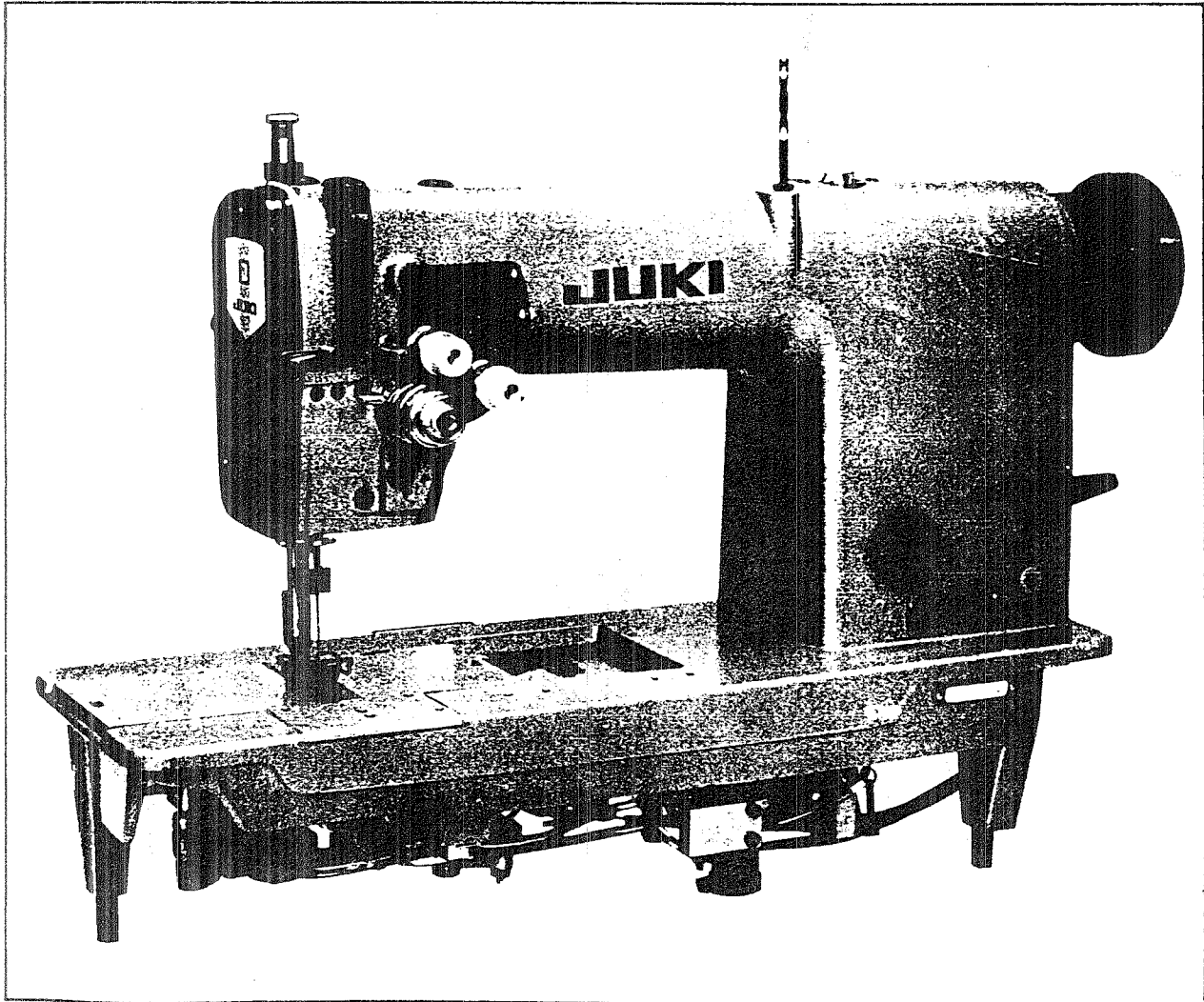


JUKI

2-Needle, Needle Feed Lockstitcher with Automatic
Thread Trimmer, Wiper and Automatic Reverse Feed

LH-1152-4 Series

ENGINEER'S MANUAL



LIST OF MAIN REVISIONS (LH-1152-4, Series)

The following shows main revisions that have been made in Engineer's Manual. (In this case, Management No. will be changed.)

Management No.	Month/year	Description
VI-5-1	Aug., 1983	The moving knife, fixed knife and thread presser of LH-1152-4 have been modified in configuration. The clamping pressure of the thread presser has been made adjustable.

PREFACE

This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the sewing machine.

The Instruction Book for the sewing machine, which is intended for the maintenance personnel and operators at an apparel factory contains detailed operating information. This manual describes "How to Adjust", "Effects of Adjustment", and other information not covered by the Instruction Book.

It is advisable to use the pertinent Instruction Book and Parts Book together with this Engineer's Manual when carrying out the maintenance and service of the sewing machine. This manual mainly consists of three sections; the first section presents "Adjustment Standard", the second section, "How to Adjust", and the third, "Effects of Adjustment".

CONTENTS

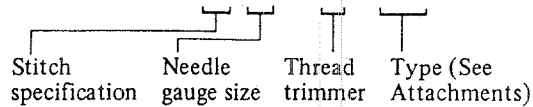
1. SPECIFICATIONS	1
2. ADJUSTMENT STANDARD	4
(1) Needle bar	4
1) Needle entry point	4
2) Needle bar height	4
3) Needle entry in the needle feed slot	6
(2) Needle-to-hook relation	8
1) Rising of needle	8
2) Clearance between the needle and the hook point	8
3) Hook point location above the top end of the needle eye	8
(3) Working position of the bobbin case opening lever	8
(4) Clearance between the throat plate and the bobbin case stopper	10
(5) Timing of cloth feed action	12
(6) Height of feed dog	12
(7) Relation between the main shaft and the hook driving shaft	14
(8) Timing to release thread tension	14
(9) Lubrication	16
(10) Sway of the needles	18
(11) Stitch length in the forward and reverse feed	18
3. ADJUSTMENT STANDARD FOR THE ATTACHMENTS	20
(1) Thread trimmer	20
1) Height of the moving knife	20
2) Initial position of the moving knife	20
3) Position of the camp spring	22
4) Timing of thread trimming action	22
5) Position of the thread trimmer cam	24
6) Position of the trimmer cam driving mechanism	24
7) Clearance between the tension discs for releasing the thread	26
8) Position of the safeguard mechanism	26
(2) Wiper components	28
1) Stroke of the magnet plunger	28
2) Height of the wiper	28
(3) Automatic reverse feed components	30
1) Stroke of the reverse feed magnet plunger	30
4. DESCRIPTION OF THE THREAD TRIMMER COMPONENTS	32
5. HOW TO DISASSEMBLE AND RE-ASSEMBLE THE THREAD TRIMMER UNIT	34
6. HOW TO REPLACE THE TIMING BELT	36
7. HOW TO REMOVE PLAYS IN THE AXIAL DIRECTION	38
1) Needle bar frame	38
2) Thread take-up lever	38
3) Hook	38
8. MOTOR	40
1) Synchronizer	40
2) Selection of need-up or -down stop, selection for soft start and speed adjustment	40
9. TABLE OF SELECTIVE PARTS	42
10. PARTS TO BE FIXED BY "LOCK-TITE" PAINT	43
11. PARTS FIXED BY BOND OR SEALING MATERIALS	43
12. MAINTENANCE PARTS	44
13. IMPORTANT CAUTIONS IN ADJUSTMENT	44
14. COMPARISON TABLE OF THE COMPONENTS BY SPECIFICATIONS AND THE METHODS FOR MODIFICATION	46
15. MECHANICAL TROUBLES AND CORRECTIVE MEASURES	48
16. STITCH FAILURES AND CORRECTIVE MEASURES	50
17. MECHANICAL TROUBLES OF ATTACHMENTS AND CORRECTIVE MEASURES	54
18. DIMENSIONS OF THE MACHINE TABLE	61

1. SPECIFICATIONS

No.	Item	Specification
1	Model No.	LH-1152-4-4B
2	Model description	2-needle, needle feed lockstitcher with automatic thread trimmer (with wiper and automatic reverse feed mechanism)
3	Uses by type	"A" Specifications : For Light-weight materials "S" Specifications : For Medium-weight general materials "G" Specifications : For Denim or similar materials "F" Specifications : For Light-weight and foundation garments
4	Sewing speed	4,500 s.p.m. (max), (3,500 s.p.m. for stitch length of 4 mm (5/32") or longer
5	Needle	DP x 5 #9 ~ #22, (Schmets System 134) (Sg x 1906 #9 ~ #18) (Sg x 1965 #9 ~ #12)
6	Thread	#80 ~ #20
7	Needle gauge size	3/32" ~ 1-1/4" (3/32" ~ 1-1/2" without automatic thread trimmer)
8	Stitch length	4 mm (5/32") (forward and reverse stitching) (Standard) "G" Specifications : 6 mm (15/64") (Forward stitching) 4 mm (5/32") (Reverse stitching)
9	Presser foot lift	6 mm (15/64") by hand lifter 10 mm (25/64") by knee lifter
10	Stitch length regulator	Wing-shape dial
11	Reverse feed system	solenoid magnet (Externally mounted solenoid magnet with switch lever)
12	Thread take-up	Link type thread take-up
13	Needle bar stroke	33.4 mm (1-5/16")
14	Hook	Vertical axis hook with long-shaft bobbin case
15	Bobbin case opener	Interlocking with hook driving eccentric cam (1:1 principle)
16	Take-up spring	Separated type
17	Feed mechanism	By slide block
18	Hook driving system	Gears
19	Needle feed system	Interlocked with bottom feed system
20	Connection of shafts	Timing belt connects the main shaft and the hook driving shaft
21	Lubrication system	Fully automatic by a plunger pump
22	Oil return flow	Circulated by a plunger pump
23	Thread trimmer	Rocks around the hook (cam with safety mechanism)
24	Tension release system	Interlocked with thread trimming clutch
25	Wiper components	Swaying type (single wiper)
26	Lubrication oil	JUKI New Defrix Oil No. 2
27	Bed size	517 x 178 mm (20-23/64" x 7")
28	Head weight	44 Kg (38 Kg without thread trimmer)
29	Motor	MA22LH (with BB type detector), general-purpose 400 W clutch motor for a head without thread trimmer)
30	Driving belt	M type V-belt

MODEL DESIGNATION

LH-1152 □ □ -4-4B



(Example) LH model of "G" specification in 1/4" needle gauge size with thread trimmer (complete) LH-1152 GF-4-4B.

○ **ATTACHMENTS**

	4-1	4-1B	4-2	4-2B	4-3	4-3B	4-4	4-4B
Automatic thread trimmer	○	○	○	○	○	○	○	○
Wiper					○	○	○	○
Automatic reverse feed		○		○		○		○
Motor & Stand			○	○			○	○

○ **STITCH SPECIFICATIONS AND PRESENCE OF AUTOMATIC THREAD TRIMMER**

Stitch specification	With Automatic thread trimmer	Without Automatic thread trimmer	Use
A	○	○	Light-weight fabrics
S	○	○	Medium-weight general fabrics
G	○	○	Denim, etc.
F		○	Foundation garments

○ **CODE FOR NEEDLE GAUGE SIZE**

(mm)	(2.4)	(3.2)	(4.0)	(4.8)	(5.6)	(6.4)	(7.1)	(7.9)	(9.5)	(11.1)
Gauge size	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"	9/32"	5/16"	3/8"	7/16"
Code	A	B	C	D	E	F	G	H	K	W

(mm)	(12.7)	(15.9)	(19.1)	(22.2)	(25.4)	(28.6)	(31.8)	(34.9)	(38.1)	
Gauge size	1/2"	5/8"	3/4"	7/8"	1"	1-1/8"	1-1/4"	1-3/8"	1-1/2"	
Code	L	M	N	P	Q	R	S	T	U	

Note : The parenthesized figures are mm conversions.

○ LIST OF SEWING SPEED FOR EACH GAUGE SIZE

LH-1152-4 (with automatic thread trimmer)

Stitch Specification	Gauge size	Stitch length	Max. sewing speed	Normal sewing speed	Remarks
"S" Specification	1/8" ~ 3/8" (3.2 ~ 9.5 mm)	Up to 4 mm	4500 s.p.m.	4000 s.p.m.	The max. sewing speed for denim weighing over 12 oz should be 4000 s.p.m.
	7/16" ~ 3/4" (11.1 ~ 19.1 mm)	Up to 4 mm	3800 s.p.m.	3500 s.p.m.	
	7/8" ~ 1-1/4" (22.2 ~ 31.8 mm)	Up to 4 mm	3500 s.p.m.	3200 s.p.m.	
"G" Specification	3/16" ~ 3/8" (4.8 ~ 9.5 mm)	Up to 4 mm	4500 s.p.m.	4000 s.p.m.	
	3/16" ~ 3/8" (4.8 ~ 9.5 mm)	Up to 4 ~ 6 mm	4000 s.p.m.	3800 s.p.m.	
	7/16" ~ 3/4" (11.1 ~ 19.1 mm)	Up to 4 mm	3800 s.p.m.	3500 s.p.m.	
	7/16" ~ 3/4" (11.1 ~ 19.1 mm)	Up to 4 ~ 6 mm	3500 s.p.m.	3200 s.p.m.	
	7/8" ~ 1-1/4" (22.2 ~ 31.8 mm)	Up to 4 mm	3500 s.p.m.	3200 s.p.m.	
	7/8" ~ 1-1/4" (22.2 ~ 31.8 mm)	Up to 4 ~ 6 mm	3200 s.p.m.	3000 s.p.m.	
"A" Specification	3/32" ~ 3/8" (2.4 ~ 9.5 mm)	Up to 4 mm	4000 s.p.m.	3800 s.p.m.	
	7/16" ~ 3/4" (11.1 ~ 19.1 mm)	Up to 4 mm	3500 s.p.m.	3200 s.p.m.	
	7/8" ~ 1-1/4" (22.2 ~ 31.8 mm)	Up to 4 mm	3200 s.p.m.	3000 s.p.m.	

* The sewing speed varies according to material and operation.

LH-1152 (without automatic thread trimmer)

Stitch Specification	Gauge size	Stitch length	Max. sewing speed	Normal sewing speed	Remarks
"S" Specification	1/8" ~ 3/8" (3.2 ~ 9.5 mm)	Up to 4 mm	4500 s.p.m.	4000 s.p.m.	The max. sewing speed for denim weighing over 12 oz should be 4000 s.p.m.
	7/16" ~ 3/4" (11.1 ~ 19.1 mm)	Up to 4 mm	3800 s.p.m.	3500 s.p.m.	
	7/8" ~ 1-1/2" (22.2 ~ 38.1 mm)	Up to 4 mm	3500 s.p.m.	3200 s.p.m.	
"G" Specification	3/16" ~ 3/8" (4.8 ~ 9.5 mm)	Up to 4 mm	4500 s.p.m.	4000 s.p.m.	
	3/16" ~ 3/8" (4.8 ~ 9.5 mm)	Up to 4 ~ 6 mm	4000 s.p.m.	3800 s.p.m.	
	7/16" ~ 3/4" (11.1 ~ 19.1 mm)	Up to 4 mm	3800 s.p.m.	3500 s.p.m.	
	7/16" ~ 3/4" (11.1 ~ 19.1 mm)	Up to 4 ~ 6 mm	3500 s.p.m.	3200 s.p.m.	
	7/8" ~ 1-1/2" (22.2 ~ 38.1 mm)	Up to 4 mm	3500 s.p.m.	3200 s.p.m.	
	7/8" ~ 1-1/2" (22.2 ~ 38.1 mm)	Up to 4 ~ 6 mm	3200 s.p.m.	3000 s.p.m.	
"A" Specification	3/32" ~ 3/8" (2.4 ~ 9.5 mm)	Up to 4 mm	4000 s.p.m.	3800 s.p.m.	
	7/16" ~ 3/4" (11.1 ~ 19.1 mm)	Up to 4 mm	3500 s.p.m.	3200 s.p.m.	
	7/8" ~ 1-1/2" (22.2 ~ 38.1 mm)	Up to 4 mm	4000 s.p.m.	3800 s.p.m.	
"F" Specification	1/8" ~ 5/16" (3.2 ~ 7.9 mm)	Up to 4 mm	4000 s.p.m.	3800 s.p.m.	

* The sewing speed varies according to material and operation.

○ SOLENOID SPECIFICATIONS

	Domestic/Export	For JE	Solenoid stroke (mm)
Automatic thread trimmer	AC31V, 2.3A	AC24V, 2.5A	4
Wiper	AC31V, 2.6A	AC24V, 3.3A	6.7
Automatic reverse feed	AC31V, 8.4A	AC24V, 9.2A	8

2. ADJUSTMENT STANDARD

(1) Needle bar

1) Needle entry point

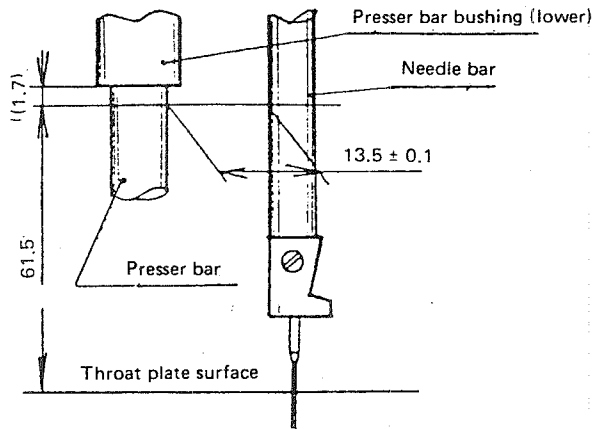


Fig. 1

Requirements :

- Needle bar : In the lowest position
- Stitch length : "0" mm

2) Needle bar height

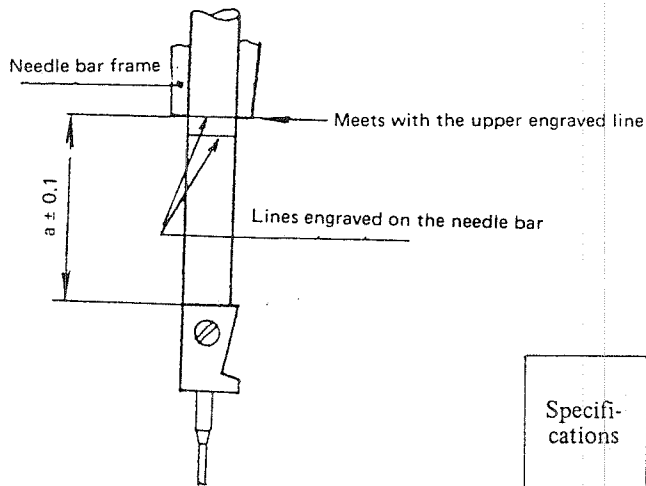


Fig. 3

Requirements :

- Needle bar : In the lowest position
- Stitch length : "0" mm

Specifi- cations	Needle bar height (distance "a" mm)	
	With thread trimmer	Without thread trimmer
A	44.5	44.0
S	44.5	44.0
G	44.5	44.0
F	/	44.0

HOW TO ADJUST

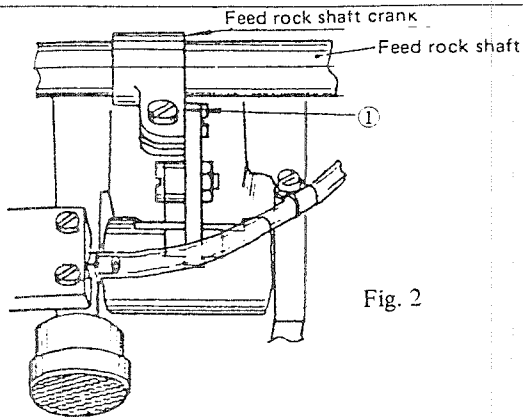


Fig. 2

1. Set the stitch length to "0" mm.
2. Turn the handwheel until the needle bar has come down to the lowest point of its stroke.
3. Loosen screw ① .
4. Provide a 13.5 ± 0.1 mm clearance between the needle bar and the presser bar and tighten screw ① .

EFFECTS OF ADJUSTMENT

If the clearance is too great ;

- When the stitch length is set to the maximum, the feed dog will hit the throat plate.
- Stitch skipping or needle breaking may occur.

