SERVICE MANUAL

FOR

RIB TRANSFER CARRIAGE

RT-1

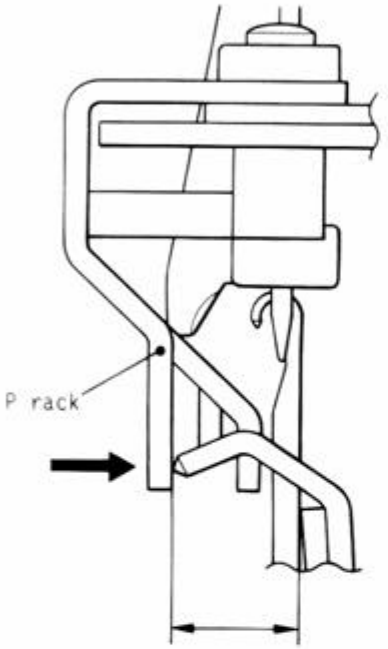
CAUTIONS ON HANDLING RT-1

1. Applicable model

RT-1 is applicable to the following combination of the knitting machine and ribber.

Knitting machine: SK-321~360, SK-250 (MOD.260), SK-500~560
Ribber: SRP-50~

Note; Not applicable to the ribber produced prior to SRP-20



height of sinker needle

The front and back position of the transfer needle is (relationship with the ribber latch needle) determined by the position where P-Rack of RT-1 contacts the tip of the sinker of the ribber.
RT-1 can not be used for the models produced prior to SRP-20 as the height of the sinker needle is different.

The height of the sinker needle of SRP-50 (distance between the front edge and the tip of the needle) is 0.5mm higher than that of SRP-20.

2. Accessorries on the sinker plate

If the following items are attached to the knitting machine, remove them before using RT-1.

Electronic knitting machine: point cam
Punch-card knitting machine: point cam M, E

It is not necessary to remove the Close Knit Bar.

3. Yarns and fabric

- This Rib Transfer Carriage is applicable to the fabric knitted with the yarns within the range from fine yarn to medium yarn.
- Inelastic summer yarns knitted in tight Stitch Dial settings will cause unsatisfactory condition in transferring stitches using the RT-1.
- On the varied rib stitches, edge stitches may not be good for transferring stitches using the RT-1.
- If a ribber needle has two stitches, transferring stitches may require special care.

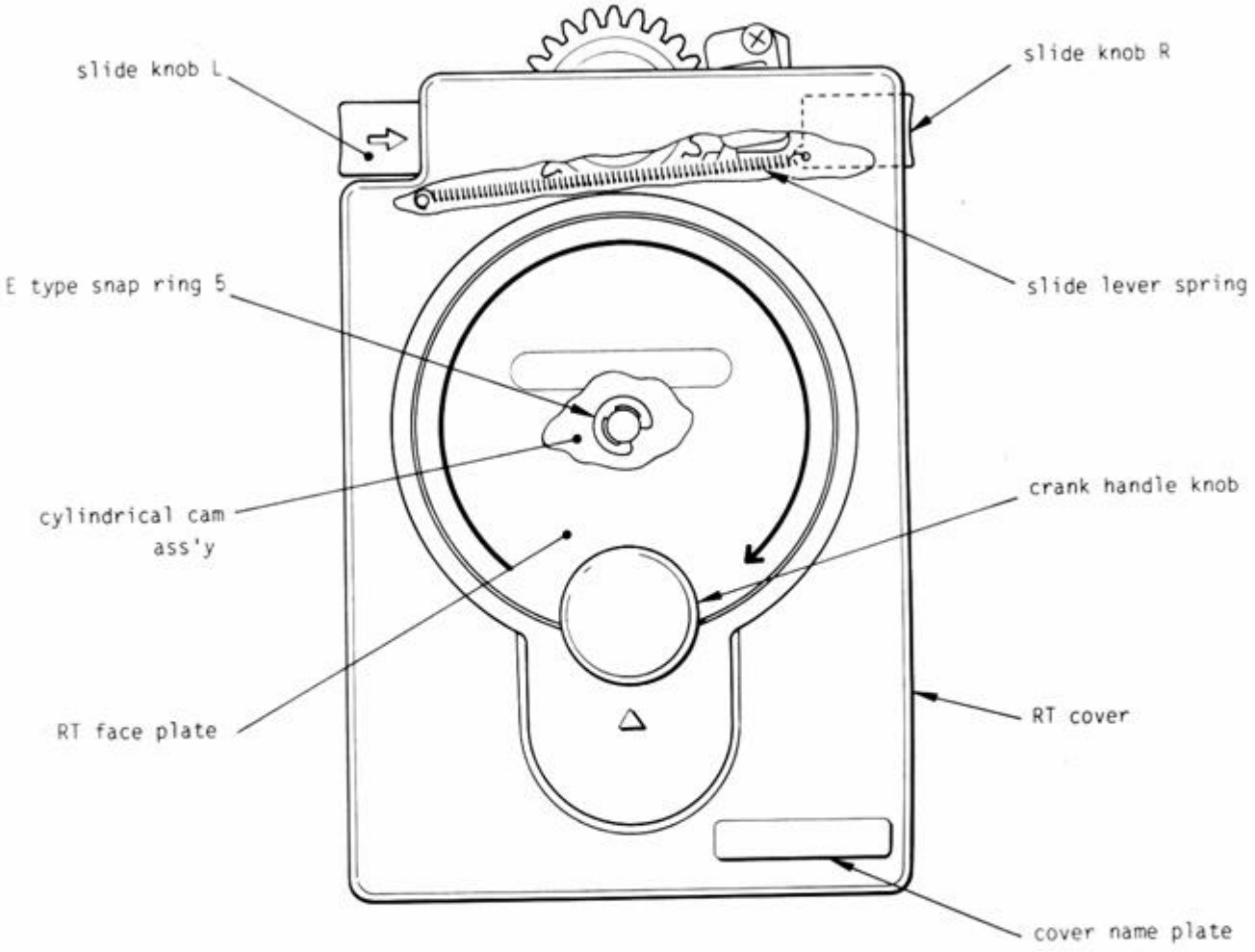
4. General cautions on operation

- Ribber must be set on the Knitter correctly.
- Before transferring stitches, set the Half-Pitch Lever to "P".
  If the Half-Pitch Lever is set at "H", the Crank Handle of the Transfer Carriage will rotate idly, and the Transfer Needle will not move.
  If the position of the Ribber is dislocated excessively against the Knitter, this protecting mechanism can not function properly and the Transfer Needle will be damaged.
- Set the Crank Handle Knob at ▲ mark before mounting or dismounting the Rib Transfer Carriage. If the Crank Handle Knob is not set at the mark, the slide knob will not move, or even if the knob is pressed in, the Crank Handle will not turn.
- Turn the Crank Handle Knob smoothly as if to draw a circle.
- If the RT-1 is set at the right extreme end of the needle bed the Sinker Retaining Cam will contact with the plastic Auxiliary Piece and the Crank Handle will not turn.
  To transfer the stitch on the extreme end needle, set the Transfer Carriage at the position where the plastic Piece will not interfere with the Sinker Retainer Cam.

RIB TRANSFER CARRIAGE MODEL RT-1

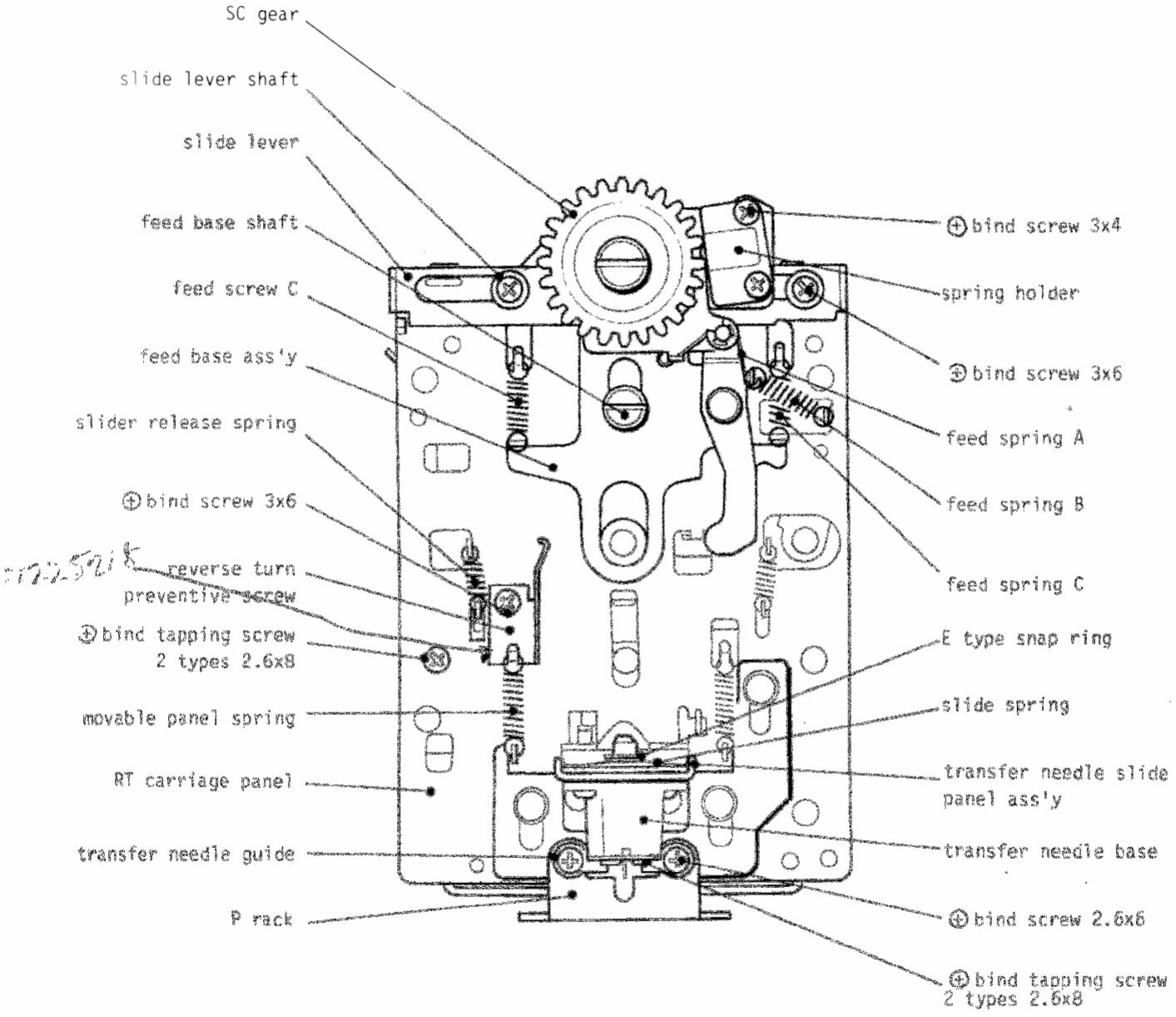
[1] NAMES OF PARTS

1 - 1 External appearance



(Fig. 1) external appearance

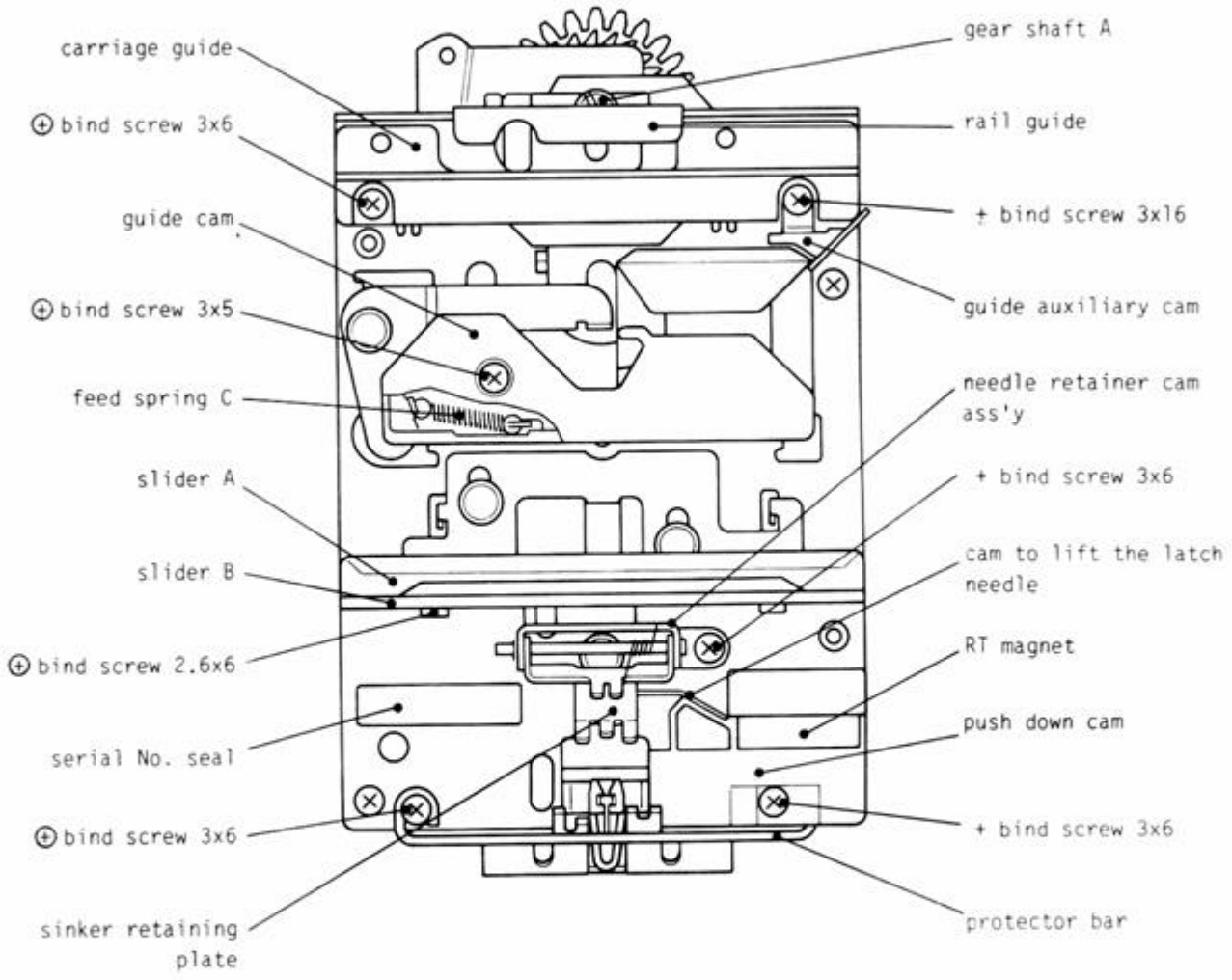
1 - 2 Inside



Note; Unless otherwise specified, the same parts, or the screws used on the symmetrical position shall be the same screw. This shall be applied to the tensile coil spring.

