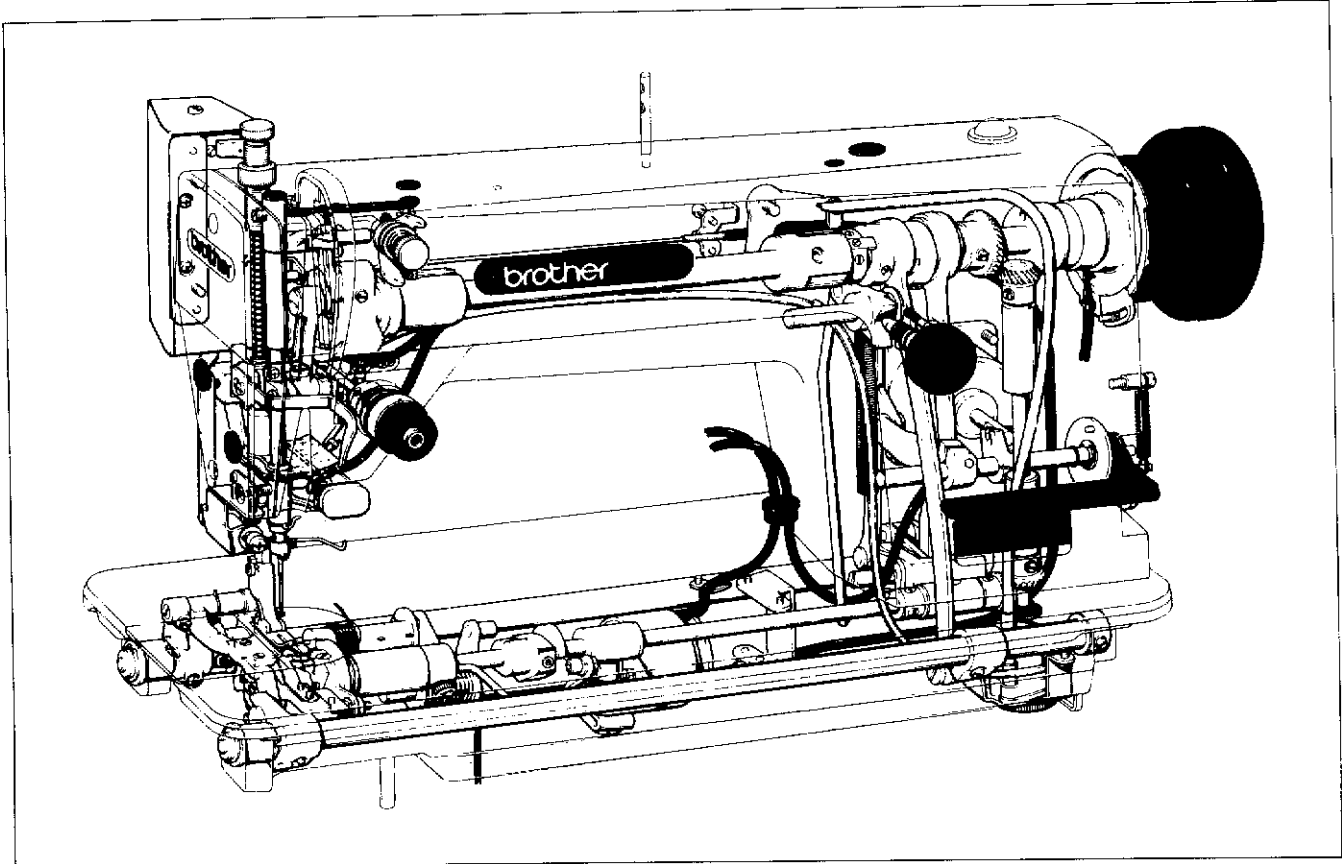


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SEWING MACHINE MODELS

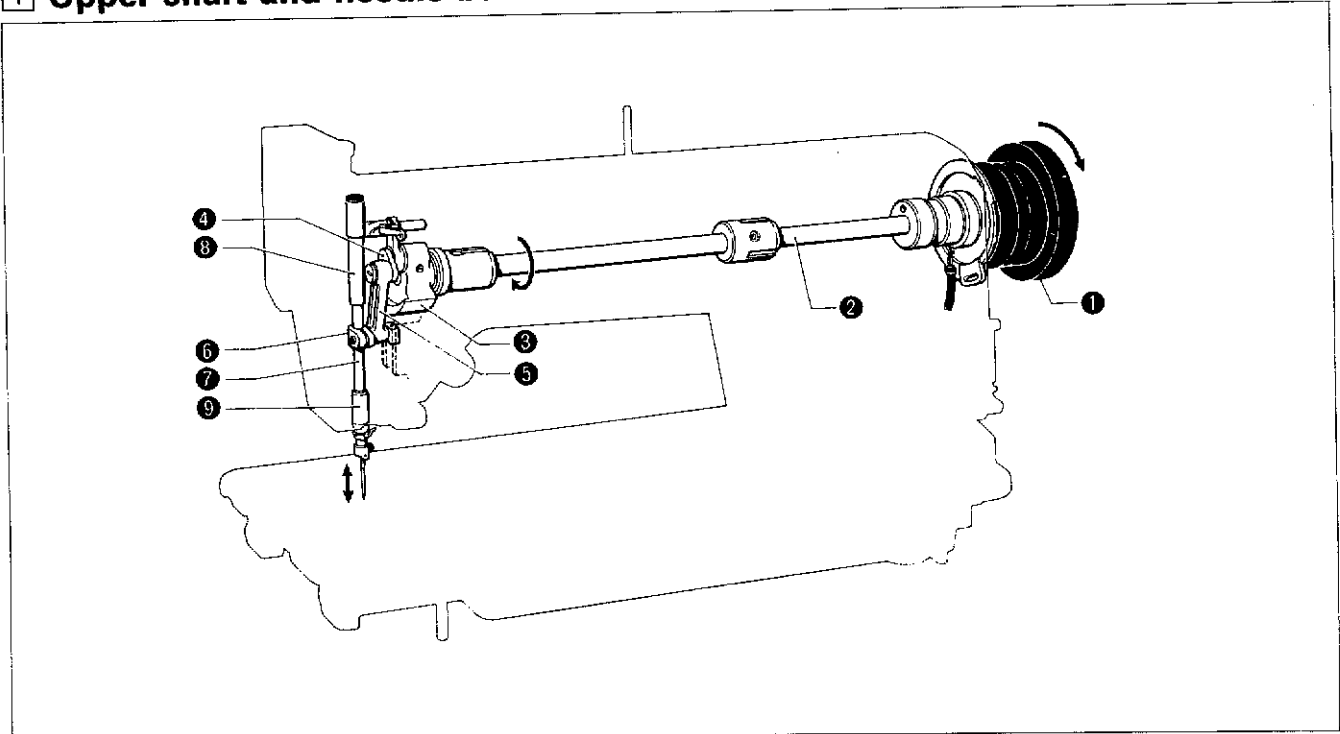


Sewing machine specifications

Subclass		-1	-3	-5
Application		Thin materials	Standard materials	Thick materials
Sewing speed		4,000 s.p.m	5,000 s.p.m	3,500 s.p.m
Maximum stitch length		4.2 mm		5 mm
Needle bar stroke		31.0 mm		35 mm
Thread take-up stroke		57.4 mm		61 mm
Feed dog height		0.8 mm		1.2 mm
Presser foot height	Presser bar lifter lever	6 mm		
	Knee lifter	11 mm		
	Automatic presser bar lifter	8 mm		
Presser bar pressure		3 ~ 6 kg		6 ~ 9 kg
Needle		DB x 1 #11		DB x 1 #22
Weight (including belt cover)		33 kg		

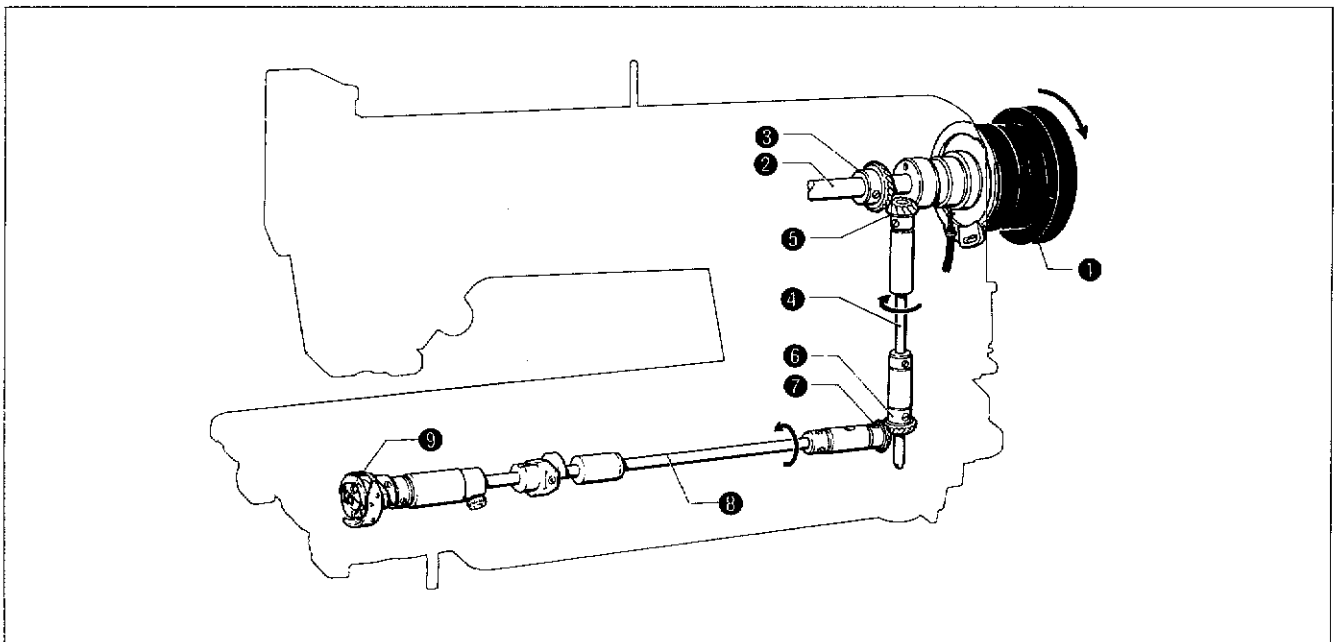
MECHANICAL DESCRIPTIONS

1 Upper shaft and needle bar mechanism



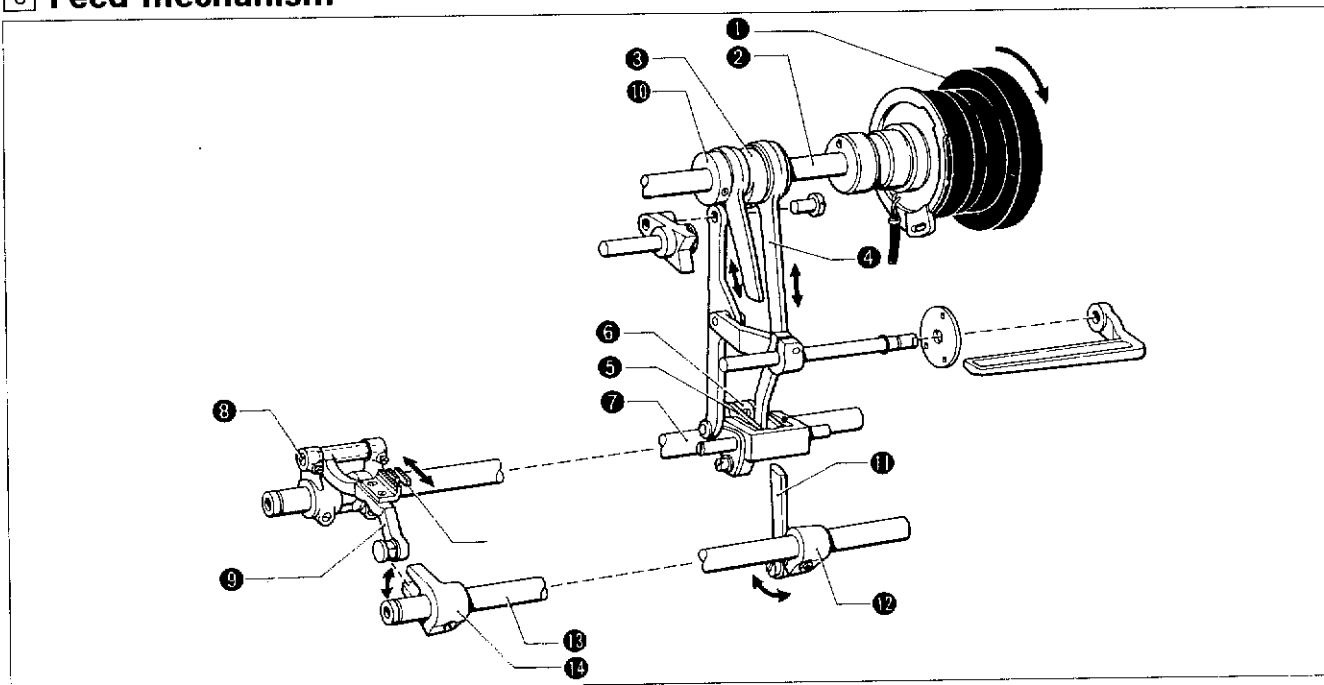
1. Turning the pulley ① rotates the upper shaft ②, which in turn causes the counter weight ③ to rotate.
2. The needle bar connecting link ⑤ is driven via the needle bar crank ④ connected to the counter weight ③.
3. The needle bar connecting link in turn drives the needle bar ⑦ connected to the needle bar clamp ⑥.
4. The needle bar is guided by the needle bar bushing U ⑧ and needle bar bushing D ⑨.

2 Lower shaft and rotary hook mechanism



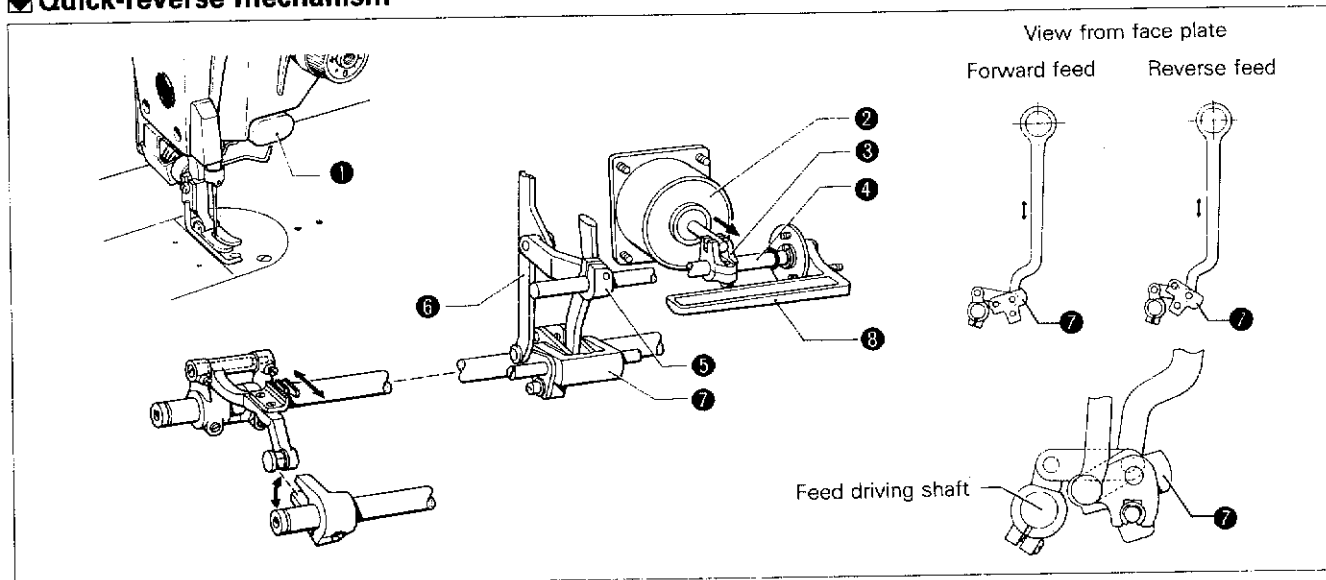
1. Rotation of the pulley ① is transferred from the upper shaft bevel gear ③ mounted on the upper shaft ② to drive the vertical shaft ④ via vertical shaft bevel gear U ⑤ mounted on the top of the vertical shaft ④.
2. Motion is relayed from the vertical shaft ④ via the vertical shaft bevel gear D ⑥ to the lower shaft bevel gear ⑦ to drive the lower shaft ⑧.
3. The high speed rotary hook ⑨ is driven in full revolutions by the lower shaft ⑧.

3 Feed mechanism



1. Turning the pulley ① relays a vertical motion to the feed rock shaft connecting rod ④ via the feed rock shaft eccentric ③ connected to the upper shaft ②.
2. The feed rock shaft crank ⑥ is driven in circular motion via the feed rock shaft crank link ⑤ connected to feed rock shaft connecting rod ④.
3. The motion of the feed rock shaft crank ⑥ is translated to the feed driving shaft ⑦.
4. The feed bar ⑨ is moved forward and back via the forking feed bar shaft ⑧ connected to the feed driving shaft ⑦.
5. The feed lifting eccentric ⑩ translates a vertical motion to the feed lifting connecting rod ⑪.
6. The feed lifting connecting rod ⑪ drives the connected feed lifting feed crank ⑫ in a circular motion.
7. The action of the feed lifting feed crank ⑫ is relayed to the feed lifting feed shaft ⑬.
8. The feed lifting feed shaft ⑬ drives the feed bar ⑨ up and down via the feed lifting crank ⑭.
9. The combined action of steps 4 and 8 above determines the action of the feed dog ⑮ connected to the feed bar ⑨.

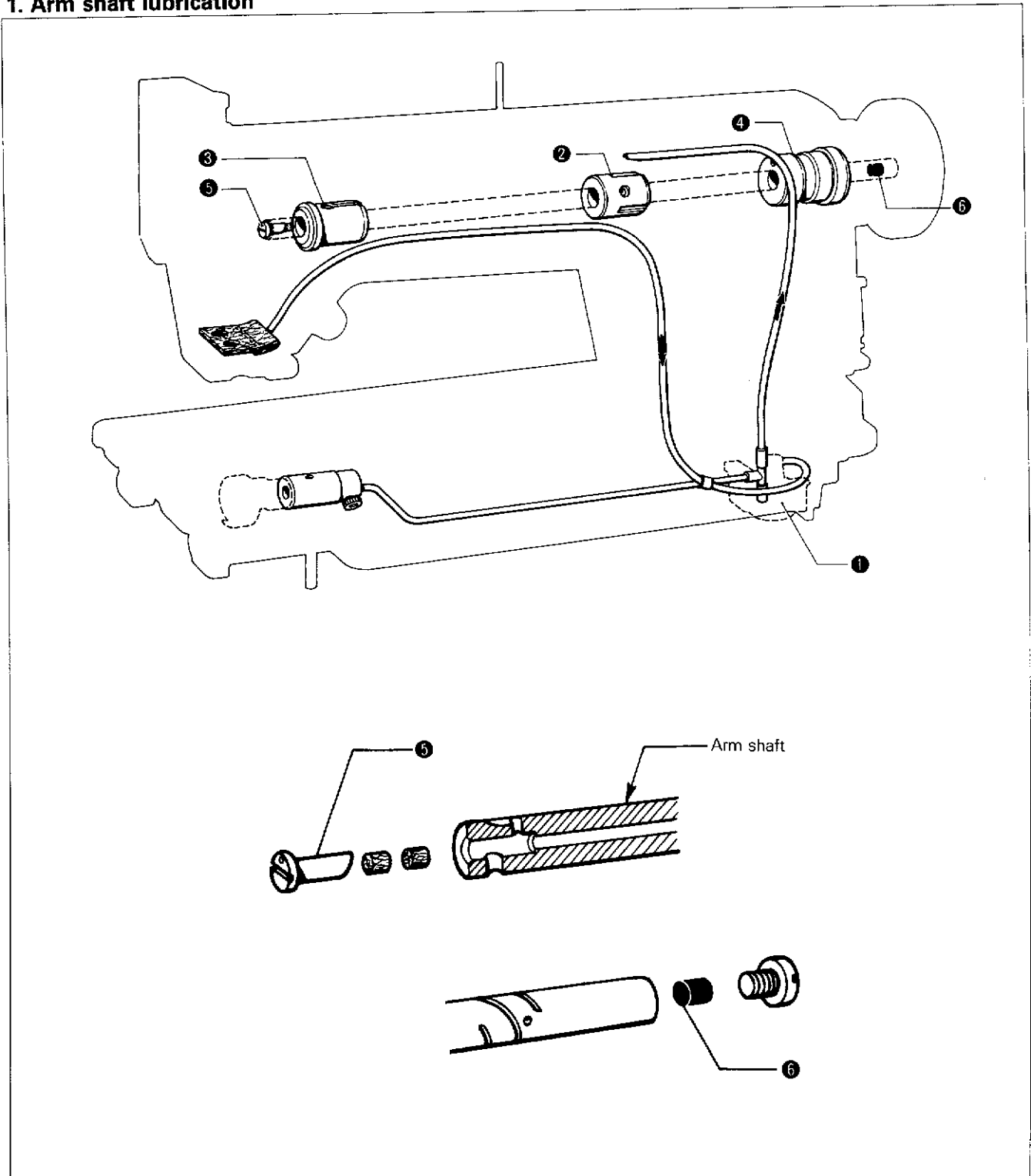
◆ Quick-reverse mechanism



1. Lightly pressing the actuator ① activates the reverse feed solenoid ② which drives the reverse lever shaft ④ via the solenoid lever ③.
 2. The reverse lever shaft ④ drives the switch block connector complete ⑥ via the lever ⑤ to change the facing of the switch block ⑦.
 3. By changing the facing of the switch block ⑦, the action of the feed rock shaft crank link and feed rock shaft crank changes from forward to reverse.
- * Lowering the reverse lever ⑧ effects the same action as described above.

4 Lubrication system

1. Arm shaft lubrication

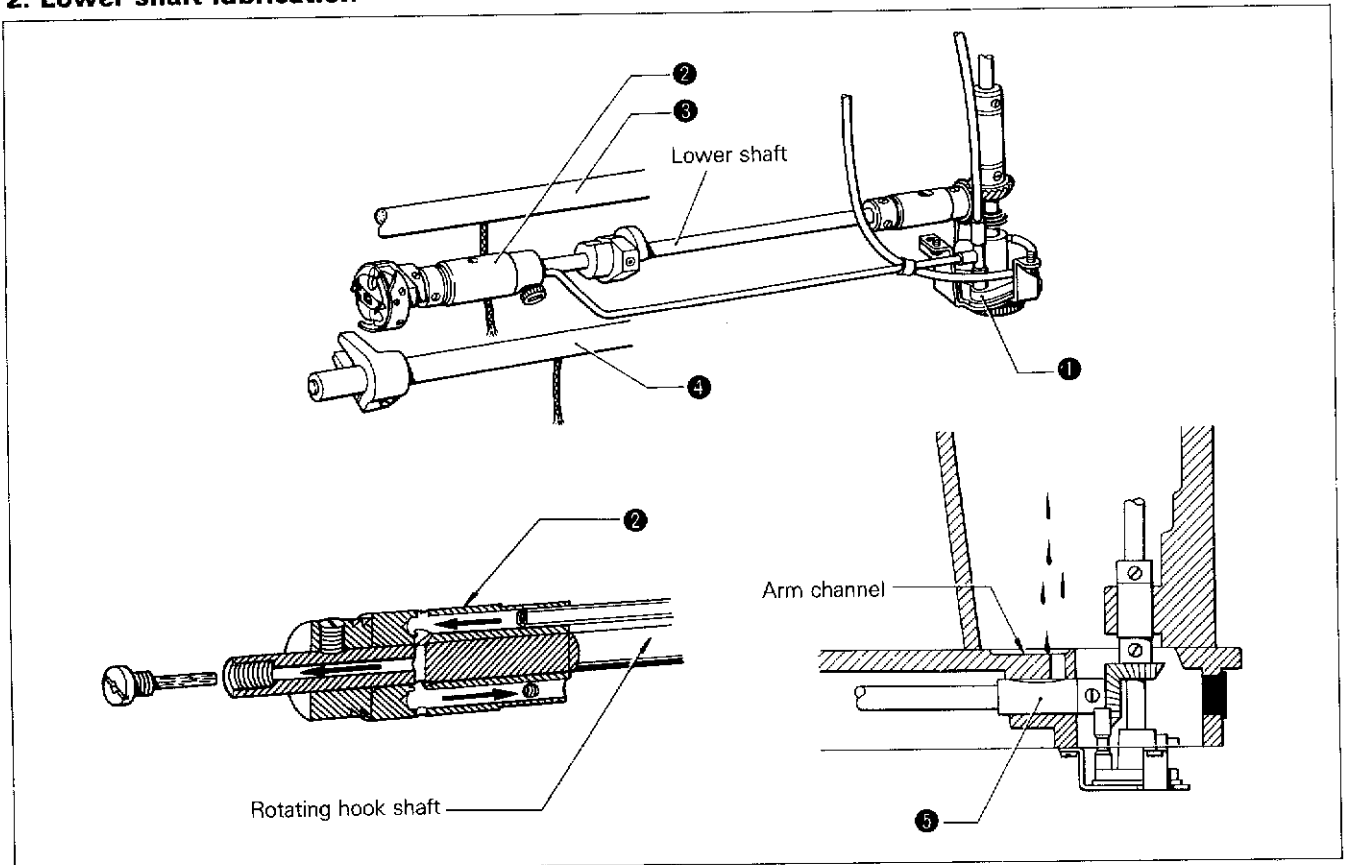


1. Oil fed by the pump ① enters the upper shaft from upper shaft bushing M ② to lubricate upper shaft bushing L ③ and R ④.

Oil sprayed inside the machine arm lubricates the feed regulator.

2. An oil fitting ⑤ is provided on the left end of the upper shaft for lubrication of the needle thread take-up via the thread take-up lever and needle bar crank.
3. A felt pad is attached to the needle bar crank to prevent excessive oil flow and lubrication tube blockage, and to lubricate the needle bar connecting link.
4. An oil cap ⑥ in the pulley clamp screw on the right end of the arm shaft prevents oil overflow.
5. Oil which collects in the needle bar end of the arm is absorbed by the felt pad and sucked back through the tube to the pump ①.

2. Lower shaft lubrication

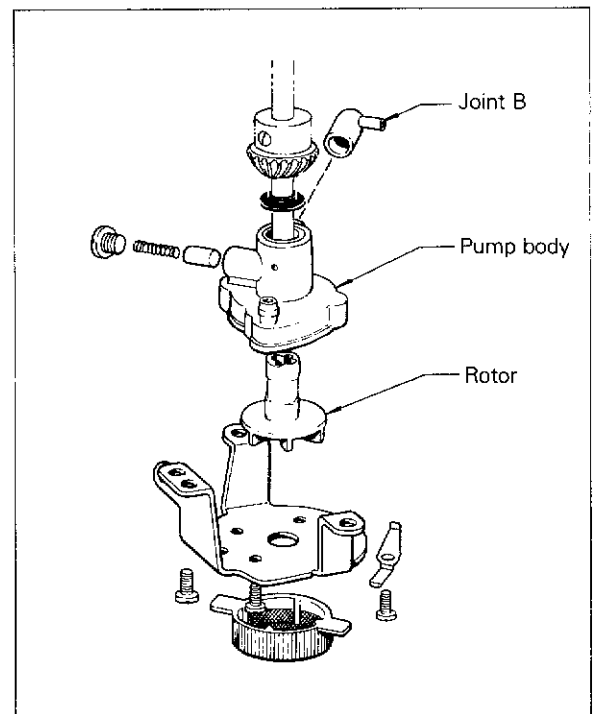


1. Oil fed by the pump ① lubricates the lower shaft and lower shaft bushing L ②.
2. Some of the oil at lower shaft bushing L ② flows through the lower shaft to lubricate the rotary hook. Oil shed by lower shaft bushing L ② returns to the oil pan.
3. Oil conducted by the wick lubricates the feed driving shaft ③ and feed lifting feed shaft ④.
4. Oil sprayed inside the arm lubricates lower shaft bushing R ⑤, feed driving shaft ③, and feed lifting feed shaft ④ from the channel in the arm.

