2-Needle, Needle-feed, Lockstitch Machine

LH-3128

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

LH-3128-7-WB

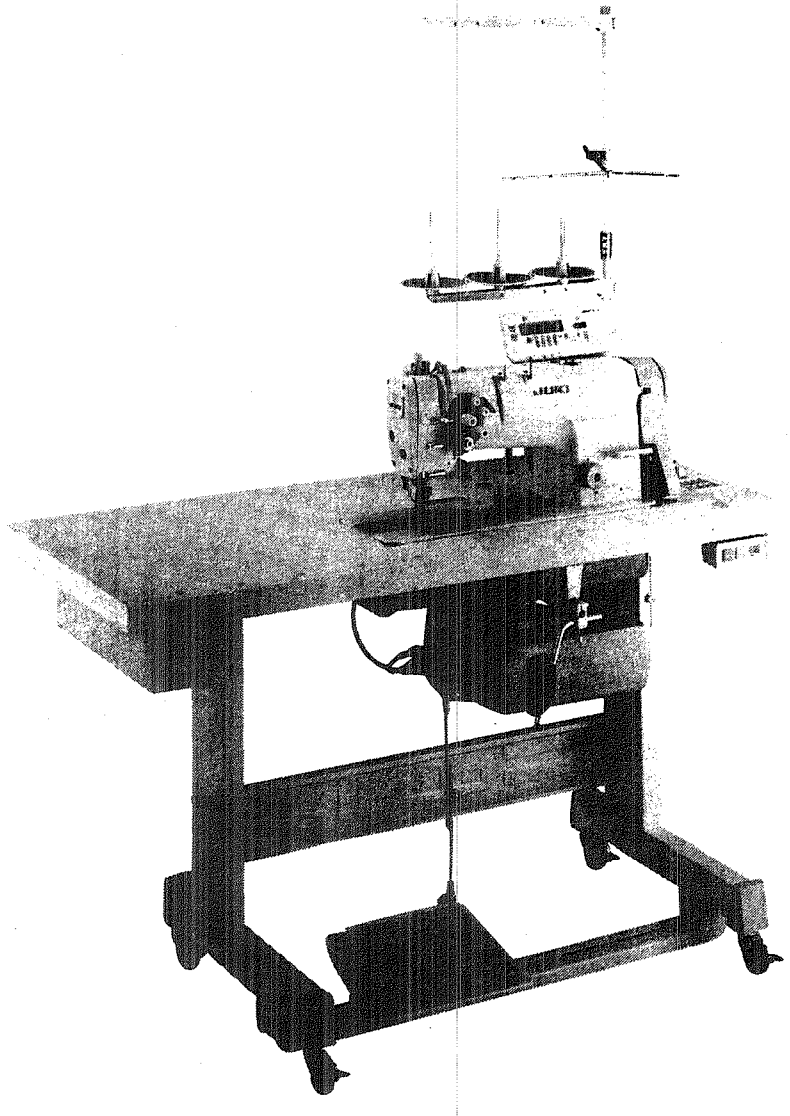
2-Needle, Needle-feed, Lockstitch Machine with an Organized Split Needle Bar

LH-3168

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

LH-3168-7-WB

ENGINEER'S MANUAL



NO. VI-15
1993. 12

PREFACE

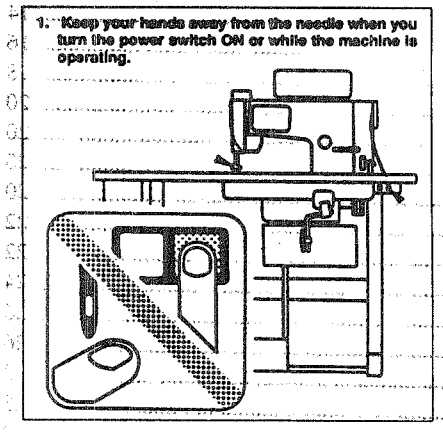
This Engineer's Manual is written for the technical personnel who are responsible for the service and maintenance of the machines.

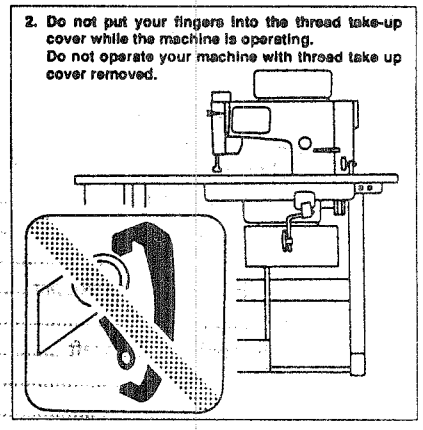
The Instruction Manual for these machines intended for the maintenance personnel and operators at an apparel factory contains detailed operating instructions. And this manual describes "How to Adjust", "Results of Improper Adjustment", and other information which are not covered by the Instruction Manual.

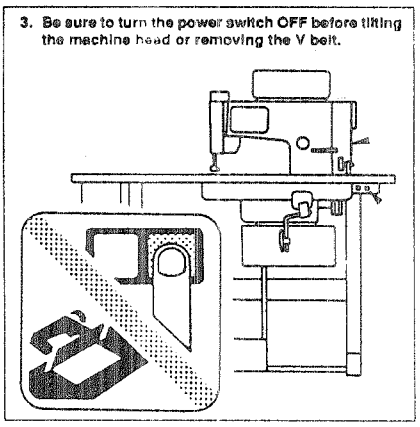
Separately refer to the Instruction Manual and Engineer's Manual for the SC-1 for the explanation of the motor components of the sewing machine with a thread trimmer. Refer to the "Instruction Manual for the CP-30 series" and the "Installation Manual for the Control Panel" for the explanation of the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

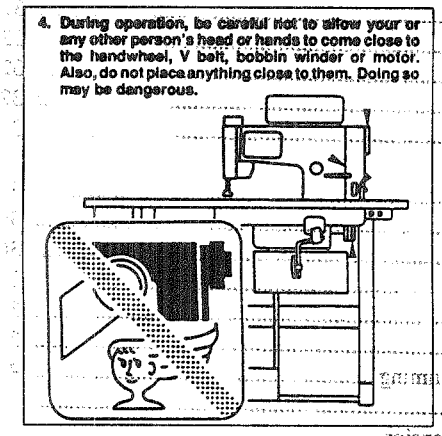
It is advisable to use the pertinent Instruction Manual and Parts List together with this Engineer's Manual when carrying out the maintenance of these machines.

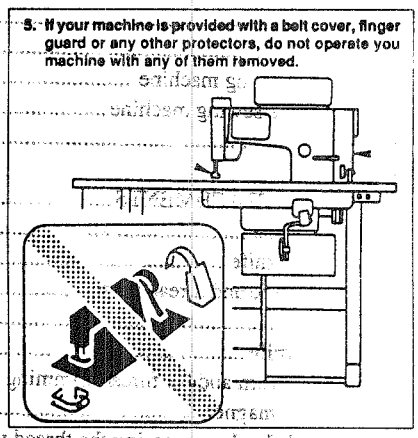
CAUTION











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)

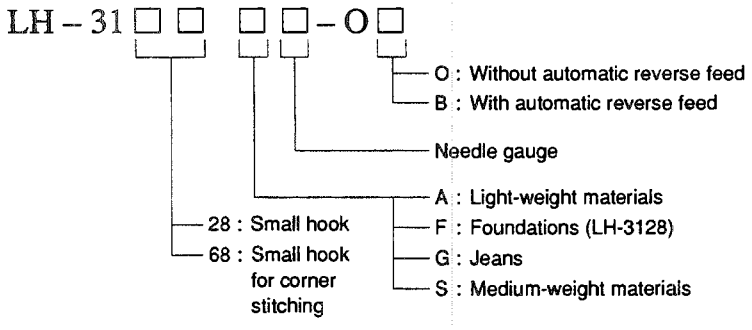


Table 1

Model		LH-3128				LH-3168		
Stitch type		A	G	S	F	A	S	G
Max. sewing speed		3000 s.p.m						
Max. stitch length (forward and reverse stitching)		5 x 5 mm						
Needle (standard)		DP x 5 (#9~#14)	DP x 5 (#18~#22)	DP x 5 (#11~#18)	134 SES SERV 7 (Nm 65~80)	DP x 5 (#9~#14)	DP x 5 (#11~#18)	DP x 5 (#18~#22)
Presser foot lift	Hand lifter	5.5 mm						
	Knee lifter	12 mm						
Organized split needle bar mechanism		Not provided with				Provided with		

*1: 134SES SERV7 Nm65

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

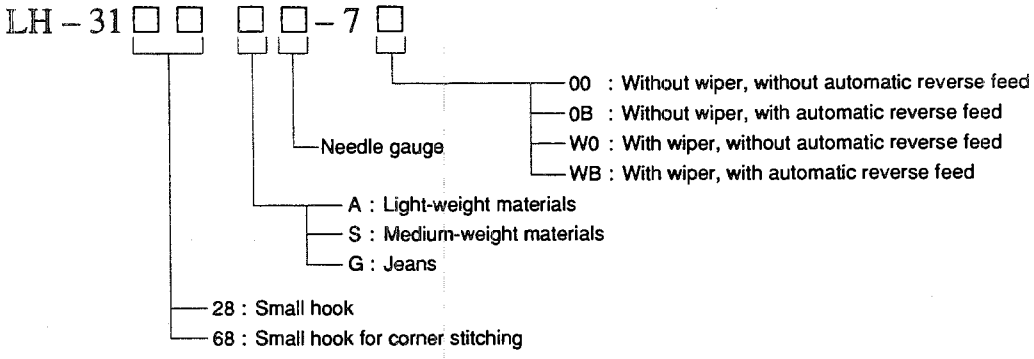


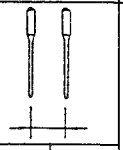
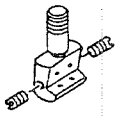
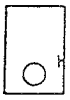
Table 2

Model		LH-3128-7			LH-3168-7		
Stitch type		A	S	G	A	S	G
Max. sewing speed		3000 s.p.m					
Max. stitch length (forward and reverse stitching)		5 x 5 mm					
Needle (standard)		DP x 5 #11 (#11~#14)	DP x 5 (#11~#18)	DP x 5 (#18~#22)	DP x 5 #11 (#11~#14)	DP x 5 (#11~#18)	DP x 5 (#18~#22)
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

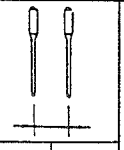
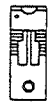
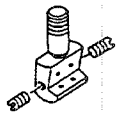
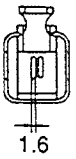
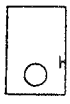
(1) LH-3128, S type

Table 3

Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.
Code								
	Inch	mm		ϕ 1.9		2.0		
C	5/32	4.0	226 25206	226 30206	101 47759	101 52650		
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	226 01058	226 00555
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		
M	5/8	15.9	226 26105	226 31402	101 48658	101 53559	226 01157	226 00654
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		
Q	1	25.4	226 26402	226 31808	101 48955	101 53856	226 01256	226 00753
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		
T	1-3/8	34.9	226 26709	226 32103	101 49250	101 54151	226 01355	226 00852
U	1-1/2	38.1	226 26808	226 32202	101 49359	101 54250		

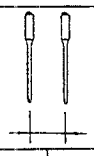
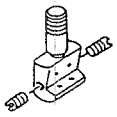
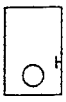
(2) LH-3128, A type

Table 4

Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.
Code								
	Inch	mm		ϕ 1.4		1.6		
A	3/32	2.4	226 25008	226 35007	101 47551	226 37557		
B	1/8	3.2	226 25107	226 30107	101 47650	226 37656		
C	5/32	4.0	226 25206	226 35205	101 47759	226 37755		
D	3/16	4.8	226 25305	226 35304	101 47858	226 37854		
E	7/32	5.6	226 25404	226 35403	101 47957	226 37953	226 01058	226 00555
F	1/4	6.4	226 25503	226 35502	101 48054	226 38050		
G	9/32	7.1	226 25602	226 35700	101 48153	226 38258		
H	5/16	7.9	226 25701	226 35809	101 48252	226 38357		
K	3/8	9.5	226 25800	226 35908	101 48351	226 38456		
W	7/16	11.1	226 25909	226 36005	101 48450	226 38555		
L	1/2	12.7	226 26006	226 36203	101 48559	226 38753		
M	5/8	15.9	226 26105	226 36302	101 48658	226 38852	226 01157	226 00654
N	3/4	19.1	226 26204	226 36401	101 48757	226 38951		
P	7/8	22.2	226 26303	226 36609	101 48856	226 39157		
Q	1	25.4	226 26402	226 36708	101 48955	226 39256	226 01256	226 00753
R	1-1/8	28.6	226 26501	226 36807	101 49052	226 39355		
S	1-1/4	31.8	226 26600	226 36906	101 49151	226 39454		
T	1-3/8	34.9	226 26709	226 37003	101 49250	226 39553	226 01355	226 00852
U	1-1/2	38.1	226 26808	226 37102	101 49359	226 39652		

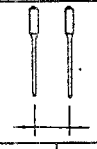
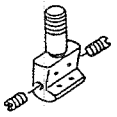
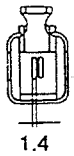
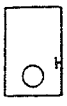
(3) LH-3128, G type

Table 5

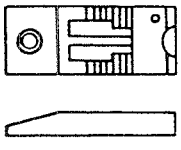
Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.
Code								
	Inch	mm		ϕ 2.2		2.0		
D	3/16	4.8	226 25305	B1613 512 D0H	101 47858	226 40353		
E	7/32	5.6	226 25404	B1613 512 E0H	101 47957	226 40452	226 01058	226 00555
F	1/4	6.4	226 25503	B1613 512 F0H	101 48054	226 40551		
G	9/32	7.1	226 25602	B1613 512 G0H	101 48153	226 40759		
H	5/16	7.9	226 25701	B1613 512 H0H	101 48252	226 40858		
K	3/8	9.5	226 25800	B1613 512 K0H	101 48351	226 40957		
L	1/2	12.7	226 26006	B1613 512 L0H	101 48559	226 41252		
M	5/8	15.9	226 26105	B1613 512 M0H	101 48658	226 41351	226 01157	226 00654
N	3/4	19.1	226 26204	B1613 512 N0H	101 48757	226 41450		
P	7/8	22.2	226 26303	B1613 512 P0H	101 48856	226 41658		
Q	1	25.4	226 26402	B1613 512 Q0H	101 48955	226 41757	226 01256	226 00753
R	1-1/8	28.6	226 26501	B1613 512 R0H	101 49052	226 41856		
S	1-1/4	31.8	226 26600	B1613 512 S0H	101 49151	226 41955		
T	1-3/8	34.9	226 26709	B1613 512 T0H	101 49250	226 42052	226 01355	226 00852
U	1-1/2	38.1	226 26808	B1613 512 U0H	101 49359	226 42151		

(4) LH-3128, F type

Table 6

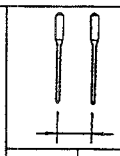
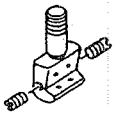
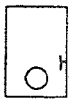
Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.
Code								
	Inch	mm		ϕ 1.4		1.4		
B	1/8	3.2	226 25107 ※226 28002	226 30107	101 47650	101 85957		
D	3/16	4.8	226 25305 ※226 28200	226 35304	101 47858	101 86054		
							226 01058	226 00555
F	1/4	6.4	226 25503 ※226 28408	226 35502	101 48054	101 86757		
G	9/32	7.1	226 25602 ※226 28507	226 35700	101 48153	101 86153		
H	5/16	7.9	226 25701	226 35809	101 48252	101 86856		

Asterisk (*) shows throat plate Part No. for tape attaching.



