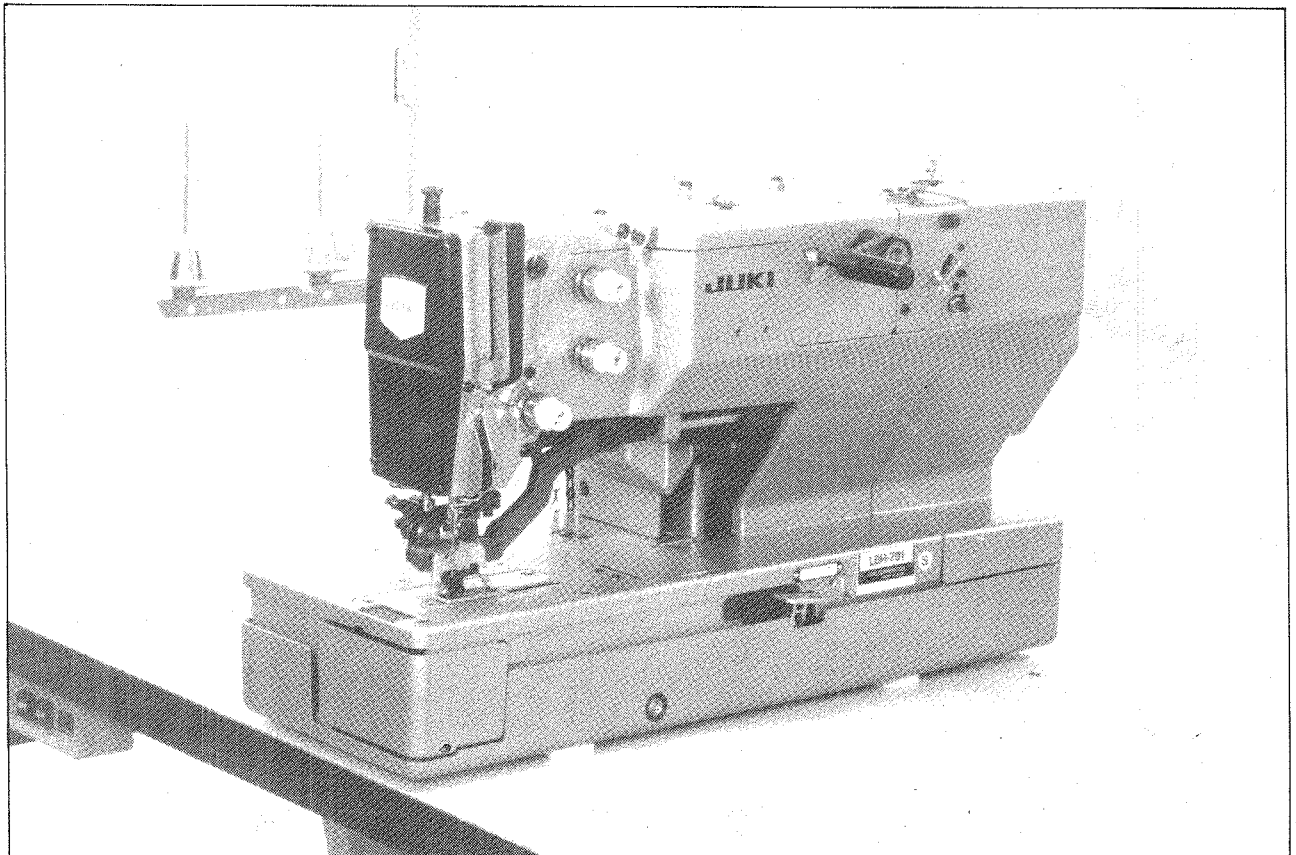


JUKI

High-Speed, 1-Needle Lockstitch Straight
Buttonholing Industrial Sewing Machine

LBH-790 Series

ENGINEER'S MANUAL



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PREFACE

This engineer's manual is written for the technical personnel who are responsible for the service and maintenance of the sewing machines. This manual describes "HOW TO ADJUST," "RESULTS OF IMPROPER ADJUSTMENT," and other functions which are not covered by the Instruction Manual intended for the maintenance personnel and sewing operators at a sewing factory.

All personnel engaged in repair of LBH-791S and LBH-791S-1 are required to carefully read "STANDARD ADJUSTMENTS" which contains important information on the maintenance of LBH-791S and LBH-791S-1.

The "STANDARD ADJUSTMENTS" consists of two parts; the former part presents illustration and simplified explanation for the convenience of reconfirmation of the required adjustment values in carrying out actual adjustment after reading this manual once; and the latter part provides "RESULTS OF IMPROPER ADJUSTMENT" in which sewing and/or mechanical failures, and the correcting procedures are explained for those persons who perform such adjustment for the first time.

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1. SPECIFICATIONS

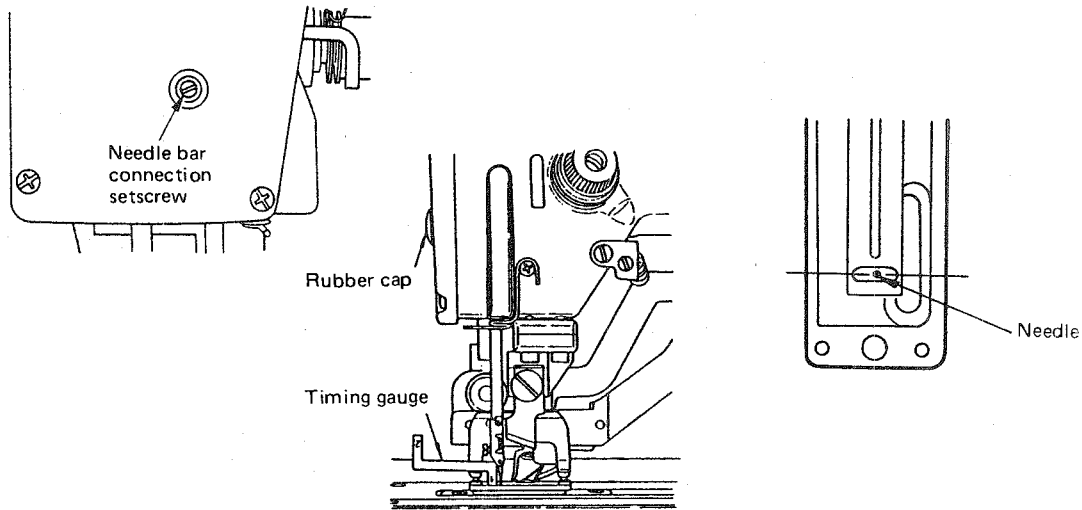
1	Buttonhole dimension				
	Model	LBH-791S LBH-791S-1	LBH-792S LBH-792S-1	LBH-793S LBH-793S-1	LBH-794S LBH-794S-1
	Bartacking width (all width)	2 to 4 mm (0.079" ~ 0.157")	2 to 5 mm (0.079" ~ 0.197")	2 to 5 mm (0.079" ~ 0.197")	2 to 5 mm (0.079" ~ 0.197")
	Buttonhole width (Knife blade width)	6.35 to 19.05 mm (1/4" to 3/4")	6.35 to 25.4 mm (1/4" to 1")	6.35 to 31.75 mm (1/4" to 1 1/4")	6.35 to 38.1 mm (1/4" to 1 1/2")
	Buttonhole length (Max.)	24.8 mm (0.976")	32.2 mm (1.268")	39.7 mm (1.563")	47.2 mm (1.858")
		LBH-791S, -792S, -793S, -794S		LBH-791S-1, -792S-1, -793S-1, -794S-1	
2	Sewing speed	Max. 4,000 s.p.m.			
3	Needles	DP x 5J (DP x 5, DP x K15)			
4	Needle bar stroke	34.6 mm (1.362")			
5	Thread take-up	Link type			
6	Hook	DP type Automatically lubricating rotary hook			
7	Lift of work clamp check	12 mm (0.472") (Max. 14 mm (0.551"))			
8	Bobbin thread winder	Incorporated in the machine head. Capable of winding bobbin while the motor is actuated.		Incorporated in the machine head. Capable of winding bobbin while the sewing machine is actuated.	
9	Number of stitches	By replacing the gears (within the range from 56 to 370 stitches).			
10	Emergency stop	By the speed reduction lever and emergency stop lever.			
11	Manual feed	By full-turn handle, manually operated.			
12	Outer dimension	Bed width 205 mm (8.071")			382 mm (15.039")
		Height (from the top surface of the machine table to the top edge of the thread tension assembly)			626 mm (24.646")
		Length (from the front edge of the bed to the rear edge of the belt cover)			
13	Sewing machine head weight	52 kg		50 kg	
14	Belt	Two V belts (M-type)		One V belt (M-type)	
15	Motor	300W Induction motor		400W (3-phase or single-phase, electronic-stop motor)	
		(Caution) If a 250W motor is used, be sure to run the sewing machine at 3000 s.p.m. or less. If the voltage is 100V, be sure to run the machine at 3,300 s.p.m. or less.			
16	Lubrication	Self-lubricating system			

2. STANDARD ADJUSTMENTS

STANDARD ADJUSTMENTS

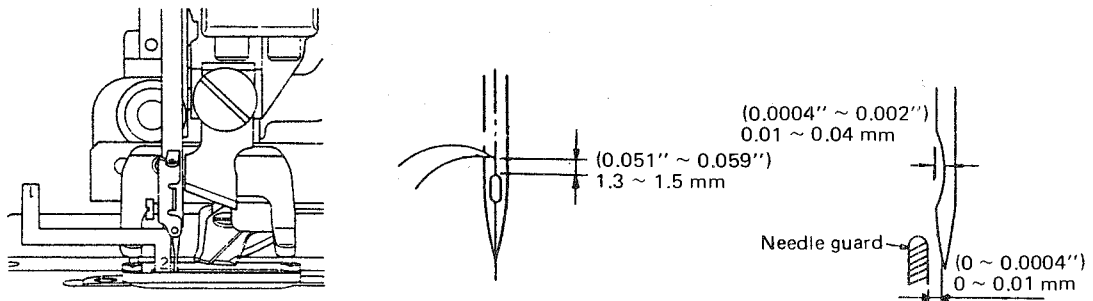
(1) Height of the needle bar

The distance from the surface of the throat plate to the bottom face of the needle bar should be 12.3 mm (0.484") when the needle bar comes down to the lowest position of its stroke.
(With regard to the center of the hole in the throat plate)



(2) Timing relation between the needle and the hook, and the needle guard

1. When the needle bar goes up 2.5 mm (0.098") from the lowest position of its stroke, the center of the needle should be aligned with the blade point of the hook. At this time, the upper end of the needle eyelet is 1.3 (0.051") to 1.5 mm (0.059") away from the blade point of the hook. (With regard to the center of the hole in the throat plate)
2. 0.01 (0.0004") to 0.04 mm (0.002") clearance should be obtained between the needle and the blade point of the hook. (With regard to the right end of hole in the throat plate)
3. The standard adjustment value of the needle guard is 0 to 0.01 mm (0.0004").



HOW TO ADJUST

RESULTS OF IMPROPER ADJUSTMENTS

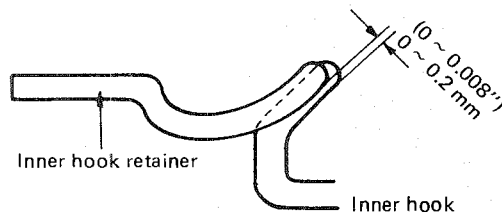
1. Insert the timing gauge supplied with the machine into the gap between the bottom of the needle bar and the throat plate as shown in the figure. Loosen the needle bar connection setscrew and adjust the height of the needle bar properly.
2. Timing gauge table

Subclass model	Timing gauge	
	1	2
Standard type	12.3 mm (0.484")	14.8 mm (0.583")
K type	11.3 mm (0.445")	14.3 mm (0.563")

- It is advisable to adjust the position of the needle bar slightly lower than specified when sewing a floppy material.

1. Bring the needle bar to the lowest position of its stroke and then let it ready to start going up. At this time, insert timing gauge 2 between the throat plate and the bottom end of the needle bar as shown in the figure. Then, loosen the hook sleeve setscrew to perform adjustment.
2. When the needle moves to the right end of the hole in the throat plate, the clearance between the needle and blade point of the hook should be 0.01 (0.0004") to 0.04 mm (0.002").
3. At this time, adjust so that a 0 to 0.2 mm (0.008") clearance is obtained between the inner hook and the inner hook retainer as shown in the figure. Then tighten the inner hook setscrew.

- It is advisable to slightly delay the hook timing from the standard timing when sewing a floppy material.
- For purl stitching, when the hook timing is set earlier, the crest of seam is often improved, and when the timing is delay, skipped stitches will likely appear.



STANDARD ADJUSTMENTS

(3) Needle throw positioning lever

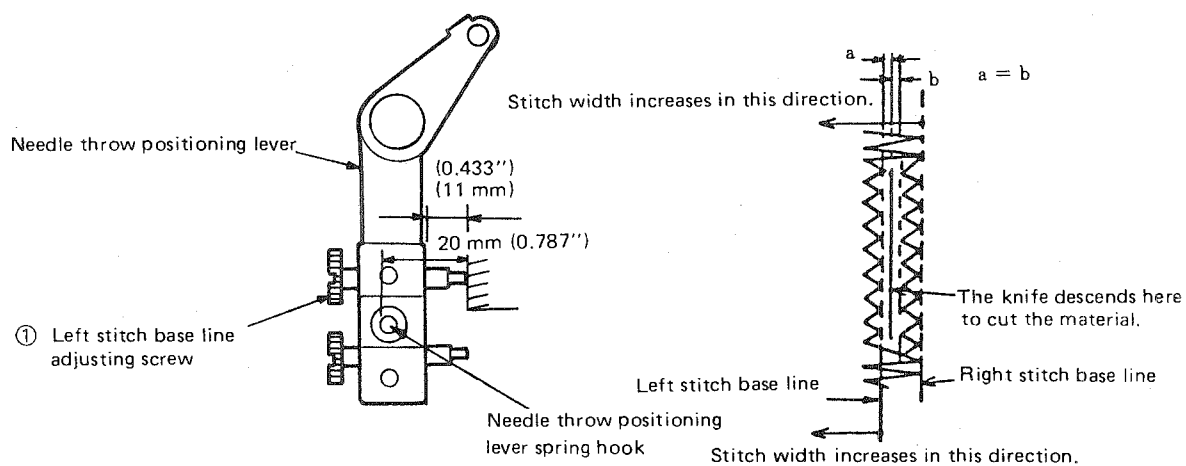
(cutting space adjustment)

1. Left bank stitch

Obtain a 20 mm (0.787") distance from the needle throw positioning lever spring hook to the processed face of the machine arm.

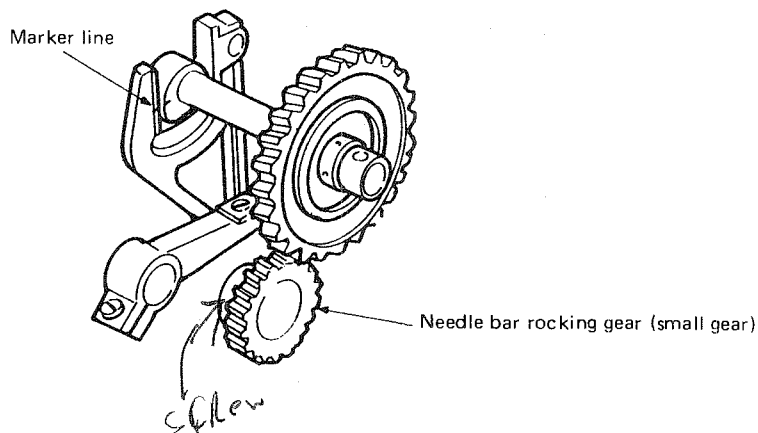
2. Right bank stitch

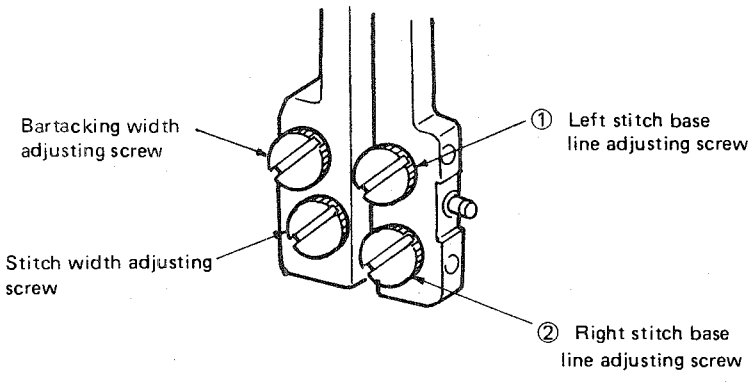
The base line of the right bank stitch shall be adjusted according to the stitch width and to equalize the distance "a" with "b."



(4) Timing of needle bar rocking motion

When the needle moves to the right on the left stitch base line, the marker line on the forked section of the needle bar forked rod should be aligned with the marker line on the needle bar rocking gear cam at the lowest position of the needle bar. (The needle bar should have completed its rocking motion when the needle comes down through the throat plate.)

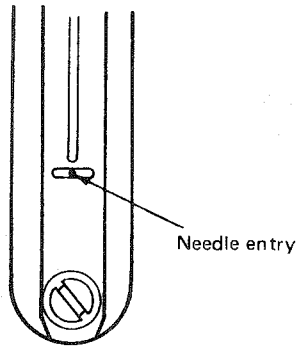


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ The needle travels from right to left to produce stitches.</p> <ol style="list-style-type: none"> 1. Adjust the left stitch base line so that the distance from the needle throw positioning arm spring hook to the processed face of the machine arm is 20 mm (0.787") when the needle enters the center of the hole in the throat plate. Perform the adjustment using left stitch base line adjusting screw ① . 2. Adjust the right stitch base line by the right stitch base line adjusting screw ② . 3. Adjust the left and right stitch base lines so that the knife descends in the center of the cutting space between the parallel banks of stitches. 4. Adjusting sequence of stitch width and base line: Change of stitch width → Checking of the cutting space → Adjustment of the right stitch base line → Adjustment of the bartacking width 	<ul style="list-style-type: none"> ○ If the right or left base line is set nearer to either side, the crest of seam closer to the cutting line may tilt inwards. ○ When the stitch width is increased, only the left bank seam is shifted to the left.
<ul style="list-style-type: none"> ○ Adjust the timing of needle bar rocking motion by the pinion gear (needle bar rocking small gear). <p>< Confirming the results of the adjustment > Place a piece of paper on the throat plate, turn the pulley by hand to cause the needle to pierce the paper, and confirm that the needle makes a clearcut and perfectly round dot on the paper.</p>	<ul style="list-style-type: none"> ○ Misalignment of the marker line on the forked section of the needle bar forked rod with the marker line on the needle bar rocking gear cam will cause needle breakage, stitch skipping, etc. due to crosswise deviation of the needle.

STANDARD ADJUSTMENTS

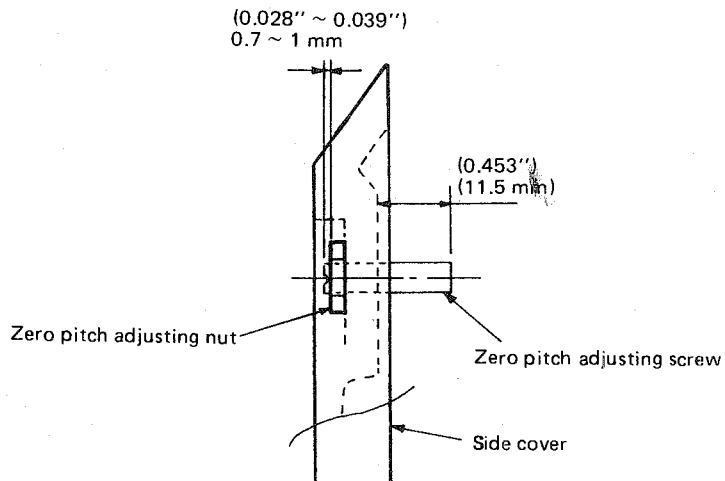
(5) Needle entry into the throat plate

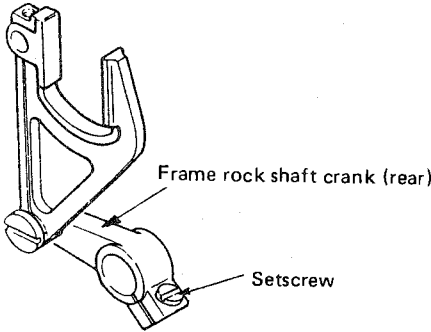
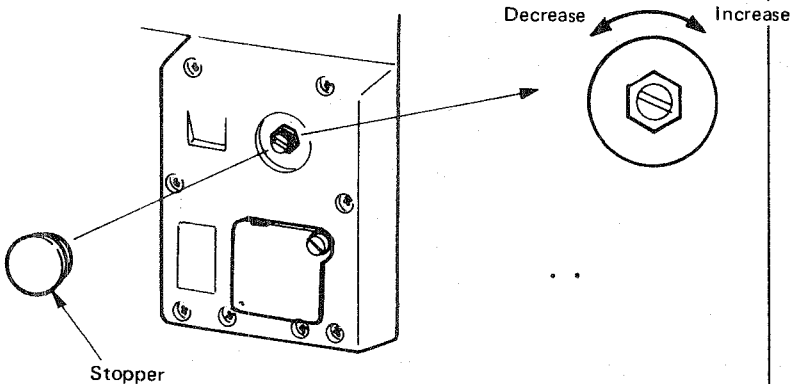
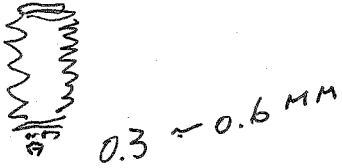
When the left bank stitches are being made, the needle should enter the center of the needle hole in the throat plate while the needle is on the left standard line.



(6) Tie stitch

When the difference in level between the tip of zero pitch adjusting screw and the zero pitch adjusting nut is 0.7 (0.028") to 1 mm (0.039"), the stitch width for the tie stitch will be 0.3 (0.012") to 0.6 mm (0.024").

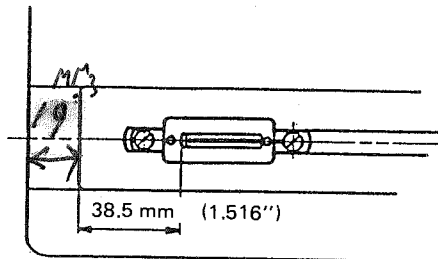


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ If the correct needle entry cannot be obtained, though the marker line on the forked section of the needle bar forked rod is aligned with the marker line on the needle bar rocking gear cam when the needle is in its lowest position of its stroke on the left stitch base line, make readjustment by correcting the frame rock shaft crank (rear) after loosening its screw.</p> 	<p>○ Improperly adjusted needle entry causes the needle to come in contact with the throat plate hole at either side when sewing in a large stitch width, resulting in needle or thread breakage.</p>
<p>○ Perform the test sewing and adjust so that a 0.3 (0.012") to 0.6 mm (0.024") stitch width is obtained. Loosen nut and turn the zero pitch adjusting screw clockwise within the level difference (0.7 (0.028") to 1 mm (0.039")) as shown in the figure, and the stitch width will be increased. Turning the screw counterclockwise will decrease the stitch width.</p>  <p>(Caution) The tie stitch width must not exceed the stitch width for the banks. (Or else, the stitch width for the banks will be increased.)</p> 	<p>○ If the tie stitch width is inadequate, the stitches may lump and the needle thread may float on the right side of the material. If the tie stitch width is excessively widened, stitches may be frayed.</p>

STANDARD ADJUSTMENTS

(7) Relation between the work clamp carrier and the work clamp check

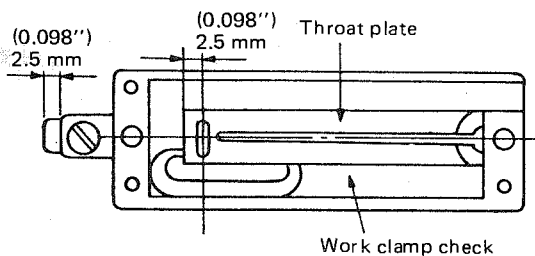
The distance from the front edge of the work clamp carrier and the front end face of the inside of the work clamp check should be 38.5 mm (1.516").



(8) Longitudinal position of the work clamp check

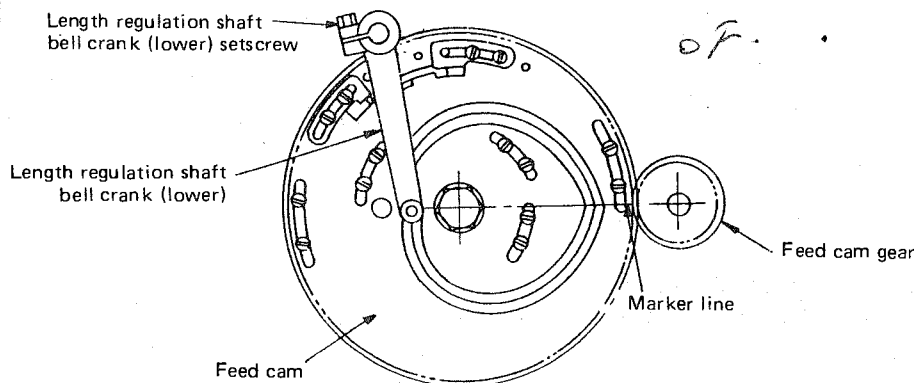
The work clamp check should be spaced 2.5 mm (0.098") from the needle entry hole at the time of stop-motion. At this time, the clearance between the throat plate and the work clamp carrier will be 2.5 mm (0.098"). (The work clamp check should be positioned symmetrically about the knife entrance slit in the throat plate.)

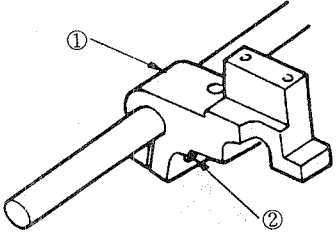
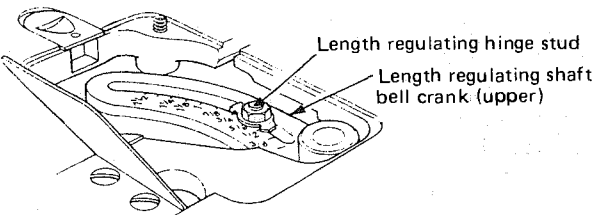
(Caution) Apply this standard distance, 2.5 mm (0.098"), for the adjustment of the position of the work clamp check of all the models of LBH-791S, through to -794S series.



