PFAFF® Industrial

487

ADJUSTMENT MANUAL

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und Maschinen AG

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1 Safety

1.01 General notes on safety

- The machine must only be operated by adequately trained operators and only when the instruction manual has been fully read and understood!
- All notices on safety and the instruction manual of the motor manufacturer are to be read before the machine is put into operation!
- All notes on the machine concerning danger and safety must be observed!
- The machine must be used for the purpose for which it is intended and must not be operated without its safety devices; all regulations relevant to safety must be adhered to.
- When part sets are changed (e.g. needle, presser foot, needle plate, feed dog or bobbin), during threading, when the workplace is left unattended and during maintenance work, the machine must be isolated from the power supply by turning off the on/off switch or removing the plug from the mains!
- Daily maintenance work must only be carried out by appropriately trained persons!
- Repairs and special maintenance work must only be carried out by qualified technical staff or persons with appropriate training!
- During maintenance or repairs on the pneumatic system the machine must be isolated from the compressed air supply! The only exception to this is when adjustments or function checks are carried out by appropriately trained technical staff!
- Work on the electrical equipment must only be carried out by technical staff who are qualified to do so!
- Work on parts or equipment connected to the power supply is not permitted! The only exceptions to this are specified in regulations EN 50110.
- Conversion or modification of the machine must only be carried out under observation of all relevant safety regulations!
- Only spare parts which have been approved by us are to be used for repairs! We draw special attention to the fact that spare parts and accessories not supplied by us have not been subjected to testing nor approval by us. Fitting and/or use of any such parts may cause negative changes to the design characteristics of the machine. We shall not accept any liability for damage caused by the use of non-original parts.

1.02 Safety symbols



Danger!
Special points to observe.



Danger of injury to operating or technical staff!

1.03 Danger warnings



Never put your hands in the sewing area during sewing!
Danger of injury by the needle!



While setting or adjusting the machine do not leave any objects on the table nor in the needle plate area! Objects may be trapped or flung out of the machine!



To adjust this mechanism the machine must be tilted backwards.
When setting the machine upright again, use both hands.
Danger of crushing between sewing head and table top!"

2 Adjustment



Before any servicing or adjustment work is carried out, the notes on safety in this service manual and the safety notes in the instruction book have to be observed!



Do not use a screw-clamp on the needle bar of the PFAFF 487, because this will damage the special coating of the needle bar.

2.01 Notes on adjustment

All adjustments in this service manual refer to a fully assembled machine. Machine covers which have to be removed for checking and adjustment work and refitted afterwards are not mentioned in the text.
The screws or nuts indicated in brackets () are for fixation of parts of the machine and have to be loosened before an adjustment and tightened again afterwards.

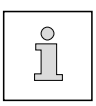
2.02 Tools, gauges and other equipment

- Set of screwdrivers with blade widths from 2 to 10 mm
- Set of open-ended spanners, 7 to 14 mm across-flats
- Set of allen keys, 1.5 to 6 mm
- Metal rule, part No. 08-880218-00
- Adjustment pin (5 mm dia.), part No. 13-030341-05
- Adjustment gauge, part. No. 61-111642-49
- Adjustment link, part No. 91-069375-15
- Adjustment foot, part No. 61-111639-20

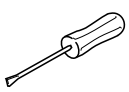
2.03 Abbreviations

t.d.c. = top dead centre
b.d.c. = bottom dead centre

2.04 Explanation of symbols



Note, information



Service, repair,
adjustment, maintenance

2.05 Checking and adjusting aid

By blocking holes 1 to 6 with a pin it is possible to accurately fix the required needle bar positions.

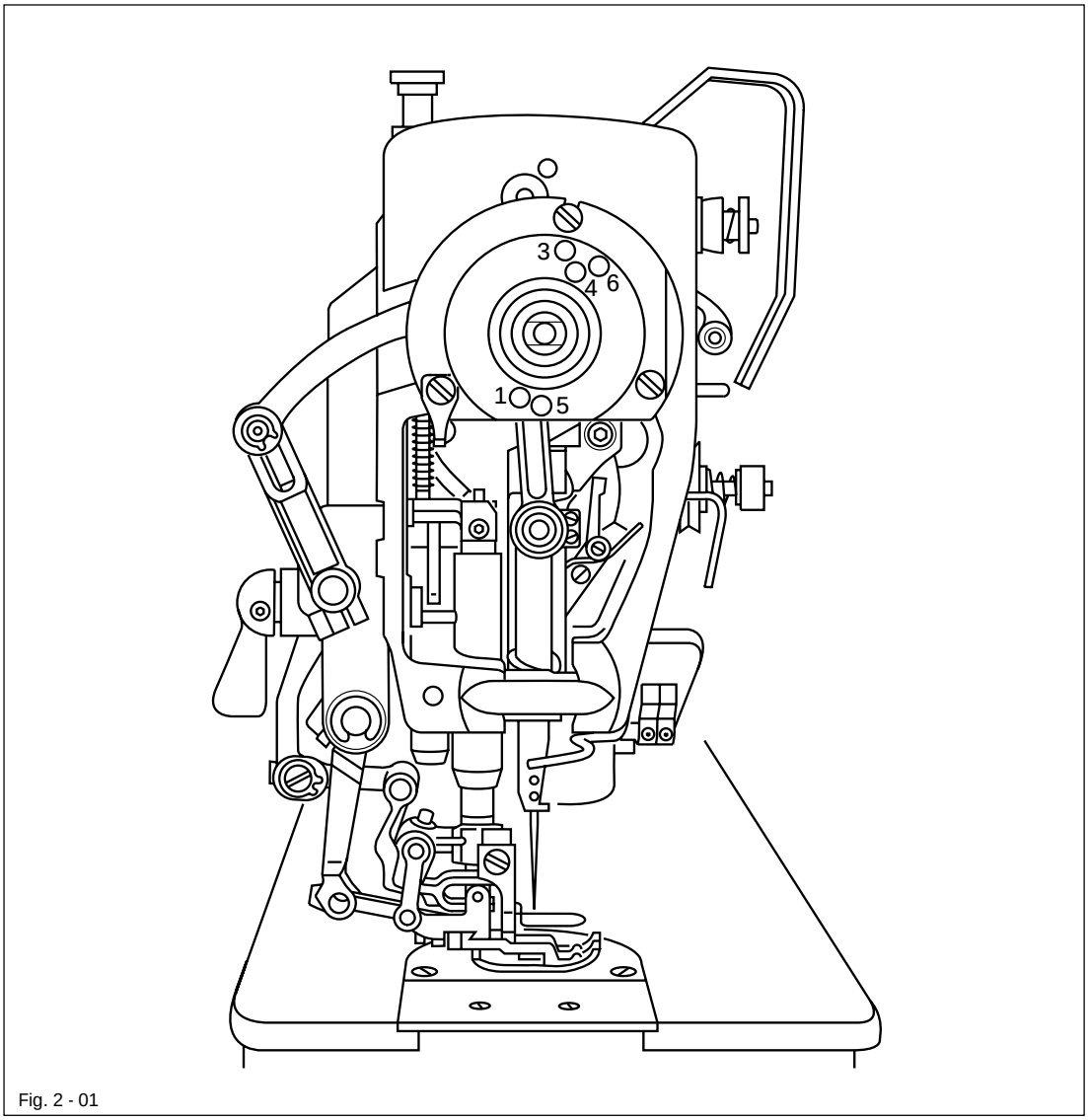


Fig. 2 - 01

- Turn the balance wheel until the needle bar is roughly in the required position.
- Insert the blocking pin in the required hole and press against it.
- Turn the balance wheel slightly back and forth so that the pin enters the cutout in the bearing plate behind and thus blocks the machine.

Hole 1 = 0.6 mm past top dead centre of the needle bar (0.6 past t.d.c.)
Hole 3 = 0.6 mm past bottom dead centre of the needle bar (0.6 past b.d.c.)
Hole 4 = 1.8 mm past bottom dead centre of the needle bar (needle rise position)
Hole 5 = top dead centre of the needle bar (t.d.c.)
Hole 6 = 4 mm past bottom dead centre of the needle bar (4 past b.d.c.)

2.06 Preliminary adjustment of needle height

Requirement
With the needle bar at b.d.c. the underside of the needle bar must be at a distance of approx. 16.5 mm from the needle plate.

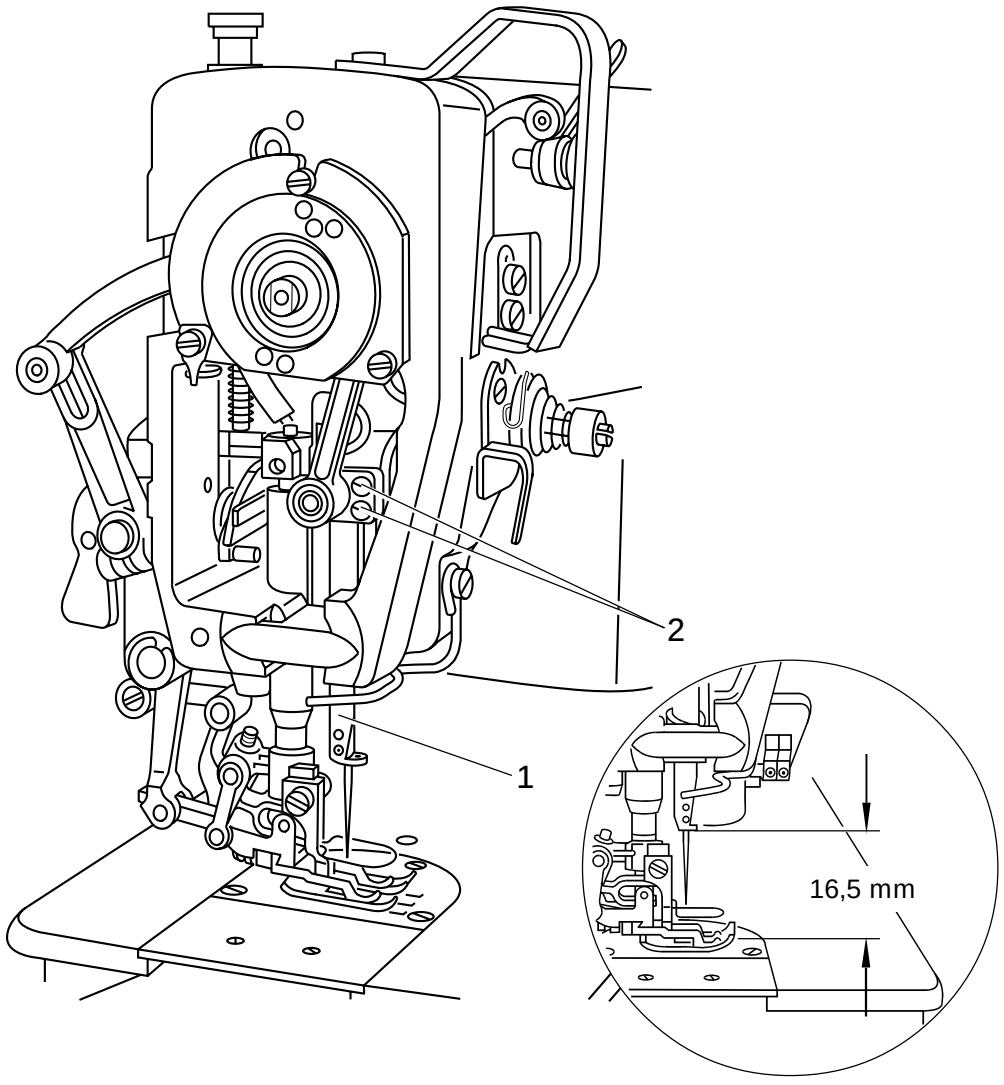
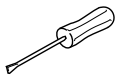


Fig. 2 - 02



- Re-position needle bar 1 (screws 2) according to Requirement.

2.07 Needle in needle-hole centre

Requirement
The needle must enter exactly in the centre of the needle hole.

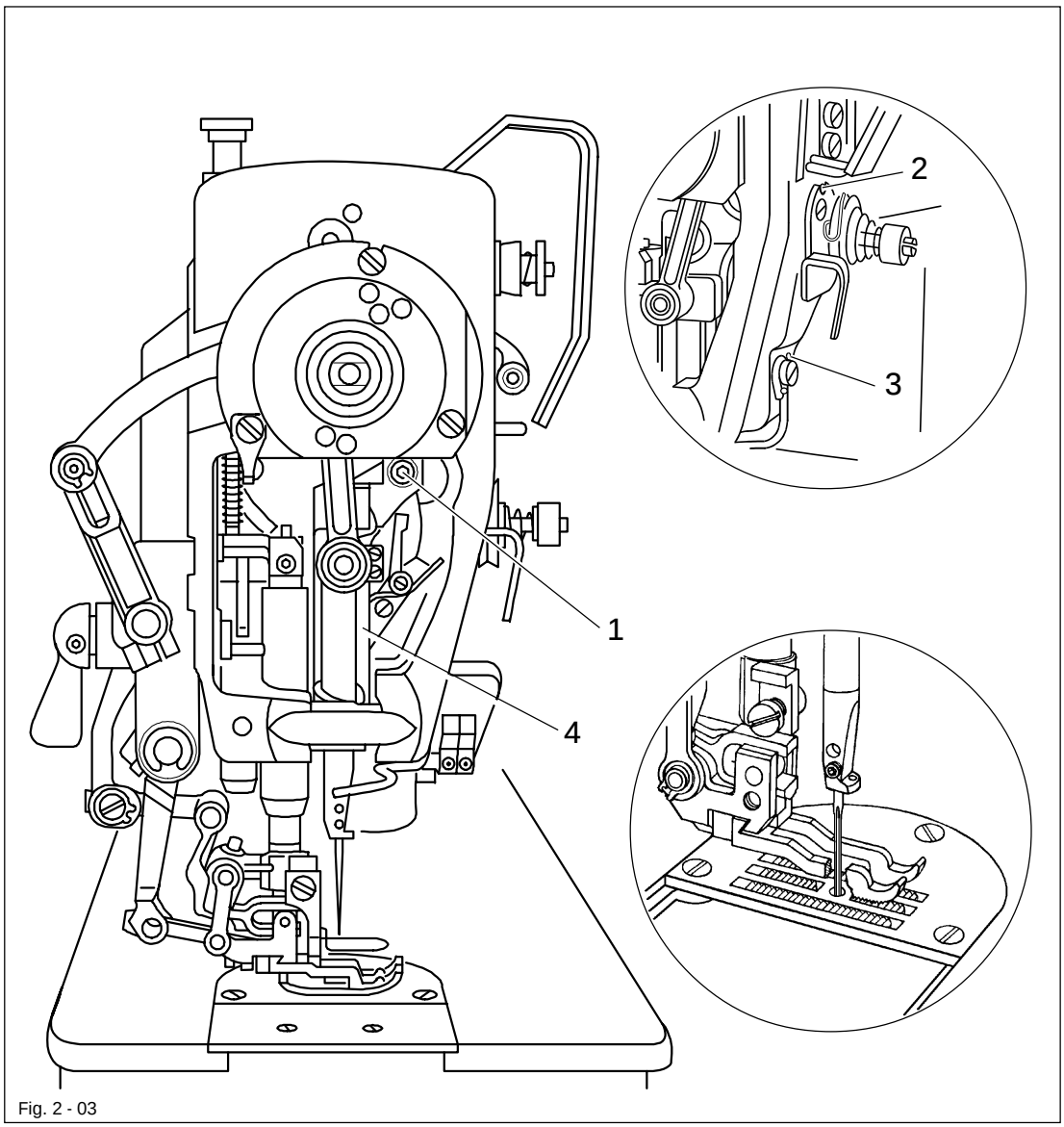


Fig. 2 - 03

- Set the needle immediately above the needle hole.
- Loosen screws 1, 2 and 3.
- Reposition needle bar frame 4 according to the Requirement both crosswise and lengthwise of the feeding direction.
- Tighten screw 3 firmly and screw 2 just a little.
- Turn screw 1 to take up the guide pin behind it against the eye of the needle bar frame and tighten it.
- Take out the needle.
- Loosen screw 2, turn the balance wheel a few turns (to remove any binding) and tighten screw 2 firmly.

2.08 Neutral position of drop feed

2.08.01 Adjustment with the gearcase closed

Requirement
At stitch length setting "O" the drop feed must not make any feeding movement when the balance wheel is turned.

