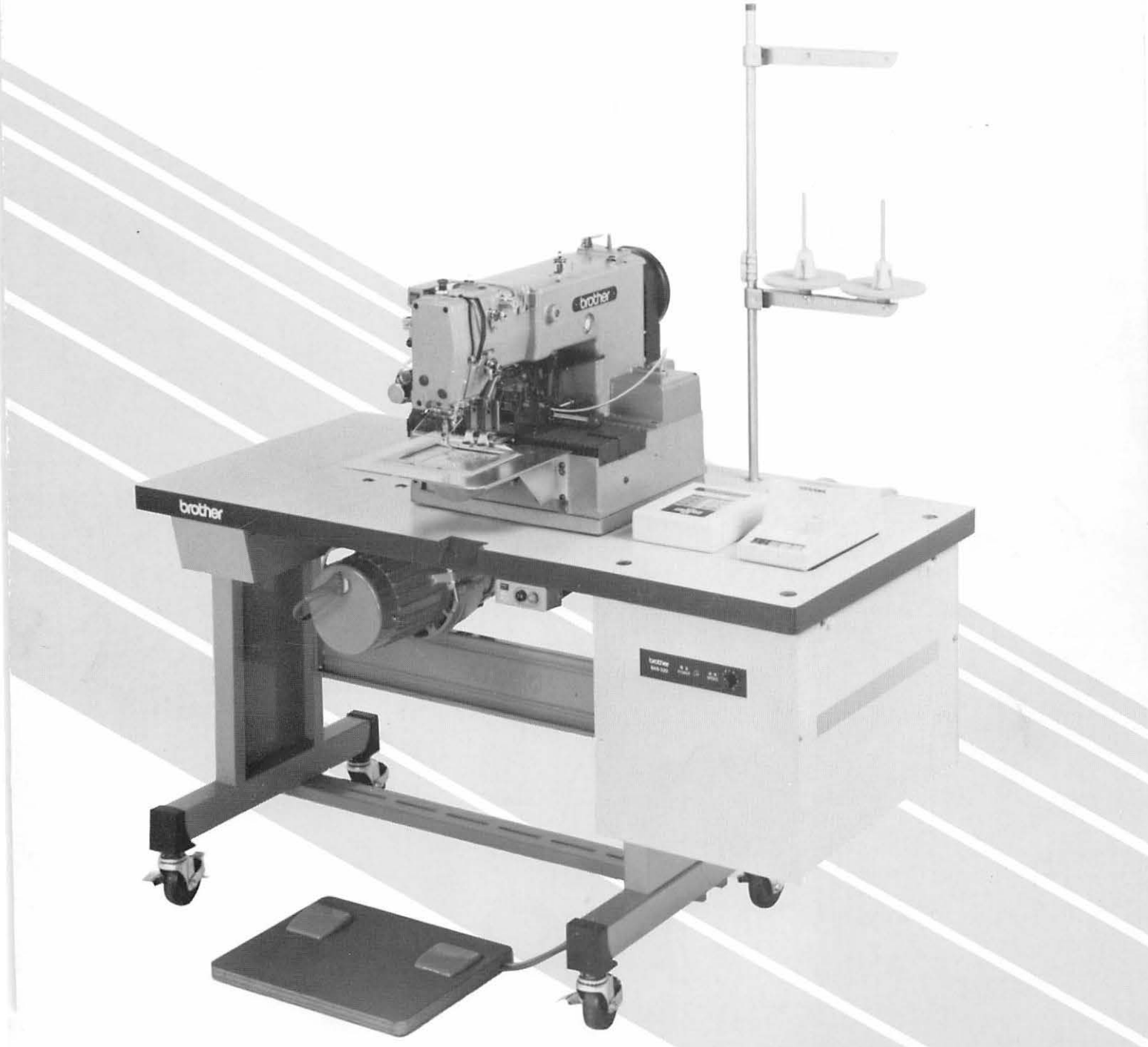
brother

BAS-320

Electronically Programmable lockstitch Machine with Cylinder Arm Profile SII

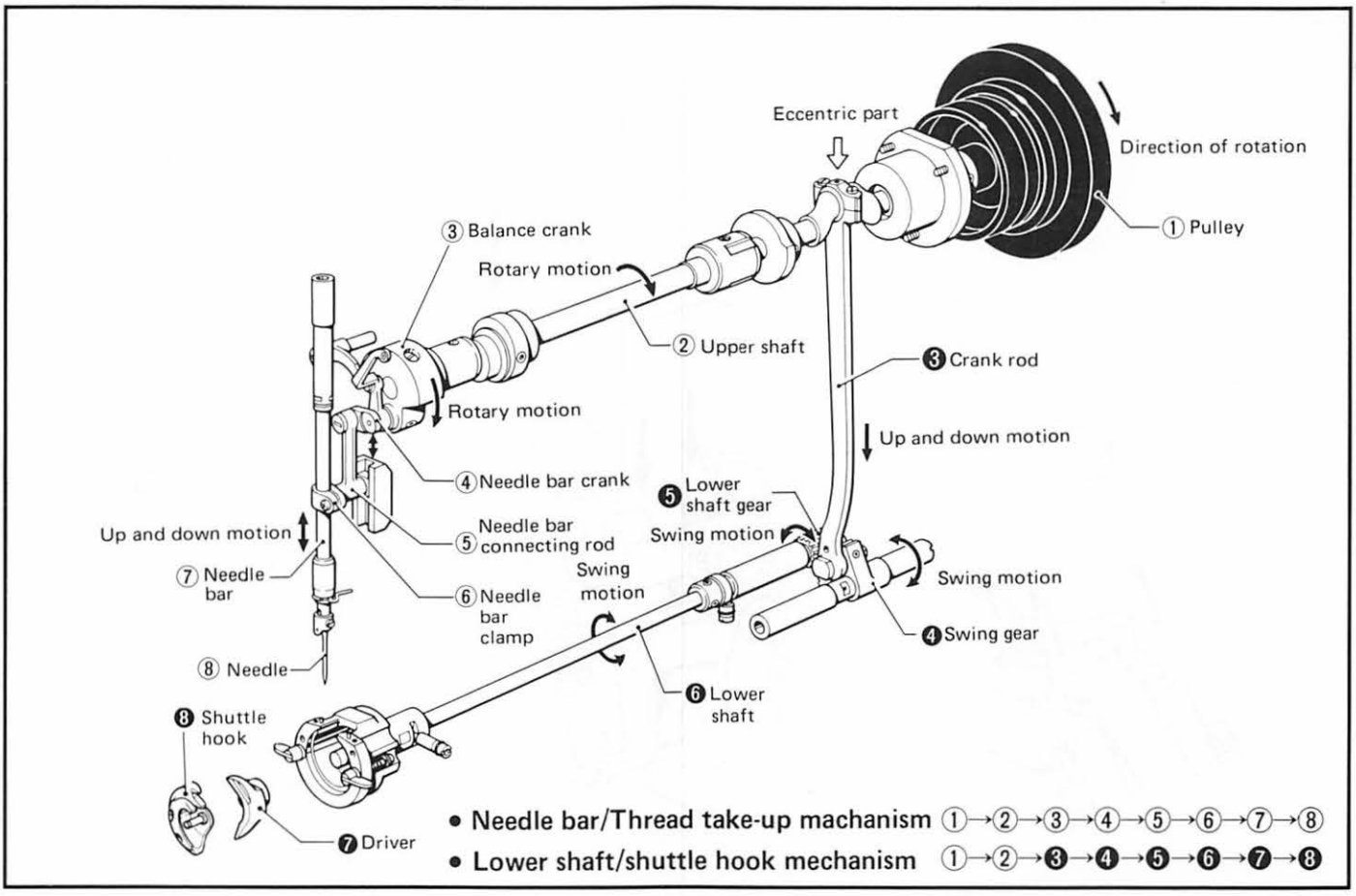
Service manual



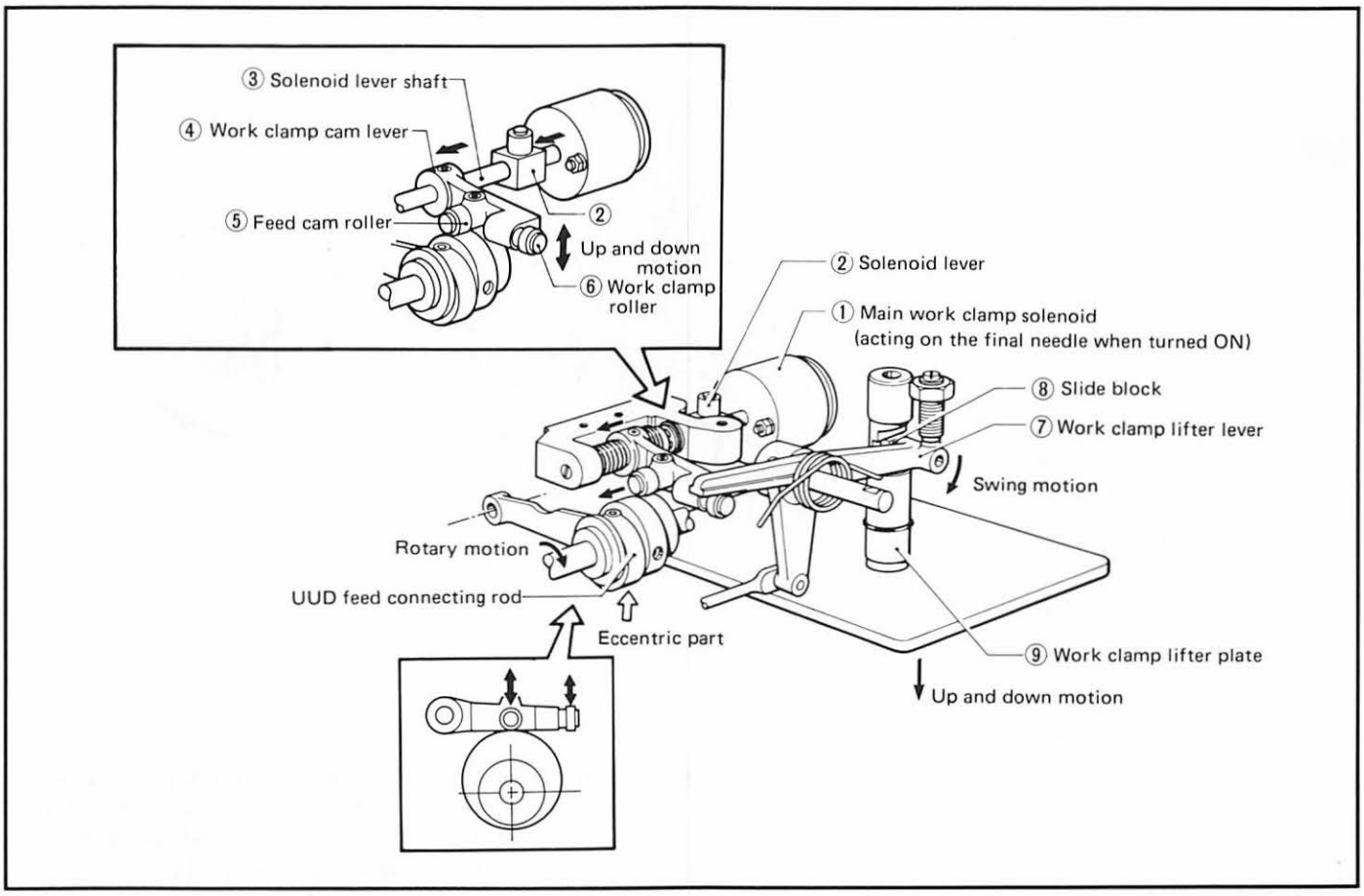
CONTENTS

1 MECHANISM

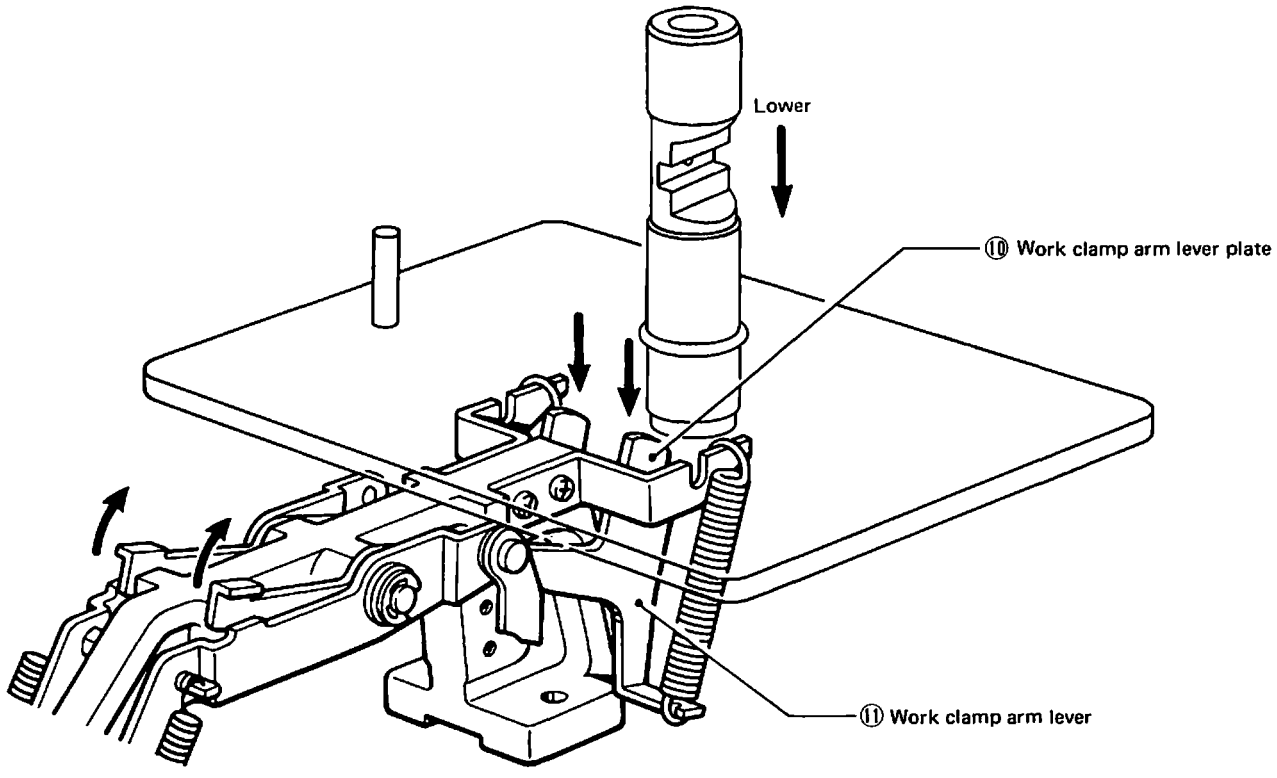
1 Needle bar, thread take-up, lower shaft, and shuttle hook mechanism



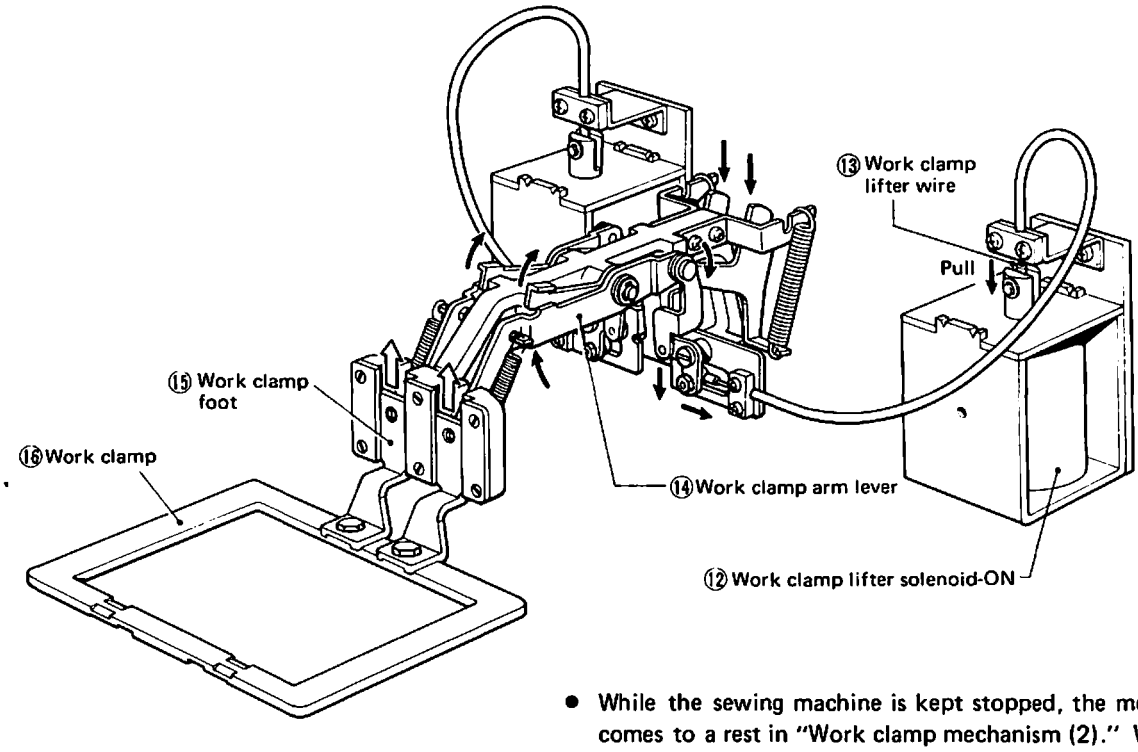
2 Work clamp mechanism (1)



Work clamp mechanism (2)

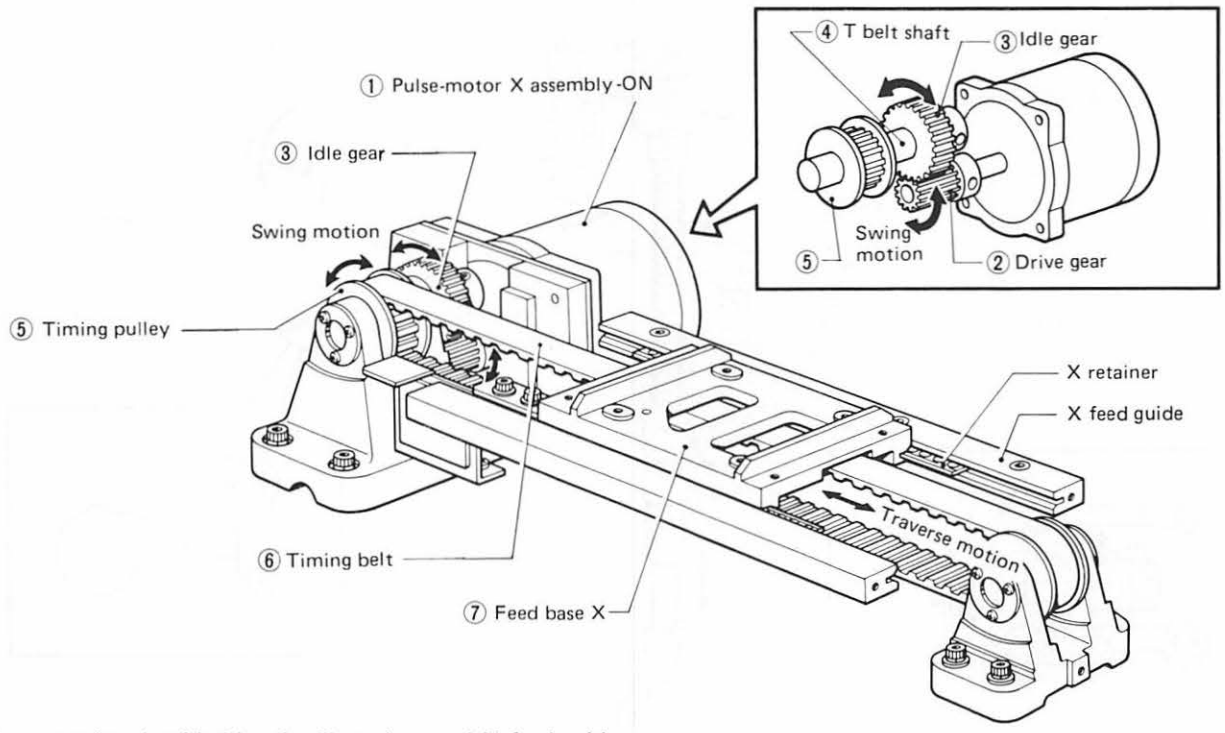


Work clamp mechanism (3)



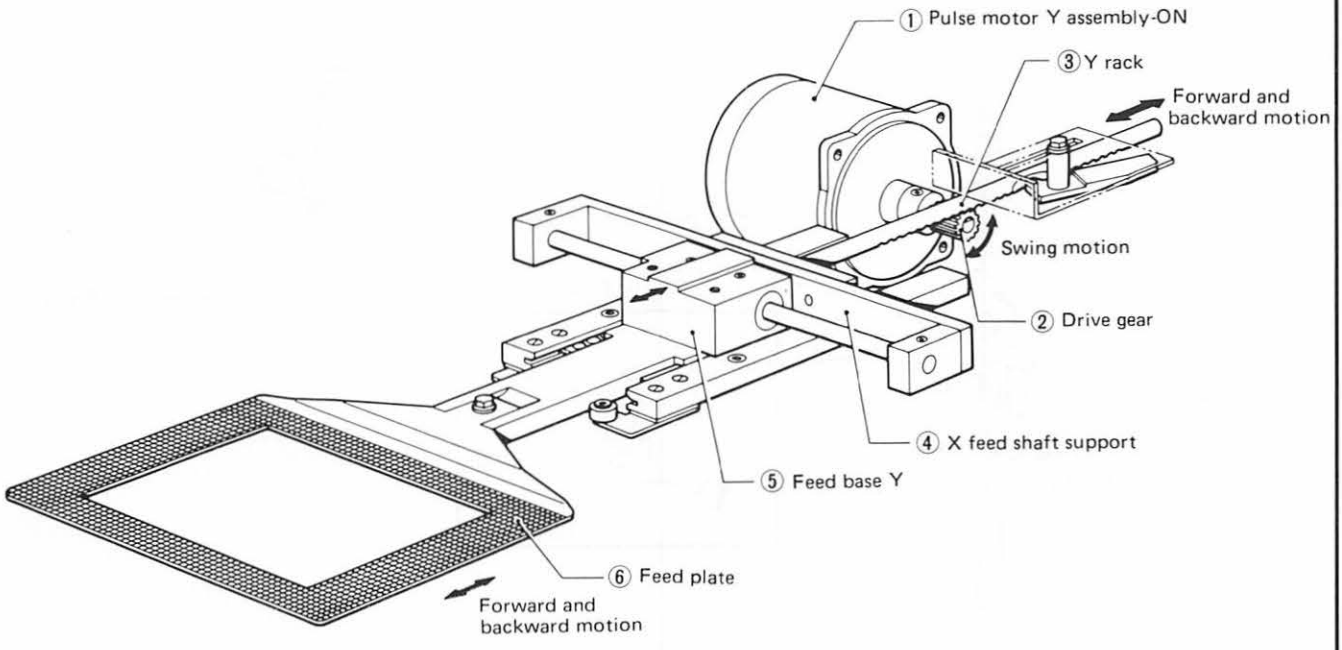
- While the sewing machine is kept stopped, the mechanism comes to a rest in "Work clamp mechanism (2)." When the work clamp lifter pedal is pressed, the work clamp lifter solenoid ⑫ works, raising the work clamp ⑯ .

3 Feed mechanism (X axis)

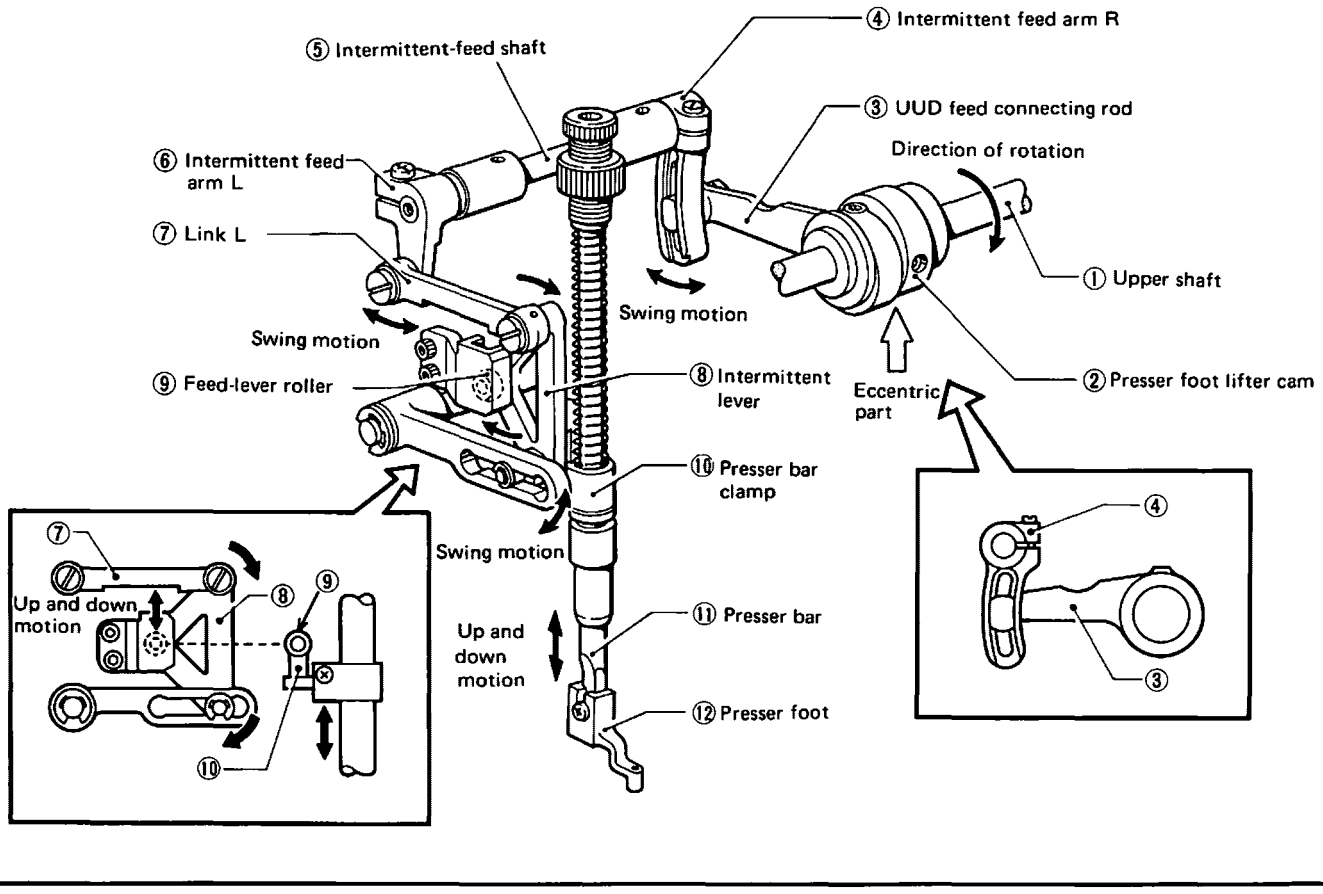


- Supported and guided by the X retainer and X feed guide, the feed base X fixed on the timing belt traverses.

Feed mechanism (Y axis)

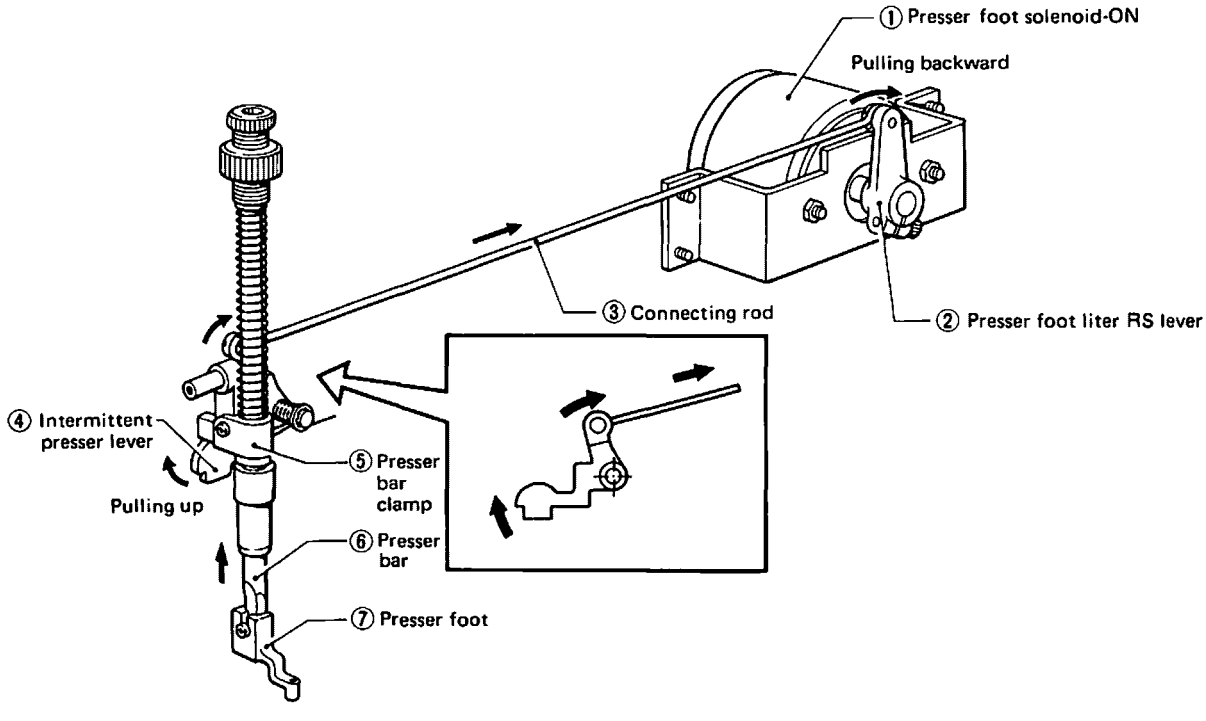


4 Intermittent-presser foot mechanism (1)

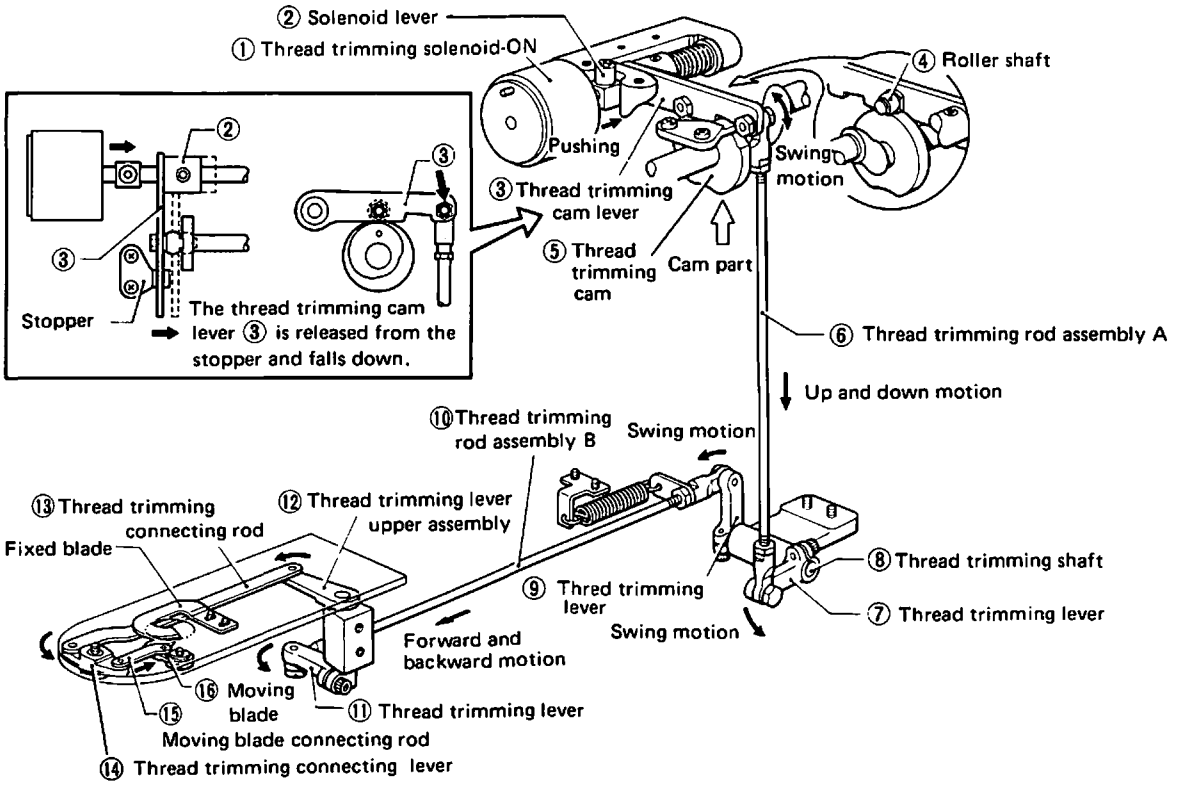


Intermittent-presser foot mechanism (2)

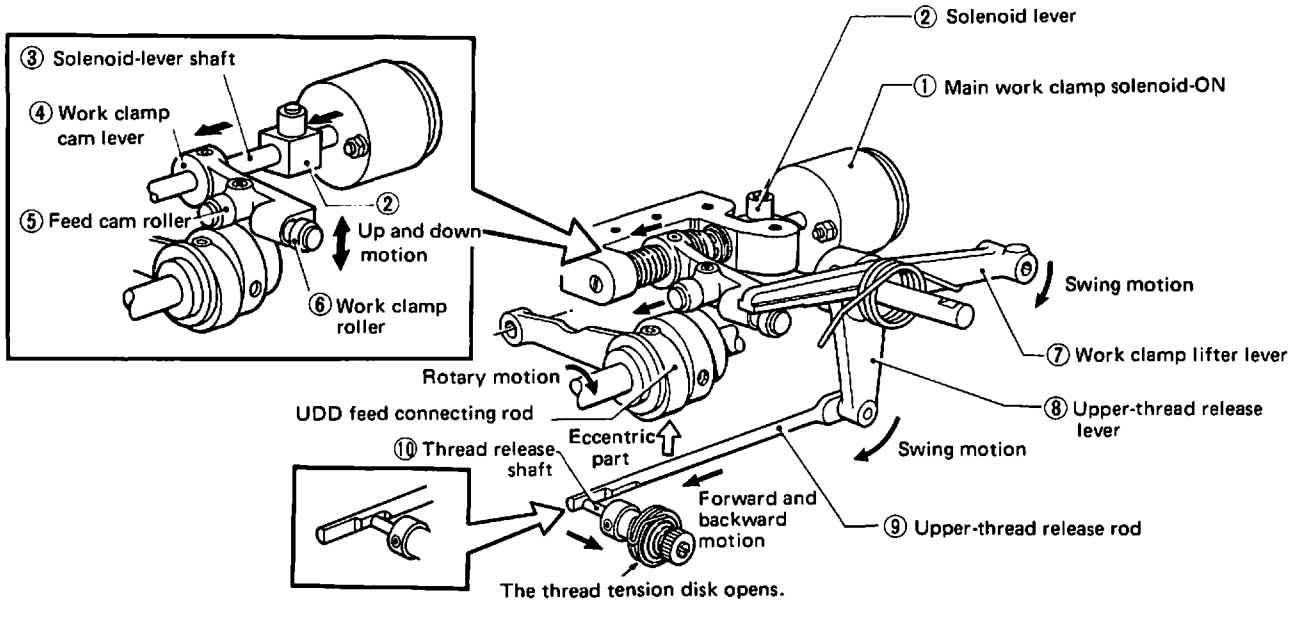
- Mechanism for raising the presser foot.



