Preface and General Safety Notes

Part 3: Service Instructions Cl. 558

1. General

These Service Instructions 558 describe in a practical order the settings for the sewing machine.

ATTENTION

The tasks described in the service instructions may only be conducted by specialists or suitably trained personnel !

Since various setting positions are interdependent it is essential that the settings be made keeping to the order described.

ATTENTION Danger of Breakage

After disassembly and before recommissioning of the sewing machine the testing described in the Chapters 11,12,14,16,18,24 and 28 is to be conducted !

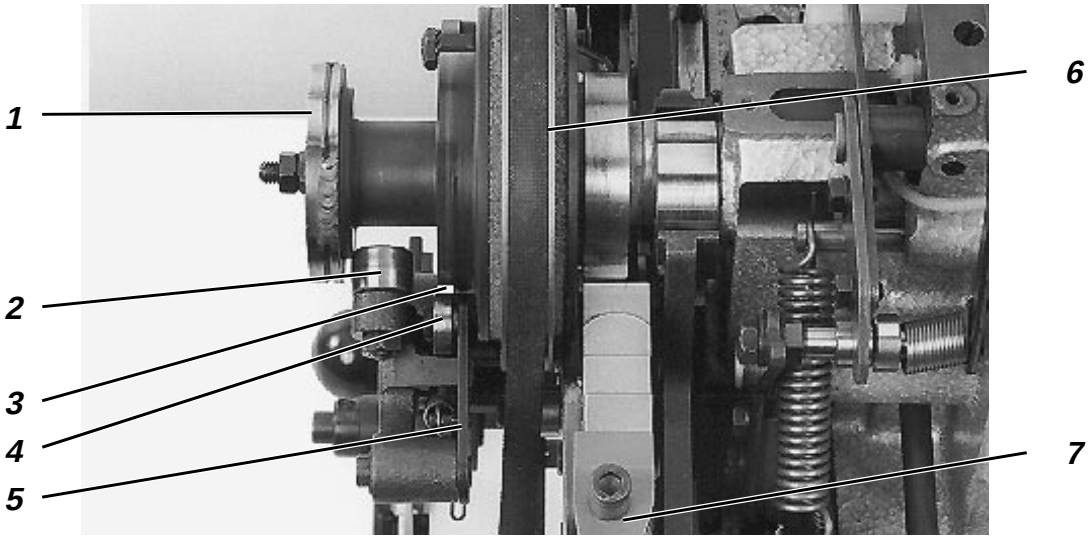
With material in place and the needle making a stitch the machine may not be advanced using the hand crank.

Caution Risk of Injury

Prior to repair, conversion and maintenance work pull the mains plug.

Adjustment work and function testing with the machine running may only be conducted with the greatest caution while observing all safety measures.

2. Handwheel

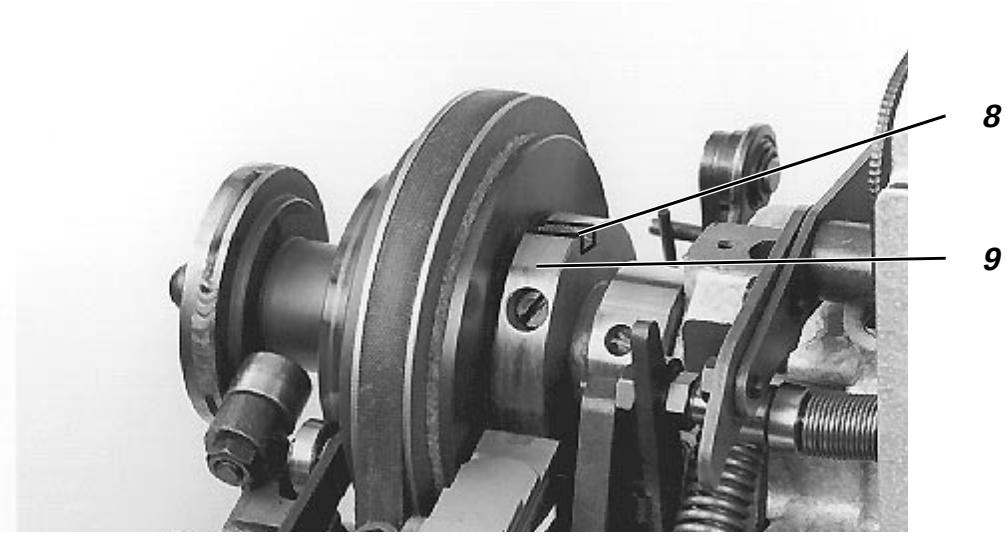


The freeing of the drive pulley 6 when turning off the machine is done by disengaging the handwheel 1.
The timing for the disengagement is determined by the switch surface 3.
The turn-off link 5 with the roller 4 lies onto the handwheel.
When reaching the switch surface it releases and the disengaging roller 2 falls in to disengage the handwheel.

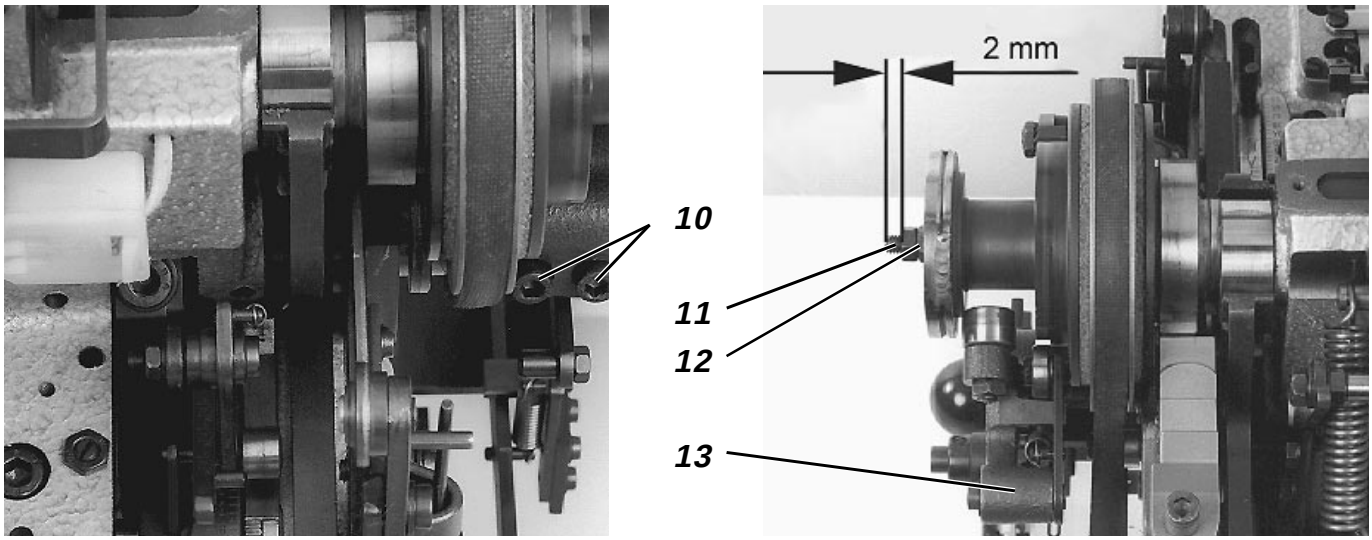
Caution Risk of Injury !

Pull the mains plug before setting.

In order that the full sewing speed not become effective at the brake lever 7, the handwheel, however, reaches the end position (needle high position) with certainty, it must be set as follows:



With the catch groove 8 of the brake cam 9 standing vertical at the top the roller 4 should lie opposite the switch surface.



- Loosen and remove lock nuts 12.
  Attention Pressure spring !
- Loosen screws 10.
- Swing the coupling lever 13 to the back.
- Pull off handwheel 1.
- Place the handwheel on the multi-key profile of the arm shaft as described.
- Reset the correct locating pressure of the handwheel.
  For this screw on lock nuts 12 so far that the threaded bolt 11 juts out about 2 mm.
- Tighten screws 10.

By deviations from the nominal speed

The above described setting of the handwheel must be changed if the motor, because of the allowable voltage range, does not reach the given nominal speed.

With **higher** sewing speed:

- Position the handwheel so that, with the above setting, the catch groove 8 of the brake cam 9 lies farther to the back.
  The turn-off position is reached **earlier**.

With **lower** sewing speed:

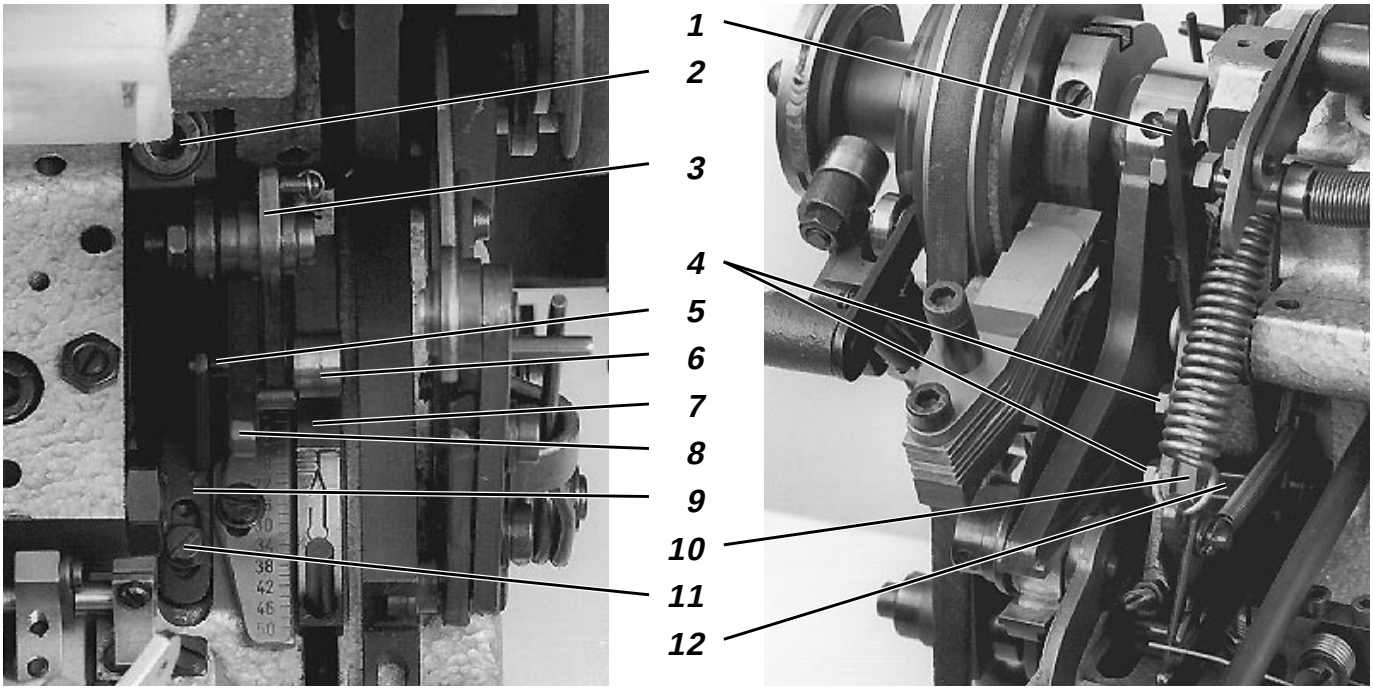
- Position the handwheel so that, with the above setting, the catch groove 8 of the brake cam 9 lies farther to the front.
  The turn-off position is reached **later**.

ATTENTION !

Danger of needle breakage and damage to the material when the quick transport is activated !
By the following setting it must be assured that the handwheel reaches the end position (Needle high position) with certainty.

Check the setting of the handwheel as well as the braking effect by repeatedly turning on the machine !

3. Turn-off Lever

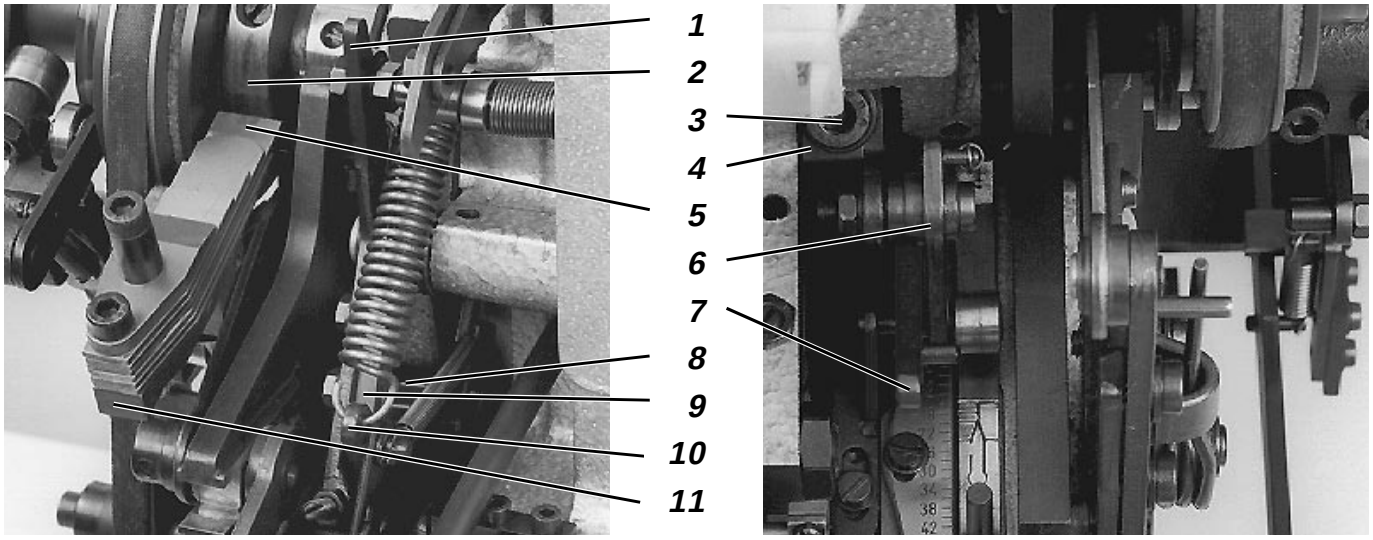


The turn-off lever 1 is set with the gauge (Order no. 558 1635).

Caution Risk of Injury !
Pull the mains plug before setting.

- Loosen screw 11.
- Set stop 9 as far forward as possible.
- Loosen screw 2.
- Press the turn-on link 3 manually to the back.
  The idle lever 8 fall downward and encompasses with its groove the pin 5.
- Hold the idle lever 8 down.
  At the same time turn the hand crank drehen until the roller 6 of the turn-on link 3 reaches the highest point of the overrun surface 7 of the length setting slide.
- Tighten screw 2 again.
- Loosen screws 4.
- Between the setting plate 10 of the turn-off lever 1 and square stone 12 set a clearance of 0.5 mm.
  Use the gauge for this.
  When the edge is worn (after a longer period of switching use) turn the square stone 90°.
  The correct position of the square stone is always shown by a groove.
- Tighten screws 4 again.

4. Brake Lever

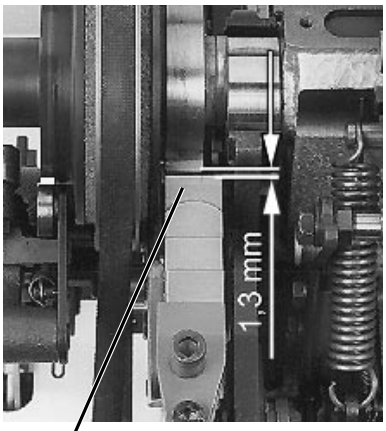


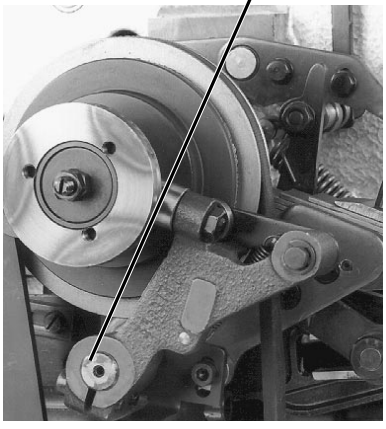
Through the brake lever 11 the handwheel is arrested in the end position of the machine (needle high position).
For this the leaf spring assembly 5 falls into the groove of the brake cam 2.

The brake lever is set with the gauges (Order no. 558 1636 for 1 mm and 558 1634 for 0.3 mm).

Caution Risk of Injury !

Pull the mains plug before setting.

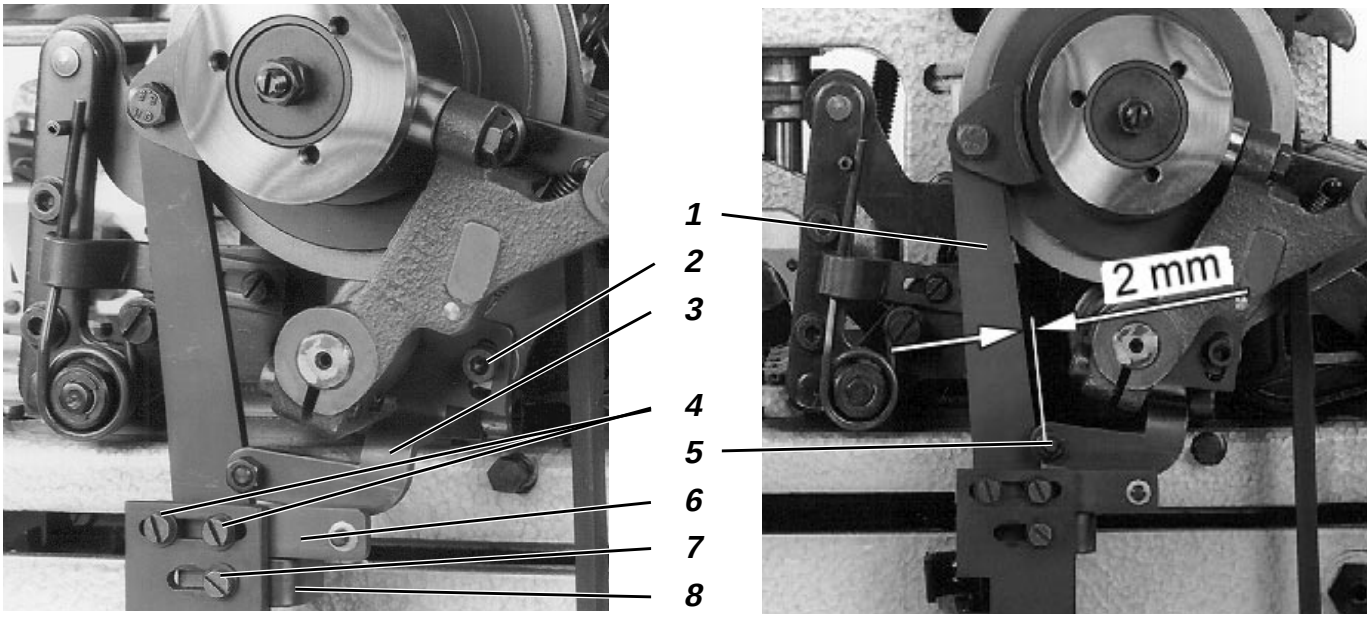




- Lift the idle lever 7.
  The turn-on link 6 jumps from the highest point of the length setting slide (see setting chapter 3).
  The square stone 8 moves under the setting plate 9 of the turn-off lever 1 and arrests the three-armed lever 10.
- Loosen attachment screw 3.
- Between leaf spring 5 of the brake lever 11 and the position of greatest eccentricity of the brake cam 2 set a clearance of 1.3 mm.
  To measure the clearance use the gauges (Order no. 558 1636 for 1 mm and 558 1634 for 0.3 mm).
- Set the brake lever tight.
  For this insert a screwdriver between the sides of the machine arm and the clamping block 4.
  Press the screwdriver to the right and hit lightly against the shaft end 12.
- Tighten attachment screw 1 again.
- Check the clearance of 0.5 mm as per chapter 3 and the dimension 1.3 mm again.

If necessary, it is essential to correct the required dimensions!

4.1 Auxiliary Brake



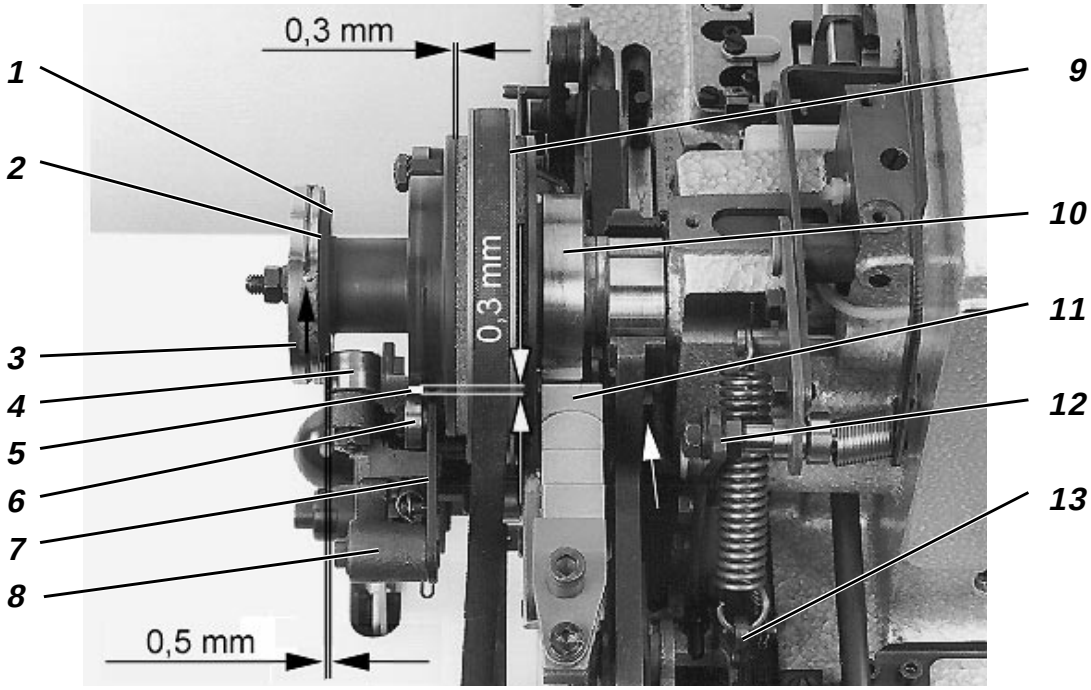
The auxiliary brake supplements the brake lever with the spring assembly for braking. A greater serviceable life of the spring assembly is thus achieved.

Caution Risk of Injury !

Pull the mains plug before setting.

- Bring the machine in the end position.
- Loosen screw 2.
- Turn the lever 3.
  The clearance between the auxiliary brake 1 and the bolt 5 should be 2 mm.
- Tighten screw 2 again.
- With the buttonhole machine turned on there must be an aip gap between brake shoe and disc.
  If necessary, reset lever 3.
- Loosen screws 4.
- Move bracket 6.
  With the spring attached to bracket 6 the braking effect of the auxiliary brake is generated.
- Tighten screws 4 again.
- Check the functioning of the auxiliary brake.
  With the braking effect set too high the buttonhole machine does not run into the end position.
- Tilt up the machine head.
- Loosen screw 7.
- Set stop 8.
  The stop 8 secures the auxiliary brake during tilting up of the machine head. It is set so that the spring of the brake lever holds with a slight drawing tension.
- Tighten screw 7 again.

5. Coupling Lever



The coupling lever is set with the gauge (Order no. 558 1634).

Caution Risk of Injury !

Pull the mains plug before setting.

- Arrest the three-armed lever 13 as described in chapter 3.
- Swing the coupling lever 8 with its roller 6 up to a distance of 0.3 mm from the handwheel 3.
  The gauge is used to measure the distance.
- Slide the coupling lever sideways so that the disengaging roller 4 juts out about 0.5 mm beyond the edge 1 of the coupling path 2.
- Tighten screws **10 (page 5)** again.

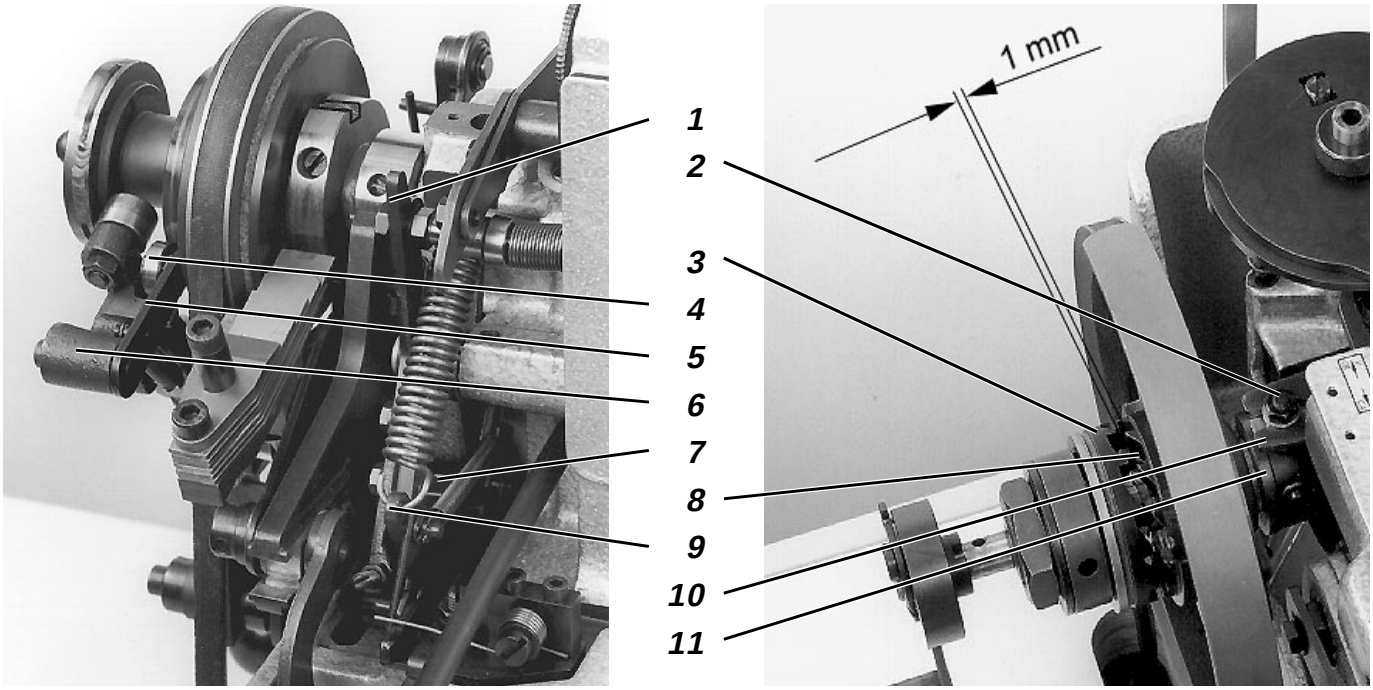
Checking the Settings:

- Pull the turn-off lever 12 in the direction of the arrow.
  The three-armed lever is released and the roller 6 lays onto the handwheel.
  There must still be an air gap between the leaf spring 11 and the position of greatest eccentricity of the brake cam 10.
- Turn the handwheel 3 farther in direction of the arrow up to the turn-off position.
  Upon reaching the switch surface 5 the turn-off link 7 is released. The disengaging roller 4 falls in the coupling path 2 and frees the drive pulley 9.
  The clearance between drive pulley 9 and handwheel 3 should be about 0.3 mm at the narrowest point.
- If necessary, correct the sideways position of the coupling lever.

Attention !

The previously set clearance between roller 6 and handwheel 3 must be retained hereby.

6. High-speed Wheel



After turning the handwheel into the turn-off position (needle high position) the catches 8 of the high-speed wheel grip in the catches 3 of the feeding shaft. The changeover from sewing to quick transport is established.

The setting of the correct clearance between the catches is made with the gauge (Order no. 558 1636).

Caution Risk of Injury !

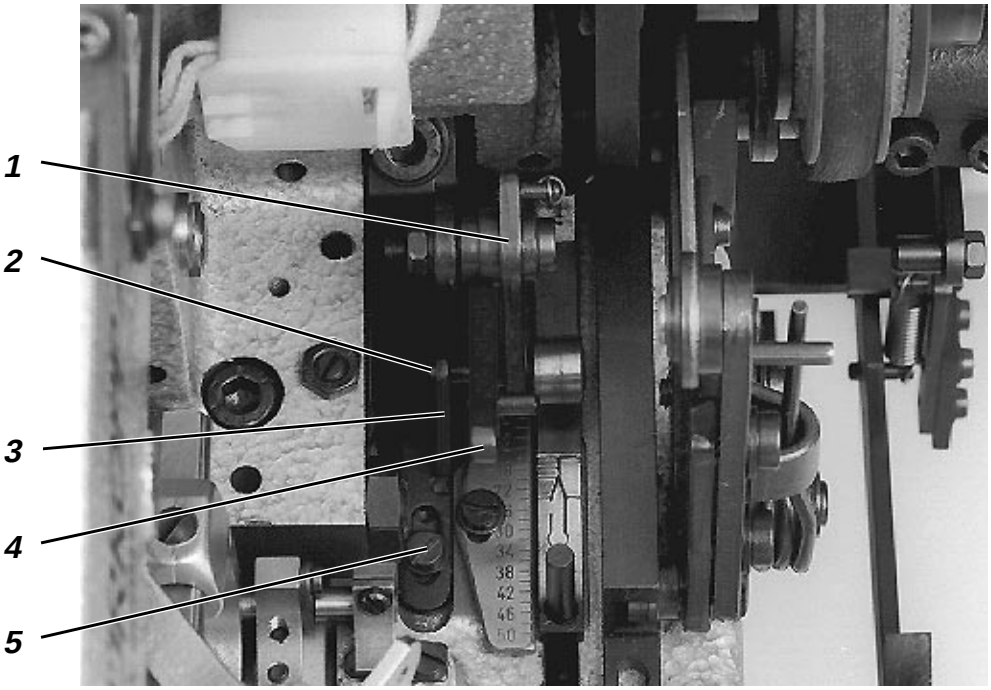
Pull the mains plug before setting.

- Press the coupling lever 6 manually so far back that the three-armed lever 9 with the square stone 7 is arrested under the turn-off lever 1.
- Pull the turn-off lever 1 forward.
  The three-armed lever 9 is released.
  The roller 4 of the turn-off link 5 lays onto the handwheel.
  The turning off of the sewing procedure is initiated.
- Loosen nut 2 on the reversing lever 10.
- Set the carrier bush 11 with the high-speed wheel.

  The clearance between the catches 8 of the high-speed wheel and the catches 3 of the feeding shaft should be 1 mm.

  Use the gauge to measure the clearance.
- Turn the handwheel to the turn-off position (needle high position). The catches grip into one another. The changeover from sewing to quick transport is established.

7. Turn-on Link with Idle Lever



For sure starting of the sewing drive the groove in the idle lever 4 must freely enclose the pin of the roller screw.
When running into the turn-off position the turn-on link 1 is pressed so far back by the stop 3 that the idle lever can fall in.

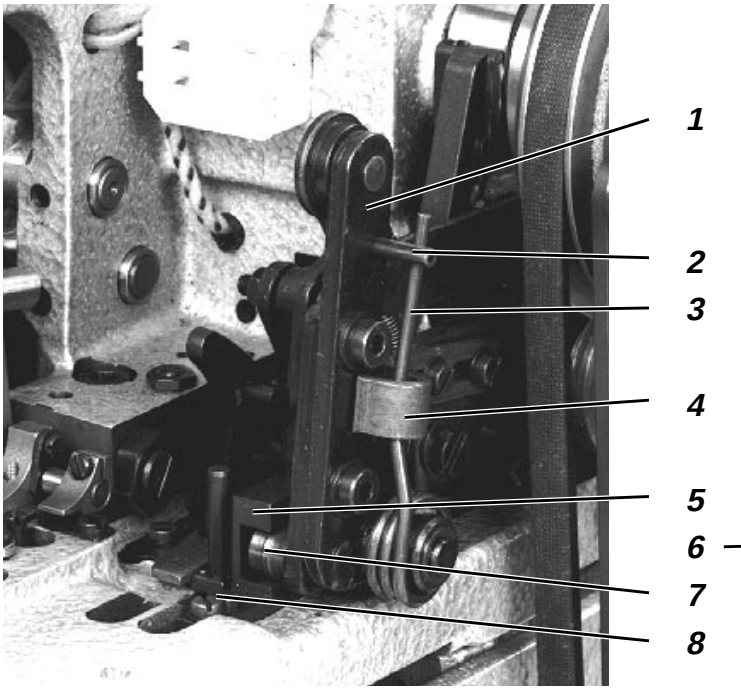
Caution Risk of Injury !
Pull the mains plug before setting.