(9) Position of the length regulation shaft bell crank (lower)

The length regulation shaft bell crank should be positioned at the sewing start position of the groove in the feed cam.

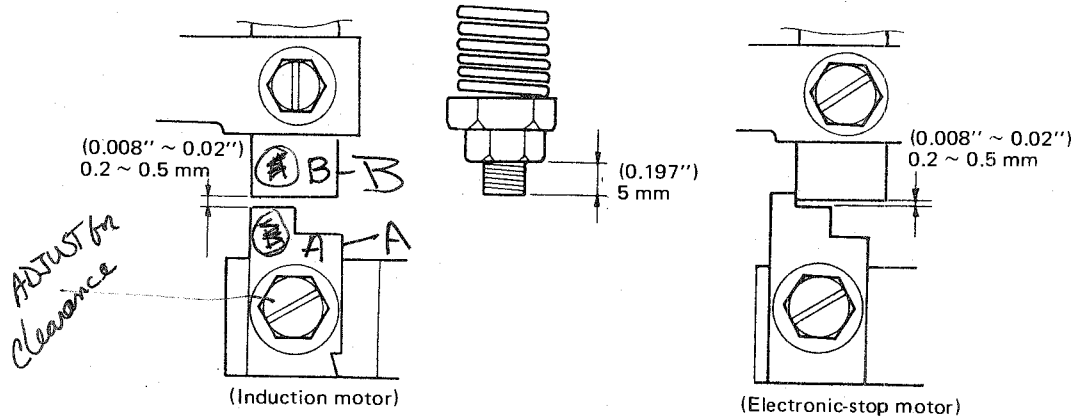


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ The relation between the work clamp carrier and the work clamp check is determined by this distance. Loosen setscrew ② of work clamp carrier ①, and then perform adjustment.</p> 	<p>○ If the distance between the front edge of the work clamp carrier and the front end face of the inside of the work clamp check exceeds 38.5 mm (1.516") at the time of stop-motion, the work clamp carrier may hit the throat plate, resulting in an increase in the torque while the second bartacking is being performed.</p>
<p>○ Loosen the connection screw of the length regulating shaft bell crank, and then perform longitudinal repositioning of the work clamp check.</p> <p style="text-align: center;"><i>sec # ⑨-7</i></p>	<p>○ If the space between the needle eyelet and the work clamp check at the time of stop-motion is inadequate, the needle may come into contact with the work clamp check when stitching an overlapped section, resulting in thread or needle breakage.</p>
<p>○ Rotate the feed cam using the manual feed handle until the feed cam axis and the feed cam driving gear axis align with the marker line on the outside of feed cam. Then find such a position where the length regulating shaft bell crank (upper) does not move even when the length regulating hinge stud is moved along the adjusting slit in the length regulating shaft bell crank (upper). When such position is obtained, retighten the screw of the length regulating shaft bell crank (lower). At this time, confirm that no play is left to the length regulating shaft bell crank (lower).</p> 	<p>○ Incorrect position of the length regulating shaft bell crank (upper) will cause the position of the work clamp check to be shifted every time the buttonhole size is changed. As a result, the needle might come in contact with the work clamp check.</p>

STANDARD ADJUSTMENTS

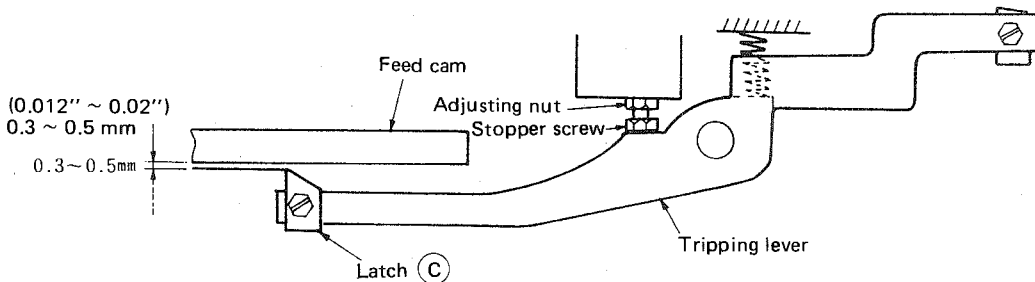
(10) Position of stop motion lever catch (A) and latch (B)

When the machine has entered the stop motion state, there should be a 0.2 (0.008") to 0.5 mm (0.02") clearance between the stop motion lever catch (A) and latch (B).



(11) Height of the tripping lever

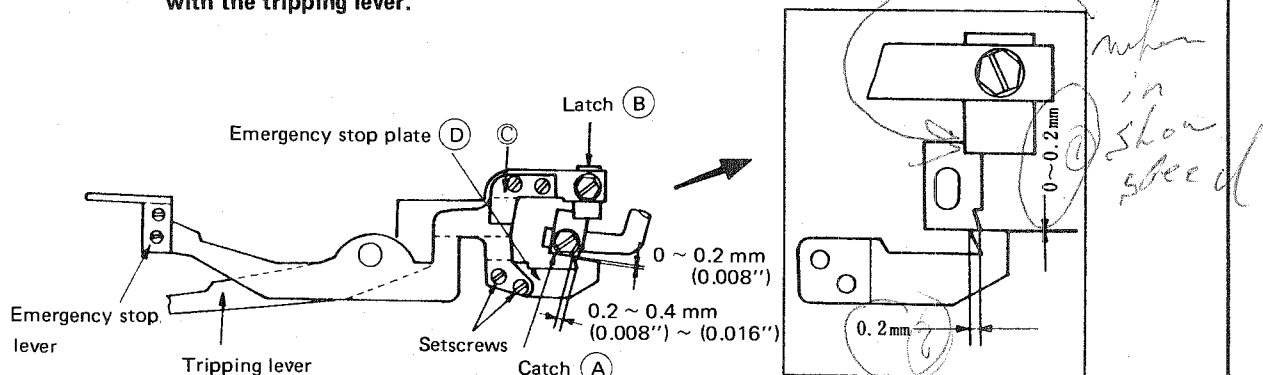
When the feed cam is in the position for high-speed sewing, the clearance between the bottom face of the feed cam and the latch (C) which is fixed on the tripping lever should be 0.3 (0.012") to 0.5 mm (0.02").



(12) Position of the emergency stop plate (for the induction motor)

When catch (A) is engaged with latch (B) in the low-speed operation mode and a 0 to 0.2 mm (0.008") clearance is obtained between the corner of the emergency stop plate and the corner of latch (A), the overlapping width will be 0.2 (0.008") to 0.4 mm (0.016").

(Caution) These dimensions are obtained provided that emergency stop lever (C) comes in contact with the tripping lever.



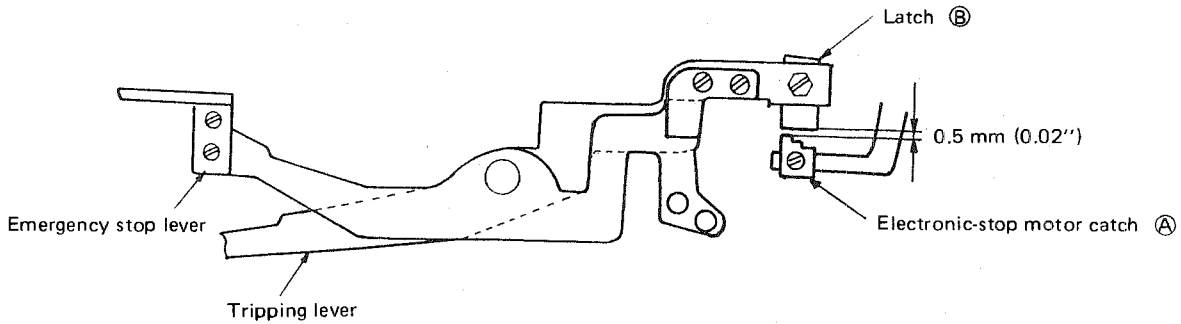
HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>1. Move the stop-motion lever catch (A) up and down to obtain proper positioning.</p> <p>2. Adjusting the pressure spring (Induction motor) Screw in the nut so that the bolt protrudes approx. 5 mm (0.197") from the bottom of the nut, and then firmly tighten the nut.</p> <p>< Confirming the results of the adjustment > Set the stop-motion lever to the same state at high-speed operation. Turn the manual feed handle and confirm that the stop motion lever catch disengages one step to slow down the machine, and then disengages a step further, causing the machine to enter into the stop motion state. This confirmation must be done without fail. (For the electronic-stop motor, confirm that the lever catch engages in the previous step to the stop state of the machine.)</p>	<ul style="list-style-type: none"> ○ If the clearance between the stop-motion lever catch (A) and the latch (B) is inadequate, the machine may not enter into the stop motion state. ○ Loosened nut will cause improper height of the needle at the time of machine stop.
<ul style="list-style-type: none"> ○ Move the stopper screw up and down so that the specified height of the tripping lever is obtained. 	<ul style="list-style-type: none"> ○ If the clearance between the feed cam and the latch (C) exceeds the specified amount, the machine may not enter into the high-speed operation state. If the clearance is inadequate, the latch (C) may be abraded. As a result, the machine will not enter into the stop motion state.
<ul style="list-style-type: none"> ○ Move the emergency stop plate up and down or left and right direction to obtain proper positioning. <p>< Confirming the results of adjustment > Be sure to confirm that the machine enters the low-speed operation mode by pushing down the emergency stop lever when the machine is running at high speed. Release the emergency stop lever and confirm that the machine enters the stop-motion state.</p>	<ul style="list-style-type: none"> ○ If the vertical clearance between catch (A) and latch (B) is inadequate when emergency stop plate (D) comes in contact with catch (A), the machine may fail to enter the stop-motion state. The machine may fail to enter the stop-motion state if the overlapping amount is inadequate. ○ If the overlapping amount is too great, the emergency stop function may fail to work. ○ On the other hand, if the vertical clearance between the catch and latch is much greater than 0.2 mm (0.008"), the machine may enter the stop-motion state directly from the high-speed operation mode instead of entering the low-speed operation mode as it should.

STANDARD ADJUSTMENTS

(13) Position of the tripping lever stopper

(for the electronic-stop motor)

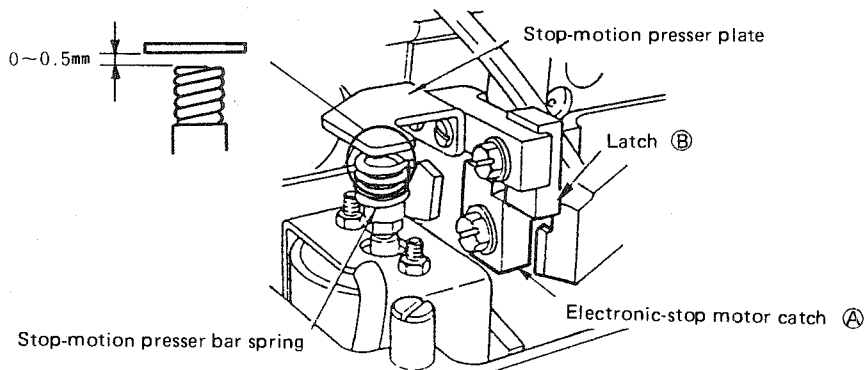
The clearance between electronic-stop motor catch ① and latch ② should be 0.5 mm (0.02") when the emergency stop lever is depressed.



(14) Position of the stop-motion presser plate

(for the electronic-stop motor)

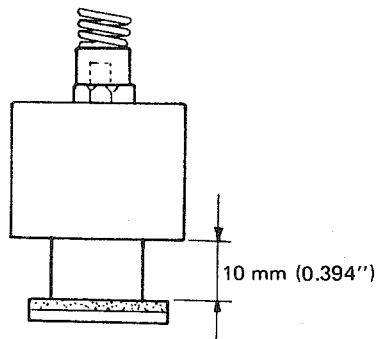
When the electronic-stop motor catch ① is engaged with latch ② in the high-speed operation state, the clearance between the stop-motion presser plate and the presser bar spring should be 0 to 0.5 mm (0.02").

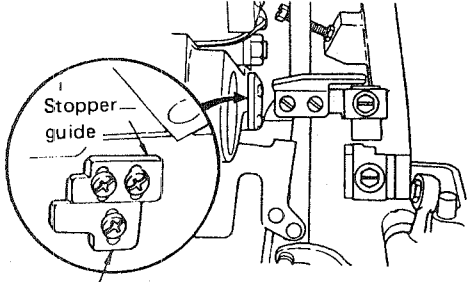
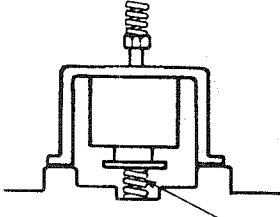
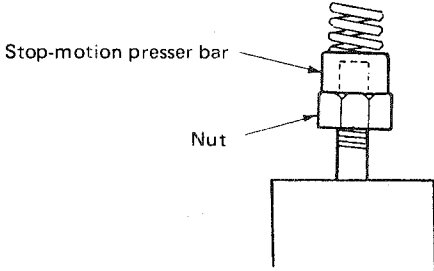


(15) Stop-motion solenoid stroke

(for the electronic-stop motor)

Stop-motion solenoid stroke should be 10 mm (0.394").

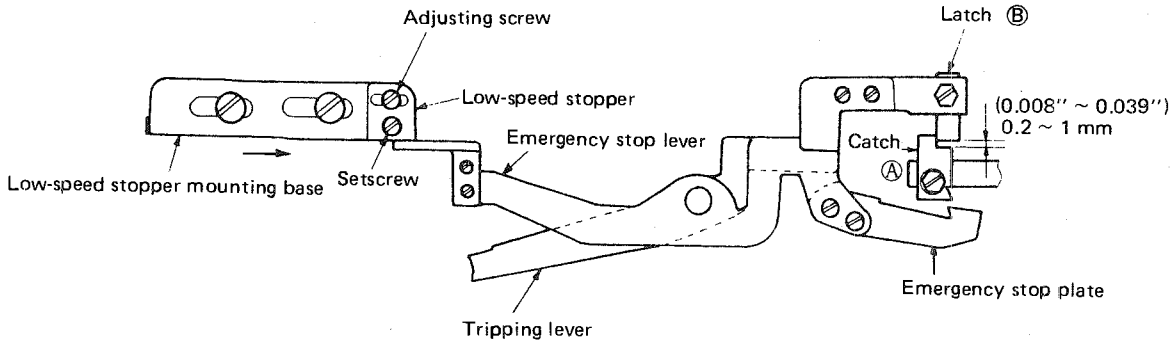


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> Loosen setscrew of the tripping lever stopper and stopper guide, and adjust the height of the tripping lever stopper.  <p>Tripping lever stopper</p>	<ul style="list-style-type: none"> If the clearance between the stopper and the tripping lever is too large, the tripping lever may come in contact with the machine base when the stop-motion magnet is actuated. As a result, noise will be produced. If the clearance is inadequate, the stop motion lever may fail to return to the stop motion position. As a result, the work clamp check cannot be raised.
<ul style="list-style-type: none"> Loosen the setscrew of the stop-motion presser plate, and adjust the position of the stop-motion presser plate. <p>(Caution) Since the stop-motion presser bar is raised by the stop motion reset spring, be sure to depress the spring until it will go no further when adjusting the stop-motion presser plate.</p>  <p>Stop motion reset spring</p>	<ul style="list-style-type: none"> If there is no clearance between the stop-motion presser plate and the stop-motion presser plate spring, the high speed operation cannot be performed. If the clearance is excessively large, the work clamp check cannot be raised.
<ul style="list-style-type: none"> Move the presser bar and the nut so that the proper stroke of the stop-motion solenoid is obtained.  <p>Stop-motion presser bar Nut</p>	<ul style="list-style-type: none"> If the stroke is inadequate, the tripping lever may fail to be raised at the time of the stop-motion of the machine. As a result, the work clamp check may fail to be raised. On the other hand, if the stroke is too large, the raising force of the stop-motion solenoid may be decreased and the tripping lever fail to be raised. Additionally, the stop-motion presser plate may come in contact with the stop-motion presser bar at the time of the high-speed operation. As a result, high-speed operation cannot be performed.

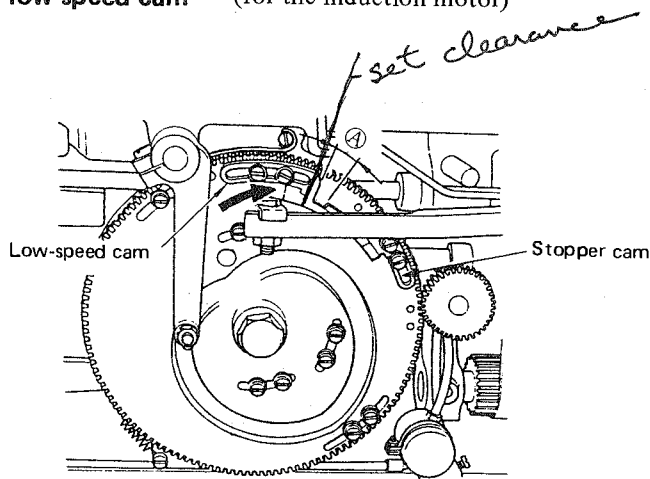
STANDARD ADJUSTMENTS

13 (16) Position of the low-speed stopper

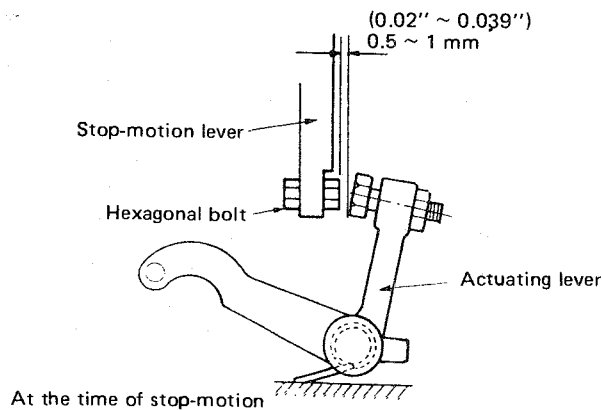
When the low-speed stopper mounting base is pressed in the direction of the arrow so that the low-speed stopper is hooked to the emergency stop lever, the clearance between catch **(A)** and latch **(B)** should be 0.2 (0.008") to 1 mm (0.039") at the low-speed operation state.



14 (17) Position of the low-speed cam (for the induction motor)



15 (18) Position of the actuating lever

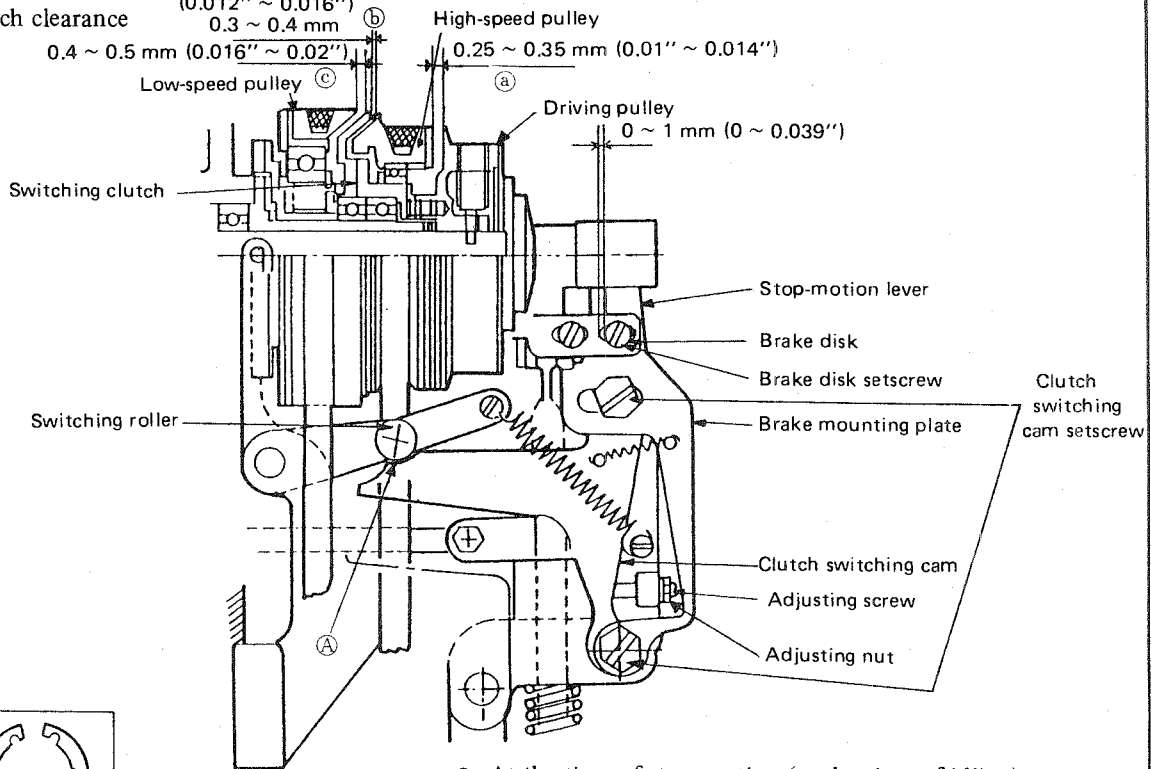


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT								
<ul style="list-style-type: none"> Loosen the adjusting screw and setscrew of the low-speed stopper and adjust the position of the low-speed stopper. After the adjustment, tighten the screws. 	<ul style="list-style-type: none"> If the clearance is inadequate, the machine may fail to run in a low speed. 								
<ul style="list-style-type: none"> Loosen the low-speed cam setscrew and adjust the clearance [Ⓐ] according to the number of stitches specified. <table border="1" data-bbox="363 1034 880 1227"> <thead> <tr> <th>Number of stitches</th> <th>Clearance [Ⓐ]</th> </tr> </thead> <tbody> <tr> <td>86 stitches or less</td> <td>18 mm (0.709")</td> </tr> <tr> <td>86 to 164 stitches</td> <td>10 mm (0.394")</td> </tr> <tr> <td>164 stitches or more</td> <td>0 mm</td> </tr> </tbody> </table>	Number of stitches	Clearance [Ⓐ]	86 stitches or less	18 mm (0.709")	86 to 164 stitches	10 mm (0.394")	164 stitches or more	0 mm	<ul style="list-style-type: none"> When the low-speed cam is shifted in the direction of the arrow, the number of stitches between the low-speed operation to the stop-motion is decreased.
Number of stitches	Clearance [Ⓐ]								
86 stitches or less	18 mm (0.709")								
86 to 164 stitches	10 mm (0.394")								
164 stitches or more	0 mm								
<ul style="list-style-type: none"> Adjust so that a 0.5 (0.02") to 1 mm (0.039") clearance is obtained between the actuating lever adjusting bolt and the stop-motion lever at the time of the stop-motion of the machine. (Adjust the clearance using the stopper.) 	<ul style="list-style-type: none"> If the clearance is excessive, the machine fails to run in a high speed. If the clearance is inadequate, faulty stop motion may result. 								

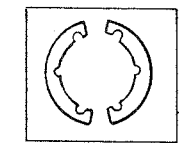
STANDARD ADJUSTMENTS

(19) Reduction gear unit (for the induction motor)

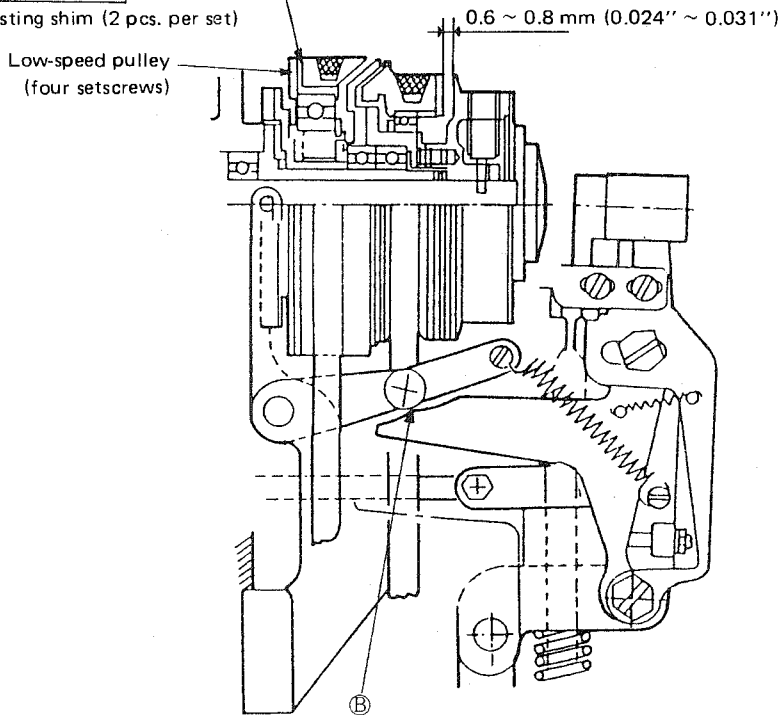
- Clutch clearance (0.012" ~ 0.016")
0.3 ~ 0.4 mm
- High-speed pulley
0.25 ~ 0.35 mm (0.01" ~ 0.014")
- Driving pulley
0 ~ 1 mm (0 ~ 0.039")
- Low-speed pulley
0.4 ~ 0.5 mm (0.016" ~ 0.02")



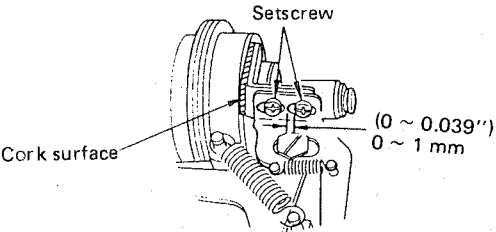
- At the time of stop motion (at the time of idling)
(The switching roller comes in contact with portion **A**.)