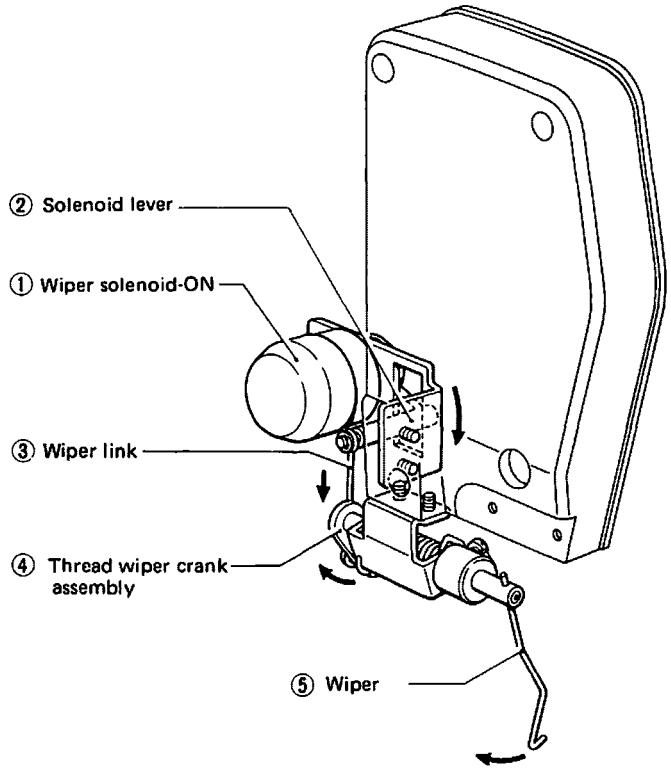
5 Thread trimming mechanism



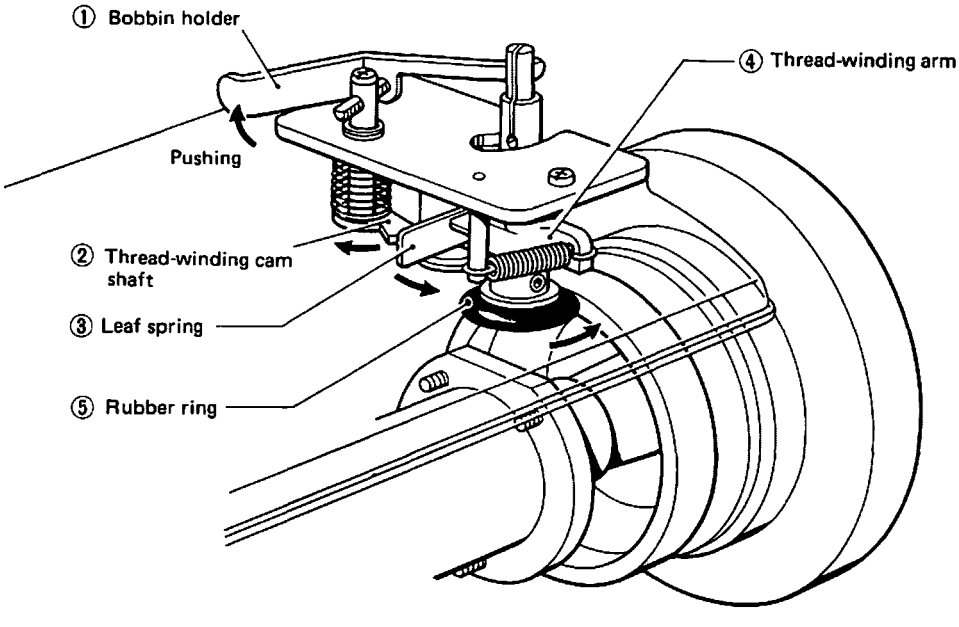
6 Thread release mechanism



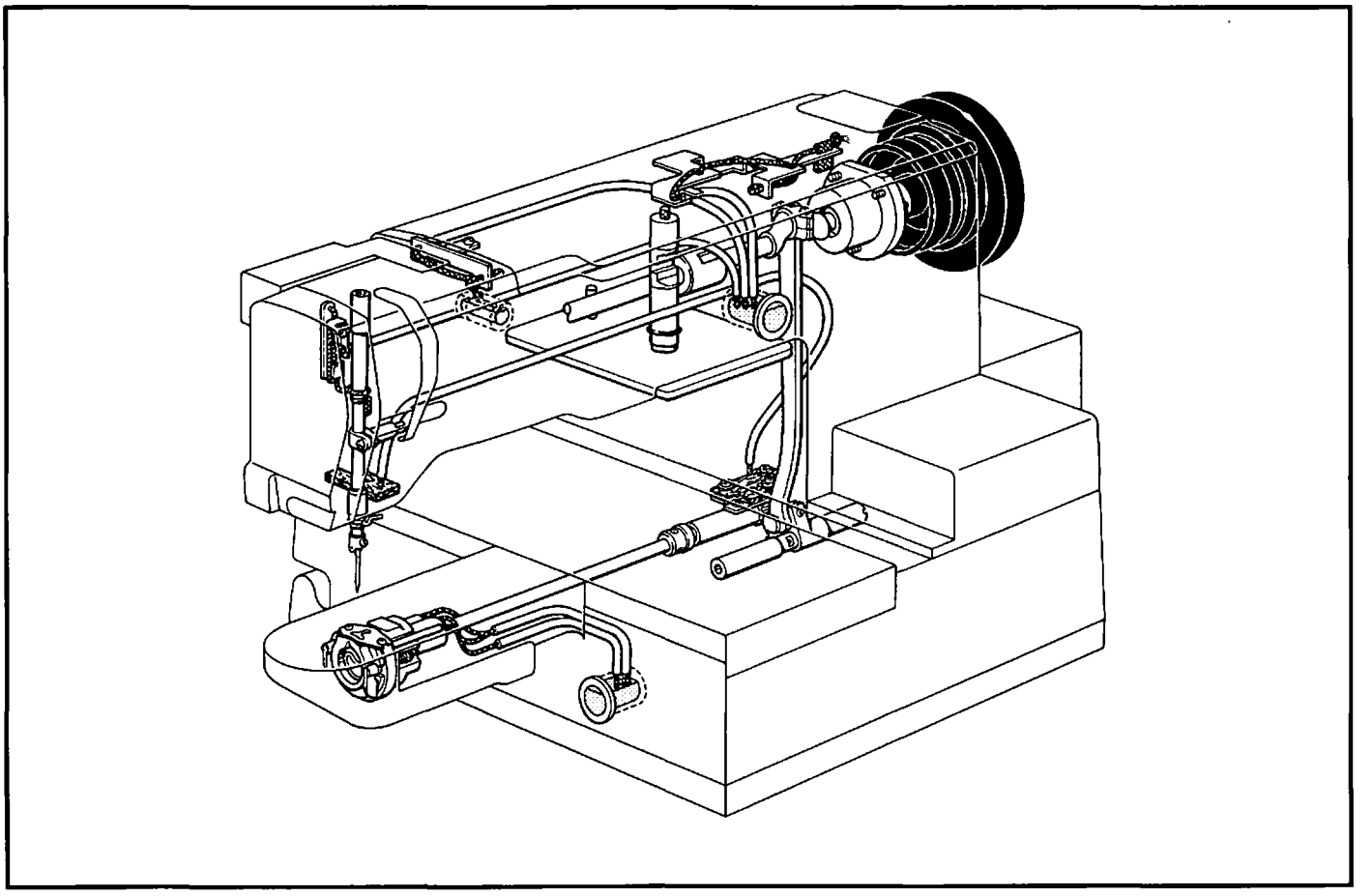
7 Thread wiper mechanism



8 Thread winding mechanism



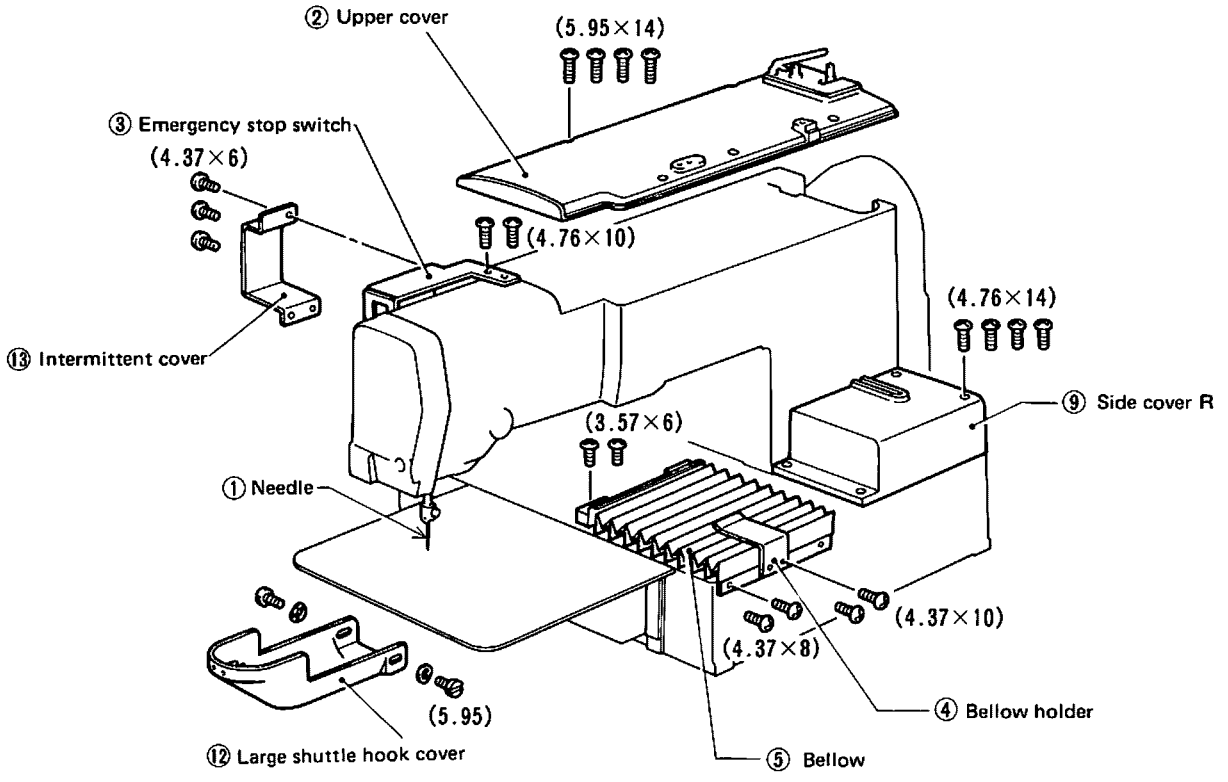
9 Lubrication

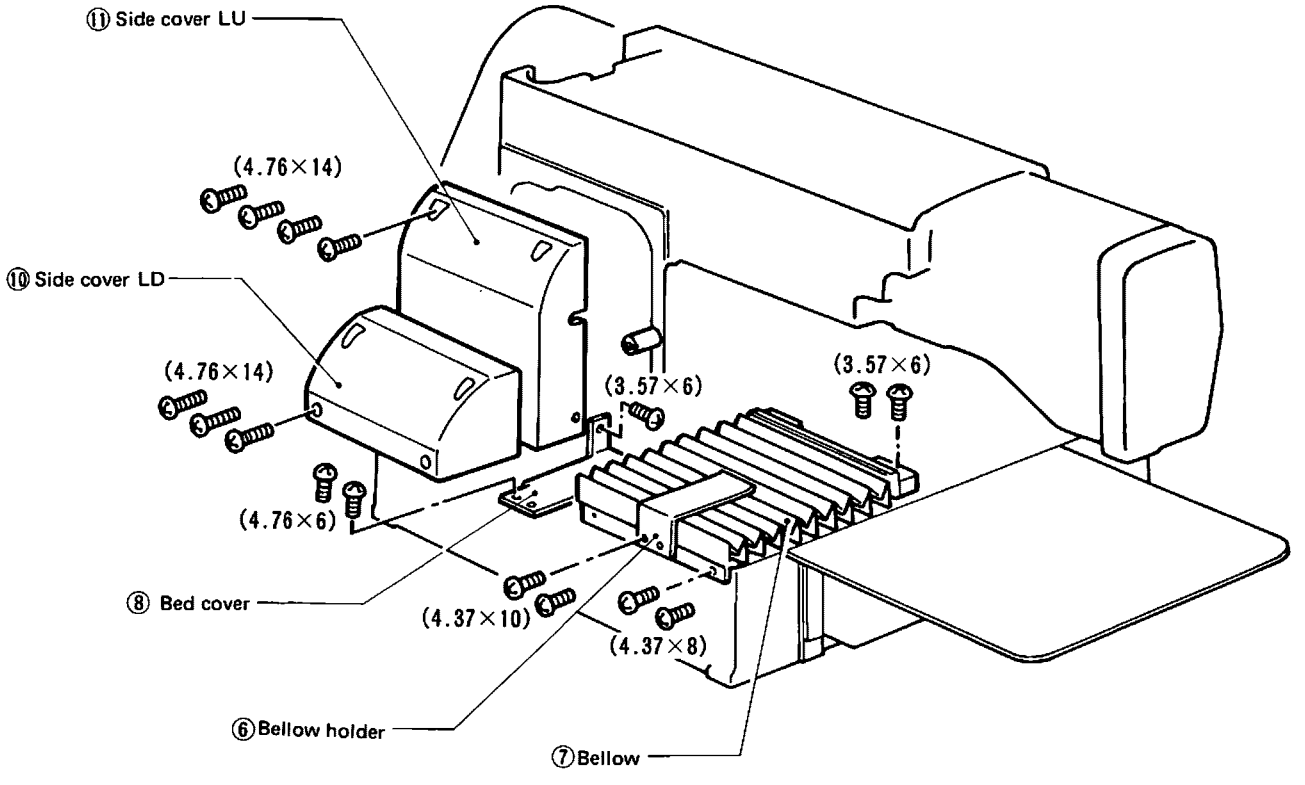


2 DISASSEMBLY PROCEDURES

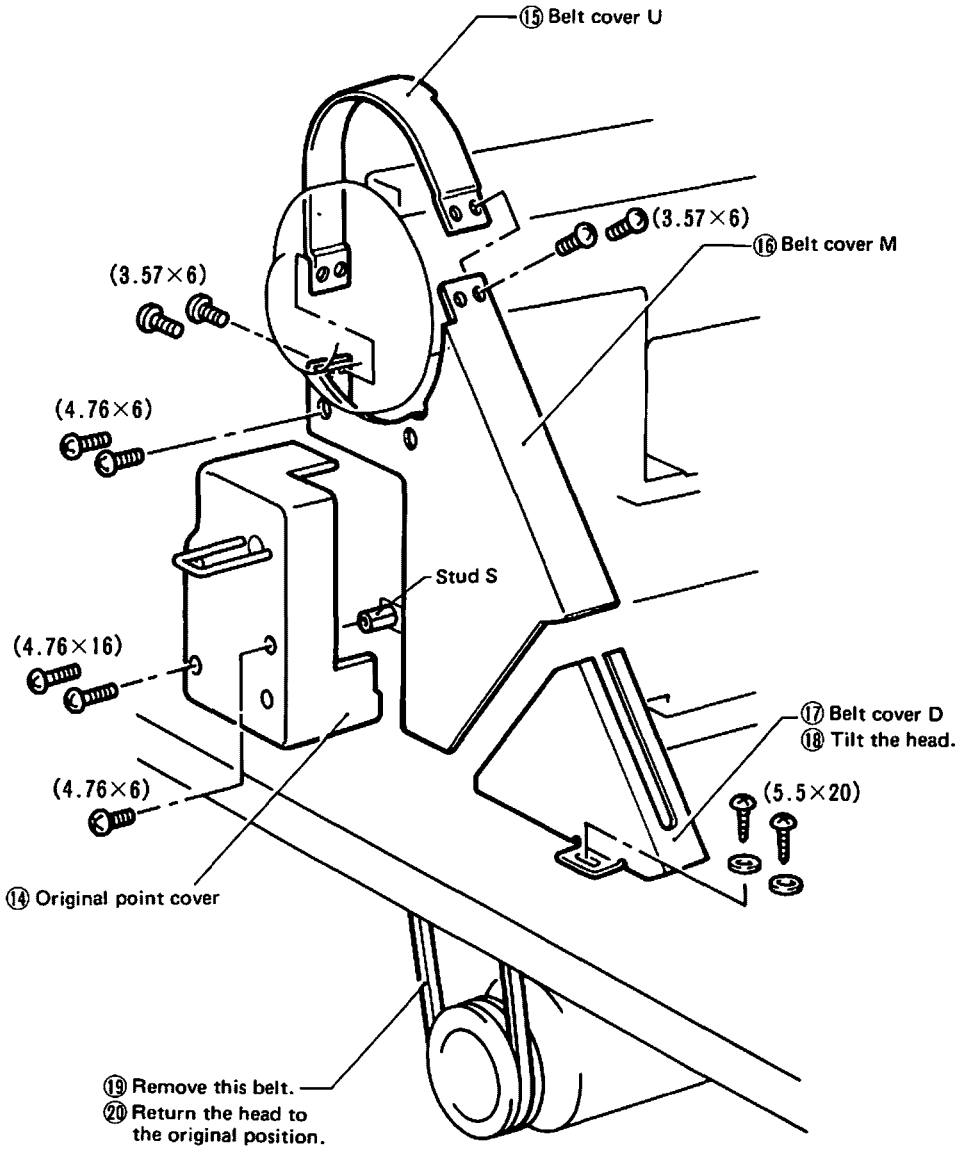
○ Disassemble the illustrated parts in the order of the encircled figures.

1 Covers (1)

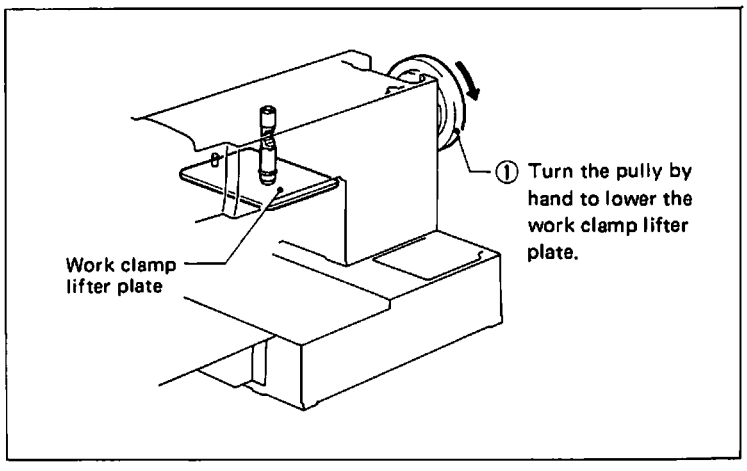


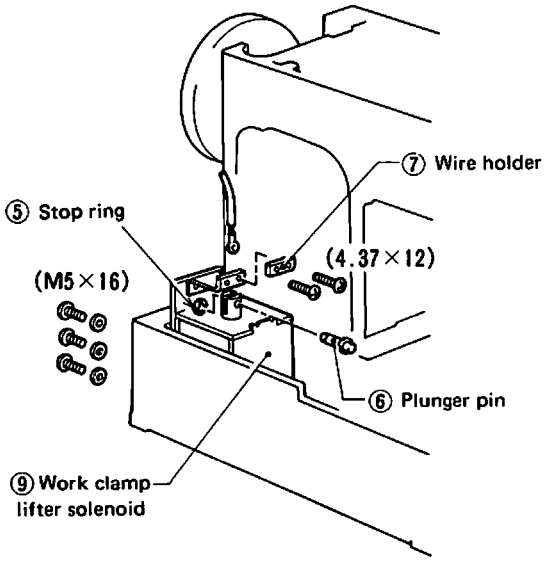


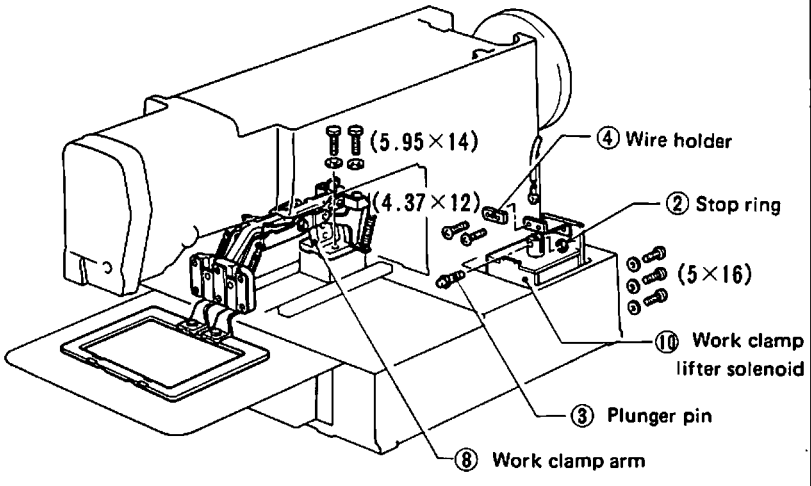
Covers (2)

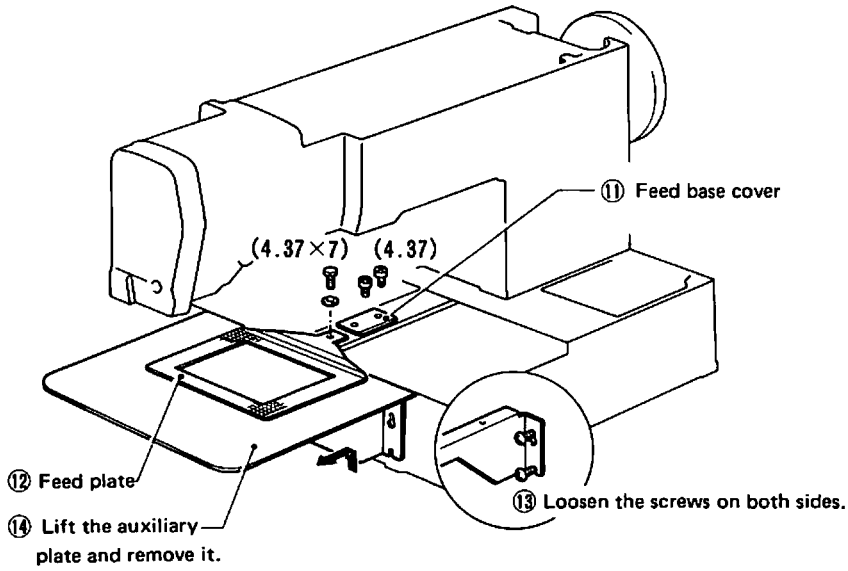


2 -1 Work clamp (solenoid type)

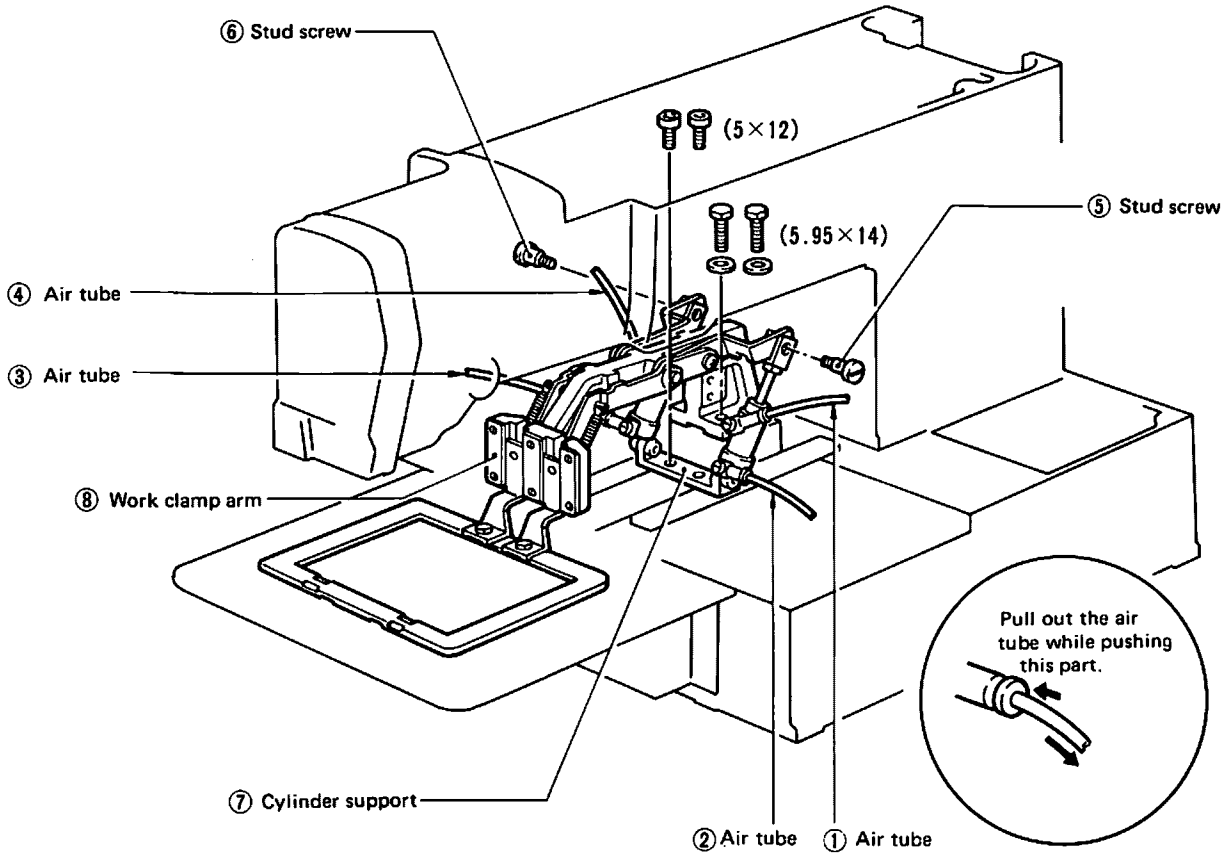




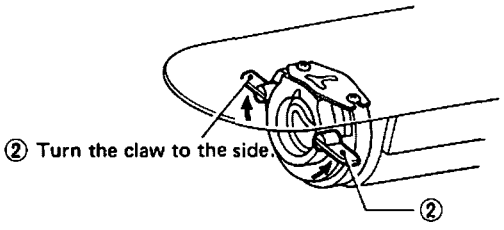


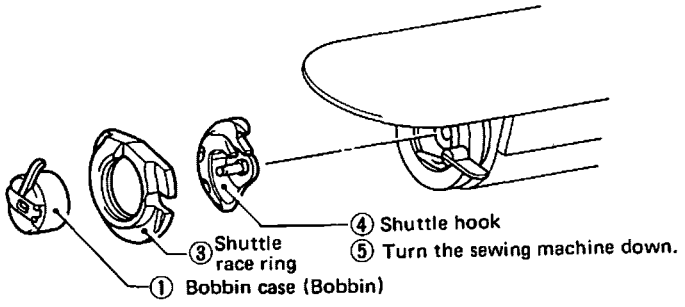


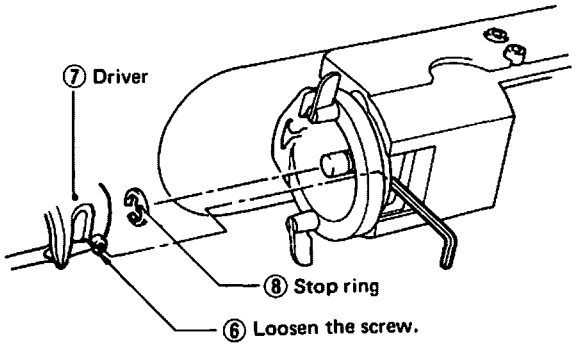
2 -2 Work clamp (pneumatic type)

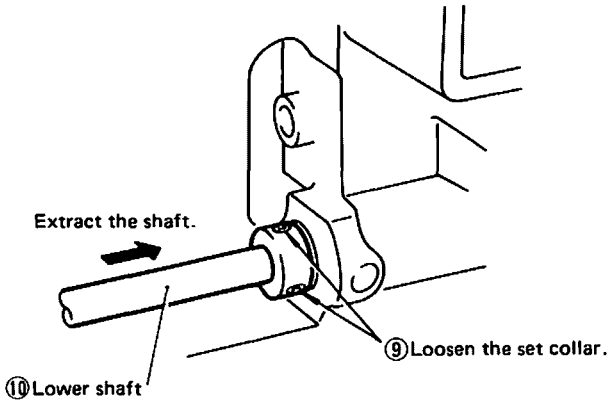


3 Lower shaft

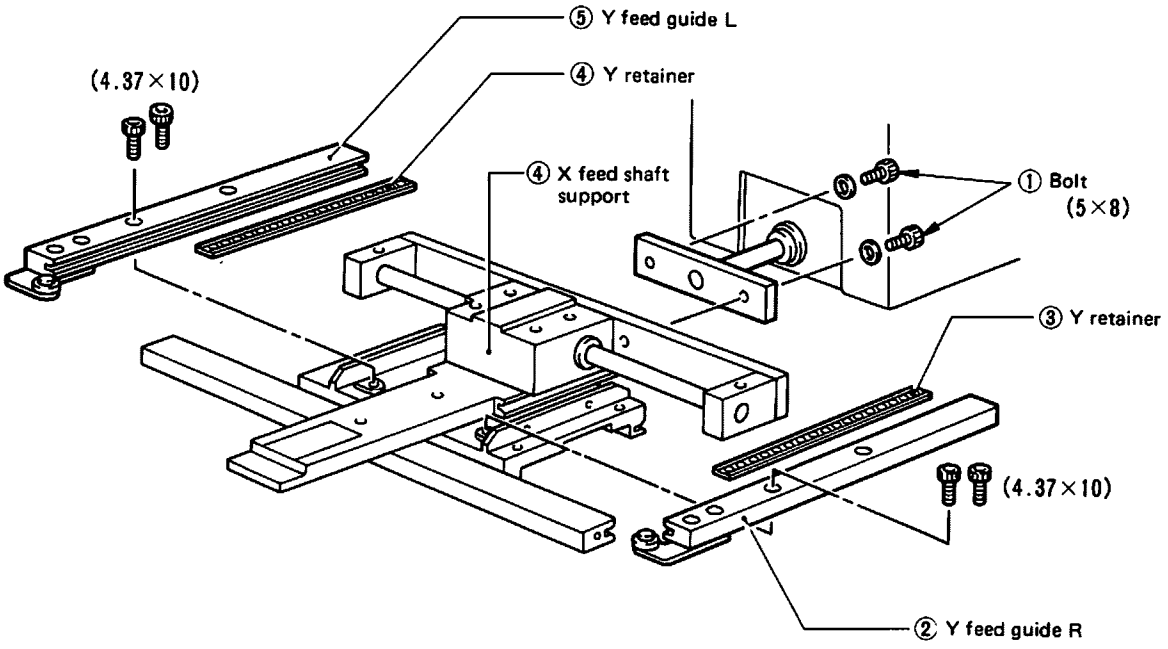


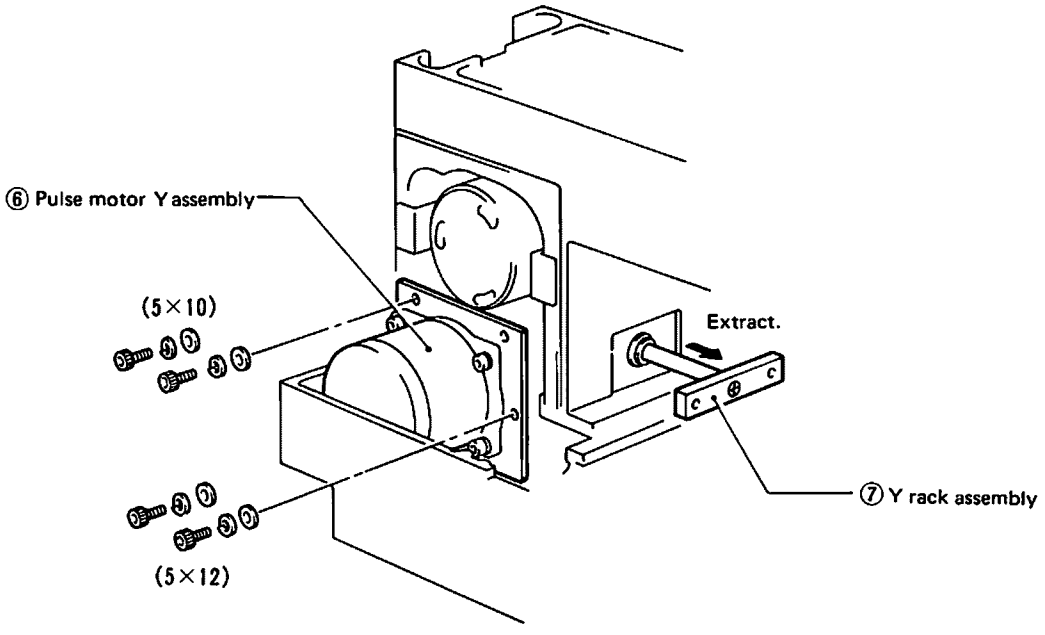




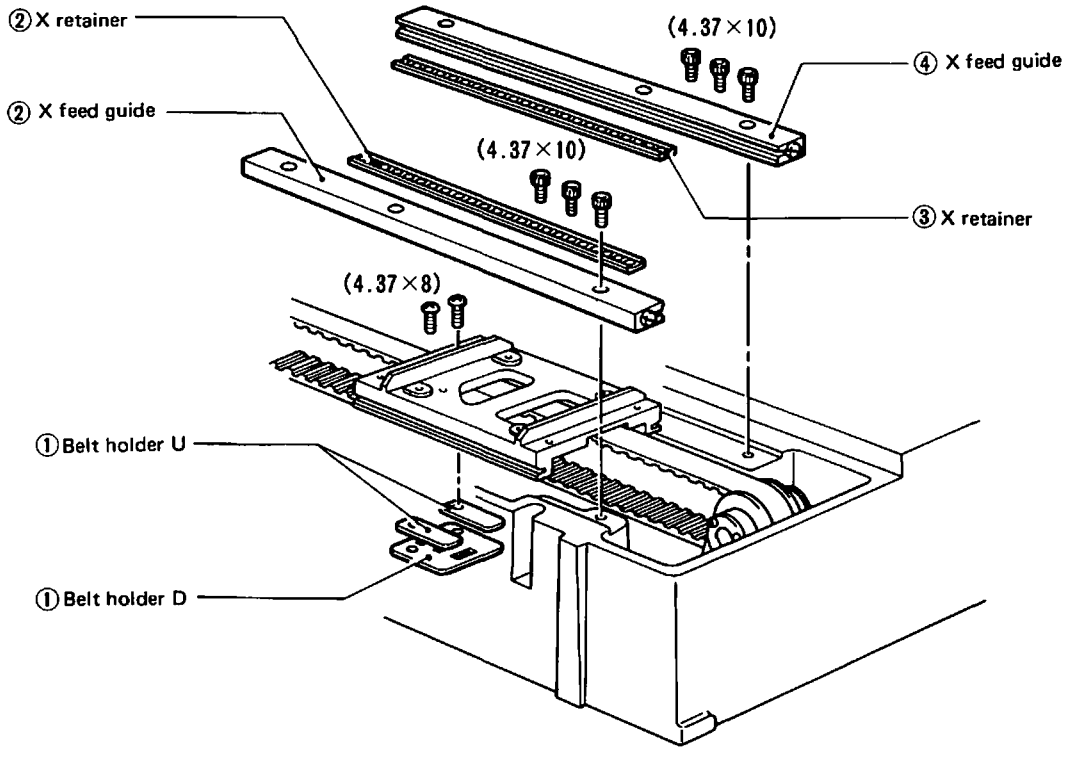


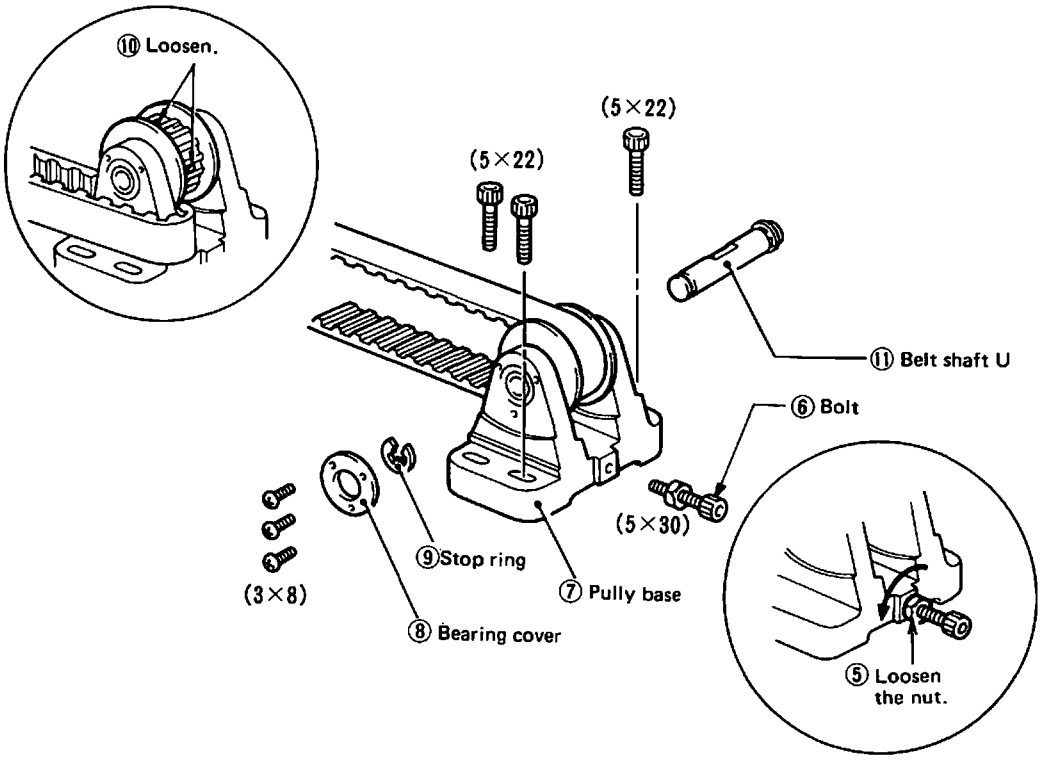
4 Longitudinal feed (Y axis)





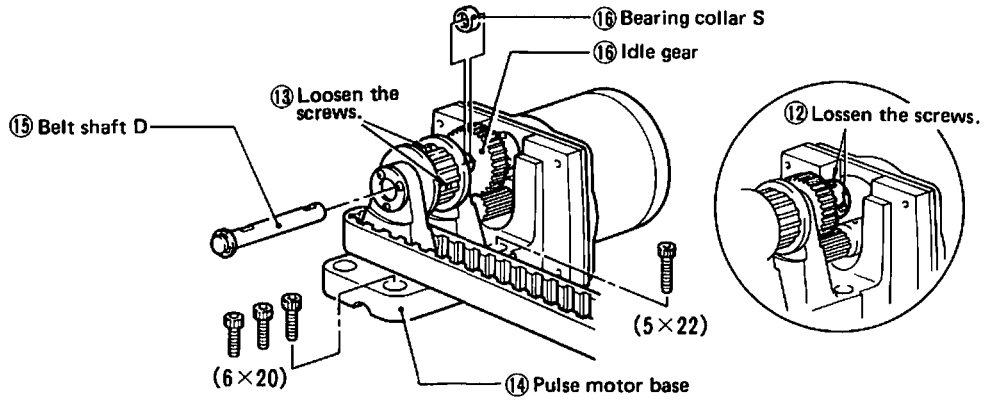
5 Traverse feed (X axis) (1)



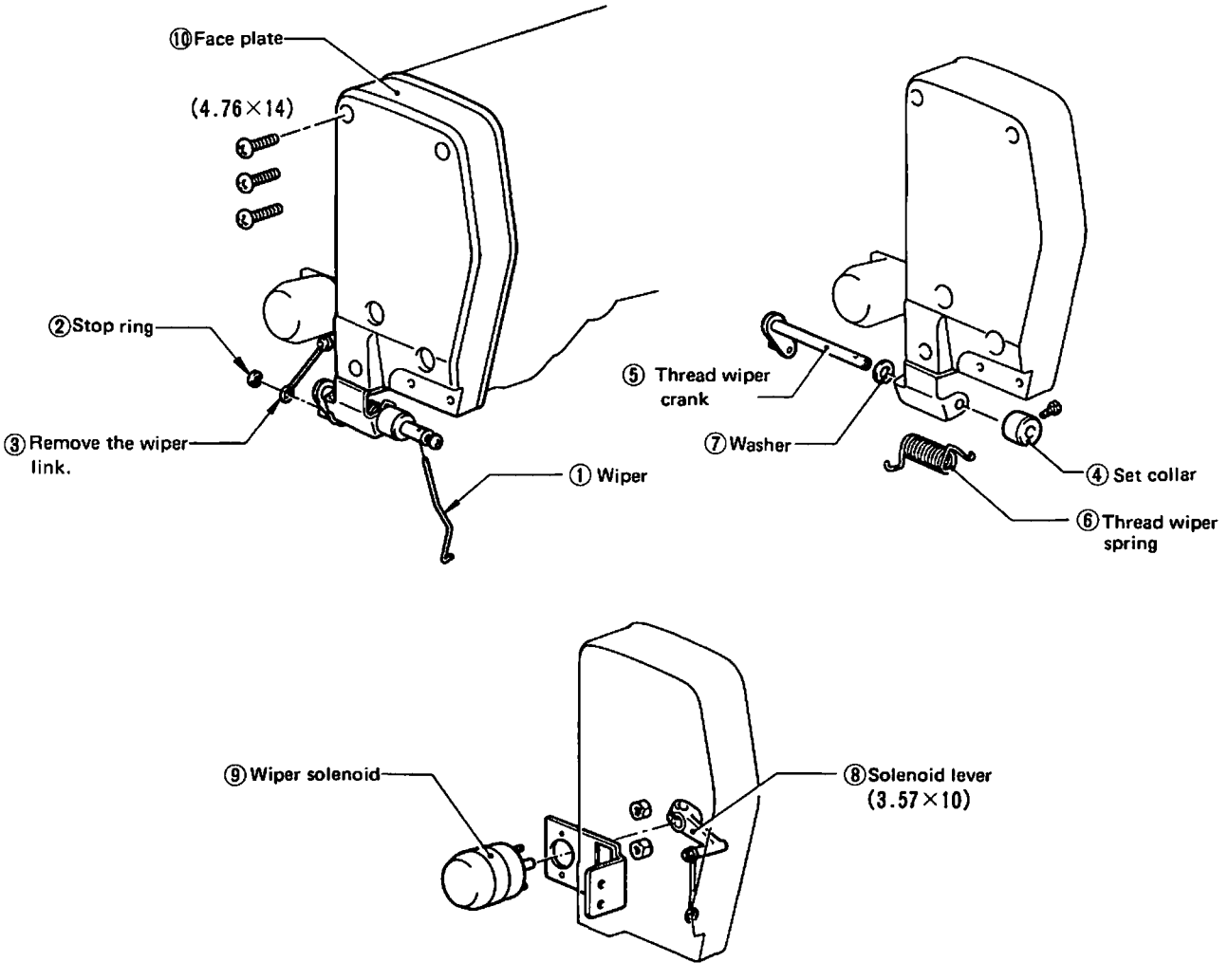


※ Steps ⑤ through ⑯ indicate the removal procedure of the timing belt.

