



DÜRKOPP

Instructions for
Operator and Mechanics

556

DÜRKOPPWERKE GMBH

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Instructions for
Operator and Mechanics

556

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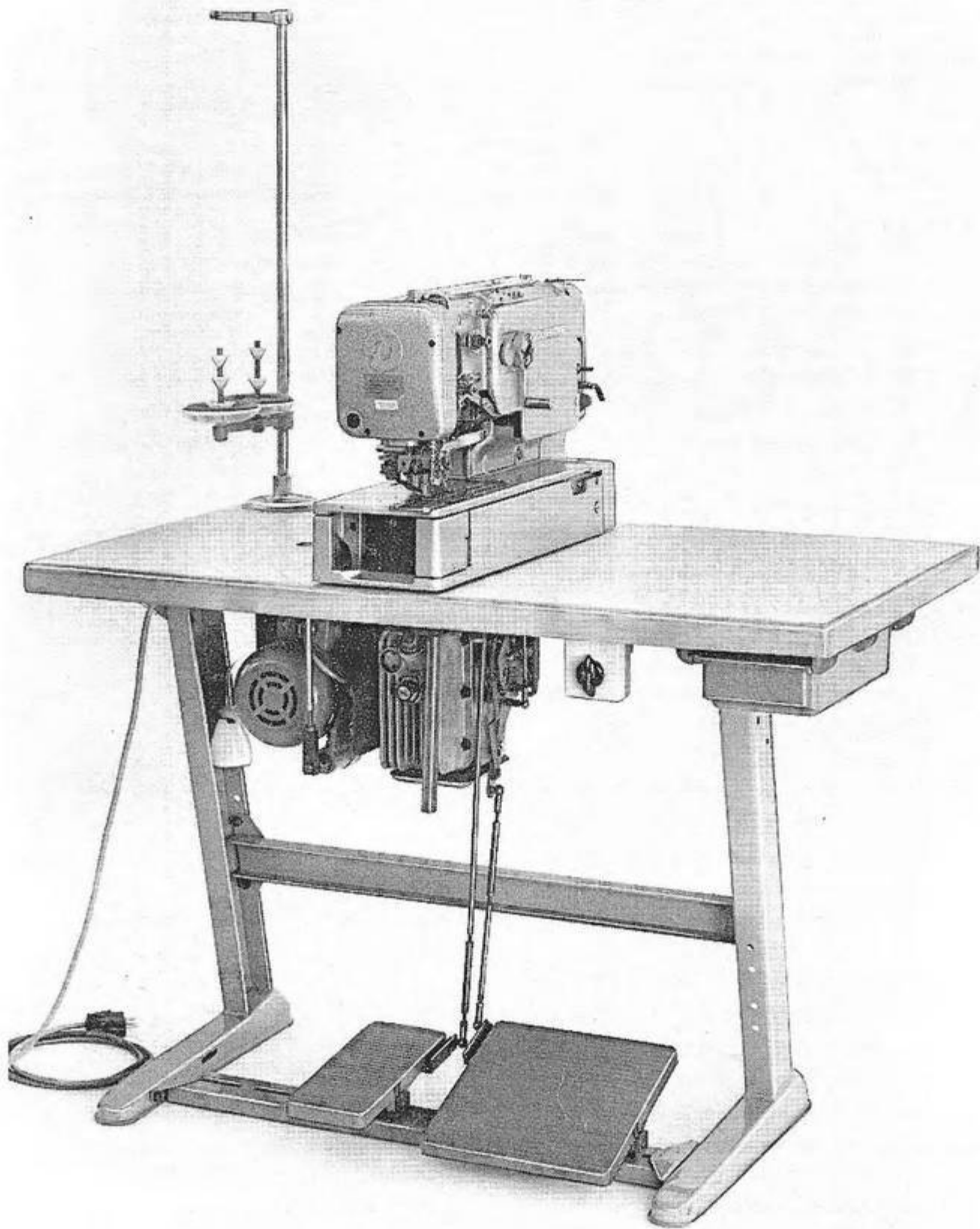


Fig. 1: Transversal installation of DÜRKOPP 556

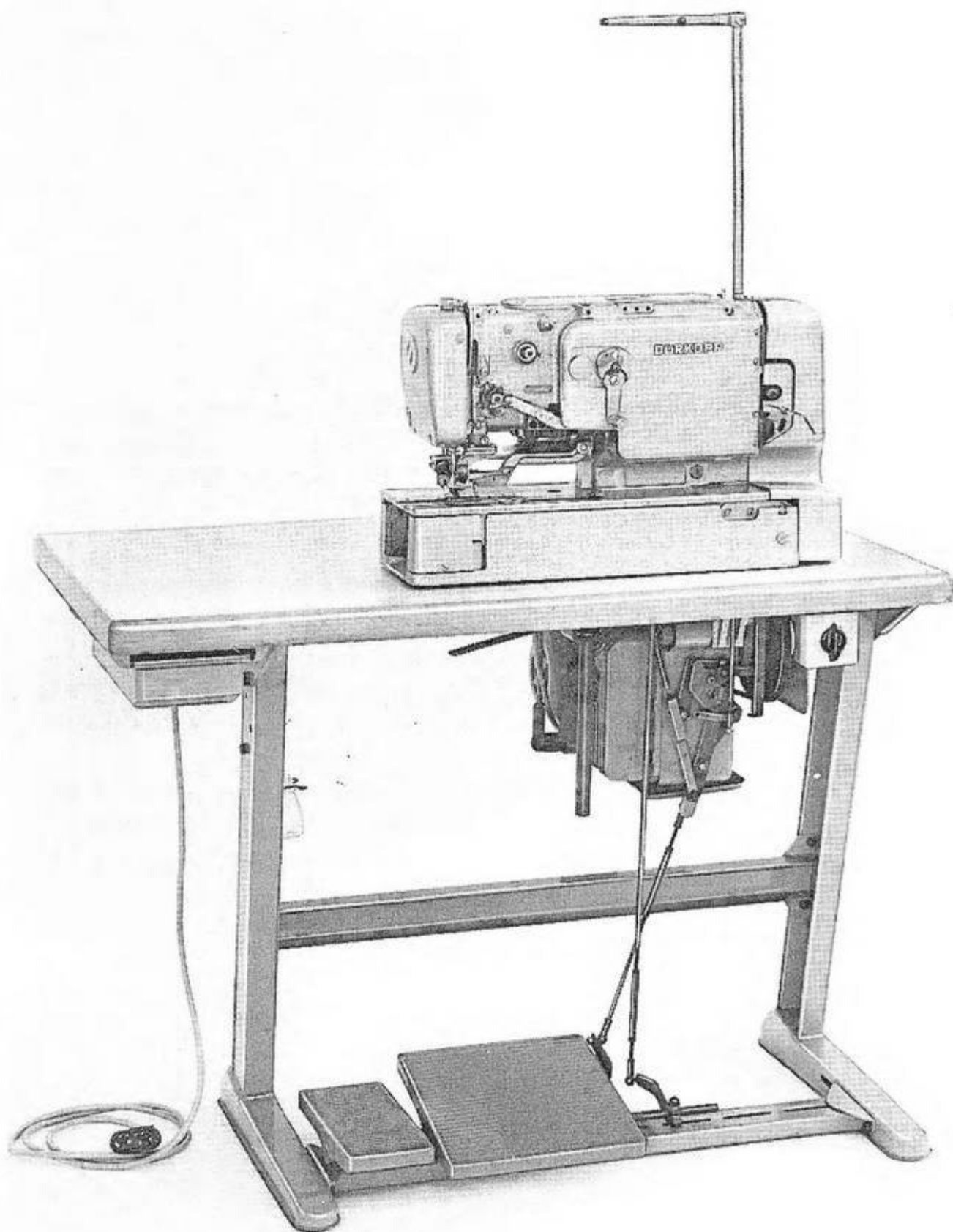


Fig. 2: Longitudinal installation of DÜRKOPP 556

DÜRKOPP 556

is an automatic high performance lockstitch buttonholer with central oil wick lubrication and separate lubrication of the hook. Lifting of the cloth presser frame and engagement of the machine is ensured by a hydraulic control unit.

GENERAL

1. Directions

All direction indications made in the present manual, such as on the left, on the right, in front, behind, are understood for a transversally installed machine seen from the side of the operator (front). In case of longitudinal installation the directions must be changed accordingly.

2. Moving the cloth presser frame into its end position by turning the crank

By turning the crank 1 (fig. 3) the cloth presser frame 2 can be transported forwards or backwards and can, therefore, be brought into its end position. The cloth presser frame is in its end position if it has travelled completely to the rear and the needle thread cutter 3 to the front. In this position, the main tensioner 4 must be open. This turning of the crank may become necessary if, for instance, the sewing cycle has been interrupted by the quick stop device and the cloth presser frame must be returned to its end position for starting a new button-hole.

3. Starting the machine by hand

For starting the machine by hand proceed as follows:

Lower the r/h pedal down to the stop, so that the joint 5 (fig. 4) can be pulled downwards and the lever 6 does not block. As shown in fig. 4, lift the lever 6 by means of a screwdriver until the lever 7 catches in the groove of the brake tappet 9 and until the ratchet 10 is sufficiently lowered for being released by the angular plate 11. In this position the machine is engaged and the r/h pedal can again be released.

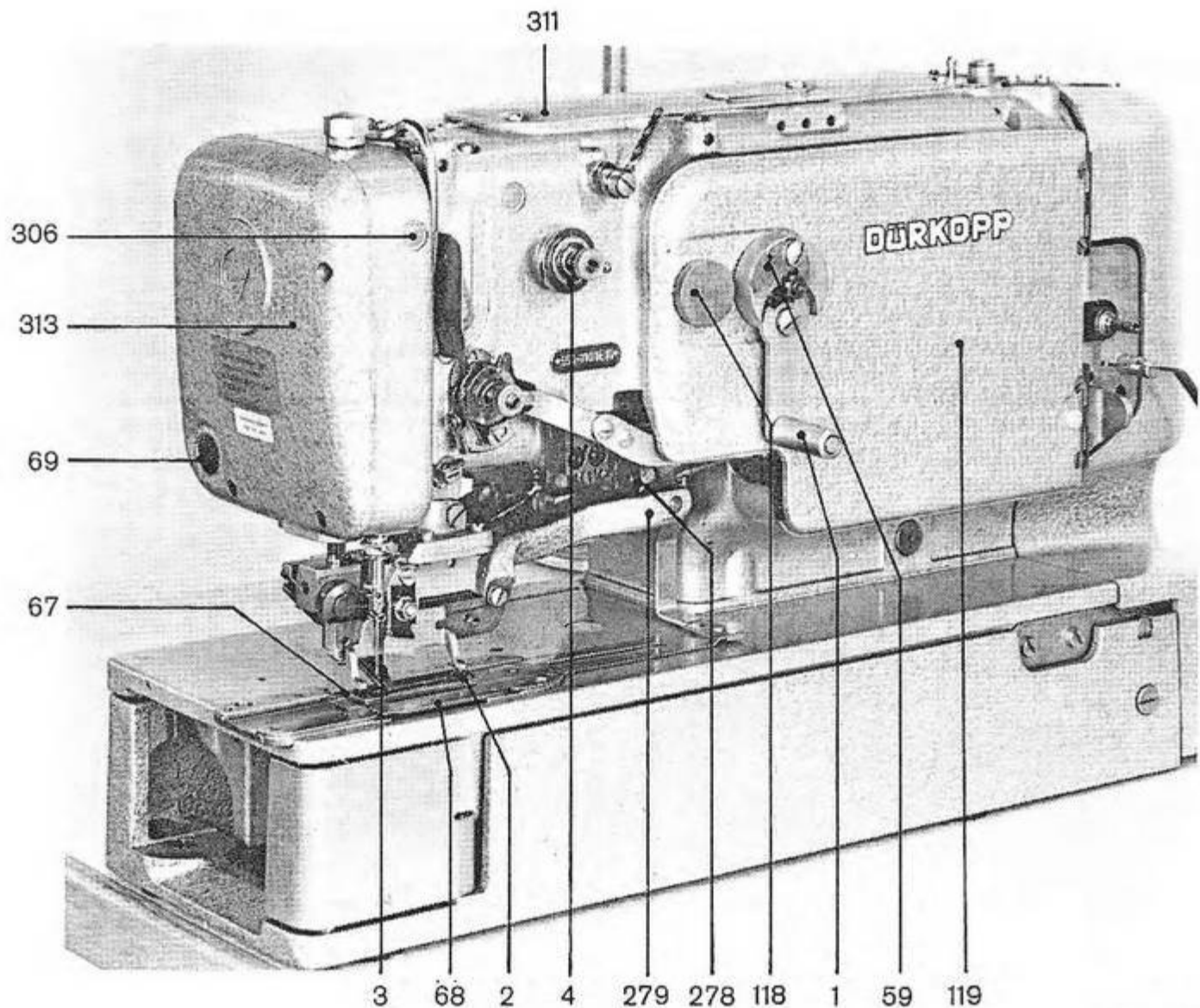


Fig. 3

4. Final stop position of the machine, obtained by motor action

The machine is in its disengaged final position if, after having switched on the driving motor and lowered the r/h pedal, it stops with the cloth presser frame in its rear final position, the knives having cut and the cloth presser frame being lifted. Furthermore, in the final position the two thread tensioners are open.

5. Final stop position of the machine, obtained by turning the clutch disk

The machine can be set to be in its disengaged final position without using the motor.

To do this, remove the flat belt from the pulley 12 (fig. 4) and engage the machine by hand, as described under 3.

Turn the crank 1 (fig. 3) until the cloth presser frame has reached its rear final position and until it can be heard that the tracing lever has dropped from its disengaging cam.

While maintaining this position, turn the clutch dis 13 (fig. 4) in the proper direction of rotation of the machine until the knife acts, the clutch disk disengages, the brake tappet catches into the braking part and the disengaged final position is reached. The needle thread will not be cut and the cloth presser frame will not be lifted before the flat belt is replaced and the driving motor is engaged.

MACHINE, STAND AND DRIVE

6. Installing the machine

a) Mounted on a stand

If DÜRKOPP 556 is supplied ready mounted on a stand observe the following indications in their sequence prior to taking the machine into service.

1. Remove the shipment locking device under the table top, fastened to the stand, and tension the V-belts by swinging the motor.
2. Remove the oil filling screw 14 and fill the hydraulic control unit up to the upper long mark of sight glass 15 (fig. 9) with oil (about 2 litres of Spinesso 10) supplied with the machine, using for this purpose a funnel and a hose, as shown in fig. 5.
3. Ensure that the flat belt, linking the hydraulic control unit with the machine, is placed in such a way that the side, bearing the mark "Laufseite", shows inwards and the direction arrow points in the direction of rotation of the machine.

The direction of rotation is shown on the idler pulley 12 (fig. 4) of the machine by a arrow ←. The flat belt should be tensioned according to the instructions of the chapter 6., item d).

4. Prior to shipment, the machine is sprayed by a rust preventing agent.

When cleaning the machine before taking it into service, remove thoroughly the rust preventing agent from the hook and the thread guides by using an oil rag. Fill then the oil container with oil* up to the maximum level reference mark. (*Spinesso 10).

5. Switch on the motor (not the machine) and check the direction of rotation.

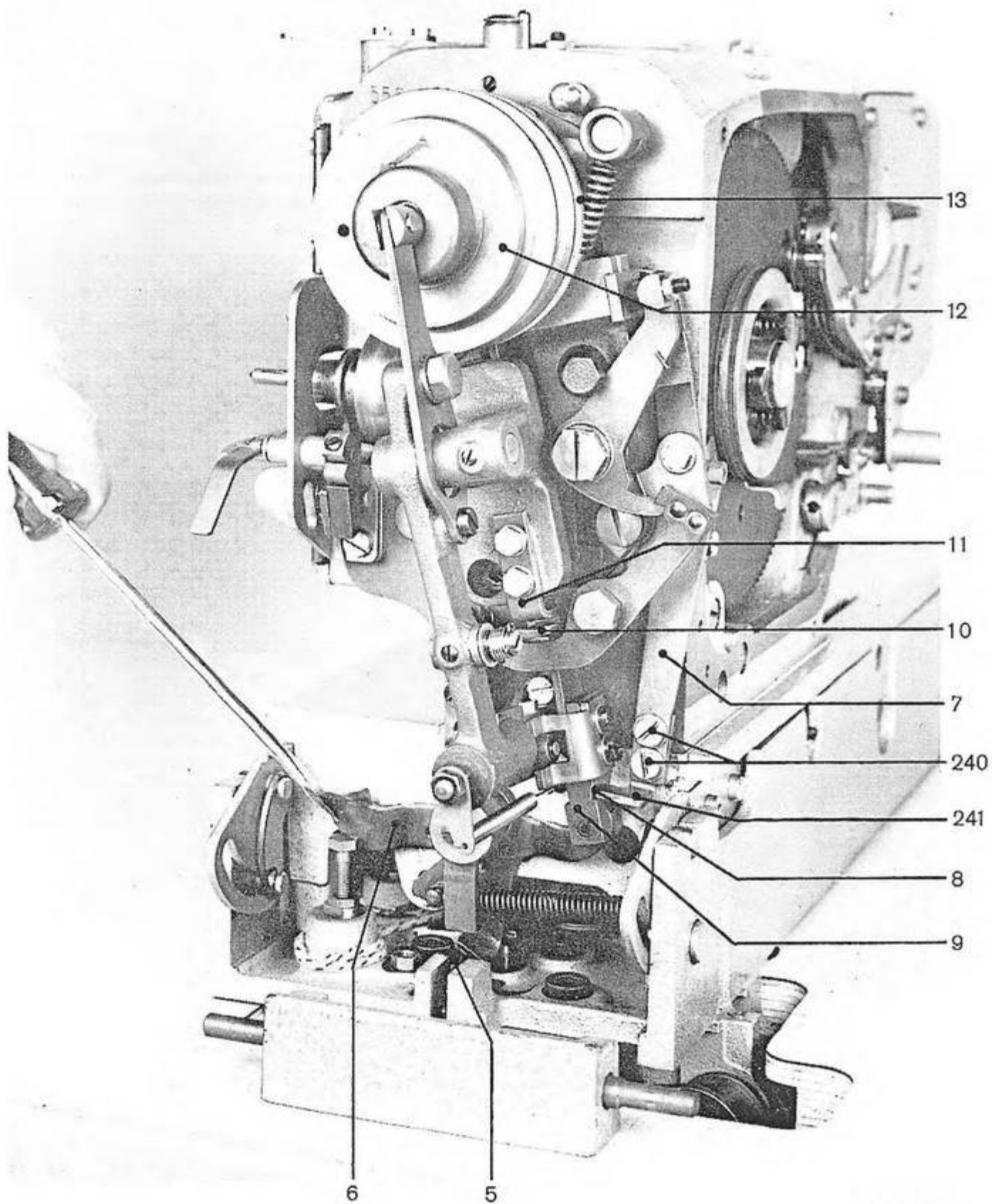


Fig. 4

b) When the base, the motor and the hydraulic control unit have been packed and shipped individually

1. Introduce the four metal connections with threaded pins from above into the boreholes in the table top and secure them on the lower side of the table top by washers and nuts.
2. Remove the lever 16 (fig. 8) with the spring 17 from the base by turning out the bearing bolt 18.
3. Place the base 19 (fig. 5) in the table top and fasten it by the four fastening screws to the metal connections. Refasten to the base the locking lever 16 and the spring 17 as shown in fig. 8.
4. Slip the two available plastic dust caps 20 (fig. 9) with pressure springs 21 on the base lever 22 so that the level of the dust caps rest on the cover of the gearing when the latter has been moved into position. The ends of the pressure springs should be shifted onto the rims of the angular lever and of the plastic caps.
5. Remove the spring 23 (fig. 10) from the part 24.
6. Remove from the shaft of the hydraulic control unit the belt pulley set. Loosen for this purpose the two fastening screws in the belt pulley.

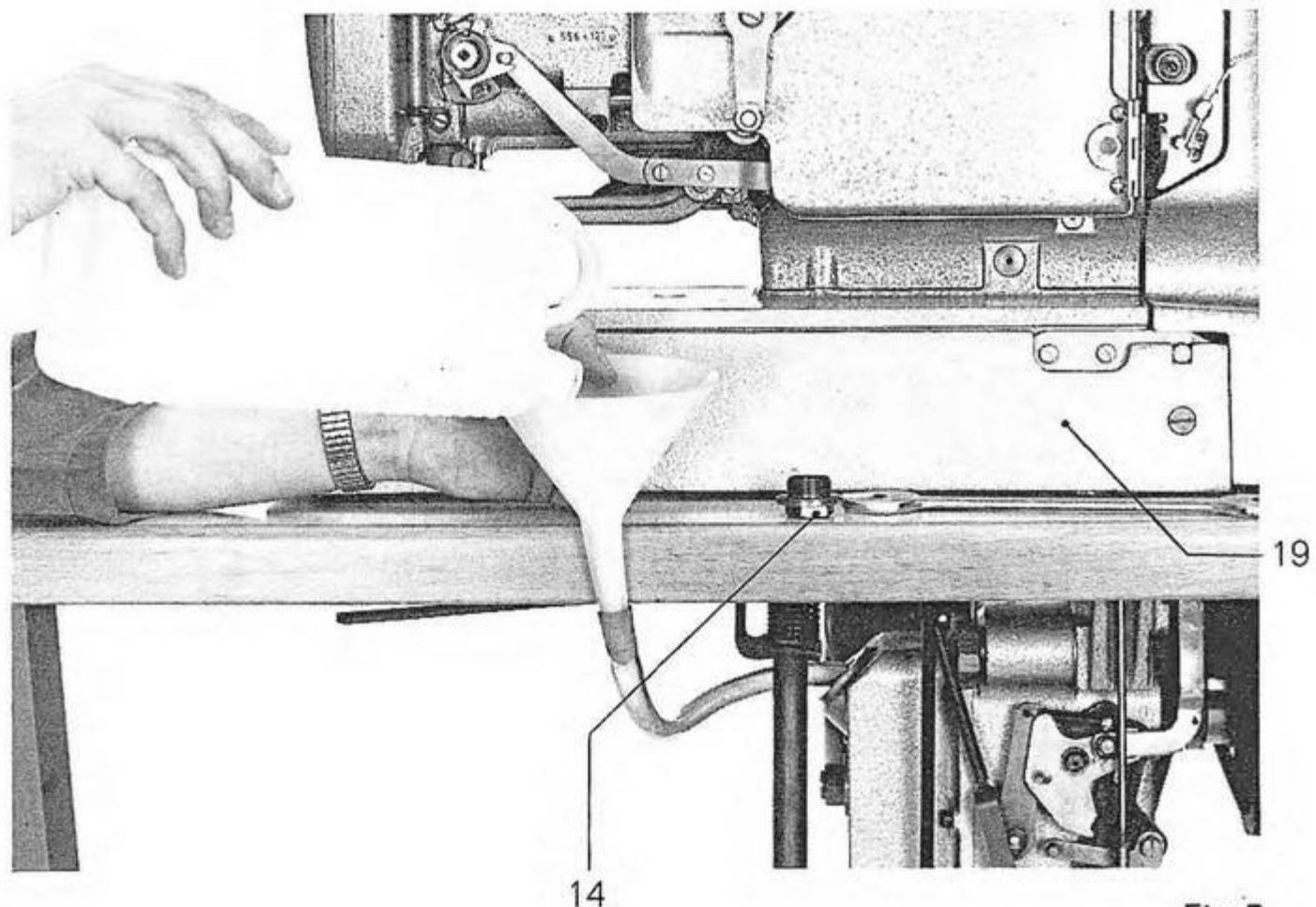


Fig. 5

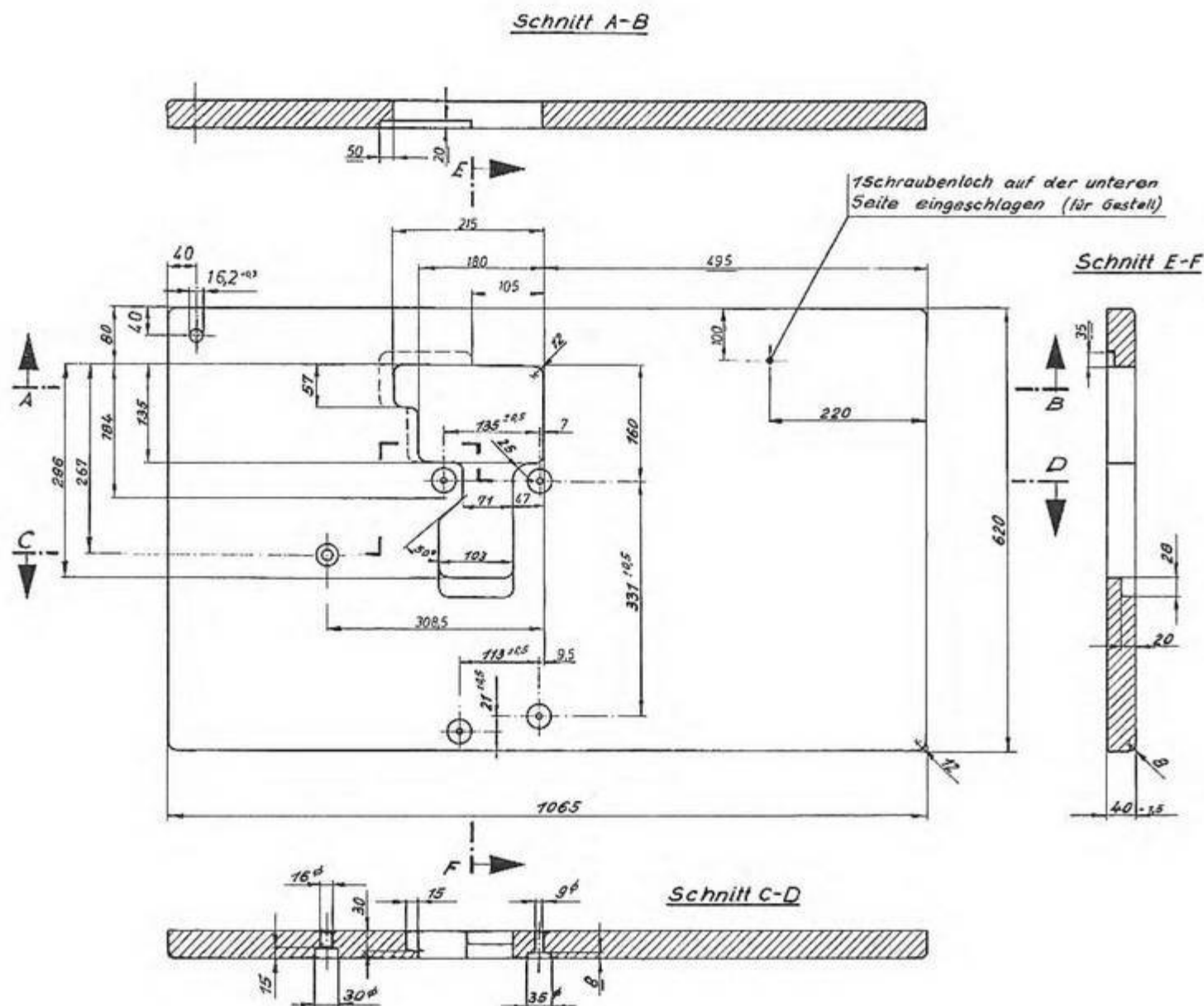


Fig. 6: Dimensioned table top sketch for the transversal installation of DÜRKOPP 556

7. Remove from the bearing bolt of the control gearing unit on the base the nut 25 (fig. 10) and the spring washer 26.

The aluminium washer 27 must remain on the bearing bolt.

8. The pistons of the control gearing unit should be in their final position. Otherwise it will be impossible to swing the unit in position, because the angular levers 22 (figs. 9 and 10) will knock against the pistons.

The pistons can be pushed into their final position by using a screwdriver which is introduced through the slits in the housing cover.

9. Slip the control gearing unit onto the bearing bolt. It will be easier to shift said unit if it is turned about 45 degrees to the right or to the front, depending on the type of installation. Ensure that the aluminium washer situates itself on the bearing bolt between the machine base and the gearing.

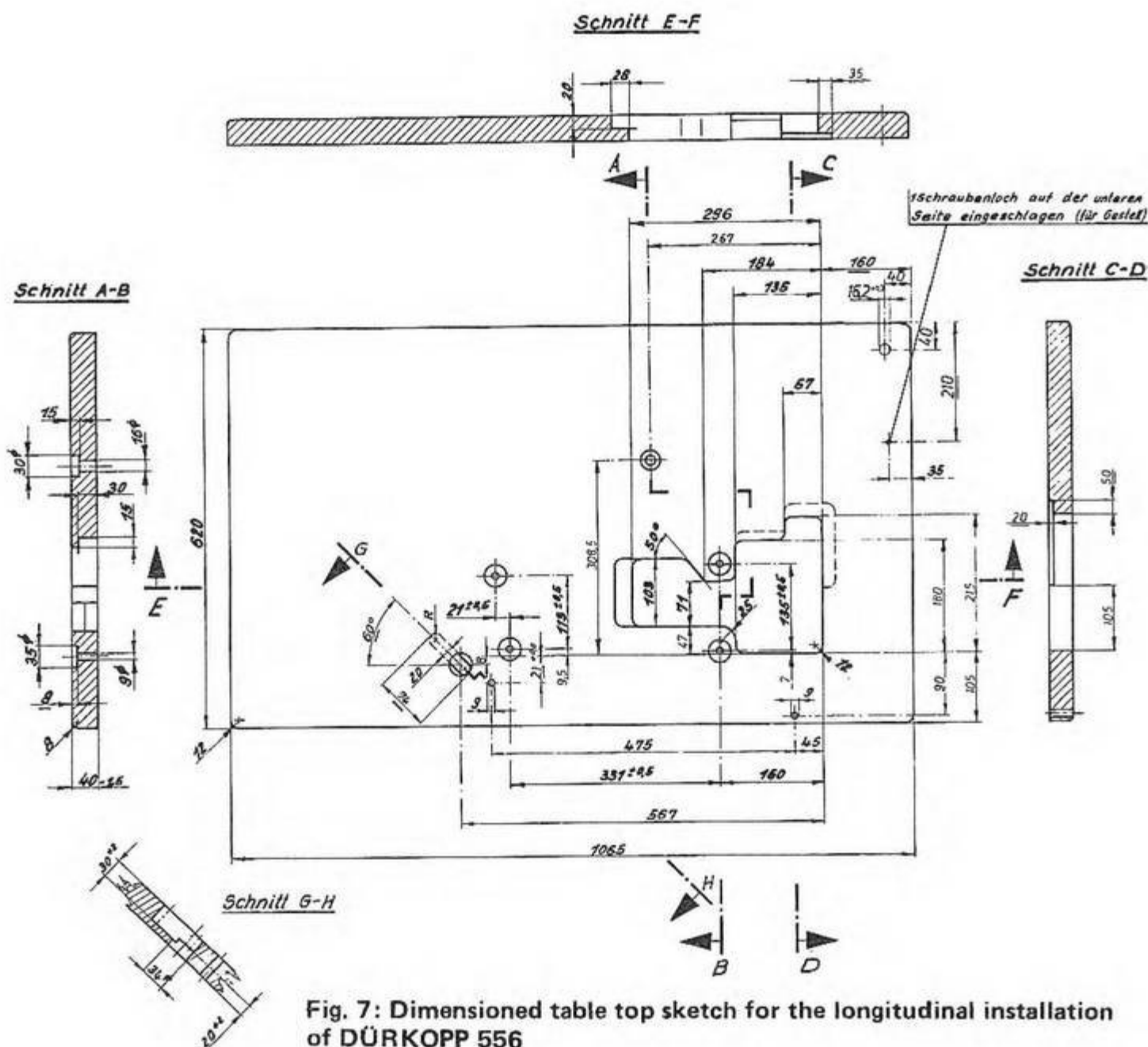


Fig. 7: Dimensioned table top sketch for the longitudinal installation of DÜRKOPP 556

10. Swing the control gearing unit into its vertical position. Push to this effect the angular lever upwards. Slip the spring washer 26 (fig. 10) on the bearing bolt and tighten the nut 25.

11. Mount the belt guard 28 on the cover plate 29 as shown in fig. 11.

12. Fasten the driving motor to its swinging foot 30 and the latter to the cover plate 29 as shown in fig. 9. For instructions regarding the driving motor see item c) of the present chapter.

13. Introduce the available rubber cushion into the hole for the holding bar 31 (fig. 9) in the table top (passing said cushion from above) and insert the bar 31 into the hole.

Fasten the holding bar to the stud of the nut 35 by the block 32, by the nut 33 and by the safety ring 34. Applies only to older machines.

In the recent machines, replace the M16 nut, supplied by the manufacturer for fastening the motor to the swinging foot, by the available crown nut 35a (fig. 106).

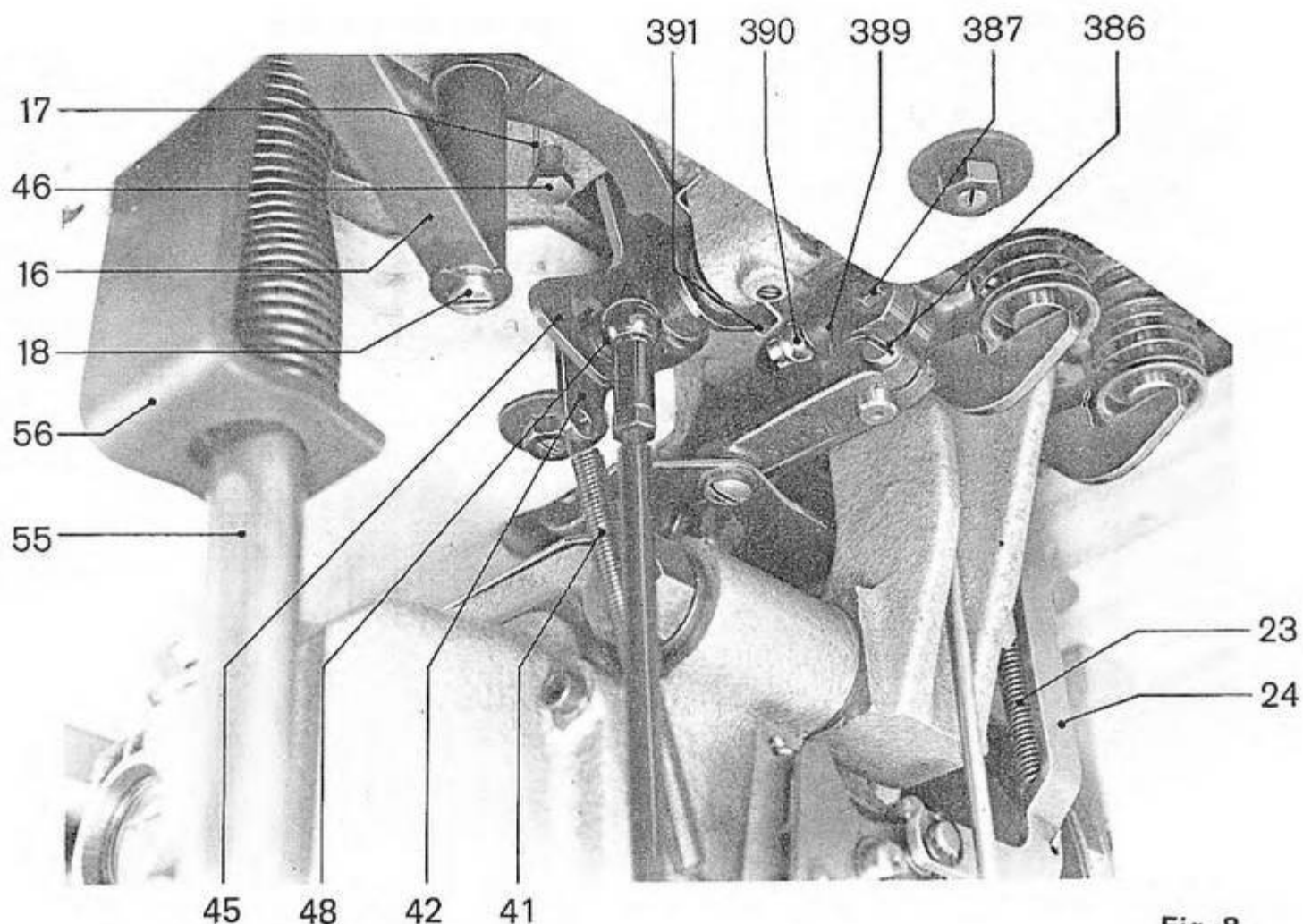


Fig. 8

14. Remove the safety ring 36 (fig. 10) and slip pulling lug 24 on the bolt 37. Slip the safety ring in the position and hang-in the traction spring 23.

15. Remove the safety ring 38 (fig. 10) from the bolt 39 and slip the pulling lug 40 onto the bolt. Replace the safety ring 38. In older machines: hang-in the spring 41 in the lever 42 and adjust so that in the lower position of the front pulling lug 47 the ball pin 48 also is in the lowest position in the oblong hole of the lever 45.

In recent machines: hang the spring 41 (fig. 10a) in the eyelet 41a. By turning the ring 42a on the bar 42b it can be obtained that in the lowest position of the front pulling lug 47 the ball pin 48 touches the lowest point in the longitudinal hole of the lever 45.

16. Mount pedals and bars according to figs. 1 and 12 or 2 and 13, depending on the type of installation. The rod length has been adjusted in the factory. Therefore it is only in exceptional cases that the following adjustments of the pedals are necessary.

The height of the r/h pedal can be adjusted by turning the tension jack 43 (figs. 12 and 13).

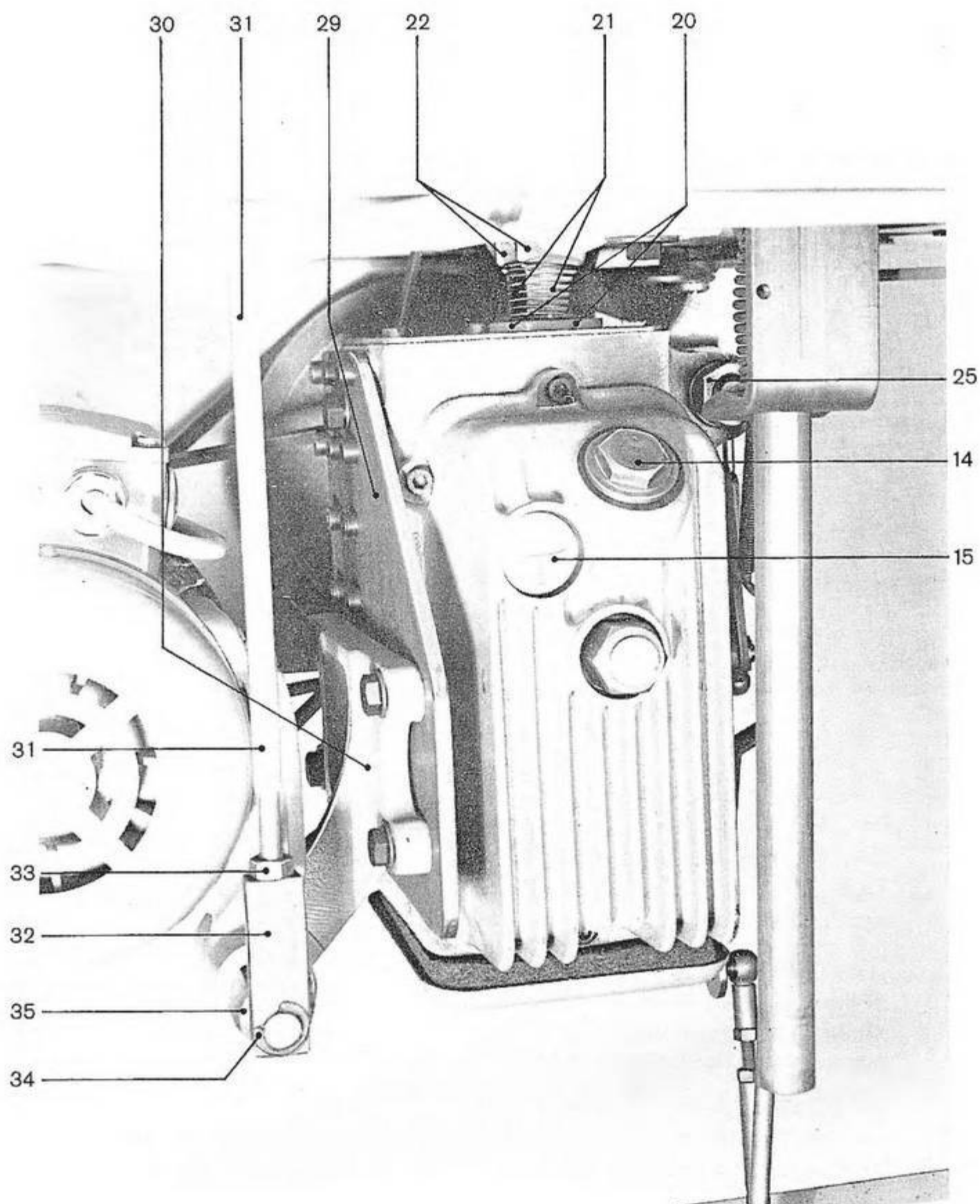


Fig. 9

The l/h pedal also can be adjusted by turning the tension jack 44 (figs. 12 and 13) so that with the l/h pedal being fully heeled down, the lever 45 (fig. 8) touches the stop screw in the base, i.e. so that the full stroke is obtained.

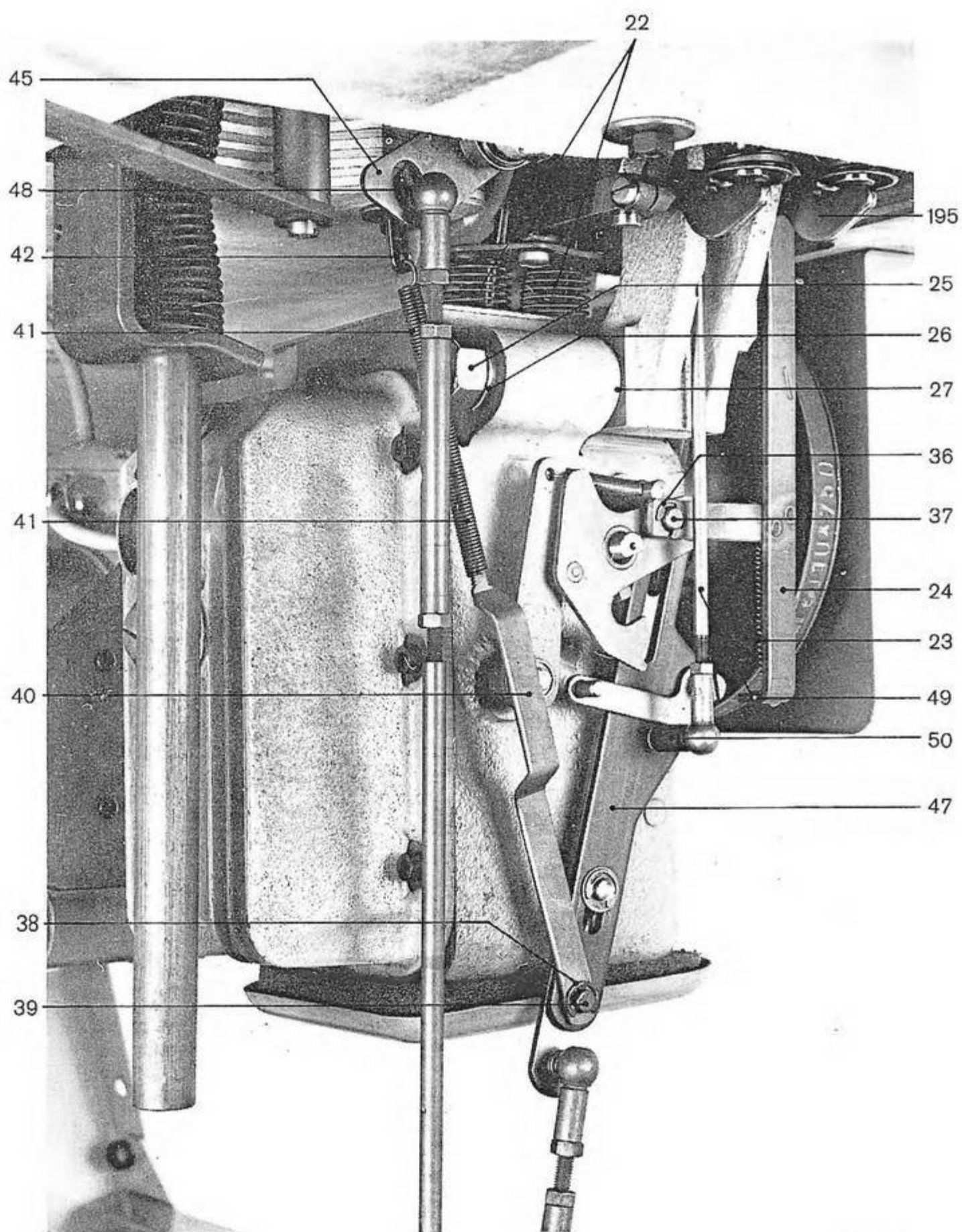


Fig. 10

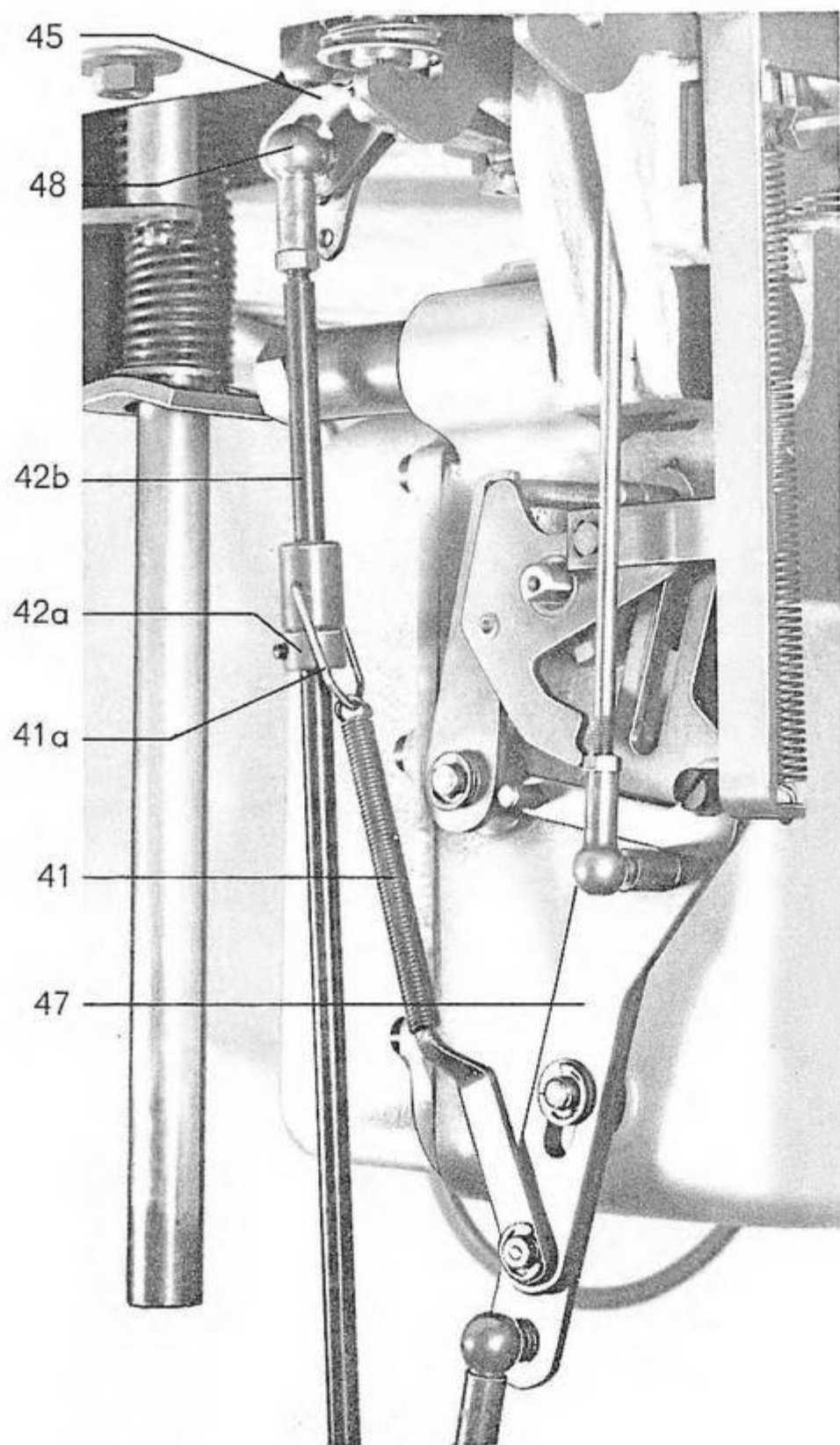


Fig. 10a

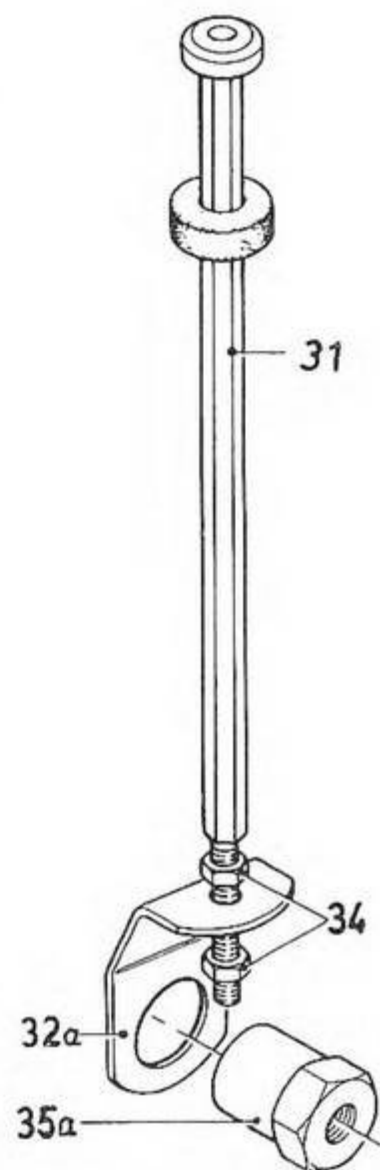


Fig. 10b

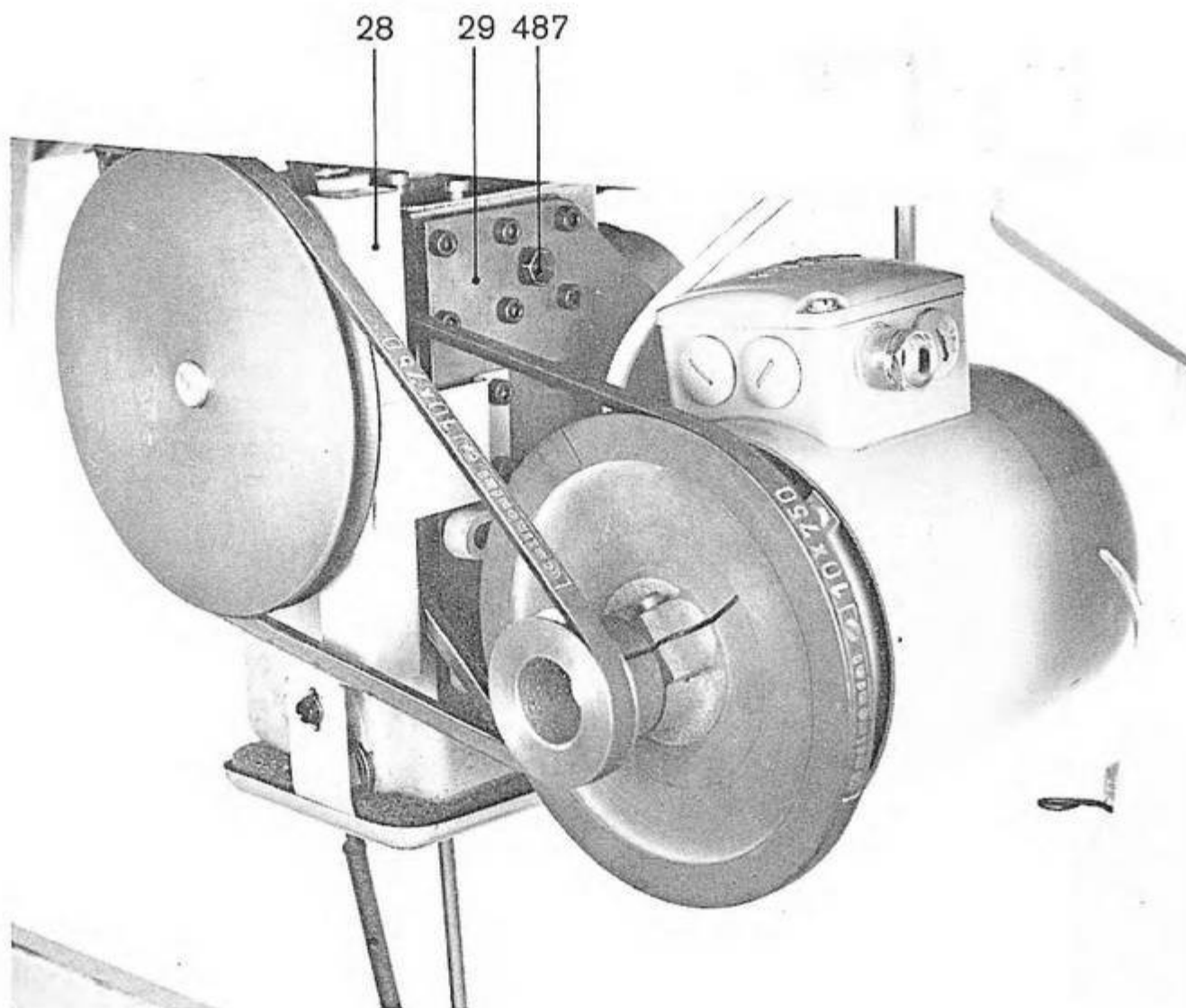


Fig. 11

Note:

The grooved counter nuts on the bars are left-threaded.

17. Pass the bar 49 (fig. 10), serving to avoid the knife action, through the hole in the base and fasten it on the ball pin 50.

18. Slip the belt pulley set, consisting of two double belt pulleys, onto the shaft of the control gearing unit and fasten it on the shaft in the axial direction in such a way that the distance between the small pulley and the screw heads in the control gearing unit ranges between 0.5 and 1 mm. When pushing the belt pulleys, place at the same time the V-belt on the small pulley, because later, on account of the pin in the control unit, this will be impossible.

19. Secure the two V-belt pulleys on the motor shaft. Ensure that they are in alignment with the pulleys on the control gear shaft.

20. Place the driving belts in following sequence:

First pass the V-belt, placed already on the small V-belt pulley of the control gearing shaft, to the big pulley on the motor shaft.

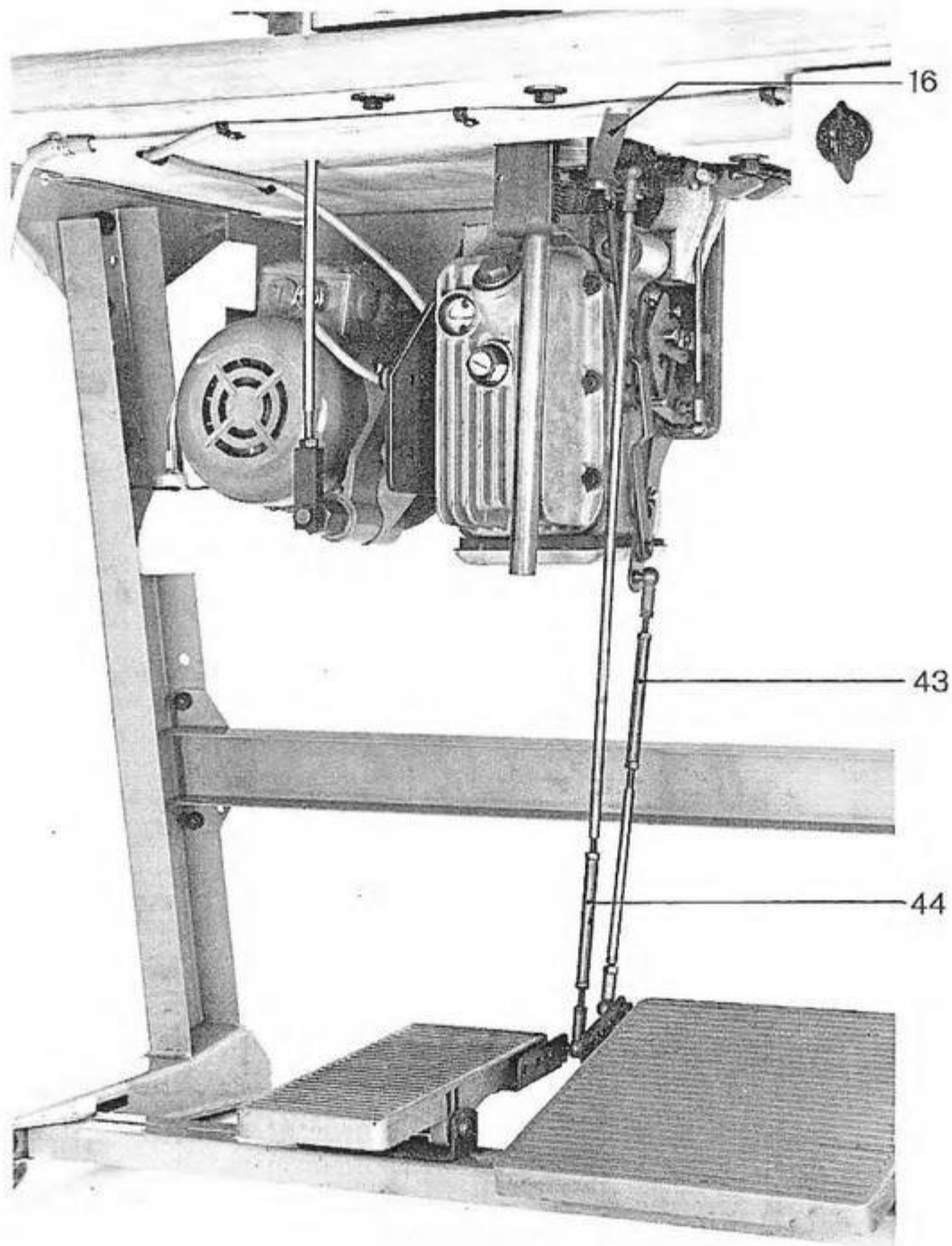


Fig. 12

Then place the flat belt on the driving pulley of the control gearing shaft and pass it through the guide of the fork 62 (fig. 16). For doing that, turn out the screw 61 and remove the guide sheet 63. Place the flat belt so that the leather surface shows inwards and the arrow shows in the direction of rotation (seen from the stand back counter-clockwise). Fit again the guide sheet 63 (fig. 16) on the belt fork 62.

Pass than the second V-belt from the small belt pulley on the motor shaft to the big belt pulley on the control gearing shaft.

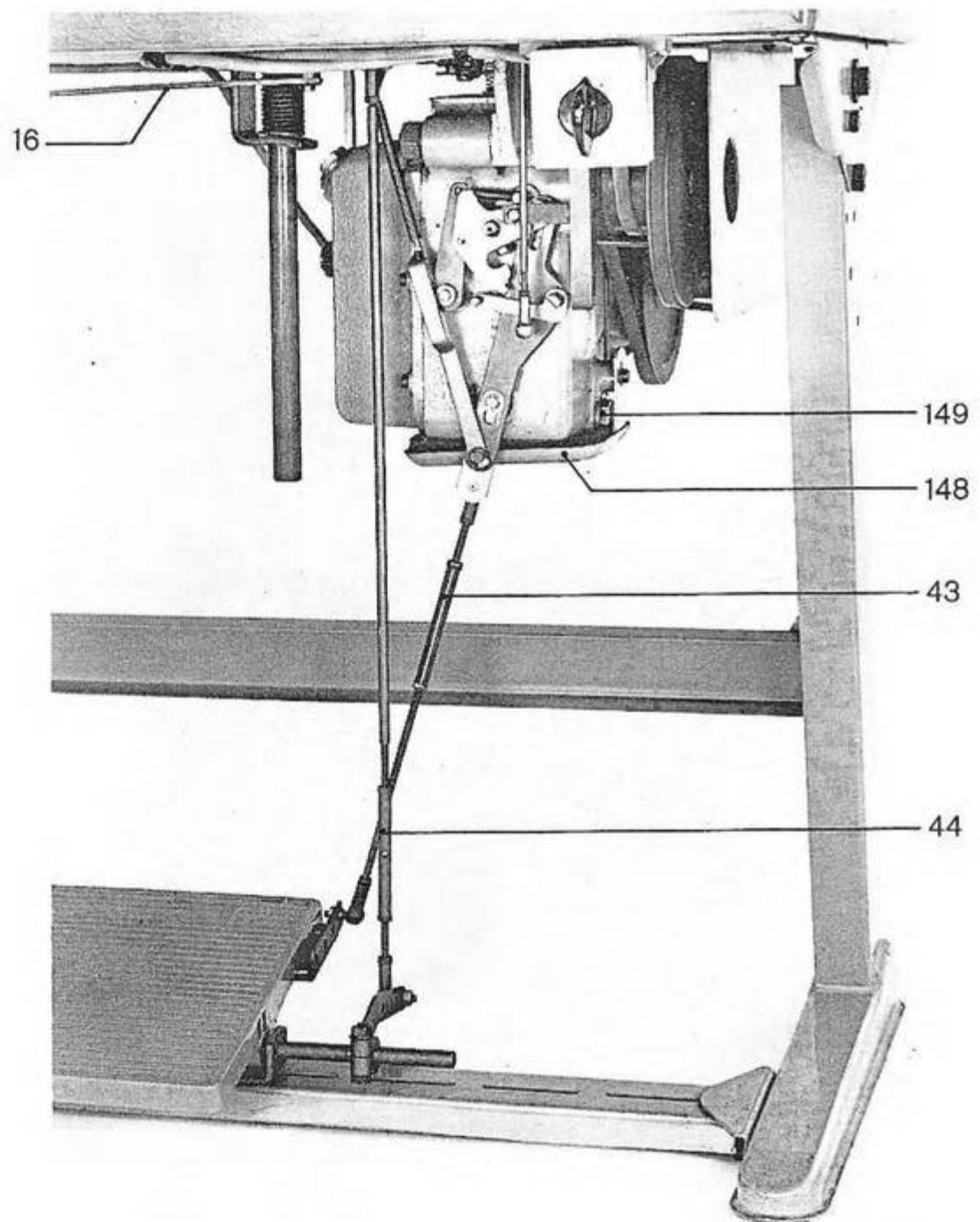


Fig. 13

21. Tension the V-belts by swinging the motors. See chapter 6, item d). Ensure that the belt pulleys are reciprocally in alignment.
22. Start the motor and check the direction of rotation. Seen from the back of the stand, the pulleys must turn counter clockwise. If required, repole the motor.
23. Check whether the ball pin 48 (figs. 10 and 10a) rests at the lowest point in the longitudinal hole of the lever 45 when the pulling lug 47 is at its lowest point. Regulate for this purpose the spring and the ring 42a.

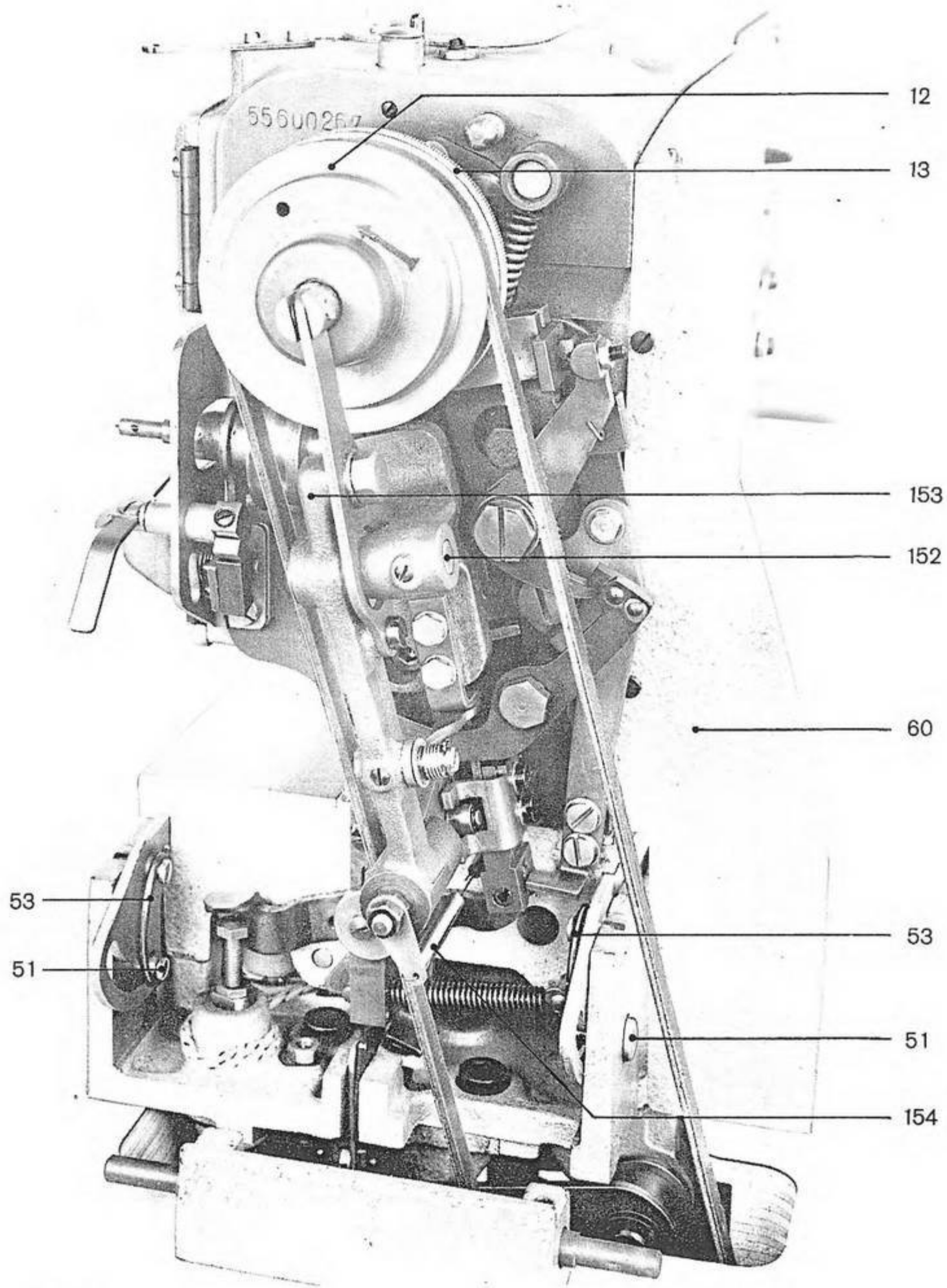


Fig. 14

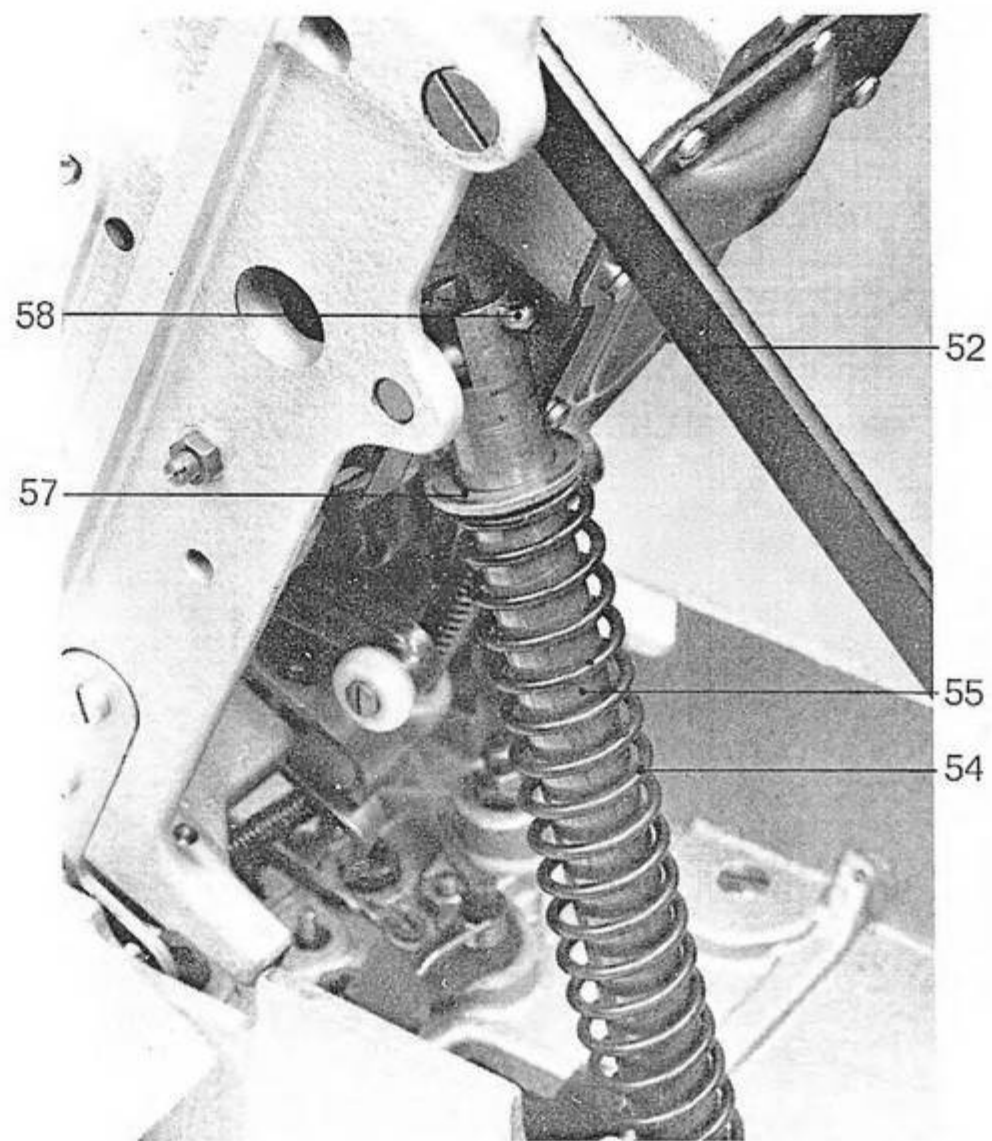


Fig. 15

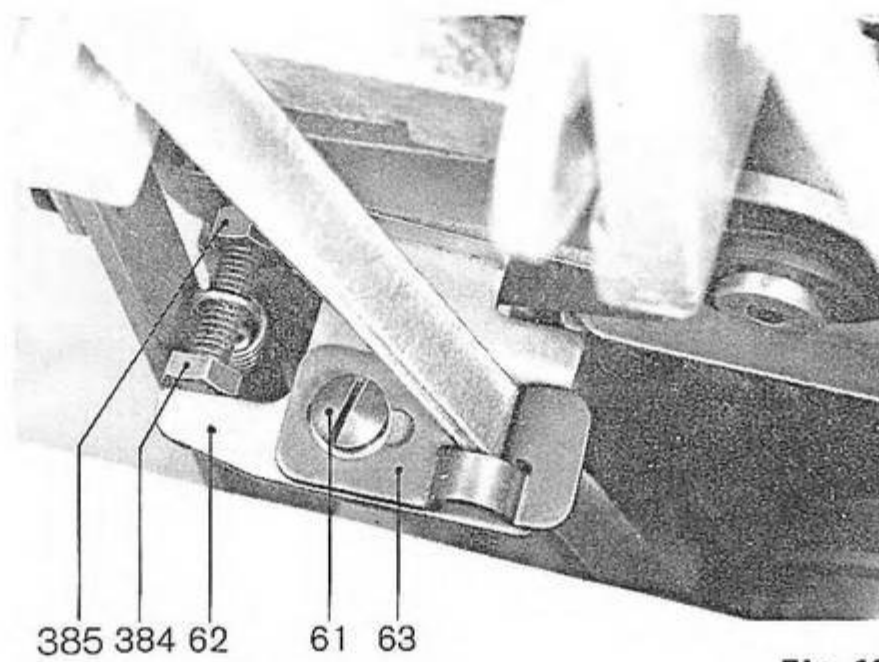


Fig. 16

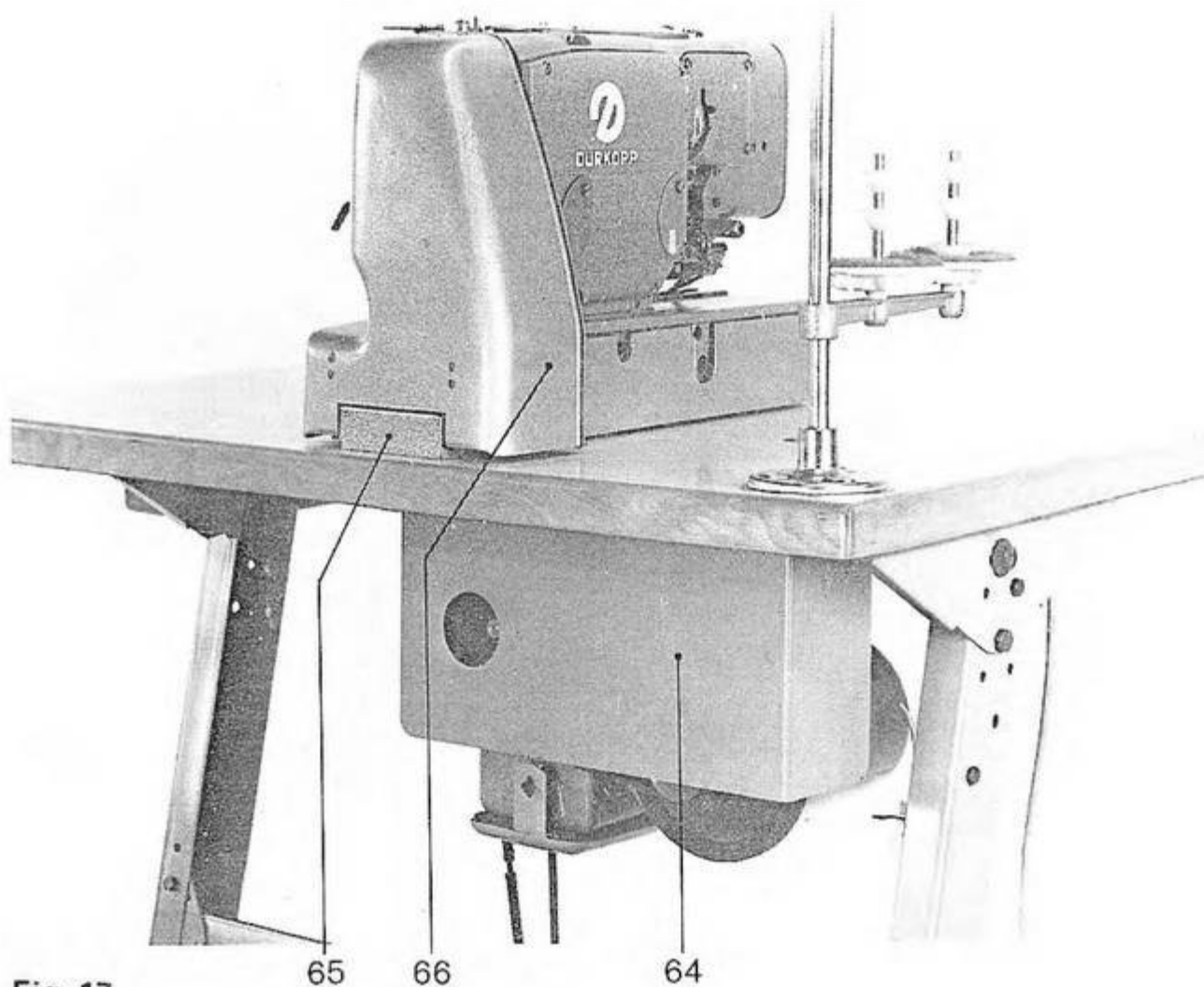


Fig. 17

24. Fill the hydraulic control gearing unit with the available oil (about 2 litres of Spinesso 10) up to the upper long reference mark on the sight glass 15 (fig. 9) by means of a funnel and a hose, as shown in fig. 5, after having removed the oil filling screw 14.

25. Adjust the lifting and engagement slides according to chapter 24, item a).

26. Saturate the oil wick on the base with oil.

27. Insert the machine head in the base. Press down the upper part of the support 52 (fig. 15), projecting out of the slit in the base plate. **It is advisable to install the machine head by 2 persons.**

28. Turn in the available safety screws 51 (fig. 14) and press-on the safety springs 53.

29. Tilt the machine head backwards. Pass the supporting spring 54 (fig. 15) with the guide-tube 55 first through the opening in the base and then through the hole in the angular support 56 (fig. 8). There should be a washer between the supporting spring 54 (fig. 15) and the angular support 56 (fig. 8).

30. Slip the washer 57 (fig. 15) on the guide tube 55 and fasten by the split pin 58 to the machine heads as shown in fig. 15. In order to ensure that the split pin 58 does not fall out bent it open in the middle of the guide tube. Fill the oil supply container with oil (Spinesso 10) up to the maximum reference mark.

31. Regulate the setting screw in the lifter slide according to chapter 24, item c).

32. Then, with the driving motor being engaged, i.e. with the hydraulic system being effective, and by fully lowering the r/h pedal set the total stroke of the braking slide 9 (fig. 53) so that the ratchet 10 is pulled about 0.5 mm below the angular part 11, causing the engagement of the machine. See fig. 53. This total stroke can be obtained by adjusting the screw 244 after having loosened the counter nut 243 (fig. 36).

33. Adjust the pulling lug, the locking lever, the fastening screw and the locking cam according to the chapter 26, items a), b) and c).

34. Place the flat belt so that the leather coating is turned inwards and the arrow points in the direction of rotation of the machine. Tension then the belt by swinging the control gearing unit. See item d) of the present chapter. Note the following:

In case of flat belts of recent design the pretension amounts only to 0.8 %. Therefore, when adjusting, the flat belt can be tensioned only up to the mark 96 (fig. 17a). This applies to quite new belts and also to such which have already been used.

35. Set the belt fork according to chapter 32. Align then the guide sheet 63 (fig. 16) so that the flat belt is not impeded.

36. Adjust the instantaneous stopping device according to chapter 33.

37. Fasten the belt guard sheet 64 (fig. 17) under the table top, according to the type of installation, as shown in fig. 17.

38. Fasten the support 65 (fig. 17) of the cover 66 by two wood screws on the table top so that said cover can well adapt itself to the machine head.

39. Fasten the thread unwinder on the table top by three flat head wood screws as shown in figs. 1 and 2.

In machines of recent design fasten the thread unwinder immediately to the table top using a Seeger circlip ring, washers and nut. Drill for this purpose in the table top a 16 mm Ø hole according to the dimensioned table top sketch (figs. 6 and 7).

Note:

If the table top is veneered with plastic material, the fastening holes for the bearing block of the cover must be drilled in advance, so that the wood screws have free passage.

If the machine head, the base, the hydraulic control gear and the motor are supplied without table top and without stand drill also the reception holes and cut out the table top as shown in the table top sketch (figs. 6 or 7) in addition to the aforementioned work.

In machines of the sub-class 556-11101 fit also the manual jump feed.

See for that purpose the "Instructions for subsequent fitting of the manual jump feed, ref. No. 556 12881, in automatic buttonholers DÜRKOPP 556 for longitudinal installation", edition September 21, 1971.

Note that these instructions apply to machines not prepared for said subsequent installation while the machines of the sub-class 556-11101 are already prepared. This limits the work to be carried out to the items 1., 12., 13., 14., 15., 16. and 17.

If no table top has been supplied, drill the reception holes for the protective bow and for the Bowden cable according to the table top sketch (fig. 1). If required, raise the machine head. For further instructions for 556-11101 see chapter 48.

c) Machine speed (number of stitches)

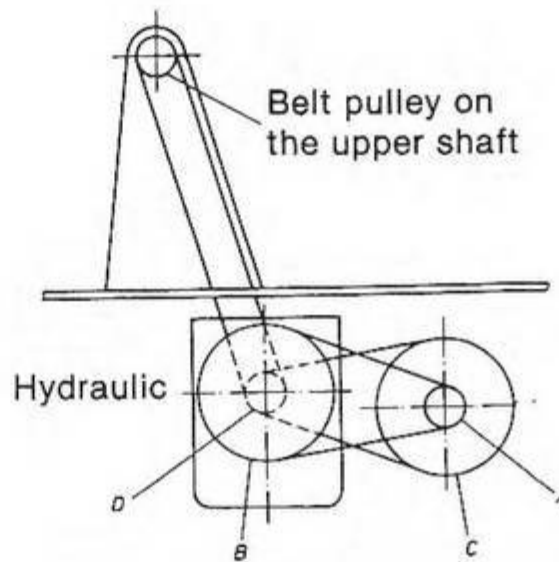
DÜRKOPP 556 produces up to 4000 stitches per minute.

For certain materials or threads it may be necessary to reduce the speed. See also the chapter 8. "Needles and threads". The speed of the machine can be modified by changing the set of belt pulleys "E" on the control gear shaft (hydraulic shaft) and the big belt pulley "C" on the motor shaft.

The set "E" comprises the pulleys "B" and "D". Its catalogue number is specified under "E" in the following table.

The driving motor should have a performance of 0.75 HP.

Following belt pulleys are supplied by the factory or by DÜRKOPP agents against extra charge.



Speed (st/min.)	Ref. No. of belt pulleys					Remark
	Belt pulleys for control gear shaft		Belt pulleys for motor shaft		Both pulleys together	
	A	B	C	D	E = B + D	
For motors with 50 Hz 1400 Upm						
2800	556 2111	556 1898	556 2127	556 2170	556 2169	Motor shaft 19 mm ϕ
3000	556 2111	556 1898	556 2129	556 2168	556 2167	
3200	556 2111	556 1898	556 2119	556 2172	556 2171	
3500	556 2111	556 1898	556 2117	556 2174	556 2173	
3800	556 2111	556 1898	556 2115	556 2162	556 2161	
4000	556 2111	556 1898	556 2112	556 2176	556 2175	
2800	556 2135	556 1898	556 2127	556 2170	556 2169	Motor shaft 16 mm ϕ
3000	556 2135	556 1898	556 2129	556 2168	556 2167	
3200	556 2135	556 1898	556 2119	556 2172	556 2171	
3500	556 2135	556 1898	556 2117	556 2174	556 2173	
3800	556 2135	556 1898	556 2115	556 2162	556 2161	
4000	556 2135	556 1898	556 2112	556 2176	556 2175	
For motors with 60 Hz 1700 Upm						
2800	570 1581	556 2203	556 2215	556 2214	556 2213	Motor shaft 19 mm ϕ
3000	570 1581	556 2203	556 2219	556 2218	556 2217	
3200	570 1581	556 2203	556 2206	556 2205	556 2204	
3500	570 1581	556 2203	556 2225	556 2170	556 2224	
3800	570 1581	556 2203	556 2117	556 2210	556 2209	
4000	570 1581	556 2203	556 2228	556 2172	556 2227	
2800	570 1589	556 2203	556 2215	556 2214	556 2213	Motor shaft $\frac{3}{4}$ " ϕ
3000	570 1589	556 2203	556 2219	556 2218	556 2217	
3200	570 1589	556 2203	556 2206	556 2205	556 2204	
3500	570 1589	556 2203	556 2225	556 2170	556 2224	
3800	570 1589	556 2203	556 2117	556 2210	556 2209	
4000	570 1589	556 2203	556 2228	556 2172	556 2227	
2800	570 1590	556 2203	556 2215	556 2214	556 2213	Motor shaft 16 mm ϕ
3000	570 1590	556 2203	556 2219	556 2218	556 2217	
3200	570 1590	556 2203	556 2206	556 2205	556 2204	
3500	570 1590	556 2203	556 2225	556 2170	556 2224	
3800	570 1590	556 2203	556 2117	556 2210	556 2209	
4000	570 1590	556 2203	556 2228	556 2172	556 2227	

d) Driving belts

For a perfect function of the machine it is necessary that the flat belt and the two V-belts are in good condition and that they are properly tensioned. This applies particularly to the flat belt.

Flat belt

The machine is driven by the control gear unit by intermediary of the flat belt.

Flat belts of new design are supplied under ref. No. 5562065a. These belts bear on their surface the direction intimating arrow. Furthermore, these belts have in their centre at a distance of about 200 mm two 1 mm big measuring holes.

The flat belt must be pre-tensioned very accurately.

Check from time to time the pre-tension, the intervals depending on the stress of the machine. A new belt should be checked already after 8 days. Further revisions can be done at longer intervals.

The belt must be tight enough to ensure that the machine attains its full speed. But it is still more important that at the end of each sewing cycle the flat belt can, within the shortest time, brake down the machine to the stopping speed.

If the belt is too slack, the stopping speed will not be attained before the brake slide 9 (fig. 4) snaps into brake piece 170 (fig. 38). The consequence of this will be that at least the ratchet 265 (fig. 54) of the disengaging safety device becomes released, and if the pressure bolt 247 (fig. 54) is very heavily whipped, this may happen also to the bent lever 249 (fig. 58). See also chapter 27.

If the belt tension is excessive, the belt fork 62 (fig. 16) will not place the belt from the fast to the slow pulley with sufficient speed. This will also impede to attain the stopping speed and lead to the above mentioned phenomena. A too high tension will affect the service life of the belt.

For adjusting the pre-tension of the flat belts of the old version, it is necessary to have a sense of feeling, which calls for some experience. Flat belts of the new design are adjusted by the gauge 91 (fig. 18), ref. No. 5562331. Proceed to this effect as follows:

1. While the flat belt is slack, introduce the reception pin of the gauge 91 in one of the 1 mm big measuring holes of the flat belt, loosen the screw 92 with the mark "0" on the centre of the second measuring hole 94. In order to obtain an accurate measurement, the flat belt must touch the gauge.

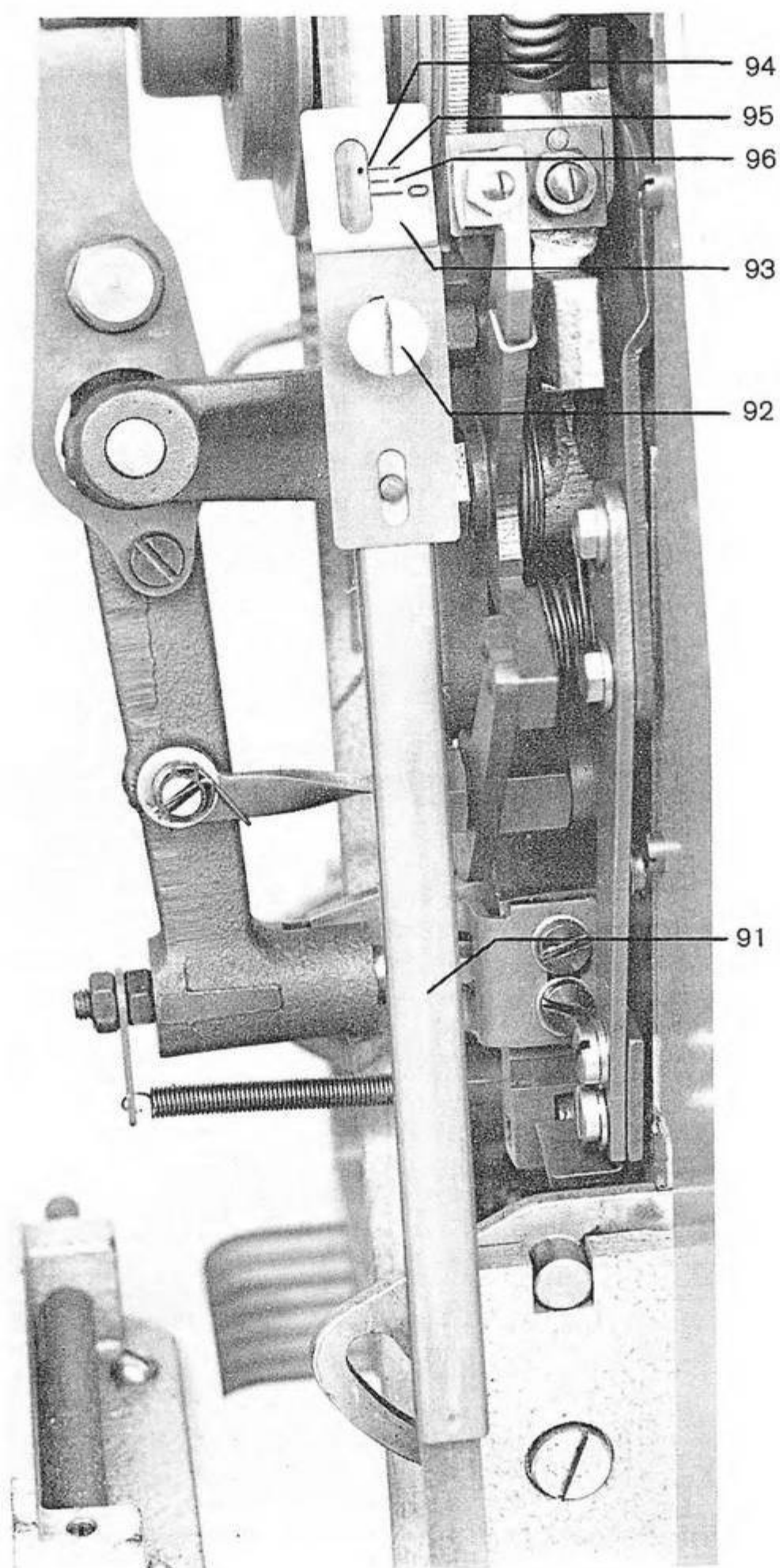


Fig. 18

2. After having determined the distance between the two measuring holes while the flat belt is slack, place the latter in position and adjust its pre-tension by swinging the control gear unit so that the reference mark 96 is level with the borehole 94. This applies to quite new belts and to the belts already used.

3. When placing a flat belt of old design (bearing the ref. No. 5562065), tension it so that the mark 95 stands level with the hole 94. See chapter 18.

4. In case of used flat belts of the older design, set the gauge with the belt slackened on "0" and adjust the pretension of the flat belt in position so that the mark 96 is level with the measuring hole.

The above instructions apply also to the periodical checking of the flat belt pre-tension.

V-belts

Power transmission from the motor to the control gear unit is ensured by two V-belts 10 x 750 DIN 2215.

Use always two V-belts of the same make and of **equal length**.

The V-belt should be flexible enough to adapt themselves to the diameter of the small motor belt pulley. These properties has, for instance the Continental V-belt (type "Kabelcord"). It can be obtained from DÜRKOPP sales centers under the ref. No. 720409a.

Check the V-belts from time to time for their proper pre-tension.

V-belt pre-tension can be set by swinging the driving motor after loosening the nut 35 (fig. 9).

Set the tension so that the belt transmits the power without slipping. Otherwise it will be worn earlier. A too high tension will also exert undue strass on the bearings of the motor and of the control gear unit.

For a long service life of the V-belts it is also extremely important that the V-belt pulleys of the motor and of the control gear unit are well aligned.

After certain period of time the two V-belts must be interchanged, because the V-belt running faster will be stretched sooner than the V-belt which is running slower.

Do not use belt wax for V-belts.

INSTRUCTIONS FOR OPERATORS

7. Maintenance of the machine

a) Cleaning

A machine which is kept clean stays trouble-free. Since this is a high speed machine, there is a great accumulation of fluff in certain parts. For this reason, the parts of the machine in the vicinity of the hook and underneath the throat plate should be cleaned more often – at least once a week.

For cleaning the parts below the throat plate and the parts of the hook, lift cover plates 67 and 68 (fig. 3) and swing them sideways, tilt the hood backwards and lift the machine head so that it can be propped by its support 52 (fig. 15) in the desired position. For cleaning, use the brush supplied with the machine.

When erecting the machine head, the oil gathered behind the inspection glass 69 (fig. 3) will flow back into machine arm, so that, if the machine is cleaned regularly, there will never be too much oil in the arm head.

b) Oiling

The machines have central oil wick lubrication and individual lubrication of the hook.

For oiling, use the **Spinesso 10** oil or an oil of equivalent quality. The lubricating oil **Spinesso 10** can be obtained from DÜRKOPP sales centers.

Oiling of the machine is confined to following points:

1. Filling the oil container with oil for hook lubrication and regulating the oil supply.
2. Filling with oil the three supply containers 73a and 73b on the machine arm (fig. 19) and below the base plate (fig. 19a).

Note:

In order to ensure that the oil wicks are always in contact with oil they should reach down to the lower oil chamber of the oil supply container. Furthermore, said containers should have enough oil to cover the oil wicks.

Note also the instructions of the chapter 22.

8. Needles and threads

The choice of needles and threads is of decisive importance for an impeccable operation of the machine and for the quality of buttonholes. The needle size depends on the thickness of the thread. The needle eye should be wide enough for the thread to pass through tightly but easily.

Use needles of the system **256** with the point slightly rounded off, except for knitwear. For the knitwear use needles of the system **556 EOSin** and the hook **5565003**.

Furthermore, the machine should be fitted with a pneumatic fabric holder. See chapter 47. When using the hook 5565003 the maximum bar width amounts to 5 mm.

Varying with the manufacturer, the designations of the point shape are as follows: Lammerz 265 SIN, Rheinnadel 265 R-SES, Metwar 265 FG, Schmetz 556 KH SES.

When inserting a new needle ensure that its long groove faces the vertical knife. Introduce the needle as deep as possible into the borehole of the needle bar.

When sewing buttonholes with flat type bars, 120 (Nm 80/2) core thread can be used for the needle and for the bobbin.

After resetting the machine for relief type bars, use for the needle a double-twisted cotton thread 40/4 with l/h torsion (Z torsion).

For the bobbin we recommend a mercerized cotton thread 70/3 or 80/3. Silk or synthetic threads of the same size can also be used.

The threads used, particularly the needle thread, must be of the best quality in order to achieve the highest seaming security at maximum sewing speed.

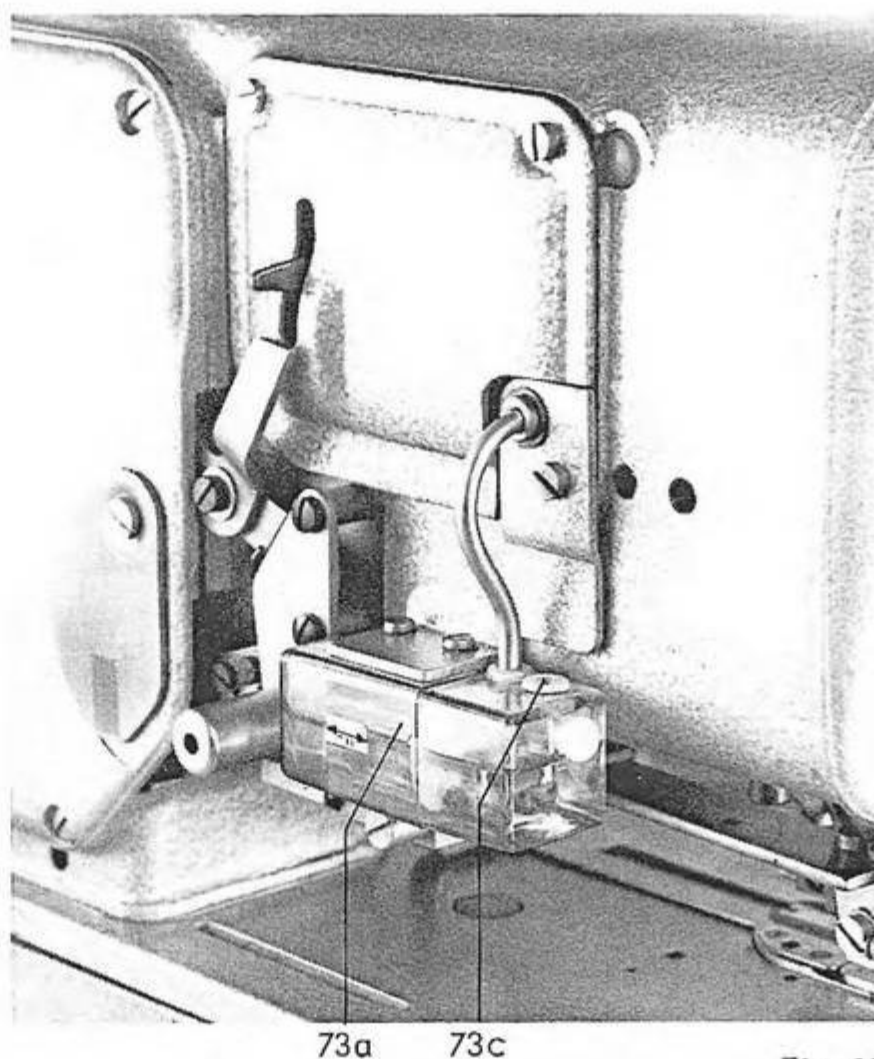


Fig. 19

9. Operating the Machine

In the final position of the machine the cloth presser frame is lifted automatically as soon as the driving motor is cut in. After having aligned the work, said cloth presser frame is lowered by treading r/h pedal down to the first step. For lifting the cloth presser frame, heel down the r/h pedal.