3. Pump construction

Centrifugal force generated by the rotation of the rotor connected to the end of the vertical arm shaft raises oil through the hole in the center, and oil is fed to the lubrication tubes through the ports in the oil chamber.

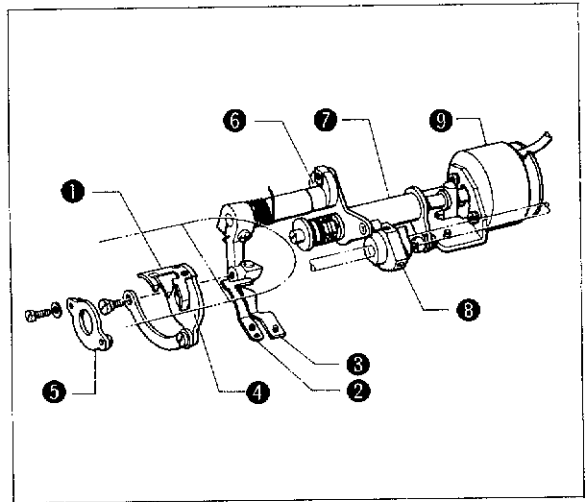
The plunger pump connected to the main pump body suction oil back from the felt pad in the machine arm.



5 Thread trimmer

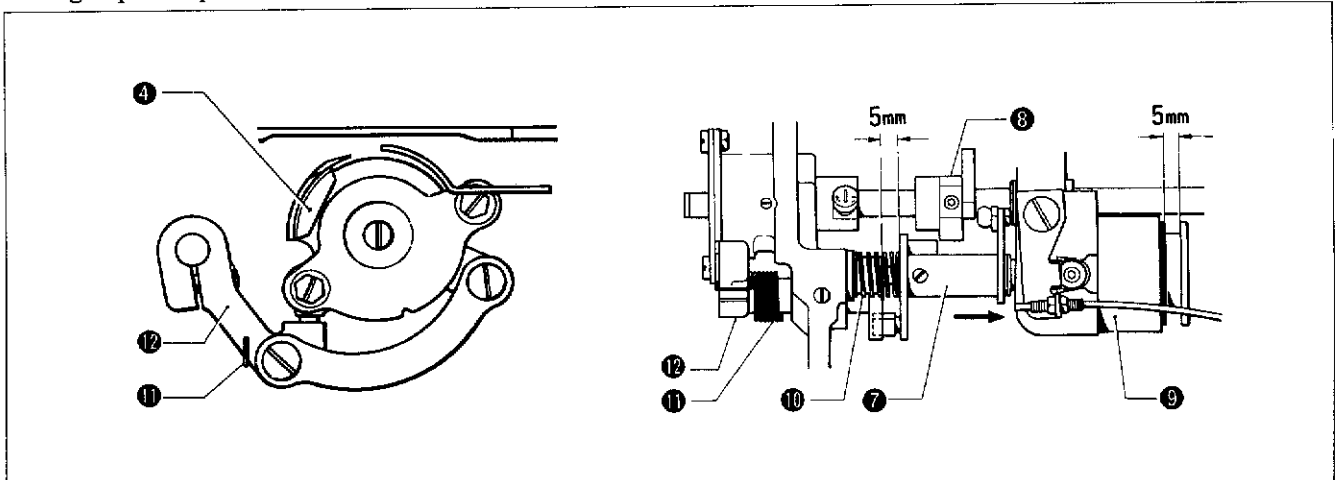
1. Thread trimmer mechanism

The thread trimmer mechanism consists of the movable knife ①, fixed knife ②, loop spreader ③, thread trimmer holder ④, thread trimmer holder clamp ⑤, feed fork shaft ⑥, thread trimmer cam lever complete ⑦, thread trimmer cam ⑧, and thread trimmer solenoid ⑨.



2. Thread trimmer operation (The figure below shows the thread trimmer without the high-speed rotary hook.)

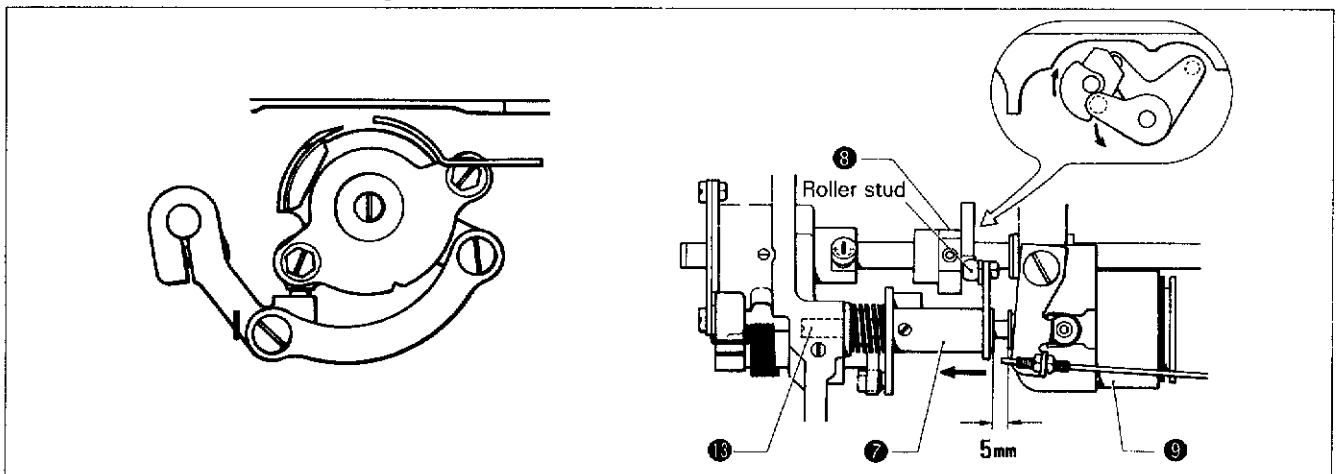
1. High-speed operation



★ The cam lever return spring ⑩ presses the thread trimmer solenoid ⑨, preventing the thread trimmer cam lever complete ⑦ from engaging with the thread trimmer cam ⑧. Accordingly, the thread trimmer holder ④ does not function.

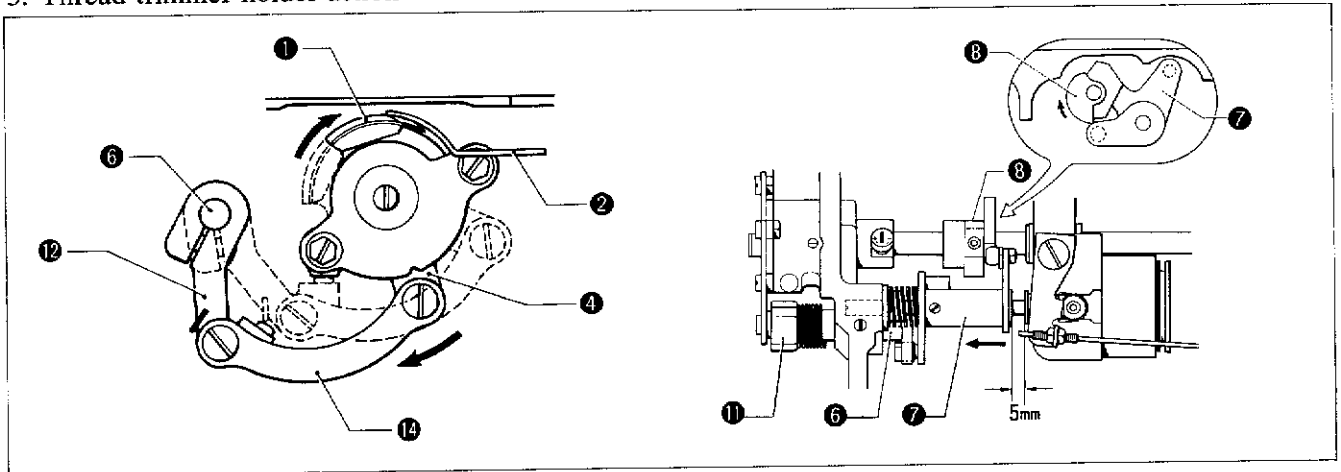
Also, spring ⑪ holds thread trimmer lever ⑫ and prevents thread trimmer ④ from shifting.

2. When the thread trimmer signal is received



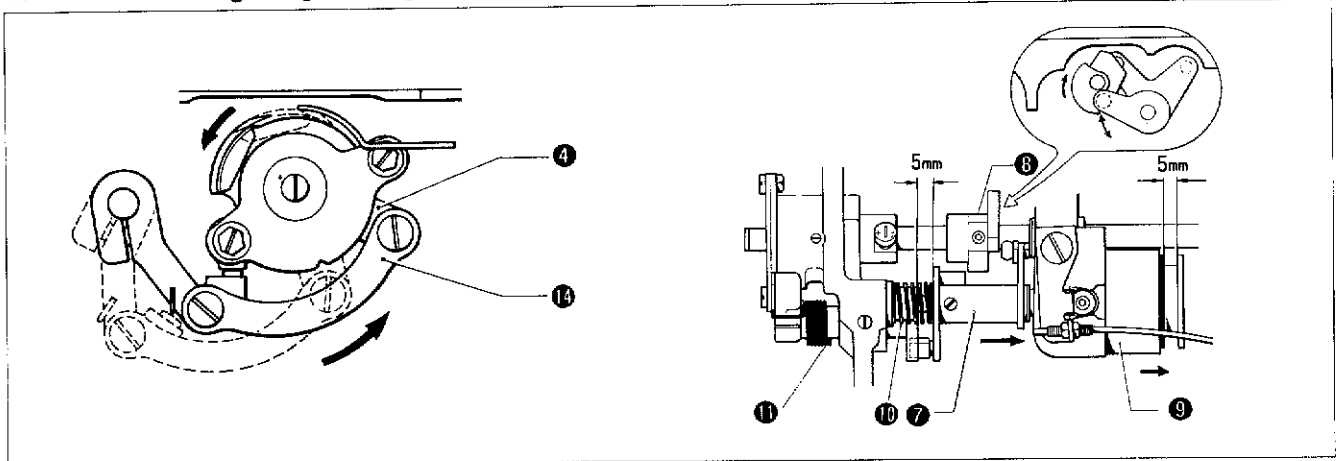
★ Pressing the treadle to reverse relays the thread trimmer signal, engaging the thread trimmer solenoid ⑨ and causing it to push the thread trimmer cam lever shaft ⑬. The roller stud (right) of the thread trimmer cam lever complete ⑦ connected to the cam lever shaft ⑬ moves around the perimeter of the thread trimmer cam ⑧.

3. Thread trimmer holder action



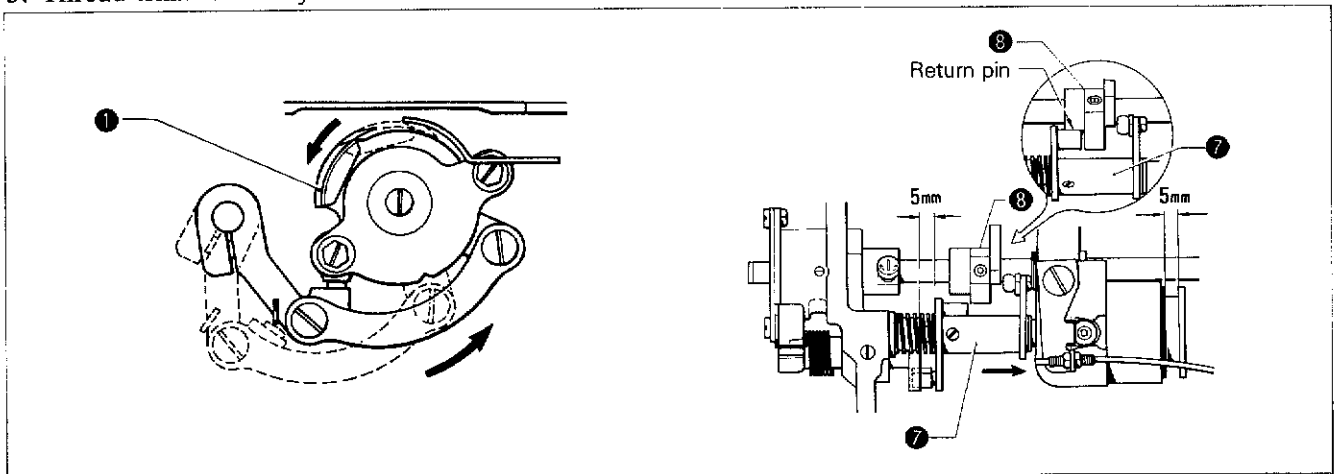
- ★ As the lower shaft and the thread trimmer cam 8 raises the roller stud (right), movement is relayed to the feed fork shaft 6 via the thread trimmer cam lever complete 7.
- ★ Movement is then relayed to thread holder 4 and thread trimmer connecting rod 14 via thread trimmer lever 12 connected to the feed fork shaft 6.
- ★ The movable knife 1 connected to thread trimmer holder 4 moves in the direction of the arrow and overlaps the fixed knife 2.

4. Thread trimming complete stop



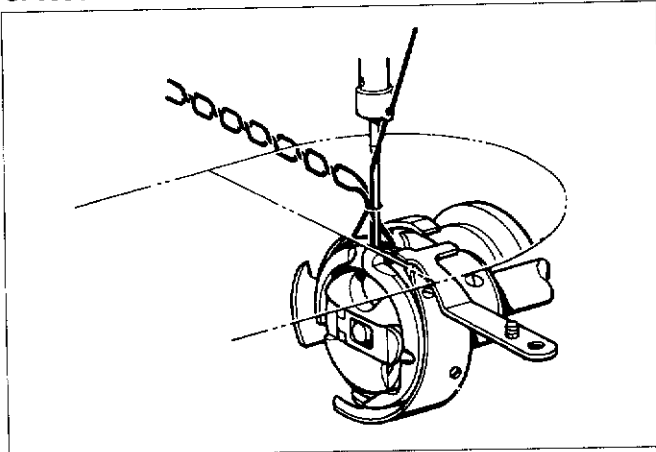
- ★ When the thread trimmer signal stops, the thread trimmer solenoid 9 retracts, the cam lever return spring 10 pushes the thread trimmer cam lever complete 7, and the roller stud of the thread trimmer cam lever complete 7 moves away from the thread trimmer cam 8.
- ★ The thread trimmer lever spring 11 returns the thread trimmer connecting rod 14 and thread trimmer holder 4 (in the direction of the arrow).

5. Thread trimmer safety device

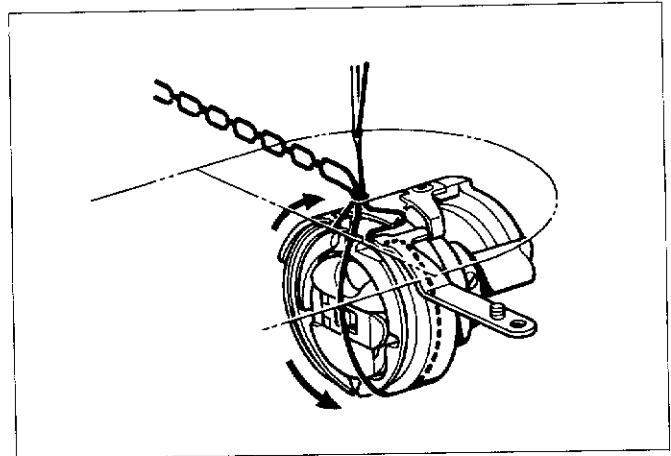


- ★ If the movable knife 1 does not completely retract, the return pin (left) of the thread trimmer cam lever complete 7 and the thread trimmer cam 8 automatically carry the movable knife 1 to a position where it will not strike the needle.

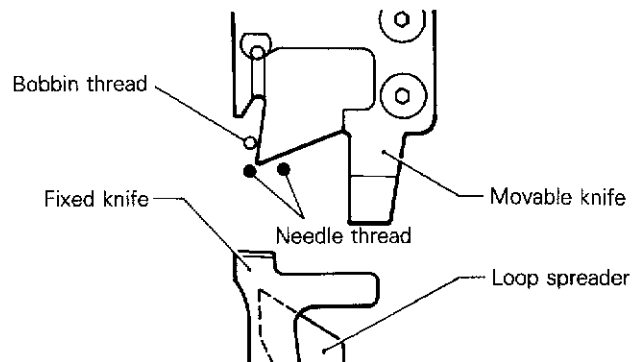
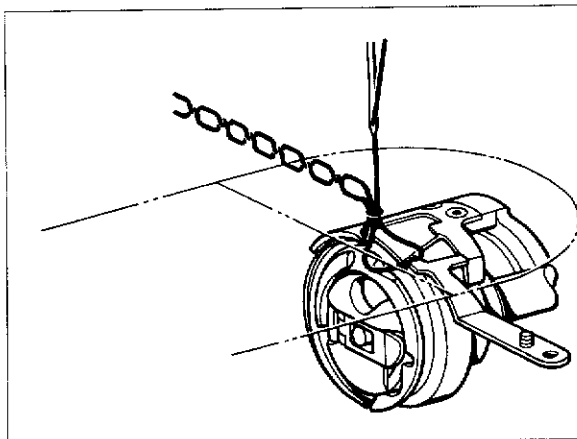
3. Needle and bobbin thread trimming



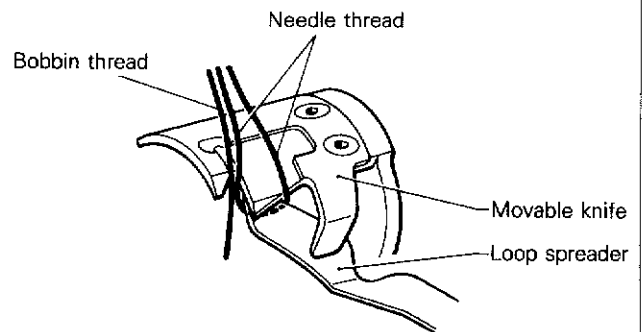
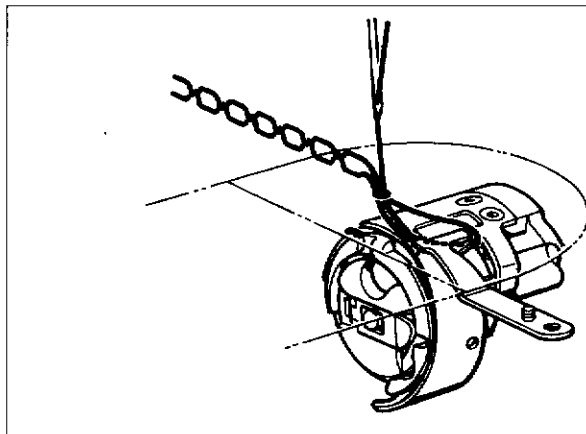
1. When the needle rises 1.8 mm (2.2 mm with thick materials) above the down position the rotary hook point catches the loop formed by the needle.



2. The thread trimmer signal is then relayed, and the thread trimmer cam drives the movable knife. The needle thread is caught by the rotary hook and fed around the shuttle body.



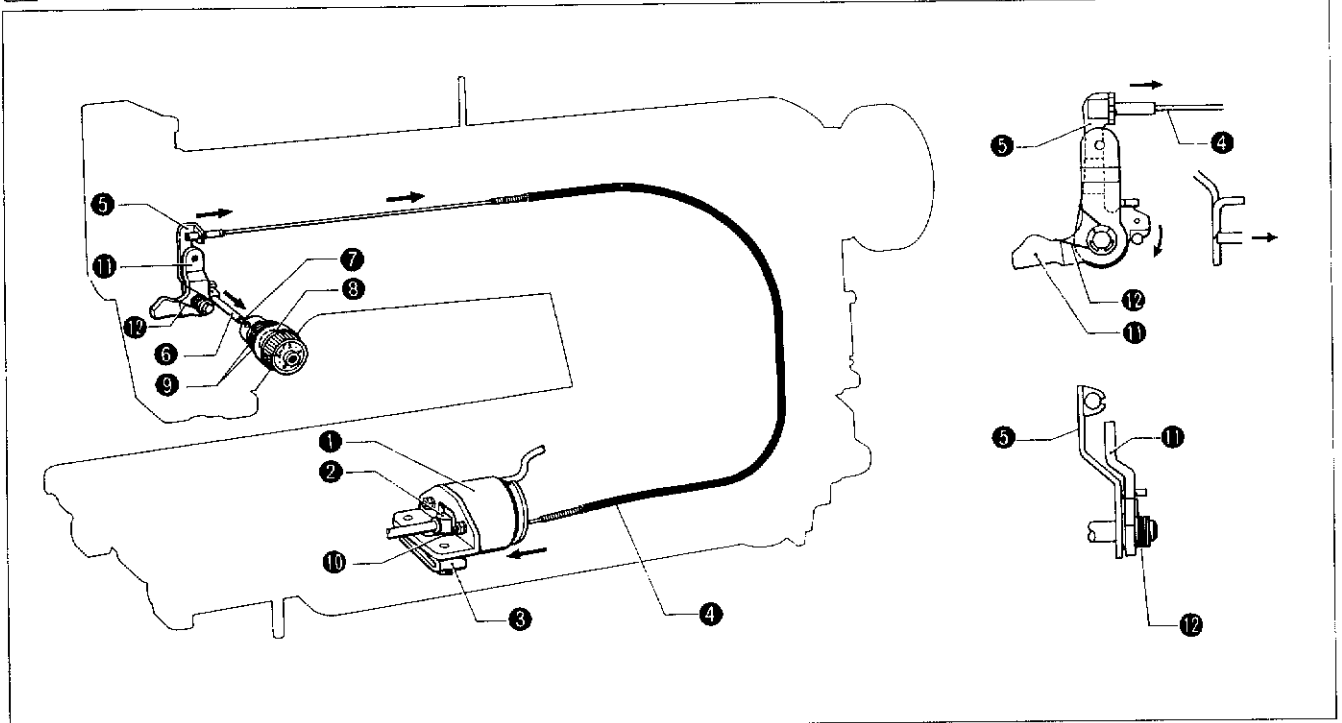
3. The movable knife tip enters the triangular loop formed underneath the needle plate by the rotary hook point, and needle and bobbin thread loop spreading occurs. At this point the needle thread take-up is raised slightly above the lowest position (the upper shaft has turned approximately 330°), and the needle thread has been spread by the thread trimmer as shown in the figure above. If the timing of the above movement is too early, loop spreading will not be performed properly, resulting in thread trimming errors.



As seen with fixed knife removed

4. The needle and bobbin threads caught by the movable knife in 3 above are gradually spread by the knife and loop spreader and cut by the fixed knife tip. The thread take-up has now approached the top of its stroke. When the knife is spreading the thread, the tension release relieves the needle thread tension to prevent excessive tension and to enable the needle thread to be smoothly extended. The length of thread spread by the movable knife determines the length of thread remaining from the needle tip and bobbin when thread trimming is complete, and effects stitch formation at the beginning of the next sewing procedure.

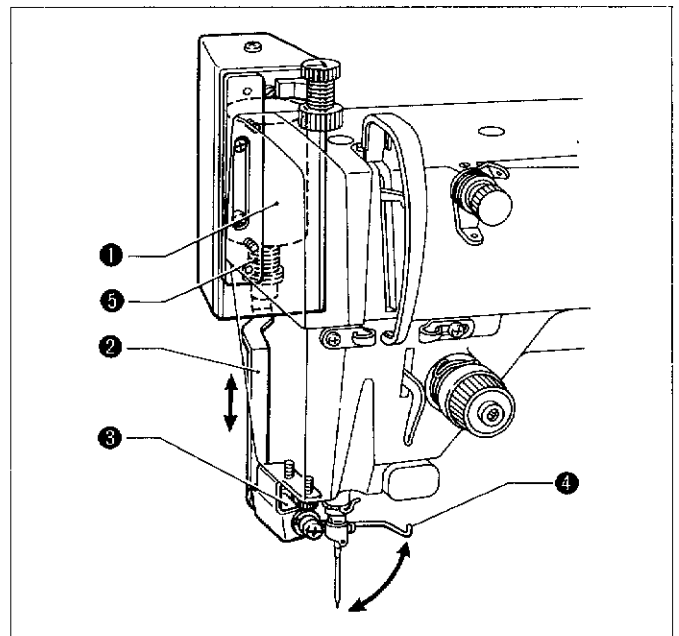
6 Tension release



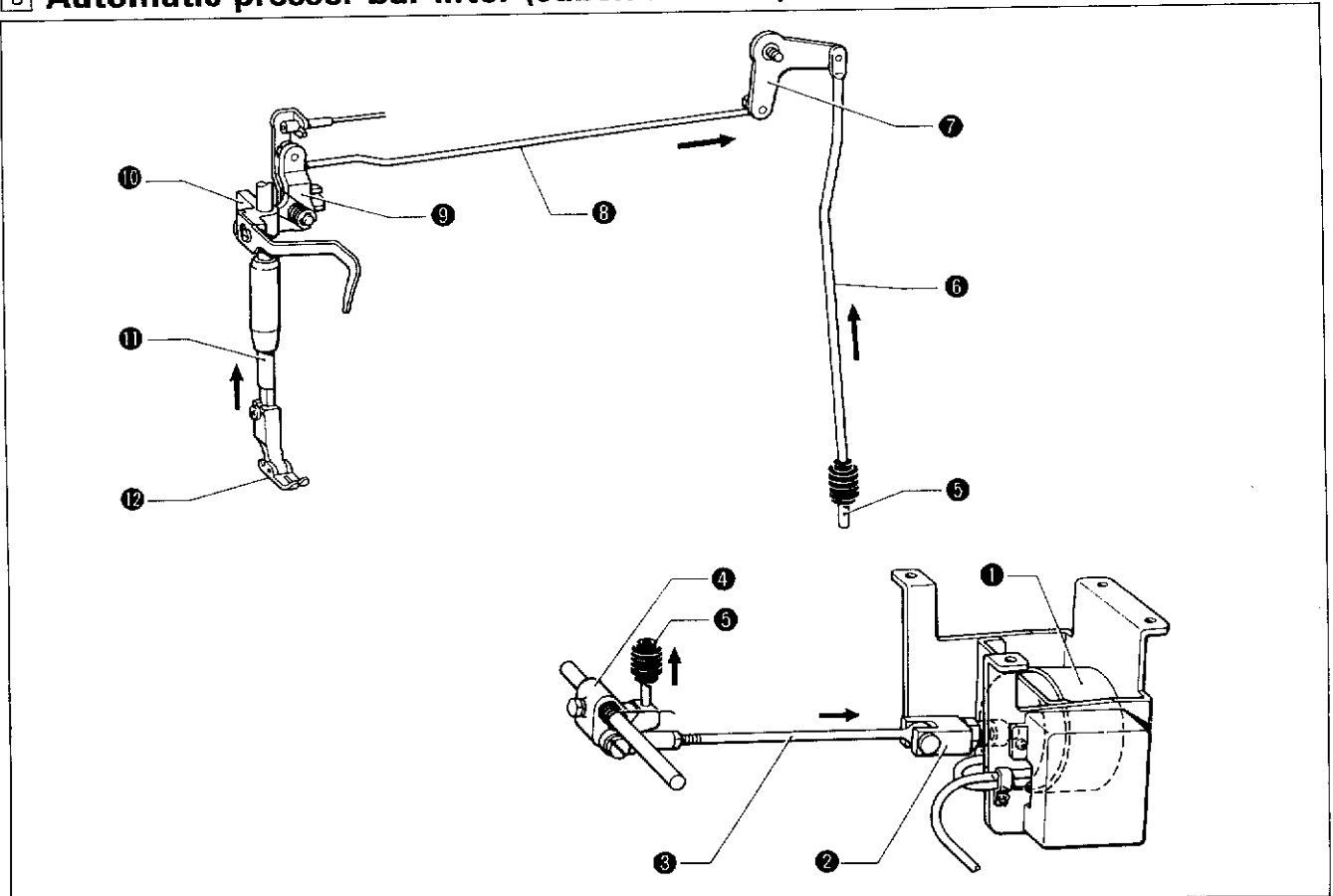
1. The thread trimmer solenoid ① operates when the thread trimmer signal is relayed.
2. The solenoid rod ② connected to the end of the thread trimmer solenoid ① pushes the tension release lever ③.
3. The tension release wire ④ relays the motion of tension release lever ③ to tension release slide ⑤.
4. The side of tension release slide ⑤ presses tension release bar ⑥.
5. Tension release bar ⑥ lifts tension release pin ⑦ and tension releasing disc ⑧.
6. Tension disc ⑨ is released when tension releasing disc ⑧ is raised.
7. When the thread trimmer signal stops, the solenoid rod ②, tension release lever ③, and wire ④ retract.
(Tension release spring ⑩ forces tension release lever ③ all the way back.)
- * When the presser foot is raised with the knee lifter, the knee lifter lifting lever ⑪ presses tension release slide ⑤. Subsequent action is the same as steps 4 through 9 above.
When the presser foot is lowered, spring ⑫ returns tension release slide ⑤.

