

INSTRUCTIONS FOR

**mitsubishi**

**INDUSTRIAL  
SEWING  
MACHINE**

**TWO NEEDLE HIGH SPEED  
LOCKSTITCH NEEDLE FEED  
SPLIT NEEDLE BAR MACHINE**

**MODEL : DN-275  
: DN-275-20**



ADVANCED AND EVER ADVANCING

**MITSUBISHI ELECTRIC**

Thank you for your purchase of "Mitsubishi" machine DN-275. Kindly read this Instruction Manual for DN-275 for your ready reference. And keep this instruction manual with you for your ready information in case of your troubles caused during operation of machine.

## INDEX

### 1. Specifications

1. Specifications .....2
2. Name and number of the accessories .....2
3. Name of main parts .....2

### 2. Preparation for operation (installation of parts)

1. Place for installation of machine .4
2. How to mount the machine head
3. How to mount the motor .....4
4. How to connect the motor lever and foot pedal .....4
5. How to mount the bobbin winder assembly .....4
6. How to mount the accessories for table .....5
  - Head holder, knee lifter assembly
  - Pedal system presser bar lifter assembly .....5
  - Oil pan, Vibration preventing rubber .....7

### 3. Lubrication before starting to sew

1. Oil to be used .....8
2. Oiling to oil reservoir .....8
3. Oiling to main parts .....8
4. How to adjust the lubrication ..9
5. Adjustment of lubrication on hook .....9
6. Precaution before operation ..9

### 4. How to operate the machine

1. How to select the thread .....10
2. How to attach the needle .....10
3. How to thread the upper thread .....10
4. How to wind the lower thread on the bobbin .....11

5. How to adjust the bobbin winder assembly .....11
6. How to place the bobbin into the rotating hook .....11
7. How to lead the lower thread ...12
8. Sewing start and over .....13
9. Stopping of the needle bars (left and right) .....14
10. Angle of the corner stitching and stitch length .....14
11. Adjustment of stitch length and reverse stitching .....15

### 5. Stitch adjustment and Proper timing

1. Adjustment of lower thread tension .....15
2. Adjustment of upper thread tension .....16
3. Adjustment of the height of feed dog and pressure of presser foot .17
4. How to remove and place the rotating hook and needle .....18
5. Proper timing between the rotating hook and needle .....19
6. Up-down adjustment of the needle .....20
7. Proper timing between the rotating hook and thread take-up lever ..20
8. Proper timing between the rotating hook and bobbin case opener ...20
9. Proper position of feed regulator 21
10. Proper timing between the needle and feed dog .....22

### 6. Maintenance, Trouble and Repairing

1. Maintenance .....23
2. Oiling .....23
3. How to find the trouble and how to repair .....24

---

# 1. Specifications

## 1. Specifications

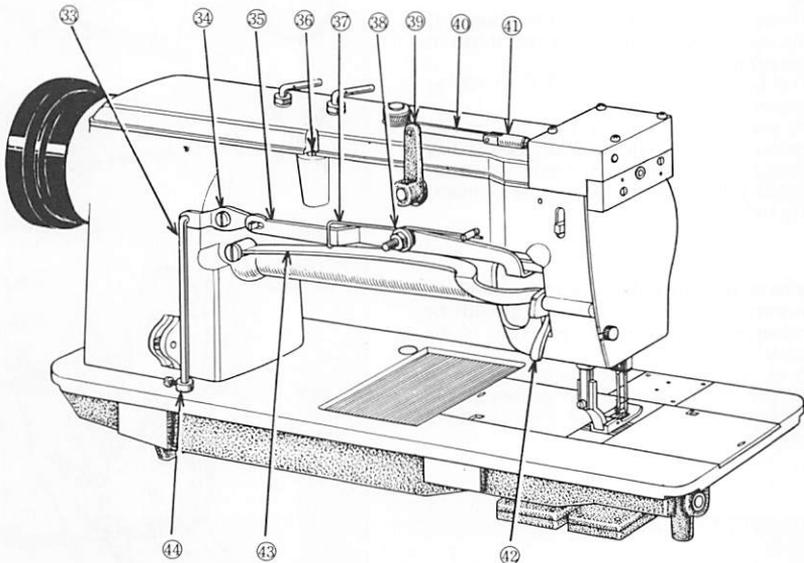
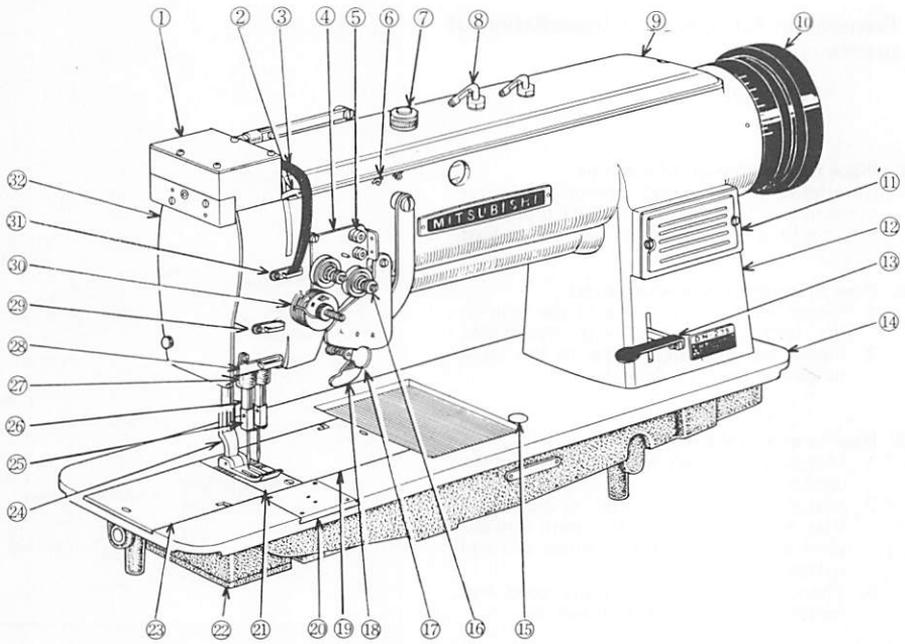
Application:	Corner stitching of the raincoat and jeans
Speed :	Max. 3500 spm (DN-275), Max. 3000 spm (DN-275-20)
Needle bar stroke:	32mm
Thread take-up:	Slide type thread take-up
Hook:	Horizontal rotating hook, fully automatic lubrication type
Presser bar stroke:	7mm
Available needle gauge:	1/4" (standard), 1/8", 3/16", 3/8", 1/2"
Feeding system:	Double eccentric mechanism
Stitch length:	0 ~ 5mm (DN-275), 0 ~ 7mm (DN-275-20)
Needles:	DP x 17 (135 x 17)
Reverse stitching:	Reverse lever type
Stitch length adjustment:	Push button system
Lubrication:	Semi-automatic lubrication system
Table:	"DN" type table
Motor:	"Mitsubishi" Clutch motor, 400W (1/2 HP)

## 2. Name and Number of the accessories

Needle (DP x 17) . . . . .	8 pcs.	Hinge (1) (2) . . . . .	each 2 pcs.	Knee lifter assembly . . .	1 set
Bobbin . . . . .	4	Screw . . . . .	each 4 pcs.	Oil pan . . . . .	1 pc.
Screw driver (large, middle, small) . . . . .	each 1 pc.	Tweezer . . . . .	1 pc.	Oil can . . . . .	1 pc.
Vibration Preventing rubber . . . . .	4 pcs.	Hexagon wrench . . . . .	1 pc.	Oil bottle . . . . .	1 pc.
Nail . . . . .	9 pcs.	Roller set . . . . .	1 set	Cotton stand . . . . .	1 set
		Bobbin winder assembly .	1 set	Oiler . . . . .	1 pc.
		Vinyl cover . . . . .	1 pc.		