Adjusting shim (2 pcs. per set)



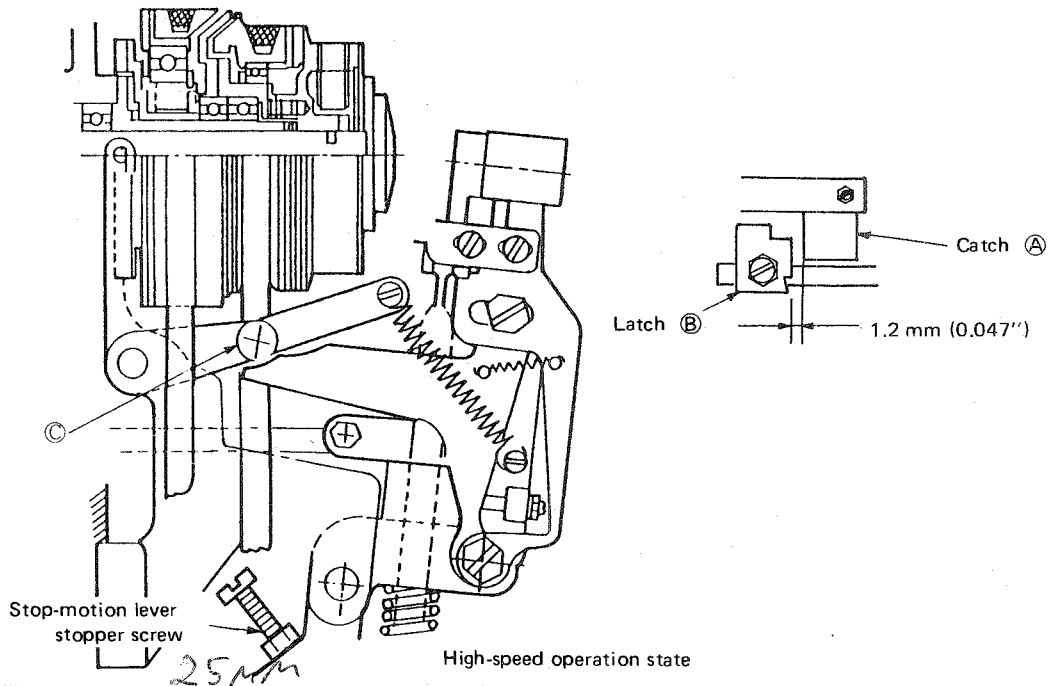
- At the time of low-speed
(The switching roller comes in contact with convex **B**.)

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ At the time of stop motion, relevant clearances are as follows:</p> <ul style="list-style-type: none"> Ⓐ Clearance between the driving pulley and the high-speed pulley: 0.25 (0.01") to 0.35 mm (0.014") Ⓑ Clearance between the high-speed pulley and the switching clutch: 0.3 (0.012") to 0.4 mm (0.016") Ⓒ Clearance between the switching clutch and the low-speed pulley: 0.4 (0.016") to 0.5 mm (0.02") <p>When adjusting clutch clearances Ⓐ and Ⓒ, loosen clutch switching cam setscrew and the adjusting nut. Then turning the adjusting screw clockwise will decrease clearance Ⓒ and increase clearance Ⓐ. Turning the screw counterclockwise will increase clearance Ⓒ and decrease clearance Ⓐ. Properly adjust the clearances using the adjusting screw and then fix the clutch switching cam.</p> <p>○ At the time of low-speed operation, the clearance between the driving pulley and the high-speed pulley should be 0.6 (0.024") to 0.8 mm (0.031") while the low-speed pulley comes in contact with the switching clutch. If the clearance exceeds the specified amount, loosen four setscrews of the low-speed pulley and apply the adjusting shims (13708201) (2 pcs. per set/0.2 mm (0.008") thickness ea.). Then tighten the setscrews.</p> <p>○ At the time of high-speed operation, the driving pulley should come in contact with the high-speed pulley and switching clutch, and a clearance should be obtained between the low-speed pulley and the switching clutch.</p>	<ul style="list-style-type: none"> ○ If clearance Ⓒ is too large, the machine may fail to enter into the low-speed operation state. As a result, the machine may enter into the stop motion state directly from the high-speed operation state. If clearance Ⓐ is inadequate, the driving pulley may run hot. ○ If clearance Ⓒ is inadequate, the low-speed pulley may run hot. Furthermore, the excessive impact of the stop motion may result. ○ If clearance Ⓐ is too large, the pulley may slip in the high-speed operation state. As a result, the desired sewing speed may fail to be obtained.
<p>○ Adjusting the brake disk Adjust the position of the brake mounting plate and brake disk so that a 0 to 1 mm (0.039") clearance is obtained between the setscrew and the edge of the long hole. Then tighten them using the setscrew with the cork surface in parallel with the mating face.</p> 	<ul style="list-style-type: none"> ○ If the clearance exceeds the specified range of 0 to 1 mm (0.039"), defective stop motion may result. If the cork surface is not parallel with the mating surface, the cork surface may likely abrade.

STANDARD ADJUSTMENTS

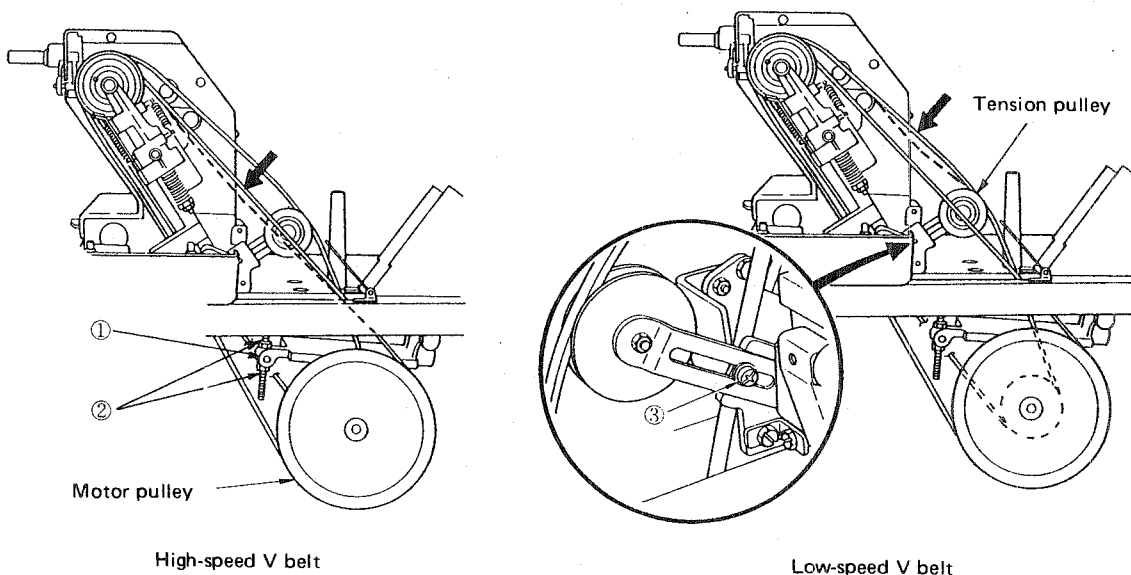
(20) Stop-motion lever stopper screw

In the high-speed operation state, move the stop-motion lever until it comes in contact with the stop-motion lever stopper screw and adjust so that a 1.2 mm (0.047") clearance is obtained between catch (A) and latch (B). (This adjustment is applicable to the induction motor and the electronic-stop motor.)



(21) Belt tension (for the induction motor)

Adjust the belt tension so that the high-speed belt slacks approx. 20 mm (0.787") and the low-speed belt slacks approx. 10 mm (0.394") if the middle (shown by the arrow \leftarrow) of the belts are lightly depressed by finger.

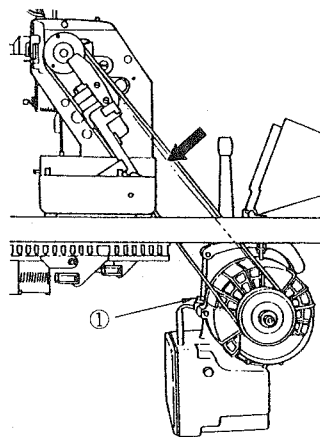


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> ○ Adjust the stop-motion lever stopper setscrew. (The standard length of the screw thread section is approx. 25 mm (0.984").) 	<ul style="list-style-type: none"> ○ If the clearance is inadequate, the machine might fail to run in a high-speed.
<p>1. High-speed belt Adjust the high-speed belt prior to the low-speed belt. Loosen fixing screw ① and nut ② , then adjust the belt tension by moving the motor mounting base up and down. After the adjustment, tighten the screw and nut.</p> <p>2. Low-speed belt Loosen fixing screw ③ of the tension pulley, and adjust the belt tension by sliding the pulley. After the adjustment, tighten the fixing screw.</p>	<ul style="list-style-type: none"> ○ If the high-speed belt tension is too high, the high-speed pulley may fail to smoothly rotate. As a result, the pulley may run hot or the operating noise may be produced. ○ If the belt tension is inadequate, the belt may vibrate at the time of idling. As a result, the sewing speed may not be increased normally.

STANDARD ADJUSTMENTS

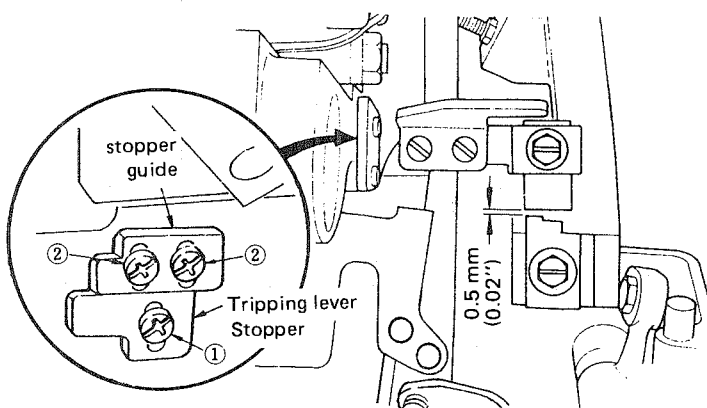
(22) Belt tension (for the electronic-stop motor)

Adjust so that the V belt slacks approx. 10 mm (0.394") if the middle (shown by the arrow ←) of the belt is lightly depressed by finger.

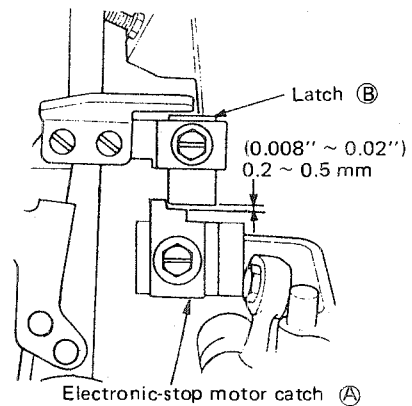


(23) Position of stop-motion lever catch (A) and latch (B) for the electronic-stop motor

After the sewing machine has stopped, the clearance between the catch (A) and latch (B) in their second step should be 0.2 (0.008") to 0.5 mm (0.02") before the stop-motion magnet starts to actuate.



○ After the stop-motion magnet has actuated.



○ Before the stop motion magnet has actuated.

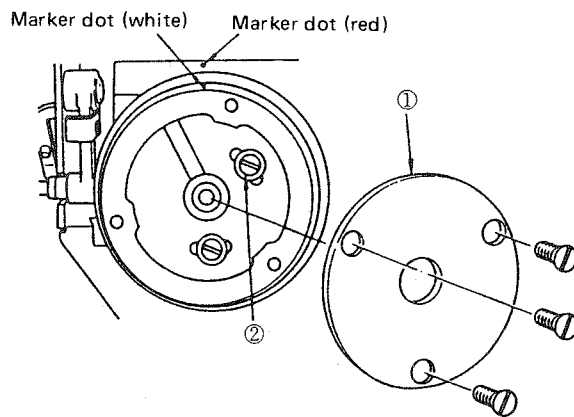
After the stop-motion magnet has actuated, the clearance between the catch (A) and the latch (B) should be 0.5 mm (0.02").

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> ○ Loosen nut ① and adjust the belt tension by moving the motor up and down. 	<ul style="list-style-type: none"> ○ If the belt tension is inadequate, ill-fitting of the belt and pulley may be caused. As a result, the main shaft stop position may fail to be consistent.
<ul style="list-style-type: none"> ○ Before the stop-motion magnet actuates: Move the electronic-stop motor catch ④ up and down so that the specified clearance is obtained. ○ After the stop-motion magnet has actuated: Loosen setscrew ①, ② and move the stopper up and down so that the specified clearance is obtained. <p>(Caution) When the V belt is removed, remove setscrew ① and detach only the stopper. By doing so, it will not be required to re-adjust the position of the stop-motion lever catch and latch to obtain the specified clearance of 0.5 mm (0.02").</p> <ul style="list-style-type: none"> ○ If the clearance between catch ④ and latch ⑤ is too great in their 3rd step, an abnormal noise may result when the machine enters the stop-motion state. 	<ul style="list-style-type: none"> ○ If no clearance is obtained between the electronic-stop motor catch ④ and the latch ⑤ in their second step, the machine may fail to stop running. ○ If the stop-motion magnet has actuated and no clearance is obtained between the electronic-stop motor catch ④ and the latch ⑤, the tension disk No. 3 may fail to float, resulting in the slip-out of the needle thread from the needle eyelet. At this time, the work clamp check may fail to go up even if the lifting pedal is depressed.

STANDARD ADJUSTMENTS

(24) Adjusting the stop position of the needle (for the electronic-stop motor)

When the stop-motion mechanism during normal operation causes the machine to stop, the white marker dot on the driving pulley should proceed to the red marker dot on the rear face of the machine arm by a distance equivalent to twice the diameter of the marker dot hole.

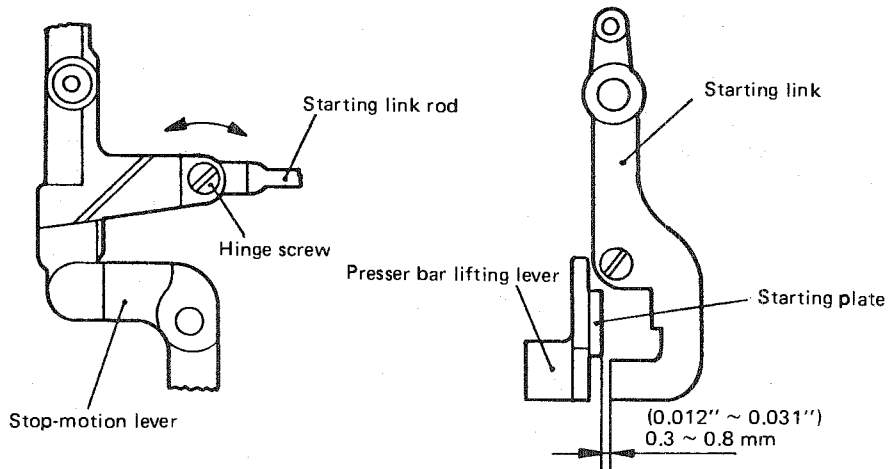


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ If the needle stops at the position beyond the predetermined position for stopping, remove pulley cover ① . Then adjust the needle stopping position by turning the pulley counter-clockwise.</p> <p>If the needle stops before the marker dot turns the pulley clockwise so that the needle stops at the correct position. The needle stopping position is subjected to be slightly varied. It is advisable to adjust the needle so that it always stops before the marker dot.</p>	<p>○ If the needle stops before the marker dot, the thread pulling arm may come in contact with the hook when the work clamp check goes up and the work clamp check may fail to go up smoothly. And since the thread take-up may fail to be carried to the highest position, needle thread would not be pulled up to the predetermined position. If the needle stops beyond the marker dot, the needle bar may excessively come down to cause the needle come down under the bottom face of the work clamp check when the work clamp check goes up. As a result, the material may be caught by the tip of the needle.</p>

STANDARD ADJUSTMENTS

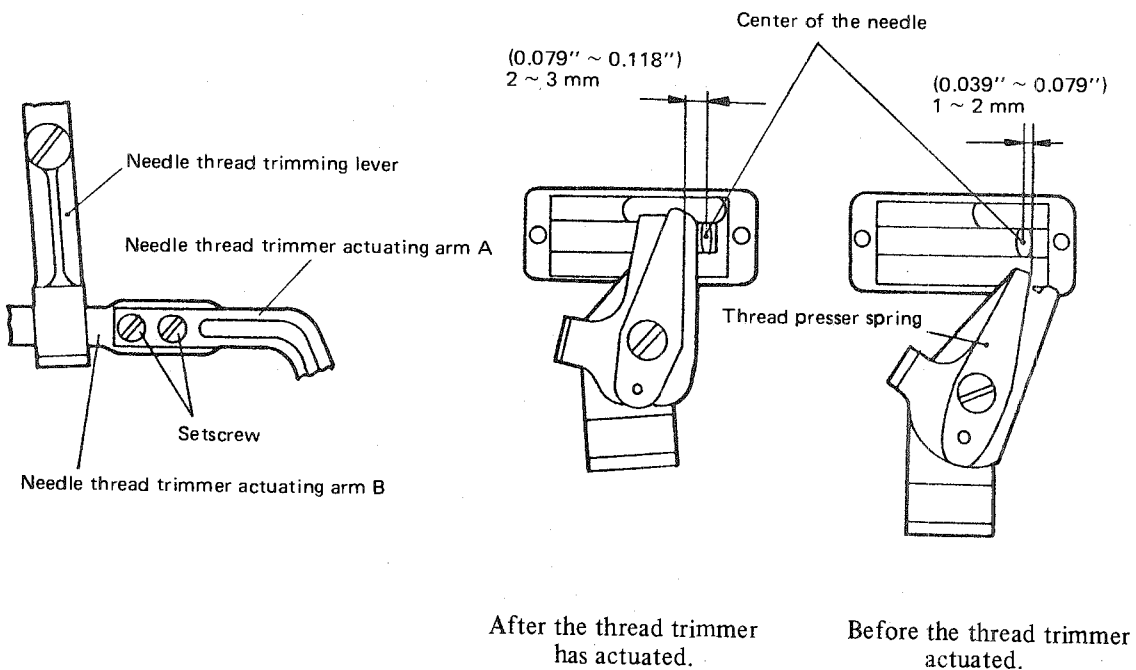
(25) Position of the starting link

The clearance between the starting link and the presser bar lifting lever should be 0.3 (0.012") to 0.8 mm (0.031"). (At the time of stop-motion)



(26) Longitudinal position of the needle thread trimmer

The distance from the center of the needle to the thread presser spring should be 1 (0.039") to 2 mm (0.079") before the needle thread is trimmed.

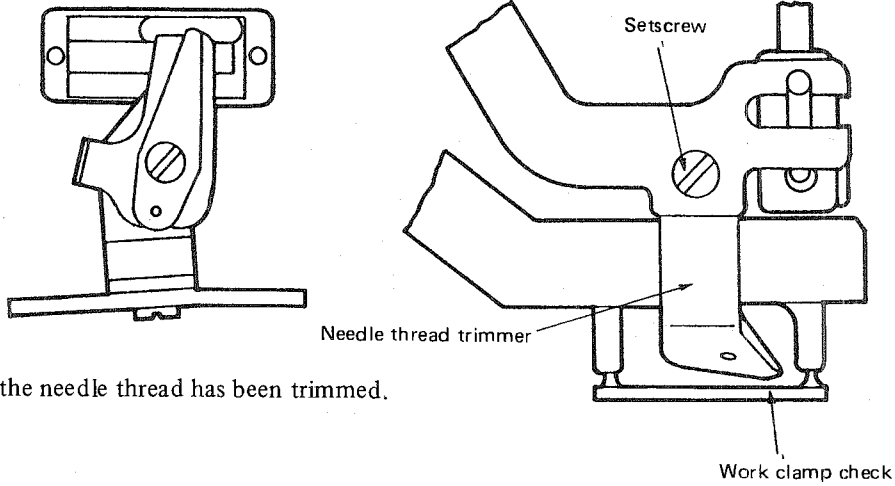


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> ○ Turn the hinge screw and adjust the clearance between the starting link and the starting plate. If the hinge screw has been turned, readjust the stop-motion linkage arm shaft. 	<ul style="list-style-type: none"> ○ If no clearance is obtained between the starting link and the starting plate, they may push against each other. As a result, the work clamp check may fail to go up. ○ If the clearance is too large, the machine may fail to enter into the stop motion state.
<ul style="list-style-type: none"> ○ Laterally move the needle thread actuating arm A and adjust so that the clearance between the needle thread trimmer thread presser spring and the center of the needle is 1 (0.039") to 2 mm (0.079") before the needle thread trimmer actuates at the position of the stop motion. 	<ul style="list-style-type: none"> ○ If the needle thread trimmer is moved excessively forward, the needle thread trimmer may come in contact with the work clamp check pin. ○ If the needle thread trimmer is moved excessively backward, the needle thread trimmer may slip off from the needle thread, resulting in the defective trimming of the needle thread.

STANDARD ADJUSTMENTS

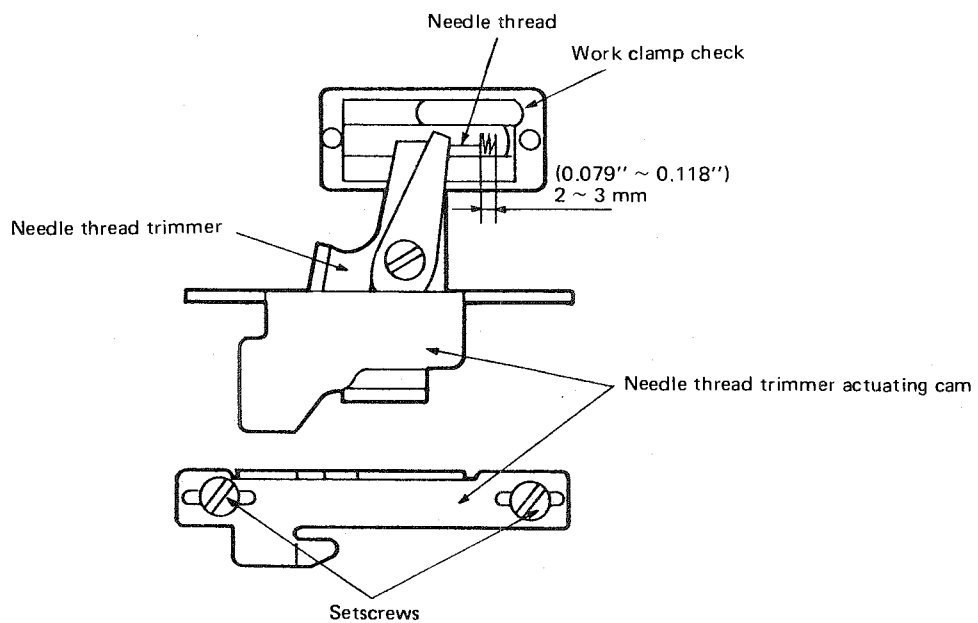
(27) Height of the needle thread trimmer

Set the needle thread trimmer as low as possible, provided that it does not touch the work clamp check.



(28) Timing to open the needle thread trimmer

Needle thread should be held for 2 (0.079") to 3 mm (0.118") from the sewing start.
(The stop-motion lever is in the position for the high-speed operation.)

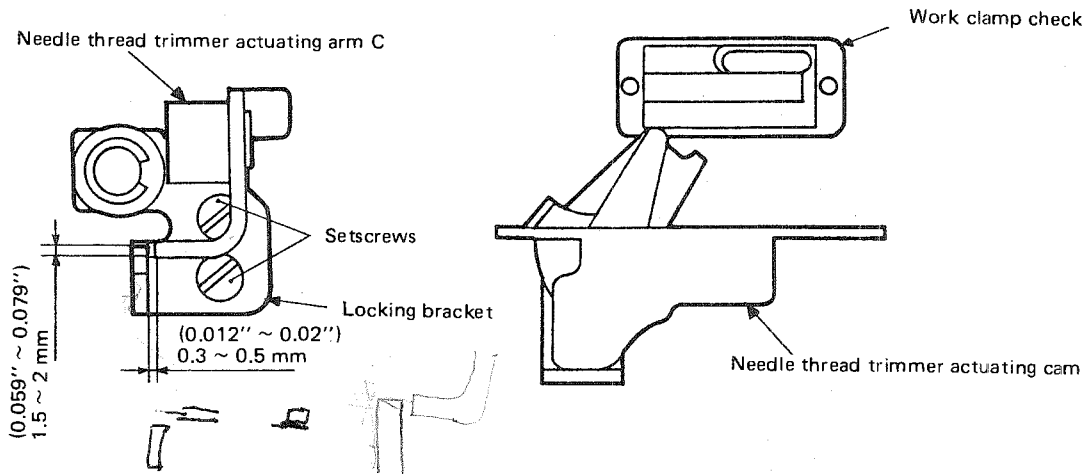


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> ○ Loosen the screws of the needle thread trimmer, and perform the vertical positioning. < Confirming the results of the adjustment > Place a plate with approx. 4 mm (0.157") thickness under the work clamp check, and confirm that the work clamp check does not hit the needle thread trimmer when the presser bar lifting lever is moved up and down. 	<ul style="list-style-type: none"> ○ If the needle thread trimmer is set too high, needle thread may be left at a bartacked part.
<ol style="list-style-type: none"> 1. Loosen the setscrews of the needle thread trimmer actuating cam, and perform adjustment by moving the actuating cam back and forth. 2. When the needle thread trimmer actuating cam is moved toward you, the needle thread holding duration will be decreased, and when the cam is moved away from you, it will be increased. <ul style="list-style-type: none"> < Confirming the results of the adjustment > After the needle thread trimmer has been adjusted, confirm that the needle thread trimmer does not come in contact with the work clamp check holder and the needle when the trimmer opens. 	<ul style="list-style-type: none"> ○ If the needle thread trimmer opens too early, the needle thread may fail to be caught, or slip out of the needle at the sewing start. ○ On the contrary, if the needle thread trimmer opens too late, inferior crest of seam may result at the sewing start.

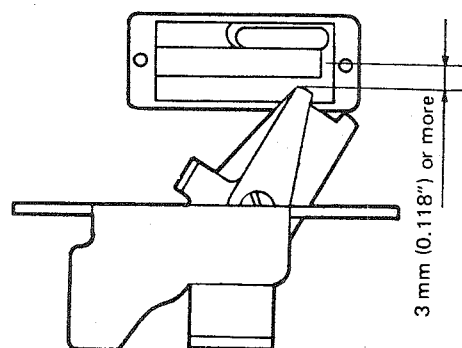
STANDARD ADJUSTMENTS

(29) Locking bracket

1. The clearance between the locking bracket and the needle thread trimmer actuating arm C should be 0.3 (0.012") to 0.5 mm (0.02") when the needle thread trimmer is in the highest position of the needle thread trimmer actuating cam.
2. The vertical overlapping width should be 1.5 (0.059") to 2 mm (0.079").



3. Confirm that a 3 mm (0.118") or more distance is obtained between the groove in the knife blade and the top end of the needle thread trimmer when the needle thread trimmer goes out of the outer periphery of the needle thread trimmer actuating cam (before the thread trimmer is actuated).