7 Thread wiper (subclasses -400, -700, -900)

1. The thread wiper signal is relayed after thread trimming is completed, and the thread wiper solenoid ① lifts thread wiper rod ②.
2. Thread wiper rod ② drives the thread wiper crank assembly ③ connected to the end of the thread wiper rod ②.
3. Thread wiper ④ connected to the end of thread wiper crank assembly ③ wipes the thread.
4. When the thread wiper signal stops, spring ⑤ causes thread wiper solenoid ① to retract.



8 Automatic presser bar lifter (subclass -900)

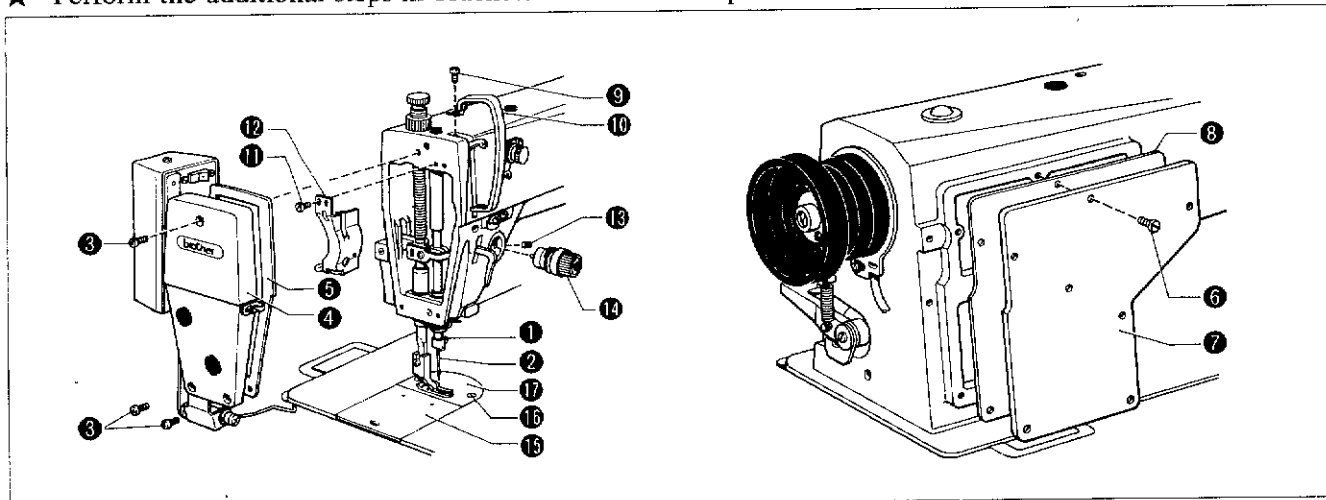


1. The presser bar lifter solenoid ① drives coupler ② and adjustment rod ③ when the knee switch is pressed.
2. Adjustment rod ③ lifts knee lifter complying bar ⑤ via presser bar lifter link ④.
3. Knee lifter complying bar ⑤ lifts presser bar guide bracket ⑩ via knee lifter connecting rod ⑥, knee lifter lever ⑦, connector ⑧, and knee lifter lifting lever ⑨.
4. Presser bar ⑪ and presser foot ⑫ connected to presser bar guide bracket ⑩ are lifted.

DISASSEMBLY

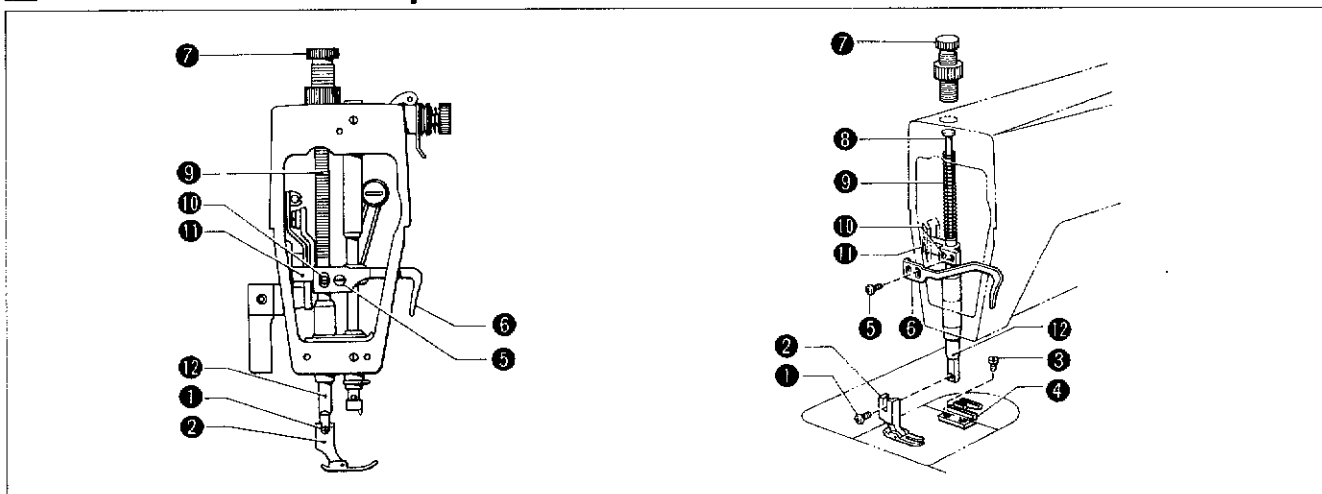
1 Machine cover

★ Perform the additional steps in brackets if the thread wiper is installed.



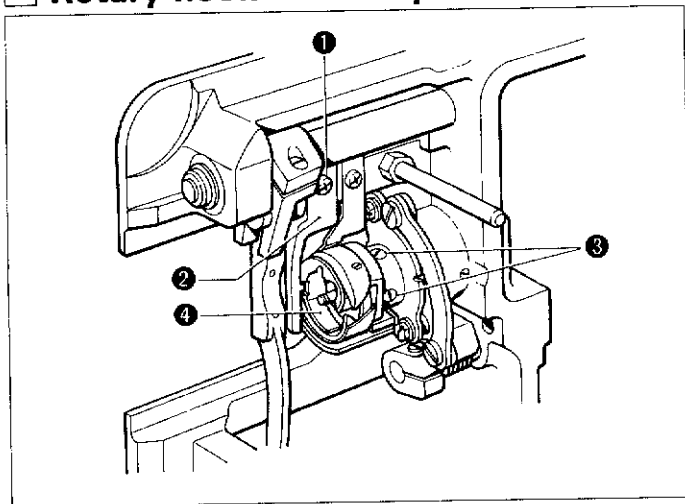
1. Loosen screw ①, and remove needle ②.
(Loosen the screw and remove the thread wiper cord from the clap.)
 2. Loosen the three screws ③, and remove face plate ④ and gasket ⑤.
 3. Loosen the seven screws ⑥, and remove rear cover ⑦ and gasket ⑧.
 4. Remove screw ⑨, and remove take-up cover ⑩.
 5. Remove the two screws ⑪, and remove thread take-up oil plate ⑫.
 6. Loosen screw ⑬, and remove thread take-up spring regulator ⑭.
 7. Remove slide plate ⑮.
 8. Remove the two screws ⑯, and remove needle plate ⑰.
- * The thread wiper is mounted on face plate ④. Refer to page 31 for thread wiper removal.

2 Presser foot assembly



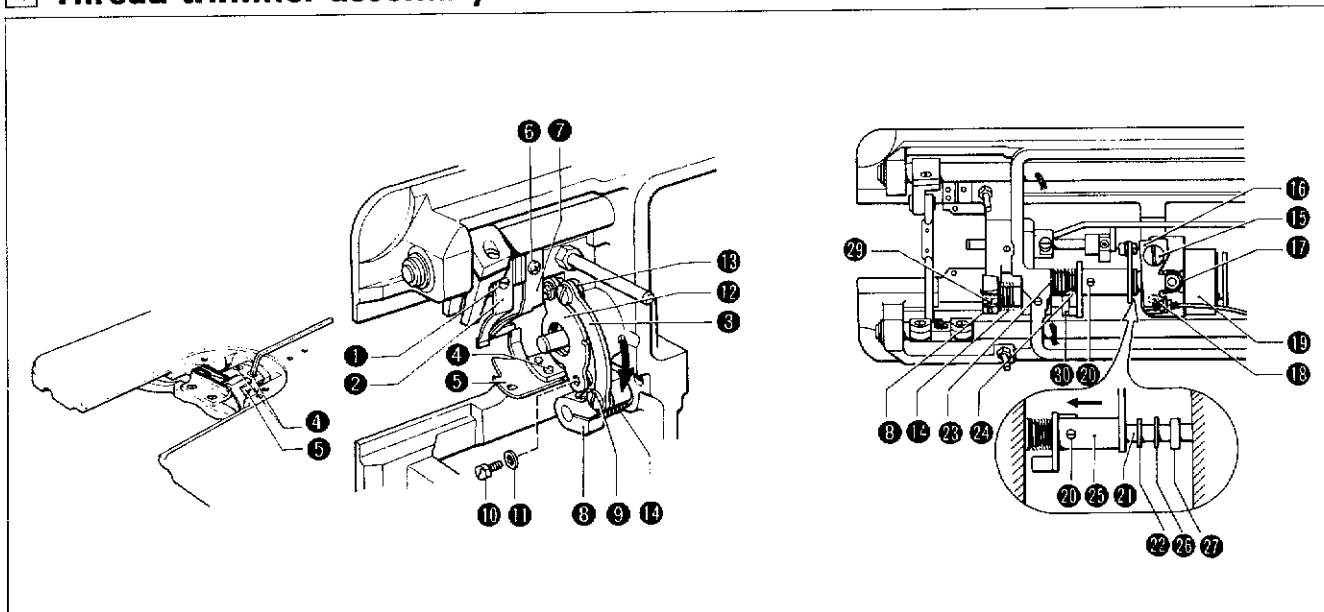
1. Remove screw ①, and remove presser foot ②.
2. Remove the two screws ③, and remove feed dog ④.
3. Remove screw ⑤, and remove presser bar guide bracket thread guide ⑥.
4. Remove presser foot adjustment screw ⑦, and remove spring guide ⑧ and spring ⑨.
5. Loosen screw ⑩ and remove presser bar guide bracket ⑪ and presser bar ⑫.
(Remove presser bar ⑫ from the arm top.)

3 Rotary hook assembly



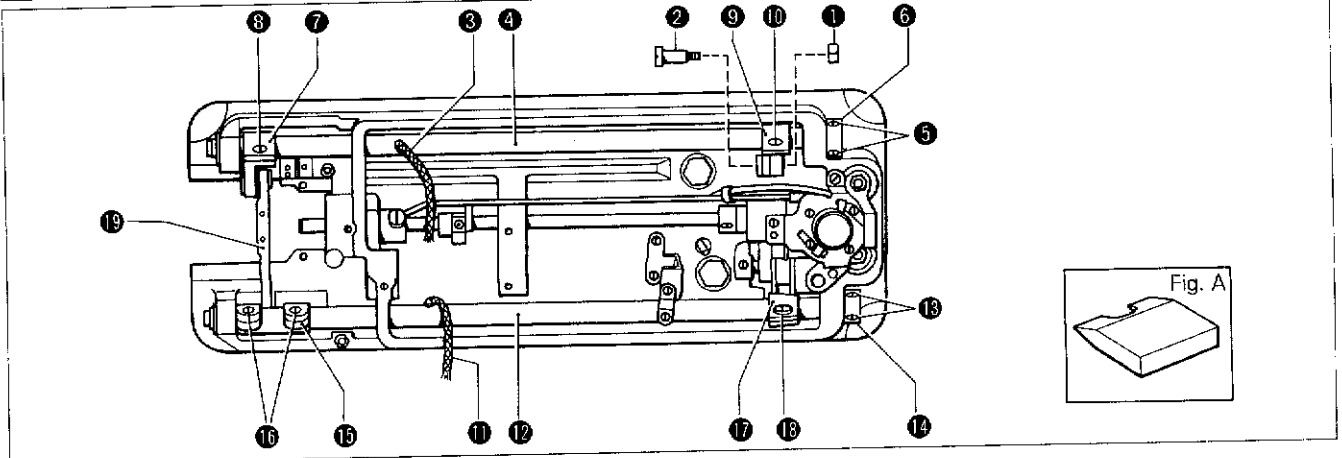
1. Tilt the machine.
2. Remove screw 1, and remove shuttle body stop 2.
3. Loosen the three screws 3 and remove high speed rotary hook 4.

4 Thread trimmer assembly



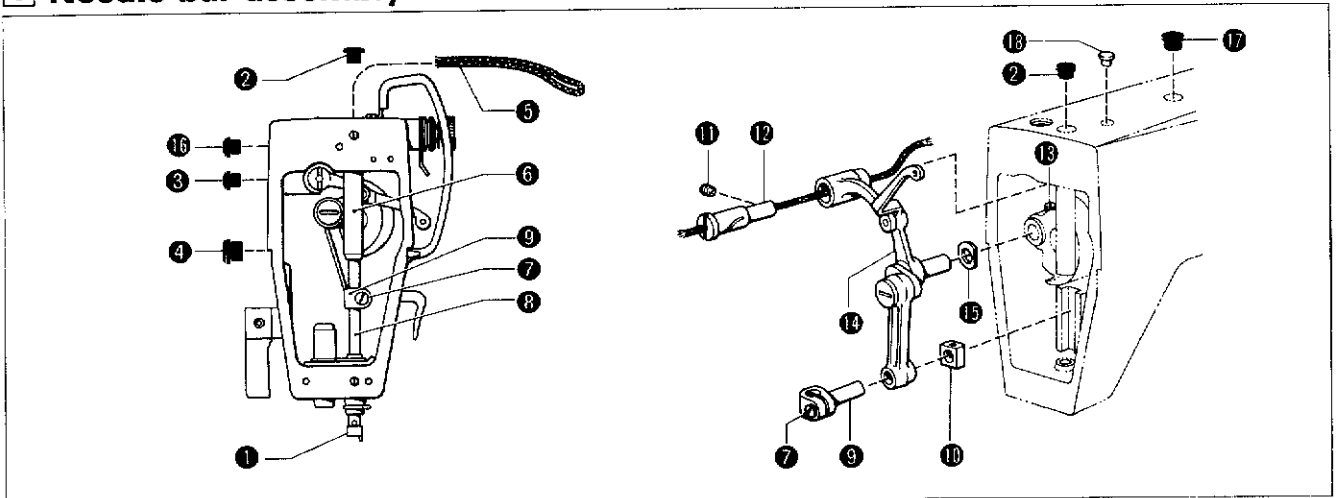
1. Remove screw 1 and remove fixed knife 2.
 2. Press thread trimmer connecting rod 3 in the direction of the arrow until the two flat screws 4 are visible.
 3. Remove screws 4, and remove movable knife 5.
 4. Remove screw 6, and remove loop spreader 7.
 5. Remove screw 9 securing thread trimmer lever 8 and connecting rod 3.
 6. Remove the two hex bolts 10, and remove washer 11, thread trimmer holder clamp 12, thread trimmer holder 13, and connecting rod 3.
 7. Remove thread trimmer lever spring 14 from thread trimmer lever 8.
 8. Remove screw 15, and remove tension release lever 16 and spring 17.
 9. Remove screw 18, and remove thread trimmer solenoid 19.
 10. Loosen screw 20, move thread trimmer cam lever shaft 21 in the direction of the arrow, and remove snap ring 22.
 11. Remove the thread trimmer cam lever shaft 21 to the right.
 12. Remove collar 23, spring 24, thread trimmer cam lever complete 25, washer 26, and cushion 27.
 13. Remove screw 29, and remove thread trimmer lever 8, spring 14, and feed fork shaft 30.
- * If the thread trimmer solenoid is not to be removed, lightly tighten screws 18 and 15.
Refer to page 30 for thread trimmer solenoid removal.

5 Feed assembly



1. Loosen nut **1**, and remove screw **2**.
2. Remove wick **3** from feed lifting feed shaft **4** (if feed shaft **4** is to be removed).
3. Loosen the two screws **5**, and remove collar **6**.
4. Loosen screw **8** to the feed lifting crank **7** and screw **10** to the feed lifting feed crank **9**.
5. Insert a wedge (Fig. A) between feed lifting crank **7** and feed lifting feed crank **9**, and remove feed lifting feed shaft **4**. (Feed lifting crank **7** and feed lifting feed crank **9** will come off.)
6. Remove wick **11** from feed driving shaft **12** (if the feed driving shaft **12** is to be removed).
7. Loosen the two screws **13**, and remove collar **14**.
8. Loosen the two set screws **16** of forked feed bar shaft **15** and screw **18** of feed rock shaft crank **17**.
9. Insert a wedge (Fig. A) between forked feed bar shaft **15** and feed rock shaft crank **17**, and remove feed driving shaft **12**. (Forked feed bar shaft **15** will come off.)
(Forked feed bar shaft **15** will come off. Feed bar **19** is connected to forked feed bar shaft **15**.)

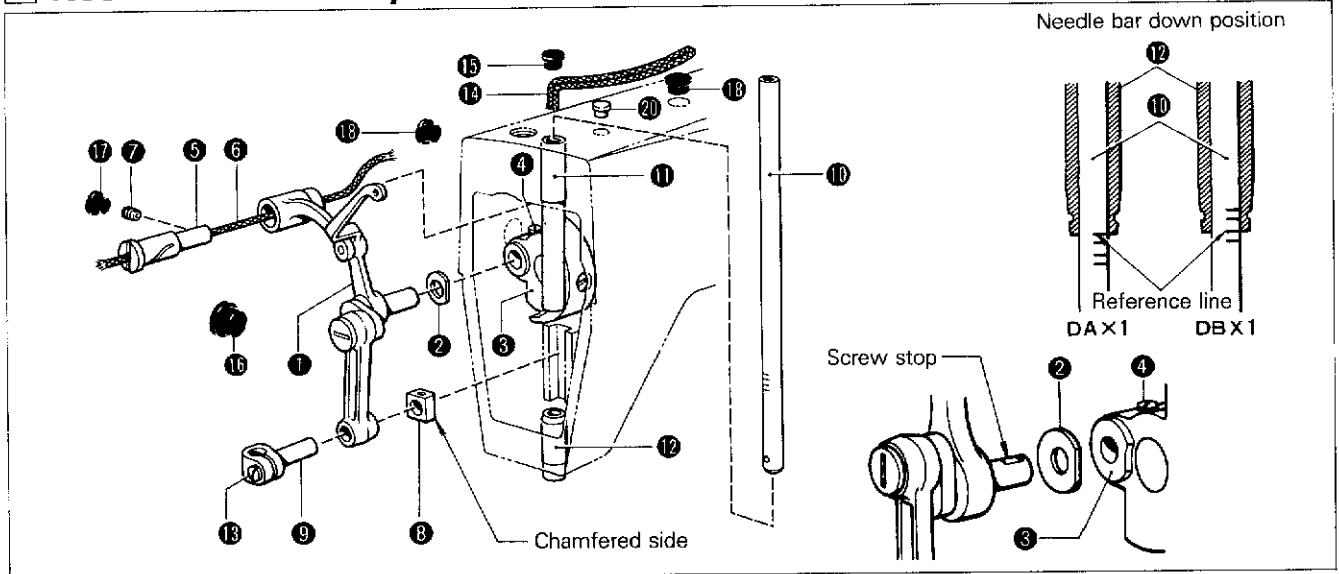
6 Needle bar assembly



1. Raise the machine.
2. Remove needle bar thread guide **1**.
3. Remove cap **2** and plugs **3** **4**.
4. Remove wick **5** from the top of needle bar bushing U **6**.
5. Loosen screw **7**, and remove needle bar **8** and needle bar clamp **9**. (Slide block **10** will come off.)
6. Loosen screw **11**, and remove thread take-up support **12**.
7. Loosen the two screws **13**, and remove needle bar connecting link **14**. (Washer **15** will come off.)
8. Remove plugs **16** **17**, and oil cap **18**. (These must be removed to replace the wick.)

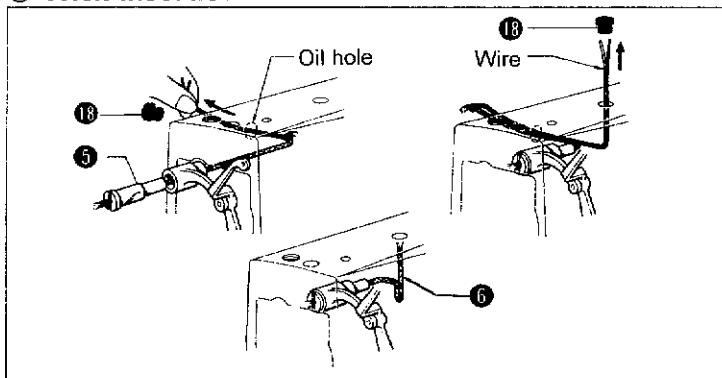
ASSEMBLY

1 Needle bar assembly



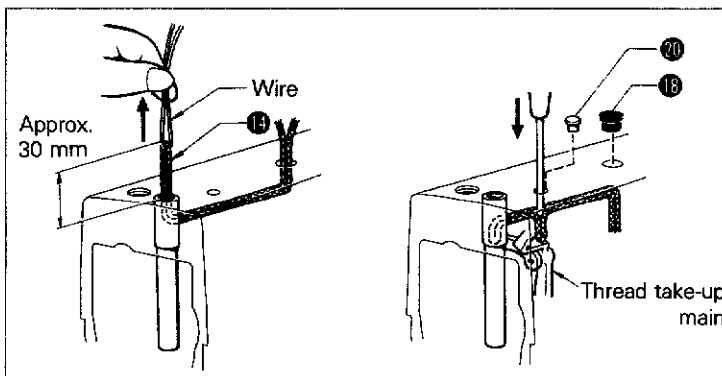
1. Secure the needle bar connecting link **1** and washer **2** to the thread take-up crank **3** with screw **4**.
* See the figure above for the correct position of the needle bar crank screw stop.
2. Pass the wick **6** through the thread take-up support **5**.
3. Slide the thread take-up support **5** into the thread take-up main while fitting it into the arm, and then secure the support **5** with screw **7**.
4. Slide the slide block **8** into the channel, and then slide the needle bar clamp **9** into the needle bar connecting link and slide block **8**.
(Be sure the chamfered side of the slide block is facing the inside.)
5. Insert the needle bar **10** from the top of needle bar bushing U **11** through needle bar clamp **9**.
6. Turn the pulley to lower the needle bar to the down position.
7. Align the needle bar **10** reference line with the bottom edge of needle bar bushing D **12**, and tighten screw **13**. (The reference line must be adjusted to the needle in use.)
8. Insert the wick **14** from the top of the arm. (See the figure below.)
9. Replace cap **15**, plugs **16** **17** **18** **19**, and oil cap **20**.

Wick insertion



1. Pass the wick **6** through the thread take-up support **5**.
2. Pass a thin wire through the oil hole on the arm side and pull the wick **6** out.
3. Pass a thin wire through the oil hole on the arm top and pull the wick **6** out.
4. Set one end of the wick **6** to the end of the thread take-up support **5** and the other in the oil hole **6**.

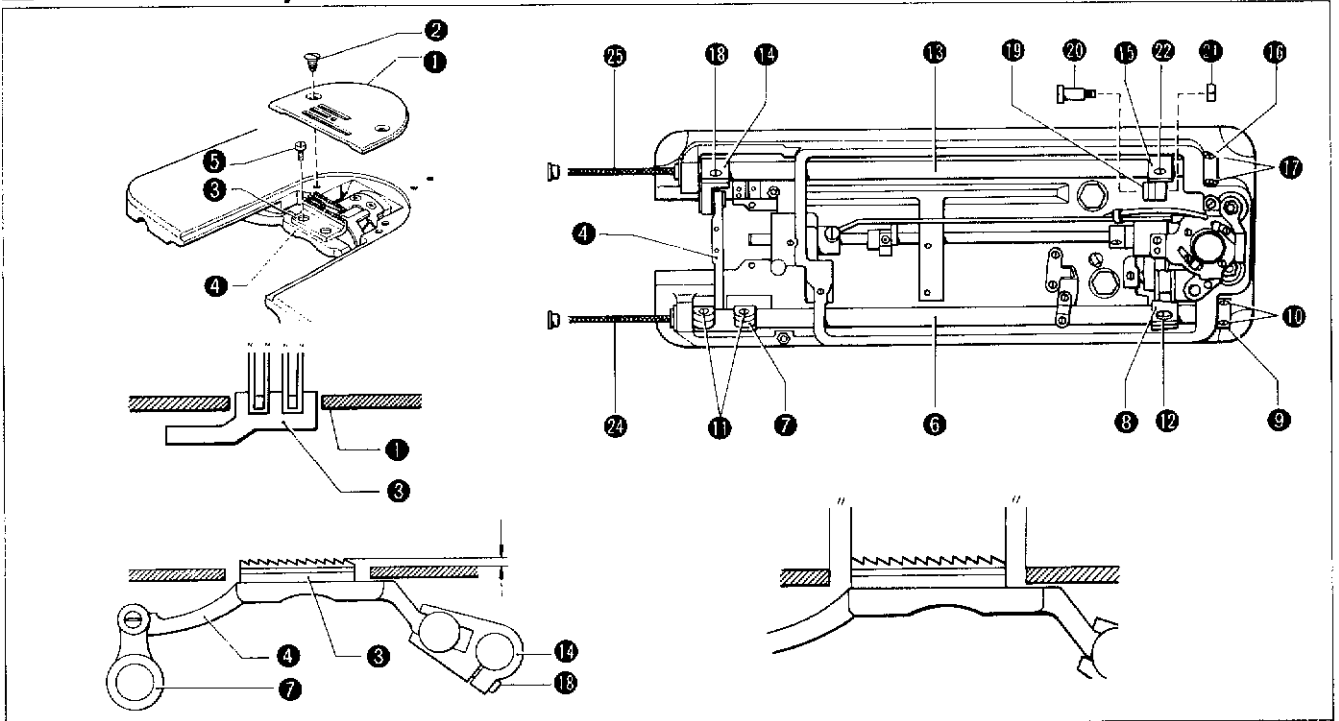
* Wick length: approx. 110 mm



1. Pass wick **14** through the arm top.
2. Extend approx. 30 mm of wick from the side of needle bar bushing **11**.
3. Turn the pulley to raise the thread take-up to the top of its stroke.
4. Insert the wick **14** as shown in the top figure until it contacts the top of the thread take-up main.
5. Insert both ends of the wick **14** in the holes.

