ⑪ with the plunger pin ⑫.
- (5) Secure the solenoid cover ⑬ to the solenoid setting bracket ⑤ with the screw ⑭.
- (6) Plug the thread wiper terminal pin (male) into pins 7 and 8 of the nylon connector 12P.

[Adjustment]

1. Thread wiper position

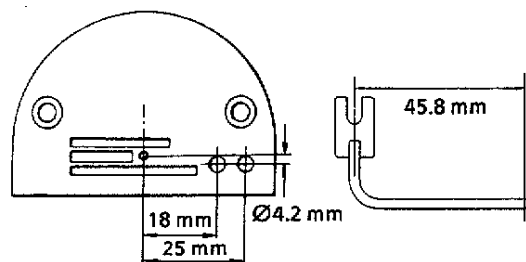
When pushing the solenoid plunger all the way up, make sure the thread wiper ⑮ tip and the left side of the presser foot ⑯ are aligned. (To adjust the alignment, loosen the two screws ⑮, and then move the solenoid setting bracket ⑤ up or down.)

2. Thread wiper height

Make sure the gap between the thread wiper ⑮ tip and the needle plate upper surface is 5 mm. (To adjust the gap, loosen the screw ⑰, and then move the thread wiper ⑮ up or down.)

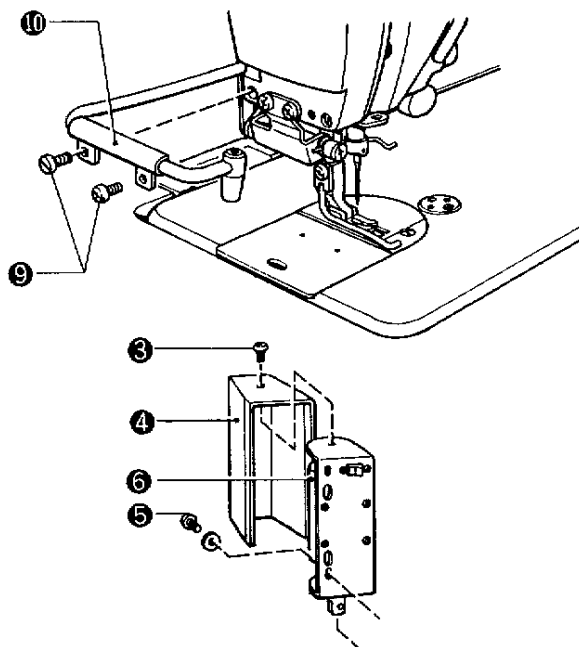
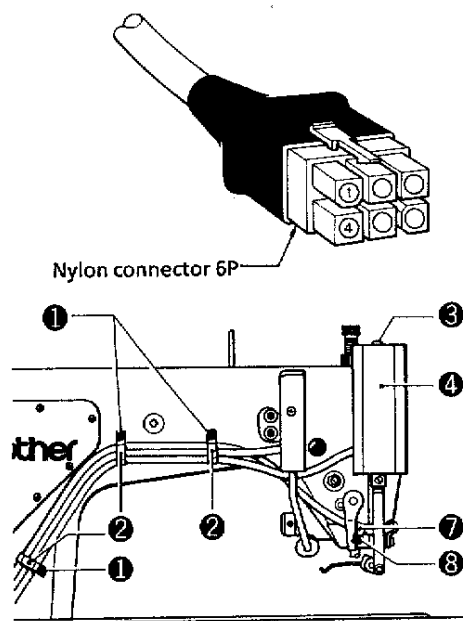
※ Make sure the thread wiper properly catches the thread.

