2-Needle, Needle-feed, Lockstitch Machine

LH-3178

2-Needle, Needle-feed, Lockstitch Machine with an Automatic Thread Trimmer

LH-3178-7

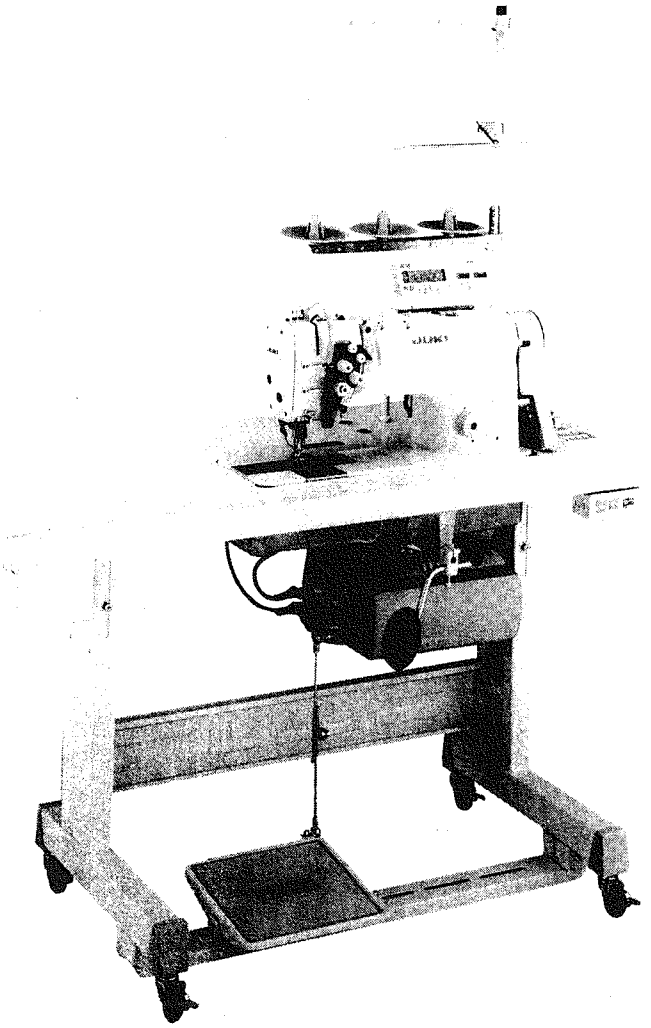
2-Needle, Needle-feed, Lockstitch Machine with Organized Split Needle Bar

LH-3188

2-Needle, Needle-feed, Lockstitch Machine with Organized Split Needle Bar and an Automatic Thread Trimmer

LH-3188-7

ENGINEER'S MANUAL



No. VI-16
1994. 8

PREFACE

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

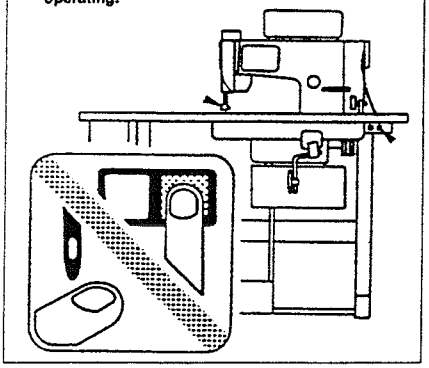
The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains detailed operating instructions. And this manual describes "How to Adjust", "Results of Improper Adjustment", and other information which are not covered by the Instruction Manual.

Separately refer to the Instruction Manual and Engineer's Manual for the SC-1 for the explanation of the motor components of the sewing machine with a thread trimmer. Refer to the "Instruction Manual for the CP-30 series" and the "Installation Manual for the Control Panel" for the explanation of the control panel.

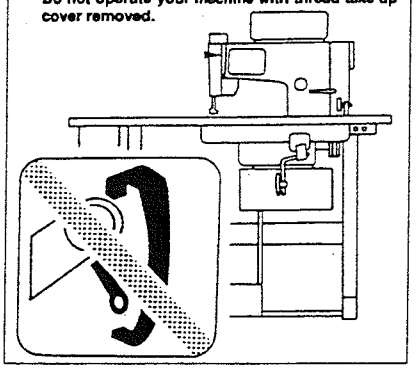
It is advisable to use the pertinent Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these machines.

CAUTION

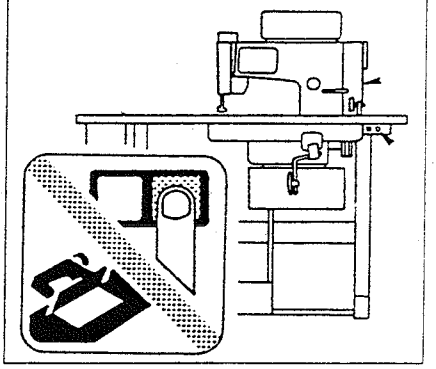
1. Keep your hands away from the needle when you turn the power switch ON or while the machine is operating.



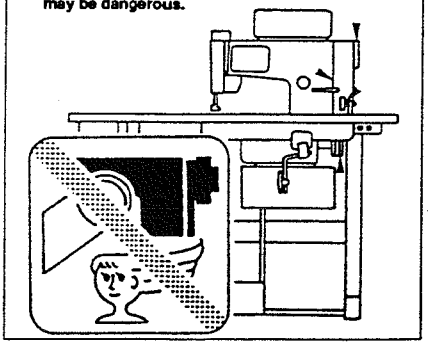
2. Do not put your fingers into the thread take-up cover while the machine is operating.
Do not operate your machine with thread take up cover removed.



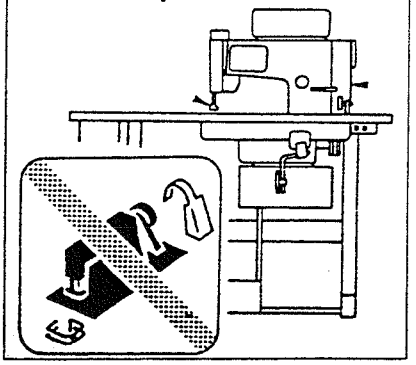
3. Be sure to turn the power switch OFF before tilting the machine head or removing the V belt.



4. During operation, be careful not to allow your or any other person's head or hands to come close to the handwheel, V belt, bobbin winder or motor. Also, do not place anything close to them. Doing so may be dangerous.



5. If your machine is provided with a belt cover, finger guard or any other protectors, do not operate you machine with any of them removed.



6. For the machine that is not equipped with a thread trimmer and uses a clutch moter, never depress the foot pedal unless the main switch has turned ON.

BEFORE OPERATION

1. Don't run the machine before filling the oil reservoir with the prescribed lubricating oil.
2. After setting up your machine, make sure that it runs in the correct direction; lower the needle by turning the handwheel and watch the handwheel's revolution by momentarily switching the power "on" (correct rotational direction of the handwheel: counterclockwise when viewed from the handwheel's end.)
3. Run the newly installed machine at a speed of 2,500 s.p.m. or lower for the first 4 weeks.
4. Confirm the ratings of your power source by the machine plate stuck on the motor (power voltage, phase etc.)

CONTENTS

1. SPECIFICATIONS

(1) Model designation (LH model without thread trimmer)

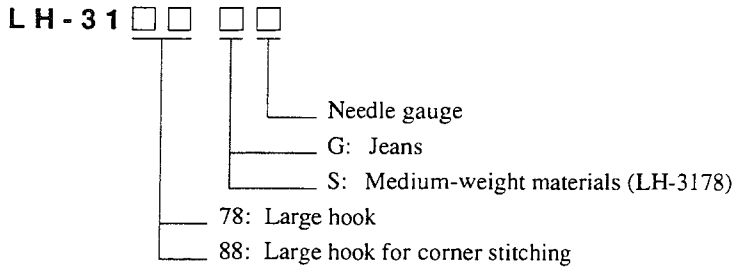


Table 1

Model		LH-3178		LH-3188
Stitch type		G	S	G
Max. sewing speed		3000 s.p.m		
Max. stitch length (forward and reverse stitching)		5 x 5 mm		
Needle (standard)		DPx5 #14 ~ #21		DPx5 #16 ~ #21
Presser foot lift	Hand lifter	5.5 mm		
	Knee lifter	12 mm		
Organized split needle bar mechanism		Not provided with		Provided with

(2) Model designation (LH model with thread trimmer)

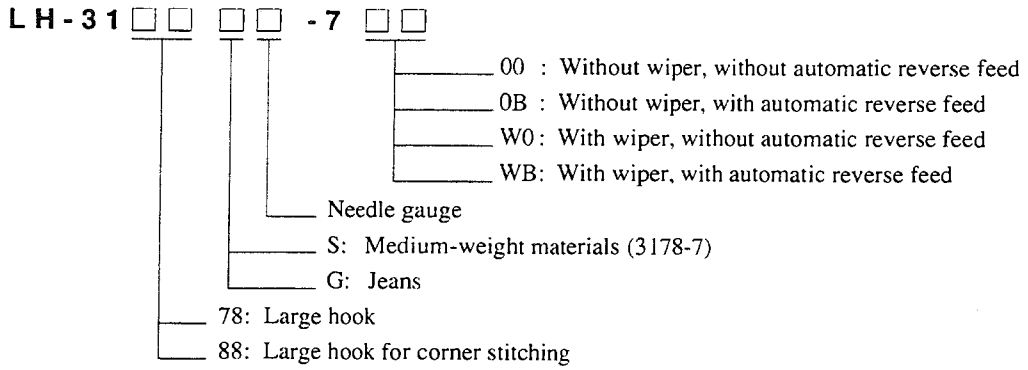


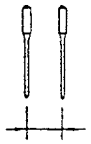
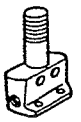
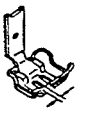
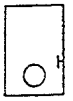
Table 2

Model		LH-3178-7		LH-3188-7
Stitch type		S	G	G
Max. sewing speed		3000 s.p.m		
Max. stitch length (forward and reverse stitching)		5 x 5 mm		
Needle (standard)		DPx5 #14 ~ #21		DPx5 #16 ~ #21
Presser foot lift	Hand lifter	5.5 mm		
	Knee lifter	12 mm (with wiper: 9 mm)		
Organized split needle bar mechanism		Not provided with		Provided with

2. LIST OF GAUGE COMPONENTS

(1) LH-3178, S type

Table 3

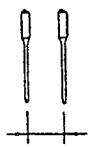
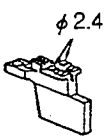
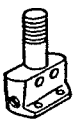
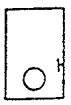
Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate(left) asm.	Slide plate(right) asm.
Code								
	Inch	mm						
C	5/32	4.0	226 25206	226 30206	101 47759	101 52650	226 01058	226 00555
D	3/16	4.8	226 25305	226 30404	101 47858	101 52759		
E	7/32	5.6	226 25404	226 30503	101 47957	101 52858		
F	1/4	6.4	226 25503	226 30602	101 48054	101 52957		
G	9/32	7.1	226 25602	226 30800	101 48153	101 53054		
H	5/16	7.9	226 25701	226 30909	101 48252	101 53153		
K	3/8	9.5	226 25800	226 31006	101 48351	101 53252		
W	7/16	11.1	226 25909	226 31105	101 48450	101 53351		
L	1/2	12.7	226 26006	226 31303	101 48559	101 53450	226 01157	226 00654
M	5/8	15.9	226 26105	226 31402	101 48658	101 53559		
N	3/4	19.1	226 26204	226 31501	101 48757	101 53658		
P	7/8	22.2	226 26303	226 31709	101 48856	101 53757	226 01256	226 00753
Q	1	25.4	226 26402	226 31808	101 48955	101 53856		
R	1-1/8	28.6	226 26501	226 31907	101 49052	101 53955		
S	1-1/4	31.8	226 26600	226 32004	101 49151	101 54052	226 01355	226 00852
T	1-3/8	34.9	226 26709	226 32103	101 49250	101 54151		
U	1-1/2	38.1	226 26808	226 32202	101 49359	101 54250		

■ Standard type

(2) LH-3178, G type

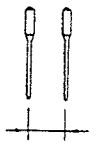
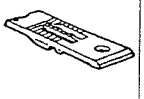
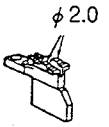
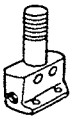
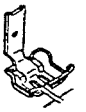
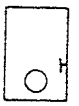
Table 4

The part marked with an asterisk (*) is available on an extra order.

Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate(left) asm.	Slide plate(right) asm.
Code								
	Inch	mm						
D	3/16	4.8	226 25305	228 15401	101 47858	228 16557	226 01058	226 00555
E	7/32	5.6	226 25404	228 15500	101 47957	228 16656		
F	1/4	6.4	226 25503	228 15609	101 48054	228 16755		
G	9/32	7.1	226 25602	228 15708	101 48153	228 16854		
H	5/16	7.9	226 25701	228 15807	101 48252	228 16953		
K	3/8	9.5	226 25800	228 15906	101 48351	228 17050		
W	7/16	11.1	226 25909	*	101 48450	*		
L	1/2	12.7	226 26006	228 16003	101 48559	228 17159	226 01157	226 00654
M	5/8	15.9	226 26105	*	101 48658	*		
N	3/4	19.1	226 26204	*	101 48757	*		
P	7/8	22.2	226 26303	*	101 48856	*	226 01256	226 00753
Q	1	25.4	226 26402	*	101 48955	*		
R	1-1/8	28.6	226 26501	*	101 49052	*		
S	1-1/4	31.8	226 26600	*	101 49151	*	226 01355	226 00852
T	1-3/8	34.9	226 26709	*	101 49250	*		
U	1-1/2	38.1	226 26808	*	101 49359	*		

(3) LH-3178-7, S type

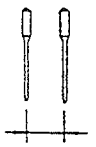
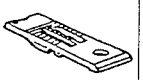
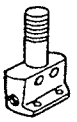
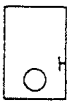
Table 5

Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate(left) asm.	Slide plate (right) asm.	Wiper
Code									
	Inch	mm							
C	5/32	4.0	226 60302	102 37907	101 47759	102 22354			
D	3/16	4.8	226 60401	102 38004	101 47858	226 40353			
E	7/32	5.6	226 60500	102 38103	101 47957	226 40452			
F	1/4	6.4	226 60609	102 38202	101 48054	226 40551	226 50857	226 50352	102 09230
G	9/32	7.1	226 60708	102 38301	101 48153	226 40759			
H	5/16	7.9	226 60807	102 38400	101 48252	226 40858			
K	3/8	9.5	226 60906	102 38509	101 48351	226 40957			
W	7/16	11.1	226 61003	101 68300	101 48450	226 41054			
L	1/2	12.7	226 61102	102 38707	101 48559	226 41252			102 09500
M	5/8	15.9	226 61201	102 38806	101 48658	226 41351	226 50956	226 50451	
N	3/4	19.1	226 61300	102 38905	101 48757	226 41450			
P	7/8	22.2	226 61409	101 68706	101 48856	226 41658			102 09807
Q	1	25.4	226 61508	102 39002	101 48955	226 41757	226 51053	226 50550	
R	1-1/8	28.6	226 61607	101 68904	101 49052	226 41856			
S	1-1/4	31.8	226 61706	101 69001	101 49151	226 41955			102 09906
							226 51152	226 50659	

(4) LH-3178-7, G type

Table 6

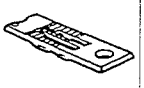
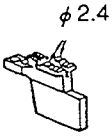
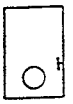
The part marked with an asterisk (*) is available on an extra order.

Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate(left) asm.	Slide plate (right) asm.	Wiper
Code									
	Inch	mm							
D	3/16	4.8	226 60401	228 21201	101 47858	228 16557			
E	7/32	5.6	226 60500	228 21300	101 47957	228 16656			
F	1/4	6.4	226 60609	228 21409	101 48054	228 16755	226 50857	226 50352	102 09230
G	9/32	7.1	226 60708	228 21508	101 48153	228 16854			
H	5/16	7.9	226 60807	228 21607	101 48252	228 16953			
K	3/8	9.5	226 60906	228 21706	101 48351	228 17050			
W	7/16	11.1	226 61003	*	101 48450	*			
L	1/2	12.7	226 61102	228 21805	101 48559	228 17159			102 09500
M	5/8	15.9	226 61201	*	101 48658	*	226 50956	226 50451	
N	3/4	19.1	226 61300	*	101 48757	*			
P	7/8	22.2	226 61409	*	101 48856	*			102 09807
Q	1	25.4	226 61508	*	101 48955	*	226 51053	226 50550	
R	1-1/8	28.6	226 61607	*	101 49052	*			
S	1-1/4	31.8	226 61706	*	101 49151	*			102 09906
							226 51152	226 50659	

(5) LH-3188, G type

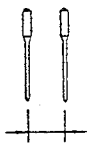
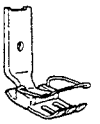
Table 7

The part marked with an asterisk (*) is available on an extra order.

Needle gauge			Throat plate	Feed dog	Needle clamp (left)	Needle clamp (right)	Presser foot	Slide plate(left) asm.	Slide plate (right) asm.
Code									
	Inch	mm							
D	3/16	4.8	226 25305	228 15401	B1402-528-DALA	B1402-528-DARA	228 16557		
E	7/32	5.6	226 25404	228 15500	B1402-528-EAL	B1402-528-EAR	228 16656		
F	1/4	6.4	226 25503	228 15609	B1402-528-FALA	B1402-528-FARA	228 16755	226 01058	226 00555
G	9/32	7.1	226 25602	228 15708	B1402-528-GAL	B1402-528-GAR	228 16854		
H	5/16	7.9	226 25701	228 15807	B1402-528-HALA	B1402-528-HARA	228 16953		
K	3/8	9.5	226 25800	228 15906	B1402-528-KALA	B1402-528-KARA	228 17050		
W	7/16	11.1	226 25909	*	*	*	*		
L	1/2	12.7	226 26006	228 16003	B1402-528-LAL	B1402-528-LAR	228 17159		
M	5/8	15.9	226 26105	*	B1402-528-MAL	B1402-528-MAR	*	226 01157	226 00654
N	3/4	19.1	226 26204	*	B1402-528-NAL	B1402-528-NAR	*		
P	7/8	22.2	226 26303	*	*	*	*	226 01256	226 00753
Q	1	25.4	226 26402	*	B1402-528-QAL	B1402-528-QAR	*		

(6) Chain-off thread gauge LH-3178, LH-3178-7, LH-3188, LH-3188-7

Table 8

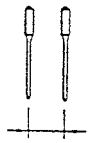
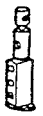
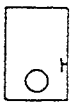
Needle gauge			Throat plate	Feed dog	Throat plate for the machine with a thread trimmer	Feed dog for the machine with a thread trimmer	Presser foot	Screw of feed dog
Code								
	Inch	mm						
D	3/16	4.8	228 35003	228 35557	228 35201	106 91053	B1524-512-DBH	SS 6580710TP
F	1/4	6.4	228 35102	228 35656	228 35300	106 98652	B1524-512-FBE	x 2

Note) The stitch length can be set up to 4 mm when a chain-off thread gauge is used with the machine.

(7) LH-3188-7, G type

Table 9

The part marked with an asterisk (*) is available on an extra order.