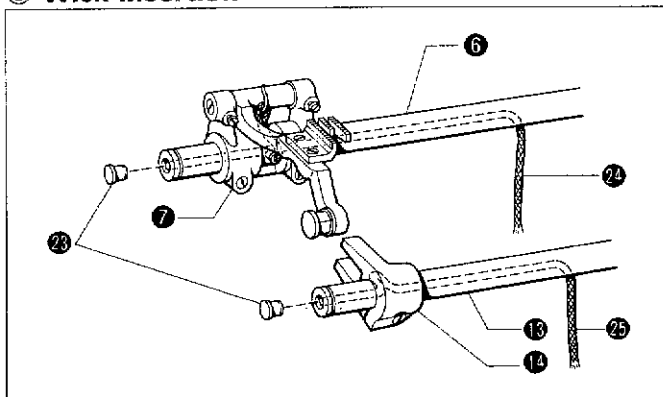
* Wick length: approx. 300 mm

2 Feed assembly



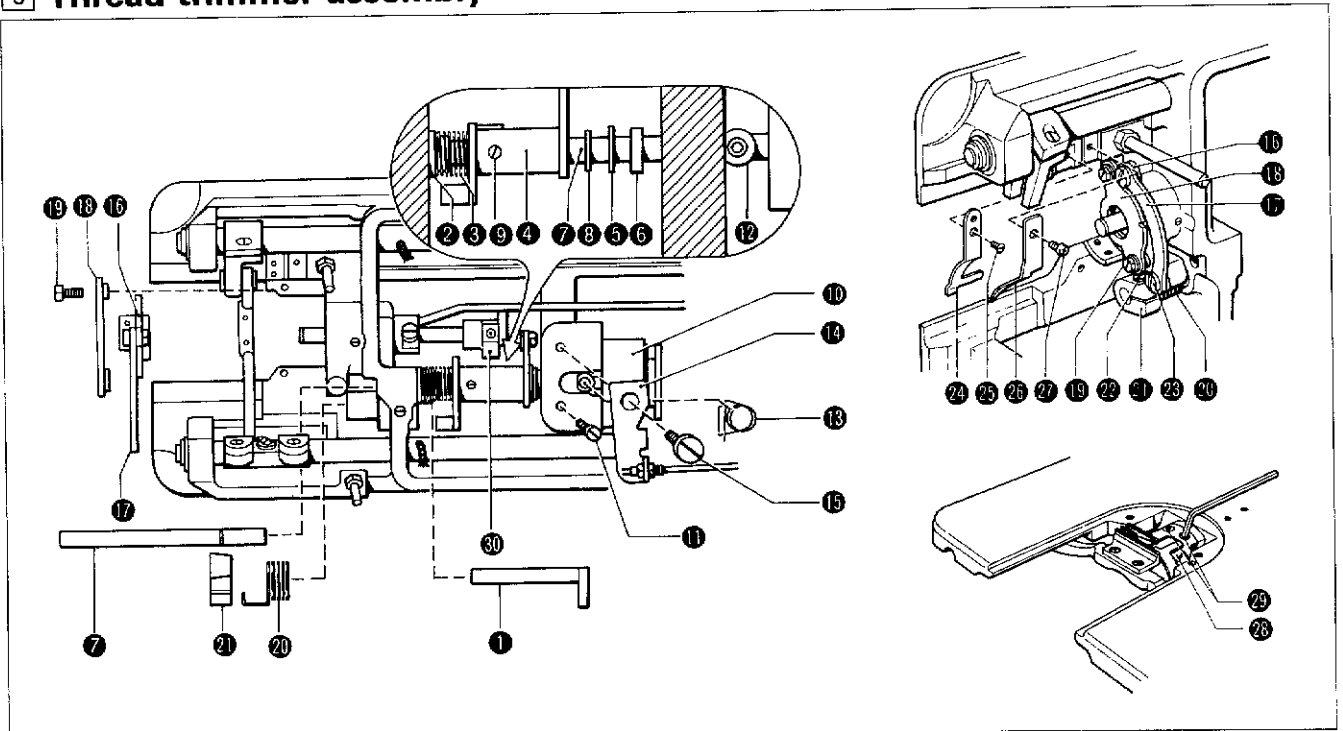
1. Secure needle plate 1 with screw 2.
 2. Tilt the machine.
 3. Secure the feed dog 3 to the feed bar 4 with screw 5.
 4. Pass feed driving shaft 6 through forked feed bar crank 7 and feed rock shaft crank 8, and secure it with collar 9 and the two screws 10 so that it is not loose but moves easily.
 5. Center the feed dog 3 in the needle plate 1, and tighten the two set screws 11 in the forked feed bar arm 7.
 6. Tighten screw 12 so the feed rock shaft crank 8 moves easily.
 7. Pass the feed lifting feed shaft 13 through the feed lifting crank 14 and feed lifting feed shaft 15, and lightly tighten collar 16 and the two screws 17 so it moves easily but is not loose.
 8. Slide the slide block on the feed bar 4 into the feed lifting crank 14, and tighten screw 18.
 9. Secure feed lifting feed shaft 15 and feed lifting connecting rod 19 with screw 20 and nut 21.
 10. Secure feed lifting feed shaft 15 with screw 22.
 11. Set the feed amount to minimum and turn the pulley.
 12. Loosen screw 18 and adjust the feed dog 3 so it extends 0.8 mm (subclasses -1, -3) or 1.2 mm (sub-class -5) from the needle plate.
 13. Set the feed amount to maximum and turn the pulley.
 14. Loosen the two screws 11 and adjust the feed dog 3 so it is centered both left-right and front-back.
- * Make sure the pulley will turn easily. Firmly tighten all screws.
- * When the feed driving shaft and feed lifting feed shaft have been removed be sure to replace the wick and lubricate the forked feed bar crank 7 and feed lifting crank 14.

Wick insertion



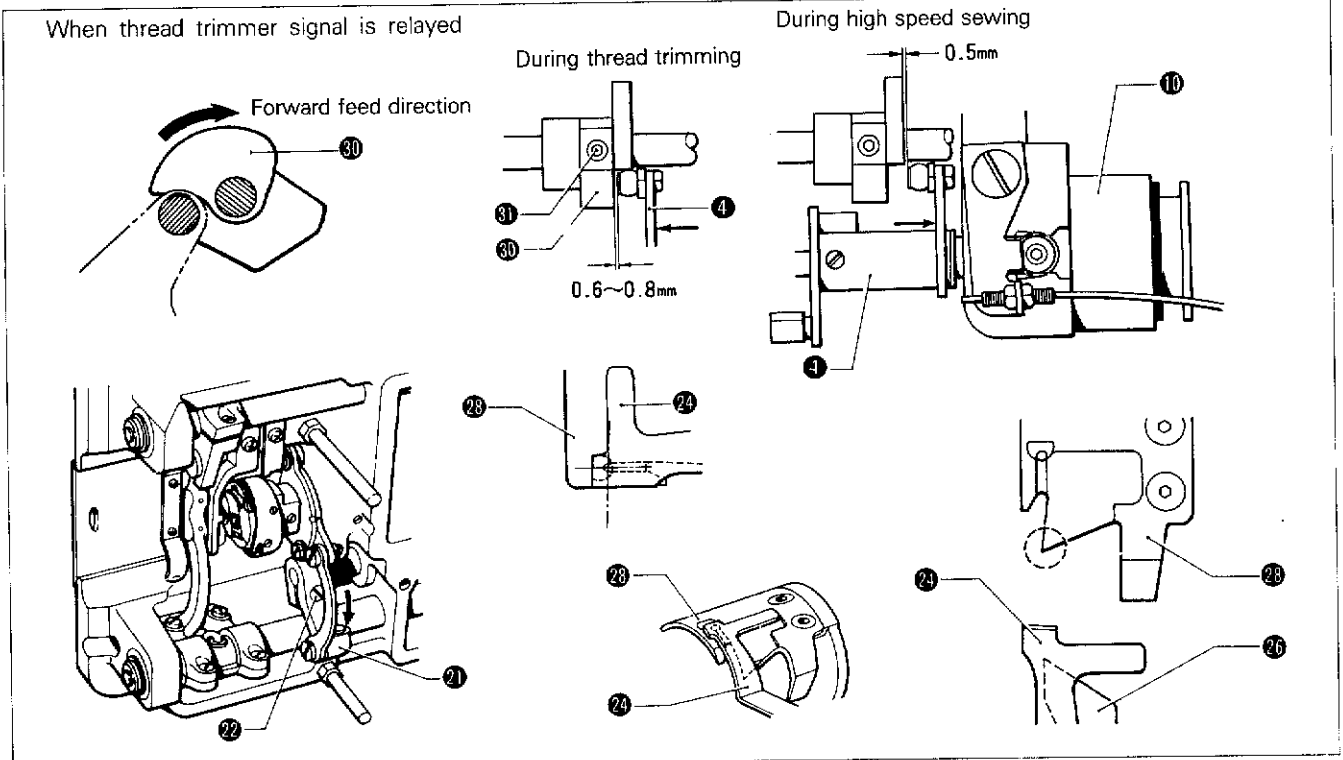
1. Remove the oil cap in the feed driving shaft 6.
2. Pass wick 24 through the feed driving shaft 6. The end of the wick should be aligned with the end of the shaft 6.
3. Replace oil cap 23.
4. Put the wick oil cap in forked feed bar crank 7 on the feed driving shaft.
5. Remove the oil cap 23 from the feed lifting feed shaft 13.
6. Pass wick 25 through feed lifting feed shaft 13. The end of the wick should be aligned with the end of the shaft 6.
7. Replace the oil cap 23.
8. Pull out the wick 25 in feed lifting feed shaft 13 so it contacts the slide block on the feed bar.

3 Thread trimmer assembly



1. Remove the needle plate.
 2. Set the feed fork shaft **1** in the bushing hole.
 3. Set the collar **2**, spring **3**, thread trimmer lever complete **4**, washer **5**, and cushion **6** in the arm bed.
 4. Pass the thread trimmer cam lever shaft **7** through parts **2** to **6**, and secure it with snap ring **8**.
 5. Tighten screw **9** in thread trimmer lever complete **4**.
Be careful of the screw stop on the thread trimmer cam lever shaft **7**.
 6. Secure thread trimmer solenoid **10** with screw **11**.
Be sure the solenoid rod **12** lightly touches shaft **7**.
 7. Slide spring **13** on the solenoid rod **12**.
 8. Secure tension release lever **14** with screw **15**.
 9. Mount the thread trimmer holder **16** (thread trimmer connecting rod **17**) in the arm bed, and secure the thread trimmer holder clamp **18** with bolt **19**.
 10. Mount spring **20** and thread trimmer lever **21** on the feed fork shaft **1**, and tighten screw **22**.
 11. Secure thread trimmer connecting rod **18** and thread trimmer lever **21** with screw **23**.
 12. Secure the fixed knife **24** in the arm bed with screw **25**.
 13. Secure loop spreader **26** in the arm bed with screw **27**.
 14. Secure movable knife **28** to the thread trimmer holder **16** with screw **29**. Hook spring **20** on the thread trimmer lever **21**.
- * Make sure the loop spreader **26** does not strike the movable knife **28**.
- * Check the position of the thread trimmer cam **30**.

◆ Thread trimmer timing adjustment



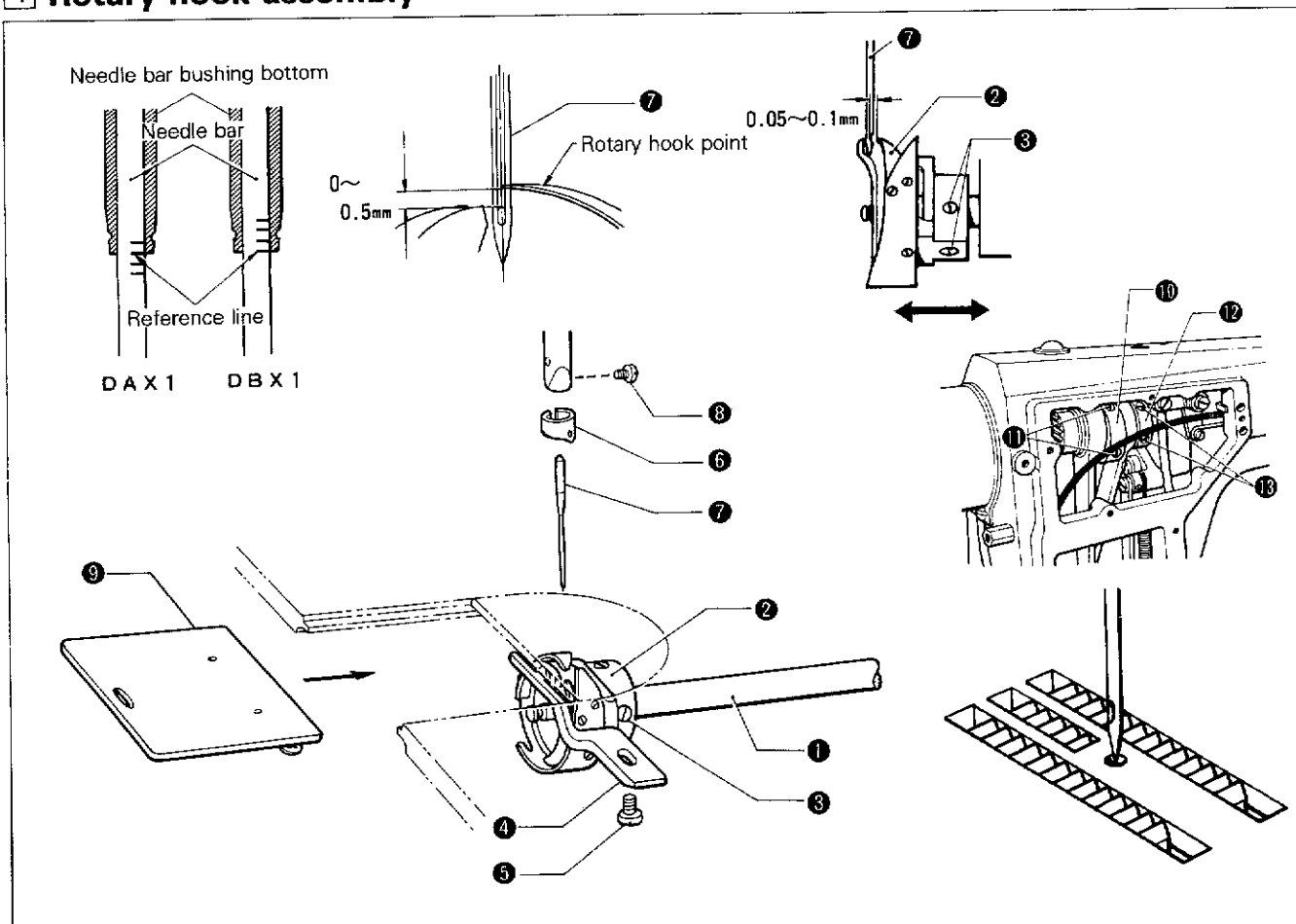
1. Thread trimmer cam position

- ★ Turn the pulley to raise the needle bar 5 mm from the down position. Press the thread trimmer solenoid 10 so the indent in the thread trimmer cam 30 contacts the slide, and then lightly tighten screw 31. When the thread trimmer solenoid 10 is returned to the original position (release it), the cam to slide gap should be 0.6 to 0.8 mm. Loosen screw 31 and adjust the thread trimmer cam 30. (Tighten screw 31 to approx. 40 kg cm.)

2. Movable knife, fixed knife position

- ★ The fixed knife 24 and movable knife 28 must overlap when the thread trimmer cam lever 4 slide is lifted by the thread trimmer cam 30. To adjust, raise the slide with the thread trimmer cam 30, shift the thread trimmer lever 21 so the knives overlap, and then tighten screw 22.
- * The loop spreader 26 should be underneath the movable knife 28.

4 Rotary hook assembly



1. Mount the high speed rotary hook ② on the lower shaft ①, and tighten screw ③.
2. Secure shuttle body stop ④ with screw ⑤.
3. Slide the needle bar thread guide ⑥ on, and tighten screw ③ to secure the needle ⑦.
4. Adjust the needle ⑦ to rotary hook ② timing.

Turn the pulley to raise the needle bar 1.8 mm from the down position. The rotary hook point should be aligned with the needle center (see the reference line in the figure above). Adjust the needle ⑦ to rotary hook point gap to 0.05 to 0.1 mm.

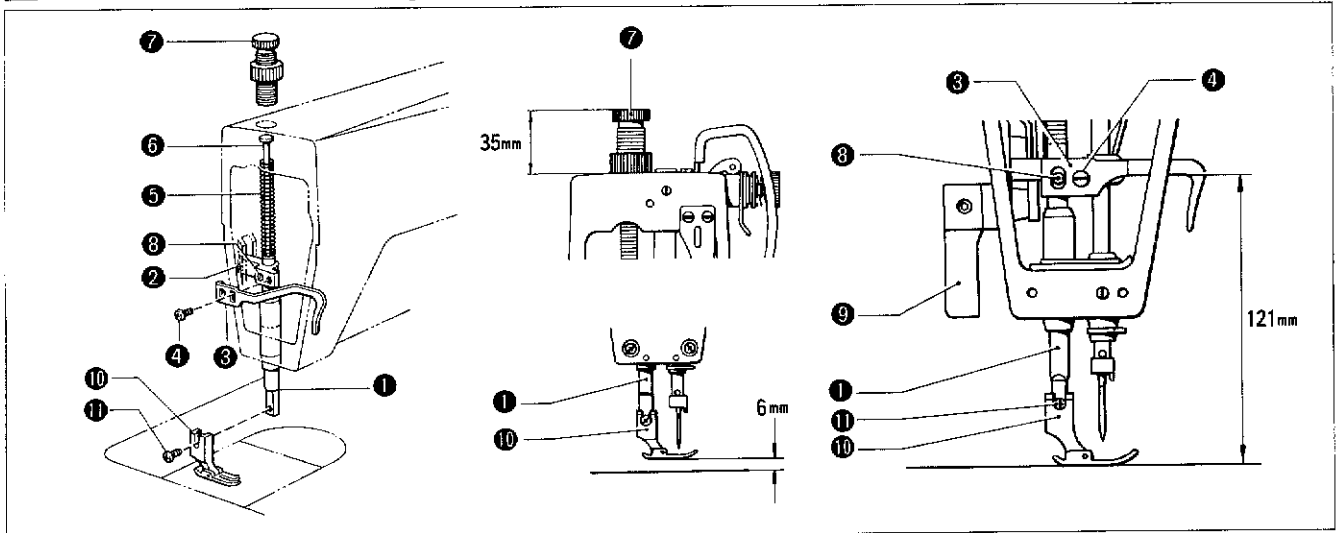
5. Mount the needle plate.
6. Install the slide plate ⑨.
7. Adjust the feed timing.
8. Set the feed amount to 0.

9. Turn the pulley towards the machine front. When the feed dog descends from the top of its stroke and is aligned with the top of the needle plate, the needle tip should be aligned with the top of the needle plate.

Loosen the feed lifting eccentric ⑩ screw ⑪ and the feed rock shaft eccentric ⑫ screw ⑬, and turn the feed lifting eccentric ⑩ to adjust.

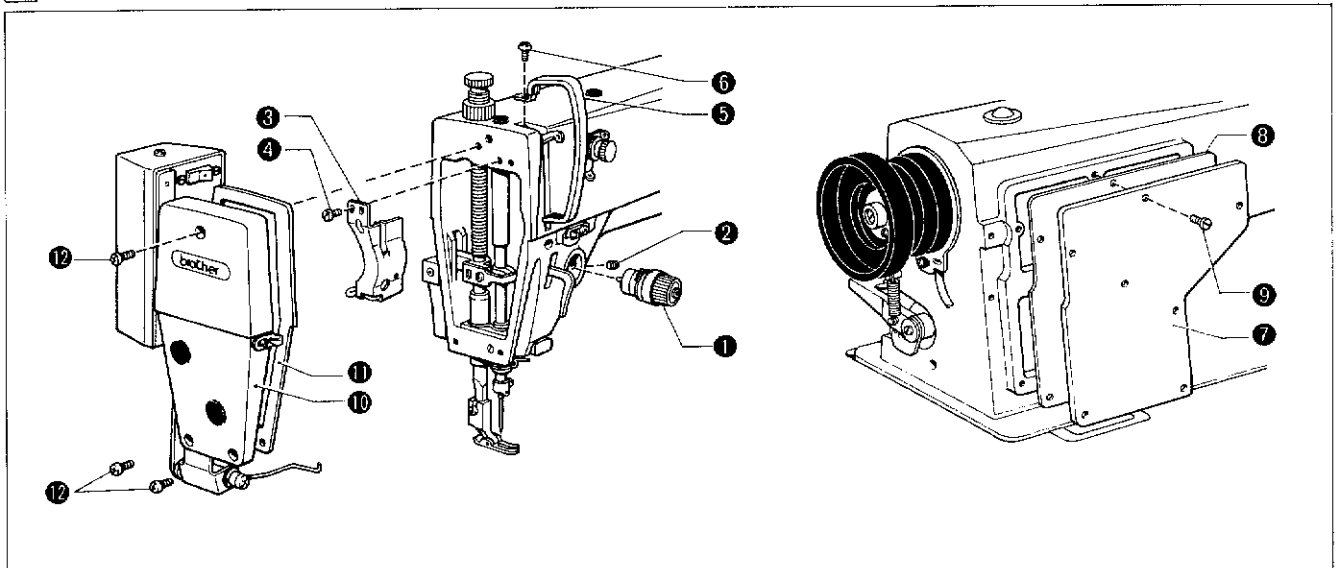
- * Make sure the shuttle body stop ④ to high speed rotary hook gap ② is sufficient to allow the thread to pass easily.
- * Make sure the loop spreader does not strike the rotary hook ②.

5 Presser foot assembly



1. Insert the presser bar ① from the top of the arm.
2. Insert the presser bar guide bracket ② in the arm channel, and then pass the presser bar ① through the guide bracket ②.
3. Secure the presser bar guide bracket thread guide ③ to the presser bar guide bracket ② with screw ④.
4. Mount spring ⑤ and presser bar spring guide ⑥, and tighten the presser foot adjustment screw ⑦. Tighten screw ⑦ until it extends 35 mm. (Firmly tighten the nut.)
5. Lightly tighten screw ⑧, and lift the presser bar ① with the presser bar lifter lever ⑨.
6. Secure the presser foot ⑩ to the presser bar ① with screw ⑪.
7. Adjust the height of the presser foot ⑩ to approx. 6 mm with screw ⑧.
8. Adjust the distance from thread guide ③ bottom to bed top to 121 mm when the needle bar is in the down position. Tighten screw ④.

6 Machine cover



1. Secure thread tension spring regulator ① with screw ②. The index should be at the top.
2. Secure oil plate ③ with screw ④.
3. Secure thread take-up ⑤ with screw ⑥.
4. Secure rear cover ⑦ and gasket ⑧ with the screw ⑨.
5. Secure face plate ⑩ and gasket ⑪ with screw ⑫.

* Firmly tighten all cord clamps.

* Refer to page 22 for thread take-up spring regulator adjustment.

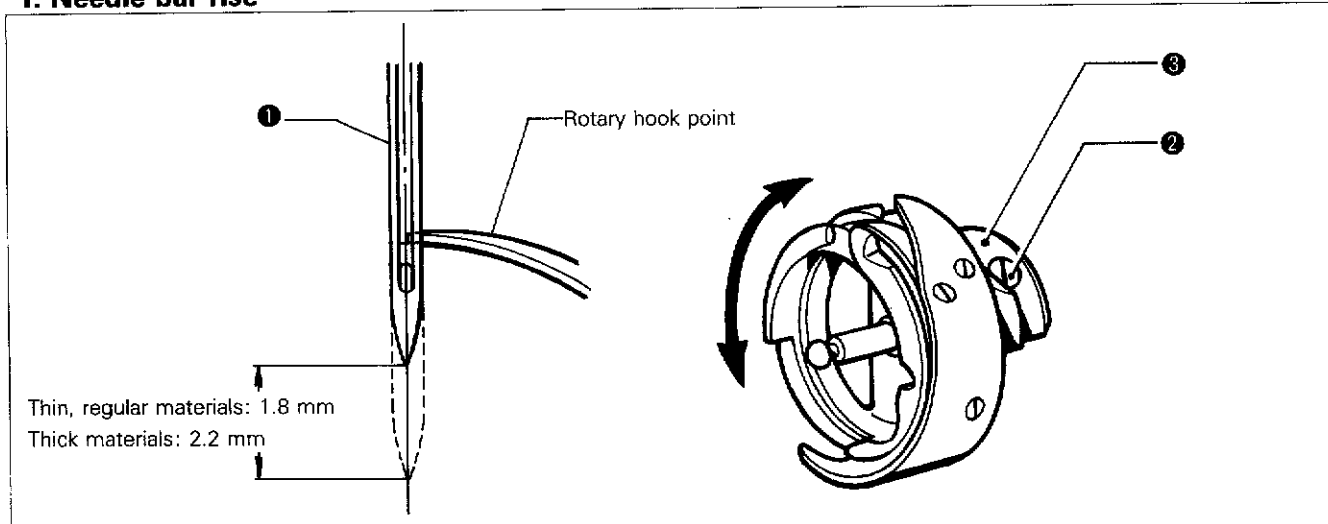
* Refer to page 31 for thread wiper installation.

ADJUSTMENTS

1 Needle to rotary hook timing

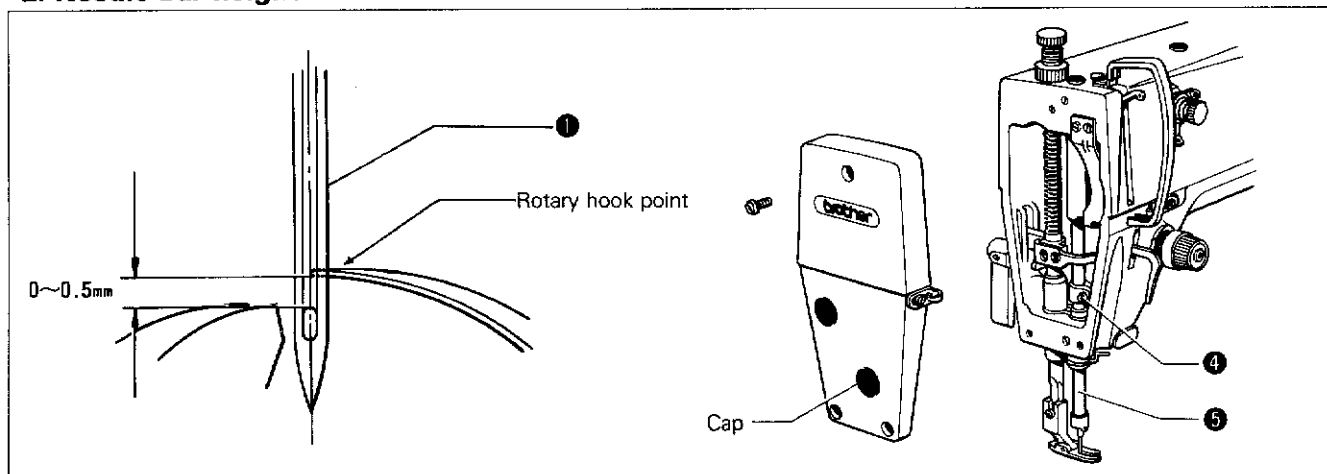
Proper needle to rotary hook timing is required for the needle to rise, forming a loop in the needle thread which is then caught by the rotary hook point.

