

# SERVICING MANUAL

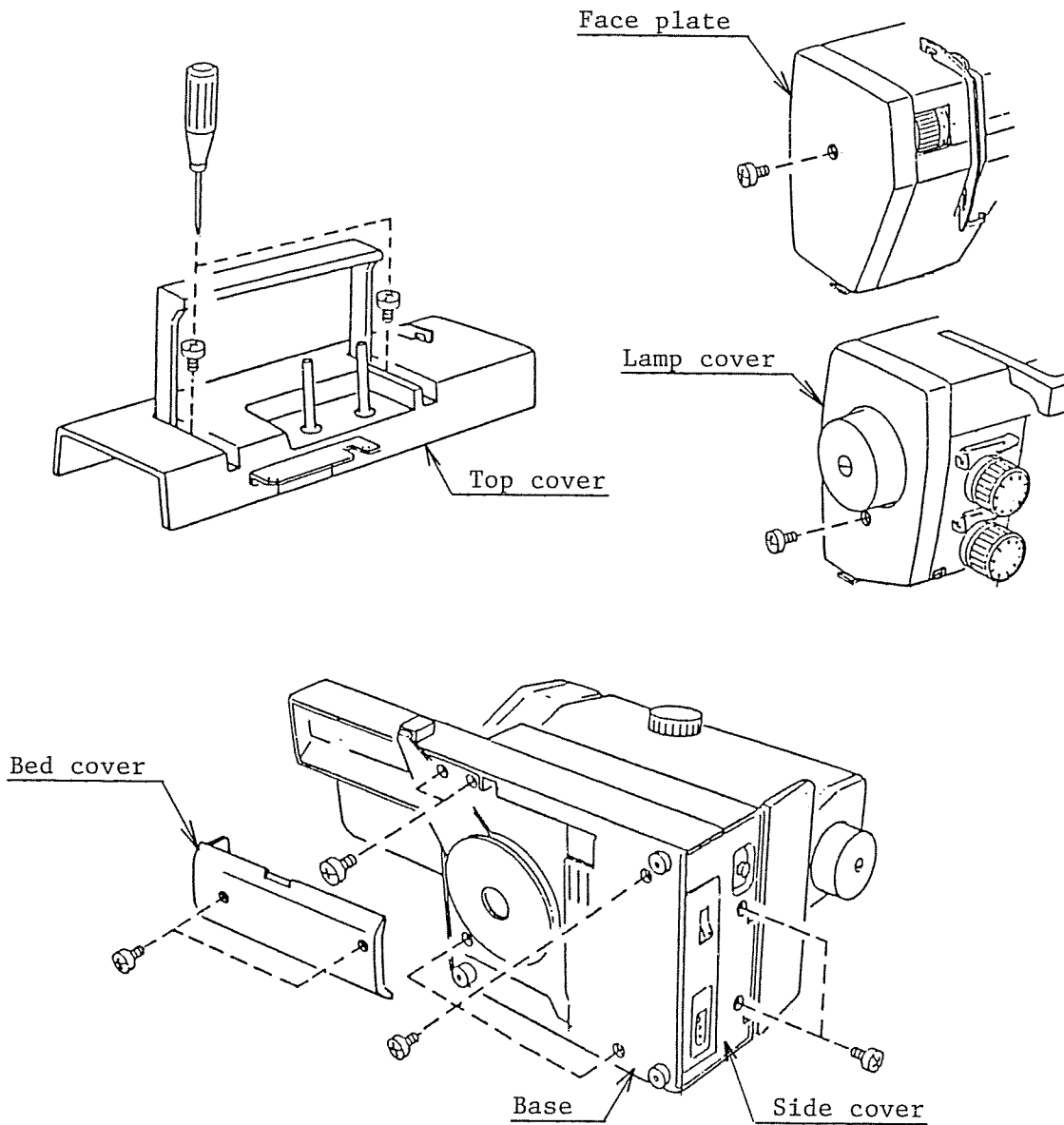
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## HOW TO REMOVE THE EXTERIOR PARTS

1. Top cover ----- Remove the two set screws.
2. Face plate ----- Remove the one set screw.
3. Lamp cover ----- Remove the one set screw.
4. Base ----- Remove the five set screws.
5. Slide cover ----- Remove the two set screws.
6. Bed cover ----- Remove the two set screws.



## TO ADJUST THE PRESSER BAR HEIGHT

### CORRECT SETTING

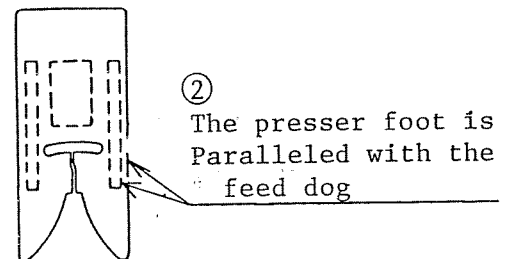
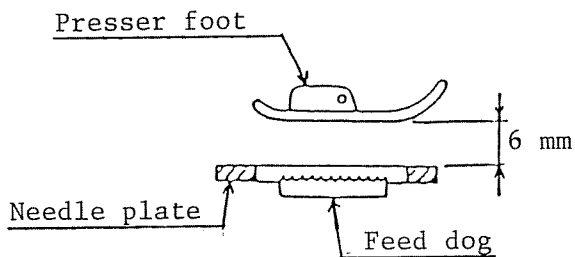
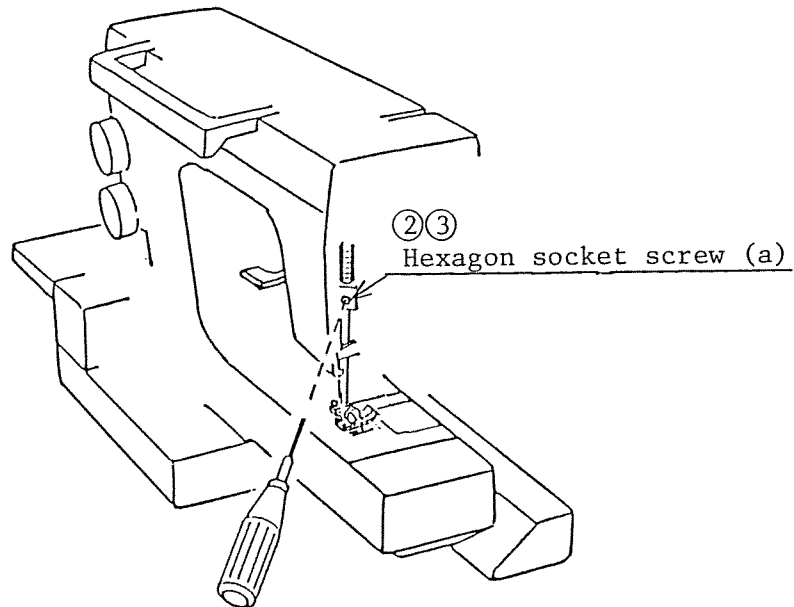
When the presser foot is raised, the distance between the surface of needle plate and the bottom of presser foot should be 6.0 mm.

### TO ADJUST

1. Remove the face plate. (Refer to the page 1.)
2. Raise the presser foot, and loosen the set screw (a). Then adjust the distance.

Make sure the presser foot is paralleled with the feed dog as shown below.

3. Tighten the set screw (a).
4. Attach the face plate.



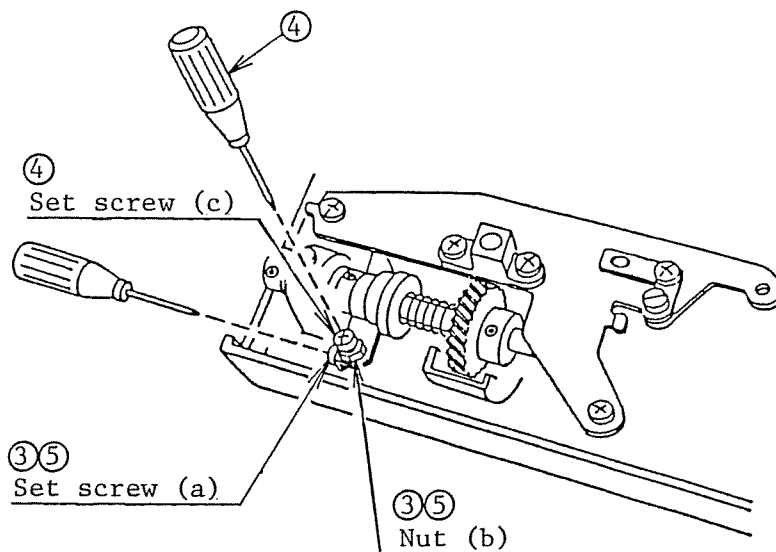
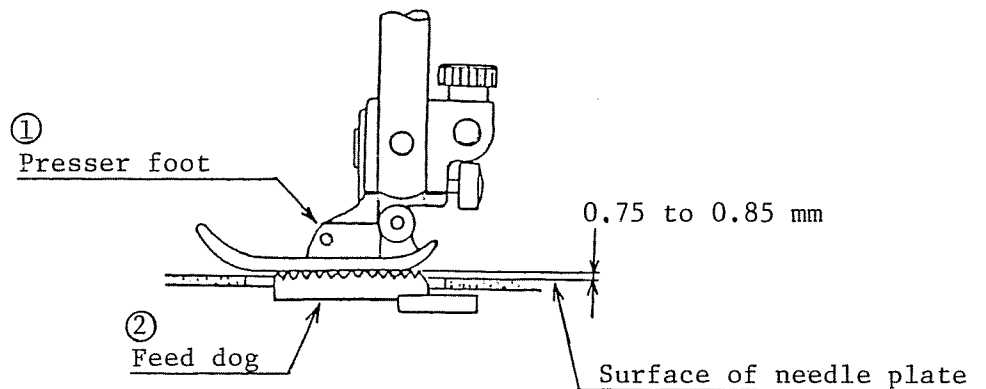
## TO ADJUST THE FEED DOG HEIGHT

### CORRECT SETTING

When the presser foot is lowered, the highest position of the feed dog should be 0.75 to 0.85 mm from the surface of needle plate.

### TO ADJUST

1. Lower the presser foot, and remove the bed cover, (Refer to the page 1.)
2. Turn the balance wheel toward you until the feed dog comes its highest position.
3. Loosen the set screw (a) and nut (b).
4. Turn the set screw (c) to:  
Clockwise to increase,  
Counter-clockwise to decrease.
5. Tighten the set screw (a) and nut (b).
6. Attach the bed cover.



## TO ADJUST THE FEED TIMING

### CORRECT SETTING

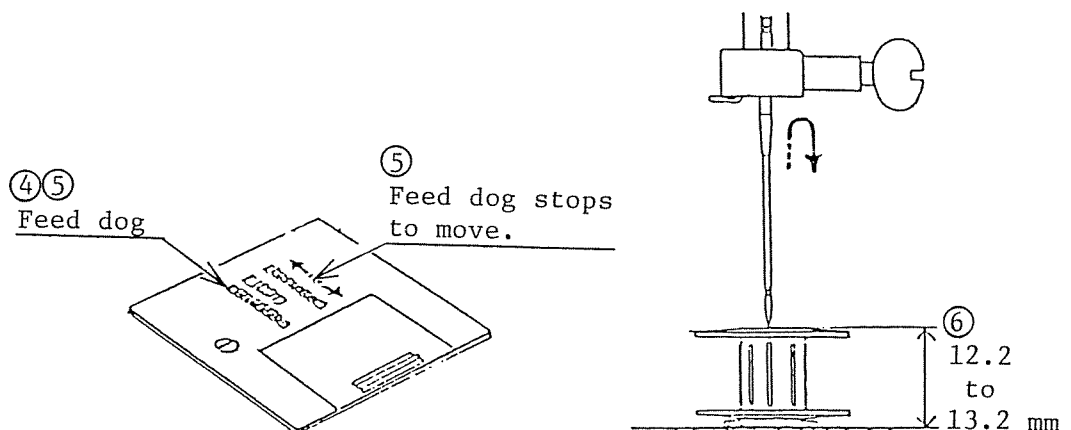
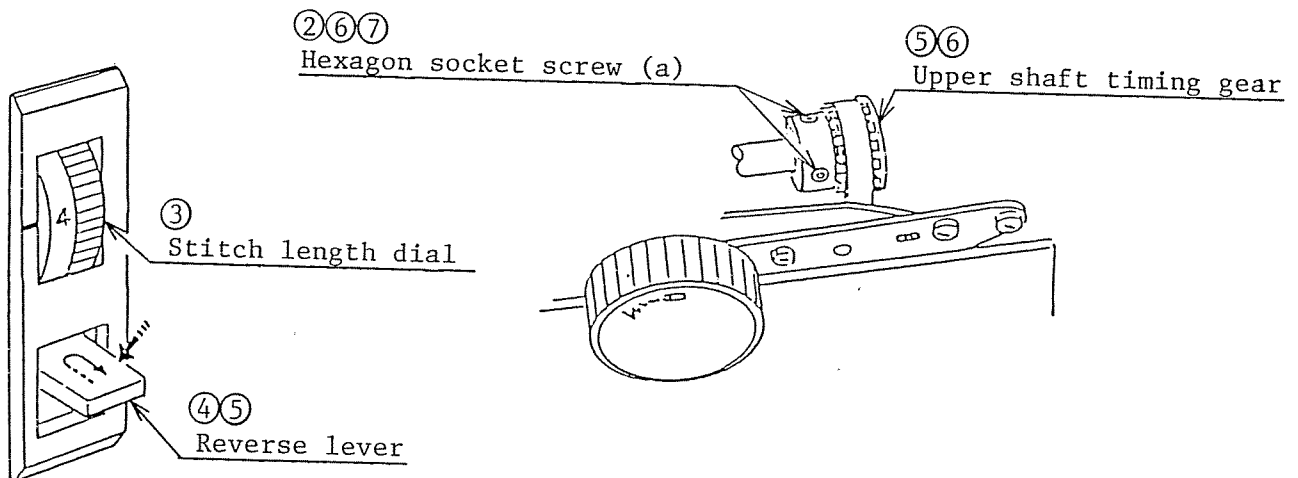
When the needle is in the fabric, the feed dog should not feed.