(Fig. 2) inside

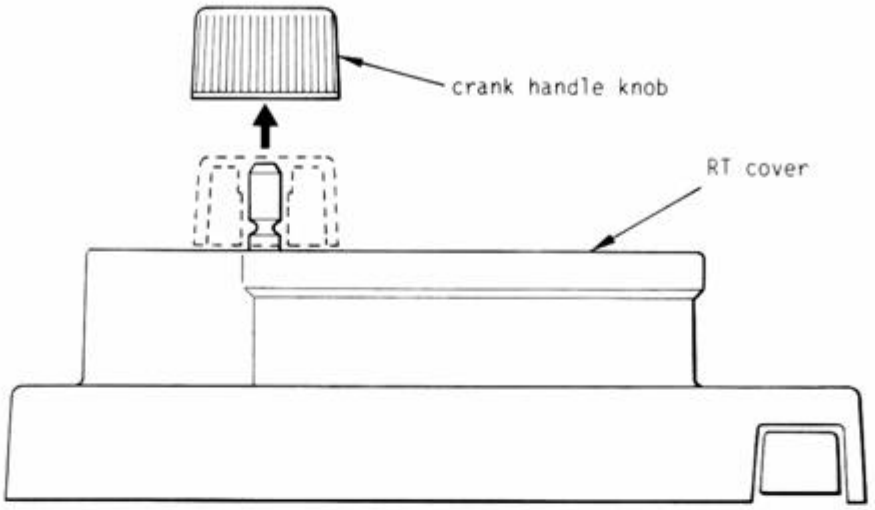
1 - 3 Underside



(Fig. 3) underside

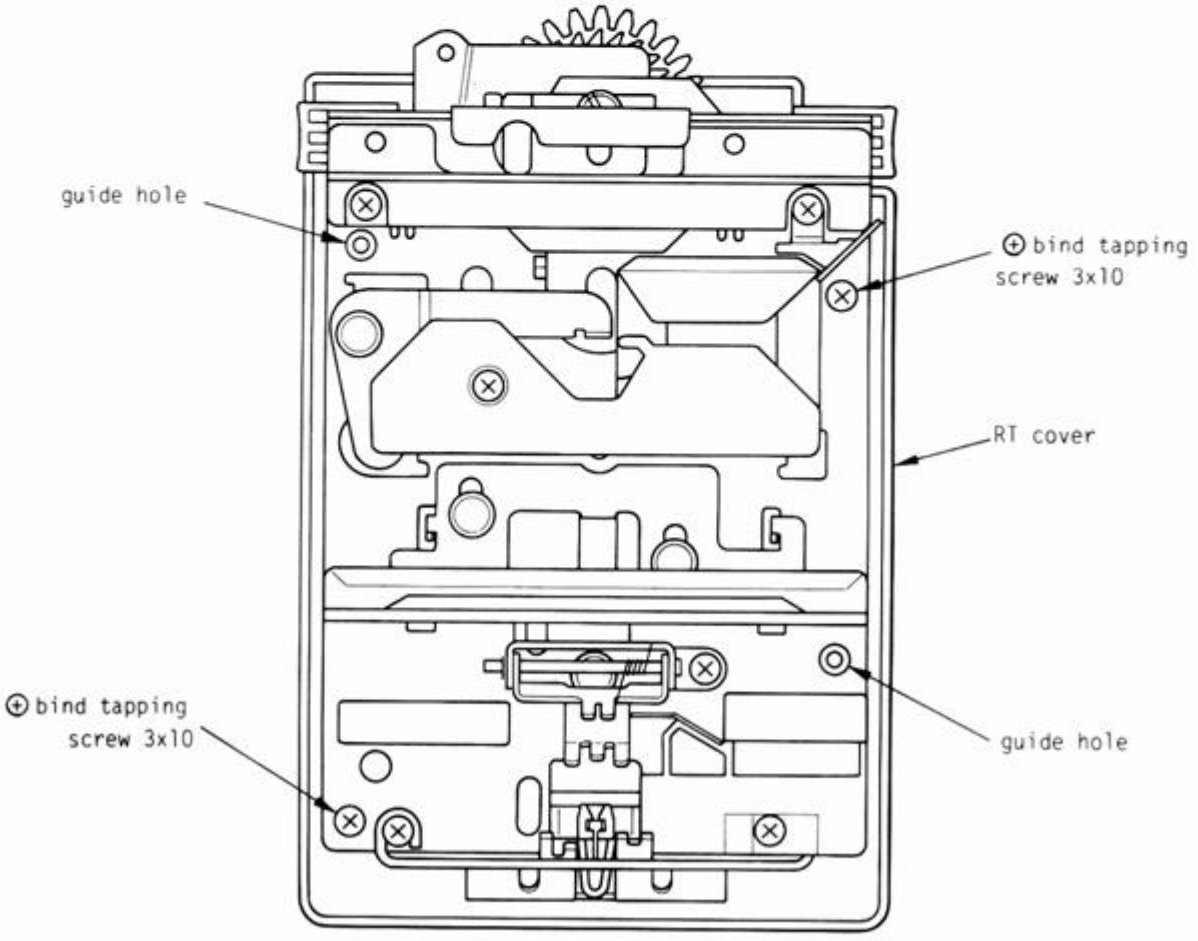
[2] DISASSEMBLY OF RT-1 (up to the removal of cylindrical cam)

1. Pull out the Crank Handle Knob upward.



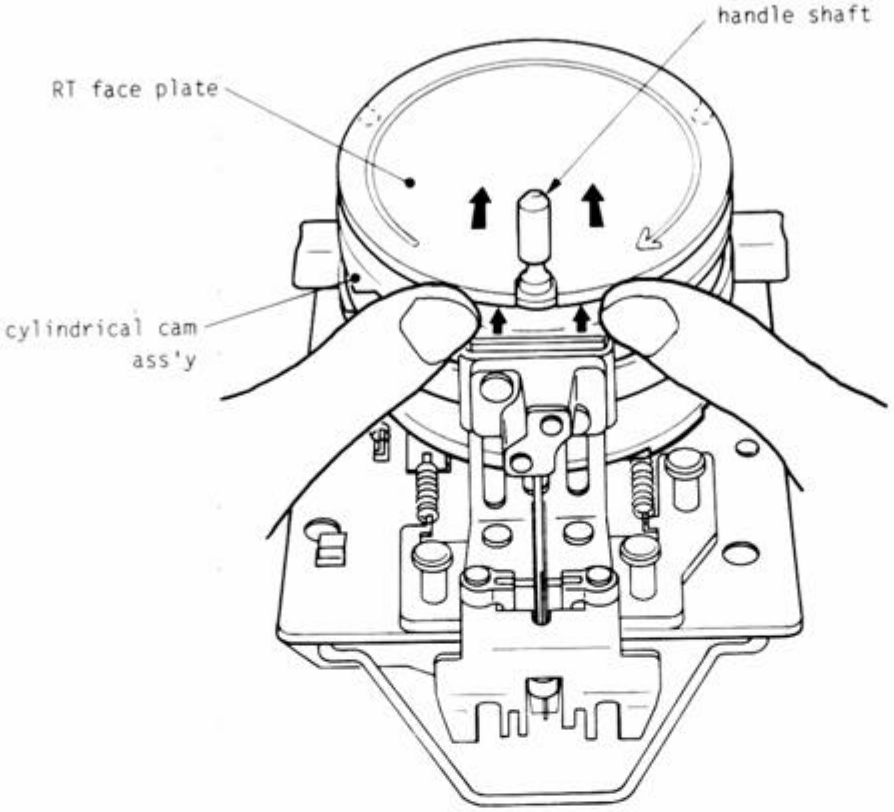
(Fig. 4)

2. Place the carriage upside down. Remove the two ⊕ bind tapping screws 3x10 and remove RT cover.



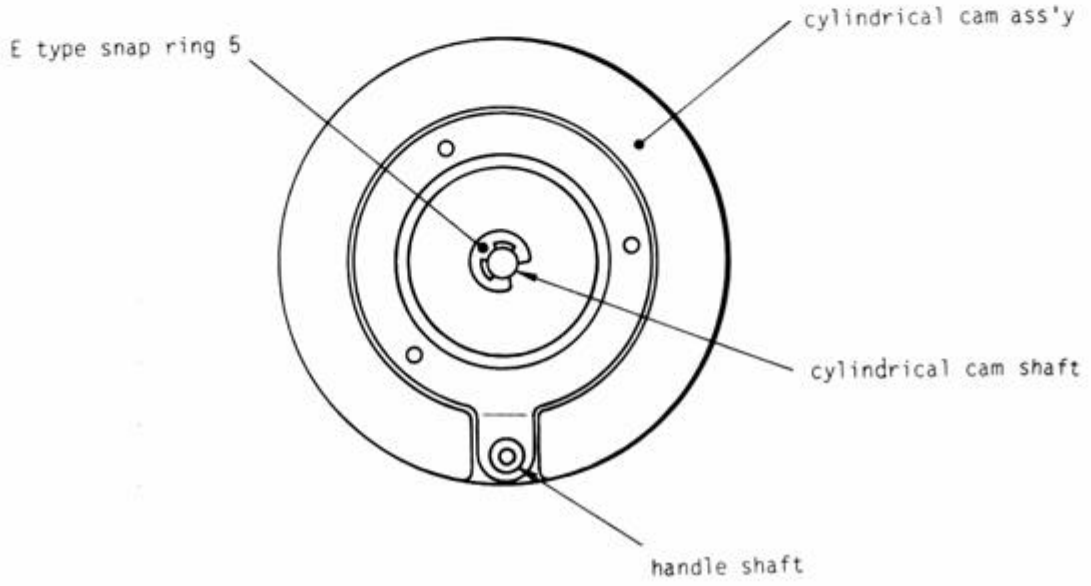
(Fig. 5)

3. Turn over the Carriage to top side.
Slightly lift the RT face plate with thumbs as shown in the illustration below.
Press it bacwards to remove the cylindrical cam ass'y.



