

General safety instructions

1.	Set of gauges and handwheel positions	5
1.1	Parts of the set of gauges	5
1.2	Adjustments in the different handwheel positions	6
2.	Adjusting the machine	7
2.1	Adjustment disk with respect to the arm shaft crank	7
2.2	Lower timing belt pulley	7
2.3	Rocker bolt for the looper drive and left bottom shaft bearing	8
2.4	Looper drive housing	9
2.5	Looper avoid (width of the elliptic looper path)	9
2.6	Symmetry of the looper motion	11
2.7	Looper in the looper holder	11
2.8	Loop stroke and needle bar height	12
2.9	Needle guard	13
2.10	Thrust motion for the feed dog	13
2.11	Stroke motion for the feed dog	14
2.12	Retaining spring at the looper	15
2.13	Looper thread take-up cam	15
2.14	Thread trimming device	17
2.15	Sewing foot stroke	19
2.16	Setting the stitch lengths	20
3.	Setting the top puller feed	22
3.1	Synchronisation of the bottom feed and top puller feed	22
3.2	Distance between the puller and needle	22
3.3	Raising stroke of the puller	23
3.4	Puller pressure	23
3.5	Fabric keep-off plate	23
3.6	Timing belt tension	23
3.7	Replacing the puller	24
3.8	Raising and lowering functions of the puller	25
4.	Adjusting the synchronizer	26



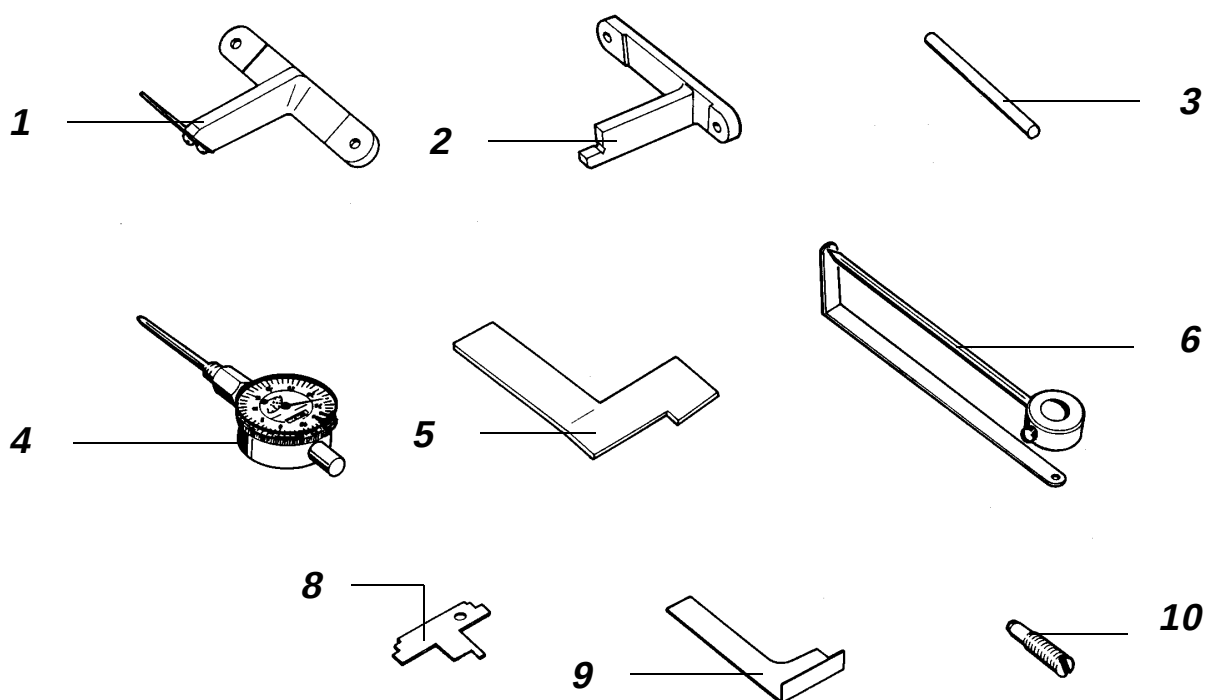
1. Set of gauges and handwheel positions

1.1 Parts of the set of gauges

The gauges listed below enable the accurate adjusting and checking of the classes 171 and 173.

The timing pin 3 is incorporated in the accessories of every delivered machine. It can be used to lock the handwheel positions A - F that are required for the machine adjustments.

Gauges	Order no.	Adjustment
Gauge 1	933 735	– Position of the rocker bolt in the looper drive housing
Gauge 2	933 739K	– Position of the looper drive housing
Timing pin 3 (accessories bag)	791 1152	– Locking the handwheel positions A - F
Metering clock 4	171 981	– To measure the looper avoid (width of the elliptic looper path). Should you already have a metering clock, you will just need the clamping sleeve 171 984 and the measuring pin 933 748.
Gauge 5	171 975	– Looper inclined by $89^{\circ} 30'$
Gauge 6	933 80192	– Symmetrical looper motion
Gauge 8	933 740	– Height of the looper thread take-up cam
Gauge 9 (accessories bag)	933 758	– Thrust eccentric for the feed dog
Screw 10	933 716	– Spreading screw for replacing the arm shaft crank, eg when modifying the needle bar stroke





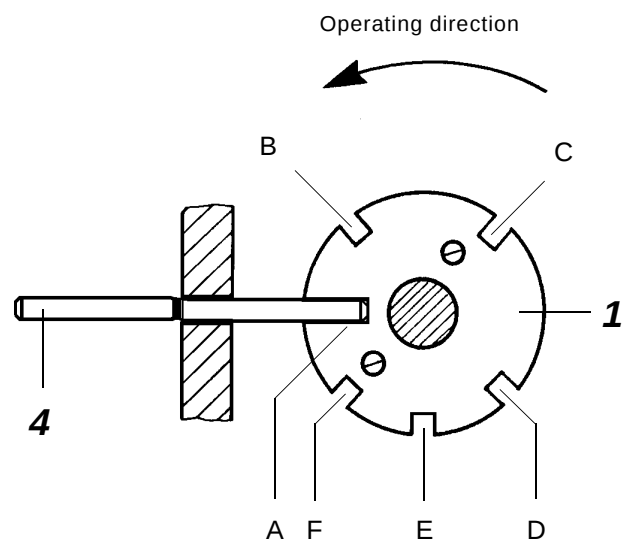
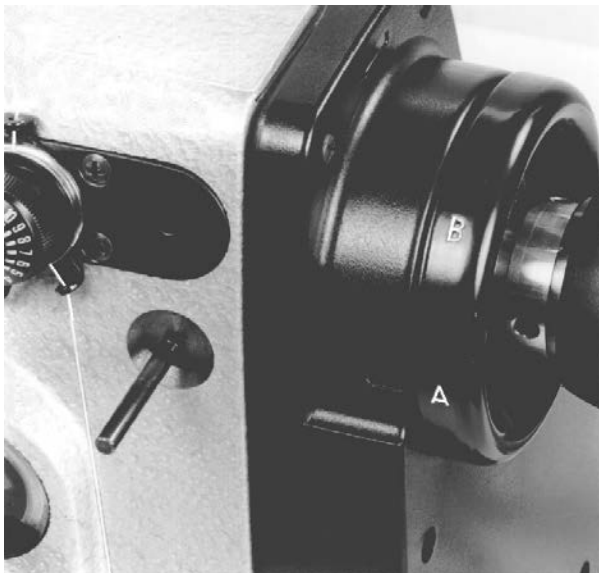
1.2 Adjustments in the different handwheel positions

For some adjustments the machine must be set in a certain position.

This position is marked by letters on the handwheel and can be locked as follows:

- Turn the handwheel into the position defined for the adjustment.
- Slide the timing pin 4 into the hole of the machine housing.
- Turn the handwheel slightly forward and backward until the timing pin 4 can be slid into the respective slot of the adjustment disk 1.
- Slot A of the adjustment disk is cut out the deepest.
The depths of the slots B - F are equal.

Slot	Adjustment
A	– The deepest slot A of the adjustment disk at the upper timing belt pulley is aligned with the groove in the arm shaft crank
B	– Symmetrical looper motion that is, when turning the handwheel in reverse direction, the needle point must also be located at the centre of the needle like in slot C
C	– Position of the lower timing belt pulley – Loop stroke – Needle bar height
D	– Stroke and thrust eccentric of the feed dog on right-hand machines
E	– Looper thread take-up cam – Eccentric for the top puller feed
F	– Stroke and thrust eccentric of the feed dog on left-hand machines



Please note!

Depending on the needle bar stroke, the following adjustment disks are built-in:

Class / Subclass	Needle bar stroke	Adjustment disk
171-131110	27 mm	171 1012
173-141110	30 mm	171 1512
173-141521	30 mm	171 1512
173-161120	32 mm	171 2012



2. Adjusting the machine

2.1 Adjustment disk with respect to the arm shaft crank

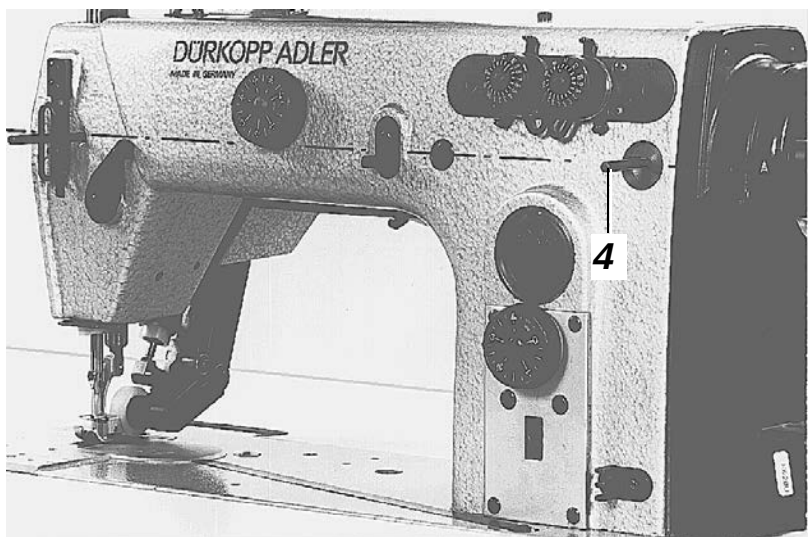
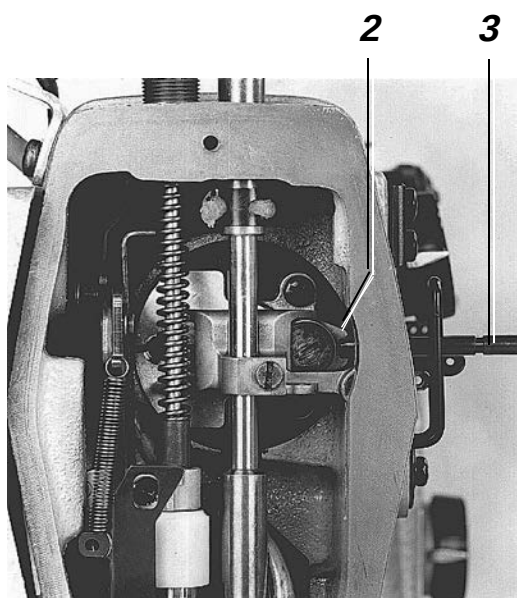
The deepest slot A of the adjustment disk 1 should be aligned with the groove 2 in the arm shaft crank. (The adjustment disk must be in this position to assure that all other adjustments to be made in the other slots are correct.)



Turn off main switch!
- Danger of injury -

Initially, check the factory adjustment using two locking pins (as an alternative 5-mm-twist drills).

- Loosen the clamping screws of the clamping ring. (The clamping ring is located on the left of the upper timing belt pulley).
- Slide the pin 3 into the groove 2 of the arm shaft crank.
- Turn the handwheel until the timing pin 4 can be slid into the deepest slot A of the adjustment disk.
- Push the arm shaft crank to the right so it is dead against the arm shaft bearing. Tighten the screws of the clamping ring.

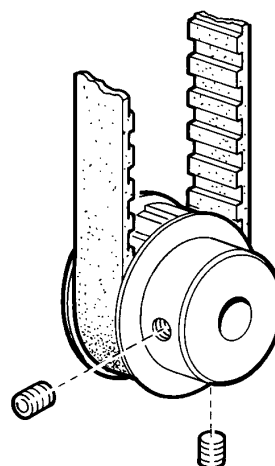


2.2 Lower timing belt pulley



Turn off main switch!
- Danger of injury -

When positioning the timing belt, make sure that both screws in slot C are positioned as shown in the drawing and are thus accessible with a screwdriver.