If the clearance is too small ;

- When the reverse stitch is made at a maximum stitch length, the feed dog will hit the throat plate.
- Stitch skipping or needle breaking may occur.
- Thread trimming failure may occur.

1. Set the stitch length to "0" mm.
2. Turn the handwheel until the needle bar has come down to the lowest point of its stroke.
3. Loosen screw ① .
4. Align the upper engraved line on the needle bar with the lower end of the needle bar frame (refer to the table for distance "a"), and tighten screw ① .

(CAUTION)

Make sure that the needle runs in the middle of the needle feed slot after the adjustment.

- If the needle bar height is not correct, it may cause stitch skipping or thread breaking.

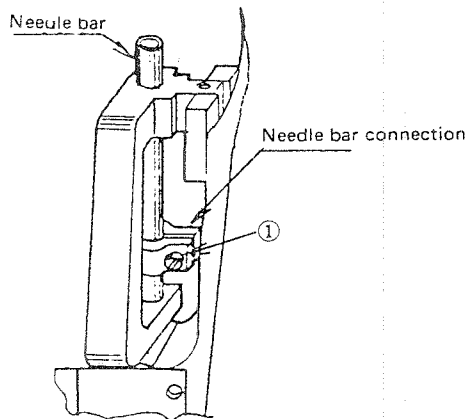


Fig. 4

3) Needle entry in the needle feed slot

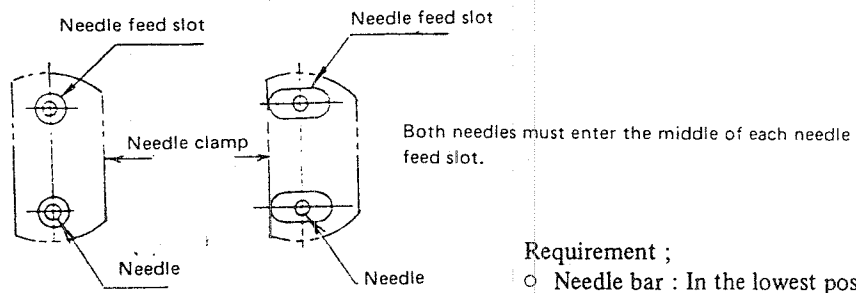


Fig. 5

Requirement ;

- Needle bar : In the lowest position.
- Stitch length : "0" mm

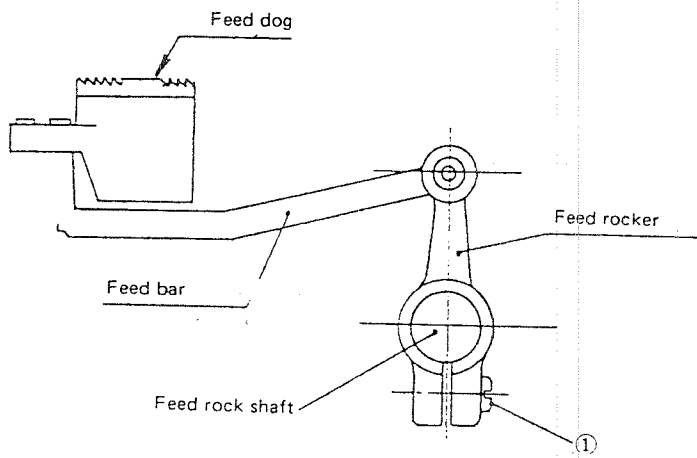
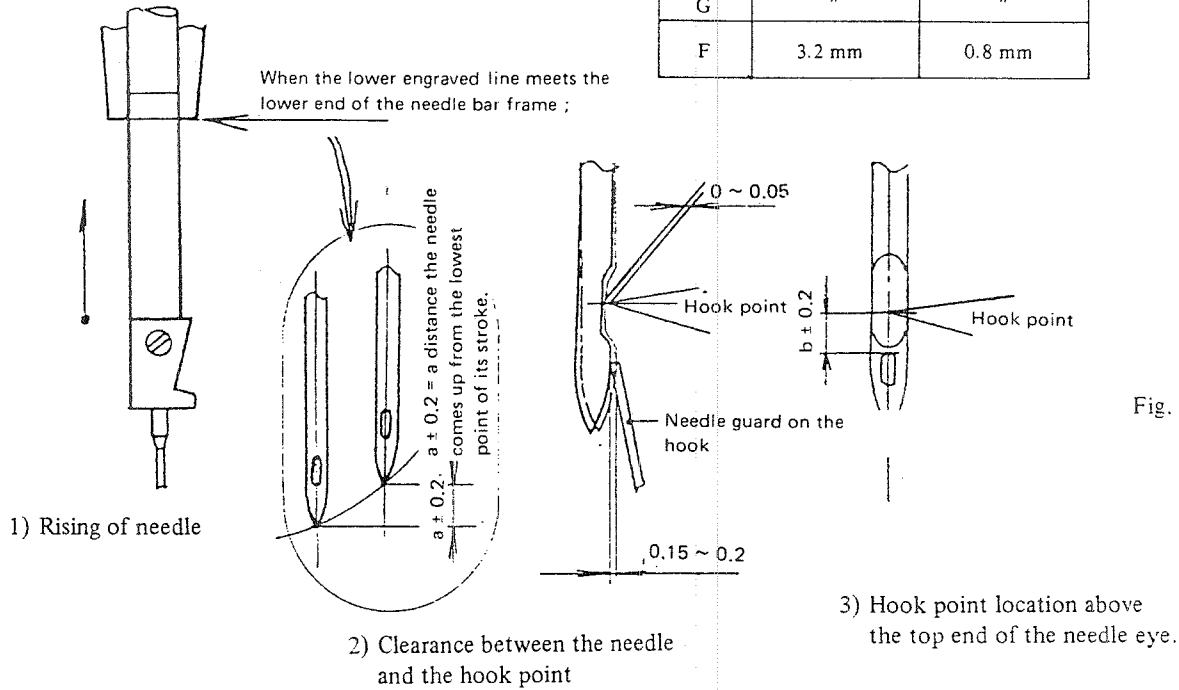


Fig. 6

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<p>If the needle bar is installed twisted ;</p> <ol style="list-style-type: none"> 1. Set the stitch length to 0 mm. 2. Turn the handwheel until the needle bar has come down to the lowest point of its stroke. 3. Loosen screw ① (Fig. 4). 4. Turn the needle bar until both needles stay in the middle of their needle feed slots. Tighten screw ① (Fig. 4). <p>(CAUTION)</p> <p>Take care not to change the height of the needle bar.</p> <ul style="list-style-type: none"> ○ Don't turn the needle clamp before screw ① (Fig. 4) is loosened. Otherwise, the needle clamp may come down accidentally while stitching. <p>If the needle deflects in the lengthwise direction of the needle feed slot ;</p> <ol style="list-style-type: none"> 1. Loosen screw ① (Fig. 6) 2. Adjust the position of the feed rocker so that both needles stay in the middle of the slots. 	<ul style="list-style-type: none"> ○ If the needles fail to enter the middle of their slots, stitch skipping, thread breaking or loose stitch may occur. ○ If the needles enter the bar end of the elongated slots (2 x 3 mm) viewed from the operator's side, the needle thread forming a stitch comes out too much on the fabric. * If the needles enter the near end of the elongated slot, thread trimming failure may occur.

(2) Needle-to-hook relation

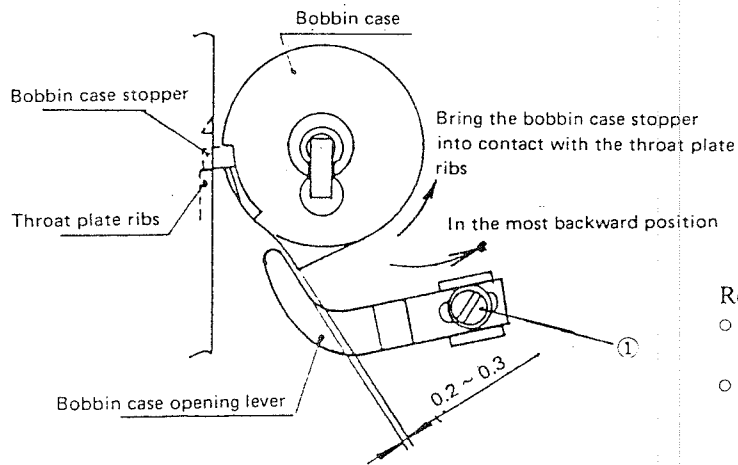
Specifications	Rising of needle (distance "a")	Hook point height (distance "b")
A	2.6 mm	1.4 mm
S	"	"
G	"	"
F	3.2 mm	0.8 mm



Requirements ;

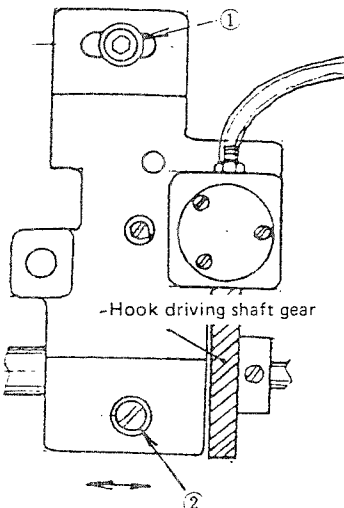
- The needle bar must be brought up from the lowest point of its stroke.
- Stitch length : 2 mm

(3) Working position of the bobbin case opening lever



Requirements :

- The bobbin case opening lever is in the most backward position.
- The bobbin case stopper is in contact with the thread plate ribs.

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
 <p>Fig. 8</p> <p>Loosen screws ① and ② to release the hook driving shaft saddle and move the saddle in the direction of the arrow for the clearance as specified above. Tighten two screws ① and ② after the adjustment.</p> <p>4. Adjustment of the hook point location to the needle eye; Loosen three screws which set the small gear to the hook shaft and align the hook point with the needle center.</p> <p>(CAUTION) When you replace the hook, you must adjust the position of the needle guard too.</p>	<ul style="list-style-type: none"> ○ If these adjustments are made inaccurately, irregular stitching, stitch skipping or thread breaking may occur.
<ol style="list-style-type: none"> 1. Turn the handwheel toward you until the bobbin case opening lever has gone back to the most backward position of its stroke. 2. Turn the bobbin case in the opposite direction to that of the hook until the bobbin case stopper comes into contact with the throat plate ribs. 3. Loosen screw ① and provide a 0.2 to 0.3 mm clearance between the bobbin case opening lever and bobbin case. 	<p>If the clearance is too great ;</p> <ul style="list-style-type: none"> ○ Loose or "balloon" stitch may be formed. <p>If the clearance is too small ;</p> <ul style="list-style-type: none"> ○ Bobbin case will be damaged while stitching.

(4) Clearance between the throat plate and the bobbin case stopper

Requirement ;

- Clearance between the upper face of the bobbin case stopper and the throat plate must be 0.8 to 1.0 mm (approx. 1/32").

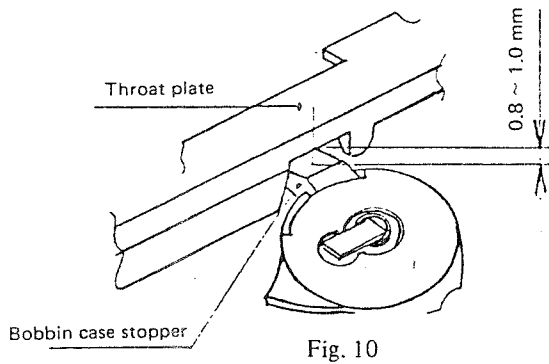


Fig. 10

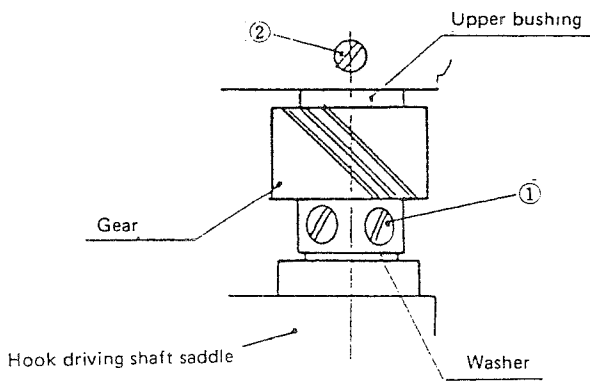


Fig. 11

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Remove the throat plate. 2. Remove the bobbin case opening lever. 3. Take off the feed dog and the needles. 4. Loosen screws ① . 5. Turn the handwheel to bring the needle bar to the highest point and remove the hook. 6. Remove the gear from the sewing hook shaft and replace the washer by the one which has a suitable thickness to provide the specified clearance at the throat plate. 7. At the same time, loosen screw ② and adjust the setting position of the upper bushing. 8. After the adjustment check also the working position of the bobbin case opening lever (Adjustment Standard (2-3)) and axial play of the hook (7-3)). 	<p>If the clearance is too great ;</p> <ul style="list-style-type: none"> ○ The bobbin case may slip off the throat plate. <p>If the clearance is too small ;</p> <ul style="list-style-type: none"> ○ Loose stitch or “balloon” stitch may be formed. ○ The moving knife may hit the hook while the thread trimmer is working.

(5) Timing of cloth feed action

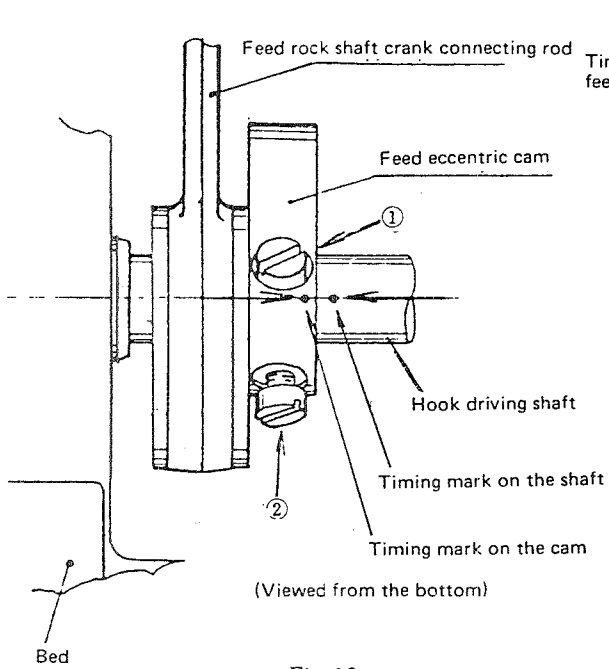
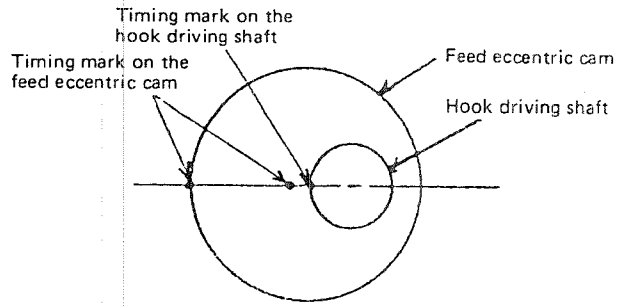


Fig. 12



Requirement ;

- The timing mark on the feed eccentric cam must be in line with that on the hook driving shaft.

(6) Height of feed dog

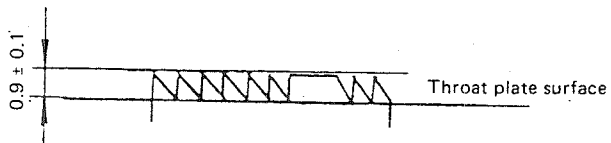
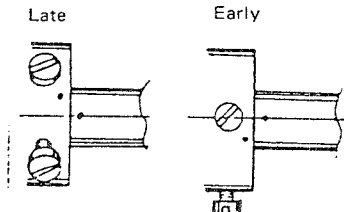
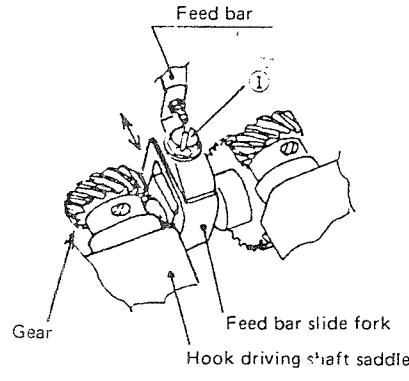


Fig. 14

Requirements ;

- Stitch length : 0 mm
- A maximal projection of the feed dog teeth must be 0.9 ± 0.1 mm from the throat plate surface.

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<p>1. Loosen screws ① and ② to set free the feed eccentric cam.</p> <p>2. Match the timing mark on the feed eccentric cam with that on the hook driving shaft. Tighten two screws ① and ②.</p> <p>(CAUTION) When aligning the timing marks, look through both marks straight toward the axis of the shaft and carefully fix the eccentric cam.</p> <p>When tightening the screws, set the eccentric cam properly in the direction of the axis of the hook driving shaft, in order to avoid extra load when revolving.</p>	<p>If the timing is too early ;</p> <ul style="list-style-type: none"> ○ Loose stitches may be formed. <p>If the timing is too late ;</p> <ul style="list-style-type: none"> ○ Loose stitches may be formed. * Thread trimming failure may occur. <div style="text-align: center;">  </div> <p style="text-align: center;">Fig. 13</p>
<p>1. Set the stitch length to 0 mm.</p> <p>2. Turn the handwheel until the feed dog has risen at maximum from the throat plate surface.</p> <p>3. Loosen screw ① and adjust the height of the feed bar slide block so that the feed dog teeth projects 0.9 ± 0.1 mm from the throat plate surface.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Fig. 15</p>	<p>If the feed dog is too high ;</p> <ul style="list-style-type: none"> ○ The stitch length becomes longer than the one set by the stitch dial. ○ The feed dog may hit the throat plate. ○ The right needle thread may not be caught at the time of thread trimming. <p>If the feed dog is too low ;</p> <ul style="list-style-type: none"> ○ The stitch length becomes smaller than the one set by the stitch dial. <ul style="list-style-type: none"> * The moving knife hits the feed dog while the thread trimmer is working. * Thread trimming failure may occur.

(7) Relation between the main shaft and the hook driving shaft

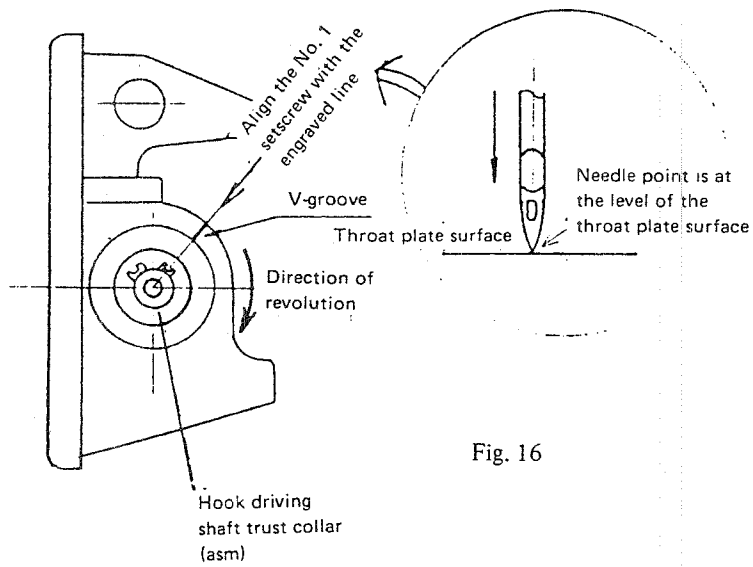


Fig. 16

Requirements ;

- The needle to be lowered.
- Stitch length : 0 mm

(8) Timing to release thread tension

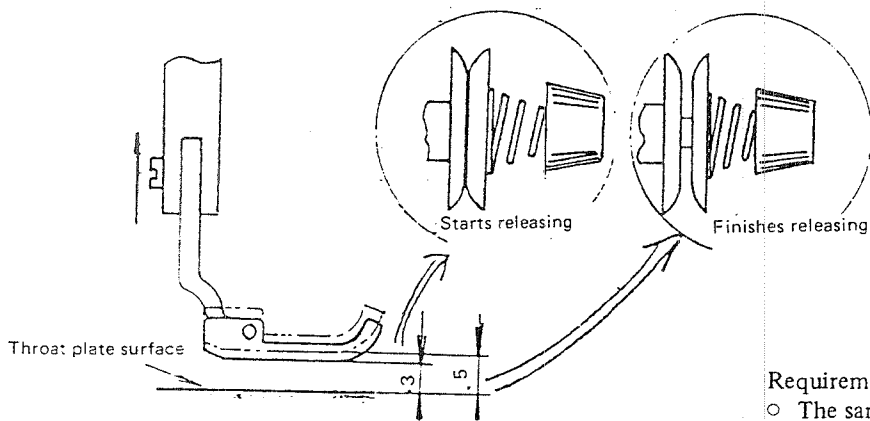
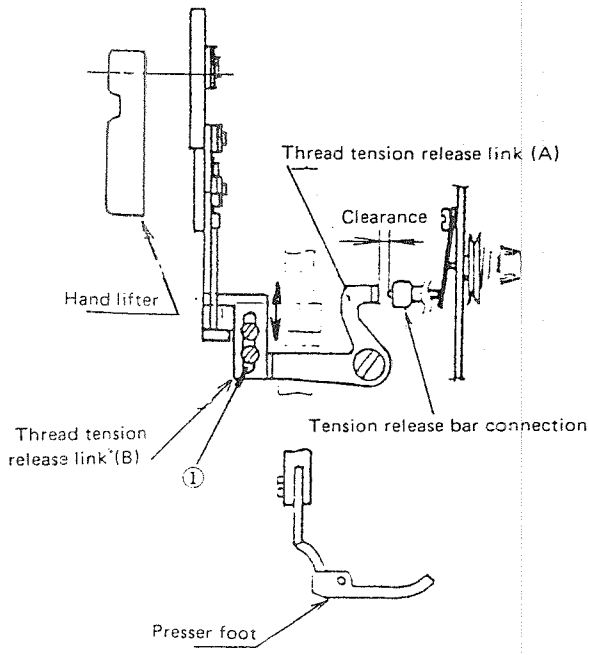


Fig. 17

Requirements ;

- The same setting for the hand lifter and knee lifter.