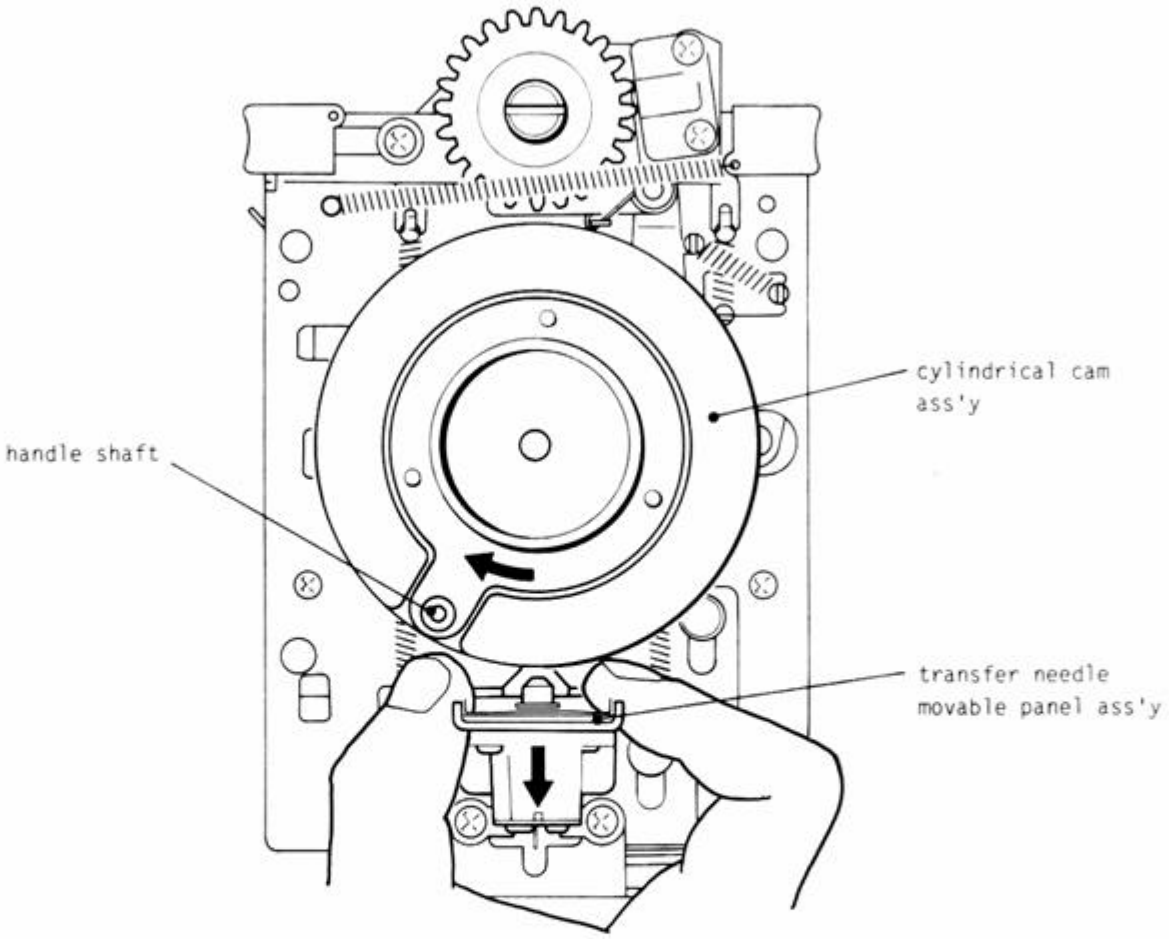
(Fig. 6) How to remove RT face plate

4. Remove E type snap ring from the cylindrical cam shaft.



(Fig. 7)

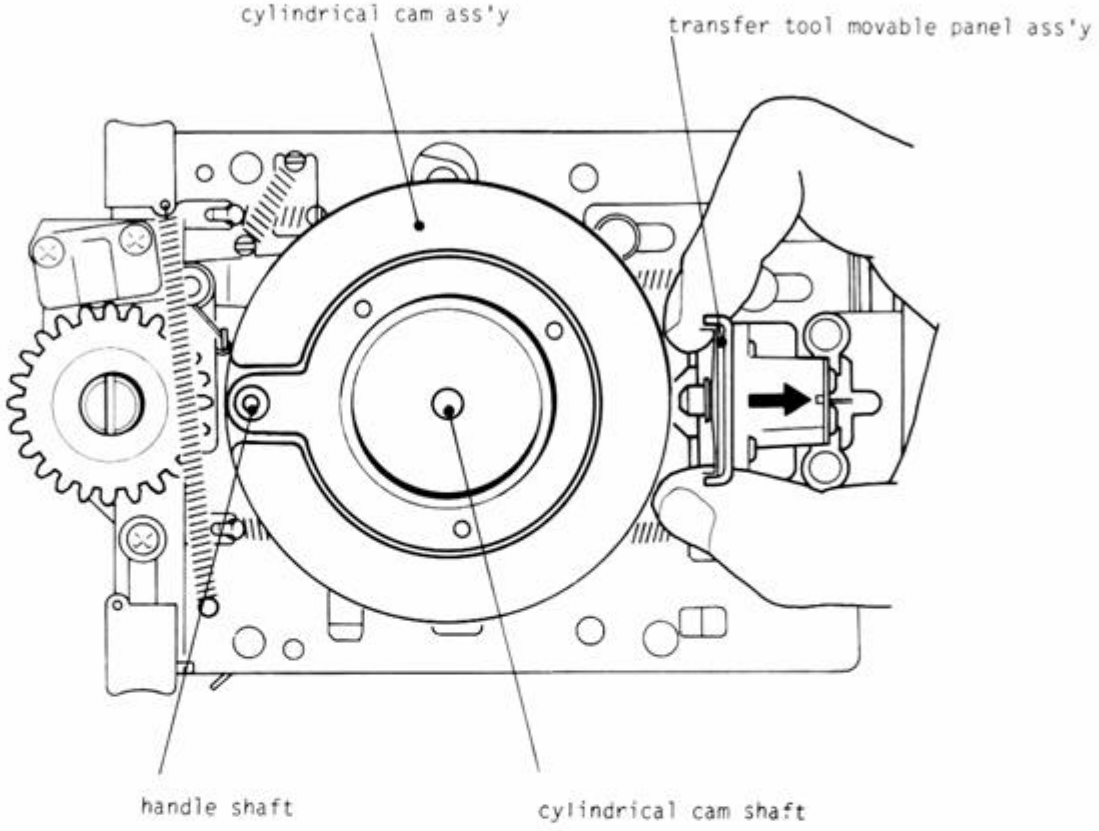
5. Hold the handle shaft and turn the cylindrical cam ass'y clockwise by approximately 30°. The cylindrical cam ass'y can be removed by lifting it upwards while pulling the transfer needle movable panel ass'y towards yourself.



(Fig. 8) How to remove cylindrical cam.

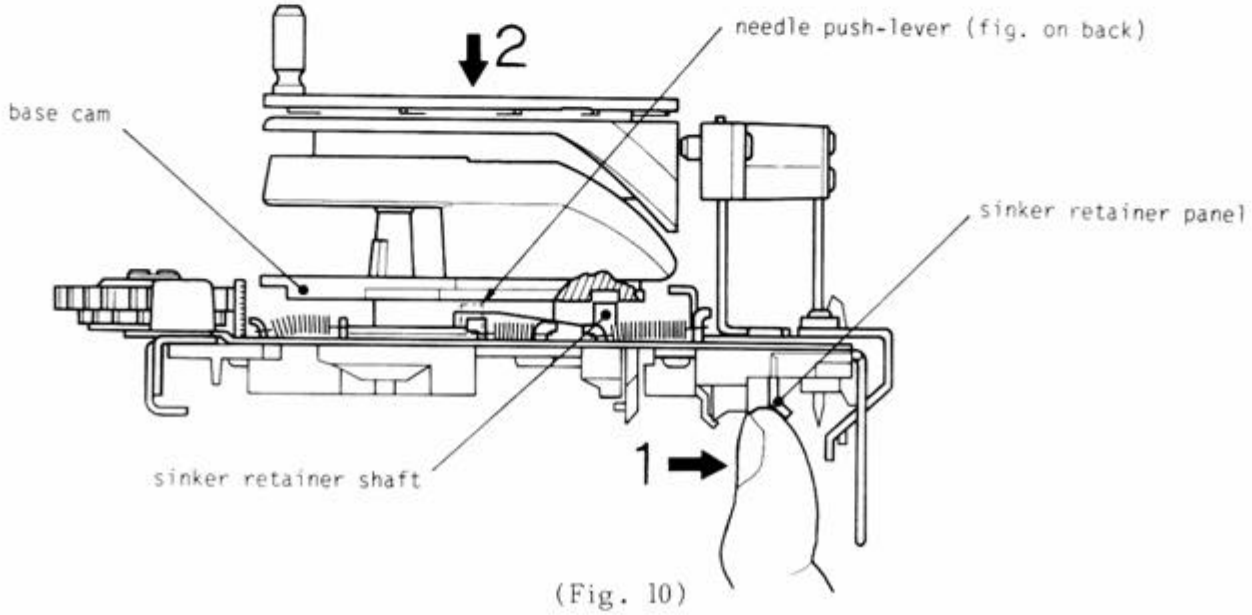
[3] ASSEMBLY OF RT-I

1. Pull the transfer needle movable plate ass'y toward yourself. Set the handle shaft of the cylindrical cam ass'y to the SC gear side, and insert the cylindrical cam ass'y into the cylindrical cam shaft.



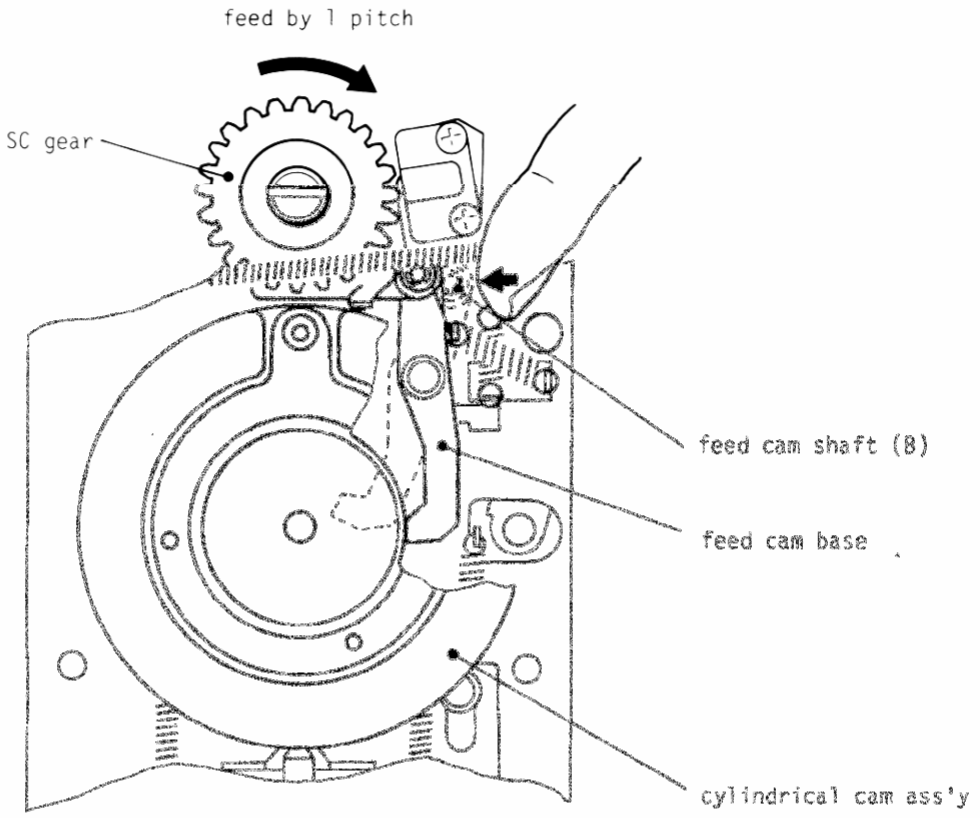
(Fig. 9)

2. Place RT-I sideways in the condition described in 1. Pull the sinker retainer panel fully to the transfer tool side and press down the cylindrical cam ass'y at the position the panel is returned for 0.5mm or so from the above position. Sinker retainer shaft and needle push-lever shaft are set to the cam unit of the base cam with a click.



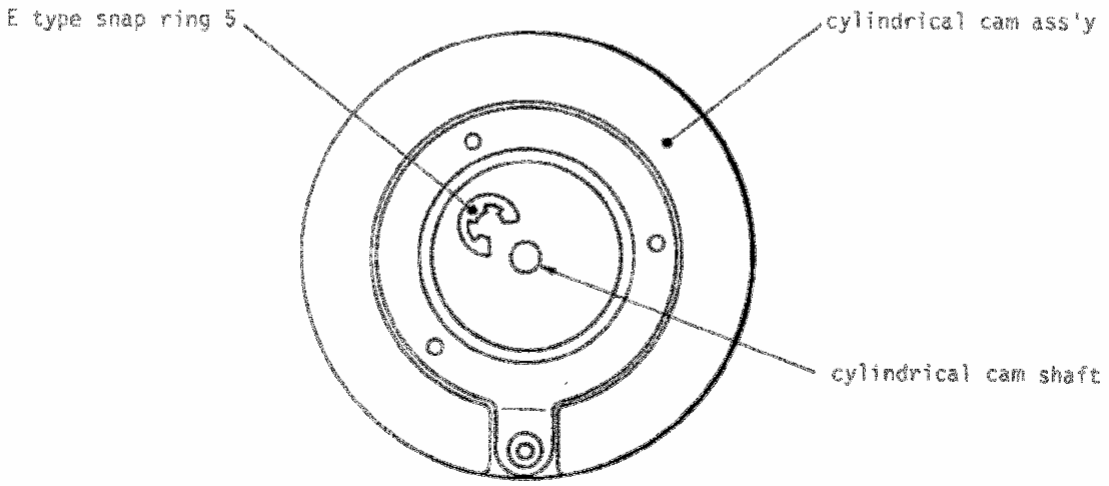
(Fig. 10)

3. Push the feed cam shaft (B) section with force in the direction of an arrow mark to feed SC gear by 1 pitch. Then the cylindrical cam ass'y is pressed down with the above condition, feed cam base is set to the cam unit and fitted into the cylindrical cam ass'y properly. The handle shaft can be turned smoothly in clockwise direction.