## 3. Name of the main parts

1. Top cover	16. Thread regulator nut	32. Face plate
2. Thread take-up	17. Stop lever	33. Knee lifter bar
3. Thread take-up guard	18. Push lever	34. Knee lifter lever (2)
4. Thread tension regulator	19. Slide plate (right)	35. Knee lifter lever (1)
5. Upper thread guide (set)	20. Slide plate (center)	36. Presser bar adjustable screw
6. Thread guide	21. Needle plate	37. Knee lifter spring
7. Oil plunger	22. Hook saddle	38. Knee lifter lever bolt
8. Thread guide (top of arm)	23. Slide plate (left)	39. Connecting link
9. Top cover	24. Presser foot	40. Connecting plate
10. Balance wheel	25. Needle clamp	41. Connecting stud
11. Front cover	26. Needle bar	42. Presser bar lifter
12. Arm	27. Needle bar holder	43. Presser bar plate spring
13. Reverse stitch lever	28. Thread guide (lower)	44. Collar
14. Bed	29. Thread guide (middle)	
15. Stitch regulator push button	30. Thread controller set	
	31. Thread guide (upper)	



## 2. Preparation for operation (Installation of machine)

### 1. Place for installation of machine

In order to ensure smooth operation of your machine at high speed without vibration, the machine should be set on well-leveled floor.

### 2. How to mount the machine head

1. Please set the hinge plate to the hole on the back of the bed with the screw.
2. Please set the hinge plate to the table hinge and hook on the table.

### 3. How to mount the motor

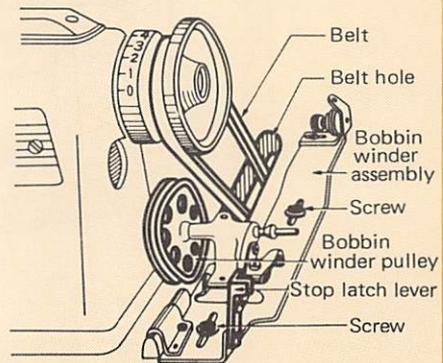
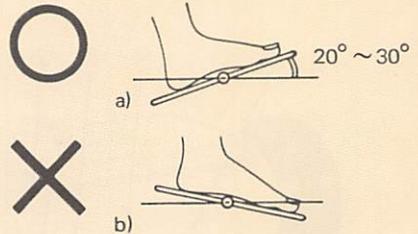
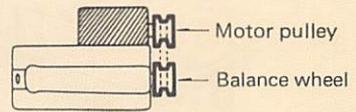
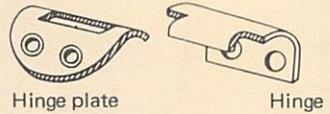
1. Motor is mounted with accessory bolts, washers and nuts.
2. Motor should be mounted on a position that enables to pass the belt straight after aligning the balance wheel slot and motor pulley slot.
3. Then, connect power supply cord and motor cord extended from switch.

### 4. How to connect the motor lever and the foot pedal

1. Power on the treadle will be reduced if the inclination of treadle is not made at the proper angle.
2. The best inclination is at  $30^{\circ}$  to  $40^{\circ}$  as shown in Fig. a)
3. As shown in Fig. b), in case the treadle pressure on the tip of the toes is too strong, the treadle gets difficult. Therefore, adjust the length of the treadle connecting rod.

### 5. How to mount the bobbin winder assembly

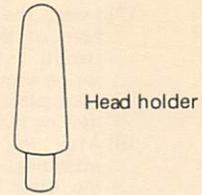
1. Accessory bobbin winder should be mounted in parallel with belt hole of the table.
2. And, it should be fixed with two screws so that the bobbin winder pulley gets in touch with the belt when the stop latch lever is pushed.



## 6. How to mount the accessories for the table

### Head holder

1. Head holder should be inserted in the hold of the back of the table.
2. Head holder is holding the machine head, when you wish to look at the reverse side of the arm bed, during the adjustment or the lubrication of the machine.



### Knee lifter mechanism

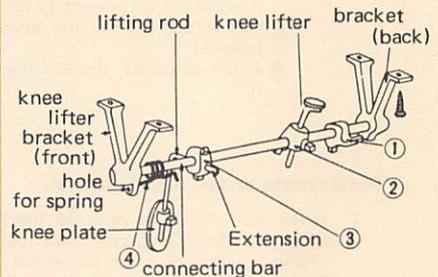
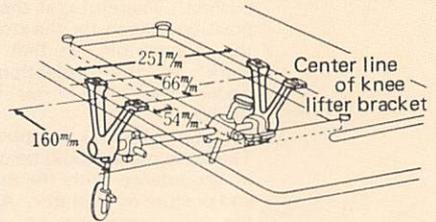
1. The knee lifter mechanism is equipped with to lift and down the presser bar.
2. Mount it properly onto the table enabling you to promote efficiency.
3. Remember that improper mounting and adjustment would render the knee operation heavy to operate and fatigue the foot.

#### 1. Place of mounting

Mount properly on the back of the table with screw conforming to the indicated measures.

#### 2. Order of mounting

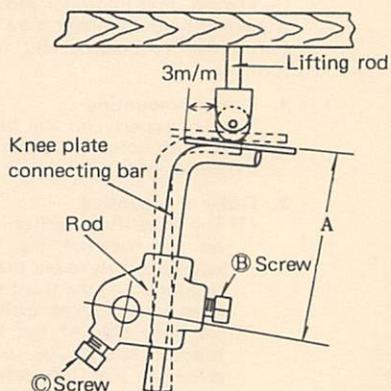
- (1) The kneelifter bracket is mounted on the back of the table with screw properly as per the indicated measures. (At the front side of the knee lifter bracket, spring is set.)
- (2) The one side of the knee lifter bracket should be set with a screw so that the extension can be inserted.
- (3) Set the following items in the following order and fix them tentatively respectively:  
1) Rod, 2) Rod, 3) Rod & 4) Spring
- (4) After fixing the above four items tentatively, insert the extension to the knee lifter bracket.
- (5) After checking whether the extension and the knee lifter bracket are connected properly, fix the extension tightly with the screw.
- (6) The knee plate is fixed to the knee plate connecting bar. And, insert it to the rod 3).



- (7) Insert the end of spring to the hole of the knee lifter bracket (front). The other end of the spring should be connected to the knee plate connecting bar, after moving the rod 3).
- (8) After the completion of all the assembly, please check wheter the knee lifter assembly can be operated properly.

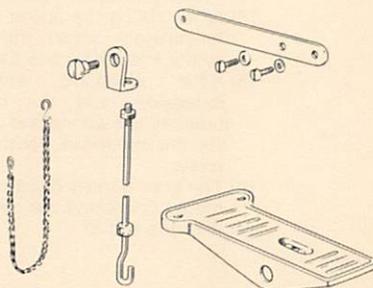
### 3. Adjustment

- (1) Position of the stopper pin (1) - - -  
Stopper pin works for fixing the place where the knee plate is pushed. Therefore, at the proper position, please fix the stopper of the stopper pin, so that it may work to the projection point under the knee lifter bracket (back).
- (2) Position of the knee plate - - -  
The knee plate should be adjusted in accordance with the structure and posture of operator. Adjust it for easy operating of operator and tighten the screw.
- (3) Position of the rod and the knee plate connecting bar
  - While the presser foot descends downward, loose screw (B) and adjust the size "A" so that the lifting rod and presser rod comes to the Fig. as shown.
  - After adjusted properly, tighten the screw (B).
  - The inclination of the lifting rod is adjusted by means of loosening the screw (C) of the knee lifter bracket.
  - After adjusted, tighten the screw (C).



### Pedal system presser lifting assembly

1. When you desire to operate the presser lifter by treadle pedal, not by knee lifting, please give us an extra order. Because, pedal system presser lifter set (as per illustration) is available.
2. When ordering, please indicate as "Treadle system presser lifter set, SM31103".



## 1. How to mount

- (1) Remove all the knee lifting link and lifting rod except for Knee lifter link (1) (R) and spring (S).
- (2) Fix the presser lifting plate (A) to the Knee lifter link (1) (R) with the screw (B).
- (3) Mount the collar on the lifting rod, and insert it to the hold of the bed.
- (4) Mount the nut onto the lifting rod.
- (5) Fix the nut to the presser lifting plate with the screw (G).
- (6) Fix the position of the stopper with the collar (F), so that the knee lifting link may not be lifted too high.
- (7) Connect the presser lifting treadle pedal and lifting rod. At this time, please take care that the chain should not be curved.

## 2. Adjustment

Please adjust the angle of the treadle pedal by the length of the chain, so that the operator can easily step.