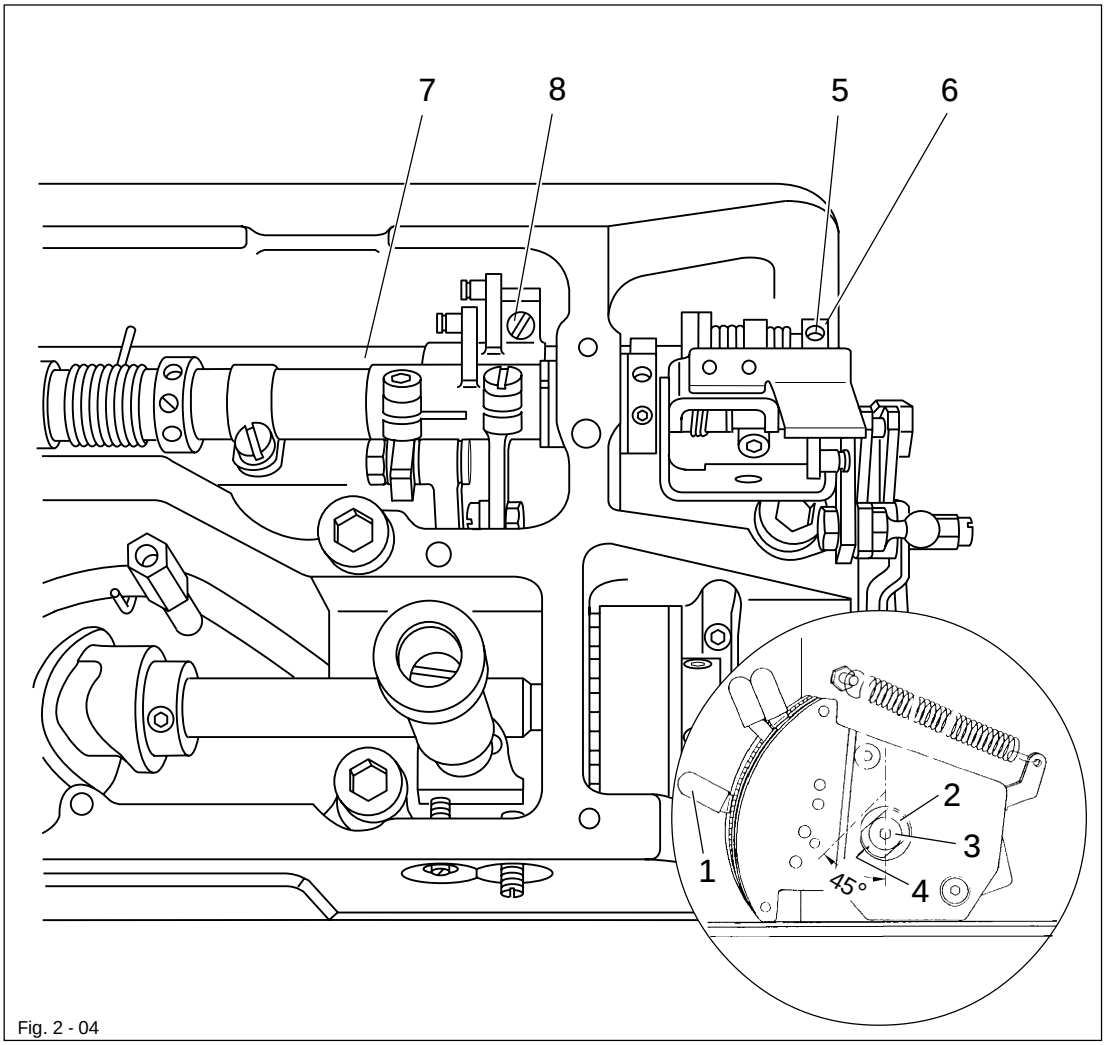
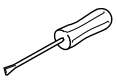


Fig. 2 - 04



- Set feed regulator lever 1 in its lowest position.
- Turn bush 2 (screw 3) so that mark 4 is facing downwards and the edge of the milled surface is at an angle of approx. 45° to the front side of the machine.
- (For the final adjustment, see Chapter 2.20 "Top feed synchronization".)
- Insert a suitable pin or allen key in hole 5 of tensioning ring 6 and hold shaft 7 with it firmly.
- Turn shaft 7 (screw 8) according to Requirement.

2.08.02 Adjustment with the gearcase opened

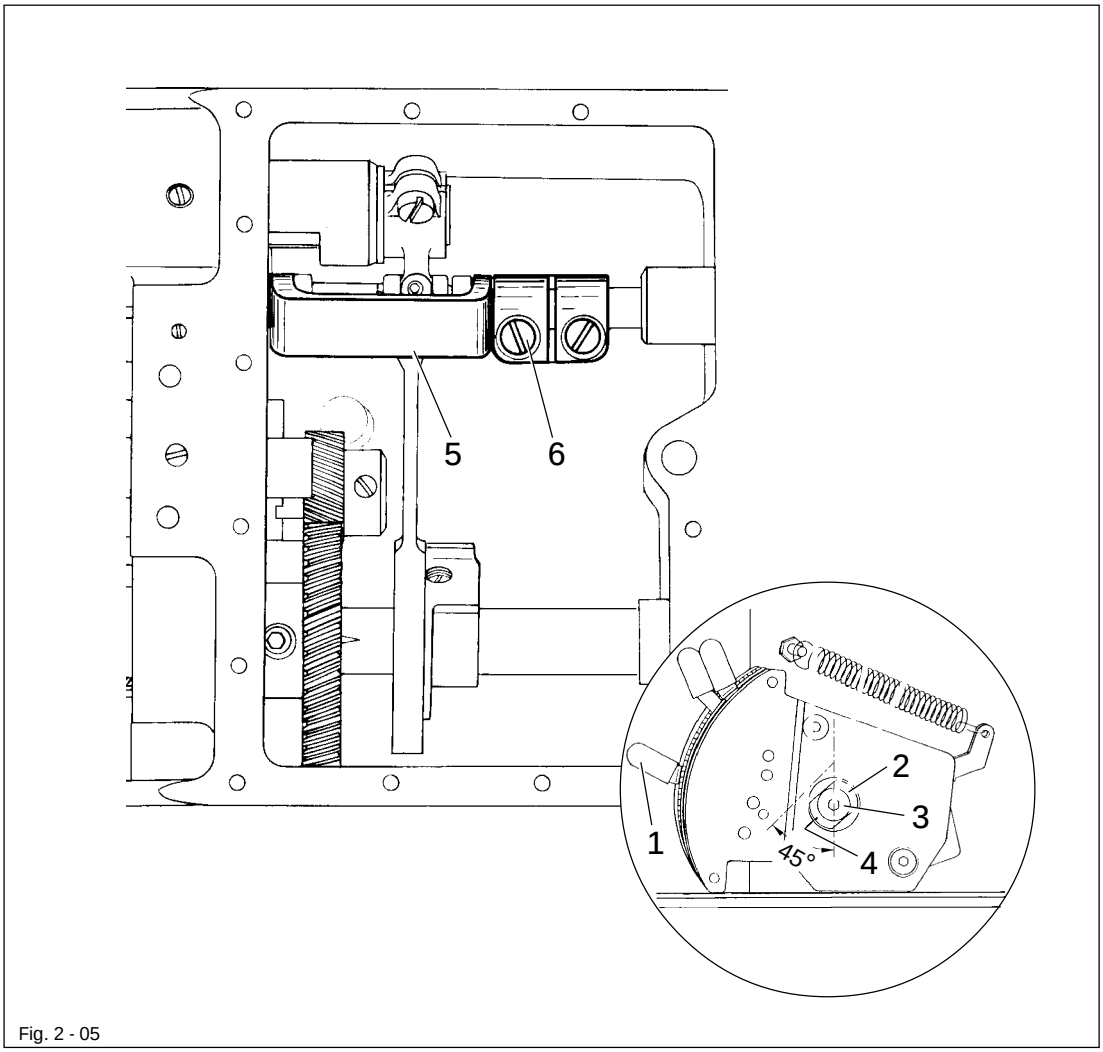


Fig. 2 - 05

- Set feed regulator lever 1 in its lowest position.
- Turn bush 2 (screw 3) so that mark 4 is facing downwards and the edge of the milled surface is at an angle of approx. 45° to the front side of the machine.
  (For the final adjustment, see Chapter 2.20 "Top feed synchronization".)
- Turn crank 5 (screw 6) according to Requirement.

2.09 Actuating lever under the reverse-feed control

Requirement
At the longest stitch length setting, reverse-feed control lever 3 must have a slight play (approx. 0.3 mm) when pressed lightly.

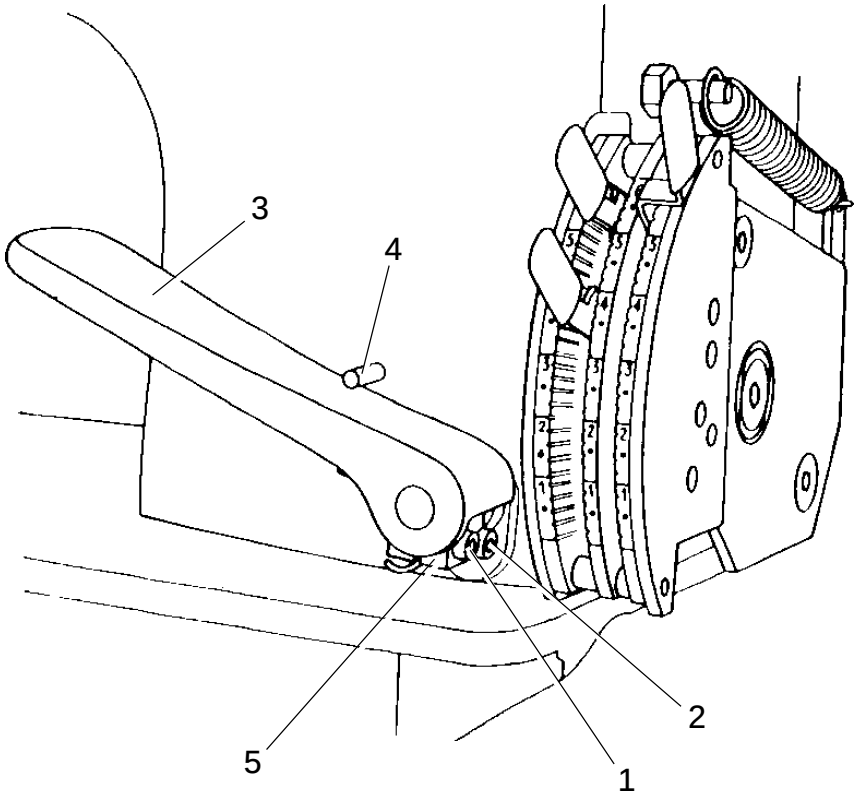
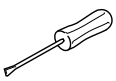


Fig. 2 - 06



- Loosen screws 1 and 2.
- Make sure that reverse-feed control lever 3 is resting on stop 4, move actuating lever 5 lightly against the reverse-feed control and tighten screw 1 again.



Leave screw 2 loose until the top-feed neutral position is adjusted (Chapter 2.15).

2.10 Feeding motion of drop feed

Requirement
At the longest stitch length setting and with the needle bar in position 0.6 past t.d.c. (blocking hole 1) the feed dog must not move when the reverse-feed control is operated.

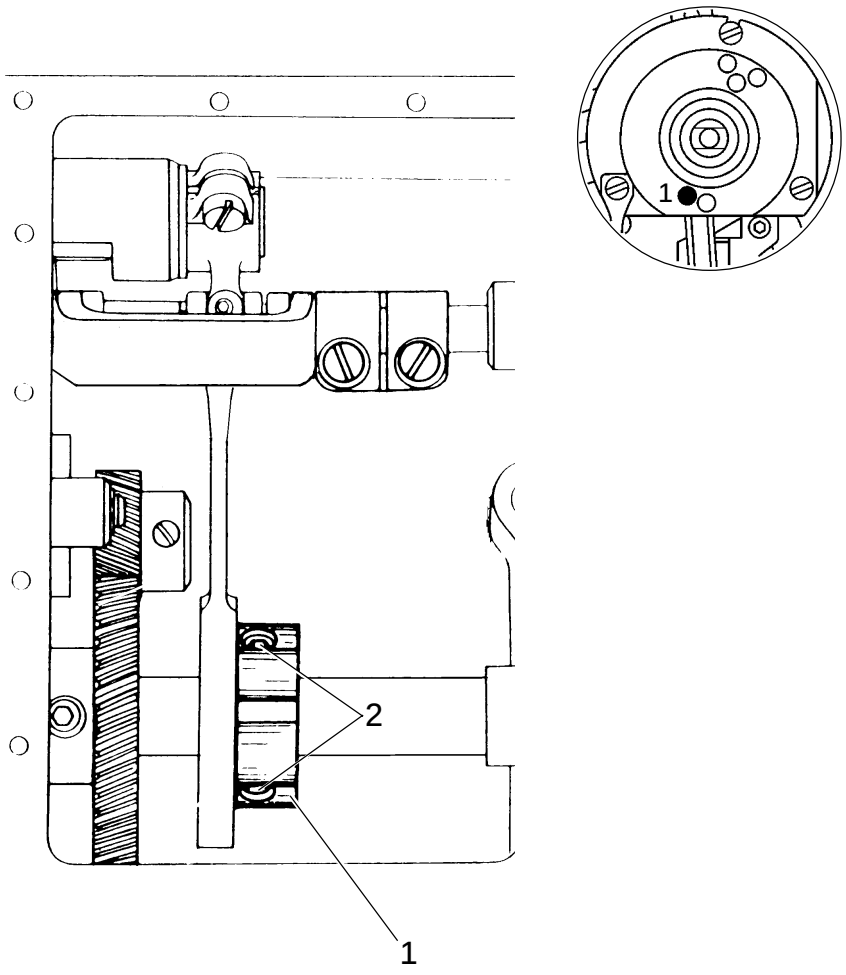
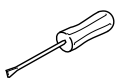


Fig. 2 - 07



- Turn feed eccentric 1 (screws 2) according to Requirement. Make sure that the cutout in the feed eccentric is visible.

2.11 Lifting motion of drop feed

Requirement
At stitch length setting "0" and with the needle bar in position 0.6 past t.d.c. (blocking hole 1) the feed dog must be at t.d.c.
The cutout in lifting eccentric 1 must face roughly vertically downwards.

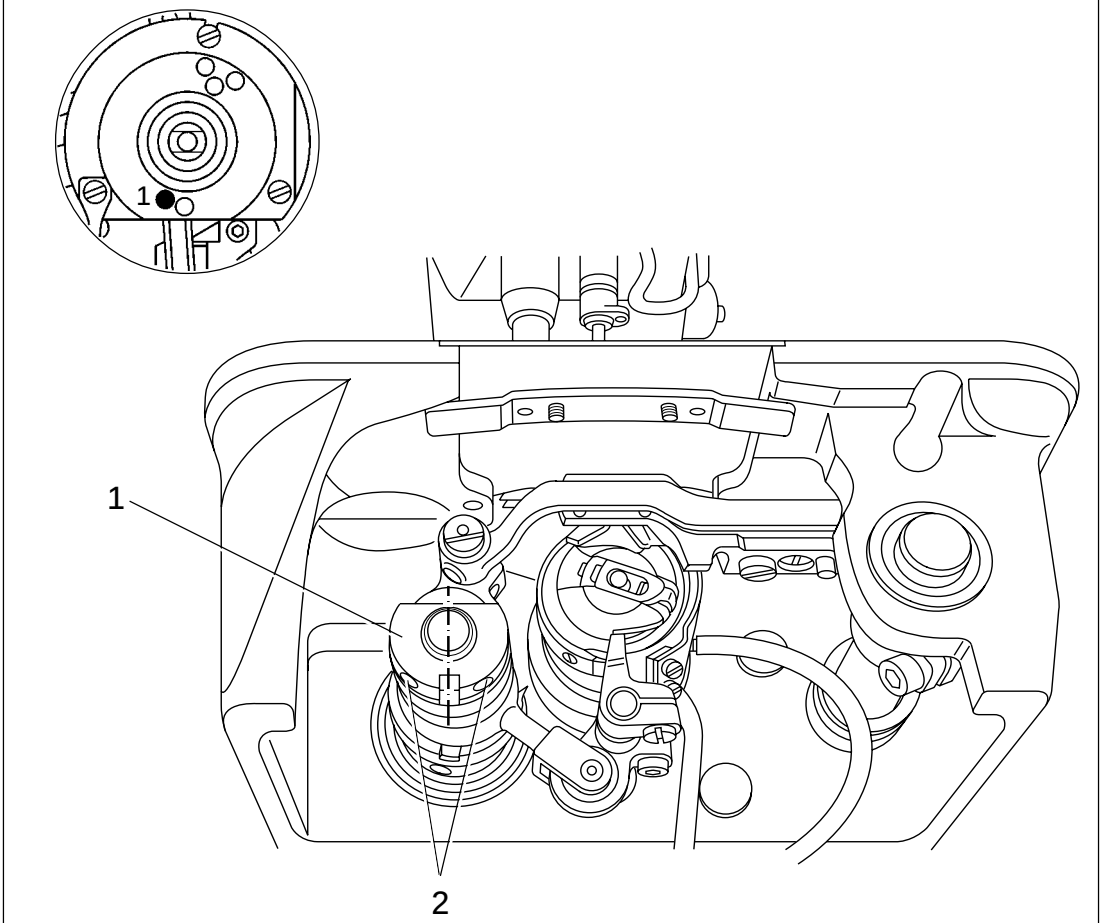


Fig. 2 - 08

- Turn lifting eccentric 1 (screws 2) according to Requirement.