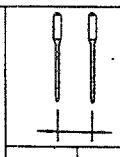
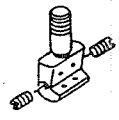
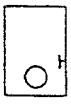
(5) LH-3128-7, S type

Table 7

Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.	Wiper
Code									
	Inch	mm		ϕ 2.0		2.0			
C	5/32	4.0	226 60302	102 37907	101 47759	101 52650			
D	3/16	4.8	226 60401	102 38004	101 47858	101 52759			
E	7/32	5.6	226 60500	102 38103	101 47957	101 52858	226 50857	226 50352	102 09230
F	1/4	6.4	226 60609	102 38202	101 48054	101 52957			
G	9/32	7.1	226 60708	102 38301	101 48153	101 53054			
H	5/16	7.9	226 60807	102 38400	101 48252	101 53153			
K	3/8	9.5	226 60906	102 38509	101 48351	101 53252			
W	7/16	11.1	226 61003	101 68300	101 48450	101 53351			102 09500
L	1/2	12.7	226 61102	102 38707	101 48559	101 53450	226 50956	226 50451	
M	5/8	15.9	226 61201	102 38806	101 48658	101 53559			102 09807
N	3/4	19.1	226 61300	102 38905	101 48757	101 53658			
P	7/8	22.2	226 61409	101 68706	101 48856	101 53757	226 51053	226 50550	
Q	1	25.4	226 61508	102 39002	101 48955	101 53856			102 09906
R	1-1/8	28.6	226 61607	101 68904	101 49052	101 53955			
S	1-1/4	31.8	226 61706	101 69001	101 49151	101 54052	226 51152	226 50659	

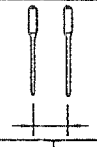
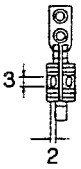
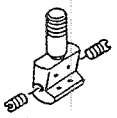
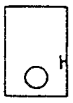
(6) LH-3128-7, A type

Table 8

Needle gauge			Throat plate	Feed dog	Needle clamp	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.	Wiper
Code									
	Inch	mm		ϕ 1.4		1.6			
A	3/32	2.4	226 60104	226 65004	101 47551	226 37557			
B	1/8	3.2	226 60203	226 65103	101 47650	226 37656			
C	5/32	4.0	226 60302	226 65202	101 47759	226 37755			
D	3/16	4.8	226 60401	226 65301	101 47858	226 37854			102 09230
E	7/32	5.6	226 60500	226 65400	101 47957	226 37953	226 50857	226 50352	
F	1/4	6.4	226 60609	226 65509	101 48054	226 38050			
G	9/32	7.1	226 60708	226 65707	101 48153	226 38258			
H	5/16	7.9	226 60807	226 65806	101 48252	226 38357			
K	3/8	9.5	226 60906	226 65905	101 48351	226 38456			
W	7/16	11.1	226 61003	226 66002	101 48450	226 38555			102 09500
L	1/2	12.7	226 61102	226 66200	101 48559	226 38753	226 50956	226 50451	
M	5/8	15.9	226 61201	226 66309	101 48658	226 38852			102 09807
N	3/4	19.1	226 61300	226 66408	101 48757	226 38951			
P	7/8	22.2	226 61409	226 66606	101 48856	226 39157	226 51053	226 50550	
Q	1	25.4	226 61508	226 66705	101 48955	226 39256			102 09906
R	1-1/8	28.6	226 61607	226 66804	101 49052	226 39355			
S	1-1/4	31.8	226 61706	226 66903	101 49151	226 39454	226 51152	226 50659	

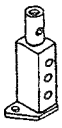
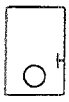
(7) LH-3128-7, G type

Table 9

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	102 39101	101 47858	226 40353			
E	7/32	5.6	226 60500	102 39200	101 47957	226 40452	226 50857	226 50352	102 09230
F	1/4	6.4	226 60609	102 39309	101 48054	226 40551			
G	9/32	7.1	226 60708	102 39408	101 48153	226 40759			
H	5/16	7.9	226 60807	102 39507	101 48252	226 40858			
K	3/8	9.5	226 60906	102 39606	101 48351	226 40957			
W	7/16	11.1	226 61003	101 70801	101 48450	226 41054			102 09500
L	1/2	12.7	226 61102	102 39804	101 48559	226 41252	226 50956	226 50451	
M	5/8	15.9	226 61201	102 39903	101 48658	226 41351			
N	3/4	19.1	226 61300	101 71106	101 48757	226 41450			102 09807
P	7/8	22.2	226 61409	101 71205	101 48856	226 41658	226 51053	226 50550	
Q	1	25.4	226 61508	101 71304	101 48955	226 41757			
R	1-1/8	28.6	226 61607	101 71403	101 49052	226 41856			102 09906
S	1-1/4	31.8	226 61706	101 71502	101 49151	226 41955	226 51152	226 50659	

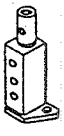
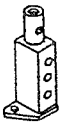
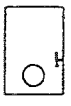
(8) LH-3168, S type

Table 10

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		ϕ 2.0			2.0		
C	5/32	4.0	226 25206	226 30206	B1402-528-CA0-A		101 52650		
D	3/16	4.8	226 25305	226 30404	B1402-528-DALA	B1402-528-DARA	101 52579		
E	7/32	5.6	226 25404	226 30503	B1402-528-EAL	B1402-528-EAR	101 52858	226 01058	226 00555
F	1/4	6.4	226 25503	226 30602	B1402-528-FALA	B1402-528-FARA	101 52957		
G	9/32	7.1	226 25602	226 30800	B1402-528-GAL	B1402-528-GAR	101 53054		
H	5/16	7.9	226 25701	226 30909	B1402-528-HALA	B1402-528-HARA	101 53153		
K	3/8	9.5	226 25800	226 31006	B1402-528-KALA	B1402-528-KARA	101 53252		
L	1/2	12.7	226 26006	226 31303	B1402-528-LAL	B1402-528-LAR	101 53450		
M	5/8	15.9	226 26105	226 31402	B1402-528-MAL	B1402-528-MAR	101 53559	226 01157	226 00654
N	3/4	19.1	226 26204	226 31501	B1402-528-NAL	B1402-528-NAR	101 53658		
Q	1	25.4	226 26402	226 31808	B1402-528-QAL	B1402-528-QAR	101 53856	226 01256	226 00753

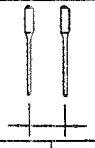
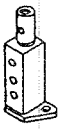
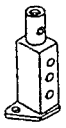
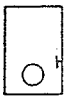
(9) LH-3168, A type

Table 11

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		ϕ 1.4			1.6		
B	1/8	3.2	226 25107	226 30107	B1402-528-BA0-A		226 37656		
C	5/32	4.0	226 25206	226 35205	B1402-528-CA0-A		226 37755		
D	3/16	4.8	226 25305	226 35304	B1402-528-DALA	B1402-528-DARA	226 37854		
E	7/32	5.6	226 25404	226 35403	B1402-528-EAL	B1402-528-EAR	226 37953	226 01058	226 00555
F	1/4	6.4	226 25503	226 35502	B1402-528-FALA	B1402-528-FARA	226 38050		
G	9/32	7.1	226 25602	226 35700	B1402-528-GAL	B1402-528-GAR	226 38258		
H	5/16	7.9	226 25701	226 35809	B1402-528-HALA	B1402-528-HARA	226 38357		
K	3/8	9.5	226 25800	226 35908	B1402-528-KALA	B1402-528-KARA	226 38456		
L	1/2	12.7	226 26006	226 36203	B1402-528-LAL	B1402-528-LAR	226 38753		
M	5/8	15.9	226 26105	226 36302	B1402-528-MAL	B1402-528-MAR	226 38852	226 01157	226 00654
N	3/4	19.1	226 26204	226 36401	B1402-528-NAL	B1402-528-NAR	226 38951		
Q	1	25.4	226 26402	226 36708	B1402-528-QAL	B1402-528-QAR	226 39256	226 01256	226 00753

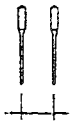
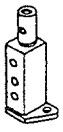
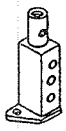
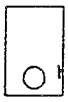
(10) LH-3168, G type

Table 12

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		ϕ 2.2			2.0		
D	3/16	4.8	226 25305	B1613 512 D0H	B1402-528-DALA	B1402-528-DARA	226 40353		
E	7/32	5.6	226 25404	B1613 512 E0H	B1402-528-EAL	B1402-528-EAR	226 40452	226 01058	226 00555
F	1/4	6.4	226 25503	B1613 512 F0H	B1402-528-FALA	B1402-528-FARA	226 40551		
G	9/32	7.1	226 25602	B1613 512 G0H	B1402-528-GAL	B1402-528-GAR	226 40759		
H	5/16	7.9	226 25701	B1613 512 H0H	B1402-528-HALA	B1402-528-HARA	226 40858		
K	3/8	9.5	226 25800	B1613 512 K0H	B1402-528-KALA	B1402-528-KARA	226 40957		
L	1/2	12.7	226 26006	B1613 512 L0H	B1402-528-LAL	B1402-528-LAR	226 41252		
M	5/8	15.9	226 26105	B1613 512 M0H	B1402-528-MAL	B1402-528-MAR	226 41351	226 01157	226 00654
N	3/4	19.1	226 26204	B1613 512 N0H	B1402-528-NAL	B1402-528-NAR	226 41450		
								226 01256	226 00753
Q	1	25.4	226 26402	B1613 512 Q0H	B1402-528-QAL	B1402-528-QAR	226 41757		

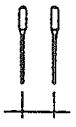
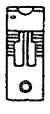
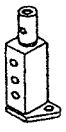
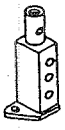
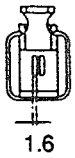
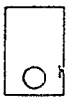
(11) LH-3168-7, S type

Table 13

Needle gauge			Throat plate	Feed dog	Needle clamp (left)	Needle clamp (right)	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.	Wiper
Code				 ϕ 2.0			 2.0			
	Inch	mm								
C	5/32	4.0	226 60302	102 37907	B1402-528-CA0-A		101 52650	226 50857	226 50352	102 09230
D	3/16	4.8	226 60401	102 38004	B1402-528-DALA	B1402-528-DARA	101 52579			
E	7/32	5.6	226 60500	102 38103	B1402-528-EAL	B1402-528-EAR	101 52858			
F	1/4	6.4	226 60609	102 38202	B1402-528-FALA	B1402-528-FARA	101 52957			
G	9/32	7.1	226 60708	102 38301	B1402-528-GAL	B1402-528-GAR	101 52054			
H	5/16	7.9	226 60807	102 38400	B1402-528-HALA	B1402-528-HARA	101 52153			
K	3/8	9.5	226 60906	102 38509	B1402-528-KALA	B1402-528-KARA	101 52252			
L	1/2	12.7	226 61102	102 38707	B1402-528-LAL	B1402-528-LAR	101 52450	226 50956	226 50451	102 09500
M	5/8	15.9	226 61201	102 38806	B1402-528-MAL	B1402-528-MAR	101 52559			
N	3/4	19.1	226 61300	102 38905	B1402-528-NAL	B1402-528-NAR	101 52658			102 09807
Q	1	25.4	226 61508	102 39002	B1402-528-QAL	B1402-528-QAR	101 52856	226 51053	226 50550	102 09906

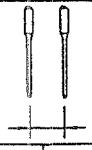
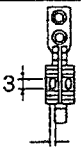
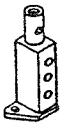
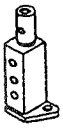
(12) LH-3168-7, A type

Table 14

Needle gauge			Throat plate	Feed dog	Needle clamp (left)	Needle clamp (right)	Presser foot	Slide plate (left) asm.	Slide plate (right) asm.	Wiper
Code				 ϕ 1.4			 1.6			
	Inch	mm								
B	1/8	3.2	226 60203	226 65103	B1402-528-BA0-A		226 37656	226 50857	226 50352	102 09230
C	5/32	4.0	226 60302	226 65202	B1402-528-CA0-A		226 37755			
D	3/16	4.8	226 60401	226 65301	B1402-528-DALA	B1402-528-DARA	226 37854			
E	7/32	5.6	226 60500	226 65400	B1402-528-EAL	B1402-528-EAR	226 37953			
F	1/4	64	226 60609	226 65509	B1402-528-FALA	B1402-528-FARA	226 38050			
G	9/32	7.1	226 60708	226 65707	B1402-528-GAL	B1402-528-GAR	226 38258			
H	5/16	7.9	226 60807	226 65806	B1402-528-HALA	B1402-528-HARA	226 38357			
K	3/8	9.5	226 60906	226 65905	B1402-528-KALA	B1402-528-KARA	226 38456			
L	1/2	12.7	226 61102	226 66200	B1402-528-LAL	B1402-528-LAR	226 38753	226 50956	226 50451	102 09500
M	5/8	15.9	226 61201	226 66309	B1402-528-MAL	B1402-528-MAR	226 38852			
N	3/4	19.1	226 61300	226 66408	B1402-528-NAL	B1402-528-NAR	226 38951			102 09807
Q	1	25.4	226 61508	226 66705	B1402-528-QAL	B1402-528-QAR	226 39256	226 51053	226 50550	102 09906

(13) LH-3168-7, G type

Table 15

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		2			2.0			
D	3/16	4.8	226 60401	102 39101	B1402-528-DALA	B1402-528-DARA	226 40353			102 09230
E	7/32	5.6	226 60500	102 39200	B1402-528-EAL	B1402-528-EAR	226 40452	226 50857	226 50352	
F	1/4	6.4	226 60609	102 39309	B1402-528-FALA	B1402-528-FARA	226 40551			
G	9/32	7.1	226 60708	102 39408	B1402-528-GAL	B1402-528-GAR	226 40759			
H	5/16	7.9	226 60807	102 39507	B1402-528-HALA	B1402-528-HARA	226 40858			
K	3/8	9.5	226 60906	102 39606	B1402-528-KALA	B1402-528-KARA	22640957			
										102 09500
L	1/2	12.7	226 61102	102 39804	B1402-528-LAL	B1402-528-LAR	226 41252			
M	5/8	15.9	226 61201	102 39903	B1402-528-MAL	B1402-528-MAR	226 41351	226 50956	226 50451	102 09807
N	3/4	19.1	226 61300	101 71106	B1402-528-NAL	B1402-528-NAR	226 41450			
								226 51053	226 50550	
Q	1	25.4	226 61508	101 71304	B1402-528-QAL	B1402-528-QAR	226 41757			102 09906

3. LIST OF THE MAJOR COMPONENTS

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

Table 16

	Without thread trimmer		With thread trimmer	
Model	LH-3128, LH-3168		LH-3128-7, LH-3168-7	
Frequency	50 Hz	60 Hz	Common to 50 Hz and 60 Hz	
Motor	Clutch motor MTL2200040S		SC-1	AC servo motor 200V
			M0001351AA0	M6101351AA0
Motor pulley	ø70 MTKP0070000	ø60 MTKP0060000	ø80 MTSP00800B0	
V-belt	42" MTJVH004200A	41" MTJVH004100A	40" MTJVH004000A	

(2) List of expendable parts

Table 17

Without thread trimmer		With thread trimmer	
LH-3128, LH-3168		LH-3128-7, LH-3168-7	
Part No.	Part name	Part No.	Part name
	Needle DPx5		Needle DPx5
B9117051000	Bobbin	10210805	Bobbin
22612055	Latch hook (asm.)	22653158	Latch hook (asm.) with thread trimmer
22612758	Cap hook (asm.)	22653059	Cap hook asm. with thread trimmer
22688253	Hook (asm.) for an organized split needle bar	22693857	Hook (asm.) for an organized split needle bar and a thread trimmer.
22603708	Felt	10211605	Moving knife
10210805	Bobbin (F type)	22655302	Counter knife
		22655401	Thread presser
		22603708	Felt

(3) Other renewal parts

Table 18

Without thread trimmer		With thread trimmer	
LH-3128, LH-3168		LH-3128-7, LH-3168-7	
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)
22628903	Idling prevention sheet (0.3)	10111508	Idling prevention spring
		22653802	Idling prevention sheet

4. SPECIAL NOTES FOR SAFE OPERATION

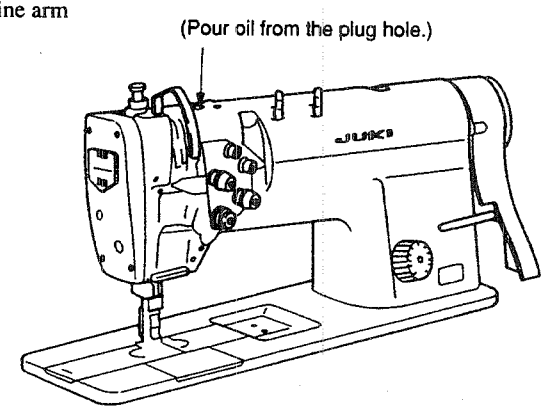
(1) For the LH-3128 and -3168 models of sewing machine without a thread trimmer, the throat plate, feed dog and presser foot developed for the LH-512 or -515 are applicable. Furthermore, commercially available thread trimmer, throat plate, feed dog and presser foot can also be used with them.

(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.

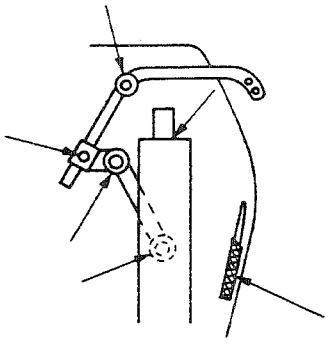
(3) Fill the oil pan with sewing machine oil (New Defrix Oil No. 2) until the H mark is reached.

(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.

