

**506-3**

**Instructions, complete**

Operating Instructions

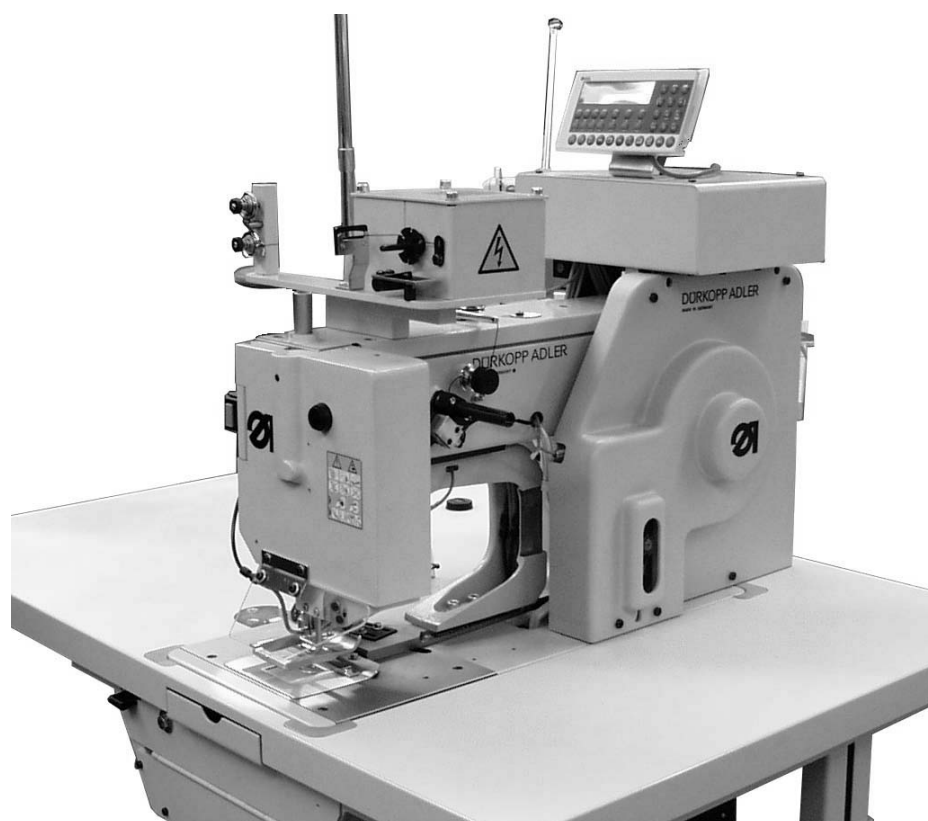
1

Installation Instructions

2

Service Instructions

3



Postfach 17 03 51, D-33703 Bielefeld • Potsdamer Straße 190, D-33719 Bielefeld  
Telefon +49 (0) 521 / 9 25-00 • Telefax +49 (0) 521 / 9 25 24 35 • [www.duerkopp-adler.com](http://www.duerkopp-adler.com)

Ausgabe / Edition:  
**10/2008**

Änderungsindex  
Rev. index: **01.0**

Printed in Federal Republic of Germany

Teile-Nr./Part.-No.:  
**0791 506011**

Instructions, complete

**506-3**

#### **Overview**

Operating table

Operating Instructions  
Installation Instructions  
Service Instructions

Pneumatic circuit plan

9770 506002

Interconnection-diagram

9890 506003 B

*All rights reserved.*

Property of Dürkopp Adler AG and copyrighted. Reproduction or publication of the content in any manner, even in extracts, without prior written permission of Dürkopp Adler AG, is prohibited.

**Copyright © Dürkopp Adler AG - 2008**

# Foreword

This instruction manual is intended to help the user to become familiar with the machine and take advantage of its application possibilities in accordance with the recommendations.

The instruction manual contains important information on how to operate the machine securely, properly and economically. Observation of the instructions eliminates danger, reduces costs for repair and down-times, and increases the reliability and life of the machine.

The instruction manual is intended to complement existing national accident prevention and environment protection regulations.

The instruction manual must always be available at the machine/sewing unit.

The instruction manual must be read and applied by any person that is authorized to work on the machine/sewing unit. This means:

- Operation, including equipping, troubleshooting during the work cycle, removing of fabric waste,
- Service (maintenance, inspection, repair) and/or
- Transport.

The user also has to assure that only authorized personnel work on the machine.

The user is obliged to check the machine at least once per shift for apparent damages and to immediately report any changes (including the performance in service), which impair the safety.

The user company must ensure that the machine is only operated in perfect working order.

Never remove or disable any safety devices.

If safety devices need to be removed for equipping, repairing or maintaining, the safety devices must be remounted directly after completion of the maintenance and repair work.

Unauthorized modification of the machine rules out liability of the manufacturer for damage resulting from this.

Observe all safety and danger recommendations on the machine/unit! The yellow-and-black striped surfaces designate permanent danger areas, eg danger of squashing, cutting, shearing or collision.

Besides the recommendations in this instruction manual also observe the general safety and accident prevention regulations!

## General safety instructions

**The non-observance of the following safety instructions can cause bodily injuries or damages to the machine.**

1. The machine must only be commissioned in full knowledge of the instruction book and operated by persons with appropriate training.
2. Before putting into service also read the safety rules and instructions of the motor supplier.
3. The machine must be used only for the purpose intended. Use of the machine without the safety devices is not permitted. Observe all the relevant safety regulations.
4. When gauge parts are exchanged (e.g. needle, presser foot, needle plate, feed dog and bobbin) when threading, when the workplace is left, and during service work, the machine must be disconnected from the mains by switching off the master switch or disconnecting the mains plug.
5. Daily servicing work must be carried out only by appropriately trained persons.
6. Repairs, conversion and special maintenance work must only be carried out by technicians or persons with appropriate training.
7. For service or repair work on pneumatic systems, disconnect the machine from the compressed air supply system (max. 7-10 bar). Before disconnecting, reduce the pressure of the maintenance unit. Exceptions to this are only adjustments and functions checks made by appropriately trained technicians.
8. Work on the electrical equipment must be carried out only by electricians or appropriately trained persons.
9. Work on parts and systems under electric current is not permitted, except as specified in regulations DIN VDE 0105.
10. Conversion or changes to the machine must be authorized by us and made only in adherence to all safety regulations.
11. For repairs, only replacement parts approved by us must be used.
12. Commissioning of the sewing head is prohibited until such time as the entire sewing unit is found to comply with EC directives.
13. The line cord should be equipped with a country-specific mains plug. This work must be carried out by appropriately trained technicians (see paragraph 8).