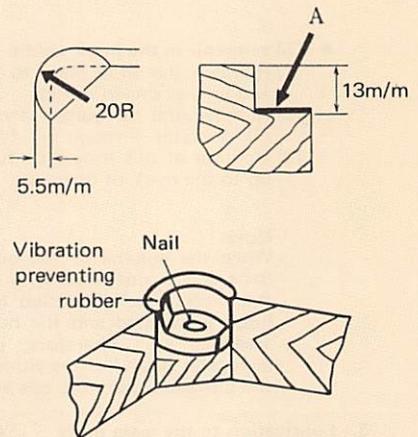
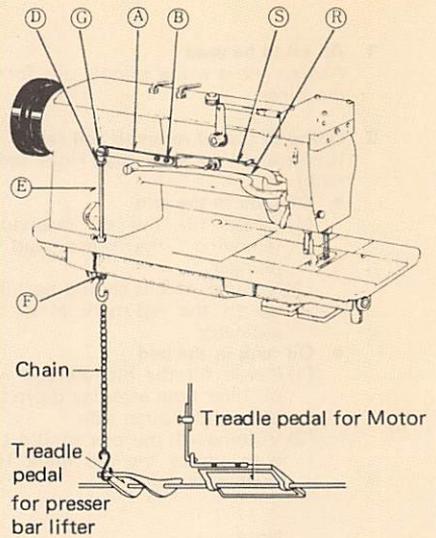
## Oil pan

Mont it on the hole of the table by nails so as not to object the knee lifter mechanism.

## Vibration preventing rubber

The vibration-preventing rubber is used to prevent the machine from vibrating and thereby to provide smooth operation of the machine. Fit these rubber at the four corners of the table as shown in Fig.

- a) Achieve spot facing of 20mm radius and 13mm depth at the four corners of the table. Be sure to give smooth facing to the face A where spot facing is achieved.
- b) Nail the vibration-preventing rubbers down at the four corners of the table as shown in Fig.



### 3. Lubrication before starting to sew

#### 1. An oil to be used

Always use a white spindle oils for sewing machines.

#### 2. Oiling to the oil reservoir (oil tank)

(Lubrication for Arm, Bed, Hook saddle, oil tank)

##### ● Oil tank in the arm

- (1) Please fill the oil reservoir, after removing the press stud for oil plunger.
- (2) Volume of oils should be filled with up to the red-mark H of oil level indicator.

##### ● Oil tank in the bed

- (1) Please fill the oil reservoir through oil filler hole after lay down the head toward the other side.
- (2) Volume of the oils should be filled with up to the red mark H of oil level indicator.

#### Note:

When the volume of the oils is not filled with upto the red mark L, the lubrication to the main parts is stopped and the machine is freed up. Therefore, you should always take care to supply the oils by checking the volume of the oils through the oil indicators of the arm and the bed.

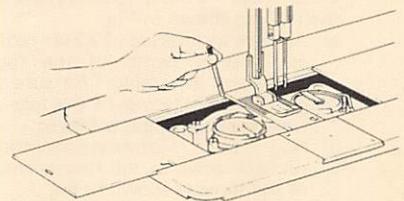
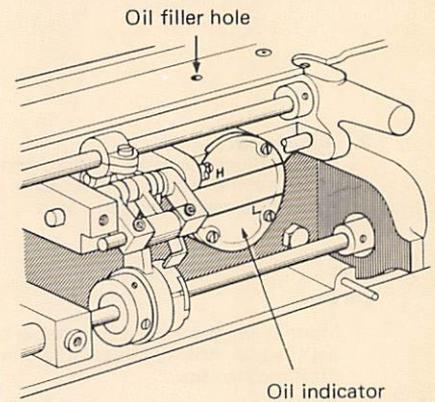
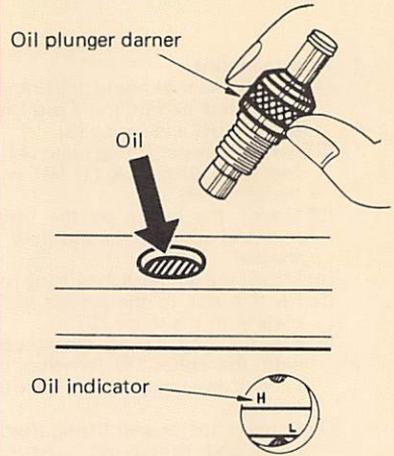
##### ● Oil reservoir in the hook saddle

- (1) Remove the slide plate to the right and left, as shown in Fig.
- (2) Remove the oil gauges and fill the oil reservoir through oil filler hole.
- (3) Volume of oils should be filled with up to the mark of oil gauge.

#### Note:

When the volume of the oils get little and is not filled with up to the mark, the lubrication to the hook is stopped and the hook is freed up. Therefore, please always be careful of the volume of the oils and supply the oils properly.

#### 3. Lubrication to the main parts - - - See page 23



#### 4. How to adjust the lubrication

##### 1. Oil plunger device

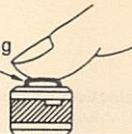
When starting to operate the machine, please push the press bar down so that an oil penetrates thoroughly into the necessary parts in the arm.

- When the machine is out of operation, please push the press stud downward so that the press bar put automatically back and stop to lubricate automatically.

##### Note:

Keep putting the press bar back as (a rest) shown in Fig. by all means in case of out of operation. Otherwise, be careful oils happen to flow out.

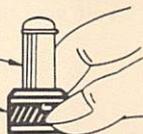
Press bar for oil plunger



When operate

Press bar for  
oil plunger

Oil plunger knob



When not operate

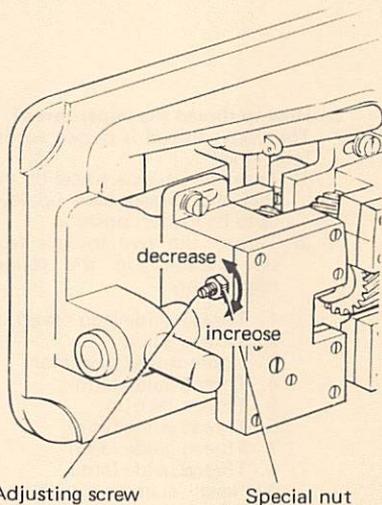
##### 5. Adjustment of hook lubrication

- Lay down the machine head toward the other side.
- Loosen the nut on the side of the hook saddle.
- A red line mark is indicated in the adjusting screw, which shows the standard volume of lubrication. Turn the adjustable screw clockwise basing the red line mark is to increase, and on the contrary, turn counterclockwise is to reduce.
- After adjusted, tighten the nut.

##### 6. Precaution before starting to sew

When the machine is operated for the first time or when operating the machine after long interval:

- It is necessary to fill oils thoroughly into necessary parts.
- Fill oils at the level of red marked H of each oil reservoirs.
- Please push the press bar for oil plunger downward.
- Operate the machine slowly until oils are penetrated thoroughly into necessary parts.



## 4. How to operate the machine

### 1. Selection of thread

- (1) Always use left-twisted thread for upper thread.
- (2) In order to check if a thread is right-twisted or left-twisted, hold the thread as shown in Fig. and twist it toward you with your right hand.

### 2. How to attach the needle

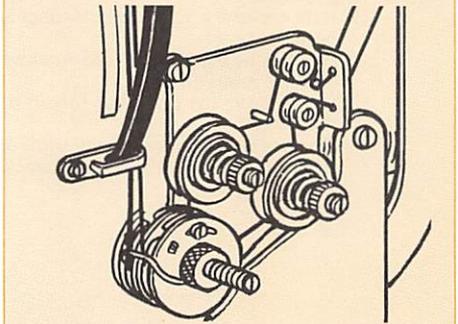
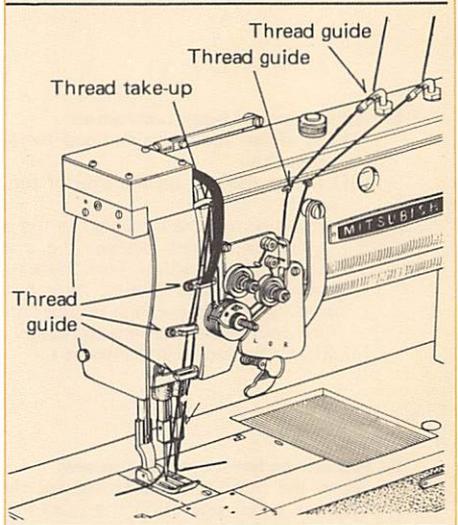
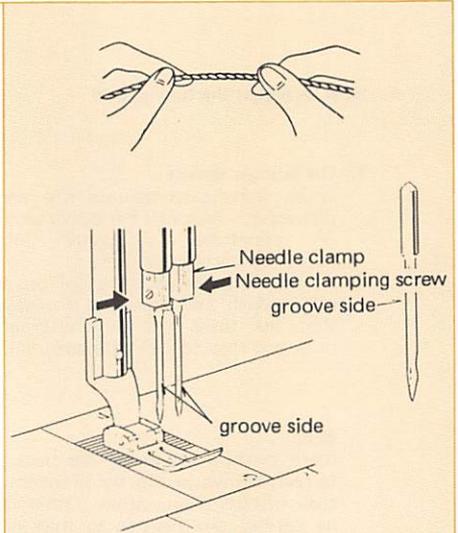
Use DP x 17 (135 x 17) needle.