1. Needle bar rise



When the needle ① is raised 1.8 mm from the down position (2.2 mm for thick materials), the rotary hook point should be aligned with the needle center. Loosen screw ② and turn the rotary hook ③ to adjust.

2. Needle bar height



When the rotary hook point is aligned with the needle ① center, the rotary hook point to needle hole edge gap should be 0 to 0.5 mm. Remove the plug, loosen screw ④, and vertically adjust the needle bar height ⑤ to adjust the gap.

3. Needle to rotary hook point gap

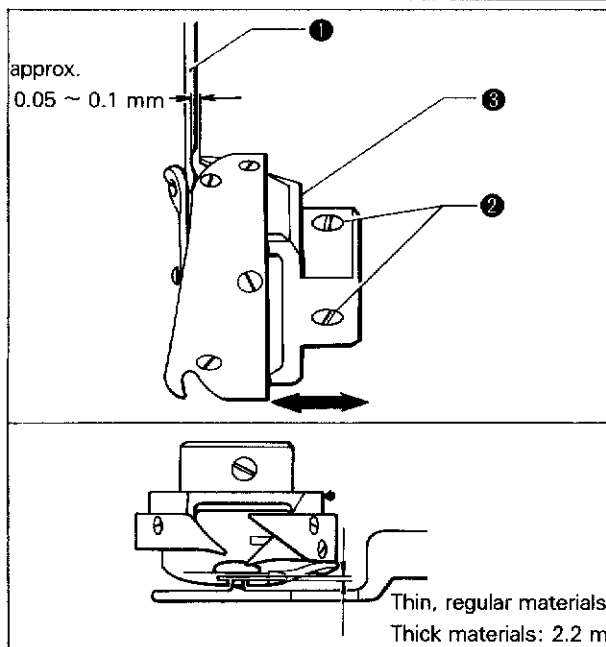
The needle ① to rotary hook point gap should be 0.05 to 0.1 mm. Loosen screw ② and move the rotary hook ③ right or left to adjust.

4. Rotary hook to rotary hook stop gap

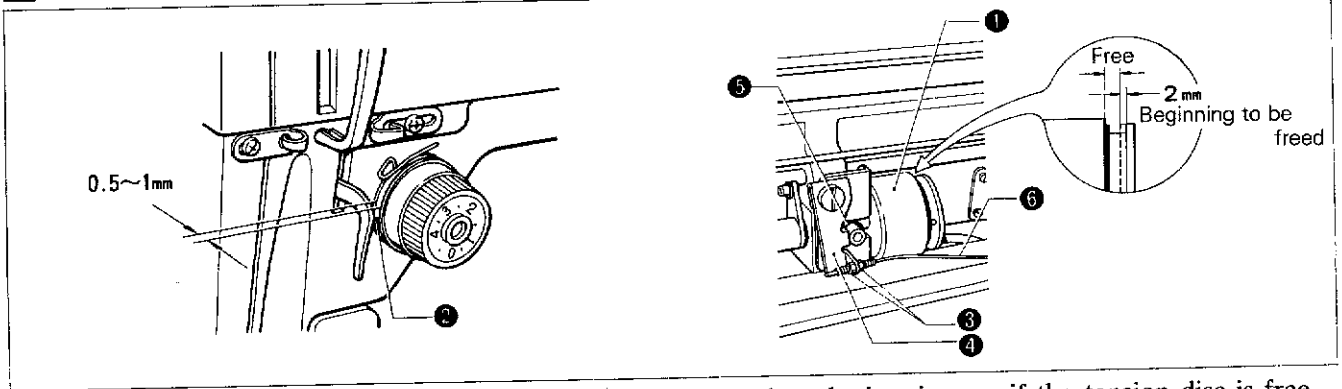
★ The rotary hook to rotary hook stop gap should be adjusted to allow the thread to pass easily.

With thin and regular materials the gap should be 0.4 to 0.7 mm.

With thick materials the gap should be 0.6 to 0.9 mm.



2 Tension release



★ If the needle thread escapes from the needle hole after thread trimming, or if the tension disc is free, make the following adjustment.

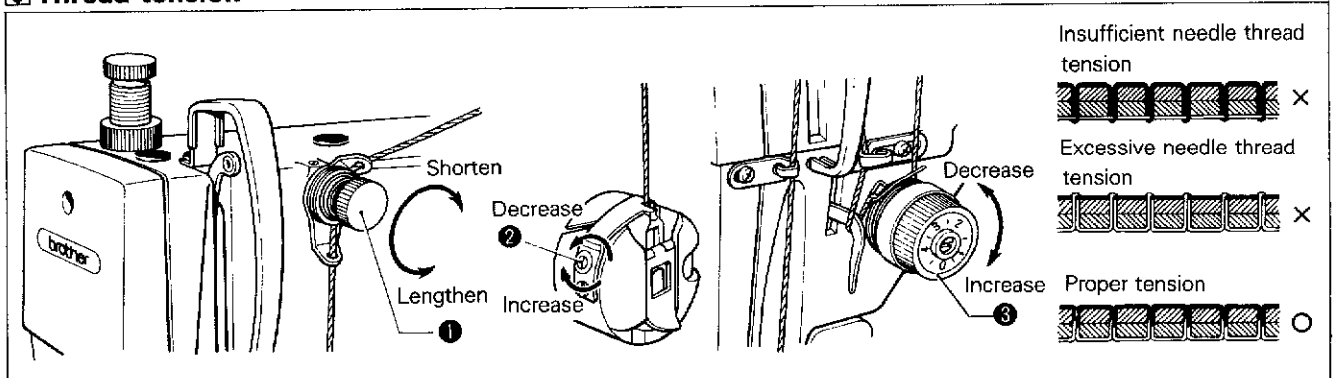
A. If thread escapes from needle hole

1. The tension disc ② (tension releasing disc washer) should gain some play when the thread trimmer solenoid ① is extended approx. 2 mm, and move freely when the solenoid is fully extended.
2. When the thread cutter solenoid ① is released the tension disc ② should close.
3. Loosen nut ③ and extend thread cutter solenoid ① about 2 mm.
4. Tighten nut ③ (left side) at the point where tension disc ② begins to move.
Check that tension disc ② is free when thread cutter solenoid ① is fully extended, and that the disc ② closes when the solenoid ① is released.

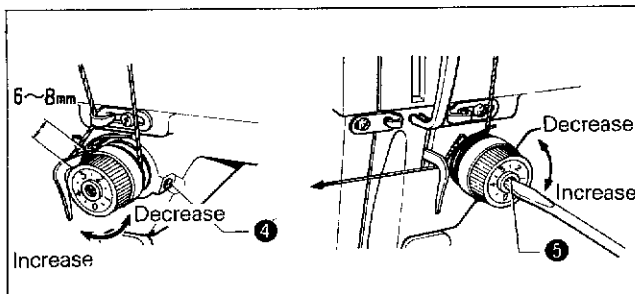
B. If the tension disc remains free

1. Check if the tension release lever ④ is retracted.
2. Is the return spring ⑤ out of place.
3. Is the tension release wire ⑥ stretched?
(The above three items can be adjusted with nut ③. If the adjustment cannot be made with nut ③, replace the wire ⑥.)

◆ Thread tension



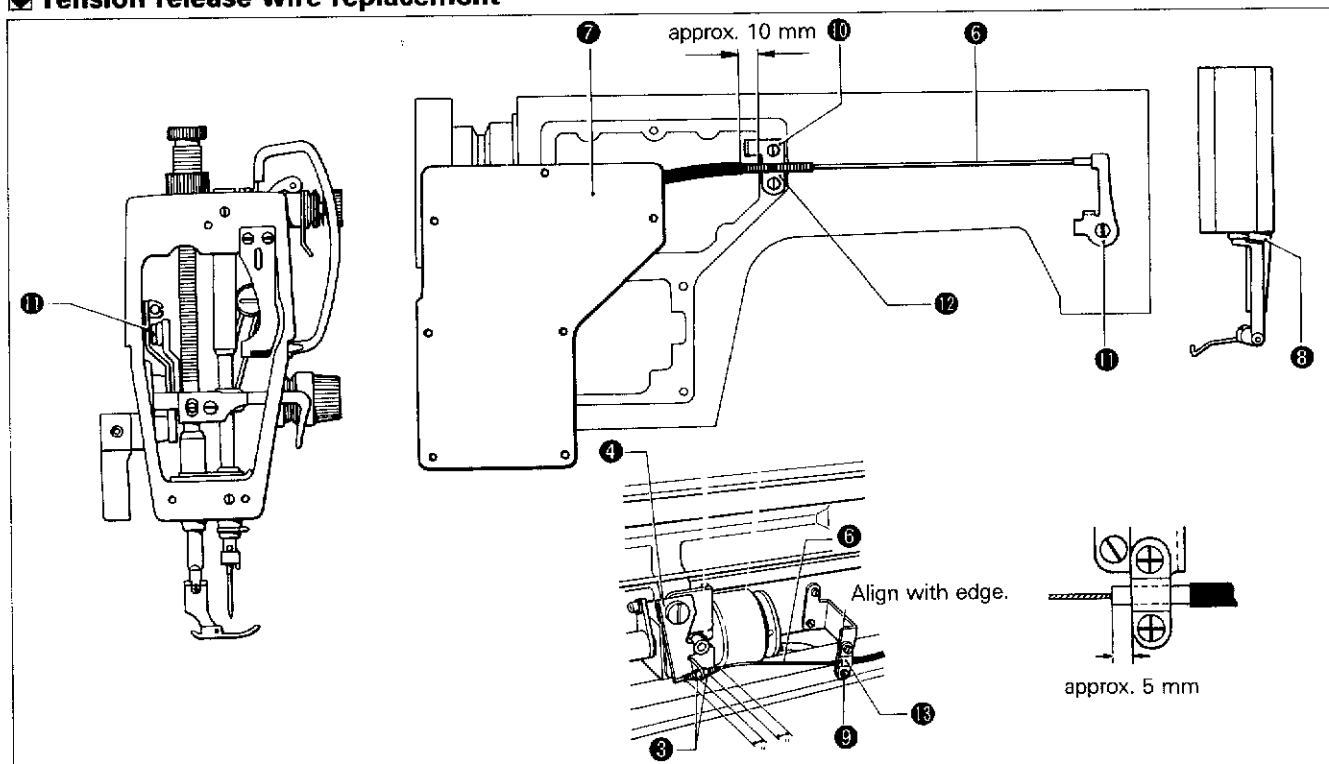
- ★ A 35 to 40 mm thread leader should remain from the needle hole after thread cutting. Turn adjustment screw ① to adjust.
- ★ The bobbin thread tension should be adjusted so that the bobbin case falls of its own weight when suspended by the bobbin thread. Adjust with tension screw ②.
- ★ Adjust the needle thread tension with adjustment screw ③ after lowering the presser bar.



◆ Thread take-up spring

- ★ Proper thread take-up spring height is 6 to 8 mm, tension is 25 to 30 g.
- ★ Loosen screw ④ and turn the needle thread tension regulator to adjust the height of the thread take-up spring.
- ★ Turn the thread tension stud ⑤ with a screwdriver to adjust the thread take-up spring tension.

◆ Tension release wire replacement



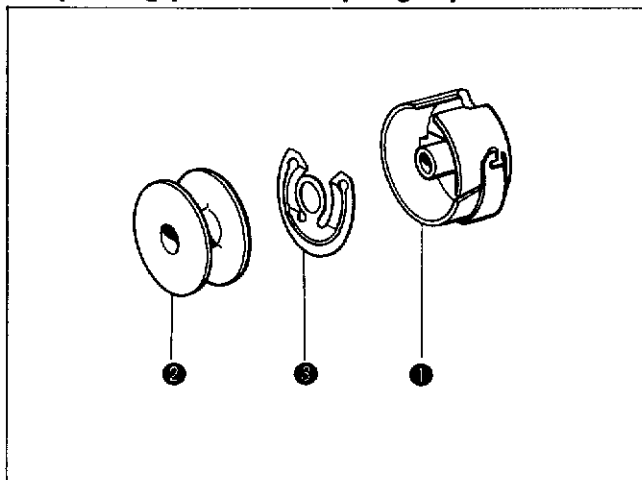
◆ Tension release wire removal

1. Remove nut ③.
2. Remove side plate ⑦.
3. Remove face plate ⑧.
4. Loosen screws ⑨ ⑩.
5. Remove the tension release wire ⑤ from the tension release slide ①, tension release wire clamp U ⑫, and clamp D ⑬.
6. Remove nut ③, and remove tension release wire ⑤.

Installation

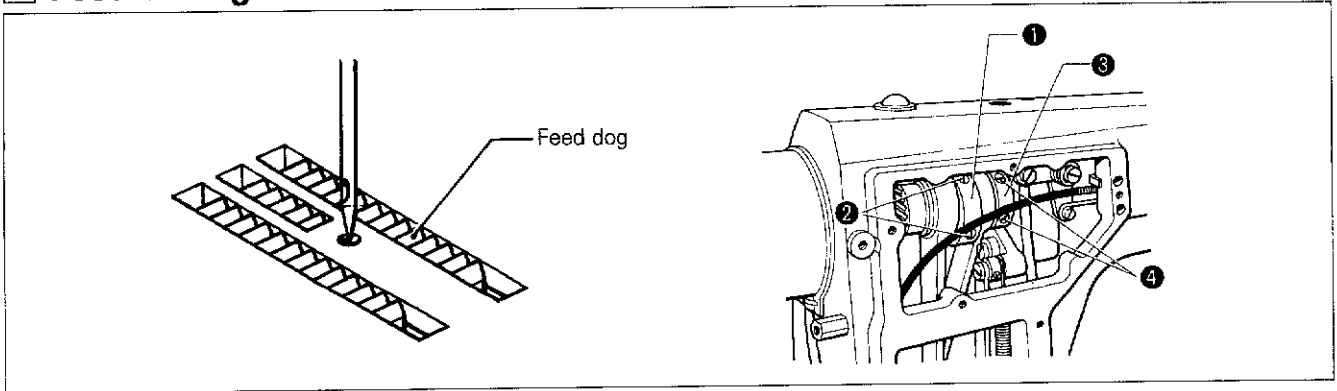
1. Thread the tension release wire.
2. Hook the end of the wire on the tension release slide ①.
3. Secure the wire with tension release wire clamp U ⑫.
Refer to the above figure.
4. Secure the wire with tension release wire clamp D ⑬.
Refer to the above figure.
5. Pass the wire through tension release lever ④, and secure it with nut ③. (Adjust as described on the previous page.)

◆ Spinning prevention spring replacement



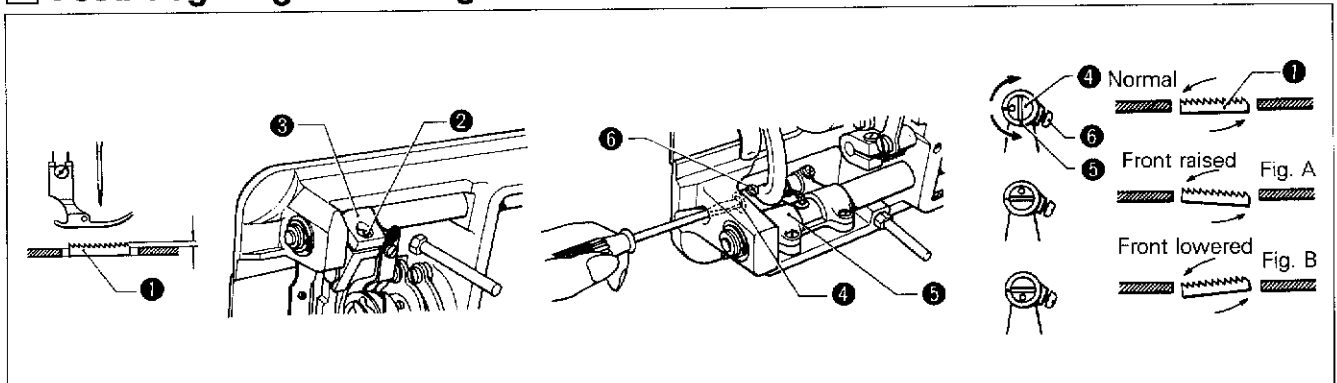
1. Remove the bobbin case ① from the machine.
2. Remove the bobbin ② from the bobbin case ①.
3. Remove the spinning prevention spring ③ from the bobbin case ① with a screwdriver.

3 Feed timing



1. When the feed dog is driven to the top of its stroke and descends to the point where the dog teeth tips are aligned with the needle plate top, the needle tip should also be aligned with the needle plate top.
2. To adjust the timing, loosen the feed lifting eccentric ① set screw ② and the feed rock shaft eccentric ③ set screw ④.
If the feed dog drops below the needle plate too early, turn the feed lifting eccentric ① and feed rock shaft eccentric ③ opposite to normal rotation; if the feed dog is delayed, turn them slightly forward.
3. Tighten screw ② and ④ when the timing is correct.

4 Feed dog height and angle



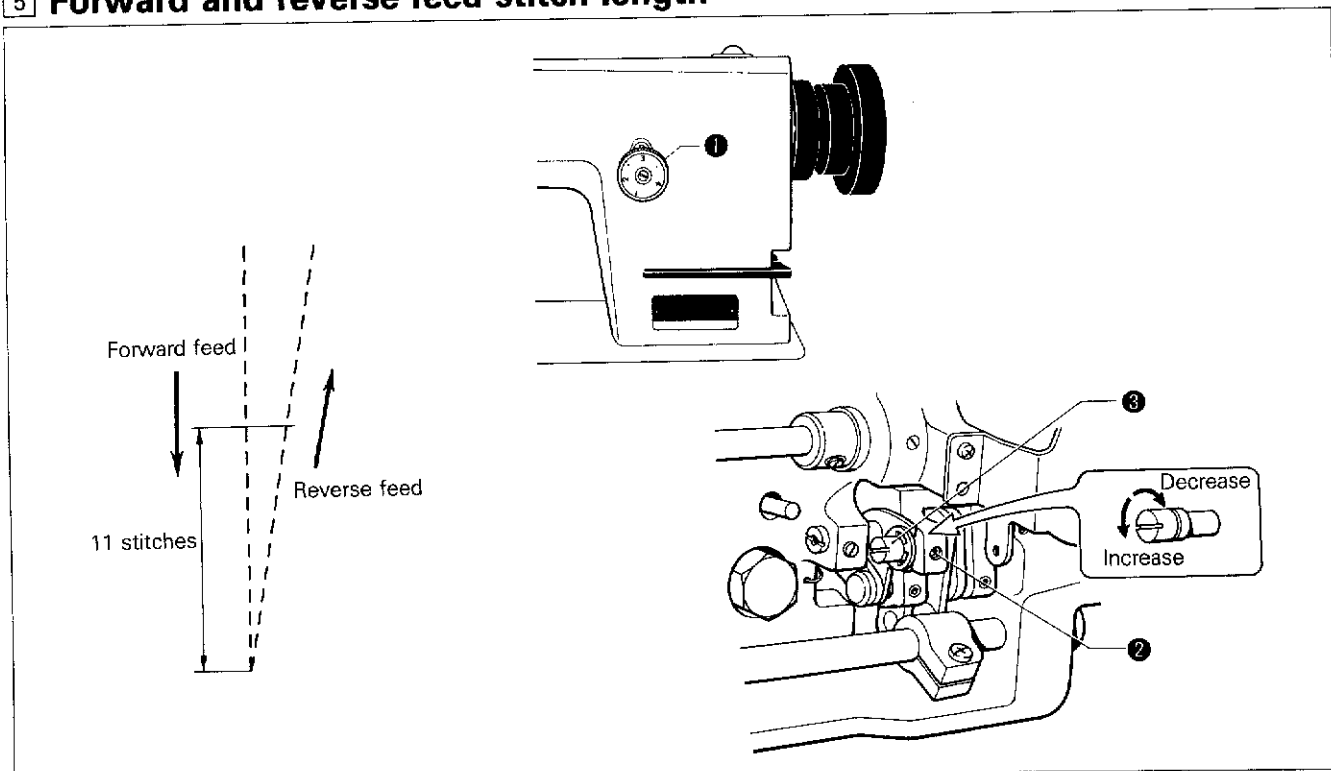
◆ Feed dog height

1. Normal feed dog height when the feed dog ① is in the full up position is 0.8 mm with thin and regular materials, and 1.2 mm with thick materials.
* The specific feed dog height will vary with different models.
2. When the feed dog ① is fully raised, loosen screw ②, turn feed lifting crank ③, and adjust the feed bed height.

◆ Feed dog angle

1. When the feed dog ① is in the full up position the feed dog angle will be properly adjusted if the circle on the feed bar hinge pin ④ is aligned with the index on the feed rock shaft crank ⑤.
 - The feed dog front should be tilted up to prevent puckering. (Fig. A)
 - The feed dog front should be tilted down to prevent uneven material feeding. (Fig. B)
2. To adjust the feed dog ① angle, loosen screw ⑥, set the feed bar hinge pin ④ to the reference position, and then turn the pin within 90° of the reference position.
* Adjusting the feed dog ① angle will change the feed dog height. Readjust the feed dog ① height.

5 Forward and reverse feed stitch length



★ Forward and reverse feed stitch length are adjusted together.

1. With regular materials set the length control dial ① to 3.
With thick materials set the length control dial ① to the maximum setting.
2. Sew approximately 11 stitches forward and reverse at the inching speed (230 spm).
3. Adjust as follows when necessary.

(1) Tilt the machine.

(2) Loosen screw ②.

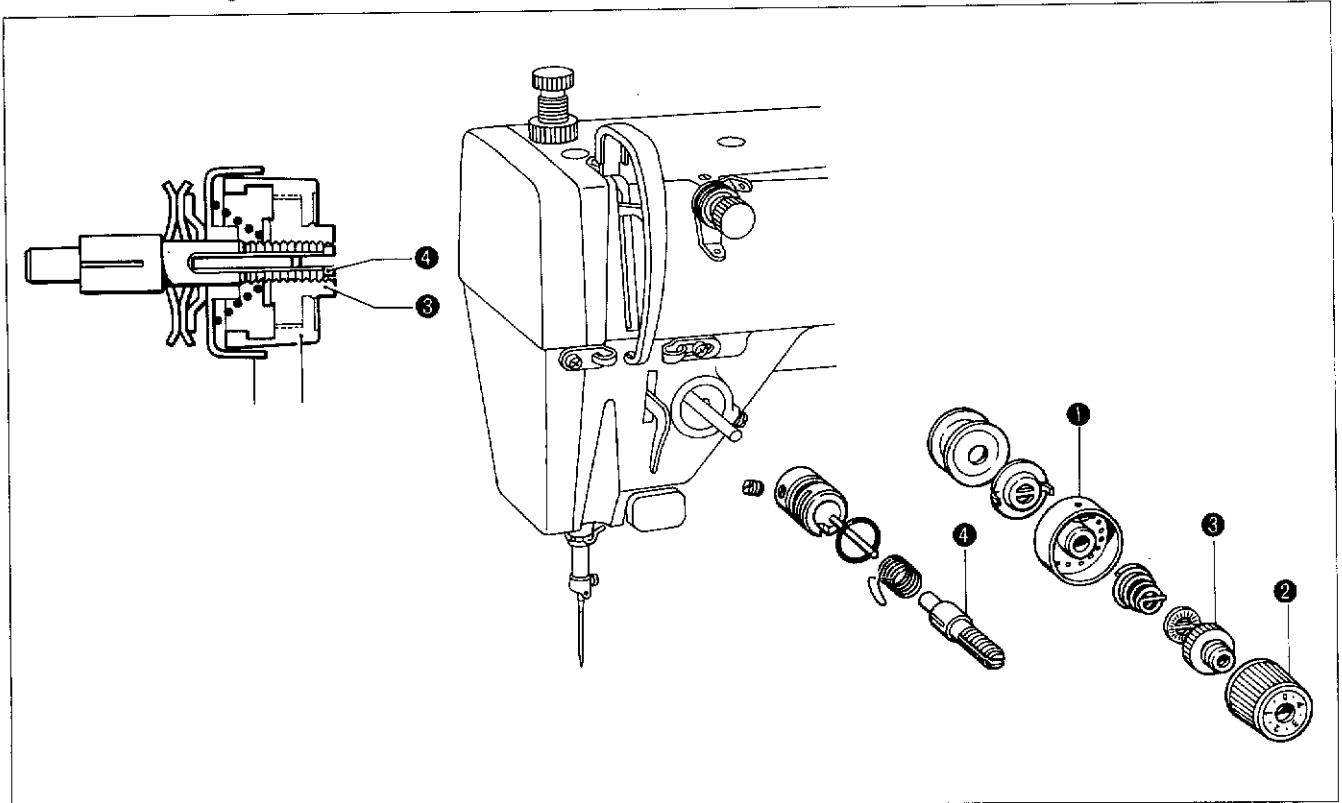
(3) If forward feed is greater than reverse feed, turn pin ③ clockwise.

If forward feed is less than reverse feed, turn pin ③ counterclockwise.

- * Feed directions will reverse if the pin ③ is turned 180°.
- * Firmly tighten screw ② after adjustment.
- * Changing the stitch length with length control dial ① will result in differing forward and reverse stitch lengths.

6 Thread take-up spring regulator

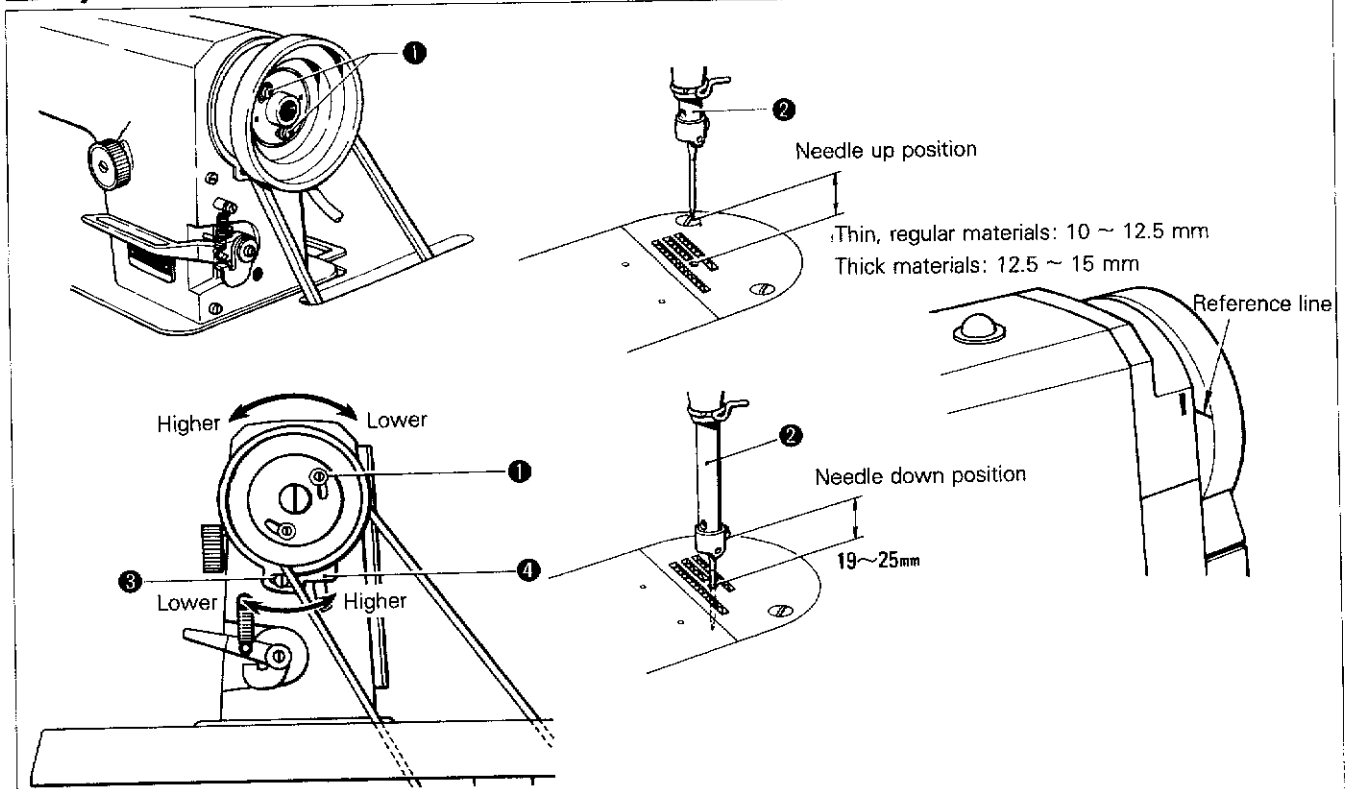
- ★ When the thread take-up spring height is adjusted the red index on the tension releasing disc plate ① will change. Free the tension releasing disc plate ④ from the tension releasing disc ⑤ and bring the red index to the top.