If the pedal is lowered beyond the first step, i.e. down to the stop, the machine will be engaged and the sewing process will begin.

If at the beginning of the seam the scissors do not yet hold the needle thread, then, during the first stitches, the end of the upper thread, hanging out of the eye of the needle, must be held by the hand. Be careful not to bend the needle, as otherwise it might knock against the throat plate.

After completion of the sewing cycle the buttonhole is cut up, the threads are cut off and the cloth presser frame is again lifted. All these operations are done automatically.

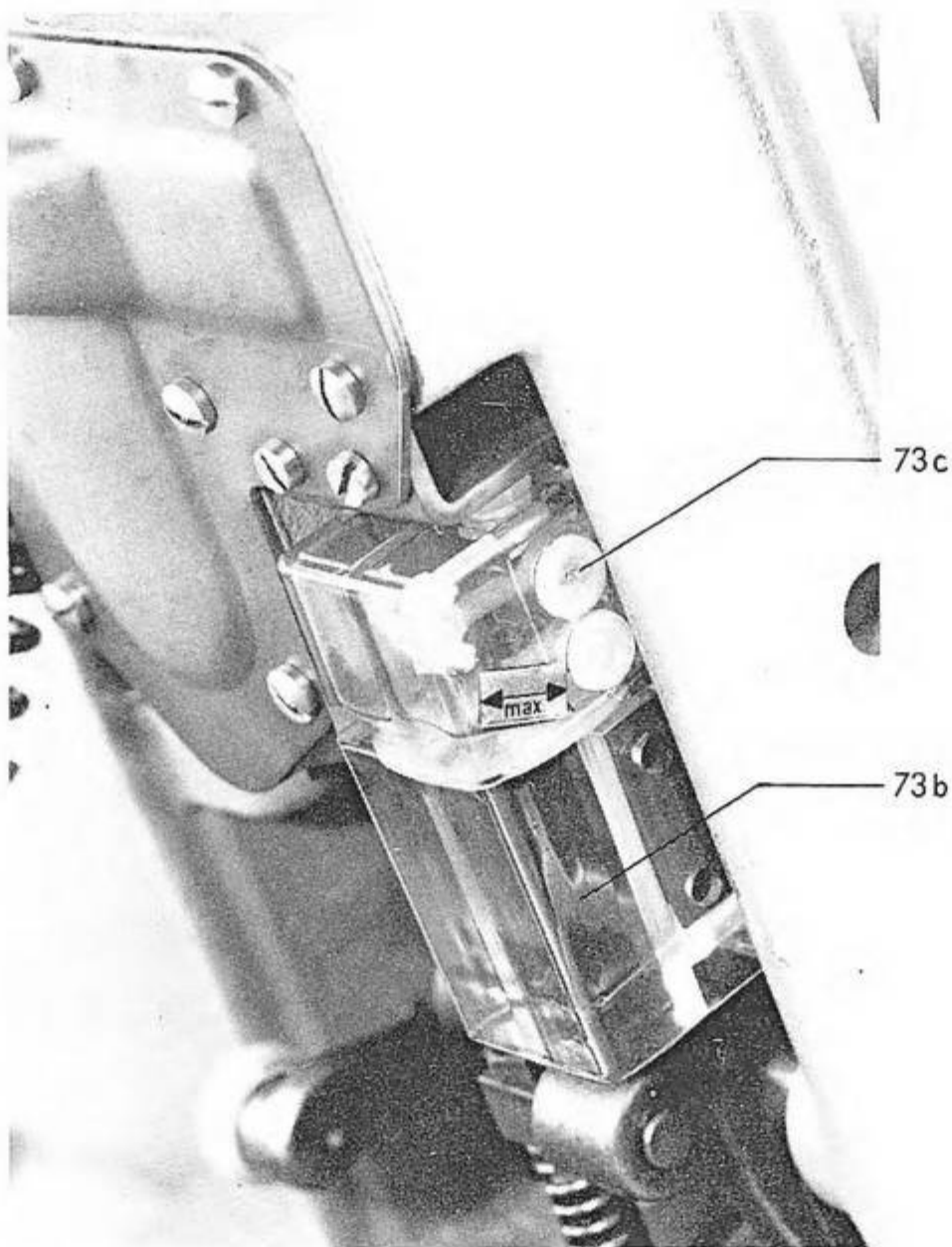


Fig. 19a

Should the needle thread break while sewing or the bobbin become empty, it can be avoided that after completion of the sewing cycle the knife and the scissors act and the cloth presser rises when the l/h pedal is heeled down to the first step. After having eliminated the trouble, the buttonhole can be sewn once again or continued to be sewn from the point where the trouble had occurred, if the buttonhole is brought in the respective position by turning the crank 1 (fig. 3).

If it is necessary to stop the machine suddenly when sewing = quick stop, heel the l/h pedal beyond the first step down to the stop. This will make the stopping lever 16 (figs. 8, 12 and 13) catch.

For re-engaging the machine after quick stop action, the stopping lever must be released. In case of transversal installation push it to the left and in case of longitudinal installation away from you.

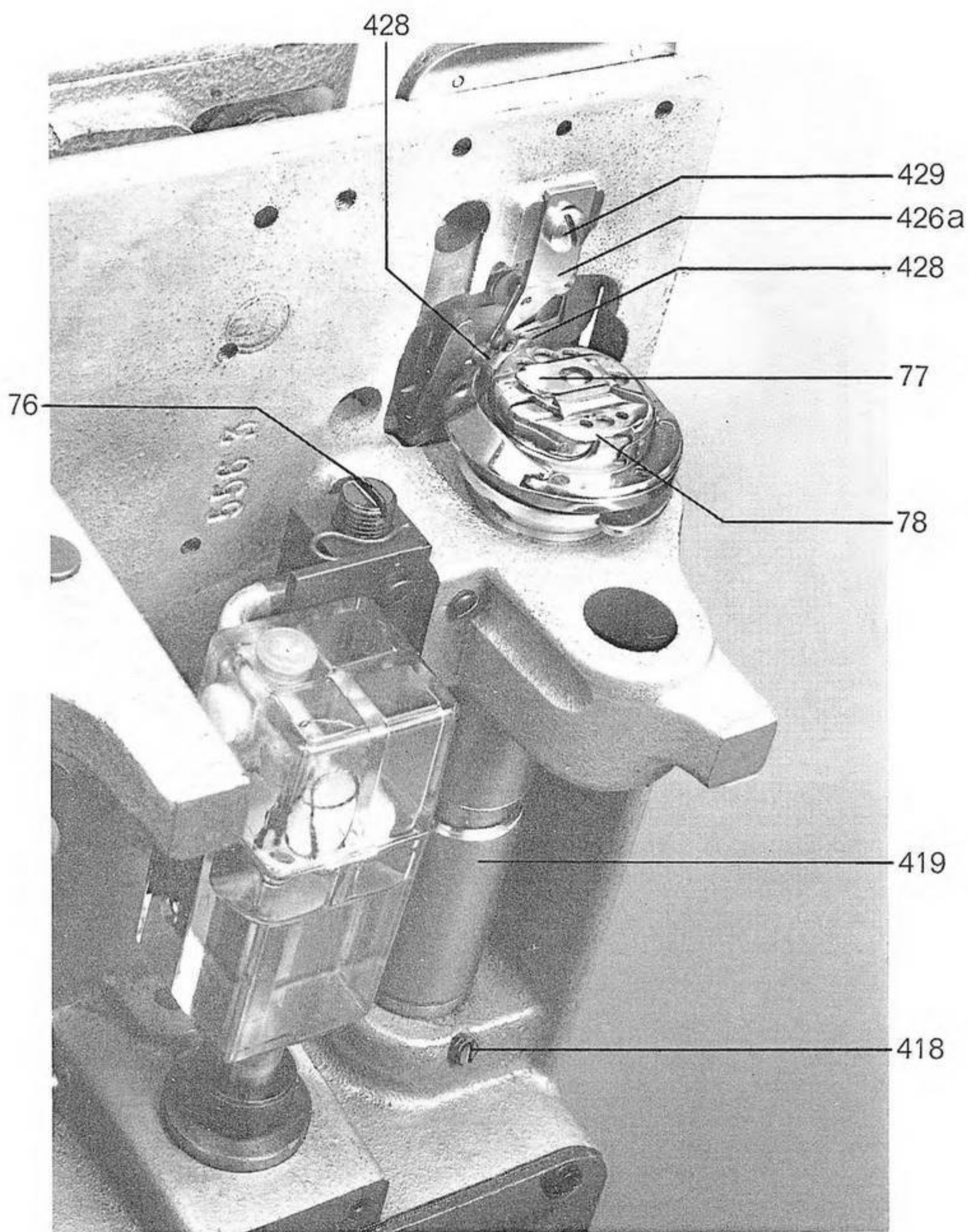


Fig. 20

10. Sewing a buttonhole at stopping speed

For sewing buttonholes at stopping speed (low speed), proceed as follows:

1. Heel the l/h pedal beyond the first step down to the stop.
2. Place the work in position.
3. Lower the cloth presser frame by lowering the front end of the r/h pedal, and start the sewing cycle.

The machine will now sew the buttonhole at the stopping speed and then stop with the cloth presser frame lowered.

4. After disengagement of the machine, turn off the main switch for the driving motor.
5. Release catch lever 16 (figs. 8, 12 and 13) and lower the r/h pedal forwards.
6. Turn on the main switch for lifting the cloth presser frame and for cutting off the threads.

In order to ensure that the knife cuts up the buttonhole, release quickly — while the machine is running at low speed and when starting to sew the last bar — the catch lever 16. Prior to be stopped, the machine will then run for a short while at normal speed. Within this time the buttonhole will be cut up, the cloth presser frame will be lifted and the threads will be cut off. In this case it is not necessary to observe the instructions under 4, 5 and 6.

11. Removing the bobbin case top with bobbin

With the needle being above the throat plate, lift the flap 77 (fig. 20) and remove from the hook the bobbin case top 78 and the bobbin.

As long as the flap 77 is held in position, the bobbin will be held in its case. After releasing the flap and by holding the open side of the case downwards, the bobbin will fall out of the case.

12. Winding the bobbin

When winding the bobbin, the thread extends from the reel through the thread guide in the thread unwinder, through the guide 79 (fig. 21), round the spindle of the thread tension 80 and through the thread guide 81 to the winder.

For winding the bobbin 82, first push it on the winder spindle as far as it will go, wind the end of the thread clockwise several times around the bobbin and press the bobbin winder flap 83 against the bobbin winder hub until it catches.

The winding process takes place while the machine is in operation, the winding device cutting out automatically as soon as the bobbin is fully wound. After winding, pull the bobbin off the bobbin winder spindle and pull the thread over the knife 84 of the winder flap. The thread will be cut off and the thread end will be clamped ready for the next sewing operation.

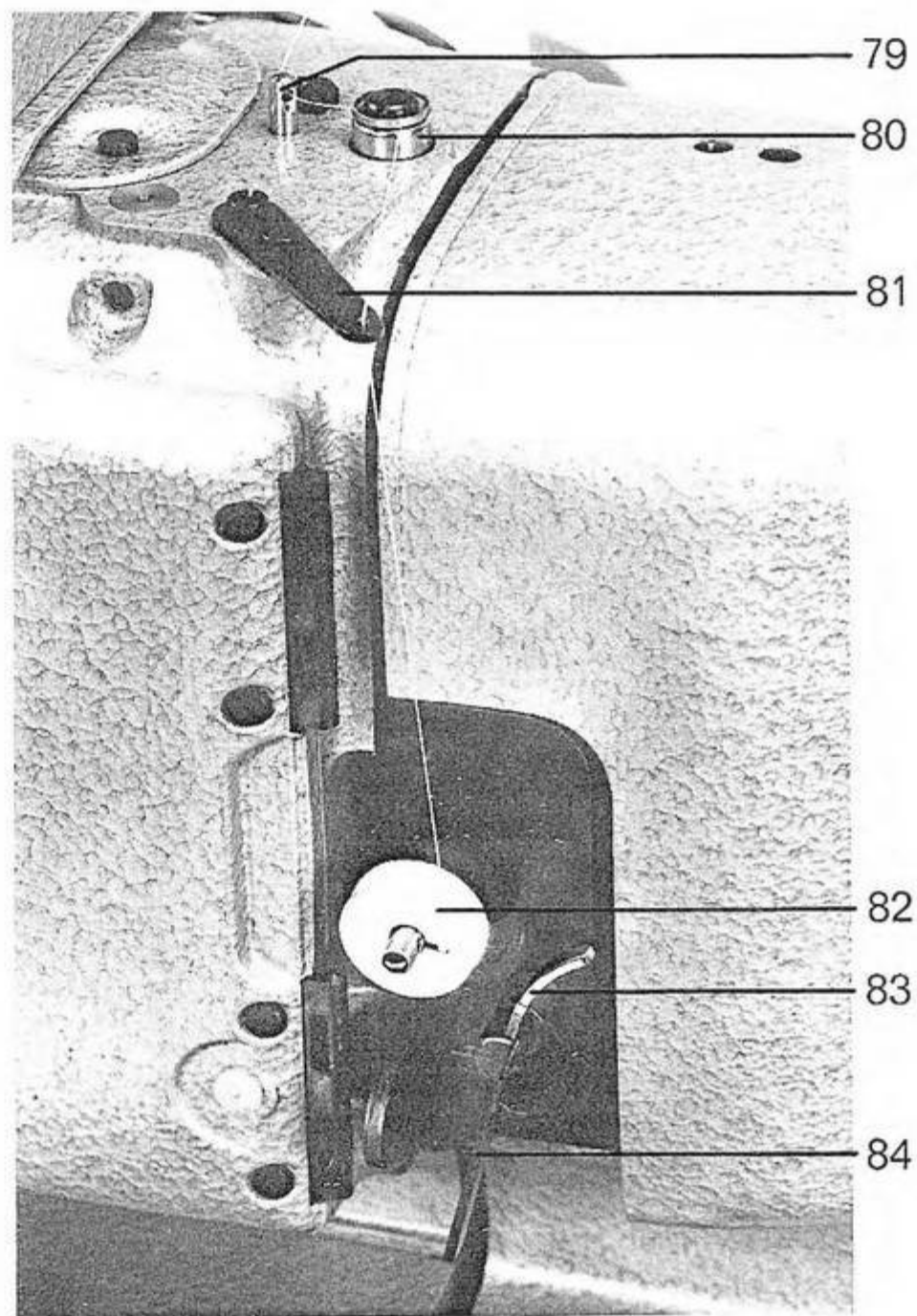


Fig. 21

13. Threading the bobbin

Hold the bobbin with the finger tips of your right hand so that the free end of the thread extends from the front to the right and places itself in the bobbin case top. See fig. 22.

Pass then the thread in the slit 85 and under the tension spring 86. See fig. 23.

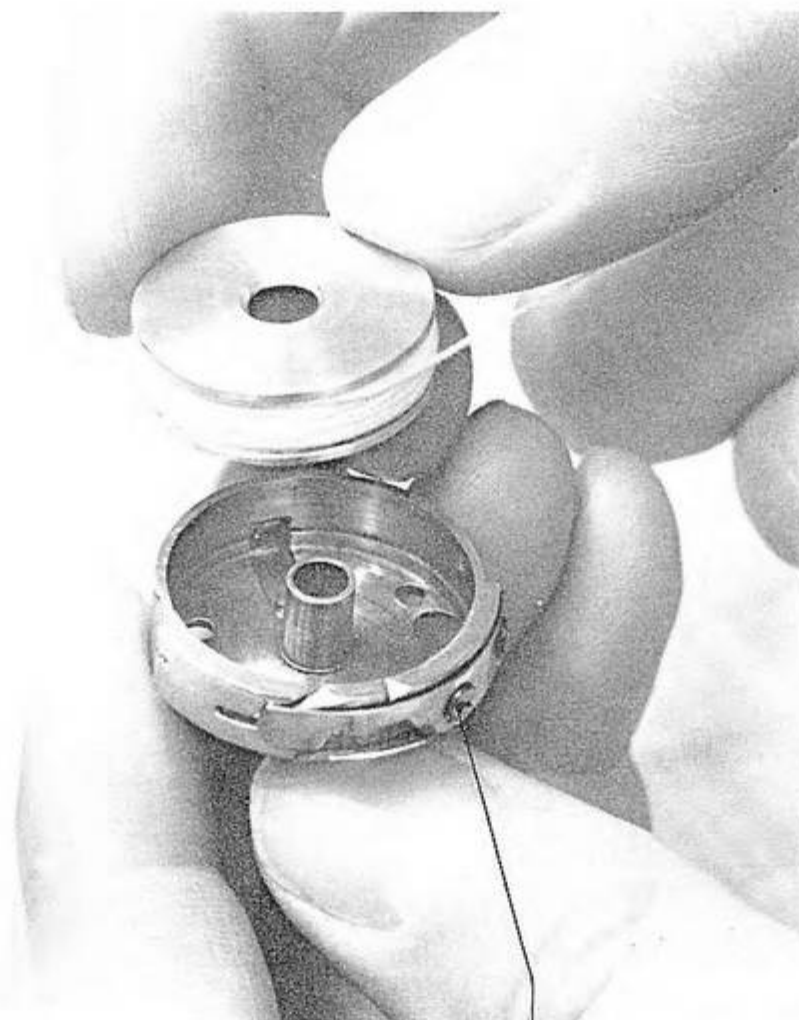
Hold then the thread, forming a loop, with the thumb of your left hand and pass it further through the slit 87. See fig. 24.

Pass it finally through the slit 88 in the borehole 89. Fig. 25.

For obtaining the proper starting length of the thread, the latter can be pulled over the knife 90 and cut off as shown in fig. 26.

14. Inserting the bobbin case top with bobbin

For inserting the bobbin case top, the same as for removing it, the needle must be above the throat plate. Seize the flap 77 (fig. 20) with the thumb and the index finger of your right hand so that the fully



112

Fig. 22

lifted flap holds the bobbin in its case. Slip then the case onto the centre pin of the bobbin case base so that the flap end shows to the left. For more safety, press the case with the thumb. If the case is not well in its proper position, the needle or the bobbin case may be broken.

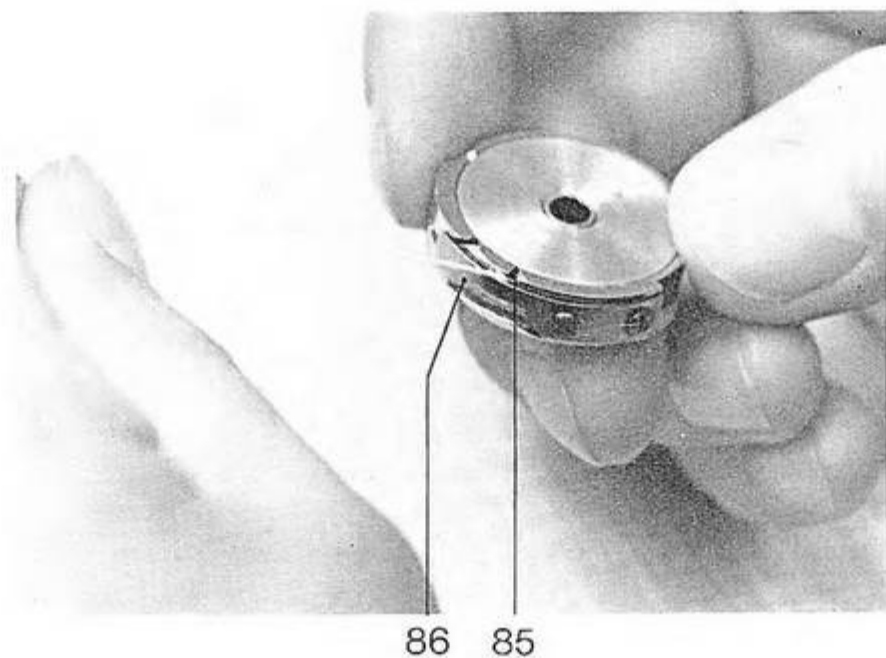


Fig. 23

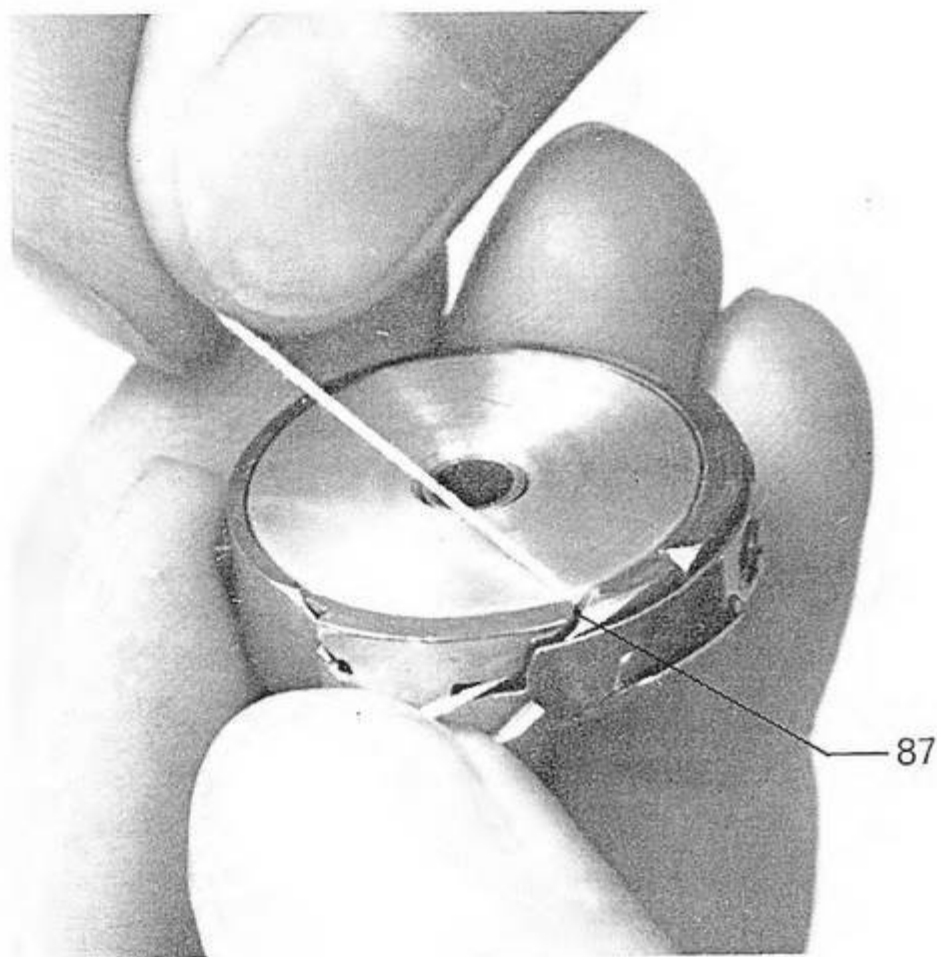


Fig. 24

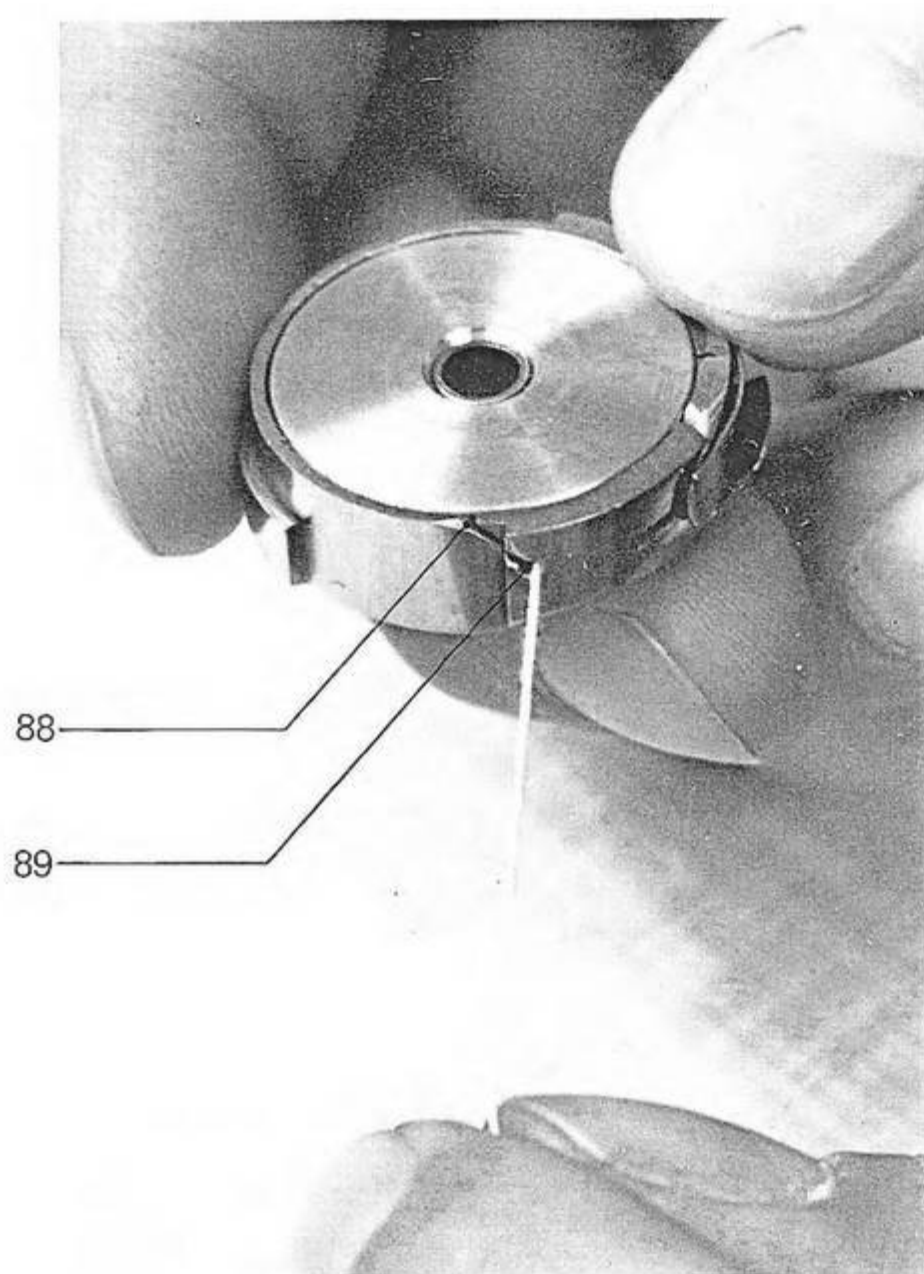


Fig. 25

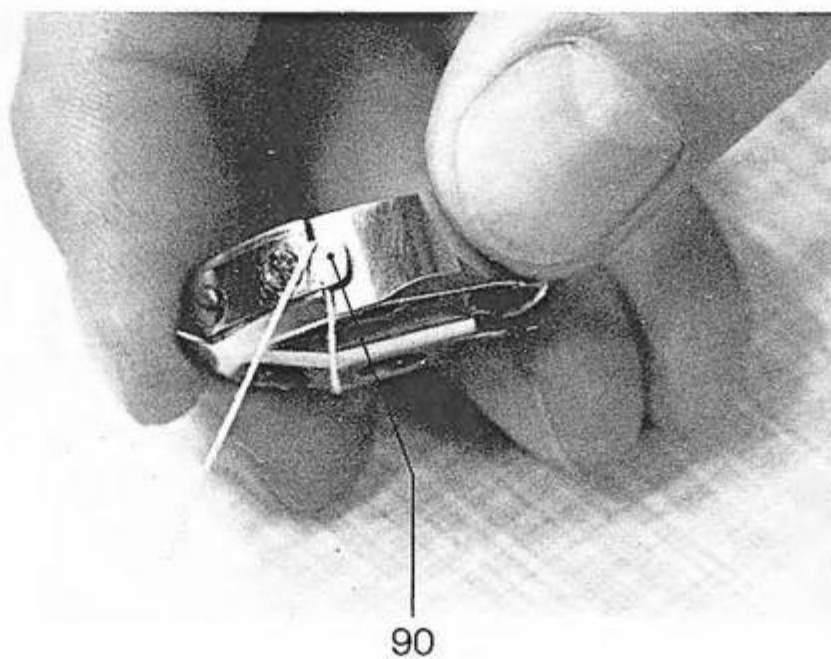


Fig. 26

15. Threading the needle

The path of the needle thread is shown by the fig. 27.

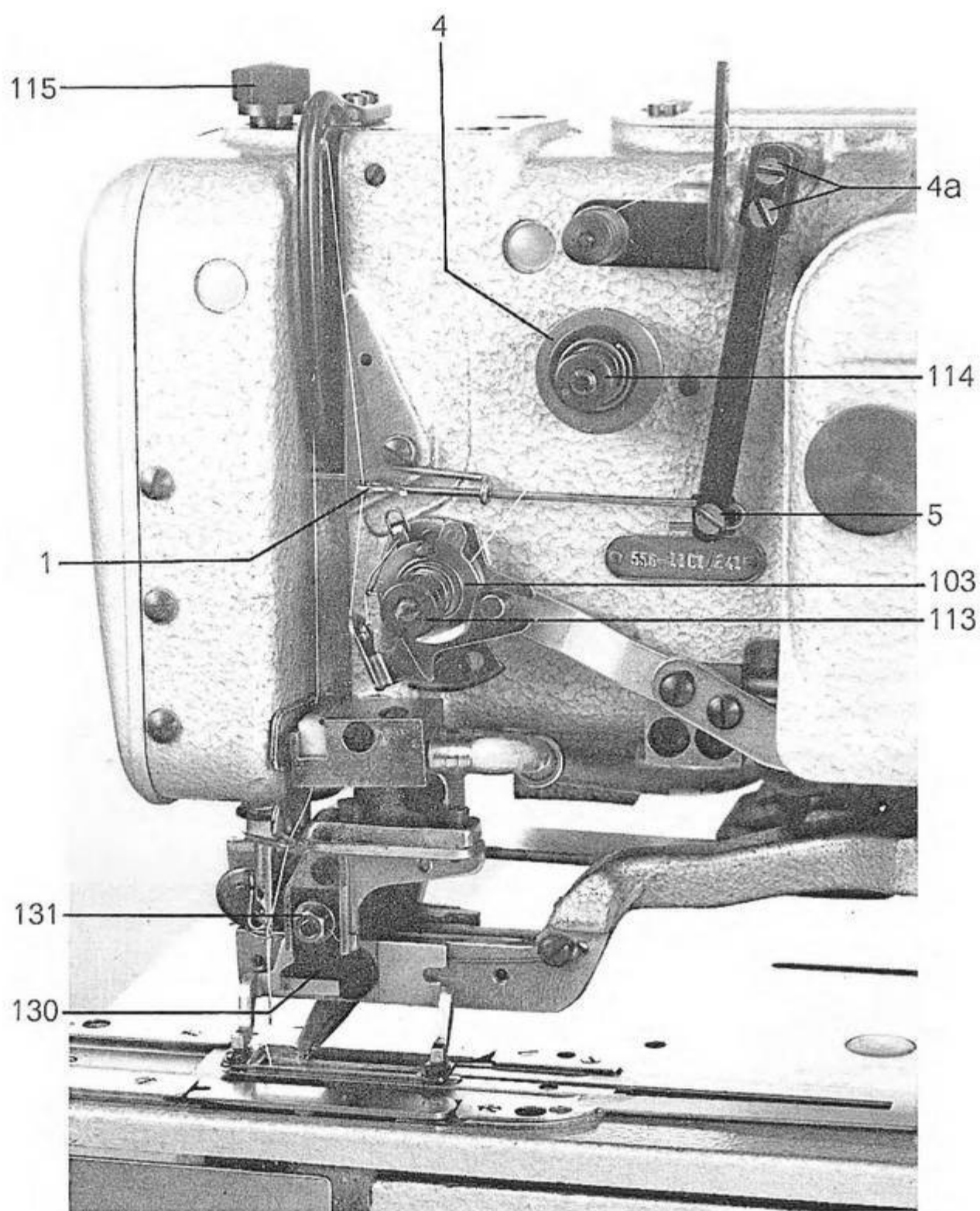


Fig. 27

16. Adjusting the thread tensions

The adjustment of the thread tensions depends on how the buttonhole is to be sewn, i.e. flat or raised.

For raised buttonholes, adjust the tensions as follows:

The bobbin thread tension is adjusted by turning the tension spring regulating screw 112 (fig. 22). Turn the screw 112 clockwise for increasing and counter clockwise for reducing the tension. The tension must be such that the case with the full bobbin descends slowly if one holds the thread and lets the case swing freely.

The needle thread has the tensions 4 and 103 (fig. 27). By means of the knurled nut 113 (fig. 27) adjust the thread tension, the so-called tying stitch tension, so that when making the first stitches it brakes the needle thread to such an extent that already prior to the full efficiency of the main tension 4 the needle thread draws the bobbin thread upwards, ensuring thus tight stitches.

On the other hand the tension should not be so too tight that the machine does not sew properly or that the needle thread is pulled out of the scissors.

The main tension, which does not become effective before a few stitches have been sewn, should be adjusted by the knurled nut 114 so that the needle thread pulls the bobbin thread upwards to such an extent that the interlocking takes place in the middle of the row of the buttonhole. In order to obtain a perfect stitch pattern, the lower thread must place itself around the upper thread.

For sewing flat buttonholes, adjust the upper and the lower thread tensions so that the interlocking takes place in the middle of the material.

When sewing flat or relief type buttonholes and using in the needle the core thread 120, optimum results are obtained with following tension values:

The tension 103 (fig. 27) for the tying stitches should be set for about 50 to 60 g and both tensions together for about 200 g.

When using a double-twisted cotton thread 40/4 in the needle for sewing relief type buttonholes, following values can be used as references:

The tension 103 for the tying stitches should be set for about 80 g and the two tensions together for about 360 g.

When measuring the tension by a thread scale pull the thread horizontally out of the thread take-up lever hole. The thread scale can be ordered under the ref. No. 5562461.

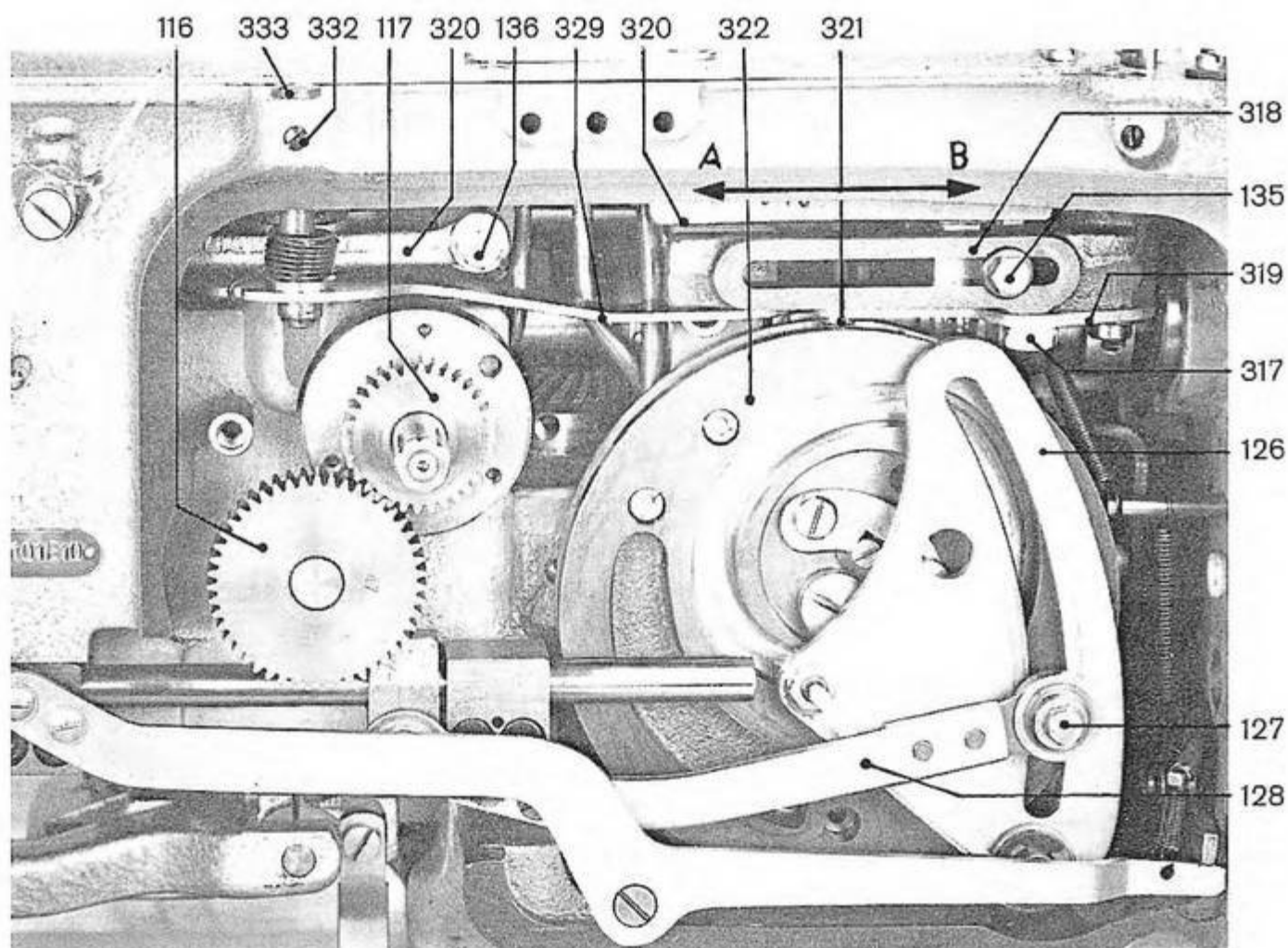


Fig. 28

17. Adjusting the pressure of the cloth presser frame

The pressure of the cloth presser frame exerted on the material should be strong enough to hold it firmly.

Screw the sleeve 115 (fig. 27) deeper for increasing the pressure and viceversa.

18. Modifying the stitch density in the buttonhole

The density of stitches, i.e. the number of stitches per buttonhole, can be modified by changing the wheels 116 and 117 (fig. 28). Proceed as follows:

1. Depress the lever 59 and remove the crank 1 (fig. 3) from the shaft.
2. Open the cover 119 by turning the knurled screw 118 counter clockwise.

The total sum of the teeth of the upper and lower wheel should always amount to 79.

Normally, the machine is supplied with three pairs of wheels, their difference being determined by the type of equipment of the machine.

The machine stopping cam has been factory-set for the wheel couple with medium number of stitches. When using any other wheel couple, reset the stopping cam and the scale sheet 120 (fig. 30) accordingly.

For doing this, loosen the nut 121 by the available spanner and reset the scale sheet 120 so that the figure or the mark on the scale sheet, being next to the desired number of stitches, faces the mark 122 of the part 123.

The part 123 is sealed by yellow varnish and it should not be reset.

In the older machines, which do not still have the scale sheet 120, check after changing the wheels whether the machine stops in its final position, i.e. whether the frame has travelled backwards and whether the main tension is open. In the negative, i.e. if the machine has stopped too early, loosen the nut 125 and displace the cam 124 (fig. 31) in the direction of the arrow A. If the machine stops too late, displace said cam in the B arrow direction.

For reaching the nut 125 remove the big cover on the left machine side.

For further instructions regarding the adjustment of the stopping cam 124 see the chapter 30, item a).

19. Setting the buttonhole length

The buttonhole length must be adapted to the cutting length, so that the buttonhole can be cut up to the bars without damaging same.

The scale figures on the coulisse 126 (fig. 28 and 32) correspond to the knife cutting length in inches.

For modifying the buttonhole length, loosen the screw 127 (fig. 32) by the spanner supplied together with the machine accessories. Place now the lever 128 with the indicator 129 (fig. 32) against the respective scale figure and the machine will sew a buttonhole corresponding to the cutting length with normal bar length.

When modifying the buttonhole length note that it is limited by the cutout in the cloth presser frame.

In case of need change the cloth presser frame.

In the recent machines, the adjustment range of the lever 128 and consequently the buttonhole length can be limited by the adjustable stop 128a according to the size of the respective cloth pressure frame. See fig. 133.

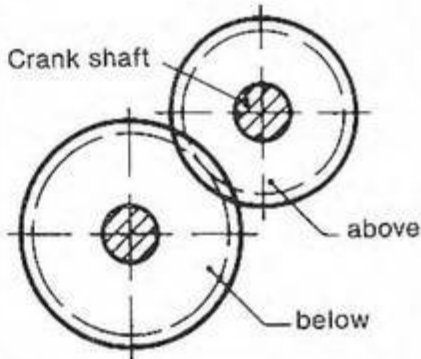
Number of stitches	Number of teeth				
	above	below			
76	22	57			
81	23	56			
86	24	55			
91	25	54			
97	26	53			
102	27	52			
108	28	51			
114	29	50			
120	30	49	247	44	35
127	31	48	261	45	34
134	32	47	274	46	33
141	33	46	289	47	32
149	34	45	305	48	31
157	35	44	321	49	30
165	36	43	339	50	29
173	37	42	358	51	28
182	38	41	379	52	27
192	39	40	401	53	26
202	40	39	425	54	25
212	41	38	451	55	24
223	42	37	479	56	23
235	43	36	510	57	22

Fig. 29

20. Modifying the cut length (changing the knife)

The cut length can be modified by changing the buttonhole knife 130 (fig. 27) against a longer or a shorter knife. For changing the knife 130, remove the nut 131 by the available spanner. **Fit the knife into its holder so that the inscriptions (part number and cut length) can be read.**

Adjust the height so that when the knife is in its lowest position its front or left edge is about 1 mm below the throat plate surface.

Following the adjustment, retighten firmly the nut 131. If the cut length has been modified, the buttonhole length must be adjusted according to chapter 19.

21. Setting the row width, the bar width, the distance between the two rows and the position of the buttonhole with respect to the knife incision

The above adjustments are interdependant. If, for instance, the row width is changed, it is also necessary to change the bar width and the distance between the rows accordingly. After these adjustments it is also necessary to check whether the knife still cuts axactly in the middle between the two rows. In case of need, rectify the position of the buttonhole.

The various adjustments can be done as follows:

Setting the row width

The row width can be modified by turning the screw 132 (fig. 30).

Setting the bar width

The bar width can be modified by turning the screw 133 (fig. 30).

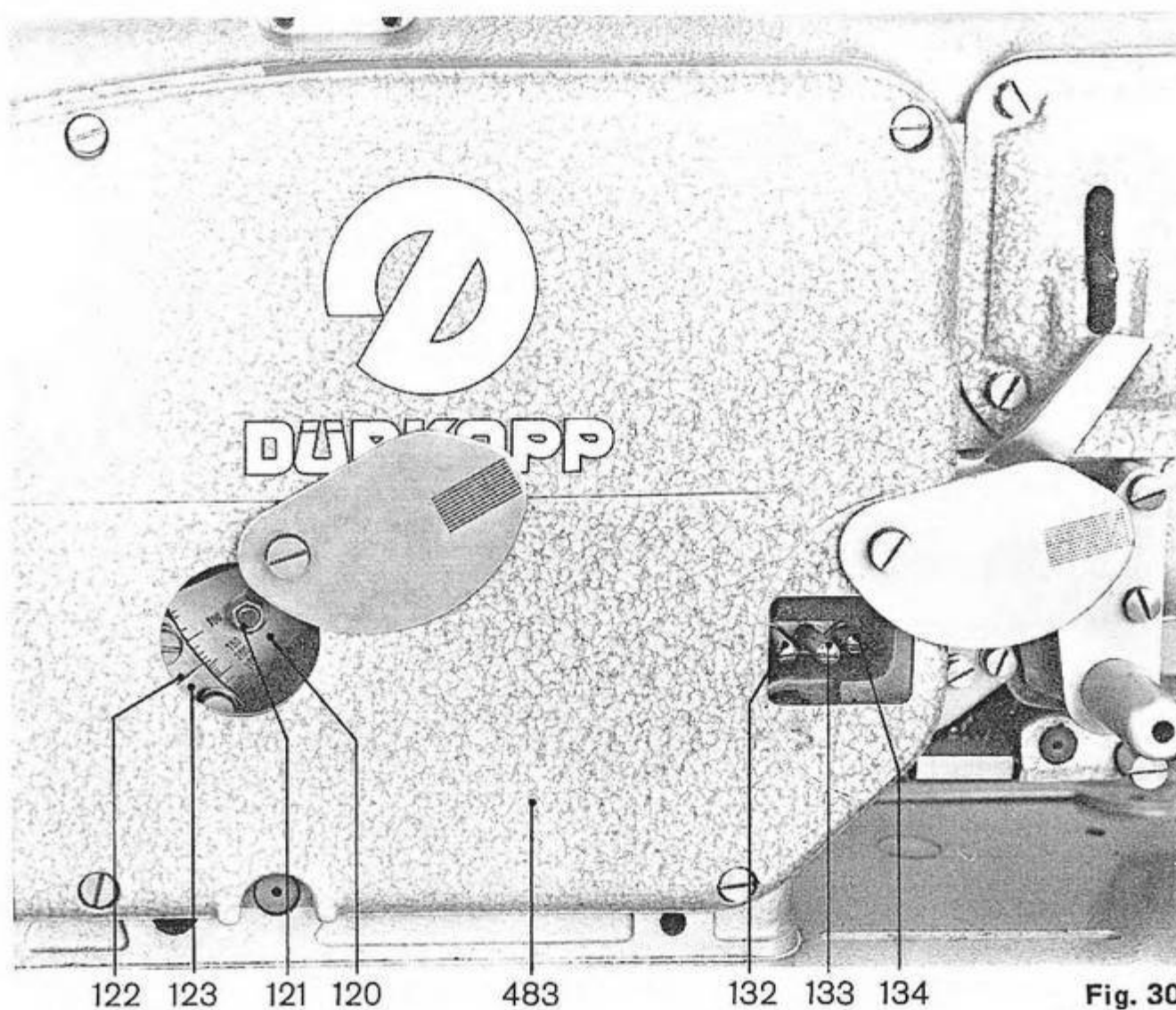


Fig. 30

Note:

The screw 134 (fig. 30) serves for setting the throw width of the tying stitches. This adjustment has been done in the factory and normally it should not be modified.

For precise adjustment, see chapter 30, item e).

Setting the distance between the two rows

For setting the distance between the two rows, loosen the screw 136 (fig. 28) by the available spanner. Displace the screw 135 in the "A" arrow direction for increasing the distance and in the "B" arrow direction for reducing it. Following the adjustment retighten firmly the screw 135. For precise adjustment see chapter 30, item g).

Setting the position of the buttonhole with respect to the knife incision

The position of the buttonhole with respect to the knife incision can be modified by turning the stop screw 136 (fig. 28) by the available spanner. For precise adjustment, see chapter 30, item g).

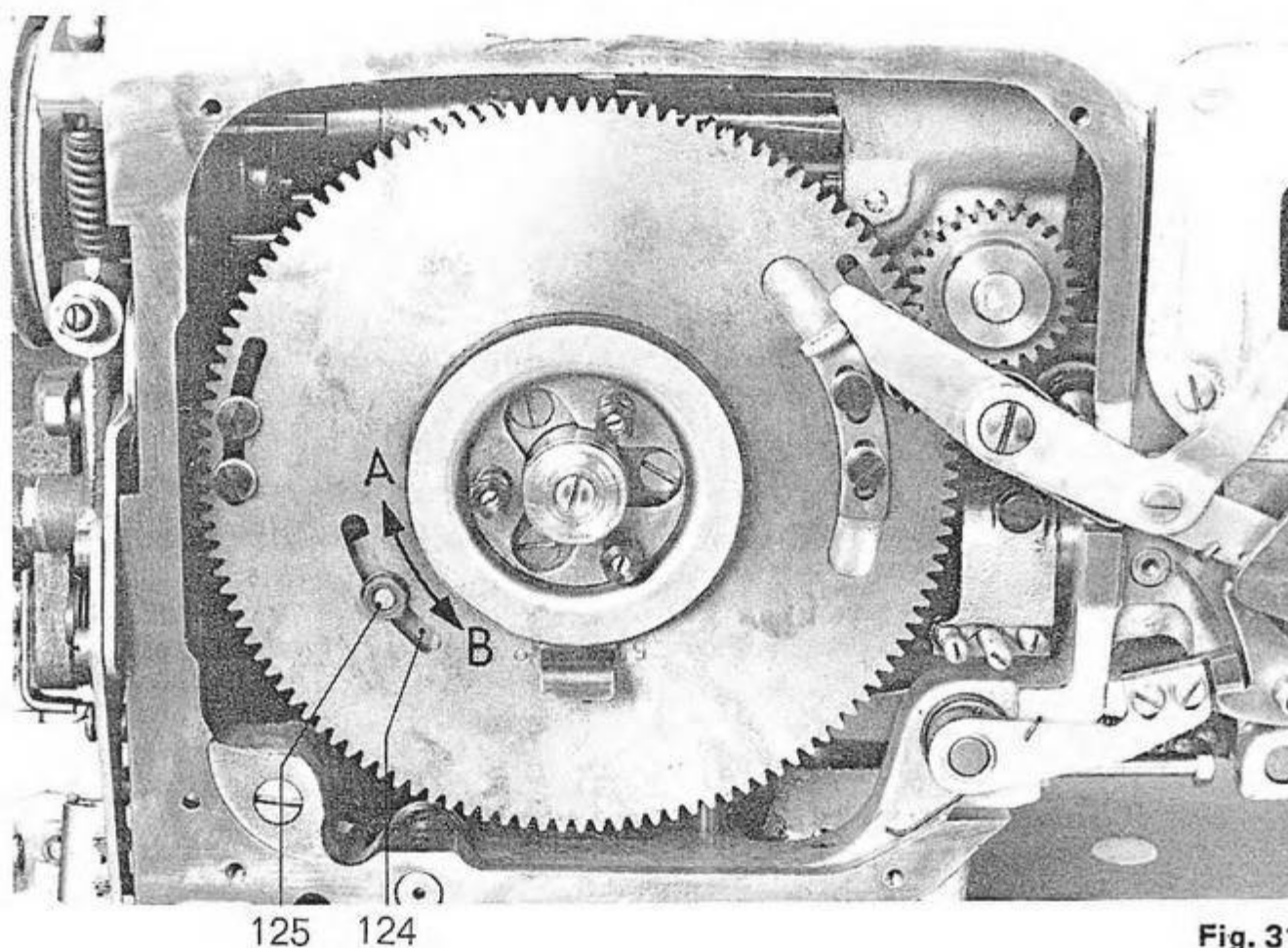


Fig. 31

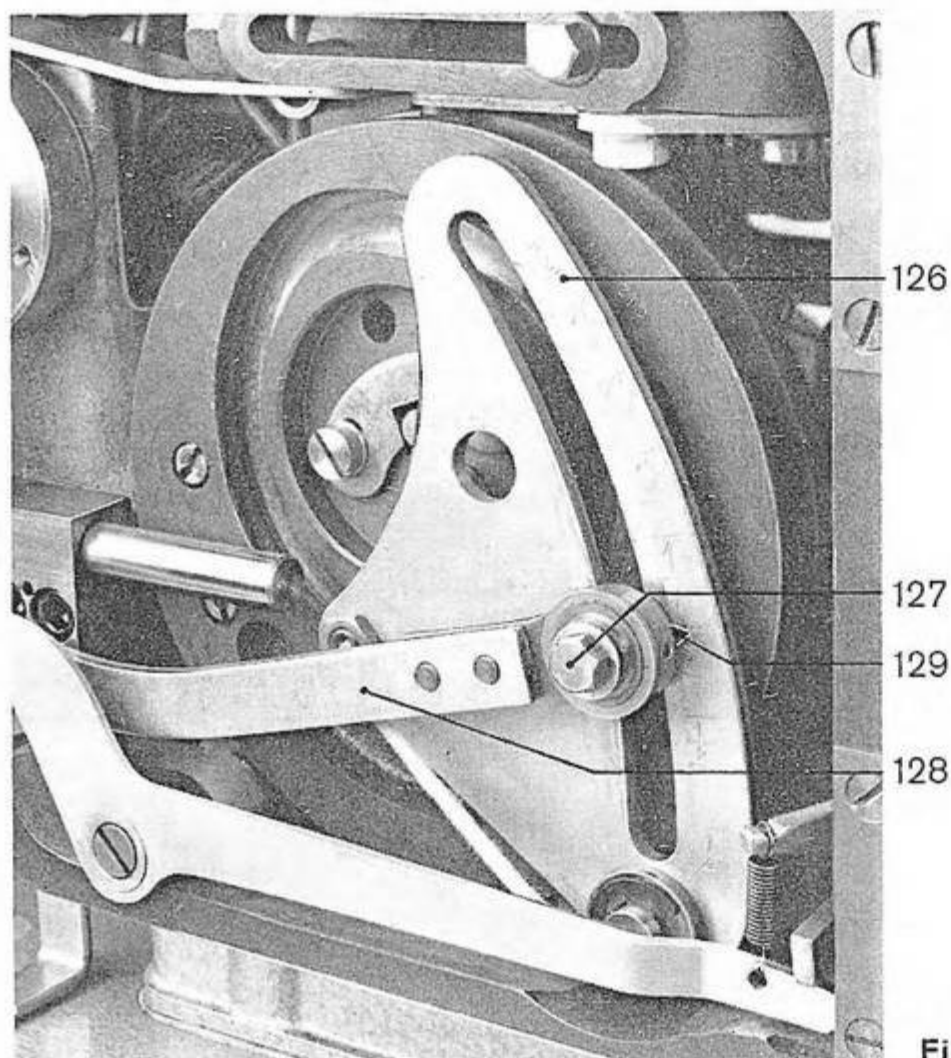


Fig. 32

INSTRUCTIONS FOR MECHANICS

22. Lubrication

All moving parts of the machine, except those specified hereinafter, are lubricated centrally from two oiling points, 73a (fig. 19a) and 73b (fig. 19b). The oil container 73a (fig. 19a) supplies the oil for lubricating the parts in the arm, and the oil container 73b (fig. 19b) under the base plate supplies the oil for lubricating the parts below the base plate, the lower bearing for the vertical shaft, the bearing for the coulisse 126 (fig. 28) and the roller bolt of the longitudinal coulisse.

Before taking the machine into service, fill both containers with Spinesso 10 oil up to the maximum mark. Replenish them when the oil contents has been consumed.

For lubricating this high speed machine use **Spinesso 10 oil** or an equivalent quality. The Spinesso 10 oil can be obtained from DÜRKOPP sales centers.

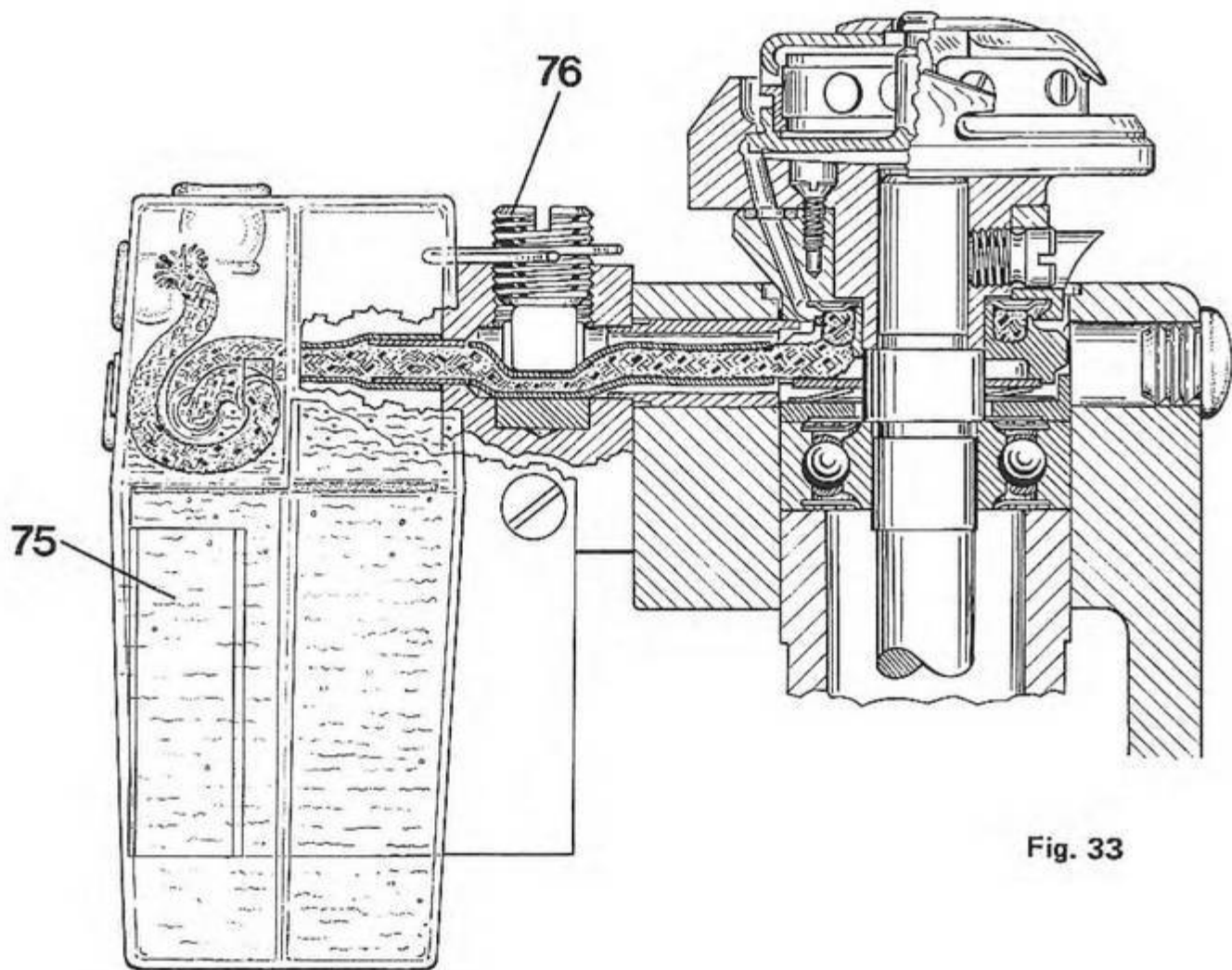


Fig. 33

a) Hook lubrication

The hook lubrication system is shown by fig. 33.

The amount of oil required for the hook lubrication depends on the type of the material and of the thread used. Therefore, the oil supply should be adapted to the requirements. If the hook gets very warm, runs noisily or breaks the thread, it is not receiving enough oil.

For checking the proper supply of oil proceed as follows:

Sew a buttonhole in the fabric and with the thread to be used later.

Hold during this time a small mirror underneath the hook. The adjustment of the oil supply is correct if the mirror is covered with a thin film of oil. The oil supply is adjusted by the screw 76.

Note:

For more oil, turn the regulating screw clockwise.

For less oil, turn the regulating screw counter clockwise.

After each resetting of the screw 76 sew with the machine for about 15 minutes and check then the oil supply by means of a mirror as described.

If with an adjustment supposed to be correct there is no change after more than one hour's service, the oil supply can be considered to be correct.

The oil supply in the container 75 should be sufficient for impregnating the wick when the machine is lowered.

For replenishing the oil supply, set the machine upright and prop it by the respective support.

b) Checking the oil level in the hydraulic control unit

The oil level in the hydraulic control level can be checked through the sight glass 15 (fig. 9).

The oil level should fluctuate between the upper and the lower division mark. Since normally no oil is consumed, replenishing is required only in exceptional cases, and only when the oil can no longer be seen through the sight glass.

For replenishing, remove the plug screw 14 (fig. 9).

For the gears use Spinesso 10 oil.

For draining the oil, remove oil drip pan 148 (fig. 13) and the screw 149.

Adjust the oil pressure as described under chapter 45.

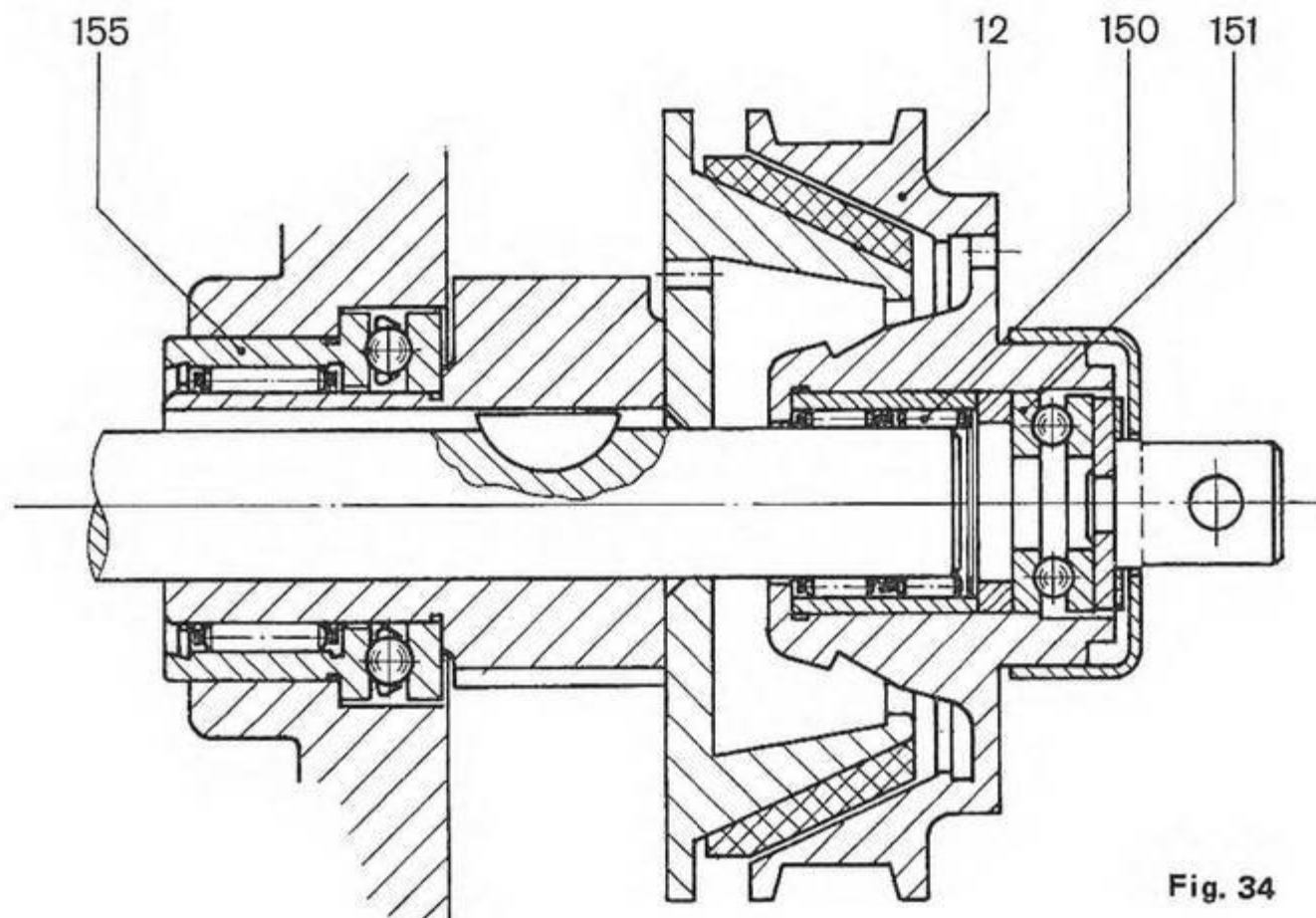


Fig. 34

c) Lubricating the needle bearing and the grooved axial ball bearing in the belt pulley

After about one year's service, i.e. after about 2500 service hours, the needle bearing 150 (fig. 34) and the grooved axial ball bearing 151 of the belt pulley 12 should be washed and replenished with fresh grease.

For lubricating this bearing, remove the bearing bolt 152 (fig. 14) of the clutch lever 153, hang out the pulling spring 154 and remove the belt pulley with the clutch lever by pulling it backwards.

For washing the bearing use washing gasoline with 5 % oil admixture or non-acid petrol.

For lubricating, use special needle bearing grease, supplied by DÜRKOPP sales centers under ref. No. 570 1710. Fill each chamber with about 0.25 cm^2 of grease = size of a pea.

If too much grease is filled in, there is a danger that the grease will be thrown off and that it will contaminate the clutch lining.

An excessive grease quantity can also increase the service temperature of the bearing.

d) Lubricating the rear arm shaft bearing (Nadex bearing)

After about two year's service the rear arm shaft bearing 155 (fig. 34) should be washed out and lubricated with a fresh special needle bearing grease.

For stropping the bearing, use the stropping device, supplied under the ref. No. 5562221.

e) Lubricating the bearings in the bearings in the belt pulleys of the hydraulic control gearing system

These ball bearings require no maintenance, because service-free ball bearings are used.



f) Lubricating the hook driving gears

After about one year's operation, i.e. after about 2500 hours of service, the interior of the gear housing 156 (fig. 103) must be cleaned and provided with fresh grease. Gauge the filling by means of the trough in the casing cover.

For replenishing, use a **special gear grease**, supplied in 30 g tubes under ref. No. 211 693.

Fig. 35

g) Maintenance of the lubrication points in the machine base and of the bobbin case lifter bearing

The ball oiler 157 (fig. 35) lubricates the bearing points of the engaging lever and of the lifting lever on the base.

The oil sump 158 lubricates the bearing points of the engaging tappet 160 (fig. 36), of the lifting tappet 161 and of the control lever 162 for the belt fork in the base.

The bearing 431f (fig. 103a) of the traction rod 431d is a maintenance-free ball bearing.

The bearing 431g is a grease-filled needle sleeve. After about two year's service it should be washed out and should be filled with fresh special needle bearing grease.

h) Adjusting the upper shaft in the axial direction

In order to ensure a proper lubrication of the bearing points of the thread take-up lever and of the traction rod for the needle bar driving lever on the stud, the upper shaft must be adjusted as described hereinafter.

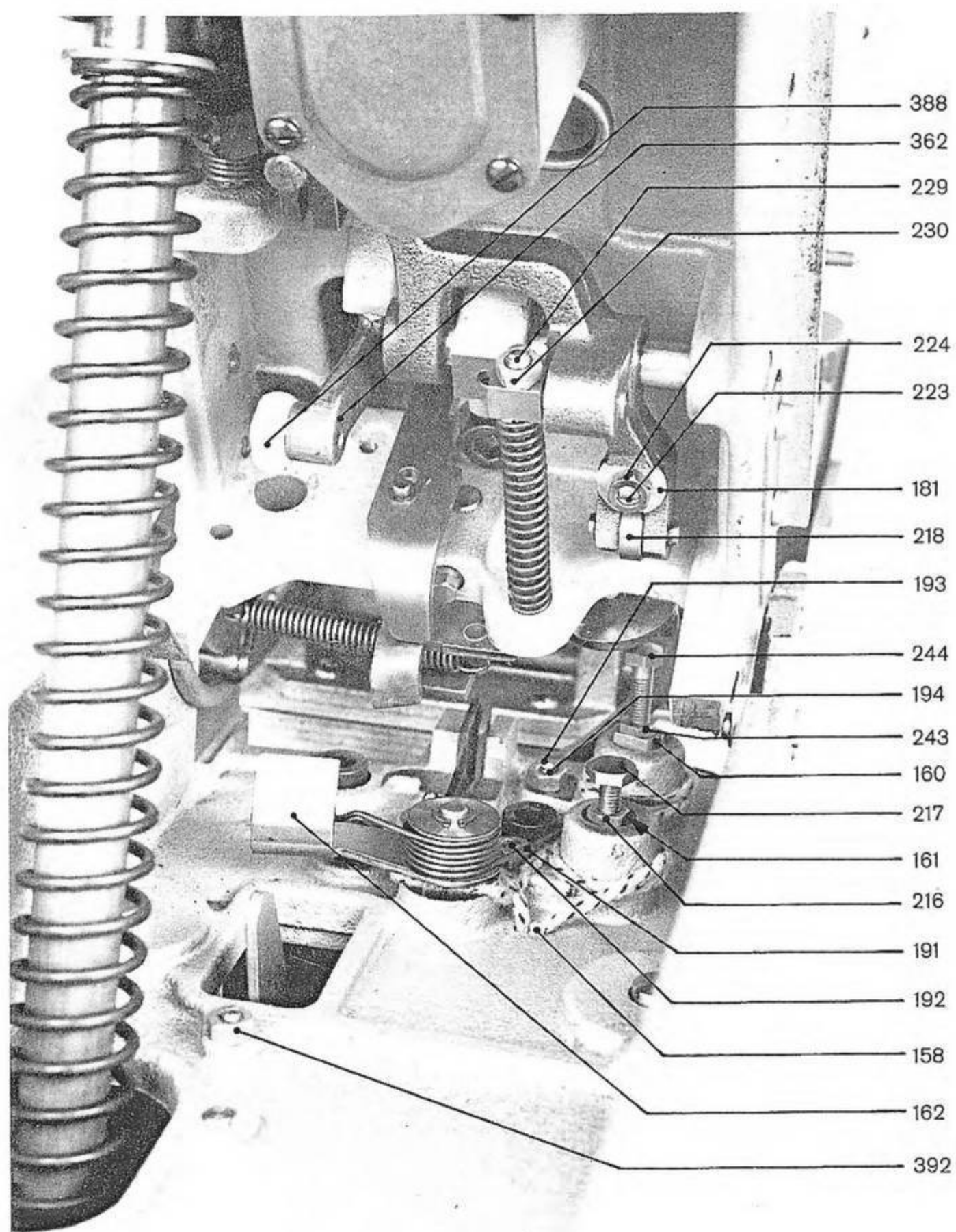


Fig. 36

The front arm shaft bearing 165 includes a brass pin 166, projecting with a length of 1.8 mm out of the bearing. See fig. 37. When adjusting the upper shaft 167 (fig. 38) in the longitudinal direction, loosen the screws 168 in the setting ring 169 and the screws in the brake piece 170 and displace the upper shaft until the ring 171 (fig. 37) touches the brass pin 166.

While maintaining this position, set the ring 169 (fig. 38) against the medium arm shaft bearing 172 and retighten firmly the screws 168.

Fasten finally the braking piece 170 on the arm shaft so that between said piece 170 and the ring 169 only oil can pass.

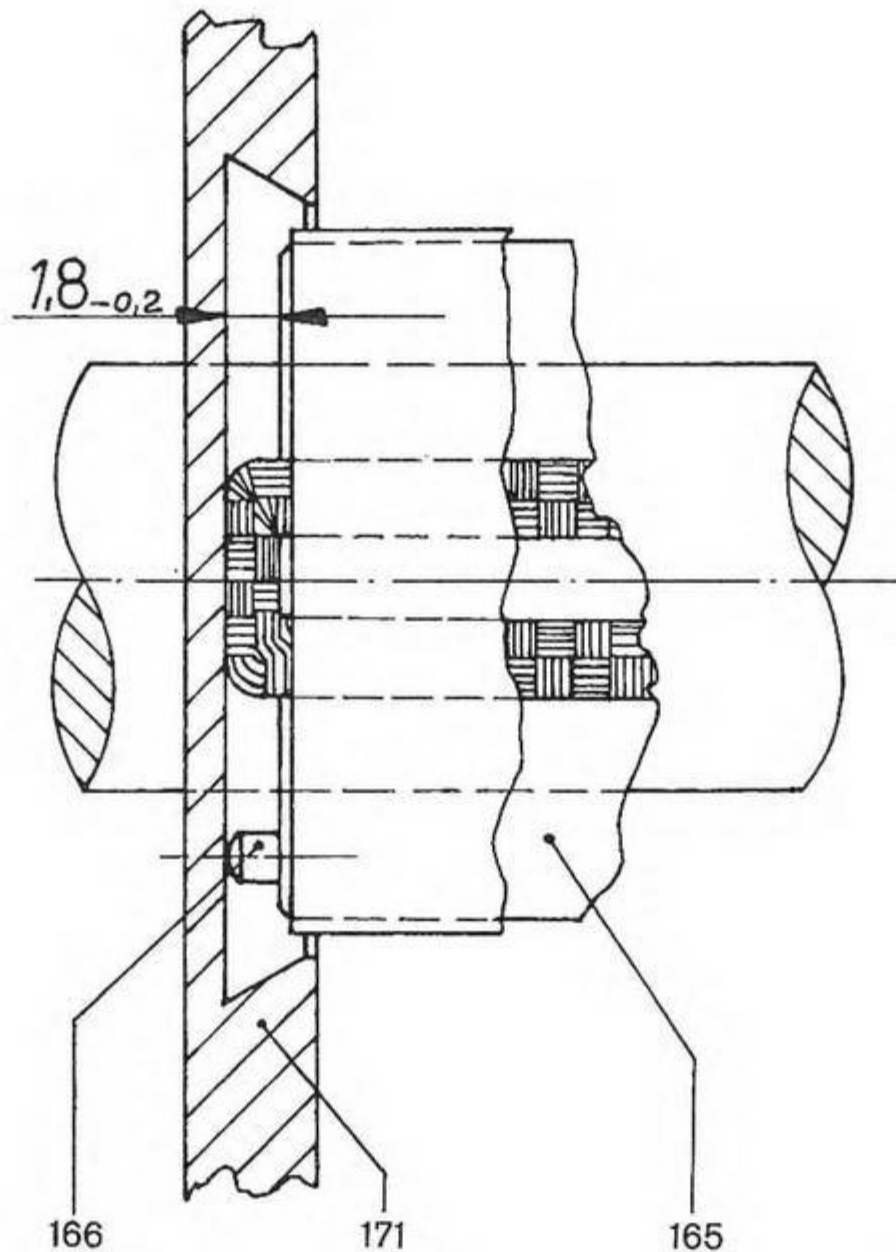


Fig. 37

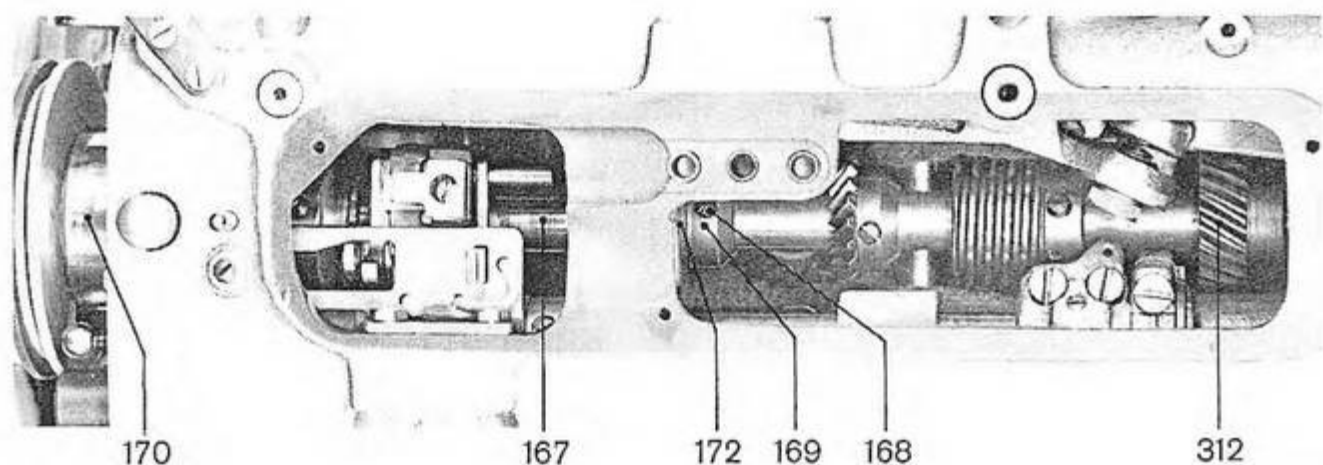


Fig. 38

23. Adjusting the bobbin thread cutter

a) Adjusting the counter knife

For adjusting the counter knife 173 (figs. 39 and 40) remove the two fastening screws and remove the throat plate. For removing the latter, engage the motor and lift the cloth presser frame. Loosen the screws 174 and adjust the counter knife 173 so that its blade 175 (fig. 40) is in the middle of the distance between the right stitch hole edge and the end of the thread slot 176. The distance "a" is equal to the distance "b". See fig. 40.

Set the thread clamp plate 177 (fig. 39) so that in the area of the stitch hole it covers the blade in the counter knife 173. See fig. 39.

The bobbin thread cutter 178 (fig. 41) should be slightly pressed against the lower side of the throat plate. By underlaying of distance plates 179 (ref. No. 556 1683) set the counter knife vertically so that, when cutting, the cutter is slightly pressed upwards.

Set thread clamp plate 177 (fig. 42) in its height with respect to the thread puller 180 so that the lower thread is safely clamped. Dress clamp plate 177 as required.

b) Adjusting the lifting motion of the bobbin thread cutter

When the bobbin thread cutter 178 (fig. 41) — with the cloth presser frame being lifted — is in its r/h position, it must have travelled under the counter knife 173 so far that the upper edge of its block is about 0.2 mm behind the edge of the counter knife. See fig. 41.

For adjusting, proceed as follows:

1. Set upright the machine head.
2. Push lifter lever 181 (fig. 36) by hand upwards so that the block 182 (fig. 36) touches the surface 183 of the block 184 and the bobbin thread cutter reaches thus its r/h final position.
3. While maintaining this position, loosen the thumb screw 185 (fig. 43) in the block 182 and turn the knife control shaft 186 (fig. 43) so that the upper edge of the bobbin thread cutter 178 (fig. 41) is about 0.2 mm behind the rear blade of the counter knife 173. Following the adjustment, retighten firmly the thumb screw 185 (fig. 43).

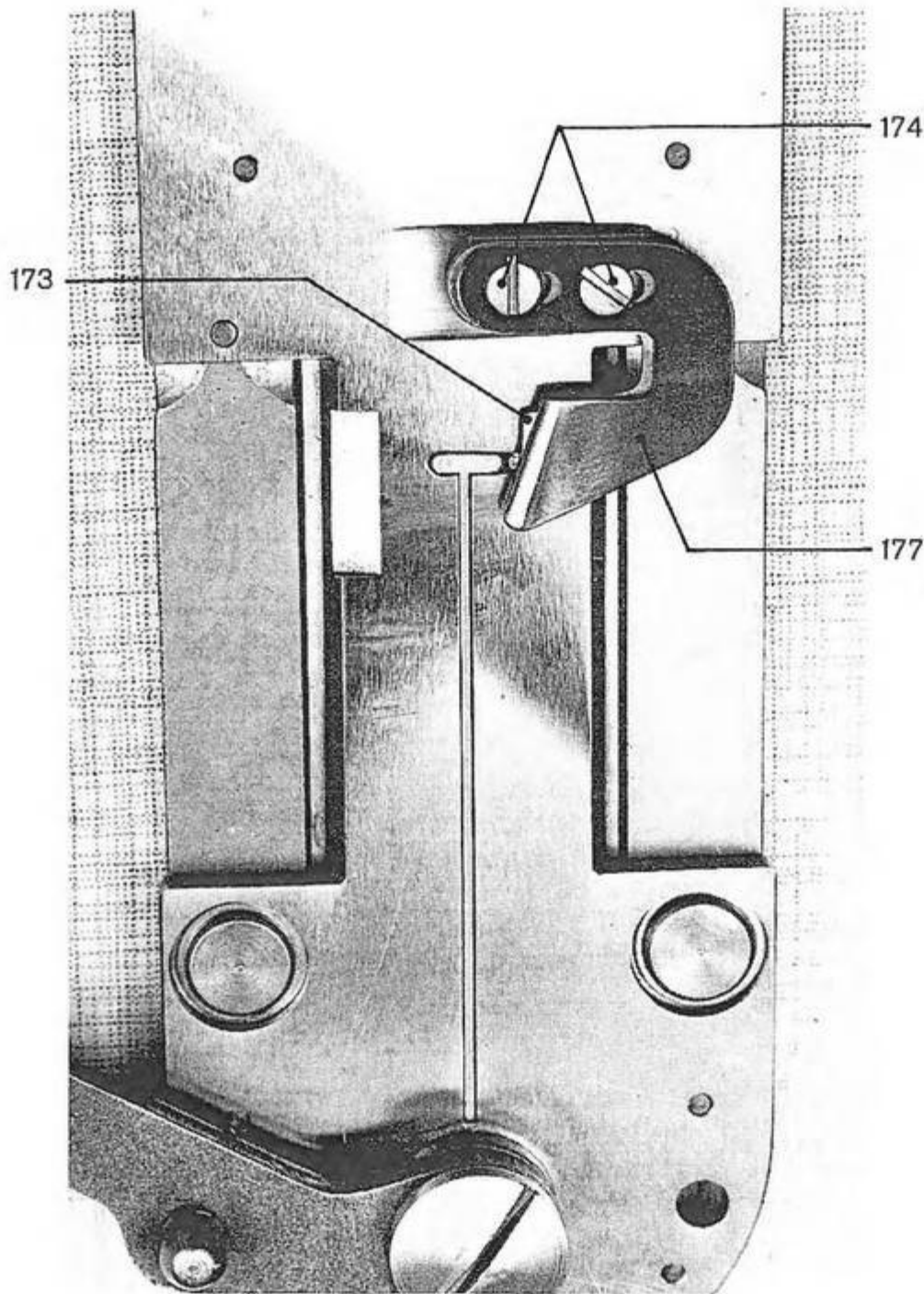


Fig. 39

Ensure that in the neutral position of the lower thread cutter (l/h final position) the cutter lever 187 (figs. 41 and 44) does not touch the base plate, while the block 182 (fig. 45) must be in contact with the stop screw 188. After loosening the counter nut 189 set the screw 188 so that the distance between the cutter lever 187 and the base plate 190 amounts to about 1 mm. See fig. 44.

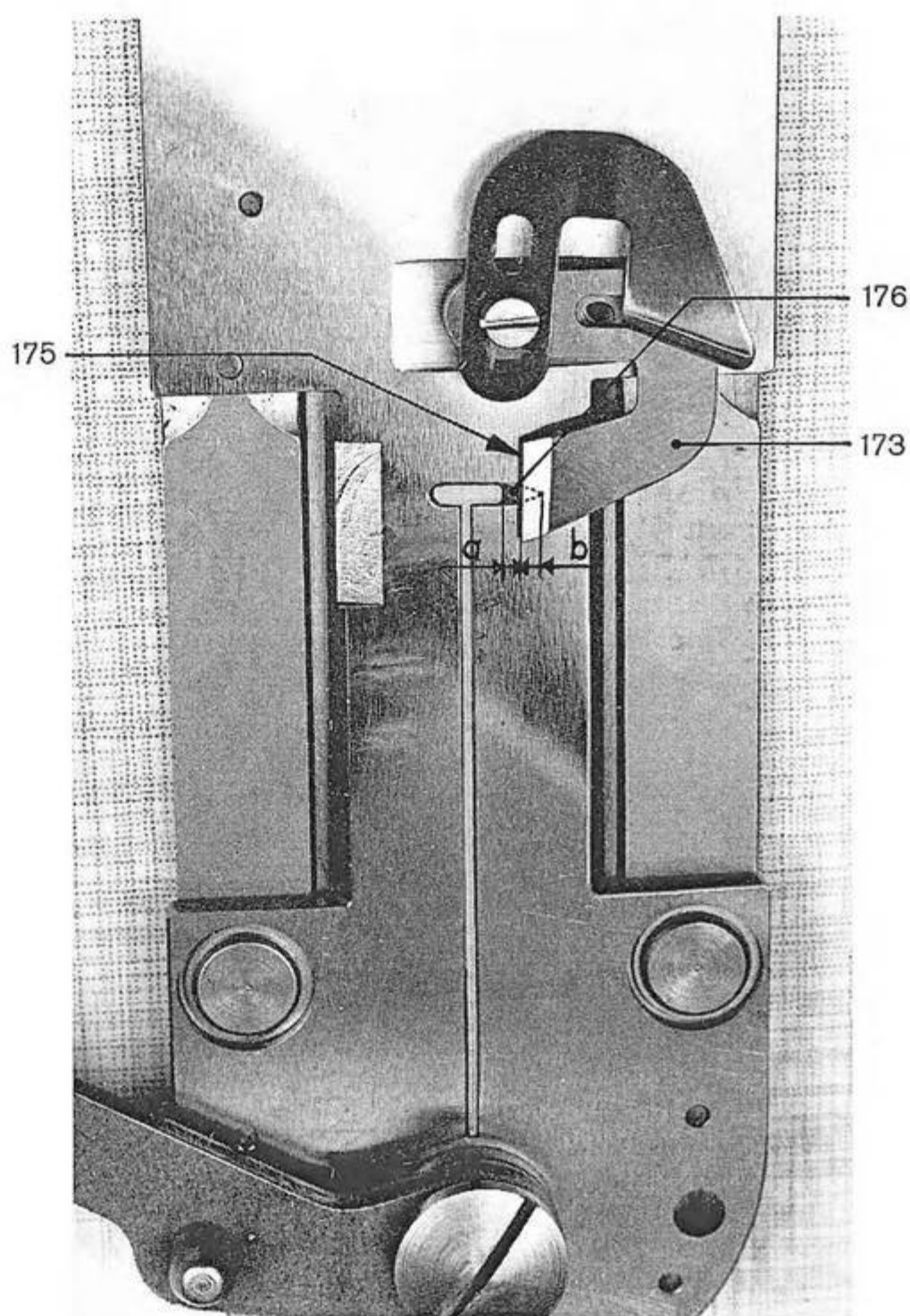


Fig. 40

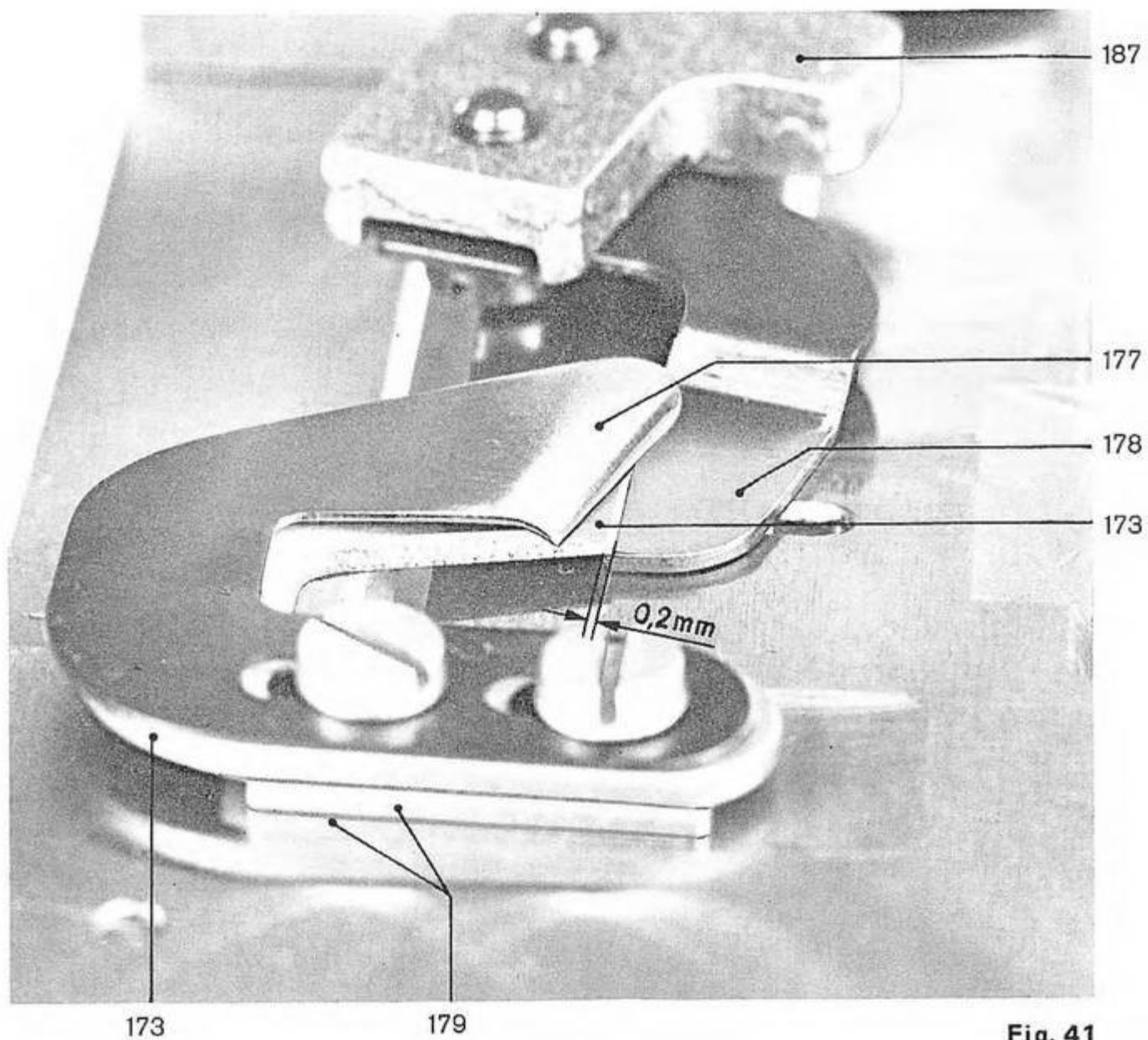


Fig. 41

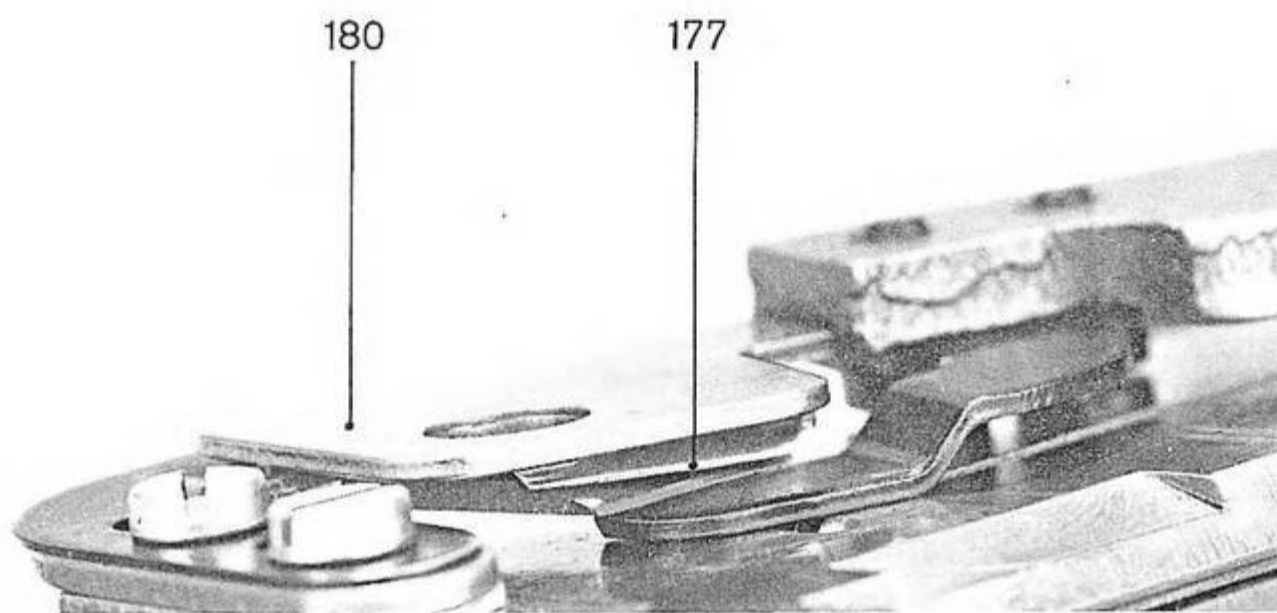


Fig. 42

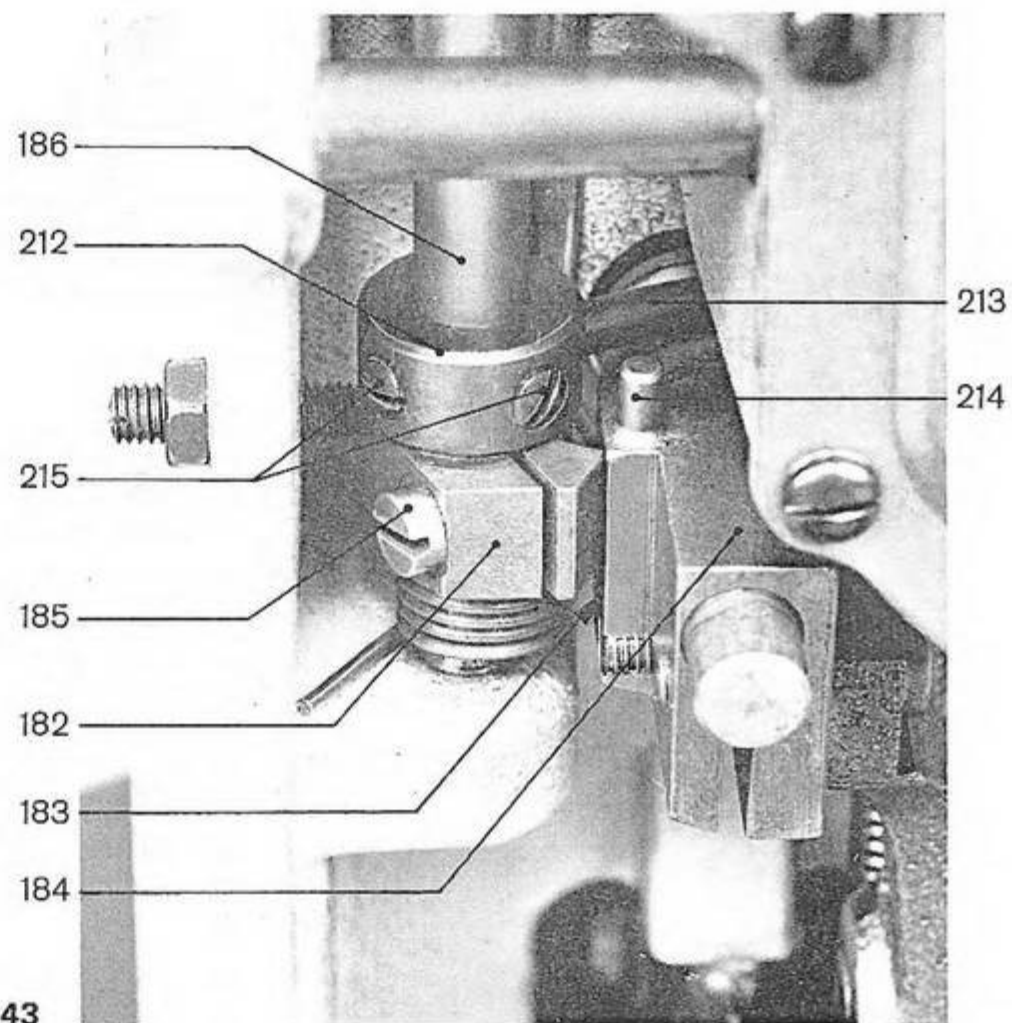


Fig. 43

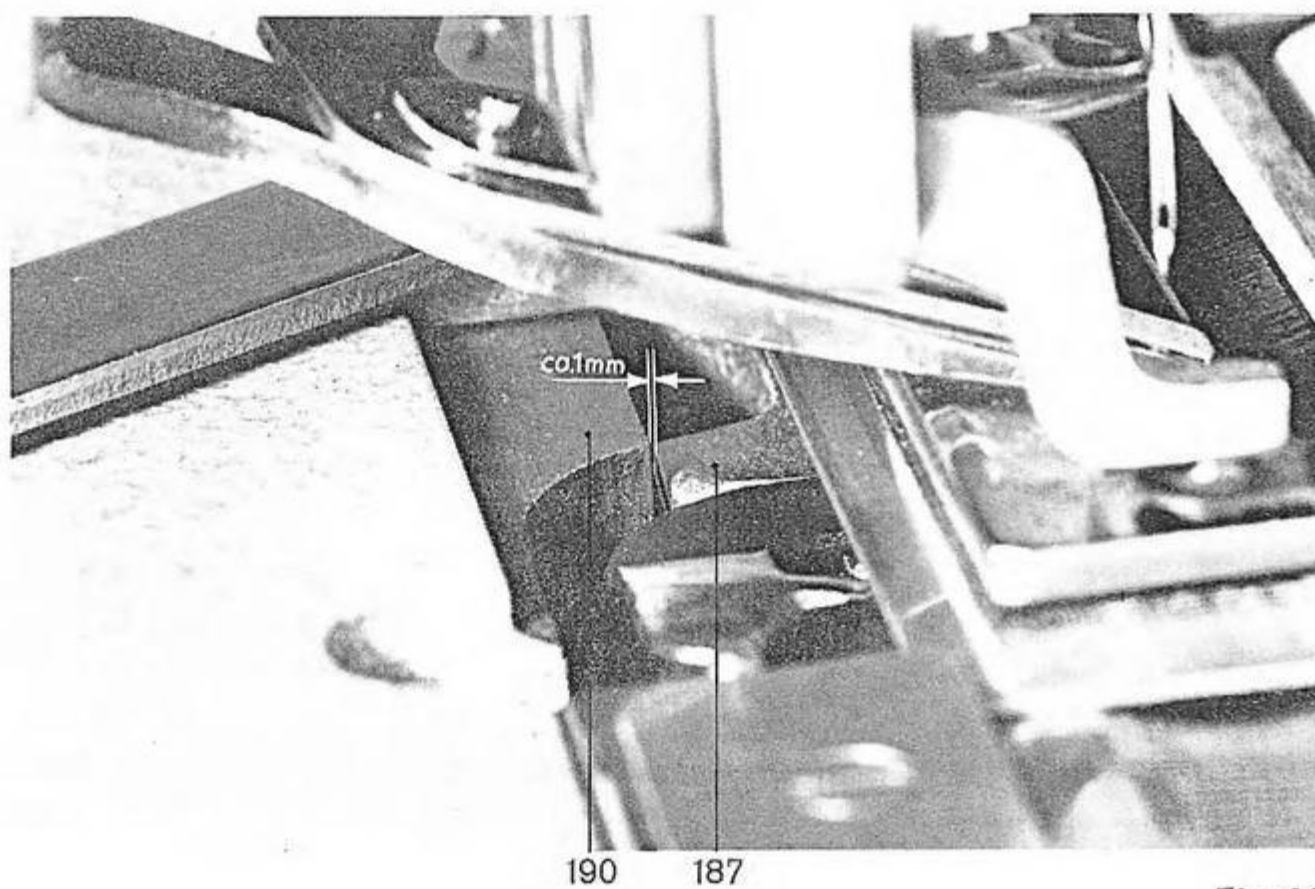


Fig. 44

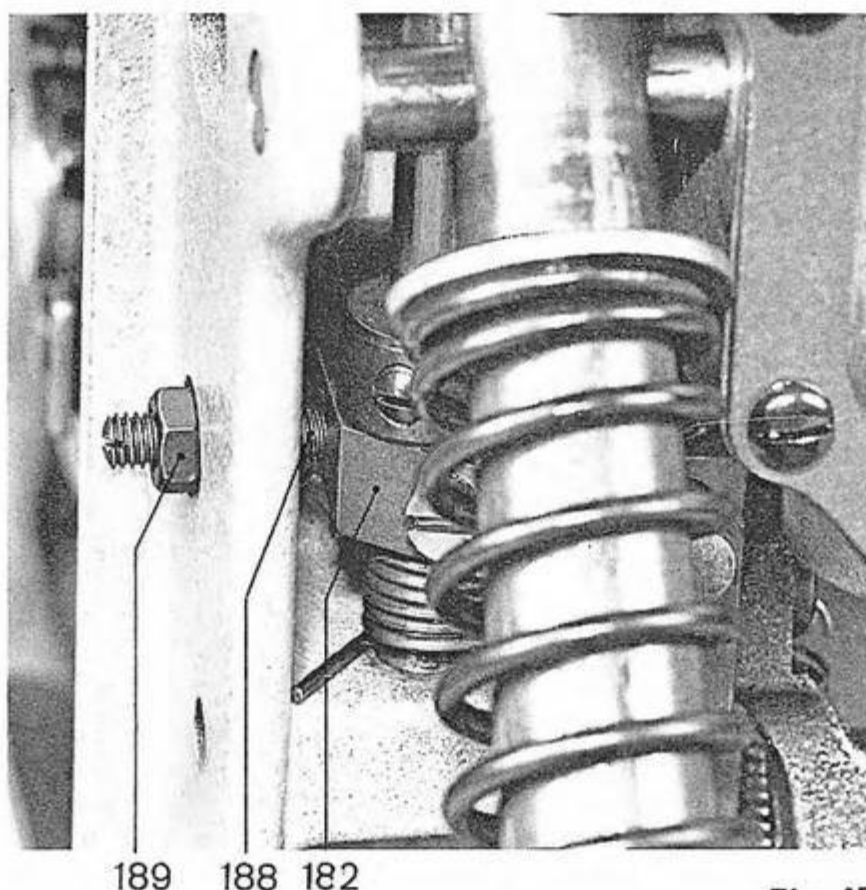


Fig. 45

24. Adjusting the lifting motion of the cloth presser frame

Instructions for adjusting the lifting movement in 556-5101, -5121, -202101 and -205101 are contained under chapter 18 of the Supplementary Instructions for 556-5101 and -5121.

a) Adjusting the motion of the lifting and engaging piston

After engaging the diving motor, the piston 161 (fig. 36) will be lifted automatically by the hydraulic control unit.