3. Photo-cell and reflection sensor replacement (B7910)





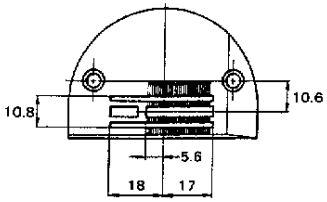
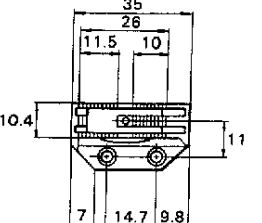
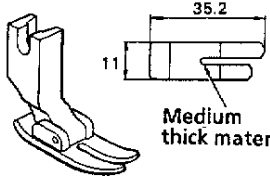
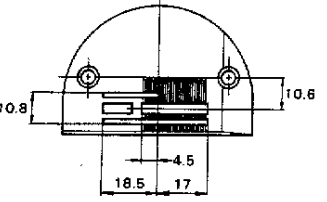
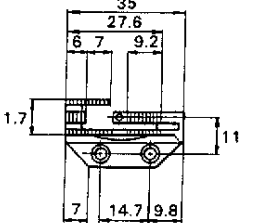
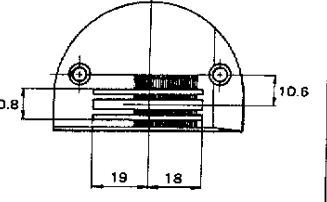
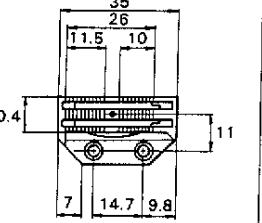
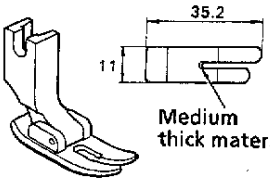
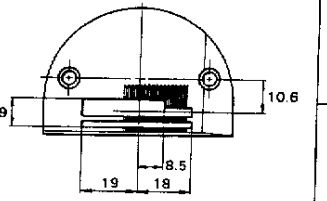
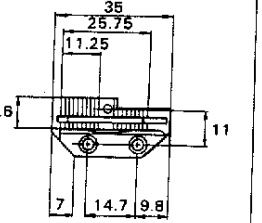
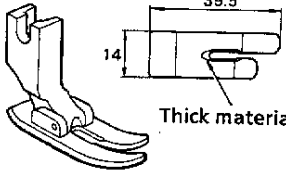
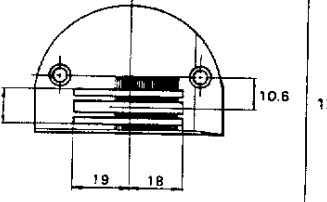
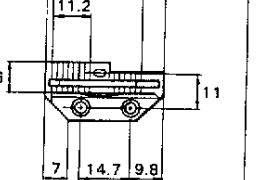
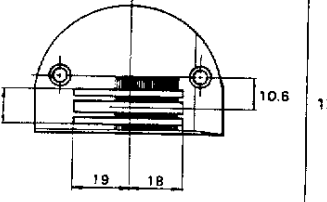
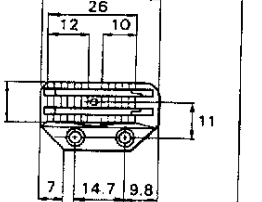
- ※ Do not damage the cover ⑩ when removing the needle plate ⑨.
- ※ Drill a sensor hole with a diameter of 4.2 mm on a needle plate that is available on the market. The distance between the needle hole and the sensor can be changed within the range of 18-25 mm.
- ※ There are two types of sensor guards: one is for sensors whose distance to the needle hole is 18 mm. The other is for sensors whose distance to the needle hole is 25 mm.