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Set the stitch length to 0 mm. 2. Disengage the timing belt from the sprocket wheel of the hook driving shaft. 3. Turn the handwheel toward you until the needle point has come down at the level of the throat plate surface. 4. Turn the hook driving shaft toward you to align the No. 1 setscrew of its thrust collar with the V-groove on the machine bed. 5. Mesh the timing belt with the sprocket wheel on the hook driving shaft and let them firmly engage with each other by turning the handwheel. 	<ul style="list-style-type: none"> ○ If the timing of the hook driving shaft to the main shaft is incorrect, loose stitches may be formed.
<ol style="list-style-type: none"> 1. Raise the presser foot 3 mm from the throat plate surface. 2. Loosen two screws ① and adjust the clearance between the tension release link (A) and the tension release bar connection.  <p>The diagram, labeled Fig. 18, illustrates the internal mechanism of the thread tension controller. It shows a hand lifter on the left that operates a vertical link. This link is connected to a horizontal thread tension release link (A). A horizontal bar, the tension release bar connection, is positioned below link (A). The distance between link (A) and the bar is labeled as 'Clearance'. Two screws, marked with a circled '1', are used to adjust this clearance. Another link, the thread tension release link (B), is shown below the main assembly. At the bottom, the presser foot is shown in its raised position, 3 mm above the throat plate surface.</p>	<p>If the thread tension is released after the presser foot has gone up more than 3 mm ;</p> <ul style="list-style-type: none"> ○ Thread does not pass smoothly through the thread tension controller. <p>If the thread tension is released before the presser foot goes up 3 mm ;</p> <p>* Loops of thread are produced on the fabric while a corner is being stitched (only the machine with the thread trimmer).</p>

(9) Lubrication

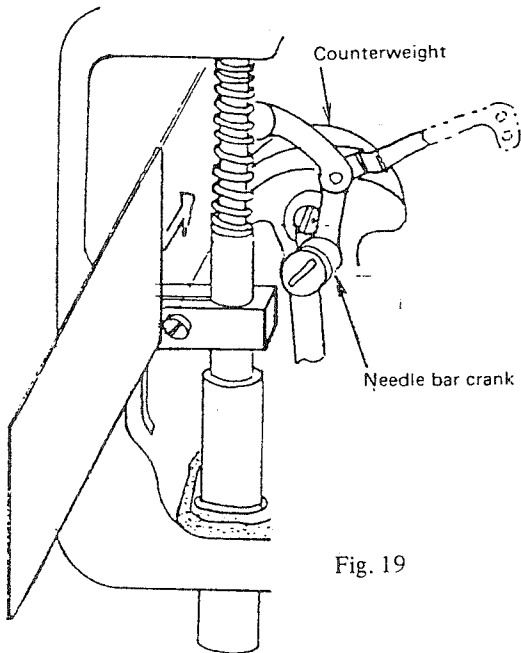


Fig. 19

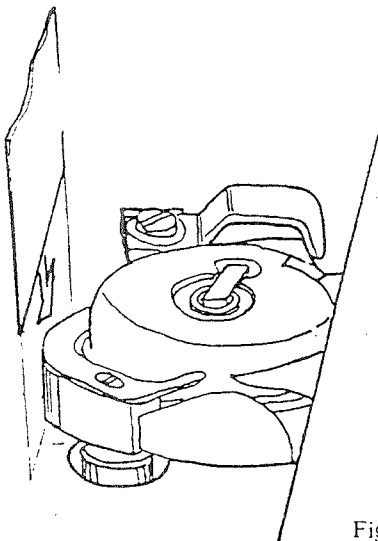
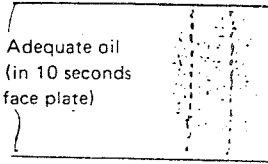


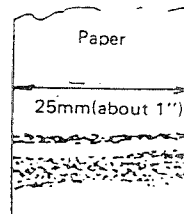
Fig. 21

Paper, Adequate oil splash (in 10 seconds in the face plate)

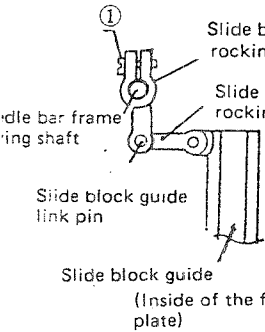
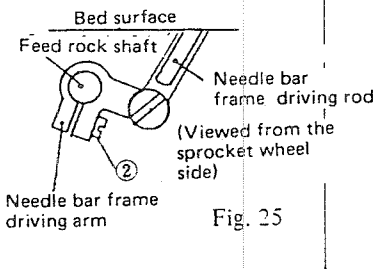


- 1) How to judge the lubrication of the components in the face plate :
 - Sewing speed : 4,000 s.p.m.
 - Let the machine idle for 30 seconds and insert a piece of paper into the machine arm through the face plate opening, and oil lines will be drawn on the paper in 10 seconds when the needle bar components are properly lubricated.

- 2) How to judge the lubrication of the hooks :
 - Sewing speed : 4,000 s.p.m.
 - Let the machine idle for 30 seconds and hold a piece of paper 10 mm away from the side face of the hook, and the oil lines will be drawn on the paper in 5 seconds if both hooks are properly lubricated.



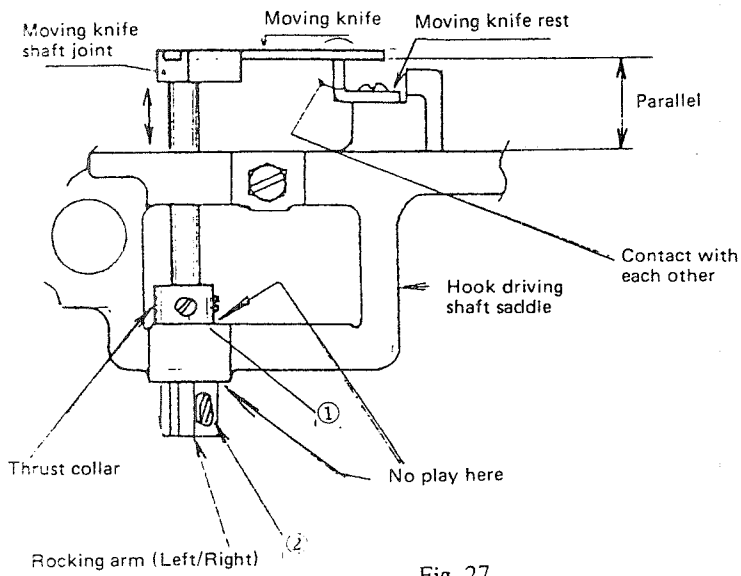
Adequate oil splash (in 5 seconds)

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Set the stitch length to 0 mm. 2. Bring the needle bar to the lowest point of its stroke and check that the distance between the needle bar and the presser bar is 13.5 mm (17/32") as specified by 2-(1). 3. In this state, make sure that the slot in the needle bar frame driving arm is in the vertical position as shown in Fig. 23. <ol style="list-style-type: none"> 3-1. If it is not vertical, loosen screw ① (Fig. 24). 3-2. By keeping a 13.5 mm distance between the needle bar and the presser bar, loosen screw ② (Fig. 25) and set the slot in the vertical position as shown in Fig. 23. Tighten screws ② and ① after the adjustment. 4. Set the stitch length to the maximum. 5. Loosen nut ② (Fig. 23) and adjust the setting position of the connection stud and tighten nut ②. 6. Turn the handwheel and make sure that sway of the needles is eliminated. <p>(CAUTION) After this adjustment, re-adjust the needle entry point in the needle feed slots.</p>  	<ul style="list-style-type: none"> ○ Needle braking may occur. ○ Stitch skipping may occur.
<ol style="list-style-type: none"> 1. Loosen screws ① which fix the feed regulator base. 2. Turn the feed regulator rod pin in the direction of the arrow and minimize the difference in the stitch length. 	<ul style="list-style-type: none"> ○ If it is not adjusted properly, the stitch length of the reverse feed differs from the forward feed.

3. ADJUSTMENT STANDARD FOR THE ATTACHMENTS

(1) Thread trimmer

1) Height of the moving knife



Requirements ;

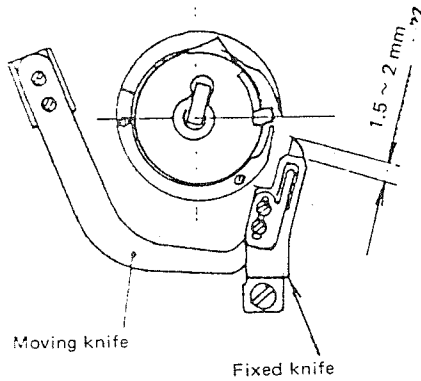
- With the fixed knife removed, the moving knife must be in contact with the moving knife rest and must be parallel to the upper face of the hook driving shaft saddle.

2) Initial position of the moving knife

Requirements ;

- The top end of the moving knife must jut 1.5 to 2.0 mm (1/16" to 5/64") from the top end of the fixed knife.

Fig. 28



Gauge size	Distance A
3/32" ~ 3/8"	126.4 mm
7/16" ~ 5/8"	133.8 mm
3/4" ~ 1"	142.4 mm
1-1/8" ~ 1-1/4"	150.3 mm

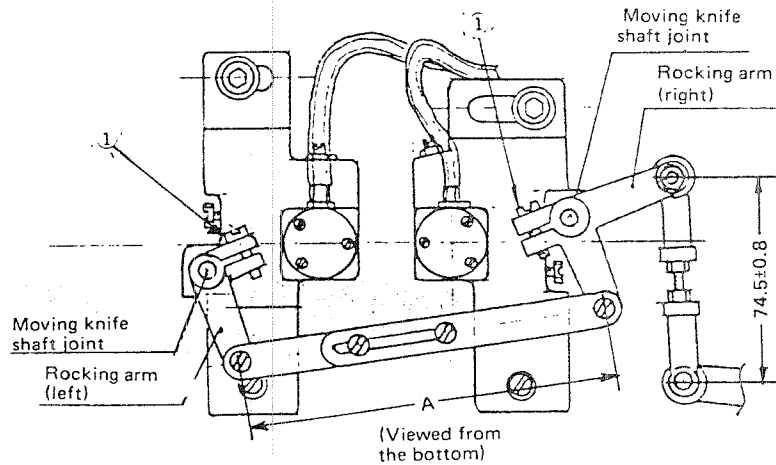


Fig. 29

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Remove the fixed knife from the hook driving shaft saddle. 2. Loosen two screws ① releasing the thrust collar from the moving knife shaft. 3. Loosen screw ② to release the rocking arm. 4. Move the moving knife shaft joint up and down to bring the moving knife into contact with the top end of the moving knife rest. Tighten screws. <p>(CAUTION) When you fix the thrust collar to the moving knife shaft and screw ②, take care not to leave any clearance at the hook driving shaft saddle.</p>	<p>If the moving knife is lower than the top end of the moving knife rest ;</p> <ul style="list-style-type: none"> ○ The moving knife hits the moving knife rest when it works. If it is too low, it may lock up the thread trimming mechanism. ○ The thread trimmer fails to sharply cut the thread. ○ The thread trimmer fails to cut the thread (thread trimmer fails to catch the thread). <p>If the moving knife is higher than the top end of the moving knife rest ;</p> <ul style="list-style-type: none"> ○ The thread trimmer fails to sharply cut the thread. ○ The thread trimmer fails to catch the thread.
<ol style="list-style-type: none"> 1. Loosen screws to release rocking arm (Fig. 29). 2. Adjust the position of the moving knife to the moving knife rest. 3. After the adjustment, push the pushing plate in the direction of the arrow in Fig. 30 and turn the handwheel toward you to check that the requirements have been met. (Report this procedure several time to make sure). <p>(CAUTION) When tightening screw ① to fix the rocking arm, make sure that there is no clearance at the surface of the hook driving shaft saddle.</p> <div data-bbox="248 1493 711 1770" data-label="Diagram"> </div> <p>Fig. 30</p>	<p>If the moving knife juts out too much from the fixed knife ;</p> <ul style="list-style-type: none"> ○ Thread trimming failure may occur. ○ The thread trimmer may fail to catch the thread. <p>If the moving knife juts out too little from the fixed knife ;</p> <ul style="list-style-type: none"> ○ The thread trimmer may fail to catch the thread. ○ The machine may fail in making some starting stitches as illustrated below; <div data-bbox="1015 1371 1312 1472" data-label="Diagram"> <p>(Failure in starting stitches)</p> </div> <p>* Initial position of the moving knife by thread size</p> <div data-bbox="946 1566 1373 1696" data-label="Diagram"> </div>

3) Position of the clamp spring

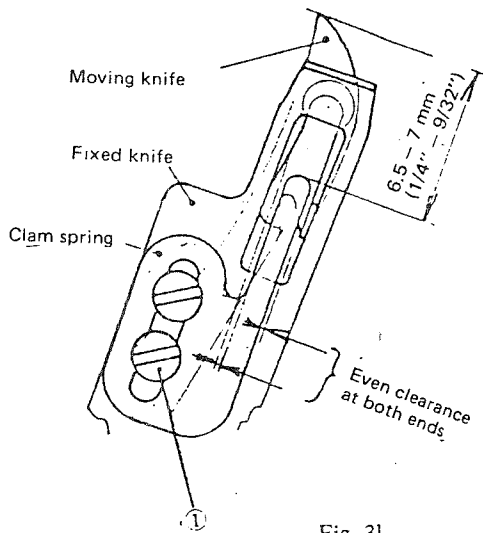


Fig. 31

Requirements ;

- Distance from the top end of the moving knife to the top end of the clamp spring must be 6.5 to 7.0 mm (1/4" to 9/32").
- See 2) for the initial position of the moving knife.

4) Timing of thread trimming action

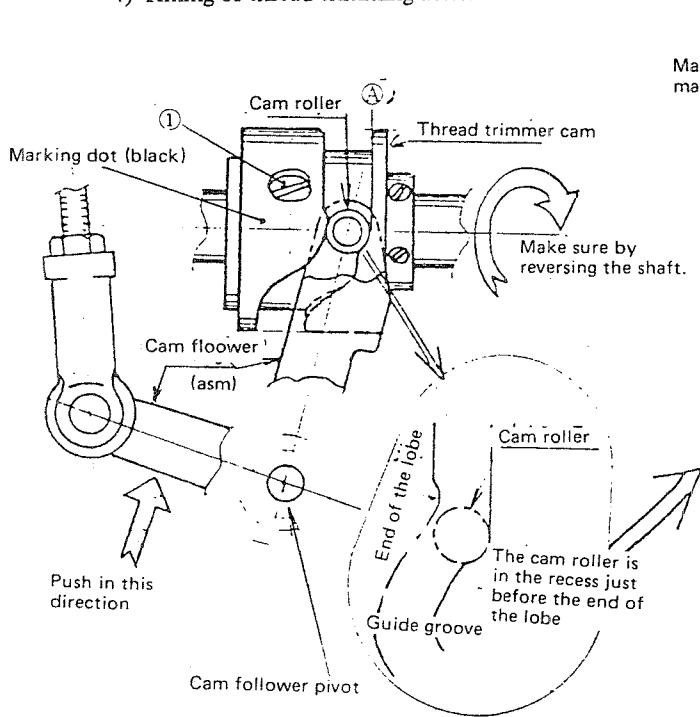
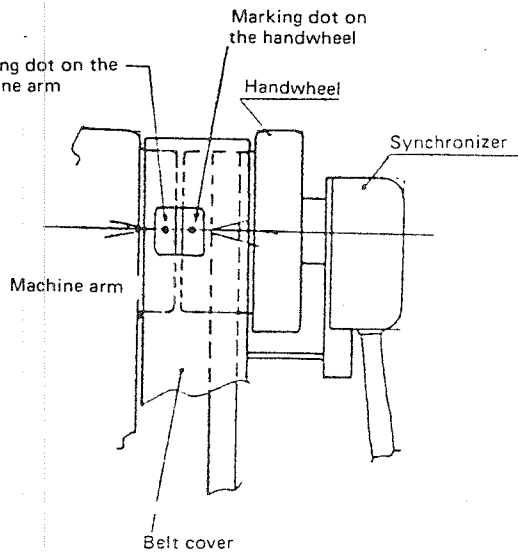
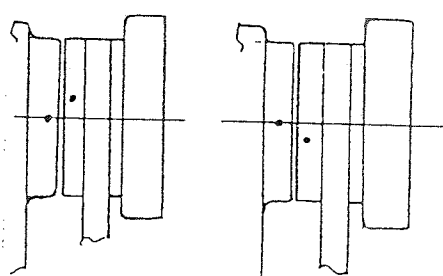


Fig. 32



Requirements ;

- When the cam roller arrives in the recess of the guide groove just before the end of the lobe, the marking dot on the handwheel must be in line with the marking dot on the machine arm. (Angle of rotation is 31° measured from the top dead point of the needle bar stroke (0°))

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<p>1. Loosen two screw ① in Fig. 31.</p> <p>2. Adjust the position of the clamp spring as specified (6.5 ~ 7.0 mm) and tighten two screws.</p> <p>(CAUTION) When tightening the screws, make sure that there are even clearances at both ends of the slot in the moving knife.</p>	<p>If the distance is too great ;</p> <ul style="list-style-type: none"> ○ The machine may fail to made some stitches at the start of sewing. ○ Especially when thick thread is used, it may entangle with the hook causing the mechanism to lock up. <p>If the distance is too small ;</p> <ul style="list-style-type: none"> ○ Troubles similar to the above may occur. <p>If the clearances at the slot in the moving knife are not even ;</p> <ul style="list-style-type: none"> ○ The clamp spring may be broken.
<p>1. Loosen two screws ① releasing the thread trimmer cam.</p> <p>2. Match the marking dot (red) on the handwheel with that (red) on the machine arm.</p> <p>3. Put the cam roller of the cam follower (asm) in the guide groove of the thread trimmer cam (push the cam follower in the axial direction of the cam follower shaft).</p> <p>4. Turn by hand the thread trimmer cam until the cam roller arrives in the recess of the guide groove just before the end of the lobe and fix the cam. When tightening two screw, hold the cam pressing against the side (A) of the guide groove.</p>	<p>If the timing is too early;</p> <ul style="list-style-type: none"> ○ The thread slips from the needle eye. ○ The thread trimmer may fail in cutting right or left, needle or bobbin thread. ○ The right needle thread may not be caught at the time of thread trimming when cotton thread is used. <p>If the timing is too late;</p> <ul style="list-style-type: none"> ○ The wiper hits the needle. ○ The thread trimmer malfunctions. <div style="text-align: center;">  </div> <p style="text-align: center;">Early timing Late timing</p> <p style="text-align: center;">Fig. 33</p>

5) Position of the thread trimmer cam

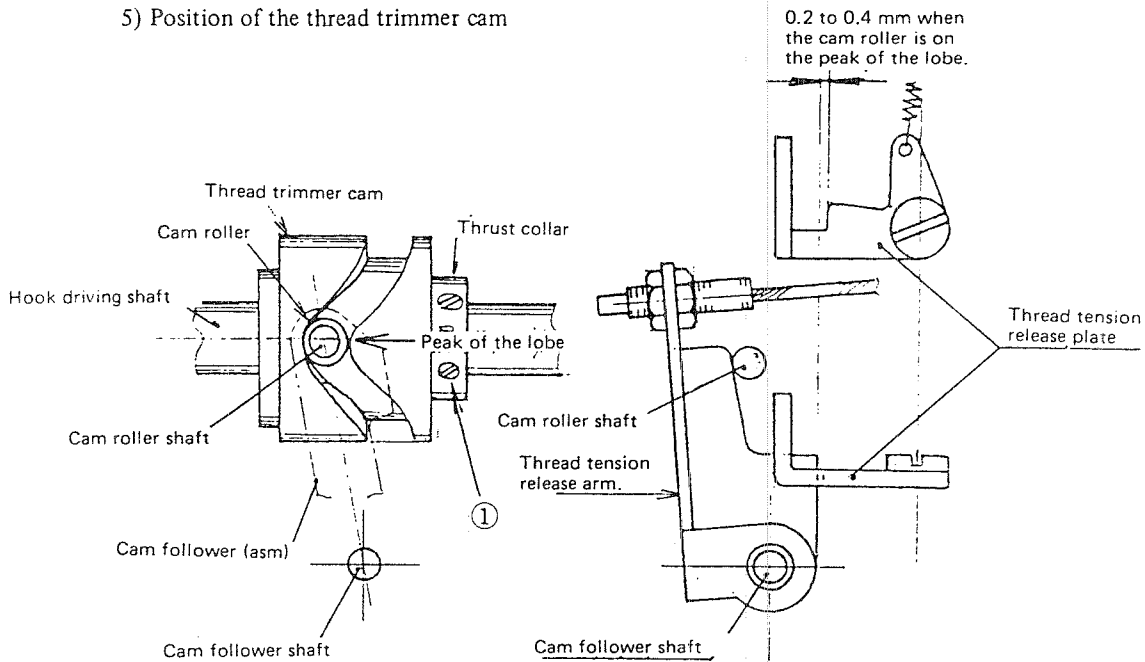


Fig. 34

Requirements ;

- When the cam roller reaches the peak of the lobe of the thread trimmer cam;
- The cam roller shaft must touch the thread tension release arm and that there must be a 0.2 to 0.4 mm clearance between the thread tension release arm and the thread tension release plate.