With the driving motor being disengaged, the lifting piston 161, rising from its lowest position should have the maximum stroke of 22 mm. This stroke can be adjusted by turning the stop screw 192 after having loosened the counter nut 191.

For adjusting the maximum stroke motion of the engaging piston 160 (fig. 36) start the driving motor and lower the r/h pedal forwards for lifting the engaging piston.

In this position of the engaging piston 160 (fig. 36) loosen the counter nut 193 and turn back the stop screw 194 until the maximum stroke of the engaging piston is obtained.

Adjust then the stop screw 194 so that it touches the lever 195 (fig. 10). In order to ensure that the lever 195 is in contact with the screw 194 (fig. 36), tighten it by 1/2 revolution.

Retighten finally the counter nut 193.

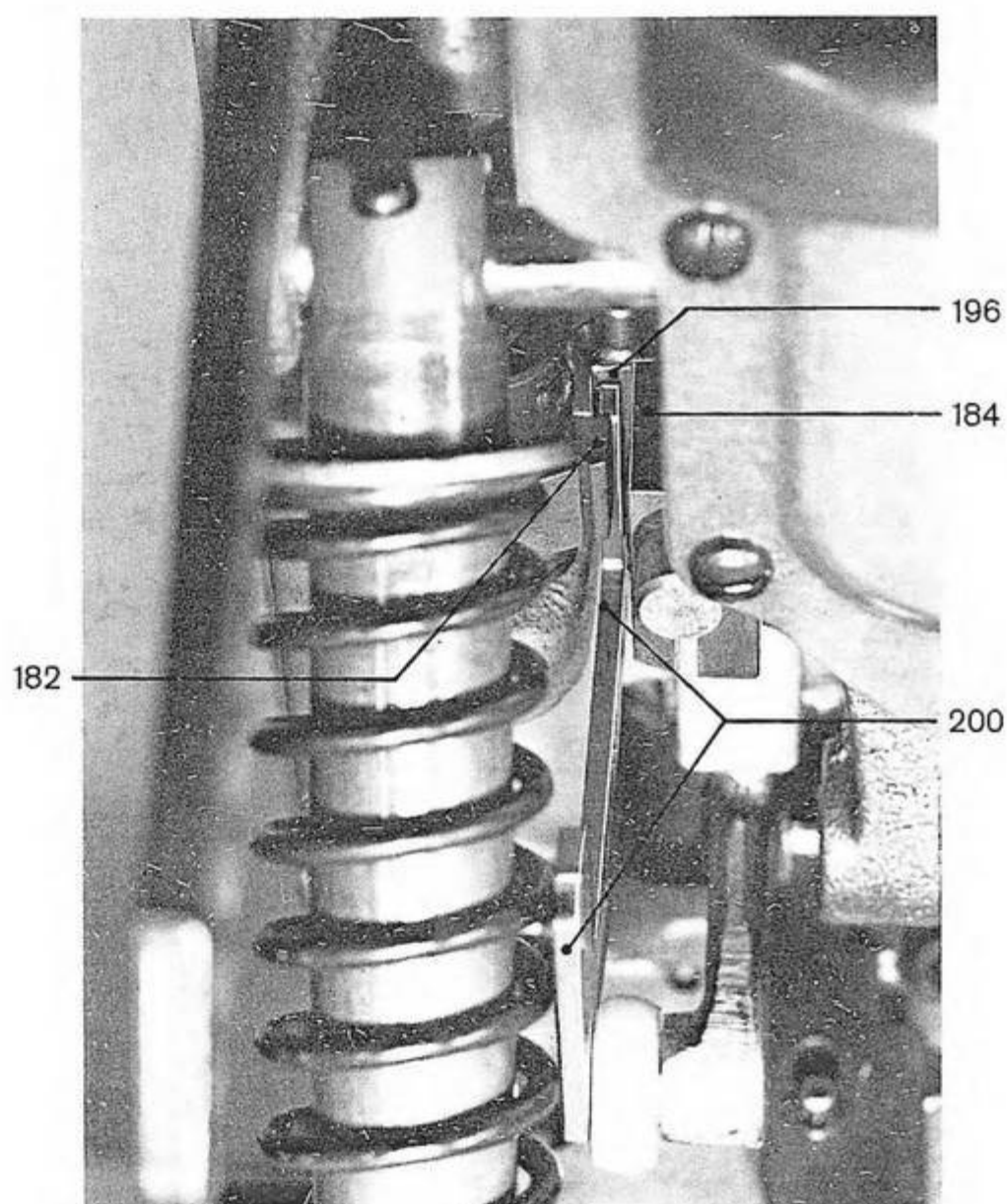


Fig. 46

b) Adjusting the block 184 on the lifting bar

In the neutral position of the lifting lever 181 (fig. 36) the distance between the edge 196 (fig. 46) of the block 184 and the lug of the block 182 should amount to about 6 mm.

For effecting this adjustment, loosen the thumb screw 197 (fig. 47) and the screw 198 and displace the block 184 on the lifting bar 199.

For the precise adjustment of this distance use the gauge 200, ref. No. 556 2260, according to fig. 46.

When regulating the block 184 as described above be careful not to turn the lifting bar, since otherwise this would modify the adjustment of the lifter safety device. If, however, the lifting bar has been turned, regulate anew the lifter safety device according to item d) of the present chapter.

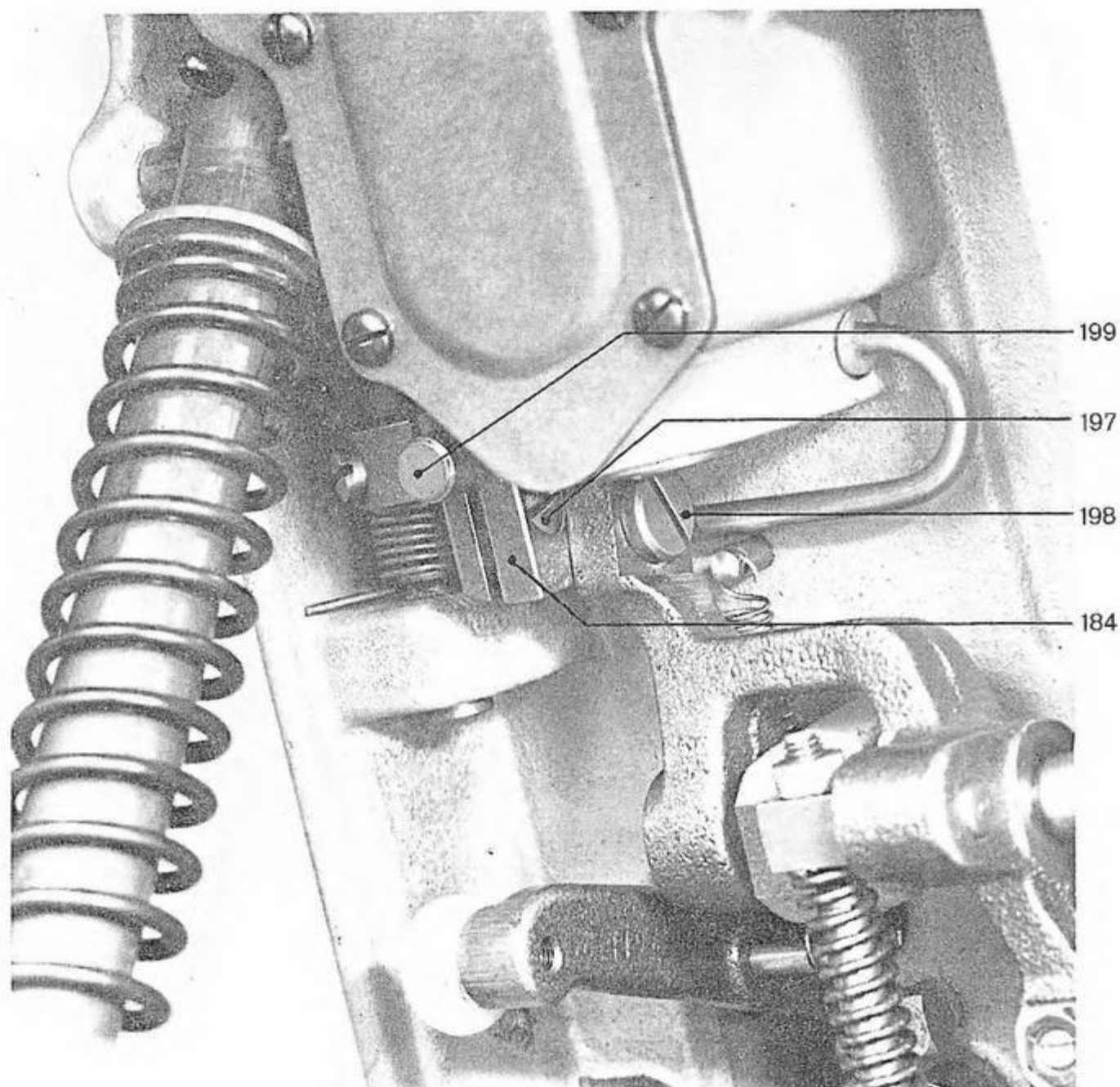


Fig. 47

Furthermore, in the neutral position of the lifting lever 181 (fig. 36) set the collar 212 (fig. 43) on the knife control shaft so that its pin 213 touches the pin 214. For adjusting, loosen the screws 215 in the collar 212. The collar 212 with the pin 213 ensure that the bobbin thread cutter always returns to its neutral position even if it is jammed by thread ends or the like.

Before effecting the above adjustments it is necessary to adjust the lifting motion of the bobbin thread cutter according to the chapter 23, item b).

c) Adjusting the setting screw in the lifting piston

After loosening the counter nut 216 (fig. 36) adjust the screw 217 in the lifting piston so that with the machine being lowered and with the lifting piston 161 being in its neutral position the distance between the roller 218 of the lifting lever and the screw 217 amounts to about 0.3 mm.

This distance can be checked by raising the lifting piston.

Retighten firmly the counter nut 216.

d) Adjusting the lifting safety device

This device prevents the cloth presser frame from being lifted when the machine is not in its final position.

After removing the control cam according to chapter 41 and after loosening the screws 219 (fig. 48) adjust the control sheet 221, located under the block 220, so that in the **end position of the machine** and with the cloth presser frame being lifted, a length of 2.5 mm of the surface of the ratchet 222 situates itself under the control sheet 221. Note for this adjustment that, when lifting, the control sheet can freely move sideways and pass along the ratchet 22 when the machine has transported out of its end position.

When the control cam 292 (fig. 63) is removed the machine can be moved by hand into its end position by turning the cam disk 3222 (fig. 28).

e) Adjusting the maximum lifting stroke

Loosen the counter nut 224 and turn back the stop screw 223 (fig. 36) in the lifting lever 181. If after engaging the driving motor the cloth presser frame, standing under spring pressure, is lifted automatically, then the distance between the block 225 (fig. 117) and the cloth presser bar bush 226 should amount to about 0.5 mm.

For adjusting this distance, remove the control disk according to chapter 41 and, after loosening the screw 227 (fig. 48) set the block 220 on the lifting bar 228 accordingly.

Adjust then the stop screw 223 (fig. 36) in the lifting lever 181 so that with the lifting lever being pushed up by hand the stop screw 223 is in contact when the distance between the cloth presser bar bush 226 (fig. 17) and the block 225 amounts to 0.5 mm. Tighten firmly the counter nut 224 (fig. 36). For checking this, turn back the sleeve 115 (fig. 27) so far that the cloth presser frame can be lifted by hand.

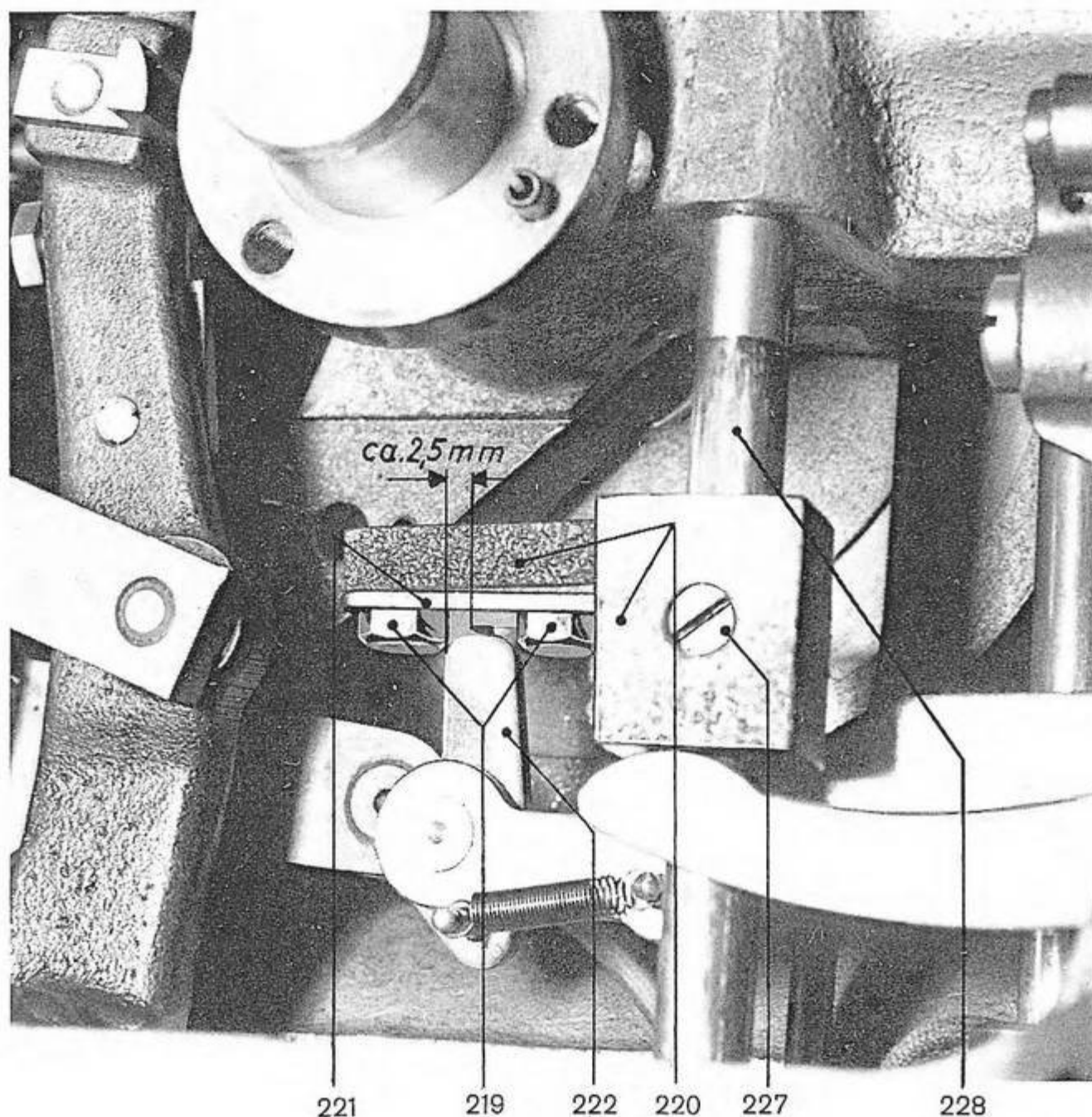


Fig. 48

f) Adjusting the engagement safety device

With the cloth presser frame being lifted, the bar 229 (fig. 36) in the lifting lever 181 avoids the engagement of the machine.

Loosen the counter nut 230 and adjust the bar 229 so that with the cloth presser bar being lowered (driving motor switched off) its end is flush with the machine back.

25. Adjusting the starting and the braking device

For checking and adjusting the starting and braking device proceed in following sequence:

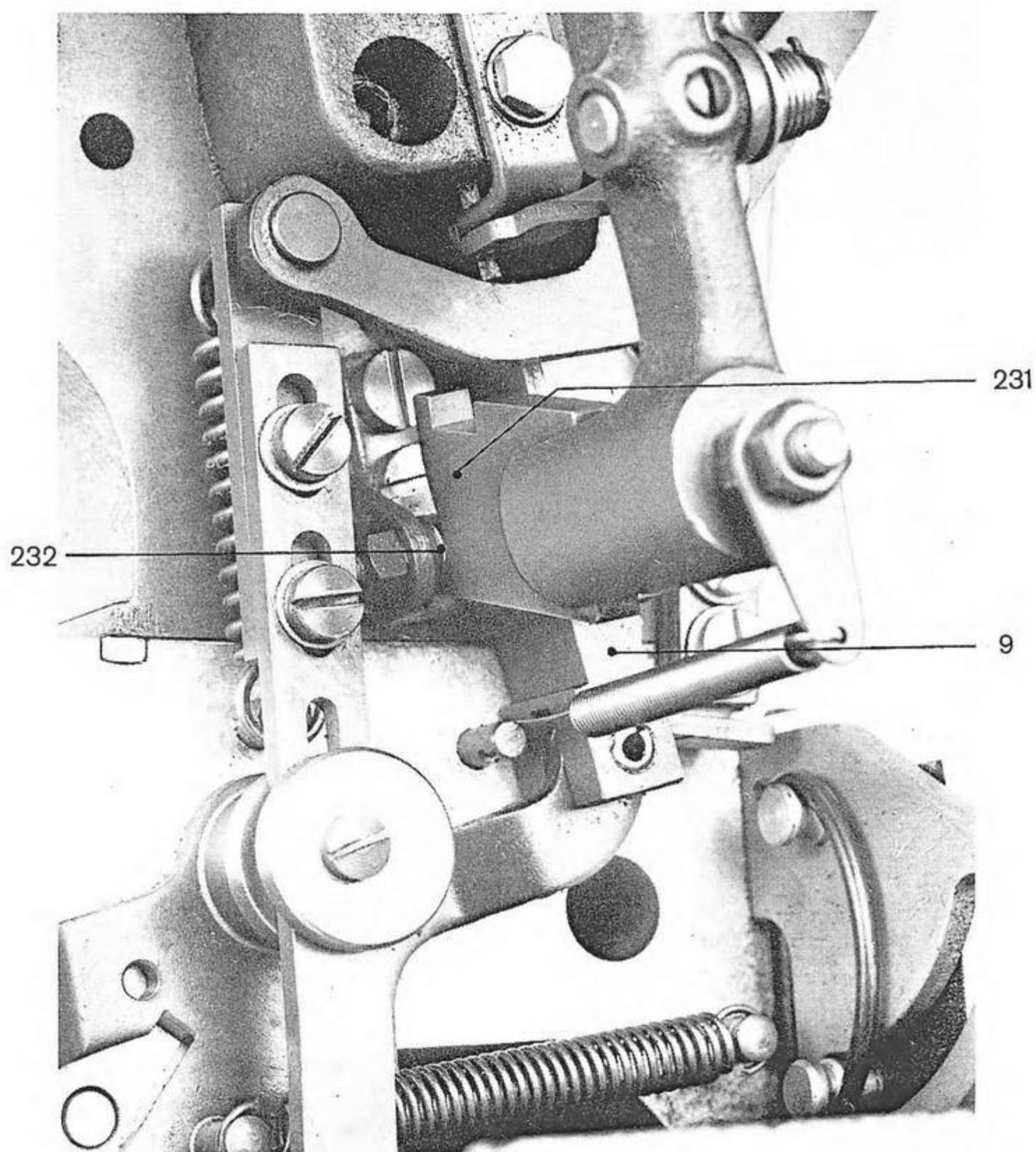


Fig. 49

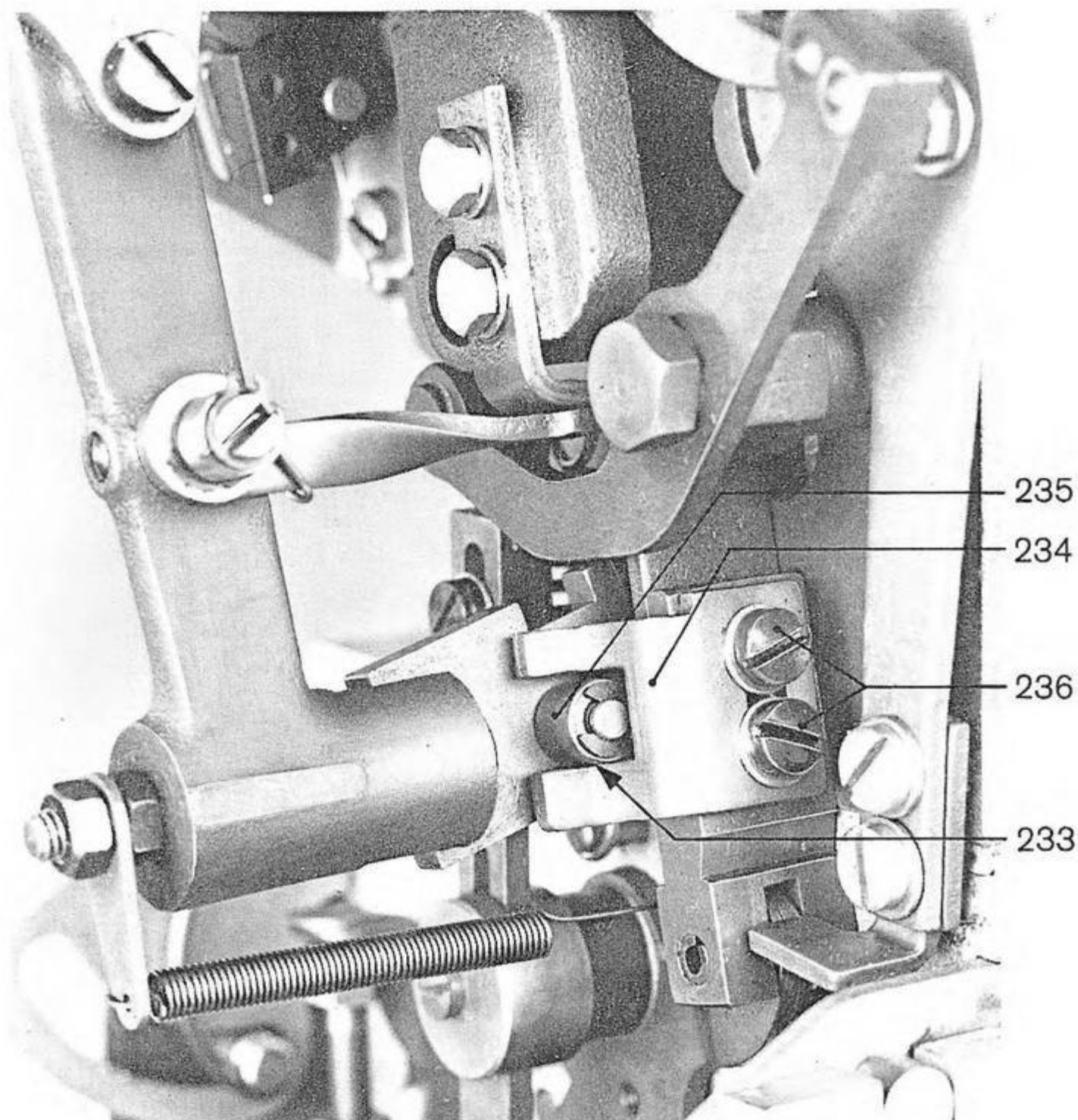


Fig. 50

A. In machines where the face of the pressure part 231 (fig. 49) is shaped as a cam (new design)

1. Stop the machine in end position and remove the flat belt from its pulley.
2. With the brake slide 9 (figs. 4 and 49) being in its lowest position, the lowest point of the cam on the face of the thrust member 231 (fig. 49) should be in the middle of the roller 232. See fig. 49.

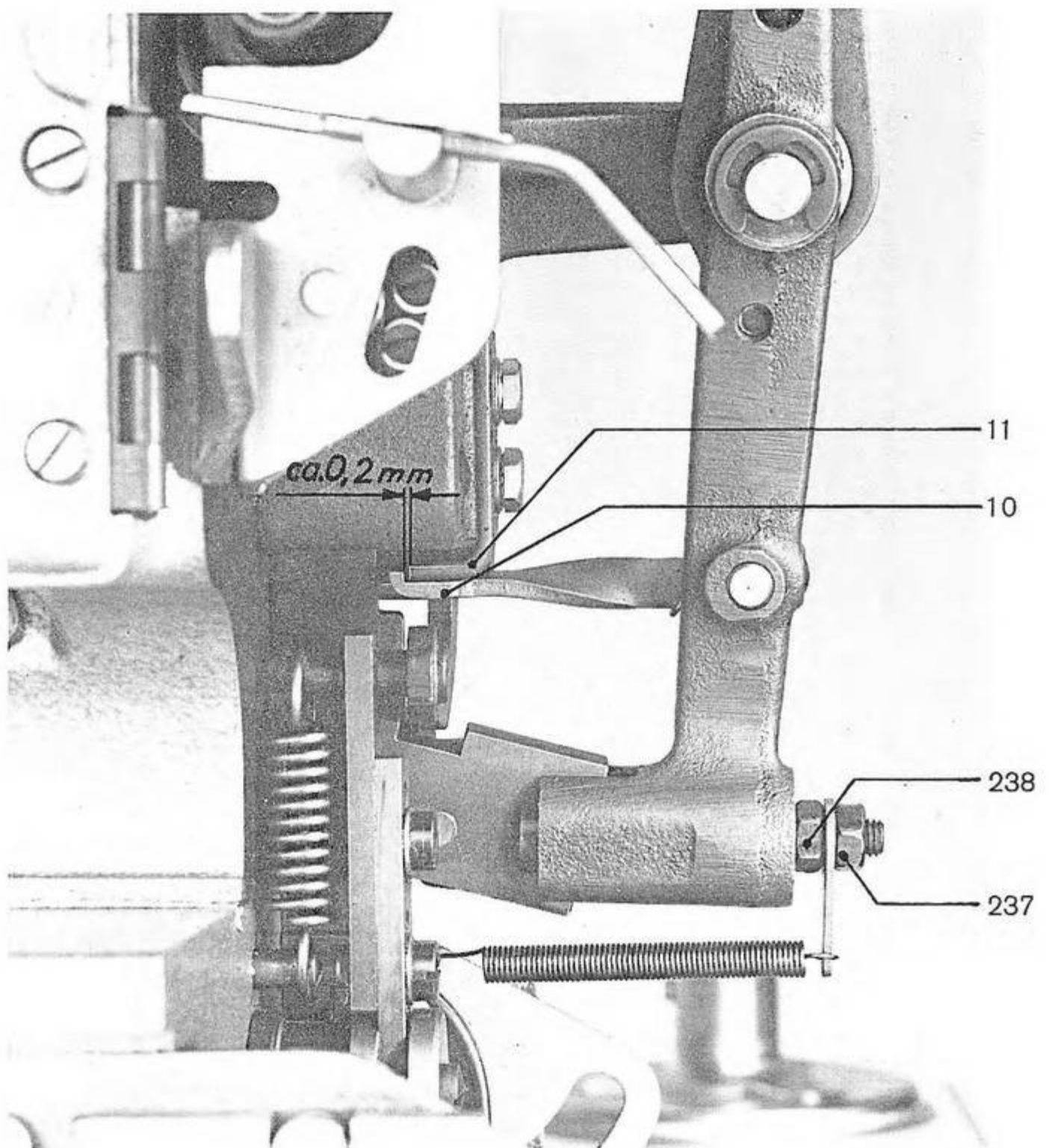


Fig. 51

Furthermore, in this position the lower fork side 233 (fig. 50) of the angular member 234 should be in contact with the roller 235. See fig. 50. This adjustment can be effected by resetting the angular member 234 after having loosened the screws 236.

3. Loosen the counter nut 237 (fig. 5) and turn the nut 238 until the distance between the ratchet 10 and the angular member 11 amounts to about 0.2 mm. When the machine is disengaged, the ratchet 11 should freely move behind the angular member 11.

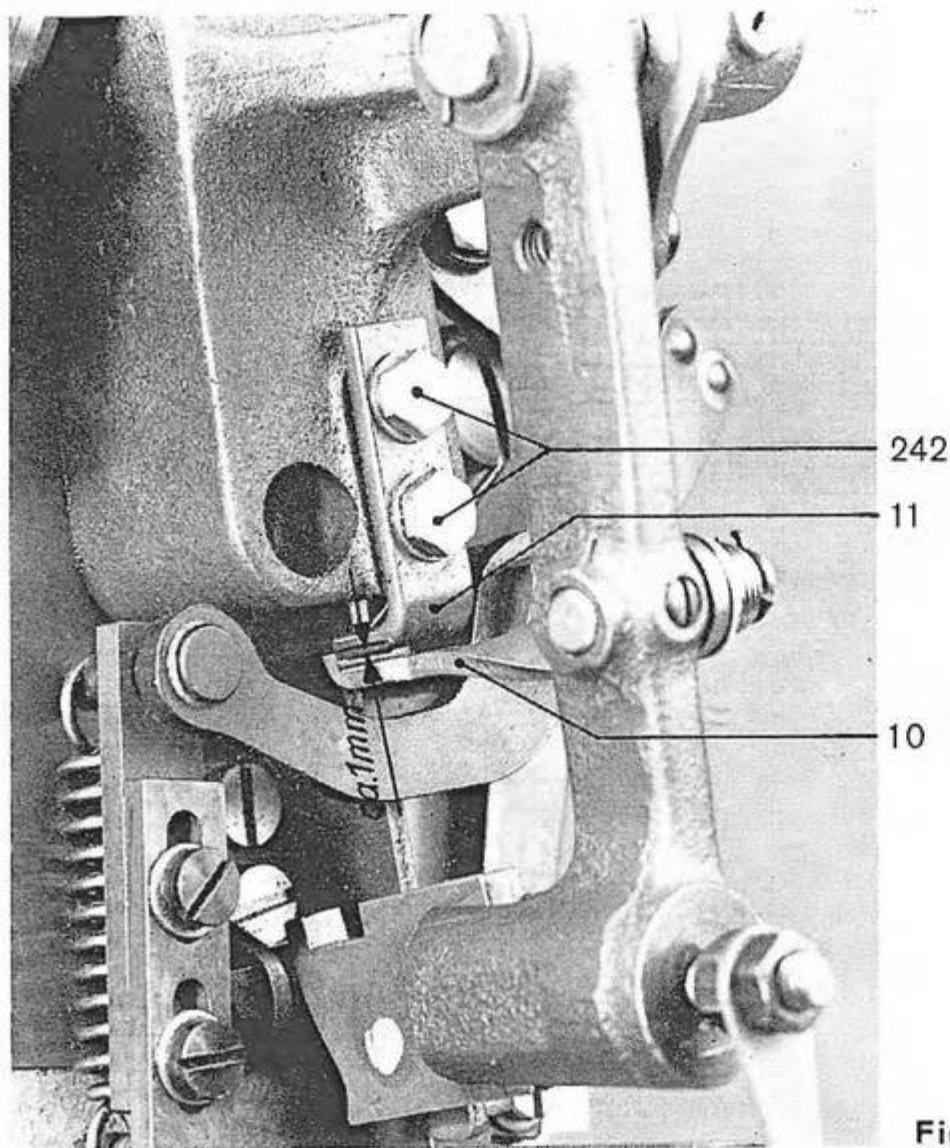


Fig. 52

4. With the driving motor being disengaged and the r/h pedal fully lowered move the braking piston 9 (fig. 4) — by means of lever 6 and screwdriver (see fig. 4) downwards until its slot slightly catches behind the angular member 241 of the control lever 7.

In this position, the distance between the big diameter of the braking member 170 (fig. 38) and the braking piston 9 (fig. 4) should amount to about 0.5 mm.

This distance can be adjusted by resetting the angular member 241 after having loosened the two screws 240 (fig. 4). In the above mentioned position of the braking piston 9, the ratchet 10 should still touch the angular member 11 (fig. 52) at a height of about 1 mm, and the belt pulley 12 (fig. 14) should in no case be engaged.

The adjustment of the angular member 11 (fig. 52) with respect to the ratchet 10 can be effected after having loosened the screws 242. If required, adjust the coupling play of the belt pulley 12 (fig. 14) as described below under 6.

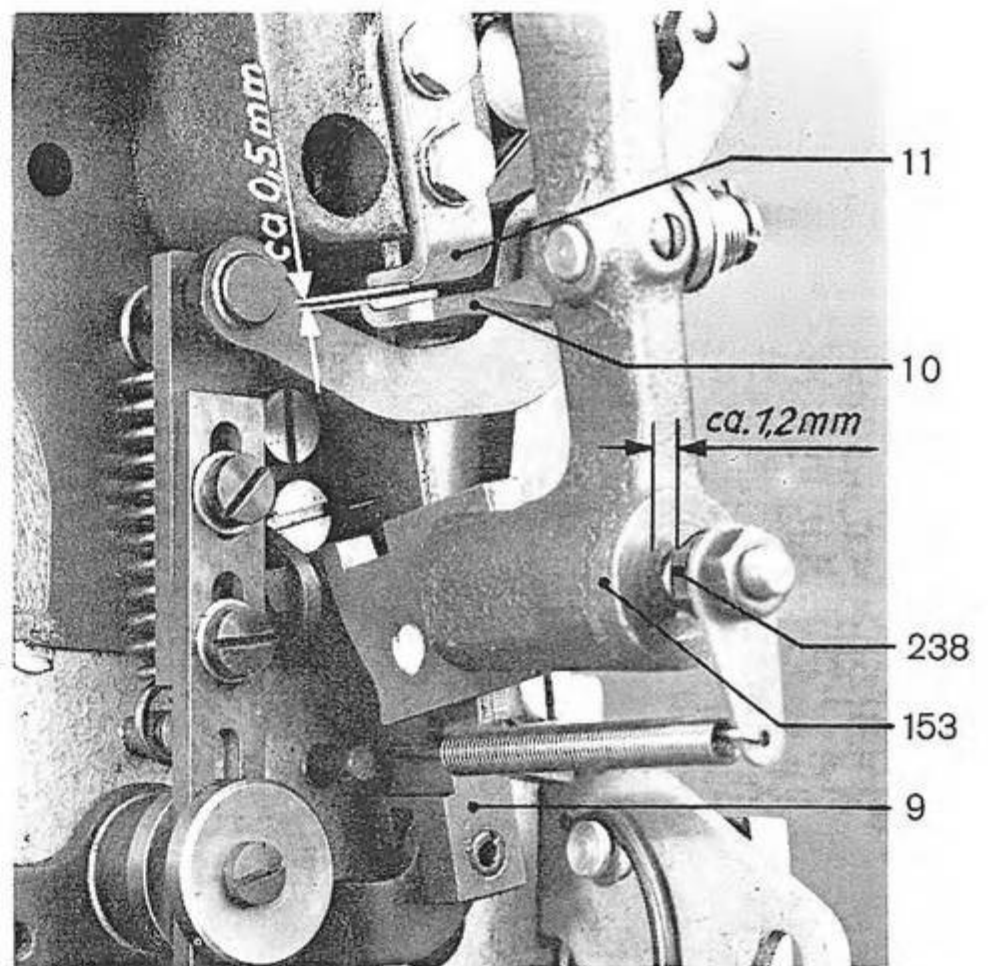


Fig. 53

5. Then, with the driving motor engaged, fully depress the r/h pedal and set the total stroke of braking piston 9 (fig. 53) so that the ratchet 10 is pulled by about 0.5 mm under the angular member 11 and that the machine is thereby engaged. See fig. 53. This total stroke can be adjusted by the resetting screw 244 after loosening the counter nut 243 (fig. 36).

6. Adjust now the clutch play between the clutch disk 13 (fig. 54) and the belt pulley 12.

This play should be of 0.5 mm, i.e. if with the machine being engaged the distance between the clutch disk 13 and the belt pulley 12 amounts to 4 mm, with the machine disengaged it must amount range between 4.5 and 5 mm. These values apply to conical and to flat clutches.

For adjusting the clutch play, loosen the screws 245 (fig. 54) and regulate the lever 246 or the pulley 12.

Following the clutch play adjustment check by pressing the disengaged belt pulley 12 (fig. 54) by hand against the clutch disk 13 whether it touches the clutch disk 13 or whether there is a slight clutch play.

If required, increase the clutch play beyond 1 mm.

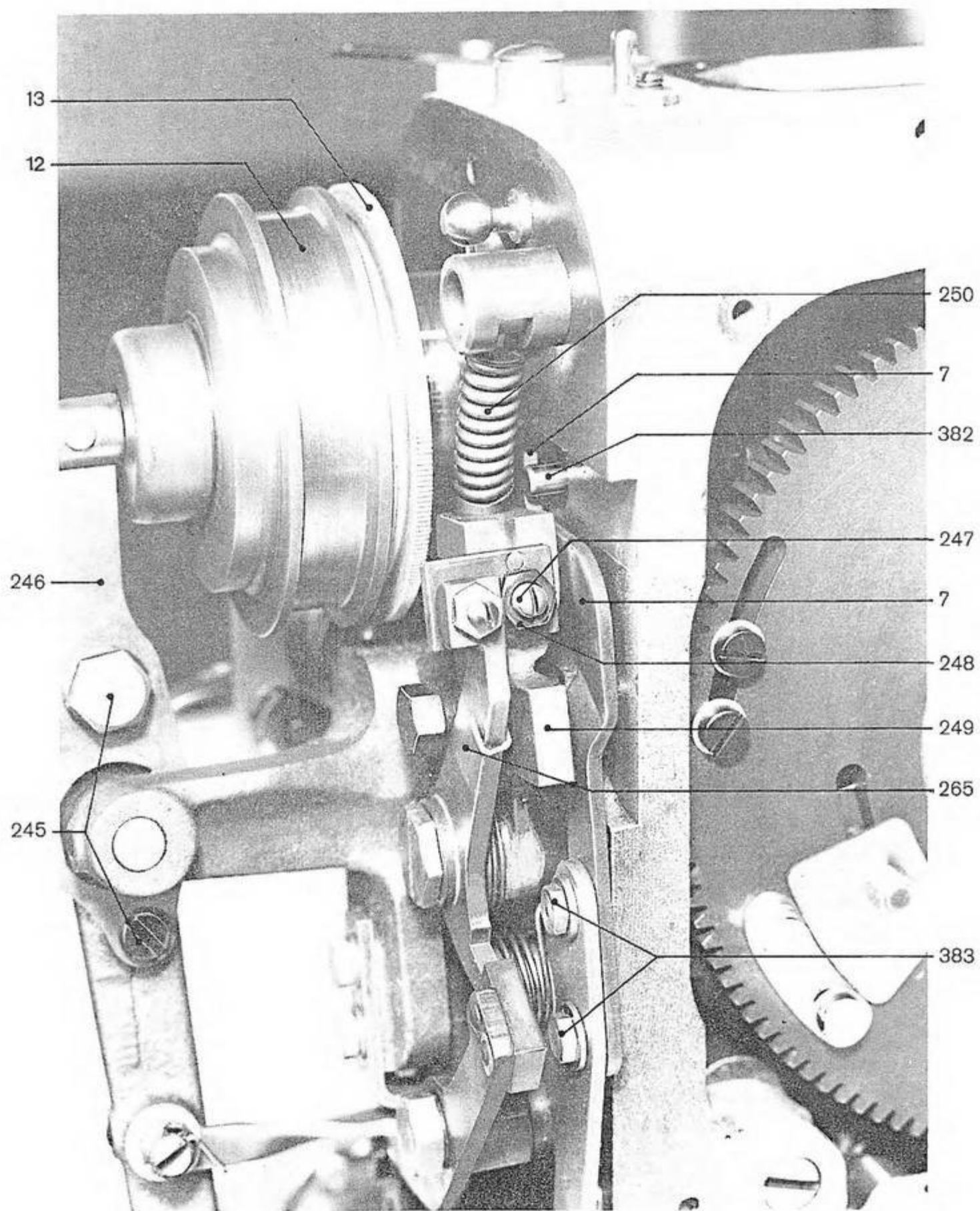


Fig. 54

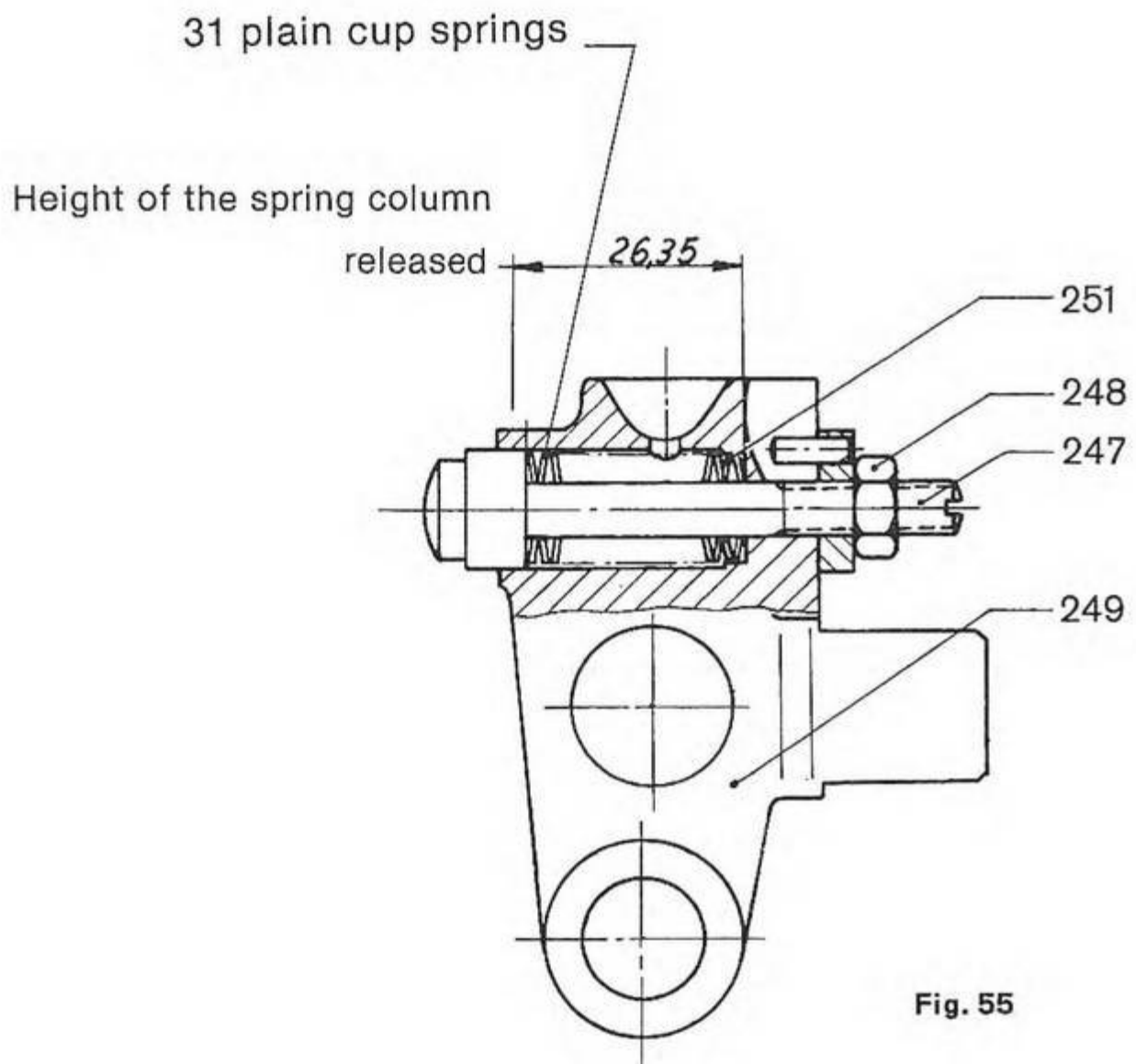


Fig. 55

7. The braking piston 9 (figs. 4 and 49) is guided by the thrust bolt 247 (figs. 54, 55 and 55a). With the machine being disengaged, set the thrust bolt 247 so that the distance between the braking piston 9 and the thrust bolt 247 amounts to about 0.2. mm.

In order to adjust this distance, loosen the counter nut 248 (fig. 54) and turn the thrust bolt 247 by a screwdriver.

In the new machines do not modify the adjustment of the thrust bolt 247, set by means of a gauge and sealed by yellow varnish. For setting the distance of about 0.2 mm with respect to the braking piston 9 (fig. 55a) loosen the screw 247b (fig. 60) and turn the eccentric 247a (fig. 55a and 60).

Note:

For a perfect operation of the articulated lever 249 (fig. 54) it is necessary that in released condition the screw pressure spring 250 has the length of 37 ± 0.7 mm.

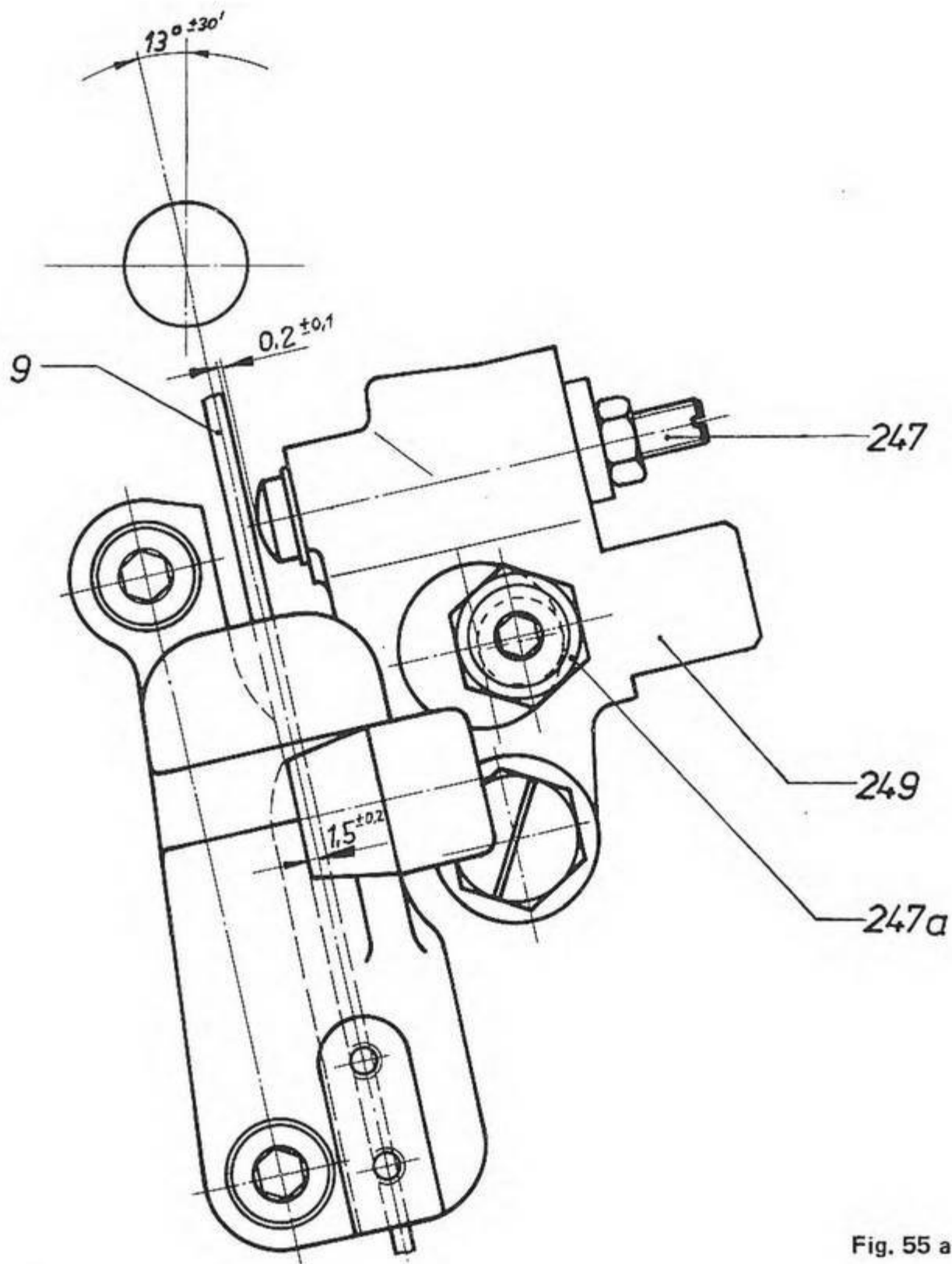


Fig. 55 a

The spring assembly on the thrust bolt 247 (figs. 54 and 55) in the articulated lever 249 should usually consist of 31 simply stratified cup springs 251 (fig. 55). In released condition, the spring assembly should have a height of 26.35 mm. See fig. 55. In case of difference, add or remove a cup spring.

B. In machines, in which the face of the thrust member 231 (fig. 49) is straight (old design)

1. Stop the machine in the end position and remove the flat belt from the pulley.

2. In this position of the machine, the depressed ratchet 10 (fig. 51) should freely move behind the angular member 11. The distance between the ratchet 10 and the angular member 11 should amount to about 0.2 mm. See fig. 51.

For adjusting this distance reset the nut 238 after having loosened the counter nut 237.

3. With the driving motor **disengaged** and the r/h pedal fully lowered move the braking piston 9 (fig. 4) — by means of the lever 6 and a screwdriver (fig. 4) — downwards until its slot 8 slightly catches behind the angular member 241 of the control lever 7.

In this position, the distance between the big diameter of the braking member 170 (fig. 38) and the braking piston 9 (fig. 4) should amount to about 0.5 mm. This distance can be adjusted by resetting the angular member 241 after having loosened the two screws 240 (fig. 4).

In the above position of the braking piston 9, the ratchet 10 (fig. 52) should still touch the angular member 11 (fig. 52) at a height of about 1 mm, and the belt pulley 12 (fig. 54) should in no case be engaged.

The adjustment of the angular member 11 (fig. 52) with respect to the ratchet 10 can be effected after having loosened the screws 242. If required, adjust the clutch play of the belt pulley 12 as described under A.6.

4. Then, with the driving motor engaged, fully depress the r/h pedal and set the total stroke of the braking piston 9 (fig. 53) so that the ratchet 10 is pulled by about 0.5 mm under the angular member 11 and that the machine is thereby engaged. See fig. 53.

The total stroke can be adjusted by the screw 244 after having loosened the counter nut 243 (fig. 36).

5. When the machine is engaged, the distance between the clutch lever 153 (fig. 53) and the nut 238 must amount to about 1.2 mm. For adjusting this distance, loosen the screws 236 (fig. 50) and reset the angular member 234 as required.

6. For adjusting the clutch play, see the instructions under A.6.

7. For adjusting the thrust bolt 247 (fig. 54), see the instructions under A.7.

26. Adjusting the traction link 24, the catch lever 255, the control bar 49 and the locking cam 258 (figs. 56 and 57)

a) Adjusting the traction link 24 (fig. 56)

In order to ensure that the cloth presser frame is perfectly lifted and the machine is properly disengaged, the lifting piston 161 (fig. 36) and the engaging piston 160 must be free from pressure while the machine is engaged, i.e. while sewing.

The pistons are free from pressure if the engaging piston 160, lifted by hand is freely moved to its lowest position by spring action.

For adjusting, proceed as follows:

1. Remove the flat belt.
2. Engage the driving motor.
3. Engage the machine by lowering the r/h pedal forwards.
4. Heel down the l/h pedal until the lever 16 (fig. 12) under the table has dropped in.
5. Loosen the screws 252 (fig. 56) and adjust the traction link 24 so that the distance between the bolt 253 and the cavity of the control lever 254 amounts to about 3 mm.

In the majority of cases the lifting piston and the engaging piston are, with this adjustment, free from pressure. In the negative, modify the distance accordingly.

Important

By displacing the control unit, e.g. for tensioning the flat belt, the distance between the bolt 253 (fig. 56) and the control lever 254 will be changed. The distance can be increased up to 5 mm without having to readjust the traction link 24.

b) Adjusting the catch lever 255

In the above position of the machine adjust the catch lever 255 (fig. 56) so that the position of its bolt 253 with respect to the control lever 254 is as shown in fig. 56.

The catch lever 255 can be adjusted by turning the eccentric bush 256 after having loosened the counter screw 257.

c) Adjusting the control bar 49 (fig. 56) and the locking cam 258 (fig. 57)

With the machine being in the aforementioned position, set the bar 49 for impeding the action of the buttonhole knife so that the angular part 259 (fig. 57) of the safety bar 260 is level with the locking cam 258 on the joint 261.

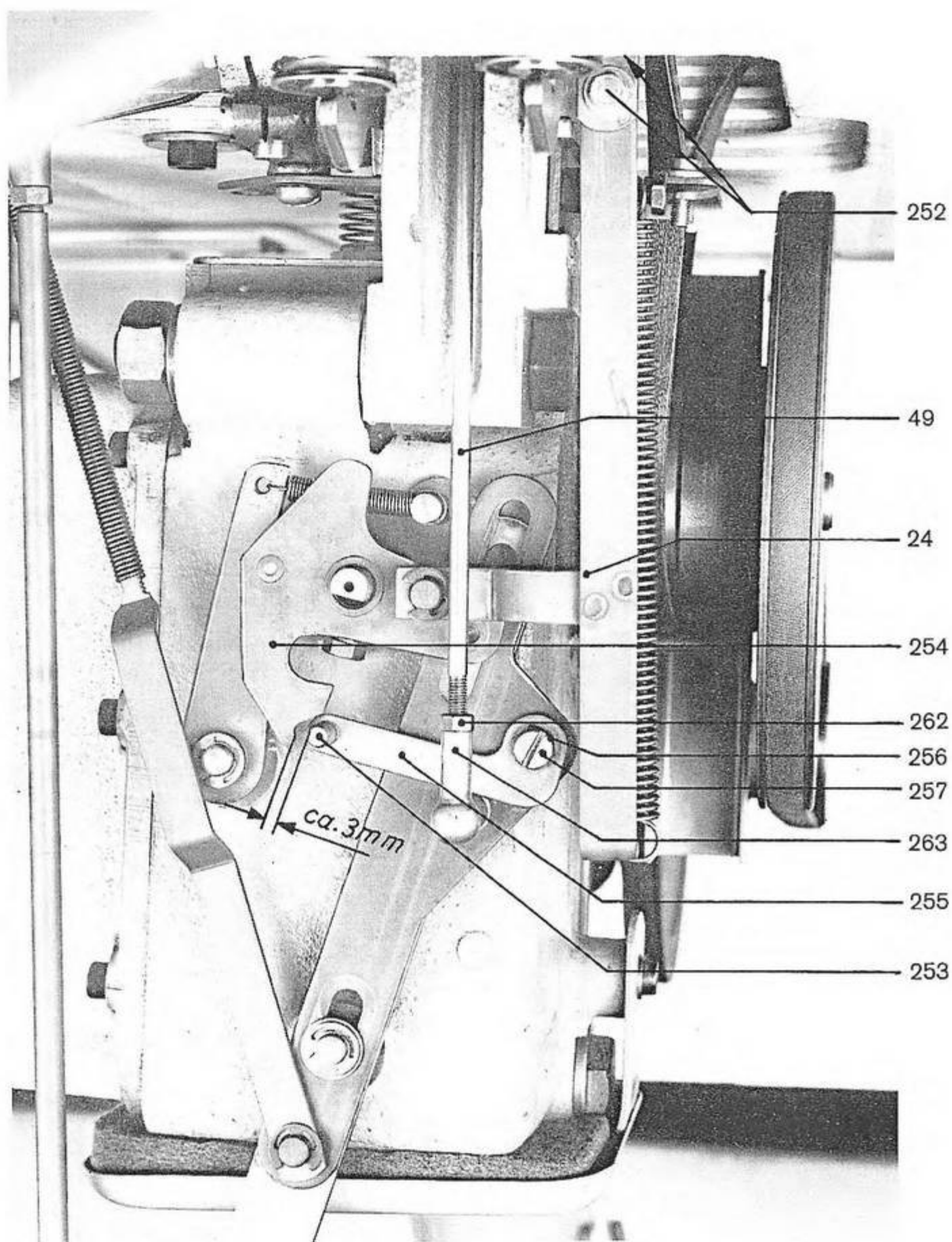


Fig. 56

To effect this adjustment, loosen the counter nut 262 (fig. 56) and turn the bar 49 in the ball cup 263.

Set also the locking cam 258 (fig. 57) on the joint 261 so that with the machine in the aforementioned position the distance between its left edge and r/h edge of the safety bar 260 and 259 respectively amounts to about 2 mm. For adjusting the locking cam 258 loosen the screws 264 after having removed the left hand machine cover and the control cam according to the chapter 41.

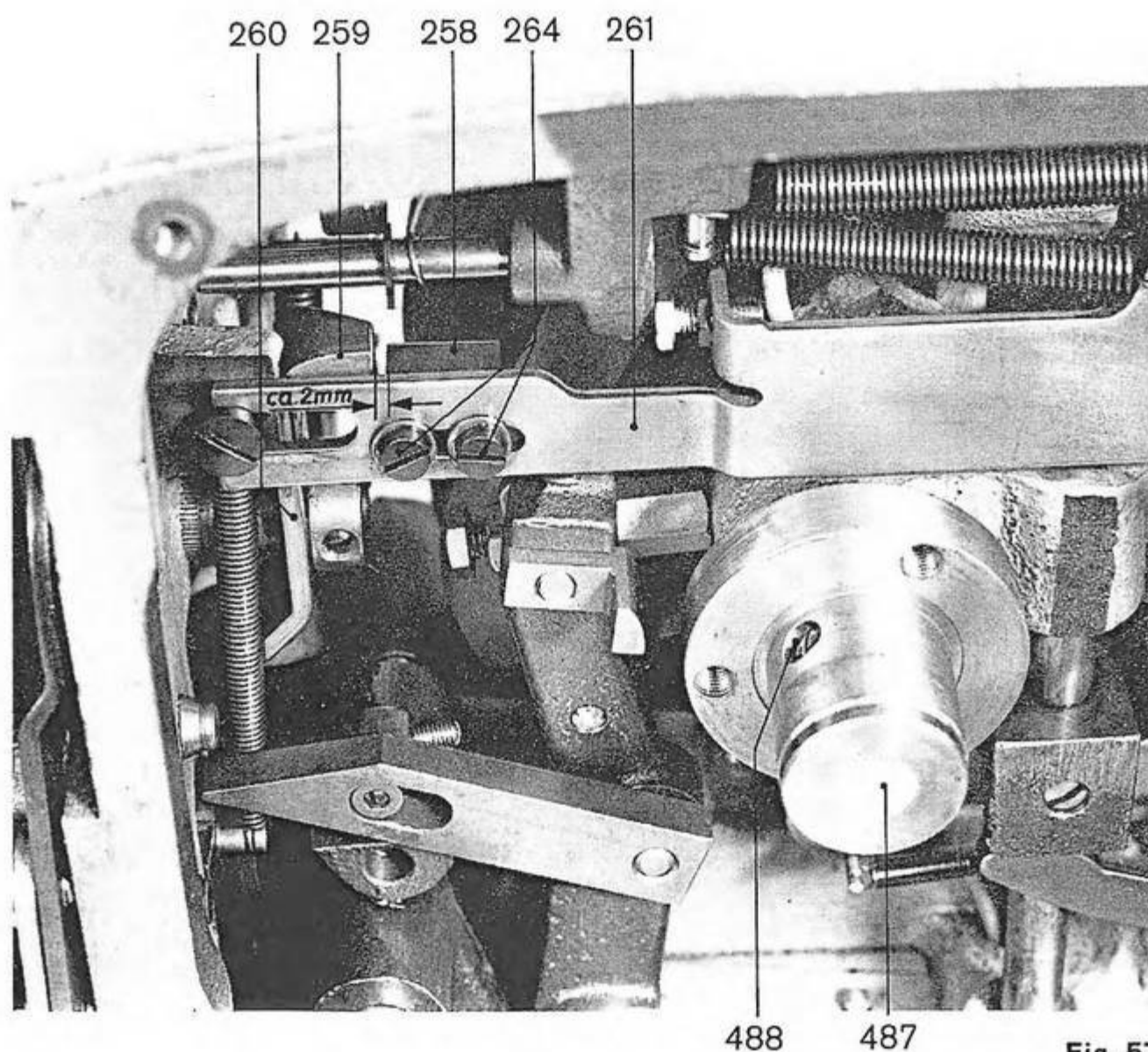


Fig. 57

27. Function and adjustment of the disengagement safety device

If, for the reasons specified below, the machine is disengaged at a too high stopping speed and the thrust bolt 247 (fig. 54) therefore wips or the articulated lever 249 is thrown out, then the ratchet 265 of the disengagement safety device must be released.

By releasing the ratchet 265, the disengagement safety device prevents the cloth presser frame from being lifted and avoids thus the swinging motion of the lower thread knife.

If, with the articulated lever thrown out, the machine stops so that the needle is located in the swinging area and the lower thread knife, it cannot be damaged by the latter.

The reasons for a too high stopping speed may be the following:

- a) The flat belt, lining the hydraulic control unit with the machine, is not tight enough, it slips and, therefore, does not sufficiently brake the machine when it is switched over to the stopping speed. For accurate adjustment see the chapter 6, item d).
- b) The belt fork 62 (fig. 16) is not properly adjusted and, when switching over to the stopping speed, it does not pull the flat belt onto the pulley for the stopping speed.

For accurate adjustment of the belt fork see the chapter 32.

By means of a 17 gauge spanner, the articulated lever 249 and the safety lever 266 can be brought into their initial position as shown in figs. 58 and 59.

Adjust the stud 267 (fig. 60) of the ratchet 265 as follows:

By means of the two thumb screws 270 clamp the gauge 269 (fig. 60), ref. No. 5562311, to the protective sheet 60 and set the angular part 271 against the thrust bolt 247.

Loosen the screw 272 and adjust the scale 273 so that the division mark "0" is above the division mark of the angular part 271. Make then the machine perform several cycles and check the gauge to see to what extent the thrust bolt 247 (fig. 60) is whipping.

Add to the measure determined a safety distance of 1 mm and set the stud so that the distance between said stud 267 (fig. 60) and the plate 275 corresponds to this total measure.

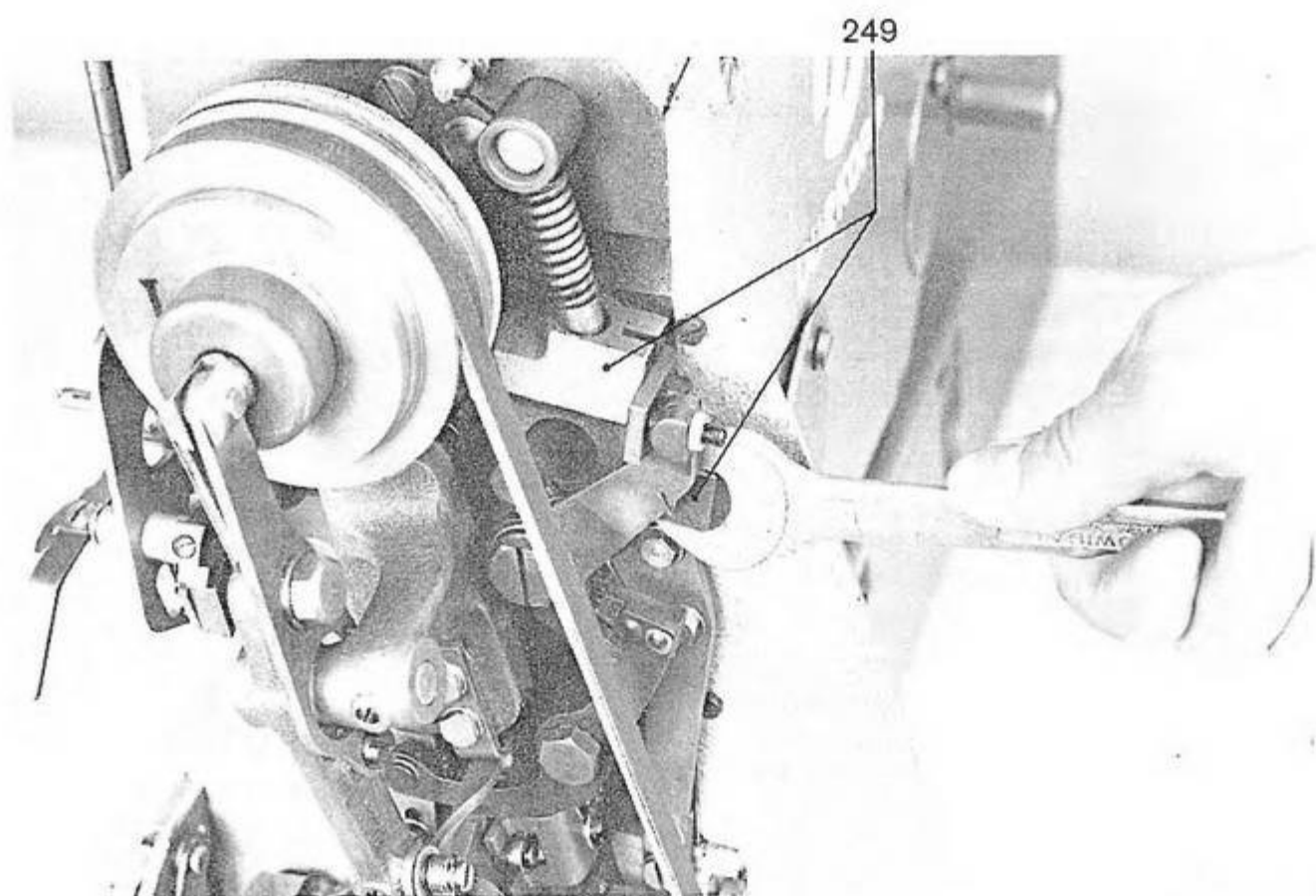


Fig. 58

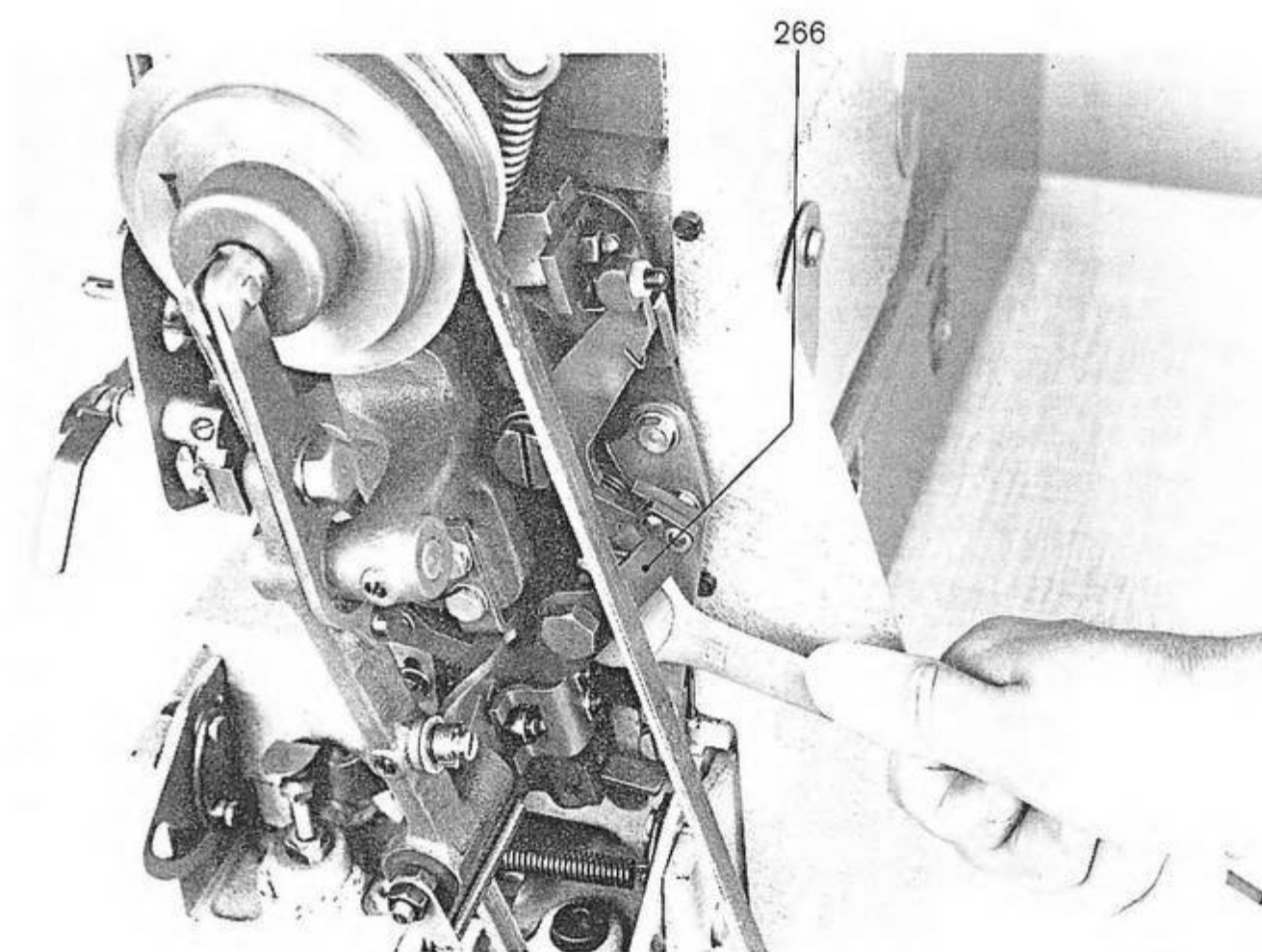


Fig. 59

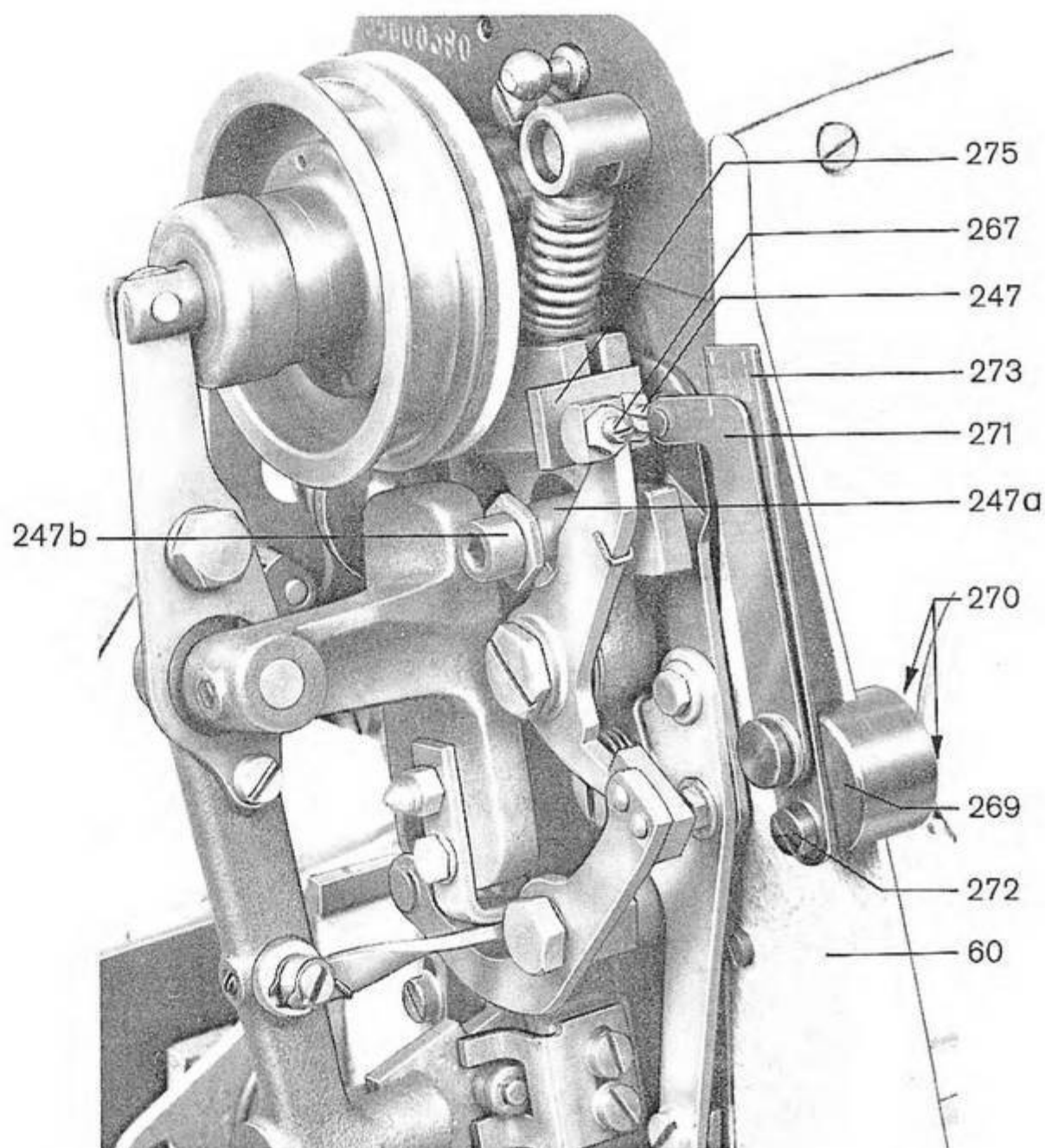


Fig. 60

Adjust then the safety bar 276 (fig. 62) as follows:

1. Engage the machine by hand.
2. Loosen the screws 277 (fig. 62).
3. Release the ratchet 265 (fig. 60) so that the safety bar 276 (fig. 62) can move downwards.
4. Adjust the safety bar 276 so that it slightly rests on the articulated part 5, without lowering it. Retighten firmly the screws 277.
5. Drop in the safety lever 266 (fig. 59) by means of a spanner.

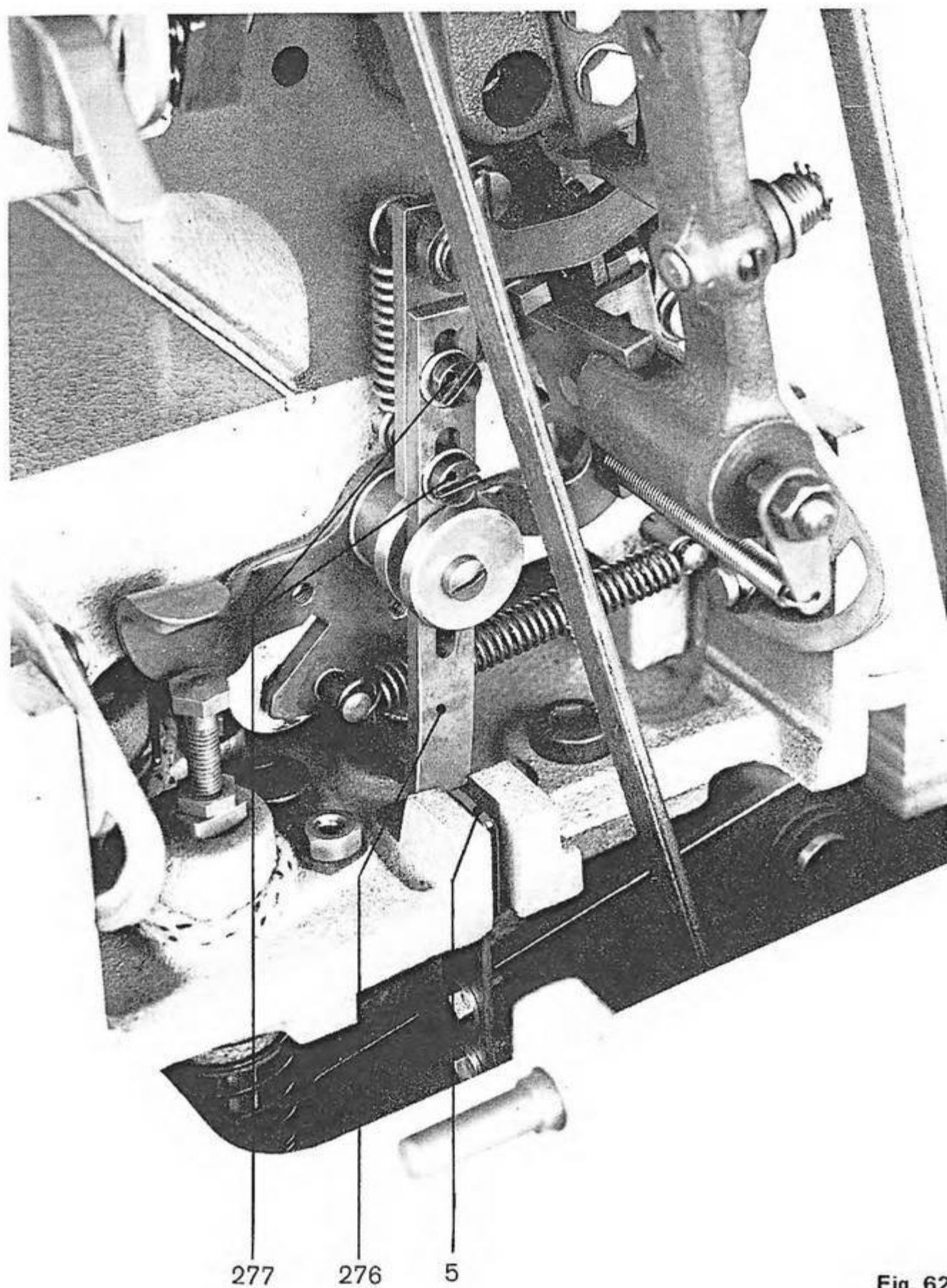


Fig. 62

28. Adjusting the cloth pressure frame with respect to the knife slit in the throat plate

1. Untighten the threaded bush 115 (fig. 27) until no spring pressure is exerted on the cloth presser frame.
2. Loosen the thumb screw 278 (fig. 3) and set the frame guide lever 279 so that the knife slot is exactly in the middle of the cloth presser frame 2. Retighten firmly the thumb screw 278.
3. Add or remove 0.15 mm thick shims, ref. No. 9336274, between the guide roller 280 (fig. 117) and the block 225 and set the guide roller 280 so that it is exactly aligned with the prismatic groove 281 of the frame guide lever.

Engage the machine by hand and turn the clutch disk in the direction of rotation until the needle bar is at its topmost point, so that after loosening the stud 282 the bolt 283 of the guide roller can be pulled out to the right.

Note:

If the frame guide lever 279 (fig. 3) has been reset, it is indispensable to check the adjustment of the lifter safety device according to the chapter 24, item d).

29. Adjusting the knife with respect to the knife slit in the throat plate

In the transversal direction, the knife 130 (fig. 119) should coincide with the middle of the knife slit in the throat plate. In the longitudinal direction, i.e. in the feeding direction, adjust the knife 130 so that the distance between the front edge 284 of the knife and the surface 285 at the needle bar amounts to about 0.5 mm.

For effecting this adjustment, loosen the screws 286 and reset the angular knife carrier 287 with respect to the block 288. The front side 289 of the knife reception plate 290 should normally be flush with the front side of the angular knife carrier 287. If the adjustment range in the longitudinal direction is not sufficient for the angular knife carrier 287, loosen the screw 291 and displace the knife reception plate 290 in the longitudinal direction accordingly.

30. Adjusting the operation of the machine

a) Adjusting the final bar cam and timing the disengagement of the machine

Setting the final bar cam

1. The machine is in disengaged final position.
2. Remove the control cam 292 (figs. 63 and 64) according to chapter 41.

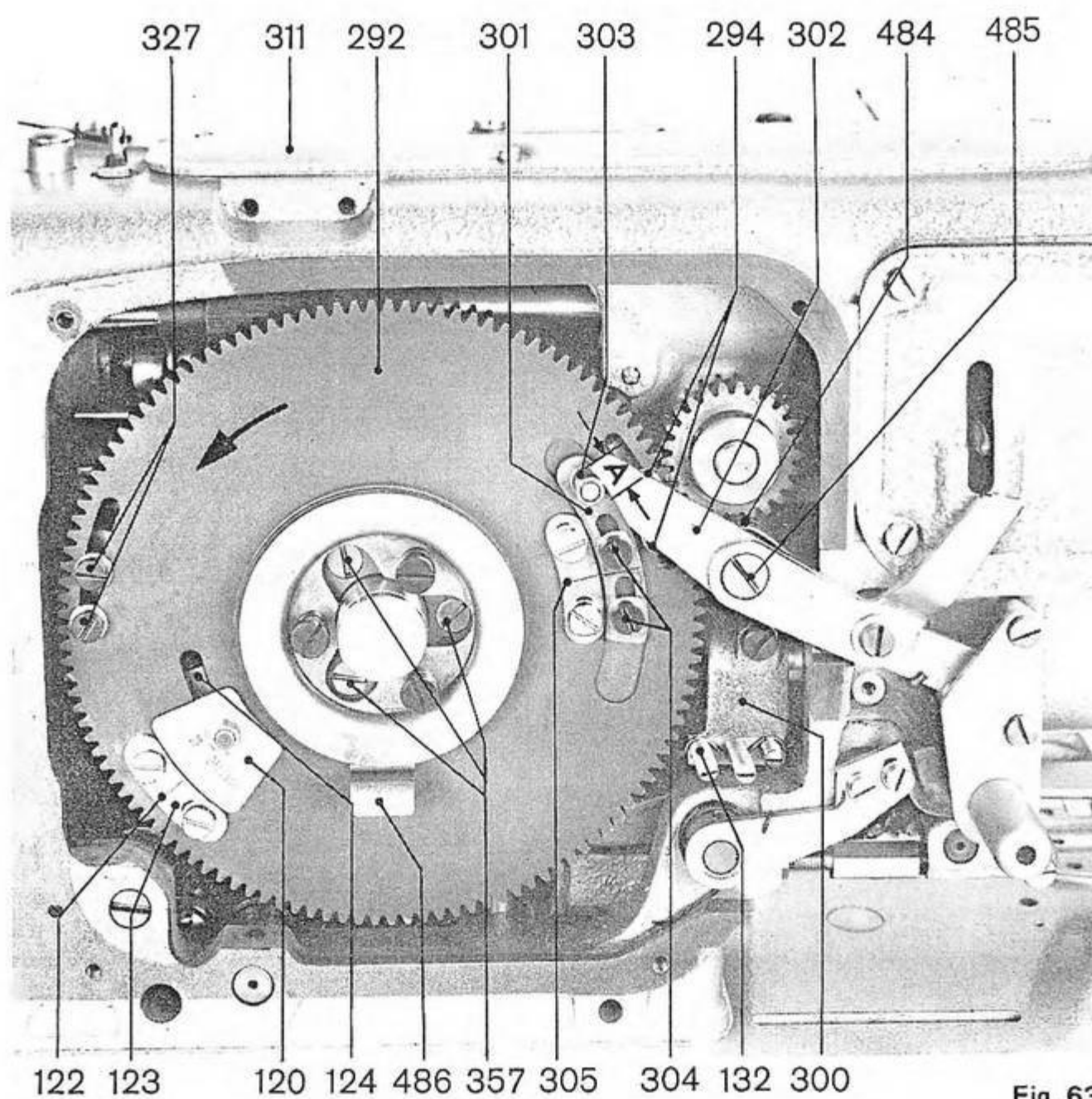


Fig. 63

3. Loosen the screws 294 (fig. 64) and set the bartack cam 293 (fig. 64) so that seen in the direction of rotation (arrow direction) of the control cam the end 295 (fig. 64) of the final bartack cam 293 is flush with the beginning 296 of the milled cavity 297 for the locking stitches. See fig. 64.

4. Replace the control cam 292.

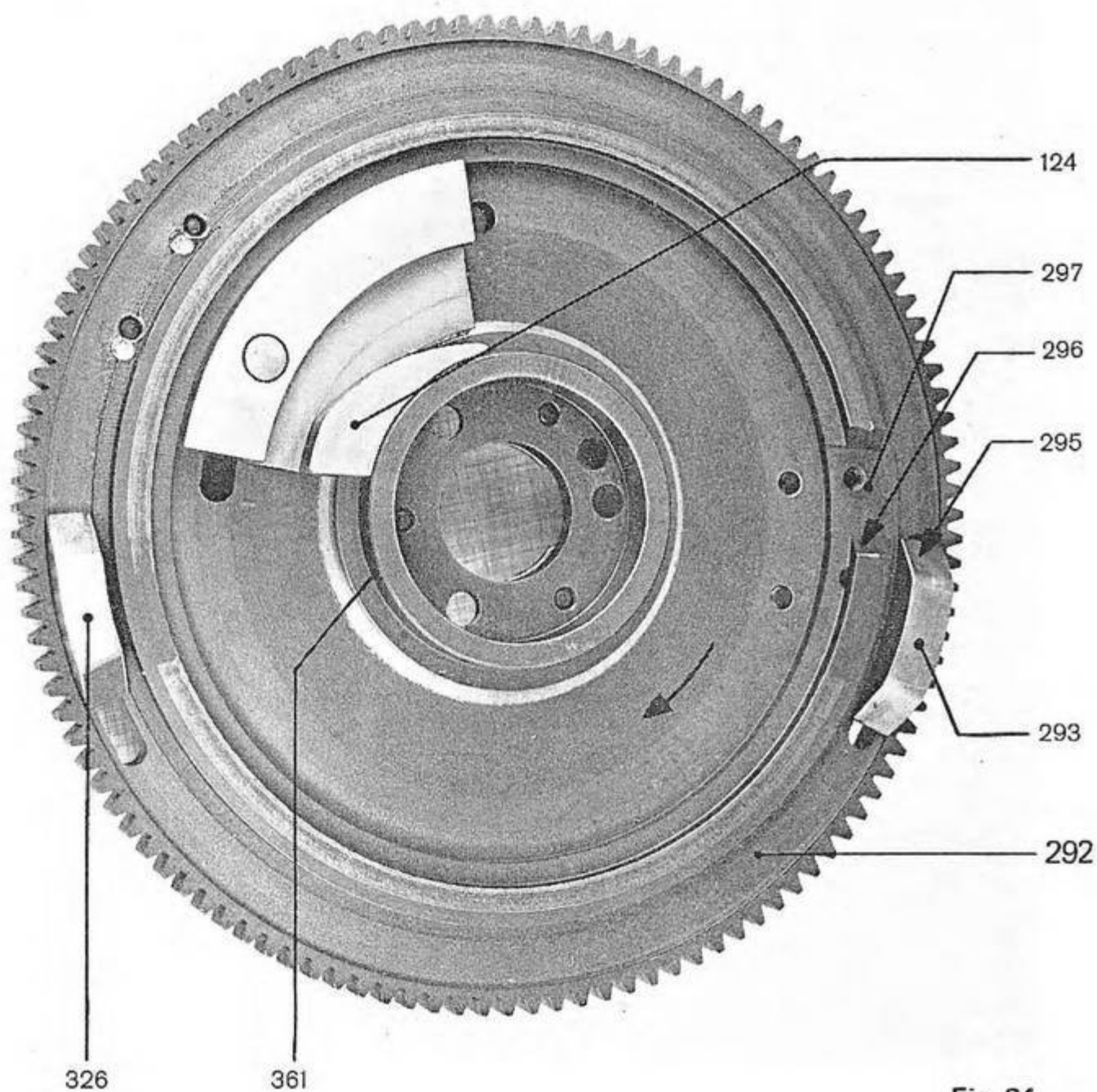


Fig. 64

Timing the disengagement of the machine

1. Remove the needle and the knife.
2. Remove the screw 298 and the upper thread scissors 3 (fig. 105).
3. If required, place in position the flat belt (linking the control unit with the machine) and switch on the driving motor by turning the main switch.
4. Start the sewing cycle by fully lowering the r/h pedal. After having engaged the machine move the l/h pedal back to the first perceivable pressure point so that after completion of the sewing cycle the cloth pressure frame remains in its lowered position.
5. When the machine has completed the sewing cycle it should stop with the cloth presser frame in the rear final position. This adjustment, which is only a rough adjustment, can be effected by resetting the disengaging cam 124 after having loosened the nut 125 (fig. 31).

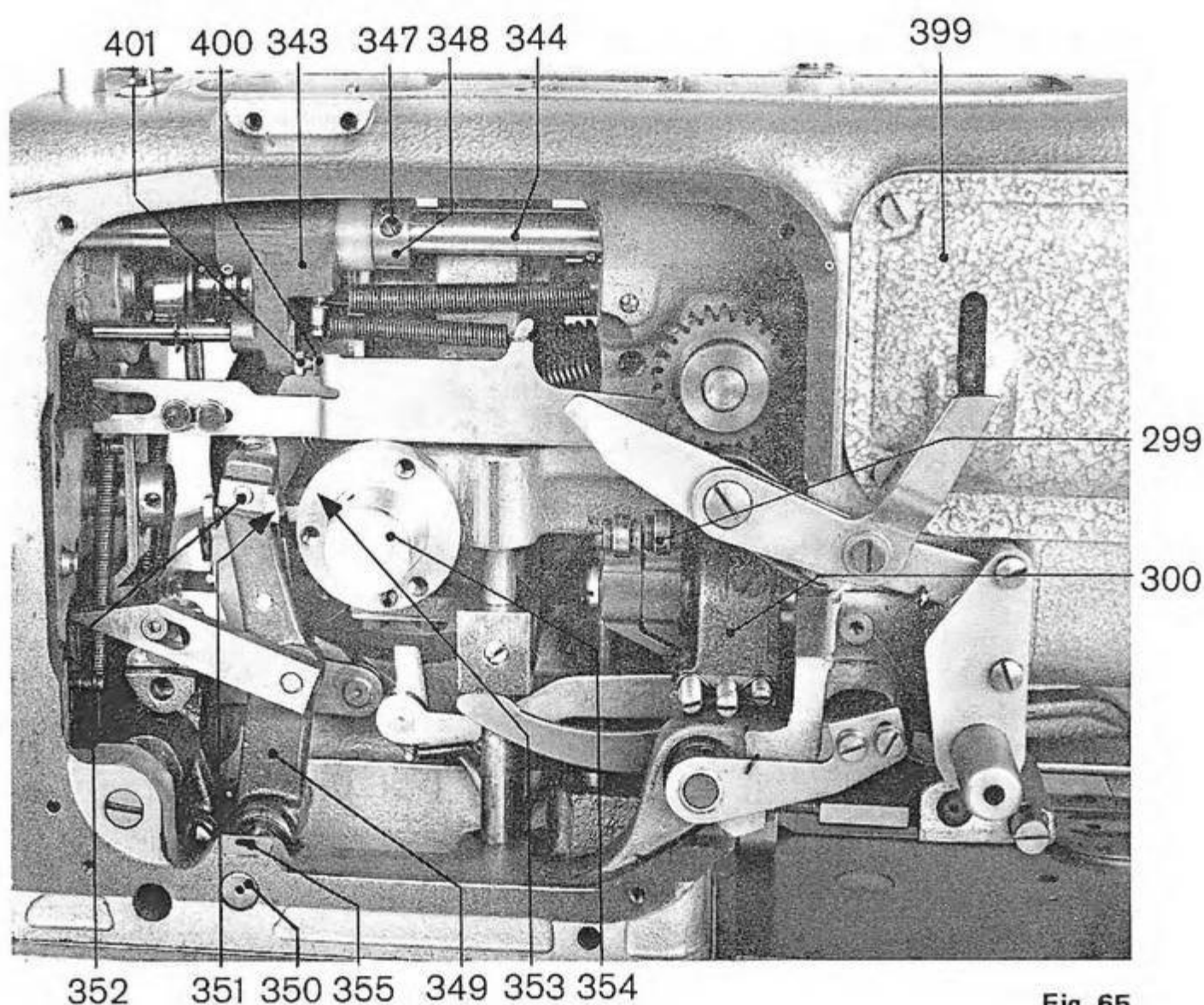


Fig. 65

6. For accurate timing of the disengagement, determine first the number of the locking stitches.

The number of the locking stitches depends on the total number of stitches per buttonhole.

