

SERVICING MANUAL

Model 659

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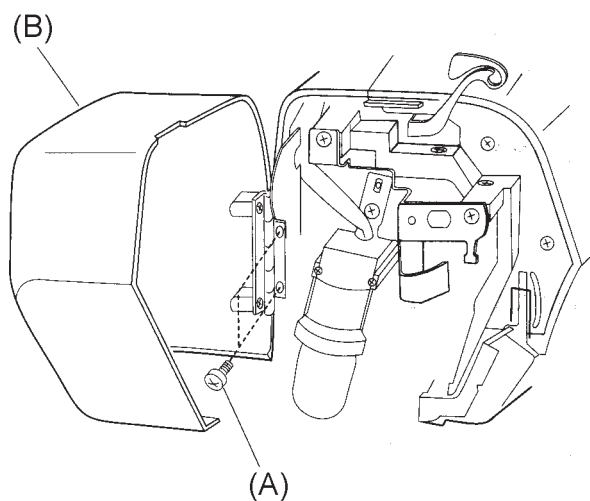
FACE COVER

TO REMOVE:

- 1, Remove the 2 set screws and the face cover.

TO ATTACH:

2. Replace the face cover (B) by lightly tightening the 2 set screws (A).
3. Close the face cover (B), carefully aligning it with the arm.
Then tighten the screws firmly.



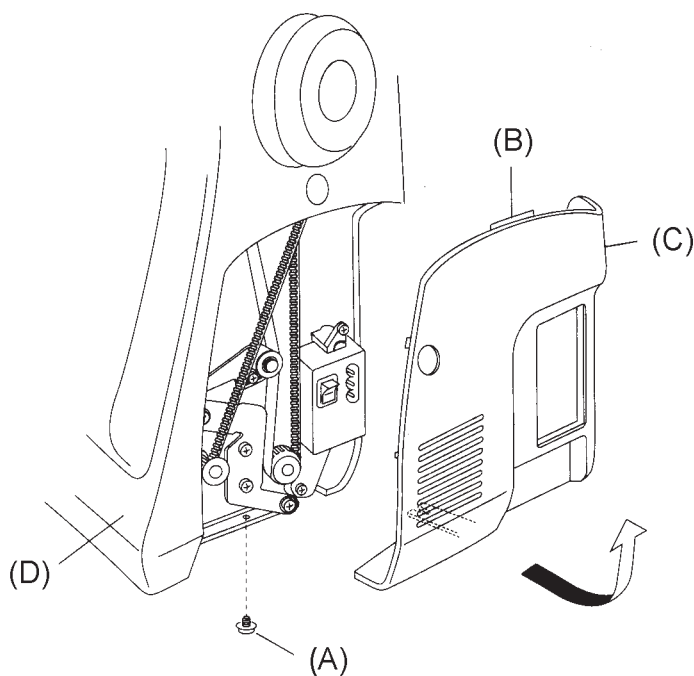
BELT COVER

TO REMOVE:

1. Loosen the set screw (A), and remove the belt cover rib (B) by pulling out the belt cover (C) rib from the front cover (D).

TO ATTACH:

2. Mount the belt cover rib (B) to the front cover (D), then mount the belt cover (C) and tighten the set screw.



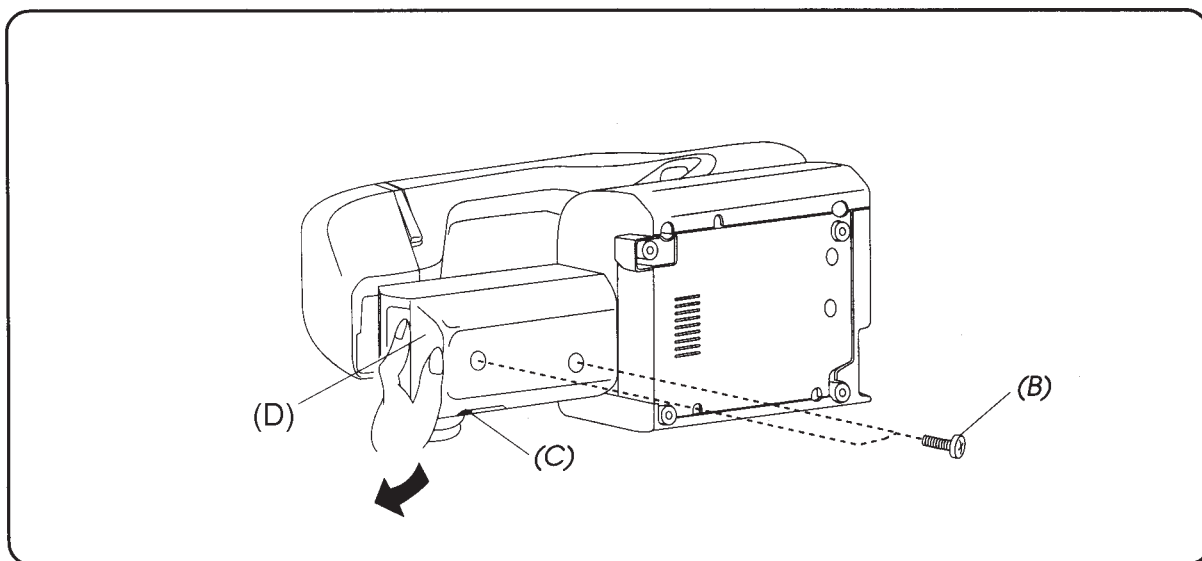
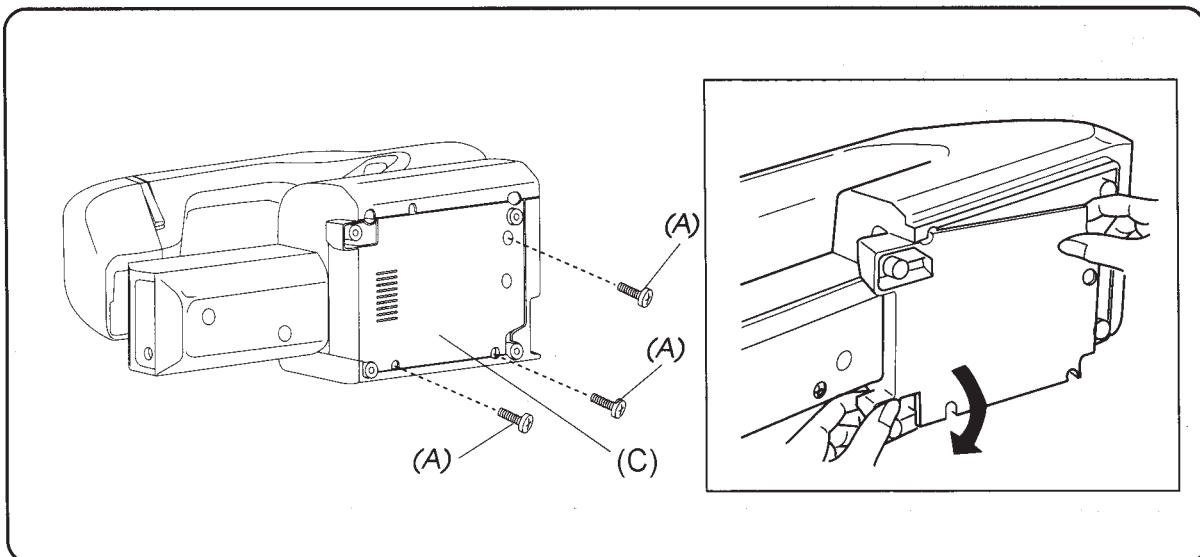
BASE PLATE

1. Remove 3 set screws (A).
2. Remove the base plate (C).

BED COVER

1. Remove 2 set screws (B).
2. Remove the bed cover (D).

* When you attach the bed cover (D), set the drop lever (C) at the left position.