Make sure that there is slight play between lifting eccentric 1 and the crank lever behind it.

2.12 Height of drop feed dog

Requirement
At stitch length setting "0" and with the needle bar in position 0.6 mm past t.d.c. (blocking hole 1) the feed dog must:
1. be centred in the feed slots of the needle plate both crosswise and lengthwise,
2. be at top dead centre and resting against the adjustment gauge throughout its length.

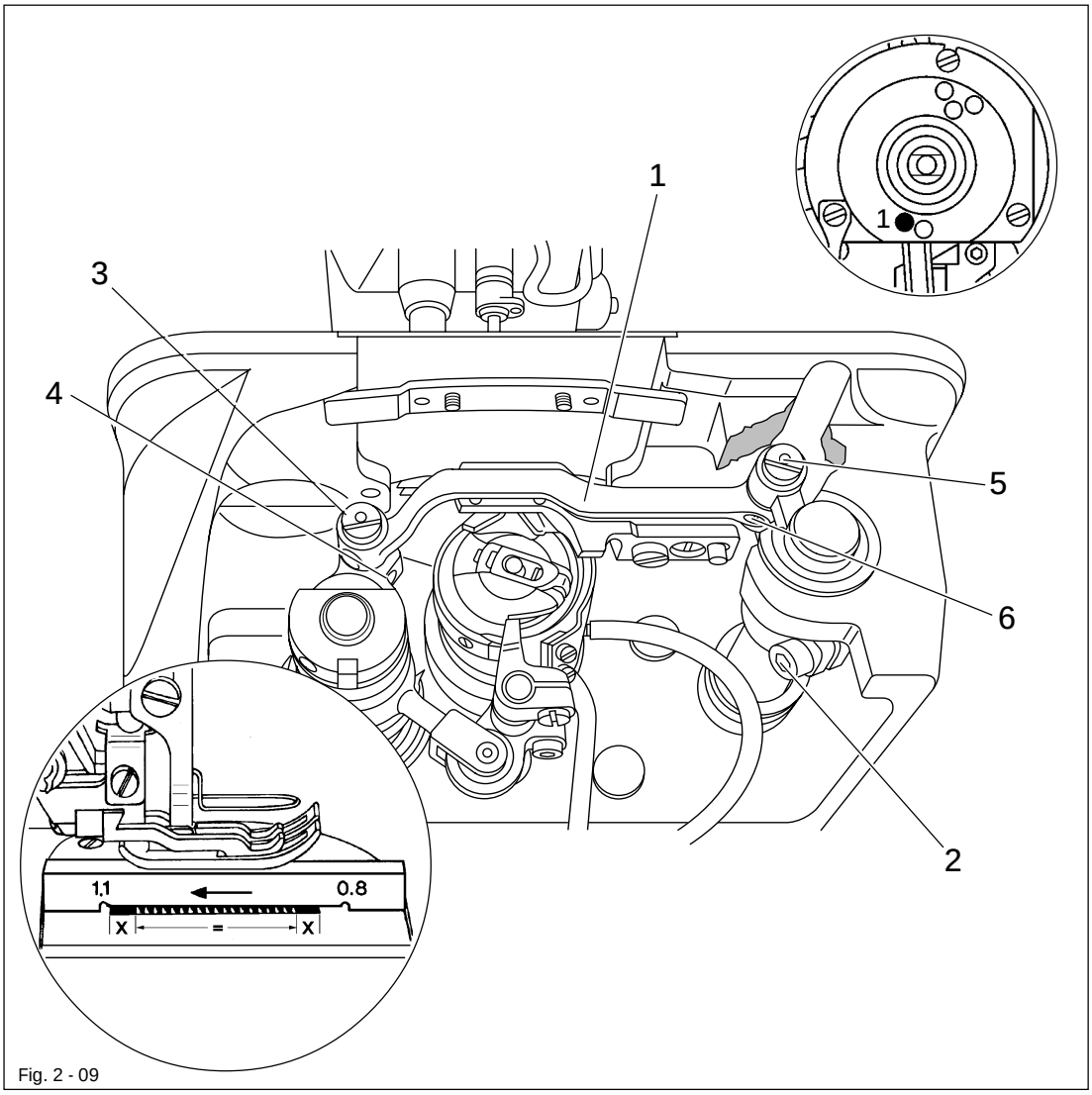


Fig. 2 - 09

- Reposition feed bar 1 (screws 2) according to Requirement 1.
- Lower presser foot onto gauge.
- Turn eccentric 3 (screws 4) and eccentric 5 (screws 6) according to Requirement 2.

2.13 Clearance between presser foot and needle plate

Requirement
When lifting lever 1 is raised there must be a clearance of 5 mm between the presser foot and the needle plate.

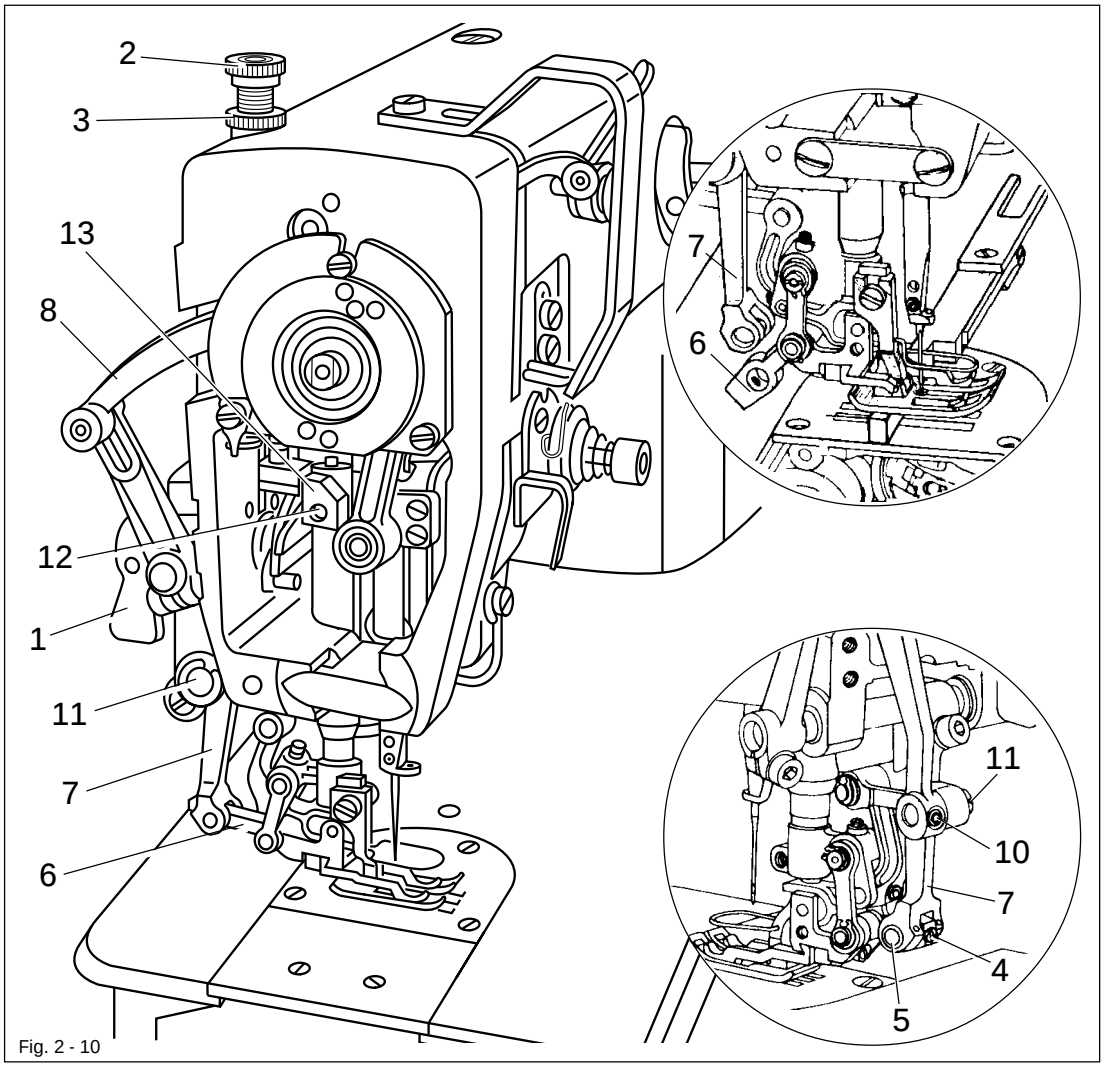


Fig. 2 - 10

- Lower presser foot onto needle plate using lifting lever 1.
- Reduce pressure on the presser bar by unscrewing regulating screw 2 (knurled nut 3).
- Loosen screw 4, push pin 5 out and swing link 6 out of the fork of lever 7.
- Set lever 8 at its outermost position by turning the balance wheel.
- Place the feed-dog adjustment gauge, cutout facing downwards, under the presser foot.
- Loosen screw 10 and push pin 11 out.
- Loosen screw 12.
- Position the presser foot crosswise so that its edge is parallel with the needle plate cutout
- Move lifting piece 13 fully down and tighten screw 12.

Leave screws 4 and 10 loose for the next adjustment.

2.14 Top feed actuating link

Requirement
1. All moving parts of the top feed must move freely but without any play.
2. The vibrating presser must not contact the lifting presser.

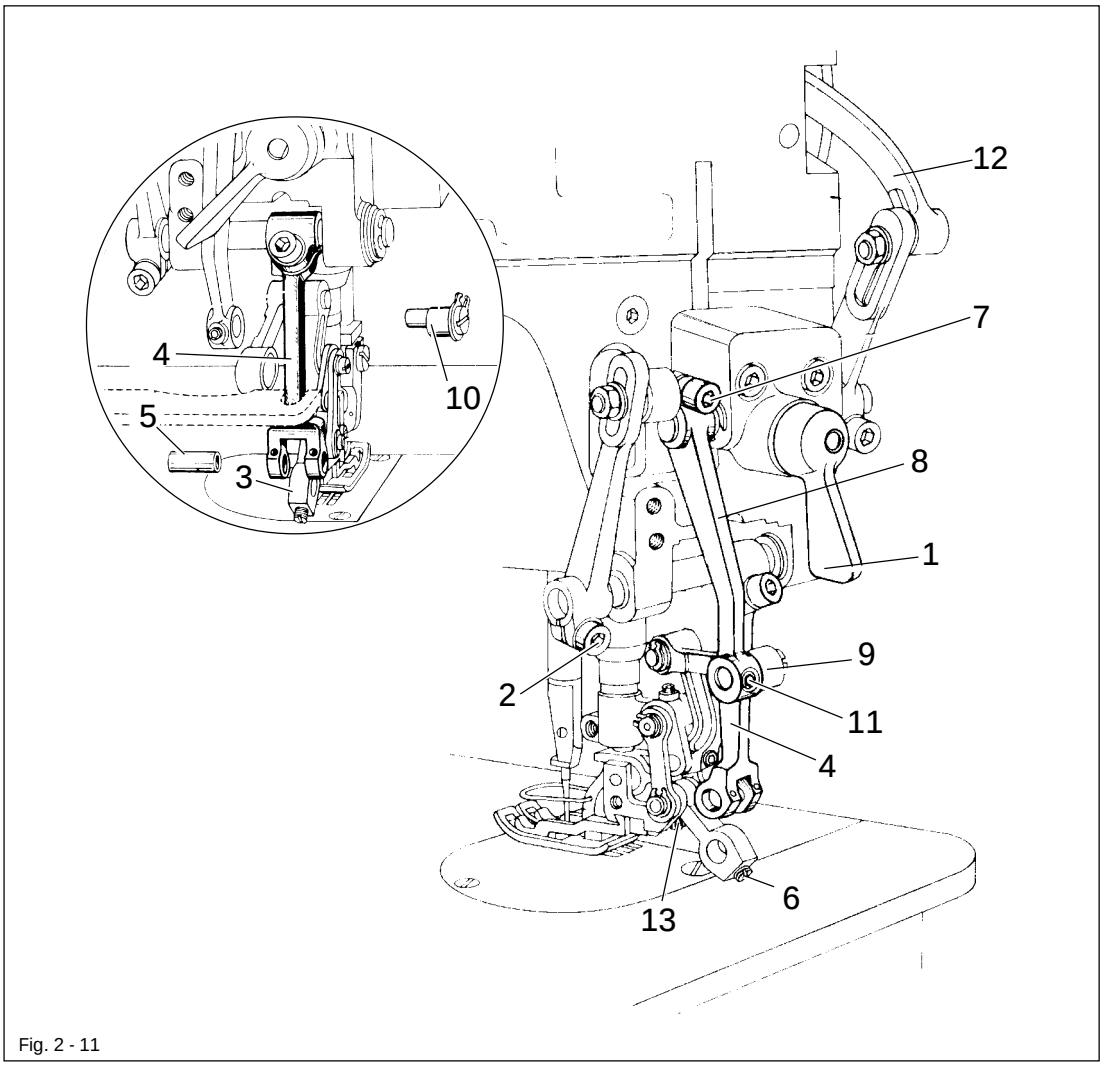


Fig. 2 - 11

- Lower the presser foot using lifting lever 1.
- Loosen screw 2.
- Swing link 3 into the fork of lever 4, insert pin 5 and tighten screw 6 (check for free movement and set lever 4 if necessary).
- Set stitch length at "0".
- Position vibrating presser at centre of lifting presser cutout and tighten screw 2.
- Loosen screw 7.
- Align the hole in lever 8 with the elongated hole of lever 9**,** without any lateral play, if necessary re-position or set lever 8.
- Insert pin 10 with its eccentric lobe facing downwards into the holes of levers 9 and 8 and tighten screw 11.
- Move lever 12 to its outermost position.
- Push lever 8 in feeding direction until you feel it move into contact, and tighten screw 7.
- Position the vibrating presser crosswise so that it does not touch the lifting presser (screw 13).

2.15 Neutral position of top feed

Requirement
With the stitch length and top feed set at "0" and with adjustment link **9** fitted, drive lever **2** must not make any movement when the balance wheel is turned.

