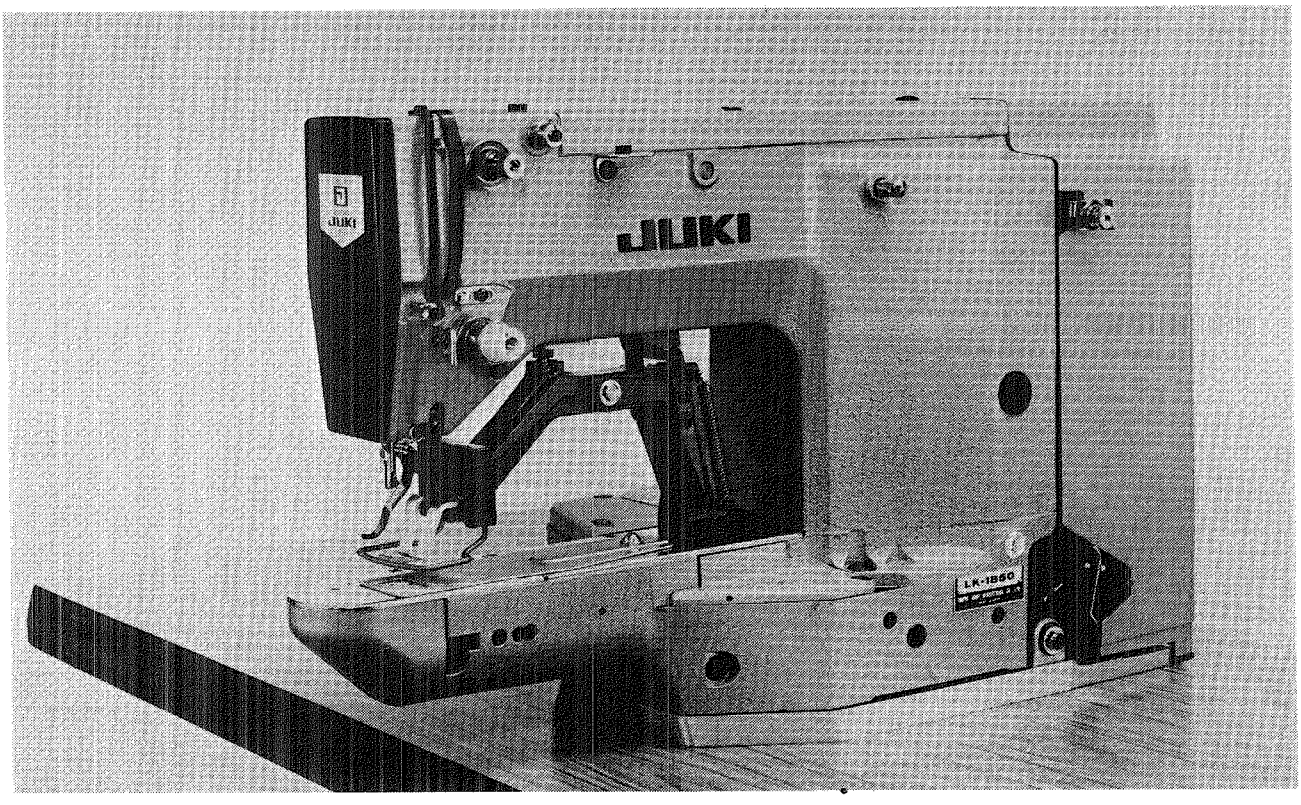
JUKI

High-speed 1-Needle Cylinder Bed
Lockstitch Bar Tacking Machines

LK-1850 Series

ENGINEER'S MANUAL



NO. IV-19-1
1989. 7

CONTENTS

PREFACE

This Engineer's Manual is written for technical personnel who are responsible for the service and maintenance of the machine.
The Instruction Book for the machine intended for the maintenance personnel and operators at a garment factory contains detailed operating instructions. This manual describes "Standard Adjustment", "How to Adjust", "Effects of Adjustment", and various other information which is not covered by the Instruction Book.
It is advisable to use the relevant Instruction Book and Parts Book together with this Engineer's Manual when carrying out the maintenance of the machine.

2. CAUTION IN RUNNING THE MACHINE BY HAND

Since the safety unit works, the starting pedal will not go down if the work clamp foot is up when you try to run the sewing machine by hand. To start the machine by hand, follow the procedure shown below.

1) Take off the belt cover, and remove spring ①.
2) Turn pulley ② in the arrowed direction, and the work clamp will go down.
3) Turn driving pulley ③ in the arrowed direction while pulling down starting lever ④, and the sewing machine will start.

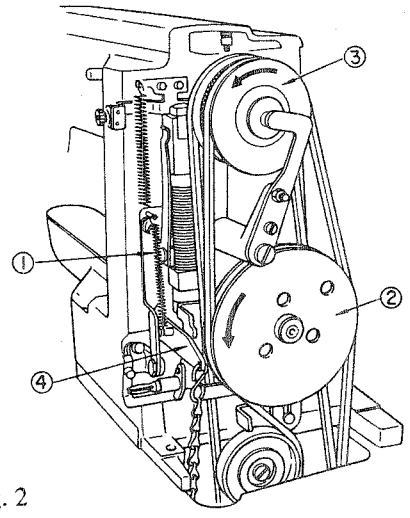
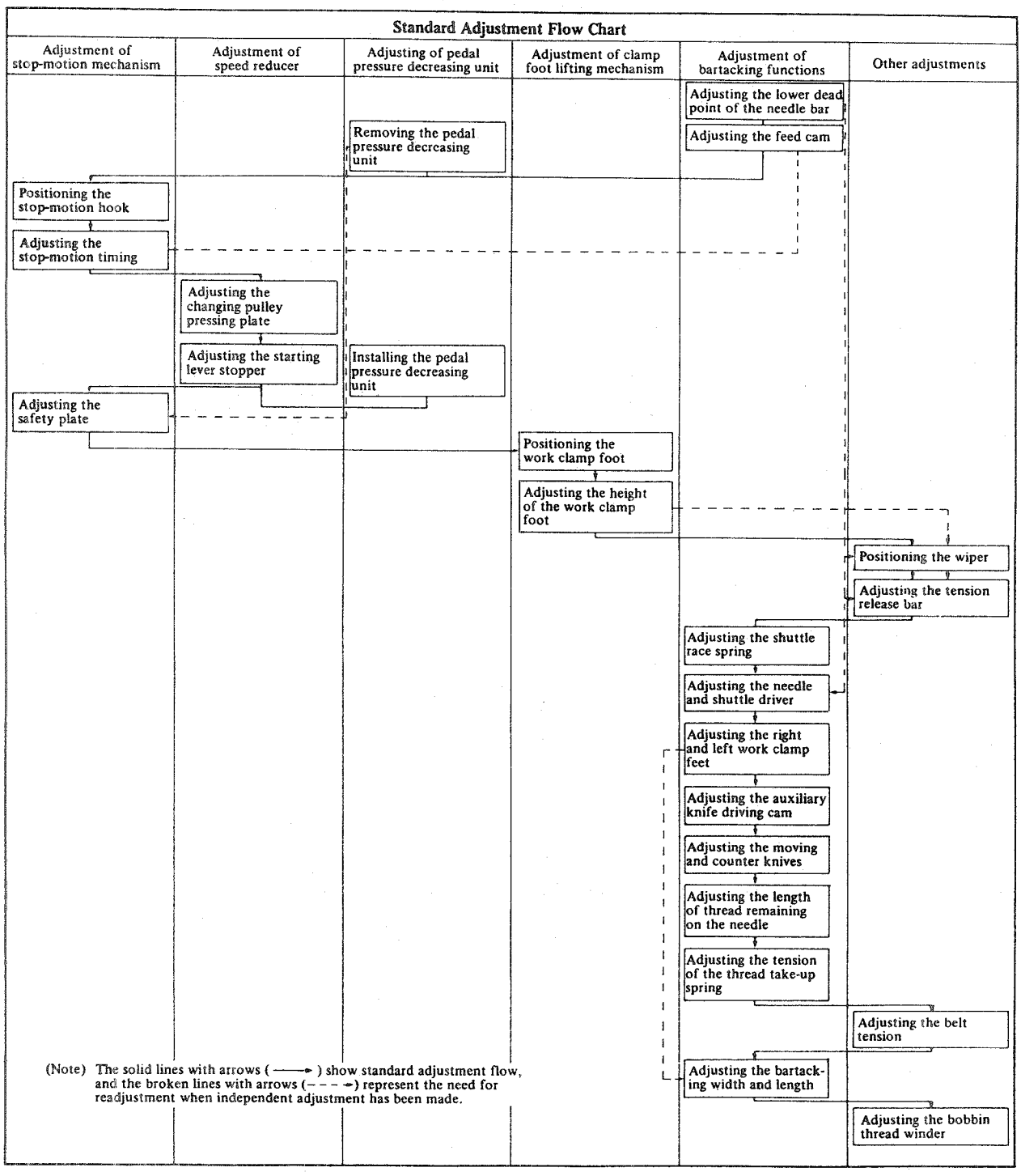


Fig. 2

3. STANDARD ADJUSTMENT FLOW CHART



4. STANDARD ADJUSTMENT

Standard Adjustment

(1) Height of the needle bar

The upper marker line engraved on the needle bar should be flush with the bottom end of the lower needle bar bushing when the needle bar is at the lowest point of its stroke.

(Note) Perform this adjustment first before making any other adjustment.

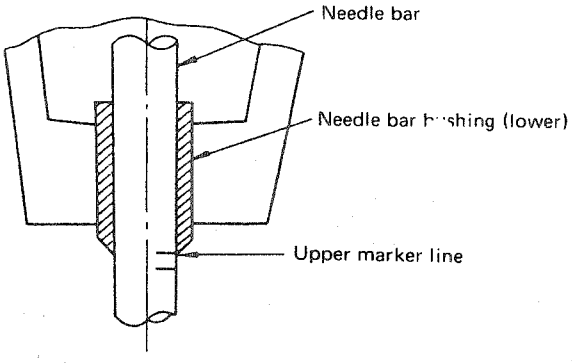


Fig. 3

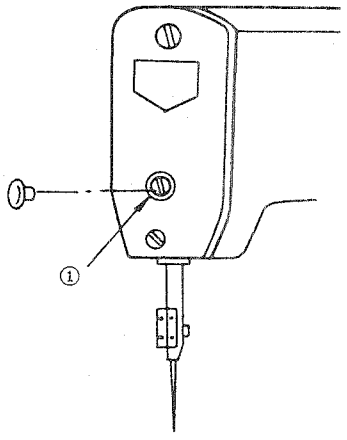


Fig. 4

(2) Adjustment of the feed cam

Adjustment should be made so that the feed is completed when the needle point is 8 to 12 mm (0.315″ ~ 0.472″) above the throat plate surface.
(It is advisable to make this adjustment during lateral feed).

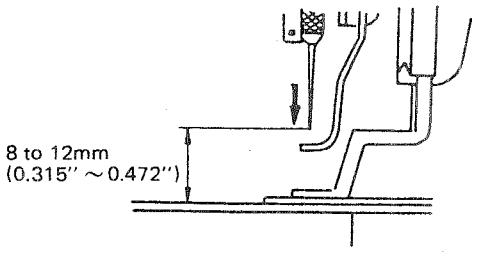
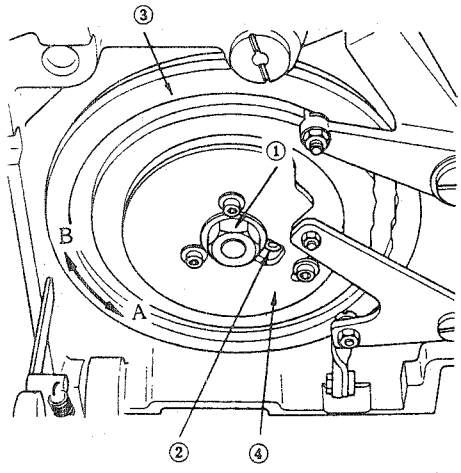


Fig. 5

How to Adjust	Effects of Adjustment
1) Turn the changing pulley by hand until the needle bar reaches the lowest point of its stroke. 2) Remove the rubber plug from the face plate. 3) Loosen setscrew ①, and move the needle bar up or down to make the adjustment. 4) After adjustment, securely tighten setscrew ①.	• Improper adjustment will cause stitch skipping or thread breakage.
Loosen nut ① and then cam guide pin ②. This will allow feed cam ③ to be moved in the direction of rotation for adjustment. • When the feed cam is turned in direction A, the feed timing advances. • When the feed cam is turned in direction B, the feed timing is delayed.  Fig. 6 **(Caution)** **Perform this adjustment first after the adjustment of the height of the needle bar. Make sure to readjust stop-motion regulating cam ④ whenever the feed cam has been adjusted.**	• When it is adjusted to 8 mm (0.315″) or so, well-tensed stitches will result. • When it is adjusted to 12 mm (0.472″) or so, protrusion of the first stitch needle thread onto the material surface will be prevented when sewing with a synthetic thread. * For sewing extra heavy-weight material, adjust it to 10 to 12 mm (0.394″ ~ 0.472″)

★

Standard Adjustment

(Note)
Strictly follow the order of adjustment for (3) through (6) shown below.

(3) Position of the stop-motion hook

Perform adjustment so that a 3 mm (0.118″) clearance is provided between the stop-motion hook and the stop-motion cam when the machine runs at a low speed.

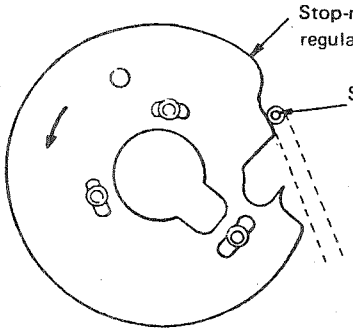


Fig. 7

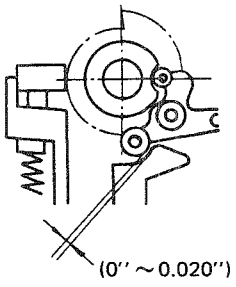


Fig. 9

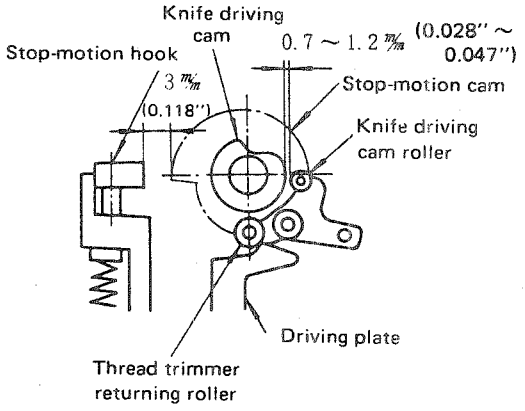


Fig. 8

(4) Stop-motion timing

Perform adjustment to make the stop-motion regulating cam roller drop from the low-speed point of the stop-motion regulating cam onto the stop motion point at the moment the top surface of the stop-motion hook aligns with the center of the screw No. 1 on the stop-motion cam at the last stitch as shown in Fig. 12.

* Turn the main shaft while pressing the hook by finger.

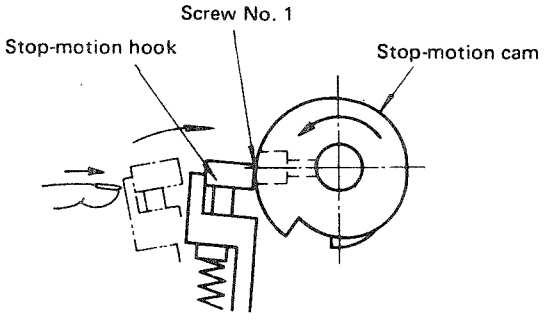


Fig. 12

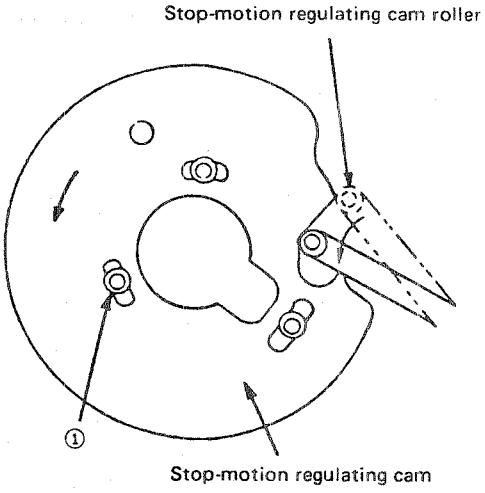
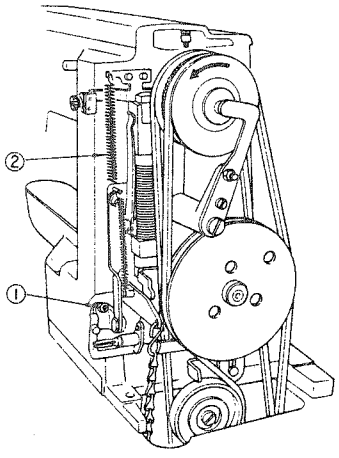
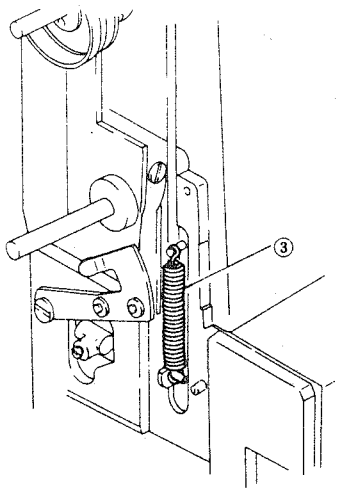
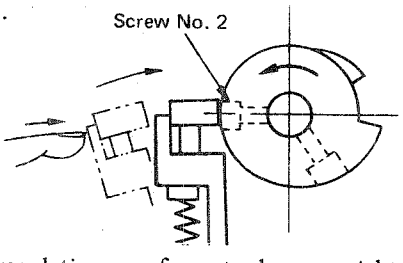


Fig. 13

How to Adjust	Effects of Adjustment
1) Turn the main shaft by hand to obtain the state shown in Fig. 7. (low-speed running) 2) Remove the spring ② and spring ③. 3) Loosen screw ①, and perform adjustment to allow a 3 mm(0.118″) clearance between the stop-motion hook and the knife driving cam. **(Caution)** **When tightening screw ①, be careful not to cause excessive axial sticking.**  Fig. 10  Fig. 11	• If the clearance is adjusted to 3 mm (0.118″) or less; A neutral state will result when the machine runs at low speed, causing the machine to idle and stop. Further, the clearance of 0.7 to 1.2 mm (0.028″ ~ 0.047″) between the knife driving cam and the knife driving cam roller will go at the time of low-speed machine running with resultant striking noises. Also the stop-motion cam will interfere with the stop-motion hook at the time of stop motion. (Fig. 8) • If the clearance is adjusted to 3 mm (0.118″) or more; The pressure of spring ② will become too high when the machine runs at high speed, often causing the machine to idle and stop. It may also lead to inadequate torque at the start of high-speed running with consequent reduction in sewing speed. Also, the thread trimmer returning roller will interfere with the driving plate, resulting in thread trimming failure. (clearance : 0 to 0.5 mm (0.020″)) (Fig. 9)
Loosen three setscrews ①, and make adjustment within the slot. (Stop-motion timing for Canton crepe and heavy-weight material) There is a stop-motion control cam exclusively used for Canton crepe or heavy-weight material. Adjust so that, when the last stitch stop-motion hook meets the center of the stop-motion cam screw No. 2, the stop-motion control cam roller moves from the low-speed section into the stop-motion section of the stop-motion regulating cam.  Stop-motion regulating cam for extra heavy-weight material 	Part No.	Part name	No. of stitches
---	---	---
13539606	Stop-motion regulating cam	42 stitches
13539705	Stop-motion regulating cam	28 stitches
13539804	Stop-motion regulating cam	36 stitches		• If later than screw No. 1; The brake will not work, and therefore a great stop-motion shock will result. Also, it may cause the machine to stop at the first starting stitch. If, however, the stop motion fails to take place from time to time when sewing extra heavy-weight material, the timing may be delayed a little. • If earlier than screw No. 1; The brake will work excessively, causing a stop motion failure. If the timing is extremely too early, the stop motion will be engaged one stitch earlier, producing an abnormal sound.