6) Position of the trimmer cam driving mechanism

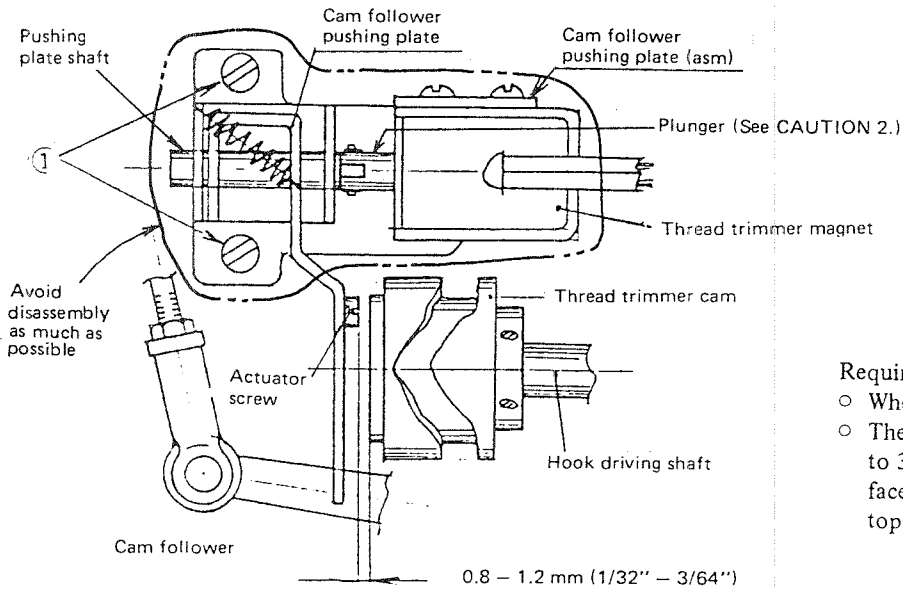


Fig. 35

Requirements ;

- When the thread trimmer magnet is "off"
- There must be a 0.8 to 1.2 mm (1/32" to 3/64") clearance between the left end face of the thread trimmer cam and the top end of the actuator screw head.

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Loosen two screws to release the thread trimmer cam from the hook driving shaft. 2. Loosen screws ① to release the thrust collar. 3. Put the cam roller in the guide groove on the thread trimmer cam (push the cam follower (asm) in the direction of the axis of the cam follower shaft). 4. Turn the cam until the cam roller arrives the peak of the lobe. (By so doing, the cam roller shaft moves the thread tension release arm causing the thread tension release plate to latch the arm.) 5. Move the thread trimmer cam in the axial direction of the hook driving shaft in the way that the clearance between the thread tension release arm and the thread tension release plate becomes 0.2 to 0.4 mm, and fix the thrust collar. 6. Make sure once again the timing of the thread trimming action and fasten the thread trimmer cam to the hook driving shaft. 	<p>If the clearance is too great ;</p> <ul style="list-style-type: none"> ○ The thread may slip from the needle eye. ○ The needle-up stop position becomes unstable causing the wiper to hit the needle. <p>If the clearance is too small ;</p> <ul style="list-style-type: none"> ○ The thread may slip from the needle eye.
<ol style="list-style-type: none"> 1. Loosen screws ① to release the cam follower pushing plate (asm). 2. Provide a 0.8 to 1.2 mm (1/32" to 3/64") release between the actuator screw head and the end face of the thread trimmer cam. Tighten screw ① . <p>(CAUTION 1) When tightening screws ① make sure that the cam follower pushing plate is parallel to the end face of the thread trimmer cam.</p> <p>(CAUTION 2) When replacing cam follower pushing plate (asm) components, assemble them so that the pushing plate shaft and plunger smoothly move axially at any point of 360 degree.</p>	<p>If the clearance is too great ;</p> <ul style="list-style-type: none"> ○ Thread trimming failure may occur. <p>If the clearance is too small ;</p> <ul style="list-style-type: none"> ○ The thread trimmer may be driven accidentally causing mechanical troubles.

7) Clearance between the tension discs for releasing the thread

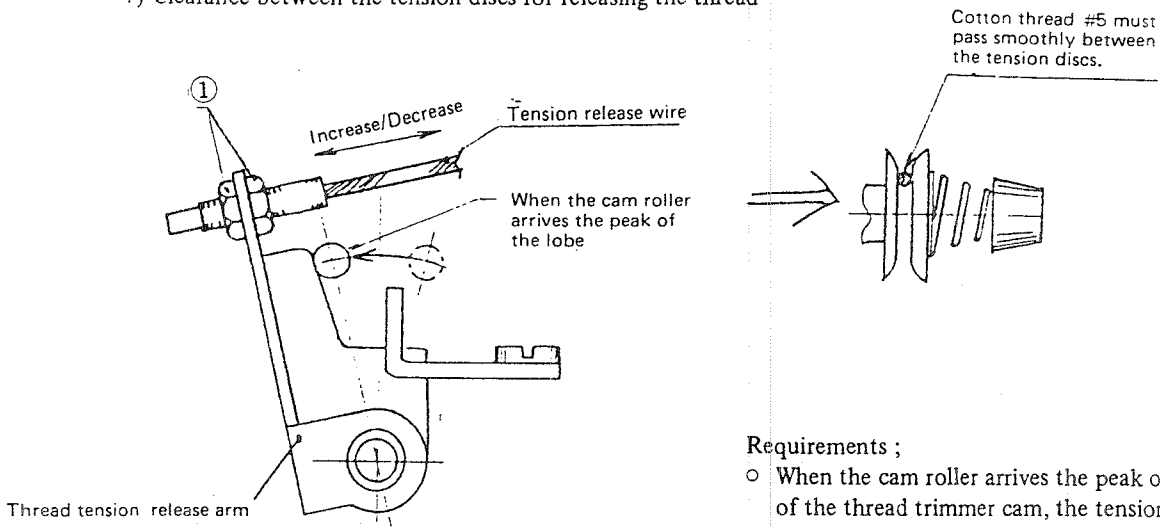


Fig. 36

- Requirements ;
- When the cam roller arrives the peak of the lobe of the thread trimmer cam, the tension discs must permit the cotton thread #5 to pass smoothly through them.

8) Position of the safeguard mechanism

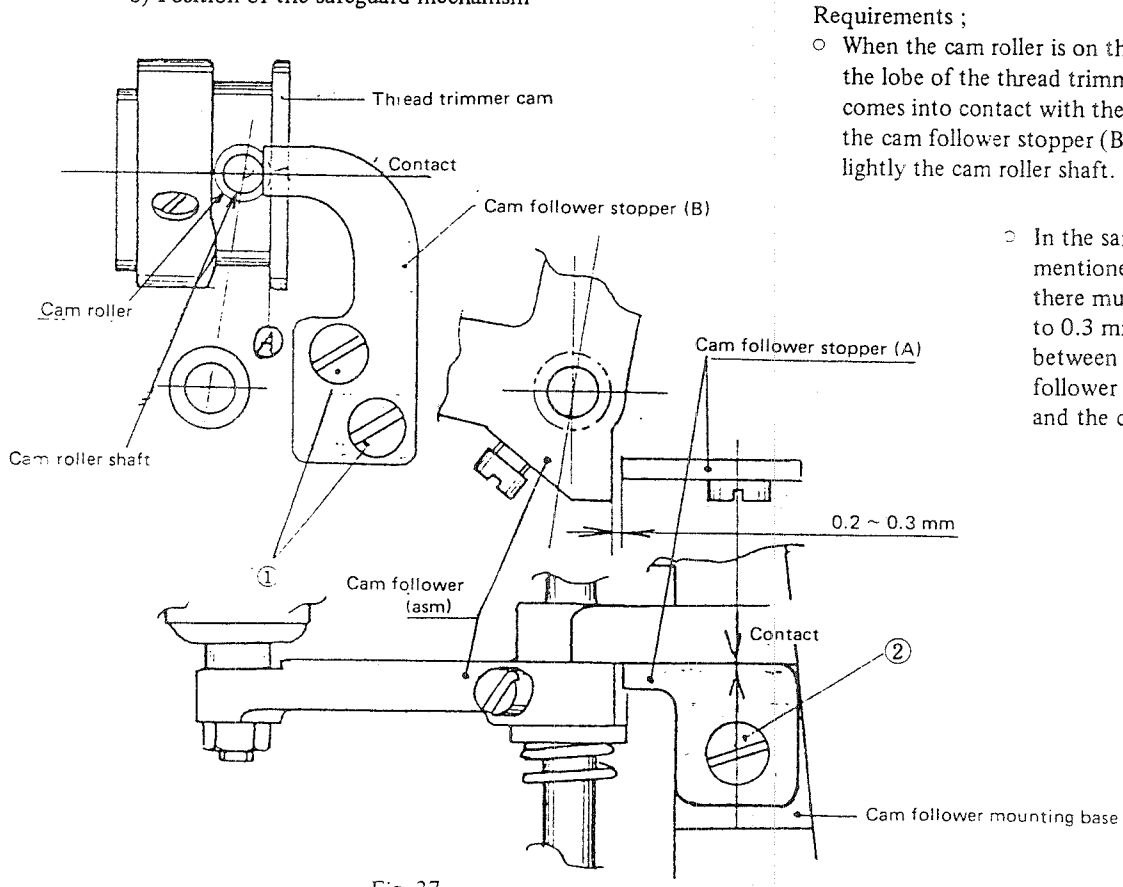


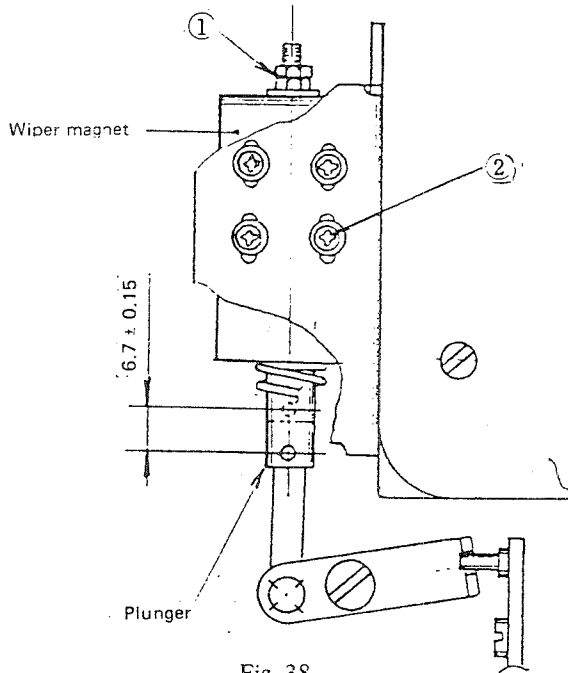
Fig. 37

- Requirements ;
- When the cam roller is on the bottom of the lobe of the thread trimmer cam and comes into contact with the face (A), the cam follower stopper (B) must touch lightly the cam roller shaft.
 - In the same state as mentioned above, there must be a 0.2 to 0.3 mm clearance between the cam follower stopper (A) and the cam follower.

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Loosen nuts ① . 2. Pull the thread tension release wire in either direction as illustrated and tighten nuts ② . 	<p>If the clearance is too great ;</p> <ul style="list-style-type: none"> ○ The thread trimmer cam seizes the cam follower causing mechanism troubles. <p>If the clearance is too small ;</p> <ul style="list-style-type: none"> ○ The thread left on the needle after trimming becomes shorter. ○ The thread slips from the needle eye.
<p>Cam follower stopper (B)</p> <ol style="list-style-type: none"> 1. Loosen screws ① . 2. Turn the handwheel until the cam roller arrives the bottom of the lobe of the thread trimmer cam. 3. Tighten two screws ① in the way that the cam follower stopper ② lightly touches the cam roller shaft and, at the same time, the cam roller touches the face ③ of the thread trimmer cam. <p>Cam follower stopper (A)</p> <ol style="list-style-type: none"> 1. Loosen screw 2. . 2. Provide a 0.2 to 0.3 mm clearance between the cam follower and the cam follower stopper ④ when the cam follower ⑤ is in the above-mentioned state. 	<p>If the cam follower stopper (B) juts out too much ;</p> <ul style="list-style-type: none"> ○ It causes a mechanical trouble. ○ The needle-up stop action becomes unstable causing the wiper to hit the needle. <p>If the cam follower stopper (B) does not touch the cam roller shaft ;</p> <ul style="list-style-type: none"> ○ The bobbin thread is not clamped causing stitch failure at the start. ○ It causes a mechanical trouble. <p>If the clearance is too great ;</p> <ul style="list-style-type: none"> ○ Thread trimming failure may occur. ○ It causes a mechanical trouble. <p>If the clearance is too small ;</p> <ul style="list-style-type: none"> ○ The cam follower is not released from the thread trimmer cam causing the thread trimmer to work at the start of sewing. It may break down the thread trimmer and cause other related troubles.

(2) Wiper components

1) Stroke of the magnet plunger

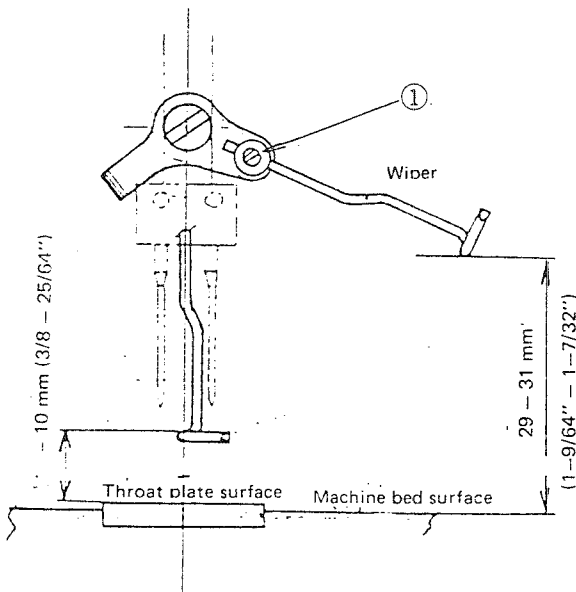


Requirements ;

- Stroke of the magnet plunger must be 6.7 ± 0.15 mm

Fig. 38

2) Height of the wiper



Requirements ;

- When the wiper has come down and met the needle bar center, it must be 9.7 to 10 mm above the throat plate surface.
- In the initial position, the wiper must be 29 to 31 mm above the bed surface.

Fig. 39

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Loosen nut ① located on the top of the wiper magnet. 2. Set the plunger's stroke to 6.7 ± 0.15 mm and tighten nut ①. 	<ul style="list-style-type: none"> ○ If the stroke is too great, the wiper may fail to return when thick thread is used. ○ If the stroke is too small, the wiper may fail to wipe the thread.
<ol style="list-style-type: none"> 1. Bring down the wiper and align it with the center line of the needle bar. 2. Loosen screw ① and adjust the height of the wiper to 9.7 ~ 10 mm from the throat plate surface. <p>Initial position adjustment ;</p> <ol style="list-style-type: none"> 1. Loosen four screws ② (Fig. 38) to release the wiper magnet assembly. 2. Adjust the height of the wiper in its initial position to 29 ~ 31 mm from the bed surface by moving the wiper magnet assembly up and down. 	<ul style="list-style-type: none"> ○ If the wiper is too high, it hits the needle. ○ If the wiper is too low, it hits the finger guard of the presser foot.

(3) Automatic reverse feed components

1) Stroke of the reverse feed magnet plunger

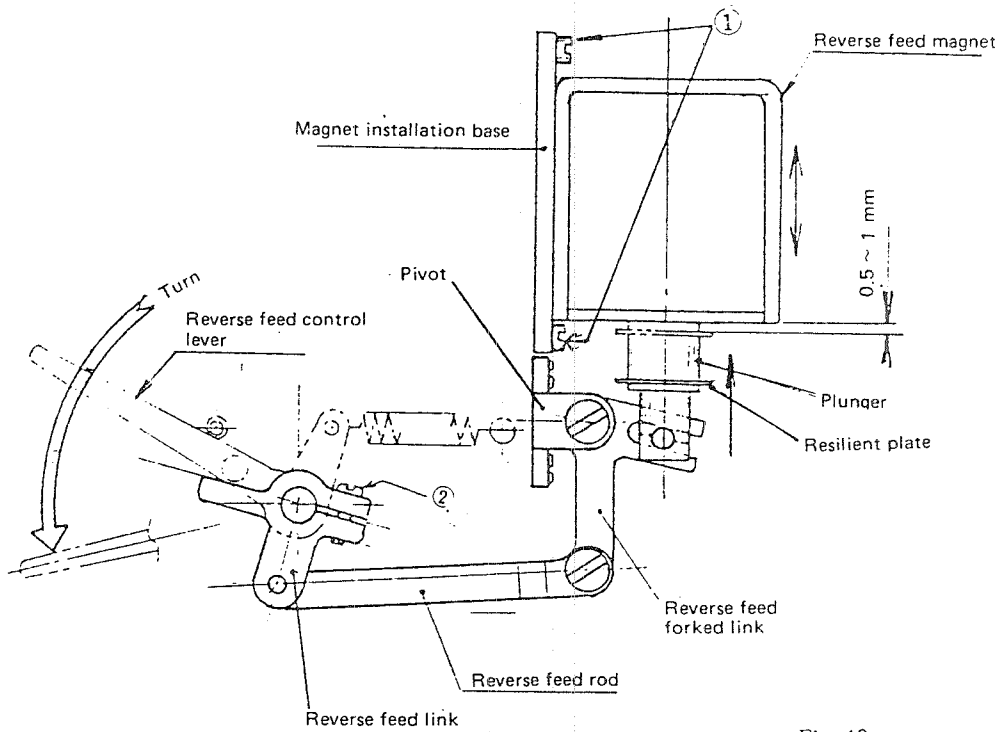


Fig. 40

Requirements ;

- Stitch length : Maximum
- There must be a 0.5 to 1.0 mm clearance between the bottom face of the magnet and the resilient plate attached to the plunger when the reverse control lever has been turned fully downwards.