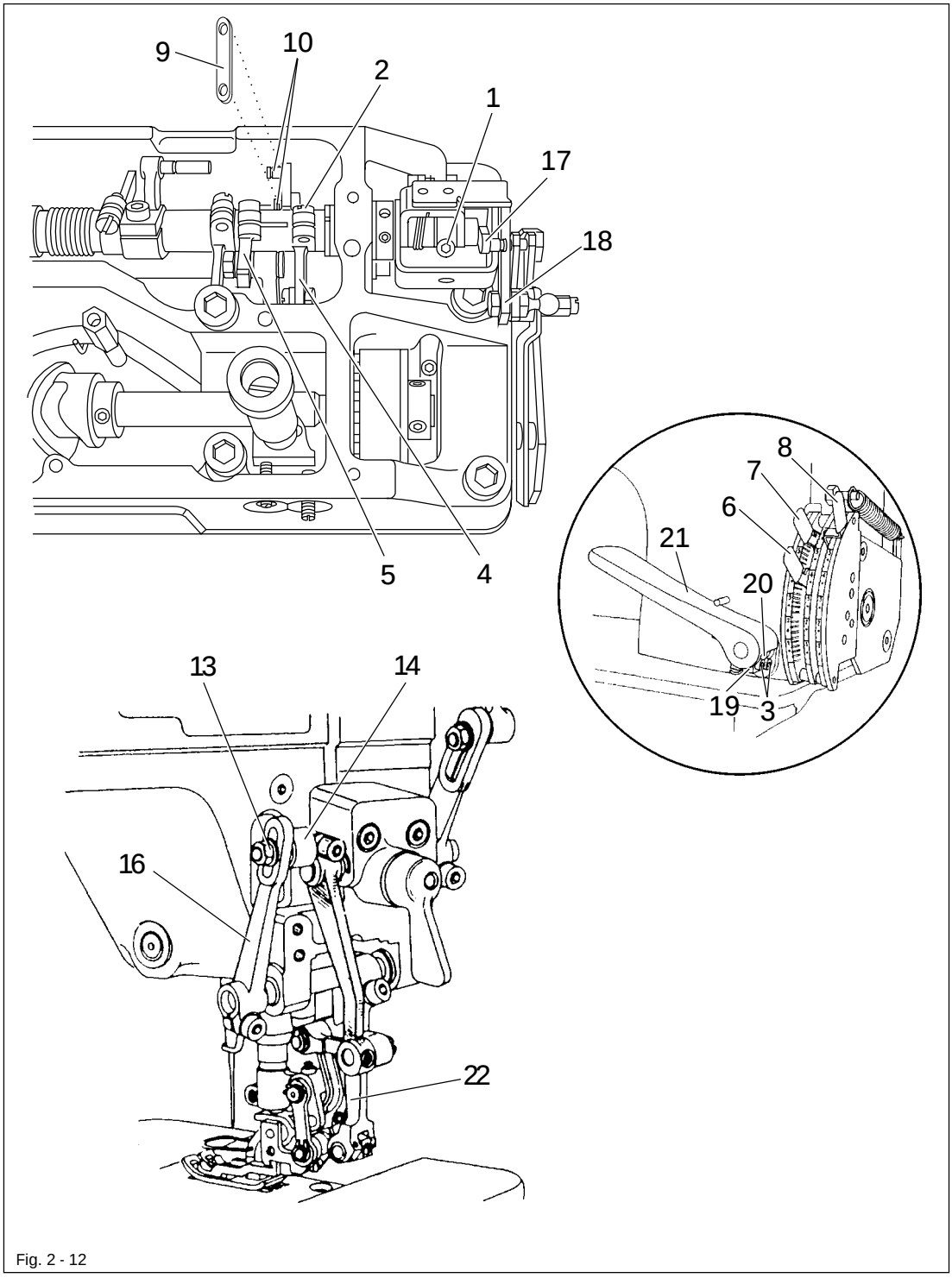


Fig. 2 - 12

- Raise the presser foot.
- Loosen screws 1, 2 and 3.
- Set crank 4 parallel with crank 5 and tighten screw 2.

- Set feed regulator levers 6, 7 and 8 at "0".
- Fit adjustment link 9 onto pins 10.
- Rotate the balance wheel and turn crank 11 (screw 12) so that the vibrating presser no longer moves.
- Loosen nut 13.
- Move linkage 14 up and down several times, and while doing so adjust lever 16 (screw 15) so that the vibrating presser no longer moves.
- Set linkage 14 at the top end of the elongated hole and tighten nut 13.
- Set feed regulator levers 6**,** 7 and 8 at "3".
- Move crank 17 axially and radially against crank 18 and tighten screw 1.
- Remove adjustment link 9.
- Push feed regulator levers 6**,** 7 and 8 fully to the top.
- Set a clearance of 0.5 mm between reverse-feed lever 21 and actuating levers 19 and 20 and tighten screw 3.
- Set linkage 14 at the bottom end of the elongated hole (nut 13).

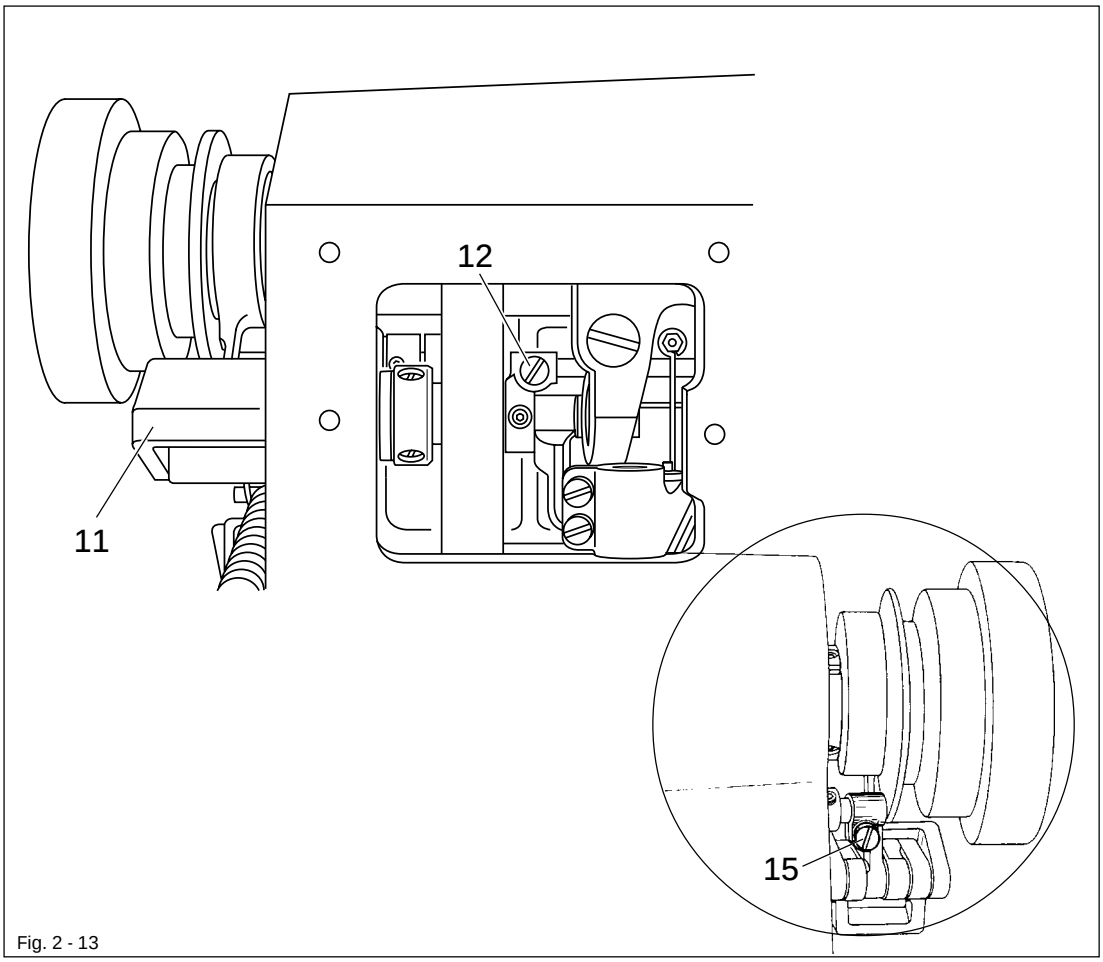


Fig. 2 - 13

2.16 Feeding motion of vibrating presser

Requirement
At the longest stitch length setting and with the needle bar in position 0.6 past t.d.c. (blocking hole 1) the vibrating presser must not move when the reverse-feed control is operated.

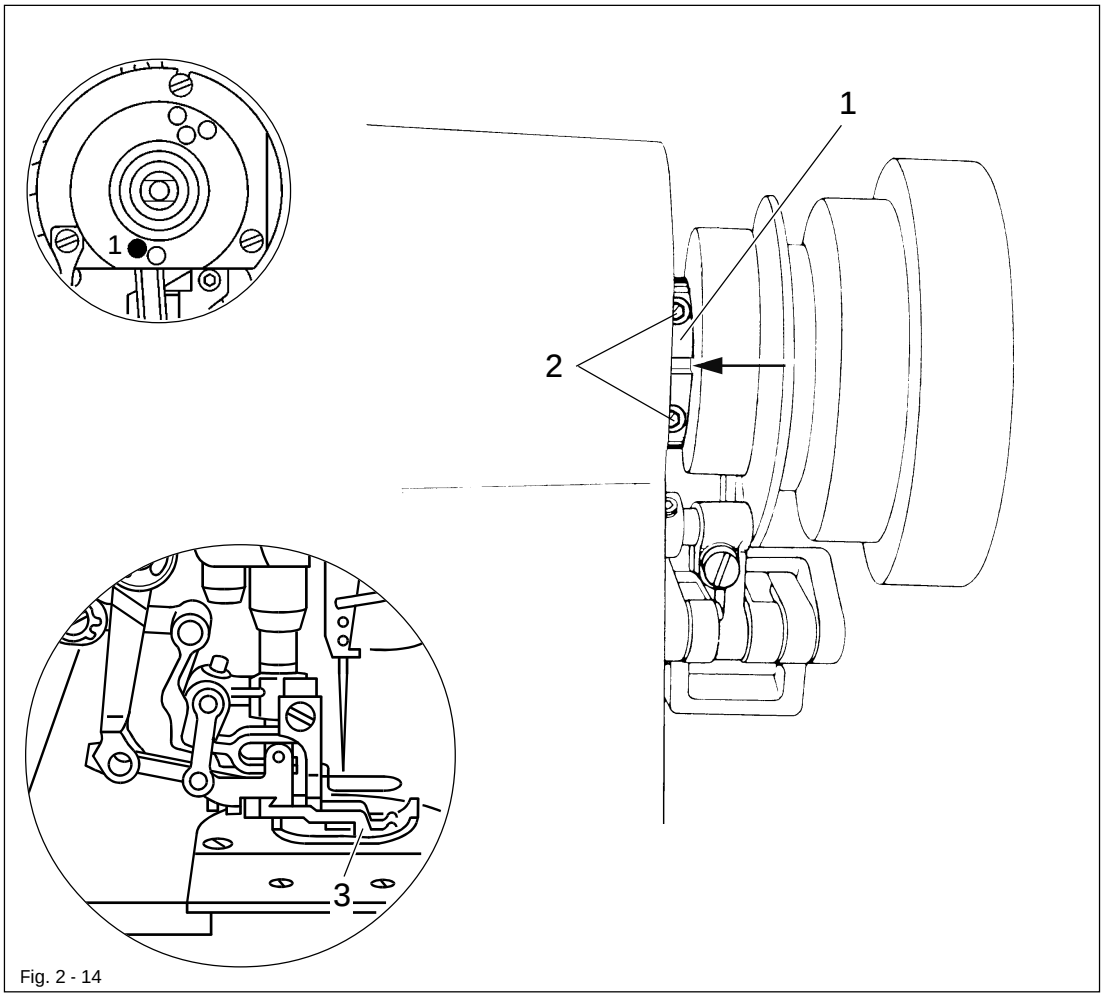


Fig. 2 - 14

- Raise the presser foot.
- Turn drive eccentric 1 (screws 2) according to Requirement.

Make sure that the cutout (see arrow) is visible.

2.17 Vibrating presser clearance

Requirement
At stitch length setting "0", when the presser foot is resting on the needle plate and the vibrating presser is at top dead centre, the clearance between vibrating presser and needle plate must be as follows, depending on the top-feed type:

1.3 mm for pulling-type top feed
3.2 mm for pushing-type top feed

For sewing thin materials the top-feed stroke on machines with pushing-type top feed can be limited to 2.0 mm. To do so, set pin 9 (nut 10) fully down its elongated hole.

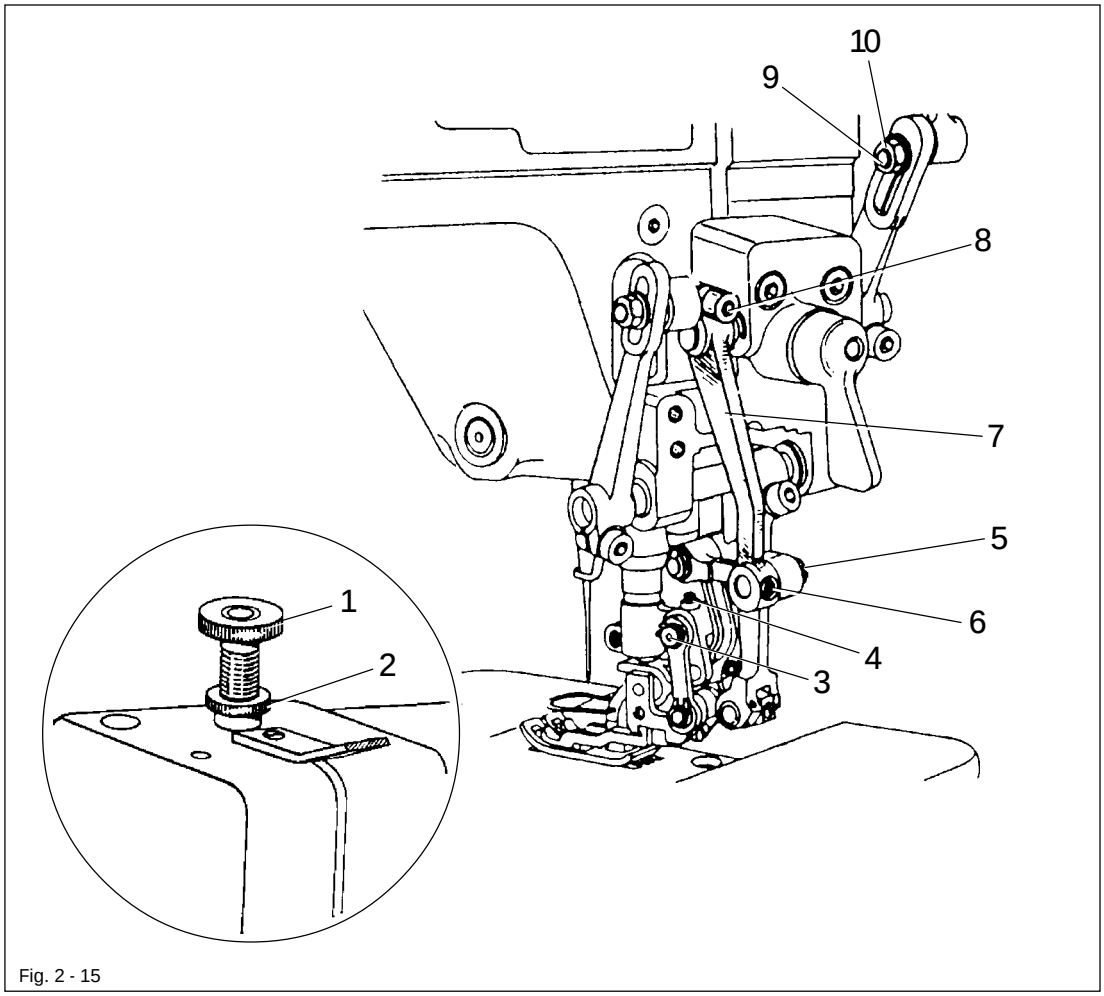


Fig. 2 - 15

- Increase the presser foot pressure somewhat on screw 1 (nut 2).
- Lower the presser foot onto the needle plate.
- Position the eccentricity of pin 3 (screw 4) facing the needle bar.
- Position the eccentricity of pin 4 (screw 6) facing downwards.
- Turn the balance wheel until link 7 is in its far rear position.
- Push lever 7 (screw 8) down and insert the corresponding feeler gauge (see Requirement) between the vibrating presser and the needle plate.
- If fine adjustment is required, turn eccentric pin 5 (screw 6) accordingly.

2.18 Top feed lifting motion

Requirement
With the stitch length set at "2" (on version "N" at stitch length "5") the lifting presser must rest on the bottom feed dog (see arrow) when the rising bottom feed dog has reached the upper surface of the needle plate.