Needle gauge			Throat plate	Feed dog	Needle clamp (left)	Needle clamp (right)	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.	Wiper
Code										
	Inch	mm								
D	3/16	4.8	226 60401	228 21201	B1402-528-DALA	B1402-528-DARA	228 16557			
E	7/32	5.6	226 60500	228 21300	B1402-528-EAL	B1402-528-EAR	228 16656			
F	1/4	6.4	226 60609	228 21409	B1402-528-FALA	B1402-528-FARA	228 16755	226 50857	226 50352	102 09230
G	9/32	7.1	226 60708	228 21508	B1402-528-GAL	B1402-528-GAR	228 16854			
H	5/16	7.9	226 60807	228 21607	B1402-528-HALA	B1402-528-HARA	228 16953			
K	3/8	9.5	226 60906	228 21706	B1402-528-KALA	B1402-528-KARA	228 17050			
W	7/16	11.1	226 61003	*	*	*	*			102 09500
L	1/2	12.7	226 61102	228 21805	B1402-528-LAL	B1402-528-LAR	228 17159			
M	5/8	15.9	226 61201	*	B1402-528-MAL	B1402-528-MAR	*	226 50956	226 50451	102 09807
N	3/4	19.1	226 61300	*	B1402-528-NAL	B1402-528-NAR	*			
P	7/8	22.2	226 61409	*	*	*	*	226 51053	226 50550	
Q	1	25.4	226 61508	*	B1402-528-QAL	B1402-528-QAL	*			102 09906

3. LIST OF THE MAJOR COMPONENTS

(1) List of motor, motor pulley and V-belt

Table 10

	Without thread trimmer		With thread trimmer	
Model	LH-3178, LH-3188		LH-3178-7, LH-3188-7	
Frequency	50 Hz	60 Hz	Common to 50 Hz and 60 Hz	
Motor	Clutch motor		SC-1	AC servo motor
Motor pulley	ø 70 MTKP0070000	ø 60 MTKP0060000	ø 80 MTSP00800B0	
V-belt	42" MTJVH00420A	41" MTJVH00410A	40" MTJVH00400A	

(2) List of expendable parts

Table 11

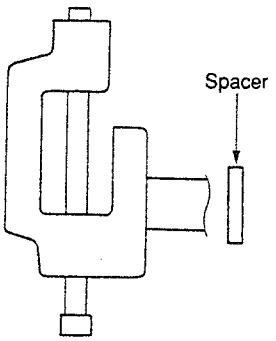
Without thread trimmer		With thread trimmer	
LH-3178, LH-3188		LH-3178-7, LH-3188-7	
Part No.	Part name	Part No.	Part name
	Needle DPx5		Needle DP x 5
B9117563000	Bobbin (Large) (Steel)	10231603	Bobbin (Aluminium bobbin) (Large hook)
22814255	Cap hook (asm.) (Large hook)	22819452	Cap hook asm. with thread trimmer (Large hook)
22827158	Hook (asm.) for an organized split needle bar (Large hook)	22831259	Hook (asm.) for an organized split needle bar and a thread trimmer. (Large hook)
22603708	Felt	10211605	Moving knife
		22820302	Counter knife G
		22820203	Thread presser G

(3) Other renewal parts

Table 12

Without thread trimmer LH-3178, LH-3188		With thread trimmer LH-3178-7, LH-3188-7	
Part No.	Part name	Part No.	Part name
22601504	Slide plate window	22601504	Slide plate window
22604300	Timing belt	22604300	Timing belt
B3128051000	Thread take-up spring (A)	B3128051000	Thread take-up spring (A)
B3128527000	Thread take-up spring (B)	B3128527000	Thread take-up spring (B)
22813455 For LH-3178	Latch hook (asm.) (Large hook)	22819908	Idling prevention spring (large hook)
		22819809	Idling prevention sheet (large hook)
For thick thread B3128520000 22835805	Thread take-up spring (left) 0.8 Thread take-up spring (right) 0.8	For thick thread B3128520000 22835805	Thread take-up spring (left) 0.8 Thread take-up spring (right) 0.8
		22811558	Thread guide F (Needle thread presser) asm. (1/2" or more)
		22655401	Thread presser (for thin thread)

(4) Needle bar frame spacer



	Size ±0.015	Part No.	Part name
	1.1	226 06206	Needle bar frame spacer Y
	1.2	226 06305	Needle bar frame spacer Z
	1.3	226 07600	Needle bar frame spacer A
	1.4	226 07709	Needle bar frame spacer B
Standard ◎	1.5	B1438512B00	Needle bar frame spacer C
	1.6	226 07808	Needle bar frame spacer D
	1.7	226 07907	Needle bar frame spacer E
	1.8	226 06404	Needle bar frame spacer F

4. SPECIAL NOTES FOR SAFE OPERATION

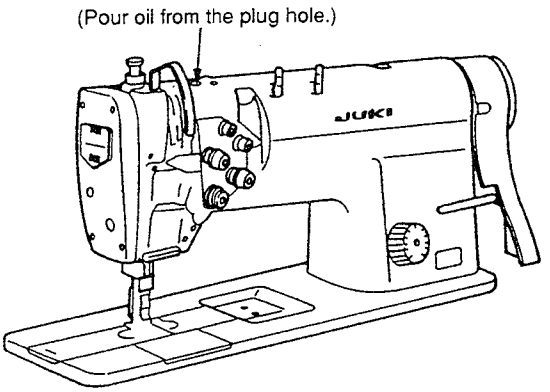
(1) For the LH-3178 and -3188 models of sewing machine without a thread trimmer, the throat plate, feed dog and presser foot developed for the LH-512 or -515 are applicable. Furthermore, commercially available thread trimmer, throat plate, feed dog and presser foot can also be used with them.

(2) When putting a V belt on the handwheel of the sewing machine head and the motor pulley, adjust the position of the motor so that the V belt is tensed to the extent where it slackens by approximately 10 mm when the center of the belt is pressed by hand.

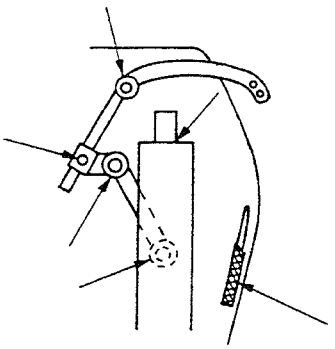
(3) Fill the oil pan with sewing machine oil (New Defrix Oil No. 2) until the H mark is reached.

(4) When you operate your machine for the first time after the set-up or after an extended period of disuse, apply a few drops of oil to the portions indicated by the arrow in Fig. 1.

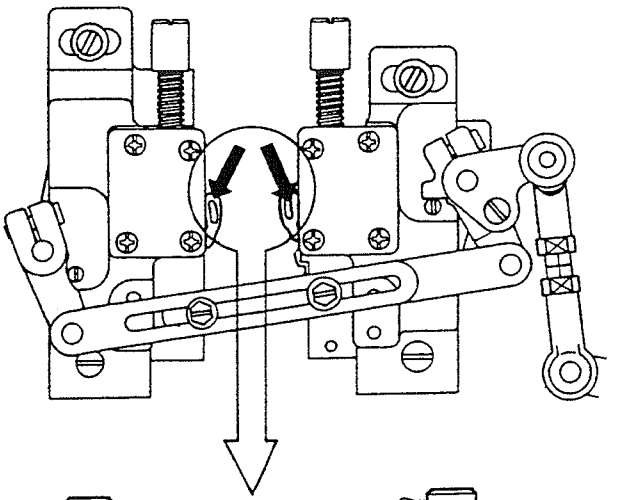
1) Main unit of the machine arm



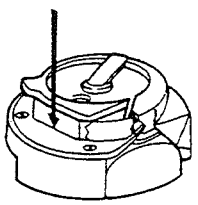
2) Face plate



3) Hook driving shaft saddle



4) Hook race surface (left and right)



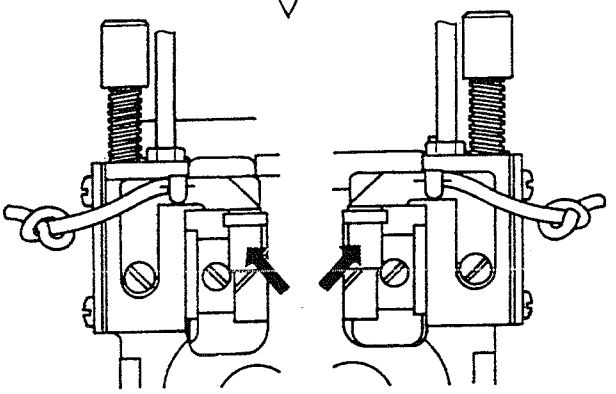


Fig. 1

(5) Hook differs with the type of sewing machine, i.e., the sewing machine with/without a thread trimmer. Be sure to use a hook that is exclusively designed for the sewing machine head. For the LH-3178 and -3188 models of sewing machine without a thread trimmer, commercially available hooks can be used.

(6) How to pass the bobbin thread (The bobbin thread winding direction is indicated by the arrow.)

1) LH-3178 Cap hook (asm.) Large hook (Option)

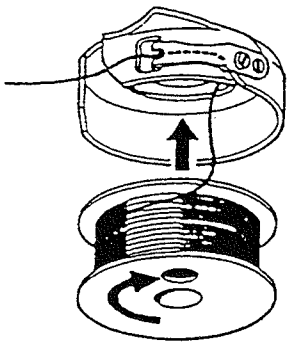


Fig. 2

2) LH-3178 Cap hook (asm.) Large hook LH-3178-7

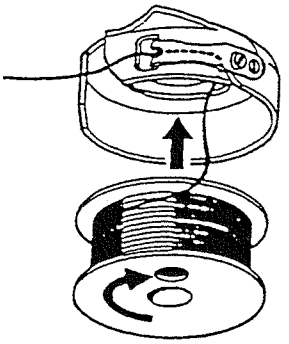


Fig. 3

3) LH-3188 Hook for an organized split needle bar (asm.) Large hook
LH-3188-7 Hook with a thread trimmer and an organized split needle bar (asm.) Large hook

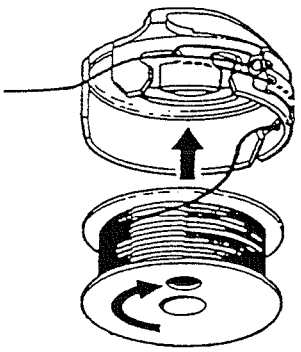


Fig. 4

(7) Use the thread stand thread guide arm (asm.).

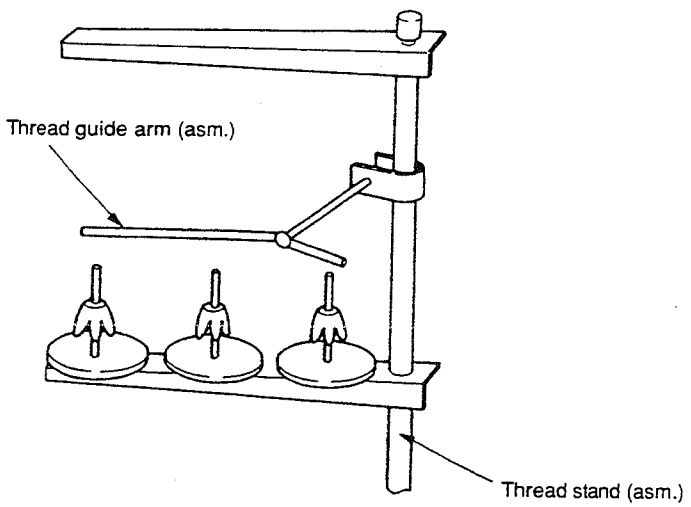


Fig. 5

STANDARD ADJUSTMENT

(1) Needle bar and feed dog

1) Initial position of the needle bar

Conditions

- o The needle bar is in the lowest dead point.
- o Feed amount (stitch length): 0

o LH-3178, LH-3178-7

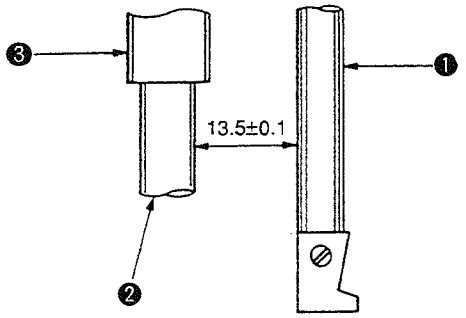


Fig. 6

o LH-3188, LH-3188-7

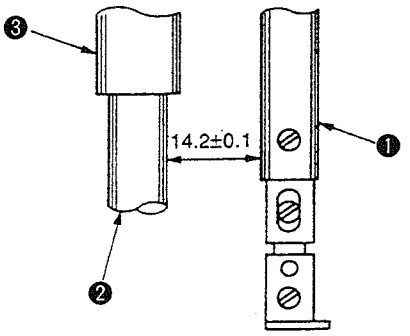


Fig. 7

2) Position and height of the feed dog

Conditions

- o Feed amount (stitch length): 0
- o When the feed dog is in the highest position of its stroke, it should rise 0.9 to 1.1 mm from the top surface of the throat plate.

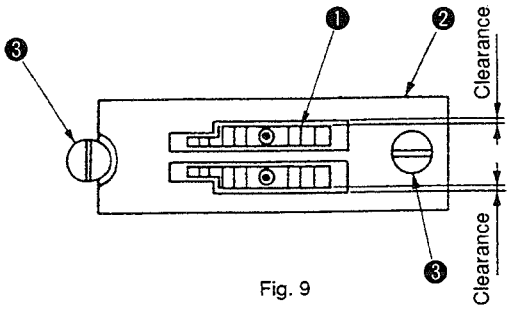


Fig. 9

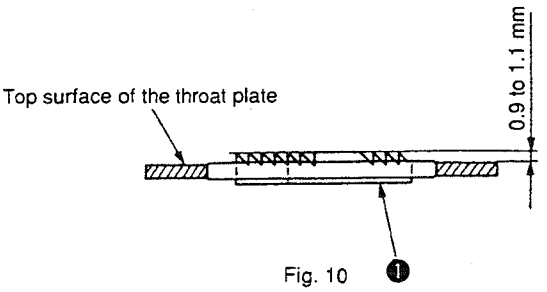


Fig. 10

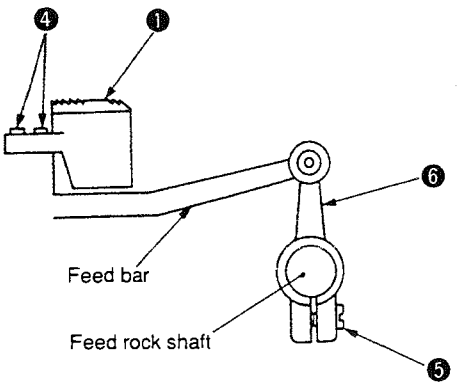


Fig. 11

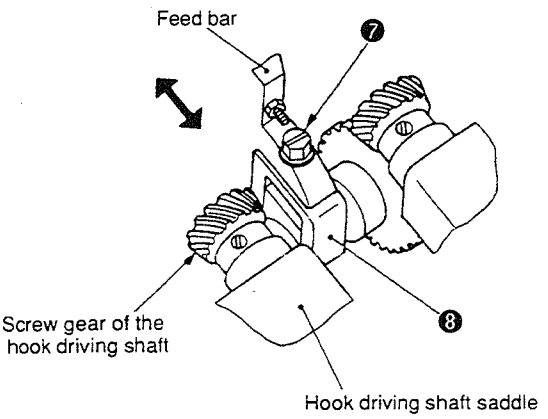
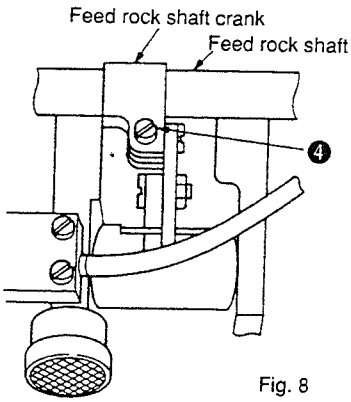


Fig. 12

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1. Set the stitch dial at " 0 " on the scale. 2. Turn the handwheel to bring needle bar ❶ to the lowest dead point. 3. Loosen screw ❹ shown in Fig. 8. 4. Adjust the inner dimension provided between needle bar ❶ and presser bar ❷ to the specified dimension. Then, tighten screw ❹.  Fig. 8 (Caution) **1. Distance from needle bar ❶ to presser bar ❷ should be the distance provided between the bottom end of the presser bar and the bottom end of presser bar lower bushing ❸.** **2. After the adjustment, the needle entry point in the needle slot in the feed dog may change.**	When the stitch length is maximized, the feed dog will come in contact with the feed dog. o Stitch skipping or needle breakage will be caused. o Thread trimming failure will be caused.
o Position of the feed dog 1. Attach feed dog ❶ to the bed using screws ❹. Attach throat plate ❷ to the bed using screws ❸. 2. Loosen clamping screw ❺ in the feed rocker in Fig. 11. Move feed rocker ❻ in the axial direction to adjust so that respective feed dogs ❶ teeth are equidistantly spaced in feed dog slots in the throat plate ❷ as illustrated in Fig. 9. After the adjustment, tighten screw ❺. 3. If the position of the feed dog is not properly adjusted by the procedure described above, suppose that feed dog ❶ has been attached with inclined. So, loosen screws ❹, and adjust the inclination angle of the feed dog ❶ to " 0." Then, tighten screws ❹ and perform the aforementioned step 2). o Height of the feed dog 1. Set the stitch dial at "0" on the scale. 2. Turn the handwheel to bring feed dog ❶ to the position where it rises the most above throat plate ❷. 3. Loosen screw ❼ in Fig. 12, and move feed bar lifting fork ❽ up or down to adjust so that feed dog ❶ rises 0.9 to 1.1 mm above the top surface of throat plate ❷. Then, tighten screw ❼. (Caution) **1. After the adjustment, the needle entry point in the needle slot in the feed dog may change.**	When the feed dog is positioned too high: o The feed dog will come in contact with the throat plate. o The stitch length will be larger than the value indicated by the scale on the stitch dial. o Thread trimming failure will occur. When the feed dog is positioned too low: o The stitch length will be smaller than the value indicated by the scale on the stitch dial. o The moving knife will come in contact with the feed dog at the time of thread trimming resulting thread trimming failure.

3) Needle bar height

Conditions

- o Needle bar should be in its lowest dead point.
- o Feed amount (stitch length): 0

○ LH-3178, S and G type
LH-3178-7, S and G type

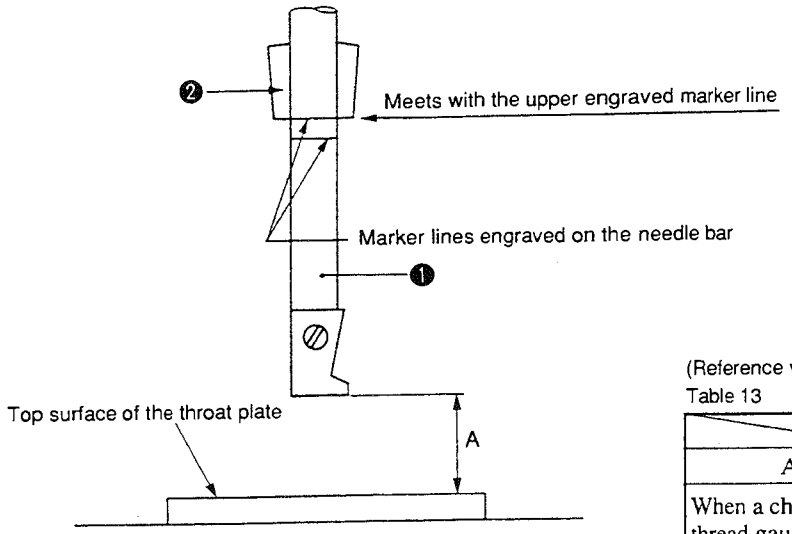


Fig. 13

(Reference value)
Table 13

	LH-3178	LH-3178-7
A	13±0.15	11.9±0.15
When a chain-off thread gauge is used	12.5±0.15	11.4±0.15

○ LH-3188, G type
LH-3188-7, G type

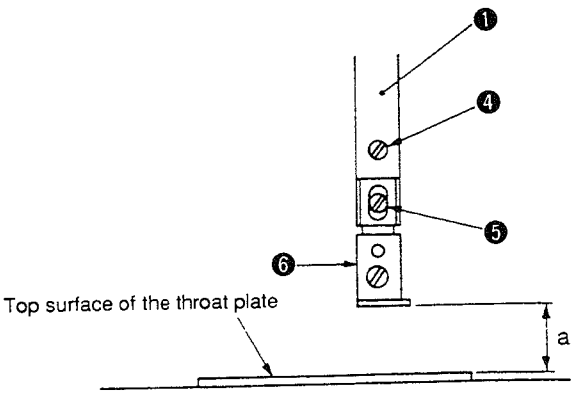
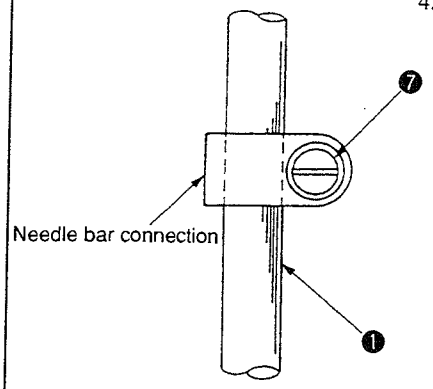
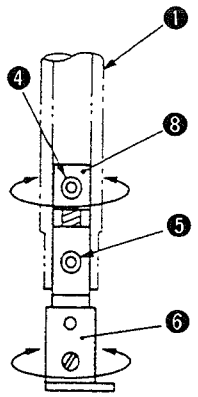


Fig. 14

(Reference value)
Table 14

	LH-3188	LH-3188-7
a	12.5±0.15	11.4±0.15
When a chain-off thread gauge is used	12±0.15	10.9±0.15

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
o LH-3178S, G LH-3178-7S, G 1. Set the stitch dial at "0." 2. Turn the handwheel to bring needle bar ❶ to the lowest dead point. 3. Loosen clamping screw ❼. 4. Align the upper marker line engraved on needle bar ❶ with the lower surface of needle bar frame ❷. Then, tighten clamping screw ❼.  Fig. 15	Change in height of the needle bar may result in stitch skipping or thread breakage.
o LH-3188G LH-3188-7G The needle bar height is determined by the height of the needle clamp.  Fig. 16 o Needle clamp ❻ goes up or comes down by 0.6 mm in one revolution. Remove screw ❺ and move needle clamp ❻ up or down. o Spring shoe ❽ goes up or comes down by 0.3 mm in half revolution. Remove screws ❹ and ❺, draw out needle clamp ❻ from needle bar ❶, and turn spring shoe ❽. 1. Set the stitch dial at "0." 2. Turn the handwheel to bring needle bar ❶ to the lowest dead point. 3. Turn needle clamp ❻ and/or spring shoe ❽ to adjust the clearance provided between the bottom of the needle bar and the top surface of the throat plate to dimension a shown in Table 14. Then tighten screws ❹ and ❺. **(Caution) 1. After the adjustment, the needle entry point in the needle slot in the feed dog may change.**	

4) **Needle entry**

Conditions

- o Needle bar should be in the lowest dead point.
- o Feed amount (stitch length): 0
- o The needle should enter the center of the needle slot in the feed dog.