◆ Disassembly and assembly

1. Free the tension releasing disc plate ① and turn the knob ② counterclockwise.
2. Set the red index on the tension releasing disc plate ① to the top.
3. Push the end of screw ③ to release it from the knob ②.
4. Loosen screw ③, and align it with the end of tension stud ④.
5. Align "1" on the knob ② scale with the red index of the tension releasing disc plate ① and press the knob in place.
6. Knob ② can be turned 1 1/5 revolution.

7 Synchronizer



- ★ The synchronizer detects the needle position with two sensors. The thread trimmer signal is timed to the needle down position signal and the treadle reverse signal.
- ★ When the power is turned on and the needle stopped in the down position, the distance between needle plate top and needle set screw bottom should be 19 to 25 mm. When the needle is stopped in the up position and the pulley reference line is within the belt cover reference lines, the distance between needle plate top and needle tip should be 10 to 12.5 mm with thin and regular materials, 12.5 to 15 mm with thick materials.

Adjust as follows when necessary.

- ★ Turn the power off.

◆ Needle up position

1. Slightly loosen the two screws ①.
Move the set screws ① in the direction of normal pulley movement to raise the needle bar ② stop position. Turn the other way to lower the needle bar.

◆ Needle down position

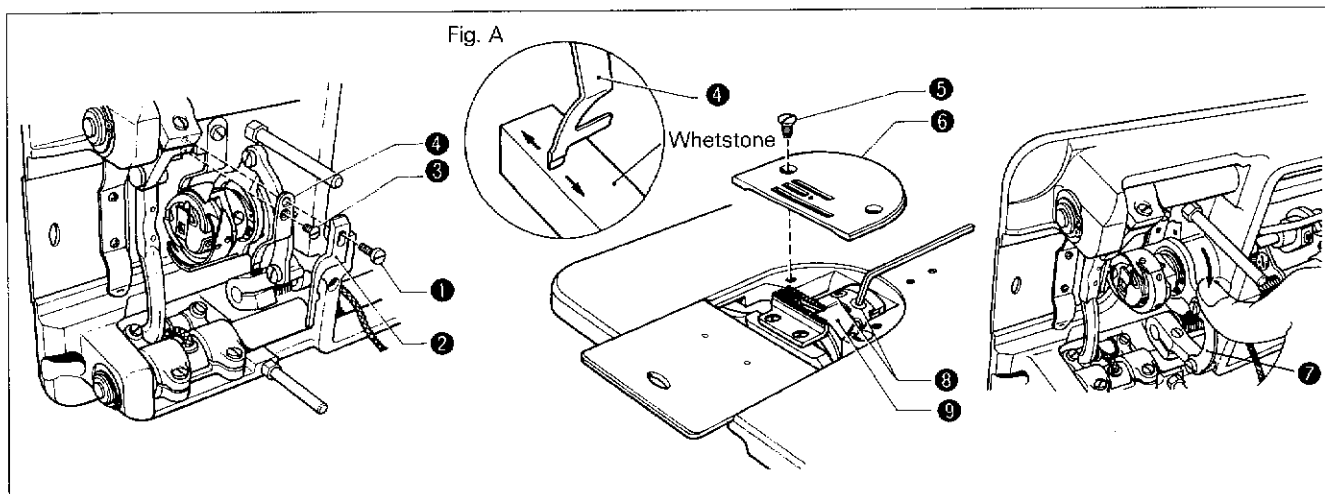
1. Set the treadle to reverse and then release it to neutral. (This is the needle down stop position.)
2. The needle plate top to needle screw bottom gap should be 19 ~ 25 mm.
3. Loosen screw ③ and move the synchronizer ④ to adjust.

* Check the needle up stop position.

8 Thread trimmer

1. Fixed knife and movable knife replacement

* Turn the power off.



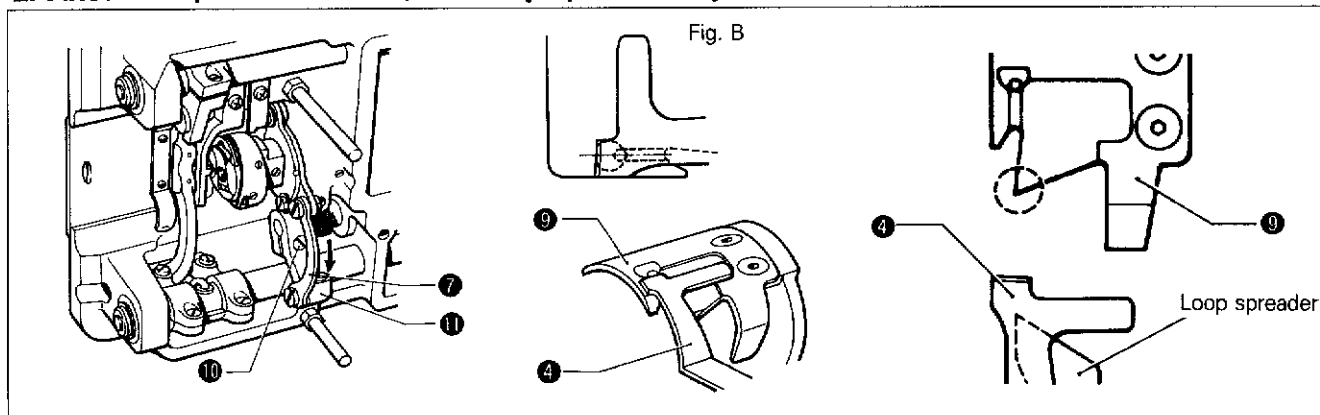
Fixed knife removal

1. Tilt the machine.
 2. Remove screw ①, and remove rotary hook stop ②.
 3. Remove screw ③, and remove the fixed knife ④.
- * Sharpen the fixed knife ④ if it cuts poorly.

Movable knife removal

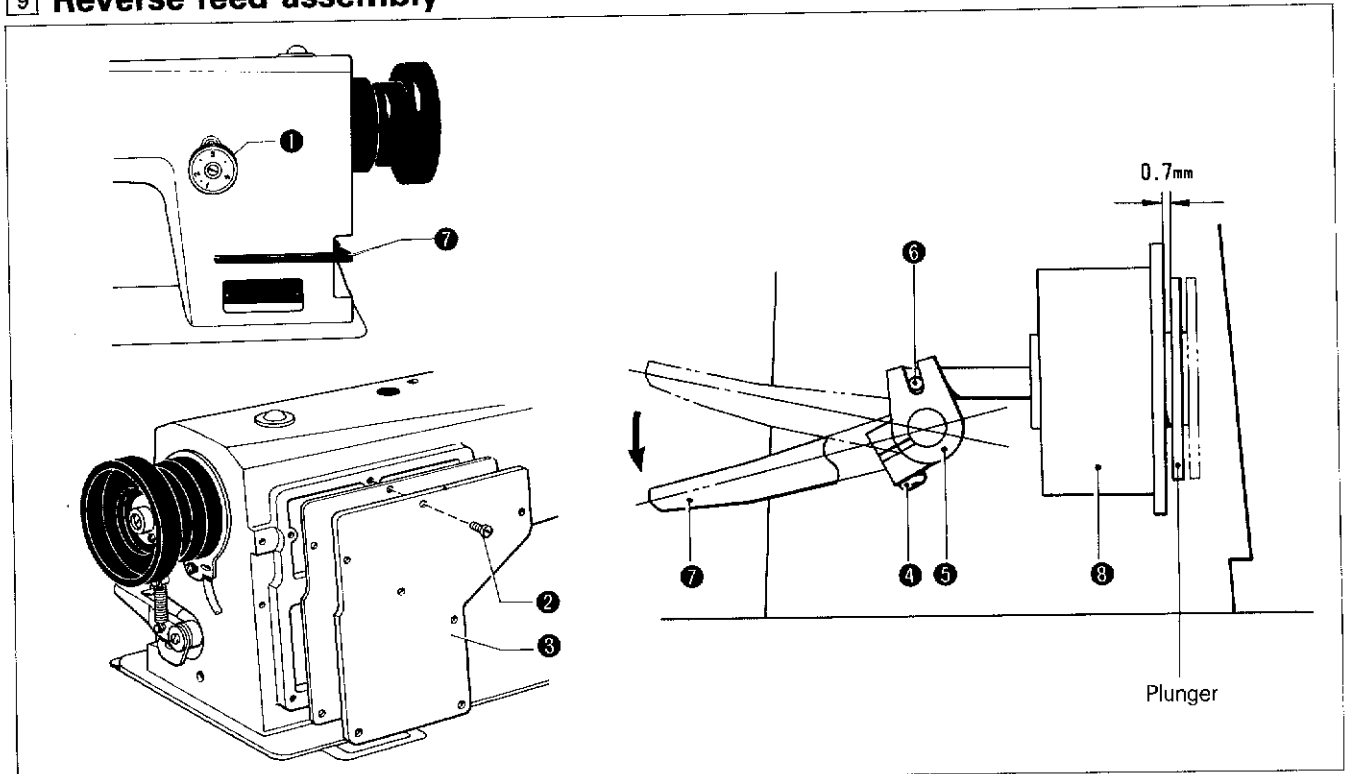
1. Raise the presser foot with the presser bar lifter lever.
 2. Remove screw ⑤, and remove the needle plate ⑥.
 3. Turn the main pulley, and stop the needle bar at the top of its stroke.
 4. Move the thread trimmer connecting rod ⑦ by hand in the direction of the arrow until flat screw ⑧ is visible.
 5. Remove flat screw ⑧, and remove the movable knife ⑨.
- * Remove the needle before attempting removal of the needle plate and movable knife.
* Installation is the reverse of removal.

2. Fixed knife, movable knife, and loop spreader adjustment



1. Install the fixed and movable knives. The movable knife ⑨ should overlap the fixed knife ④ tip as shown in Fig. B when the movable knife is driven to the end of its stroke with the thread trimmer cam. Loosen screw ⑩ and adjust the thread trimmer lever ⑪.
- * Make sure the loop spreader does not strike the rotary hook or movable knife ⑨.

9 Reverse feed assembly



★ Adjustment will be easier if the machine head is removed from the work table.

1. Set the length control dial **1** to maximum.
2. Remove the seven screws **2**, and remove the rear cover **3**.
3. Tilt the machine.
4. Loosen screw **4**.
5. Check if the pin roller **6** is in the fork of the solenoid rod **5**.
6. Completely lower the reverse sewing lever **7**.
7. Push the reverse feed solenoid **8** until there is a 0.7 mm gap.
8. Tighten screw **4**.

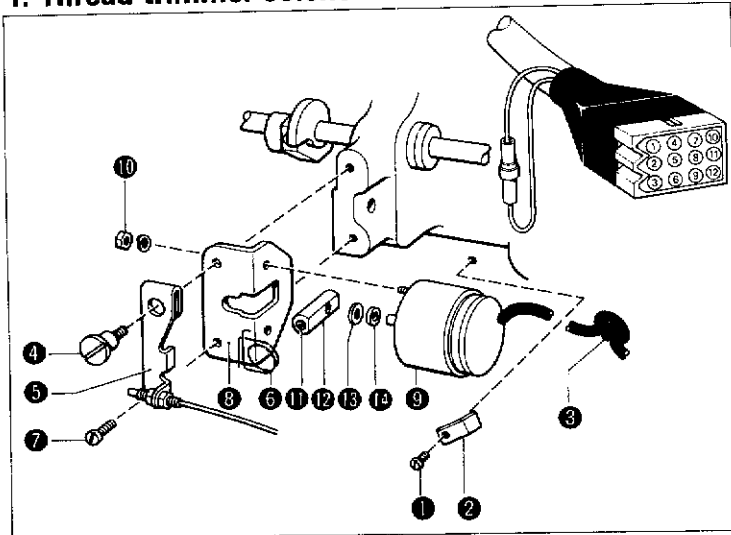
* If the 0.7 mm gap is too great the reverse feed solenoid **8** will work slowly. If the gap is too small, the solenoid **8** will sound as if it were striking something when it operates.

REPLACEMENTS

1 Solenoid replacement

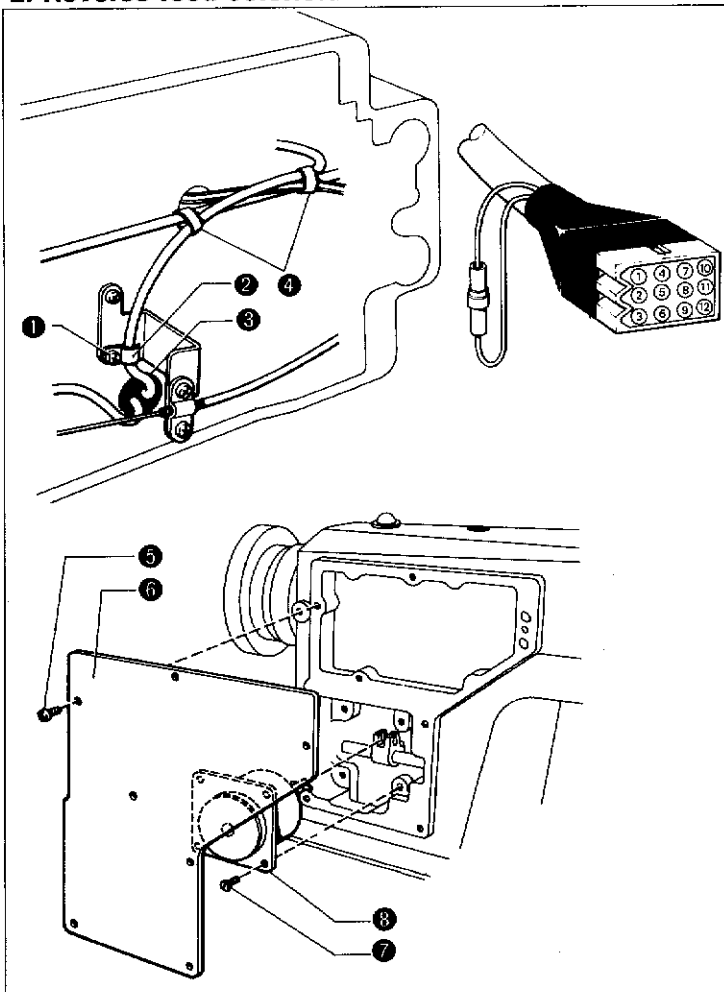
- ★ Remember where the solenoid cords are connected when you disconnect them.
- ★ Installation is the reverse of removal.

1. Thread trimmer solenoid



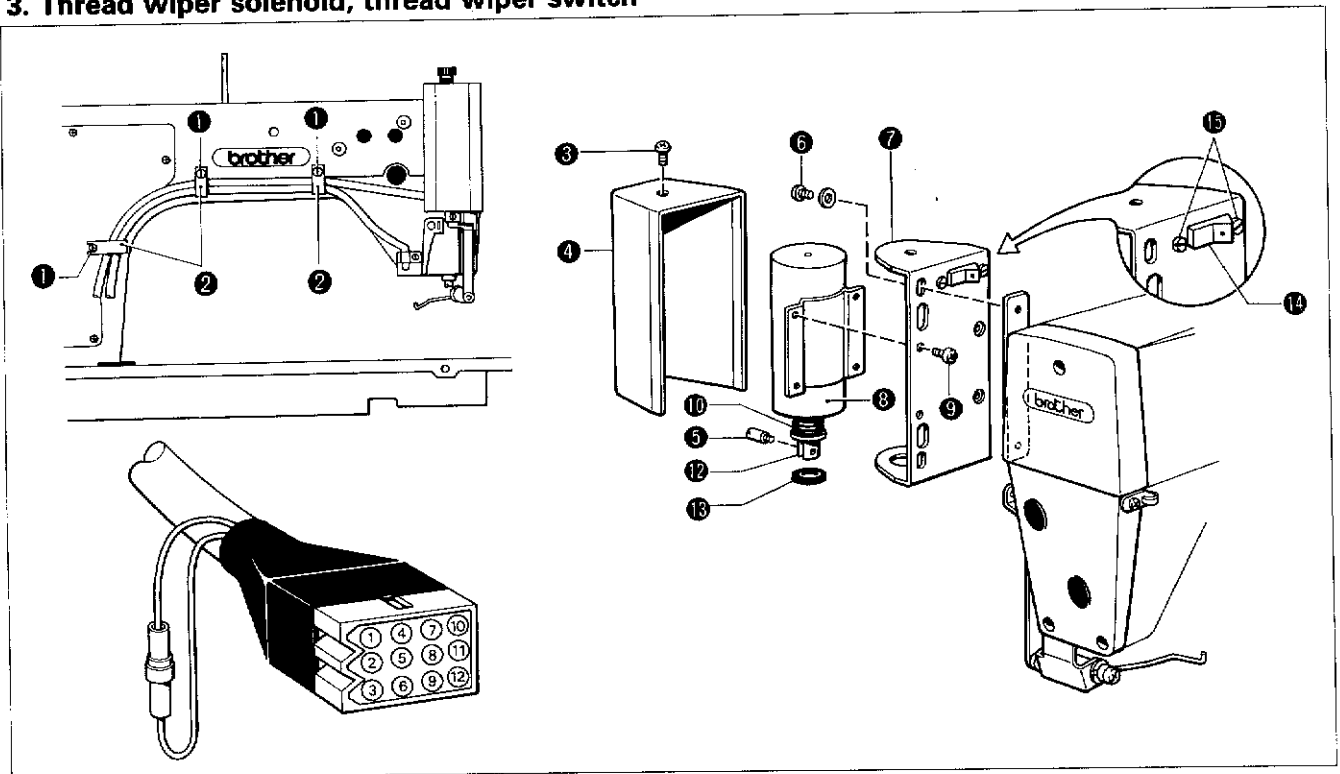
1. Disconnect the male connectors from pins 4 and 5 of the 12 pin plug.
 2. Tilt the machine.
 3. Loosen screw ①. Disconnect the cord from cord clamp ②.
 4. Remove the cord from the cord cushion ③.
 5. Loosen screw ④, and remove the tension release lever ⑤, and spring ⑥.
 6. Remove screw ⑦, and remove bracket ⑧ and thread trimmer solenoid ⑨.
 7. Remove the two nuts ⑩ and remove thread trimmer solenoid ⑨.
 8. Loosen screw ⑪, and remove solenoid rod ⑫, washer ⑬, and cushion ⑭.
- * Replace the thread trimmer solenoid.

2. Reverse feed solenoid



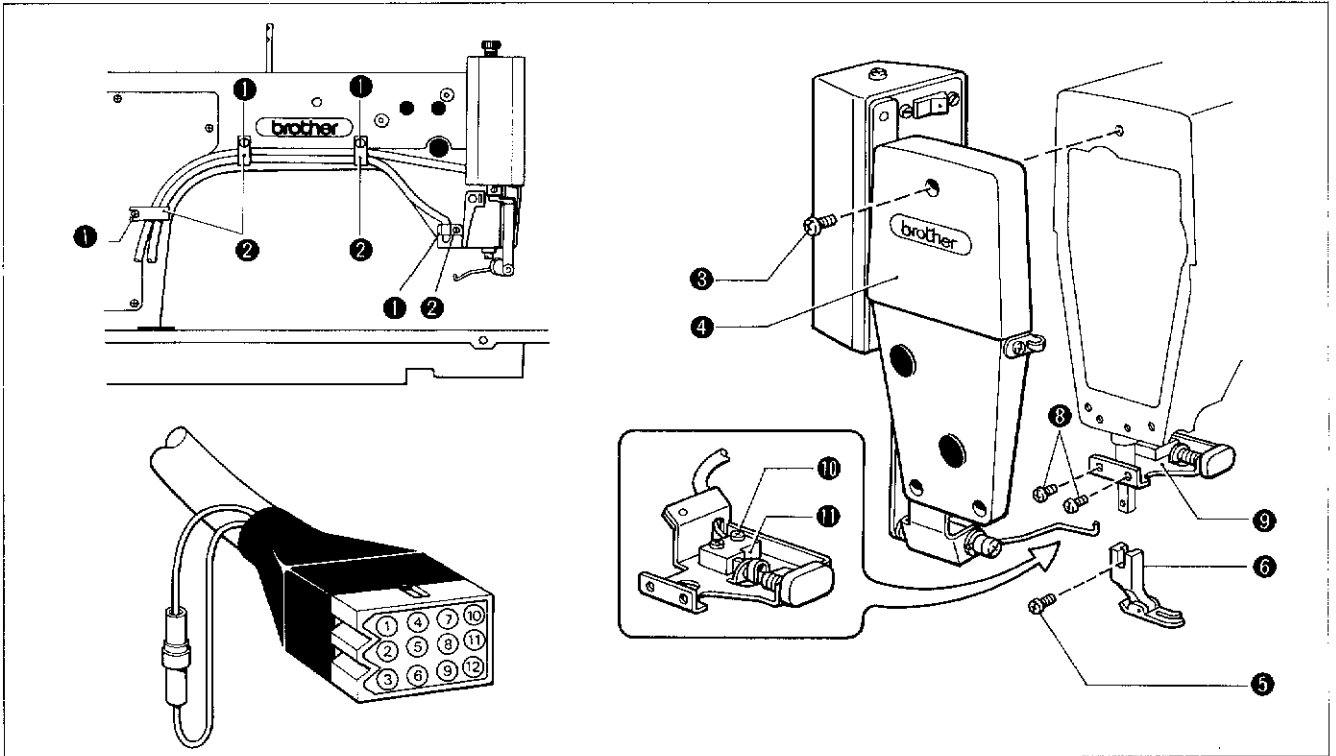
1. Disconnect the male connectors from pins 10 and 11 of the 12 pin plug.
 2. Tilt the machine.
 3. Loosen screw ①. Disconnect the cord from cord clamp ②.
 4. Remove the cord from the cord cushion ③.
 5. Remove the cord from tube ④.
 6. Right the machine.
 7. Remove the seven screws ⑤, and remove the rear cover ⑥.
 8. Remove the four screws ⑦, and remove the reverse feed solenoid ⑧.
- * Replace the reverse feed solenoid.

3. Thread wiper solenoid, thread wiper switch



1. Disconnect the male connectors from pins 7 and 8 of the 12 pin plug.
 2. Loosen the three set screws ①. Disconnect the cord from cord clamp ②.
 3. Remove screw ③. Remove the solenoid cover ④.
 4. Remove the plunger pin ⑤.
 5. Remove the two screws ⑥, and remove solenoid mounting bracket ⑦, and thread wiper solenoid ⑧.
 6. Remove the four set screws ⑨, and remove the thread wiper solenoid ⑧, spring ⑩, solenoid plunger ⑫, and plunger gasket ⑬.
 7. Remove the solenoid plunger ⑫, and remove the spring ⑩.
- * Thread wiper switch ⑭ can be replaced by removing screw ③, solenoid cover ④, and the two screws ⑮.
- * Replace the thread wiper solenoid.

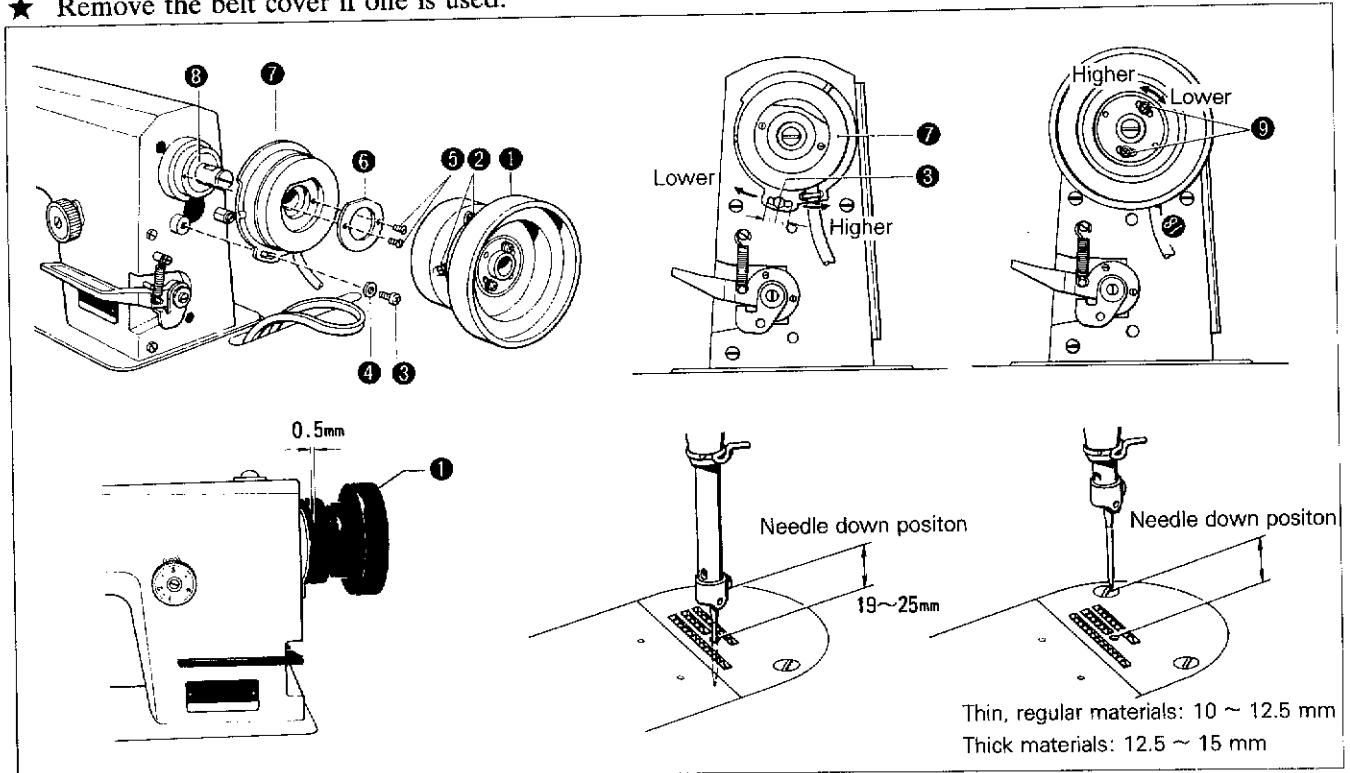
2 Reverse switch



1. Disconnect the male connectors from pins 9 and 12 of the 12 pin plug.
 2. Loosen the four set screws ①. Disconnect the cord from the four cord clamps ②.
 3. Remove the three screws ③. Remove the face plate ④.
 4. Remove screw ⑤, and remove the presser foot ⑥.
 5. Remove the two screws ⑧, and remove switch bracket ⑨.
 6. Remove the two screws ⑩, and remove the right switch ⑪ and cord.
- * Replace the R switch Unit.

