

# **SINGER®**

## **Service Manual**

# **14**

**SH 644/654**

# PRECAUTIONS

- Be sure to disconnect plug from electric outlet.
- Be sure that the electrical voltage of the electric outlet (wall receptacle) is the same as the rated voltage of the motor.
- Do not touch the machine with wet hand. wet cloth or with anything wet.
- When turning the machine pulley, always turn it toward the operator in the direction indicated by arrow on the pulley.
- The lower looper and upper looper mentioned in this manual are the same as left looper and right looper listed on the parts chart.

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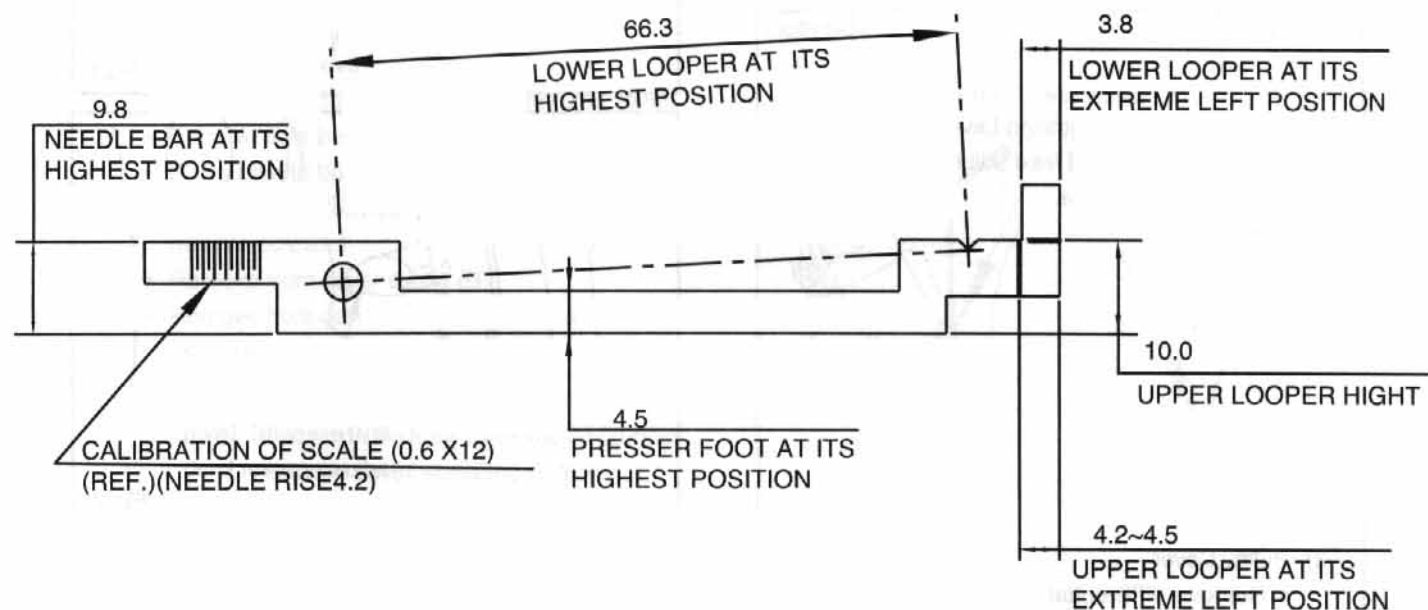
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## 1. SPECIFICATION

Item	Specification	
Sewing speed	1,300 rpm maximum	
Stitch length (feed amount)	1 ~ 4mm (standard: rolled hemming F - 2, ordinary overedge 3.0)	
Differential feed ratio	1:0.7 ~ 1:2 (with differential feed machine)	
Overedge stitch width	Rolled hemming 1.5mm, ordinary overedge 3.0 ~ 7.7mm (standard 3.5mm)	
Needle bar stroke	27mm	
Presser foot rise	4.5mm	
Needle	Rolled hemming: Singer Cat. No. 2022 #11 Ordinary overedge: Singer Cat. No. 2022 #11, #14	
Model	14U644	14U654
Number of threads	4	4
Machine dimensions (mm)		
Width	329	329
Depth	270	270
Height	265	265
Weight (Kg)	6.0	6.2

## 2. HOW TO USE SERVICE GAUGE

- 14U 644/654 ( four thread ) Type Service Gauge ( P/N 550321-554 )



### 3. EXTERNAL PARTS

#### < Removal >

##### 1) Light Cover

- Remove light cover screw in back of machine.
- Push light cover downward and to the left away from you and remove it from machine.

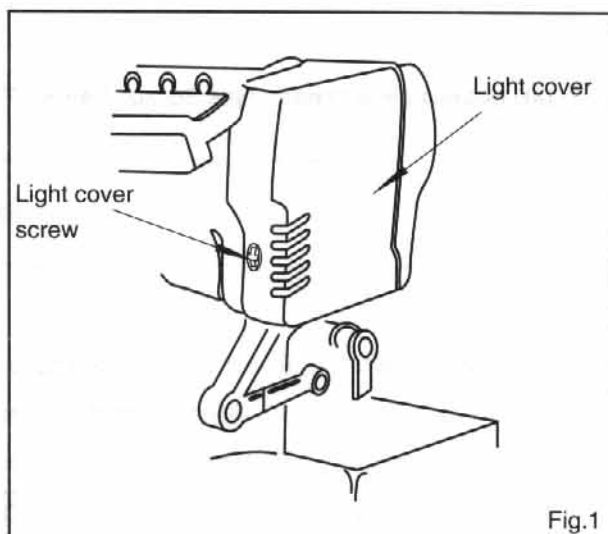


Fig.1

##### 2) Differential Feed Adjusting Lever Knob

- Pull the differential feed adjusting lever knob to the right to remove.

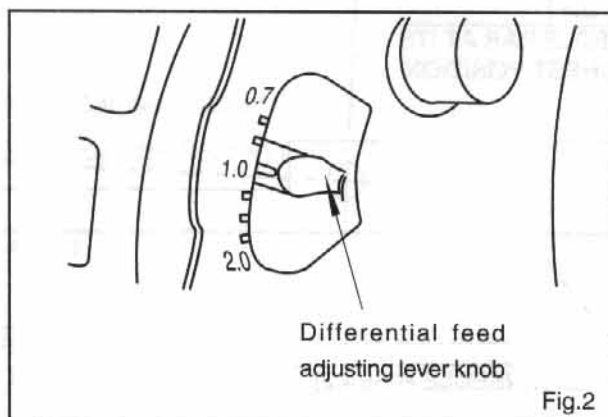


Fig.2

##### 3) Pulley Cover

- Remove differential feed adjusting lever knob (654 only).
- Remove three pulley cover screws.
- Push pulley cover to the rear until it clears the boss (A) on rear cover and remove from machine.

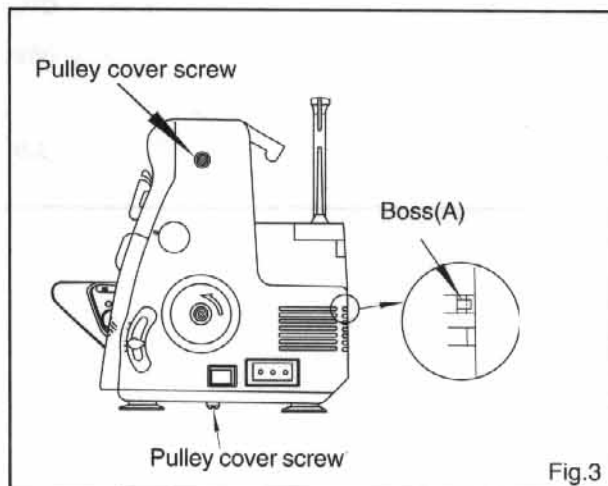


Fig.3

##### 4) Top Cover

- Remove light cover and pulley cover.
- Remove two top cover screws.
- Remove top cover.

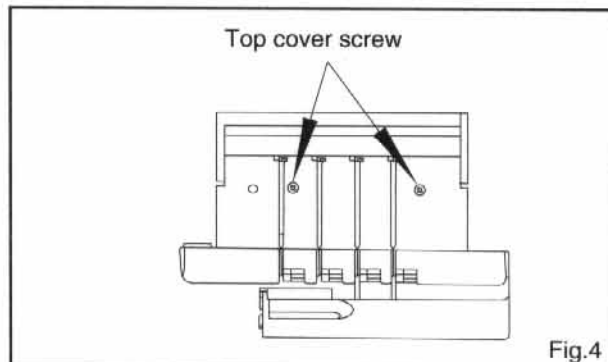
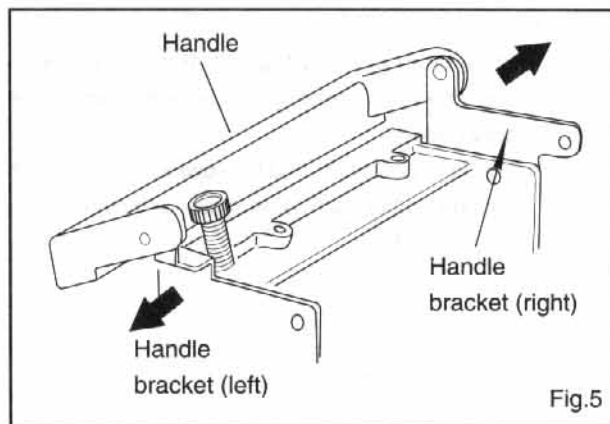


Fig.4

5) Handle

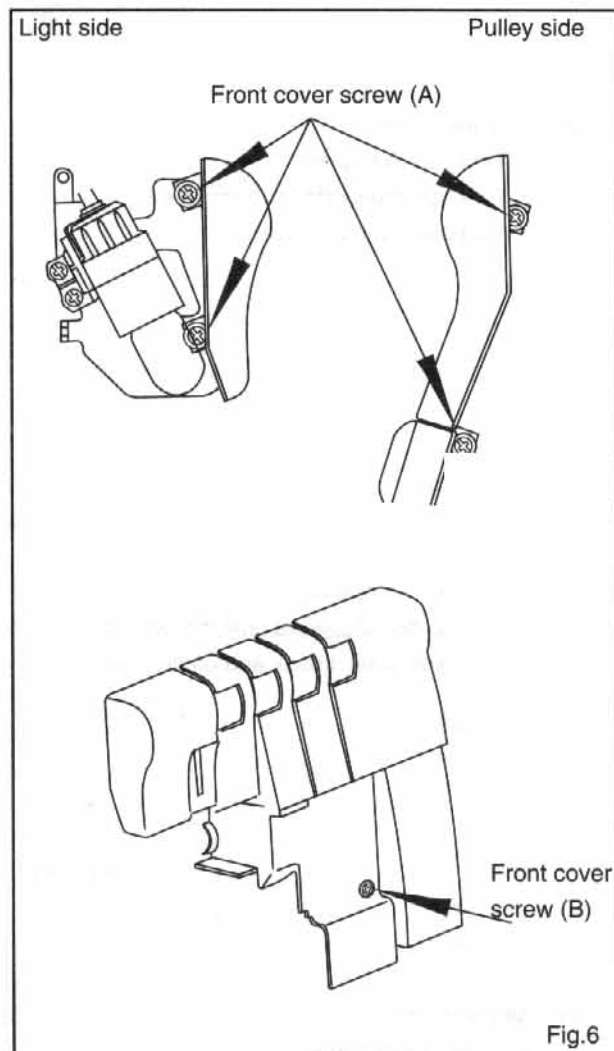
- Remove light cover, pulley cover and top cover.
- Push handle outward as shown at right and remove from hinge pins on left and right handle brackets.



6) Front Cover

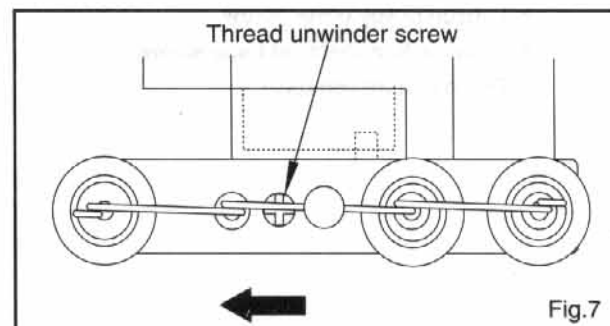
- Open looper cover
- Remove light cover, pulley cover and top cover.
- Remove light bulb.
- Raise needle bar to its highest position.
- Loosen four front cover screws (A). (Do not remove screws.)
- Remove front cover screw (B).
- Remove front cover by drawing it toward front of machine.