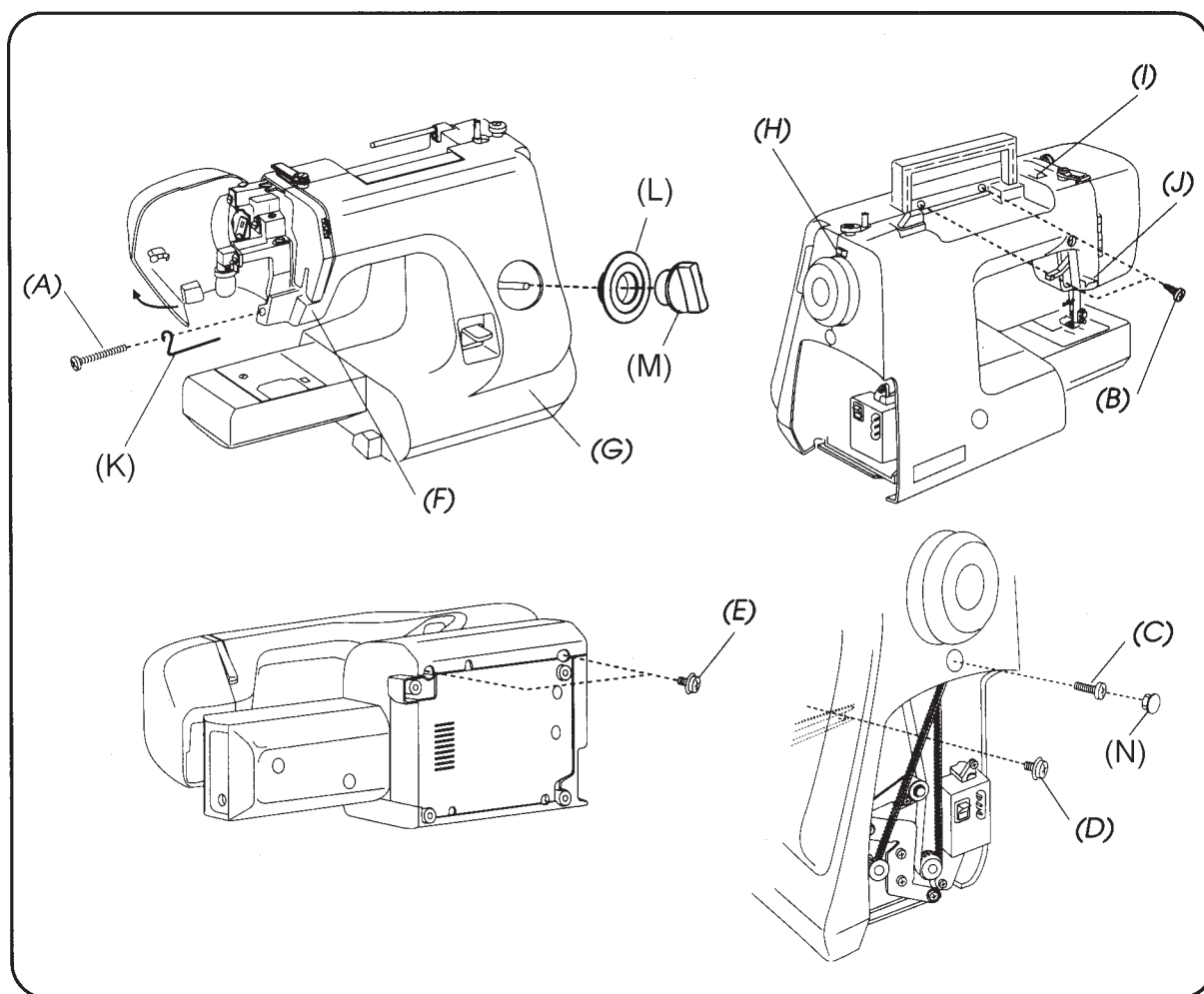
FRONT COVER

TO REMOVE:

1. Remove the belt cover (See page 3).
2. Remove the selector dial (M) and dial plate (L).
3. Remove the cap (N) , then set screws (A), (B), (C) and Arm thread guide (K). Loosen the set screws (D) and (E).
4. Remove the notches (H), (I) and (J).
5. Push and lower the part (F) gently, then pull it toward you to remove the front cover unit (G).

TO ATTACH:

6. Follow the above procedure in reverse.



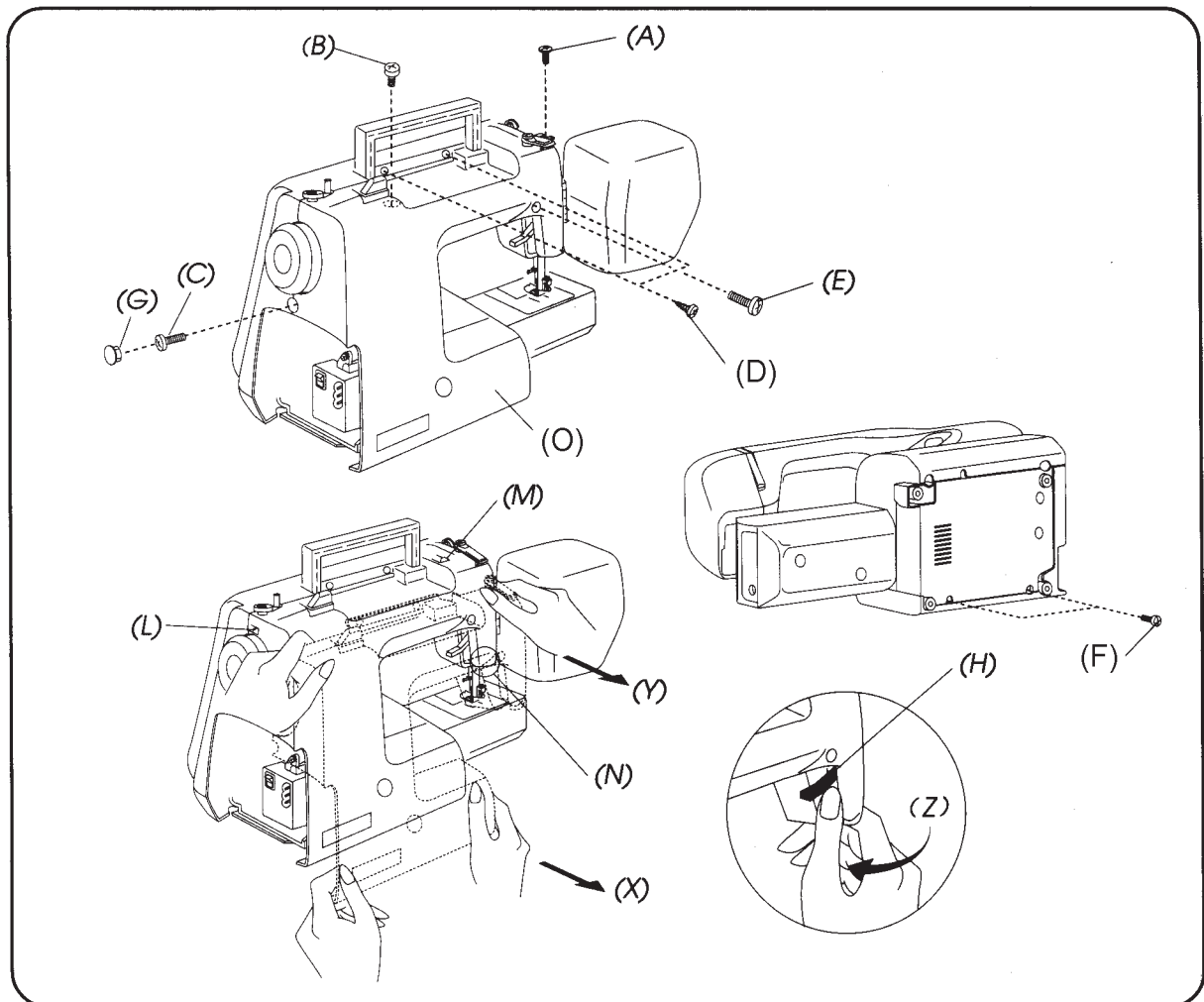
REAR COVER

TO REMOVE:

1. Remove the belt cover (See page 3).
2. Remove the cap (G).
3. Remove the set screws (A), (B), (C), (D), (E) and (F).
4. While pushing up the rear cover (O) near the notches (L), (M) and (N), pull upper part of the rear cover (See (Y) below).
5. Pull lower part of the rear cover toward you and slide it to the left (See (X) below). While sliding the rear cover to the left, clear the presser bar lifter (h) through the slit (See (Z) below).