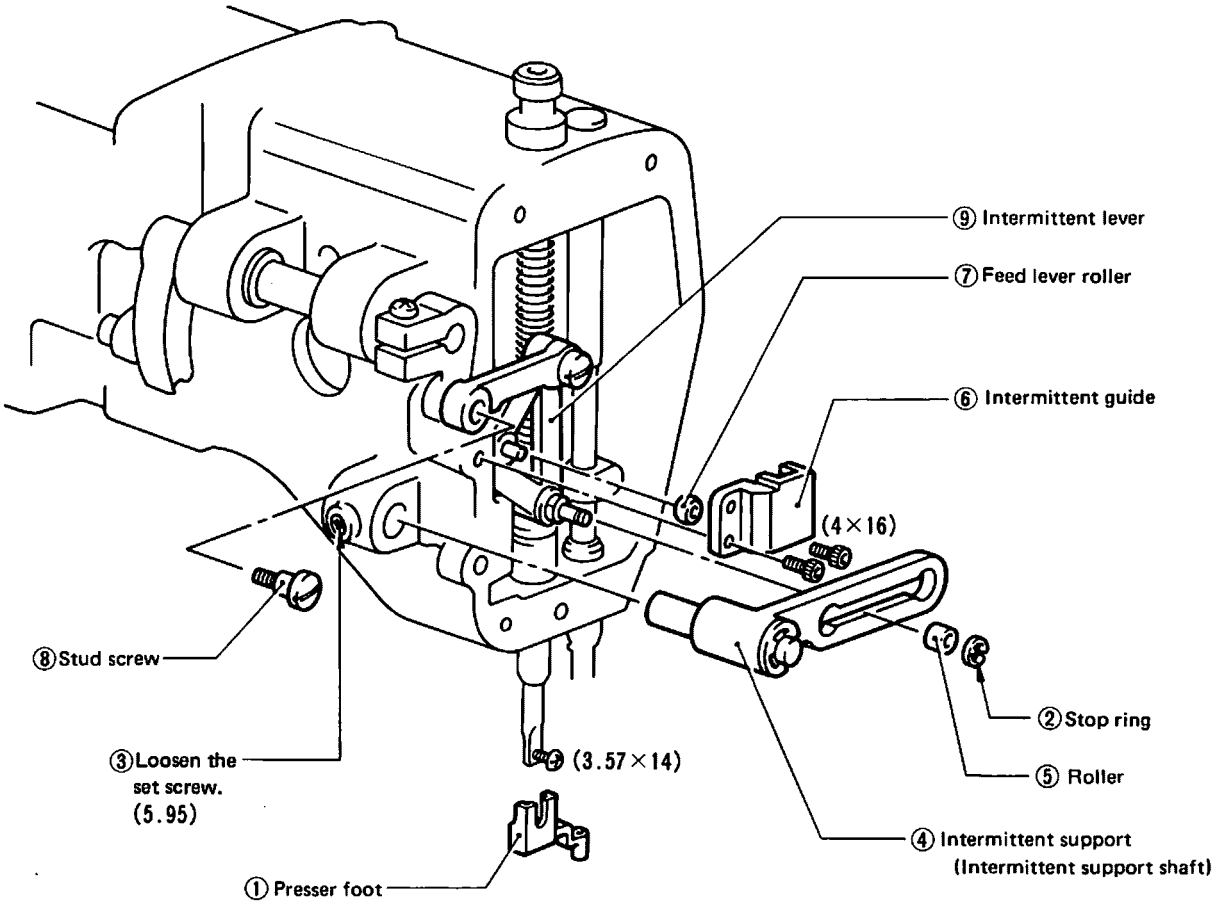
Traverse feed (Y axis) (2)

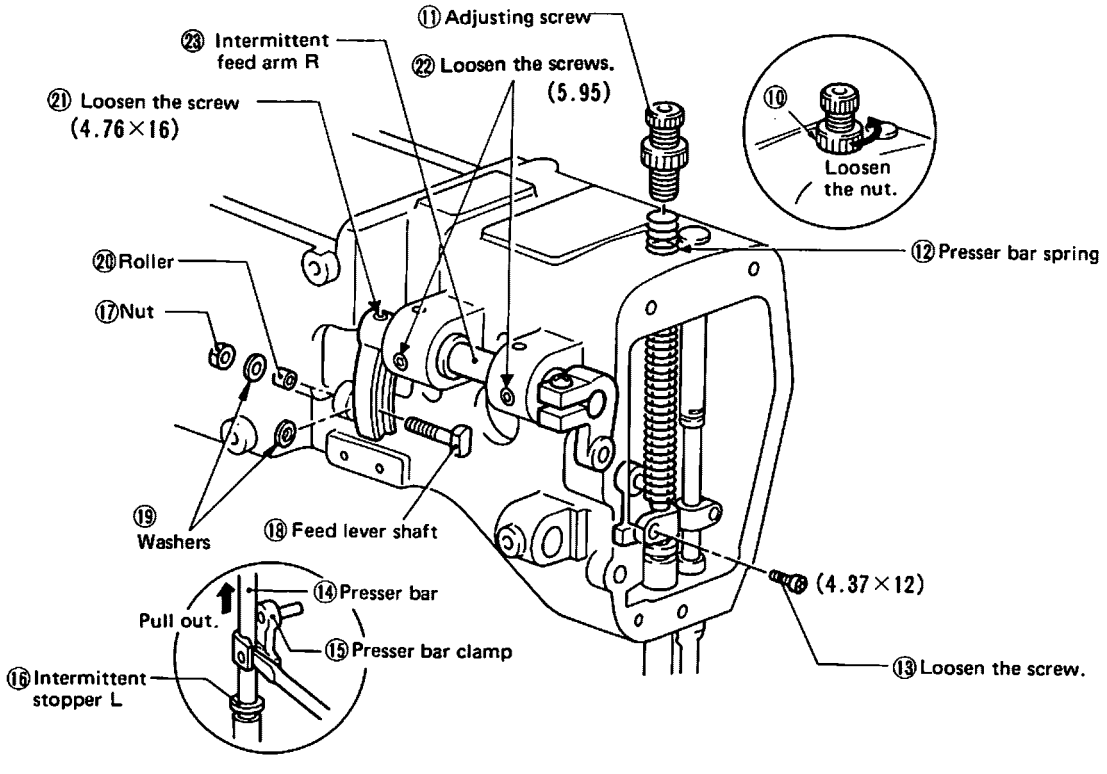


6 Thread wiper

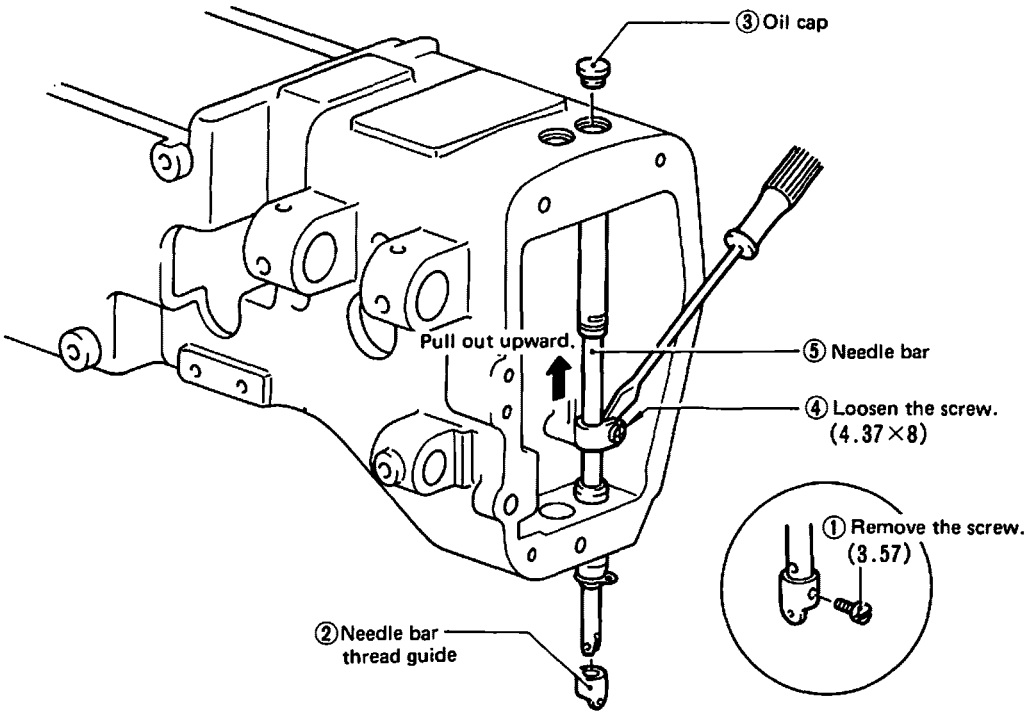


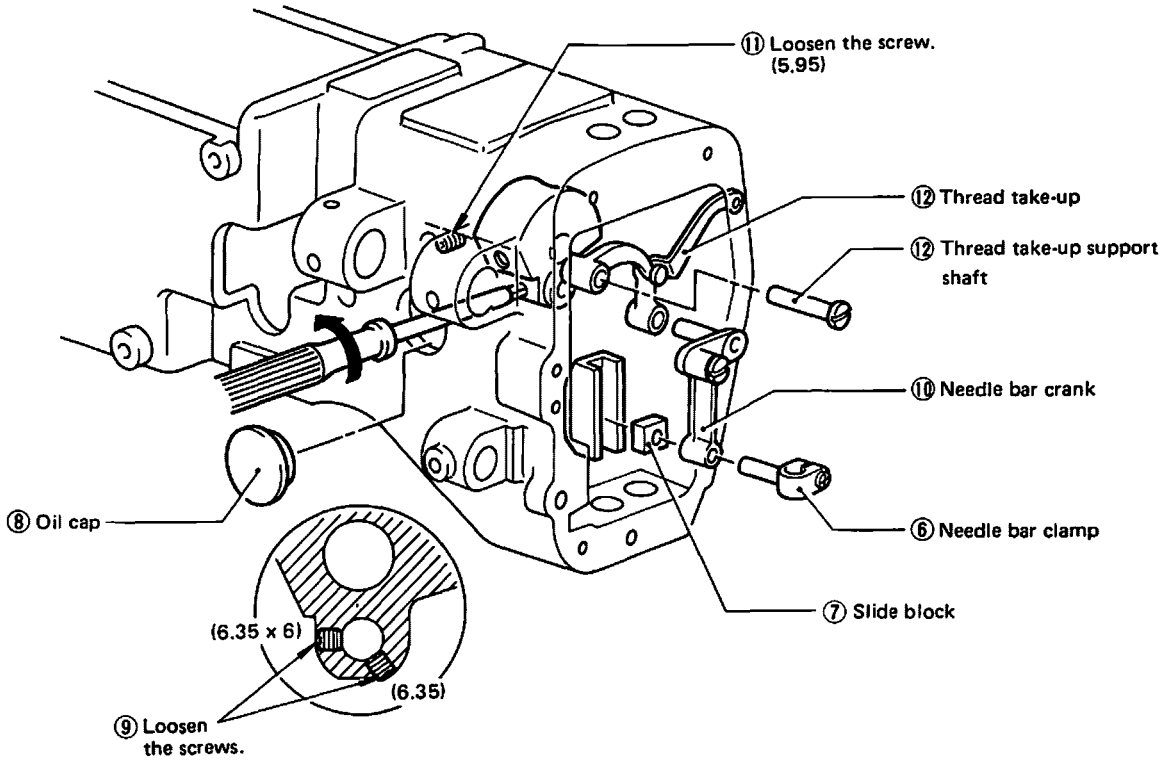
7 Intermittent-presser foot



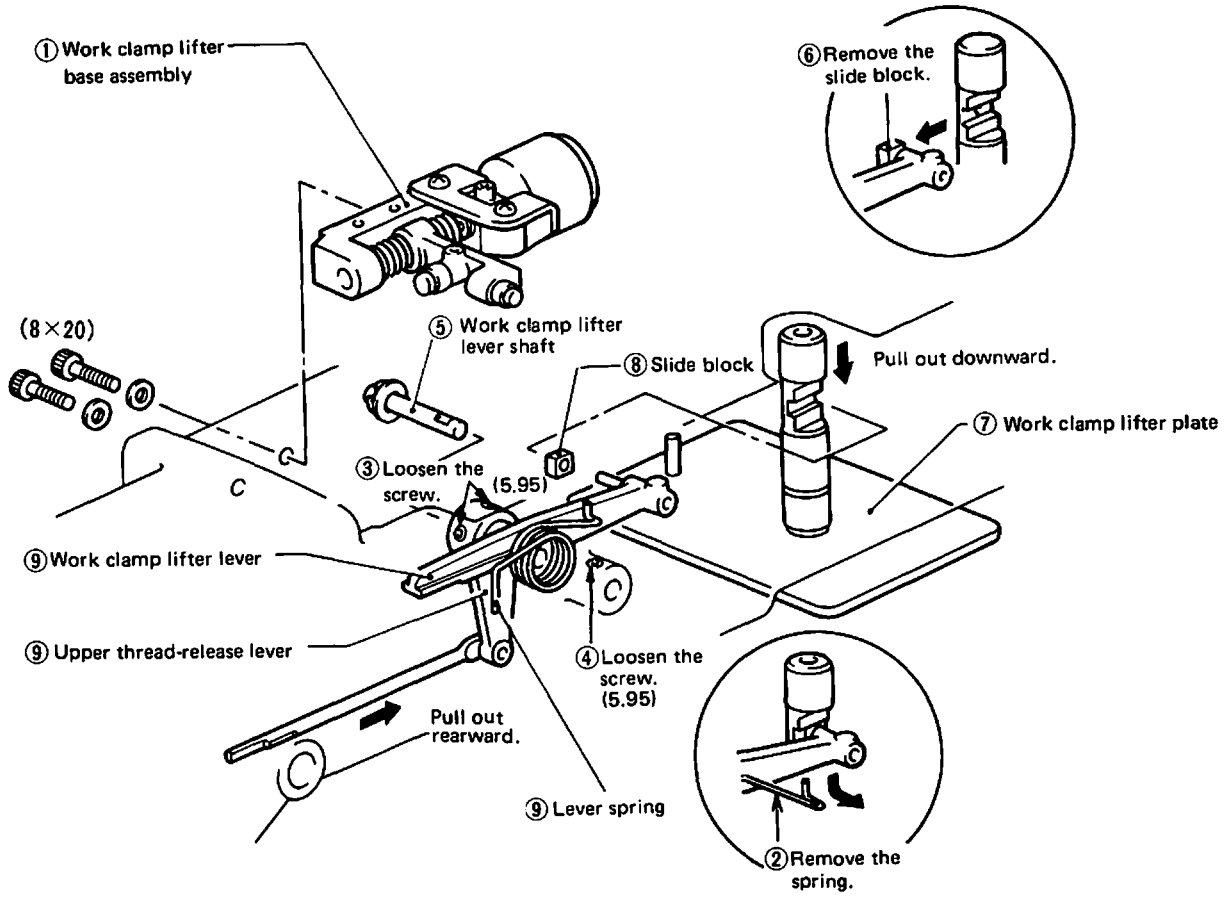


8 Needle bar

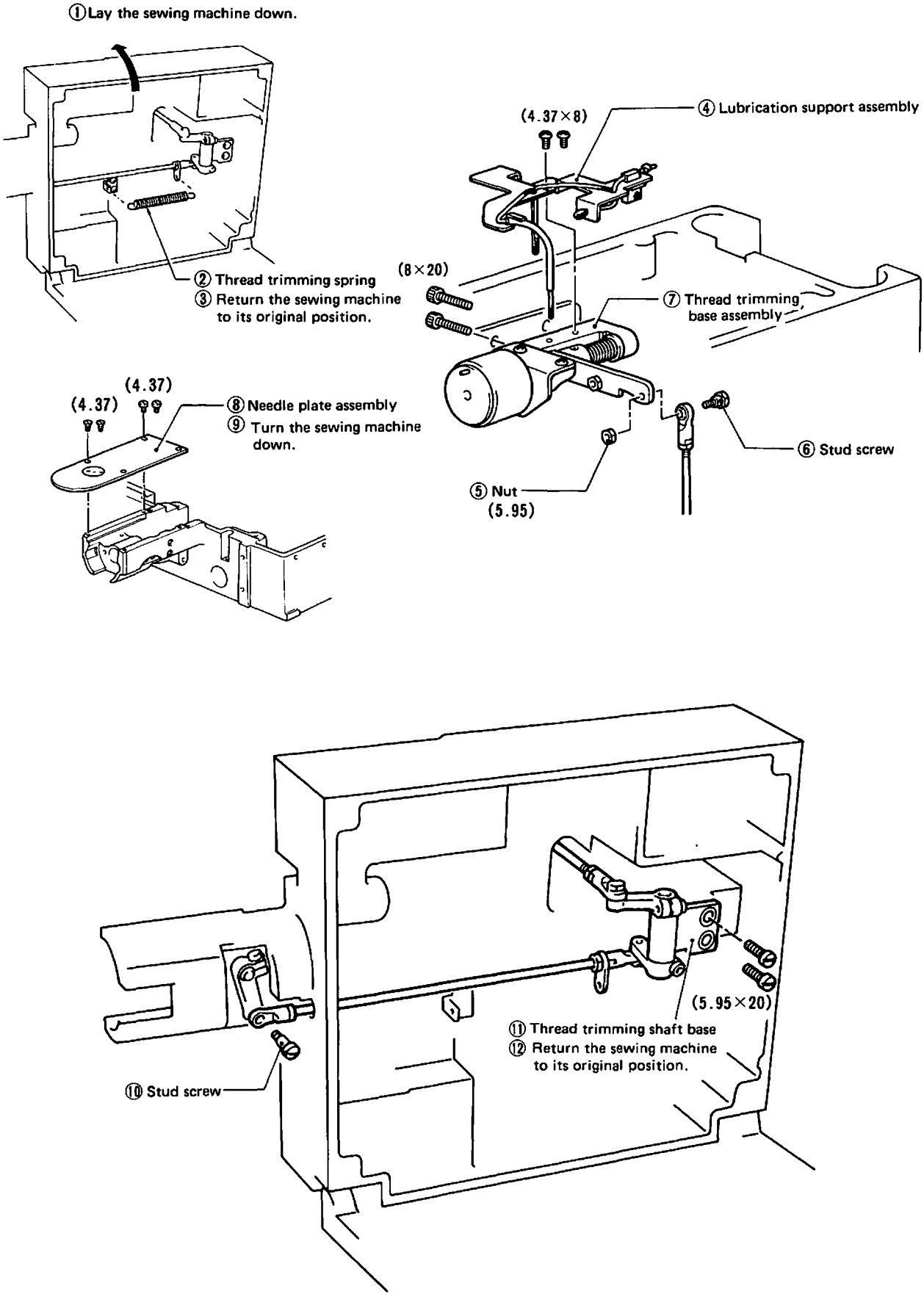




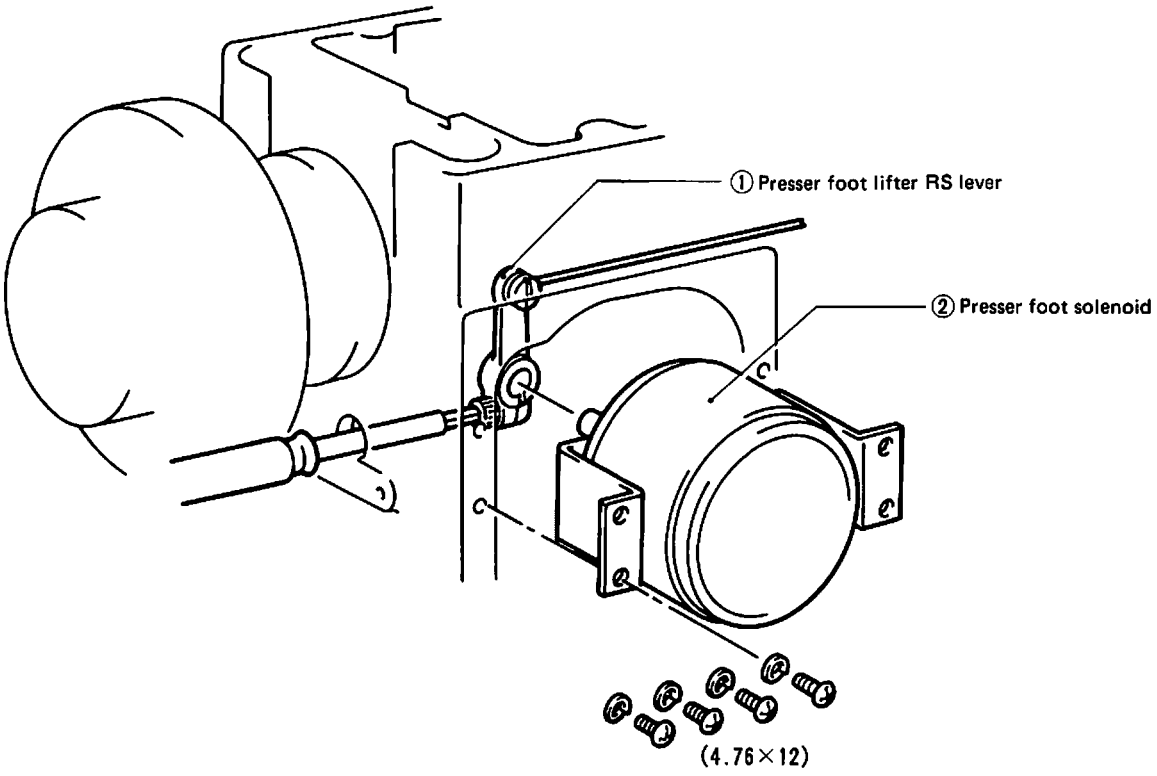
9 Work clamp lifter and thread release

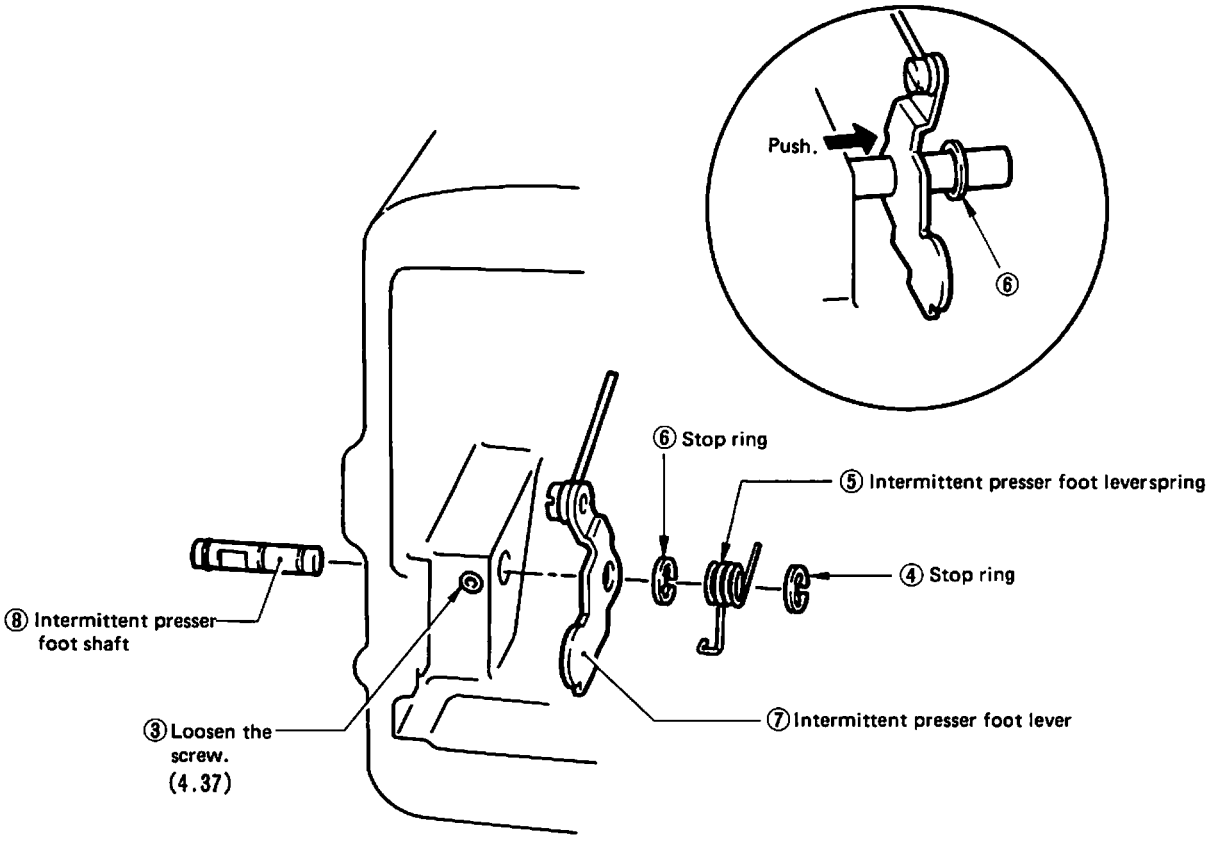


10 Thread trimming

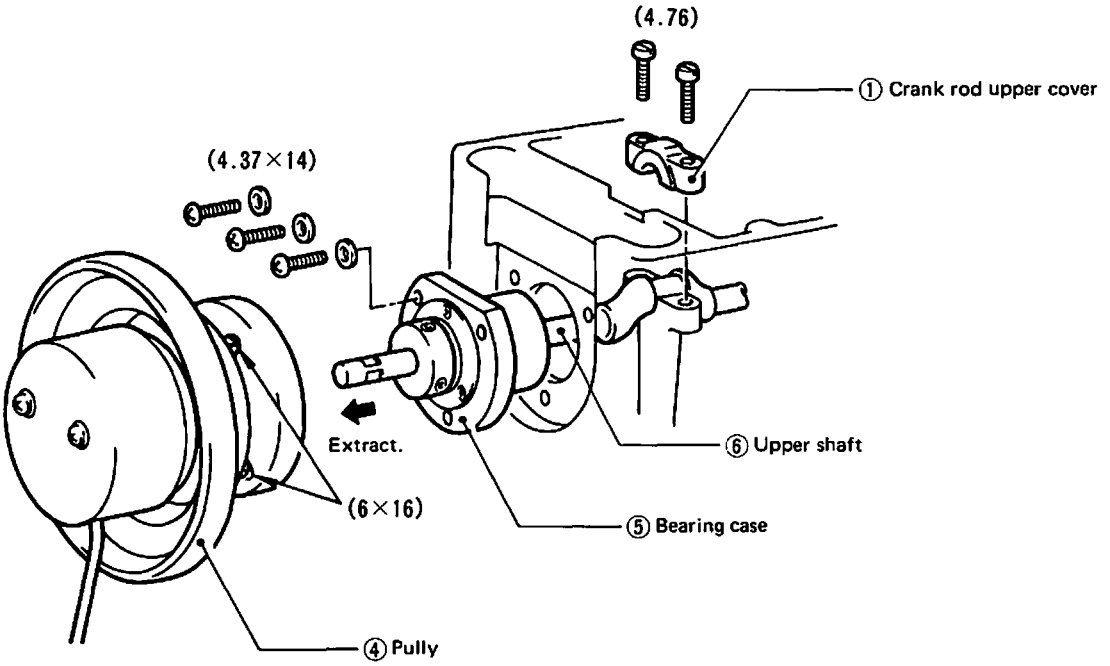


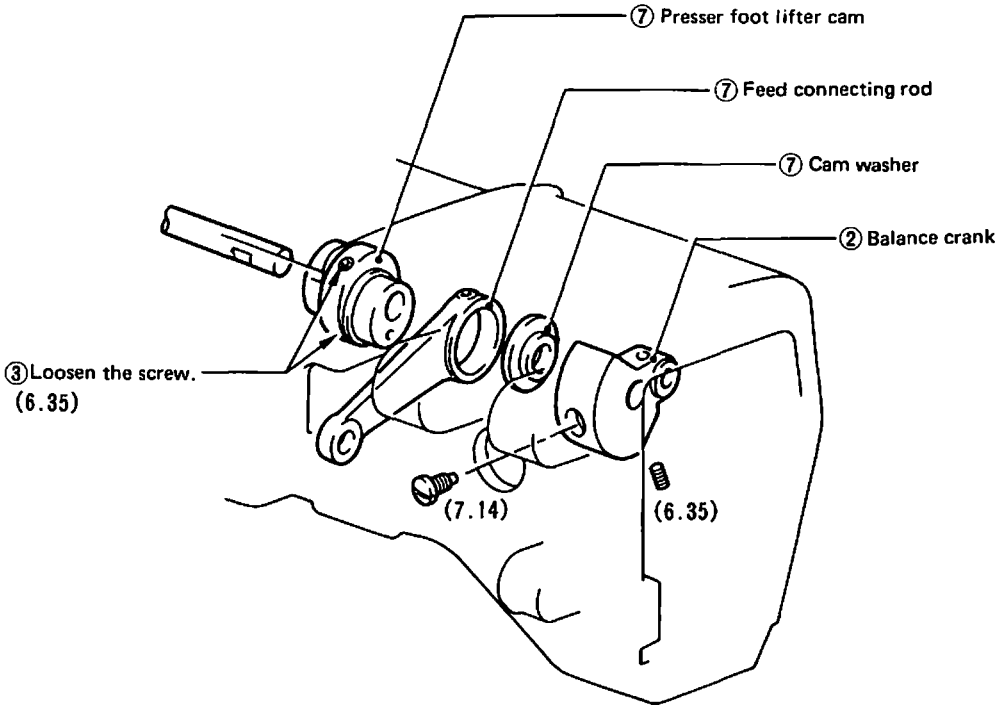
11 Intermittent-presser foot lifter





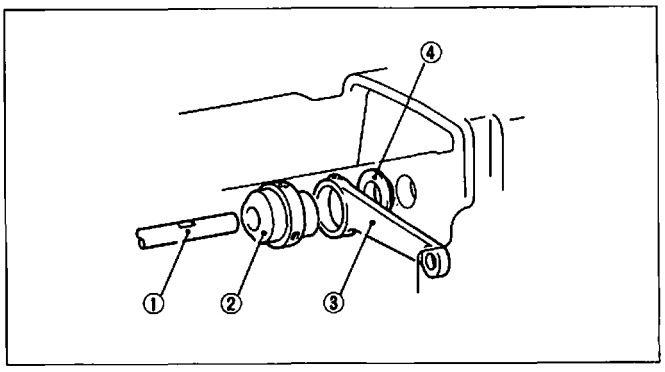
12 Upper shaft



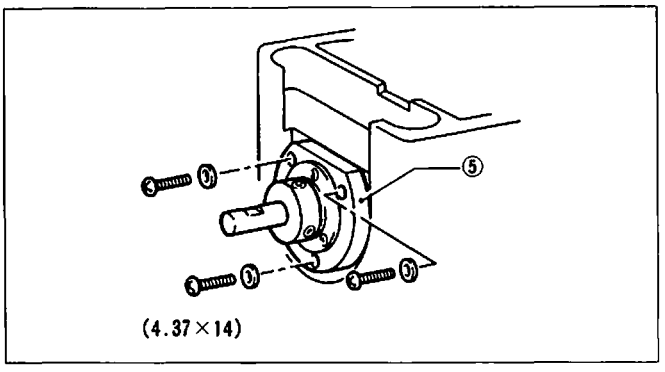


3 ASSEMBLY AND ADJUSTMENT PROCEDURES

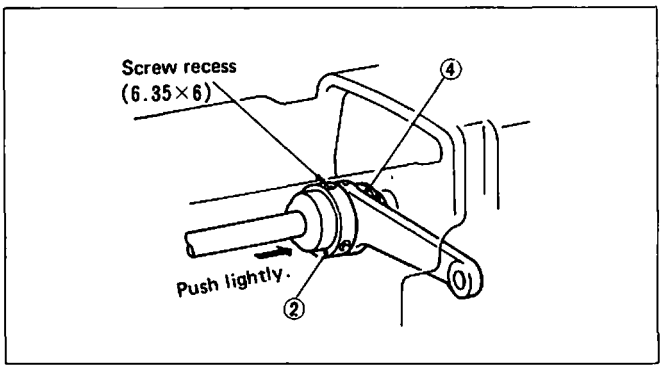
1 Upper shaft



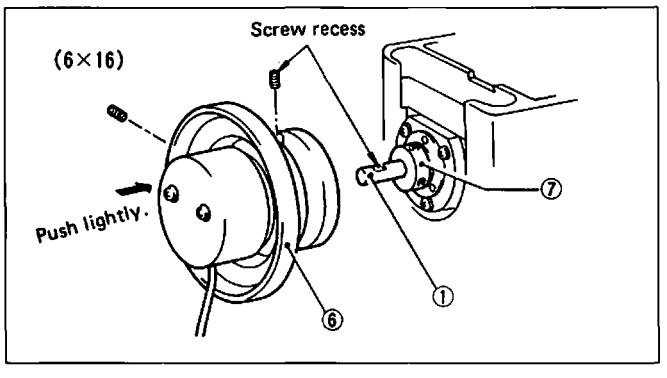
(1) Pass the upper shaft ① through the presser foot lifter cam ②, feed connecting rod ③, and cam washer ④ in that order.



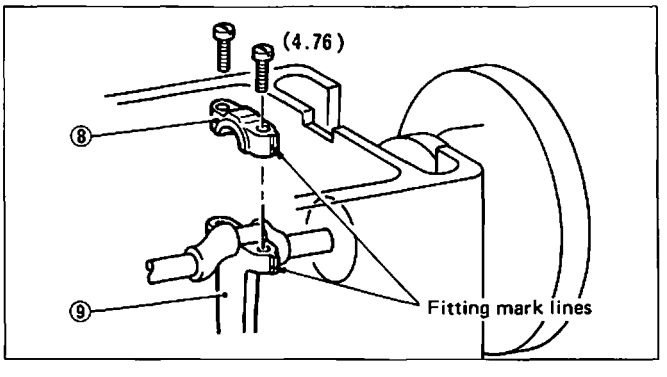
(2) Attach the bearing case ⑤ to the frame.



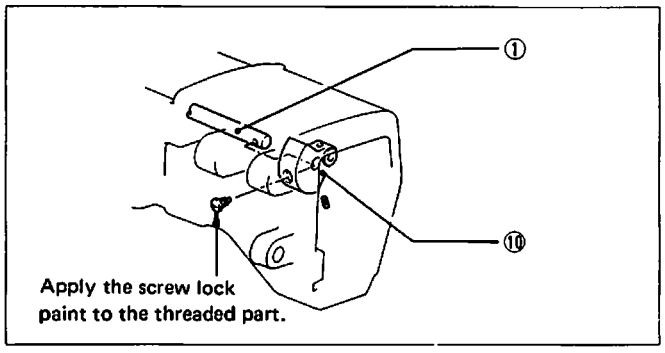
(3) Push the presser foot lifter cam ② against the screw recess so that the cam washer ④ still turns lightly, and then tighten.



(4) Allow the pulley ⑥ to touch the set collar ⑦ lightly, and attach to the upper shaft ①.

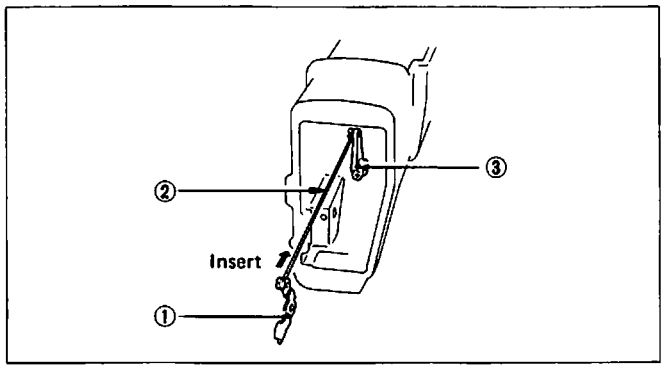


(5) Align the matching mark on the crank rod upper cover ⑧ with the matching mark on the crank rod ⑨. Attach the crank rod ⑨ to the crank rod upper cover ⑧.

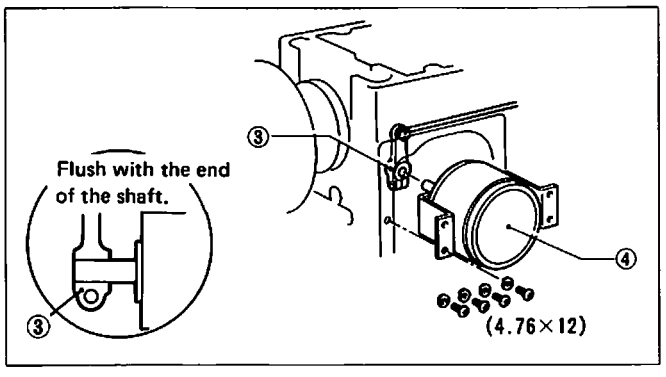


(6) Fit the screw hole of the balance crank ⑩ with the hole of the upper shaft ①. Attach the balance crank to the upper shaft.

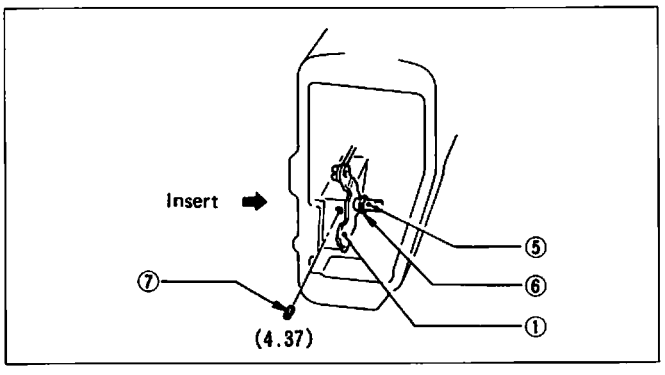
2 Intermittent-presser foot lifter



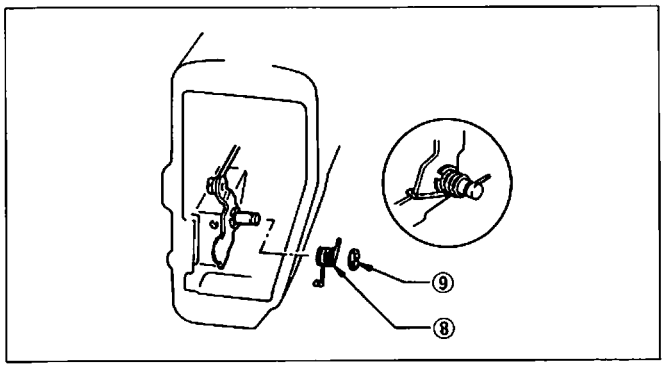
(1) Insert the intermittent presser lever ①, connecting rod ②, and presser foot lifter RS lever ③ into the arm.



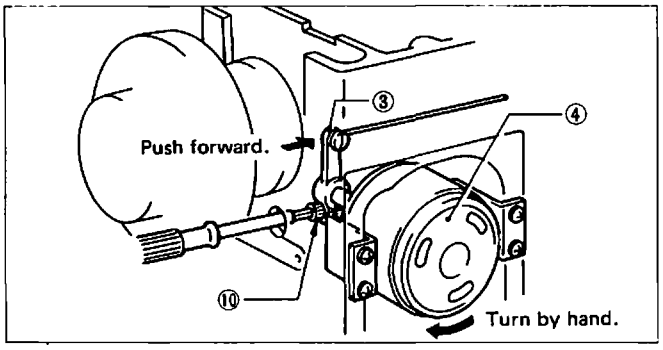
(2) Fit the presser foot lifter RS lever ③ onto the shaft of the presser foot solenoid ④. Attach the presser foot solenoid ④ to the frame.



(3) Insert the intermittent presser foot lifter shaft ⑤ into the intermittent presser lever ① and fit the stop ring ⑥. Tighten the stop screw ⑦ while lightly pressing the intermittent presser foot lifter shaft toward the arm.

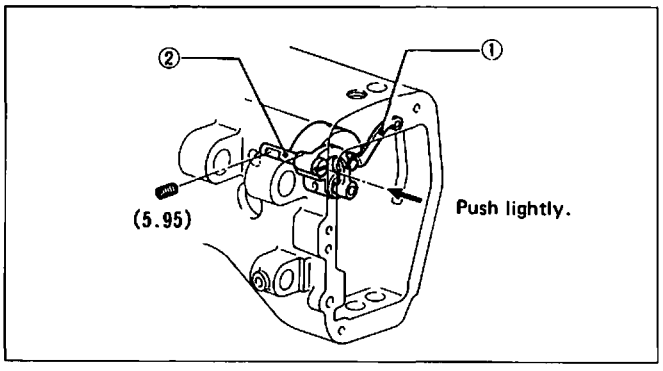


(4) Set the spring ⑧, and the right-side stop ring ⑨.

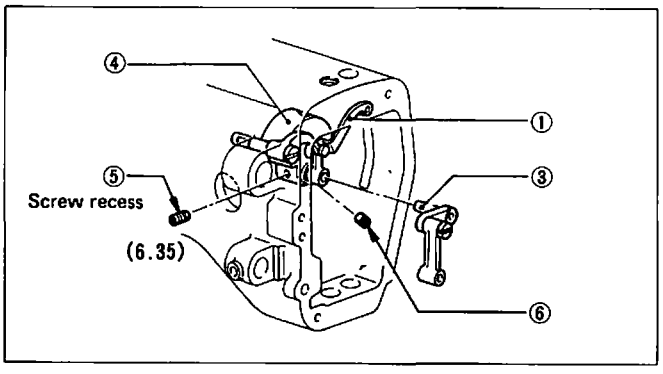


(5) Lift the presser foot lifter RS lever ③ while pushing it forward. Turn the rotary plate of the solenoid ④ clockwise, and then tighten the bolt ⑩.

3 Needle bar

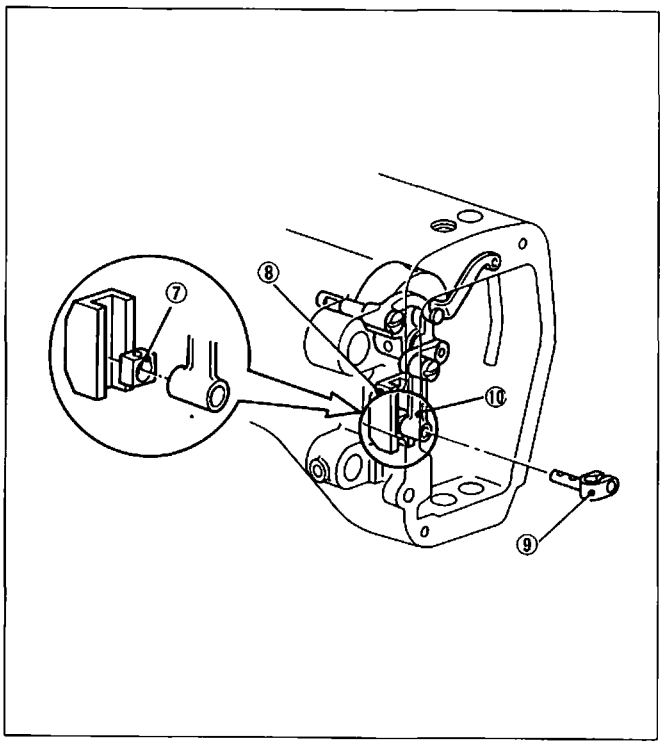


(1) Assemble the thread take-up ① and thread take-up support shaft ②. Push the thread take-up support shaft lightly, and attach it onto the screw recess with the screw.



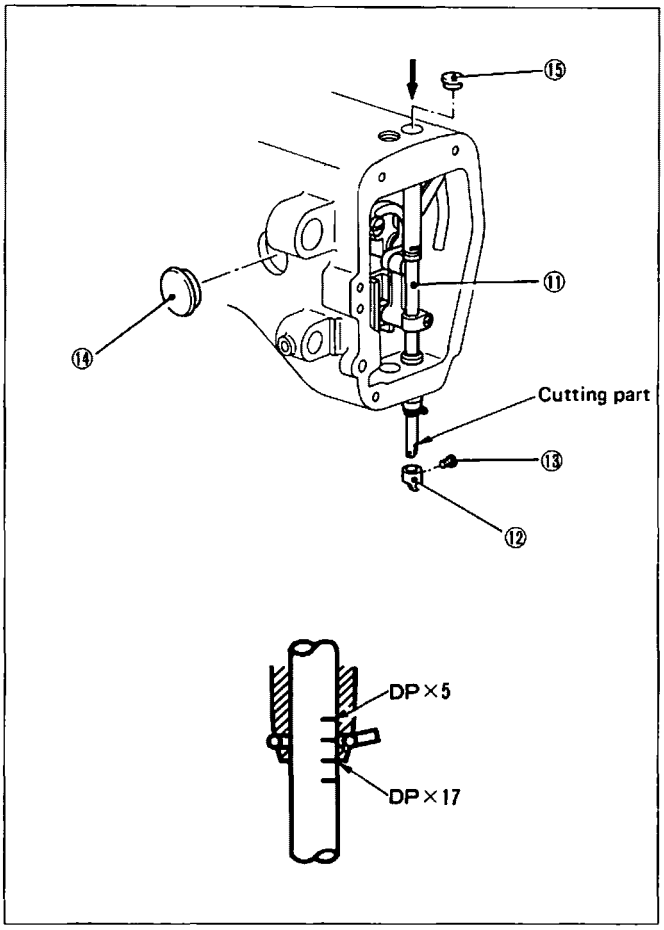
(2) Insert the needle bar crank ③ into the thread take-up ① and balance crank assembly ④. Remove the screw ⑤ and make sure that the shaft part of the needle bar crank ③ comes into contact with the screw recess. Tighten the needle bar crank.

(3) Turn the pulley so that the screw ⑥ can be fixed through the side hole. Then, tighten the screw ⑥.



(4) Insert the slide block ⑦ into the needle bar guide ⑧ with the hole of the slide block facing upward.

(5) Insert the needle bar clamp ⑨ into the needle bar connecting rod ⑩ and slide block ⑦.



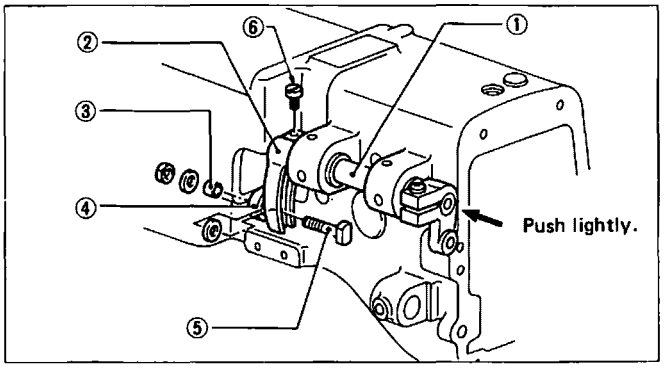
(6) Insert the needle bar ⑪ from the top of the arm (with the oblique cut part of the needle bar ⑪ toward the operator).

(7) Turn the pulley so that the needle bar comes to the lowest position. Match the reference line of the needle bar with the second lowest line (DP x 17). Tighten the screw of the needle bar clamp. (In case of the needle DP x 5, use the top reference line.)

(8) Fit the needle-bar thread guide ⑫ on the needle bar ⑪. Attach the screw ⑬ to the needle bar ⑪.

(9) Mount the oil caps ⑭ and ⑮ on the frame.

