

SERVICING MANUAL

ML3023

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Face plate (unit)

To remove:

- (1) Remove the two set screws (A), and detach the face plate (unit).

To attach:

- (2) Temporarily tighten the two set screws (A) to set the face plate (unit).
- (3) Close the face plate, level it with the arm, thread tension dial (unit) and top cover, and then completely tighten the two set screws (A).

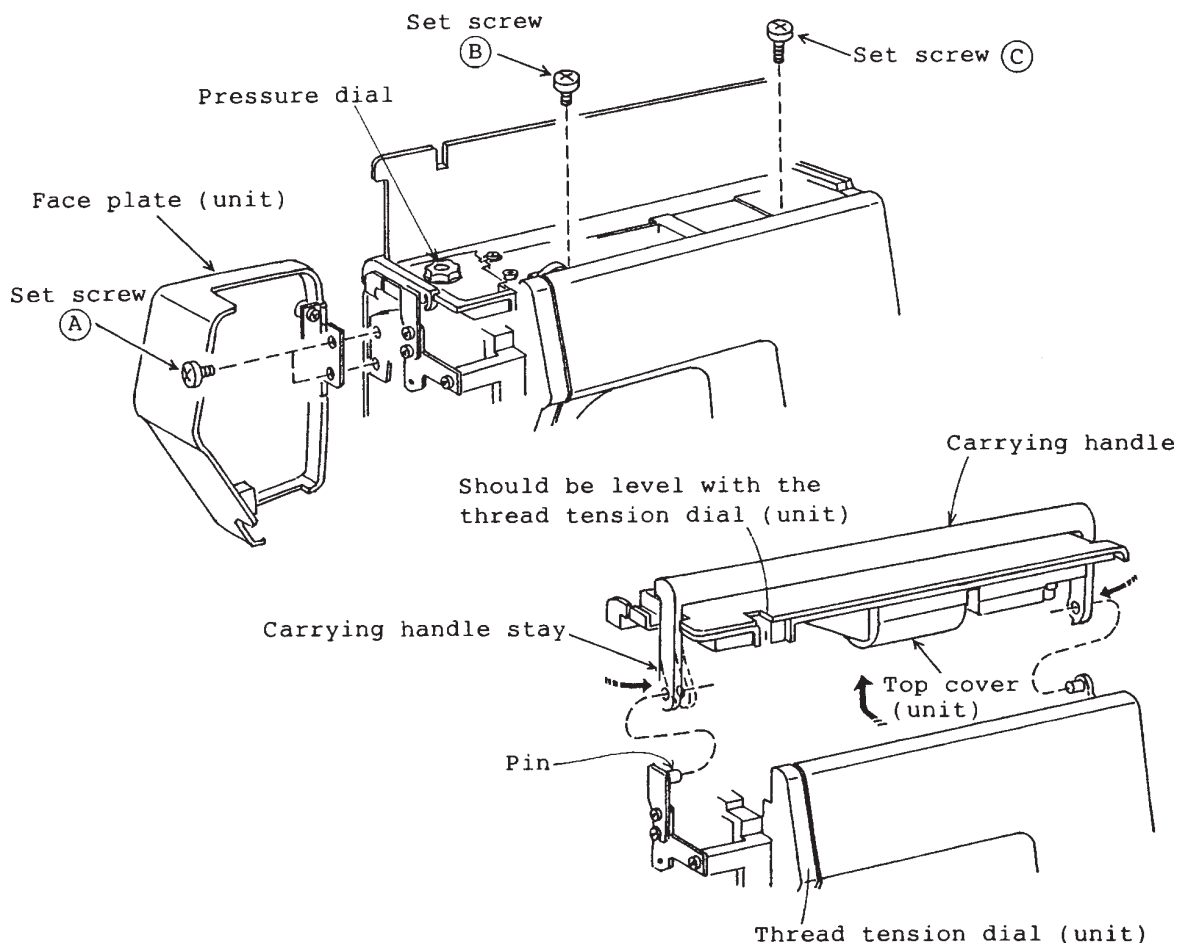
Top cover (unit)

To remove:

- (1) Loosen and remove the two set screws (B) and (C).
- (2) Raise the carrying handle, lift the top cover (unit), and separate the carrying handle stays from each pin by pushing them from both sides.
- (3) Detach the top cover (unit) together with the carrying handle.

To attach:

- (4) Put the top cover (unit) and carrying handle together, and fit the carrying handle stays to each pin while pushing them from both sides.
- (5) Attach the top cover (unit) with the two set screws (B) and (C).
(There should be no interference with the pressure dial and the clearance between the front panel and top cover should be uniform.)



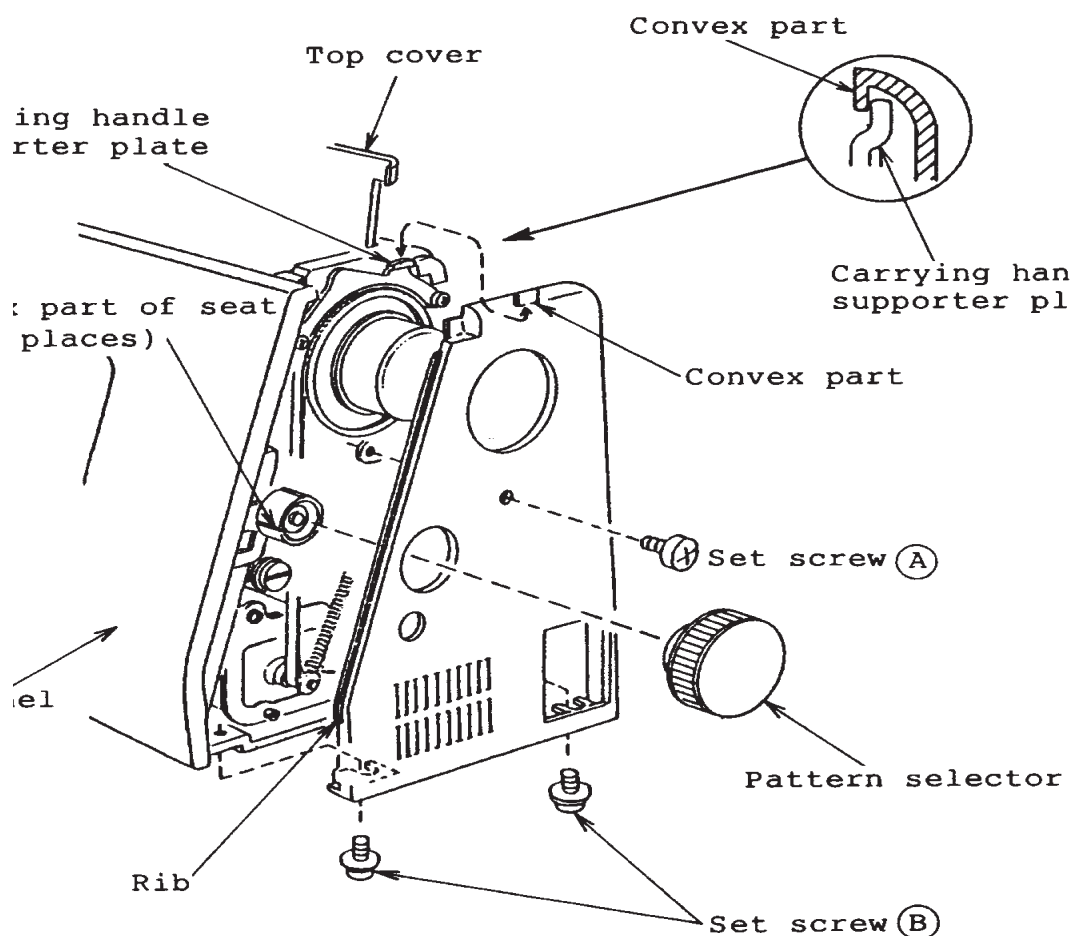
Belt cover

To remove:

- (1) Pull out the pattern selector dial.
- (2) Remove the set screw (A) and loosen the set screws (B).
- (3) Open the top cover and separate the rib of the belt cover from the front panel. After that, pull up the belt cover to disengage its convex part from the carrying handle supporter plate and detach the belt cover.

To attach:

- (4) Engage the convex part of the belt cover with the carrying handle supporter plate, fit the rib to the front panel, and tighten the set screws (A) and (B).
- (5) Fit the pattern selector dial to the seat.
(Match the three convex parts of the seat with the three concave parts of the dial.)
(The clearance around the balance wheel should be uniform.)



Base

To remove:

- (1) Loosen and remove the three set screws (A), (B), (C) and then two set screws (D).
- (2) Detach the base while tilting it.

To attach:

- (3) Insert the base while tilting it, and tighten the two set screws (D) and then three set screws (A), (B) and (C).

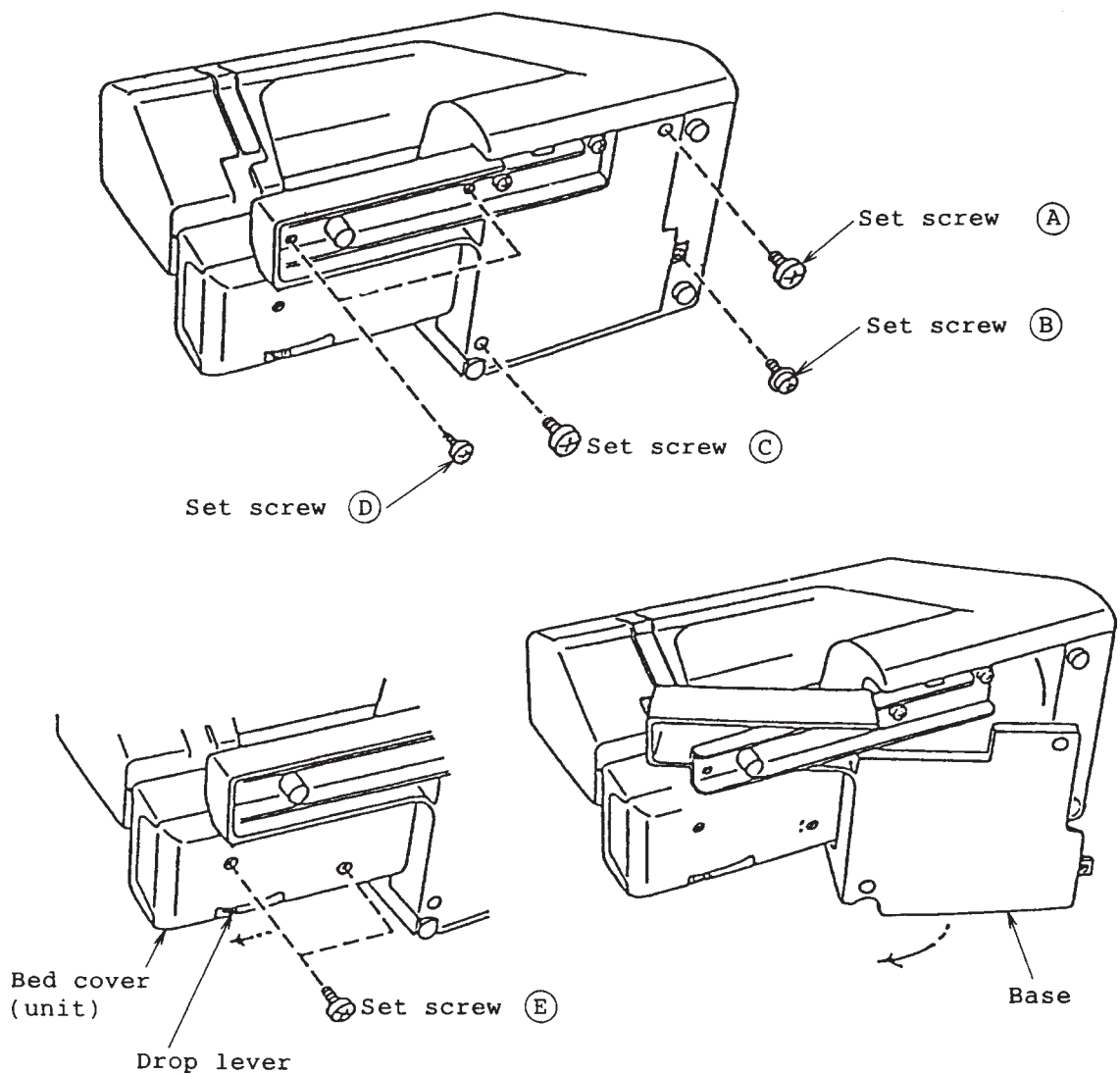
Bed cover (unit)

To remove:

- (1) Loosen and remove the two set screws (E).