(5) Adjustment of the changing pulley pressing plate.

The clearance A should be equal to clearance B at the time of stop motion. (A = B = 0.35 mm (0.013″))

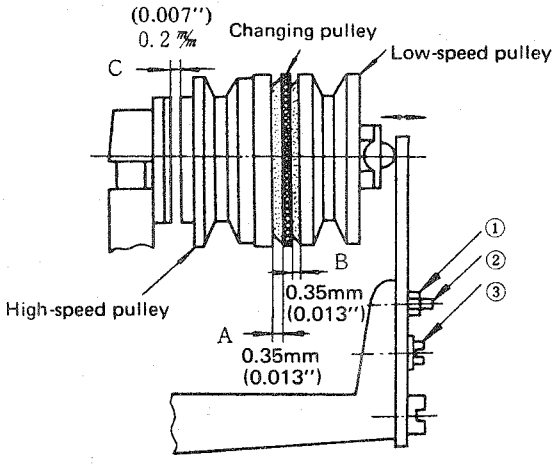


Fig. 14

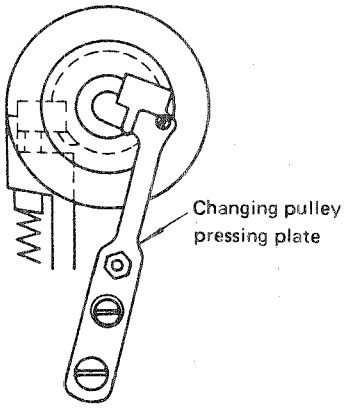


Fig. 15

(6) Adjustment of the starting lever stopper

Bring the starting lever into contact with the stopper screw and make adjustment so that the starting lever, when pulled, will stop at the moment the clearance between the stop-motion hook and the stop-motion cam reaches 3 mm (0.118″) (refer to the previous clause (3)).

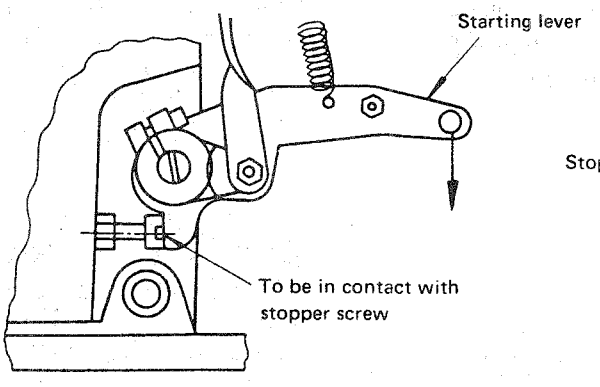


Fig. 17

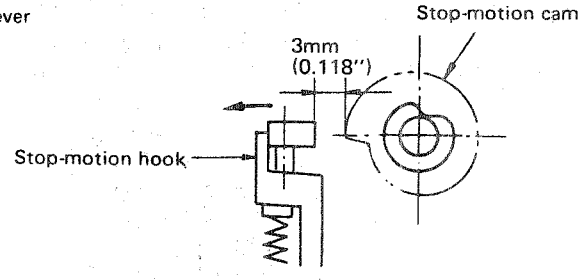


Fig. 16

How to Adjust	Effects of Adjustment
1) Place the stop-motion hook in the stop-motion position. 2) Loosen nut ① and then screw ② . 3) Securely tighten screw ③ . 4) Gradually tighten screw ② until equal clearances are provided at A and B. (A = B = 0.35 mm (0.013″))	● If A is larger than 0.35 mm (0.014″) while B is smaller than 0.35; Heat may be generated due to the contact between low-speed pulley and the changing pulley, or low-to-high speed changing feed timing may not synchronize with the motion of the needle bar, often causing the machine to idle and stop. Also, the machine may fail to reach the high sewing speed. ● If A is smaller than 0.35 mm (0.014″) while B is large than 0.35; An inadequate torque may be caused in low-speed operation, or heat may generated due to the contact between the changing pulley and the high-speed pulley. ● If A + B + C is larger than the specified value; The machine may stop at the time when the sewing speed is changed from low speed to high speed in sewing extra heavy-weight material or the like.
Push down the starting lever and make adjustment so that the starting lever comes in contact with the stopper screw when the clearance between the stop-motion hook and the stop-motion cam becomes 3 mm (0.118″) (refer to (3) Position of the stop-motion hook), then lock it using the nut.	● If the adjusted value is larger than 3 mm (0.118″), the machine will be put into idling state and stop at the time of starting. ● If the adjusted value is smaller than 3 mm (0.118″), there will be no allowance in the slot of the starting lever when the machine runs at high speed, causing the lever to bind.

(7) Adjustment of the safety plate

Adjust the safety plate and work clamp foot lever so that a lateral clearance of 0.2 to 0.5 mm (0.007″ to 0.019″) is provided for A, and a longitudinal clearance of 1.5 to 2.5 mm (0.059″~ 0.098″) for B. (Be sure that the lateral clearance is 0.2 to 0.5 mm (0.008″ to 0.020″) when the work clamp foot is down.)

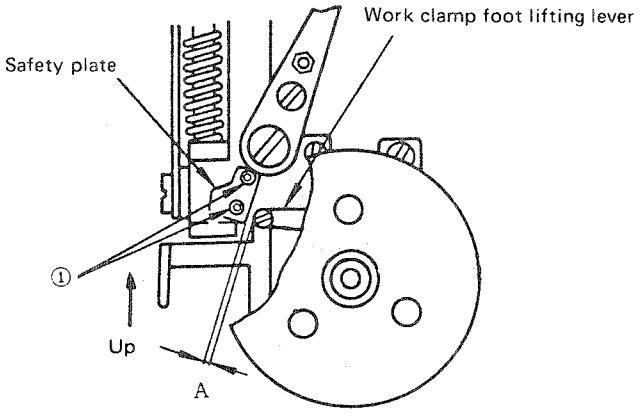


Fig. 18

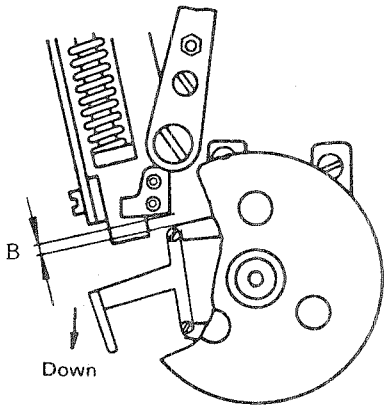


Fig. 19

(8) Position of the work clamp foot

Turn the main shaft by hand and perform adjustment to equalize the both clearances A bétween the needle and the work clamp feet in the longitudinal feed.
Also make equal the both clearances B between the feed plates and the work clamp feet.

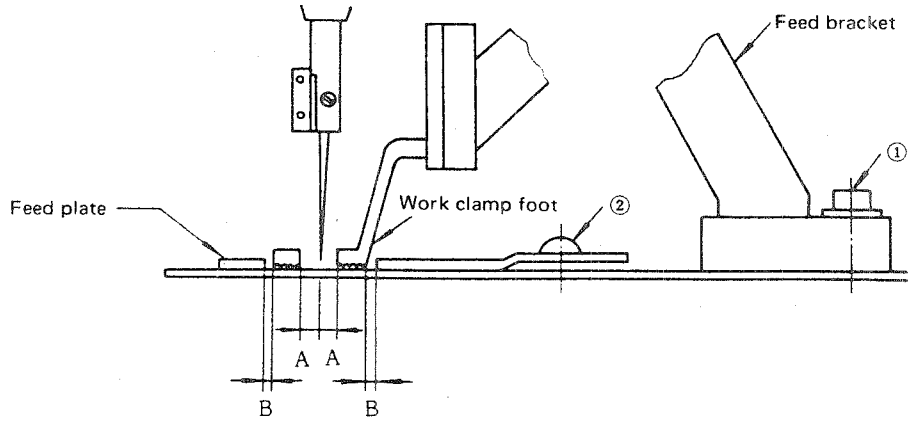


Fig. 20

How to Adjust	Effects of Adjustment
Loosen setscrew ① to make adjustment. After adjustment, securely tighten the setscrew.	• If the clearance A is extremely small, the work clamp foot will not go up. • If the clearance B is smaller than the specified value, the safety plate and the work clamp foot lifting lever will interfere with each other, causing a stop motion failure. • If the clearance B is zero, the machine can not be started. • If the clearance A is too large, the wiper and the thread trimmer will be actuated before stop motion, causing the wiper to interfere with the needle, or the thread trimmer to cut the needle thread to remain on the needle too short with consequent slippage of the thread from the needle at stitching start.
1) Loosen screw ① and make adjustment of the work clamp foot within the slot in the feed bracket. 2) Loosen screw ② and adjust the position of the feed plate by the slot in the feed plate.	• If the two clearances A are not equal, either work clamp foot may interfere with the needle, leading to needle breakage during longitudinal feed.

(9) Height of the work clamp feet

Remove the top cover, and adjust the height of the work clamp feet by the screw located at the center of the frame.
The maximum lift of the work clamp feet is 17 mm (0.669").

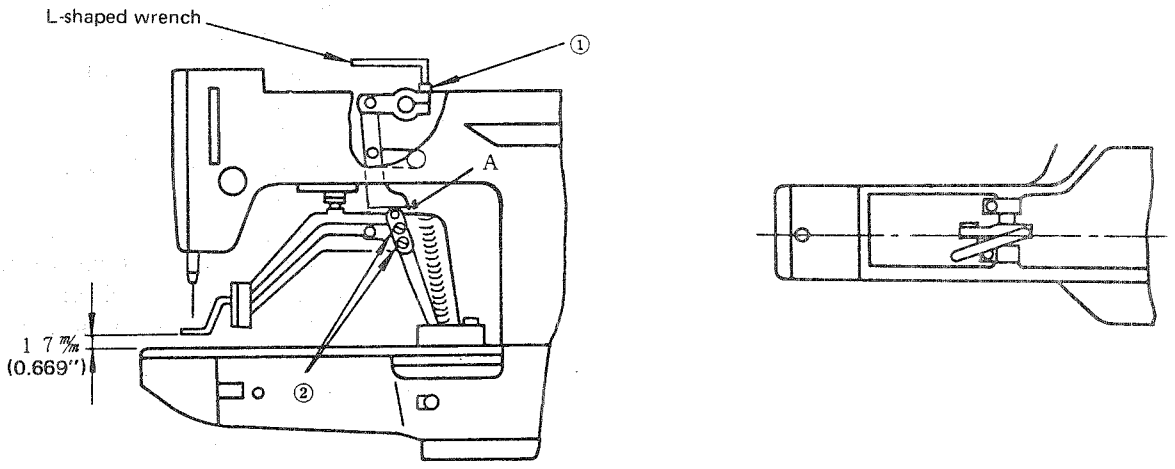


Fig. 21

(10) Position of the wiper

The clearance between the wiper and the needle should be 2.5 mm (0.098") or more at the time when the wiper passes by the needle point.
When the wiper is in its home position, the end of the wiper should be 15 mm (0.591") from the center of the needle.
(The needle is in stationary state at the time of stop motion.)
(Clearance in the direction of rotation of the stop-motion cam and the stop-motion hook)

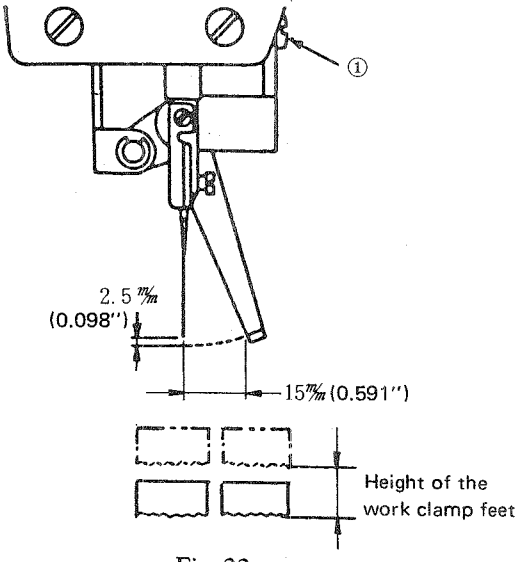
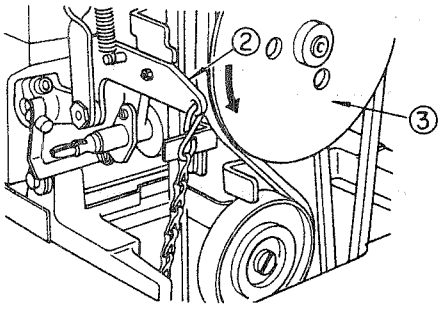
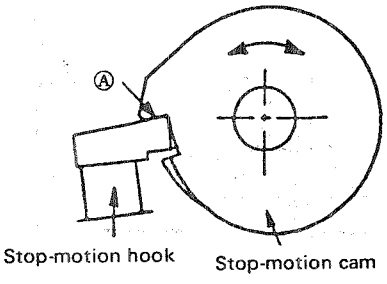


Fig. 22

How to Adjust	Effects of Adjustment
Stop the machine with the work clamp feet up, and loosen screw ① to make adjustment. If the right and left work clamp feet are not levelled, perform further adjustment using screw ② .	• If the work clamp feet are too high, they will interfere with the wiper when the wiper is actuated. • If screws ② are too low, the feed bracket will interfere with the lowering shaft. (Point A)
Adjust the position of the wiper by screw ① . To move the wiper, move starting lever ② up and down, and turn pulley ③ by hand. Be sure to bring the stop-motion cam into contact with A of the stop-motion hook as shown in Fig. 24 when making this adjustment.  Fig. 23  Fig. 24	• If the clearance is smaller than 2.5 mm (0.098″); The wiper will interfere with the needle point, resulting in needle breakage or scratches on the needle. • If the clearance is much larger than 2.5 mm (0.098″), the needle clamp screw will hit the wiper when the needle bar goes down.

(11) Adjustment of the tension release bar

Tension release bar ③ should project 4 mm (0.157") from the surface of supporter ② with the work clamp feet up when the machine stops.
(Be sure that the tension discs are closed while the machine is in operation.)

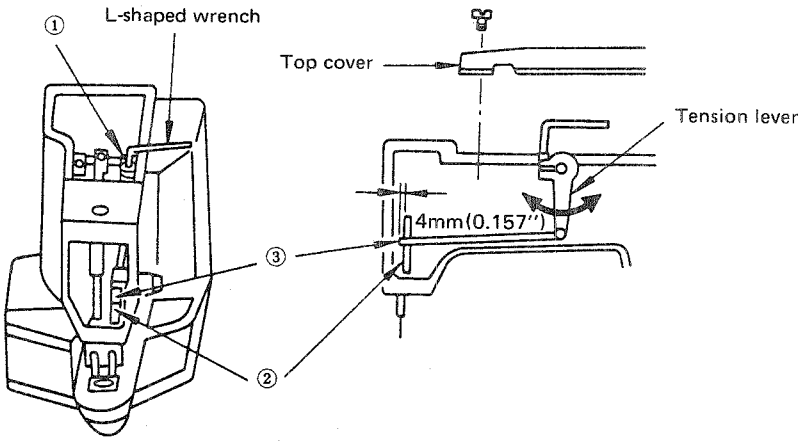


Fig. 25

(12) Position of the shuttle race spring

The shuttle race spring should be evenly positioned laterally with respect to the needle entry point, and it should be positioned longitudinally so that the rear edge of the needle aligns with corner A as shown below.

(Note)
Presence of any scrathes on area B may cause breakage of the bobbin thread. Grind and smooth out scratches if any.

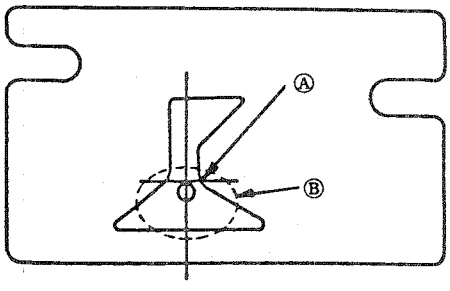
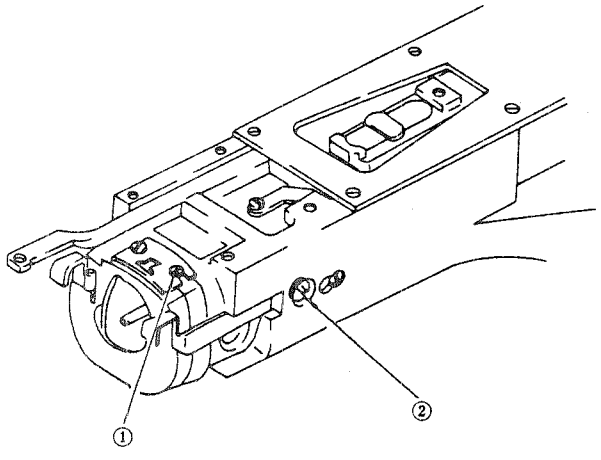


Fig. 26

How to Adjust	Effects of Adjustment
With the machine in stationary state, remove the top cover and the face cover, and loosen screw ① to make adjustment with the work clamp feet up.	• If the projection of the tension release bar is smaller than 4 mm (0.157″); The tension discs will be left released during machine operation. If the projection is much smaller than 4 mm (0.157″), tension release bar ③ will come off supporter ② when the work clamp feet begins to go up and consequently the work clamp feet fail to go up. Also, the tension discs will not be released. • If the projection of the tension release bar is larger than 4 mm; The end of tension release bar ③ will hit the face cover when the work clamp feet go up, producing a loud noise. Also, the thread will not be released at the time of thread trimming, and as a result, the needle thread will be cut extremely short.
Remove the feed bracket, feed plate and throat plate, then perform adjustment using screw ① . **(Note)** **The lateral position of the shuttle race spring is affected also by the locking position of setscrew ② .**  Fig. 27	• Lateral or longitudinal deviation of the shuttle race spring will cause the needle thread to bite into the shuttle race. • If the shuttle race spring is positioned excessively in the rear, the moving knife may fail to catch the needle thread.

