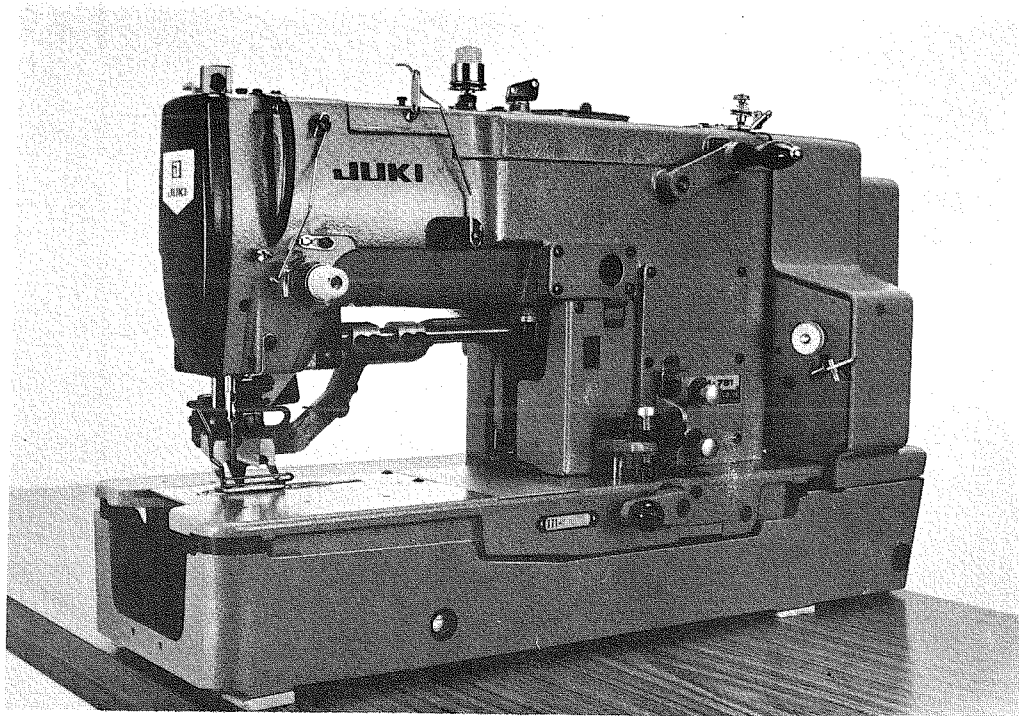


**JUKI**

1-Needle Lockstitch Straight Buttonholing

# **LBH-780 Series**

# **ENGINEER'S MANUAL**



## ENGINEER'S MANUAL FOR LBH-780 SERIES

### PREFACE

This service manual is written for the technical personnel who are responsible for the service & maintenance of the sewing machines. This manual describes "Adjustment Procedure", "Results of Improper Adjustment", and other functions which are not covered by the Instruction Book intended for the maintenance personnel and sewing operators at a sewing factory.

All personnel engaged in repair of LBH-781 are required to carefully read Section 2 "Standard Adjustment" which contains important information on the maintenance of LBH-781.

The "Standard Adjustment" 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.

It is advisable to use "LBH-781 Parts Book" together with this service manual.

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## 1. SPECIFICATIONS

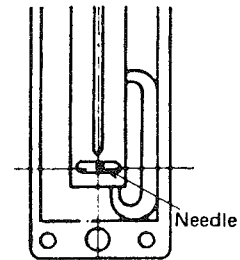
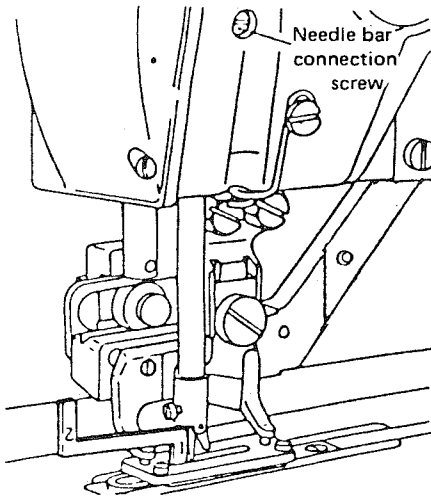
1 Buttonhole dimension		LBH-781	LBH-782	LBH-783	LBH-784
Model					
Bar-tacking width (Buttonhole width)		2.5 ~ 4 mm	2.5 ~ 5 mm	2.5 ~ 5 mm	2.5 ~ 5 mm
Knife blade width		6.35 ~ 19.05 mm (1/4" ~ 3/4")	6.35 ~ 25.4 mm (1/4" ~ 1")	6.35 ~ 31.75 mm (1/4" ~ 1-1/4")	12.7 ~ 38 mm (1/2" ~ 1-1/2")
Buttonhole length (max.)		22 mm	33 mm	40 mm	47 mm
2	Sewing speed	Max. 3,600 s.p.m.			
3	Needle	DP x 5, DP x 5J, DP x K15 SINGER SY6790			
4	Needle bar stroke	34.6 mm			
5	Thread take-up	Link type			
6	Sewing hook	DP-type Automatically lubricating rotary hook			
7	Work clamp check lift	12 mm			
8	Bobbin thread winder	Incorporated in the machine head. Bobbin thread winding is possible at any time during motor running.			
9	Number of stitches	Can be changed from 54 to 345 stitches by replacing the gears.			
10	Emergency stop	By the speed reduction and emergency stop handle			
11	Manual feed	Full-turn handle, manually operated			
12	Dimensions	Bed width – 185 mm Height (from table top surface to the top edge of the thread tension assembly): 380 mm Length (from the front edge of the bed to the rear edge of the belt cover): 614 mm			
13	Machine head weight	40 kg			
14	Belt	V-belt (M type), Flat belt			
15	Motor	300W general-purpose motor Note: When a 250W motor is used, operate the machine at 3,100 s.p.m. or less.			
16	Lubrication	Automatic lubrication system			

## 2. STANDARD ADJUSTMENT

### Standard Adjustment

#### (1) Height of the needle bar

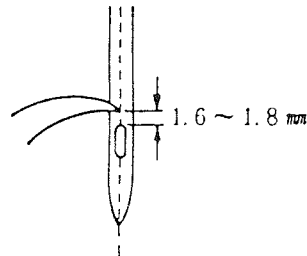
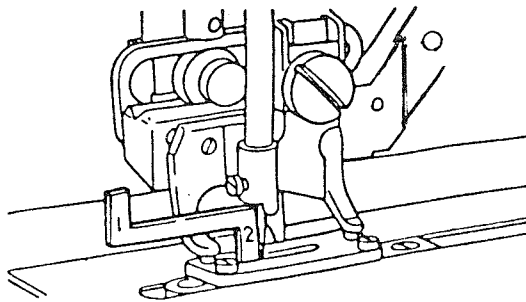
Adjust the height of the needle bar so that the distance between the top surface of the throat plate and the bottom surface of the needle bar becomes 11.9 mm when the needle bar is at its lowest point.

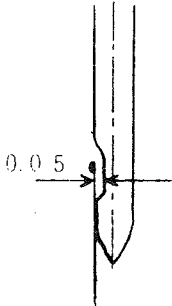


#### (2) Timing relation between the sewing hook and needle

① When the needle bar is 2.3 mm above its lowest point, the blade point of the sewing hook should agree with the center line of the needle. At this time, the distance between the upper edge of the needle eye and the blade point of the hook should be 1.6 to 1.8 mm.

② The clearance between the needle and the blade point of the sewing hook should be 0.05 mm.



Adjusting Procedures	Results of other adjustment											
<p>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 illustration, and loosen the needle bar connection screw to adjust the height of the needle bar.</p> <p>Note) The timing adjustment for the needle and sewing hook must be made while the needle stays in the center of the needle hole in the throat plate.</p> <p>2. Timing Gauge Table</p> <table border="1" data-bbox="340 571 893 743"> <thead> <tr> <th rowspan="2">Subclasses</th> <th colspan="2">Timing gauge</th> </tr> <tr> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <td>Standard · P · E</td> <td>11.9 mm</td> <td>14.2 mm</td> </tr> <tr> <td>K · D · T · V</td> <td>11.4</td> <td>14.2</td> </tr> </tbody> </table>	Subclasses	Timing gauge		1	2	Standard · P · E	11.9 mm	14.2 mm	K · D · T · V	11.4	14.2	<p>Set the needle bar slightly lower than specified for floppy cloths.</p>
Subclasses		Timing gauge										
	1	2										
Standard · P · E	11.9 mm	14.2 mm										
K · D · T · V	11.4	14.2										
<p>1. Set the needle bar so that it begins to go up from its lowest position, and insert the part (2) of the timing gauge into the gap between the throat plate and the bottom of the needle bar. Then, loosen the screw of the hook sleeve to perform adjustment.</p> <p>2. Loosen the screws of the bobbin case stop, and make adjustment so that the clearance between the bobbin case stop and the bobbin case becomes 0.5 mm. (The clearance should be adjusted to allow thread to pass it through.)</p> <p>3. The clearance between the needle and the blade point of the sewing hook should be 0.05 mm. Confirm that the needle does not come in contact with the blade point of the hook when the needle moves zigzag.</p> 	<ul style="list-style-type: none"> <li>○ Slightly delay the sewing hook timing from the standard timing for floppy cloths. (The distance between the upper end of the needle eye and the blade point of the sewing hook should desirably be set to approx. 1.0 mm.)</li> <li>○ For purl stitching, when the sewing hook timing is set earlier, the crest of seam is often improved, and when the timing is delayed, stitch skipping may be prevented with some sacrifice in the seam crest.</li> </ul>											

### Standard Adjustment

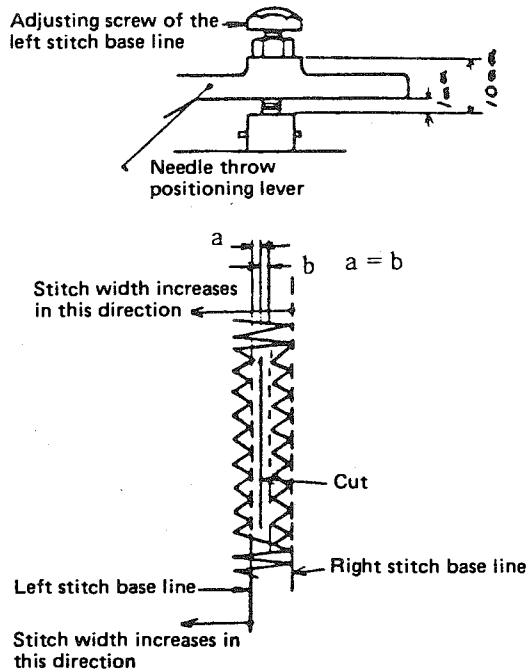
#### (3) Adjusting the needle throw positioning lever (cutting space adjustment)

##### ① Left bank stitch

The height of the top of the needle throw positioning lever shall be 10 mm from the bottom of the left stitch base line adjusting screw.

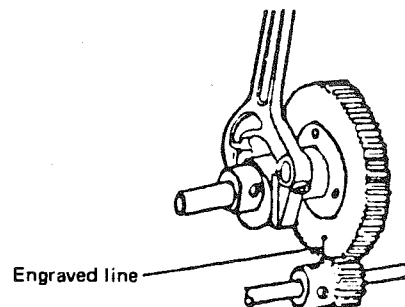
##### ② Right bank stitch

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

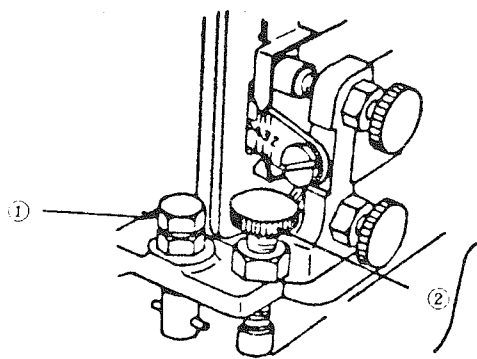


#### (4) Timing of needle bar rocking motion

When the needle bar reaches its highest position, the engraved line on the needle bar rocking gear (large gear) must be aligned with the axis of the hook driving shaft. (The needle bar should have completed its rocking motion when the needle comes down through the throat plate.)

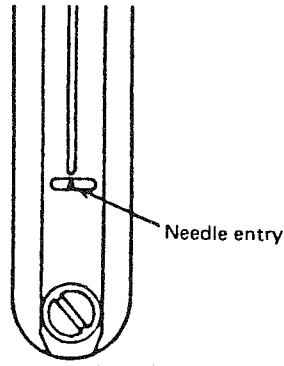




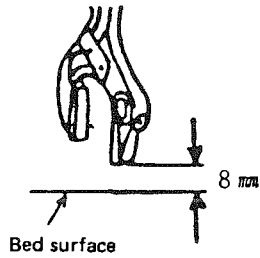
Adjusting Procedures	Results of Improper Adjustment
<p>The needle travels from right to left to produce stitches.</p> <ol style="list-style-type: none"> <li>To adjust the left stitch base line, adjust the left stitch base line adjusting screw ① so that the distance from the bottom of the left stitch base line adjusting screw to the top of the needle throw positioning lever becomes 10 mm when the needle comes down through the center of the needle hole in the throat plate.</li> <li>Adjust the right stitch base line by the right stitch base line adjusting screw ②.</li> <li>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.</li> <li>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 bar tacking width</li> </ol> 	<ul style="list-style-type: none"> <li>○ If the right or left baseline is set nearer to either side, the crest of seam closer to the cutting line may tilt inwards.</li> <li>○ When the overedging width is increased, only the left overedging seam is shifted to the left.</li> </ul>
<ol style="list-style-type: none"> <li>Correct it by the pinion gear with care taken not to leave any play to the hook driving shaft (play in the axial direction). (How to confirm reconditioning) Place a piece of paper on the throat plate, turn the driving 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.</li> </ol>	<p>Misalignment of the engraved line with the axis of the hook driving shaft will cause needle breakage, stitch skipping, etc. due to crosswise deviation of the needle.</p>

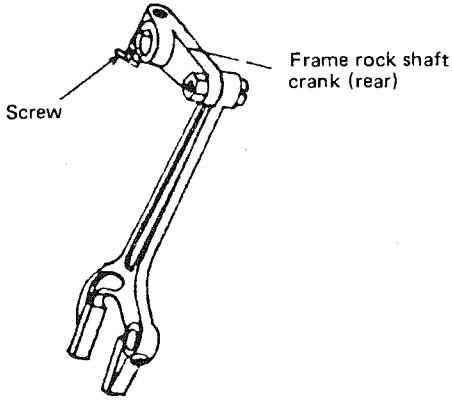
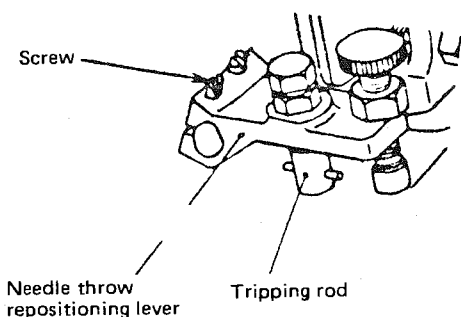
### Standard Adjustment

- (5) Needle entry into the throat plate  
When the needle enters into the center of the throat plate needle hole while left bank stitches are being sewn, the needle bar forked rod should be at its leftmost position.