TO ATTACH:

6. Follow the above procedure in reverse.



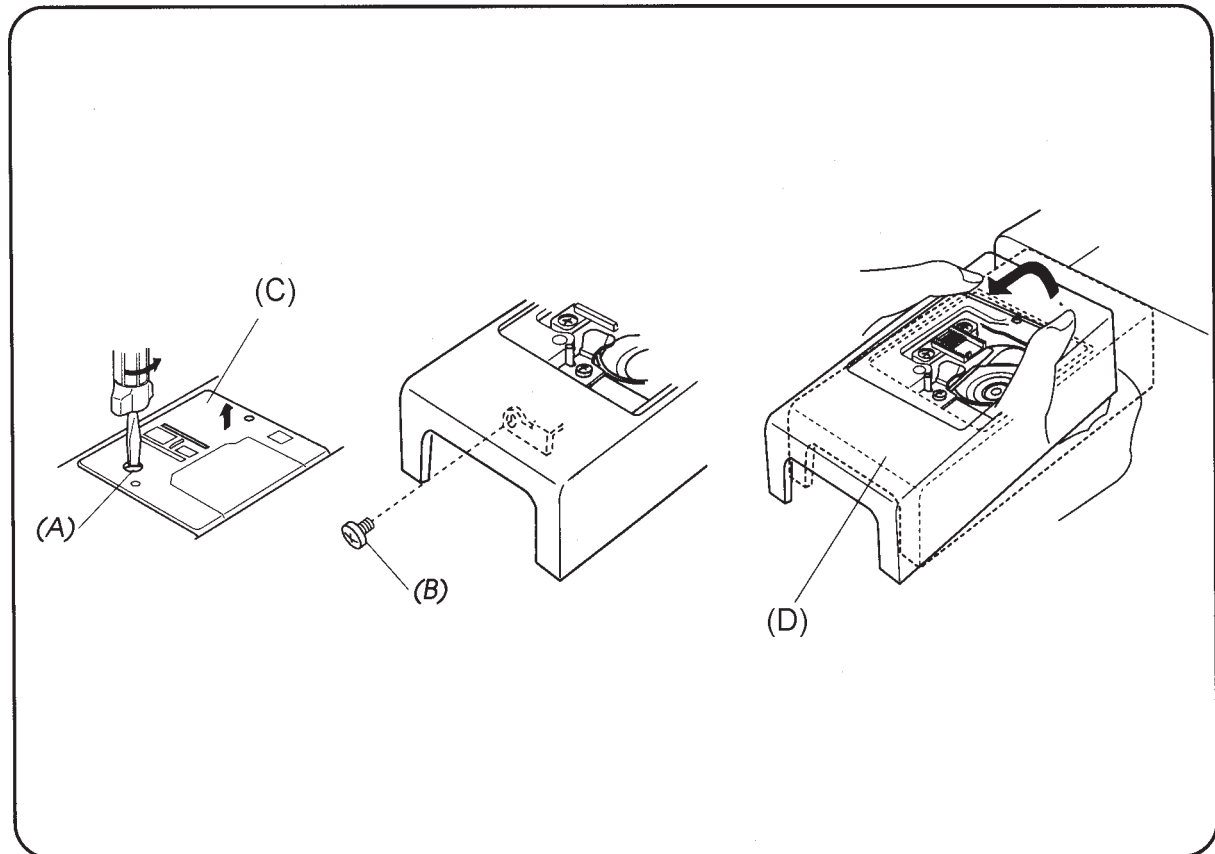
FREE ARM COVER

TO REMOVE:

1. Remove the set screw (A) and the needle plate (C).
2. Remove the bed cover (See page 4).
3. Remove the set screw (B) and the free arm cover (D).

TO ATTACH:

4. Follow the above procedure in reverse.



TOP TENSION

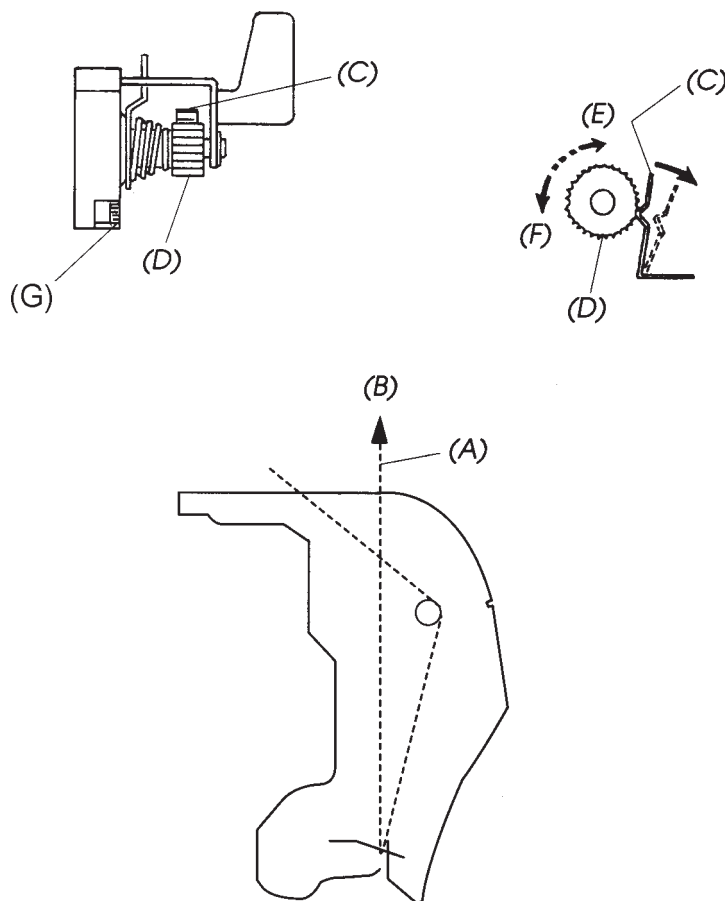
TO CHECK:

1. Set the tension dial (G) at "4" and raise the presser foot.
2. Pass the thread (A) between the discs and draw the thread (A) down around the check spring holder as shown below.
3. Lower the presser foot and bring the thread (A) up.
4. Top tension should be 75-90g when pulling the thread (A) up in the direction (B).

- * Use white polyester sewing thread size 50.
- * If the tension is out of the range, adjust as follows:

Adjustment procedure:

1. Remove the front cover (See page 5).
2. Pull spring (C) away from the lead screw (D).
3. If the top tension is too loose, turn the lead screw (D) in the direction of (E).
If the top tension is too tight, turn the lead screw (D) in the direction of (F).
4. Attach the front cover.



PRESSER BAR HEIGHT AND ALIGNMENT

TO CHECK:

1. Raise the presser foot lever (B).
2. The distance between the zigzag foot (A) and the needle plate (C) should be 6.0 mm (0.24").

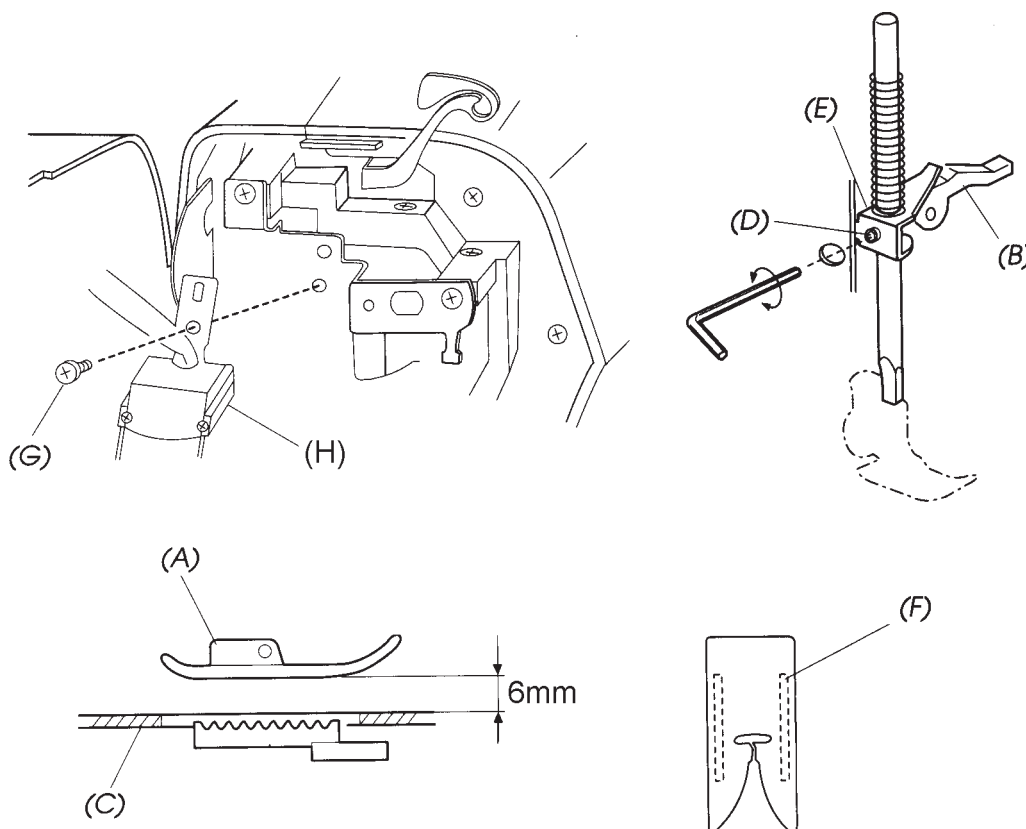
If the height is greater or less than 6.0 mm (0.24"), adjust as follows:

Adjustment procedure:

1. Open the face cover.
2. Remove the set screw (G) and remove the lamp socket.
3. Raise the presser foot lever (B) and loosen the hexagon socket screw (D) on the presser bar holder (E).
4. Adjust the distance between the zigzag foot (A) and the needle plate (C) to 6.0 mm (0.24").
5. Tighten the hexagon socket screw (D) securely.