- 1) Turn the balance wheel toward you so as to raise the needle bar to its highest position.
- 2) Then, loosen the needle clamping screw.
- 3) Hold the needle so that its side with long groove side faces each two needle, and insert it as deeply as it will go into the needle clamping hole.
- 4) Then, tighten the needle clamping screw.

### 3. How to thread the upper-thread

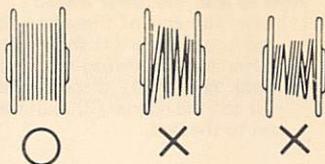
The upper thread is passed according to the following:

- 1) Turn the balance wheel by your hand so that the thread take up lever is raised up to its highest position.
- 2) Thread the two threads from the left side spool in the following order respectively:
  1. Thread guide (top cover)
  2. Thread guide
  3. Upper thread regulator
  4. Thread guide (arm)
  5. Thread take-up
  6. Thread guide (arm)
  7. Thread guide (arm)
  8. Thread guide (arm)
  9. Needle clamp
  10. Needle



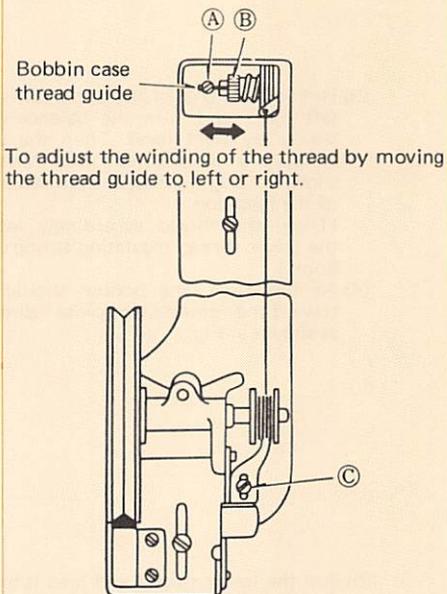
#### 4. How to wind the lower thread on the bobbin

- (1) Insert the bobbin into the bobbin winder shaft.
- (2) As shown in Fig., pass the thread and wind the edge of the thread about 5 to 6 times on the bobbin, and operate the machine.
- (3) When the bobbin is fully wound with thread, the pulley will automatically be free from the belt and stopped.
- (4) This operation can be done while sewing.



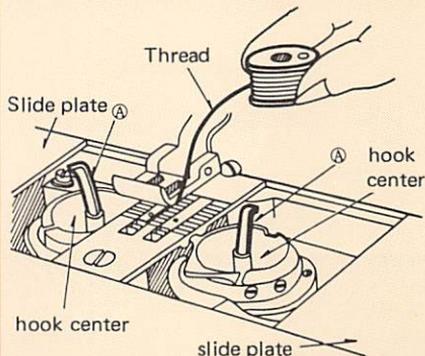
#### 5. How to adjust the bobbin winder assembly

- (1) It is desirable that the bobbin is wound evenly with thread.
- (2) In case of uneven winding  
If it is inclined to left or right, loosen the screw (A) shown in Fig. and move the thread guide rest slightly to the left or right so as to obtain uniform winding of thread. After adjusting, please tighten the screw (A).
- (3) Strength of the winding  
There is the possibility that the bobbin may be damaged if the bobbin is wound too tightly with thread. Please adjust the pressure of the regulator plate with the nut (B), so that the thread can be pulled slightly out of the regulator plate.
- (4) Best result is obtained when the bobbin is wound up to 4/5 of its full capacity with thread. Excessive winding will result in poor draw-out of the thread. To adjust the amount of thread wound on the bobbin, turn the screw (C) shown in Fig. to the left when the winding is excessive, and to the right when insufficient.



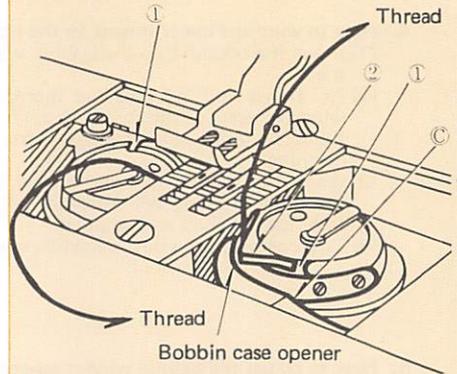
#### 6. How to place the bobbin into the rotating hook

- (1) Turn the balance wheel with your hand, so that the needle bar is raised up to its highest position.
- (2) Open the slide plate and pull up the latch (A) of the hook as shown in Fig.
- (3) Hold the bobbin pulling out the end of thread by about 5cm, and fit the bobbin into the hook center pin.
- (4) Then flap down the latch lever (A).

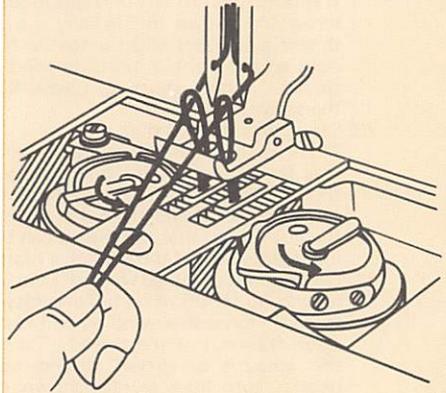


### 7. How to lead the lower thread

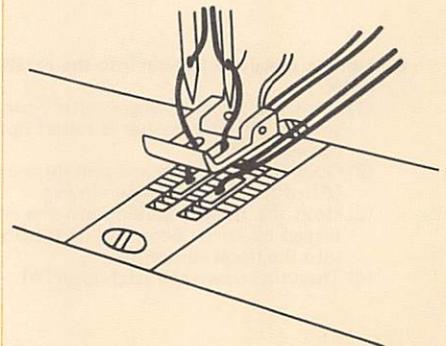
- (1) Lead the end of thread to the groove of the hook center (1) shown in Fig.
- (2) After led the thread from the groove of hook center (1) through the hook beak (2) and the opener (3), pull the thread out on to the bed.



- (3) Holding the end of the upper thread by left hand and turn the balance wheel slowly by right hand. Then the upper thread are led out the lower thread (as shown in Fig.) through the needle hold of the feed dog.  
(Then, the thread accordingly lead to the lower thread regulating spring of the hook.)
- (4) At this time, the bobbin should turn toward the counterclockwise direction as shown in Fig.



- (5) Pull the lower thread and lead it toward the direction as shown in Fig.
- (6) Please close the slide plate which was opened when the bobbin was inserted.



## 8. Sewing start and over

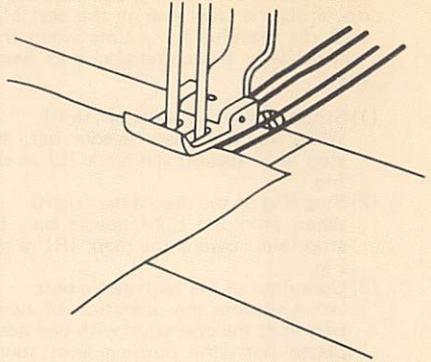
### How to operate the machine

#### ● Sewing start

- (1) Lift the presser foot and put the part of cloth to start sewing under the needle.
- (2) Turn the balance wheel toward your side by your hand and needle stitches the cloth.

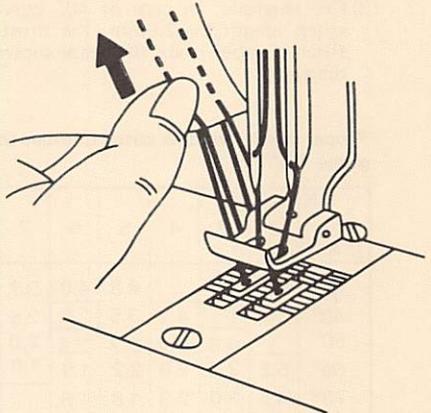
#### Note:

When starting to sew, please leave the upper thread pulled out by approx. 10cm in length so as not to be full out.



#### ● Sewing over

- (1) When sewing over, the thread take-up lever should be lift at its highest position.
- (2) Lift the presser foot and pull out the sewn cloth toward diagonally other side.
- (3) Trim both of the upper and lower thread.