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Set the stitch length to the maximum. 2. Loosen screws ① to release the magnet installation base. 3. Turn the reverse feed control lever downwards as far as it will go and fix the reverse feed magnet installation base in the position where a 0.5 to 1.0 mm clearance is provided between the bottom face of the magnet and the resilient plate attached to the plunger. 	<p>If the clearance is too great ;</p> <ul style="list-style-type: none"> ○ The automatic reverse feed mechanism may fail to work due to insufficient stroke of the plunger. <p>If the clearance is too small ;</p> <ul style="list-style-type: none"> ○ The stitch length in the reverse feed becomes smaller than the set stitch length.

4. DESCRIPTION OF THE THREAD TRIMMER COMPONENTS

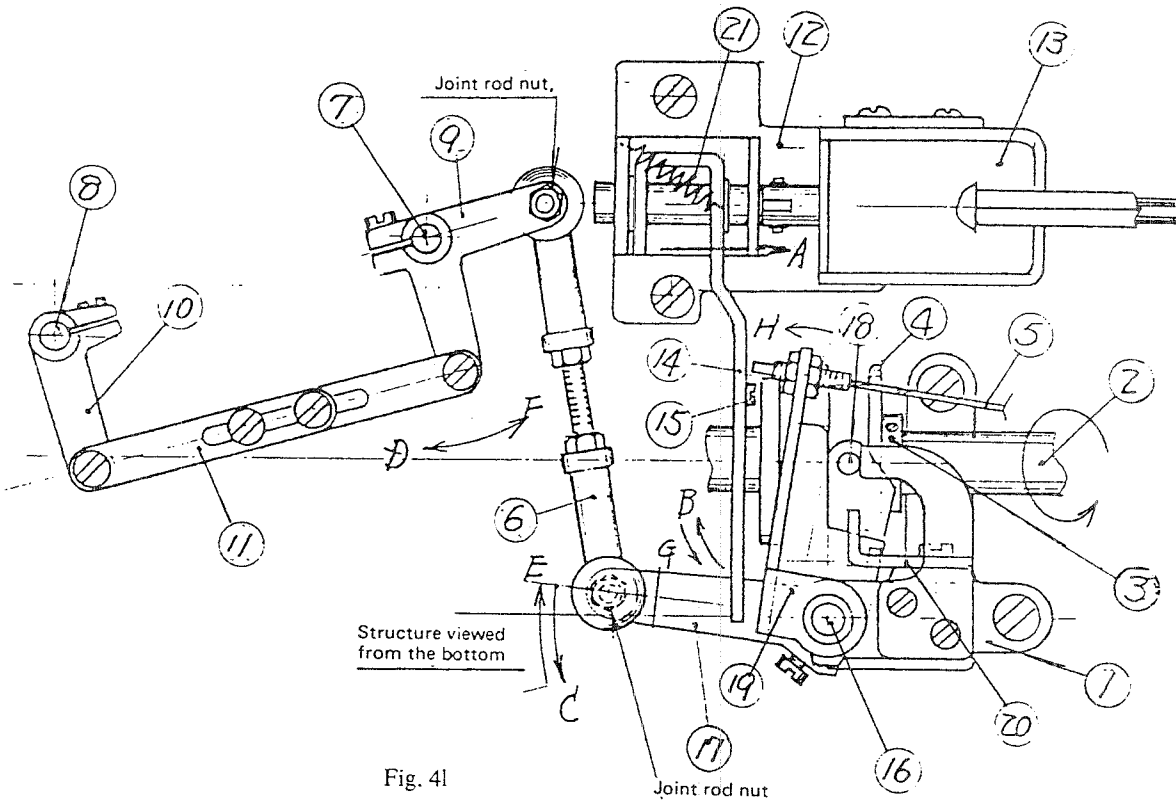


Fig. 4l

Rotational angle (from the top dead center of the needle bar)	0°	90°	180°	270°	360°
Sensor signal (synchronizer)	(Needle "up")		178°		(Needle "down")
Clutch Cam follower pushing plate				53.8°	
Cam roller engagement					
Moving knife	Cut at 30.5°			Failure if 44.8°	
Safeguard mechanism					
Clamp spring					
Thread tension release arm					
Needle "up" stop					
Timing of thread trimming (Marking dots on the arm and the handwheel meet each other)	31°				

1. When current flows thread trimmer magnet ⑬, the plunger is pulled in the direction of "A".
2. As the plunger is pulled, actuator screw ⑮ attached to cam follower pushing plate ⑭, which is fixed to the plunger, engages with the side face of thread trimmer cam ④.
3. Cam follower pushing plate ⑭ is turned in the direction "B" by the cam causing cam follower ⑰ to move in the axial direction of cam follower shaft ⑯. As a result, the cam roller of the cam follower engages with the guide groove on the thread trimmer cam.
4. Revolution of the hook driving shaft is transmitted via thread trimmer cam ④ to rock cam follower ⑰ in the direction "C".
5. Rocking motion of the cam follower is transmitted via joint rods ⑥, ⑨, ⑪ and ⑩ to drive moving knife shafts ⑦ and ⑧ in the direction "D".
6. At this moment, cam roller shaft ⑱ moves thread tension release arm ⑲ in the direction "H". As a result, tension release arm ⑲ is locked up by tension release plate ⑳ at the front end of the guide groove on the thread trimmer cam.
7. When cam roller ④ arrives at the rear end of the guide groove on the thread trimmer cam, cam follower ⑰ and moving knife shafts ⑦ and ⑧ move in the directions "E" and "F", respectively.
8. When the cam roller arrives at the rear end of thread trimmer cam ④, cam follower pushing plate is turned in the direction "G". At the same time, the thread trimmer magnet is switched "off" permitting spring ㉑ to pull back cam follower pushing plate ⑭.
9. When cam follower pushing plate ⑭ goes back to its original position, cam follower ⑰ is pushed back to its original position by a force of spring in the axial direction of cam follower shaft ⑯.
10. At the same time, thread tension release plate ㉑ is pushed up and unlocks thread tension release arm ⑲ causing the tension discs to close for the next sewing cycle.

THREAD TRIMMER COMPONENTS

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description
①	1011663	Cam follower installation base (asm) (B)	⑫	10117851	Cam follower pushing plate (asm)
②	10108504	Hook driving shaft	⑬	10117604	Thread trimmer magnet
③	CS1470710SH	Thrust collar	⑭	10117802	Cam follower pushing plate
④	10117307	Thread trimmer cam	⑮	10118305	Actuator screw
⑤	10123057	Thread tension release wire joint	⑯	10116804	Cam follower shaft
⑥	10116507	Joint rod	⑰	10116754	Cam follower (asm)
⑦	10116051	Moving knife shaft joint	⑱	D2428555B00A	Cam roller shaft
⑧	10116051	Moving knife shaft joint	⑲	10117000	Thread tension release arm
⑨	10116309	Rocking arm (right)	⑳	10117208	Thread tension release plate
⑩	10116200	Rocking arm (left)	㉑	B203737200	Spring
⑪	10116457	Link (asm)			

5. HOW TO DISASSEMBLE AND RE-ASSEMBLE THE THREAD TRIMMER UNIT

DISASSEMBLING PROCEDURES (See Fig. 41)

Remove the throat plate	
Remove the fixed knives and the moving knives on the both sides.	Use an Allen key to loosen the fixed knife setscrews.
Remove link ⑪	Pull out the hinge screws from the rocking arms on the right ⑨ and on the left ⑩ .
Remove rocking arms left ⑩ and right ⑨ from their moving knife shaft joints ⑦ and ⑧ .	Loosen their clamp screws
Remove joint rod ⑥ from rocking arm ⑨ and cam follower ⑰ .	Remove the joint rod nuts from both ends.
Remove cam follower pushing plate ⑫	Remove two setscrews.
Remove thread tension release wire joint ⑤ from thread tension release arm ⑱ .	Remove two nuts which fasten release arm ⑱ at both ends.
Remove the hook driving shaft.	Loosen the fastening screws and setscrews which fix the shaft components to the shaft and disengage the timing belt from the sprocket wheel on the hook driving shaft.
Remove moving knife shaft joints ⑧ and ⑨ from the hook driving shaft saddle	Loosen setscrews which fasten the thrust collar to the moving knife shaft.
Remove cam follower installation base (asm) ①	Remove two setscrews from the installation base.

NOTES ON RE-ASSEMBLING

————— Make sure that the bobbin case stopper rests in the recess of the throat plate.

————— See 3-(1)-2) and -3).

————— The effective length of the link (asm)
(center-to-center of connection holes);
3/32" ~ 3/8"=126.4, 7/16" ~ 5/8"=133.8
3/4" ~ 1"=142.4, 1-1/8" ~ 1-1/4"=150.3

————— See 3-(1)-1).

————— Set the length of joint rod ⑥ to 74.5 ± 0.8 mm between the centers of the nuts which fix the rod at both to ⑨ and ⑰ .

————— See 3-(1)-6).

————— See 3-(1)-7).

————— See 3-(1)-4), 3-(1)-5) and 3-(1)-8).

————— See 3-(1)-1).

————— Align the center of the screws.

6. HOW TO REPLACE THE TIMING BELT

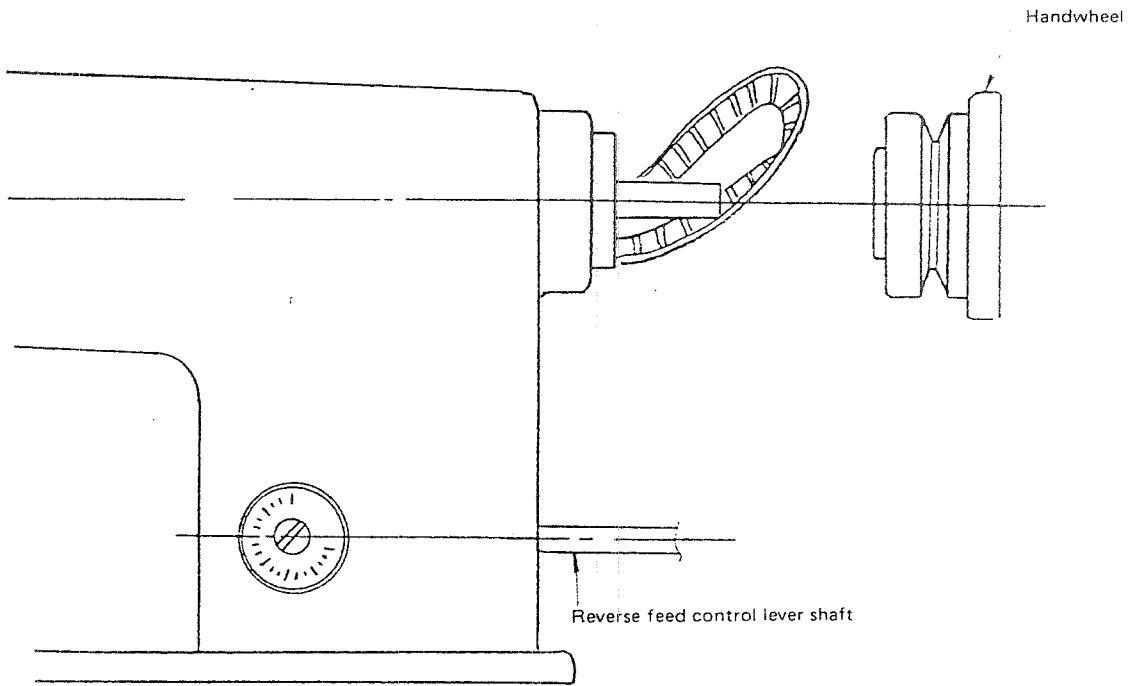


Fig. 42

HOW TO REPLACE	NOTES ON RE-ASSEMBLING
<ol style="list-style-type: none"> 1. Remove the belt cover and the belt. 2. Take the synchronizer from the handwheel. 3. Loosen two setscrews and pull out by hand the handwheel. (CAUTION) Don't use hammer to pull out the handwheel. 4. Set the stitch length to the maximum. 5. Disconnect the tension spring from the feed regulating pin. 6. Loosen the fastening screw of the feed regulating arm. 7. Disconnect the reverse feed rod from the reverse feed forked link, and remove the reverse feed link and the reverse feed control lever. 8. Loosen setscrews of the thrust collar on the reverse feed control lever shaft and pull out the reverse feed control lever shaft. 9. Insert a new timing belt in the machine arm through an opening made by removing the handwheel and engage it with the sprocket wheel on the hook driving shaft. 	<ul style="list-style-type: none"> ○ When setting the handwheel, take care not to let it bite the O-ring. Tighten the screw No. 1 (in the rotational direction) on the flat face of the shaft. ○ When inserting the reverse feed control lever, take care not to break the oil seal. ○ Adjust the timing of the hook driving shaft to the main shaft referring to 2-(7).

7. HOW TO REMOVE PLAYS IN THE AXIAL DIRECTION

1) Needle bar frame

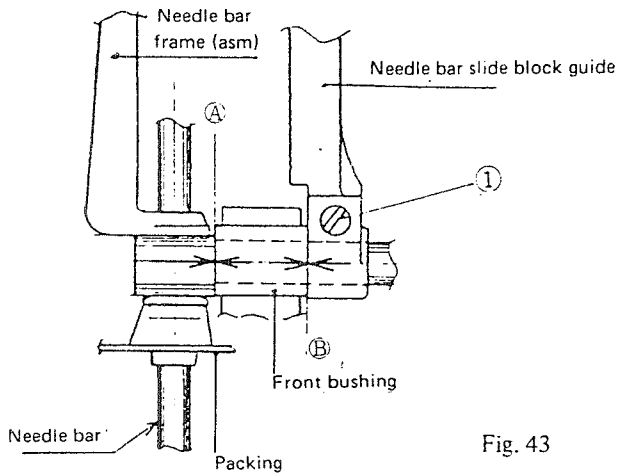


Fig. 43

Requirements ;

- The needle bar frame must rock smoothly without any clearance at points 'A' and 'B'.

2) Thread take-up lever

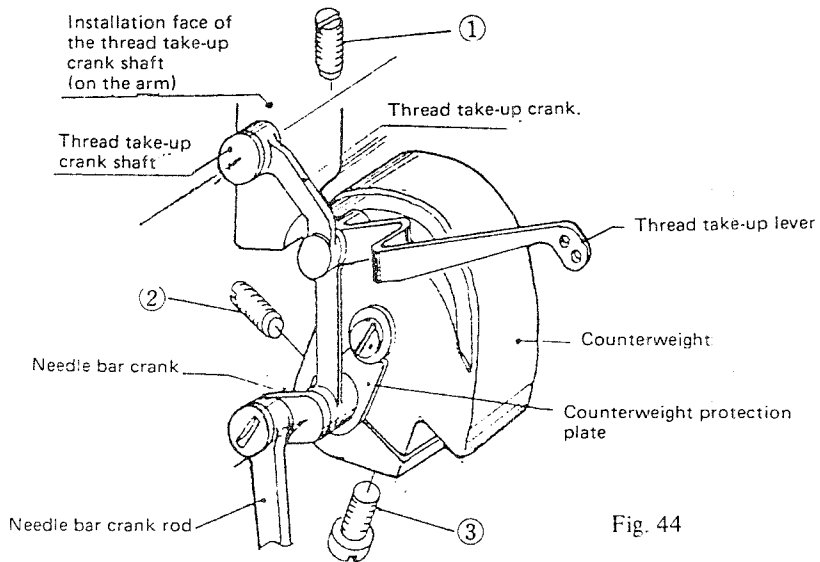


Fig. 44

Requirements ;

- There must be no clearance between the end face of the thread take-up crank and the installation face on the machine arm and between the needle bar crank and the counterweight protection plate. Both the thread take-up lever and the take-up crank must move smoothly.

3) Hook

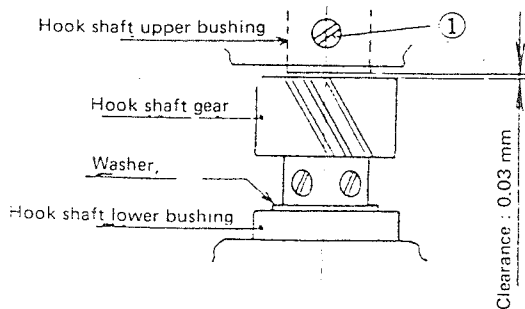


Fig. 45

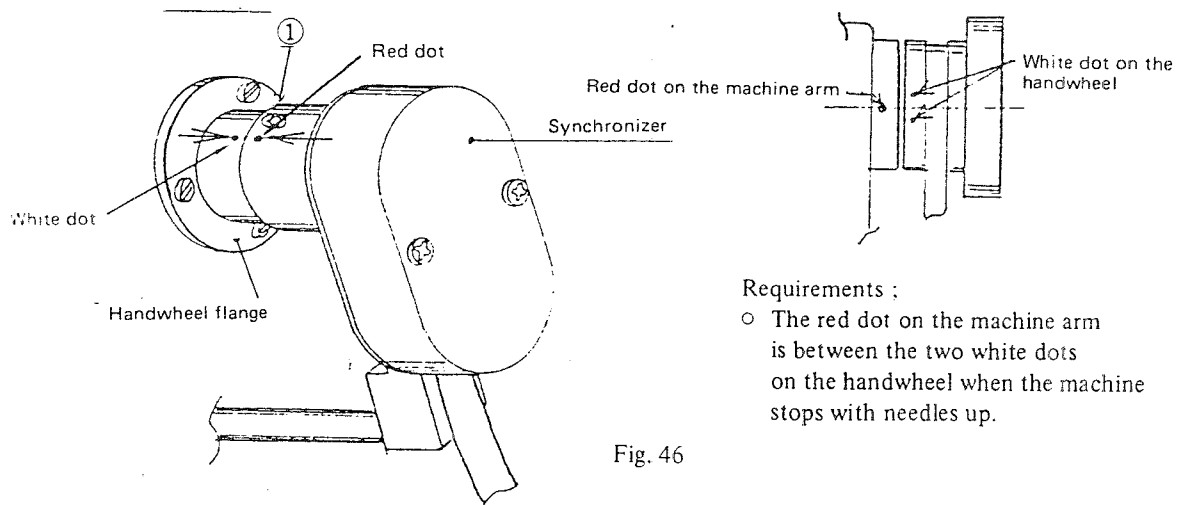
Requirements ;

- Clearance between the hook shaft gear and the hook shaft upper bushing must be 0.03 mm.

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<p>Loosen screw ① and position the needle bar slide block guide so that there is no clearance at both ends of the front bushing. Tighten screw ① after positioning.</p>	<ul style="list-style-type: none"> ○ If there is a clearance between them, it shakes the needle bar frame causing thread or needle breakage.
<p>Loosen screw ①, ② and ③ respectively and remove clearances between these components.</p>	<ul style="list-style-type: none"> ○ If there are large clearances between the components, they shake the mechanism too much and break the components.
<p>Loosen screw ① and provide a specified clearance.</p>	<ul style="list-style-type: none"> ○ If the clearance is greater than 0.03 mm, it may cause stitch skipping. ○ If the clearance is smaller than 0.03 mm, it may seize the neighbouring components.

8. MOTOR

1) Synchronizer

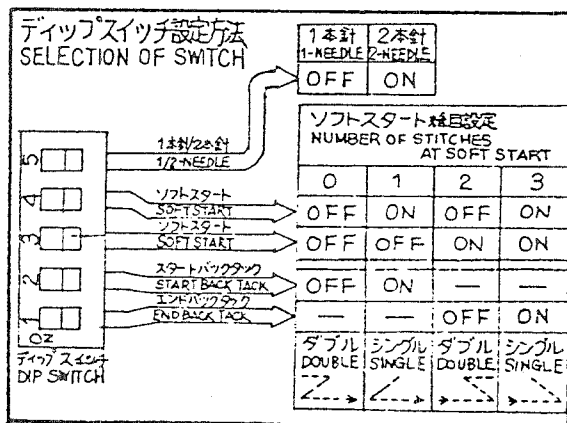


Requirements :

- The red dot on the machine arm is between the two white dots on the handwheel when the machine stops with needles up.