It is absolutely necessary to respect the safety instructions marked by these signs.

**Danger of bodily injuries !**

Please note also the general safety instructions.



**Part 3: Service Instructions CI. 506-3**

- 1. General . . . . . 3**
- 2. Removing the top cover and turning over the upper part of the machine**
  - 2.1 Removing the top cover . . . . . 4
  - 2.2 Turning over the upper part of the machine . . . . . 6
- 3. Shuttle, needle bar**
  - 3.1 Needle bar height. . . . . 7
  - 3.2 Synchronizing the shuttle and needle bar movements. . . . . 9
  - 3.3 Shuttle-tip/needle distance . . . . . 10
  - 3.4 Driver/needle distance . . . . . 11
  - 3.5 Loop stroke . . . . . 13
- 4. Bobbin ejector . . . . . 14**
- 5. Disc cam**
  - 5.1 Replacing the disc cam . . . . . 17
  - 5.2 Fitting the intermediate transmission . . . . . 20
  - 5.3 Replacing the worm-gear pair and worm screw . . . . . 21
    - 5.3.1 Fit/Remove the synchronous motor . . . . . 21
    - 5.3.2 Replacing the worm-gear pair and worm screw . . . . . 23
  - 5.4 Worm-screw wheel play . . . . . 24
- 6. Shut-down devices**
  - 6.1 Basic stop position (switch S7). . . . . 27
- 7. Clamps and table plate**
  - 7.1 Position of table plate with respect to the needle . . . . . 29
  - 7.2 Position of clamps with respect to the table plate. . . . . 32
- 8. Thread advance . . . . . 33**
- 9. Thread-tensioning spring . . . . . 34**
- 10. Needle cooling . . . . . 35**

<b>11. Thread-burning device</b>	
11.1 Thread extractor . . . . .	36
11.2 Upper burning device . . . . .	38
11.2.1 Starting position. . . . .	38
11.2.2 Position of fully-extended burner . . . . .	39
11.2.3 Adjusting the burner height-stop. . . . .	40
11.2.4 Burner angle. . . . .	41
11.3 Lower burning device . . . . .	42
11.3.1 Adjustment preconditions . . . . .	42
11.3.2 Distance between thread extractor and burner . . . . .	43
11.3.3 Position of burner when swivelled forwards . . . . .	43
11.3.4 Burner height . . . . .	44
11.3.5 Thread-extractor height . . . . .	44
<b>12. Thread-suction device . . . . .</b>	<b>45</b>
<b>13. Bobbin-winder adjustment . . . . .</b>	<b>46</b>
<b>14. V-belt tension . . . . .</b>	<b>47</b>

# 1. General

These service instructions describe the adjustment of the automatic sewing machine in an appropriate order.



**CAUTION:**

Various adjustments are mutually dependent. It is therefore essential for adjustments to be carried out in the order described.

**CAUTION:**

The activities described in these servicing instructions may be carried out only by experts or by persons with the appropriate training.

**Danger of breakage**

It is essential for the adjustments specified in these servicing instructions to be carried out before the machine is recommissioned following disassembly.

Never start the machine with the drive motor rotating in the wrong direction.

A sewing run may not commence unless the head cover and the shuttle-area cover are closed.

If either of these is open, all control functions are blocked.



**CAUTION: danger of injury**

Prior to all repair, modification and maintenance work the main switch **must be turned off** and the machine disconnected from the compressed-air supply.

Adjustment work and function testing carried out with the machine running require the utmost care and observance of all safety precautions.

### Setting gauges

We can supply the following setting gauges on request:

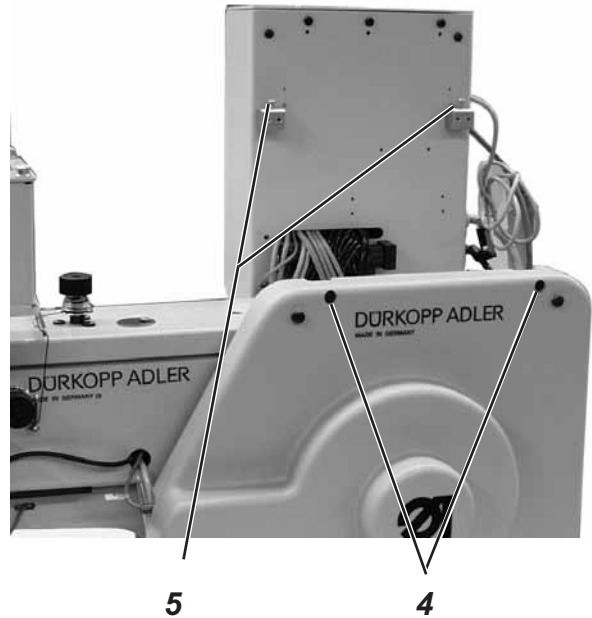
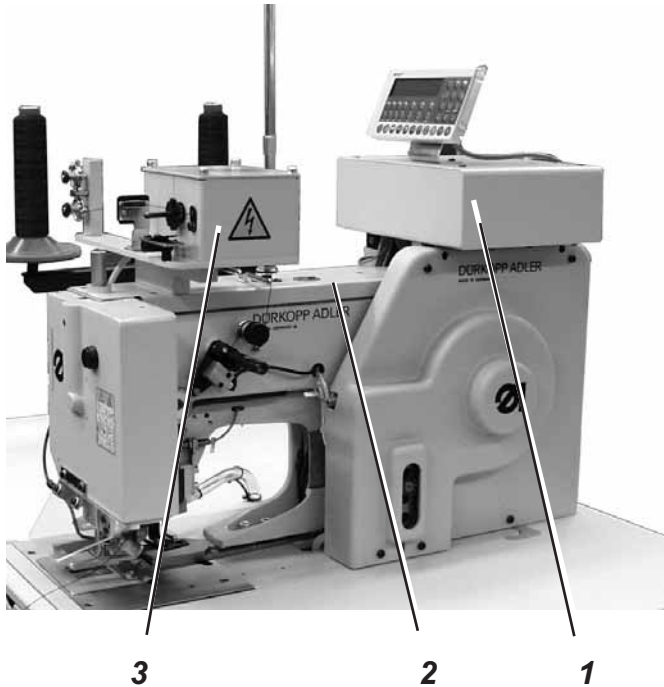
Setting gauge	Use	Order No.
Gauge	Loop-stroke adjustment	0981 150009
Calliper	Loop-stroke adjustment	0981 150006
Gauge	Adjusting the arm-shaft eccentric (optional)	7270 159160

## 2. Removing the arm cover and Turning over the upper part of the machine

### 2.1 Removing the arm cover

For service work in the interior of the upper part of the machine the arm cover 3 must be removed.