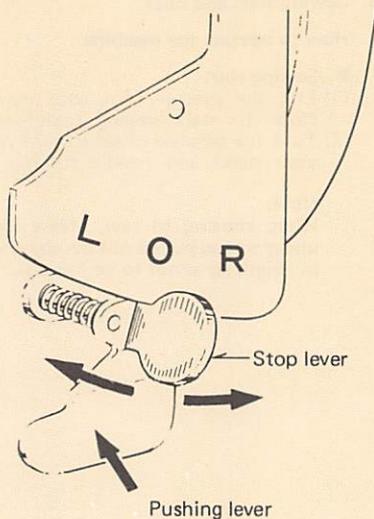


### 9. Stop of needle bar (right or left)

- o Set the stop lever to "L" or "R"

Note: Stop lever may be operated even though the machine is working, but it is desirable for operating the stop lever in the best of order to stop the machine for a time when the thread take-up lever has come about its highest position.

- (1) Stopping of the needle bar (left)  
When stop the left needle bar, turn the stop lever toward the mark (L) as shown in Fig.
- (2) Stopping of the needle bar (right)  
When stop the right needle bar, turn the stop lever toward the mark (R) as shown in Fig.
- (3) Operation of the two needle bars  
When resume the operation of two needle bars after the operation with one needle bar, please push the pushing lever toward the opposit side. Then, the stop lever is turned automatically to the neutral position, and the two needle operation can be done.

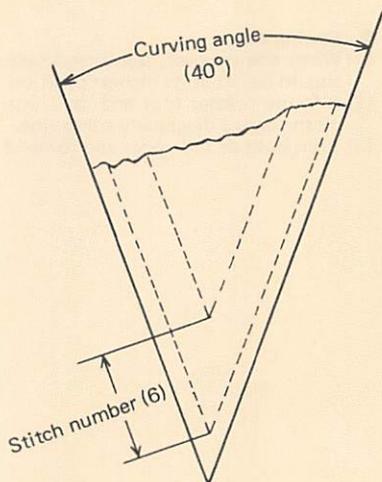


### 10. Relationship between Curving angle of the corner sewing and stitch length

- (1) The proper corner sewing can be obtained according to the proper stitch length as shown in the following diagram (In case of the needle gauge of 1/4")
- (2) When decide the stitch length according to the curving angle, the proper number of stitches for the outside needle, can be obtained from the diagram.
- (3) For example, In case of 40° curving and stitch length by 2.9mm, the most proper stitch number is six stitihes as shown in the diagram.

Proper stitch length & stitch number (needle gauge 1/4")

S.N	2	3	4	5	6	7	8
30°				4.8	4.0	3.7	3.0
40°			4.4	3.5	2.9	2.5	2.2
50°		4.6	3.4	2.7	2.3	2.0	1.7
60°	5.5	3.7	2.8	2.2	1.9	1.6	
70°	4.6	3.0	2.3	1.8	1.5		
80°	3.8	2.5	1.9	1.5	1.3		
90°	3.2	2.1	1.6	1.3			
100°	2.7	1.8	1.3				
110°	2.2	1.5					
120°	1.8	1.2					
130°	1.5						
140°	1.1						



## 11. Adjustment of stitch length and revers stitch

### ● Adjustment of stitch length

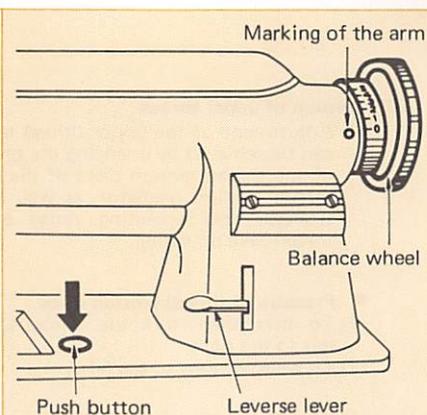
- (1) Pushing the push button down and turn the balance wheel slowly toward you.
- (2) Then, the push button goes down further and the balance wheel stops rotating.
- (3) Push the push button down additionally so that the balance wheel rotates. At this time set the graduation (0~5) of the dial on the balance wheel with the marking on the arm and then release the push button shown in Fig.

### Note:

Please remember that do not push the push button by all means while operation of the machine.

### ● Reverse stitch

- (1) Reverse sewing can be done during the reverse lever being pushed down.



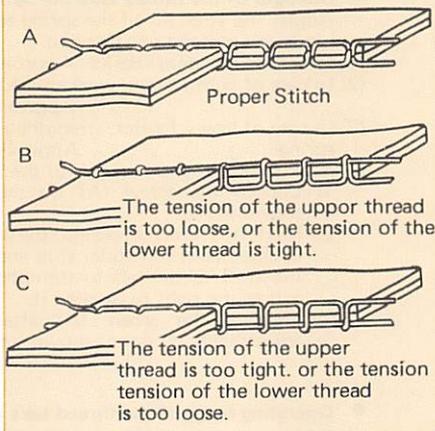
## 5. Stitch adjustment and proper timing

### ● Adjustment of thread tension

Thread tension should be adjusted so that the upper and lower thread will link together in the middle of the sewing fabric to provide perfect as shown in Fig. A.

In case of Fig. B, the tension of upper thread is too tight or the tension of lower thread is too loose.

In case of Fig. C, the tension of the lower thread is too tight or the tension of upper thread is too loose.

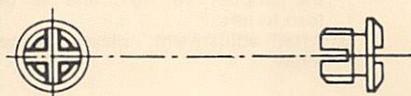
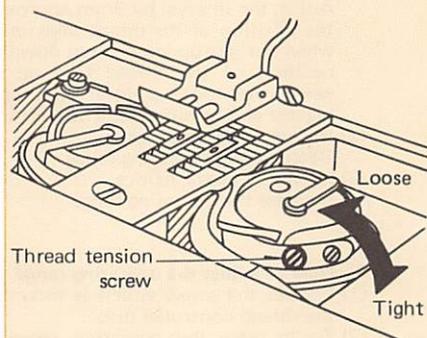


### 1. Tension of the lower thread

- (1) The adjustment of the lower thread tension is no need necessary virtually except the special sewing fabric or the thread, some adjustment will be necessary.
- (2) Turn the thread tension screw to the hook center to the clockwise is to strengthen tight, and turn to the counterclockwise, to weaken.

### ● Thread tension screw

- (1) Thread tension screw is slitted, so that the adjustment can be made easily. However, if it looses often while the machine operation, please open the slitted part and tighten it accordingly.



## 2. Tension of upper thread

(1) Adjustment of the upper thread tension can be achieved by changing the pressure of the thread tension discs of the upper thread tension regulator, as well as the strength and operating range of the thread take up spring.

### ● Pressure of thread tension discs

- (1) To strengthen, turn the thread tension nut to the right.
- (2) To weaken, turn to the left.

### ● Strength of the thread take up spring

Adjust the strength of the spring according to the materials to be sewn.

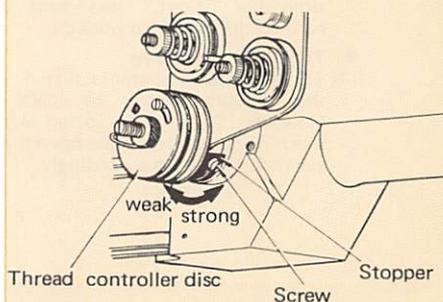
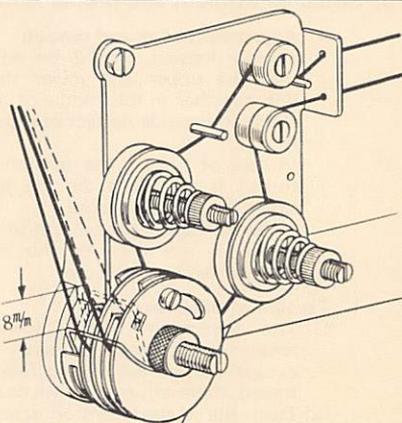
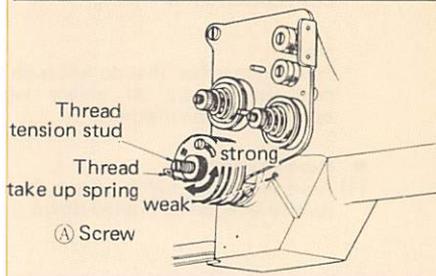
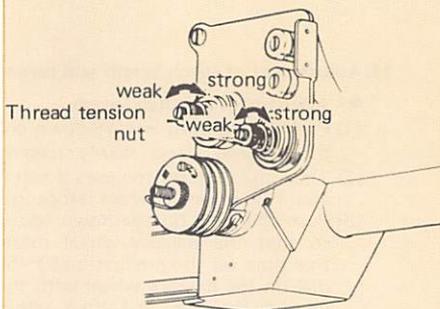
- (1) In case of standard fabrics. Approx. 25g.
- (2) In case of light fabrics, weaken the spring . . . . . Approx. 20g.
- (3) In case of heavy fabrics, strengthen the spring . . . . . Approx. 30g.
- (4) How to adjust the strength of the spring
  - 1) Loosen the screw (A) on the arm shown in Fig.
  - 2) Next, fit a screw driver into the groove of the thread controller stud and turn the stud to the left to strengthen it, and to the right to weaken it.
  - 3) Tighten the screw (A) after the adjustment is done shown in Fig.