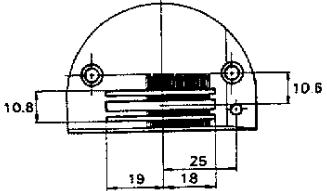
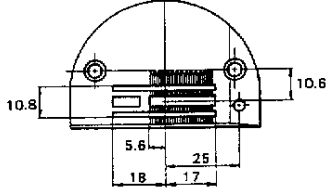
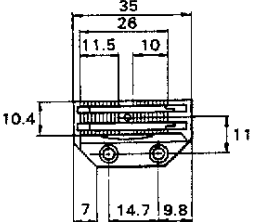
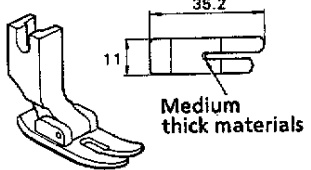
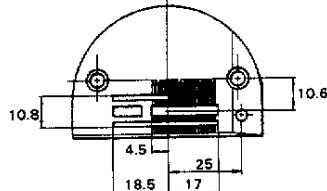
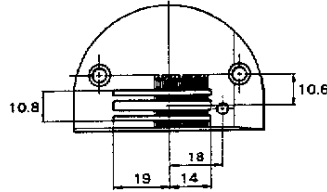
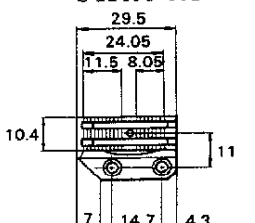
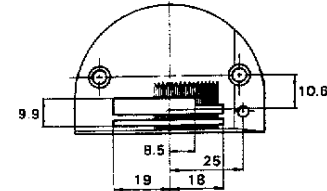
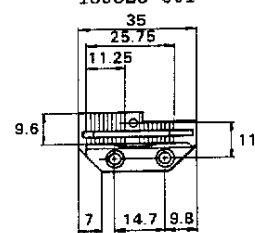
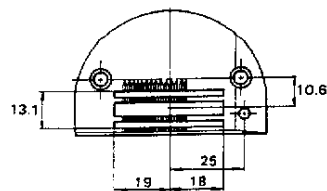
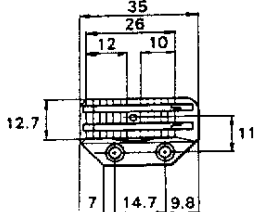
1. Photo-cell replacement



- (1) Disconnect the terminal pin (male) from pins 1 (white) and 4 (black) of the nylon connector 6P.
- (2) Remove the cords from the three cord holders ② by loosening the three screws ③.
- (3) Remove the solenoid cover ④ by loosening the screw ⑤.
- (4) Remove the solenoid setting bracket ③ by loosening the two screws ⑤.
- (5) Remove the cord and the photo-cell ⑩ by loosening the screw ⑤.
- (6) Replace the photo-cell and the reflection sensor together.

- ※ Installation is the reverse of removal.
- ※ After installing the photo-cell and the reflection sensor, adjust the sensor position and the distance between the needle hole and the sensor.

Sub class	Needle plate  3.2	Feed dog 	Presser foot assembly
中厚物用	143857-001 	S 01159-001 	P 141158-001  Medium thick materials
	148300-001 	S 01160-001 	
	143855-001 	S 03357-001 	147703-001  Medium thick materials
厚物用	148842-001 	159525-001 	1.15 140717-001  Thick materials
	S 13101-001 	159526-001 	
	S 13101-001 	S 13102-001 	2

Sub class	Needle plate  3.2	Feed dog 	P	Presser foot assembly		
中厚物用	S 11156-001 					
	S 11157-001 	159521-001 	1.15	140717-001  Medium thick materials		
	S 11159-001 					
	S 11463-001 	S 11464-001 				
	厚物用	S 11158-001 			159525-001 	1.25
S 11160-001 		S 13102-001 			2	

TROUBLESHOOTING GUIDE

1. Machine head

Problem	Cause	Check	Solution	Page	
Needle breakage	Improper needle installation	Needle facing, height	Reinstall needle.		
	Bent needle. Blunt needle tip, jammed eye.	Needle	Replace needle.		
	Improper feed timing		Adjust feed timing.	32	
	Improper needle to rotary hook timing	Needle bar rise		Adjust needle to rotary hook timing.	31
		Needle bar height		Adjust needle to rotary hook timing.	31
		Needle to rotary hook gap		Adjust needle to rotary hook timing.	31
	Thread wiper too high	Thread wiper position		Adjust thread wiper.	45
Thread breakage	Improper threading	threading	Rethread.		
	Bent needle. Blunt needle tip, jammed eye.	Needle	Replace needle.		
	Improper needle installation	Needle facing, height	Reinstall needle.		
	Excessive needle thread tension	Needle thread tension	Adjust needle thread tension.	5	
	Excessive bobbin thread tension	Bobbin thread tension	Adjust bobbin thread tension.	5	
	Loose needle thread	Thread take-up spring operation	Adjust thread take-up spring.	5	
	Insufficient rotary hook lubrication	Oil supply	Adjust oil supply.		