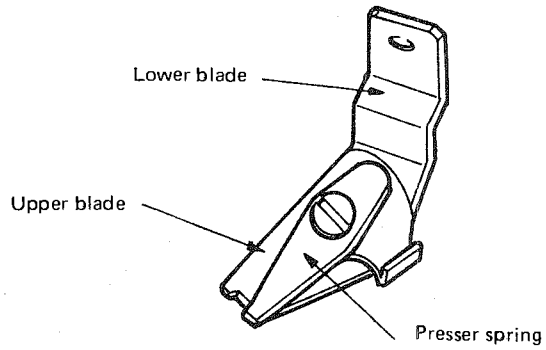


4. Confirm that the needle thread trimmer does not come in contact with the needle when the work clamp foot goes up.

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ Loosen the setscrews of the locking bracket, and simultaneously adjust so that a 1.5 (0.059") to 2 mm (0.079") vertical overlapping width and a 0.3 (0.012") to 0.5 (0.02") lateral clearance is obtained.</p> <p>(Caution)</p> <p>1. If the lateral position of the work clamp check is changed (work clamp check roller sleeve setscrew is loosened), the lateral clearance between the locking bracket and the needle thread trimmer actuating arm C may also be changed. So, be sure to adjust the position of the center of the work clamp check prior to the adjustment of the lateral clearance between the bracket and the arm C.</p> <p>2. When sewing a heavy-weight material, the position of the needle thread trimmer actuating arm C will be lower, resulting in the increase of the overlapping width of the actuating arm C and the locking bracket</p> <p>< Confirming the results of the adjustment > Upon completion of the above adjustments, turn the manual feed handle and confirm that the needle thread trimmer does not come in contact with the work clamp check or the needle when the needle thread trimmer opens. Also confirm that the needle thread trimmer does not come in contact with the needle by moving the presser bar lifting lever up and down.</p>	<p>○ If the locking bracket is moved excessively toward right, the needle thread trimmer actuating arm C may fail to overlap the locking bracket.</p> <p>○ If the locking bracket is moved excessively toward left, the distance between the center of the needle and the needle thread trimmer will be decreased. As a result, the needle thread trimmer may come in contact with the needle when the needle moves to the right.</p> <p>○ If the overlapping width is excessive, the timing of thread trimmer will be delayed, and the needle thread may be left at a bartacked part.</p> <p>○ If the overlapping width is inadequate, the needle thread trimmer will be actuated before stop-motion. As a result, the needle thread trimmer may come in contact with the needle.</p>

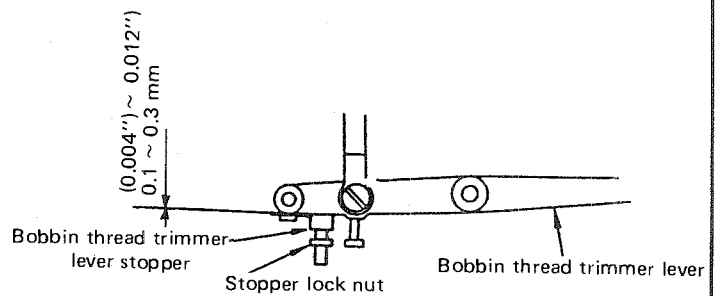
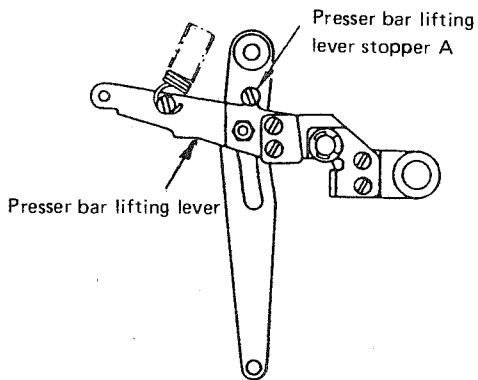
STANDARD ADJUSTMENTS

(30) Pressure of the needle thread trimmer's presser spring



(31) Bobbin thread trimmer lever stopper

The clearance between the bobbin thread trimmer lever and the bobbin thread trimmer lever stopper should be 0.1 (0.004") to 0.3 mm (0.012").

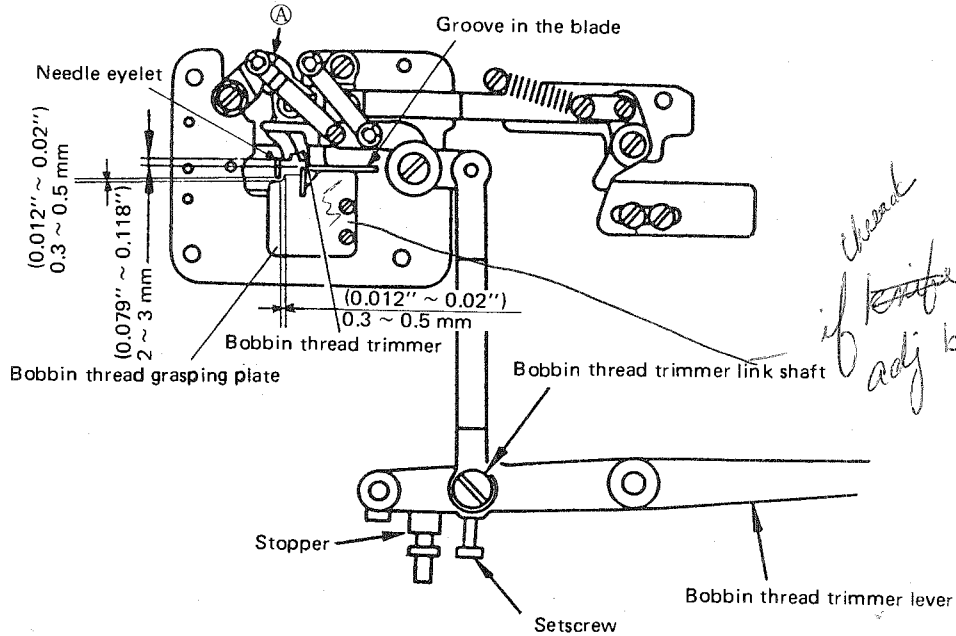


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<ol style="list-style-type: none"> 1. If the grasping force of the needle thread trimmer has weakened, bend the presser spring slightly toward the upper blade so that the upper and lower blades contact very closely each other with their full length in order to enable the trimmer to securely catch and trim the needle thread at any point on the blades. 2. When the trimmer has gone dull, sharpen the edge of the upper and lower blades of the trimmer using an oil stone. 	<ul style="list-style-type: none"> ○ If the pressing pressure of the presser spring is inadequate, the needle thread may slip out of the needle at the sewing start.
<ul style="list-style-type: none"> ○ Adjust so that the clearance between the bobbin thread trimmer and the bobbin thread trimmer lever stopper is 0.1 (0.004") to 0.3 mm (0.012") when the presser bar lifting lever comes in contact with the presser bar lifting lever stopper A, using the bobbin thread trimmer lever stopper. Then tighten the stopper lock nut. 	<ul style="list-style-type: none"> ○ If the clearance is too large, the play of the bobbin thread trimmer in the direction of the rotation will be increased. As a result, if the timing to open the bobbin thread trimmer set to be earlier, the bobbin thread trimmer may open after it has trimmed the bobbin thread and returned to the home position. ○ If no clearance is obtained and the bobbin thread trimmer lever is excessively protruded, the presser bar lifting lever may fail to return to the position where it comes in contact with the presser bar lifting lever stopper A. As a result, the presser bar lifting lever will not be actuated.

STANDARD ADJUSTMENTS

(32) Timing to close the bobbin thread trimmer

The clearance between the top end of the bobbin thread trimmer and the center of the groove in the knife blade should be 2 (0.079") to 3 mm (0.118") when the presser bar lifting lever is brought to home position.



Check if knife is missed adj bobbin grasping plate

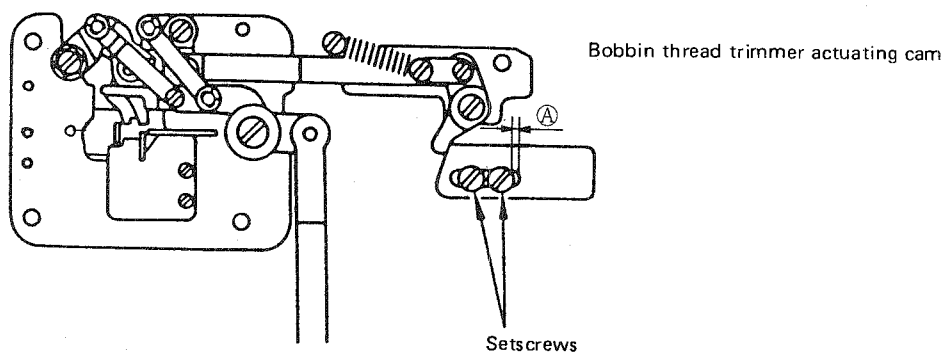
(Position of the bobbin thread grasping plate)

Both vertical and lateral clearance between the needle eyelet and the bobbin thread grasping plate should be 0.3 (0.012") to 0.5 mm (0.02").

(33) Timing to open the bobbin thread trimmer

The bobbin thread holding distance **A** with regard to the position of the bobbin thread trimmer actuating cam will be as follows:

Filament thread	} 6 (0.236") to 8 mm (0.315").	Cotton thread	} 3 (0.118") to 5 mm (0.197")
Core spun thread			
Two PIY spun thread			

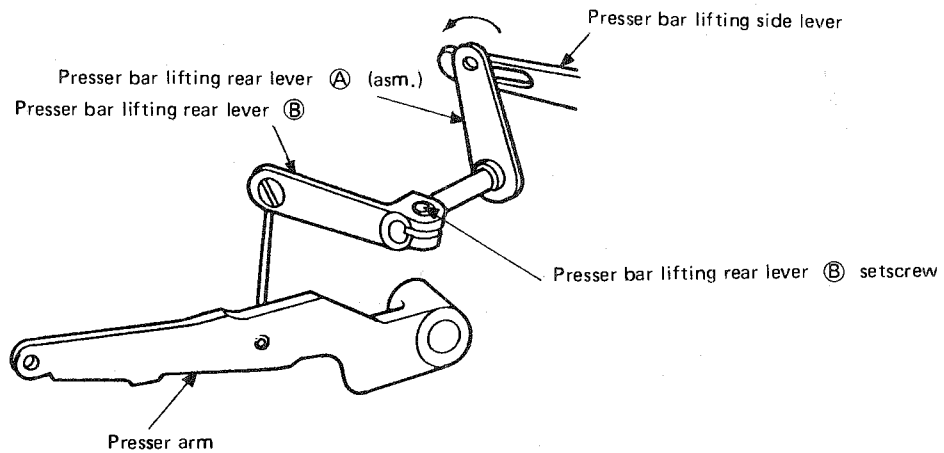
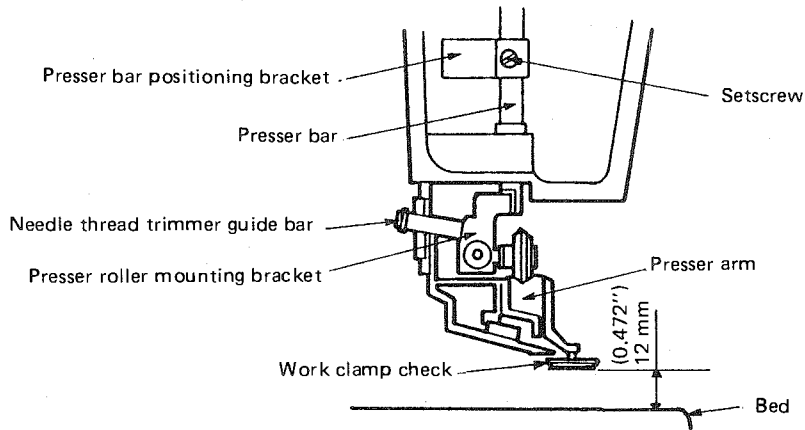


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> ○ Loosen the setscrew when the presser bar lifting lever has returned to its home position, turn the bobbin thread trimmer link shaft and adjust so that the bobbin thread is properly trimmed with a 2 (0.079") to 3 mm (0.118") clearance between the top end of the bobbin thread trimmer and the center of the groove in the knife blade. < Confirming the results of the adjustment > Confirm that the bobbin thread trimmer securely cut the bobbin thread and hold it when the presser bar lifting lever is lowered. 	<ul style="list-style-type: none"> ○ If the clearance between the top end of the bobbin thread trimmer and the center of the cloth cutting knife blade is too large, portion ④ may come in contact with the bed. And the bobbin thread trimmer may fail to trim the bobbin thread. ○ If the clearance between the top end of the bobbin thread trimmer and the groove in the knife blade is inadequate, the cloth cutting knife blade may come in contact with the bobbin thread trimmer.
<ol style="list-style-type: none"> 1. Loosen the setscrews of the bobbin thread trimmer actuating cam, and perform adjustment by moving the actuating cam back and forth. 2. When the actuating cam is moved toward you, the bobbin thread holding duration will be decreased, and when the cam is moved away from you, it will be increased. <p>(Caution) If the actuating cam is moved excessively toward you, the bobbin thread trimmer will open when the presser bar lifting lever is raised.</p>	<ul style="list-style-type: none"> ○ If the bobbin thread trimmer opens too early, the bobbin thread may slip out at the sewing start. ○ On the contrary, if the bobbin thread trimmer opens too late, inferior crest of seam may be formed. As a result, the deviation of the material may occur.

STANDARD ADJUSTMENTS

(34) Height of the work clamp check

The lift of the work clamp check : 12 mm (0.472")



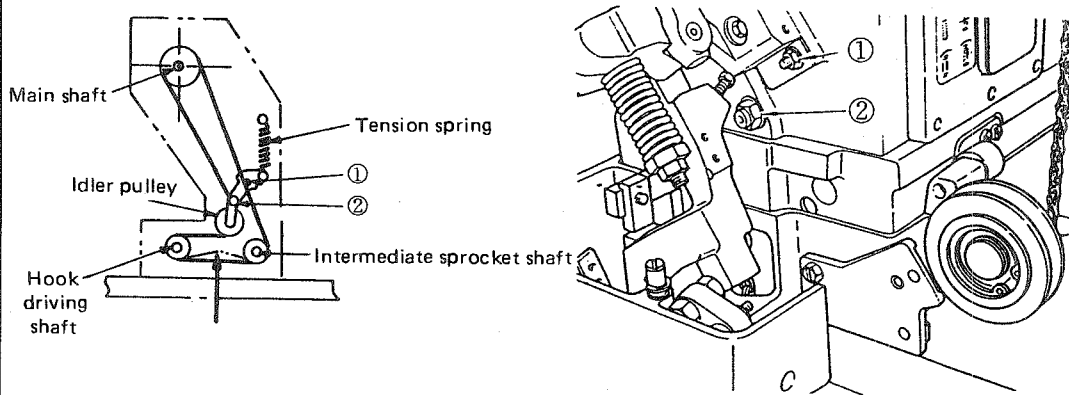
HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>1. Insert an appropriate 12 mm (0.472") spacer between the work clamp check and the throat plate, loosen the setscrew of the presser bar positioning bracket, and fully tread the presser bar lifting pedal. With this condition maintained, push down the presser bar positioning bracket and the presser roller mounting bracket so that the height of the work clamp check is set to 12 mm (0.472"). After adjustment, securely tighten the setscrew. The height of the work clamp check can be adjusted to be as high as 14 mm (0.551").</p> <p>< Confirming the results of the adjustment ></p> <ul style="list-style-type: none"> ○ After adjustment, be sure to confirm that the work clamp check works perfectly. ○ Confirm that the needle thread trimmer guide shaft is parallel to the front edge face of the bed. <p>(Caution)</p> <p>If the setscrew of the presser bar lifting rear lever Ⓑ has been loosened, be sure to readjust the setscrew as follows:</p> <ol style="list-style-type: none"> 1. Align the stepped portion of the presser bar with the bottom end face of the presser bar connection. 2. Insert a 15 mm (0.591") rod between the throat plate and the work clamp check. 3. Install the presser bar adjusting screw. 4. Bring the presser bar lifting lever to its lowest position. 5. Press the presser bar lifting rear lever Ⓐ (asm.) in the direction of the arrow. 6. Eliminate the clearance between the presser bar lifting rear lever Ⓐ (asm.) and the presser bar lifting rear lever Ⓑ (asm.) and tighten the setscrew. 7. Upon completion of the above steps, adjust the height of the work clamp check so that the specified height is obtained following the above-mentioned adjustment procedures. 	



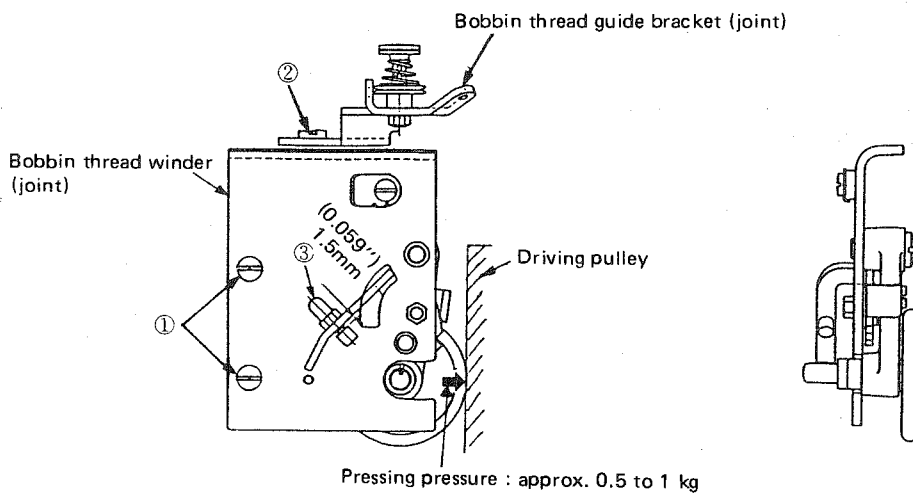
STANDARD ADJUSTMENTS


(35) Tension of the timing belt

The tension of the timing belt which drives the hook driving shaft is determined by the tension spring.



(36) Bobbin thread winder unit

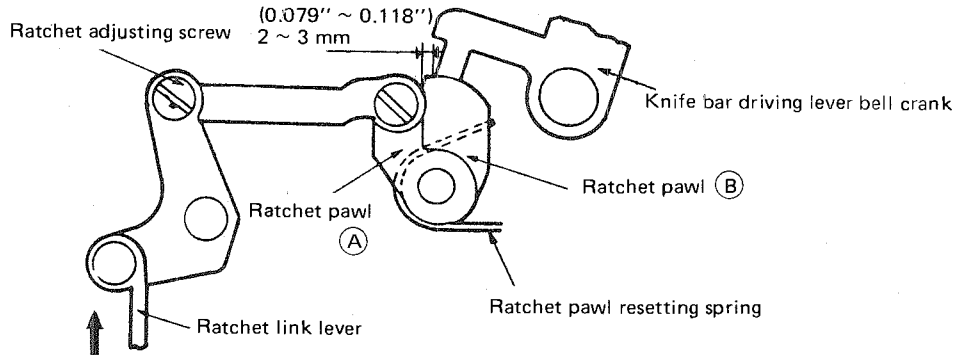


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ Loosen adjusting nut ① and idler arm lock nut ② (this nut is left-handed, so be careful), and then tighten them in the order of their number. If loosening the timing belt, tilt the machine head, loosen ① and ②, and press the timing belt which is installed between the intermediate sprocket and the hook driving shaft in the direction of the arrow (↗) so that the belt slackens. In this state, tighten ① and fix the belt using ②.</p> <p><i>important loosen small nut first then (big reverse thread) then tighten small first then big NUTS</i></p>	<p>○ If the tension of the timing belt is inadequate, a gear teeth skip may occur at the time of stop-motion. As a result, the timing of the hook may fail to be consistent.</p>
<p>1. Loosen screw ①. Move the bobbin thread winder (joint) to adjust so that the driving pulley friction ring (rubber ring) is allowed to be pressed against the driving pulley with an approx. 0.5 to 1 kg pressing pressure. Then tighten the screw.</p> <p>2. If the bobbin thread fails to be wound evenly, loosen screw ② and adjust the bobbin winding condition by moving the bobbin thread guide bracket (joint) laterally or longitudinally. Then tighten the screw.</p> <div style="text-align: center;">  </div> <p>3. Adjust the amount of the bobbin thread to be wound by loosening bobbin thread amount adjusting nut ③ and moving the bobbin thread amount adjusting screw back and forth.</p>	<p>○ If the pressing pressure is not adequate, the driving pulley friction ring may slip.</p>

STANDARD ADJUSTMENTS

(37) Position of the ratchet pawl (B)

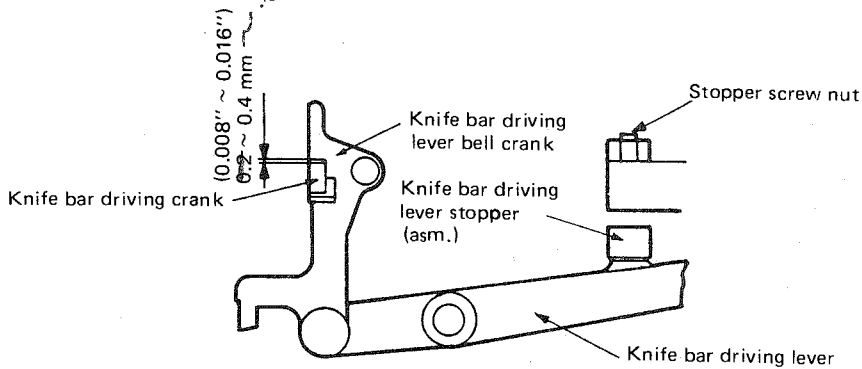
When the top end of the knife bar driving lever bell crank claw comes in contact with ratchet pawl (B), ratchet pawl (B) should be positioned so that it appears to be convex for 2 (0.079") to 3 mm (0.118").



(Caution) The ratchet link lever should not be driven in the direction of the arrow.

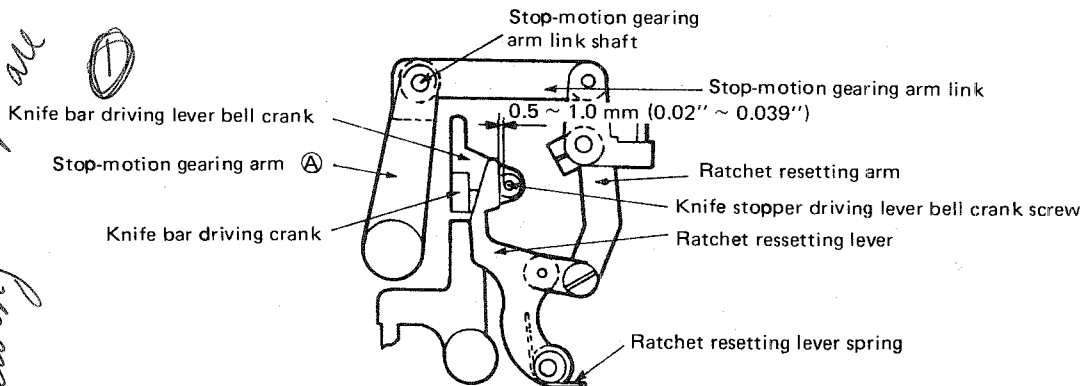
(38) Position of the knife bar driving lever bell crank

The clearance between the knife bar driving lever bell crank and the knife bar driving crank should be 0.2 (0.008") to 0.4 mm (0.016") when the knife bar driving crank is in its lowest position.



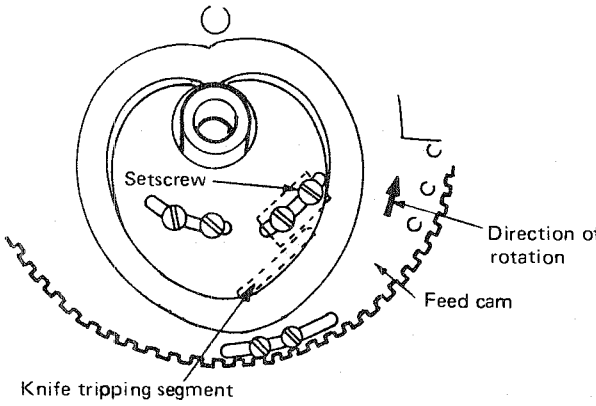
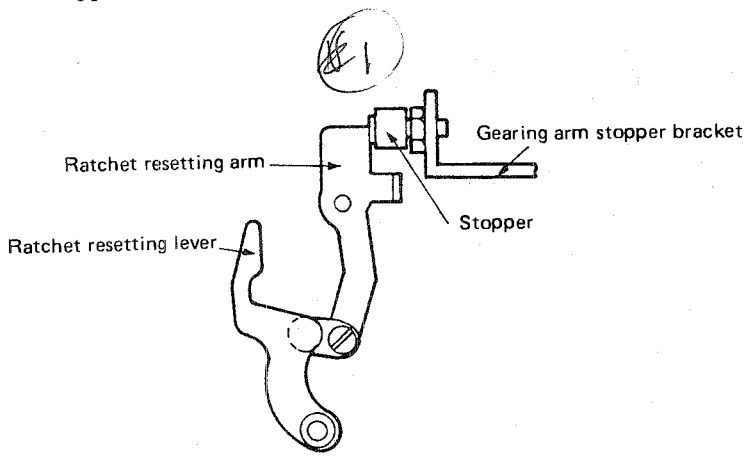
(39) Position of the ratchet resetting lever

The clearance between the ratchet resetting lever and the knife stopper driving lever bell crank screw should be 0.5 (0.02") to 1.0 mm (0.039") when the knife bar driving lever bell crank engages with the knife bar driving crank at the time of the low-speed rotation of the machine.



very important for knife
 stoppers to ~~be~~ ~~run~~
 if knife drops while
 sewing check points
 all

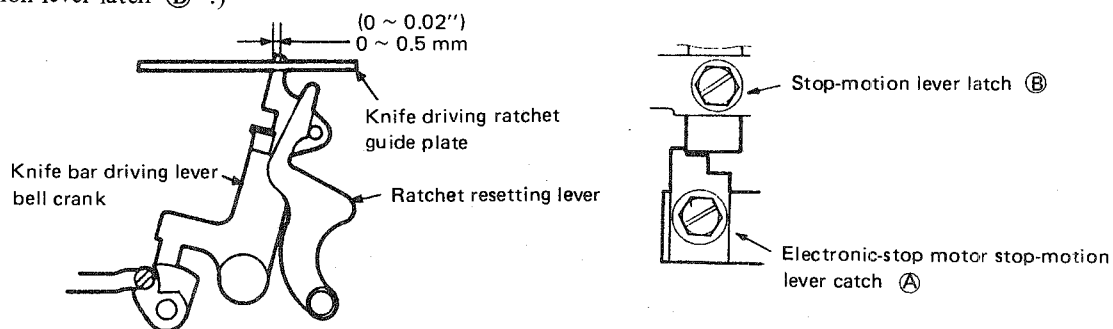
Check Point #①

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ Confirm that the ratchet link lever is not driven in the direction of the arrow from the knife tripping segment mounted on the feed cam. Then rotate the ratchet adjusting screw which is an eccentric shaft to perform adjustment.</p>  <p>The diagram shows a circular feed cam with a ratchet gear on its outer edge. A knife tripping segment is mounted on the cam. A setscrew is used to adjust the position of the ratchet link lever. An arrow indicates the direction of rotation of the cam.</p>	<ul style="list-style-type: none"> ○ If the clearance is inadequate: The ratchet pawl (B) will be opened by the knife bar driving lever bell crank. As a result, the cloth cutting knife may repeats dropping. ○ If the clearance is too large: The ratchet pawl (B) may fail to engage with the knife bar driving lever bell crank. As a result, the cloth cutting knife will not descend because the knife tripping segment fail to open.
<p>○ Perform adjustment by the stopper (asm.) and fix the knife bar driving lever bell crank using the knife bar driving lever stopper screw nut.</p>	<ul style="list-style-type: none"> ○ If the clearance is inadequate: The cloth cutting knife may fail to be actuated normally and it may fail to descend. ○ If the clearance is too large: The cloth cutting knife may fail to cut the material completely (because of the shortage of stroke).
<p>○ Move the ratchet resetting lever by adjusting the position of the stopper which fixes the ratchet resetting arm to the gearing arm stopper bracket.</p>  <p>The diagram shows a ratchet resetting lever connected to a ratchet resetting arm. The arm is held in place by a stopper which is mounted on a gearing arm stopper bracket. A circled '1' is drawn around the stopper area.</p>	<ul style="list-style-type: none"> ○ If the clearance is inadequate: The cloth cutting knife may fail to fully descend. ○ If the clearance is too large: The knife bar driving crank may come in contact with the ratchet resetting lever resulting in the production of noise.