Fig. 46

2) Start/end reverse feed stitching, and setting for soft start and needle-up or -down stop



- Remove the rear cover of the motor control box, and make necessary setting by the dip switches.

3) Setting for soft start (up to 3 stitches)

Generally, the number of stitch set for the soft start is one. However, set it to two or three stitches if the starting one stitch is skipped in sewing with a thin thread or at a small stitch length.

4) How to adjust the sewing speed (1,800 ± 200 up to max. sewing speed)

Remove the rubber cap (marked with max. speed) on the motor control box, and turn the knob in the hole using a flat-bit screwdriver to adjust the sewing speed. Turn the knob clockwise to increase the sewing speed, or turn it counterclockwise to decrease it toward 1,800 ± 200 spm.

5) How to true up the starting reverse feed stitch

Turn the variable resistor (VR6) on the L circuit board clockwise to true up the stitches (merely for starting stitches).

HOW TO ADJUST	EFFECTS OF ADJUSTMENT
<ol style="list-style-type: none"> 1. Set and fix the red dot between the two white dots. 2. Check that the red dot on the machine arm is between the two white dots on the handwheel when the machine stops with its needles up (with material and thread set on the machine). 3. If the red dot on the machine arm is not between the two white dots on the handwheel, loosen two screws ① on the synchronizer rotor and make fine adjustment. 	<div data-bbox="954 254 1401 548" style="text-align: center;"> <p>Handwheel flange</p> <p>Synchronizer rotor</p> <p>Early Late</p> <p>Fig. 47</p> </div> <ul style="list-style-type: none"> * If the timing of the synchronizer rotor is early, it may cause thread trimming failure. ○ The cam roller will not come off the thread trimmer cam. A click may be heard at the sewing start, or the moving knife may be erroneously actuated at the sewing start with consequent stitching accident in the worst case. * If the timing is too late, <ul style="list-style-type: none"> ○ The thread trimmer malfunctions. ○ The wiper strikes the needle.

9. TABLE OF SELECTIVE PARTS

The parts shown below are selective.

Description	Part No.	Tolerance	
Hook shaft gear	10111904	-0.2 ~ -0.1	
	10112100	0 ~ +0.1	
	10112209	+0.1 ~ +0.2	
Thread take-up lever needle bearing	B1905541A00	0 ~ -0.002	
	B1905541B00	-0.002 ~ -0.004	
	B1905541C00	-0.004 ~ -0.006	
	B1905541D00	-0.006 ~ -0.008	
Hook shaft needle bearing	SB30953010A	0 ~ -0.002	
	SB30953010B	-0.002 ~ -0.004	
	SB30953010C	-0.004 ~ -0.006	
	SB30953010D	-0.006 ~ -0.008	
Feed rock needle bearing	B1636581A00	0 ~ -0.002	
	B1636581B00	-0.002 ~ -0.004	
	B1636581C00	-0.004 ~ -0.006	
	B1636581D00	-0.006 ~ -0.008	
Hook shaft gear thrust collar	Engraved numbers		
	10109700	0	1
	10110906	1	1.1
	10111003	2	1.2
	10111102	3	1.3
	10111201	4	1.4
	10109809	5	1.5
	10112506	6	1.6
	10112605	7	1.7
10112704	8	1.8	
Slide block guide link pin	B1412352A00	+0.016 ~ +0.011	
	B1412352B00	+0.011 ~ +0.006	
	B1412352C00	+0.006 ~ +0.001	
	B1412352D00	+0.001 ~ -0.004	

10. PARTS FIXED WITH "LOCK-TITE" PAINT

The following parts are fixed with "LOCK-TITE" paint 601. Whenever these parts have been disassembled, wash the attaching parts using thinner, dry them well, and then apply LOCK-TITE paint to them for reassembly. If it is difficult to remove screws fixed with LOCK-TITE paint, heat them with a torch, and they can be removed easily.

(CAUTION)

Avoid disassembling the following parts as much as possible. (Do not disassemble 2. Feed regulating arm plate (setscrew), or else the actual stitch length may substantially differ from the stitch dial setting.)

- | | |
|---|---------------------|
| 1. Wiper link shaft (B) | (Part No. 10114007) |
| 2. Feed regulating arm plate — setscrew | (Part No. 10106706) |

11. PARTS FIXED WITH BOND OR SEALING MATERIALS

The following parts are fixed or sealed against oil leakage by applying sealing materials or bond.

Parts	Sealing/Bonding materials
1. Needle bar frame setscrew	THREE-BOND 1101
2. Thread guide (A) screws	THREE-BOND 1101
3. Hand lifter shaft O-ring	THREE-BOND 1101
4. Thread take-up lever oil guard	BOND E SET
5. Jaw plate packing (against the needle bar frame)	Cyano-acrylate bond (ALONALFA)
6. Feeding lever shaft oil guard	Gum-type adhesive agent (for outside sealing)
7. Main shaft rear bearing O-ring	THREE-BOND 1101
8. Feed adjusting screw O-ring	THREE-BOND 1101

12. MAINTENANCE PARTS

Basic maintenance parts

Description	Part No.	Remarks on installation
Needle		Direction of the long groove on the needle
Hook (asm) (for thread trimming)	10110054	} See 2-(2), 2-(3), 2-(1)-3 and 2-(9)
Hook (asm) (not for thread trimming)	10110153	
Bobbin (for thread trimming)	10111300	
Bobbin (not for thread trimming)	B9117051000	
Moving knife	10115004	See 3-(1)-1), 3-(1)-2), and 3-(1)-3)
Fixed knife	10115400	
Clamp spring	10115707	See 3-(1)-3).

Recommendable maintenance parts

Description	Part No.	Remarks on installation
Hook shaft gear	10112001	Tighten three setscrews evenly
Bobbin case opening lever	10111805	See 2-(3)
Cam follower (asm)	10116754	See 3-(1)-8)
Cam follower pushing plate	10117802	See 3-(1)-6)
Pushing plate actuator screw	10118305	See 3-(1)-6)
Thread take-up spring (A)	B3128-051-000	
Thread take-up spring (B)	B3128-527-000	
Thread take-up lever pin (asm)	10125557	Don't press it too much against the thread take-up
Oil felt (asm)	10125755	
Hook shaft gear oil wick support (left) (asm)	10126555	
Hook shaft gear oil wick support (right) (asm)	10126654	

13. IMPORTANT CAUTIONS IN ADJUSTMENT

- When you confirm the correct direction of revolution at the time of installation, don't operate the thread trimmer. If the motor runs in the wrong direction, it will break the thread trimmer. (Correct direction : the handwheel revolves towards you.) (The motor should run counterclockwise as observed from the handwheel.)
- In the special adjustment for the Needle Entry Point (see 2-(1)-1), if you set the needle bar closer to the presser bar than the standard, the needle will hit the pressure foot, the feed dog will touch the throat plate and the needle clamp will hit the wiper holder connection, respectively.
- Never remove the feed regulator arm plate (10106706) from the feed regulator base.
- Screw tightening torque
 - Fastening screw of the feed regulator base (1010706) : 45 to 50 Kg-cm
 - Fastening screw of the reverse feed link (Screw (2), Fig. 40) : 45 to 50 Kg-cm
A torque of 45 to 50 Kg-cm is obtained by tightening the screw 1/4 to 1/2 turns after reaching the end of its thread using an accessory screw driver (large).

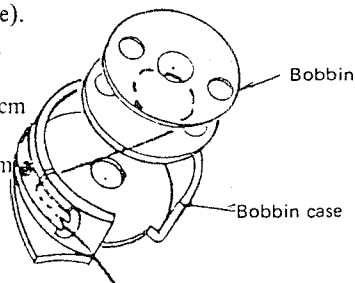


Fig. 48

- Oil sight window setscrew : 5 ~ 10 kg-cm
 - Hook driving shaft saddle set (A) (SM7082550SP) : 80 ~ 100 kg-cm
 - Hook driving shaft upper bushing setscrew (SS8151550SP) : 10 ~ 12 kg-cm
- Threading the bobbin case

(Note that the direction of the thread wound on the bobbin is opposite to the revolving direction of the hook.)

- When winding the bobbin of the "F" specification machine with the presser foot "up", be careful that the presser foot will hit the needle guard.
- Do not move the magnet plate in the synchronizer. - 44 -

14. COMPARISON TABLE OF THE COMPONENTS BY SPECIFICATIONS AND THE METHODS FOR MODIFICATION

No.	Components	LH-1152 □ □ (without thread trimmer)			
		F specification	A specification	S specification	G specification
1	Thread tension post (asm)	10124758 (Tension spring : $\phi 0.9$)	10124758 (Tension spring : $\phi 0.9$)	10124766 (Tension spring : $\phi 1.0$)	10124774 (Tension spring : $\phi 1.2$)
2	Thread guide (B)	10101301	10101301	10101301	10188001
3	Throat plate	10135309	10135309	10135309	10137602
4	Feed dog	B1613512D0B (Needle hole : $\phi 1.4$, 3/16")	10172807 (Needle hole : $\phi 1.6$, 3/16")	B1613512D00 (Needle hole : $\phi 1.9$, 3/16")	B1613512F0H (Needle hole : $\phi 2.2$, 1/4")
5	Presser foot	10186153 (Needle slot: 1.4 wide, 3/16")	10150357 (Needle slot: 1.6 wide, 3/16")	10152759 (Needle slot: 2.0 wide, 3/16")	10156552 (Forked end : 1/4")
6	Needle clamp	10147809 (3/16")	10147809 (3/16")	10147809 (3/16")	10148005 (1/4")
7	Presser bar spring	B1505227T00A	B1505227000A	B1505227000A	B1505227000A
8	Stitch dial connection	B16234700A0	B16234700A0	B16234700A0	10107357
9	Machine specification plate	BME0000F000	B113255200A	BME0000S000	B113255200G
10	Gauge indication plate	BME0000D00B	BME0000D00B	BME0000D00B	BME0000F00B
11	Needle	MSG19650900 (Organ Sg x 1965 #9) (Schmetz System 134 SES Nm65)	MSG19060900 (Organ Sg x 1906 #9) MC200500650 (Schmetz System 134 Nm65)	MDP500B1400 (Organ DP x 5 #14) MC200500900 (Schmetz System 134 Nm 90)	MDP500B2100 (Organ DP x 5 #21) MC200501300 (Schmetz System 134 Nm 130)
Remarks:					
Stitch length (max.)		4 mm	4 mm	4 mm	6 mm
Standard gauge size		3/16"	3/16"	3/16"	1/4"

METHODS FOR MODIFICATION

To "G" from "F", "A" or "S" specifications

Since the maximal stitch length becomes 6 mm (15/64") from 4 mm (5/32"), you must adjust the initial position of the reverse feed control lever shaft.

(Machine with the thread trimmer)

Procedures:

1. Set the stitch length to "0" mm.
2. Loosen screw ① and remove the stitch dial connection from the stitch regulator stud.
3. Insert a corresponding stitch dial connection (select from the table on the left) and fix it by screw ① in the way that its "0" scale is perpendicular to the machine bed.
4. Loosen screw ②, Fig. 40.
5. Set the stitch dial to the maximum scale and tighten screw ②, Fig. 40.
6. Adjust the reverse feed mechanism referring to 3-(3).

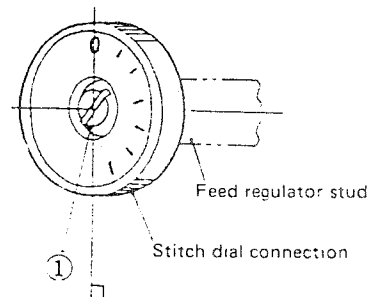


Fig. 49

LH-1152 □ □ -4-4B (with thread trimmer)		
A specification	S specification	G specification
10124659 (Tension spring : $\phi 0.9$)	10124667 (Tension spring : $\phi 1.0$)	10124675 (Tension spring : $\phi 1.2$)
10101301	10101301	10188001
10130300	10130300	10132603
10165306 (Needle hole : $\phi 1.6$, 3/16")	10167708 (Needle hole : $\phi 2.0$, 3/16")	10170405 (Needle hole : 2x3, 1/4")
10150357 (Needle slot: 1.6 wide, 3/16")	10152759 (Needle slot: 2.0 wide, 3/16")	10156552 (Forked end : 1/4")
10147809 (3/16")	10147809 (3/16")	10148005 (1/4")
B1505227000A	B1505227000A	B1505227000A
B16234700A0	B16234700A0	10107357
B113255200A	BME0000S000	B113255200G
BME0000D00B	BME0000D00B	BME0000F00B
MSG19060900 (Organ Sg x 1906 #9)	MDP500B1400 (Organ DP x 5 #14)	MDP500B2100 (Organ DP x 5 #21)
MC200500650 (Schmetz System 134 Nm 65)	MC200500900 (Schmetz System 134 Nm 90)	MC200501300 (Schmetz System 134 Nm 130)
4 mm 3/16"	4 mm 3/16"	6 mm 1/4"

(Machine without thread trimmer)

Procedures :

1. Follow the above instructions from 1 to 3.
2. Loosen screw ② (Fig. 26).
3. Set the stitch dial to the maximum scale and tighten screw ② (Fig. 26) positioning the reverse feed control lever as shown in Fig. 50.

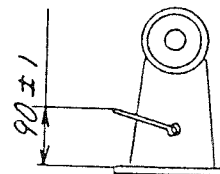
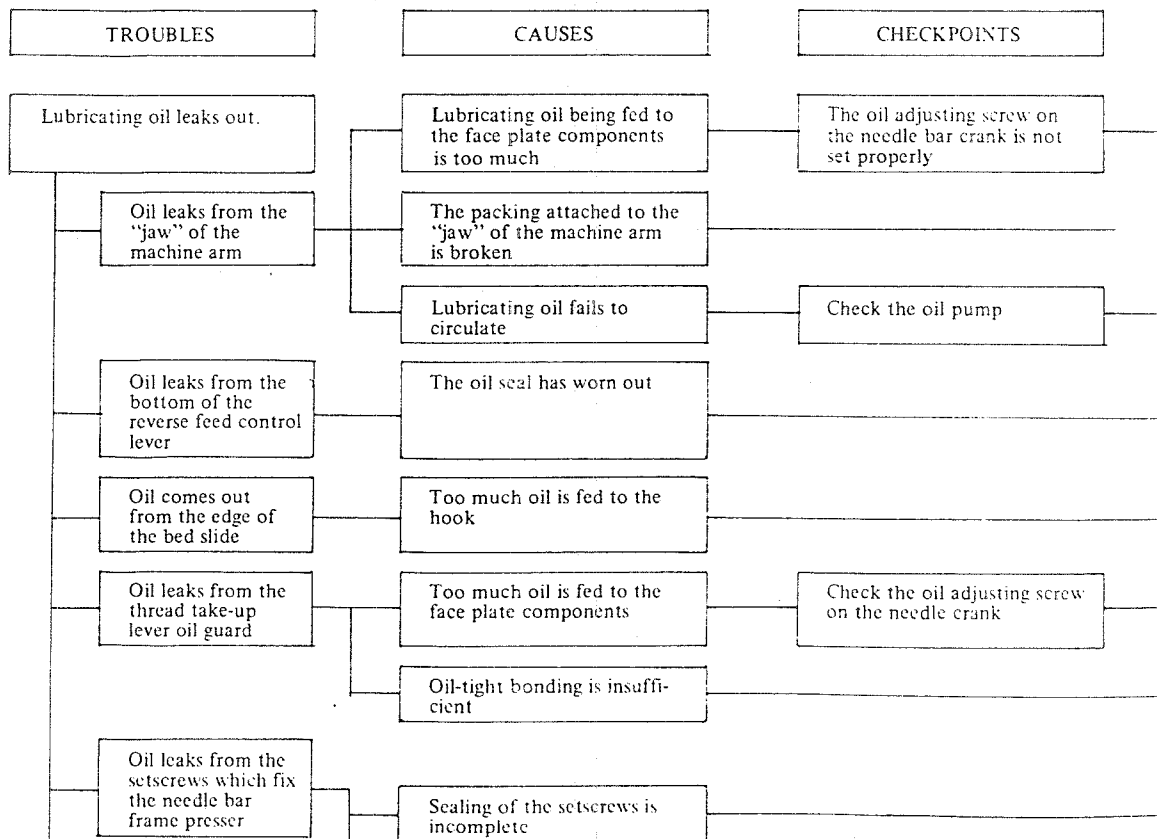
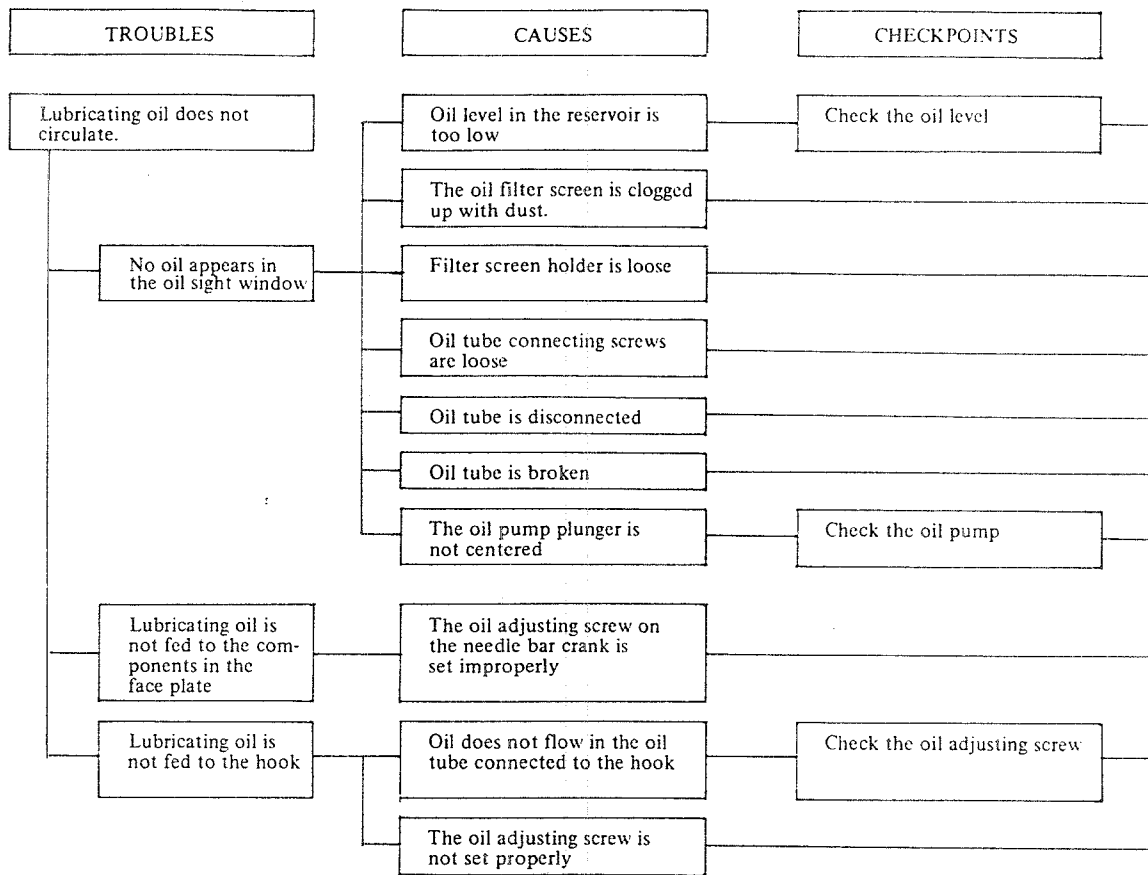


Fig. 50

15. MECHANICAL TROUBLES AND CORRECTIVE MEASURES



*Grease may leak from the rear bushing of the main shaft (only for a new machine)

CORRECTIVE MEASURES

TEST REPORT

Fill the oil reservoir in the bed between "H" and "L" marks

Clean up the oil filter screen

Tighten the screen holder clamping screw

Tighten the connecting screws

Connect the oil tube securely

Replace the broken tube

Center the oil pump plunger to its opening

*This trouble may be caused by misalignment of the plunger at the time of repair or maintenance work.