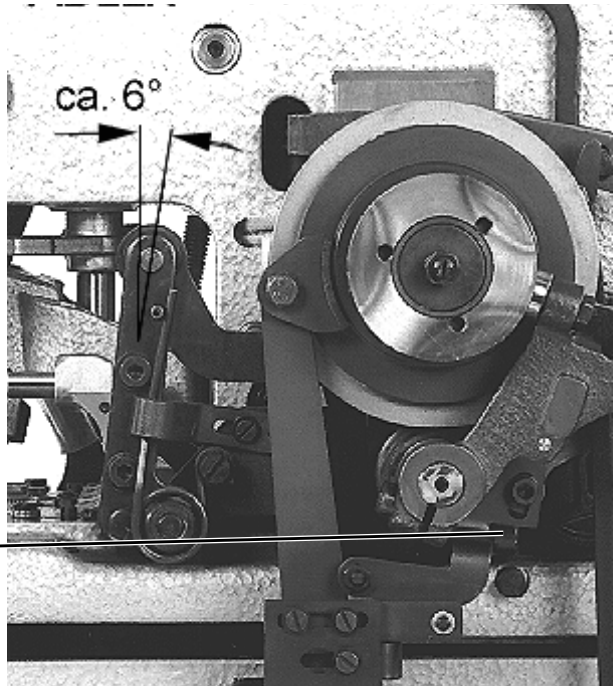
- Bring the material support plate by turning the hand crank into the **absolute end position**.
  The end position is reached when the material support plate no longer moves to the rear.
- Press the turn-on link 1 to the back.
  The idle lever 4 falls downward.
- Loosen screw 5.
- Set the stop 3 to in front of the pin 2 of the roller screw.

Attention !
The pin may not be trapped in the groove of the idle lever.

- Tighten screw 5 again.

8. Setting Lever for Stitches in the Eye



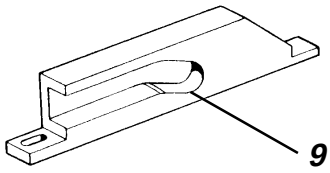


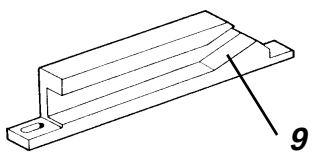
The stitches in the eye of the buttonhole can be set denser by pulling forward the stitch length regulating rail 5.

In the area of the eyes the roller 7 drops in the curved path 9 or the roller 7 is raised by the curved path 9.
Through the setting lever 1 this causes a reduced or increased transport advance of the material support plate.

Caution Risk of Injury !

Pull the mains plug before setting.

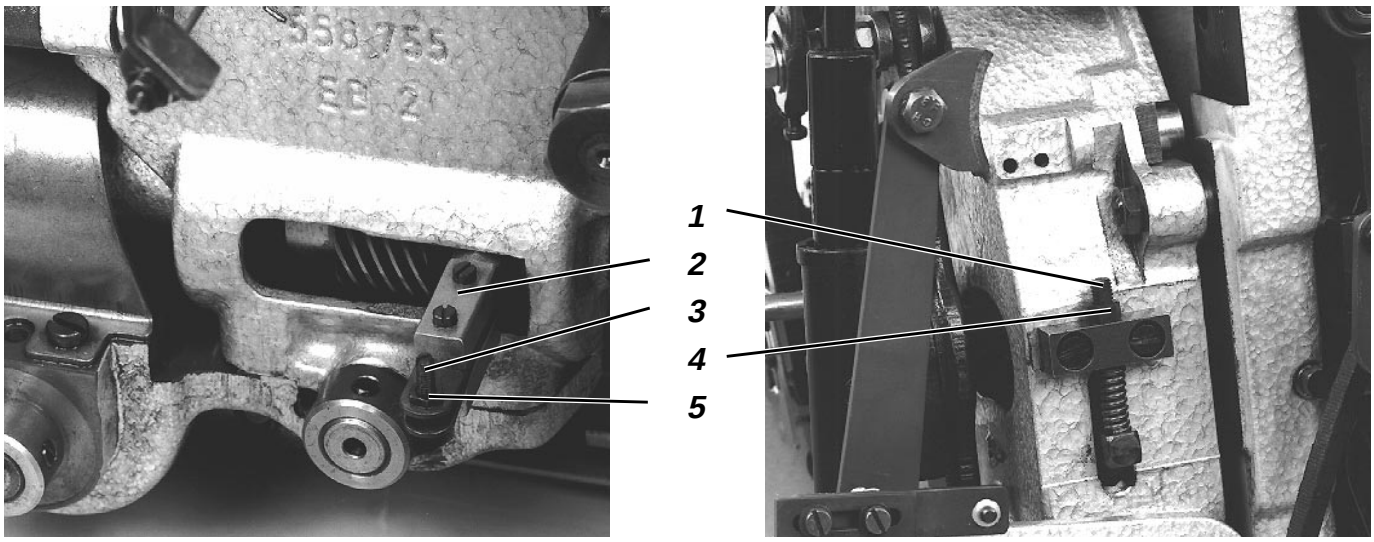




The setting occurs when the roller 7 is on the straight part of the stitch length regulating rail 5.

- Loosen screw 6.
- Set the setting lever 1 at an angle of about 6° from the vertical to the back.
- Tighten screw 6 again.
- Loosen screws 8.
- Set the spring stop 4 so that spring 3 touches the pin 2 and there is a clearance of 1 mm between spring stop 4 and spring 3.
  In this way the setting lever 1 is stabilized in its position during sewing of the two seam rows.
  When the roller 7 runs into the curved path 9 the setting lever 1 moves forward or back.
  During this movement sequence the spring stop 4 intercepts the spring pressure.

9. Brake Strap



The brake strap lies as a semi-circle around the main control disc in the forward part of the housing.

The main control disc should only be braked so much that the needle positions in both seam rows appear uniform.

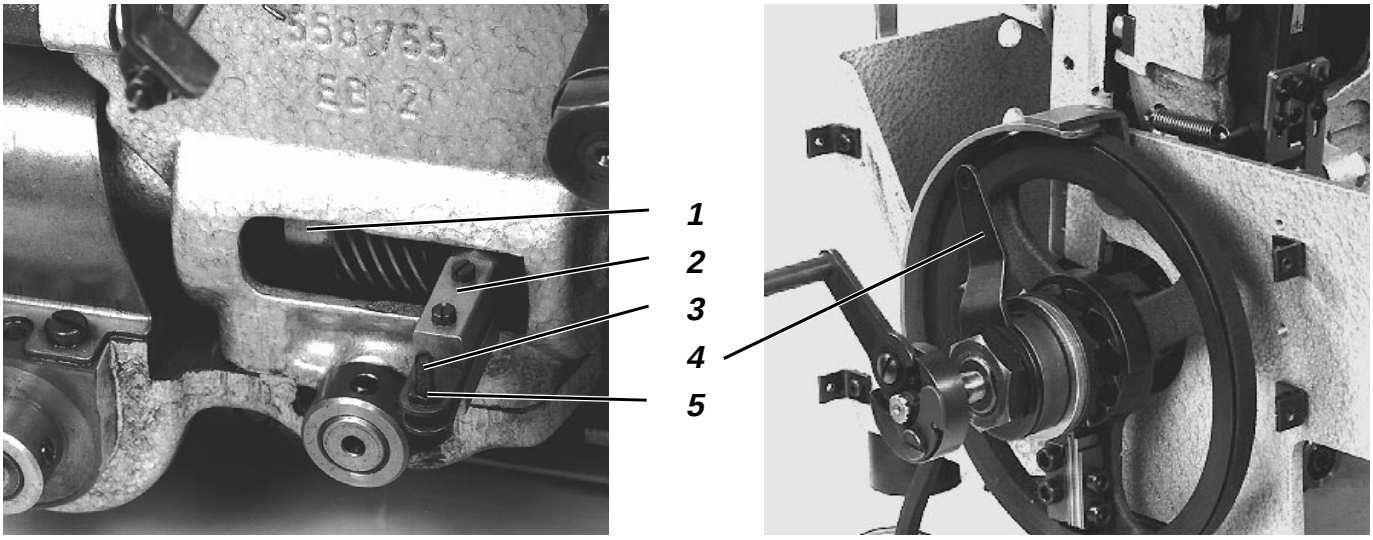
A brake strap set too loose can cause noises in the buttonhole machine.

Caution Risk of Injury !

Pull the mains plug before setting.

- Loosen lock nut 5.
- Loosen brake clamps 2.
  For this turn back the pressure screw 3.
- Loosen lock nut 4.
- With the brake strap loose run the machine through via the hand crank.
- Tighten the setting screw 1 by stages.
  At the same time check the braking effect by turning the hand crank. Normally only a very slight braking is required.
- Tighten lock nut 4 again.
- Set the brake clamps 2 as per chapter 10.

10. Brake Clamp

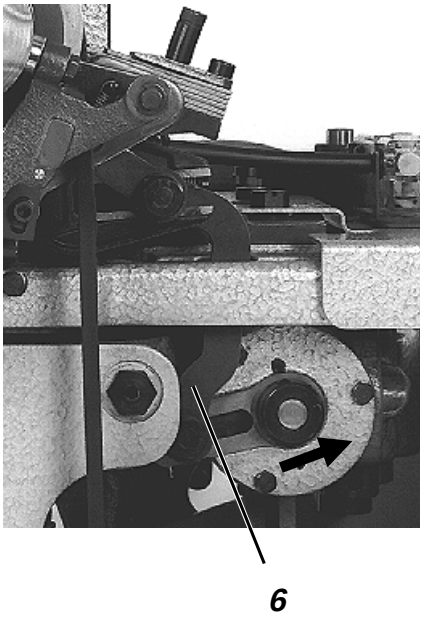


The brake clamp 2 brakes the feeding shaft 1.
The braking should thereby be only so strong that during running of the machine the transport the material support plate occurs absolutely uniform.

The setting of the braking force occurs through turning the pressure screw 3.

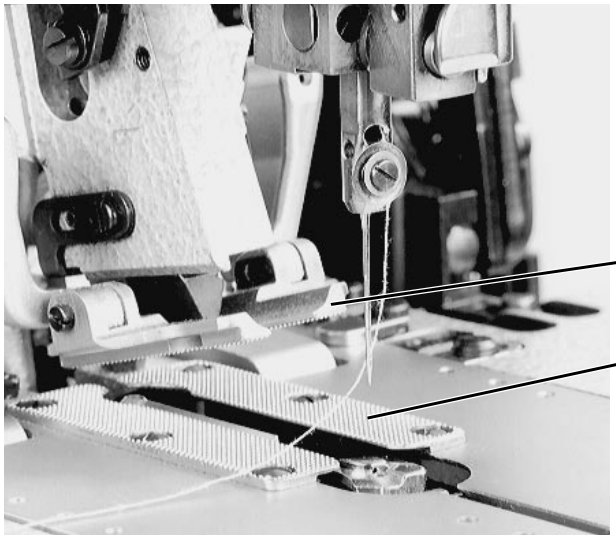
Caution Risk of Injury !

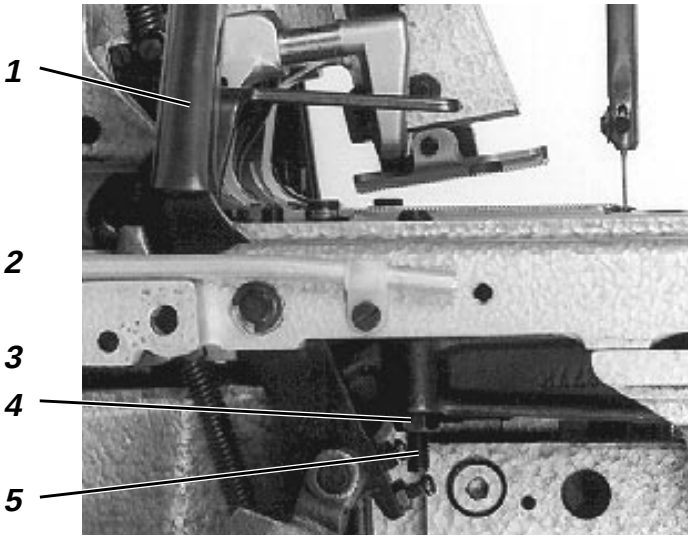
Pull the mains plug before setting.



- By sliding the transport lever 6 in direction of the arrow set the greatest transport movement of the material support plate.
- Turn the handwheel forward.
  The transport lever moves up and the transport stroke is executed.
  The lever 4 is moves onward by a certain amount.
- Turn the handwheel **to the back**.
  The transport lever moves down and the idle stroke is executed.
  This movement should have **no** effect on the feeding shaft.
  The lever 4 remains in its position !
- Set the braking force accordingly by turning the pressure screw 3.
- Tighten lock nut 5 again.

11. Cloth Clamp Height





The clearance between the upper cloth clamps 2 and the lower cloth clamps 3 should be 10 mm.

The clearance is set with the gauge 3 (Order no. 558 1633) eingestellt.

Caution Risk of Injury !

Pull the mains plug before setting.

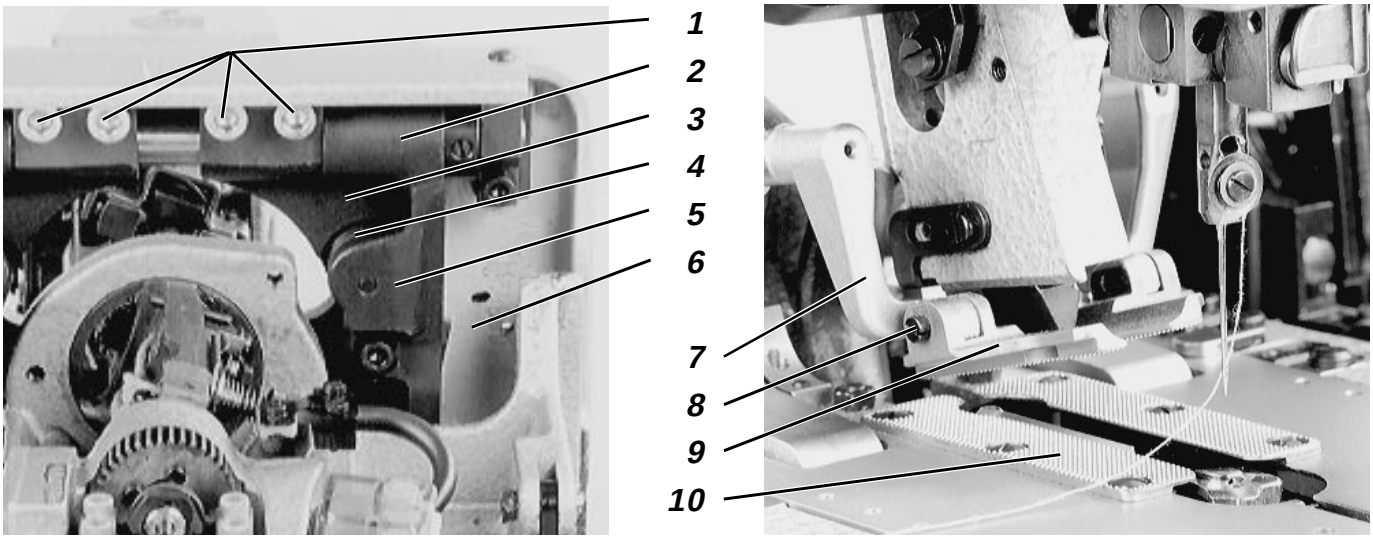
- Loosen lock nut 4.
- Place the gauge under the upper cloth clamps 2.
- Set the clearance by turning the stop screw 5.
- Tighten lock nut 4 again.

ATTENTION !

The faultless functioning of the clamp closing lever 1 is dependent on the precise settings of chapters 11 to 15.

If one of these settings is changed, then all settings for chapters 11 to 15 (in this order) must be made.

12. Cloth Clamp Pressure



Through the spring-mounted clamp frame 2 found under the material support plate the pressure of the upper cloth clamps is automatically adjusted to the material thickness.

The pressure of its compensation springs 4 is set at the factory. Normally it should not be altered.

The clearance between the upper frame piece 3 and the lower frame piece 4 should be 14.2 mm up to +0.5 mm.

The setting is only possible with clamp frame removed.

The cloth clamp pressure must be set so that even the thinnest material to be sewn is still securely clamped.

Caution Risk of Injury !

Pull the mains plug before setting.

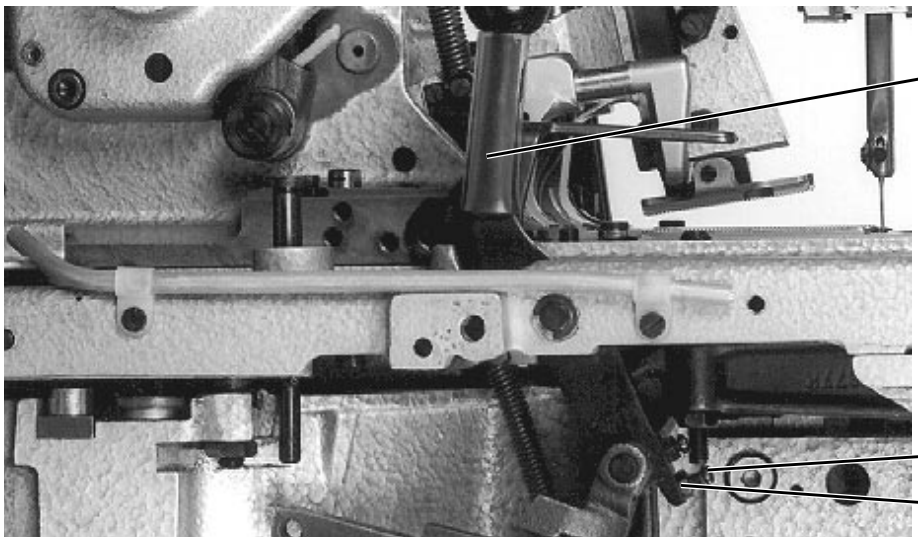
- Remove the upper cloth clamps 7 after loosening the mounting screws 8.
  Caution ! Do not lose the spring washers lying inbetween.
- Loosen the four attachment screws 1.
- Hold the clamp operating lever in the rear position.
- Place a 4 mm thick item between the clamp bracket 7 and the lower cloth clamps.
- Pull the cClamp operating lever forward to the stop.
- Tighten the four attachment screws 1 uniformly.
  The clamp pressure for a normal setting is made.
- Screw the upper cloth clamps 7 on again.
  Thereby place the spring washers inbetween.

ATTENTION !

The flawless functioning of the clamp closing lever is dependent on the precise settings of chapters 11 to 15.

If one of these settings is changed, then all settings for chapters 11 to 15 (in this order) must be made.

13. Pressure Point of the Clamp Operating Lever



In order to prevent a jumping up of the upper cloth clamps during sewing the clamp operating lever 1 must be set a little beyond its strongest pressure point.

Exceeding the pressure point too much can result in:

- Unwanted weakening of the cloth clamp pressure.
- The cloth clamps are no longer opened automatically by the clamp closing lever.

Setting and checking is to be conducted with the clamping plates in place.

Caution Risk of Injury !

Pull the mains plug before setting.

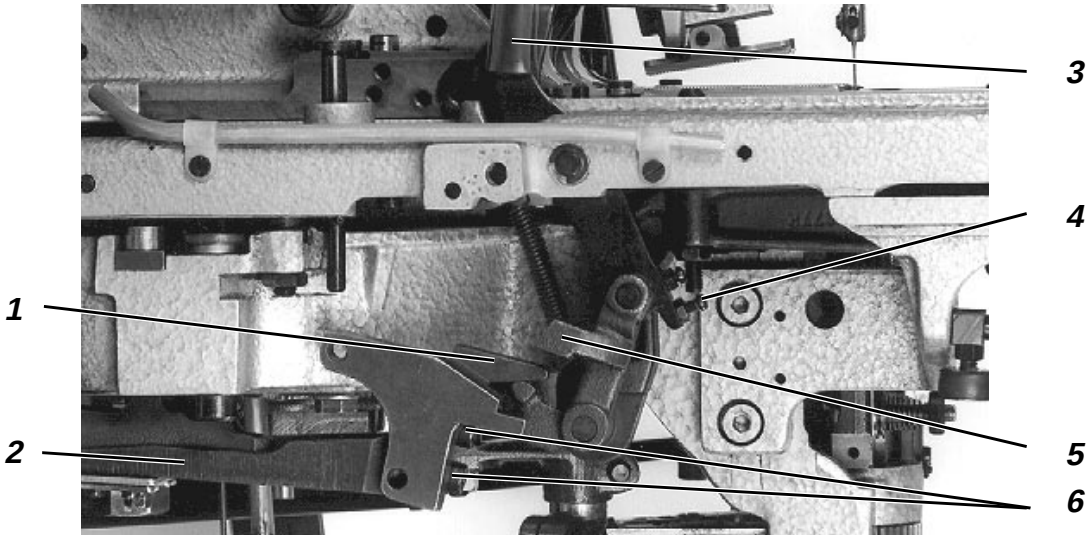
- Loosen lock nut 3.
- By turning the setting screw 1 suitably set the pressure point.
- Tighten lock nut 3 again.
- Check the cloth clamp pressure (see chapter 12).

ATTENTION !

The settings of the pressure point and the cloth clamp pressurees are interdependent.

If one of these settings is changed, then all settings for chapters 11 to 15 (in this order) must be made.

14. Pressure of the Clamp Closing Lever



When starting the sewing procedure the upper cloth clamps are automatically closed by the movement of the clamp closing lever 3.

The clamp operating lever 2 must thereby be moved with certainty in front of the stop screw 4.
For this in the lowest position of the closer 1 there must be a clearance of 0.1 mm between it and the angle lever 5.

Caution Risk of Injury !

Pull the mains plug before setting.

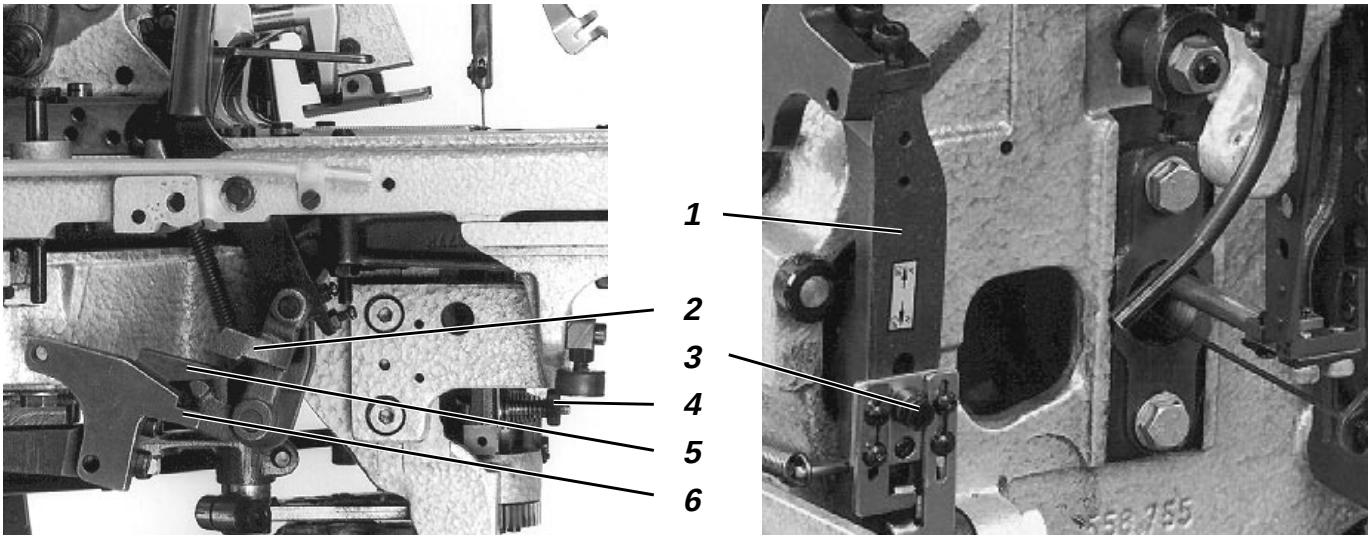
- Turn the hand crank until the closer 1 reaches its lowest position.
- Loosen screws 6.
- Set a clearance of 0.1 mm between closer 1 and angle lever 5.
- Tighten screws 6 again.

ATTENTION !

The flawless functioning of the clamp closing lever is dependent on the precise settings of chapters 11 to 15.

If one of these settings is changed, then all settings for chapters 11 to 15 (in this order) must be made.

15. Position of the Clamp Closing Lever



On the clamp closing lever 1 are to be found the closer 5 for automatic closing and the tappet 6 for automatic opening of the clamping plates.

Depending on the execution of the Sewing machine for

a) cutting after sewing

b) vor and cutting after sewing

different settings of the clamp closing lever become necessary.

Caution Risk of Injury !

Pull the mains plug before setting.

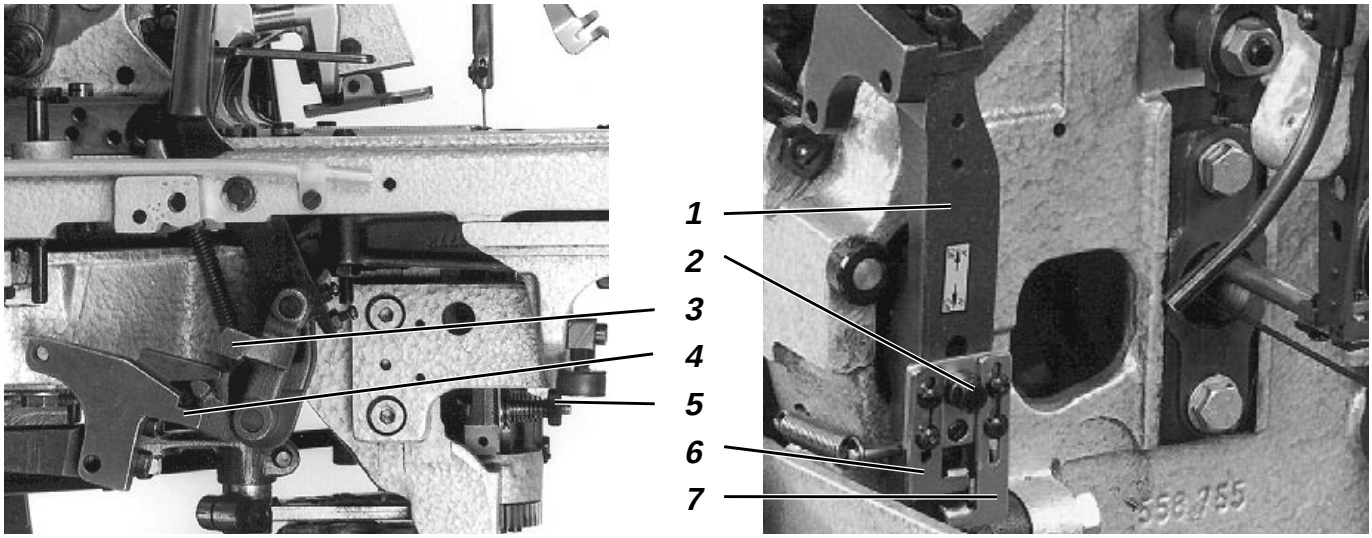
a) Cutting after sewing

- With clamping plates closed turn the sewing machine out of the end position with the hand crank until the hook block has turned 180°.
  In this position the underthread tension 4 points to the rear (shown in the picture to the front).
- Turn farther until the cutter bar lowers and the cutting block lies above the knife.
- Loosen screw 3.
- Set the tappet 6 tight on the angle lever 2 by pulling up on the clamp closing lever 1.
- Tighten screw 3 again.

ATTENTION !

The flawless functioning of the clamp closing lever is dependent on the precise settings of chapters 11 to 15.

If one of these settings is changed, then all settings for chapters 11 to 15 (in this order) must be made.



b) Cutting before and after sewing

By sewing machines laid out for cutting before and after sewing two cams on the main control disc control the movement of the clamp closing lever.

The first cam in the direction of turn conducts the closing movement for cutting before sewing and the second cam for cutting after sewing. Two stops, between which the clamp closing lever can be adjusted, limit the positions.

Caution Risk of Injury !

Pull the mains plug before setting.

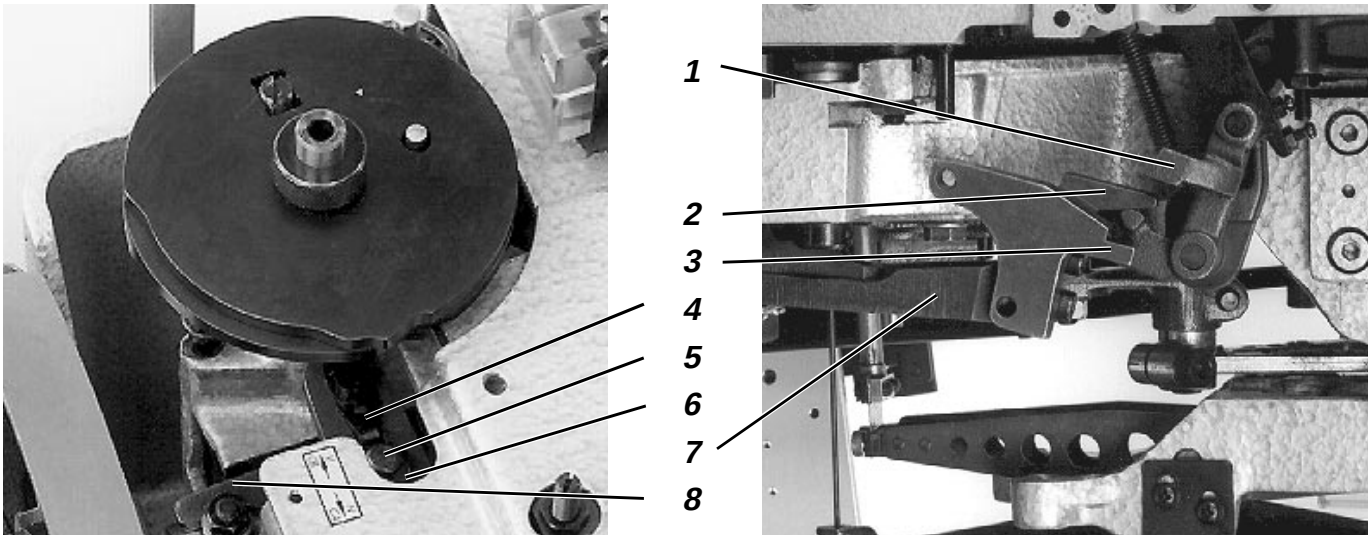
- With clamping plates closed turn the sewing machine out of the end position with the hand crank until the hook block has turned 360°.
  In this position the underthread tension 5 points to the front.
- Move stop 6 in direction N (see sticker) until touching.
- Turn the sewing machine out of the end position with the hand crank until the hook block has turned 360°.
  In this position the underthread tension 5 points to the front again.
- Turn a bit farther until the closing movement of the clamp closing lever downward starts (for cutting before sewing).
- Turn farther until the clamp closing lever moves upward again. With the upwards movement the tip of the tappets 4 must move past as close as possible to the tip of the angle lever 3. The two tips may not, however, thereby touch.
- Loosen screw 2.
- Set clamp closing lever 1 appropriately.
- Tighten screw 2 again.
- Bring stop 7 to touching in direction V (see sticker).

ATTENTION !

The flawless functioning of the clamp closing lever is dependent on the precise settings of chapters 11 to 15.

If one of these settings is changed, then all settings for chapters 11 to 15 (in this order) must be made.

16. Machine End Positions



The turning off in each of the end position occurs via the turn-off bolt 11 which is released by the reversing lever 8 of the high-speed wheel.

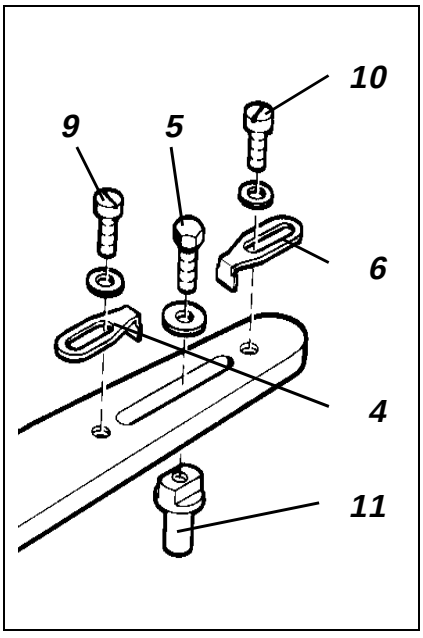
The timing for release of the high-speed wheel is determined by the settings cutting before or after sewing.

Caution Risk of Injury !

Pull the mains plug before setting.

a) Cutting before sewing

The turn-off bolt 11 should release the high-speed wheel via the reversing lever 8 when the machine is shortly before a new cutting procedure. The clamp closing lever 7 must be set to " cutting before sewing ".



– Turn the hand crank until the cutter bar starts to move downward. In this setting the clamp closing lever 7 must have moved so far downward that, with open clamping plates, there is a clearance of about 4 mm between the closer 2 and the angle lever 1.
This clearance is absolutely essential for closing so that the edge of the angle levers 1 can glide on the surface of the tappet 3 and not be blocked in front of it.