NOTE: The rib on the front cover should fit under the rear cover at mating portion.



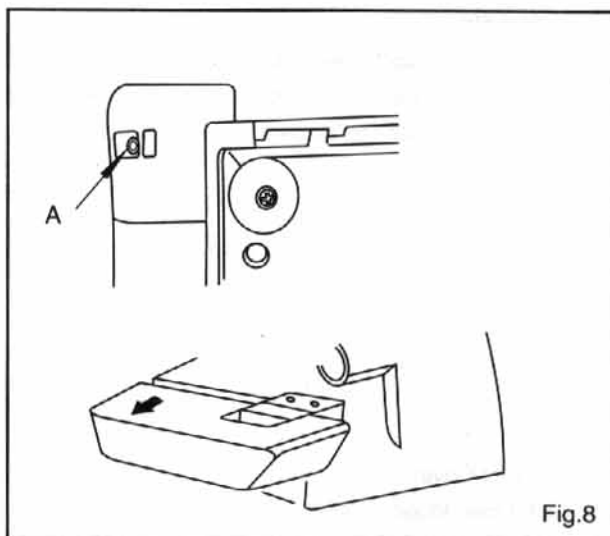
7) Thread Unwinder

- Remove thread spool for upper looper from thread unwinder.
- Remove thread unwinder screw.
- Slide thread unwinder toward pulley end and remove from machine.



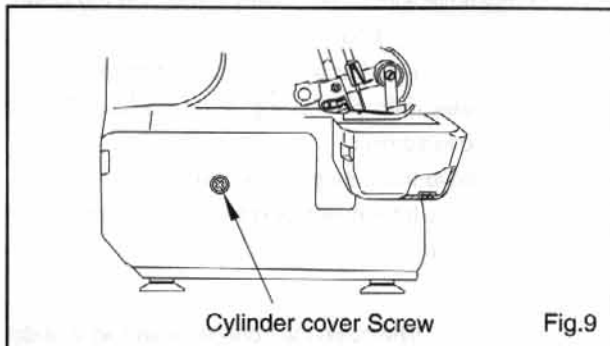
#### 8) Cloth Plate

- Slide cloth plate to the left and remove from machine while pressing button (A) located on the underside.
- This is especially suited for sewing hard to reach garment areas such as armholes and overcasting trouser cuffs.



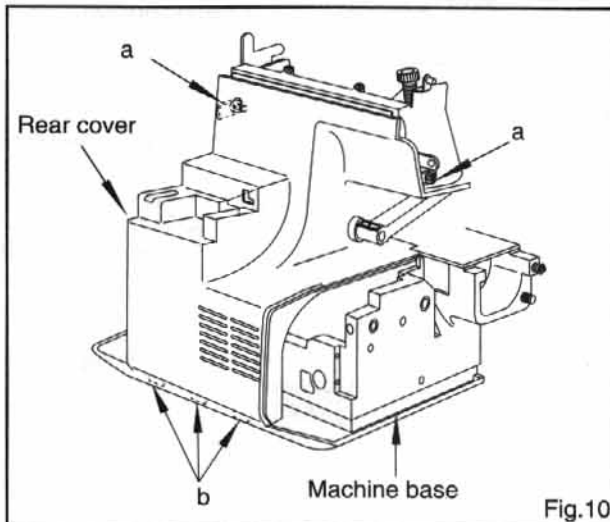
#### 9) Cylinder Cover

- Remove cloth plate.
- Remove two cylinder cover screws.
- Remove Cylinder cover



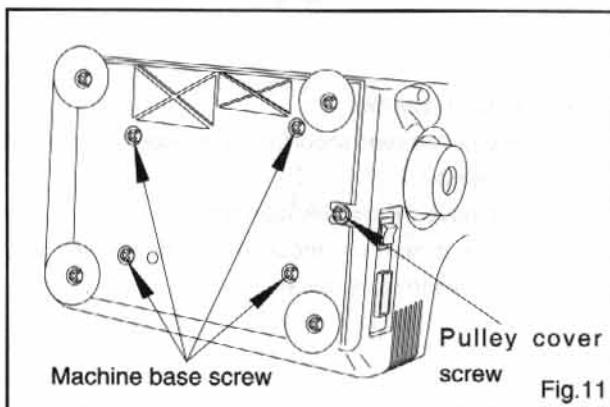
#### 10) Rear Cover

- Remove light cover, pulley cover, top cover, thread unwinder and Cylinder cover.
- Loosen two rear cover screws (a).
- Lift rear cover upward until the tabs (b) clear the base and draw it back and off the machine.



#### 11) Machine Base

- Open loop cover.
- Loosen pulley cover screw.
- Remove four machine base screws.
- Remove machine base.



#### 4. TO SET NEEDLE BAR AT CORRECT HEIGHT

- Remove light cover.
- Remove presser foot.
- Remove Cylinder Cover.
- Remove light socket.
- Turn machine pulley toward you until needle bar is at its highest position.
- Loosen needle bar connecting stud screw.

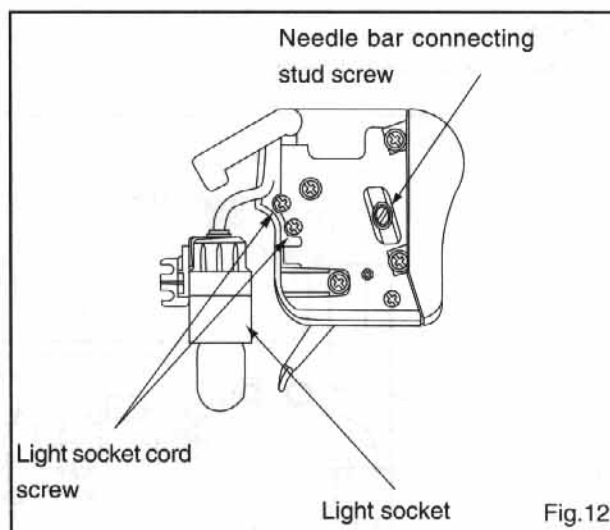


Fig.12

- Adjust needle bar to correct height as shown in sketch using Cat.No.2022 size #14 needle and service gauge while taking every care not to disturb the setting of needle clamp.

NOTE: Check and make sure the needle is inserted fully into the needle clamp.

- Firmly tighten needle bar connecting stud screw.

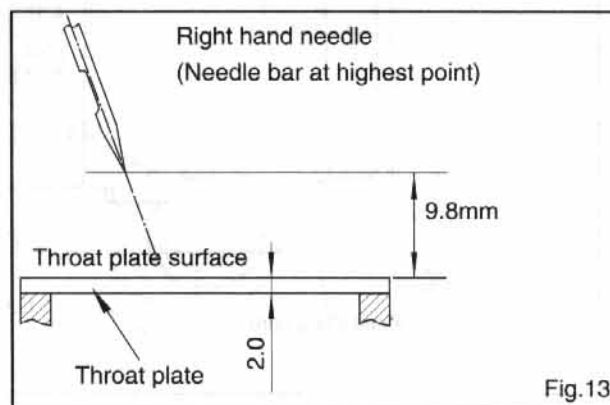


Fig.13

#### <Setting of Throat Plate>

- If feed dog interferes with the throat plate, feed dog setting should also be readjusted. (See pages 16, 17 ).
- Loosen throat plate screws (A) and (B) and adjust throat plate so that left and right overedge needles are equally distanced (a and b) from edge of slot in throat plate.

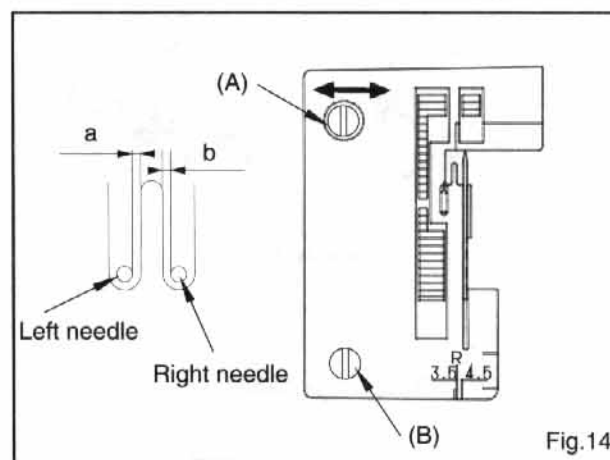


Fig.14

5.Cams

< Setting and Name of Cams >

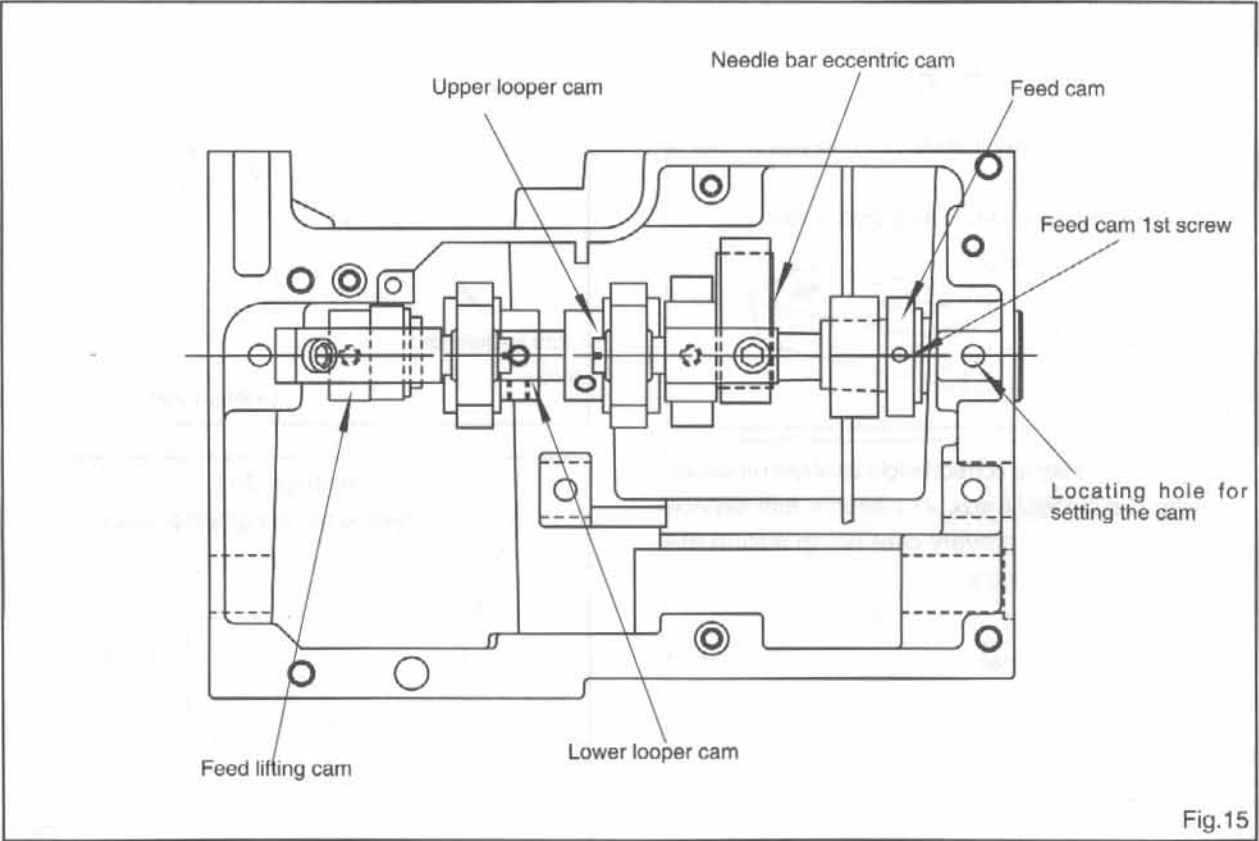


Fig.15

## <To Set the Cams>

### 1) Feed Cam

Position first set screw in feed cam to bear squarely on flat on rotating shaft and tighten set screw making sure there is no end play in rotating shaft.

### 2) Needle Bar Eccentric Cam

Position first set screw in needle bar cam to bear squarely on flat on rotating shaft and tighten set screw.

### 3) Lower Looper Cam

When projection on feed cam is located in a position shown at right, adjust lower looper cam so that its first set screw is located at 6 o'clock position and tighten set screw temporarily.