2.3 Rocker bolt for the looper drive and left bottom shaft bearing

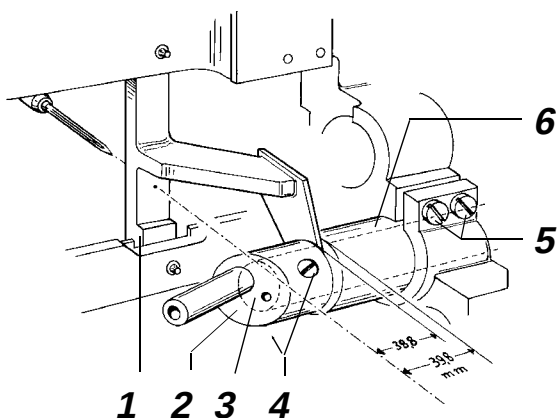


Turn off main switch!

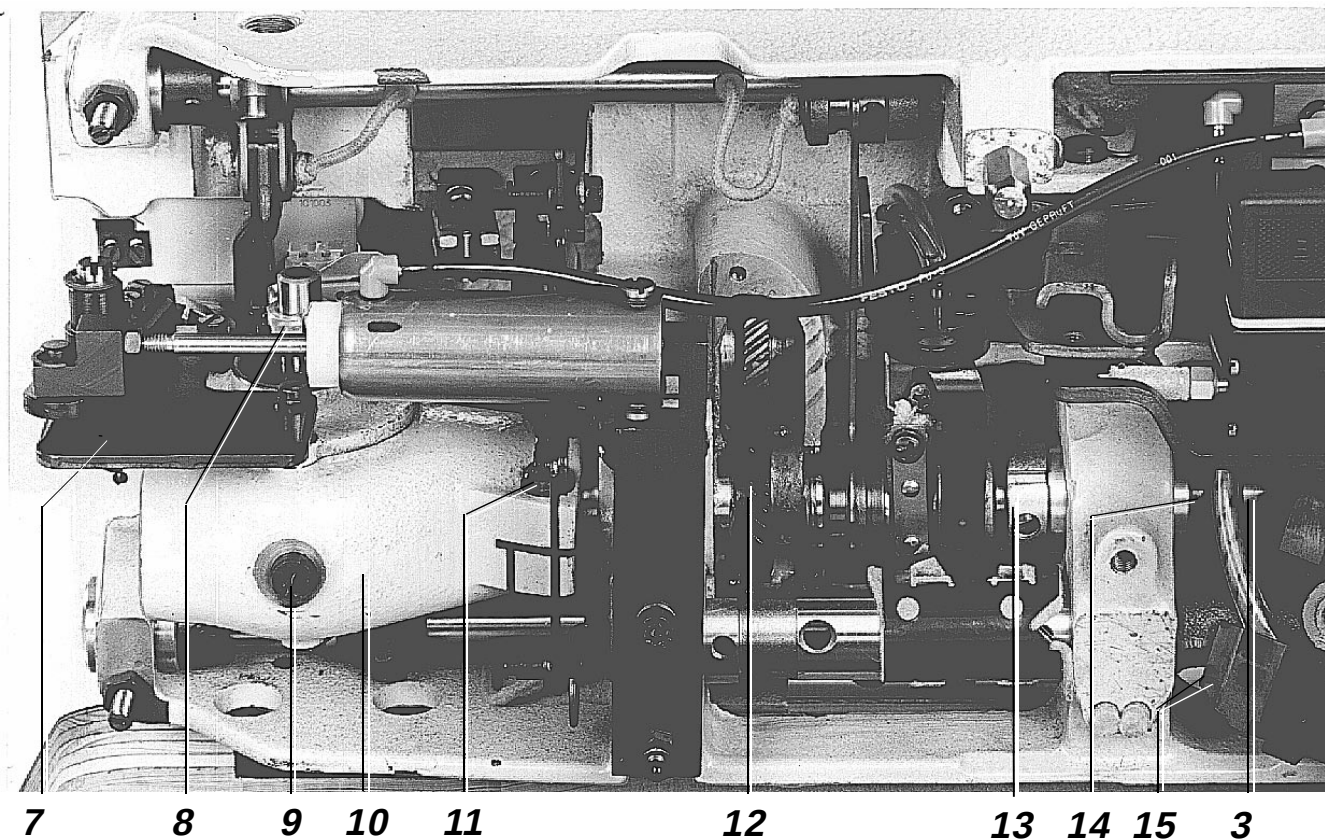
- Danger of injury -

The distance between the centre of the needle and the beginning of the left bottom shaft bearing 6 should be 39.8 mm and between the centre of the needle and the end of the rocker bolt 38.8 mm. The rocker bolt 2 must be flush with the face 3 of the bottom shaft.

- Unscrew the screw 9 and drain the oil in the housing. Set the machine into the upright position.
- Remove the needle, needle guard, looper holder 8 with the looper and the thread trimming device 7.
- Loosen the clamping screw 11.
- Carefully remove the looper drive housing 10. At the same time slowly turn the bottom shaft 3.



- Screw on the gauge 1, order no. 933 735. Loosen the clamping screws 5.
- Push the bottom shaft bearing 6 beside the gauge. Tighten the clamping screws 5.
- Loosen the screws 4. Check, whether the rocker bolt 2 is dead against the face 3 of the bottom shaft.
- Remove the grease cover and the oil drip pan 15.
- Loosen the eccentric 13, adjusting ring 14 and the gearwheel 12. Shift the bottom shaft 3 such that the distance between the bottom shaft bearing 6 and the rocker bolt 2 is 1 mm or the rocker bolt rests against the gauge.
- Set the adjusting ring 14 and the eccentric 13 tight and align the gearwheel 12. Tighten the screws.
- Check the running of the timing belt on the bottom timing belt pulley. If necessary, align the bottom timing belt pulley.
- Screw in the screw 9. Re-mount the looper drive housing and fill with ESSO SP-NK 10 oil to the upper mark of the sight glass.
- To adjust the housing, looper, needle guard and the thread trimmer, see sections 2.4, 2.5, 2.6, 2.7 and 2.14.





2.4 Looper drive housing

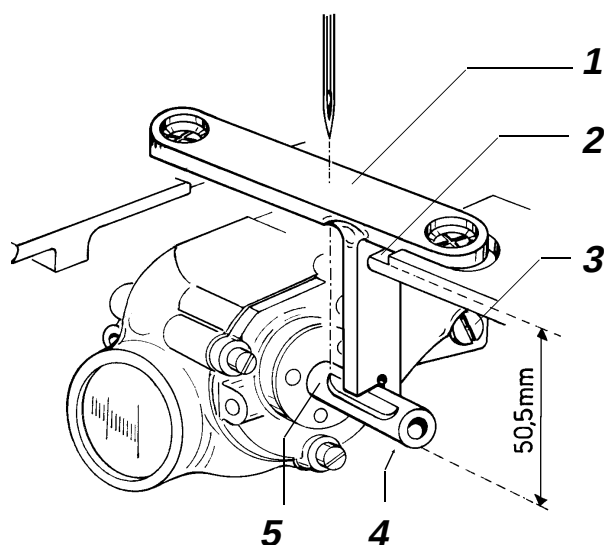


Turn off main switch!
- Danger of injury -

The needle point should point to the centre of the looper shaft 5 and the bottom edge of the looper shaft should be parallel to the throat plate underside.

This corresponds to a distance of 50.5 mm between the looper shaft bottom edge 4 and the throat plate rest 2.
Remove the throat plate and looper holder with the looper. Loosen the clamping screw 3.

Align the looper drive housing such that the looper shaft rests in the cutout of the gauge 1.
Tighten the clamping screw 3.



2.5 Looper avoid (width of the elliptic looper path)



Turn off main switch!
- Danger of injury -

The looper avoid motion is adjusted correctly, when the clearance between the looper point and needle is 0.1 mm during the **right-to-left** looper motion. During the **left-to-right** looper motion the point of the descending needle must rest against the back of the looper, when the looper and needle are positioned as shown in the sketch opposite.

The exact amount of the avoid motion depends on the needle system and needle size. It must thus be computed according to the following formula:

$$E = a + b + 0.1 + X$$

Example for a 934 SIN/Nm 110 needle

Needle size "a"	= 0.7 mm
Looper thickness "b"	= 1.4 mm
Looper point - needle clearance	= 0.1 mm
For greater needle size 110 Nm "X" *	= 0.1 mm

Width of the elliptic looper path "E" = **2.3 mm**

*X=greater measure "a" for greater needle sizes.

X for Nm 100 = 0 mm

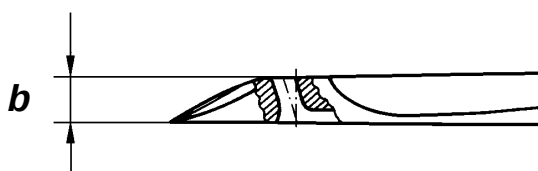
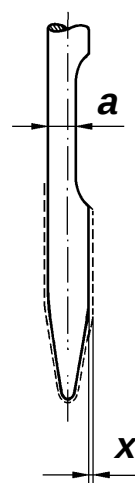
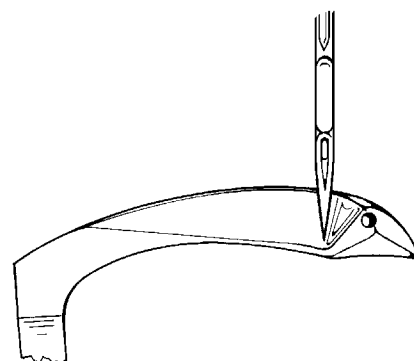
X for Nm 110 and 120 = 0.1 mm

X for Nm 130 = 0.2 mm

To adjust, shift the bottom shaft axially.

To the right: decreasing the width of the elliptic path
To the left: increasing the width of the elliptic path

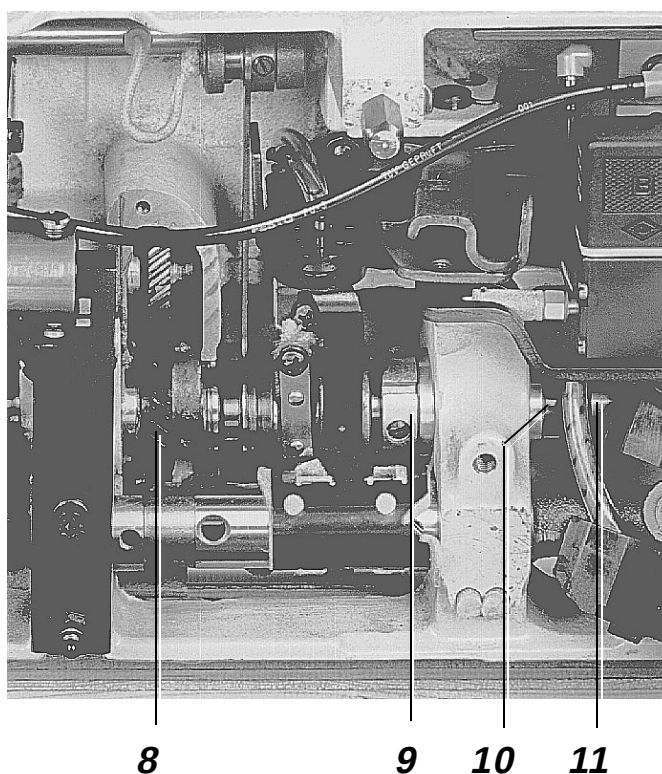
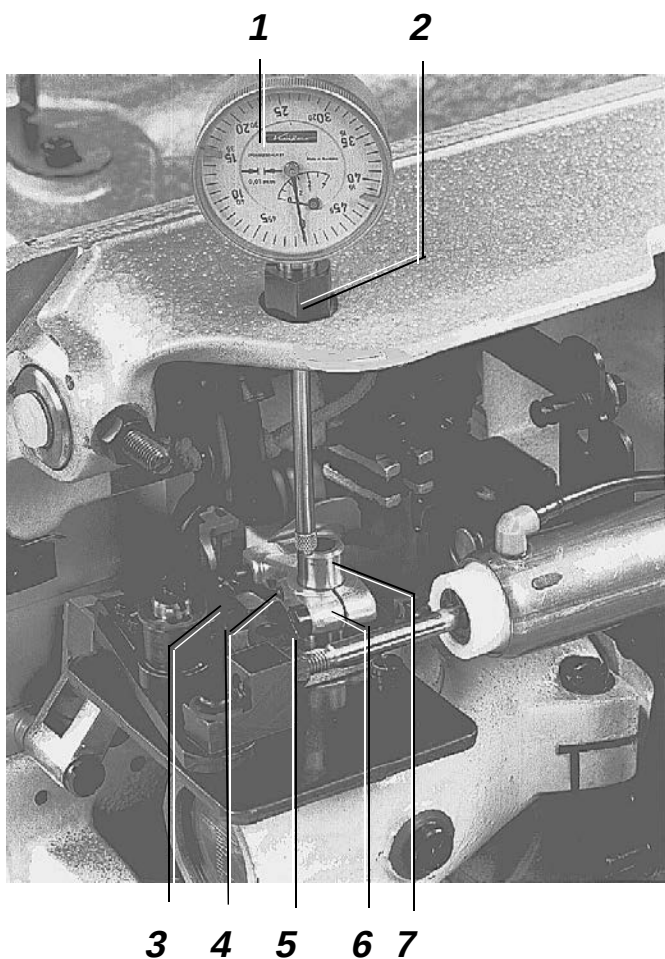
For the adjustment see next page.