First the control unit 1 must be swivelled aside and the bobbin-winder cartridge 2 removed.



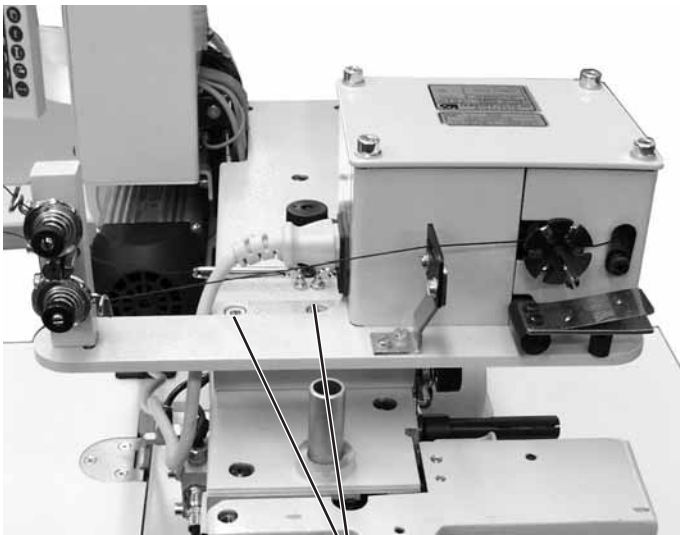
#### **CAUTION: danger of injury**

Turn off the main switch and disconnect the machine from the compressed-air supply.

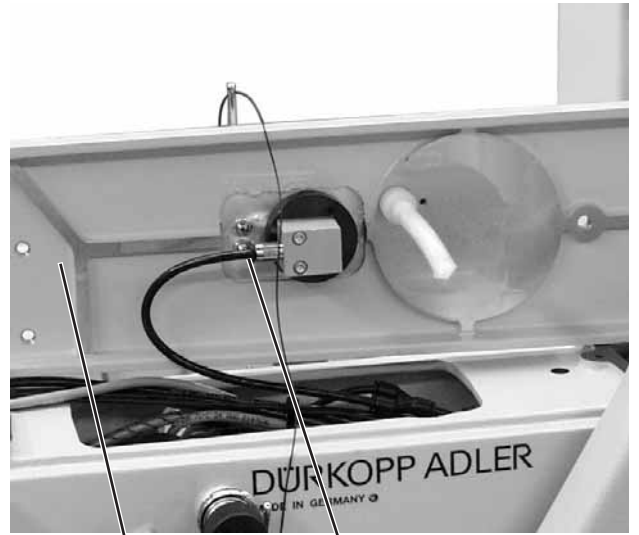
The arm cover must not be removed until both these steps have been taken.

#### **Swivelling the control unit aside**

- Slightly undo Allen screws 5.  
These are accessible through the holes 4 in the casing.
- Carefully swivel the control unit aside.



6



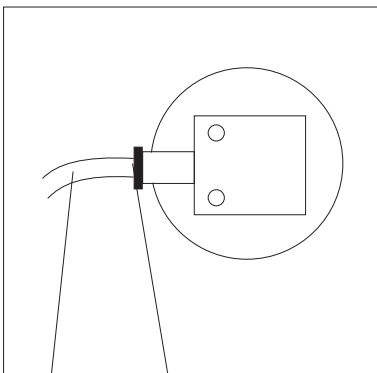
2

7

### Removing the bobbin-winder cartridge

- Undo fixing screws 6.
- Lift off bobbin-winder cartridge.

3



7

8

### Removing the arm cover

- Undo arm-cover fixing screws 2.
- Carefully raise the arm cover 2 and fold it back.
- Remove compressed-air hose 7 from the quick-release fastening: Push the ring 8 to the right and pull the hose out of the quick-release fastening.

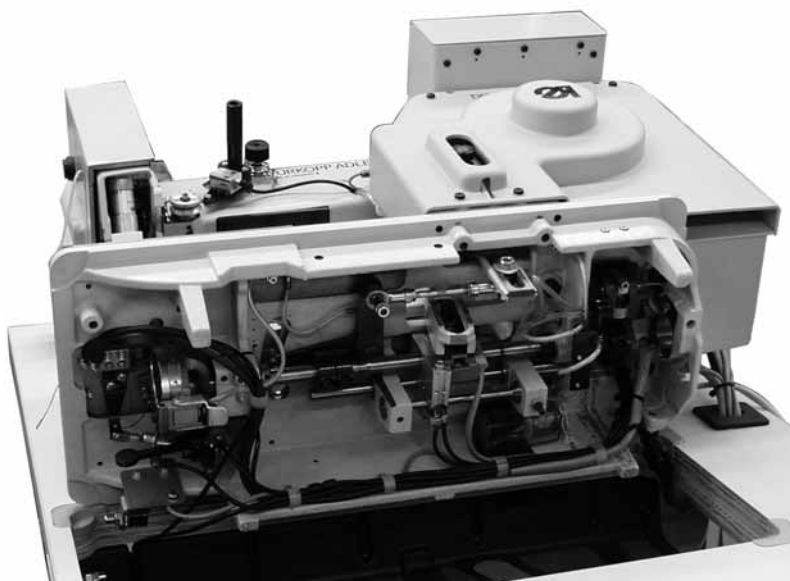


### CAUTION :

The use of force to remove the arm cover may cause damage to the compressed-air line.