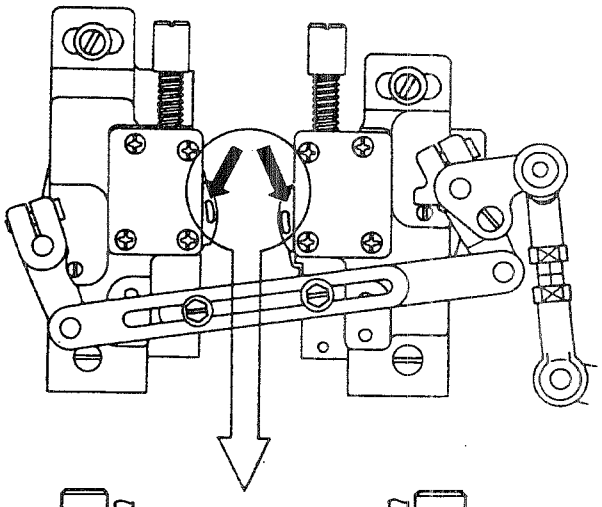
1) Main unit of the machine arm



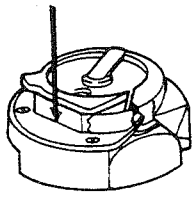
2) Face plate



3) Hook driving shaft saddle



4) Hook race surface (left and right)



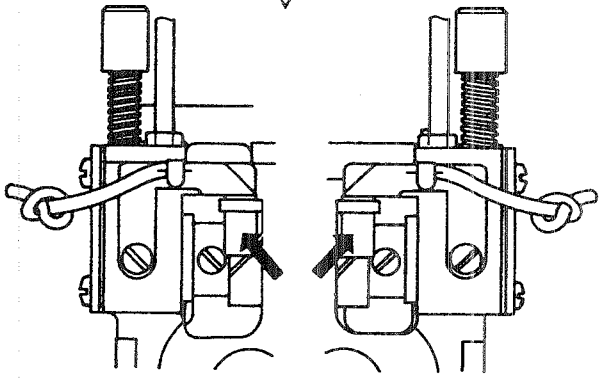


Fig. 1

(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-3128 and -3168 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-3128 Latch hook
LH-3128-7 Latch hook with a thread trimmer

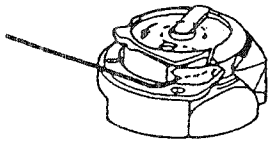


Fig. 2

2) LH-3128 Cap hook
LH-3128-7 Cap hook with a thread trimmer

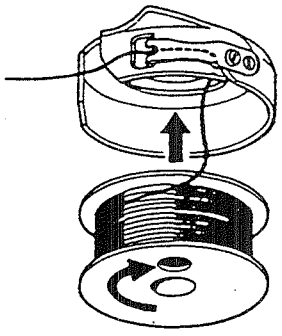


Fig. 3

3) LH-3168 Hook for an organized split needle bar
LH-3168-7 Hook with a thread trimmer and an organized split needle bar

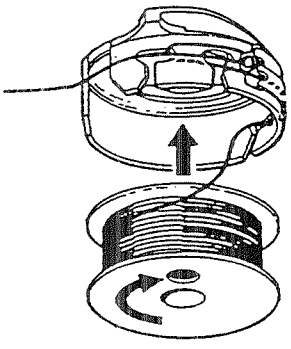


Fig. 4

(7) When synthetic threads are used, use the thread guide arm (asm.) for the thread stand if the thread flaps during sewing.

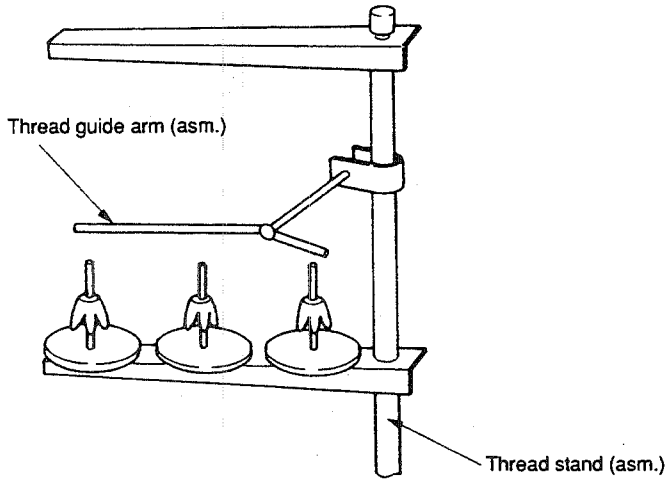


Fig. 5

5. STANDARD ADJUSTMENT

STANDARD ADJUSTMENT

(1) Needle bar and feed dog

1) Initial position of the needle bar

Conditions

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

- LH-3128, LH-3128-7

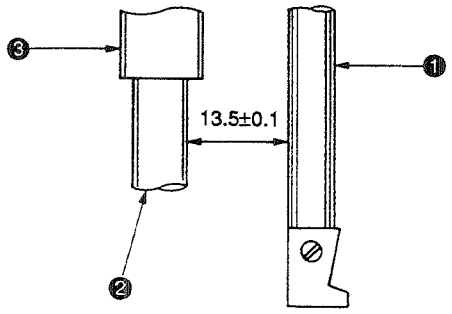


Fig. 6

- LH-3168, LH-3168-7

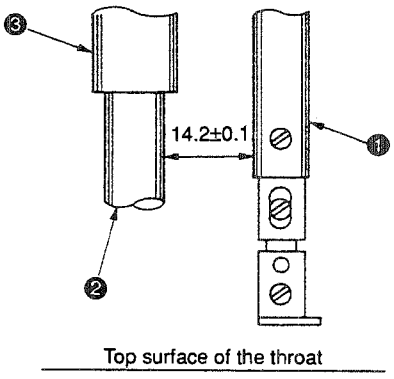


Fig. 7

2) Position and height of the feed dog

Conditions

- Feed amount (stitch length): 0
- 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.

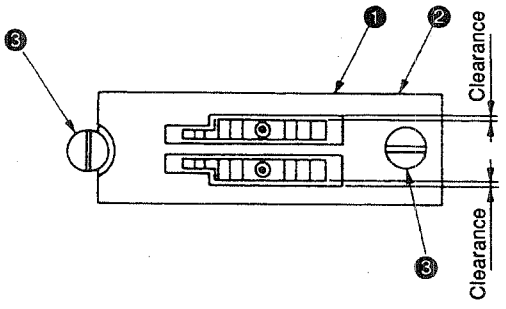


Fig. 9

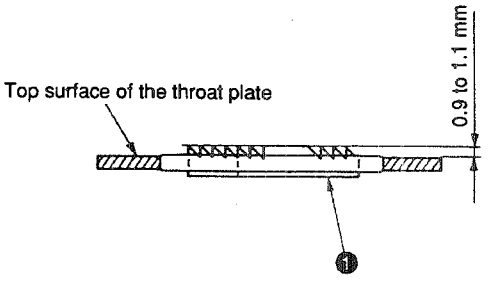


Fig. 10

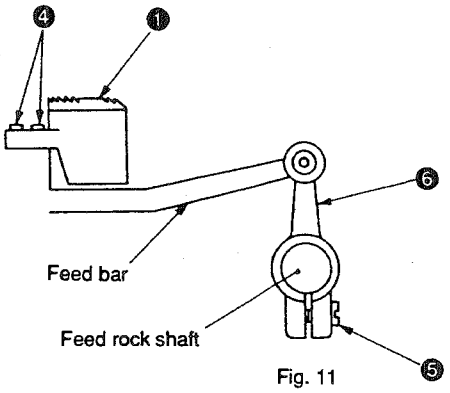


Fig. 11

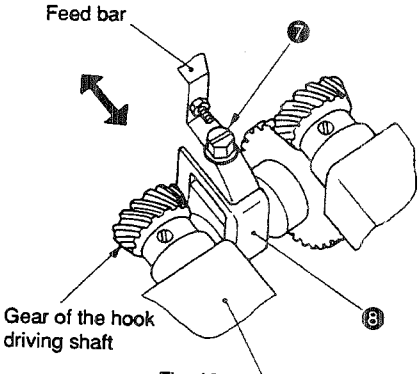
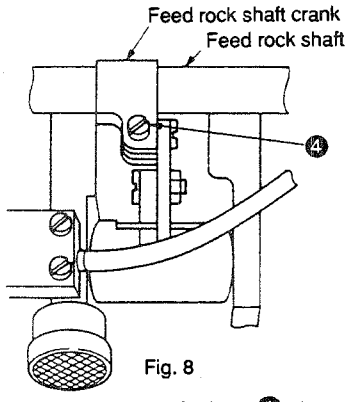


Fig. 12

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 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. ○ Stitch skipping or needle breakage will be caused. ○ Thread trimming failure will be caused.
○ 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 ❷ in the throat plate 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). ○ 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 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: ○ The feed dog will come in contact with the throat plate. ○ The stitch length will be larger than the value indicated by the scale on the stitch dial. ○ Thread trimming failure will occur. When the feed dog is positioned too low: ○ The stitch length will be smaller than the value indicated by the scale on the stitch dial. ○ 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
- Needle bar should be in its lowest dead point.
- Feed amount (stitch length): 0

○ LH-3128, S, A and G type
LH-3128-7, S, A and G type

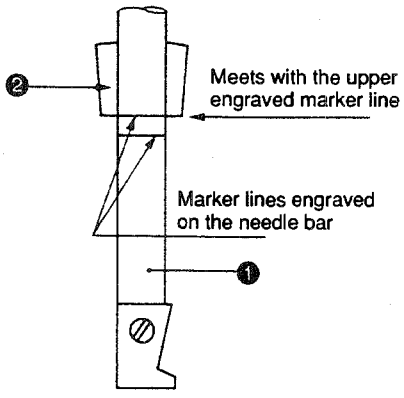


Fig. 13

○ LH-3128, F type

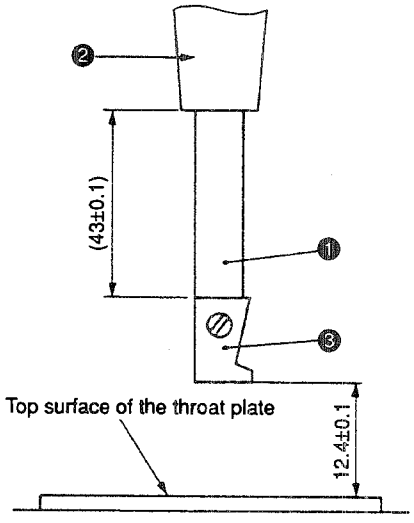


Fig. 14

○ LH-3168, S, A and G type
LH-3168-7, S, A and G type

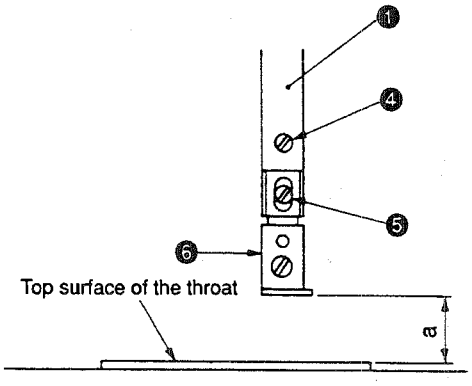
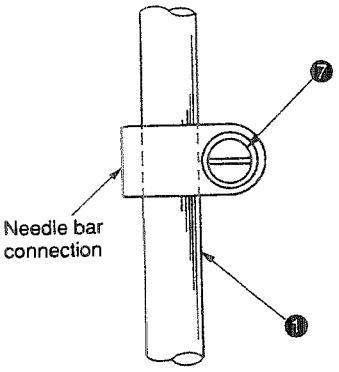
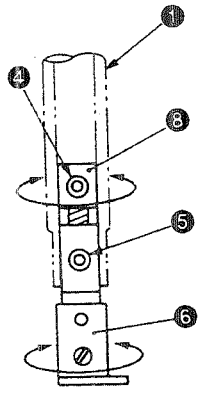


Fig. 15

Table 19

	LH-3168	LH-3168-7
a	12.6±0.15	11.5±0.15

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ LH-3128S, -3128A, -3128G LH-3128-7S, -3128-7A, -3128-7G  Fig. 16 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. ○ LH-3128F 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. Adjust so that bottom end of needle clamp ❸ is spaced 12.4 ±0.1 mm from the top surface of the throat plate. Then, tighten clamping screw ❼. * The two marker lines engraved on the needle bar are ineffective. ○ LH-3168S, -3168A, -3168G LH-3168-7S, -3168-7A, -3168-7G The needle bar height is determined by the height of the needle clamp.  Fig. 17 ○ 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. ○ Spring shoe ❽ goes up or comes down by 0.3 mm in one 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 19. 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.**	Change in height of the needle bar may result in stitc skipping or thread breakage.

4) Needle entry

Conditions

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

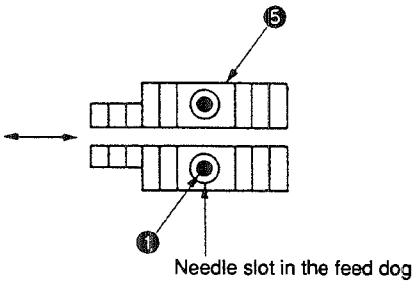


Fig. 18

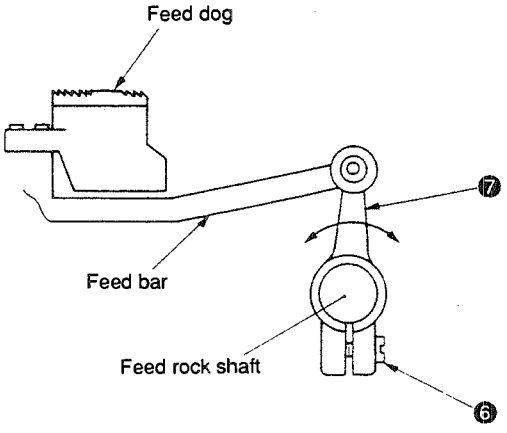


Fig. 20

- LH-3168
  LH-3168-7

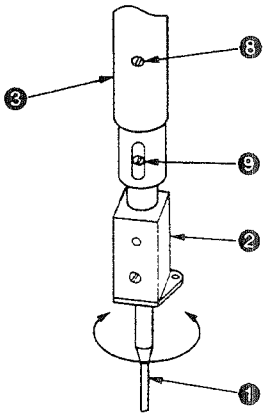


Fig. 19

- LH-3128
  LH-3128-7

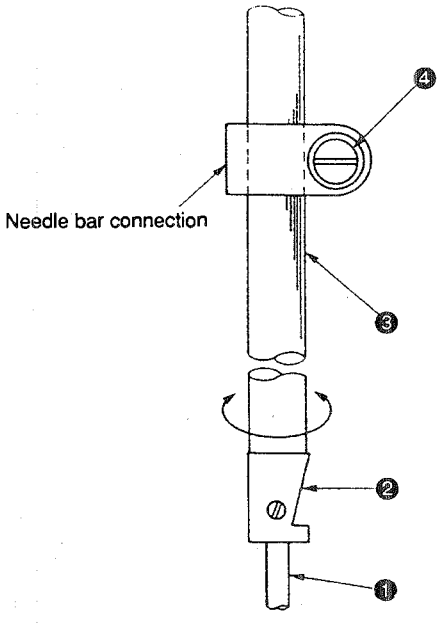


Fig. 21

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ LH-3128, -3128-7 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 7 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.** ○ LH-3168, -3168-7 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.**	○ Stitch skipping and thread breakage will be caused. ○ Poorly tensed seam will result. ○ When the feed dog has elongated needle slots (2 mm x 3 mm), the needle thread will be loosened if the needles enter the far end of the respective elongated slots viewed from the operator. * When the feed dog has elongated needle slots, thread trimming failure will result if the needles enter the near end of the respective elongated slots, as viewed from the operator, at the time of thread trimming.

(2) Needle-to-hook relation

Conditions

- The needle bar ascends from the lowest dead point of its stroke.
- Feed amount (stitch length): 2.5 (For G type, it should be set at 3.5.)