To adjust the width of the elliptic looper path proceed as follows:

- Insert a straight and undamaged needle. Screw in the clamping bushing 2 and insert the metering clock 1.
- Turn the handwheel to set the looper shaft 7 at its lowest point. Set the metering clock at the measuring value 0.
- Then turn the handwheel to set the looper shaft at its highest point. Read the difference on the metering clock. Should the measure not be identical with the computed width of the elliptic path, the bottom shaft 11 must be loosened.
- In the case of an adjustment in axial direction the width of the elliptic path changes with a ratio of 1:2. When thus the bottom shaft is shifted eg 0.2 mm, the width of the elliptic path changes by 0.1 mm.
- Remove the throat plate and feed dog. Set the needle guard 3 to the rear.
- Loosen the eccentric 9, adjusting ring 10 and the gearwheel 8. Push the bottom shaft 11 into the respective direction until the computed measure is reached.
- Tighten the eccentric 9 and the adjusting ring 10 so that the bottom shaft 11 is set tight. Align the gearwheel 8 and tighten.
- Loosen the screw 5 and one of the screws 4. Set a distance of 0.1 mm between the looper point and the needle by shifting the looper holder 6 (looper point behind the needle). Re-tighten the screws 4 and 5.
- Check the running of the timing belt. If necessary, align the lower timing belt pulley.





2.6 Symmetry of the looper motion

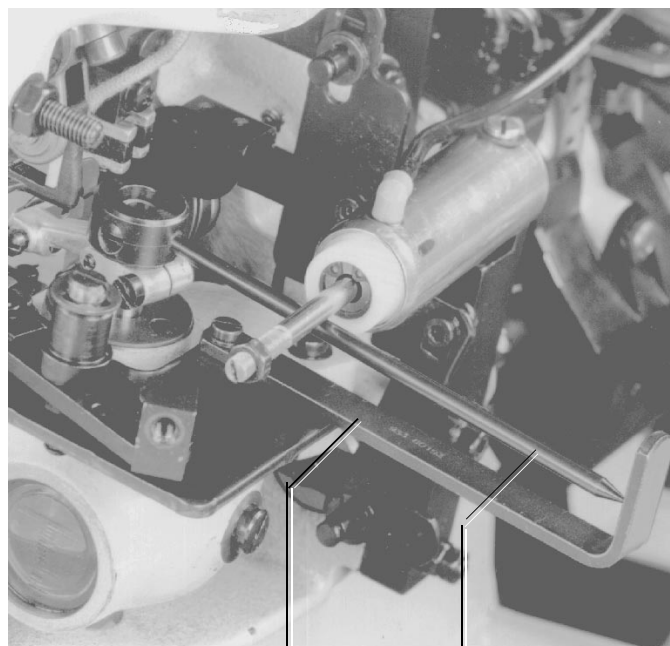


Turn off main switch!
- Danger of injury -

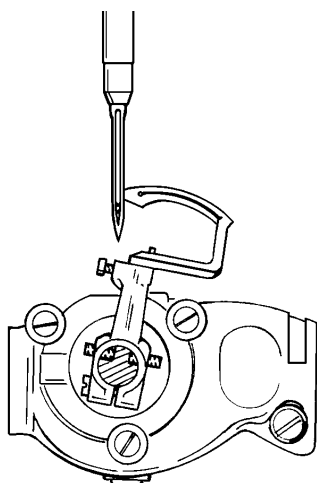
This adjustment means that the looper point is located at the centre of the needle, when the machine is locked either in slot C or B.

In slot C the looper point should be behind the needle, and in slot B in front of the needle.

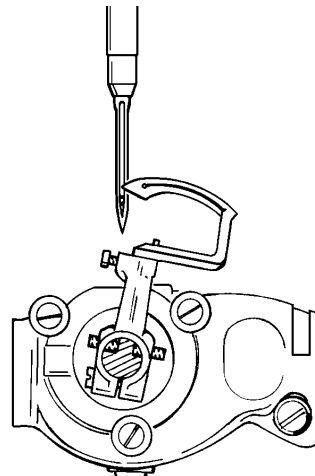
- To enable an accurate adjustment, fasten the gauge 1 on the looper drive housing and the pointer 2 on the looper shaft.
- Loosen the screws of the lower timing belt pulley.
- Turn the bottom shaft such that in slot C and B each, the pointer 2 is over the mark of the gauge.
- When turning the handwheel the pointer must swing to the left.
- Tighten the screws of the timing belt pulley.



1 2



In operating direction - slot C



In reverse direction - slot B

2.7 Looper in the looper holder

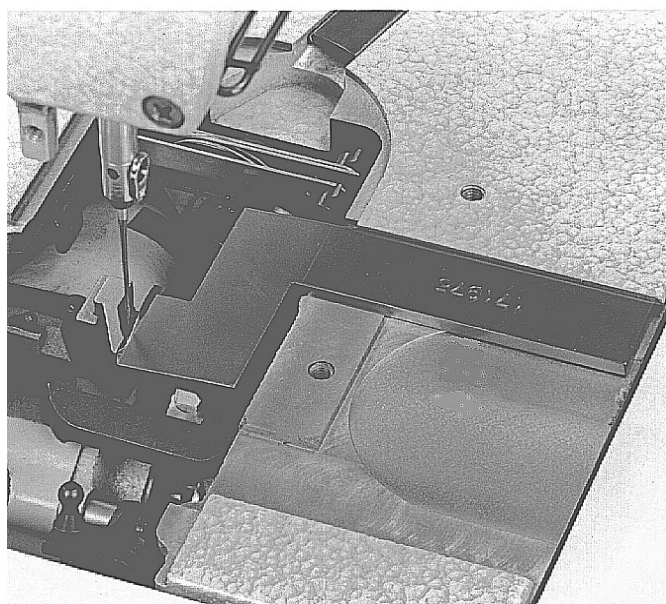


Turn off main switch!
- Danger of injury -

The looper face should be positioned with respect to the edge of the machine bed at an angle of $89^{\circ} 30'$.

In the case of two loopers, first align and securely tighten the rear looper, and then the front one.

The adjustment can be made using the gauge 171 975, as shown in the figure opposite.





2.8 Loop stroke and needle bar height



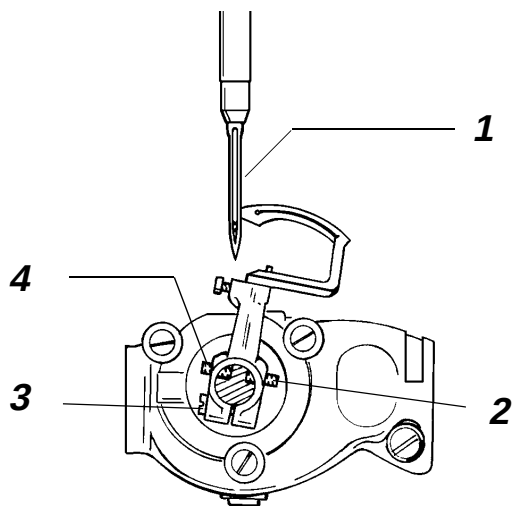
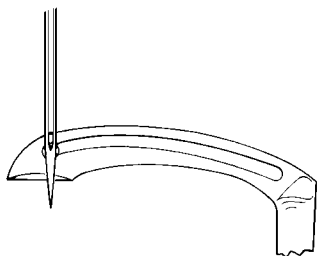
Turn off main switch!

- Danger of injury -

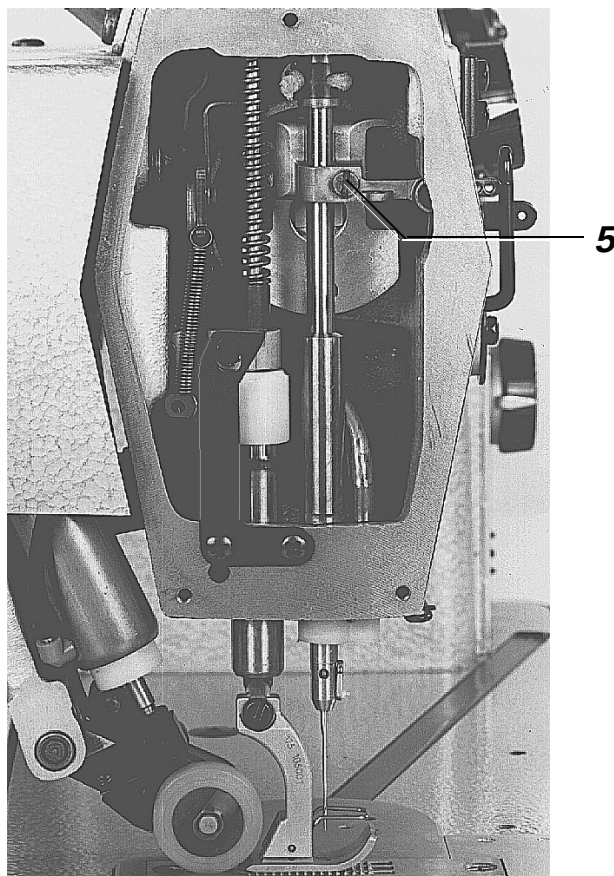
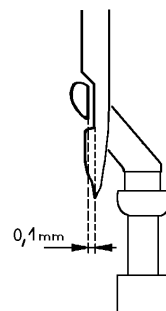
The loop stroke is 3.5 mm. This means that the looper point must be at the centre of the needle, when the needle has risen 3.5 mm from its lower dead point by turning the handwheel in operating direction. - Slot C of the adjustment disk.

This adjustment must also exist in reverse direction. - Slot B of the adjustment disk. See also section 2.6 Symmetry of the looper motion.

When the looper eye is at the centre of the needle, the bottom edge of the needle eye and the upper edge of the looper eye should be level. (see Fig.)



- Insert the needle into the needle bar and fasten.
- Lock the machine in slot C.
- Position hook point behind the needle on needle center line.
To do this, loosen the screw 3. Turn the set screws 2 and 4 accordingly.
Tighten the screw 3.
- Loosen the screw 5.
Adjust the needle bar height such that the lower edge of thread eye is aligned with the upper edge of the looper's eye.
Tighten the screw 5.
- Set a distance of 0.1 mm between the looper point and the centre of the needle by shifting the looper holder axially.
Tighten the screw 3. (see Fig.)
- Check symmetry of looper motion (Pos. B• and C). See section 2.6.





2.9 Needle guard



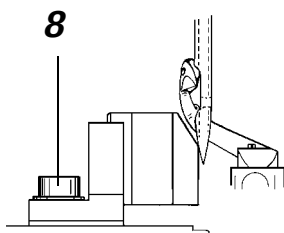
Turn off main switch!

- Danger of injury -

When the looper point moves to the left and reaches the needle, the needle point should rest against the needle guard.

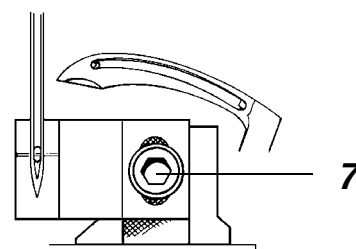
When lateral pressure is applied to the needle, it must not be possible to press it into the path of the looper point.

In the lowest needle position, half of the needle eye must remain accessible.



Stitch tightening.

- Loosen the screw 7. Adjust the height of the needle guard accordingly. Tighten the screw 7.
- Loosen the screws 8. Place the needle guard against the needle point. Tighten the screws 8. The needle must not be deflected more than is required.