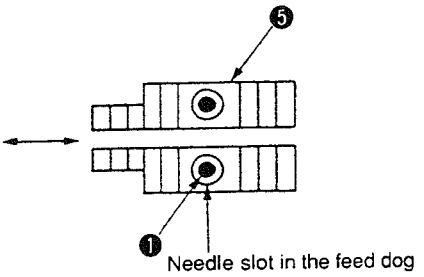


Fig. 17

○ LH-3178
LH-3178-7

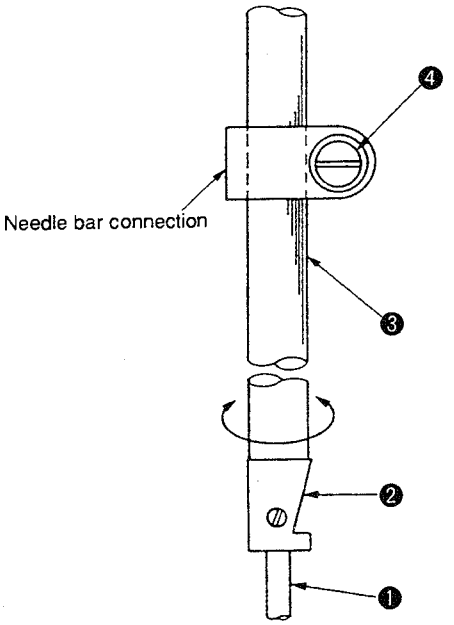


Fig. 18

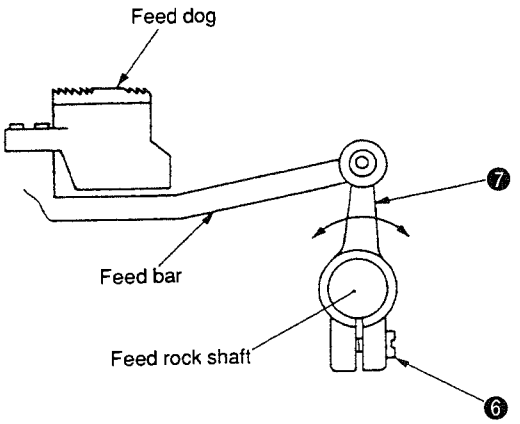


Fig. 19

○ LH-3188
LH-3188-7

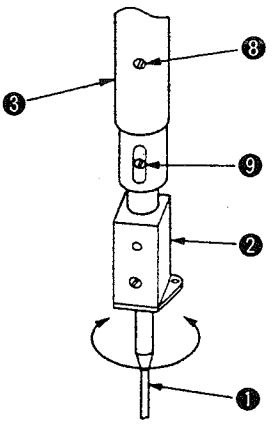


Fig. 20

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
o LH-3178, -3178-7 1. Attach needle ❶ to needle clamp ❷. 2. Set the stitch dial to " 0." 3. Turn the handwheel to bring needle bar ❸ to the lowest dead point. 4. Loosen clamping screw ❹. 5. Turn needle bar ❸ to adjust so that needle ❶ enters the center of the needle slot in feed dog ❺. After the adjustment, tighten screw ❹. 6. If needle ❶ is longitudinally dislocated in the needle slot in the feed dog, loosen clamping screw ❻ in feed rocker ❼ and adjust the longitudinal position of the needle by turning feed rocker ❼. After the adjustment, tighten screw ❻. **(Caution) 1. Do not change the needle bar height.** **2. Do not loosen needle clamp ❷.** o LH-3188, -3188-7 1. Attach needle ❶ to needle clamp ❷. 2. Set the stitch dial to " 0." 3. Turn the handwheel to bring needle bar ❸ to the lowest dead point. 4. Loosen clamping screws ❽ and ❾. 5. Turn needle clamp ❷ to adjust so that needle ❶ enters the center of the needle slot in feed dog ❺. After the adjustment, tighten screws ❽ and ❾. 6. If needle ❶ deflects in the longitudinally direction of the needle slot in the feed dog, loosen screw ❻ and properly adjust the longitudinal position of the needle in the needle slot by turning feed rocker ❼. After the adjustment, tighten screw ❻. **(Caution) 1. Needle clamp ❷ can be turned in the clearance provided between screw ❾ and the rightmost and leftmost edges of the slot in the needle bar.**	o Stitch skipping and thread breakage will be caused. o Poorly tensed seam will result.

(2) Needle-to-hook relation

Conditions

- o The needle bar ascends from the lowest dead point of its stroke.
- o Feed amount (stitch length): 3.5

1) Lift of the needle bar

LH-3178 LH-3188

LH-3178-7 LH-3188-7

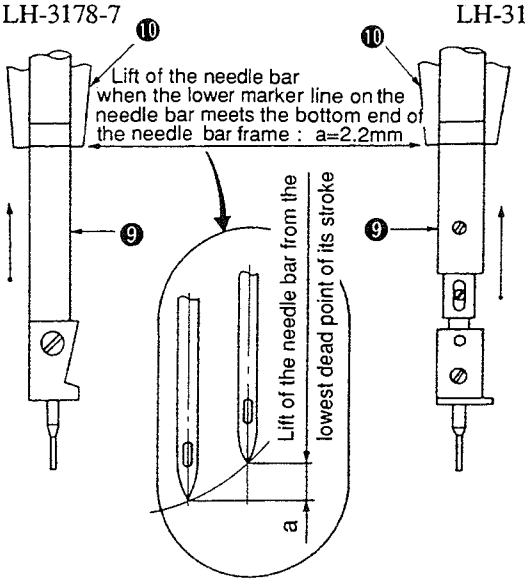


Fig. 21

2) Clearance between the needle and the blade point of the hook

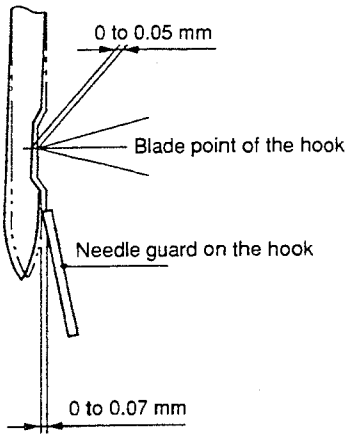
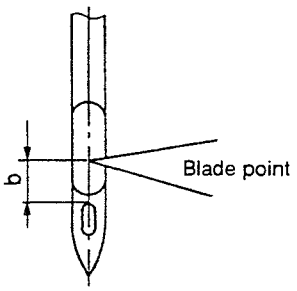


Fig. 22

Table 15

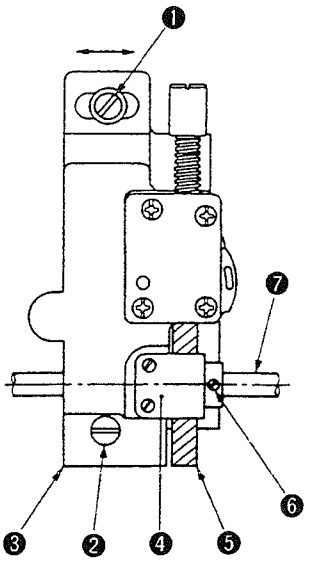
Type	a mm	b mm
S.G	2.2	1.2

3) Position of the needle and the blade point of the hook



Center of the needle aligns with the blade point of the hook.

Fig. 23



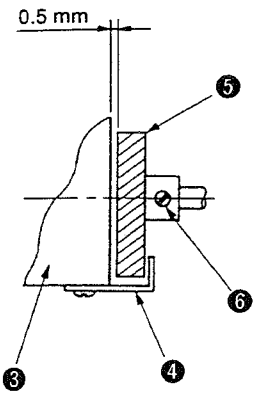
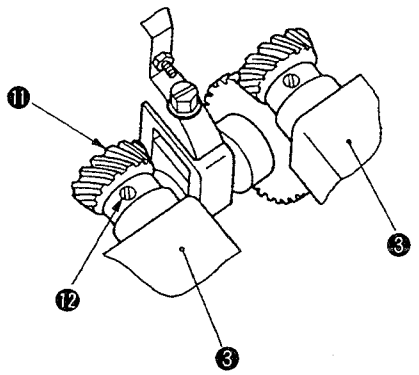


Fig. 24

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
o To adjust the clearance between the needle and the blade point of the hook and the needle gauge 1. For the sewing machine with a thread trimmer, loosen hinge screw ⑯ in the connecting link in Fig. 26 on page 18. 2. Loosen screws ❶ and ❷ in the hook driving shaft saddle (Fig. 24) and two screws ❻ in the hook driving screw gear. At this time, do not remove the screw No. 1 (retained in the flat section of hook driving shaft ❼). Loosen the screw to such an extent that the screw No. 1 does not come off the flat section of the hook driving shaft when turning hook driving shaft screw gear ❺ by hand. 3. Set the stitch dial to 3.5 on the scale. 4. Raise needle bar ❾ from the lowest dead point of its stroke by dimension a. At this time, align the lower marker line engaged on needle bar ❾ with the bottom end face of needle bar frame ⑩, and the lift of the needle bar will be 2.2 mm. 5. Move hook driving shaft saddle ❸ to the right or left to adjust so that the specified clearance is provided between the needle and the blade point of the hook and the needle guard provides the specified effective amount. Then, tighten screws ❶ and ❷ to secure hook driving shaft saddle ❸. 6. Adjust so that an approximately 0.5 mm clearance is provided between hook driving shaft screw gear ❺ and hook driving shaft saddle ❸. Then fix hook driving shaft screw gear ❺ by tighten screws ❻. 7. Attach connecting link (asm.) ❷ in position using hinge screw ⑯ as illustrated in Fig. 26 on page 18. o To change the position of the needle and the blade point of the hook 1. Loosen three screws ⑫ in hook driving shaft screw gear ⑪ in Fig. 25. 2. Align the blade point of the hook with the center of the needle, and tighten screws ⑫ .  Fig. 25 **(Caution) 1. Confirm that hook driving shaft screw gear ❺ does not come in contact with hook driving shaft saddle ❸ and hook driving shaft screw gear guide ❹.**	Stitch skipping or thread breakage will result.

4) **Position of the connecting link (asm.) and rocking arm plate**
LH-3178-7, LH-3188-7

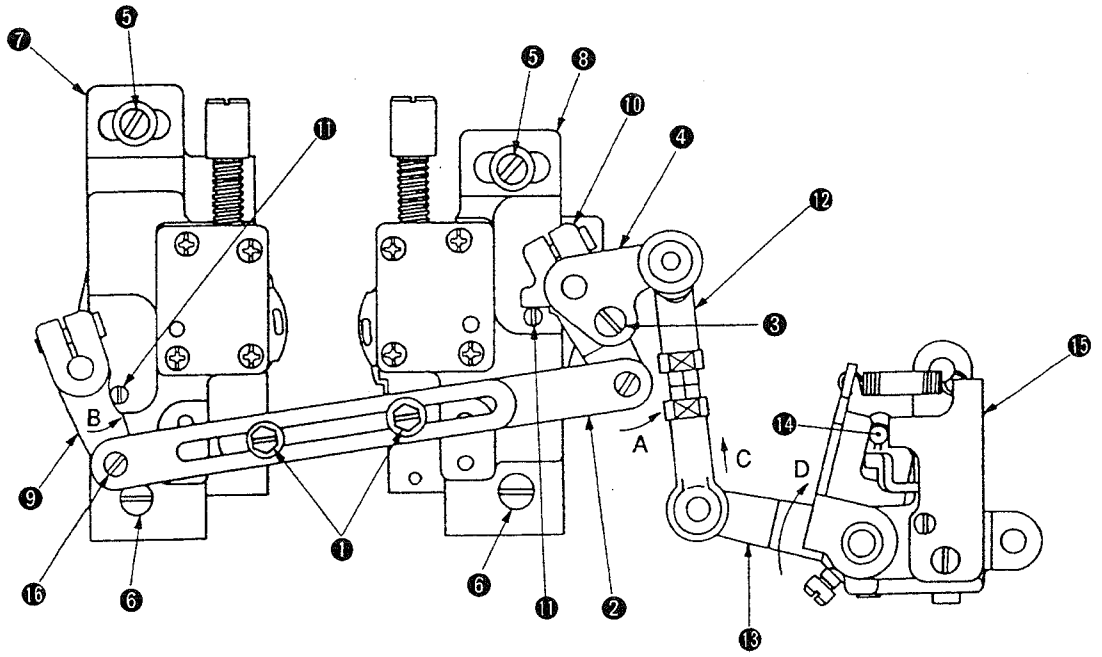


Fig. 26

Conditions
- o Rocking arms (left) and (right) should come in contact with the respective rocking arm stopper screws.
- o The cam roller shaft should come in contact with the follower stopper.

(3) Initial position of the bobbin case opening lever

Conditions
- o The bobbin case opening lever should be moved backward until it will go no further.
- o Press the bobbin case stopper against the throat plate ribs.

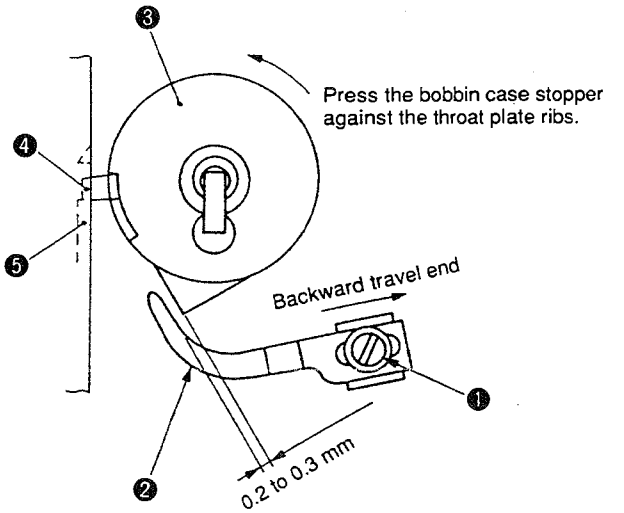


Fig. 27

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1. Loosen two screws ❶ in connecting link (asm.) ❷ and screw ❸ in rocking arm plate ❹ in prior to the adjustments 1), 2) and 3) of (2) on page 16. 2. After you have finished the adjustments 1), 2) and 3) of (2) on page 16, adjust the length of connecting link (asm.) ❷ so that rocking arm (left) ❾ and rocking arm (right) ❿ come in contact with stopper screw ⓫ in the rocking arm. Then tighten screws ❶. 3. To adjust rocking arm plate ❹, turn cam follower (asm.) ⓭ and joint rod ⓬ in direction C or D so that cam roller shaft ⓮ comes in contact with follower stopper plate ⓯. Then tighten screw ❸. **(Caution) 1. Do not leave screws ❶ , ❸ loosened. Doing so will cause the sewing machine lock at the time of thread trimming.**	If the connecting link (asm.) and the rocker arm are not properly positioned, thread trimming failure will result.
1. Turn the handwheel to move bobbin case opening lever ❷ backward until it will go further. 2. Turn bobbin case ❸ in the direction opposite to the direction of rotation of the hook until bobbin case stopper ❹ comes in contact with throat plate ribs ❺. 3. Loosen screw ❶ in the bobbin case opening lever and adjust so that a 0.2 to 0.3 mm clearance is provided between bobbin case ❸ and bobbin case opening lever ❷. Then tighten screw ❶.	If the clearance between the bobbin case and the bobbin case opening lever is larger than the specified value: o Towel-like stitches, loosened stitches or thread breakage will result. If the clearance is smaller than the specified value: o The bobbin case may break.

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

o A clearance of 0.8 to 1.0 mm should be provided between the top surface of the groove on stopper of the throat plate and the top surface of the stopper of the bobbin case.

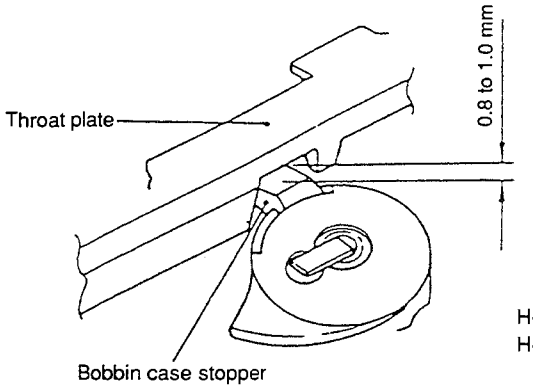


Fig. 28

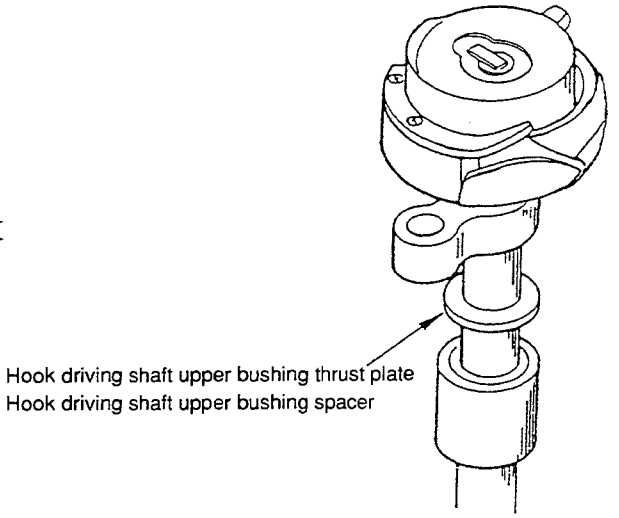


Fig. 29

Table 16

	Part No.	Name of part	Engraved mark	Thickness
Sewing machine with a thread trimmer	10109700	Hook driving shaft upper bushing thrust plate A	0	1
	10110906	Hook driving shaft upper bushing thrust plate C	1	1.1
	10111003	Hook driving shaft upper bushing thrust plate D	2	1.2
	10111102	Hook driving shaft upper bushing thrust plate E	3	1.3
	10111201	Hook driving shaft upper bushing thrust plate F	4	1.4
	10109809	Hook driving shaft upper bushing thrust plate B	5	1.5
	10112506	Hook driving shaft upper bushing thrust plate G	6	1.6
	10112605	Hook driving shaft upper bushing thrust plate H	7	1.7
	10112704	Hook driving shaft upper bushing thrust plate K	8	1.8
Sewing machine without a thread trimmer	10112506	Hook driving shaft upper bushing thrust plate G	6	1.6
	10112605	Hook driving shaft upper bushing thrust plate H	7	1.7
	10112704	Hook driving shaft upper bushing thrust plate K	8	1.8
	22614002	Hook driving shaft upper bushing spacer A	A	1.9
	22614101	Hook driving shaft upper bushing spacer B	B	2.0
	22614200	Hook driving shaft upper bushing spacer C	C	2.1
	22614309	Hook driving shaft upper bushing spacer D	D	2.2
	22614408	Hook driving shaft upper bushing spacer E	E	2.3
	22614507	Hook driving shaft upper bushing spacer F	F	2.4

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Remove the throat plate, bobbin case opening lever, feed dog and needle. 2. Loosen three screws which are used to secure the hook driving shaft screw gear. 3. For the sewing machine equipped with a thread trimmer, also remove the moving knife and counter knife. 4. Draw out the hook. 5. Replace the thrust plate and spacer of the hook driving shaft upper bushing with appropriate ones. * Thrust plates and spacers of the hook driving shaft upper bushing are prepared respectively for the sewing machine with/without a thread trimmer.	If the clearance provided between the throat plate and the bobbin case stopper is larger than the specified value: o The bobbin case may come off the throat plate. If the clearance provided between the throat plate and the bobbin case stopper is smaller than the specified value: o Isolated idling loops will result. o Moving knife will come in contact with the hook at the time of thread trimming.

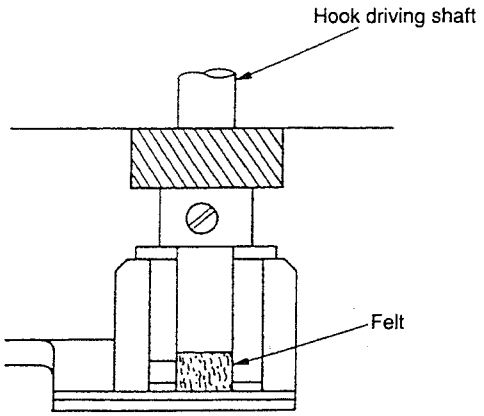


Fig. 30

(Caution) 1. A lubricating felt is placed on the bottom of the hook driving shaft of this sewing machine. So, do not tighten the screw with the hook raised.
Doing so will cause an axial play, resulting in thread trimming failure, stitching troubles or breakage of the hook point.

(5) Feed timing

Condition

o The marker dot engraved on the hook driving shaft should be aligned with the marker dot engraved on the feed rock cam.