## 2.2 Turning over the upper part of the machine

For service work on the underside of the upper part of the machine the upper part must be turned over.



### **CAUTION: danger of injury**

Turn off the main switch.  
The upper part of the machine must not be turned over unless the main switch is off.

- Carefully turn over the upper part of the machine until it is supported by the table-plate prop.  
The underside of the upper part of the machine is now accessible for service work.

### 3. Shuttle, needle bar

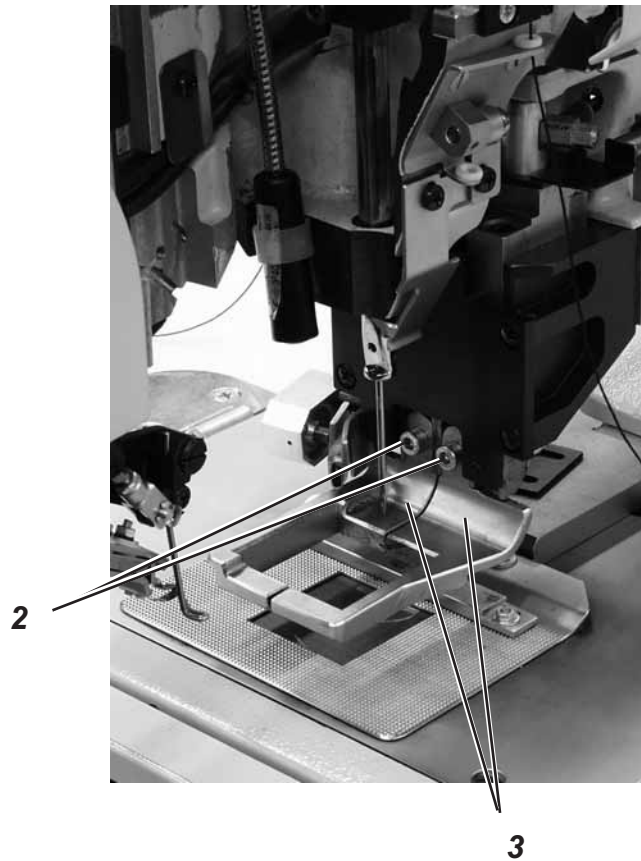


**CAUTION:**

The adjustments described in chapters 3.1 to 3.4 are mutually dependent. It is therefore essential for the individual adjustments to be carried out in the order specified in the service instructions.

#### 3.1 Needle bar height

When the shuttle tip extends 2 mm beyond the right-hand side of the needle, the eye of the needle must be directly beneath the shuttle tip.



**CAUTION: danger of injury**

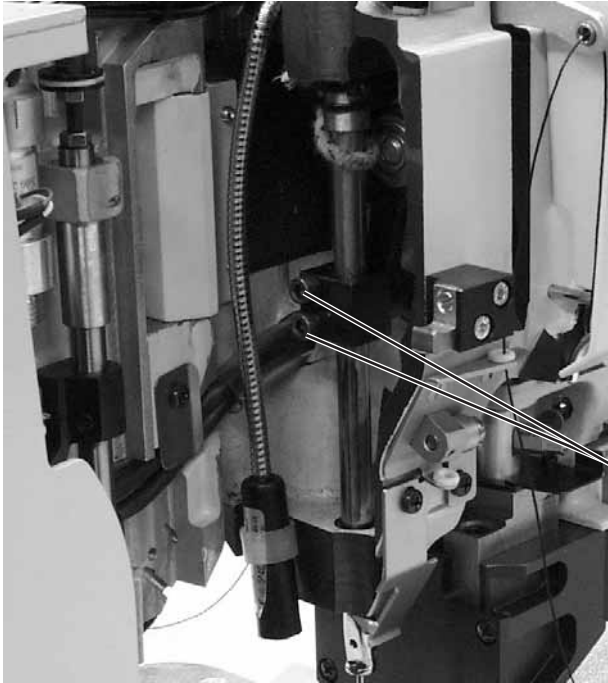
Turn off the main switch.  
The needle bar height may only be adjusted with the main switch turned off.

- Turn off the main switch.
- Undo screws 2.
- Remove clamp 3.

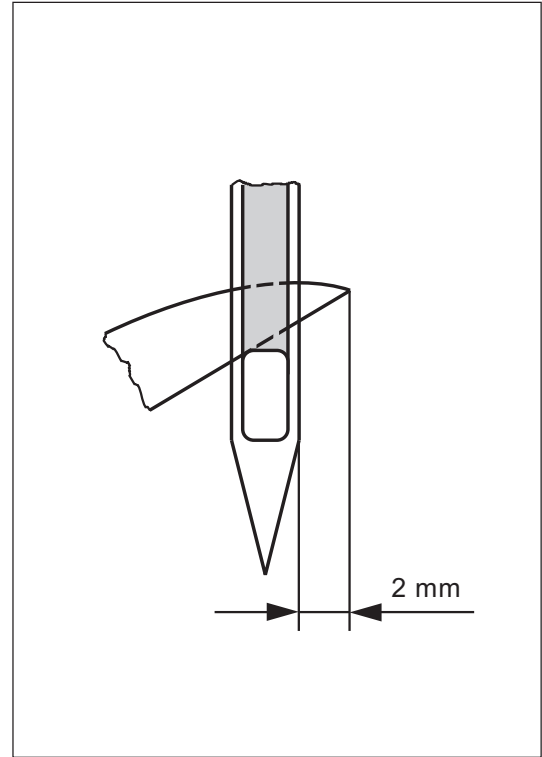


**CAUTION: Danger of breakage**

It is essential for the clamps to be removed prior to the following adjustment work.  
This prevents the needle from fouling the clamps in the course of subsequent adjustments.