2.10 Thrust motion for the feed dog

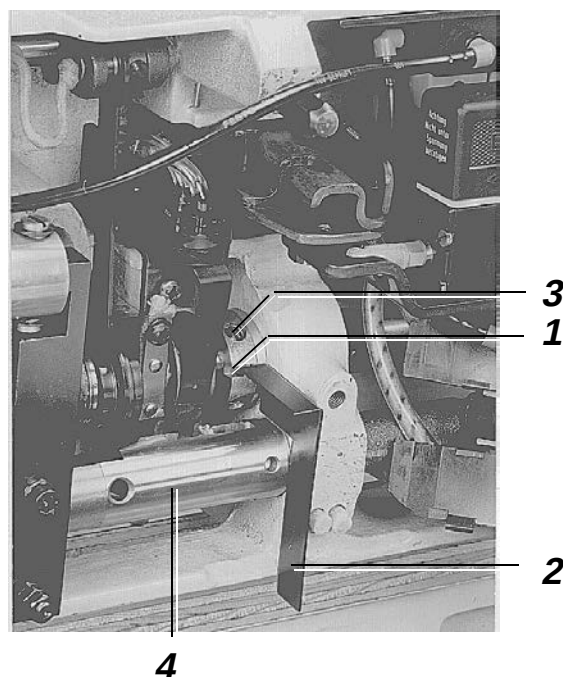


Turn off main switch!

- Danger of injury -

To assure good stitch tightening the feed dog should make a slight "additional thrust motion" after the needle has passed its upper dead position. The accurate adjustment is obtained in slot D using the gauge 2 that is in the accessories bag. Proceed as follows:

- Loosen the screws of the thrust eccentric 3.
- Lock the handwheel in slot D.
- Slide the gauge 2 into the slot 1 of the thrust eccentric.
- Turn the thrust eccentric 3 such that the edges of the gauge rest on the stitch regulator frame 4.
- Tighten the screws of the thrust eccentric. Make sure that the bottom shaft is set tight.
- With maximum feeding length the feed dog must not strike the edges of the throat plate slots.



Attention exception!

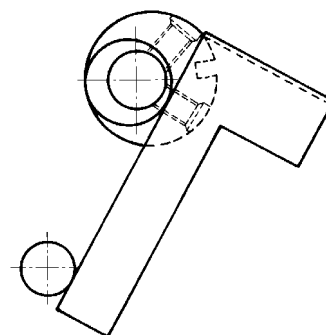
The class 171-131110 without frame shaft, ie with fixedly adjustable stitch lengths, is an exception as to adjustments.

The 171-131110 can be retrofitted for the use on hemming units.

Kit 171 1201 for "right-hand machines"

Kit 171 1301 for "left-hand machines"

Please note that the thrust eccentric must be adjusted differently on left- and right-hand machines.



"Left-hand machine": slot F

Set the first screw seen in operating direction of the thrust eccentric 3 with its lower edge onto the upper edge of the gauge.

"Right-hand machine": slot D

Set the second screw seen in operating direction of the thrust eccentric 3 with its lower edge onto the upper edge of the gauge. See sketch.



2.11 Stroke motion for the feed dog



Turn off main switch!
- Danger of injury -

When the needle point reaches the throat plate needle hole, the descending tooth points of the feed dog should be level with the throat plate surface. This position corresponds to slot D in the adjustment disk.

- Loosen the screws of the stroke eccentric 3.
- Lock the machine in slot D.
- Turn the stroke eccentric 3 such that seen in operating direction the centre of the first screw 4 and the housing edge 2 have the position shown in the figure. Align the gearwheel and tighten the screws of the stroke eccentric.
- At its highest point of travel the feed dog should extend 0.8 mm above the throat plate surface.

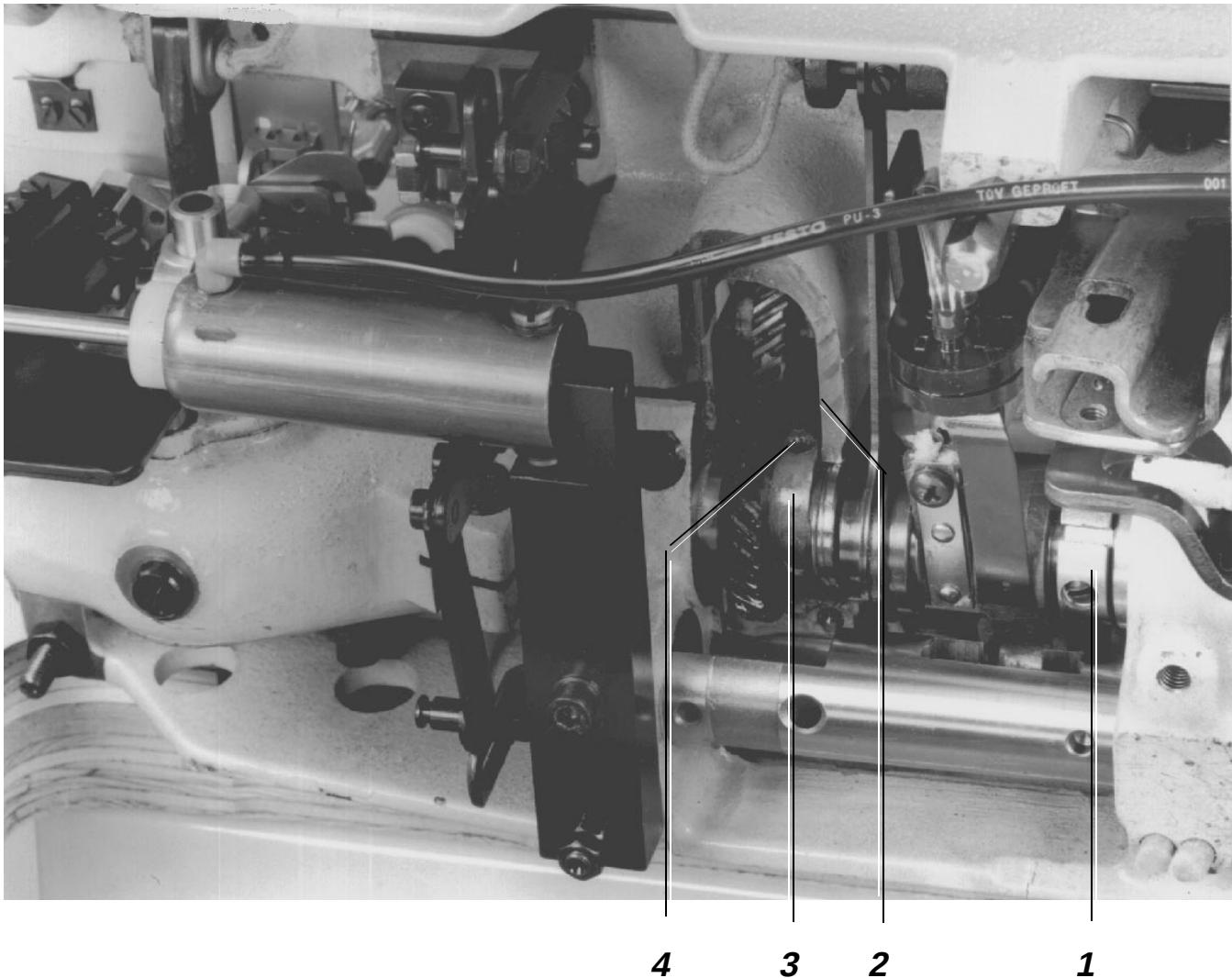
Attention! Except of class 171-131110

"Right-hand machine": slot D

Set the first screw of the stroke eccentric 3 seen in operating direction level with the second screw of the thrust eccentric 1.

"Left-hand machines": slot F

Set the second screw of the stroke eccentric 3 seen in operating direction level with the first screw of the thrust eccentric 1.





2.12 Retaining spring at the looper (Only class 173-141521 with thread trimmer)

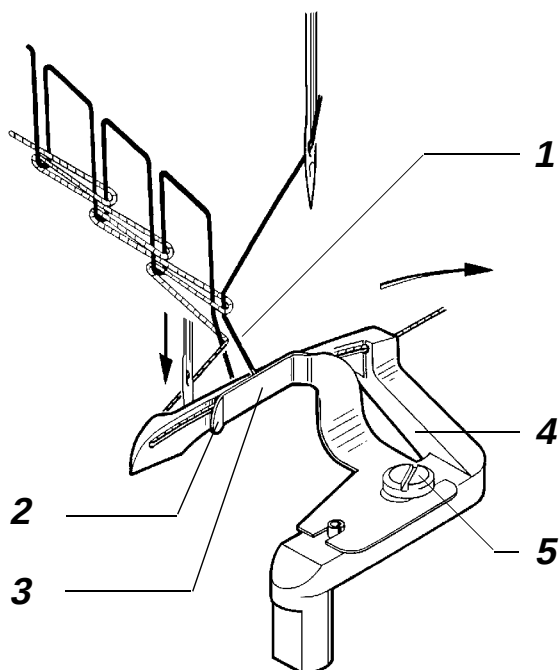


Turn off main switch!
- Danger of injury -

During the **right-to-left** motion of the looper the needle thread loop 1 must slide beyond the holding point 2 between the retaining spring 3 and the looper 4.

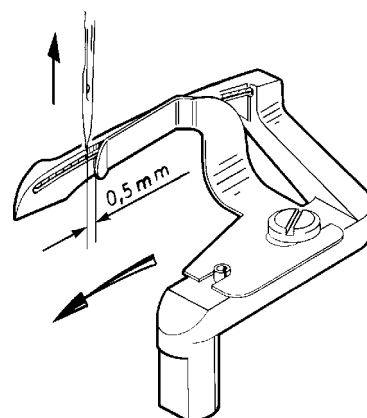
During the **left-to-right** motion of the looper the needle thread loop should be held at the holding point 2 until the descending needle has entered the thread triangle on the left in front of the needle thread loop 1.

As the needle rises to its upper position and the looper moves to the left, the needle point should pass the retaining spring at a distance of approx. 0.5 mm.



To make the adjustment proceed as follows:

- Bend the retaining spring 3 so that it rests flat against the looper. Make also sure that the pressure is greatest in front at the holding point 2.
- Loosen the screw 5 and shift the spring 3 to adjust the distance of 0.5 mm.
- The pressure of the spring against the looper must be checked when the machine is completed and threaded. To do this, tilt the machine head backward and rotate the handwheel by hand.
- Check the described stitch formation during the right-to-left and left-to-right looper motion.
- When the needle thread loop is not pushed over the holding point 2, decrease the pressure of the spring against the looper by bending the spring, and when the needle thread loop is not held by the holding point 2 until the needle enters the thread triangle on the left in front of the needle thread loop 1, increase the pressure.