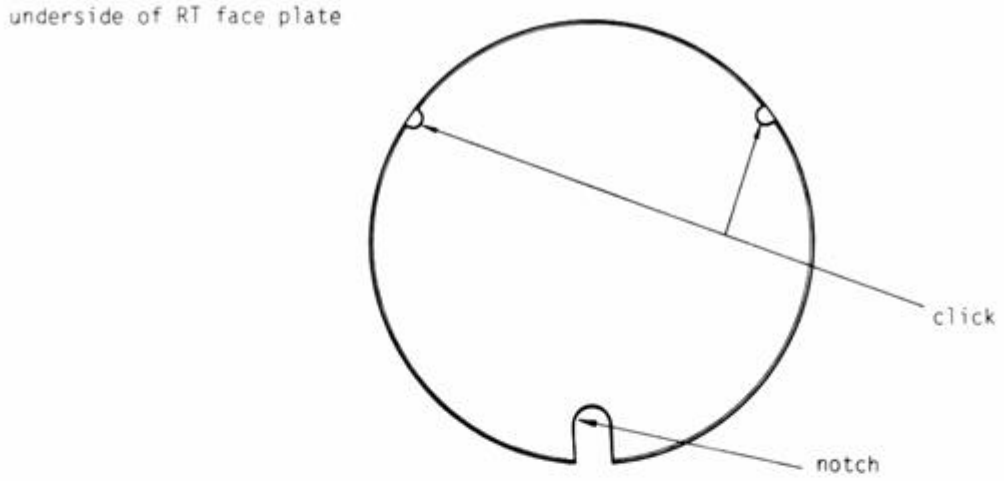
(Fig. 11)

4. Attach E type snap ring 5 to the cylindrical cam shaft using the radio pliers.

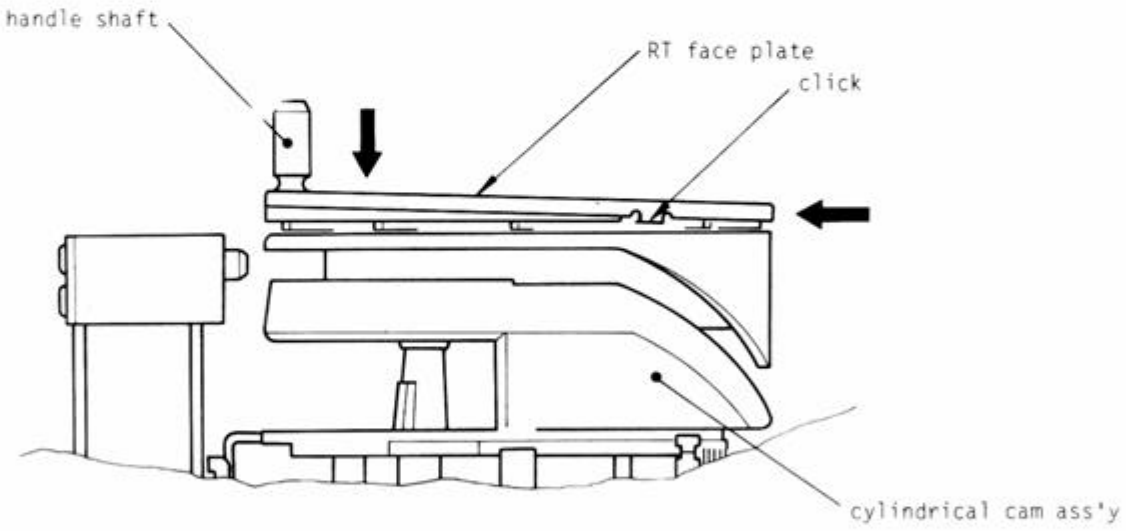


(Fig. 12)

5. Face the notch on the RT face plate against the handle shaft and insert it into the cylindrical cam ass'y. Insert the two clicks of RT face plate into the fitting part of the cylindrical cam ass'y. Then push them down to attach them.



(Fig. 13)



(Fig. 14)

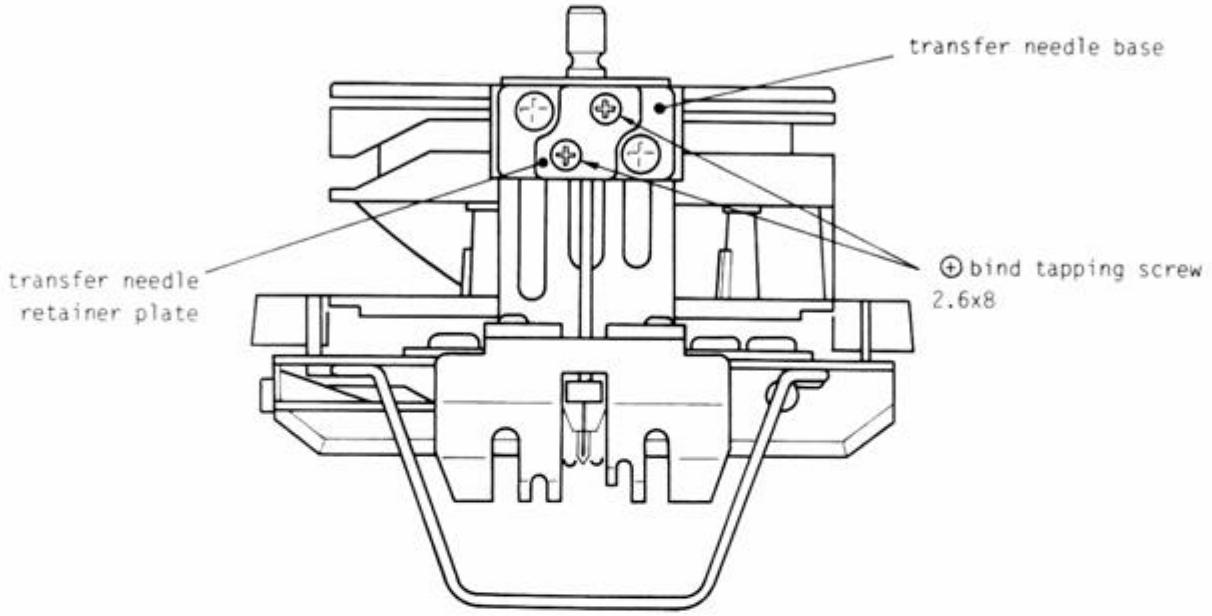
6. Place RT cover and then turn RT carriage upside down. Tighten ⊕ bind tapping screws 3x10 (2). Check if the screw of the cover is in the guide hole of the carriage panel. (See Fig. 5)

7. Insert the Crank Handle Knob into the handle shaft. (see Fig. 4)

[4] METHOD FOR REPLACING THE TRANSFER NEEDLE

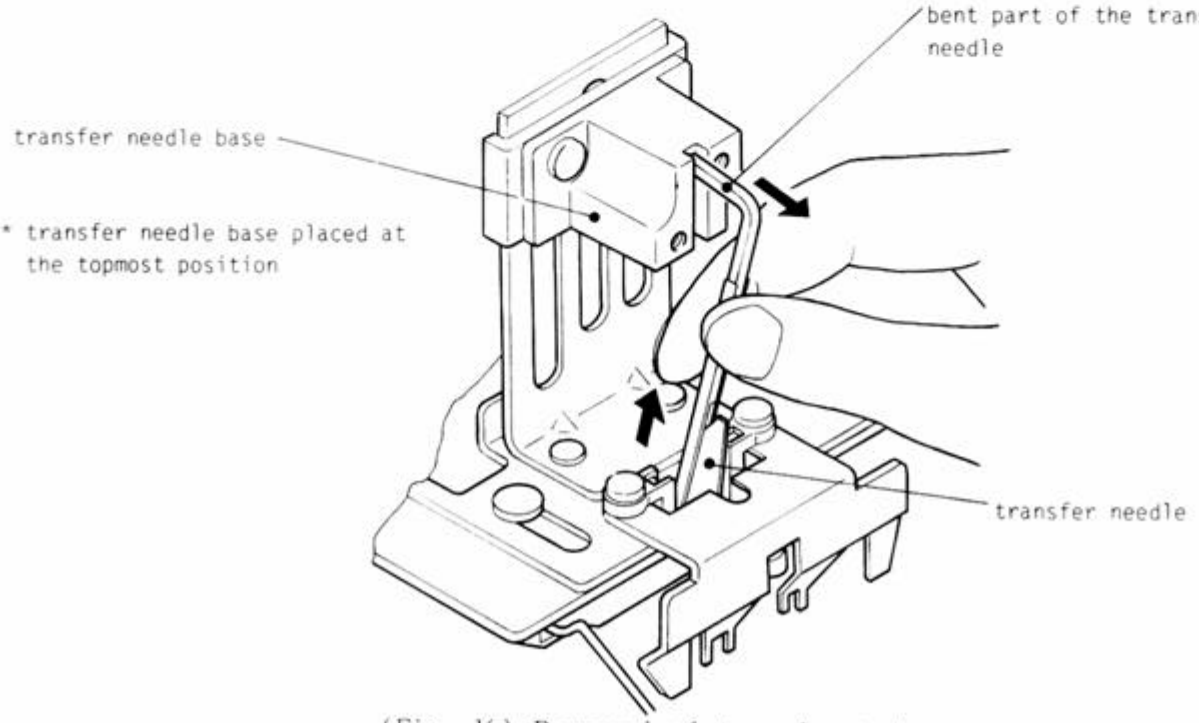
4 - 1 How to remove the tranfer needle.

1. Stop the Crank Handle Knob at the stop position (▲mark), and move the transfer needle base upward as far as it goes.
   Remove the two ⊕ bind tapping screws 2.6x8 that hold the transfer needle retainer plate.



(Fig. 15)

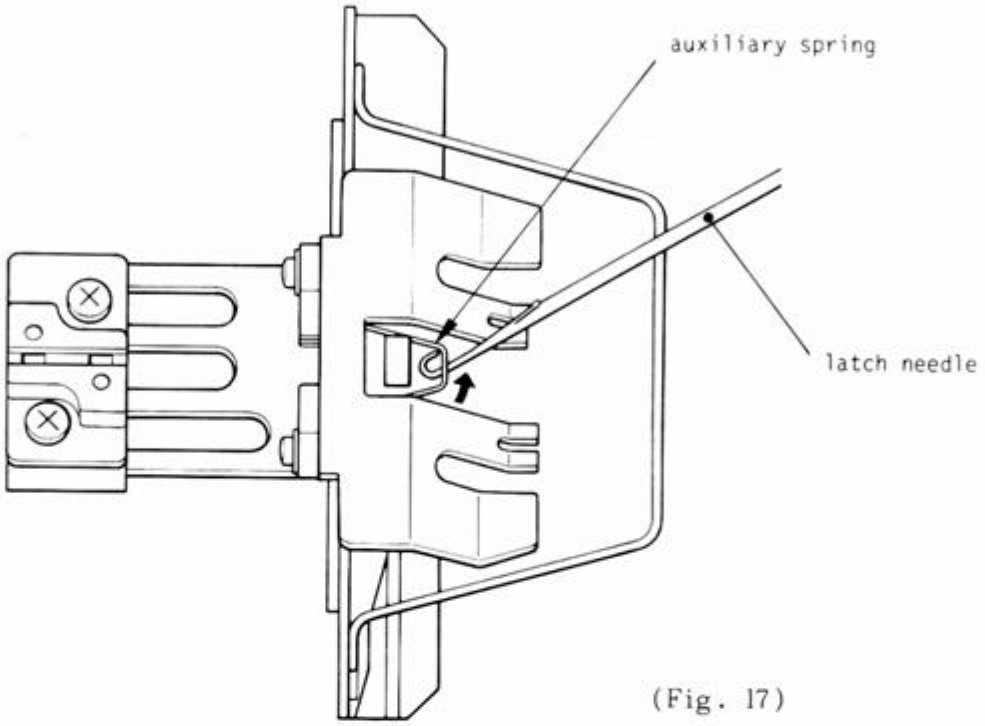
2. Pull the transfer needle slowly toward yourself until the bent part of the needle can be seen through the hole on the transfer needle base. When the tip of the bent part of the transfer needle appears, lift it upward to remove.