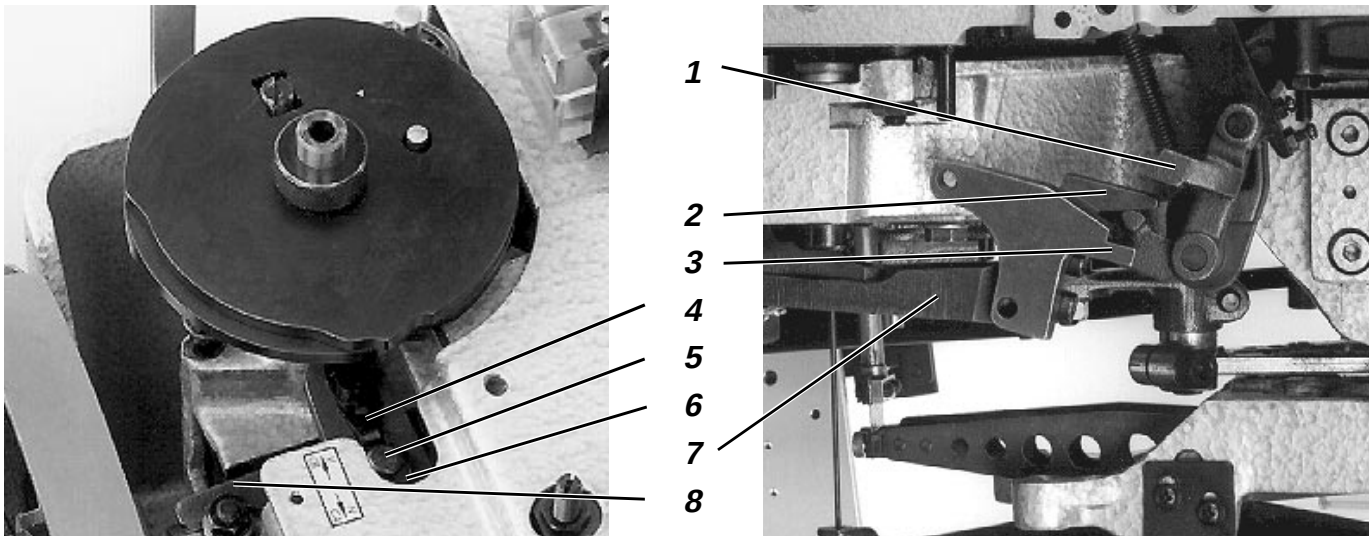
– Loosen screw 5 and set the turn-off timing by adjusting the turn-off bolt 11:

Machine switches too early - Turn-off bolt farther forward
Machine switches too late - Turn-off bolt farther to the back

– Tighten screw 5 again.

– Give the machine a run through and check the setting.

– To arrest the setting pull stop 6 up to the turn-off bolt 11 and screw tight.

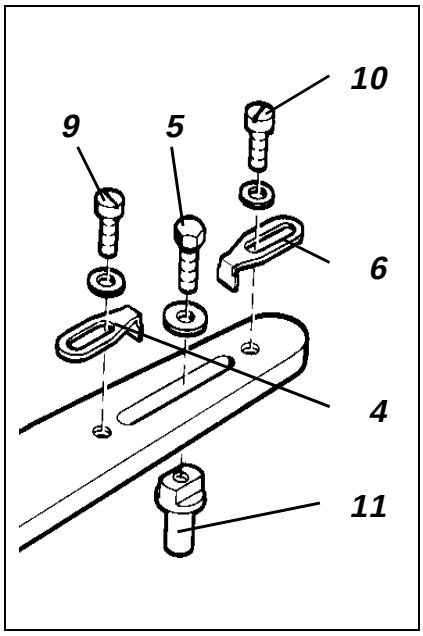


b) Cutting after sewing

The turn-off bolt 11 should release the high-speed wheel via the reversing lever 8 when the cutting procedure is ended, this means, when the cutter bar is in its highest position. The clamp closing lever 7 must be set to " cutting after sewing ".

Caution Risk of Injury !

Pull the mains plug before setting.

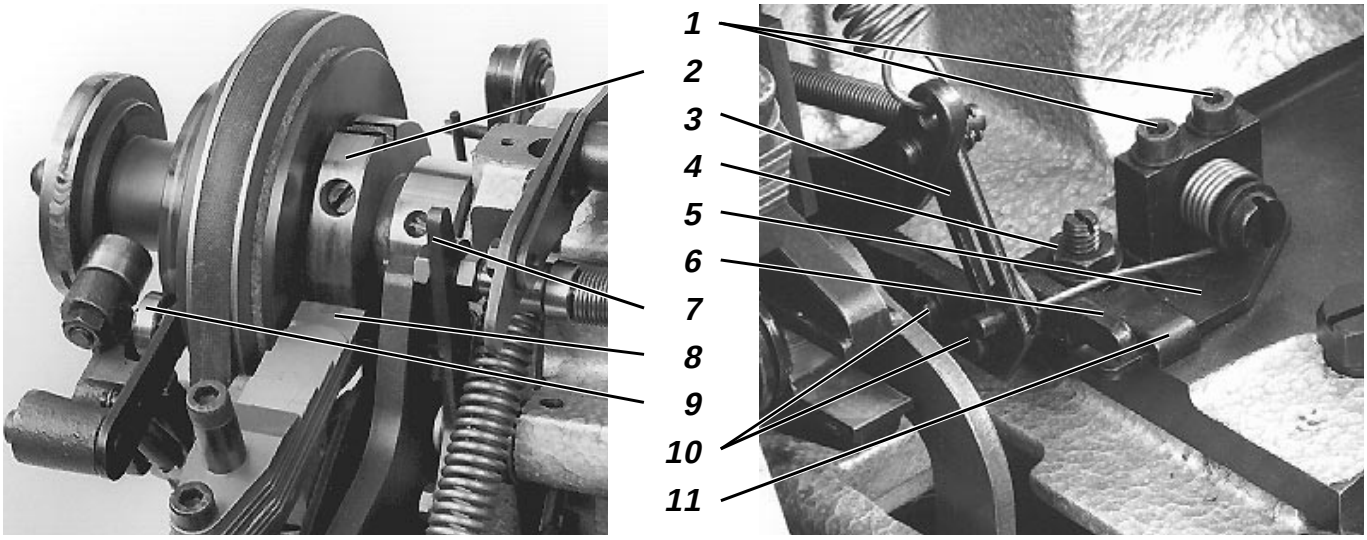


- Turn the hand crank until the cutter bar is in its highest position. In this setting, with open clamping plates, there must be a clearance of about 4 mm between the closer 2 and the angle lever 1.
- Loosen screw 5 and set the turn-off timing by adjusting the turn-off bolt 11:

  Machine switches too early - Turn-off bolt farther forward
  Machine switches too late - Turn-off bolt farther to the back

- Tighten screw 5 again.
- Give the machine a run through and check the setting.
- To arrest the setting pull stop 4 up to the turn-off bolt 11 and screw tight.

17. Changeover Protection



The changeover protection prevents the switching of the machine from sewing to quick transport before the needle is in the high position.

Damage to the needle and material are thus avoided.

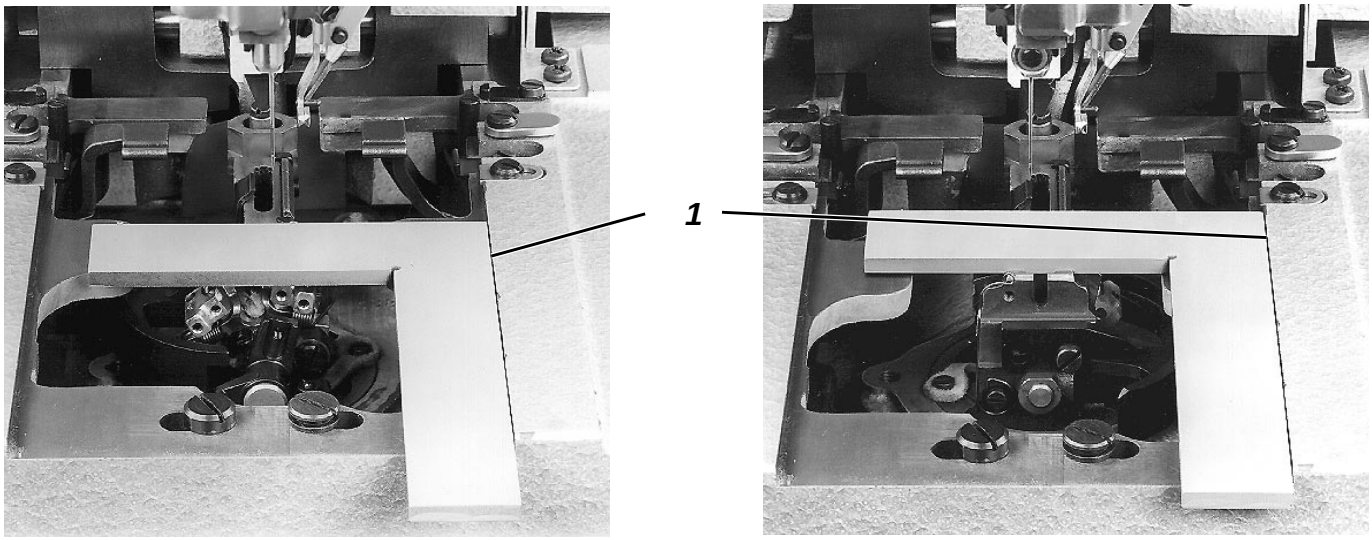
Caution Risk of Injury !

Pull the mains plug before setting.

- Loosen lock nut 4
- Move the securing angle 11 off of the interlock 5.
- Loosen screws 1.
- Set the interlock 5 so far to the back that the lever 6 with its cutout lay onto the interlock 5.
- Pull the turn-off lever 7 forward.
  The roller 9 lays onto the handwheel. The turning off of the sewing procedure is initiated.
  In this setting the lever 6 must stop in front of interlock 5. Between the catches on the high-speed wheel there is a clearance of 1mm (see chapter 6.).
- Push interlock 5 against lever 6.
- Tighten screws 1.
- Turn the handwheel until it catches.
  The brake spring 8 lies in the groove of the brake cam 2.
  In this setting lever 6 must have lifted from interlock 5.
  The catches on the high-speed wheel must have fallen in place.

  A higher lift of the lever 6 is achieved by adjusting the bracket 3.
  For this loosen screws 10 and then tighten again.
- Set the securing angle 11 tight and tighten the lock nut 4.
- Run the machine through manually and check the setting.

18. Squaring of the Hook Block to the Material Support Plate

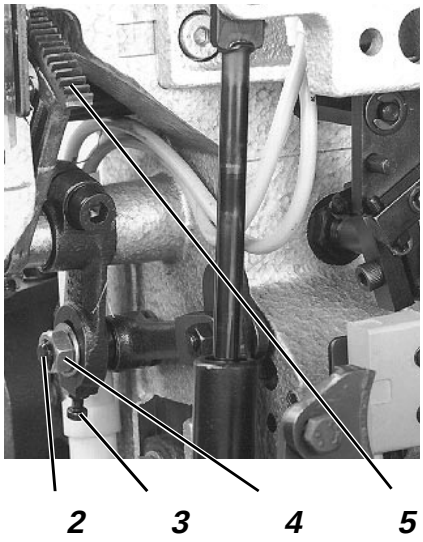


The hook block must, during sewing of both buttonhole rows, thus also after it turns in the buttonhole eye by 180°, lit **at a right angle** to edge 1 of the material support plate.

The measurement is made with an angle. It should not be made in the end position, but rather in the middle of the right and left buttonhole seam.

Caution Risk of Injury !

Pull the mains plug before setting.



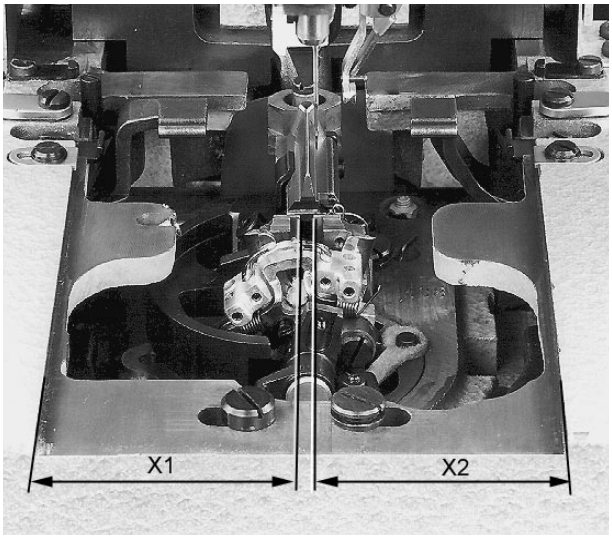
- Remove the clamping plates.
- Close the clamp operating lever.
- Remove the spreader stops, spreader and hook.
  Remove the cutting knife, Cutting block and needle plate.
- Turn on the main switch.
- Turn on the machine and turn off again with the hand switching lever when about half of the right buttonhole seam has been sewn.
- Place the angle on the hook block and check the angle setting to edge 1 of the material support plate.
- Turn on the machine again and, after the turning of the hook block, stop about in the middle of the left buttonhole seam.
  The turning movement of the hook block must be exactly 180°.
- Loosen nut 4 and, by setting the bolt 5 higher or lower, set the exact half rotation.
- Check the right angle in both positions of the hook block through a trial run and correct if necessary. korrigieren.
- Loosen the screw on the toothed quadrant 5.
- Set the toothed quadrant 5 so that the hook block lies precisely in a right angle to edge 1.

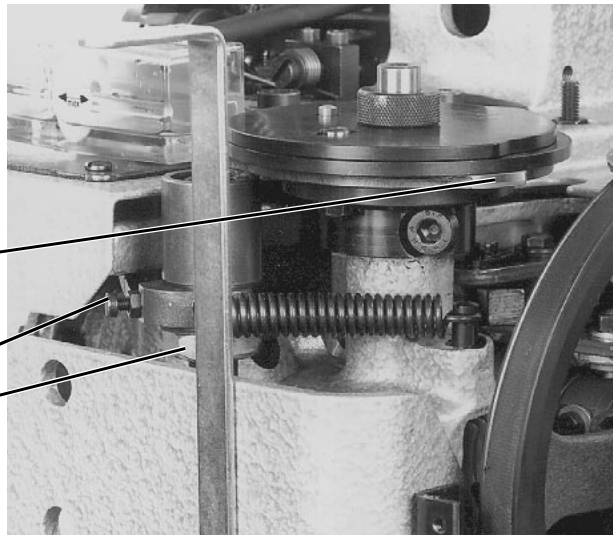
ATTENTION !

The toothed quadrant 4 must, in both positions of the hook block, grip with an equal number of teeth into the spur wheel.

- With an incorrect insertion swing out the toothed quadrant and reset.

19. Material Support Plate





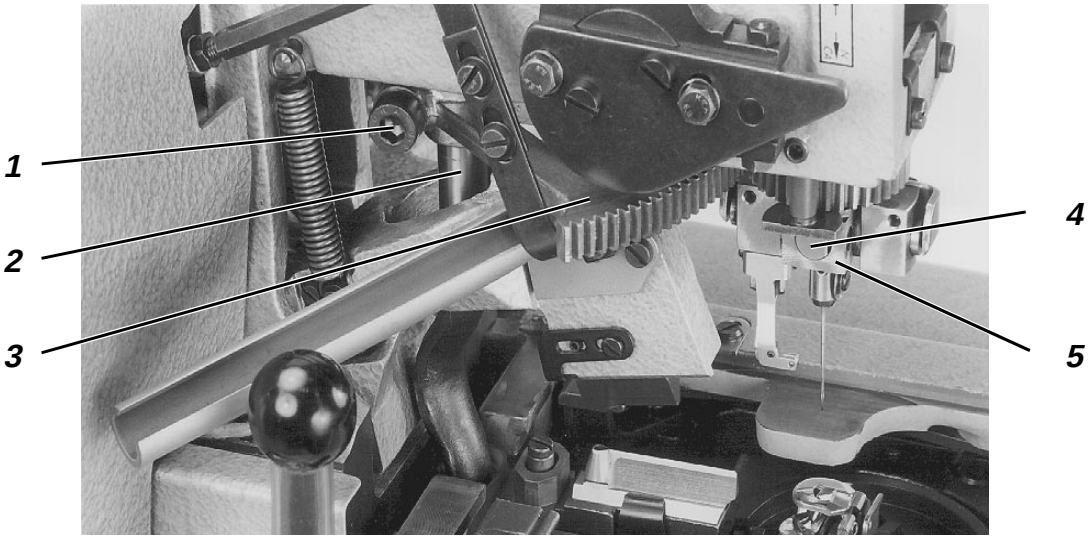
The clearances X1 and X2 between the edges of the material support plate and the hook block must be equal.

Caution Risk of Injury !

Pull the mains plug before setting.

- Turn the machine out of the end position.
  The roller bolt should not be on the cam 1.
- Remove the needle plate and run the machine until in the turn-off position.
- Measure and compare the clearances X1 and X2.
- With unequal clearances loosen the nut 3.
- Set the roller bolt by turning the setting screw 2 accordingly.
- Tighten nut 3 again.
- Run the machine through and check the setting again **outside** of the end position.
- Lock setting screw 2.

20. Upper Toothed Quadrant



Previous to the setting of the upper toothed quadrant 3 the settings per chapters 17, 18 and 19 must be checked and made corrected.

The pendulum movement of the needle bar should occur precisely at a right angle to the material support plate.

Caution Risk of Injury !

Pull the mains plug before setting.

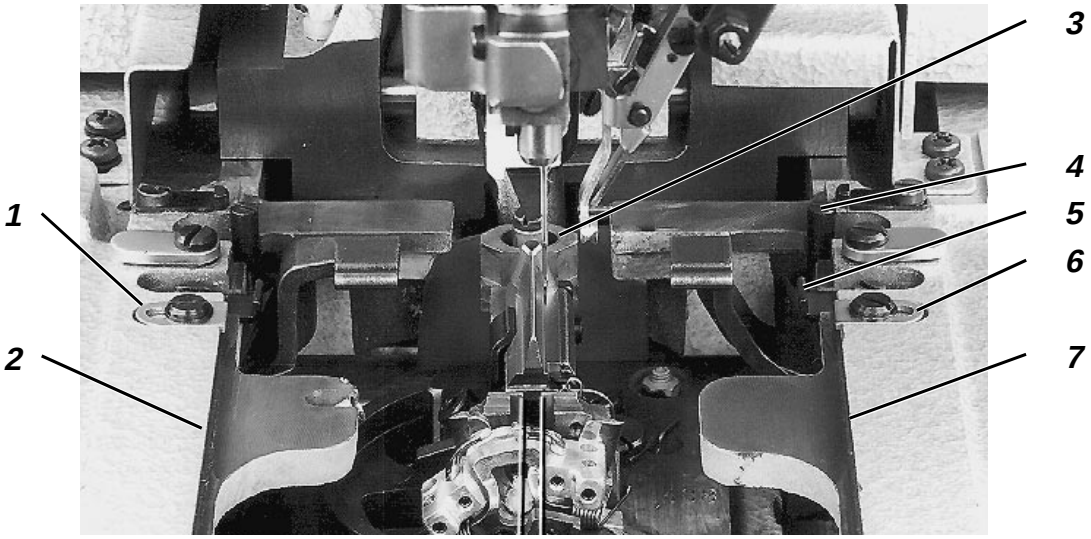
- Loosen screw 1.
- Turn the toothed quadrant 3 on axle 2 so that the swing sleeve 5 lies parallel to the edge of the material support plate.
- Tighten screw 1 again.
- Turn on the main switch and let the machine run through.
- For checking place a slide gauge or ruler on the swing sleeve 5. Attention ! Do not place the slide gauge or ruler over bolt 4.

ATTENTION !

Analogous to the lower toothed quadrant, the upper toothed quadrant's tooth insertion must be equal in both end positions when the swing sleeve lies parallel to the material support plate.

21. Clamping Plates

21.1 Setting Parallel to the Material Support Plate



The clamping plates should lie parallel to the edge 2 and 7 of the material support plate.

Caution Risk of Injury !

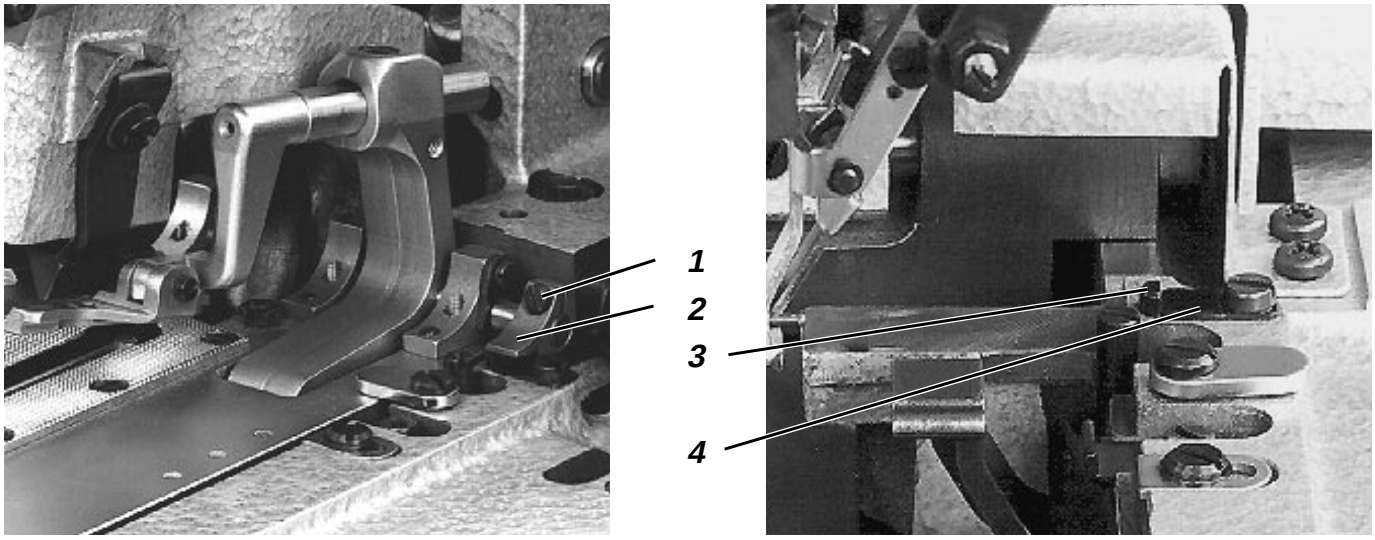
Pull the mains plug before setting.

- Place the right clamping plate on the material support plate.
- Set the stopper piece 6 back.
- Loosen screw 4.
- Press the clamping plate so far to the right until it lay onto the edge 7 of the material support plate along the whole length.
- In this position press screw 4 onto the clamping plate and screw tight.
- If the clamping plate moves back up to the stop 5 then there must be an equal clearance between it and the edge 7 along the whole length.
- Set the left clamping plate in the same way.

21.2 Setting the Stopper Pieces

- Place both clamping plates.
- Turn the hand crank until the rollers under the clamping plates are at the highest point of the spreading block 3. Both clamping plates are spread sideways in this position.
- Align the clamping plates sideways on the material support plate so that an equal clearance exists to the left edge 2 and to the right edge 7.
- Set the stopper pieces 1 and 6 tight to the clamping plates and tighten the screws again.

21.3 Setting the Securing Blocks

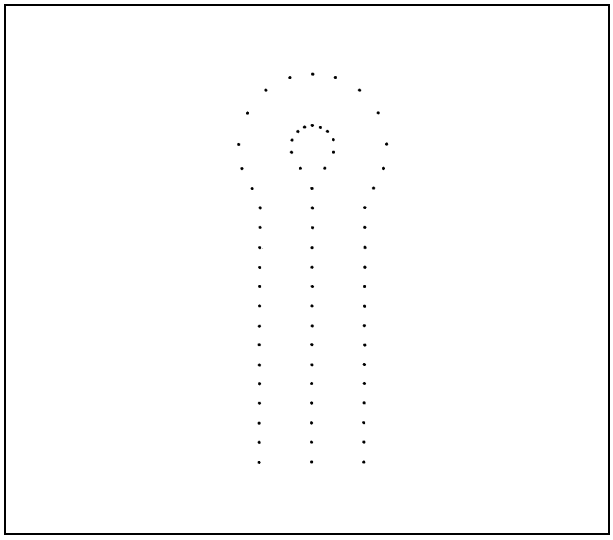


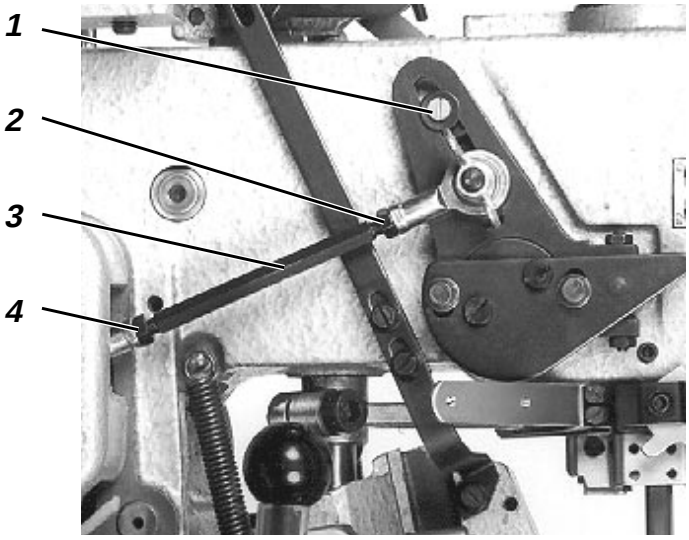
The securing blocks 2 prevent a sliding of the clamping plates out of their spread positions during the cutting and sewing procedures.

Caution Risk of Injury !
Pull the mains plug before setting.

- With closed and spread clamping plates loosen screws 1.
- Bring the securing blocks 2 into contact with bracket 4 and the spring-mounted catch bolt 3. The securing blocks should, however, exert no pressure on the bracket thereby.
- Screws 1 again.
- Repeat the spreading procedure with closed clamps.
  The spring-mounted catch bolt 3 must thereby jump in front of the securing blocks 2.
- Check if the securing blocks 2 can move unhindered over catch bolt 3 with open clamping plates.

22. Neutral Needle Position





The neutral needle position lies to the left, that is, the swing of the needle bar is one-sided. During sewing of the right buttonhole seam it is conducted from left to right.

When changing over from the smallest to the greazest buttonhole width only the position of the stitches lying to the outside may change. The position of the stitches lying to the inside must remain unchanged.

Caution Risk of Injury !

Pull the mains plug before setting.

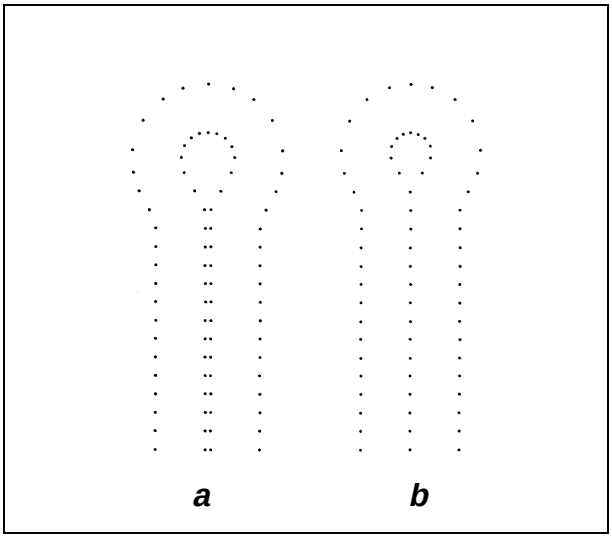
- Punch the seam pattern for the smallest and greatest buttonhole width onto a thin cardboard with a short needle.
- If the inner stitches for smallest and greatest buttonhole width are not congruent loosen nuts 2 and 4.
  Attention ! Nut 4 has a lefthanded thread.
- Twist the tiebar 3 until the inner stitches are congruent.
- Tighten nuts 2 and 4 again.

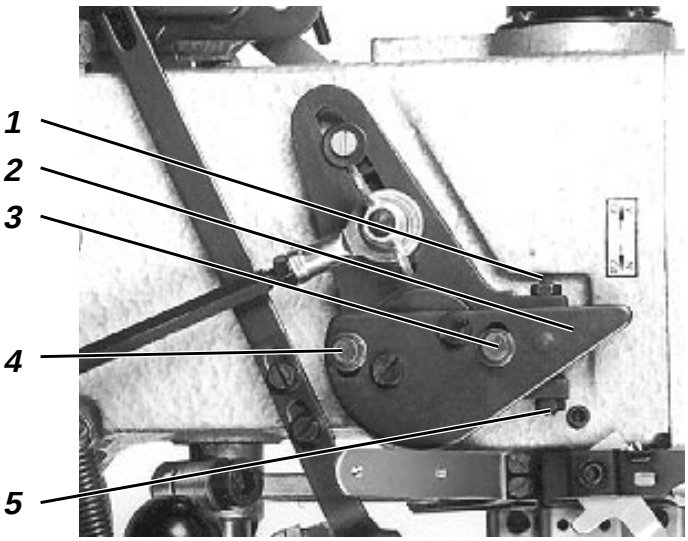
ATTENTION !

The setting of screw 1 limits, dependent on sewing device, the smallest and greatest buttonhole width.

It may not be adjusted !

23. Cutting Room Between the Two Seam Rows





By machines that **cut before sewing** the interior stitches must be precisely congruent (see illus. **b**).

By machines that **cut after sewing** there must be a small cutting room between the two seam rows for the knife cut (see illus.**a**).

The cutting room required for different materials can be found in the Device Summary Table in chapter 1.4 of the Operating Instructions.

Caution Risk of Injury !

Pull the mains plug before setting.

– Punch the seam pattern into a thin cardboard with a short needle.

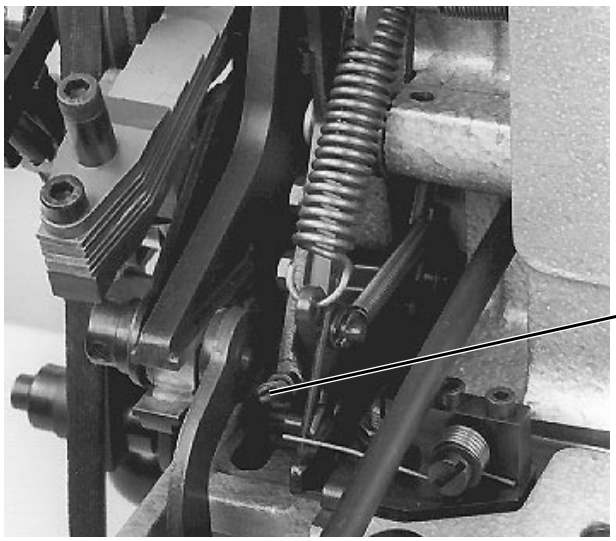
Machine for cutting after sewing

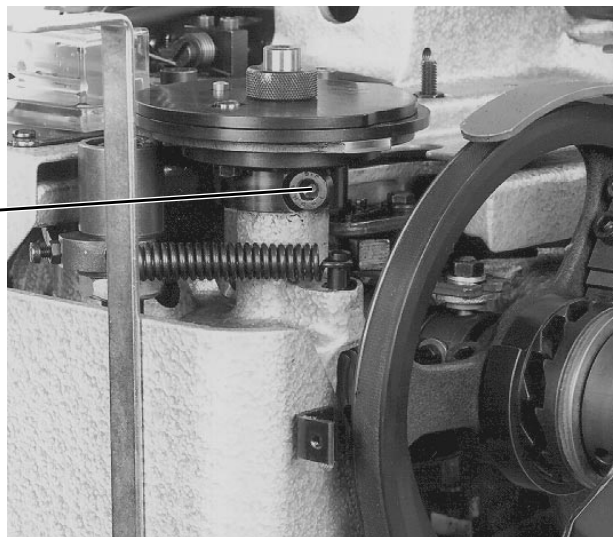
– Loosen screws 3 and 4.
– Set the interior stitches apart with the setting screws 1 and 5 for the appropriate cutting room (see illus. **a**).
– Lock setting screws 1 and 5.
– Tighten screws 3 and 4 again.

Machine for cutting before and after sewing

– Loosen screws 3 and 4.
– First set the interior stitches congruent with the setting screws 1 and 5.
– Lock the upper setting screw 1.
– For setting of the cutting room turn back the lower setting screw 5 a suitable amount.
– Press lever 2 down.
– Tighten screws 3 and 4.
– Check the setting of the cutting room by sitching into cardboard.
– After the setting is correct lock the lower setting screw 5.
– After the loosening of the screws 3 and 4 the lever 2 can now be positioned to touching at the top for cutting before and to touching at the bottom for cutting after sewing.

24. Symmetrical Eye Form and Uniform Length of the Buttonhole Seam

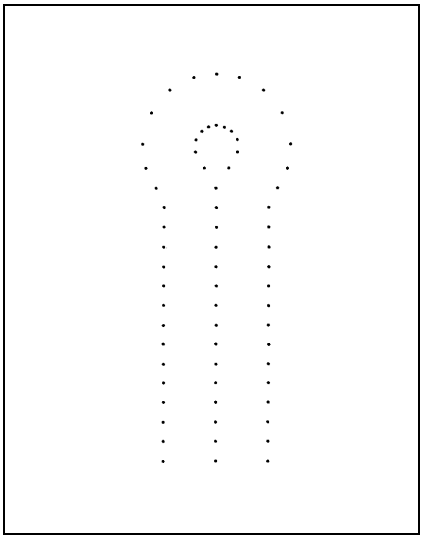




Both seam rows should be of equal length and the buttonhole eye should appear circular.