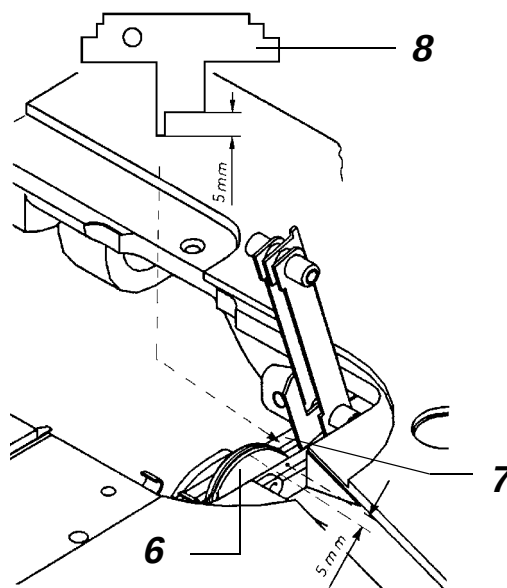
2.13 Looper thread take-up cam

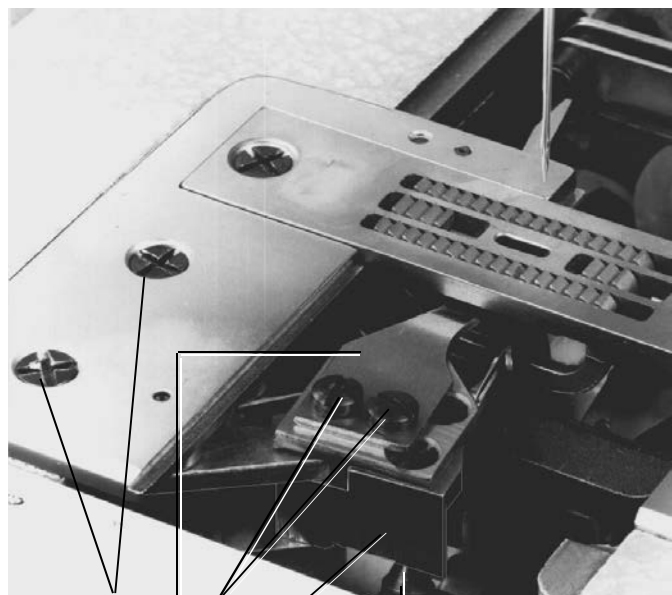


Turn off main switch!
- Danger of injury -

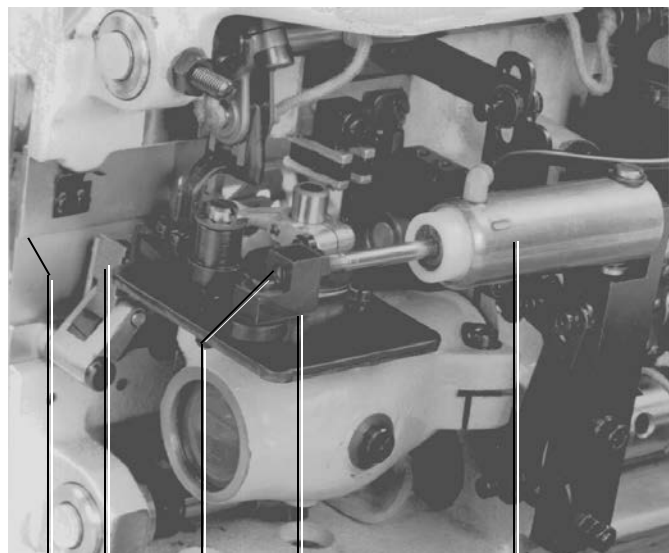
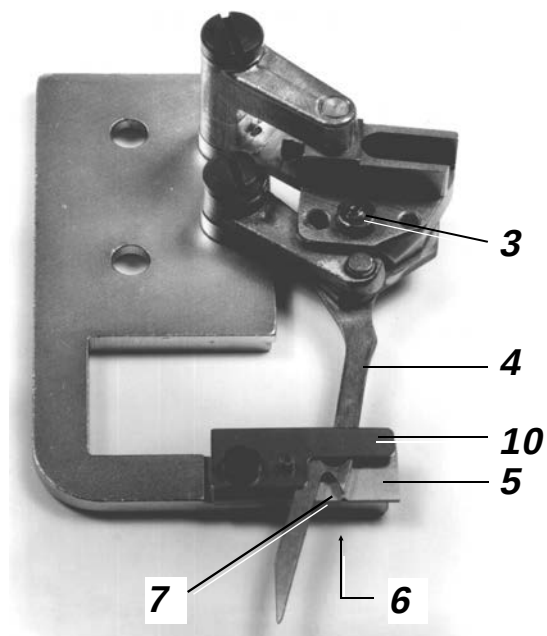
With the machine locked in slot E (upper dead position of the needle bar) the looper thread take-up cam 6 should be located 5 mm above the carrier plate 7.

- Loosen the screws of the looper thread take-up cam.
- Slide the locking pin into slot E.
- Turn the looper thread take-up cam 6 accordingly. For measurements use the gauge 8.
- Set the cam tight and tighten the screws.

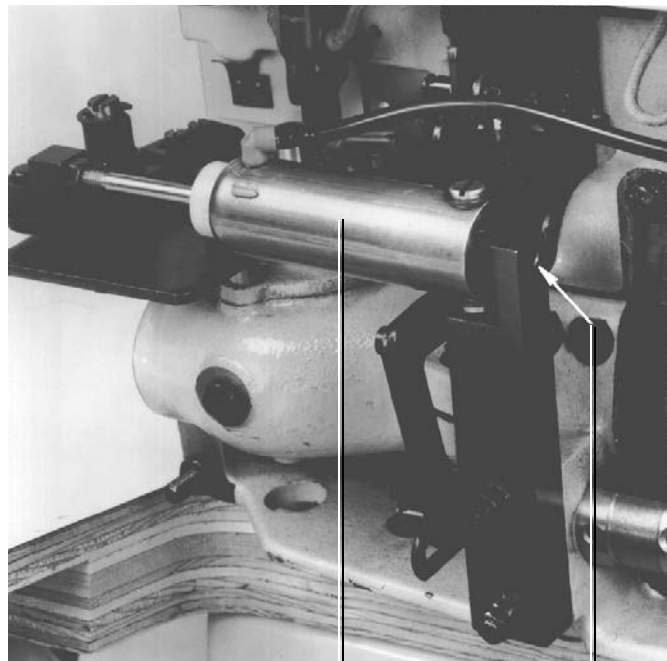




1 4 2 13 16



14 13 12 11 9



9 8



18 17



2.14 Thread trimming device

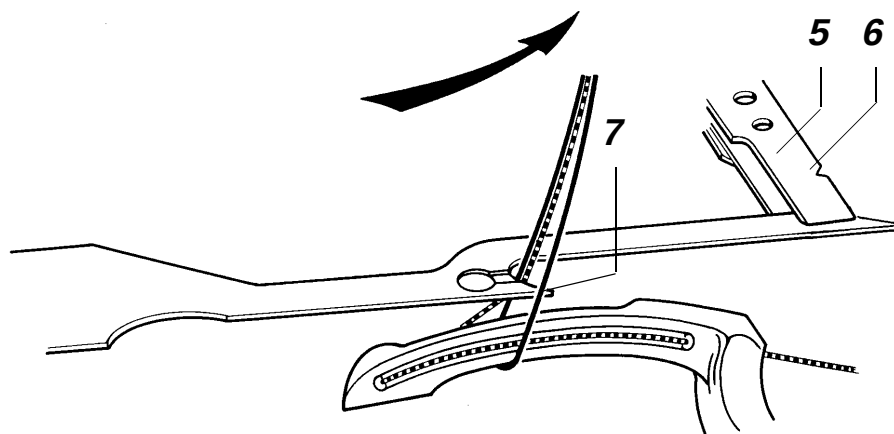


Turn off main switch!
- Danger of injury -

During the trimming process the looper thread behind the looper and the rear thread of the needle thread loop must be caught by the point 7 of the movable knife. See sketch.

4. Mounting and end positions of the thread trimmer

- Unscrew the screws 2 and initially remove the movable knife.
- Position the thread trimmer such that the knife holder 13 fits over the ball lever 16. Tighten the screws 1.



1. Removing the knife

- Unscrew the screws 2 and remove the movable knife 4.
- Then unscrew the screws 1 and remove the whole thread trimmer assembly.

2. Manual trimming test

- Initially, fasten the movable knife 4 by tightening the screws 2 slightly. The screws 2 should be approx. located at the centre of the elongated hole of the knife.
- Align the point 7 of the movable knife with respect to the notch 6 of the stationary knife 5. Tighten the screws 2 securely.
- Make a trimming test with thread. If the thread is not trimmed properly, the edges must be checked or new sharp knives are to be installed.
- Set the movable knife in cutting position by slightly turning in the pressure screw 3. The smooth motion of the knife must be assured.
- If necessary, align the movable knife in cutting position with respect to the stationary knife.

3. Thread clamping sheet

The thread clamping sheet 10 should slightly clamp the thread end to assure a secure seam beginning.

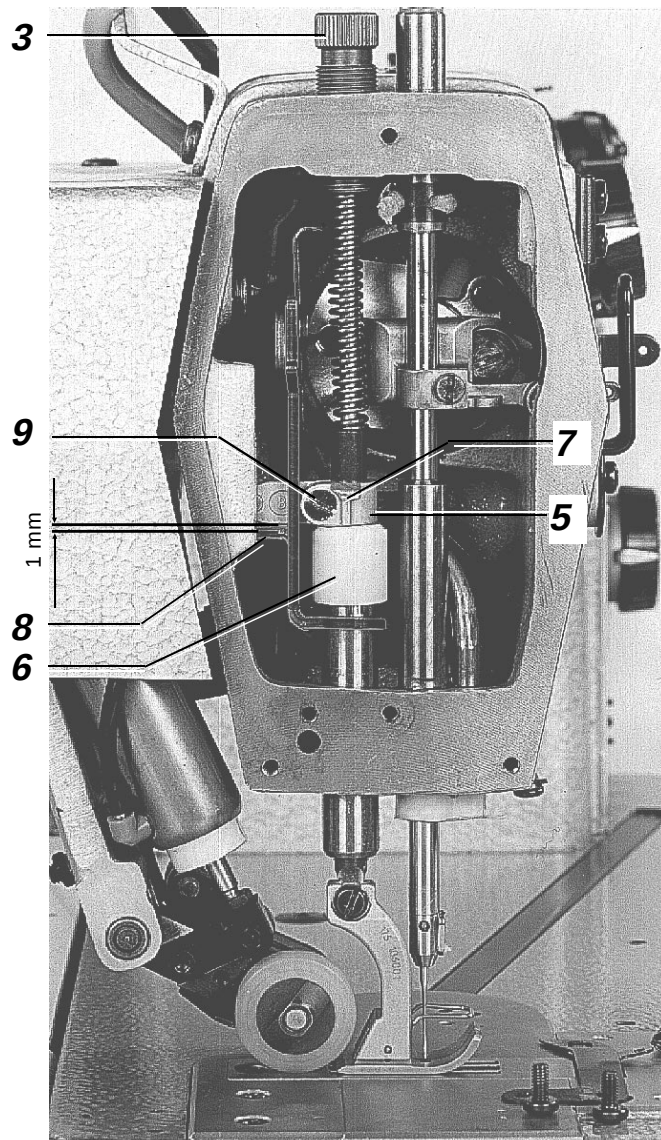
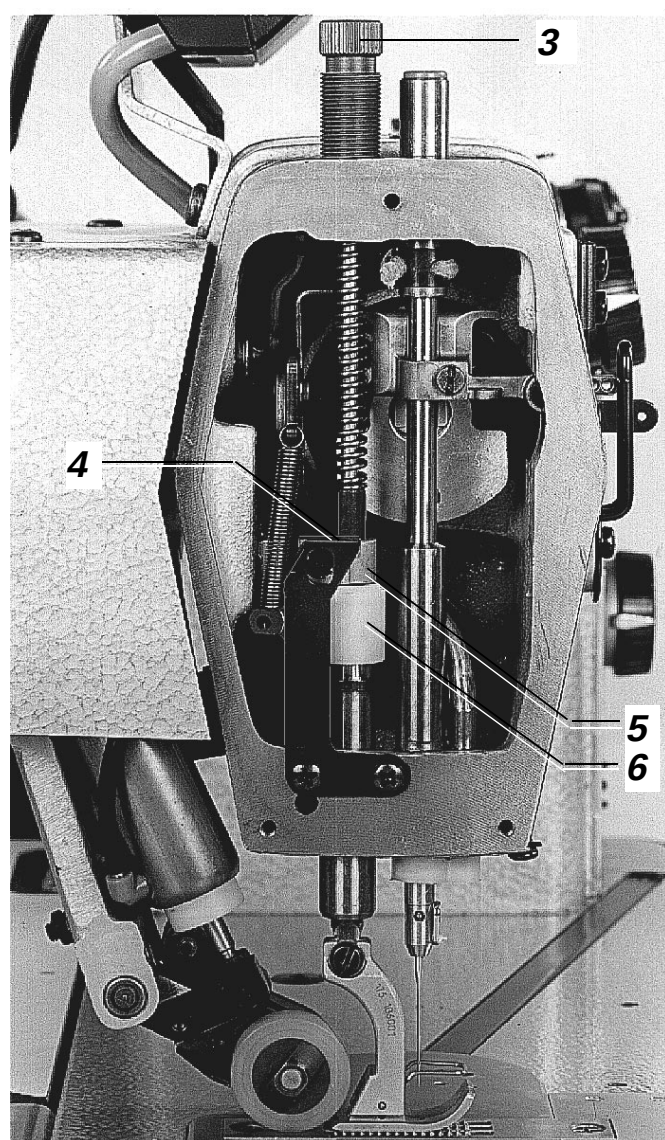
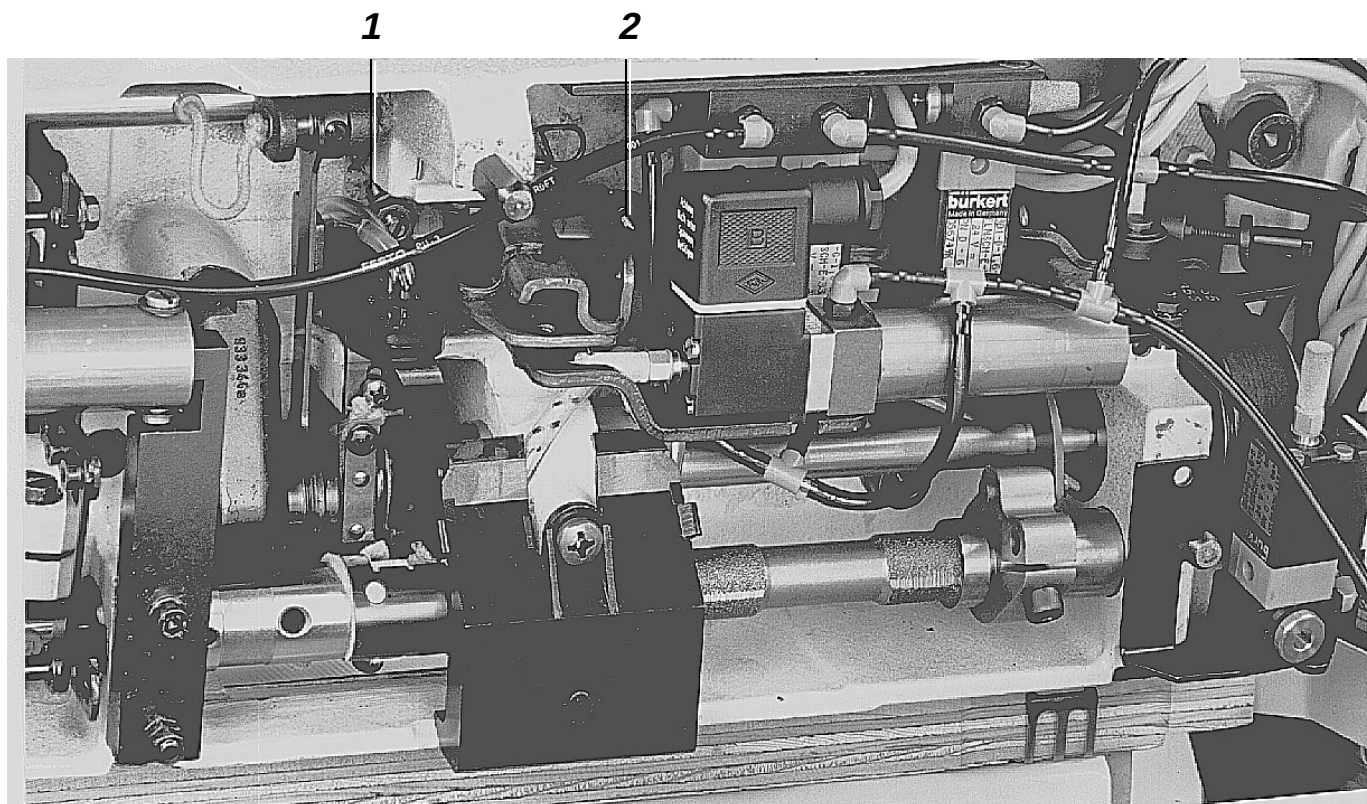
If the clamping sheet holds the thread too tightly, seam pucker may occur at the seam beginning.