### TO ADJUST

1. Remove the top cover (Refer to the page 1.) and foot holder.
2. Loosen the two hexagon socket screws (a).
3. Set the stitch length dial at "4".
4. Raise the feed dog to the point where the feed dog just start to feed forward, and press the reverse lever several times to make sure the feed dog moves smoothly.
5. Turn the upper shaft timing gear little by little towards you while repeating to press the reverse lever until the feed dog stops to move back and forth.
6. Turn the balance wheel toward you with your hand while holding the upper shaft timing gear until the point of needle comes 12.2 to 13.2 mm from the surface of needle plate in downward stroke.

Alternatively you may use a plastic bobbin supplied with the machine to measure the distance as shown below.

7. Tighten the two hexagon socket screws (a).
8. Attach the foot holder and top cover.
9. Check the hook timing, buttonhole feed balance and stretch stitch feed balance.



## TO ADJUST THE NEEDLE BAR HEIGHT

### CORRECT SETTING

When the point of shuttle hook meets exactly the right side of needle at the left needle position with the maximum zigzag width, the distance between upper edge of needle eye and point of shuttle hook should be 1.7 to 2.1 mm.

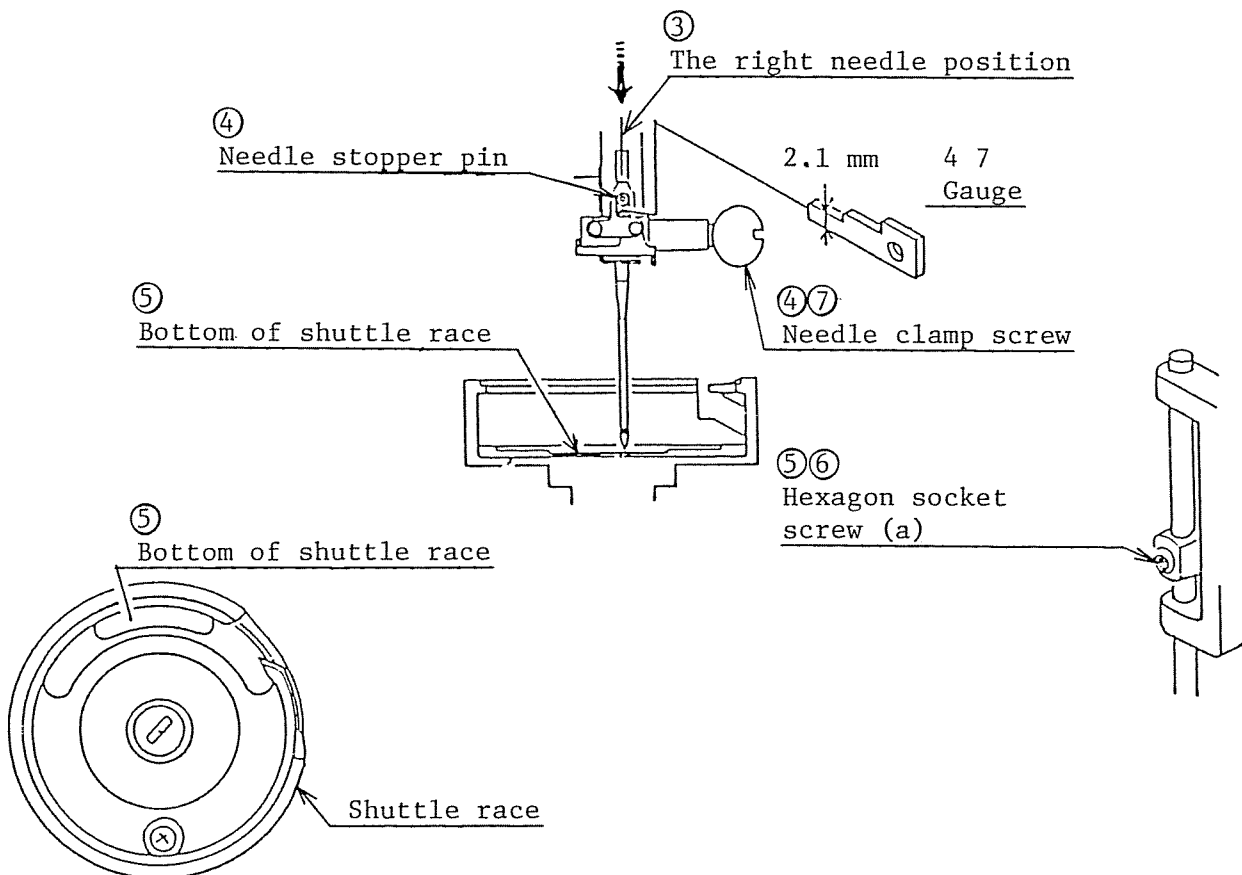
### TO ADJUST

1. Remove the presser foot, needle plate, bobbin, bobbin holder and face plate.
2. Set the pattern selector dial at "W" (the maximum zigzag width).
3. Turn the balance wheel toward you with your hand and bring the needle to the right hand side.
4. Loosen the needle clamp screw, and insert the gauge (2.1 mm) between the needle stopper pin and needle. Tighten the needle clamp screw.
5. Turn the balance wheel toward you until the needle bar comes to the lowest position.

Loosen the hexagon socket screw (a), and lower the needle bar until the point of needle just touches the bottom of shuttle race.

Make sure not to turn the needle bar.

6. Tighten the hexagon socket screw (a).
7. Loosen the needle clamp screw, and remove the gauge. Push up the needle as far as it will go, and tighten the needle clamp screw.
8. Insert the bobbin holder and bobbin, then attach the needle plate and presser foot.



## TO ADJUST THE NEEDLE SWING TIMING

### CORRECT SETTING

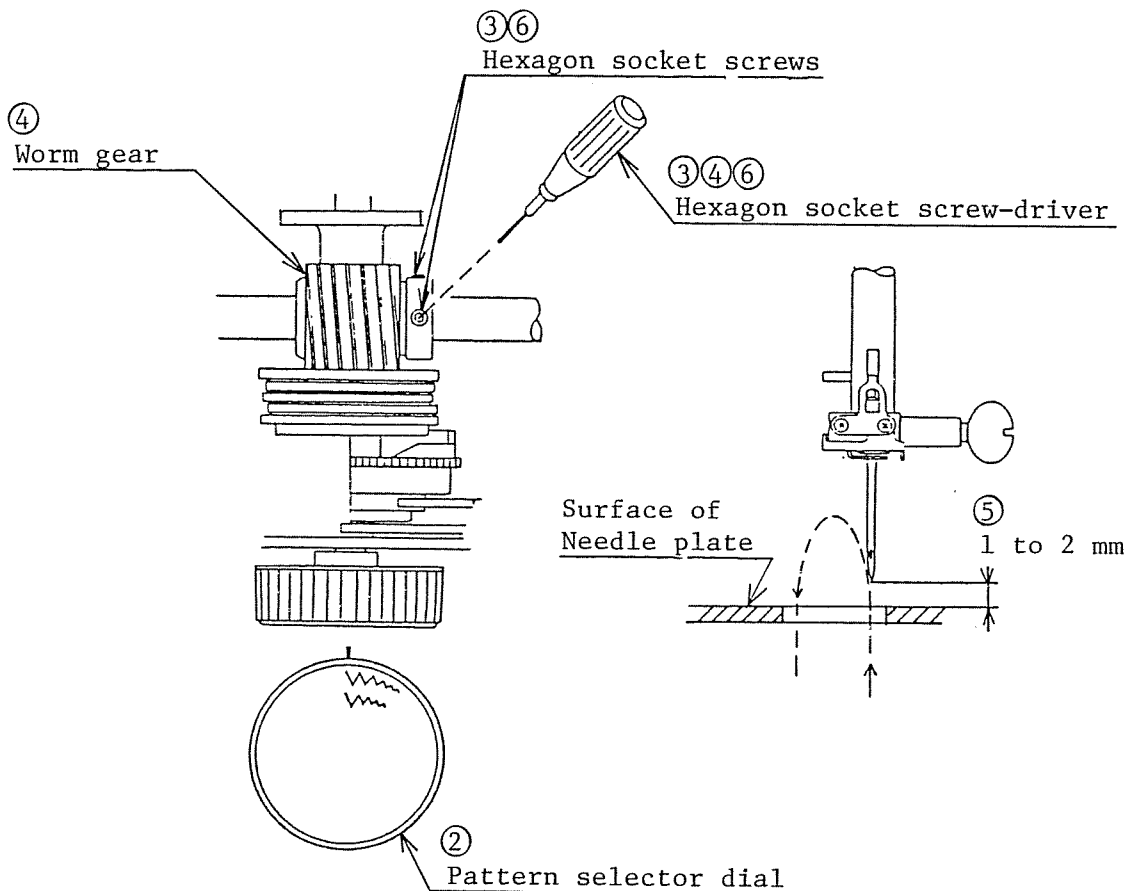
The needle must start to swing from one side to another when the point of needle is 1 to 2 mm above the surface of needle plate.

### TO ADJUST

1. Remove the top cover. (Refer to the page 1.)
2. Set the pattern selector dial at the maximum zigzag width.
3. Loosen the two hexagon socket screws.
4. Insert the hexagon socket screwdriver into one of the two hexagon socket screws, and turn the balance wheel towards you.

Be careful not to move the worm gear to sideways.

5. Adjust the timing of needle swing.
6. Tighten the two hexagon socket screws, and check the stretch stitch feed balance.
7. Attach the top cover.





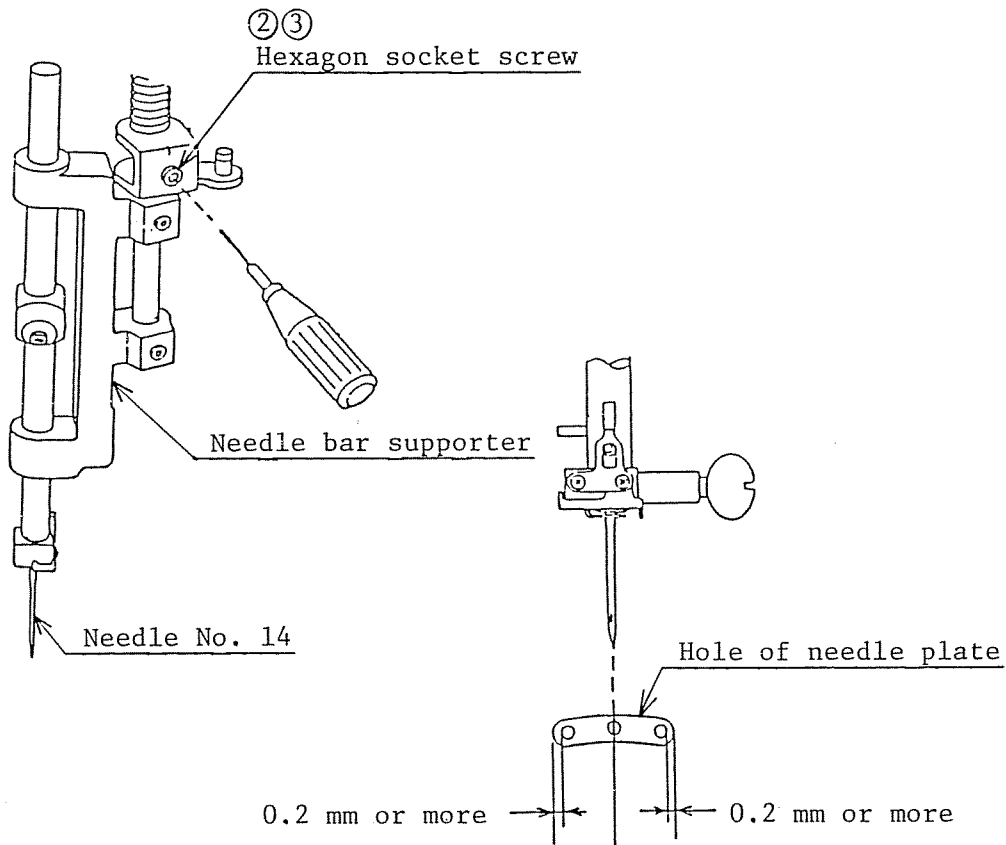
## TO ADJUST THE NEEDLE POSITION

### CORRECT SETTING

When the pattern " $\phi$ " is selected, the needle should be at the center needle position. When the pattern " $\sim$ " (the maximum zigzag width) is selected, the clearance between the needle and the edge of hole of needle plate should be more than 0.2 mm.

### TO ADJUST

1. Set the pattern selector dial at the maximum zigzag width, and remove the face plate. (Refer to the page 1.)
2. Loosen the hexagon socket screw, and adjust the needle position.
3. Tighten the hexagon socket screw.
4. Set the pattern selector dial at " $\phi$ " and check the needle position.
5. Attach the face plate.