### 4) Upper Looper Cam

When midway between first and second set screws of lower looper cam is located at 6 o'clock position, adjust upper looper cam so that its first set screw is located at 6 o'clock position and tighten set screw temporarily.

### 5) Feed Lifting Cam

Align first set screw in feed lifting cam with first set screw in feed cam and tighten temporarily making sure the flange side of the feed lifting cam is located as shown in sketch.

Set feed lifting cam so that there is 0.2 ~ 0.5 mm clearance between feed bar as shown in sketch.

Viewing cam from machine pulley side

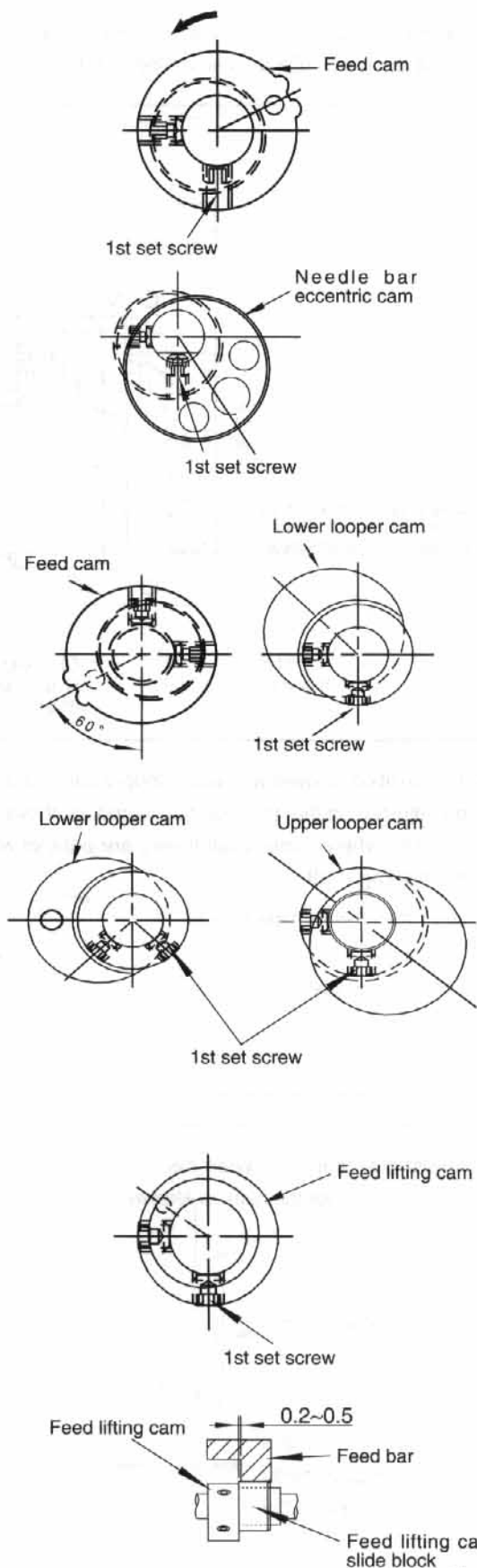


Fig.16

## <Setting of Looper Shaft Levers and Cams>

Both chainstitch and upper looper shaft lever screw or lower and upper looper shaft lever screw should be located in line with the center line of rotating shaft.

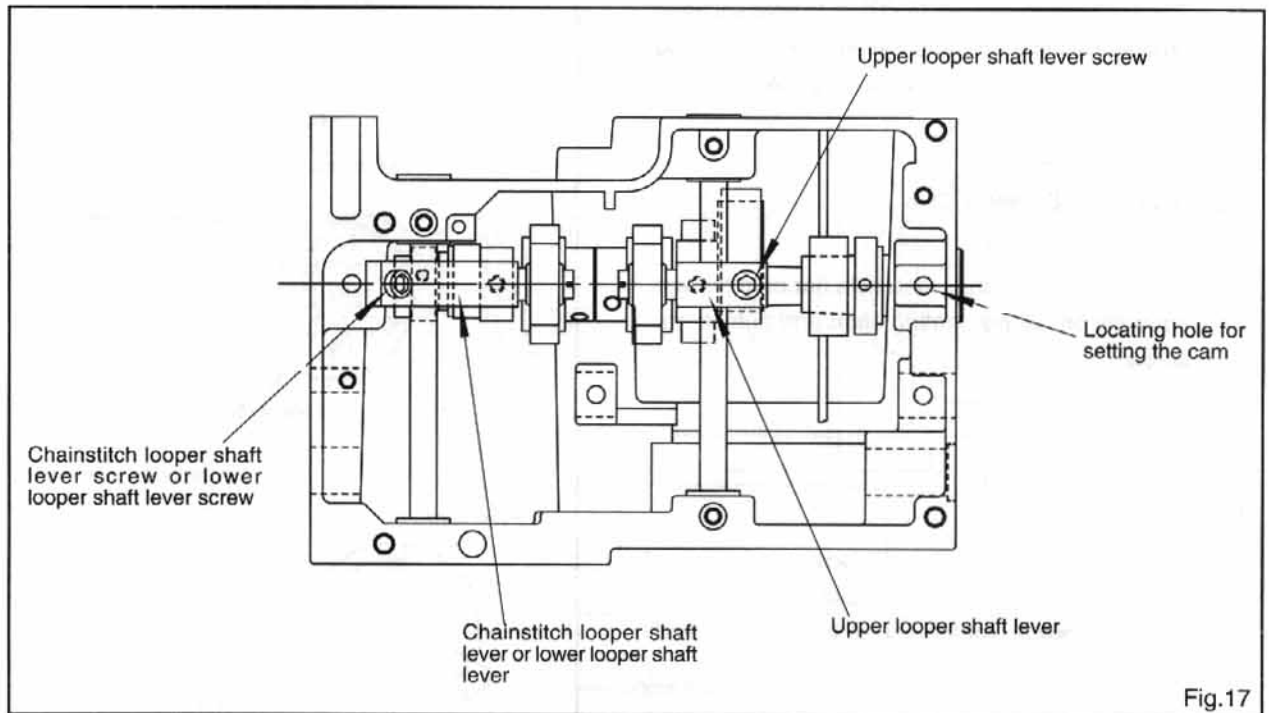


Fig.17

- The position of lower and upper looper cams should be adjusted so that they will be located as shown in Fig. 18 when looper shaft levers are parallel with the rotating shaft.

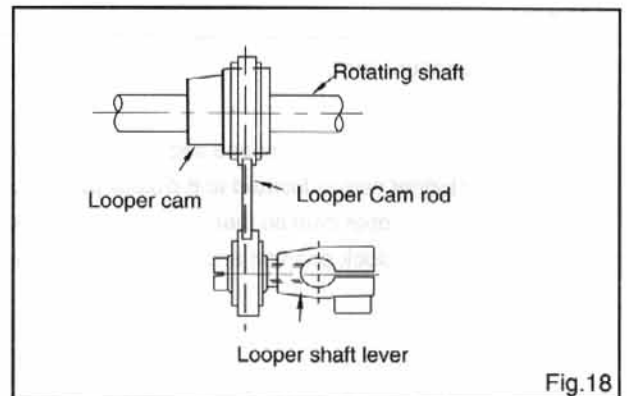


Fig.18

- Adjust clearance between needle crank rod and needle bar eccentric cam as shown in sketch.

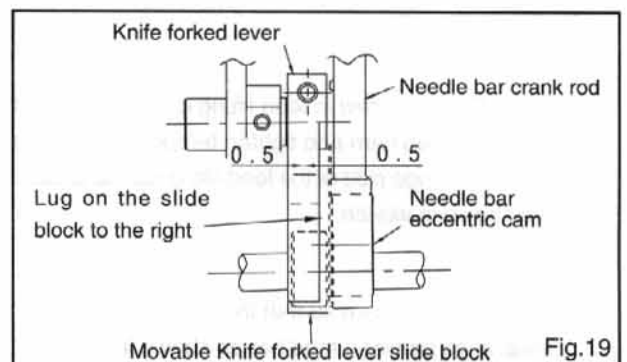


Fig.19

## 6. LOWER LOOPER

### 1) To Set The Lower Looper Height

- Open looper cover and remove machine base.
- Remove presser foot, throat plate and feed dog.
- Remove lower looper holder thread guide and needle guard (back) for overedge needle.
- Turn machine pulley until lower looper is at its extreme right position.
- Fasten service gauge to lower looper holder with thread guide screw as shown in Fig.20 and turn it back one half turn.
- Loosen lower looper screw and move lower looper up or down as required, until lower looper is in a position shown in Fig. 20
- Firmly tighten lower looper screw.

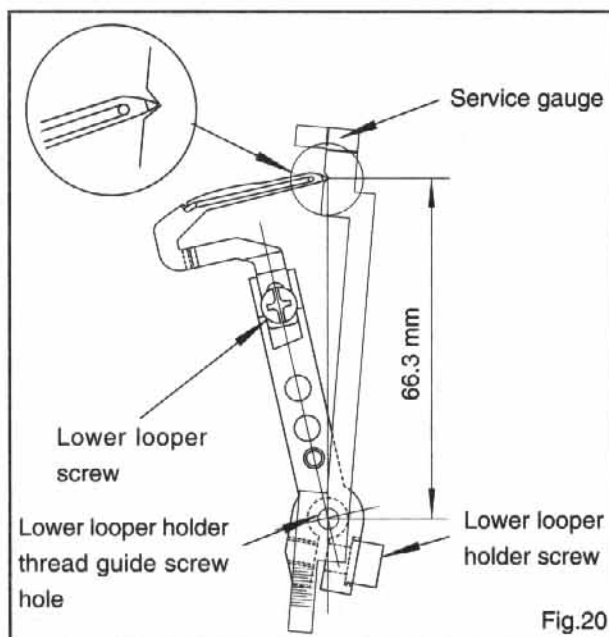


Fig.20

### 2) Setting of lower Looper Holder Thread Guide and Needle Guard (back) for Overedge Needle

- \* Assemble needle guard (back) for overedge needle so that the extension line of its edge will meet the lower looper point as shown in sketch. (Needle guard (back) for overedge needle should be assembled parallel to lower looper holder.)
  - \* Secure lower looper holder thread guide in position while pushing it lightly against the needle guard (back) for overedge needle.
- Needle guard (back) (For overedge needle)
- Lower looper holder thread guide
- Lower looper holder thread guide screw
- Needle guard (back) (For overedge needle) screw

Fig.21

### 3) To Time The Lower Looper in Relation with the Needle

NOTE: Use Cat. No. 2022 size #14 needle.

- a) Loosen lower looper shaft lever screw taking care not to disturb the lower looper cam and set the looper shaft lever so that the point of lower looper is located 3.8mm from left side of right needle when in its extreme left position. (Fig. 22)

Firmly tighten the looper shaft lever screw. (Fig. 25)

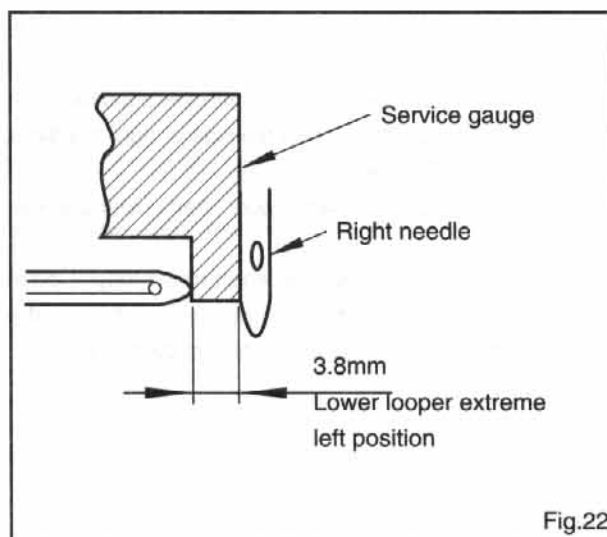


Fig.22

- b) Adjust lower looper cam so that the point of lower looper is at center of right needle when needle rises 4.2mm from its lowest position. (Fig.23)  
Firmly tighten lower looper cam set screw.(Fig. 25)

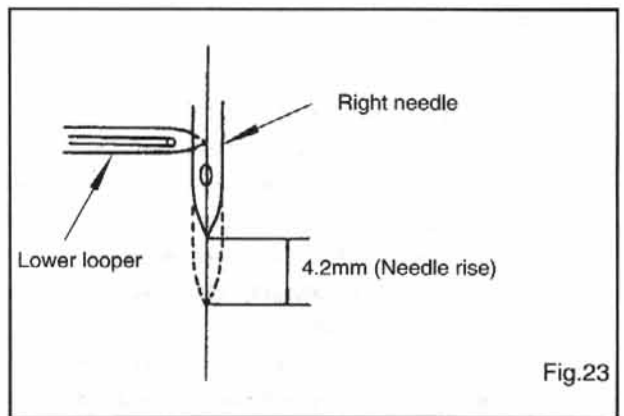


Fig.23

- \* Use service gauge calibrated into 0.6mm graduation when setting the needle rise. Remove top cover and front cover and insert service gauge into needle bar bushing.