(13) Adjustment of the timing between the needle and the shuttle

1) Timing of the needle bar
The needle bar goes up from the lowest point of its stroke until the lower marker line engraved on the needle bar is flush with the bottom end of the needle bar bushing (lower). (Fig. 28)

2) Timing of the shuttle
When the state is as described in the above 1), the center of the needle coincides with the point of the shuttle at A. (Fig. 29)

3) Clearance between the needle and the shuttle driver
When the state is as described in the above 2), there should be no clearance between the needle and the shuttle driver. (Fig. 30)

4) Clearance between the needle and the point of the shuttle
When the state is as described in 2), the clearance B between the needle and the point of the shuttle should be 0.05 to 0.1 mm (0.001" ~ 0.004"). (Fig. 31)

5) Clearance between the needle and the shuttle race
The clearance between the side face of the needle and the shuttle race should be 7.5 mm (0.295"). (Fig. 32)

1) Timing of the needle bar

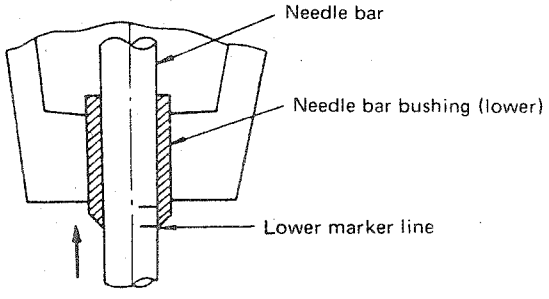


Fig. 28

2) Timing of the shuttle

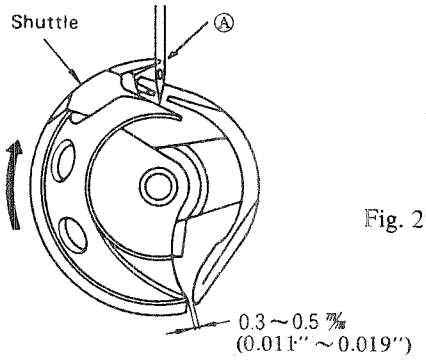


Fig. 29

3) Clearance between the needle and the shuttle driver

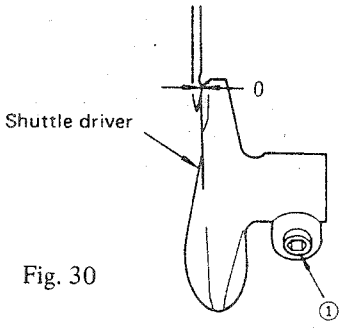


Fig. 30

4) Clearance between the needle and the point of the shuttle

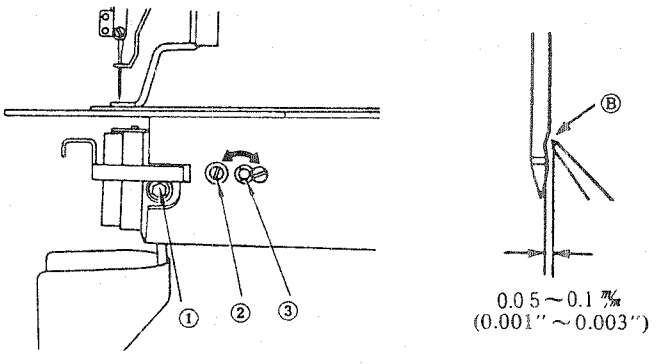


Fig. 31

5) Clearance between the needle and the shuttle race

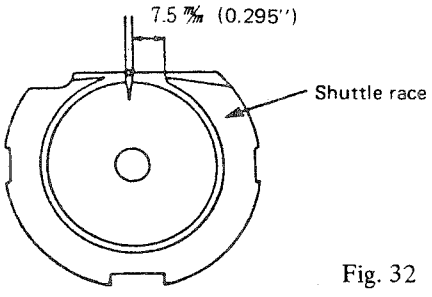
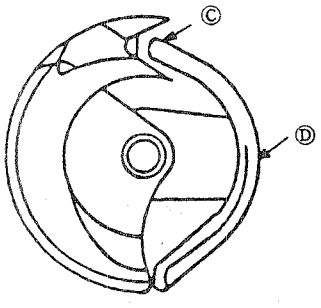


Fig. 32

How to Adjust	Effects of Adjustment
1) Referring to Standard Adjustment (1) Height of the needle bar, make the lower marker line engraved on the needle bar flush with the bottom end of the bushing. 2) and 3) Loosen setscrew ① of the shuttle driver, and adjust the rotational and longitudinal directions of the shuttle driver. **(Caution)** **Ensure to turn the shuttle in the arrowed direction as shown in Fig. 29 when adjusting the timing of the shuttle.** 4) Loosen setscrew ② of the shuttle race, and turn eccentric shaft ③ to make adjustment. 5) Loosen setscrew ② to perform adjustment. Enough care should be exercised when performing the adjustment described in 4), namely the adjustment of the clearance between the needle and the point of the shuttle. **(Note)** **The clearance in the rotational direction between the shuttle and the shuttle driver should be 0.3 mm to 0.5 mm (0.011″~ 0.019″) as shown in Fig. 29.** **Strike points D for adjustment.** **After adjustment, check that point C is evenly spaced vertically with respect to the shuttle.**  Fig. 33	1) and 2) Slightly reduce the height of the needle bar (upper marker line) for floppy material, and on the contrary, slightly increase the height for heavy-weight material to adjust the timing of the shuttle. (For prevention of stitch skipping) 3) If the clearance is more than 0 mm, the needle will be bent in the direction of the shuttle point, causing scratches on the shuttle point and the needle. On the contrary, however, excessive contact between the needle and the shuttle driver may cause stitch skipping. 4) If the clearance is greater than 0.05 to 0.1 mm (0.001 ~ 0.003″), stitch skipping will occur. If it is smaller than the specified values, the needle strikes the shuttle point and scratches occur, leading to thread breakage or fine splits of thread. 5) If the clearance is smaller than 7.5 mm (0.295″) the needle thread will not be fully spread, often causing the needle thread to bite into the shuttle. ● If the clearance between the shuttle drive and the shuttle is greater than 0.3 to 0.5 mm (0.011″ ~ 0.019″), the shuttle noise will be louder. On the contrary, if the clearance is not enough, poorly tensed stitches will result when sewing with a thick thread.

★

(14) Lateral position of the work clamp foot

The center of the work clamp foot should lie at the 26th stitch for 42-stitch large size bartacking, and at the 18th stitch for 28-stitch large size bartacking.

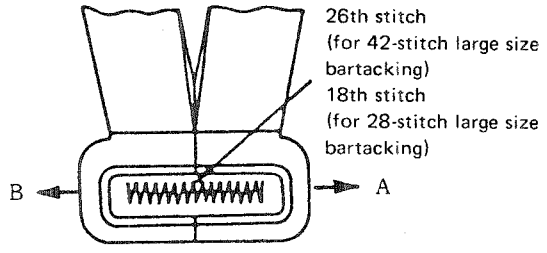


Fig. 34

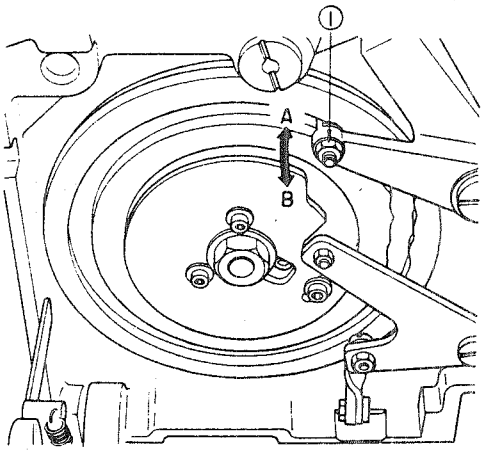


Fig. 35

(15) Adjustment of the auxiliary knife driving cam

The clearance between the end of the auxiliary knife driving cam and roller ③ should be 0.3 to 0.5 mm (0.011"~ 0.019") when roller ② fits in the recess of the knife driving cam.

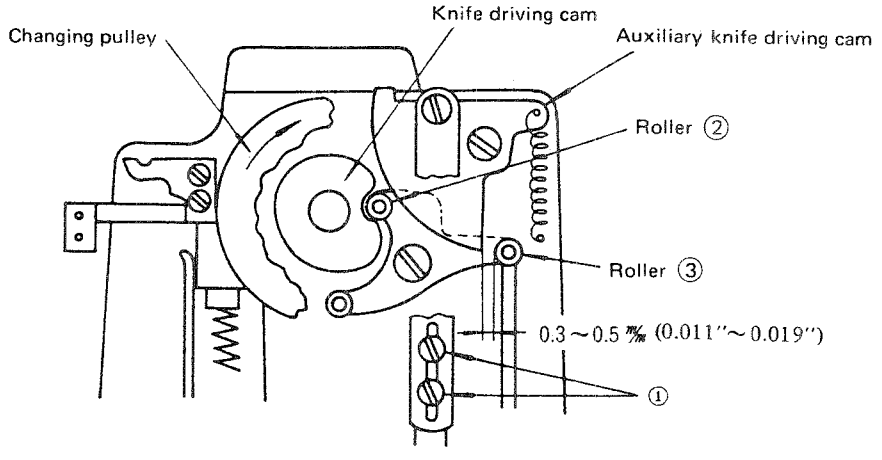


Fig. 36

How to Adjust	Effects of Adjustment
Loosen lock nut ① of the feed cam roller shaft, and move the roller shaft in the arrowed directions for adjustment. To correct slight deviation, loosen the lateral feed adjusting nut and push the work clamp foot to the right or left to perform adjustment.	• Improperly positioned center of the work clamp foot would cause the needle to hit the work clamp foot, leading to breakage of the needle.
1) Push down the starting lever, and manually turn the driving pulley to lower the work clamp foot. 2) Further push down the starting lever, and turn the changing pulley in the arrowed direction until roller ② fits in the recess of the knife driving cam. 3) Loosen the setscrews, and make adjustment so that a clearance of 0.3 to 0.5 mm (0.011″~ 0.019″) is provided between the end of the auxiliary knife driving cam and roller ③ when roller ② fits in the recess of the knife driving cam.	• If the clearance is extremely large, the thread trimming timing will be delayed, resulting in thread trimming failure. • If no clearance is allowed between the end of the auxiliary knife driving cam and roller ③ , thread trimming action will be interrupted at the time of thread spreading with resultant thread trimming failure.

Standard Adjustment

(16) Position of the moving knife and the counter knife

Position of the counter knife : The clearance between the counter knife and the needle hole guide should be 0.5 mm (0.019").

Position of the moving knife : The needle hole in the needle hole guide should meet the hole in the moving knife at the time of stop motion (before the work clamp foot goes up).

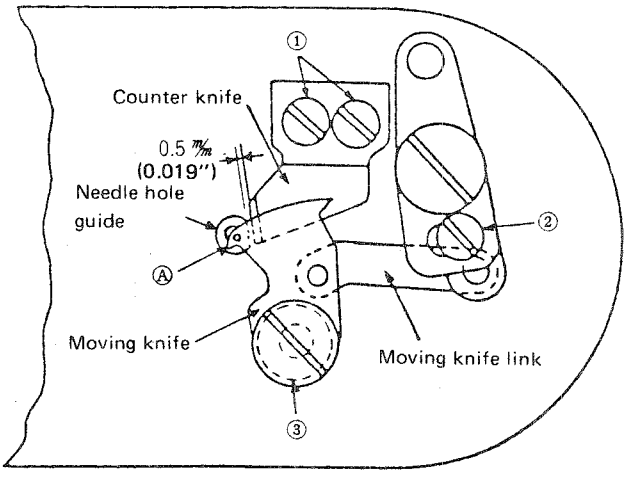


Fig. 37

(17) Height of the moving knife and the counter knife

Moving knife : Engagement of the needle hole guide with the moving knife blade ..... 0.15 mm (0.005")

Counter knife : Difference between the needle hole guide and the counter knife blade in height ..... 0.1 to 0.15 mm (0.003"~0.005")

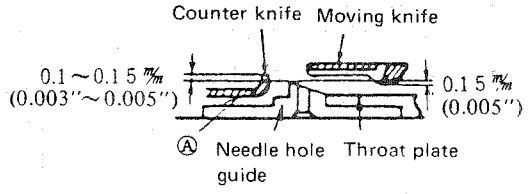


Fig. 38

(18) Tilt of the counter knife blade

The counter knife blade surface should be tilted by 0.2 mm to evenly cut the two threads (needle thread and bobbin thread).

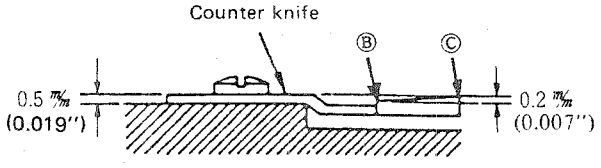
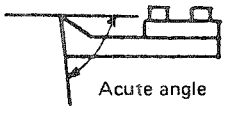


Fig. 39

How to Adjust	Effects of Adjustment
1) Positioning the counter knife Loosen setscrew ① , and adjust the position of the counter knife. 2) Positioning the moving knife Loosen setscrew ② , and adjust the position of the moving knife. **(Note)** **The normal operation of the knives is such that the moving knife passes by the inside of the needle hole guide as shown by A.**	• If the clearance is smaller than 0.5 mm (0.019″), the thread will be trimmed by the blade point of the counter knife when the moving knife pulls the threads and therefore the needle and bobbin threads will be trimmed too short. • If the clearance is greater than 0.5 mm (0.019″), the thread remaining on the fabric after thread trimming will be longer. • If the moving knife is deflected to the counter knife, the thread trimmer will be actuated at the time of stop motion, or the thread spreader will fail to work properly, resulting in thread trimming failure. • If the moving knife is spaced too much from the counter knife, the thread trimming mechanism will stick, causing thread trimming failure, or the needle will strike the moving knife, leading to needle breakage.
1) Adjusting the height of the moving knife Adjust the height of the moving knife according to the thickness of washer ③ of Fig. 37. If proper adjustment of the moving knife cannot be obtained, select and use one of the following parts. Part No. / Description / Thickness B242328000A / Moving knife washer / 0.4 m/m B242328000B / Moving knife washer / 0.5 m/m B242328000C / Moving knife washer / 0.6 m/m B242328000D / Moving knife washer / 0.7 m/m 2) Adjusting the height of the counter knife Wrench portion Ⓐ using a screwdriver or the like to make adjustment.	• Insufficient difference in level (specified value: 0.25 to 0.3 mm) (0.009″~ 0.011″) between the moving knife and the counter knife will lead to thread trimming failure. • Excessive difference in level (specified value: 0.1 to 0.15 mm) (0.003″~ 0.005″) between the needle hole guide and the counter knife will cause the blade point of the counter knife to trim the threads when the moving knife pulls the threads, and as a result, the needle and bobbin threads will be trimmed too short.
Shave side Ⓒ if the thread on side Ⓑ is not trimmed, or shave side Ⓑ if the thread on side Ⓒ is not trimmed. **(Caution)** **Make sure to form either side into an angle smaller than 90 degree when shaving sides Ⓑ or Ⓒ .**  	• If the tilt is smaller than 0.2 mm (0.007″), the thread on side Ⓒ will not be trimmed. • If the tilt is larger than 0.2 mm (0.007″) the thread on side Ⓑ will not be trimmed.

(19) Adjustment of the length of the remaining needle thread

The length of the thread remaining on the needle after thread trimming should be 35 to 40 mm (1.378" ~ 1.575") from the needle eye.
In case of a synthetic thread, the remaining needle thread should be longer than that of cotton thread.

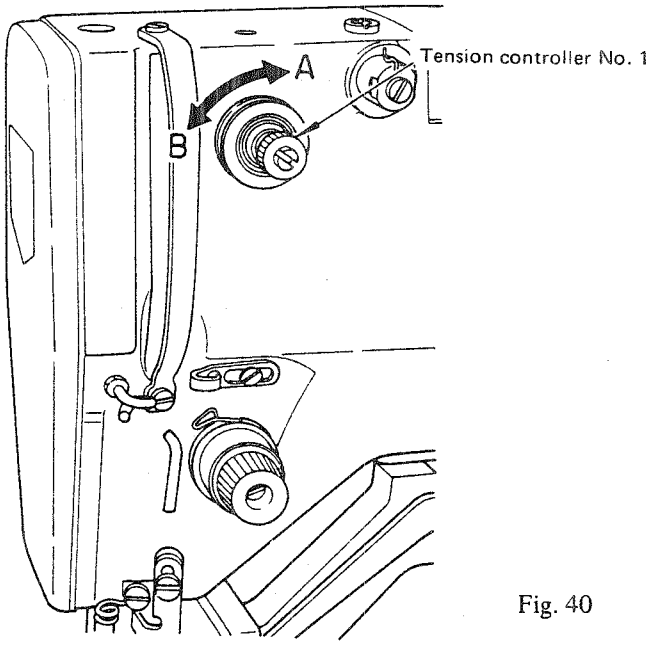


Fig. 40

(20) Adjustment of the thread take-up spring

Stroke : Should be adjusted so that the thread take-up spring moves approx. 8 mm (0.315") from the horizontal of the L-shaped thread guide.

Tension : Make adjustment while checking the stitch performance.
(The proper tension is such that the thread take-up spring moves for the full stroke in actual sewing operation.)

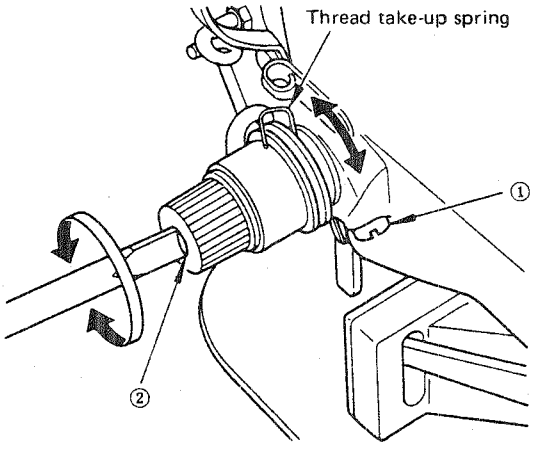


Fig. 41

How to Adjust	Effects of Adjustment
Perform adjustment by the tension controller No. 1. ● As the tension controller No. 1 is turned in direction A, the length of the remaining needle thread will be reduced. ● As the tension controller No. 1 is turned in direction B, the length will be increased. **(Caution)** **Take care not to make the thread release timing too late for thread trimming, otherwise the needle thread will be trimmed too short.** **Refer to Standard Adjustment (11).**	● Insufficient length of the remaining thread will cause the thread to slip off the needle at sewing start. ● If the remaining thread is too long, the needle thread will protrude onto the material, or clumsy wrong side of material will result.
1) Adjusting the stroke. Loosening setscrew ①, insert a screwdriver into tension controller No. 2 ② to turn it for adjustment. 2) Adjusting the tension First securely tighten the setscrew, then insert a screwdriver into tension controller No. 2 ② to turn it for adjustment.	● If the stroke is greater than 8 mm (0.315″), the thread remaining on the needle will be too short, and the thread will slip off the needle at sewing start.