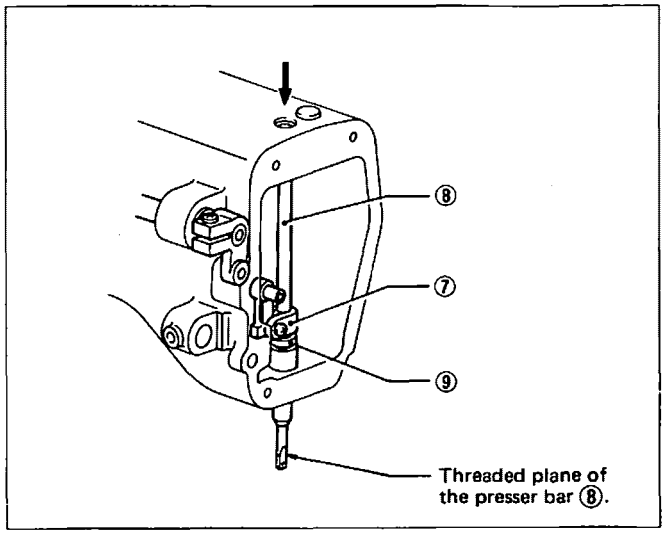
4 Intermittent-presser foot



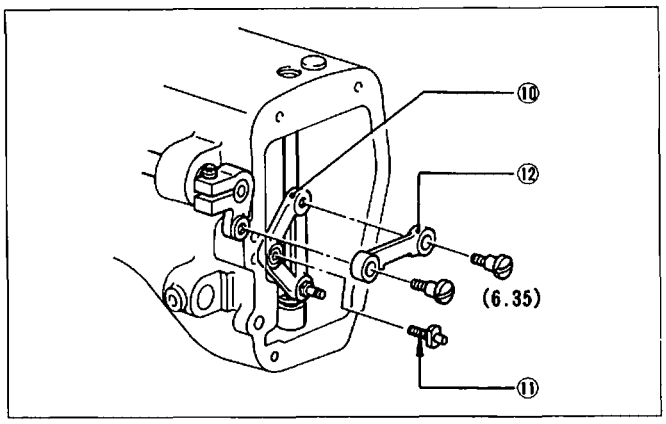
(1) Fit the intermittent feed shaft ① to the frame and insert the intermittent feed arm R ②.

(2) Insert the roller ③ into the feed connecting rod ④. Tighten the feed lever shaft ⑤ to the intermittent feed arm R ② at the center of the oval hole.

(3) Lightly hold the frame between the intermittent feed shaft ① and intermittent feed arm R ② and tighten the screw ⑥.

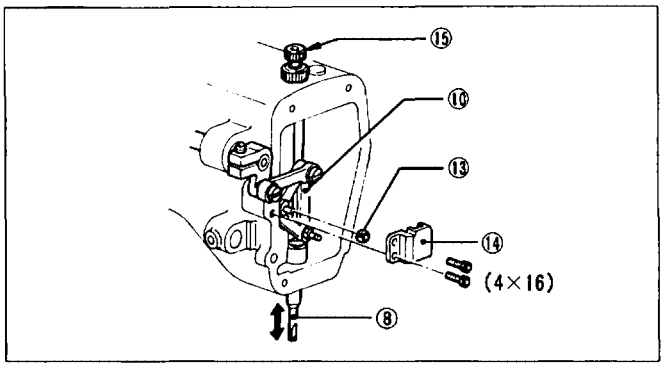


(4) Fit the guide part of the presser bar clamp ⑦ with the groove of the frame. Insert the presser bar ⑧ from the top of the arm, and insert the stopper L ⑨ at the same time.
(Position the screw hole plane part of the presser bar ⑧ toward you.)



(5) Fit the intermittent lever ⑩ in the shaft of the presser bar clamp ⑦, and tighten the roller shaft ⑪.

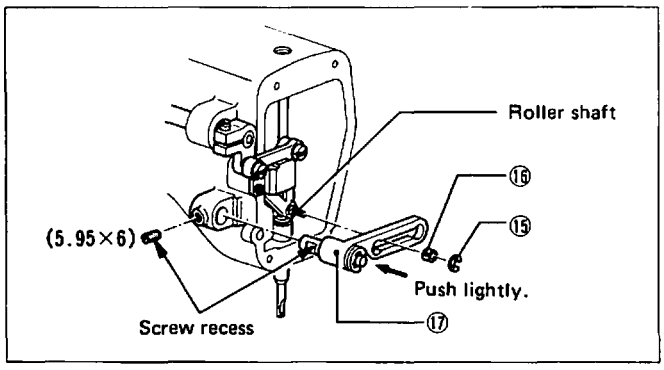
(6) Attach the link ⑫.



(7) Fit the feed lever roller ⑬ in the intermittent lever ⑩. Temporarily secure the intermittent guide ⑭ to the frame.

(8) Attach the adjusting screw ⑮.

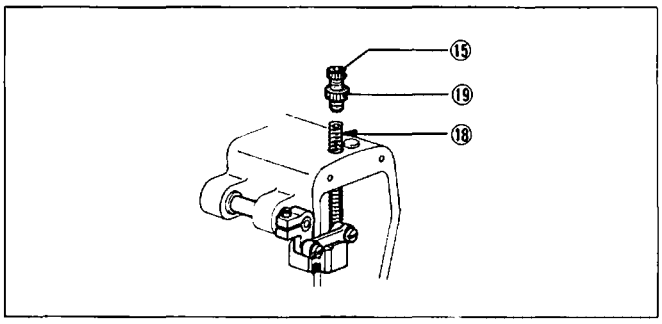
(9) Try to move the presser bar ⑧ up and down and find a point where there is the least resistance. Tighten the intermittent guide ⑭ at this point.



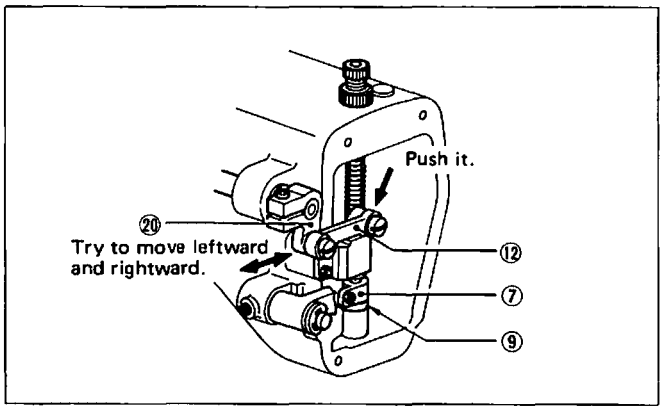
(10) Fit the roller ⑯ in the roller shaft.

(11) Fit the intermittent support shaft ⑰ in the roller ⑯, and fit with the screw recess. Lightly push the intermittent support shaft ⑰ and tighten.

(12) Fit the stop ring ⑮ in the roller shaft.



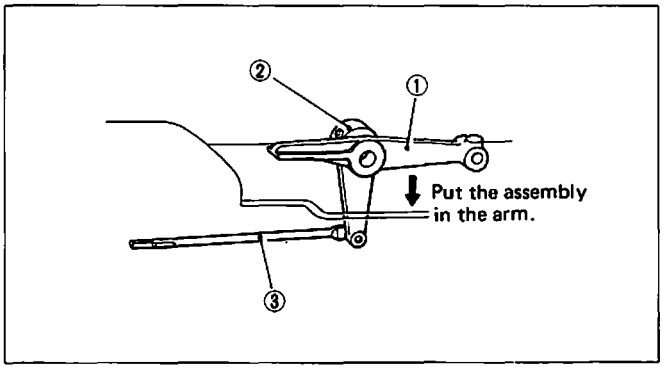
(13) Remove the adjusting screw ⑮ and insert the presser bar spring ⑱. Tighten the adjusting screw again and fix it with the nut ⑲.



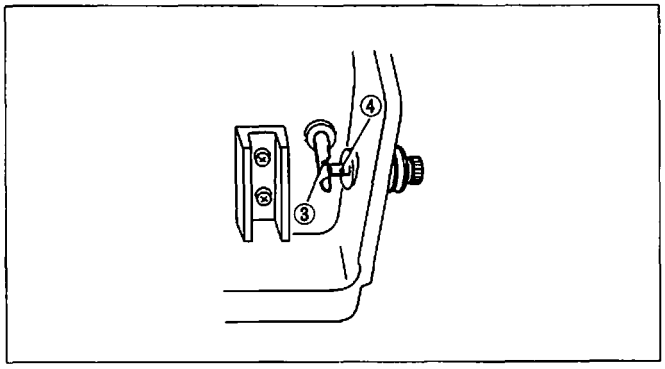
(14) Turn the pulley until the presser bar comes to the lowest position. Loosen the intermittent feed arm L ⑳.

(15) Try to move the link L ⑫ leftward and rightward, and find a place where there is no clearance between the bottom surface of the presser bar clamp ⑦ and the stopper L ⑨. Tighten the link ⑳ at this point. (Move the link L ⑫ while pushing it at the point indicated by the arrow, and the link L becomes easily movable.)

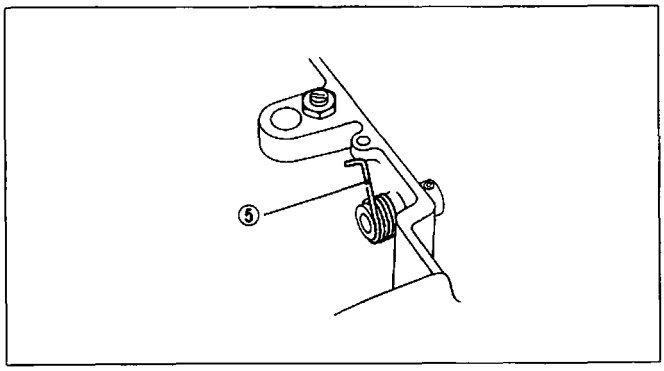
5 Work clamp lifter and thread release



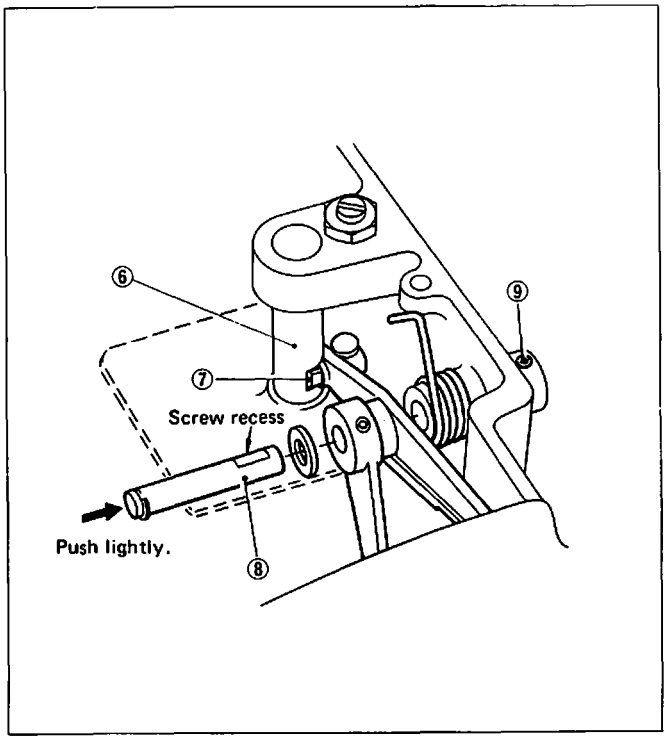
(1) Assemble the work clamp lifter lever ①, upper thread release lever ②, and upper thread release rod ③. Put the assembly in the arm.



(2) Insert the end of the upper thread release rod ③ until it comes contact with the thread release shaft ④.



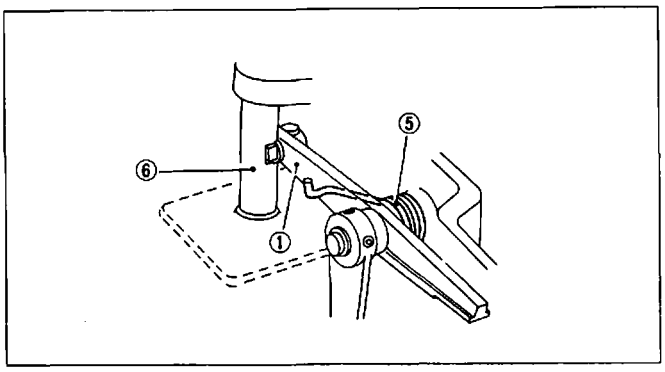
(3) Fit the lever spring ⑤ with the boss of the frame.



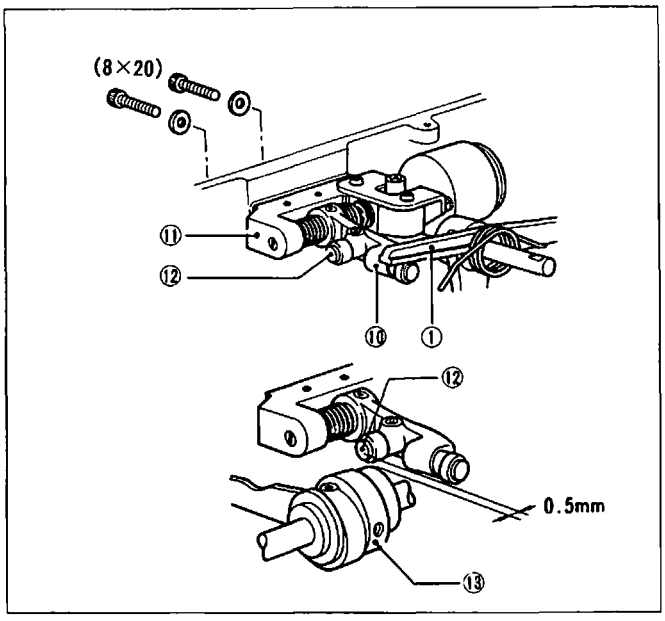
(4) Insert the work clamp lifter plate ⑥ from the lower surface of the frame.

(5) Fit the slide block ⑦ in the shaft of the work clamp lifter plate ⑥.

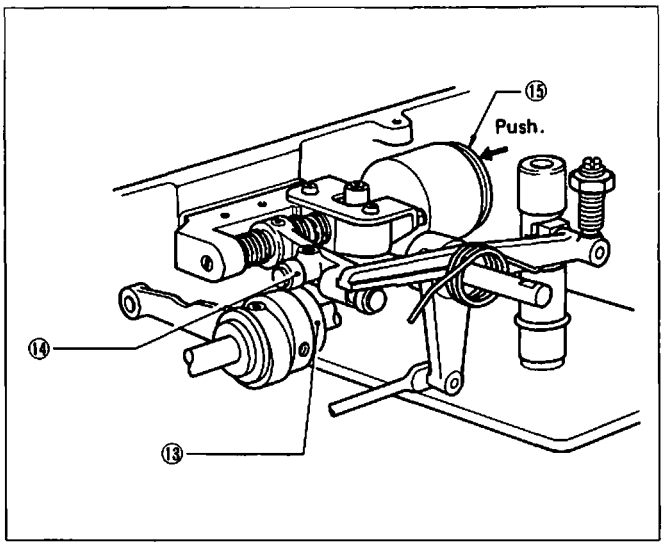
(6) Insert the work clamp lifter lever shaft ⑧ and fit with the screw recess. Tighten the screw ⑨ while pushing the work clamp lifter lever shaft lightly.



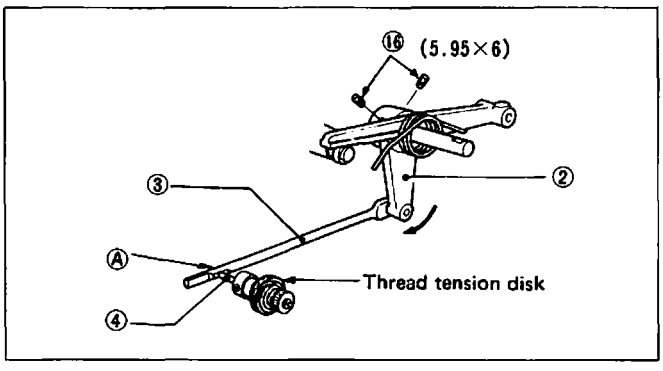
(7) Raise the work clamp lifter plate ⑥ and fit the lever spring ⑤ with the work clamp lever ①.



(8) Place the roller of the cam lever ⑩ under the work clamp lifter lever ①, and mount the work clamp lifter base ⑪. Ensure that there is a clearance of 0.5 mm between the end of feed roller shaft ⑫ and the end of the work clamp lifter cam ⑬.

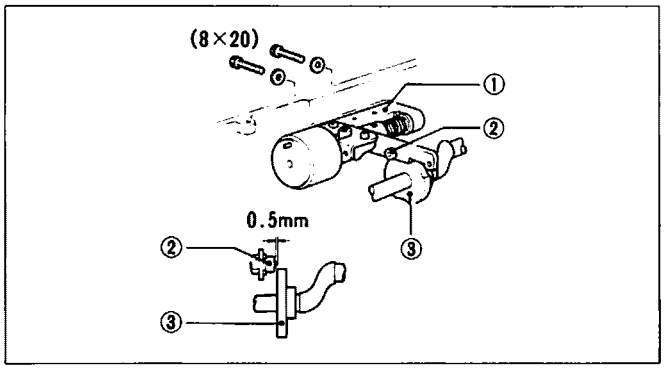


(9) Turn the pulley until the thread take-up comes to the lowest position, while pushing the main work clamp solenoid ⑮ so that the feed roller ⑭ rests on the work clamp lifter cam ⑬.

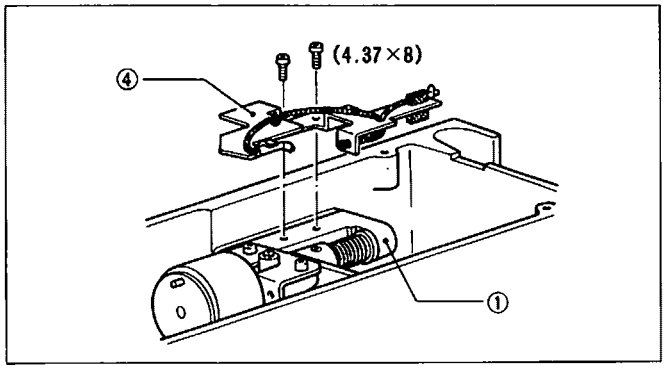


(10) Push the thread release shaft ④ with part Ⓐ of the upper thread release rod ③, and adjust using the upper thread release lever ② until the thread tension disk loosens.

6 Thread trimming

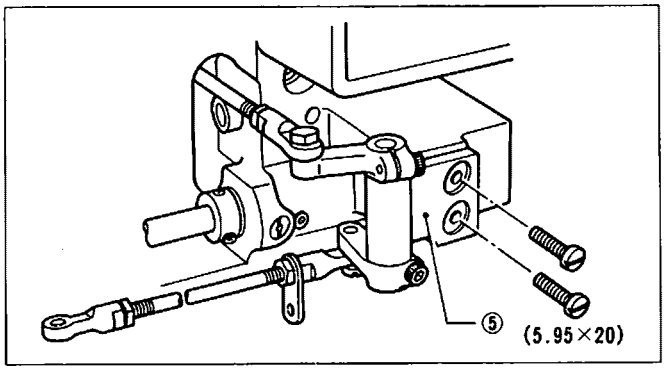


(1) Attach the thread trimming base ① to the frame. Ensure that there is a clearance of 0.5 mm between the end of the roller shaft ② and the end of the thread trimming cam ③ .

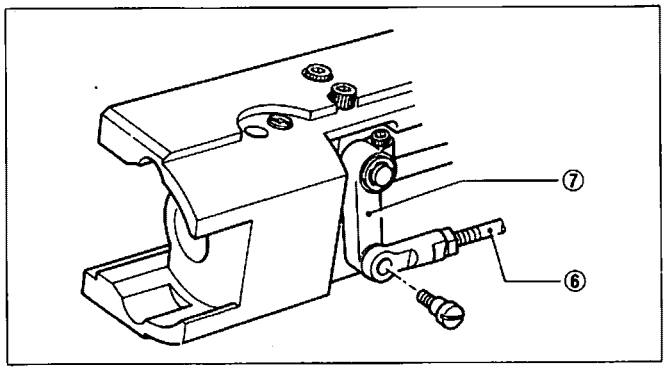


(2) Attach the upper shaft lubrication support plate ④ to the thread trimming base ①.

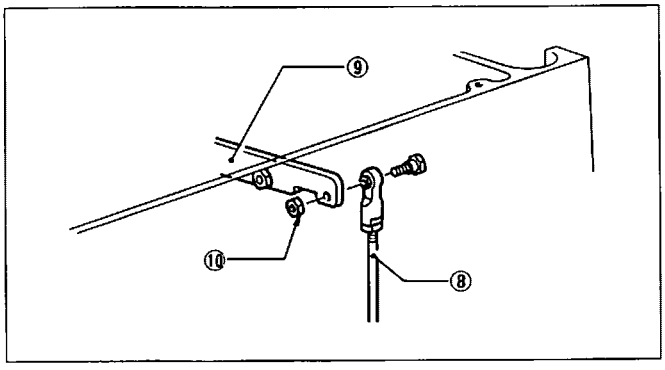
(3) Lay the sewing machine down.



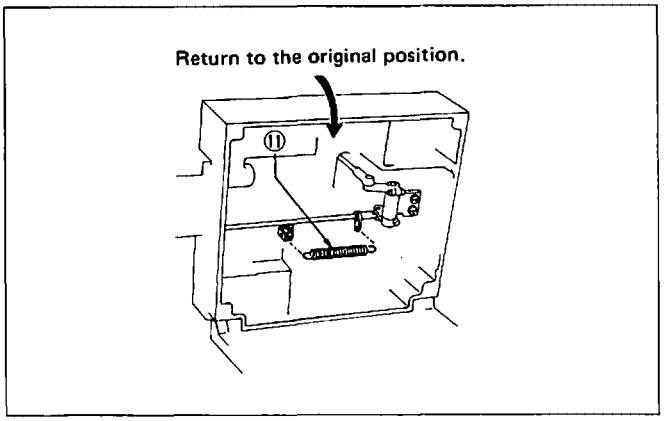
(4) Attach the thread trimming shaft base ⑤ to the frame.



(5) Attach the thread trimming rod B ⑥ to the thread trimming lever ⑦.

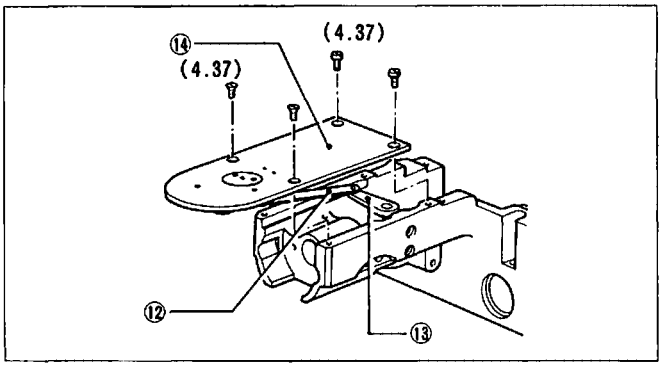


(6) Attach the thread trimming rod A ⑧ to the thread trimming cam lever ⑨, and tighten with the nut ⑩.



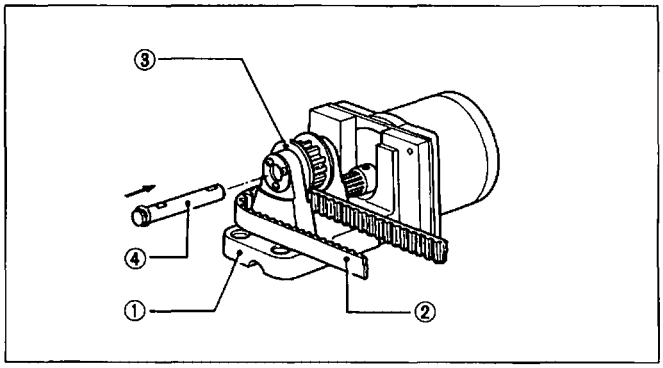
(7) Hook up the thread trimming spring ⑪.

(8) Return the sewing machine to the original position.

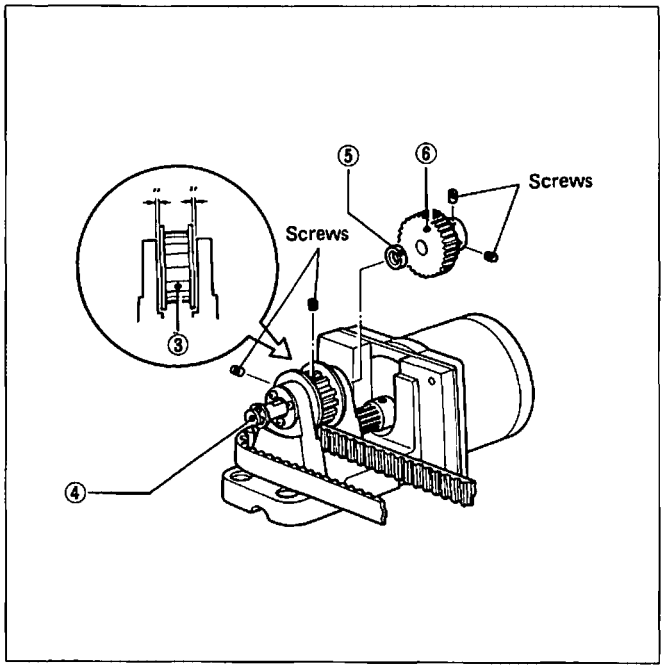


(9) Attach the needle plate ⑭ by fitting the pin on the thread trimming lever ⑬ into hole in the thread trimming connecting rod ⑫. Start tightening with the flat head screw.

7 Traverse feed (X axis)

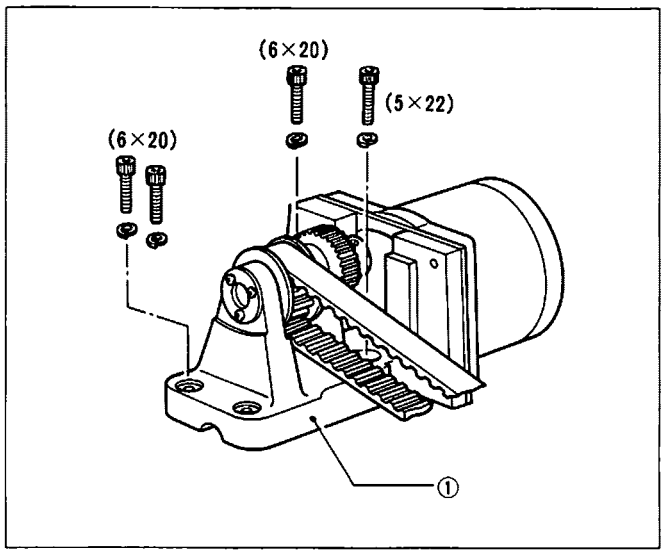


(1) Attach the timing belt ② and timing pully ③ to the pulse motor base ① and then attach the belt shaft D ④.

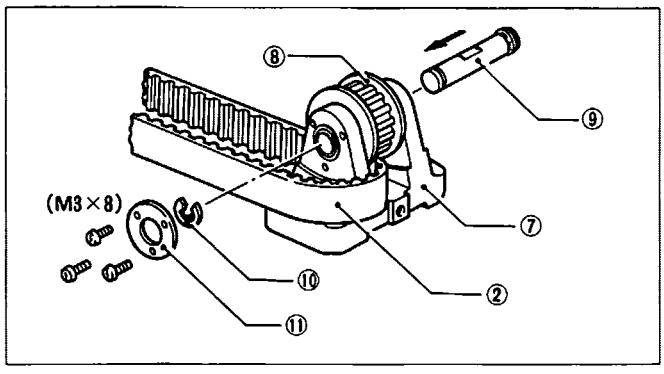


(2) Set the bearing collar S ⑤ and idle gear ⑥ in place at the top of the belt shaft D ④. Adjust the screw recess by lightly holding the belt shaft against them, and then fix with the screws.

(3) Ensure that the clearances on both sides of the timing pulley ③ are equal. Secure the timing pulley ③ with the screws while adjusting the screw recess.

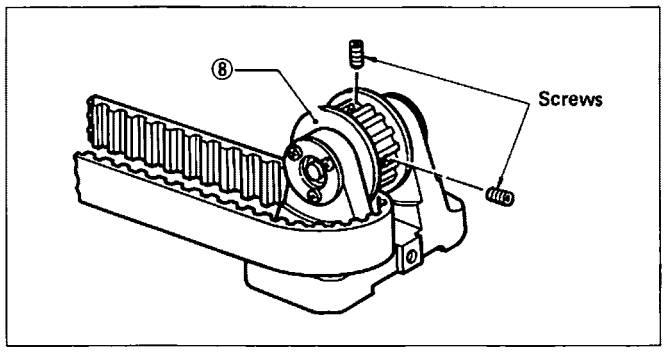


(4) Securely attach the pulse-motor base ① to the bed base .

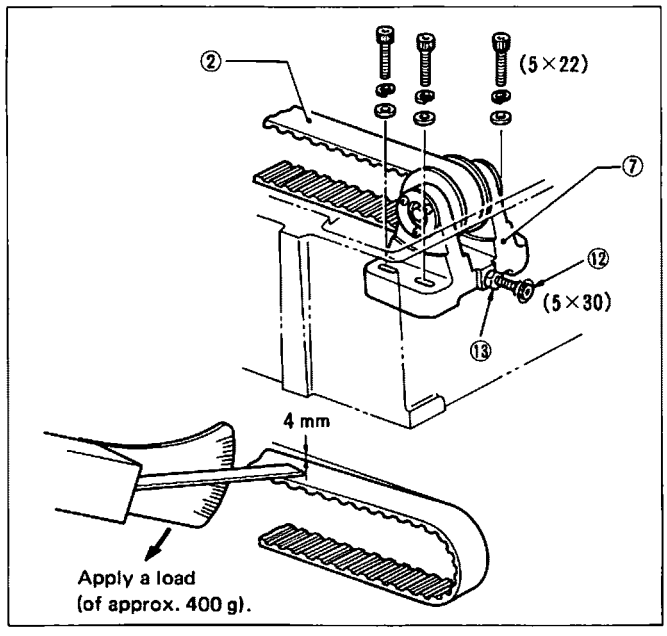


(5) Attach the timing belt ② and timing pulley ⑧ to the pulley base ⑦. Attach the belt shaft U ⑨ on the reverse side.

(6) Mount the stop ring ⑩ on the belt shaft U ⑨ and attach the bearing cover ⑪ .

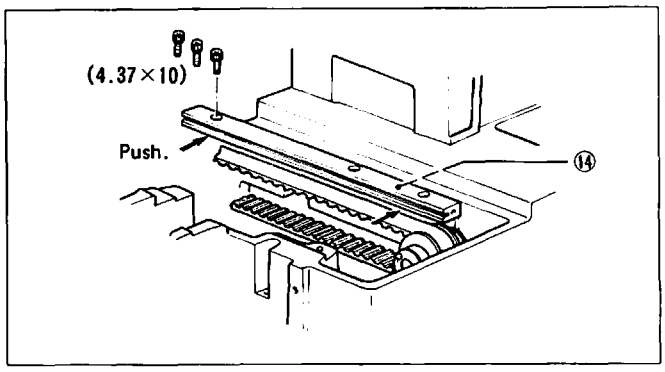


(7) Ensure that the clearances on both sides of the timing pulley ⑧ are equal. Tighten the timing pulley ⑧ with the screws while adjusting the screw recess.

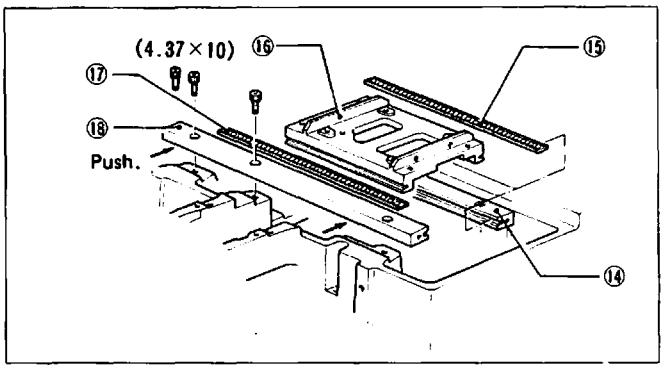


(8) Temporarily tighten the pulley base ⑦ on the bed base. Adjust the timing belt ② using the adjusting bolt ⑫ so that the timing belt produces a deflection of 4 mm under a load of approximately 400 g applied at the center of the belt. Fix the pulley base with 3 bolts.

(9) Fix the adjusting bolt ⑫ with the nut ⑬ .

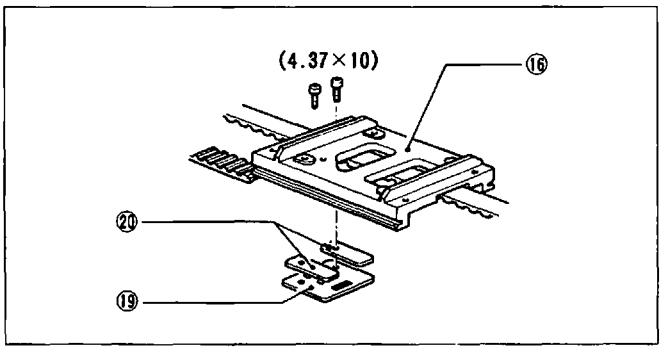


(10) Push the X feed guide ⑭ against the end of the bed base, and tighten.



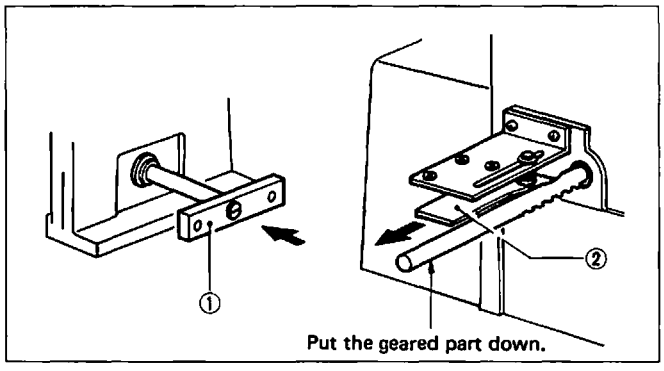
(11) Attach the X retainer ⑮ and feed table X ⑯ to the X feed guide ⑭.

(12) Temporarily tighten the X retainer ⑰ and X feed guide ⑱ to the feed table X ⑯ using the bolts. Try to move the feed table X rightward and leftward while pushing the X feed guide ⑱. Find a point where the feed table X ⑯ causes no chattering and moves smoothly. Fix the feed table at this point using the bolts.

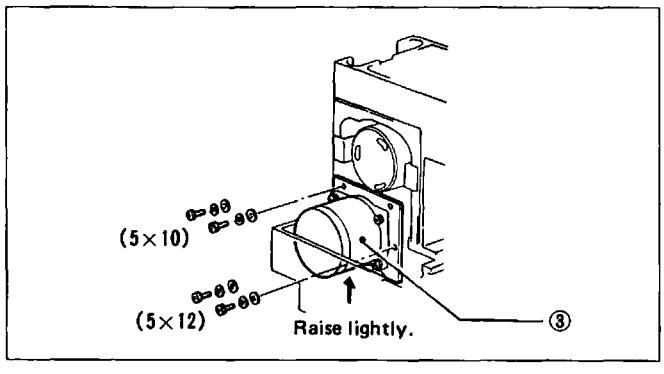


(13) Fit the teeth of the timing belt into the groove of the belt holder D ⑲. Load 2 belt holders U ⑳ and tighten while moving the feed table X ⑯.

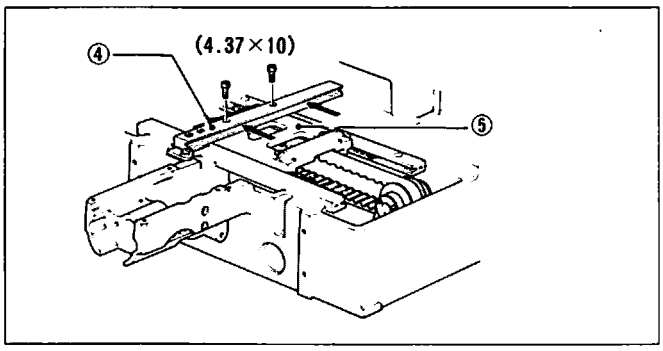
8 Longitudinal feed (Y axis)



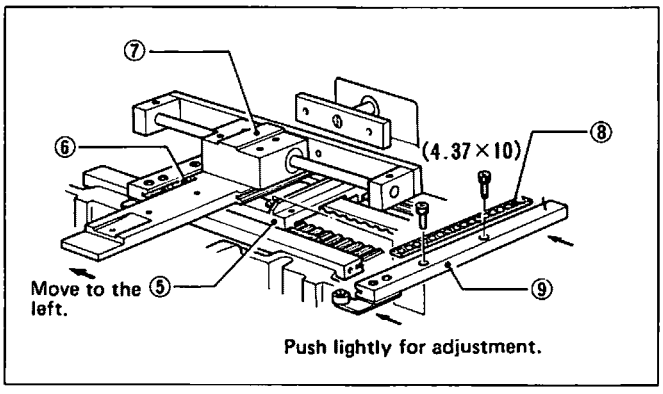
(1) Put the Y rack ① into the frame. Insert the Y original point dog ② with it parallel to the axis.



(2) Attach the pulse-motor Y ③ to the frame while raising it lightly so that its backlash becomes 0.

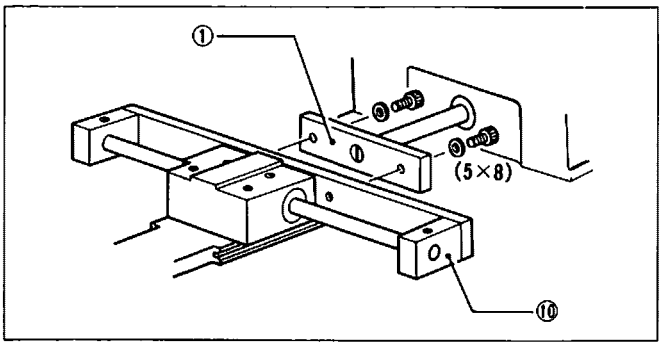


(3) Push the Y feed guide L ④ against the end of the feed table X ⑤, and tighten.



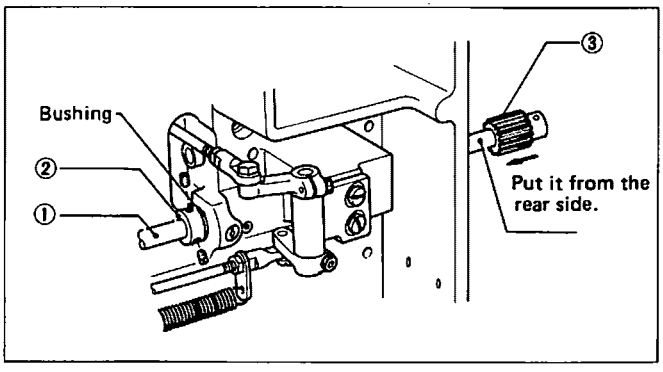
(4) Attach the Y retainer ⑥ and feed table Y ⑦.

(5) Attach the Y retainer ⑧ and Y feed guide R ⑨ and move the feed table X ⑤ to the left. Lightly push the Y feed guide R ⑨, and tighten at a point where the feed table Y ⑦ causes no chattering and moves smoothly, using the bolts.



(6) Tighten the Y rack ① to the X feed shaft support ⑩.

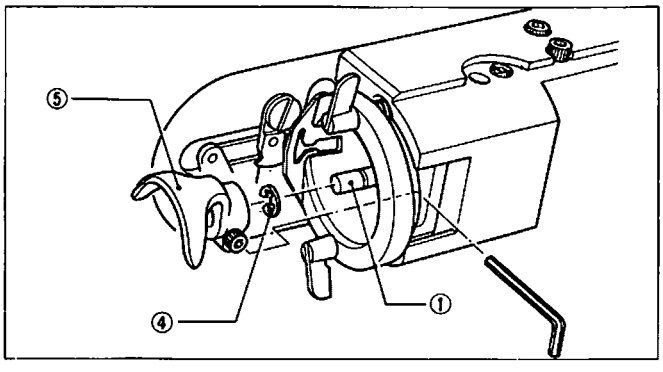
9 Lower shaft and relevant



(1) Lay the sewing machine down.

(2) Put the lower shaft ① in the machine from the rear side, and fit it to the ground surface of the set collar ② facing the bushing side.

(3) Engage the lower shaft gear ③ with the swing gear, and tighten the set collar ② so that the lower shaft does not chatter.

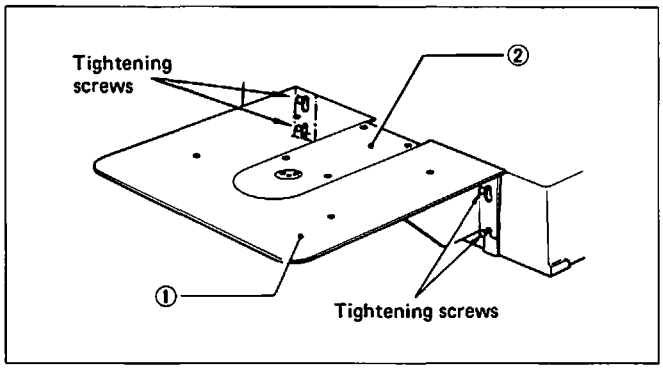


(4) Mount the stop ring ④ on the lower shaft ①

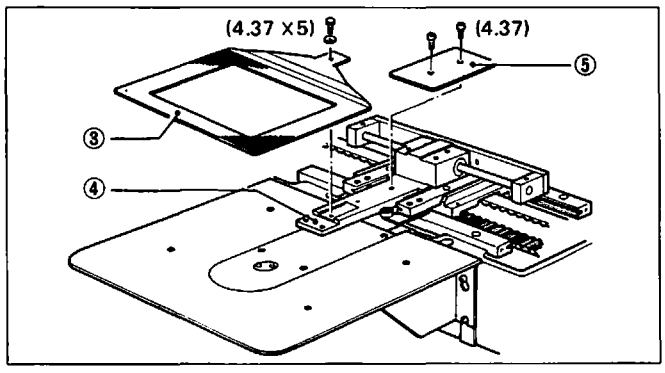
(5) Fit the driver ⑤ with the lower shaft ①. Temporarily tighten it through the stop ring ④.