To attach:

- (2) Move the drop lever to the left and tighten the two set screws (E).
(Turn the balance wheel and confirm that the feed dog moves up and down.)



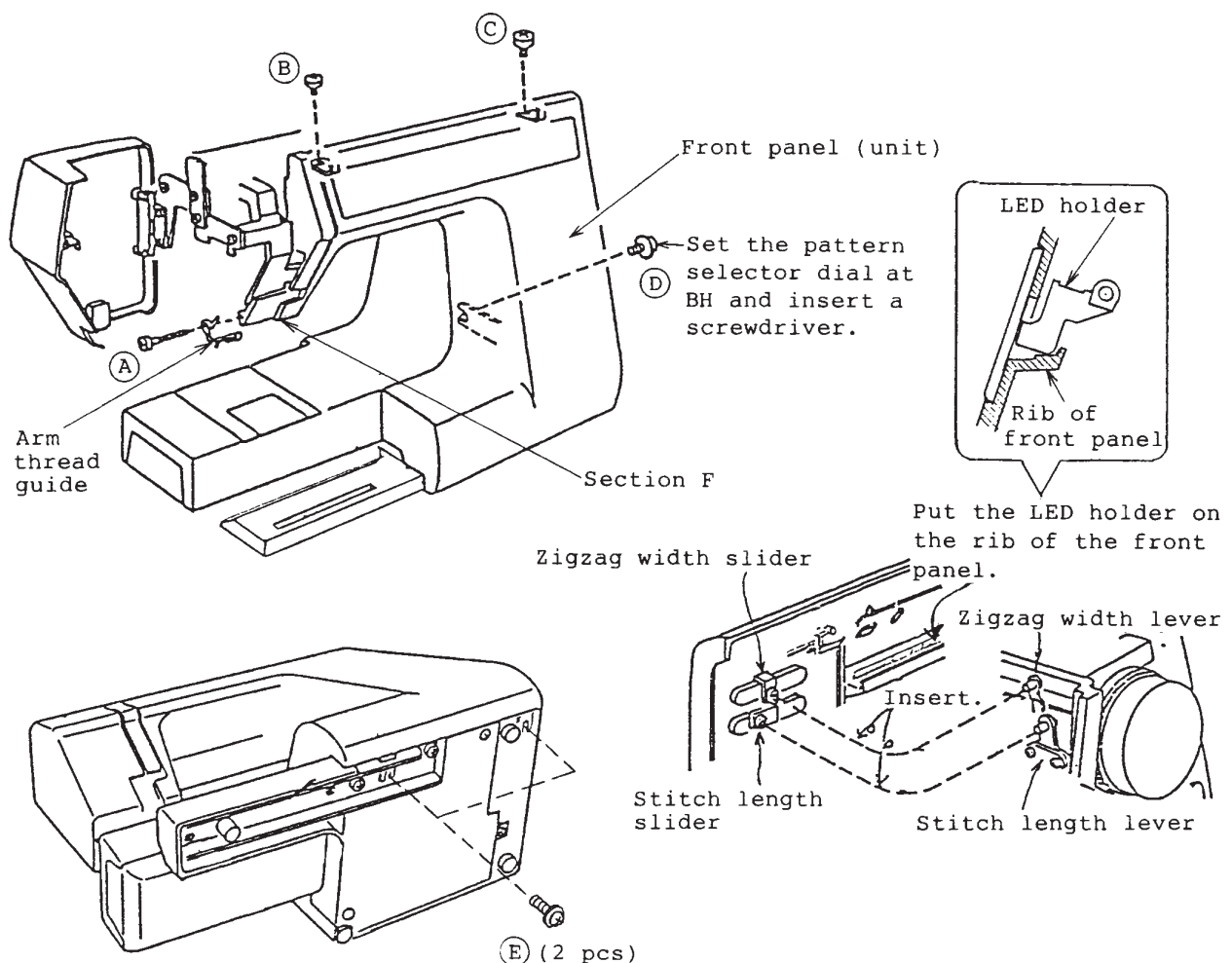
Front panel (unit)

To remove:

- (1) Detach the top cover (unit) and belt cover.
- (2) Turn the pattern selector dial toward you to select BH.
- (3) Remove the set screws (A) and (B), and loosen the set screws (C), (D) and (E).
- (4) While holding the right side of the front panel and lightly pushing down section F, draw the front panel (unit) toward you for removal.

To attach:

- (5) While holding the right side of the front panel and lightly pushing down section F, fit the front panel to the lower side of the thread tension dial (unit).
- (6) While inserting the pin of the zigzag width lever into the hole in the zigzag width slider and the pin of the stitch length lever into the hole in the stitch length lever, put the LED holder on the rib of the front panel to set it to the arm.
- (7) Tighten the set screws (A) to (E) to fasten the front panel. (Fasten the arm thread guide together with the front panel with the setscrew (A)).
- (8) Attach the top cover (unit) and belt cover.



CORRECTION OF STAGGERED STRAIGHT STITCH

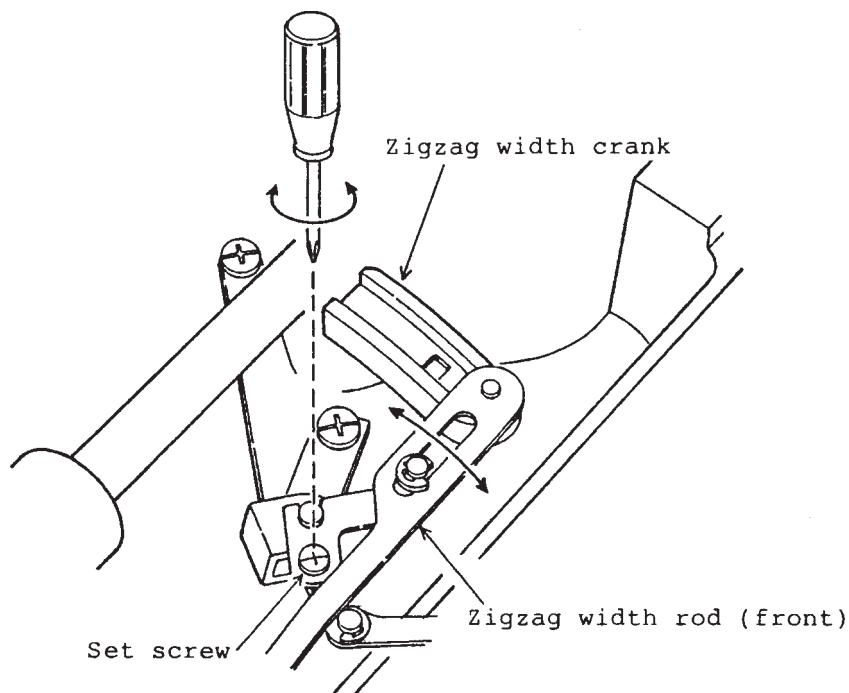
If the needle bar moves laterally when the balance wheel is turned toward you with the pattern selector dial set at “Z” and the zigzag width adjusted to “0” then make adjustment in the following procedure:

- (1) Remove the top cover (unit), set the pattern selector dial at “Z” and adjust the zigzag width to “0”.
- (2) Loosen the set screw.
- (3) While turning the balance wheel, move the zigzag width rod (front) until the needle bar ceases to move laterally. (Pull the zigzag width rod (front) toward you and lightly press it against the zigzag width crank.)
- (4) Completely tighten the set screw, and attach the top cover (unit).

(Note)

For removal and attachment of the top cover (unit), refer to page 2.

It is unnecessary to correct the staggered straight stitch for the straight stitch pattern because an exclusive cam is used.



ADJUSTMENT OF TIMING OF LATERAL NEEDLE SWING

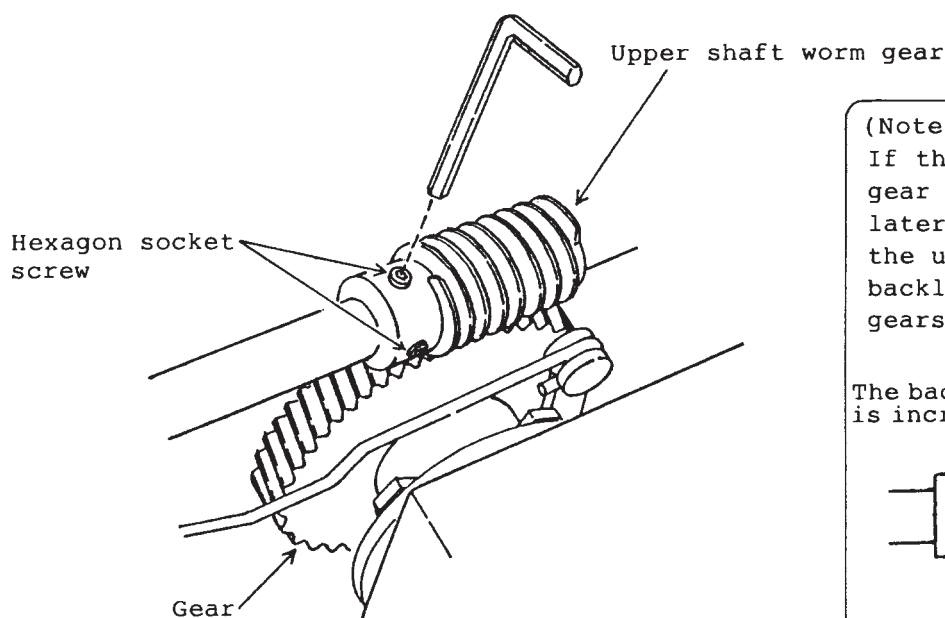
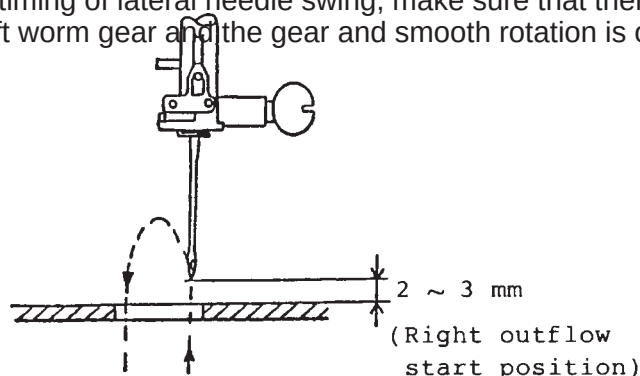
If the needle bar moves sidewise while the needle is in the fabric in zigzag stitching, then make adjustment in the procedure given below. The needle should start swinging from a position 2 to 3 mm above the top surface of the needle plate.