(21) Adjustment of the belt tension

Both the high-speed belt and low-speed belt should slack about 10 mm (0.394") when the middle of the belts (the point shown by arrow) is pushed by a finger under an approx. 1 kg pressure.

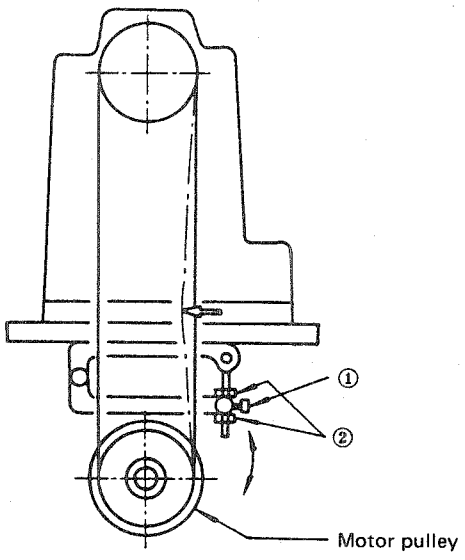


Fig. 42

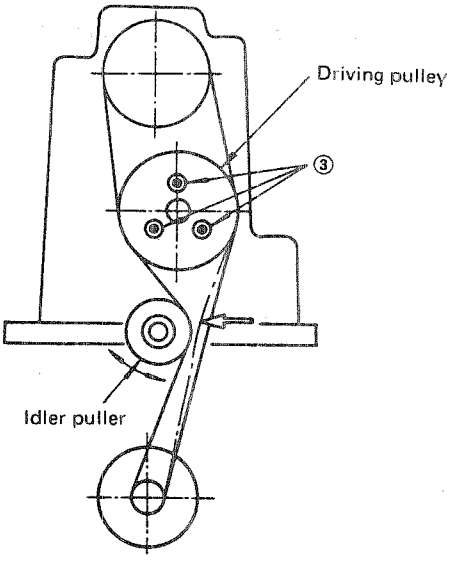


Fig. 43

(22) Adjustment of the bobbin winder

The clearance between the bobbin winding wheel and the V belt should be about 3 mm (0.118") when the wheel is not winding a bobbin.

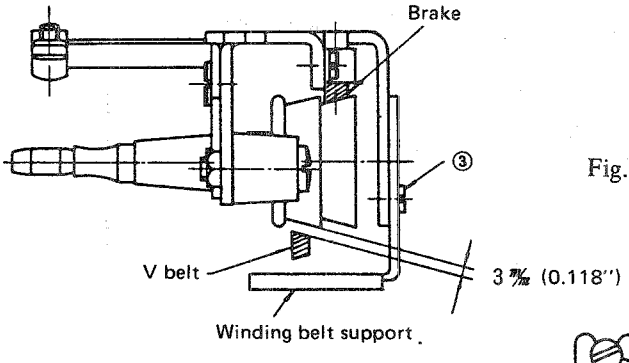


Fig. 44

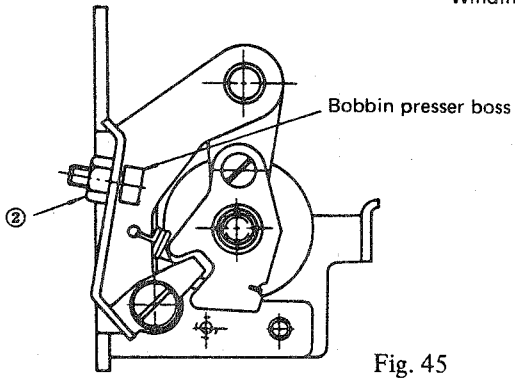


Fig. 45

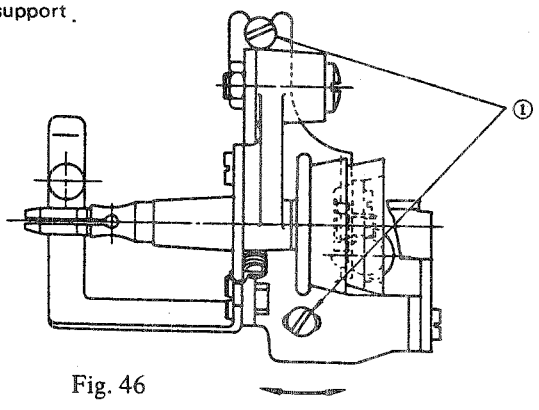
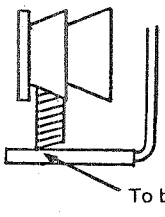
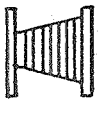
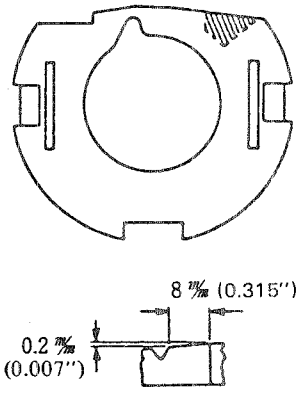
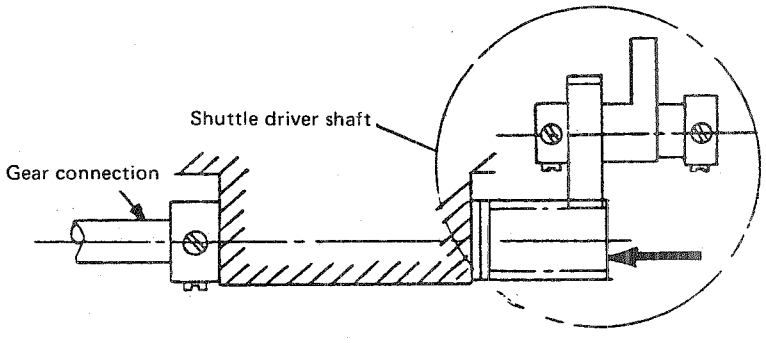
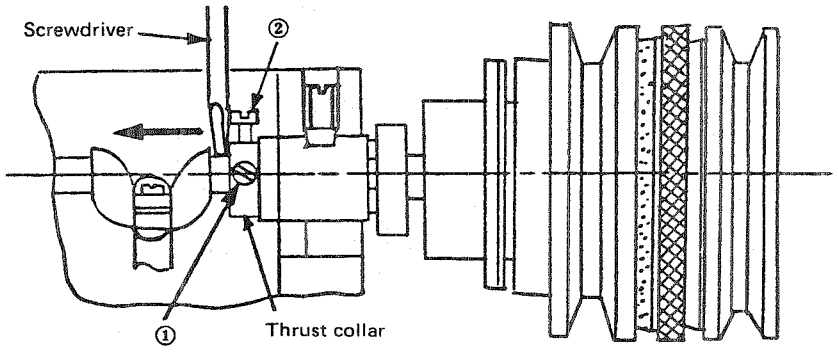


Fig. 46

How to Adjust	Effects of Adjustment
1) Adjusting the high-speed belt tension Adjust the tension of the high-speed belt first. Loosen fixing screw ① and nut ②, and move up or down the motor mounting base to make adjustment. When proper belt tension has been obtained, tighten the screw and nut. 2) Adjusting the low-speed belt tension Loosen screws ③ in the holes (three) of the driving pulley, and move the idler pulley to the right and left to make adjustment. When proper belt tension has been obtained, tighten the three screws.	• Excessive tension of the high-speed belt will prevent smooth run of the high-speed pulley with consequent reduction in high-speed operation. • Inadequate tension will increase idling vibration, and prevent the machine from reaching high speed, causing the machine to idle and stop.
1) Adjust the position of the V belt by moving the motor or the motor pulley. 2) Perform adjustment by screw ③ so that the winding belt support comes in light contact with the edge of the belt while a bobbin is being wound.  To be in light contact 3) If a bobbin is wound unevenly, loosen screw ① and bend the bobbin winder to the right or left.  Bend to the left.  Bend to the right. 4) To adjust the amount of thread to be wound round a bobbin, loosen nut ② and move back or forth the bobbin presser boss to make adjustment.	• If the clearance allowed is smaller than 3 mm (0.118″), the belt will touch the winding wheel and wear out. • If the belt support fails to come in light contact with the belt, the winding speed will be low.

5. OTHER PRECAUTIONS

Precautions
(1) Configuration of the shuttle race ring If the shuttle point has been found worn out severely, remove the shuttle race ring and check whether the hatched portion on the rear side measures 0.2 mm (0.007") x 8 mm (0.315").    Fig. 47
(2) How to remove the backlash of the shuttle driver shaft    Fig. 48
(3) How to remove the backlash of the main shaft    Fig. 49

Procedures	Remarks
● If the hatched portion does not measure 0.2 mm (0.007") x 8 mm (0.315"), correct it using an oil stone.	
● Removing the axial backlash Loosen two setscrews ① of the thrust collar, and tighten them while pushing the shuttle driver shaft in the direction of arrow. ● Removing the rotational backlash Replace the gear connection by an appropriate one selected among the followings. ○ 13508353 Shuttle driver shaft gear connection (Y) (0.2 smaller in dia.) ○ 13509054 Shuttle driver shaft gear connection (Z) (0.1 smaller in dia.) ○ 13509153 Shuttle driver shaft gear connection (A) (Standard) ○ 13509252 Shuttle driver shaft gear connection (B) (0.1 larger in dia.) ○ 13509351 Shuttle driver shaft gear connection (C) (0.2 larger in dia.)	
● Tighten thrust setscrews ① and ② while twisting the crank in the direction of arrow using a screwdriver or the like. Setscrew ① is the first setscrew. Tighten it so that it fits to the flat part of the main shaft. ● The proper play is 0.01 to 0.04 mm. (0.0003"~ 0.0015"). (Note) **Make sure to check the timing of the feed cam and the stop-motion cam after removing the backlash.**	● An axial backlash on the main shaft would adversely affect the speed reducer and the feed timing.

★

(4) How to remove the backlash between the worm and worm gear.

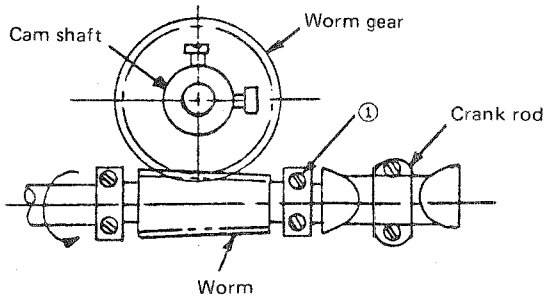


Fig. 50

(5) How to remove the backlash of the feed bracket

Backlash of the feed cam roller (Fig. 74) or feed slide biock (Figs. 73 and 74) would lead to lateral or longitudinal backlash of the feed bracket.

Procedure	Remarks
1) Remove the top cover. 2) Loosen four screws ①. 3) Holding the cam shaft, turn the worm in the direction of arrow with care taken not to disturb the timing between the main shaft and the cam shaft. This will make the worm advance toward the rear bushing of the main shaft, removing the backlash. 4) After removing the backlash, securely tighten four screws ①. **(Note)** **If the timing between the main shaft and the cam shaft has been disturbed, readjust the stop motion timing and the feed cam.**	• An excessive backlash would adversely affect the feed timing. • If no backlash is allowed, the worm will get hot, and the main shaft torque will increase, causing stop motion failure or idling stop.
1) Replace the feed cam roller by one of the followings. B250228000A — Feed cam roller — ϕ9.5 $^{+0.01}_{+0.005}$ B250228000B — Feed cam roller — ϕ9.5 $^{+0.005}_{0}$ B250228000C — Feed cam roller — ϕ9.5 $^{0}_{-0.005}$ 2) Replace the feed slide block by one of the followings. 13516604 — Feed slide block — 12 $^{0}_{-0.009}$ 13516703 — Feed slide block — 12 $^{+0.009}_{0}$ 13516802 — Feed slide block — 12 $^{+0.018}_{+0.009}$	

6. DISASSEMBLING & ASSEMBLING PROCEDURES AND PRECAUTIONS

Disassembling & Assembling Procedures

(1) Disassembling the shuttle driver shaft

1) Remove the pedal pressure decreasing unit.
2) Loosen setscrew ① , and remove the shuttle driver.
3) Loosen the two setscrews of the thrust collar.
4) Loosen and remove the setscrew of the stop-motion regulating arm B, and take out the stop-motion regulating arm B down from the shaft. (See Fig. 72)
5) Draw out the shuttle driver shaft to the rear.

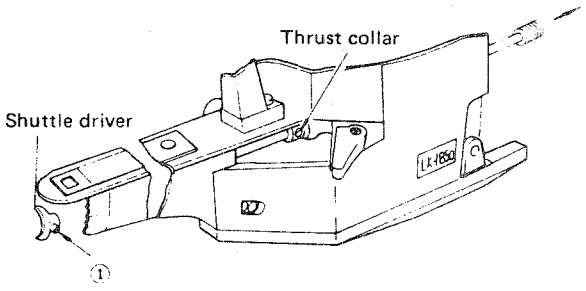


Fig. 51

* Assemble them by reversing the above disassembling procedure.

(2) Disassembling the main shaft

1) Remove the speed reducer.
2) Remove the needle.
3) Remove the stop-motion lever.
4) Loosen two setscrews ① of the counterweight and four setscrews ② of the worm.
5) Loosen two setscrews ③ of the crank rod, and remove the crank rod cover.
6) Loosen and remove two setscrews ④ of the thrust collar.
7) Loosen and remove setscrew ⑤ of the main shaft rear bushing.

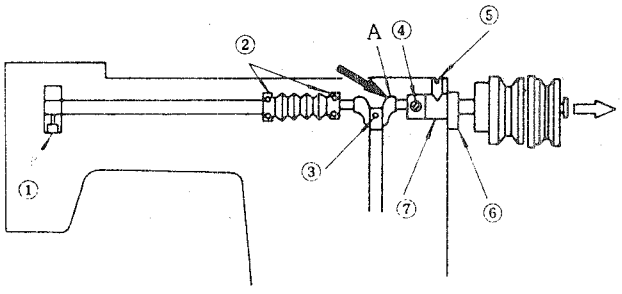
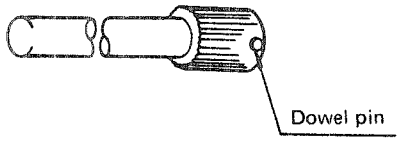


Fig. 52

8) Remove the thread take-up spring (③ in Fig. 11), and position the knife driving cam arm so that it does not interfere with the rear end of the bushing.
9) Apply as brass bar to point A, tap it to draw out the main shaft together with rear bushing ⑦ .

* Assemble them by reversing the above disassembling procedure.

Precautions in disassembly	Precautions in Assembly
• When drawing out the shuttle driver shaft, never remove the dowel pin from the shuttle driver shaft gear, or else the shuttle driver shaft needle bearing will be damaged.  	• When reassembling the same gears, put the mating faces of the gears to their original position to prevent loud gear noise.
• Be sure to use a soft metal such as a brass bar when tapping point A. At this time, remember to tap it gradually.	• To assemble the main shaft, place a covering piece on the end of knife driving cam ⑥, and tap it gradually using a brass bar or the like to drive in the rear bushing of the main shaft. • Securely fit the end of setscrew ⑤ into the long groove of the rear bushing of the main shaft, and fit it.

(3) Disassembling the speed reducer

1) Remove the presser plate of the changing pulley. (Fig. 15)
2) Loosen setscrews ① to remove ball bracket ②.
3) Loosen setscrews ③ to remove washers ④ and mounting disc ⑤.
4) Remove low-speed pulley ⑥, adjusting shim ⑦ and pulley spacer ⑧.
5) Loosen setscrew A ⑨ and then setscrew B ⑩ (tapered screw) to remove low-speed pulley shaft ⑪.
6) Remove changing pulley ⑫ and low-speed pulley spring ⑬.
7) Loosen setscrew ⑭, then loosen and remove setscrew (large) ⑮ (tapered screw) to remove high-speed pulley ⑯.

* Assemble the unit by reversing the above disassembling procedure.