- Screw the piston rod 12 into the block 11 until it is flush with the face of the block.
- If the piston rod is moved into its right end position, the edge 13 of the knife holder and edge 14 of the plate should be flush with each other. Adjust the end position of the cylinder 9 accordingly (hexagon spanner 2.5 mm) using the self-locking set screw 8.
- As a pre-adjustment fasten the movable knife with the screws 2 such that
 - a) the point 7 points to notch 6 and
 - b) the cutting edges of the knives overlap approx. 1 mm.
- During sewing make a trimming test with the shortest and longest stitch length.
- If necessary, slightly correct the position of the point 7 so that the threads are caught securely.

5. Thread puller for the looper and needle thread

During thread trimming the thread tensions are opened and the thread pullers 18 for the looper and needle thread are activated. The pulled tension-free thread is needed for secure stitch formation at the next seam beginning. Just the amount of thread needed should be pulled, as this determines the length of the thread end at the seam beginning.

- The thread puller 18 is stepped. By adjusting the stopper 17, more or less thread can be pulled.





2.15 Sewing foot stroke



Turn off main switch!
- Danger of injury -

The height of the sewing foot stroke depends on the needle bar stroke of the respective class and the needle system used.

With the needle system 934 the sewing foot stroke is in general 5 mm, and with the needle system 933 it is in general 10 mm.

In the case of higher adjustments and a passage for thick fabrics make sure that the needle bar or the needle block must not strike the sewing foot. Initially, unscrew the stop screws 1 and 2 by some turns.

The sewing foot sole must rest on the throat plate. To do this, turn the handwheel accordingly.

Adjusting the foot stroke of hinged feet (top puller feed)

- Place an object, the thickness of which corresponds to the stroke, between the sewing foot sole and throat plate.
- Loosen the screw 9.
Adjust the block 5 on the cloth presser bar so that the support sheet 4 can just be swung unhindered under the support nose 7.
- Align the sewing foot with the needle and tighten the screw 9.
- Remove the object.
When the sewing foot rests on the throat plate, a distance must be between the block 5 and the sleeve 6.

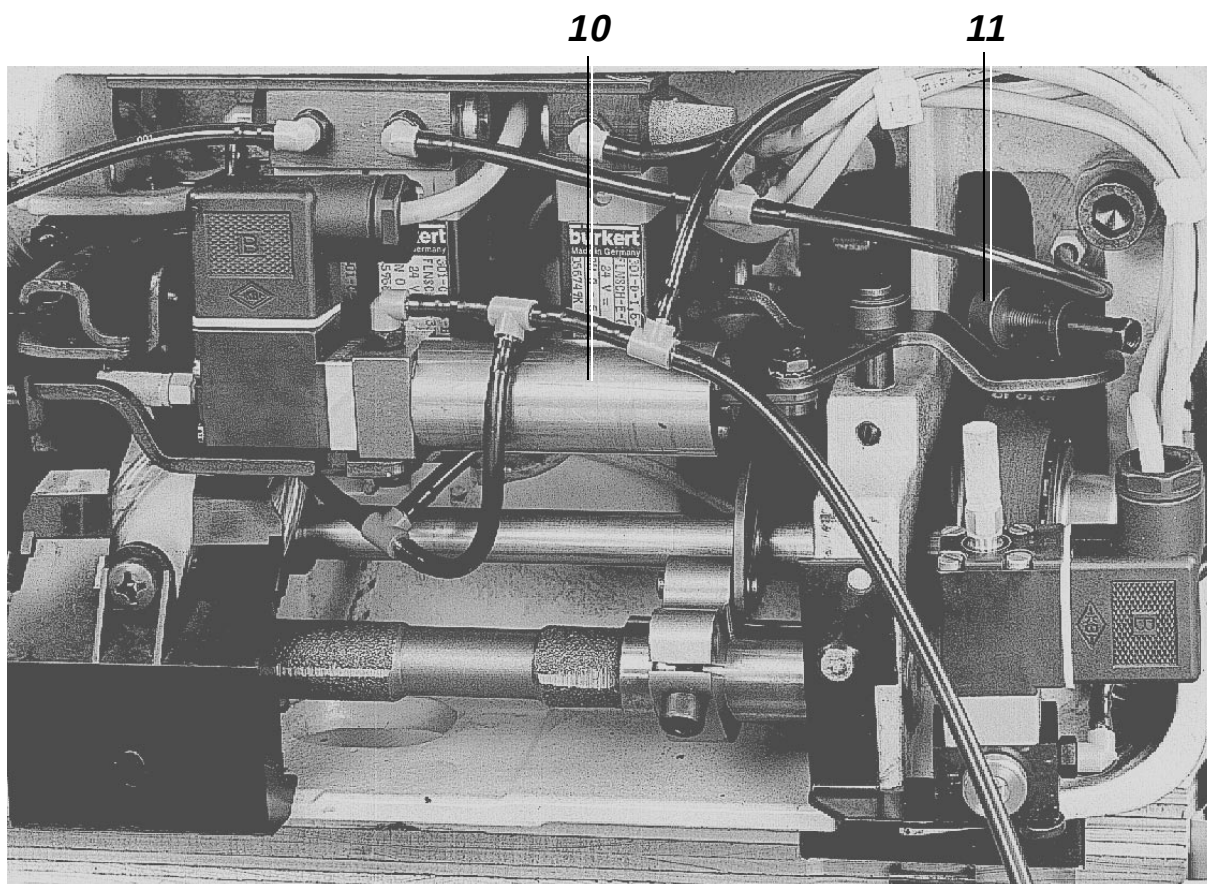
Adjusting the foot stroke of hinged lever feet

- Initially, reduce the sewing foot pressure by screwing the pressure sleeve 3 upwards.
- Loosen the screw 9.
Lower the cloth presser bar until the sewing foot sole rests flat on the throat plate.
- Adjust a distance of approx. 0.5 mm between the block 5 and the sleeve 6.
- Align the sewing foot with the needle and tighten the screw 9.
- Re-tighten the pressure sleeve 3.
Make sure that the pressure of the spring is adjusted clearly higher than that of the hinged lever foot.
The lowest position of the hinged lever foot is thus determined by the sleeve 6.

Screw in the screw 1 until the distance between the angle 8 and the block 5 is approx. 1 mm. The sewing foot sole must then rest on the throat plate.

Limit the path of the knee lever block by screwing in the screw 2. - One should just be able to swing the support sheet 4 unhindered under the support nose 7.

When the machine is equipped with the pneumatic sewing foot lift, the stroke of the cylinder 10, ie the sewing foot stroke, is to be limited by the stop screw 11 accordingly.





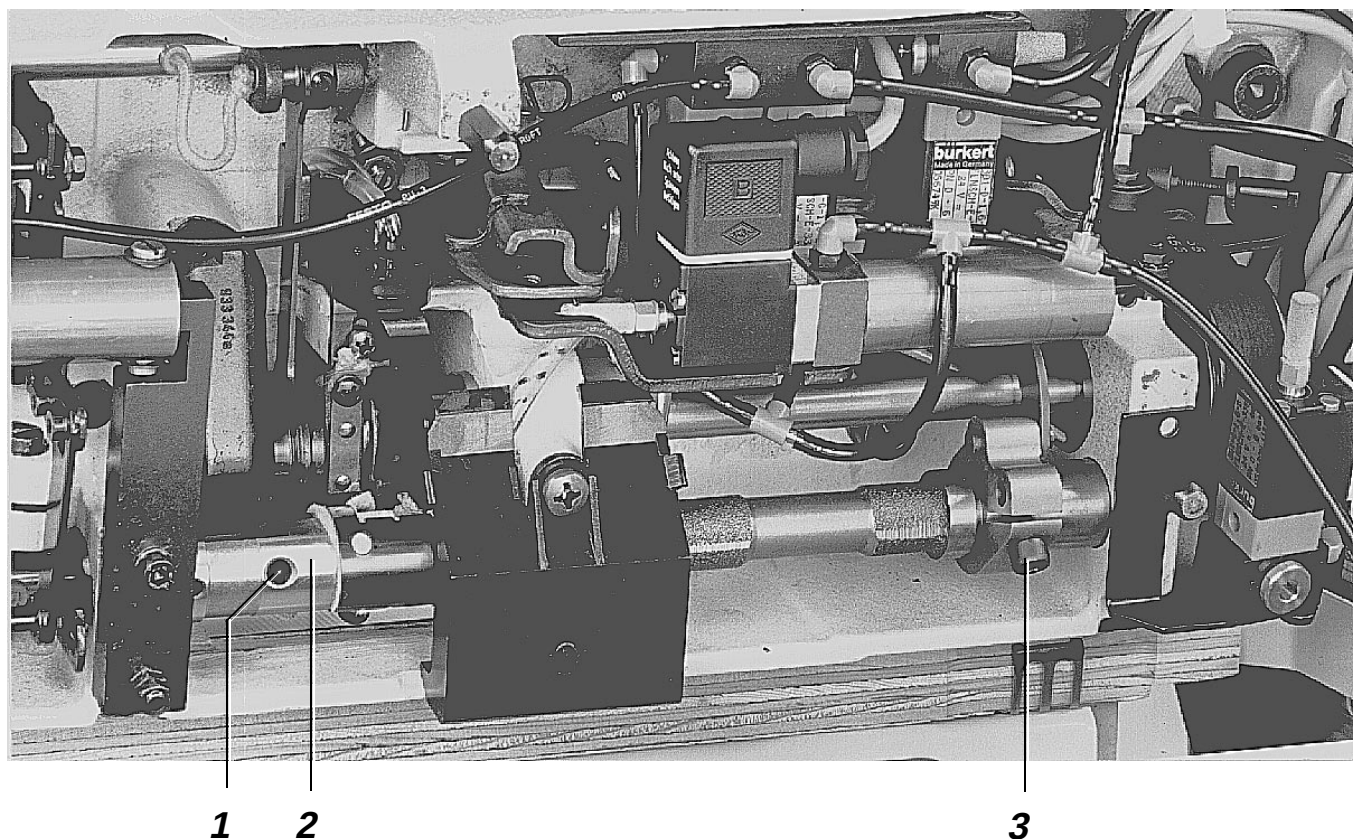
2.16 Setting the stitch lengths

Regular stitch lengths

If eg a stitch length of 3 mm has been adjusted at the dial, 11 stitches on thin cardboard must be equal to 30 mm.