Problem	Cause	Check	Solution	Page	
Thread frays, breaks	Burr in thread path		Remove with sandpaper.	/	
	Blunt needle tip		Replace needle.	4	
Skipped stitches	Improper needle installation	Needle facing, height	Reinstall needle.	4	
	Wrong needle for application	Needle size, length	Replace needle with larger count needle.	/	
	Bent needle, blunt tip	Needle	Replace needle.	4	
	Blunt rotary hook point	Rotary hook point	Replace rotary hook.	/	
	Improper threading	Threading	Rethread.	4	
	Poor presser foot contact	Presser bar pressure		Tighten presser foot adjustment screw.	/
		Presser bar height		Adjust presser bar height.	/
	Improper needle to rotary hook timing	Needle bar rise		Adjust needle to rotary hook timing.	31
		Needle bar height		Adjust needle to rotary hook timing.	31
		Needle to rotary hook timing		Tighten presser foot adjustment screw.	31
	Needle thread remainder too short; does not remain in material.			Adjust pretension.	5
Bobbin spins during thread cutting and bobbin thread remainder gets too short; won't rise.	Bobbin presser spring		Replace bobbin presser spring.	/	
Thread take-up spring tension too weak, won't raise bobbin thread.	Thread take-up spring tension		Adjust take-up spring tension.	5	

Problem	Cause	Check	Solution	Page
Needle thread does not tighten.	Insufficient needle thread tension		Increase needle thread tension.	5
	Excessive needle thread tension		Decrease bobbin thread tension.	5
Bobbin thread does not tighten.	Excessive needle thread tension		Decrease needle thread tension.	5
	Insufficient needle thread tension		Increase bobbin thread tension.	5
Improper looping stitch tightening	Rough thread path	Thread path	Polish with fine sandpaper.	
	Poor bobbin spinning	Tension of bobbin thread leader	Replace bobbin, rotary hook.	
	Rotary hook to rotary hook stop gap too small	Gap	Adjust needle to rotary hook timing.	31
Improper thread cutting a. Needle, bobbin threads not cut	Movable knife, fixed knife do not overlap		Adjust knives.	27
	Worn, rough movable, fixed knife edges	Knives	Replace knives.	36
	Movable knife does not move	Thread cutter signal relayed?	Check electrical circuits; replace thread cutter solenoid.	
b. Needle thread not cut	Improper needle installation	Needle facing	Reinstall needle.	4
	Last stitch skipped, needle thread not caught by thread cutter	Thread take-up spring stroke	Adjust thread take-up spring.	49
c. Bobbin thread not cut	Movable knife, fixed knife do not overlap		Adjust knives.	27
	Poor movable knife, fixed knife cutting.	Knives	Replace knives.	36
	Movable knife, fixed knife do not overlap		Adjust knives.	27

Problem	Cause	Check	Solution	Page
Needle thread escapes at sewing start.	Tension disc does not open sufficiently.	Tension disc opening	Adjust tension release.	/
	Excessive pretension		Adjust pretension.	5
	Needle too heavy for thread		Needle size	/
	Up needle stop position too high, thread removed by thread take-up	Thread take-up height at up needle stop position	Delay up needle stop position.	35
Thread cutter mechanism does not function.	Thread cutter solenoid does not function.	Check with tester	Replace thread cutter solenoid.	/
	Thread cutter signal not relayed		Check circuits. Refer to motor adjustment manual.	/
Thread wiper does not function.	Needle thread remainder too long		Adjust pretension.	5
	Excessive material, presser foot resistance		Replace with presser foot have back channel.	/
	Timing too early; wipes thread before tension disc closes.		Adjust operating time.	/
	Thread wiper operation too short		Adjust operating time.	/

Problem	Cause	Check	Solution	Page
Thread wiper does not wipe thread.	Improper thread wiper facing		Adjust facing.	45
	Thread wiper strikes needle		Adjust thread wiper height.	45
	Thread wiper does not operate.		Set thread wiper solenoid switch to on, or replace solenoid.	45
	Thread wiper operation is too short.		Adjust operating time.	
Reverse and forward stitch lengths do not match when using the wuick reverse function.	Improper forward, reverse adjustment		Adjust eccentric pin.	34
No oil in gauge window; rotary hook not lubricated	Not enough oil pan	Oil	Add oil.	3
	Filter clogged	Pump filter	Clean filter or replace.	
	Tube disconnected	Tube	Reconnect tube.	
	Tube broken		Replace tube.	
	Rotary hook lubrication adjustment screw tightened too far	Rotary hook lubrication	Loosen screw.	3

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