## TO ADJUST THE HOOK TIMING

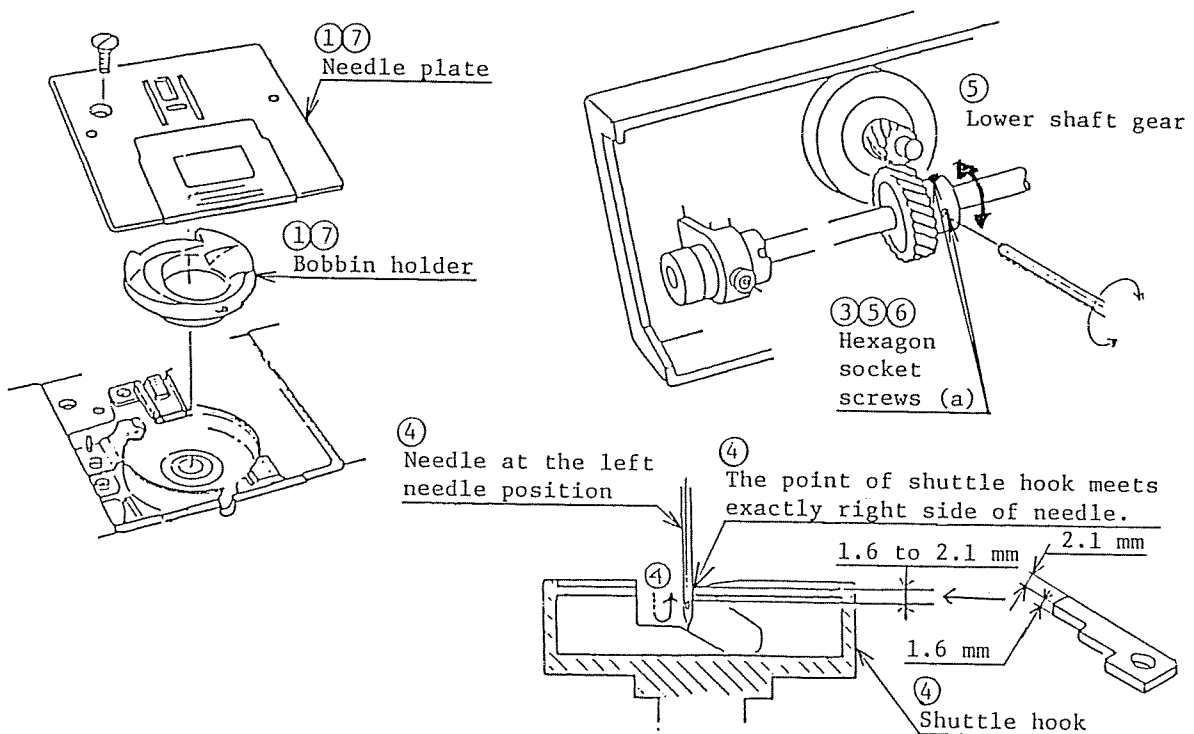
### CORRECT SETTING

When the point of shuttle hook meets exactly the right side of needle at the left needle position in upward stroke of the travel of needle bar, the distance between the top of needle eye and upper edge of the point of needle should be 1.6 to 2.1 mm.

### TO ADJUST

Before proceeding this adjustment, check the feed timing and needle bar height. (Refer to the pages 4 & 5.)

1. Remove the presser foot, needle plate, bobbin, bobbin holder and bed cover.
2. Set the pattern selector dial at " Zigzag " (the maximum zigzag width).
3. Loosen the two hexagon socket screws.
4. Turn the balance wheel toward you until the point of shuttle hook meets exactly the right side of needle at the left needle position in the upward travel of needle bar.
5. Insert the hexagon socket screwdriver into one of the two hexagon socket screws (a) and turn the lower shaft gear while holding the balance wheel tight with your hand.
6. Tighten the two hexagon socket screws (a) firmly.
7. Attach the bed cover, and insert the bobbin holder and bobbin. Then attach the needle plate and presser foot.



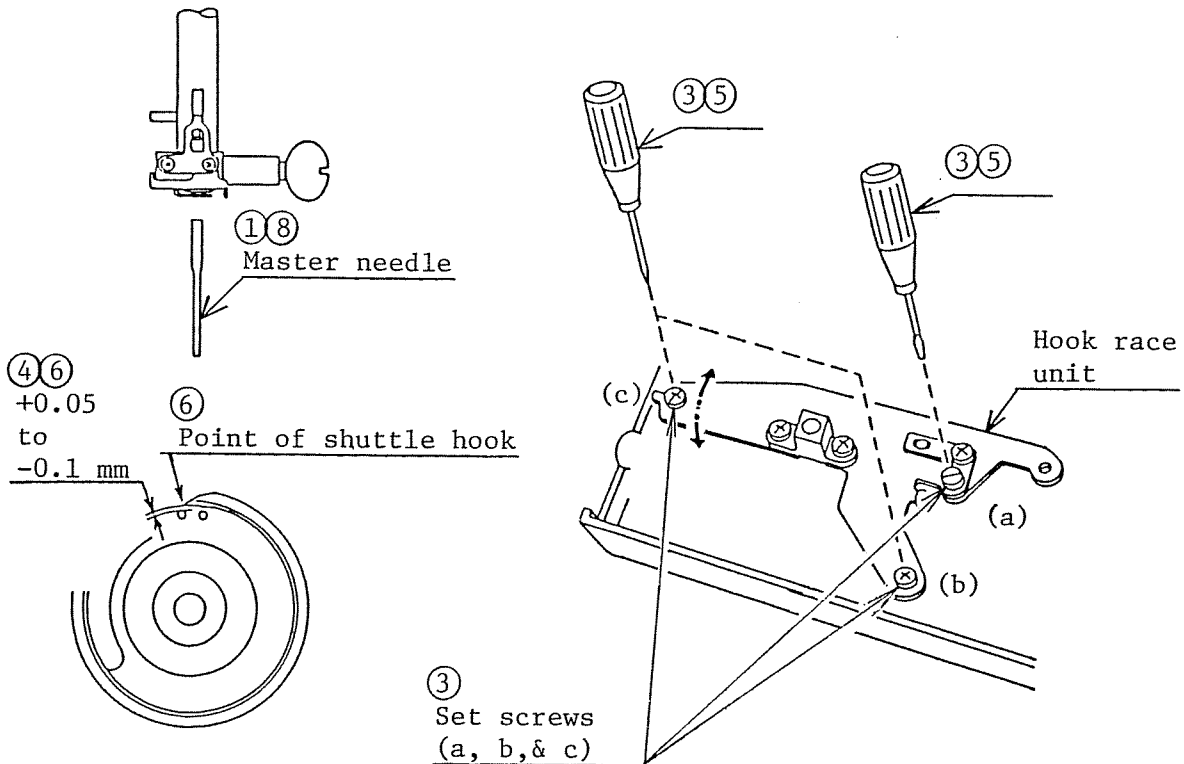
## TO ADJUST THE CLEARANCE BETWEEN NEEDLE AND SHUTTLE HOOK

### CORRECT SETTING

The clearance between needle and point of shuttle hook should be  $+0.05$  to  $-0.10$  mm at the left and right needle positions.

### TO ADJUST

1. Remove the needle plate, bobbin and bobbin holder.  
Change the needle to MASTER needle, and set the pattern selector dial at "W" (the maximum zigzag width).
2. Turn the machine to the back, and remove the base and bed cover.  
(Refer to the page 1.)
3. Loosen the set screws (a, b & c) just enough to move the hook race unit (d).
4. Turn the balance wheel toward you with your hand, and adjust the clearance between the MASTER needle and shuttle hook by moving the left end of the hook race unit up or down.
5. Tighten the set screws (a, b & c) firmly.
6. Recheck the clearance between the MASTER needle and the point of shuttle hook.
7. Attach the bed cover, then attach the base.
8. Remove the MASTER needle, and insert a new needle.
9. Insert the bobbin holder, and attach the needle plate.



## TO ADJUST THE BACKLASH OF LOWER SHAFT GEAR AND HOOK DRIVE GEAR

### CORRECT SETTING

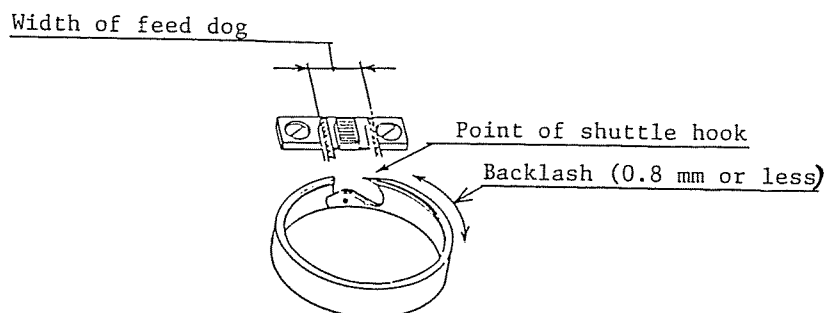
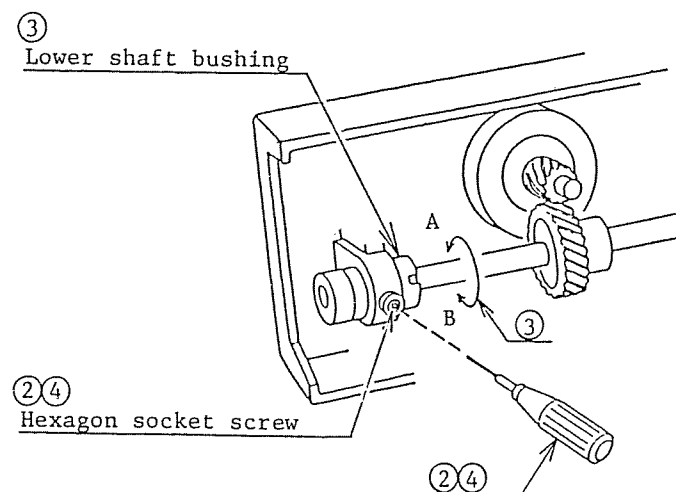
The play of shuttle hook should be 0.8 mm or less when the point of shuttle hook comes within the width of feed dog. And there should be no tight spot at any position of the shuttle hook.

### TO ADJUST

1. Remove the bed cover. (Refer to the page 1.)
2. Loosen the hexagon socket screw.
3. Turn the lower shaft bushing to the direction of:  
A to reduce the backlash.  
B to increase the backlash.

Be careful not to move the lower shaft bushing to sideways, otherwise the hook timing will be changed.

4. Tighten the hexagon socket screw.
5. Attach the bed cover.



## TO ADJUST THE STRETCH STITCH FEED BALANCE

### CORRECT SETTING

When the machine is set for triple stretch stitch "④", the needle should enter the same perforation during forward and backward feeding.

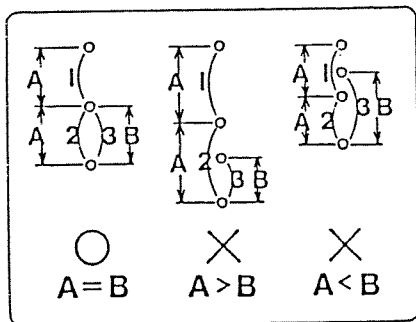
### TO ADJUST

1. Remove the top cover. (Refer to the page 1.)
2. Set the pattern selector dial at "④".  
Set the stitch length dial at "S.S.".
3. Place a sheet of paper under the presser foot, and lower the presser foot.  
Turn the balance wheel toward you with your hand.
4. The forward stitch length should be the same as the backward stitch length.

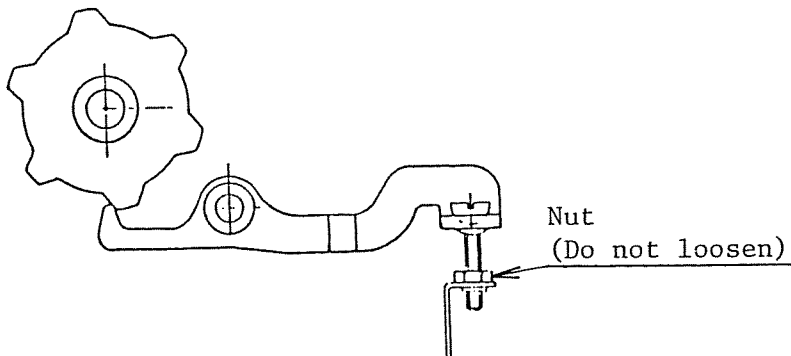
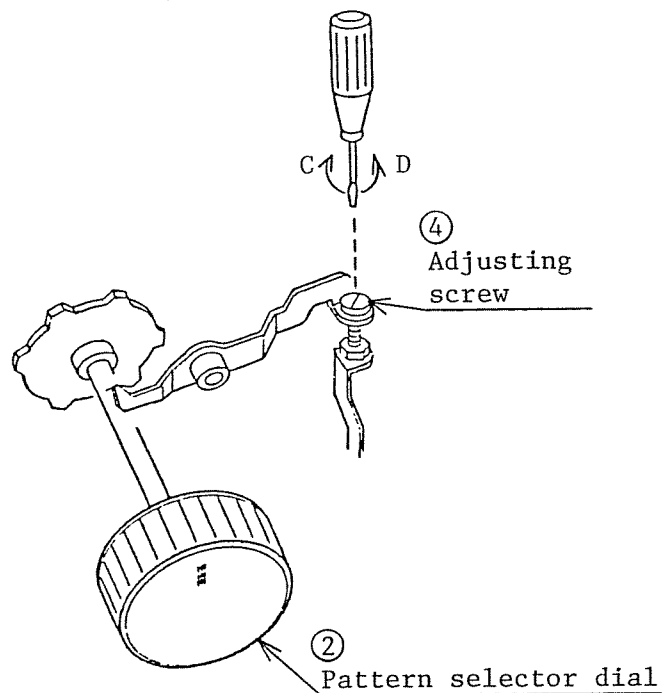
If the forward stitch length is longer than the backward, turn the adjusting screw to the direction of "C".

If the forward stitch length is shorter than the backward, turn the adjusting screw to the direction of "D".