Caution Risk of Injury !

Pull the mains plug before setting.



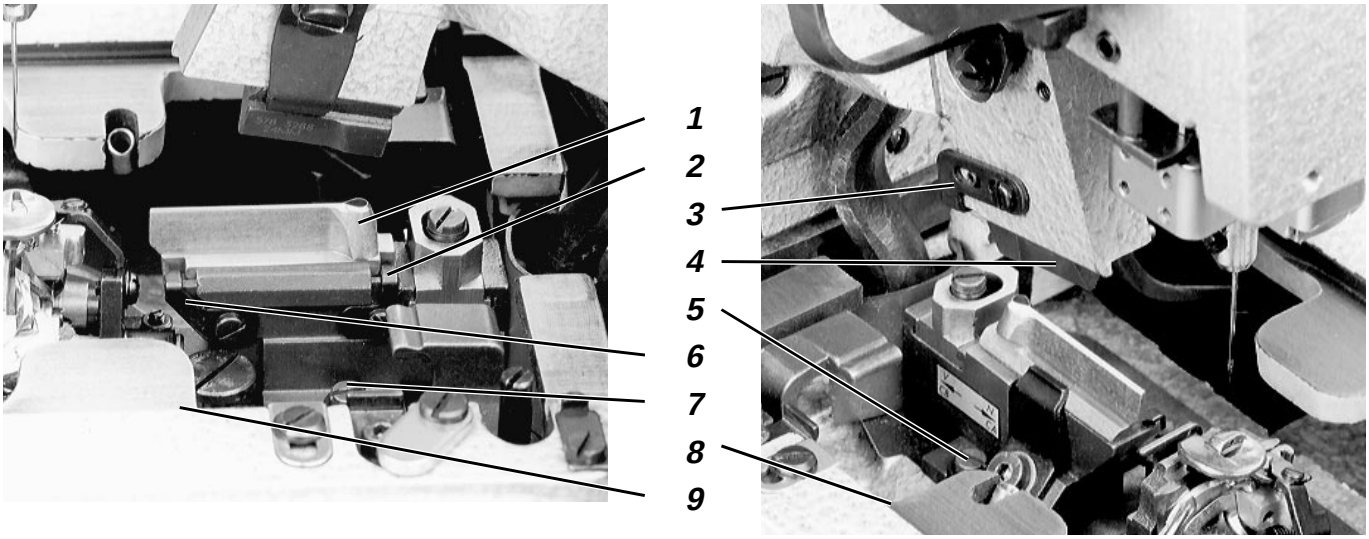
When both seam rows are not equally long the ball-headed screw 2 must be adjusted accordingly.

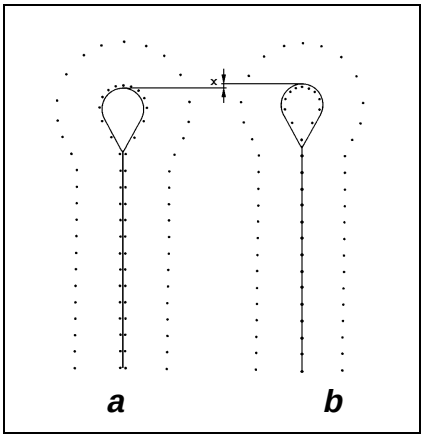
- Loosen the lock nut.
- Adjust the ball-headed screw 2 at the lower end of the turn-off lever accordingly.
- Tighten the lock nut.

When the buttonhole eye does not appear precisely circular the movement of the upper control disc comes too early or too late.

- Punch the seam pattern with a short needle into thin cardboard.
- Loosen screw 1.
- Turn the control disc drive shaft accordingly.
- Tighten screw 1 again.

25. Anvil Body and Cutter Bar





The cutting knife 1, by machines for **cutting after sewing,** should cut precisely between the inner seam rows and in the middle of the eye (see illus. **a**).
Attach the control disc for large eyes !

By machines for **cutting before sewing** the cutting knife should cut precisely on the congruent inner stitches and around the eye (see illus. **b**).
Attach the control disc for small eyes !

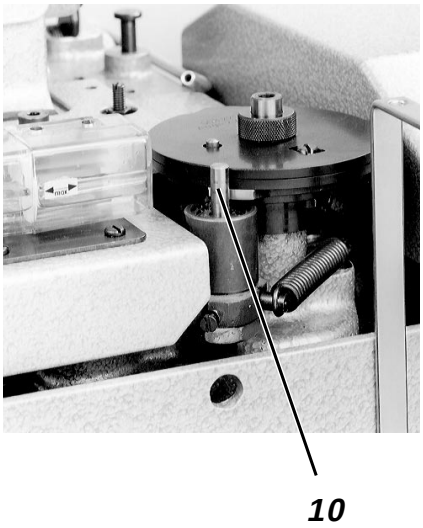
The difference x results from the two versions, cutting before and after sewing. This is the amount by which the cutting knife 1, when changing over from cutting before to cutting after sewing, must be moved between the stops 2 and 6.

The cutter bar is so aligned that the knife impression appears on the middle of the cutting block. When inserting the cutting blocks 4 these are to be brought to touching on the stop 3.

Prerequisite for the setting is the correct neutral needle position.

Caution Risk of Injury !

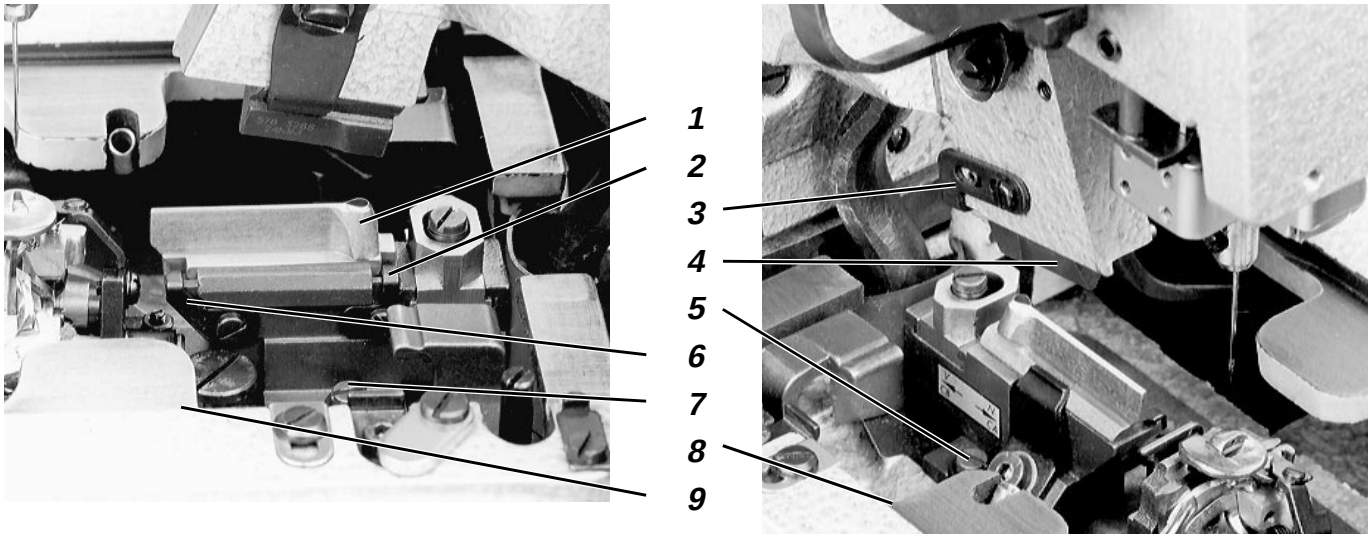
Pull the mains plug before setting.



Anvil body

- Set stop 6 to the middle of its slot.
- Insert cutting knife 1 into the anvil body and push forward until touching the stop 6.
  Fasten the cutting knife.
- Turn the machine out of its end position with the hand crank until the roller bolt 10 has run off of the cam of the underlying cam disc and lays onto the upper control disc.
- Loosen the screws 5 and 7 of the anvil body slightly.
- Align the blade of the cutting knife 1 to the middle of the material support plate.
  For this set equal clearances between the knife blade and the edges 8 and 9 of the material support plate with a slide gauge.
  The alignment of the cutting knife is to be conducted in the setting for "cutting after sewing".

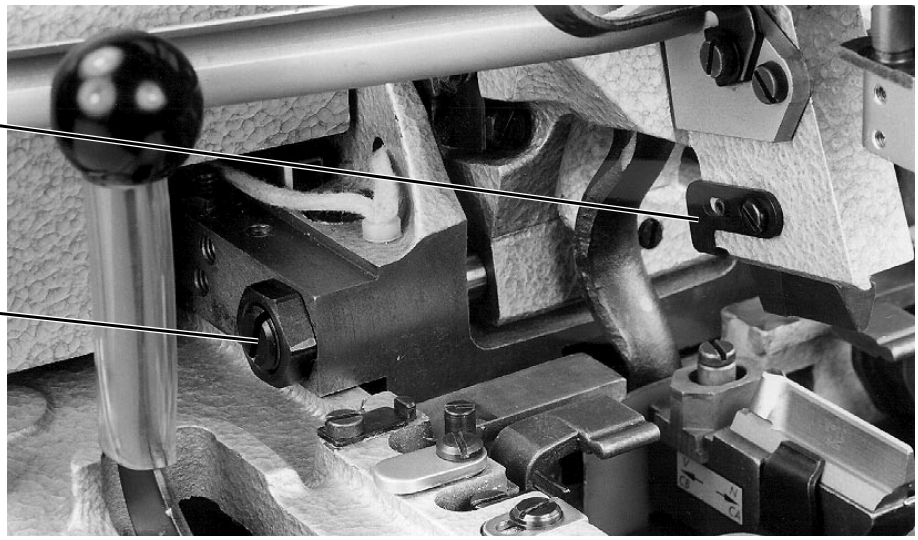
Continued on the next page !



- Position the clamping plates.
- Turn on the main switch.

Caution Risk of Injury !
Do not reach into the area of the cutting knife with the machine turned.

- Punch the seam pattern into thin cardboard with a short needle.
- Check the position of the knife cut (see Illus. a).
- Align the anvil body suitably and set the cutting knife accordingly.
- Slide the stop 6 until touching the cutting knife and tighten.
- Tighten screws 5 and 7 of the anvil body again.
- Insert the upper control disc and cutting block for "cutting before sewing".
- Push the cutting knife by the difference x about 1 mm to the back.
- Punch the seam pattern into thin cardboard with a short needle again.
- If necessary, correct the setting of the cutting knife lengthwise.
- Slide the stop 2 until touching the cutting knife and tighten.



Cutter bar

Before setting the cutter bar the anvil body must be aligned.

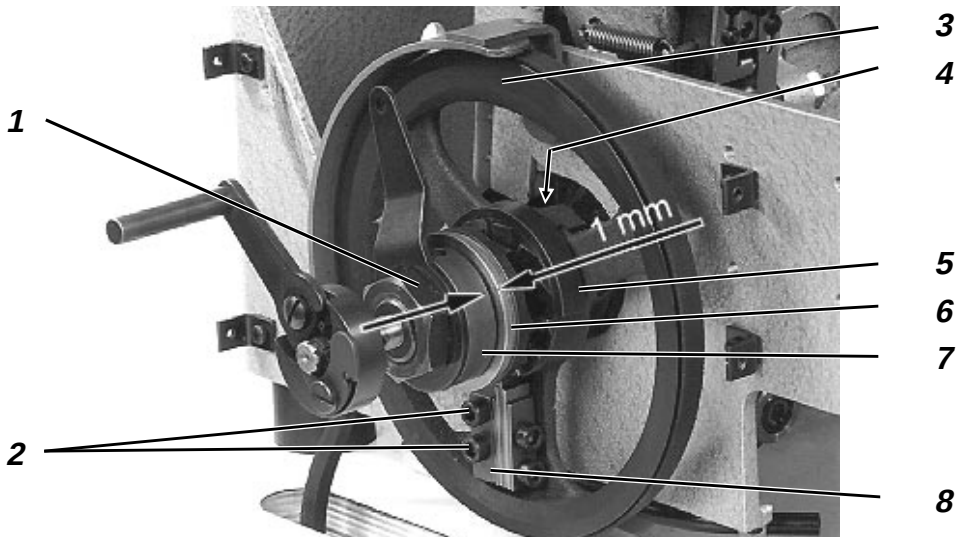
The knife impression should be at the center of the cutting block.
The cutter bar must move easily up and down but without any play.

Caution Risk of Injury !

Pull the mains plug before setting.

- Loosen the lock nuts.
- Align the cutter bar sideways by screwing the bearing screws 2 in or out.
- Tighten the lock nuts again.
- Set the cutting block lengthwise so that the knife impression on the cutting block reaches the given cutting length.
- Slide the stop 1 until touching the cutting block and tighten.

26. Torque Limiter and Ratchet Wheel on the High-speed Wheel



On the feeding shaft thereis a **torque limiter**.
It serves is avoid breakage through possibly jamming machine parts (e.g. of the cutter bar if the cutting pressure is set too high).

The **ratchet wheel** 5 does not have a rigid connection to the high-speed wheel 3. It can be turned against the pressure of a torque rod up to a certain point. Only at this point does it begin to move with.

The handwheel can thus thus run first into the turn-off position (needle high position) before the material support plate continues running in quick transport.

Caution Risk of Injury !

Pull the mains plug before setting.

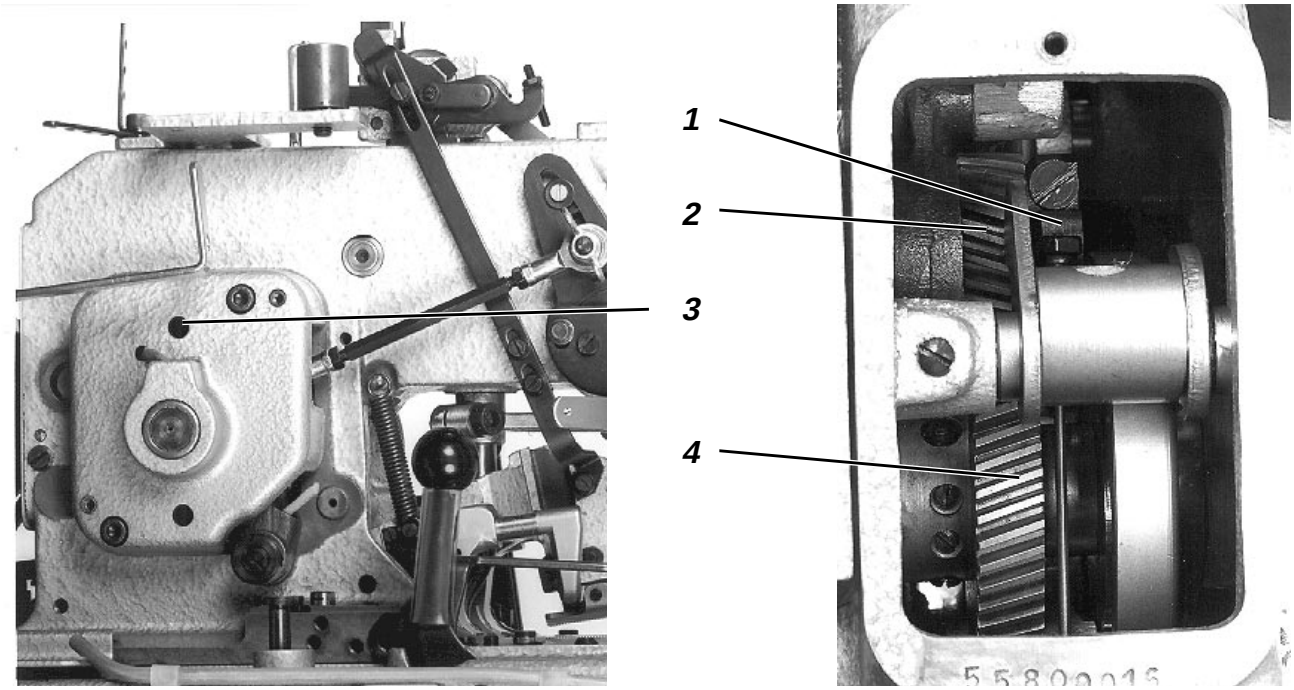
Torque limiter setting.

- Loosen nut 1.
- Set the clearance by turning the ring 7.
  To measure the clearance use the gauge (Order no. 558 1636).
  The torque limiter is correctly set when there is a clearance of 1 mm between ring 7 and disc 6.
- Tighten nut 1 again.

Ratchet wheel setting.

- Loosen screw 4.
- Set the high-speed wheel axially.
  The ratchet wheel 5 must move back easily but without play through the pressure of the torque rod.
- Tighten screw 4 again.
- Loosen screws 2 on the drive piece 8.
- Set the drive piece 8 so that the longest leaf spring is not touching but as close as possible to the recess in the ratchet wheel 5.
- Tighten screws 2 again.

27. Needle Bar Drive Wheels

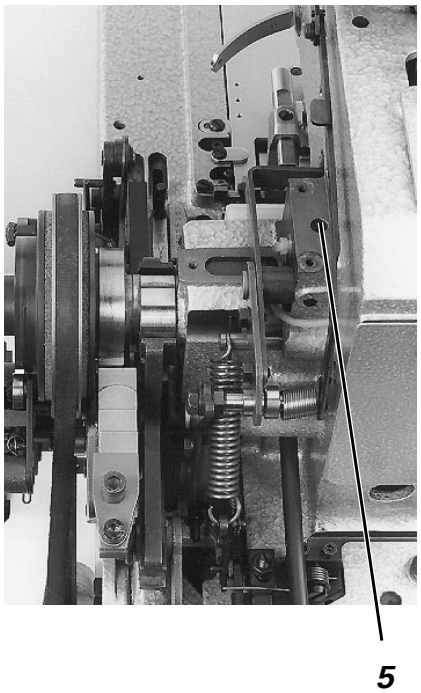


The play between the needle bar drive wheels 2 and 4 may not be set too small but also not too high.
Too little play leads to too much noise developing in the sprockets.
Too much play leads to rattling of the needle bar.

So that the exact movement sequence is retained the two sprockets are equipped with a center mark. When turning the sprockets the center marks must lie exactly opposite each other.

Caution Risk of Injury !

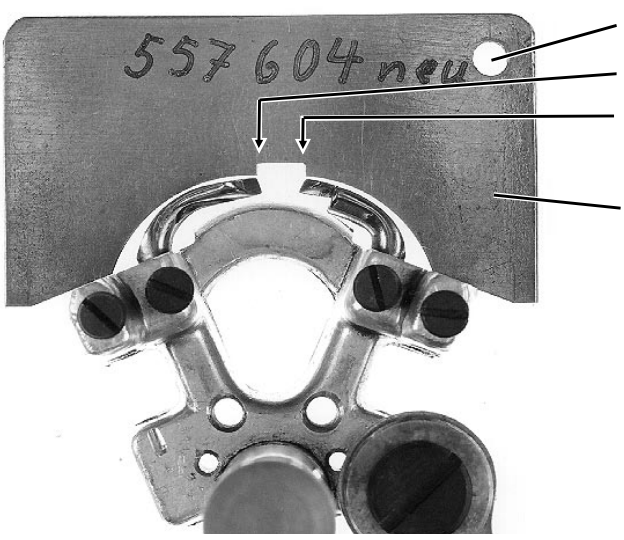
Pull the mains plug before setting.

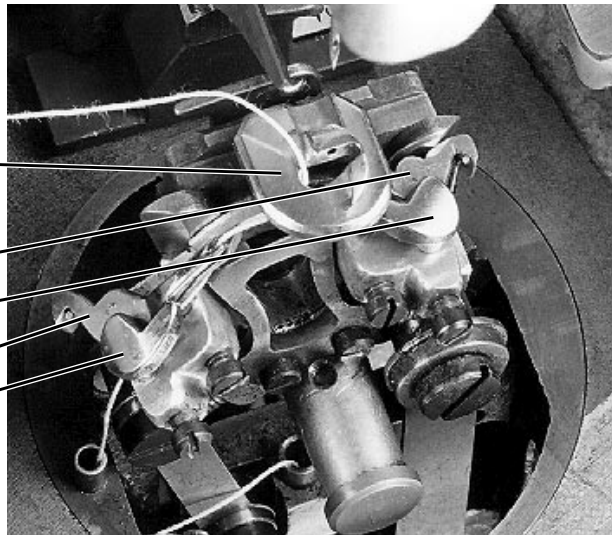


- Loosen screw 5.
- Set the play between the sprockets 2 and 4 by turning the eccentric bearing bolt 1.
  The bearing bolt 1 is set with a screwdriver through hole 3.
- Tighten screw 5 again.

28. Hook

28.1 Hook Height





Before setting the looping stroke and the needle bar height and particularly **after needle breakage** the correct hook height must be checked.

For checking the hook height use the gauge (Order no. 557 604).

Caution Risk of Injury !

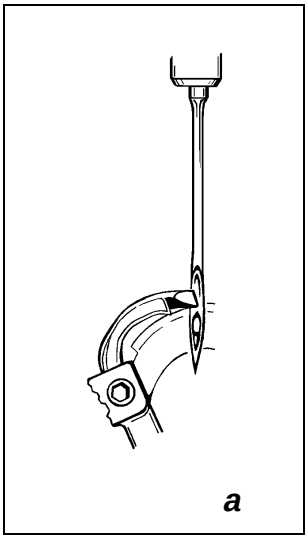
Pull the mains plug before setting.

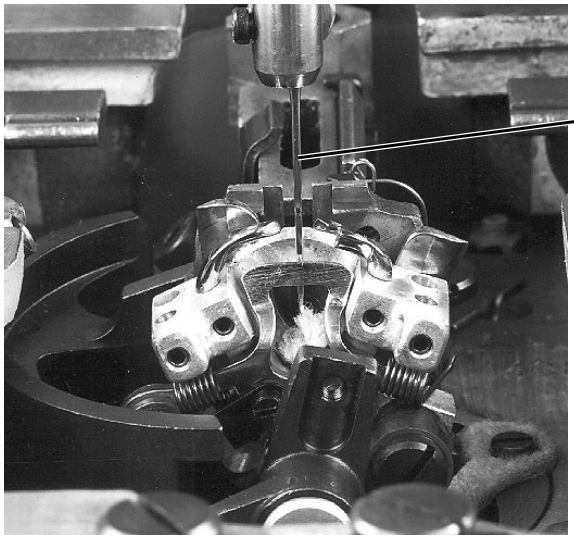
- Remove the needle plate 4, spreader stops 7 and 9 and spreaders 6 and 8 from the hook supports.
- Bring the needle bar in the high position by turning the handwheel.
- With the hooks inserted up to the neck in the hook supports set gauge 5 on the hook support.

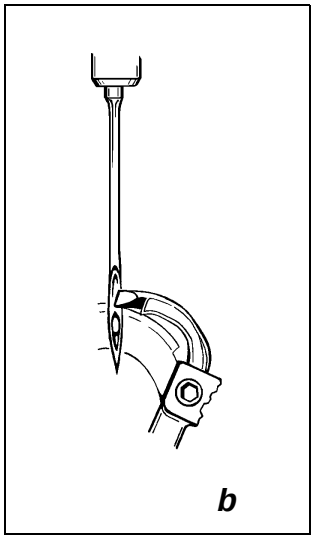
  The hole 1 of the gauge must point to the right.
  Thereby the tip of the left hook should lie under edge 1 and the tip of the right hook under edge 2 of the gauge.

  In this setting of the gauge the **hook tips** should just barely lie on the gauge.
- Set the correct hook height by a slight alignment of the hook.
- Reinsert the spreader stops and spreader in the hook support again.

28.2 Looping Stroke







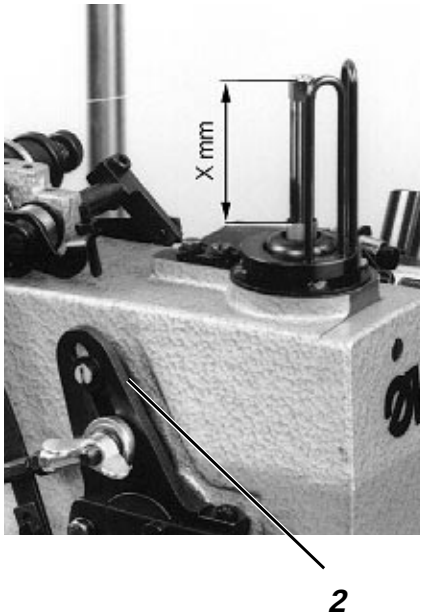
With looping stroke is meant the path that the needle bar travels from its lowest position to that point where the left or right hook tip lies at the center of the needle.

The setting of the looping stroke must be made with the maximum buttonhole width set.

The maximum buttonhole widths and looping stroke dimensions for the various sewing devices (E no.s) can be found in the Operating Instructions.

Caution Risk of Injury !

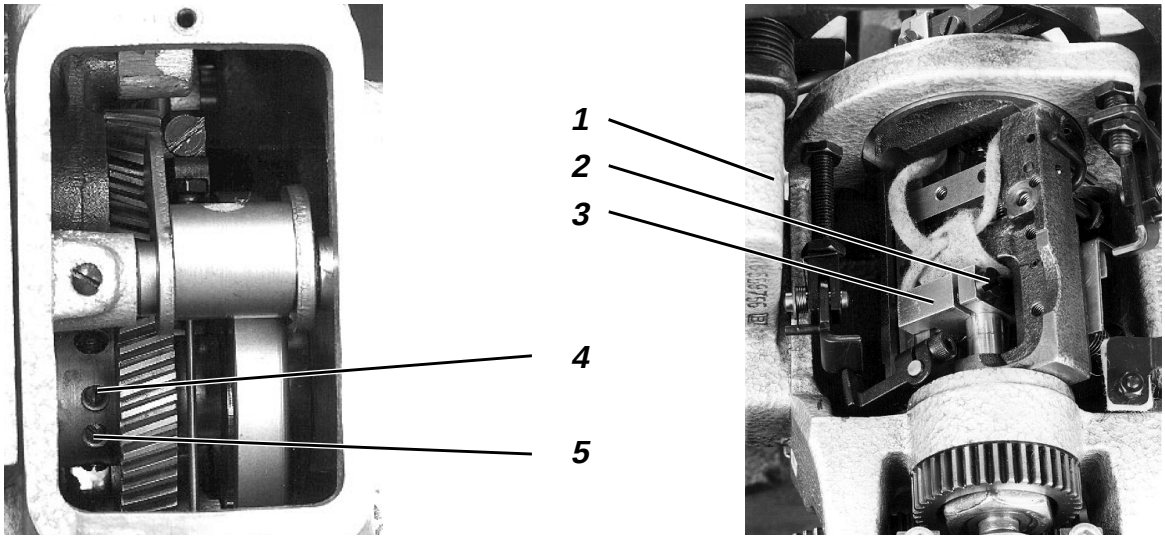
Pull the mains plug before setting.

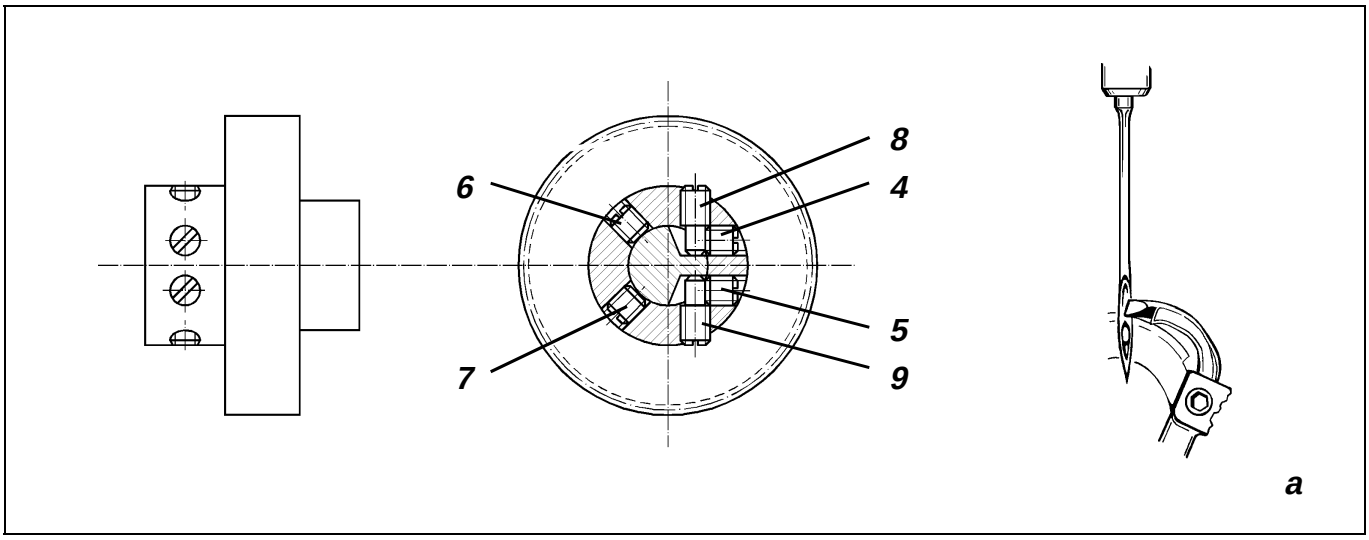


- Set the maximum buttonhole width at the guide 2.
- Set the needle bar 1 in its lower dead center.
- Find the dimension X from the upper edge of the needle bar to the bush with the depth gauge of a slide gauge.
- To the established dimension on the slide gauge add the looping stroke dimension.
- Place the slide gauge parallel to the needle bar on the bush again.
- Move the needle bar up in the amount of the added dimension by turning the handwheel.
- After a left-sided needle stitch the left hook tip should and after a right-sided stitch the right hook tip should lie at the center of the needle (see illus. a and b).

  This setting is achieved by turning the needle bar drive wheel.

Continued on the next page !



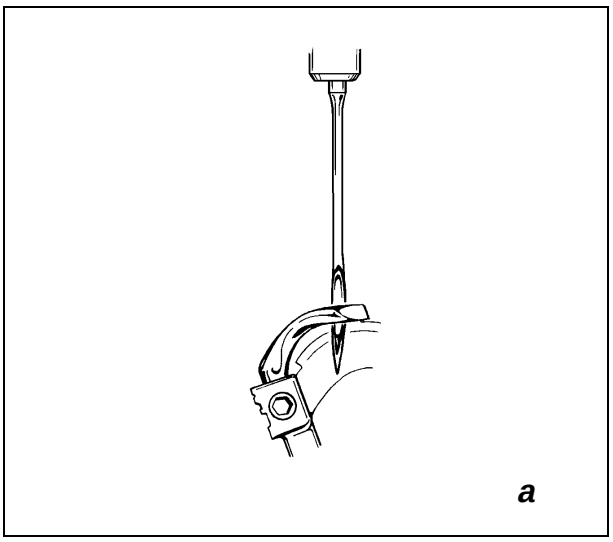


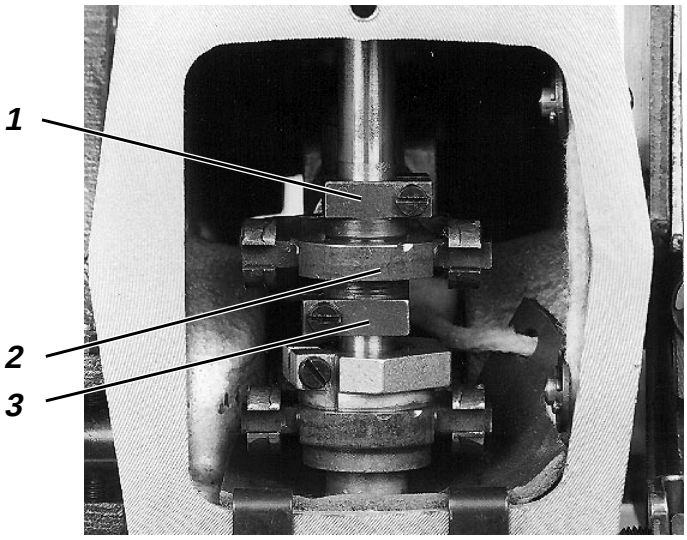
- For precise setting first loosen the screw 2 accessable behind the hook block.
  Screw 2 is accessable through hole 1 in the base position of the hook block.
- By adjusting the clamping piece 3 set the hook support so that the right and left hook tip have the same clearance to the needle.
- Tighten screw 2 again.
- Loosen the mounting screws 6 and 7 and securing screws 4 and 5 on the sprocket.
- Set the hook tips to the needle center by turning the setting screws 8 and 9 (see illus. a):

  Hook tips lie in front of the needle center
  Screw out the upper setting screw 8
  Screw in the lower setting screw 9.

  Hook tips lie beyond the needle center
  Screw in the upper setting screw 8
  Screw out the lower setting screw 9.
- After a correct setting first tighten the mounting screws 6 and 7 again.
- Tighten the securing screws 4 and 5 again.