(Fig. 16) Removal of transfer tool

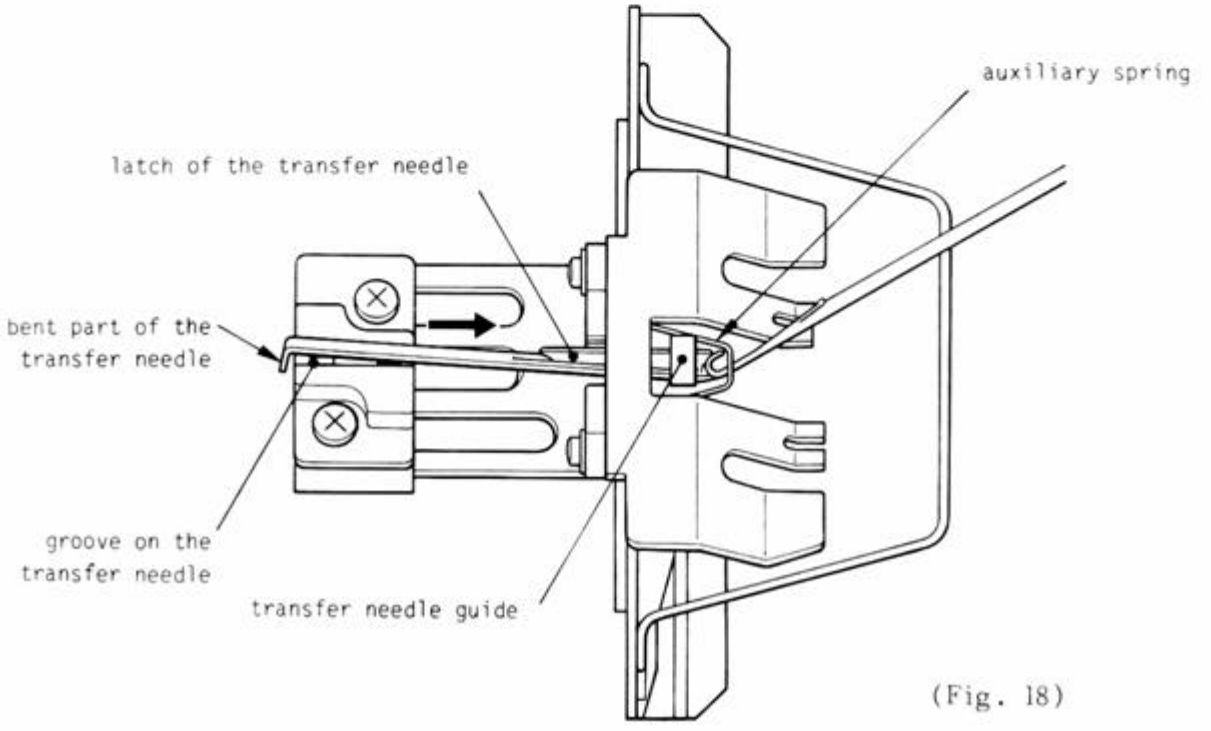
4 - 2 How to attach the transfer needle

1. As shown in the illustration below, lift the auxiliary spring with the hook of the latch needle for approximately 5mm.
   Note; If the auxiliary spring is bent excessively, its spring effect will be reduced and a drop of stitch will be resulted.



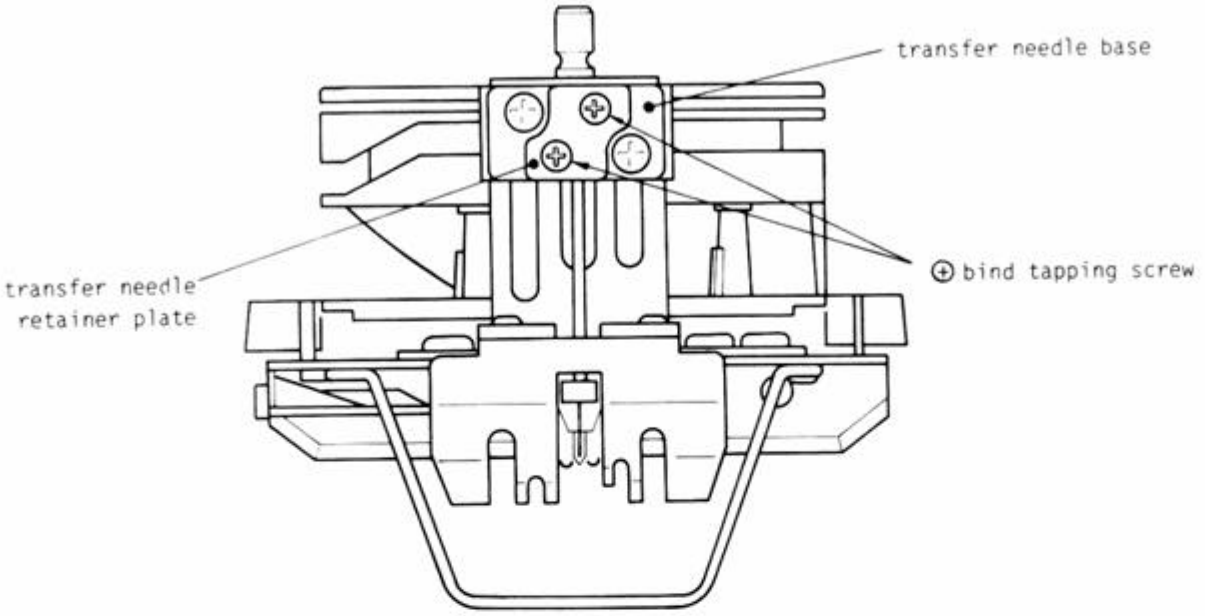
(Fig. 17)

2. With the auxiliary spring lifted by the hook of the latch needle, insert the transfer needle into the transfer needle guide hole. Insert the bent part of the transfer needle into the groove of the transfer needle base while putting the latch of the transfer needle under the auxiliary spring.



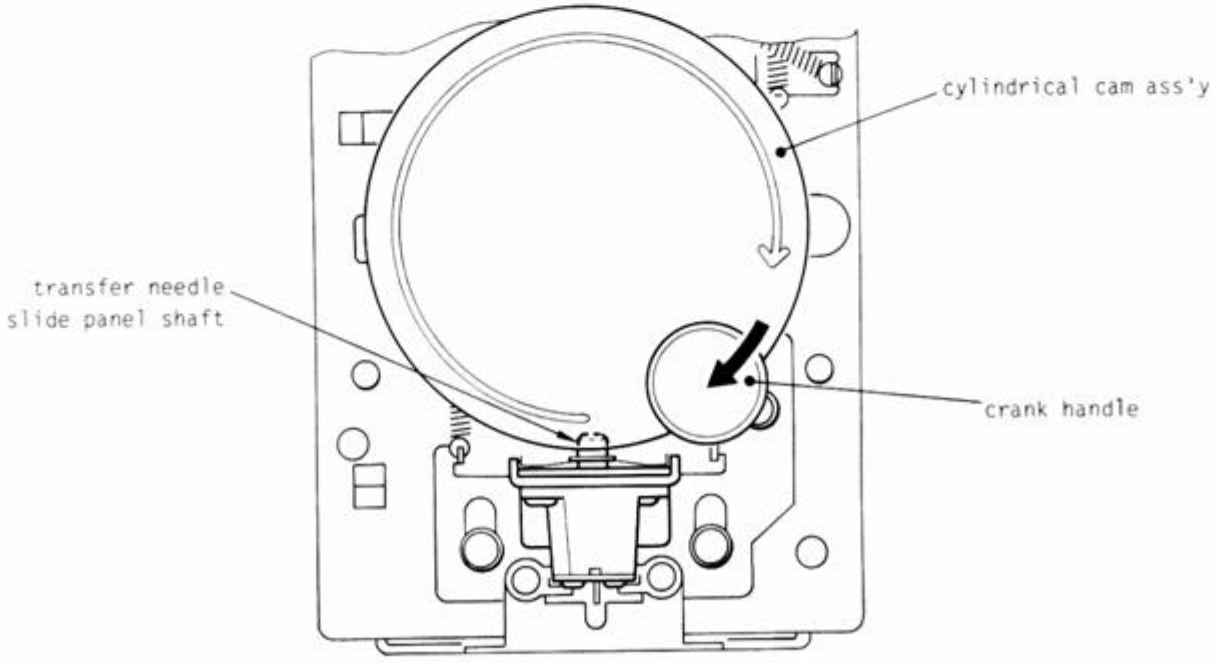
(Fig. 18)

3. Place the transfer needle retainer plate on the transfer needle base, and lightly tighten it with the two ⊕ bind tapping screws 2.6x8.



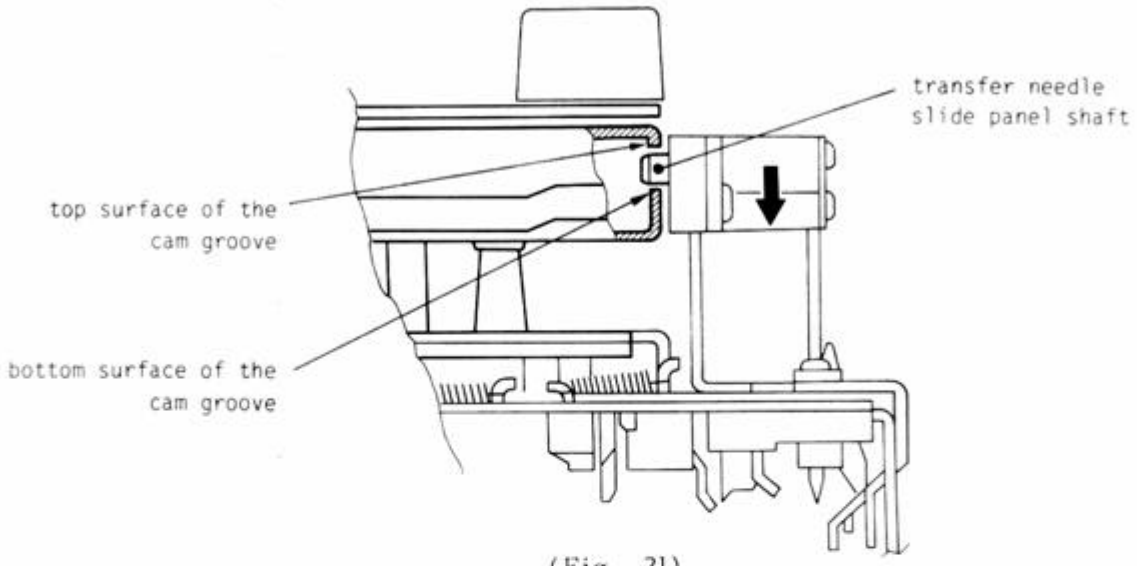
(Fig. 19)

4. Turn the handle clockwise and stop it at approximately 30° before its full rotation. In this state, the position of the transfer needle is at the top dead point, and the transfer needle slide panel shaft is fitted to the cam of the cylindrical cam ass'y.



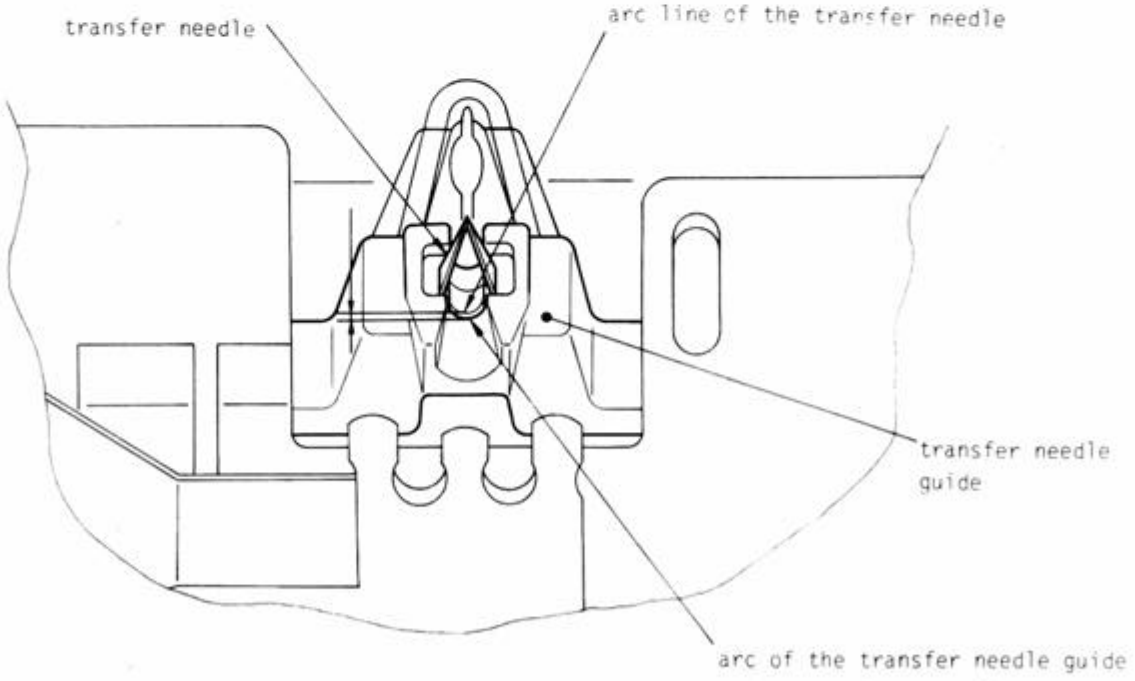
(Fig. 20)

5. There is a gap between the transfer slide panel shaft and the top surface of the cam groove of the cylindrical cam ass'y.
Turn RT carriage upside down while maintaining the contact between the transfer slide panel shaft and the lower surface of the cam.



(Fig. 21)

6. Look into the tip of the transfer tool from the rear of RT carriage. Confirm that the arc of the diagonal cut of the transfer needle and that of the taper of the transfer guide are in conformity. (See Fig. 35)



(Fig. 22) Reference of the top and bottom positions of transfer needle

If the above mentioned arc lines are not in conformity, move the transfer needle up and down to make adjustment. Securely tighten ⊕ bind tapping screw 2.6x8 (2) that hold the transfer needle retainer plate.