- (6) Height of the needle bar forked rod  
While left bank stitches are being sewn, the needle bar forked rod is at its leftmost position. The clearance between the lower end of the needle bar forked rod and the bed surface should be 8 mm.

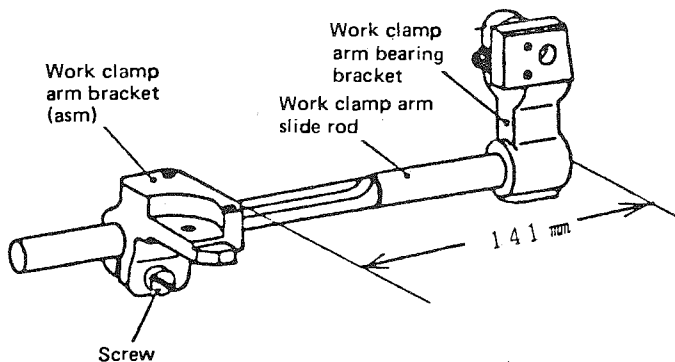


Adjusting Procedure	Results of Improper Adjustment
<p>If the needle fails to enter the throat plate needle hole correctly despite of the needle bar forked rod in the correct position, make readjustment by correcting the frame rock shaft crank (rear) after loosening its screw.</p>  <p style="text-align: center;">Screw                      Frame rock shaft crank (rear)</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>Insert an 8 mm block into the needle bar forked rod, and push down the needle bar forked rod. Then, connect the needle throw repositioning lever with the tripping rod, and retighten the screws.</p> <p>Note) Before performing this readjustment, remove tension springs (A) and (B) from the needle throw repositioning lever link.</p> <p>On completion of the readjustment, check the needle bar rocking gear (large gear) cam for smooth motion.</p>  <p style="text-align: center;">Screw                      Needle throw repositioning lever                      Tripping rod</p>	<p>Improperly adjusted height of the needle bar forked rod causes a difference in the right and left stitch widths.</p>

### Standard Adjustment

(7) Position of the work clamp arm bracket (asm)

The distance from the far end of the work clamp arm slide rod to the work clamp arm bracket (asm) should be 141 mm.

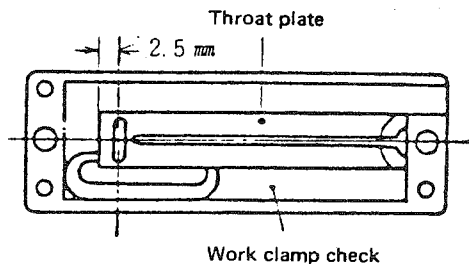


(8) Position of the work clamp check

The work clamp check should be spaced 2.5 mm from the needle hole at the time of stop-motion as shown in the figure below.

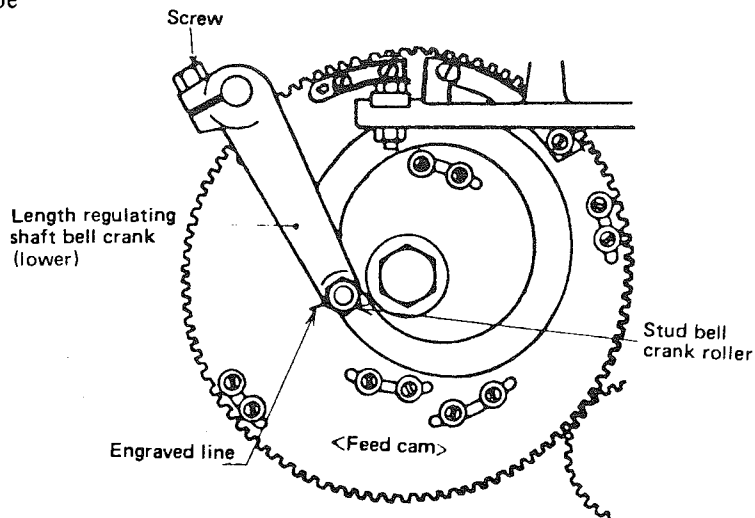
The work clamp check should be positioned symmetrically about the knife entrance slit in the throat plate.

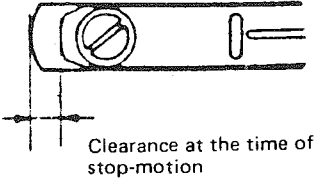
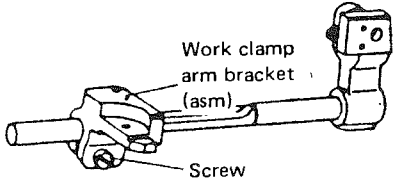
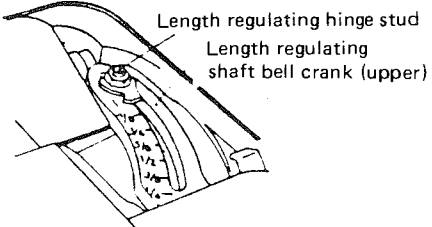
Note: The above 2.5 mm distance is applicable to all models of 781~784.



(9) Position of the length regulating shaft bell crank

The work clamping position at the time of stop-motion should not be influenced by buttonhole size.

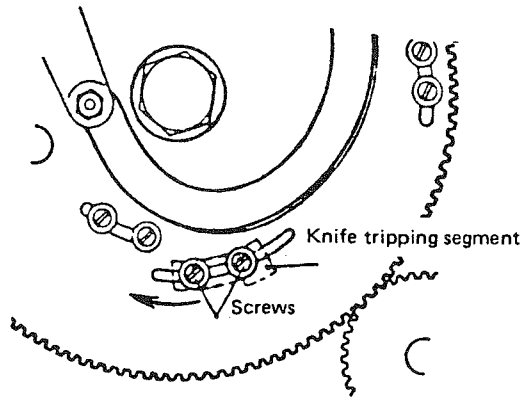


Adjusting Procedures	Results of Improper Adjustment
<p>The clearance between the work clamp carrier and the throat plate is determined by the position of the work clamp arm bracket (asm).</p> <p>Perform readjustment after loosening the screw of the work clamp arm bracket (asm).</p> 	<p>If the clearance left at the time of stop-motion is too small, the work clamp carrier may hit the throat plate, resulting in an increase in the torque while the second bar tacking is being performed.</p>
<p>Perform lateral and longitudinal repositioning of the work clamp check after loosening the screw of the work clamp arm bracket (asm). (Confirmation after readjustment) Confirm that the work clamp arm is perpendicular to the bed surface.</p> 	<ul style="list-style-type: none"> <li>○ Improper positioning of the work clamp check will lead to improper lengthwise position of the work clamp arm, and further affect the opening/closing of the needle thread trimmer.</li> <li>○ If the space between the needle hole and the work clamp check at the time of stop-motion is too small, the needle comes in contact with the work clamp check when stitching an overlapped section, resulting in thread or needle breakage.</li> </ul>
<p>Rotate the feed cam by the handle for manual feed until the feed cam axis and the regulating shaft bell crank roller axis align with the engraved line on the 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, leading to improper position of the needle thread trimmer.</p>

### Standard Adjustment

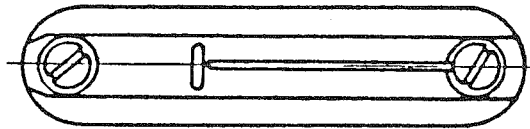
(10) Timing to drop the knife

The knife should descend to cut the materials just before final two or three stitches are formed (for the number of stitches of 123).



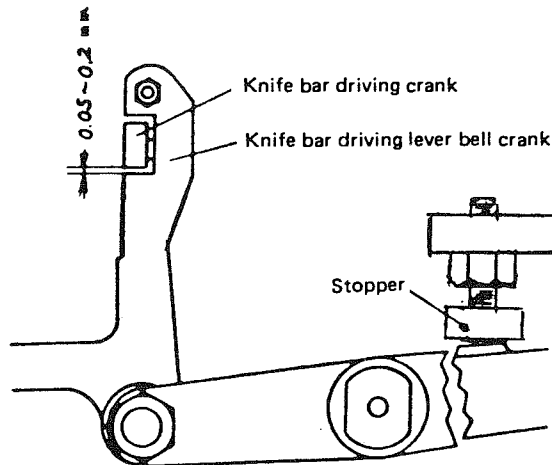
(11) Knife descending position

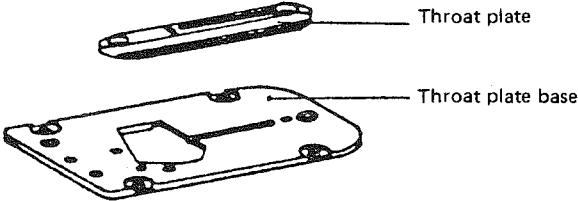
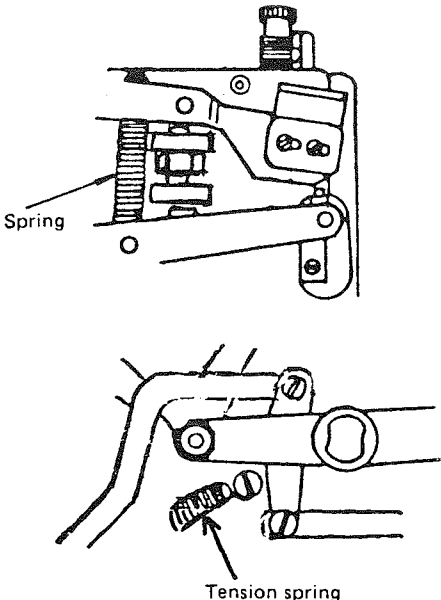
The knife should descend in the center of the knife slit in the throat plate.



(12) Inclination 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 0.05 to 0.2 mm when the knife bar driving crank is at its lowest position.

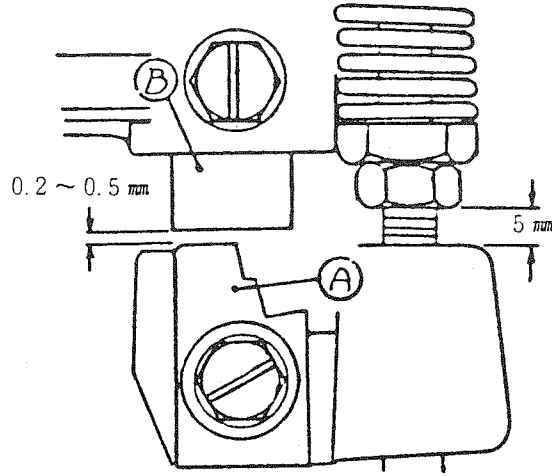


Adjusting Procedures	Results of Improper Adjustment
<p>Adjust the knife tripping segment so that the knife is dropped two or three stitches before the machine stops.</p> <p>Moving the knife tripping segment in the arrow direction will result in an earlier timing for dropping the knife.</p> <p>Note: Readjust the position of the low speed cam when the number of stitches (gear) is set to 93 or less.</p>	<p>If the knife is driven before the machine has reduced its running speed, the knife may not descend fully, or the knife blade will be damaged or worn out soon.</p>
<p>Adjust the positions of the throat plate and the throat plate base.</p> 	<p>The adjustment can not be made by the knife bar or the knife guide plate.</p>
<p>Perform adjustment by the stopper.</p> 	<ul style="list-style-type: none"> <li>○ If the knife does not descend from time to time, it is because the machine does not slow down, or the tension spring has been weakened (replace the weakened tension spring).</li> <li>○ If the knife does not go up or repeatedly descends, check for proper clearance between the knife bar driving crank and the bell crank, or replace the knife bar driving lever spring.</li> </ul>

### Standard Adjustment

(13) 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 to 0.5 mm clearance between the stop motion lever catch (A) and Latch (B).



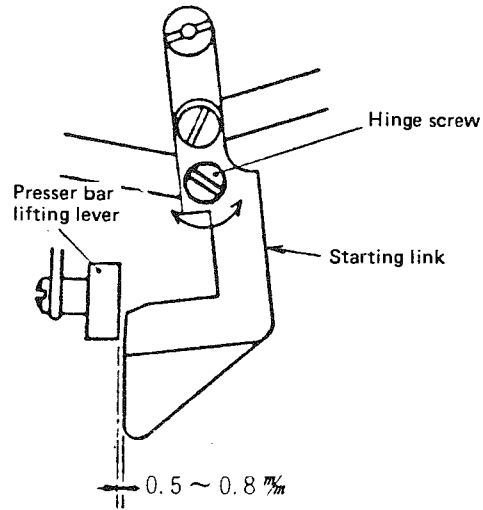


Adjusting Procedures	Results of Improper Adjustment
<p>1. Move the stop motion lever catch (A) up and down to obtain proper positioning.</p> <p>2. Adjustment of the pressure spring  Screw in the nut so that the bolt protrudes approx. 5 mm from the bottom of the nut, and firmly tighten the nut.  (Confirmation after adjustment)  Set the stop motion lever for the same state as high-speed operation. Turn the handle for manual feed, 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 the stop-motion state. This confirmation must be done without fail.</p>	<ul style="list-style-type: none"> <li>○ If the clearance between the stop motion lever catch (A) and the latch (B) is too small, the machine may not enter the stop-motion state.</li> <li>○ Loosened nut will cause improper height of the needle at the time of machine stop.</li> </ul>

## Standard Adjustment

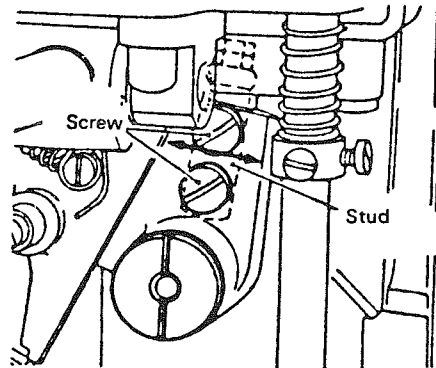
### (14) Position of the starting link

The clearance between the starting link and the presser bar lifting lever should be 0.5 to 0.8 mm at the time of stop-motion.



