

SERVICE-MANUAL



BERNINA KL. 940/950

Provisional Edition 1983

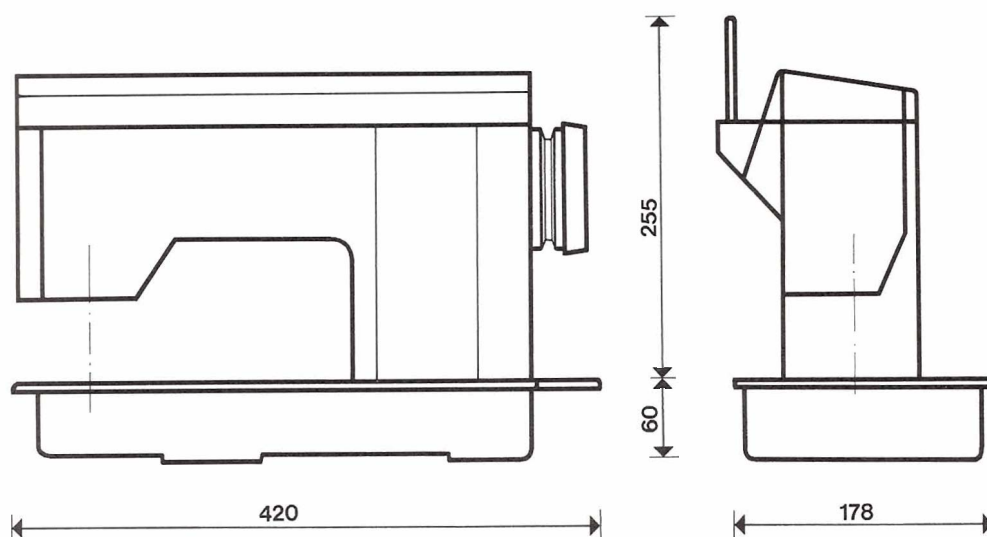
BERNINA

INDEX

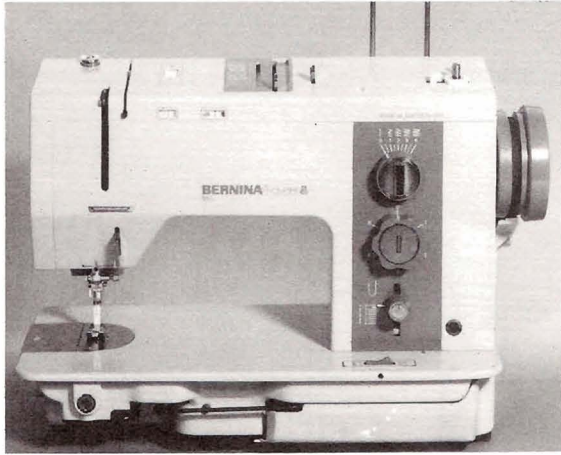
Technicals	3
Dismantling Covers	4
The Needle	7
Setting: – Crank	9
– Notched Segment Carrier	14
– Notched Segment	15
Hook Setting	19
Feed-Dog	23
Presser Foot Bar, Presser Foot	26
Thread Tension	30
Adjustment of Automatic Buttonholer	32
Bobbin Winding Device	37
Cleaning and Lubricating	40
Model 950	40
Fault Avoidance	41

TECHNICAL DATA:

BERNINA favorite Model 940/950 Zig-zag, utility and decorative stitch sewing machine with automatic buttonholer.



Max. stitch width	4,5 mm
Stitch position adjustment	5 positions
Max. forward stitch length	6,0 mm
Max. reverse stitch length	6,0 mm
Presser foot lift	7,5 mm
Passage pace	104x210 mm
Size of baseplate	373x178 mm
Hook system	107 W (non-jamming)
Bobbin capacity	75 m cotton yarn
Needle system	130/705 H (Cl. 950 = 287 WH)
Needle movement	swinging needle bar
Thread take-up lever	link take-up lever
Thread tension	upper thread tensioning incorporated in frame cover
Winder	self-releasing, can be used during sewing
Motor	220 V/90 W
Sewing light	220 V/15 W (Cl. 950 = 12 V/15 W)
Number of stitches	1600 U/Min. (Cl. 950 = 2200 U/Min.)
Weight of machine	14,25 kg
Needle deflection	
with lifting bar suspension	3,0 mm
needle plate upper edge	4,5 mm
at hook tip	4,63 mm
Needle bar lift	33,73 mm
Loop lift: left	2,8 mm
Take-up lever travel	61,0 mm
Darner lift	2,92 mm
Size of machine:	
overall length	410 mm
overall breadth	204 mm
height over reel pin	326 mm (overall)
	254 mm (from baseplate)



ADJUSTMENT OF MODELS 940 (950)

These adjustment instructions are intended to help you carry out minor repairs and adjustments.

The instructions lay no claim to completeness.

They are not suitable for a complete assembly or dismantling procedure.

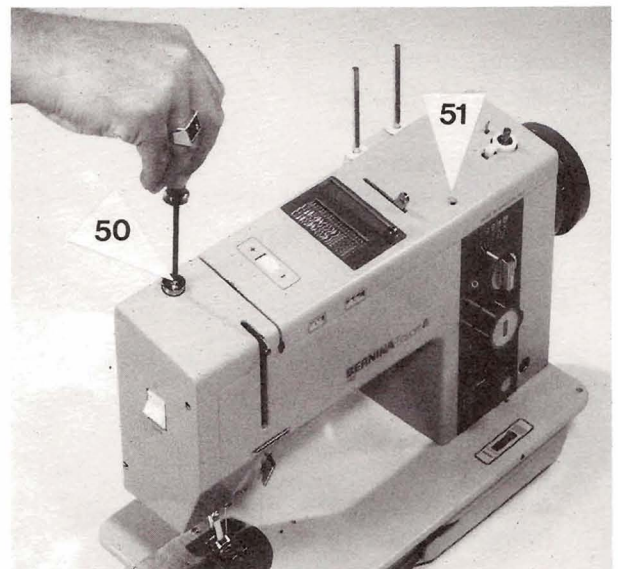
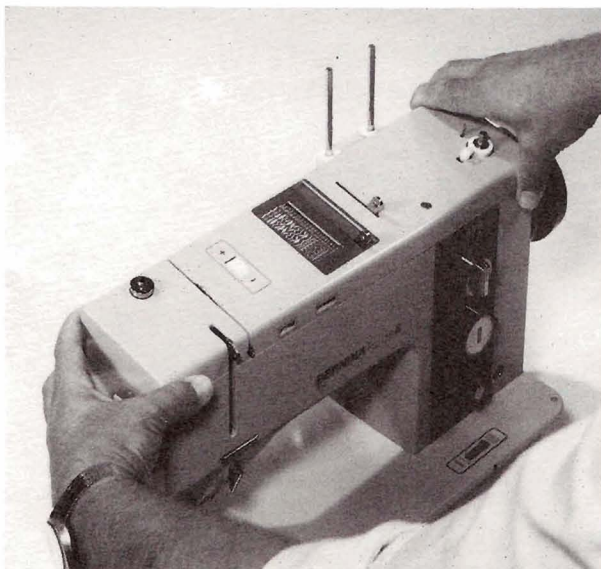
IMPORTANT: to enable the work described to be performed correctly, the *sewing machine must be in good mechanical condition* (running smoothly, properly oiled, etc.).

If the sequence of adjustments is observed, the machine will sew satisfactorily.

Dismantling covers

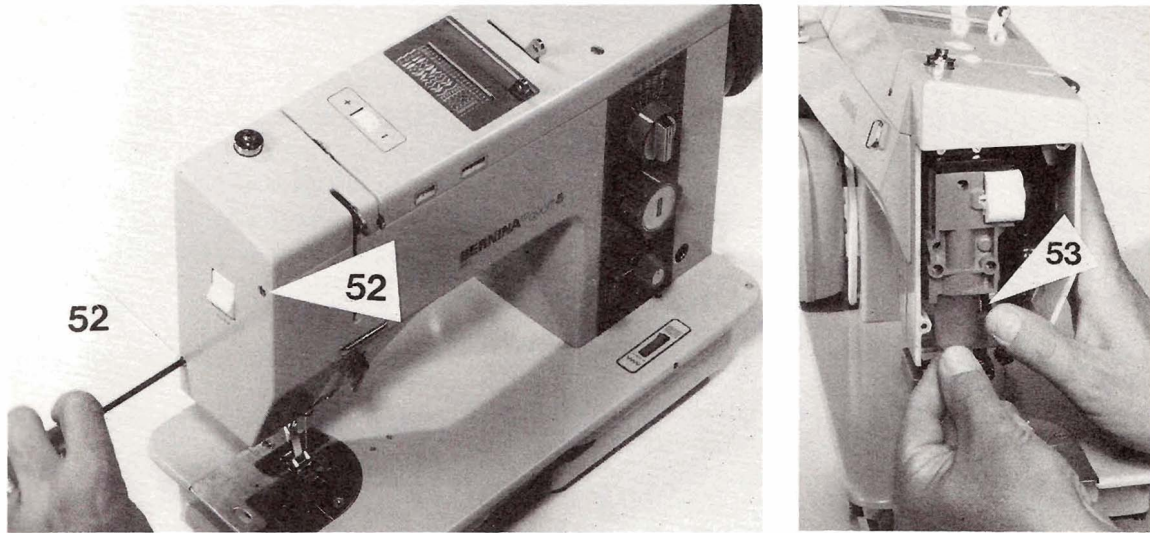
Dismantling top frame cover

Screws 50 and 51 hold the top frame cover secure. Press screws down with screwdriver and turn half a rotation to right in the clockwise direction (bayonet fixing). The top frame cover can then be lifted off.



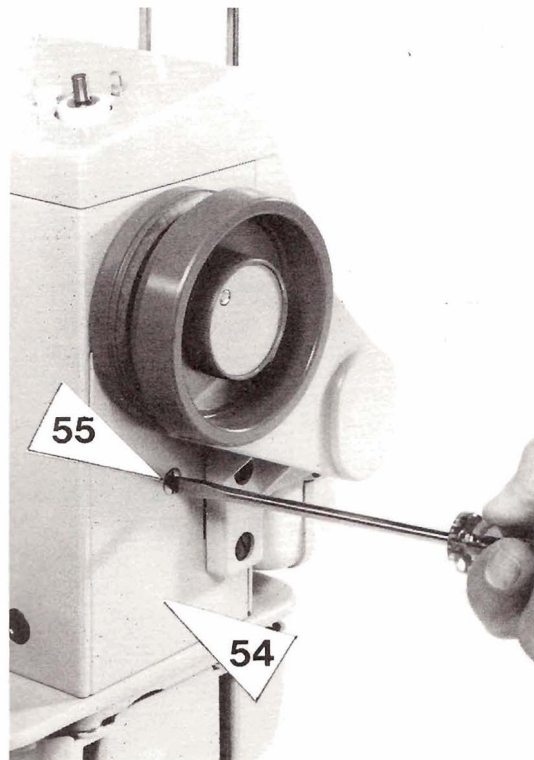
Removing the front cover

Loosen both fixing screws 52. The screws are secured in the front cover.



Changing the bulb

The lamp has a bayonet socket. A new bulb can only be fitted after folding the protective cover 53 in front of the lamp socket to the side.



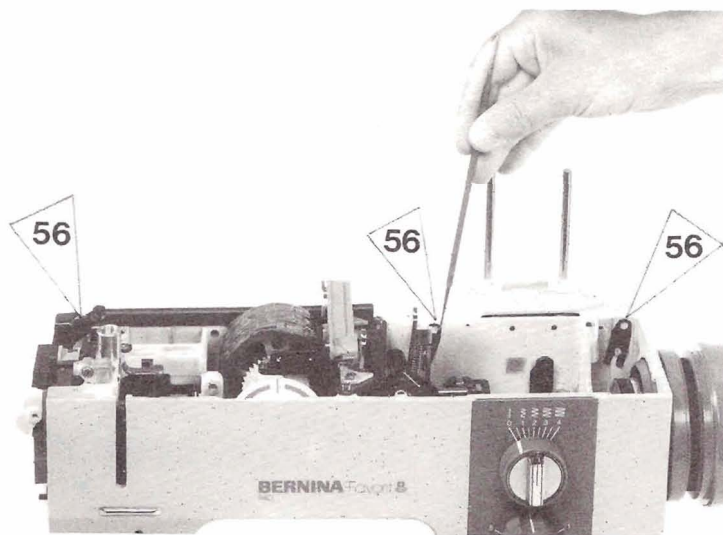
Removing the belt cover 54 under the handwheel

Release cheese-head screws 55 and remove belt cover.

Removing bobbin pins cover

First remove front cover.

Remove three securing springs inside on the top frame wall, and draw out cover backwards over the bobbin pins.



THE NEEDLE

The needle is one of the most important items of sewing equipment. Its function is to pierce the material and to take the upper thread to the hook for linking with the lower thread and to form the loop for acceptance by the hook.

The loop is formed after the needle has pierced the material and reached its lowest point. The thread is drawn tight and lies in the long groove at the front. At the rear it lies in the short groove and higher up between the needle stem and the hole pierced in the fabric. If the needle rises slightly, the so-called loop lift, a loop is produced at the eye of the needle on the short groove side, which the tip of the hook can enter, as a result of the friction on the short groove side, which the tip of the hook can enter, as a result of the friction between the work and the needle stem where the thread is retarded.