STANDARD ADJUSTMENTS

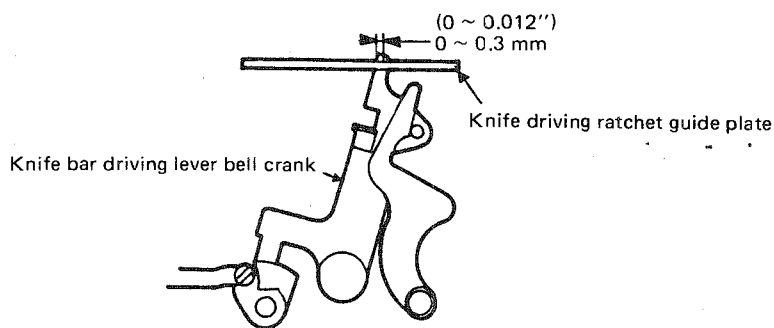
(40) Stop-motion gearing arm link shaft (for the induction motor)

When the stop-motion lever overrides the highest point of the stop-motion cam, the knife bar driving lever bell crank should move on the knife driving ratchet guide plate toward the face plate by 0 to 0.5 mm (0.02"). (For the electronic-stop motor, the knife bar driving lever bell crank should move by 0 to 0.5 mm (0.02") when the second step of the electronic-stop motor stop-motion lever catch ① engages with the stop-motion lever latch ②.)



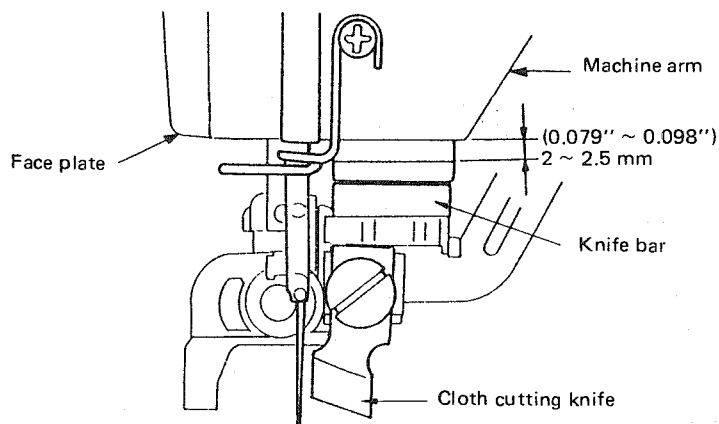
(41) Position of the high-speed safety link

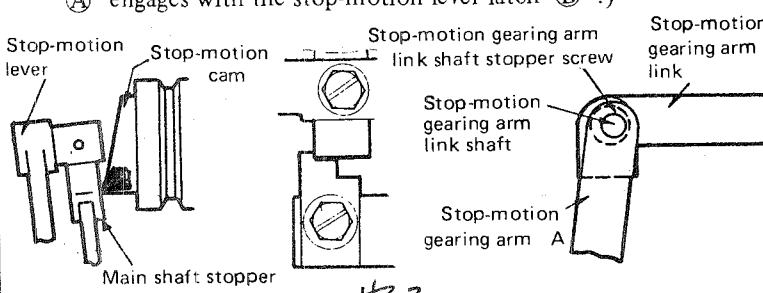
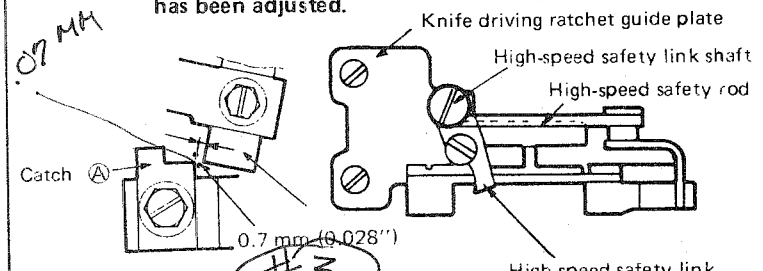
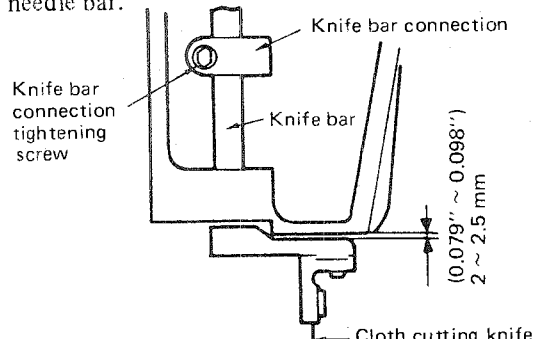
When a 0.7 mm (0.028") thick spacer is inserted between the catch ① and latch ② with the machine running at a high speed, the knife bar driving lever bell crank should move on the knife driving ratchet guide plate toward the face plate by 0 to 0.3 mm (0.012").



(42) Height of the knife bar

The clearance between the jaw of the machine arm and the knife bar should be 2 (0.079") to 2.5 mm (0.098") when the knife bar is in its highest position.

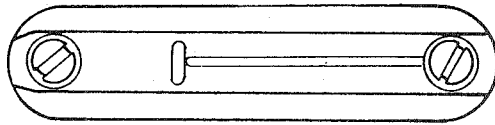


HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<p>○ When the main shaft stopper of the stop-motion lever overrides the highest point of the stop-motion cam, adjust the stop-motion gearing arm link shaft by rotating. (For the electronic stop motor, make adjustment when the second step of the electronic-motor stop-motion lever catch (A) engages with the stop-motion lever latch (B).)</p>  <p>(Induction motor) (Electronic-stop motor)</p> <p style="text-align: center;">#2</p>	<p>○ The cloth cutting knife may descend at the sewing start.</p> <p>○ The manual feed handle may fail to rotate the feed cam.</p> <p><i>Check adj with stop motion lever at highest point move feed crank one cycle there should be no movement knife during lever bell crank</i></p>
<p>○ Set the catch (A) and latch (B) to the high-speed operation state and insert a 0.7 mm (0.028") thick spacer between them. At this time, adjust the position of high-speed safety link shaft. Fix the high-speed safety link shaft using the hexagonal socket setscrew after the stop-motion lever has been set to the low-speed operation state.</p> <p>(Caution) Be sure to adjust the position of the high-speed safety link shaft after the stop-motion gearing arm link shaft has been adjusted.</p>  <p style="text-align: center;">#3</p>	<p>○ When the AO is applied to this machine to perform double stitching, an extraordinary noise may be produced near the sewing end point of the first stitching.</p> <p><i>when complete adj place drive pulley on highest top of cam check adj with easy</i></p>
<p>○ Confirm that the position of the knife bar driving lever bell crank has been adjusted and the knife bar driving lever comes in contact with the knife bar driving lever stopper. Then specify the height of the knife bar using the knife bar connection. And then, determine the position of the knife bar by tightening the connection tightening screw of the needle bar.</p> 	<p>○ If the clearance is inadequate: The knife bar may come in contact with the jaw of the machine arm resulting in the production of the extraordinary noise.</p> <p>○ If the clearance is too large: The knife bar may come in excessive contact with the safety unit. As a result, the needle thread trimmer may fail to be actuated normally.</p>

STANDARD ADJUSTMENTS

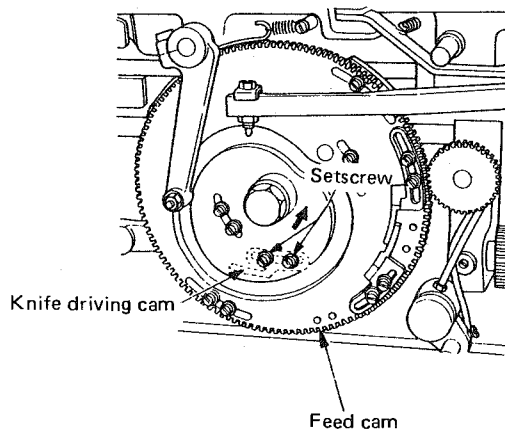
(43) Knife descending position

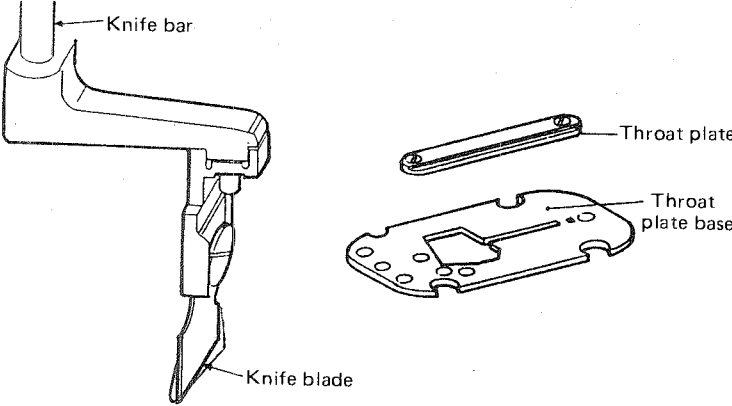
The knife should descend in the center of the knife slit in the throat plate.



(44) Timing to drop the knife

The knife should descend to cut the materials just before final three or four stitches are formed (for the number of stitches of 126) with the sewing speed reduced.



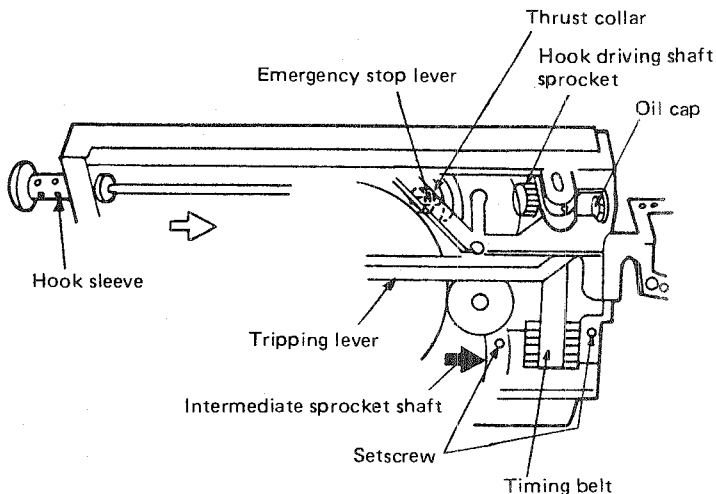
HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
<ul style="list-style-type: none"> ○ Adjust the direction of rotation of the knife using the knife bar and adjust the longitudinal and lateral direction of the knife descending position by the installing position of the throat plate base.  <p>The diagram illustrates the components of the cloth cutting knife mechanism. On the left, a side view shows the 'Knife bar' attached to the 'Knife blade'. On the right, an exploded view shows the 'Throat plate' (a thin metal strip) and the 'Throat plate base' (a larger metal plate with a central slot for the throat plate).</p>	<ul style="list-style-type: none"> ○ If the knife descending position is deviated, the blade of the cloth cutting knife may soon be worn out. <p>(Caution) If descending the cloth cutting knife manually, press the knife bar to drop the knife with the stop-motion lever set at the low-speed position. When the knife bar is raised and brought to the home position, confirm that it has been fully raised and accurately brought to the home position.</p> <ul style="list-style-type: none"> ○ Be sure to check that the bobbin thread trimmer performs properly whenever you set the position of the throat plate base. Refer to (32) on Page 32.
<ul style="list-style-type: none"> ○ Adjust the knife tripping segment so that the knife is dropped three or four stitches before the machine stops. Moving the knife tripping segment in the direction of the arrow will set the timing for dropping the knife to earlier. 	<ul style="list-style-type: none"> ○ The cloth cutting knife will not be actuated unless the knife is set to decreased in the low-speed operation state.

3. DISASSEMBLY/ASSEMBLY PROCEDURES

DISASSEMBLY/ASSEMBLY PROCEDURES

(1) Removing the hook driving shaft

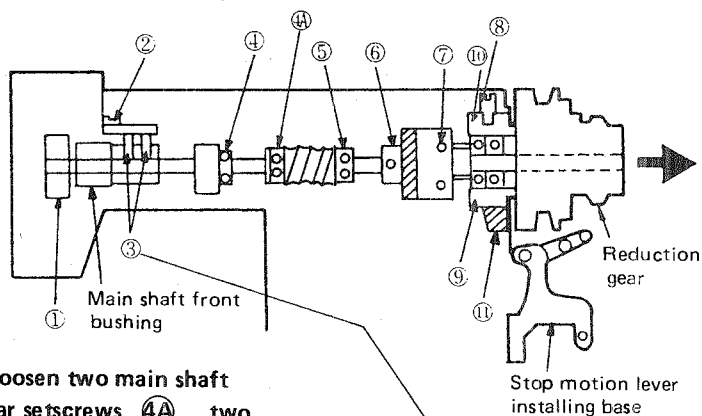
1. Tilt the machine. Then remove tripping lever, emergency stop lever and oil cap.
2. Loosen the timing belt following the procedure described in step (35) on page 36.
3. Loosen two intermediate sprocket shaft setscrews and pull out the intermediate sprocket shaft in the direction of the arrow (→).
4. Remove the timing belt from the hook driving shaft sprocket.
5. Loosen two hook sleeve setscrews.
6. Loosen two thrust collar setscrews, and then pull out the hook driving shaft in the direction of the arrow (⇨). Two ball bearings are fixed on the hook driving shaft using C ring.



⊙ Assemble the hook driving shaft following the above steps for disassembly in the reversed order.

(2) Removing the main shaft

1. Remove the reduction gear if the main shaft is replaced. (Regarding the electronic-stop motor, remove the driving pulley for the electronic-stop motor.)
2. Remove the needle.
3. Remove the stop motion lever.
4. Remove the stop motion lever installing base.
5. Loosen the timing belt following the procedure described in step (35) on page 36.
6. Loosen two counterweight setscrews ①.
7. Remove plunger installing plate setscrew ② and then pull out the plunger and two springs ③.
8. Loosen two knife driving cam setscrews ④.



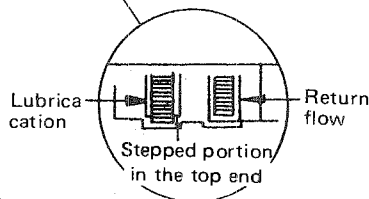
(Caution) When replacing the main shaft, loosen two main shaft intermediate bushing thrust collar setscrews ④A, two worm setscrews ⑤, two needle bar rocking small gear setscrews ⑥, and two main shaft sprocket setscrews ⑦.

9. Loosen two main shaft rear bushing outside wheel setscrews ⑧.
10. Pull out the main shaft in the direction of the arrow → together with main shaft rear bushing outside wheel ⑨ and ball bearing ⑩. (At this time, also remove oil cap ⑪.)

(Regarding the electronic-stop motor, disassembly procedures are as same as the above other than the reduction gear.)

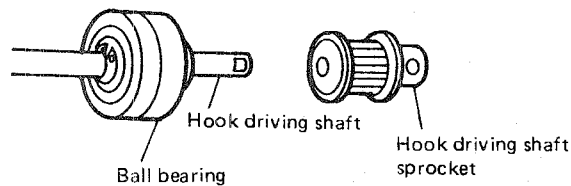
⊙ Assemble the main shaft following the above steps for disassembly in the reversed order.

[The electronic-stop motor is disassembled in the same procedure with the induction motor other than the reduction gear unit.]



CAUTIONS IN DISASSEMBLY

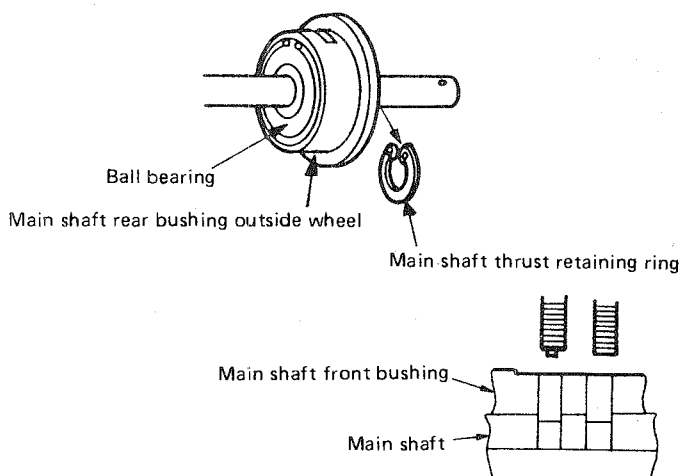
- When removing the hook driving shaft, it cannot be pulled out in the opposite direction of the arrow (\Rightarrow). (Direction of the arrow is toward the hook.) So be careful of the removing direction of the hook driving shaft.
- Do not hit the outside wheel of the ball bearing, whenever the hook driving shaft sprocket is removed from the hook driving shaft and the ball bearing is attached or detached.



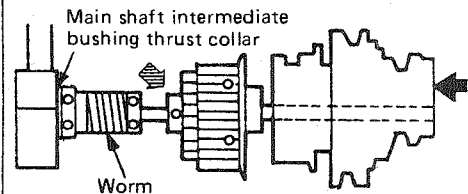
CAUTIONS IN ASSEMBLY

- When eliminating excessive play of the hook driving shaft, be sure to press the hook driving shaft toward the hook and fix the thrust collar before the timing belt is installed. (There should be approx. 0.03 mm (0.001") play around the thrust before the timing belt is installed.)

- If the outside wheel of the main shaft rear bushing is hard to be removed, apply a brass rod to the outside wheel of the main shaft rear bushing and tap the wheel lightly so that the main shaft is removed.
- Prior to the removal of the ball bearing from the main shaft, remove the main shaft thrust retaining ring of the outside wheel of the main shaft. Then apply a ring or alike onto the inside wheel of the ball bearing, and tap the main shaft so that the ball bearing is removed. When installing the ball bearing, press the inside wheel of the ball bearing.



- When eliminating the excessive play of the main shaft after the main shaft has been assembled, press the reduction gear (driving pulley for electronic motor in case of the electronic-stop motor) in the direction of the arrow (\leftarrow) and tap it lightly in the direction of the arrow (\Rightarrow). Adjust so that a 0.01 (0.0004") to 0.04 mm (0.002") play is obtained in the main shaft assembly, and then fix the main shaft using two main shaft setscrews (screw No. 1 used in the flat portion).
- Fix the main shaft thrust collar providing approx. 0.03 mm (0.001") play. Fix it pressing the worm onto the thrust collar.

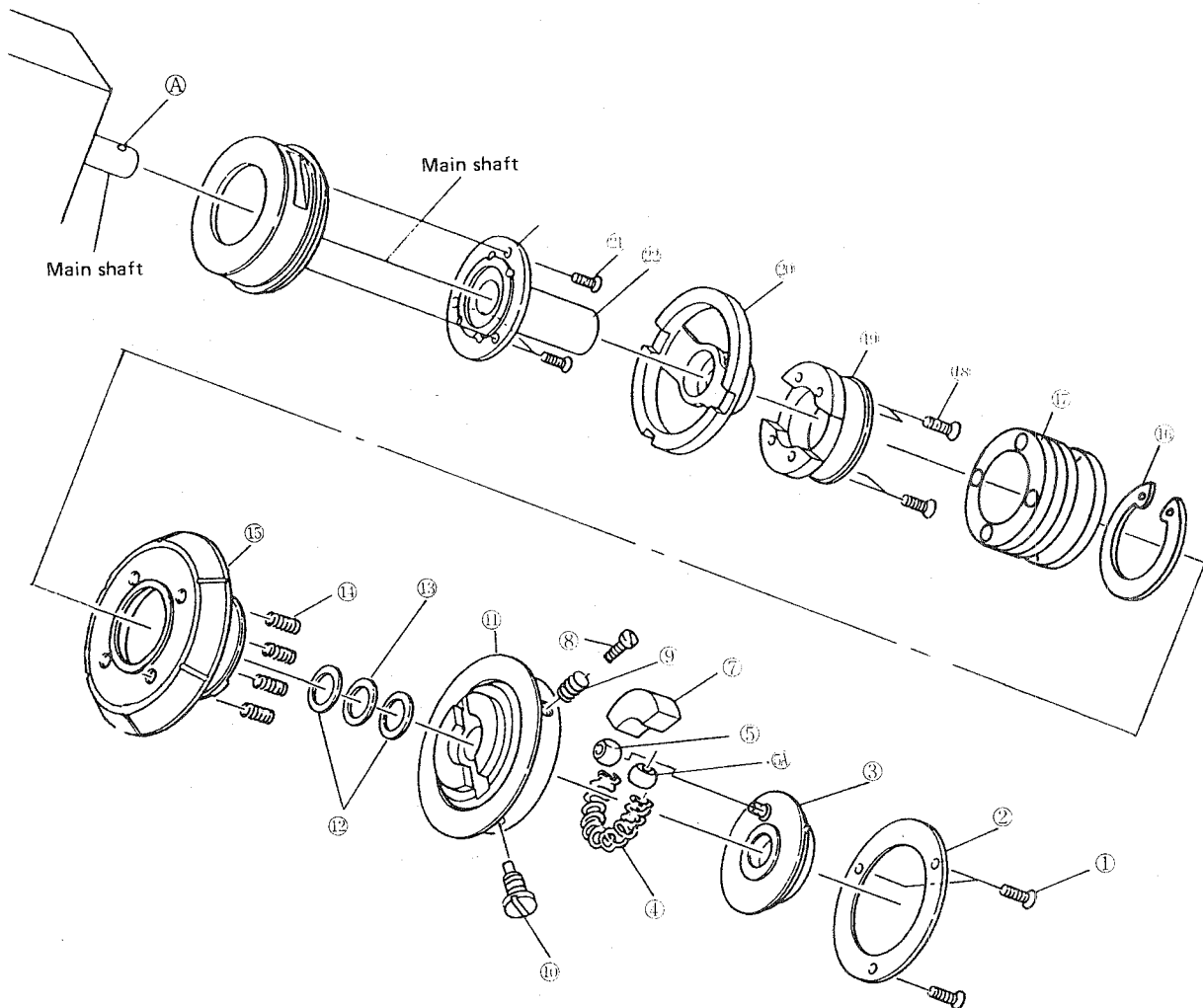


- Check if the groove of the main shaft plunger is aligned with the hole in the plunger, after the main shaft has been fixed. If not, tap the main shaft front bushing with a brass rod and move the bushing forward or backward.

DISASSEMBLY/ASSEMBLY PROCEDURES

(3) Disassembling the reduction gear (for the induction motor)

1. Remove the stop motion lever. Remove the reduction gear installing base together with the clutch lifter.
 2. Loosen stop motion cam presser plate setscrew ① , and then remove the presser plate.
 3. Remove stop motion cam ③ , stop motion compressed spring ④ , roller ⑤ and pressure bake ⑦ .
 4. Remove driving pulley oil stopcock ⑧ , and then loosen driving pulley setscrew B ⑨ .
 5. Loosen driving pulley setscrew A ⑩ , then pull out it. Remove driving pulley ⑪ from the main shaft.
 6. Remove three thrust washers ⑫ and ⑬ , and four springs ⑭ of the low speed pulley.
 7. Remove switching clutch (asm.) ⑮ .
 8. Remove low speed pulley retaining ring ⑯ , and then remove low speed pulley (asm.) ⑰ .
 9. Loosen four low speed pulley mounting base setscrews ⑱ , and then remove low speed pulley mounting base ⑲ and switching pulley shaft ⑳ .
 10. Loosen three slide bearing bracket setscrews ㉑ , then remove the slide bearing bracket.
- ◎ Assemble the hook driving shaft following the above steps for disassembly in the reversed order.