Turn machine pulley until needle bar rises seven graduations (on the gauge) from its lowest position. This position is the specified 4.2mm needle rise. (Fig. 24)

If service gauge is not available, adjust needle rise using calipers in place of the gauge.

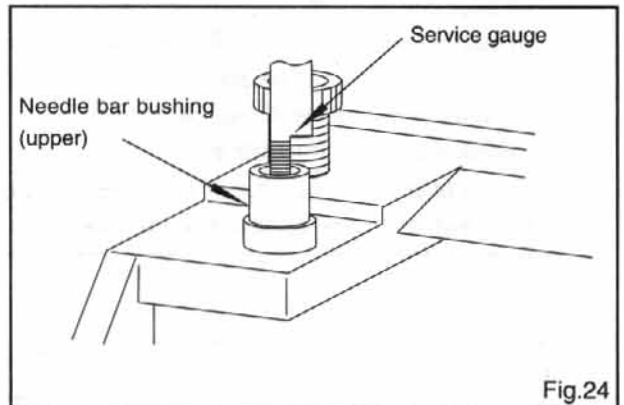


Fig.24

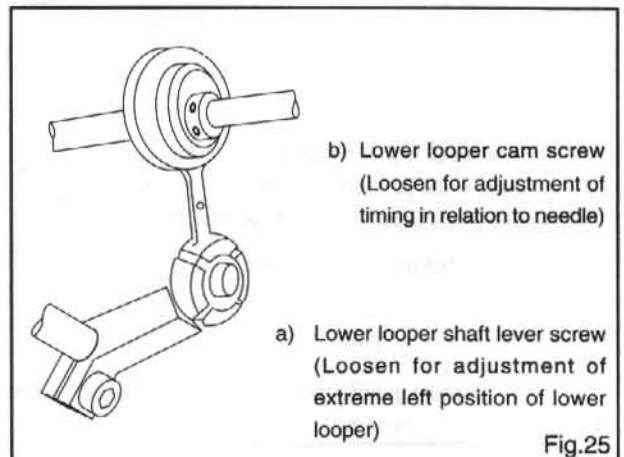


Fig.25

- c) Loosen lower looper shaft bushing screw (Fig. 27 ) and move looper shaft bushing forward or backward, as required, until clearance between looper point and reverse side of right needle is zero. (Fig. 26 )

Firmly tighten lower looper shaft bushing screw.

Adjust clearance between lower looper point and reverse side of left needle by adjusting the needle guard as instructed on page 23.

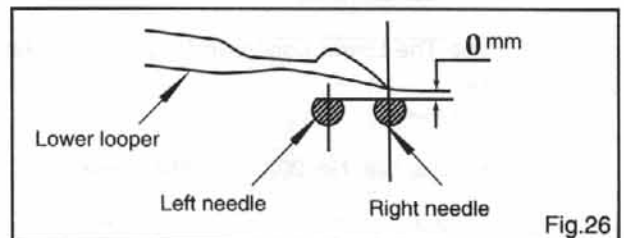


Fig.26

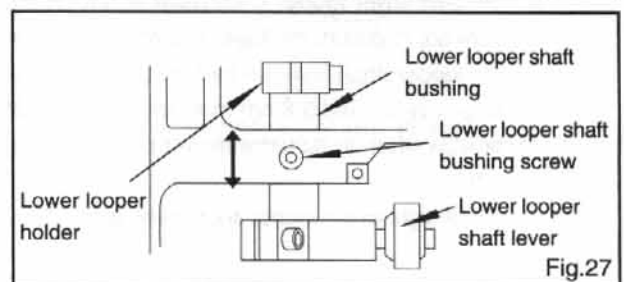


Fig.27

## 7. UPPER LOOPER

### To Adjust the Upper Looper

- Open looper cover and remove machine base.

NOTE: Use Cat. No. 2022 size #14 needle.

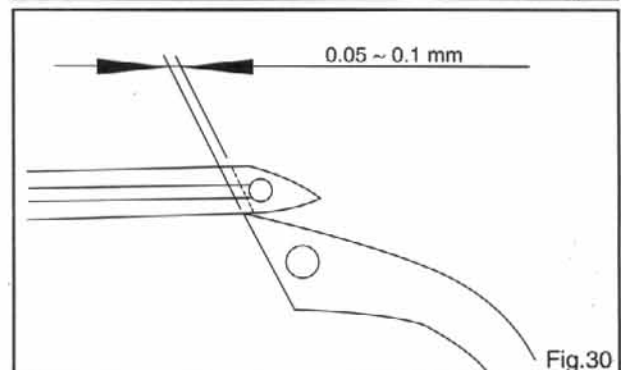
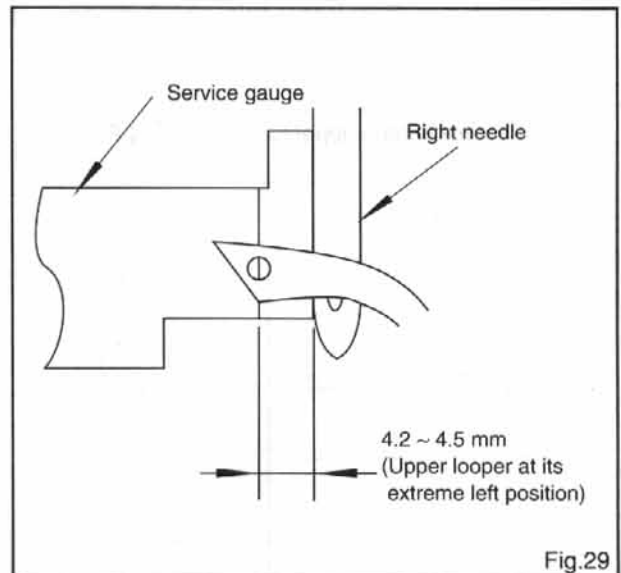
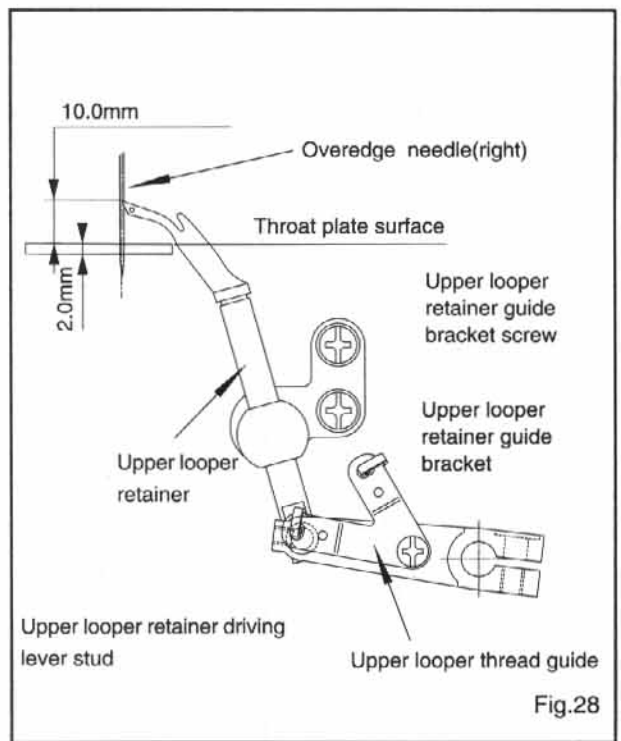
- Loosen two upper looper retainer guide bracket screws and move upper looper retainer, as required, so that the upper looper height is as shown in Fig.28, when upper looper point is at center of needle.

Firmly tighten the two upper looper retainer guide bracket screws taking every care not to move the upper looper retainer guide bracket out of position.

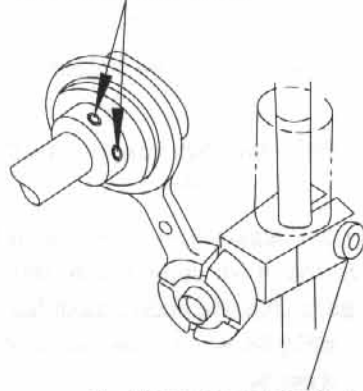
- Secure upper looper thread guide in position with its bottom edge aligned flush with underside of upper looper retainer driving lever stud. (Fig. 28)
- Loosen upper looper shaft lever screw (Fig. 31) taking care not to disturb the upper looper cam and set the looper shaft lever so that the center of eye of the looper is located as shown in Fig. 29 when at its extreme left position.

Firmly tighten looper shaft lever screw. (Fig. 31)

- Turn machine pulley to bring lower and upper loopers to the position shown in Fig. 30 and adjust upper looper cam to provide 0.05 - 0.1mm clearance as shown in Fig. 30. Then firmly tighten upper looper cam set screw. (Fig. 31)



- d) Upper looper cam set screw  
(Loosen for adjustment of lower  
and upper looper timing)



- c) Upper looper shaft lever screw  
(loosen for adjustment of extreme left  
position of upper looper)

Fig.31

- e) Loosen upper looper screw and adjust upper  
looper so that there is 0 ~ 0.1mm clearance  
between upper looper point and reverse side of  
lower looper as shown in Fig. 32.

Firmly tighten upper looper screw. ( Fig. 32 )

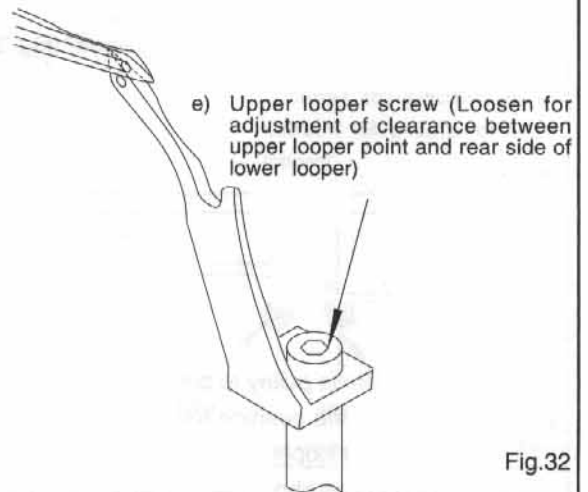
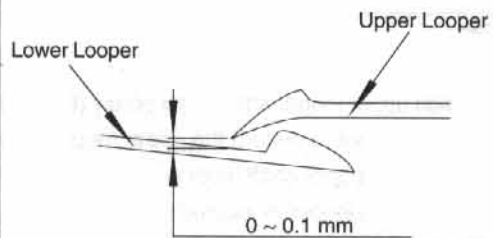
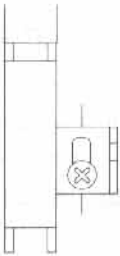
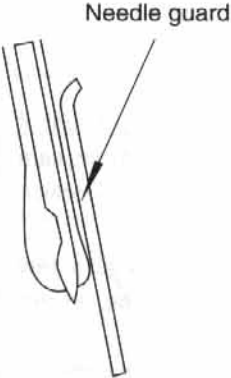
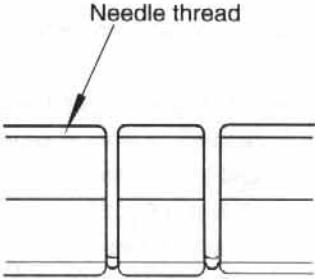
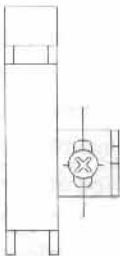

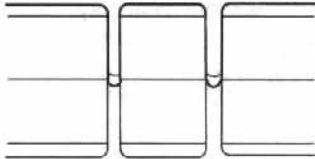
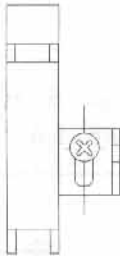

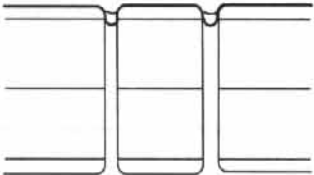


Fig.32

8. TO SET FRONT COVER THREAD GUIDE BRACKET

Loop shape and stitch formation of overedge needle thread can be varied by moving the thread guide bracket up and down.