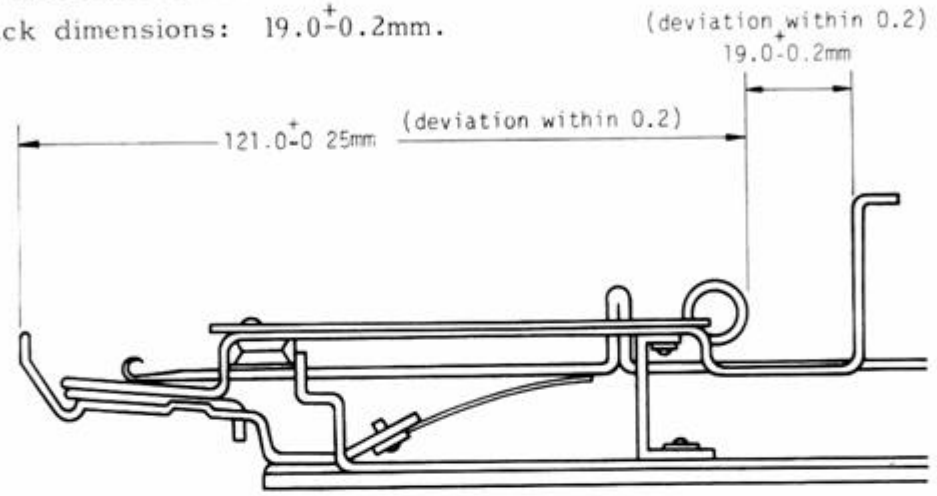
[5] ADJUSTMENT OF VARIOUS PARTS

5 - 1 Characteristics of knitting machine and ribber

5 - 1 - 1 Characteristics of knitting machine

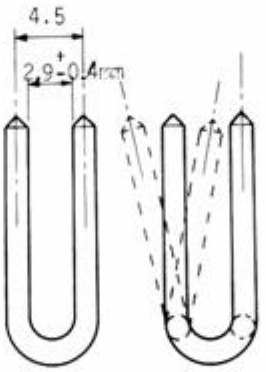
The characteristics of the knitting machine shall satisfy the following dimensions.

1. Sinker to Rail dimensions: $121.0^{+}_{-}0.25$mm.
2. Rail to Rack dimensions: $19.0^{+}_{-}0.2$mm.



(Fig. 23) Characteristics of the knitting machine

3. Displacement of sinker: $2.9^{+}_{-}0.4$mm
   Reference: extreme displacement is not permissible.



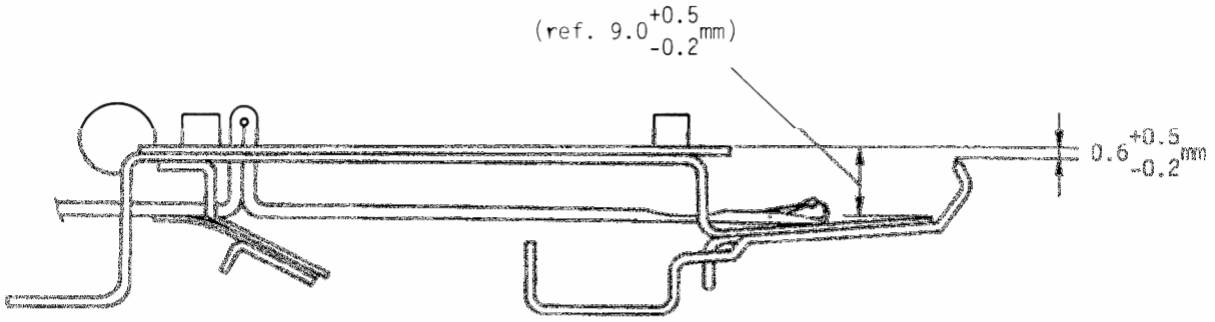
(Fig. 24) Displacement of sinker

4. The latch needles shall have not bend or break.
   If the RT-1 is operated with the bent or broken latch needles, it will cause the transfer needle to be damaged.

5 - 1 - 2 Chracteristics of ribber

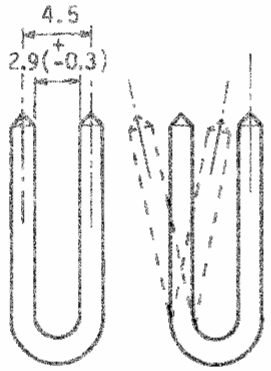
The characteristics of ribber shall satisfy the following dimensions.

1. Height of the Sinker(from the surface of the top plate of the needle bed to the tip of the Sinker.): $0.6^{+0.5}_{-0.2}$mm.



(Fig. 25) Characteristics of ribber

2. Displacement of the Sinker: within 2.9($\pm$0.3)mm



Excessive bend (more than 2.9mm.) of the Sinker is not permissible.

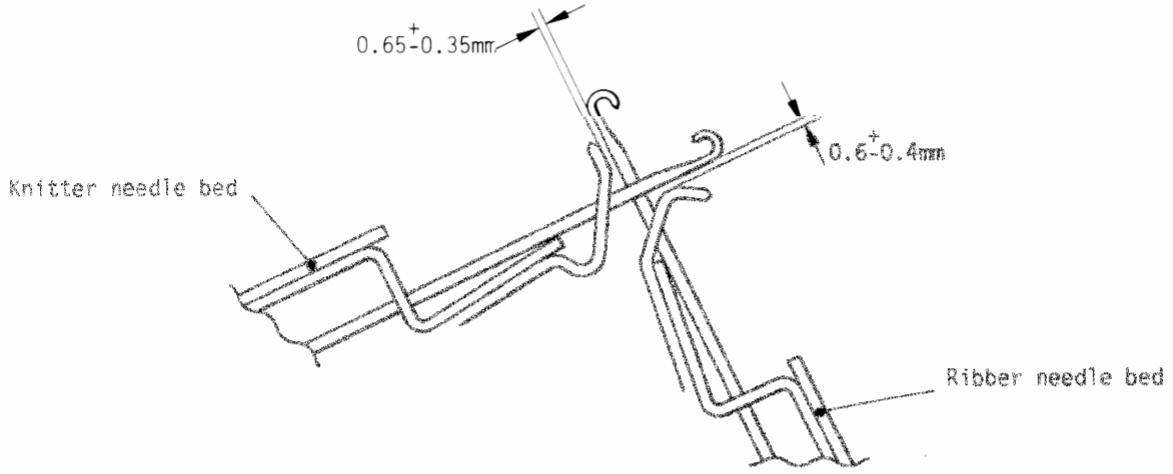
If the bend is more than the permissible range, the stitch will not be transferred partially.

(Fig. 26) Displacement of the Sinker

3. No bend or breakage of the latch needle is permissible.
If the RT-1 is used with the bent or broken latch needles, it will cause the transfer needle to be damaged.

5 - 1 - 3 Characteristics when the knitting machine and ribber are set.
The characteristics when the above are set shall satisfy the following dimensions.

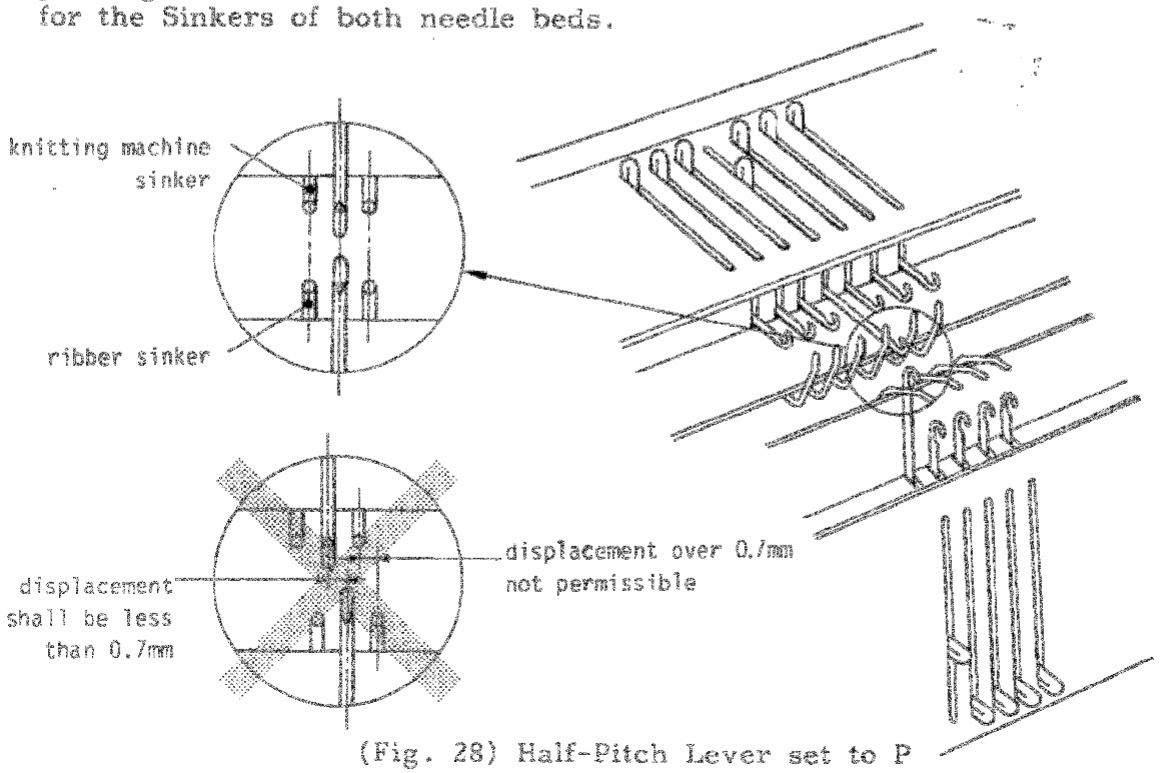
1. Vertical position of the knitter and the ribber: $0.6^{+}_{-}0.4$mm
2. Horizontal position of the knitter and the ribber: $0.65^{+}_{-}0.35$mm



(Fig. 27)

Note; The vertical dimensions and horizontal dimensions of the ribber and the knitter are wider on the center of the needle beds.
Depending on the manner in which the ribber is attached to the knitter or curve of top surface of the knitting table, those horizontal and vertical dimensions become excessively different.

3. Left and right displacement of the ribber against the knitter must be within 0.7mm.
When the Half-Pitch Lever is set to "P" the right and left displacement of the ribber against the knitter, between the knitter needle and the corresponding ribber needle, must be within 0.7mm. This same dimensions hold for the Sinkers of both needle beds.



(Fig. 28) Half-Pitch Lever set to P

4.

- If the vertical position of the ribber against the knitter is higher, stitches will drop or will not be transferred.

- If the vertical position of the ribber against the knitter is lower, transferring stitches will be carried out without problem, but the relative position between the Ribber Arm Yarn Feeder and the needle will be in incorrect position, requiring adjustment.

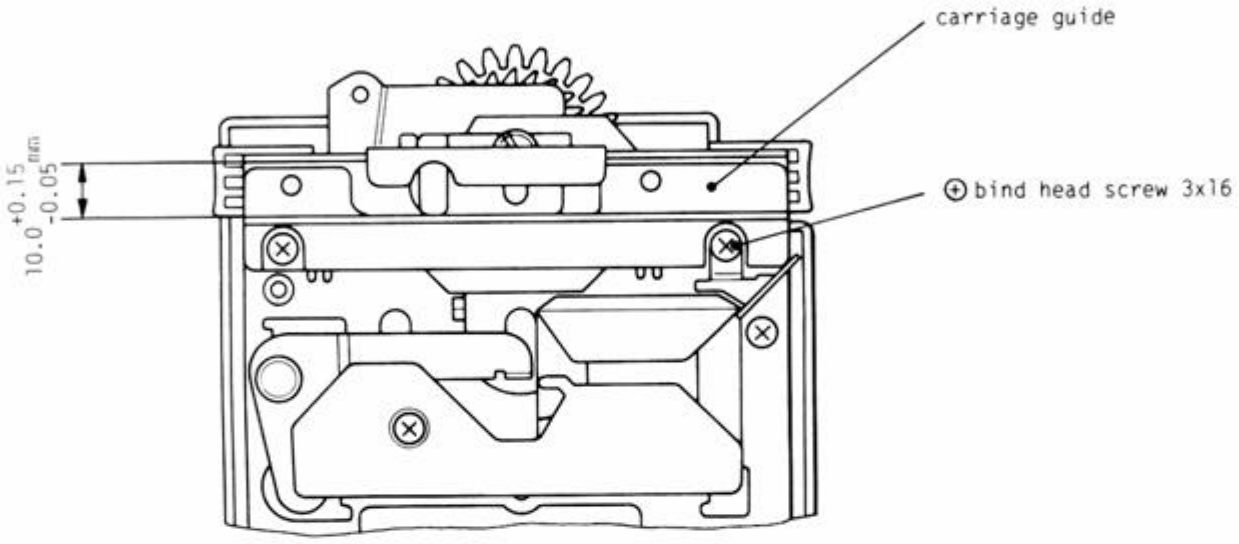
- If the horizontal position of the ribber against the knitter is higher transferring stitches will be carried out without problem, but adjustment is required for the relative position between the Yarn Feeder and the needles.

- If the horizontal position of the ribber against the knitter is lower, stitches will drop or will not be transferred.

- If the right and left position of the ribber against the knitter is displaced, the stitches will not be transferred partially, or the transfer needle will be damaged.

5 - 2 Adjustment of play between RT carriage and knitting machine rail.

Confirm the setting condition between the RT carriage and the rail of the knitting machine after attaching RT carriage to the machine. Loosen ⊕ bind head screws 3x6 and 3x16 which hold the carriage guide, and adjust the play of the RT carriage by jogging the carriage to back and front. Set RT carriage to the knitting machine and make adjustment so that the carriage moves smoothly without play while it is not heavy to the move.