(6) Return the sewing machine to its original position.

10 Work clamp arm and relevant



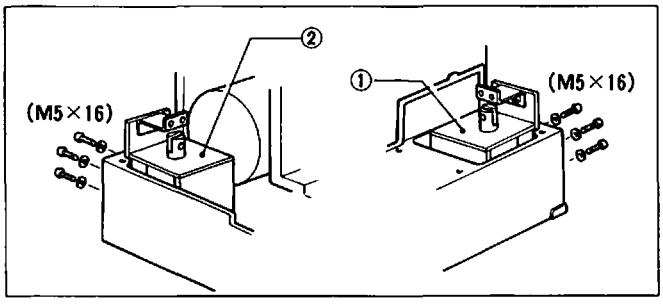
(1) Attach the auxiliary plate ① to the frame, and tighten while matching the upper surface of the auxiliary plate with the upper surface of the needle plate ②.



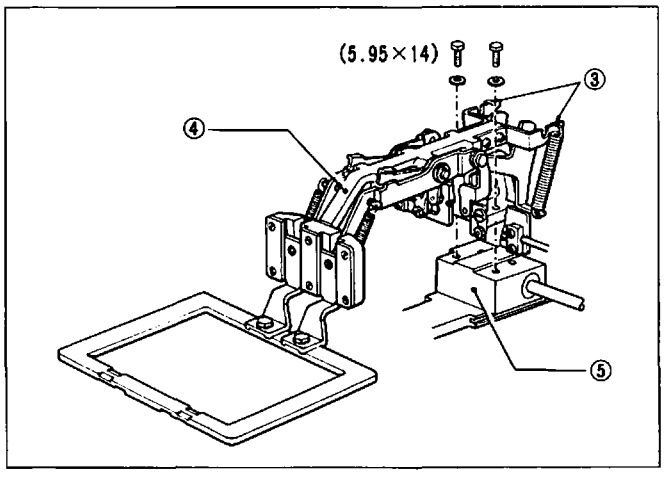
(2) Tighten the feed plate ③ to the feed table Y ④.

(3) Attach the feed table cover ⑤ to the feed table Y ④.

■ **For electromagnetic types (For pneumatic types, start from item (10).)**



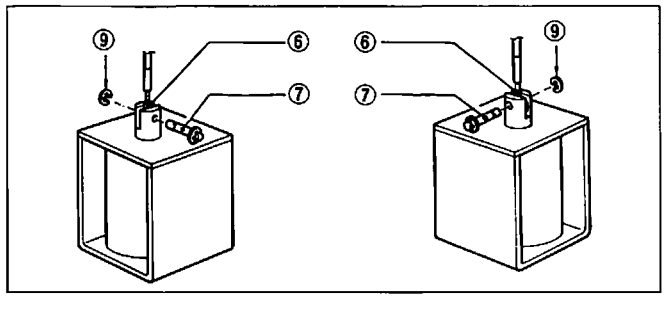
(4) Attach the work clamp lifter solenoids R ① and L ② to the frame.



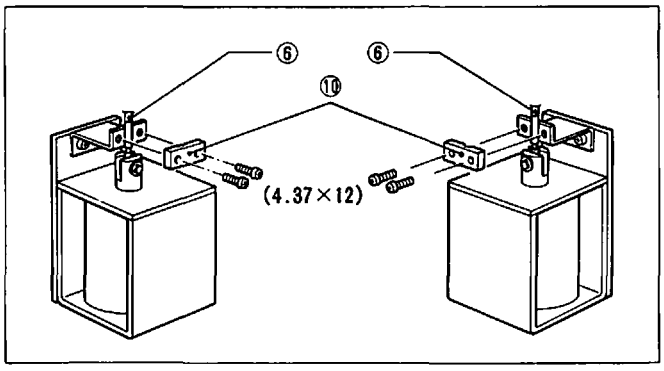
(5) Remove the presser springs ③.

(6) Fit the work clamp arm ④ into the groove in the feed table Y ⑤ and secure.

(7) Attach the presser springs ③ again.

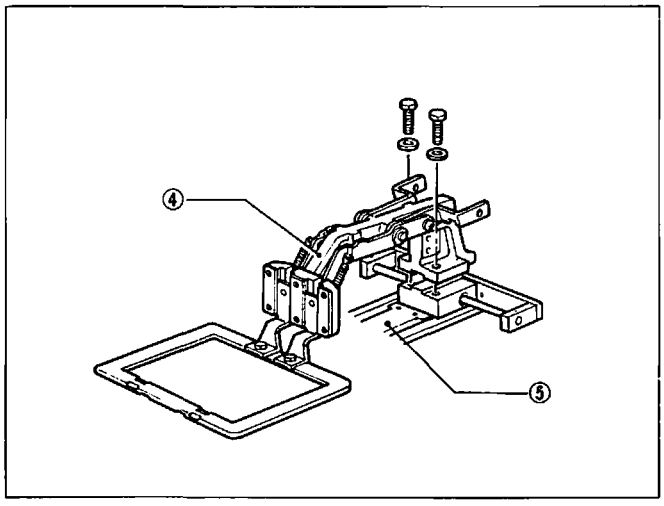


(8) Put the plunger pin ⑦ at the top of the work clamp lifter wire ⑥, and hold it with the stop ring ⑨.

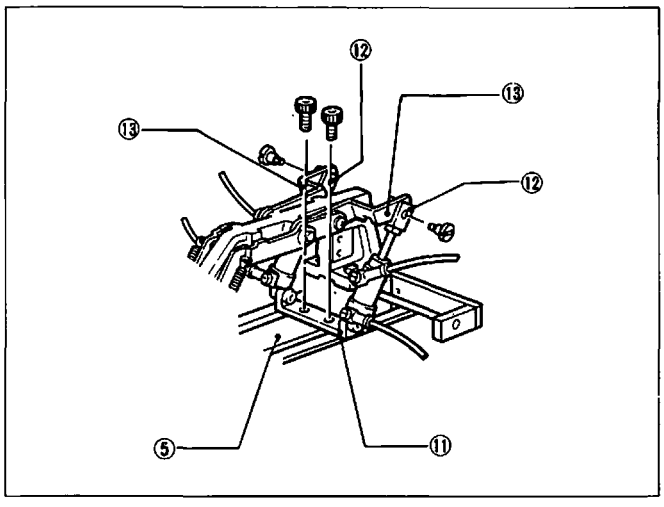


(9) Hold the tip of the work clamp lifter wire fitting ⑥ with the wire presser V ⑩, and tighten.

■ **For pneumatic types**

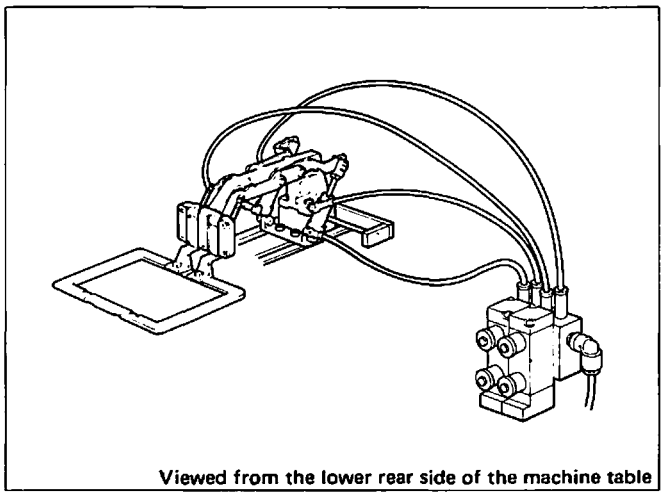


(10) Fit the work clamp arm ④ into the groove in the feed table Y ⑤, and secure.



(11) Attach the cylinder support ⑪ to the feed table Y ⑤.

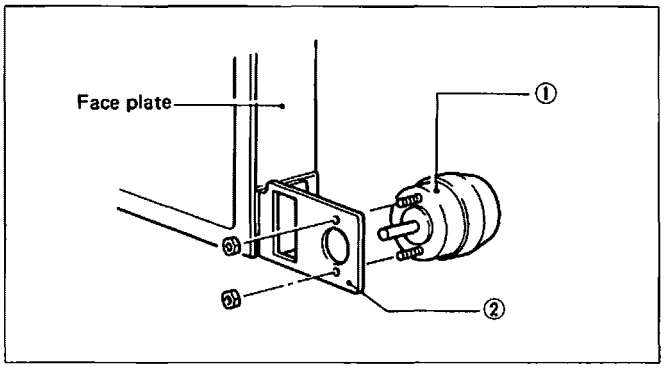
(12) Attach the cylinder joint ⑫ to the work clamp arm lever C ⑬.



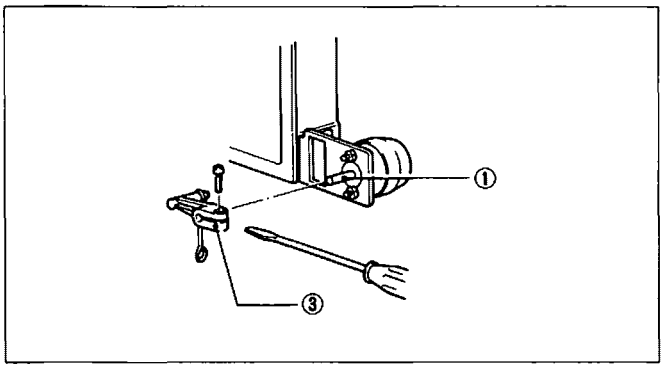
Viewed from the lower rear side of the machine table

(13) Connect the air tube as illustrated in the Figure to the left.

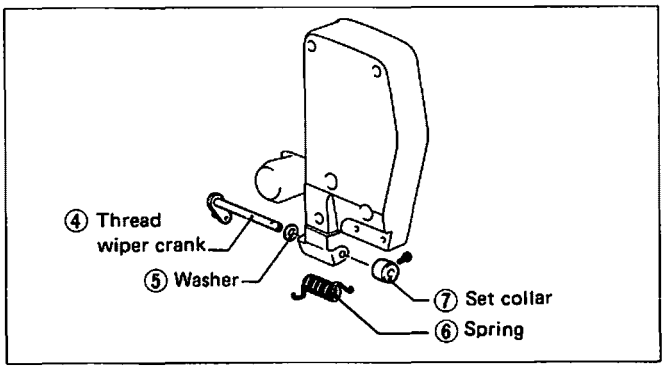
11 Thread wiper



(1) Attach the wiper solenoid ① to the solenoid base ②.



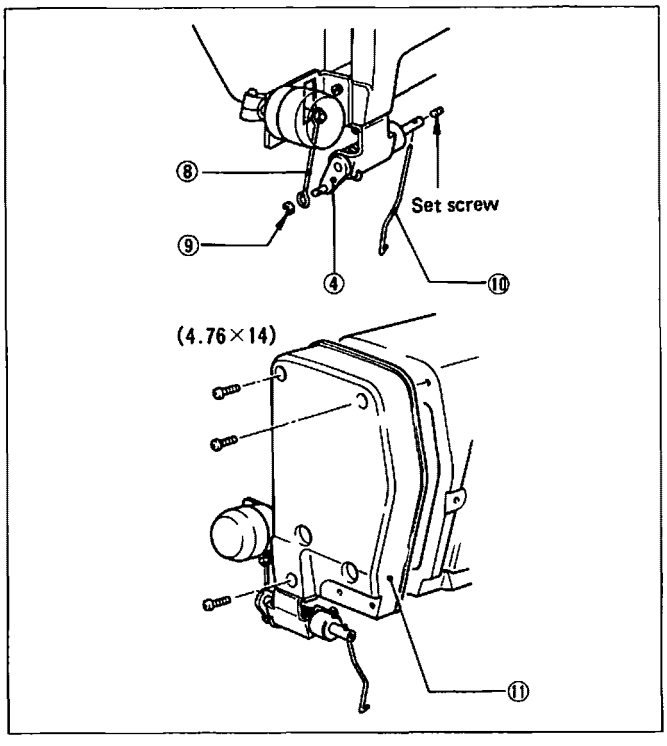
(2) Temporarily tighten the solenoid lever ③ to the wiper solenoid ①.



(3) Attach the thread wiper crank ④, washer ⑤, spring ⑥, and set collar ⑦ as illustrated.

(4) Lightly push the thread wiper crank ④ until the screw is aligned with the screw recess, and tighten the thread wiper crank.

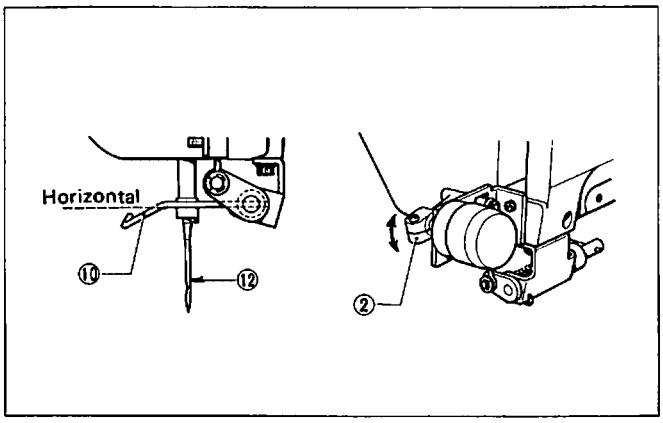
(5) Hook the spring ⑥ on the screw.



(6) Fit the wiper link ⑧ with the pin on the thread wiper crank ④, and mount the stop ring ⑨.

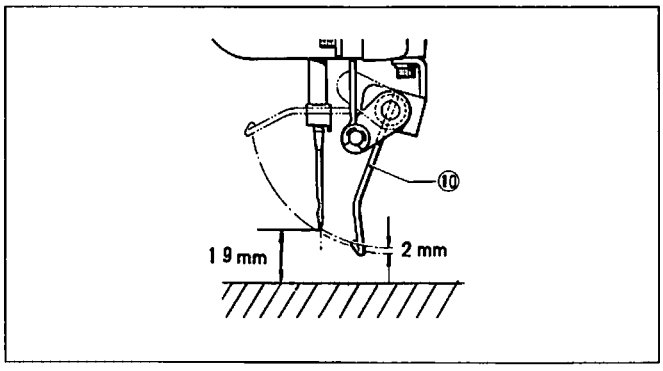
(7) Temporarily tighten the thread wiper ⑩ to the thread wiper crank ④.

(8) Attach the face plate ⑪.



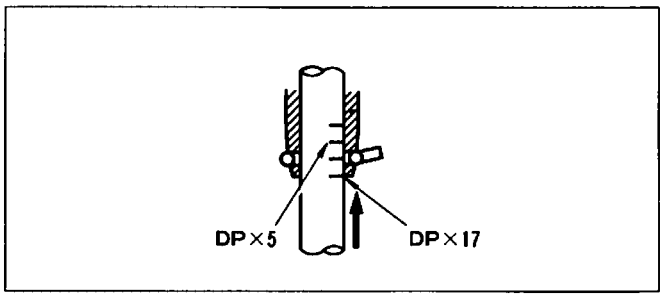
(9) Attach the needle ⑫ .

(10) Adjust using the solenoid lever ② so that the thread wiper ⑩ becomes horizontal at the point where it stops.

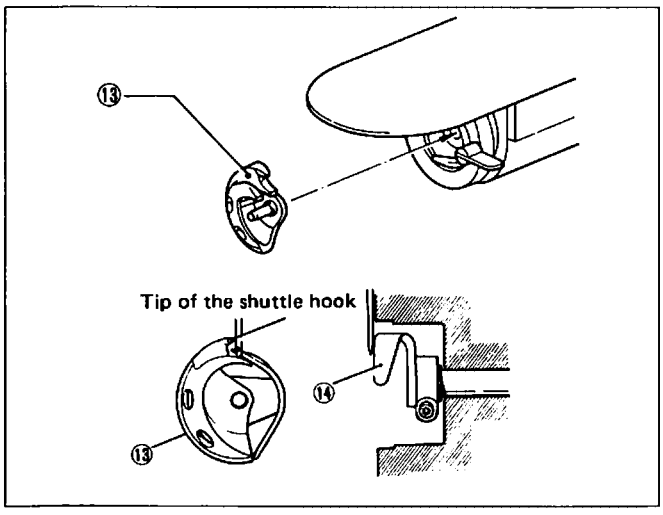


(11) Turn the pulley so that needle tip is positioned 19 mm away from the upper surface of the needle plate.

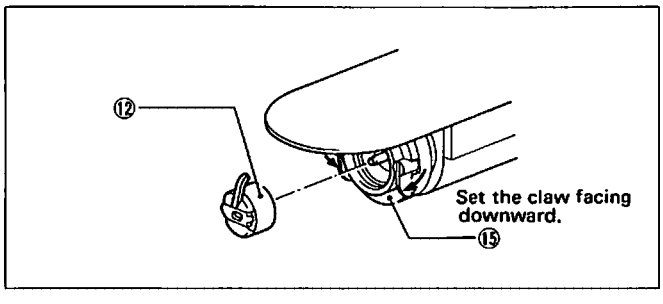
(12) Adjust by putting the thread wiper ⑩ in and out until there is clearance of 2 mm between the needle and threed wiper ⑩ .



(13) Turn the pulley by hand until the needle is at the lowest position. Align the reference line of the needle bar with the lowest reference line (DP x 17). (In the case of the needle DP x 5, use the second highest reference line.)

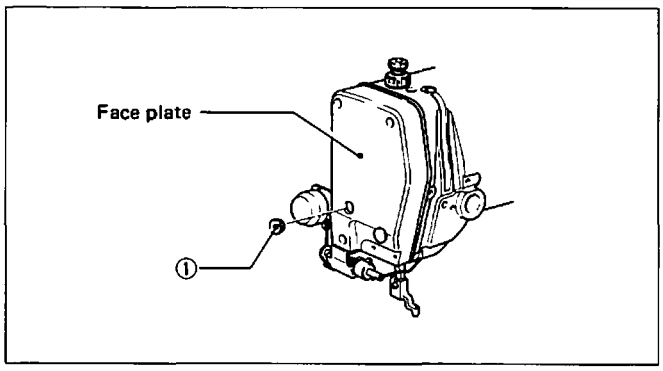


(14) Insert the shuttle hook ⑬ into the arm. Adjust the driver ⑭ until the tip of the shuttle hook rests at the center of the needle.



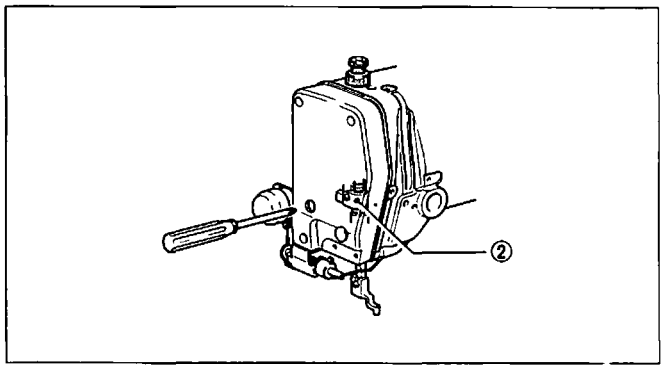
(15) Attach the shuttle race ring ⑮ to the arm, and set the claw. Put the bobbin case ⑫ in the shuttle hook ⑩ .

12 Intermittent-presser foot



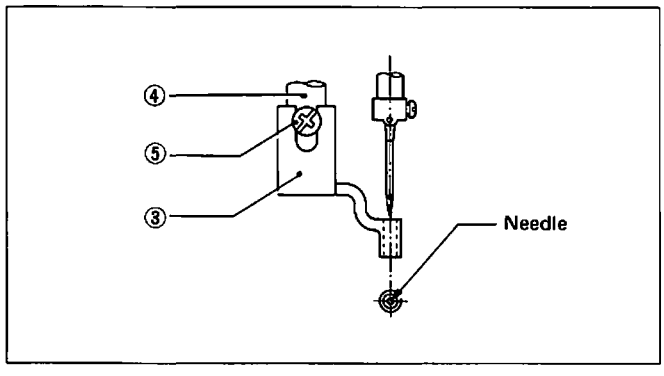
(1) Remove the oil cap ① on the face plate.

(2) Turn the pulley until the needle is at the lowest position.



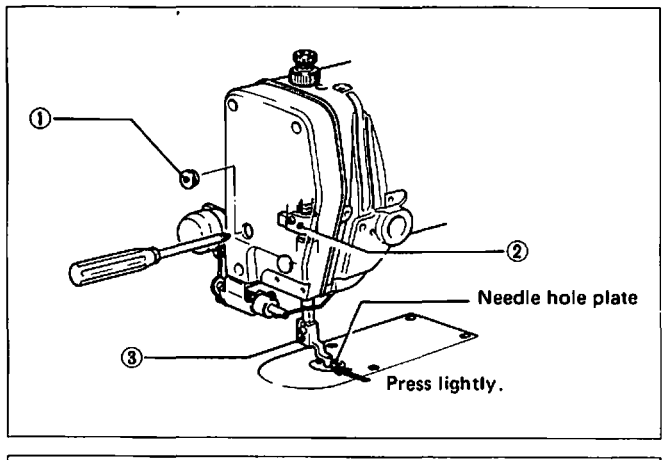
(3) Loosen the screw on the presser bar clamp ②.

(4) Turn the pulley until the needle is at the highest position.



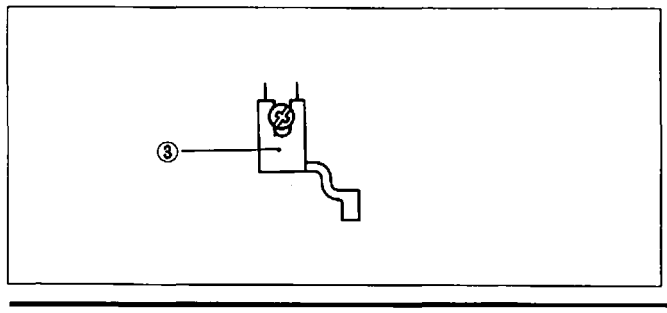
(5) Fit the presser foot ③ in the presser bar ④ and align with the top end of the screw head ⑤. Temporarily tighten the presser foot.

(6) Turn the pulley until the needle bar rests at the lowest position while ensuring the needle rests at the center of the hole in the presser foot.



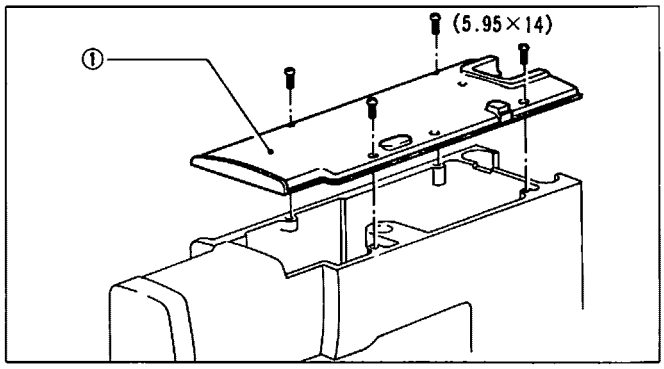
(7) Press lightly the top of the presser foot ③ against the needle hole plate, and tighten the screw on the presser bar clamp ②.

(8) Attach the oil cap ①.

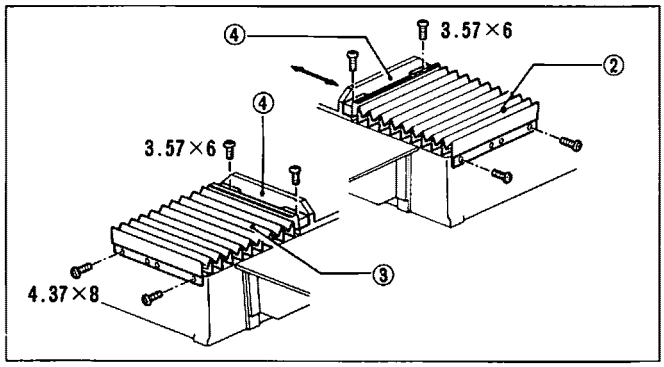


(9) Attach at the center of the groove of the presser foot ③.

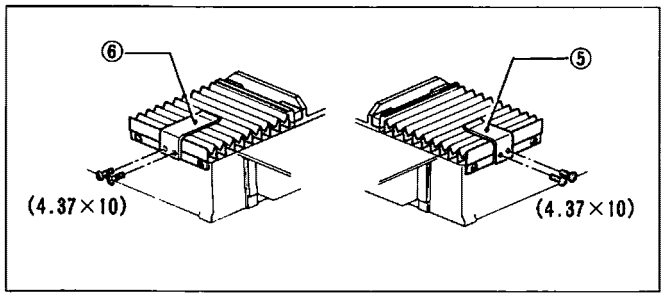
13 Covers and relevant



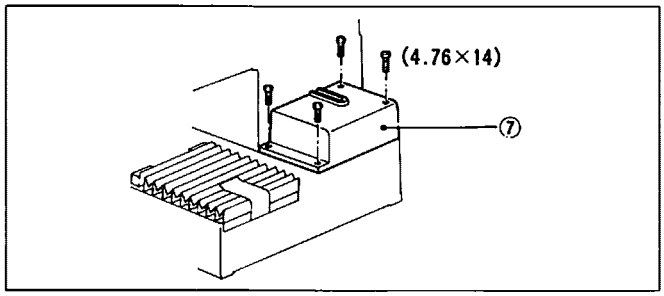
(1) Attach the upper cover ①.



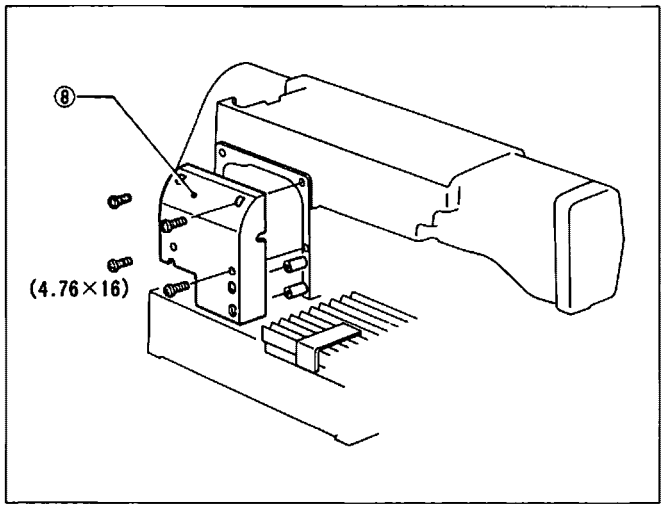
(2) Attach the bellows R ② and L ③. Move the feed table rightward and leftward while tightening them to the feed table ④.



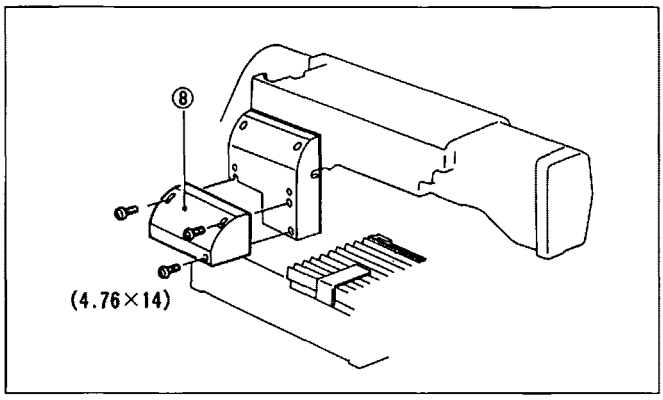
(3) Attach the bellow holder R ⑤ and L ⑥.



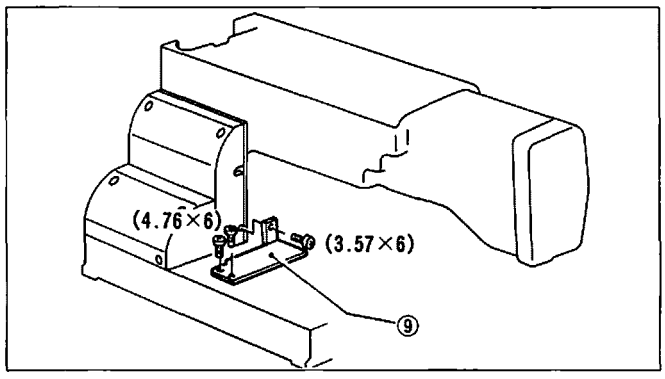
(4) Attach the side cover R ⑦.



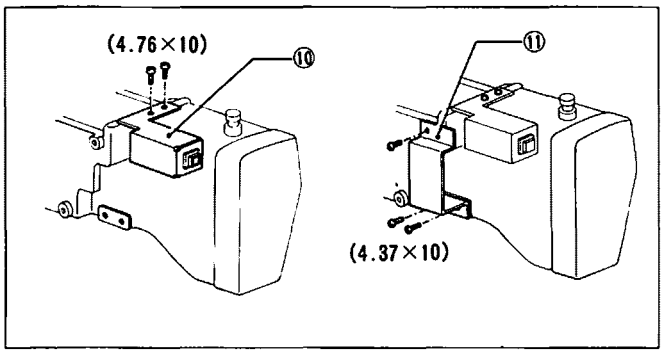
(5) Attach the side cover LU ⑧.



(6) Attach the side cover LD ⑧.

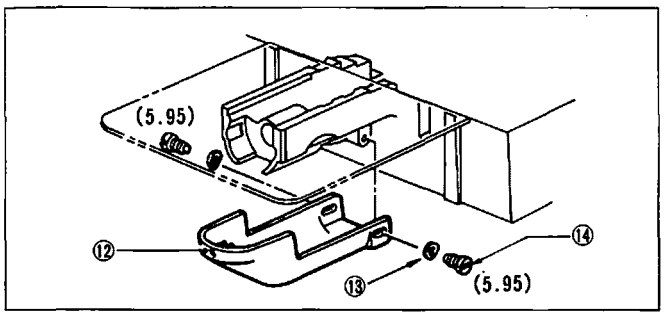


(7) Attach the bed cover ⑨.

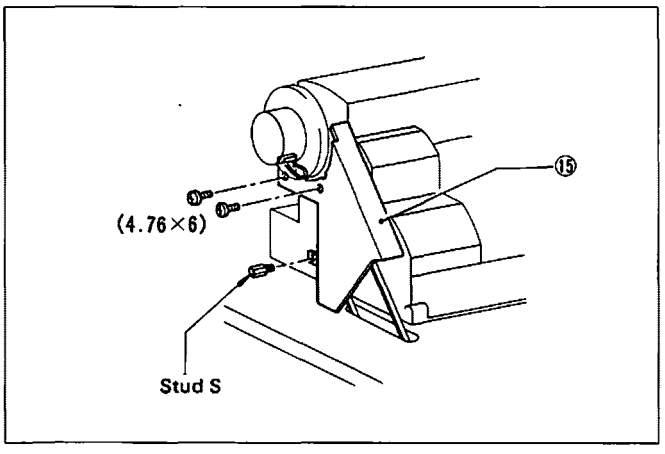


(8) Mount the emergency stop switch ⑩ .

(9) Attach the intermittent cover ⑪ .

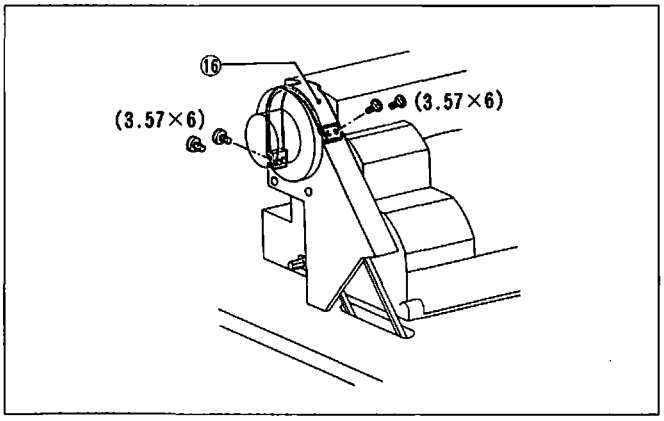


(10) Attach the large shuttle hook cover ⑫ to the arm using the wave washer ⑬ and stud screw ⑭ .

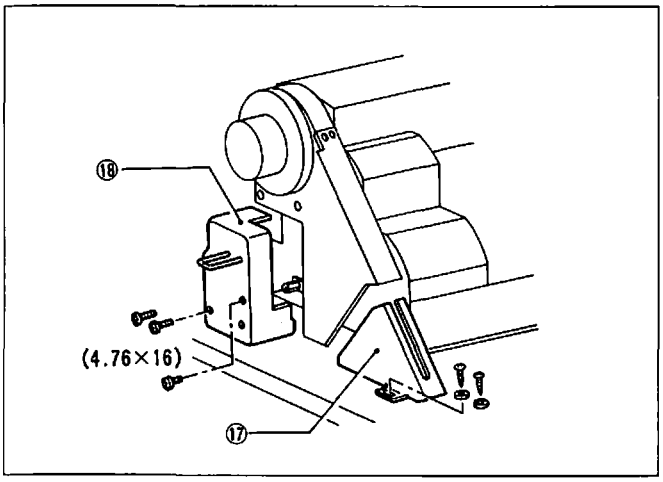


(11) Lay the sewing machine down. Fit the V-belt and return the sewing machine to its original position.

(12) Attach the belt cover M ⑮ .



(13) Attach the belt cover U ⑯ .

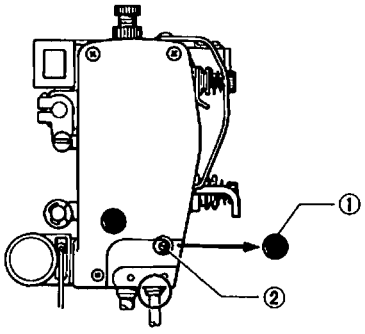


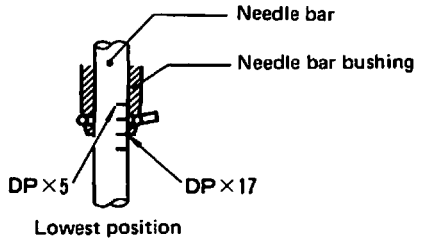
(14) Attach the belt cover D ⑰ with two screws and washers.

(15) Attach the original point cover ⑱ .

4 STANDARD ADJUSTMENTS

1 Adjustment of needle-bar height





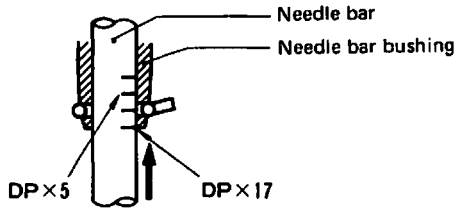
(1) Remove the oil cap ①.

(2) Turn the pully until the needle bar rests at the lowest position.

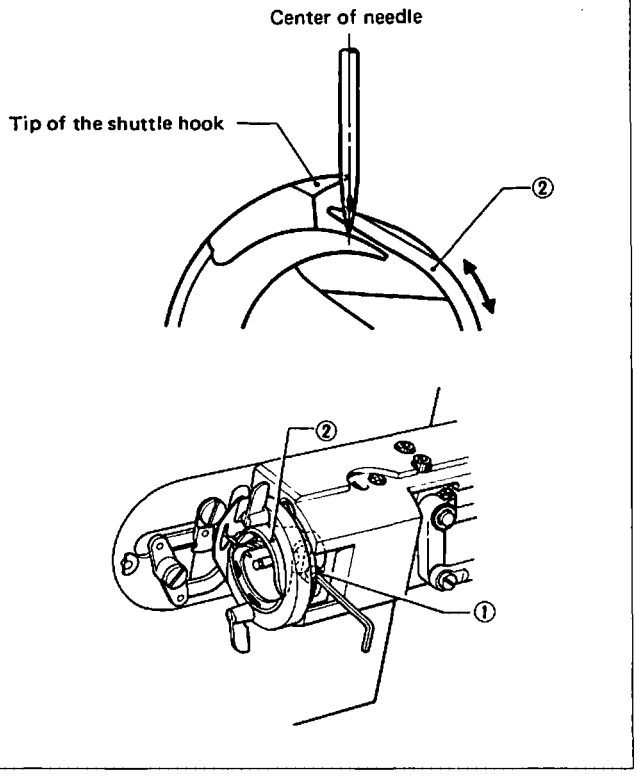
(3) Loosen the screw ②.

(4) Align the second lowest reference line with the lower end of the needle bar bushing (the needle of DP x 17). (For a DP x 5 needle, use the highest reference line).

2 Matching the needle with the tip of the shuttle hook

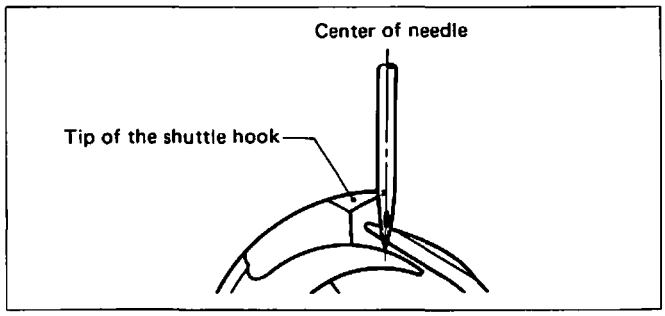


(1) Turn the pulley to raise the needle bar from the lowest position and align the lowest reference line with the lower end of the needle bar bushing (for a DP x 17 needle). (For a DP x 5 needle, use the second highest reference line.)

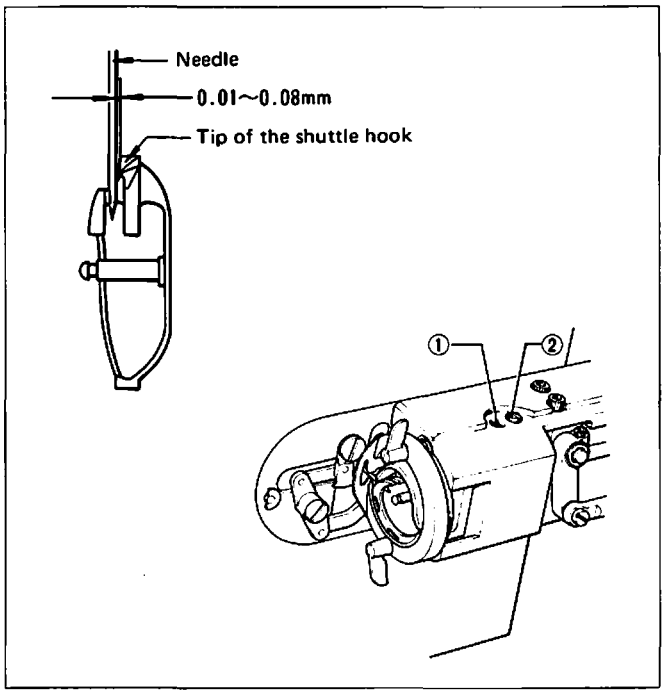


(2) Loosen the set screw ① and adjust using the driver ② so that the tip of the shuttle hook aligns with the center of the needle.

3 Adjustment of clearance between the needle and the tip of the shuttle hook

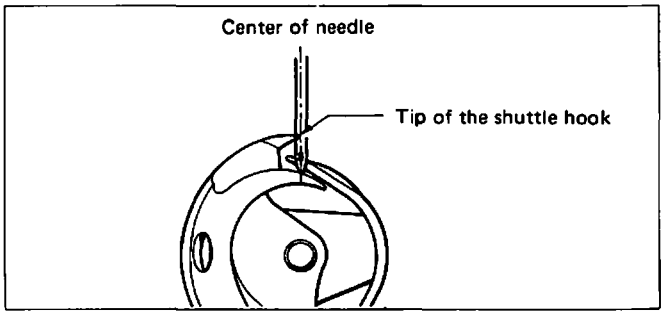


(1) Turn the pulley to allow the tip of the shuttle hook to align with the center of the needle.

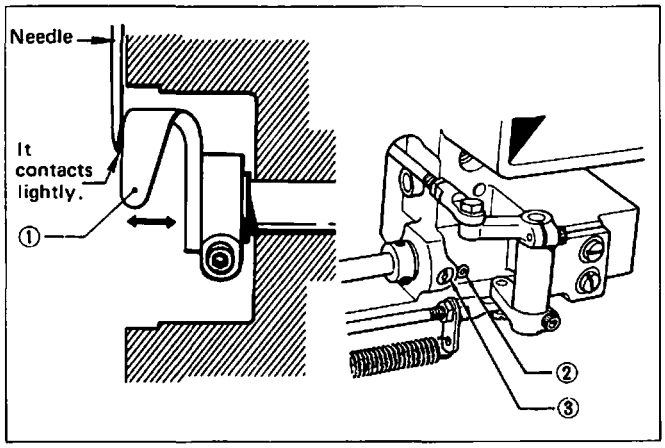


(2) Adjust by loosening the screw ① and turning the eccentric shaft ② so that the clearance between the needle and the tip of the shuttle hook is from 0.01 mm to 0.08 mm.

4 Adjustment of the needle receiver of the driver



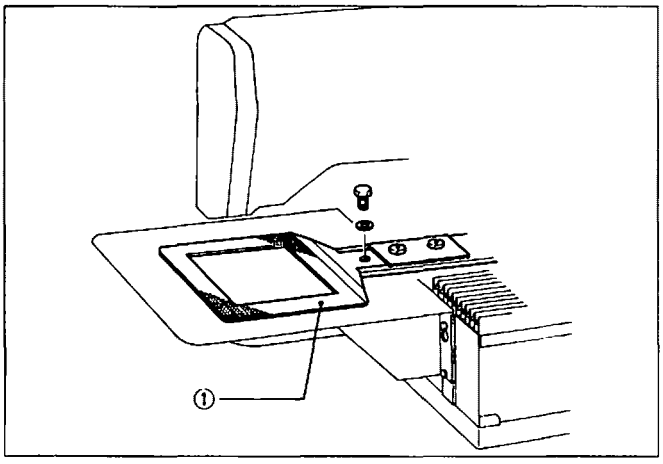
(1) Align the tip of the shuttle hook with the center of the needle by turning the pulley.