### ● Operating range of the thread take up spring

- (1) In case of standard fabric  
Adjust the interval by 8mm approx. from the position of the thread take up spring when the take up lever comes down to the position of the thread take up spring when the take up lever lifts up its highest and tensioned the upper thread.
- (2) In case of light fabrics  
Decrease the operating range.
- (3) In case of heavy fabrics  
Increase the operating range

### ● How to adjust the operating range

- (1) Loosen the screw which is mounted on the thread controller disc.
- (2) To increase the operating range, turn the stopper to right and to decrease, turn to left.
- (3) After adjustment, please tighten the screw.



### 3. Adjustment of feed dog height and pressure of the presser foot

The height of the feed dog as well as the pressure on the sewn material must be properly adjusted according to the materials to be sewn.

- (1) In case of light fabrics:  
If the feed dog is raised excessively or the pressure on the materials to be sewn is too strong, shrunken sewing will be obtained.
- (2) In case of heavy fabrics:  
If the feed dog is not raised sufficiently or the pressure on the materials to be sewn is too weak, the feeding of material will become poor, and stitches will become uneven or stitch skipping may be obtained.
- (3) The height of feed dog is measured when the feed dog raised at its highest position from the needle plate turning the balance wheel by hand.  
Light fabrics . . . . . Approx. 0.8mm from the needle plate surface  
Standard fabrics . . . . . Approx. 1.0mm from the needle plate surface  
Heavy fabrics . . . . . Approx. 1.2mm from the needle plate surface

#### ● Adjustment of feed dog height

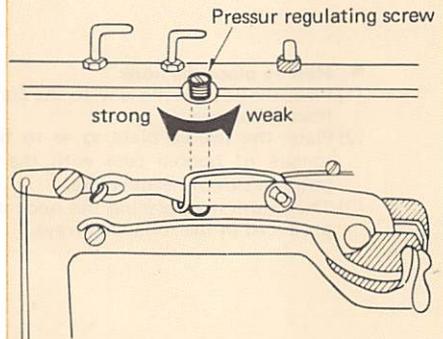
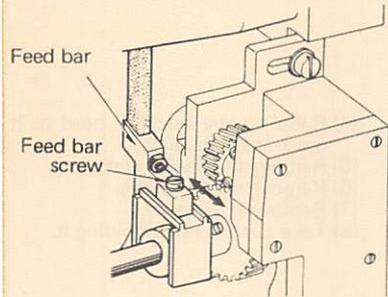
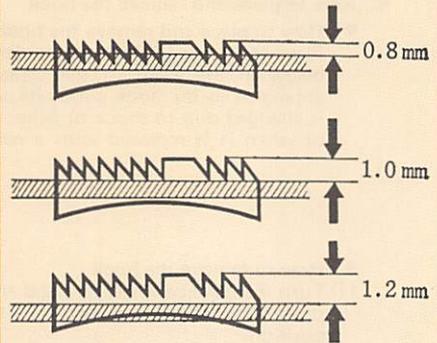
- (1) Lay down the machine toward the other side.
- (2) Turn the balance wheel by hand and stop turning when the feed dog would be raised to its highest position from the needle plate.
- (3) Loosen the screw of the feed bar.
- (4) Adjust the feed dog to the desired height moving the feed bar up and down, as shown in Fig.
- (5) Tighten the screw of the feed bar at the adjusted height of the feed dog.

When deliver the machine, the height of the feed dog is adjusted at 1.0mm.

#### ● Adjustment of pressure of presser foot

Adjustment of pressure of the presser foot can be done by means of the presser regulating screw at the center of arm shown in Fig.

- a) Turn the screw to the right to strengthen.
- b) Turn the screw to the left to weaken.



#### 4. How to place and remove the hook

##### ● How to place and remove the hook

Place the hook in the position described below in the event of the thread gets entangled in the hook, when its position is changed due to shock or other causes, or when it is replaced with a new one.

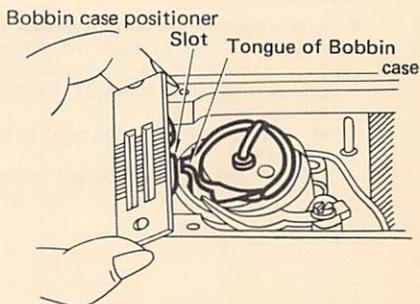
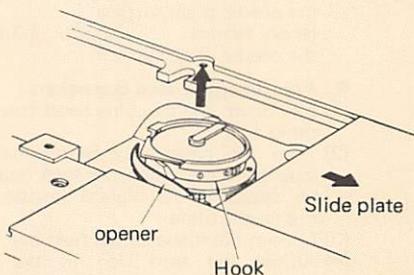
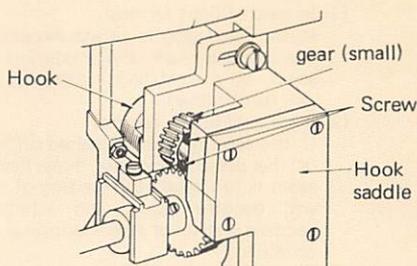
##### ● How to remove the hook

- (1) Turn the balance wheel by hand and stop it when the needle is raised to its highest position.
- (2) Lay down the machine head toward the other side.
- (3) Loosen the three screws of the gear (small) of the hook saddle.

- (4) Raise up the machine head as it is, and move the slide plate.
- (5) Remove the needle plate.
- (6) Remove the feed dog.
- (7) Remove the opener.
- (8) Take out the hook holding it.

##### ● How to place the hook

- (1) Place the hook in the way to the contrary how to remove it.
- (2) Place the needle plate so as to fit the tongue of bobbin case with the hook position slot of needle plate.
- (3) The position of placing the hook will be produced in the following ways.



### 5. The timing of the hook and needle

- (1) Please set the amount of the stitch length with the graduation 2.5 of the dial.
- (2) As shown in Fig., adjust the position of the hook and the needle at the following position, when the needle is raised by 2.0mm from its lowest position.  
 Top of the needle hole . . . . .1.6mm  
 lower position from the tip of the hook.  
 Tip of hook . . . . . Center of the needle  
 The gap between the lateral face of the needle and the tip of the hook . 0.05mm
- (3) In order to adjust the position of the hook and needle as shown in Fig., the following way is recommendable:  
 \* It is easier to adjust, if you at first remove the presser foot, needle plate and feed dog.

#### ● The position of tip of hook

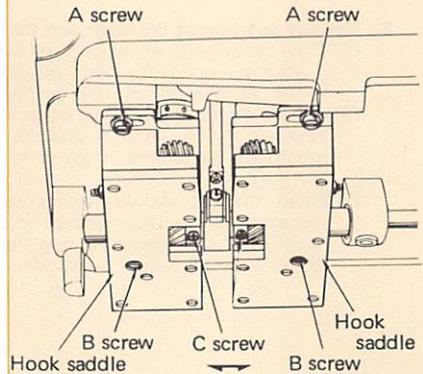
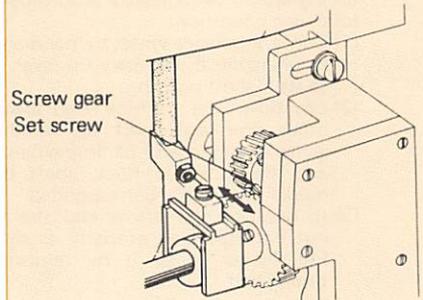
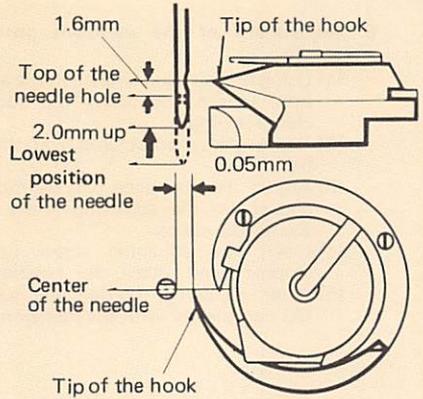
As described below, adjust the tip of hook so as to come to the center line of the needle.