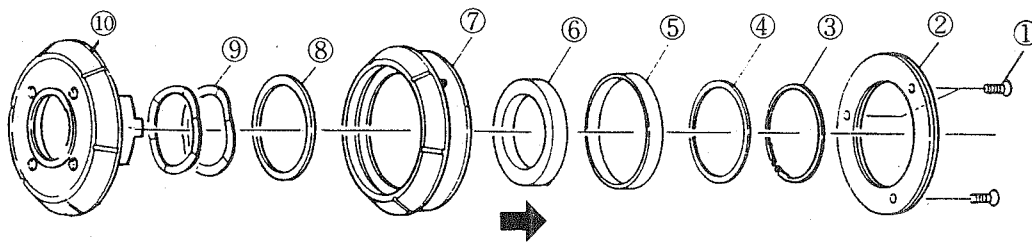


CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
<ul style="list-style-type: none"> ○ Driving pulley setscrew A ⑩ is a taper screw. It is advisable to remove the screw instead of loosening so that the reduction gear will be assembled with ease. ○ The reduction gear installing base setscrew has been fixed using the LOCK-TITE paint. (Be sure to fix the setscrew using the LOCK-TITE paint when assembling the reduction gear.) 	<ol style="list-style-type: none"> 1. Assemble ⑪ so that the taper screw ⑩ is fitted in (A) of the main shaft tapered hole. 2. Apply grease to the low-speed pulley spring, and then set it in ⑪. Be sure not to twist the low-speed pulley spring when ⑪ is fitted with ⑬. 3. When assembling, take care not to apply grease on the surfaces of the cork and the clutch. 4. When assembling, be sure to apply grease to the inner surface of ⑳ and three washers ⑫ and ⑬. 5. Assemble three washers ⑫ and ⑬ so that the plastic washer is placed between two steel washers. <p>◎ Replacing only stop-motion pressure spring ④</p> <ol style="list-style-type: none"> 1. Set the stop-motion lever for the high-speed operation, and remove ②. 2. Then after removing ③, change stop-motion pressure spring ④. 3. To install a new spring, push the crescent-shaped spring into the driving pulley with its both ends applied to rollers ⑤ and ⑤A, and then push in the central part of the spring. 4. Fit stop-motion cam pin rollers ⑤ and ⑤A onto pressure bake ⑦. 5. Apply a thin film of grease to the new spring before reinstalling ④ and ②.

DISASSEMBLY/ASSEMBLY PROCEDURES

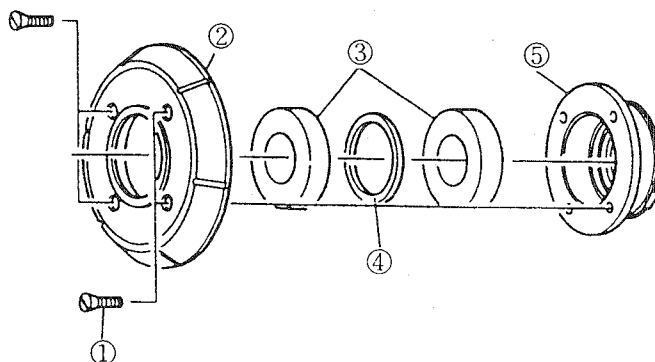
(4) Disassembling the high-speed pulley (asm.) (for the induction motor)

1. Remove high-speed pulley C ring ③ . Then remove washer ④ , high-speed pulley ⑦ , spring washer ⑧ , and two springs ⑨ from switching clutch (asm.) ⑩ .
 2. Loosen three flat clutch plate setscrews ① , and then remove flat clutch ② .
 3. Press the outside wheel of the ball bearing in the direction of the arrow (→) so that ball bearing ⑥ and bush ⑤ are removed.
- ⊙ Assemble the high-speed pulley following the above steps in the reversed order.



(5) Disassembling the switching clutch (for the induction motor)

1. Loosen four switching clutch setscrews ① , and then remove switching clutch ② and switching clutch claw ⑤ .
2. Remove two ball bearings ③ and the switching clutch ring from switch clutch claw ⑤ .

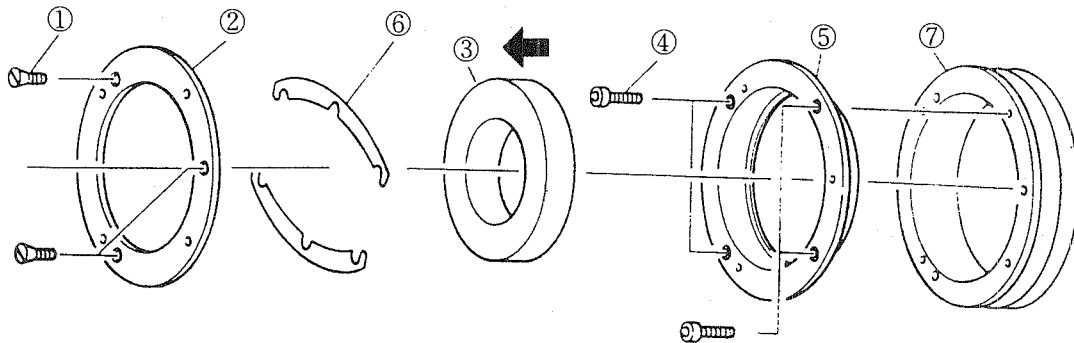


CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
<ul style="list-style-type: none"> ○ When taking out ball bearing ⑥ from high-speed pulley ⑦ , press the outside wheel of the ball bearing so that the ball bearing is not scratched. ○ Three flat clutch plate setscrews ① have been fixed using the LOCK-TITE paint. So be careful when the setscrews are removed. <div data-bbox="478 667 769 1057" style="text-align: center;"> <p>Washers</p> </div>	<ol style="list-style-type: none"> 1. Lightly apply grease on the surface of two washers ⑨ . 2. Fix three screws ① using the LOCK-TITE paint. 3. Adjust the clearance between switching clutch ⑩ and the high-speed pulley by changing the number of washers (0.2 mm (0.008\")) thick) to be applied. 4. Lightly apply grease onto the contact faces of switching clutch ⑩ and ball bearing ⑥ .
<ul style="list-style-type: none"> ○ Four switching clutch setscrews ① have been fixed using the LOCK-TITE paint. So be careful when the setscrews are removed. 	<ol style="list-style-type: none"> 1. Fix four setscrews ① using the LOCK-TITE paint.

DISASSEMBLY/ASSEMBLY PROCEDURES

(6) Disassembling the low-speed pulley (for the induction motor)

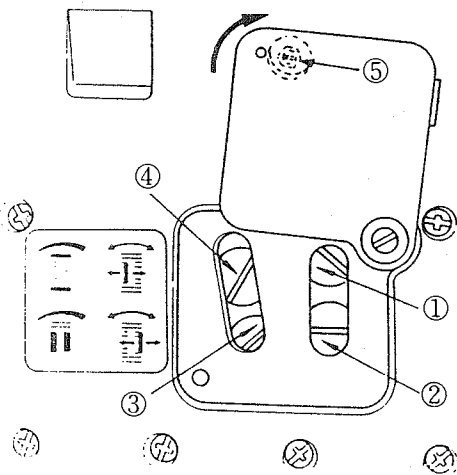
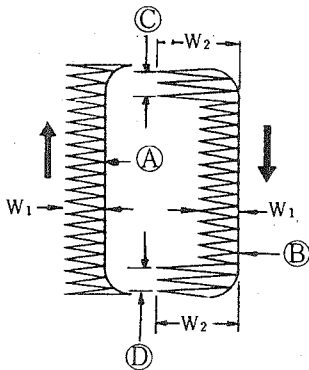
1. Loosen three low-speed bearing fixing plate setscrews ① , and then remove low-speed bearing fixing plate.
2. Loosen low-speed fixing screws ④ , and then remove low-speed pulley ⑦ from outside wheel ⑤ of the low-speed bearing.
3. Pull out the ball bearing from the low-speed pulley while pressing the ball bearing in the direction of the arrow (←).



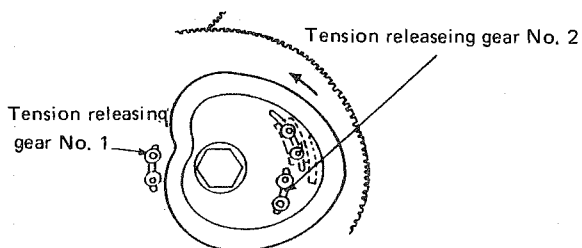
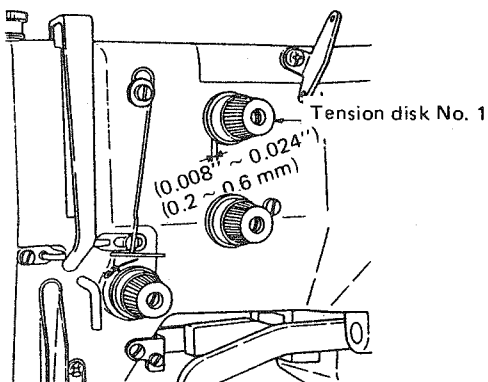
CAUTIONS IN DISASSEMBLY	CAUTIONS IN ASSEMBLY
<ul style="list-style-type: none">○ When removing the ball bearing from low-speed pulley ⑦ , press the outside wheel of the ball bearing.○ There are a set of shims ⑥ (2 pieces per set) in order to adjust all clearances in the low speed pulley (asm.).	<ol style="list-style-type: none">1. When fitting the ball bearing, take care not to scratch the end face of the low-speed pulley.2. The adjusting shims are allowed to be inserted in the low-speed pulley (asm.) after the low-speed pulley has been assembled by loosening four setscrews ④ .

4. ADJUSTMENT OF FUNCTIONS OF THE MACHINE

(1) Adjusting the overedging width and the needle position



(2) Adjusting the thread release timing



1. Needle position

The needle travels from the right to left to produce stitches. In the illustration, **A** is left base line. **B** represents right base line, " W_1 ," overedging width, and " W_2 ," bartacking width. **C** is the first bartacking, and **D** is the second bartacking.

2. Setting the left and right base lines

- ① Set the left base line **A** by turning the regulating screw ①; the left base line is moved to the left by clockwise turn or to the right by counterclockwise turn. (This adjustment for **A** is not always necessary even when the overedging width is changed.)
- ② Set the right base line **B** by turning the regulating screw ②; the right base line is moved to the left by clockwise turn and vice versa.

3. Adjusting the overedging width and bartacking width

- ① Adjust the overedging width " W_1 " by turning the regulating screw ③; the stitch width is increased by clockwise turn, and vice versa.
- ② Adjust the bartacking width " W_2 " by turning the regulating screw ④; the bartacking width is increased by clockwise turn, and vice versa.

4. Adjusting the tie stitch width

Turning zero pitch adjusting screw ⑤ clockwise will increase the tie stitch width. Turning the screw counterclockwise will decrease the tie stitch width.

Note that the stitch width will not need to be readjusted.

1. Tension post No. 1

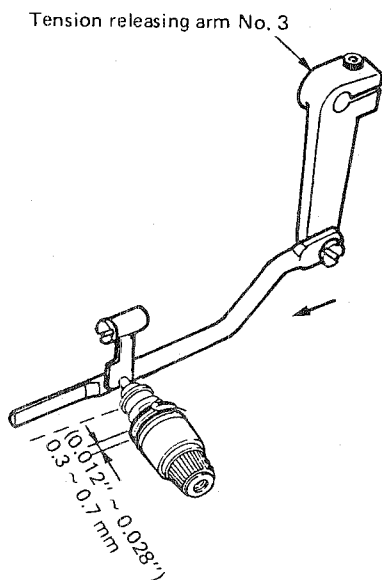
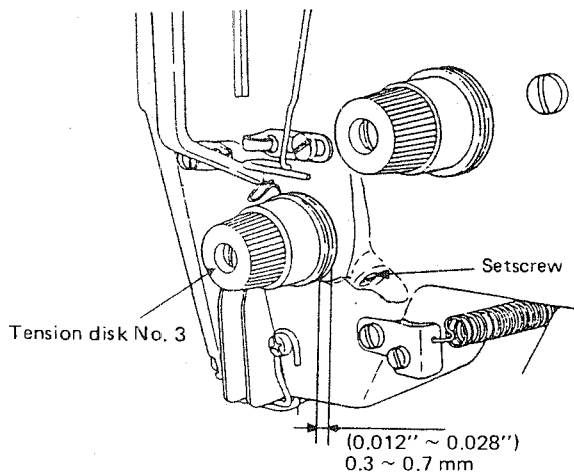
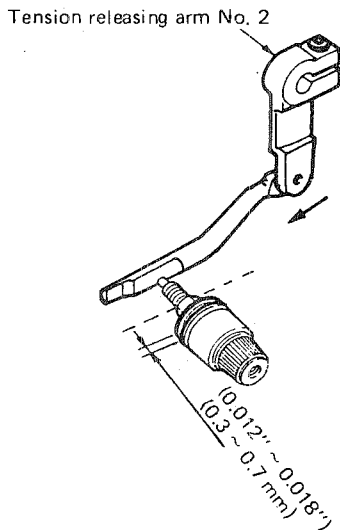
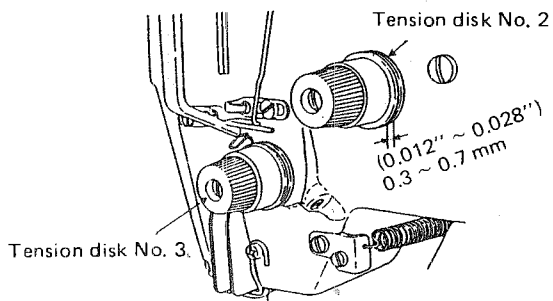
The tension disk of the controller No. 1 releases thread while the bartacking seams (whip stitching) are being formed and several stitches are being formed at the beginning and end of buttonholing. Adjust the tension post socket so that the tension disk floats to make a gap of 0.2 (0.008") to 0.6 mm (0.024") for releasing thread.

< Timing of thread tension release >

For stitching the first bartacking part, make adjustment so that tension release is terminated one or two stitches before completion of the bartacking in order to prevent the crest of seam from tilting outward after completion of the first bartacking. Adjust the thread tension releasing duration so that the tension release is terminated after 3 to 4 stitches from the sewing start.

< How to adjust >

The timing for releasing the thread tension becomes earlier when the tension releasing gears No. 1 and No. 2 on the feed cam are moved in the direction of the arrow. If those gears are moved in the opposite direction of the arrow, the thread tension releasing timing will be delayed.



2. Tension post No. 2

The tension disk of the tension controller No. 2 floats when the machine is in the low-speed operation and in the stop-motion. The appropriate floating amount of the disk is to make a gap of 0.3 (0.012") to 0.7 mm (0.028"). Adjust the tension post socket so that the specified floating amount is obtained.

< Timing for thread tension release >

Adjust so that the tension disk floats while the machine runs in the low-speed operation, and the tension disk closes in the high-speed operation.

< How to adjust >

The sewing machine incorporates the stop-motion lever which acts in accordance with the high-speed or low-speed operation of the machine. Set catch **A** on the stop-motion lever to be engaged with latch **B** on the hook releasing lever. In the high-speed state and in the low-speed state, moving the tension releasing arm No. 2 in the direction of the arrow will float the disk earlier and moving the arm in the opposite direction of the arrow will float the disk later.

3. Tension post No. 3

The tension disk of the tension controller No. 3 floats only when the machine enters into the stop-motion state and then stops. The appropriate floating amount of the disk is to make a gap of 0.3 (0.012") to 0.7 mm (0.028"). Loosen the setscrew and adjust the floating amount by moving the tension post socket.

< How to adjust >

When the tension post No. 3 overrides the stop-motion cam just before the machine enters into the stop motion state, moving the thread releasing arm No. 3 in the direction of the arrow will float the disk earlier and moving the arm in the opposite direction of the arrow will float the disk later.

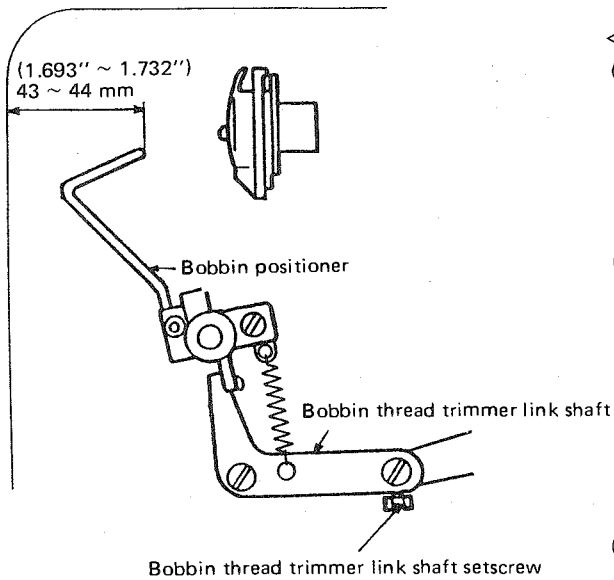
When the gap in each tension disk of the tension controllers No. 1, No. 2 and No. 3 is increased, the thread tension releasing duration will be increased.

(Caution)

Adjustment of the tension post No. 3 may cause the breakage of the O ring by the screw resulting the oil leak from the thread tension controller components. So be careful of adjustment of the tension post No. 3.

(3) Adjusting the bobbin positioner

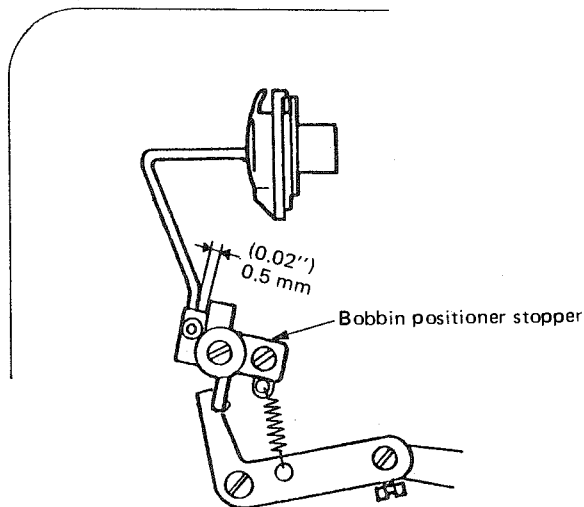
Interlocked with the bobbin thread trimmer, the bobbin positioner functions to prevent a bobbin from running idle by pressing the bobbin from the front of the sewing hook at the time of pulling bobbin thread. It also serves to pull remaining needle thread in under a fabric. Furthermore, since the bobbin positioner is interlocked with the hook cover, the bobbin positioner releases the bobbin case at the time of opening the hook cover. This permits a bobbin case to be installed or removed with ease.



< How to adjust >

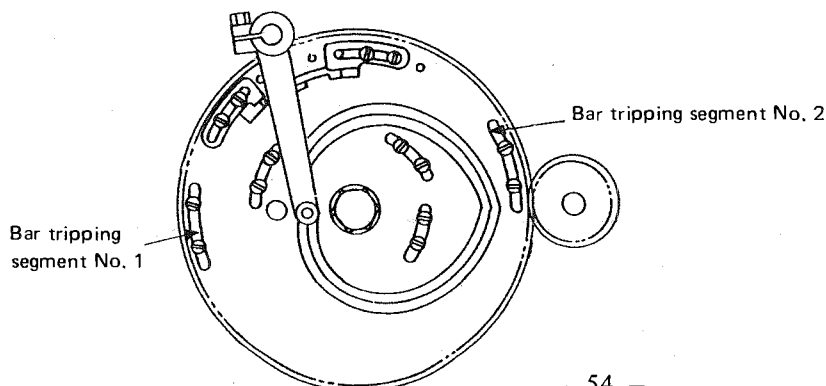
- ① Position of the bobbin positioner
Loosen the setscrew and adjust the position of the bobbin positioner so that the top end of the bobbin positioner enters the center of the hole in the front face of the bobbin case.
- ② Returning position of the bobbin positioner
The distance between the top end of the bed and the top end the bobbin positioner should be 43 (1.693") to 44 mm (1.732") when the presser bar lifting lever is not actuated. Loosen the bobbin thread trimmer link shaft setscrew and make adjustment by turning the bobbin thread trimmer link shaft.
- ③ Actuating position of the bobbin positioner
Adjust the position of the stopper so that a 0.5 mm (0.02") clearance is obtained between the bobbin positioner arm and the bobbin positioner stopper when the presser bar lifting lever actuates and causes the bobbin positioner to press the bobbin.

(Caution) Be sure to perform adjustments in steps ② and ③ with the hook cover closed.



(4) Changing the number of stitches at bartacking part and the cam to be used

Bartacking part	Standard	20% decrease
First bartacking	13753702	13793906
Second bartacking	13753801	13794003

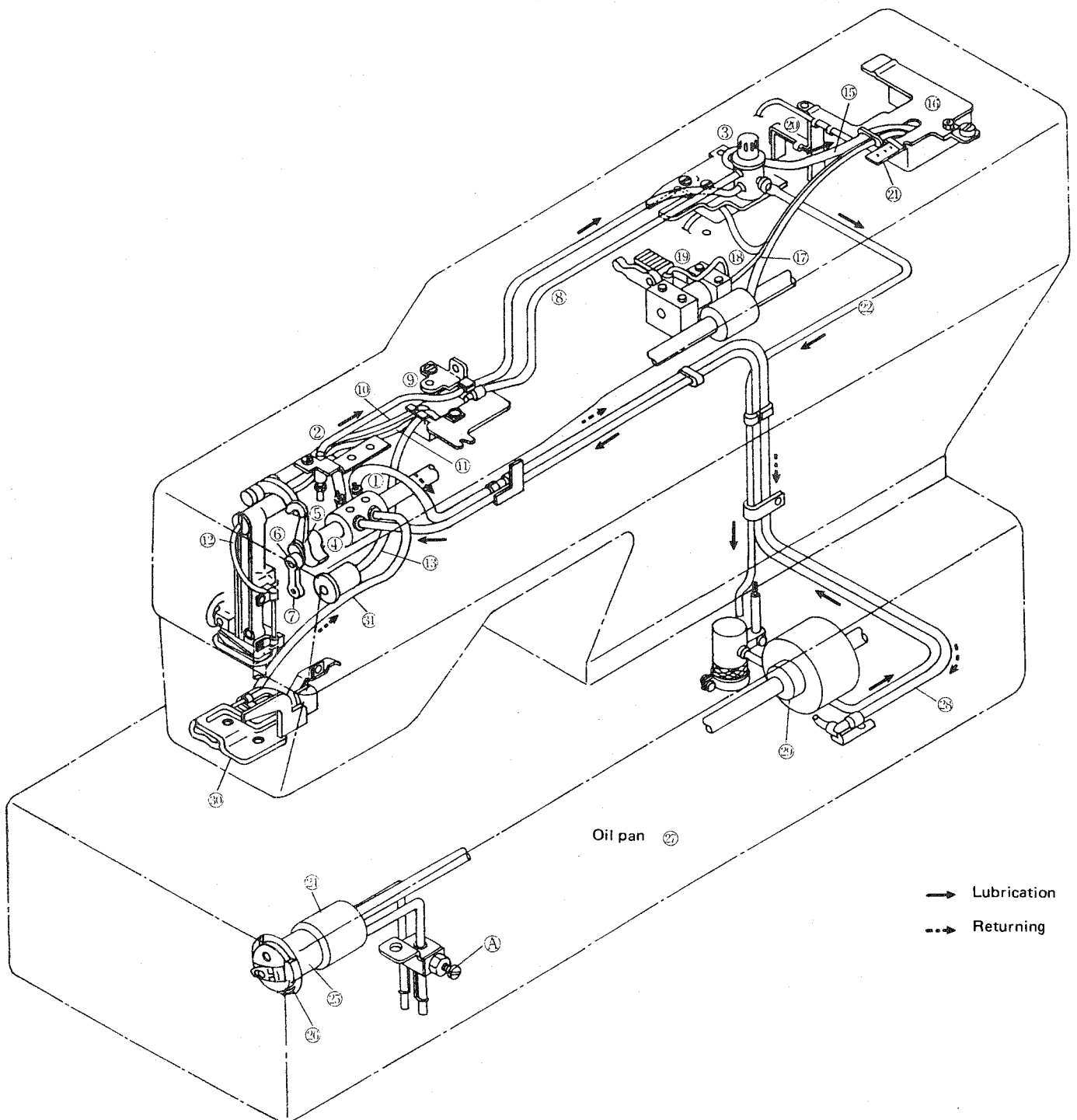


5. LUBRICATION SYSTEM

(1) General

The lubrication system of this machine is as shown in the figure.

In this figure, the oil flow is shown by the arrow. A plunger pump making use of the main shaft that sucks up oil in oil pan ⑰, and the sucked-up oil is temporarily discharged to oil separation shaft ③ before distributed to each section to be lubricated.



(2) Lubricating each section

1. The oil discharged from plunger ① will pass through separation pipe ② and main shaft front bushing ④, then through the main shaft, the counterweight, and the needle bar crank. Then it will be distributed to ;

- i) thread take-up bearing ⑤ ,
- ii) needle bar crank rod bearing ⑥ ,
- iii) needle bar connection ⑦ through the needle bar crank rod

The volume of oil to be lubricated is adjusted using main shaft oil amount adjusting ⑧ .

2. The oil in front oil pan ⑨ which is discharged from lubricating separation shaft ③ through oil wick ⑧ will be distributed to ;

- i) thread take-up support shaft ⑩ through an oil wick and rod felt,
- ii) needle bar rocking frame through an oil wick, and then needle bars ⑪ and ⑫ through the felt,
- iii) needle bar rocking shaft front bushing ⑬ .

The oil is supplied to the face plate components in the form of oil drops.

3. The oil in rear oil pan ⑬ which is discharged from lubricating separation shaft ③ through oil wick ⑮ will be discharged to ;

- i) main shaft intermediate bushing ⑰ ,
- ii) knife bar driving crank shaft and knife bar driving rod ⑱ through an oil wick,
- iii) knife bar driving crank ⑲ through an oil wick and the Vilene cloth,
- iv) cam driving gear and needle bar rocking cam ⑳ through the Vilene cloth.

The oil is supplied to the moving components in the form of oil drops.

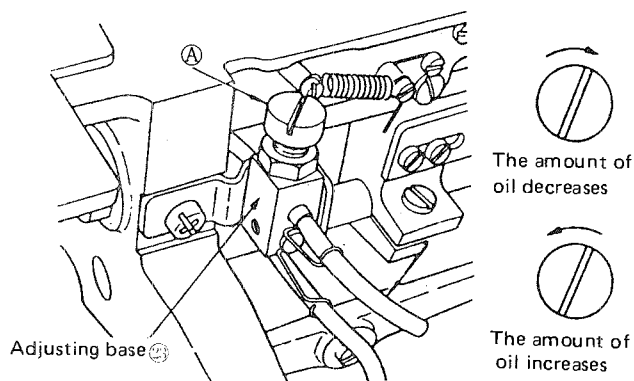
4. The oil which comes from lubricating separation shaft ③ will be discharged to sewing machine head base components ⑳ through pipe ㉑ .

Then the oil will be distributed to hook driving shaft front bushing ㉒ through an oil wick, then to hook sleeve ㉓ and hook ㉔ through an oil wick. The volume of oil to be lubricated to the hook is controlled using hook oil adjusting shaft ㉕ .

5. The oil returned from the face plate through oil returning felt ㉖, will pass through oil returning pipe ㉗ and will be directly distributed to hook driving shaft thrust collar ㉘ .