Basically, the sewing machine needle has the following features:

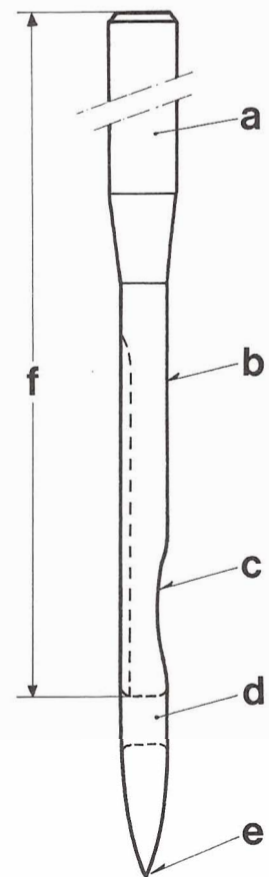
- a) the *plunger* for securing the needle in the needle bar
- b) the *stem* with a long groove for guiding the thread and forming the loop
- c) the *scarf*
- d) the *eye of the needle*
- e) the *point of the needle*
- f) the *needle length*

BERNINA used the 130/705 H needle system with scarf for the Model 940. (Cl. 950 = 287 WH).

The *needle size* is measured in millimetres. Needle size «100» means a needle stem thickness = 1 mm (Needle mm) or Nm = 0,8 mm dia.

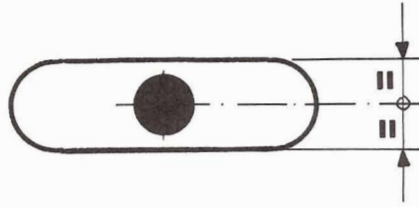
The needle must be firmly secured with the knurled screw on the needle holder. Tighten screw with special screw-driver.

IMPORTANT: Unless indicated otherwise, always use an «Nm 80» needle for all adjustments. Check the needle before every adjustment to the machine. It must be absolutely straight.



Needle distribution in stitch hole (needle plate)

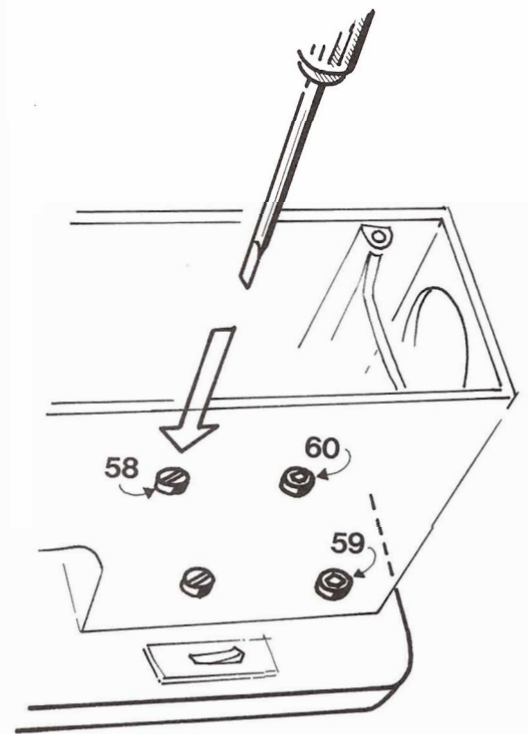
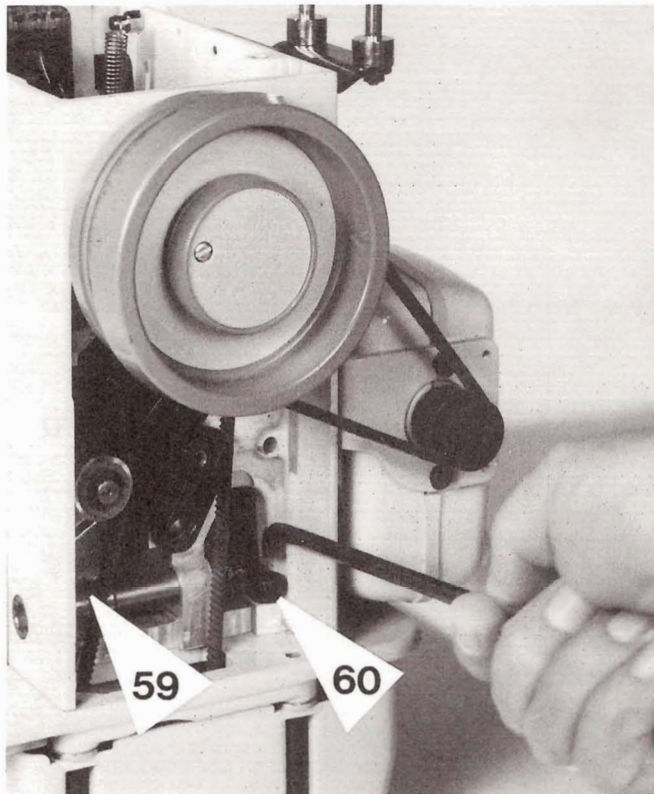
The needle must penetrate at the center of the stitch hole as seen in the direction of the material feed (use needle Nm 90).



If a correction has to be made, the belt cover must be removed on the handwheel side and three of the four frame fixing screws released.

For this operation the special Key No. 398 089 03 and a screwdriver No. 6 are required.

Place the top frame in the desired position and re-tighten the three screws.

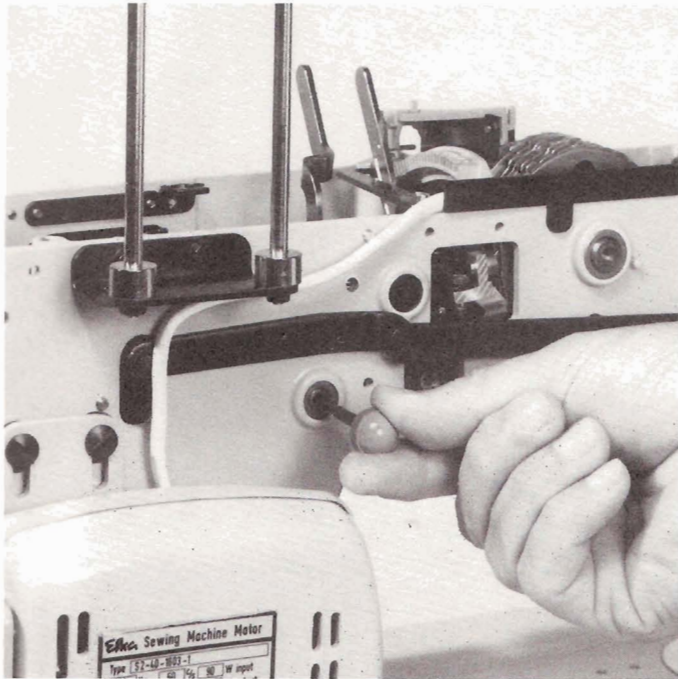


ADJUSTMENT OF LINK AND STITCH POSITION

(Left – half-left – Center – half-right – Right)

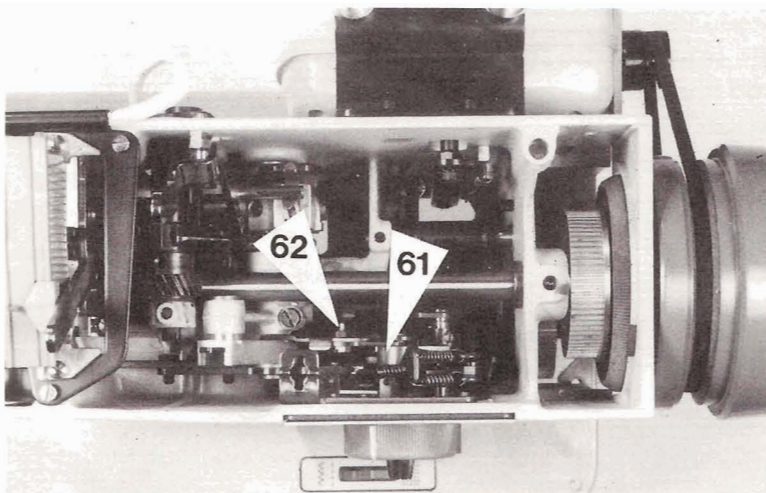
Dismantle handwheel, belt cover, motor cover and rear top frame cover. The front of the link spindle is then accessible.

Place the special tool No. 398 001 04 through the hollow link spindle, while at the same time turning the LCR knob backwards and forwards till the conical tip of the tool engages in the hole of the link. This ensures that the link in its normal position pivots around the center of the link spindle.



At the same time the LCR locking lever 61, must be engaged in the center position. If not, the locknut and socket head screw 62 are released.

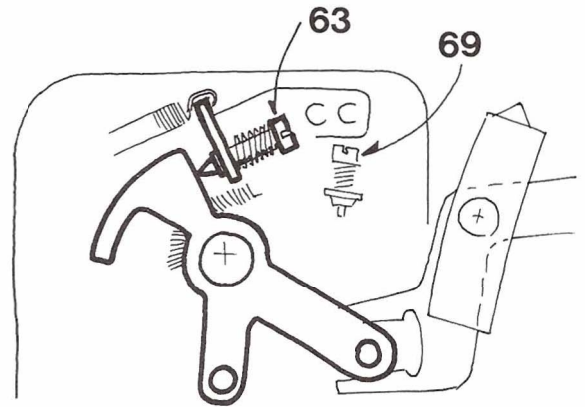
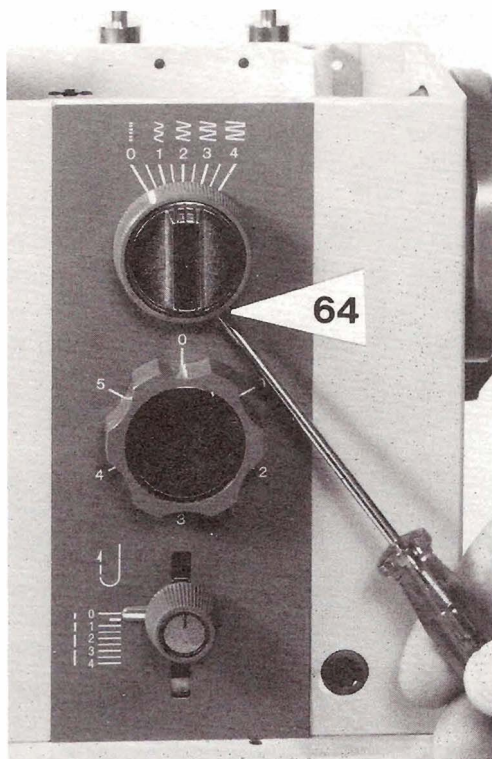
Set the locking lever to the prescribed position and re-tighten the socket head screw with the nut. Remove tool.



REST POSITION OF THE NEEDLE

Turn stitch width knob fully left to the stop (0 position). Start machine. The needle swivel support must not make any sideways movement.

If it does move, correction is made as follows: turn right-hand screw 63 (with helical spring) to right or left till the *needle swivel support* makes no further sideways movement.



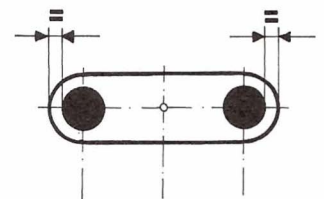
When the rest position of the needle is corrected, check whether the marking line on the stitch width knob coincides with the «0» on the scale.

If not set exactly, loosen screw 64 in the stitch width knob and set the two marks (knob and scale) in alignment. Tighten screw 64.

LATERAL NEEDLE MOVEMENT

The needle must pierce through the center of the stitch hole when the mark on the LCR knob is vertical.

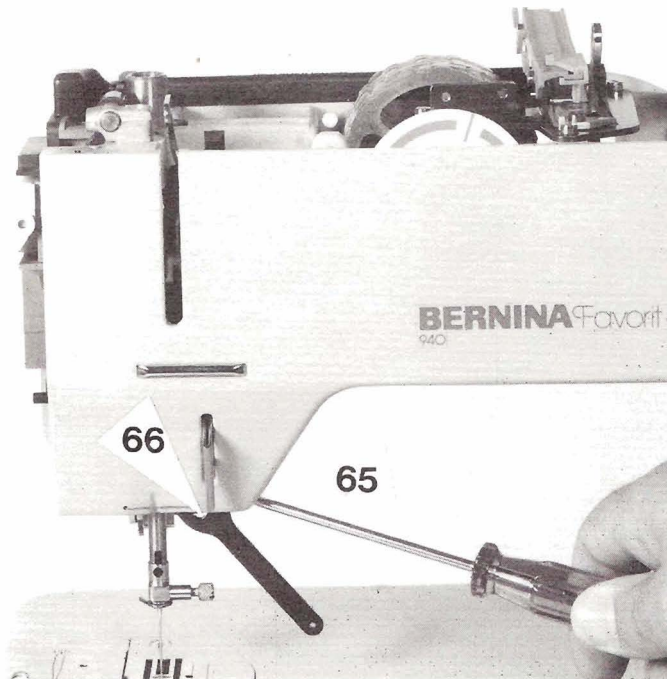
This can easily be checked by observing the needle while turning the LCR knob from left to right.



The distance from the edge of the stitch hole must be the same in each case. If not, correct as follows:

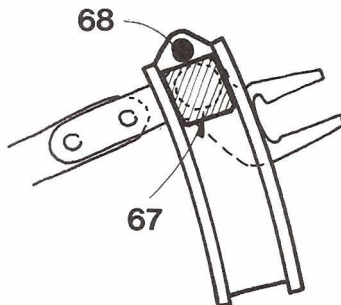
Loosen screw 65 very slightly. Place special fork wrench No. 398 063 03 on the knurled eccentric bolt 66. By turning slightly to left or right the needle can then be brought to the desired position. Tighten screw 65.

IMPORTANT: Ensure that there is *no clearance* between take-up lever link and swivel support when the eccentric is turned!



STITCH POSITION ON ZIG-ZAG

Turn stitch width knob to position 4 and observe whether the zig-zag link block 67 contacts the screw head stop 68. If not, the limiting screw 69 should be turned back until the link block reaches the stop. Turn handwheel and observe whether the left and right-hand penetration are equidistant from the edge of the stitch hole.