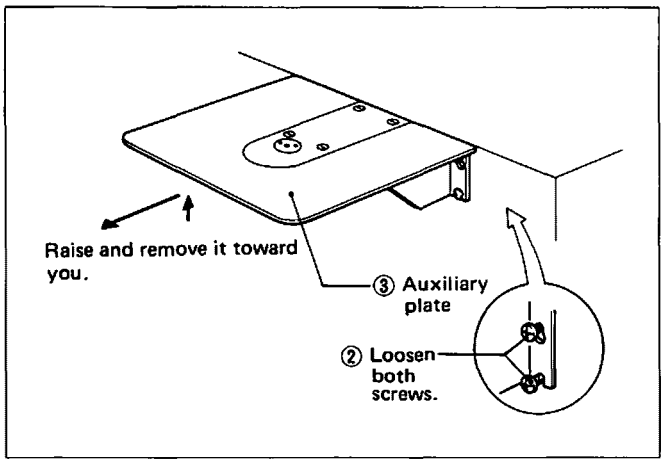
(2) Lay the sewing machine down.

(3) Loosen the screw ②. Adjust by turning the eccentric shaft ③ so that the needle lightly contacts the needle receiver of the driver ①.

5 Adjustment of the shuttle hook thread guide

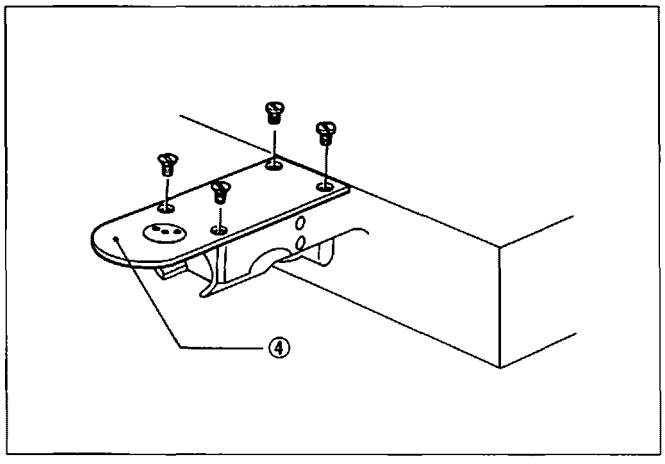


(1) Remove the feed plate ①.

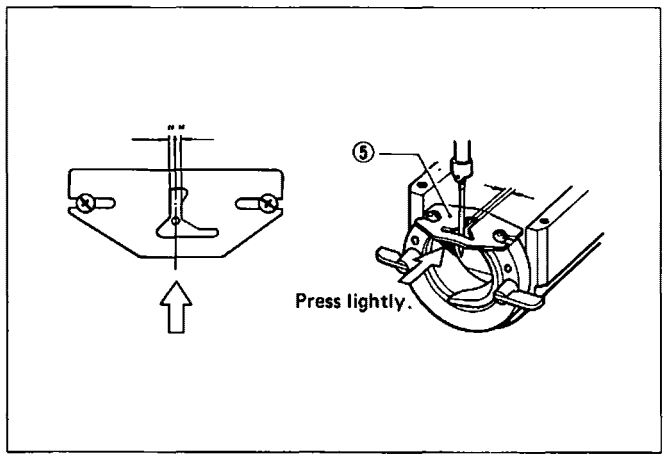


(2) Loosen the screws ② .

(3) Raise the auxiliary plate ③ and remove by sliding it toward the operator.

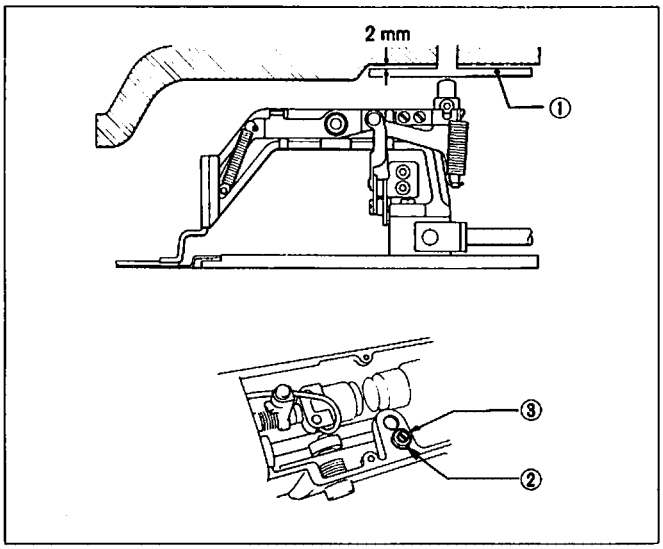


(4) Remove the needle plate ④.

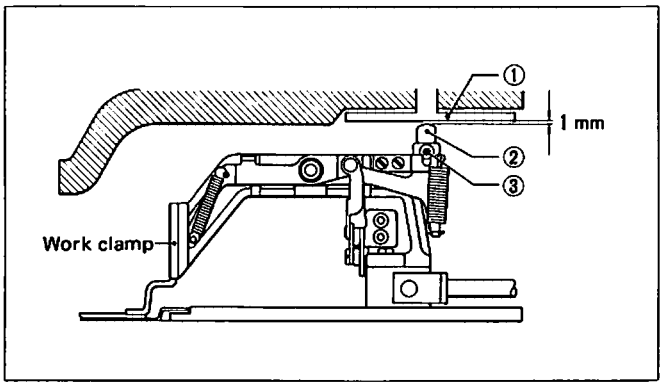


(5) Drive the needle groove of the shuttle hook thread guide ⑤ into both sides of the needle center. Allow the needle to lightly touch the bottom and tighten.

6 Adjustment of the work clamp lift



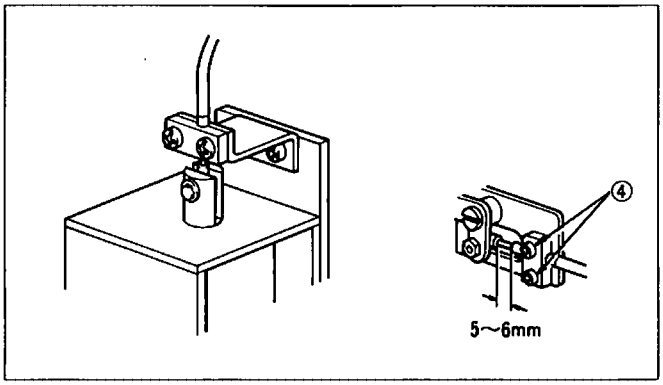
(1) Loosen the nut ② and adjust the adjusting screw ③ until there is a clearance of 2 mm between the work clamp lifter plate ① and the lower surface of the arm, when the work clamp lifter plate is raised.



<To set the work clamp lift to a maximum of 20 mm:>

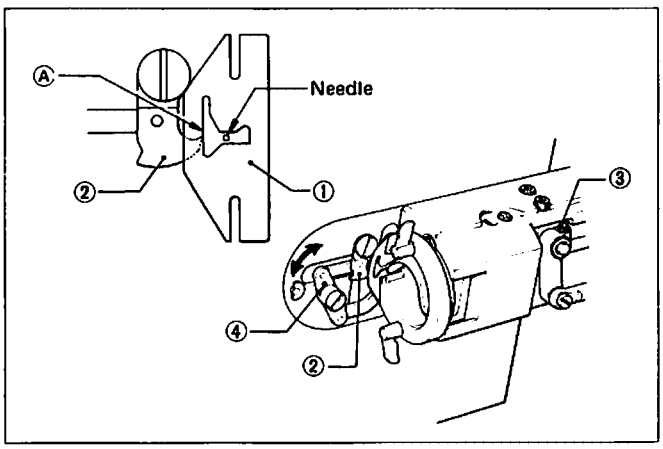
(1) Loosen the screws ③ (right and left) and adjust so that there is a clearance of 1 mm between the work clamp lifter plate ① and lever plate ② (right and left) when the holder is lowered.

(2) If the clearance is greater, the lift is reduced.



(3) Loosen the screws ④ and pull the wire tube on the solenoid side until the wire of the presser arm lever part becomes 5 to 6 mm.

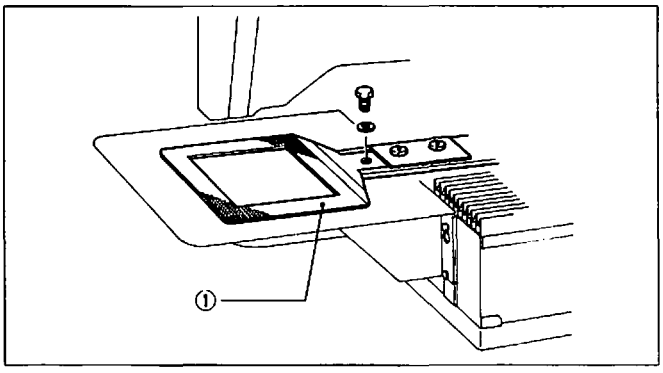
7 Adjustment of the moving blade



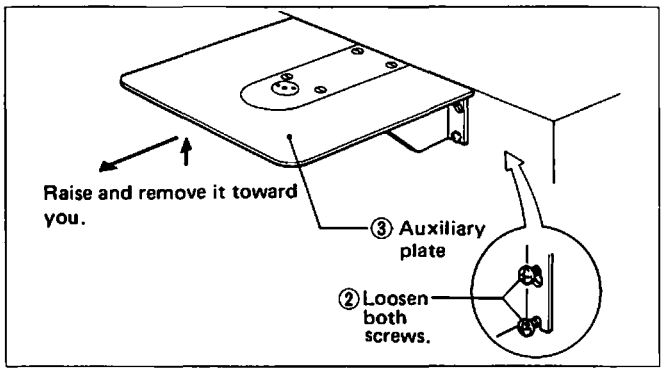
(1) Set the sewing machine in the stop position.

(2) Loosen the screw ③ and adjust using the thread trimming connecting lever ④ so that the needle groove edge Ⓐ of the shuttle hook thread guide ① is even with the tip of the moving blade ② .

■ Replacement of the moving and fixed blades

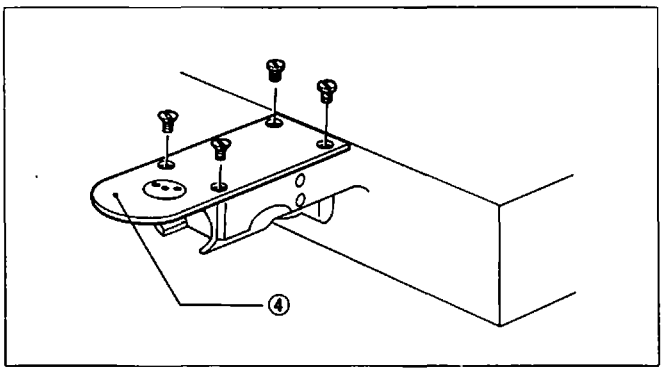


(1) Remove the feed plate ①.

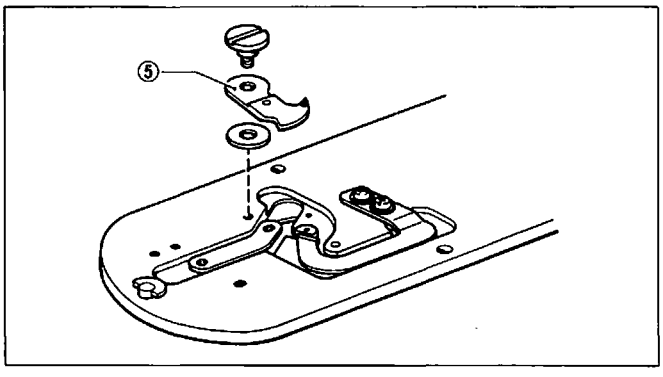


(2) Loosen the screws ② .

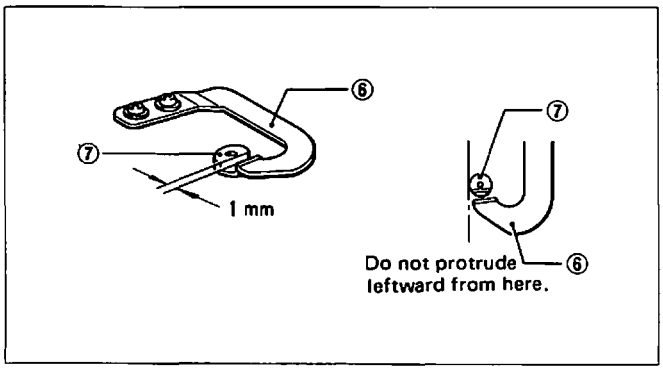
(3)Raise the auxiliary plate ③ and remove by sliding it toward the operator.



(4) Remove the needle plate ④.



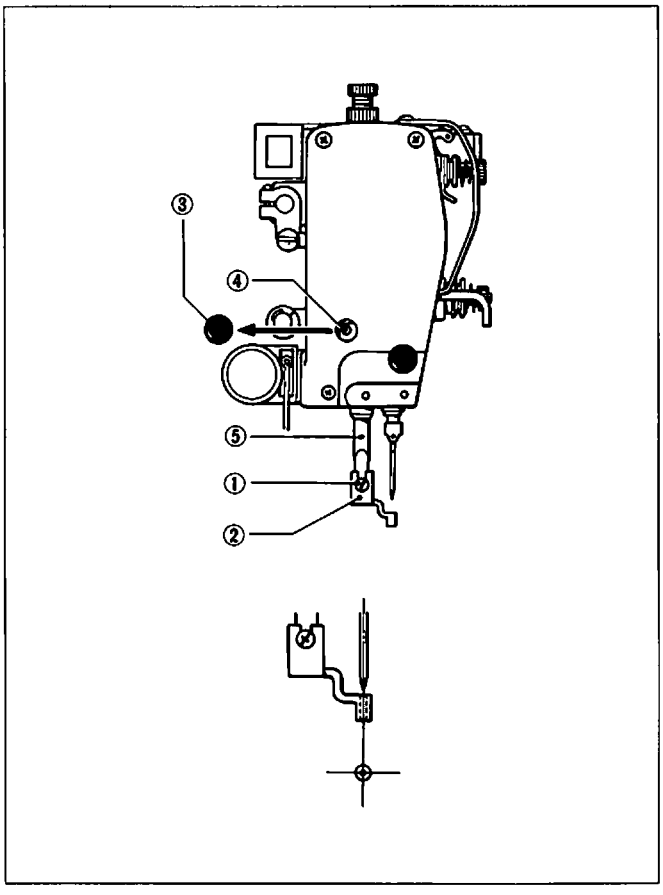
(5) Remove the moving blade ⑤ and replace it with the new one.



(6) Remove the fixed blade ⑥ and replace it with the new one. Ensure that there is a clearance of 1 mm between the needle hole plate ⑦ and the new fixed blade ⑥ after replacement. Make sure that the tip of the fixed blade ⑥ does not protrude leftward from the end of the needle-hole plate ⑦.

(7) Reassemble the moving and fixed blades by reversing the disassembly steps.

8 Adjustment of the presser foot



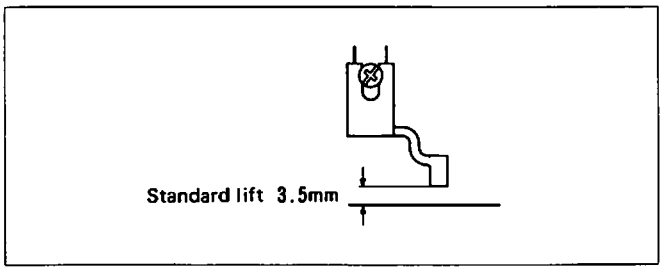
(1) Turn the pulley until the presser foot is at the lowest position.

(2) Loosen the screw ①. Retighten it at a position where the lower surface of the presser foot ② lightly contacts the material to be sewn.

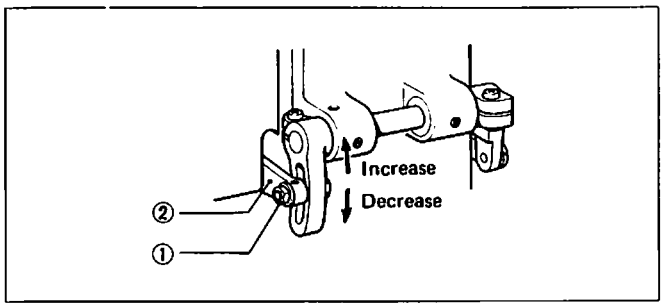
(3) Turn the pulley and make sure that the needle enters the center of the presser foot.

(4) If the needle does not enter the center of the presser foot, remove the oil cap ③, loosen the screw ④, and turn the presser bar ⑤ to adjust.

9 Adjustment of the intermittent-presser foot lift

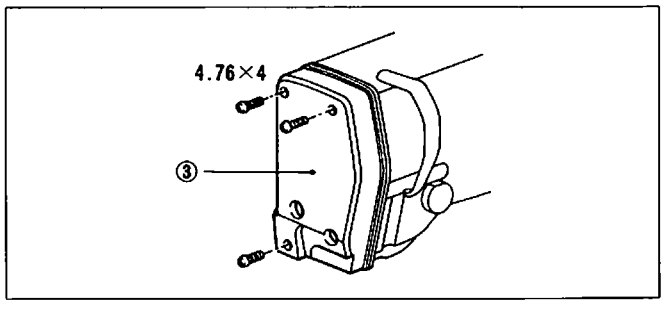


○ The standard lift of the presser foot is 3.5 mm.

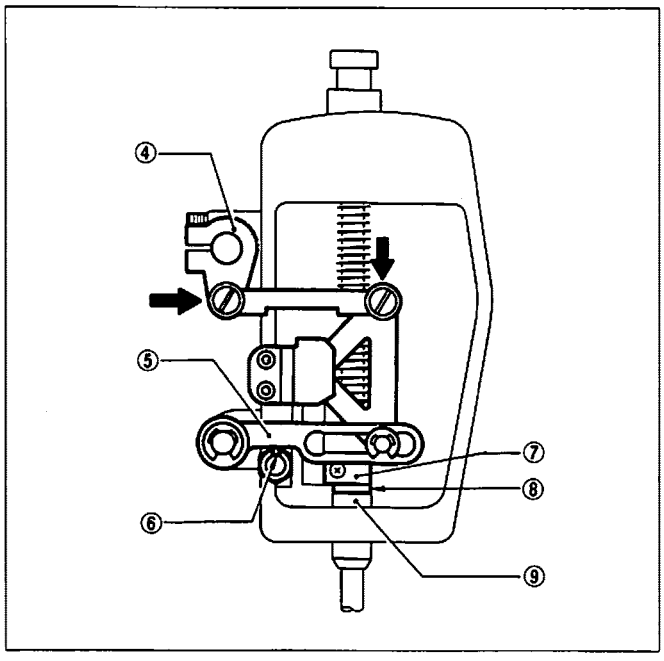


<To change the standard lift:>

(1) Loosen the nut ①. Raising the set position of the feed connecting rod ② increases the lift; lowering the set position decreases the lift.



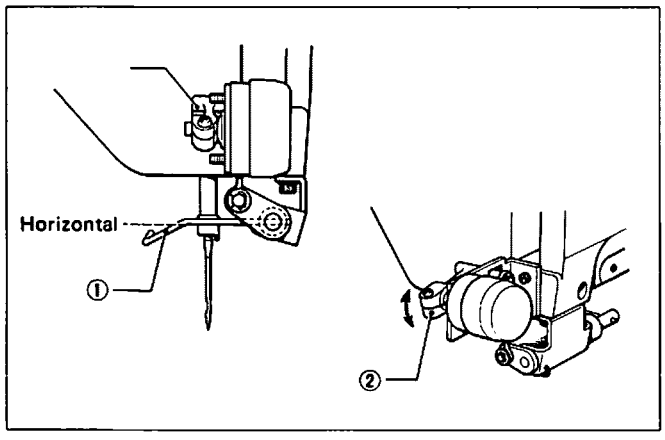
(2) Remove the face plate ③.



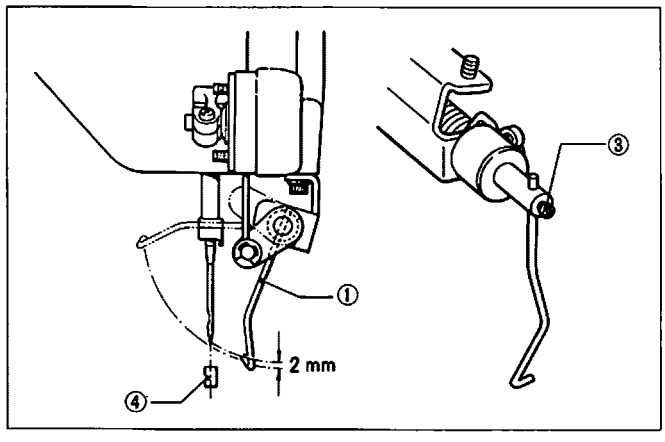
(3) Turn the pulley until the presser bar is at its lowest position. Loosen the intermittent feed arm L ④.

(4) Ensure that there is no clearance among the presser bar clamp ⑦, intermittent stopper ⑧, and presser bar bushing ⑨, with the intermittent support ⑤ kept touching the intermittent stopper support ⑥. Tighten the intermittent feed arm L ④.

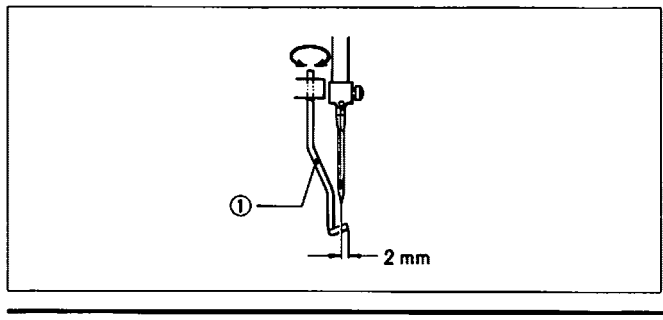
10 Adjustment of the thread wiper



(1) Adjust the thread wiper ① with the solenoid lever ② so that the wiper becomes horizontal at the stop position.

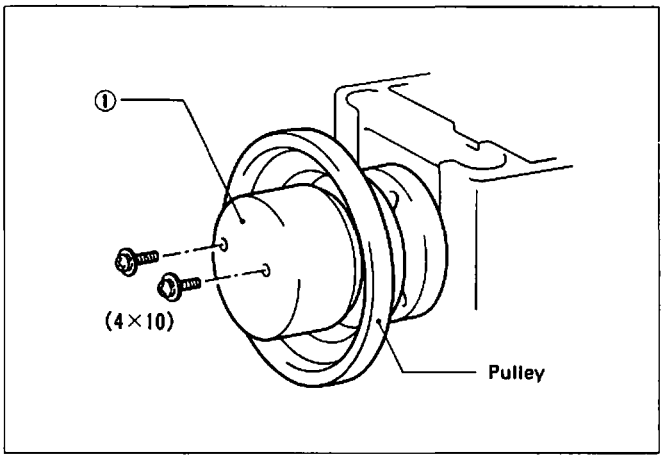


(2) Actuate the thread wiper ①. Adjust the thread wiper with the screw ③ so that there is a clearance of approximately 2 mm between the thread wiper ① and the tip of the needle. Make sure that the thread wiper does not strike the presser foot ④.

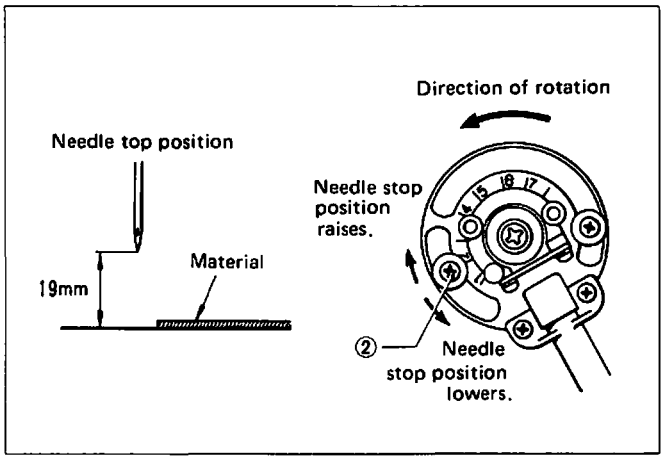


At the same time, ensure that when viewed from the front the tip of the thread wiper ① protrudes approximately 2 mm from the center of the needle.

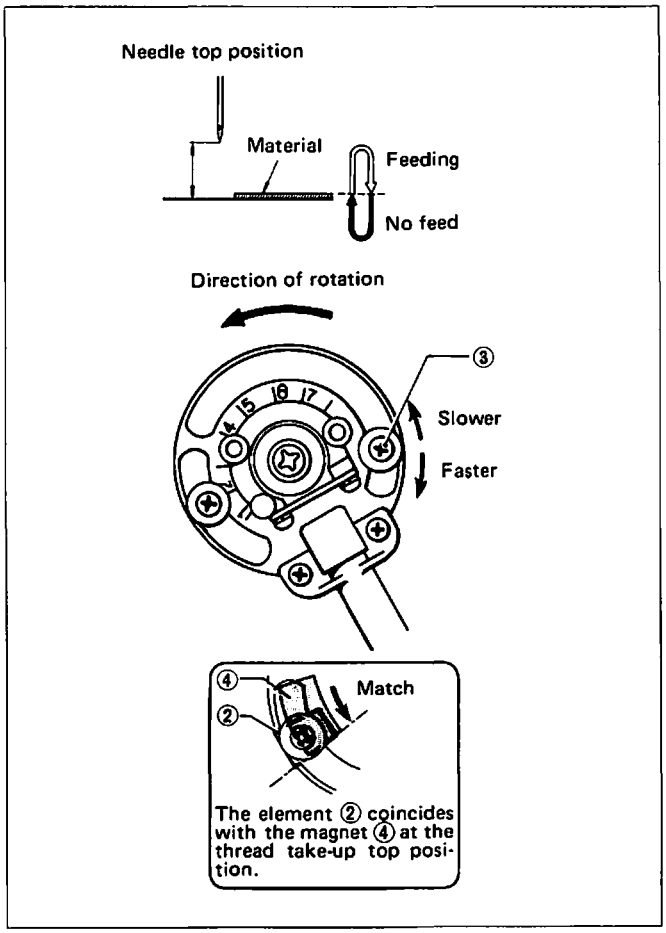
11 Adjustment of the needle-stop position and feed timing



(1) Remove the cover ① of the synchronizer.



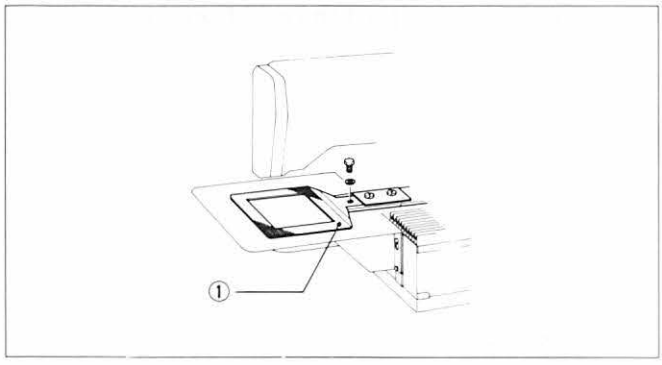
(2) Adjust the needle-stop position with the element ② so that the needle tip comes to a stop 19~20 mm away from the upper surface of the needle plate. Turning the element ② clockwise raises stop position; counterclockwise, lowers it.



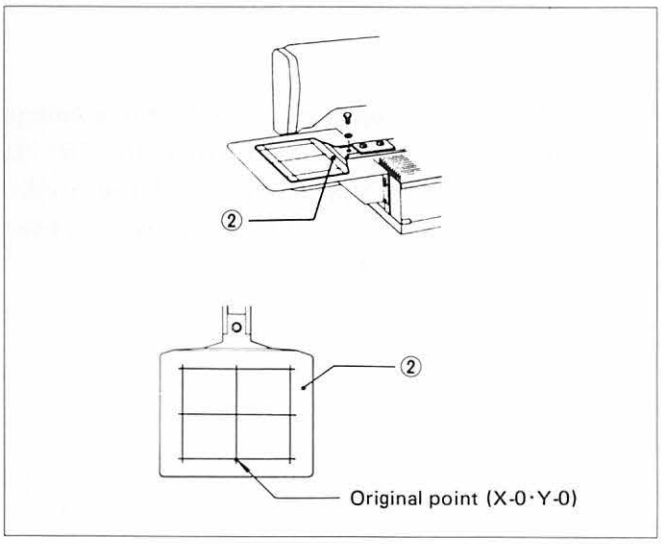
(3) Adjust the timing of the needle and feed with the element ③ so that feed starts working after the needle has come out of the material being sewn and stops before the needle touches the material.

Note: For thicker material, increasing the feed timing speed reduces needle flow and improves sewing performance.

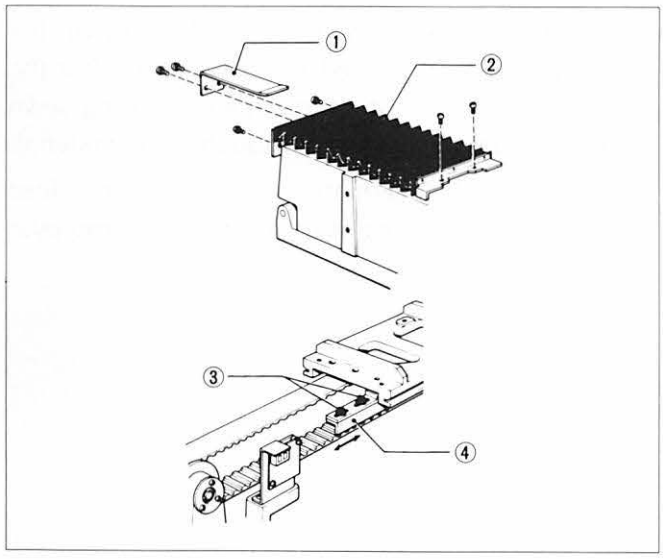
12 Adjustment of the original point



(1) Remove the feed plate ①.

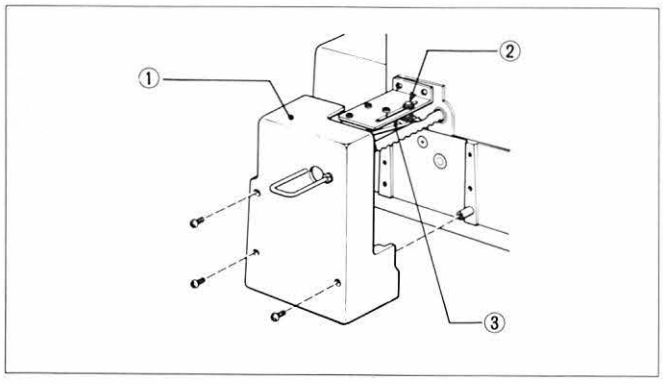


(2) Attach the original-point reference plate ②. The original point is in the center on the operator side.



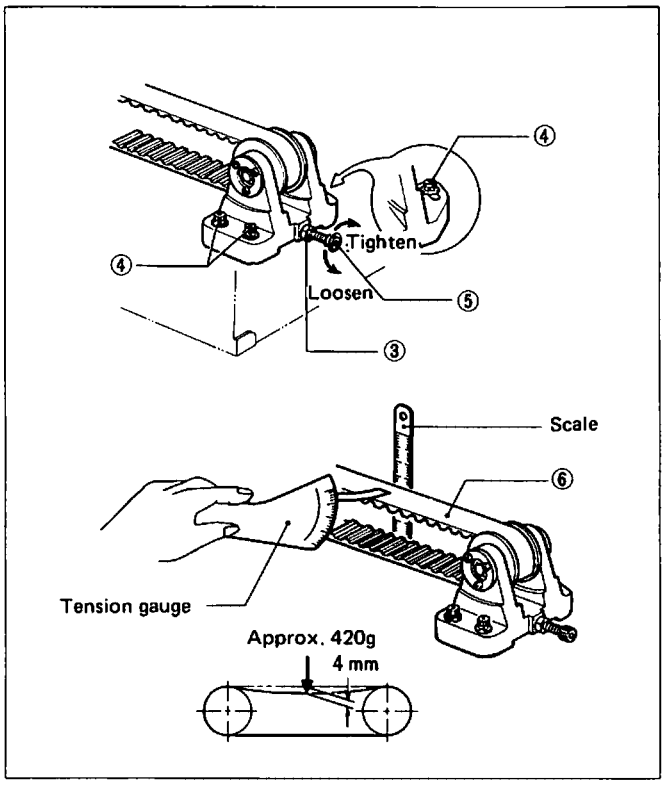
<Adjustment of X axis>

(1) Remove the bellow holder L ①.
(2) Remove the bellow L ②.
(3) Switch the sewing machine ON.
(4) Press the [P] key on the programmer.
(5) Move the needle tip toward the original-point reference plate by turning the pulley.
(6) Loosen the screws ③ so that the needle tip is aligned with the original point. Adjust the X axis by moving the X original point dog ④ rightward and leftward.



<Adjustment of Y axis>

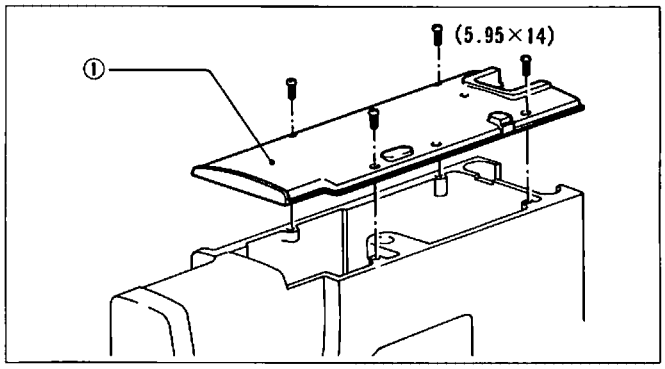
(1) Remove the original-point cover ①.
(2) Switch the sewing machine ON.
(3) Press the [P] key on the programmer.
(4) Move the needle tip toward the original-point reference plate by turning the pulley.
(5) Loosen the hexagonal bolt ②. Move the original-point dog ③ forward and backward until the needle tip aligns with the original point.



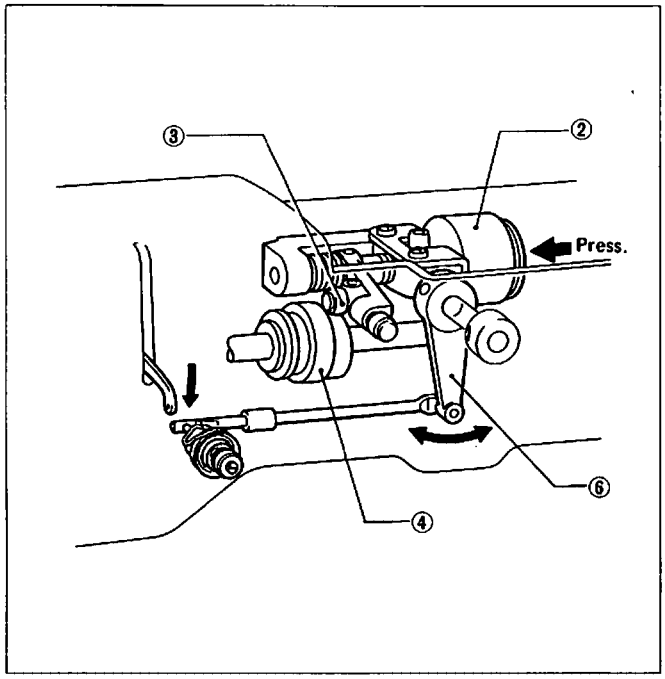
(3) Loosen the nut ③ and screw ④. Make adjustment with the adjusting screw ⑤.

(4) Ensure that the timing belt is deflected by approximately 4 mm at the center under a load of approximately 420 g.

13 Adjustment of the upper thread release timing

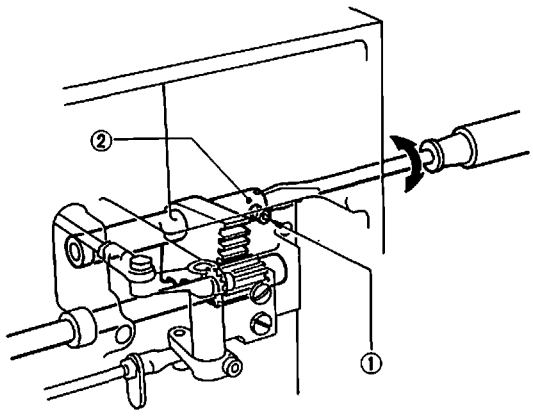


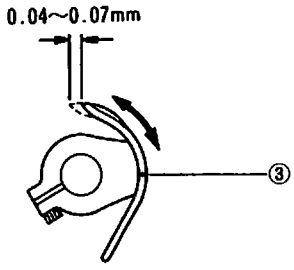
(1) Remove the upper cover ①.



(2) Turn the pulley while pushing the main work clamp solenoid ②. Place the feed cam roller ③ on the work clamp lifter cam ④ and keep the thread take-up ⑤ at the lowest position. Then, adjust with the upper thread release lever ⑥ until the upper thread loosens.

14 Adjustment of the backlash

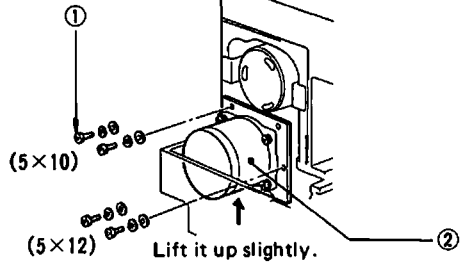




<Lower shaft>

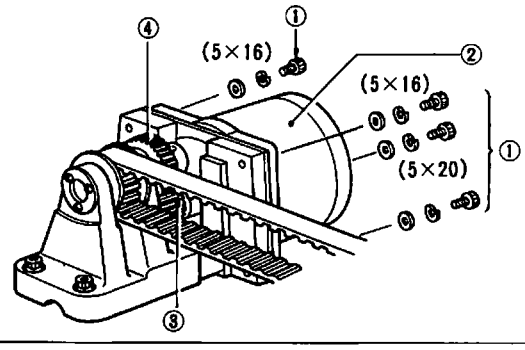
(1) Lay the sewing machine down.

(2) Loosen the screw ① and turn the swing gear shaft ② to adjust the backlash. Provide a play of 0.04 ~ 0.07 mm at the top of the driver ③.



<Longitudinal feed>

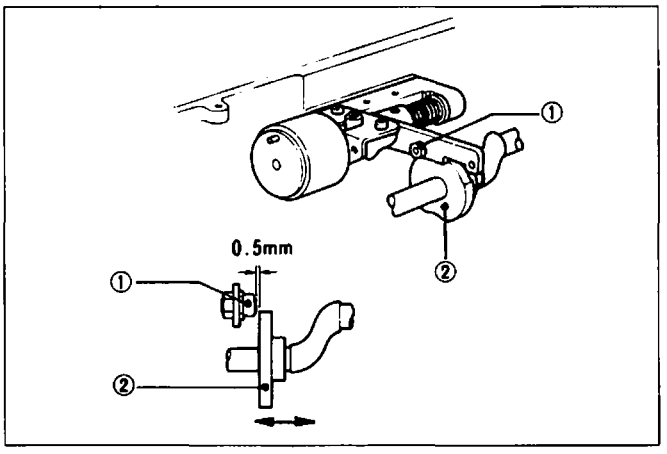
(1) Loosen the bolts ① and slightly raise the pulse-motor ② . Adjust so that no backlash remains between the drive gear and the Y-rack shaft.



<Traverse feed>

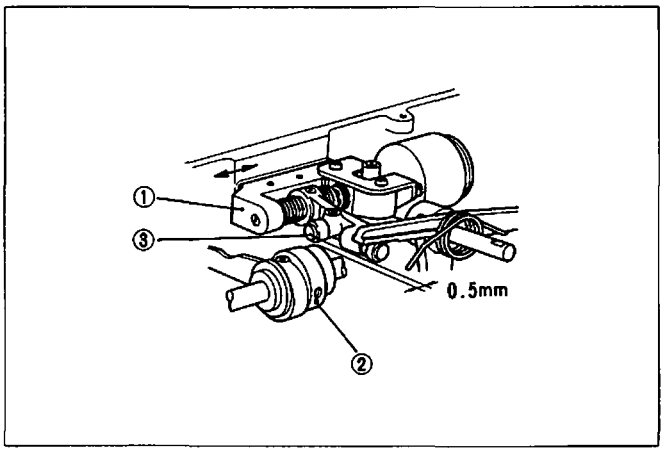
(1) Loosen the bolts ① and slightly raise the pulse-motor X ②. Adjust so that there is no backlash between the drive gear ③ and the idle gear ④.

15 Adjustment of the thread trimming cam



(1) Adjust with the thread trimming cam ② until there is a clearance of 0.5 mm between the roller shaft ① and the thread trimming cam ②.

16 Adjustment of the work clamp lifter base position

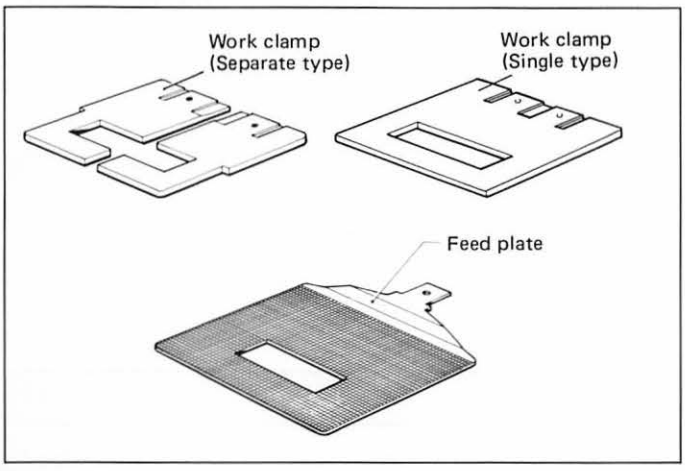


(1) Attach the work clamp lifter base ① while ensuring that there is a clearance of 0.5 mm between the work clamp lifter cam ② and feed cam roller shaft ③.