(3) Adjusting the volume of lubricating oil

1. Adjusting the volume of lubricating oil to the hook



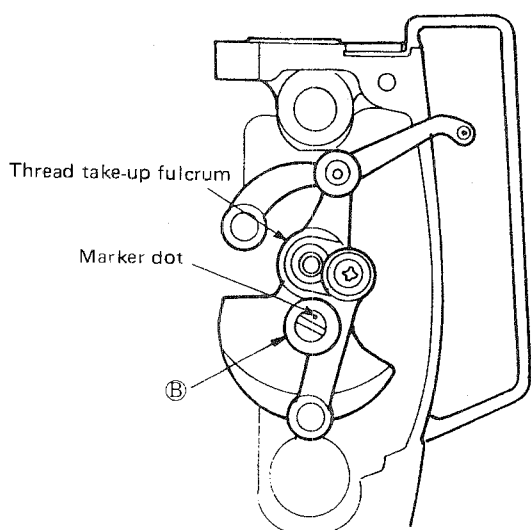
The amount of the lubricating oil to the hook is adjusted using adjusting screw ① on adjusting base ②.

The adjustment procedure is described in the Instruction Manual. However, if the amount of lubricating oil has been extremely decreased, check for the appropriate amount of lubricating oil after sewing approx. 100 pieces of material on trial.

Take care not to set the amount of lubrication oil to zero.

If the sewing speed has been changed, also check the amount of lubricating oil as mentioned above.

2. Adjusting the volume of lubricating oil for the face plate components

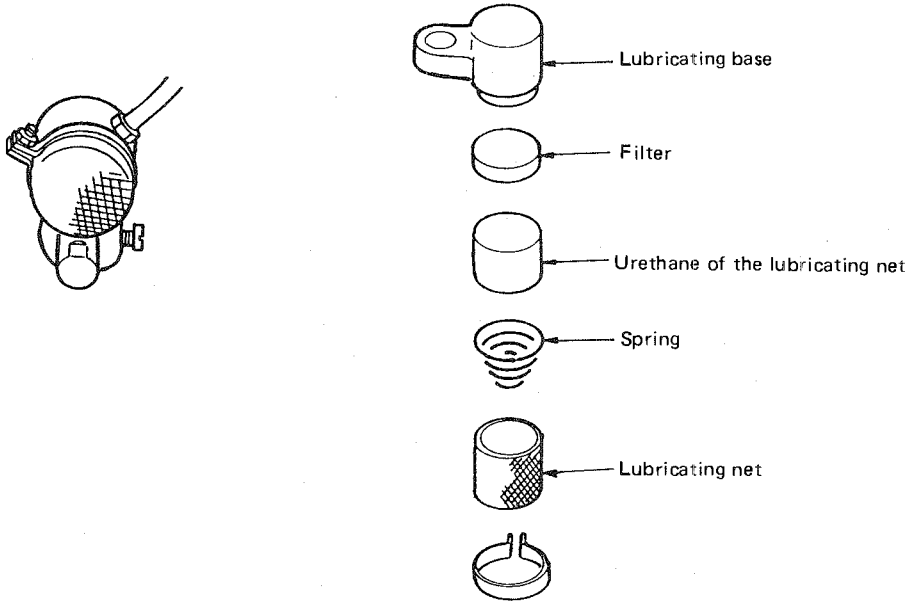


The figure observed from the face plate

Adjust the amount of oil to be lubricated to the face plate components using oil amount adjusting screw ③. Setting the marker dot on the adjusting screw in the figure closer to the thread take-up fulcrum will decrease the amount of oil to be lubricated, and setting it away from the fulcrum will increase the amount of oil. The lubrication system for this model incorporates the returning pump and the lubricating pump. Since each pump is designed to operate independently, the pump works to achieve the most efficient result. It is advisable to set the amount of lubricating oil to relatively small. If the oil amount adjusting screw is operated to adjust the amount of the oil to be lubricated, the amount of oil will be temporarily increased. Then the amount of oil will be gradually decreased, and there might be a case that no oil is lubricated. Take enough care when adjusting the amount of lubricating oil.

(Note)

If the lubricating net is clogged with dust or flocks, the amount of oil to be lubricated will be reduced. Be sure to wash the lubricating net, urethane of the lubricating net, and the filter with cleansing oil.



(4) Other sections to be lubricated

Grease is applied to the thrust washer in the main shaft rear bushing. Apply grease of high quality to the washer when disassembling or assembling.

< Checking the lubrication >

Check for the normal flow of the lubricating oil while observing from the oil window.

(Caution)

If a machine which is newly set up, or has been out of use for a long time, each section of the machine run dry because the lubricating oil has not been supplied.

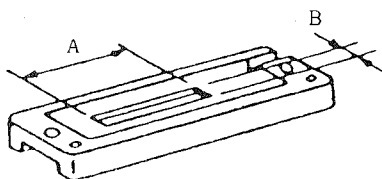
In this case, supply oil more than standard amount of oil to be lubricated through the oiling hole in the top cover, remove the rubber plug and fill approx. 5 cc of oil through it. Then start operating the machine.

In lubricating separation shaft ③ does not suck up oil even after the above action has been taken, remove the top cover, apply a few drops of oil to the plunger pump, and allow the machine to run idle at a low speed to confirm that the oil is sucked up.

6. SPECIAL PARTS

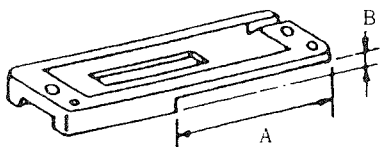
(1) Work clamp check for knit and knitted fabric

1. LBH-791K (for flat part)



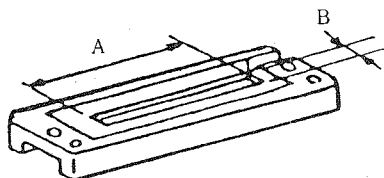
	Dimension A	Dimension B	Knife blade width	Buttonholing width	Part No.
1	7.3 mm (0.287")	5.2 mm (0.205")	5/8"	22 mm (0.866")	D1508771KOB
2	11.3 mm (0.445")	5.2 mm (0.205")	1/2"	18 mm (0.709")	D1508771KOC

LBH-791K (for overlapped part)



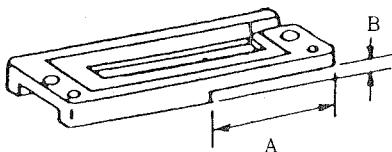
	Dimension A	Dimension B	Knife blade width	Buttonholing width	Part No.
1	7.3 mm (0.287")	0.9 mm (0.035")	5/8"	22 mm (0.866")	D1508771KOE
2	11.3 mm (0.445")	0.9 mm (0.035")	1/2"	18 mm (0.866")	D1508771KOF

2. LBH-792K (for flat part)



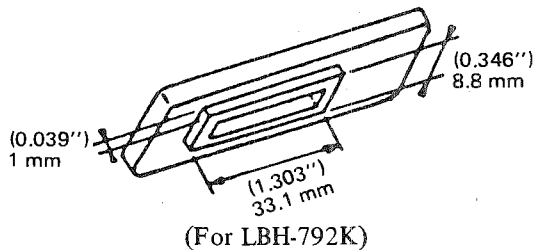
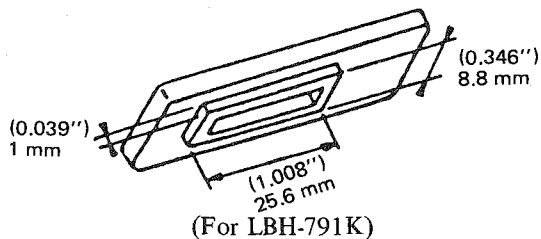
	Dimension A	Dimension B	Knife blade width	Buttonholing width	Part No.
1	37 mm (1.457")	5.2 mm (0.205")	1"	33 mm (1.299")	D1508772KOA
2	29.5 mm (1.161")	5.2 mm (0.205")	3/4"	25.5 mm (1.004")	D1508772KOB
3	22 mm (0.866")	5.2 mm (0.205")	1/2"	18 mm (0.709")	D1508772KOC

LBH-792K (for overlapped part)



	Dimension A	Dimension B	Knife blade width	Buttonholing width	Part No.
1	7.8 mm (0.307")	0.9 mm (0.035")	1"	33 mm (1.299")	D1508772KOD
2	15.3 mm (0.602")	0.9 mm (0.035")	3/4"	25.5 mm (1.004")	D1508772KOE
3	22.8 mm (0.898")	0.9 mm (0.035")	1/2"	18 mm (0.709")	D1508772KOF

3. LBH-791K, -792K (for top-center plait)



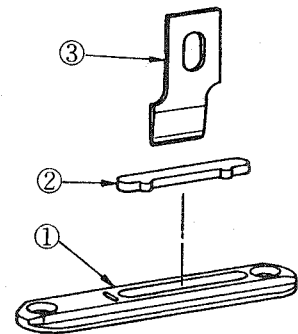
	Knife blade width	Buttonholing width	Part No.
For LBH-791K	1/2"	18 mm (0.709")	D1508771KOH
For LBH-792K	3/4"	25.5 mm (1.004")	D1508772KOH

(2) Cloth cutting knives for special fabric

These knives are intended for use with non-twisted yarn fabric (including that used in women's blouses) so that hitching is prevented.

Recently, fabric woven with non-twisted yarn is being sold in the market in addition to general twisted yarn fabric. Non-twisted yarn fabric is likely to become hitched when the machine performs buttonholing and the cloth cutting knife cuts a hole for a button. However, these special cloth cutting knives are effective in preventing non-twisted yarn fabric from becoming hitched.

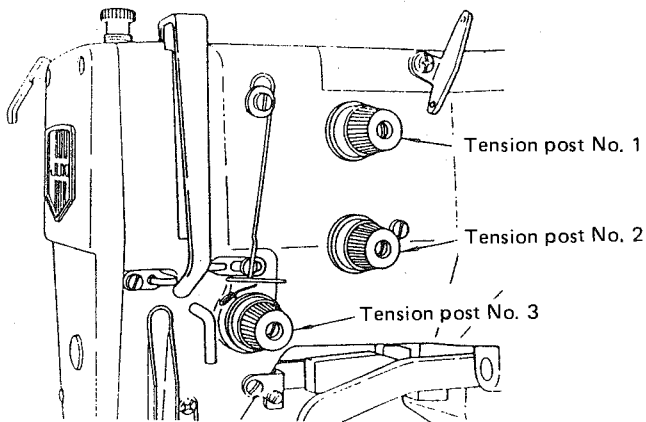
	Part No.	Part Name	Size
①	13782800	Throat plate	For 1/4" to 1 1/4"
②	B2746771000	Knife receiving plate	For 1/4" to 1 1/4"
③	B2745771F00	Knife	For 1/4"
	B2745771K00	Knife	For 3/8"
	B2745771L00	Knife	For 1/2"
	B2745771M00	Knife	For 5/8"
	B2745771N00	Knife	For 3/4"
	B2745771P00	Knife	For 7/8"
	B2745771Q00	Knife	For 1"
	B2745771R00	Knife	For 1 1/8"
	B2745771S00	Knife	For 1 1/4"



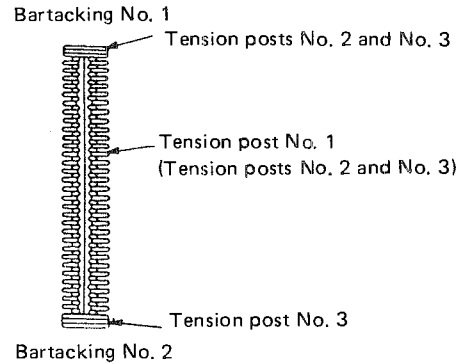
7. STITCHING ADJUSTMENT

(1) Adjusting the needle thread tension

Purl stitch

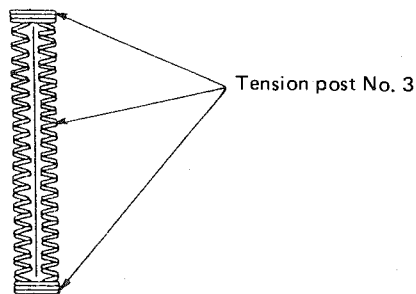


Adjusting each section of purl stitched seam



Adjust each section of purl stitched seam using the relevant tension controllers as shown in the figure.

Whip stitch

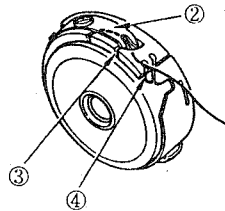
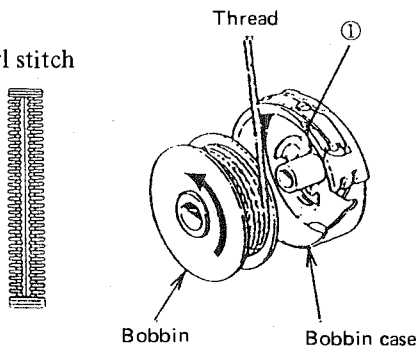


Set the thread tension of Tension posts No. 1 and No. 2 to zero and adjust the needle thread tension for whip stitching using Tension post No. 3.

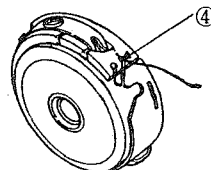
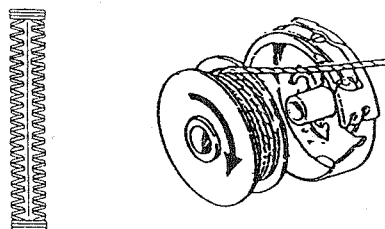
(2) Threading the bobbin case

Direction of rotation and threading the bobbin

Purl stitch

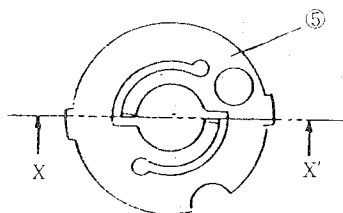


Whip stitch



1. The direction of rotation of purl stitch is different from that of whip stitch.
2. Set a bobbin in the bobbin case so that the bobbin rotates in the direction of the arrow.
3. Pass the thread through threading slit ①, then pass it under tension spring ②. Then pass it through threading slit ③ and pull it out from ④.
4. Threading for purl stitch and for whip stitch are different with regard to ④.

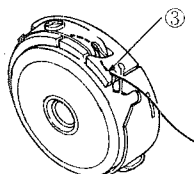
(3) Adjusting the bobbin race preventing spring



If the bobbin races, be sure to adjust the height of the bobbin race preventing spring ⑤ as shown in the figure.

(0.059" ~ 0.079")
1.5 ~ 2 mm

(4) Adjusting the bobbin thread tension

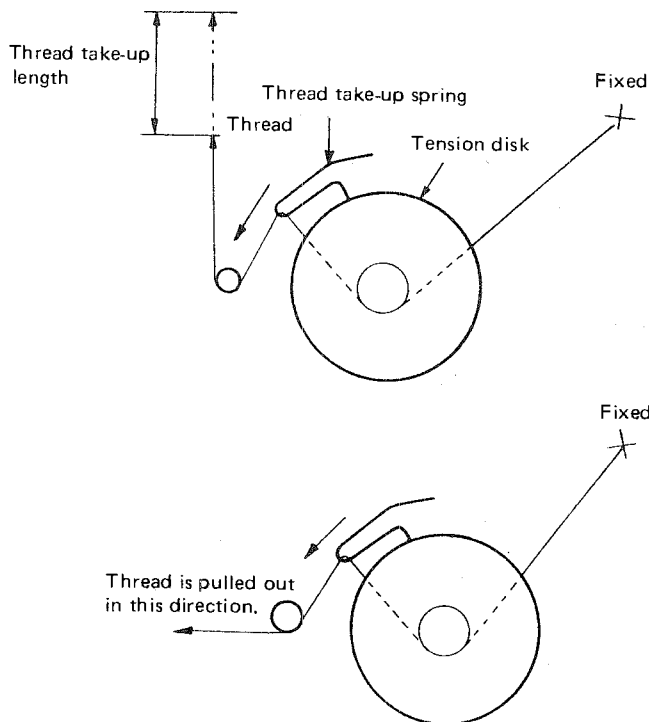


Adjust so that the thread tension as shown in the table below is obtained when the threading thread ③ faces upward.

Purl stitch	5 to 10 g
Whip stitch	15 to 30 g

Decrease the bobbin thread tension for synthetic filament thread and increase the bobbin thread tension for spun thread. The bobbin race preventing spring of the bobbin case will increase the bobbin thread tension further by approx. 5 g.

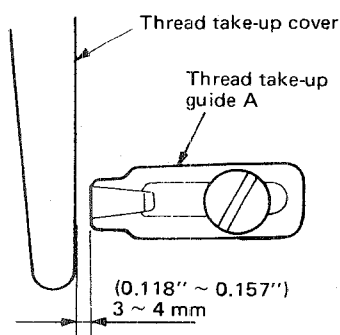
(5) Adjusting the thread take-up spring



Adjust the thread take-up spring so that the thread is drawn (thread take-up amount) by 8 (0.315") to 10 mm (0.394") with the thread take-up spring at the lowest position from its home position when the bobbin thread is pulled with its one end fixed.

The appropriate bobbin thread tension is 5 to 10 g when the bobbin thread is drawn as shown in the figure and the thread take-up spring moves 1 (0.039") to 2 mm (0.079") away from the home position.

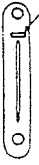
(6) Adjusting the thread take-up guide



Normally, the thread take-up guide A is positioned in the leftmost (the clearance between the thread guide A and the thread take-up cover is 3 (0.118") to 4 mm (0.157")). Moving the thread guide A to the right will increase the bobbin thread tension. In this case, the bobbin thread which is not stout enough will likely be broken.

8. TROUBLES AND CORRECTIVE MEASURES (WITH REGARD TO SEWING)

(1) Sewing components

Trouble	Cause (1)	Cause (2)	Corrective measures	
1. Needle thread is broken.	1-1) The needle is not attached properly.	1)-A The needle faces toward the wrong direction.	Attach the needle so that the indented portion of the needle faces toward you observed from the front face of the sewing machine.	
		1)-B The height of the needle is not proper.	Insert the needle into the needle bar until its shank will go no further.	
		1)-C The needle is bent.	Place the needle on a flat surface such as a table, turn the needle while pressing its shank with a finger to check for the bent in the tip of the needle. If it is bent, replace the needle.	
	1-2) Needle threading error.	1-3) Scratch on the components related to threading.	3)-A Scratches on the thread take-up spring, thread take-up, tension disk, throat plate, needle bar, or bobbin thread guide. The thread path abrades.	Re-thread the needle properly.
			3)-B Scratches on the blade point of the hook or the periphery of the hook.	Buff the scratched points of the parts or replace the scratched parts. Check carefully the finish of the bottom face of the needle hole in the throat plate.  Check this point.
	1-4) Defective adjustment of the parts related to thread tension.	4)-A Improper tension of the Tension post No. 1	4)-A Improper tension of the Tension post No. 1	Adjust the bobbin thread tension to the optimum tension, then adjust the Tension post No. 1 while checking the crest of seam on the banks. (See the Instruction Manual.)
			4)-B Improper tension of the Tension post No. 2 or No. 3	Adjust the stitch formation of the bartacking sections of the seam while observing the stitch relation between the needle thread and the bobbin thread (needle thread on the right side of the workpiece and bobbin thread on the wrong side of the workpiece).
		4)-C Defective tension or stroke of the thread take-up spring	Adjust so that the stroke of the thread take-up spring is 8 mm (0.315") to 10 mm (0.394") (standard value) and the tension of it is 5 to 10 g (standard value).	

1-5) The timing relation between the needle and the hook is improper.

5)-A The height of the needle bar is not correct.

Be sure to adjust the timing between the needle and the hook at the time when the needle descends on the center of the needle hole in the throat plate on the left base line. At this time, adjust the height of the needle bar so that a 1.2.3 mm (0.484") (K.T.V. timing is 1.1.0 mm (0.433")) clearance is obtained between the bottom end of the needle bar and the surface of the throat plate at the lowest point of the needle bar, using the timing gauge No. 1.

5)-B The blade point of the hook is not aligned with the needle.

Be sure to adjust the timing between the needle and the hook at the time when the needle descends on the center of the needle hole in the throat plate on the left base line. Loosen the hook sleeve setscrew and adjust so that the blade point of the hook is aligned with the center of the needle when the needle goes up from the lowest point of its stroke, using the timing gauge No. 2. Confirm that the needle does not come in contact with the blade point of the right stitch base line (when the needle rocks to the right). At this time, the clearance between the needle and the blade point of the hook should be 0.01 mm (0.0004") to 0.04 mm (0.002").

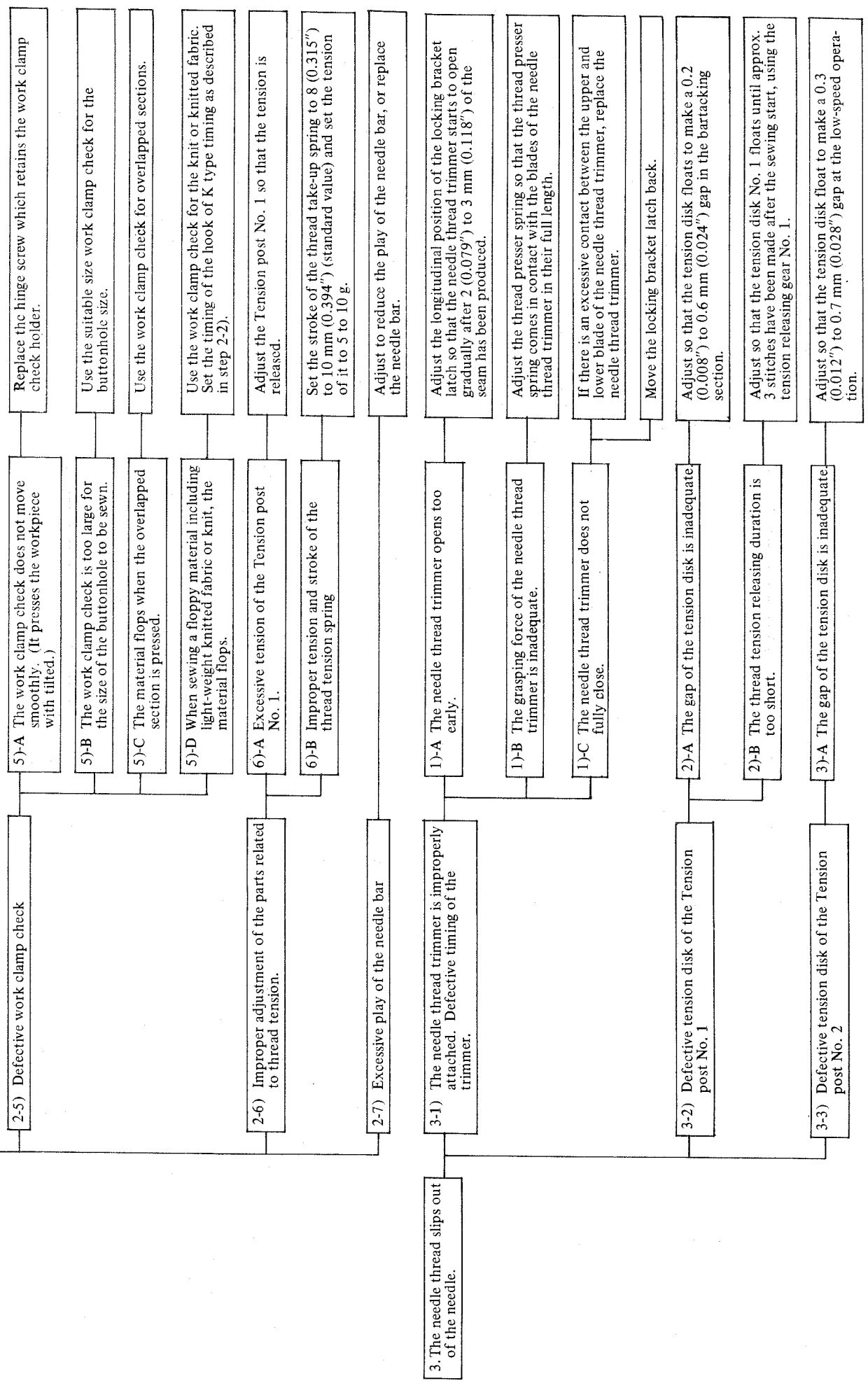
1-6) Thread is caught in the hook.

Remove the thread (single yarn) caught in the inner hook and outer hook.

1-7) Thread is broken by the heated needle.

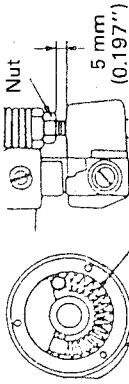
Decrease the sewing speed.

Trouble	Cause (1)	Cause (2)	Corrective measures
2. Stitch skips.	2-1) The needle is improperly attached.	1)-A The needle faces toward the wrong direction.	Attach the needle so that the indented portion of the needle faces toward you observed from the front of the machine.
	1)-B The height of the needle is not proper.	1)-B The height of the needle is not proper.	Insert the needle into the needle bar until its shank will go no further.
	1)-C The needle is bent.	1)-C The needle is bent.	Place the needle on a flat surface such as a table, turn the needle while pressing its shank with a finger to check for the bent in the tip of the needle. If it is bent, replace the needle.
	1)-D The tip of the needle is blunt.	1)-D The tip of the needle is blunt.	Replace the needle.
	1)-E The needle used is too thin.	1)-E The needle used is too thin.	Use the needle according to the material and thread used.
	2-2) The timing relation between the needle and the hook is improper.	2)-A The height of the needle bar is not correct.	Be sure to adjust the timing between the needle and the hook at the time when the needle descends on the center of the needle hole in the throat plate on the left base line. At this time, adjust the height of the needle bar so that a 12.3 mm (0.484") (K.T.V. timing is 11.0 mm (0.433")) clearance is obtained between the bottom end of the needle bar and the surface of the throat plate at the lowest point of the needle bar, using the timing gauge No. 1.
	2)-B The blade point of the hook is not aligned with the needle.	2)-B The blade point of the hook is not aligned with the needle.	Be sure to adjust the timing between the needle and the hook at the time when the needle descends on the center of the needle hole in the throat plate on the left base line. Loosen the hook sleeve setscrew and adjust so that the blade point of the hook is aligned with the center of the needle when the needle goes up from the lowest point of its stroke, using the timing gauge No. 2. Confirm that the needle does not come in contact with the blade point of the right stitch base line (when the needle rocks to the right). At this time, the clearance between the needle and the blade point of the hook should be 0.01 mm (0.0004") to 0.04 mm (0.002").
	2-3) The blade point of the hook is blunt.	3)-A The needle comes in contact with the blade point of the hook.	Adjust the blade point of the hook or replace the hook. Then adjust the timing of the hook referring to step 2)-B.
	2-4) The bobbin thread is too short.	2-4) The bobbin thread is too short.	This occurs by the causes which are same with those of the thread slip-out. Refer to the "Thread slips out of the needle."