POSITION OF SCREW IN HOLE	* LOOP SHAPE	* STITCH FORMATION
<div></div> <div>BOTTOM</div>	<div></div>	<div></div>
<div></div> <div>CENTER</div>	<div></div>	<div><p>Standard thread tension (correct)</p></div>
<div></div> <div>TOP</div>	<div></div>	<div></div>

\* Sketch shows exaggerated loop shape and stitch formation

## 9. Feed

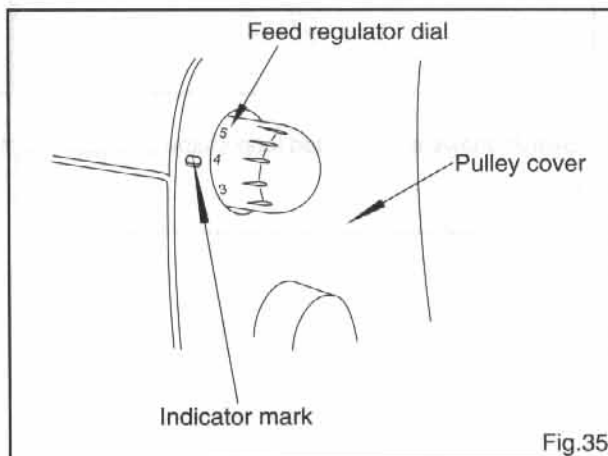
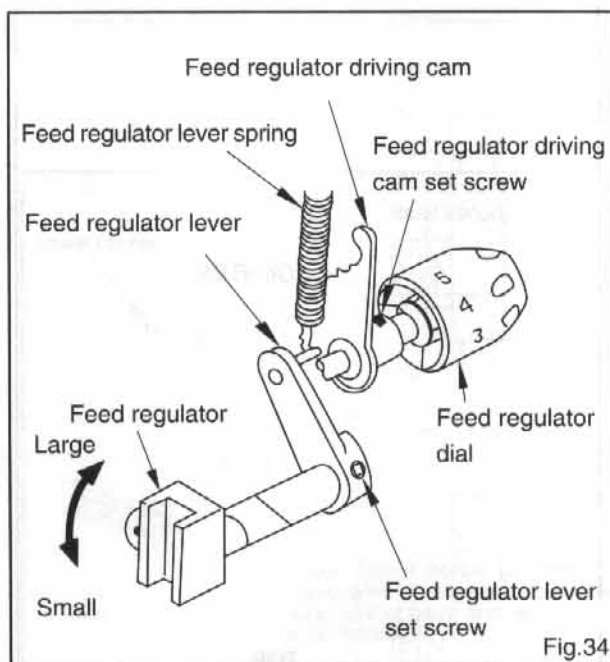
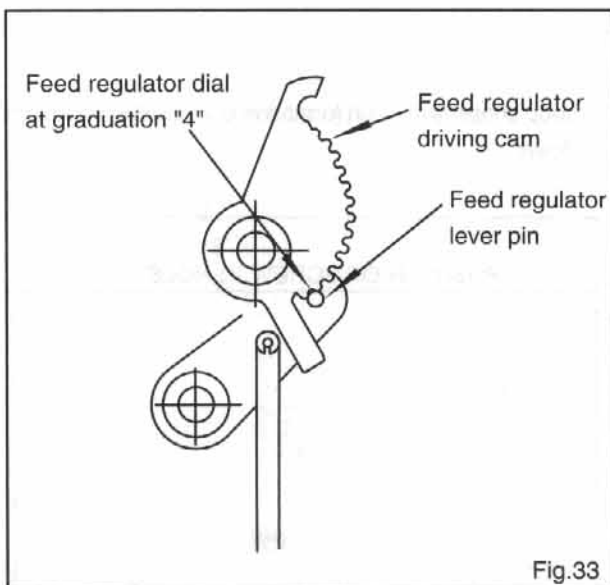
- Check and make sure feed timing is correct.
- Normally the machine is adjusted to sew a maximum stitch length of 4mm, therefore when making adjustment, set machine for longest stitch of 4mm.
- Remove pulley cover, light cover and front cover.

### 1) To Adjust Amount of Feed

- Adjust angle of feed regulator so that amount of feed will be 4mm when feed regulator driving cam and feed regulator lever pin is located in a position shown in Fig. 33.
- To adjust, loosen feed regulator lever set screw and turn feed regulator, as required, in the direction of arrow. (Fig. 34)
- When feed regulator has been set in correct angle, tighten feed regulator lever screw making sure the feed regulator functions smoothly by means of feed regulator lever spring force and without axial play.

### 2) To Set the Feed Dial

- When amount of feed is set to 4mm, the graduation mark "4" on the feed dial should be aligned with indicator mark on pulley cover.



## - Standard Feed (644)

### 1) To Time the Feed

- Open looper cover and remove machine base.
- When point of needle reaches the throat plate surface on its downward stroke, the feed dog should be located at rearmost position and the top of its teeth level with the throat plate surface as shown in Fig. 36.

NOTE: Use Cat. No. 2022 size #14 needle.

- If adjustment of feed timing is necessary, adjust as follows.
  - Loosen two feed lifting cam screws and turn cam as required.
  - Firmly tighten feed lifting cam screws.

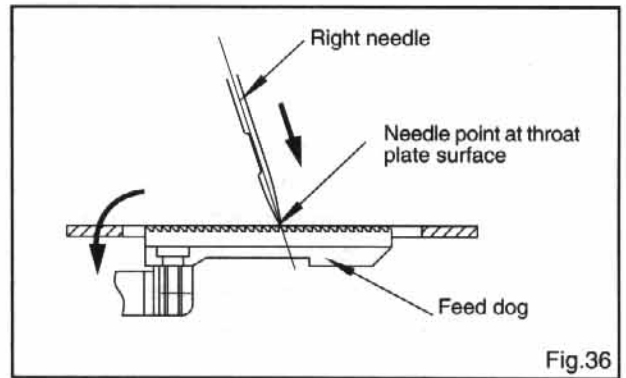
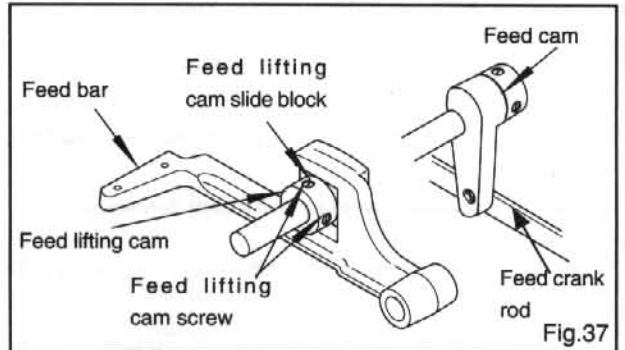


Fig.36



Viewed from bottom of machine

### 2) To Position Feed Dog in Throat Plate Slots

- Set feed dial for longest stitch "4".
- Remove presser foot.
- Front-to-back travel of feed dog should be equidistant from both front and rear edges of slots in throat plate.
- If front-to back adjustment is necessary, adjust as follows.
  - Remove light cover, pulley cover, top cover, and rear cover.
  - Loosen two feed crank (left) set screws and move feed bar forward or backward, as required.

- \* Make sure the feed dog is centered laterally in throat plate slots and tighten the two feed crank (left) set screws.

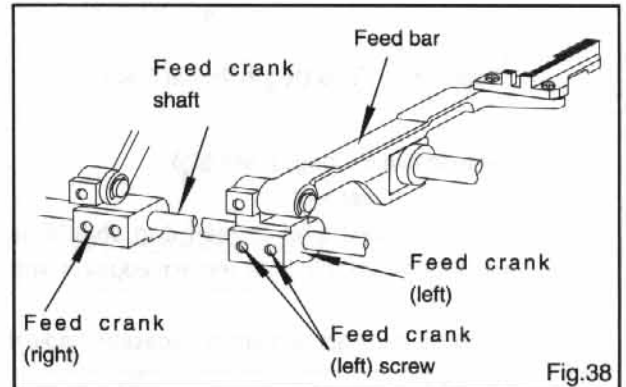


Fig.38

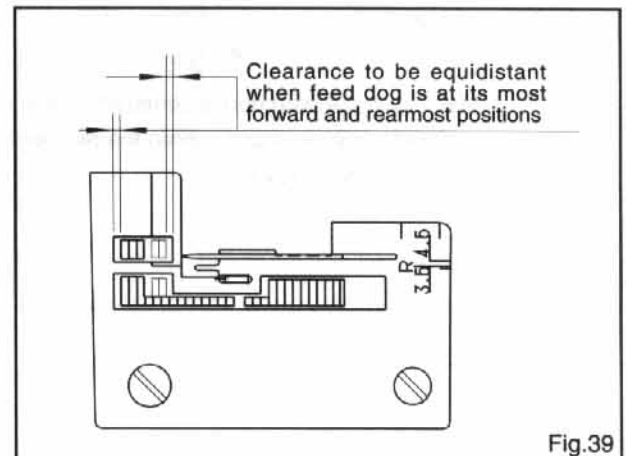


Fig.39

## - Differential Feed (654)

### 1) To Time the Feed

- Open looper cover and remove machine base.
- When point of needle reaches the throat plate surface on its downward stroke, the main feed dog should be located at rearmost position and the top of its teeth level with the throat plate surface as shown in Fig. 56.

NOTE: Use Cat. No. 2022 size #14 needle.

- If adjustment of feed timing is necessary, adjust as follows.
  - Loosen two feed lifting cam screws and turn cam as required.
  - Firmly tighten feed lifting cam screws.

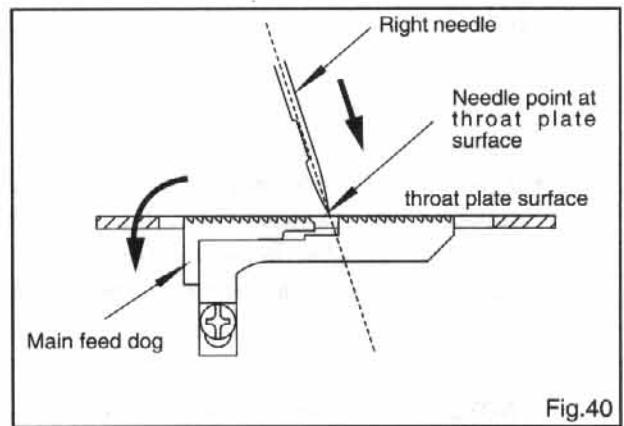


Fig.40

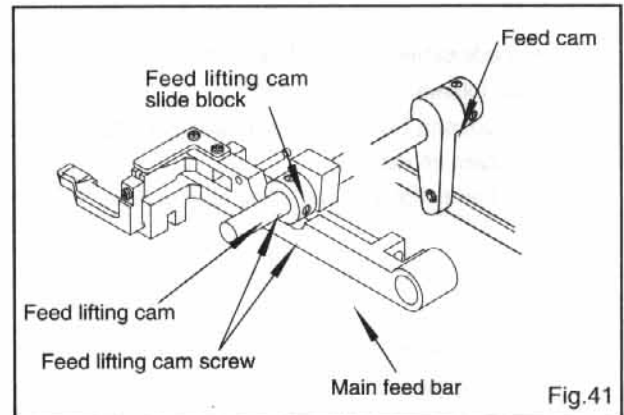


Fig.41

Viewed from bottom of machine

### 2) To Position Feed Dog in Throat Plate Slots

- Set feed dial for longest stitch "4".
- Remove presser foot.
- Front-to-back travel of feed dog should be equidistant from both front and rear edges of slots in throat plate.
- If front-to-back adjustment is necessary, adjust as follows.
  - Remove light cover, pulley cover, top cover, and rear cover.
  - Loosen two feed crank (left) set screws and move feed bar forward or backward, as required.
- \* Make sure the feed dog is centered laterally in throat plate slots and tighten the two feed crank (left) set screws.