Note: when you tighten the screw (D), make sure that both sides of the zigzag foot (A) are parallel to the feed dog slits (F) on the needle plate.

6. Fix the lamp socket (H) with set screw (G).



NEEDLE SWING

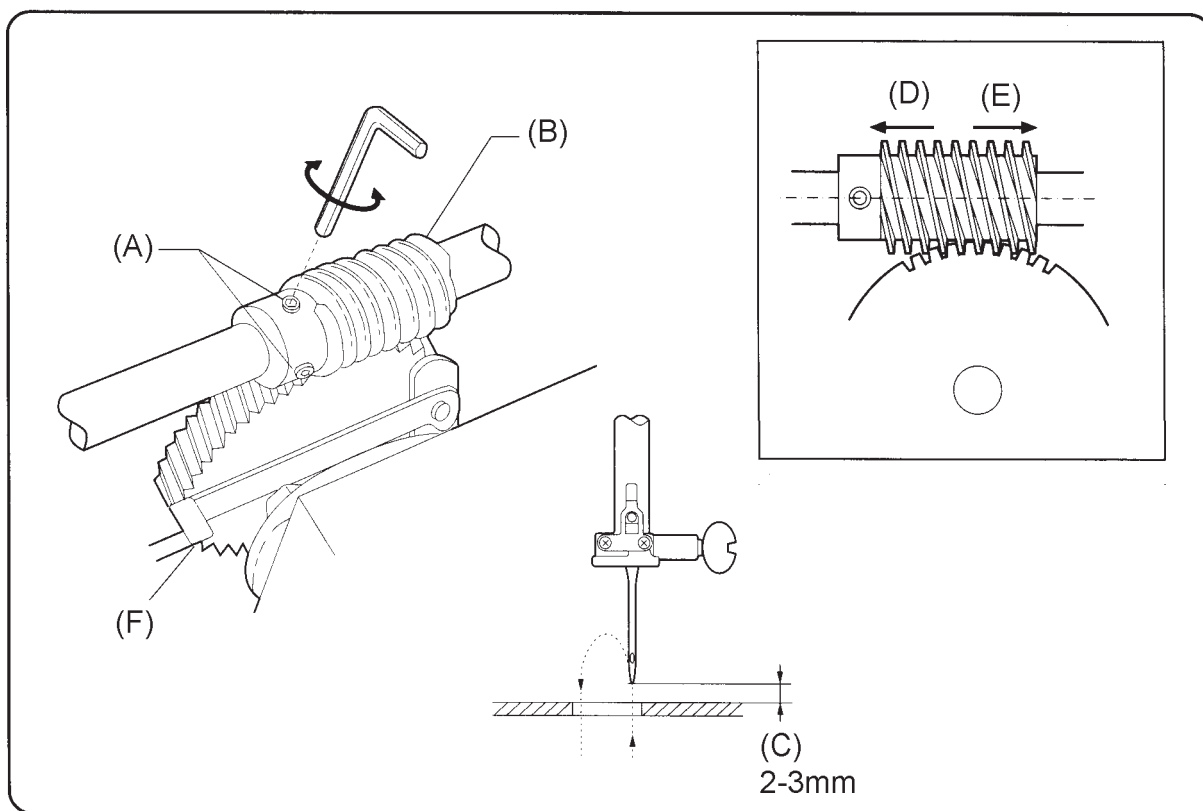
TO CHECK:

When sewing the zigzag pattern (with maximum zigzag width), if the needle bar starts moving sideways while the needle is in the fabric, adjust the needle swing according to the following procedure.

(The needle should start swinging when 2 to 3mm above the needle plate.)

Adjustment procedure:

1. Set the pattern selector dial at the maximum zigzag stitch width, and remove the front cover (See page 5).
2. Loosen the two hexagon socket screws (A) on the upper shaft worm gear (B).
3. While holding the upper shaft worm gear in place, carefully turn the hand wheel and adjust so that lateral needle swing starts from a position 2 to 3mm (C) above the needle plate after the needle has come out of the right side of the needle plate hole.
Make sure the worm gear does not move side way, when turning the upper shaft.
Otherwise, the backlash between the worm and gear and the other gear (F) will change.
4. Tighten the two hexagon socket screws on the upper shaft worm gear.
Make sure that there is no backlash between the upper shaft worm gear and the other gear and that smooth rotation is obtained.
If it is necessary to adjust the backlash of the gears, move the worm gear to the direction of:



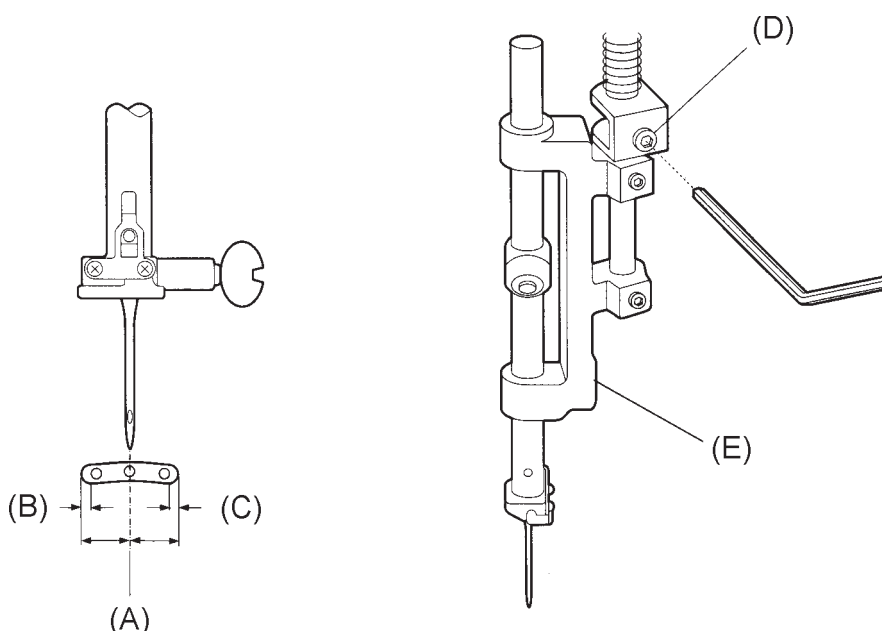
DISTRIBUTION OF NEEDLE SWING

When the pattern selector dial is set at the straight stitch (stitch No. 2), the needle should be positioned at the center of the needle plate hole (A).

When the pattern selector dial is set at the zigzag (stitch No. 6), the clearance between the needle and the edge of needle plate hole should be equal and it should be 0.2 mm or more, at the left and right needle drop positions (B and C).

Adjustment procedure:

1. Set the pattern selector dial at the straight stitch (stitch No. 2)
2. Open the face cover, and loosen the hexagon socket screw (D).
3. Move the needle bar supporter (E) to position the needle at the center of the needle plate hole.
4. Tighten the hexagon socket screw (D).
5. Set the pattern selector dial at the maximum zigzag stitch width.
6. Turn the hand wheel and make sure that there is an equal clearance between the needle and the edge of the needle plate hole at the left and right needle drop positions (B and C).