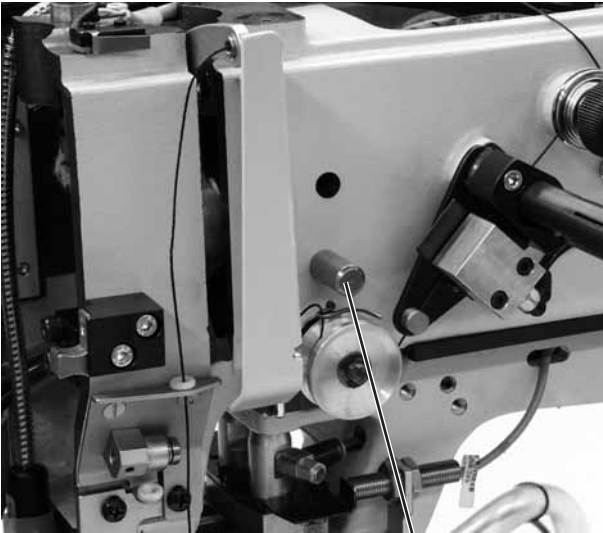
4



- Turn the handwheel in the direction of rotation until the shuttle tip extends 2 mm beyond the right-hand side of the needle.  
**CAUTION:**  
Care must be taken that the driver touches the shuttle in the direction of rotation.
- Undo locking screws 4.
- Adjust the height of the needle bar so that the lower edge of the shuttle tip just becomes visible in the eye of the needle.
- Fully tighten locking screws 4.
- Refasten clamp 3 with screws 2.

### 3.2 Synchronizing the shuttle and needle bar movements

The movement of the shuttle is synchronized with that of the needle bar by means of the locking pin 1 and gauge 2.



1



6

3



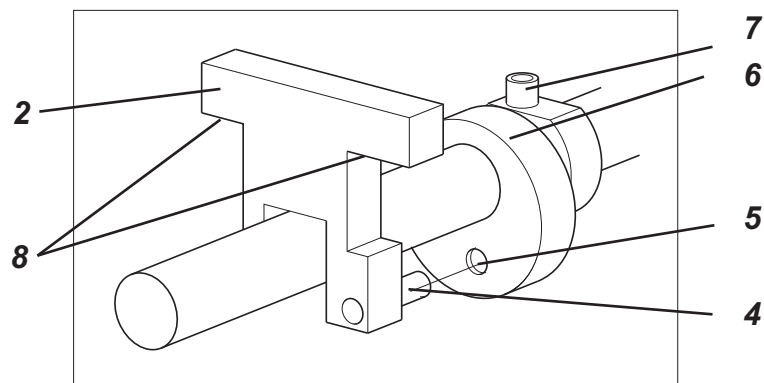
#### CAUTION: danger of injury

Turn off the main switch.

The shuttle and needle bar movements may only be synchronized with the main switch switched off.

3

- Insert locking pin 1 in the hole in the housing of the upper part of the machine.
- Turn the handwheel in the direction of rotation until the locking pin 1 perceptibly engages in the groove of the arm-shaft handle.
- Place the gauge 2 on the shaft between the worm-screw wheel 3 and the eccentric 6 in such a way that the pin 4 points to the eccentric 6.
- Push the gauge against the eccentric. The pin 4 must fit into the hole 5.
- The legs 8 of the gauge must lie flat on the unpainted surface of the arm.

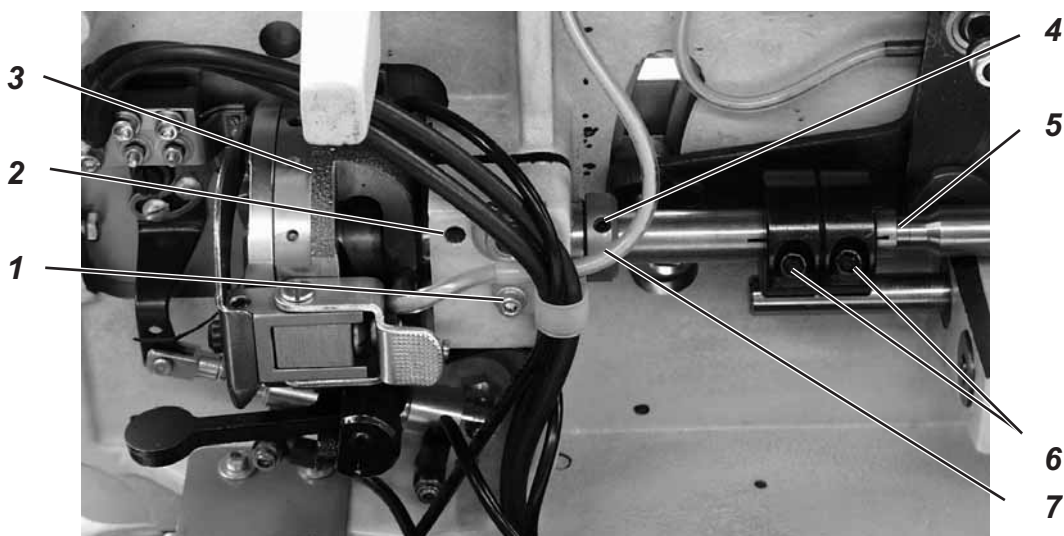


#### Adjustment:

- Remove the top cover.
- Undo the locking screw 7 on the eccentric.
- Turn the handwheel until the pin 4 of the gauge fits into the hole 5 of the eccentric.
- Fully tighten locking screw 7.
- Replace cover.

### 3.3 Shuttle-tip/needle distance

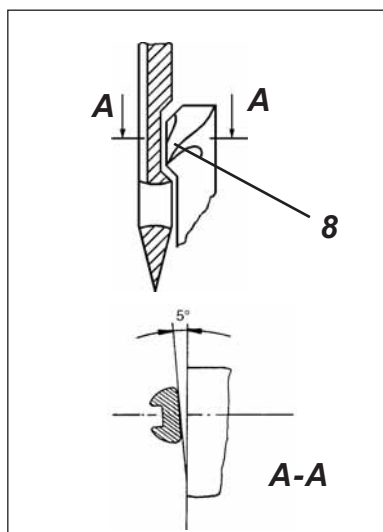
The shuttle tip 9 must be as close as possible to the groove of the needle without touching it.



#### CAUTION: danger of injury

Turn off the main switch.  
The shuttle-tip/needle distance may only be adjusted with the main switch turned off.

- Turn the handwheel to bring the shuttle tip 9 close to the needle and check the position of the shuttle tip with respect to the throat of the needle.