For determining the number of the locking stitches, proceed as follows:

With the flat belt removed, engage the machine by hand. Turn the crank 1 (fig. 3) until the final bar cam 293 (fig. 64) is on the roller lever 299 (fig. 65) and the block 300 is thereby moved sideways. Turn the clutch disk in the direction of rotation until the machine and the control cam 292 (fig. 63) are in the position in which the roller lever 299 (fig. 65) has just left the final bartack cam 293 (fig. 64) and the block 300 (fig. 65) is again in its neutral position.

Continue turning the clutch disk in the direction of rotation and count the stitches until the block 300 (fig. 65) begins to move again sideways. At the end of this cycle the machine, operated by hand, will be disengaged. For starting a further cycle, the machine must be engaged by hand.

7. After having determined the number of locking stitches, proceed to an accurate adjustment and set the disengaging cam 124 (figs. 64 and 66) so that about $\frac{2}{3}$ of the number of the locking stitches are sewn prior to the disengagement and $\frac{1}{3}$ at the commencement of the new sewing cycle.

This timing of the machine disengagement must be checked again after changing the number of stitches per buttonhole.

After resetting the disengaging cam 124 (fig. 31) check subsequently, according to the following item b), also the position of the roller elbow 301 (fig. 63).

Note:

The timing of the machine disengagement, described above under items 1 to 7, is not required in **machines of new design**, i.e. in which the disengaging cam 124 (fig. 63) is fitted with the scale plate 120.

In these machines the disengagement can be timed by jointly resetting the scale plate and the disengaging cam 124 according to the indications on the scale plate.

Varying with the number of stitches per buttonhole, set the figure on the scale plate 120, which is nearest to the number of stitches per buttonhole, against mark 122 (fig. 63) of the shackle 123. Thus the disengagement will be properly timed.

The shackle 123 has been accurately adjusted in the factory. It is secured by varnish and usually should not be reset.

b) Adjusting the roller square

By intermediary of the lever 302, the roller square 301 (fig. 63) moves the upper thread scissors to the front. With the disengaging cam adjusted according to the above item a), set the roller square 301 so that with the machine disengaged in its final position, the roller 303 stands in the upper half (area "A" in fig. 63) on the sliding surface of the lever 302 (also for few stitches per buttonhole).

The roller square 301 can be adjusted after loosening the screws 304. The proper adjustment should be checked by repeatedly engaging the machine and allowing it to perform complete sewing cycles, i.e. to stop in the final position, because particularly in case of buttonholes with few stitches (under 102 stitches) the position of the control cam in the final position of the machine slightly changes at each engagement.

Note:

In machines of new design the roller square 301 (fig. 63) has a division mark. The adjustment is correct if this mark coincides with the division mark of the shackle 305.

The shackle 305 has been properly adjusted in the factory and it has been secured by varnish.

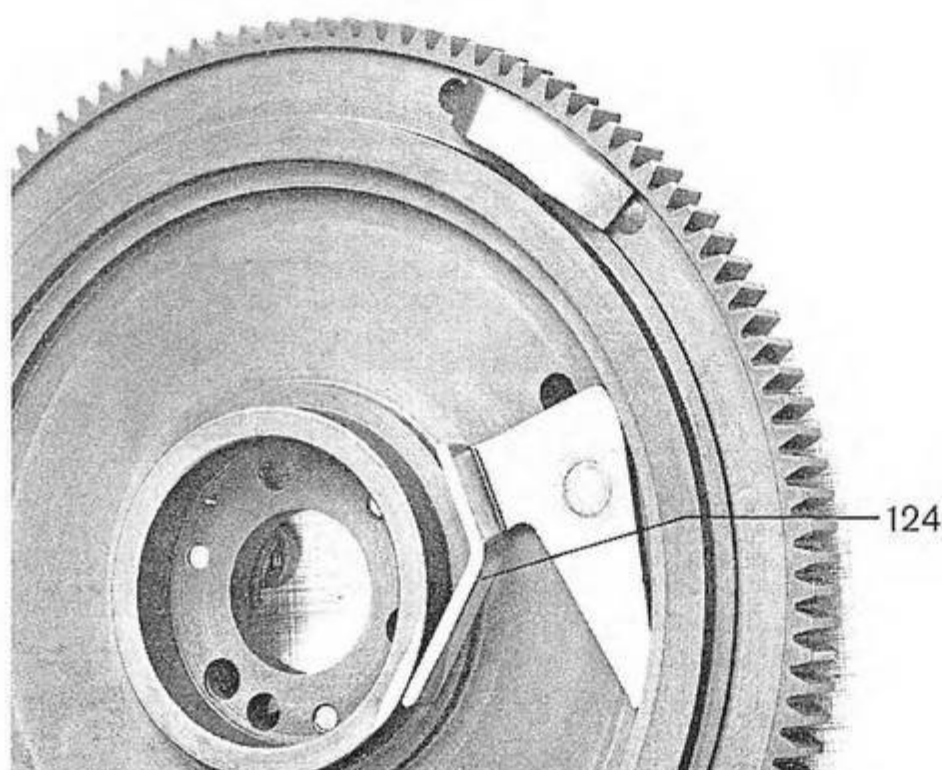


Fig. 66

c) Adjusting the needle with respect to the stitch hole

Seen in the feeding direction of the cloth presser frame, i.e. contrary to the oscillation of the needle, the latter must coincide with the middle of the stitch hole.

For adjusting, proceed as follows:

1. Remove the face plate 313 (fig. 3).
2. Remove the plug 306 in the arm head and loosen the thumb screw in the needle bar crank 307 (fig. 67) through the hole which is now open.
3. Loosen the thumb screw 308 (fig. 67) and displace the needle bar crank on the bearing bolt and on the guide bolts so that the needle stands in the middle of the stitch hole. Following the adjustment, re-tighten firmly the thumb screws.

When making this adjustment ensure also that the guide bolt 309 (fig. 68) tightens the guide in the needle bar crank so that only oil can pass through. The guide bolt can be adjusted after having loosened the stud 310.

d) Adjusting the needle oscillation

The oscillation of the needle must be synchronized with the upwards and downwards motion of the needle. The latter should in no case oscillate when it penetrates into the fabric.

For checking the oscillation of the needle, proceed as follows:

1. Take off the arm cover 311 (fig. 3) and open the cover 119.
2. Set the row and the bartack width and the row distance for the maximum value admissible for the equipment.
3. Conduct the machine in the bartack position by turning the crank, so that the oscillation of the needle can be exactly controlled.
4. Remove the lower gear 116 (figs. 28 and 29) from the shaft, so that, when turning the clutch disk, the machine stops in the bartack position.
5. Remove the flat belt and engage the machine by hand or, with the driving motor engaged, by lowering the r/h pedal.
6. Turn the clutch disk in the direction of rotation until the needle bar begins to descend to perform the l/h stitch. During this descending motion the needle should stop oscillating when its point is about 1.5 mm above the throat plate surface.

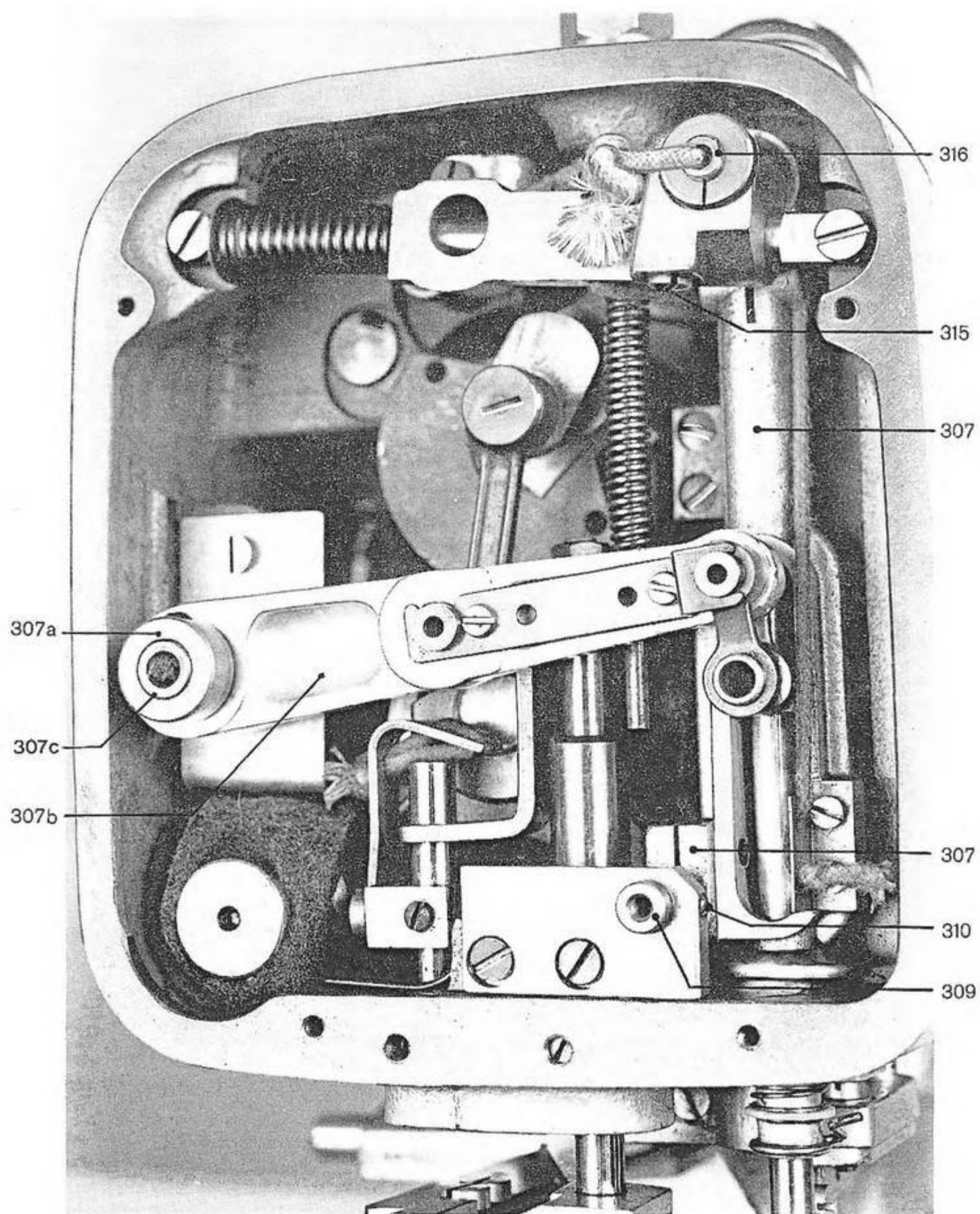


Fig. 67

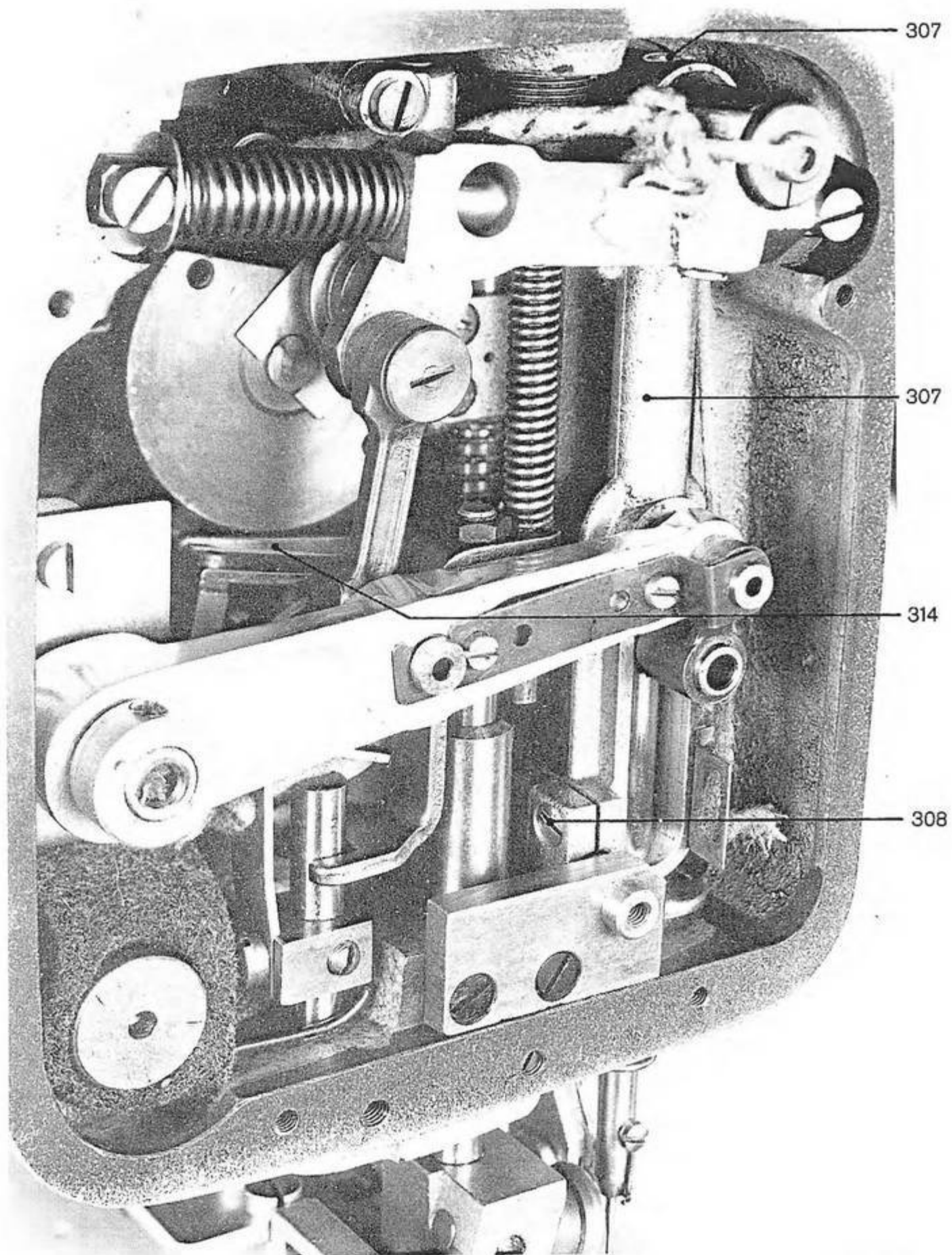


Fig. 68

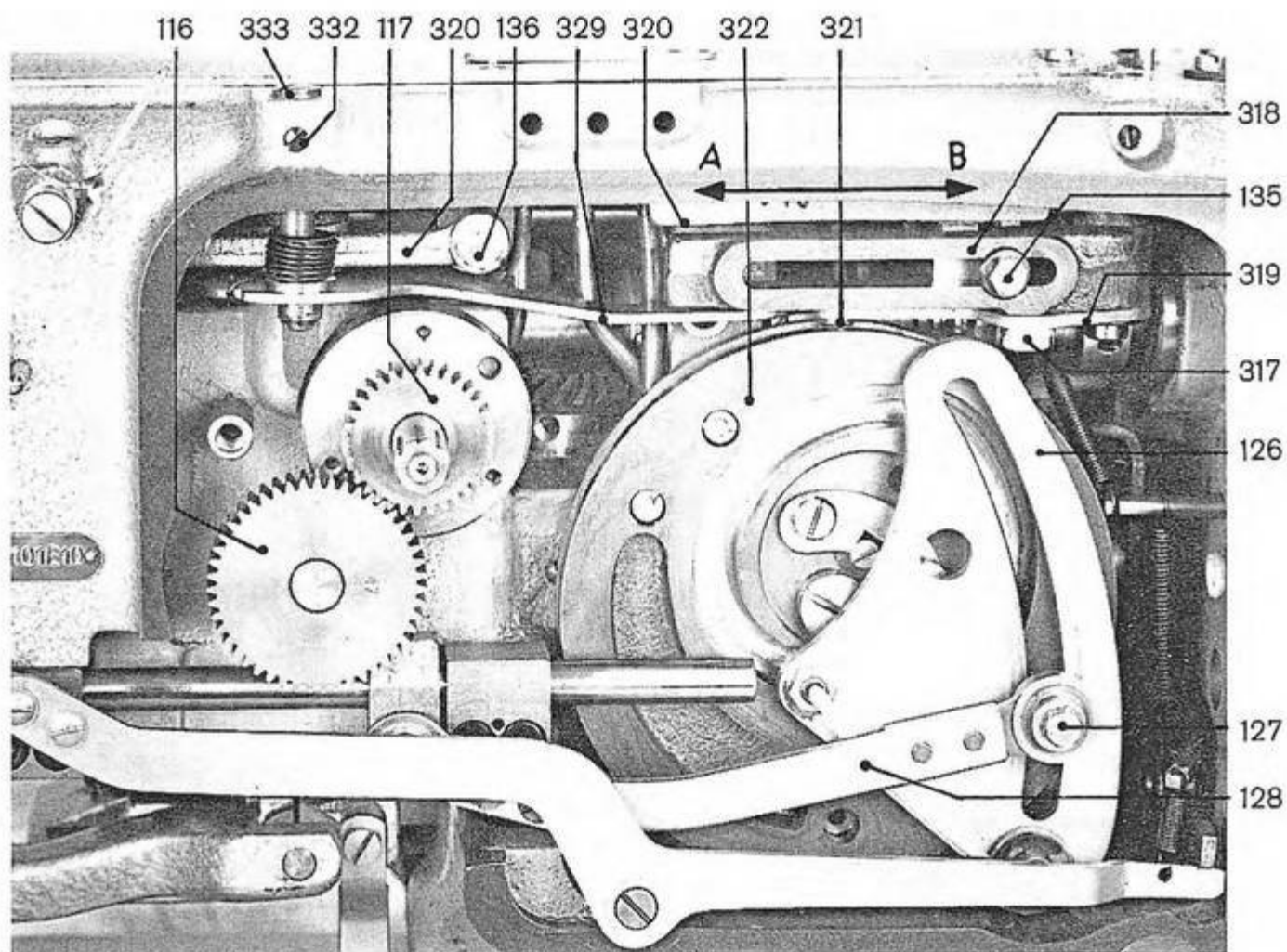


Fig. 69

This adjustment can be effected by turning the spur gear on the arm shaft after loosening the two fastening screws of said spur gear 312 (fig. 38).

Following the adjustment, retighten the two fastening screws of the spur gear 312, ensuring that seen in the axial direction the spur gear is in the middle of the lower spur gear.

e) Setting the needle zero position

1. The machine is in disengaged final position.
2. Remove the crank 1 (fig. 3) and open the cover 119 after having removed the screw 118.
3. Remove the head cover 313.
4. Remove the lower gear 116 (figs. 28 and 69).
5. Engage the machine by hand.

6. Insert an impeccable straight needle.
7. Place a piece of paper under the cloth presser frame.
8. Make the needle stitch the paper by turning the clutch disk in the direction of rotation.

Make the needle stitch the paper once again by turning the clutch disk in the direction of rotation. Both stitches must be made at an exactly the same place.

This adjustment can be effected by turning the screw 134 (fig. 30).

9. Turn then the clutch disk in the direction of rotation and set the needle bar at its lowest dead centre while the eccentric fork 314 (fig. 67) is at its topmost point.

This position exists after each second needle stitch.

If in this position of the needle and of the eccentric fork the crank 307 (fig. 68) is moved by lifting the set screw 134 (fig. 30) or the block, the needle bar should not move. For effecting this adjustment, turn the eccentric bolt 316 after loosening the thumb screw 315 (fig. 68).

For turning the bolt 316 use a 6 gauge spanner. Following the adjustment, retighten firmly the thumb screw 315.

After having finished this adjustment check the adjustment described under 8. and correct it, if required.

Note:

After having completed the adjustments of the needle zero position according to chapter 30, item e) and the adjustment of the crank for the stitch position according to chapter 30, item f) and in order to well secure the end of the buttonhole, turn the set screw 134 (fig. 30) clockwise by about 1/2 revolution so as to reduce the distance between the locking stitches.

f) Adjusting the zero position of the coulisse for the stitch position

1. The machine is in disengaged final position.
2. Take off the crank 1 (fig. 3) and open the cover 119 after having removed the screw 118.
3. Pull off the lower gear 116 (figs. 28 and 69).
4. Engage the machine by hand.
5. Insert a perfect straight needle.
6. Place a piece of paper under the cloth presser frame.
7. Loosen the screw 135 (figs. 28 and 69) and displace the coulisse 318 fully to the rear (a bit of fabric).

8. Turn the clutch disk in the direction of rotation to bring the eccentric fork 314 (fig. 67) and continue turning the hand wheel in the direction of rotation until the paper under the cloth presser frame is stitched.

9. Lift then the needle to its topmost position by turning the clutch disk in the opposite direction of rotation.

10. Loosen the screw 135 (figs. 28 and 69) and displace it fully to the front (much of fabric).

11. Turn the clutch disk again in the direction of rotation and make the needle stitch the paper.

This stitch and that mentioned under 8. should be performed at exactly the same spot.

If this is not the case, loosen the screw 317 (fig. 69) and displace the crank 318 with respect to the roller lever 319 as required.

The screw 317 is secured by a yellow varnish. After turning, it should again be secured by said varnish.

For easier adjustment of the coulisse 318 it is advised to displace the screw 135 fully to the rear.

g) Adjusting the stitch position with respect to the knife slit in the throat plate and with respect to the cutout of the cloth presser frame

1. The machine is in disengaged final position.

2. Engage the machine by hand.

3. Take off the crank 1 (fig. 3) and open the cover 119 after having removed the screw 118.

4. Insert a perfect straight needle.

5. Replace the crank and turn it until the machine is in the position for sewing the first row (left row).

6. Turn the clutch disk until the needle is in the position for sewing the r/h stitch of the left row.

In this position, the needle should coincide with the middle of the knife slit. For obtaining this position, turn the screw 136 (figs. 28 and 69) by a spanner.

7. Turn the clutch disk until the needle is in the position for sewing the left hand stitch in the left row. In this position, the distance between the left cloth presser frame edge and the needle should amount to about 0.4 mm.

This adjustment can be obtained by turning the screw 132 (figs. 30 and 63) for the throw width (row width).

8. Turn the crank until the machine is in the position for sewing the second row (r/h row).

9. Turn the clutch disk until the needle is in the position for sewing the l/h stitch of the row.

The distance, which now exists between the centre of the needle and the centre of the knife slit, e.g. 1 mm, should be reduced to the half of its amount (0.5 mm) by turning the screw 135 (figs. 28 and 69) in the crank 318.

10. By resetting the screw 135 in the crank 318, the position (under 6.) of the r/h stitch of the left row in relation to the knife slit has changed. It is, therefore, necessary to correct this adjustment accordingly by the screw 136.

11. Since the adjustment of the position of the r/h stitch of the l/h row (described under 6.) and the adjustment of the l/h stitch of the r/h row (described under 9.) are interdependant, the adjustments must be repeated until both stitches are performed in the middle of the knife slit.

12. If with this adjustment the distance between the two rows is too narrow, i.e. if the rows are damaged by the knife, increase the distance between the two rows by turning the screw 135 (figs. 28 and 69) in the direction of the arrow A. Following this adjustment check the width of the row and of the bartack, in order to ensure that the needle does not touch the cloth pressure frame.

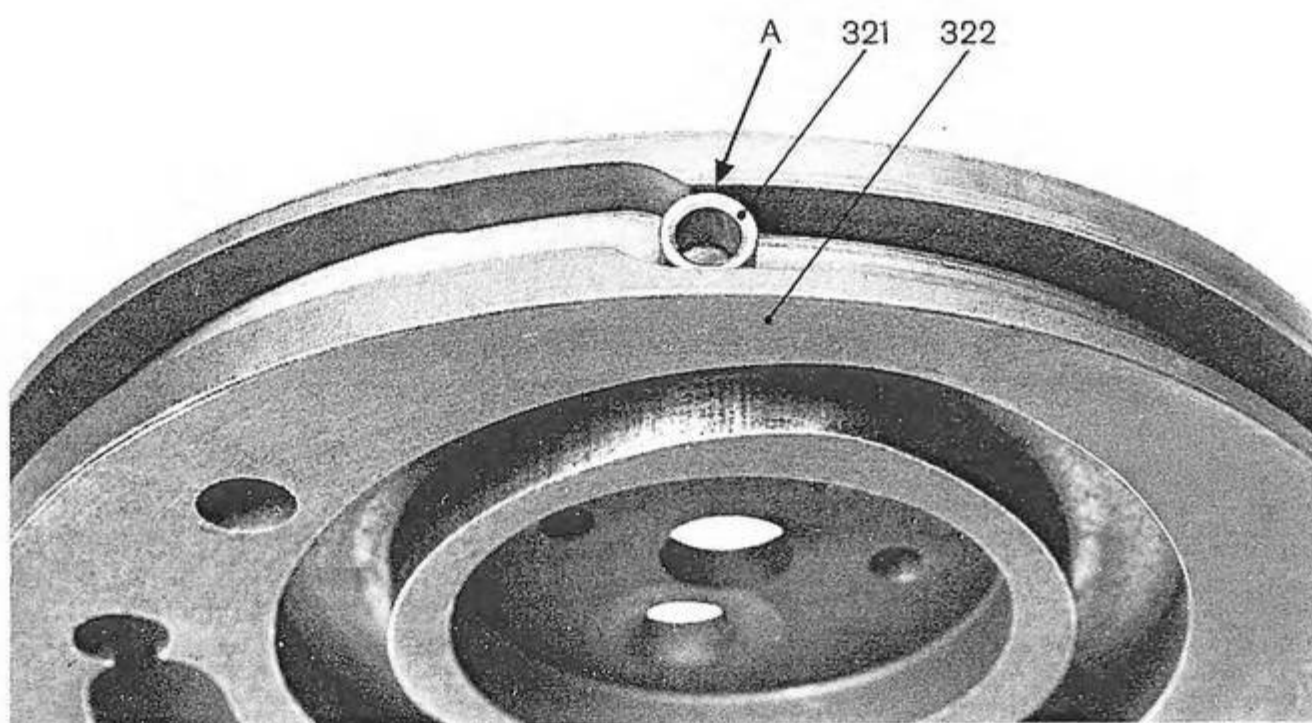


Fig. 70

Important

The above adjustments must be made in any case if the machine is fitted with a smaller cloth presser frame (narrower).

h) Adjusting the cam disk with respect to the control disk

1. The machine is in disengaged final position.
2. Take off the crank 1 (fig. 3), open the cover 119 after having removed the screw 118 and replace the crank 1.
3. Turn the crank until the roller lever 299 (fig. 65) and the block 300 have reached the final bartack cam 293 (fig. 64).
4. Engage the machine by hand.

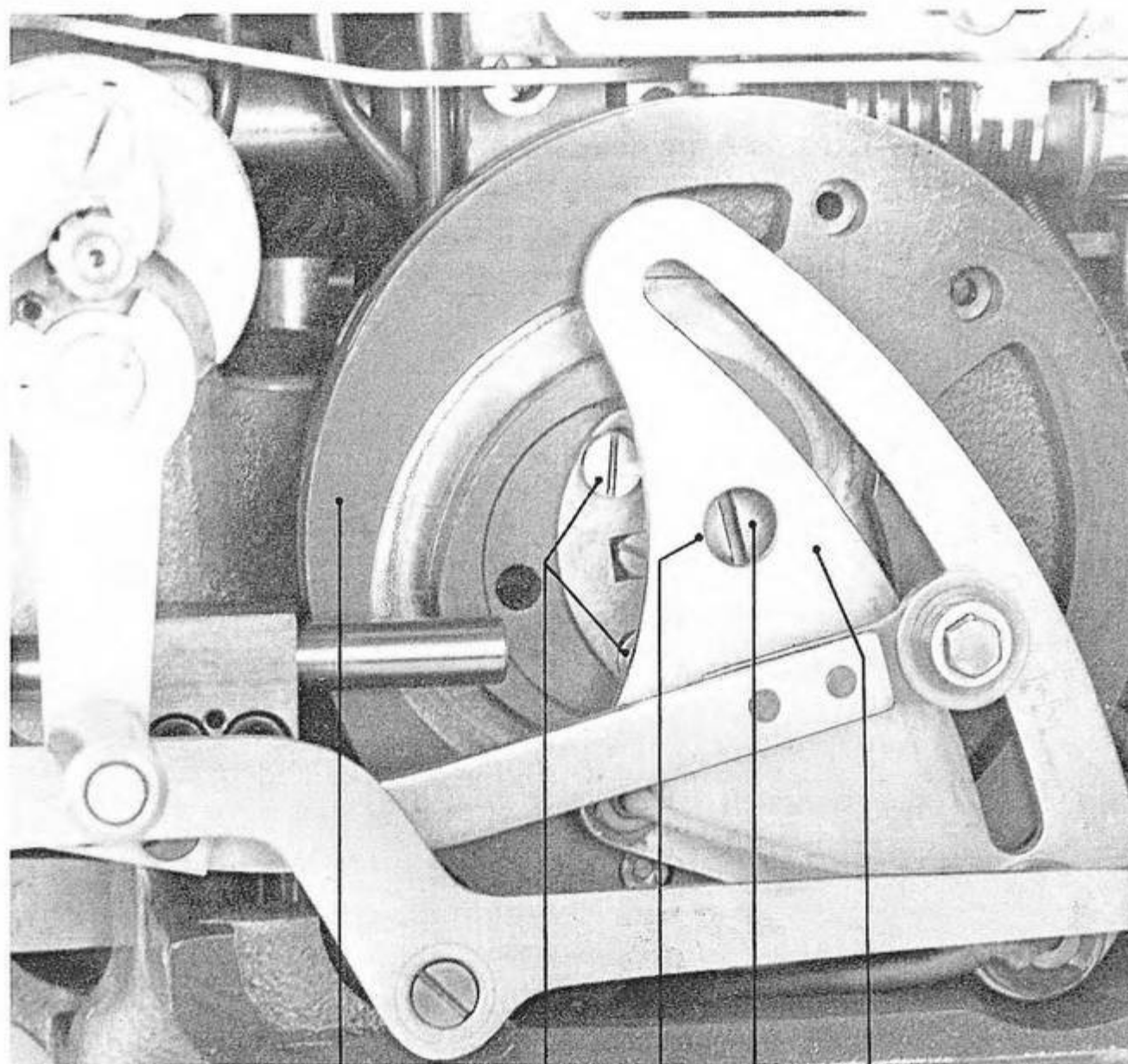


Fig. 71

5. Turn the clutch disk in the direction of rotation until the machine and the control cam 292 (fig. 63) are in the position in which the roller lever 299 (fig. 65) begins to leave the final bartack cam 293 (fig. 64) i.e. in which the block 300 begins to descend to its neutral position.

Now, in no case earlier, the stitch position lever 320 (figs. 28 and 69) should begin to move into its zero stitch position, i.e. the roller 321 (figs. 28 and 69) should stand at point A of the cam 322. See fig. 70. This adjustment can be obtained by turning the cam 322 (fig. 71) with respect to the cam 292 (fig. 63) after loosening the screws 323 and 324 (fig. 71).

In order to reach the screws 323 and 324 (fig. 71) set the cam in the respective position by turning the crank. The fastening screw 324 can be reached through the hole 325 in the crank 126. See fig. 71. Following the adjustment, retighten firmly the screws.

i) Adjusting the cam for the first bar

1. The machine is in disengaged final position.

2. Take off the crank 1 (fig. 3), open the cover 119 after removing the screw 118 and replace the crank 1.

3. Turn the crank until the machine is in the position in which the roller 321 (fig. 69) of the stitch position crank stands short before the first lip (point B).

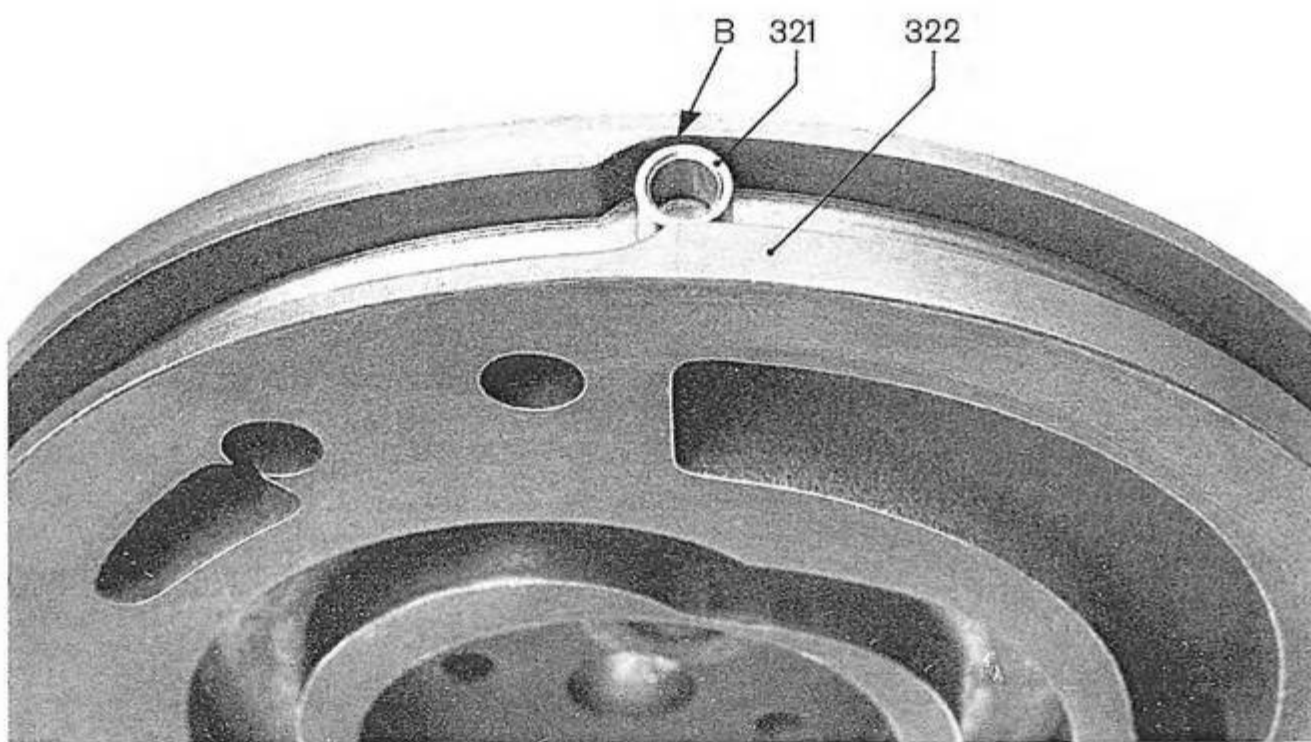


Fig. 72

4. Engage the machine by hand.

5. Turn the clutch disk in the direction of rotation until the machine and the cam 322 are in the position in which the stitch position lever 320 and the stitch position coulisse 319 (fig. 69) have finished their motion to the right, i.e. in which the roller 321 stands at the point C. See fig. 73.

At this moment, the cam 326 (fig. 64) for the first bar should reach the roller lever 299 (fig. 65) and push the block 300 upwards.

The cam 326 (fig. 64) can be adjusted after loosening the screws 327 (fig. 63).

Remove to this effect the l/h cover.

j) Adjusting the main tension release

Way

1. The machine is in disengaged final position.

2. Take off the crank 1 (fig. 3), remove the screw 118, open the cover 119 and replace the crank 1.

3. Turn the crank 1 until the machine is in the position in which the cam 328 (fig. 74) of the releasing lever 329 is about in the centre of the releasing plate 330.

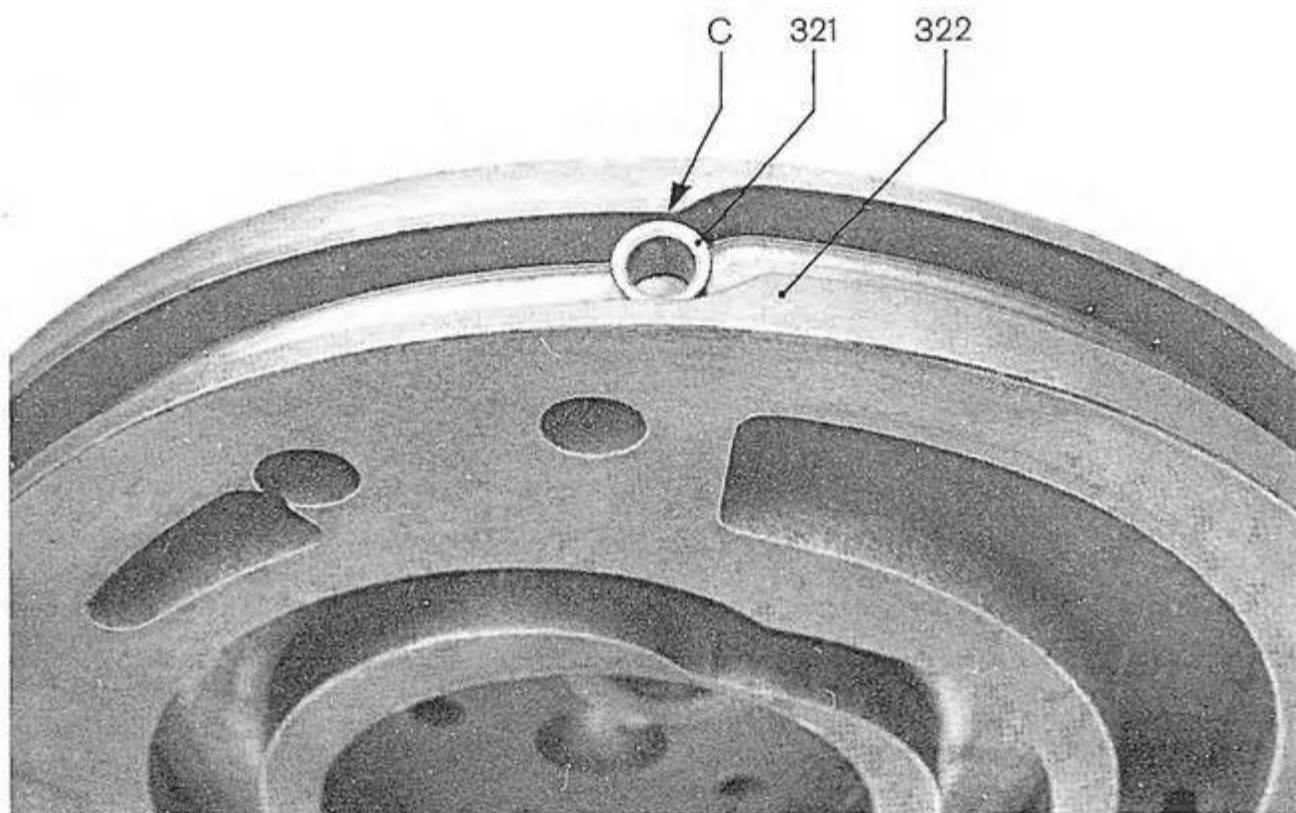


Fig. 73

In this position, the distance between the back of the rear tension disk 331 (fig. 75) and the collar of the tension axle 332 should amount to about 1 mm. This adjustment can be obtained by turning the eccentric bearing bolt 333 after having loosened the stud 332 (fig. 69). After turning said stud check whether the tension releasing lever 329 can still be moved easily.

Moment

The moment in which the tension is released is determined by the position of the plate 330 (fig. 74) on the cam.

With the disengagement adjusted according to the item a) of the present chapter and when the machine, driven by motor, has stopped in its final position, adjust the releasing plate 330 so that the cam 328 stands on the left hand half (zone "A", fig. 74) of the releasing plate 330. See fig. 76.

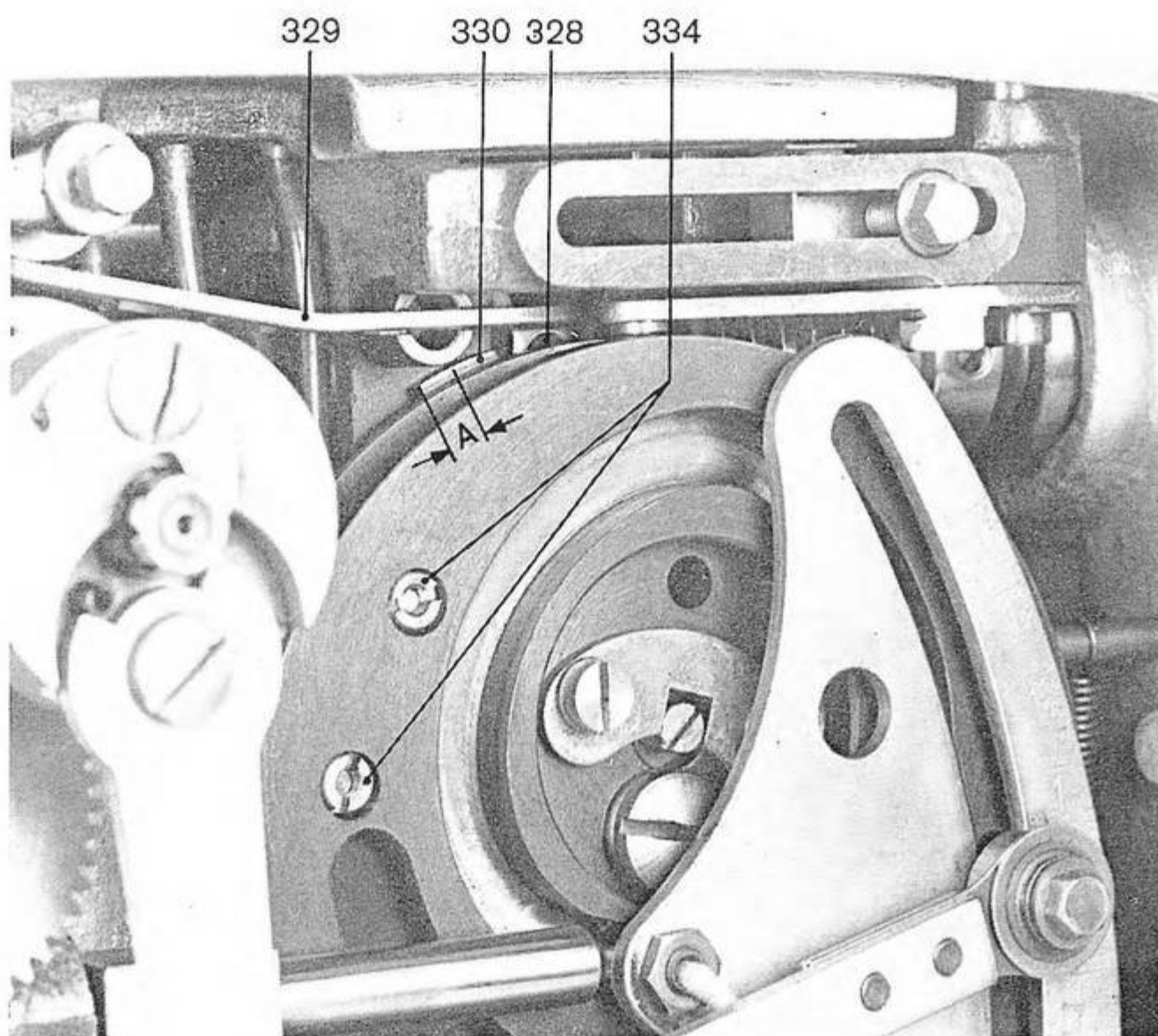


Fig. 74

The releasing plate 300 can be adjusted accordingly after loosening the nuts 334 (figs. 74 and 76).

Since particularly in case of buttonholes with few stitches the position of the control cam in the final position of the machine is slightly different at each engagement, ensure that the main tensioner 4 (fig. 3) is in any case opened when the machine is in its disengaged final position.

Note:

If with the releasing plate 330 (figs. 74 and 76) adjusted according to the above instructions the stitch pattern is not proper, set the releasing plate 330 so that when starting to sew a buttonhole the main tensioner is closed as soon as possible and in the final position of the machine it is still opened.

k) Adjusting the release of the tension for the fastening stitches

In the disengaged final position of the machine the releaser 103 (figs. 27 and 75) must have released and in the engaged position it must again clamp.

This adjustment can be obtained by resetting the releasing lever 336 after having loosened the screws 335 (fig. 75).

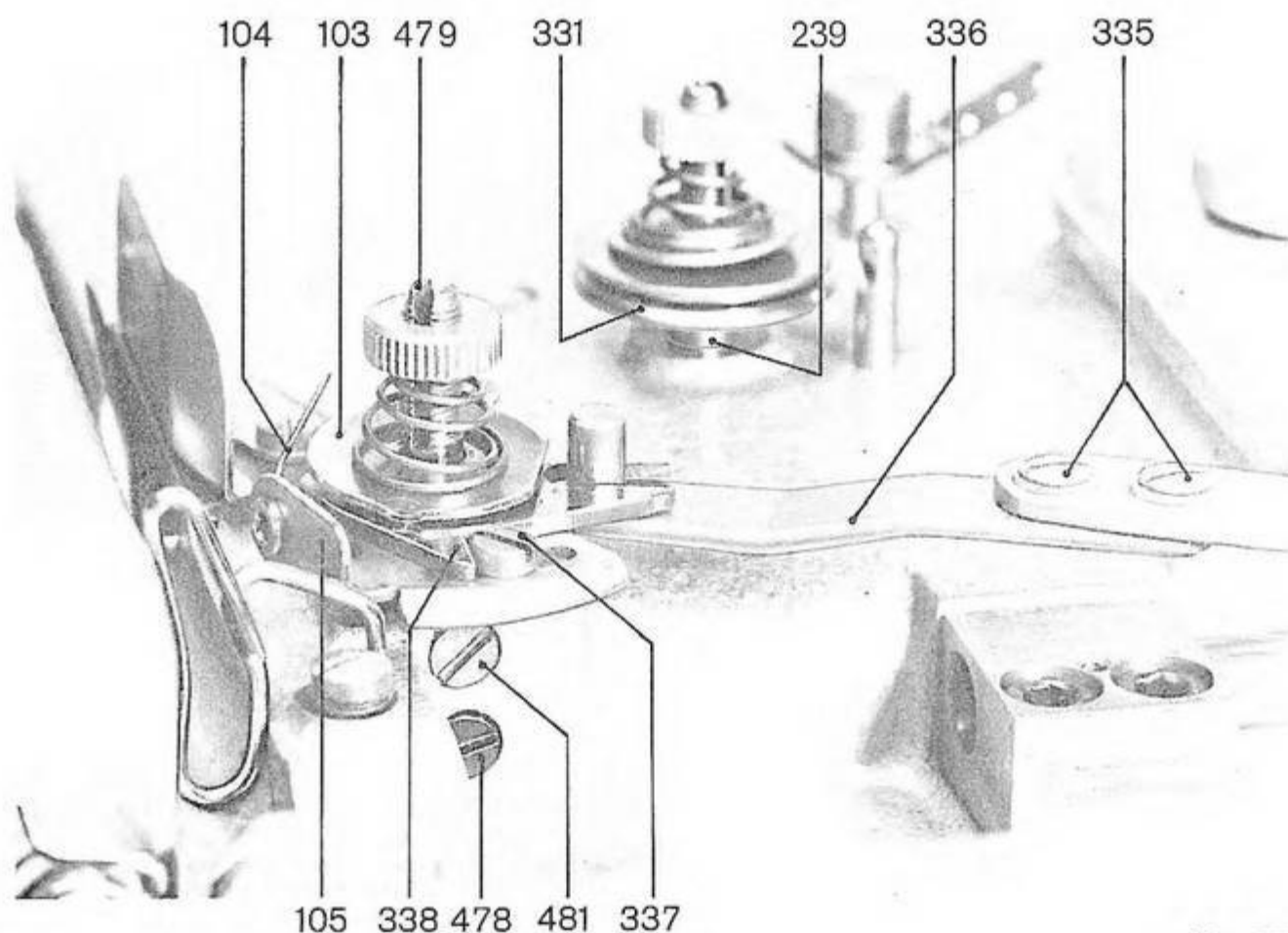


Fig. 75

l) Adjusting the thread puller

The adjustment of the thread puller 105 (fig. 27 and 75) depends on the type of the fabric and on the thread.

If too much thread is pulled, the excessive thread can get into the hook race or the stitches at the beginning of the buttonhole will not be tight enough.

If the quantity of the thread pulled is not sufficient, skipped stitches at the beginning of the buttonhole may result, or the bobbin thread will be pulled up.

Normally, the thread puller 105 (fig. 75) should be adjusted in such a way that with the machine engaged the distance between the head of the screw 337 and the lug 338 of the tension releasing plate ranges from 1 to 2 mm.

For setting this distance, loosen the screw 337 and adjust it accordingly.

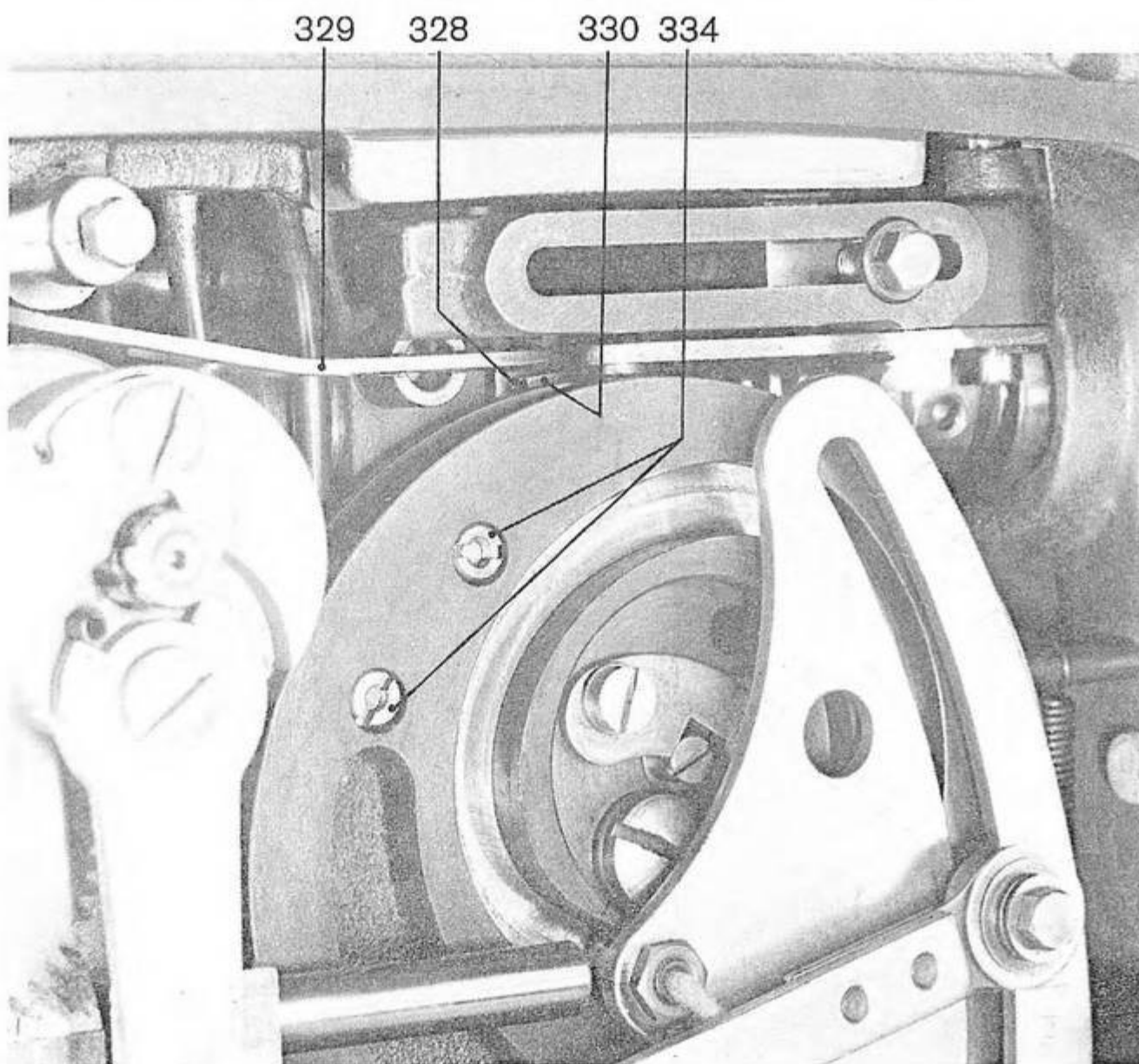


Fig. 76

31. Adjusting and checking the disengagement

For adjusting and checking the disengagement proceed in following sequence:

a) Adjusting the disconnecting worm

Set the worm 339 (fig. 77) on the upper shaft so that the distance between the braking member or bearing 340 and the disengaging worm 339 amounts to 5.2 mm. See fig. 77. For adjusting this distance of 5.2 mm use the gauge 341, supplied by the factory under the ref. No. 556 2260, and proceed as follows:

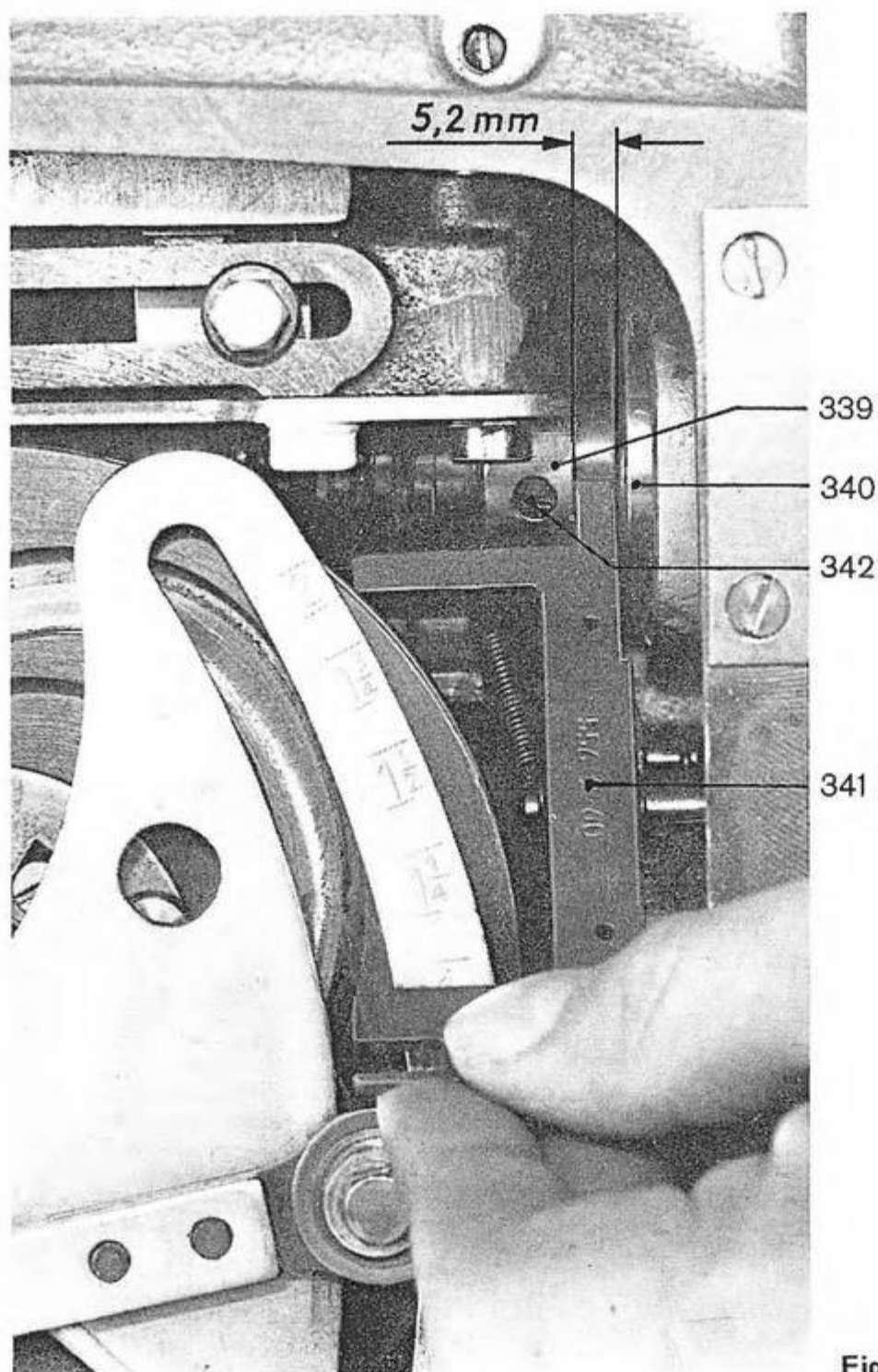


Fig. 77

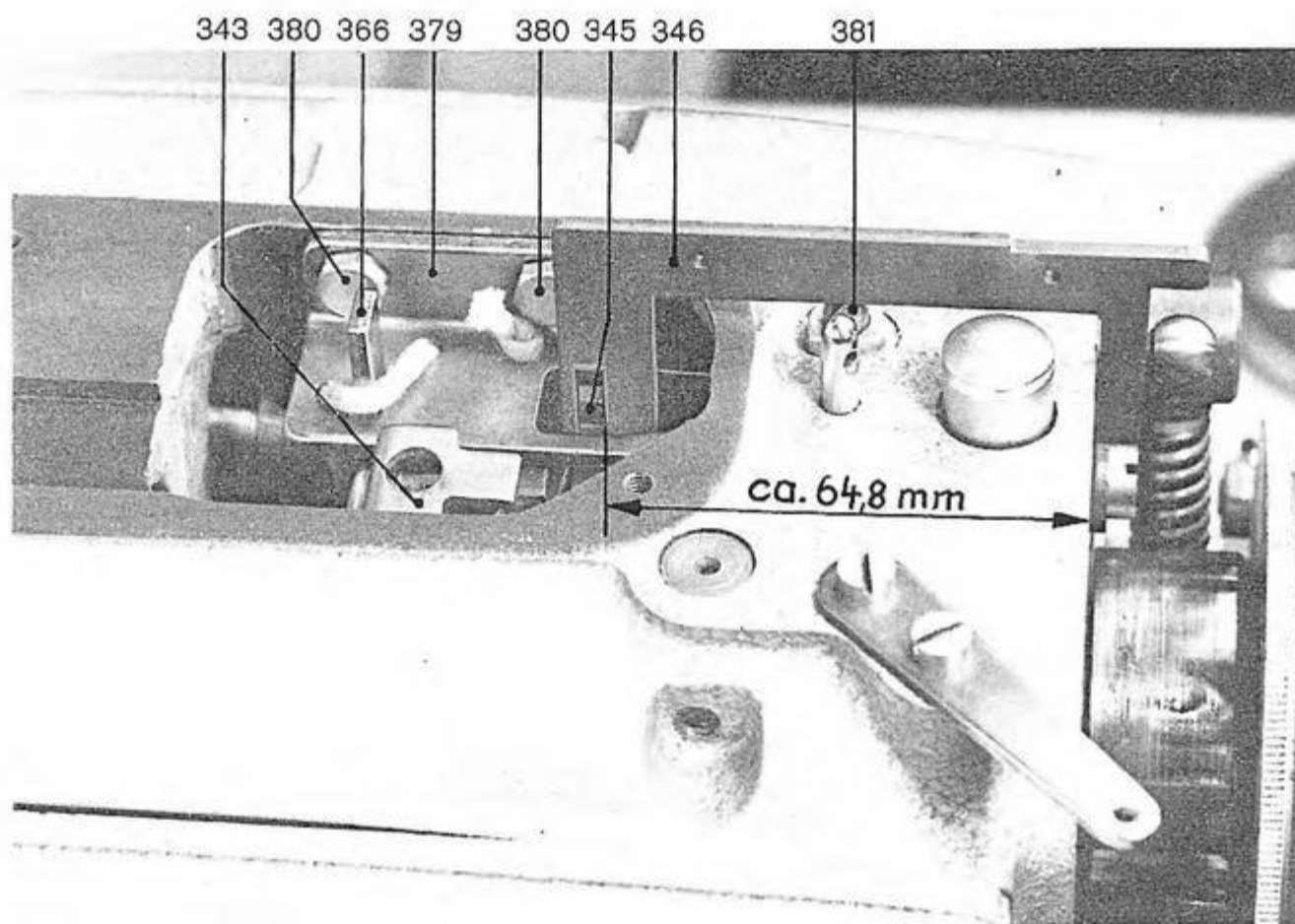


Fig. 78

1. Open the cover 119 (fig. 3) after having taken off the crank 1 and removed the screw 118.
2. With the flat belt removed from its pulley, engage the machine by hand and turn the hand wheel in the direction of rotation until the disengaging worm 339 (fig. 77) is in such a position that the fastening screws 342 can be loosened.
3. Set the disengaging worm 339 by the gauge 341 as shown in fig. 77 and retighten firmly the fastening screws 342.

Note: First screw in the direction of rotation on the surface.

b) Adjusting the releasing lever

Set the releasing lever 343 (fig. 65) on the knife shaft 344 so that with the machine in the disengaged final position, the distance between the machine back and the latch 345 (fig. 78) amounts to about 64.8 mm. See fig. 78. Adjust this distance by the gauge 346, supplied by the factory under ref. No. 556 2260, as follows:

1. Remove the control cam 292 (fig. 63) according to the chapter 41 and take off the arm cover 311.

2. With the machine in disengaged final position, set the gauge 346 against the machine back as shown in fig. 78. It must be possible to guide the opening of the gauge 346 freely over the latch 345 of the releasing lever 343. If this is not the case, loosen the screw 347 (fig. 65) in the collar 348 and adjust the releasing lever 343 by resetting the collar 348 accordingly. Following the adjustment, retighten firmly the screws 347.

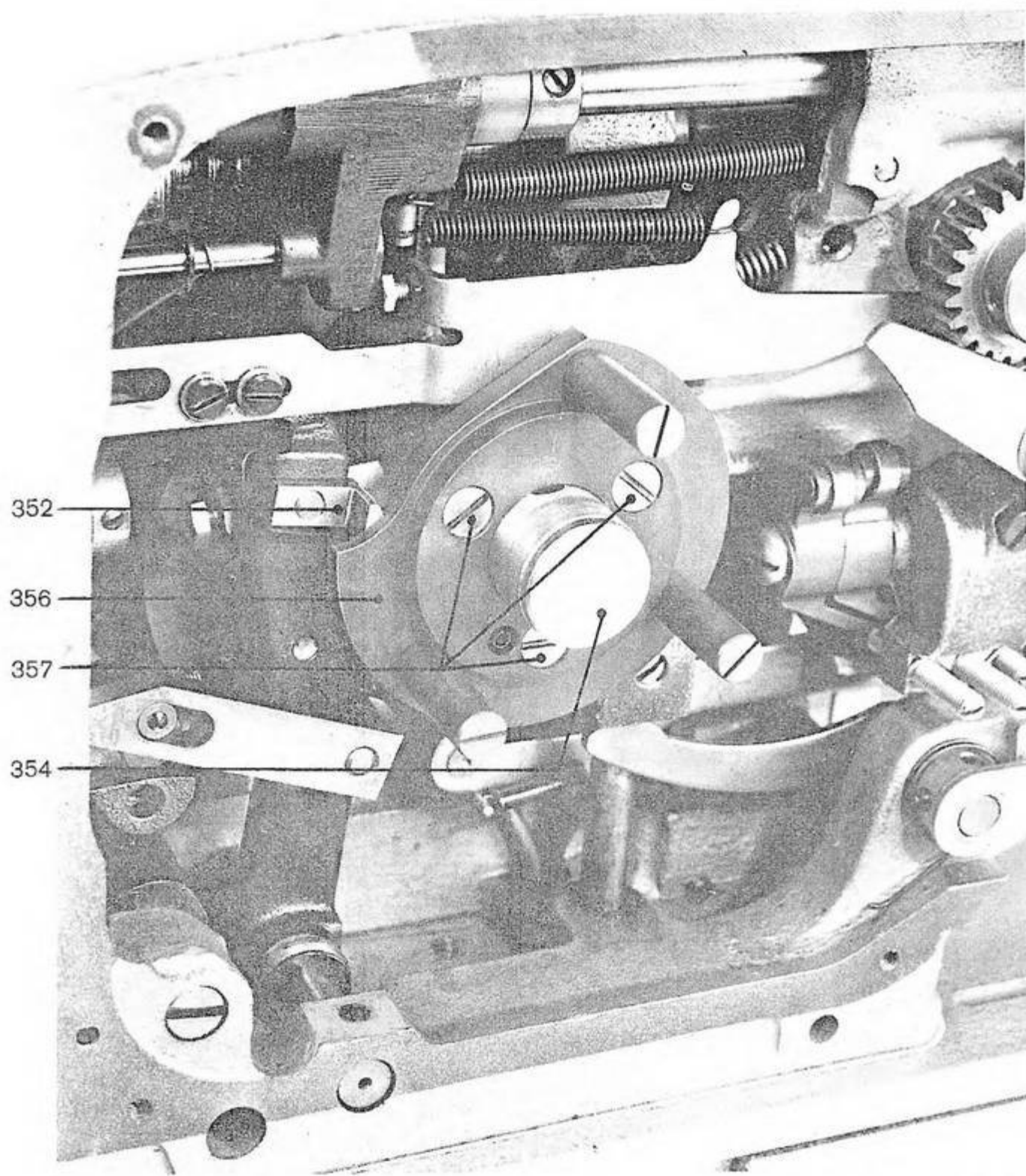


Fig. 79

c) Adjusting the key lever

Set the tracing lever 349 (fig. 65) with its axle 350 so that the surface of the key stone 352 locates itself about 3 mm behind the surface 353 of the hub 354. For adjusting, loosen the stud 355.

This distance can also be checked by the gauge 356 (fig. 79), ref. No. 556 2236.

For doing this, fasten the gauge 356 with the three screws 357 of the control cam to the hub 354 and turn it then so that it occupies the position shown in fig. 79.

The key stone 352 should rest again the back of the gauge 356.

Use the gauge 356 (fig. 8/7, cat. No. 5562236, also for adjusting the neutral position of the key lever 349.

When the gauge 356 is in the position as shown in fig. 80, the key stone 352 should touch the gauge 356 in the zone "A" and the stop bolt 358 should be in contact with the machine body 359.

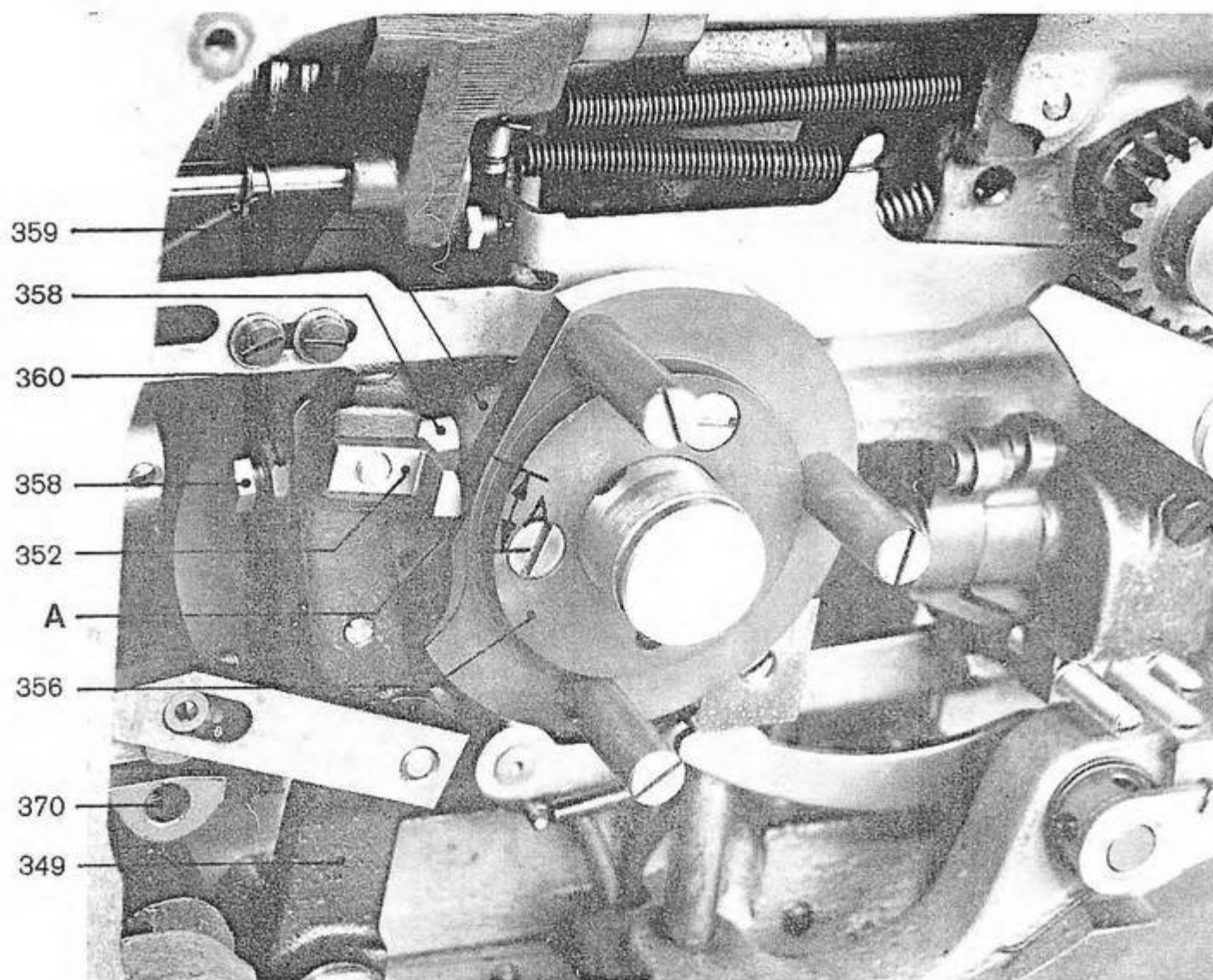


Fig. 80

This adjustment can be obtained by the stop bolt 358 after loosening the counter nut 360.

This adjustment ensures that the key stone 352 does not knock against the collar 361 (fig. 64) on the control cam and that it has a sufficient stroke.

d) Adjusting the roller lever

Adjust the roller lever 362 (fig. 81) on the axle so that the distance between the face 363 of the articulated bolt 364 and the back of the shackle 365 is sufficient for the oil flow.

For adjusting, loosen the stud in the roller lever 362. Said stud presses against a surface of the axle and can be reached from underside of the machine by means of a screwdriver.

e) Adjusting the knee articulation

The knee articulation, consisting of an articulated latch 365 (fig. 81) and an articulated bolt 364 links, when it is dropped in, the key lever 349 with the roller lever 362, so that when returning the key lever 349 over the lever 362 also the belt fork and, when moving over the latch 366 (fig. 78) also the releasing lever 343 will be operated.

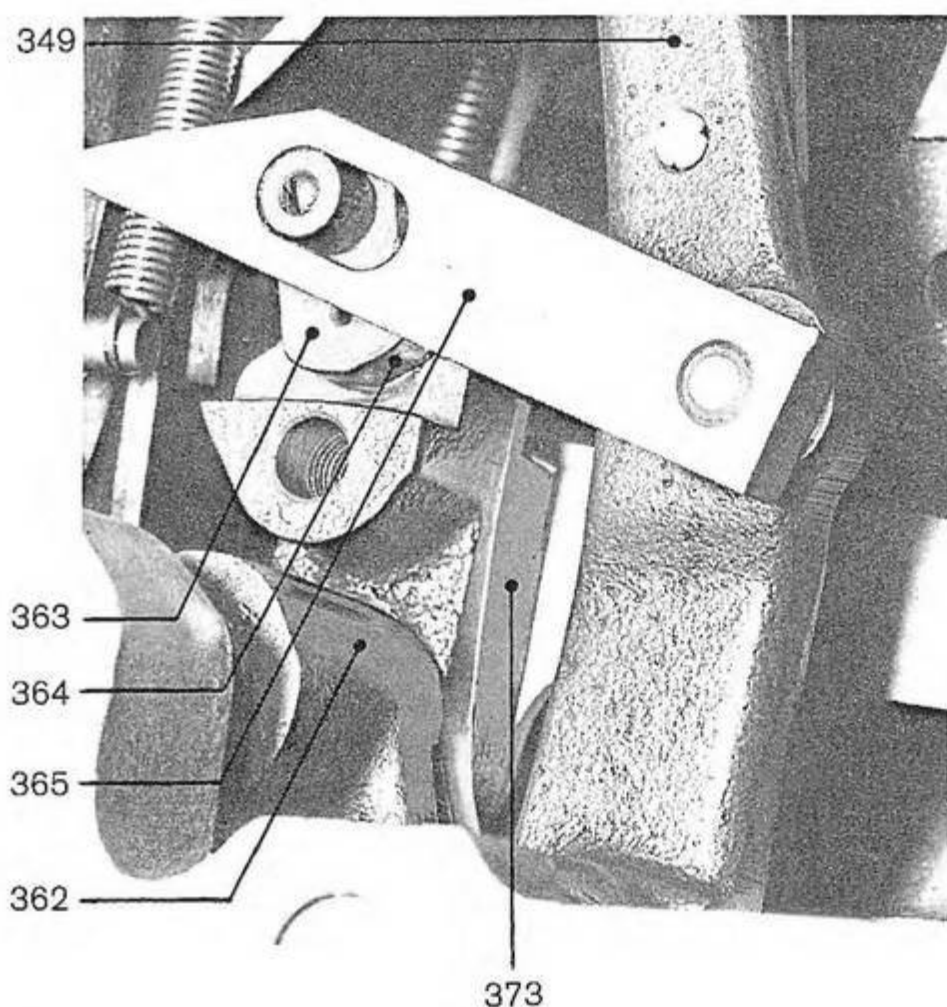


Fig. 81

For adjusting the knee articulation, proceed as follows:

1. Engage the machine by hand.
2. Fasten the gauge 356 (fig. 82) to the hub 354 by the three fastening screws 357 of the control cam.
3. Varying with the type of the disengaging cam 124 (figs. 64 and 66) set the gauge as follows:

In machines with the disengaging cam 124 (fig. 66) of stell plate (old design) set the gauge 356 (fig. 82) so that the stone 352 situates itself in the zone "B" of the gauge 356. See fig. 82.

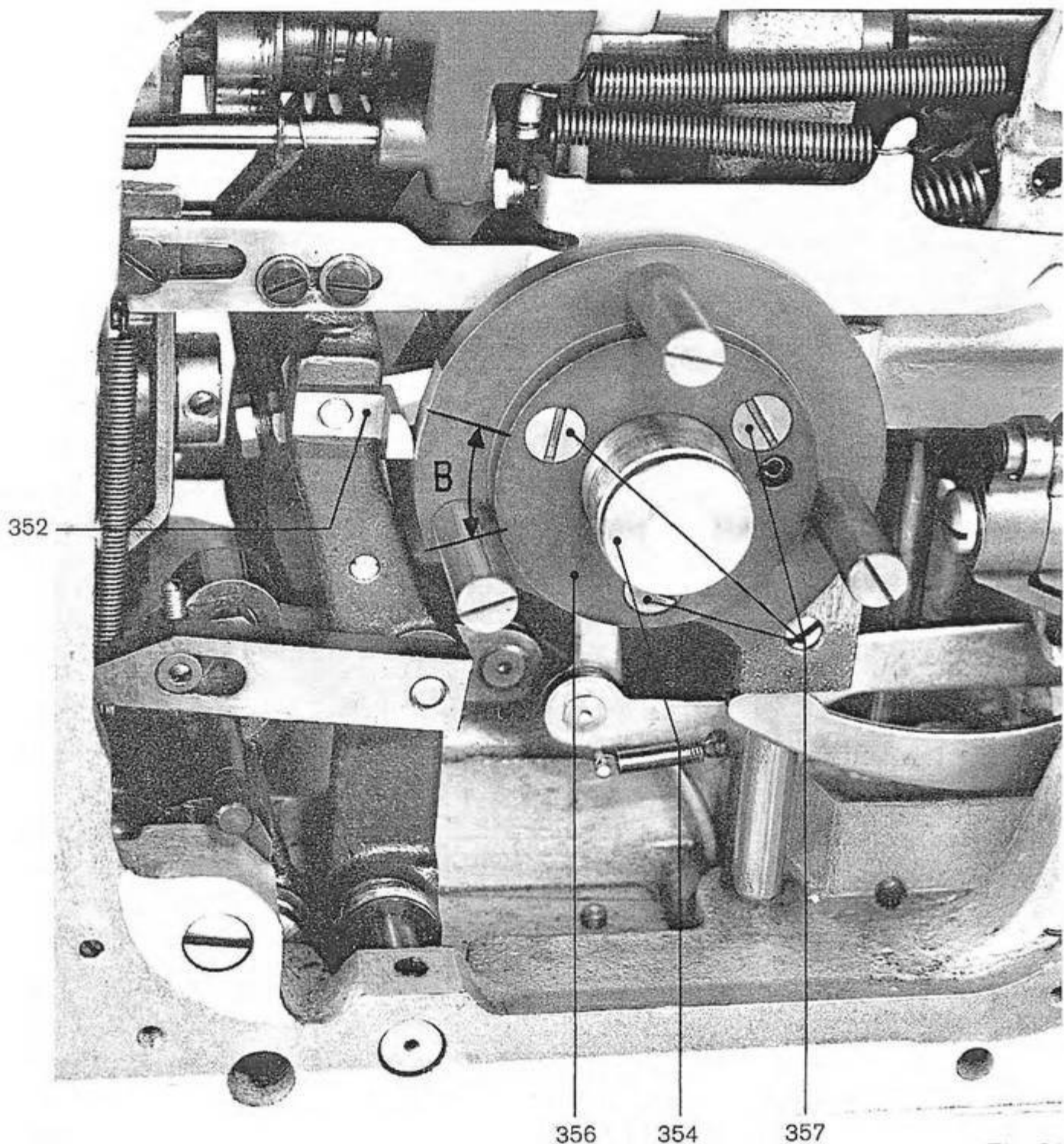


Fig. 82

In machines with the disengaging cam 124 of new design, with 0.8 mm stroke (see fig. 64), set the gauge 356 so that the stone 352 situates itself in the zone "C" of the gauge 356. See fig. 83. In this position, i.e. when the lever 349 has completed its maximum motion to the rear, the distance between the bolt 367 and the rear end of the oblong hole 368 in the articulated shackle 365 must have travelled downwards so far that it slightly rests on the setting pin 369, ref. No. 5562240. Introduce for this purpose the pin 369 (fig. 83) in the borehole 370 (fig. 80).

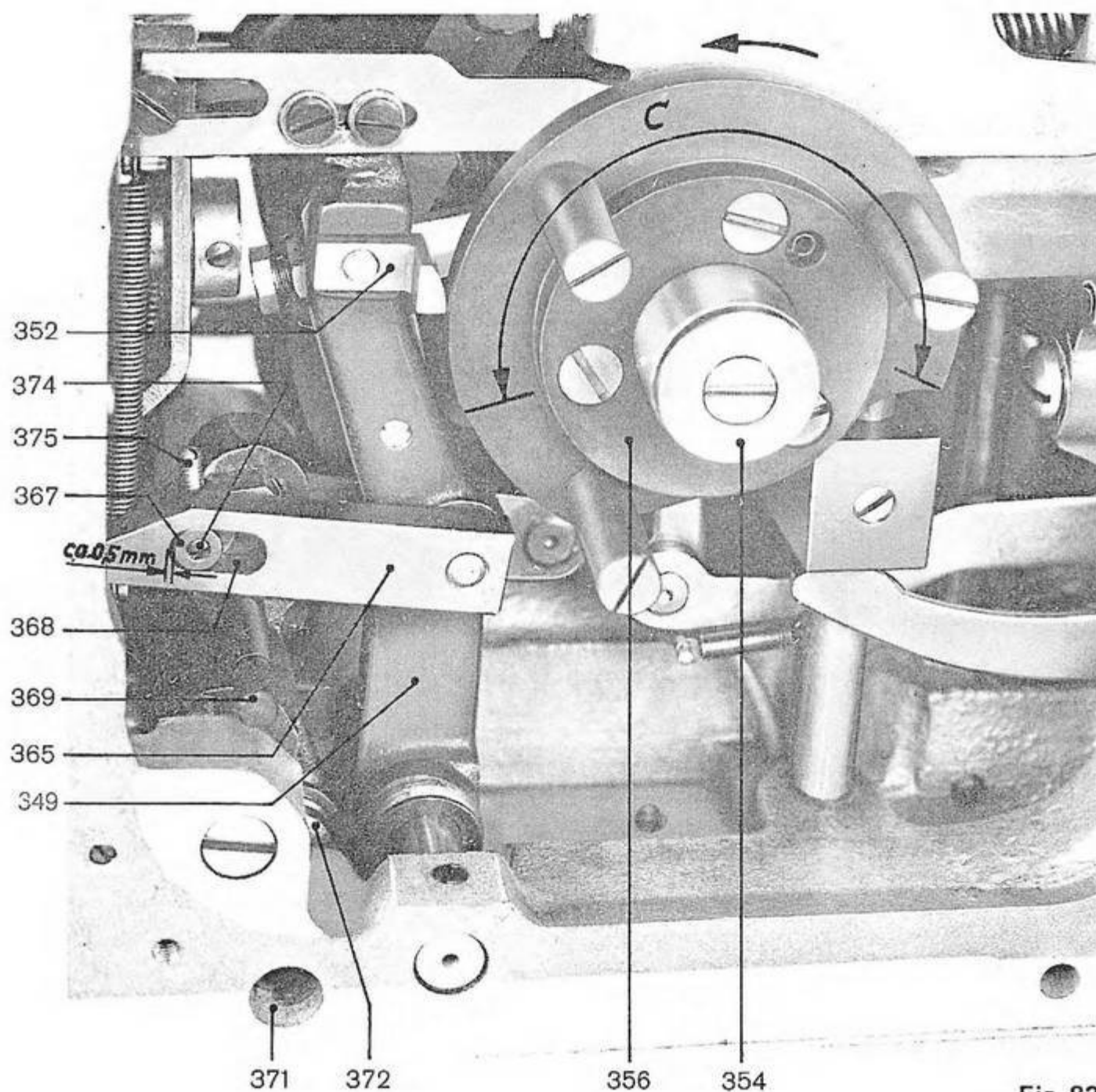


Fig. 83

For adjusting the distance of about 0.5 mm between the bolt 367 (fig. 83) and the rear end of the oblong hole 368, loosen the screw 372 which is accessible through the hole 371 and reset the articulated lever 373 (fig. 81) with respect to the roller lever 362.

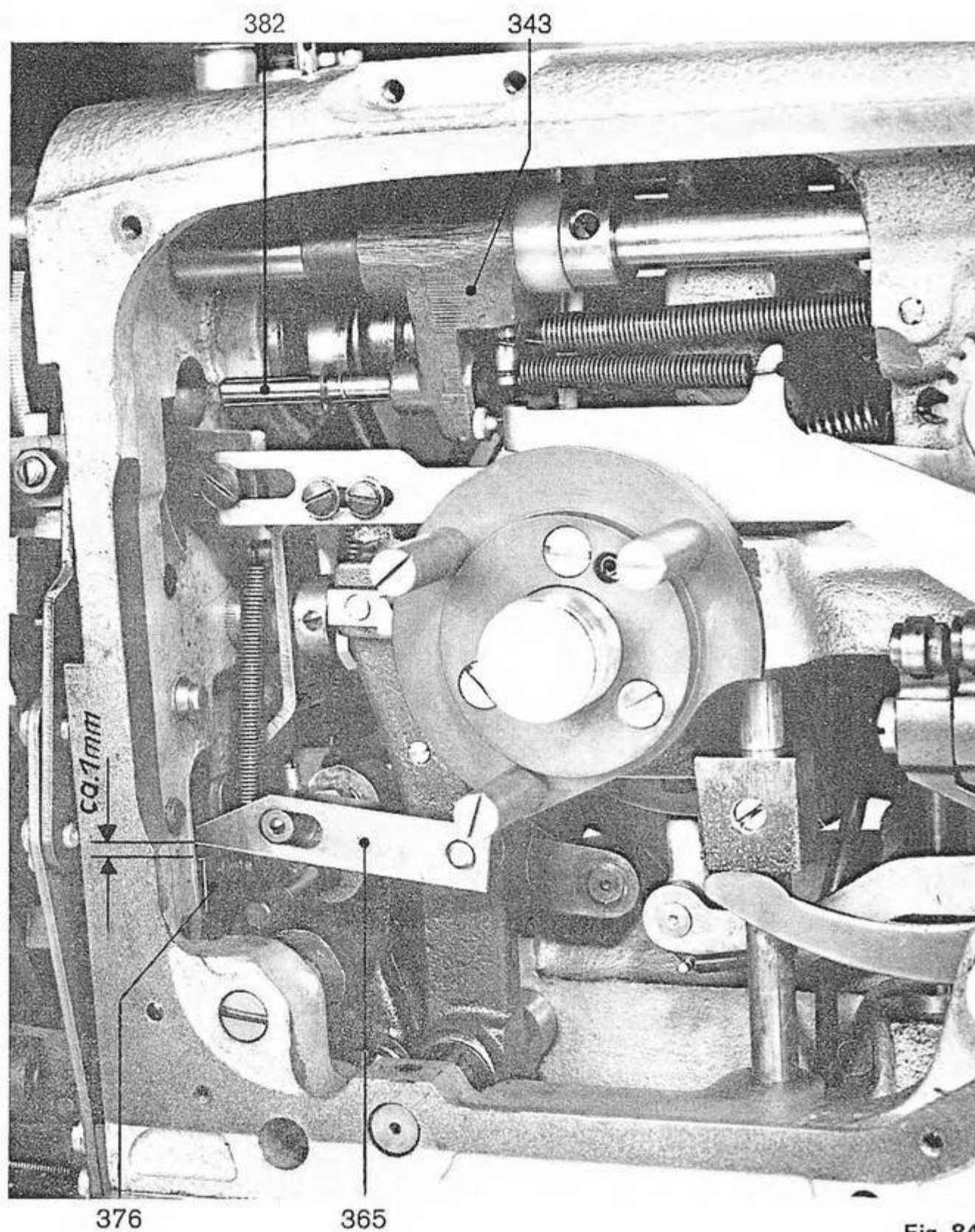


Fig. 84

The position of the articulated shackle 365 (fig. 83) in relation to the pin 369 can be set by the stop screw 375 after loosening the screw 374. Furthermore, in the above position, the minimum distance between the articulated shackle 365 (fig. 84) and the lever 376 should amount to 1 mm. See fig. 84. In the negative, remove to the lever 376 and grind it as required.

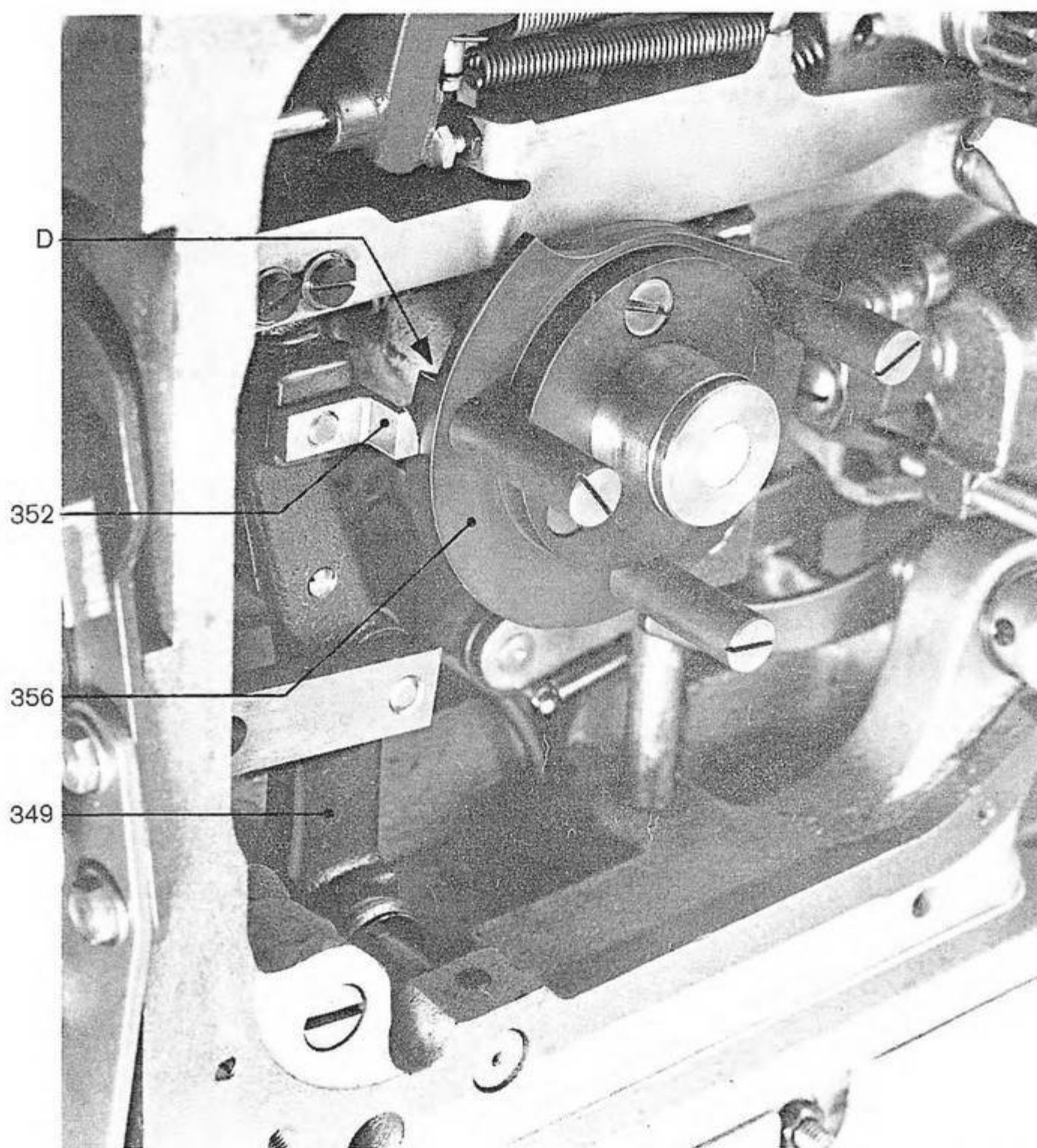


Fig. 85

f) Adjusting the threaded jaw

With the gauge 356 fastened to the hub 354 (fig. 83) of the control cam, engage the machine by hand and turn first the gauge 356 in the arrow direction ↻ until the articulated shackle 365 of the knee articulation has safely snapped. See fig. 83.

Turn the gauge 356 in the arrow direction ↻ until the stone 352 of the key lever 349 leaves the gauge at the point D (fig. 85) and moves into its neutral position.

When the lever 349 leaves the gauge 356, the shackle 366 pulls the threaded jaw 377 (fig. 86) of the releasing lever 343 into the disengaging worm. Should the worm be in such a position that the threaded jaw 377 rests on the outer diameter of the worm, turn the handwheel until the threaded jaw is pulled by the spring action into the worm.

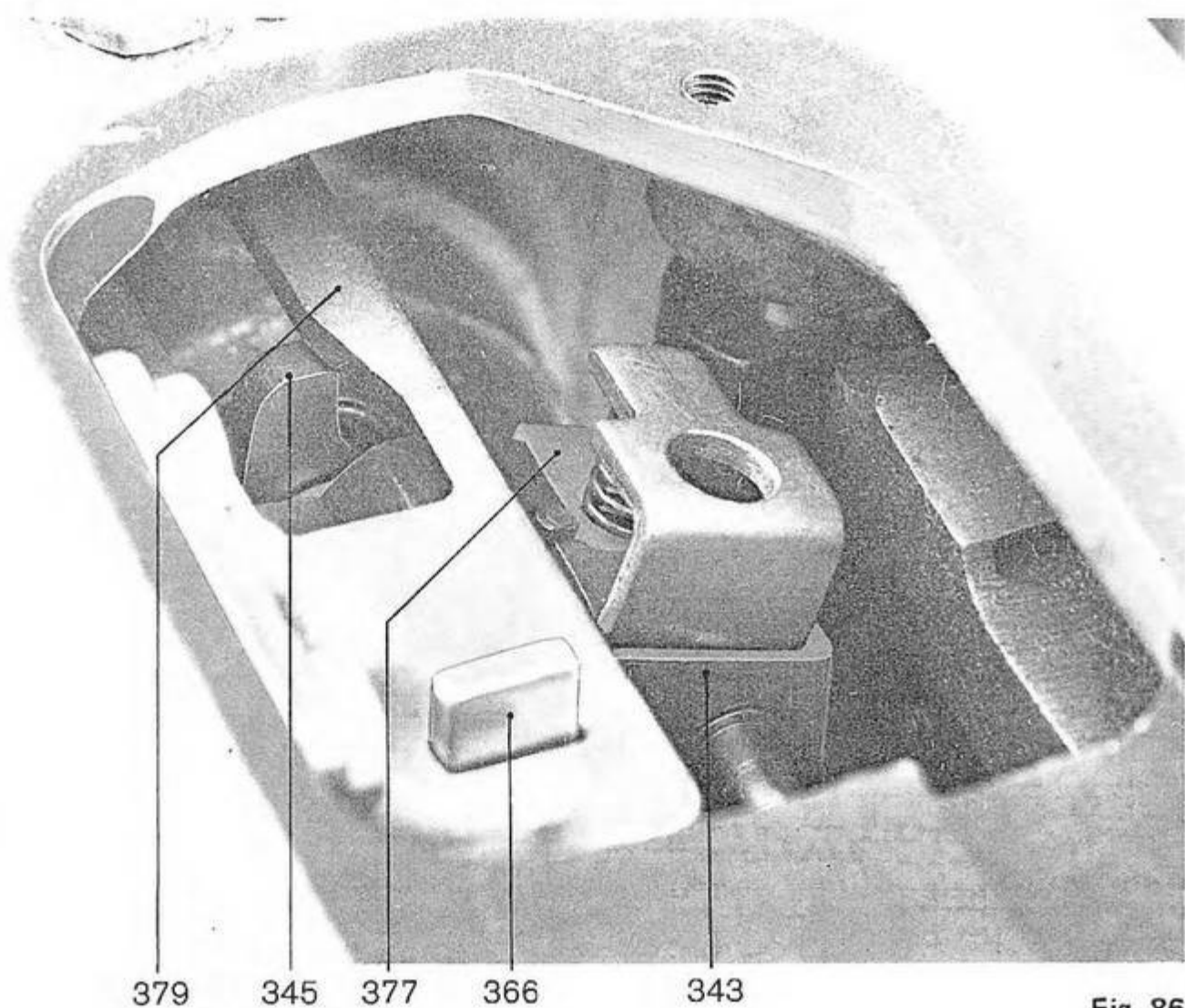


Fig. 86

In this position, the play between the threaded jaw and the tooth valley should amount to about 0.5 mm. Check by lowering said jaw.

This play can be adjusted by resetting the shackle 366 (fig. 78) after loosening the screw 378 (fig. 87). Following the adjustment, retighten firmly the screw 378.

g) Adjusting the angular stop

After having pulled the threaded jaw into the disengaging worm and when turning the clutch disk in the direction of rotation and while the disengaging worm moves the releasing lever 343 (fig. 86) backwards the top of the ratchet 345 should travel beneath the angular stop 379 (figs. 78 and 86) at a distance of about 0.2 mm.