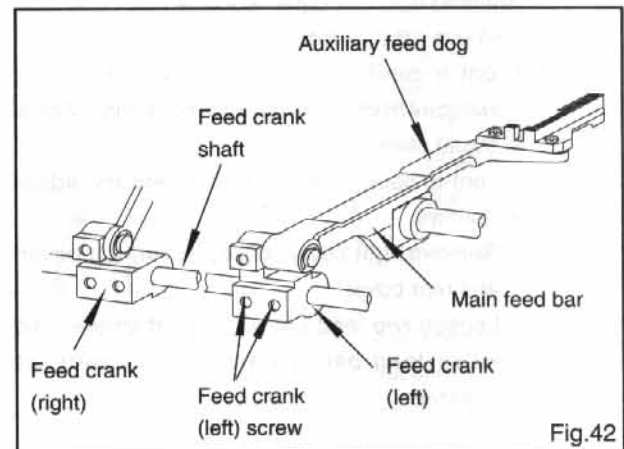


Fig.42

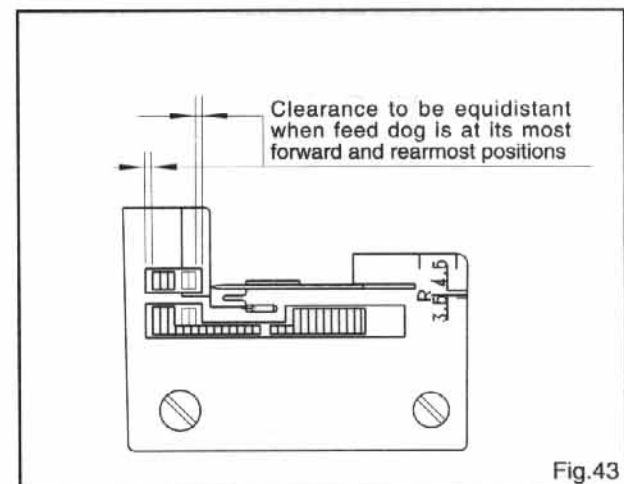


Fig.43

### 3) To Adjust the Auxiliary Feed Dog

- Remove presser foot.
- Open looper cover and remove machine base.
- Set feed regulator dial to "3" and set differential feed adjusting lever to maximum gathering ratio.
- Turn machine pulley toward you until feed dog is at its rearmost position.
- Since there is a slight play in auxiliary feed dog, loosen differential feed arm screw (Fig . 45) and adjust differential feed arm so that there is 0.5 mm clearance between auxiliary feed dog and edge of throat plate slot when auxiliary feed dog is pushed back to its rearmost position.

NOTE: Differential feed adjusting arm set screw is set squarely on the flat on differential feed shaft.

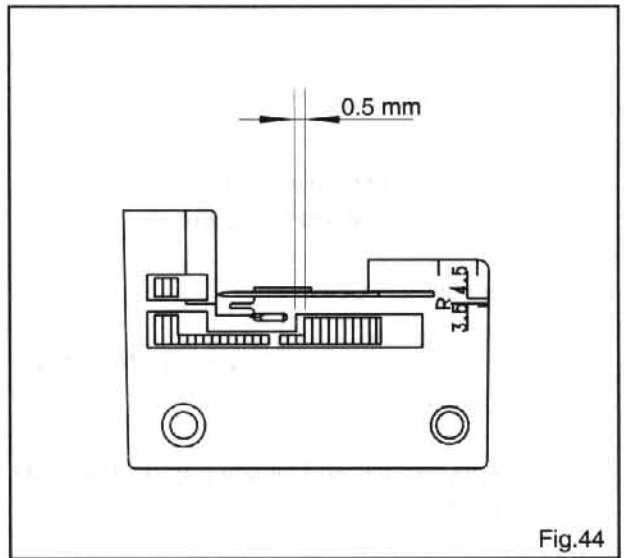


Fig.44

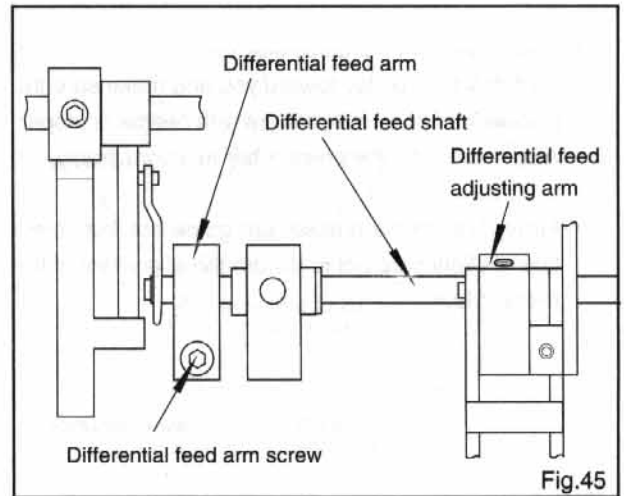


Fig.45

### 4) To Adjust Auxiliary Feed Dog Height

- Loosen auxiliary feed dog screw.
- Adjust height of auxiliary feed dog so that top of its teeth will also be level with the throat plate surface when top of main feed dog teeth are level with the throat plate surface on its descent as shown in Fig. 46.
- Tighten auxiliary feed dog screw.

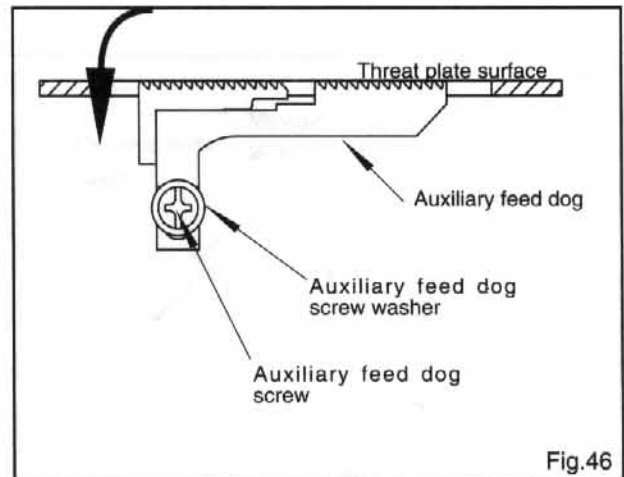
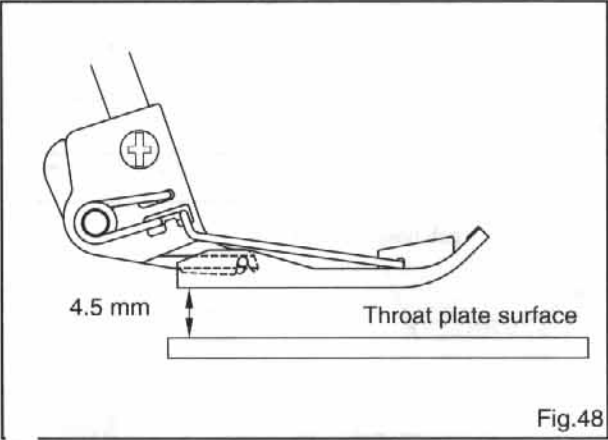
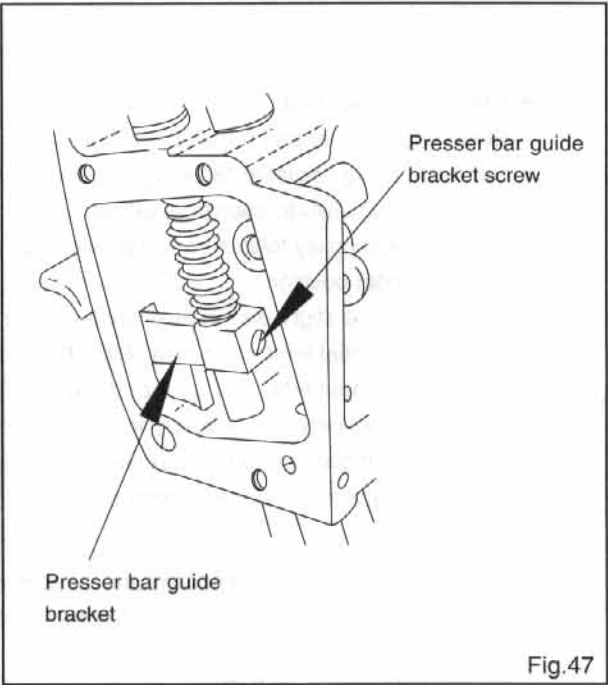


Fig.46

# 10.PRESSER FOOT

## < To Adjust Presser Foot Lift >

- Remove light cover, pulley cover, top cover, handle, lamp holder bracket and front cover.
- Remove Cylinder Cover.
- Turn machine pulley toward you until feed dog is below throat plate surface.
- Raise presser bar and loosen presser bar guide bracket screw. (Fig. 47)
- Set presser foot to correct height with scale or service gauge as shown in Fig. 48.
- Tighten presser bar guide bracket screw temporarily. Turn machine pulley toward you and make sure the presser foot does not interfere with needle or looper. Also make sure the presser bar functions freely.
- Firmly tighten the presser bar guide bracket screw taking every care not to disturb the alignment of the presser foot.



11. KNIVES

- To Set the Movable Knife

1) When movable knife forked lever screw is loosened, adjust as follows.

- Loosen movable knife screw and set movable knife flush with movable knife holder and tighten the screw. ( Fig. 49 )
- With movable knife lever at its lowest position, adjust engagement of movable knife and stationary knife to 1.0 ~ 1.5mm and tighten movable knife forked lever screw temporarily. ( Fig. 50 )
- To adjust the angle, loosen movable knife holder collar set screw and turn movable knife holder so that movable knife is located centrally in relation to stationary knife (a=b, Fig. 50), and tighten the set screw making sure there is 1.0mm clearance between right end of movable knife lever as shown in Fig. 51.
- Firmly tighten movable knife forked lever screw making sure there is no sidewise play in movable knife lever and movable knife forked lever.

NOTE: Movable knife forked lever screw should be tightened to 45kgf-cm.

2) When movable knife forked lever screw is not loosened, adjust as follows.

- Loosen movable knife screw and movable knife holder collar screws and adjust front-to-back and sidewise setting of movable knife in the same manner as item 1) above.

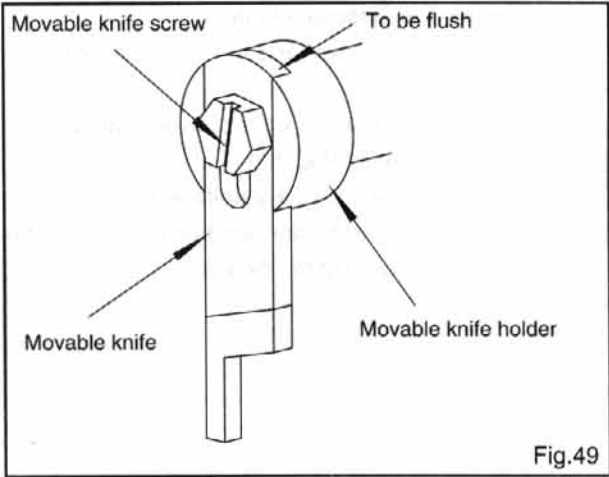


Fig.49

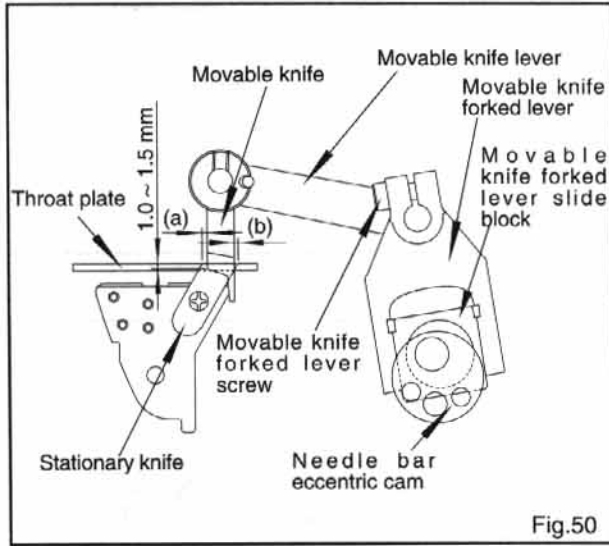


Fig.50

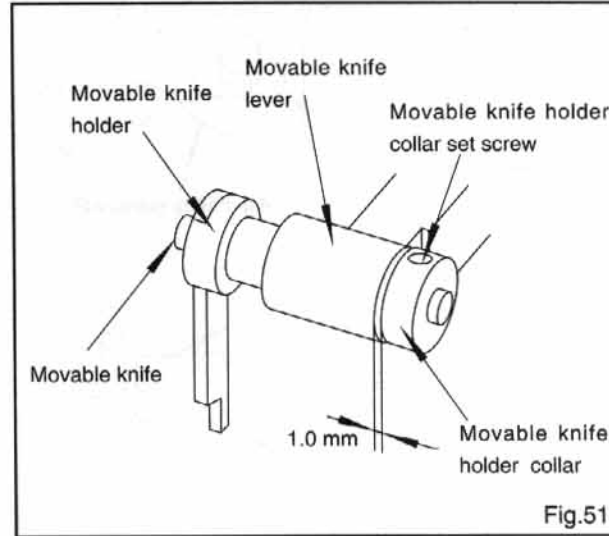


Fig.51

-To Replace the Stationary Knife

- Open looper cover and put movable knife into non-operating position.
- Loosen stationary knife screw and remove stationary knife. (Fig. 52)
- Place a new stationary knife in the groove of stationary knife holder and push it down as far as it will go and tighten the stationary knife screw.