- (1) Lay down the machine head toward the other side, then loosen the gear (small) set screws (3 pcs.)
- (2) Raise the machine head as it is, and turning the balance wheel by hand and stop it when the needle is raised by 2.0mm from the lowest position.
- (3) Turn the hook by hand and adjust the tip of hook to the center of the needle.
- (4) Adjust the position of the hook saddle by loosening the adjusting screw A, B and C (2 pcs.), so that the gap between the tip of the hook and the lateral side of the needle may be 0.05mm.

#### Note:

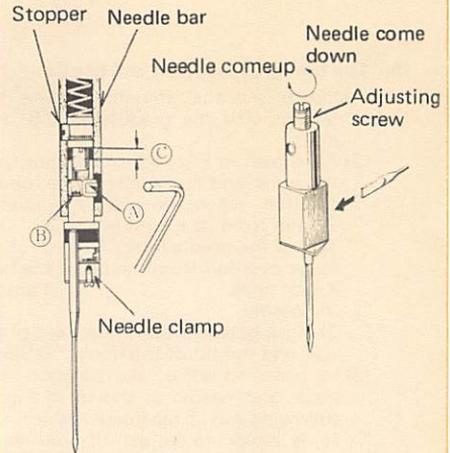
At this time, please take care not to loosen the set screw of the screw (C) too loose, and not to leave free from engagement of each gears (large) and (small).

- (5) Tightening of the screw  
 Tighten the screw in the following order:  
 (1) Pushing the gear (large) slightly to the side of the hook saddle, tighten the set screw of the screw (C) at first.  
 (2) Checking the gap between the needle and the hook, tighten the screw (A) completely.  
 (3) Tighten the screw (B).



## 6. Adjustment of the up-down position of needle

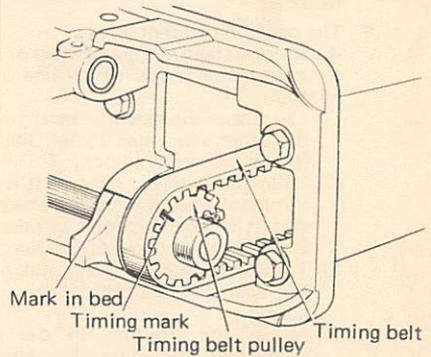
- (1) Using the hexagon wrench in the accessory box, loosen the screw (A) for needle clamp setting.
- (2) Remove the needle clamp from the needle bar.
- (3) Adjust the clearance (C), by moving up and down the adjusting screw for the needle clamp.
- (4) Insert the adjusting screw up to the stopper, and place the needle clamp.
- (5) After adjusting, tighten the screw (B) (A) completely with the hexagon wrench.



## 7. Proper timing of the hook and take up lever

When removed the timing belt by replacing of it, the relation of hook and take up lever timing would be adjusted according to the following condition:

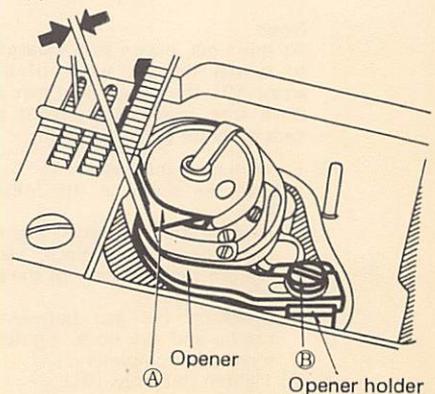
- (1) Turn the balance wheel by hand and stop it when the thread take up lever raised to its highest position.
- (2) Lay down the machine head toward the other side, and check up whether the arrow (timing mark) of timing belt pulley and the boss of hook shaft bushing holder is properly corresponded.
- (3) In case of the arrow and the boss is not corresponded properly as shown in Fig. Please adjust it by removing the timing belt.



## 8. Relative position of the hook and the opener

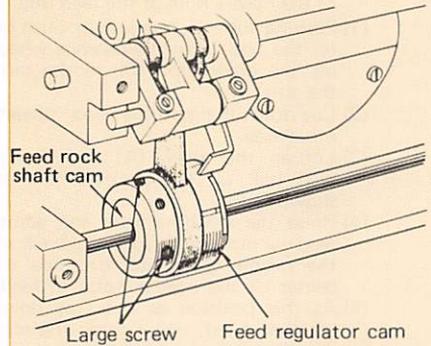
- (1) Turn the balance wheel by hand and stop it when the opener holder would become to its farthest from the needle plate.
- (2) At this time, check up whether the gap between the (A) of hook and the opener should be by approx. 0.2mm as shown in Fig.
- (3) When the gap would be increased or decreased exceedingly, please adjust the position of the opener loosing the screw (B) of opener holder as shown in Fig.

Approx. 0.2mm



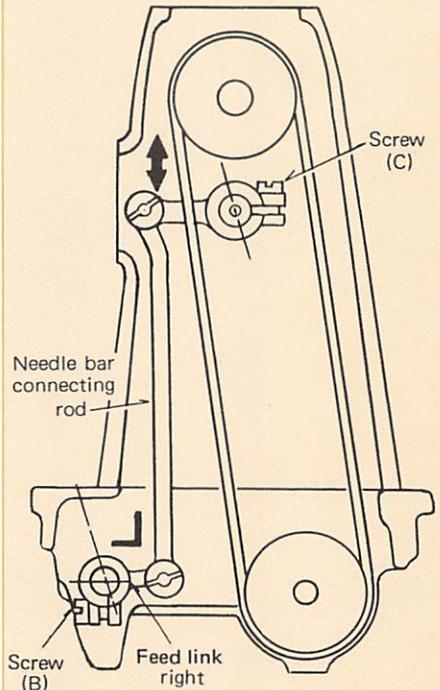
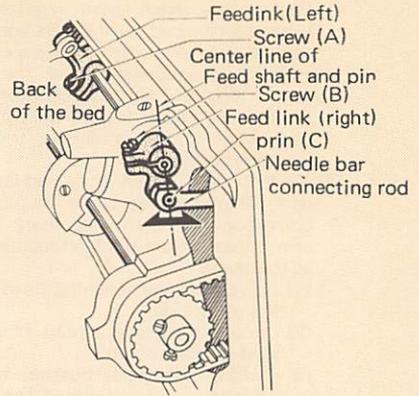
### 9. Position of feed regulator

- (1) Pushing the stitch length regulator push button on the bed, turn the balance wheel toward you, and when the balance wheel stops automatically shows the largest stitch length. On the contrary, turn the balance wheel toward the other side, and when stops it shows the stitch length is zero.
- (2) At this time, when the graduation (5) and (0) of balance wheel would not be corresponding with the mark on the arm, please adjust the feed regulator cam as following:
  - (1) Lay down the machine head toward the other side.
  - (2) Loosen the large screws (2 pcs.) of feed regulator cam.
  - (3) Pushing the push button, turn the balance wheel and adjust the graduation (0) or (5) to the mark on the arm.
  - (4) At the adjusted position, tighten the screws (2 pcs.) on the cam.



## 10. Relative position of needle and feed dog

- Adjust so that needle drops in the center of the needle hole of the feed dog.
- (1) Pushing the stitch regulator push button on the bed, turn the balance wheel and set the graduation (0) to the mark on the arm.
  - (2) Lay down the machine head toward the other side.
  - (3) Loosen the screw (A) and (B) of the feed link on the back of the bed as shown in Fig.
  - (4) Raise the machine head and adjust the feed bar moving to front and back so that the needle would be dropped on the center of the needle holes of feed dog.
  - (5) At this position as it is, lay down the machine head, and tighten the screw (A) and (B) of the feed link.
  - (6) As this time, as shown in Fig., check up whether the rod and the feed link (right) would properly be adjusted at right angle.
  - (7) If it is not at the right angle, remove the front cover and top cover, and loosen the screw (C) of the needle bar lifting link, then adjust it so as to be at the proper right angle each other.
  - (8) After adjusted the respective parts, tighten the screws (A) (B) and (C).