### (15) Longitudinal travel of the needle thread trimmer

Longitudinal travel : 4.0 to 5.0 mm

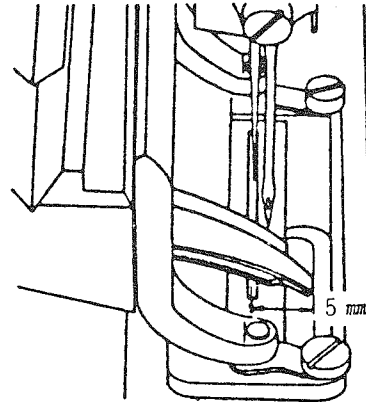
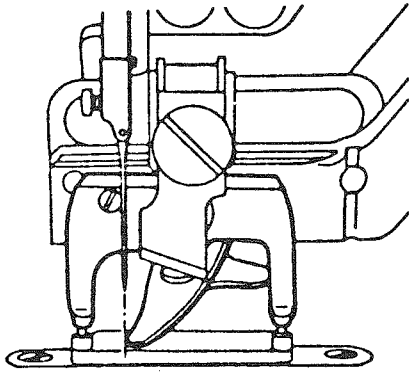


Adjusting Procedures	Results of Improper Adjustment
<p>Turn the hinge screw to perform adjustment.</p>	<ul style="list-style-type: none"> <li>○ If no clearance is allowed between the starting link and the presser bar lifting lever, the work clamp check may not go up.</li> <li>○ On the other hand, if the above clearance is too large, complete stop-motion may be prevented.</li> </ul>
<ol style="list-style-type: none"> <li>1. Loosen the screws on the tip of the presser bar lifting lever, and move the stud right and left to adjust the longitudinal travel of the needle thread trimmer. When the stud is moved to the right, the longitudinal travel of the needle thread trimmer increases, and vice versa.</li> <li>2. Be careful not to move the stud too much, since this is a minute adjustment.</li> </ol> <p>(Confirmation) Confirm the longitudinal travel of the needle thread trimmer by checking the difference in the movement of the needle thread shaft when the presser bar is up and when it is down, and also by measuring the distance from the needle thread trimmer shaft guide to the needle thread trimmer arm.</p>	<ul style="list-style-type: none"> <li>○ If the stud is moved excessively, the projected part of the needle thread trimmer arm (front) may get out of the groove in the bracket when the needle thread trimmer moves right and left.</li> <li>○ Take care not to cause the projected part of the needle thread trimmer arm to come off the groove because, if allowed to come off, the presser bar will not go up or smooth feed will be prevented.</li> </ul> <div data-bbox="1148 1575 1478 1911" data-label="Image"> </div>

## Standard Adjustment

### (16) Lateral positioning of the needle thread trimmer

- ① Adjust the position of the needle thread trimmer so that its tip aligns with the center of the needle, and is kept away 5 mm right from the center of the knife groove when the trimmer has advanced farthest.

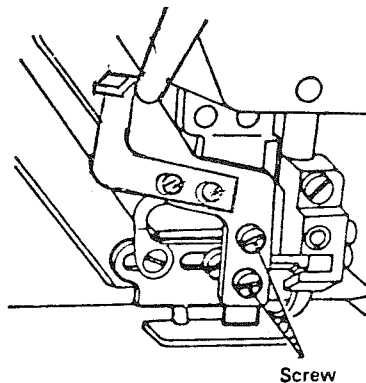


- ② When the needle thread trimmer has completely closed, its upper and lower blades should overlap each other by 0.5 to 0.8 mm.

Confirm that the trimmer completes closing with some allowance left for further closing.

### (17) 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.



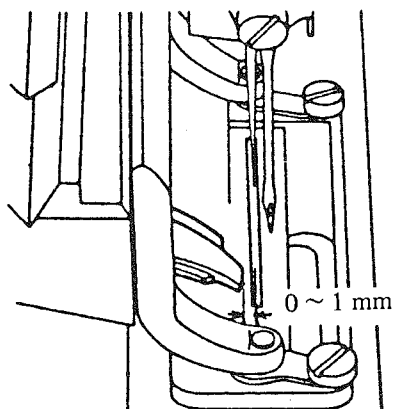
Screw

Adjusting Procedure	Results of Improper Adjustment
<p>1. Tread the presser bar lifting pedal to cause the needle thread trimmer to advance farthest. Then loosen the screws of the needle thread trimmer arm (front) by a hexagonal wrench, and perform longitudinal and lateral positioning of the needle thread trimmer arm (front).</p> <p>2. Loosen the screw of the needle thread trimmer guide A, and adjust the overlapping of the upper blade with the lower blade.</p> <p>3. Adjust the longitudinal position of the needle thread trimmer in relation to that of the needle thread trimmer guide A.</p> <p>If the trimmer blades are closed too early or overlapped 1 mm or more, move the needle thread trimmer guide A slightly towards the operator.</p> <div data-bbox="454 814 1058 1150" data-label="Image"> <p>The diagram illustrates the needle thread trimmer assembly. A screw is shown on the rear surface, which is used to adjust the needle thread trimmer arm (front). The trimmer arm is positioned to trim the needle thread as it passes through the presser bar.</p> </div>	<ul style="list-style-type: none"> <li>○ Inferior longitudinal/lateral positioning of the needle thread trimmer arm may prevent smooth movement of the presser bar lifting lever.</li> <li>○ If the needle thread trimmer guide A is set excessively nearer to the operator, needle thread will not be trimmed, or the trimmer will not close.</li> <li>○ On the contrary, if the needle thread trimmer guide A is set excessively farther from the operator, the trimmer will close before it reaches needle thread.</li> </ul>
<p>Loosen the screws of the needle thread trimmer, and perform the vertical positioning.</p> <p>(Confirmation after adjustment) Place a plate with approx. 4 mm 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.</p>	<p>If the needle thread trimmer is set too high, needle thread may be left at a bar-tacked part.</p>

### Standard Adjustment

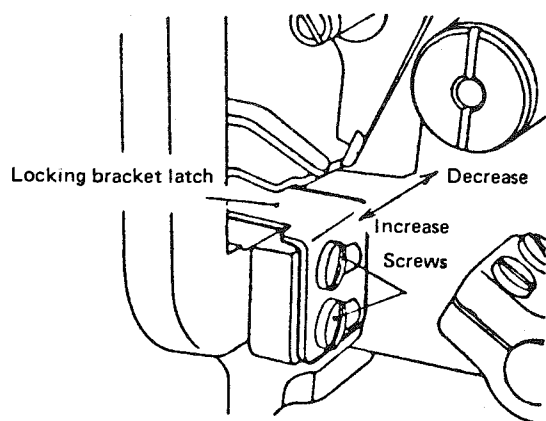
#### (18) Needle thread catching position at the start

Needle thread should be caught when the tip of the needle thread trimmer has come 0 to 1 mm left from the center of the knife slit in the throat plate at the sewing start.



#### (19) Timing to open the needle thread trimmer

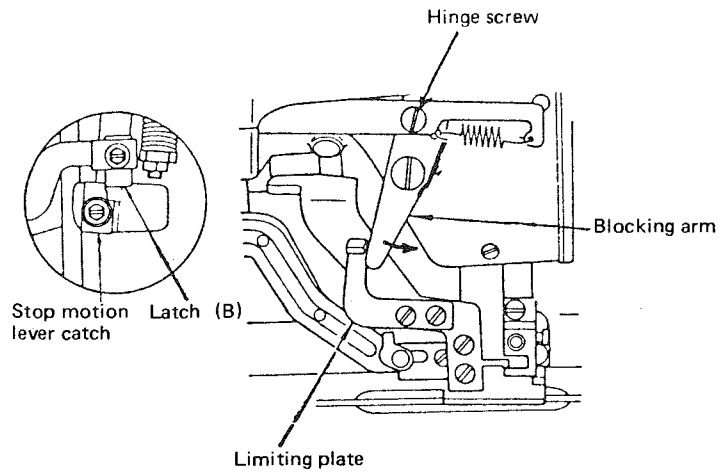
Needle thread should be held for 2.5 to 3 mm from the sewing start. (Then the trimmer should open gradually.)



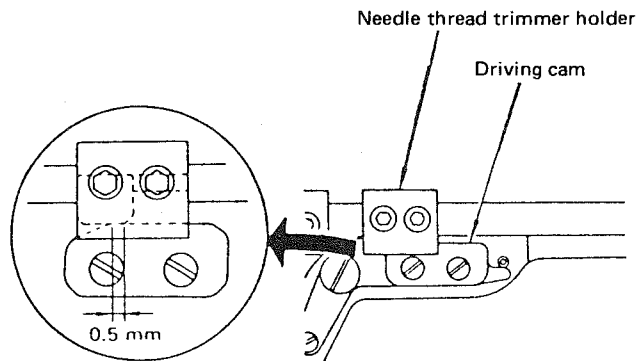
Adjusting Procedures	Results of Improper Adjustment
<p>Adjust the position by adding or reducing the number of the spacers (B2023761000).</p> <div data-bbox="487 415 801 697" data-label="Image"> </div> <p>(Caution)  Since this position is also influenced by the point at which the thread is caught by the trimmer, check and correct the position of the needle thread trimmer guide in relation with the thread trimmer before changing the number of spacers.</p>	<ul style="list-style-type: none"> <li>○ If the locking bracket latch is set excessively to the right, the needle thread will deviate to the right from the seam.</li> <li>○ On the other hand, if the locking bracket latch is set excessively to the left, the needle thread will deviate to the left.</li> </ul>
<ol style="list-style-type: none"> <li>1. Loosen the screws of the locking bracket latch, and perform adjustment by moving the latch back and forth.</li> <li>2. When the locking bracket latch is moved toward you, the needle thread holding duration will be decreased, and when moved away from you, it will be increased.</li> </ol> <p>(Confirmation after adjustment)  Whenever the needle thread trimmer has been adjusted, turn the handle for manual feed, and confirm that the trimmer does not come in contact with the work clamp check or needle when it opens.</p>	<ul style="list-style-type: none"> <li>○ If the needle thread trimmer opens too early, the needle thread will not be caught, and slip out of the needle at the sewing start.</li> <li>○ On the contrary, if the needle thread trimmer opens too late, inferior crests of seam will result at the sewing start.</li> </ul>

## Standard Adjustment

### (20) Adjusting the limiting plate



### (21) Adjusting the needle thread trimmer holder

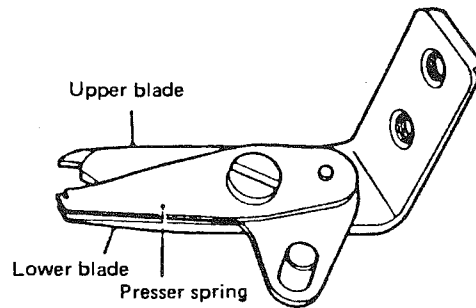




Adjusting Procedures	Results of Improper Adjustment
<p>Perform adjustment by the setscrews of the limiting plate so that the blocking arm lightly comes in contact with the limiting plate at the time of low speed starting of the machine (when the stop motion lever catch engages with the latch (B)).</p> <p>Note: Push the blocking arm in the direction of arrow to confirm that some allowance is still left in the slit of the blocking link when the machine has been set for high speed start.</p>	<p>If the blocking arm does not lightly contact the limiting plate, the needle thread trimmer may hit the needle when it opens.</p> <p>Note: When lifting the work clamp check after emergency stop, be sure to lift it at the starting position of the buttonholing.</p>
<p>Perform adjustment so that the needle thread trimmer holder engages with the driving cam by 0.5 mm when the needle thread trimmer arm (rear) leaves the locking bracket latch, causing the trimmer to open.</p>	<p>If the needle thread trimmer holder does not engage with the driving cam as specified, the trimmer will not open properly.</p>

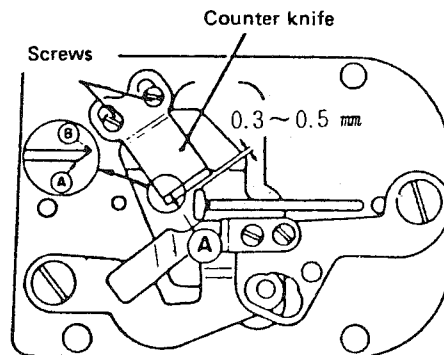
## Standard Adjustment

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



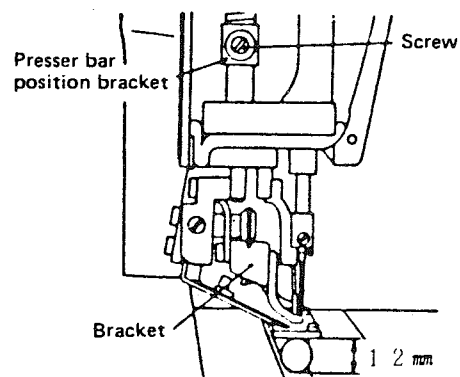
### (23) Position of the counter knife

The blade edge of the counter knife should be distanced 0.3 to 0.5 mm from the needle hole in the throat plate.