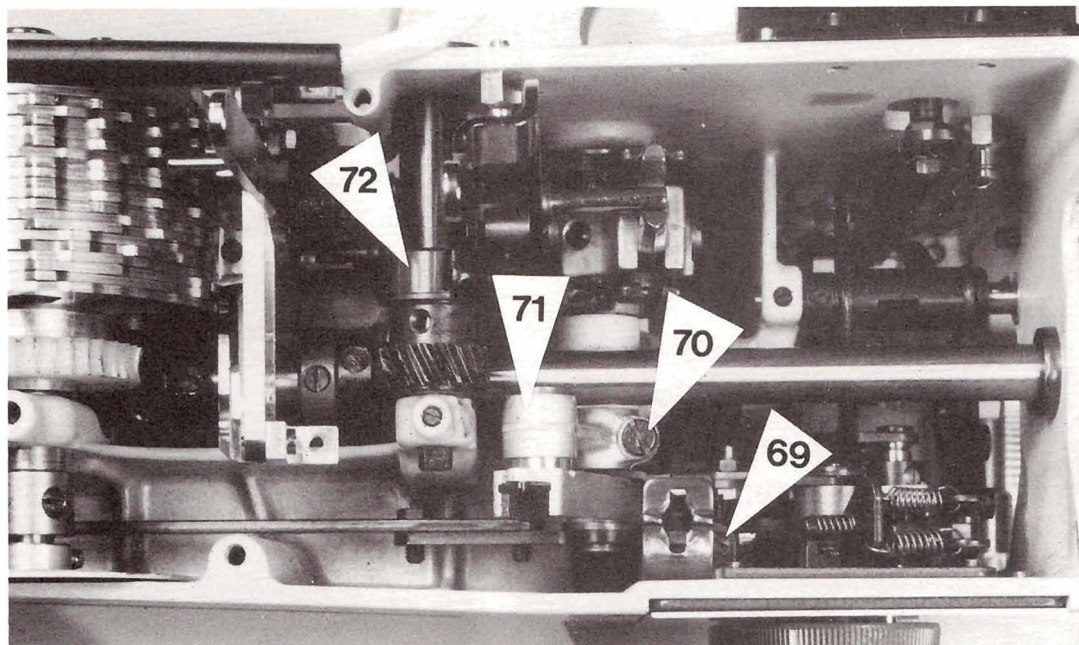


If this is not the case, release clamping screw 70 of rocker arm 71 (on which the zig-zag link is suspended) and set needle to correct position. Tighten clamping screw.

IMPORTANT: Ensure that there is *no clearance* between take-up lever link and swivel support when the eccentric is turned.

Now the limiting screw is set for maximum zig-zag width (approx. 4,5 mm).

The screw 69 is moved down until the distance from the edge of the stitch hole for right and left needle penetration is approx. 0,1 mm.

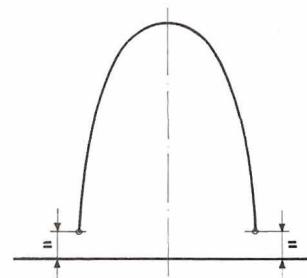


LATERAL MOTION OF NEEDLE DURING ZIG-ZAG SEWING

The sideways movement of the needle (parabola) must be exactly matched to the up and down motion.

It must only begin when the tip of the needle during the upwards motion is 7,5 mm above the needle plate and must finish when the needle is 7,5 mm above the needle plate during the downwards movement.

The motion is derived from the zig-zag eccentric 72 running at half-speed (1:2).

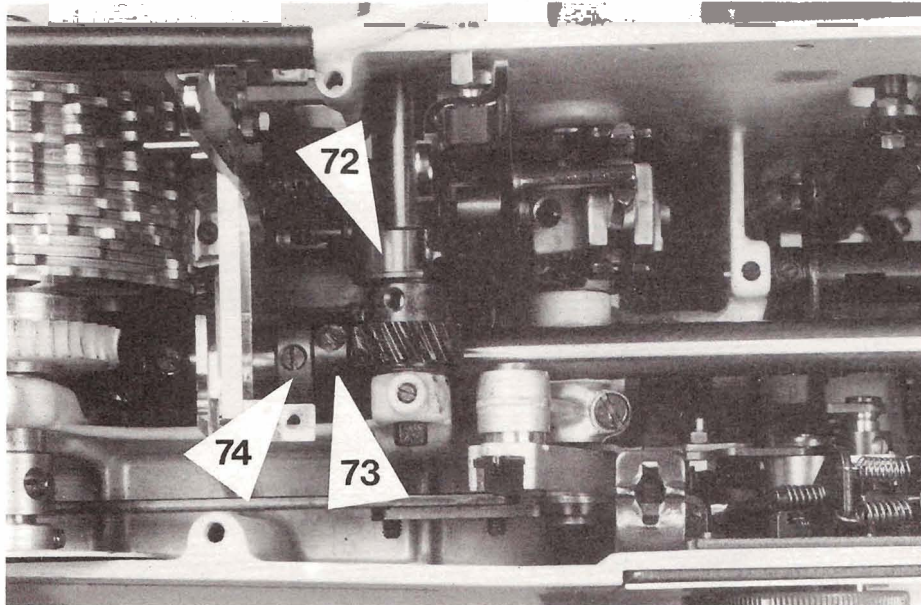


Check:

Set LCR knob to center.

Set needle to uppermost position by turning handwheel. When the stitch width knob is turned backwards and forwards between «0» and «4», the *needle must remain stationary*. Otherwise, a correction must be made:

Loosen the two screws on worm wheel 73. Then using the screwdriver secure the worm wheel 73 now loose on the spindle, while pressing the setting ring 74 and turning the handwheel at the same time, until the correct setting is found. Tighten both screws on worm wheel 73.

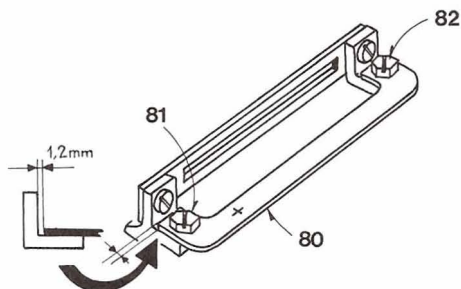


BASIC SETTING OF THE TRACER LIFTER STRAP

To ensure that the notched carrier has sufficient range of adjustment, the lifter strap 80 must be set to the correct position.

The following procedure should be adopted:

1. Release two fixing screws 81 and 82.
2. Insert distance gauge at front between cam control lever and lifting rail 80 and press the lifter strap slightly against the distance gauge (1.2 mm).



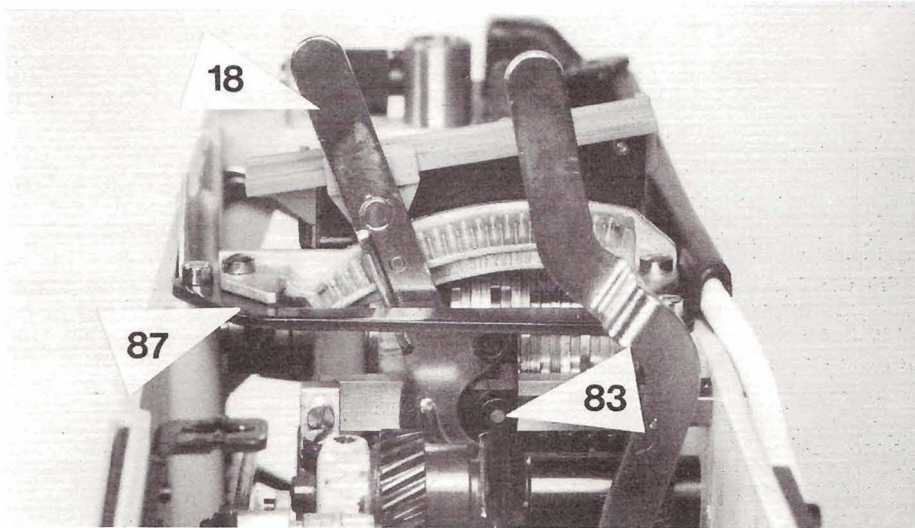
3. Tighten screw 81 slightly.
4. Repeat operations 2 + 3 on other side (back).
5. Tighten both screws 81 and 82.

SETTING NOTCHED CARRIER

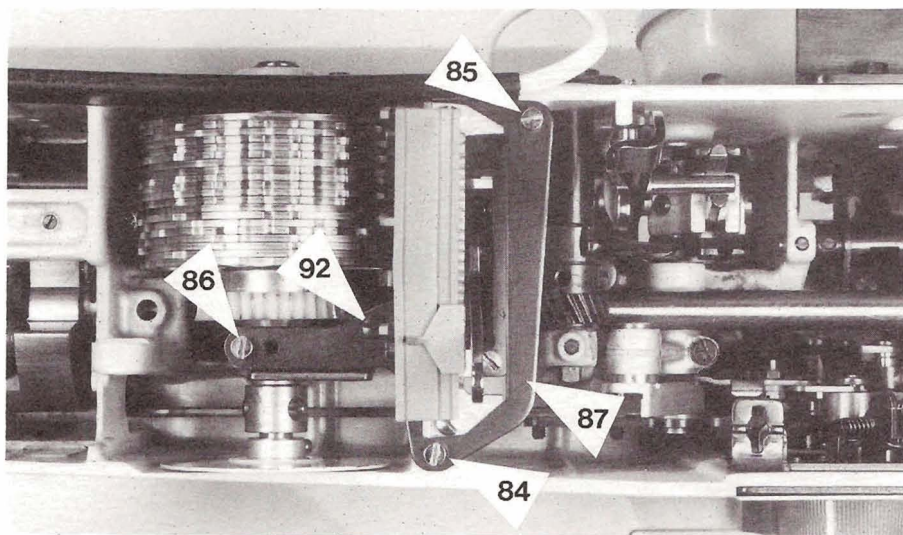
When setting the individual decorative stitches, tracer 83 is moved with selector lever 18 from one control cam to the other.

This is performed a) by rising the tracer
b) by moving the selector lever

During lifting, the notched carrier limits the selector lever on the right.



The notched carrier 87 must, therefore, be set so that the tracer 83 no longer contacts the control cam when moved. On the other hand, it must only be raised sufficiently for the needle still to penetrate in the stitch hole (far left).



If correction is necessary the three screws 84, 85, 86 must be loosened and the notched carrier 87 moved to the desired position.

Tighten the three screws.

IMPORTANT: The stitch pointer must also be reset after adjusting the notched carrier.

SETTING NOTCHED SEGMENT

The notched segment 88 holds the lever 18 in the selected position. The notches must be set laterally so that the tracer coincides with the cams.

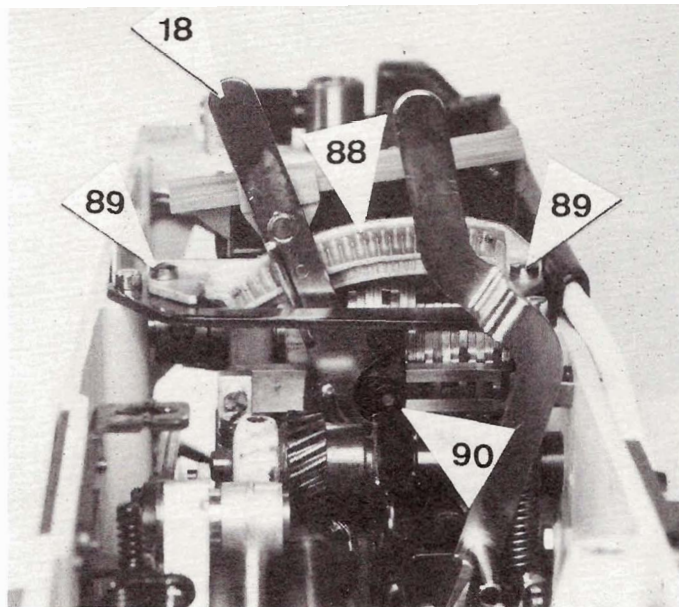
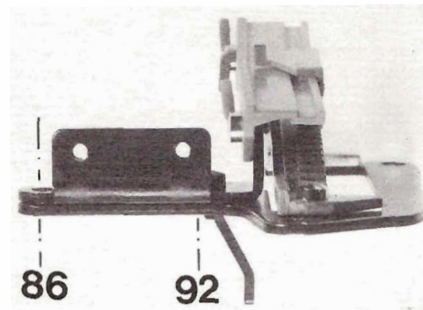
In order to achieve this it is necessary to move the notched segment sideways, forwards or backwards depending on the deviation.

In the event of discrepancies, the two fixing screws 89 must be loosened and the notched segment 88 moved to the desired position.

SUPPORT WITH GUIDE RAIL AND STITCH SELECTION

Loosen screws 86 and 92 and move sideways so that the stitch indicator can slide freely from 0-20.

Tighten screws.



TRACER DISTRIBUTION ON CAMS

The tracer 83 must be evenly distributed sideways on cams 2 + 19.

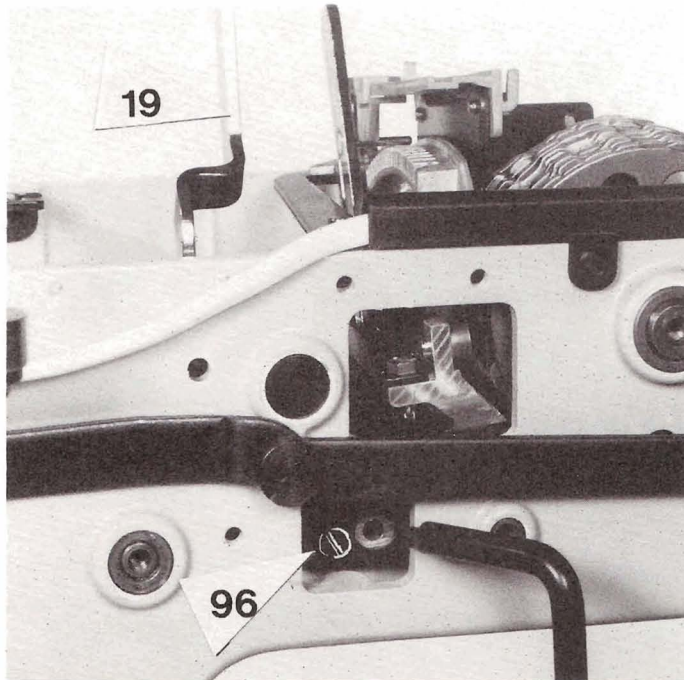
The tracer position can be found by turning the eccentric bolt on the adjusting lever to the right or left. The conical locknut 90 must also be loosened and re-tightened after adjustment.