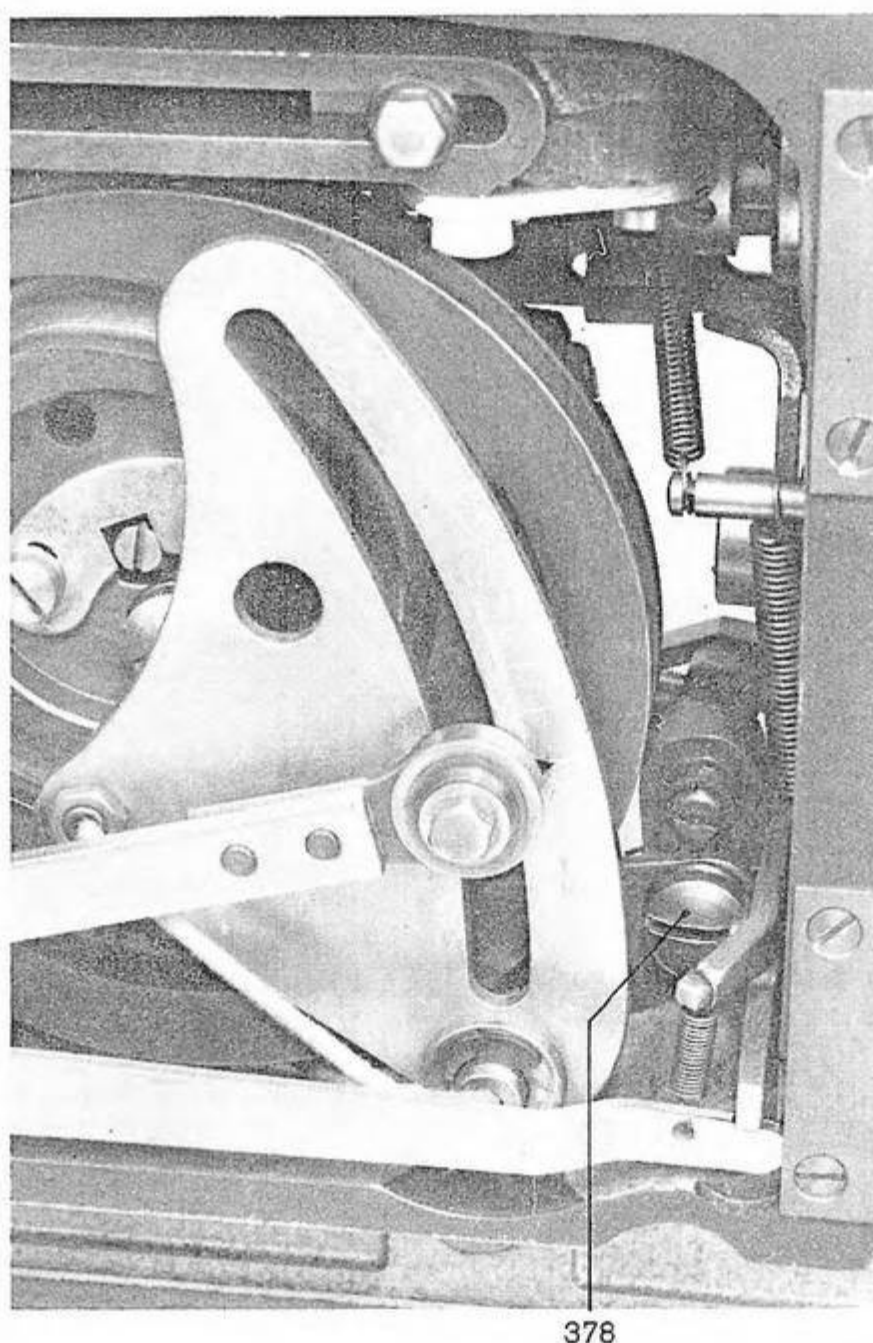


Fig. 87

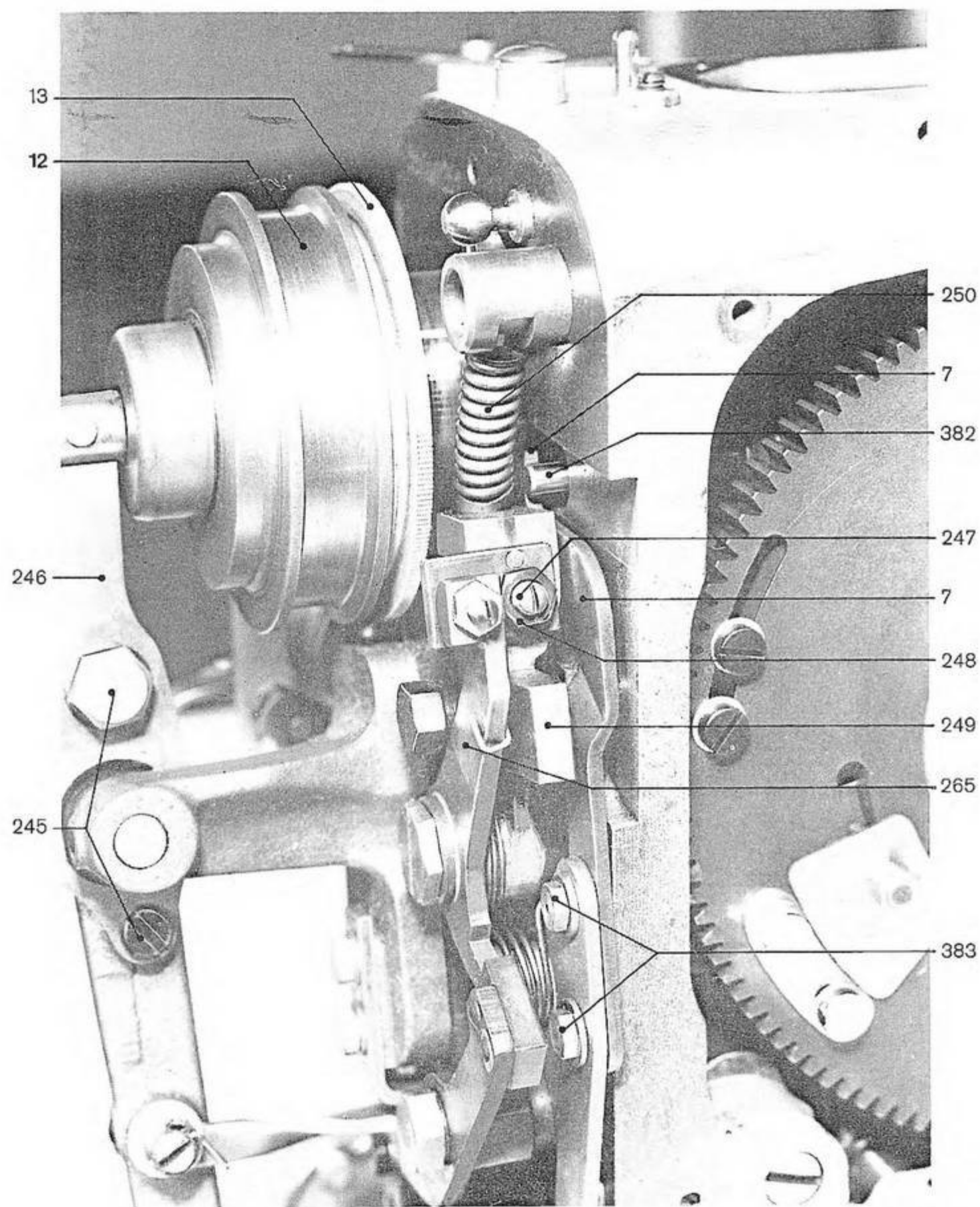


Fig. 88

This distance can be adjusted by resetting the angular stop 379 after having loosened the screws 380 (fig. 78). Tighten or loosen the screw 381, depending on the adjustment.

h) Adjusting the releasing pin

Adjust the releasing pin 382 (fig. 84) in the releasing lever so that at the moment when the releasing lever is being released by the cam the end of the releasing pin 382 (fig. 88) travels about 1 mm beyond the back of the control lever 7 and the latter is distanced about 0.2 mm from the releasing pin 382.

For adjusting the releasing pin 382 with respect to the control lever 7 loosen the fastening screw of said pin 382.

The distance of about 0.2 mm between the releasing pin 382 and the control lever 7 can be adjusted by resetting the upper portion of the lever after having loosened the screws 383.

32. Adjusting the belt fork

When engaging the driving motor while the machine is still in its disengaged final position, the belt fork 62 (fig. 89) should touch the stop screw 384 and the flat belt should freely run on the front belt pulley.

If required, readjust the stop screw 384 after having loosened the counter nut 385.

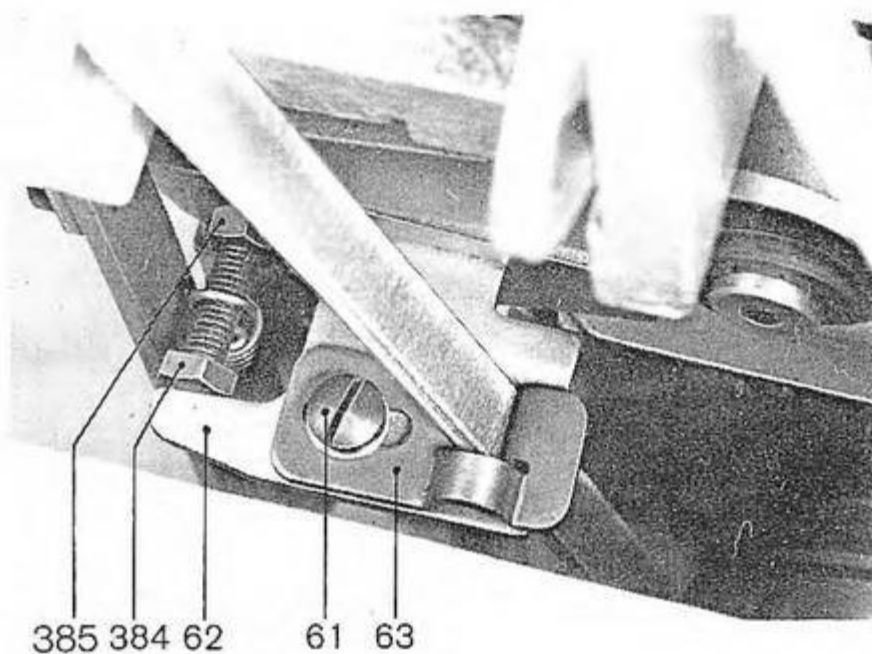


Fig. 89

Loosen then the lower screw 386 (fig. 90) (slotted screw) and the upper screw 387 (hexagonal) and set the lever 162 (fig. 36) with respect to the plastic roller 388 of the lever 362 so that with the machine operating the flat belt is pulled onto the pulley for the braking speed far enough, i.e. until the front edge of the belt is flush with the front edge of the belt pulley.

Following the adjustment, retighten firmly the lower screw 386 (fig. 90) (slotted screw).

For presetting, adjust the roller lever 389 so that the roller 390 touches the lever 391. In this position, retighten the hexagonal screw 387.

33. Adjusting the instantaneous disengagement

Engage the driving motor and heel down the l/h pedal until the ratchet lever 16 (fig. 90) has snapped.

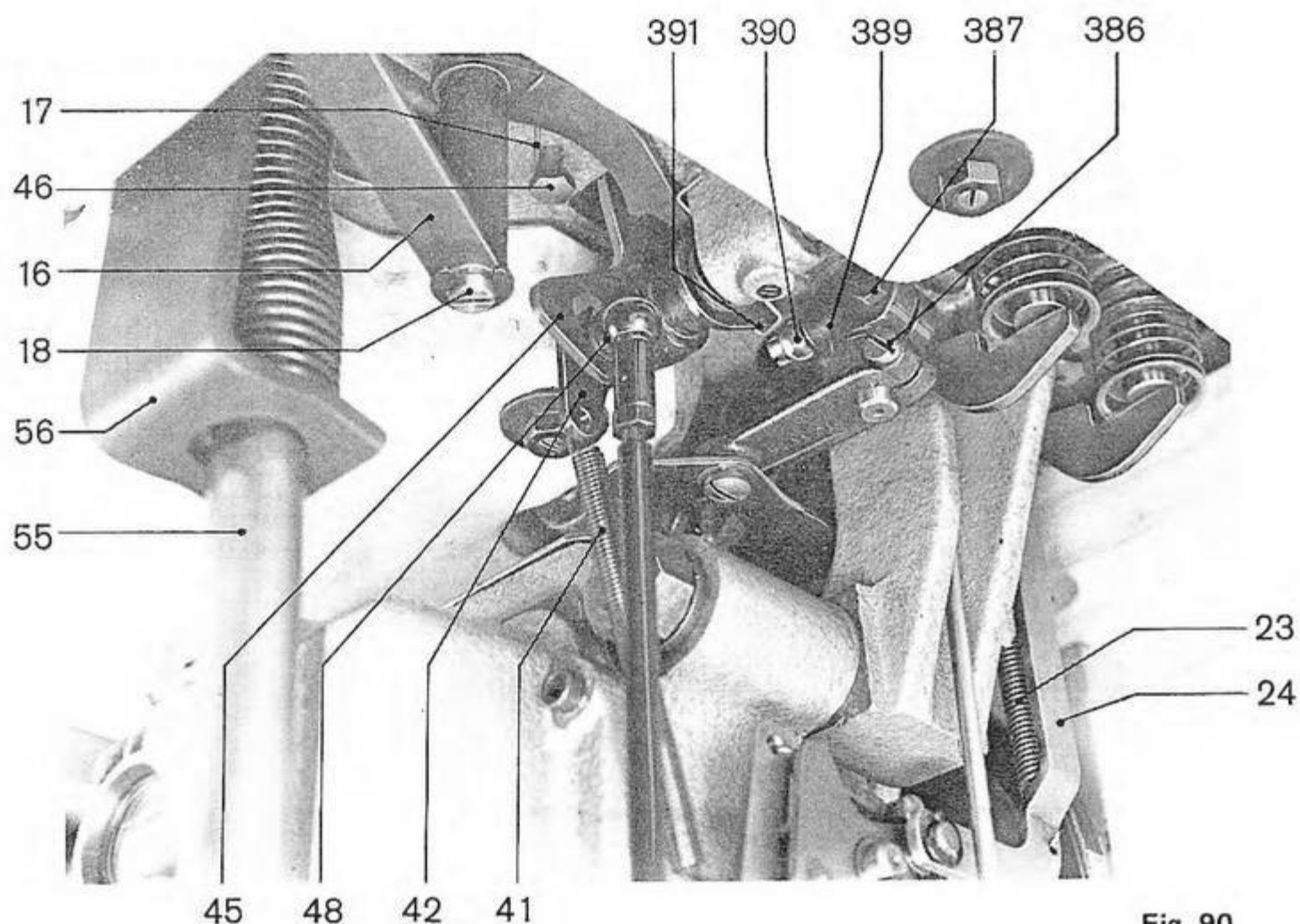


Fig. 90

In this position, the belt fork 62 (fig. 89) should pull the flat belt onto the belt pulley for the braking speed so far that the front edge of the belt is flush with the front edge of the belt pulley. This position can be obtained by turning the roller lever 389 after having loosened the hexagon screw 387 (fig. 90).

Then, with the machine in its disengaged final position, remove the flat belt, take off the arm cover and engage the machine by hand.

Heel down the left hand pedal beyond the first rest point until the stop is reached. When doing this, the threaded jaw 377 (fig. 86) should be pulled into the disengaging worm so far that the distance to the teeth valley amounts to about 0.5 mm.

If the threaded jaw cannot fall into the disengaging worm when the l/h pedal is being heeled down, turn by hand the clutch disk and consequently the disengaging worm as required.

The distance of 0.5 mm between the threaded jaw and the teeth valley of the disengaging worm can be adjusted by resetting the stop screw 46 (fig. 90) after having loosened the counter nut 392 (fig. 36).

The adjustment of the threaded jaw 377 (fig. 86) according to the chapter 31, item f) must already have been made.

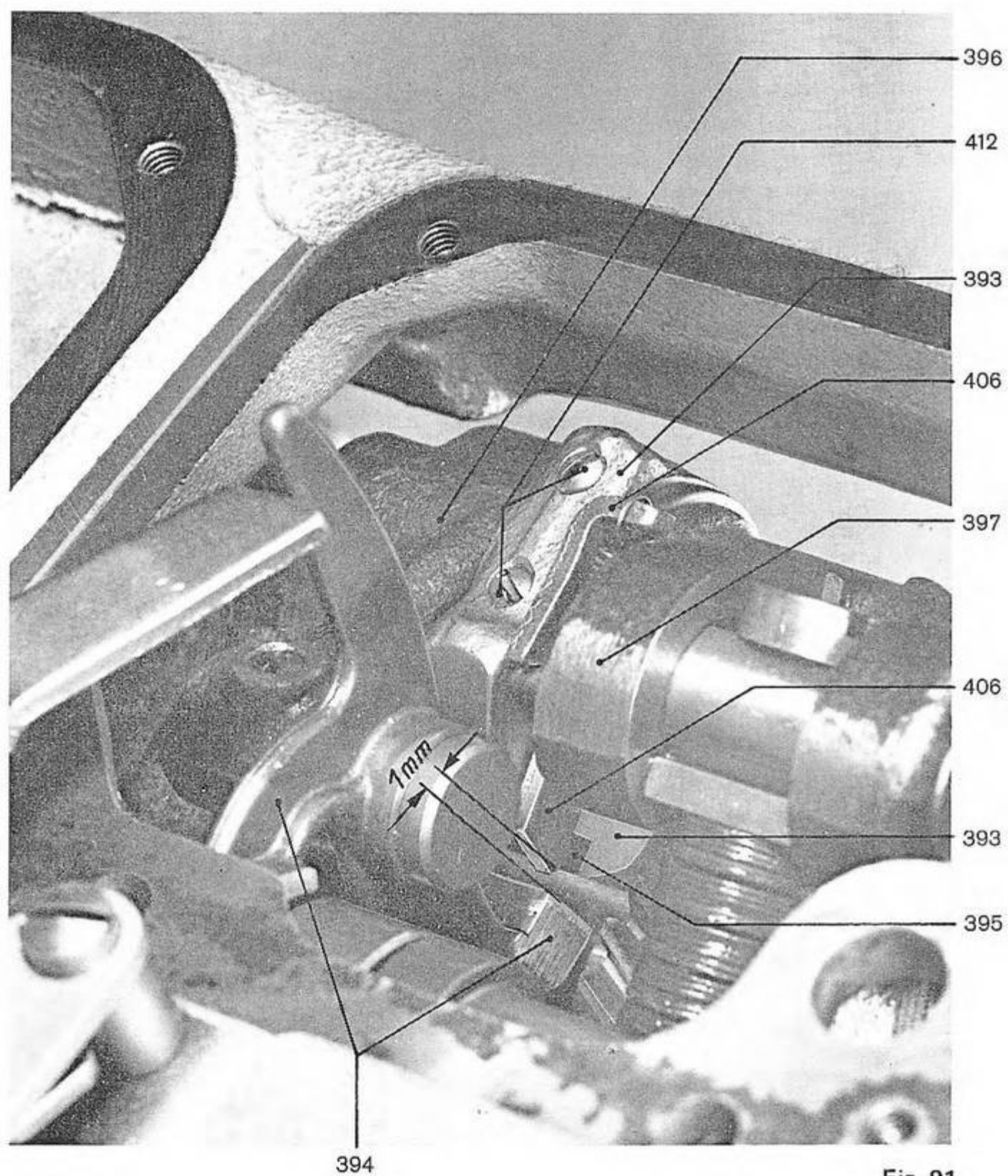
34. Function and adjustment of the buttonhole knife

Function

The vertical buttonhole knife operates as follows:

If, with the machine operating, the lever 349 (fig. 65) is moved backwards by the disengaging lever 124 on the control lever 292 (fig. 63), the articulated axle 365 (fig. 83) on the knee articulation will fall in and the lever 349 (fig. 81) will be linked with the roller lever 362.

When, subsequently, the lever 349 quickly returns to its initial position, the releasing lever 343 (fig. 65) will be moved downward and the threaded jaw 377 is pulled onto the disengaging worm, it will fall into the worm when the clutch disk is rotated further.



When the threaded jaw has dropped into the worm, the upper shaft makes still $5 \frac{1}{4}$ revolutions before the machine stops. The ratchet lever 394 must drop into the slot 395 of the tappet 393 already after the second or third revolution of the clutch disk (counted from the moment when the threaded jaw has dropped into the worm). Whether two or three revolutions of the clutch disk are required depends on the position of the tappet 393 (fig. 9). The switch ring 403 (fig. 92) has now travelled to the rear.

The lever 396 (fig. 91) is thus linked with the lever 397, the motion of the lever 397 is transmitted to the lever 396 and to the shaft 344 (fig. 65) and the knife 130 (fig. 27) moves downwards. When continuing to turn the clutch disk, the ratchet lever 394 (fig. 92) is lifted and the spring loaded ring 398 is moved to the gear under the lever 394. When the lever 394 is moved backwards, it rests on the ring 398 and is pulled out of the groove 395 (fig. 91) of the tappet 393. By the spring action, the knife 130 (fig. 27) is returned to its neutral position.

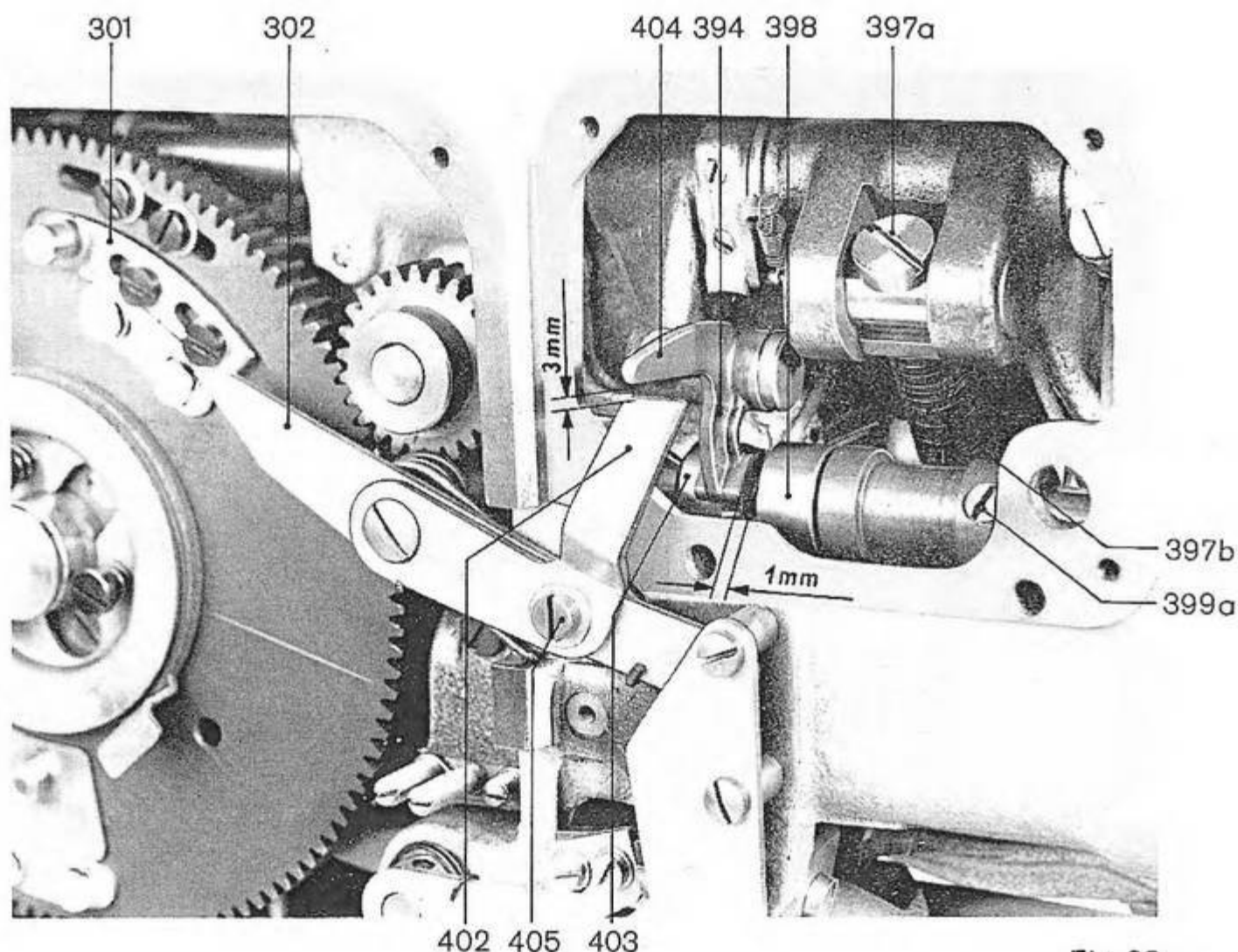


Fig. 92

Adjustment

For adjusting the buttonhole knife action, proceed as follows:

1. Setting the tripping ring

Remove the control cam 292 (fig. 63) according to the chapter 41 and take off the cover 399 (fig. 65).

In the position, in which the control cam has been removed, the distance between the l/h edge of the tripping ring 398 (fig. 92) and the r/h edge of the ratchet lever 394 should amount to at least 1 mm. This distance can be set by turning the stop screw 401 after having loosened the counter nut 400 (fig. 65).

2. Setting the safety lever

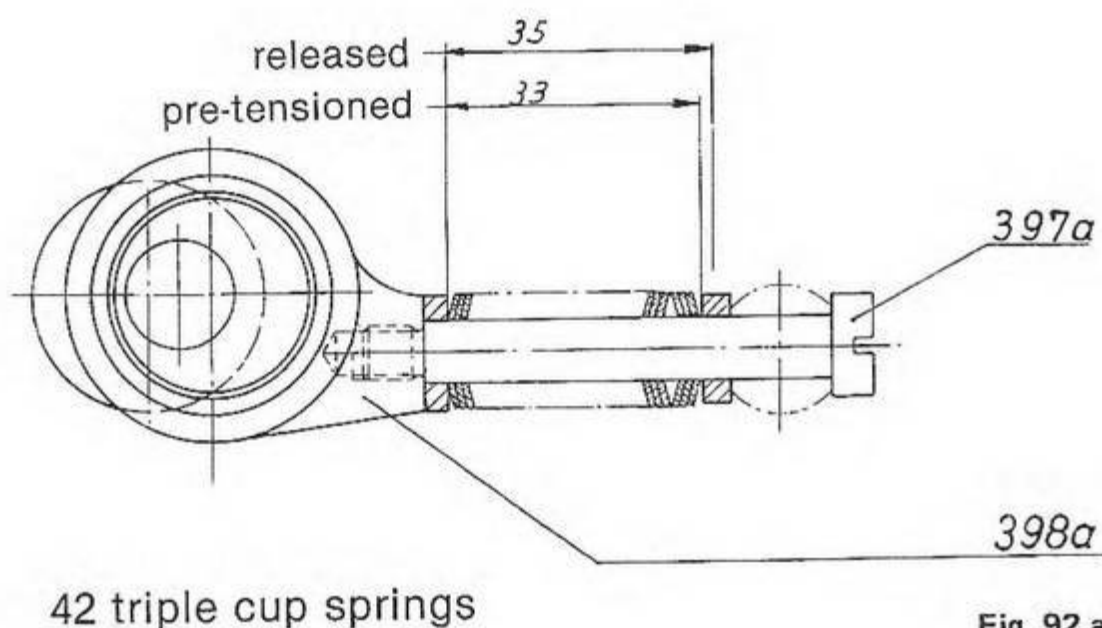
When the safety lever 402 (fig. 92) is properly adjusted, the buttonhole knife will only act if the fabric under the cloth presser frame is placed in such a way that the knife can freely travel downwards.

Set the safety lever 402 as follows:

Turn the clutch disk until the machine is in the position in which the roller elbow 301 has left the scissors control lever 302. In this position, i.e. when the lever 394 rests on the left tripping ring 403, the distance between the shaft 404 of the lever 394 and the safety lever 402 should amount to at least 3 mm. See fig. 92.

The safety lever 402 can be adjusted after loosening the screw 405.

Height of the spring column



3. Setting the ratchet lever and the locking lever

Remove the cover 399 (fig. 65) and the arm cover 311 (fig. 63). Engage the machine by hand and check — by turning the clutch disk in the direction of rotation — whether the distance between the locking lever 406 (fig. 91) and the ratchet lever 394, resting on the left tripping ring 403 (fig. 92) amounts to at least 1 mm. See fig. 91. When checking this adjustment, the knife bar control lever 407 (fig. 93) should be in contact with its stop screw 408 in the head, i.e. the knife bar should be in its topmost position. For setting the ratchet lever 394 (fig. 91) with respect to the locking lever 406, turn the screws 410 after loosening the thumb screws 409.

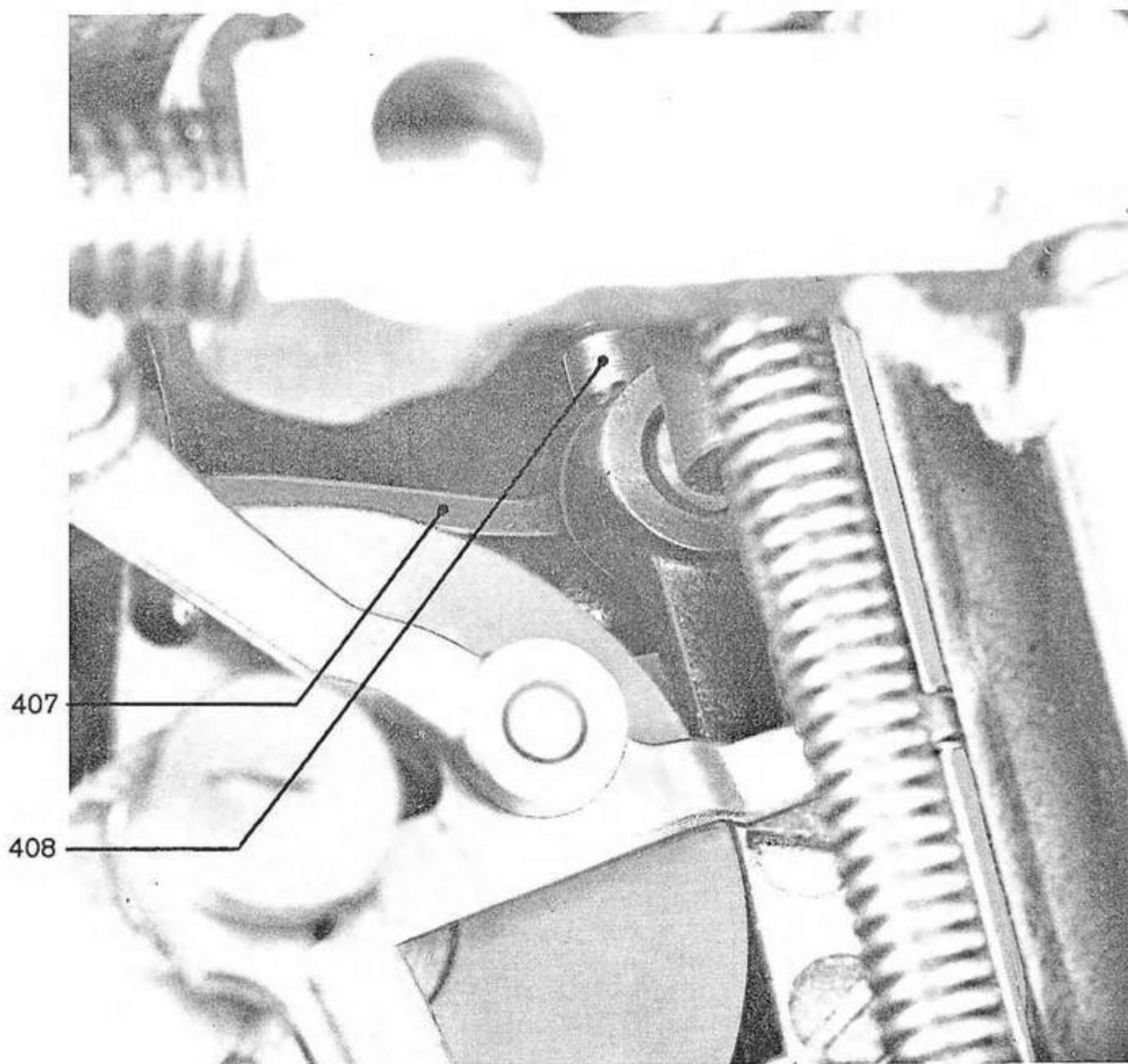


Fig. 93

Both screws 410 (fig. 94) press against the surfaces. If one screw has been reset, it is necessary to reset accordingly also the other screw.

Following the adjustment, retighten firmly the thumb screws 409 (fig. 94) and check the position of the safety lever 402) according to the preceding item 2.

4. Setting the tappet with respect to the ratchet lever

Engage the machine by hand. Turn the crank until the machine is in the position in which the releasing lever 343 (fig. 65) is pulled downwards and, consequently, the threaded jaw 377 (fig. 86) is pulled into the disengaging worm. If the threaded jaw does not immediately fall into the disengaging worm, this can be remedied by slightly turning the clutch disk in the direction of rotation. If after the moment when the threaded jaw has dropped into the disengaging worm the clutch disk is turned in the direction of rotation and when, after two revolutions of the clutch disk, the tappet 393 (fig. 95) travels in the direction of the arrow A ↷ and reaches its rear dead point, the slot 395 in the tappet 393 must stand exactly above the ratchet of the lever 394, so that this can freely drop into the slot 395.

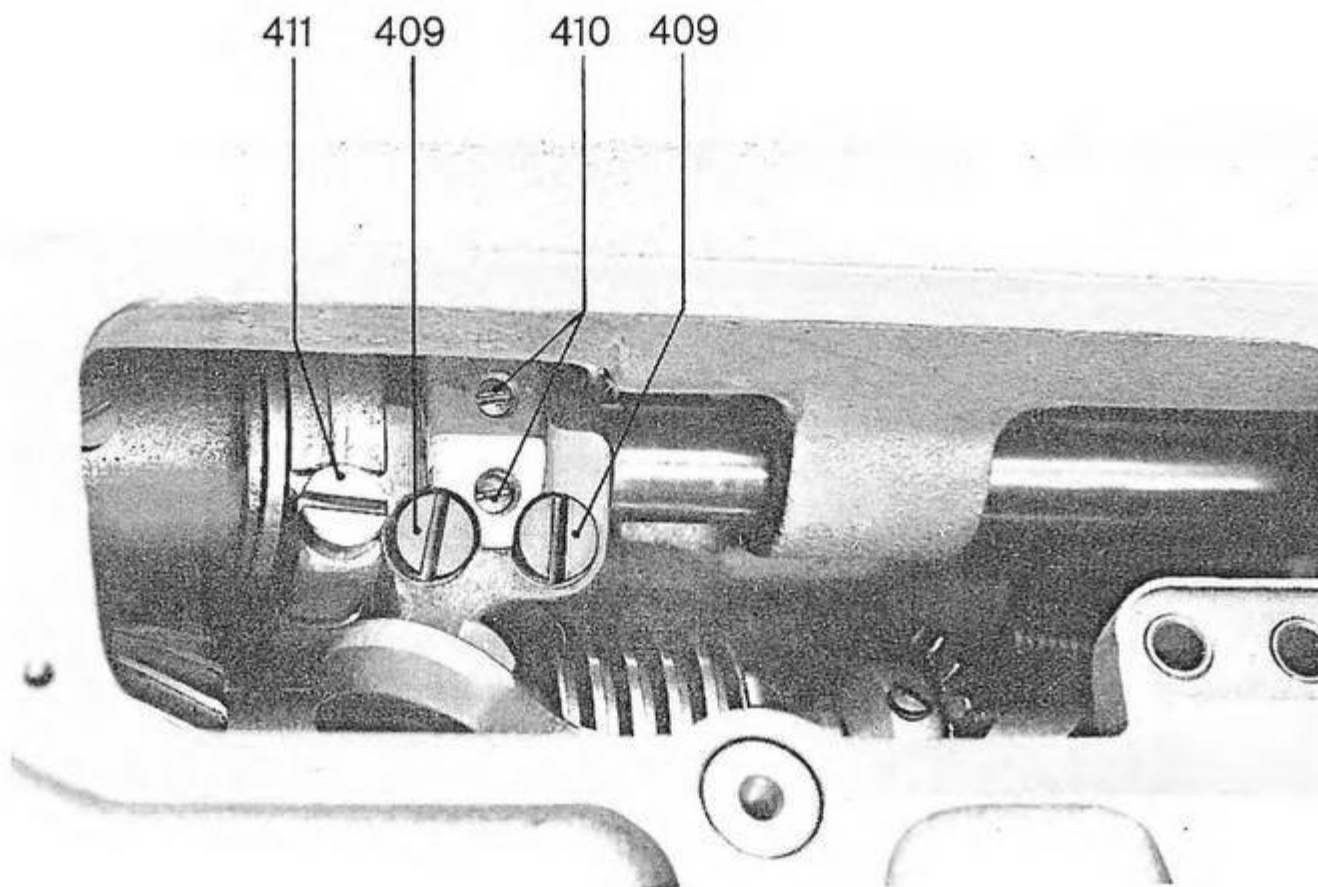


Fig. 94

If after two revolutions of the clutch disk the tappet 393 moves in the direction of the arrow B  , then the clutch disk must still perform a third revolution, so that the tappet 393 moves in the direction of the arrow A, i.e. into its rear dead point, and, consequently, the ratchet lever 394 can freely drop into the slot 395.

The tappet 393 can be adjusted by turning the screws 412 (fig. 9) after having loosened the thumb screw 411 (fig. 94). Both screws press against the surfaces. If one screw has been reset, the other screw also must be reset accordingly.

Following the adjustment, retighten firmly the thumb screw 411 (fig. 94).

After having adjusted the tappet 393 (fig. 95), ensure that the locking lever 406 (fig. 91) can still be easily moved to and fro.

Exchanging the cup springs on the traction bar 397a (fig. 92)

For replacing the cup springs on the traction bar 397a proceed as follows:

1. Remove the head cover and the cover 399 (fig. 65).
2. Remove the setting collar 307a (fig. 68) and pull of the needle bar control lever 307b.
3. After loosening its fastening screws and the screw 399a (fig. 92) advance the axle 307c so that the traction bar 397a (figs. 92 and 92a) – after being turned out of the bearing 398a – can be removed from the machine.

Note:

Ensure, also when replacing the traction bar, that no cup spring falls out of the machine arm.

4. Fit the new cup springs, ref. No. 556283, on the traction bar 397a. See fig. 92a.
5. For assembling the machine, proceed in inverse sequence. Note that the axle 307c (fig. 68) serves as stop for the needle bar control lever 307b and that, therefore, it should be pushed back into machine arm only so far that there is a small distance between the lever 307b and the needle bar coulisse 307. Furthermore, when advancing the axle 307c, return the oil wick to the oil sump.

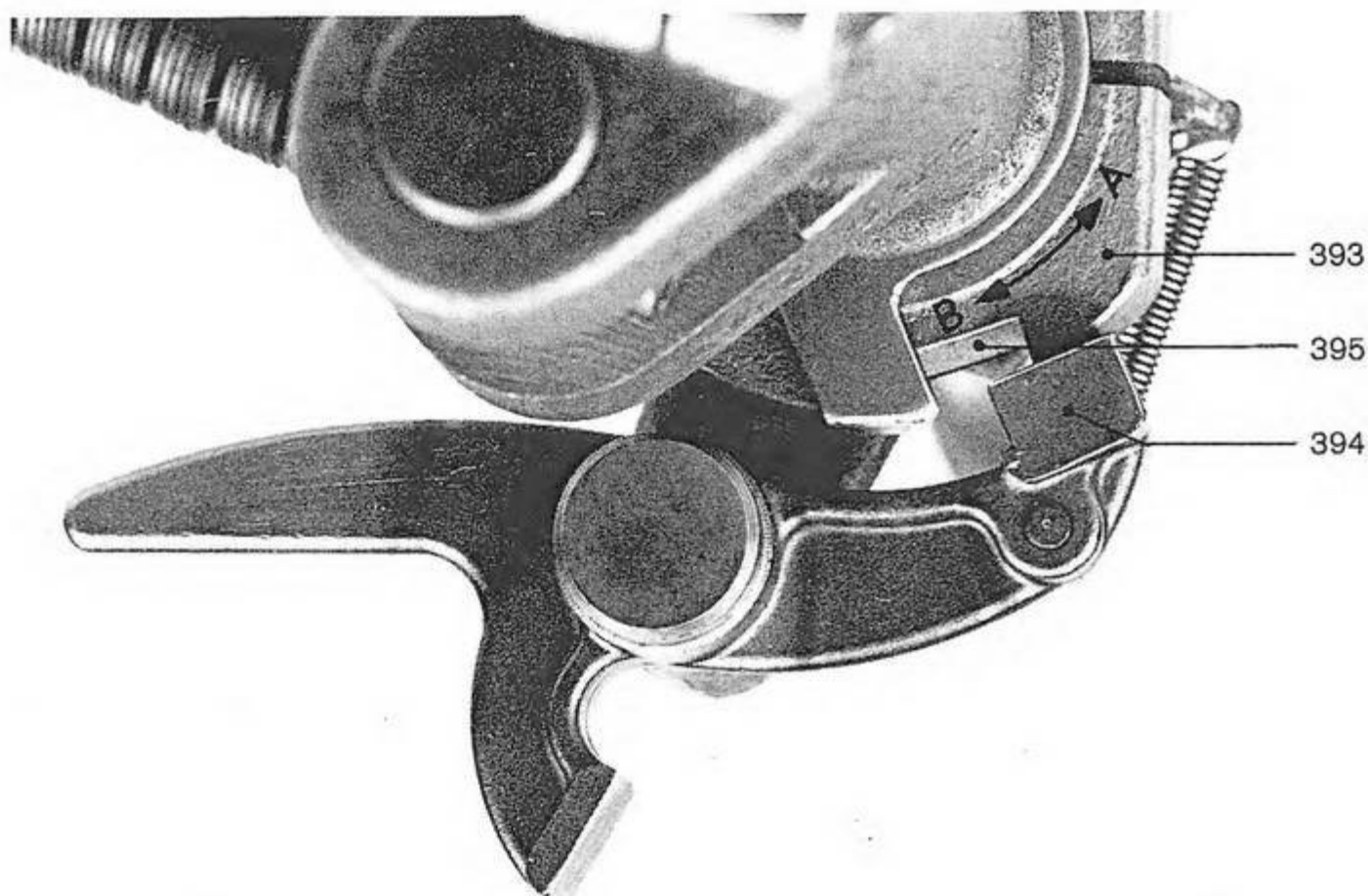


Fig. 95

35. Adjusting the needle bar height and the hook

In order to obtain with this high speed machine perfect stitches, the position of the needle bar with respect to the hook must be properly adjusted. Adjust, therefore, very accurately the height of the needle bar, the loop stroke and the distance of the hook point from the needle.

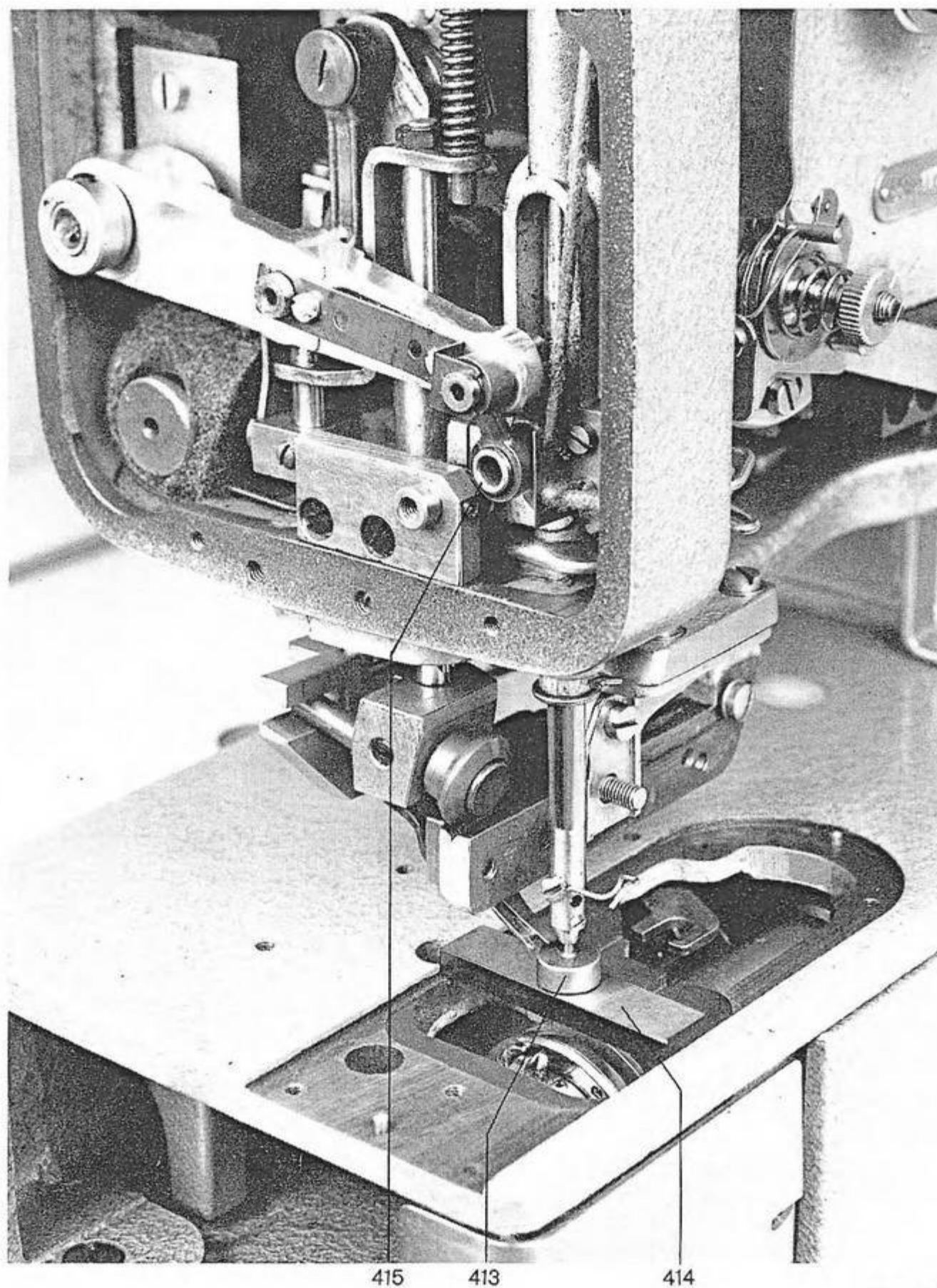
a) Setting the needle bar height

For setting the height of the needle bar in its lowest position, use the needle bar setting gauge, supplied by the factory under the ref. No. 556 2231.

The setting gauge consists of the bridge, ref. No. 556 2232, and the setting pin, cat. No. 211 10125.

For setting, proceed as follows:

1. Turn the crank until the machine is in its final position.
2. Loosen the threaded bush 115 (fig. 27) until no pressure is exerted on the cloth presser frame.
3. Remove the needle, the knife, the cloth presser frame, the face plate and the throat plate, and swing the thread guide 110 (fig. 27) sideways.



415

413

414

Fig. 96

Note:

When, after adjustment, the cloth presser frame is mounted again on the frame guide lever, ensure that the frames are fitted as follows: The very short frame in the left hole, the short frame in the central hole, and the long and the medium frame in the r/h hole.

4. Engage the machine by hand and, by turning the clutch disk in the direction of rotation, position the needle bar so that after completion of the r/h stitch in the left hand row it moves from its lowest position upwards.

5. Introduce the setting pin 43 (fig. 96) into the bridge 414 as far as it will go and secure by the screw.

6. Place the bridge 414 with the setting pin 413 on the throat plate rest so that the setting pin locates itself under the needle hole in the needle thread bar. Lift to this effect the scissors and the frame guide lever.

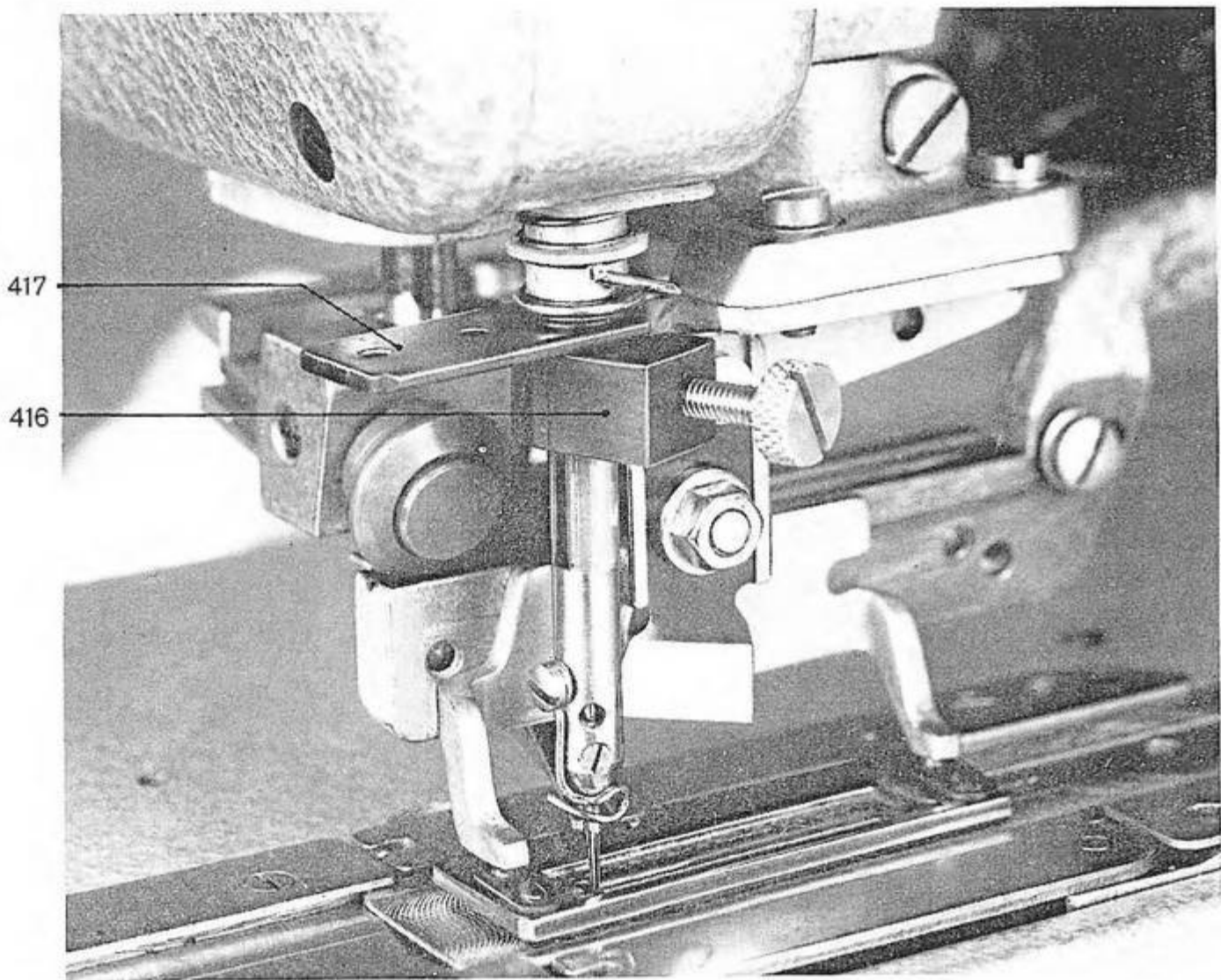


Fig. 97

7. Loosen the needle bar fastening screw, accessible through the hole 415, and, by turning the clutch disk in the counter direction of rotation, lower the needle bar so that it is in its lowest position when the r/h stitch in the left hand row is being performed.

8. Adjust the loosened needle bar so that it rests with the end of its needle hole on the setting pin.

Retighten then the needle bar fastening screw and ensure that the plane surface of the end of the needle bar is facing the vertical knife.

b) Adjusting the loop stroke

In this machine, the loop stroke amounts to 2 mm. This means that when, by turning the handwheel in the direction of rotation, the needle, after completion of the r/h stitch in the l/h row, has risen 2 mm from its lowest point, the hook tip should be opposite the centre of the needle.

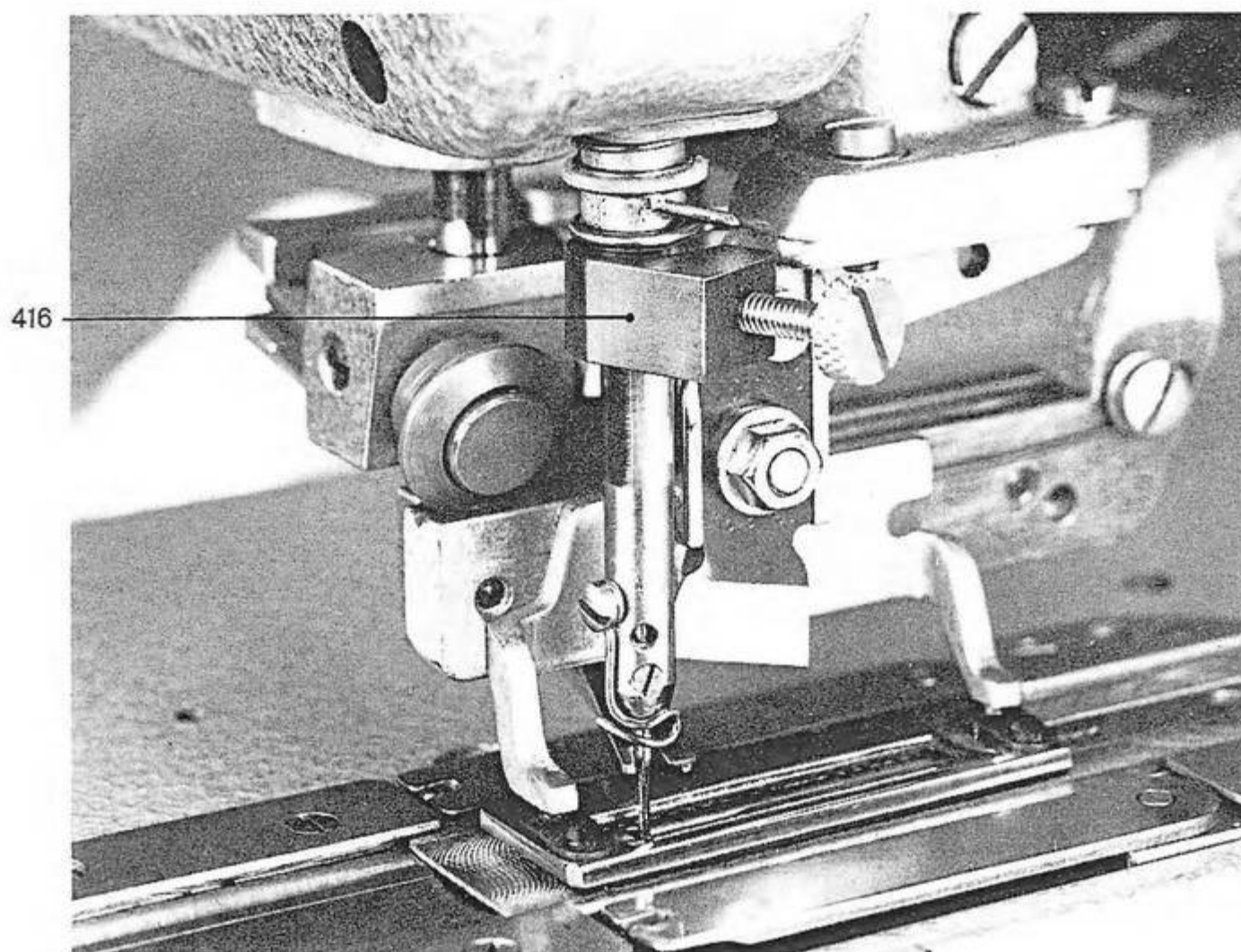


Fig. 98

For adjusting the loop stroke, use the setting cube 416 (fig. 97), ref. No. 223531, and the 2 mm thick tongue 417, ref. No. 223536c, and proceed as follows:

1. Fit a perfect, straight needle into the needle bar.
2. Loosen the hook fastening screws.
3. By turning the clutch disk in the direction of rotation, set the needle bar, adjusted according to the preceding chapter a) to its lowest point while the r/h stitch in the left row is being performed.
4. Slip the setting cube 416 onto the needle bar and press the tongue 417 with the cube 416 against the needle bar crank. Secure the setting cube by a screw and take off the tongue.

In order to obtain an accurate adjustment, check after securing the cube 416 whether the tongue 417 can be introduced between the setting cube and the needle bar crank without a play. Change the position of the cube 416, if required.

5. By turning the clutch disk in the direction of rotation, lift the needle bar until the setting cube 416 touches the needle bar crank. See fig. 98.
6. By turning the hook, set its tip against the centre of the needle and retighten firmly the hook fastening screws. When retightening these screws ensure that the hook is in contact with the hook shaft collar (important for the lubrication of the hook).

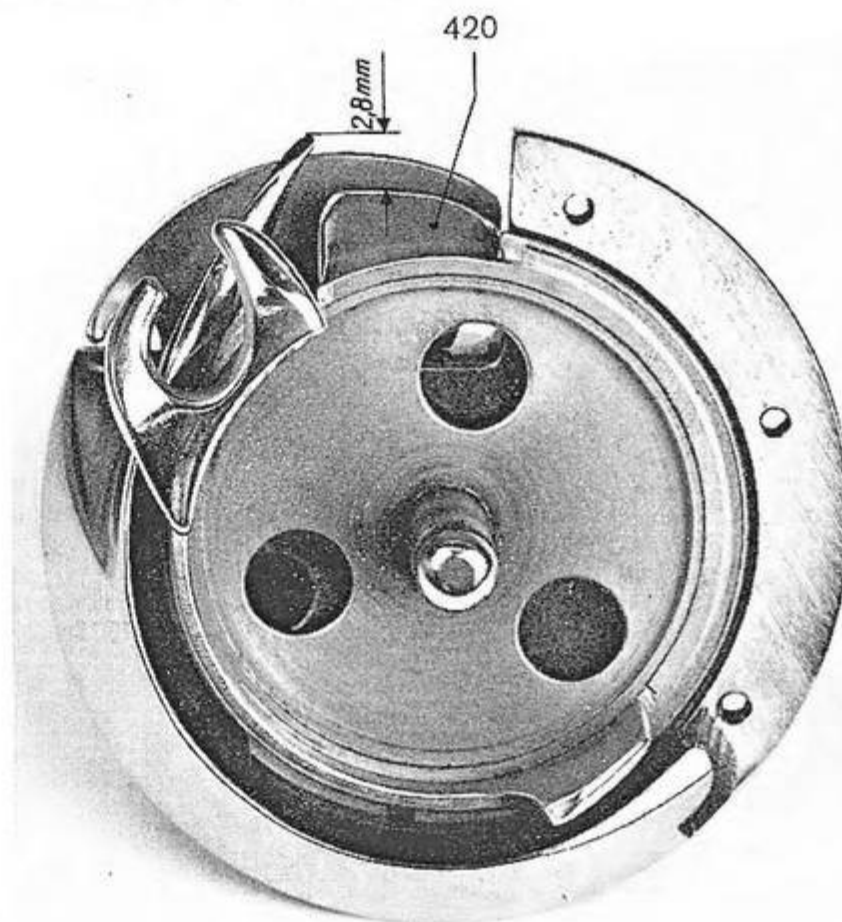


Fig. 99

c) Adjusting the distance from the hook point to the needle

Adjust the hook in relation to the needle so that its point passes very close along the needle, without touching same.

This adjustment can be obtained by resetting the spacer 419 after loosening the threaded pin 418 (fig. 104a).

d) Changing and adjusting the needle guard

The needle guard 420 (fig. 99) prevents the needle from being caught by the hook point when the needle is deviated.

It has been adjusted in the factory for the needle Nm 90. Varying with the size of the needle, adjust the needle guard so that with the hook distance set according to the preceding chapter c) the needle touches its guards without being deflected while the loop is being formed for performing the r/h stitch in the l/h row.

This should also occur when the right stitch in the right lip is performed. If the point of the hook can be caught by the needle, correct, the position of the needle guard.

When the left stitch in the left lip is performed, it is not always possible to avoid a slight deflection of the needle because of the lower loop stroke position.

The needle guard can be dressed as required.

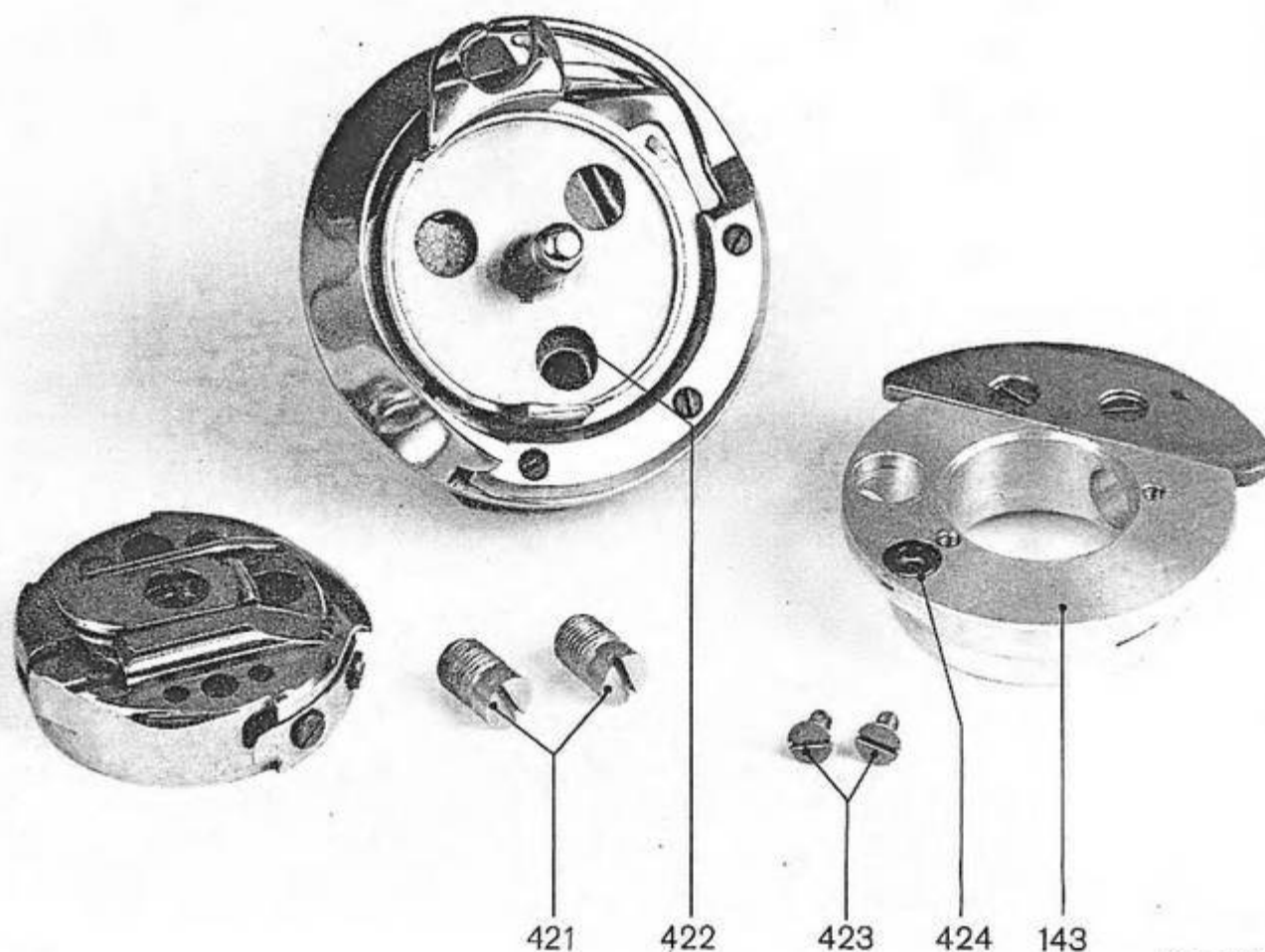


Fig. 100

The height of the needle guard has been adjusted in the factory. If it becomes necessary to replace it, set the height so that the distance between the tip of the hook point and the upper edge of the needle guard amounts to about 2.8 mm. See fig. 99.

With the hooks 5565003, 5565005 and 5565006 the distance amounts to 4 mm.

For replacing and adjusting a removed hook, proceed as follows:

1. Remove from the hook its two fastening screws 421 (fig. 100).
2. Remove the two fastening screws 423 of the oil ring 143 through the holes 422 in the bobbin case base.
3. Strip the oil ring 143 off the hook, taking care of the gasket 424.
4. After removing the fastening screw 425 (fig. 101), which is now accessible, the needle guard 420 can be replaced and adjusted.

36. Adjusting the bobbin case holder with respect to the bobbin case base

With the hook being set with respect to the needle according to chapter 35, item c, set the bobbin case holder 426 (fig. 102) so that the front edge 427 of the bobbin case holder is flush with the back of the bobbin case lugs 428. For adjusting, loosen the screw 429 (fig. 103). Ensure that the front edge 427 (fig. 102) of the bobbin case holder does not protrude.

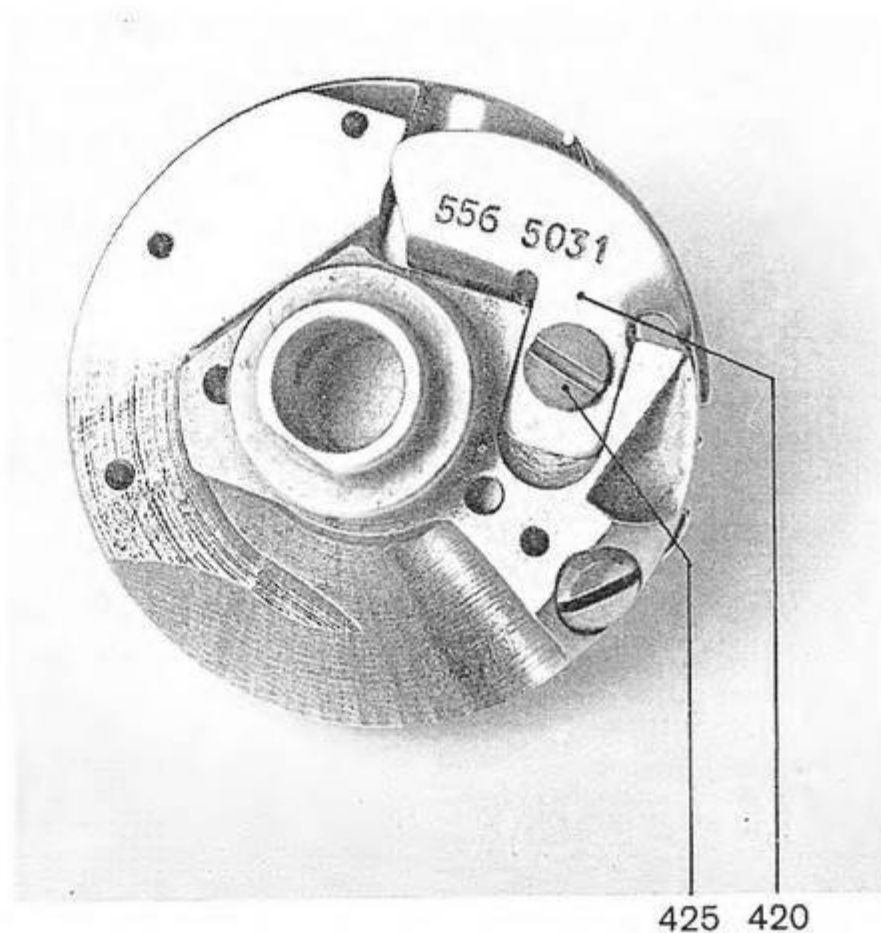


Fig. 101

37. The bobbin case lifter (not included in new machines)

a) Purpose of the bobbin case lifter

The high rotational speed of the sewing hook produces considerable friction between the hook race and that of the bobbin base and, consequently, in case of machines without this device, a certain degree of pressure at the thread exit between the bobbin case retaining lug 426 (fig. 102) and the joining surface 430 of the bobbin base. The purpose of this lifter is to pull the bobbin case slightly contrary to the direction of rotation of the hook at the moment when the upper thread loop passes the retaining lug 426, in order to allow the thread to slide past this point unhindered.

b) Adjusting the bobbin case lifter finger with respect to the bobbin case base in axial direction

Seen in the axial direction of the lifter shaft, set the lifter 431 (fig. 104) in relation to the bobbin case base so that at about the half of its material thickness it rests against the lug 432 of the bobbin case base.

For adjusting, loosen the stud 433 (fig. 103) and reset the bearing bush 434 accordingly.

Adjust the lifter finger 431 (fig. 104) so that its top is level with or a little lower than the upper edge of the lug 432 of the bobbin case base. For adjusting, loosen the fastening screw 435.

c) Adjusting the bobbin case lifter motion

Adjust the bobbin case lifter so that when turning the machine and when the bobbin case is pressed in the direction of the hook the upper thread loop has free passage between the lug 432 (fig. 104) and the lifter finger 431 and also at the bobbin case holder 426 (fig. 102).

For adjusting the motion of the bobbin case lifter, which must be very accurate, proceed as follows:

Thread the upper and the lower thread, place a piece of fabric under the cloth presser frame, engage the machine by hand, set upright the machine and prop it by the machine support.

By turning the clutch disk in the direction of rotation perform some stitches and conduct the machine in the position in which the upper thread rests on the hook as shown in fig. 104.

In this position of the hook and of the upper thread, the lifter 431 (fig. 104) should start its motion to the right. The motion of the lifter can be timed by turning the cam 163 (fig. 103) on the shaft after loosening the two fastening screws.

Loosen then the screws 436 (fig. 103) and set the lifter 431 so that when being in its r/h final position and with the bobbin case pressed by hand in the direction of rotation of the hook, it pulls the bobbin case to the right so far that the distance between the application surfaces of the bobbin case lugs 428 (fig. 102) is equal.

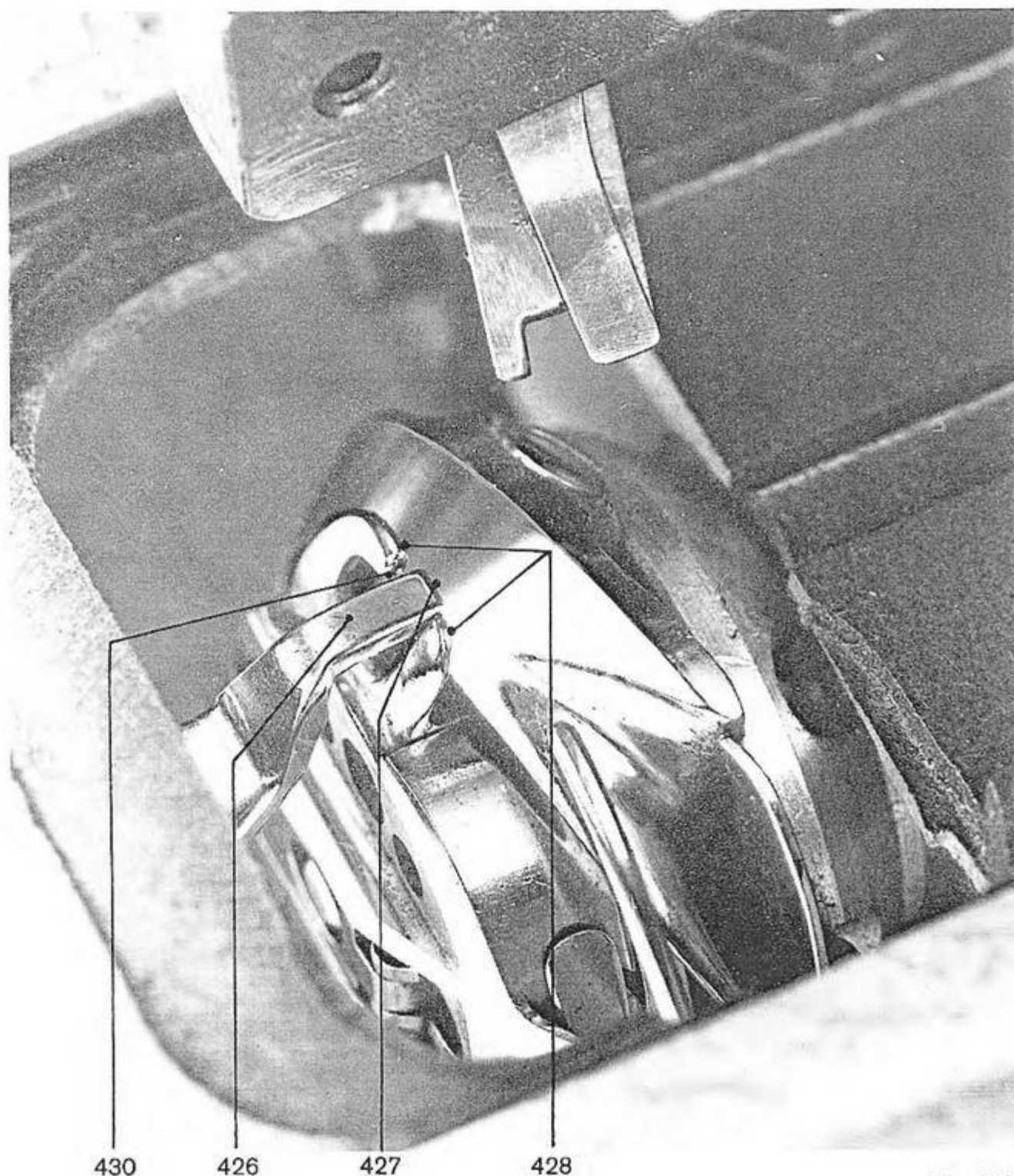


Fig. 102

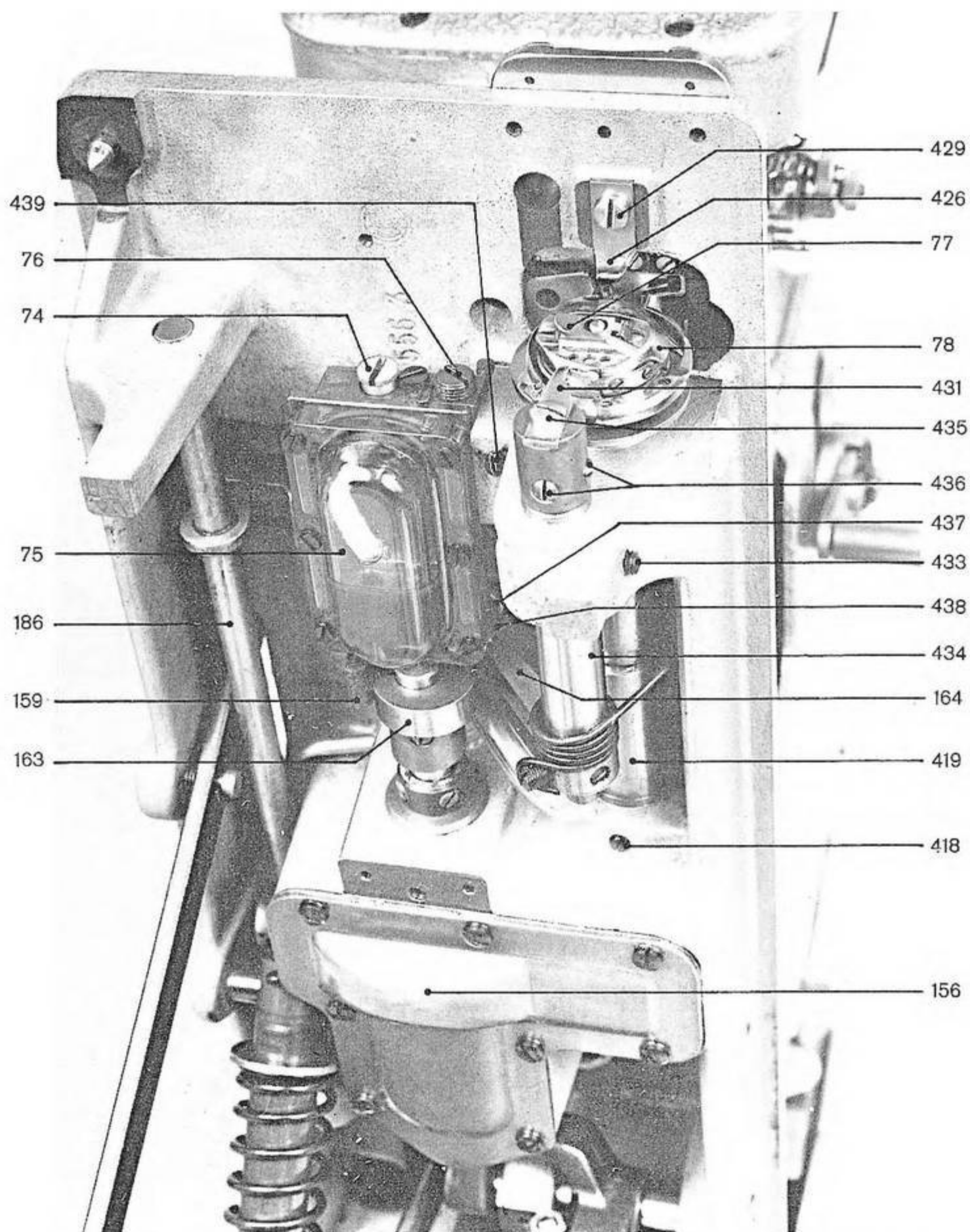


Fig. 103

Following the adjustment, retighten firmly the screws 436 (fig. 103).

In order to avoid the lifter lever 164 (fig. 103) vibrates when sewing at high speed, loosen the counter nut 437 (fig. 103) and stop the screw 438 so that at the moment when the lifter lever 164 is at topmost point of the cam body, the distance between the slide and the top screw 438 amounts to about 0.2 mm.

For loosening the counter nut 437 and resetting the stop screw 438 loosen the stud 439 and swing the oil container 75 upwards. If after completion of the above adjustments the upper thread cannot be freely pulled over the hook, as described under a), this can be remedied by slightly deviating from the above adjustments.

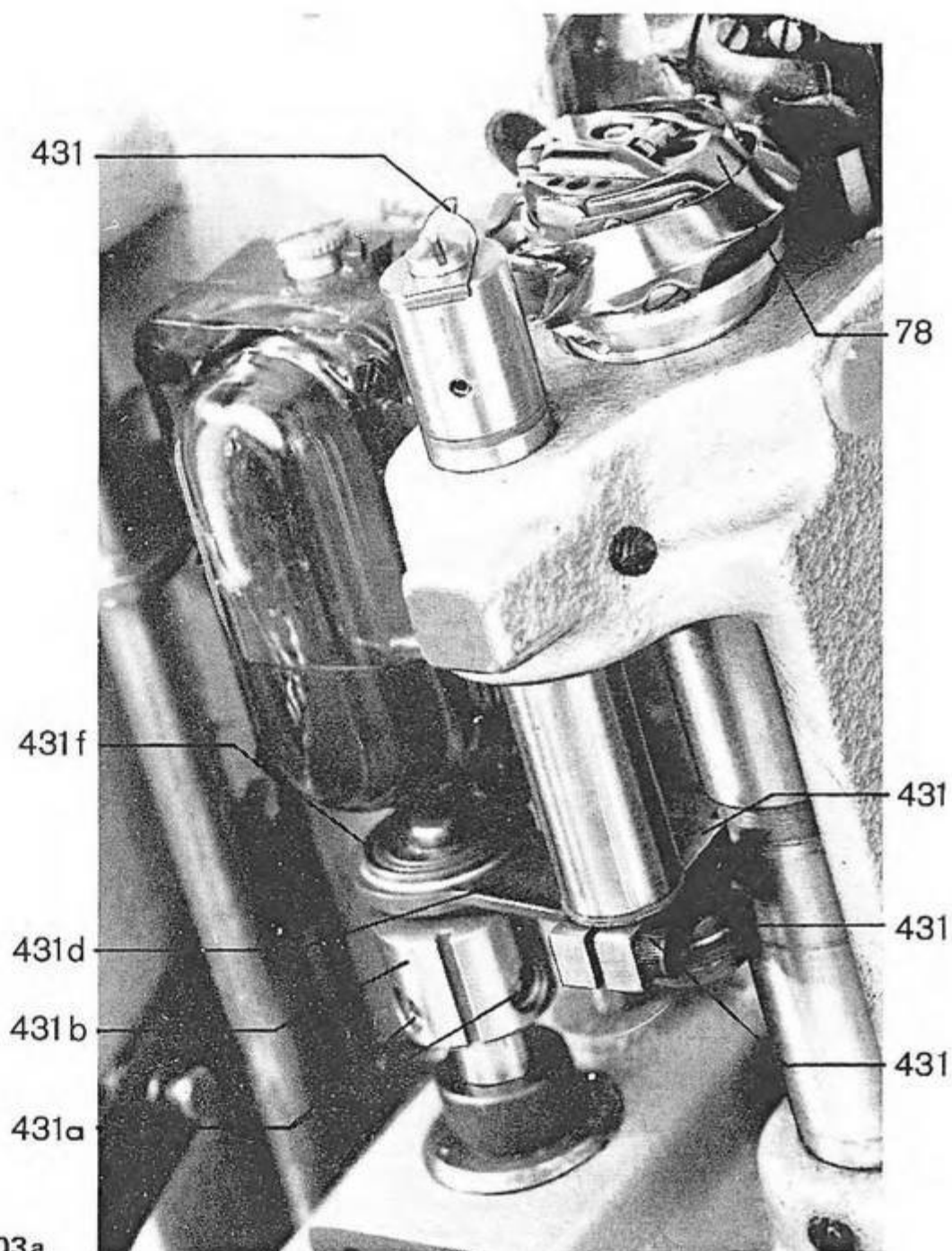


Fig. 103a

Moment

In the loop stroke position, i.e. when the needle has been raised from its lowest point 2 mm by turning the handwheel in the direction of rotation for producing the r/h stitch in the l/h row and when the hook tip stands against the middle of the needle, the lifter finger 431 (fig. 103a) should stand in the **left end position**.

This adjustment can be made by turning the crank 431b after loosening the screws 431a (fig. 103a).

When tightening the crank fastening screws ensure that between the rocker 431c and the traction bar 431d there is a small gap for oil passage.

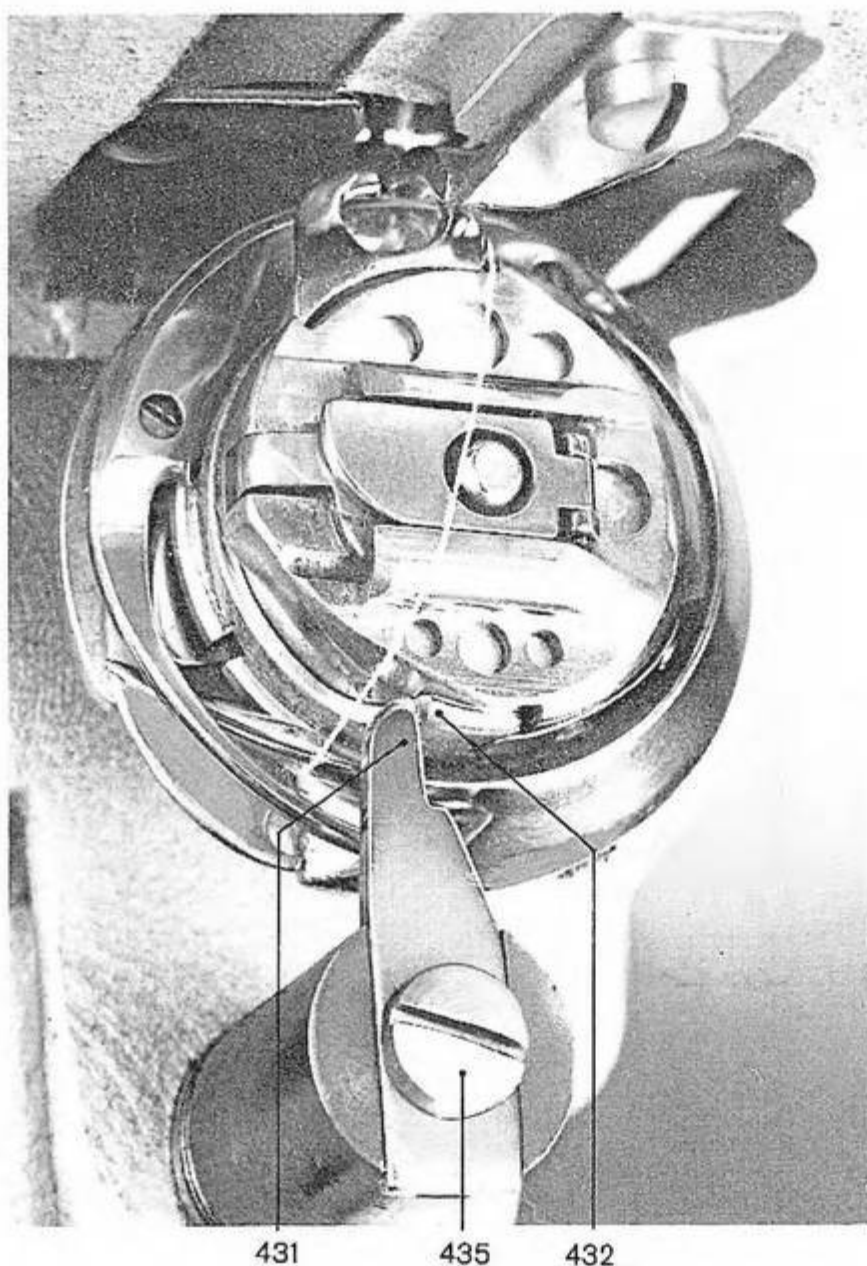


Fig. 104

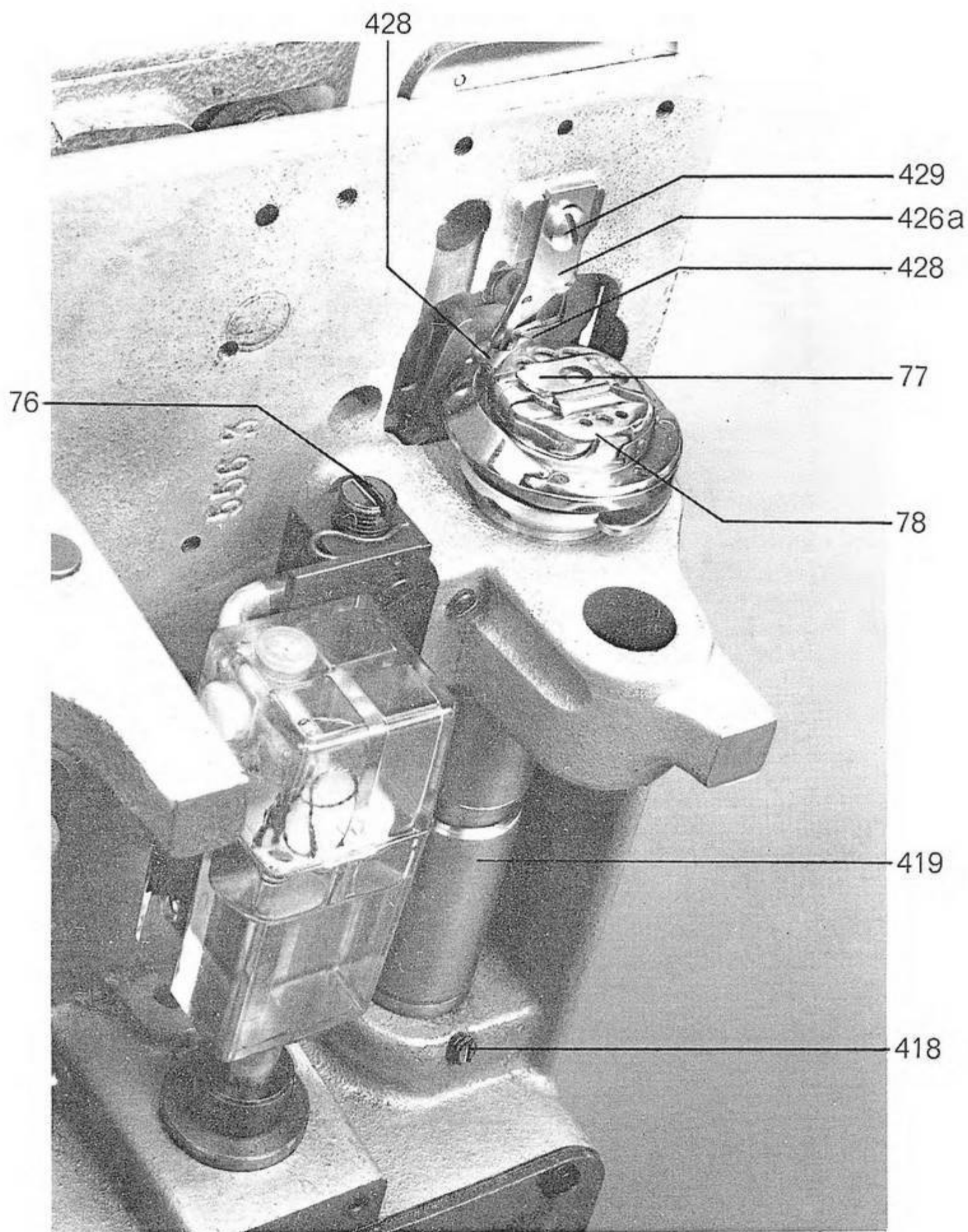


Fig. 104a

Way

When the lifter finger 431 (fig. 103a) is in its r/h end position and after pressing the bobbin case 78 by hand in the hook rotation direction said finger should pull the bobbin case to the right so far at at both sides of the bobbin case holder 426 (fig. 102) there is an equal distance to the contact surfaces of the bobbin case lugs 428.

This adjustment cab be made by turning the lifter finger 431 after loosening the hexagon screw 431e.

If after the preceding adjustment the needle thread cannot be freely pulled over the hook as described under the item a) of the chapter 37, deviate slightly from the above adjustments for obtaining a free passage.

Bobbin case holder

Recent machines are fitted with the bobbin case holder 426a (fig. 104a) with spring.

Adjust the bobbin case holder vertically with respect to the bobbin case base so that the left holder lug touches the spring and, when the base in pressed by hand in the arrow direction, the spring deviates upwards. See fig. 104b. If required, rectify the bobbin case holder accordingly.

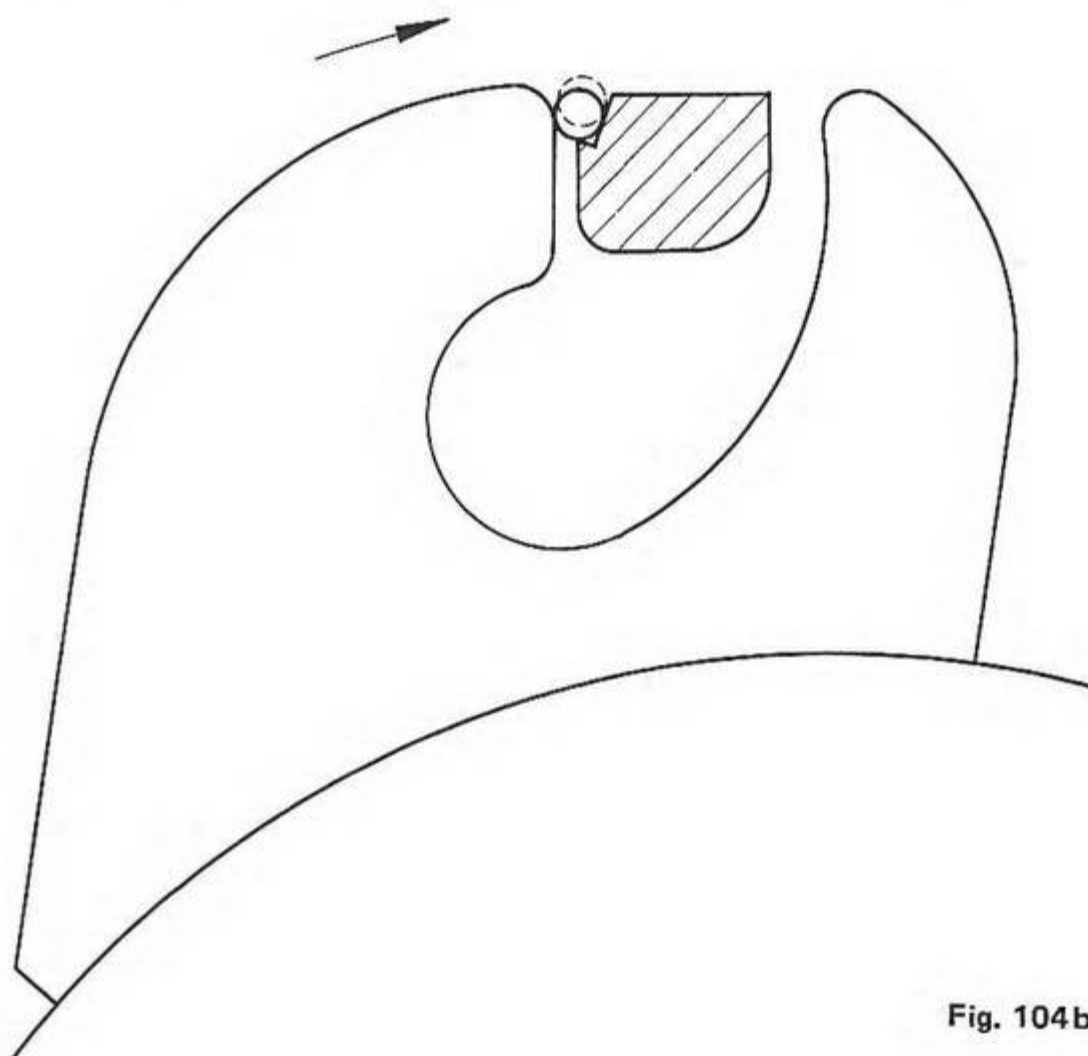


Fig. 104b

38. Function and adjustment of the needle thread cutter

Function

If during the operation of the machine the roller 303 (fig. 63) of the elbow 301 runs onto the knife control lever 302, the roller bolt lever 441 (fig. 115) will move the cutter holder 440 (fig. 105) and the cutter 3 to the front.

When the machine is in its final position and the cloth presser frame is lifted automatically, the lever 442 (fig. 115) will also be lifted and the roller bolt lever 441 will be liberated, so that by the spring action, the cutter holder 440 (fig. 105) and the cutter 3 will be moved to the right into their cutting position. During this motion of the scissors to the right, the ball pin 443 (fig. 117) of the open scissors will rest against the r/h side 444 of the stop ledge 445, whereby the scissors will be closed and the upper thread will be clamped and cut off. Furthermore, the roller bolt lever 441 (fig. 112) has moved into its r/h final position, so that the cube 446 (fig. 115) will be pulled by the spring action up to the stop screw 447. Then the lower thread is cut off and the cloth presser frame is lifted. During further lifting of the cloth presser frame, the cutter holder 440 (fig. 105), located under the catch 448 (fig. 117) will be moved by the clant of the guide ledge 450 (fig. 124), located under the arm, to the left so far that the catch 448 can fall in between the stop ledge 445 and setting screw 449.

Thus the cutter is brought into position in which the upper thread is kept quite safely, so that at the beginning of a new buttonhole it can be sewn into the left hand row neatly and properly.

Engage the machine and, by moving the frame guide lever to the front, move the roller bolt 441 (fig. 115) and consequently the cube 446 to the left until the lever 442 falls again behind the roller bolt lever 441. Furthermore, the ball pin 443 (fig. 117) rests against the left inner side of the stop ledge 445, so that the scissors are opened again.

Adjustment

For adjusting and checking the upper thread scissors proceed in the following sequence:

1. Check first the upper knife 452 (fig. 106), the lower knife 453 and the clamping plate 454.

With the machine being in its final position, remove the screw 298 (fig. 105) and strip the scissors 3 from their holder 440. As can be seen from fig. 107, all edges in the dot-and-dash area of the scissors upper knife, except the cutting edge 455, must be slightly rounded off and polished. The edge 456 must have a radius of 0.3 mm.