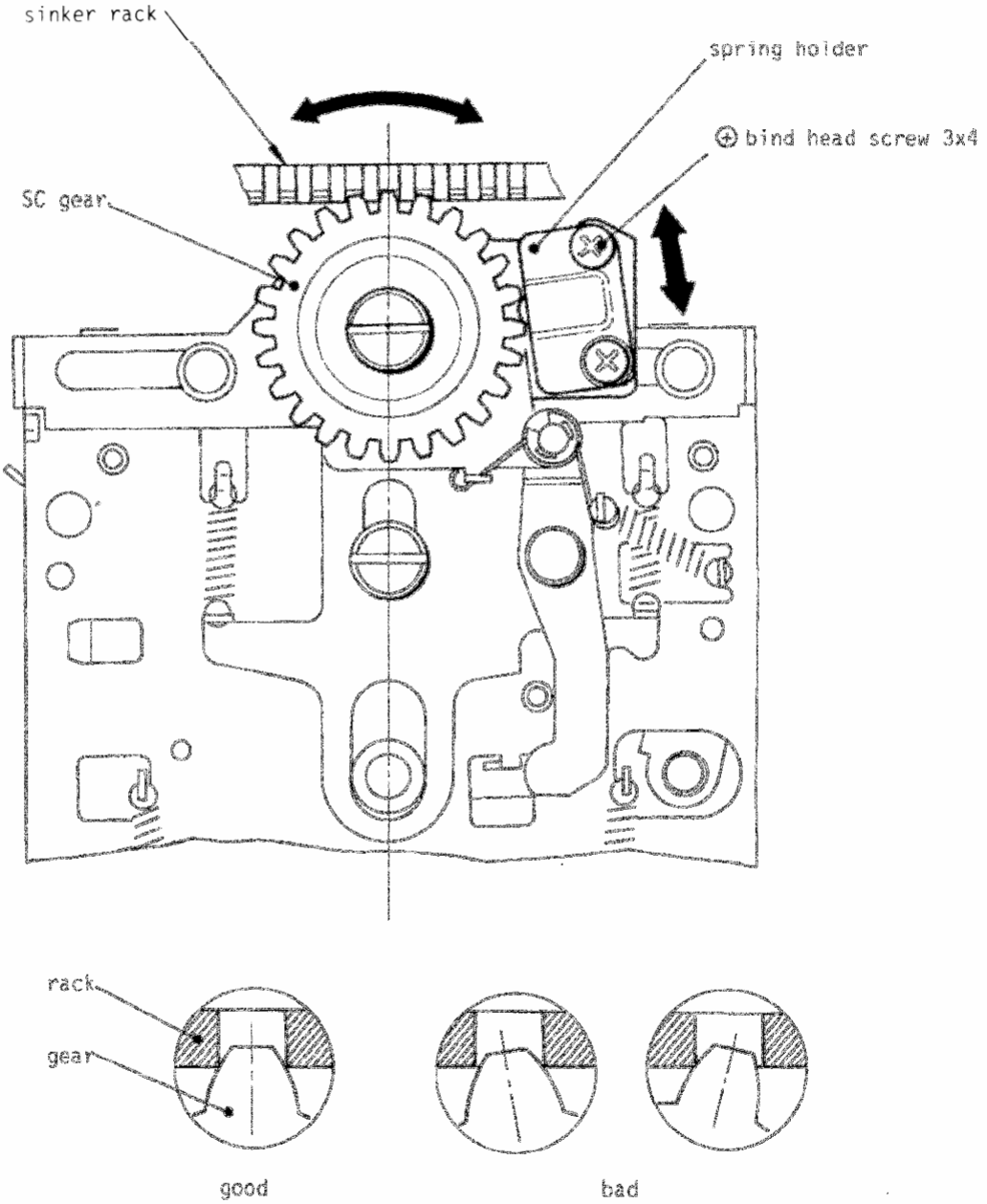


(Fig. 29) Adjustment of the play

- Excessive play: RT carriage vibrates sideways so that the transfer function will be imperfect.
- Insufficient play: Becomes heavy to move and may cause the idle rotation of the gear.

5 - 3 Gear adjustment

If the SC gear is not meshed with the rack of the needle bed properly, the relative position of the Transfer Needle against the ribber needle when picking up its stitch will be dislocated and a drop of stitch will be resulted. Check the engagement visually, (check the condition where the sinker retainer plate is fixed to the sinker)
To make adjustment, loosen the two ⊕ bind head screws 3x4 and move the spring holder up and down.

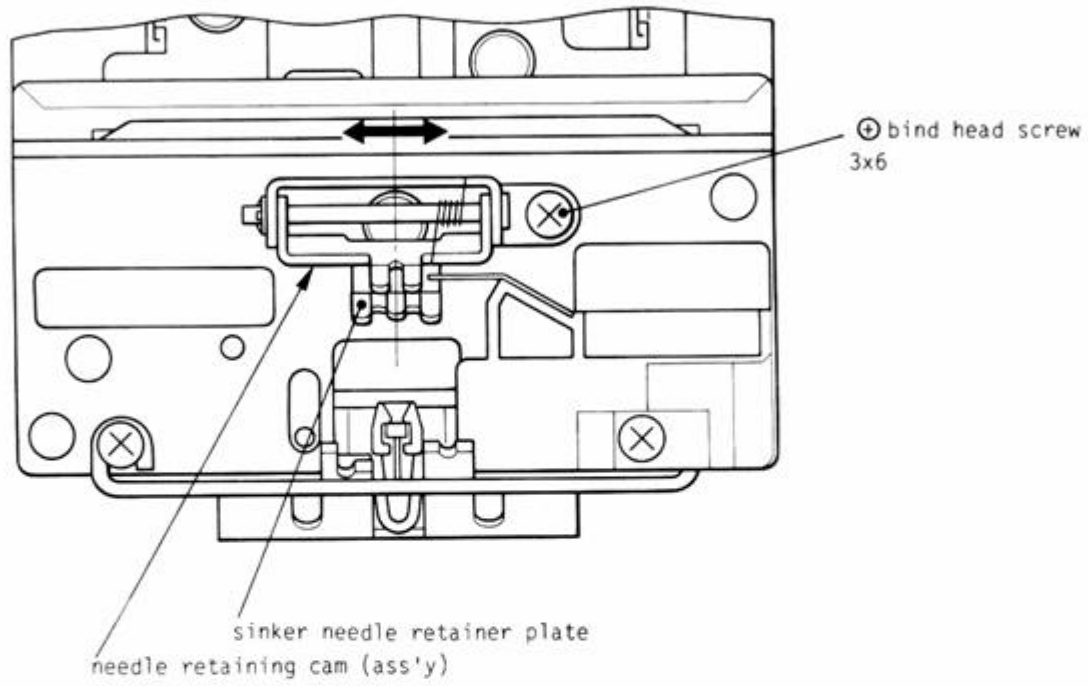


(Fig. 30) Gear adjustment

- SC gear turns counter-clockwise when the spring holder is moved upward.
- SC gear turns clockwise when the spring holder is moved downward.

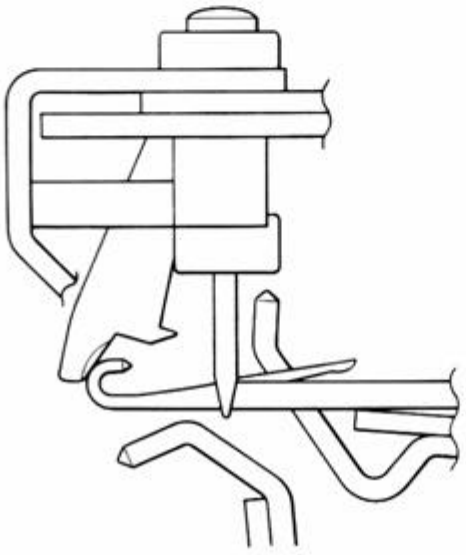
5 - 4 Horizontal adjustment of needle retaining cam

If the needle retaining cam is largely displaced horizontally, the latch of the transfer needle will not be opened by the knitter needle, and the stitch will remain on the transfer needle.
If the Transfer Carriage is operated in this condition, the transfer needle will be damaged.
To make adjustment, loosen ⊕ bind head screw 3x6 that holds the needle retaining cam, and move the cam to the right and left, and check visually.



(Fig. 31) Horizontal adjustment of needle retaining cam

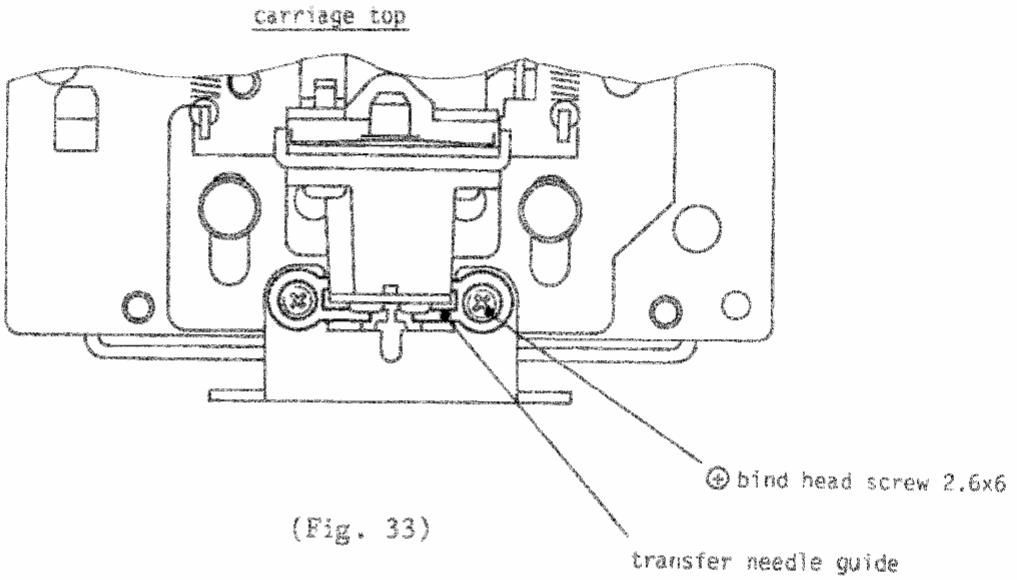
- Make adjustment to have the centre of the centre rack on the sinker needle retainer plate and that of the notch of the needle retaining cam in conformity when the Crank Handle Knob is set at ▲ mark.
- On completion of the adjustment, set the RT-1 on the knitting machine and perform idle operation to check to see if the hook of the knitter needle pushes the centre of the latch of the transfer needle and open it properly.



(Fig. 32)
Checking the push of the latch

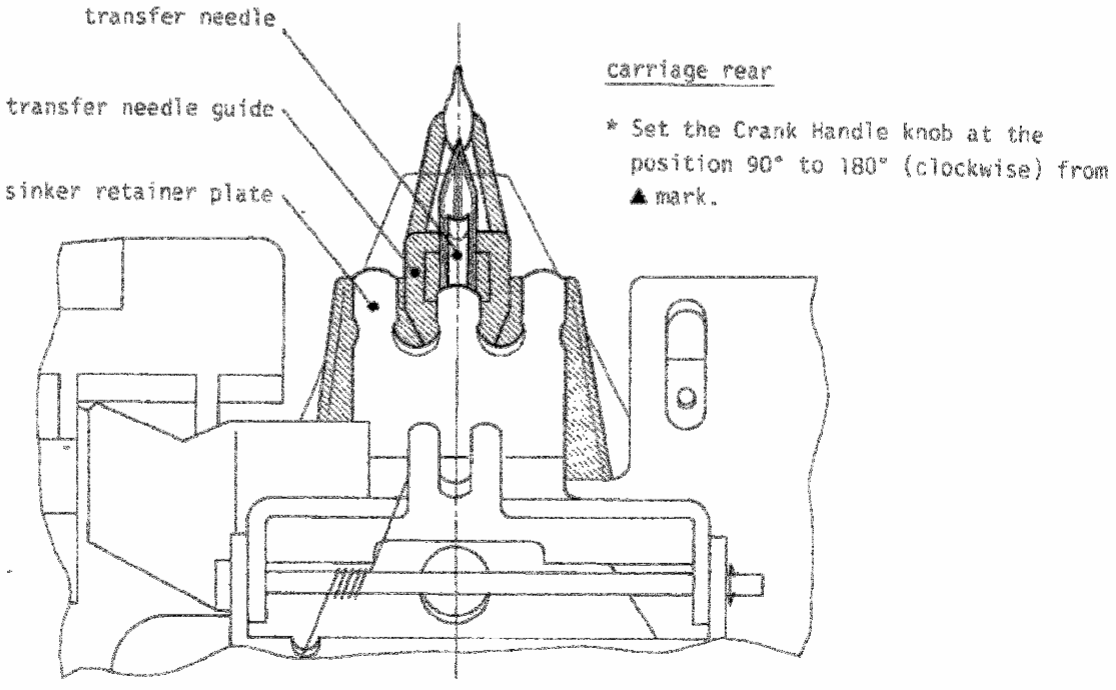
5 - 5 Horizontal adjustment of transfer needle guide

If the transfer needle guide is extremely dislocated horizontally, the relative position between the transfer needle and the latch needle of the ribber becomes incorrect, and the stitches will drop, or the stitches will not be transferred.
This also causes the incorrect relative position between the transfer needle and the latch needle of the knitting machine causing the defects described in the preceding section 5 - 4.
To make adjustment, loosen the two ⊕ bind head screws 2.6x6 that hold the transfer needle guide and move the guide to the right and left.