The best check for coincidence can be made on stitches 2 + 19.

STITCH DISTRIBUTION WITH CAM CONTROL

Set changeover lever 19 to the rear to 1-20. Stitch control is then made by cams.

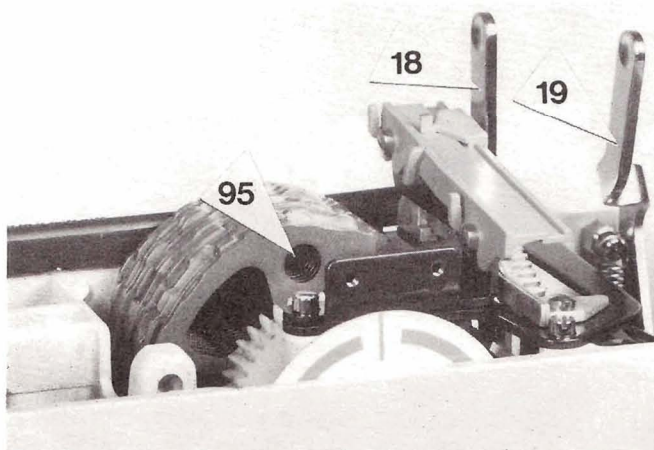
To check the stitch distribution, select decorative stitch pattern 17 and turn the hand-wheel until the centering hole 95 of the cam is exactly over the center of the cam flange. The lateral needle displacement is greatest in this position. Set stitch width knob to position 4. The lateral spacing from the edge of the stitch hole should then be the same to right and left.



Correcting stitch distribution:

Dismantle bobbin pin cover. The cam control lever is in two parts connected by screw 96. Insert special key No. 398 067 03 in the existing hole next to screw 96. Then loosen screw 96 slightly. By turning the key to right of left the correct needle position can be set.

Tighten screw 96.



LATERAL MOTION OF NEEDLE WITH CAM CONTROL

When the stitch control is from cams, the lateral needle motion (parabola) must be exactly the same as for zig-zag stitch.

Check:

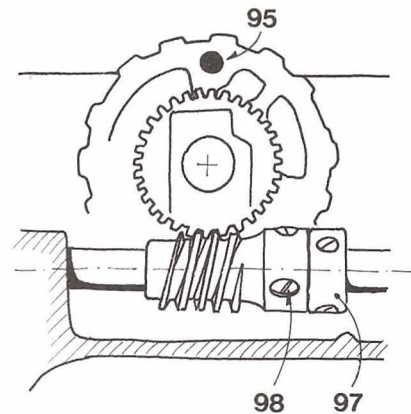
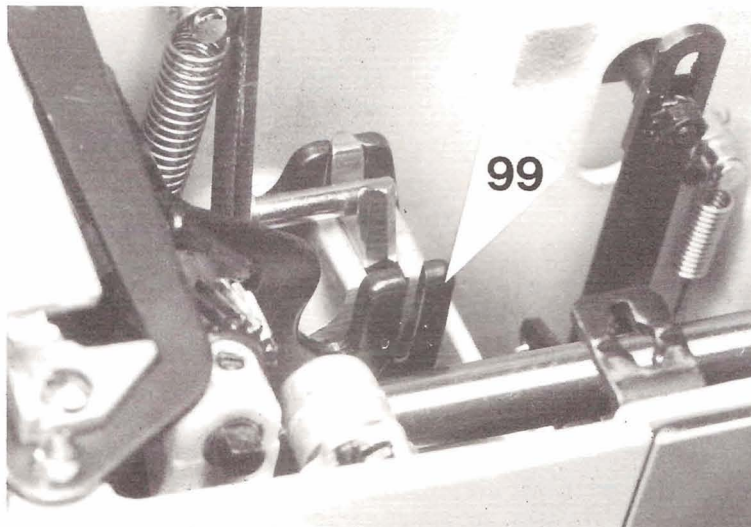
Set LCR knob to center, changeover lever 19 to 1-20, selector lever 18 to stitch 17.

Turn handwheel until the centering hole 95 of the cams is exactly over the center of the cam flange (maximum stitch width). Then set needle exactly at uppermost position (reversing point).

If the stitch width knob is turned backwards and forwards between 0 and 4, the *needle must remain stationary*.

If not, loosen screws 98 on the worm wheel. Secure worm wheel with screwdriver and turn handwheel forwards or backwards until the correct setting is found (possibly several times). Tighten screws 98.

WARNING: There must be *no clearance* between wormwheel and setting ring.



IMPORTANT:

Cam control lever and zig-zag fork must run in synchronism. The following must be observed when correcting or checking:

- Stitch width knob to 4
- Changeover lever to 1-20
- Selector lever to stitch 17
- Run machine until the maximum stitch width is reached (centering hole 00 on top).

Lever and zig-zag fork must then run in synchronism.

If the zig-zag fork 99 moves in the opposite direction, the worm wheel 73 must be turned through one complete revolution (360°). Loosen the two screws on the worm wheel for this purpose and again check the lateral motion of the needle with zig-zag stitch.

TRACER SUPPORT FOR STRAIGHT- AND ZIG-ZAG STITCH

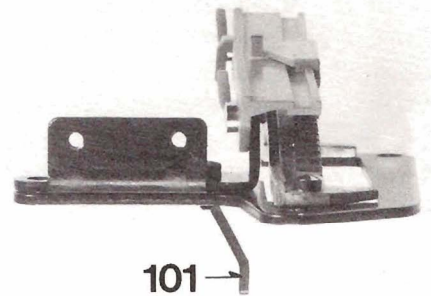
Check the support as follows:

- Selector lever to position 0
- LCR knob to center

If the stitch width knob is turned from 0-4, the needle must remain stationary.

If not, correct, as follows:

If the needle moves to the left when the stitch width knob is turned from 0-4, the tracer support 101 must be set left, if the needle moves right the tracer support should also be moved right.



ADJUSTING THE PATTERN (REPEAT) INDICATOR

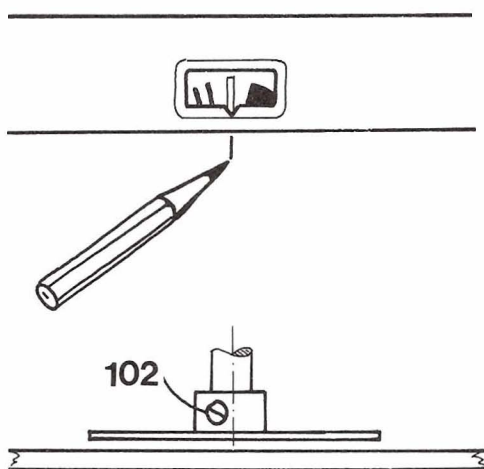
If the red mark of the pattern indicator no longer coincides with the mark on the inspection window resetting must be performed:

- Selector lever 18 to stitch
- Changeover lever 19 to 1-20
- Stitch width 4
- No presser foot, no thread.

Mark with a pencil below the notch of the window on the frame. Remove top frame cover. Start machine and observe needle motion.

The red mark should coincide with the mark on the top frame cover when the needle performs the jump from maximum zig-zag deflection left to the center. The eye of the needle should be flush with the needle plate at this instant.

If not, the eye of the needle (in downwards motion) should be set flush to the needle plate. Then screw 102 of the pattern indicator should be loosened and the red line made to coincide with the pencil marking on the top frame. Re-tighten screw 102.



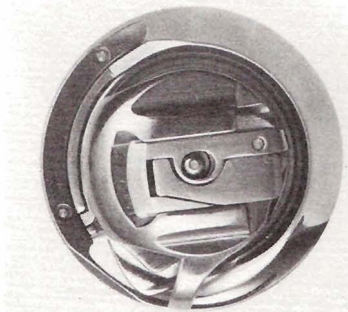
WARNING:

Ensure spacing between pattern indicator disc and top frame wall.

ADJUSTING THE HOOK

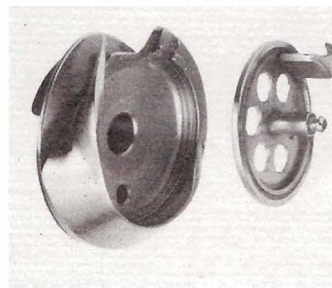
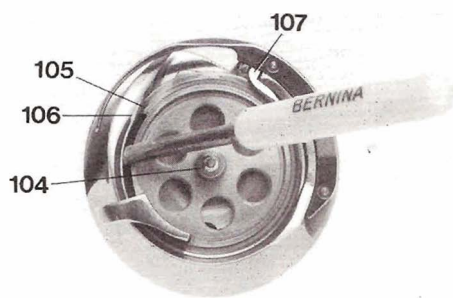
The hook

The hook is designed to accept the upper thread from the needle, to enlarge the loop and to guide it round the lower thread supply. All sliding surfaces coming into contact with the thread are given a mirror finish.



BERNINA model 940/950 is provided with the non-jamming hook.

The hook is dismantled as follows:



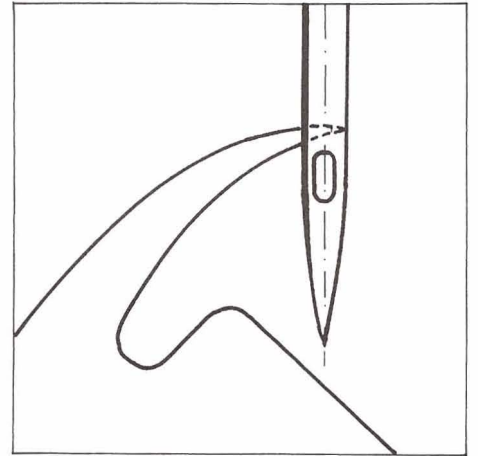
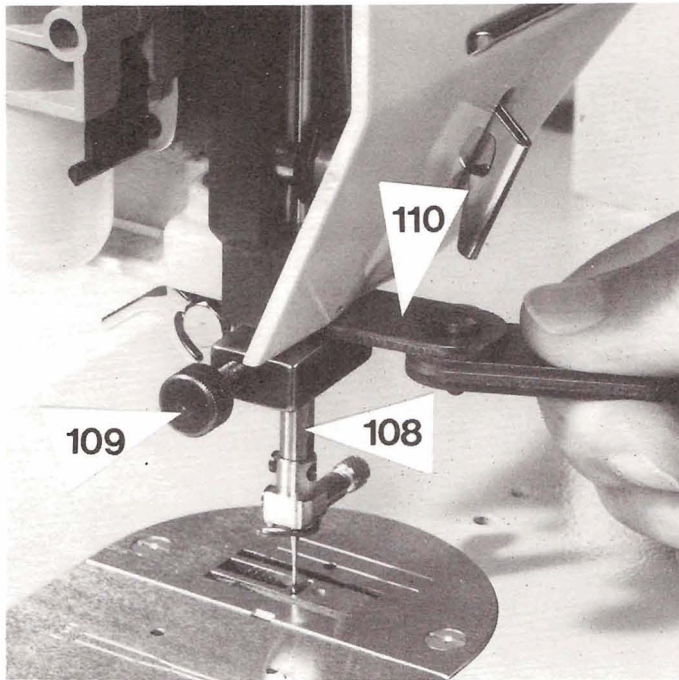
After withdrawing the bobbin case with the bobbin from the hook, the latter should be turned so that the tip of the thread picket 105 of the bobbin case holder 104 lies beneath the tip of the sprung race ring 106.

Then insert screwdriver 398 054 03 under the sprung ring 106 and tilt it while moving sideways until the sprung race ring 106 is ejected from its guide.

Assembly is performed by suspending the sprung race ring with its retention lug 107 in the groove provided and pressing the race ring into its V-shaped slot. The bobbin case holder should first be placed in its race so that the retention piece is located between tip and retention lug of the sprung race ring. It should be ensured that the sprung race ring lies in its proper position and that the bobbin case holder runs smoothly in the track. The dismantled hook is illustrated in the Fig.

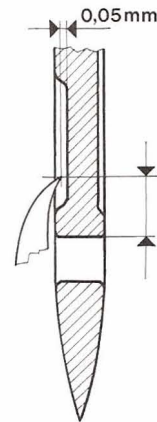
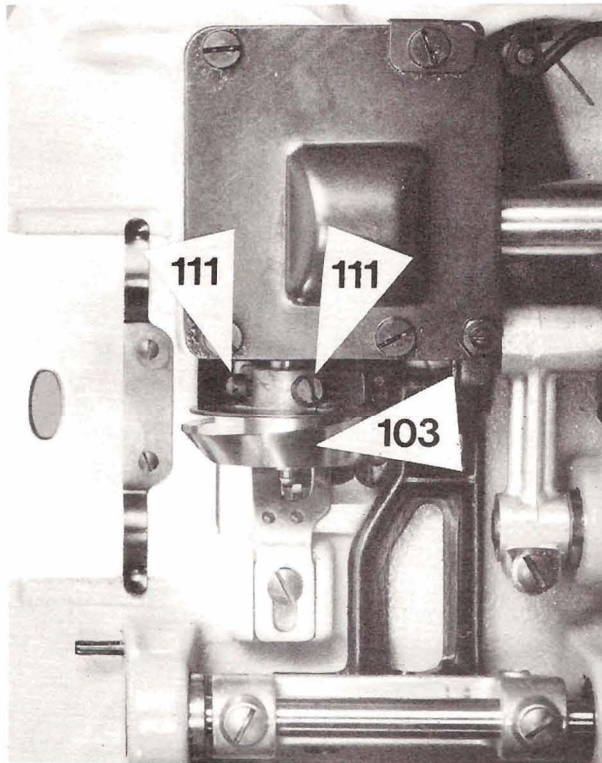
Loop lift 2.8 mm.