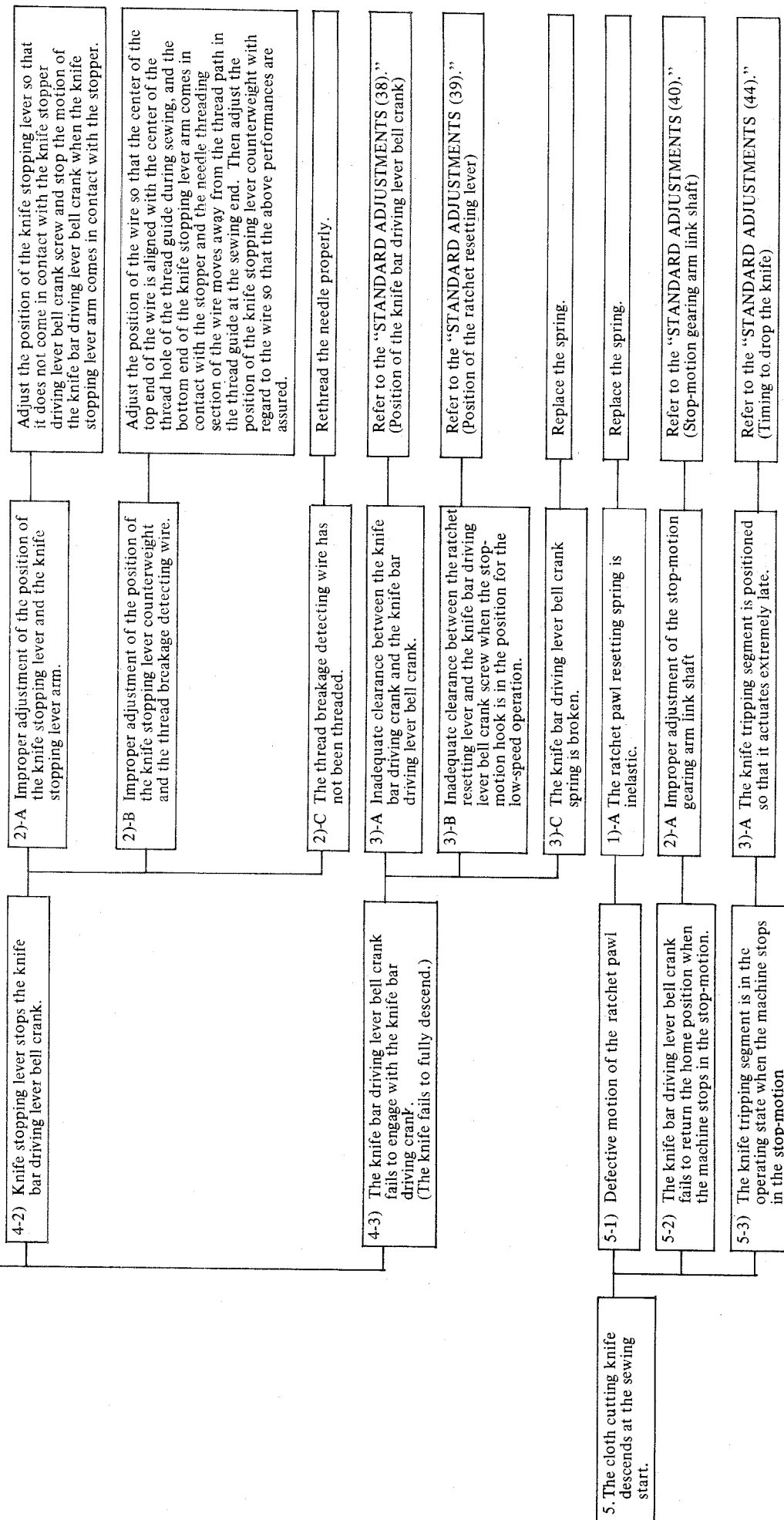


Trouble	Cause (1)	Cause (2)	Corrective measures	
3-4) Defective tension disk of the Tension post No. 3	3-5) The needle thread trimmer is improperly attached. Defective timing of the trimmer.	4)-A The gap of the tension disk is inadequate.	Adjust so that the tension disk floats to make a 0.3 (0.012") to 0.7 mm (0.028") gap at the stop motion. (Confirm that the tension disk closes at the low-speed operation.)	
		4)-B Tension of the Tension post No. 3 is excessive.	Adjust the tension so that whip stitch is made at the sewing start.	
		5)-A The needle thread trimmer opens too early.	Adjust to reduce the clearance between the bobbin thread trimmer lever and the stopper.	
		5)-B The grasping force of the needle thread trimmer is inadequate.	Adjust the position of the bobbin thread trimmer actuating cam so that the timing to open the bobbin thread trimmer is delayed.	
		5)-C The needle thread trimmer does not fully close.	Adjust the thread presser spring so that the thread presser spring comes in contact with the blades of the needle thread trimmer in their full length.	
		3-6) Thread slips out of the needle because the thread splits finely.	3-7) Incorrect stopping position of the main shaft (electronic-stop motor)	Adjust the bobbin thread trimmer link shaft (eccentric shaft) so that the distance between the center of the groove in the blade and the top end of the bobbin trimmer becomes 2 (0.079") to 3 mm (0.118").
		3-8) Incorrect position of the bobbin thread catching plate	Refer to the "Needle thread is broken."	Refer to "STANDARD ADJUSTMENTS (24)."
		4-1) The timing of the bobbin thread trimmer is not correct.	7)-A Incorrect position of the position detection magnet.	Refer to "STANDARD ADJUSTMENTS (24)."
5-1) The stitch width at the sewing end is too small.	8)-A The bobbin thread catching plate is excessively recessed.	Adjusted so that the bobbin thread catching plate is longitudinally aligned to 0.3 mm (0.012")		
5-2) Incorrect tension of thread tension disk No. 3	4-4) The bobbin thread fails to be caught properly.	Adjust the position of the bobbin thread trimmer. (Refer to the "STANDARD ADJUSTMENTS (28).")		
5-3) Incorrect stopping position of the main shaft (electronic-stop motor)	5-1) The needle thread is re-mained on the needle.	Adjust so that the stitch width of tie stitch at the sewing end is 0.3 (0.012") to 0.6 mm (0.024"). (Refer to the "STANDARD ADJUSTMENTS (6).")		
5-4) Incorrect position of the supporting plate of the needle thread trimmer	2)-A The tension of thread tension disk No. 3 is inadequate.	Increase the tension of thread tension disk No. 3.		
	2)-B The thread tension disk closes too late.	Quicken the timing of the closing of thread tension disk No. 3		
	3)-A Incorrect position of the position detection magnet.	Refer to "STANDARD ADJUSTMENT (24)"		
	4)-A The supporting plate of the needle thread trimmer comes in heavy contact with the actuating arm of the needle thread trimmer.	Refer to "STANDARD ADJUSTMENT (29)."		

(2) Mechanical components

Trouble	Cause (1)	Cause (2)	Corrective measures	
1. Height of the needle bar is not correct when the sewing machine stops.	1-1) Defective stop-motion pressure spring. (Induction motor)	1)-A The spring is broken.	Replace the spring.	
		1)-B The spring has become inelastic.	Replace the spring.	
	1-2) The nut which retains the push-up pressure spring is loosened. (Induction motor)	 <p>Stop-motion pressure spring</p>		
		1-3) Defective stop-motion (Induction motor)	Tighten the nut until the spring protrudes from the bottom face of the nut by 5 mm (0.197").	
			Increase the tension using the V belt pulley.	
	1-4) Defective stopping position of the main shaft. (Electronic-stop motor)	3)-A The tension of the low-speed V belt is inadequate.		Refer to the "STANDARD ADJUSTMENTS (18)." (Position of the actuating lever)
		3)-B There is no clearance between the stop-motion lever and the actuating lever.		Refer to the "STANDARD ADJUSTMENTS (25)." (Position of the starting link)
		3)-C There is too much clearance in the starting link.		Refer to the "STANDARD ADJUSTMENTS (19)." (Adjusting the brake-disk or the induction motor)
		3)-D The control power of the brake-disk of the reduction gear unit is too strong.		Refer to the "STANDARD ADJUSTMENTS (19)." (Adjusting the reduction gear unit for induction motor)
		3)-E Defective position of the low-speed pulley and the switching clutch		Refer to "(2) Tension post No. 2 and No. 3" of the "ADJUSTMENT OF FUNCTIONS OF THE MACHINE."
2. Stop-motion noise is too loud.	2-1) Inadequate number of stitches for the low-speed operation. (Induction motor)	4)-A Defective position of the position detecting solenoid	Refer to the "STANDARD ADJUSTMENTS (24)." (Adjusting the position of the upper detecting magnet)	
		4)-B The jumper wire in the MCS0A box is connected to J14.	Connect the jumper wire to J8 instead of J14.	
2. Stop-motion noise is too loud.	2-2) The machine fails to decrease the sewing speed at the sewing end. (Induction motor)	4)-A Defective position of the position detecting solenoid	Refer to the "STANDARD ADJUSTMENTS (17)." (Position of the low-speed cam)	
		2)-A Inadequate tension of the low-speed V belt.	Increase the tension of the low-speed V belt using the V belt pulley.	
		2)-B Defective position of the low-speed pulley and the switching clutch	Refer to the "STANDARD ADJUSTMENTS (19)." (Adjusting the reduction gear unit for induction motor)	
	2)-C The control power of the brake-disk of the reduction gear unit is too weak.		Refer to the "STANDARD ADJUSTMENTS (19)." (Adjusting the brake-disk or the induction motor)	

Trouble	Cause (1)	Cause (2)	Corrective measures
3. The sewing machine fails to stop.	3-1) The sewing machine fails to enter into the stop-motion.	1)-A Inadequate clearance between the second step of stop-motion lever latch (B) and catch (A).	Refer to the "STANDARD ADJUSTMENTS (23)." (Position of stop motor catch (A) and latch (B) for the electronic-stop motor)
		(Electronic-stop motor)	
		1)-B Inadequate clearance between the stop-motion lever catch (A) and latch (B).	Refer to the "STANDARD ADJUSTMENTS (10)." (Position of stop motion lever catch (A) and latch (B))
		(Induction motor)	
		1)-C Improper clearance or overlapping amount between the emergency stop plate and latch (B). Improper overlapping width.	Refer to the "STANDARD ADJUSTMENTS (12)." (Position of emergency stop lever)
		(Induction motor)	
		1)-D Excessive contact between the starting link and the starting plate	Refer to the "STANDARD ADJUSTMENTS (25)." (Position of the starting link)
		1)-E The setscrew which retains the tripping lever shaft has been loosened. As a result, the tripping lever deviates and latch (C) does not engage with speed switch cam.	Readjust the lever shaft so that there is no play of the thrust of the tripping lever.
		(Electronic-stop motor)	
		1)-F The starting link fails to smoothly return to its home position.	The needle thread trimmer actuating cam shaft is clogged.
4. The cloth cutting knife fails to drop.	4-1) The knife bar driving lever bell crank fails to actuate.	1)-A Too much clearance between ratchet pawl (B) and the knife bar driving lever bell crank.	Refer to the "STANDARD ADJUSTMENTS (37)." (Position of the ratchet pawl (B))
		1)-B Inadequate clearance between the knife bar driving crank and the knife bar driving lever bell crank.	Refer to the "STANDARD ADJUSTMENTS (38)." (Position of the knife bar driving lever bell crank)
		1)-C Improper positioning of the knife tripping segment.	Refer to the "STANDARD ADJUSTMENTS (44)." (Timing to drop the knife)

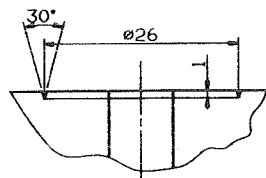
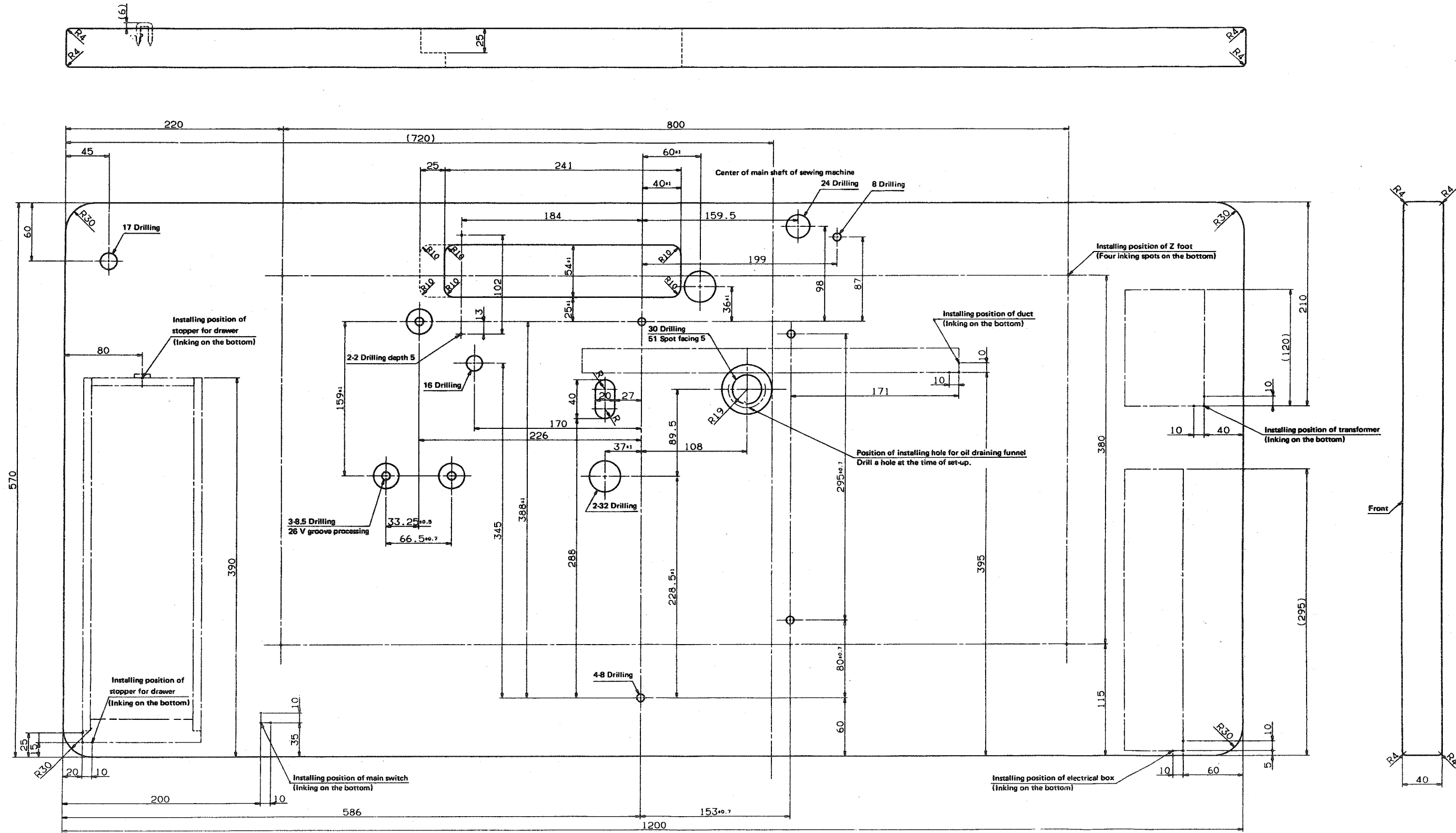


Trouble	Cause (1)	Cause (2)	Corrective measures
6. The cloth cutting knife repeats descending twice.	6-1) If the knife bar driving lever bell crank comes in contact with the ratchet pawl (B), it opens.	1)-A Inadequate clearance between the ratchet pawl (B) and the knife bar driving lever bell crank.	Refer to the "STANDARD ADJUSTMENTS (37)." (Position of the ratchet pawl (B))
	6-2) Defective motion of the ratchet pawl	2)-A The ratchet pawl resetting spring is inelastic.	Replace the spring.
7. The actuating pedal fails to move. (The presser bar lifting lever fails to return to its home position.)	7-1) The bobbin thread trimmer driving arm fails to smoothly return to its home position.	2)-B Excessive torque caused by the contact between the ratchet pawl.	Reassemble the related parts.
		1)-A Dust has accumulated in the parts including the throat plate, throat plate base, and bobbin thread trimmer components.	Remove the throat plate and clean up the parts around the throat plate.
	1)-B The bobbin thread trimmer lever comes in contact with the bobbin thread trimmer guide pin.	Adjust the length of the bobbin thread trimmer guide pin.	
	1)-C The bobbin thread trimmer lever stopper excessively protrudes.	Refer to the "STANDARD ADJUSTMENTS (31)." (Bobbin thread trimmer lever stopper)	
	1)-D Defective motion of the bobbin positioner.	2)-A Inadequate clearance between the starting link and the presser bar lifting lever.	Refer to the "STANDARD ADJUSTMENTS (25)." (Position of the starting link)
	7-2) The starting link comes in contact with the presser bar lifting lever.	3)-A The defective motion of the stop-motion gearing link. (The returning motion is excessive.)	Refer to the "STANDARD ADJUSTMENTS (40)." (Stop-motion gearing link)
	7-3) The safety device of the cloth cutting knife fails to smoothly return to its home position.	3)-B The tension release arm No. 2 comes in excessive contact with the tension release arm No. 3.	Refer to the "ADJUSTMENT OF FUNCTIONS OF THE MACHINE" on page 53. (Adjusting the thread tension release timing of the Tension post No. 2)
			Refer to the "ADJUSTMENT OF FUNCTIONS OF THE MACHINE" on page 53. (Adjusting the thread tension release timing of the Tension post No. 3).

Trouble	Cause (1)	Cause (2)	Corrective measures
8. Work clamp check fails to go up.	8-1) Defective motion of the bobbin thread trimmer driving arm	1)-A Dust has accumulated in the parts including throat plate, throat plate base, and bobbin thread trimmer components.	Remove the work clamp carrier and clean up the throat plate or related parts.
		1)-B The bobbin thread trimmer lever comes in excessive contact with the bobbin thread trimmer guide pin.	Adjust the length of the bobbin thread trimmer guide pin.
		1)-C The bobbin thread catching arm comes in contact with the hook.	Refer to the "STANDARD ADJUSTMENTS (2)." (Timing relation between the needle and the hook, and the needle guard)
			Check the stopping position of the main shaft (electronic-stop motor). Adjust so that the main shaft stops at the marker dot.
			Refer to the "TROUBLES AND CORRECTIVE MEASURES 1-3."
		2)-A Defective stop-motion	Refer to the "STANDARD ADJUSTMENTS (25)." (Position of the starting link)
			Refer to the "STANDARD ADJUSTMENTS (18)." (Position of the actuating lever)
		1)-A Too much clearance between the stop-motion lever and the actuating lever.	Screw in the high-speed stopper until the stop-motion lever enters into the high-speed operation. At this time, adjust that a 1.2 mm (0.047") clearance is obtained between catch (A) and latch (B).
		1)-B Defective position of the stop-motion lever high-speed stopper	Refer to the "STANDARD ADJUSTMENTS (10)." (Position of stop-motion lever catch (A) and latch (B))
		2)-A Improper adjustment of the clearance between the catch (A) and latch (B).	Refer to the "STANDARD ADJUSTMENTS (11)." (Height of the tripping lever)
		2)-B Improper adjustment of the clearance between the feed cam and latch (C).	

Trouble	Cause (1)	Cause (2)	Corrective measures
	9-3) Though the stop-motion lever is set to the high-speed position, the machine fails to run at a high speed.	3)-A Too much clearance between the high-speed pulley and the switching clutch (Induction motor)	Refer to the "STANDARD ADJUSTMENTS (19)." (Reduction gear unit)
		3)-B Excessive tension of the V belt (Induction motor)	Refer to the "STANDARD ADJUSTMENTS (21)." (Belt tension)
		3)-C The speed reduction switch has not been pressed. (Electronic-stop motor)	Loosen the speed reduction switch setscrew, and move the switch back and forth so that the switch is set to be depressed at the position of the high-speed operation.
10. While the sewing machine is operated in the high-speed, the machine directly enters into the stop-motion instead of the low-speed operation state.	10-1) The stop-motion lever is scarcely positioned in the low-speed operation state.	1)-A Inadequate vertical clearance between the emergency stop plate and latch (B).	Refer to the "STANDARD ADJUSTMENTS (12)." (Position of the emergency stop plate)
		1)-B The low-speed cam actuates only for a short distance.	Refer to the "STANDARD ADJUSTMENTS (17)." (Position of the low-speed cam)
	10-2) The machine fails to enter into the low-speed operation state.	2)-A Too much clearance between the low-speed pulley and the switching clutch	Refer to the "STANDARD ADJUSTMENTS (19)." (Reduction gear unit)

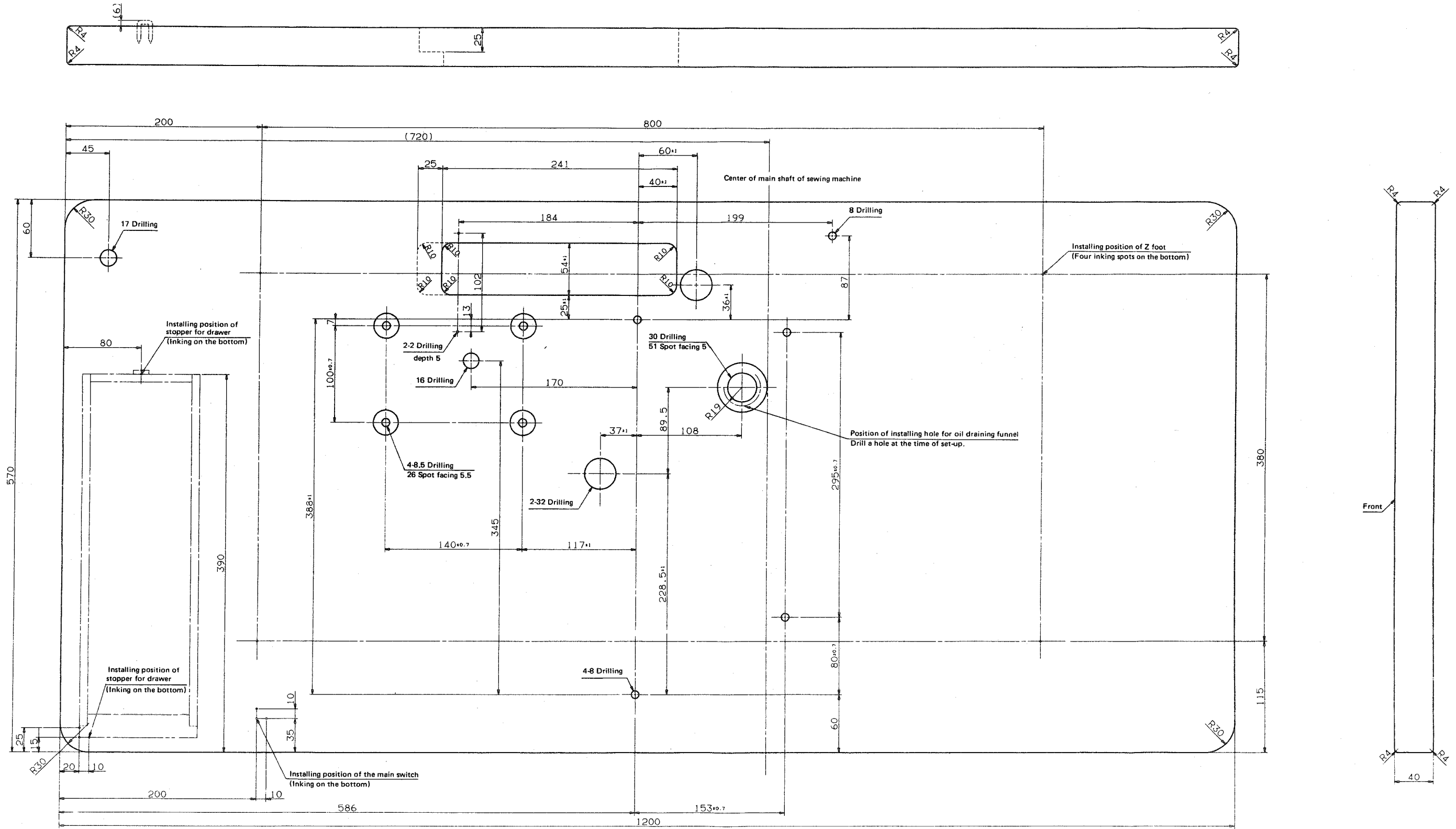
(2) For the electronic-stop motor

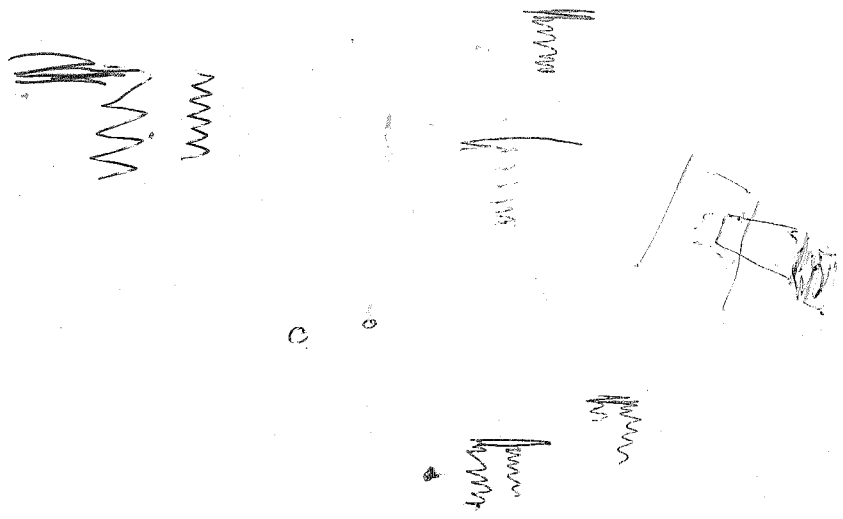


$\phi 26$ Detailed drawing of V groove processing (2/1)

9. DRAWING OF THE TABLE

(1) For the induction motor





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