5. Attach the top cover.



④



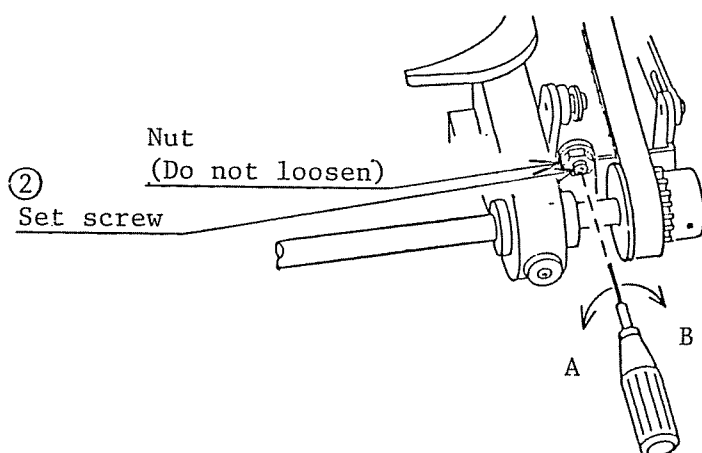
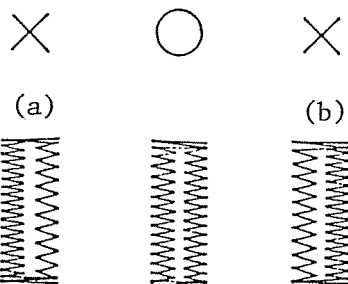
## TO ADJUST THE BUTTONHOLE FEED BALANCE

### CORRECT SETTING

The left and right sides of buttonhole should be the same stitch density. The variance of 9 to 12 stitches in the right side row against 10 stitches in the left side row is considered acceptable feed balance.

### TO ADJUST

1. Remove the base. (Refer to the page 1.)
2. Change the presser foot to the buttonhole foot.  
Turn the set screw to the direction of:  
    "A" if the buttonhole is like (a).  
    "B" if the buttonhole is like (b).
3. Attach the base.



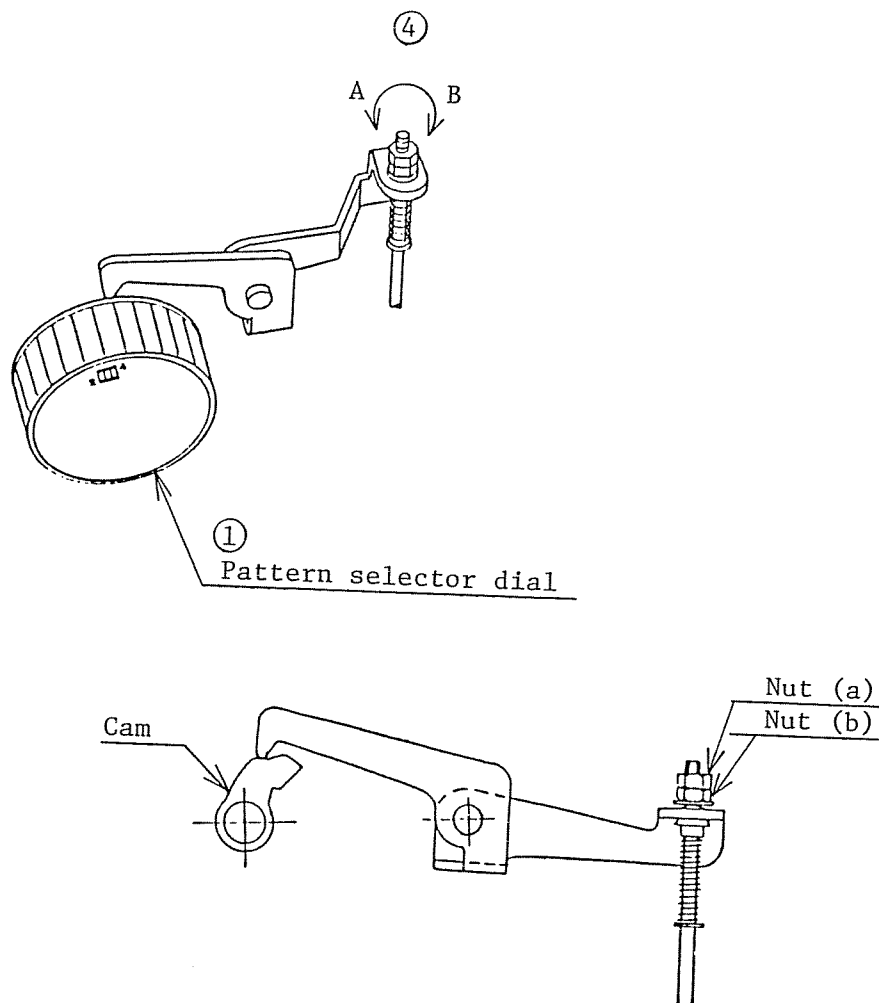
## TO ADJUST THE BARTACK FEED ON BUTTONHOLE

### CORRECT SETTING

The bartack feed on buttonhole should be less than 1 mm in 20 stitches.

### TO ADJUST

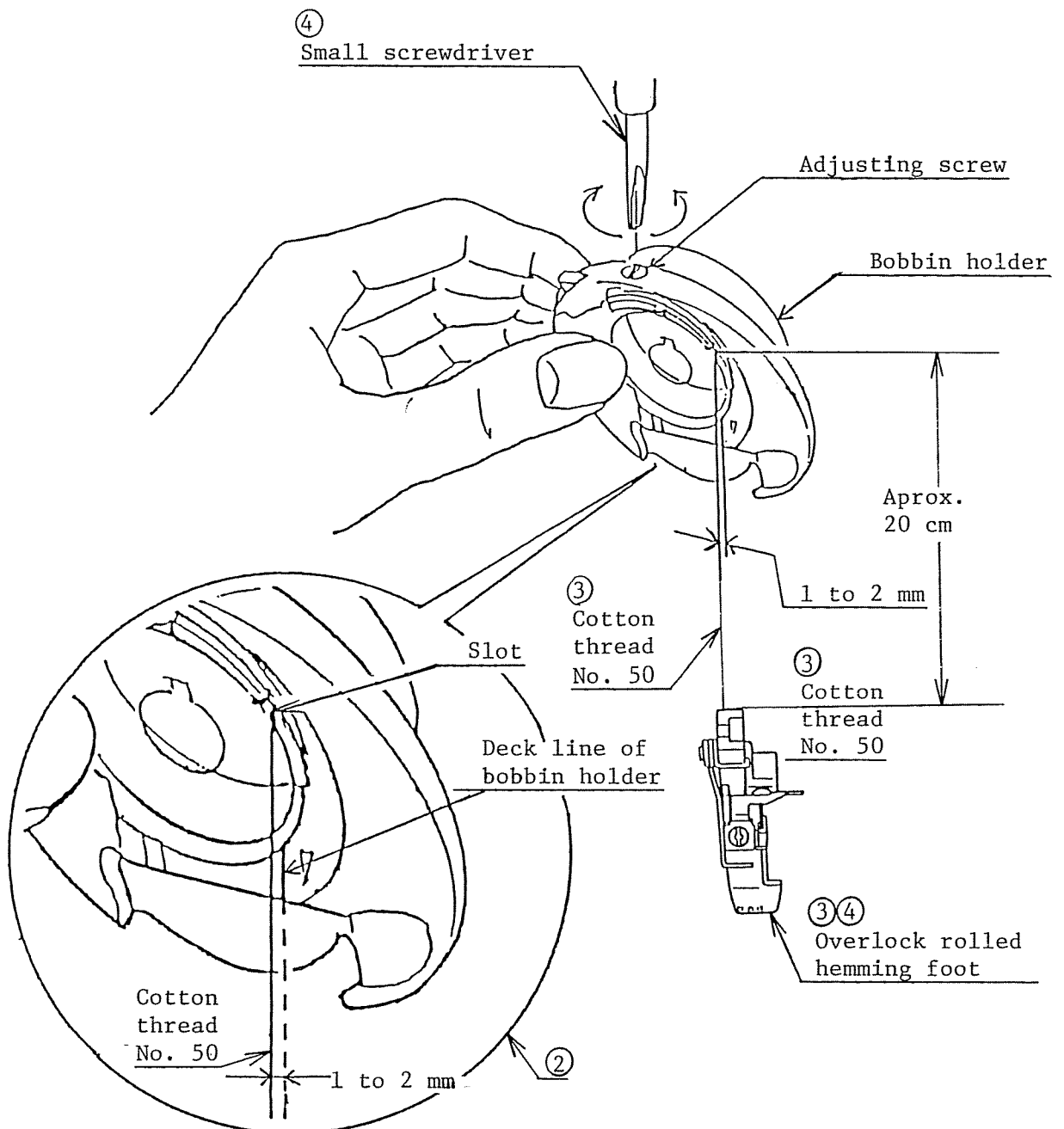
1. Remove the top cover. (Refer to the page 1.)
2. Set the pattern selector dial at "4".  
Set the stitch length dial at "4".
3. Loosen the upper nut.
4. Place a sheet of paper under the presser foot, and lower the foot.  
Turn the balance wheel with your hand.  
When the paper is fed:  
    forward, turn the both two nuts (a & b) to the direction of "A".  
    backward, turn the lower nut (b) to the direction of "B".
5. Tighten the upper nut (a).
6. Attach the top cover.



## TO ADJUST THE BOBBIN THREAD TENSION

### TO ADJUST

1. Remove the needle plate.
2. Take out the bobbin holder.  
Wind the bobbin with size 50 cotton thread and insert into the bobbin holder.
3. Pull out the thread approx. 20 cm in length through the slot and hang the overlock rolled hemming foot supplied with the machine at the end of thread.
4. Turn the adjusting screw so that the overlock rolled hemming foot comes down very slowly by its own weight.





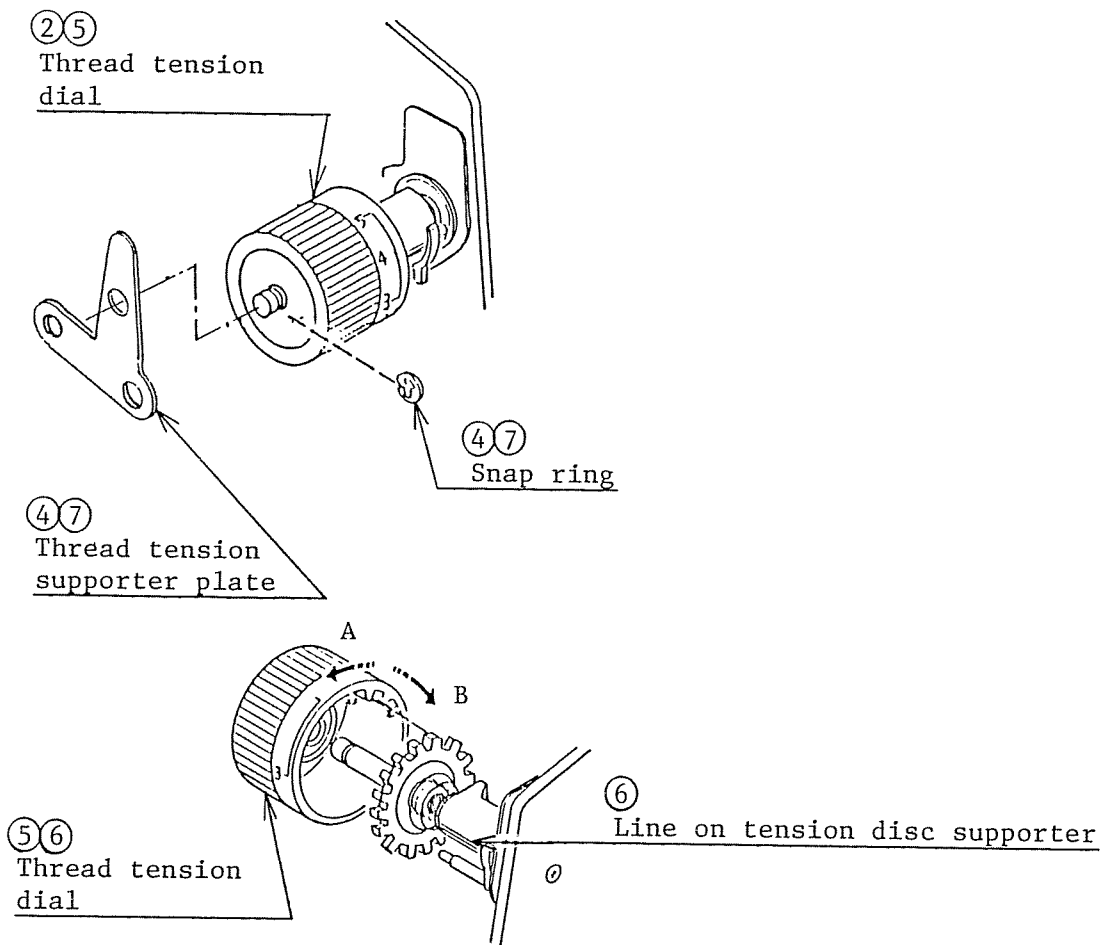
## TO ADJUST THE NEEDLE THREAD TENSION

Before proceeding this adjustment, check the following points.

- a) The bobbin thread tension is adjusted correctly.  
(Refer to the page 14.)
- b) Check the tension discs if there is any piece of thread or lint between the tension discs.

### TO ADJUST

1. Thread the machine and sew straight stitch.
2. Turn the tension dial until the correct tension is obtained.
3. Remove the face plate and top cover, and lower the presser foot.
4. Remove the thread tension supporter plate and snap ring.
5. Pull out the tension dial.
6. Set the tension dial at "5" in line with the line on the tension disc supporter, then insert the tension dial.
7. Attach the snap ring and thread tension supporter plate.
8. Attach the face plate and top cover.