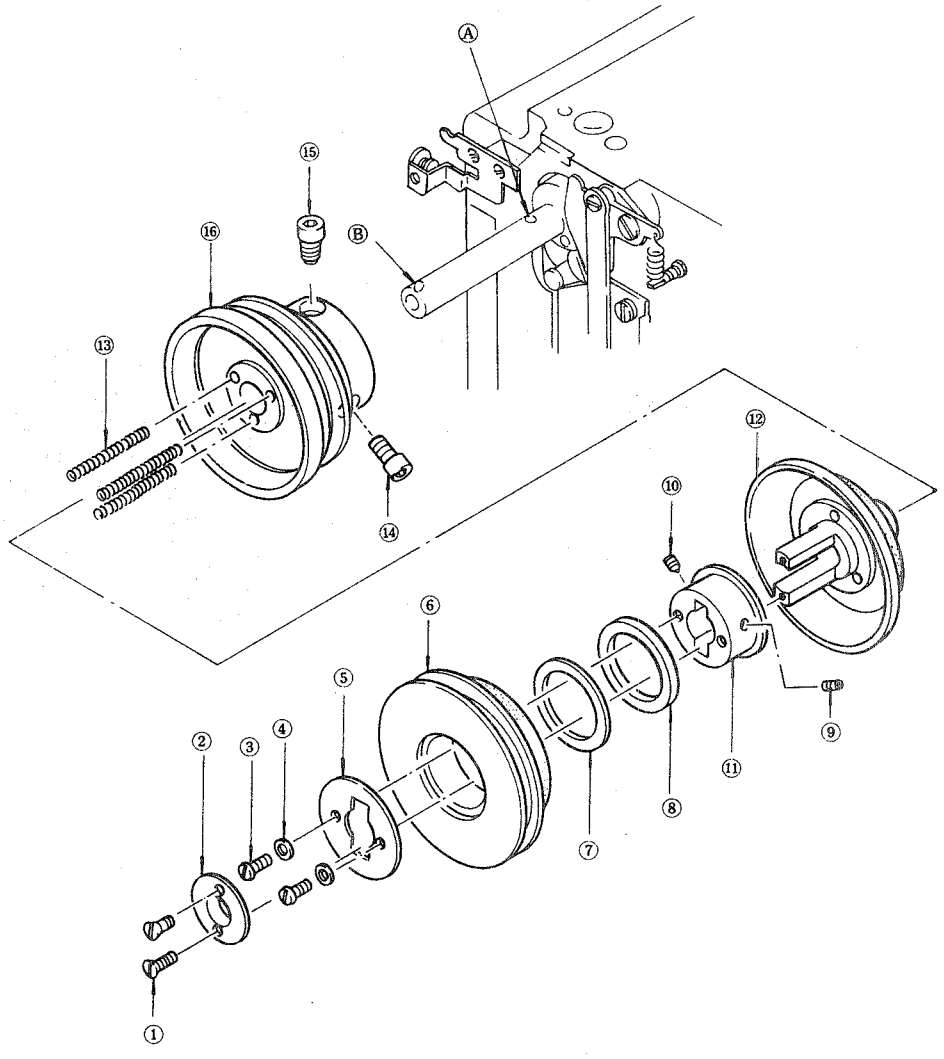
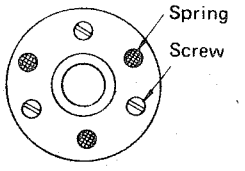
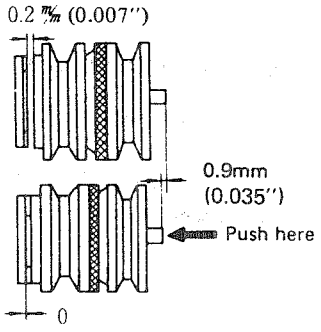


Fig. 53

Precautions in Disassembly	Precautions in Assembly
• Note that setscrew B ⑩ is a tapered screws. Low-speed pulley shaft ⑪ can be removed only by loosening the screw, however, it is advisable to remove the screw for easier assembly.	1) Attach ⑯ so that tapered screw ⑮ enters tapered hole Ⓐ. 2) Apply grease to the low-speed pulley springs before attaching them to ⑯. 3) Attach ⑪ so that tapered screw ⑩ enters tapered hole Ⓑ in the main shaft. At this time, be careful not to cause springs ⑬ to interfere with the flatheaded screws of the changing pulley, and also not to twist the pulley springs. **(Caution)** **Take care not to overtighten ⑩ otherwise it would be difficult to remove it later. (35 kg-cm)**  4) The clearances between low-speed pulley ⑥, changing pulley ⑫, and high-speed pulley ⑯ should be about 0.35 mm (0.014″) each. Check that a contraction of about 0.9 mm (0.035″) is obtained when the part shown by an arrow in the figure below is pushed forcibly (0.2mm (0.007″)→ 0 mm). Perform this adjustment by increasing or decreasing the number of adjusting shims ⑦ (0.1 mm (0.003″) in thickness). * As the number of the adjusting shims is increased, the clearances will grow larger. 

(4) Disassembling the high-speed pulley (asm)

1) By removing bearing snap ring ① first, then pulley spacer ② and adjusting shim ③, high-speed pulley ⑦ can be removed together with ball bearing snap ring ④, washer ⑤ and ball bearing ⑥. (Ball bearing ⑥ has been force-fitted.)
2) Remove preload spring ⑧ and pulley spacer ⑨.
3) Loosen three screws ⑪ and ⑫ of the high-speed cluth, and high-speed clutch ⑩ can be removed from stop-motion cam ⑬.
4) Stop-motion cam pawl ⑭ and safety stopper spring ⑮ can be removed by drawing out stop-motion cam pin ⑯.
(Stop-motion cam pin ⑯ is force-fitted.)

* Assemble the high-speed pulley (asm) by reversing the above disassembling procedure.

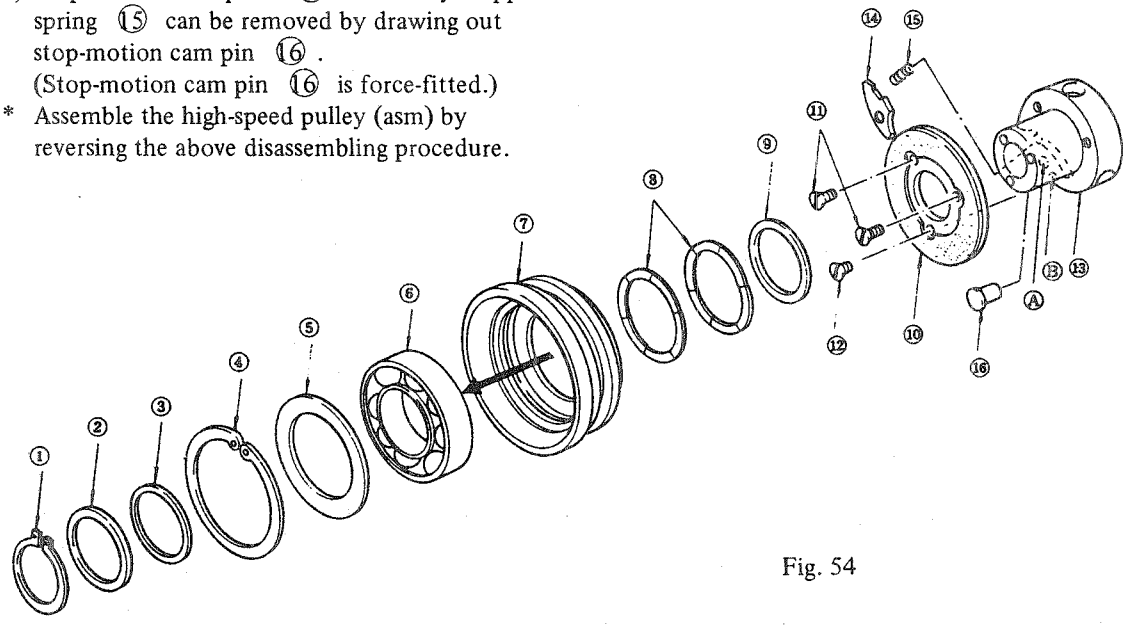


Fig. 54

(5) Disassembling the changing pulley

1) Loosen and remove setscrew ① of the changing pulley.
2) Changing pulley shaft ③ comes off changing pulley ②.

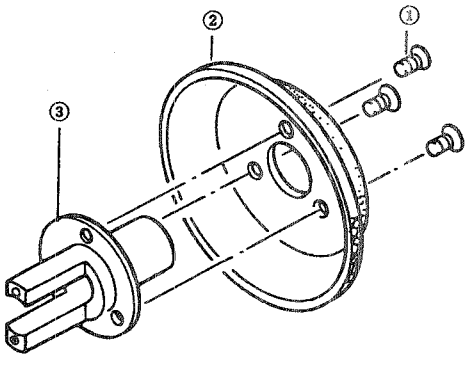


Fig. 55

(6) Disassembling the low-speed pulley

1) Remove ball bearing snap ring ① and then washer ②.
2) Low-speed pulley ④ and ball bearing ③ are force-fitted.

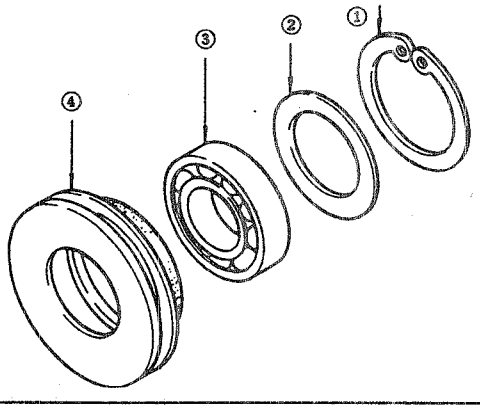
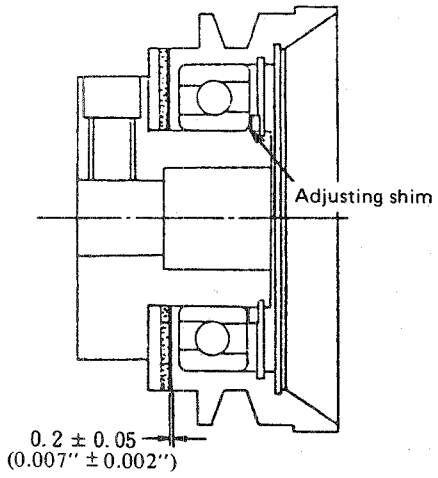


Fig. 56

Precautions in Disassembly	Precautions in Assembly
• When taking ball bearing ⑥ out from high-speed pulley ⑦, remove snap ring ④ and washer ⑤, then push the inner ring in the direction of arrow.  	1) Apply grease to stop-motion cam pin 16 before force-fitting it. 2) Apply a thin coat of grease to surface Ⓐ of the stop-motion cam. 3) Adjust the clearance between high-speed clutch ⑩ and high-speed pulley ⑦ by increasing or decreasing the number of adjusting shim ③ (0.1 mm (0.003") in thickness). * As the number of the adjusting shims is increased, the clearance will grow smaller. 4) To install ball bearing ⑥, apply a thin coat of grease to the inner ring, and push the outer ring to force-fit it into the pulley. At this time, take care not to produce scratches on the end surface of the high-speed pulley. 5) Of the three setscrews for the high-speed clutch, one setscrew ⑫ is shorter than the rest. Use this shorter screw for Ⓑ stop-motion cam ⑬.
• Carefully remove setscrews ① since they are fixed by lock tite.	• Apply lock tite to three setscrews ①.
	• When force-fitting the ball bearing, take care not to produce any scratches on the end surface of the low-speed pulley.

(7) Assembling the pedal pressure decreasing unit

1) Attach reverse rotation preventing latch ② and spring ③ to mounting base ① by hinge screw ④, fix them by nut ⑤.
2) Drive lowering shaft collar B ⑲ into input shaft ⑮.
3) Fit clutch spring ⑦ onto pressure decreasing clutch latch ⑥ so that the end of the spring comes in contact with the pin of the clutch latch.
4) Attaching screw ⑧ to thrust collar ⑨ for sleeve, set them onto inner sleeve ⑩. Then install them so that the groove of the inner sleeve fits to the pin of the pressure decreasing clutch latch.
5) Apply Esso Temprex N3 to outer sleeve ⑪, and attach it so that the stopper pin of the outer sleeve comes in contact with the end of clutch spring ⑦.
6) Apply Esso Temprex N3 to input shaft ⑮, then attach needle bearings ⑯ and ⑱, and collar A ⑰ to the input shaft.
7) Attach input shaft ⑮ to ball bearing ⑭, and fix it by snap ring ⑬.
8) Attach outer sleeve guide ring ⑫ to outer sleeve ⑪, then install the assembly including ⑬ through ⑲ and the assembly comprising ⑥ through ⑫.

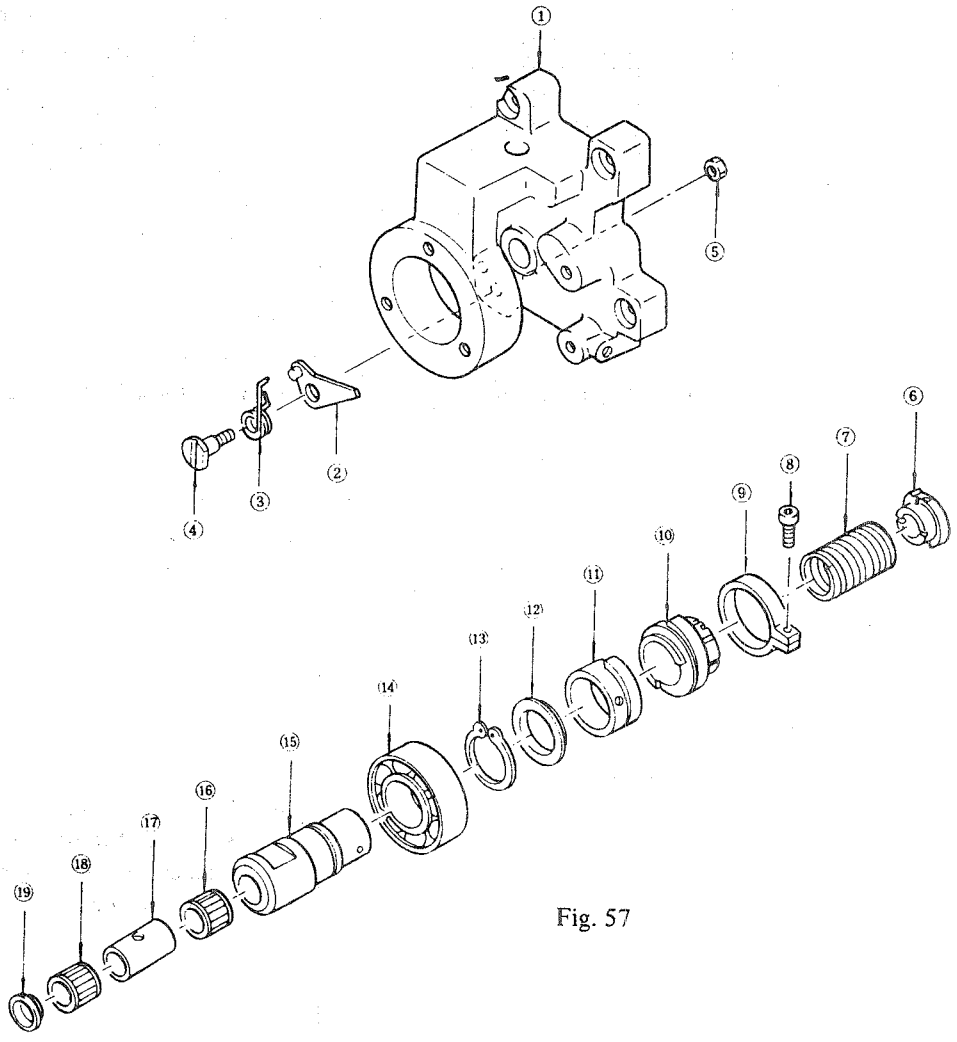
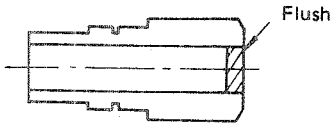
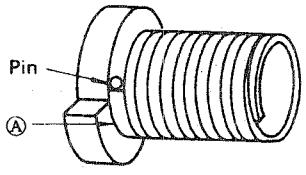
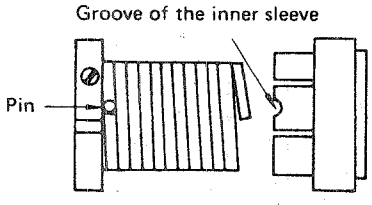
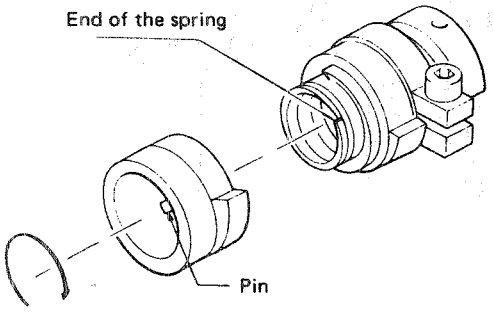


Fig. 57

Precautions in Assembly	Precautions in Disassembly
1) Pay attention to the attaching direction when attaching the reverse rotation preventing latch, spring, and hinge screw. Use lock tite to fix nut ⑤. 2) When driving collar B ⑲ into input shaft ⑮, make their end surfaces flush with each other.  3) The clutch spring should be screwed onto the pressure decreasing clutch latch so that the end of the spring comes in contact with the stopper pin. However, be careful not to screw the spring onto the latch excessively, otherwise the spring will be deformed. Apply Esso Temprex N3 to the circumference of the screw. Pay attention to the orientation of the spring.  4)  5)  Bring the pin into contact with the end of the spring, and turn the outer sleeve in the direction of arrow to attach it to the inner sleeve.	● To remove the clutch spring, draw it out while wrenching point Ⓐ using a small screw-driver or the like. Do not forcibly pull out the spring, or the spring would be deformed.

9) Install input shaft ② assembly to pressure decreasing unit frame. (from the direction of arrow A)
10) Attach idler mounting plate ③ to pressure decreasing unit frame ① by setscrew ④.
11) Inserting pressure decreasing shaft ⑤ from direction B (shown by arrow), drive in dowel pin ⑥, aligning the tapered hole of the shaft with the tapered hole of the pressure decreasing clutch latch (Fig. 57, ⑥).
12) Tighten setscrew ⑦.

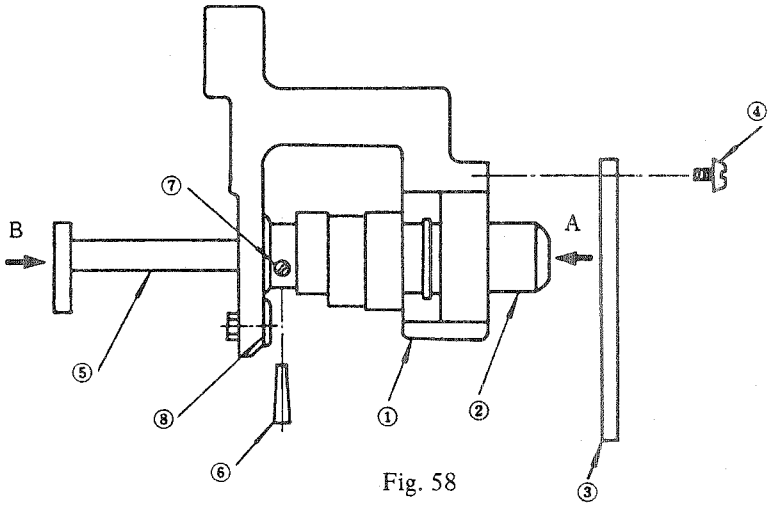


Fig. 58

13) Attach spring suspension ② to work clamp foot lifting lever link ①.
14) Attach upper and lower work clamp foot lifting levers ⑧ to work clamp foot lifting lever link ① by hinge screw ③.
15) Using setscrew A ④ and setscrew B ⑤, attach lever latch A ⑥ and lever latch B ⑦ to work clamp foot lifting levers ⑧, respectively.

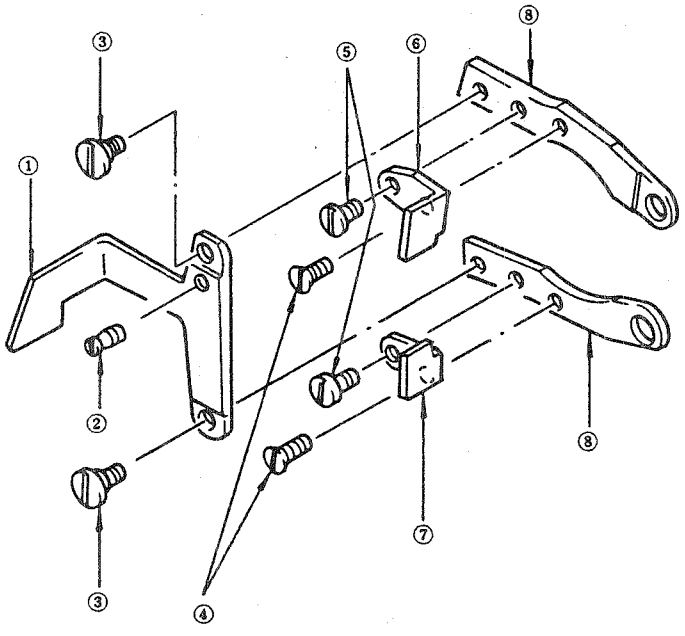


Fig. 59

Precuations in Assembly	Precuations in Disassembly
6) When installing the input shaft to the pressure decreasing unit frame, take care not to pinch reverse rotation preventing latch ⑧.	• When taking out the dowel pin, be careful not to hit it reversely, or else the head would be crashed and the dowel pin would not come out.
7) The dowel pin is tapered, and therefore do not drive it in reversely.	• To draw out pressure decreasing shaft ⑤, draw out the dowel pin, loosen setscrew ⑦, and tap the shaft from direction A.
8) Use lock tite to fix setscrews A ④ and B ⑤. 9) Apply grease to the parts of hinge screw ③ and spring suspension ② onto which the spring is hooked.	