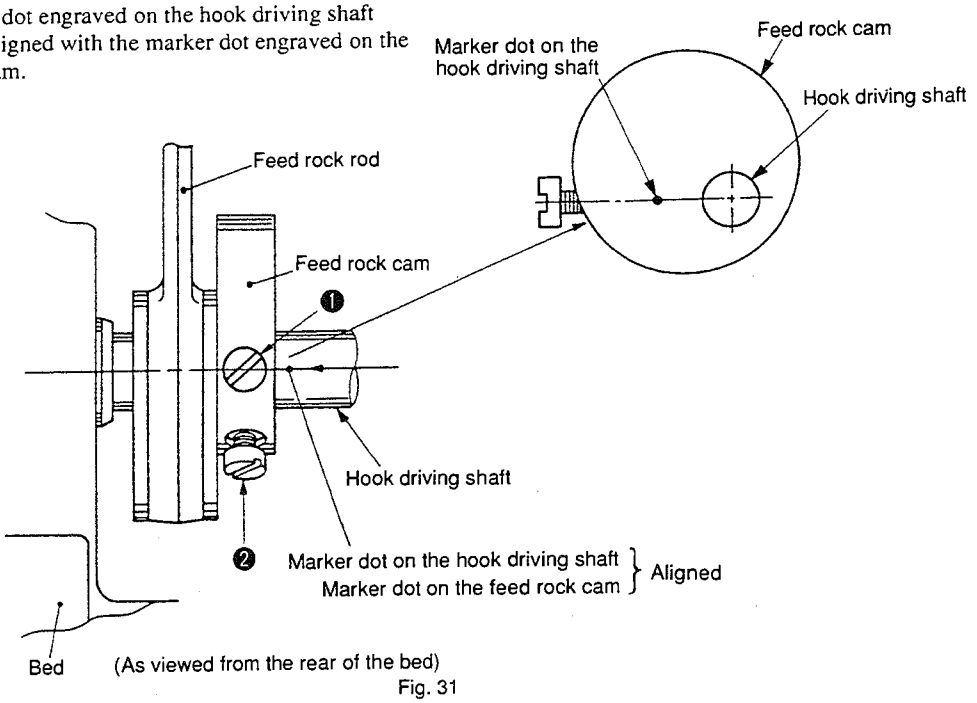


Fig. 31

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

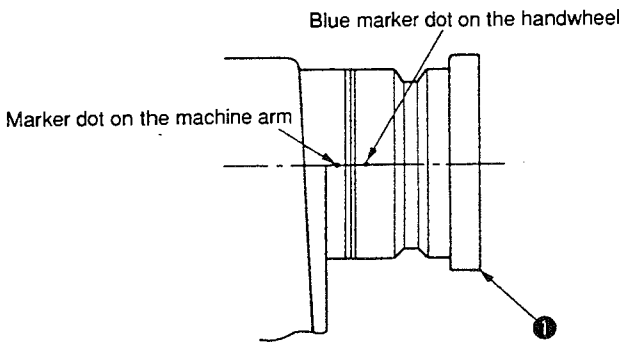


Fig. 33

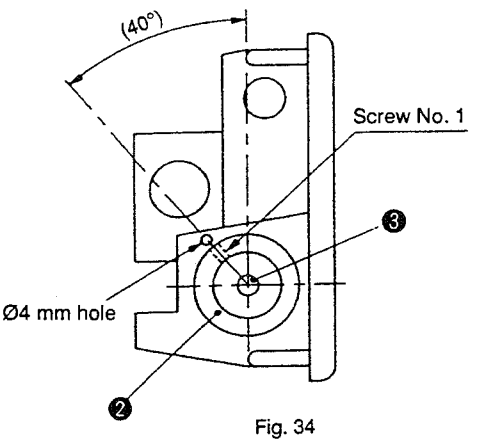
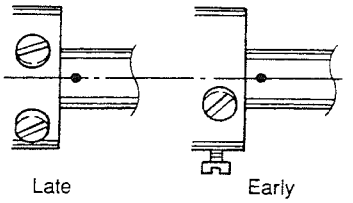


Fig. 34

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Loosen screws ❶ and ❷ in the feed rock cam. 2. Align the marker dot engraved on the feed rock cam with the marker dot engraved on the hook driving shaft. **(Caution) The adjustment result of the feed timing will be affected by the position from which you observe the marker dots. So, be sure to adjust the feed timing while observing the marker dots from the correct position.** **If the feed rock cam shifts in the axial direction while adjusting the feed timing, an extra load will be applied to the cam. So, be careful.**	 Fig. 32 o If the feed timing is changed, the needle entry in the slot in the feed dog will also change. In this case, properly adjust the needle entry with respect to the feed dog.
1. Remove the timing belt from lower sprocket ❷ of the hook driving shaft. 2. Turn handwheel ❶ until the blue marker dot engraved on the handwheel is aligned with the marker dot engraved on the machine arm. 3. Turn hook driving shaft ❸ until the screw No. 1 is aligned with the Ø4 mm hole in the bed. 4. Put the timing belt on lower sprocket ❷ while securely keeping the main shaft and hook driving shaft held in the correct position. **(Caution) Confirm that the screw No. 1, that is aligned with the Ø4 mm hole in the bed, rests on the flat section of the hook driving shaft.**	If the relation between the main shaft and the hook driving shaft is not correct: o Thread trimming timing, needle entry in the feed dog slot and feed timing will change, causing the sewing machine to be locked. So, carefully adjust the relation between the aforementioned shafts.

(7) Lubrication

1) Amount of oil in the face plate

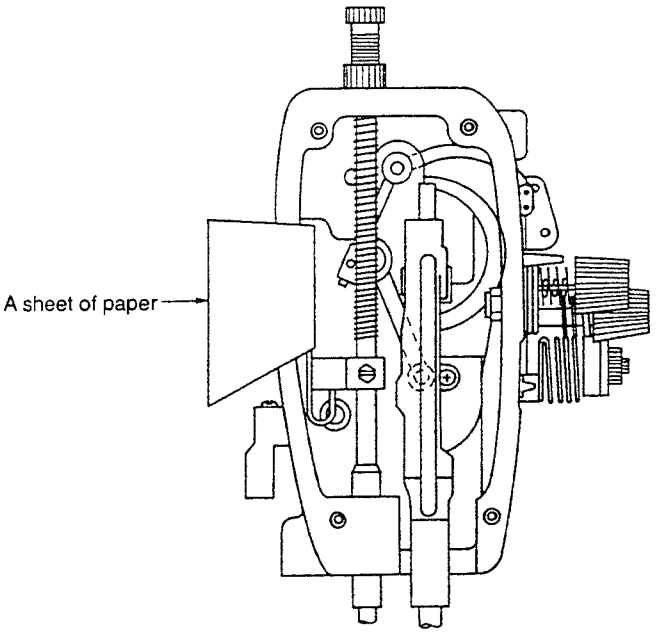


Fig. 36

Adequate amount of oil

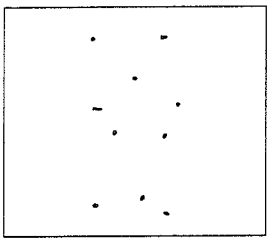


Fig. 35

Conditions

o Oil splashes are made on a sheet of paper while making the sewing machine run for one minute after having made it run idle for one minute.

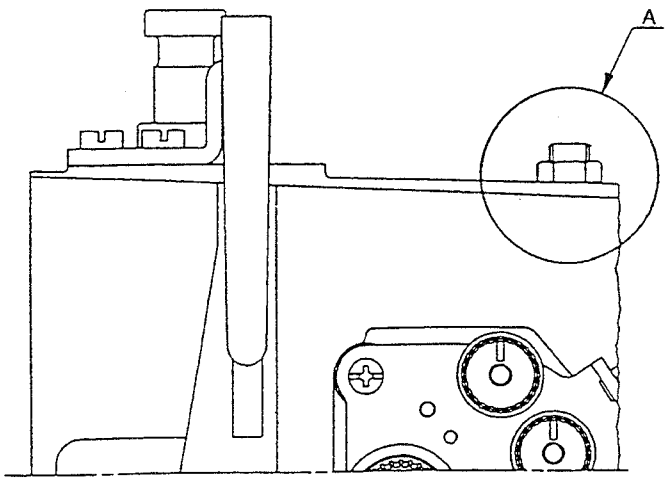
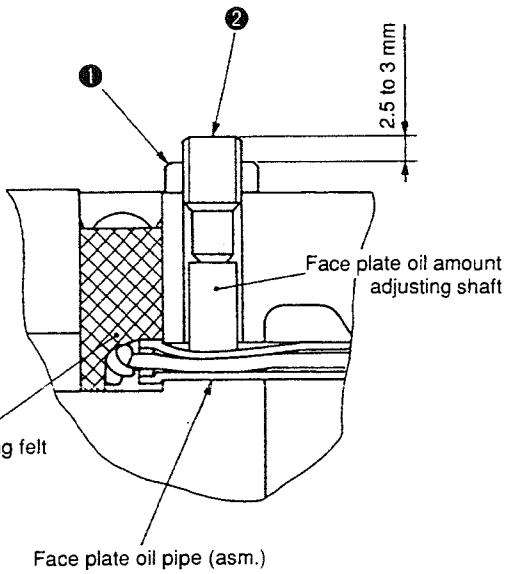


Fig. 37

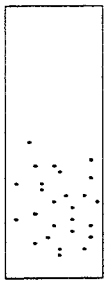
Detailed figure of portion A

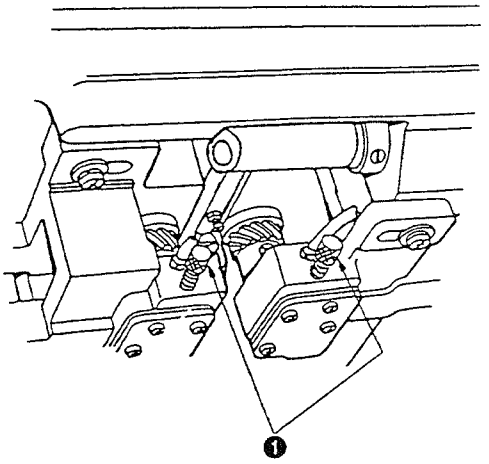


HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Loosen locknut ❶ of the face plate oil amount adjusting screw. 2. Move face plate oil amount adjusting screw ❷ up or down. Tightening the screw will decrease the amount of oil in the face plate. Loosening the screw will increase it. 3. After the amount of oil is properly adjusted, tighten locknut ❶. **(Caution) 1. Adjust the height of face plate oil amount adjusting screw ❷ within the range of 2.5 to 3 mm taking the height of the top face of locknut ❶ for reference. Then, fix the screw.** **2. Do not leave locknut ❶ in the loosened state.**	o If the amount of oil is insufficient, the needle bar crank or the needle bar crank rod will be seized. o If the amount of oil is excessive, oil leakage will result.

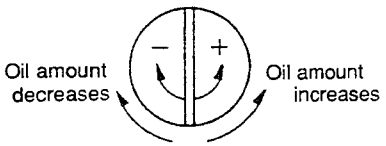
2) Amount of oil in the hook

Adequate amount of oil





❶ Oil amount adjusting screw



Conditions

o Oil splashes are made on a sheet of paper while making the sewing machine run for five seconds after having made it run idle for two minutes.

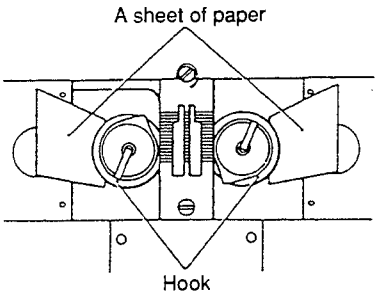


Fig. 38

(8) Stitch length in the normal feed stitching and reverse feed stitching

Conditions

o When the stitch dial is set at "3," the difference in the stitch length between the normal feed stitching and reverse feed stitching should be 0.2 mm or less.

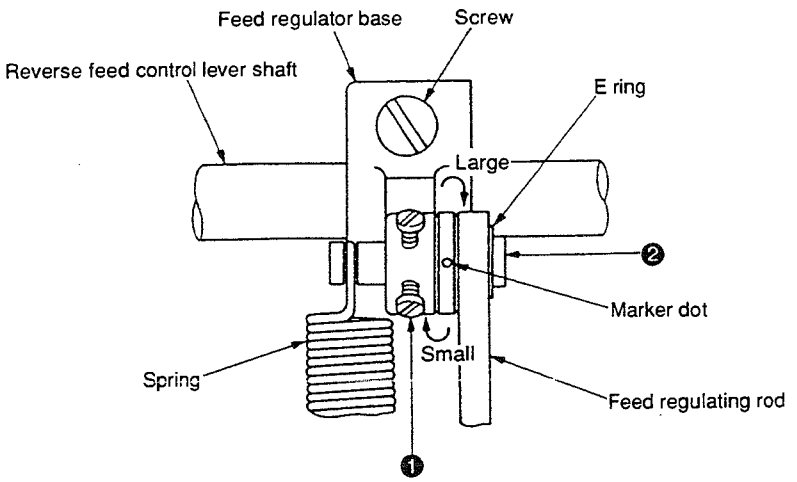
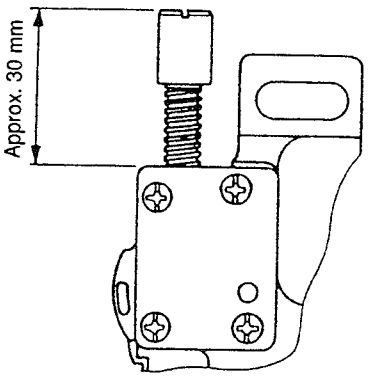


Fig. 40

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Adjust the amount of oil in the hook using oil amount adjusting screw ❶ mounted on the hook driving shaft saddle. Tightening the screw will decrease the amount of oil in the hook. Loosening the screw will increase it. **(Caution) Adjust the position of the oil amount adjusting screw referring to Fig. 39.**  Fig. 39	o If the amount of oil in the hook is insufficient, poorly-tensed seam will result. Furthermore, the hook will become hot causing seizure. o If the amount of oil in the hook is excessive, the thread will be stained with oil. The material will also be stained with oil.
1. Set the stitch dial at "3." 2. Loosen two screws ❶ in the feed regulator base. 3. Move feed regulator base pin ❷ in the direction of the arrow to adjust so that a difference in stitch length between the normal feed stitching and the reverse feed stitching to 0.2 mm or less.	o The stitch length for the reverse feed stitching will be different from that for the normal feed stitching.

(9) Synchronizer

1) Installing the synchronizer

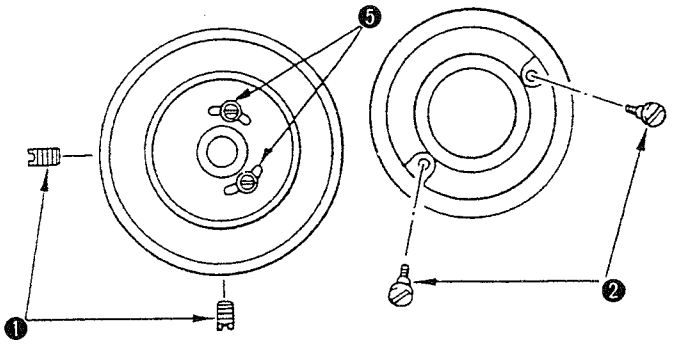


Fig. 41

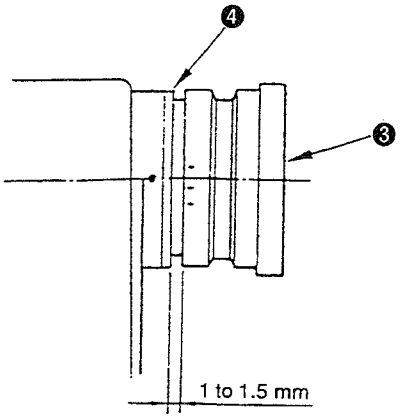


Fig. 42

Fig. 43

2) Needle-up stop position of the sewing machine

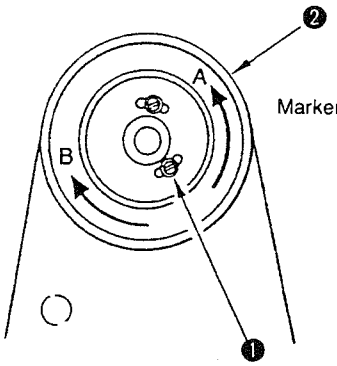


Fig. 44

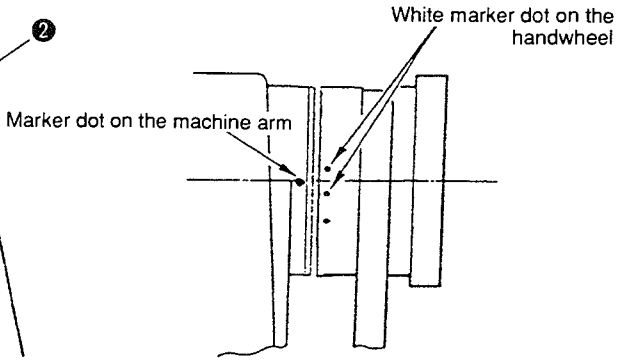


Fig. 45

3) Needle-down stop position of the sewing machine

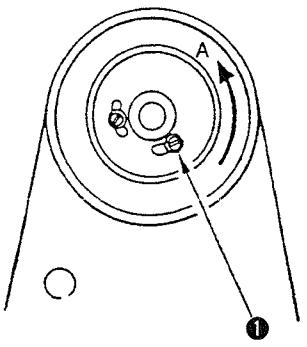
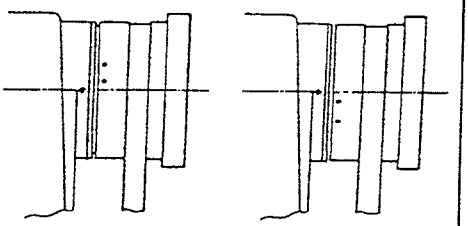


Fig. 47

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
How to replace the synchronizer 1. Remove the bolt cover. Loosen screws ❶ in the handwheel and remove handwheel❸. 2. Remove the screw in the cable metal fittings and remove two screws ❷ in stator of the generator. Then, remove stator ❹. 3. Fix a new stator using screws ❷. 4. Place the cable in the cable metal fittings and tighten the screw. 5. Assemble the handwheel ❸, making sure that the screw No. 1 comes in contact with the flat section of the main shaft. Also adjust the lateral position of the handwheel so that a 1 to 1.5 mm clearance is obtained between stator ❹ and handwheel ❸. 6. Route the cable properly and put the V belt on the handwheel. 7. Install the belt cover. 8. Adjust the needle-up stop position of the sewing machine using screw ❺ in the magnet mounting base of the handwheel.	o The stator is made of plastic. So, tighten the screw with an approximately 15 kg.cm torque. o Confirm that the handwheel does not interfere with the stator. o Confirm that the V belt does not come in contact with the cable. o Attach the belt cover to the sewing machine. Making the sewing machine run at low speed, check that there is not any rubbing noise.
The standard needle-up stop position of the sewing machine is obtained when the marker dot engraved on the machine arm rests in between the two white marker dots engraved on handwheel ❷ when the needles stop in the highest position after thread trimming. (How to adjust) Stop the needles. Loosen screw ❶ and adjust the needle-up stop position of the sewing machine within the range of the slot. o To advance the needle-up stop timing of the sewing machine → Move the screw in direction A. o To retard the needle-up stop timing of the sewing machine → Move the screw in direction B. **(Caution) 1. Do not run the sewing machine with screw ❶ loosened, while and after making the adjustment. Only loosen screw ❶ and never remove it.**	 Early Late Fig. 46 o If the needle-up stop position of the sewing machine is not properly adjusted, thread trimming failure will result. The cam roller will not come off the thread trimming cam at the time of thread trimming, but will come off from the cam at the start of next sewing with a noise.
(How to adjust) Loosen screw ❶, and move the screw in direction A until it will go no further. Then, tighten screw ❶. **(Caution) 1. Do not run the sewing machine with screw ❶ loosened, while and after making the adjustment. Only loosen screw ❶ and never remove it.**	The timing to detect the needle-down stop position of the sewing machine should be advanced the most. If the timing is retarded, troubles will result such that the thread trimmer fails to cut the thread, reverse-feed stitches may not to be sewn accurately on the normal-feed stitches at the time of automatic reverse stitching or the needle thread will be insufficiently tensed at the corner of a material at the time of sewing the corner.

(10) Initial position of the conversion lever

LH-3188, LH-3188-7

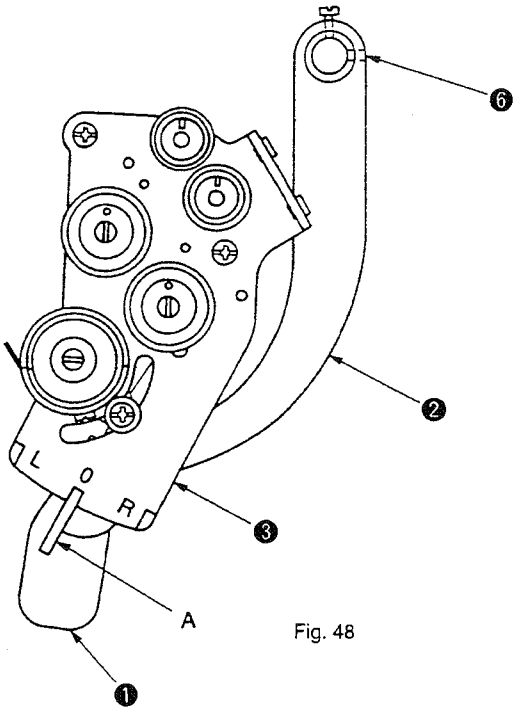


Fig. 48

Conditions

o Section A of the conversion lever is set at the "0" position of the thread tension plate, the leftmost end face of the needle bar frame is almost aligned with the standard line of the slider.