3 Synchronizers

★ Remove the belt cover if one is used.



Removal

1. Disconnect the synchronizer plug from the motor.
 2. Remove the V-belt from the pulley ①.
 3. Loosen the two screws ② and remove the pulley ①.
 4. Remove screw ③ and washer ④.
 5. Remove the two screws ⑤, and remove clamp ⑥ and synchronizer ⑦.
- * Replace the synchronizer.

Installation

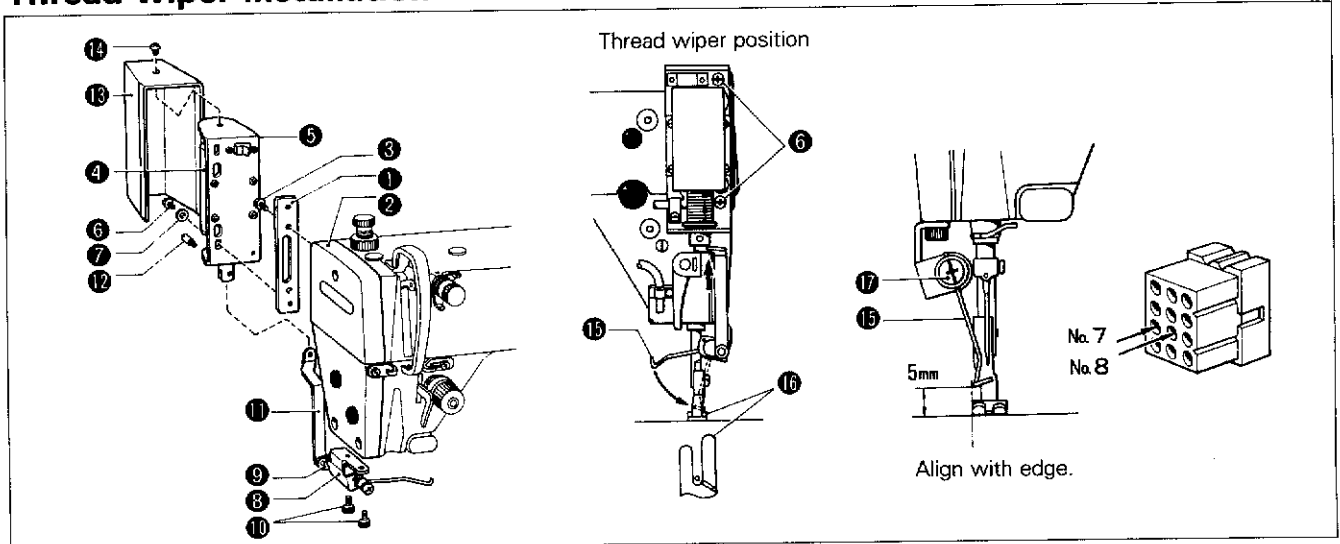
1. Mount the synchronizer ⑦ on upper shaft bushing R ⑧.
2. Secure sensor clamp ⑥ with the two screws ⑤. (Make sure the synchronizer ⑦ can be moved by hand.)
3. Tighten screw ③ and washer ④ in the middle of the long hole in the synchronizer.
4. Slide the pulley ① on the upper shaft, and secure it with screw ②.
(Tighten screw ② at the back to secure the pulley on the upper shaft. The pulley to synchronizer gap should be 0.5 mm.)
5. Mount the V-belt on the pulley ①.
6. Reconnect the synchronizer plug into the motor.

Adjustment

1. Turn the power off.
 2. Press the treadle to reverse, and then release it to neutral (the needle down position).
Check that the distance from the needle plate top to needle screw bottom is 19 ~ 25 mm. Loosen screw ③ and move the synchronizer ⑦ to adjust.
 3. Press the treadle to reverse. (Needle up position)
The needle plate top to needle tip gap should be 10 ~ 12.5 mm for thin and regular materials, 12.5 ~ 15 mm for thick materials.
Loosen and move the two screws ⑨ to adjust.
- * Tighten screws ③ and ⑨ after adjustment.

4 Thread wiper

Thread wiper installation



1. Mount the solenoid bracket ① on the side of the face plate ② with screw ③.
2. Secure thread wiper solenoid ④ and bracket ⑤ to solenoid mounting bracket ① with screw ⑥ and washer ⑦.
3. Secure thread wiper bearing bracket ⑧ and crank ⑨ to the bottom of the face plate ② with bolt ⑩.
4. Connect the solenoid plunger and thread wiper rod ⑪ with plunger pin ⑫.
5. Secure solenoid cover ⑬ to bracket ⑤ with screw ⑭.
6. Plug thread wiper solenoid into pins 7 and 8 of the 12 pin connector.

Adjustment

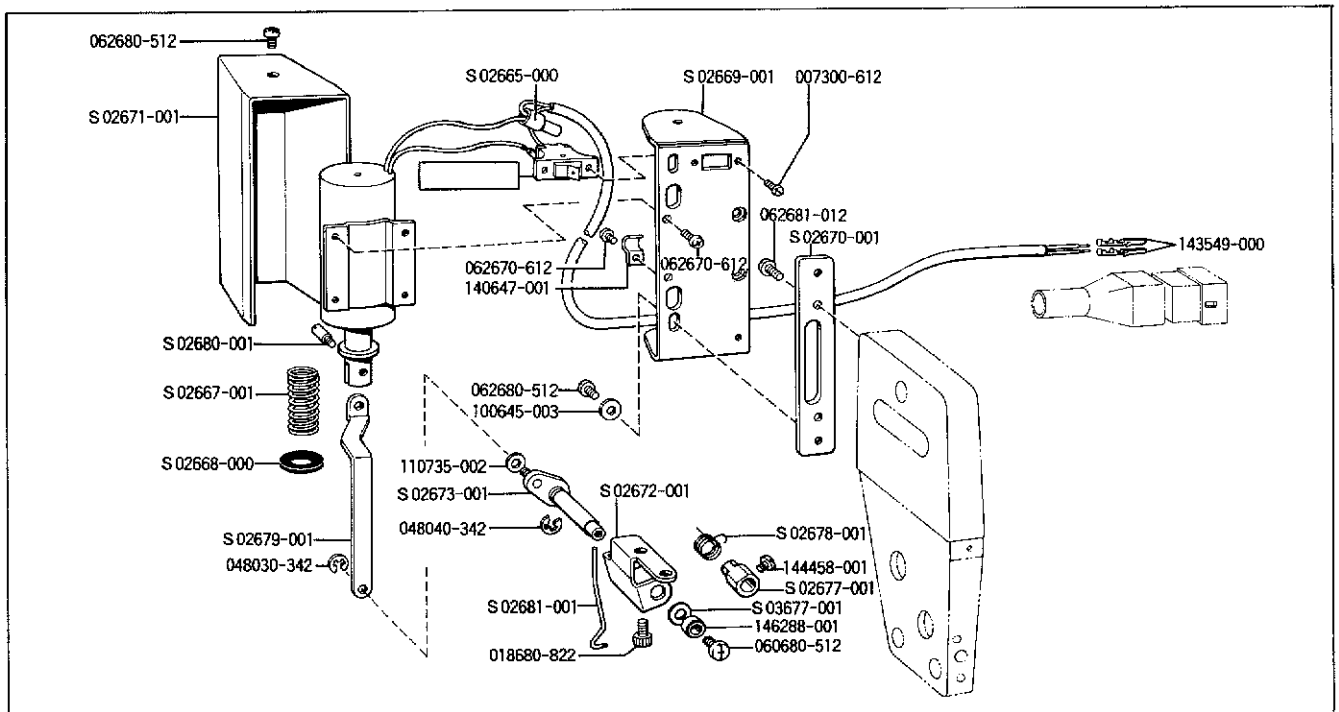
1. Thread wiper position

- Push the solenoid plunger all the way up, and make sure the thread wiper tip ⑮ and left side of the presser foot ⑯ are aligned. (Loosen screw ⑥ and shift bracket ⑤ up or down.)

2. Thread wiper height

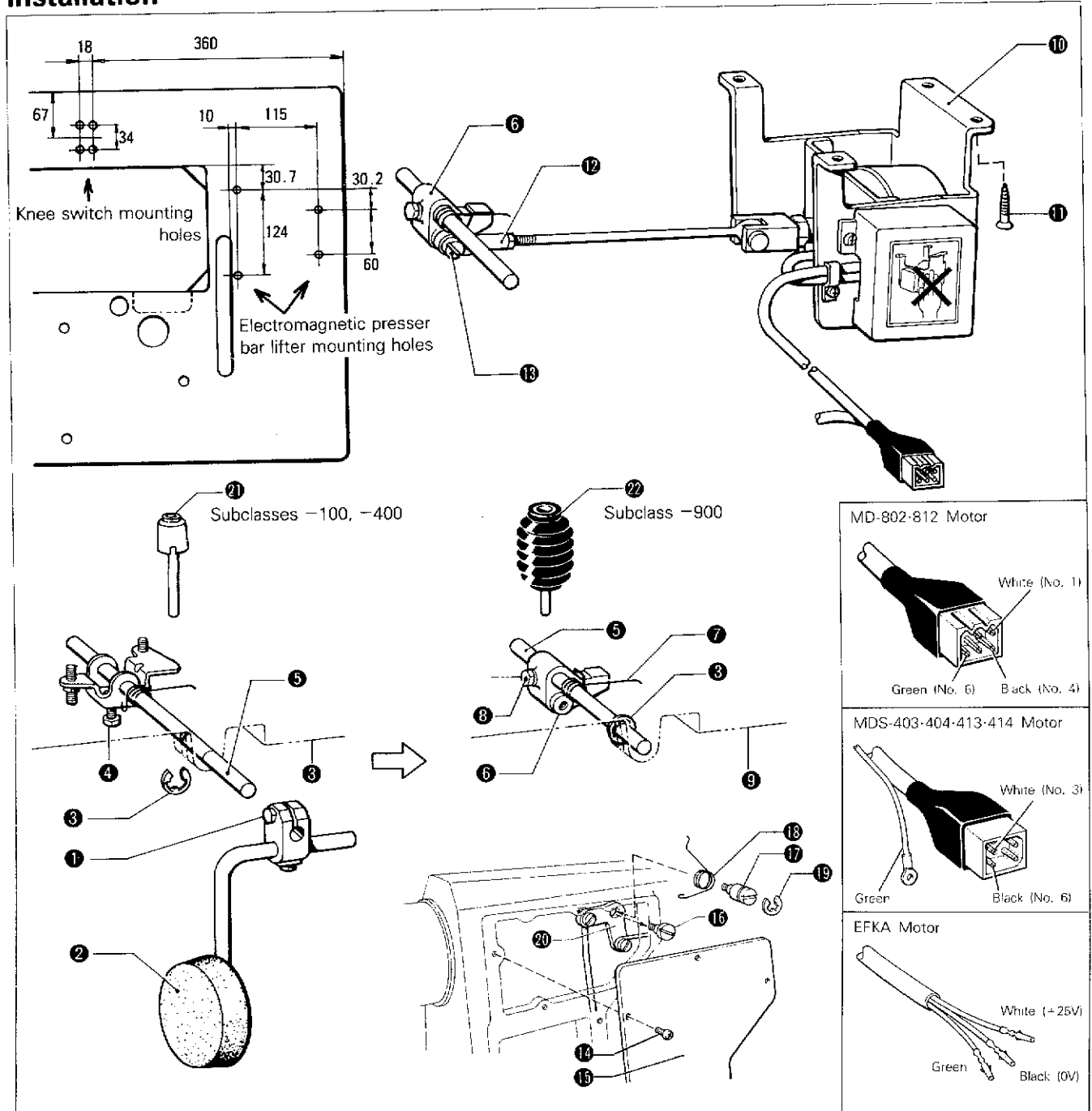
- The thread wiper tip ⑮ to needle plate top gap should be 5 mm. (Loosen screw ⑰ and move the thread wiper ⑮ up or down to adjust.)

* Make sure the thread wiper properly catches the thread.

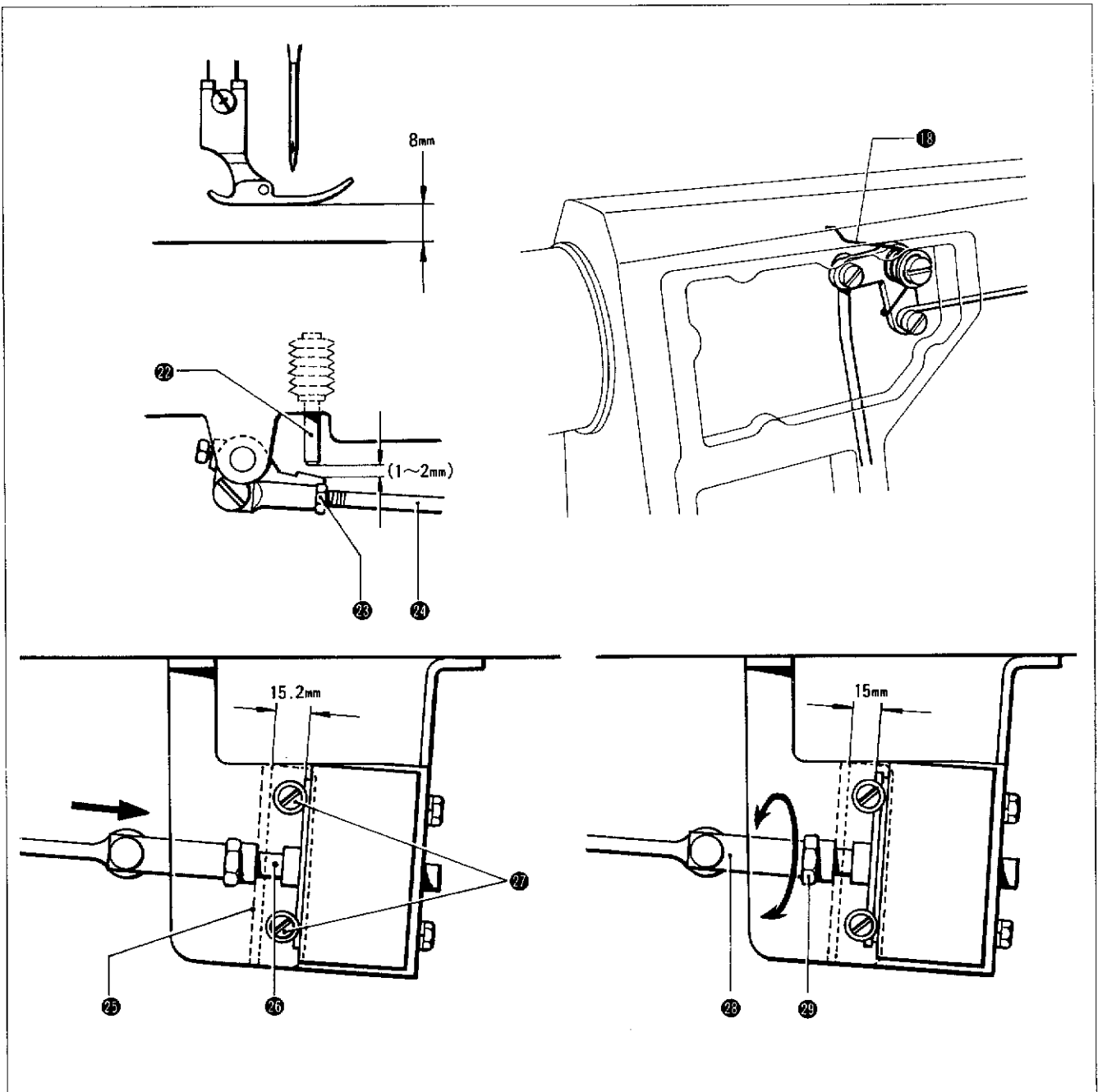


5 Electromagnetic presser bar lifter

Installation



1. Loosen bolt ① and remove knee lifter pad ②.
2. Remove snap ring ③, loosen bolt ④, and remove knee lifter horizontal shaft ⑤.
(The knee lifter horizontal shaft on -900 machines is shortened so the knee lifter pad will not mount on the shaft.)
3. Slide the presser bar lifter link ⑥, and spring ⑦ on the knee lifter horizontal shaft ⑤, and secure the oil pan ⑨ with bolt ⑧ and snap ring ③.
4. Mount the electromagnetic presser bar lifter ⑩ with wood screws ⑪ as shown above.
5. Mount the presser bar lifter adjustment couple ⑫ on the presser bar lifter link ⑥ with screw ⑬.
6. Connect the presser bar lifter cord to pins 1, 4, and 6 in the 6 pin connector.
7. Remove the seven screws ⑭, and remove the rear cover ⑮.
8. Remove screw ⑯, and replace stud ⑰, knee lifter lever spring ⑱, and snap ring ⑲.
9. Hook the knee lifter lever spring ⑱ on knee lifter lever ⑳ and the arm.
10. Replace knee lifter complying bar ㉑ with knee lifter complying bar ㉒.



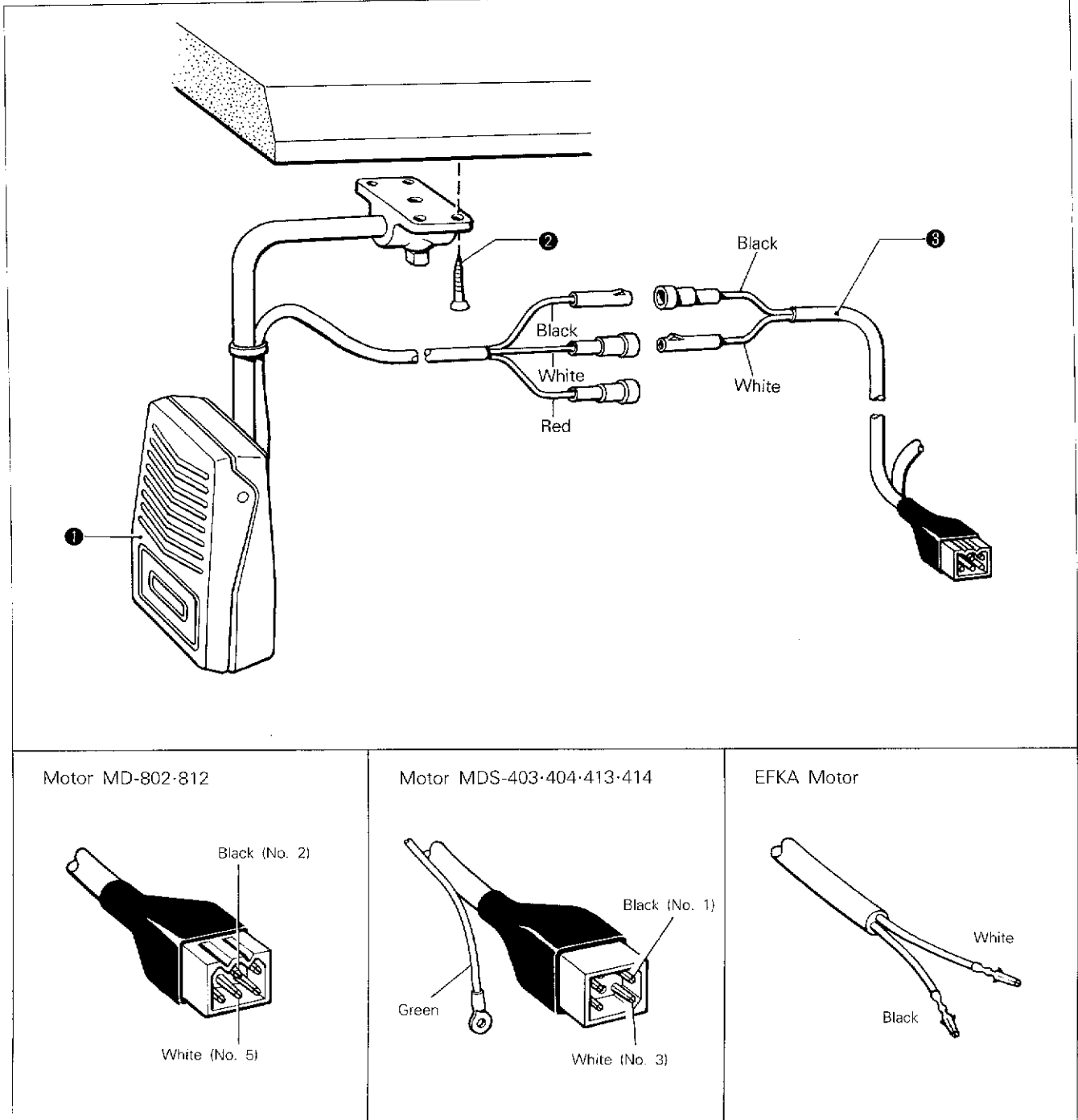
Presser foot height adjustment

- ★ The presser foot should rise a maximum 8 mm with the presser bar lifter lever ⑥. Loosen nut ⑳ and turn rod ㉔ to adjust.
(There will be about 1 ~ 2 mm of play in the presser bar lifter lever ⑥ and knee lifter complying bar ㉒ when the presser foot height is set to 8 mm.)

Solenoid adjustment

1. The solenoid is preadjusted at the factory.
 2. Adjust as follows when the solenoid is replaced.
When installing solenoid plate ㉕, push the plunger ㉖ all the way, and tighten screw ㉗ so the gap between the plate ㉕ and plunger ㉖ is 15.2 mm.
 3. When coupler ㉘ is installed, the gap between plate ㉕ and the side of plunger ㉖ should be 15 mm.
Firmly tighten nut ㉙.
- * When knee lifter lever spring ㉑ is not installed, the machine may produce an unusual sound when the pulley is turned.

Knee switch installation



1. Secure knee switch ① to the table with screws ②.
(Refer to the knee switch template.)
2. Plug the knee switch cord ③ into pins 2 (black) and 5 (white) of the 6 pin connector.
3. Connect the plugs (black, white, red) on the end of the knee switch ① into the plugs on the knee switch cord ③.

◆ Plug connections

Connection A White — White

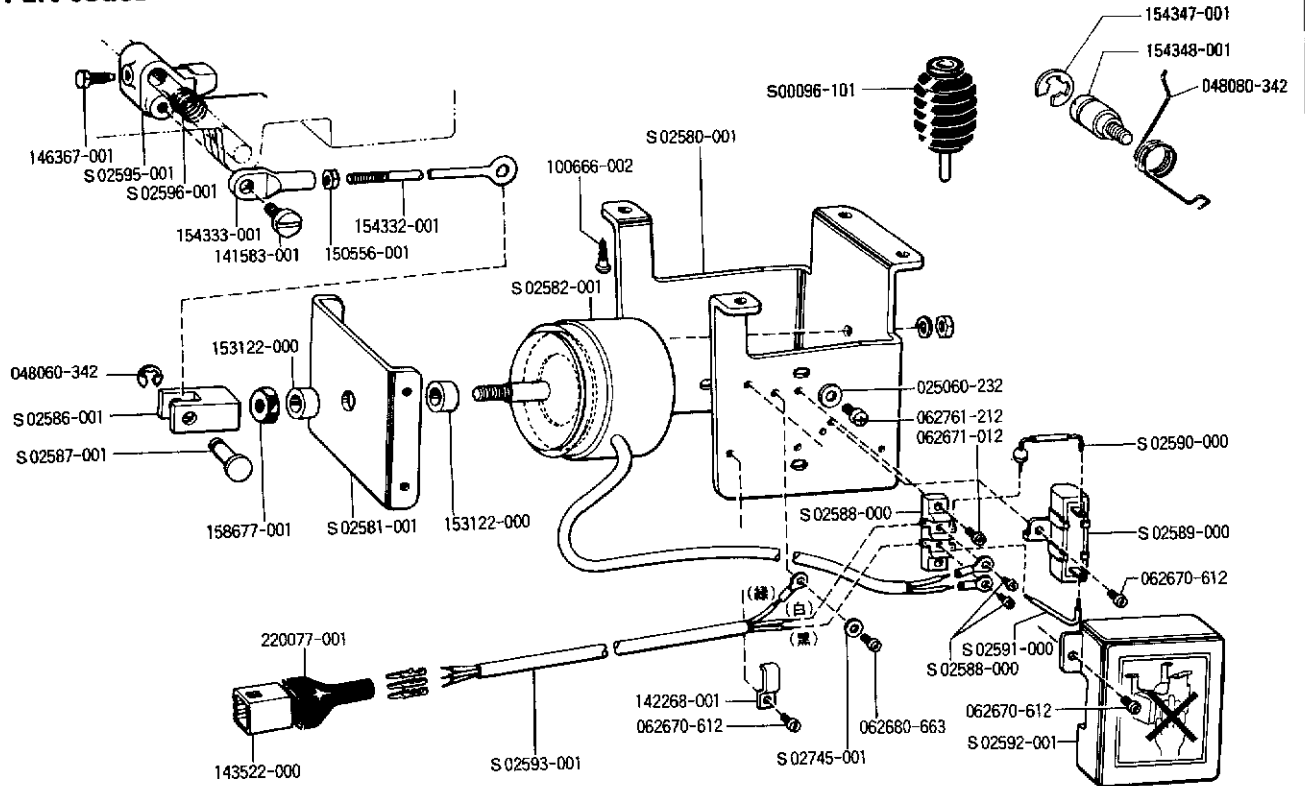
Enables the knee switch to raise the presser foot when the treadle is at neutral and the presser foot is lowered.

Connection B White ↔ Red

Enables the knee switch to lower the presser foot when the treadle is at neutral and the presser foot is raised.

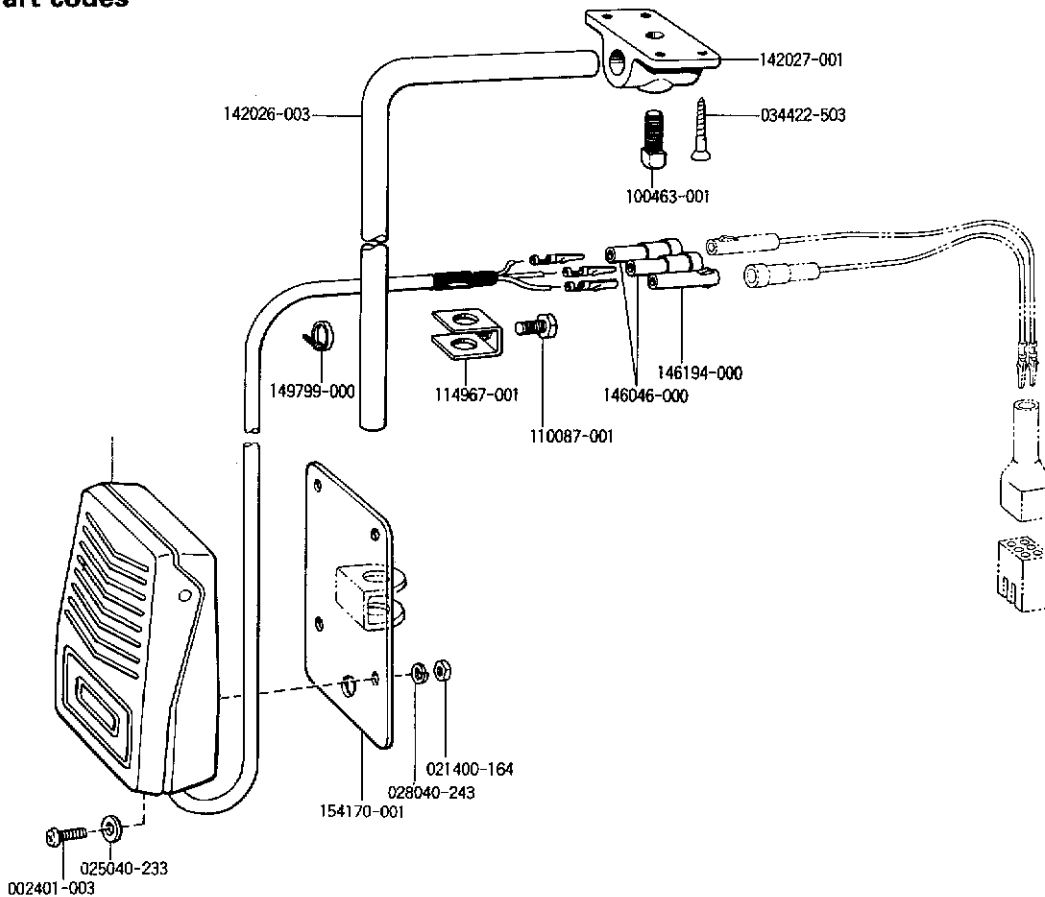
Electromagnetic presser bar lifter

Part codes



Knee switch part codes

Part codes



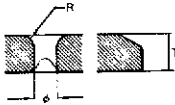
* Please use part code 183396-001 when ordering the above assembly.