- (1) Remove the top cover (unit), set the pattern selector dial at "Z" and select the maximum zigzag width.
- (2) Loosen the two hexagon socket screws of the upper shaft worm gear.
- (3) While holding the upper shaft worm gear in place, carefully turn the balance wheel to make adjustment so that lateral needle swing starts from a position 2 to 3 mm above the top surface of the needle plate in right outflow.
- (4) Tighten the two hexagon socket screws of the upper shaft worm gear.
- (5) Attach the top cover (unit).

(Note)

For removal and attachment of the top cover (unit), refer to page 2.

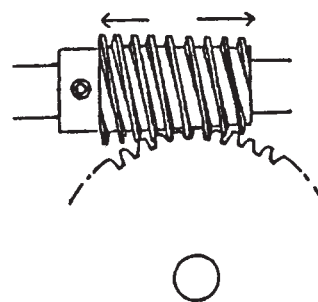
After adjustment of the timing of lateral needle swing, make sure that there is no backlash between the upper shaft worm gear and the gear and smooth rotation is obtained.



(Note)

If the upper shaft worm gear is deviated laterally upon turning the upper shaft, the backlash between the gears will change.

The backlash is increased. The backlash is decreased.



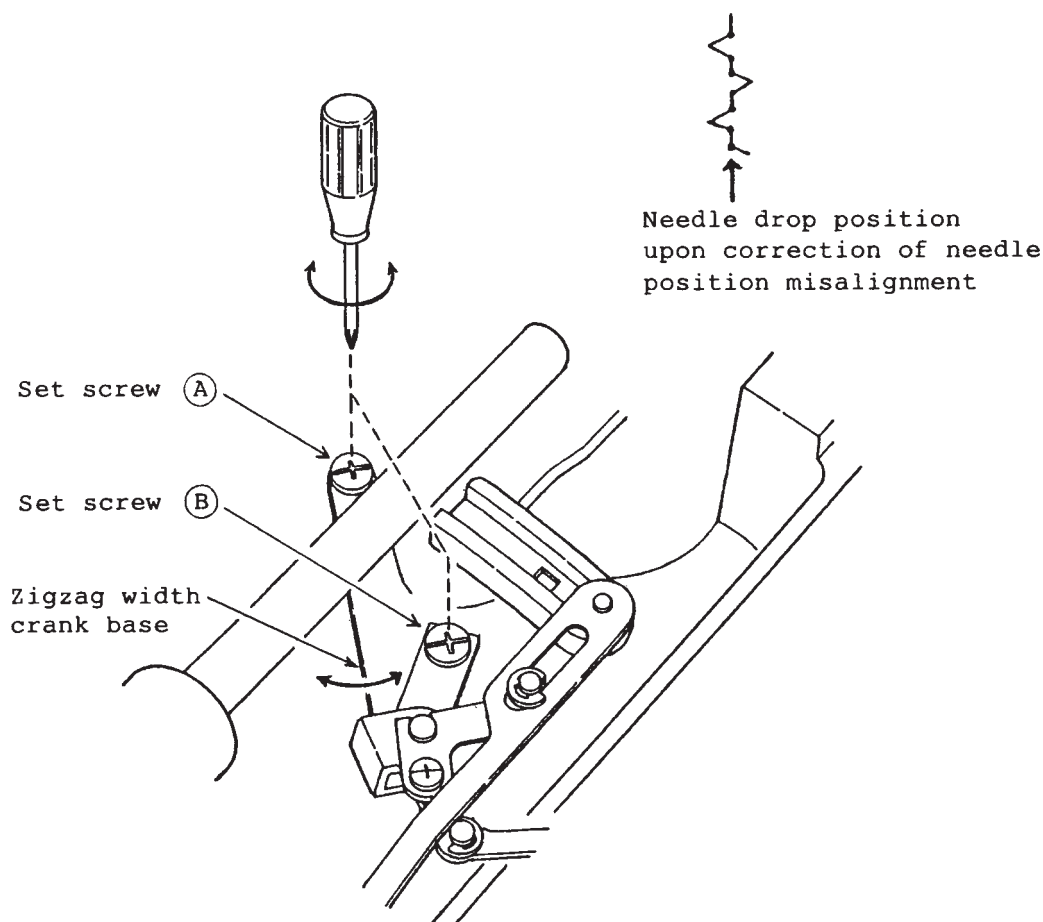
CORRECTION OF NEEDLE POSITION MISALIGNMENT

Make adjustment in the procedure given below if the needle bar moves laterally upon change of the zigzag width between "0" and "6.5" (maximum width) with the needle brought to the center after the pattern selector dial is set at "Z" and the maximum zigzag width is selected. (After the adjustment, check if the straight stitch "M" position is deviated in reference to the right and left needle drop positions at the maximum zigzag width.)

- (1) Remove the top cover (unit) and set the pattern selector dial at "Z" and select the maximum zigzag width.
- (2) Manually turn the balance wheel until the needle is brought to the center of the needle plate hole.
- (3) Loosen the set screws (A) and (B). The set screw (A) should be tightened temporarily after loosening.
- (4) Move the zigzag width crank base until the needle bar ceases to move laterally when the zigzag width is changed between "0" and "6.5" (maximum width) and completely tighten the set screws (A) and (B).
- (5) Attach the top cover (unit).

(Note)

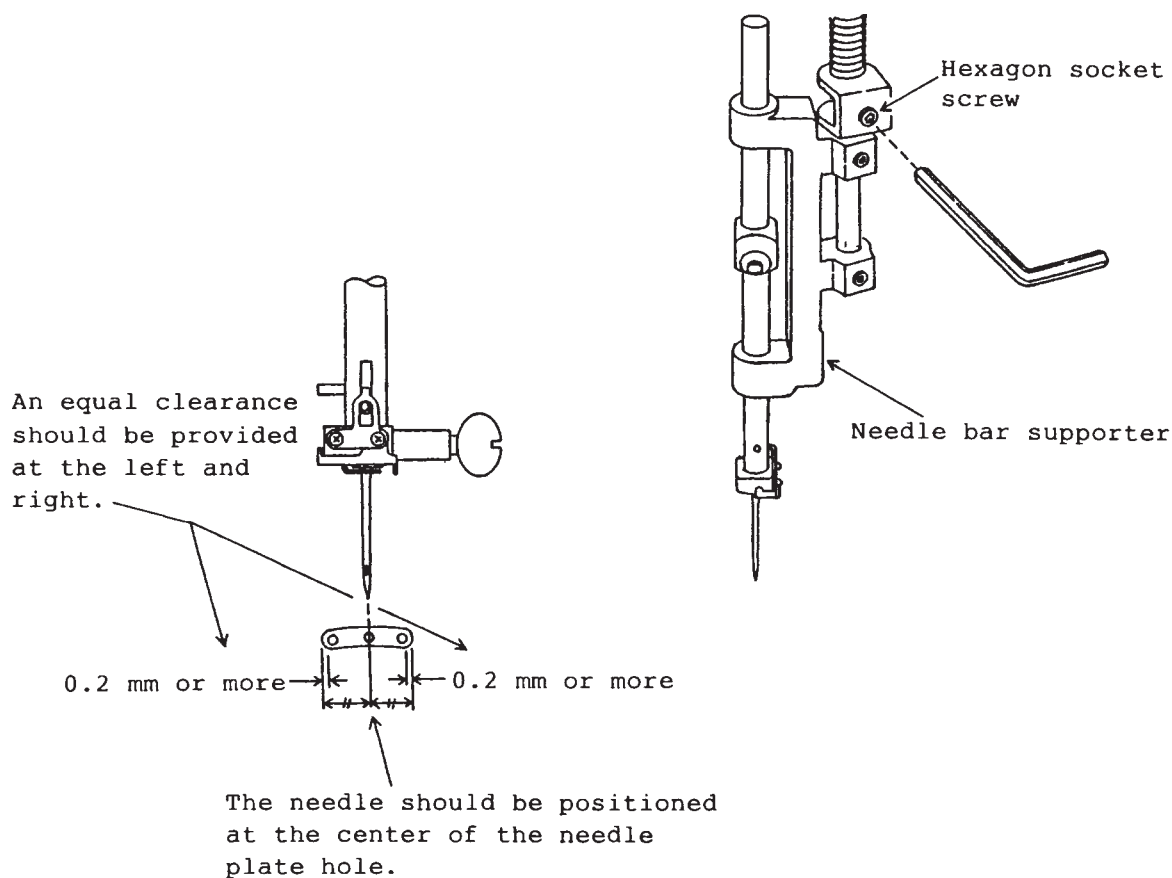
For removal and attachment of the top cover (unit), refer to page 2.



ADJUSTMENT OF NEEDLE DROP POSITION IN NEEDLE PLATE HOLE

When the pattern selector dial is set at “|” (straight stitch), the needle should be positioned at the center of the needle plate hole. When the pattern selector dial is set at “Z” and the maximum zigzag width is selected, the clearance between the needle and the edge of needle plate holder should be equal and 0.2 mm or more at the left and right needle drop positions.

- (1) Set the pattern selector dial at “|” (straight stitch).
- (2) Open the face plate, and loosen the hexagon socket screw.
- (3) Move the needle bar supporter to position the needle at the center of the needle plate hole.
- (4) Tighten the hexagon socket screw.
- (5) Set the pattern selector dial at “Z” and select the maximum zigzag width.
- (6) Turn the balance wheel and make sure that there is an equal clearance between the needle and the edge of needle plate hole at the left and right needle drop positions.



ADJUSTMENT OF ZIGZAG STOPPER

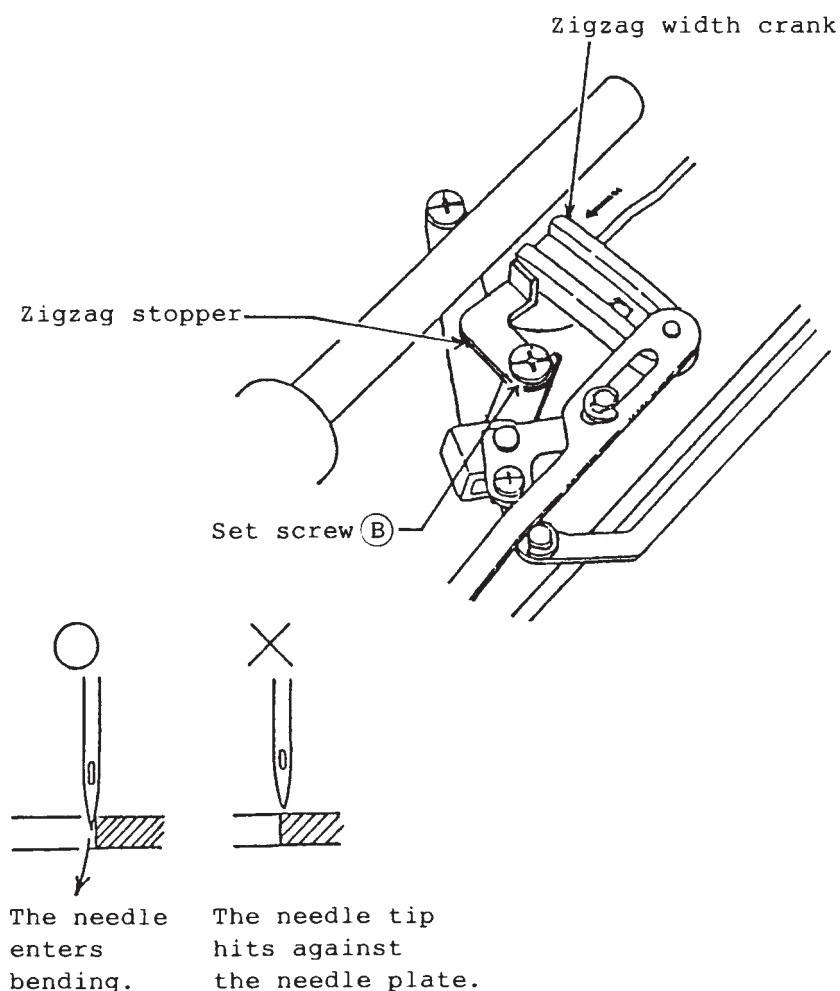
If the needle tip interferes with the needle plate when the needle swings to the right at the maximum zigzag width, then make adjustment in the following procedure.