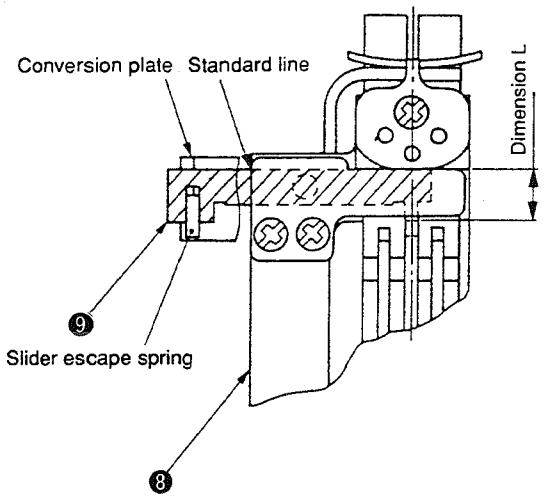


Fig. 49

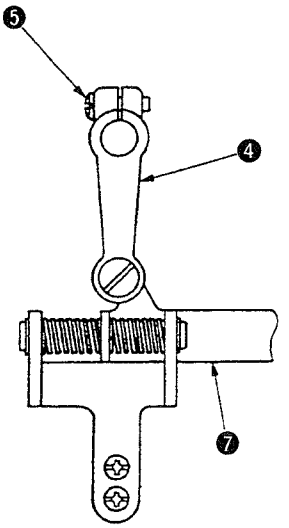


Fig. 50

Table 17

Part No.	Part name	Engraved mark	Dimension L
22681902	Slider A	A	11.0
22682009	Slider B	B	11.1
22682108	Slider C	C	11.2
22682207	Slider D	D	11.3
22682306	Slider E	E	11.4

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Turn the handwheel to bring the needle bar to the lowest dead point. 2. Press conversion fixing lever ❶ to release conversion lever ❷. 3. At this time, confirm that section A of conversion lever ❷ is aligned with the "0" position of thread tension plate ❸. 4. If they are not aligned with each other, loosen conversion shaft clamping screw ❺ as illustrated in Fig. 50, and align section A of conversion lever ❷ with the "0" position of thread tension plate ❸. Then, firmly tighten conversion arm clamping screw ❺. **(Caution) 1. Do not loosen two screws ❻ in the conversion lever.** **2. When tightening conversion arm clamping screw ❺, using conversion lever ❷ and conversion arm ❹.** **If there is a play at the clamping screw, conversion lever ❷ will be pushed against conversion plate ❼. In this case, the function to stop either needle bar separately will not work normally, the separately-stopped needle will not be released from the stop state or needle bar breakage will occur.**	If the initial position of the conversion lever is not correct, the function to separately drive the needle bars will not work properly.

6. STANDARD ADJUSTMENT OF THE ATTACHMENTS

STANDARD ADJUSTMENT

(1) Thread trimmer

1) Vertical position of the moving knife

Conditions

o The moving knife should come in contact with the moving knife rest and should not be pushed against the moving knife rest when the knife oscillates.

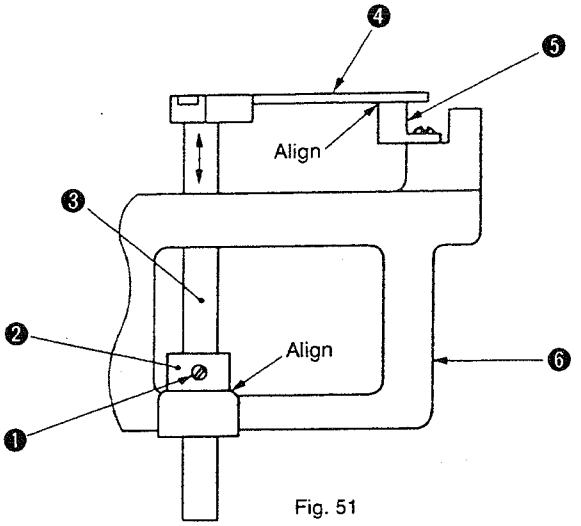


Fig. 51

2) Initial position of the counter knife G and thread presser G

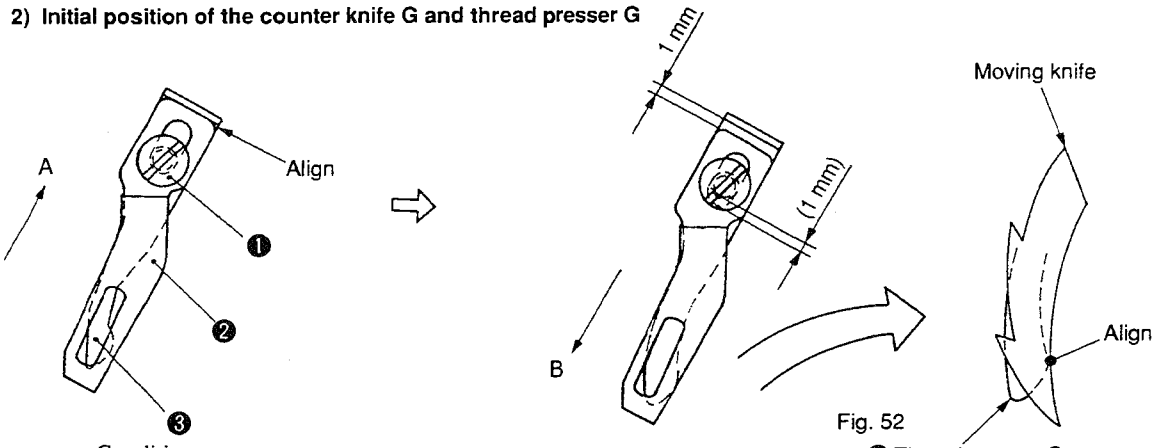


Fig. 52

❸ Thread presser G

Conditions

o Only loosen the screw in the counter knife G and never remove it.

3) Clamp pressure

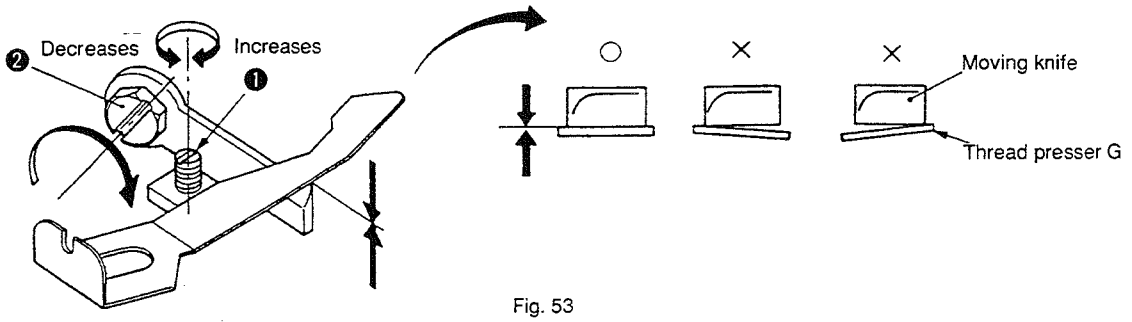
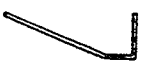


Fig. 53

If the moving knife comes in single-sided contact with the thread presser G, the thread will come off the needle thread clamp.
The figure shown above illustrates the state of contact between the underside of moving knife and the thread pressure G.

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Remove the counter knife G, thread presser G and rocker arms (left and right) from hook driving shaft saddle ❻. 2. Loosen two screws ❶ in moving knife shaft thrust collar. 3. Move moving knife shaft joint ❸ up or down to adjust the height of thrust collar ❷ so that moving knife ❹ comes in contact with moving knife rest ❺ and moving knife ❹ is not pushed against moving knife rest ❺ when rocker moving knife ❹. After the adjustment, fix thrust collar ❷.	o The thread trimmer will fail to cut the thread sharp. o Bobbin thread clamp failure will result. o An extra load will be applied to the sewing machine at the time of thread trimming, causing the sewing machine to be locked.
1. Loosen screw ❶ in the counter knife G. Do not remove the screw from the knife. 2. Align the rear end of counter knife G ❷ with section L of thread presser G ❸. Then, simultaneously move the counter knife G and thread presser G back in direction A until they will go no further. 3. Keeping thread presser G ❸ held in the backward travel end, move counter knife G ❷ forward in direction B by 1 mm. 4. Tighten screw ❶ in the counter knife G. **(Caution) 1. Be sure to correctly adjust the initial position of the counter knife G and thread presser G. The initial position of the moving knife is determined by the position of the counter knife G.** **2. Align the protruding portion of thread presser G ❸ with the inside end of the moving knife.**	o If the initial position of the thread presser G is not properly adjusted, a bobbin thread clamp failure will result. o If the initial position of the counter knife G is not properly adjusted, a thread trimming failure will result. o If the needle thread cannot be cut when using a tetron thick thread, move the initial position of the moving knife 1 mm forward. (Counter knife G and thread presser G are also moved 1 mm forward.) Furthermore, increase not only the thread take-up spring pressure but also the stroke of the thread take-up lever.
1. The underside of the moving knife comes in contact with the thread presser G when the thread presser G, moving knife and counter knife G are installed on the sewing machine. 2. In the aforementioned state, make the thread presser G adjusting metal fitting with the thread presser G. Loosen screw ❷, and perform the adjustment by turning screw ❶. After the adjustment, tighten screw ❷. If the thread is not properly clamped by the thread presser G even when the aforementioned two adjustment steps have been properly performed: * Loosen screw ❷, and turn screw ❶ in the direction of the arrow to adjust the clamping pressure of the thread presser. After the adjustment, tighten screw ❷. For reference of the adequate pressure of the thread presser, tighten screw ❶ by 120° to 180° from the position at which the thread presser G adjusting metal fitting comes in contact with the thread presser G .	If the pressure of the thread presser is insufficient: o Stitch skipping will occur when changing the thread from a thick one to a thin one. If the presser of the thread presser is excessive: o Several stitches will skip at the start of sewing. If the shape of the thread presser G is defective: As viewed from this side →   Bobbin thread clamp failure will be caused.  Needle thread clamp failure will occur.  Normal When performing sewing using a thin thread with a lower bobbin thread tension, use the thread presser for the small-capacity hook.

4) **Initial position of the moving knife**

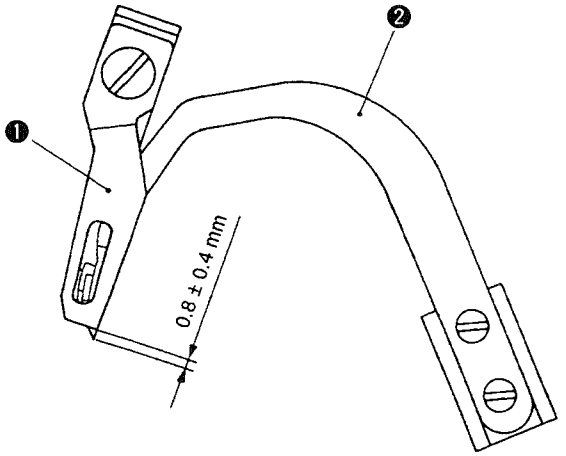


Fig. 54

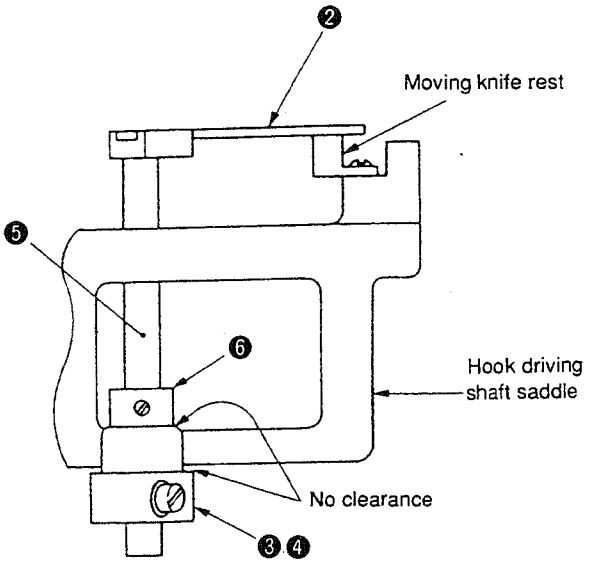


Fig. 55

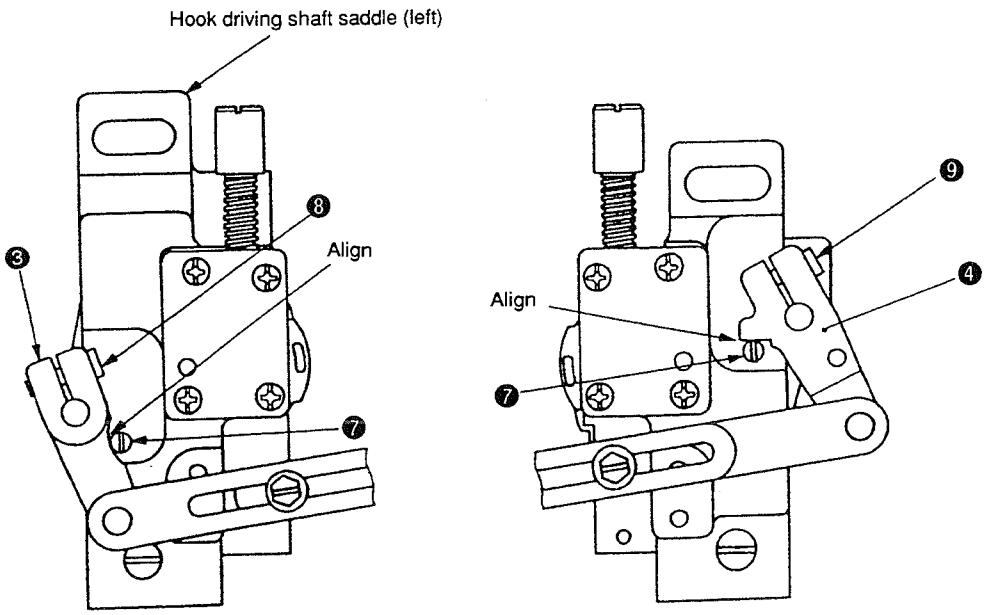
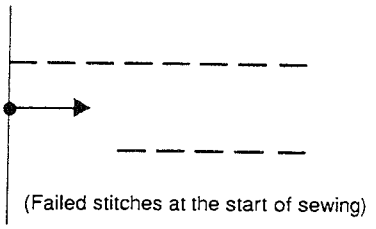


Fig. 56

Conditions

- Top end of the counter knife G should be spaced 0.8 ± 0.4 mm away from the top end of the moving knife.
- Rocker arms (left and right) should be aligned with the stopper screw.
- No clearance should be provided between the rocker arms (left and right) and the hook driving shaft saddle and between the moving knife shaft thrust collar and the saddle.

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Turn moving knife ❷ to adjust so that the top end of counter knife G ❶ is spaced 0.8 ± 0.4 mm from the top end of moving knife ❷. 2. Fit rocker arm (left) ❸ and rocker arm (right) ❹ into moving knife shaft joint ❺ and make them come in contact with respective stopper screws ❼. 3. Adjust the thrust section using thrust collar ❻, rocker arm (left) ❸ and rocker arm (right) ❹. Then tighten screws ❽ and ❾. **(Caution) 1. Confirm that the top end of counter knife G ❶ is 0.8 ± 0.4 mm away from the top end of moving knife ❷ when rocker arm (left) ❸ and rocker arm (right) ❹ are pressed against respective stopper screws ❼.**	If the distance between the top end of the moving knife and that of the counter knife G is larger than the specified value: o Thread trimming failure will result. o Bobbin thread clamp failure will occur. If the distance between the top end of the moving knife and that of the counter knife G is smaller than the specified value: o Bobbin thread clamp failure will occur. o The bobbin thread and needle thread will fail to interlace with each other at the start of sewing.  (Failed stitches at the start of sewing) Fig. 57 * If a bobbin thread clamp failure occurs after replacing the feed dog, particularly when the feed dog with a round needle hole is replaced by one with a slot, lower the moving knife (i.e., decrease the distance (0.8 ± 0.4 mm) from the moving knife to the counter knife G).

5) Position of the thread trimming cam and the thread trimming timing

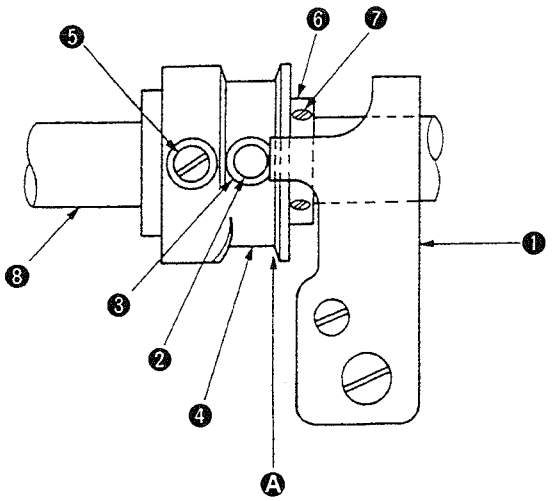


Fig. 58

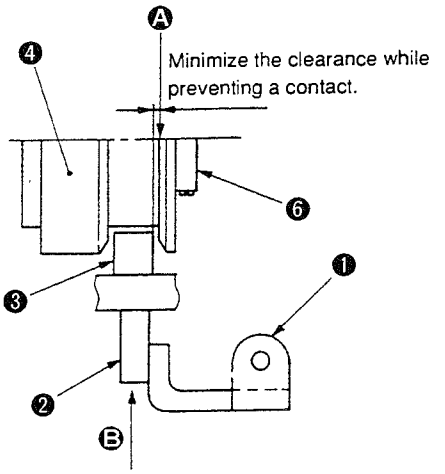


Fig. 59

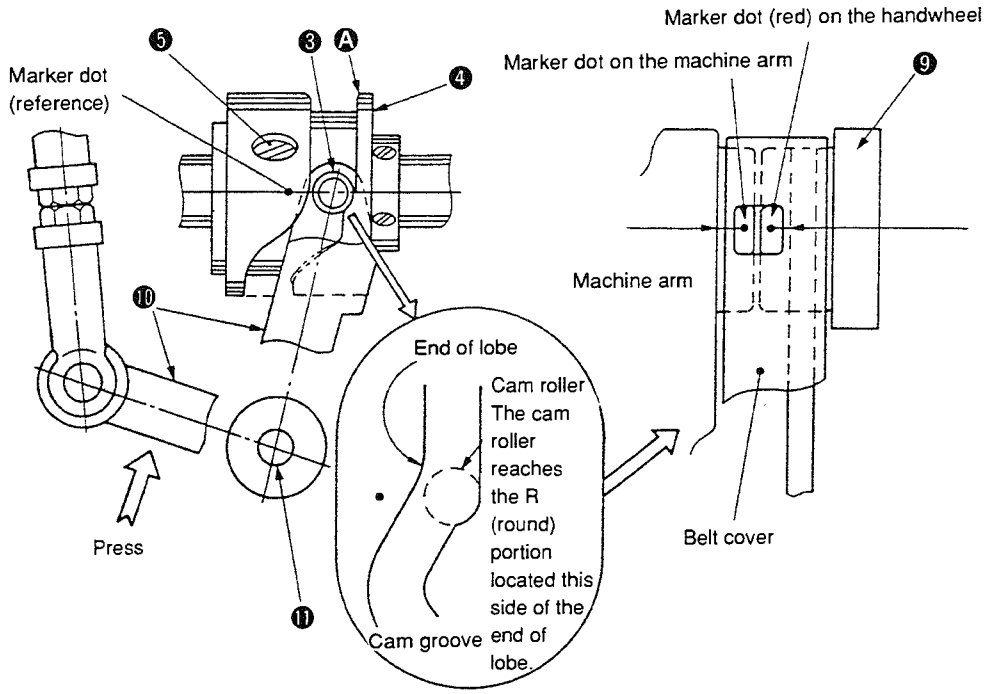


Fig. 60

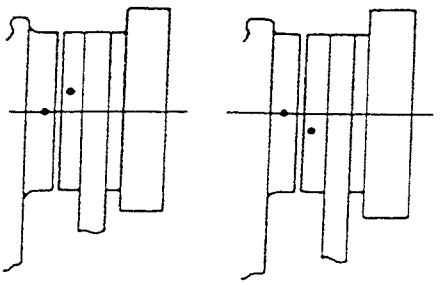
HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT

1. Move thread trimming cam ❹ in the lateral direction in terms of hook driving shaft ❽ to minimize the clearance provided between cam roller ❸ and plane Ⓐ of thread trimming cam ❹ as long as they are not pushed against each other when cam roller shaft ❷ comes in contact with follower stopper plate ❶. Then, temporarily tighten screw ❺ in the thread trimming cam.
2. Pressing hook driving shaft thrust collar ❻ against the rightmost end face of thread trimming cam ❹, securely tighten two screws ❼.
3. Loosen screws ❺.
4. Turn handwheel ❾ until the marker dot engraved on the machine arm is aligned with red marker dot engraved on the handwheel.
5. Fit cam roller ❸ of cam follower (asm.) ❿ in the groove on thread trimming cam ❹. (Press cam follower (asm.) ❿ in the axial direction of cam follower shaft ⓫.)
6. Tighten two screws ❺ to fix thread trimming cam ❹ when cam roller ❸ is aligned with R (round) portion located this side of the end of lobe of thread trimming cam ❹ and also comes in contact with plane Ⓐ of the cam groove on thread trimming cam ❹.

(Caution)

o Checking the thread trimming timing

1. **Pressing cam follower (asm.) ❿ in direction Ⓑ, gradually turn handwheel ❾ in the reverse direction (away from the operator).**
2. **Handwheel ❾ will be hitched when cam roller ❸ of cam follower (asm.) ❿ reaches the R (round) portion of the cam groove on thread trimming cam ❹. Now, confirm that the red marker dot engraved on the handwheel is aligned with the marker dot engraved on the machine arm.**



Thread trimming timing is excessively advanced.

Thread trimming timing is excessively retarded.