16) Using eccentric shaft ③ , attach work clamp foot lifting lever (asm) ② , to pressure decreasing unit frame ① .
17) Fix eccentric pin ③ by setscrew ④ .
18) Inserting stopper screw ⑤ into pressure decreasing unit frame ① , fix it using nut ⑥ .
19) Attach tension spring ⑦ to the work clamp foot lifting lever.
20) Tighten sleeve thrust collar screw (⑧ of Fig. 57)

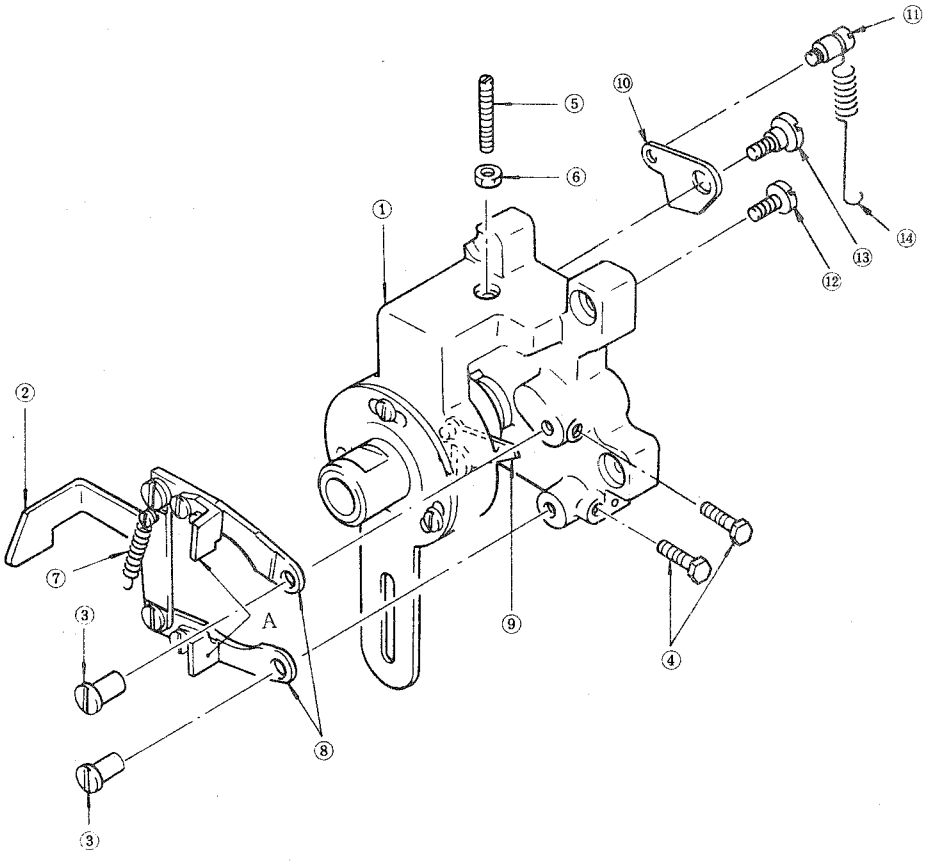
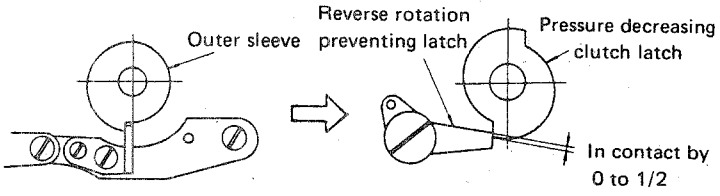
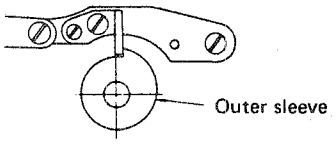
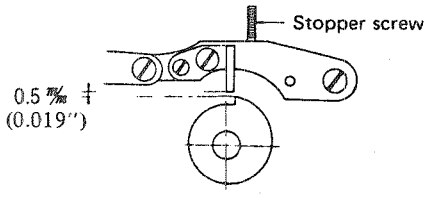
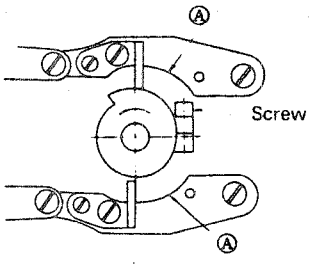


Fig. 60

21) Attach spring hook ⑪ to auxiliary cam ⑩ .
22) Screw stopper screw ⑫ into pedal pressure decreasing unit ① .
23) Attach auxiliary cam ⑩ to pedal pressure decreasing unit ① , using hinge screw ⑬ , then attach tension spring ⑭ to it.

Precuations in Assembly	Precuations in Disassembly
10) Grease eccentric pin ③ . 11) Make adjustment by eccentric pin ③ so that the end of reverse rotation preventing latch ⑨ comes in contact with the pressure decreasing clutch latch (⑥ of Fig. 57) by 0 to 1/2 when latch A of work clamp foot lifting lever ⑧ touches the stopper of outer sleeve (⑪ of Fig. 57).  12) When the clutch spring (⑦ of Fig. 57) has been replaced and the adjustment has been considerably disturbed, replace the clutch spring or cut the spring end on the pressure decreasing clutch latch (⑥ of Fig. 57). The reverse rotation preventing latch should come in contact with the pressure decreasing clutch by 0 to 1/2 at the point shown below.  13) The clearance between outer sleeve (⑪ or Fig. 57) and latch A of work clamp foot lifting lever ⑧ should be 0.5 mm (0.019"). Adjust the clearance by stopper screw ⑤ .  14) Fix the screw of the pressure decreasing sleeve collar in a position where it does not touch points A when the outer sleeve is turned with latch A of work clamp foot lifting lever ⑧ in contact with the circumference of the outer sleeve.  	

7. PARTS TO BE FIXED WITH LOCKTIGHT

Since a great number of starts and stops are expected in operating this machine, the screws that are likely to loosen have been fixed with lock tite.
Accordingly, whenever these parts have been disassembled, clean them with thinner and dry well before applying lock tite to them for reassembly.
If it is difficult to remove a screw fixed with lock tite, heat it with a torch lamp or the like.
The parts using lock tite that are usually disassembled are as shown below.

(1) Stop-motion lever shaft
- End of the lever shaft

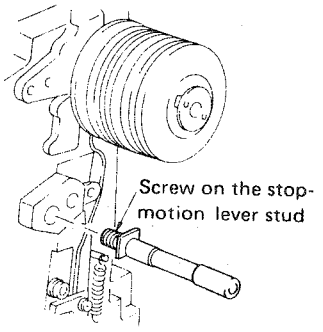


Fig. 61

(2) Stop-motion lever
- End of stop link rod

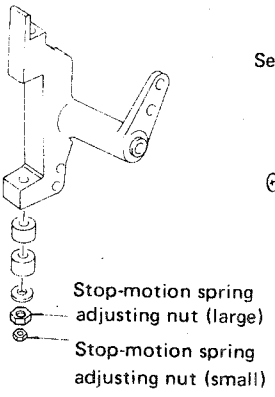


Fig. 62

(3) Changing pulley
- Setscrews

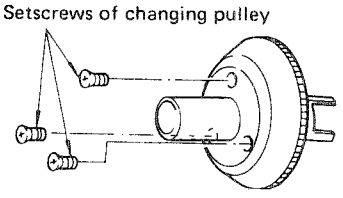


Fig. 63

(4) Throat plate
- Knife driving lever stud

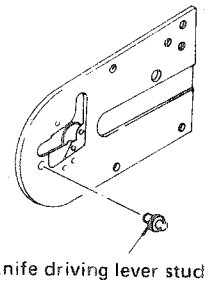


Fig. 64

(5) Work clamp foot lifting lever
- Work clamp foot lifting lever latch

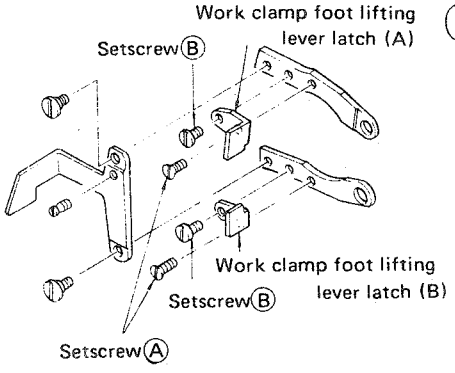


Fig. 65

(6) Shuttle driver shaft gear
- Gear dowel pin

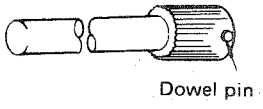
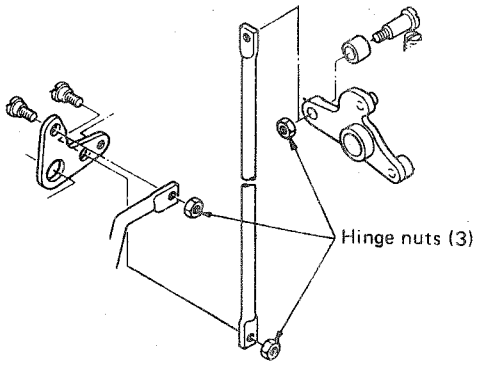
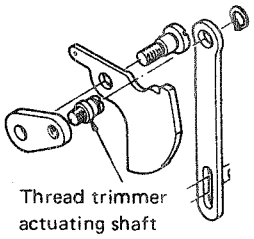


Fig. 66

(7) Thread trimmer connecting rod hinge screw nuts and thread trimmer actuating shaft assembly





(Caution)

Lock tite is used for many hinge screws. Be very careful not to allow lock tite to stick to their shafts, or else the functions of the parts may be damaged.

8. PARTS TO BE FILLED WITH GREASE

(1) Refill grease once every other year or when the parts filled with grease have been disassembled.
(2) Grease to be used
Lithium-based grease

Maker	Description
Esso	Lithen 2, Beacon 2,
Shell	Clvania

* **Use Esso Temprex N3 for the pedal pressure decreasing unit components. (supplied with the machine)**

(3) Parts to be filled with grease
If a grease pump is not available, use a plastic oiler or an injector with its needle removed.

1) Main shaft components

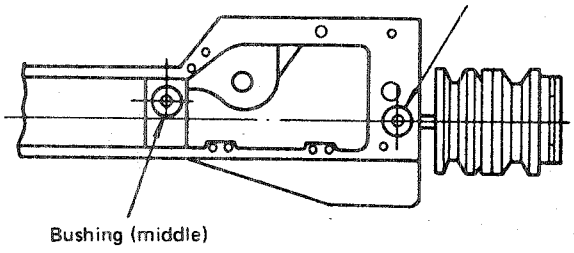


Fig. 67

2) Pedal pressure decreasing unit compoments

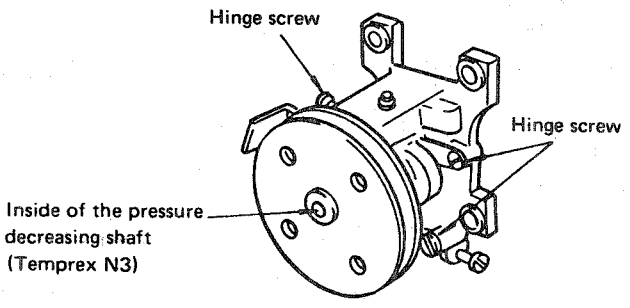


Fig. 68

3) Speed reducer

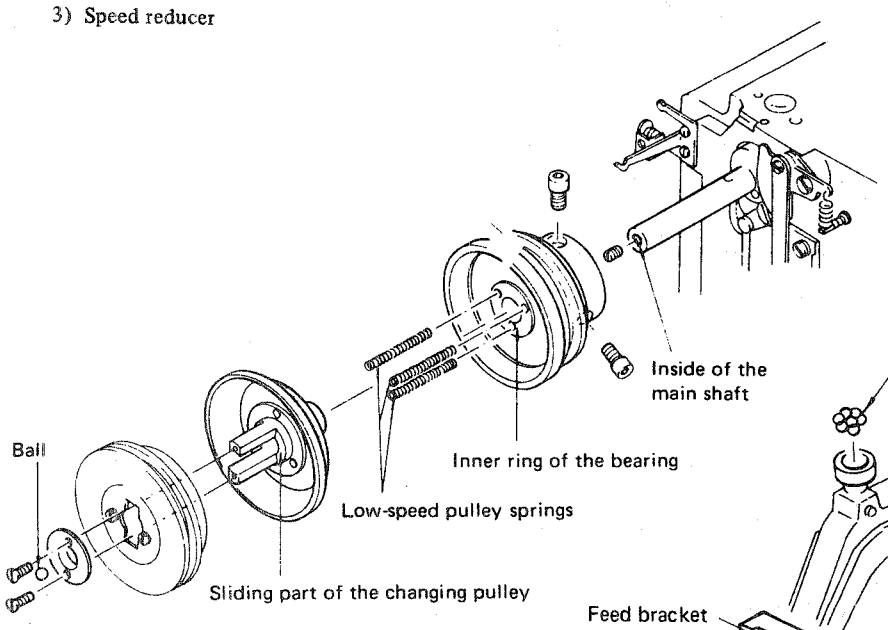


Fig. 69

4) Feed bracket components

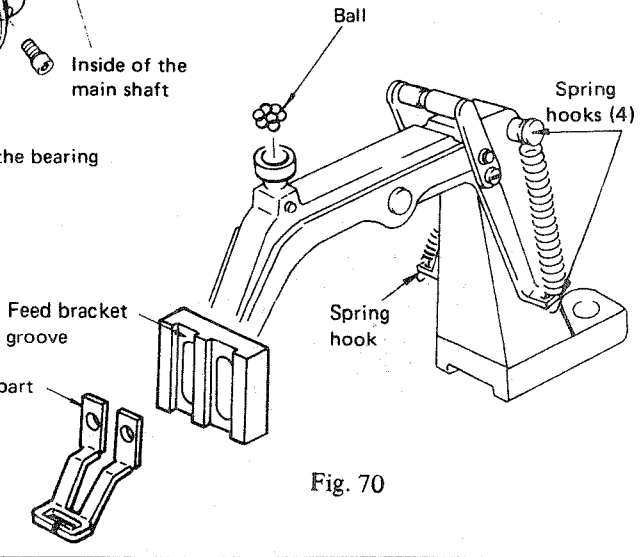


Fig. 70

5) Stop-motion lever components

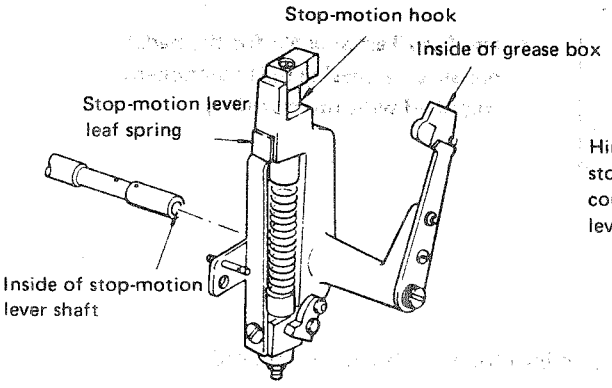


Fig. 71

6) Lowering lever and stop-motion connecting lever components

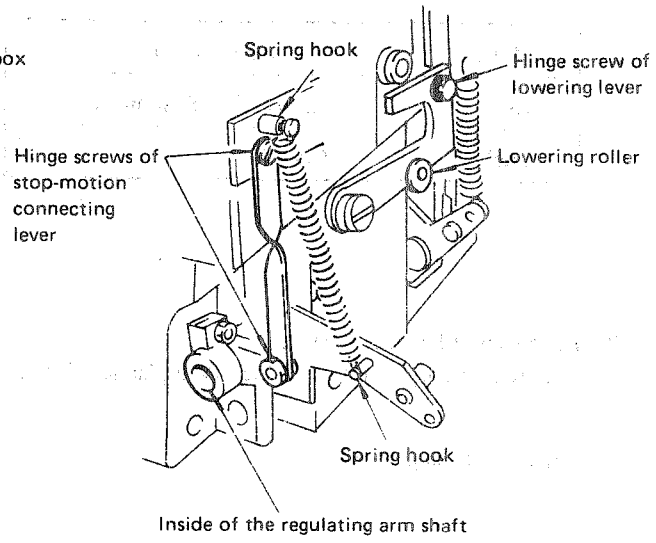


Fig. 72

7) Longitudinal and lateral feed components

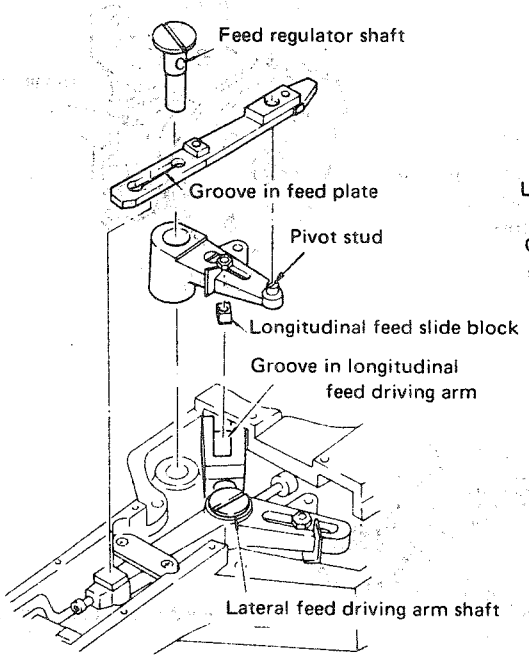


Fig. 73

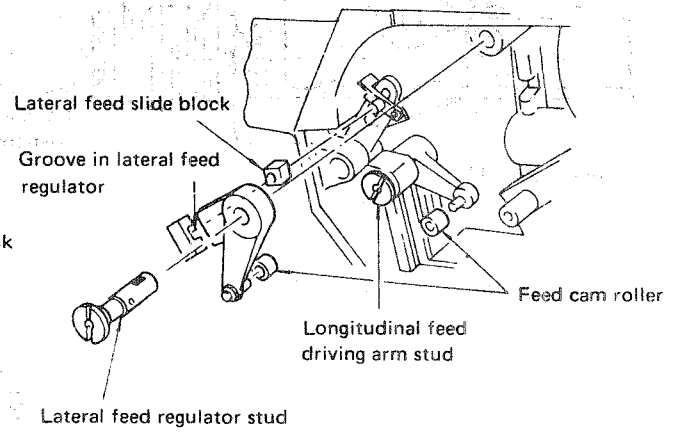


Fig. 74

8) Knife driving cam components

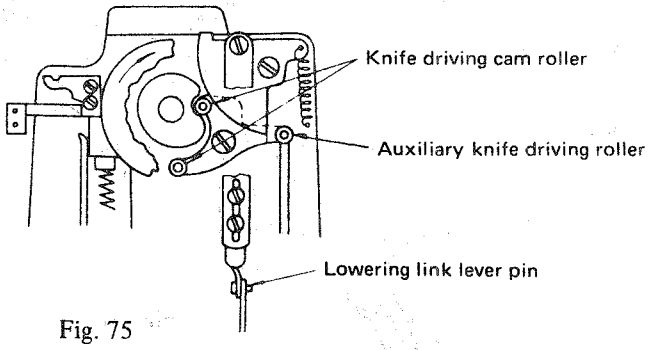
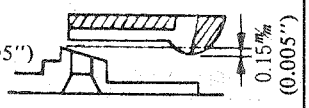
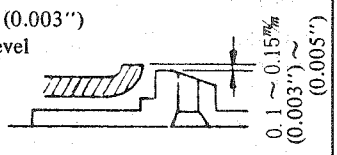