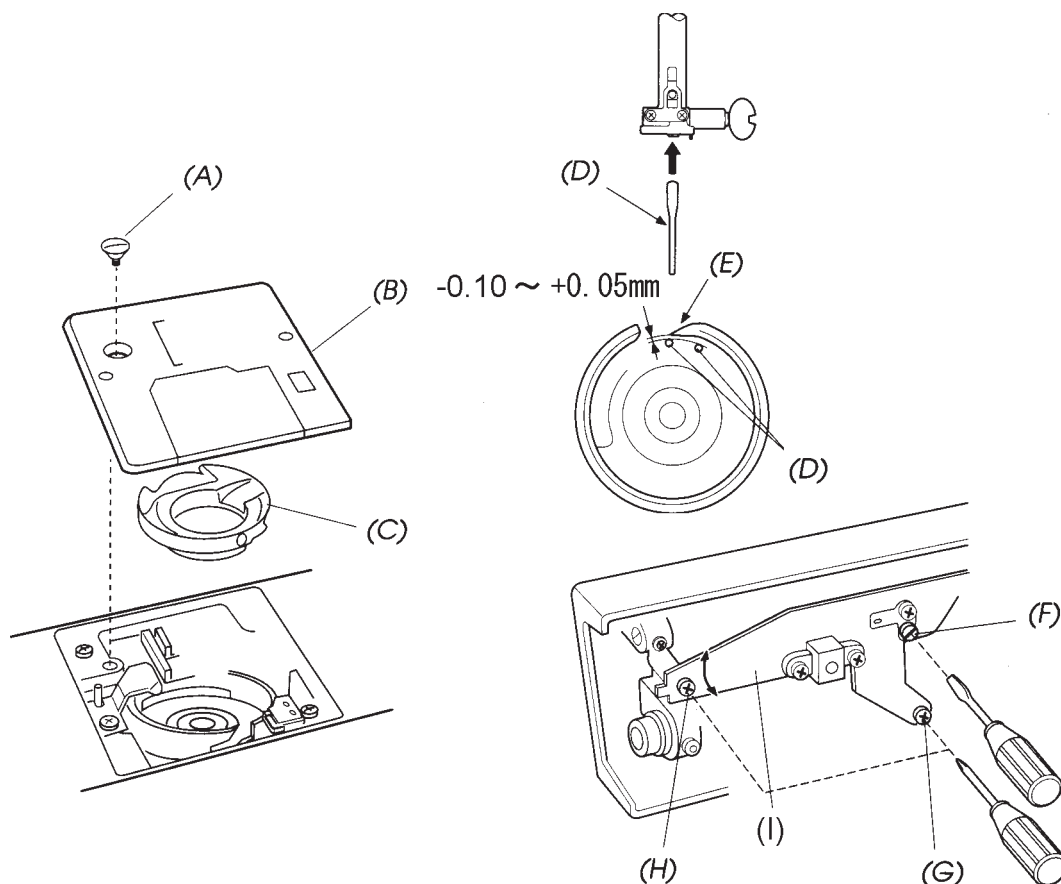
NEEDLE CLEARANCE TO HOOK

TO CHECK:

1. Set the pattern selector dial at the maximum zigzag stitch width.
2. Remove the set screw (A) on the needle plate, and detach the needle plate (B) and bobbin holder (C).
3. Replace the needle with test pin #68368 (D).
4. Turn the hand wheel toward you slowly by hand until the needle bar reaches its lowest position.
5. The clearance between the test pin #68368 (D) and the point of the hook (E) should be between -0.10 and +0.05 mm.

Adjustment procedure:

1. Remove the bed cover (See page 4).
2. Loosen set screws (F), (G), and (H).
3. Tighten set screw (F) temporarily.
4. Move hook set plate (I) to either direction as shown by the arrow until the clearance between the test pin #68368 (D) and the point of the hook (E) is between -0.10 and +0.05 mm.
5. Tighten the set screws (F), (G) and (H) securely.
6. Reattach the bed cover, bobbin holder and needle plate and remove the test pin #68368 (D).



BACKLASH (LOWER SHAFT GEAR)

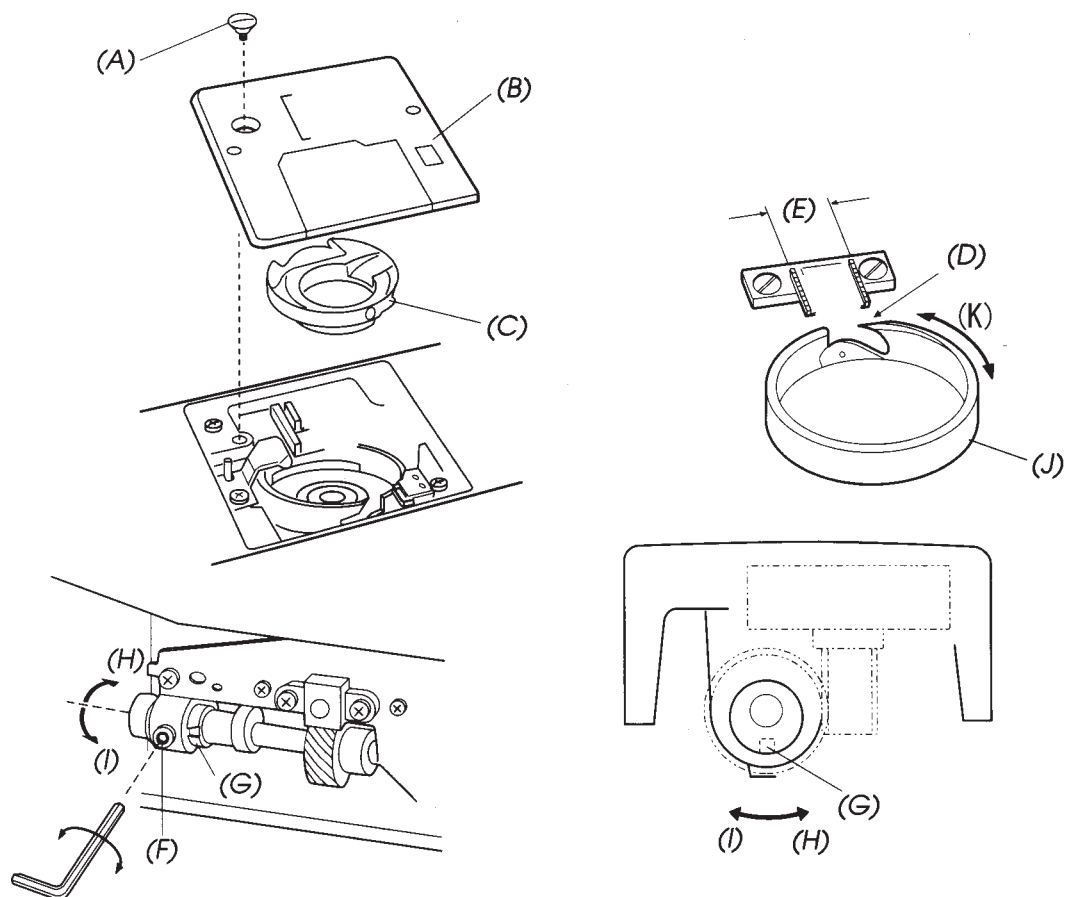
TO CHECK:

1. Remove set screw (A) to remove the needle plate (B) and the bobbin holder (C).
2. Turn the hand wheel slowly toward you until the point of the hook (D) is between both ends (E) of the feed dog.
3. Rotate the hook race (J) clockwise and counterclockwise by hand and check the play. It should be within 0.8 mm (K).

* If there is more than 0.8 mm backlash (between the gears, adjust as follows:

Adjustment procedure:

1. Remove the bed cover (See page 4) and loosen hexagon socket screw (F).
2. Turn the lower shaft bushing (eccentric bushing) (G) in the direction of (H) when the play at the point of the hook is too small.
3. Turn the lower shaft bushing (eccentric bushing) (G) in the direction of (I) when the play at the point of the hook is too large.
4. Tighten hexagon socket screw (F) securely after adjustment.
5. Attach the bed cover.

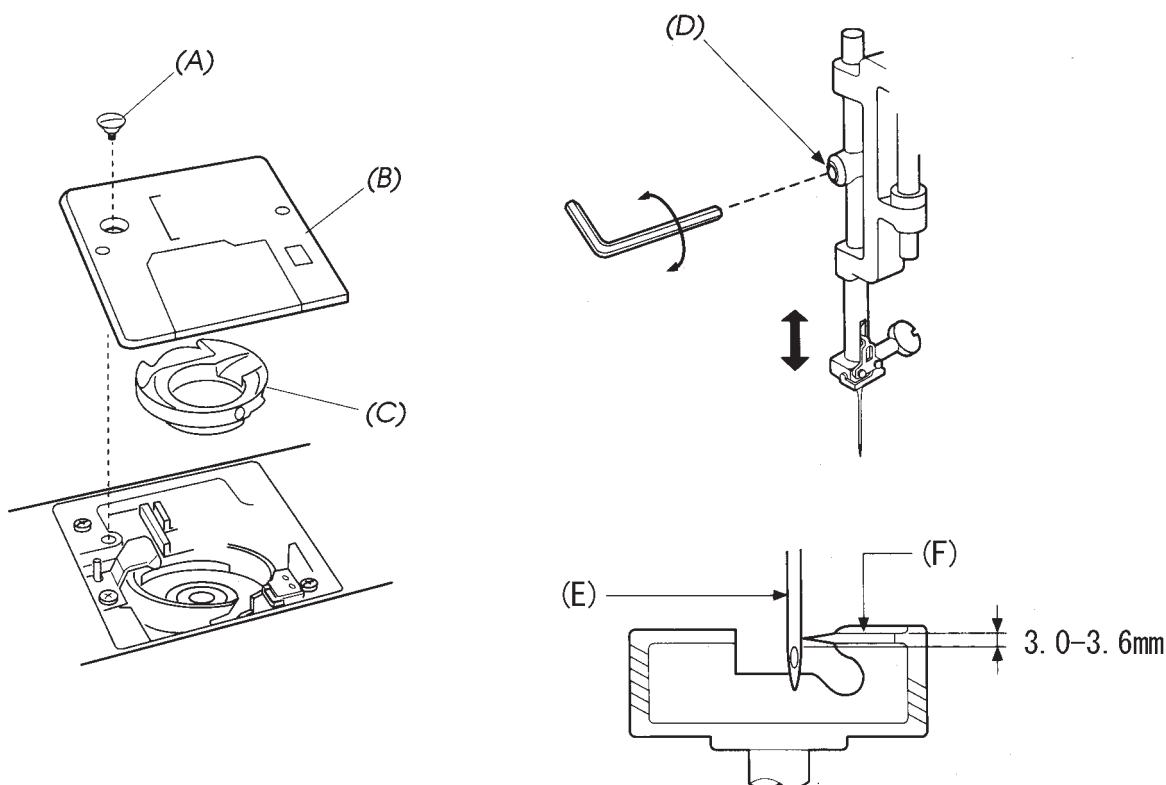


NEEDLE BAR HEIGHT

When the point of the rotary hook exactly meets the right side of the size 14 needle (E) in ascending travel of the needle bar from its lowest position at the right needle drop position with the pattern selector dial at zigzag stitch (stitch No. 6), the distance between the upper edge of the needle eye and the race of rotary hook (F) should be 3.0 to 3.6 mm.