See 2-(9)

Close the oil flow by tightening the oil adjusting screw fully, turn the screw in the reverse way by 6 turns and fix it by the locknut

See 2-(9)

CORRECTIVE MEASURES

TEST REPORT

See 2-(9)

Replace the broken packing

*When assembling this section, take care not break the packing. Attach the packing tightly using adhesive as specified in 11

Center the oil pump plunger to its opening

Replace the oil seal

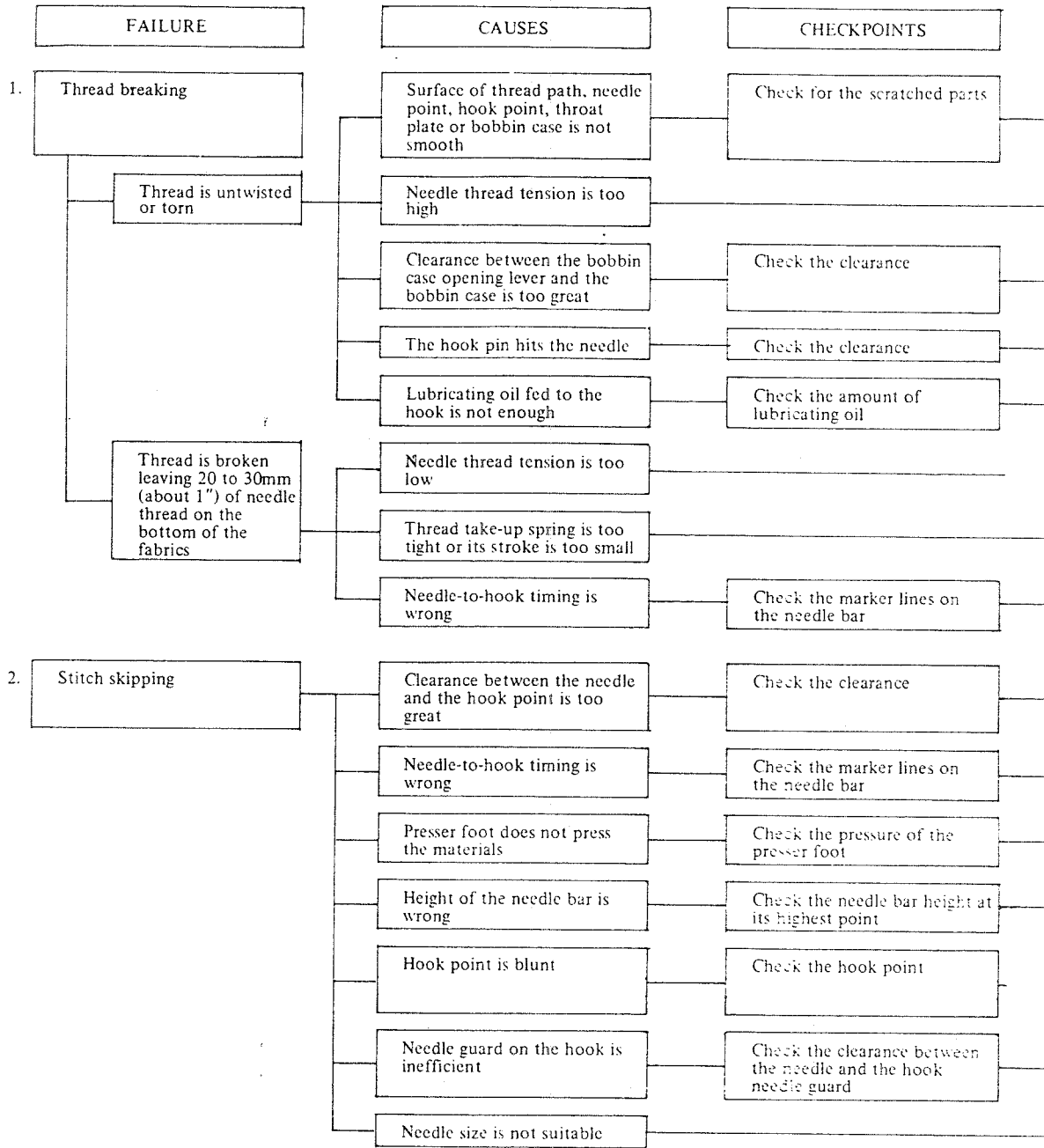
See 2-(9)

See 2-(9)

Apply BOND "E" to the lower end of the thread take-up lever oil guard

Apply new sealing material (THREE BOND 1101)

16. STITCH FAILURES AND CORRECTIVE MEASURES



CORRECTIVE MEASURES

Remove scratches from the hook point using a fine sandpaper. Make the throat plate slot surface smooth using a buffing wheel

Adjust the needle thread tension

Reduce the clearance (see 2-(3))

See 2-(2)

See 2-(9)

Adjust the needle thread tension (this occurs rather in synthetic fiber thread)

Reduce the tension of the thread take-up spring or increase its stroke

See 2-(2)

See 2-(2)

See 2-(1) and 2-(2)

Tighten the presser spring regulator screw

See 2-(1)-2)

Make the hook blade straight and sharp or replace it

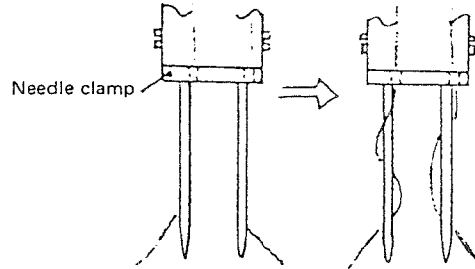


See 2-(2)-2)

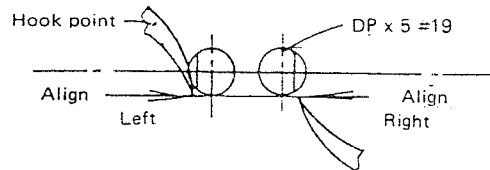
Replace the needle by a thicker one

TEST REPORT

*If synthetic fiber thread is frequently broken;
 1) Replace DP x 5 needle by Sgx1906 needle.
 2) Wind the thread once on to the needle.



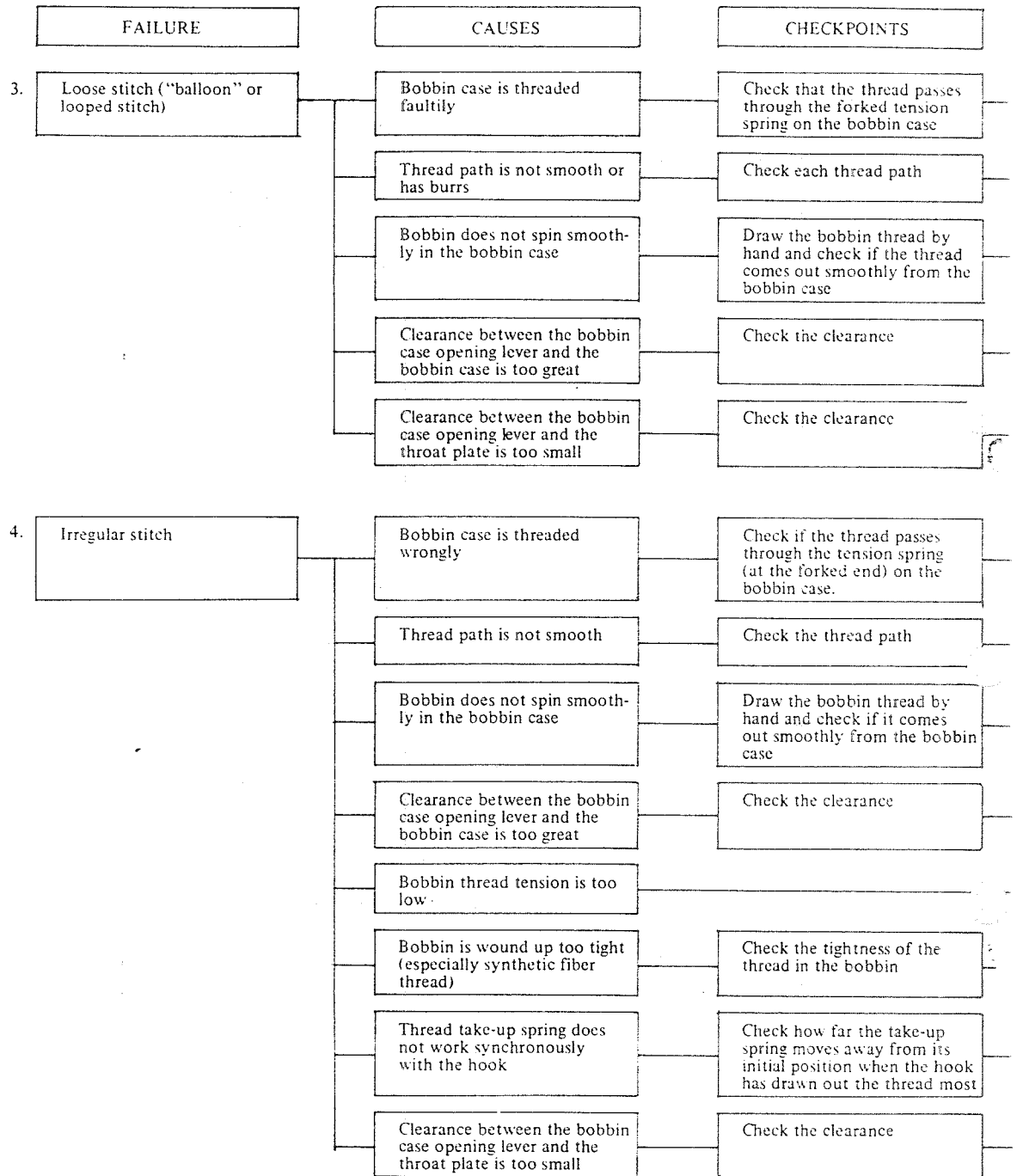
*If stitch skipping occurs frequently in the synthetic fiber thread;
 Find which needle causes stitch skipping, and delay its needle-to-hook timing by a needle's thickness from that of the other needle.



(Example)

Suppose that the right-hand needle causes stitch skipping;

- 1) Loosen screws which fix the hook shaft gear of the right-hand hook.
- 2) Needle DP x 5 #19 is used and stitch length is "2".
- 3) Align the hook points with the end face of the needle as illustrated, so that the right-hand needle-to-hook timing is delayed by a needle's thickness.



CORRECTIVE MEASURES

Thread the bobbin case correctly

Sand the rough surface with a fine sandpaper or a buffing wheel

Replace the bobbin or hook

See 2-(3)

See 2-(4)

Thread the bobbin case correctly

Smooth the thread path using a fine sandpaper or buffing wheel

Replace the bobbin or the hook

See 2-(3)

Adjust the tension spring on the bobbin case

Wind the bobbin with an adequate tension

Adjust the thread take-up spring to move about 1 mm from its initial when the hook has drawn out the thread most

See 2-(4)

TEST REPORT

*If this trouble frequently happens:

- 1) Smooth the thread path.
 - 2) Reduce the clearance between the bobbin case opening lever and the bobbin case to 0.15 or 0.2 mm.
- But, don't reduce the clearance too much, or it may break the bobbin case.

*Generally, "leaps" of the needle thread are indicative of unfavorable stitching conditions.

This phenomenon can be reduced or avoided by:

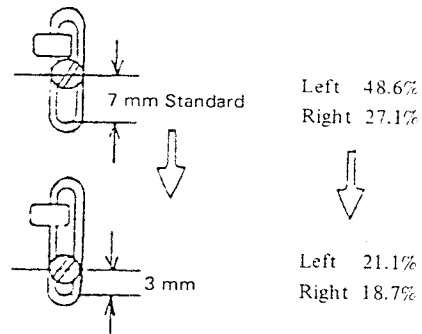
- 1) Reducing the clearance between the bobbin case opening lever and the bobbin case, or
- 2) Making the bobbin spin freely in the bobbin case.

*Stitch tightness varies according to the position of the thread take-up lever thread guide (B).

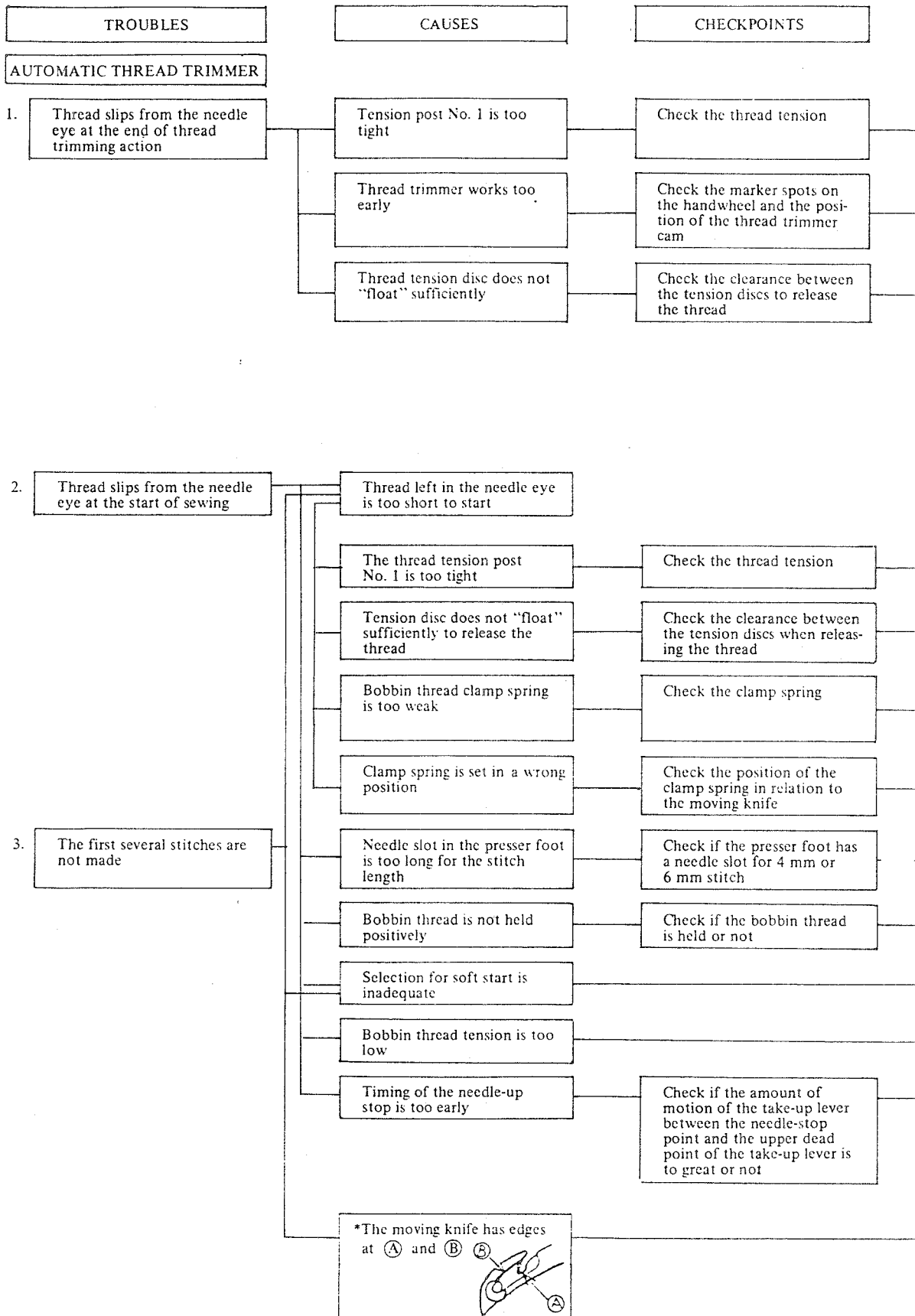
Formation of uneven stitches at sewing speed of 1000 to 4000 spm

(Material: 2 plies of cotton gaberdine

Thread: Spun thread #60 Stitch length: 2 mm)



17. MECHANICAL TROUBLES OF ATTACHMENTS AND CORRECTIVE MEASURES



CORRECTIVE MEASURES

Reduce the thread tension applied by the tension post No. 1

See 3-(1)-4)

See 3-(1)-7)

Reduce the tension applied by the tension post No. 1

See 3-(1)-7)

Set the clamp spring as illustrated or replace it



See 3-(1)-3)

Replace the presser foot

See 3-(1)-2), 3-(1)-3) and 3-(1)-8)

See 8-(2)

Increase the bobbin thread tension

See 8-1)

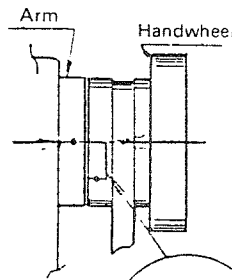
*Using a fine sandpaper or diamond file, remove the edges at (A) and (B) with care taken not to blunt the moving knife blade.

TEST REPORT

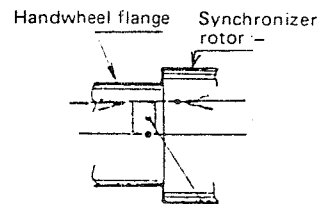
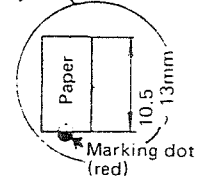
*Such troubles as "thread escapes from the needle eye" and "the first several stitches are not formed" are mainly caused by inadequate length of the thread left on the needle eye at the start. These troubles frequently occurs especially when sewing with a thin synthetic fiber thread at a small stitch length. These troubles can be reduced by making the following changes:

- 1) Start of the moving knife : $295^{\circ} \rightarrow 310^{\circ} \sim 315^{\circ}$
- 2) Needle-up stop : $51^{\circ} \sim 59^{\circ} \rightarrow 60^{\circ} \sim 65^{\circ}$

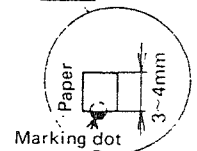
How to change the timing:



- 1) Stick a piece of paper with adhesive tape to the handwheel aligning its one end with the center of the marking dot on the handwheel as illustrated.
- 2) Turn the handwheel until the other end of the paper arrives at a point shown by the marking dot engraved on the arm.
- 3) Adjust the thread trimmer cam according to 3-(1)-4).
- 4) Then set the marking dot on the synchronizer to that on the handwheel flange in the way to delay the timing as illustrated.

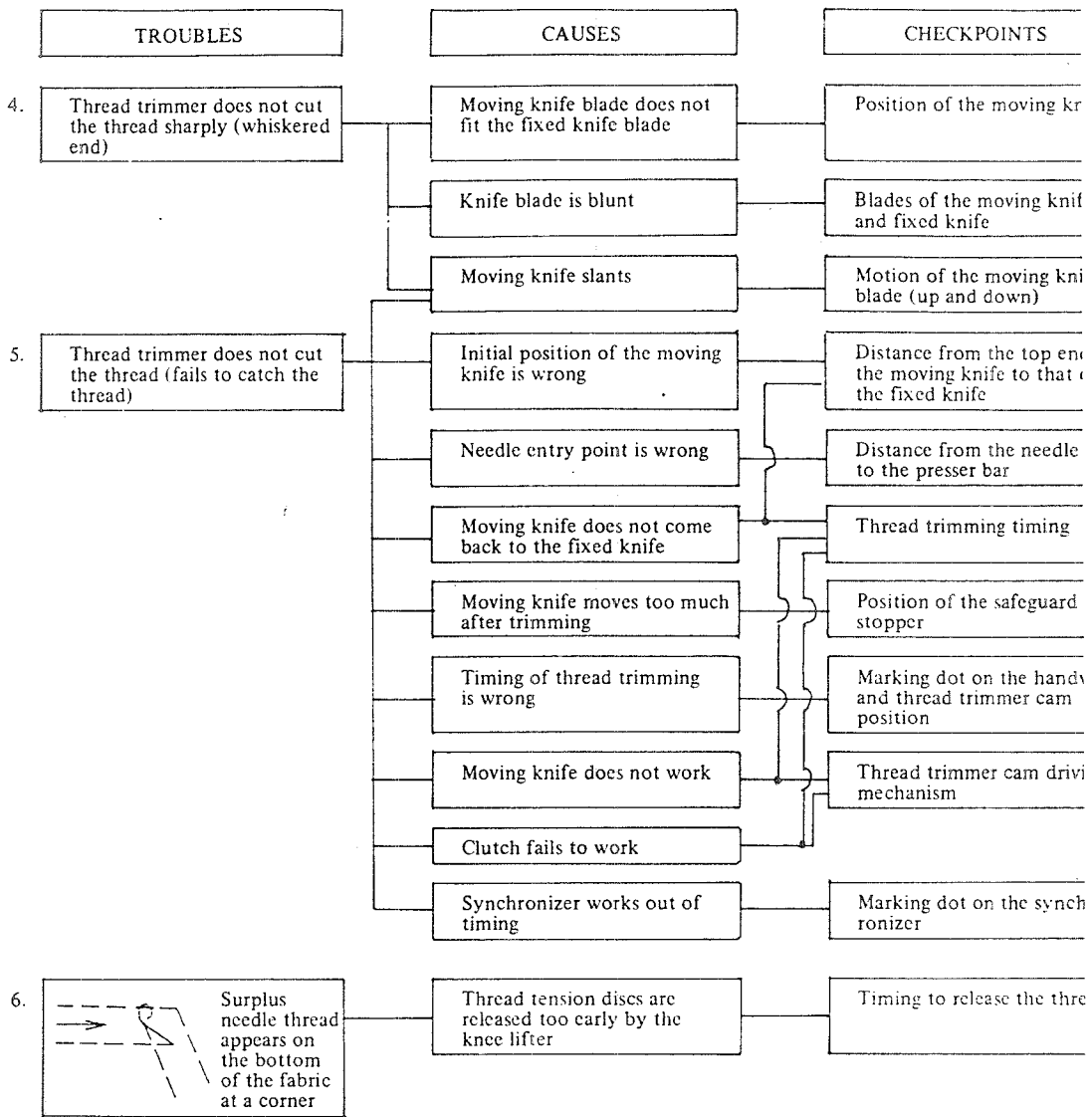


- 5) Change the height of the wiper from the throat plate surface from 9.7 ~ 10 mm to 8 mm according to 3-(2)-2).