Loosen the screw 3.

Insert a drift into the hole 1 and turn the frame shaft 2 accordingly.



Condensed stitch length of the bottom feed

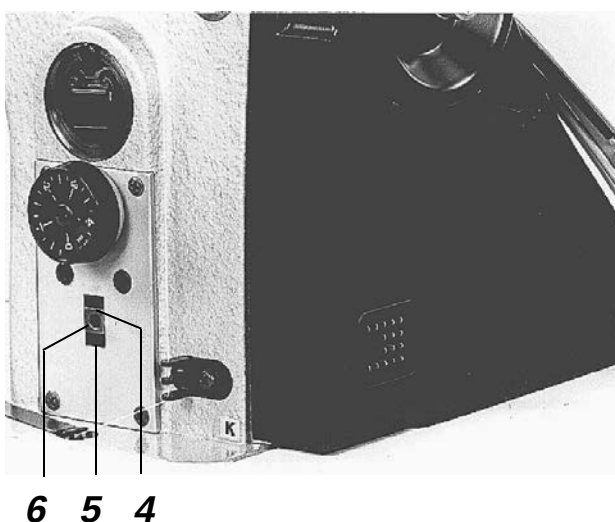
The minimum condensed stitch length is 1.2 mm.

While adjusting the stitch length, raise the puller.

Make condensed stitches on thin cardboard by pressing the button at the machine head. 11 stitches must be equal to 12 mm.

To make the adjustment, insert a screwdriver into the slot 5.

Loosen the screw 6 and set the stopper 4 higher or lower accordingly.





Condensed stitch length of the top puller feed

The puller should always feed slightly more than the bottom feed.

The material is thus tensioned, thereby preventing seam pucker.

When the condensed stitch length of the bottom feed is eg 1.2 mm, the feed of the puller is to be adjusted to 1.3 mm.

Reduce the sewing foot pressure such that thin cardboard can just pass between the sewing foot and feed dog.

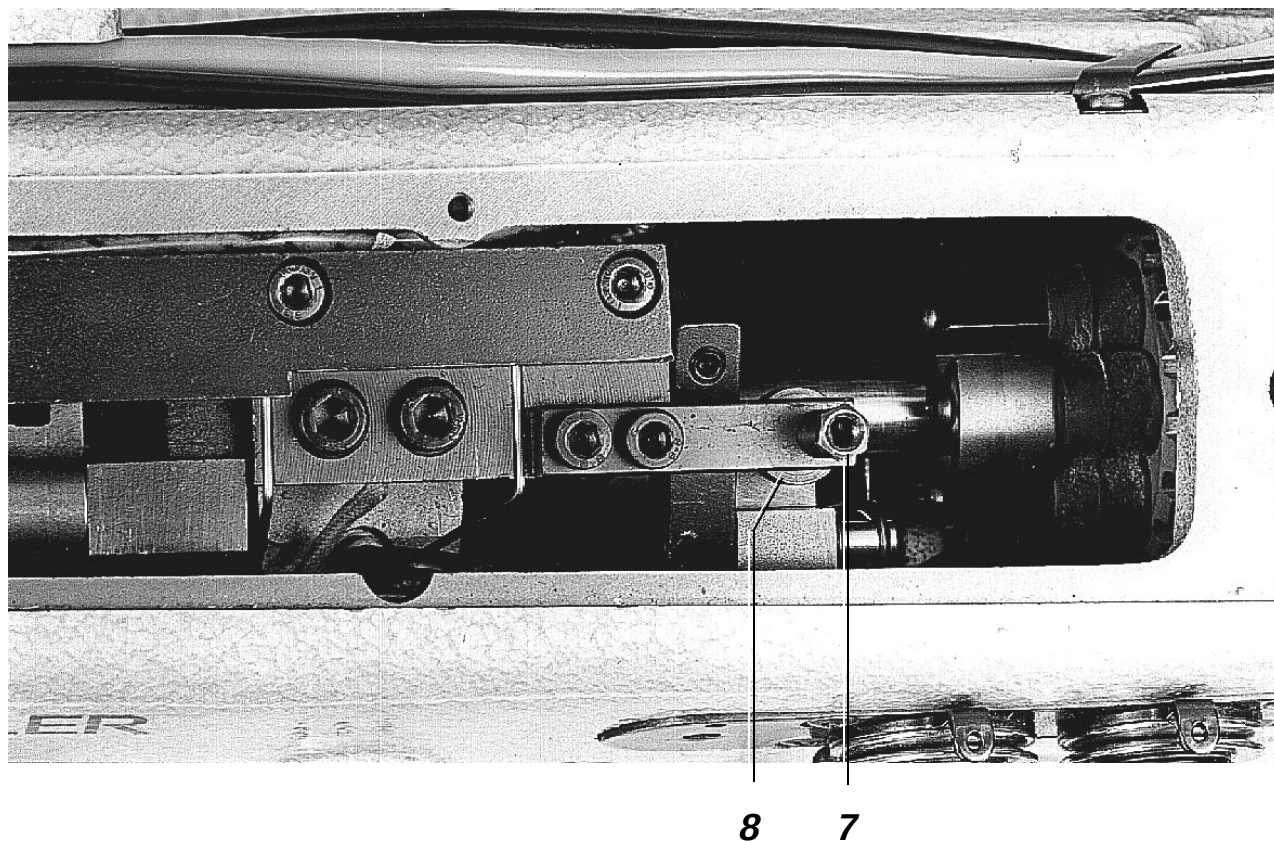
Lower the puller.

Make condensed stitches on thin cardboard by pressing the button at the sewing head.

11 stitches must be equal to 13 mm.

Adjust the stopper 8 accordingly.

The lock nut 7 and the stopper 8 are also accessible with screwed on top cover plate.





3. Setting the top puller feed



Turn off main switch!
- Danger of injury -

3.1 Synchronisation of the bottom feed and top puller feed

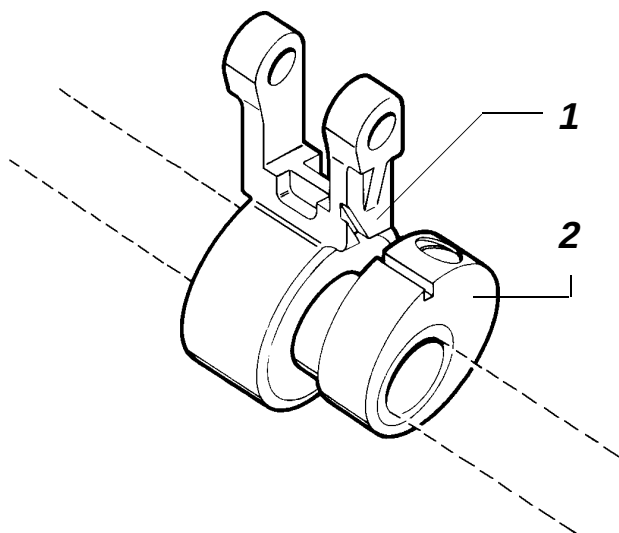
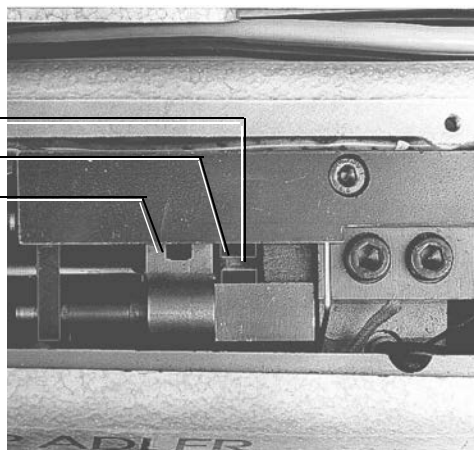
The bottom feed and top puller feed should be synchronised. The puller motion, however, must never be completed earlier than the feed dog motion.

Thus, the material is tensioned between the sewing foot and the puller so as to prevent seam pucker. When the machine is locked in slot E and the grooves of the traction rod 1 and the eccentric 2 are congruent, the above adjustment is completed.

- Remove the bobbin winder cover.
- Loosen the screws of the eccentric 2 just enough that it can be turned on the arm shaft with minimum effort.
- Insert a screwdriver into the groove 3 of the eccentric.
- Turn the handwheel to bring the machine to the position E.
- Tighten the screws of the eccentric 2.

To check the synchronisation proceed as follows:

- Set the dials for the bottom feed and top puller feed at 3 mm.
- Place two thin cardboard strips under the sewing foot and puller such that their ends are adjacent.
- Turn the handwheel. - The distance between the ends must not change.
- If necessary, correct the setting of the puller dial so as to assure synchronous feeding motions.
- Loosen the graduated plate of the dial and re-attach such that 3 mm is indicated.

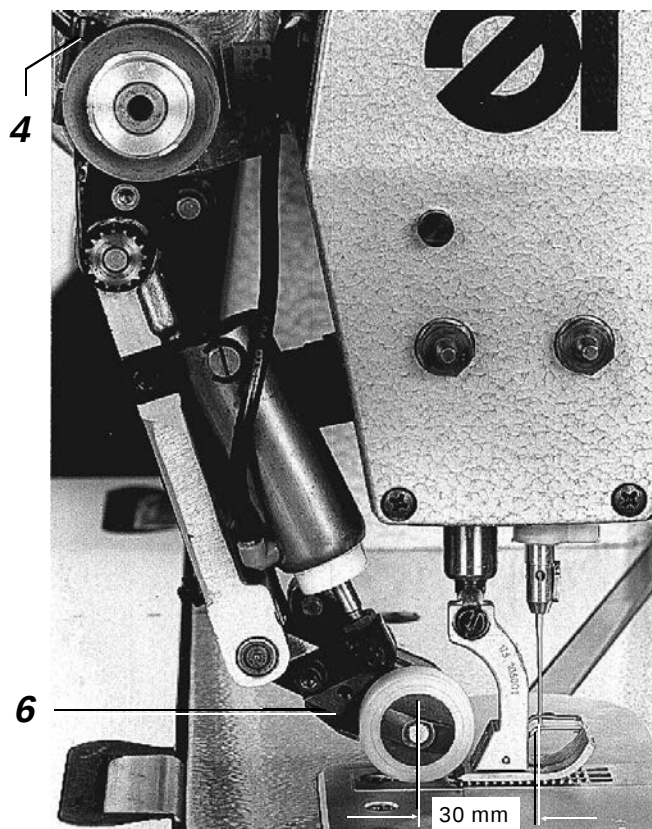


3.2 Distance between the puller and needle

The distance between the puller and centre of the needle should be 30 mm.

Make sure that the automatically raising puller does not strike the sewing foot.

To make the adjustment, loosen the screw 4.