1) Lift of the needle bar

LH-3128
LH-3128-7

LH-3168
LH-3168-7

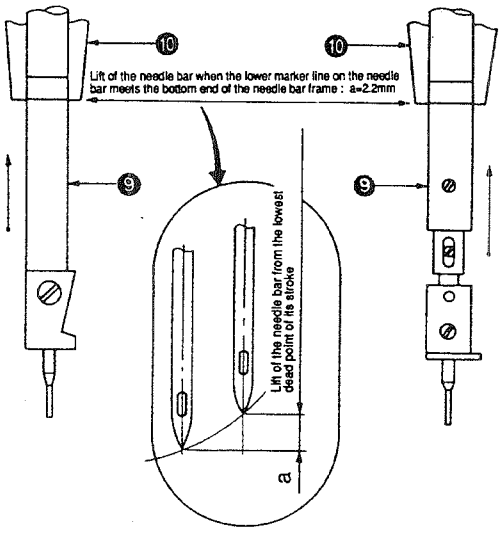


Fig. 22

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

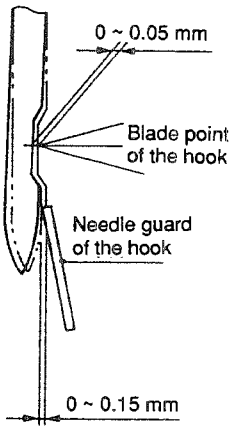
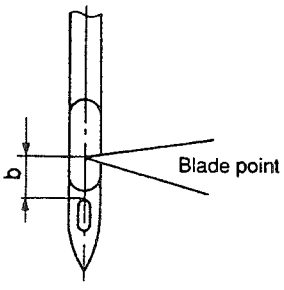


Fig. 23

Table 20

	a mm	b mm
S. A. G	2.2	1.2
F	3.2	0.9

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. 24

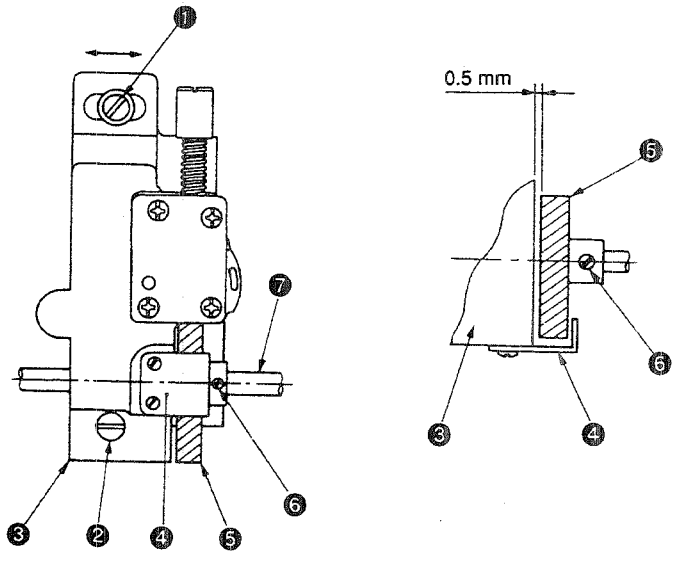
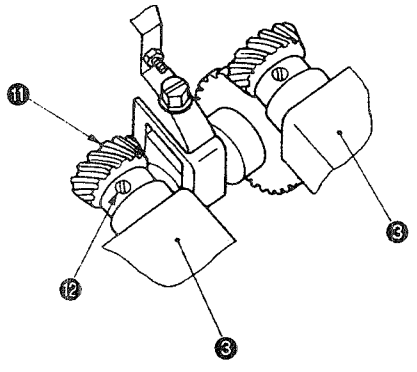


Fig. 25

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ 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. 27 on page 22. 2. Loosen screws ① and ② in the hook driving shaft saddle and two screws ⑥ in the hook driving gear. At this time, do not remove the screw No. 1 (retained in the flat section of hook driving shaft ⑦). Loosen the screw to such an extent that the screw No. 1 does not come hook driving shaft when turning hook driving shaft gear ⑤ by hand. 3. For the sewing machine of which sewing specification is S, A or F, set the stitch dial at 2.5 on the scale. For the sewing machine of which sewing specification is G, set the stitch dial at 3.5 on the scale. 4. Raise needle bar ⑨ from the lowest dead point of its stroke by dimension a. At this time, align the lower marker line engaged on needle bar ⑨ 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 ③ 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 ① and ② to secure hook driving shaft saddle. 6. Adjust so that an approximately 0.5 mm clearance is provided between hook driving shaft screw gear ⑤ and hook driving shaft saddle ③. Then fix hook driving shaft screw gear ⑤ by tighten screws ⑥. 7. Attach connecting link (asm.) ② in position using hinge screw ⑯ as illustrated in Fig. 27 on page 22. ○ To change the position of the needle and the blade point of the hook 1. Loosen three screws ⑫ in hook driving shaft gear ⑪ in Fig. 26. 2. Align the blade point of the hook with the center of the needle, and tighten screws ⑫.  Fig. 26 (Caution) **1. Confirm that hook driving shaft gear ⑤ does not come in contact with hook driving shaft saddle ③ and hook driving shaft gear guide ④.**	Stitch skipping or thread breakage will result.

4) **Position of the connecting link (asm.) and rocking arm plate**
LH-3128-7, LH-3168-7

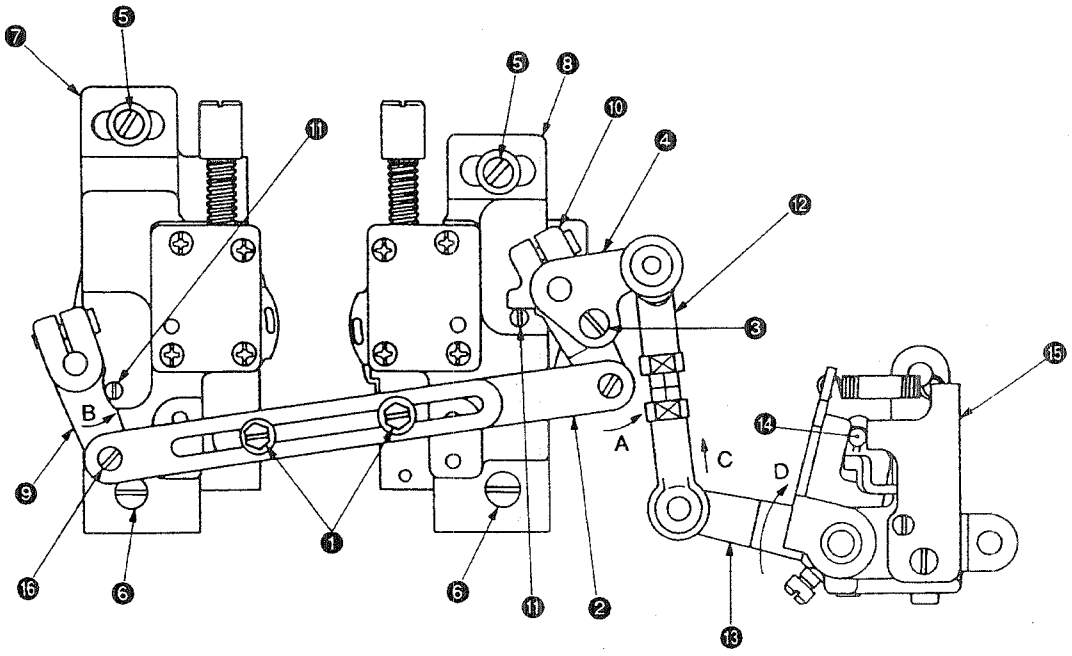


Fig. 27

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

(3) Initial position of the bobbin case opening lever

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

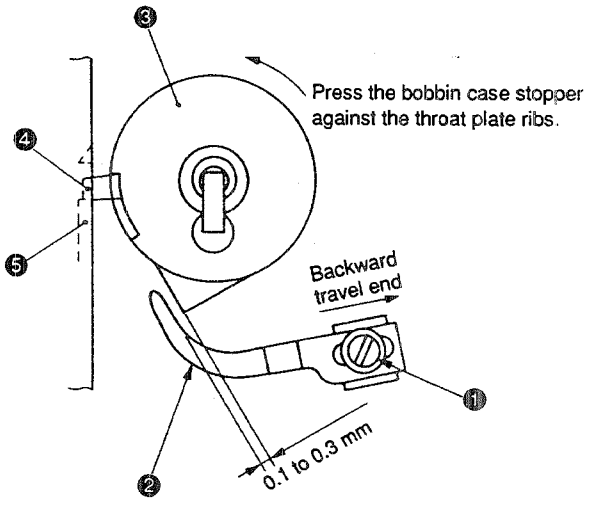


Fig. 28

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 20. 2. After you have finished the adjustments 1), 2) and 3) of (2) on page 20, 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 ❺. 3. Loosen screw ❶ in the bobbin case opening lever and adjust so that a 0.1 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

- 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.

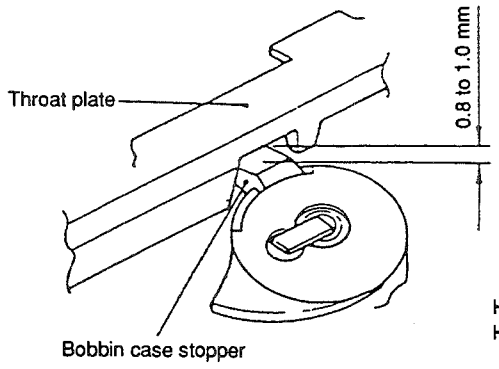


Fig. 29

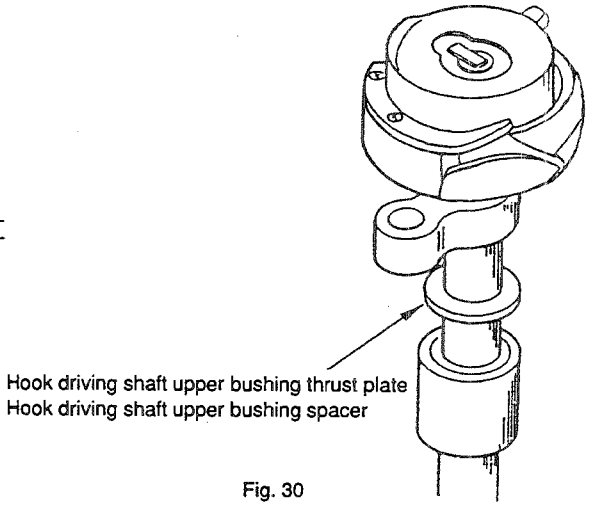
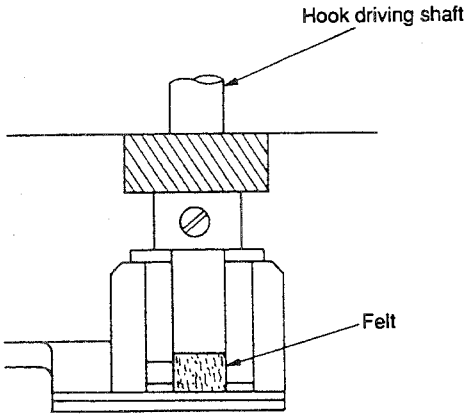


Fig. 30

Table 21

	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	" C	1	1.1
	10111003	" D	2	1.2
	10111102	" E	3	1.3
	10111201	" F	4	1.4
	10109809	" B	5	1.5
	10112506	" G	6	1.6
	10112605	" H	7	1.7
	10112704	" K	8	1.8
Sewing machine without a thread trimmer	10112506	Hook driving shaft upper bushing thrust plate G	6	1.6
	10112605	" H	7	1.7
	10112704	" K	8	1.8
	22614002	Hook driving shaft upper bushing spacer A	A	1.9
	22614101	" B	B	2.0
	22614200	" C	C	2.1
	22614309	" D	D	2.2
	22614408	" E	E	2.3
	22614507	" F	F	2.4

HOW TO ADJUST	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 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.  Fig. 31 (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.**	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.

(5) Feed timing

Condition

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

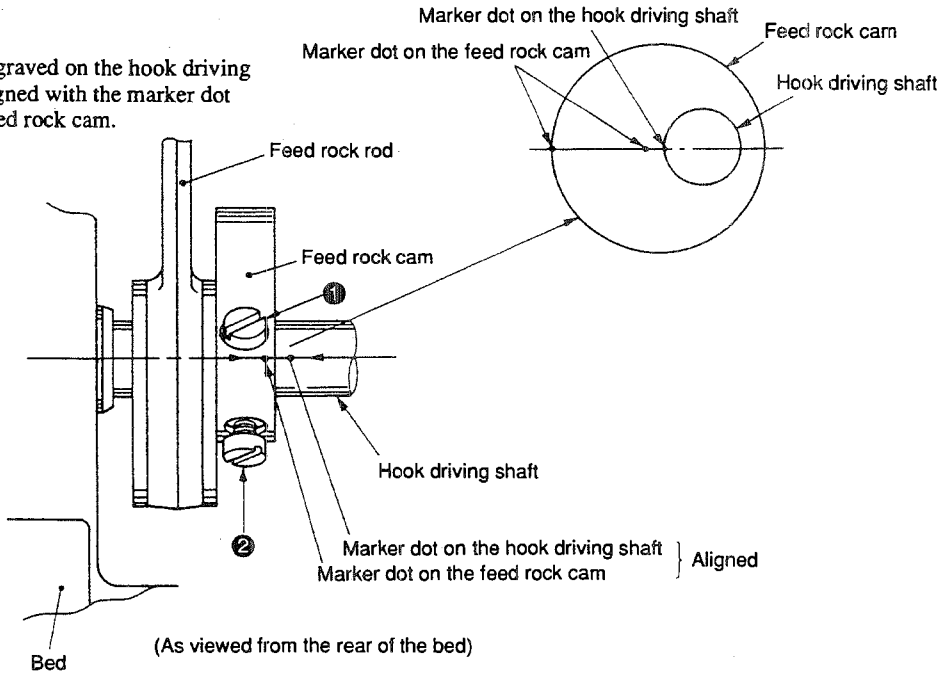


Fig. 32

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

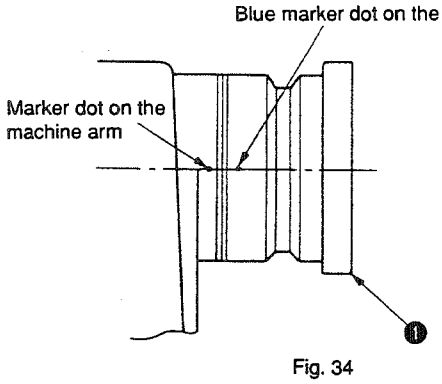


Fig. 34

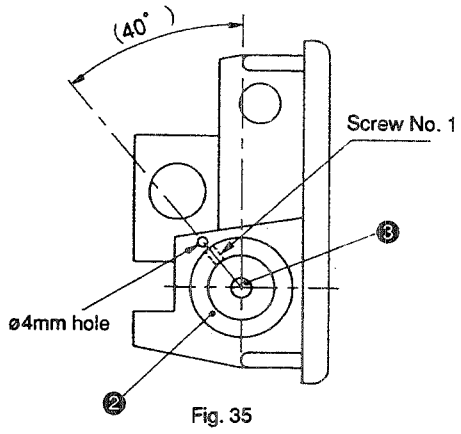
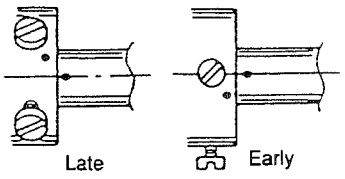


Fig. 35

HOW TO ADJUST	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. 33 ○ 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 4 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) **1. Confirm that the screw No. 1, that is aligned with the 4 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: ○ 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

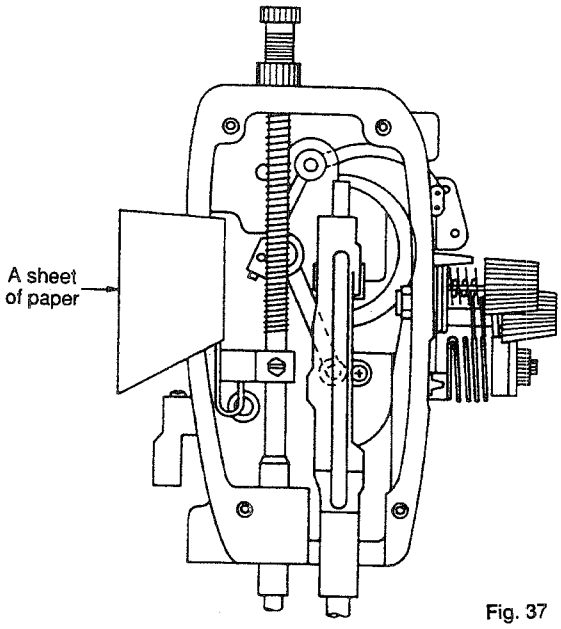


Fig. 37

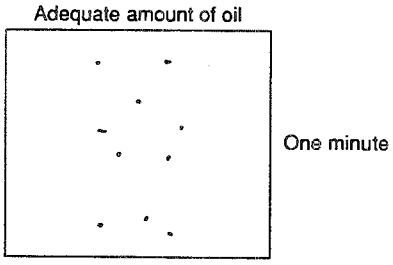


Fig. 36

Conditions

- 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.