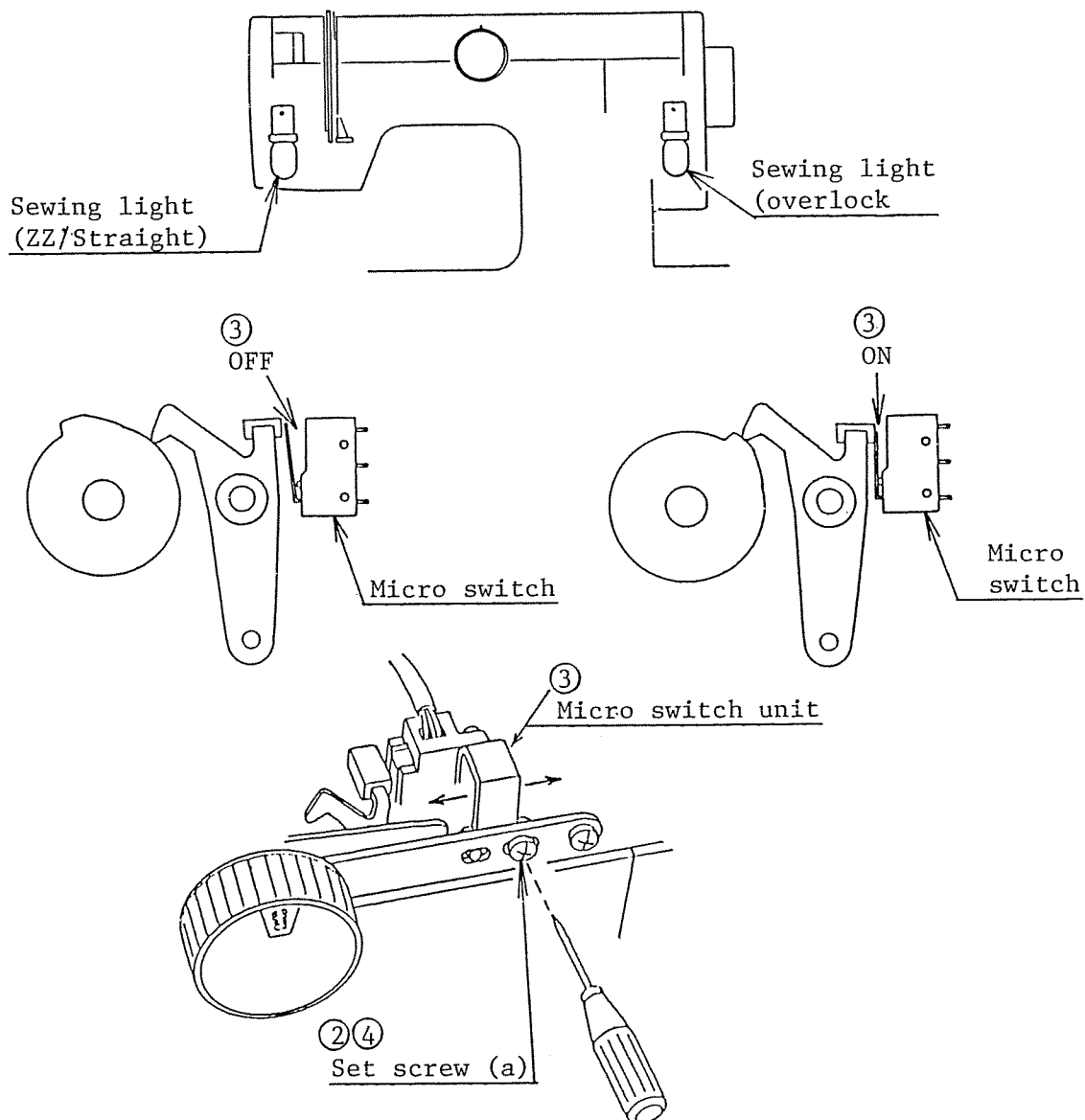
## TO ADJUST THE MICRO SWITCH POSITION

### CORRECT SETTING

When zigzag/straight or overlock is selected, the sewing lamp should be changed over automatically.

### TO ADJUST

1. Remove the top cover. (Refer to the page 1.)
2. Loosen the set screw (a).
3. Slide the micro switch to the right or left so that:  
when overlock side is selected, the micro switch is turned on,  
when zigzag/straight side is selected, the micro switch is turned off.
4. Tighten the set screw (a).
5. Attach the top cover.



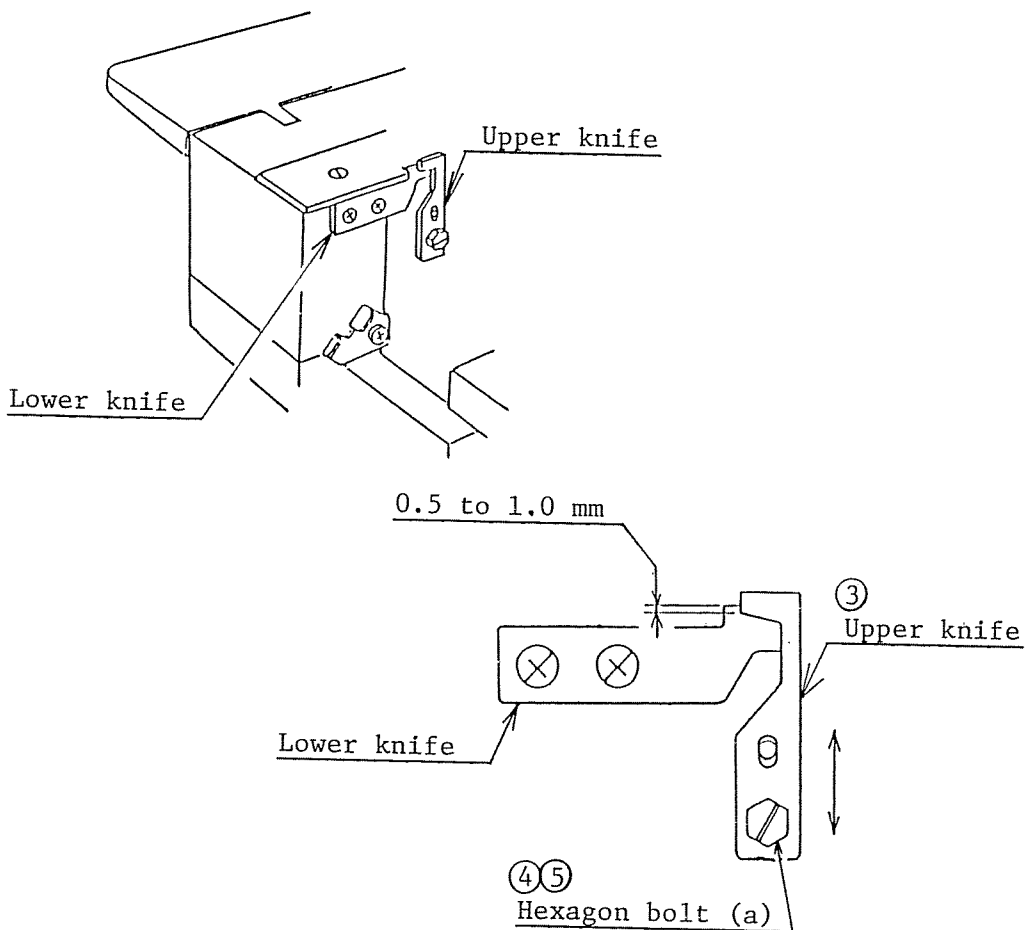
## TO ADJUST THE UPPER KNIFE POSITION

### CORRECT SETTING

When the upper knife is at the lowest position, the front edge of the upper knife should be 0.5 to 1.0 mm below the edge of lower knife.

### TO ADJUST

1. Open the chip guard.
2. Check the timing of upper knife movement. (Refer to the page 18.)
3. Turn the balance wheel away from you until the upper knife comes to the lowest position of its travel.
4. Loosen the hexagon bolt (a), and adjust the upper knife position.
5. Tighten the hexagon bolt (a).



## TO ADJUST THE TIMING OF UPPER KNIFE MOVEMENT

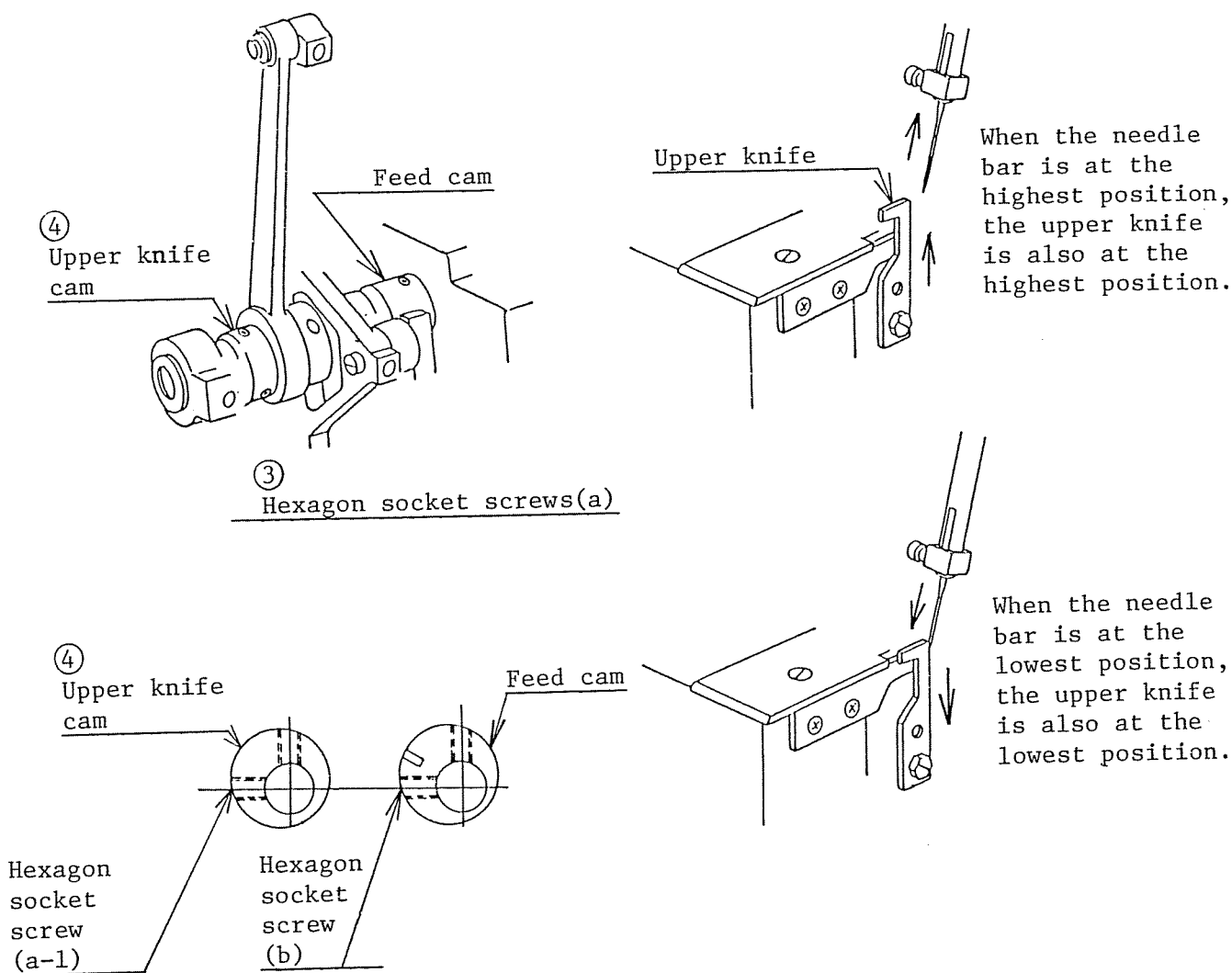
### CORRECT SETTING

When the needle bar is at the highest position of its travel, the upper knife should be at the highest position.

When the needle bar is at the lowest position of its travel, the upper knife should be at the lowest position.

### TO ADJUST

1. Turn the machine to the back.
2. Remove the base. (Refer to the page 1.)
3. Loosen the two hexagon socket screws (a).
4. Turn the upper knife cam to set the hexagon socket screw (a-1) in line with the hexagon socket screw (b) as illustrated.
5. Attach the base.