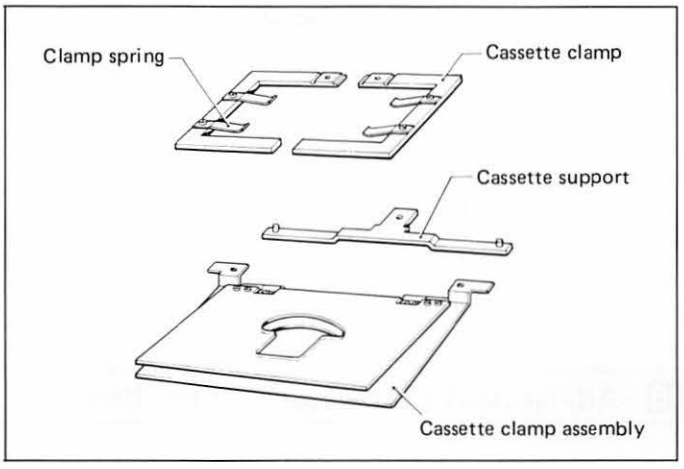
5 HOW TO MAKE UP THE PRESSER

● **The presser is available in two types; clamping type and cassette type.**
The maximum sewing range is 100 (L) x 120 (W) mm.

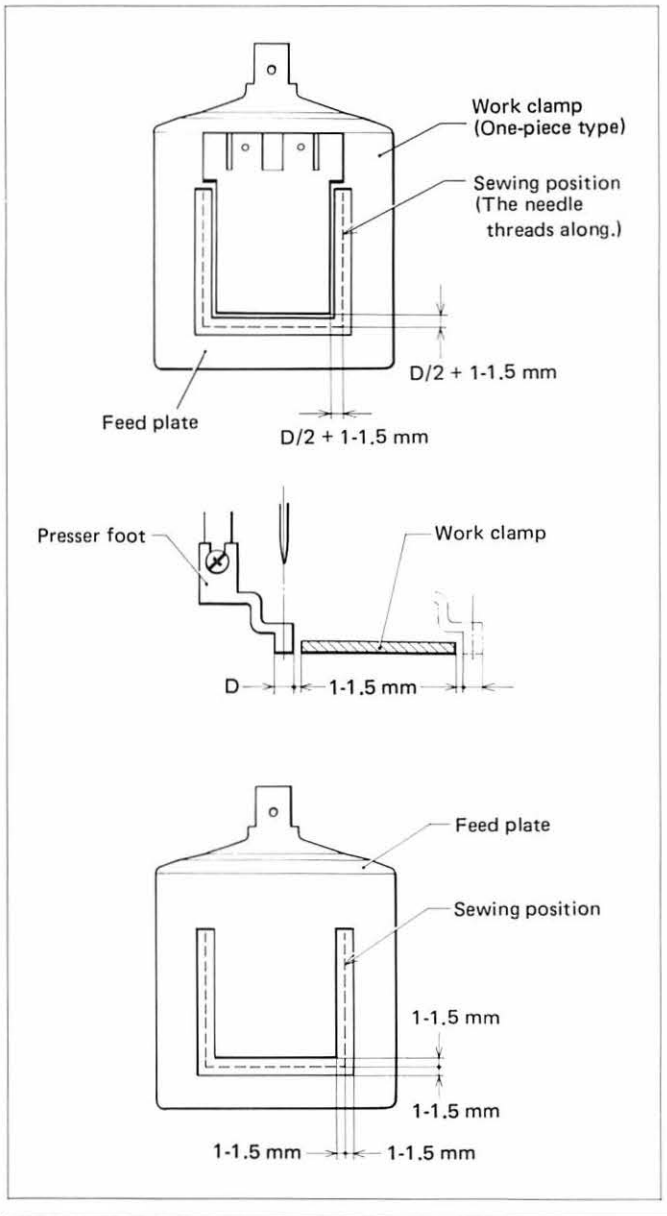
■ **Clamping Type**



■ **Cassette Type**



1 How to make up the clamping type presser



1. How to make up the work clamp blank

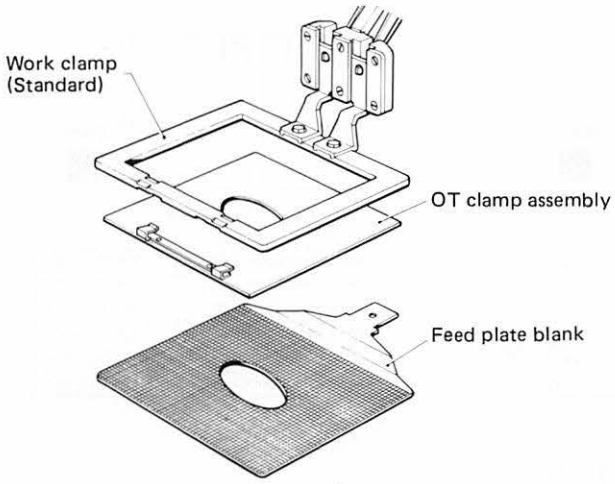
Cut out the work clamp blank so that the cutout size is wider than a sewing position by (half of the presser foot diameter + 1-1.5 mm).

D: Diameter of the top end of the presser foot

2. How to make up the feed plate blank

Cut out the feed plate blank 1-1.5 mm apart from the sewing position.

In the case of the left figure, 1-1.5 mm margin is required on both sides of the sewing position.



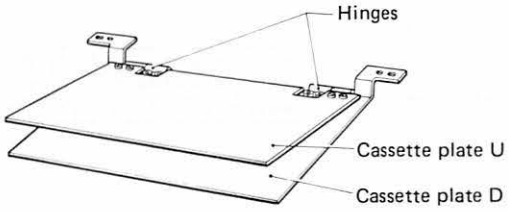
3. How to make up the plastic presser

(1) Cut out the plastic plate according to the contour of a material to be sewn.

(2) Bond a paper cushion material or the like around the cut-out part to securely press a material to be sewn.

(3) Make up the feed plate blank by referring to item "2. How to make up the feed plate blank."

2 How to make up the cassette type presser



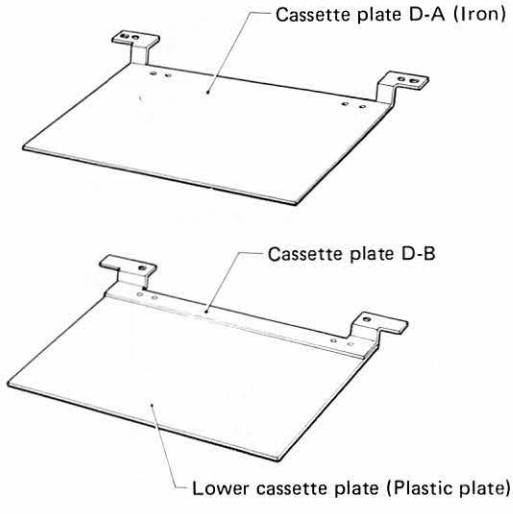
Cassette clamp assembly

★ The cassette type presser is composed of a cassette plate U, cassette plate D, and hinges as illustrated in the left figure.

(1) Cut out the cassette plates U and D. For cutting dimensions, refer to section "1. How to make up the clamping type presser."

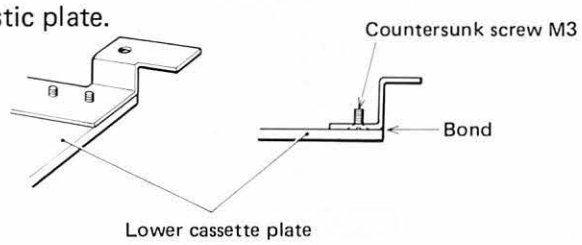
* Making up two cassettes to use them alternately will increase work efficiency.

(2) Bond a paper cushion material or the like around the cut-out part to securely press a material to be sewn.

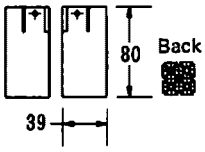


★ The cassette plate D is available in two types; D-A and D-B.

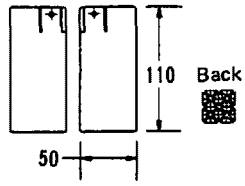
* Use the cassette plate D-B with the same way as the D-A, except that a plastic plate or the like must be bonded on the back of the D-B. When mounting hinges on the cassette plate D-B, insert a countersunk screw M3 into the 4.6 mm diameter countersunk hole prior to bonding the plastic plate.



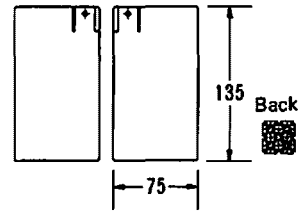
Work clamp blank



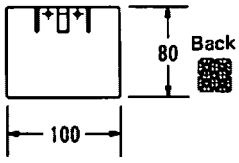
Work clamp blank B-1R	t3.2	153448-000
Work clamp blank B-1L		153449-000
Work clamp blank B-3R	t4	153470-000
Work clamp blank B-3L		153471-000



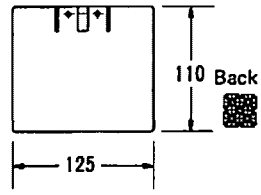
Work clamp blank 1-3R	t3.2	S02821-000
Work clamp blank 1-3L		S02822-000
Work clamp blank 1-4R	t4	S02823-000
Work clamp blank 1-4L		S02824-000
Work clamp blank 1-5R	t5	S02825-000
Work clamp blank 1-5L		S02826-000



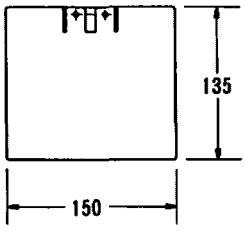
Work clamp blank 2-3R	t3.2	S02827-000
Work clamp blank 2-3L		S02828-000
Work clamp blank 2-4R	t4	S02829-000
Work clamp blank 2-4L		S02830-000
Work clamp blank 2-5R	t5	S02831-000
Work clamp blank 2-5L		S02832-000



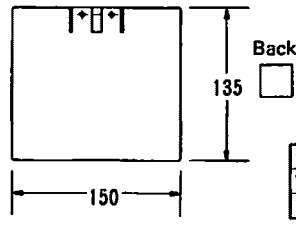
Work clamp blank 3-3	t3.2	S02833-000
Work clamp blank 3-4	t4	S02834-000
Work clamp blank 3-5	t5	S02835-000



Work clamp blank 4-3	t3.2	S02836-000
Work clamp blank 4-4	t4	S02837-000
Work clamp blank 4-5	t5	S02838-000

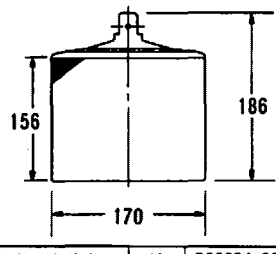


Work clamp blank 5-3	t3.2	S02839-000
Work clamp blank 5-4	t4	S02840-000
Work clamp blank 5-5	t5	S02841-000

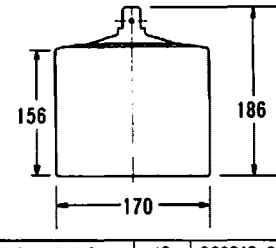


Work clamp blank 5-3A	t3.2	S02981-000
Work clamp blank 5-4A	t4	S02982-000
Work clamp blank 5-5A	t5	S02983-000

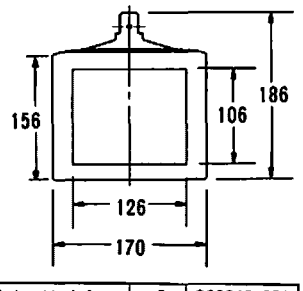
Feed plate blank



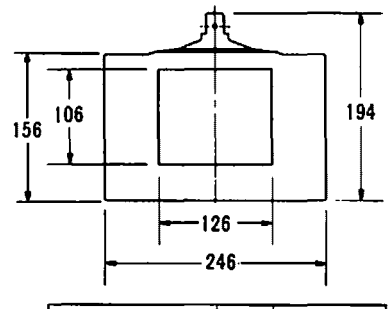
Feed plate blank 1	t1	S02234-000



Feed plate blank 2	t2	S02843-000
Feed plate blank 3	t1	S02844-000

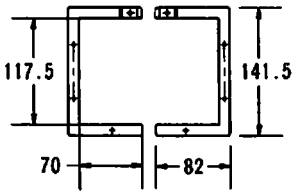


Feed plate blank 4	t2	S02842-001

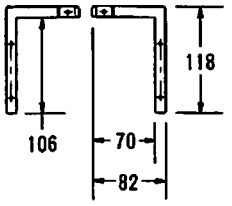


Feed plate blank 5	t2	S03309-000

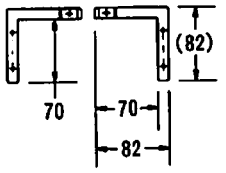
Cassette clamp



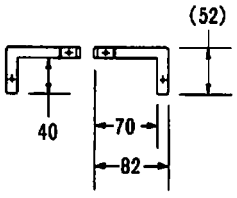
Cassette clamp 1R	t3.2	S02845-001
Cassette clamp 1L		S02846-001



Cassette clamp 2R	t3.2	S02847-001
Cassette clamp 2L		S02848-001

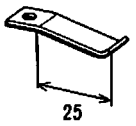


Cassette clamp 3R	t3.2	S02849-001
Cassette clamp 3L		S02850-001



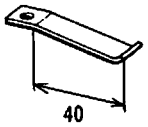
Cassette clamp 4R	t3.2	S02851-001
Cassette clamp 4L		S02852-001

Clamp spring



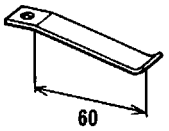
t 0.4

Clamp spring 1	S02853-001



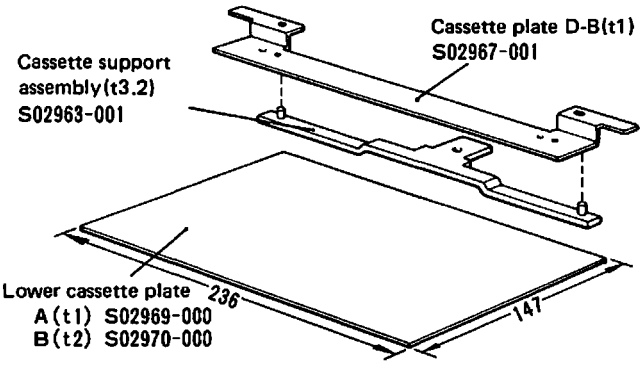
t 0.6

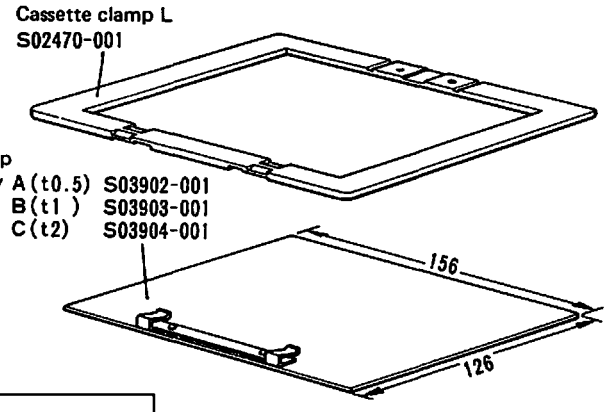
Clamp spring 2	S02854-001

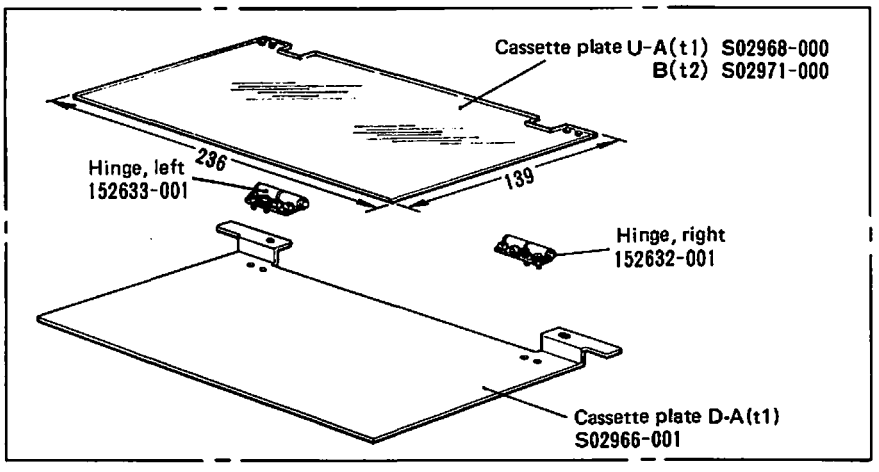


t 0.8

Clamp spring 3	S02855-001



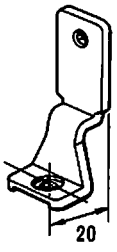




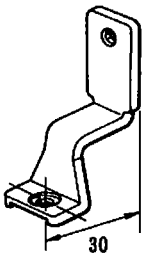
Cassette clamp A Assembly	S02959-001
Cassette plate U-A	S02968-000
Hinge, left	152633-001
Hinge, right	152632-001
Cassette plate D-A	S02966-001

Cassette clamp B Assembly	S02960-001
Cassette plate U-B	S02971-000
Hinge, left	152633-001
Hinge, right	152632-001
Cassette plate D-A	S02966-001

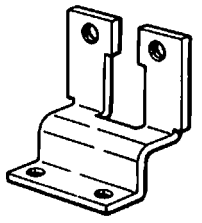
Presser foot



Presser foot L
S02469-001



Presser foot R
S02441-001



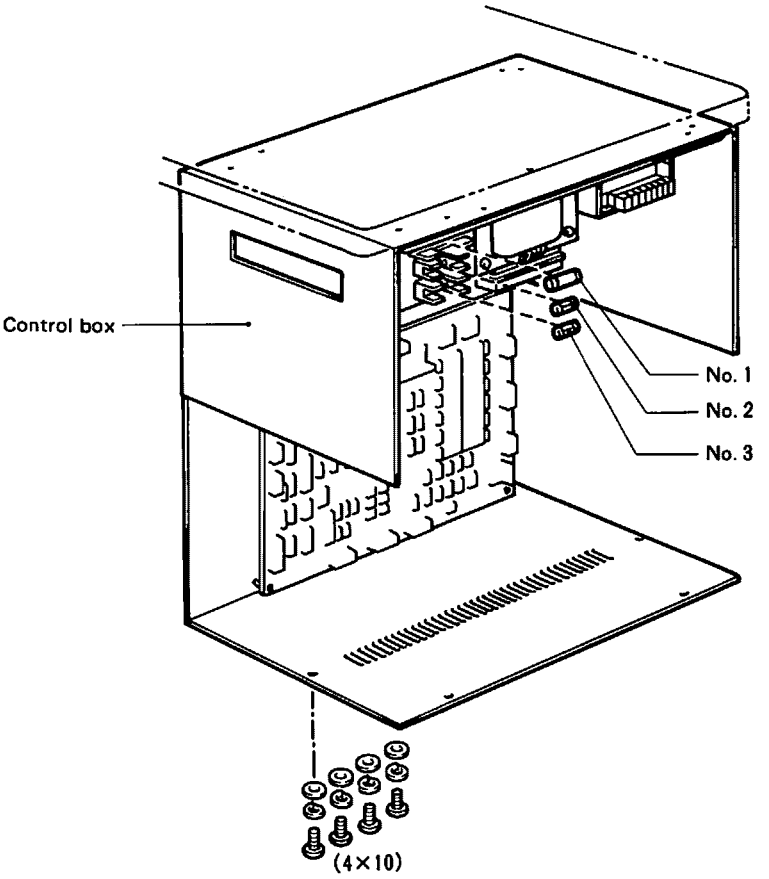
Presser foot MM
S05667-001

6 ADJUSTMENT OF ELECTRIC APPLIANCES

1 Description on fuse

1. Position of fuse

Open the control box cover. At the upper left is the fuse holder having three fuses, when viewed from the front.



2. Fuse capacity

No.	Type and capacity of fuses	Remarks
1	Cylindrical fuse: 5A–500V	For AC input
2	Glass tube fuse: 15A–125V	For pulse motor
3	Glass tube fuse: 15A–125V	For pulse motor, solenoid, and clutch and brake of sewing machine motor

3. Countermeasures when a fuse blows

For your reference, the following table shows phenomena when a fuse blows. Be sure to use a fuse with the same capacity as that of the blown one.

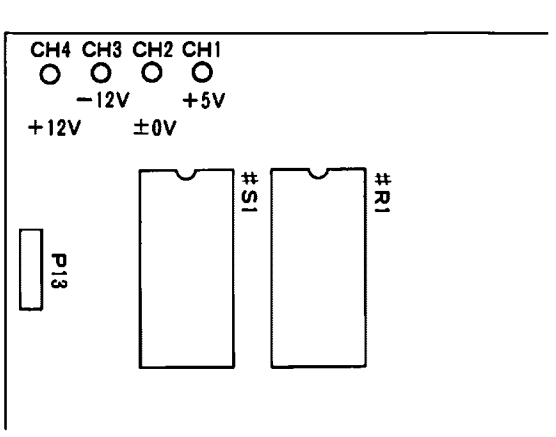
Fuse No.	Trouble encountered when a fuse blows	Reference page
1	○ No power lamp lights or works.	78 (#2)
2	○ The low torque of pulse motor causes the distorted or dislocated patterns. ○ The presser is easily moved by hand even when the motor is energized.	80 (#7)
3	○ No presser opens or closes. ○ The low torque of pulse motor causes feed malfunction only with noisy sound of motor.	79 (#5)

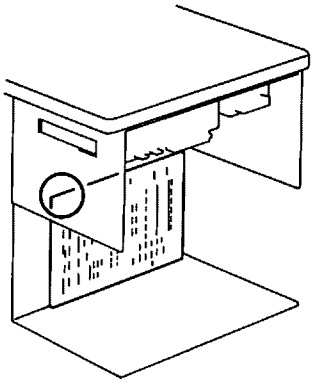
2 Voltage measurement

The following figures show where to measure voltage on the PCB and connectors.

1. Check for control voltage +5V, +12V and −12V

Measure voltage with a tester between check pins on the PCB; CH1—CH2, CH2—CH4 and CH2—CH3.





Check list 1

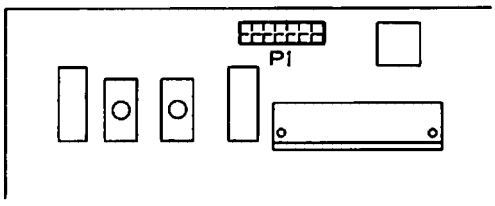
C H 1⊕ − C H 2⊖	5V DC ± 0.25V, acceptable
C H 4⊕ − C H 2⊖ C H 2⊕ − C H 3⊖	12V DC ± 0.5V, acceptable

2. Check for drive voltages V_L and V_H

(1) Remove the connector P1.

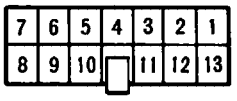
(2) Measure drive voltages V_L and V_H on the lead wire side of the connector P1 using a tester.

Note: Use a tester probe on the side of the lead.



Check list 2

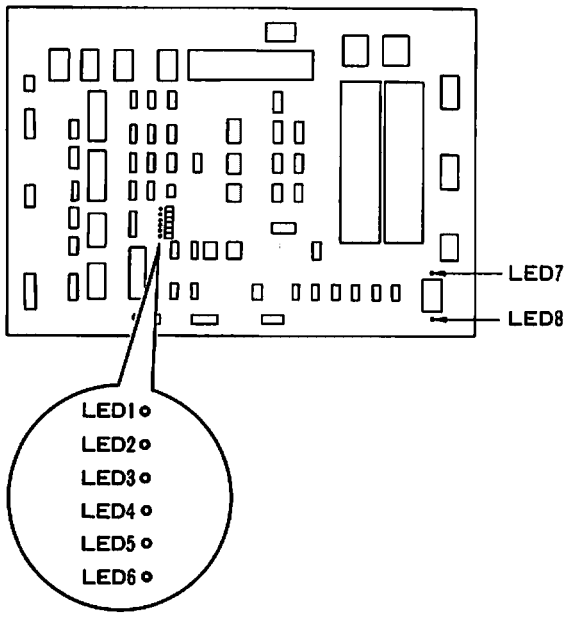
1 ⊕ – 3 ⊖	Approximately 44V DC, acceptable
2 ⊕ – 3 ⊖	Approximately 10V DC, acceptable



(Viewed from the lead wire side)

3 LEDs on PCB

On the PCB are eight LED lamps by which the operator can monitor control signals.



1. Monitoring solenoid output

The LEDs 1 through 6 light when each solenoid is turned ON.

LED 1: Right side of presser

LED 2: Presser foot

LED 3: Thread wiper

LED 4: Main presser

LED 5: Left side of presser

LED 6: Thread trimming

2. Monitoring output of brakes and clutches

LED 7 for clutch:

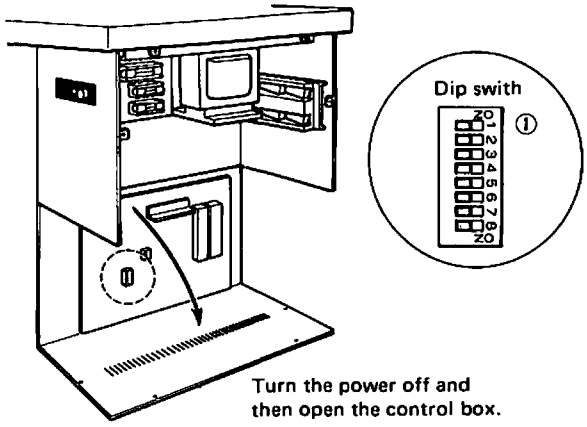
Lights while the sewing machine is rotating.

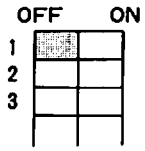
LED 8 for brake:

Lights momentarily when the sewing machine comes to a stop, accompanied by a braking sound.

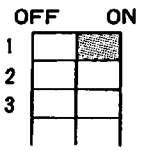
4 How to use the DIP switch

1. Changing selectors 1 through 3 of DIP switch ① located on the lower left of the control PCB varies the movement of the presser.

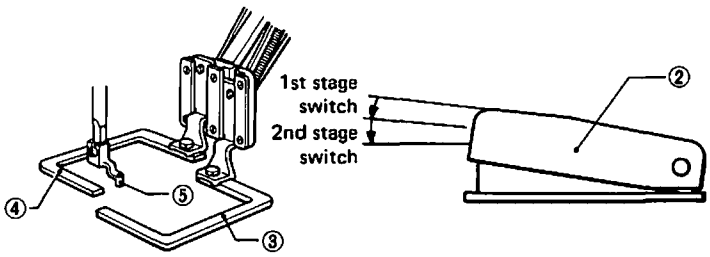




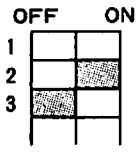
The presser is automatically raised after sewing.



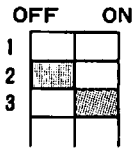
Raise the presser by pressing the work clamp lifter pedal after sewing.



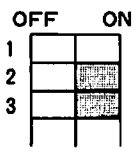
Pressing the work clamp lifter pedal ② raises the right presser ③, left presser ④, and presser foot ⑤ simultaneously. To lower them, turn the switches ON as shown below. (The work clamp lifter pedal ② is designed as a 2-stage switch.)



1st stage switch ON — the left presser ④ lowers.
2nd stage switch ON — the right presser ③ and presser foot ⑤ lower.

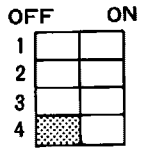


1st stage switch ON — the right presser ③ lowers.
2nd stage switch ON — the left presser ④ and presser foot ⑤ lower.

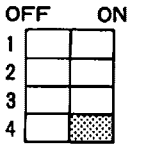


1st stage switch ON — the right presser ③ and left presser ④ lower.
2nd stage switch ON — the presser foot ⑤ lowers.

2. Selector 4 of DIP switch ① is used for selecting the electromagnetic type or pneumatic type.

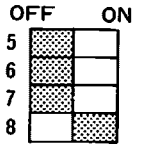


For electromagnetic type

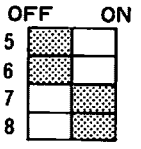


For pneumatic type

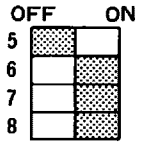
3. Selectors 5 through 8 of DIP switch ① serve as the test switch for the sewing machine motor.



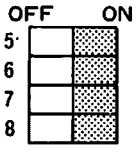
The sewing machine turns at approximately 230 spm (the thread trimming speed).



The sewing machine turns within a speed range of 400~1200 spm. The speed may be changed with the speed volume on the panel.



The sewing machine turns within a speed range of 550~1500 spm.



The sewing machine turns within a speed range of 850~2000 spm.

Selectors 5 through 8 are provided solely for testing the sewing machine controls. Be sure to set all of them OFF when the sewing machine is in normal use.

5 Description of each connector

Most of the sewing machine failures are due to connector problems such as improperly inserted connectors and faulty contact. Check to make sure that each connector is properly inserted and each pin comes in proper contact with each wire before troubleshooting. For your reference, the following table shows the symptoms resulting from connector failures.

*For the connector No., refer to the control circuit block diagram on page 70.

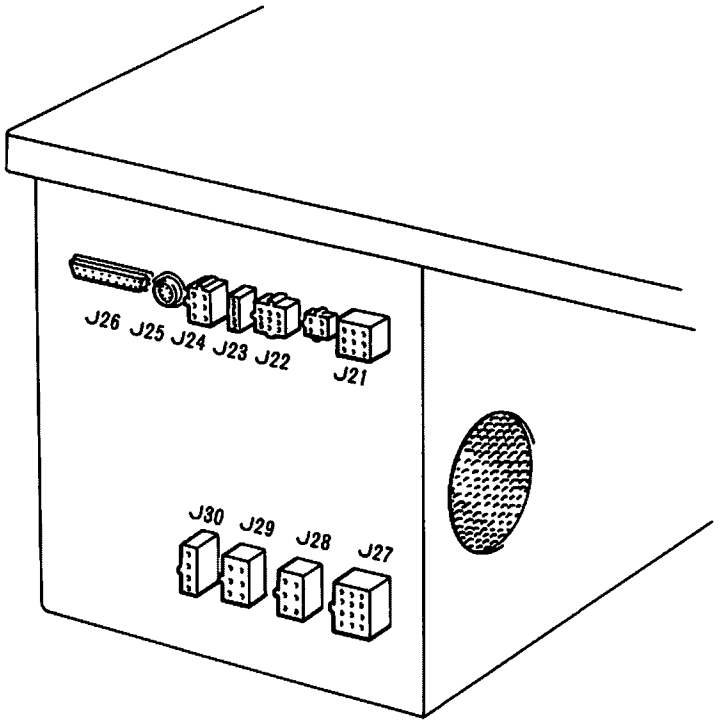
Connector No.	Connection	Main signal	Phenomenon resulting from improper contact
P 1 J 1	Power supply ↕ PCB	+ 5 V、+12V、−12V Drive voltage +44V +10V	○ Abnormal motion ○ No motion
P 2 J 2 | J 27 P 27	PCB ↕ Each solenoid	Solenoid drive power supply	○ Malfunction of presser, presser foot, thread wiper parts, main presser, and thread trimming parts.
P 3 J 3 | J 28 P 28	PCB ↕ X pulse motor	Pulse-motor drive power supply	○ Disorder in X direction. ○ Abnormal sound from X pulse-motor.
P 4 J 4 | J 29 P 29	PCB ↕ Y pulse motor	Pulse-motor drive power supply	○ Disorder in Y direction. ○ Abnormal noise from Y pulse motor
P 5 J 5 | J 30 P 30	PCB ↕ Brakes and clutches	Sewing machine starting and stopping currents	○ Abnormal rotation of sewing machine ○ Poor stop of sewing machine
P 6 J 6 | J 21 P 21	PCB ↕ Synchronizer	+ 5 V Needle top position, synchronizing, and rotation signals	○ The sewing machine turns at high speed and stops. (The emergency stop lamp lights.) ○ The mechanism does not stop above the needle top position. ○ The sewing machine turns but the feed mechanism does not work.
P 7 J 7	PCB ↕ Switch panel	+ 5 V Speed volume signal	○ The power lamp does not light. ○ Even though the speed volume is turned, the sewing machine keeps turning at a constant speed of 2000 spm.
P 8 J 8 | J 25 P 25	PCB ↕ Programmer	Key switch signal Display signal	○ Malfunction of programmer

Connector No.	Connection	Main signal	Phenomenon resulting from improper contact
P 9 J 9 | J 26 P 26	PCB ↕ FMC device	Read and write signals of microdisk	○ The microdisk will not read. ○ Switches for data, step-back, and tests will not function.
P 10 J 10 | J 24 P 24	PCB ↕ Original point PCB	X and Y original-point signals	○ The original point is not detected.
P 11 J 11 | J 23 P 23	PCB ↕ Emergency stop switch	○ Emergency stop switch signal ○ LED signal	○ An emergency stop is not initiated. ○ The emergency stop lamp is turned ON but is not released.
P 12 J 12 | J 22 P 22	PCB ↕ Pedal switch	○ Start signal ○ Work clamp lifter signal	○ The work clamp lifter and start switches will not work when their pedals are pressed.

6 Description on control box

1. Connection of connectors

The rear face of the control box:



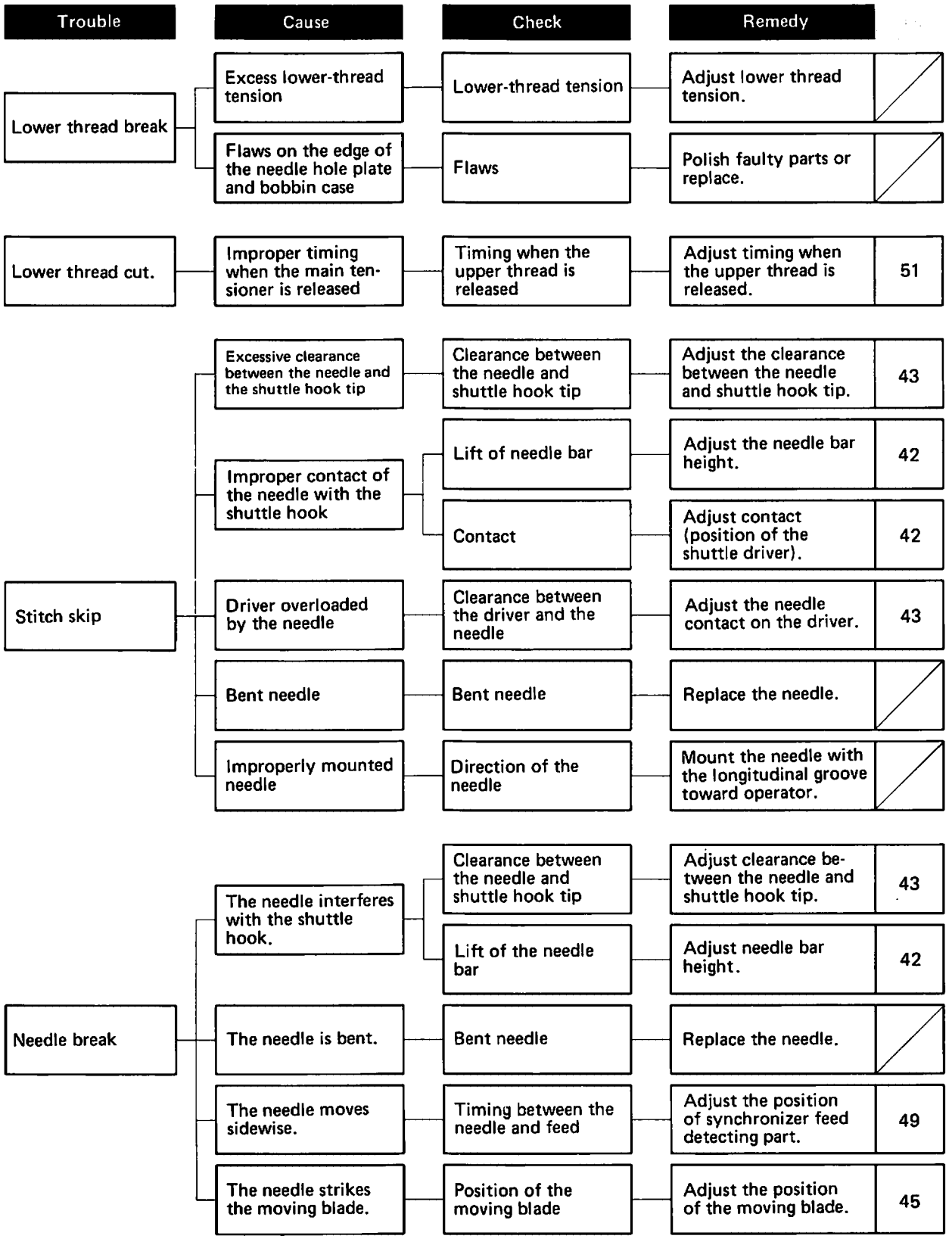
J21 : Synchronizer connector
J22 : Foot-switch connector
J23 : Emergency stop connector
J24 : Original point signal connector
J25 : Programmer connector
J26 : FMC device connector
J27 : Solenoid connector
J28 : X pulse motor connector
J29 : Y pulse motor connector
J30 : Clutch and brake connector

2. Fan motor

The fan motor cools the inside of the control box. Make sure that the fan is working: if not, the electronic parts may be damaged. Regularly clean the fan equipment so that the air inlet does not become clogged.

7 TROUBLESHOOTING LIST

Trouble	Cause	Check	Remedy	Page
Inadequate work clamp lift	Improperly positioned lever plate	Distance between the upper surface of the needle plate and the work clamp	Adjust the work clamp height.	45
	Improperly positioned work clamp lifter plate	Clearance between the work clamp lifter plate and arm	Adjust clearance to 2 mm with the adjusting screw.	45
Malfunction of thread wiper	Interference between the thread wiper and the needle	Clearance between the thread wiper and needle tip	Adjust height of the thread wiper.	48
		Sewing machine stop position	Adjust the stop position. (19~20 mm above the needle and the upper face of the needle plate)	49
	Improperly positioned thread wiper	Thread wiper position	Adjust the position where the thread wiper starts working.	48
Improper quantity of wound lower thread	Improperly positioned bobbin holder	Quantity of wound thread	Adjust the position of the bobbin holder.	
Thread escape	Variations in needle thread length	Sub-tension	Adjust sub-tension.	
Upper thread break	Excess upper thread tension	Upper thread tension.	Adjust upper thread tension.	
	Improperly mounted needle	Direction of the needle	Mount the needle with the longitudinal groove toward operator.	
	The thread is too thick for the needle.	Thread and needle	Select a thread of the proper size so it will match the needle.	
	Improper strength and height of the thread take-up spring	Strength and height of the thread take-up spring	Adjust the strength and height of the thread take-up spring.	
	Flaws and burrs on the shuttle hook, needle hole plate, needle, etc.	Flaws and burrs	Polish faulty parts or replace.	
	Thermal cut	Thread end	Use liquid (silicone) cooling equipment.	

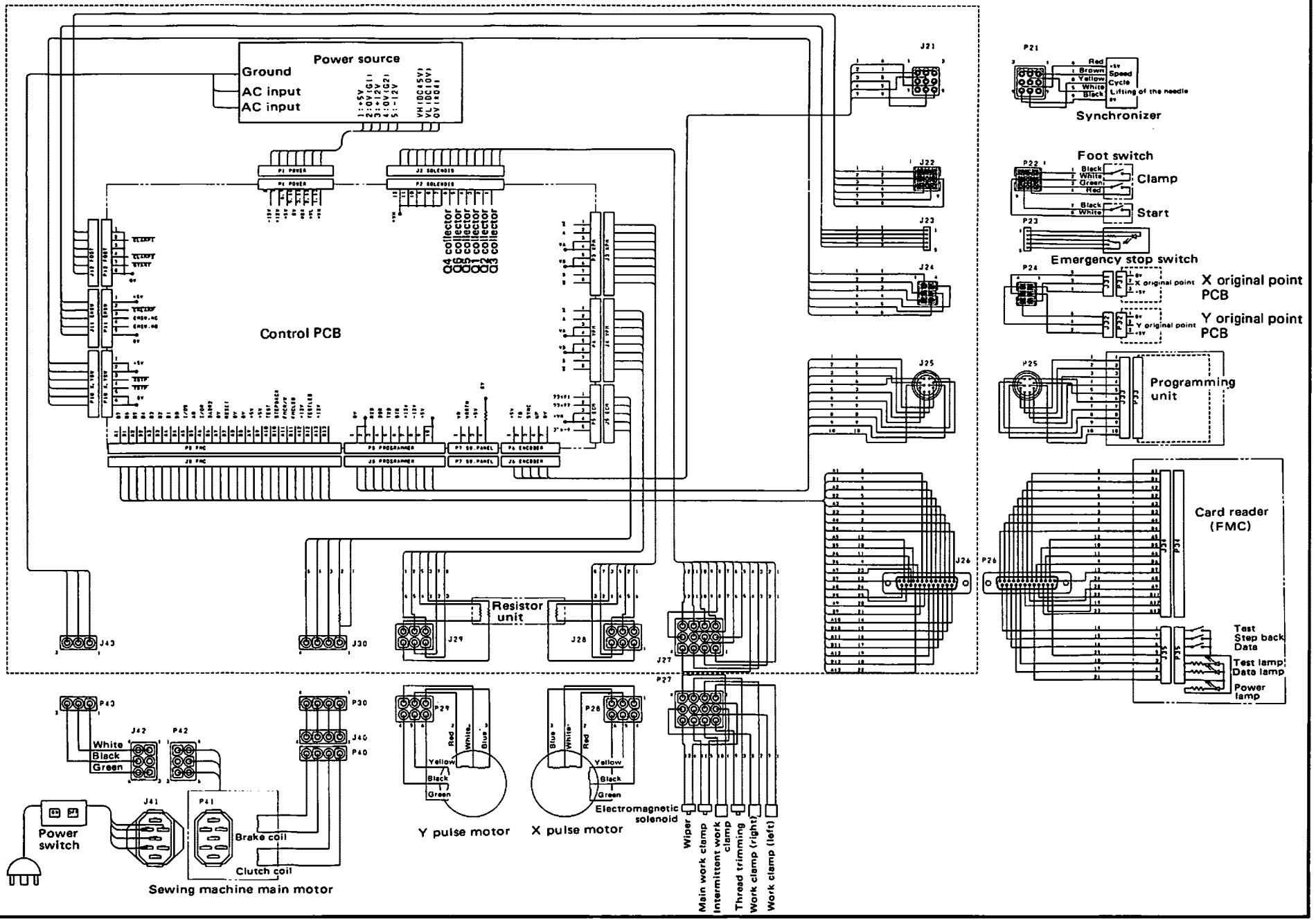


Trouble	Cause	Check	Remedy	Page
The upper thread is not cut.	Dull fixed blade	Fixed-blade edge	Sharpen the fixed blade or replace with a new one.	
	Insufficient moving-blade motion due to weak thread trimming spring pressure	Thread trimming spring pressure	Replace the thread trimming spring with a stranger one, B.	
	The moving blade will not catch upper thread.	Position of the shuttle hook thread guide	Adjust the position of the shuttle hook thread guide.	44
		Direction of seams of the final stitch	Adjust so that the stitch ends in the proper seam direction.	
	The moving blade will not catch upper thread because the final stitch skips.	Skipping of the final stitch	Refer to the item, "stitch skip."	67
	Improperly positioned moving blade	Position of the moving blade	Adjust the position of the moving blade.	45
	Improper timing when the main tensioner is released	Timing for releasing the upper thread	Adjust the release timing for the upper thread.	51
Poorly tightened thread	Excessively weak upper-thread tension	Upper thread tension	Adjust upper-thread tension.	
	Excessively weak lower-thread tension	Lower-thread tension	Adjust lower-thread tension.	
	Improper strength and height of the thread take-up spring	Strength and height of the thread take-up spring	Adjust strength and height of the thread take-up spring.	