## 6. Maintenance, how to find and repair the trouble

### 1. Cleaning

Clean away always dust covering the hook, teeth of feed dog, thread tension regulator and thread controller disc which will cause ununiform stitching.

### 2. Lubrication

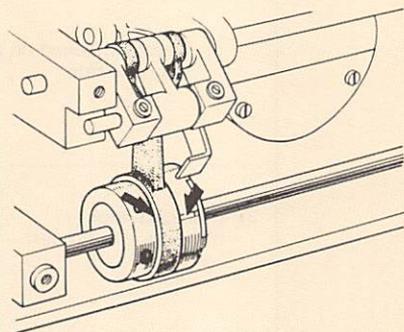
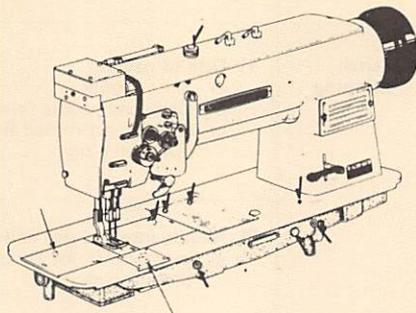
The most important care of the machine is lubrication. If you neglect it, the life of the machine shortened with a heavy wear and tear. Please lubricate as follows:

#### (1) The number of times of lubrication

1. In the case of usual working . . . at 2 or 3 times in a week
2. In the event of continuous working everyday . . . . . once everyday

#### (2) Place where to lubricate

- (1) Dust attached on the parts where lubrication is required should be cleaned away, for the dust absorbs oil and the lubrication is not sufficient on the dust.
- (2) You should oil thoroughly to the every place where indicated by arrow shown in Fig. (bed and inside parts on the face plate).
- (3) To the place (A) in Fig., oil after opening the slide plate (left), and to the place (B) in Fig., oil after opening the slight plate (front).



### 3. Trouble and repairing

Trouble	Cause	Repairs
<b>1. Stitch skipping</b>	<b>1) Due to needle</b> a) Bent needle b) Damaged needle (weak) c) Needle and thread size not matching	Change the needle with new one Change the needle with excellent one. Use the correct size
	<b>2) Needle inserted not enough</b> a) Insertion is not enough there is a gap  b) Needle distorted   c) Needle attached on the opposite side.	Insert to the bottom of the needle clamp    Attach the needle as its hole faces sideways. (But, in case using the nylon or tetolon thread, distance the needle hole somewhat, after checking of loop finish).  Correct the attaching side. (Attach the needle keeping its groove side toward the left, and hollowed side toward the right.) (Refer to page 10.)
	<b>3) Damaged hook</b> (Proper) (Improper)  	Either change the hook or smooth by oil stone.
	<b>4) Gap between hook and needle too large</b>	Correct the hook position to have a gap of 0.05mm (diameter of hair) (Refer to page 19)
	<b>5) Relative position of hook and needle not correct</b> a: Hook set forward b: Hook set backward	When needle is raised 2mm from its lowest position, set the tip of hook at the center of needle. — (Refer to page 19)
	<b>6) Pressure of presser foot not sufficient</b>	Turn the pressure adjusting screw clockwise to strengthen the pressure, but take care not to shrink the sewn fabrics.

Trouble	Cause	Repairs
<b>2. Irregular stitches</b>	<b>1) Pressure for tension disc too weak</b>	Turn its nut clockwise to increase the pressure. (Refer to page 16)
	<b>2) Thread take-up spring too weak</b>	Turn the tension stud clockwise for increasing, little by little. For heavy fabrics, increase the pressure. (Refer to page 16)
	<b>3) Working sphere of thread take-up spring too narrow</b>	Turn the tension stud clockwise, to increase working sphere. For very light fabrics, increase the working sphere.
	<b>4) Under thread tension too weak</b>	Tighten the bobbin case tension screw, little by little, and adjust the thread tension. (Refer to page 15)
	<b>5) Unbalanced thread</b> a: Thread size unbalanced b: Poor wound thread  c: Dust deposited between tension discs. d: Poor winding of thread on bobbin e: Bobbin case tension spring is bent or broken f: Placing of bobbin not correct	Use proper grade of thread Use the well wound thread. Poor wound thread is difficult to be led. Remove the tension regulator nut and discs, and burnish the inside of discs thread way on the stud Rewind the bobbin correctly. Wind about 4/5 of thread on the bobbin. Correct the bending, or change into new one.  Place the bobbin in the bobbin case, so that the bobbin may turn clockwise, when you lead the thread.  (Refer to paragraph 6 of page 11)
	<b>6) Relative position of hook and needle not matching</b>	Regulate the hook set position. (Refer to page 19)
	<b>7) Damaged hook</b>	Change the hook into new one
	<b>8) Improper timing of feed dog</b>	Adjust the position of feed regulator

Trouble	Cause	Repairs
<b>3. Thread cuts</b>	<b>1) Due to thread</b> a: Poor thread  b: Right twisted thread used for upper thread c: Thread too big for the needle size	Use the better machine thread. Irregular thick thread cannot be used. Change it with left twisted thread  Change it with the proper size thread
	<b>2) Due to needle</b> a: Bent needle b: Needle with poor groove or poor hole c: Needle attaching not correct d: Needle too thin for the thread size	Change it into new one. Change it into good needle  Refer to the paragraph concerning the skip-stitch  Change the needle into the suitable one.
	<b>3. Upper thread tension too strong</b>	Turn the tension regulator counterclockwise and weaken the upper thread tension. (If the tension is too strong due to the insufficient tightening, check the cause of the insufficient tightening and correct it.)
	<b>4) Working the thread take-up lever too fast</b>	Loosen it by turning the upper thread tension regulator counter-clockwise. (Refer to page 16)
	<b>5) Thread take up spring too strong</b>	Turn the tension stud counter-clockwise, and weaken the spring. (If the spring is too strong due to the insufficient tightening, check the cause of it and correct it.)
	<b>6) Hook hurt (damaged)</b>	Grind it by oil stone. (Hook may be hurt, by the needle in case the sewn materials are taken out during the machine operation or the hook is not placed in a proper position, or the bent needle is used.)
	<b>7) Damaged needle hole in needle plate</b>	Grind the needle hole, or change the needle plate into new one. (Needle plate may be hurt by the needle, in case the sewn materials are taken out during the machine operation, or the bent needle is used.)
	<b>8) Unbalanced strength of thread</b>	Refer to the paragraph concerning the insufficient tightening.
	<b>9) Relative position of hook and needle not matching</b>	Regulate the hook set position (Refer to page 19.)

Trouble	Cause	Repairs
<b>4. Puckering</b>	<b>1) Thread and needle too thick for material</b> (In case of sewing up thin material, thicker thread and needle causes puckering)	Change with fine thread and needle.
	<b>2) The pressure by presser foot too strong</b>	Turn the presser regulating thumb screw to the left to weaken (Refer to page 16)
	<b>3) Upper thread tension too strong</b> (Thread take-up spring too strong)	Turn the tension nut to the left to weaken (Refer to page 13)
	<b>4) Lower thread tension too strong</b>	Turn the tension screw of bobbin case to the left to weaken (Refer to page 15)
	<b>5) The feed dog too high</b>	Loosen the screw of the feed lifting rock shaft crank, and adjust the height of feed dog (Refer to page 16)
	<b>6) Stitch length too long for materials</b>	Shorten the stitch length for thin materials.
<b>5. Irregular stitches</b>	<b>1) Bent needle or damaged needle point</b>	Change it into new one, or grind the needle point with oil stone.
	<b>2) Pressure of the presser foot too weak</b>	Apply more pressure for heavy materials. (Refer to page 17.)
	<b>3) Improper height of the feed dog</b>	Set higher for thick fabrics (Refer to page 17.)
<b>6. Needle breaks</b>	<b>1) Needle bent</b>	Change it into new one
	<b>2) Poor grade of needle</b>	Change it into new one
	<b>3) Needle inserted not enough</b>	Refer to the paragraph concerning the skip stitch
	<b>4) Needle knocks against hooks</b>	Adjust the set position of the hook. The cause is that clearance of the tip of the hook and the needle is not enough, or that the timing of them is not proper. (Refer to page 19.)
	<b>5) Feed timing not correct</b>	Regulate the feed cam setting position.
	<b>6) Needle, fabrics and thread not matching</b>	Use proper size needle





**MITSUBISHI ELECTRIC CORPORATION**

No. 2-3 2-CHOME MARUNOUCHI CHIYODA-KU TOKYO JAPAN