Fig. 61

If the thread trimming timing is excessively advanced:

- o Needle thread will come of the needle eyelet.
- o Thread trimmer will fail to operate normally, which will result in thread trimming failure.
- o Needle thread clamp failure will occur at the time of thread trimming.

If the thread trimming timing is excessively retarded:

- o The needle will interfere with the wiper.
- o Thread trimming failure will occur.

6) Position of the thread trimming magnet

Conditions

o When the thread trimming solenoid is in the OFF state, a clearance of 0.8 to 1.2 mm should be provided between the leftmost end face of the thread trimming cam and the end face of the presser plate driving screw.

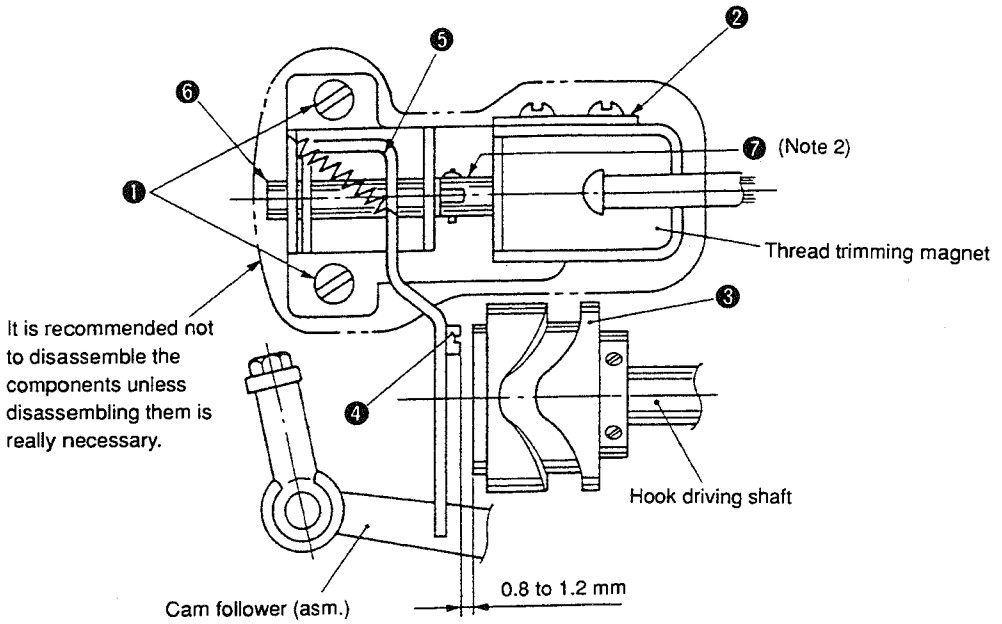


Fig. 62

7) Rising amount of the tension disk when releasing the thread tension

Conditions

o A clearance of 1 mm should be provided between the tension disks when the thread tension release arm is locked by the thread tension release plate after the arm has rocked the most.

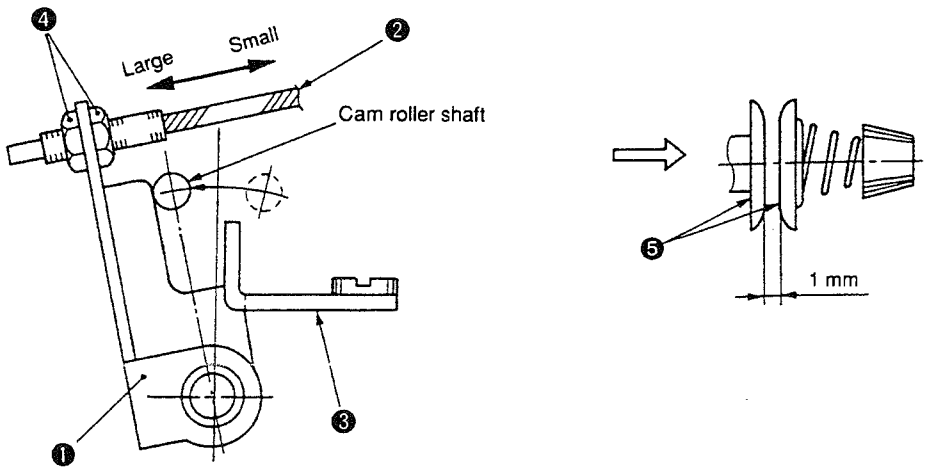
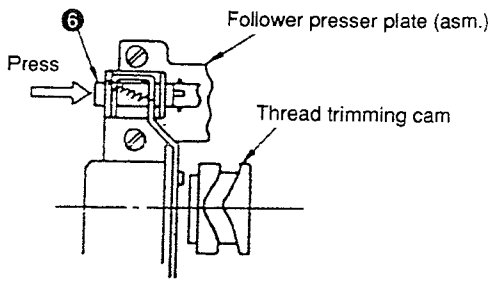


Fig. 63

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Loosen two screws ❶ in follower presser plate (asm.)❷. 2. Move follower presser plate (asm.) ❷ to adjust so that a 0.8 to 1.2 mm clearance is provided between the leftmost end face of thread trimming cam ❸ and presser driving screw ❹. Then tighten screws ❶. **(Caution) 1. Determine the position of follower presser plate (asm.) ❷ so that follower presser plate ❺ is in parallel to the leftmost end face of thread trimming cam ❸.** **2. When replacing a component contained in follower presser plate (asm.)❷, attach a new part in position while preventing the part from being pressed against the related components by moving the plunger of the presser plate shaft and plunger in the axial direction at any desired position (in terms of 360°).**	If the clearance between the thread trimming cam and the presser plate driving screw is too large: o Thread trimming failure will be caused. If the clearance between the thread trimming cam and the presser plate driving screw is too small: o Thread trimmer will actuate repeatedly, causing the thread trimmer to break.
1. Pressing presser plat shaft ❻ in the direction of the arrow as shown in Fig. 64, turn the handwheel in the normal direction of rotation to make the thread trimmer actuate. 2. When thread tension release arm ❶ rocks and thread tension release wire ❷ is drawn the most, thread tension release plate ❸ and thread tension release arm ❶ will be locked. 3. Loosen nut ❹ and adjust thread tension release wire ❷ so that a clearance of 1 mm is provided between the tension disks. After the adjustment, tighten nut ❹.  Fig. 64	If the clearance provided between the tension disks is too large: o Related components will break. If the clearance provided between the tension disks is too small: o The remaining length of the needle thread will be decreased. o The needle thread will slip off the needle eyelet.

8) Position of the follower guide

Conditions

o When the cam roller shaft comes in contact with the follower stopper plate (Figs. 58 and 59 on page 36), a clearance of 0.2 to 0.3 mm should be provided between the follower guide plate and the cam follower (asm.).

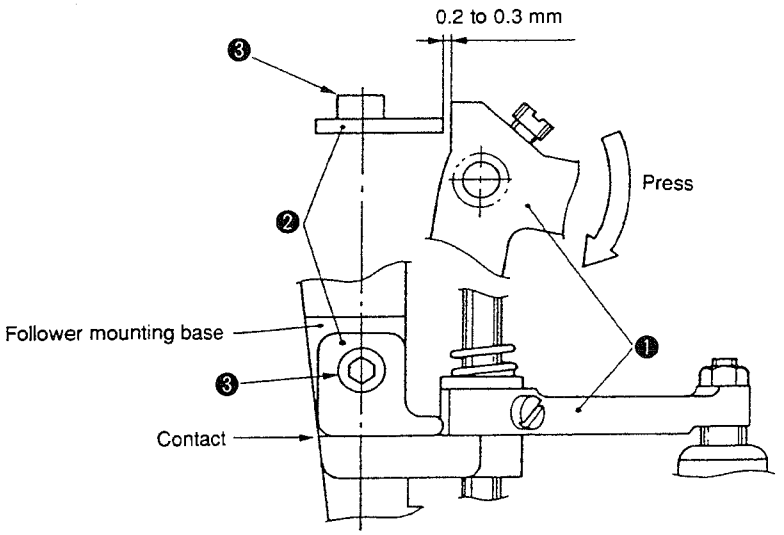


Fig. 65

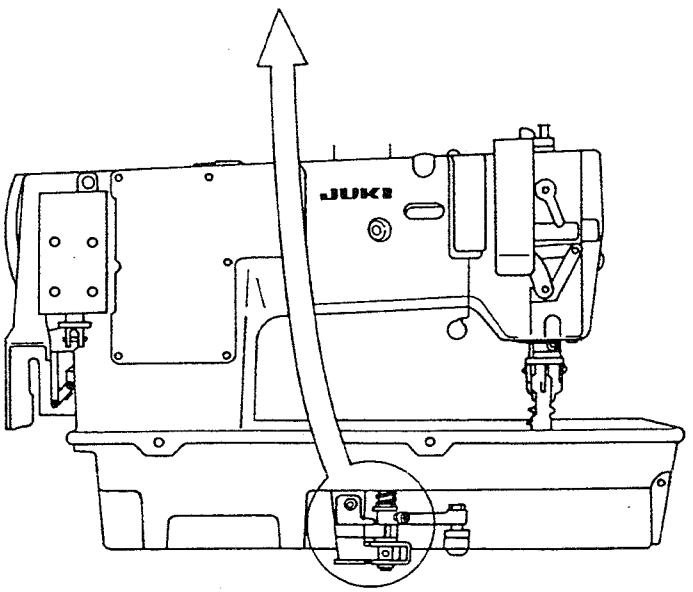


Fig. 66

HOW TO ADJUSTMENT	RESULTS OF IMPROPER ADJUSTMENT
1. Move follower guide plate ❷ to adjust so that a 0.2 to 0.3 mm clearance is obtained between follower guide plate ❷ and cam follower (asm.) ❶ when the cam roller shaft comes in contact with the follower stopper plate (Figs. 58 and 59 on page 36). Then, fix the follower guide plate by tightening screw ❸. **(Caution) 1. Confirm, by pressing cam follower (asm.) ❶ in the direction of the arrow, that the cam roller shaft comes in contact with the follower stopper plate.**	If the clearance provided between the follower guide plate and the cam follower (asm.) is larger than the specified value: o A play at the moving knife in the rocker direction will be larger. If the clearance provided between the follower guide plate and the cam follower (asm.) is smaller than the specified value: o The follower will fail to come off the thread trimming cam causing the thread trimmer to actuate at the start of sewing. In this case, the related components will break or the sewing machine will be locked.

9) **Installing the joint rod (asm.)**

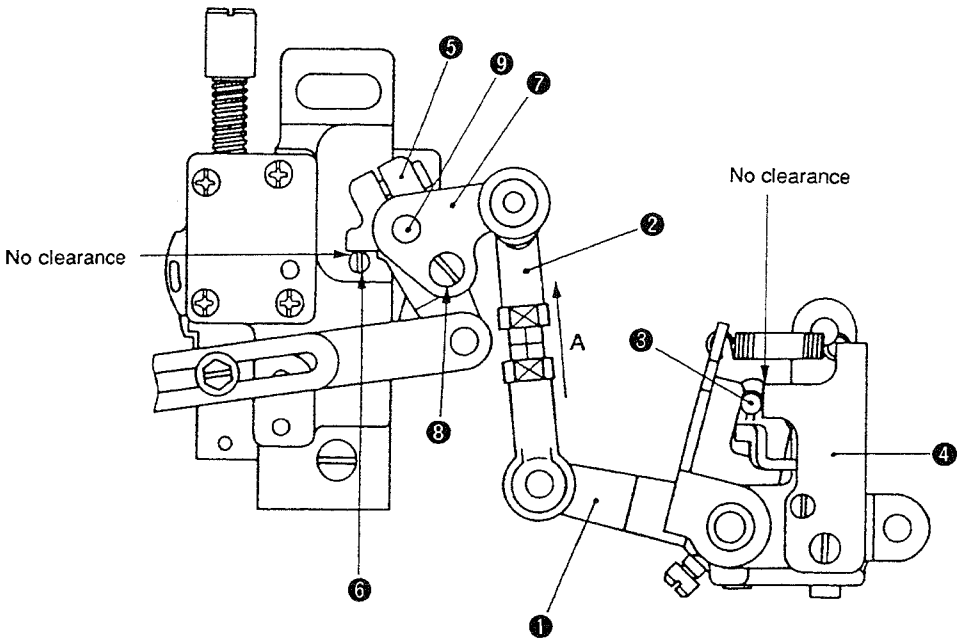


Fig. 67

Conditions

o The rocker arm (right) should come in contact with the rocker arm stopper screw. In addition, the cam roller shaft should come in contact with the follower stopper plate.

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1. Connect joint rod (asm.) ❷ to cam follower (asm.) ❶ and fix it there. 2. When cam roller shaft ❸ comes in contact with follower stopper plate ❹ and rocker arm (right) ❺ comes in contact with rocker arm stopper screw ❻ , fit rocker arm plate ❼ over moving knife shaft ❾ . Then fix the rocker arm plate on rocker arm (right) ❺ using screw ❽ . **(Caution) 1. When fixing the rocker arm plate on the rocker arm (right), be sure to fix it while lifting the joint rod (asm.) in the direction of arrow A .**	If there is a clearance between the follower stopper plate and the cam roller shaft or between the rocker arm stopper screw and the rocker arm (right), the initial position of the moving knife will be improper. In this case, following trouble will be caused. o Bobbin thread clamp failure will occur. o Thread trimming failure will occur. o The sewing machine will be locked.

(2) Wiper components

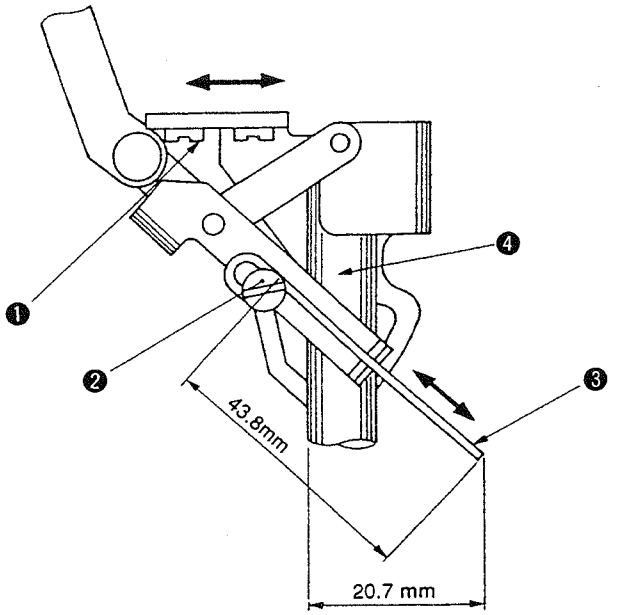


Fig. 68

(3) Position of the reverse stitching magnet

Conditions
- o Stitch length (feed amount): Maximum
- o When the reverse feed lever is pressed until it will go no further, a clearance of 0.5 to 1 mm should be provided between the reverse feed magnet and the plunger rubber.

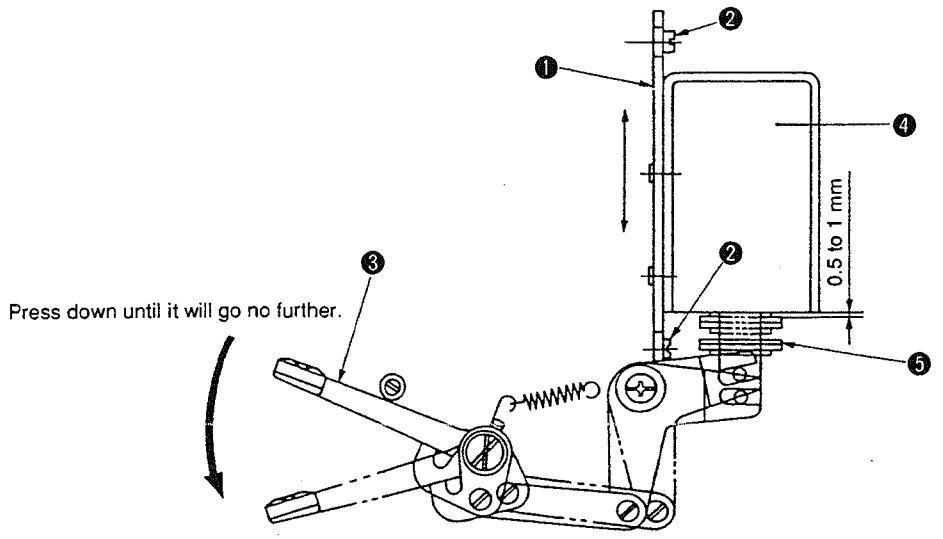
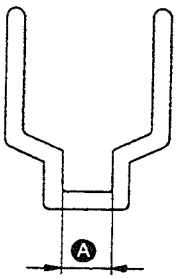


Fig. 70

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1. Loosen screw ❷. Move wiper ❸ in the direction of the arrow so that the length of the wiper is set to 43.8 mm. Then, tighten screw ❷. 2. Loosen two screws ❶, and adjust so that the top end of the wiper is spaced 20.7 mm from presser bar ❹. Then, tighten screws ❶.  Fig. 69 Table 18 Gauge size / Part No. / Dimension Ⓐ ~ 3/8" / 10209230 / 16 7/16"~5/8" / 10209500 / 24 3/4"~7/8" / 10209807 / 30 1"~1-1/4" / 10209906 / 37	o If the wiper is too long (longer than 43.8 mm), the wiper will interfere with the needle clamp while the sewing machine is in operation. o If the wiper is not correctly positioned (the clearance between the presser bar and the wiper is larger than 20.7 mm), the wiper will interfere with the needle clamp while the sewing machine is in operation. o If the wiper is not correctly positioned (the clearance between the presser bar and the wiper is smaller than 20.7 mm, the wiper will come in contact with the needle while the wiper is in operation. (The needle may breaks.)
1. Set the stitch dial to the max. value on the scale. 2. Loosen two screws ❷ in magnet mounting base ❶. 3. Press reverse feed control lever ❸ down until it will go no further. Then move magnet mounting base ❶ up or down to adjust the clearance provided between plunger rubber ❺ and the underside of reverse feed magnet ❹ to 0.5 to 1 mm. Then, tighten screws ❷.	If the clearance provided between the plunger rubber and the reverse stitching magnet is larger than the specified value: o The attraction of the magnet will be decreased. In this case, the machine fails to start reverse feed stitching. If there is no clearance provided between the plunger rubber and the reverse stitching magnet: o The stitch length for reverse feed stitching will be decreased.

(4) Initial position of the reverse feed control lever

1) For the sewing machine equipped with an automatic reverse feed stitching function

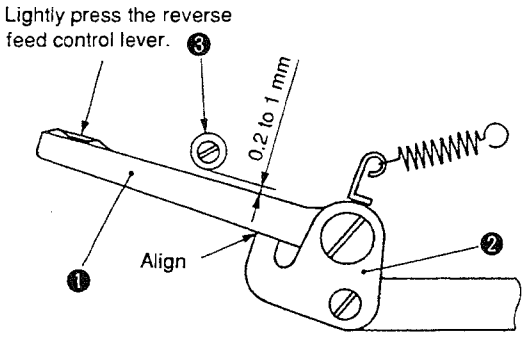


Fig. 71

Conditions
- o Stitch length (feed amount) should be maximized.
- o Lightly press the reverse feed control lever until the lever is aligned with the reverse feed link (1), a clearance of 0.2 to 1 mm should be provided between the reverse feed control lever and the back lever stopper.

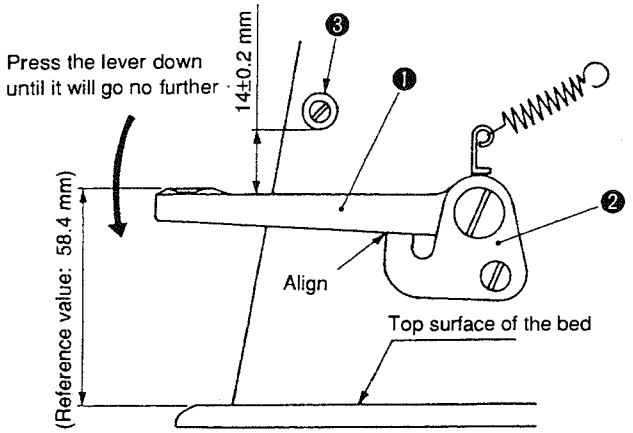


Fig. 72

2) For the sewing machine that is not equipped with an automatic reverse feed stitching function

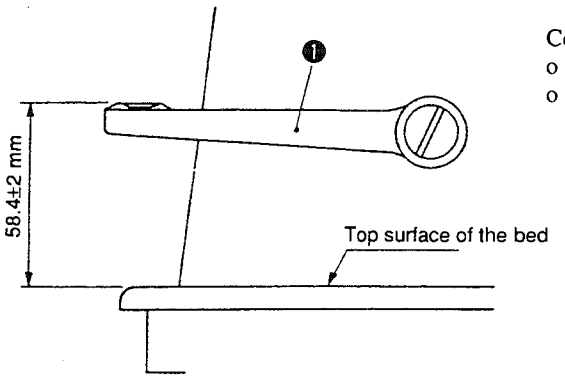


Fig. 73

Conditions
- o Stitch length (feed amount): 0
- o Height of the top surface of the reverse feed control lever should be 58.4±2 mm above the top surface of the bed.