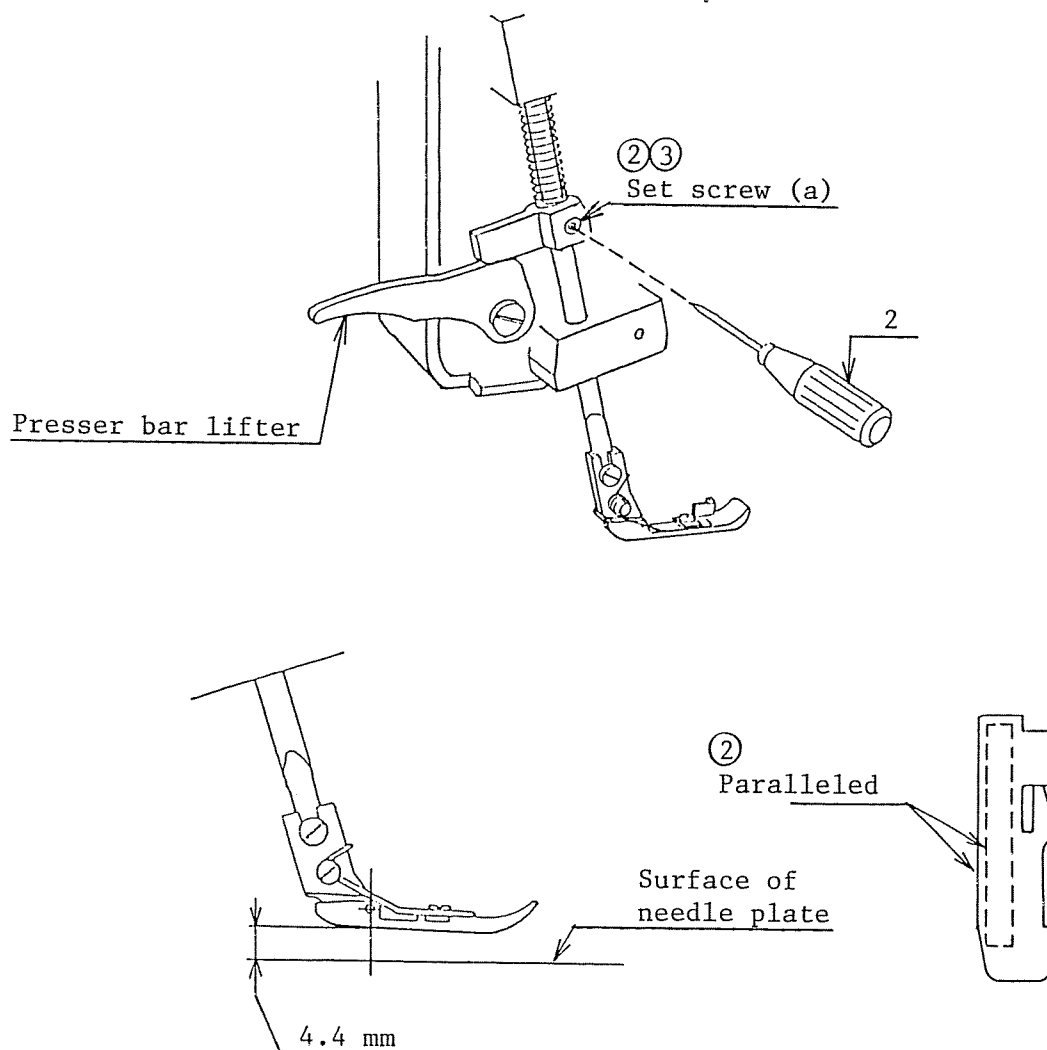
## TO ADJUST THE PRESSER BAR HEIGHT

### CORRECT SETTING

The distance between the surface of needle plate and the bottom of presser foot should be 4.4 mm when the foot is raised.

### TO ADJUST

1. Remove the lamp cover. (Refer to the page 1.)
2. Loosen the set screw (a), and adjust the presser bar height.  
The presser foot must be paralleled with the feed dog as shown below.
3. Tighten the set screw (a).
4. Attach the lamp cover.



## TO ADJUST THE FEED DOG HEIGHT

### CORRECT SETTING

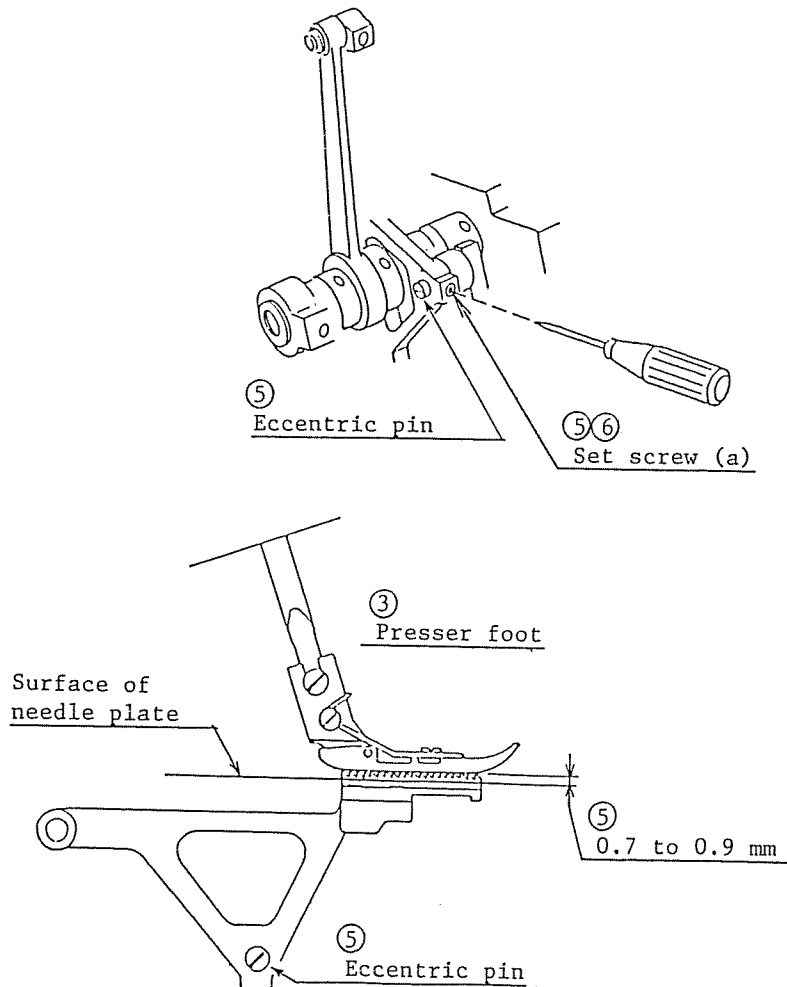
The distance between the surface of needle plate and the bottom of presser foot should be 0.7 to 0.9 mm when the feed dog is at the highest position and the foot is lowered.

--- Alternative way to check ---

The bottom of front tooth is leveled with the surface of needle plate when the foot is lowered and the feed dog is at the highest position.

### TO ADJUST

1. Turn the machine to the back.
2. Remove the base and the side cover. (Refer to the page 1.)
3. Lower the presser foot.
4. Turn the balance wheel away from you to bring the feed dog at the highest position.
5. Loosen the hexagon socket screw (a), and turn the eccentric pin to adjust the feed dog height.
6. Tighten the hexagon socket screw (a).
7. Attach the base and side cover.



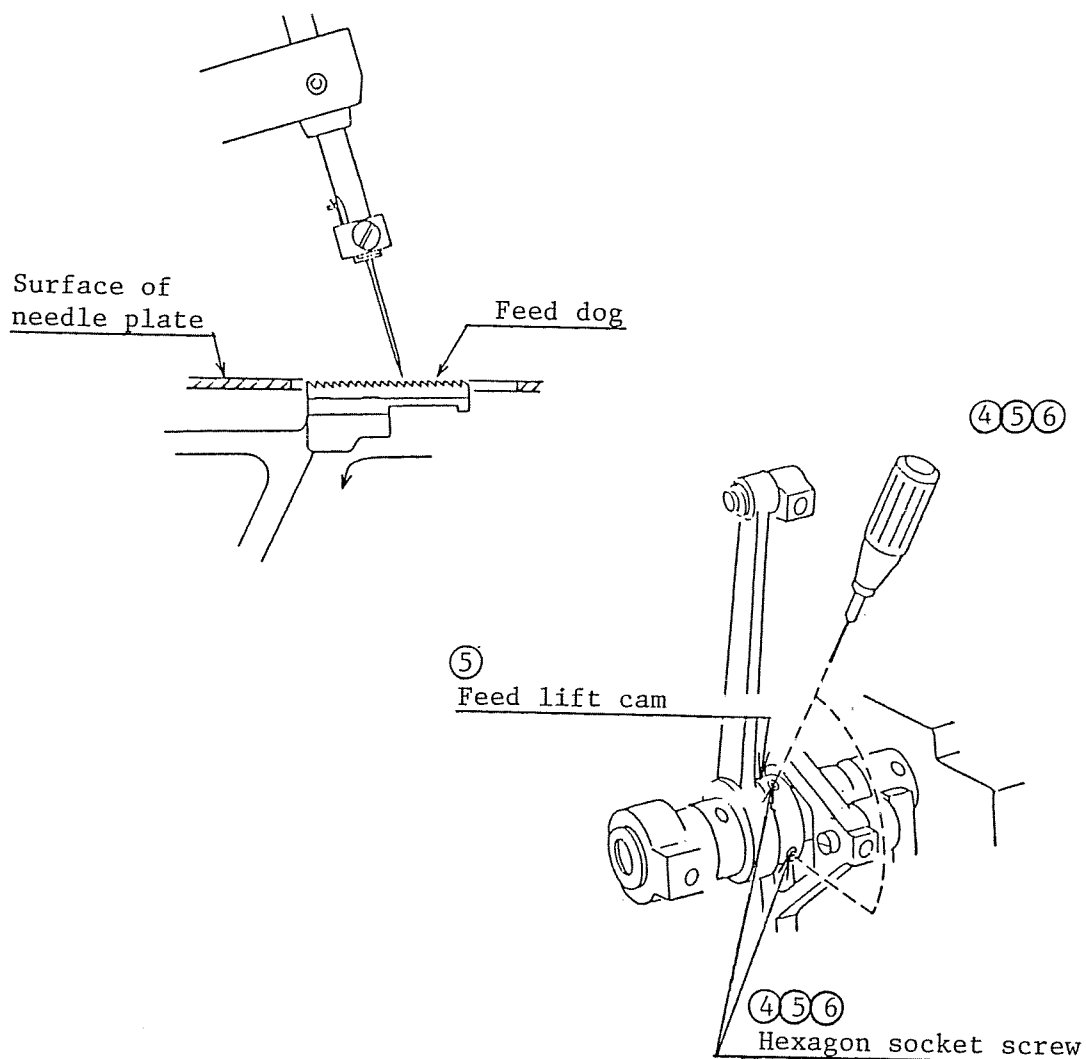
## TO ADJUST THE VERTICAL FEED TIMING

### CORRECT SETTING

When the point of needle in downward stroke comes to the same level as the surface of needle plate, the top of feed dog should be leveled with the surface of needle plate in downward movement.

### TO ADJUST

1. Turn the machine to the back.
2. Remove the base. (Refer to the page 1.)
3. Raise the presser foot.
4. Loosen the two hexagon socket screws.
5. Insert the hexagon socket screwdriver into one of the hexagon socket screws to turn the feed lift cam, and turn the balance wheel away from you little by little until the feed timing is obtained.
6. Tighten the two hexagon socket screws.
7. Attach the base.



## TO ADJUST THE HORIZONTAL FEED TIMING

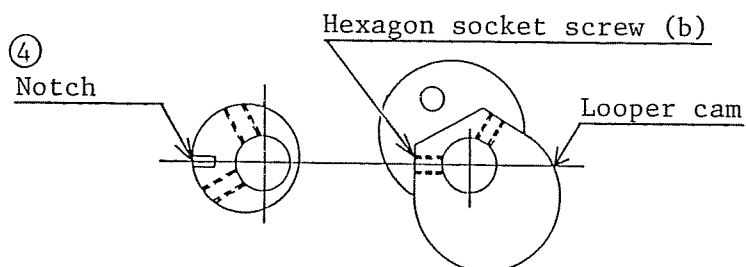
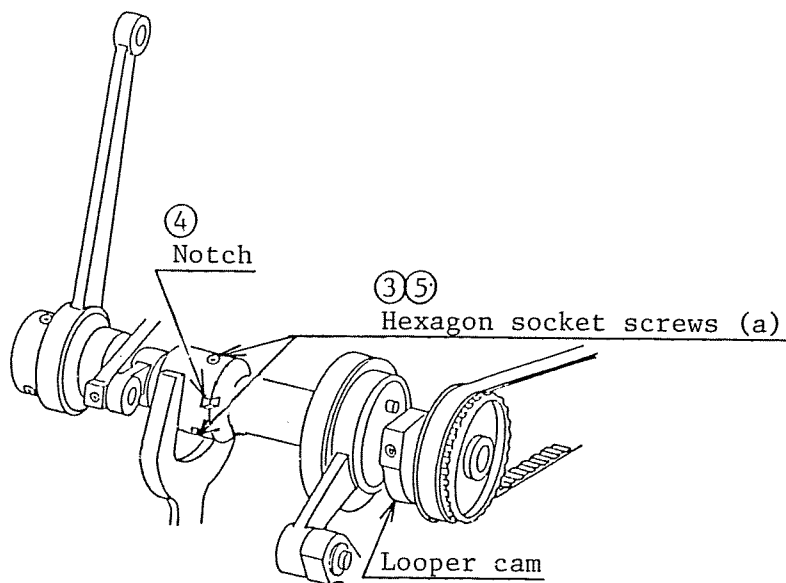
### CORRECT SETTING

When the feed dog starts to move forward, the point of needle in upward stroke is the same level as the upper surface of the finger (a) of the presser foot.

When the feed dog stops to move, the point of needle in downward stroke is the same level as the upper surface of the finger (a) of the presser foot.

### TO ADJSUT

1. Turn the machine to the back.
2. Remove the base. (Refer to the page 1.)
3. Loosen the two hexagon socket screws (a).
4. Turn the feed cam to set the notch in line with the hexagon socket screw (b) as illustrated below.
5. Tighten the two hexagon socket screws (a).
6. Attach the base.