The loop lift is the distance travelled by the needle from its lowest point until the tip of the hook intercepts the needle. Thus, after completion of this movement, the tip of the hook is behind the needle to accept the loop. The tip should intercept the front edge of the needle. The position of the tip with respect to the eye, or the final height of the needle, is adjusted after setting the loop lift.



The loop lift is set on left-hand stitch with the aid of the loop lift gauge 398 008 04.

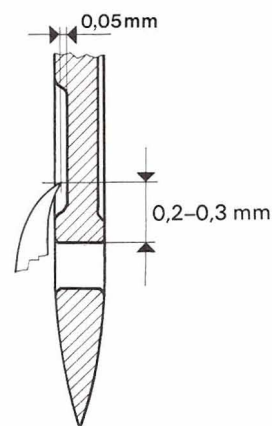
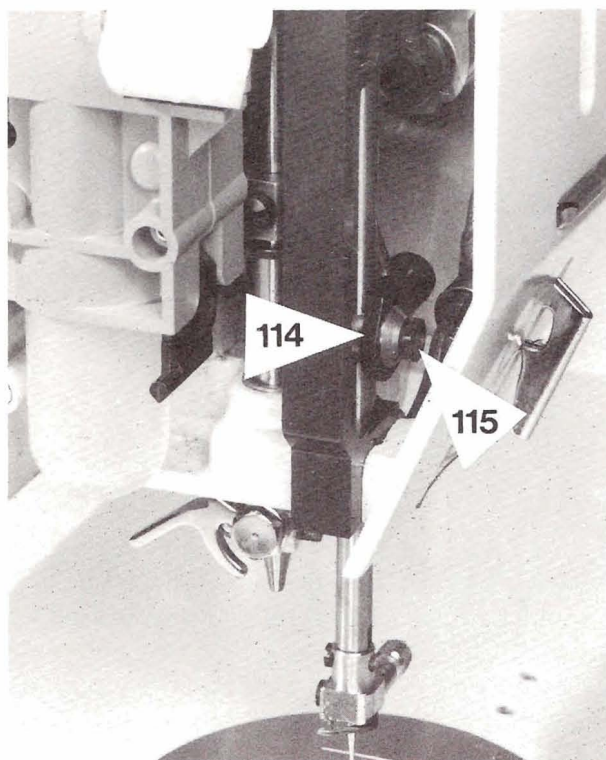
A clamping piece 00 398 005 04 is fixed to the needle bar 108 in its lowest position, so as to allow the distance gauge 110 to be inserted between the lower edge of the frame and upper edge of the clamping piece 109. The distance gauge 110 is then removed and the handwheel turned in the direction of motion until the clamping piece 109 strikes the lower edge of the frame. In the position the tip of the hook must intercept the left outside edge of the needle.



To achieve this setting, the hook 103 must first be brought to the correct position. After loosening the two fixing screws 111 and twisting the hook spindle it can be brought to the required position. It should be noted that the lateral distance of tip of hook from needle must be 0.05 mm. The fixing screws can then be re-tightened. The clamping piece 109 can be removed from the needle bar and the needle height adjusted.

NEEDLE HEIGHT

The height of the needle should be set so that the tip of the hook lies in the groove of the needle for both right and left-hand penetration.



Correction or resetting is performed as follows:

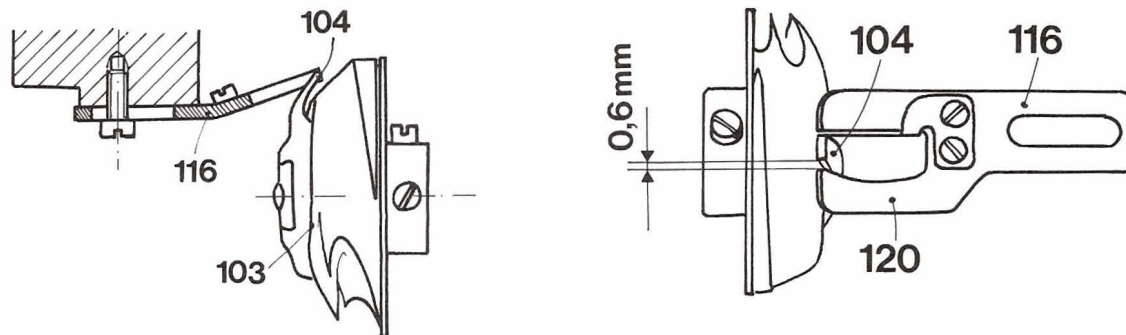
Set zig-zag width to maximum (4.5 mm) and penetrate needle in left-hand stitch. When the loop lift is completed the lower edge of the hook tip should lie approx. 0.2-0.3 mm over the upper edge of the eye of the needle.

Adjustment of the needle bar can be made after loosening the hexagonal screw 115 on the needle bar carrier 114.

When moving the needle bar it should be ensured that it is not twisted when the screw 115 is re-tightened. Check with a DUO-needle (3 or 4 mm distance).

CASE RETAINER

Following adjustment of needle and hook, the case retainer 116 for the bobbin case holder 104 should be secured on the machine and moved forwards until the lower edge of the bobbin case retainer intercepts the bobbin case holder lug on both sides.



In addition, it must be ensured that the holder finger in the bobbin case stopper fork has 0.6 mm clearance for the passage of thread.

If this is not the case, the left wing 120 of the bobbin case stopper fork can be moved upwards or downwards as necessary.

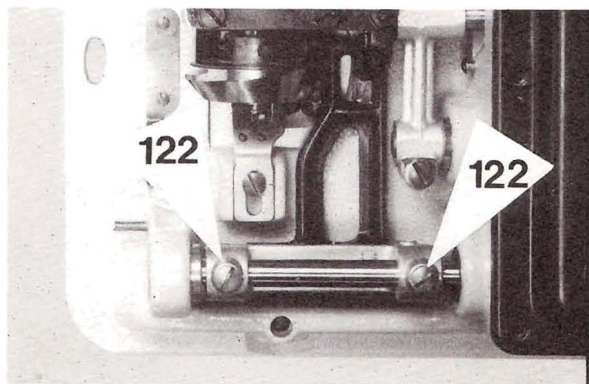
ADJUSTING THE FEED-DOG

a) Position of the feed-dog in the needle plate

The feed-dog must be free to move in the needle plate.

Correct as follows:

- Loosen both screws 122
- The feed-dog can then be moved sideways and lengthwise.
- Set stitch length knob to 3, average out the feed-dog-needle plate spacing in the longitudinal direction.
- Tighten the two screws 122.



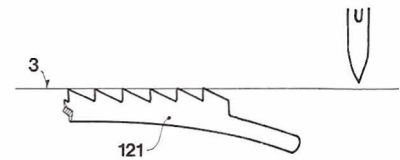
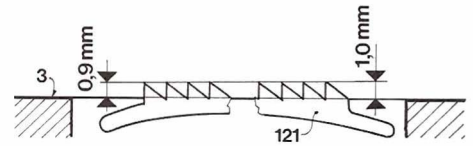
b) Height of feed-dog

Turn handwheel until the feed-dog 121 is at its highest working position. In this position the feed-dog teeth must be 0.9 to 1 mm above the needle plate 3.

Adjustment

Loosen screw 93 slightly and set feed-dog to the prescribed value by turning the lifting lever 94. Gauge No. 398 024 03.

WARNING: Loosen screw on lifter lever only slightly to avoid axial clearance in the spindle.

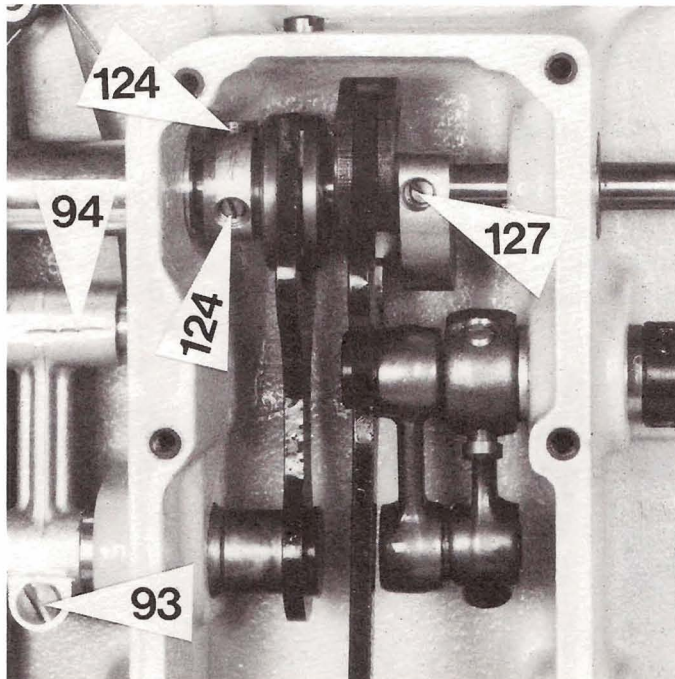


c) Feed-dog lift

When the rear feed-dog teeth are at the same height as the needle plate, the needle tip should be flush with the needle plate. A tolerance of up to 1 mm above the stitch plate is permitted.

Correction:

- Remove oil pan cover
- Loosen two screws 124 at lift eccentric and turn eccentric as required
- Tighten screws.



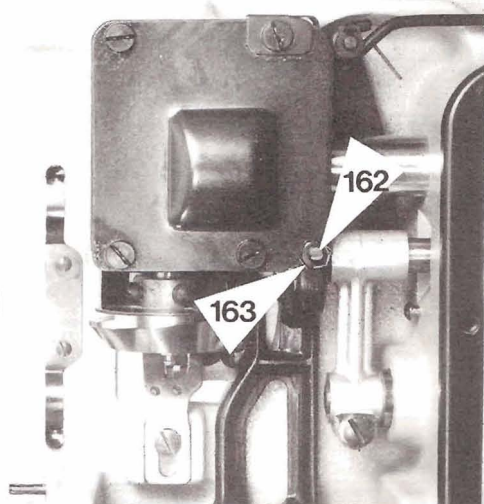
d) Feed-dog advance (timing of motion)

When the thread take-up lever is at its highest point, a short advance motion can still be discerned (1/2-3/4 feed-dog tooth). The forward advance must then be ended.

Correction:

- Stitch setting lever to position 6
- Loosen two screws 127 at advance eccentric and turn advance eccentric as required
- Tighten screws.

WARNING: The lift and advance eccentric must not be displaced laterally when tightening, or the lift and advance fork could jam.



e) Limiting the feed-dog depth

When the feed-dog is lowered the screw 162 serves as a stop in the downwards direction. This prevents the feed-dog from touching the bobbin case stopper and hook.

Correction:

Set knob for sewing/darning to sewing. Then bring the feed-dog to its lowest position by turning the handwheel. There should then remain approx. 0.2 mm clearance between stopping screw and feed-dog carrier.

If not loosen locknut 163. Set screw 162 in prescribed position and tighten locknut.

PRESSER FOOT BAR

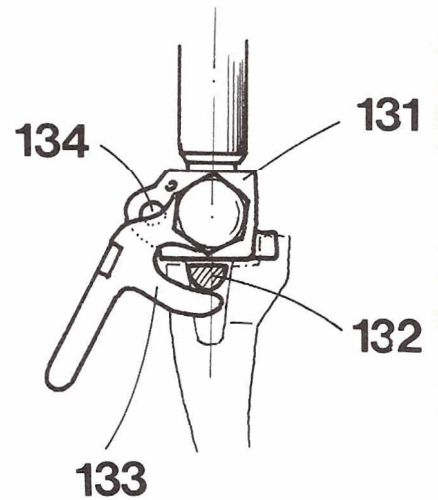
a) Adjustment of presser foot fixing

The height of the clamping piece 131 should be set so that the tension cam 132 of the presser foot is approximately at the center of the clamping surface of lever 133.

Correction:

Loosen screw 134 and set clamp to the correct position.

WARNING: The clamp 131 must *not* be twisted.

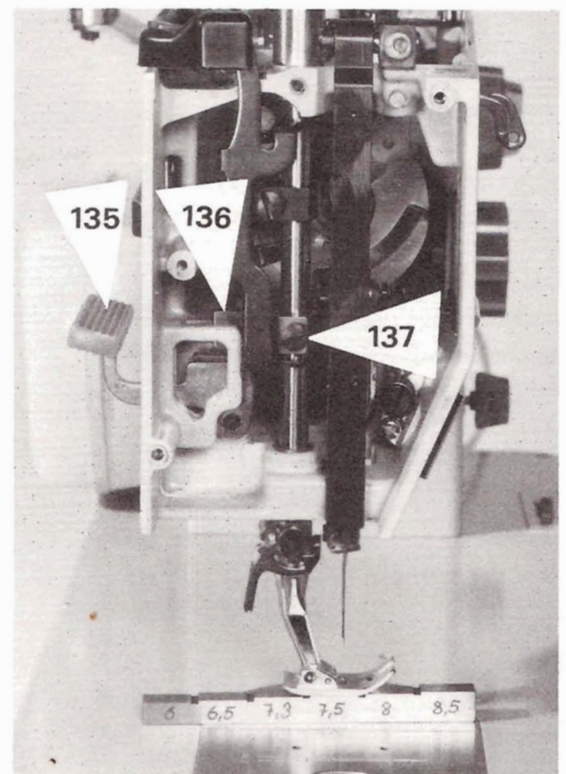


b) Adjusting presser foot

Lower feed-dog, raise lifter lever 135 and attach normal presser foot.

Place gauge No. 398 031 133 (height 7.5 mm) under the presser foot on the needle plate. In this position the material presser foot bar guide 136 must lie on the lifter lever 135.