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
o For the sewing machine equipped with an automatic reverse feed stitching function 1. Set the stitch dial at the maximum value on the scale. 2. Lightly press reverse feed control lever ❶ down until it meets reverse feed link (1) ❷ . At this time, a clearance of 0.2 to 1 mm should be provided between reverse feed control lever ❶ and back lever stopper ❸ . 3. If the aforementioned clearance is smaller than 0.2 mm or larger than 1 mm, set the stitch dial at 0 (zero) on the scale. 4. Press reverse feed control lever ❶ down until it will go no further. 5. Loosen the screw in the feed adjusting base and turn reverse feed link (1) ❷ to adjust so that a clearance of 14±0.2 mm is provided between back lever stopper ❸ and reverse feed control lever ❶. After the adjustment, tighten the screw in the feed adjusting base. o For the sewing machine that is not equipped with an automatic reverse feed stitching function 1. Set the stitch dial at 0 on the scale. 2. Loosen the screw in the feed adjusting base. Turn reverse feed control lever ❶ to adjust so that the height of the top surface of reverse feed control lever ❶ to 58±2 mm above the top surface of the bed. After the adjustment, tighten the screw in the feed adjusting base. **(Caution) When the screw in the feed adjusting base is loosened, do not move the feed adjusting base in the axial direction of reverse feed control lever ❶ . This will push the feed adjusting base against the reverse feed control lever. In this case, stitching troubles such as reduced stitch length for the reverse feed stitching will occur.**	If the clearance provided between the back lever stopper and the reverse feed control lever is 0 (zero): o The kinky reverse feed control lever will occur. o Stitch length will be shortened. If the clearance provided between the back lever stopper and the reverse feed control lever is 1 mm or more: o Stitch length will be reduced when performing reverse feed stitching.

7. OPERATING PROCEDURE OF THE ORGANIZED SPLIT NEEDLE BARS

[To stop the right-hand needle bar]

(1) Move change-over lever ❷ to the R side.
Lever ❶ for changing over rises and is locked there.
(2) Move slide ❾ to the right by way of change-over plate ❼ that is attached to change-over lever ❷ .
(3) When the protruding portion of slider ❾ comes in contact with the release pin of needle bar connection (asm.) ⓫ that is attached to needle bar ⓫ .

[To release the needle bar from stopped state]

(1) Press change-over change-over lever ❶ , and change-over lever ❷ will return to the home position.
(2) Slider ❾ returns to the center position by way of change-over plate ❼ that is attached to change-over lever ❷ .
(3) The protruding portion of slider ❾ pushes the release pin, the clutch lever fits again in the clutch lever to move the needle bar up and down.

(Caution) 1. When replacing parts, replace the complete set of the needle bar connection (asm.) and whole needle bar frame (with organized split needle bars) asm.

2. Adjust the needle to be stopped by selecting the slider. Select the slider so that the needle bar stops within the range of 326.5°±0.5° when taking the highest dead point of the needle bar as 0°.

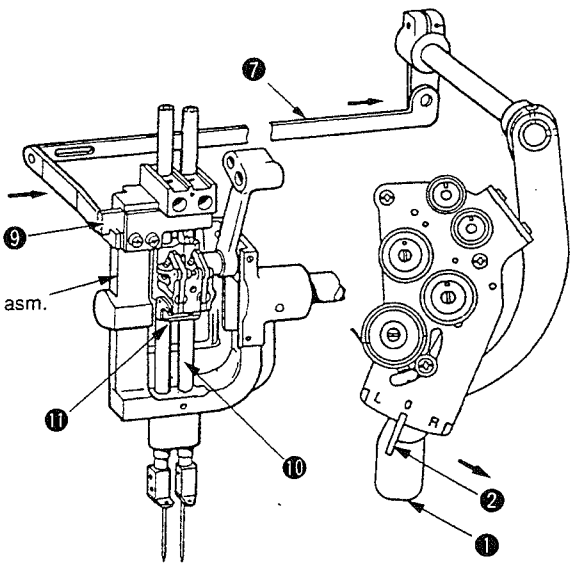
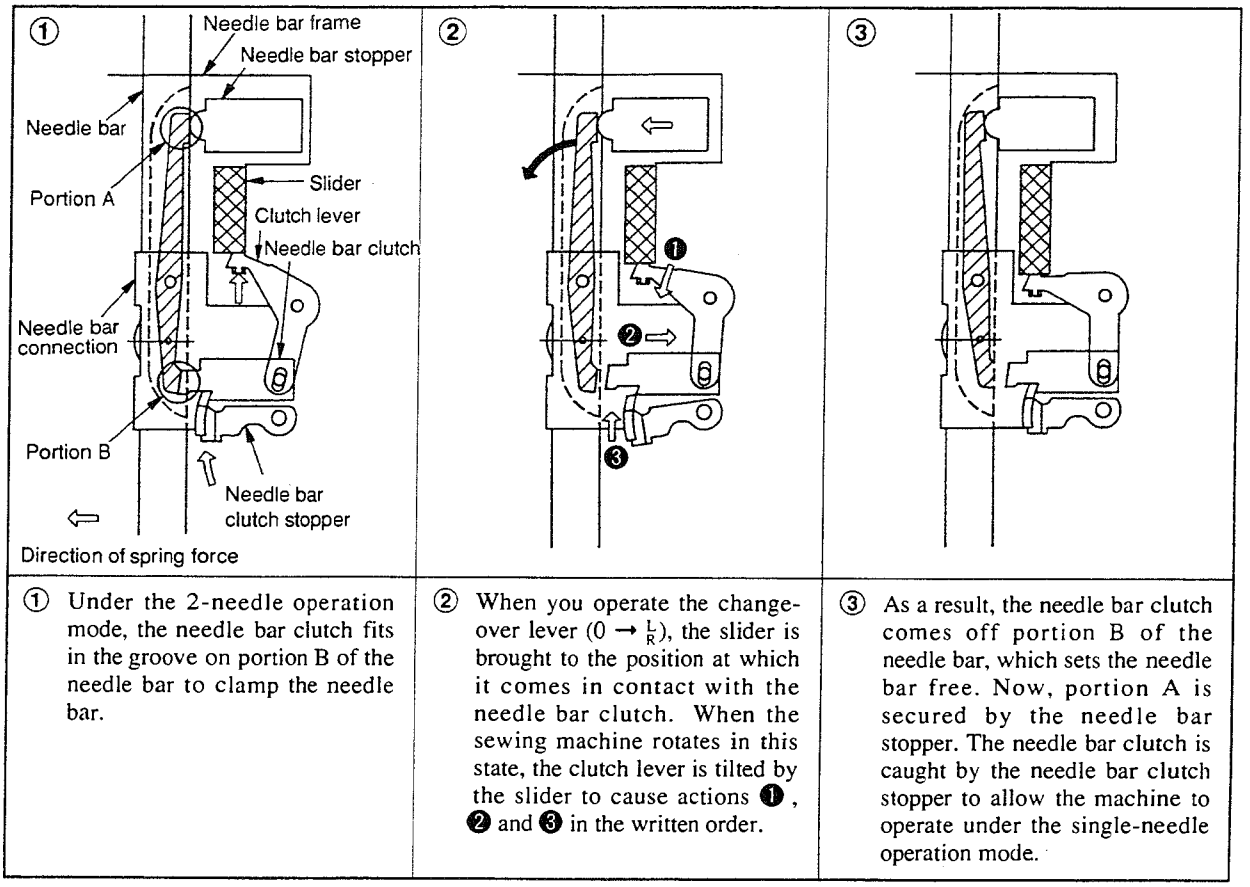


Fig. 74

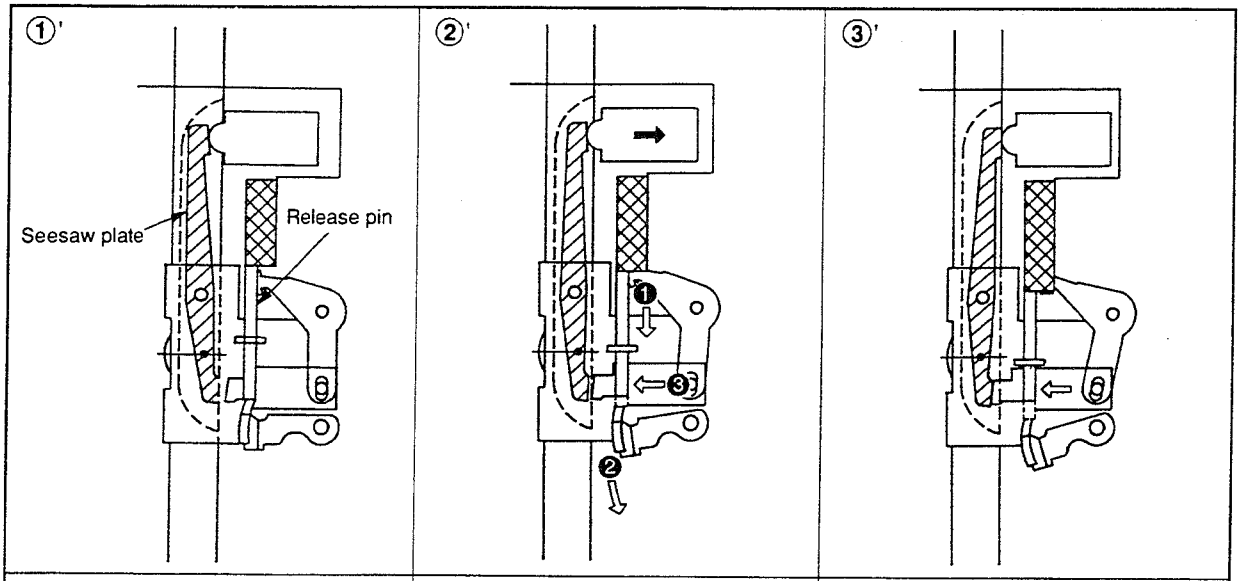
Explanation of the organized split needle bars

• 2-needle operation mode → Single-needle operation mode



①	②	③
Under the 2-needle operation mode, the needle bar clutch fits in the groove on portion B of the needle bar to clamp the needle bar.	When you operate the change-over lever (0 → $\frac{L}{R}$), the slider is brought to the position at which it comes in contact with the needle bar clutch. When the sewing machine rotates in this state, the clutch lever is tilted by the slider to cause actions ❶, ❷ and ❸ in the written order.	As a result, the needle bar clutch comes off portion B of the needle bar, which sets the needle bar free. Now, portion A is secured by the needle bar stopper. The needle bar clutch is caught by the needle bar clutch stopper to allow the machine to operate under the single-needle operation mode.

• Single-needle operation mode → 2-needle operation mode



①'	②'	③'
Operate the change-over lever ($\frac{L}{R}$ → 0) to bring the slider to a position at which the slider comes in contact with the release pin. In this state, rotate the sewing machine (the needle bar is held secured by the needle bar stopper).	Now, the needle bar clutch stopper is pressed down by the release pin. This allows the needle bar clutch to fit in portion B of the needle bar. This causes actions ❶, ❷ and ❸ in the written order.	When the needle bar clutch has fitted in portion B of the needle bar, the seesaw plate pushes the needle bar stopper to restore the 2-needle operation mode.

8. GAUGE REPLACING PROCEDURE

(1) How to remove the gauge

1) Turn OFF the power switch.
2) Remove the slide plate, needle, needle clamp, presser foot, throat plate and feed dog.
   ※ For the sewing machine with a thread trimmer and a wiper, remove the currently-mounted wiper if the size of gauge to be used is not acceptable to the wiper.
3) Tilt the sewing machine.
4) Loosen screws ❶ and ❷ in the hook driving shaft saddle.
   ※ For the sewing machine with a thread trimmer, loosen two screws ❸ in connecting link (asm.) ❹ and screw ❻ in the rocker arm plate ❺ . Do not remove the aforementioned screws but only loosen them.
5) Loosen two screws ❿ in hook driving shaft gear screw ❾.
   ※ At this time, do not lever the screw (screw No. 1) which is tightened in the flat section of hook driving shaft ❼. Loosen the screw to the extent where the screw No. 1 does not come off the flat section of hook driving shaft ❼ when turning hook driving shaft screw gear ❾ by hand.

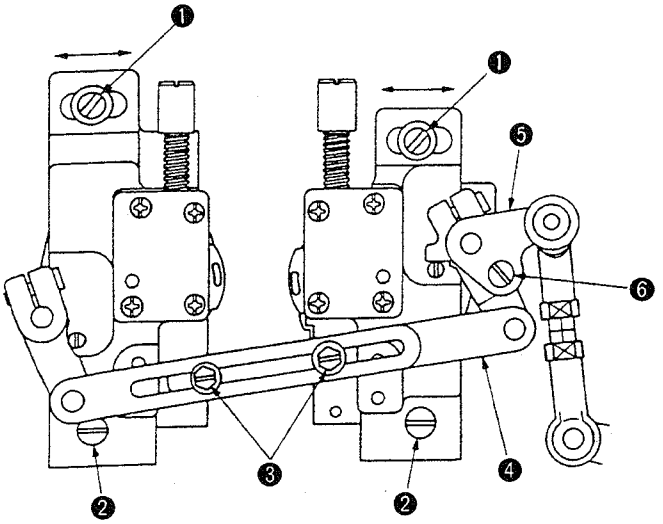


Fig. 75

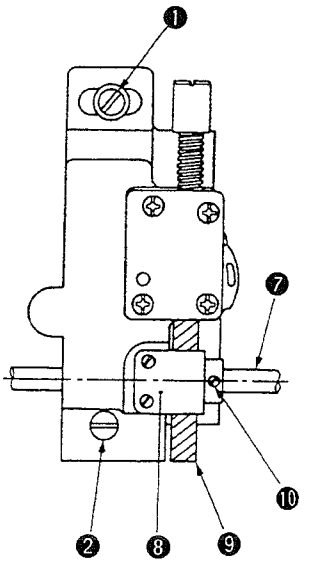


Fig. 76

(2) How to install the gauge

1) Raise the sewing machine.
2) Attach the feed dog in position. ——— Refer to " 2) Position and height of the feed dog" on page 10.
3) Attach the needle clamp and needle in position. —— Refer to " 4) Needle entry" on page 14.
4) Adjust the height of the needle bar. ——— Refer to " 3) Needle bar height" on page 12.
5) Remove the throat plate.
6) Tilt the sewing machine.

7) Move the hook driving shaft saddle from its home position. Adjust so that the specified clearance is provided between the needle and the blade point of the hook.
Then, fix the hook driving shaft. ——— Refer to "(2) Needle-to-hook relation" on page 16.
8) Fix the hook driving shaft screw gear in position. — Refer to "(2) Needle-to-hook relation" on page 16.
9) Raise the sewing machine.
10) Attach the throat plate in position.
11) Attach the presser foot in position.
12) Attach the wiper in position. ——— Refer to "(2) Wiper components" on page 44.

(Caution) 1. When attaching feed dog ❶, confirm that it is equidistantly spaced in the feed dog slot in throat plate ❷ with respect to the lateral direction. Also confirm that the needle enters the center of the needle hole in feed dog ❶ by turning the handwheel.

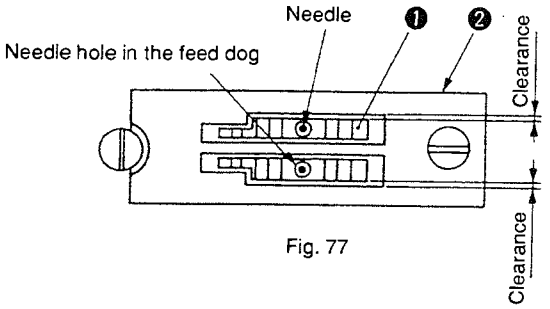


Fig. 77

2. For the G and S types of the sewing machine, use the marker line engraved on the needle bar for the adjustment of the needle bar height.

3. Adjust the clearance provided between the needle and the blade point of the hook to the specified dimension. Position hook driving shaft screw gear ❾ so that a clearance of approximately 0.5 mm is provided between the screw gear and the hook driving shaft saddle. Then, tighten screw ❿. Do not remove hook driving shaft screw gear guide ❽.

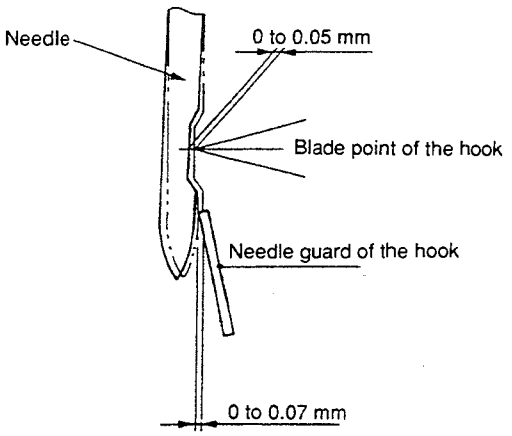


Fig. 78

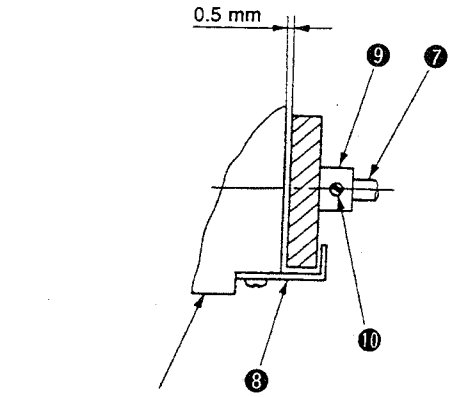


Fig. 79

4. When attaching the presser foot, confirm that the needle does not come in contact with the hook.

9. REPLACING THE TIMING BELT

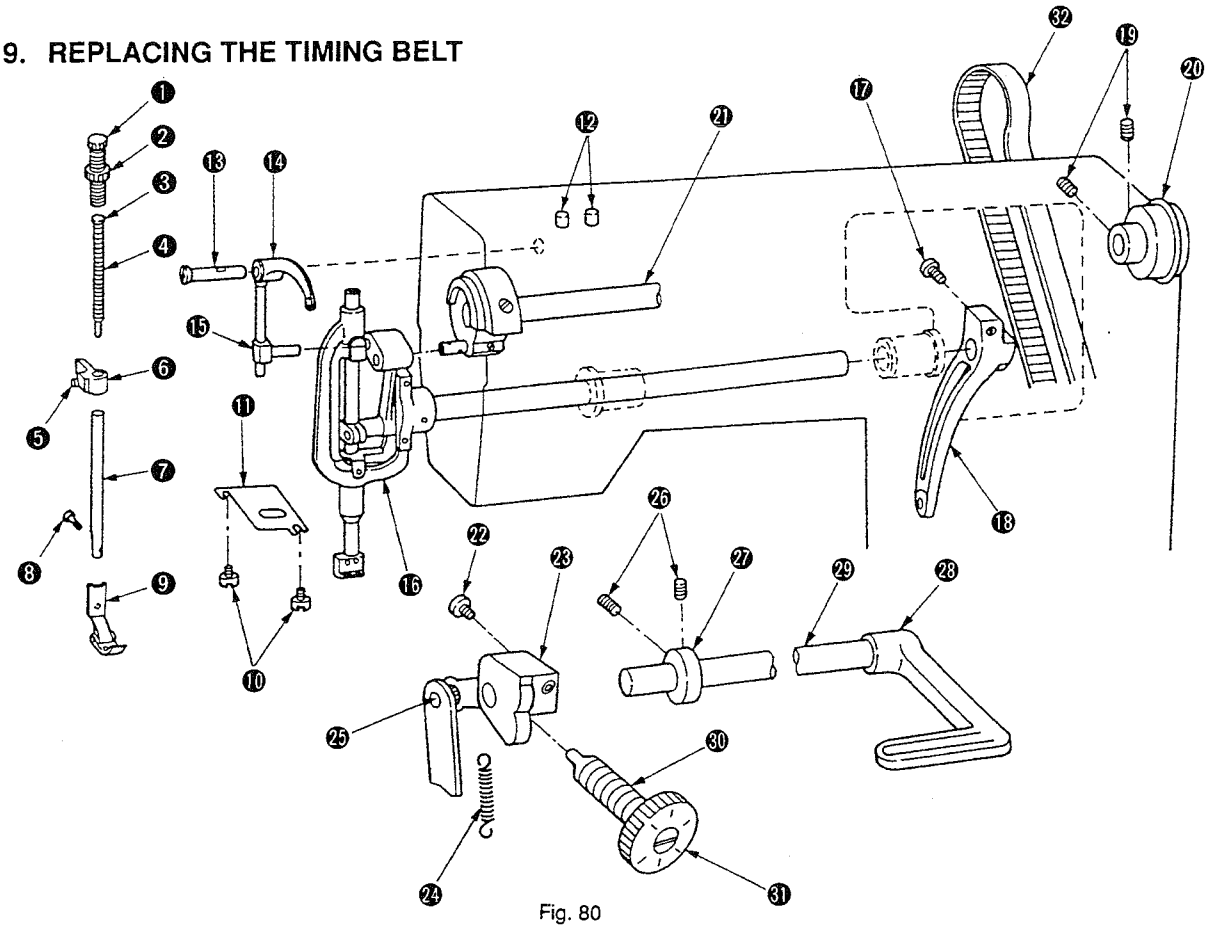


Fig. 80

※ The below-mentioned replacing procedure has been prepared for the LH-3178 as an example.
If you want to replace a timing belt for the other types of 2-needle lockstitch machines, refer to the procedure described below.