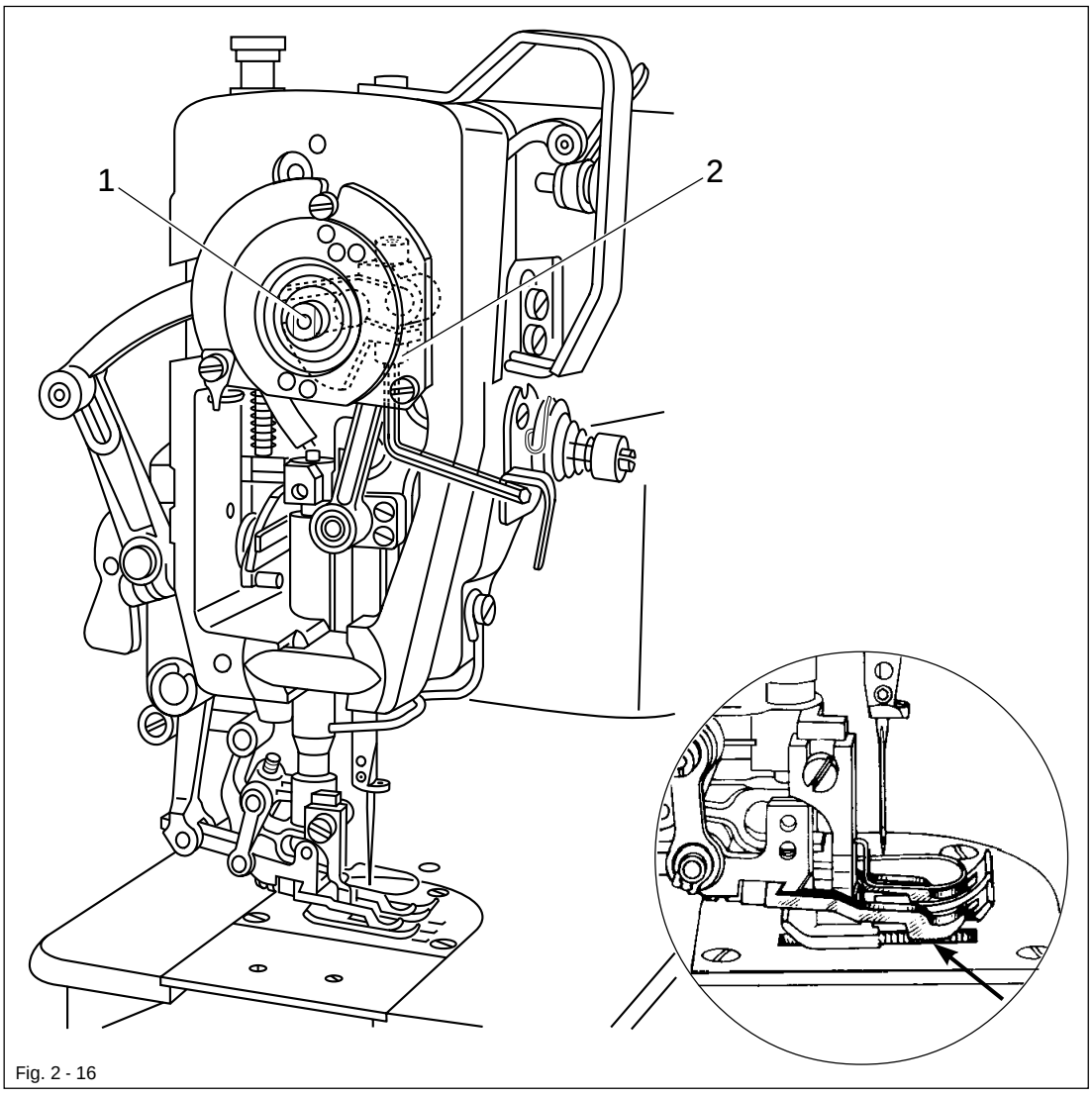
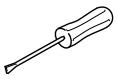


Fig. 2 - 16



- Turn eccentric pin 1 (screw 2) according to Requirement.

2.19 Position of lifting presser

Requirement
When the bottom feed dog is at t.d.c. the lifting presser must be parallel with the drop feed dog.

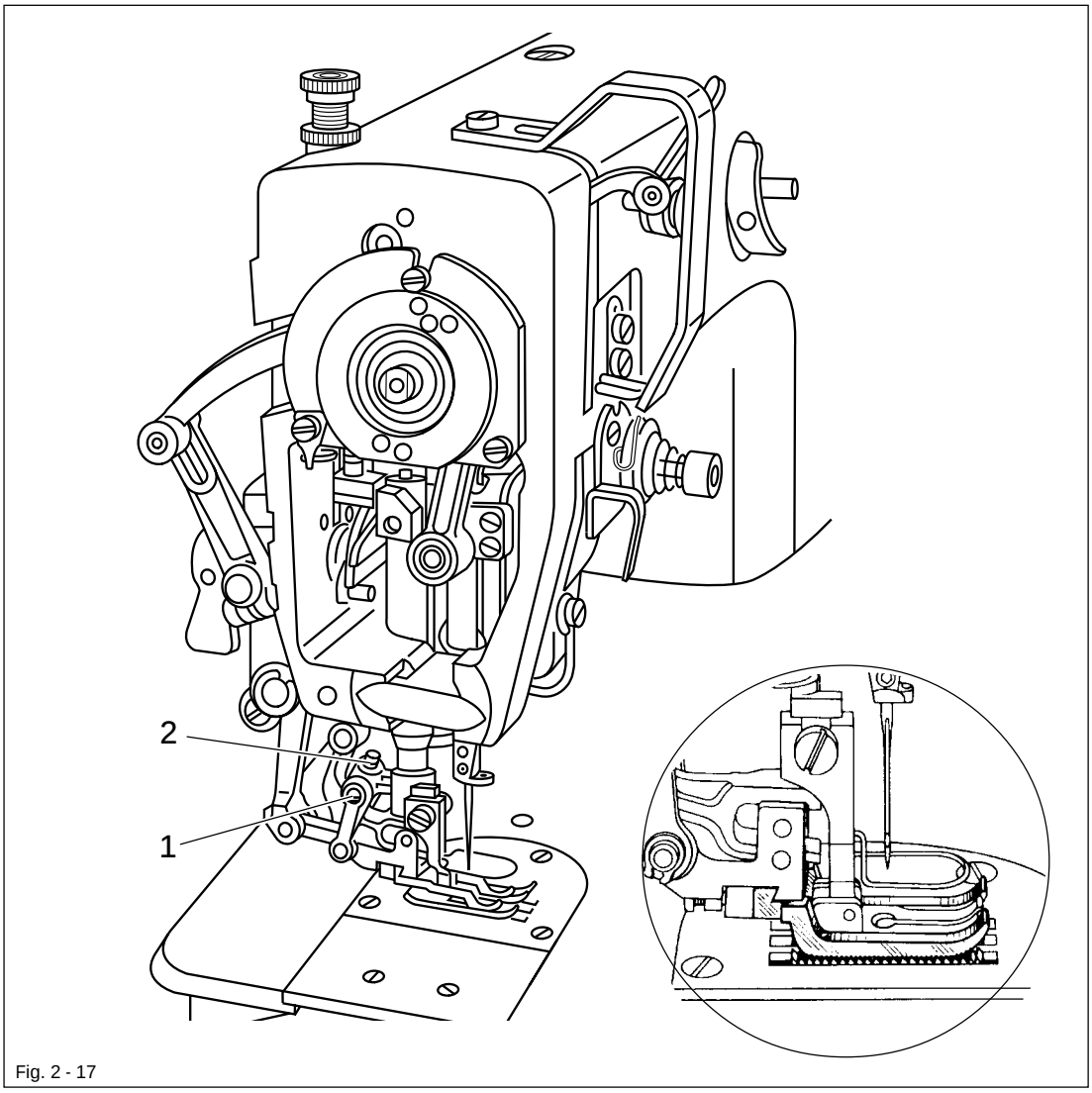


Fig. 2 - 17

- Turn eccentric pin 1 (screw 2) according to Requirement.

2.20 Synchronizing the top feed

Requirement
When the feed regulator levers for stitch length and top-feed stroke are set at "3", both top feed and bottom feed must move at the same stroke when the balance wheel is turned.

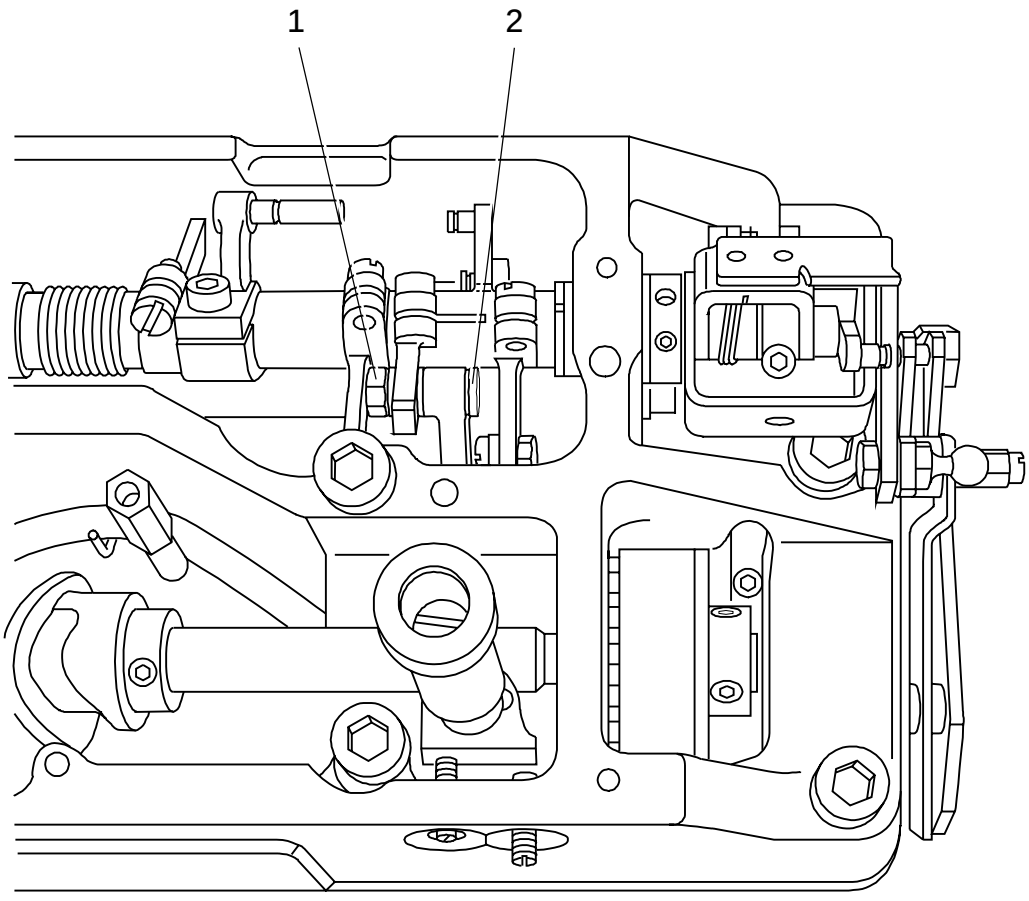
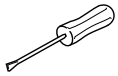


Fig. 2 - 18



- Press the reverse-feed lever and loosen nut 1 accessible behind it.
- Position screw 2 in the slot according to Requirement and tighten nut 1.

2.21 Stitch length alignment

Requirement
When the stitch length is set at "3" the feed stroke must be the same in forwards and reverse feeding

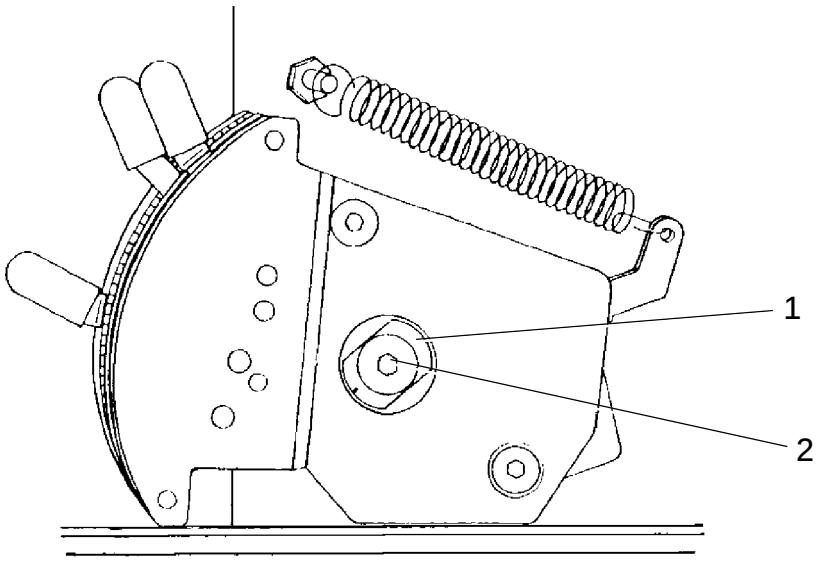
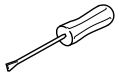


Fig. 2 - 19



- Turn bush 1 (screw 2) according to Requirement. Make sure that the eccentricity of bush 1 faces downwards.

2.22 Eccentric hook shaft bearing

Requirement

1. The slot in bearing 3 must be visible from the underside.
   There must be a very slight, but still perceivable, play between gears 5 and 7.
2. When the hook is resting lightly against thrower 4 and the hook point is at the needle centre, there must be a clearance of less than 0.1 mm between hook point and clearance cut.
3. Gear 5 must be aligned with gear 7.

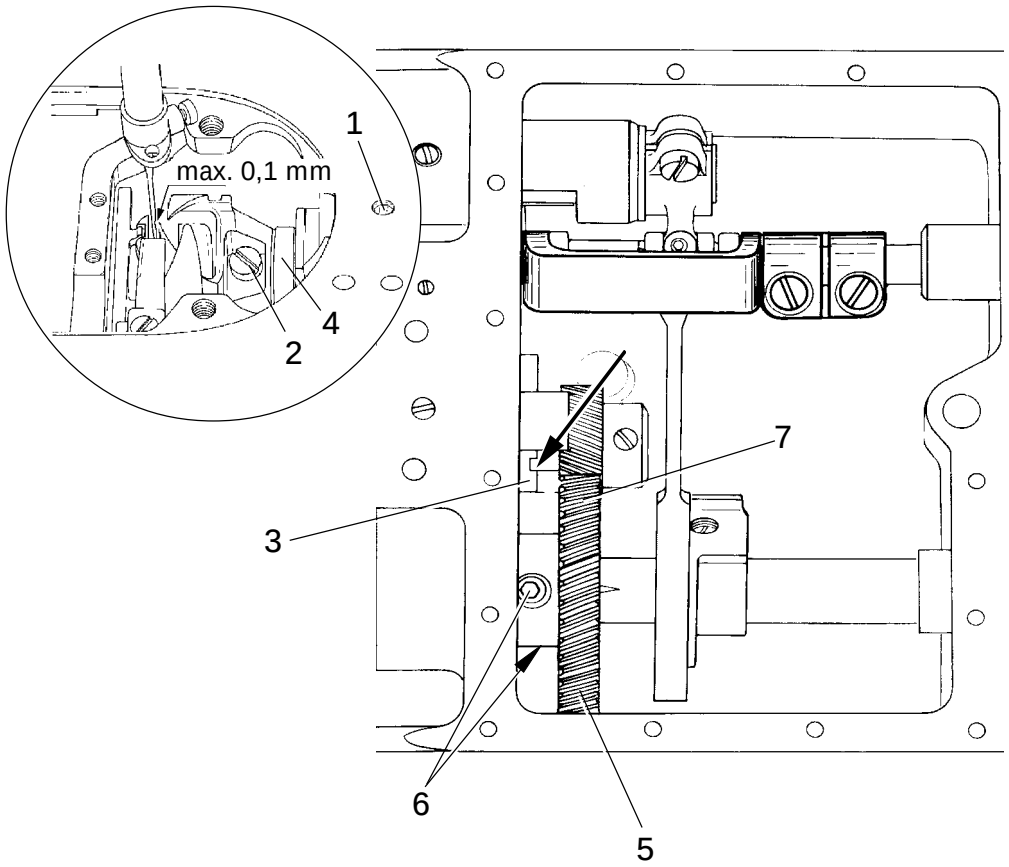
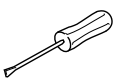


Fig. 2 - 20



- Loosen screws 1 and 2.
- Turn bearing 3 according to Requirement 1.
- Move hook lightly against thrower 4, position bearing 3, without turning it, according to Requirement 2 and tighten screws 1 and 2.
- Position gear 5 (screws 6) according to Requirement 3.