(When the needle drop position in the needle plate hole is deviated toward the right on the whole, refer to "ADJUSTMENT OF NEEDLE DROP POSITION IN NEEDLE PLATE HOLE"

- (1) Remove the top cover (unit), set the pattern selector dial at "Z" and select the maximum zigzag width.
- (2) Turn the balance wheel until the needle tip is located above the top surface of the needle plate (in descending travel) at the right needle position.
- (3) Slightly loosen the set screw (B), lightly press the stopper against the zigzag width crank, and then temporarily tighten the set screw.
- (4) Push the zigzag width crank in the direction of arrow and turn the balance wheel to make sure that the needle tip into contact with the needle plate, and then completely tighten the set screw (B).
- (5) Run the sewing machine and make sure that there is no sound made by interference between the zigzag width crank and the zigzag stopper. After that, attach the top cover (unit).

(Note)

For removal and attachment of the top cover (unit), refer to page 2.



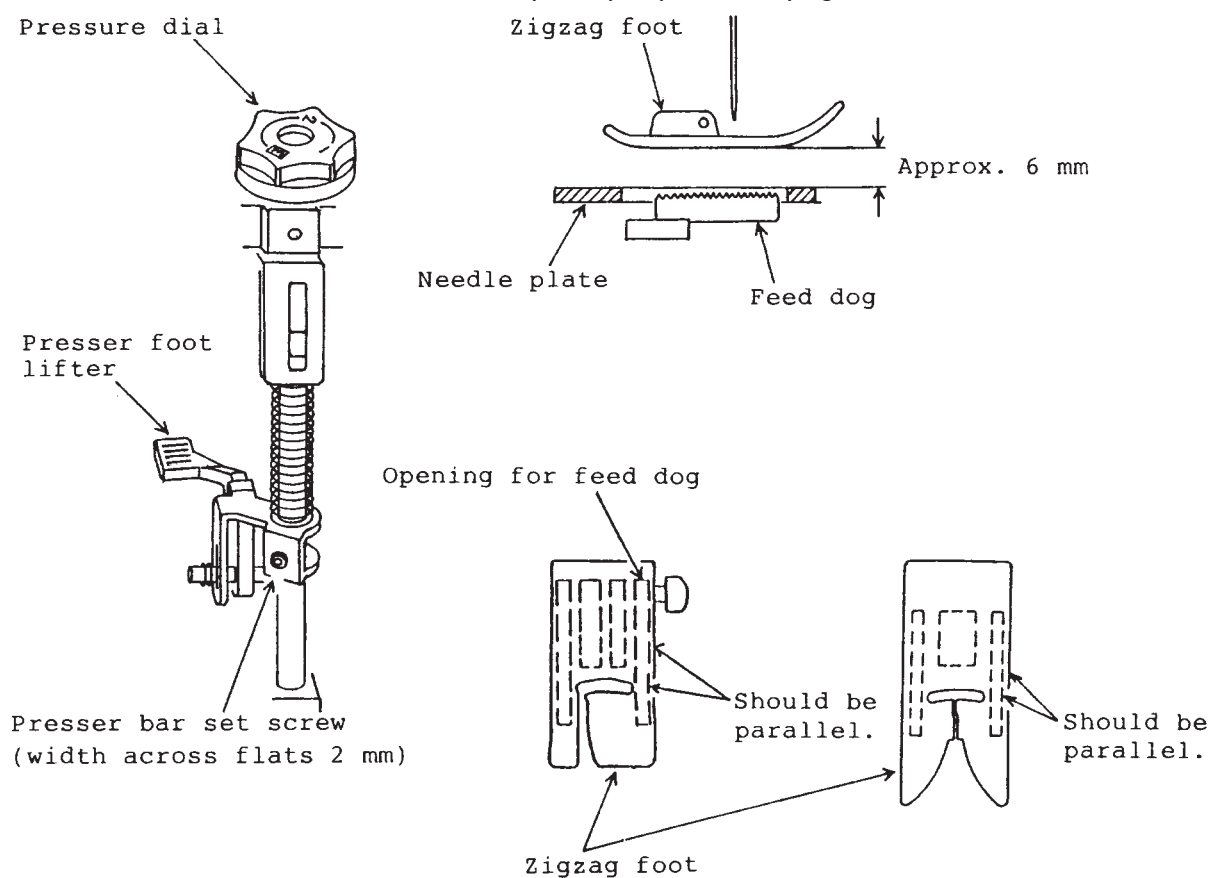
ADJUSTMENT OF PRESSER BAR DIRECTION AND HEIGHT

The side of the zigzag foot is parallel with the openings for the feed dog in the needle plate when the presser foot lifter is lowered. There should be a clearance of about 6 mm between the presser foot and the needle plate when the presser foot lifter is raised.

- (1) Remove the face plate (unit), and turn the balance wheel to lower the feed dog below the top surface of the needle plate.
- (2) Open the top cover, and set the pressure dial at "3".
- (3) Raise the presser foot lifter, loosen the set screw of the presser bar bracket, and adjust the distance between the bottom surface of presser foot and the top surface of needle plate to 6 mm.
- (4) Tighten the set screw of the presser bar bracket. Be sure that the presser foot is paralleled with the opening for the feed dog in the needle plate.
- (5) Attach the face plate (unit).

(Note)

For removal and attachment of the face plate (unit), refer to page 2.



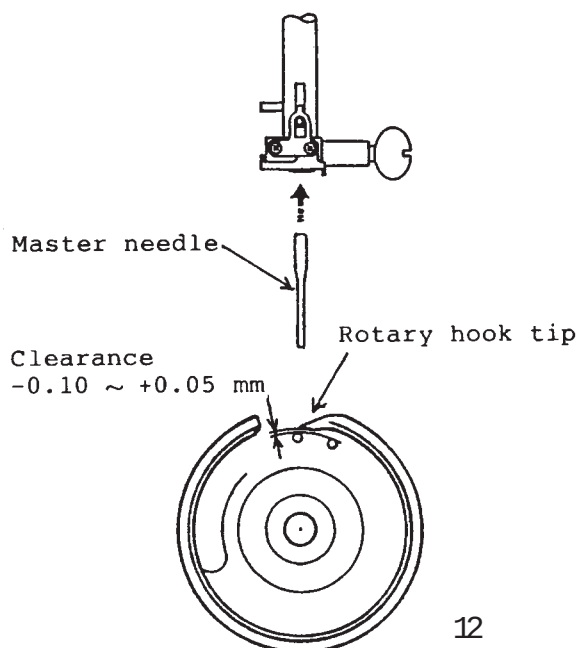
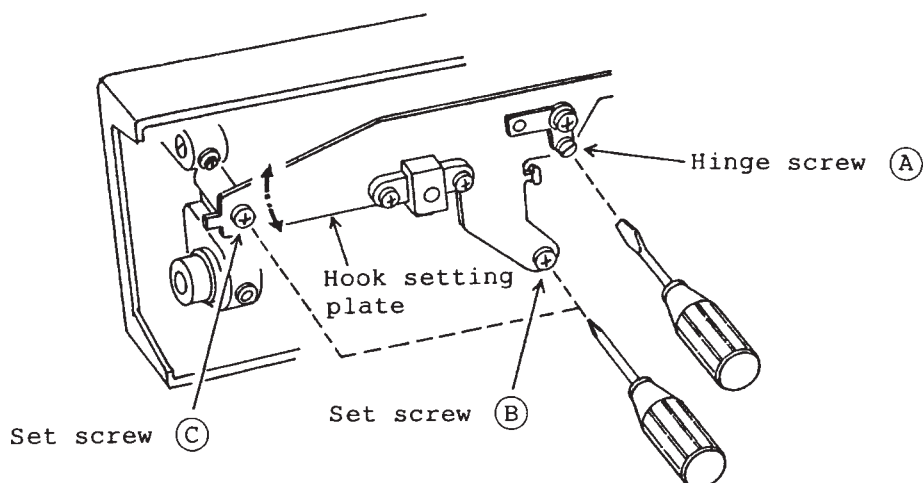
ADJUSTMENT OF CLEARANCE BETWEEN NEEDLE AND ROTARY HOOK

The clearance between the needle and the rotary hook tip should be -0.10 to +0.05 mm.

- (1) Remove the needle plate and bobbin holder, and then attach the master needle.
- (2) Set the pattern selector dial at "Z" and adjust the zigzag width to "0".
- (3) Remove the bed cover (unit).
- (4) Loosen and then temporarily tighten the hinge screw (A), and loosen the set screws (B) and (C).
- (5) Turn the balance wheel toward you to cross the master needle and the rotary hook tip, and adjust the clearance between them in a range of -0.10 to +0.05 mm by vertically moving the hook setting plate.
- (6) Turn the balance wheel toward you at the maximum zigzag width to check the clearance between the master needle and the rotary hook tip at the right and left needle drop positions.
- (7) Completely tighten the set screws (B) and (C) and hinge screw (A). Then remove the master needle.
- (8) Check the backlash between the hook drive shaft gear and the lower shaft gear. (For the adjustment procedure, refer to page 13.)
- (9) Attach the bed cover (unit), bobbin holder and needle plate.

(Note)

For removal and attachment of the bed cover (unit), refer to page 4.



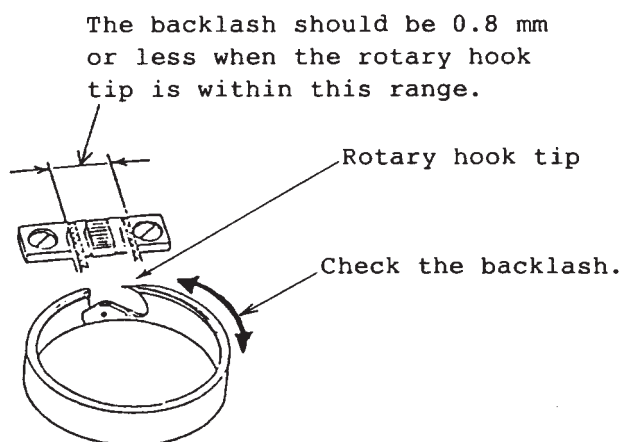
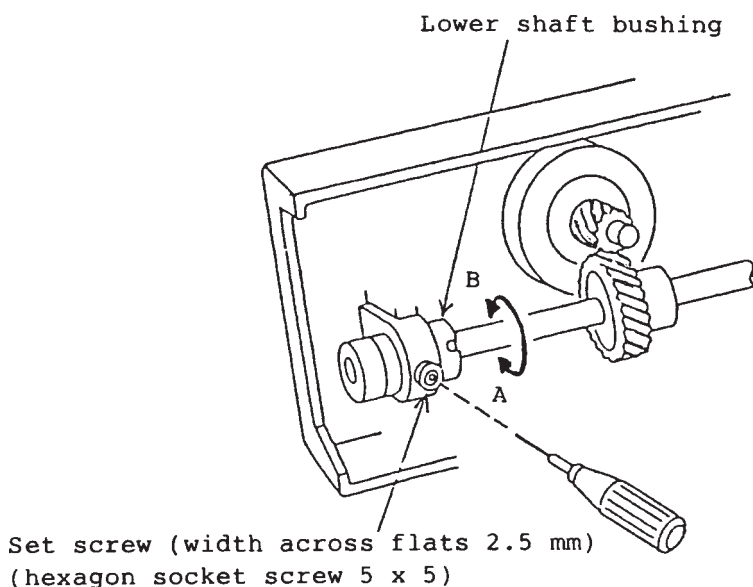
ADJUSTMENT OF BACKLASH BETWEEN HOOK DRIVE SHAFT AND LOWER SHAFT GEARS

Engagement of the gears should be smooth and the backlash should be 0.8 mm or less when the rotary hook tip is within the width of the feed dog. After adjustment of the clearance between the needle and the rotary hook, be sure to check and adjust the backlash.