Check whether the presser foot sole runs parallel to the needle plate slot.

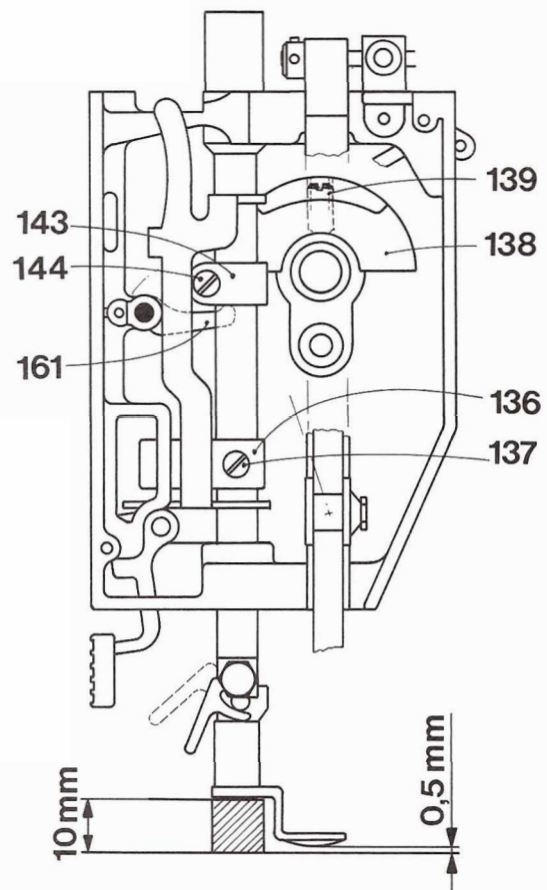


c) Setting the darning device

- Remove presser foot
- Attach darning foot
- Lower feed-dog
- Place spacer (10 mm) under the darning foot shank and lower presser foot bar.
- Turn handwheel until the fixing screw of the balance piece 138 points vertically upwards.
- Loosen presser foot bar dog 143 and move it down until it lies on the darning lever 161.
- Tighten screw 144.

WARNING: Do not twist presser foot bar dog.

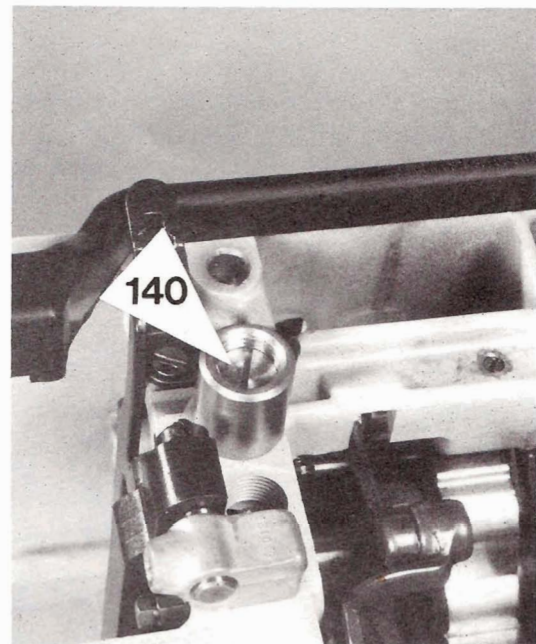
If set correctly, the distance between darning foot sole and needle plate is 0.5 mm.



d) Regulating the presser foot pressure

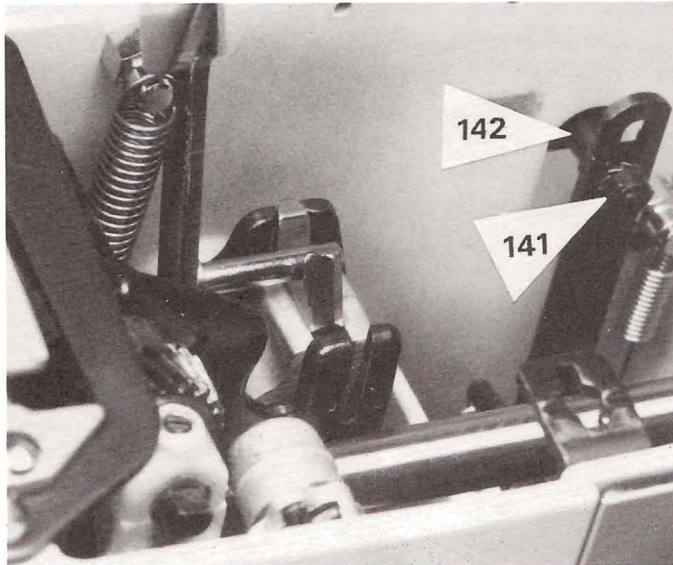
The presser foot pressure can be regulated with screw 140.

Factory setting = 1400 grams at lowest presser foot position on thin material (single-ply cretonne).



ADAPTING THE PRESSER FOOT LIFTER

Loosen nut 141 with hexagonal ring spanner. The presser foot lifter can be adjusted to the optimum position by moving the connecting bolt 142 up or down. Tighten nut 141.

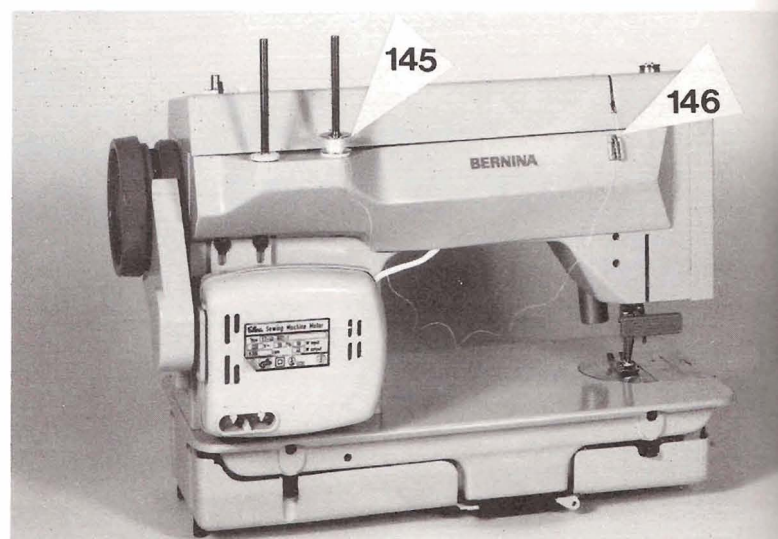
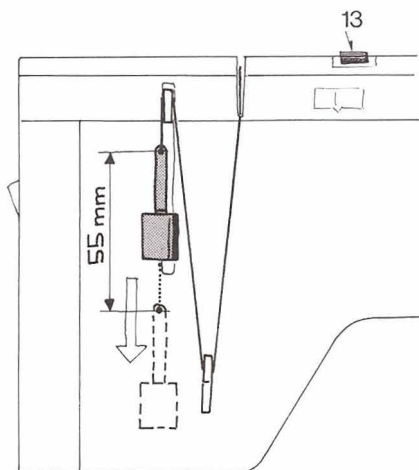


UPPER THREAD TENSION

Draw approx. 30 cm thread off the bobbin so that the thread hangs *loosely* between bobbin and reel pin 145. Suspend test weight No. 398 099 04 (133 gr) from the thread immediately after the take-up lever and note the take-off.

Correction:

Set the upper thread tension by turning the regulating knob 000 so that the thread is not drawn by test weight No. 398 099 04 = 133 gr. The thread may only be drawn *slowly* down when the additional tolerance weight No. 398 139 03 = 8 gr. has been suspended.

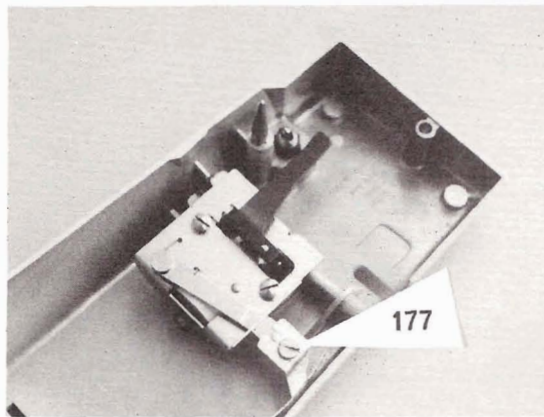


When the correct tension has been reached, the scale on the mark (notch) in the upper frame cover is adjusted as follows:

- Loosen screw 177
- Align scale line with mark

WARNING: The scale should be as near as possible to the cover wall but should not touch it!

- Tighten screw 177 and test the whole setting area turning right and left with the tension regulating screw.
- Finally place to the center again.



LOWER THREAD TENSION

For testing use thread No. 60, 3-ply, white, left-twist. This thread is contained in the bobbin case of every new machine.

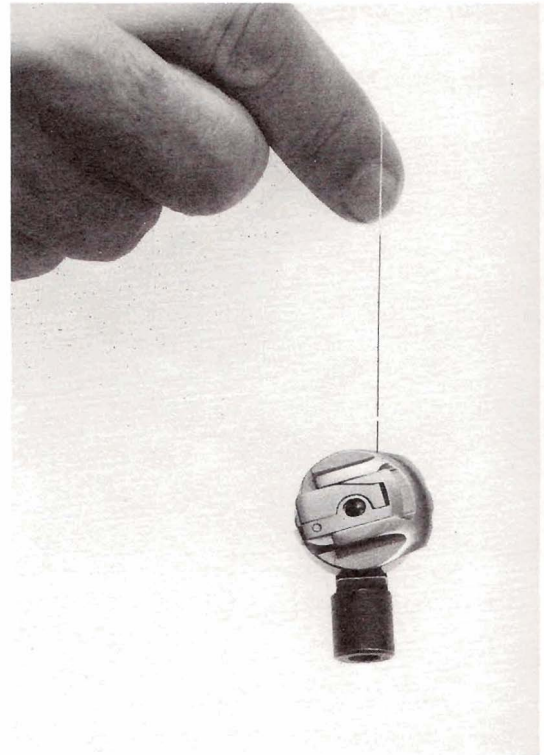
The lower thread tension is checked with the setting weight No. 398 140 04 (14 gr.).

The bobbin case is placed in the weight gauge just as in the hook.

Check:

Hold the free end of the thread and suspend the bobbin case with setting weight. (Bobbin must be 3/4 full). Place the setting screw 1 1 3 on the bobbin case in such a way that thread may only *slowly* move downwards after attaching the additional tolerance weight No. 398 141 03 (3 gr.).

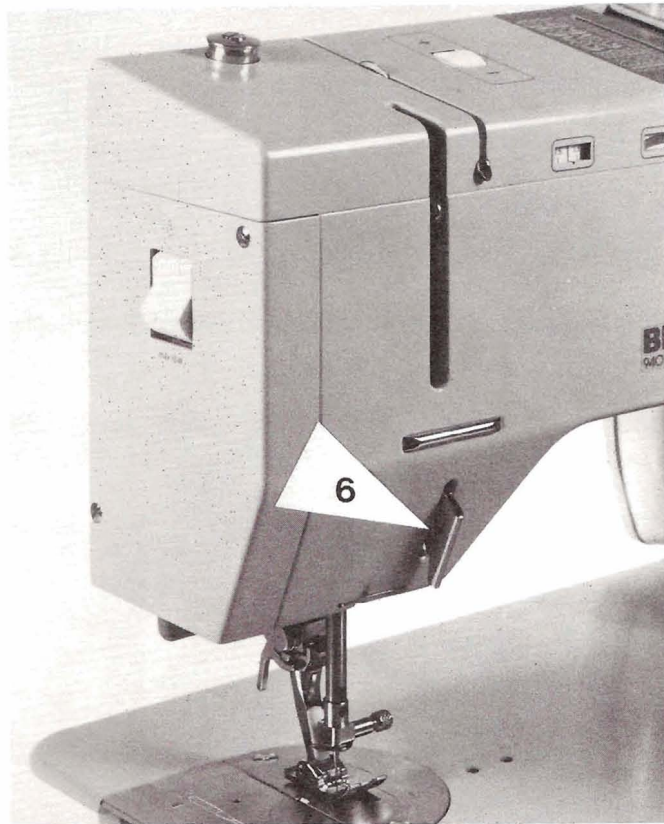
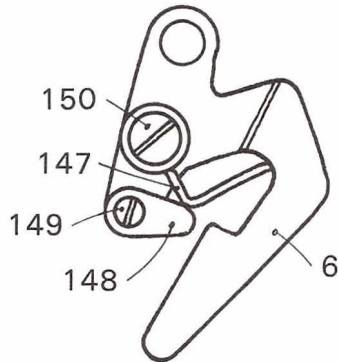
Note: All test weights for upper and lower thread tension are intended only to determine the basic tension value. During sewing the thread tension can be regulated according to need.



The upper thread tension must be adapted to the lower thread tension.

SETTING THE THREAD REGULATOR

The thread regulator spring 147 must contact the limiter 148 when the eye of the needle (downward motion) is flush with the needle plate. The stop 148 can be set by turning screw 149.



The tension of the regulator spring 147 is also important. It is correct when the needle is held tight by spring 147 during the downward motion of the take-up lever.

The tension can be increased or decreased by turning screw 150 to left or right.

ADJUSTMENT OF AUTOMATIC BUTTONHOLER

Set buttonhole knob to 0.
Turn in stitch length knob 29 to the stop.

a) Position of stitch length knob 29

The mark on the front of the knob 29 must be at the top. In the event of a discrepancy, loosen hexagonal nut 79 behind the knob and turn knob to correct position.