### (24) Height of the work clamp check

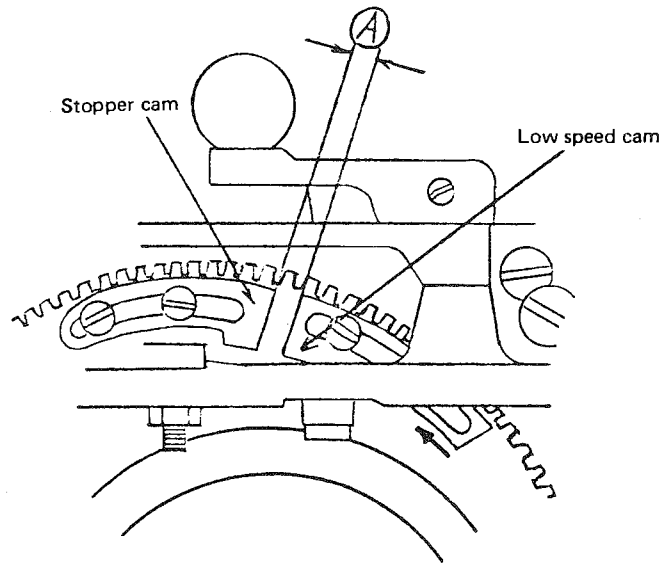
The lift of the work clamp check should be 12 mm.



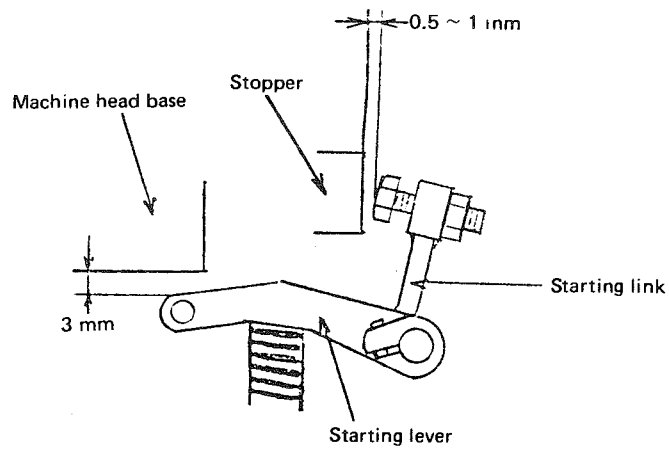
Adjusting Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> <li>1. If the grasping force of the needle thread trimmer has weakened, bend the presser spring slightly towards the upper blade so that the upper and lower blades contact very closely each other with their full length in order to enable the trimmer to securely catch and trim needle thread at any point on the blades.</li> <li>2. When the trimmer has gone dull, sharpen the edges of the upper and lower blades of the trimmer by an oil stone.</li> </ol>	<p>Weakened presser spring will cause thread to slip out of the needle at the stitching start.</p>
<ol style="list-style-type: none"> <li>1. Adjust the position of the counter knife after loosening the screws.</li> <li>2. To replace the counter knife, tilt the machine head, remove the bobbin case stop, and loosen the screws to remove the counter knife.</li> <li>3. Before installing the counter knife, grind the edge (A) of the counter knife blade by a buff or the like to round it lest it should touch thread while stitching.</li> </ol> <p>(Caution) Never buff the edge (B) of the counter knife blade.</p>	<p>If the clearance between the counter knife and the needle hole in the throat plate is too small, needle thread may break during stitching.</p>
<p>Insert an appropriate 12 mm rod between the work clamp check and the throat plate, loosen the screw of the presser bar position bracket, and fully tread the presser bar lifting pedal. With this condition maintained, push down the presser bar position bracket and the bracket, and firmly tighten the screw of the presser bar position bracket.</p> <p>(Confirmation after adjustment) After adjustment, always check the work clamp check for proper function.</p>	

Standard Adjustment

(25) Position of the low speed cam



(26) Position of starting lever and starting link



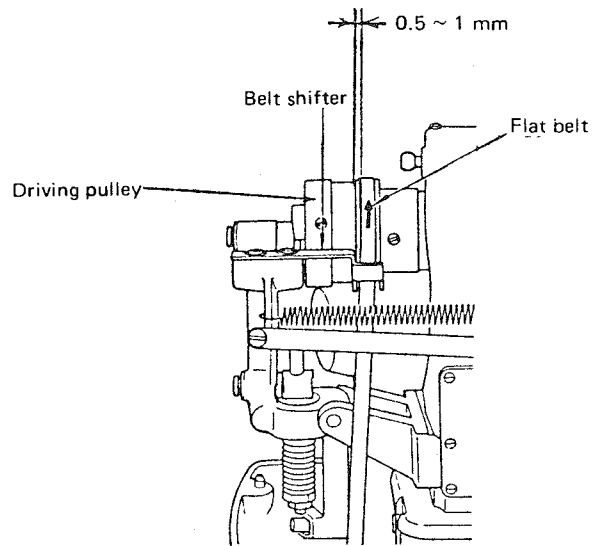
At the time of stop motion

Adjusting Procedures	Results of Improper Adjustment								
<p>Loosen the setscrew of the low speed cam, and adjust dimension ① according to a required number of stitches.</p> <table border="1" data-bbox="437 533 863 835"> <thead> <tr> <th>No. of stitches</th> <th>Dimension ①</th> </tr> </thead> <tbody> <tr> <td>Less than 93</td> <td>10 ~ 12 mm</td> </tr> <tr> <td>93 ~ 123</td> <td>5 mm</td> </tr> <tr> <td>More than 123</td> <td>0</td> </tr> </tbody> </table>	No. of stitches	Dimension ①	Less than 93	10 ~ 12 mm	93 ~ 123	5 mm	More than 123	0	<p>As the low speed cam is moved in the direction of arrow, the number of stitches between the low speed and stop motion will be reduced.</p>
No. of stitches	Dimension ①								
Less than 93	10 ~ 12 mm								
93 ~ 123	5 mm								
More than 123	0								
<p>Perform adjustment so that the clearance between the adjusting bolt of the starting link becomes 0.5 to 1 mm, and that the starting lever does not touch the machine head base (provide approx. 3 mm clearance between them) at the time of stop motion.</p>	<p>If the clearance (0.5 to 1 mm) is too large, the machine will not run at high speed, and if it is too small, inferior stop motion will result.</p>								

## Standard Adjustment

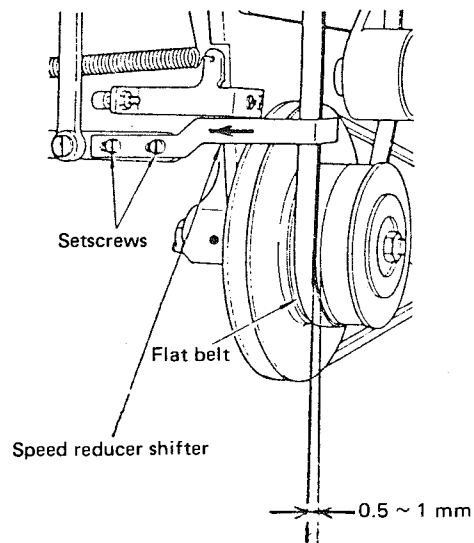
### (27) Adjusting the flat belt

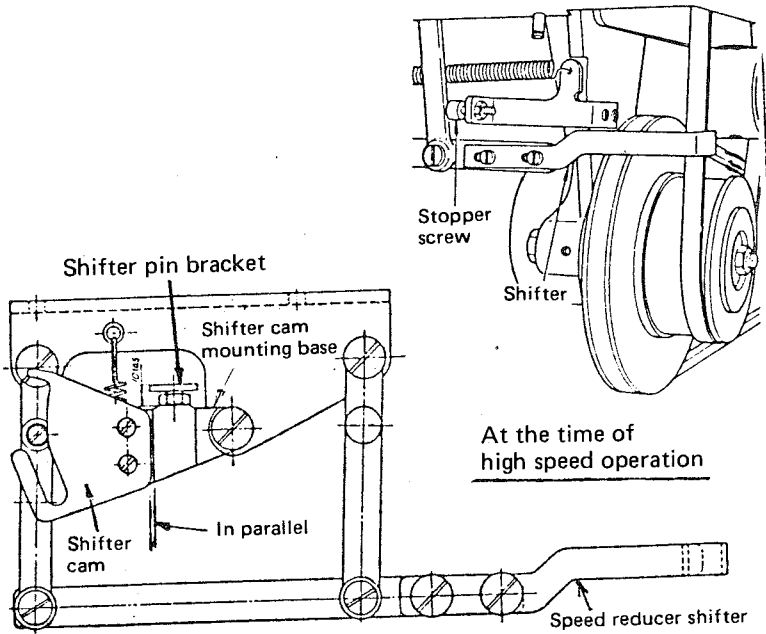
#### (1) Position of the machine head belt shifter



At the time of idling

#### (2) Position of the speed reducer shifter



Adjusting Procedures	Results of Improper Adjustment
<p>Position the flat belt so that it is located 0.5 to 1 mm from a groove end of the pulley at the time of idling. Adjust the belt shifter within the slit so that the flat belt fully rests on the driving pulley at the time of low speed operation.</p> <p>Note: Do not allow the flat belt to get in touch with the belt shifter as much as possible at the time of idling. Note that the right side of the flat belt bears an arrow mark.</p>	<p>If the flat belt is allowed to rest on the driving pulley during idling, the flat belt will wear, and the pulley get hot.</p>
<p>Adjust the position of the speed reducer shifter by its setscrews in the same manner as the positional adjustment of the machine head belt shifter. However, use the stopper screw to adjust the position of the speed reducer shifter for high speed operation. The standard stroke of the shifter is 14 mm for high speed operation, stop motion, or low speed operation. Adjust the stroke of the shifter by screwing in or out the screw of the shifter pin bracket. As the screw is screwed out, the stroke of the shifter decrease.</p> <p>Note: If the shifter stroke at the time of low speed operation or stop motion is too large, it is due to improper installation of the shifter cam. Reinstall the shifter cam in parallel to the worked surface of the shifter cam mounting base as shown below. The shifter stroke at the time of low speed operation <math>\leftrightarrow</math> stop motion should be 0.5 to 1 mm.</p> 	<p>If the speed reducer shifter does not work enough to make proper adjustment, the shifter pin bracket. When the shifter pin bracket is raised, the speed reducer shifter will move in the direction of arrow.</p>

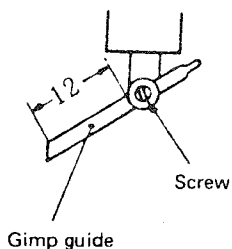
### 3. ADJUSTMENT FOR "T" (SINGLE STITCH) and "V" (DOUBLE STITCH) MODELS

#### Standard Adjustment

#### (1) Positioning the gimp guide

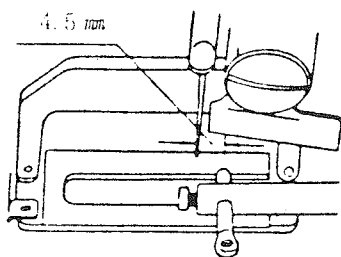
##### ① Protrusion of the gimp guide

The gimp guide should protrude 12 mm from the top end of the gimp guide holder.  
(The gimp guide holder should be parallel with the work clamp check.)

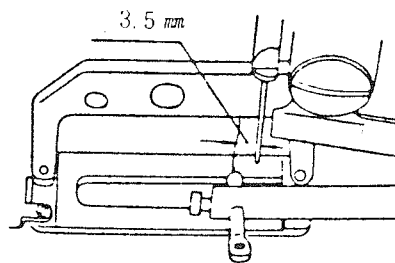


##### ② Distance from the needle

The gimp guide should be kept away from the needle by 4.5 mm during forward stitching, and 3.5 mm during return stitching.



(Forward stitching)



(Return stitching)

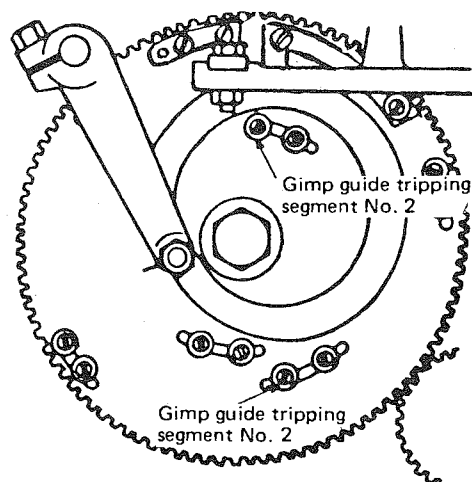
#### (2) Adjustment of the gimp guide tripping segments (for "T")

##### ① Timing of the gimp guide tripping segment No. 1

The gimp guide should start to move to the right as soon as the first bar tacking begins.

##### ② Timing of the gimp guide tripping segment No. 2

The gimp guide should be at the upper position a little before tripping takes place at the time of stop motion.