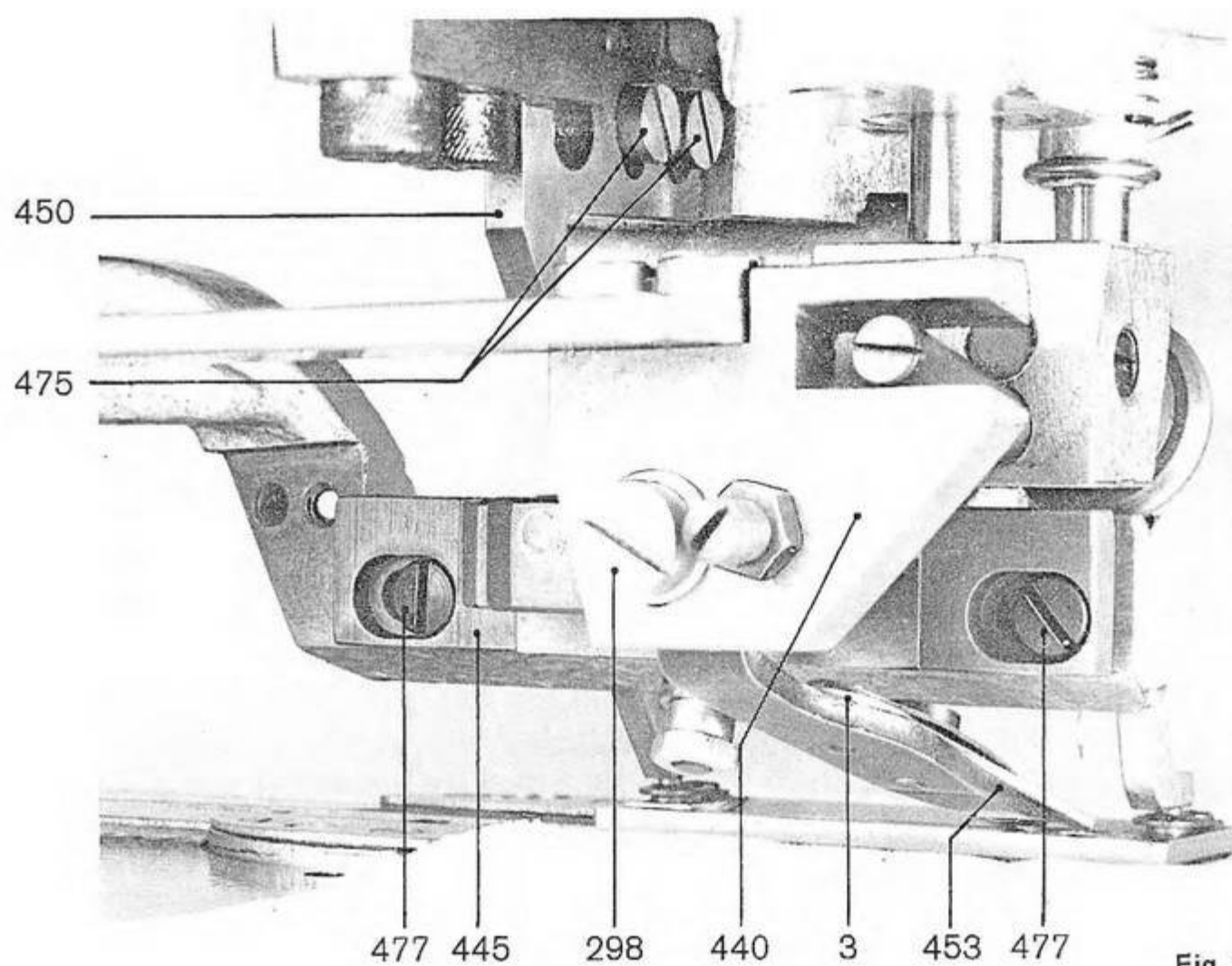


Fig. 105

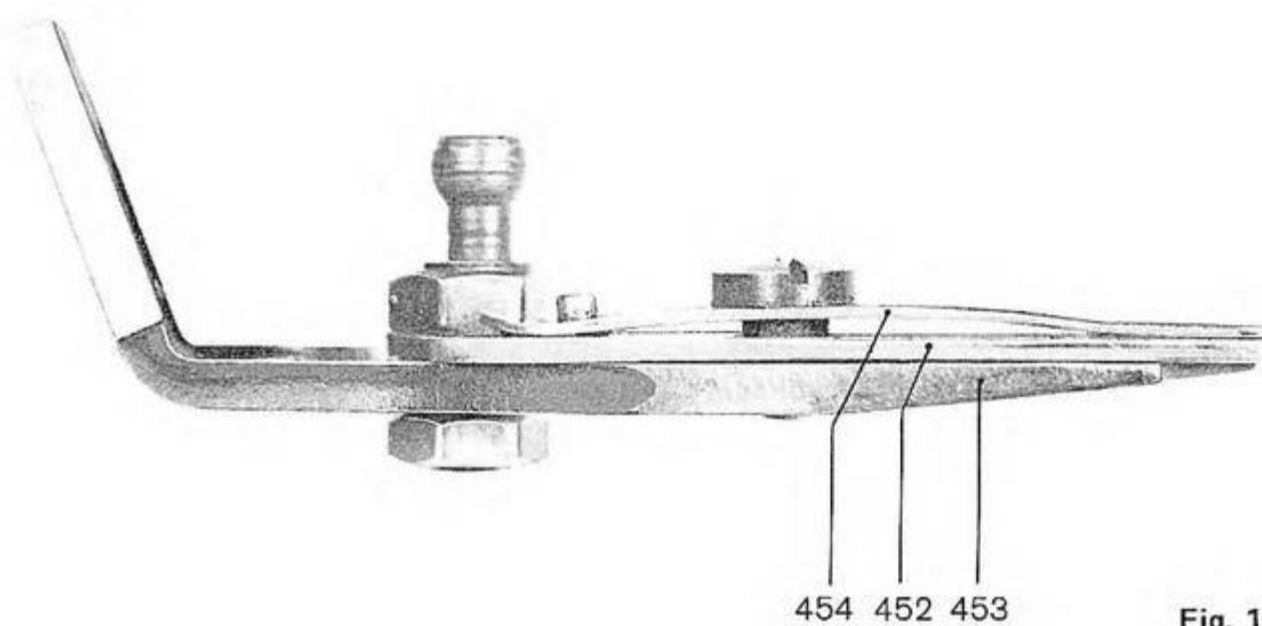


Fig. 106

4. Turn the crank until the roller bolt lever 441 (fig. 113) is in its extreme left hand position. In this position, the lever 442 should be able to drop behind the lever 441 and the distance between the part 464 of the lever 442 and the lever 441 should amount to about 0.3 mm.

In order to be able to effect this adjustment, turn the crank until the machine is in its final position.

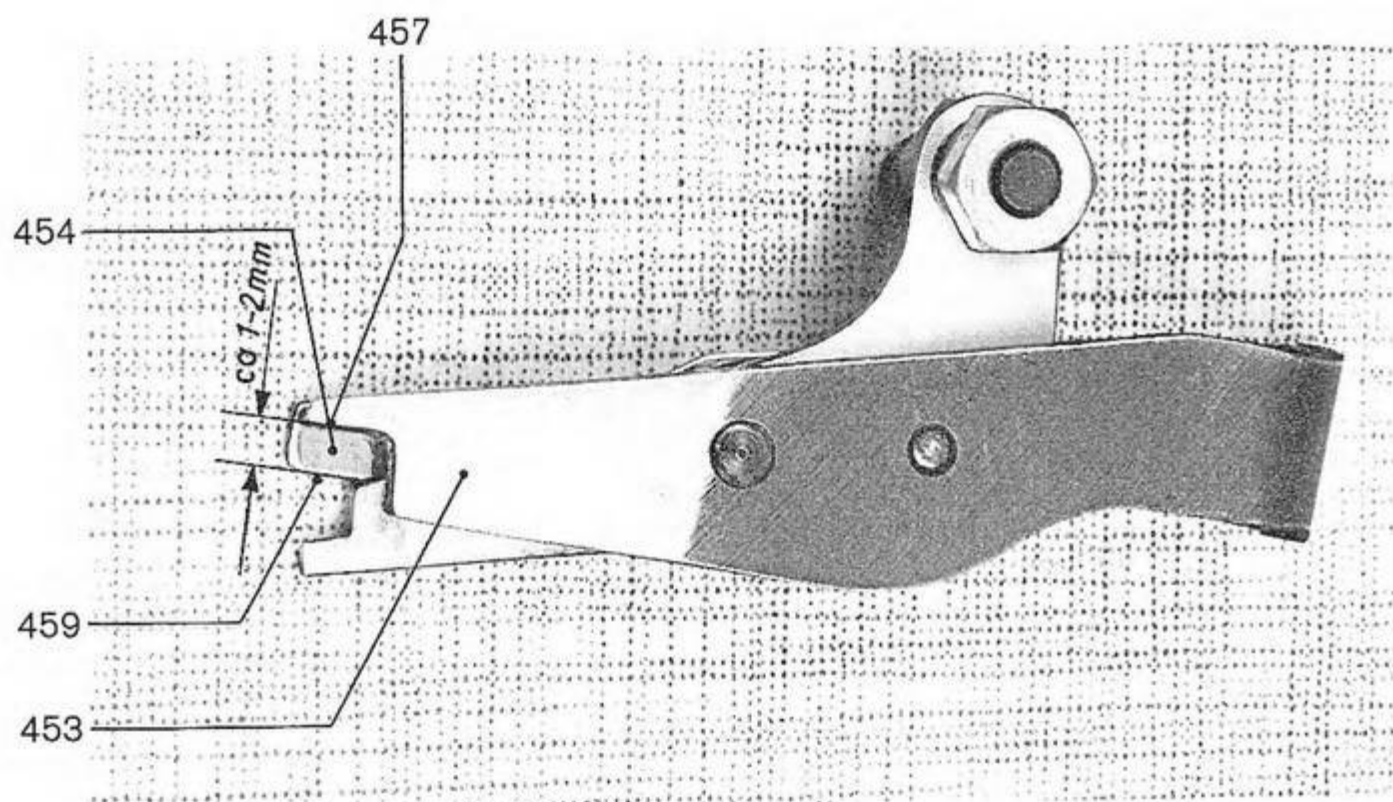


Fig. 110

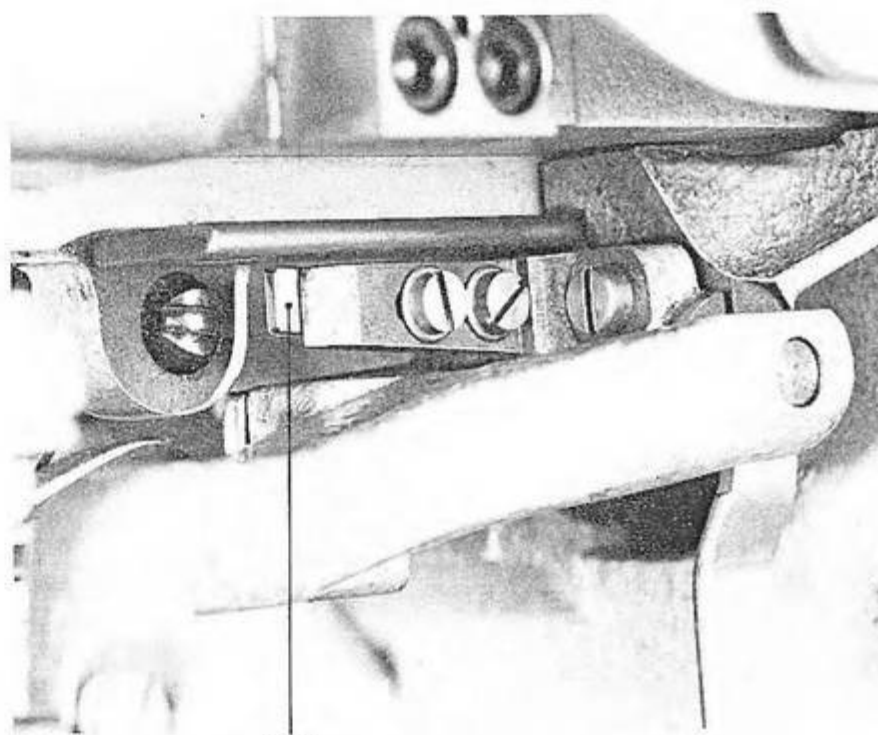
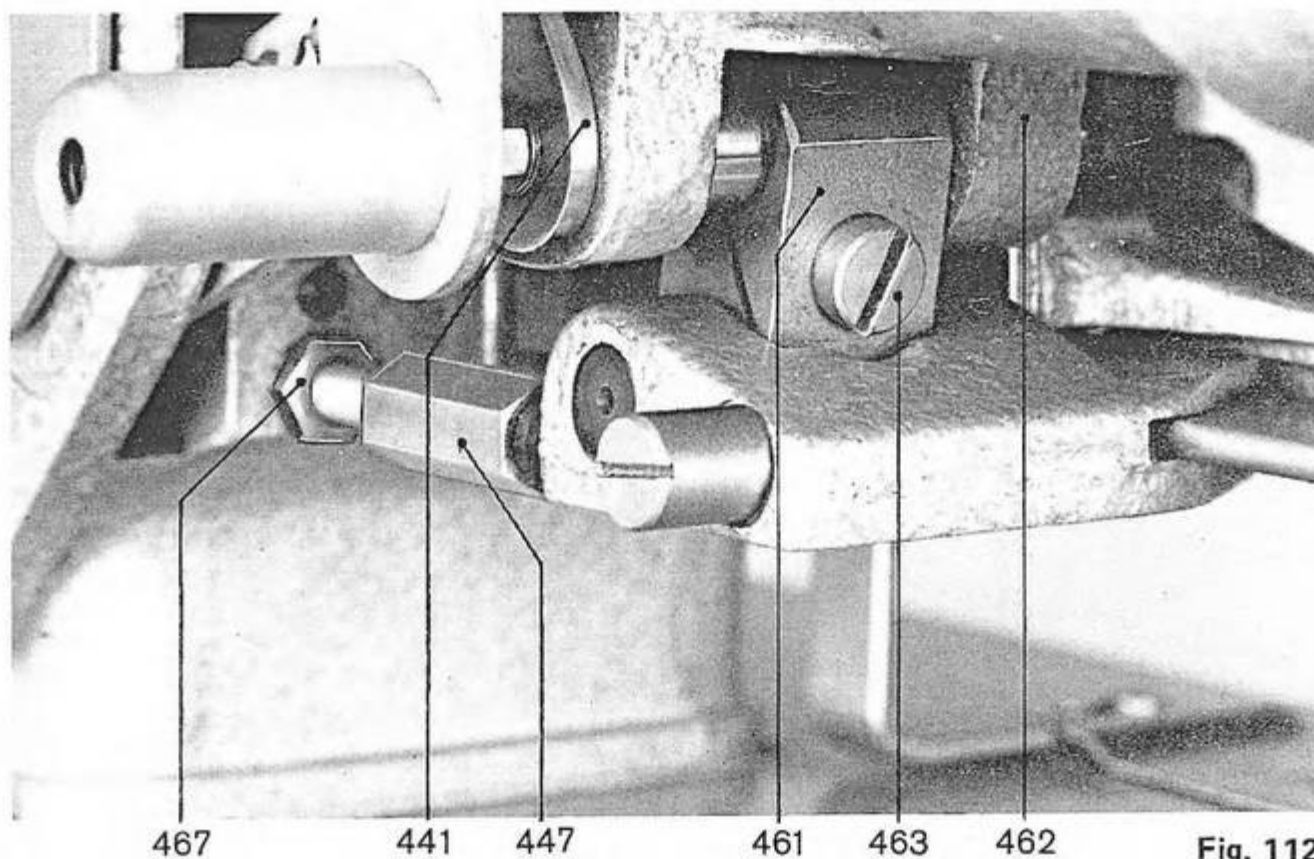


Fig. 111

460



467

441

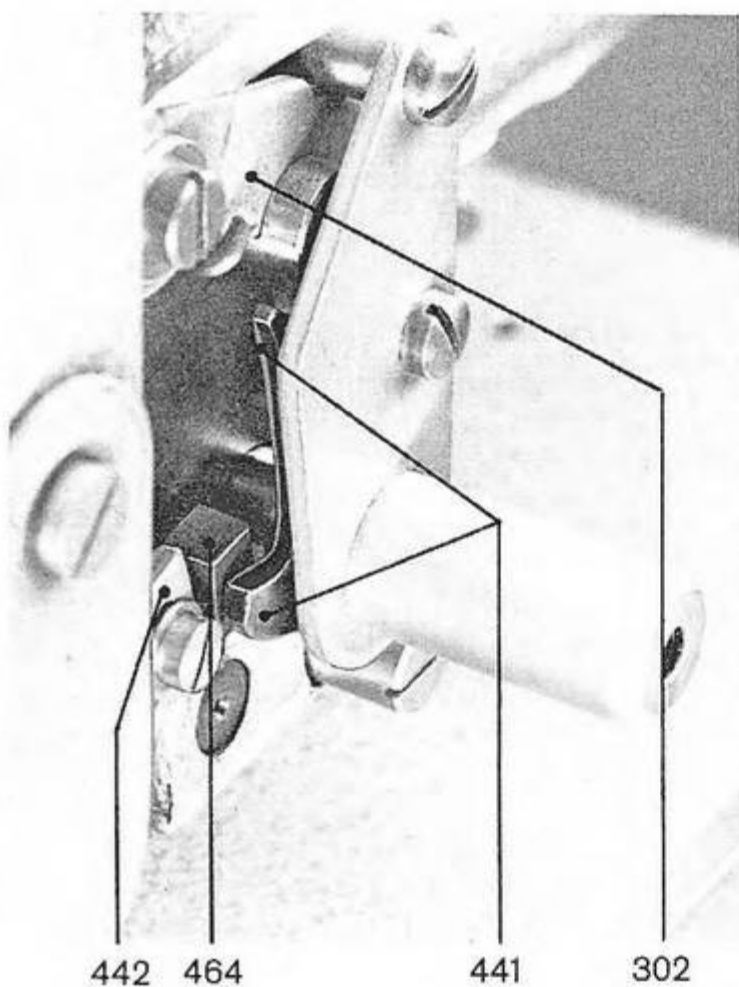
447

461

463

462

Fig. 112

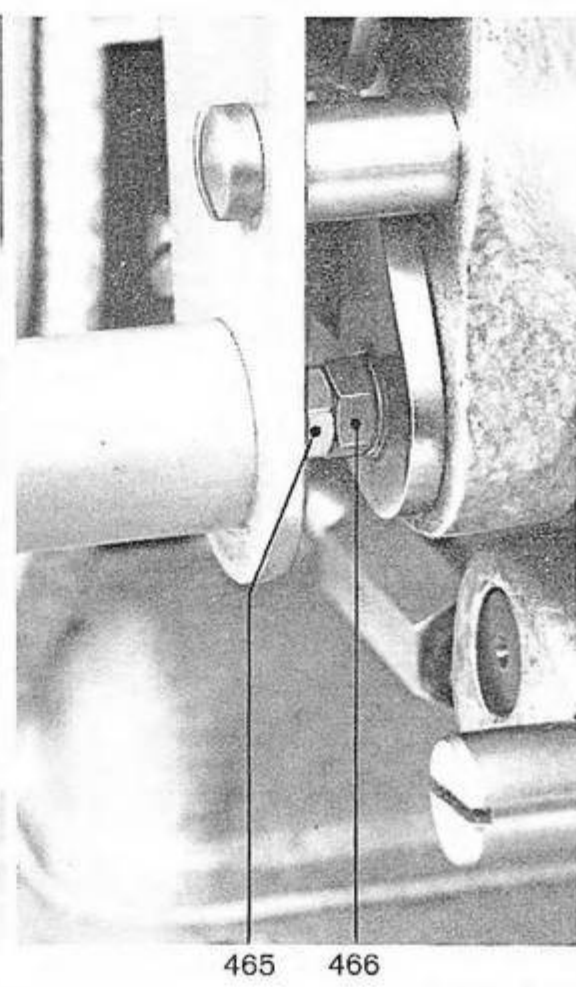


442 464

441

302

Fig. 113



465

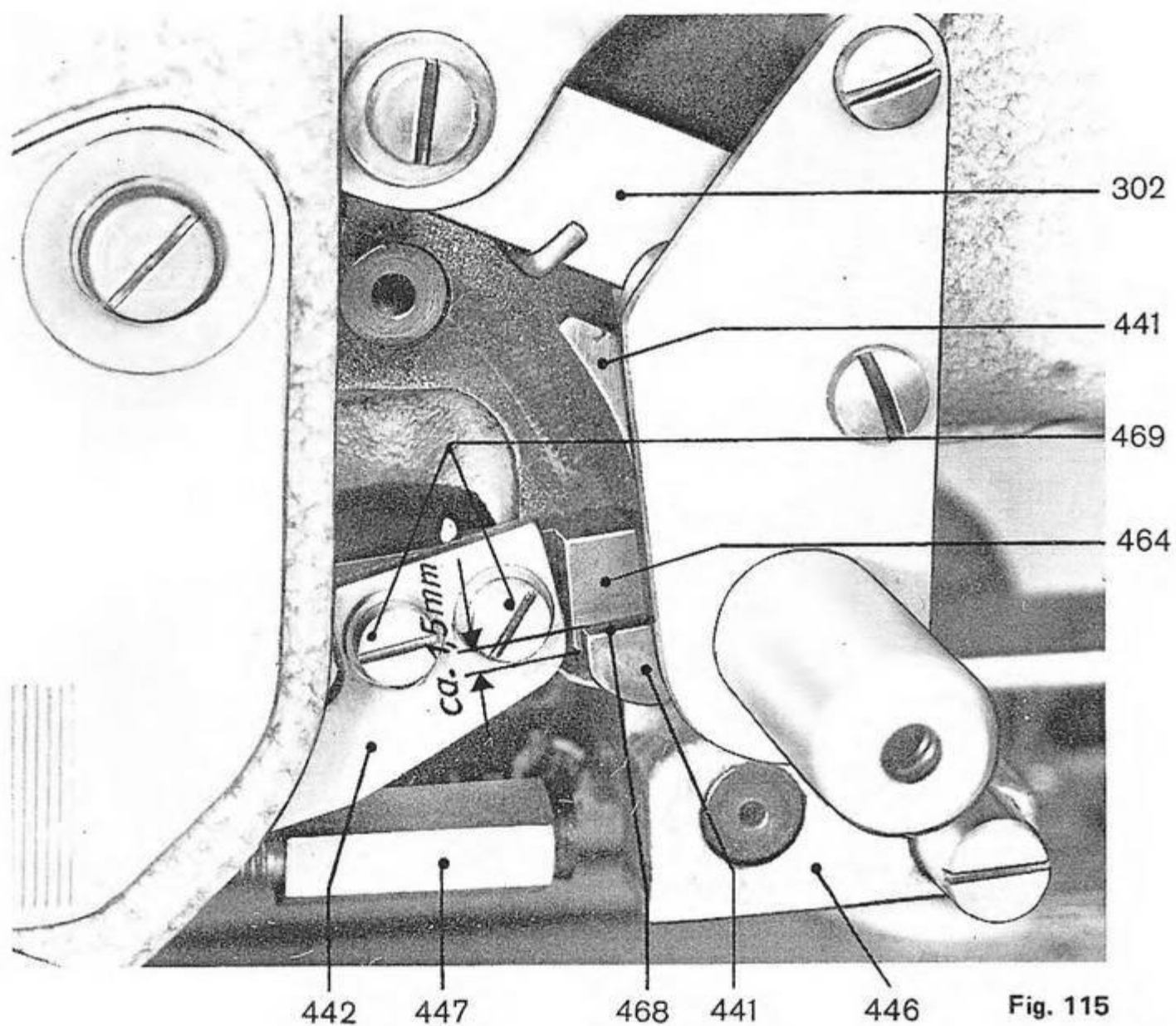
466

Fig. 114

If the lever 442 (fig. 113) has already dropped behind the lever 441, it is necessary to lift it again, so that the lever 441 can move to its extreme r/h position, and the counter nut 465 (fig. 114) and the adjusting by resetting the nut 466 after loosening the counter nut 465 (fig. 14). Turn the nut 466 clockwise to reduce the distance and counter clockwise to increase it.

5. Turn the crank until the machine is in its final position. In this position, the roller bolt lever 441 (fig. 115) should be in touch with the scissors control lever 302. This adjustment can be effected by resetting the stop screw 447 (figs. 112 and 115) after having loosened the counter nut 467 (fig. 112).

It is necessary to reset the stop screw 447 (fig. 115) only if it has been loosened in excess and the roller bolt lever 441 can no longer touch the scissors control lever 302.



If, when turning the machine into its final position, i.e. when depressing the lever 441 by the lever 302, the lever 441 is not held by the part 464, adjust the latter according to the following instructions before effecting the above adjustment.

With the machine being in its final position, the lower edge of the part 464 of the lever 442, said part 464 being located behind the roller bolt lever 441, should be about 1.5 mm below the upper edge 468 of the roller bolt lever 441. This adjustment can be obtained by resetting the part 464 after loosening the screw 469.

In order to be able to check this adjustment, pull by hand the block 446 slightly to the left.

6. Thread upper and lower threads and, with the driving motor running, start the sewing cycle by depressing the r/h pedal forwards. Ensure prior to sewing that there is a piece of fabric under the cloth presser frame.

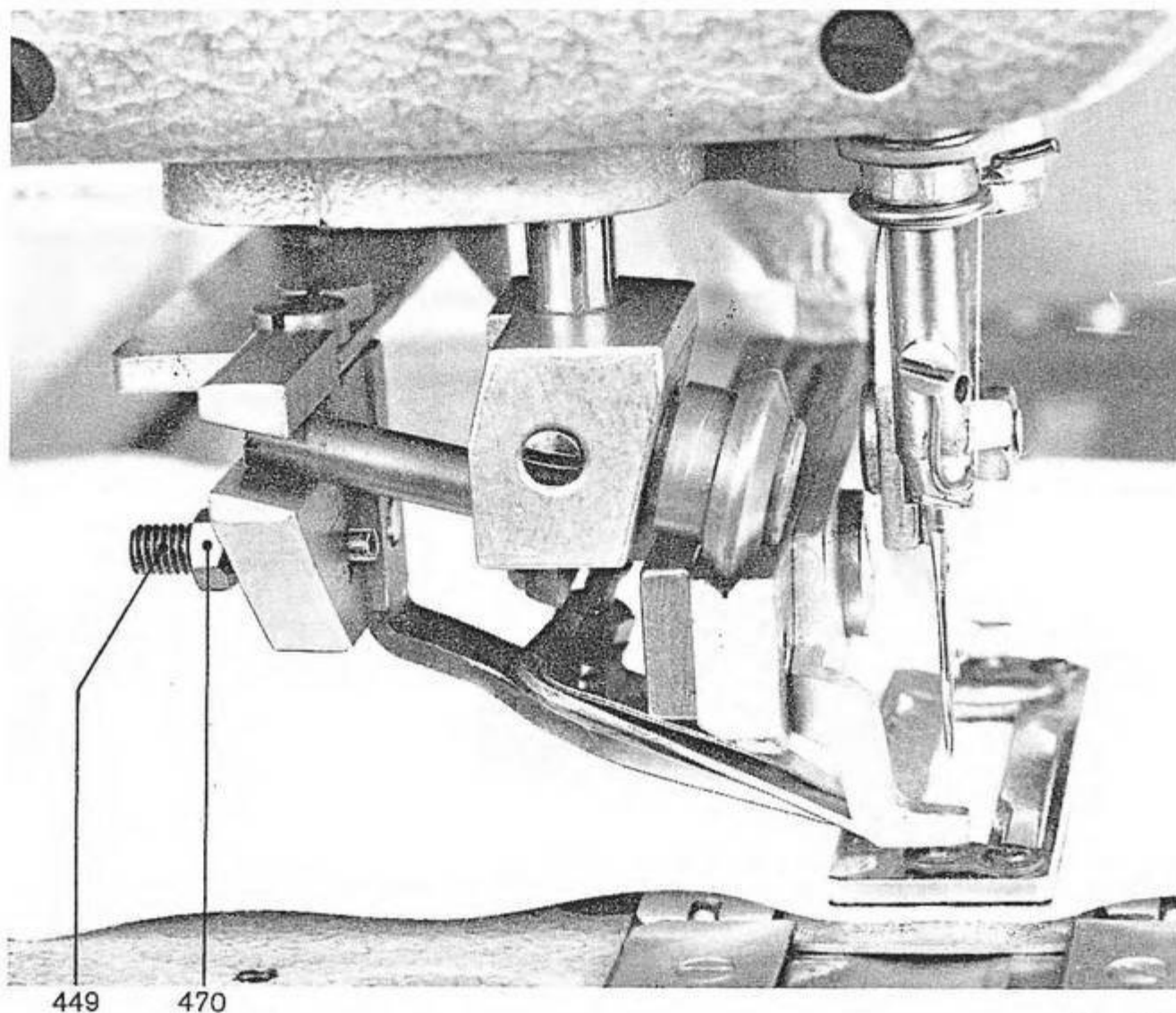


Fig. 116

Short prior to finishing the sewing cycle heel the I/h pedal down to the first rest point in order to avoid that the buttonhole knife acts, that the upper and the lower threads are severed and that the cloth presser frame is lifted. The upper thread between the needle and the buttonhole will thus be under tension and the position of the scissors with respect to the upper thread can be accurately adjusted. Turn off the main switch and consequently the driving motor.

7. Untighten the counter nut 470 (fig. 116) and loosen completely the setting screw 449.

8. Set the eccentricity of the ball pin 443 (fig. 117) to the front. Said ball pin 443 can be set accordingly after loosening the nut 471.

9. Fasten the scissors 3 (fig. 105) to their holder 440.

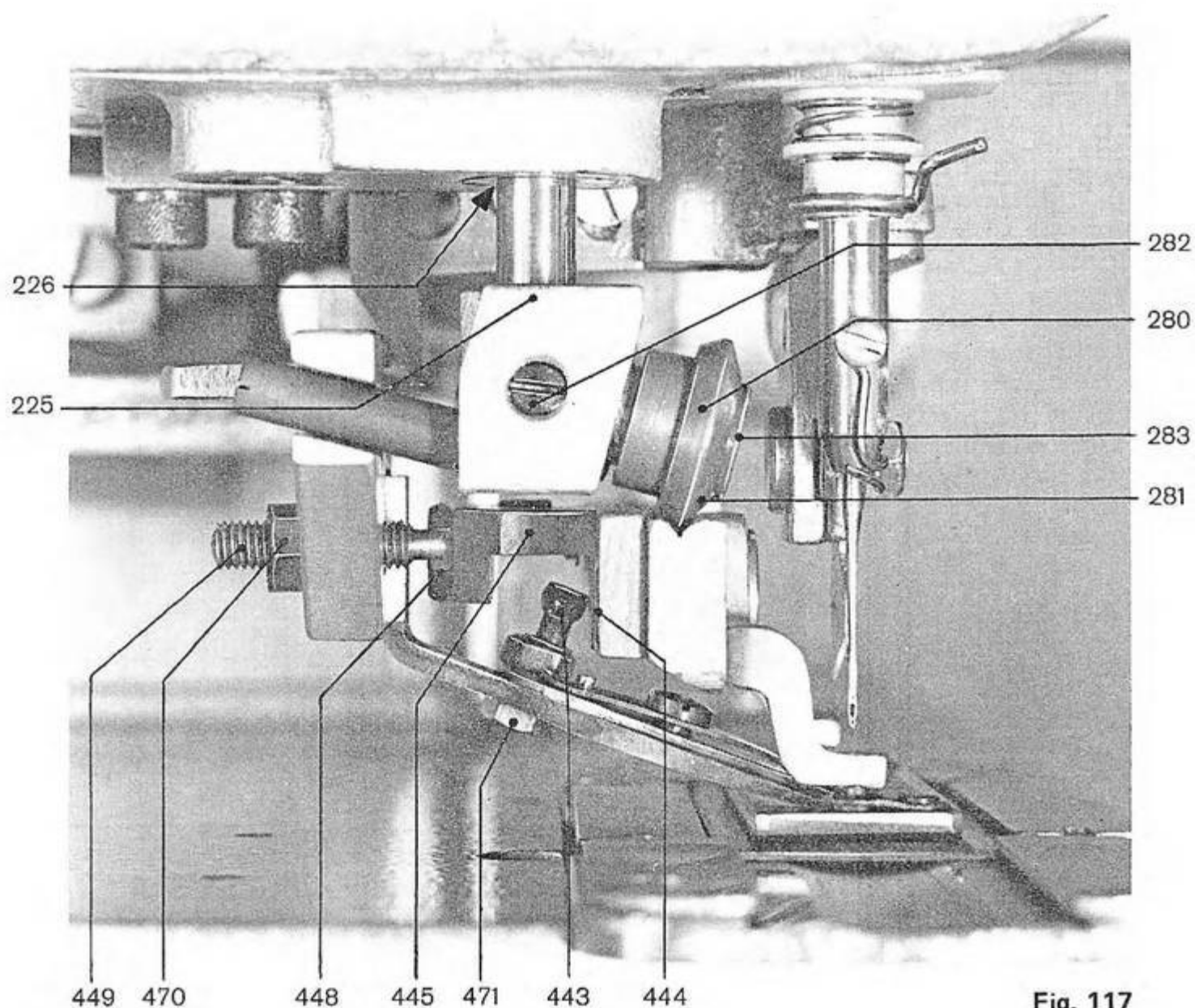


Fig. 117

Adjust the height of the scissors 3 so that the distance between the bottom of the scissors lower knife 453 and the top of the cloth presser frame amounts to about 0.5 mm.

10. Seize the block 446 (fig. 118) with the left hand, push the roller bolt lever 442 (fig. 115) downwards and press the roller bolt lever against the scissors control lever 302. See fig. 118.

While maintaining this position, loosen the thumb screw 463 (fig. 118) and pull the block 446 with the scissors holder 440 (fig. 105) to the front until the front edge 459 (fig. 119) of the plate 454 is level with the tensioned upper thread. See fig. 119.

Tighten the thumb screw 463 (fig. 118), taking care not to reset the block 446 in the axial direction on the roller bolt.

11. Seize the block 446 (fig. 120) with the left hand, lift the lever 442 and displace the scissors to the right until the block 461 (fig. 112) touches the surface of the bearing point.

In this position, the distance between the front edge of the scissors and the r/h edge of the cutout in the cloth presser frame should amount to about 0.5 mm. See fig. 121.

In no case should the scissors knock against the cloth presser frame.

This adjustment can be obtained by resetting the threaded pin 473 in the block after loosening the counter bush 472 (fig. 122).

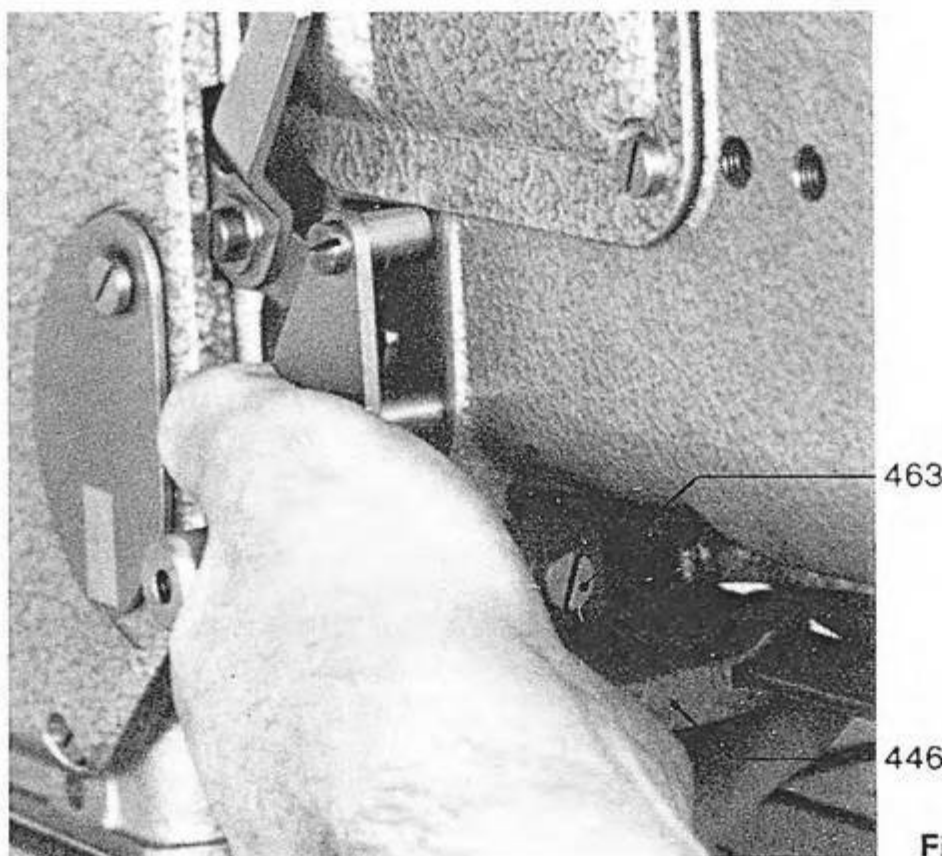


Fig. 118

12. While the scissors are in their r/h final position, as described above, loosen the counter nut 471 and set the bolt 443 (fig. 123) so that **with the scissors fully closed** the distance between the bolt 443 and the r/h side 444 of the stop ledge 445 amounts to about 0.2 mm. See fig. 123.

13. Then, with the fabric under the cloth presser frame and with the scissors in their r/h final position, loosen the screws 475 (fig. 105) and set the guide ledge 450 (figs. 105 and 124) so that the distance between the slant of the guide ledge 450 (fig. 124) and the slant of the scissors arm 474 amounts to about 2 mm. See fig. 124.

This distance is required for ensuring that also with a fabric of maximum thickness the scissors can freely move into their r/h final position and that when lifting the cloth presser frame the part 448 (fig. 124) can freely drop between the guide ledge 445 and the setting screw 449, adjusted according to the item 15.

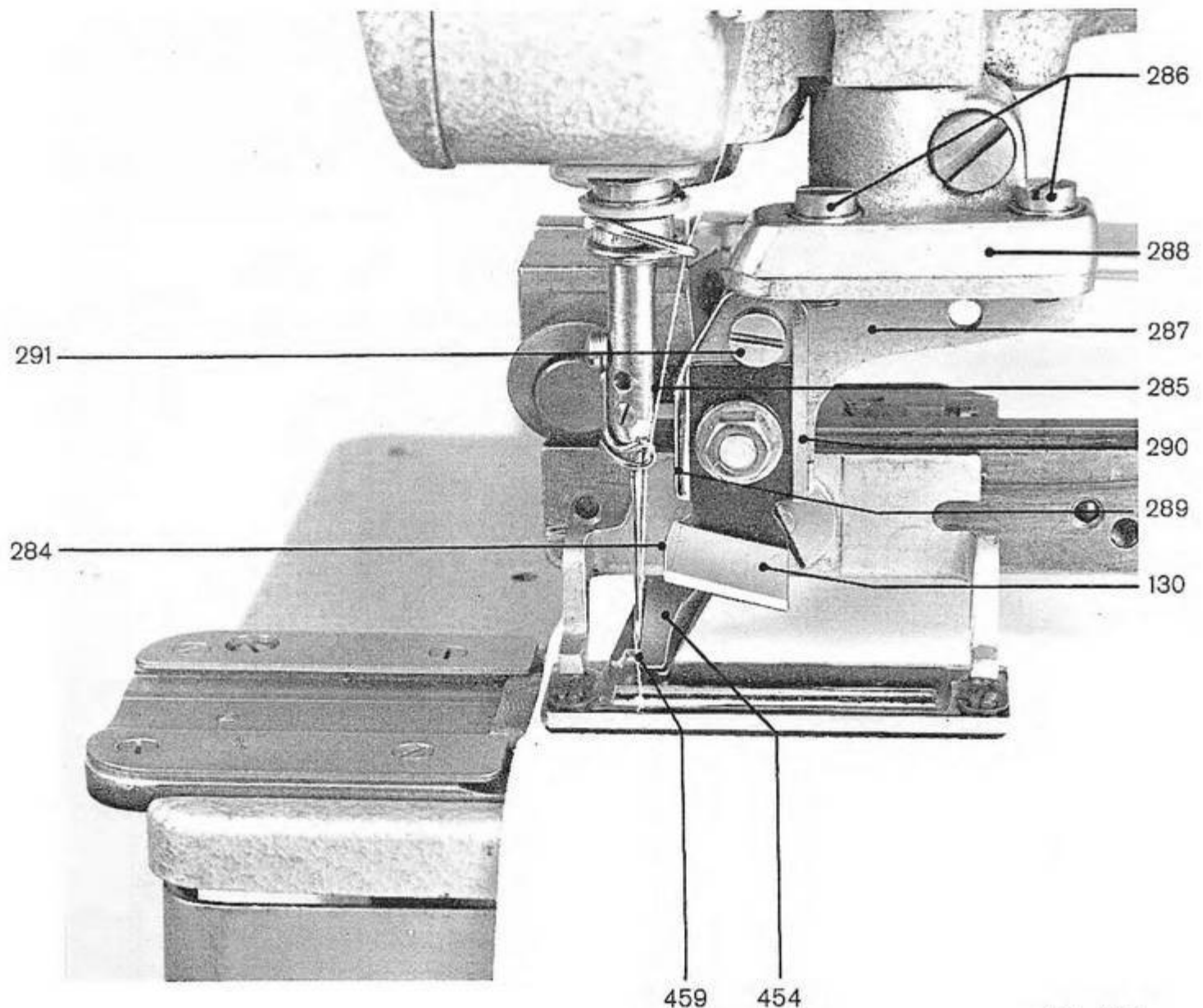


Fig. 119

14. Turn the crank until the roller bolt lever 441 (fig. 115) has reached its extreme l/h position and the scissors are open. In this position the scissors must be opened 1.5 to 2 mm. See fig. 125.

In order to be able to effect this adjustment, turn the crank until the machine is in its final position, lift the lever 442 (fig. 115) and conduct the scissors in their r/h final position in order to be able to loosen the counter nut 465 (fig. 114) and to reset the nut 466.

Turn the nut 466 (fig. 114) clockwise to open the scissors more and counter clockwise to open them less. Ensure that the lever 442 (fig. 115) can still freely fall behind the roller bolt lever.

15. Lift the cloth presser frame by turning on the main switch.

After lowering the l/h pedal down to the first stage for avoiding the knife action etc., depress once again the r/h pedal before turning on the main switch, so that the cloth presser frame can rise.

With the cloth presser frame being lifted, the distance between the needle and the clamping plate 454 (fig. 126) of the upper thread scissors should amount to about 2 mm. See fig. 126. The distance can be adjusted by resetting the stop screw 447 after loosening the counter nut 467 (fig. 112).

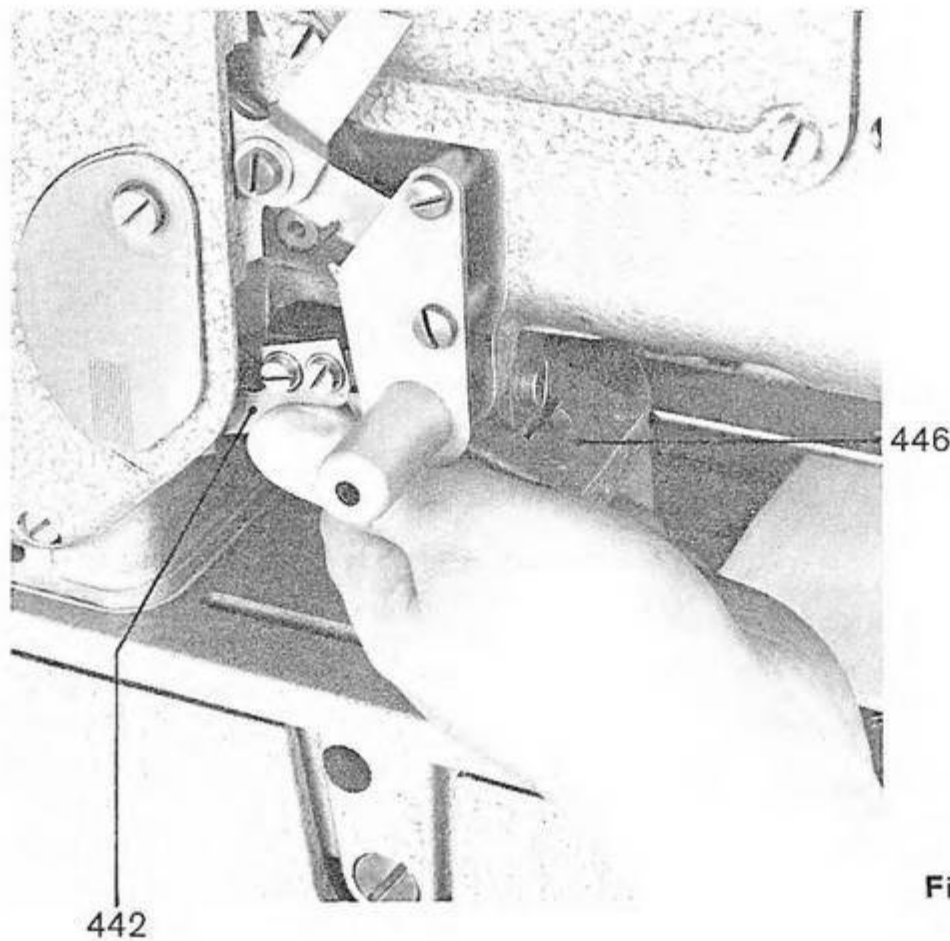


Fig. 120

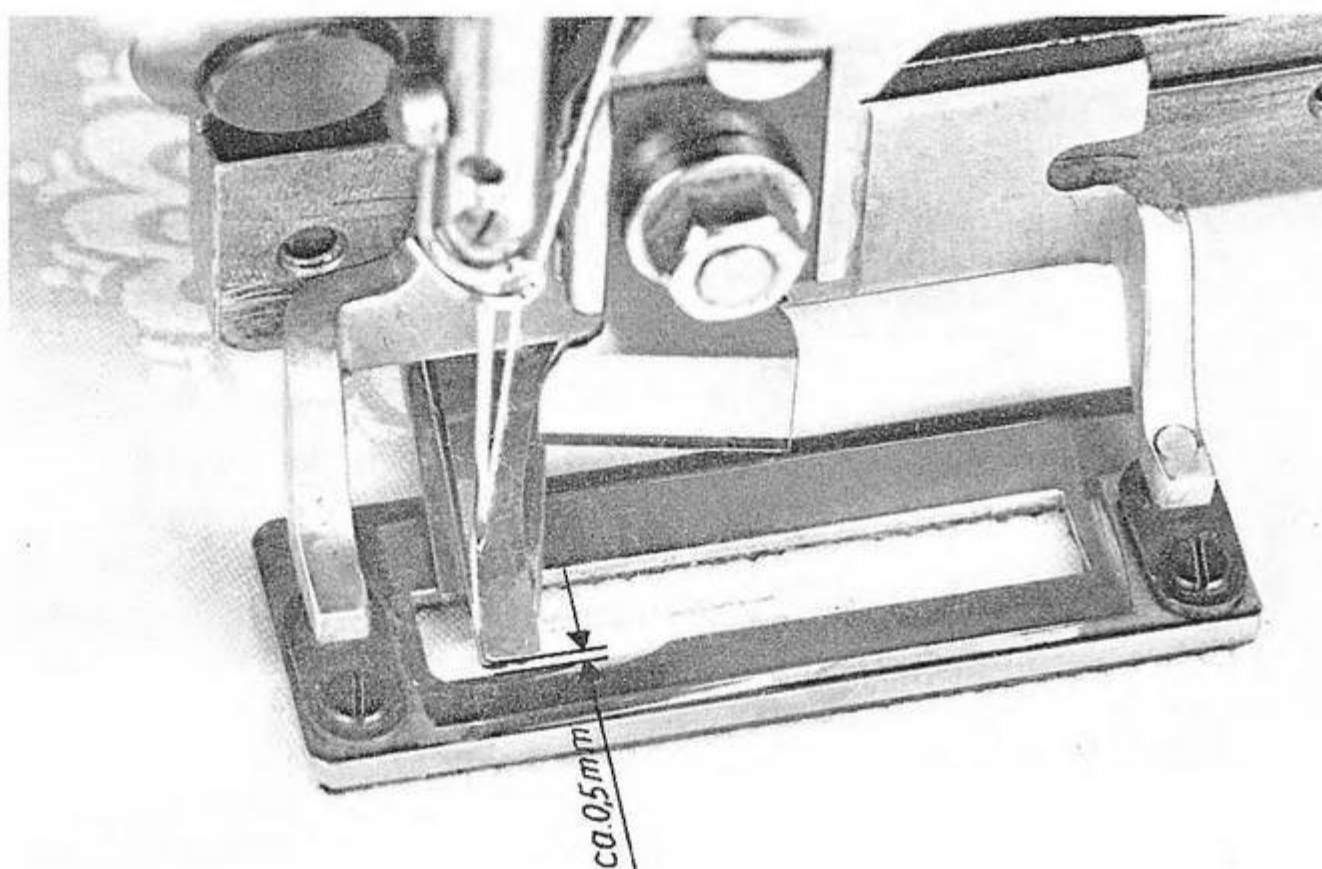


Fig. 121



Fig. 122

472

473

16. With the cloth presser frame being lowered (turn off the main switch) loosen the counter nut 470 and set the screw 449 (fig. 117) so that it is flush with the r/h side of the part 448. See fig. 117.

Pull to this effect the scissors arm 474 (fig. 124) to the front until the screw 449 (fig. 117) stands opposite the face of the part 448.

17. Loosen the screw 476 and set the cam 460 (fig. 127) usually so that with the machine being in its disengaged position the distance between the roller and the slope of the cam 460 amounts to about 1 mm.

Varying with the fabric quality and with the row width this distance must be increased or reduced, so that the scissors are opened in due time and the upper thread end is sewn properly.

Displace the cam 460 to the front only so far that with the machine in its disengaged final position the distance between the roller and the slope of the cam 460 still amounts to about 0.3 mm. This distance is required also for the smallest buttonhole (10 mm long).

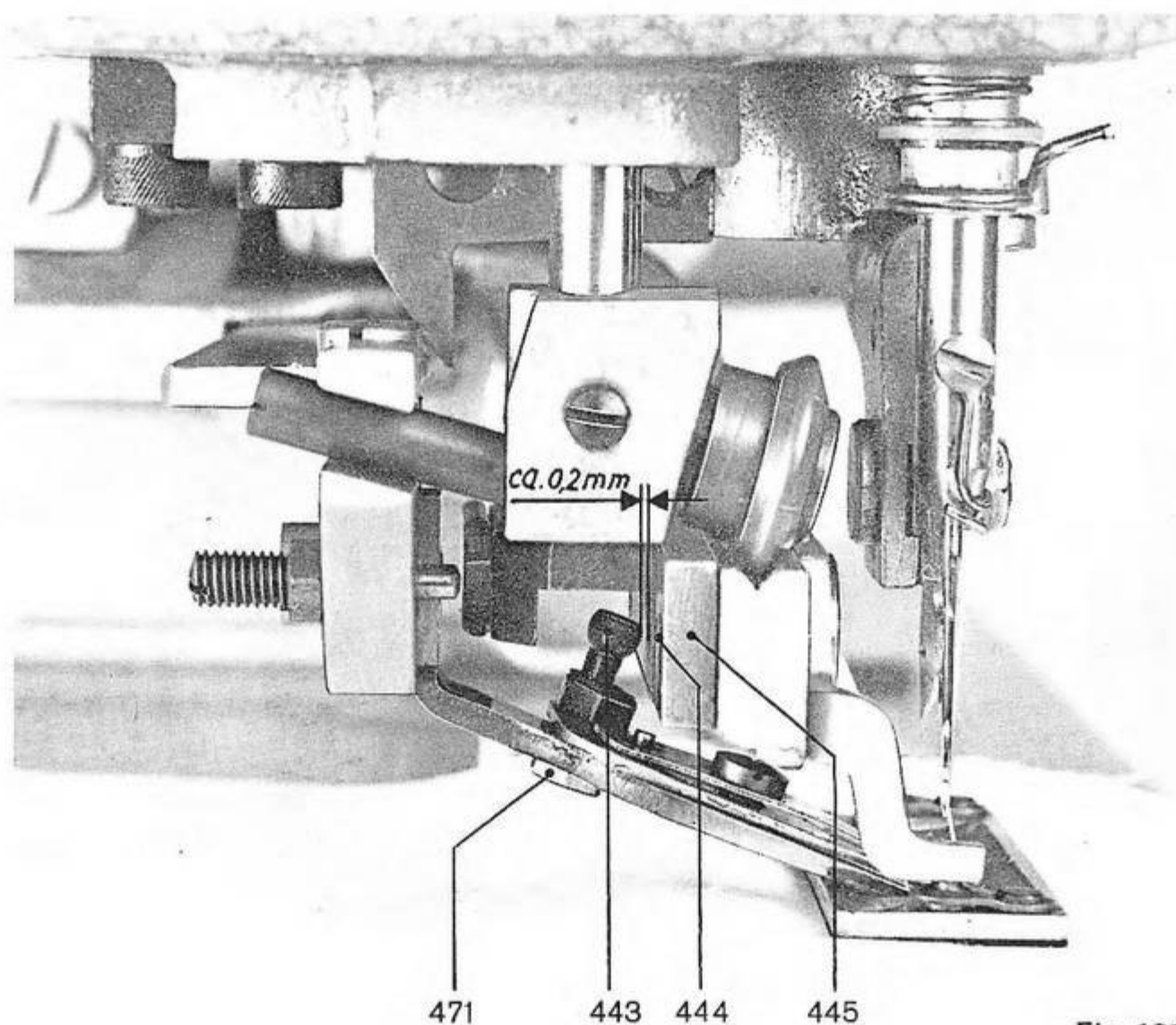


Fig. 123

18. Thread the upper and the lower threads and proceed to sewing. Short before finishing the sewing cycle heel the l/h pedal down to the first rest point in order to avoid that the buttonhole knife acts, that the upper and the lower threads are severed and that the cloth presser frame is lifted. Turn off the main switch, which will disengage the driving motor.

19. Seize the block 446 (fig. 120) with the left hand, pull it a bit to left and lift thus the lever 442.

Move slowly the block 446 and consequently the scissors to the right. Take care not to move it forwards or backwards. When moving the scissors to the right, the setting screw 449 (fig. 117) should pass along the face of the part 448 at a distance of about 0.5 mm, so that the scissors are well closed.

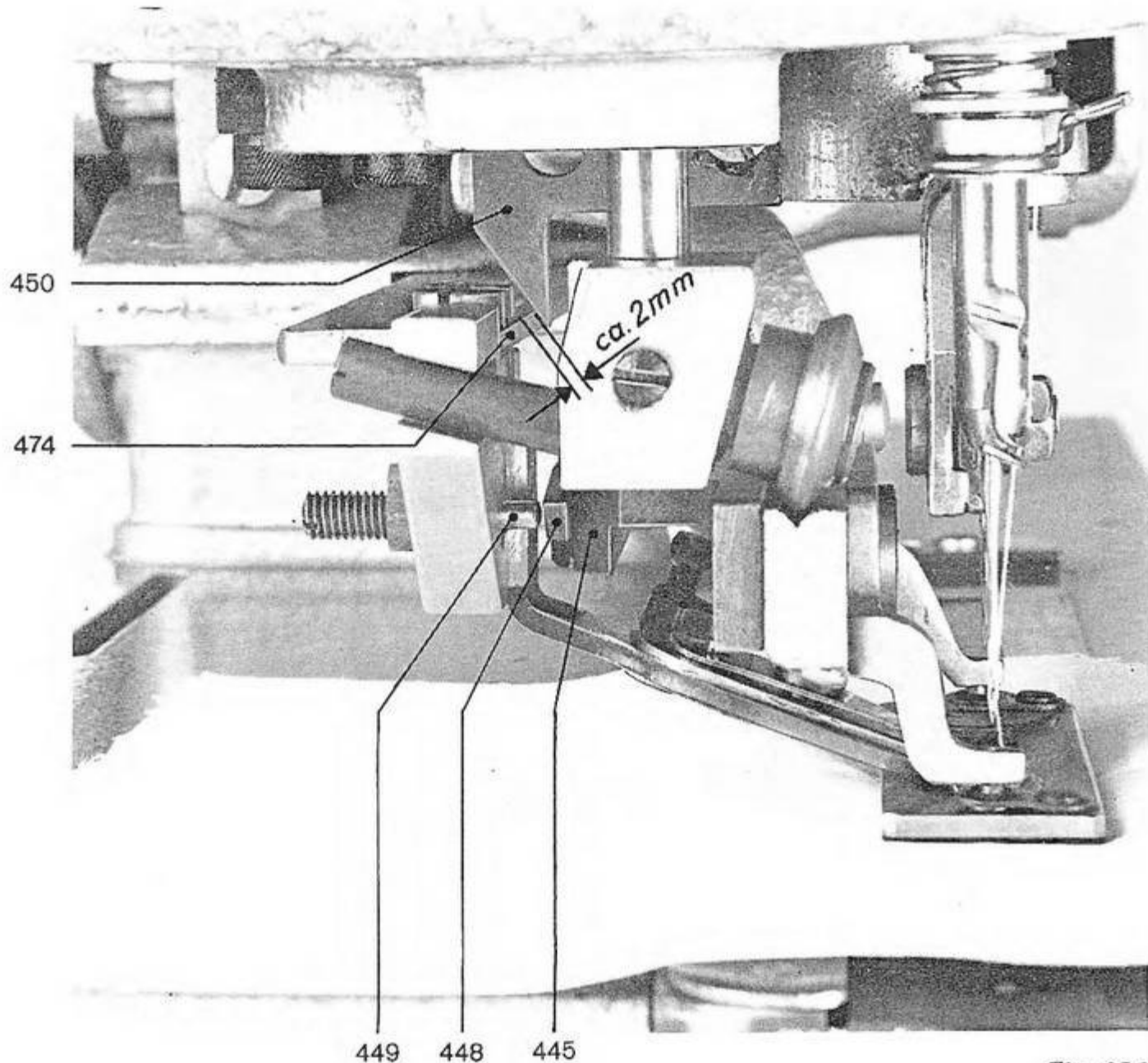


Fig. 124

This distance can be adjusted by resetting the stop ledge 445 on the guide lever of the cloth presser frame after loosening the screws 477 (fig. 105).

20. Following these adjustments, the scissors can be set by the screw 449 (fig. 117) so that they properly place the upper thread into the r/h row.

Reset the screw 449 to the right only so far that, when lifting, the part 448 can again freely fall before the screw 449.

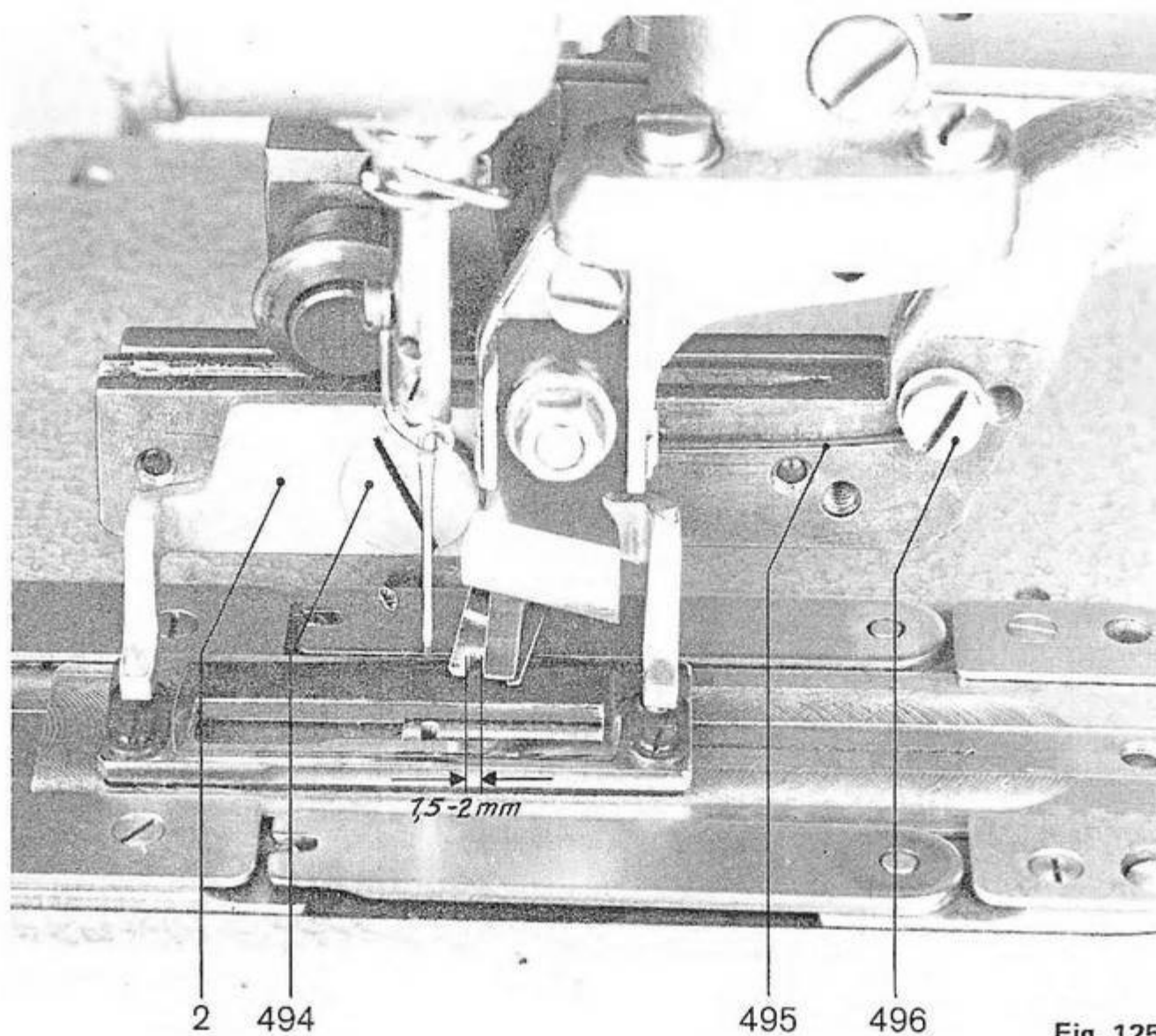


Fig. 125

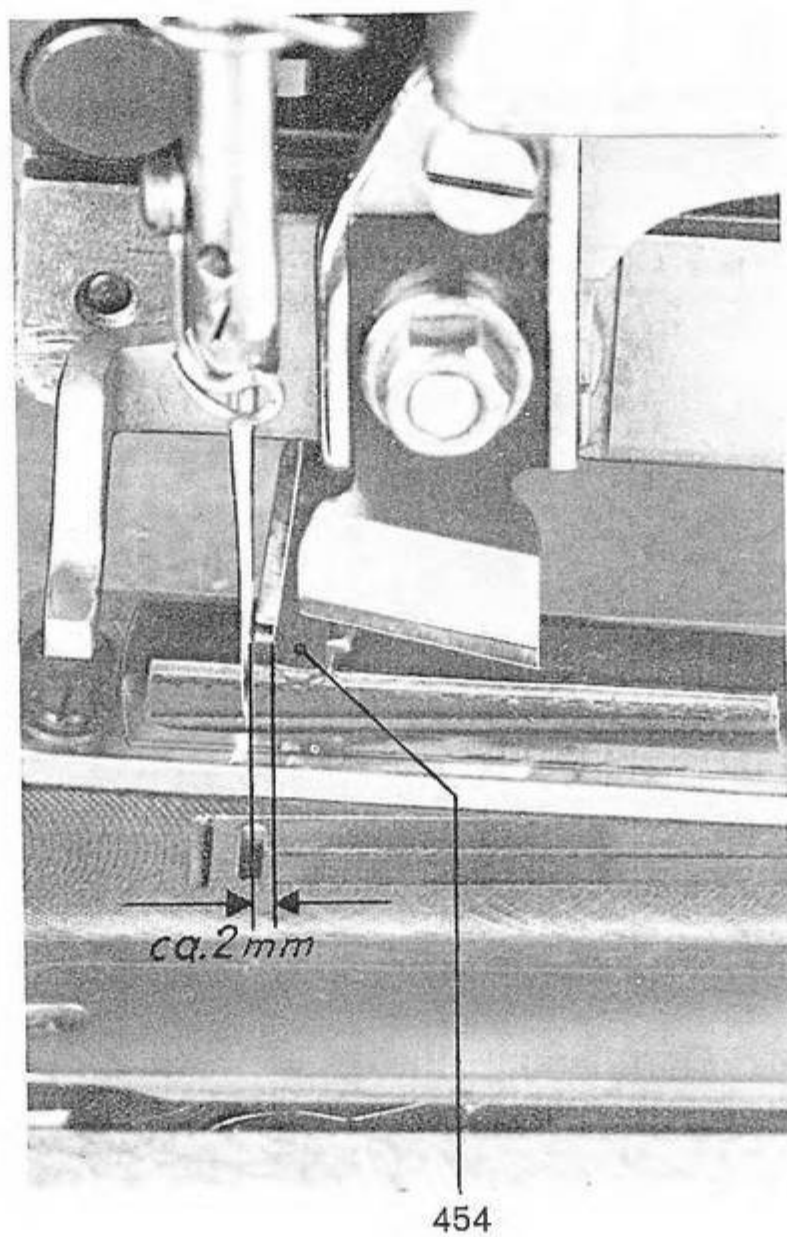


Fig. 126

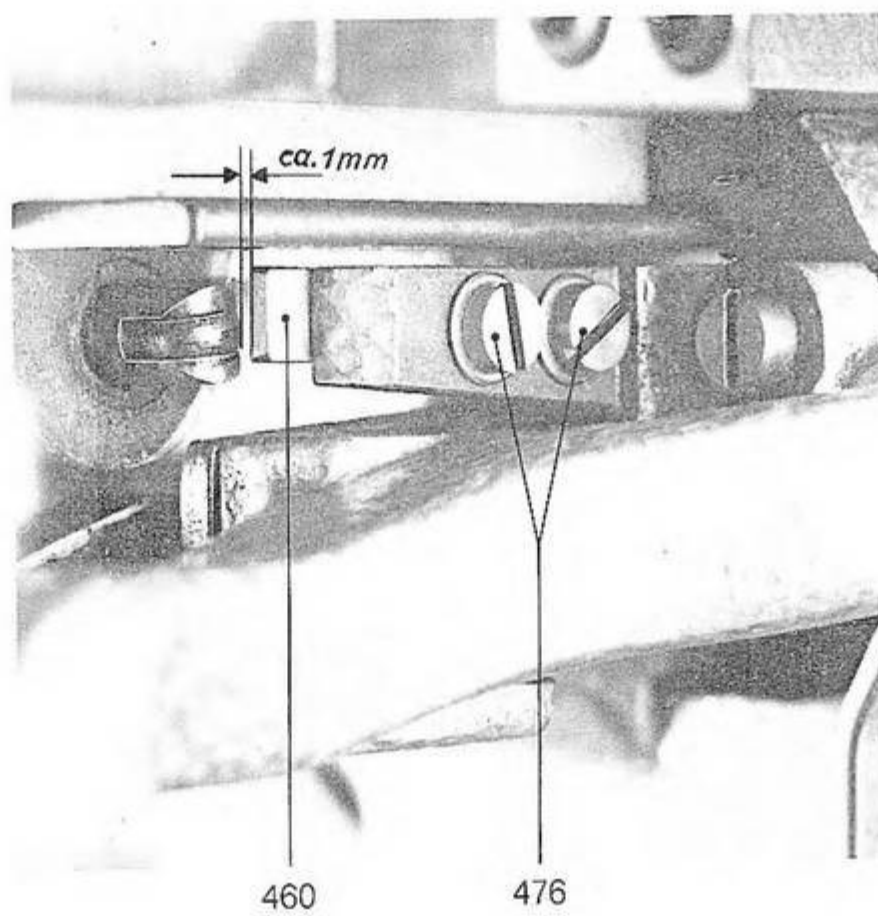


Fig. 127

39. Changing and adjusting the thread tension spring

a) Changing the thread tension spring

For changing the pulling spring 104 (fig. 128) loosen the rear screw 478 (fig. 128) and remove the tension axle 479 from the tension bush 480 (fig. 129). After changing the thread pulling spring replace the tension axle 379, introducing it into the tension bush 480 up to the top.

b) Adjusting the thread tension spring

The tension spring 104 (fig. 128) should hold the upper thread under slight tension until the needle penetrates into the fabric. If, at this moment, the thread is too slack, the descending needle might pierce its own thread. Both the deflection and the tension of the thread tension spring are adjustable.

To **adjust the deflection** of the thread tension spring 104, loosen the screw 481 (fig. 128) and turn the tension bush as required. In the r/h side of the tension bush there is a slot, into which you can introduce a screwdriver for easier adjustment of the tension bush.

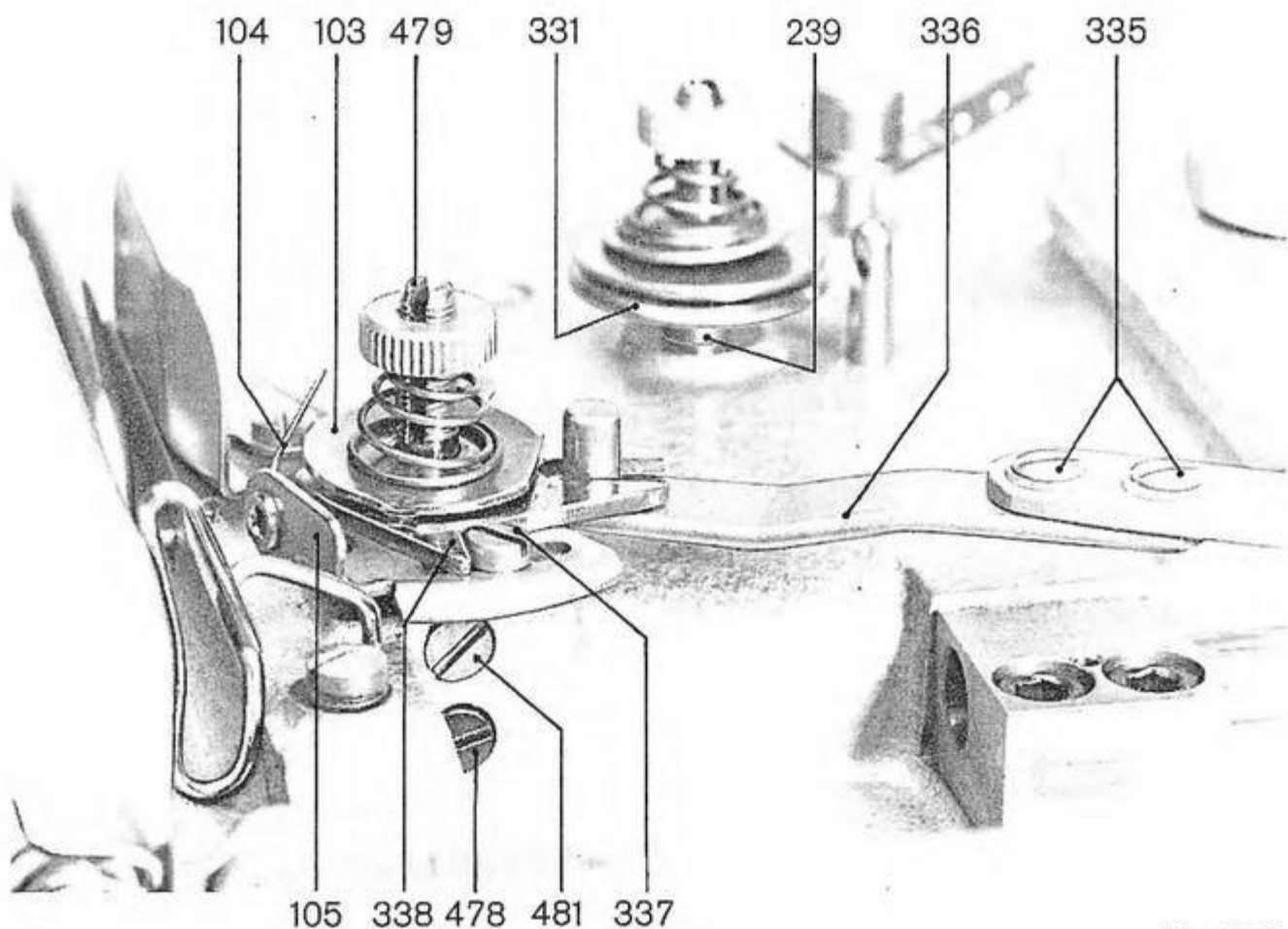


Fig. 128

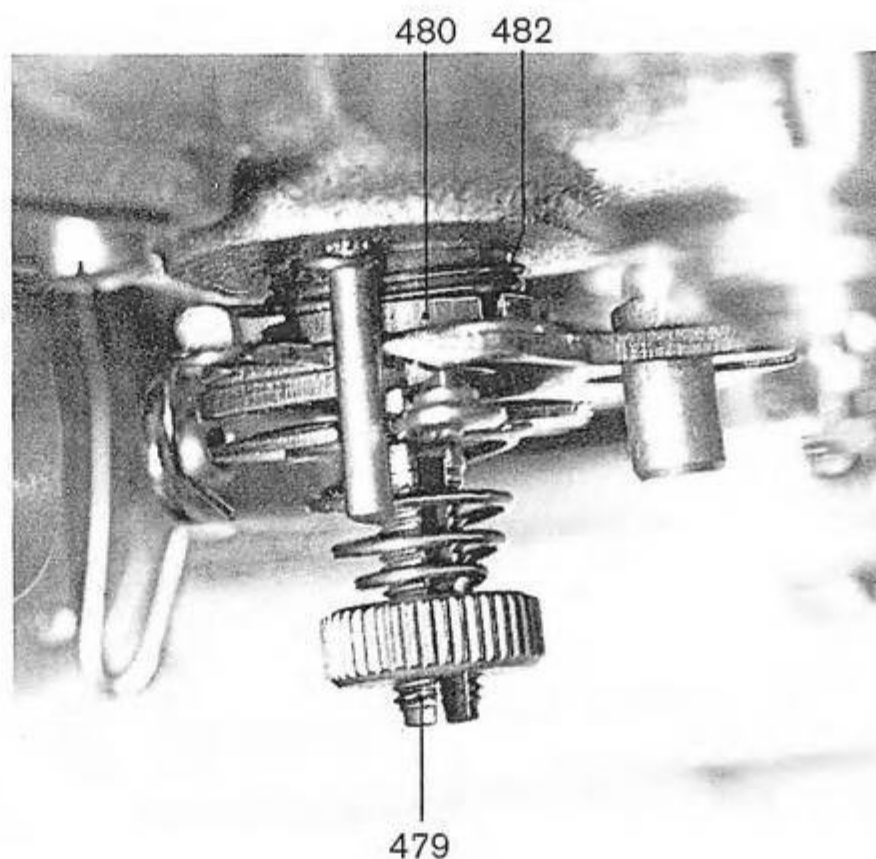


Fig. 129

The thread tension spring should normally have a stroke of 3 to 4 mm.

For **setting the tension** of the thread pulling spring 104 (fig. 128) loosen the rear screw 478 and turn the tension axle 479 as required. Turn clockwise to increase the tension and counter clockwise to decrease it.

40. Changing the hook

Before changing the hook, remove the bobbin case holder 426a (fig. 104a) after turning out the screw 429.

The hook can be removed from its shaft and replaced by a new one after having loosened the hook fastening screws 421 (fig. 33). Note that the disk 141 (fig. 33) which is possibly pulled out together with the old hook must be slipped onto the new hook. When fitting the new hook, push it against the hook shaft collar until the stop is felt (important for the lubrication of the hook!).

Adjust then the hook according to chapter 35.

When replacing the bobbin case lifter finger 431 (fig. 103), adjust it according to chapter 37 and the bobbin case holder according to chapter 36.

41. Removing and fitting the control disk

For removing the control disk 292 (fig. 63) proceed as follows: Take off the cover 483 (fig. 30). With the machine being in its disengaged final position, turn the crank until the roller elbow 301 (fig. 63) and the fastening screws 304 are no longer behind the lever 302 and the tracer 352 (fig. 80) has dropped from the disengaging cam 124 (fig. 63).

While maintaining this position, press the spring 484 (fig. 63) back into the space between the control disk and the bearing bolt 485, unscrew the fastening screws 357 and remove the control disk from the collar.

For replacing the control disk, proceed in the reverse sequence, ensuring that the pin in the collar catches into respective hole in the control cam.

When fastening the cover 483 (fig. 30) ensure that the elbow 486 (fig. 63) of the brake is located on the right or on the left of the stop cam and not below the latter on the inside of the cover 483 (fig. 30).

42. Tightening the bearing shaft for the control disk and cam disk

Proceed to this effect as follows:

1. Remove the control disk 292 (fig. 63) according to chapter 41.
2. Loosen the screw 487 (fig. 57) by some revolutions.

Note:

The screw 487 is secured by a varnish against an involuntary loosening.

3. Loosen the stud 488.
4. Knock with the handle of a screwdriver or a hammer against the screw 487 to give the bearing shaft such a longitudinal play that after retightening the screw 487 this play is still sufficient to allow the oil to pass through. Before tightening the screw 487 tighten slightly the stud 488 and, after having adjusted the longitudinal play of the bearing shaft retighten firmly the stud 488.
5. Secure the screw 487 again by the safety varnish.
6. Replace the control disk.

43. Adjusting the bobbin winder

When the winder flap 83 (fig. 130) is in contact with the winder hub, i.e. when the bobbin winder is engaged, push its wheel 489 against the flat belt so far that it will be driven by the flat belt until the bobbin with its growing thickness pushes back the flap 83 and disengages consequently the bobbin winder.

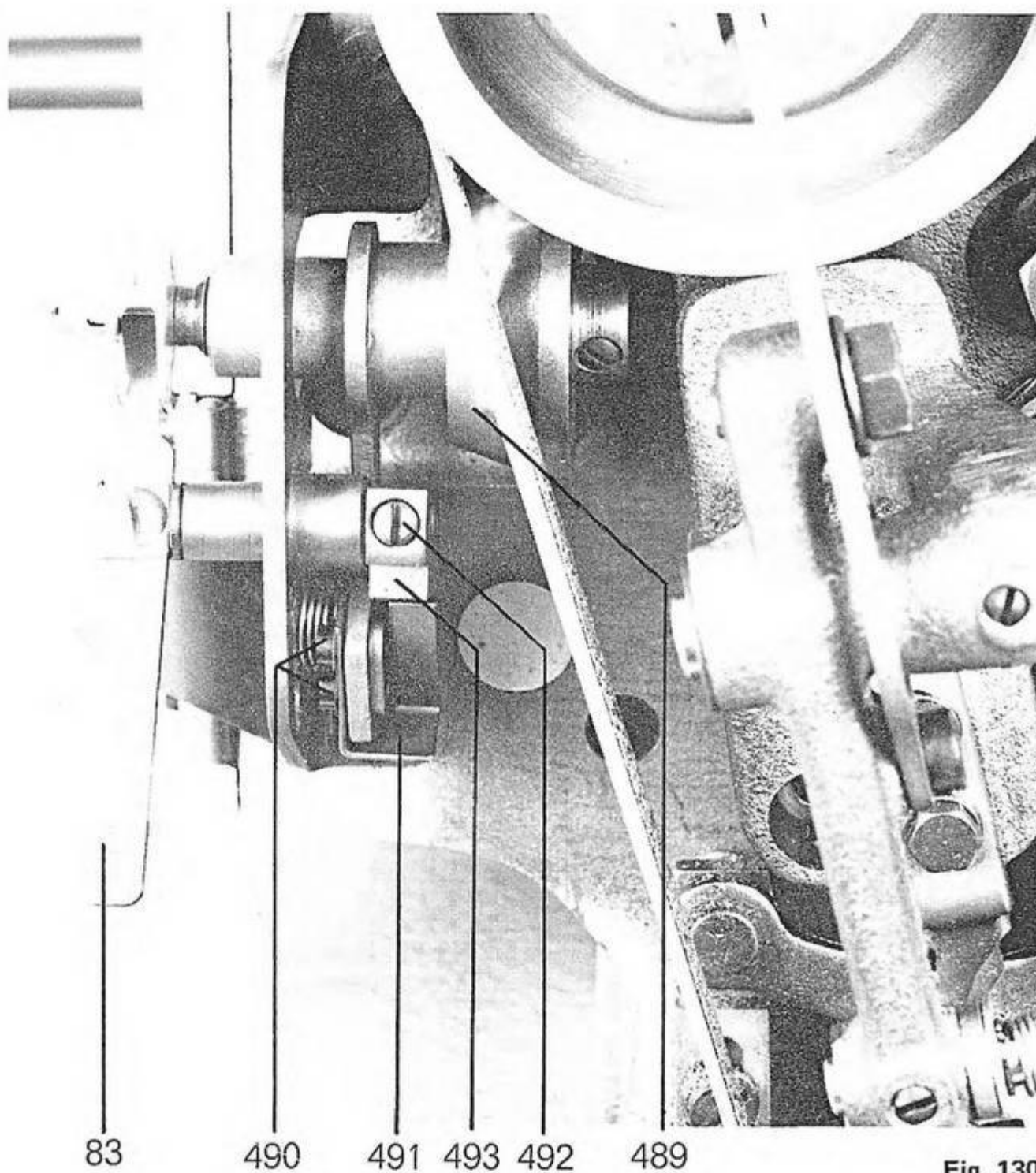


Fig. 130

The adjustment can be obtained by resetting the thrust piece 491 after having loosened the screws 490.

The moment at which the filled bobbin should push back the winder flap 83 and consequently disengage the bobbin winder can be timed by turning the block 493 on the bobbin winder flap axle after having loosened the screw 492.

Set the thread guide 81 (fig. 21) so that the thread is wound uniformly.

44. Changing the cloth presser frame

The cloth presser frame 2 (fig. 125) can be changed after removing the screw 494.

When mounting the cloth presser frame note that its fastening screw 494 corresponding to the frame length, is screwed into one of the three holes in the frame guide lever.

In the cloth presser frame with cutout length of 28 mm into front hole.

In the cloth presser frame with cutout length of 41 mm into medium hole.

In the cloth presser frame with cutout length of 54 and 66 mm into rear hole.

Loosen the screw 496 and adjust the spring 495 (fig. 125), that holds the cloth presser frame in a determinate position, so that at the moment when the cloth presser frame touches the throat plate the bottom of the frame is parallel to the throat plate surface.

The fastening screw 496 of the spring 495 should be turned into the front hole in case of cloth presser frames with cutout lengths of 28 and 41 mm and into the rear hole in case of frames with cutout length of 54 and 60 mm.

45. Adjusting the oil pressure in the hydraulic control gearing system

When the control unit is operating and has reached the operating temperature, the oil pressure should amount to 15 kp/cm².

The oil pressure can be adjusted as follows:

1. When checking the oil pressure, the control unit must have reached the operating temperature, i.e. it must have run for at least 1 hour with the lifter piston under pressure (cloth presser frame lifted).

2. Disengage then the driving motor and turn out the screw plug 487 (fig. 11) with the gasket.
3. Screw then into this free hole, as shown in fig. 131, the manometer 498 with gasket. Manometer ref. No. 5562301.
4. Engage again the driving motor and check whether the manometer shows now the proper pressure of 15 kp/cm². Adjust the oil pressure, if required.
5. In order to alter the oil pressure, turn out the screw plug 499, loosen the counter nut 500 and, by means of a screwdriver, passed through the free hole of the screw plug 499, turn the regulating screw accordingly.
6. If the adjustment is correct, hold the regulating screw in position by a screwdriver, tighten the counter nut 500 and turn in and tighten the screw plug.
7. Disengage the driving motor, take off the manometer screw in the screw plug 487 (fig. 11) with the gasket.

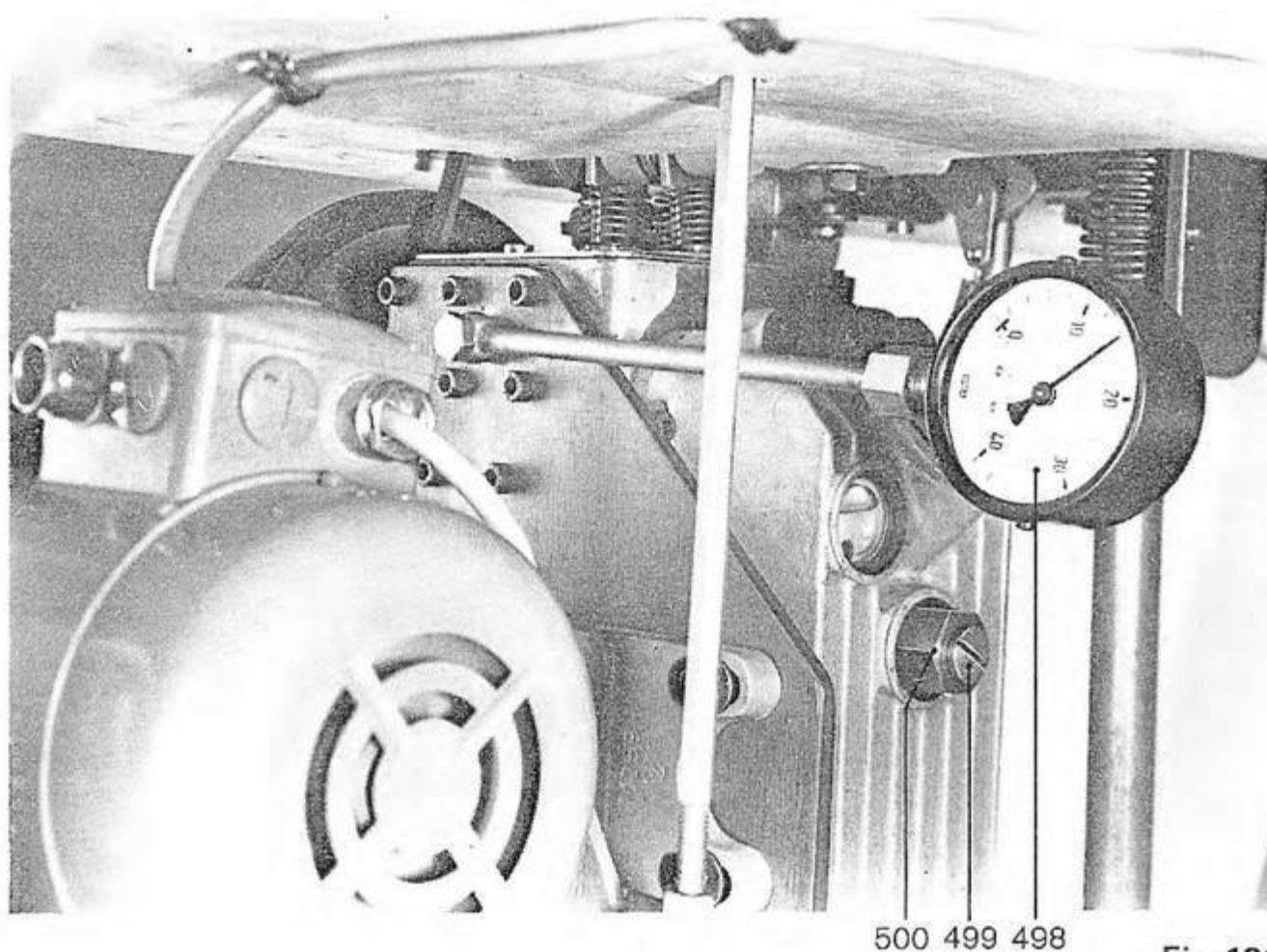


Fig. 131

46. Resetting for buttonholes with relief type bars

The machines are supplied by the factory for flat-bar buttonholes, permitting to use in the needle for instance a core thread 120.

But this does not apply to DÜRKOPP 556-1106. This machine sews eyelet buttonholes with relief type bars, requiring for the needle a cotton thread NeB 40/4 and for the bobbin a polyester fibre thread Nm 80/3.

In machines for sewing flat-bar buttonholes the cam disk 322 (fig. 132) has two tension releasing sheets.

The releasing sheet 501 opens the main tension during the first bartack while the releasing sheet 502 opens it during the final bartacking. The releasing sheets should be adjusted as follows:

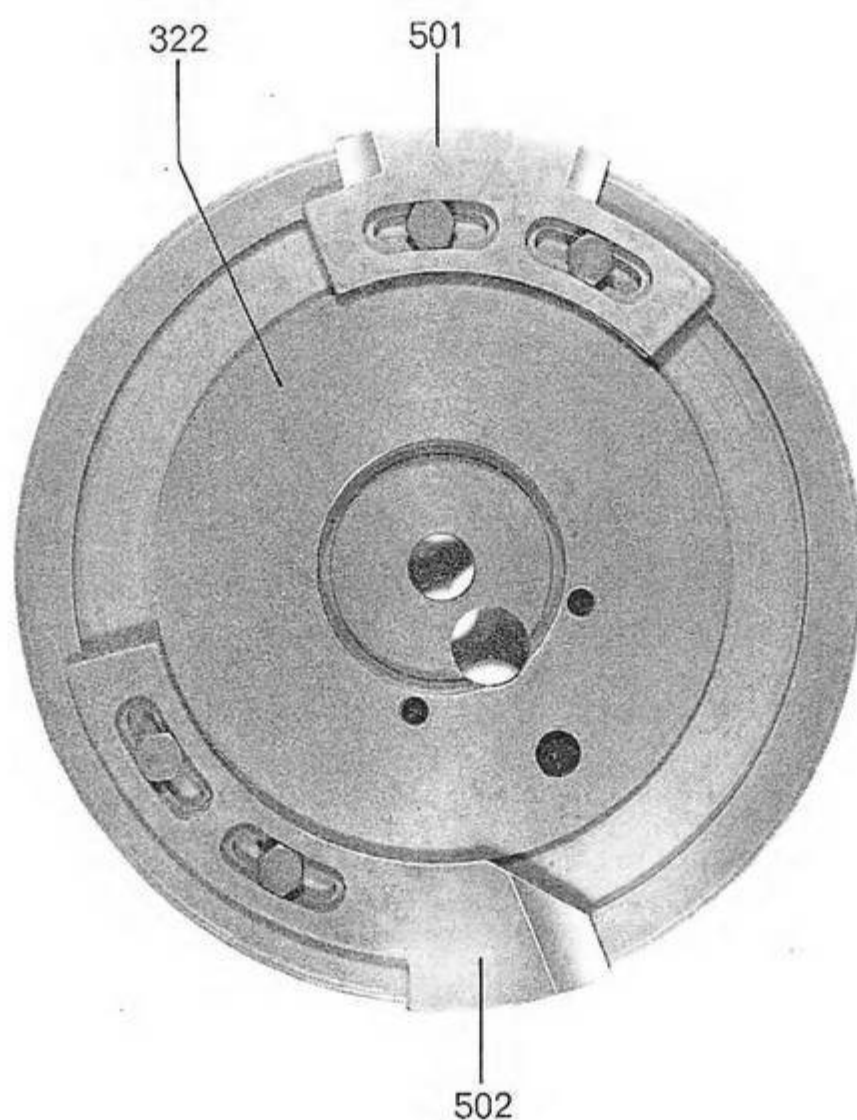


Fig. 132

Adjust the releasing sheet for the first bar on the cam disk so that the bar is being sewn when the tension is open. The latter should be closed again for obtaining a perfect releaf type seam. In case of a buttonhole of 1/2", sewn with 120 stitches, the machine produces at the beginning of the second seam (row) still 2 to 4 stitches with the upper thread tension released.

This adjustment should be checked by hand.

However, certain materials may require that the tension is closed again already when sewing the first stitch of the second row.

Adjust the tension releasing sheet for the final bar according to chapter 30, item j).

For resetting for buttonholes with relief type bars, remove from the cam disk the releasing sheet 501 for the first bar and exchange the releasing sheet 502 for the final bar against a releasing sheet included in the accessories. Adjust this sheet according to chapter 30, item j).

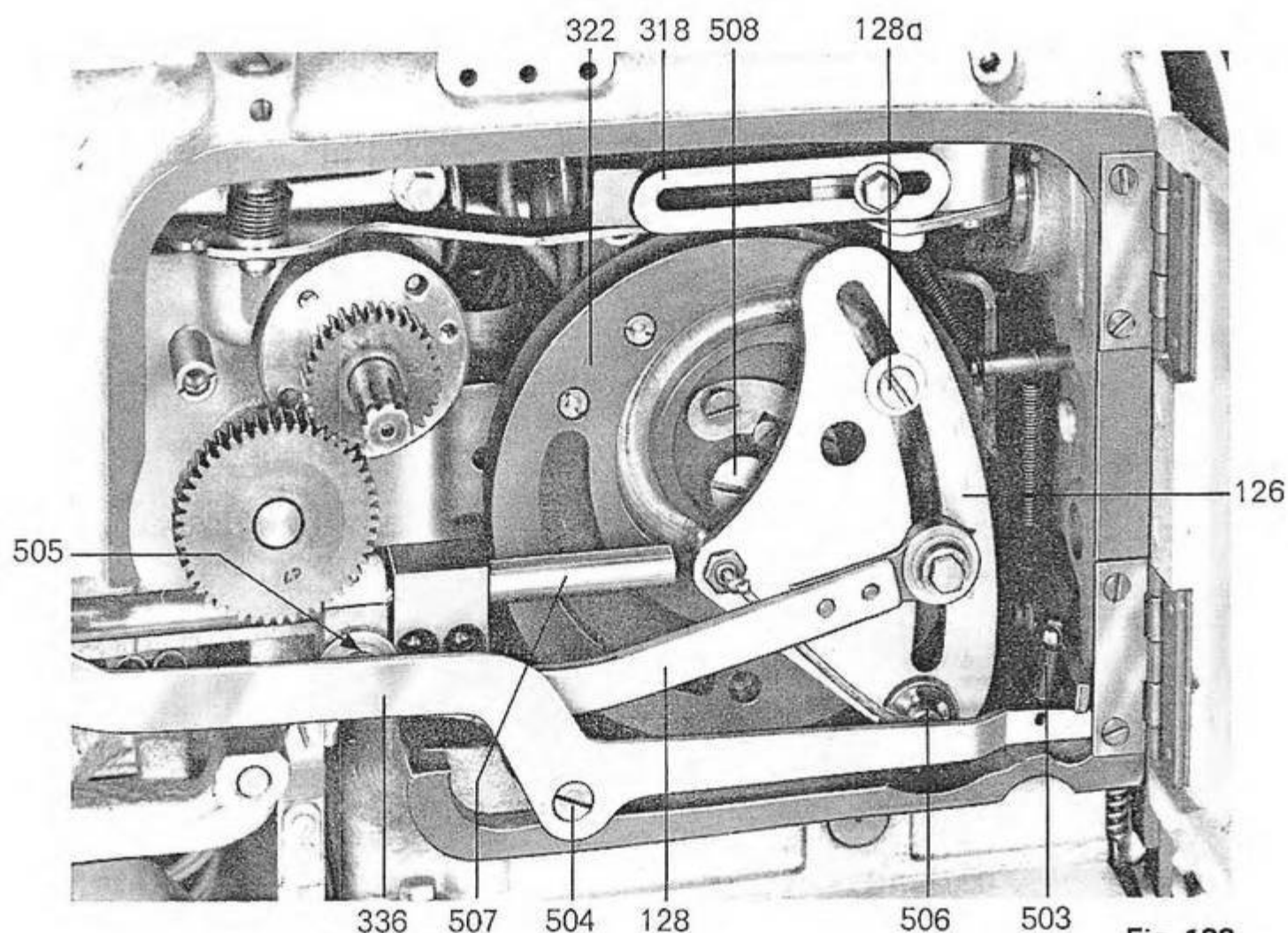


Fig. 133

For removing the cam disk, proceed as follows:

1. The machine is in disengaged final position.
2. Remove the crank 1 (fig. 3), turn out the screw 118 and open the cover 119.
3. Remove the releasing lever 336 (fig. 133). For doing that, hang out the spring 503 and turn out the screw 504.
4. Loosen the fastening screws (studs) of the bolts 505 and 506 (the fastening screw of the bolt 506 is accessible through a borehole on the backside of the machine), and remove the coulisse 126 with the lever 128.
5. Turn back the threaded sleeve 115 (fig. 27) so that no spring pressure is exerted on the cloth presser frame. Advance then the scissors and swing them to the left so that they are arrested in this position.

Now, the cloth presser frame and consequently the axle 507 (fig. 133) can be advanced so far that the cam disk, after turning out the screw 508, can be removed from the machine. For doing that, advance slightly the coulisse 318.

For fitting the cam disk, proceed in reverse order.