(Fig. 33)

- Make adjustment to match the center of the center rack of the sinker retainer plate and the center of the transfer needle.
- Check in the manner as described in the preceding section (Fig. 32) on completion of adjustment.



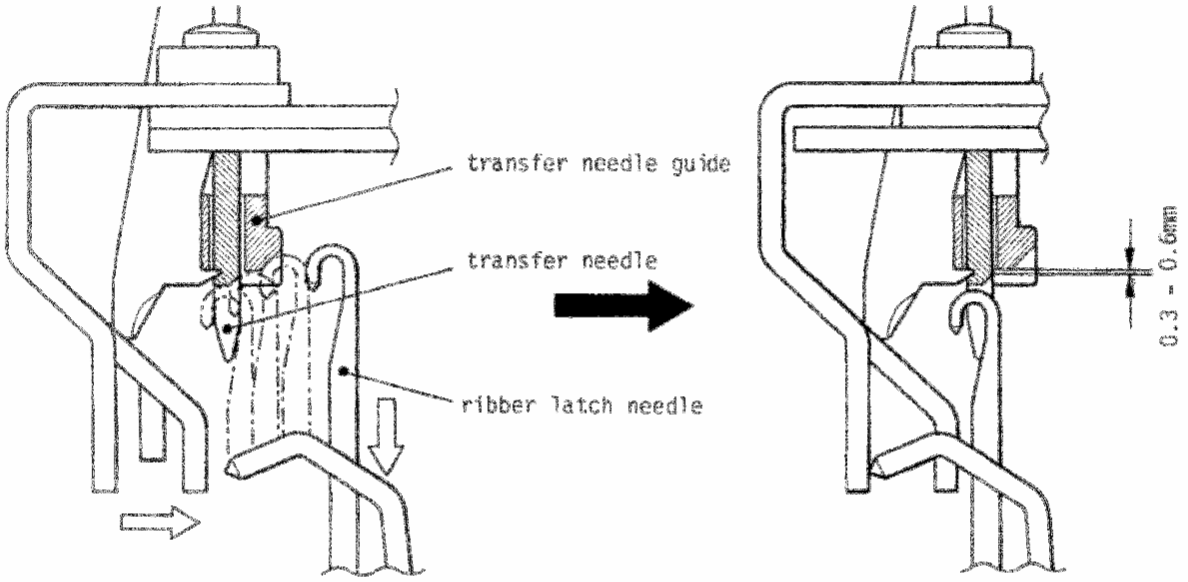
(Fig. 34) Adjustment of transfer needle guide

5 - 6 Adjustment of vertical positioning of the Transfer Needle

It is necessary that the vertical position of the transfer needle should be adjusted accurately so that the transfer needle picks up the stitch from the ribber needle and transfer it to the knitter needle in a proper timing.

Refer to the section "4 - 2 How to attach the transfer needle" for the details of adjustment.
In this section, the relation between the transfer needle and transfer needle guide, ribber latch needle and latch needle of the knitting machine are illustrated.

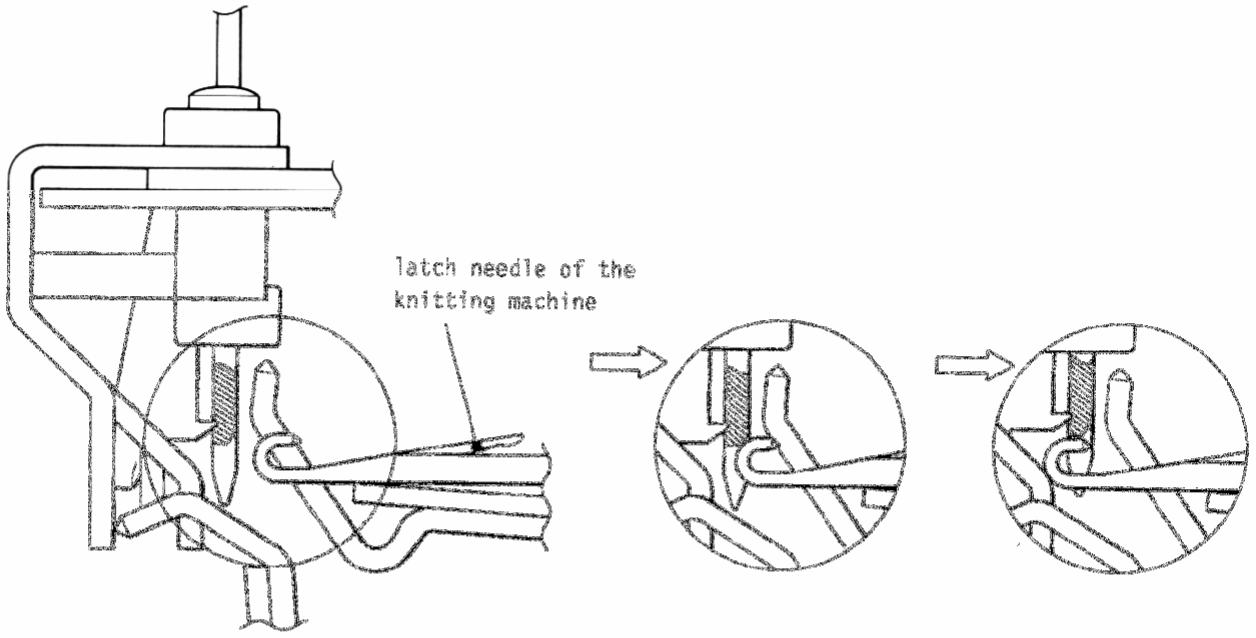
1. Relation between the transfer tool and transfer tool guide and the ribber latch needle.



(Fig. 35) Height of the transfer needle

- The latch needle of the ribber is guided to the center of the transfer needle while being pushed down by the slope of the transfer needle guide.
- If the position of the transfer needle is too low at this point, the latch needle of the ribber can not split open the transfer needle, and the stitch will not be transferred and will drop.

2. Relation between the transfer needle and the latch needle of the knitting machine.



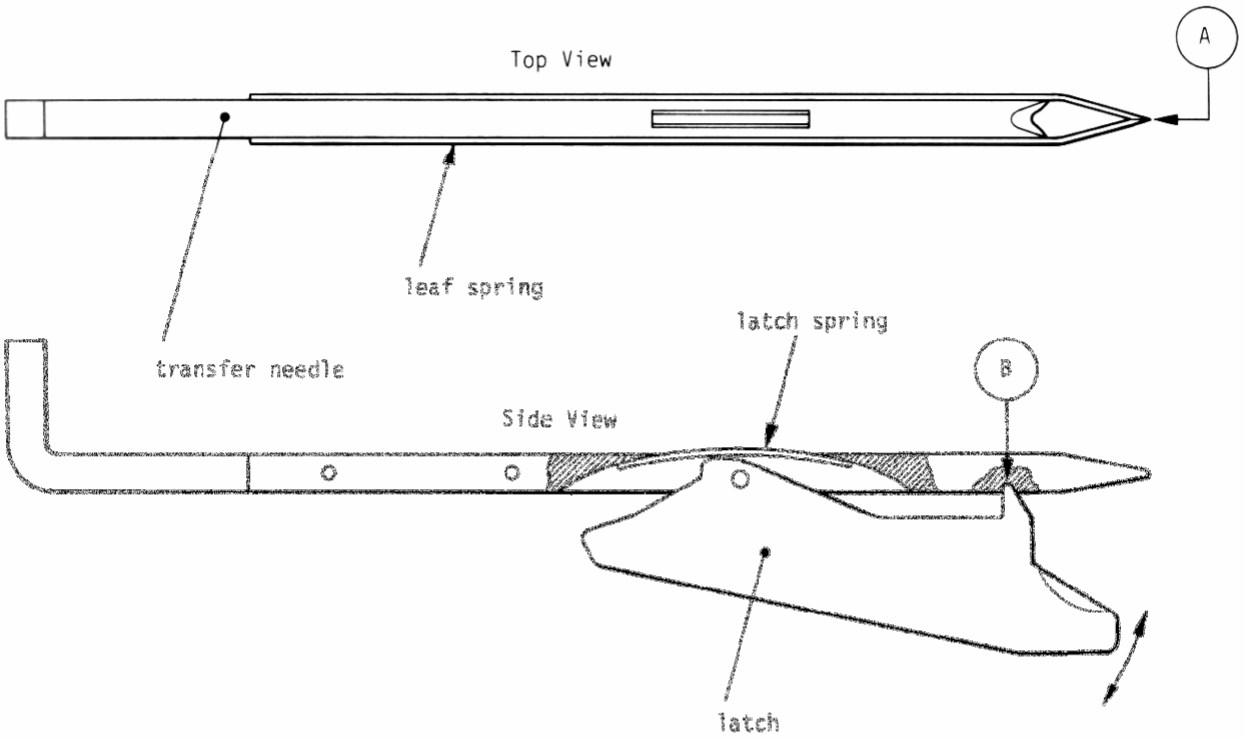
(Fig. 36) Height of the transfer needle

- The latch needle of the knitting machinie goes into the transfer needle while pushing up the transfer needle.
- If the position of the transfer needle is too low, the operation load may become excessively large, or may cause the damage of the transfer needle.
- If the position of the transfer needle is too high, the positional relationship between the loop and the latch needle of the knitting machine will be incorrect. This particulary causes the stitch at the edge to be dropped.

5 - 7 Corrections of transfer needle

5 - 7 - 1 Transfer needle

1. Names of parts



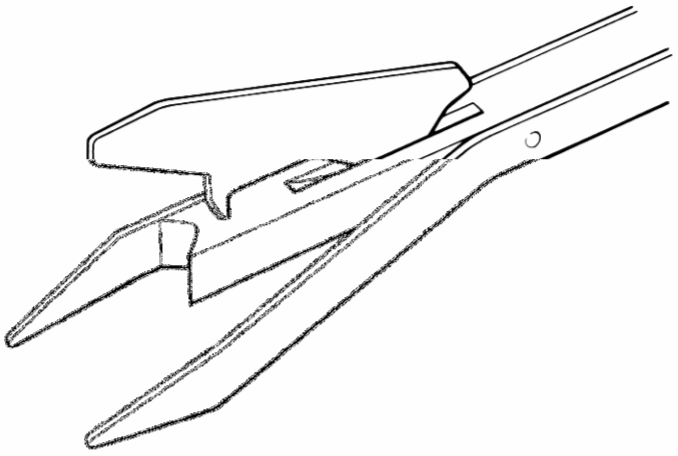
(Fig. 37) Transfer needle

2. Acceptable conditions

- Tips of the leaf spring should be in contact at the centre. (Acceptable only if the gap of the tips is less than 0.2mm.)
- The latch shall be closed by the force of the latch spring, and its tip should be securely housed in the punched hole on the transfer needle.
- There shall be no warp or burrs and scars affecting to the operation.

5 - 7 - 2 Correction of the transfer needle (reference)

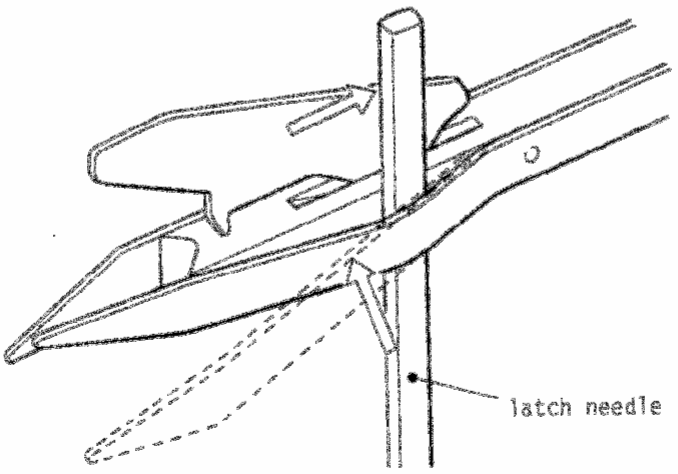
The main damage on the transfer needle is slackening of the tip of the leaf spring, it remains open as in Fig. 38.

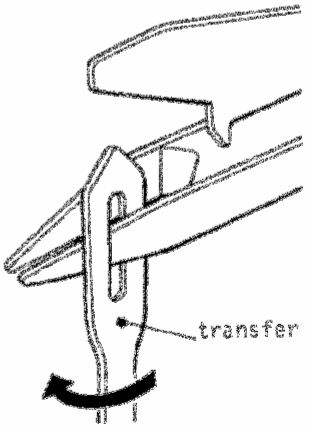


(Fig. 38) Damage of the transfer needle (leaf spring)

° Method of correction

1. Insert the latch needle between the leaf spring of the transfer needle.
2. Hold down the side surface of the leaf spring securely by hand, and bend it until the tip contacts the other tip.
3. Correct the bulge on the side surface of the transfer needle by holding it with a radio pliers.
   Slight bulge on the side surface does not cause any serious trouble as to operation, however, care should be taken to avoid scratch on it.





If the opening at the tip of the transfer needle is slight it can be repaired as shown.

(Fig. 39) Method of correction