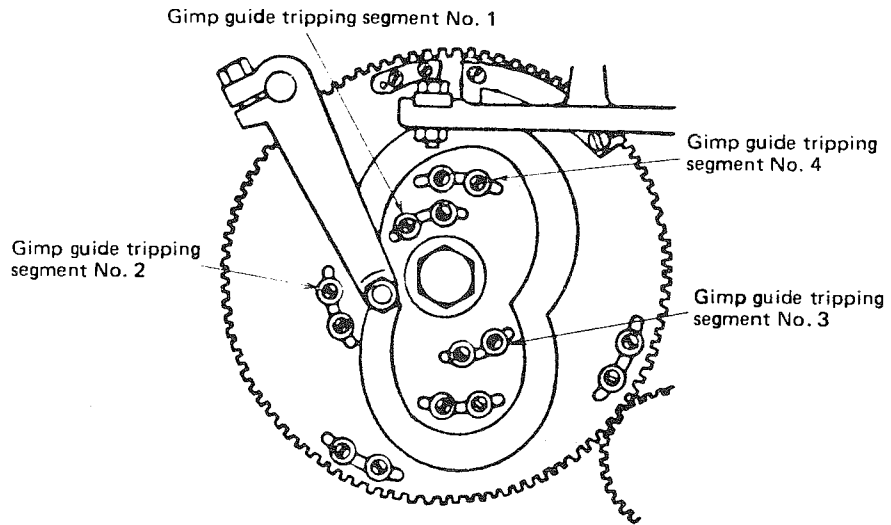




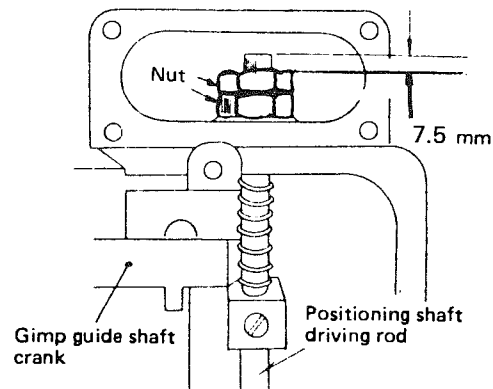
Adjusting Procedures	Results of Improper Adjustment
<p>1. Loosen the screw of the gimp guide for adjustment.</p> <p>2. Adjust the gimp guide so that its tip is positioned at the center of the needle throw during buttonholing.</p> <p>3. Loosen the screw of the gimp guide arm to make adjustment of the distance from the needle.</p> <p>The closer the tip of the gimp guide is set to cloth, the better will it catch a gimp.</p> <div data-bbox="470 766 916 1186" data-label="Image"> </div>	<ul style="list-style-type: none"> <li>○ If the tip of the gimp guide is set too close to fabric, the gimp guide may hit the work clamp check at the time of tripping.</li> <li>○ On the other hand, if the tip of the gimp guide is set too far from fabric, the gimp guide will often fail to catch a gimp.</li> </ul>
<p>1. Loosen the screws of the gimp guide tripping segment No. 1 to make adjustment.</p> <p>2. If the adjustable range of the gimp guide tripping segment No. 2 is not sufficient, use also the speed changing segment. (Timing of the gimp guide tripping segment No. 1) In case of "a" shown below, delay the timing. In case of "b", set the timing earlier.</p> <div data-bbox="404 1690 850 1942" data-label="Image"> </div>	<p>If the timing of the gimp guide tripping segment No. 2 is too early, the excess end of a gimp is bent and sewn in the seam, resulting in inferior appearance of the buttonhole.</p>

### Standard Adjustment

- (3) Adjustment of the gimp guide tripping segments (for "V")  
The first bar tacking is adjusted by the gimp guide tripping segments No. 1 and No. 2.  
The second bar tacking is adjusted by the gimp guide tripping segments No. 3 and No. 4.



- (4) Height of the positioning shaft driving rod  
The positioning shaft driving rod should protrude 7.5 mm from the top of the thrust collar.

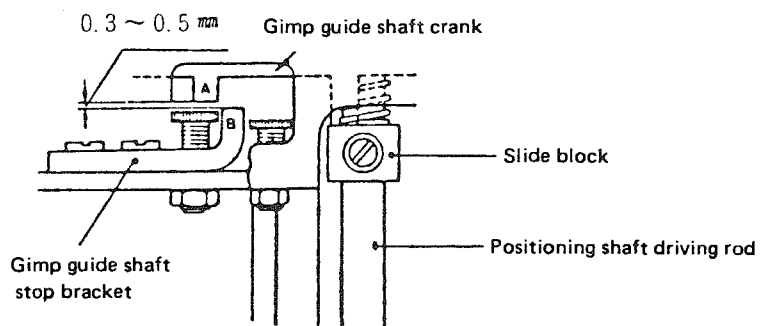


Adjusting Procedures	Results of Improper Adjustment
<ol style="list-style-type: none"> <li>1. The timing adjustment of the gimp guide tripping segments for "V" is the same as that for "T" except that there are four gimp guide tripping segments for "V".</li> <li>2. Adjust the timing of the gimp guide tripping segment No. 4 so that the gimp guide moves to the right base line position 4 to 5 stitches before the stop motion, and then shifts to the right upon the stop motion.</li> </ol>	<p>The same results as described for "T" will be caused.</p>
<p>Loosen the screw of the thrust collar to make adjustment.</p> <p>(Caution) When performing the adjustment, be careful not to hurt the lubricating pipe and the oil return pipe located in front of the positioning shaft driving rod.</p>	<p>If the distance is greater or smaller than 7.5 mm, the gimp guide arm may fail to provide full crosswise gimp formation.</p>

## Standard Adjustment

### (5) Height of the slide block

The clearance between the bottom of the gimp guide shaft crank A and the top of the gimp guide shaft stop bracket B shall be 0.3 to 0.5 mm when the gimp guide shaft crank is at its highest position.



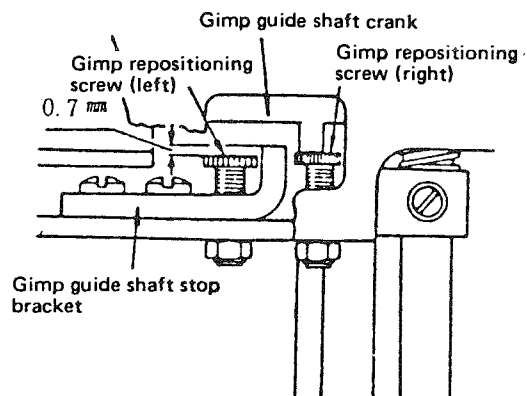
### (6) Lateral positioning of gimp base line

#### ① Position of the right base line

The top of the gimp repositioning screw for the right base line should be 0.7 mm lower than the top of the gimp guide shaft crank.

#### ② Position of the left base line

The adjustment is made by rotating the handle for manual feed so that the tip of the gimp guide is located at the center of the left bank stitch of a buttonhole when the gimp guide is shifted to the left base line.



Adjusting Procedures	Results of Improper Adjustment
<p>Rotate the handle for manual feed until the positioning shaft driving rod reaches its highest position. Then loosen the screw of the slide block to adjust its height.</p> <p>(Confirmation after adjustment)            Rotate the handle for manual feed, and confirm that the gimp guide shaft crank smoothly moves in the axial direction.</p>	<p>Too small or large clearance between A and B may prevent the gimp guide from providing full crosswise or lengthwise gimp formation.</p>
<ol style="list-style-type: none"> <li>1. Rotate the handle for manual feed, and adjust the height of the gimp repositioning screw (right) so that the tip of the gimp guide is set at the center of the right bank stitch of a buttonhole when the gimp guide is shifted to the right base line.</li> <li>2. Adjust the protrusion of the gimp repositioning screw (left) for making adjustment of the left base line.</li> </ol> <div data-bbox="447 1289 898 1663" data-label="Image"> </div>	<p>The gimp guide may fail to provide full crosswise gimp formation.</p>

## 4. OTHER ADJUSTMENTS

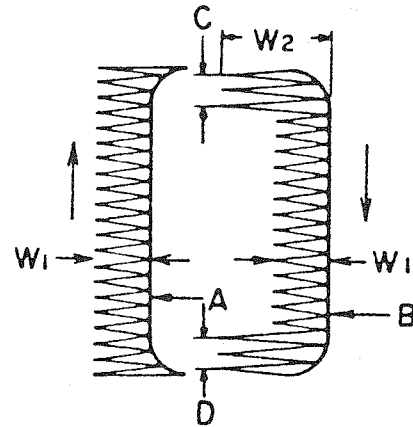
### (1) Adjusting the overedging width and the needle position

#### 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 " $W_2$ ", bar tacking width. "C" is the first bar tacking, and "D" is the second bar tacking.

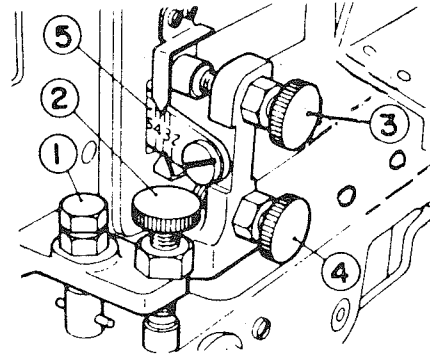
#### 2. Setting the left and right base lines

- 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 bar tacking 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 bar tacking width " $W_2$ " by turning the regulating screw ④; the bar tacking width is increased by clockwise turn, and vice versa.
- ③ The graduated scale ⑤ roughly indicates the bartacking width " $W_2$ ".



(2) Adjustment of timing to release the thread tension

1. Tension post No. 1

The tension disc of the controller No. 1 releases thread only when the machine stops under the control of the stop-motion component. Adjust the height of the tension post No. 1 so that the tension disc floats to make a gap of 0.5 to 1.0 mm for releasing thread.

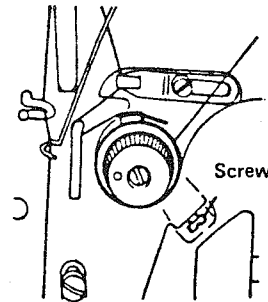
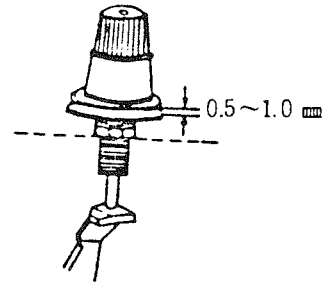
2. Tension post No. 2

The tension disc of the controller No. 2 releases thread while the bar tacking seams (whip stitching) are being formed and several stitches are being formed at the beginning and end of buttonholing. Adjust the tension post socket after loosening its screw so that the tension disc floats to make a gap of 0.5 to 1.0 mm for releasing thread.

(Timing for thread tension release)

For stitching the first bar-tacking part, make adjustment so that tension release is terminated one or two stitches before completion of the bar-tacking in order to prevent the crest of seam from inclining to the right after completion of the first bar-tacking.

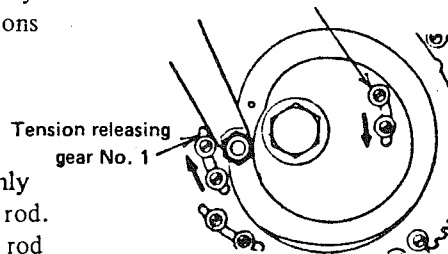
Adjust the thread tension releasing duration so that the tension release is terminated after 3 to 4 stitches from the sewing start.



3. How to perform adjustment

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 directions shown by the arrows, and when they are moved in the directions opposite to the arrows, the timing is delayed.

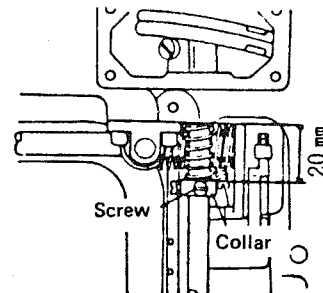
Tension releasing gear No. 2



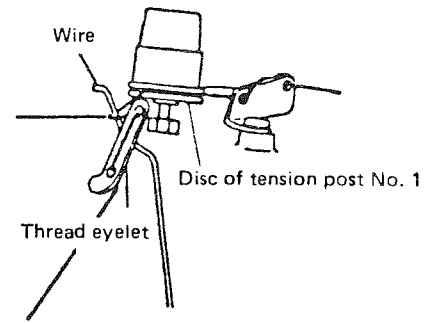
\* One of the causes for inferior crests of seam suddenly developed is defective return of the tension release rod. In this case, loosen the screw of the tension release rod and push up the collar to increase the tension of the spring for returning the tension release rod.

The standard distance for the spring is 20 mm.

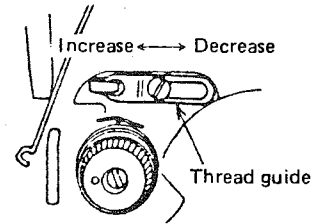
When the gap in the tension disc of the tension controller No. 1 or No. 2 is increased, the thread tension releasing duration will be increased.



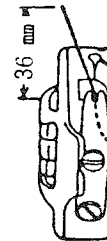
- (3) Adjusting the thread pulling wire  
 This wire functions to allow the needle thread to have a 5 to 7 mm slack in order to produce stable crests of seam at the sewing start.  
 When the wire is lowered, more thread is pulled.  
 Adjust the wire within such extent that it does not come in contact with the thread eyelet or the tension disc of the tension controller No. 1.



- (4) Adjusting the thread take-up guide  
 The thread take-up guide must be adjusted according to the thickness of fabrics in order to ensure well-tightened stitches.  
 When the thread take-up guide is moved to the left, the length of thread to be taken up will be increased, and vice versa.

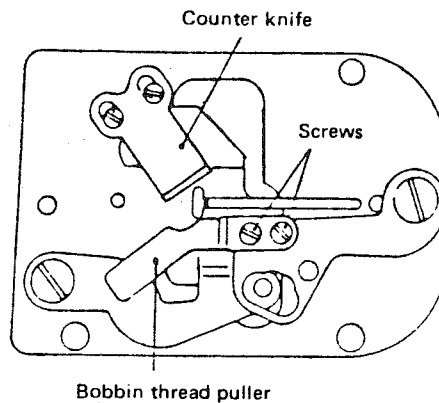


- (5) Adjusting the bobbin thread puller  
 Adjust the bobbin thread puller to obtain remaining bobbin thread of a proper length for producing stitches at the sewing start.  
 Loosen the screws of the bobbin thread puller, and make adjustment based on the installing angle of the bobbin thread puller so that the length of the remaining bobbin thread becomes approx. 36 mm.



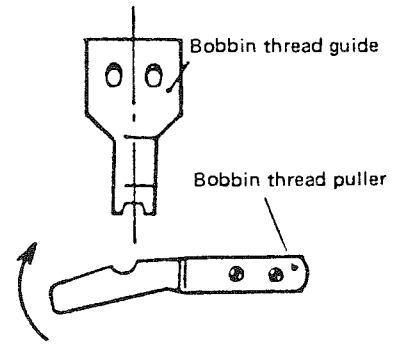
**(Operational Sequence)**

- The needle thread trimmer operates.
- Needle thread is trimmed.
- The bobbin thread puller operates.
- Bobbin thread is pulled out.
  - Remaining needle thread is pulled in.
- The bobbin thread trimmer blade (moving knife) operates.
- Bobbin thread is trimmed.
  - The work clamp check begins to go up.