28.3 Needle Bar Height



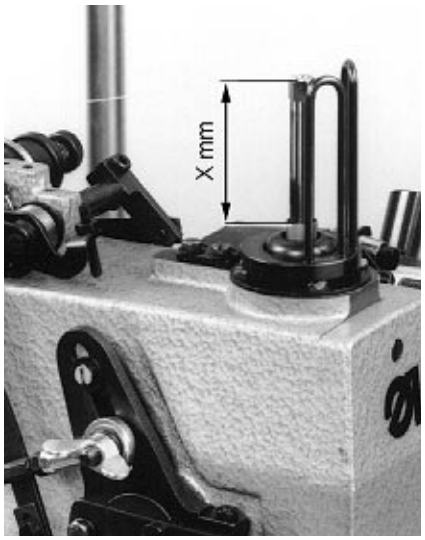


The needle bar height is 2.5 mm.

When the needle bar has risen in the amount of the **needle bar height plus the looping stroke** out of its lower dead center, then 3/4 of the needle eye should be visible under the lower edge of the left hook. See Illus.: a .

Caution Risk of Injury !

Pull the mains plug before setting.



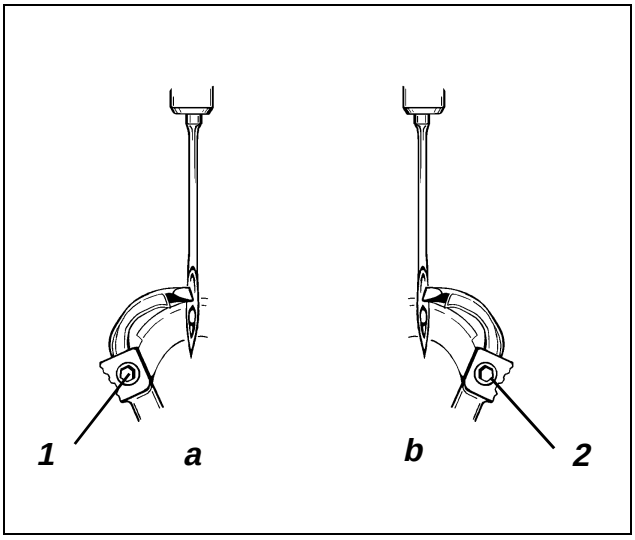
- Bring the needle bar in its lower dead center by turning the handwheel.
- Find the lower dead center of the needle bar.
  Measure the clearance X from the upper edge of the needle bar to the bush.
  To the dimension found add the looping stroke dimension (see Device Summary Table) and the needle bar height.

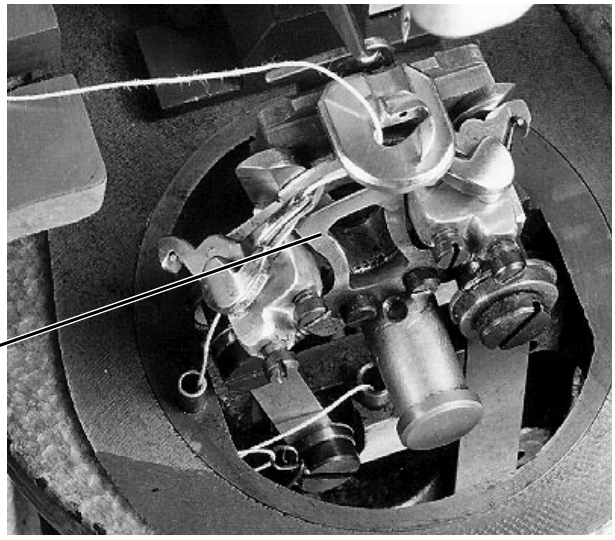
  Example:

Lower dead center of the needle bar e.g.	11.1 mm
+ Looping stroke	2.7 mm
+ Needle bar height	2.5 mm
	16.3 mm

- Move the needle bar up by the calculated amount out of its lower dead center through turning the handwheel.
  In this setting 3/4 of the needle eye should be visible under the lower edge of the left hook (see illus.: a).
- Set the maximum buttonhole width.
- Loosen the setting collars 1 and 3.
- Set the needle bar height accordingly.
- Tighten the setting collars 1 and 3 again.
  So that the needle bar, during sewing of the buttonhole eye, can easily turn set lubricating air between both setting collars and crosshead 2.

28.4 Hook Clearance and Needle Guard





The hook tips should have a clearance of 0.1 mm to the needle.

The hook clearance to the needle remain constant during the whole turning movement of the hook block. If this is not the case the needle bar rotation center must be corrected (see chapter 35).

The **needle guard** 3 is set at the factory. It normally needs no adjustment.

The needle should lie onto the needle guard 1 until the hook tips have reached the needle.
When the hook tips are at the center of the needle the described hook clearance of 0.1 mm must be felt.

Caution Risk of Injury !

Pull the mains plug before setting.

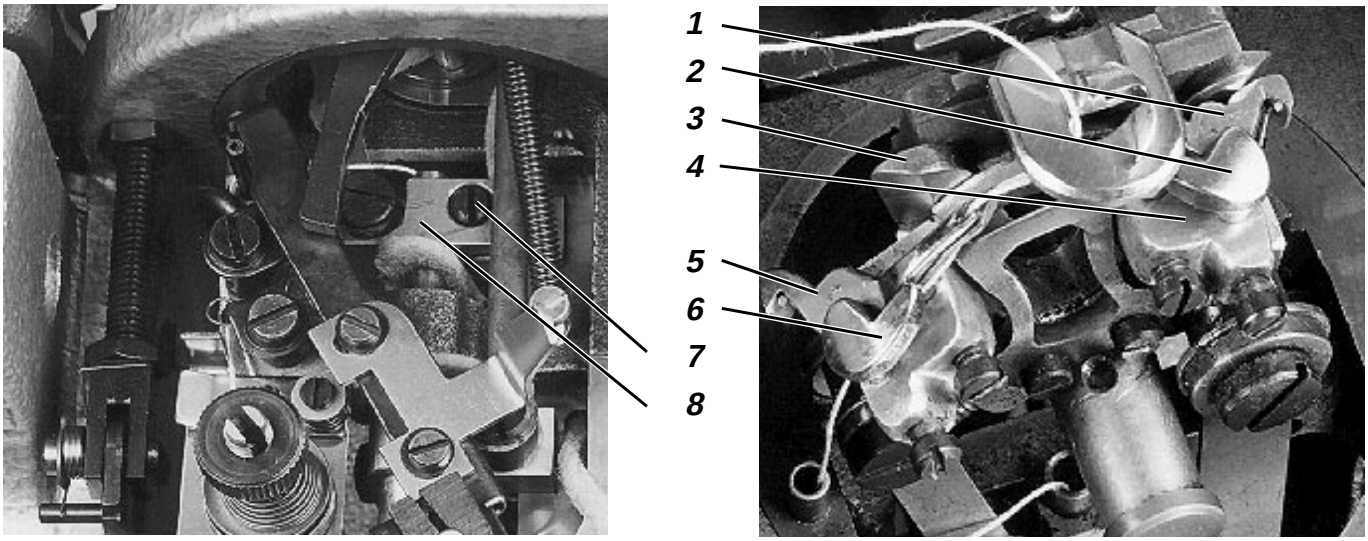
Hook clearance

- Loosen screws 1 and 2.
- Set the hook accordingly.
- Tighten screws 1 and 2 again.

Needle guard

- With other needle thicknesses align the needle guard 3 accordingly, if necessary.

29. Spreader



Between the fork spreader 5 and the left hook there must be a clearance appropriate to the thickness of the underthread used.

The right spreader 1 should move as close as possible without touching on the top of the right hook.

Caution Risk of Injury !

Pull the mains plug before setting.

– If necessary align the spreader slightly.
  The spreaders must move easily in the hook support 4.

The spreaders, which are under spring pressure, are held in their end position by the stops 2 and 6.

The fork of the left spreader should lie precisely over the thread hole of the left hook and the tip of the right spreader centered over the tip of the right hook.

The opening and closing of the spreaders occurs through the alternating movement the spreader operating plate 3.

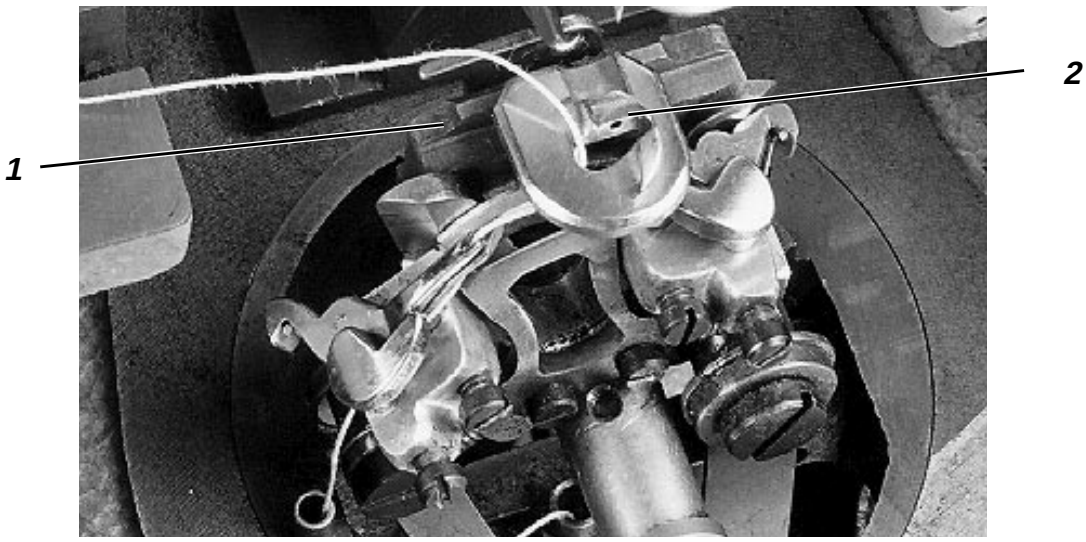
The movement of the left and the right spreader must be uniform. This means that with a left-sided needle stitch the left spreader and with a right-sided needle stitch the right spreader must touch the corresponding spreader stop shortly before the lower dead center of the needle bar.

– Set the maximum buttonhole width.
– Loosen screw 7 slightly.
– Set the spreader operating plate 3 to the spreader drive spindle by sliding the clamping piece 8.

ATTENTION !

By sewing devices (E nos.) with small buttonhole widths the closing movement of the spreader ends a little later.

30. Needle Plate



The penetration of the needle into the needle hole of the needle plate should occur one-sided on edge 2.
The clearance the needle to edge 2 should be 0,1 to 0.2 mm.

The needle plate must be set as high as possible.
This avoids the material being pressed too far down during stitching of the needle.

Caution Risk of Injury !

Pull the mains plug before setting.

– Set the height of the needle plate at the stop screw in the needle plate guide 1.
  Through the stop screw the setting remains intact during renewed insertion of the needle plate.

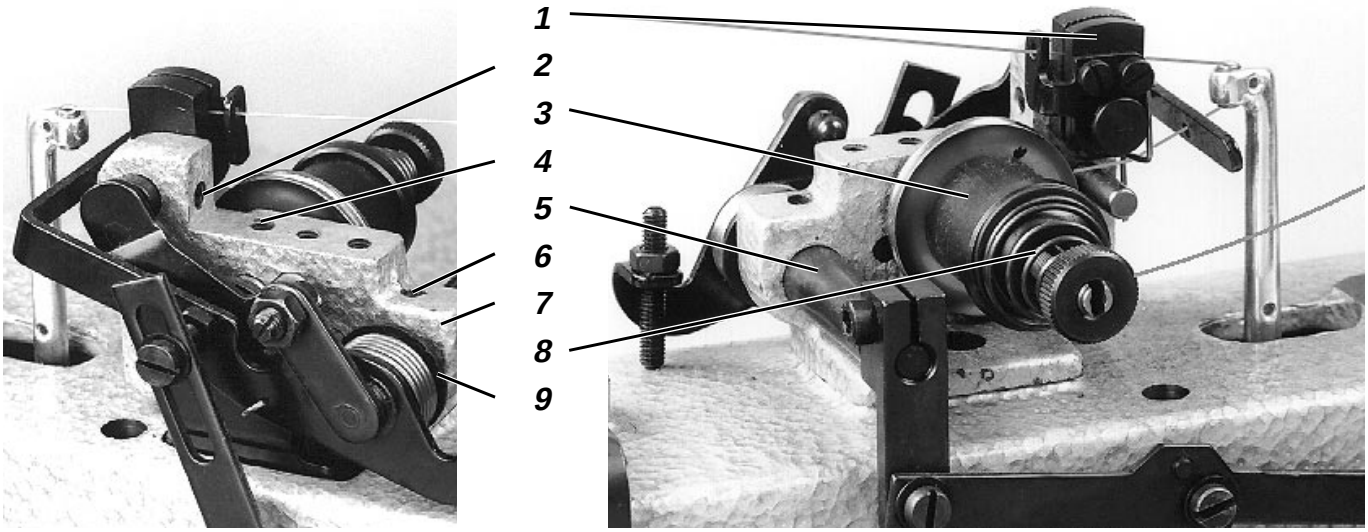
ATTENTION !

Danger of breakage !
The needle plate may not hit on anything during the complete work procedure.
Check unhindered movement by turning the hand crank.

In particular at the following points there must still be a small clearance to the needle plate:

– Under the material and the closed upper cloth clamps.
  The material must be able to move unhindered over the needle plate.
– Under the scissors of the underthread and gimp trimmer.
– Under the lower cloth clamps.
– Over the upper thread knife.
  The upper thread knife must move as closely as possible without touching below the needle plate.

31. Tension Release



The upper thread tension is executed as a dual tension.
It consists of the main tension 8 and the remaining tension 3.

The **remaining tension** 3 serves for tautening of the upper thread for the cutting procedure under the needle plate.
It is not opened after the seam end.
Its set tension value determines the length of the upper thread end remaining at the seam beginning.

The opening of the **main tension** 8 should occur after the seam end but before the cutting of the upper thread.

Caution Risk of Injury !

Pull the mains plug before setting.

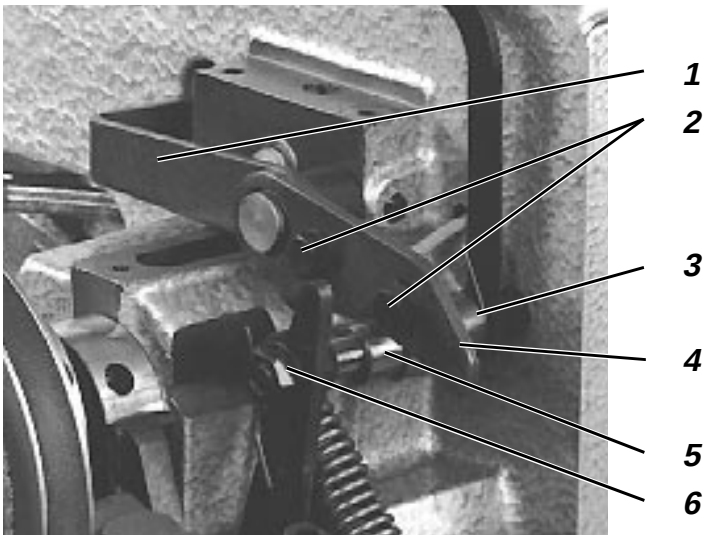
- With the hand crank run the machine out of the end position up to the seam beginning.

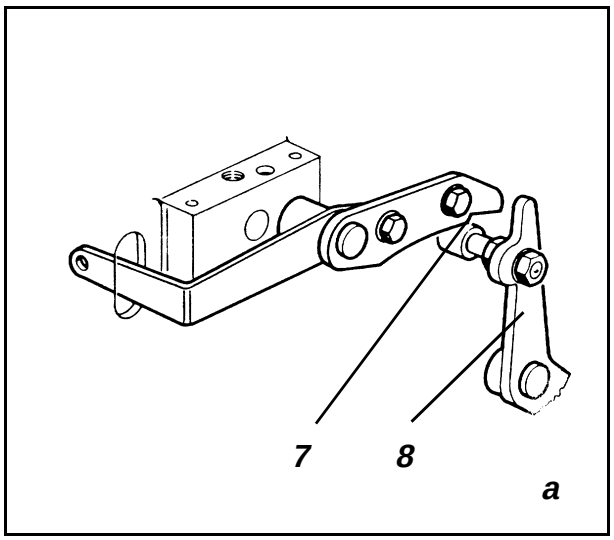
- Loosen screw 2.
- Set a clearance of 1 mm between the two clamping jaws of the thread gripper 1.
  For this slide the thread gripper 1 in or out appropriately.
- Tighten screw 2 again.

- Loosen screw 4.
- Align the tensioning discs of the remaining tension 3 to the thread gripper 1.
  A straight thread entry must be achieved.
- Tighten screw 4.

- Loosen screw 6.
- Set a clearance of 4.5 mm between block 7 and disc 9. For this slide bearing sleeve 5 accordingly.
- Tighten screw 6 again.

Continued on the next page !

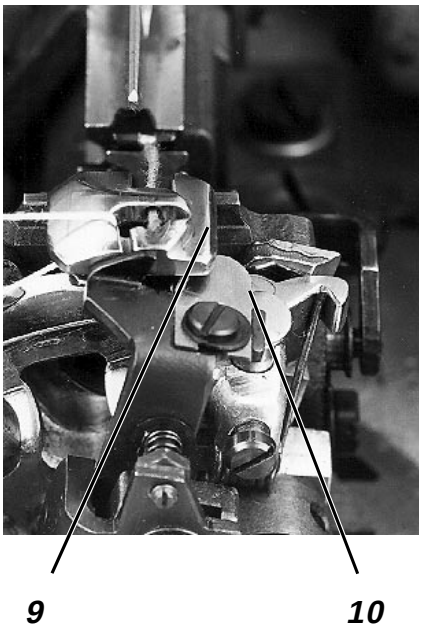




– Turn the machine with the hand crank until just before the seam end.
  Turn farther until the upper thread knife begins with the cutting movement to the right.
– Loosen nut 6.
– Set turn-off lever 8 so that the roller center is exactly under the tip 7 of the curve plate 4. See illus.: a .
– Tighten nut 6 again.

ATTENTION !

When loosening and adjusting the roller bolt secure against turning with a wrench.
The pre-tensioning of the torque rod 3 for the bent lever 1 must be retained.

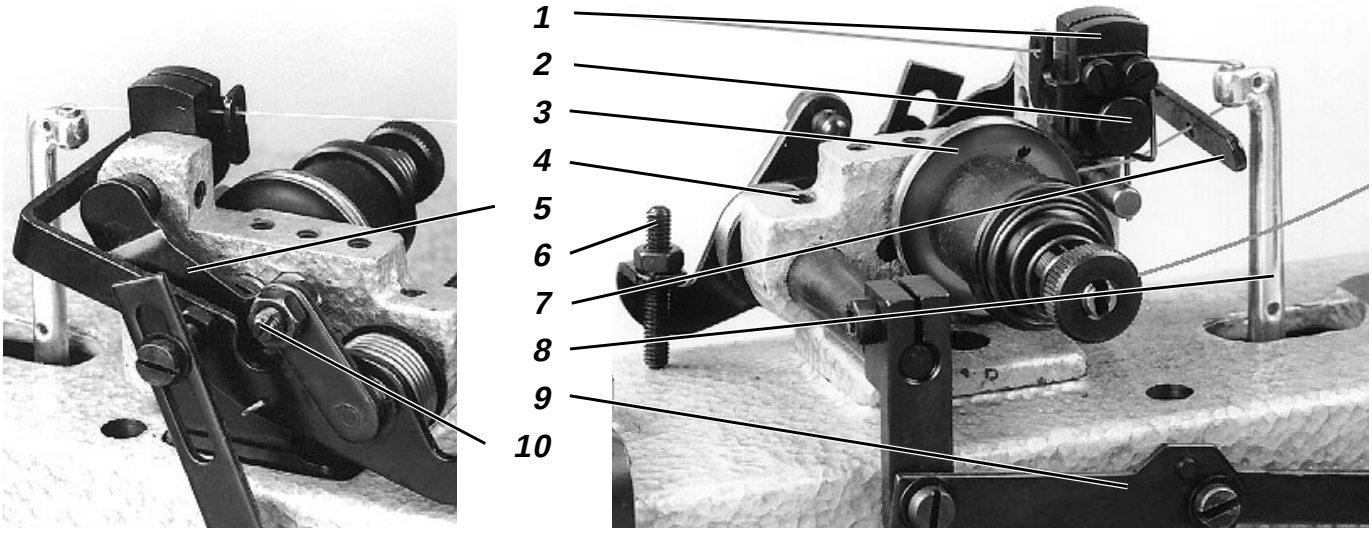


– Turn the machine farther with the hand crank until knife edge 10 and needle plate edge 9 are flush.
– Loosen screws 2 on the curve plate 4.
– Press lever 1 down until the main tension opens 0.3 mm.
– In this held position press curve plate 4 down onto roller 5.
– Tighten screws 2 again.
– Turn the machine with the hand crank until just before the seam end.
  The turn-off lever 8 should show a slight forward motion.
– Turn the handwheel until it catches completely.
  Play must be felt between curve plate 4 and roller 5.

  If no play is felt, then the settings described on this page must be repeated !

– Turn the hand crank farther until knife edge 10 and needle plate edge 9 are flush.
  Check if the main tension is open 0.3 mm.

32. Upper Thread Puller



The upper thread puller 7 makes available an always uniformly long beginning thread for the secure stitch formation at the seam beginning.

So that the pulled-forward upper thread is not pulled back out of the upper thread tension, the thread gripper 1 only releases it shortly before sewing begin.

The function sequence first thread gripping and then upper thread pulling is therefore important.

Caution Risk of Injury !

Pull the mains plug before setting.

- Turn the machine into the end position.
- At the length setting slide set the shortest buttonhole length.
- Loosen screw 4.
- Set the bent lever 9 sideways so that there is a safety clearance between it and the machine arm.
- Tighten screw 4 again.

- Thread the upper thread and turn the machine into the sewing position.
- Set stop screw 6.
  The upper thread puller 5 should lie exactly in the direction of thread drawing between thread lever 7 and tensioning discs 3.

- Turn the hand crank until the upper thread puller 7 moves down.
- Tighten pressure screw 10 so far that the upper thread is just still securely held.
  A too high pressure impedes the operation of the release button 2.
- Turn the machine into the end position with the hand crank.
  The pressure screw moves down on the operating plate 5.
  The thread gripper 1 may not be pressed onto the block. Springy play must be felt. This is the case when by pressing the button 2 the thread gripper still opens.

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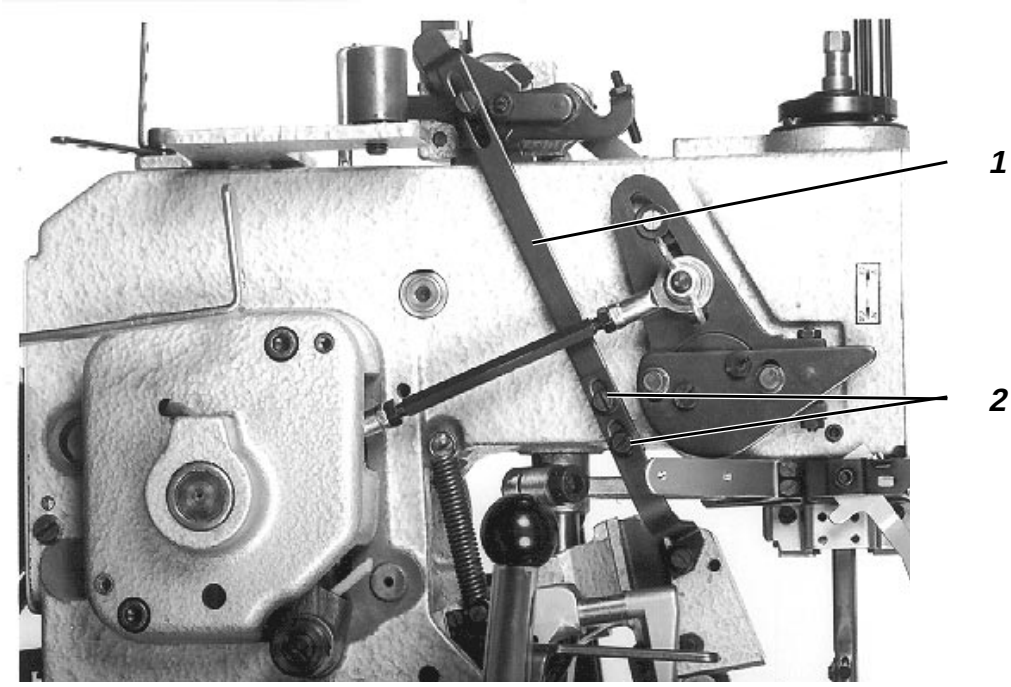


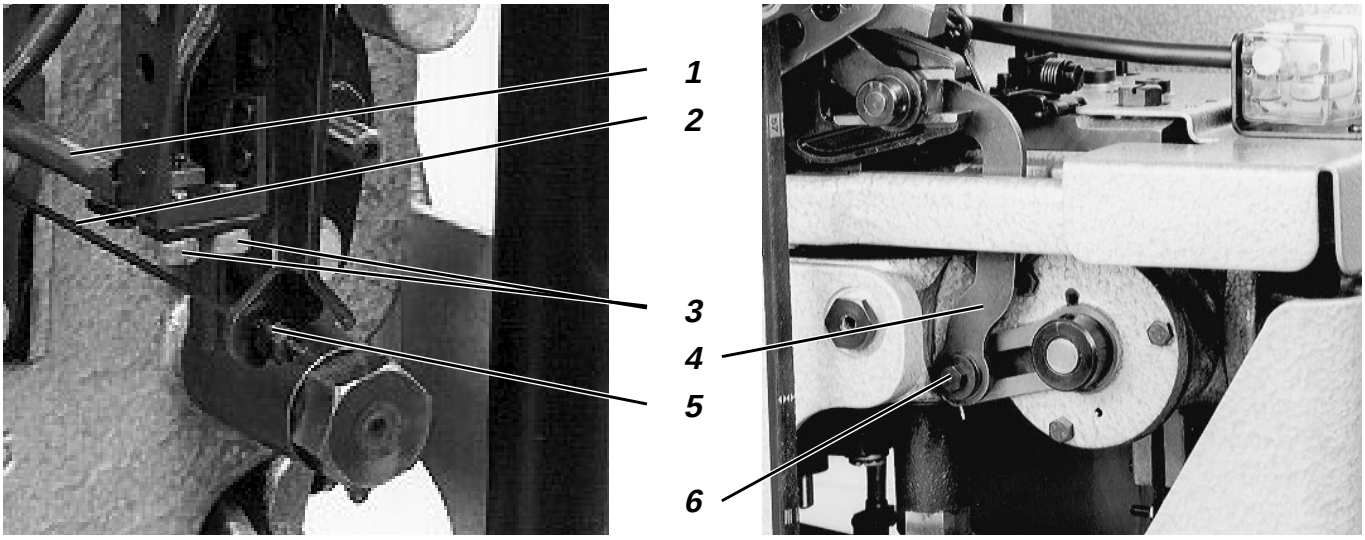
- With inserted cutting block and cutting knife turn the cutter bar into its lowest position with the hand crank.
- Loosen screws 2.
- Pull the upper thread puller into its lowest position by sliding the rod 1.
- Tighten screws 2 again.

Attention !

Retain the safety clearance to the machine arm.

- Check the setting with a sewing trial.
  If the excess thread end at the seam beginning is too long set the thread puller to less thread pulling at the rod 1.

33. Removing of the Machine Arm



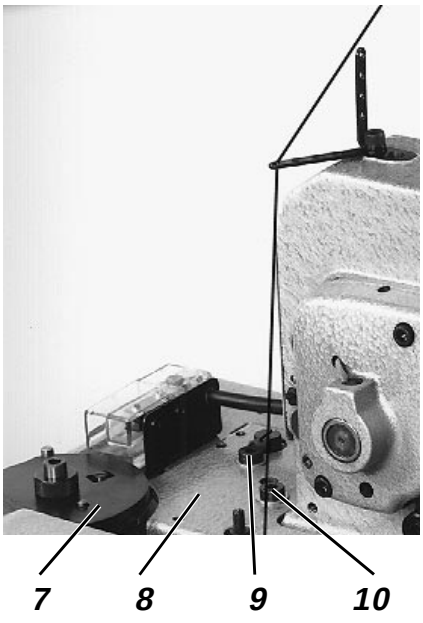
The removal of the machine arm becomes necessary when there is a blockage of the sewing machine.
This can be caused by a foreign object (e.g. the remainder of a needle), which has caught in the main control disc.

Caution Risk of Injury !

Before removing or replacing the machine arm pull the mains plug.

Before removal of the machine arm:

- Check the correct setting of the cutting pressure and pressure of the Clamp closing lever.
- Disconnect the transport lever 4 from the housing drive.
- Check the machine arm for ease of movement by turning the handwheel.
  If it can be easily turned then the cause of the blockage lies in the machine housing.



Removing the machine arm

- Remove the clamping plates and needle.
- Remove the right protective hood.
- Remove the V-belt from the drive pulley.
- Tilt the machine head up.
- Loosen nut 5 from the spreader tie rod.
- Take the wire pull 2 out of the machine arm from the top.
- Loosen screws 3 of the hook tie rod 1 from the dual lever.
- Tilt the machine head down.
- Loosen screw 6 and screw the transport lever 4 out.
- Remove screws 9 and 10.
  Remove the protective plate 8 and take out the control discs 7.