8 SPARE PARTS LIST

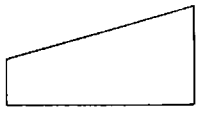
Item	Thin and medium-thick material		Thicker material	
Needle 	Needle DP×5 #9	107415-009	Needle DP×17 #14	145646-014
	Needle DP×5 #11	107415-011	Needle DP×17 #16	145646-016
	Needle DP×5 #14	107415-014	Needle DP×17 #18	145646-018
	Needle DP×5 #16	107415-016	Needle DP×17 #19	145646-019
	Needle DP×5 #18	107415-018	Needle DP×17 #21	145646-021
	Needle DP×5 #19	107415-019	Needle DP×17 #24	145646-024
	Needle DP×5 #21	107415-021	Needle DP×17 #25	145646-025
Needle hole plate 	Needle hole plate A (φ1.6 for thin material)	S02371-001	Needle hole plate E (φ2.6 for extremely thick material)	S02372-001
	Needle hole plate F (φ2.2 for medium-thick material)	S02373-001		
Shuttle hook 	Shuttle hook A	152685-001	Shuttle hook B	152687-001
Shuttle race ring 	Shuttle race ring A	152682-001	Shuttle race ring B	152686-001
Thread take-up spring 	Thread take-up spring	145519-001	Thread take-up spring B	144588-001
Thread tension spring 	Thread tension spring	104525-001	Thread tension spring	107606-001

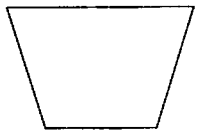
Caution: Needle and needle-hole plate must be properly selected to match the thread and material to be sewn.

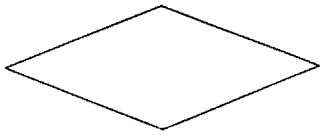


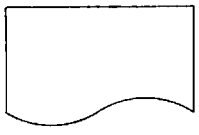
10 TROUBLESHOOTING FLOW CHART

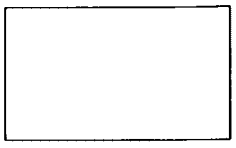
Description of Symbols

1.  means "manual operation."

2.  means "switch operation."

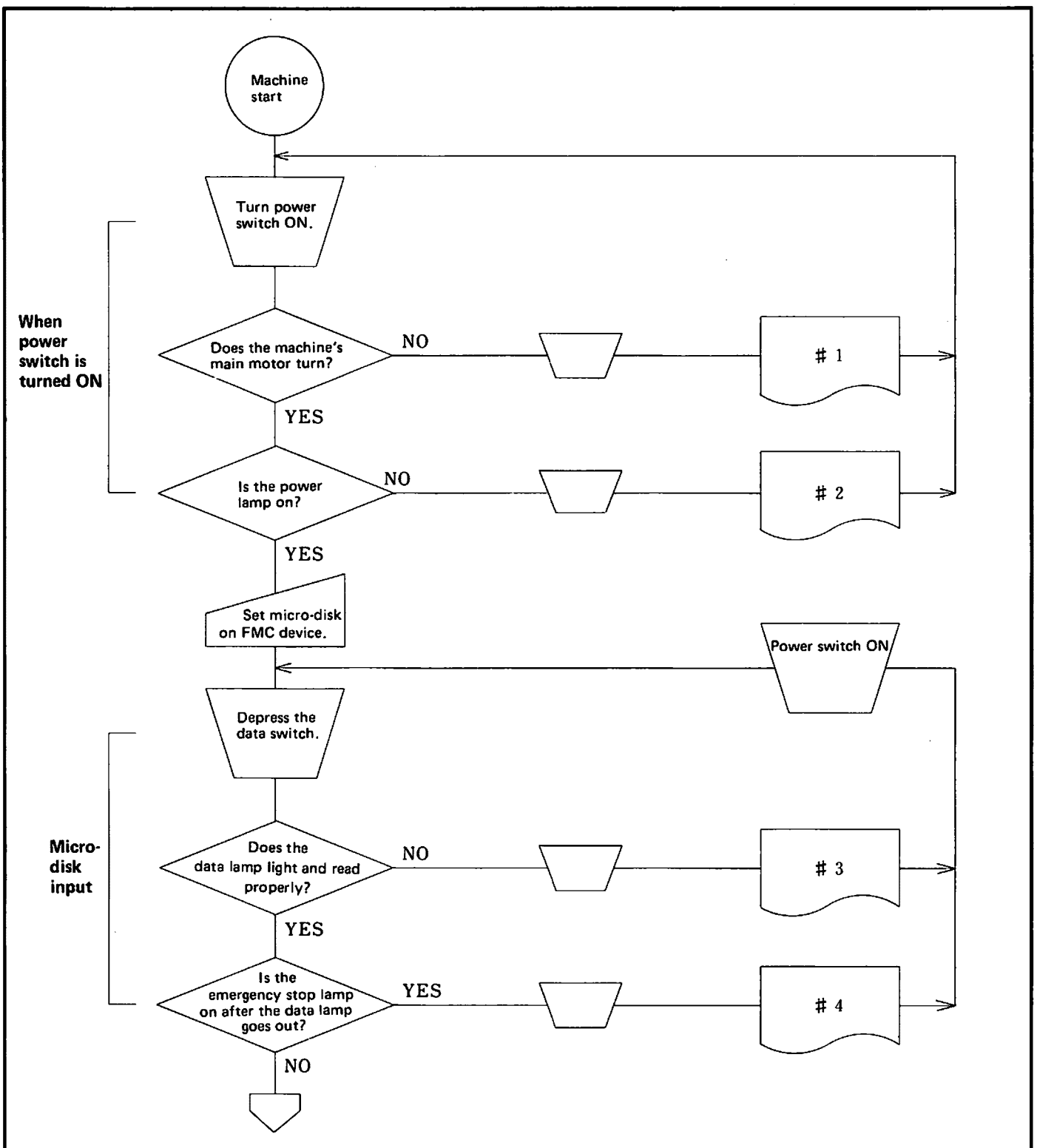
3.  means "decision."

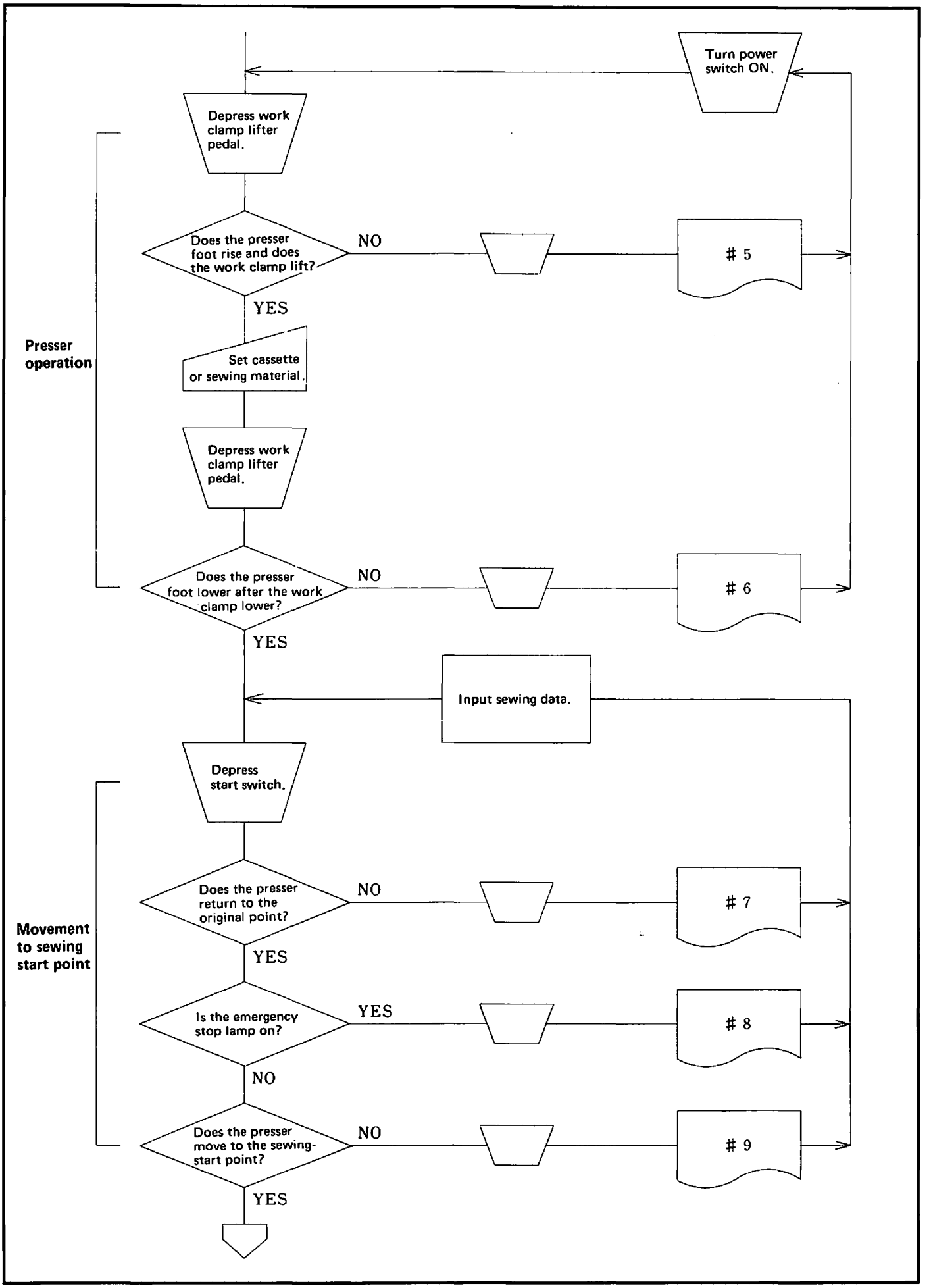
4.  means "refer to Abnormal Item No." in the first column of the list, Chapter 11 COUNTERMEASURES.

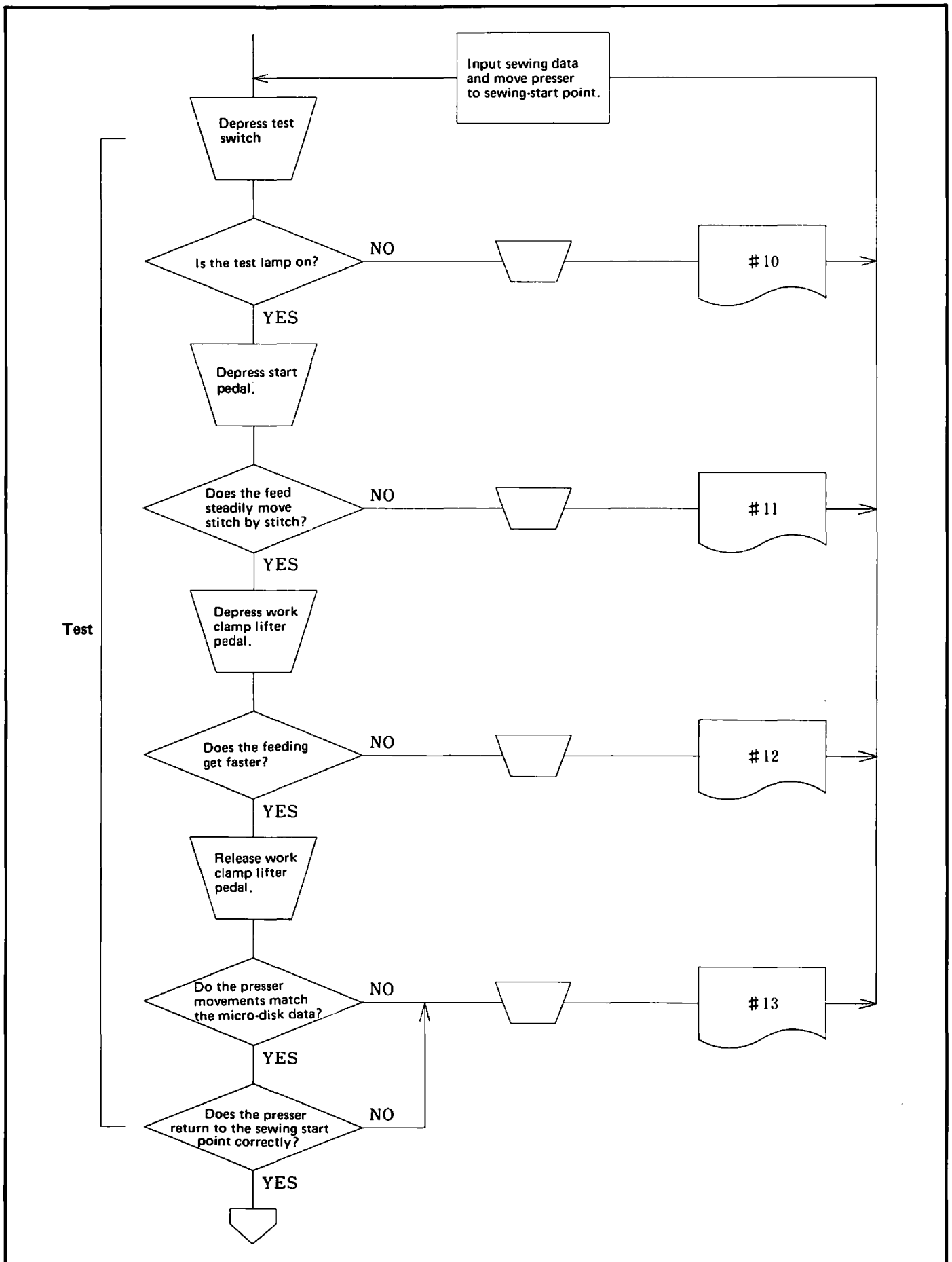
5.  means "set-up of conditions or situation."

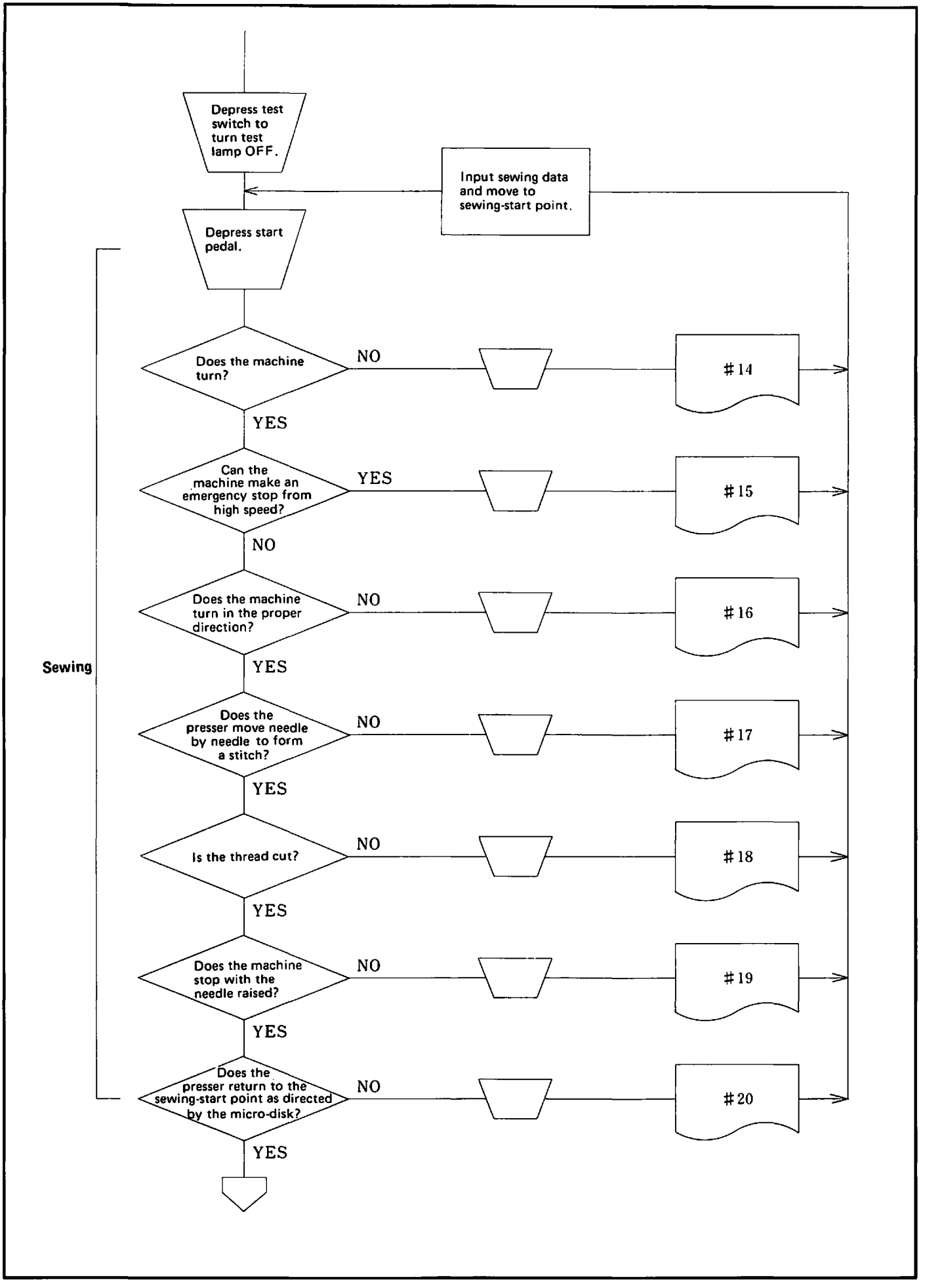
6.  means "continue to next page."

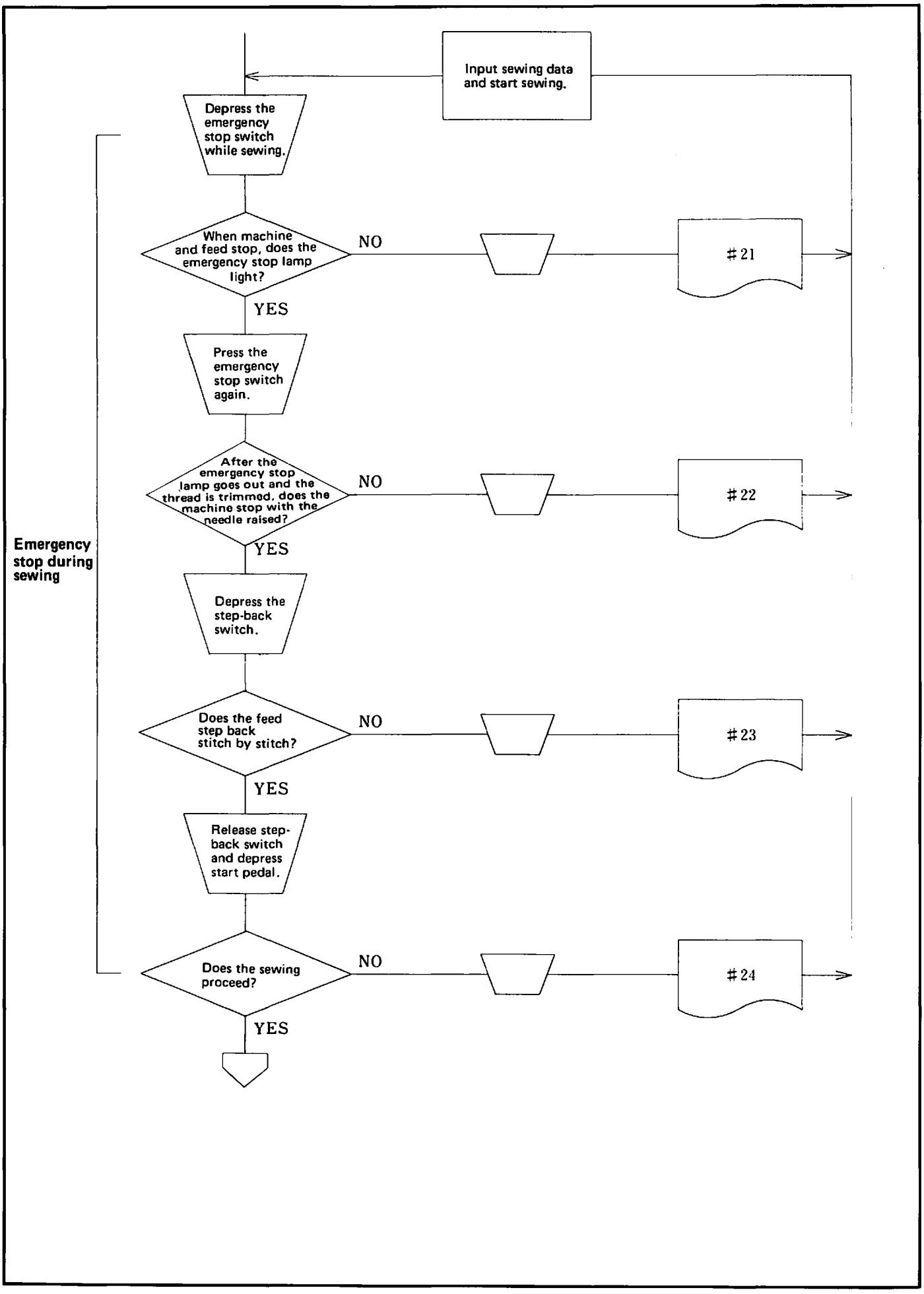
7.  means "switch-off of power supply."

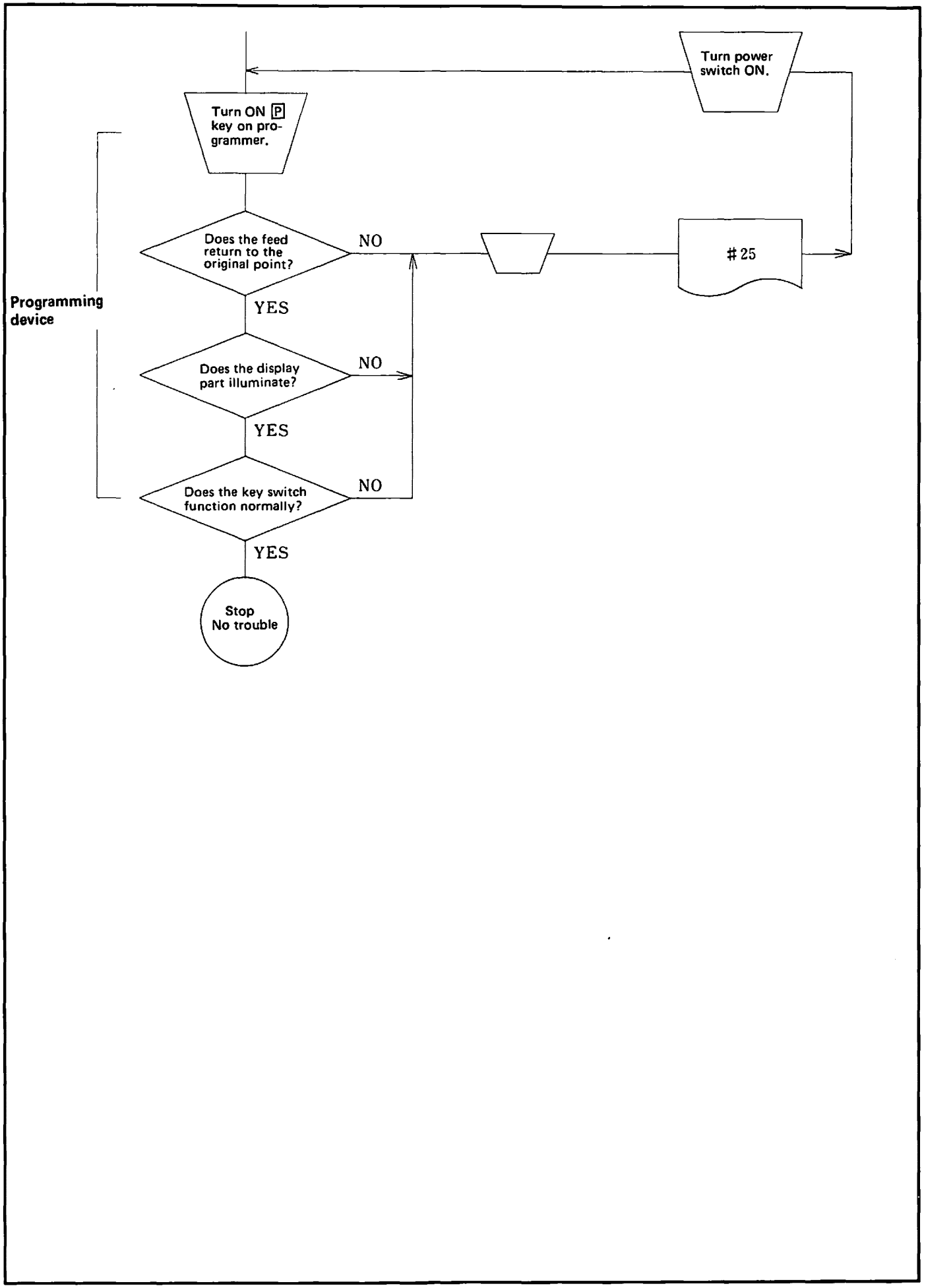












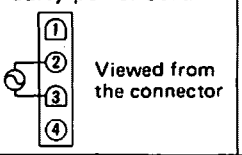
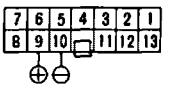
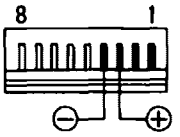
11 COUNTERMEASURES

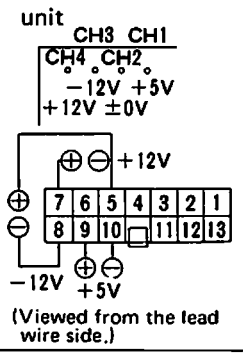
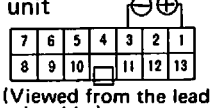
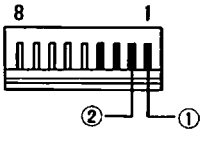
Caution on Diagnosis:

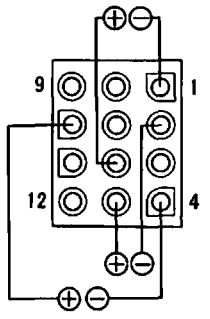
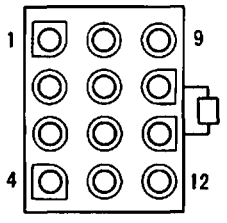
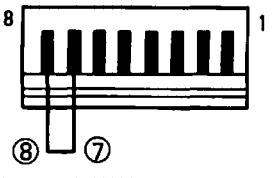
1. Be sure to turn the power switch OFF before plugging and unplugging the power cord.
2. Turn the power switch OFF before opening the cover.
3. When symbols (a, b, c, etc.) appear in a circle (○), turn the power switch OFF and measure the resistance. When in a box (□), turn the power switch ON and measure the voltage.
4. When replacing a fuse, be sure to use a new one of the same quality and with the same capacity as the old one.

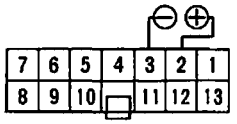
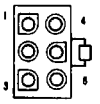
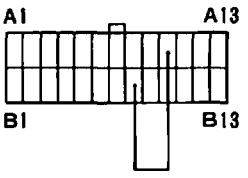
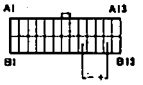
■ Before Adjustment:

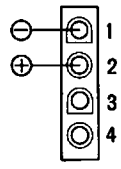
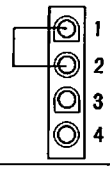
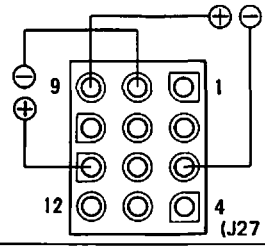
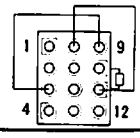
1. Check for blown fuses.
2. Check to see if each plug is properly inserted.
3. Refer to the Flow Chart to identify the status (#1 ~ 25) from which a problem occurs.

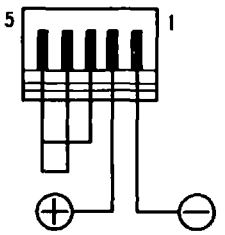
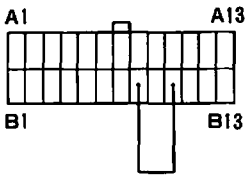
Type of trouble	Cause	Check/Repair/Adjustment	Parts to be replaced	Page
#1 **Machine's main motor will not turn when power switch is turned ON**	1. Power is not ON.	a. Check the 3-phase power supply. b. Check the 3-phase plug to make sure it is properly connected. Check the grounding wire connections because bad connection results in single-phase operation.		
	2. Faulty power switch and cord	ⓐ With the power plug and reverse J41 plugs pulled out, turn power switch ON. Check for continuity between the power plug and the J41 plugs (red, white, black and green) using a tester. The power switch and cord are acceptable if they pass the continuity check.	Power switch and cord	70
#2 **Power lamp will not light when power switch is turned ON**	1. Faulty power cord  Viewed from the connector	[a] With the power connector P43 unplugged from the control box, turn the power switch ON and measure the voltage. An acceptable voltage is 200 V AC.	Power cord	70
	2. Blown fuse	ⓐ Remove the fuse No. 1 and check for continuity. It is acceptable if there is continuity.	Tube fuse 5A	58
	3. Faulty power supply unit 	[a] Remove connector J1 from the PCB. Turn the power ON and measure the voltage. The control box is acceptable if the value is +5 V. Note: Use a tester probe on the side of the lead wire.	Control box	
	4. Faulty control PCB	[a] If the power supply unit was found normal in Item 3, plug the connector J1 into the PCB. Turn the power ON and measure the voltage between CH1 (+) and CH2 (−). The control PCB is acceptable if the voltage is +5 V.	Control PCB	59
	5. Faulty lamp (LED) or cord 	ⓐ Remove connector J7 from the PCB and measure the voltage. The panel assembly is acceptable if a pointer moves to the maximum range of magnification.	Panel assembly	70

Type of trouble	Cause	Check/Repair/Adjustment	Parts to be replaced	Page
#3 **The data lamp will neither light nor read when the data switch is depressed**	1. Faulty connector contact	a. Check connectors P9 · J9, and P26 · J26 for poor connection, disconnection, and faulty pins.		
	2. Faulty power supply unit  (Viewed from the lead wire side.)	[a] Turn the power ON and measure the voltages between check pins 1, 2, 3 and 4. The acceptable voltages are +5V (1-2), +12V (2-3) and −12V (3-4). [b] Remove connector J1. Turn power ON and measure voltage. The acceptable voltages are as follows: No. 9 ⊕ − No. 10 ⊖ 5 V DC No. 7 ⊕ − No. 5 ⊖ 12 V DC No. 8 ⊖ − No. 5 ⊕ 12 V DC	Control box	59 70
	3. Faulty control PCB	a. Turn the power ON and press the emergency stop switch. The control PCB is acceptable if the emergency stop lamp lights the first time the switch is pressed and goes out the next time the switch is depressed. b. Press the work clamp lifter pedal. If the presser works normally, the control PCB is good.	Control PCB	
	4. Faulty foot switch	a. When the power is turned on, the work clamp will automatically work, which means that the foot switch is faulty. b. Remove connector P22 from the control box and press the data switch. If the data switch functions normally, the foot switch is responsible for the trouble.	Start switch (adjustment of 2-stage switch)	
	5. Faulty FMC device	a. Replace the FMC.	FMC device	
#4 **Emergency stop lamp lights several seconds after data switch is depressed**	1. Faulty micro-disk	If other micro-disks are read normally, the micro-disk is responsible for the trouble.	Micro-disk	
	2. Faulty FMC device	Replace the faulty FMC device.	FMC device	
	3. Faulty control PCB	Replace the faulty control PCB.	Control PCB	
#5 **Work clamp will not rise when the work clamp lifter pedal is depressed**	1. Blown fuse	ⓐ Remove fuse No. 3 and check for continuity. It is acceptable subject to continuity.	Fuse No. 3 (15A)	58
	2. Faulty power supply unit  (Viewed from the lead wire side.)	[a] Turn the power ON with the connector J1 plugged into the PCB. Measure the voltage. An acceptable voltage is approximately 44V DC.	Control box	70
	3. Faulty switch and cord  	ⓐ Remove connector J12 from the PCB to check for continuity. Acceptable if resistance is 0Ω when pedal switch is ON: ∞Ω when pedal switch is OFF.	Work clamp lifter switch or cord	70

Type of trouble	Cause	Check/Repair/Adjustment	Parts to be replaced	Page
#5 **Work clamp will not rise when the work clamp lifter pedal is depressed**	4. Faulty PCB  (J27 viewed from the pin side)	a. Refer to #3-3, a. b. The control part is good if LED's 1, 2 and 5 light when the pedal is depressed. [c] Turn the power ON with connector P27 unplugged. Press the pedal to turn ON LED's 1, 5, 6. Measure the voltage applied to J27 using a tester. No. 1 ⊖ – No. 7 ⊕ No. 2 ⊖ – No. 8 ⊕ ○ Solenoid type: Acceptable if approximately 15V DC is measured. ○ Pneumatic type: Acceptable if approximately 44V DC is measured. ○ No. 4 ⊖ —No. 10 ⊕ : Acceptable if approximately 15V DC is measured.	Control PCB	70 65
	5. Faulty solenoid  (J27 viewed from the pin side)	ⓐ Measure resistance with connector J27 unplugged. Acceptable value for the resistance is: No. 1 – No. 7 : Approximately 15 Ω No. 2 – No. 8 : Approximately 15 Ω No. 4 – No. 10: Approximately 15 Ω	Solenoid	70 65
#6 **Work clamp will not lower when work clamp lifter pedal is pressed**	1. Faulty pedal switch (Faulty 2-stage switch)	a. Make sure the work clamp lowers when the power is turned OFF. If the power is turned ON and the work clamp rises without being manually operated, a faulty pedal switch should be suspected. If the work clamp lowers when the pedal is pressed, but raises again when the pedal is released, the pedal switch is responsible for the trouble. b. See #5-5.a.	Foot switch (adjustment of 2-stage switch)	
#7 **The presser will not return to the original point when the start pedal is depressed**	1. Faulty start switch and cord  	a. If the presser will not move at all, plug in connectors J12–P12 and J22–P22 once again. ⓑ Check for continuity with connector J12 removed. An acceptable resistance is ∞Ω between ⑦ and ⑧. The resistance should be 0Ω when the start pedal is turned ON.	Foot switch	70
	2. Erroneous original point signal	a. If the presser moves in the reverse direction and rasps noisily, an erroneous signal may be responsible. b. Plug in connectors J10–P10, J24–P24, J31–P31 and J32–P32 once again. c. Remove the pulse-motor connectors P28 and P29 from the control box and turn the power ON. Manually move the feed near the original point. The LED on the original point PCB should blink. d. Check to see if light is striking the sensor on the original point PCB (the Y original point in particular).		70
	3. Blown fuse	ⓐ Check for continuity with fuses No. 2 and No. 3 removed.	Fuse 15 A	58

Type of trouble	Cause	Check/Repair/Adjustment	Parts to be replaced	Page
#7 **The work clamp will not return to the original point when the start pedal is depressed**	4. Faulty power supply unit  (Viewed from the lead wire side.)	a. Refer to #5-2, a. [b] Measure the voltage at connector J1. An acceptable value is 10V DC between 2 ⊕ and 3 ⊖.	Control box	70
	5. Faulty pulse-motor and cord 	ⓐ Remove connectors P28 and P29 from the control box and measure the resistance. An acceptable resistance value is approximately 0.5Ω between 1 – 2, 1 – 3, 4 – 5, and 4 – 6.	Pulse-motor assembly	70
	6. Faulty control PCB	Replace the control PCB.	Control PCB	
#8 **Emergency stop lamp lights after presser moves to the original point**	1. Faulty micro-disk	Insert a good micro-disk.		
#9 **The work clamp will not move to sewing start point**	1. Faulty micro-disk	Use other micro-disks. If they work normally, the micro-disk is responsible for the problem.	Micro-disk	
	2. Faulty control PCB	Replace the control PCB.	Control PCB	
#10 **Test lamp will not light when test switch is pressed**	1. Faulty test switch and faulty cord  	ⓐ Remove the connector J9 from the PCB and check for continuity. Acceptable if resistance between A10 – B8 is ∞Ω or 0Ω when test switch is turned ON.	FMC device	70
	2. Faulty test lamp and cord 	ⓐ Remove connector J9 from the PCB and check for continuity. The pointer should move to the range of maximum magnification. B12 ⊕ – B9 ⊖	FMC device	70
	3. Faulty control PCB	Replace the control PCB.	Control PCB	
#11 **The feed is not effected during the test**		Refer to #7-1, 3, 4, 5 and 6. (See pages 80 and 81.)		
#12 **Rapid feed can not be used during the test**	1. Faulty work clamp lifter pedal switch	Refer to #5-3. (See page 79.)		

Type of trouble	Cause	Check/Repair/Adjustment	Parts to be replaced	Page
#13 The feed does not move as programmed during the test	1. Feed mechanism is improperly adjusted.	Adjust so that the feed moves smoothly by hand.		
	2.	Refer to #7-1, 3 ~ 6. (See pages 80 and 81.)		
#14 Machine stops turning during sewing	1. Faulty cord	Check connectors J5 – J30, and P30 – J40 for continuity.	ECM harness	
	2. Faulty control PCB 	a. Turn power ON and turn ON selector 8 on DIP switch on the PCB. LED 7 should light. [b] Remove P30 from the control box and do the same as a. (above), measure the voltage at J30. An acceptable voltage is approximately 44V DC between 1 ⊖ – 2 ⊕.	Control PCB	61 60 62
	3. Faulty machine main motor 	a. Check to see if the main motor is turning. (b) Remove connector J40 and check P40 for continuity. An acceptable resistance is approximately 7Ω between 1 – 2.		70
#15 During operation the machine starts turning at high speed and then makes an emergency stop.	1. Faulty synchronizer and cord	a. Check connectors P6–J6 and J21–P21. b. Replace the synchronizer.	Synchronizer assembly	70
#16 Machine turns in reverse direction	1. Connector plugged in reverse	Correctly plug in power connector J41, which leads to the machine motor.		70
#17 Machine turns but presser will not move	1. Faulty synchronizer and cord	Refer to #15. *When this failure occurs, tests are normally performed		
#18 Thread will not be trimmed	1. Faulty synchronizer and cord	Refer to #15.		
	2. Faulty PCB  (J27 viewed from the lead wire side)	[a] Perform the thread trimming with the connector P27 plugged into the control box. Remove the connector cover and measure the voltage by using a probe on the lead wire side. 9 ⊕ – 3 ⊖ and 11 ⊕ – 5 ⊖ The voltage should momentarily register approximately 30V DC during thread trimming.	Control PCB	70
	3. Faulty thread trimming solenoid, work clamp lifter solenoid and cord 	(a) Remove connector P27 from the box and measure the resistance. An acceptable resistance is approximately 7Ω between 3 – 9; 14Ω between 5 – 11.	Thread trimming solenoid assembly Work clamp lifter solenoid assembly	70

Type of trouble	Cause	Check/Repair/Adjustment	Parts to be replaced	Page
#19 Mechanism will not stop above the needle after thread trimming	1. Improperly adjusted synchronizer	If the machine stops but the needle is positioned at random, adjust the position from which the signal is raised.		49
	2. Faulty PCB	The LED 8 on the PCB should light momentarily and the motor brake should click after thread trimming stops.	Control PCB	
#20 Pattern is not formed as programmed		Refer to #13. (See page 82.)		
#21 Machine will not stop when emergency stop switch is pressed	1. Faulty emergency stop switch and cord 	ⓐ Remove connector J11 from the PCB and check for continuity. An acceptable resistance is: Between 3-5: 0Ω, ∞Ω if switch ON Between 4-5: ∞Ω, 0Ω if switch ON Between 1 ⊖ – 2 ⊕: The probe moves to the range of the maximum magnification.	Emergency stop switch assembly	70
#22 Thread is not trimmed when emergency stop switch is release		Refer to #18 and #19. (See pages 82 and 83.)		
#23 Step-back switch will not function	1. Faulty step back switch and cord 	ⓐ Remove connector J11 from the PCB and check for continuity. An acceptable resistance is: Between 3-5 : 0Ω, ∞Ω if switch ON Between 4-5 : ∞Ω, 0Ω if switch ON Between 1 ⊖ – 2 ⊕: The probe moves to the range of the maximum magnification.	FMC device	70
#24 The machine stops during sewing		Refer to #13 and #14. (See page 82.)		
#25 Program can not be executed	1. Faulty connector and cord	Plug in connectors J8 and P25 correctly.		70
	2. Faulty programmer	Replace the programmer.	Progammer	
	3. Faulty control PCB	Replace the control PCB.	Control PCB	

BROTHER INDUSTRIES, LTD.

HEAD OFFICE: No. 35, 9-CHOME.
HORITA-DORI, MIZUHO-KU, NAGOYA, JAPAN 467
CABLE: BROTHER NAGOYA,
TELEX: BROTHER 4473696J & J59743

Printed in Japan
I 5100214 F②