#### Adjustment:

- Fold the upper part of the machine aside.
- Undo locking screws 6.
- Undo locking screws 4 on adjustment ring 7.
- Extract driver with driver shaft 5 forwards from the shuttle-track support 3.
- Undo locking screw 1 on the base plate.
- Slightly screw in pressure screw 2.  
This opens the base-plate jaws.
- Bring the shuttle tip 8 close to the throat of the needle by axially shifting the shuttle-track support 3.  
The upper surface of the shuttle-track support 3 must be parallel to the needle plate.
- Screw pressure screw 2 out again.
- Fully tighten locking screw 4 (max. 21 Nm).
- Replace driver with driver shaft 5 in the shuttle-track support 3 and push back as far as it will go.
- Push adjustment ring 7 as far as it will go against the end of the shuttle-track support 3.
- Fully tighten locking screws 4.
- Fully tighten locking screws 6.



#### CAUTION:

It is essential to check the loop-stroke setting.  
Fitting a stronger needle has the effect of altering the distance between the shuttle tip and the needle.  
This shuttle-tip/needle distance must be corrected.

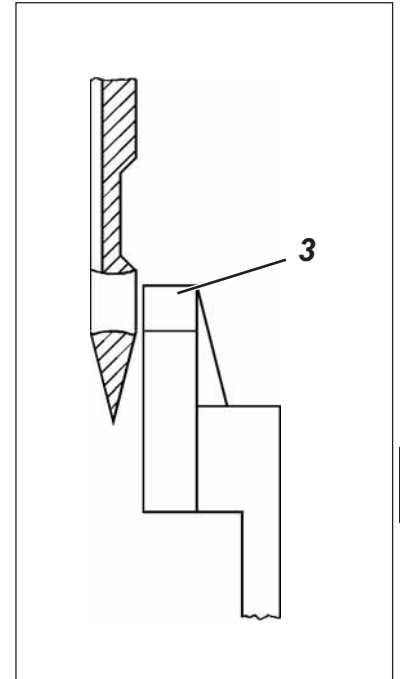
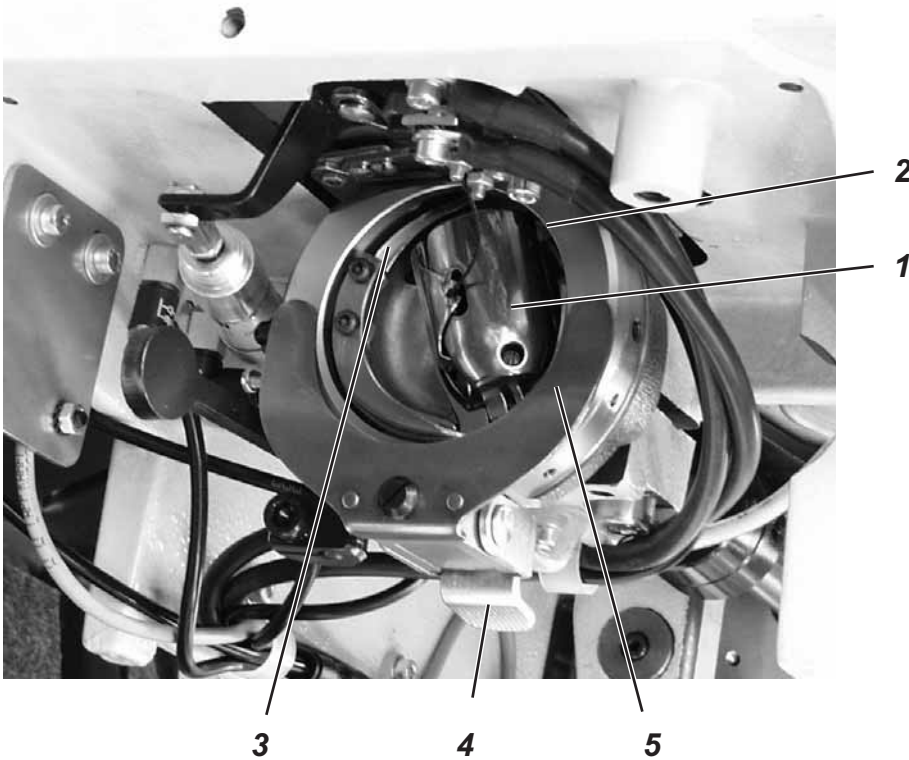
### 3.4 Driver/needle distance

The oscillating driver 3 moves the shuttle 1 in the shuttle track. When the setting of the driver is correct it also acts as a needle guide in the vertical dimension.

This avoids needle "flutter", which causes dropped stitches.

The right-hand side of the needle must be parallel to the driver 3 and at a very small distance from it.

For this purpose the driver 3 must be brought close to the needle.



3

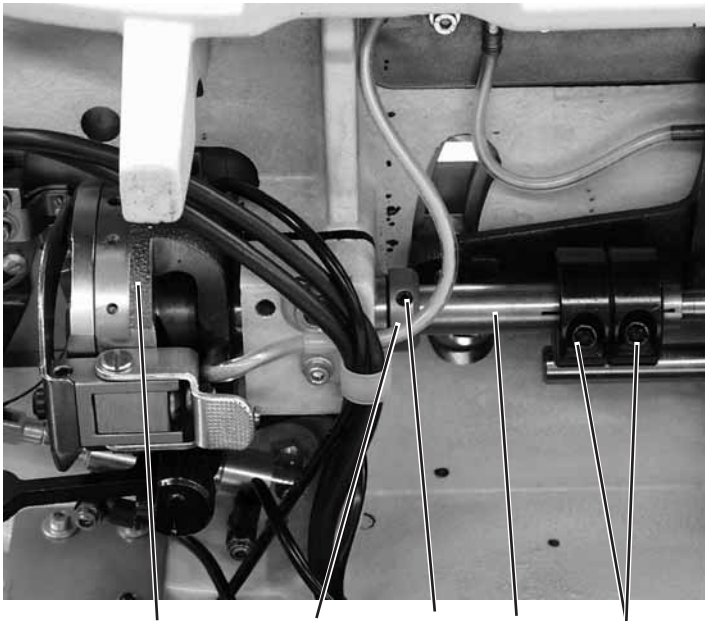


#### **CAUTION: danger of injury**

Turn off the main switch.

The driver/needle distance may only be adjusted with the main switch turned off.