Adjustment procedure:

1. Set the pattern selector dial at (maximum zigzag stitch width).
2. Remove the set screw (A) of the needle plate, and detach the needle plate (B) and bobbin holder (C).
3. Tilt the head backward, and open the face cover.
4. Turn the hand wheel toward you until the rotary hook point exactly meets the right side of the needle at the right needle drop position.
5. Loosen the hexagon socket screw (D) of the needle bar connecting stud.
6. Move the needle bar to provide a distance of 3.0 to 3.6 mm between the upper edge of needle eye and the race of the rotary hook.
7. Tighten the hexagon socket screw (D) of the needle bar connecting stud.
8. Reattach the bobbin holder and needle plate.



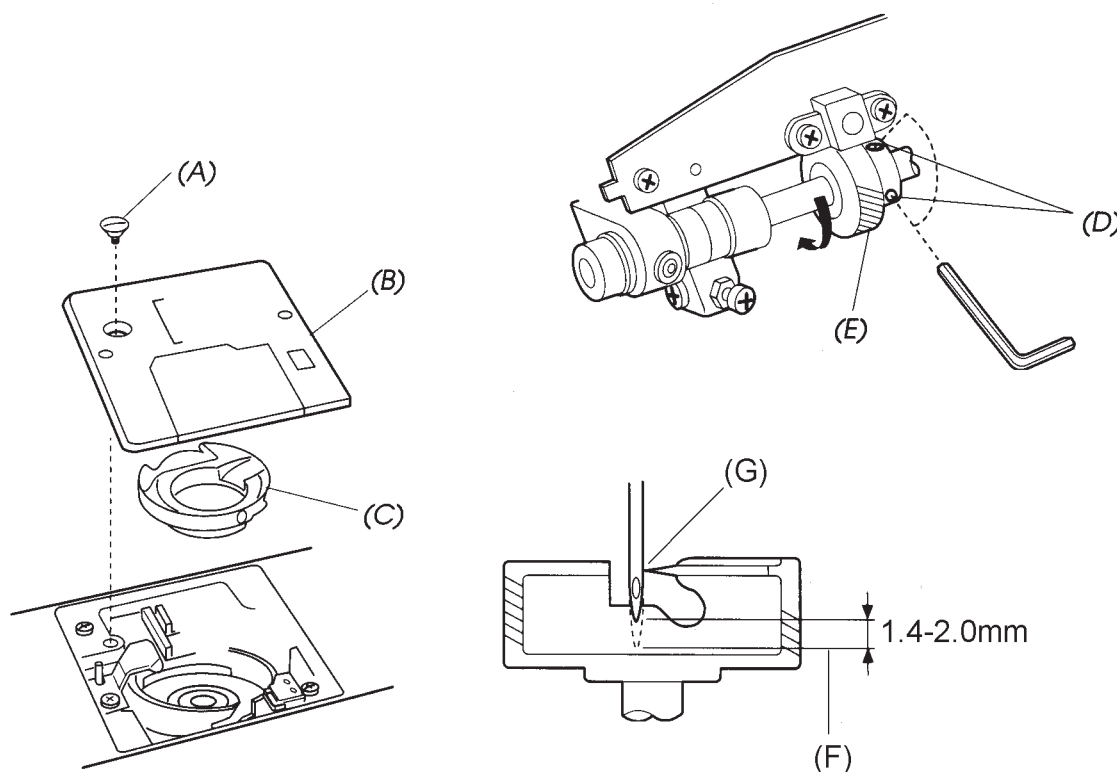
NEEDLE TO HOOK TIMING

With the needle bar swung to the right 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 1.4 to 2.0 mm.

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

Adjustment procedure:

1. Set the pattern selector dial at maximum zigzag stitch width (stitch No. 6).
2. Remove set screw (A) on the needle plate to remove the needle plate (B) and bobbin holder (C).
3. Remove the bed cover (See page 4).
4. Loosen hexagon screws (D) on the lower shaft gear (E).
5. Turn the hand wheel toward you to bring the needle bar 1.4 to 2.0 mm from its lowest position (F) with the needle swing to the right.
6. While holding the hand wheel by hand to prevent the needle bar from moving, turn the lower shaft gear in the direction of arrow until the tip of the rotary hook exactly meets the right side of the needle (G).
7. Taking care not to affect the relationship between the rotary hook tip and the needle, tighten the hexagon screws (D) on the lower shaft gear.
8. Attach the bed cover, bobbin holder and needle plate,



FEED DOG HEIGHT

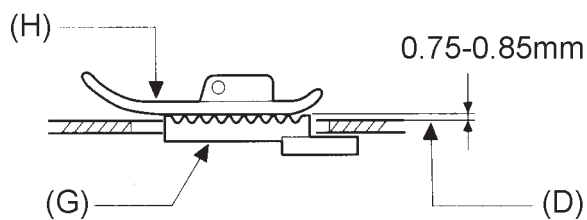
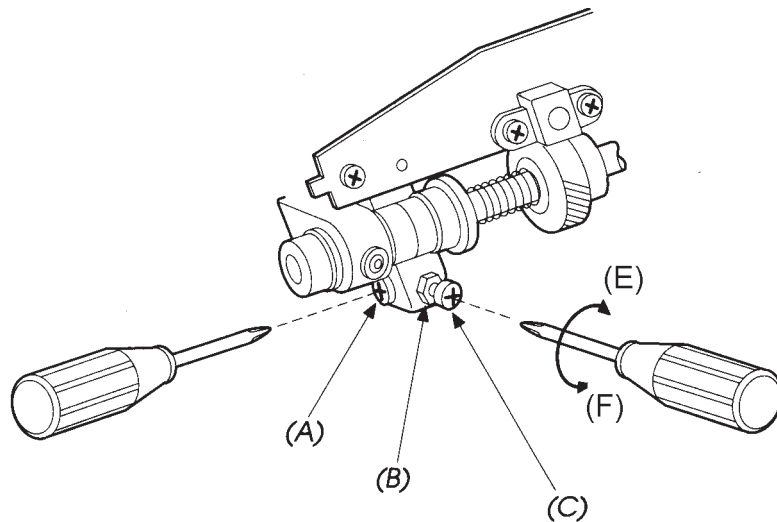
Lower the presser foot and turn the hand wheel toward you until the needle bar comes to the highest point of its travel.

In this condition, the height of the feed dog above the needle plate should be 0.75 to 0.85 mm.

Adjustment procedure:

1. Set the stitch length dial at "4", and lower the presser foot (H).
2. Turn the hand wheel until the feed dog (G) comes to its highest position.
3. Remove the bed cover (See page 4).
4. Loosen set screw (A) and nut (B).
5. Turn the adjusting screw (C) to set the feed dog height at 0.75 to 0.85 mm above the top surface of the needle plate (D). Turn the adjusting screw (C) in the direction of:

(E) to increase the height.
(F) to decrease the height.
6. Tighten the nut (B).
7. Tighten screw (A) and attach the bed cover.