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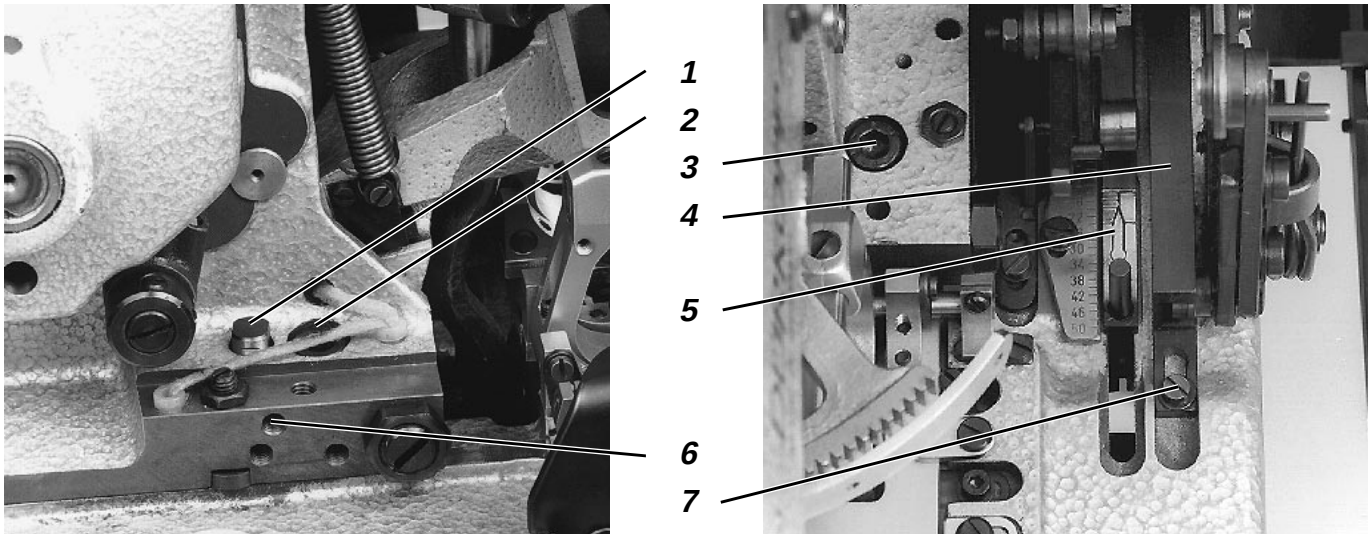
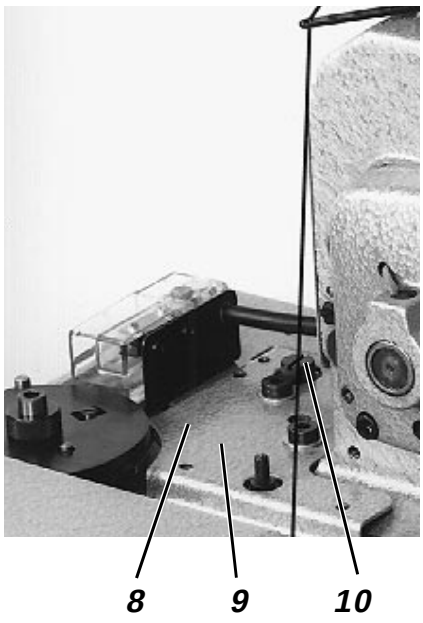
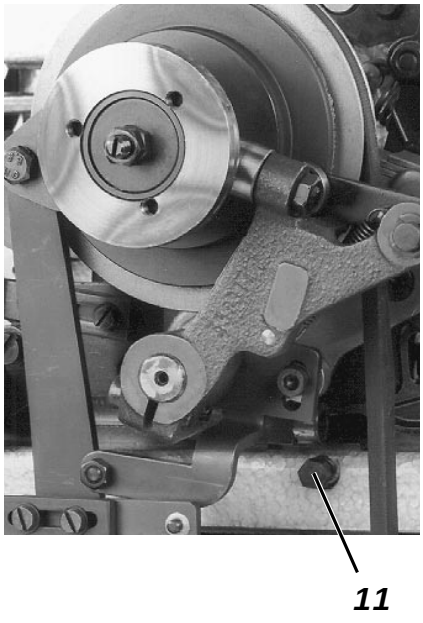
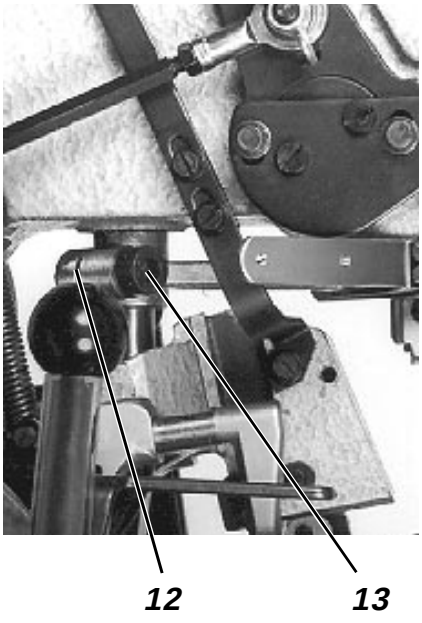






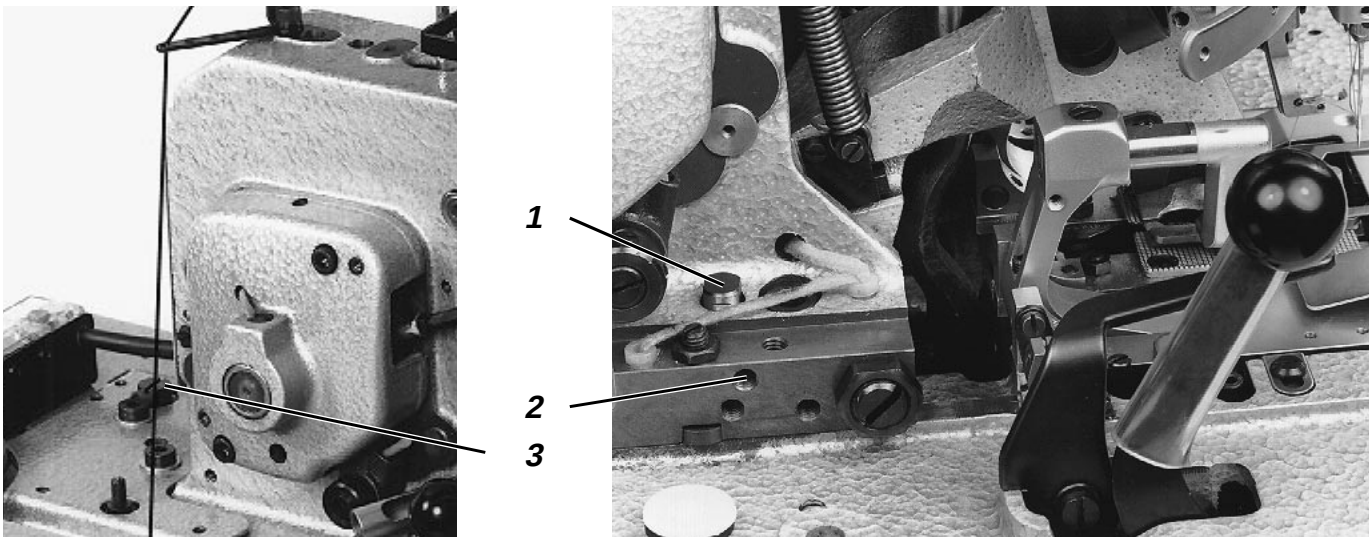


- Remove the 3 arm mounting screws 2 and 3 as well as screw 9 lying under the protective plate 8.
- Loosen screw 6 and remove setting pin 1.
- Remove the centering screw 10.
- Loosen screw 11 and remove the length setting slide 5.
- Loosen screw 7.
  By turning the hand crank move the material support plate so far as possible forward.
  Remove the transport distance regulating rail 4.
- Loosen screw 13 and knock a wedge into the clamping slit 12.
- Remove the machine arm.

ATTENTION !

When setting down care should be taken that the tie rod is not bent.

34. Replacing of the Machine Arm



To reattach the machine arm work in the reverse order as described in the chapter Removing of the Machine Arm.

Caution Risk of Injury !

Before replacement of the machine arm pull the mains plug.

The following points are to be taken into account when replacing the machine arm !

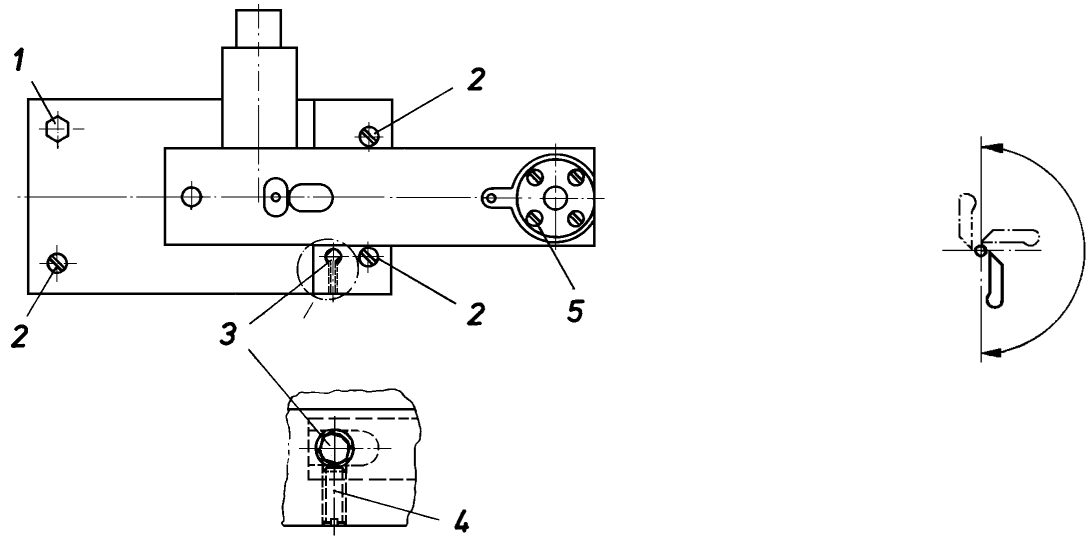
- The glide pads with their ground-in markings found in the machine housing must point forward.
- Before the machine arm is completely lowered insert the upper toothed quadrant between cutter bar and arm.
- After the centering screw 3 and the machine mounting screws are screwed in, the setting pin 1 is inserted as deep as possible into the housing so that it catches.
  With an open-end wrench it is turned until it touches and secured with the screw 2.

After all screws have been tightened the old setting of the machine arm has been reached.

ATTENTION !

The movement of the spreaders (chapter 29), the position of the upper toothed quadrant (chapter 20), the setting of the hook (chapter 28) and the clearance of the needle to the hook tip in the various hook block positions (chapter 35) are to be checked as described in these instructions and reset as necessary !

35. Needle Bar Rotation Center



The machine arm is aligned at the factory so that the needle bar rotation center and hook block rotation center lie over each other. This position is secured by the centering screw 1 and the setting pin 3.

The needle bar rotation center is correctly aligned when the clearance between needle and hook tip always remains constant during the needle bar and hook block rotation (see illus.).

Caution Risk of Injury !

Pull the mains plug before adjusting.

For checking turn the handwheel until the left hook tip lies at the needle center. Check the clearance between needle and hook tip in the following positions:

1. In the hook block base position.
2. Hook block turned 90° with the hand crank.
3. Hook block turned 180° with the hand crank.

When there are different clearances in the three Positions:

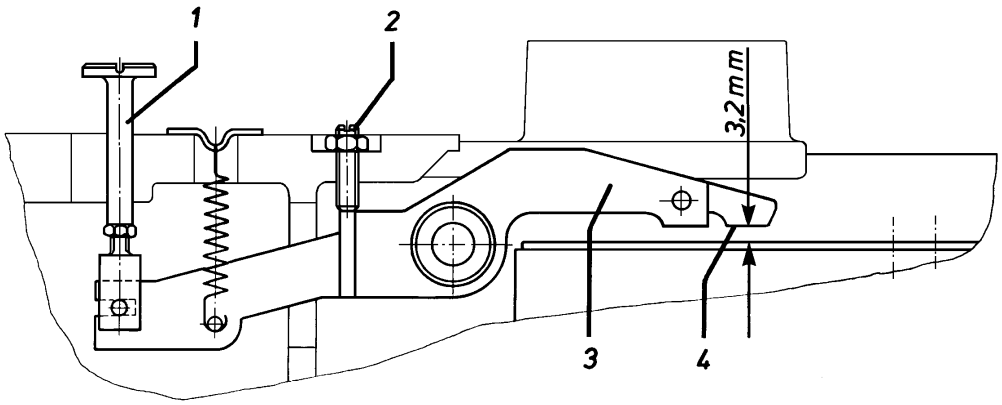
- Loosen mounting screws 2 and centering screw 1.
- Loosen the securing screw 4 for the setting pin 3.
- Tighten the centering screw 1 again and then loosen slightly.
- Turn the setting pin 3 clockwise until touching.
- Tighten securing screw 4.
- Tighten centering screw 1.
- Tighten mounting screws 2.
- Check the clearances between needle and hook tip again.

By differing clearances:

- As an exception loosen the yellow-sealed screws 5.
- Through careful aligning of the upper needle bar bushing set the correct clearances.
- Tighten screws 5.

36. Upper Thread Trimmer

36.1 Control Lever



The control lever 3 is in the machine housing.
Via the feed rod 1 it operates the upper thread trimmer.

Caution Risk of Injury !

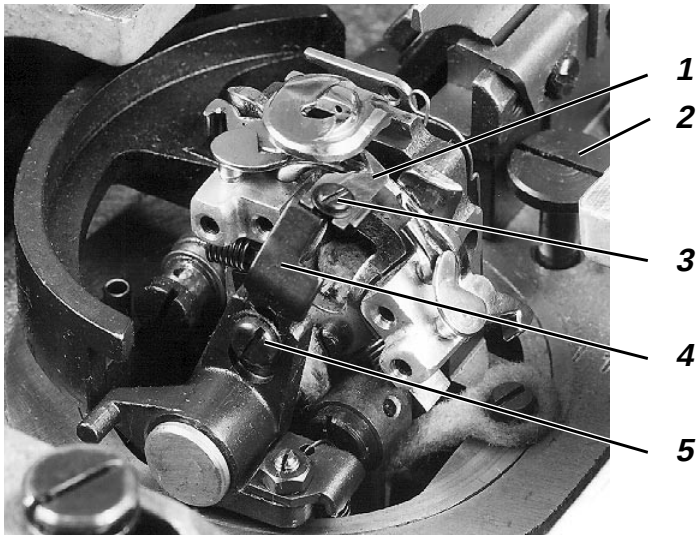
Pull the mains plug before checking and adjusting.

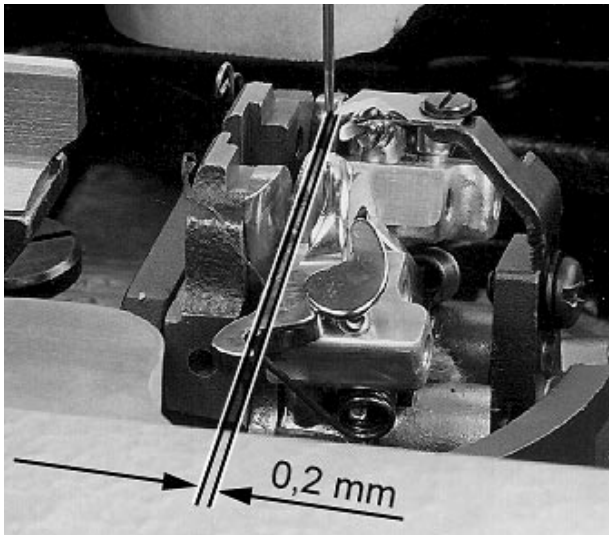
The setting of the control lever 3 to the main control disc is fixed by the stop screw 2.

The clearance between edge 4 of the control lever and the main control disc must be 3.2 mm.

The setting can only be made with the machine arm removed. The yellow-sealed stop screw 2 is set at the factory. Normally it should not be adjusted.

36.2 Upper Thread Knife

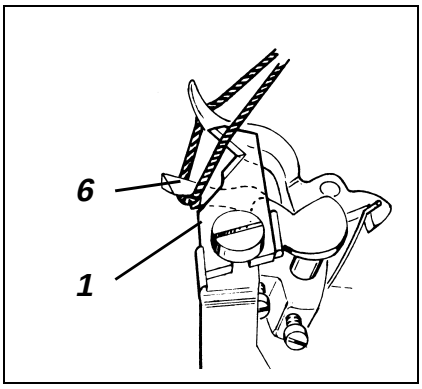




At the seam end (sewing drive disengaged) the cutting movement of the upper thread knife occurs via the feed rod 2.

Caution Risk of Injury !

Pull the mains plug before adjusting.



Clearance

The Clearance between the tip of the upper thread knife 1 and the needle lying at the right in its lowest position must be about 0.2 mm.

The upper thread knife 1 should cut through the upper thread loop taken up by the right hook 6 only at the front of the hook.

Note !
Cutting the upper thread loop on both sides leads to a too short thread end and thus to missing stitches at the seam beginning.

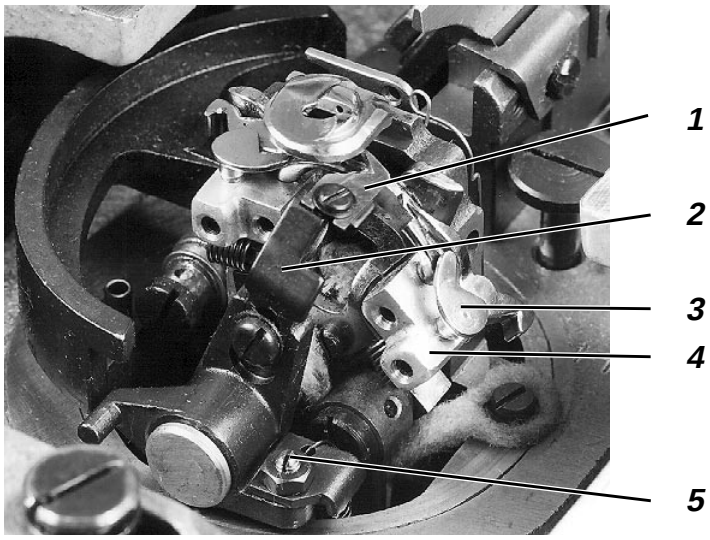
- Bring the machine in the end position by turning the hand crank.
- Turn the handwheel until it catches.
  The needle is in its highest position.
- Remove the clamping plates.
- Loosen screw 3.
- Through sliding the upper thread knifes 1 set the clearance between knife point and needle accordingly.
- Tighten screw 3 again.

Height

The height of the upper thread knife 1 is to be set so that it can move as close as possible, but still unhindered, under the needle plate bottom.

- Loosen screw 5.
- Set the height of the knife holder 4 accordingly.
  To check the ease of movement swing the knife holder 4 by hand.
- Tighten screw 5 again.

Continued on the next page !

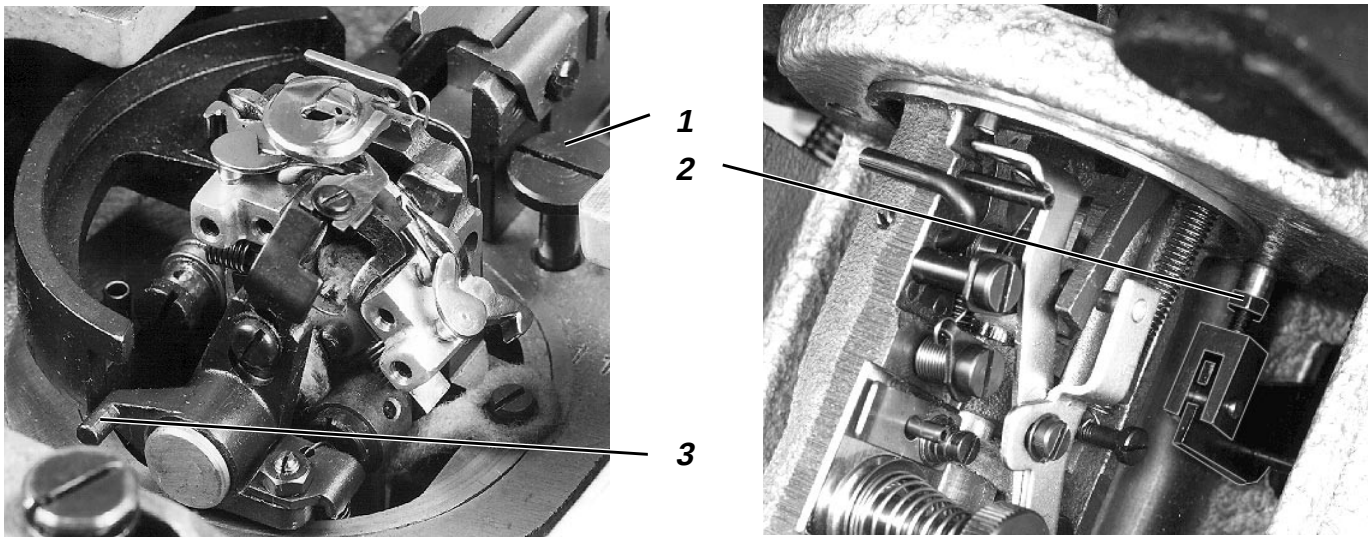


Sideways alignment

After the hook carrier 4 has moved into its extreme left position (machine end position) the spreader stop 3 may not hit the knife holder 2 lying in its right end position.

– Loosen the lock nut and move the knife holder 2 to the right toward the spreader stop 3 by turning the setting screw 5 .
  The clearance between the knife holder and spreader stop must be 0.3 mm.
– Tighten the lock nut again.
– Check the safety clearance between the needle and the upper thread knife.
  With the maximum buttonhole width set and stitching at the right side the needle must pass the upper thread knife 1 with an assured clearance.

36.3 Feed Rod



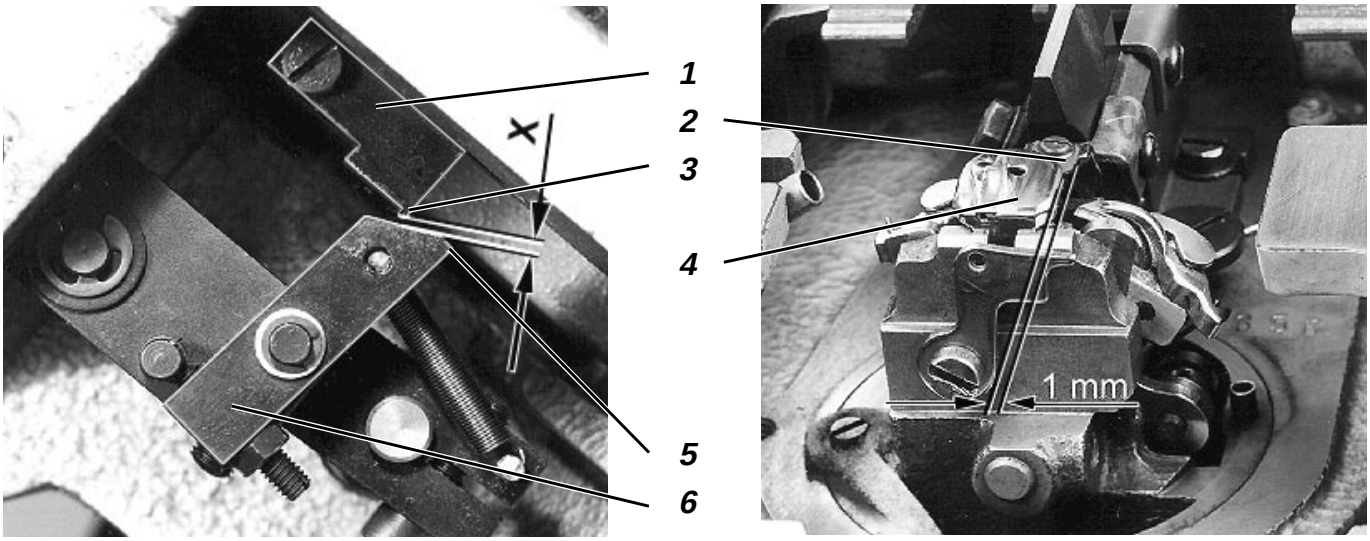
When the lever 3 lies under the feed rod 1 in its rest position (upper position) the clearance between the two must be 1 mm.

Caution Risk of Injury !

Pull the mains plug before adjusting.

- Turn the hand crank until the hook block has turned by about 90 °. Lock nut 2 is freely accessable in this position.
- Tilt the machine head up.
- Loosen lock nut 2.
  Set the feed rod 1 higher for safety reasons.
- Turn the hand crank farther until the hook block has turned by 180°. In this position lever 3 is under feed rod 1.
- Turn feed rod 1 until the clearance of 1 mm to the lever 3 is reached.
- Turn the hand crank until lock nut 2 is accessable.
- Tighten lock nut 2 again.

36.4 Operating Latch



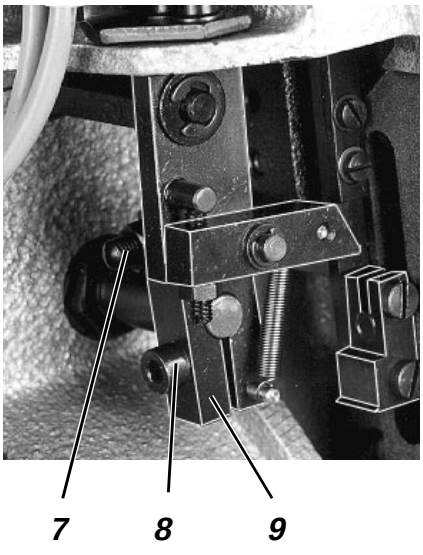
At the last stitch of the buttonhole seam the handwheel locks.
In this position there must be a feelable clearance X between latch 6 and the operating piece 1.

By slow continued turning of the hand crank the operating piece 1 with the operating edge 3 wanders onto the latch tip 5.
In this position the edge of the upper thread knife is 1 mm from the edge of the needle plate 4.

Too great a swing of the upper thread knife can lead to damage of the underthread guided in the left hook.

- Bring the machine into the end position by turning the hand crank.
- Turn on the machine and turn off just before the last stitches of the buttonhole seam.

Caution Risk of Injury !
Pull the mains plug before adjusting.



- Turn the handwheel until it catches.
  The needle is in its highest position.
- Tilt the machine head up.
- Loosen screw 8.
- Loosen the lock nut and turn in setting screw 7 at first only so far that its face is flush with lever 9.
  Setting screw 7 may thus not yet exit on the other side of lever 9.

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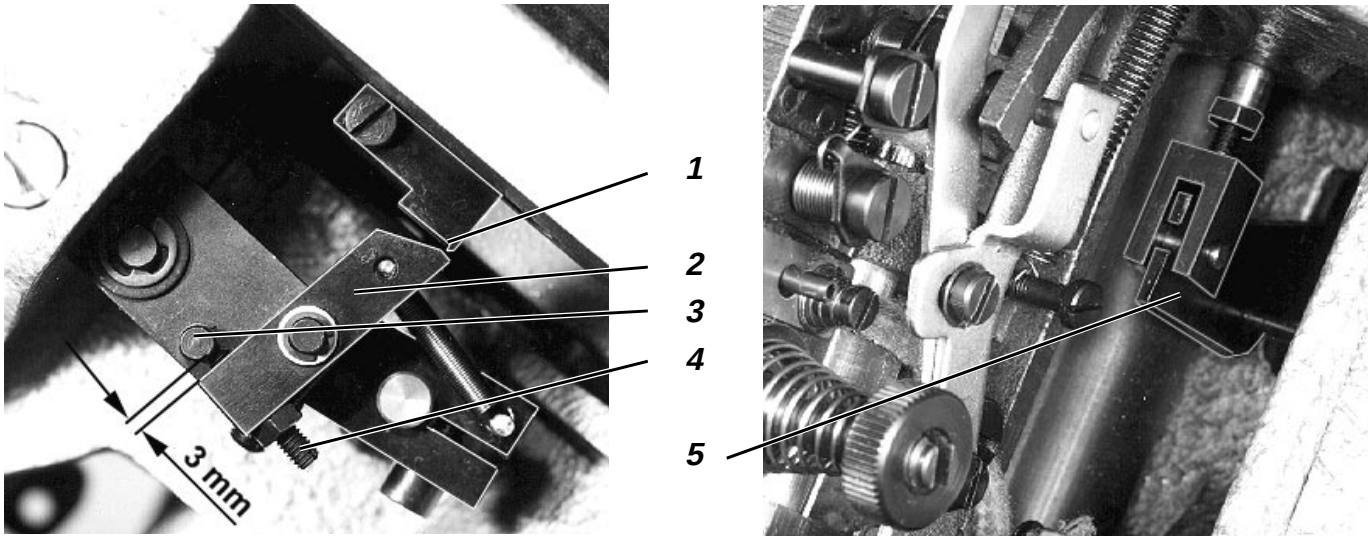
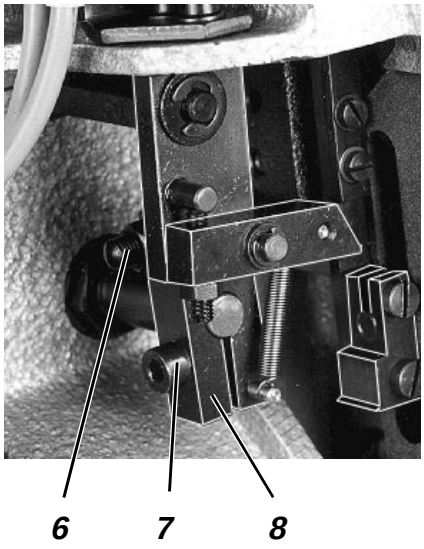
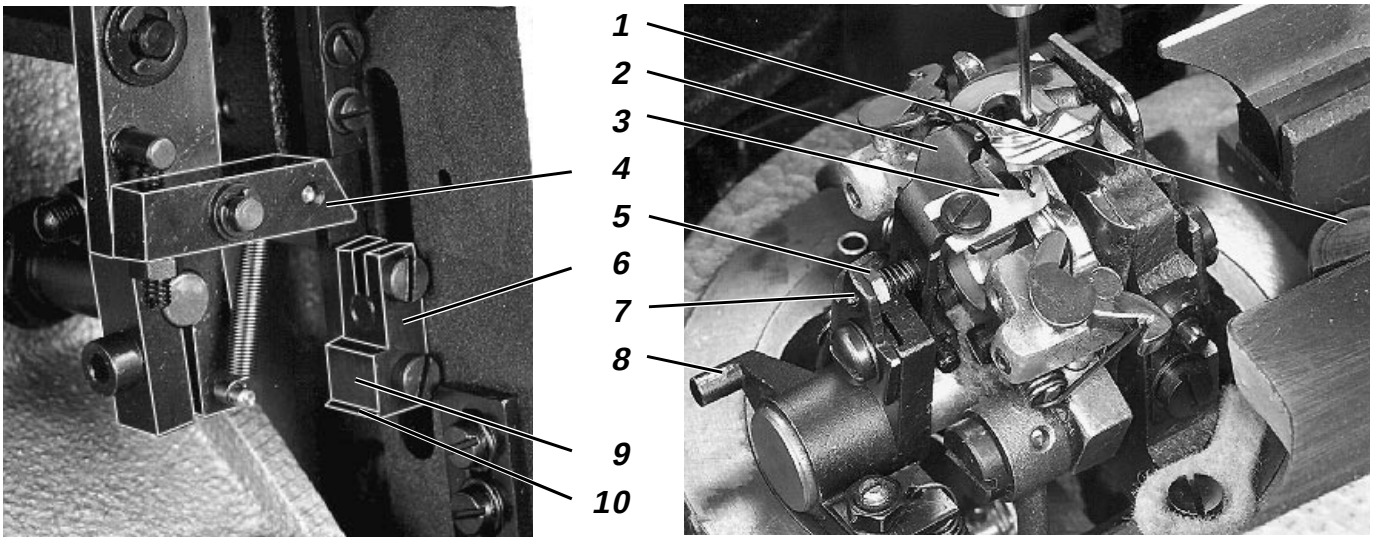




- Loosen the lock nut and set the clearance between the edge of the latch 2 and the pin 3 with the setting screw 4.
  The clearance must be 3 mm.
- Press lever 8 up until touching.
- Slowly turn the hand crank farther until the operating edge 1 is exactly at the latch tip.
- Tighten screw 7 again.
  Check axial play and ease of swinging.
  If necessary press against lever 5 and set lever 8 tight.
- Screw the setting screw 6 in until the knife edge extends 1 mm over the needle plate edge.
  Too great a swing of the upper thread knife can lead to damage of the underthread guided in the left hook.
- With the hand crank turn the machine until just before the buttonhole end.
  Turn the handwheel farther until it catches.
  In this position there must the clearance X between the latch tip and the operating edge must be felt.
- If necessary reset the clearance with setting screw 4.
  Check if the position knife edge and needle plate edge is all right when the operating edge 1 lies exactly on the latch tip.
  If not correct with the setting screw 6.

37. Underthread Gripper by Sub-class - 211000 and - 241000



After the sewing sequence is completed latch 4, through the movement of the material support plate, runs onto the operating edge 10 of the operating piece 6. The feed rod 1 lowers itself onto lever 8. The upper thread knife 3 connected to the underthread gripper 2 conducts the cutting movement.

Latch 4 glides on surface 9. The underthread gripper 2 initially moves back until in the waiting position in front of thread slit 12 in the needle plate. The underthread gripper 2 must touch with light spring pressure in front of the face of the needle plate. Thread slit 12 should not yet be covered in this position.

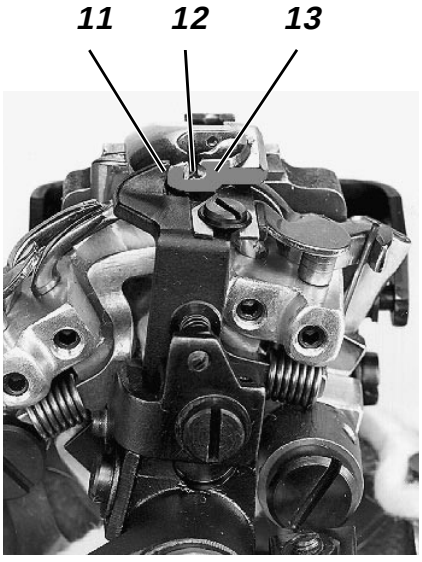
During the material support plate's run into the end position the underthread is drawn into the thread slit 12. The latch 4 moves from the surface 9. The underthread gripper 2 moves 1 mm beyond the exit of the thread slit 12 and holds the underthread clamped.

With the subsequent turning movement of the hook block the underthread and gimp are cut on the right clamping plate by the thread scissors.

Caution Risk of Injury !

Pull the mains plug before adjusting.

Clamping pressure



- Transport the material support plate with the hand crank so far that screw 7 is accessable.
- Loosen lock nut 5.
- Set screw 7.
  The underthread gripper 2 which is under slight spring pressure should not be blocked in its movement to the back by the needle plate edge 11.
  When gliding onto the face 13 the spring pressure must become effective.
- Check the setting by swinging the lever 8 by hand.
- Tighten lock nut 5 again.