3.3 Raising stroke of the puller

Upper end position

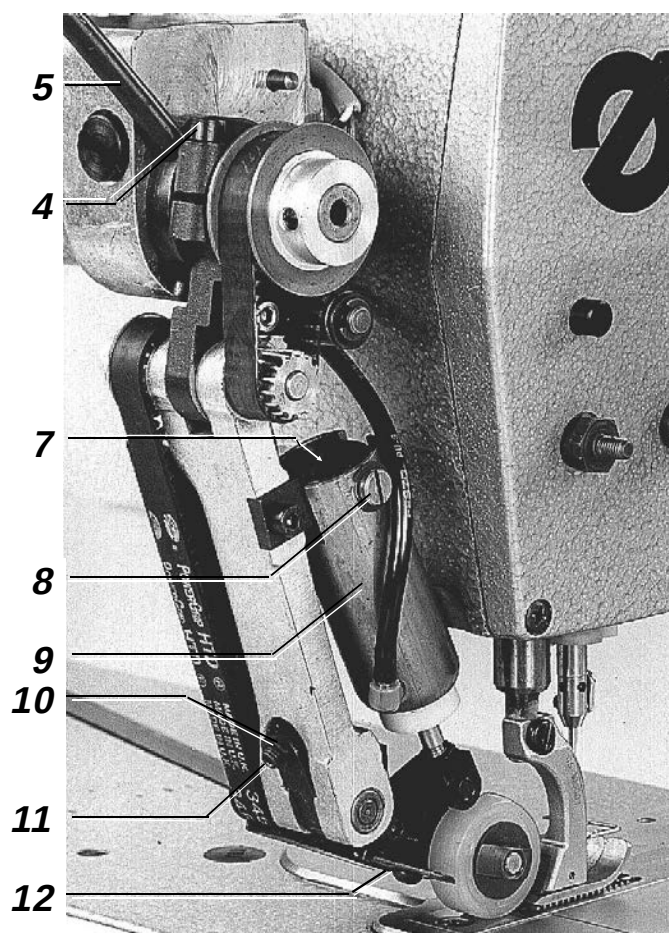
The raised puller must not strike the sewing foot. Turn the bolt 8 such that its slot is vertical. Limit the stroke of the piston in the cylinder 9 accordingly using the self-locking set screw 7. To do this, use a 2.5-mm-Allen key.

Lower end position

After the vulcollan puller has lowered onto the throat plate, the rocker 6 must still be able to oscillate 2 mm, before the stopper of the hand lever 5 reaches its end position. The material is thus slightly tensioned by the touching down puller. Loosen the lock nut 10 and turn the threaded pin 11 accordingly.

Attention!

Steel pullers must not rest on the throat plate. The distance between the puller and plate should be approx. 0.2 mm.



3.4 Puller pressure

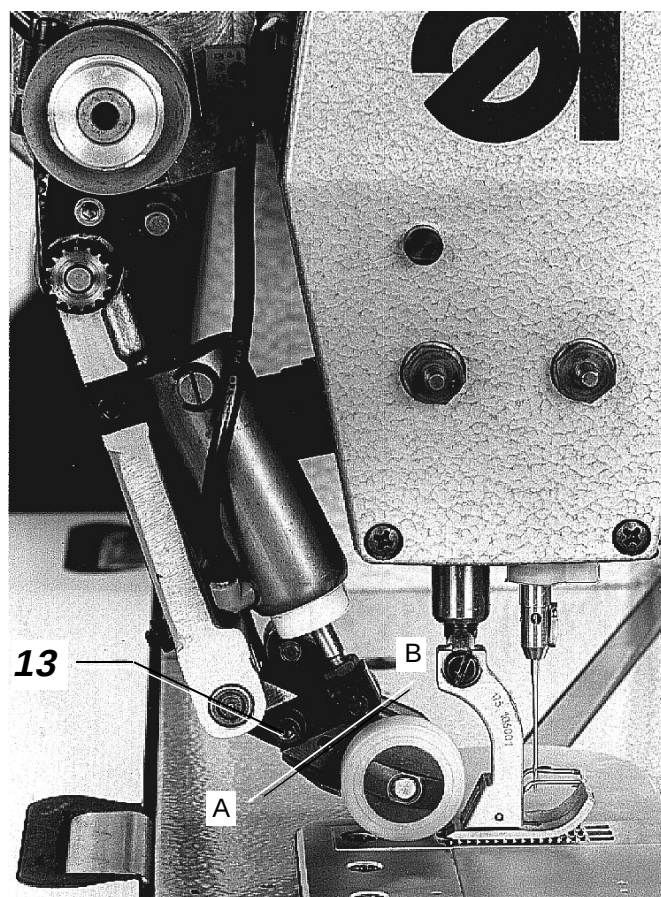
The puller pressure can be modified by adjusting the lever arm for the cylinder force and can thus be adjusted to the respective material. Loosen the screw 13. Cylinder in arrow-indicated direction A = higher pressure arrow-indicated direction B = lower pressure

3.5 Fabric keep-off plate

The distance between the puller and the fabric keep-off plate 12 should be as small as possible. To prevent the material from getting caught in this gap, the distance needs to be corrected depending on the abrasion of the puller. On machines without thread trimmer the fabric keep-off plate at the same time serves as trimming knife for the thread chain.

3.6 Timing belt tension

The timing belts should be tensioned so as to assure the accurate transmission of the step lengths of the puller. A too great belt tension may result in excessive wear and tear and malfunctioning.





3.7 Replacing the puller

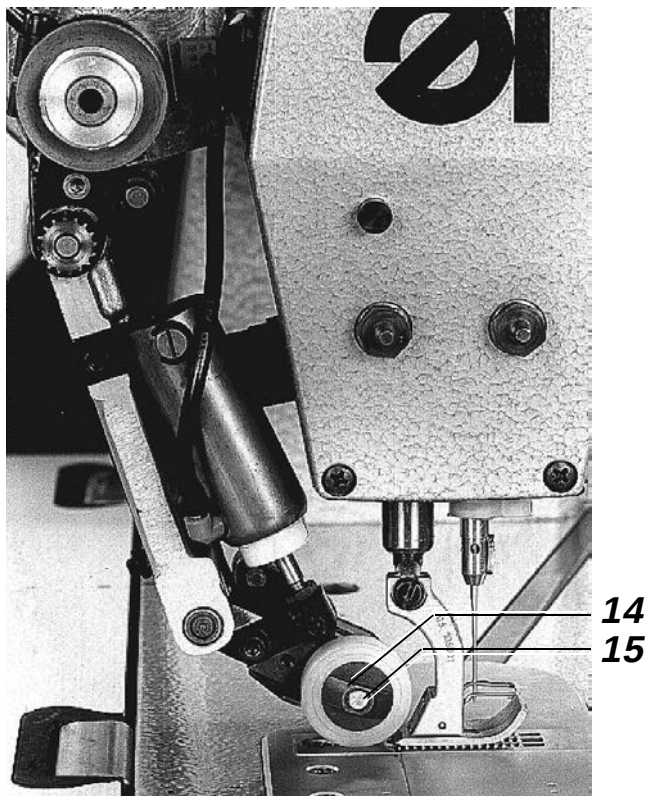
The following pullers are available for the diverse applications:

Vulcollan puller	9-mm-wide	standard on the machine	Order no. 933 5725
Vulcollan puller	16-mm-wide	asymmetric (in the accessories bag)	Order no. 933 5737a
Steel puller	9-mm-wide	1-mm-roof-toothed	Order no. 933 5736
Steel puller	15-mm-wide	1-mm-roof-toothed	Order no. 933 5737
Steel puller	15-mm-wide	2-mm-saw-toothed	Order no. 933 5738a

The asymmetric vulcollan puller that is in the accessories bag enables to vary the position of the puller with respect to the seam or fabric fold. This puller is to be used on twin-needle machines.

To replace the puller proceed as follows:

- Remove the nut 14 using a 7-mm-fork spanner. (Attention l/h thread!) At the same time hold the other end of the axle 15 by means of a screw-driver.
- Steel pullers must not touch the throat plate. The distance should be 0.2 mm. Therefore, correct the "Lower end position" of the puller as described in section 3.3 accordingly.





3.8 Raising and lowering functions of the puller

Various functions for the puller can be selected at the Efka V730 control panel.

This is done in the parameter F190 / code no. FFF 001 to 003, preferably according to subclasses for machines with or without thread trimmer. 003 does not contain any functions for double chainstitch machines.

001 preferably for top puller feed **without thread trimmer** with the following functions:

1. At the seam end the puller always remains lowered to hold the thread chain. The thread chain is trimmed by the trimming knife of the fabric keep-off plate.
2. When the sewing foot is lifted within the seam the puller is raised as well.
3. When sewing is continued, the puller lowers either immediately or after a delay, depending on the entered number of stitches. The numbers of stitches 0-254 are set in parameter F191.
4. The puller can be raised or lowered within the seam at the touch of a button at the sewing head.

002 preferably for top puller feed **with thread trimmer** with the following functions:

1. After thread trimming the puller is raised automatically.
2. When the sewing foot is lifted within the seam and the threads are trimmed within the material, the puller is raised.

3. The puller lowers at the seam beginning and after the sewing foot lift within the seam after the number of stitches between 0 and 254 entered in parameter F191 has been sewn.
4. The puller can be raised or lowered within or outside the seam at the touch of a button at the sewing head.

For programming proceed as follows:

1. Hold the key P pressed.
2. Turn on main switch. - The code no. C 0000 is displayed.
3. To enter the "technician level 1" input the Efka code no. 1907 using the keys 1....0.
4. Press key E. - The parameter no. F 100 is displayed.
5. Enter the parameter no. 190 using the keys 1...0.
6. Press key E. FFF 001, FFF 002 or FFF 003 is displayed. One of the code numbers can be selected using the + or - key.
7. Press key P twice.- Then the adjustment is completed.
8. **Attention!** Always sew a seam with thread trimming or sewing foot lift. Only then the entered adjustment is memorized.



4. Adjusting the synchronizer

Prior to the adjustment check whether the synchronizer is properly fastened on the handwheel flange.

When the machine is locked in slot A, the mark 11 should be located exactly opposite the groove 12.

This is position 0, which is the starting point that all factory settings of machine positions depend on.

The machine positions are registered by the synchronizer in steps (increments) of 0.7° and are displayed.

One complete revolution is subdivided into 512 steps (increments).

1st position

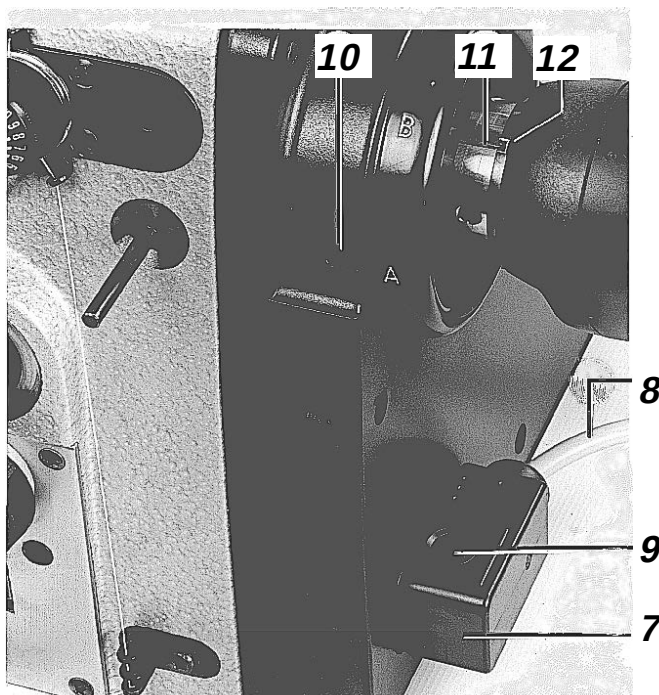
The machine should stop when the looper has safely picked up the loop that is, the needle should rise from its lower dead position until the looper point has moved to the left by approx. 3 mm beyond the needle.

This corresponds to the number of increments 214.

2nd position

Needle bar in its upper dead position.

This corresponds to the slot E of the adjustment disk or the number of increments 384.



For programming proceed as follows:

1. Hold the key P pressed.
2. Turn on main switch.- Code no. C 0000 is displayed.
3. To enter the "technician level 1" input the Efka code no. 1907 using the keys 1....0.
4. Press key E.- The parameter no. F 100 is displayed.
5. Enter the parameter no. F 170 using the keys 1....0. Press key E.- Service routine 1 (Sr1) appears. Press key F.- Position 0 is displayed.
6. Turn the handwheel by one complete revolution in operating direction and lock in position A using the enclosed timing pin. Press key P twice.
7. Press key P.- F 170 is displayed.
8. Press key E twice.- The service routine 2 (Sr2) and F 171 are displayed.
9. Press key F. - Position 1 and the set number of increments are displayed. Set the number of increments 214 using the + or - key.
10. Press key E.- Position 2 and the set number of increments are displayed. Set the number of increments 384 using the + or - key.
11. Press key P twice. - Now the adjustment is completed.
12. **Attention!** Always sew a seam with thread trimming or sewing foot lift. Only then an entered adjustment is definitely memorized. If no seam is sewn, the adjustment is lost when the main switch is turned off.