*If trouble 3 happens when thick thread is used for the needle, and thin thread is used for the bobbin it is recommendable to change the position of the clamp spring in the way to reduce the distance to the moving knife slightly from the standard of 6.5 ~ 7.0 mm, referring to 3-(1)-3).

The first several stitches are not formed.
This trouble may be also caused by a bobbin which is wound a less amount of thin thread. In such a case, fill up the bobbin.



CORRECTIVE MEASURES

See 3-(1)-1, 3-(1)-2, and 3-(1)-3
Adjust or replace the moving knife or fixed knife

See 3-(1)-1

See 3-(1)-2

See 2-(1)-1 and 2-(1)-3

See 3-(1)-4

See 3-(1)-8

See 3-(1)-4

See 3-(1)-6

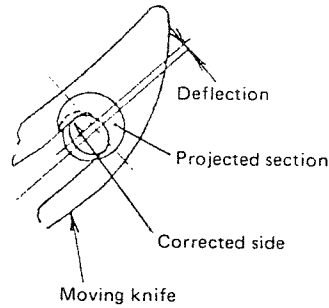
See 8-1)

See 2-(8)

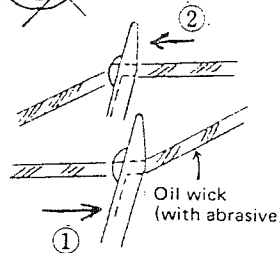
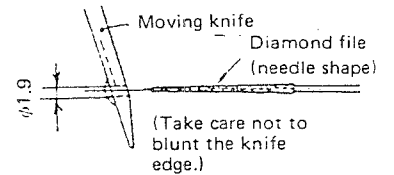
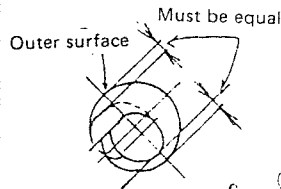
TEST REPORT

* "Thread trimmer does not cut the thread sharply."
This may be mainly caused by deflection of the projected section of the fixed knife from the center of the moving knife. (degree of deflection can be judged from the trace scraped on the fixed knife.)

HOW TO CORRECT THE DEFLECTION :



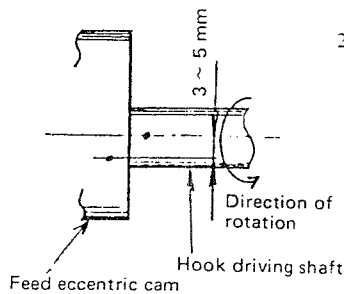
1. Check how the projected section deflects.
2. Correct the shape of the projected section using a diamond file so that its symmetrical edge meets evenly with the knife blade as illustrated on the left.



3. Re-sharpen the knife blade. Lap the blade in process ① and bring back without lapping in process ②. Repeat ① and ② for 2 or 3 times, and the knife blade will be sharpened.

*Failure to catch the thread
If this trouble often occurs, set the feed eccentric cam slightly earlier than the standard with respect to the hook driving shaft.

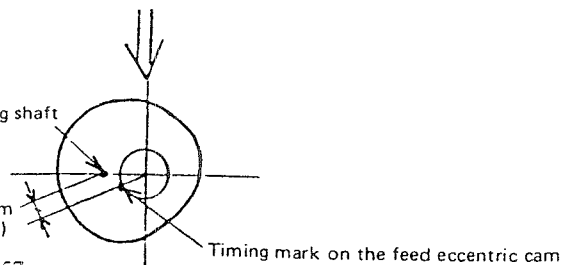
HOW TO ADJUST



1. Adjust the timing of the cloth feed action according to 2-(5).
2. Set the marking dot engraved on the feed eccentric cam to 2.3 to 3.9 mm below the marking dot on the hook driving shaft as illustrated. (After adjustment, check the stitch length once again.)

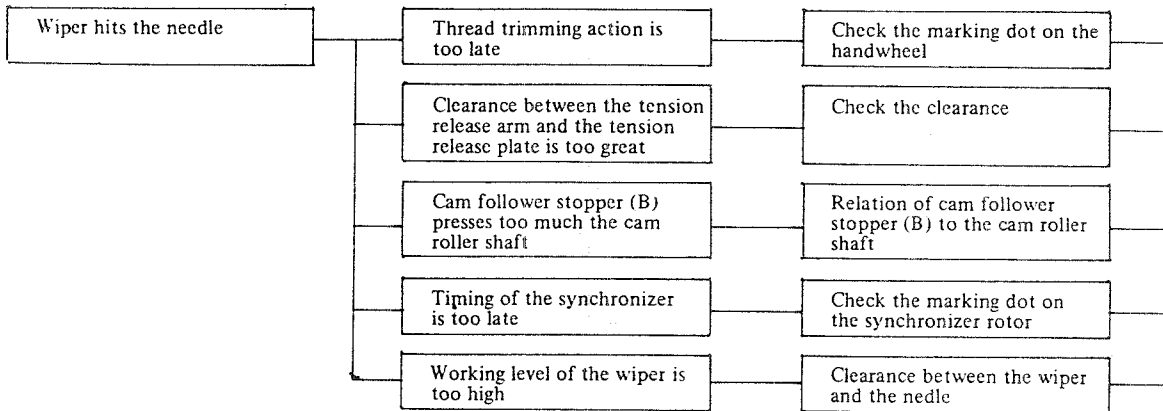
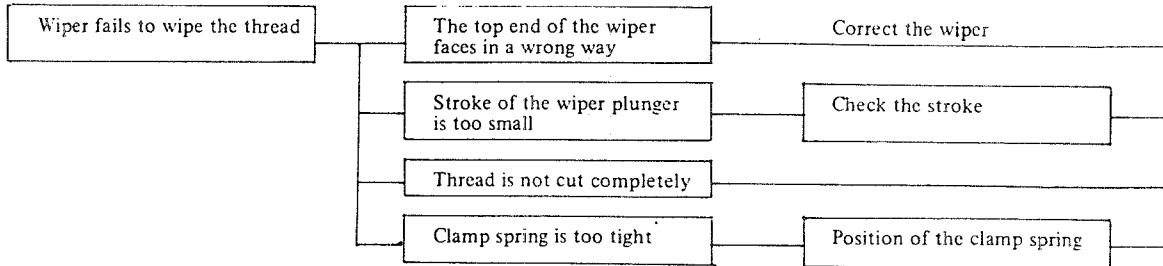
Timing mark on the hook driving shaft

2.3 ~ 3.9 mm
(+16° ~ 27°)

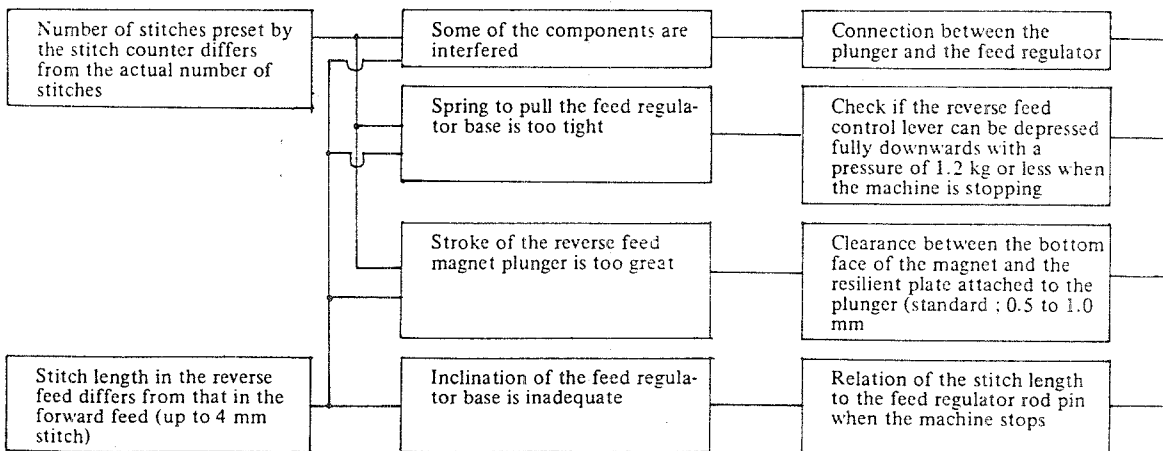


TROUBLES	CAUSES	CHECKPOINTS
----------	--------	-------------

WIPER COMPONENTS



AUTOMATIC REVERSE FEED MECHANISM



CORRECTIVE MEASURES

Correct the wiper

See 3-(2)-1)

See Troubles 4 and 5 of the thread trimmer



3.6 $\begin{matrix} +0.2 \\ 0 \end{matrix}$

Correct the position of the clamp spring or replace the clamp spring

See 3-(1)-4)

See 3-(1)-5)

See 3-(1)-8)

See 8-1)

See 3-(2)-2)

Remove the cause of interference

Reduce the tension of the spring

See 3-(3)-1)

See 2-(11)

TEST REPORT

* If the wiper does not return when thick thread is used:

- Check if the thread gets entangled with the wiper causing the presser foot to float. In this state, if the thread is broken, the wiper will return.
- This phenomenon is prevented by reducing the projection of the moving knife (standard amount : 1.5 to 2 mm as shown in Fig. 29).

DIMENSIONS OF THE MACHINE TABLE (LH-1152-4 SERIES)

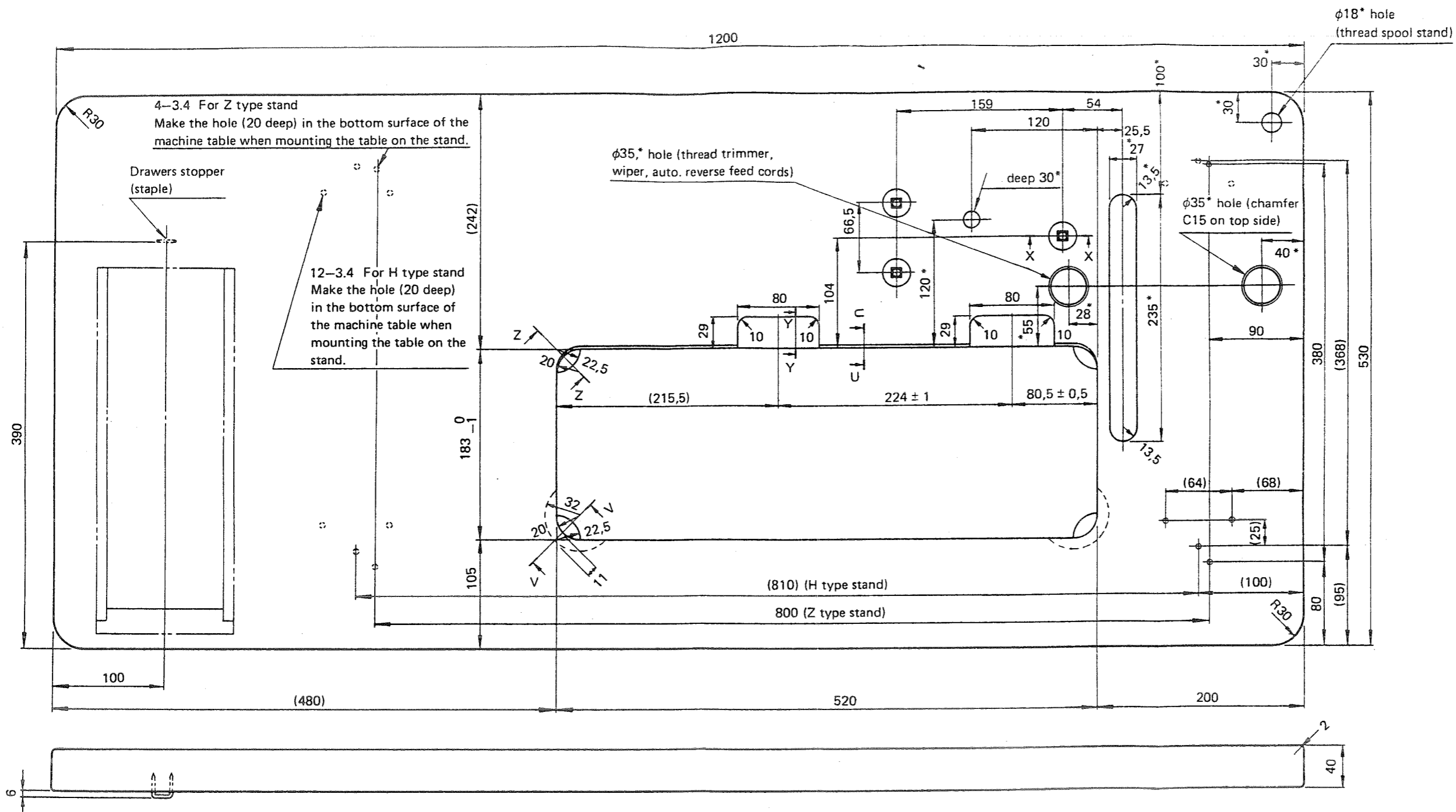
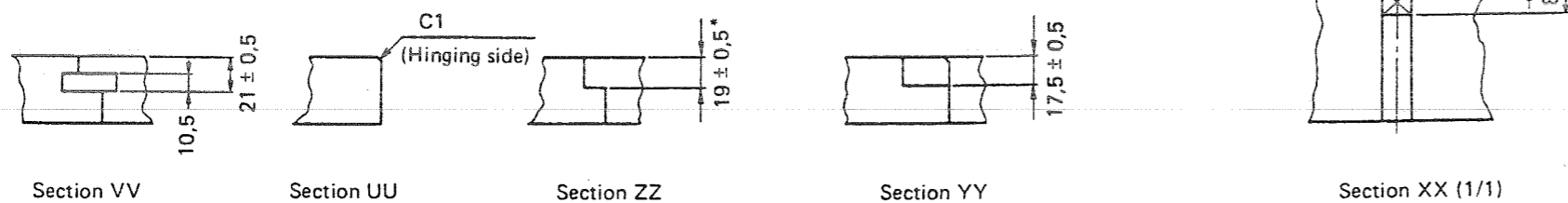
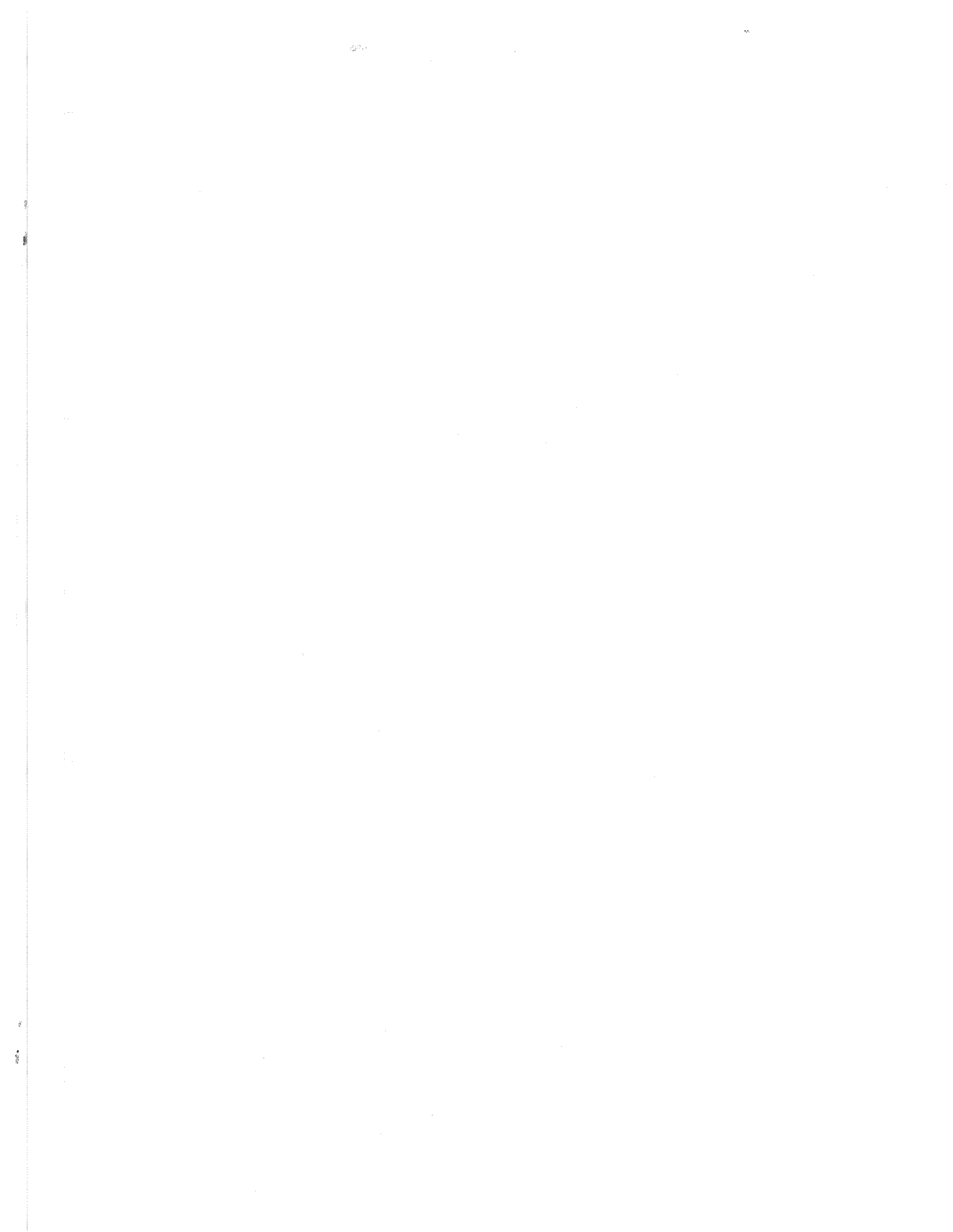


Table part No. B8201-512-000A



(Note) All dimensions are millimeters (not scale)

- Notes:
1. Make sure to use a rubber hinge seat of Part No. B8212125000 and a head support rubber seat of Part No. 8209528000.
 2. Note that no plus (+) tolerance is allowed for the table width, 183₋₁⁰.
 3. The asterisked (*) dimensions differ from those of B8201512000A.



JUKI

JUKI CORPORATION

HEAD OFFICE
2-1, 8-CHOME, KOKURYO-CHO,
CHOFU-CITY, TOKYO, JAPAN

BUSINESS OFFICE
23-3, KABUKI-CHO 1-CHOME,
SHINJUKU-KU, TOKYO 160, JAPAN

CABLE : JUKI TOKYO
TELEX : J22967, 232-2301
PHONE : 03(3205)1188,1189,1190