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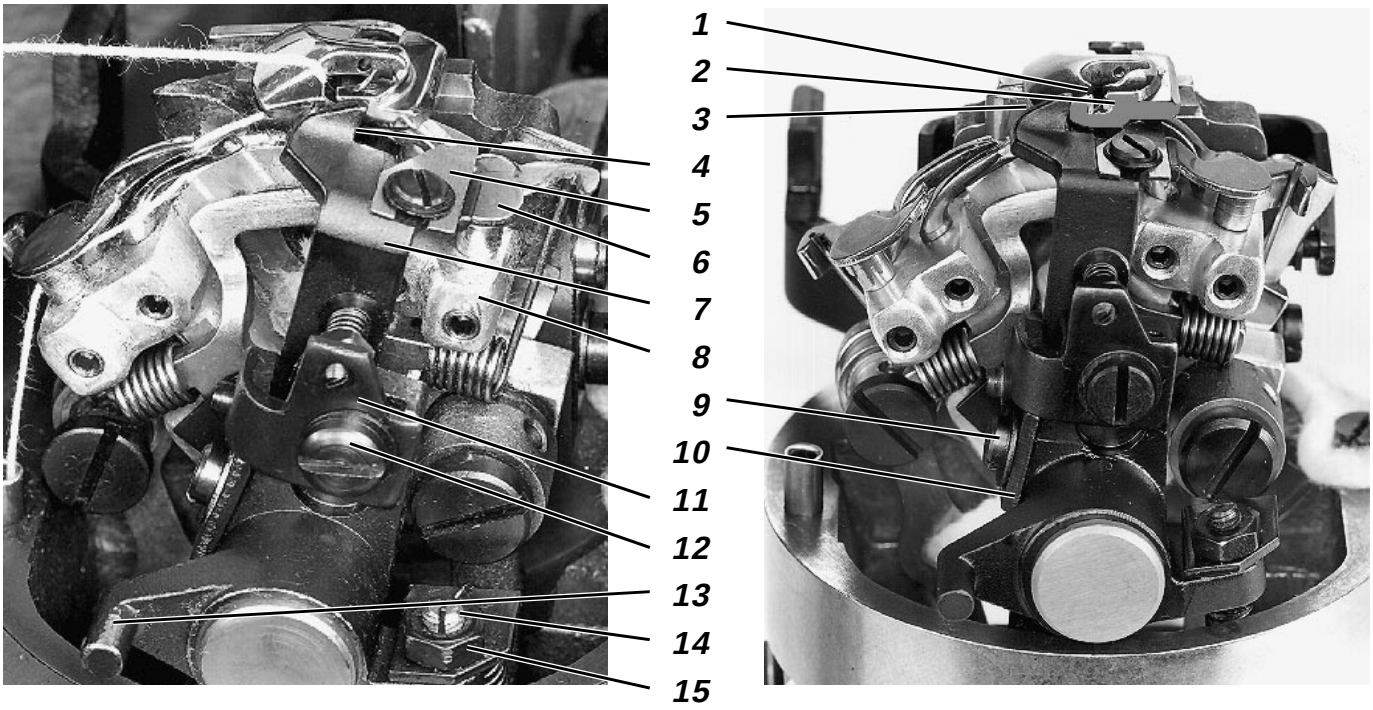


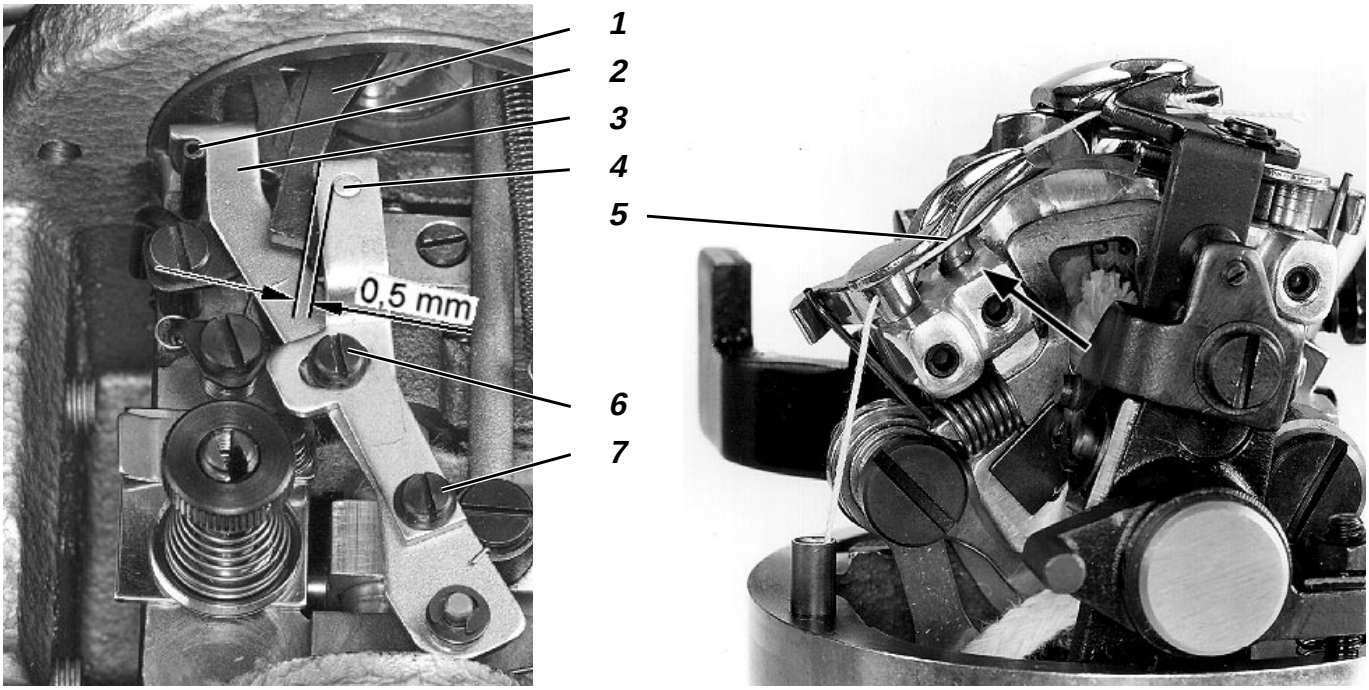
Right end position

- Loosen lock nut 15.
- Set screw 14.
  In the right end position edge 4 of the underthread gripper should have moved about 1 mm beyond the edge 2 of the exit on the thread slit.
- Tighten lock nut 15 again.
- Swing the hook carrier into its extreme left position by turning the handwheel.
  The spreader stop 6 should not hit the knife holder 7.

Height

- Loosen screw 12.
- Set holder 11.
  In the right end position the upper edge 3 of the underthread gripper and the top 1 of the needle plate should be at the same height.
- Swing lever 13.
  Check if the upper thread knife 5 can be moved unhindered and without hitting between the needle plate and the spreaders and spreader stop.
- Loosen screw 9.
- Set the height stop 10 tight under holder 11.
- Screw 9 again.
- Conduct a manual clamping trial.

38. Underthread Puller by Sub-classes - 211000 and - 241000



The movement of the underthread puller 3 occurs simultaneously with the cutting movement of the upper thread knife.

The amount of underthread pulled forward assures a secure seam beginning. It prevents the premature pulling out of the otherwise tensioned underthread out of the underthread gripper.

The amount of underthread pulled forward must be so set,

- that the underthread on the one hand is held taut, during the first stitch at the seam beginning, between hook and needle plate bottom
- on the other hand, however, is not yet pulled out of the underthread gripper during the first stitch.

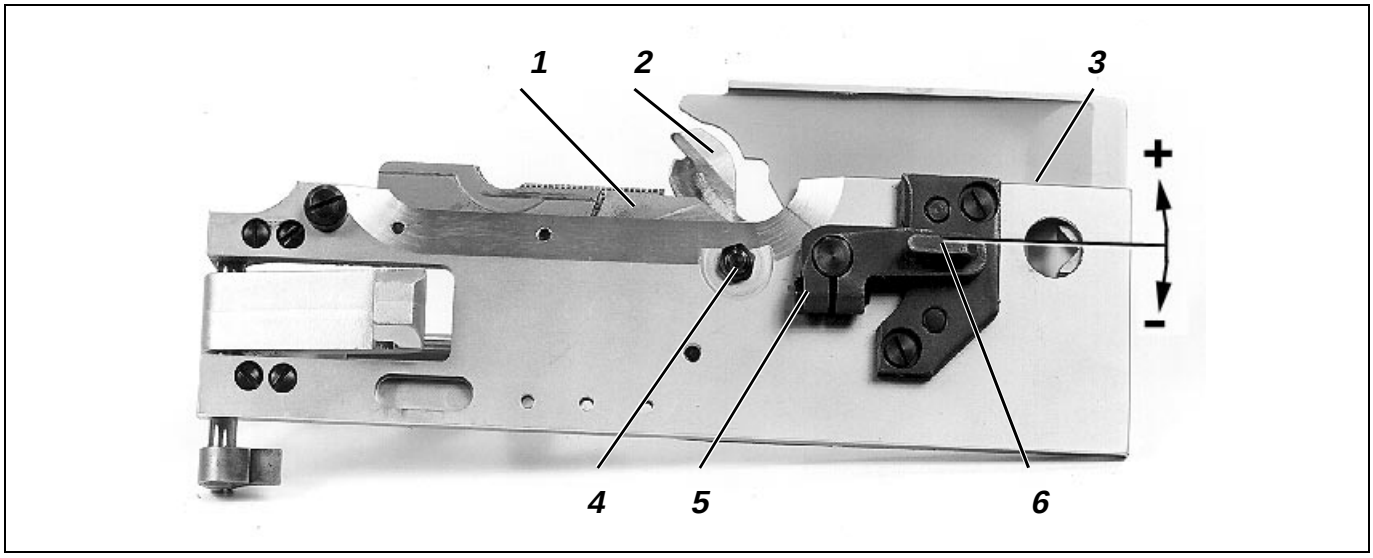
The amount of underthread 5 pulled off is shown in the photograph.

Caution Risk of Injury !

Pull the mains plug before adjusting.

- Loosen screws 6 and 7.
- With the underthread puller 3 touching pin 2 set a clearance of about 0.5 mm between lever 1 and pin 4.
- Tighten screws 6 and 7 again.
- To check the setting tilt the machine head up.
- Conduct the first stitch by turning the handwheel.
  Thereby observe the function of the underthread puller.
  If necessary correct the set clearance slightly.

39. Short trimmer for Underthread and Gimp by Sub-class - 241000

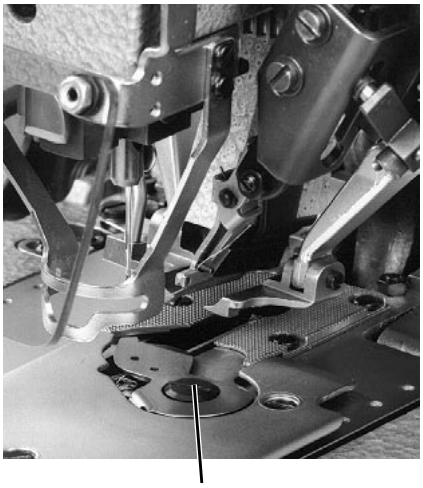


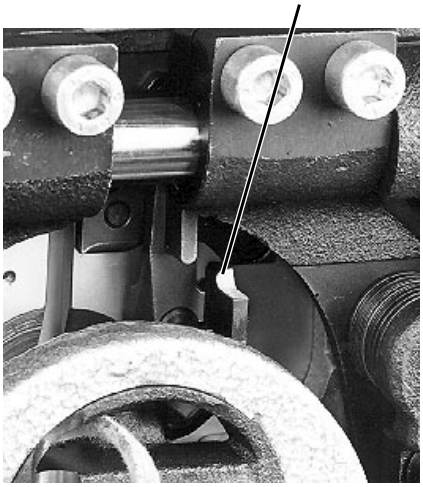
Just before the machine end position the hook block turns.
The driver 8 mounted thereon operates the scissors knives 1 and 2 through lever 6.

The blades of the two scissors must have moved about 1 mm above each other in front of their reversing point.

Caution Risk of Injury !

Pull the mains plug before adjusting.

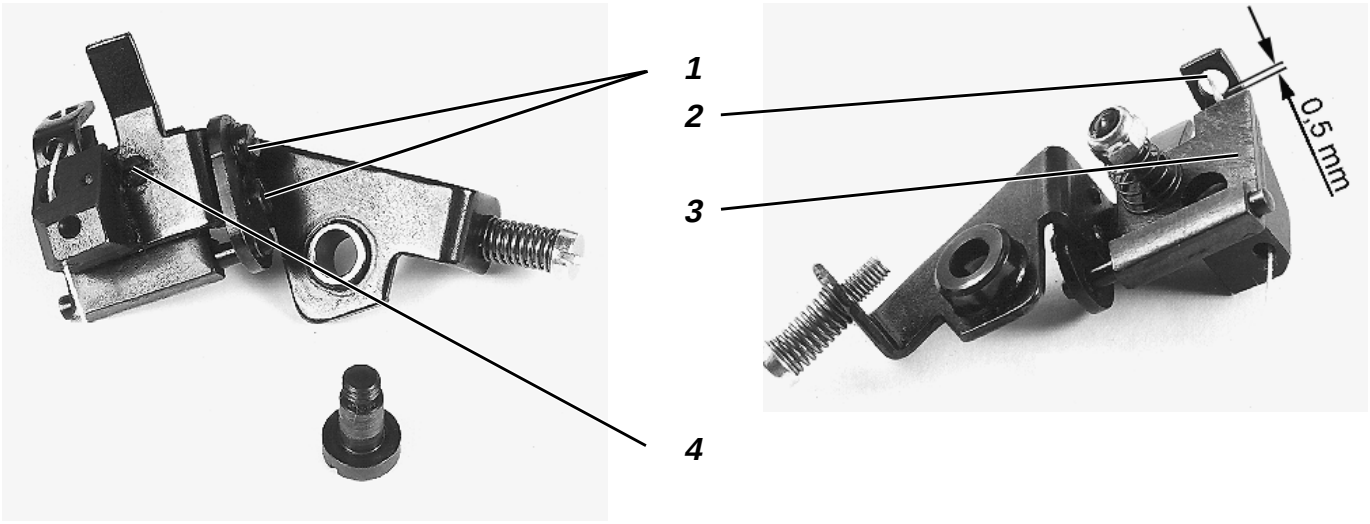




- Bring the machine in the end position by turning the hand crank.
- Remove the right clamping plate.
- Loosen screw 5.
- Align lever 6 parallel to the edge 3 of the clamping plate as a preliminary setting.
- Tighten screw 5 again.
- Loosen nut 4.
- Set screw 7 with underlying star spring so that a good cutting result is achieved with the lowest possible cutting pressure.
- Tighten nut 4 again.
- Conduct a manual cutting trial with yarn or gimp.
  Thereby check for ease of knife movement.
  For grinding the knives see chapter 43 .
- Position the clamping plates.
- Operate the scissors knives by turning the hand crank.
  The blades must move about 1 mm over each other.
- If necessary correct the scissors path by adjusting the lever 2:

In the arrow direction (+) to the left = greater path
In the arrow direction (-) to the right = smaller path

40. Gimp Pulling Device by Sub-class - 241000



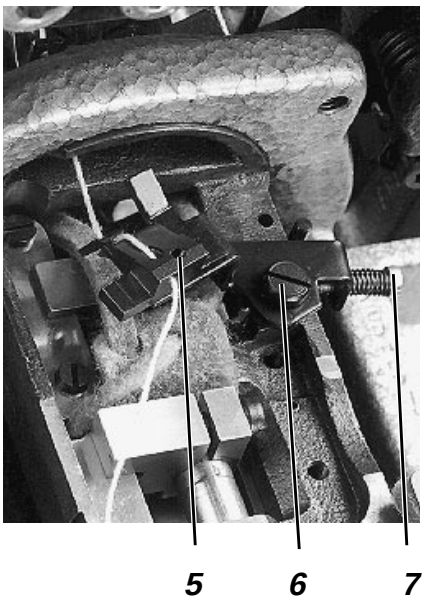
The drop weight 5 with the adjustable brake flap 3 pulls the lower gimp back to the correct starting length before sewing begins.

The path of the drop weight 5 is limited by the stop screw 7. It must be set so that the gimp is as short as possible but still be able to be sewn in securely at the beginning of sewing.

For this the gimp end extend about 4 mm out of the gimp hole in the needle plate.

Caution Risk of Injury !

Pull the mains plug before adjusting.



- Remove the clamping plates.
- Turn the handwheel until it catches.
  The needle is in its highest position.
- Turn the hand crank until the hook block is turned 180°.
- Screw out screw 6 and remove the drop weight 5.
- Loosen screws 1.
- Set a clearance of 0.5 mm between the brake flap 3 and the hole 2.
- Tighten screws 1 again.
- Attach drop weight 5 with screw 6 again.
- Thread the lower gimp.
- Set the braking power at setting screw 4.
  At the beginning of sewing the drop weight 5 must also be pulled up to touching through the gimp thread.

Note!
Setting screw 4 was inserted with a liquid screw lock.
It is therefore difficult to turn.

With the braking power set too high the position of the gimp in the area of the buttonhole eye changes.

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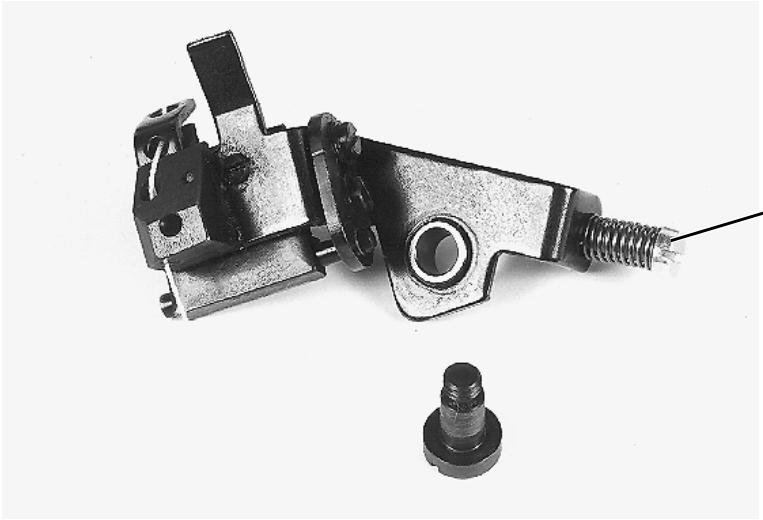


– Set the stop screw 1.
  The gimp end should, after cutting, still extend about 4 mm out of the gimp hole in the needle plate.

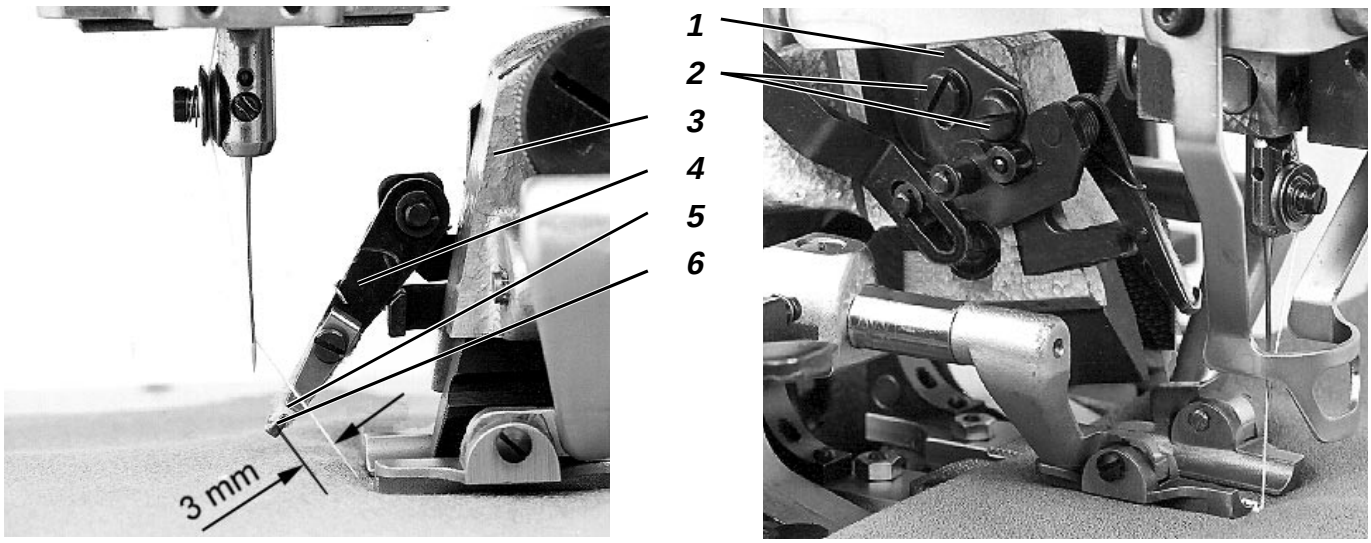
  Screw screw 1 in = shorter gimp end
  Screw screw 1 out = longer gimp end

ATTENTION !

The path of the drop weight must also be reset when changing the buttonhole length or the clamping plates (change of the cutting length assembly) neu eingestellt werden.

From experience when changing the clamping plates turn the stop screw 1 by 1 turn and a little less for length adjustment.

41. Mechanical Upper Thread Catcher by Sub-classes - 211000 and - 241000



The upper thread catcher 4 lowers and rises with the movement of the cutter bar 3.

During lowering the hook 6 must move about 3 mm forward beyond the upper thread. Only thus is assured that the upper thread jumps securely behind hook 6.

The felt 5 holds the upper thread end until the next seam beginning.

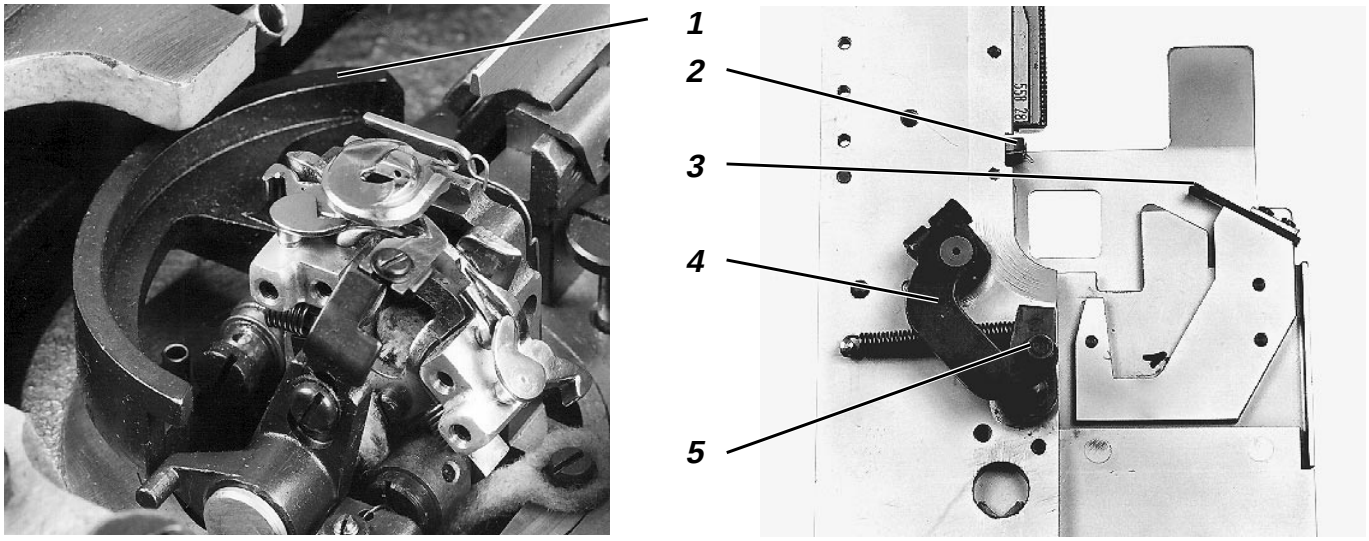
- Conduct the setting with threaded thread and with material in place.
- Turn on the machine with the hand lever.
- Just before the seam end of the left buttonhole seam turn the machine off with the hand lever or pedal.

Caution Risk of Injury !

Pull the mains plug before adjusting.

- Manually turn the handwheel farther until it catches (turn-off position).
- Turn the hand crank until the cutter bar 3 reaches its lowest position.
- Loosen screws 2.
- Turn plate 1 so that the hook 6 lies about 3 mm forward beyond the upper thread.
- Tighten screws 1 again.

42. Long Trimmer for Underthread and Gimp by Sub-class -221000

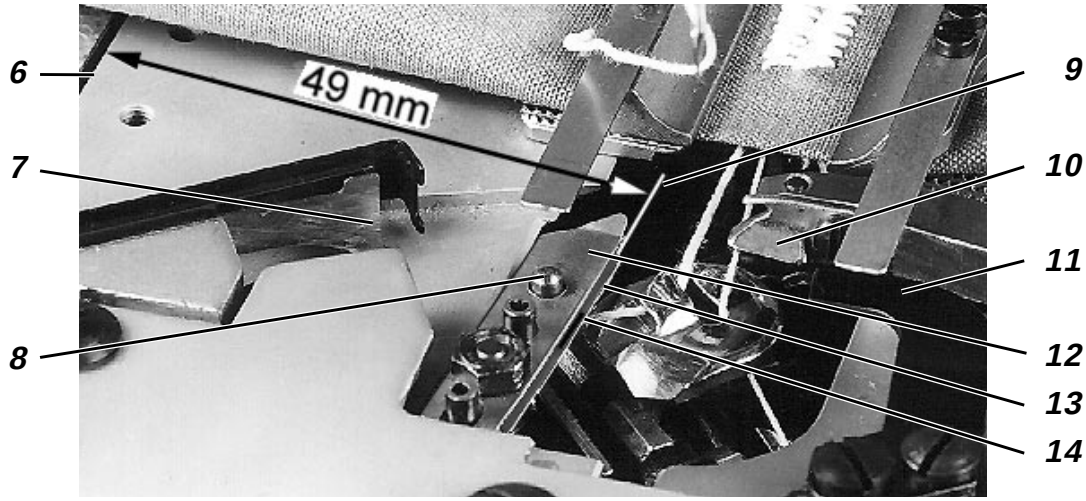


Lever 4 for the underthread and gimp trimmer is operated by the knife drive curve 1.

The blades 2 and 3 must move 1 mm above each other.

Roller 5 determines the swing of lever 4 through its position to the knife drive curve 1.

42.1 Position of the Underthread and Gimp Clamp

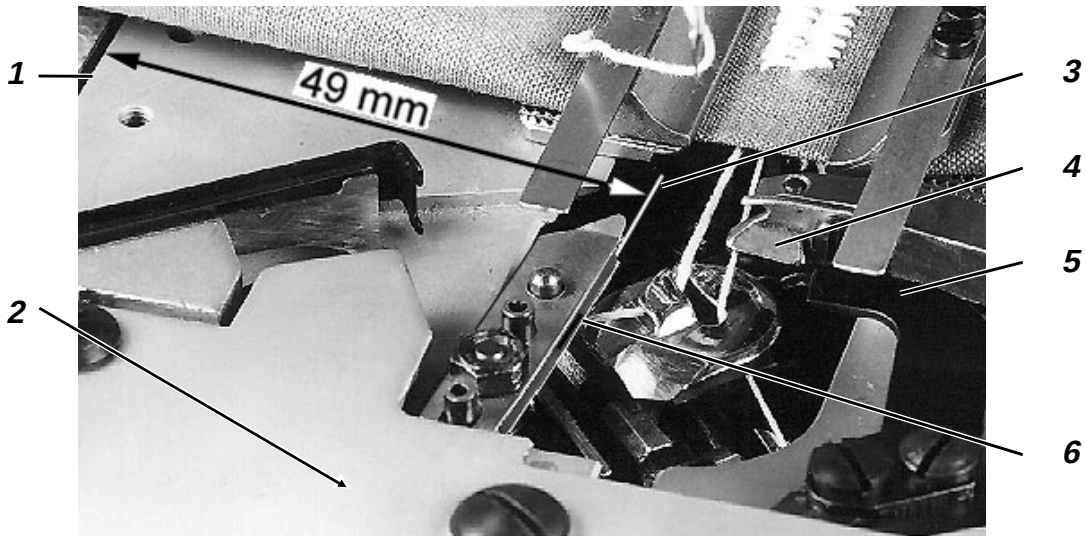


Before the start of the cutting sequence at the fixed knife 7 the underthread must be pulled between the lower clamping spring 14 and clamping piece 13. The gimp thread must be pulled between the upper clamping spring 12 and clamping piece 13.

For this the thread gripper must take the following position:
There must be a clearance of 49 mm between the left edge 6 of the left clamping plate and edge 9 of the thread gripper.

There must be a clearance of only 0.3 mm between the thread seperator 10 swinging to the left and the tips of the thread gripper.

For a sure insertion of the underthread before cutting the clamping spring 14 is opened by the operator 11 via pin 8.
The opening width is thereby dependent on the thickness of the underthread used. With too large an opening width the underthread can jump back after cutting.



Caution Risk of Injury !

Pull the mains plug before adjusting.

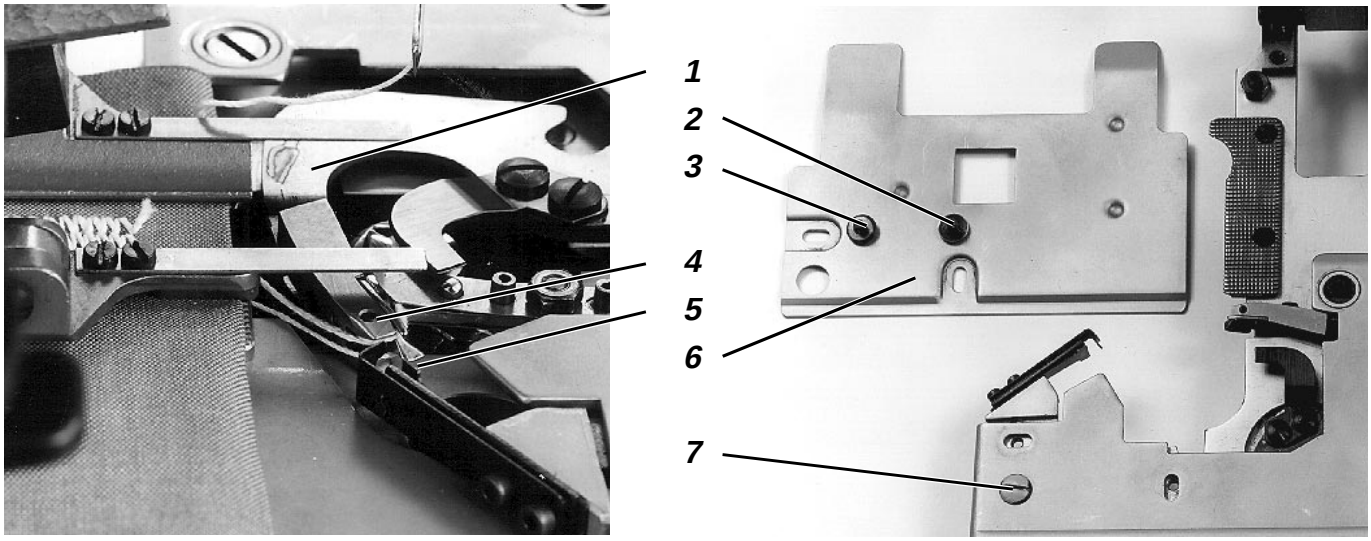
- Bring the machine into the end position.
- Remove the clamping plates.
- Loosen the mounting screws 2 for the thread gripper.
- Set a clearance of 49 mm between the left edge 1 of the clamping plate and the right edge 3 of the thread gripper.

ATTENTION !

If the thread gripper is too far to the right, that is, over the needle plate surface, there is a **danger of breakage** during the turning movement of the hook block.

- First tighten the mounting screws 2 slightly.
- Position the clamping plates.
- Slide the thread gripper until a clearance of about 0.3 mm to the thread seperator 4 is reached.
  To check the clearance manually swing the thread seperator 4 to the left.
- Remove the clamping plates.
- Check the clearance of 49 mm between the edges 1 and 3 again and correct if necessary.
- Tighten mounting screws 9.
- Align the operator 5 in its height so that the clamping spring 6 is opened suitably for the underthread thickness used.
- Set the pressure of the cClamping spring 6 through dressing so that the underthread is held slightly clamped after cutting and does not jump back.

42.2 Cutting Rressure and Cutting Movement of the Underthread and Gimp Trimmer



The cutting pressure may only be set as strong as is necessary for a sure cutting of the threads.

At the reversing point the blade of the fixed knife 5 must lie about 1 to 2 mm over the blade of the movable knife 4. At the reversing point the movable knife 4 has reached its farthest swing to the left.

In this position it must still be possible to manually move the movable knife 4 in the cutting direction. A little play must be felt.

Caution Risk of Injury !

Pull the mains plug before adjusting.

- Bring the machine into its end position.
- Remove the right clamping plate.
- Screw out screws 2 and 3.
- Remove the cover plate 6.
- Loosen the yellow-marked screw 7.
- Manually swing the movable knife 4 to the left.
  Hold the knife in this position.
- Bring the fixed knife 5 to touching through light pressure on the movable knife 4.
- Tighten the yellow-marked screw 7.
- Conduct a manual cutting trial with thread.
  If the blades are not parallel to each other align the knife lever 1 slightly.
  Do not loosen the yellow-marked screw 7 again thereafter.

ATTENTION !

Do not with too great a cutting pressure.
If necessary align the knife lever 1 slightly or regrind blunt cutting knives (see chapter 43).