- (1) Remove the bed cover (unit). (Refer to page 4.)
- (2) Loosen the set screw.
- (3) (A) If the backlash is too much, turn the lower shaft bushing in direction A.
- (B) If the backlash is not enough, turn the lower shaft bushing in direction B.
- (4) Tighten the set screw.
- (6) Attach the bed cover (unit). (Refer to page 4.)

(Note)

After adjustment of the backlash, be sure to check and adjust the hook timing and feed dog height.



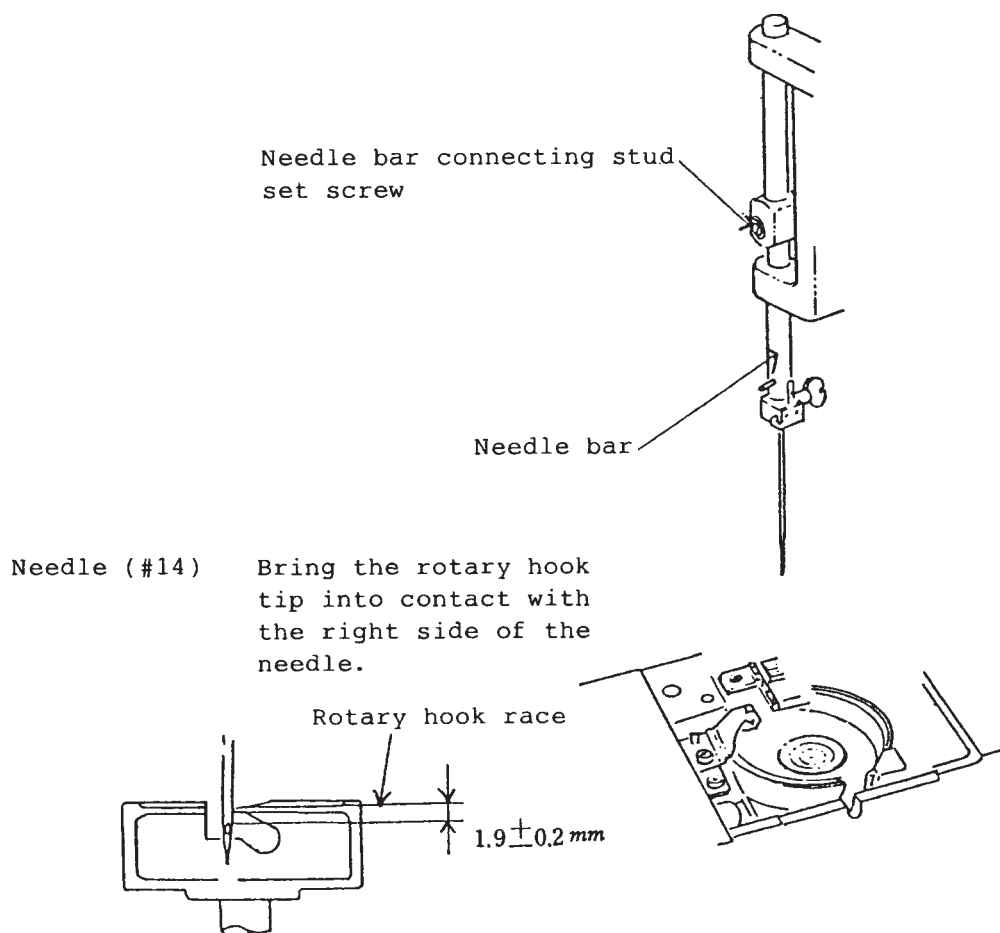
ADJUSTMENT OF NEEDLE BAR HEIGHT

When the tip of the rotary hook exactly meets the right side of the needle in ascending travel of the needle bar from its lowest position at the left needle drop position with the pattern selector dial set at “Z” and the maximum zigzag width selected, the distance between the upper edge of needle eye and the race of rotary hook should be 1.7 to 2.1 mm.

- (1) Set the pattern selector dial at “Z” and select the maximum zigzag width.
- (2) Remove the set screw of the needle plate, and detach the needle plate and bobbin holder.
- (3) Tilt the head backward, and open the face plate.
- (4) Turn the balance wheel toward you until the rotary hook tip exactly meets the right side of the needle at the left needle drop position.
- (5) Loosen the set screw of the needle bar connecting stud.
- (6) Move the needle bar to provide a distance of 1.7 to 2.1 mm between the upper edge of needle eye and the race of rotary hook.
- (7) Tighten the set screw of the needle bar connecting stud.
- (8) Attach the bobbin holder and needle plate.

(Note)

When moving the needle bar in step (6), take care not to turn the needle bar.

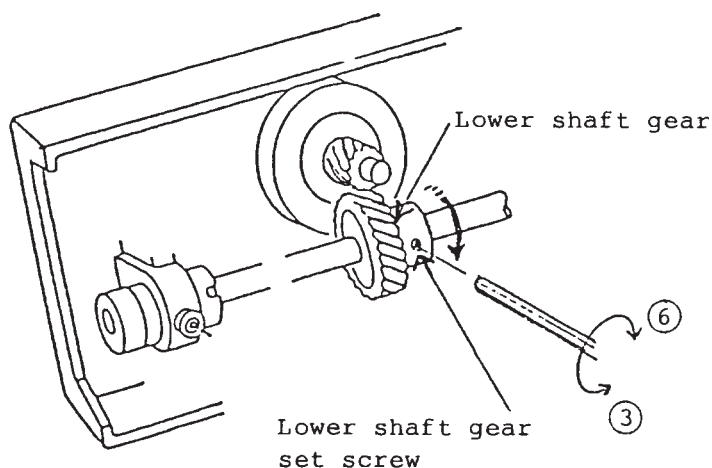


ADJUSTMENT OF HOOK TIMING

With the needle bar swung to the left at the maximum zigzag width, the amount of ascending travel of the needle bar from its lower position to the position where the tip of the rotary hook exactly meets the right side of the needle should be 3.15 to 3.45 mm.

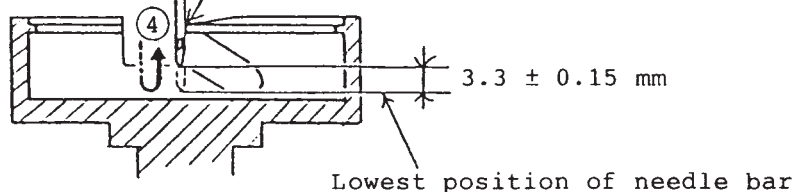
Before the adjustment, be sure to check the needle bar height.

- (1) Remove the needle plate, bobbin holder and bed cover.
- (2) Set the pattern selector dial at "Z" and select the maximum zigzag width.
- (3) Loosen the two set screws of the lower shaft gear.
- (4) Turn the balance wheel toward you to move up the needle bar 3.15 to 3.45 mm from its lowest position with the needle swung to the left.
- (5) While holding the balance wheel by hand to prevent the needle bar from moving, turn the upper shaft gear in the arrow direction until the tip of the rotary hook exactly meets the right side of the needle.
- (6) Taking care not to affect the relationship between the rotary hook tip and the needle, tighten the two set screws of the lower shaft gear.
- (7) Attach the bed cover, bobbin holder and needle plate.



Swing the needle to the left at the maximum zigzag width.

Bring the rotary hook tip into contact with the right side of the needle.



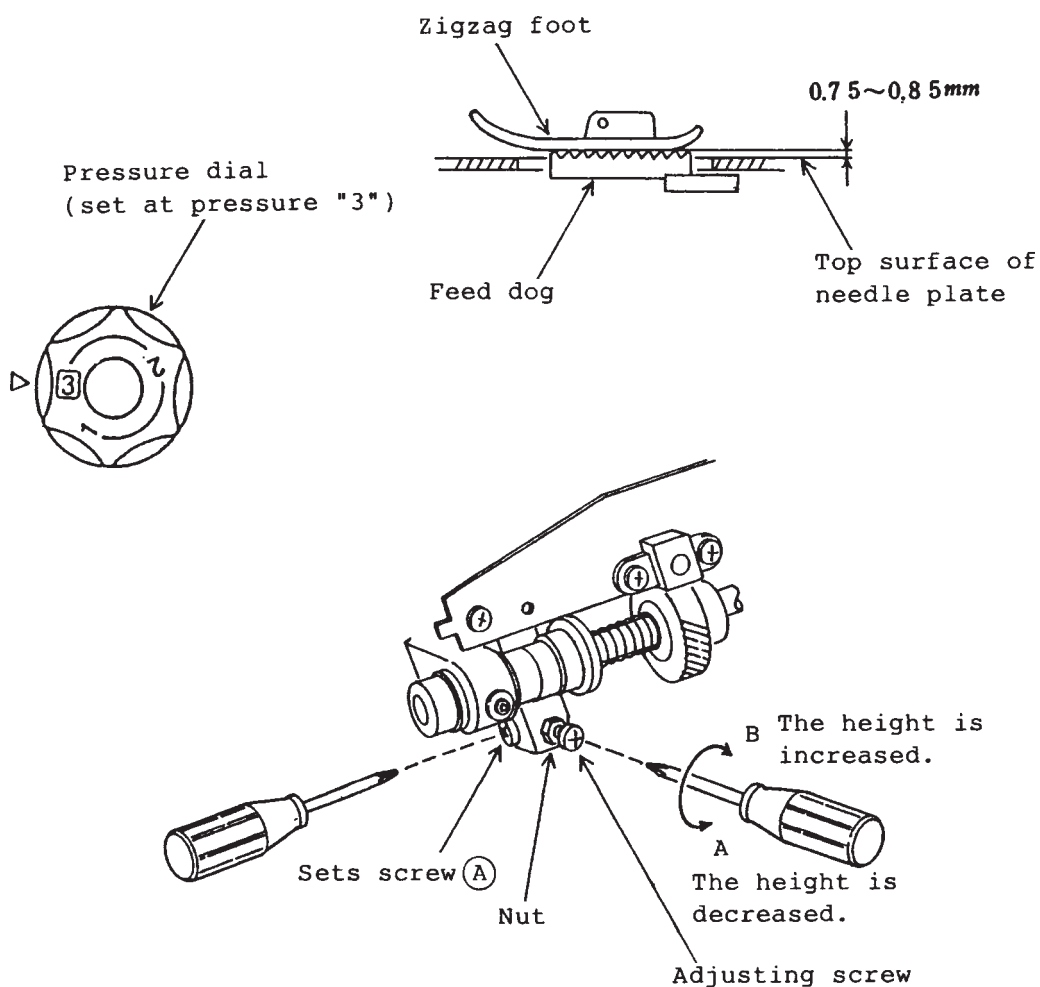
ADJUSTMENT OF FEED DOG HEIGHT

When the presser foot is lowered with the pressure dial set at " 3 " the highest position of the feed dog should be 0.75 to 0.85 mm above the top surface of the needle plate.