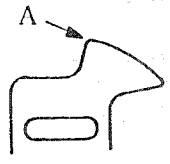
Fig. 75

9. EXPENDABLE PARTS

(1) General expendable parts

Part No.	Description	Caution in installation
	Needle	
B1818280000	Shuttle	Check that the clearance of 0.3(0.011") to 0.5 mm (0.019") is provided between the shuttle and the shuttle driver. If not, correct it in accordance with the pertinent "Standard Adjustment".
B24222800A0	Moving knife	Select a proper washer for the moving knife and perform adjustment so that the moving knife blade engages with the needle hole guide by 0.15 mm (0.005") 
B2424280000	Counter knife	Perform adjustment to provide a 0.1 (0.003") to 0.15 mm (0.005") difference in level between the counter knife blade and the needle hole guide. 
B2426280000	Needle hole guide	Replace this part if its needle hole has been scratched or grown bigger in diameter. Whenever installing a new needle hole guide, check the height of the moving and counter knives.
B3112761000	Thread take-up spring	
B2303280000	Tension release pin	

(2) Expendable parts to be replaced infrequently

Part No.	Description	Caution in installation
13503750	High-speed clutch disc	Refer to 6. Disassembling/assembling procedures for replacement.
13504402	Changing pulley	
13504709	Low-speed pulley	
B1215280000	Stop-motion cam latch	
B1217280000	Stop-motion cam latch driving spring	
13520309	Changing pulley pressing plate	Replace this part when the portion in contact with the ball has been depressed, scarcely providing no tilt.
13520408	Driving plate	Replace this part when point A has worn out and the moving knife is allowed to move in low-speed operation, producing tapping sound. 
13522206	Stop-motion regulating cam roller	Whenever replacing the roller, the snap ring RC0470611KP should be also replaced with a new one.
13523808	Clutch spring	Refer to 6. Disassembling/assembling grocedures for replacement.

(3) Parts likely to be lost or damaged during repair

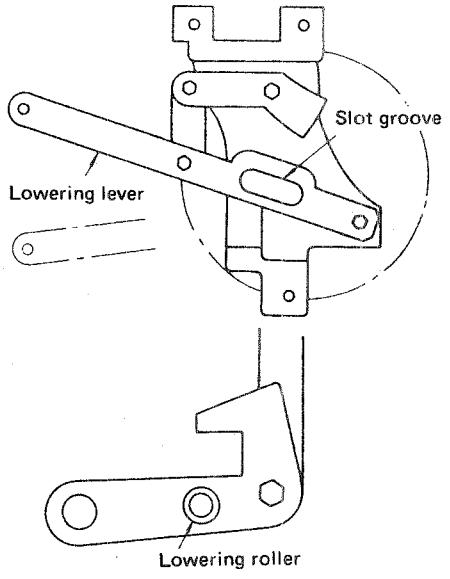
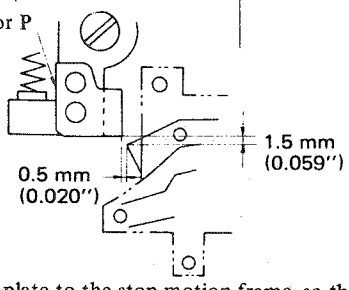
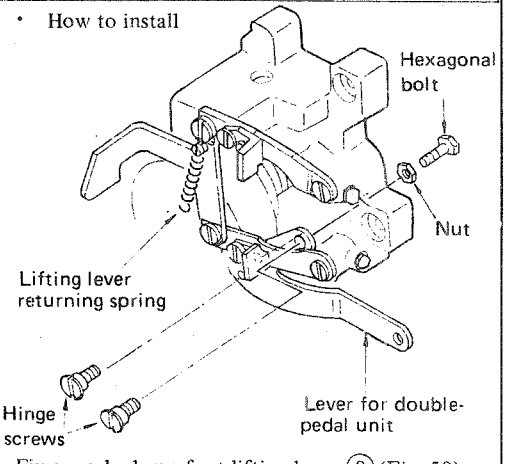
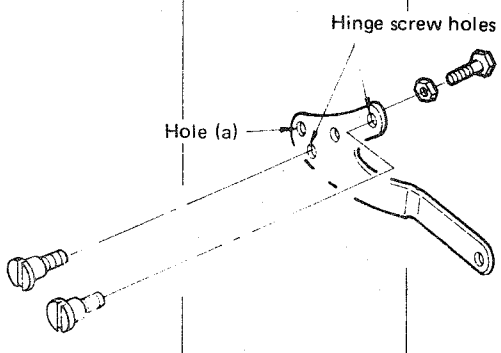
Part No.	Description	Caution in installation
B2549280000	Balls (seven) for feed bracket	Apply grease to these balls to prevent them from falling when installing them.
SS1060210TP	Needle hole guide setscrews (two)	
B1253980000	Stop-motion ball	Apply grease to the ball before installing it.

10. PARTS FOR SUBCLASS MACHINES

(1) Parts for changing the number of stitches

Model	No. of stitches	Worm gear	Worm	Stop-motion regulating cam
LK-1852	28	13510904	13510805	13538301
	14	13510904	13510805	13539002
LK-1853	36	13511100	13511001	13538400
LK-1854	42	13510409	13510300	13522008
	21	13510409	13510300	13539200

(2) Special part and devices

Application	Description	Part No.	Remarks
For lifting the work clamp foot by 2 pedals	Foot-treadle type lifter (for P)	13545959	• How to install 
For using two pedals with a machine table for attaching belt loops	Belt cover for P Stop-motion tension spring for P Pedal shaft (asm) for P	13546809 13547500 13547658 13546601	
Start safety plate for P  Fix the start safety plate to the stop-motion frame so that about 0.5 mm (0.020") lateral clearance and about 1.5mm (0.059") longitudinal clearance are provided between the start safety plate and the lifting unit.			
* When the belt-loop pedal lever (asm) is used with a belt-loop sewing machine	Start lever tension spring (B)	13522503	Removing the pedal pressure decreasing unit, fit the slot in the lowering lever on the back of the lifter onto the lowering roller, and fix it using three setscrews.
One-touch lateral feed adjustment	One-touch lateral feed regulator asm. (for F)	GAF010010A0	
Lifting by double-pedal pedal pressure decreasing unit	For double-pedal pedal pressure decreasing unit (for T) Belt cover Stop-motion tension spring	13526058 13546809 13547500	• How to install  Fix a work clamp foot lifting lever (8) (Fig. 59). using the two hinge screws, and lock the hexagonal bolt with the nut. Replace the work clamp foot lifting lever returning spring.
			

For long needle (DP x 17, DI x 3)	Needle bar	D1401L7VV00	
	Needle bar thread guide	D1405L7AM00	
	Wiper	D2101L7AM00	
For thick needle (#19 or more)	Shuttle	D1818282N00	
	Shuttle race ring (for #23 needle)	D1817282N00	
	Needle hole guide (without boss) ϕ 2 hole	B242628000B	
	Needle hole guide (without boss)	D2426MMCK00	
	Needle hole guide (with boss) ϕ2.7 hole	D2426L7AM00	
For thick thread	Thread take-up spring	D3112L4BB00	
	Tension spring No. 2	B3129053000	
	Bobbin case	B18289800AB	For thread of more than #5
For making shuttle rotation angle greater (for sewing canvas shoes)	Large oscillating rock shaft	D1805MLBH00	
For higher tension of pressure spring	Spring	13519004	

★

(3) Modifying the standard machine to subclass machine (Follow the arrows shown below for modification.)

Modification within the same number of stitches		
Parts to be replaced	Remarks	
Feed cam		
Feed plage		
Work clamp foot (right)		
Work clamp foot (left)		

Modification within the same number of stitches but with division		
Parts to be replaced	Remarks	
Feed cam		
Feed plate		
Work clamp foot (right)		
Work clamp foot (left)		
Stop-motion regulating cam	Comes in two types for same number of stitches with or without division	Refer to the paragraph covering the stop-motion regulating cam.

Modification in which the number of stitches is changed		
Parts to be replaced	Remarks	
Feed cam		
Feed plate		
Work clamp foot (right)		
Work clamp foot (left)		
Stop-motion regulating cam	Exclusive cams are available, depending on number of stitches	Refer to the paragraph covering the stop-motion regulating cam.
Worm	Replace according to number of stitches.	Refer to the paragraphs covering the worm and worm gear.
Worm gear	Replace according to number of stitches.	Refer to the paragraphs covering the worm and worm gear.

Modified to subclass machine

Modification in which bartacking size is also changed		
Condition : Change from standard machine	Description	Part No.
Bartacking size : 40mm (lateral feed) x 20mm (longitudinal feed)	Feed pressing plate	13519103

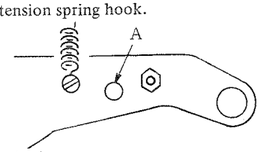
Modification in which the count of needle is also changed			
Description	Part No.	Count of needle	Remarks
Needle hole guide	D2426282C00	#11 DP x 5	
	B2426280000	#14 ~ #18 DP x 5	Standard
	B242628000B	#19 or more DP x 5	
Shuttle race ring	B1817280000	#11 ~ #18 DP x 5	Standard
	D1817282N00	#19 or more DP x 5	
Needle bar	B1401L7VV00	DP x 17 #19 or more	For extra heavy-weight material (canton flannel)
Needle bar thread guide	B1405L7VV00	DP x 17 # 19 or more	10 plies or more

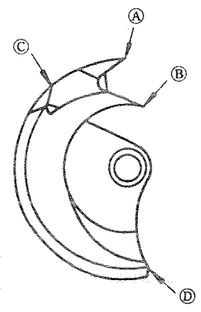
11. TROUBLES AND CORRECTIVE MEASURES

Trouble	Cause (1)	Cause (2)	Corrective measures
1. The machine stops in the idling area between low-speed and high-speed operation. (The machine stops at the second or third stitch (idling area) after it is started.	1–1) The pressing plate has been positioned improperly.		Correct the position of the pressing plate. (Refer to Standard Adjustment (5).)
	1–2) The starting lever is pulled down excessively to the high-speed idling area.	2)–A The starting lever stopper has been positioned improperly.	Correct the position of the starting lever stopper. (Refer to Standard Adjustment (6).)
	1–3) The clearance between the clutch and the pulley is too large.		Reduce the number of the adjusting shims. (Refer to Disassembling & Assembling Procedures.)
	1–4) The safety place has stuck.	4)–A The safety plate has stuck against the pedal pressure decreasing unit.	Correct the clearance between the safety plate and the work clamp foot lifting lever. (Refer to Standard Adjustment (7).)
	1–5) The tension of the high-speed or low-speed belt is not high enough.		Correct the tension of the belt. (Refer to Standard Adjustment (21).)
	1–6) The stop-motion hook has been positioned improperly.	6)–A An excessive clearance is provided between the stop-motion hook and the stop-motion cam when the machine runs at low speed.	Correctly position the stop-motion hook. (Refer to Standard Adjustment (3).)
	1–7) The changing pulley slides unsmoothly.	7)–A In want of grease	Supply grease through the hole in the main shaft. (See "Parts to be filled with grease".)
	1–8) The idling area is reached when the needle penetrates material.	8)–A The stop-motion timing is wrong.	Correct the stop-motion timing. (Refer to Standard Adjustment (4).)
	1–9) The machine torque is abnormally large.	9)–A The worm has no backlash.	Provide the worm with a proper backlash. (Refer to Other Precautions (4).)
		9)–B The crank rod has stuck.	Move the oscillating rock shaft laterally to correct the sticking.
		9)–C The feed cam roller sticks against the feed cam groove.	Replace the feed cam roller with a proper one. (Refer to Other Precautions (5).)
2. The machine does not run at high speed. (Change between low-speed and high-speed is not made, and therefore the machine does not run at normal sewing speed.)	2–1) The pressing plate has been positioned improperly.		Correctly position the pressing plate. (Refer to Standard Adjustment (5).)
	2–2) The clearance between the clutch and the pulley is not correct.		Correct the position of the pressing plate and the starting lever stopper. (Refer to Standard Adjustment (5) and (6).)
	2–3) The machine torque is too large.		Remove sticking of the main shaft, shuttle driver shaft, etc.
	2–4) Belt tension is not high enough.		Correct belt tension. (Refer to Standard Adjustment (21).)
	2–5) The clutch slips.	5)–A The clutch has worn.	Increase or decrease the number of adjusting shims. (Refer to Disassembling Procedures.) If this does not correct the trouble, replace the clutch.
		5)–B The clutch has grease on its surface.	Clean the clutch surface.
3. The machine keeps on running and does not stop in continuous sewing.	3–1) The stop-motion lever has stuck.		Supply grease to the stop-motion lever.
	3–2) The pressing plate has worn or is in want of grease.		Replace the pressing plate or apply grease to the pressing plate.
4. The clutch gets hot. (The clutch gets hot during idling.)	4–1) The pressing plate has been positioned improperly.		Correctly position the pressing plate. (Refer to Standard Adjustment (5).)
	4–2) The high-speed pressing plate has worn out.		Replace the pressing plate.
	4–3) The clearance between the high-speed and low-speed tapered clutches is less than 0.7 mm (0.028")		Increase the number of the adjusting shims. (Refer to Disassembling & Assembling Procedures.)

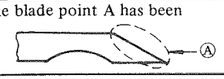
★

Trouble	Cause (1)	Cause (2)	Corrective measures
	4–4) The clearance at the high-speed flat clutch is much smaller than 0.2 mm		Decrease the number of the adjusting shims. (Refer to Disassembling & Assembling Procedures.)
	4–5) The inner ring of the high-speed bearing is in want of grease.		Apply grease to the inner ring.
5. Abnormal sound is heard.	5–1) The bearing has worn out or scratched.		Replace the bearing. (Refer to Disassembling & Assembling Procedures.)
6. The stop motion is not engage. (The machine stops without entering the stop motion.)	6–1) The machine torque is large.	1)–A The worm has no back-lash	Provide the worm with a proper back-lach. (Refer to Other Precautions (4).)
		1)–B Excessive torque due to maladjustment of the parts.	Check each part for proper adjustment to eliminate such excessive torque.
	6–2) The stop-motion is too early, and the stop-motion is engaged one stitch earlier. Or the stop motion is engaged before the stop-motion cam screw No. 1 is reached.		Correct the stop-motion timing. (Refer to Standard Adjustment (4).)
	6–3) The high needle penetration resistance in sewing heavy-weight material causes the machine to stop before the correct stop-motion point is reached.		– ditto –
7. The stop motion is engaged during high-speed operation.	7–1) The changing pulley deflects much.		Replace the part.
	7–2) The stop-motion timing is too late.		Correct the stop-motion timing. (Refer to Standard Adjustment (4).)
	7–3) The high-speed clutch has grease on its surface.		Clean the clutch surface.
	7–4) The pressing plate has been positioned improperly.		Correct the position of the pressing plate. (Refer to Standard Adjustment (5).)
8. The work clamp foot will not go up. (The work clamp foot will not rise even though the motor runs.)	8–1) The belt slips.	1)–A The tension of the low-speed belt is not high enough.	Correct the belt tension. (Refer to Standard Adjustment (21).)
		1)–B The height of the work clamp foot is wrong.	Correct the height of the work clamp foot. (Refer to Standard Adjustment (9).)
		1)–C The work clamp foot comes in contact with the wiper.	Correct the position of the wiper. (Refer to Standard Adjustment (10).)
	8–2) The safety plate sticks.		Correct the clearance between the safety plate and the work clamp foot lifting lever. (Refer to Standard Adjustment (7).)
	8–3) Failure with the pedal pressure decreasing unit.	3)–A The reverse rotation preventing latch does not engage with the pressure decreasing clutch latch properly.	Correct the length of the clutch spring or the eccentric shaft, or replace the clutch spring. (Refer to Disassembling & Assembling Procedures.)
		3)–B The stopper screw of the pressure decreasing unit frame has been adjusting improperly.	Correctly adjust the stopper screw. (Refer to Disassembling & Assembling Procedures.)
		3)–C The clutch spring has worn out.	Replace the clutch spring. (Refer to Disassembling & Assembling Procedures.)
		3)–D The input shaft has worn out.	Replace the input shaft. (Refer to Disassembling & Assembling Procedures.)
	8–4) Stop motion failure.		See Trouble 6.