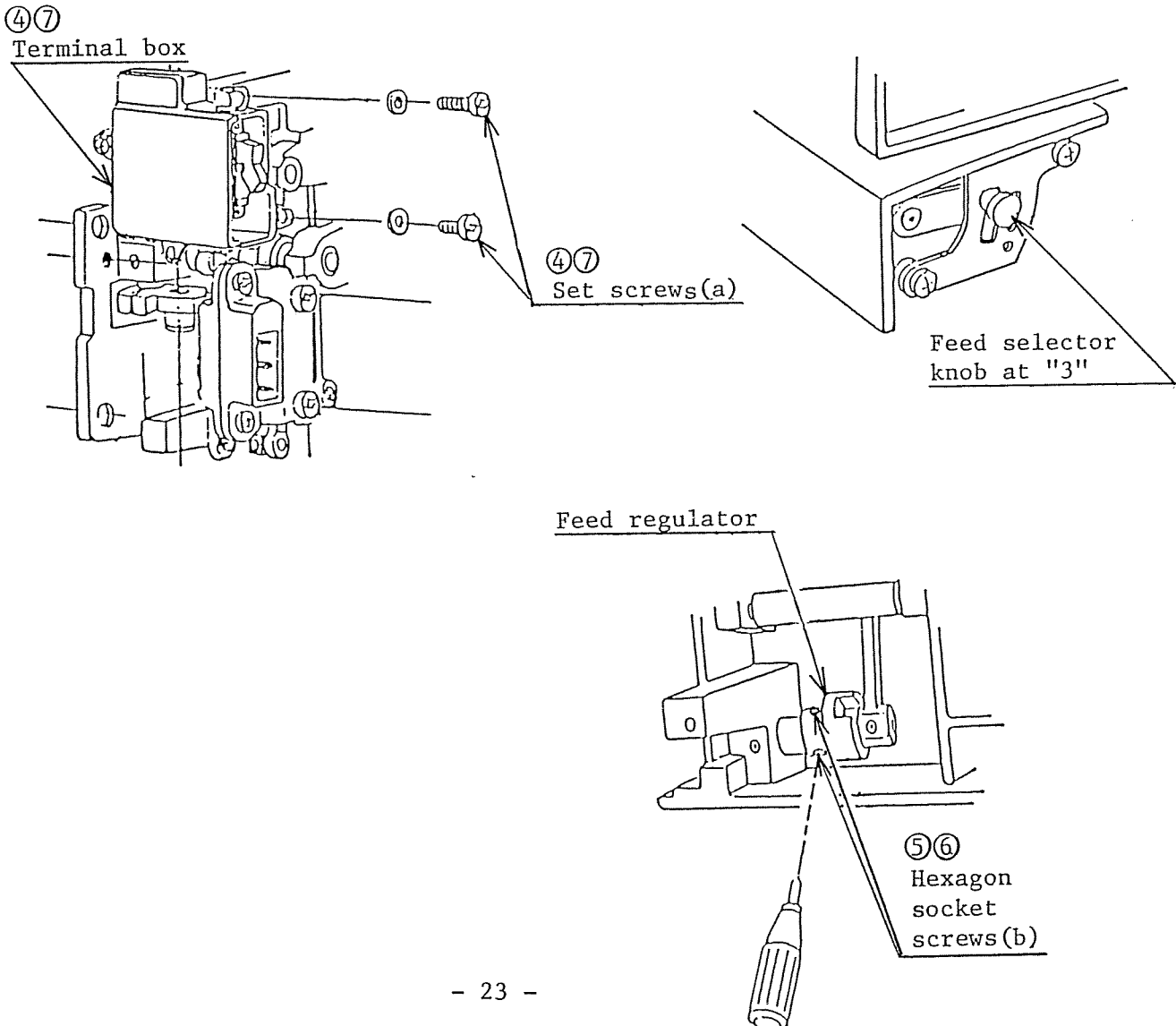
## TO ADJUST THE STITCH LENGTH

### CORRECT SETTING

When the feed regulator knob is set at "3", the stitch length should be 2.6 to 2.9 mm.

### TO ADJUST

1. Turn the machine to the back.
2. Remove the base. (Refer to the page 1.)
3. Set the feed regulator knob at "3".
4. Remove the two set screws (a), and pull out the terminal box.
5. Loosen the hexagon socket screw (b), and turn the feed regulator to:  
down to shorten the stitch length.  
up to lengthen the stitch length.
6. Tighten the hexagon socket screw (b).
7. Attach the terminal box and fix it with the two set screws (a).
8. Attach the base.



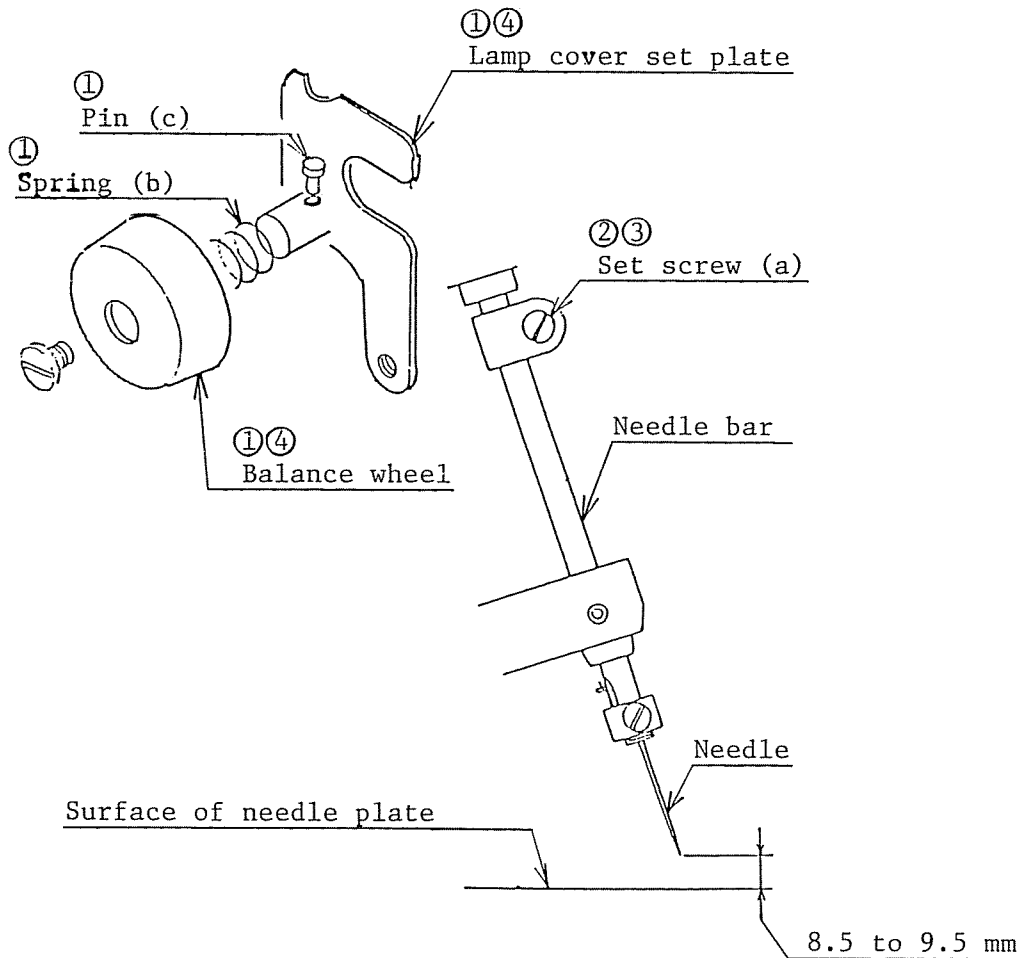
## TO ADJUST THE NEEDLE BAR HEIGHT

### CORRECT SETTING

The distance between the surface of needle plate and the point of needle should be 8.35 to 8.85 mm when the needle bar is at the highest position of its travel.

### TO ADJUST

1. Remove the lamp cover, top cover and lamp cover set plate.  
Be careful not to loose the spring (b) and pin (c).
2. Loosen the set screw (a), and adjust the needle bar height.  
Make sure not to turn the needle bar.
3. Tighten the set screw (a) firmly.
4. Attach the lamp cover set plate, lamp cover and top cover.



## TO ADJUST THE LOOPER TIMING

### CORRECT SETTING

When the looper comes to the leftmost position from the right, the point of the looper must be in line with the center of the needle as illustrated below.

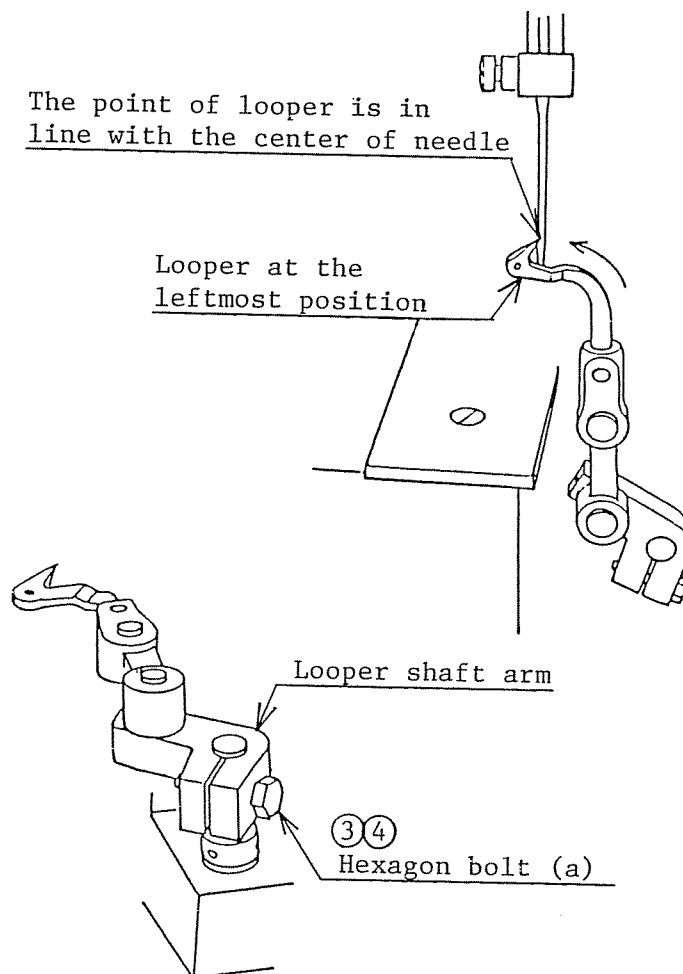
### TO ADJUST

1. Turn the machine to the back.
2. Remove the base. (Refer to the page 1.)
3. Loosen the hexagon bolt (a), and adjust.
4. Tighten the hexagon bolt.

Do not tighten the hexagon bolt too much, otherwise the looper shaft arm will be cracked.

After tightening the bolt, recheck the looper timing. And also check the clearance between the needle and the looper. (Refer to the page 26.)

5. Attach the base.



## TO ADJUST THE CLEARANCE BETWEEN NEEDLE AND LOOPER

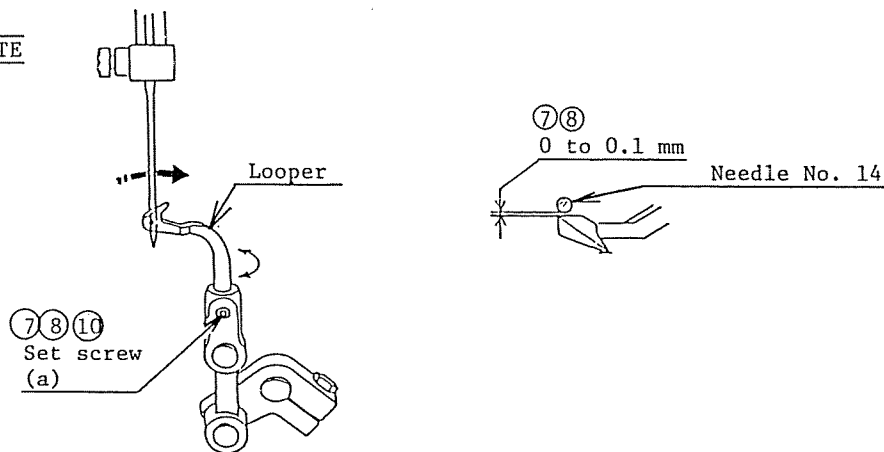
### CORRECT SETTING

When the looper picks up the loop of thread from the needle, the clearance between the needle and the point of looper should be 0 to 0.1 mm.

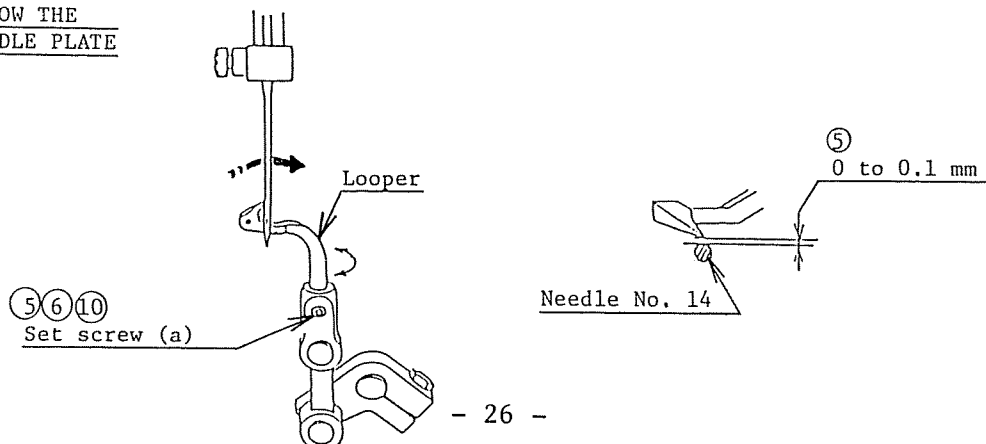
### TO ADJUST

1. Replace the needle with new one (size 14/90).
2. Remove the presser foot and needle plate.
3. Open the chip guard.
4. Turn the balance wheel away from you and bring the point of looper from the left to the center of needle.
5. Loosen the hexagon socket screw (a), and adjust the clearance between the looper and needle.
6. Tighten the hexagon socket screw (a) temporary.
7. Turn the balance wheel away from you to bring the looper to the left-most position. Then turn the balance wheel away from you until the eye of looper lines up with the center of needle. In this condition, the clearance between the needle and looper should be 0 to 0.1 mm.
8. To adjust, follow the above para. 5.
9. Recheck the clearance between the needle and looper when the looper picks up the needle thread.
10. Tighten the hexagon socket screw (a) firmly.
11. Attach the presser foot and needle plate.
12. Close the chip guard.