- (1) Set the pressure dial at " 3 " and lower the presser foot.
- (2) Turn the balance wheel until the feed dog comes to its highest position.
- (3) Detach the bed cover (unit).
- (4) Loosen the set screw (A) and nut.
- (5) Turn the adjusting screw so that the feed dog height is 0.75 to 0.85 mm above the top surface of the needle plate.
- (6) Tighten the nut.
- (7) Tighten the set screw (A) and attach the bed cover (unit).

(Note)

For removal and attachment of the bed cover (unit), refer to page 4.



ADJUSTMENT OF STRETCH STITCH FEED BALANCE

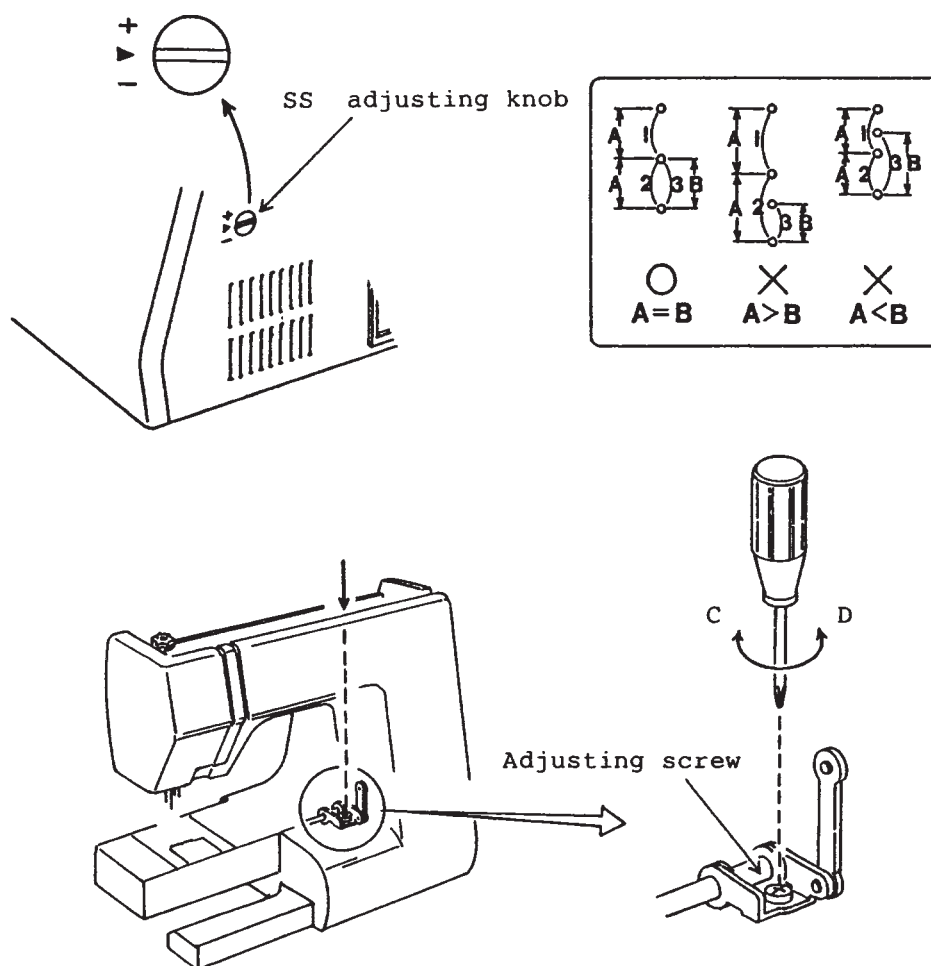
When a stretch stitch pattern is sewed with the 55 adjusting knob at a mark "►" the pattern should be formed as shown in the figure below. If not (if there is no balance between forward feeding and backward feeding), then make adjustment in the following procedure.

- (1) Remove the top cover (unit), and set the SS adjusting knob at a mark "►"
- (2) Put a piece of paper under the presser foot, and turn the balance wheel to check the needle drop position in forward feeding (A) and backward feeding (B).
- (3) If $A > B$, then turn the adjusting screw in direction of C.
If $A < B$, then turn the adjusting screw in direction of D.
- (4) Attach the top cover (unit).

(Note)

After the above adjustment, readjust the zero feeding.

For removal and attachment of the top cover (unit), refer to page 2.



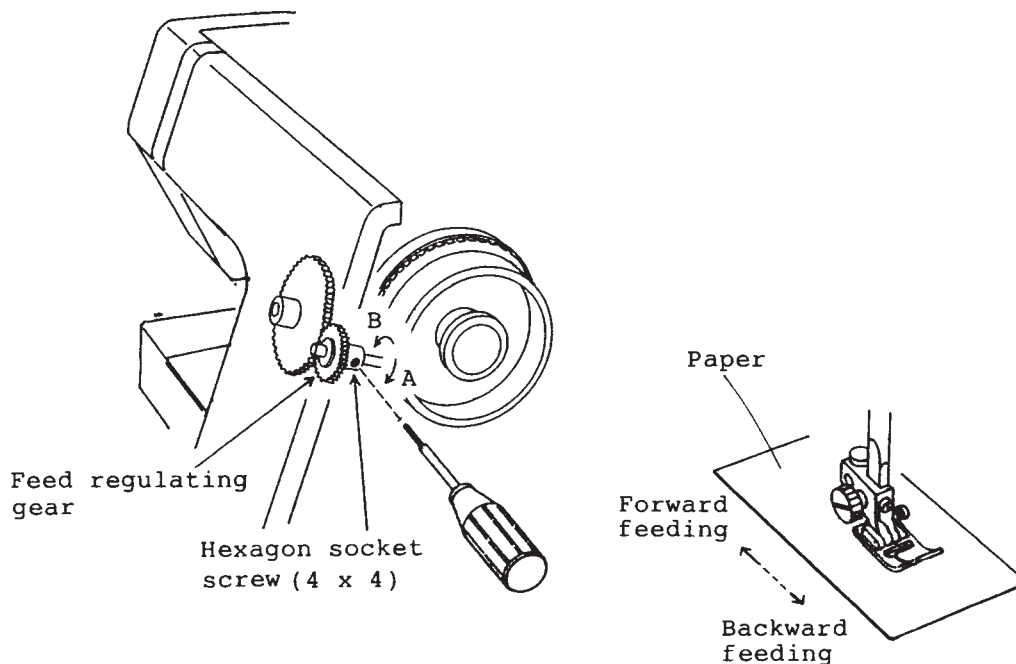
ADJUSTMENT OF ZERO FEEDING

If the material is fed with the pattern selector dial set at “1” (straight stitch) and the stitch length adjusted to “0” then make adjustment in the following procedure.

- (1) Remove the belt cover, set the pattern selector dial at “” and adjust the stitch length to “0”.
- (2) Put a piece of paper between the presser foot and the feed dog, and lower the presser foot lifter.
- (3) Turn the balance wheel toward you to check if the paper is fed forward or backward.
- (4) Loosen the set screw of the feed regulating gear.
If the paper is fed forward, turn the gear in direction B until feeding is stopped.
If the paper is fed backward, turn the gear in direction A until feeding is stopped.
- (5) Tighten the set screw of the gear.
- (6) Attach the belt cover.

(Note)

For removal and attachment of the belt cover, refer to page 3.



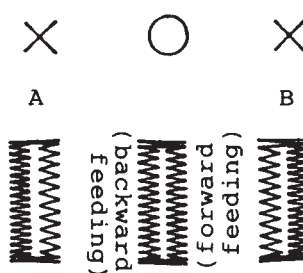
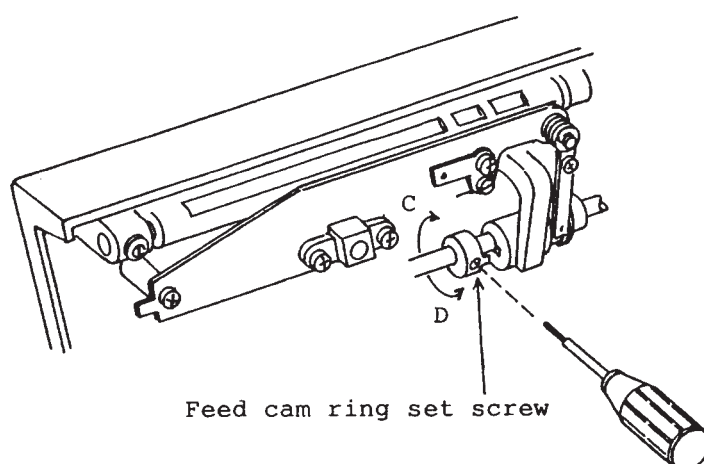
ADJUSTMENT OF BUTTONHOLE FEED BALANCE

If there is a difference in stitch density between the right and left rows of a buttonhole, then make adjustment in the procedure given below. The right row should have 9 to 12 stitches compared with 10 stitches on the left row.

- (1) Sew a buttonhole by use of the BH foot (R) and check the stitch density on the right and left rows.
- (2) Remove the bed cover (unit).
- (3) Loosen the set screw of the feed cam ring with care not to move the ring laterally.
- (4) If the right row is denser than the left row (A), turn the ring in direction of (C).
If the left row is denser than the right row (B), turn the ring in direction of (D).
- (5) Tighten the set screw of the feed cam ring, and attach the bed cover (unit).

(Note)

For removal and attachment of the bed cover (unit), refer to page 4.



Check of buttonhole feed balance

ADJUSTMENT OF BUTTONHOLE FUNCTION

If any of the following functional troubles occur in buttonhole stitching, make adjustment in the procedure given below.

- I. The buttonhole is extremely short or long.
- II. The sewed length is smaller or larger than the length set on the R foot.

<Adjustment in case of I >

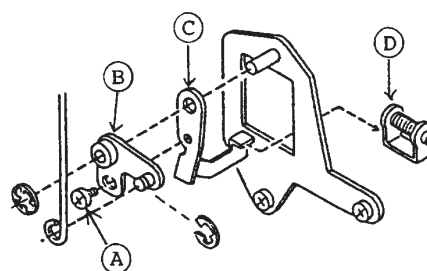
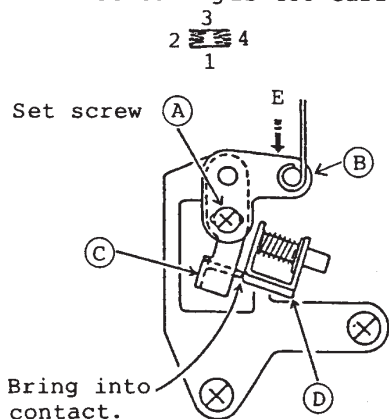
- (1) Remove the belt cover. (Refer to page 3.)
- (2) Loosen the set screw (A).
- (3) Make adjustment so that the plate (C) touches the plate (D) with the plate (B) lightly pushed in direction of (E), and tighten the set screw (A)/
- (4) Attach the belt cover. (Refer to page 3.)