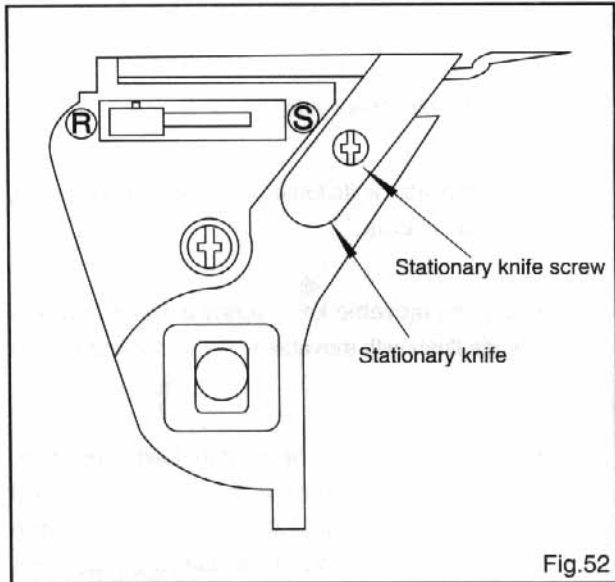


Fig.52

## 12. TO SET THE STATIONARY KNIFE HOLDER

- Open looper cover.
- Remove cylinder cover.
- Place the movable knife in the non-working position.
- Loosen the seam width control stud screw and seam width control dial screw.
- Adjust the height of seam width finger by turning seam width control stud so that seam width finger is flush with the top surface of throat plate. When making this adjustment, if seam width finger strikes the bottom surface of throat plate and positioned approximately 0.2 mm below the top surface of throat plate, it is permissible.

Note: Make sure that seam width finger does not protrude from the top surface of throat plate.

- Adjust seam width control stud so there is no clearance between stationary knife holder and seam width control stud when the left edge of seam width finger support plate is set at the graduation mark 3.0 in throat plate. Then tighten seam width control stud screw.
- Check to see that the left edge of seam width finger support plate moves to the graduation mark 3.5 ~ 4.5 in throat plate.
- Set the left edge of seam width finger support plate at the desired position and tighten seam width control dial screw.

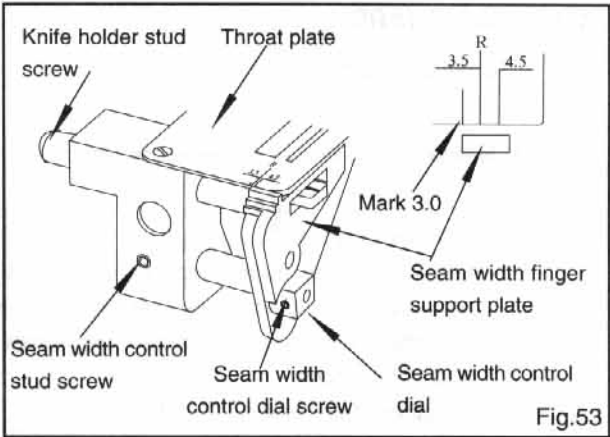


Fig.53

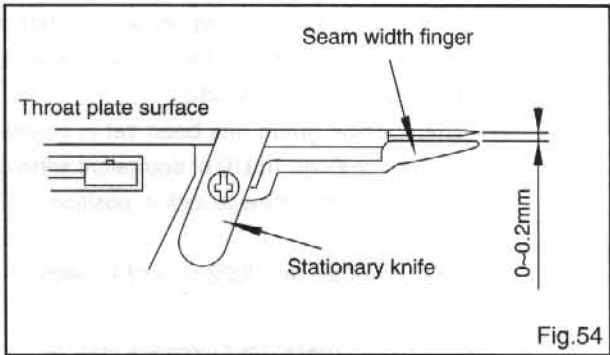


Fig.54

## 13. TO SET SEAM WIDTH FINGER

- Open looper cover.
- Remove cylinder cover, presser foot, and throat plate.
- Place the movable knife in the non-working position.
- Move seam width finger to (R) side.
- Loosen seam width finger support plate screw and while pushing the seam width finger downward to eliminate vertical play, tighten seam width finger support plate screw making sure the end of seam width finger support plate is flush with end face of stationary knife holder.
- Set seam width finger spring in position so that its V-shaped portion is located in the V-groove of seam width finger when seam width finger is at (S) side.
- Check function of seam width finger.

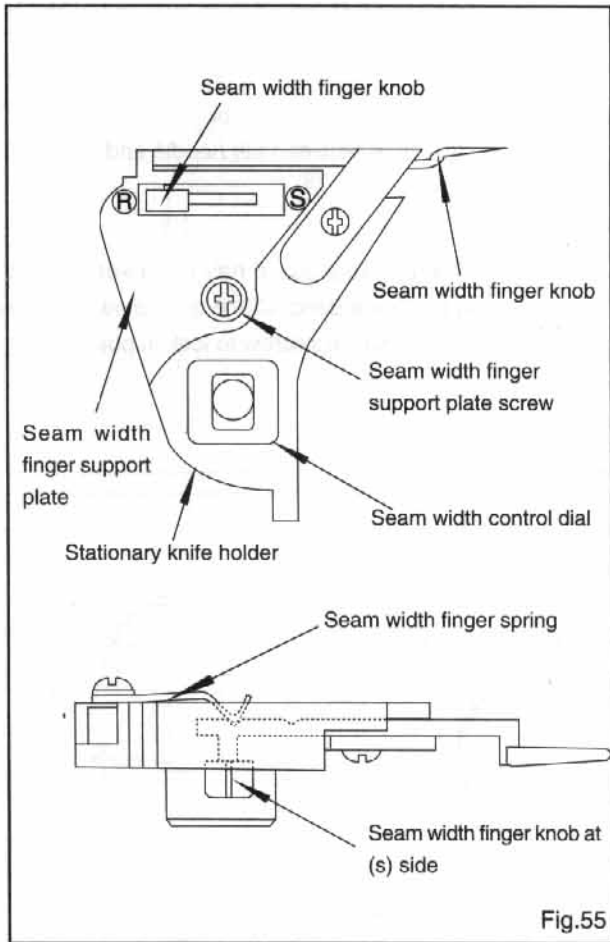


Fig.55

14. NEEDLE GUARD

- To Adjust Needle Guard

1) Needle Guard (front) for Overedge Needle

- Remove Cylinder Cover.
- Loosen needle guard (front) (for overedge needle) adjusting screw and check and make sure there is no clearance between right needle and lower loop.
- Readjust, if necessary. (See page 11)
- While pressing needle guard against the left needle, turn needle guard adjusting screw, as required, until there is no clearance between left loop point and left needle.
- When needle guard has been set in position, apply Three Bond 1031B or equivalent adhesive to the adjusting screw to lock in position.

NOTE: Use Cat. No. 2022 size #14 needle.

2) Needle Guard (back) for Overedge Needle

- Set needle guard (back) for overedge needle in position as shown at right by turning the needle guard adjusting screw.
- Turn pulley and check and make sure the clearance between left needle and lower loop is zero.
- When needle guard has been set in position, apply Three Bond 1031B or equivalent adhesive to the adjusting screw to lock in position.

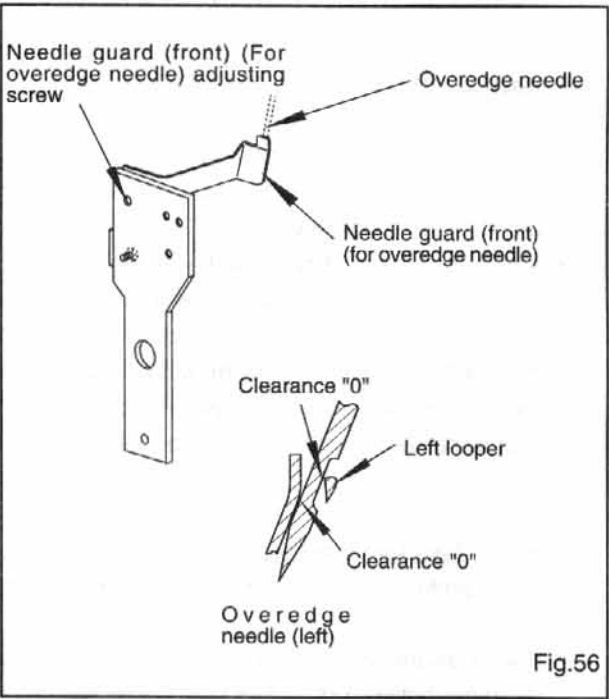


Fig.56

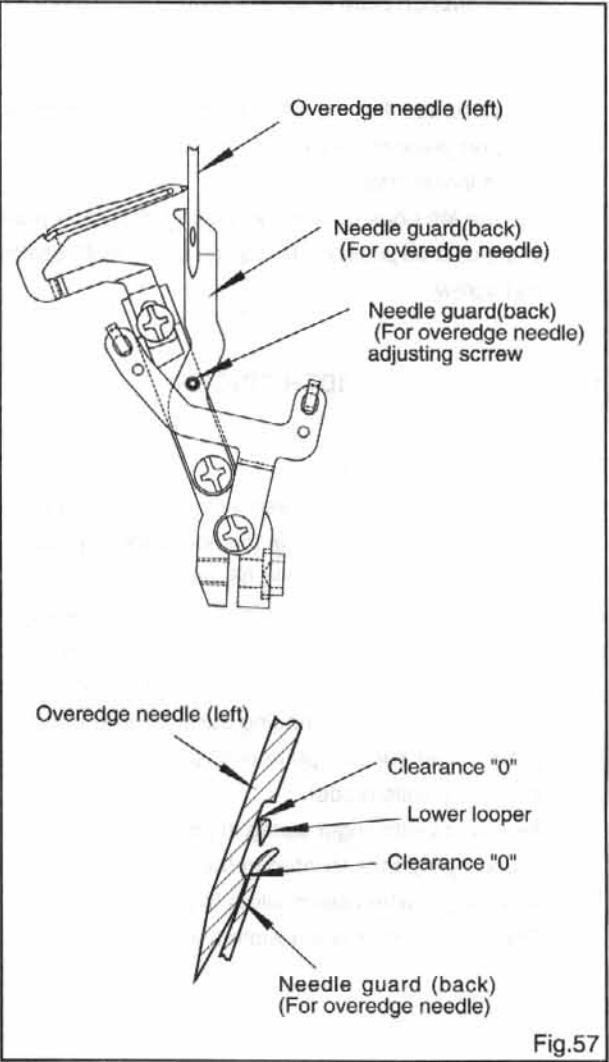


Fig.57

15. TO ADJUST END PLAY OF ROTATING SHAFT

- Open looper cover and remove machine base.
- Loosen two feed cam screws. (Fig. 58)
- Push feed cam to the right while pressing the machine pulley against rotating shaft bushing and tighten the two screws.

NOTE: Be sure the first set screw bear squarely on the flat on rotating shaft.

- Check and make sure there is no end play.