- Turn the handwheel to bring the needle to its highest point.
- Pull the sprung bolt 4 forwards to unlock the shuttle-track spring 5.
- Swivel back the shuttle-track spring 5.
- Remove plunger ring 2.
- Extract shuttle 1.
- To check the setting turn the handwheel to bring the driver 3 close to the needle.



10 9 8 7 6



12 11

**Adjustment:**

- Fold the upper part of the machine aside.
- Undo locking screws 6.
- Undo locking screws 8 on adjustment ring 9.
- Extract driver with driver shaft 7 forwards from the shuttle-track support 10.

- Once the driver shaft 7 has been dismantled, remove or add shims 12. The shims can be found in the accessory kit.

**Hint**

The use of a smaller needle normally requires a shim to be added and vice versa.

- Replace driver with driver shaft 7 in the shuttle-track support 10 and push it back as far as it will go.
- Push adjustment ring 8 as far as it will go against the end of the shuttle-track support 10.
- Fully tighten locking screws 8.  
This prevents the driver from being axially shifted.
- Reset the loop stroke (see chapter 3.5).
- Check the setting by turning the belt pulley on the arm shaft. The right-hand side of the needle must be parallel to the driver and at a very small distance from it.  
If the setting is not correct the adjustment process must be repeated.



**CAUTION:**

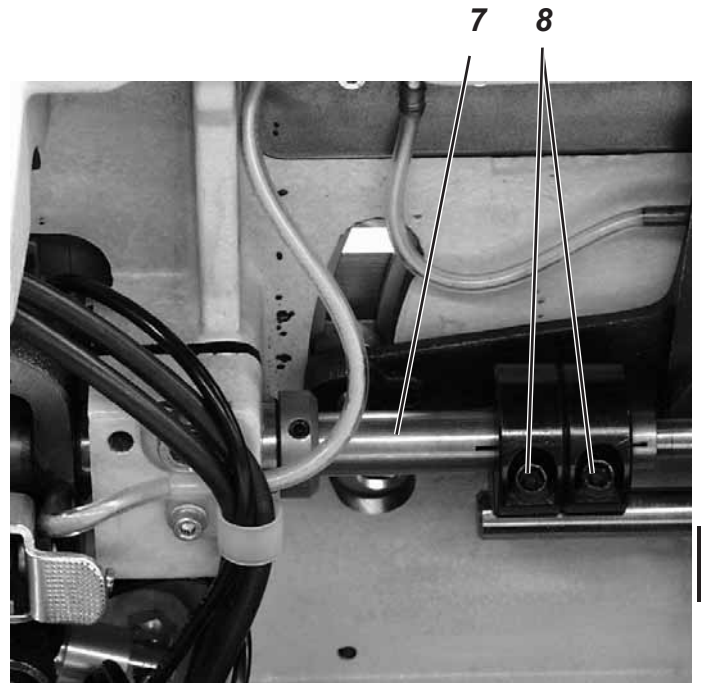
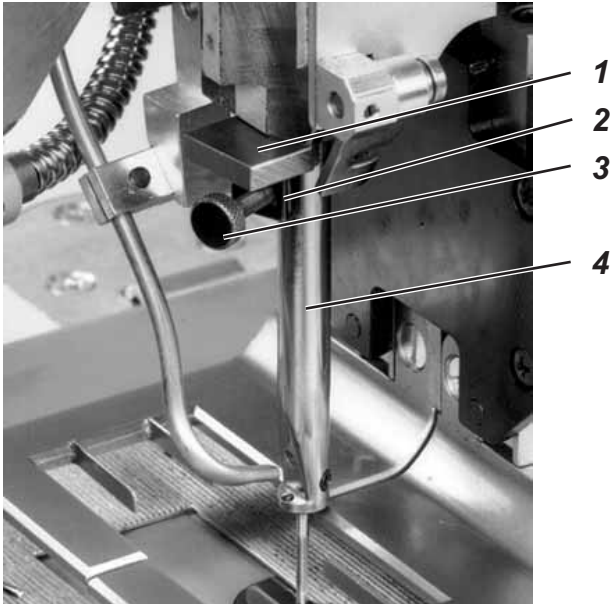
After adjusting the driver/needle distance it is essential to readjust the loop stroke as described in chapter 3.5.


### 3.5 Loop stroke

The loop stroke is the travel of the needle bar from its BDC point to the point at which the shuttle tip 9 is at the same level as the right-hand side of the needle.

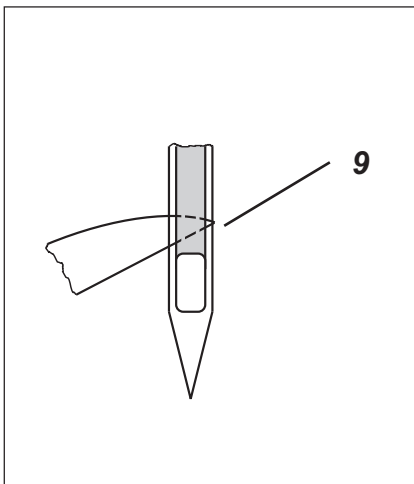
The loop stroke must be 4 mm.

It is set with the gauge 1 (order no. 0981 150012) and block 2 (order no. 0981 150006).





**CAUTION: danger of injury**  
 Turn off the main switch.  
 The loop stroke may only be adjusted with the main switch turned off.