(1) How to remove the timing belt

1) Tilt the sewing machine, and remove timing belt ㉜ from the hook driving shaft sprocket.
2) Remove the side plate and face plate.
3) Remove presser bar components ① through ⑨.
4) Remove thread take-up components ⑫ through ⑮.
5) Remove filler plate ⑪ from the jaw section and screws ⑩.
6) Loosen screw ⑰ in needle bar rocking rear arm ⑱ and draw out needle bar frame (asm.) ⑯.
7) Loosen screws ⑲ in main shaft thrust collar (asm.) ⑳. Remove the handwheel. Then shift main shaft ㉑ out of position.
8) Remove feed regulating spring ㉔ from the feed adjusting base pin ㉕.
9) Set stitch dial ㉛ at 0 (zero) and loosen screw ㉒ in feed adjusting base ㉓.
10) Loosen screws ㉖ in thrust collar ㉗. Draw out reverse feed control lever ㉘ and reverse feed control lever shaft ㉙.
11) Draw out timing belt ㉜ from the side plate of the machine arm.

(2) How to install the timing belt

1) Put timing belt ㉜ in position from the side plate of the machine arm. Then pass main shaft ㉑ through the timing belt.
2) Tighten screws ⑲ in main shaft thrust collar ⑳ taking care to remove a play at main shaft ㉑ .
3) Attach the handwheel. At this time, align the hole for screw No. 1 with the flat portion on the main shaft by turning the handwheel toward the operator. Confirm, now, that the handwheel is not rubbed against the machine arm.
4) Put timing belt ㉜ on the main shaft sprocket and hook driving shaft sprocket.
   At this time, refer to "(6) Timing between the main shaft and the hook driving shaft" on page 22.
5) Put reverse feed control lever ㉘ and reverse feed control lever shaft ㉙ in the machine arm. Then pass thrust collar ㉗ and feed adjusting base ㉓ over the reverse feed control lever shaft.
   Tighten screws ㉖ in thrust collar ㉗ at a position where there is no play.
6) Adjust the position of feed adjusting base ㉓ with respect to the direction toward the hook driving shaft so that the center of reverse feed adjusting screw ㉚ meets the center of the cam surface of feed adjusting base ㉓ .
   Tighten screw ㉒ referring to "(4) Initial position of the reverse feed control lever" on page 46.
7) Fit needle bar frame (asm.) ⑯ from the face plate and join it with needle bar rocker rear arm ⑱ .
8) Assemble thread take-up components ⑫ through ⑮ .
   At this time, confirm that there is no axial play in the thread take-up components.
9) Attach filler plate ⑪ to the jaw section with screws ⑩ .
10) Assemble presser bar components ❶ through ❾ .
11) Turn the handwheel to bring needle bar frame (asm.) ⑯ to the lowest position.
    At this time, the stitch dial should be set at 0 on the scale.
12) Set the needle bar so that specified dimensions described in "(1) Needle bar and feed dog, 1) Initial position of the needle bar" on page 10. In this state, position needle bar rocker rear arm ⑱ as illustrated in Fig. 81 and tighten screw ⑰ . At this time, confirm that there is no axial play in the needle bar.

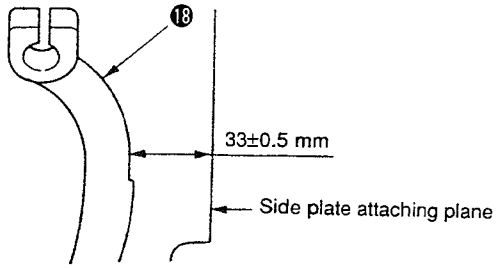


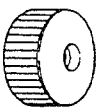
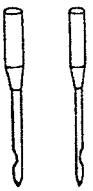
Fig. 81

13) Re-confirm that needle entry is correct referring to "4) Needle entry" on page 14.

10. SEWING SPECIFICATION CHANGE-OVER PROCEDURE

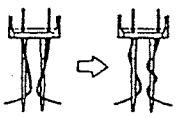
(1) If it is necessary to change the gauge, refer to "2. Gauge component table" and "8. Gauge replacing procedure."

(2) Replaceable component table

Name of part	S type	G type
Tension spring 	Part No. B3129012A00 Wire diameter 1.0 mm	Part No. B3114232000 Wire diameter 1.2 mm
Tension spring No. 1 	Part No. 11045101	Part No. 11093606
Stitch dial 	Part No. 11071909 Stitch length 5	Part No. 11071909 Stitch length 5
Needle (standard)  (Caution) 1	DPx5 #14 MDP500B1400 For JE (134 Nm 90 MC200500900)	DPx5 #21 MDP500B2100 For JE (134 Nm 130 MC200501300)

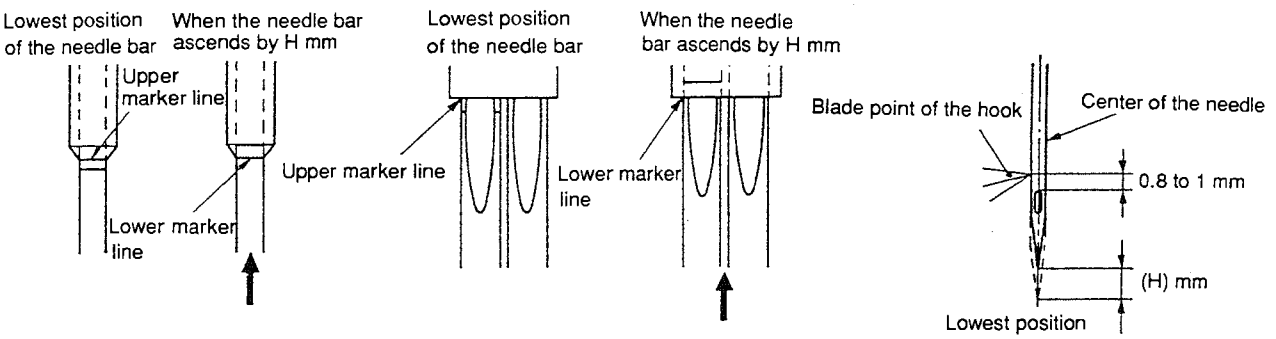
(Caution) 1. When replacing the needle for changing the sewing specification, adjust the needle referring to "(2) Needle-to-hook relation" on page 16.

11. TROUBLESHOOTING CHART

Phenomenon	Cause	Item to be inspected	Corrective measure	Page
Thread breakage	Groove on the bobbin case stopper of the throat plate has scratches.		Grind the groove on the bobbin case stopper.	
	The needle thread tension is too high or too low.	The tension applied to the needle thread.		
	Needle-to-hook timing is not properly adjusted.	The clearance provided between the hook and the bobbin case opener.	Adjust the clearance provided between the hook and the bobbin case opener to 0.2 mm.	P. 18
		The clearance provided between the needle and the blade point of the hook.	Adjust the clearance provided between the needle and the blade point of the hook to within 0.05 mm.	P. 16
		The clearance provided between the hook and the throat plate.	Check the clearance provided between the hook and the throat plate.	P. 20
		Lift of the needle bar and the needle bar height.	Adjust the lifting amount of the needle bar and the height of the needle bar properly.	P. 12 P. 16
	Amount of oil in the hook is insufficient.	Amount of oil in the hook.	Properly adjust the amount of oil in the hook.	P. 26
	Operating range and pressure of the thread take-up spring are improper.	Operating range and pressure of the thread take-up spring.	Properly adjust the thread take-up spring.	
	Blade point of the hook has scratches.		Grind the blade point of the hook.	
	Periphery of the needle hole in the feed dog has scratches.		Grind the periphery of the needle hole in the feed plate.	
	The machine head is not properly threaded.	How the machine head is threaded.		
	The needle is not properly installed.	Orientation of the needle.		
	The needle is bent or has a blunt point.	Needle	Replace the needle with a new one.	
	The presser foot is not properly installed.		Install the presser foot while facing it in the correct direction.	
	The needle thread untwists.	If thread is likely to break especially when using a tetron thread: 1) Minimize the needle thread tension and the thread take-up spring pressure as long as stitches are neatly finished. 2) Wind the thread round the needles to reduce the frequency of the trouble.  3) The needle sticks into the thread. Replace the needle with a ball-point needle.		
	Idling stitches are produced.			
	A thread loop is not made with consistency when the blade point of the hook clamps the needle thread.		Use the thread guide equipped with a felt pad.	

Phenomenon	Cause	Item to be inspected	Corrective measure	Page
Loose stitches are produced.	Same as the aforementioned causes given in the "Thread breakage." Other causes are described below in addition to them.			
	Bobbin fails to move smoothly.		Replace the bobbin with a new one.	
	The clearance provided between the hook and the bobbin case opener is too large.	Check the clearance provided between the hook and the bobbin case opener.	Adjust the clearance provided between the hook and the bobbin case opener to 0.2 mm.	P. 18
	The feed dog is positioned too high.	Check the height of the feed dog.	Adjust the height of the feed dog to 1 mm.	P. 10
	The thread path is poorly finished.		Buff it up.	
	The clearance provided between the bobbin case and the throat plate is not properly adjusted.	Check the clearance provided between the bobbin case and the throat plate.	Adjust the clearance provided between the bobbin case and the throat plate to 0.9 mm.	P. 20
Puckering frequently occurs.	The needle thread tension is too high.	Needle thread tension.	Minimize the needle thread tension as long as stitches are neatly finished.	
	The bobbin thread tension is too high.	Bobbin thread tension.	Minimize the bobbin thread tension as long as stitches are neatly finished.	
	The tension of thread take-up spring is too high.	Tension of the thread take-up spring.	Minimize the thread take-up spring tension as long as stitches are neatly finished.	
	Operating range of the thread take-up spring is too large.	Operating range of the thread take-up spring.	Minimize the operating range of the thread take-up spring as long as stitches are neatly finished.	
	Presser foot pressure is too low.	Pressure of the presser foot.	Increase the presser foot pressure.	
	Sewing speed is too high. (The number of revolutions of the motor is too large.)		Reduce the sewing speed.	

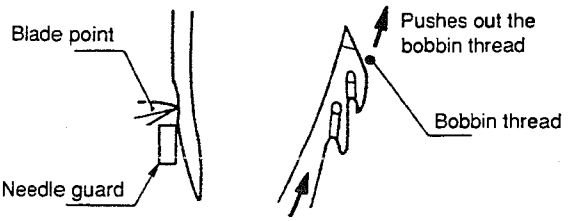
Phenomenon	Cause	Item to be inspected	Corrective measure	Page
Stitch skipping frequently occurs.	Same as the aforementioned causes of "Needle-to-hook relation" in the "Thread breakage"			
	Presser foot pressure is too low.	Pressure of the presser foot.	Increase the presser foot pressure.	
	Blade point of the hook is blunt.	Check the shape of the blade point of the hook.	Correct the blade point of the hook or replace the hook with a new one.	
	The needle guard of the hook fails to work.	Clearance provided between the needle guard and the needle.	Adjust the needle guard of the hook so that it works normally.	P. 16
	The needle is too thick for the thread used.		Replace the needle with one that is thinner by one count.	
	A heavy-weight material is used.		If stitch skipping is likely to occur particularly when using a spun thread: Refer to "(2) Needle-to-hook relation."	



Stitch skipping is not likely to occur when H mm is adjusted to 2.4 to 2.6 mm. If H (mm) is excessively increased, loosened stitches will result. So, be careful.

Phenomenon	Cause	Item to be inspected	Corrective measure	Page
Needle thread trimming failure	Thread trimming timing is not properly adjusted.		Properly adjust the thread trimming timing.	
	Top end of the moving knife has scratches or bent.		Replace the moving knife with a new one.	
	The clamp pressure is too high.		Properly adjust the clamp pressure.	P. 32
	Needle-to-hook relation is not properly adjusted.	The clearance provided between the hook and the bobbin case opener.	Adjust the clearance provided between the hook and the bobbin case opener to 0.2 mm.	P. 18
		The clearance provided between the needle and the blade point of the hook.	Adjust the clearance provided between the needle and the blade point of the hook to within 0.05 mm.	P. 16
		The clearance provided between the bobbin case and the throat plate.	Adjust the clearance provided between the bobbin case and the throat plate to 0.9 mm.	P. 20
		Lift of the needle bar and the needle bar height.	Adjust the lifting amount of the needle bar and the height of the needle bar properly.	P. 12 P. 16
	The moving knife is improperly positioned.		Adjust the longitudinal position of the moving knife.	P. 34
	Operating range of the thread take-up spring is too small.		Adjust the operating range of the thread take-up spring using the thread take-up spring stopper.	
	The needle thread is clamped.	Position and inclination of the thread presser G.	Properly adjust the thread presser G.	P. 32 P. 33
Bobbin thread trimming failure	Top end of the moving knife is positioned too low.	Position of the moving knife blade.	Replace the moving knife with a new one.	
	The hook is positioned too high.	Height of the hook.	Check the height of the hook.	P. 20
	Top end of the moving knife has scratches or bent.		Replace the moving knife with a new one.	
	Needle hole in the feed dog (throat plate) is too large.		Replace the feed dog (throat plate) with one that has a needle hole of appropriate size.	
	The feed dog is positioned too high.	Check the height of the feed dog.	Adjust the height of the feed dog to 1 mm.	P. 10
	Blade point of the hook has worn out.		Replace the hook with a new one.	P. 16
	The clearance provided between the needle and the blade point of the hook is not properly adjusted.			

(Caution) If the clearance between the needle and the blade point of the hook is adjusted when the needle guard works, the needle may bend. As a result, the moving knife will be improperly positioned and push out the bobbin thread, causing a thread trimming failure.



Phenomenon	Cause	Item to be inspected	Corrective measure	Page
Bobbin case idles at the time of thread trimming.	Thread is not wound round the bobbin in the correct direction.		Wind the thread round a bobbin in the direction opposite to the direction of rotation of the hook.	P. 9
	The bobbin is wound with thread of which amount exceeds 80% of its capacity.	Amount of thread wound round the bobbin.	Wind the bobbin with thread until 80% of its capacity is reached.	
	Pressure of the idling prevention spring is too low.		Replace the idling prevention spring with a new one.	P. 7
		Idling prevention sheet is not used.	Use an idling prevention sheet with the machine.	P. 7
	A bobbin made of iron is used.	Type of the bobbin used.	Replace the bobbin with a specified aluminum bobbin for the sewing machine with a thread trimmer.	P. 6
	Thread path on the hook is poorly finished.		Grind the thread path on the hook or replace the hook with a new one.	
Stitch skipping at the start of sewing Slip-off of the thread at the start of sewing.	The needle-up stop timing is excessively advanced	Position of the red marker dot engraved on the handwheel and the marker dot engraved on the machine arm when the sewing machine stops with its needle up.	Properly adjust the needle-up stop position of the sewing machine.	P. 28
	Bobbin thread presser spring fails to clamp the bobbin thread after thread trimming.	Check whether the thread is clamped under the moving knife after thread trimming.	Adjust the position of the moving knife or replace the thread presser with a new one.	P. 32 P. 34
	The feed dog is positioned too high.	Check the height of the feed dog.	Adjust the height of the feed dog to 1 mm.	P. 10
	Pressure of the thread take-up spring is too high or the stroke of the spring is too large.	Thread take-up spring.	Decrease the pressure of the thread take-up spring or reduce the stroke of the spring.	
	Length of thread remaining at the needle eyelet is insufficient.		Adjust the pretensioner to a lower value so that a longer thread remains at the needle eyelet after thread trimming.	
	The needle used is too thick.		Use a thinner needle.	
	The bobbin thread is clamped.	Check the clamp pressure.	Adjust the clamp pressure to an appropriate value.	P. 32 P. 33

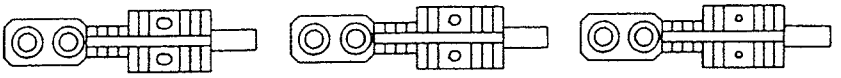
To be continued to the next page

Phenomenon	Cause	Item to be inspected	Corrective measure	Page

Continued from the previous page

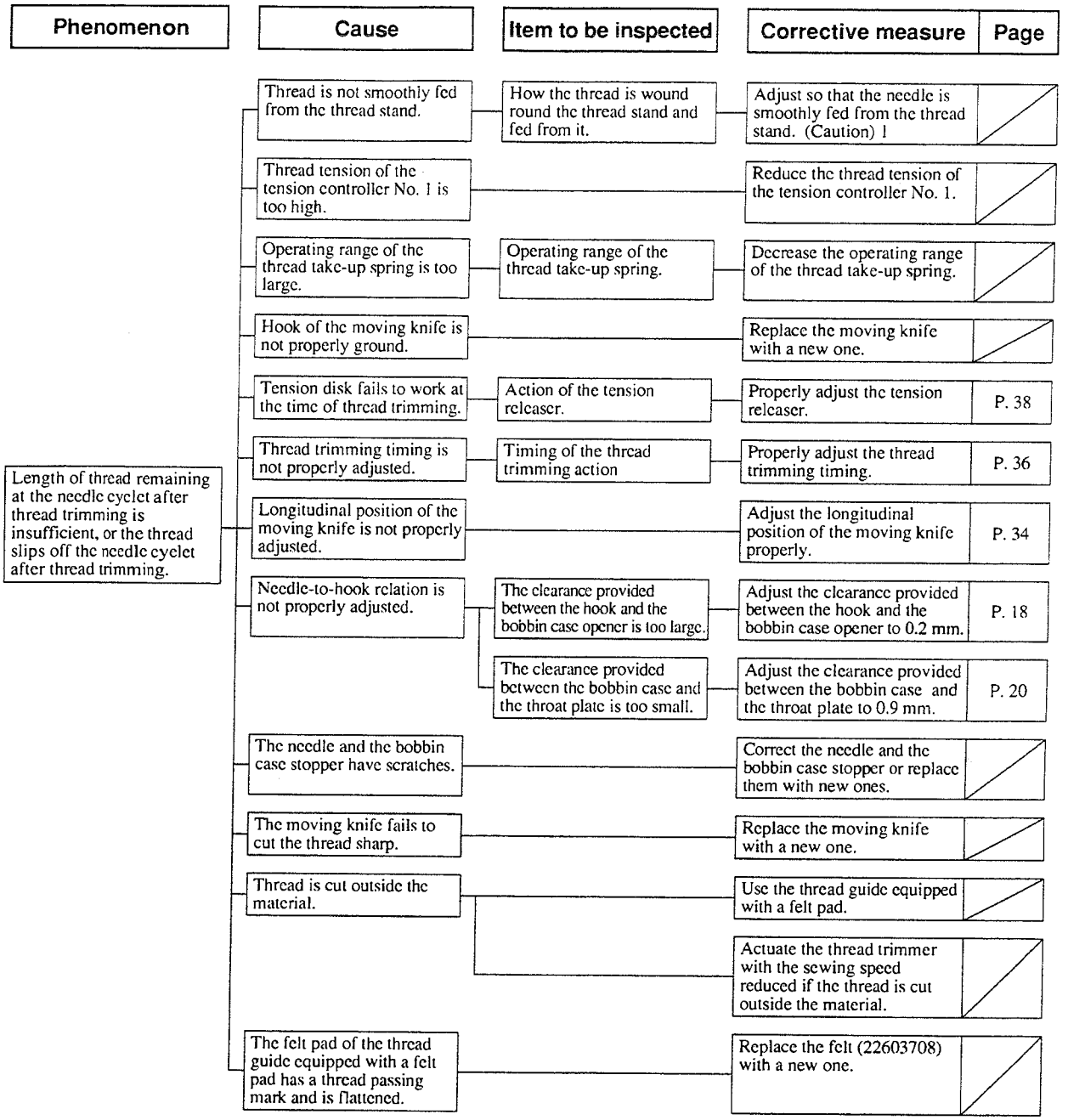
Cause	Item to be inspected	Corrective measure	Page
Needle hole in the feed dog is too large.		Replace the feed dog with one that has a smaller needle hole.	

(Caution) The feed dog comes in three different types with respect to the size of the needle hole. Use the feed dog with the smallest needle hole as long as the needle does not break.



For heavy-weight materials　For medium-weight materials　For light-weight materials

Cause	Item to be inspected	Corrective measure	Page
Bobbin thread tension is too high.		Decrease the bobbin thread tension.	
Bobbin thread tension is too low.	Extent of idling of the bobbin	Increase the bobbin thread tension.	
The presser foot rises at the start of sewing.		Use the soft-start function.	



(Caution) 1. When using a synthetic thread, the thread is likely to be wound round the thread stand.
In this case, use the thread stand guide arm (asm.) supplied with the sewing machine.

Phenomenon	Cause	Item to be inspected	Corrective measure	Page
Wiper comes in contact with the needle.	The wiper is improperly positioned.		Adjust so that the wiper spreads the thread properly.	P. 44
	The needle-up stop position of the machine is improper.	Position of the red marker dot engraved on the handwheel and the marker dot engraved on the machine arm when the sewing machine stops with its needle up.	Properly adjust the needle-up stop position of the sewing machine.	P. 28
	The V belt is not properly tensed.		Properly tense the V belt.	P. 8
The wiper fails to spread the thread.	The wiper is improperly positioned.		Adjust so that the wiper spreads the thread properly.	P. 44
	Length of the needle thread remaining after thread trimming is excessive.	Tension of the tension controller No. 1	Adjust the tension controller No. 1 so that the needle thread of 35 to 45 mm remains after thread trimming.	
		Timing of the thread trimming action.	Properly adjust the thread trimming timing.	P. 36
		Position of the moving knife	Adjust the longitudinal position of the moving knife.	P. 34
	The needle thread is caught by the thread presser.	Thread presser G	Properly adjust the position of the thread presser G.	P. 32
	The moving knife fails to cut the thread sharp.		Replace the moving knife with a new one.	

12. DRAWING OF THE TABLE