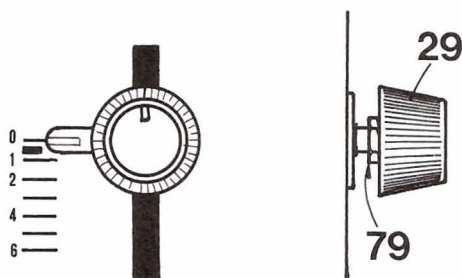
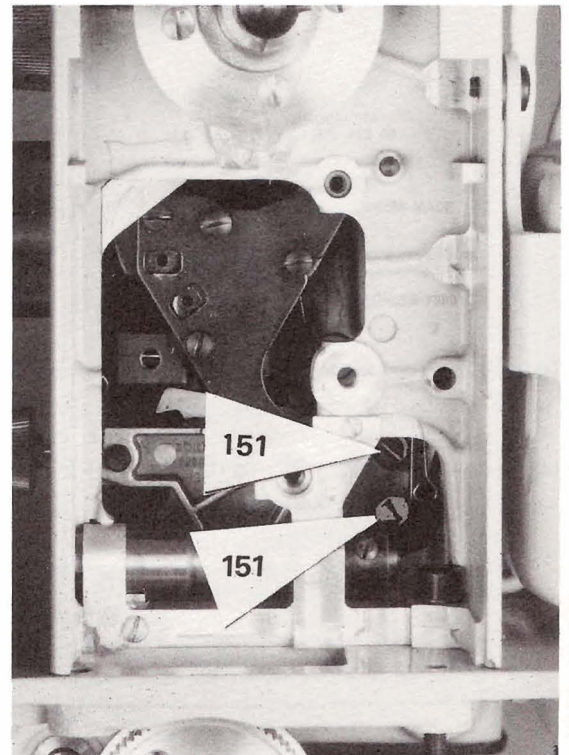
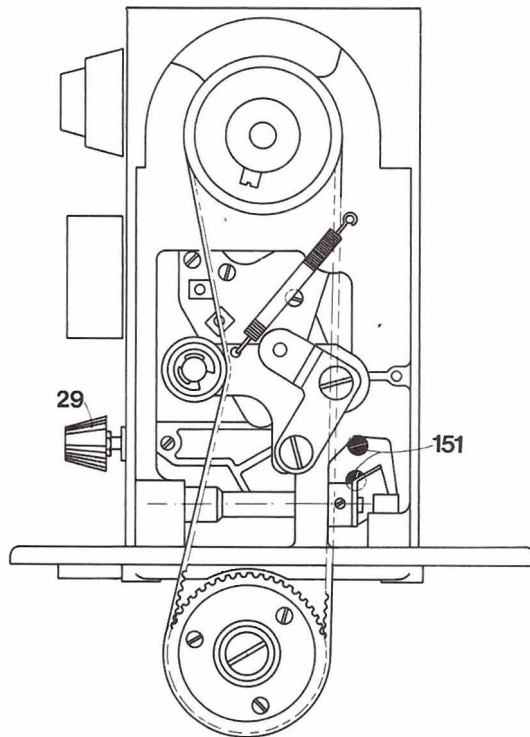
WARNING: Spacing between sliding arrow and nut must be at least 2 mm. The stitch length knob must not turn out of the zero position.

b) Setting stitch length stop

The sliding arrow must coincide with the 0 on the stitch length scale.

Correction:

Loosen the two screws 151. The stitch length knob 29 with sliding pointer (stop) can then be moved so that the sliding pointer coincides with the scale. Tighten the two screws 151.

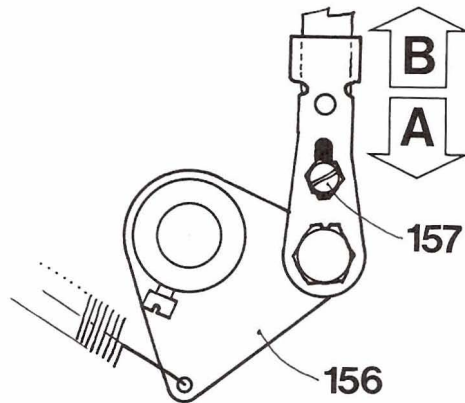
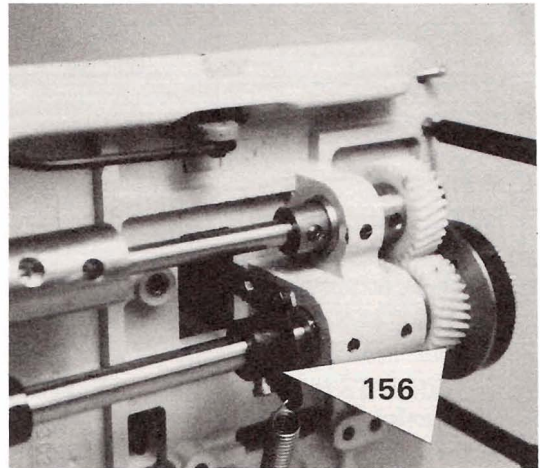


c) Zero position of stitch setting link

Needle: System 130/705 H Nm. 80. (neither blunt nor bent). (Cl. 950=287 WH).

Sewing-off material raw cotton-cretonne, 2-ply, place under buttonhole foot (without thread). Select a medium sewing speed. Observe material – it must not move. If the material is fed forwards, screw 157 must be loosened and the advance lever 156 moved upwards (in direction of handwheel).

- A Material ist fed *backwards* = correct *downwards*
- B Material ist fed *forwards* = correct *upwards*

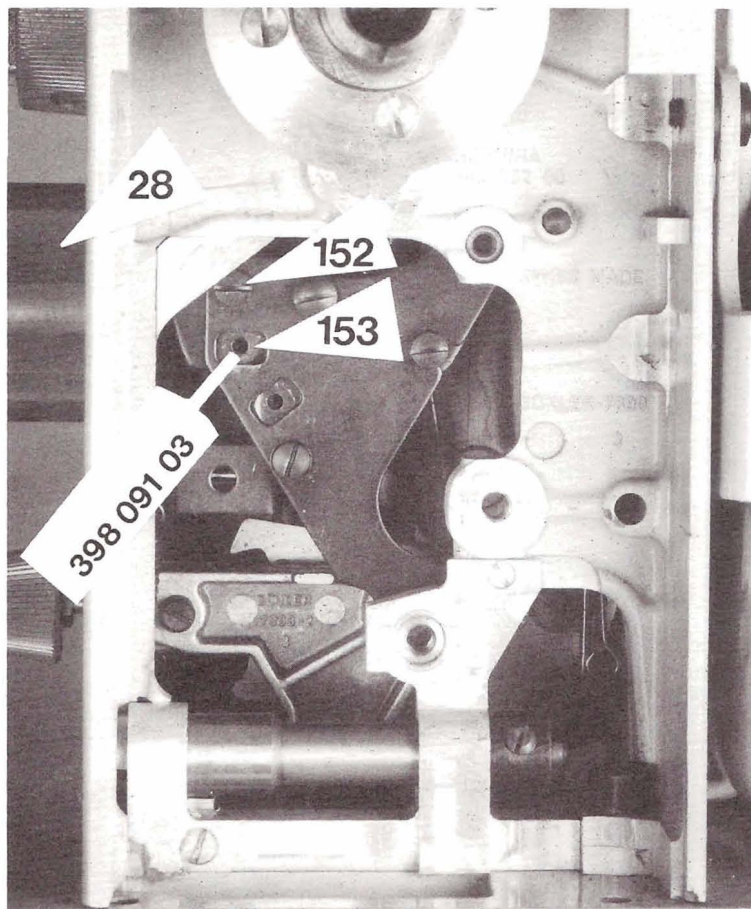


d) Setting the bar tack density

The material feed must be zero when sewing the bar tack. A minimum feed in the direction of reverse stitch is permissible.

Correction:

- Remove belt cover
- Set buttonhole knob to 2
- Open stitch length knob 29 half a revolution from the zero position. The mark on the front of the knob is now underneath.
- Loosen screw 152 slightly.
- Set dog 153 with eccentric key 398 091 03.
- Check material feed
- Tighten screw 152
- Check bar tack density again with buttonhole position 2 and 4.



e) Setting the reverse bead (stitch density)

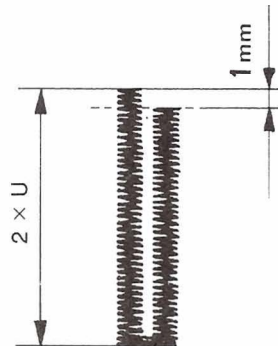
The reverse bead must be adapted to the forward bead. The pattern indicator is used to count the stitches (36 stitches per revolution), without thread.

Forward bead

Buttonhole knob to 1,
pattern indicator 2
complete turns

Reverse bead

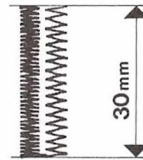
Buttonhole knob to 3,
pattern indicator 2
complete turns.



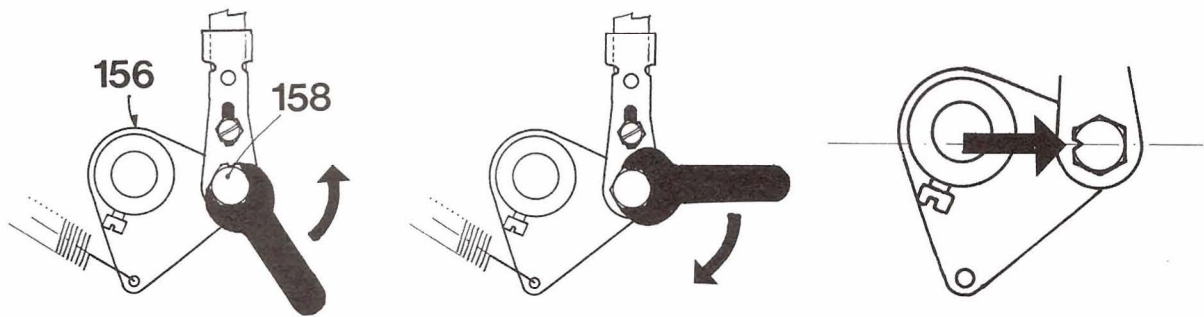
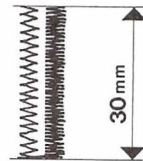
Measure difference in length between forward and reverse beads. They should both be the same length. It is permissible for the reverse bead to be 1 mm shorter.

Correction:

The screw 158 is designed as an eccentric. Correct with a spanner (width across flats 7) as shown.



Check the bar tack spacing (section 2) again after correcting. Basic position of eccentric screw: marking notch horizontal.



Sewing test

- Thread Nm. 100, 3-ply, left-twist, or Darning thread Nm. 100, 2-ply, right-twist
- Thread bobbin case thread in the additional tension device
- Needle system 130/705 H (neither blunt nor bent)

f) Checking width of bar tack and bead

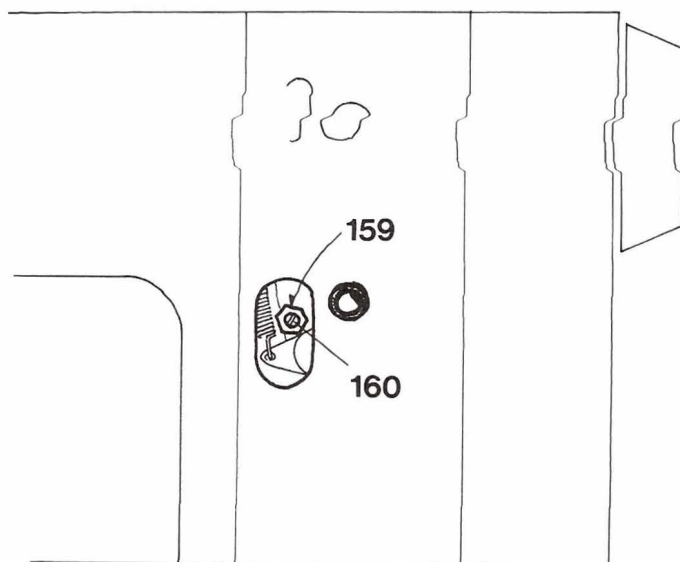
Theoretical sizes: bar tack width = 4,27 mm
bead width = 1.91 mm
cut gap = 0.45 mm

Correcting cut gap:

Cut gap and bead width *cannot* be adjusted independently.

- Buttonhole knob to 1
- Dismantle knob and scale plate of buttonhole device
- Loosen locknut 159 on zig-zag changeover lever
- Set cut gap and bead width by turning eccentric bolt 160
- Tighten locknut 159.

After adjustment check the position of the stitch width knob (marking must be at 0).
Loosen screw if necessary and move knob to correct position.

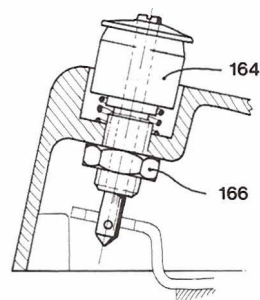


BOBBIN WINDING DEVICE

The thread **should be** wound evenly with pre-tension and the bobbin should be correctly filled.

Correction: pre-tensioner

If the **thread lies too high** in the bobbin during the **winding procedure**, loosen the locknut 166 of the **vertically adjustable pre-tensioner** 164 and **screw the pre-tensioner deeper**. If the **thread lies too deep** in the bobbin, screw the **pre-tensioner higher**. After adjustment re-tighten **the conical locknut**.



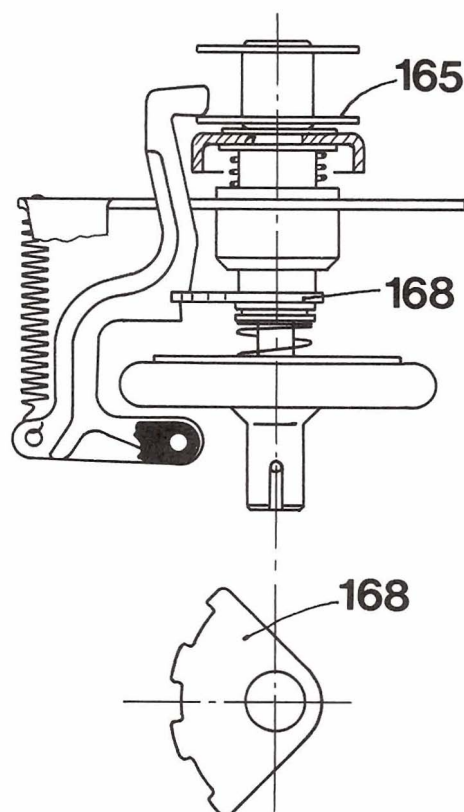
Correction: filling the bobbin

Bobbin insufficiently filled:

- Remove **top frame cover**
- Draw back **releasing lever** 167
- Turn **setting disc** 168 clockwise until **releasing lever** 167 engages in next slot.