<Adjustment in case of II >

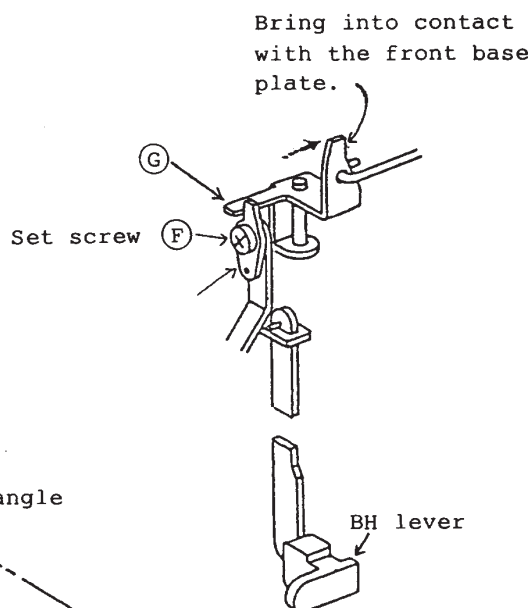
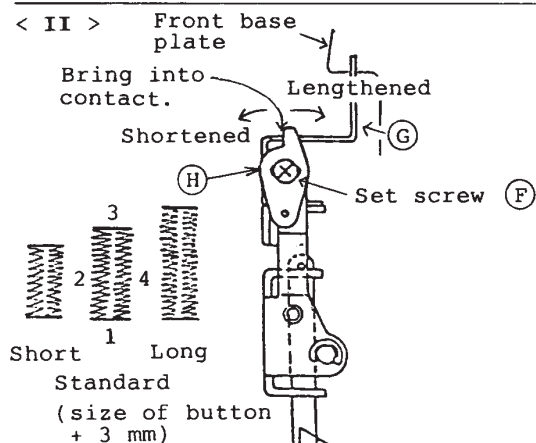
- (1) Fully lower the BH lever.
- (2) Open the face plate, and loosen the set screw (F)
- (3) Make adjustment so that the plate (H) touches the plate (G) when the BH lever is at a right angle with the top surface of the needle plate with the plate (G) brought into contact with the front base plate.

< I > Changeover to bartack stitching is too early.

Changeover to bartack stitching is not made.



< II >



REPLACEMENT OF BH LEVER (UNIT)

For replacement of the BH lever with a new one, take the following procedure.

To remove:

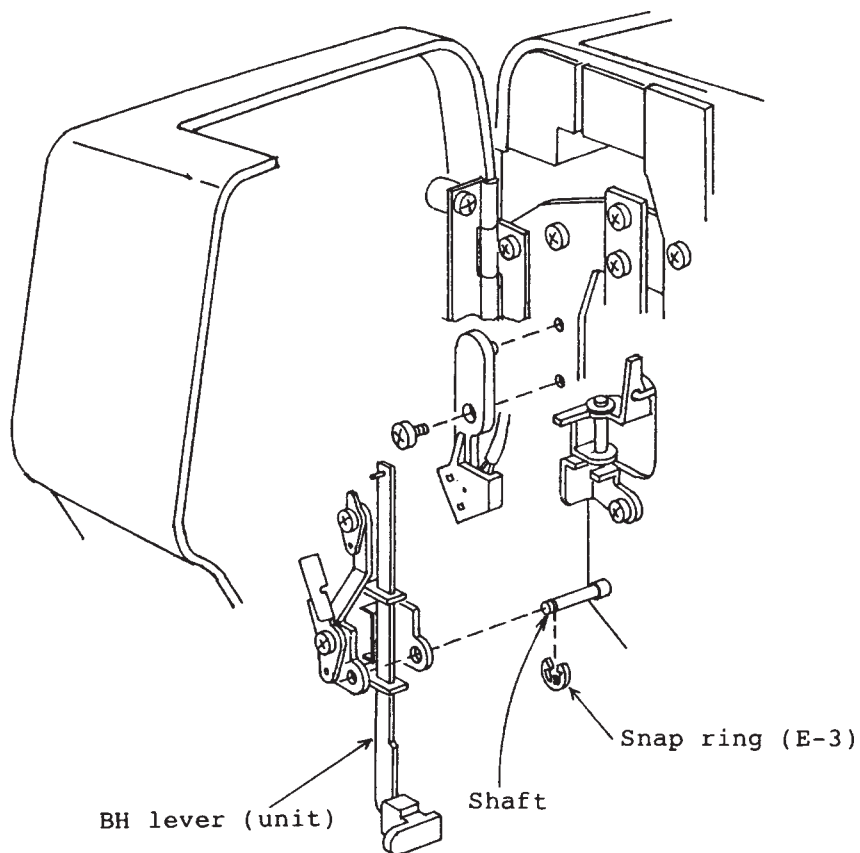
- (1) Remove the snap ring (E-3).
- (2) Pull out the BH lever (unit) from the shaft.

To attach:

- (3) Pass the shaft through a new BH lever (unit) and fasten it with the snap ring.

(Note)

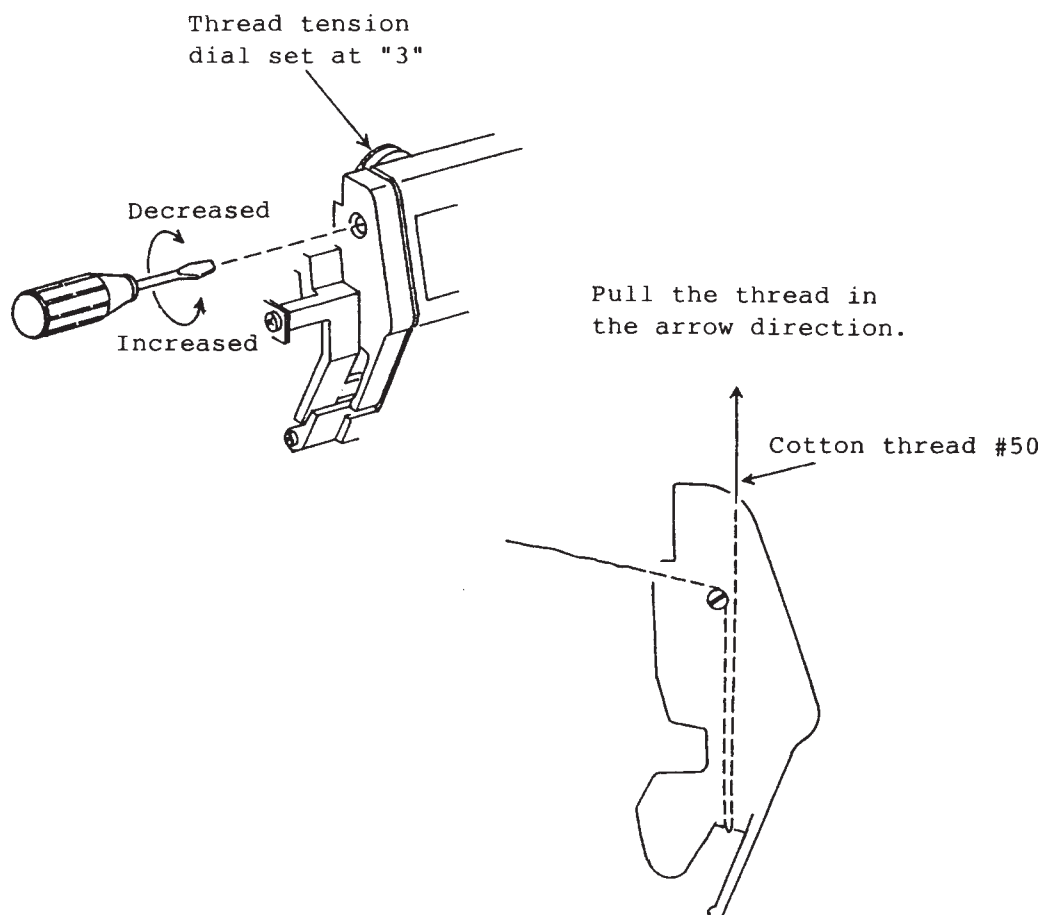
After the above replacement, check the BH function.



ADJUSTMENT OF NEEDLE THREAD TENSION

When the cotton thread size 50 is passed as shown in the figure below and pulled upward, the tension should be 85 to 115 g with the thread tension dial set at "3".

- (1) Set the thread tension dial at "3" and pass the thread.
- (2) Open the face plate, and lower the pressure foot lifter.
- (3) Adjust the tension by turning the shaft with a blade-edge screwdriver.



REPLACEMENT OF THREAD TENSION DIAL (UNIT)

To remove:

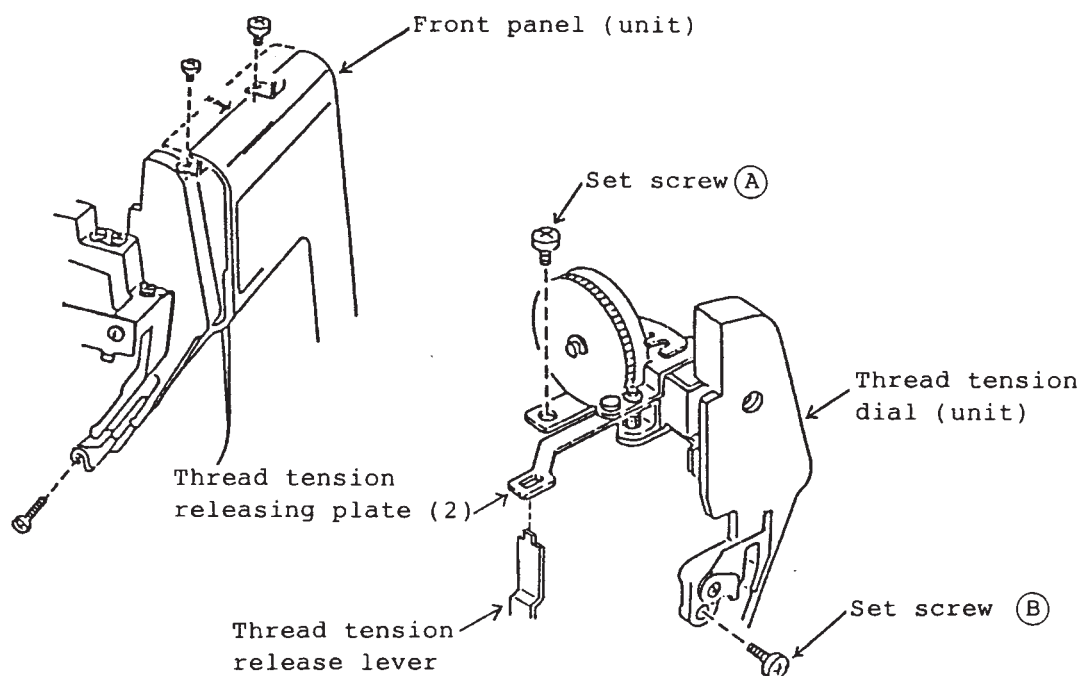
- (1) Remove the top cover (unit), lower the presser foot lifter, and open the face plate.
- (2) Detach the front panel (unit).
- (3) Lower the thread take-up lever, remove the set screws (A) and (B), and then detach the thread tension dial (unit).

To attach:

- (4) Put the thread tension release lever into the rectangular hole in the thread tension releasing plate (2), and attach a new thread tension dial (unit) with the set screws (A) and (B).
- (5) Attach the front panel (unit).
- (6) Adjust the thread tension releasing mechanism. (Refer to page 24.)
- (7) Attach the top cover (unit).