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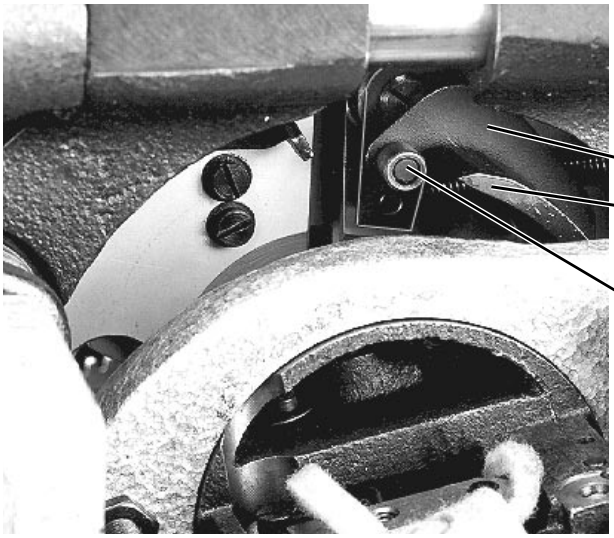
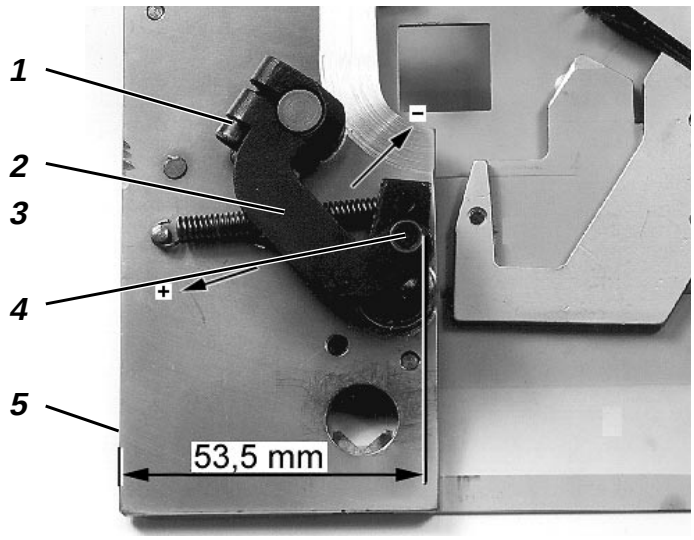
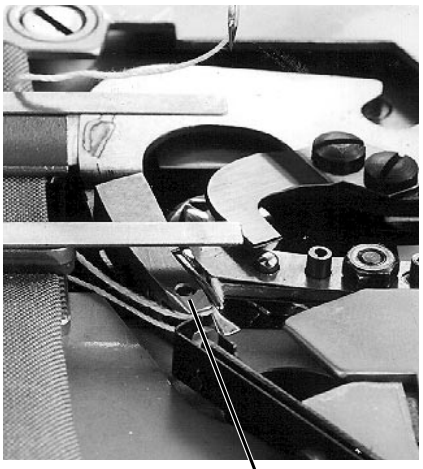




- Loosen screw 1.
- Set the operating lever 2.
  Set a clearance of 53.5 mm between edge 5 of the clamping plate and the outside of the roller 4.
  Turn the operating lever 2 appropriately.
- Tighten screw 1 again.
- Position first the left, then the right clamping plate.
- Turn the hand crank until the turning movement of the hook block begins after the sewing sequence is turned off.
- Tilt the machine head up.
- Slowly turn the hand crank farther until the roller 4 is close in front of the knife drive curve 3.
- During the continued turning the roller 4 should not hit in front of the tip of the knife drive curve 3.
  It should roll off of the inside of the curve and be only lightly operated by the curve beginning.
  If this is not the case suitably correct the position of the operating lever 2 before turning farther.
- Continue to turn the hand crank until roller 4 reaches the end of the drive curve.
  In this position it must be possible to manually move the movable knife 6 slightly to the left.



ATTENTION !

If the movable knife 6 cannot be moved farther in the cutting direction there is a **danger of breakage** through blockage.

- Set the safety clearance by adjusting the roller 4:

  in arrow direction + = greater swing to the left
  in arrow direction - = less swing to the left

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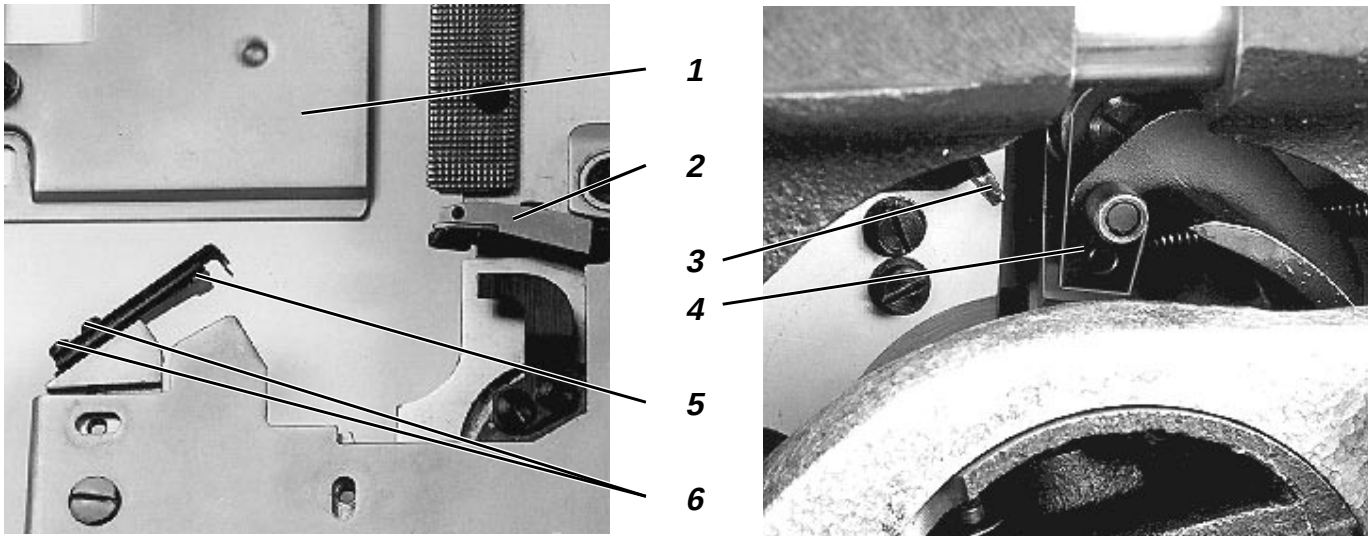
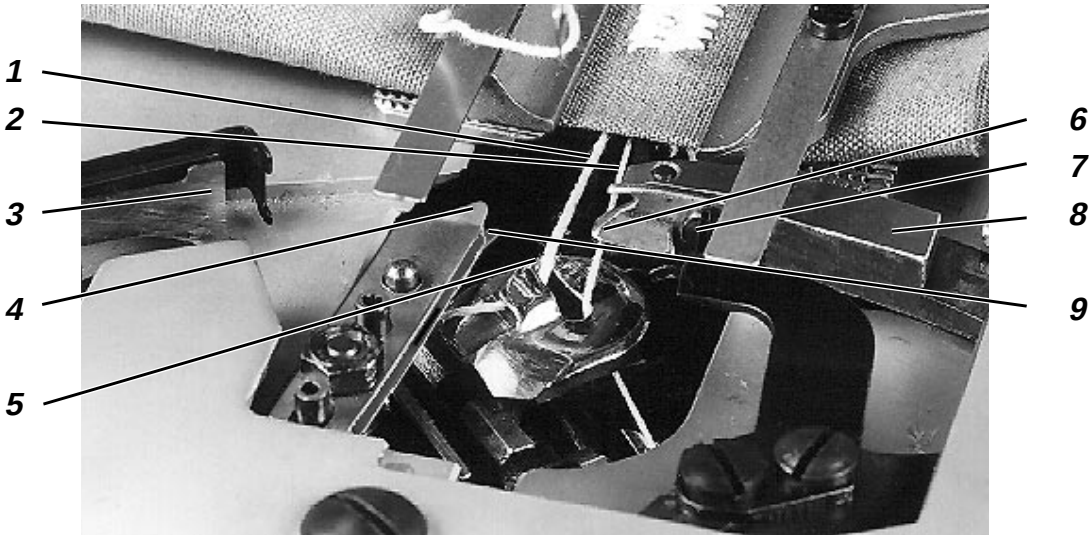


- By turning the hand crank bring the movable knife 2 back into the left end position.
- Loosen screws 6.
- Set the fixed knife 5 with its blade 1 to 2 mm above the blade of the movable knife 2.
- Tighten screws 6 again.
- Screw cover plate 1 on again.
- With the greatest left swing of the knife lever 4 and spread clamping plates set the angle 3 to 0.3 mm from the knife lever. With jammed knives the knife lever 4 is repelled by angle 3. This occurs after cutting when the spread clamping plates open and return to the base position.

42.3 Thread Seperator for Underthread and Gimp



The tip of the thread seperator 6 must insert itself between the underthread 2 and the gimp 1.

For this both threads must be taut. For the gimp this is achieved through a torque rod on the hook block. Thin and smooth gimps may have to be threaded through 3 holes on the unwinding arm of the yarn stand.

During the movement of the needle plate and thread catcher 8 with thread seperator 6 the hook thread glides into the slit 5 of the needle plate.
Through this the hook thread is securely guided to the lower clamp 9 and the gimp to the upper clamp 4.

The hook thread must jump out of the slit 5 when the thread seperator 6 is about 5 to 7 mm in front of the cutting edge of the fixed knife 3.

Through the residual movement of the thread catchers 8 both threads are pulled into the clamps 4 and 9 before cutting.

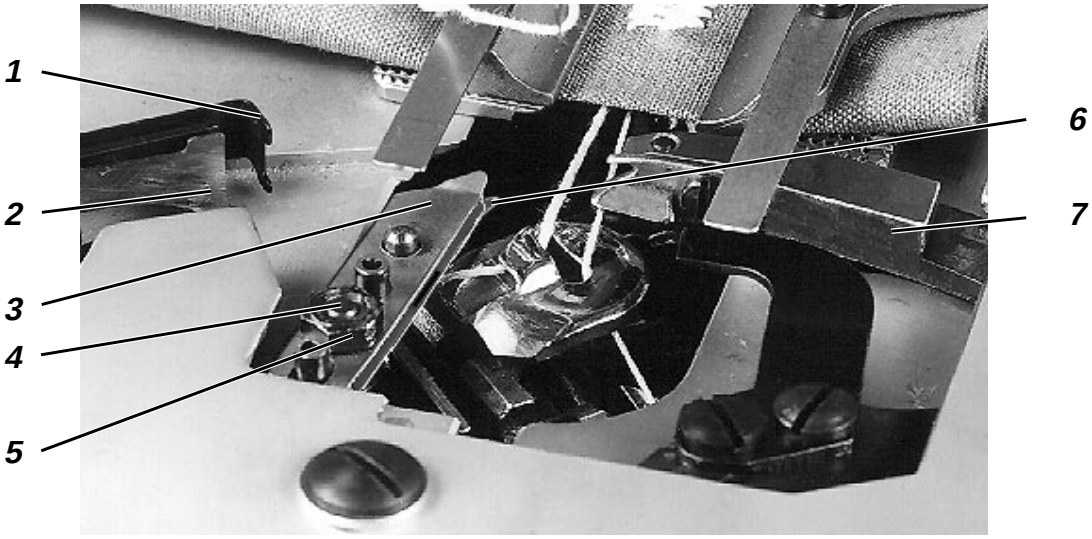
- Remove the cover plate of the right clamping plate.
- Insert material and turn on the machine.
- Turn off the machine at the seam end (end of the left buttonhole seam).

Caution Risk of Injury !

Pull the mains plug before adjusting.

- Turn the handwheel until it catches.
- Turn the hand crank until the tip of the thread seperator 6 is in front of the underthread and gimp.
- Loosen screw 7.
- Set the thread seperator 6 so that the tip of the thread seperator 6 strikes between the underthread and gimp.
- Tighten screw 7 again.

42.4 Thread Gripper and Thread Deflector



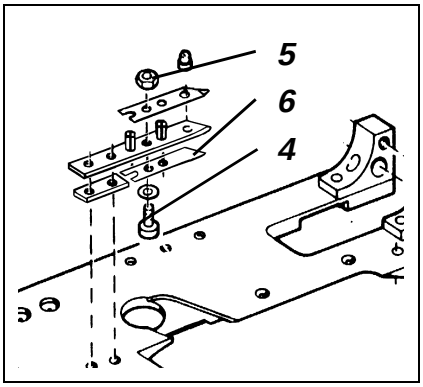
The force of the clamping spring 6 is, dependent on the thickness of the underthread used, to be set so that the thread can be pulled under it without hindrance. The underthread must, however, be held so tight that a secure and drawn tight seam beginning is achieved.

The gimp must let itself be drawn unhindered under the clamping spring 3. Thereby it should, however, be only very slightly clamped.

The deflector 1 is attached above the fixed knife 2. It prevents the underthread end from entering between knife 2 and the back of the thread catchers 7. It is instead guided next or in to the thread catcher. If this does not occur the knife can be pressed down and not cut.

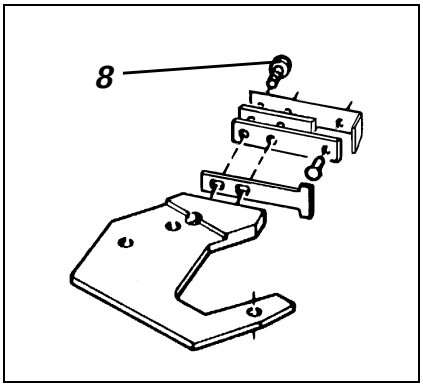
Caution Risk of Injury !

Pull the mains plug before adjusting.



Thread gripper

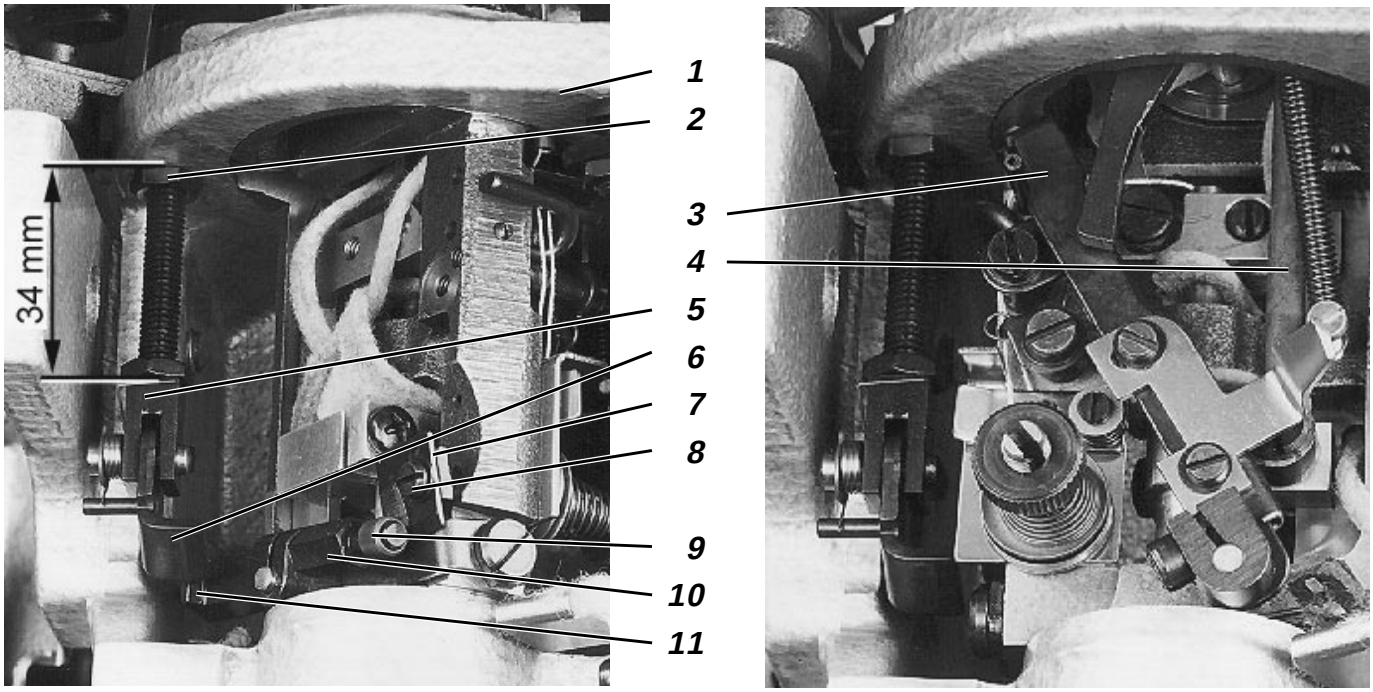
- Loosen nut 5.
- Set the clamping spring 6 by turning the screw 4 so that the above described clamping force is attained.
  The spring should not be set tight by screw 4.
- Tighten nut 5 again.
- Set the force of clamping spring 6 through slight alignment, if necessary.



Thread deflector

- Loosen screw 8.
- Set the thread deflector so that the above described function is attained.
- Tighten screw 8 again.

42.5 Underthread Puller for the Cutting Procedure



The pulling forward of the underthread is necessary so that the thread seperator can bring enough loose underthread to the fixed knife. A distortion of the sewn buttonhole is thus avoided.

After the sewing sequence is turned off and the turning movement of the hook block begins the thread pull lever 3 is operated by the latch 6 and cam 11.

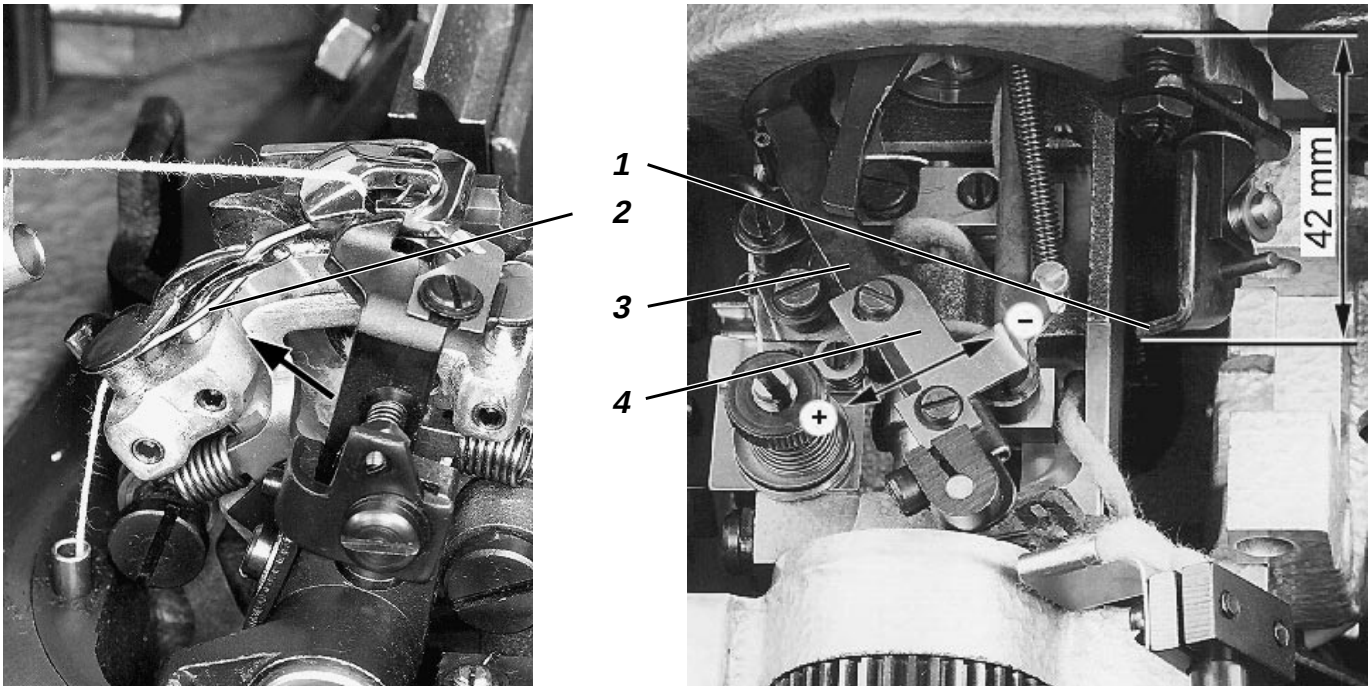
In order to have a sufficient amount of thread the thread pulling lever 3 must have moved to within about 2 mm of tie rod 4.
Latch 6 must thereby lie at the highest point of the cam 11.

In order to assure a flawless run of the cam onto the latch there must be a clearance of about 34 mm between the housing 1 and the upper edge of the fork 5.

Caution Risk of Injury !
Pull the mains plug before adjusting.

- Loosen lock nut 2.
- By turning the latch 6 in or out set a clearance of about 34 mm between the housing 1 and the upper edge of the fork 5.
- Tighten lock nut 2 again.
- Turn the hand crank until the hook block enters the position shown. In this position the latch 6 has run onto the highest point of the cam 11.
- Loosen clamping screw 10.
- Turn the thread pulling lever 3 so that there is a clearance of about 2 mm to the tie rod 4.
- Tighten clamping screw 10 again.
  Torque = 3.3 Nm !
- Loosen screw 8.
- In the idle position of the thread pulling lever 3 set the release plate 7 for the underthread tension at a small clearance to the roller 9.
- Tighten screw 8 again.

42.6 Underthread Puller for the Secure Seam Beginning



In order that the underthread held in the thread gripper not be pulled out of the thread gripper before the actual seam beginning through rapid movement of the material support plate a suitable quantity of thread must be pulled forward by the thread pulling lever 3.

The underthread gripper on the left clamping plate must thereby be set so tight that the underthread 2 is subsequently pulled only out of the underthread tension.

The quantity of underthread drawn forward must be so set,

- that the underthread, on the one hand, is held tight between the hook and the needle plate bottom during the first stitch at the seam beginning
- on the other hand, it should also not be pulled out of the underthread gripper at the first stitch.

The quantity of loose underthread at the hook required for this can be seen in the illustration below.

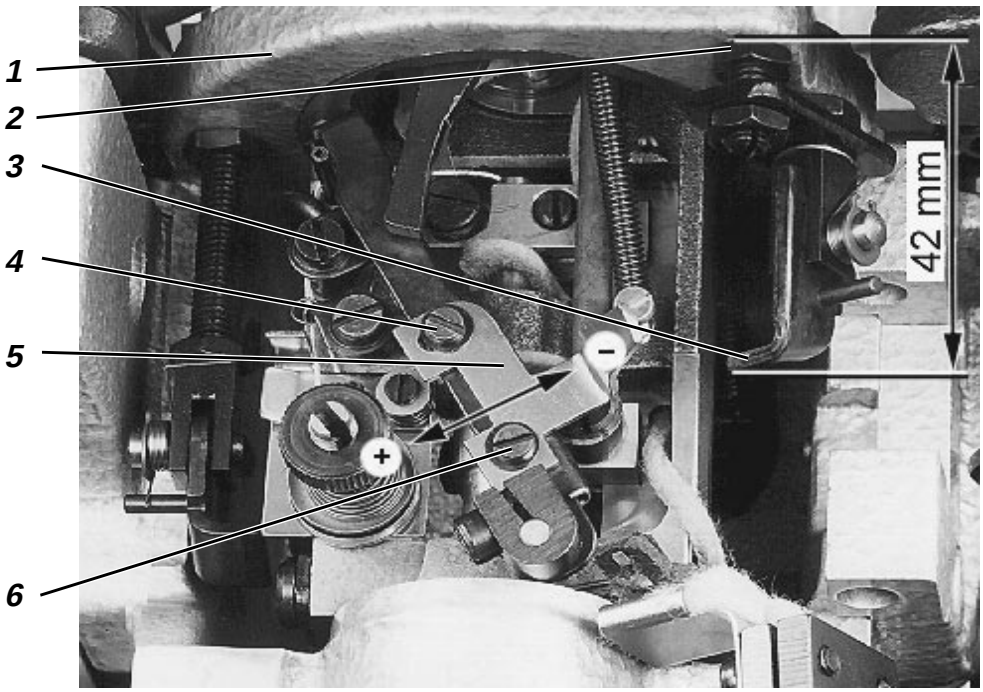
Too great a quantity of thread can cause loose stitch pulling.
Too small a quantity of thread can lead to missing stitches at the seam beginning.

ATTENTION !

When changing over from short to very long buttonhole lengths at the length setting slide a correction of the thread quantity becomes necessary.

The pulling forward of the underthread 2 occurs just before the machine end position through latch 1 and thread pulling angle 4.

For setting see next page !

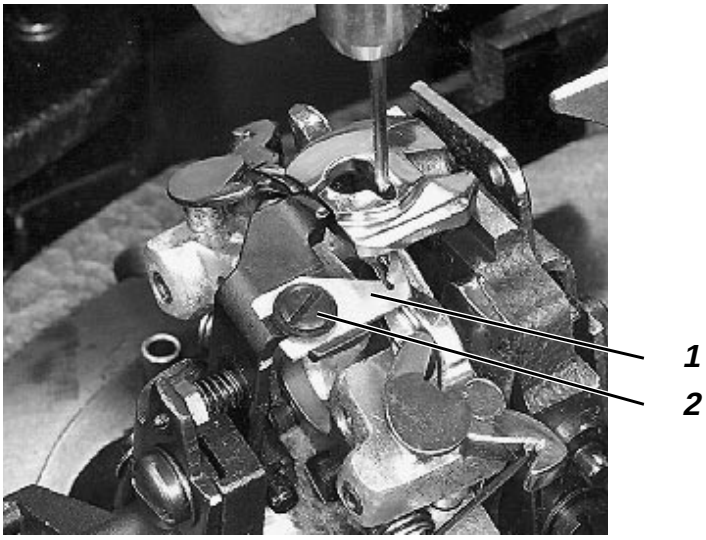


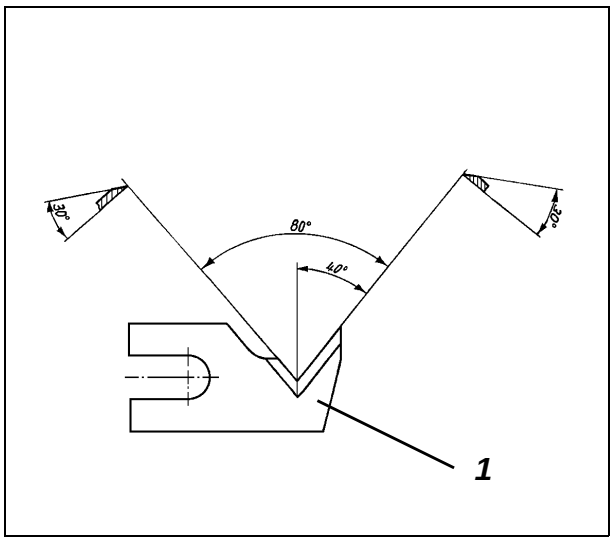
Caution Risk of Injury !
Pull the mains plug before adjusting.

- Bring the machine into its end position.
- Tilt the machine head up.
- Loosen lock nut 2.
- Set the clearance.
  The clearance between housing 1 and the lower edge the latch 3 should be 42 mm.
  Through this clearance a flawless running of the latch 3 onto the thread pulling angle 5 is achieved.
- Tighten lock nut 2 again.
- Loosen screws 4 and 6.
- First set the thread pulling angle 5 at the middle of the slot.
- Tighten screws 4 and 6 again.
- By turning the handwheel check the thread quantity at the first needle stitch of the buttonhole seam.
  If necessary correct the position of the thread pulling angle 5:

in arrow direction + = more underthread
in arrow direction - = less underthread

43. Grinding the Thread Trimming Knives





After a longer period of operation the trimming knives can lose their sharpness. In this case they should be reground or replaced by new knives.
New trimming knives are to be ordered with the appropriate order no. from the offices of the **DÜRKOPP ADLER AG**.

When grinding the blades it is essential that the following cutting angles be adhered to.

43.1 Grinding of the Upper Thread Knife

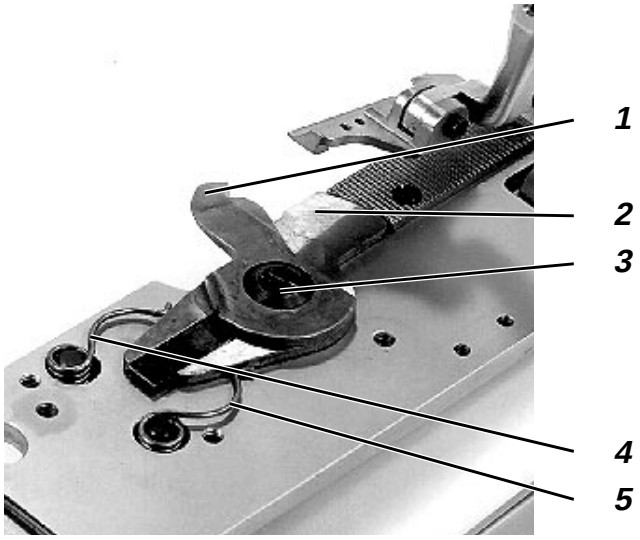
The upper thread knife is the same for all sub-classes.

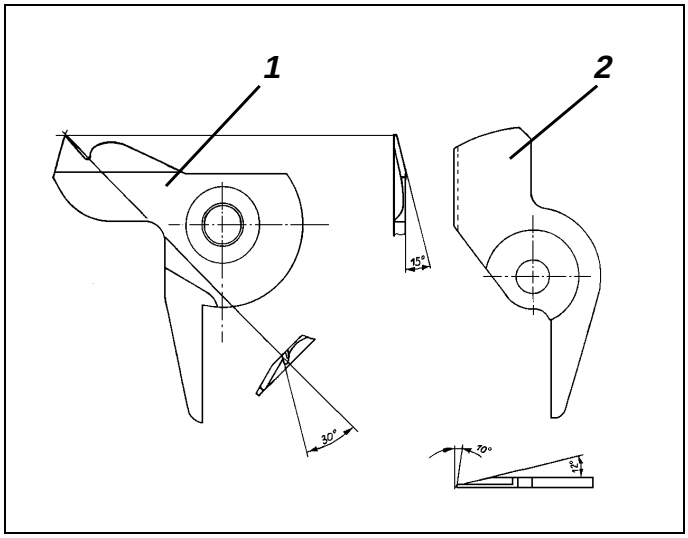
Order no. 558 9011

Caution Risk of Injury !
Before removing the trimming knife pull the mains plug.

- Loosen screw 2.
- Remove the upper thread knife 1.
- Regrind the blades according to the information in the drawing.
- Insert the upper thread knife 1 as per the setting information in chapter 36.
- Tighten screw 2 again.

43.2 Grinding the Scissors Knives for Sub-class - 241000





The different cutting length assemblies are equipped with different upper and lower knives.

Order no.s of the scissors knives for underthread and gimp

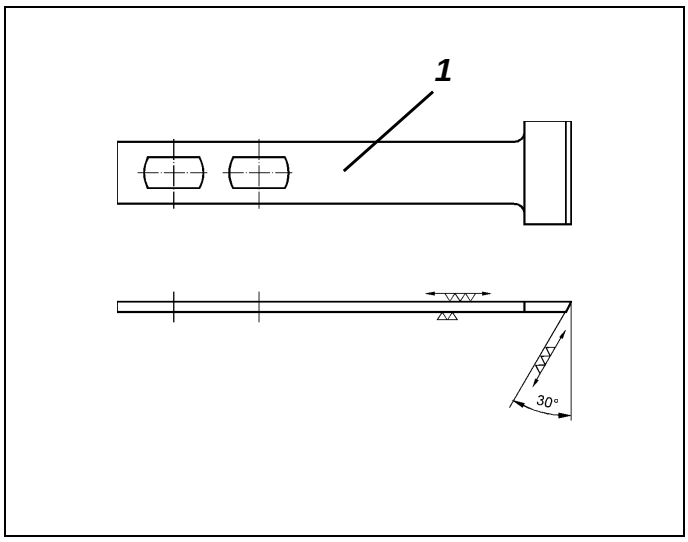
Cutting length assembly	Upper knife	Lower knife
L1	558 8816	558 8817
L2	558 8858	558 8859
L3	558 8868	558 8869
L4	558 8878	558 8879

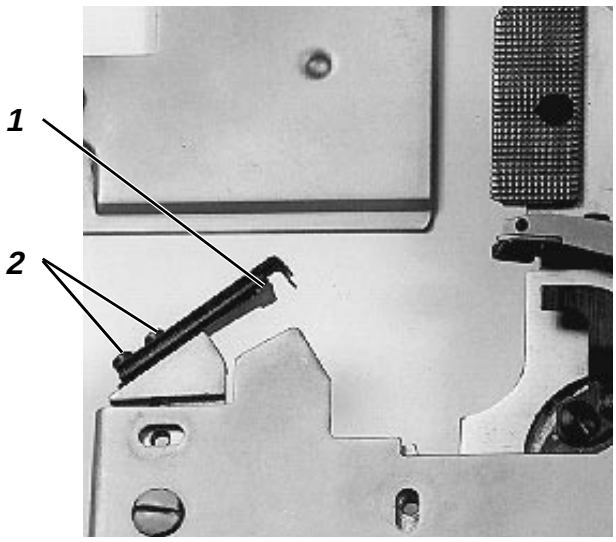
Caution Risk of Injury !

Before removing the trimming knives pull the mains plug.

- Remove the nut for pressure screw 3 to be found on the underside.
- Unhook springs 4 and 5.
- Screw out pressure screw 3 and remove scissors knives 1 and 2.
- Regrind the scissors knives according to the information given.
- Insert the scissors knives and check the setting as per chapter 39.

43.3 Grinding the Knives for Sub-class - 221000





The knife for the long trimmer has the order no. 558 7892

Caution Risk of Injury !
Before removing the trimming knife pull the mains plug.

- Loosen screws 2.
- Remove knife 1 with thread deflector and seperating plate.
- Regrind the blades of the knife according to the information given.
- Insert the knife and set as per the setting instructions in chapter 42.