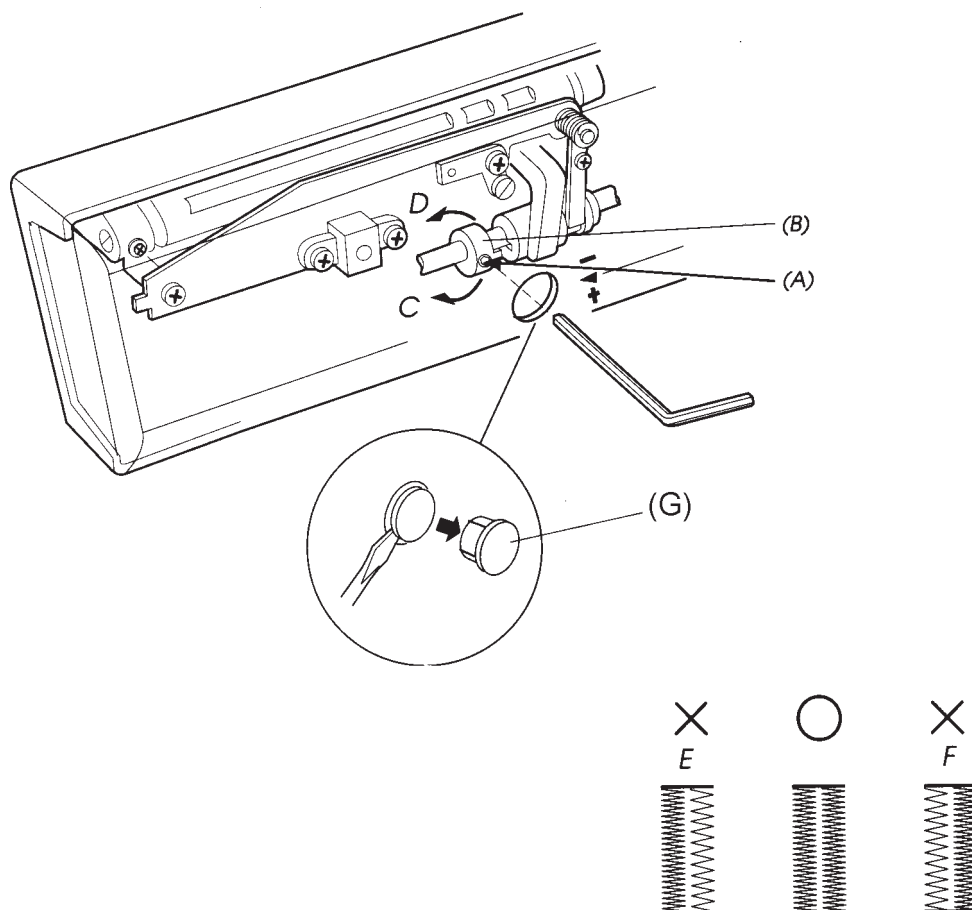
BUTTONHOLE STITCH BALANCE

If there is a difference in stitch density between the right and left rows of a buttonhole, make an adjustment in the procedure given below.

The left row should have 9 to 12 stitches compared with 10 stitches on the right row.

ADJUSTMENT PROCEDURE:

1. Attach buttonhole foot (R) and sew a buttonhole. Check the stitch density on the right and left rows.
2. Remove the cap (G).
3. Loosen the hexagon socket screw (A) of the feed cam ring (B) without moving the ring laterally.
4. If the left row is denser than the right row (E), turn the ring in the direction of (C).
If the right row is denser than the left row (F), turn the ring in the direction of (D).
5. Tighten the hexagon socket screw of the feed cam ring, and attach the cap (G).



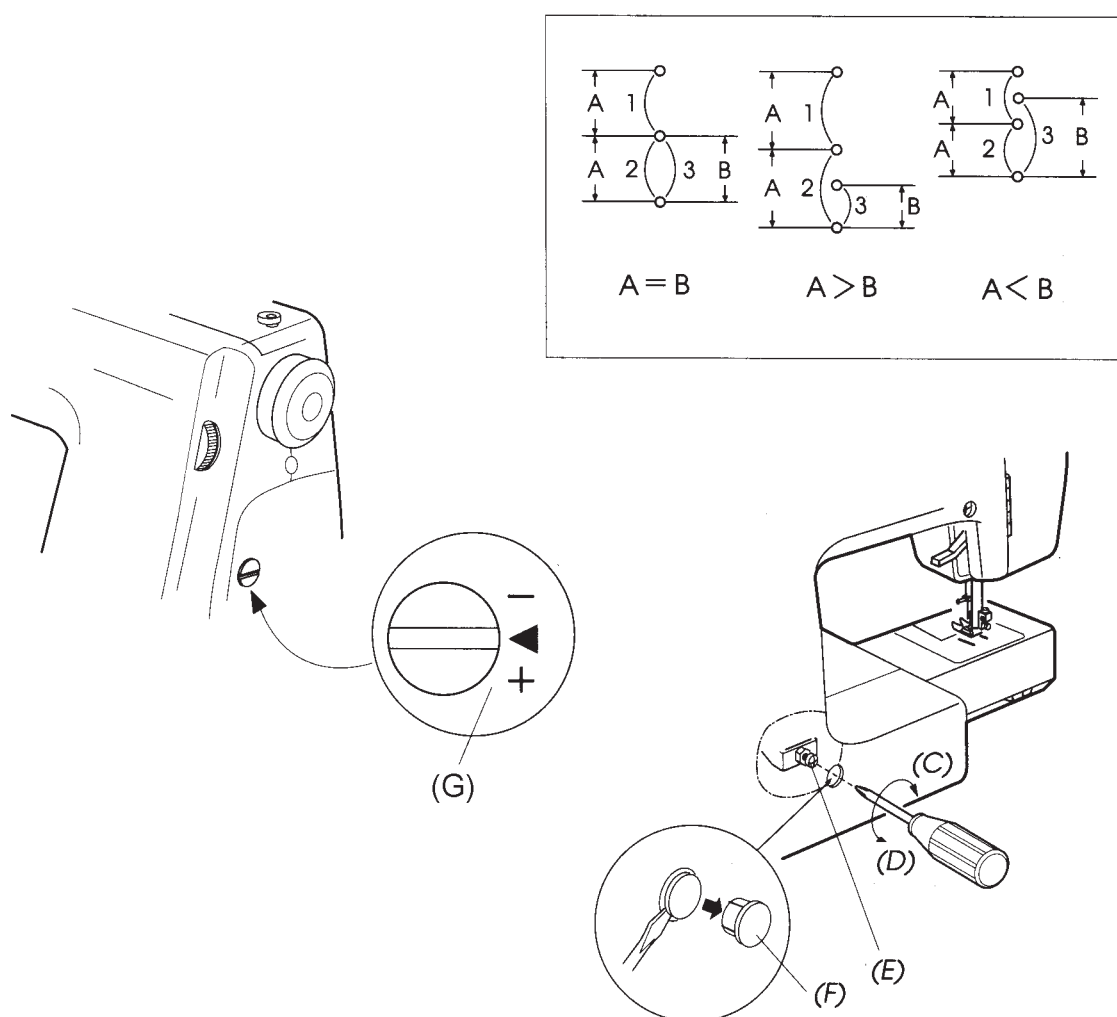
STRETCH STITCH BALANCE

When a triple lock straight stitch (stitch No. 15) is sewn with the feed balancing dial (G) at the standard setting mark "4", the stitch should form as shown in the figure below.

If not balanced, make an adjustment as follows:

Adjustment procedure:

1. Remove the cap (F).
2. If the reverse stitch length (B) is shorter than the forward stitch length (A), turn the adjusting set screw (E) in the direction of (C).
If the reverse stitch length (B) is longer than the forward stitch length (A), turn the adjusting set screw (E) in the direction of (D).
3. Attach the cap (F).



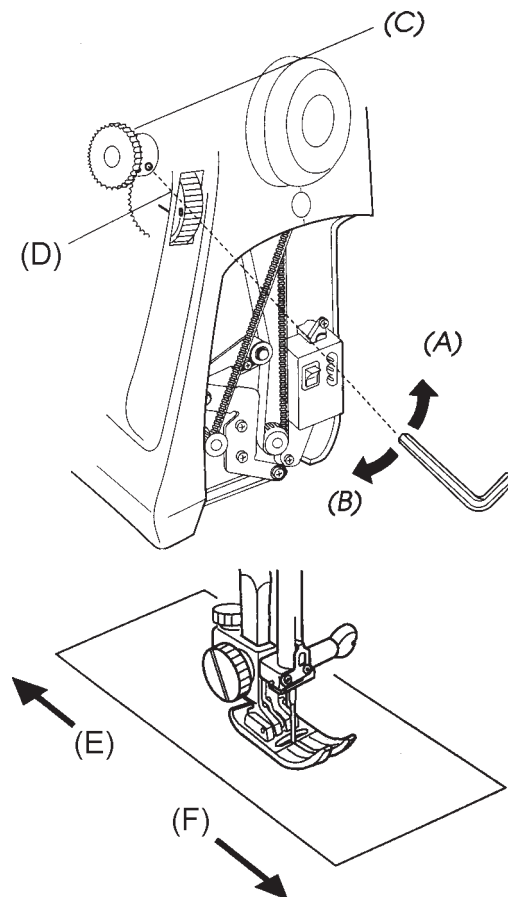
ZERO FEEDING

TO CHECK:

1. Set the pattern selector dial at straight stitch (stitch No. 2) and the stitch length dial (D) at "0".
2. Place a piece of paper under the presser foot and lower the foot.
3. Check if the paper moves forward or backward when you turn the hand wheel toward you.
4. The machine should not feed a piece of paper with the above setting.