2.23 Final adjustment of needle rise, needle height, and bobbin case position finger

Requirement
With the stitch length set at "0" and the needle bar in position 1.8 mm past b.d.c. (adjustment hole "4")

1. the hook point must be at the needle centre and the top of the needle eye 0.8 mm below the hook point, and
2. there must be a clearance of 0.5 mm between position stop **3** and the inside of the position slot.

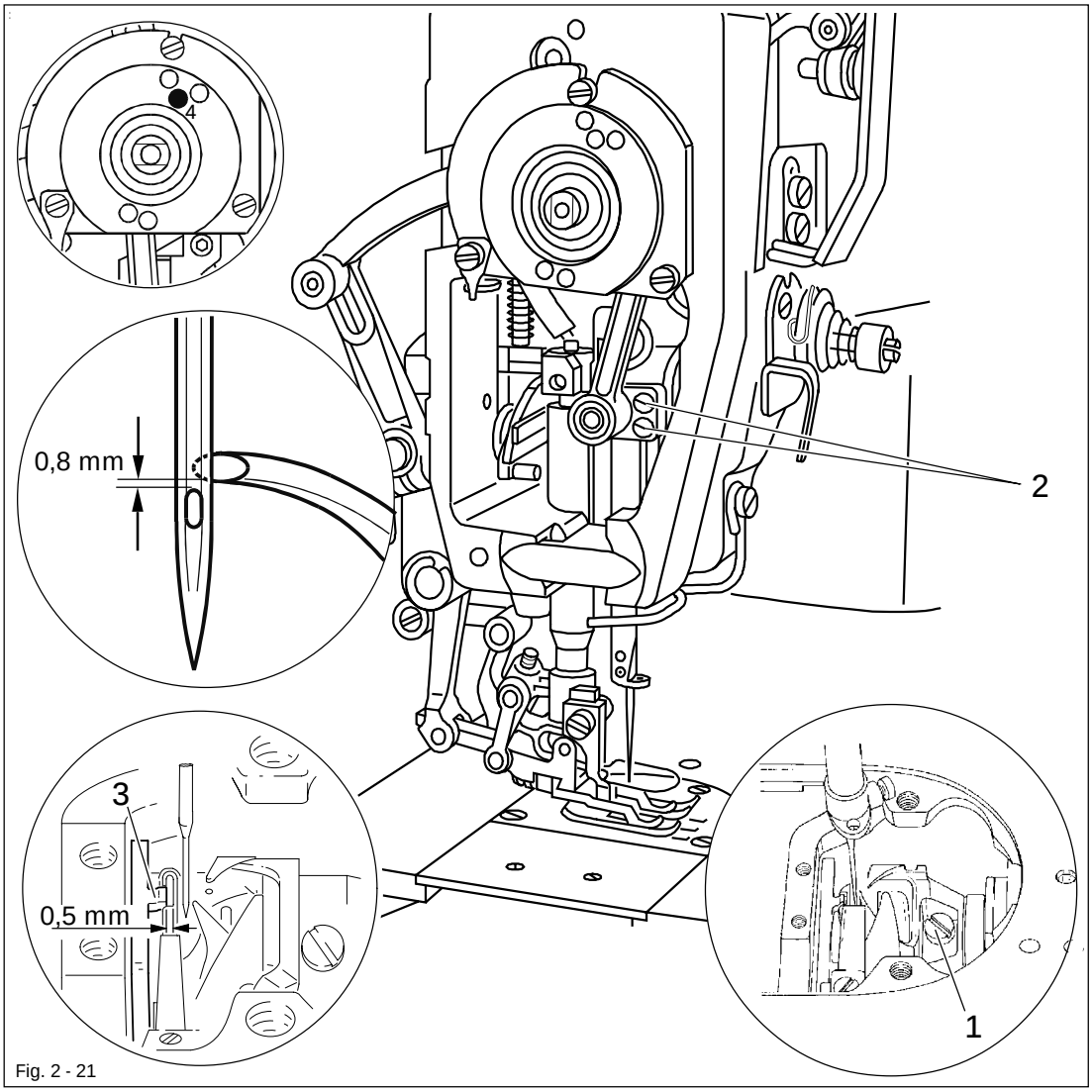


Fig. 2 - 21

- Adjust the sewing hook (screws 1), without shifting it, and needle bar (screws 2), without turning it, according to Requirement 1.
- Set the dog of position stop 3 in the slot of the hook base, position it according to Requirement 2 and secure it in place.

2.24 Bobbin case opener height

Requirement
When bobbin case opener 3 is at its left reversal point the top side of its finger must be 0.5 mm above the lower edge of bobbin case trip 4.

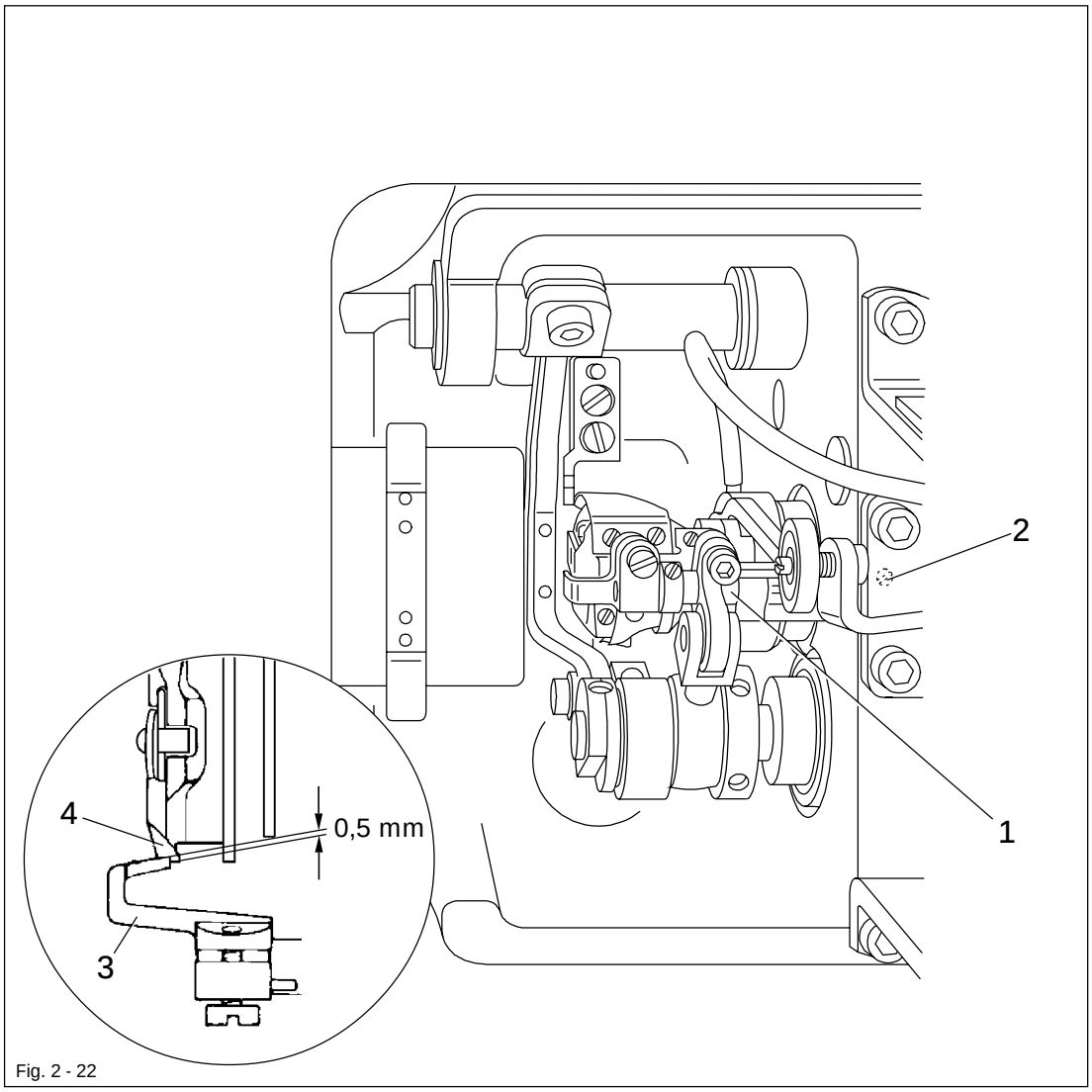
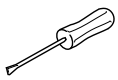


Fig. 2 - 22



- Turn bobbin case opener bearing 1 (screws 2) according to Requirement.

2.25 Position of bobbin case opener

Requirement

When bobbin case opener **3** is in its far left position

1. the front edge of its finger must be **0.6 mm** behind the front edge of bobbin case trip **7**;
2. hook base **6** must be pushed back from position finger **8** by **0.3 mm** and screw **1** must rest on stop pin **5**.

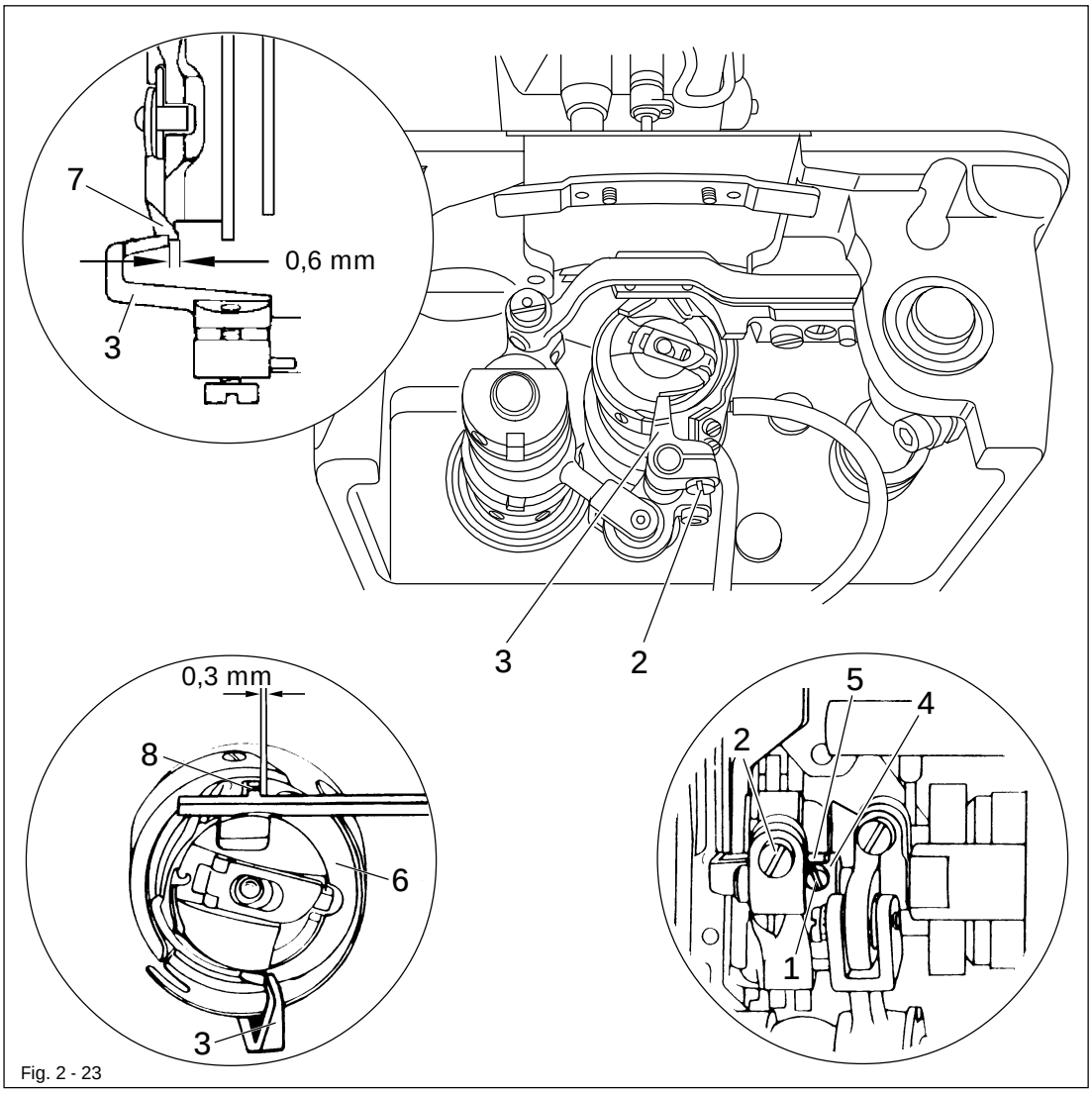


Fig. 2 - 23

- Loosen screws 1 and 2 so that bobbin case opener 3 is just movable.
- Adjust bobbin case opener 3 according to Requirements 1 and 2.
- Tighten screw 2.
- Move fixing collar 4 up against bobbin case opener 3 and stop pin 5 and tighten screw 1.

2.26 Bobbin case opener motion

Requirement
When the needle bar is in position 1.8 mm past b.d.c. (adjustment hole "4"), bobbin case opener 3 must be in its far right position.

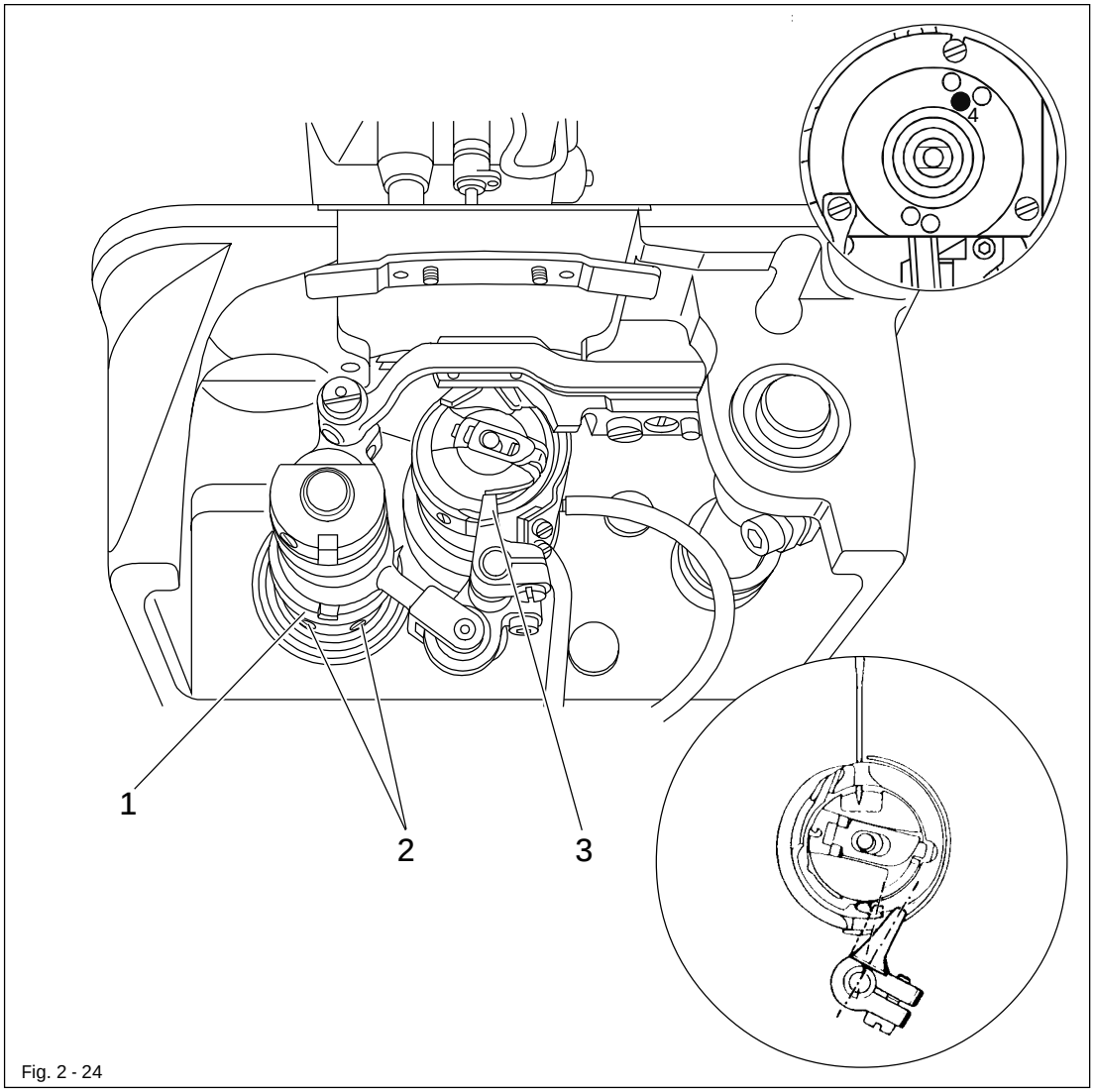
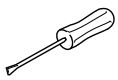


Fig. 2 - 24



- Adjust bobbin case opener eccentric 1 (screws 2) according to Requirement.