GAUGE PARTS GUIDE

Needle plat	N: hole	Mark	Feed dog	Pitch	Presser foot
117216-001	1.2	A 12	111898-001	1.15	111856-001 143711-001
146053-001	1.4	A 14			
100603-001	1.4	A 14			
100602-001	1.8	A 18			
155676-001	1.4	A 14	144675-001	1.15	113280-001 140957-001 147531-001 153037-101
S02999-001	1.4	AB 14	S02748-001	0.9	
S03000-001	1.6	AB 16	S02744-001	1.15	
156114-001	1.4	AB 14	S01235-001 156113-001	0.7	
156115-001	1.6	AB 16		1.15	
S01515-001	1.6	AB 16			
156116-001	1.8	AB 18			
S03882-001	1.2	E 12	159858-001 S03885-001 111860-001 147143-001	0.7	
S03883-001	1.4	E 14		0.9	
159859-001	1.4	E 14		1.15	
S03884-001	1.6	E 16		1.15	
111859-001	1.8	E 18			
S01107-001	1.2	E 12	S01108-001 S00868-001	0.7	
S01126-001	1.4	E 14		1.15	
S01127-001	1.6	E 16			
S00867-001	1.8	E 18			
150792-001	2.6	H 26	150793-001 159430-001	1.8 1.8	150789-001
114650-001	1.4	B 14	100334-001 S02742-001	1.6 1.6	113280-001 140957-001 153037-101
147238-001	1.4	B 14			
153190-001	1.6	B 16			
147239-001	1.6	B 16			
145971-001	1.8	B 18			
100266-001	1.8	B 18			
100267-001	2.2	B 22	144500-001 S02743-001	2.1 2.1	113280-001 145157-001
111241-001	2.6	B 26			
147245-001	2.6	B 26			
111508-001	2.6	C 26	154742-001 144500-001 S02743-001	1.6 2.1 2.1	
147322-001	2.6	C 26			
141096-001	1.8	H 18	117442-001	1.15	113280-001 140957-001 153037-101
153147-001	1.2	B 12	146231-001	1.15	
146233-001	1.4	B 14			
146232-001	1.8	B 18			

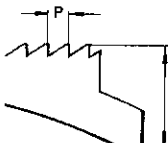
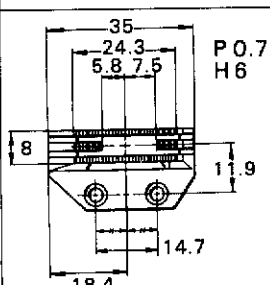
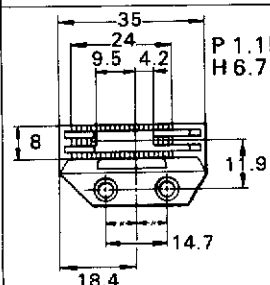
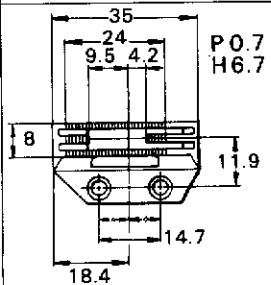
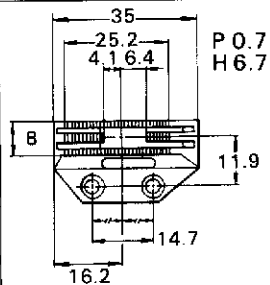
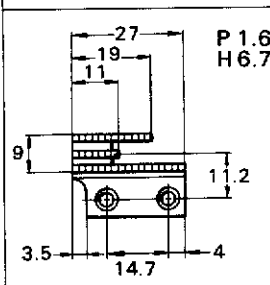
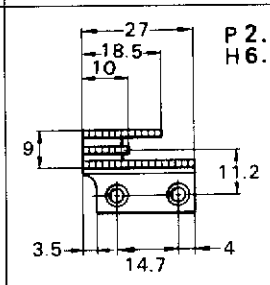
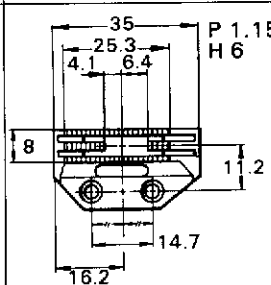
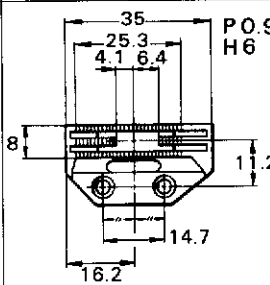
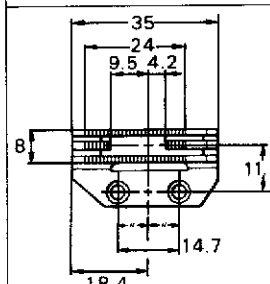
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	Regular materials	Thick materials	Regular materials	Thin, regular materials
	111241-001	111508-001	111859-001	117216-001
	Thick materials	Thick materials	Regular materials	Thin, regular materials
	141096-001	145971-001	146050-001	146053-001
	Regular materials	Regular materials	Thin, regular materials	Thin, regular materials
	146232-001	146233-001	147238-001	147239-001
	Regular materials	Thin, regular materials	Thin, regular materials	Regular materials
	147245-001	147322-001	150792-001	153147-001
	Thick materials	Thick materials	Thick materials	Thin, regular materials
	153190-001	155676-001	156114-001	156115-001
	Regular materials	Thin, regular materials	Thin, regular materials	Regular materials

Needle plate

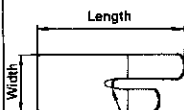
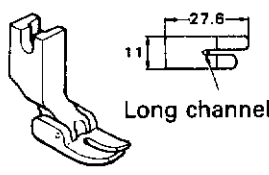
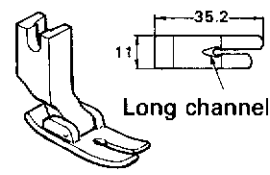
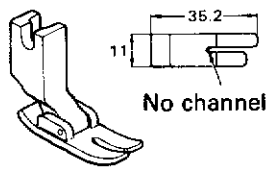
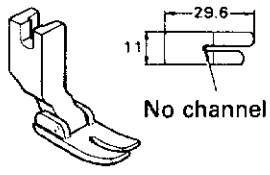
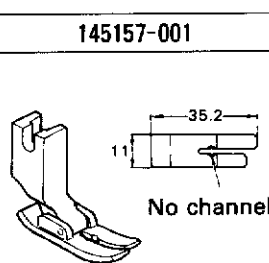
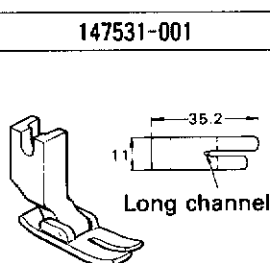
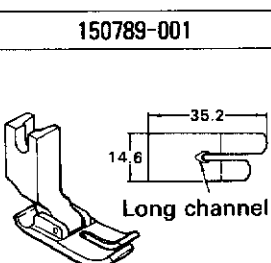
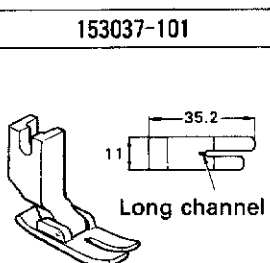


<p>Needle plate</p>	<p>156116-001</p>	<p>159859-001</p>	<p>S 00867-001</p>	<p>S 01107-001</p>
	Regular materials	Thin materials	Regular materials	Thin materials
	<p>S 01126-001</p>	<p>S 01127-001</p>	<p>S 01515-001</p>	<p>S 02999-001</p>
	Thin materials	Regular materials	Regular materials	Thin, regular materials
	<p>S 03000-001</p>	<p>S 03882-001</p>	<p>S 03883-001</p>	<p>S 03884-001</p>
Regular materials	Thin materials	Thin materials	Thin materials	

<p>Feed dog</p>	<p>100334-001</p>	<p>111860-001</p>	<p>111898-001</p>	<p>117442-001</p>
	<p>144500-001</p>	<p>146231-001</p>	<p>147143-001</p>	<p>150793-001</p>
	<p>154742-001</p>	<p>155675-001</p>	<p>156113-001</p>	<p>159430-001</p>
	<p>154742-001</p>	<p>155675-001</p>	<p>156113-001</p>	<p>159430-001</p>
	<p>154742-001</p>	<p>155675-001</p>	<p>156113-001</p>	<p>159430-001</p>

 <p>Feed dog</p>	<p>159858-001</p> 	<p>S 00868-001</p> 	<p>S 01108-001</p> 	<p>S 01235-001</p> 	
	<p>S 02742-001</p> 	<p>S 02743-001</p> 	<p>S 02744-001</p> 	<p>S 02748-001</p> 	
	<p>S 03885-001</p> 				

* If the distance from the feed dog screw hole center to feed dog center is 11.9 mm, shift the forked feed bar shaft and feed lifting feed bar shaft 0.7 mm to the left.

<p>Presser foot assembly</p> 	<p>111856-001</p> 	<p>113280-001</p> 	<p>140957-001</p> 	<p>143711-001</p> 
	<p>145157-001</p> 	<p>147531-001</p> 	<p>150789-001</p> 	<p>153037-101</p> 

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.	Does feed mechanism function while needle is in material?	Adjust feed timing.	27
	Improper needle to rotary hook timing.	Needle bar rise	Adjust needle to rotary hook timing.	24
		Needle bar height	Adjust needle to rotary hook timing.	24
		Needle to rotary hook gap	Adjust needle to rotary hook timing.	24
	Thread wiper too high.	Thread wiper position	Adjust thread wiper.	40
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.	25
	Excessive bobbin thread tension	Bobbin thread tension	Adjust bobbin thread tension.	25
	Loose needle thread	Thread take-up spring operation	Adjust thread take-up spring.	25
	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.		
Skipped stitches	Improper needle installation	Needle facing, height	Reinstall needle.		
	Wrong needle for application	Needle size, length	Replace needle with larger count needle.		
	Bent needle, blunt tip	Needle	Replace needle.		
	Blunt rotary hook point	Rotary hook point	Replace rotary hook.		
	Improper threading	Threading	Rethread.		
	Poor presser foot contact	Presser bar pressure	Tighten presser foot adjustment screw.		
	Improper needle to rotary hook timing	Needle bar rise		Tighten presser foot adjustment screw.	24
		Needle bar height		Adjust needle to rotary hook timing.	24
		Needle to rotary hook timing		Tighten presser foot adjustment screw.	24
	Needle thread remainder too short; does not remain in material.			Adjust pretension.	25
Bobbin spins during thread cutting and bobbin thread remainder gets too short; won't rise.	Bobbin case spinning prevention spring		Replace spinning prevention spring.	26	
Thread take-up spring tension too weak, won't raise bobbin thread.	Thread take-up spring tension		Adjust thread take-up spring tension.	25	

Problem	Cause	Check	Solution	Page
Needle thread doesn't tighten.	Insufficient needle thread tension		Increase needle thread tension	25
	Excessive needle thread tension		Decrease bobbin thread tension	25
Bobbin thread doesn't tighten.	Excessive needle thread tension		Decrease needle thread tension	25
	Insufficient needle thread tension		Increase bobbin thread tension	25
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	24
Improper thread cutting a. Needle, bobbin threads not cut	Movable knife, fixed knife don't overlap	Do thread cutter holder index and thread cutter holder clamp index match?	Adjust knives	31
	Worn, rough movable, fixed knife edge	Knives	Replace knives	31
	Movable knife doesn't move	Thread cutter signal relayed?	Check electrical circuits; replace thread cutter solenoid	
b. Needle thread not cut	Improper needle installation	Needle facing	Reinstall needle	
	Last stitch skipped, needle thread not caught by thread cutter	Thread take-up spring stroke	Adjust thread take-up spring	25
	Movable knife, fixed knife don't overlap	Do thread cutter holder index and thread cutter holder clamp index match?	Adjust knives	31
c. Bobbin thread not cut	Poor movable knife, fixed knife cutting	Knives	Replace knives	31
	Movable knife, fixed knife don't overlap	Do thread cutter holder index and thread cutter holder clamp index match?	Adjust knives	31

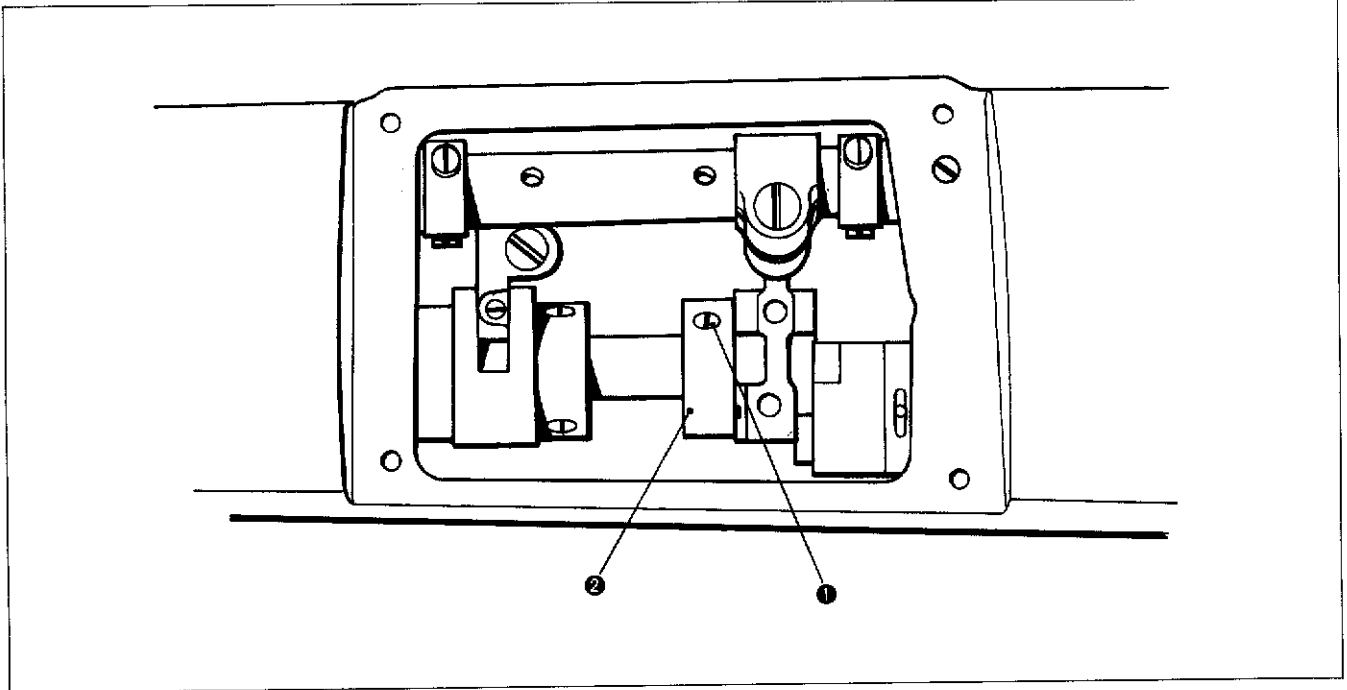
Problem	Cause	Check	Solution	Page
Needle thread escapes at sewing start	Tension disc does not open sufficiently.	Tension disc opening	Adjust tension release.	25
	Excessive pretension		Adjust pretension.	25
	Needle too heavy for thread		Needle size	
	Needle up stop position too high, thread removed by thread take-up	Thread take-up height at needle up stop position	Delay needle up stop position.	30
Thread cutter mechanism doesn't function.	Thread cutter solenoid does not function	Check with tester	Replace thread cutter solenoid.	34
	Thread cutter signal not relayed		Check circuits. Refer to motor adjustment manual.	
Thread wiper doesn't function.	Needle thread remainder too long		Adjust pretension.	
	Excessive material, presser foot resistance		Replace with presser foot have back channel.	
	Timing too early; wiper thread before tension disc closes.		Adjust operating time.	
	Thread wiper operation too short.		Adjust operating time.	
Thread wiper strikes needle, won't return.	Thread wiper operation too long.		Adjust operating time.	
	Automatic presser bar rises too fast.		Adjust presser foot operating time.	

Problem	Cause	Check	Solution	Page
Thread wiper doesn't wipe thread.	Improper thread wiper facing		Adjust facing.	40
	Thread wiper, needle strike		Adjust thread wiper height.	40
	Thread wiper doesn't operate.		Turn thread wiper solenoid switch on, or replace solenoid	35
Reverse and forward stitch lengths do not match when using the quick reverse function.	Improper forward, reverse adjustment		Adjust eccentric pin.	28
Unusual sound from quick reverse solenoid	Reverse feed solenoid gap too small		Adjust reverse feed solenoid position.	32
No oil in gauge window; rotary hook not lubricated	Not enough oil in pan	Oil	Add oil.	
	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.	

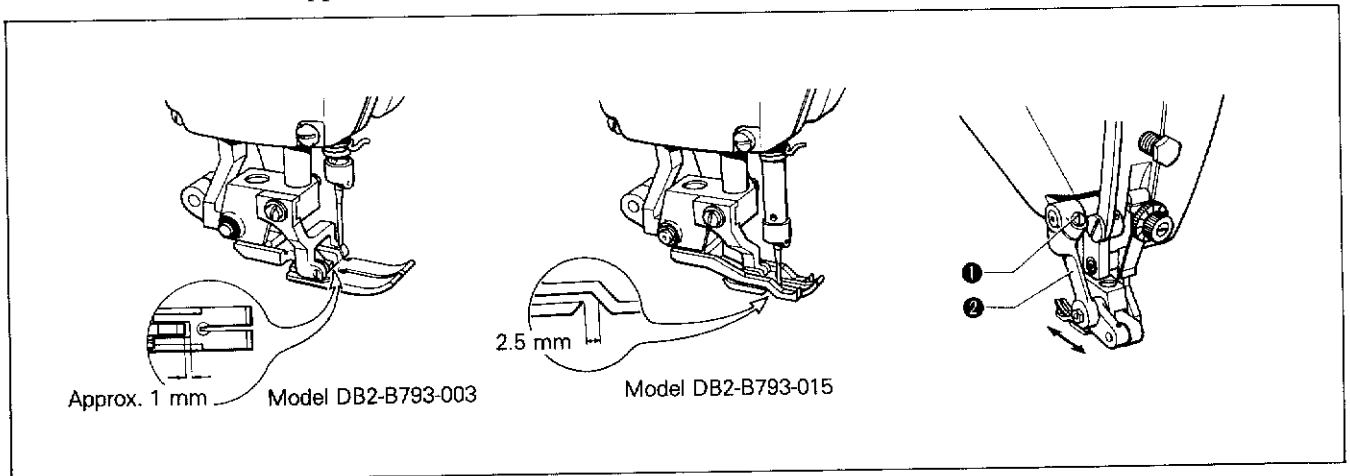
HOW TO ADJUST TOP FEED MECHANISM ON B793

PROCEDURES

1. Remove the top cover.
2. Adjust bottom and top feed to maximum feed.
3. Adjustment for horizontal movement of top feed:
 - (1) Loosen screws of upper feed eccentric wheel ②
 - (2) While depressing the reverse handle up and down, turn the pulley slowly
 - (3) Stop turning the pulley: bottom feed doesn't move and the needle is below the needle plate.
 - (4) While depressing the reverse handle up and down, turn the upper feed eccentric wheel ② until the top feed doesn't move, then tighten screws ①



4. Clearance between upper feed dog and presser foot



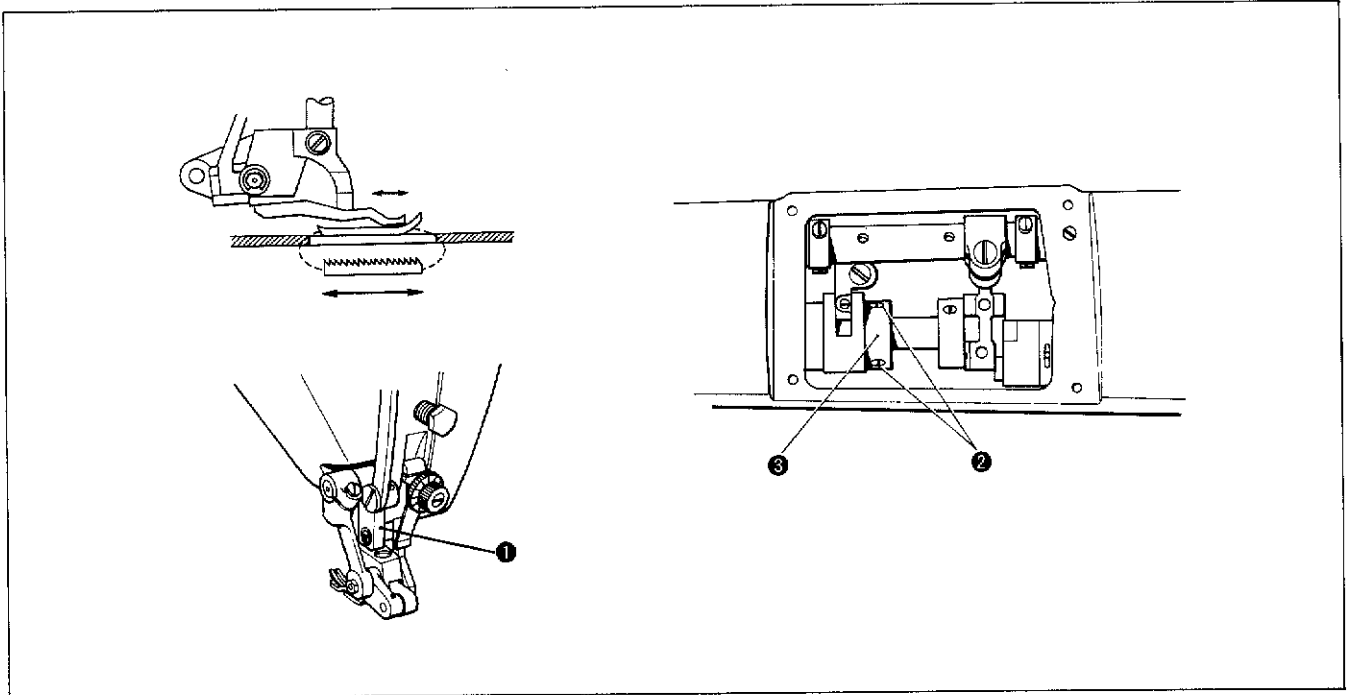
- (1) Turn the upper feed adjustment dial assembly to set the upper feed amount to maximum.
- (2) Turn the machine pulley slowly.
- (3) The minimum clearance between the upper feed dog and the presser foot should be approximately 1.0 mm when the forward-pulling type upper feed dog is used, and 2.5 mm when the gathering type upper feed dog is used.
- (4) Loosen the screw ①, and adjust the clearance by moving the upper feed arm ② forward or backward.

5. Adjustment for vertical movement of top feed:

(1) Loosen screws ② for eccentric wheel ③

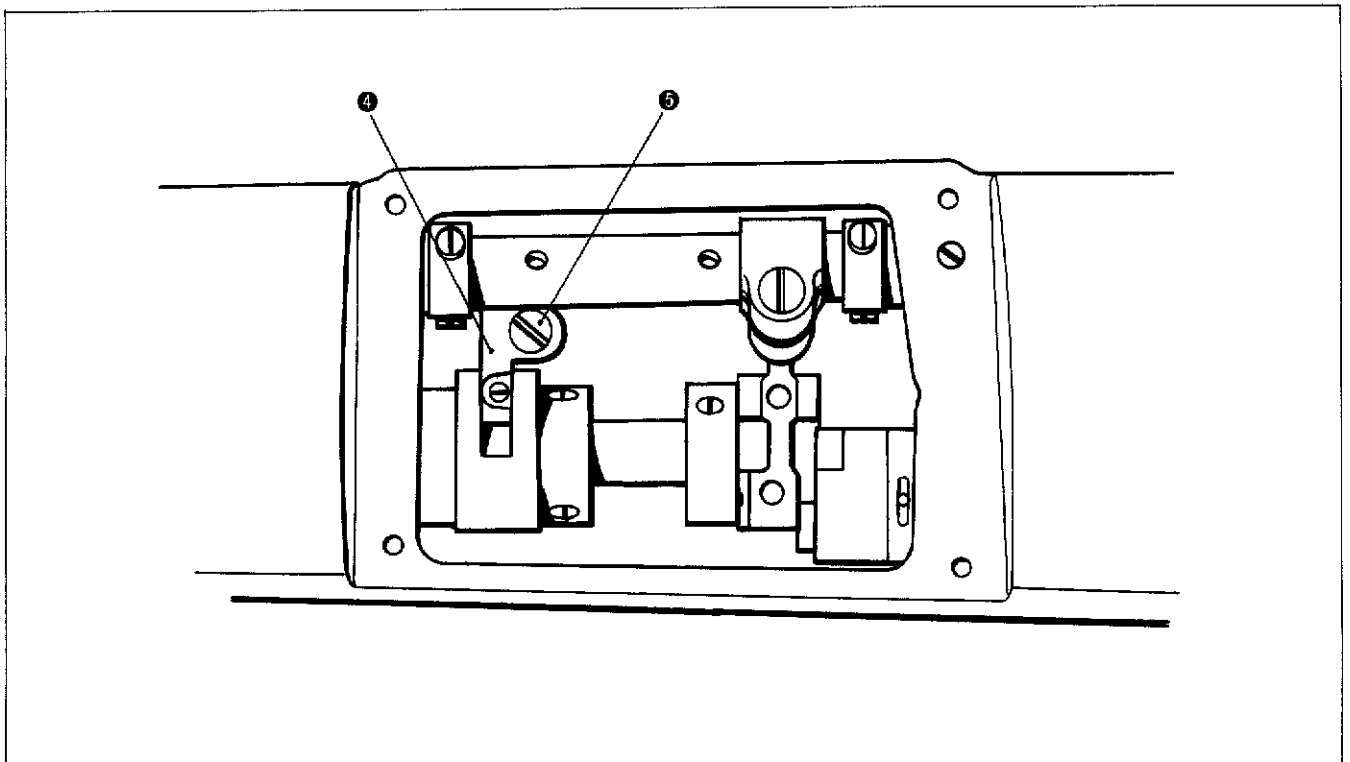
(2) Turn the pulley to lower needle bar, and then continue to turn until needle bar has risen 1 mm.

(3) Turn eccentric wheel ③ until crank assembly ① is fully back, then tighten screws. In this case, the screws for the eccentric wheel are positioned slightly lower than the screws for the upper feed eccentric wheel.



6. Turn the pulley until the crank assembly ① is in the full forward position, adjust 0.5 to 1 mm distance between roller of crank assembly and upper feed crank by screw for lifting lock connecting lever assembly ④

To adjust distance, loosen screw ⑤ and move feed crank ① to proper setting.



brother

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TELEX: BROTHER 4473696J & J59743