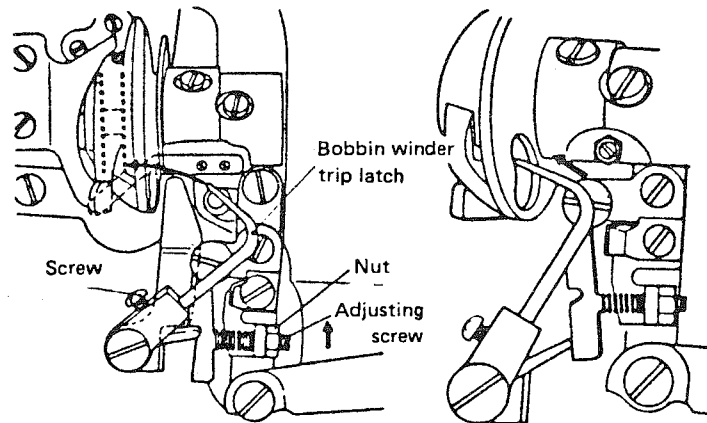
- (6) **Adjusting the bobbin thread guide**  
 The bobbin thread guide retains trimmed bobbin thread. Loosen the bobbin thread guide, and adjust the installing position of the bobbin thread guide so that the radius recess of the bobbin thread puller is aligned with the center of the bobbin thread guide. Also, bend the spring of the bobbin thread guide so that the bobbin thread guide lightly presses bobbin thread.



- (7) **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 rear of the sewing hook at the time of pulling bobbin thread. It also serves to pull remaining needle thread in under a fabric. Furthermore, it is designed to secure a required length of bobbin thread, and prevents skipped stitches or thread slipping off from the needle.

**How to make adjustment**

- If the remaining length of the bobbin thread after trimming is too short, it means that the pressure applied by the bobbin winder trip latch is too high. Loosen the nut, and perform adjustment by turning the adjusting screw. Turning the screw counter-clockwise will decrease the spring pressure, and vice versa.
- When a sewing hook has been replaced or adjusted, confirm that the tip of the bobbin winder trip latch is in the escape hole of the sewing hook. And if it is not, loosen the screw of the bobbin positioner and readjust its height.

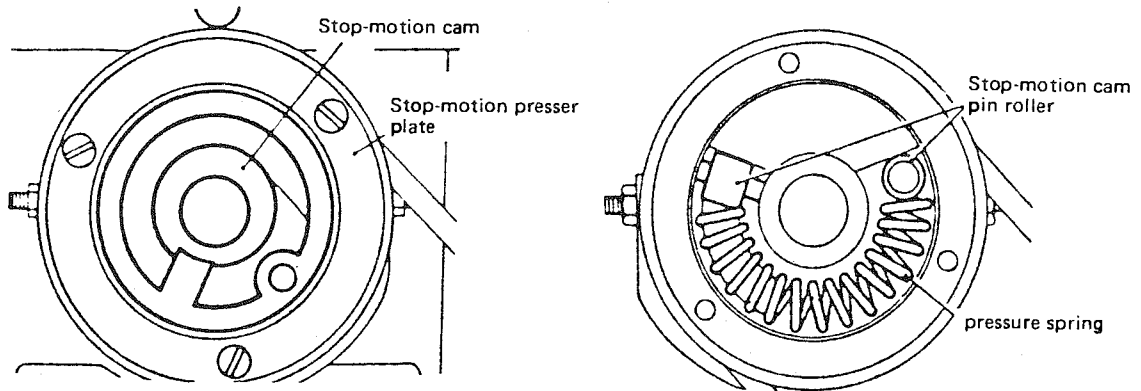


(8) Replacing the stop-motion pressure spring

When the crescent-shaped stop-motion pressure spring is broken, replace it as follows:

(Replacing sequence)

1. Set the stop-motion lever for the high-speed operation, and remove the stop-motion presser plate.
2. After removing the stop-motion cam, change the stop-motion pressure spring.
3. To install a new spring, push the new crescent-shaped spring into the driving pulley with its both ends applied to the stop-motion cam pin rollers, and then push in the central part of the spring.
4. Apply a thin film of grease to the new spring before reinstalling the stop-motion cam and stop-motion presser plate.



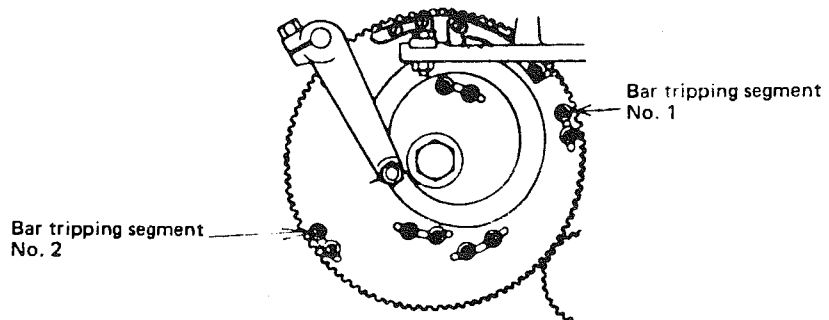
(9) Changing the number of stitches at bar-tacking part

The number of stitches at bar-tacking parts is principally constant for all the numbers of stitches, and therefore it is seldom required to be changed.

For some special application, however, if the number of stitches at a bar-tacking part must be increased or decreased, it is necessary to change the bar tripping segments No. 1 and No. 2.

(Increasing/decreasing the number of stitches at bar-tacking part and the bar tripping segments to be used)  
LBH-781 (Standard)

Increase/ decrease	Standard	20% decrease	40% decrease	40% increase
Bar-tacking part				
First bar-tacking	B2902761000	B2902761B00	D2902762V00	D2902762T00
Second bar-tacking	B2903761000	B2903761B00	D2903762V00	B2902761000



## 5. LUBRICATION SYSTEM

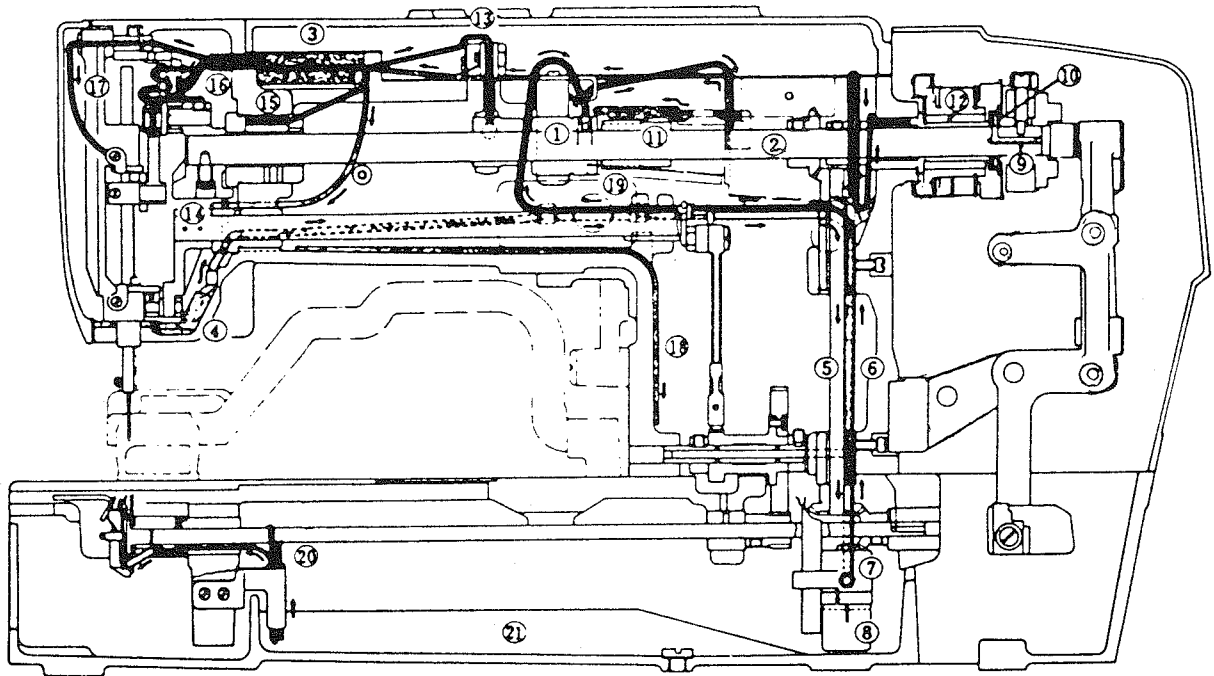
### (1) General Description

The lubrication system of this machine is as shown in the figure below. In this figure, the flow of oil is shown by arrows.

A plunger pump making use of the main shaft sucks up oil in the oil reservoir ②<sup>1</sup>, and the sucked-up oil is temporarily retained in the oil receptacle ② before distributed to each section to be lubricated.

The plunger pump functions to perform such forced lubrication while at the same time, it serves as an oil returning pump.

Excess oil on the surfaces is collected by the oil returning felt ④, and sucked up through the oil returning pipe ⑤.



### (2) Lubricating each section

#### 1. The oil in oil receptacle ② is distributed to

- (i) Work section and spring clutch section ① through the felt,
- (ii) rear bushing ⑫ of the main shaft through the oil wick, and
- (iii) front oil reservoir ③ through the felt.

Surplus oil is applied, in the form of oil drops, to the upright shaft components, needle throw components, and hook driving shaft components.

#### 2. The oil in front oil reservoir ③ is distributed to

- (i) knife driving section ⑬ through an oil wick,
- (ii) front bushing ⑭ of the needle bar rocking shaft through an oil wick,
- (iii) front bushing ⑮ of the main shaft through an oil wick,
- (iv) thread take-up components ⑯ through an oil wick, and
- (v) needle bar components ⑰ through an oil wick.

Felt ⑱ functions to return oil accumulated in the middle part of an arm to the oil reservoirs.

(3) Adjusting the volume of lubricating oil

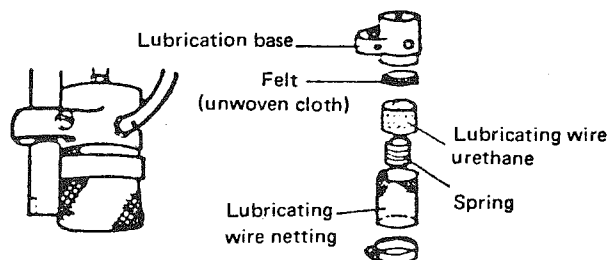
The adjustment of the amount of the lubricating oil in relation to the returning oil volume is performed by lubrication base ⑦. Wire netting ⑧ in the lubrication base consists of unwoven cloth serving as a filter, lubricating urethane, and compression spring.

When the unwoven cloth is removed to directly apply the urethane to the lubrication hole, the volume of lubricating oil will be increased.

Three pieces of the unwoven cloth are normally used. An increase in the number of pieces of the unwoven cloth will reduce the volume of the lubricating oil. The lubricating oil is normally supplied from the returning oil pipe at a rate of 3 to 20cc per minute during high-speed operation.

The volume of lubricating oil to be distributed is inversely proportional to the volume of the returning oil (in other words, when the volume of lubricating oil is increased, the volume of the returning oil is decreased, and vice versa). Accordingly, care should be exercised not change the number of pieces of the unwoven cloth, or damage the lubricating wire netting.

(Note) When too much oil is gathered at the oil returning felt, the volume of the lubricating oil distributed will increase temporarily. However, upon completion of oil return, normal volume of lubricating oil will be distributed again.



(4) Other sections to be lubricated

1. Grease is applied from the inside ⑨ of the main shaft to the rear bushing (consisting of thrust bearing ⑩) of the main shaft. Remove the rubber cap on the rear bushing of the main shaft, and supply high-quality grease to the rear bushing once half a year (if a grease pump is not available for supplying grease, a plastic oiler or an injector without a needle may be used instead).
2. The sewing hook is lubricated from the oil reservoir ⑳ through felt ㉑ and an oil wick. The adjustment of oil volume is done as explained in the Instruction Book. If the oil adjusting screws on the bed are not sufficient to obtain proper adjustment of oil volume, also adjust the screws of the hook sleeve.

(Checking the lubricating pipe & oil returning pipe)

With the machine operated at a low speed, confirm that oil is running in the arrow directions through the oil returning pipe ⑤ and lubricating pipe ⑥ which are seen through the oil sight window ⑲.

**(CAUTION)**

In a machine which is newly set up, or has been out of use for a long time, the volume of lubricating oil distributed is sometimes reduced. This is mainly because a dry oil returning felt absorbs much air, resulting in reduced oil sucked up from the oil reservoirs. In this case, supply oil through the oiling hole in the front part of the top cover, and leave it for about 30 min., or remove the face cover, and apply a few drops of oil to the oil returning felt ④ on the arm.

In the lubricating pipe ⑥ 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 ①, and allow the machine to run idle at a low speed to confirm that the oil is sucked up.

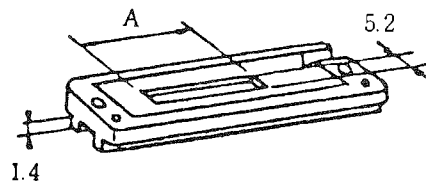
**6. SPECIAL PARTS**

**(1) Work clamp check for extremely light-weight knit**

Specially designed work clamp checks are available for the following cases; when a fabric flaps while buttonholing a flat part and skipped stitches are produced, or when a fabric, because of its extremely light weight, is tensed up along the first bar-tacking part, resulting in a buttonhole with inferior appearance.

Use work clamp carriers A (B1613771A00A) with a wider slit exclusively used for the special work clamp checks.

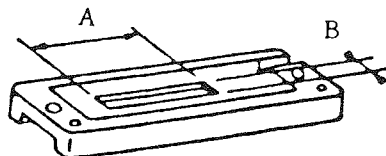
**(NOTE)** The work clamp carrier A can be used for LBH-781 and LBH-782.