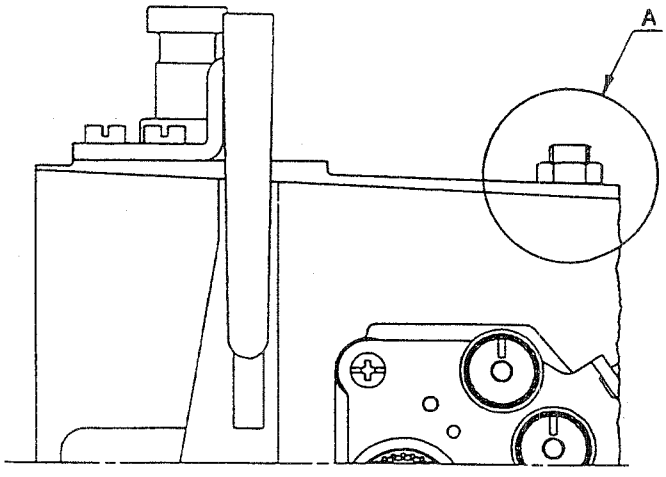
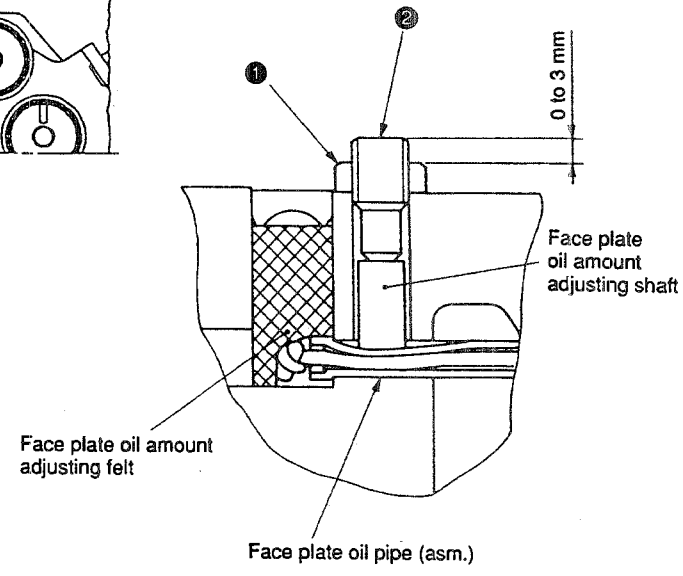


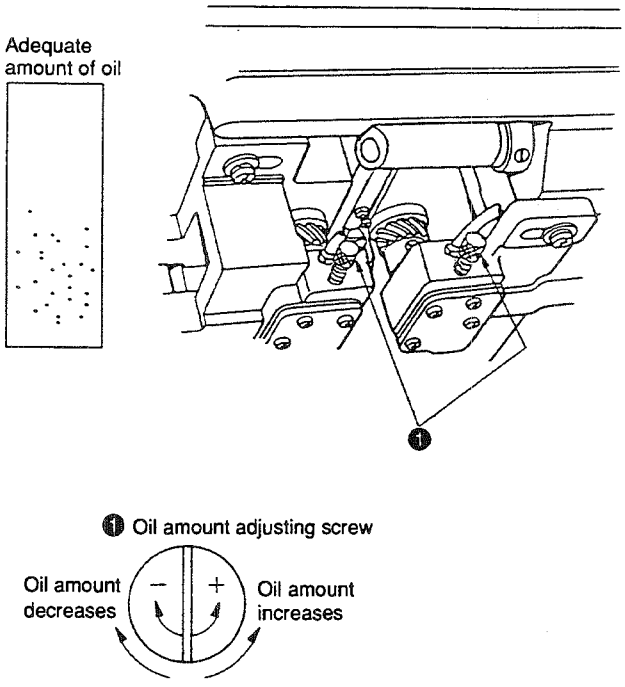
Fig. 38

Detailed figure of portion A



HOW TO ADJUST	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 0 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.**	○ If the amount of oil is insufficient, the needle bar crank or the needle bar crank rod will be seized. ○ If the amount of oil is excessive, oil leakage will result.

2) Amount of oil in the hook



Conditions

- 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. 39

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

Conditions

- 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.

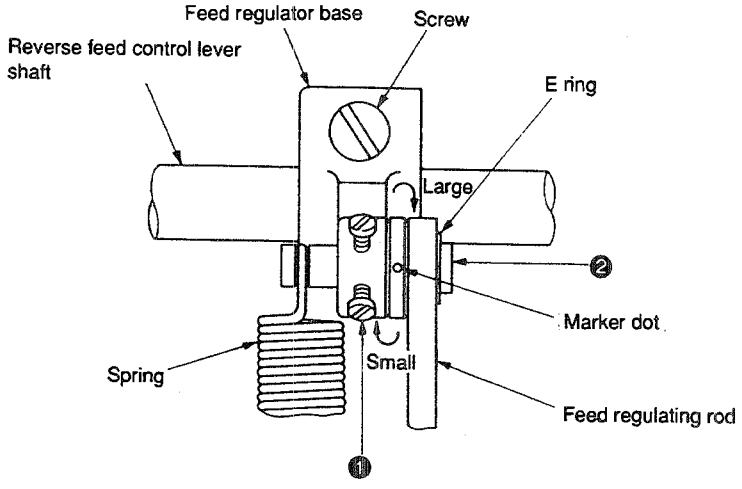
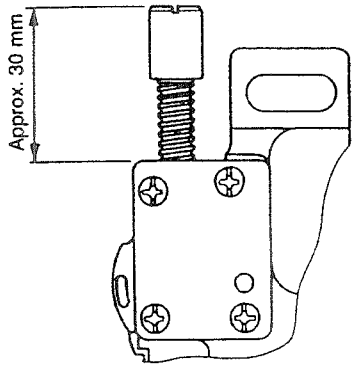


Fig. 41

HOW TO ADJUST	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. Tightening the screw will increase it. (Caution) **Adjust the position of the oil amount adjusting screw referring to Fig. 40.**  Fig. 40	○ If the amount of oil in the hook is insufficient, poorly-tensed seam will result. Furthermore, the hook will become hot causing seizure. ○ 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.	○ The stitch length for the reverse feed stitching will be different from that for the normal feed stitching.

(9) Synchronizer

1) Installing the synchronizer

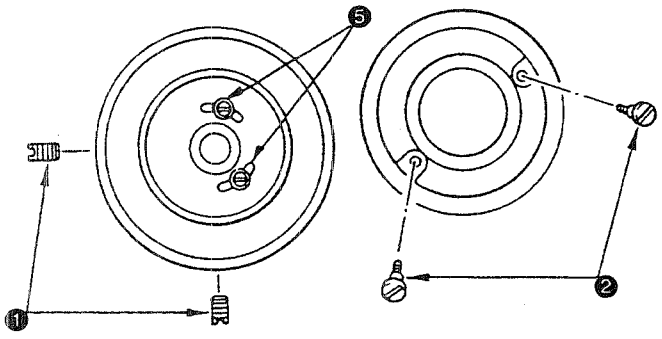


Fig. 42

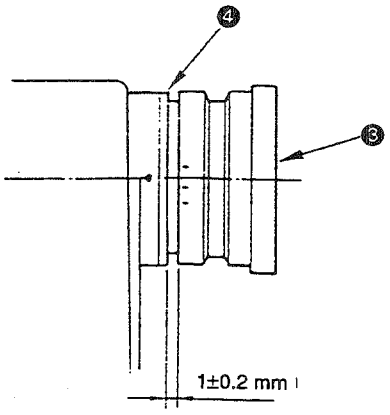


Fig. 43

Fig. 44

2) Needle-up stop position of the sewing machine

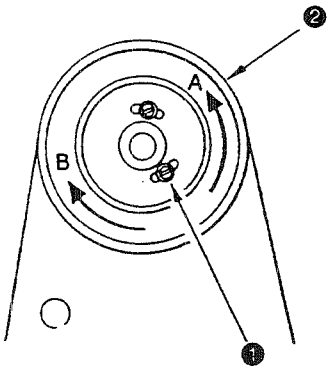


Fig. 45

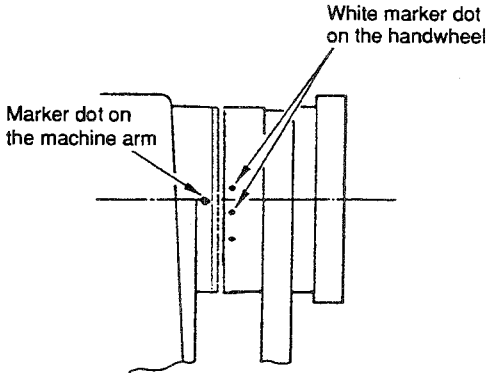


Fig. 46

3) Needle-down stop position of the sewing machine

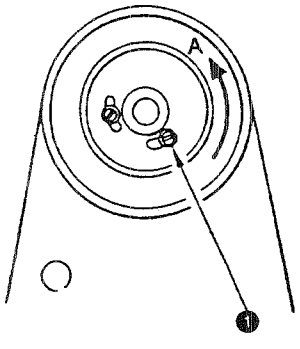
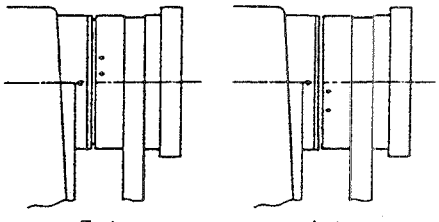


Fig. 48

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
How to replace the synchronizer 1. Remove the bolt cover. Loosen screws ❶ in the handwheel and remove handwheel ❸. 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±0.2 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.	○ The stator is made of plastic. So, tighten the screw with an approximately 15 kg.cm torque. ○ Confirm that the handwheel does not interfere with the stator. ○ Confirm that the V belt does not come in contact with the cable. ○ 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. ○ To advance the needle-up stop timing of the sewing machine → Move the screw in direction A. ○ 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. 47 ○ 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-3168, LH-3168-7

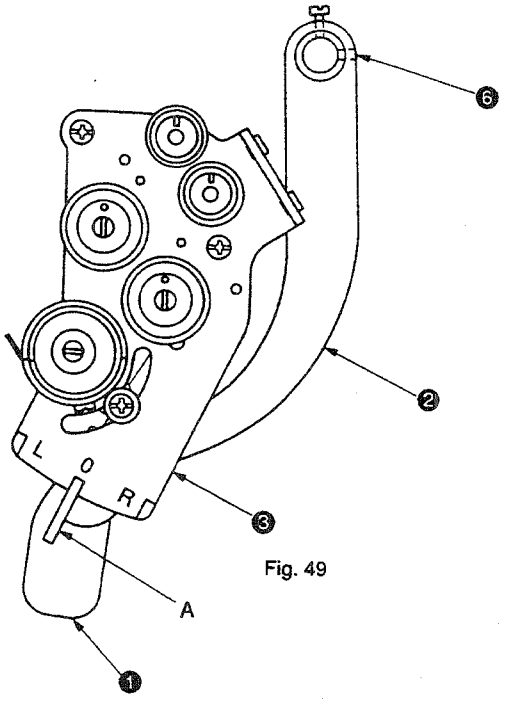


Fig. 49

Conditions

- 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.

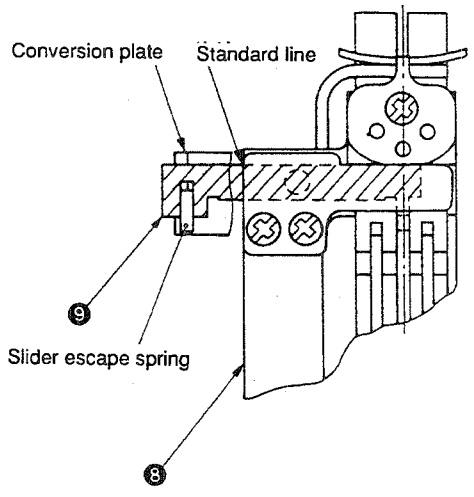


Fig. 50

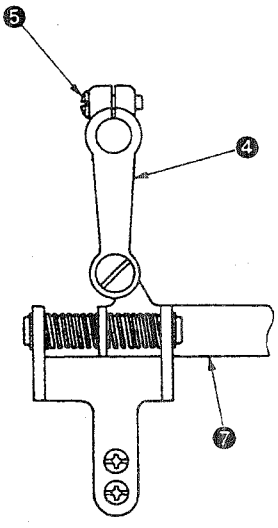


Fig. 51

HOW TO ADJUST	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. 51, 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

- 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.

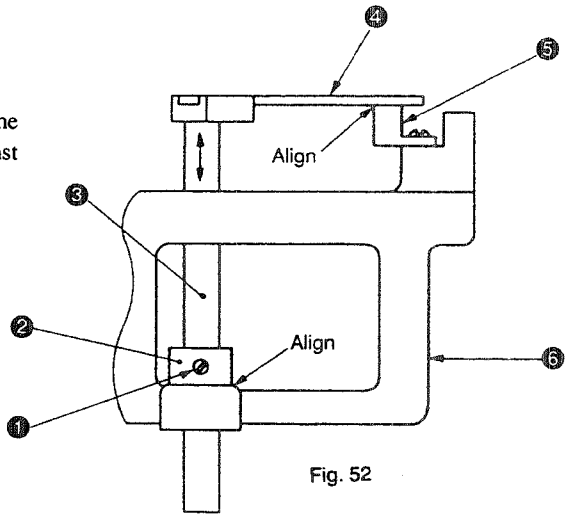


Fig. 52

2) Initial position of the counter knife and thread presser

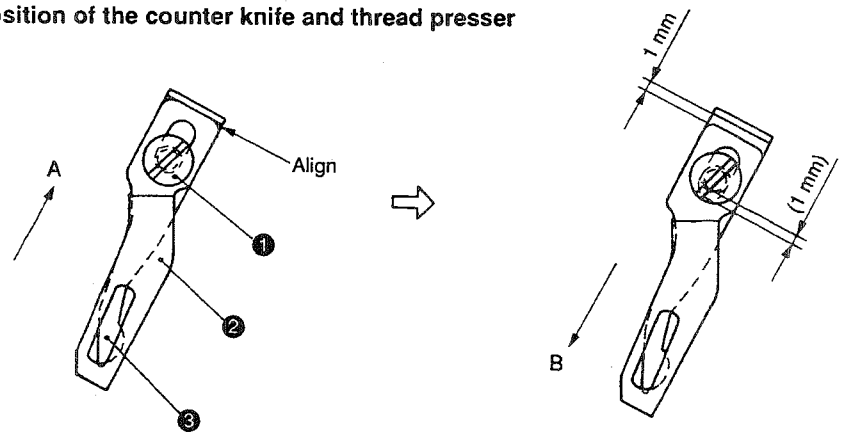


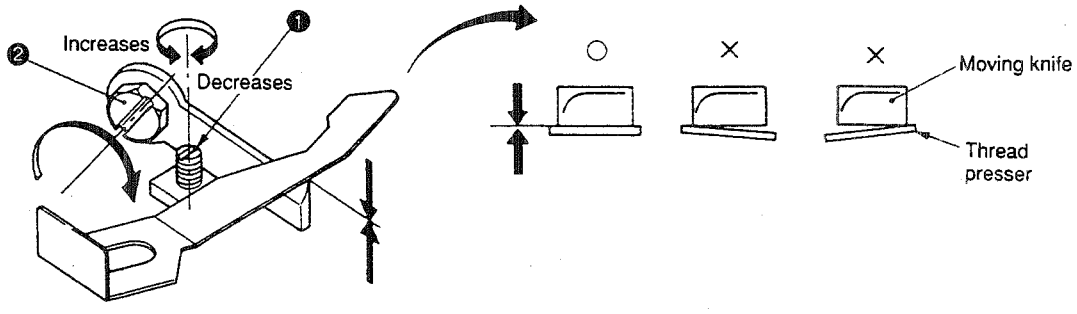
Fig. 53

Conditions

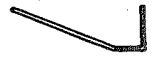
- Only loosen the screw in the counter knife and never remove it.

3) Clamp pressure

Fig. 54



If the moving knife comes in single-sided contact with the thread presser, 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.

HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1. Remove the counter knife, thread presser 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.	○ The thread trimmer will fail to cut the thread sharp. ○ Bobbin thread clamp failure will result. ○ 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. Do not remove the screw from the knife. 2. Align the rear end of counter knife ❷ with section L of thread presser ❸. Then, simultaneously move the counter knife and thread presser back in direction A until they will go no further. 3. Keeping thread presser ❸ held in the backward travel end, move counter knife ❷ forward in direction B by 1 mm. 4. Tighten screw ❶ in the counter knife. (Caution) **1. Be sure to correctly adjust the initial position of the counter knife and thread presser. The initial position of the moving knife is determined by the position of the counter knife.**	○ If the initial position of the thread presser is not properly adjusted, a bobbin thread clamp failure will result. ○ If the initial position of the counter knife is not properly adjusted, a thread trimming failure will result.
1. The underside of the moving knife comes in contact with the thread presser when the thread presser, moving knife and counter knife are installed on the sewing machine. 2. In the aforementioned state, make the thread presser adjusting metal fitting with the thread presser. 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 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 90° from the position at which the thread presser adjusting metal fitting comes in contact with the thread presser.	If the pressure of the thread presser is insufficient: ○ 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: ○ Several stitches will skip at the start of sewing. If the shape of the thread presser is defective: As viewed from this side  ○  Bobbin thread clamp failure will be caused. ○  Needle thread clamp failure will occur. ○  Normal

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

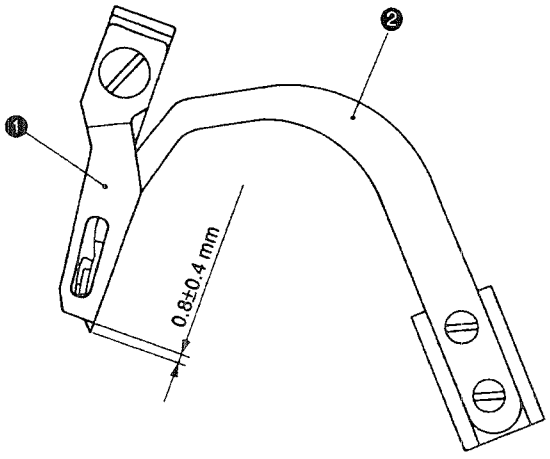


Fig. 55

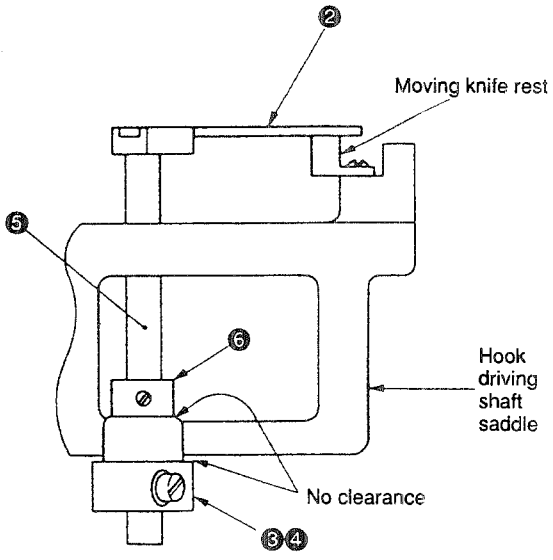


Fig. 56

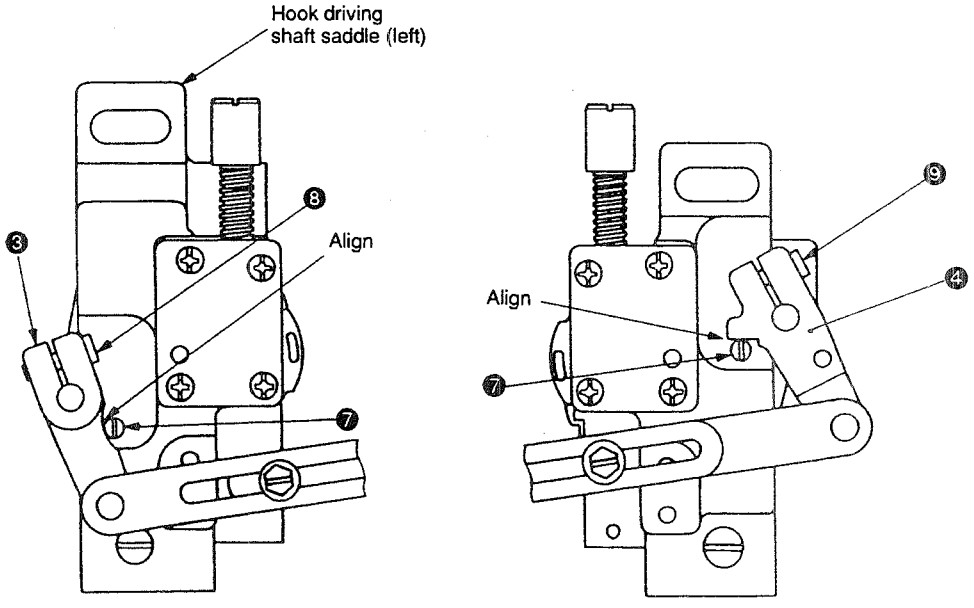
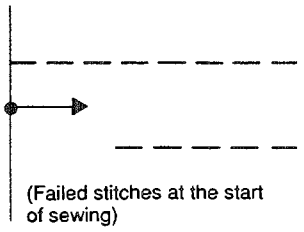


Fig. 57

Conditions

- Top end of the counter knife 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 ADJUST	RESULTS OF IMPROPER ADJUSTMENT
1. Turn moving knife ❷ to adjust so that the top end of counter knife 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 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 is larger than the specified value: ○ Thread trimming failure will result. ○ Bobbin thread clamp failure will occur. If the distance between the top end of the moving knife and that of the counter knife is smaller than the specified value: ○ Bobbin thread clamp failure will occur. ○ 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. 58 * 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±0.4mm) from the moving knife to the counter knife).

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

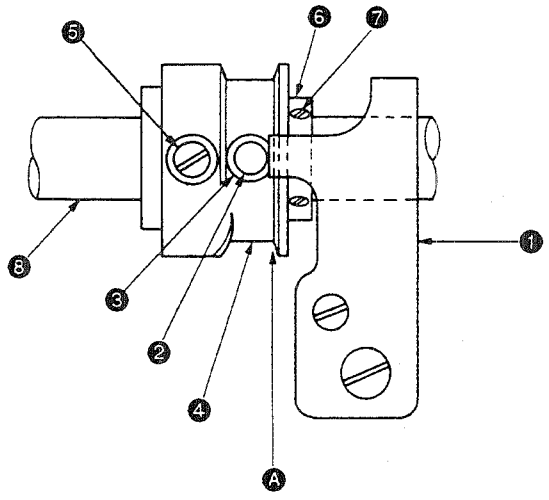


Fig. 59

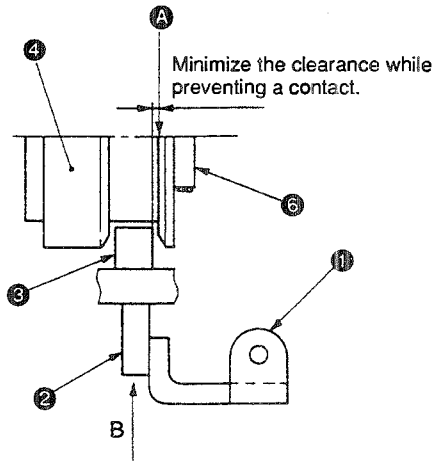


Fig. 60

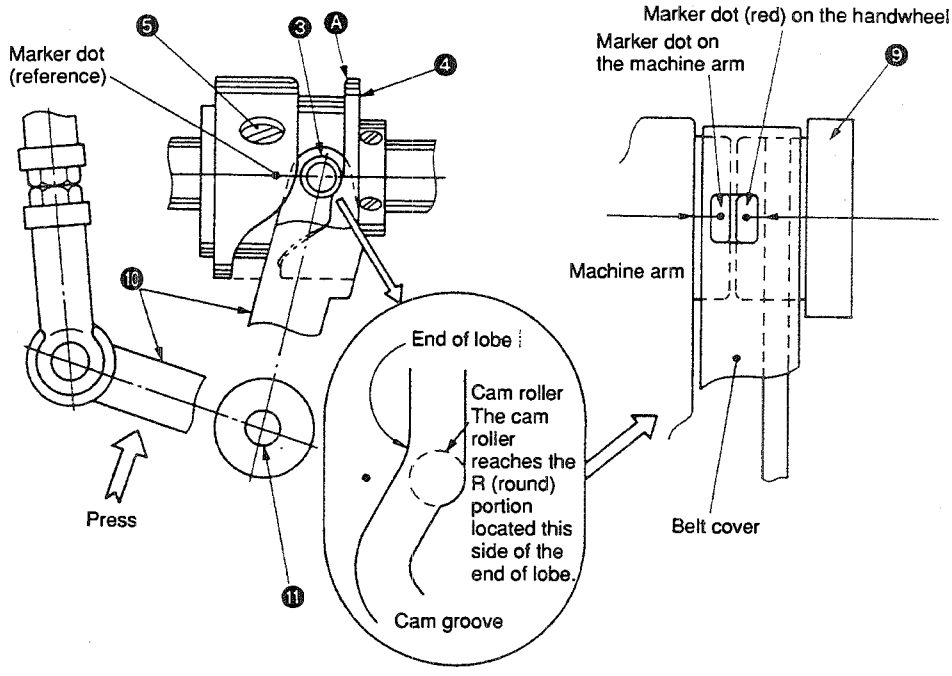


Fig. 61

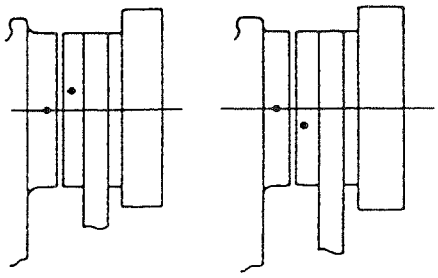
HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT

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 A of thread trimming cam 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 A of the cam groove on thread trimming cam ❹.

(Caution) ○ **Checking the thread trimming timing**

1. Pressing cam follower (asm.) ❿ in direction B, 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. 62

If the thread trimming timing is excessively advanced:

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

If the thread trimming timing is excessively retarded:

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

6) Position of the thread trimming magnet

Conditions

- 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.

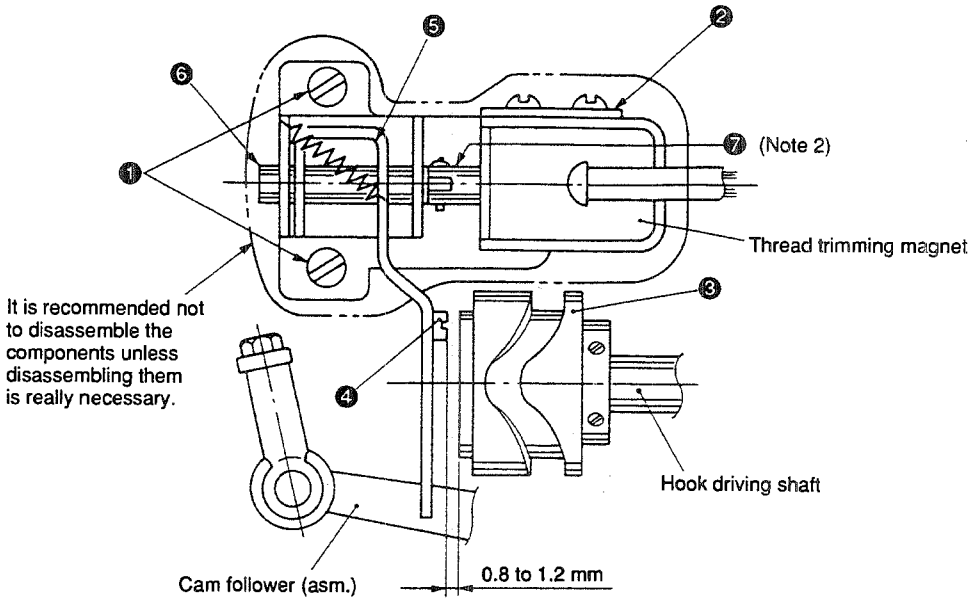


Fig. 63

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

Conditions

- 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.

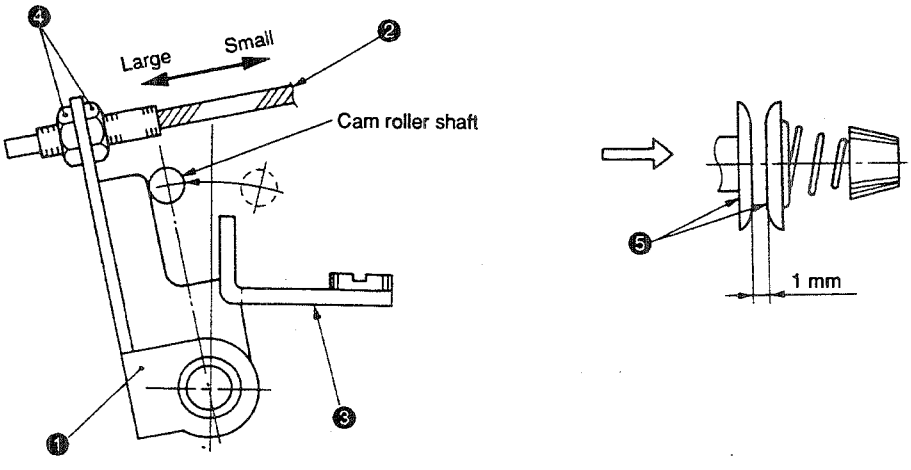
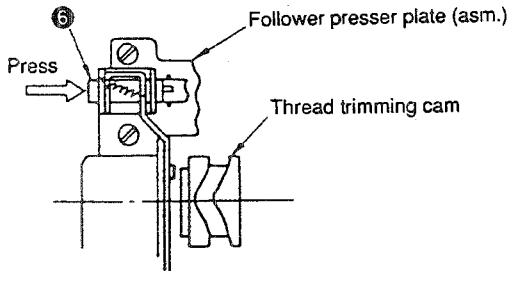


Fig. 64

HOW TO ADJUST	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: ○ Thread trimming failure will be caused. If the clearance between the thread trimming cam and the presser plate driving screw is too small: ○ 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. 65, 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. 65	If the clearance provided between the tension disks is too large: ○ Related components will break. If the clearance provided between the tension disks is too small: ○ The remaining length of the needle thread will be decreased. ○ The needle thread will slip off the needle eyelet.

8) Position of the follower guide

Conditions

- When the cam roller shaft comes in contact with the follower stopper plate (Figs. 59 and 60 on page 40), a clearance of 0.2 to 0.3 mm should be provided between the follower guide plate and the cam follower (asm.).

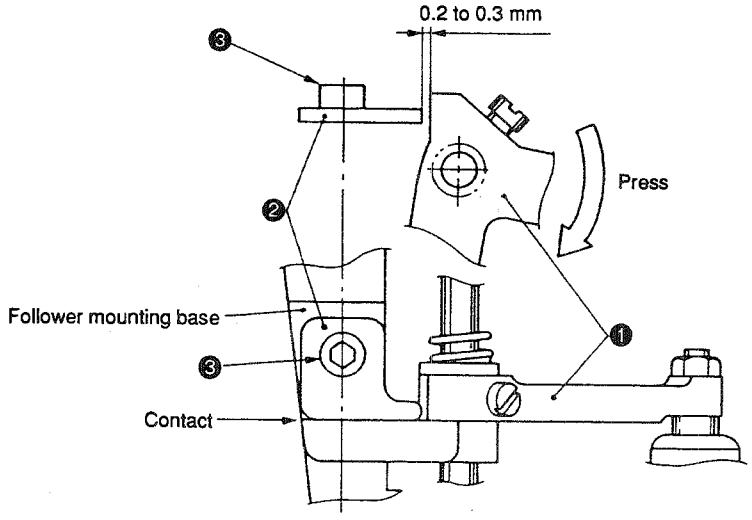


Fig. 66

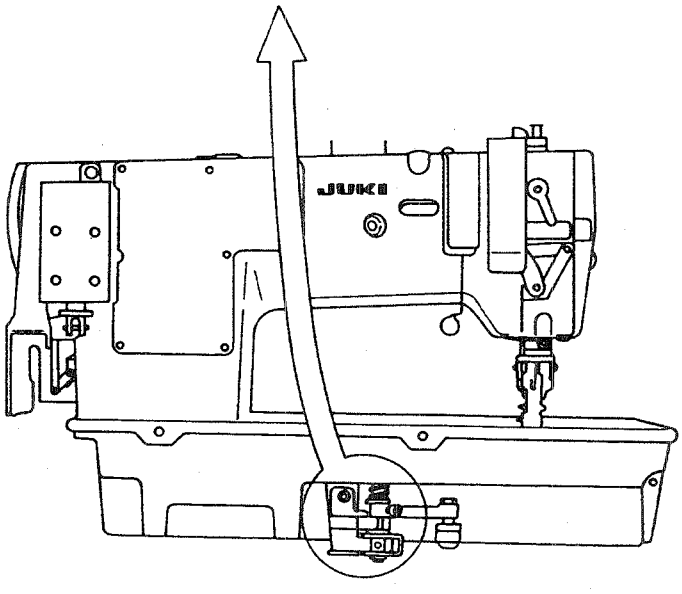


Fig. 67

HOW TO ADJUST	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 (Figures 59 and 60 on page 40). 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.)

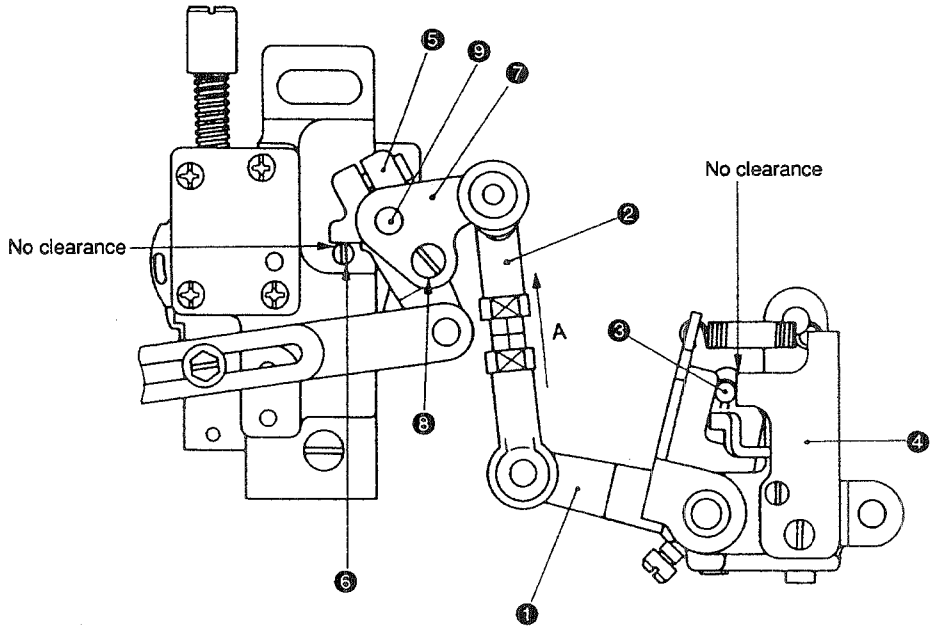


Fig. 68

Conditions

- 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. ○ Bobbin thread clamp failure will occur. ○ Thread trimming failure will occur. ○ The sewing machine will be locked.