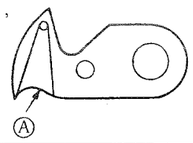
Trouble	Cause (1)	Cause (2)	Corrective measures
	8–5) The starting lever fails to return to its home position at the time of stop motion.	5)–A Sticking of the stop-motion regulating arm.	Remove the axial sticking. (See Standard Adjustment 3.)
		5)–B The belt-loop attaching pedal lever is unsmooth.	Replace the starting lever tension spring with the starting lever tension spring B. (See 10–(2).)
			Remove the friction between the starting pedal shaft and the pedal shaft bearing.
		5)–C The pressure required to operate the lockstitch pedal is too high.	Change the position of the starting lever tension spring hook.  * Hook the starting lever tension spring onto A.
			Replace the starting lever tension spring with the starting lever tension spring B.
9. The work clamp foot will not go down. (The work clamp foot will not descend even though the motor runs.)	9–1) The safety plate sticks.		Correct the clearance between the safety plate and the work clamp foot lifting lever. (Refer to Standard Adjustment (7).)
	9–2) The tension release bar hits other part.	2)–A The tension release bar hits the face plate.	Correctly adjust the tension release bar. (Refer to Standard Adjustment (11).)
10. The starting lever will not move even when the pedal is depressed.	10–1) The stop-motion regulating arm sticks.		Remove the axial sticking. (Refer to Standard Adjustment (3).)
	10–2) The work clamp foot comes down, but the pedal cannot be depressed to the machine starting position.	2)–A The safety plate has been adjusted improperly.	Correct the clearance between the safety plate and the work clamp foot lifting lever. (Refer to Standard Adjustment (7).)
		2)–B The starting lever stopper has been adjusted improperly.	Properly adjust the starting lever stopper. (Refer to Standard Adjustment (6).)
	10–3) The starting lever stopper has been maladjusted.		Correctly adjust the starting lever stopper. (Refer to Standard Adjustment (6).)
11. Abnormal sound (chattering) is heard grom the pedal pressure decreasing unit.	11–1) The clutch spring is wearing out (chattering).		Supply grease to the clutch spring.
	11–2) The clutch spring slips. (chattering)	2)–A The clutch spring has worn out.	Replace the clutch spring. (Refer to Disassembling & Assembling Procedures.)
	11–3) The reverse rotation preventing latch engages with the pressure decreasing clutch latch improperly. (chattering)	3)–A The clutch spring has worn out.	Replace the clutch spring. (Refer to Disassembling & Assembling Procedures.)
			Correct the eccentric shaft or the length of the clutch spring. (Refer to Disassembling & Assembling Procedures.)
	11–4) The ball bearing has scratches.		Replace the bearing.
12. The thread slips off the needle. (The thread slips off the needle at the first, second or third stitch before any stitch is formed.)	12–1) Stitch skipping at the first stitch.	1)–A The timing between the needle and the shuttle is wrong.	Correct the timing and the clearance between them. (Refer to Standard Adjustment (13).)
		1)–B The feed timing is wrong.	Correct the timing of the feed cam. (Refer to Standard Adjustment (2).)
	12–2) The thread remaining on the needle is not long enough.	2)–A The tension controller No. 1 has been adjusted improperly.	Correct the tension of the tension controller No. 1. (Refer to Standard Adjustment (19).)
		2)–B The tension release bar has been maladjusted.	Correctly adjust the tension release bar. (Refer to Standard Adjustment (11).)
		2)–C The stroke of the thread take-up spring has been maladjusted.	Correct the stroke of the thread take-up spring. (Refer to Standard Adjustment (20).)

Trouble	Cause (1)	Cause (2)	Corrective measures
		2)–D The difference in level between the counter knife and the moving knife is not correct.	Correct the height of the moving knife and the counter knife. (Refer to Standard Adjustment (17).)
	12–3) The bobbin thread is not long enough.	3)–A The difference in level between the counter knife and the moving knife is not correct.	Correct the height of the moving knife and the counter knife. (Refer to Standard Adjustment (17).)
		3)–B The shuttle race spring has scratches.	Remove the scratches.
		3)–C The bobbin thread tension is too high.	Correct the bobbin thread tension.
	12–4) The bobbin thread protrudes due to racing of the bobbin.		Replace the bobbin case and the bobbin with those exclusively used for LK-1850.
13. Needle breakage	13–1) The clearance between the shuttle driver needle guard and the needle is not correct.		Correct the clearance between the needle and the shuttle driver. (Refer to Standard Adjustment (13).)
	13–2) The feed timing is not correct.		Correct the feed cam timing. (Refer to Standard Adjustment (2).)
	13–3) The needle hole guide has scratches.		Remove the scratches, or replace the needle hole guide.
	13–4) The needle hits the work clamp foot.		Correct the position of the work clamp foot. (Refer to Standard Adjustment (8).)
	13–5) The needle hits the moving knife.		Properly position the moving knife. (Refer to Standard Adjustment (16).)
14. Stitch skipping	14–1) The timing between the needle and the shuttle is wrong.		Correct the timing and clearance between them. (Refer to Standard Adjustment (13).)
	14–2) The needle is bent or has been attached improperly, or the needle point is blunt.		Replace or properly attach the needle.
	14–3) The feed timing is not correct.		Correct the feed cam timing. (Refer to Standard Adjustment (2).)
	14–4) The clearance between the shuttle driver needle guard and the needle is not correct.		Correct the clearance between the needle and the shuttle driver. (Refer to Standard Adjustment (13).)
15. Thread breakage	15–1) Scratches on the shuttle. 	1)–A Scratch on point A (due to needle striking the shuttle)	Smooth out the shuttle point with an oil stone, then burnish using a blue polishing sand bar or the like. Correct the clearance between the needle and the shuttle. (Refer to Standard Adjustment (13).)
		1)–B Scratch on point B (produced when the needle bends or breaks)	Smooth it out with an oil stone, then burnish using a blue polishing sand bar or the like.
		1)–C Scratch on point C (The shuttle has been scratched at the needle when removed.)	Smooth it out with an oil stone, then burnish using a blue polishing sand bar or the like.
		1)–D Scratch on point D	Smooth it out with an oil stone, then burnish using a blue polishing sand bar or the like.

★

Trouble	Cause (1)	Cause (2)	Corrective measures
	15–2) The thread bites into the shuttle.	2)–A The shuttle race spring has been positioned improperly.	Correct the position of the shuttle race spring. (Refer to Standard Adjustment (12).)
		2)–B The shuttle blade point A has been rounded. 	Replace the shuttle.
		2)–C The shuttle race has positioned improperly.	Correct the position of the shuttle race. (Refer to Standard Adjustment (13).)
		2)–D The needle thread tension is not high enough.	Correct the needle thread tension.
	15–3) The shuttle driver has scratches.		Remove the scratches.
	15–4) The clearance between the shuttle driver and the shuttle is not correct.		Correct the clearance between the shuttle driver and the shuttle. (Refer to Standard Adjustment (13).)
	15–5) The needle hole guide has scratches.		Remove the scratches, or replace the needle hole guide.
	15–6) The needle has scratches, or has been bent or attached improperly.		Replace or properly attach the needle.
	15–7) The work clamp foot has been positioned improperly.		Properly position the work clamp foot. (Refer to Standard Adjustment (8).)
	15–8) The stroke of the thread take-up has been maladjusted.	8)–A The stroke of the thread take-up spring is too large.	Correct the stroke. (Refer to Standard Adjustment (20).)
		8)–B The tension of the thread take-up spring is too high.	Correct the tension of the thread take-up spring. (Refer to Standard Adjustment (20).)
	15–9) The needle thread tension is too high.		Correct the needle thread tension.
	15–10) The shuttle does not rotate properly.	10)–A There are fibrous wastes on the shuttle race racing surface.	Remove the shuttle, and remove the fibrous wastes.
		10)–B Poor lubrication	Lubricate the shuttle assembly.
16. Thread breaks at time of thread trimming. (normal thread trimming is not done at the last stitch, and either needle thread or bobbin thread is cut.)	16–1) The tension release timing is not correct.	1)–A Thread is trimmed before thread tension is released.	Correctly adjust the tension release bar. (Refer to Standard Adjustment (11).)
	16–2) The moving knife has scratches.		Using a blue polishing sand bar or the like, burnish the moving knife with attention paid to the blade.
	16–3) The shuttle race spring has scratches.		Remove the scratches.
	16–4) The height of the counter knife is not correct.	4)–A The thread is cut by the projection of the moving knife before it is trimmed by the moving knife.	Correct the height of the moving and counter knives. (Refer to Standard Adjustment (17).)
	16–5) The thread path of the bottom surface of the needle hole guide is not smooth.	5)–A The thread is cut by the needle hole guide.	Smooth out the thread path using a blue polishing sand bar or the like, or replace the needle hole guide.
	16–6) The thread spreading timing of the moving knife is bad.		Properly position the auxiliary knife driving cam and the moving knife. (Refer to Standard Adjustment (15) and (16).)
	16–7) The needle thread tension is too high.		Correct the needle thread tension.

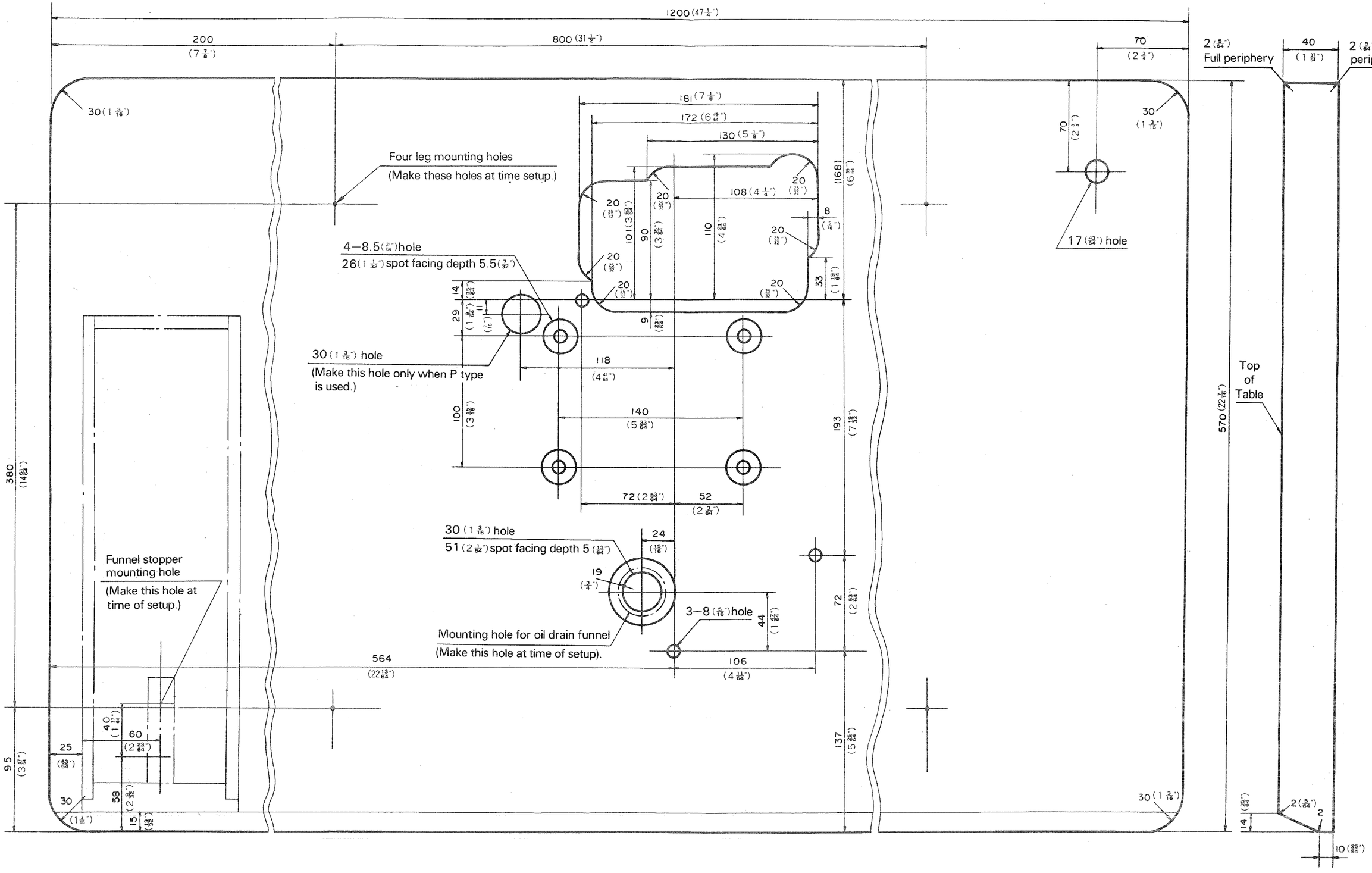
★

Trouble	Cause (1)	Cause (2)	Corrective measures
17. Thread trimming failure (The needle thread or bobbin thread is not trimmed, or the needle thread is trimmed extremely long or short upon completion of bartacking.)	17–1) The knives are blunt.	1)–A The moving knife or the counter knife have worn out.	Replace the moving knife or counter knife.
		1)–B The moving knife does not engage with the counter knife properly.	Correct the height of the moving and counter knives. (Refer to Standard Adjustment (17).)
		1)–C The moving knife has an improper vertical backlash.	The backlash should be 0.05 (0.001") to 0.1 mm (0.003") at the end of the moving knife. Replace the hinge screw or the moving knife.
		1)–D The tilt of the counter knife is not correct.	Correct the tilt of the blade point of the counter knife. (Refer to Standard Adjustment (18).)
	17–2) Fibrous wastes remain in the cylinder arm cap.	2)–A The portion A of the moving knife has a burr. (Thread is trimmed in improper shape), and thread waste remains.) 	Burnish the moving knife using a blue polishing sand bar or the like with care taken to the blade, or replace the moving knife.
		2)–B The shuttle race spring has a scratch. (Thread is trimmed in improper shape , and thread waste remains).	Remove the scratch.
	17–3) The moving knife does not spread the threads.	3)–A The moving knife has been positioned improperly.	Correctly position the moving knife. (Refer to Standard Adjustment (16).)
		3)–B The moving knife has a wrong path.	Replace the moving knife or the throat plate. (Refer to Standard Adjustment (16).)
		3)–C Stop-motion failure.	Refer to 6 of Troubles and Corrective Measures.
		3)–D The shuttle race spring has been positioned improperly.	Correct the position of the shuttle race spring. (Refer to Standard Adjustment (12).)
	17–4) The last stitch is skipped.	4)–A The timing between the needle and the shuttle is bad.	Correct the timing and clearance between the needle and the shuttle. (Refer to Standard Adjustment (13).)
18. Inferior stitch tightness	18–1) The feed timing is bad.		Correct the feed cam timing. (Refer to Standard Adjustment (2).)
	18–2) The tension controller No. 2 has been maladjusted.	2)–A The needle thread tension is not high enough.	Increase the tension.
	18–3) The tension controller No. 2 is released.		Correctly install the tension controller No. 2
	18–4) The needle thread stitches intersect with each other as illustrated below. 		Orient the needle to the left by 5 to 10 degree.
19. Stitching failure in bartacking with a synthetic thread	19–1) Thread breaks due to heat generated.	1)–A The sewing speed is too high.	Replace the motor pulley with one for synthetic thread.
		1)–B The needle is too thick.	Replace it with a thinner needle or SUPER needle for synthetic thread. Use silicone lubricant.
	19–2) Thread is split finely.	2)–A The thread paths are not smooth.	Burnish the thread path of each part using a blue polishing sand bar or the like.
	19–3) The starting stitch is loose.	3)–A The feed timing is bad.	Correct the feed cam timing. (Refer to Standard Adjustment (2).) (Adjust it to 10 mm (25/64") or so.)

★

Model LK-1850 Series Dimensions of table (For standard)

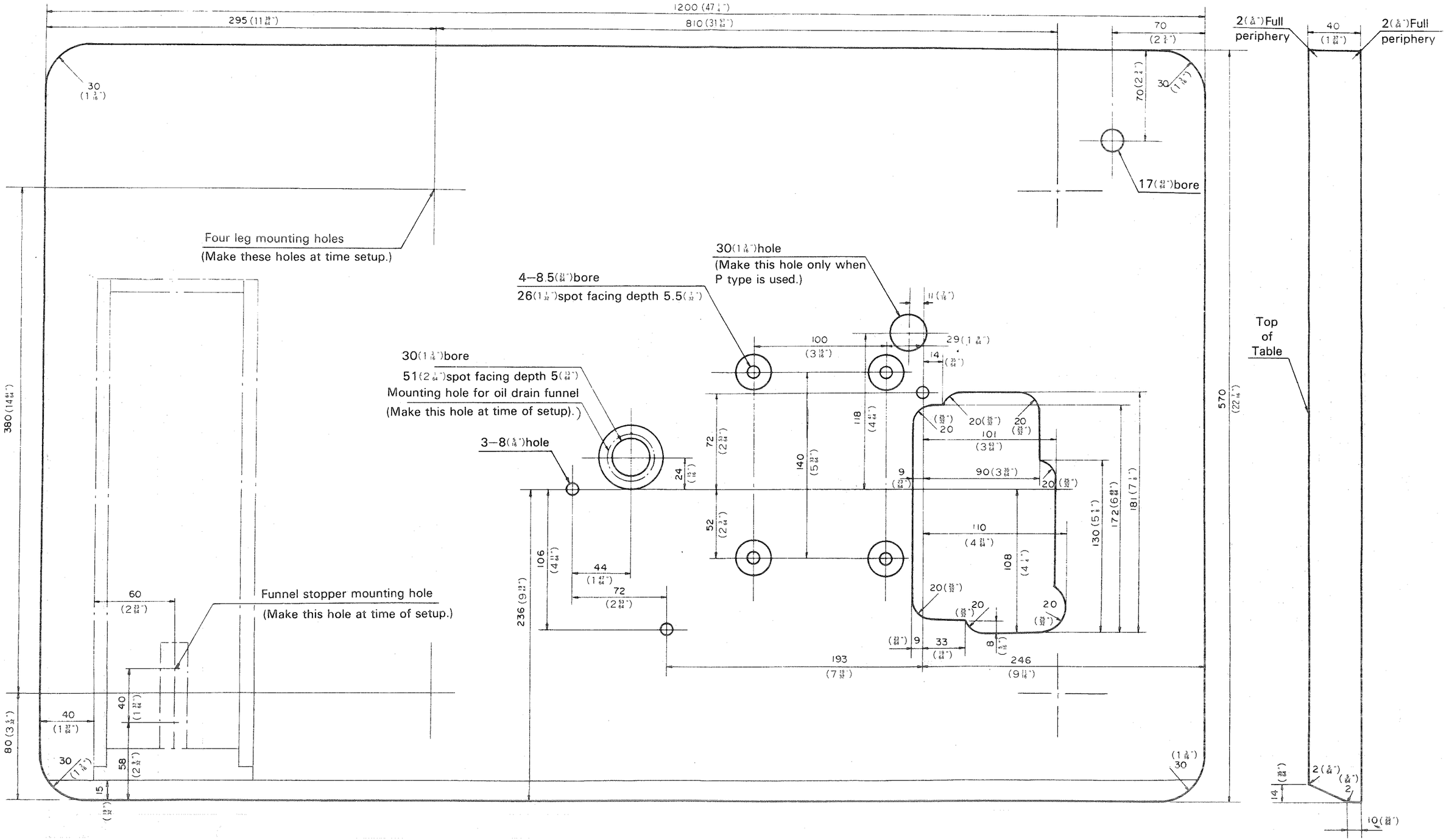
Table part No. 13534102



(Note) All dimensions are in millimeter. (Not scale)

For Sewing Machine for Attaching Belt Loops

Table part No. 13545207



(Note) All dimensions are millimeter. (Not scale)

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

To order or for further information, please contact :