	A dimension	Knife blade width	Buttonhole length	Name	Part No.
For LBH-781	30 mm	3/4"	30 mm	work clamp check (A) good	B1508771A00
For LBH-782	40 mm	1"	40 mm	work clamp check (2A) good	B1508772A00

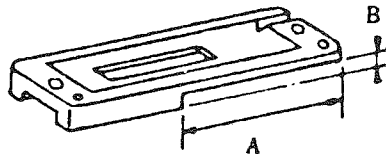
**(2) Work clamp check for knit/jersey**

**1. LBH-781-K (for flat part)**



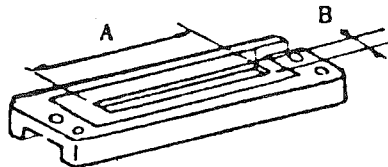
	A dimension	B dimension	Knife blade width	Buttonhole length	Part No.
1	7.3 mm	0.9 mm	5/8"	22 mm	D1508 771KOB
2	11.3 mm	0.9 mm	1/2"	18 mm	D1508 771KOC

LBH-781-K (for overlapped part)



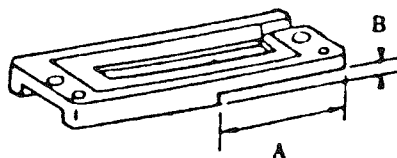
	A dimension	B dimension	Knife blade width	Buttonhole length	Part No.
1	7.3 mm	0.9 mm	5/8"	22 mm	D1508 771KOE
2	11.3 mm	0.9 mm	1/2"	18 mm	D1508 771KOF

2. LBH-782-K (for flat part)



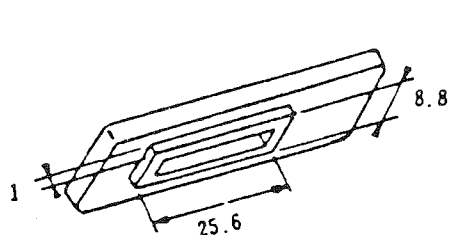
	A dimension	B dimension	Knife blade width	Buttonhole length	Part No.
1	37 mm	5.2 mm	1"	33 mm	D1508 772KOA
2	29.5 mm	5.2 mm	3/4"	25.5 mm	D1508 772KOB
3	22 mm	5.2 mm	1/2"	18 mm	D1508 772KOC

LHB-782-K (for overlapped part)

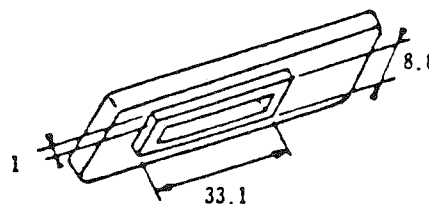


	A dimension	B dimension	Knife blade width	Buttonhole length	Part No.
1	7.8 mm	0.9 mm	1"	33 mm	D1508 772KOD
2	15.3 mm	0.9 mm	3/4"	25.5 mm	D1508 772KOE
3	22.8 mm	0.9 mm	1/2"	18 mm	D1508 772KOF

3. LBH-781-K, and 782-K (for top-center plait)



(for LBH-781)



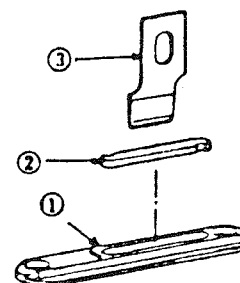
(for LBH-782)

	Knife blade width	Buttonhole length	Part No.
for LBH-781	1/2"	18 mm	D1508 771KOH
for LBH-782	3/4"	25.5 mm	D1508 772KOH

(3) Knife for special fabrics

Besides the general fabrics made from the twist yarns, special fabrics made from the non-twist yarns (used for ladies' blouses, etc.) have been available in the recent market. However, when our buttonholing machine users cut such fabrics after stitching buttonholes, they are not cut sharply by a knife built-in the machines, and the texture yarns are tensed up along the buttonhole stitches. This knife is very effective for preventing such trouble.

	Part No.	Name	Size
①	B2402 77100B	Throat plate	For 1/4"~ 1-1/4"
②	B2746 771000	Knife guard	For 1/4"~ 1-1/4"
	B2745 771F00	Knife	For 1/4"
	B2745 771K00	Knife	For 3/8"
	B2745 771L00	Knife	For 1/2"
	B2745 771M00	Knife	For 5/8"
③	B2745 771N00	Knife	For 3/4"
	B2745 771P00	Knife	For 7/8"
	B2745 771Q00	Knife	For 1"
	B2745 771R00	Knife	For 1-1/8"
	B2745 771S00	Knife	For 1-1/4"



## 7. STITCHING ADJUSTMENT

### (1) Adjustment for purl stitch

#### 1. Adjusting the bobbin thread tension

Adjust the tension of bobbin thread so that the bobbin case slowly falls down when it is suspended and moved up and down gently by holding the end of the bobbin thread coming out of the bobbin case (approx. 15 to 20g).

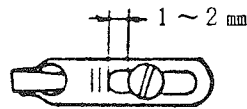
#### 2. Adjusting the thread take-up spring

Adjust the thread take-up spring stroke to 6 to 8 mm, and the tension to 20 to 35g.

Too small strokes of the thread take-up spring will produce inferior crests of seam, while too large strokes will often cause thread to be twisted on the crests.

#### 3. Adjusting the thread take-up guide

Adjust the thread take-up guide according to the thickness of fabrics. Set to the smallest stroke for a fabric with thickness of 2 mm or less (light-weight material).



#### 4. Adjusting the needle thread tension

Adjust the thread tension for the bar-tacking parts by the tension disc of the tension post No. 1.

Make adjustment by the tension disc of the tension post No. 2 so that the both banks of stitches are finely ribbed.

### (2) Adjustment for whip stitch

High tension of bobbin thread is essential to form beautiful whip stitches.

Adjust the bobbin thread tension to approx. 35 to 50g. If the bobbin thread tension is too low, the needle thread tension will be accordingly reduced, and the needle thread may be hooked twice.

### (3) How to improve needle thread catching at the stitching start

1. If needle thread deviates to the right or left from a seam, or often fails to be caught due to the lateral position of the needle thread trimmer at the start of stitching, prolong the thread holding time of the trimmer.

To prolong the thread holding time of the needle thread trimmer, move back the locking bracket latch, and find the best lateral position of the needle thread trimmer, taking the crest inclination into account. It is consequently better for needle thread to deviate to the right rather than to the left since needle thread deviated to the right is trimmed by the knife after all.

2. A larger stitch width provides better catching of needle thread.

Catching of needle thread gets a little worse for a bar-tacking stitch width of 3 mm or less. Accordingly, it is desirable not to make the stitch width smaller than necessary.

3. Set the needle thread trimmer as low as possible for better catching of needle thread, provided that the trimmer does not come in contact with the work clamp check.



(4) Adjustment for stitching synthetic fiber fabrics

The following adjustment must be made when using synthetic fiber thread, or buttonholing synthetic fiber fabrics or mixed fiber fabrics.

1. Thread breakage or stitch skipping due to heat

Take the following action if a needle gets hot because of the high needle friction produced at the time of penetration into a fabric, resulting in fusion of the thread or fabric.

A. Replace the pulley by one for synthetic fiber fabrics (50Hz B7258781000; 60Hz B7259781000).  
Set the sewing speed at 2800 s.p.m.

B. Use ESLEN.

C. Use a Super needle for synthetic fiber fabrics.

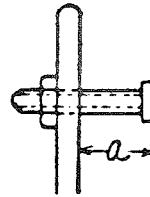
D. Use of a thin needle is recommended because it has a lower penetration resistance.

2. How to produce the best stitching conditions

There is no definite rule for obtaining the best stitching conditions for synthetic fiber fabric.

However, the following gives the basic adjustment necessary for stitching synthetic fiber fabrics.

A. Bobbin thread is desirably wound up to about 80% of a bobbin. The 80% thread winding onto a bobbin is given by setting the dimension "a" of the thread winder adjusting screw to approx. 7 mm.

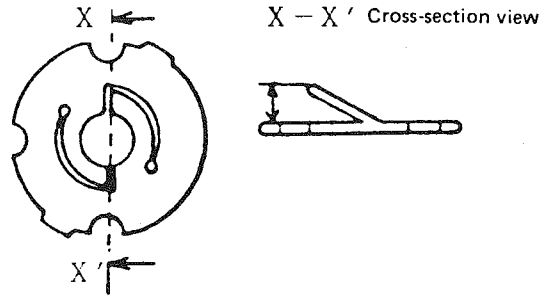


B. Adjust the thread tension at the time of bobbin thread winding to 20g which is effective in preventing ribbed banks of stitches or idling of a bobbin.

C. Adjust the tension for pulling out bobbin thread to 0 to 5g when a bobbin is placed in a bobbin case.

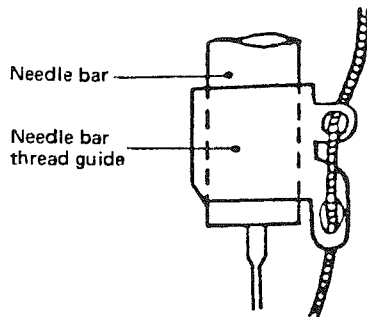
D. The use of an bobbin case asm. (B18107710BA) is very effective for preventing a bobbin from running idle.

Adjust the height of the spring for preventing idling so that an approx. 20g tension is produced when a bobbin case is installed in a sewing hook.

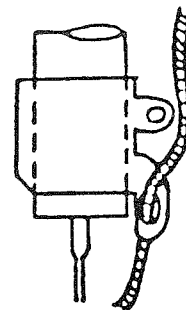


E. Use a needle bar thread guide for synthetic thread (B145177100A).

(When synthetic thread is used)

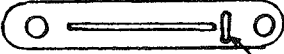
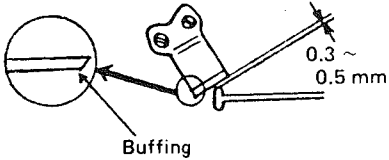


(When cotton thread is used)



When a needle bar thread guide for synthetic thread is used for cotton thread, the upper thread hole should not be used.

## 8. STITCHING TROUBLES & CORRECTIVE MEASURES

No.	Trouble	Cause (1)	Cause (2)	Corrective measures
1.	<b>Needle thread breaks.</b>	1-1) The needle has not been installed correctly.	1)-A The orientation of the needle is wrong.  1)-B The height of the needle is not correct.  1)-C The needle is bent.	Reinstall the needle with its recessed part facing toward you as viewed from the front of the machine.  Fully insert the needle into the hole in the needle bar so that the top end of the needle shank touches the upper end of the hole in the needle bar.  Placing the needle on the flat surface of a table and the like, roll the needle while pressing its shank with your finger to check the needle tip for deflection. If deflection is found on the needle tip, replace the needle.
		1-2) The machine head is threaded improperly.		Re-thread the machine head properly.
		1-3) There are scratches on the thread path and the related components.	3)-A There are scratches on the thread take-up spring, thread take-up lever, tension discs, throat plate, needle bar thread guide, etc., or the thread path has worn out.  3)-B There are scratches or burrs on the blade point and/or circumference of the hook.  3)-C The blade corners of the counter knife have not been buffed correctly.	Buff out the scratches, or replace the components. Pay special attention to the finish of the bottom surface of the needle hole in the throat plate.   Check this part carefully.  Buff out the scratches or burrs, or replace the hook.   Buffing 0.3 ~ 0.5 mm

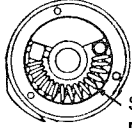
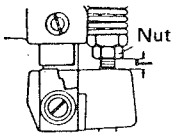
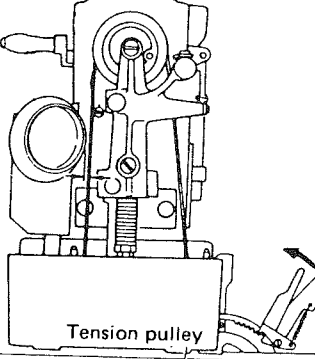
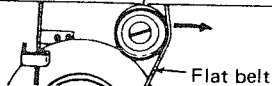
No.	Trouble	Cause (1)	Cause (2)	Corrective measures
		1-4) The thread tension components have not been adjusted properly.	<p>4)-A The tension of the thread tension No.2 is too high or low.</p> <p>4)-B The tension of the thread tension No.1 is too high or low.</p> <p>4)-C The tension and/or stroke of the thread take-up spring are not correct.</p>	<p>Properly adjust the tension of the bobbin thread (the proper tension is such that the bobbin case goes down slowly when it is suspended by holding the end of the bobbin thread coming out of the bobbin case), and perform further adjustment while checking the crests on the both banks of stitches.</p> <p>Perform readjustment while observing the stitches at the bar tacking parts (needle thread on the right side, and bobbin thread on the wrong side).</p> <p>Correct the stroke and/or tension (the standard stroke is 6~8 mm, and the tension, 30~50g which is slightly higher than that for a lock-stitcher).</p>
		1-5) The timing between the needle and hook is not correct.	<p>5)-A The height of the needle bar is not correct.</p> <p>5)-B The timing between the blade point of the hook and the needle has not been coordinated properly.</p>	<p>Using the timing gauge "1", correct the height of the needle bar so that the clearance between the bottom end of the needle bar and the top surface of the throat plate becomes 11.9 mm (12.6 mm for types K, T, and V) when the needle bar reaches its lowest position.</p> <p>Perform timing coordination with the needle entering the needle hole of the throat plate. Loosening the screws of the hook sleeve, perform adjustment by the timing gauge "2" so that the blade point of the hook aligns with the center of the needle at the moment the needle begins to go up from its lowest position.</p> <p>Adjust the clearance between the blade point and the needle to about 0.05 mm.</p>

No.	Trouble	Cause (1)	Cause (2)	Corrective measures
2.	<b>Stitch skipping</b>	2-1) The needle has been improperly installed.	<p>1)-A The orientation of the needle is wrong.</p> <p>1)-B The height of the needle is not correct.</p> <p>1)-C The needle is bent.</p> <p>1)-D The tip of the needle is crushed.</p>	<p>Reinstall the needle with its recessed part facing toward you as viewed from the front of the machine.</p> <p>Fully insert the needle into the hole in the needle bar so that the top end of the needle shank touches the upper end of the hole in the needle bar.</p> <p>Placing the needle on the flat surface of a table and the like, roll the needle while pressing its shank with your finger to check the needle tip for deflection. If deflection is found on the needle tip, replace the needle.</p> <p>Replace the needle.</p>
		2-2) The timing between the needle and hook is not correct.	<p>2)-A The height of the needle bar is not correct.</p> <p>2)-B The timing between the blade point of the hook and the needle has not been coordinated properly.</p>	<p>Using the timing gauge "1", correct the height of the needle bar so that the clearance between the bottom end of the needle bar and the top surface of the throat plate becomes 11.9 mm (12.6 mm for types K, T, and V) when the needle bar is at its lowest position.</p> <p>Perform timing coordination with the needle entering the needle hole in the throat plate. Loosening the screws of the hook sleeve, perform adjustment by the timing gauge "2" so that the blade point of the hook aligns with the center of the needle at the moment the needle begins to go up from its lowest position.</p> <p>Adjust the clearance between the blade point and the needle to about 0.05 mm.</p>