Bobbin too full:

- Turn **setting disc** 168 counter-clockwise.

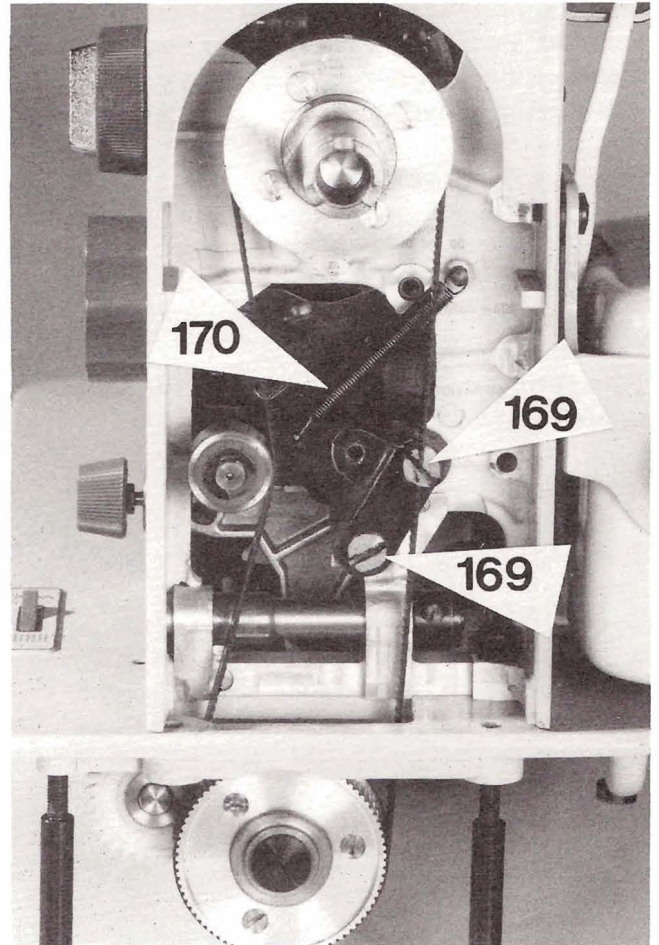


RE-TENSIONING THE TOOTHED BELT

Loosen screws 169 slightly

- Spring 170 draws the gearing into the correct position and thus produces the belt tension
- Re-tighten both screws 169.

WARNING: When re-tensioning there must be no displacement of the teeth between belt and drive wheel.



SETTING THE INTERMEDIATE DRIVE GEAR

The intermediate drive gear 172 is fitted on an eccentric pin. By means of turning the eccentric pin 173 with a 13 mm open end spanner the distance between the base plate drive shaft gear 174 can be altered.

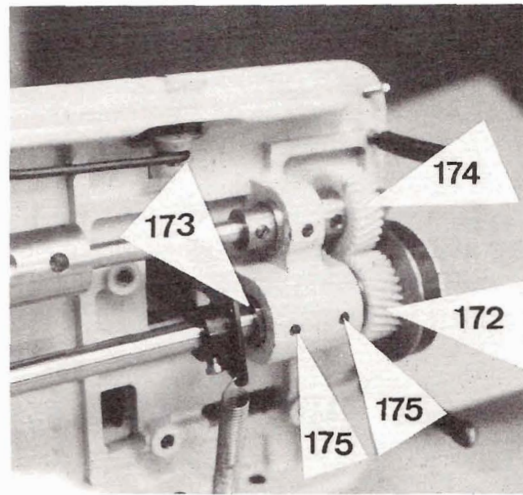
Correction:

- Loosen both screws 169 on the belt tension roller
- Loosen both screws 175 of the eccentric pin
- With a 13 mm open end spanner the eccentric pin can be turned anti-clockwise (play between the gear teeth will be made smaller)

Attention:

The gear teeth should have as little play as possible, but must not jam.

- Tighten both screws 175
- Run in the machine and if necessary repeat the operation.



CLEANING THE MACHINE

During sewing thread ends and fluff from the fabric collet under the stitch plate and around the hook, this must from time to time be removed. To achieve this the stitch plate must be removed. With the special screwdriver the two securing screws can be removed and then the stitch plate. Using a cleaning brush or cloth the thread ends and fluff can now be removed. Do not use hard implements ie. scissors.

LUBRICATING THE HOOK

After 3–4 hours of sewing 1–2 drops of oil should be placed in the hook race. To do this the bobbin case should be removed, the oiling point is marked red.

LUBRICATING THE MACHINE

Proper oiling will allows smooth and efficient running of the machine. Bearings with self-lubricating bushes do not need oiling.

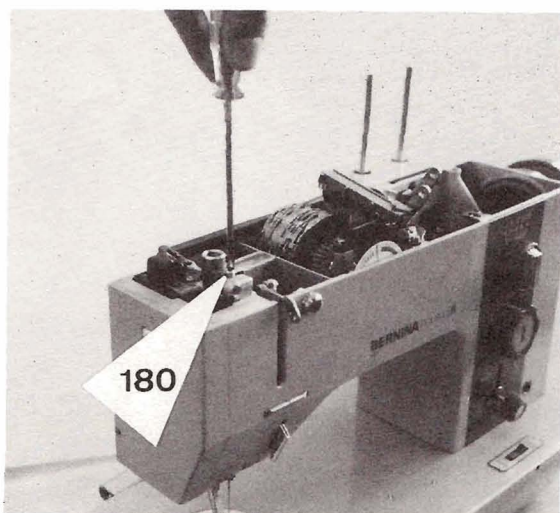
Use clear sewing machine oil, free from resins and acids, which can be aquired at any BERNINA dealers shop.

The machine should be oiled after 30–40 hours of sewing (depending on the country an climate) with approx. 1–2 drops of oil. To much oil will run unused an dirty the machine as well as the fabric being sewn.

INSTRUCTION: MODEL 950

Changing needle holder for pin tucking

The long fixing screw 180 should be tightened with a torque of approx. 7 cm Kp.



FAULT AVOIDANCE

1. Basic principles

In the great majority of cases faults can be attributed to improper handling of the machine. Should other causes be suspected, however, the machine must be examined as to whether:

- a) The needle is properly fitted. The long groove must always be at the front from where the machine is threaded.
- b) The right needle size is being used, needle No. 70 for fine darning work and No. 80 or 90 for other sewing work.
- c) The hook is lubricated with a few drops of oil.
- d) There are no remnants of material between the thread tensioning discs.
- e) There are no remnants of material stuck underneath the bobbin case tensioning spring.
- f) The machine can be turned easily with the handwheel.

2. Thread breakage at the upper thread can be caused by the following

- a) Use of poor quality, badly polished needles. Needles should always be bought from the BERNINA dealer.
- b) Needle wrongly fitted. Long groove must be at front.
- c) The needle is blunt or bent.
- d) The relationship of thread thickness to needle is not correct.
- e) The tension of the upper thread is too great.
- f) Poor yarn or yarn with knots. Yarn has dried during long storage. It should never be stored in heated, rooms.
- g) The needle plate hole has been struck by the needle and must be re-polished.
- h) The hook tip is damaged.

3. Lower thread breakage

Can be caused by the following:

- a) The lower thread tension is too great.
- b) The lower thread is badly wound.
- c) The bobbin is crushed and jammed in the case.
- d) The needle plate hole has been struck by the needle and must be re-polished.

4. Faulty stitches

Can be caused as follows:

- a) Use of wrong needle. Use only needle system 130/705 H (950-287 WH).
- b) Needle is bent.
The following wrong adjustments on the machine can be the cause of missing stitches:
 - 1. Lateral spacing between needle and hook is not right. It must be 0.05 mm.
 - 2. Loop lift is not correct.
 - 3. The needle bar height is not correctly set.

In general: always use perfect needles and first-class thread.

Also ensure that the needle size matches the thread thickness and that the presser foot recommended for the work is used.

5. Needle breakage

Can be caused by the following:

- a) The needle fixing screw is not tightened sufficiently.
- b) The upper thread tension is too great.
- c) The work is drawn out at front from under the presser foot which bends the needle. It should only be drawn out at the rear beneath the presser foot sole.
- d) Needle size and fabric thickness are not properly matched. Very often needles which are too thin are used with thick yarn which causes the needle to bend.
- e) Use of cheap yarn, unevenly twisted or knotted.
- f) The work should not be drawn too strongly to the rear during sewing.

6. Seam faults

- a) Poor, uneven seams are produced:
 - 1. When there are remnants of thread between the thread tension discs.
 - 2. There are remnants of thread under the bobbin case tension spring.
 - 3. The bobbin is crushed and jams in the bobbin case.
 - 4. The sewing yarn is of uneven thickness.
 - 5. The hook is not lubricated.
- b) When sewing Tricot it should be noted that:
 - 1. Tricot should always be basted with darning thread, not with basting thread.
 - 2. Use perfect needles, size 70 or 80.

When sewing with new, synthetic threads it can occur that the normal needle plate must be exchanged for a special needle plate. The BERNINA Sewing Machine Factory is willing to lend you every assistance in solving your particular sewing problem.

Needle system 130/705 H (Model 950 = 287 WH)
Sewing light 220 V, 15 W (Model 950 = 12 V, 15 W)

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FRITZ GEGAUF LTD.,
MANUFACTURERS OF BERNINA SEWING-MACHINES,
STECKBORN (TG) SWITZERLAND

The right to make constructional changes differing from text and illustrations is reserved.

Bernina InformationGegenstand
Subject
Sujet

THREAD GUIDE / HOOK RACE

No.: 85

To improve quality on all machines with CB-hook, the thread guide in the vicinity of the hook race, and the hook race itself will be modified. The modification will come into effect as from the beginning of 1989.

The new hook race no. 003 084.50.00 has been broadened by 1 mm; and the two tapped holes for securing the thread guide plate have been moved 1 mm to the rear. At the same time the thread guide for the upper thread loop has been omitted. (This can be used to distinguish between old and new hook races.) This also means that old and new races are not interchangeable.

The upper thread guide is now achieved by a new type of thread guide, no. 003 163.50.00 which is secured to the hook race. The thread guide plate has also been modified and has the new number 006 633.50.00.

Both thread guides are secured together by the same screws to the hook race (see sketch).

Because of this modification only the whole carrier is exchangeable. It must be noted that because of assembly technics, both thread guides are not assembled to the hook race. When ordering spare carriers (complete) one must also order thread guides no. 003 163.50.00 and 006 633.50.00 as separate articles at the same time.

We would appreciate your attention on this point.

Yours faithfully

FRITZ GEGAUF LIMITED

H. Boller
H. Boller

P. Kenyon
i.v. P. Kenyon

TECHNICAL INFORMATION

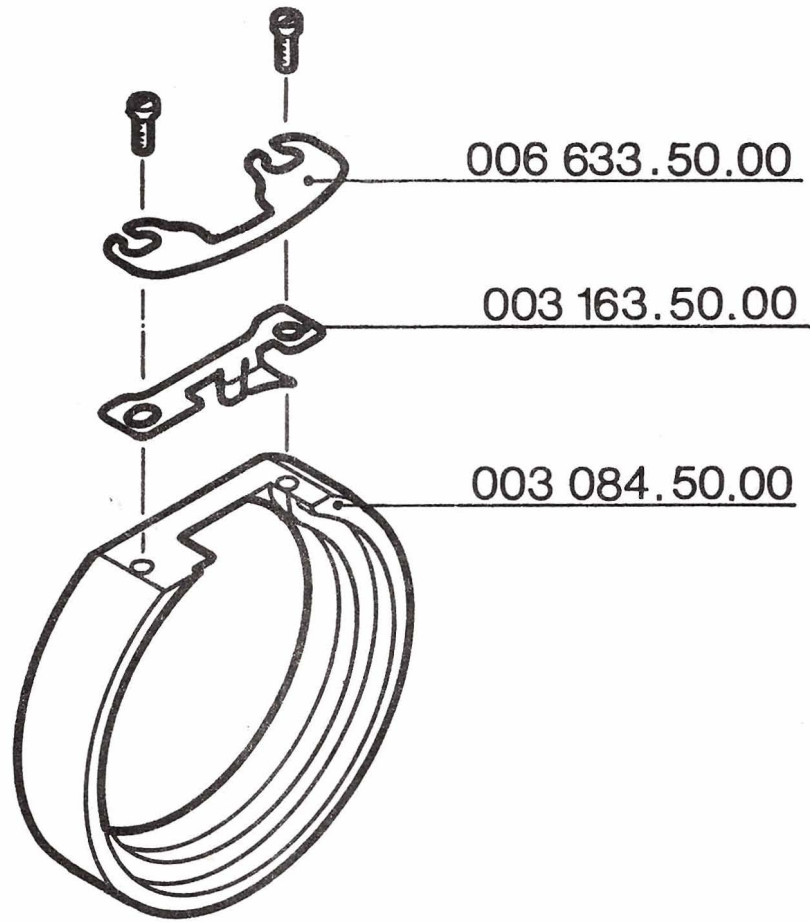
3/6/87

Service Information for 900, 1000, 1100, 1400 Series

Change of hook timing adjustment!

The hook timing has been increased by 0.2mm to 2.2mm. Be sure to use a new Nm 80 needle as before.

Please make note of this change in your Service Manual.



900 foot control
Round type 043 w/carbon pens

Cord plug 

Internal control wiring