Adjustment procedure:

1. Remove the belt cover (See page 3).
2. Set the pattern selector dial at straight stitch (stitch No. 2) and the stitch length dial (D) at "0".
3. Place a piece of paper under the presser foot and lower the foot. Then turn the hand wheel toward you by hand.
4. If the paper moves forward (E), turn the adjusting screw (C) in the direction of (A).
If the paper moves backward (F), turn the adjusting screw (C) in the direction of (B).
5. Attach the belt cover.

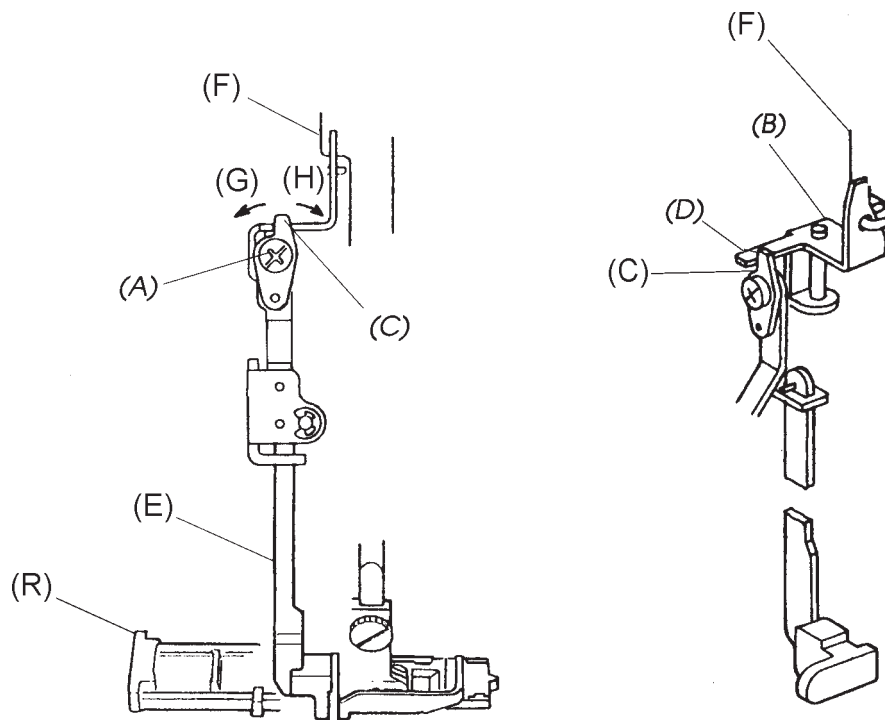


BUTTON HOLE FUNCTION (1)

A buttonhole standard length is 3mm longer than the actual button. The length can be adjusted as follows:

Adjustment procedure:

1. Lower the feed dog and attach buttonhole foot (R). Then lower the foot (R).
2. Open the face cover.
3. Loosen set screw (A).
4. Pull down the buttonhole lever (E) until it touches buttonhole foot (R).
The lever (B) should touch the front base plate (F). Also, make sure buttonhole lever adjusting plate (C) touches finger (D).
Tighten set screw (A).
5. Raise the feed dog and sew a buttonhole.
Loosen the set screw (A) and turn the buttonhole lever adjusting plate (C) in the direction of :
(G) if the buttonhole is too short.
(H) if the buttonhole is too long.



BUTTONHOLE FUNCTION (2)

If the bar tack on the buttonhole is sewn too early, or if no bar tack is sewn at all, adjust as follows:

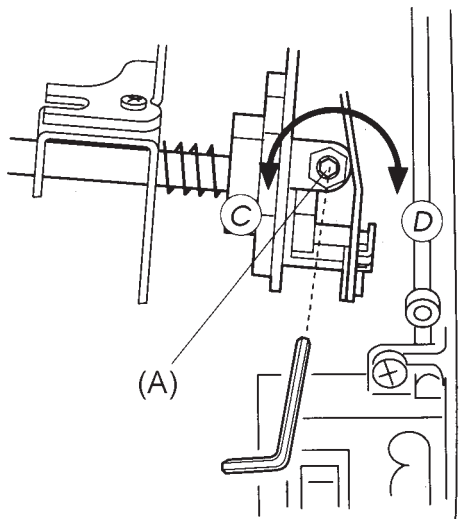
Adjustment procedure:

1. Remove the belt cover (See page 3).
2. Turn the hexagon socket screw (A) in the direction of:

(C) if bar tack is sewn too soon

(D) if bar tack is sewn too late.

3. Attach the belt cover.



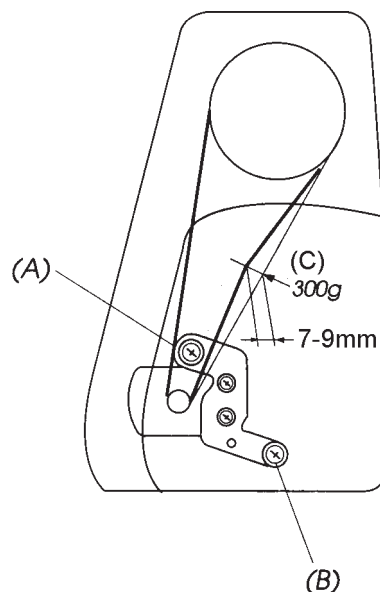
MOTOR BELT TENSION

TO CHECK:

1. If the motor belt tension is too tight or too loose, it may cause belt noise.
If motor belt tension is too tight it may cause the machine to run slowly and overload the motor.
If motor belt tension is too loose it may cause the belt teeth on the motor pulley to jump.
2. The correct motor belt tension is achieved when the belt pushes in about 7mm- 9mm under a pressure of about 300 grams (C).

Adjustment procedure:

1. Remove the belt cover (See page 3).
2. Loosen set screw (A) and (B).
3. Move the motor up or down to adjust the deflection to about 7mm- 9mm.
4. Tighten set screws (A) and (B).
5. Attach the belt cover.

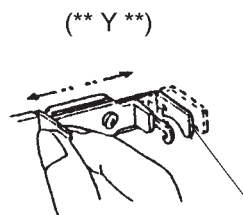
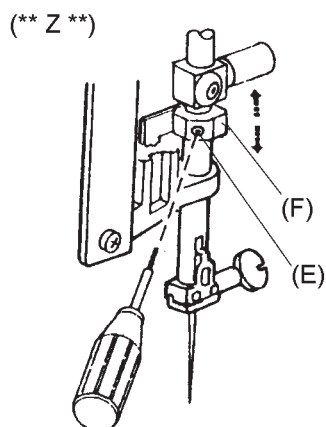
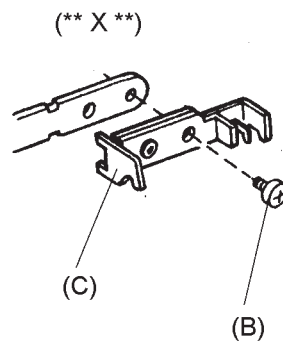
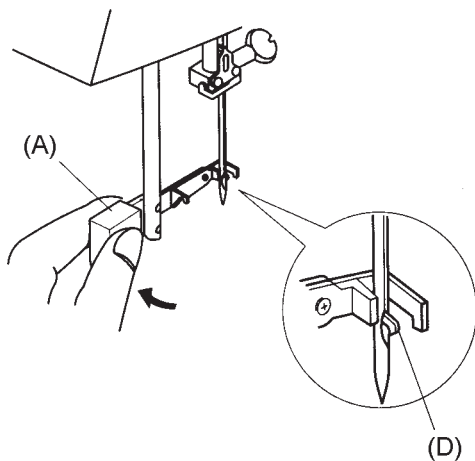


TO CHANGE THE THREADER PLATE:

1. Raise the needle to its highest position and lower the threader knob (A) to its lowest position.
2. Loosen the set screw (B) and remove the threader plate (C) as shown in (** X **).

TO CHANGE THE NEEDLE THREADER:

1. If the hook (D) of the threader plate (C) touches the left or right side of the needle eye, loosen the set screw (B) and adjust the hook position as shown in (** Y **).
2. If the hook (D) of the threader plate (C) touches the top or bottom side of the needle eye, loosen the hexagon screw (E) and adjust the hook position by moving the position setting plate (F) as shown in (** Z **).



WIRING OF TERMINAL BLOCK

A: Blue cord
B: Brown cord
L: from lamp socket
M: from motor