No.	Trouble	Cause (1)	Cause (2)	Corrective measures
		2-3) The blade point the hook has been crushed.	3)-A The blade point and the needle contact with each other.	Repair the blade point, or replace the hook. Then, adjust the timing between the blade point of the hook and the needle in accordance with 2)-B.
		2-4) The bobbin thread is too short.	4)-A The spring tension of the bobbin winder trip latch is too high.	Reduce the spring tension (Be careful not to reduce the tension excessively, or else the bobbin will run idle).
		2-5) There are problems with the work clamp check.	5)-A The work clamp check does not work smoothly (or the work clamp check is kept inclined when it clamps a work). 5)-B The work clamp check is too large for the buttonhole. 5)-C The fabric flaps because the overlapped part is clamped. 5)-D The fabric flaps because the fabric is a light-weight knit or jersey.	Replace the hinge screw for installing the work clamp check.  Replace with a work clamp check suited for the buttonhole.  Use a compensating work clamp check.  Replace the work clamp check with one for extremely light-weight knit or knit & jersey. Set the hook timing as specified for Type K in the above 2-2).
3.	<b>The needle thread slips off the needle</b>	3-1) The installation and opening timing of the needle thread trimmer is not correct.	1)-A The needle thread trimmer opens too early.  1)-B The thread holding force of the trimmer is not enough.  1)-C The tension releasing duration of the tension disc No. 2 is insufficient.	Perform adjustment by means of the needle thread trimmer driving lever B so that the trimmer begins to open slowly at about 2.5 to 3 mm from the start of buttonholing.  Readjust the pressure spring so that it contacts the whole surface of the trimmer blade.  Perform adjustment by the tension release cam No. 2 so that the tension disc No. 2 is kept floated for the beginning 3 to 4 stitches.

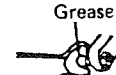
No.	Trouble	Cause (1)	Cause (2)	Corrective measures
			1)-D The needle thread trimmer slightly opens when the work clamp check has come down.	Correct the lateral and longitudinal positions of the needle thread trimmer driving lever B and the trimmer.
		3-2) The thread pulling wire is improperly positioned.	2)-A The thread pulled by the thread pulling wire is too short.	Lower the thread pulling wire to increase the length of the thread pulled by the wire (Give 5 to 7 mm slack to the needle thread).
		3-3) The tension disc No. 1 has been improperly adjusted.	3)-A The floating amount of the tension disc is not enough.  3)-B The tension is too high.	Readjust the tension disc so that it floats 0.5 to 1 mm at the time of stop motion.  Readjust the tension so that whip stitches are formed at the start of buttonholing.

## 9. TROUBLES AND CORRECTIVE MEASURES (FOR MECHANICAL COMPONENTS)

No.	Trouble	Cause (1)	Cause (2)	Corrective measures
1.	<p>The needle is not at the proper height when the machine stops.</p>	<p>1-1) The stop-motion pressure spring is defective.</p> <p>1-2) The nut of the pressure spring for the stop link rod is loose.</p> <p>1-3) The stop motion is defective.</p>	<p>1)-A The pressure spring has broken.</p> <p>1)-B The pressure spring has become fatigued.</p> <p>3)-A The tension of the flat belt is insufficient.</p> <p>3)-B The tension of the low-speed V belt is too low.</p> <p>3)-C The machine head belt shifter or speed reducer shifter has been improperly adjusted.</p> <p>3)-D The starting lever and starting link have been improperly positioned.</p> <p>3)-E The position of the starting link is not correct.</p>	<p>Replace the pressure spring.</p> <p>Replace the pressure spring.</p>  <p>Turn in the nut so that the bolt is exposed 5 mm from the bottom of the nut.</p>  <p>Increase the belt tension by means of the tension pulley.</p>   <p>Increase the V belt tension by changing the position of the motor.</p> <p>Refer to STANDARD ADJUSTMENT (27) – ① and ②.</p> <p>Refer to STANDARD ADJUSTMENT (26).</p> <p>Refer to STANDARD ADJUSTMENT (14).</p>



No.	Trouble	Cause (1)	Cause (2)	Corrective measures
2.	<b>The noise produced at the time of stop motion is abnormally high.</b>	2-1) The low speed running duration is not enough. 2-2) The machine does not slow down at the end of button-holing.	2)-A The tension of the low-speed V belt is too low. 2)-B The speed reducer shifter has been improperly adjusted.	Refer to STANDARD ADJUSTMENT (25).  Increase the V belt tension by changing the position of the motor.  Refer to STANDARD ADJUSTMENT (27)- 2 .
3.	<b>The knife is not dropped.</b>	3-1) The knife tripping segment has been improperly positioned.  3-2) The knife bar driving lever bell crank has been improperly positioned.  3-3) The machine head has been incorrectly threaded.  3-4) The knife stop lever has been improperly balanced.  3-5) The tension spring has become fatigued.	1)-A The timing of the knife tripping segment is extremely delayed.  3)-A The thread check wire has not been threaded.  4)-A The knife stop lever balance weight and thread check wire have been incorrectly adjusted.	Correct the timing of the knife tripping segment so that the knife is dropped 2 or 3 stitches before the machine stops after it has fully slowed down.  Refer to STANDARD ADJUSTMENT (12).  Re-thread the needle thread correctly.  Correct the position of the upper and lower balance weight of the wire so that the center of the wire tip aligns with the center of the thread guide hole during buttonholing, and that the tip of the knife stop lever touches the knife bar driving lever bell crank at the end of buttonholing.  Replace the tension spring.

No.	Trouble	Cause (1)	Cause (2)	Corrective measures
4.	<b>The knife is dropped at the start of buttonholing.</b>	<p>4-1) The position of the knife tripping segment is not correct.</p> <p>4-2) The tension spring of the ratchet pawl B has become fatigued or broken.</p>	1)-A The timing of the knife tripping segment is extremely late.	<p>Readjust the installing position of the knife tripping segment so that the knife is dropped 2 or 3 stitches before the machine stops.</p> <p>Replace the spring.</p>
5.	<b>The knife is dropped twice successively.</b>	<p>5-1) The tension spring of the ratchet pawl B has become fatigued or broken.</p> <p>5-2) The torque of the ratchet pawl B is too large.</p>		<p>Replace the spring.</p> <p>Lubricate and reassemble the ratchet pawl B.</p>
6.	<b>The starting pedal does not work (The presser bar lifting lever is not lifted up fully).</b>	<p>6-1) The throat plate, throat plate base, or bobbin thread trimmer is clogged with fibrous dust.</p> <p>6-2) The driving lever sticks against the ball screw.</p> <p>6-3) The tension release pin No. 1 contacts the tension release lever.</p>	<p>2)-A The ball screw is too long, and it contacts the forked part of the driving lever.</p> <p>2)-B Lubrication is insufficient.</p>	<p>Remove the work clamp carrier, and clean the area around the throat plate.</p> <p>Correct the length of the ball screw.</p> <p>Apply grease to the part indicated by the figure on the right.</p> <p>Readjust the tension release lever so that the tension release pin No. 1 rests on the tension release lever at the time of stop motion.</p> <p style="text-align: center;">Grease</p> 

No.	Trouble	Cause (1)	Cause (2)	Corrective measures
		6-4) The needle thread trimmer has been improperly installed.	4)-A The height and lateral position of the needle thread trimmer are not correct.	Refer to STANDARD ADJUSTMENT (16) and (18).
7.	<b>Work clamp check does not go up.</b>	<p>7-1) The throat plate, throat plate base, or bobbin thread trimmer is clogged with fibrous dust.</p> <p>7-2) The bobbin thread puller comes in contact with the bobbin thread guide.</p> <p>7-3) The bobbin thread puller hits the bobbin case stop.</p> <p>7-4) The clearance between the presser bar lifting lever and the starting link is not correct.</p> <p>7-5) The needle thread trimmer has been installed improperly.</p>	<p>5)-A The height and lateral position of the needle thread trimmer are not correct.</p>	<p>Remove the work clamp carrier, and clean the area around the throat plate.</p> <p>Perform readjustment so that the bobbin thread puller does not interfere with the bobbin thread guide.</p> <p>Perform readjustment so that the bobbin thread puller and the bobbin case stop do not interfere with each other.</p> <p>Refer to STANDARD ADJUSTMENT (14).</p> <p>Refer to STANDARD ADJUSTMENT (16) and (18).</p>

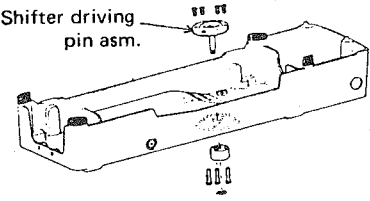
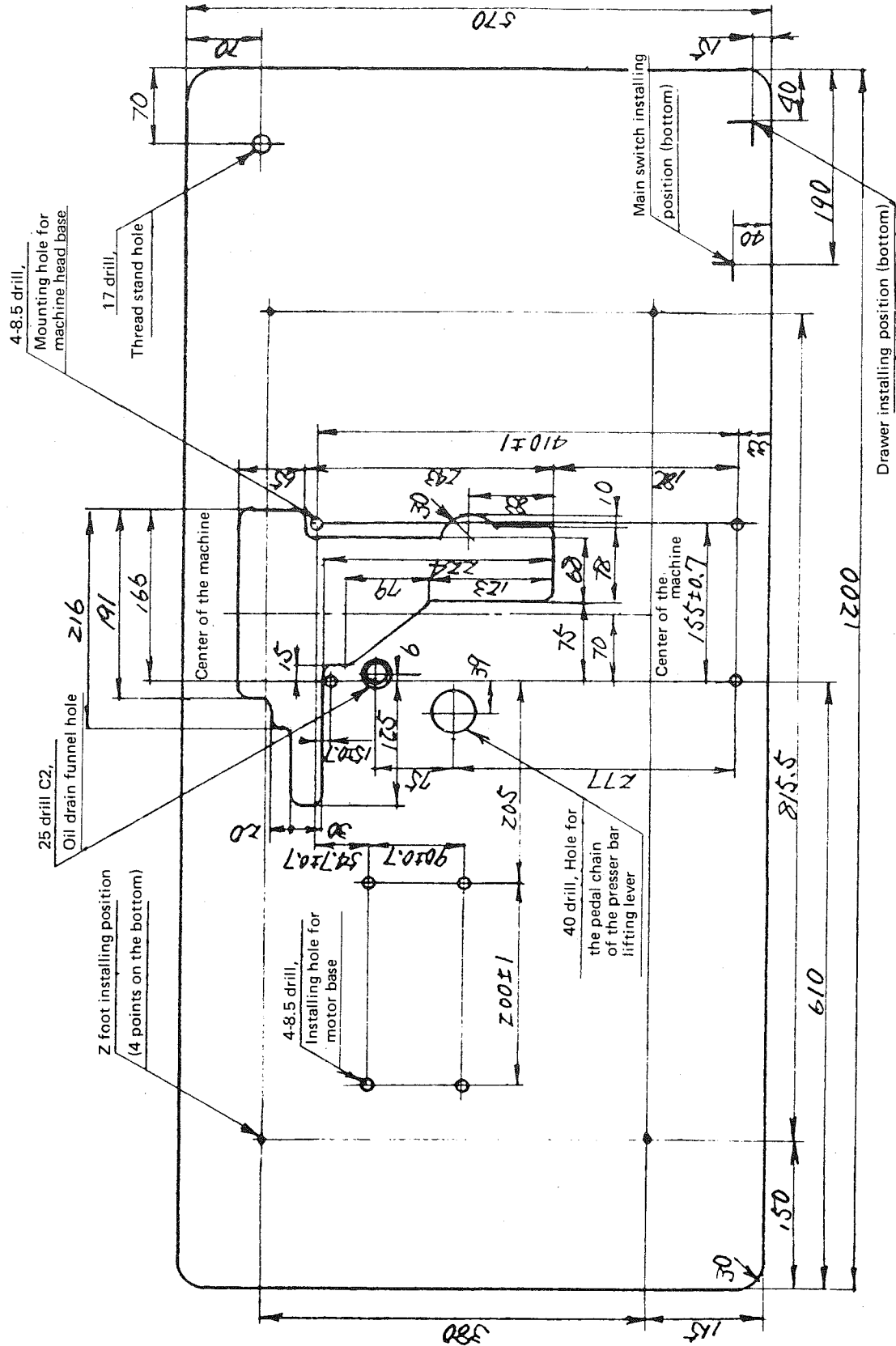
No.	Trouble	Cause (1)	Cause (2)	Corrective measures
8.	<p>The machine does not run at the highest speed even after treading on the pedal fully.</p>	<p>8-1) The position of the starting lever and starting link.</p> <p>8-2) The clearance between the stop motion lever catch (A) and the latch (B) is not correct.</p> <p>8-3) The hand stop crank has been set improperly.</p> <p>8-4) The shifter driving pin has stuck.</p> <p>8-5) The position of the starting lever</p> <p>8-6) The machine head belt shifter and the speed reducer shifter have been adjusted improperly.</p>	<p>3)-A The hand stop crank has been set downwards (low speed).</p>  <p>5)-A The clearance between the starting lever.</p>	<p>Refer to STANDARD ADJUSTMENT (26).</p> <p>Refer to STANDARD ADJUSTMENT (13).</p> <p>Set the hand stop crank to the high speed position.</p> <p>Reinstall and adjust the shifter driving pin so that it moves smoothly.</p> <p>Lubricate the shifter driving pin.</p> <p>Refer to STANDARD ADJUSTMENT (26).</p> <p>Refer to STANDARD ADJUSTMENT (27)- ① and ②.</p>

TABLE DIMENSIONAL DIAGRAM (1/6)



Note: "R" shall is R10 unless otherwise specified.





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