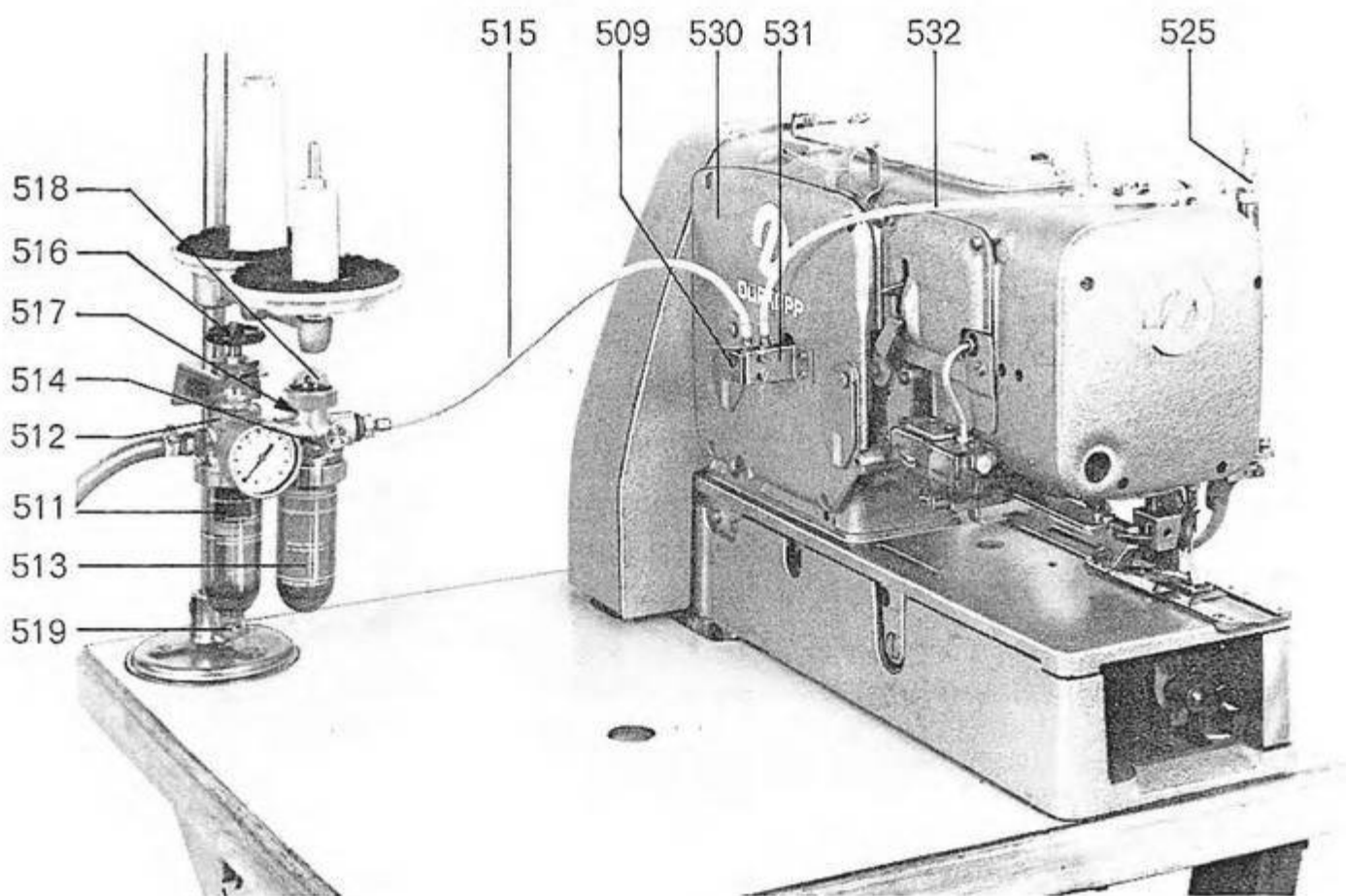


Fig. 134

47. Pneumatic fabric holder

Ref. No. 556 7201 with conditioning unit,
Ref. No. 556 7202 without conditioning unit.

The pneumatic fabric holder guides the needle thread beginning and holds the fabric down immediately beside the needle. Thus the beginning of the needle thread is perfectly included in the row and the work does not vibrate.

The fabric holder is operated pneumatically by means of the roller valve 509 (fig. 134), the latter being controlled by the cam disk 510 (fig. 135). The compressed air must have the pressure of about 6 bar. The air should be free from water and should be slightly saturated with oil.

If these requirements cannot be met by the factory-own compressed air line, use a compressed air conditioning unit.

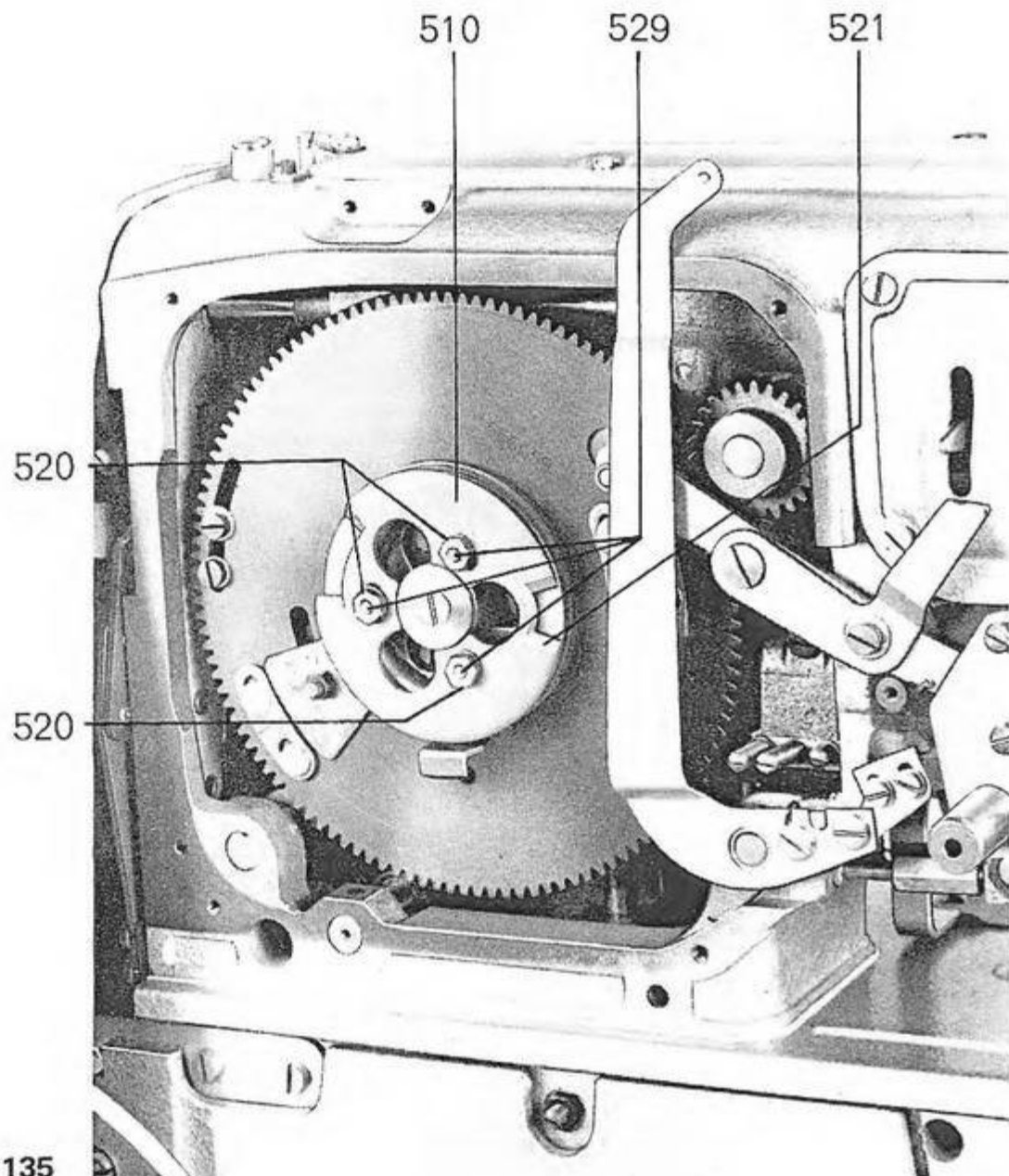


Fig. 135

a) Conditioning unit and connecting to the compressed air line

The conditioning unit consists of the filter 511 (fig. 134) for separating water and dirt, of the pressure regulator 512 for adjusting the service pressure and of the oil atomizer 513 for saturating the compressed air with oil.

Fill the oiler 513 with oil up to the "maximum" mark after having turned out the screw 514. Use Spinesso 10 oil or an oil of equivalent quality.

After establishing the hose connection 7, the unit can be connected to the compressed air line by means of the connection hose and hose coupling.

Set the service pressure by turning the wheel 8.

The intensity of the oil atomizer can be regulated by turning the screw 517 (fig. 134). Adjust it so that after about 15 to 20 working cycles a drop of oil is lost by the tube under the sight glass 518.

At certain intervals check the oil level in the oiler. It should never drop below the "minimum" mark. If when replenishing the oiler the conditioning unit is under pressure, stop the compressed air supply by turning the wheel 516 counter clockwise before turning out the oil filling screw 514 (fig. 134).

The condensed water, accumulated in the filter tray 511, is blown out by removing the draining screw 519 while the conditioning unit is under pressure.

In no case should the condensed water reach the filter cartridge.

If after a certain period of time the filter element and the filter tray are filthy, wash these parts by petrol for washing purposes. The filter element should finally be blown clean by the compressed air. Do not use for washing the filter tray acetone, benzole, thinners or similar solvents, because they would destroy the filter tray.

b) Adjusting the control cam

The fabric holder should descend as soon as seaming is started. After loosening the nuts 520 adjust the control cam 510 (fig. 135) so that with the machine being in its final position, the edge 521 of the cam disk 510 touches the roller of the valve 509 (fig. 134). This will ensure that the valve 509 is actuated and the fabric holder is lowered as soon as the sewing process begins.

c) Adjusting the fabric holder and the speed regulator valve

Adjust the fabric holder 522 (fig. 136) after having loosened its fastening screws so that it moves in the fabric presser frame without touching same and that there is a certain distance with respect to the knife and to the needle bar. In this position, the fabric holder should move easily in the guide 523. Align the guide 523 accordingly.

The fabric holder should rest on the work like a spring, i.e. it should not touch the throat plate and it should be easy to lift it from the fabric by a manual pressure.

Adjust the clamp 524 on the pressure bar accordingly.

The fabric holder should move quickly but not too suddenly. This can be adjusted by the throttle valve 525 (fig. 136).

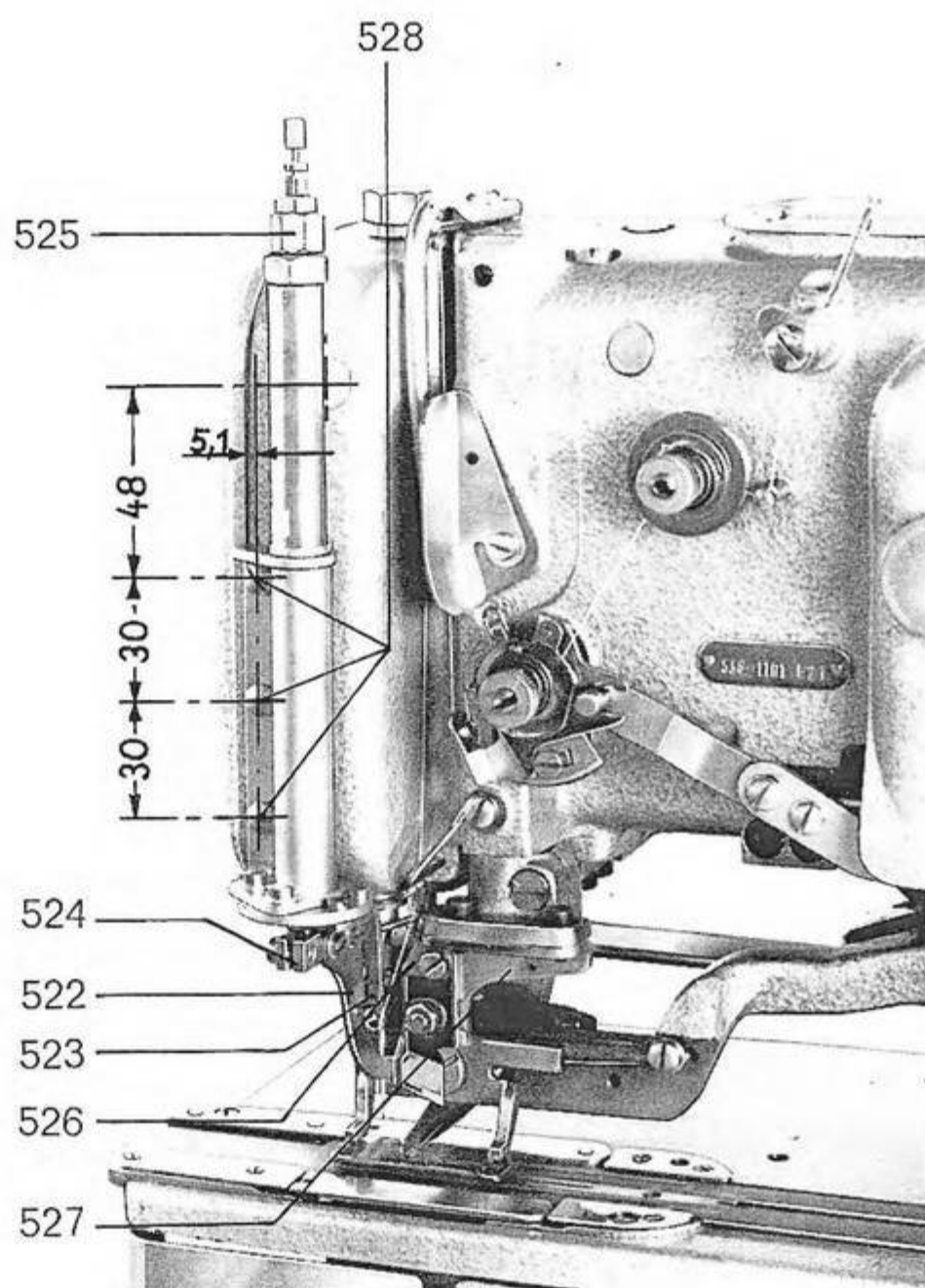


Fig. 136

d) Subsequent fitting of the pneumatic fabric holder

The machines already in use can be fitted subsequently with said pneumatic fabric holder.

For fitting, proceed as follows:

1. Replace the knife reception plate 290 (fig. 119) and the angular holder 287 by the knife reception plate 526 (fig. 136) and the angular holder 257 included in the accessories.

Adjust the reception plate 526 and the angular holder 527 according to chapter 29.

2. Remove the three screws on the r/h side of the head and fasten the sub-assembled fabric holder by the available screws 528 as shown in fig. 136. In older machines, drill for this purpose three M4 holes according to fig. 136.

Ensure that no metal chips get into the inside of the machine.

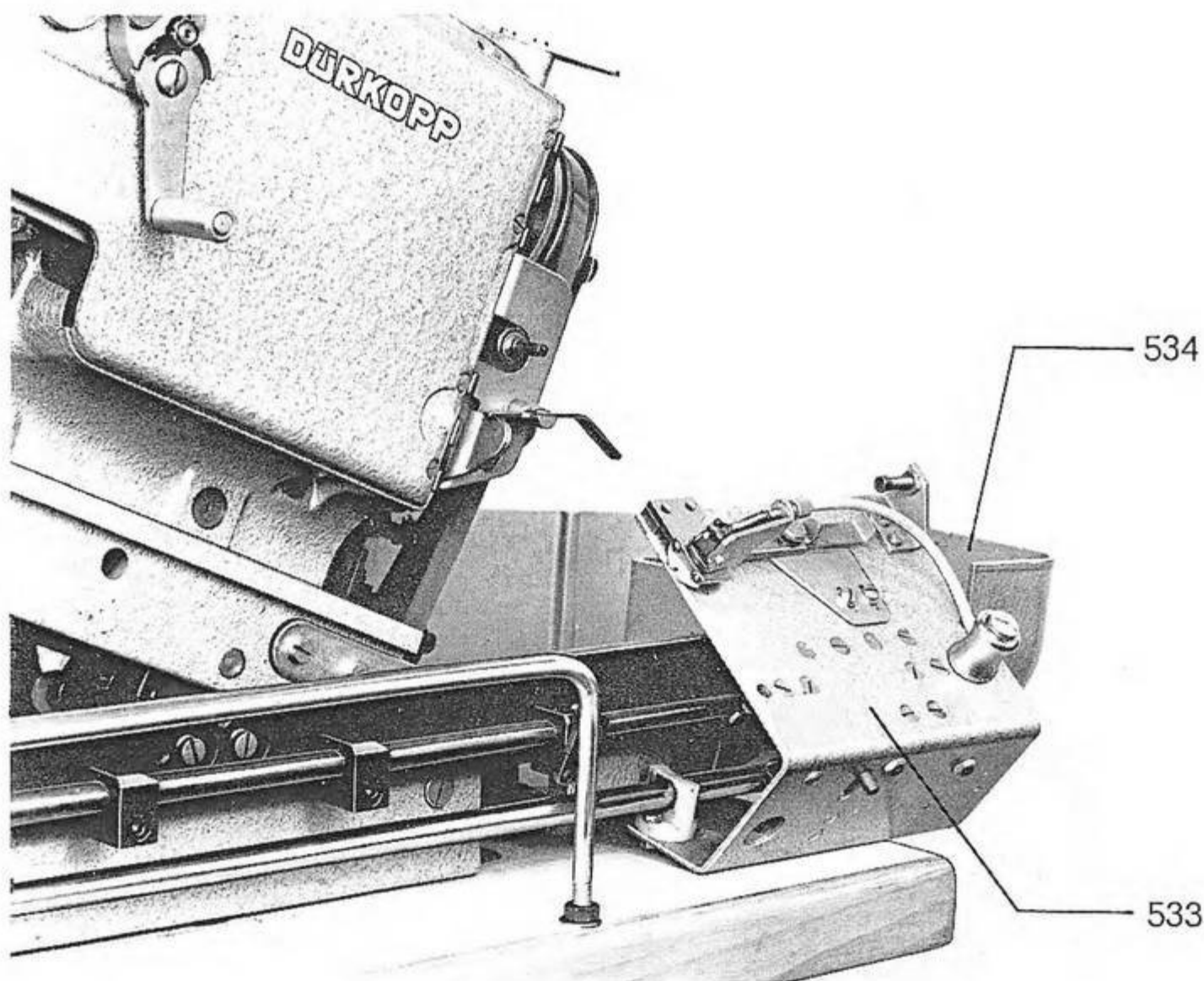


Fig. 137

3. After removing the l/h side cover, the control cam 510 (fig. 135) can be mounted as shown in fig. 135. After turning out the screws use the available threaded bolt 529. The springs on the screws can be used again. Instead of the removed lateral cover mount the cover 530 (fig. 134) with the roller valve 509. Set the valve in the oblong holes of the square 531 so that in the operated condition there is still a small distance between the roller and the valve, i.e. the cam 510 (fig. 135) should not press against the valve.
4. Fasten the conditioning unit to the thread unwinder according to fig. 134. Pass the hose 515 from the conditioning unit to the roller valve 509 and the hose 532 from the roller valve 509 to the throttle valve 525.

48. DÜRKOPP 556-11101

This automatic lockstitch machine with manual jump feed serves for sewing buttonholes in shirt fronts.

a) Installing

After installing the machine base and the hydraulic control unit on the table top move the carriage 533 in its r/h final position and swing it forwards to enable free installation of the machine head and of the cover. See fig. 137.

Note:

Swing the carriage 533 (fig. 137) forwards also when erecting the machine head and when swinging out the cover.

Otherwise there is a danger of breakage!

Do not return the carriage 533 before swinging up the cover 534.

Then the carriage 533 can be pulled to the left against the springy stop 535 (fig. 138). A ratchet will drop behind the first stop block 536 and will arrest the carriage in its initial position.

b) Setting the buttonhole distances in the feeding direction

In first fronts where the collar has not yet been attached, the distance from the upper edge to the first buttonhole is determined by the position of the stop 537 (fig. 139). Adjust the stop 537 accordingly after loosening the screw 538. If the adjustment range of the stop 537 is not sufficient, reset the base plate 539 of the stop by one hole distance on the carriage.

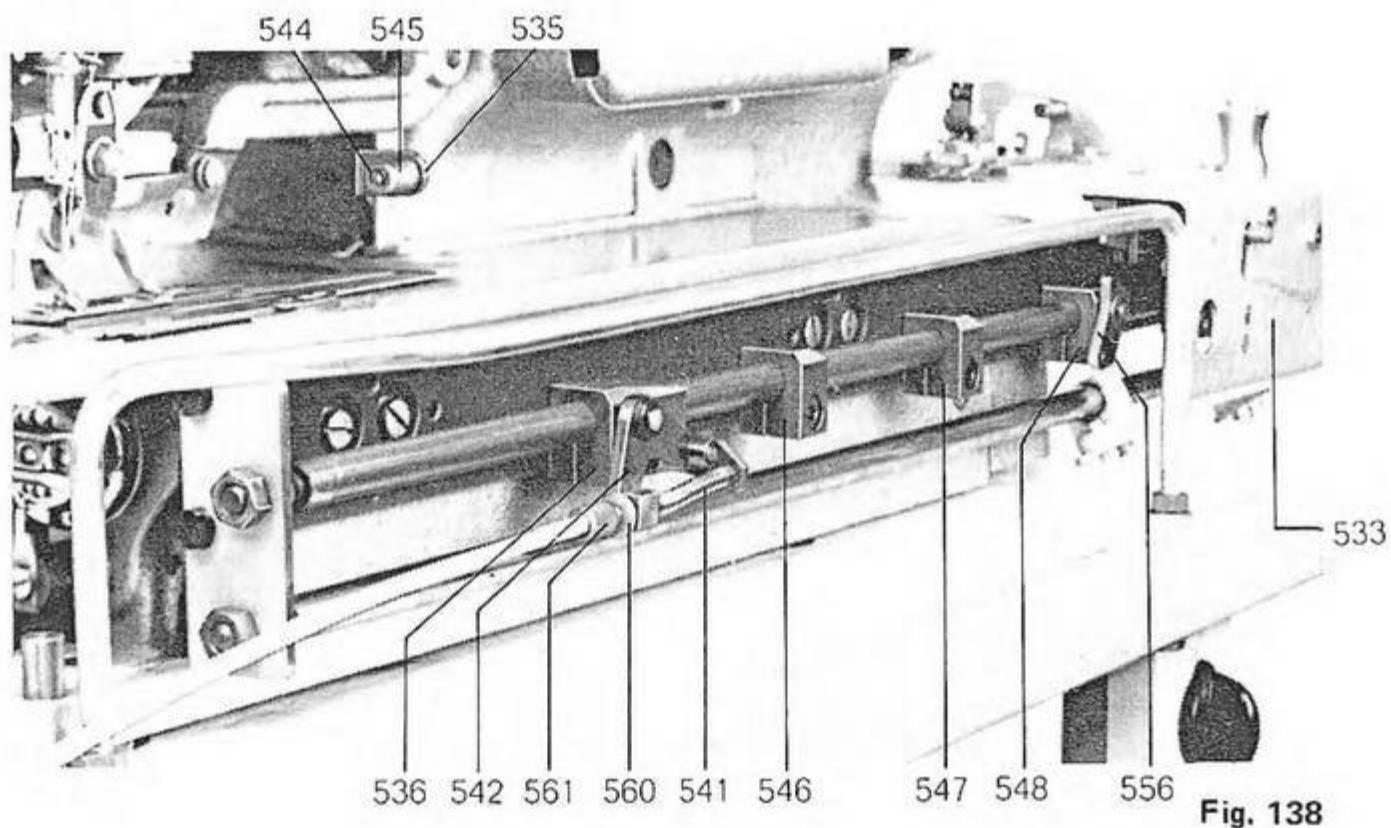


Fig. 138

Furthermore, the distance of the first buttonhole can be modified by resetting the stop block 536 (fig. 138). Ensure that the descending knife holder 287 (fig. 139) can freely pass along the clamp 540 when the carriage is in its l/h end position.

Hang out the Bowden cable 541, swing up the roller square 542 and adjust the stop block 536 (fig. 38) by the screw which is then accessible.

The adjustment of the stop block 536 may require the vertical adjustment of the Bowden cable after loosening the clamp under the table top, so that, when engaging the machine said cable can freely move between the carriage, standing the l/h end position, and the left guide bar holding sheet.

If the stop block 536 has been reset, readjust accordingly also the stop screw 543 (fig. 139).

Adjust the stop screw 543 so that with the carriage being in its left end position and touching the block 536 (fig. 138) the distance between the safety disk 544 on the spring bolt and the guide sleeve 545 ranges between 1 and 2 mm.

The distances between the further buttonholes can be determined by the respective adjustment of the stop blocks 546, 547, 548, 549 and 550 (fig. 140). In fig. 140, the stop block 550 for the sixth buttonhole is set fully to the right, i.e. it is not used.

c) Distance of buttonholes from the front edge of the shirt front

In no striped fabrics this distance can be obtained by adjusting the stops 551 and 552 (fig. 140) against which the shirt front must be placed.

In striped fabrics swing the stop 551 (fig. 140) backwards and pull the stop 552 to the right.

Align the striped fabrics according to the marks 553 and 554 (fig. 139).

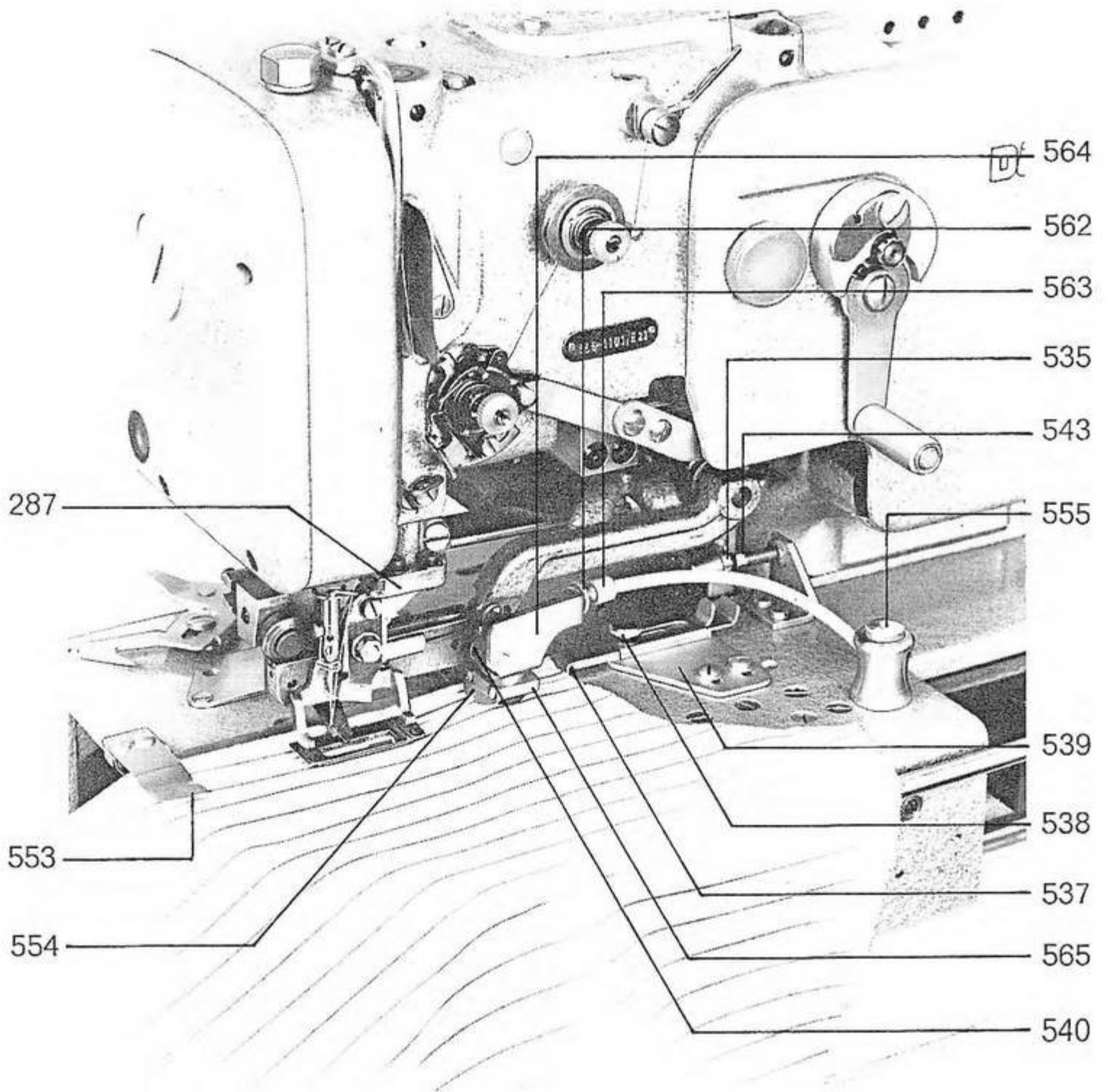


Fig. 139

d) Operation

After positioning the shirt front, as described above, start the machine in order to close the clamp and sew the buttonhole.

After the completion of the buttonhole operate the button 555 (fig. 139) and pull the carriage by the hand to the right up to the next stop. During this motion to the right guide the fabric by the left hand according to the left guide 551 (fig. 140) or according to the mark 553 (fig. 139).

After having sewn the desired number of buttonholes pull the carriage again to the left. The ratchet 556 on the block 547 (fig. 138) will release the clamp and it will be possible to remove the shirt front.

The stop block 548 with the releasing ratchet 556 should be the last but one of the stop blocks used, so that the ready shirt front can be quickly removed from the clamp.

If for some reasons the clamp should be closed or opened by hand, this can be done by lifting or lowering the pin 557 (fig. 140).

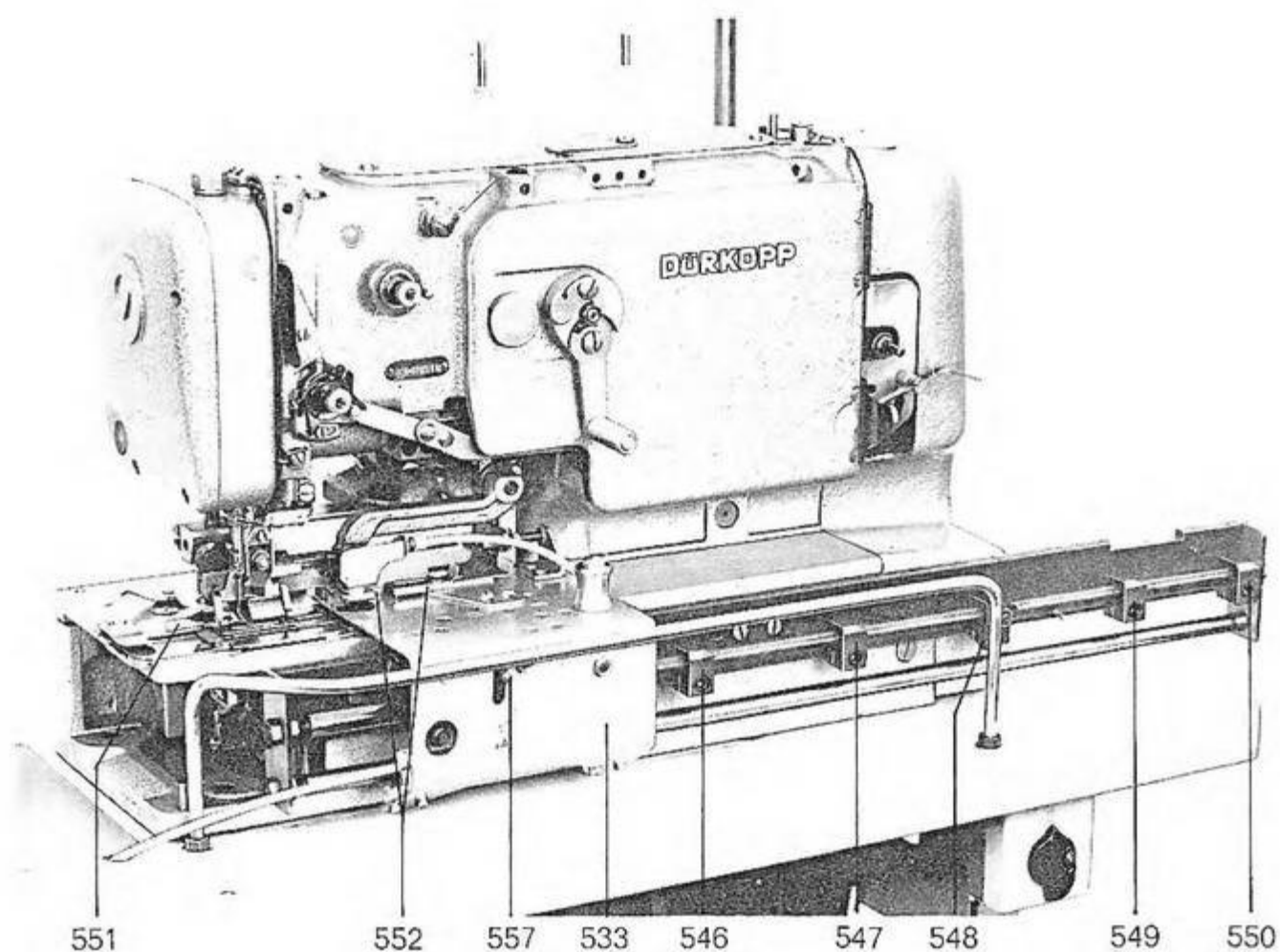


Fig. 140

e) Adjusting the roller angle for the clamping device

At the moment when the sewing process is started by lowering the r/h pedal and when the clamping device is closed the distance between the roller 558 (fig. 141) of the square 542 and the lever 559 should amount to about 0.5 mm.

This distance can be adjusted by the screw 561 after having loosened the counter nut 560 (fig. 138).

f) Adjusting the clamping pressure of the clamping device

The clamp pressure has been set for normal fabric thicknesses.

For ensuring a perfect function of the clamp when sewing very thick materials, loosen the counter nut 562 (fig. 139) and turn the screw 563 into the square 564 accordingly.

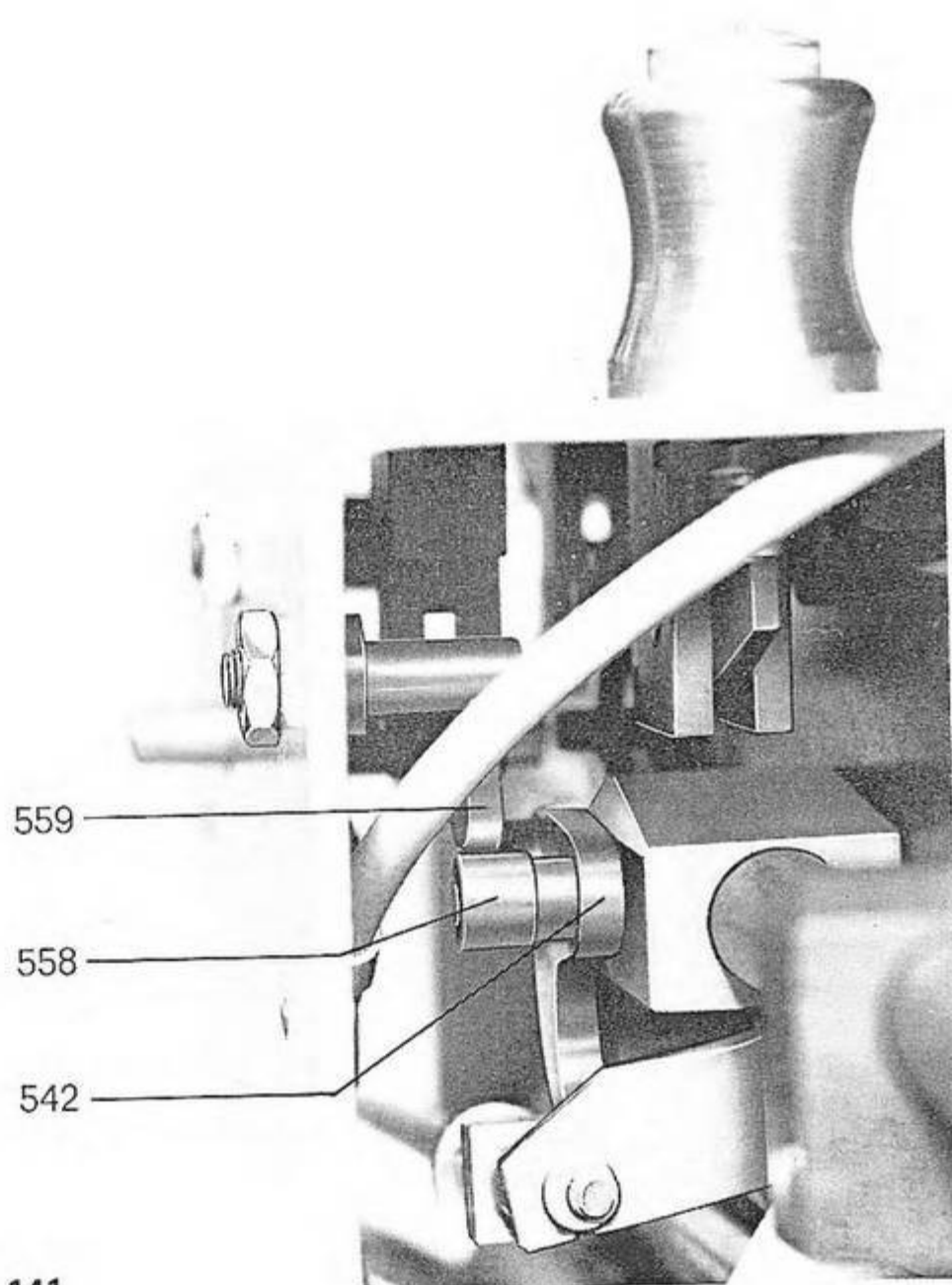


Fig. 141

Note:

When handling shirts with already attached collar, remove the stop 539 (fig. 139) for positioning the work. In this case set the stop block 536 (fig. 138) so

1. that the angular knife holder 287 (fig. 139) does not touch the clamp 540,
2. that there exists the necessary distance between the collar and the first buttonhole to be sewn.

For this purpose it is necessary to position the shirt front according to a sight mark, e.g. the rear edge 565 (fig. 139) of the clamping device.

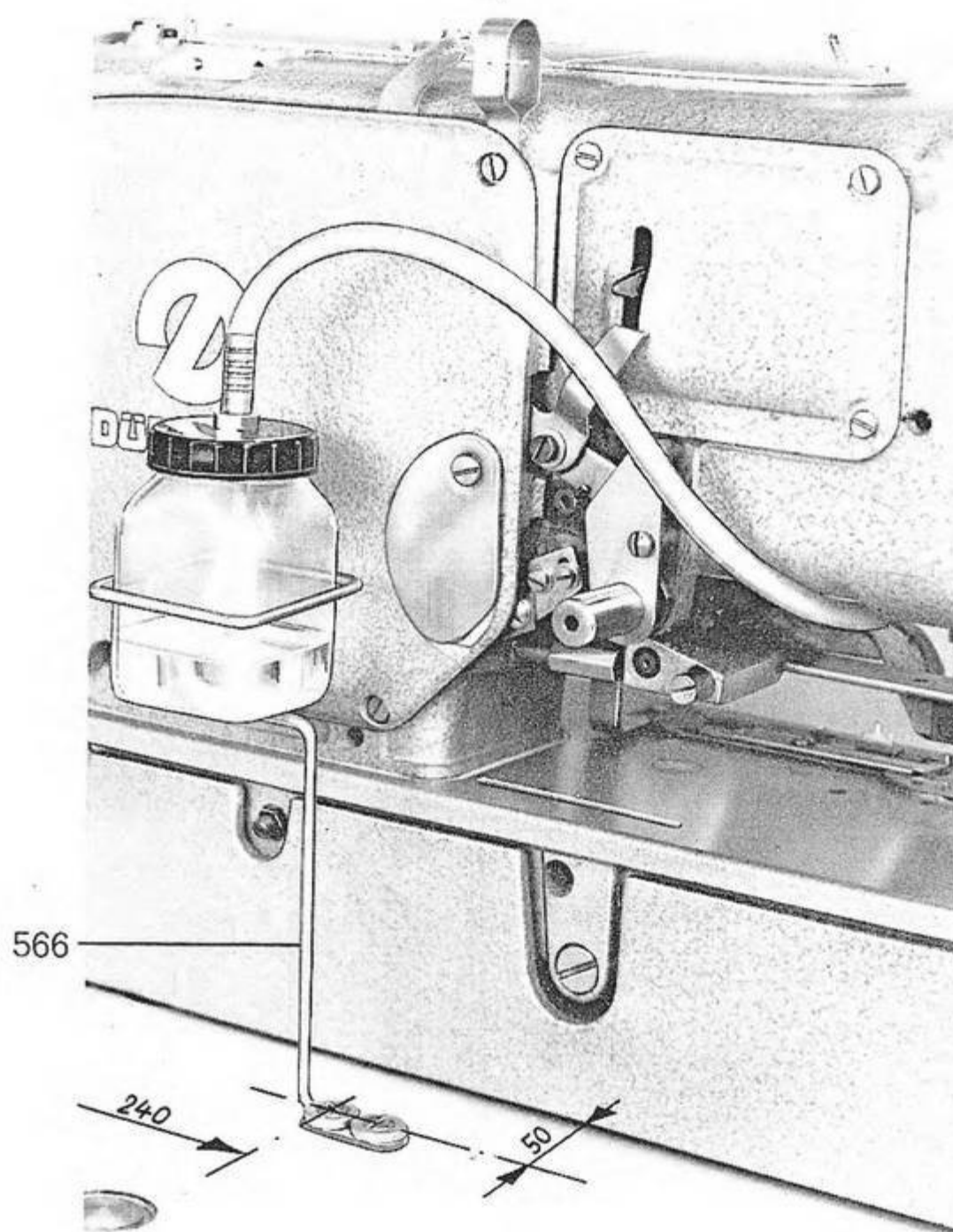


Fig. 142

49. Subsequent fitting of a thread oiler

By using the thread oiler, ref. No. 556 2842, with a suitable lubricant, the clogging of the needle and the thread breakage will be avoided when handling certain materials.

As lubricant, use a mixture of one part of silicon oil AK 100 and three parts of Shell-sol T. Under the ref. No. 93311518 you can order from DÜRKOPP 1 litre tin of silicon oil AK 100 and a 3 litre tin of Shell-sol T.

For fitting the thread oiler, proceed as follows:

1. Fasten the coil container holder 566 (fig. 142) on the table top as shown in fig. 142 — 50 mm from the base edge and 240 mm from the base rear edge.
2. Remove the thread guide from the arm head and fasten there the sub-assembled block 567 by the screw 568. See fig. 143.

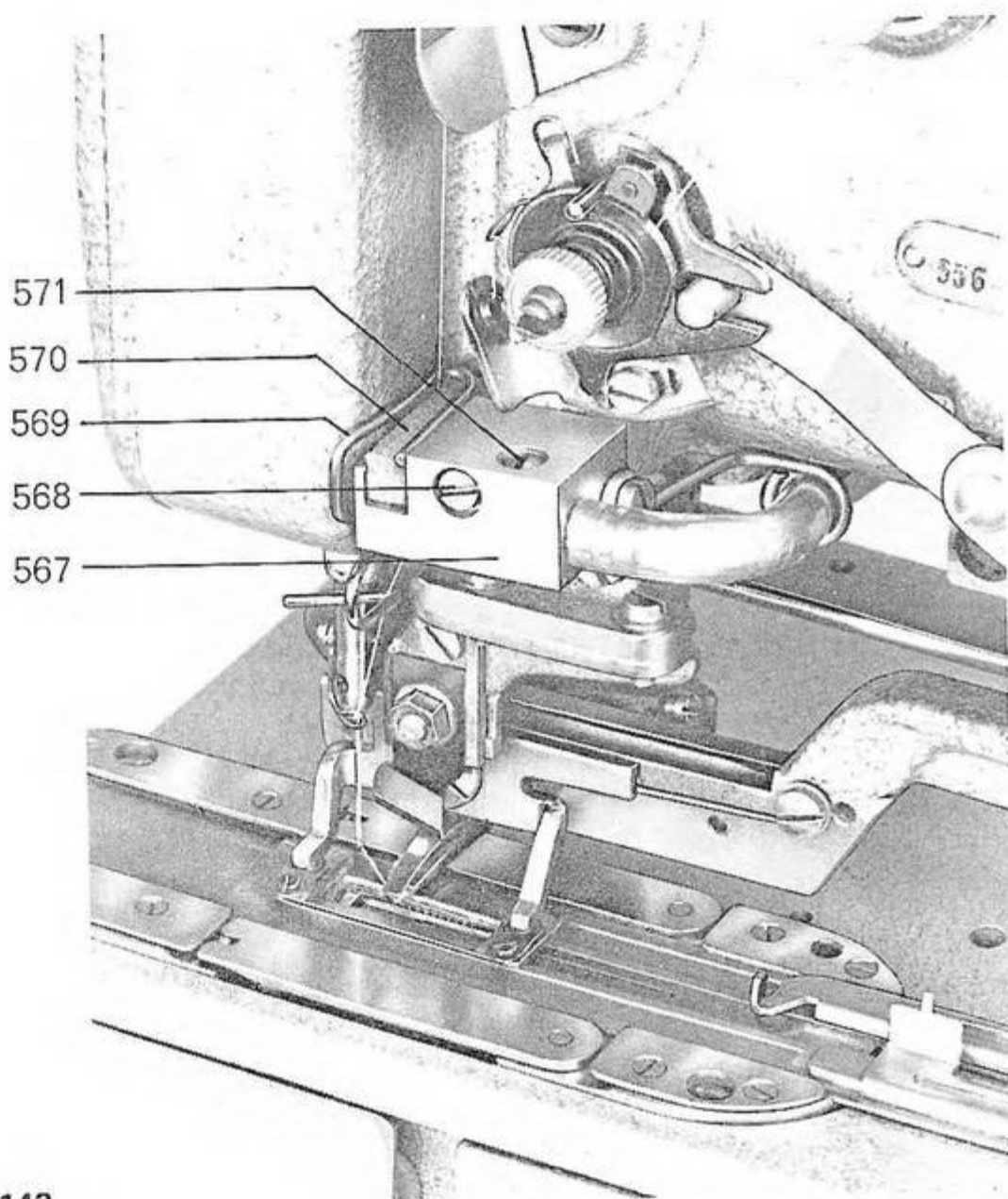


Fig. 143

Introduce the thread guide 569 first from the rear into its reception hole in the block 567. If required, rectify the thread guide so that the needle thread is in contact with the oil felt 570, but without being excessively braked by the latter.

3. The thread lubricant quantity fed can be regulated. Turn the screw clockwise to reduce the quantity and counter clockwise to increase it.

4. When filling the container with the lubricant for the first time, it takes some time until it reaches through the wick the contact felt. Meanwhile the contact felt 570 must be lubricated from an oil can.

50. DÜRKOPP 556 with cutting plate of plastic material

In case of certain synthetic light weight fabrics it is impossible to obtain with the normal 556 cutting equipment perfectly cut button-holes.

But for the clean cutting of such materials we have a throat plate with cutting plate of plastic material and a knife with rectangular cutting edge.

Transformation

Install new throat plate with cutting plate of plastic material.

Changing and adjusting the knife

1. Remove the old knife.

2. Start the machine and short before the knife action arrest it by the motor protective switch.

3. Remove the driving belt and turn the machine by hand until the knife block is at its lowest point. In this position, mount the new knife, so that the cutting edge rests on the cutting plate of plastic material. Then continue turning the machine until it is disengaged.

5. Adjust the knife by the gauge, perform by the machine some cycles and sew a buttonhole. If the latter is not cut up perfectly, telescope the gauge by further 0.2 mm and lower the knife accordingly. Lower the knife each time 0.2 mm until the buttonhole is cut up perfectly. Generally, the knife must be lowered about 1 mm. But this value is only a reference value.

Note:

Once set by the gauge, the knife height is quickly adjusted after each change. However only in the machine for which the gauge has been adjusted.

If several machines are fitted with plastic cutting plate and consequently there are several gauges, mark these in order to avoid any confusion.

In case of machines supplied by the factory with plastic cutting, the respective gauge has been set accordingly and it bears three last numbers of the machine.

Changing the cutting plate, ref. No. 556 6984

1. With the machine being disengaged, lift the cloth presser frame by introducing under it a suitable object.
2. Remove the front and the rear r/h cover of the throat plate.
3. Lift slightly the bottom feed slide, front and rear, and swing to the right.
4. Lift the plastic cutting plate by a screwdriver and replace it by a new cutting plate.
5. Fit the removed parts in reverse order.

51. Needle thread monitor

The DÜRKOPP 556 is now supplied with a thread monitor. Since it takes only about 2 seconds to sew a shirt buttonhole, it is difficult for the operator in case of thread breakage etc. to stop the machine by pedal action, particularly when the disturbance occurs in the last row.

The thread monitor, however, reacts automatically and avoids that the buttonhole is cut up at the end of the sewing cycle.

After the elimination of the disturbance the buttonhole can be stitched or overstitched once again. By means of a crank it can be transported in the position where the disturbance has occurred and the sewing can be continued.

2.1. Function and adjustment of the thread monitor

The needle thread, passed through the guide 1 (fig. 145), holds the thread monitor in the front operating position. In this position, the distance between the lever 2 (fig. 146) and the square 3 should be about 3 mm.

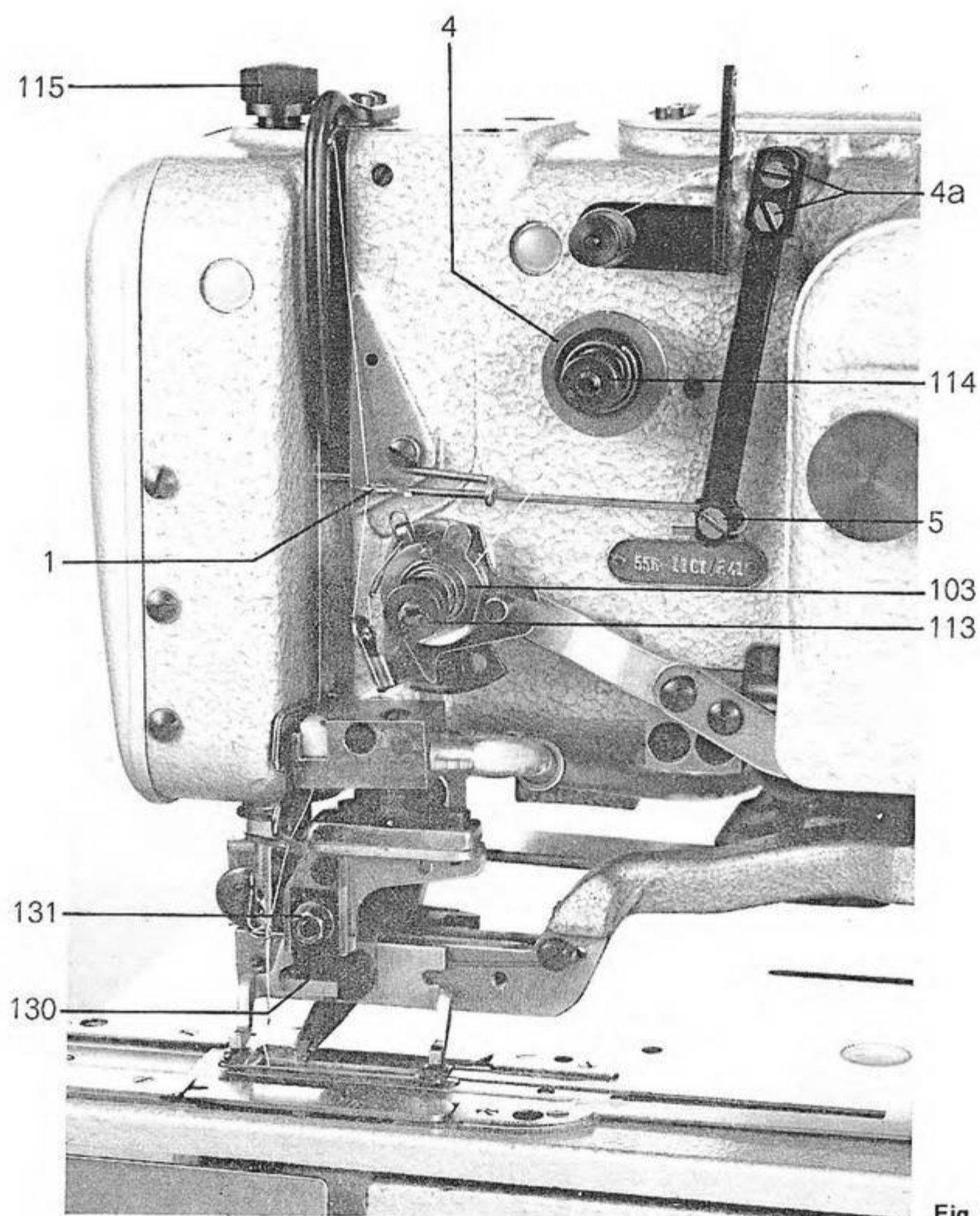


Fig. 145

The distance can be regulated after loosening the screws 4a (fig. 145). The guide 1 can be reset after loosening the screws 5.

In case of thread breakage, the thread monitor moves backwards and the square 3 (fig. 147) falls below the lever 2. This avoids the downwards motion of the lever 2 and, consequently, the action of the knife. The distance between the square 3 and the lever 2 should amount to about 1.5 mm. For adjusting, loosen the screws 6 and set the square 3 accordingly.

The spring 8, returning the monitor in case of thread breakage, can be tightened by turning the setting ring 7.

For sewing a buttonhole at braking speed, do not pass the needle thread through the guide of the thread monitor.

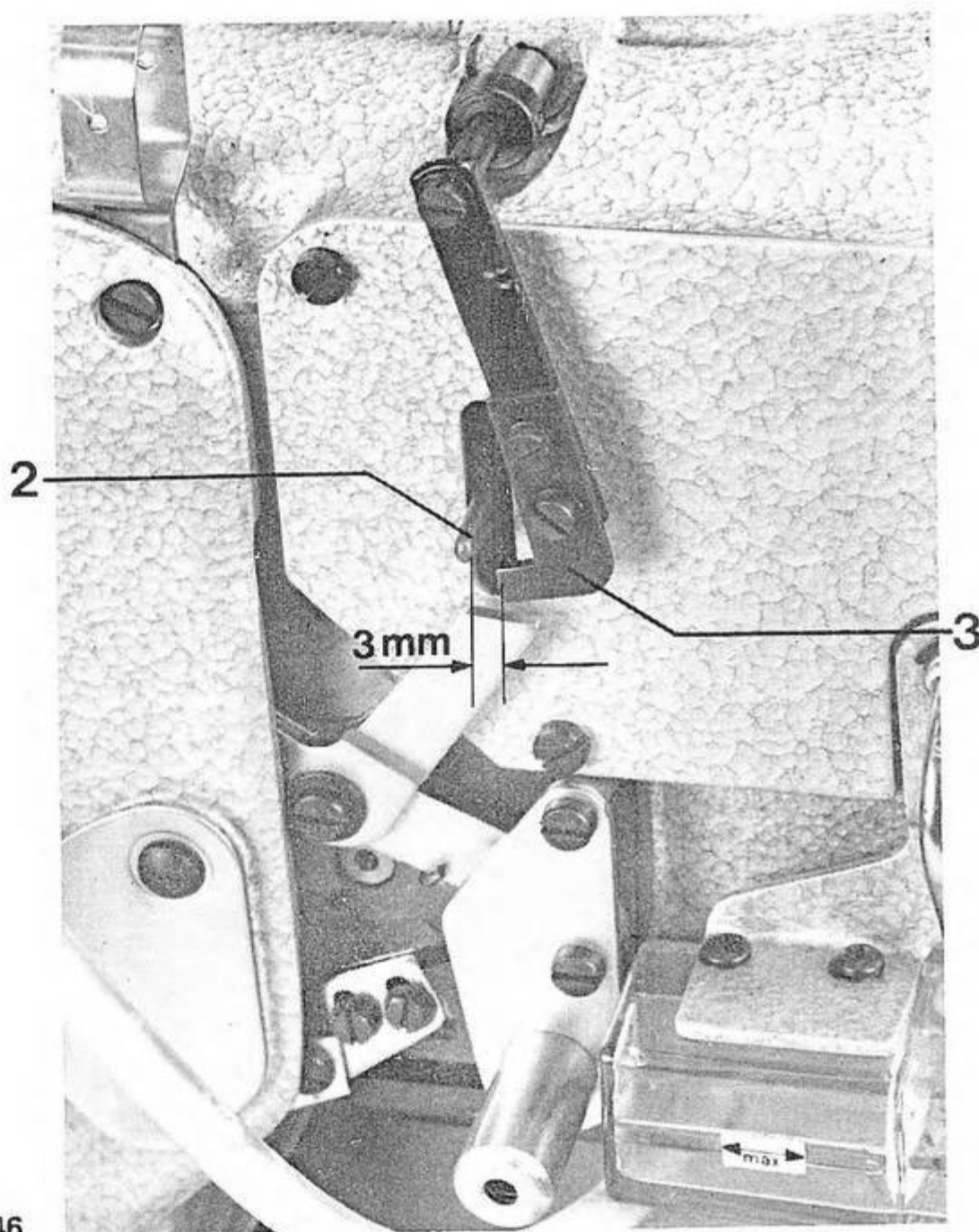


Fig. 146

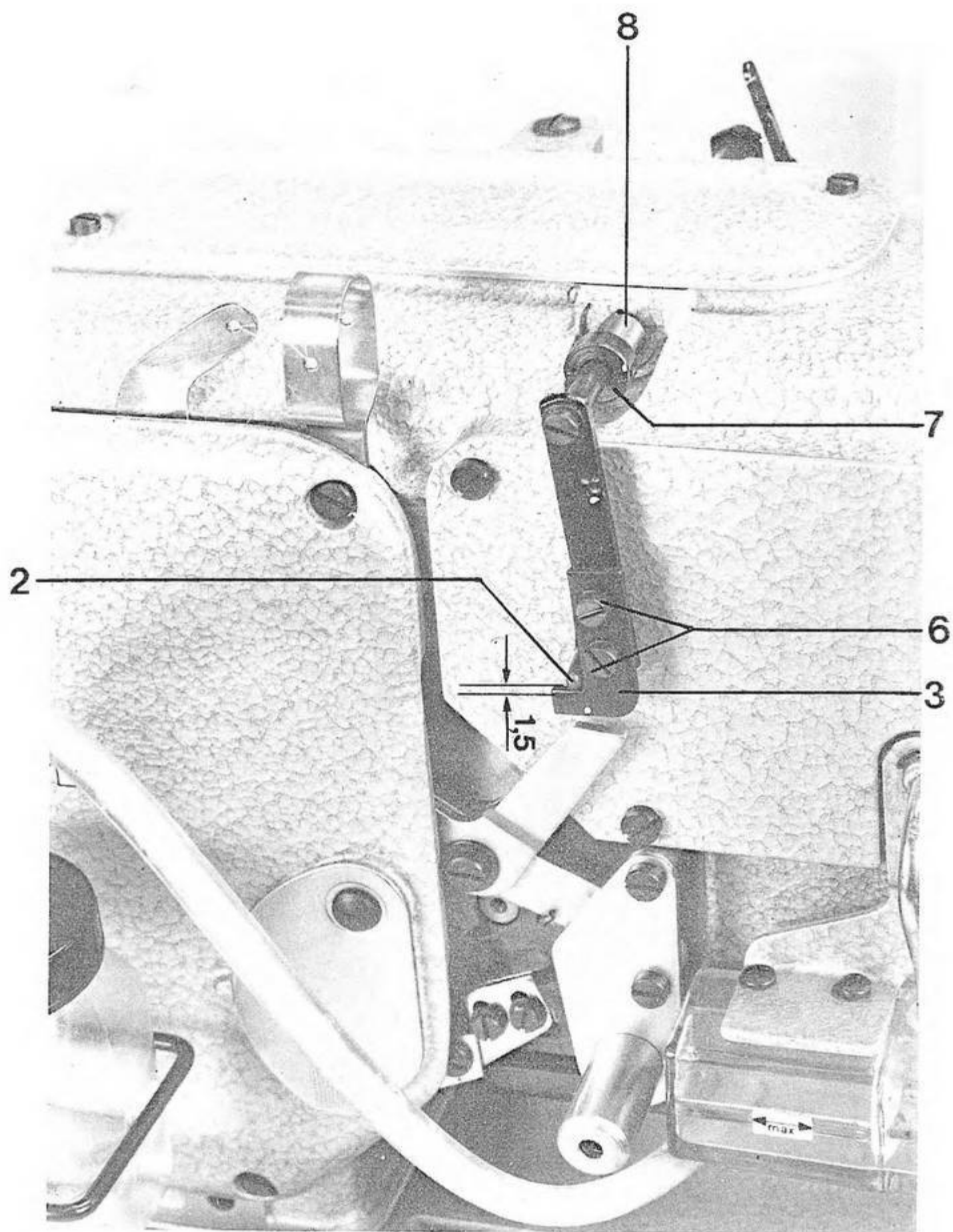


Fig. 147

52. Remedy in case of troubles

1. The ratchet 265 (fig. 54) of the disengaging safeguard and the articulated lever 249 jump out if

- a) the pretension of the flat belt is not properly adjusted. See chapter 6, item d).
- b) the engaging and braking equipment is not properly adjusted. See chapter 25.
- c) the spring 250 (fig. 54) in uncharged condition has not the length of 37 ± 0.7 mm. See chapter 25, item A.
- d) the spring assembly on the stud (figs. 54 and 55) of the articulated lever 249 in uncharged condition has not the height of 26.35 mm. See chapter 25, item A.
- e) the distance between the bolt 253 (fig. 56) and the control lever 254 has been changed by swinging the control unit, so that when disengaging the machine, the piston 160 (fig. 36) is not free from pressure and the piston 9 (figs. 4 and 49) cannot therefore move into the braking piece quickly enough.

Check the adjustment according to chapter 26, item a) "Adjusting the draw shackle".

2. The cloth presser frame will not be lifted if

- a) the ratchet 265 (fig. 54) of the disengaging safeguard and the articulated lever 249 have jumped out. The reason for it may be, among others, a wrong pretension of the flat belt. See chapter 6, item d).
- b) the control unit does not contain enough oil. See chapter 6, item a).
- c) the oil pressure in the control unit is not properly adjusted. See chapter 45.
- d) the lifter stroke is not properly adjusted. See chapter 24.

3. The buttonhole knife remains sticking in the fabric if

- a) the knife movement is not properly adjusted. See chapter 34.
- b) the ratchet 345 (fig. 86) of the releasing lever 343 does not travel under the angular stop 379. See chapter 31, item g).

4. The buttonhole knife does not act if

- a) the knife movement has not been properly adjusted. See chapter 34.

5. The buttonhole knife damages the rows if

- a) the row position is not properly adjusted. See chapter 21 and chapter 30., item g).
- b) the distance between the two rows is not properly adjusted. See chapter 21.
- c) the position of the buttonhole knife in relation to the knife slot is not properly adjusted. See chapter 29.

6. The needle thread breaks if

- a) the thread used is not suitable.
- b) the needle system and the thickness of the needle thread involved are not correct. See chapter 8.
- c) the needle thread is not properly threaded. See chapter 15.
- d) the thread guides are damaged.
- e) the front edge of the buttonhole knife is sharp. The front edge must be rounded off and polished.

6.1 The needle thread breaks in the zone of the thread pulling spring if

- a) between the hook and the base of the bobbin case there are thread ends. Remove the thread ends.
- b) the bobbin case lifter begins to move too early. See chapter 37, item c).
- c) the thread puller 107 (figs. 27 and 75) pulls too much of the needle thread. See chapter 30, item l).
- d) the tension of the tying stitches is not taut enough. See chapter 16.

6.2 The needle thread breaks in the zone of the hook and of the needle if

- a) the needle is damaged.
- b) the hook point is damaged.
- c) the needle guard is damaged.
- d) the needle bar and the hook are not properly adjusted. See chapter 35.
- e) the needle thread tension is too taut. See chapter 16.

- f) the hook is not sufficiently lubricated. See chapter 22, item a).
- g) the stitch hole has been damaged by the needle.
- h) the lower thread counter-knife and the clamping plate are not properly adjusted. See chapter 23.
- i) the movement of the bobbin case lifter is not properly adjusted. See chapter 37.

In case of very dense materials the breakage of the needle thread can be avoided by using a thread oiler.

6.3 In following cases the thread seams to be broken

- a) At the beginning of the seam the needle thread is not held by the scissors and slips, therefore, out of the needle.
- b) At the end of the sewing cycle the scissors cut off the needle thread, but do not clamp it.
- c) When sewing tying stitches at the end of the buttonhole the needle thread is stitched off. Adjustment of the tying stitches according to chapter 30, item e).

The reason for the disturbances under a) and b) may be wrong adjustment of the upper thread scissors, of the upper thread tension and of the tension release.

7. The needle breaks if

- a) the needle is too thin for the work involved.
- b) the stitch hole is too small for the needle.
- c) at the beginning of the sewing cycle the operator pulls the end of the end of the needle thread to the front and the needle knocks against the throat plate.
- d) the needle is deflected by the upper thread scissors. See chapter 38.
- e) the needle is deflected by the cloth presser frame. See chapter 30., item g).
- f) the needle is deflected by the point of the hook. See chapter 35, item c).
- g) the needle has not been introduced into the perforation in the needle bar deep enough. See chapter 8.

- h) the lower thread knife 178 (fig. 41) and the thread puller 180 (fig. 42) have not moved into their final position and the needle knocks against the knife or the puller. Said knife and puller do not move into their final position if the position of the collar 212 (fig. 43) with the pin 213 with respect to the pin 214 of the block 184 has changed. See chapter 24, item b).

8. Skipped stitches will occur if

- a) the upper and the lower threads are not properly threaded. See chapters 13. and 15.
- b) the needle is not properly fitted. See chapter 8.
- c) the needle is bent or damaged.
- d) the needle is too fine for the material involved.
- e) the needle bar, the hook or the needle guard are not properly adjusted. See chapter 35.
- f) the thread puller 105 (figs. 27 and 76) does not pull enough of the needle thread. See chapter 30., item l).
- g) the tension release is not properly adjusted. See chapter 30, items j) and k).
- h) the cloth presser frame does not properly cover the fabric, so that the latter can flutter. In order to avoid this, use a cloth presser frame of the proper size. In case of materials having different thickness in the zone of the cloth presser frame use a **stepped cloth presser frame** with **stepped slide**.

9. Bad stitch pattern if

- a) the upper thread tension is too slack.
- b) the bobbin case lifter is not properly adjusted. See chapter 37.
- c) the hook race is not sufficiently lubricated. See chapter 22, item a).
- d) the hook is damaged.
- e) the bobbin thread tension is too slack or too taut. See chapter 16.
- f) the bobbin thread is too slack or irregularly wound.

9.1 Bad stitch pattern at the beginning of the first row if

- a) the tension for the initial and the locking stitches is not properly adjusted. See chapter 16.
- b) the thread puller 105 (figs. 27 and 75) advances too much of the needle thread. See chapter 30, item l).

- c) the closing of the main tension is not properly timed. See chapter 30, item j).
- d) the bobbin case lifter is not properly adjusted. See chapter 37.
- e) the position of the locking stitches at the beginning and at the end of the buttonhole is not properly adjusted. See chapter 30, item e).

9.2 The beginning of the first row is stepped if

- a) the scissors clamp the needle thread so firmly that the thread is too taut when it is being pulled out of the scissors. The clamping of the upper thread can be modified by dressing the clamping thread. See chapter 39.

Ensure, however, that the upper thread is still clamped so firmly that it is not pulled out of the scissors already at the beginning of the sewing cycle.

- b) the upper thread scissors are adjusted to high. See chapter 38.

10. The bobbin thread will not be cut off if

- a) the bobbin thread knife and the counter knife are not properly adjusted. See chapter 23.
- b) the blades of the bobbin thread knife and of the counter knife are blunt. See chapter 23.

11. The needle thread will not be cut off if

- a) the needle thread scissors are not properly adjusted. See chapter 38.
- b) the knife of the needle thread scissors is too blunt. See chapter 38.
- c) the machine does not stop in the final position and the needle thread scissors perform, therefore, no movement.

12. The scissors only cut off the needle thread and do not clamp it if

- a) the clamping plate does not properly rest on the scissors upper knife. See chapter 38.
- b) the thread is prematurely cut by the sharp edges of the scissors upper knife and of the clamping plate. See chapter 38.

13. The machine cannot be engaged with the driving motor running if

- a) the bobbin thread knife is blocked by the thread ends, so that the engaging safeguard has displaced itself backwards and hinders the engagement of the machine. See chapter 24, item f).
- b) the control unit has not enough oil. See chapter 6, item a).
- c) the oil pressure in the control unit is not properly adjusted. See chapter 45.
- d) The engaging stroke is not properly adjusted. See chapter 24, item a).

14. The machine does not stop but continues operating at the stopping speed if

- a) the releasing pin 382 (fig. 84) is not properly adjusted with respect to the lever 7. See chapter 31, item h).
- b) the operator has engaged the machine by lowering the r/h pedal, which she leaves lowered instead of returning it to its initial position.

15. The machine operates only a short while at the stopping again to its normal speed if

- a) the toggle joint is not properly adjusted. See chapter 31, item e).

16. The machine operates after engaging only at the stopping speed if

- a) the lever 16 (fig. 12) for the quick disengagement is still catching. See chapter 9.

17. The machine will not start in spite of the driving motor running and the r/h pedal being lowered if

- a) the flat belt is not in position.

18. The buttonhole can be unravelled if

- a) the tensioner for the initial stitches and the locking stitches is not properly adjusted. See chapter 16.
- b) the distance between the locking stitches is too long or too short. See chapter 30, item e).
- c) the machine is disengaged too early.

Check the adjustment of the disengaging cam according to chapter 30, item a) and the position of the cam with respect to the control cam according to chapter 30, item b).

19. The needle thread is stitched off by the needle if

- a) the needle system used is wrong. See chapter 8.
- b) the locking stitches are performed at one point. See chapter 30, item e).

20. The buttonhole knife does not return to its upper final position if

- a) the needle oscillation is not properly adjusted. See chapter 30, item d).

Additional Instructions for DÜRKOPP 556-5101 and -5121

For Basic Instructions see DÜRKOPP 556 Instructions for Operators and Mechanics

1. General

DÜRKOPP 556-5101 and -5121 are automatic lockstitch machines for sewing buttonholes with relief type stitches and two straight bars.

The bobbin thread tension is lower than needle thread tension so that the thread (with relief type stitches) are interlocked on the reverse side of the fabric. This reduces the consumption of the bobbin thread.

Lifting of the cloth presser frame and starting of the machine pneumatically by single pedal control. Also the knife for cutting up the buttonhole is controlled by pneumatic means.

The machines are fitted with quick stop switch and with mechanical thread monitor. The machine will be stopped immediately as soon as the quick stop pedal is actuated.

If the needle thread is broken or consumed, the thread monitor avoids the knife action, the lifting of the cloth presser frame and the operation of the thread scissors.

The automatic machines have central oil wick lubrication and individual lubrication of the hook. The top feed is constituted by the cloth presser foot and the bottom feed by the travelling fabric slide plate. The machines have a needle cooling system and a blower for keeping clean the underside of the throat plate.

DÜRKOPP 556-5121 is fitted additionally with a pneumatic control for sewing around the buttonhole one or several times. The machine is particularly suitable for sewing buttonholes in hosiery and knitwear.

2. Technical Data

Speed:	up to 4500 st/min., depending on the fabric and on the thread
Needle system:	265 with the point slightly rounded off
Buttonhole length:	up to 35 mm)
Bartack width:	up to 4 mm) depending on the available E No.
Cut length:	up to 25.4 mm)
No. of stitches per seam pattern:	81 to 479
Service pressure:	6 bar

2.1 Motor

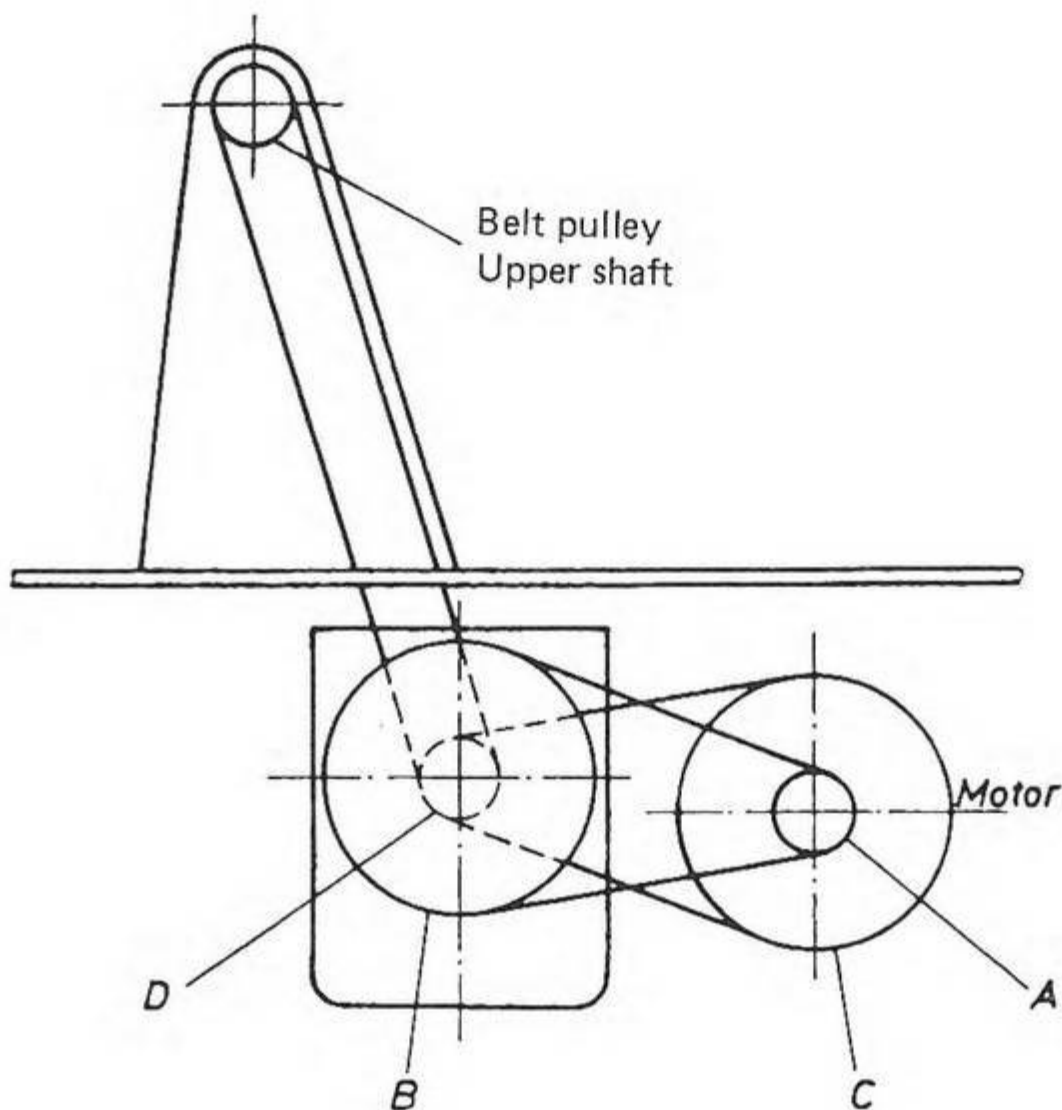
Motor type:	KOD 646/S236
Nominal performance:	550 W
Nominal voltage:	220/380 V 50/60 Hz
Speed:	1400 rpm at 50 Hz 1700 rpm at 60 Hz
Motor protective switch:	adjustment value of 1.9 A at 380 V 3.2 A at 220 V

2.2 Belt pulleys for 50 Hz motors

Motor shaft diameter:	19 mm
For machine speed of 4000 rpm (Standard equipment)	
Pulley A 556 2111	Pulley D 556 2176
Pulley B 556 1898	
Pulley C 556 2112	Pulley E 556 2175
For machine speed of 4500 rpm (optinal)	
Pulley A 556 15472	Pulley D 556 15483
Pulley B 556 15478	
Pulley C 556 15484 K	Pulley E 556 15482
For machine speed of 3500 rpm (optinal)	
Pulley A 556 2111	Pulley D 556 2174
Pulley B 556 1898	
Pulley C 556 2117	Pulley E 556 2173

Note:

The pulleys B and D are supplied only complete under E.



2.3 V-belts

Set of V-belts for machine speeds up to 4000 rpm, ref.no. 5562100 A

Set of V-belts for machine speeds above 4000 rpm, ref.no. 55615471

3. Additional equipment

Thread oiler 5562842

Sewing lamp App. 1024

4. Installing the machine

All parts required for installing the machine are included in the accessories.

1. The table top cutout and the boreholes must comply with the specifications of the dimensioned table top sketch.
2. Introduce the threaded pins of the four metal connections from above in the boreholes in the table top and secure from below by washers and nuts.

3. Set the base in the table top and fasten to the metal connections. Fasten the lever 1 (fig. 1) with torsion spring to the base underside.
4. Fit the bearing block 4 according to figs. 1 (longitudinal installation) or 2 (transversal installation). Shift the belt pulley set 5 (fig. 2a) consisting of two belt pulleys onto the bearing shaft and fasten it. When shifting, place simultaneously the V-belt onto the small belt pulley. If the large belt pulley knocks against the table edge, swing the bearing block 4 sideways.
5. Fasten the mounting plate 2 (figs. 1 and 2) with the switching elements to the bearing block 4 by nuts and safety rings.
6. Fasten the square 3 by two wood nuts under the table top.
7. Fasten the motor to the bearing block 4. Fit at the same time the safety bar 6 (fig. 1).
8. Fasten the two belt pulleys 7 and 8 (fig. 2a) on the motor shaft. Ensure that they are in alignment with the pulleys on the bearing block shaft.
9. Place the driving belts in following sequence:
Place the V-belt, being already on the small pulley, on the large pulley of the motor shaft.
Place the flat belt on its driving pulley (on the bearing block shaft) and pass it through the belt fork so that the leather surface shows in the direction of rotation of the machine (seen from the backside counter-clockwise).
Place the second V-belt of the small pulley 8 on the motor shaft leading to the large pulley of the belt pulley set 5.
10. By swinging the motor, tension the V-belts so that they do not slip. Check whether the belt pulleys are in alignment.
11. Mount the pedals and the rods according to fig. 3 (longitudinal installation). By modifying the rod length set the pedal height. Adjust the rods 10 so that with the l/h pedal being fully heeled down a full stroke is obtained (stop screw in the base).
12. Screw the solenoid valve 11 (figs. 1 and 2) under the table top.
13. Saturate the oil wick on the base with oil.
14. Place machine head in the base and secure by safety screws 12 (fig. 4) and safety springs 13.
15. Erect the machine head and fasten the machine support 14 (figs. 1 and 5) by a split pin.
16. Set the lifter 15 (fig. 5) so that the gap between the roller 16 and the non-operated lifter 15 amounts to about 0.5 mm.

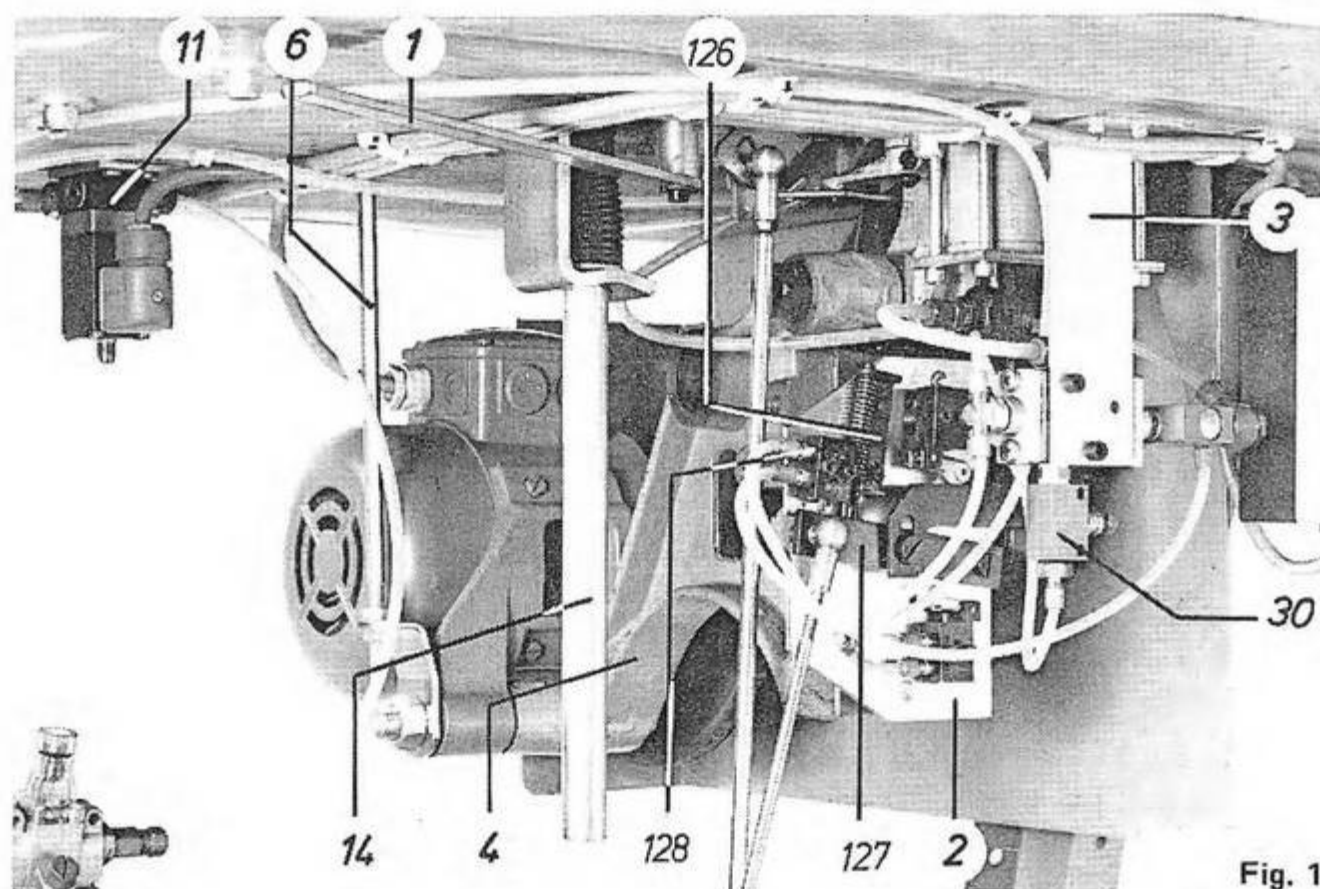


Fig. 1

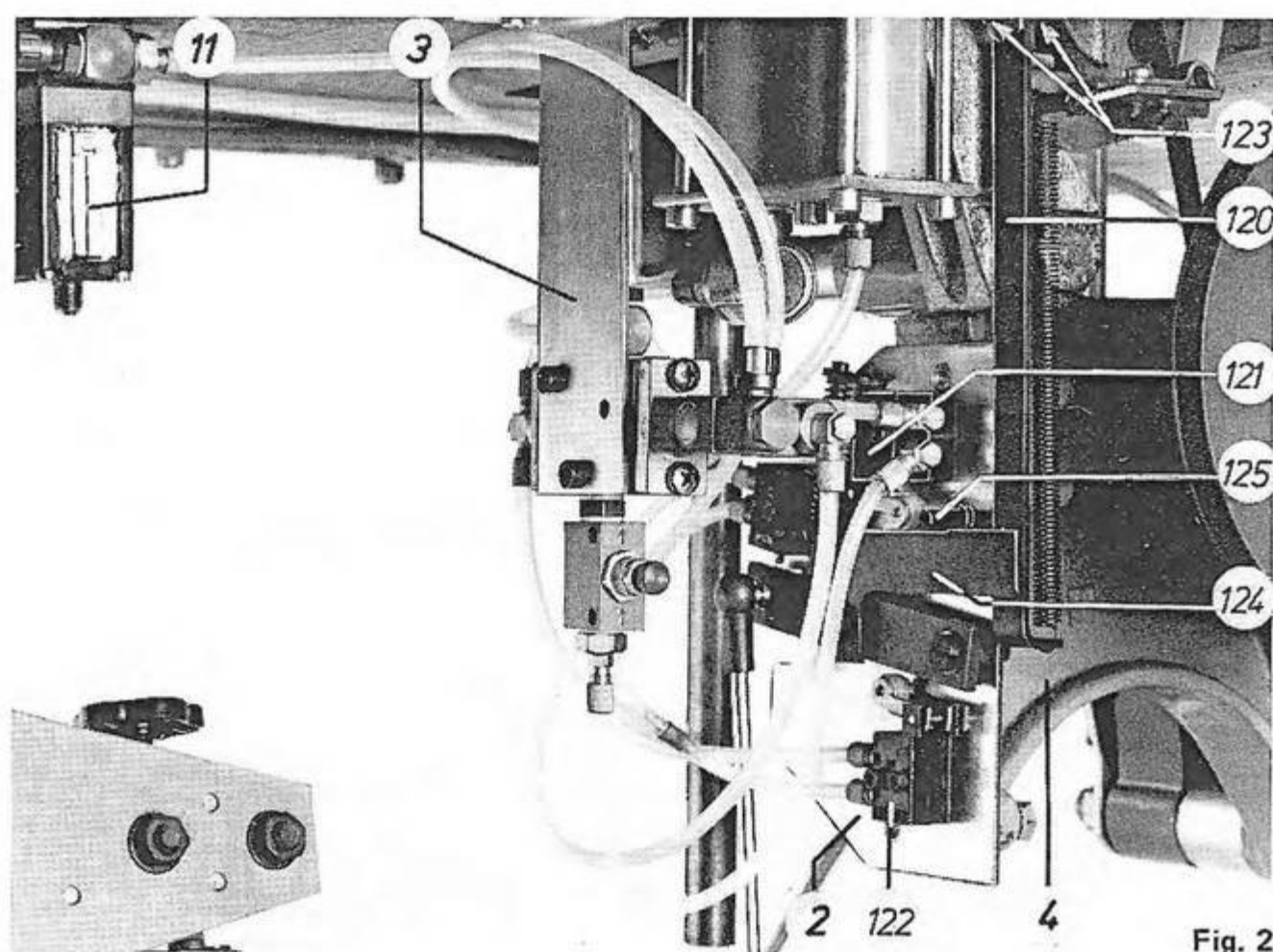
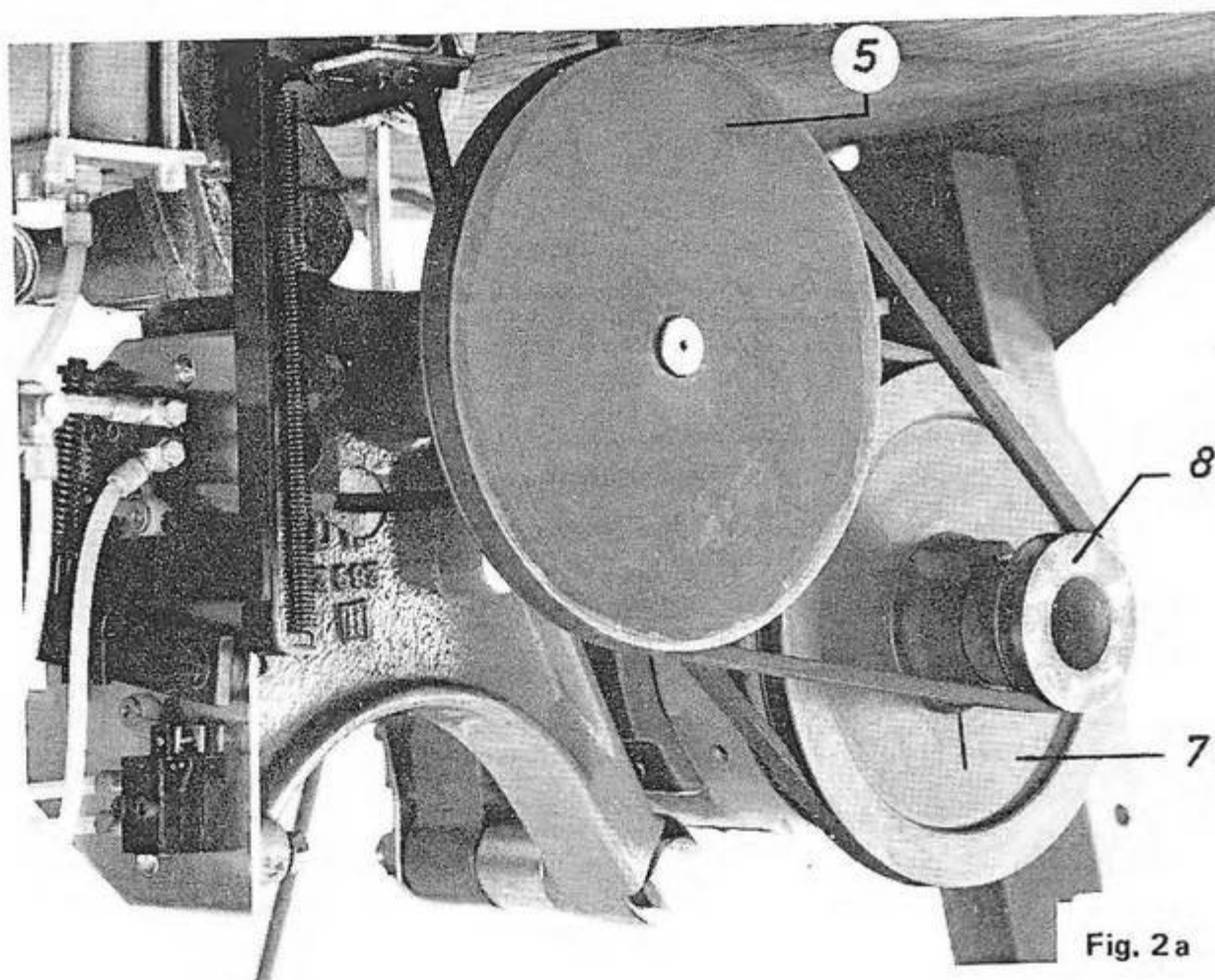


Fig. 2



17. The stroke of the brake tappet 17 (fig. 4) is determined by the engagement tappet 18 (fig. 5). With the main switch being turned on and with the r/h pedal being fully lowered set the tappet 18 so that the ratchet 19 (fig. 7) is pulled some 0.5 mm below the square 20 and that the machine is engaged.

This adjustment cannot be made before the machine has been connected to the compressed air line.

18. Adjust the traction joint 120 (fig. 2).

During the sewing process the lifting and engagement tappet must be free from pressure, i.e. the valves 121 and 122 should not be operated. Adjust for this purpose the traction joint 120 as follows:

Engage the machine by hand (chapter 3. of the basic instructions). Loosen the screws 123 and, with the machine being engaged, set the distance between the square 124 and the bolt 125 for about 4 mm. In this position, the square 124 should not operate the valves 121 and 122, i.e. the supply of the compressed air should be interrupted.

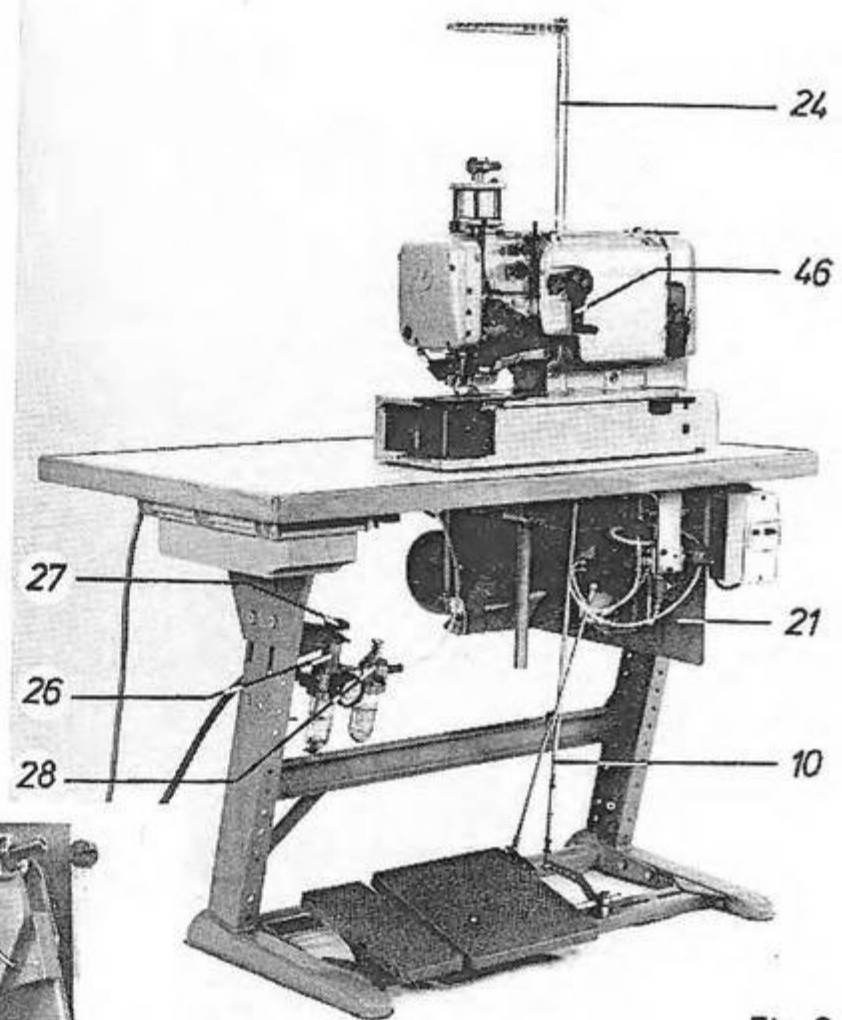


Fig. 3

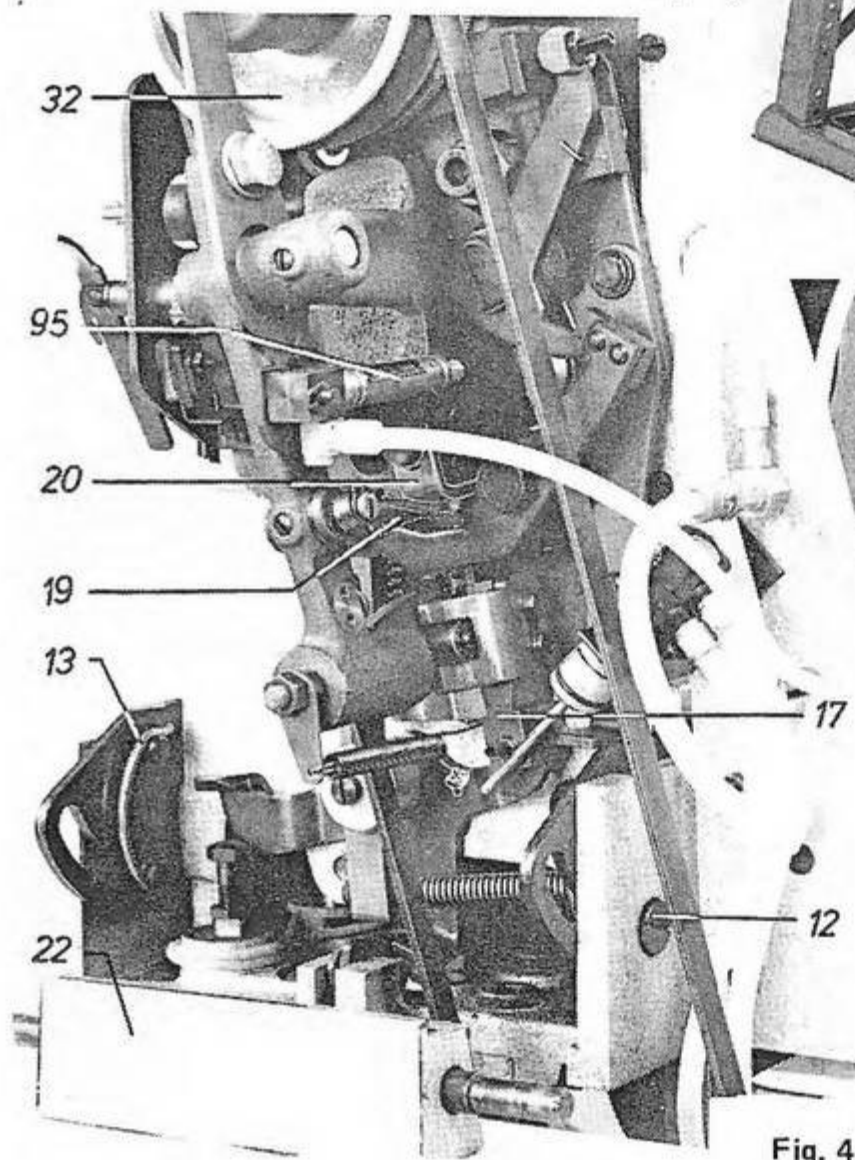


Fig. 4

19. Adjust the stop 126 (fig. 1) so that there is a small gap between the lever 127 and the tappet of the valve 128. Note furthermore, that with the pedal being lowered forwards or backwards down to the stop, the valves should not be operated more than is required for their safe function and so that the tappet is not pressed in the housing against the stop. Regulate the valves accordingly after loosening their fastening screw.
 20. Fill the oil container underneath the base plate and at the left arm side up to the maximum mark with Spinesso 10 oil or with an oil of equivalent quality.
 21. Place the flat belt on the machine head pulley so that the leather surface is inside and so that the arrow shows in the direction of rotation of the machine. By swinging the bearing block 4 (figs. 1 and 2) tension the flat belt. For further instructions see the basic instructions.
 22. Adjust the belt fork and the instant stop according to the basic instructions.
 23. Fasten the belt guard 21 (fig. 3) to the lower side of the table top.
 24. Fasten the bearing block 22 (fig. 4) on the table top so that the cover hood 23 (fig. 11) adapts itself to the machine head.
 25. Fasten the thread unwinder 24 (fig. 3) to the table top.
 26. Connect the compressed air hoses according to the enclosed pneumatic element plan and according to figs. 1 to 5 and 11.
 27. Fill the oiler 26 (fig. 3) with Spinesso 10 oil or with an oil of equivalent quality and connect the machine to the compressed air line. Set the service pressure of 6 bar by the wheel 27.
- Set the regulating screw 28 so that a drop of oil is lost after about 15 working cycles.
28. By means of the throttle 29 (fig. 11) regulate the air jet of the needle cooling and of the blower under the throat plate so that it does not impede the loop formation at the hook.
 29. Adjust the throttle 30 (fig. 1) so that the cloth presser frame is lifted quickly but not too suddenly. If it is lifted too quickly, the lower thread will be torn off.