2.27 Needle thread tension release

Requirement
When presser bar lifter 3 is raised, the tension disks must be at least 0.5 mm apart.

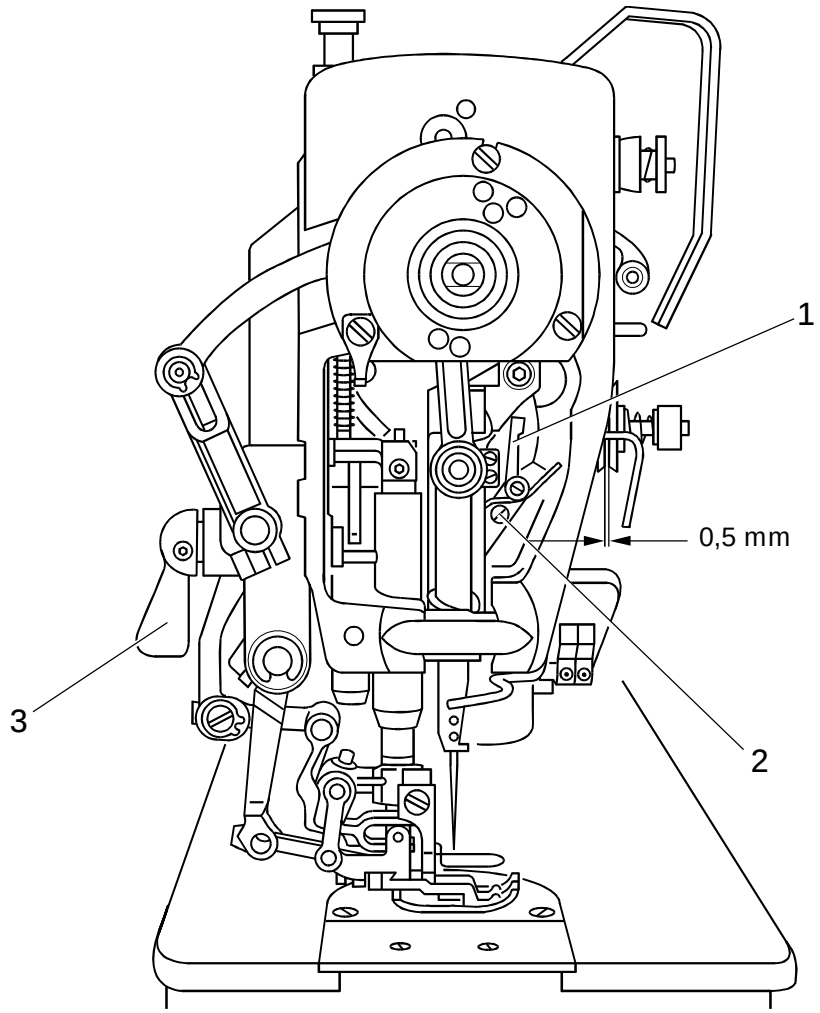


Fig. 2 - 25

- Adjust tension release lever 1 (screw 2) according to Requirement.
- Lower the presser foot onto the needle plate; the tension must now be fully activated.

2.28 Thread check spring and thread regulator

Requirement

1. The stroke of thread check spring 3 must be completed when the needle point enters the material (spring stroke roughly 7 mm).
2. Thread regulator 4 must be fixed in its elongated hole so that thread check spring 3 has moved by about 1 mm when the hook has widened the thread loop to its maximum.

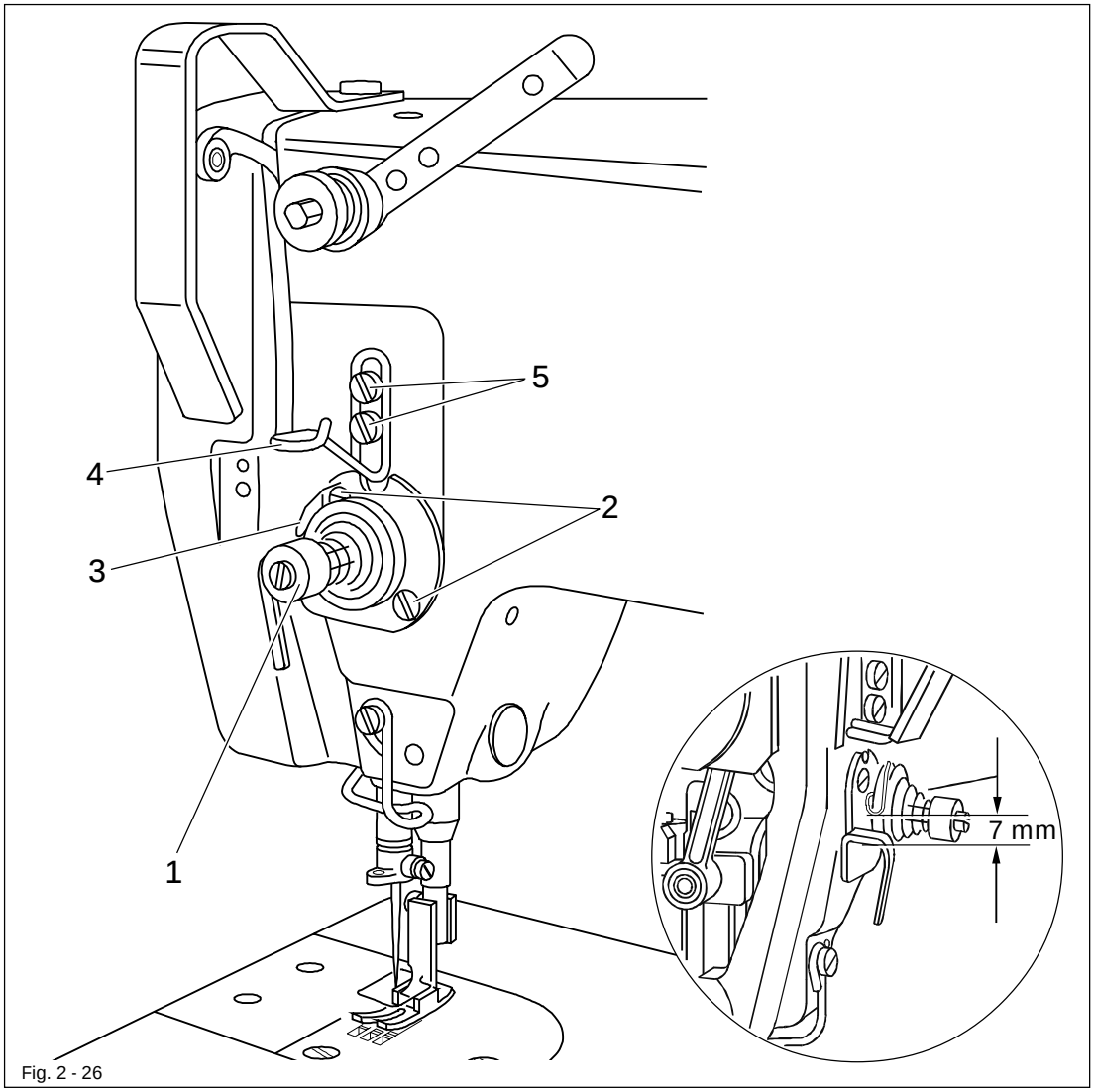
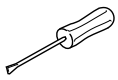


Fig. 2 - 26



- Turn thread tension 1 (screws 2) according to Requirement.
- Shift thread regulator 4 (screws 5) fully upwards.



The stroke of thread check spring 3 and the position of thread regulator 4 depend on the type of thread and material used and should be adjusted according to the appearance of the seam.

2.29 Bobbin winder

Requirement

1. When the bobbin winder is engaged the winder spindle must be driven reliably, but when it is disengaged, friction wheel 5 must not rest against drive wheel 1.
2. The bobbin winder must switch itself off when the amount of thread wound is about 1 mm from the edge of the bobbin.

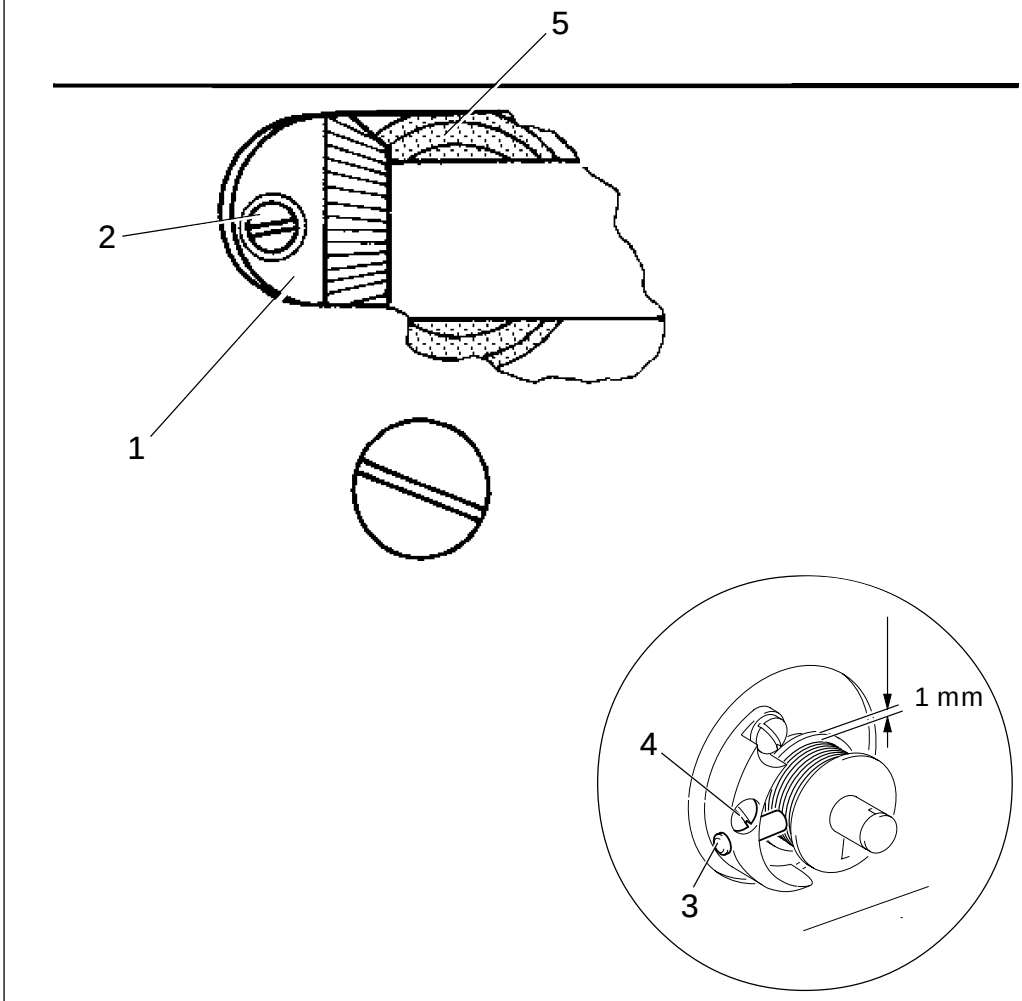


Fig. 2 - 27

- Position drive wheel 1 (screws 2) according to Requirement 1.
- Place a bobbin on the bobbin winder, thread the bobbin and switch on the winder.
- To adjust the amount of thread wound, position adjusting pin 3 (screws 4) according to Requirement 2.

2.30 Knee lever resting position

Requirement
When in its resting position, knee lever linkage 2 must be roughly at right angles to the bedplate.

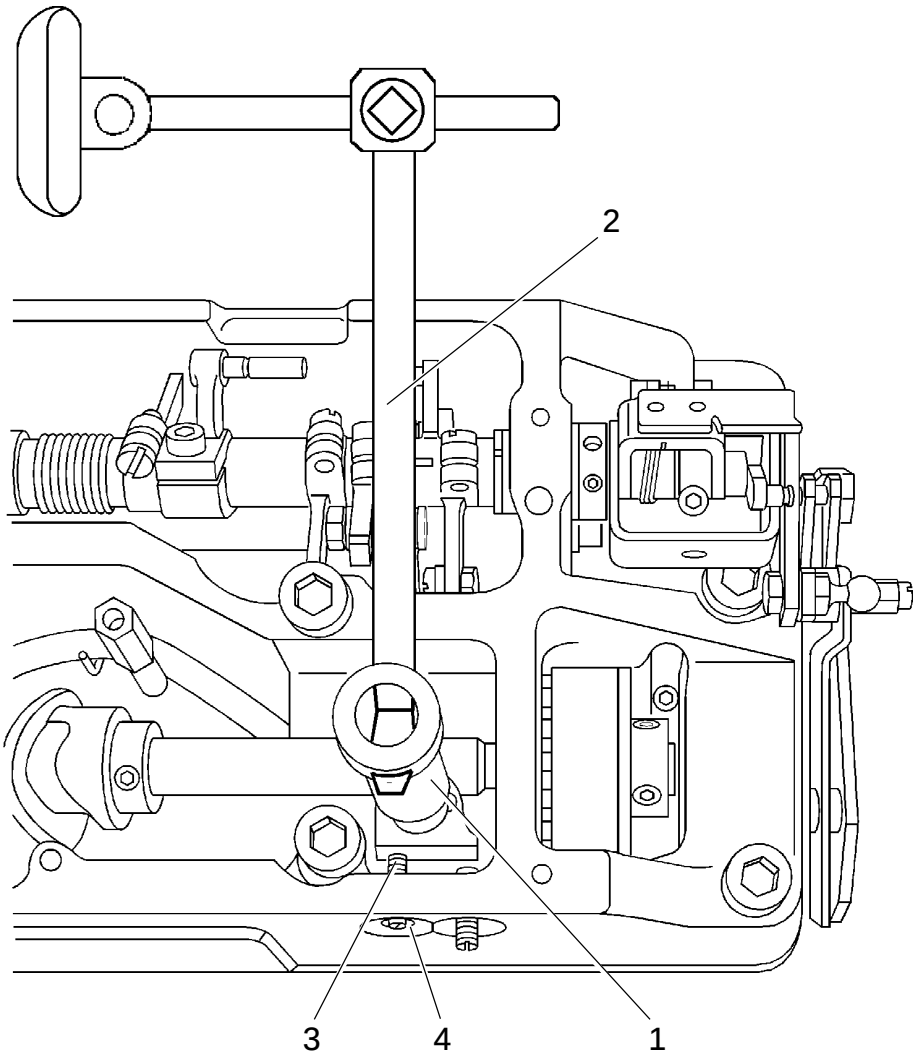
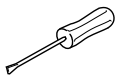


Fig. 2 - 28



- Raise the presser foot using the presser bar lifter
- Fit knee-lever coupling 1 on the knee-lever shaft and snap linkage 2 into knee lever coupling 1.
- Turn stop screw 3 (nut 4) according to Requirement.

2.31 Knee lever play

Requirement
When the presser foot is resting on the needle plate there must be a clearance of about 1.3 mm between lifting lever 3 and lifting piece 4.