### ABOVE THE NEEDLE PLATE



### BELOW THE NEEDLE PLATE



## TO ADJUST THE THREAD TENSIONS

### CORRECT SETTING

When the tension dial is set at "3" with a cotton thread size 50 without threading through the check spring, the tension should be:

- 60 - 80 g for the needle thread.
- 15 - 25 g for the looper thread.

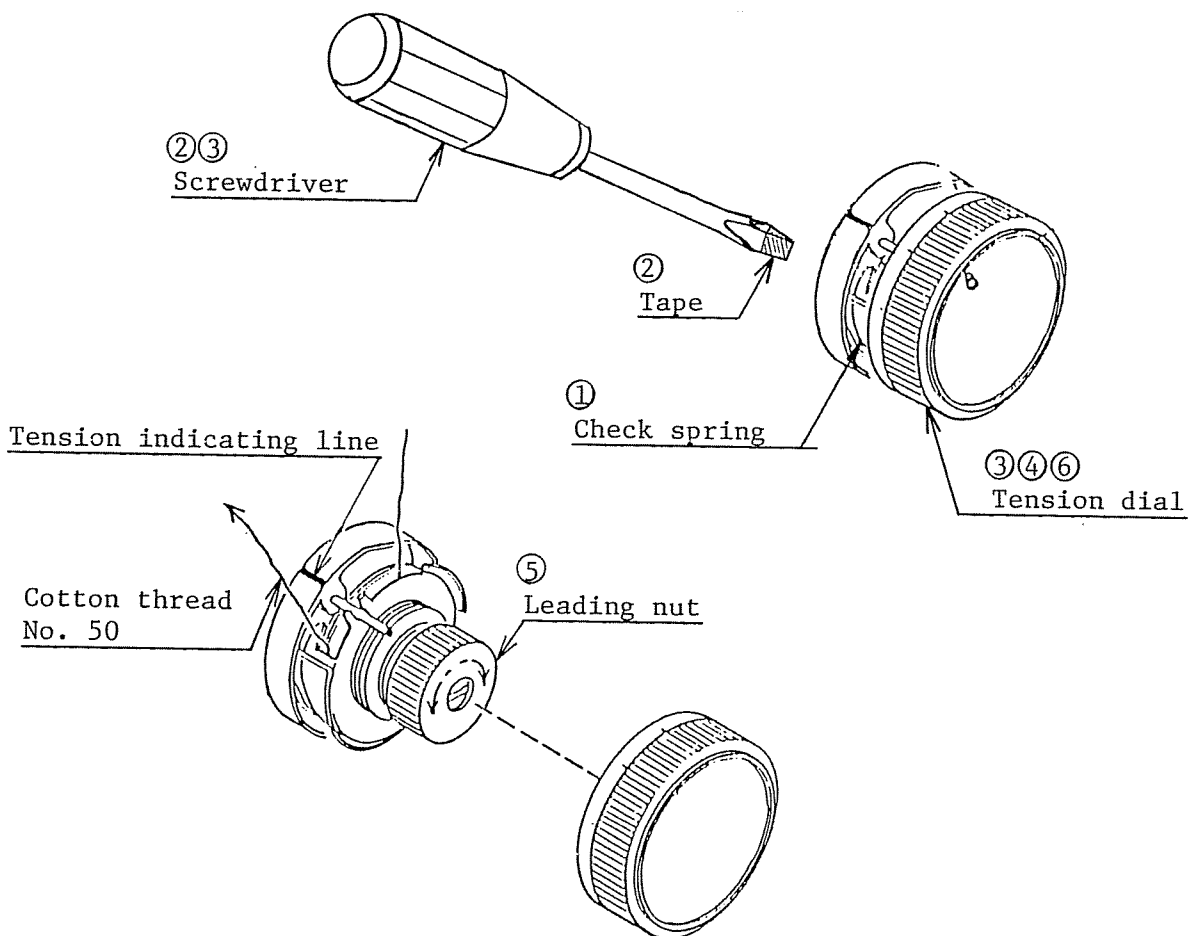
### TO ADJUST

1. Set the tension dial at "8".
2. Tape the tip of a screwdriver to prevent making a scar on the tension discs.
3. Insert the screwdriver between the tension discs at the top left, then pull the handle of screwdriver toward you gently to push out the tension dial.
4. Remove the tension dial.
5. Adjust the tension.

To tighten, turn the leading nut to clockwise.

To loosen, turn the leading nut to counter-clockwise.

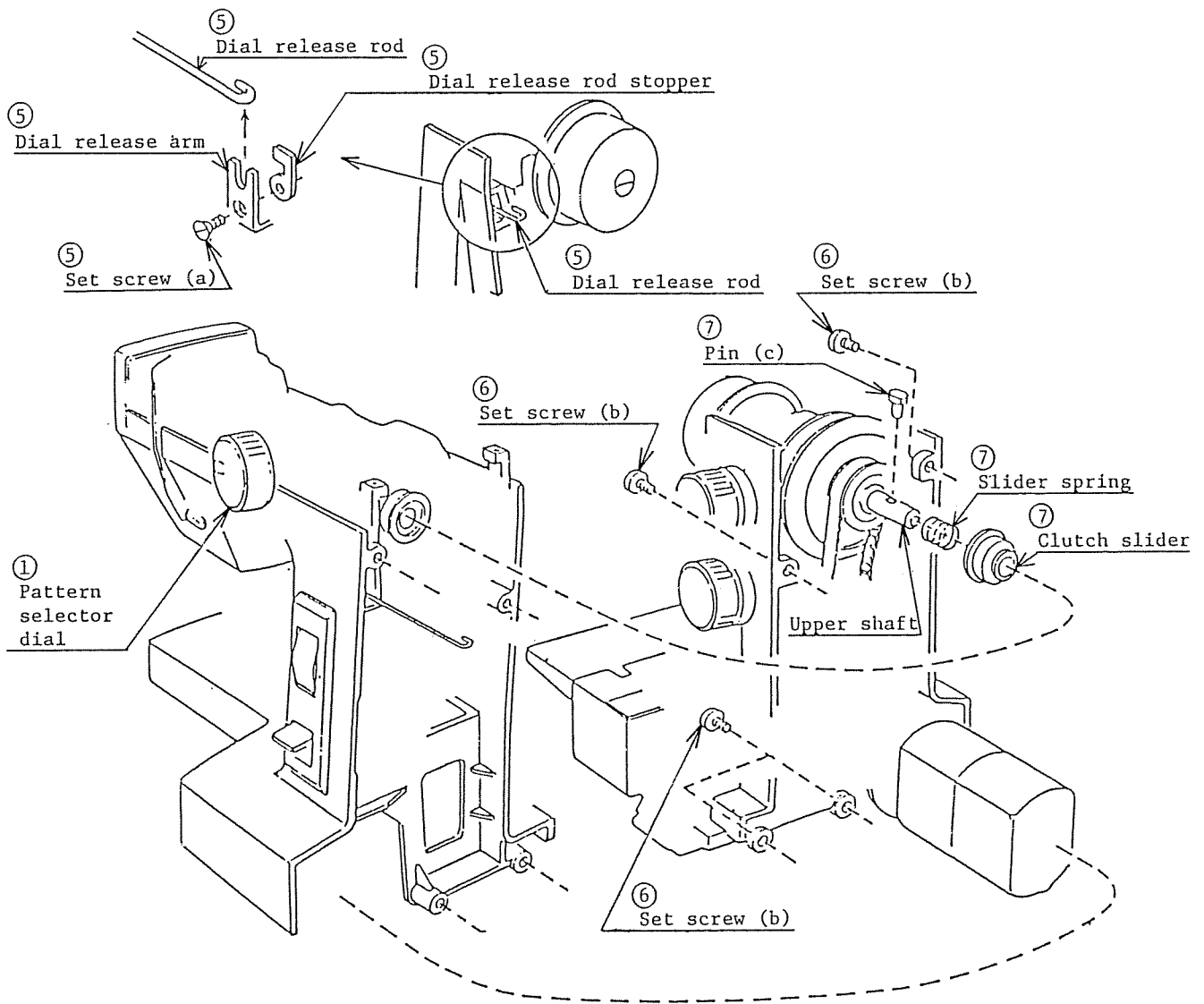
6. Set the tension dial.



## DETACHING THE OVERLOCK ARM UNIT

1. Set the pattern selector dial for zigzag/straight.
2. Remove the top cover, lamp cover, base and slide cover. (Refer to the page 1.)
3. Remove the bobbin winder unit.
4. Open the terminal box, and pull out the cord connectors connected from the lamp socket (straight/zigzag side) and micro switch. (Refer to the page 30.)
5. Loosen the set screw (a), and turn the dial release rod stopper to the right. Then pull out the dial release rod from the dial release arm.
6. Remove the four set screws (b).
7. Pull the overlock arm unit to the right carefully.

Be careful not to loose the pin (c), slider spring (d) and clutch slider (e).



## ATTACHING THE OVERLOCK ARM UNIT

1. Set the pattern selector dial for straight/zigzag.
2. Insert the pin (c) into the hole on upper shaft so that the flat side paralleled with the upper shaft.
3. Insert the slider spring (d) into the upper shaft.
4. Insert the clutch slider into the upper shaft so that the groove of inside diameter comes at the top.
5. Pass the dial release rod through the hole of overlock arm unit. Then attach the overlock arm unit to straight/zigzag side of the machine.
6. Tighten the four set screws (b).
7. Connect the cords of lamp socket (straight/zigzag) and micro switch to the terminals on the printed wiring board. (Refer to the page 30.)
8. Connect the dial release rod to the dial release arm.
9. Attach the bobbin winder unit.
10. Attach the top cover, lamp cover, side cover and base.

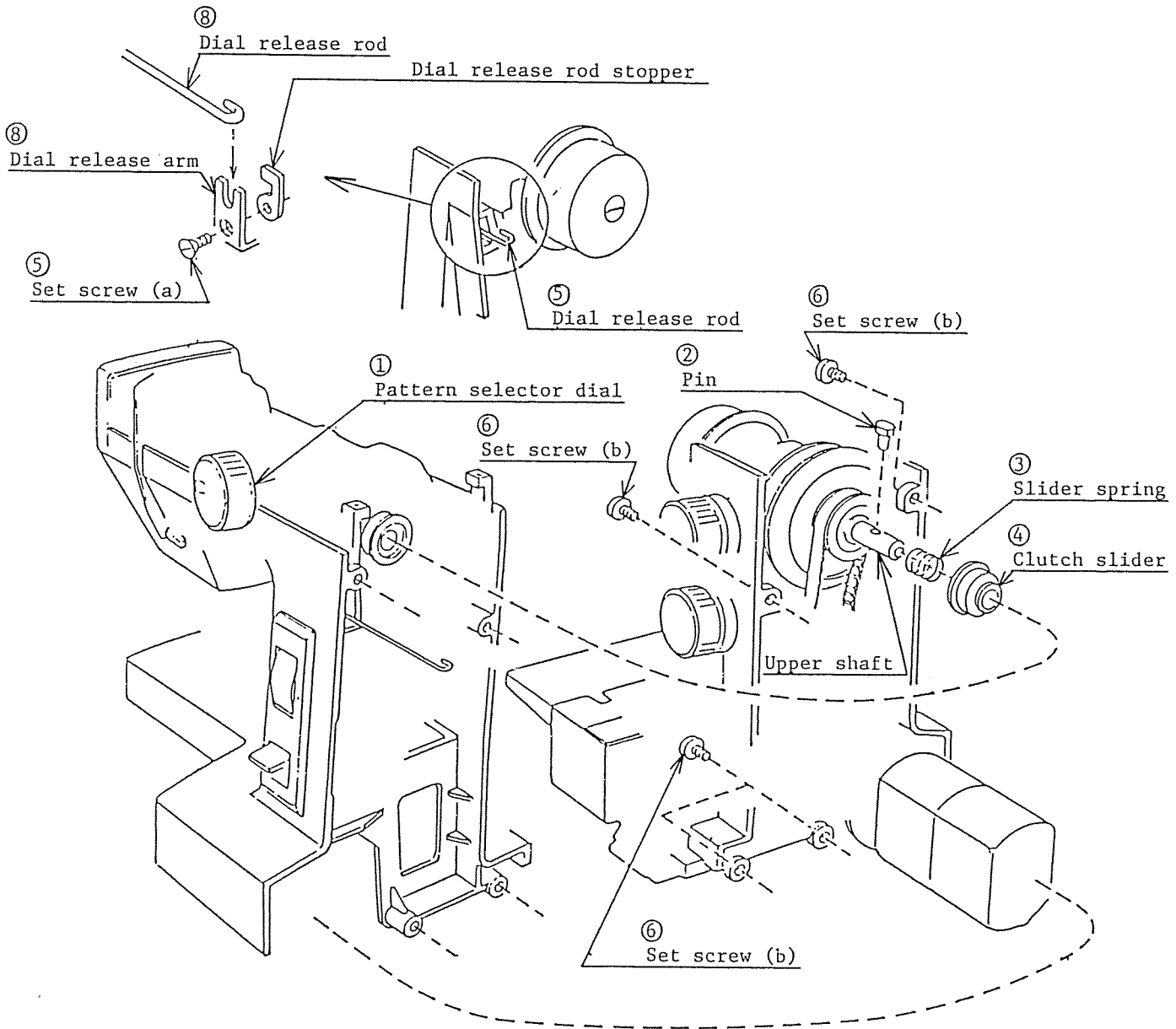


DIAGRAM OF THE CORD CONNECTORS