(2) Wiper components

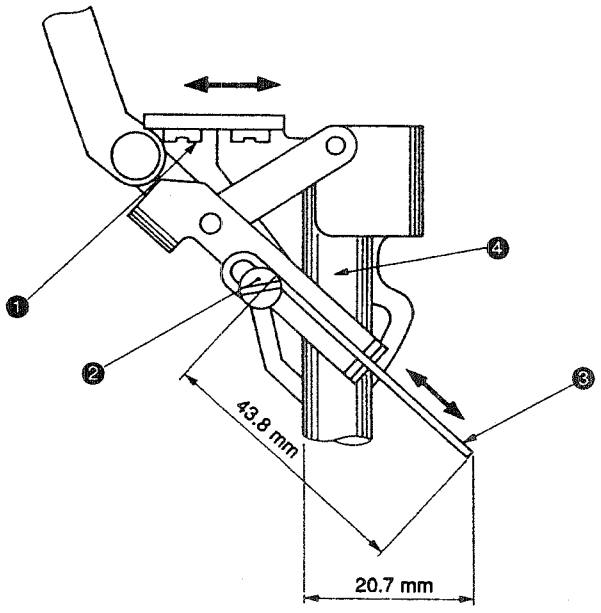


Fig. 69

(3) Position of the reverse stitching magnet

Conditions
- Stitch length (feed amount): Maximum
- A clearance of 0.5 to 1 mm should be provided between the reverse stitching magnet and the plunger radial plate when the reverse feed control lever is pressed down until it will not go further.

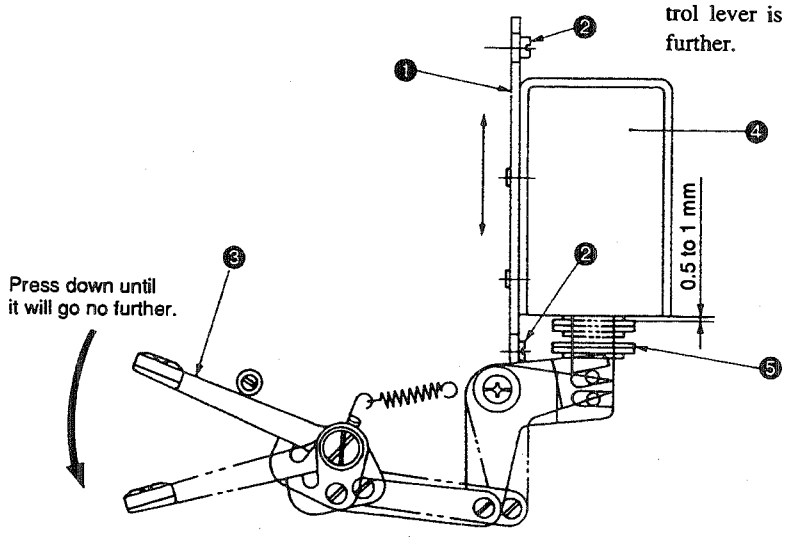


Fig. 71

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.	○ 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. ○ 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. ○ 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 radial plate 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 radial plate and the reverse stitching magnet is larger than the specified value: ○ 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 radial plate and the reverse stitching magnet: ○ The stitch length for reverse feed stitching will be decreased.

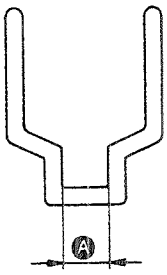


Fig. 70

Table 22

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

(4) Initial position of the reverse feed control lever

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

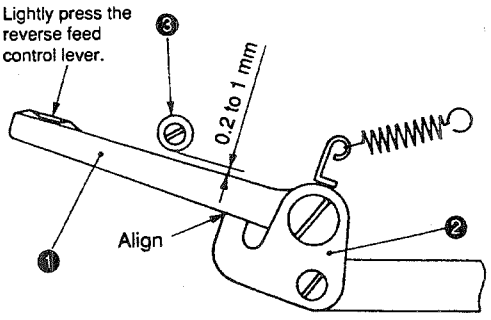


Fig. 72

Conditions

- Stitch length (feed amount) should be maximized.
- 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.

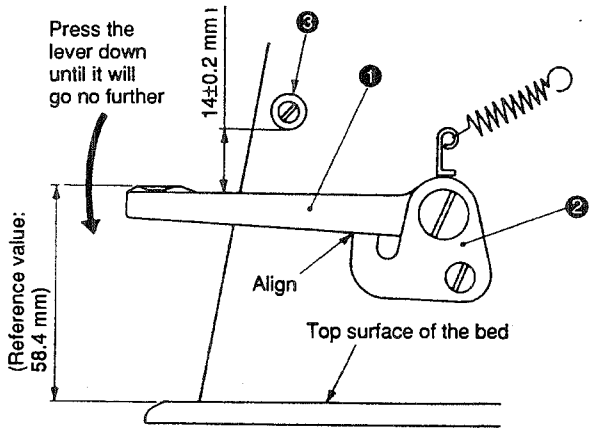


Fig. 73

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

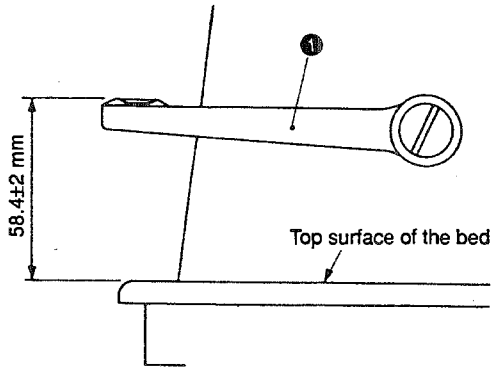


Fig. 74

Conditions

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

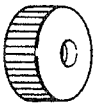
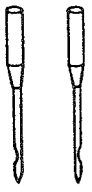
HOW TO ADJUST	RESULTS OF IMPROPER ADJUSTMENT
○ For the sewing machine equipped with an automatic reverse feed stitching function 1. Set the stitch dial at the maximum value on the scale. 2. Lightly press reverse feed control lever ❶ down until it meets reverse feed link (1) ❷. At this time, a clearance 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. ○ 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): ○ The kinky reverse feed control lever will occur. ○ 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: ○ Stitch length will be reduced when performing reverse feed stitching.

7. 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

Table 23

Name of part	S type	A type	G type	F type
Tension spring 	Part No. B3129012A00 Wire diameter 1.0 mm	Part No. D3129555D00 Wire diameter 0.9 mm	Part No. B3114232000 Wire diameter 1.2 mm	Part No. D3129555D00 Wire diameter 0.9 mm
Tension spring No. 1 	Part No. 11045101	Part No. 11045101	Part No. 11093606	Part No. 11045101
Stitch dial  (Caution) 1	Part No. 11071909 Stitch length 5	Part No. 11071909 Stitch length 5	Part No. 11071909 Stitch length 5	Part No. 11072006 Stitch length 4
Needle (standard)  (Caution) 2	DPx5 #14 MDP500B1400	Without a thread trimmer DPx5 #9 MDP500B0900 With a thread trimmer DPx5 #11 MDP500B1100	DPx5 #21 MDP500B2100	134 SES SERV7 Nm65 MC200520650

(Caution) 1. **Stitch dial for the F type of sewing specification is different from that for the other types of sewing specifications. The stitch dial is changed in the steps of procedure described below.**

1) **Align the "0" on the scale of stitch dial with the marker dot engraved on the machine arm.**
2) **Remove the screw from the stitch dial. At this time, take care not to allow the stitch dial to turn.**
3) **Align the "0" on the scale of the stitch dial to be used with the marker dot engraved on the machine arm. Then, tighten the screw.**
4) **Set the stitch dial at the max. value on the scale. Check that the max. number (5 or 4) on the scale is aligned with the marker dot engraved on the machine arm. If they are not aligned with each other, loosen the screw in the stitch dial and adjust the max. number on the scale to the marker dot on the machine arm. Then, tighten the screw in the stitch dial.**

(Caution) 2. **When replacing the needle for changing the sewing specification, adjust the needle referring to "(2) Needle-to-hook timing" on page 20.**
Only for the F type of sewing specification, the needle bar height, needle-to-hook timing and the lifting amount of the needle bar from its lowest dead point are different from those for the other types of sewing specifications. So, adjust those items referring to "3) Needle bar height" on page 16 and "(2) Needle-to-hook timing" on page 20.

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 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 gear ❾ by hand.

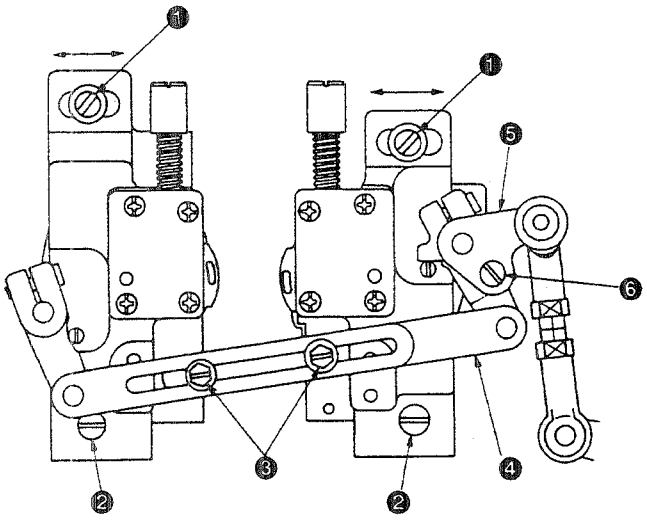


Fig. 75

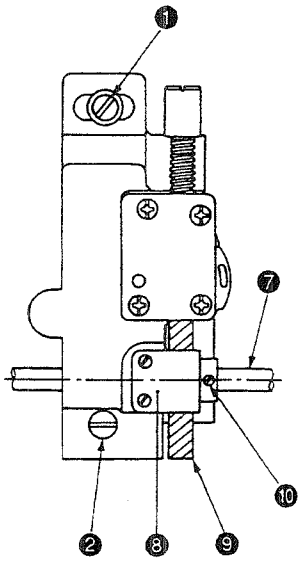


Fig. 76

(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 14.
3) Attach the needle clamp and needle in position. —— Refer to "4) Needle entry" on page 18.
4) Adjust the height of the needle bar. ———— Refer to "3) Needle bar height" on page 16.
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 20.
8) Fix the hook driving shaft gear in position. ——— Refer to "(2) Needle-to-hook relation" on page 20.
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 48.

(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.**

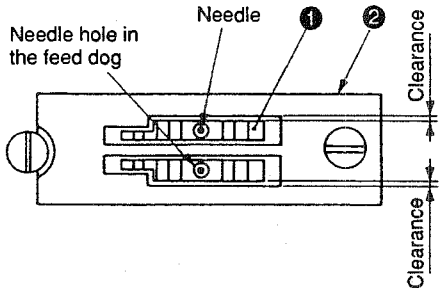


Fig. 77

2. For the LH-3128F type of sewing machine, adjust the height of the needle bar, when the stitch length is set to 0 (zero) and the needle bar rests in the lowest dead point of its stroke, so that the bottom end of the needle clamp is 12.4±0.1 mm above the top surface of the throat plate.
For the A, G and S types of the sewing machines, 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 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 ⑩. Do not remove hook driving shaft gear guide ❽.

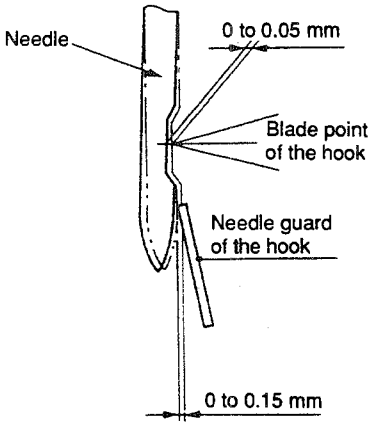


Fig. 78

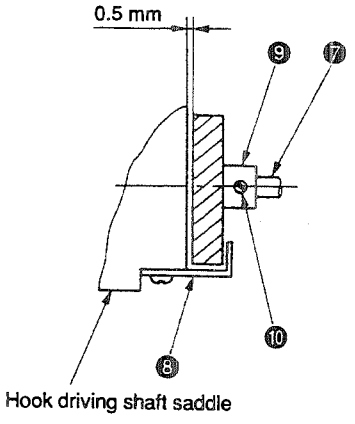


Fig. 79

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

9. REPLACING THE TIMING BELT

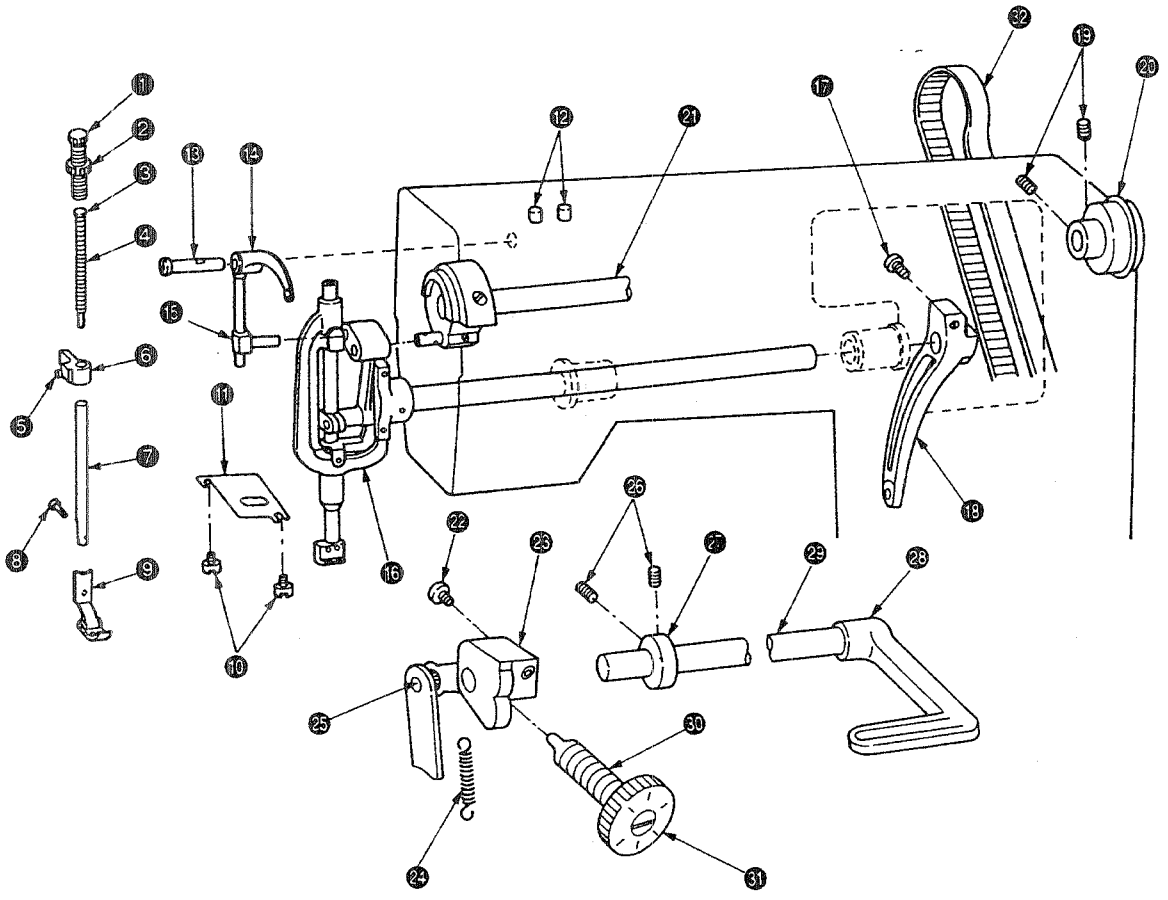


Fig. 80

* The below-mentioned replacing procedure has been prepared for the LH-3128 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 counterweight (joint) 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 ㉒ in position from the side plate of the machine arm. Then pass counterweight (joint) ㉑ through the timing belt.
2) Tighten screws ⑲ in main shaft thrust collar ⑳ taking care to remove a play at counterweight (joint) 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 ㉒ 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 26.
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.
Tighten screw ㉒ referring to "(4) Initial position of the reverse feed control lever" on page 50.
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 14. 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.