(Note)

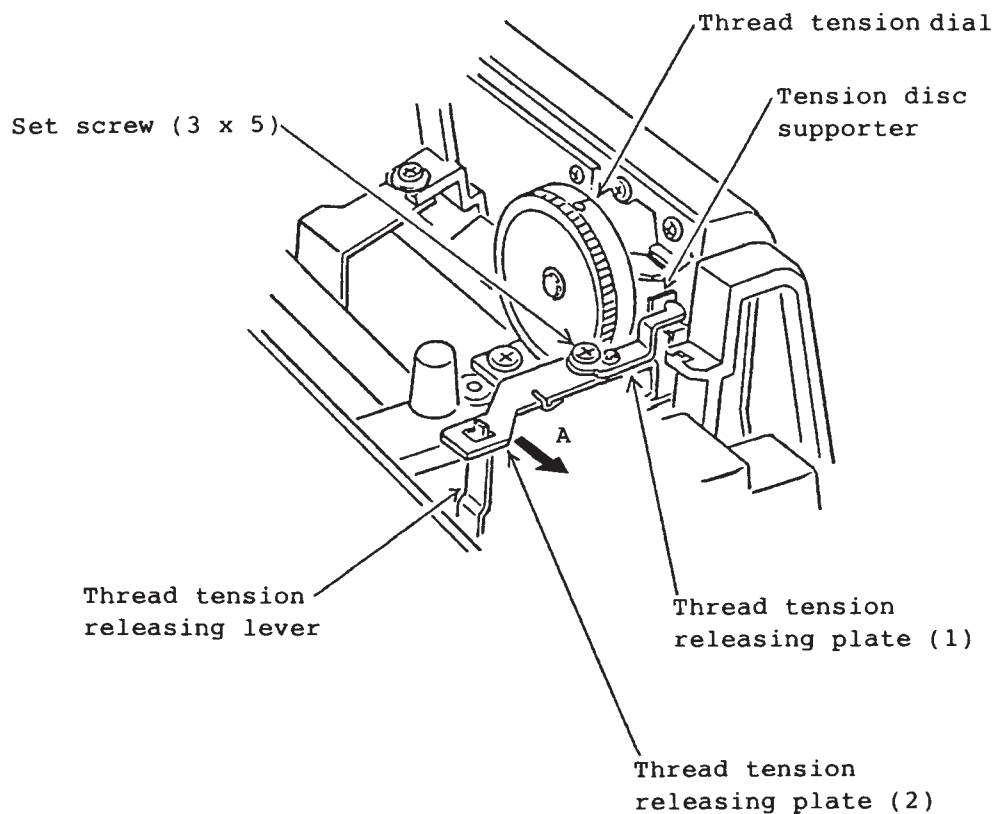
For removal and attachment of the top cover (unit) and front panel (unit), refer to pages 2 and 5.



ADJUSTMENT OF THREAD TENSION RELEASING MECHANISM

When the presser foot lifter is raised, the tension disc supporter should move about 1.0 mm so that the thread tension releasing mechanism works properly.

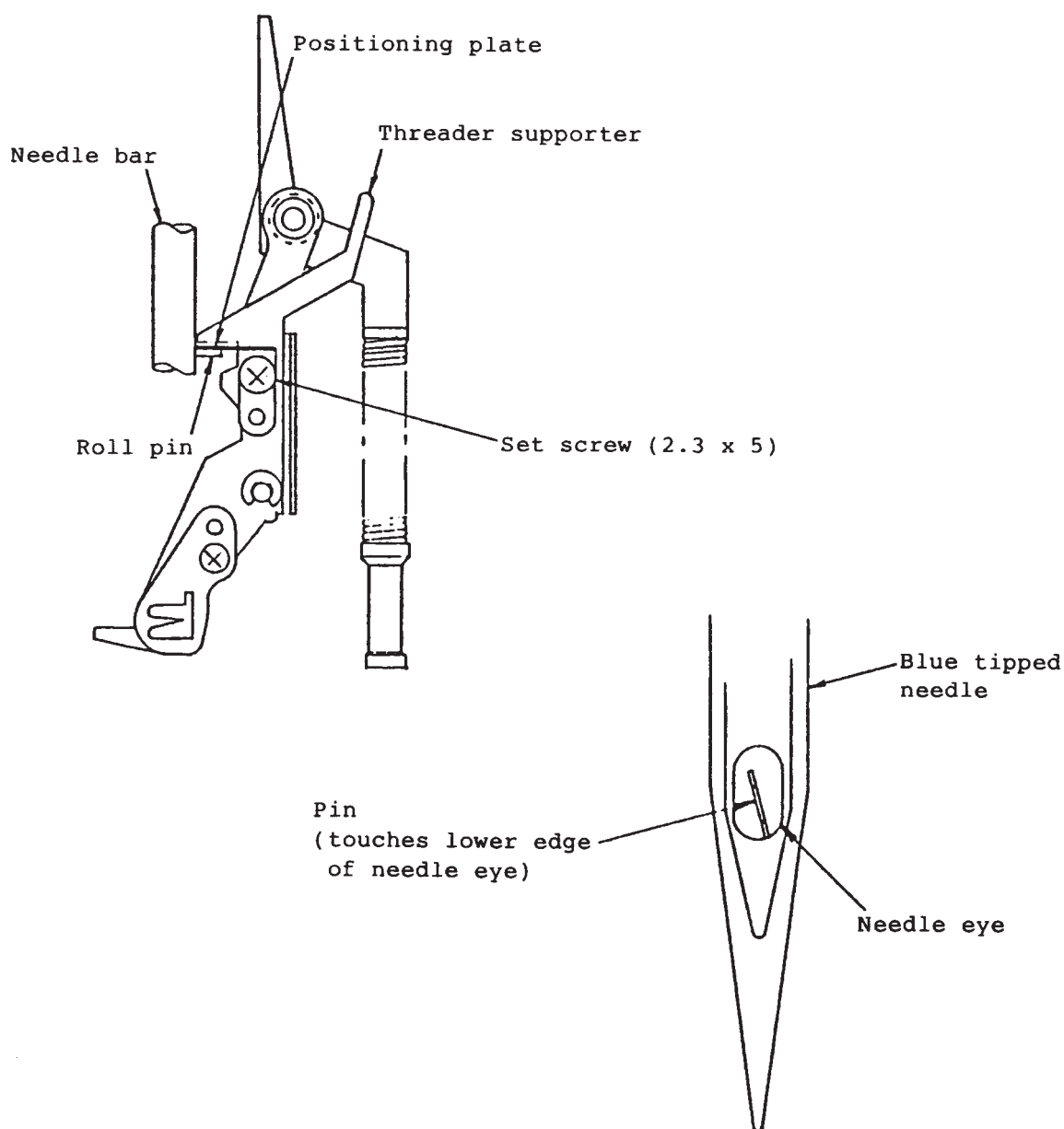
- (1) Remove the top cover (unit).
- (2) Lower the presser foot lifter, set the thread tension dial at "9" and then loosen the set screw.
- (3) While pushing the thread tension releasing plate (2) in direction (A), bring the thread tension releasing plate (1) into contact with the tension disc supporter. After that, tighten the set screw.
- (4) Set the thread tension dial at "9" and raise the presser foot lifter to check the thread tension releasing mechanism.
- (5) Set the thread tension dial at "0" lower the presser foot lifter and make sure that the tension disc does not move when the thread tension releasing plate (2) is moved within the play of the thread tension lever.
- (6) Attach the top cover (unit).



ADJUSTMENT OF THREADER (1)

If the threader pin (threader spring) interferes with the needle eye, then make adjustment in the following procedure.

- (1) Attach the blue tipped needle.
- (2) Turn the balance wheel until the needle comes to its highest position.
- (3) Pull down the threader to bring the positioning plate into contact with the roll pin of the needle bar.
- (4) Loosen the set screw of the positioning plate.
- (5) Adjust the threader supporter (unit) in the vertical direction so that the pin touches the lower edge of the eye of the blue tipped needle when the button is pushed.
- (6) Bring the positioning plate into contact with the roll pin, and completely tighten the set screw.
- (7) Make sure that the pin is passed through the needle eye without interference.

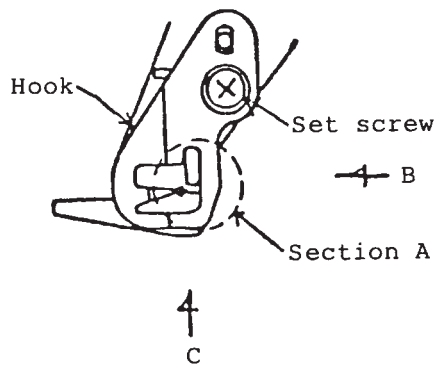


ADJUSTMENT OF THREADER (2)

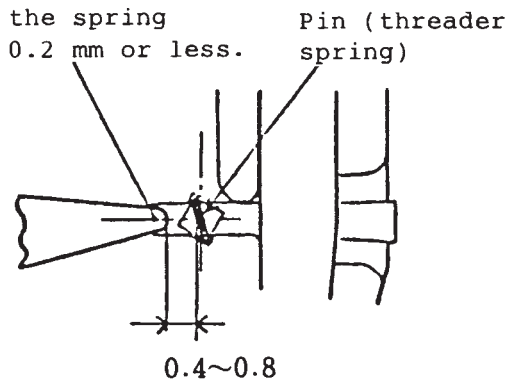
If the hook of the threader does not catch the thread loop, then make adjustment in the following procedure.

- (1) Attach the blue tipped needle to the needle bar.
- (2) Thread the embroidery thread #50.
- (3) When the hook does not catch the thread loop, adjust the hook in the vertical direction and in the direction of clearance.
 - (a) Adjustment in vertical direction
Loosen the hook set screw (tapping screw), and let the pin come out by pressing the pushbutton. Adjust the hook so as to obtain the following dimension, and completely tighten the set screw to a torque of 2 to 3 kg-cm.
 - (b) Adjustment in direction of clearance
Adjust the hook in a range of 0.1 to 0.5 mm by slightly bending its end.
- (4) Check the threading by use of the embroidery thread size 50.

- (a) Adjustment in vertical direction

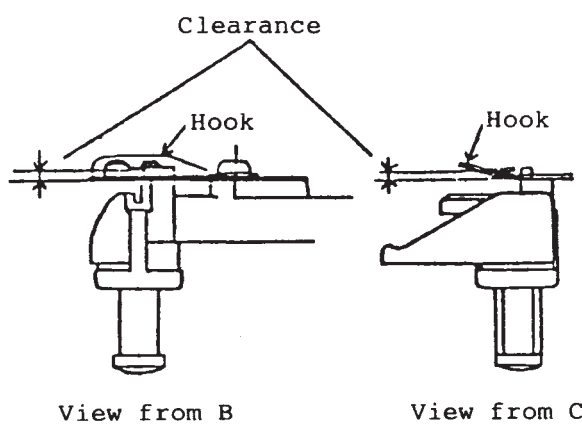


The vertical deviation of the hook end from the center of the spring should be 0.2 mm or less.



Enlarged view of section A

- (b) Adjustment in direction of clearance



REPLACEMENT OF THREADER PIN

If the threader pin (threader spring) is deformed or damaged, then replace it with a new one in the following procedure.

- (1) Pull down the threader 2 cm or so from its highest position.
- (2) Hold the threader supporter in place.
- (3) Pinch the knob section of the threader pin and pull it out.
- (4) With the pushbutton fully pushed in, carefully insert a new threader pin along the guide grooves in the pushbutton until the knob is brought into close contact with the pushbutton.
If the threader pin stops halfway, avoid forcibly pushing it in because its end is caught in a hole inside the threader supporter. In such a case, slightly move the pushbutton vertically or laterally and carefully push in the pin after smooth insertion is ensured.
- (5) Set the threader to the needle.
- (6) Press the pushbutton and check if the threader pin interferes with the needle eye.
- (7) If the threader pin interferes with the needle eye, then adjust the position of the positioning plate according to "ADJUSTMENT OF THREADER".