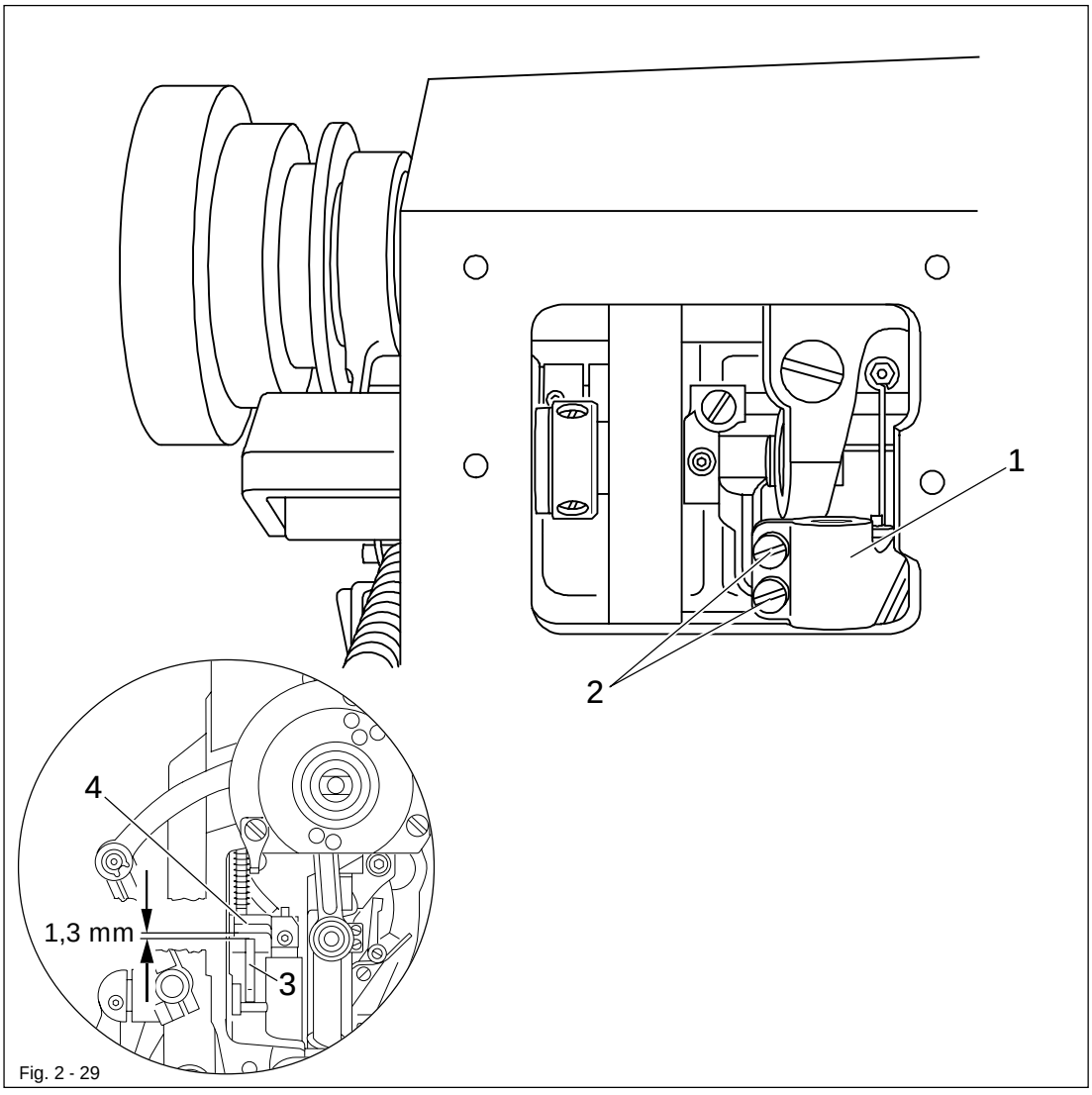


Fig. 2 - 29

- Set needle bar at b.d.c. and lower presser foot onto needle plate.
- Turn crank 1 (screws 2) according to Requirement.
- Make sure that the vertical knee lever shaft has no vertical play.

2.32 Knee lever stroke limitation

Requirement
When the knee lever is fully pressed, there must be a clearance as indicated below between presser foot and needle plate, and the presser bar lifter must drop down by its own weight.

Model A and Subclass -731/..: **7 mm**
Model B: **9 mm**

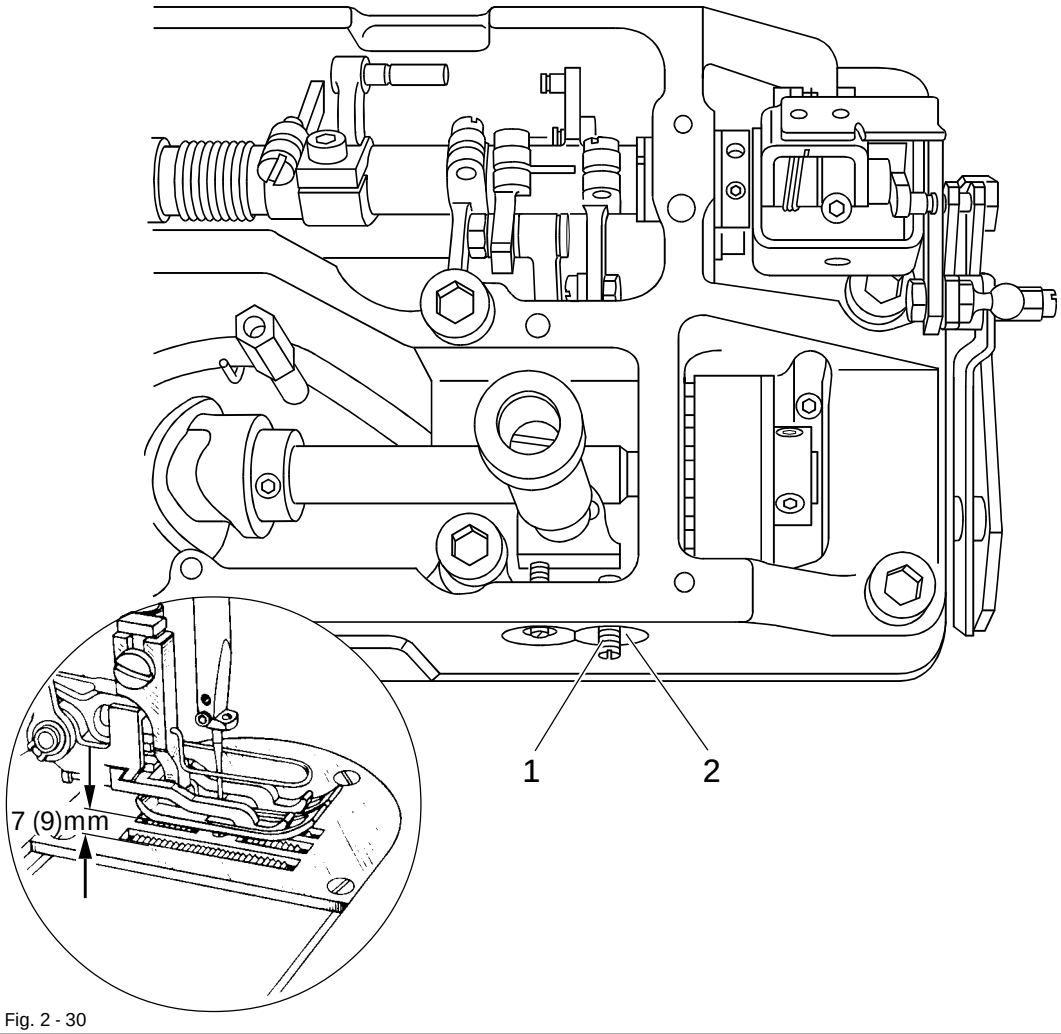
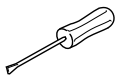


Fig. 2 - 30



- Unscrew screw 1 (nut 2) a few turns.
- Raise the presser bar lifter
- Place the 7 mm or 9 mm thick part of the feeler gauge under the presser foot and lower the presser bar lifter.
- Making sure that the presser foot does not lift off the feed dog gauge, press the knee lever fully to the right and hold it there.
- Turn screw 1 fully in and then back out by a half turn.
- Tighten nut 2.

2.33 Position of vibrating presser in relation to lifting presser

Requirement
When the presser foot is raised with the presser bar lifter and the take-up lever is in its highest position, the teeth of vibrating presser 3 must not be protrude below the shoe of lifting presser 4.

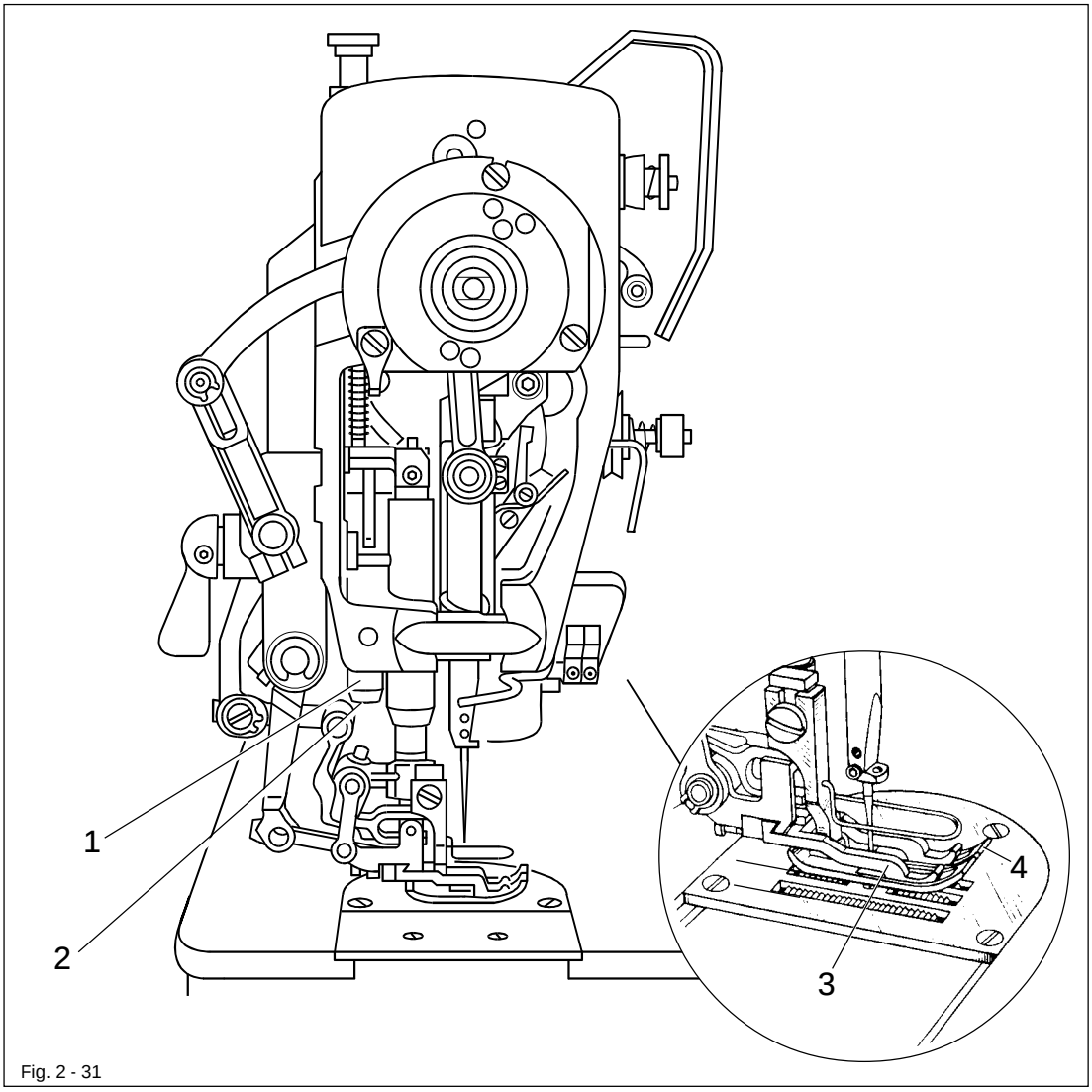
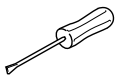


Fig. 2 - 31



- Turn eccentric sleeve 1 (screw 2) according to Requirement.

2.34 Pressure of the vibrating- and lifting pressers

Requirement
Even at the highest sewing speed the material must still be fed reliably, but there must not be any pressure marks on the material.

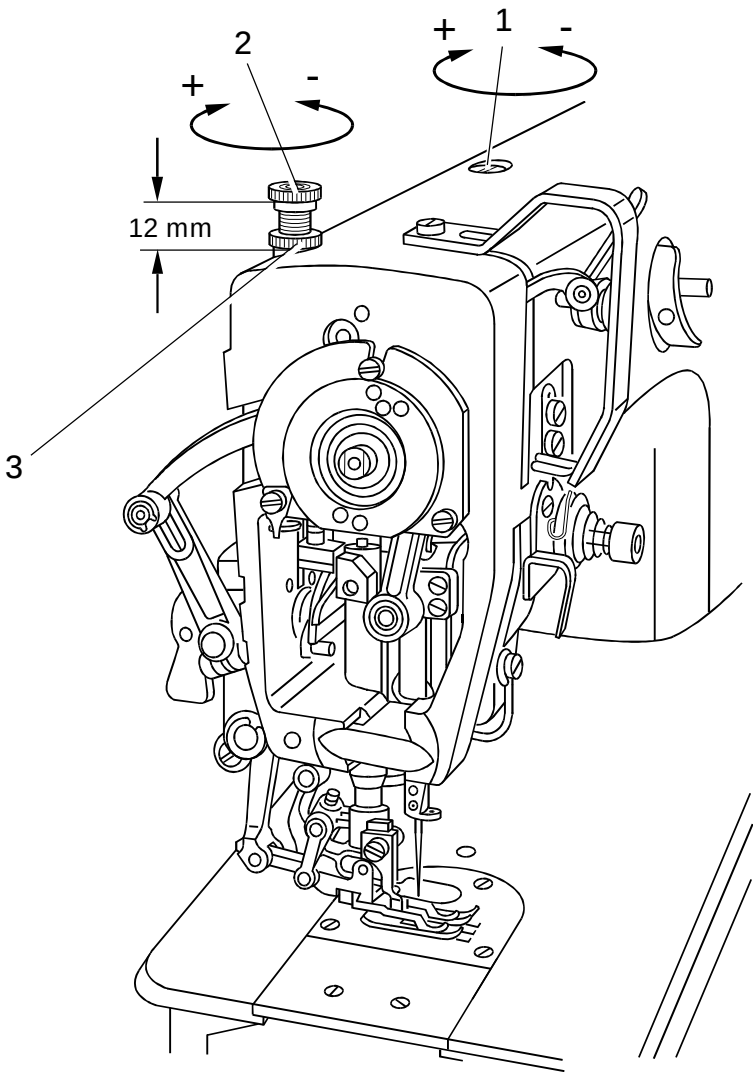


Fig. 2 - 32

- Set regulating screw 1 for the pressure of the vibrating presser flush with the top surface of the housing.
- Turn regulating screw 2 (nut 3) for the pressure of the lifting presser so that its shoulder is at a distance of about 12 mm from the machine housing.

It may be necessary to increase (+) or decrease (-) the pressure of the vibrating- or lifting presser.

2.35 Stitch length limitation

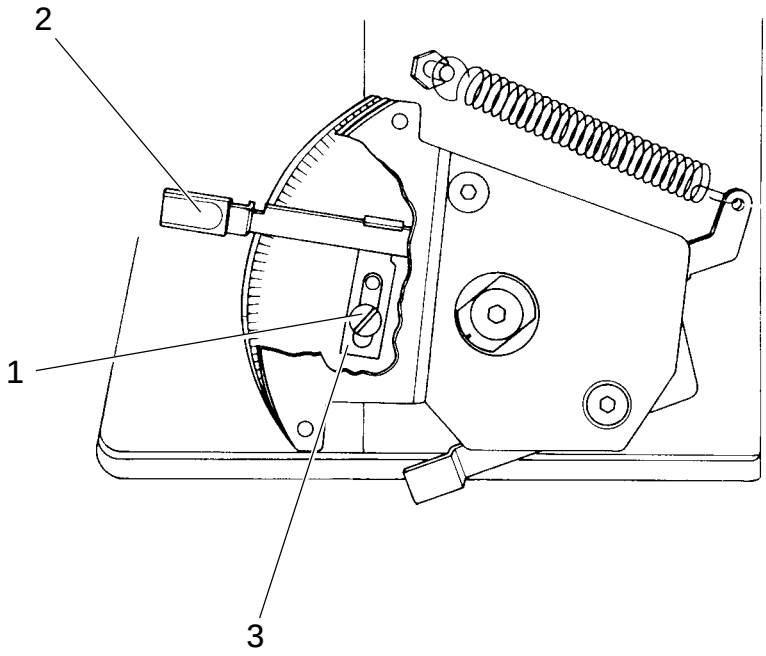


Fig. 2 - 33

- Loosen or, depending on the amount of limitation, take out screw 1 (accessible through the fitting window).
- Set feed regulator lever 2 to the required maximum stitch length.
- Place limitation stop 3 onto regulator lever 3 and secure it with screw 1 in the top or bottom hole (depending on the amount of limitation).

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