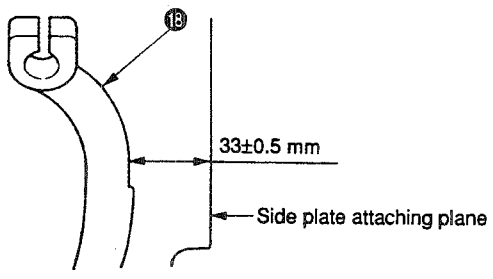
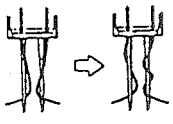


Fig. 81

13) Re-confirm that needle entry is correct referring to "4) Needle entry" on page 18.

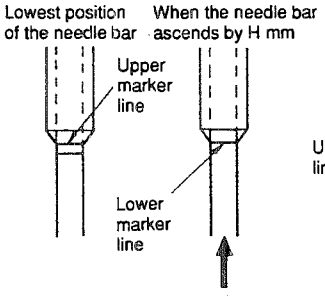
10. TROUBLESHOOTING CHART

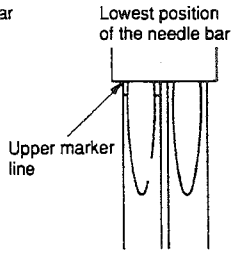
Phenomenon	Cause	Item to be inspected	Corrective measure
Thread breakage	Groove on the bobbin case stopper of the throat plate has scratches.		Grind the groove on the bobbin case stopper.
	The needle thread tension is too high.	The tension applied to the needle thread.	
	Needle-to-hook timing is not 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.
		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 0.05 mm.
		The clearance provided between the hook and the throat plate.	Check the clearance provided between the hook and the throat plate.
		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.
	Amount of oil in the hook is insufficient.	Amount of oil in the hook.	Properly adjust the amount of oil in the hook.
	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. 	
	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.

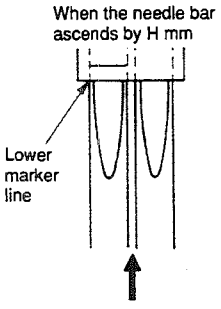
Phenomenon	Cause	Item to be inspected	Corrective measure
Loose stitches are produced.	Same as the aforementioned causes given in the "Thread breakage." Other causes are described below in addition to them.		
	Bobbin fails to move smoothly.		Replace the bobbin with a new one.
	The clearance provided between 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.
	The feed dog is positioned too high.	Check the height of the feed dog.	Adjust the height of the feed dog to 1 mm.
	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 caseand the throat plate.	Adjust the clearance provided between the bobbin case and the throat plate to 0.9 mm.
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.

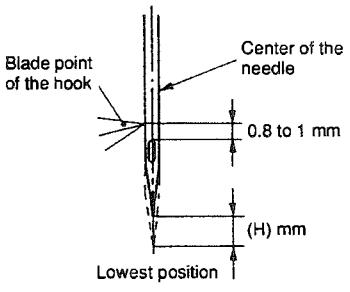
Phenomenon	Cause	Item to be inspected	Corrective measure
Stitch skipping frequently occurs.	Same as the aforementioned causes of "Needle-to-hook relation" in the "Thread breakage"		
	Presser foot pressure is too low.	Pressure of the presser foot.	Increase the presser foot pressure.
	Blade point of the 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.	Correct the blade point of the hook or replace the hook with a new one.	Adjust the needle guard of the hook so that it works normally.
	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."



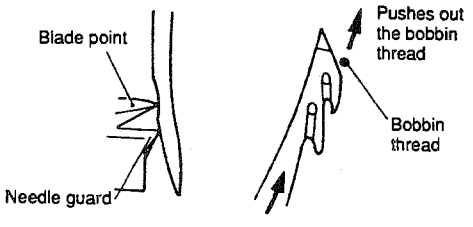




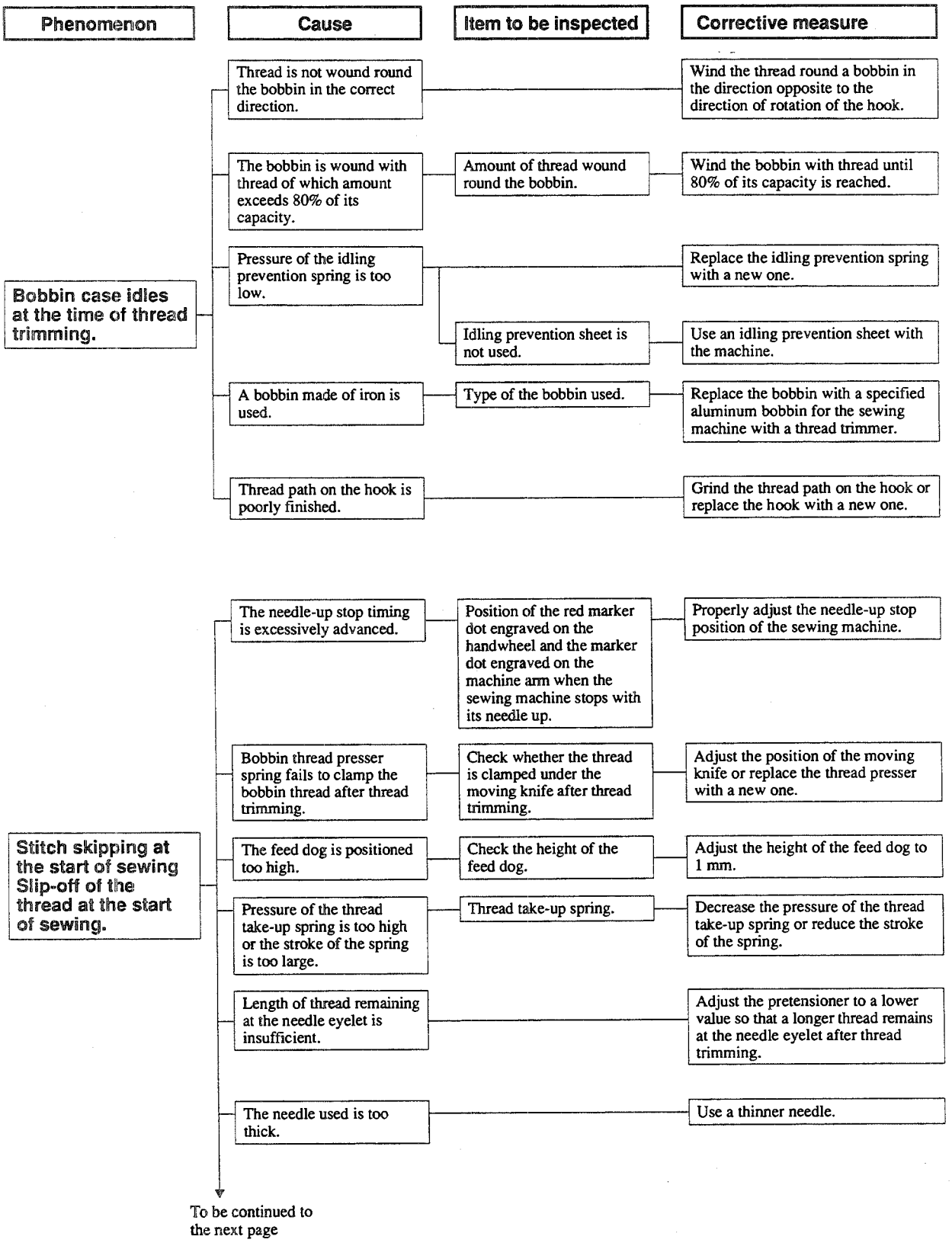


Stitch skipping is not likely to occur when H mm is adjusted to 2.4 to 2.6 mm. If H (mm) is excessively increased, loosened stitches will result. So, be careful.

Phenomenon	Cause	Item to be inspected	Corrective measure
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.
	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.
		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 0.05 mm.
		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.
		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.
	The moving knife is improperly positioned.		Adjust the longitudinal position of the moving knife.
	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.
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.
	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.
	Blade point of the hook has worn out.		Replace the hook with a new one.
	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.



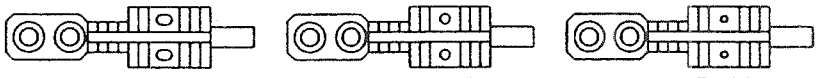
To be continued to the next page

Phenomenon	Cause	Item to be inspected	Corrective measure

Continued from the previous 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.

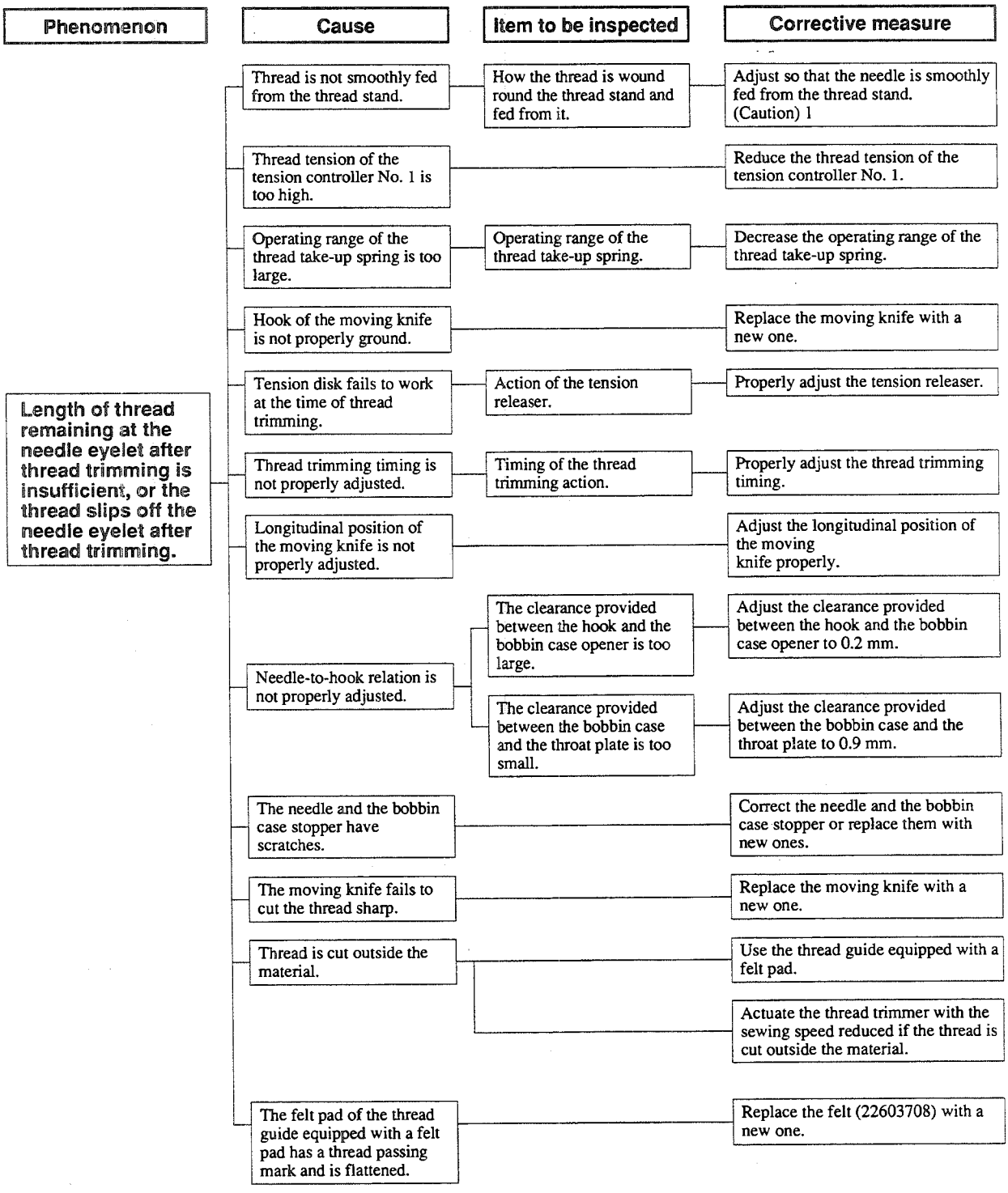


For heavy-weight materials | For medium-weight materials | For light-weight materials

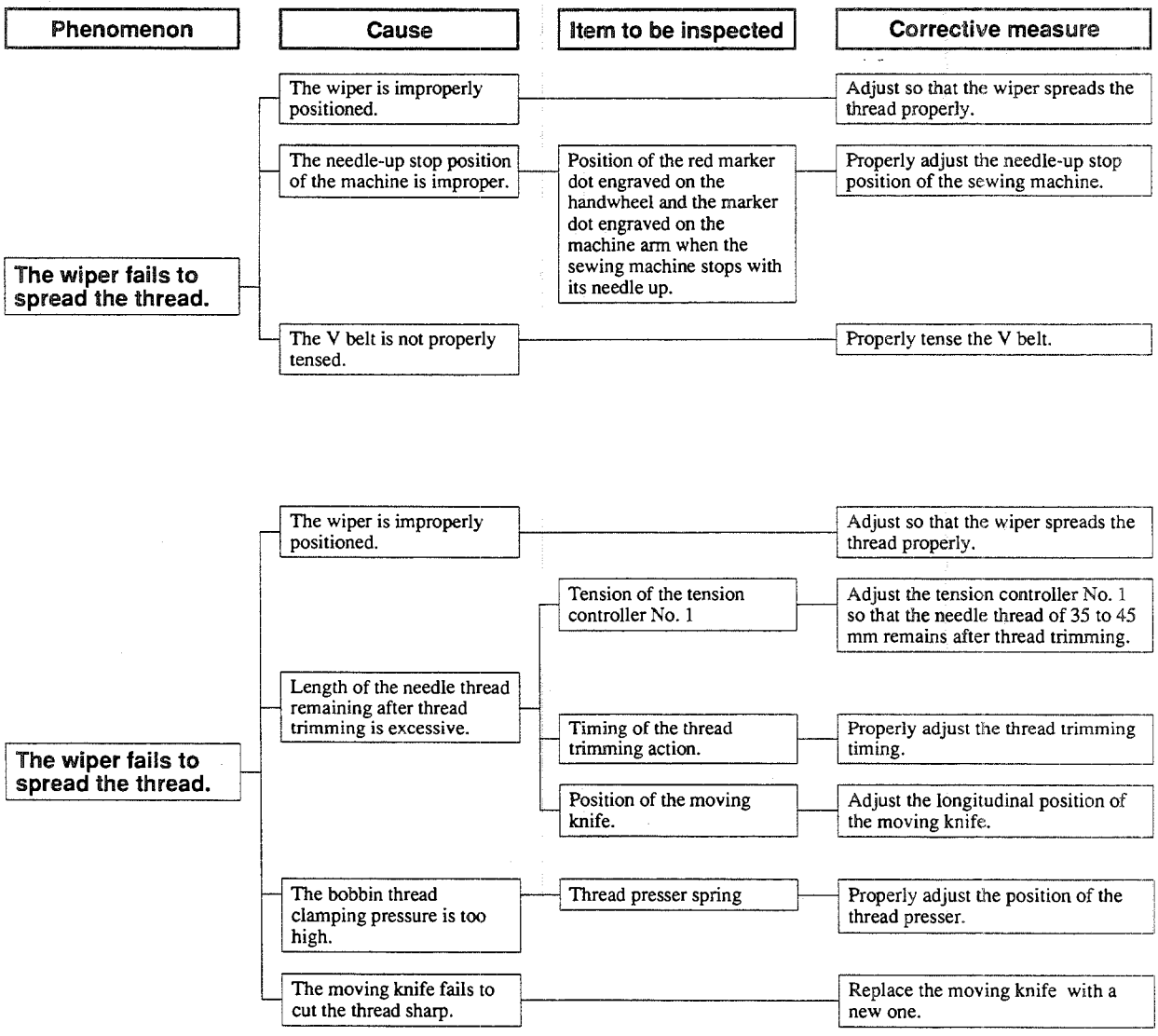
Bobbin thread tension is too high.		Decrease the bobbin thread tension.

(Caution)
When using a thin thread (with a higher count), stitch skipping or slip-off of the needle thread is likely to occur when the remaining amount of bobbin thread is not enough.

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
The wiper fails to spread the thread.
The wiper is improperly positioned.
Adjust so that the wiper spreads the thread properly.
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.
The V belt is not properly tensed.
Properly tense the V belt.
The wiper fails to spread the thread.
The wiper is improperly positioned.
Adjust so that the wiper spreads the thread properly.
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.
Position of the moving knife.
Adjust the longitudinal position of the moving knife.
The bobbin thread clamping pressure is too high.
Thread presser spring
Properly adjust the position of the thread presser.
The moving knife fails to cut the thread sharp.
Replace the moving knife with a new one.

11. DRAWING OF THE TABLE