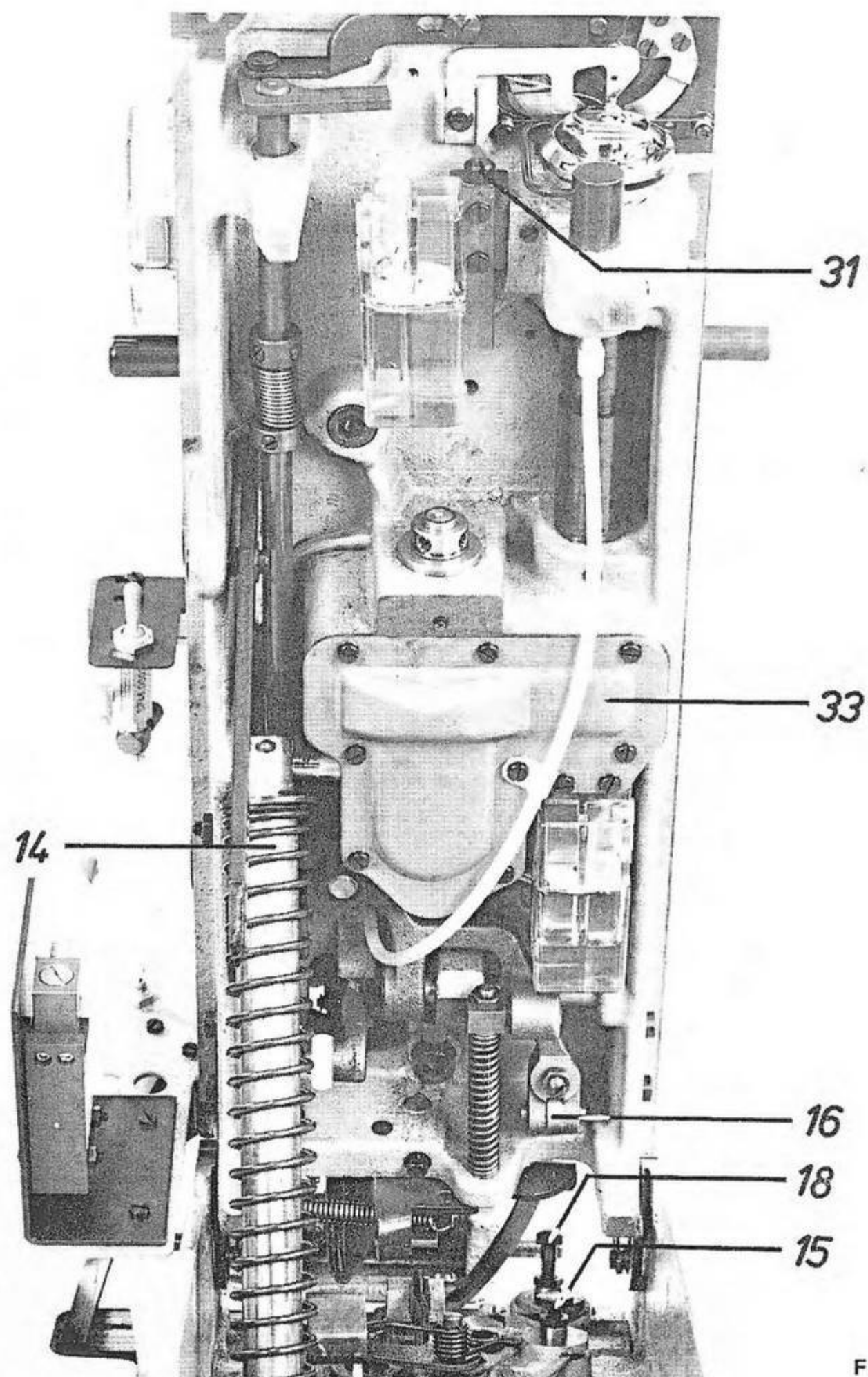


Fig. 5

5. Maintenance

A machine which is kept clean stays trouble-free. Therefore, the parts of the machine in the vicinity of the hook and underneath the throat plate should be cleaned regularly.

When erecting the machine head, the oil gathered in the machine head will return to the machine arm, so that there will never be too much oil in the arm head if the machine is cleaned regularly.

5.1. Oiling

For oiling these machines use the **Spinesso 10** oil or an equivalent quality of oil. Spinesso 10 can be obtained from DÜRKOPP sales centers.

Oiling of the machine is confined to following points:

1. Filling the oil container with oil for hook lubrication and regulating the oil supply.
2. Filling with oil the supply containers in the machine arm and under the base plate.

The oil supply to the hook can be regulated by the screw 31 (fig. 5).

Turn the screw 31 counter-clockwise for more oil.

Turn the screw 31 clockwise for less oil.

The oil quantity required for the hook lubrication depends on the fabric and on the thread.

If the hook gets very war, is noisy or tends to tear the thread it does not get enough oil. Therefore the oil supply must be readjusted. Then, while sewing a buttonhole, hold a small mirror under the hook. If it is covered by a thin film of oil and there is no change during about one hour of permanent service then the oil supply is correct.

Furthermore, after about one-year service, wash the needle and the ball bearing of the belt pulley 32 (fig. 4) and fill fresh grease. For washing the bearings use washing petrol with 5% oil addition or acid-free petrol.

For lubricating, use the special needle bearing grease, ref. No. 5701710. Fill the chambers of each bearing with only about 0.25 cm³ of grease (pea size) since otherwise the grease will be projected onto the clutch coating.

The rear shaft bearing should be washed after about two-year service and should then be filled with fresh special needle bearing grease. For removing the bearing there is a special device, supplied under the ref. No. 5562221.

The housing and the hook driving gears should be washed after about one-year service and should be replenished with fresh grease. Gauge the filling by means of the trough in the housing cover 33 (fig. 5).

For replenishing, use the special gear grease, ref. No. 211693.

6. Needles and threads

6.1. Needles

Use needles of the system 265 having a slightly rounded off point. Needle size: Nm 90.

When handling very light weight material, inclined to cause skipped stitches, it is possible to use the needle of the system 556-50 EO Sin in conjunction with the hook for knitwear, ref. No. 5565006 except E 63 and E 64.

Note:

In case of E 63 and E 64 use only needles of the system 265 in conjunction with the hook, ref. No. 5565007.

Introduce the needle as deep as possible in the needle bar perforation. The long groove of the needle must face the vertically cutting knife.

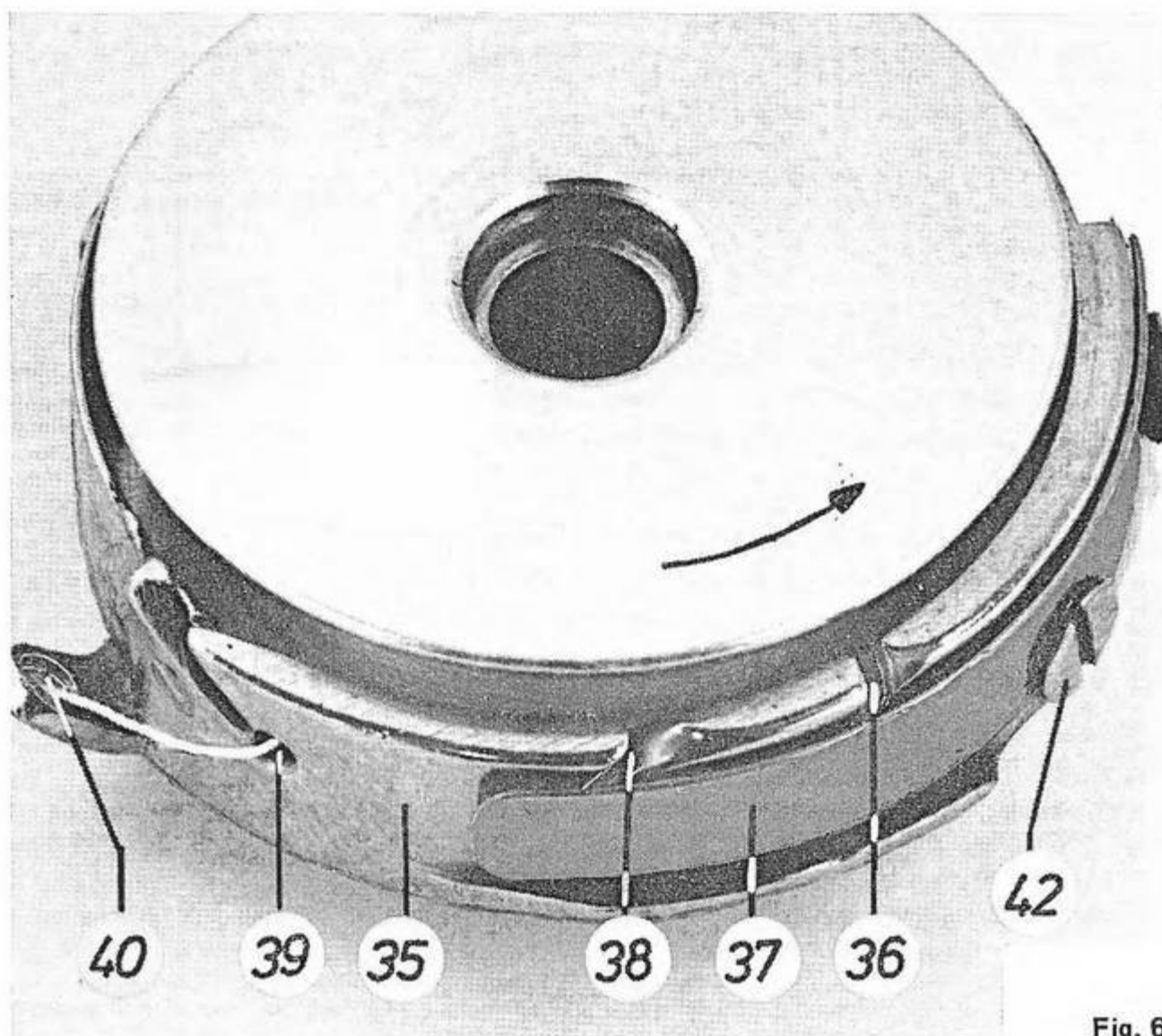


Fig. 6

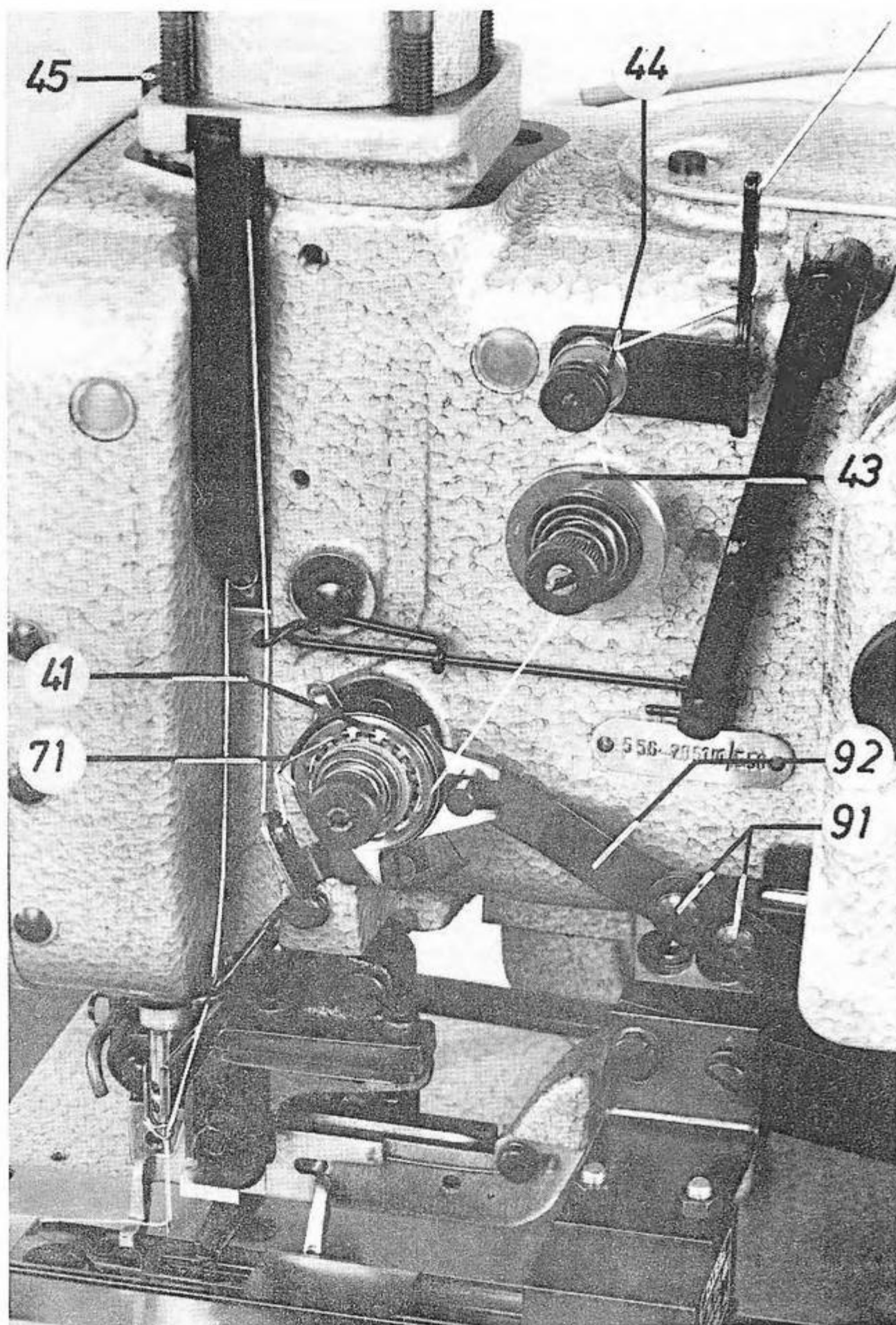


Fig. 7

6.2. Threads

Use in both machine types for the needle core thread Nm 80/2. This thread can be used also for the hook in 556-5101. In 556-5121 machines it is possible to use cotton thread of Ne 50 to Ne 20 or synthetic thread of Nm 120 to Nm 30. The thicker hook thread will assume the function of the gimp.

6.3. Hook thread oiler

In order to avoid tension differences, caused by the different thread surface properties, the hook thread should be passed along an oiler when it is being wound.

For lubricating, use a mixture, including 3/4 of Shellsol T and 1/4 silicone oil. This lubricant can be obtained from DÜRKOPP under ref. no. 93311517. The initial supply is contained in the machine accessories.

7. Threading the hook

Place the bobbin in its housing 35 (fig. 6) so that the free thread end extends from the front to the right. Pass then the thread through the slit 36 under the tension spring 37, through the slit 38 in the bobbin case and through the holes 39 and 40.

8. Threading the needle

Pass the thread from the thread unwinder upwards through the guide on the thread unwinder arm. Pass it then as shown in fig. 7. Pass the thread completely around the tension wheel 41.

9. Adjusting the thread tensions

Regulate the tensions of the hook and needle threads so that they interlock on the underside of the fabric and that the needle thread is pulled around the hook thread.

9.1. Hook thread

The tension of the hook thread should amount to about 80 g. By turning the screw 42 (fig. 6) regulate the tension accordingly.

In exceptional cases, e.g. when handling very thin materials or very thick hook threads, the thread tension must be increased or reduced accordingly for obtaining a perfect buttonhole.

A spring scale for measuring the tension is available under the ref. No. 5562461.

9.2. Needle thread

With the clamp 43 (fig. 7) being opened, the tension values should range between 50 and 70 g, adjustable by turning the knurled nut on the tension axle.

For measuring the tension use the spring scale ref. No. 5562461.

Adjust the pre-tension 44 so that after the thread pulling there is no loose thread in the area of the thread tension spring 71. When the tension spring is in contact with the upper stop, the thread must be tightly wound around the spring.

Adjust the clamp 43 for the tying stitches so that the interlocking of these stitches takes place in the middle of the fabric.

10. Regulating the cloth frame pressure

The pressure of the cloth presser frame should be just sufficient for holding safely the work.

Tighten the screw sleeve 45 (fig. 7) for increasing the pressure and loosen it for reducing the pressure.

11. Operating Instructions

By engaging the protective switch lift the cloth presser frame, rectify the work (upside down) and lower the frame on the work by heeling down the r/h pedal until the first step is reached. The frame can be lifted again by returning the pedal.

For starting the sewing process lower the pedal down to the stop. If at the seam beginning the needle thread is not clamped by the scissors, hold the thread end hanging out of the needle during the first stitches by hand. Be careful not to bend the needle, since otherwise it might knock against the throat plate. At the end of the sewing process the buttonhole will be cut up automatically, the hook and the needle threads will be cut off and the cloth presser frame will be lifted.

If during the sewing process the needle thread breaks or ends the thread monitor avoids the knife action, the lifting of the cloth presser frame and the dropping-in of the thread scissors.

After elimination of the disturbance the buttonhole can be sewn once again or sewn over or, by means of the crank 46 (fig. 3), it can be transported in the position where the disturbance has occurred for continuing the sewing.

For removing the work from the machine the cloth presser frame can be lifted by operating the button 47.

If it is necessary to stop the machine during the sewing process = quick stop, heel down the l/h pedal. The lever 1 (fig. 1) will be locked. For restarting the machine said lever must be unlocked.

The 556-5121 machine can be set for sewing a buttonhole one time or two times by operating the switch 70 (fig. 11).

Position I = sewing the buttonhole one time

Position II = sewing the buttonhole two times

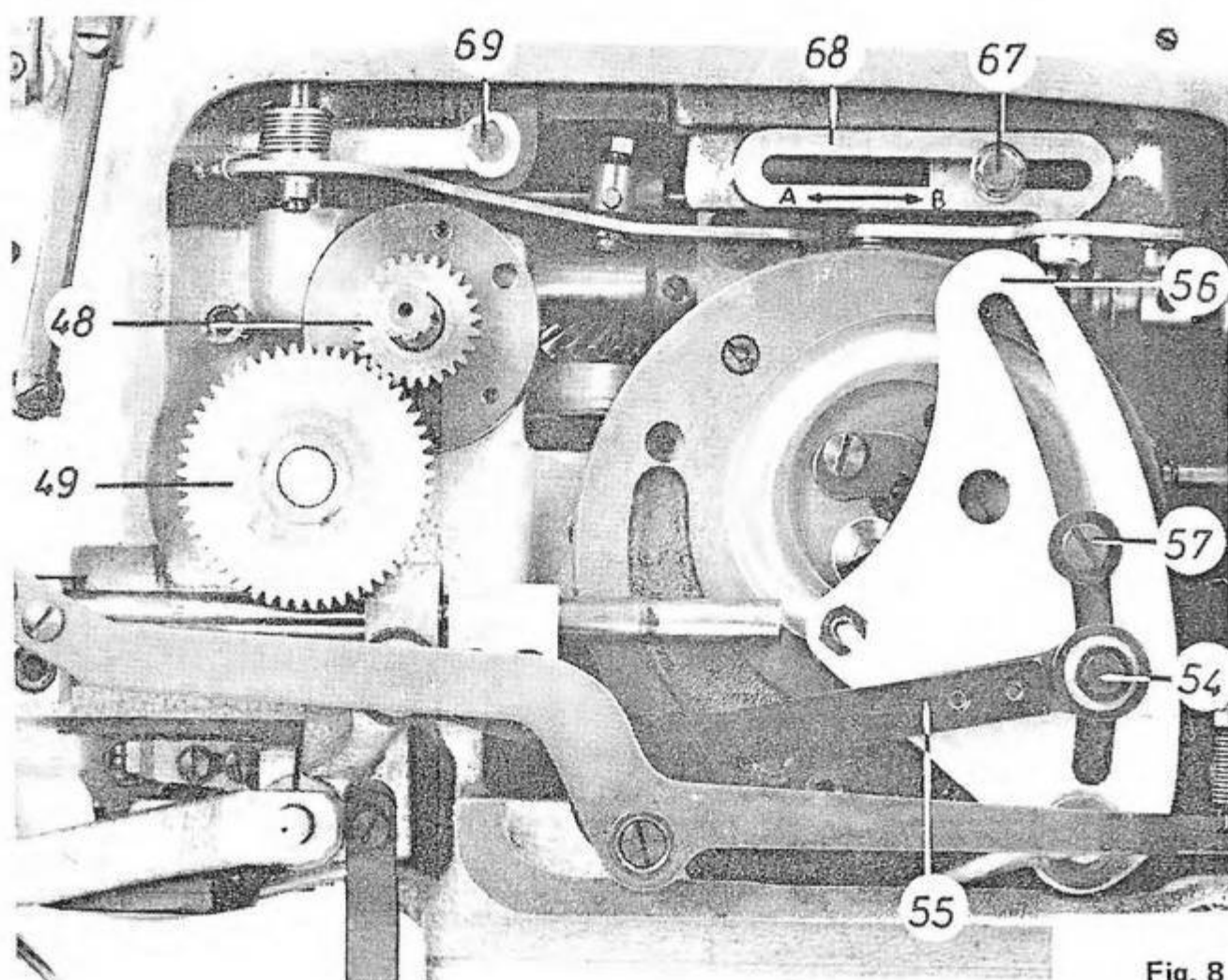


Fig. 8

12. Changing the stitch density in the buttonhole

The stitch density, i.e. the number of stitches per buttonhole, can be modified by changing the gears 48 and 49 (fig. 8). The sum of the number of teeth of the upper and lower wheels must always amount to 79.

The machines are supplied with different pairs of gears, depending on the E No.

No. of teeth	above/below		No. of stitches
E 54	23	56	81
	25	54	91
	30	49	120
E 55	26	53	97
	31	48	127
	34	45	149
E 63	23	56	81
	25	54	91
	30	49	120
	31	48	127
E 64	26	53	97
	31	48	127
	34	45	149

When changing for a different pair of gears the scale sheet 50 (fig. 9) and consequently the machine stopping cam must be set for the new number of stitches.

Loosen the nut 51 by the spanner supplied with the accessories and set the scale sheet 50 so that the figure or the reference mark nearest to the number of stitches stands opposite the mark 52. The marking link 53 is secured by yellow varnish and it should not be reset.

13. Setting the buttonhole length

Adapt the buttonhole length to the cut length so that the buttonhole is cut up to the bars, without damaging the latter.

For modifying the buttonhole length loosen the screw 54 (fig. 8) by the spanner and set the lever 55 with its indicator for the cut length according to the number of stitches. The machine will now sew a buttonhole in accordance with the cut length.

The figures of the scale on the coulisse 56 show the cut length of the knife in English inches.

When resetting the buttonhole length ensure that the change is done only within the limits permitted by the cutout in the cloth presser frame. Limit the adjustment range by the stop 57.

14. Changing the buttonhole knife

When changing a buttonhole knife it is generally necessary to change also the cutting block of plastic material, or if one side of the cutting block has no incisions, this side can be turned up. For changing the buttonhole knife 58 (fig. 10), remove the nut 59. Press the knife block 60 by hand in the lower position. Maintain this position and fasten the buttonhole knife 58 to the knife block 60 so that the cutting edge rests on the cutting block of plastic material.

Release the knife block, so that it can move in its upper position. Transmit to the available gauge No. 5566987 the distance between the cutting block and the cutting edge of the knife. Deduct from this distance the value of 0.5 mm and adjust the gauge accordingly.

This individual adjustment of the gauge is necessary because, owing to the manufacturing tolerances, there are knife stroke differences from machine to machine.

Following the proper adjustment of the gauge, adjust the distance of the knife with respect to the cutting block.

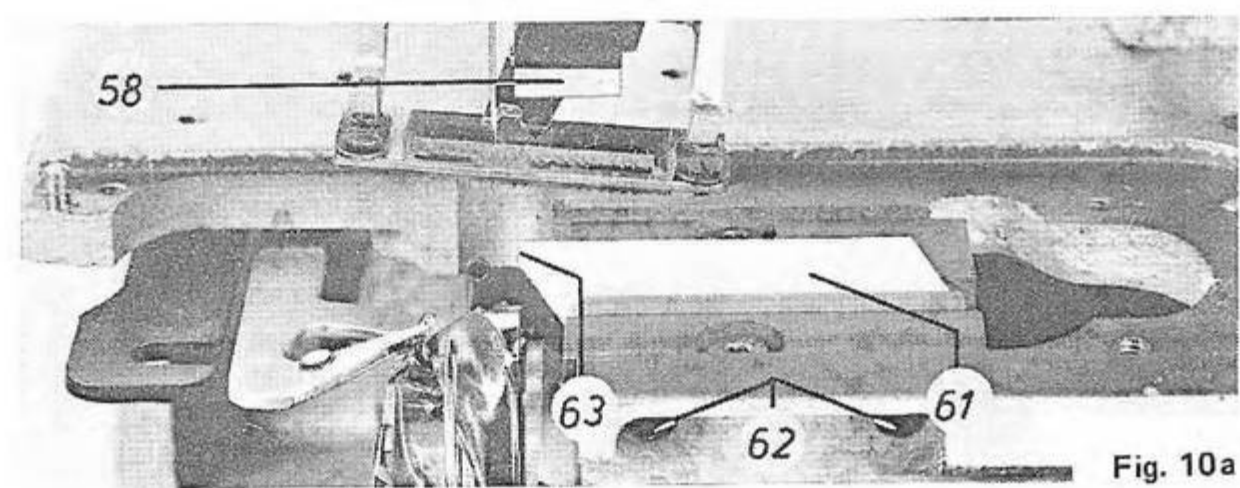
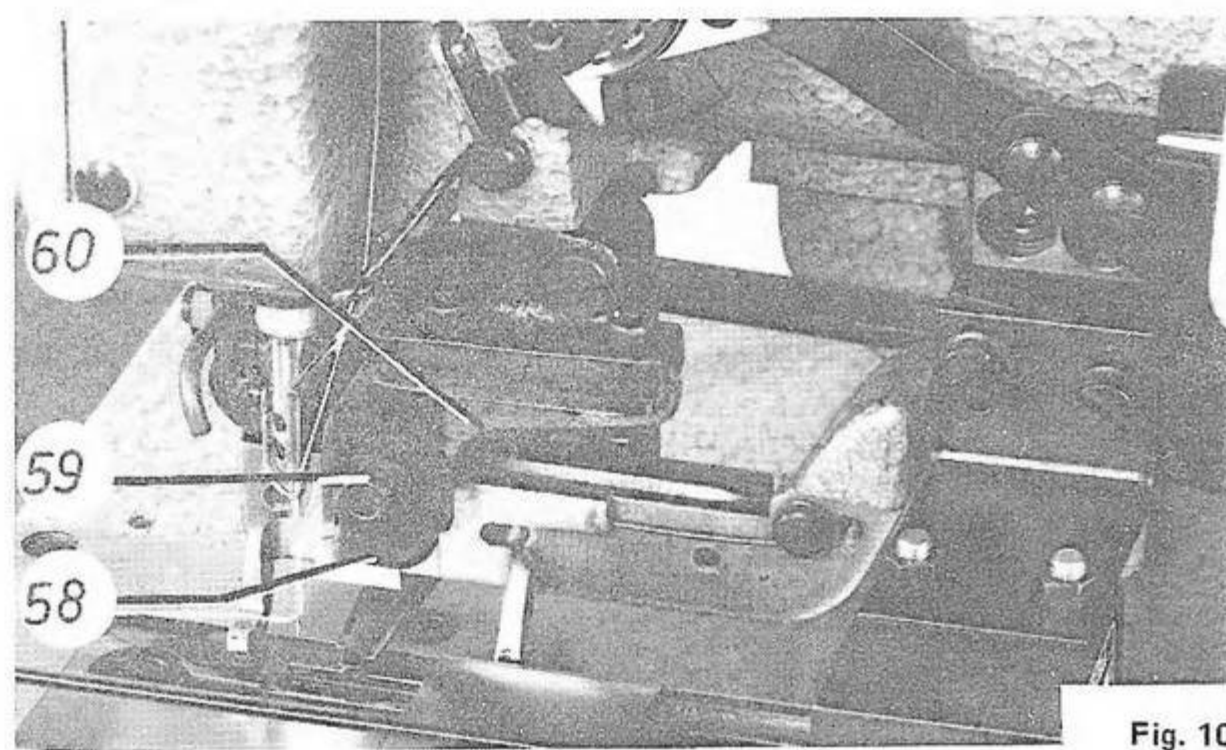
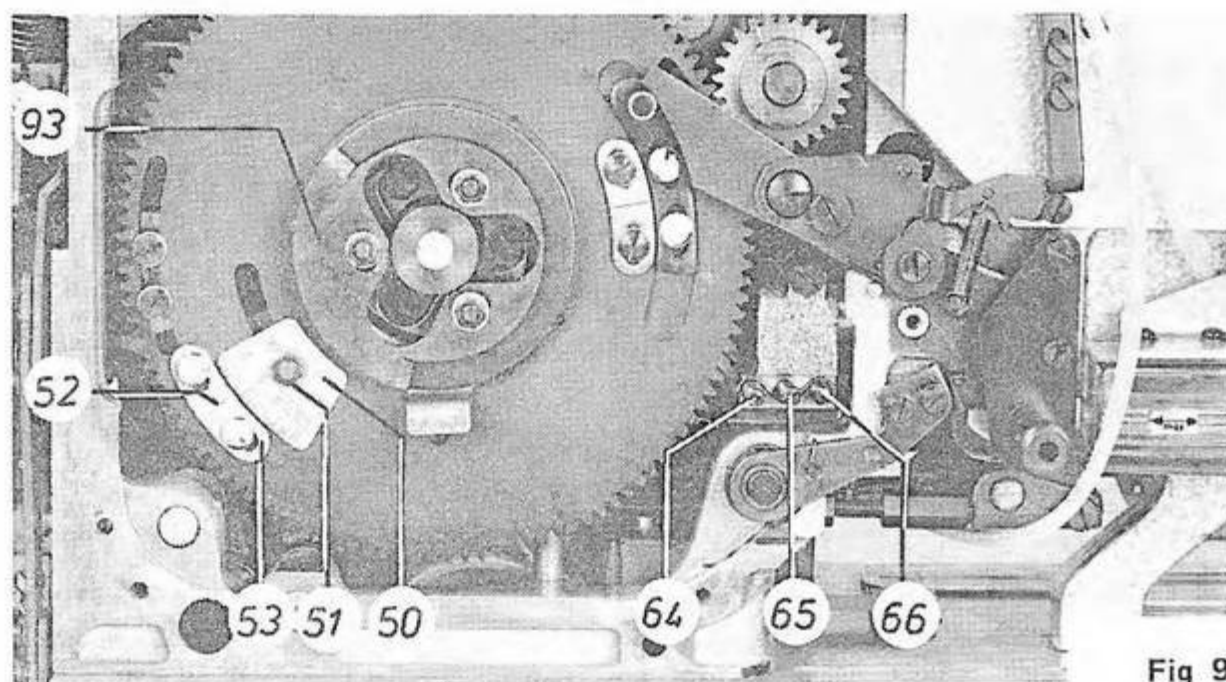
With this adjustment, when cutting, the cutting edge will penetrate 0.5 mm in the cutting block and will cut buttonhole properly.

If after a certain period of time a proper cutting is no longer possible, the knife can be set 0.2 mm lower, but not more than 3 times, so as to obtain a proper cut.

If the knife penetration in the cutting block ranges between 1 and 1.1 mm and if the buttonhole cut is no longer proper, change cutting block or turn it up, check the cutting edge of the knife and adjust the knife by means of the gauge so that first its penetration in the cutting block does not exceed 0.5 mm.

15. Changing the cutting block

If after a certain period of time the buttonholes are no longer cut properly, turn over or exchange the plastic cutting block 61 (fig. 10a). (One spare cutting block, ref. No. 55615848, is included in the accessories.



With the driving motor being switched off, arrest the cloth resser frame in the upper position by placing under it a suitable object, loosen the screws 62 and remove the cutting block 61 through the throat plate slit. Turn over or exchange the cutting block. Set the edge 63 at the front of the throat plate slit against the stop. Retighten the screws 62.

16. Setting the seam pattern

The adjustments of the lip width, bar width, distance between the two lips and position of the buttonhole with respect to the knife incision are interdependant.

If, for instance, the lip width is modified, it is necessary to rectify also the bar width and the lip distance accordingly. Check then whether the knife incision is still exactly in the middle between the two lips. If required, rectify the position of the buttonhole.

16.1. Adjusting the lip width

The lip width can be set by turning the screw 64 (fig. 9).

16.2. Adjusting the bar width

The bar width can be set by turning the screw 65.

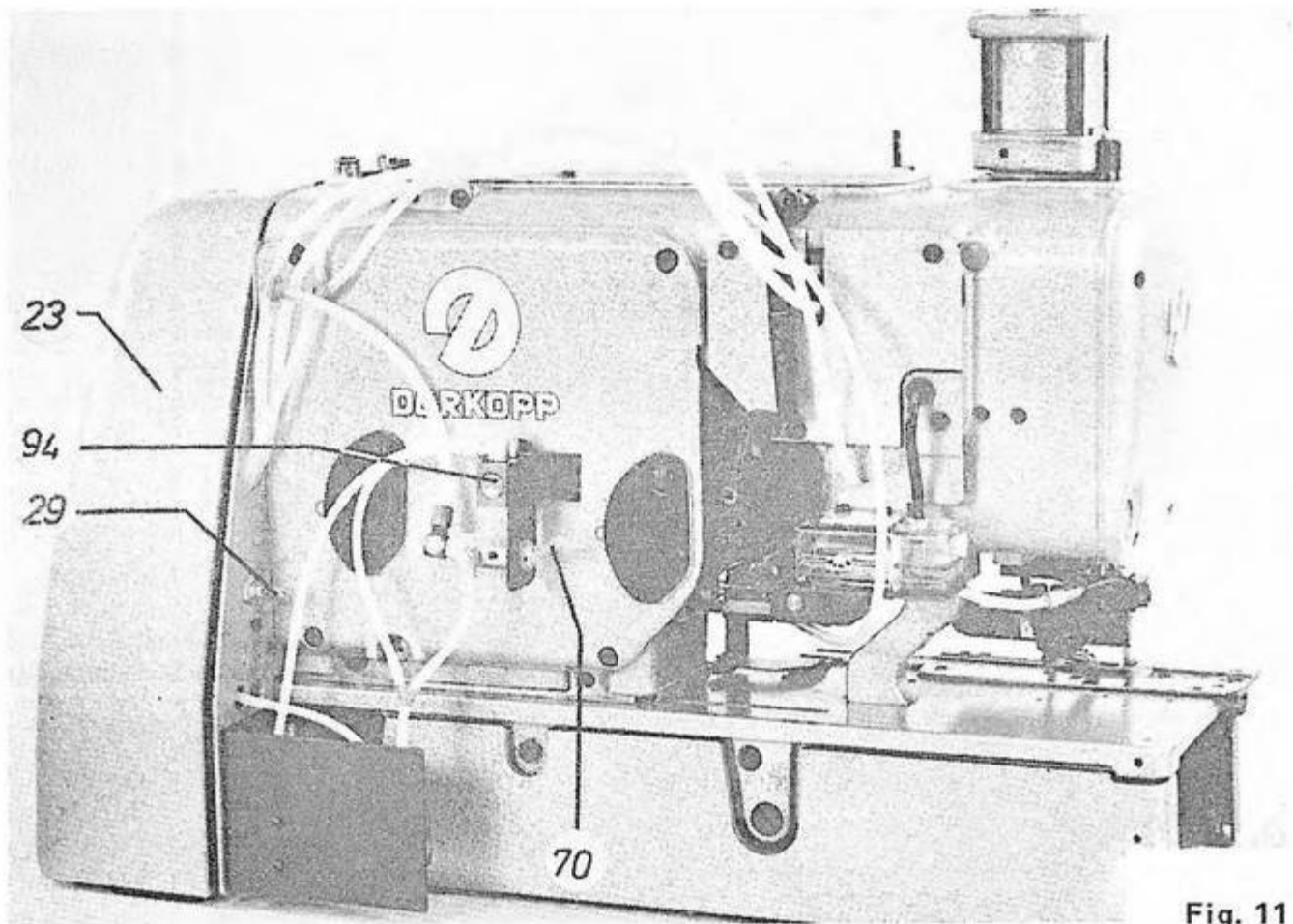


Fig. 11

Note:

The screw 66 serves for setting the spacing of the tying stitches. This adjustment has been made in the factory and should not be changed.

16.3. Setting the distance between the two lips

Loosen the screw 67 (fig. 8) and shift in the coulisse 68.

Shift in the arrow direction A for increasing the distance

Shift in the arrow direction B for reducing the distance

Retighten the screw 67.

16.4. Setting the position of the buttonhole with respect to the knife incision

The position of the buttonhole with respect to the knife incision can be modified by turning the screw 69. The precise adjustment of the seam pattern is described in the Basic Instructions.

NOTE:

In case of sewing disturbances, e.g. thread breakage, bad quality buttonholes, check also the tension wire 72 (fig. 12) and the pins 73 (fig. 13) in addition to the threading and the tension values. If the tension wire is too slack, it can be tensioned. If the tension wire or the pins are damaged, they must be replaced.

Ref. No. of the tension wire = 55615822

Ref. No. of the pins = 55615859

For changing the pins 73 it is necessary to remove the slide and the insert 74 of the throat plate.

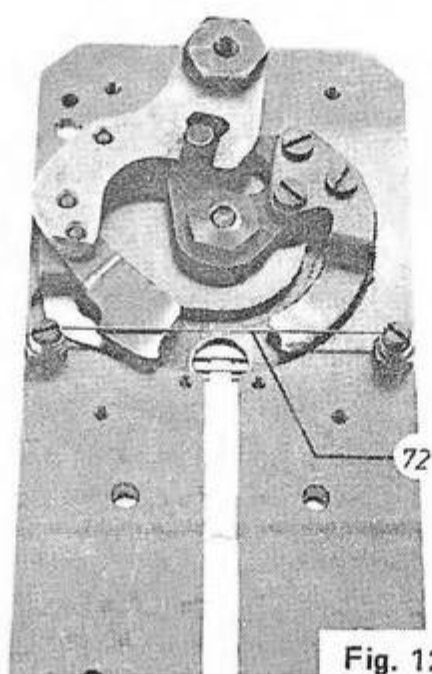


Fig. 12

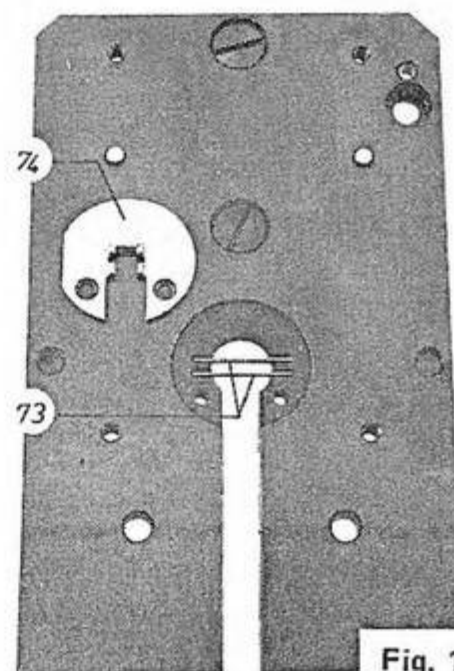


Fig. 13

17. OPERATION OF THE MACHINE

In addition to the basic instructions note for DÜRKOPP 556-5101 and -5121 also the following instructions:

17.1. Adjusting the cam for final stitches

After having loosened its fastening screw 76 (fig. 15) set the cam 75 (fig. 14) so that it reaches the roller lever 77 (fig. 16) and moves the block sideways when the roller 79 (figs. 17 and 18) of the stitch position coulisse 68 stands immediately before the cam jump "D" of the front cam. See fig. 18.

This will increase the distance between the last tying stitches before stopping the machine so that after cutting off the lower thread the projecting thread end will be pulled from the lower side to the upper side of the fabric.

Note

For obtaining with E 63 and E 64 the maximum bartacking width (7 mm), remove the end stitch cam 75 (fig. 14).

17.2. Adjusting the stopping cam

The machine should be stopped when the roller 79 stands about at the point "E" of the front cam.

But since the end position of the cam disk is slightly different after each engagement, particularly in case of few stitches, the timing should be done in such a way that, in the stopped end position, the roller 79 stands in the "F" area of the front cam.

The joint 53 has been properly adjusted in the factory. It is sealed and should not be readjusted.

17.3. Adjusting the thread clamp 43 (fig. 7) for tying stitches

Time

The moment of thread clamping is determined by the position of the releasing sheet 82 (fig. 18) on the back of the cam disk 83.

After loosening its fastening screws set the releasing sheet so that with the machine being stopped in its end position the tripping cam 85 (fig. 17) stands in the left half (A area) of the clamping sheet "B". See fig. 18.

The adjustment ensures that with the tensioner being closed about 2/3 of the tying stitches are sewn at the seam end and about 1/3 at the seam beginning.

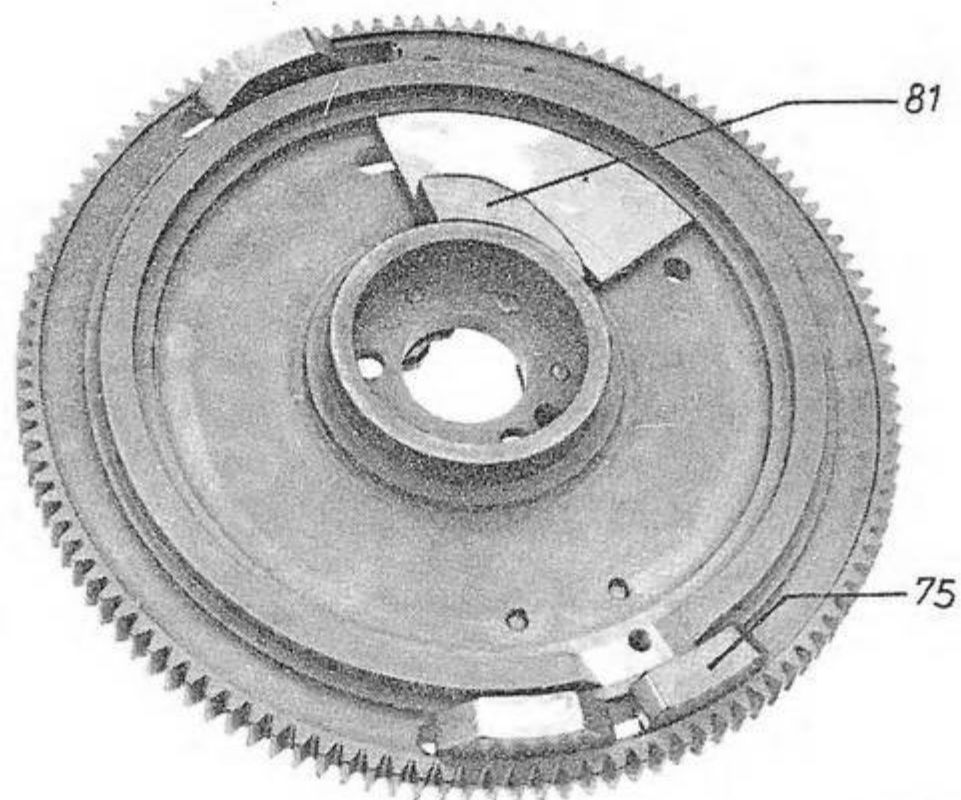


Fig. 14

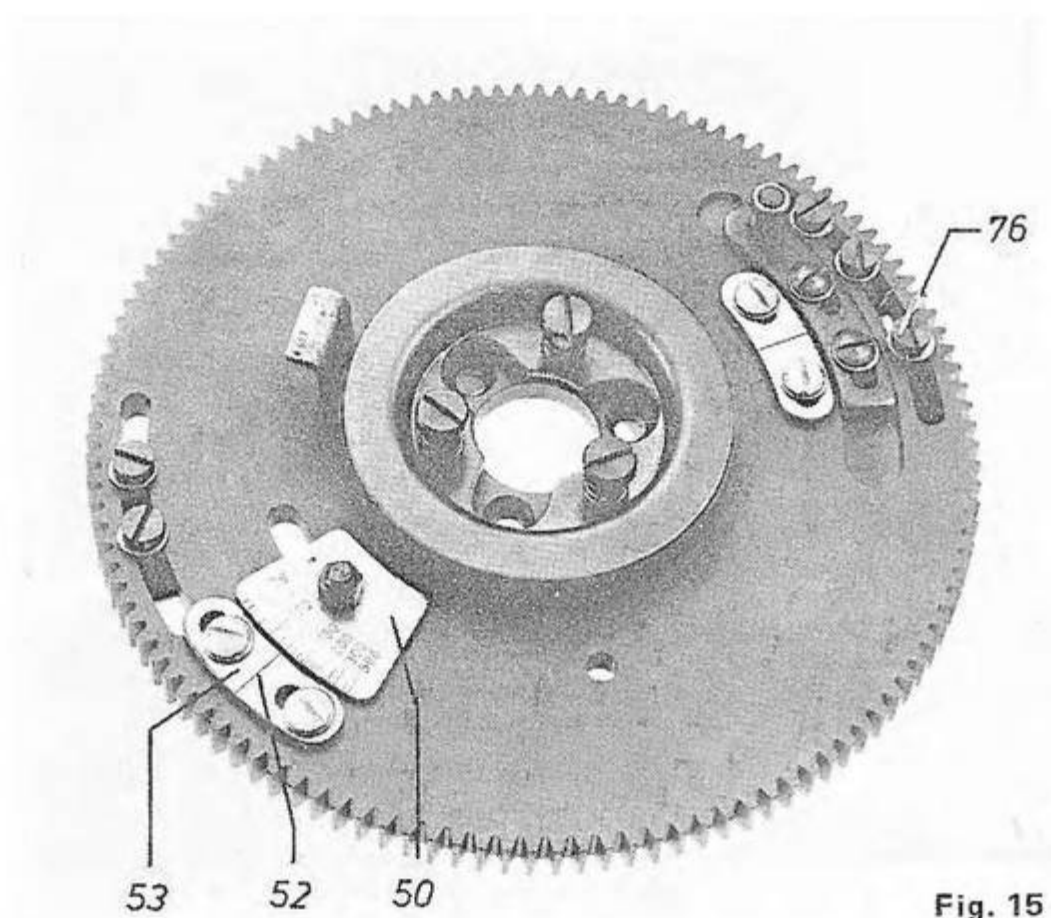


Fig. 15

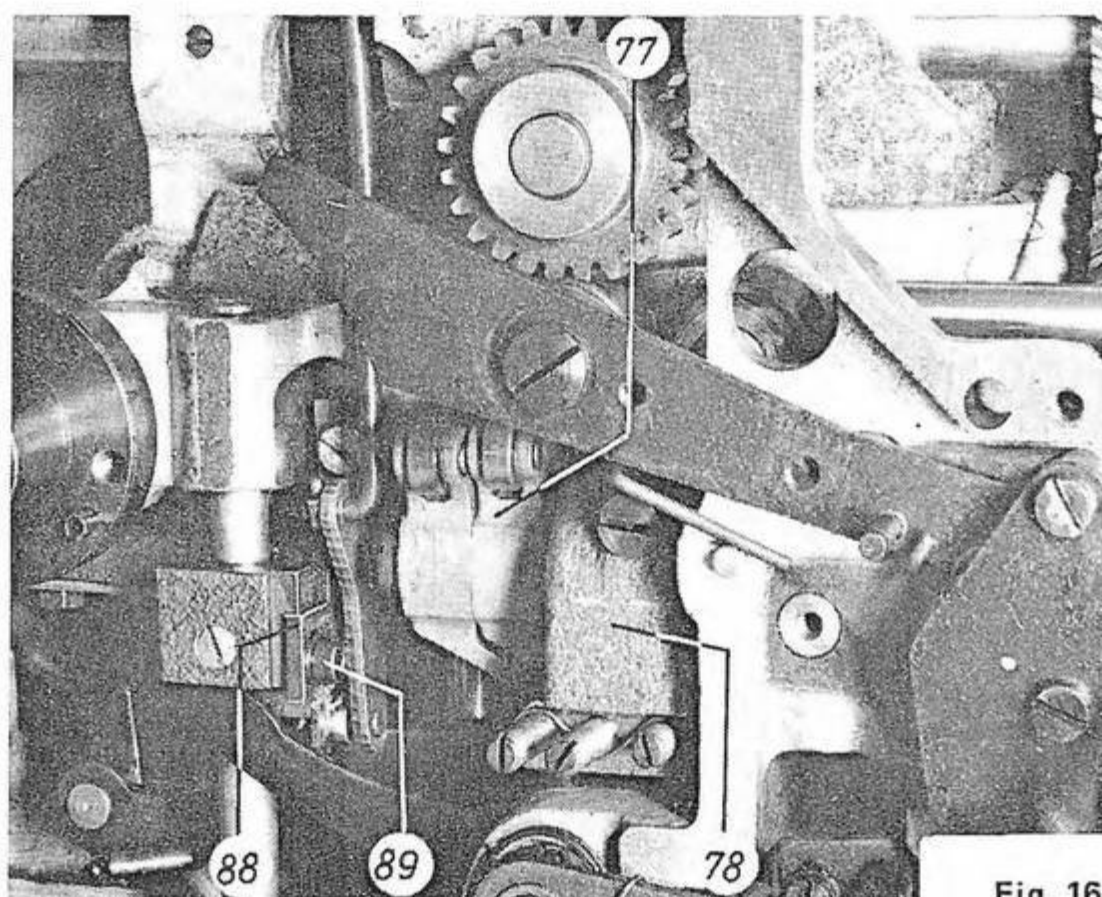


Fig. 16

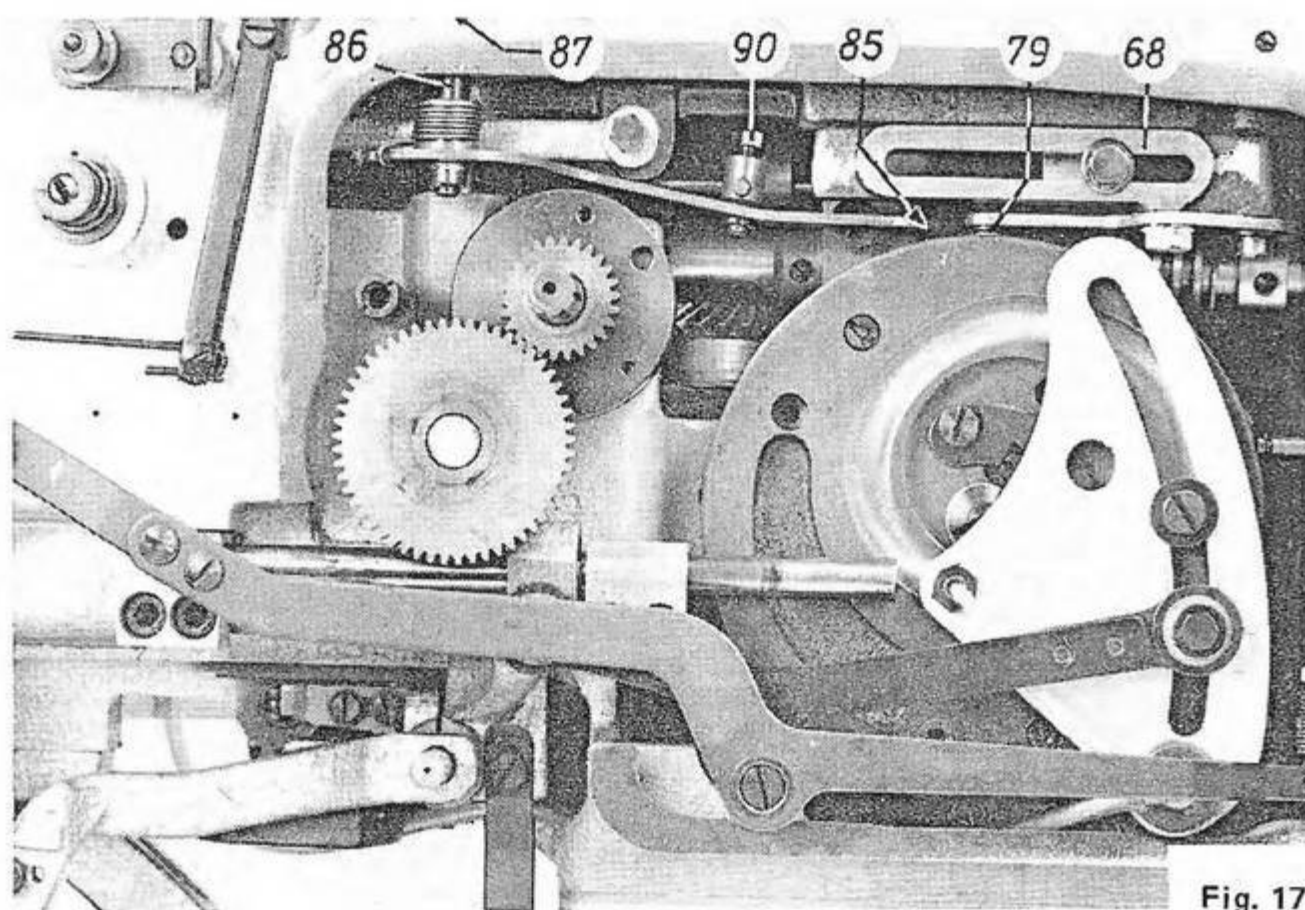


Fig. 17

Since the end position of the cam disk is a bit different after each engagement, particularly in the case of few stitches per buttonhole, operate the machine several times up to the end position and check for proper adjustment.

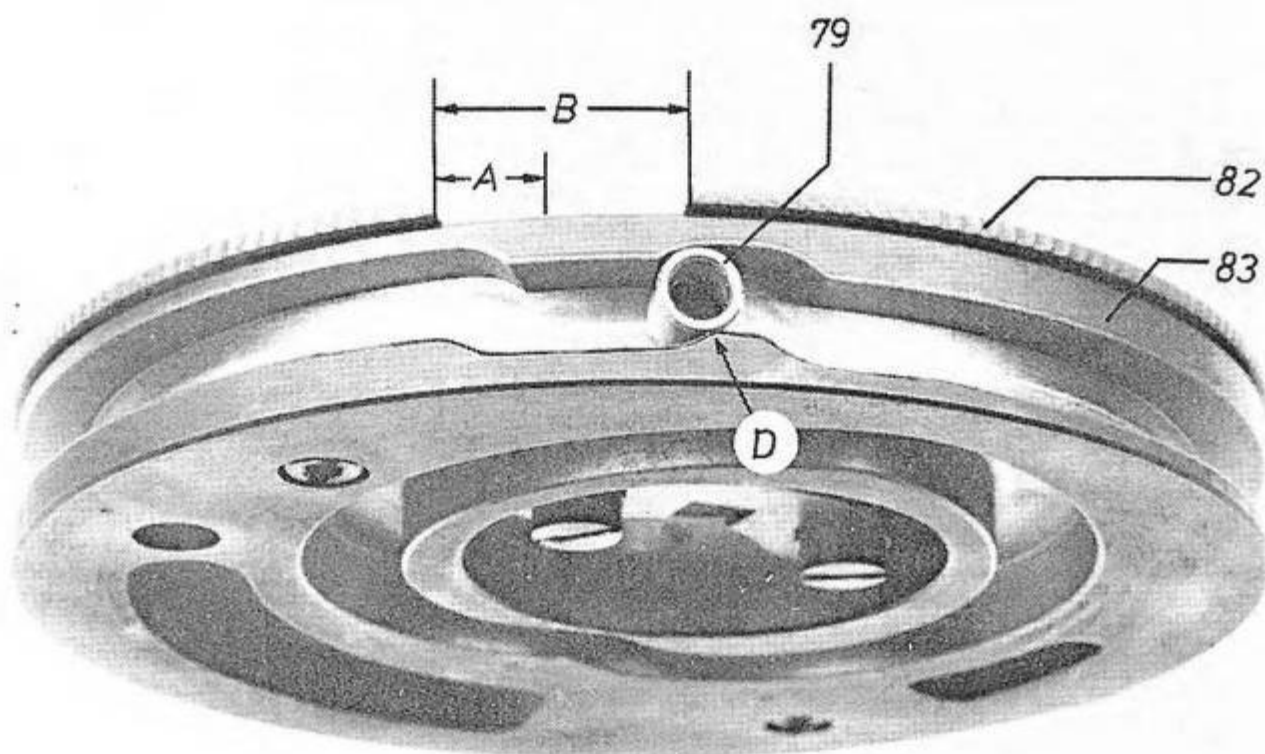


Fig. 18

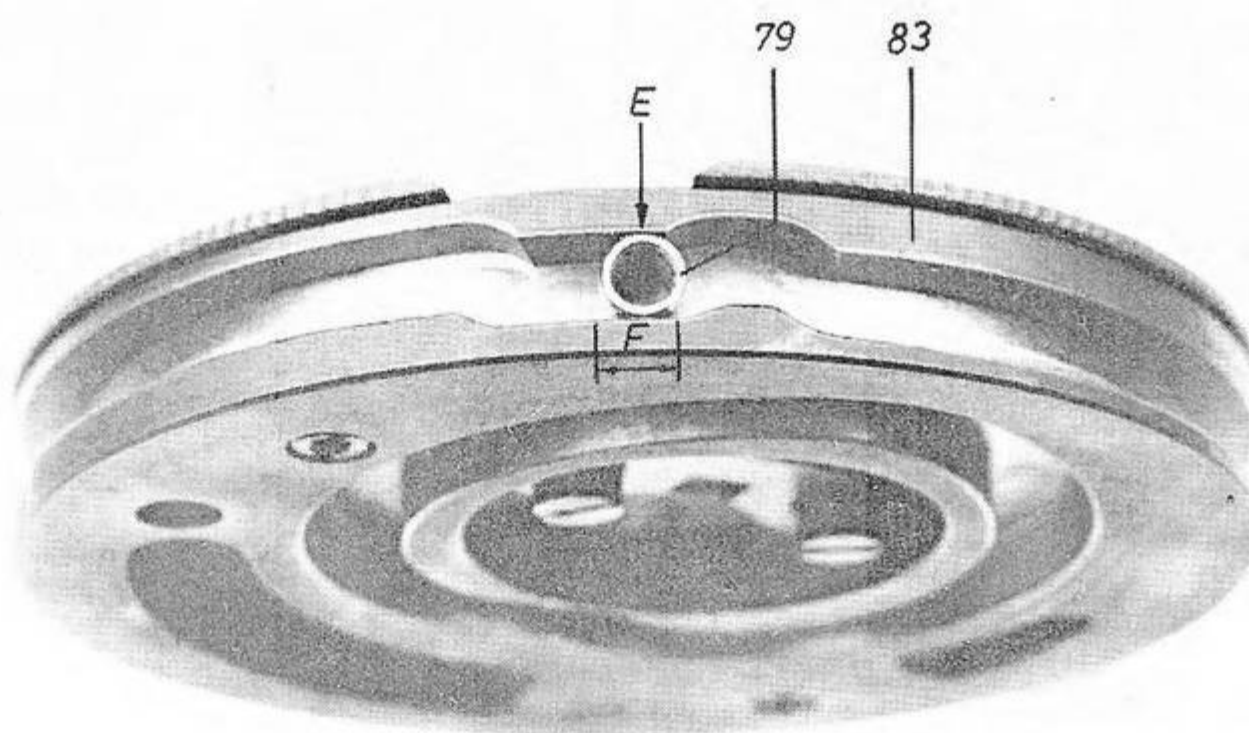


Fig. 19

Path

With the thread clamp 43 (fig. 7) being opened, the distance between the collar of the tensioner axle and the rear tension disk should amount to about 1 mm.

After loosening its fastening screw 87 adjust the eccentric bolt 86 (fig. 17) accordingly.

With the machine being stopped in its end position the thread clamp should be open. This is ensured by the automatic lifting of the cloth presser frame at the seam end. But the clamp should not be opened before the lower thread has been safely cut. The clamp should be open when the needle thread cutter acts. For this purpose, set the control square 88 (fig. 16) after having loosened its fastening screws 89 accordingly. The square 88 is accessible after removal of the cam disk.

Any play in the transmission rods can be balanced after loosening the screw 90 (fig. 17).

17.4. Adjusting the wheel tension

With the machine being stopped in its end position the wheel tension 41 (fig. 7) should be opened, and when the machine is operating it should be closed.

This adjustment can be effected by regulating the releasing lever 92 after having loosened the screws 91.

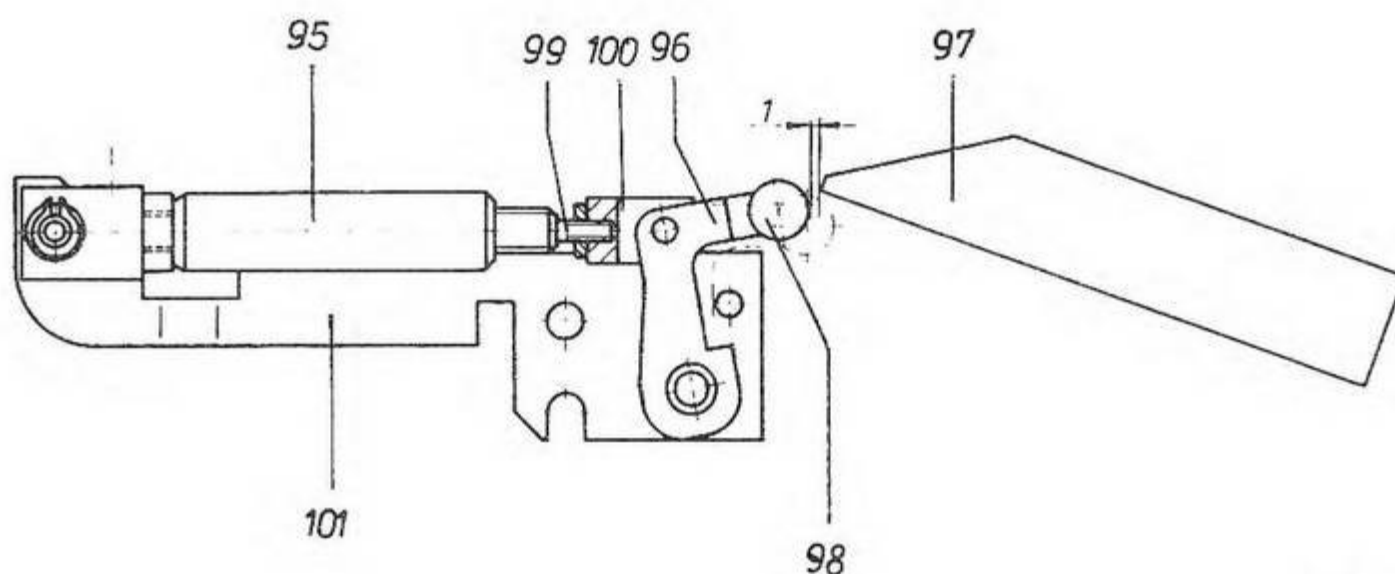


Fig. 20

17.5. Sewing a buttonhole two times

By operating the switch 70 (fig. 11, DÜRKOPP 556-5121 can be set for sewing buttonholes one time or two times.

If a buttonhole is sewn two times, the machine is not switched off after the first cycle. By means of the tripping sheet 93 (fig. 9) the valve 94 (fig. 11) is set for two cycles and it is supplied with air by the cylinder 95 (figs. 4 and 20).

The cylinder 95 moves the roller square 96 under the hinged joint 97 (figs. 20 and 21) of the bent link, so that it cannot act.

After the second cycle the cylinder 95 (fig. 20) is deaerated and the bent link can act, so that the machine is stopped.

For free action of the bent link, the link joint 97 should pass along the roller 98 at a distance of about 1 mm when the cylinder 95 is deaerated. See fig. 20.

This distance exists when the tappet 99 is level with the base surface of the fork 100. If required, the adjustment can be made by regulating the holding plate 101.

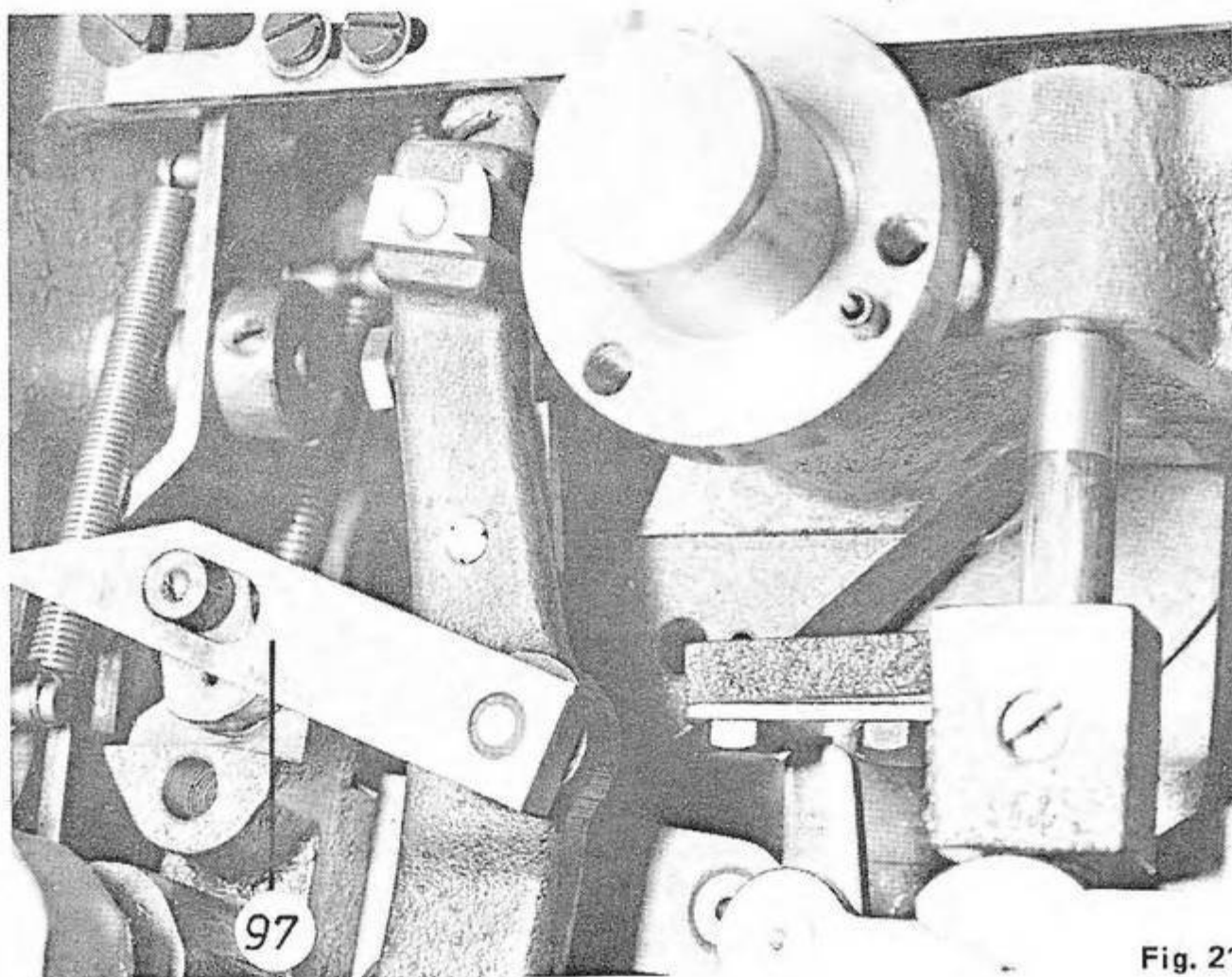


Fig. 21

17.6. Knife function and thread monitor

The action of the buttonhole knife is released by the valve 105 (fig. 22). The valve 105 is operated by the bush 106 when at the seam end it is pulled by the traction rod 107.

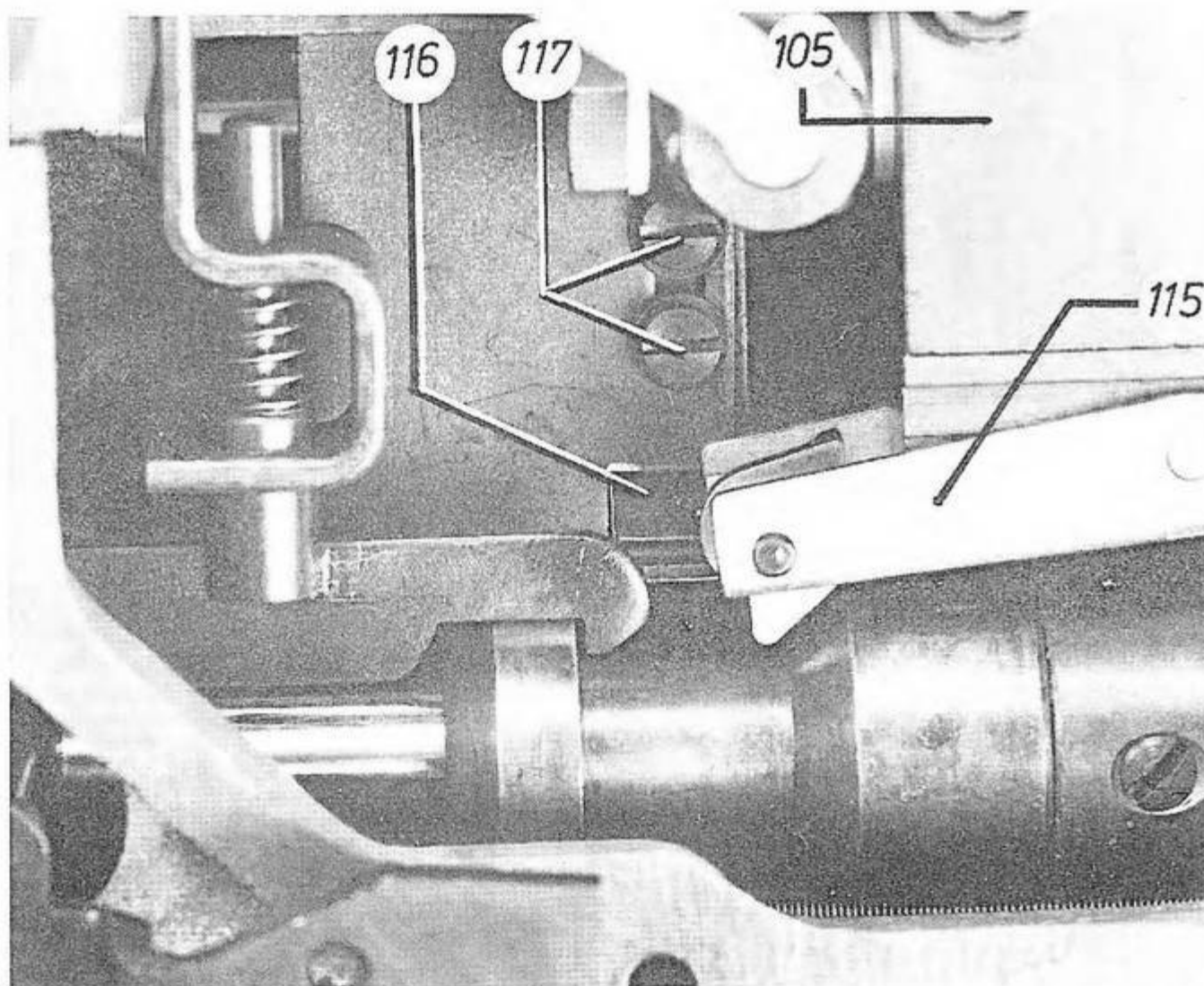
After loosening its fastening screws set the valve 105 so that it can be safely operated.

Loosen the screws 117 (fig. 21 a) and adjust the square 116 so that the control lever 115 is intercepted direct below the shaft pin of the valve 105.

But the shaft pin should not yet be operated.

The knife should act only after a disturbance-free sewing process. If the thread monitor has acted because the needle thread is broken or consumed the buttonhole should not be cut up. In this case the traction rod 107 should return without taking with it the bush 106 or it should be pulled back only so far that the valve 105 is not operated.

For this purpose, loosen the screw 109 and adjust the stop sheet 108 (fig. 23) so that the angular lever 110 and consequently the traction rod 107 (fig. 22) are arrested in the appropriate position.



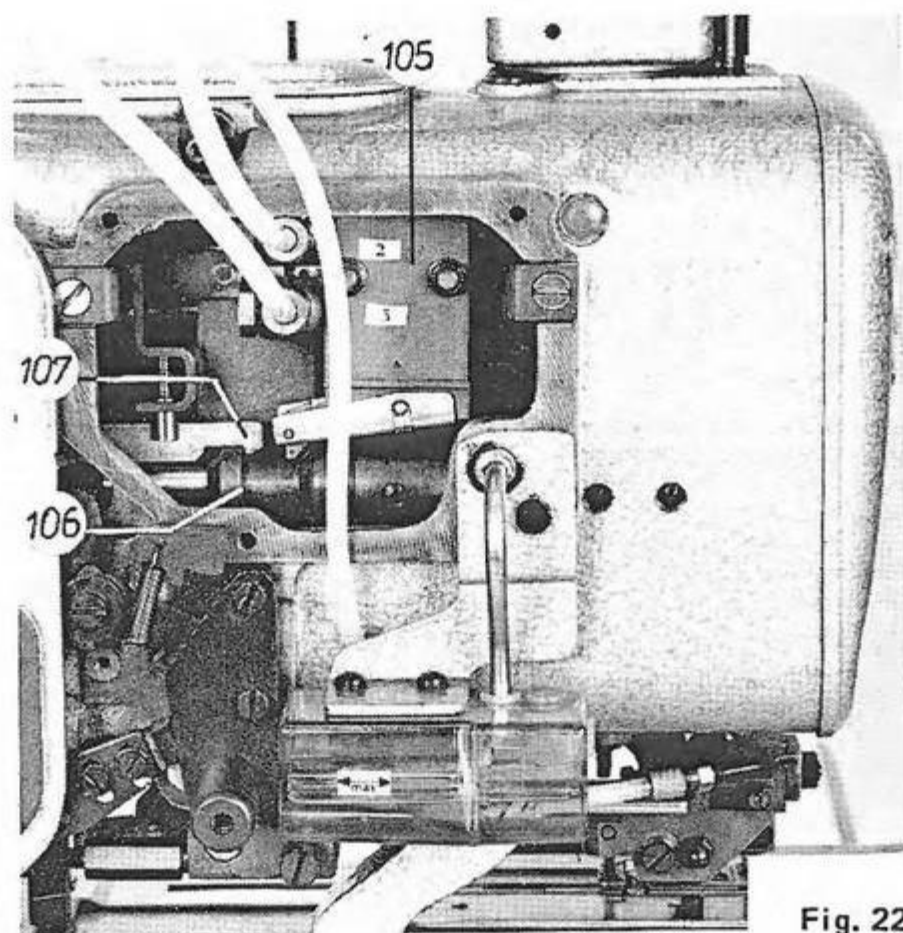


Fig. 22

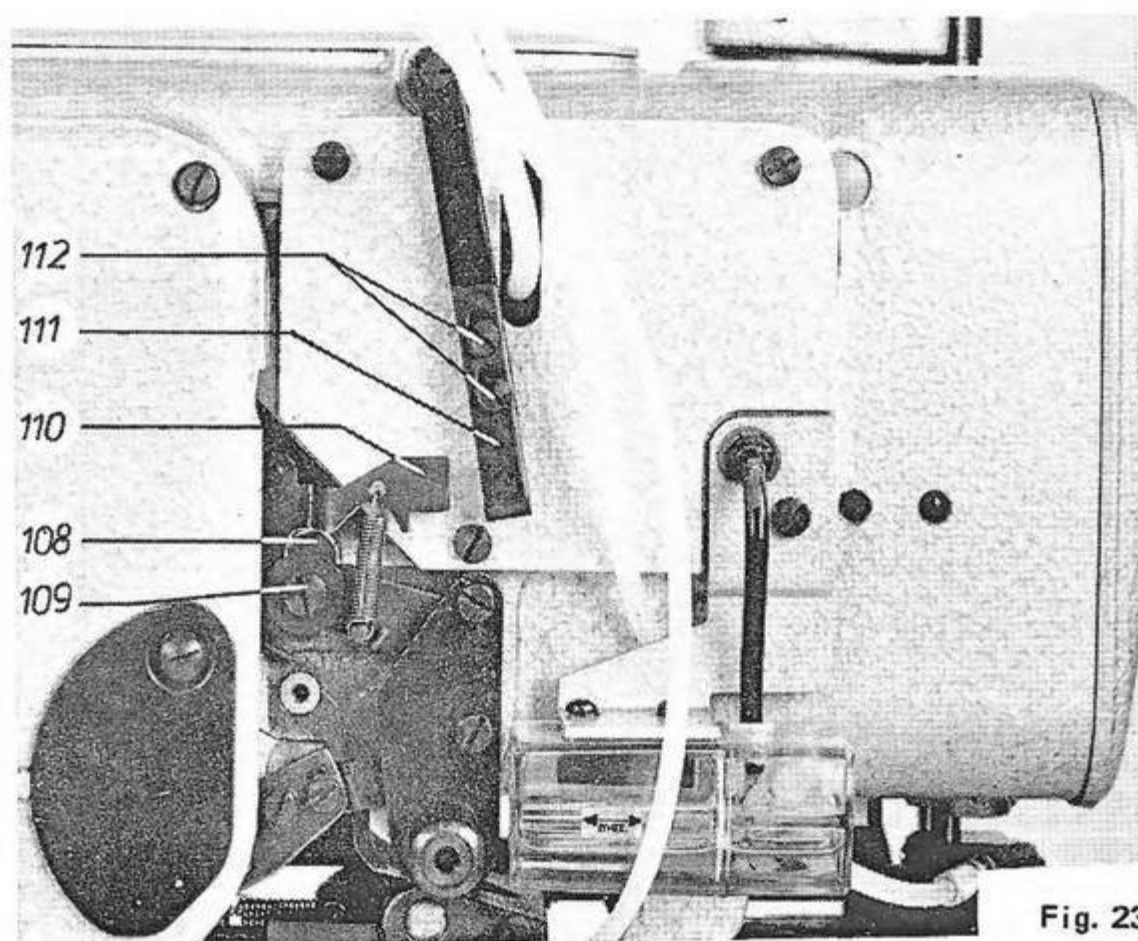


Fig. 23

Finally, after loosening the screw 112, set the joint 111 (fig. 23) so that it can drop safely under the angular lever 110 when the latter stands at its upper dead point. The distance between the angular lever 110 and the joint 111 should be no small that the downwards movement of the angular lever 110 and the joint 111 should be so small that the downwards movement of the angular lever and of the traction rod 107 (fig. 22) can be intercepted before the traction rod can fall behind the bush 106 for pulling it back.

Note:

Readjust the joint 111 after every rectification of the tripping sheet 108 (fig. 23).

18. Stroke adjustment

For a safe formation of the fastening stitches at the buttonhole end it is important to obtain the maximum stroke and to ensure the proper timing of the functions during the lifting movement.

18.1. Adjusting the block 184 (fig. 24) on the lifting bar

Loosen the screws 197 and 198 and adjust the block 184 on the lifting bar so that in the neutral position of the lifting lever 181 and of the lifting bar 199 the distance between the surface 184a (fig. 25) of the block 184 and the surface 182a of the block 182 amounts to about 0.5 mm and so that the surfaces are reciprocally parallel.

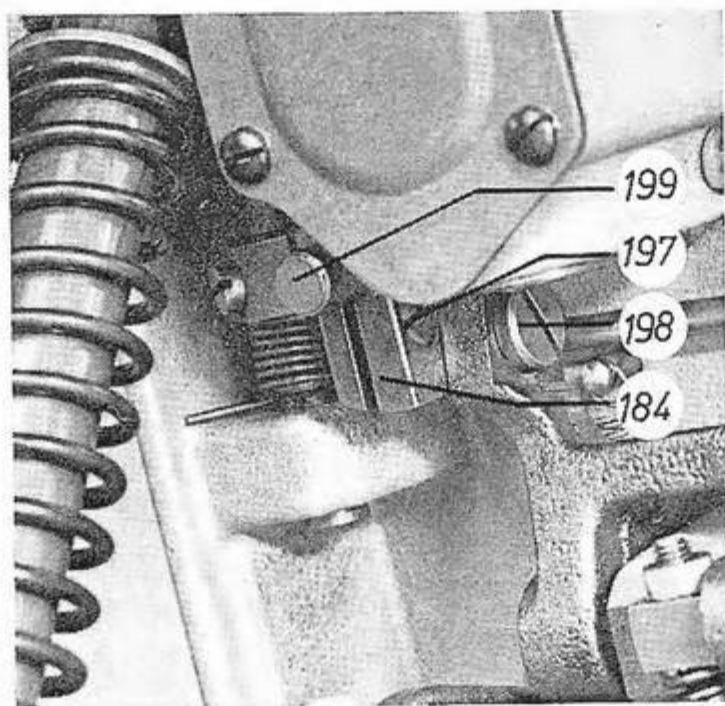


Fig. 24

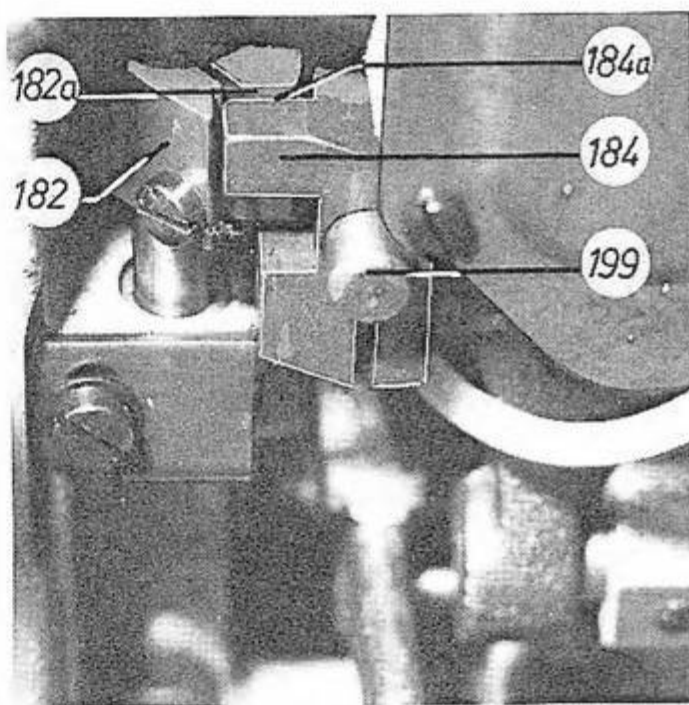


Fig. 25

18.2. Adjusting the maximum stroke

1. Loosen first the counter nut 224 (fig. 26) and loosen the stop screw 223 so that the maximum stroke is not blocked by the stop screw.
2. With the machine being stopped, i.e. with the lifter tappet 15 not operated, the distance between the roller 16 of the lifting lever and the lifter tappet 15 should amount to about 0.5 mm. For adjusting, loosen the counter nut 15a and turn the screw accordingly.
3. When the machine is engaged, i.e. when the lifter tappet 15 is operated, the distance between the block 225 (fig. 27) on the cloth presser bar and the bush 226 of the cloth presser bar should amount to about 0.5 mm (max. stroke).

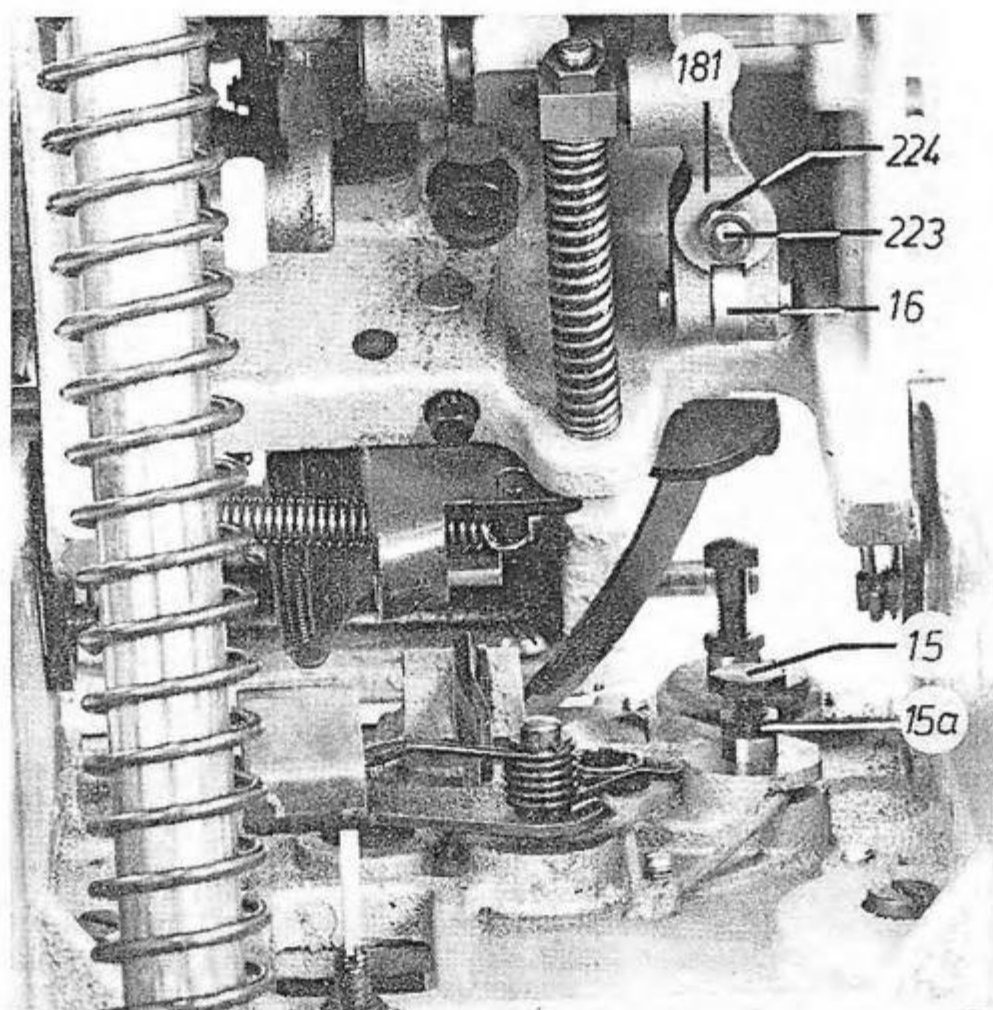


Fig. 26

The adjustment is obtained by displacing the block 220 on the lifter bar 199. It must be fixed by the stop screw 223 (fig. 26) in the lifter lever 181. Note that the adjustment should not be modified.

18.3. Functions during the lifting movement in 556-5101, -5121, and -205101

During the lifting movement first the lower thread must be cut off.

Then the needle thread clamp 43 (fig. 29) should be opened.

Finally, the needle thread should be cut off and the fabric presser clamp should be lifted.

The opening of the thread clamp 43 after cutting the lower thread is therefore of particular importance for ensuring well tightened stitches (safe stitch formation).

The thread clamp 43 can be adjusted accordingly after loosening the screw 89 (fig. 28) on the angular control piece 88.

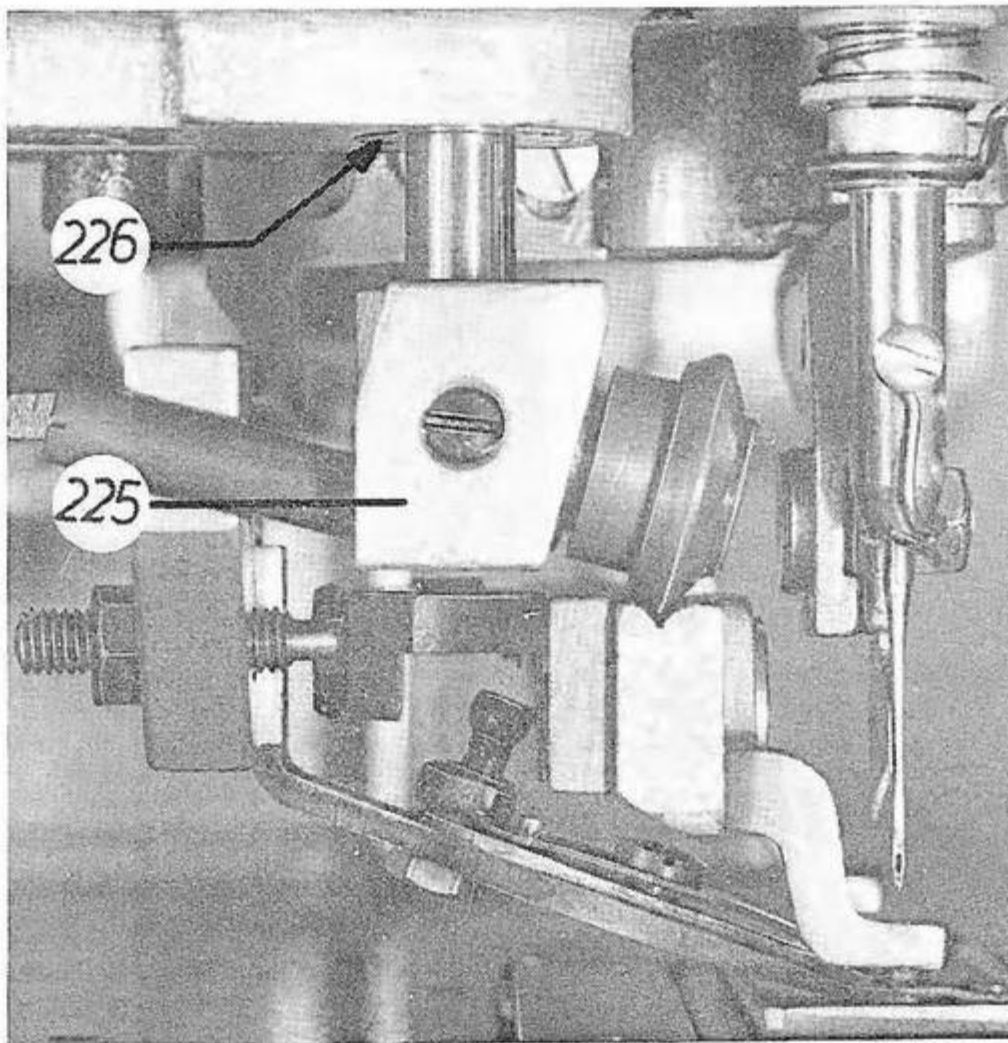


Fig 27

18.4. Functions during the lifting movement in 556-202101

During the lifting movement first the needle thread should be cut off, i.e. the needle thread cutter should act.

The the lower thread is cut off and the cloth presser clamp is lifted.

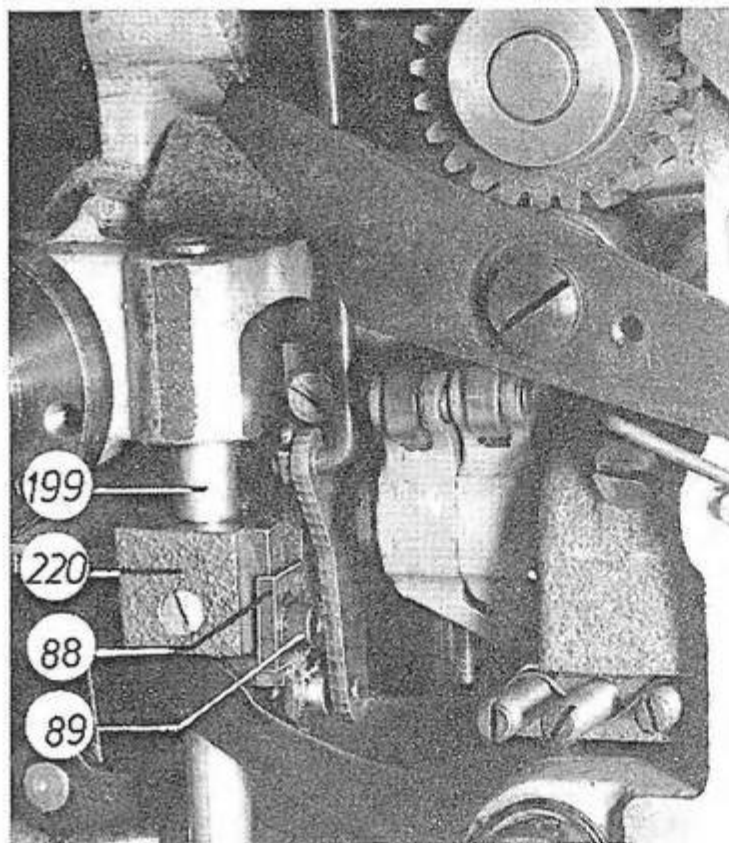


Fig 28

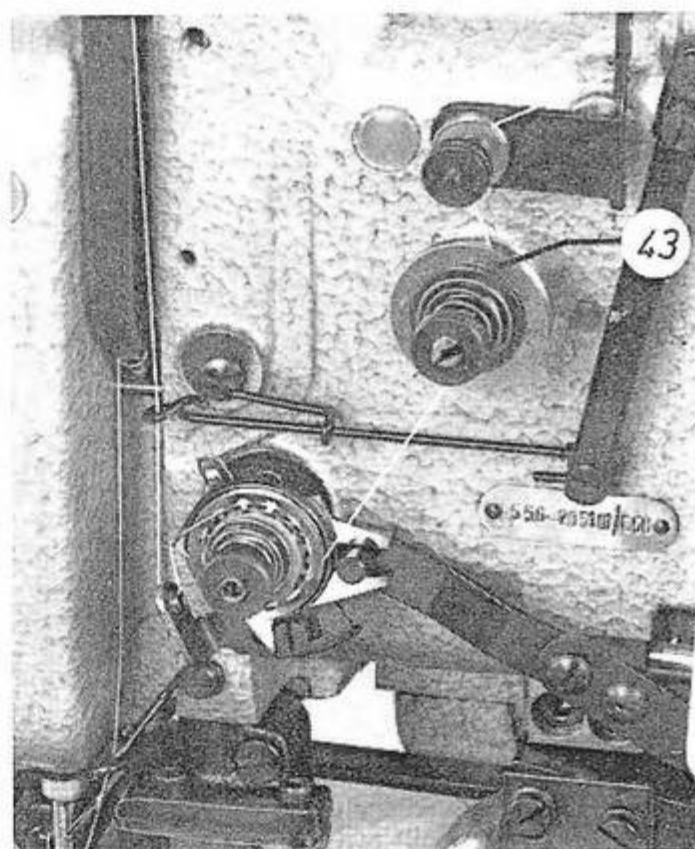


Fig 29

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