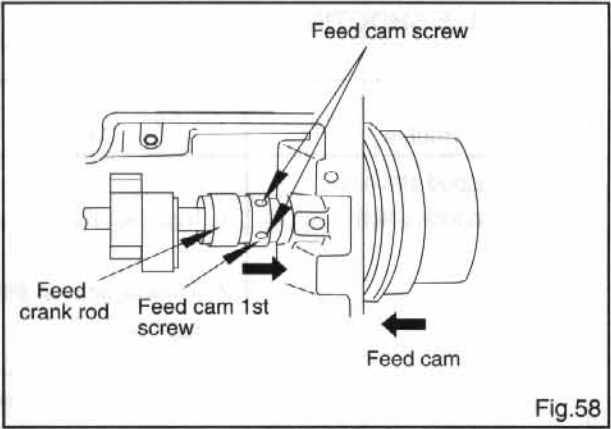


Fig.58

16. TO ADJUST MOTOR BELT TENSION

- Remove pulley cover.
- Loosen motor bracket screw and adjust belt tension by moving the motor forward or backward as required. (Fig. 59)
- Adjust motor belt tension so that motor belt is depressed 7~8 mm when a force of 0.5 kg is applied.

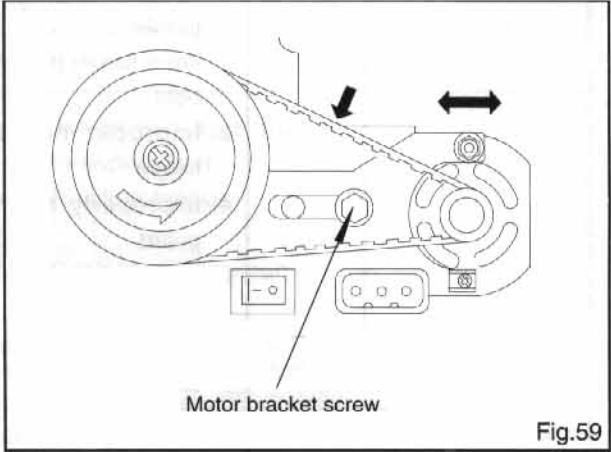


Fig.59

17. TO ADJUST ONE-TURN TENSION DIAL

(To adjust tension of tension spring)

- Set one-turn tension dial at 5.5.
- Insert a screwdriver into a slot on the front side of one-turn tension dial and remove one-turn tension dial ring.  
(To increase tension)
- Rotate one-turn tension dial clockwise (backward).  
(To decrease tension)
- Rotate one-turn tension dial counter-clockwise (toward the operator).
- Return one-turn tension dial to its original position.

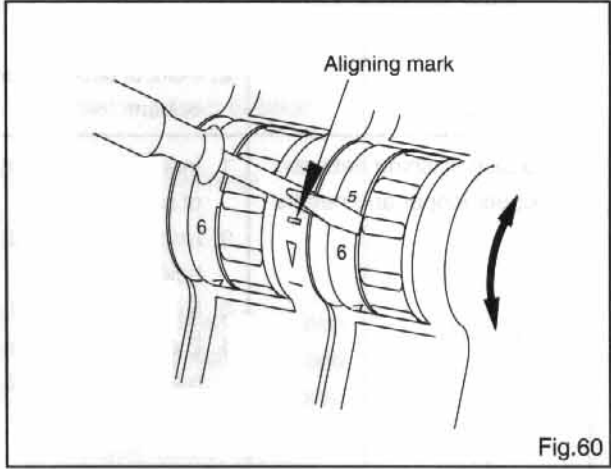


Fig.60

Note: Be sure to check that one-turn tension dial returns to its original position.

- When tension is increased, check to see that tension is free by setting one-turn tension dial at "0" tension.
- After making above adjustment, check the graduations in one-turn tension dial for each sewing condition.

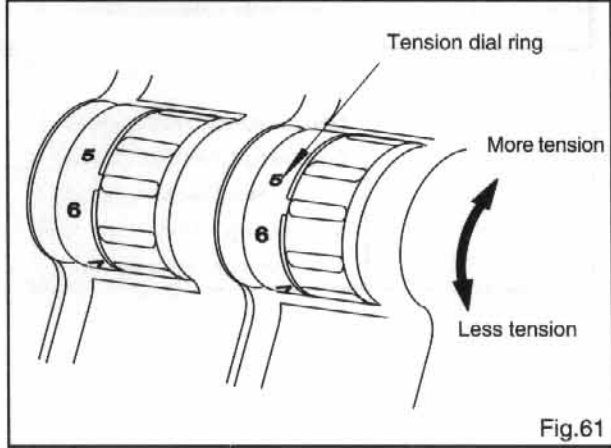


Fig.61

**18. TROUBLE SHOOTING GUIDE**

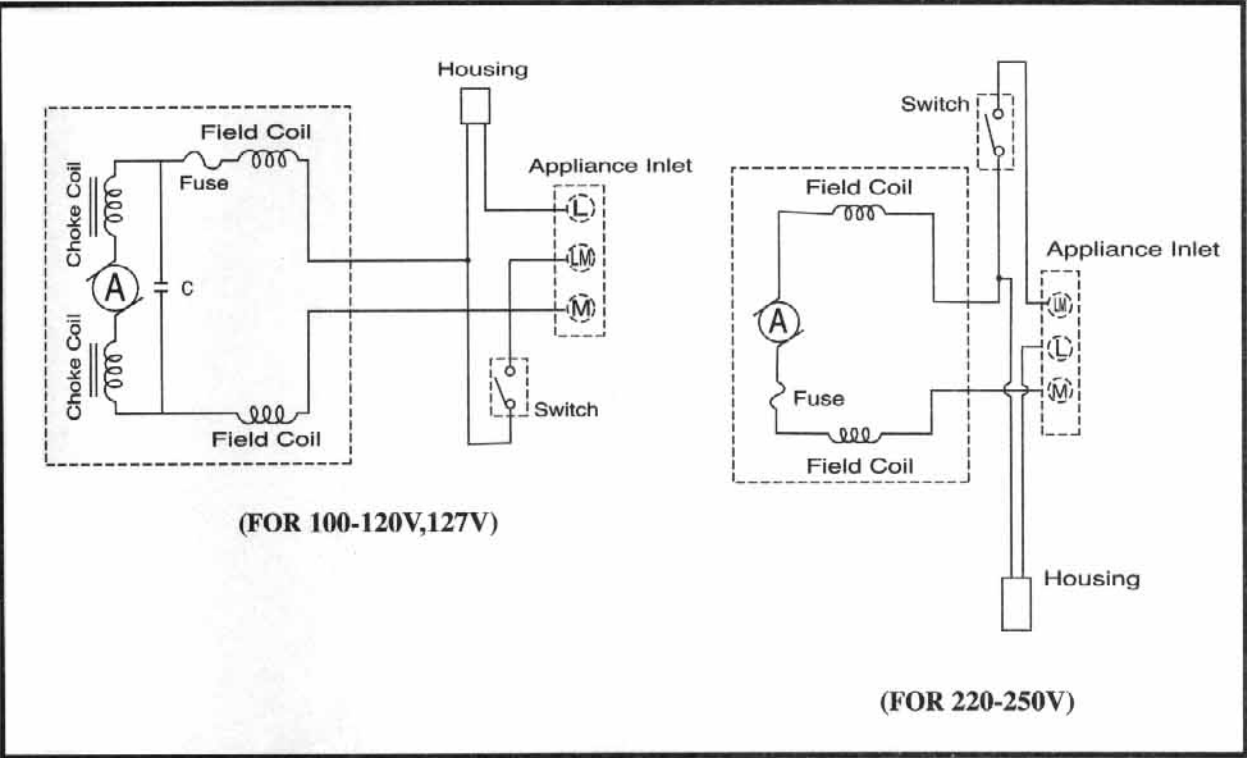
Trouble	Cause	Correction	Page
1. Skipped stitches 1.1 Overlock stitch	1. Incorrect threading  2. Thread tension either too tight or too loose	• Re-thread as shown in threading chart • Readjust tension	—  —
1.1.1 Skip stitching between lower looper and needle	1. Excessive clearance between lower looper and needle 2. lower looper point blunt or bent 3. Improper needle bar height 4. Improperly set needle guard 5. Improper timing of lower looper 6. Improperly set front cover thread guide	• Readjust clearance  • Replace with new looper or polish with oilstone and buff • Readjust height  • Readjust clearance • Readjust timing • Reset in correct position	11  — 6 23 10,11 14
1.1.2 Skip stitching between lower and upper loopers	1. Excessive clearance between lower and upper loopers. 2. Point of upper looper blunt or bent	• Readjust to minimum clearance  • Replace with new looper or polish with oilstone and buff	12,13  —
1.1.3 Skip stitching between upper looper and needle	1. Insufficient forward stroke of upper looper 2. Improper needle bar height 3. Needle point blunt or bent 4. Excessive clearance between looper and needle	• Readjust to correct setting  • Readjust height  • Replace with new needle • Adjust clearance between lower and upper loopers and make clearance between upper looper and needle smaller	12,13  6  — 12,13

Trouble	Cause	Correction	Page
2. Thread breakage			
2.1 Needle thread breakage (overlock stitch)	1. Incorrect threading 2. Thread tension too tight 3. Defective needle (Defective needle eye or overheating) 4. Thread handling area marred (needle thread) 5. Throat plate marred 6. Lower looper marred 7. Improper timing of looper and needle	<ul style="list-style-type: none"> <li>• Re-thread as shown in threading chart</li> <li>• Readjust tension</li> <li>• Replace with new needle</li> <li>• Replace with new thread handling part</li> <li>• Replace with new part</li> <li>• Replace with new part or polish with oilstone and buff</li> <li>• Readjust timing</li> </ul>	— — — — — 10 ~13
2.3 Looper thread breakage	1. Incorrect threading 2. Thread tension either too tight or too loose 3. Thread handling area of looper marred 4. Throat plate marred	<ul style="list-style-type: none"> <li>• Re-thread as shown in threading chart</li> <li>• Readjust tension</li> <li>• Replace with new part</li> <li>• Replace with new part</li> </ul>	— — — —
3. Interference of needle and looper	1. Improperly set needle 2. Needle bent 3. Improper needle bar height 4. Improperly set needle guard 5. Insufficient clearance between needle and chainstich looper / lower looper 6. Insufficient clearance between needle and reverse side of upper looper 7. Improper needle location	<ul style="list-style-type: none"> <li>• Insert needle into needle clamp as far as it will go</li> <li>• Replace with new needle</li> <li>• Readjust height</li> <li>• Reset in correct position</li> <li>• Readjust clearance</li> <li>• Adjust clearance between needle and lower looper and between lower and upper looper</li> <li>• Readjust needle location</li> </ul>	— — 6 23 11 11,12,13 11
4. Needle breakage	Check cause of above needle interference 1. Needle size too small 2. Pulling of material when sewing	<ul style="list-style-type: none"> <li>• Replace with needle suited for size of thread used and material being sewn</li> <li>• Should only guide the material when sewing</li> </ul>	— —

Trouble	Cause	Correction	Page
5. Poor sewing performance	1. Improperly set front cover thread guide 2. Thread handling parts marred	<ul style="list-style-type: none"> <li>• Reset in correct position</li> <li>• Replace defective part with new part</li> </ul>	14 —
6. Puckering	1. Thread tension too tight 2. Incorrect threading or thread entwined around other parts 3. Excessive presser foot pressure 4. Needle size too large 5. Thread size too thick 6. Stitch length setting not suitable for material being sewn 7. Width of overedge stitch too wide 8. Differential feed adjusting lever knob set for gather stitching	<ul style="list-style-type: none"> <li>• Readjust tension</li> <li>• Re-thread as shown in threading chart</li> <li>• Adjust to appropriate pressure</li> <li>• Replace with needle suited for size of thread used and material being sewn.</li> <li>• Use correct size thread for material being sewn</li> <li>• Adjust stitch length to suit material being sewn</li> <li>• Adjust overedge stitch width to appropriate width</li> <li>• Reset to center position</li> </ul>	— — — — — — —
7. Can not trim material	1. Stationary and movable knives worn out 2. Improper engagement of stationary and movable knives 3. Insufficient movable knife pressure 4. Excessive vertical play of movable knife	<ul style="list-style-type: none"> <li>• Replace with new knives</li> <li>• Readjust knives to correct height</li> <li>• Replace spring with new part</li> <li>• Replace with new part or tighten movable knife forked lever screw</li> </ul>	20,21 20,21 — 20
8. When thread can not be cut	1. Cutter worn out	• Replace with new cutter	See page 43 of Operator's Guide

19. APPENDIX I

• CIRCUIT DIAGRAM FOR MOTOR COMPLETE



20. APPENDIX II

• CIRCUIT DIAGRAM FOR CONTROLLER COMPLETE