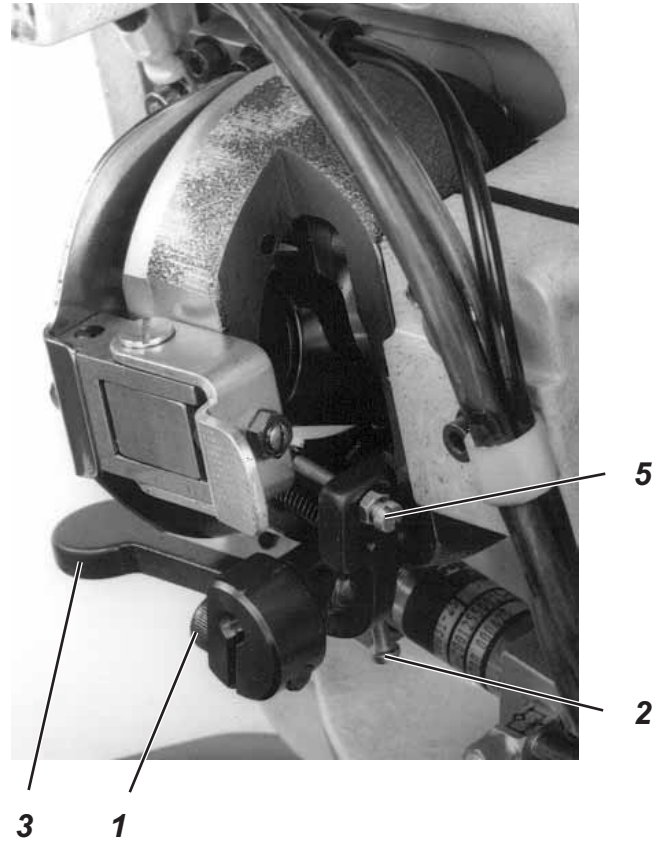
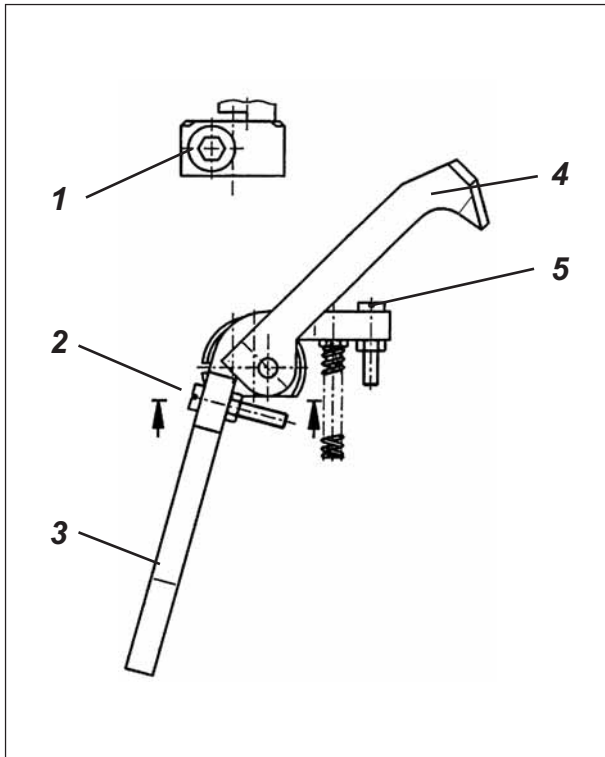
- Turn the handwheel to bring the needle bar 4 to its lowest position.
- Open the cover.
- Press gauge 1 with block 2 upwards against the housing.
- Fully tighten locking screw 3 on block 2.
- Extract gauge 1.
- Turn handwheel in the direction of rotation until the block 2 is in contact with the housing.
- Check whether the shuttle tip 9 is at the same level as the right-hand side of the needle.

**Adjustment:**

- Fold the upper part of the machine aside.
- Undo locking screws 8.
- Twist the driver shaft 7 as required.
- Fully tighten locking screws 8.
- Check the driver/needle distance once again and correct it if necessary (see chapter 3.4).

## 4. Bobbin ejector

The ejector 4 must reliably eject the bobbin. The ejector tip must not enter the bobbin's area of movement.



### **CAUTION: danger of injury**

Turn off the main switch.

The ejector may only be adjusted with the main switch turned off.

- Fold the upper part of the machine aside.
- Undo screw 1.
- Twist the ejector 4 on the axle so that the bobbin is reliably ejected when lever 3 is pressed.
- Fully tighten screw 1.
- Test by pressing the ejector lever 3.  
The bobbin case must automatically swivel out.
- Undo locknut on screw 2.
- Turn screw 2 to set the end position.  
The ejector tip must not enter the bobbin's area of movement.
- Fully tighten locknut on screw 2.
- Undo locknut on screw 5.
- Turn screw 5 to set the end position.  
The ejector must reliably eject the bobbin.
- Fully tighten locknut on screw 5.

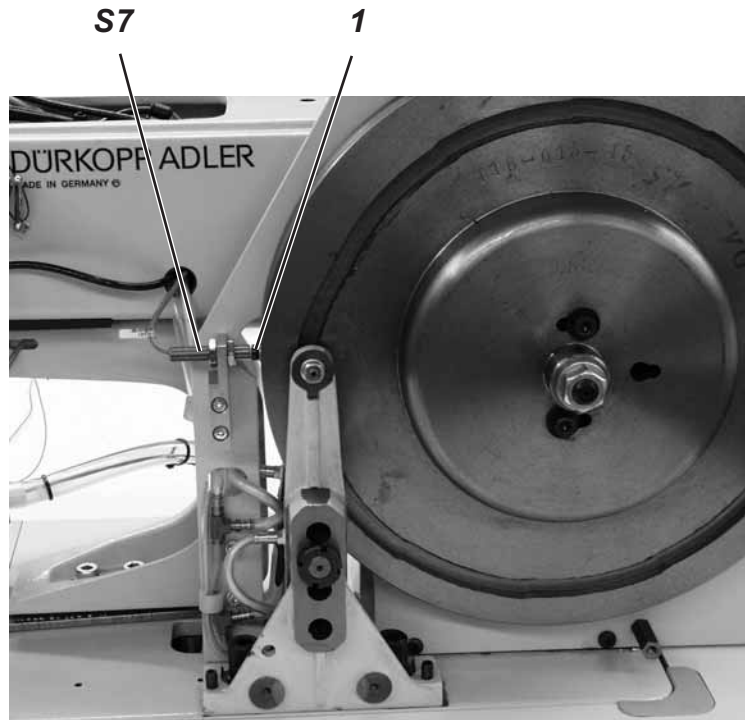
## 5. Disc cam

The cam tracks on the inside and outside of the disc cam determine the transport movement of the clamps.

The inner and outer cam tracks control the longitudinal and transverse movement of the clamps respectively.

The position of disc cam on the shaft determines clamp-transport timing.

The disc cam is in its initial position when cam 1 is located immediately in front of switch **S7**.



3

### Disc cam

The various seam (stitch) types are determined by disc cams, which are easy to replace.

All disc cams with the same stitch number are mutually interchangeable.

The disc cams are numbered.

The numbers engraved on them have the following meaning:

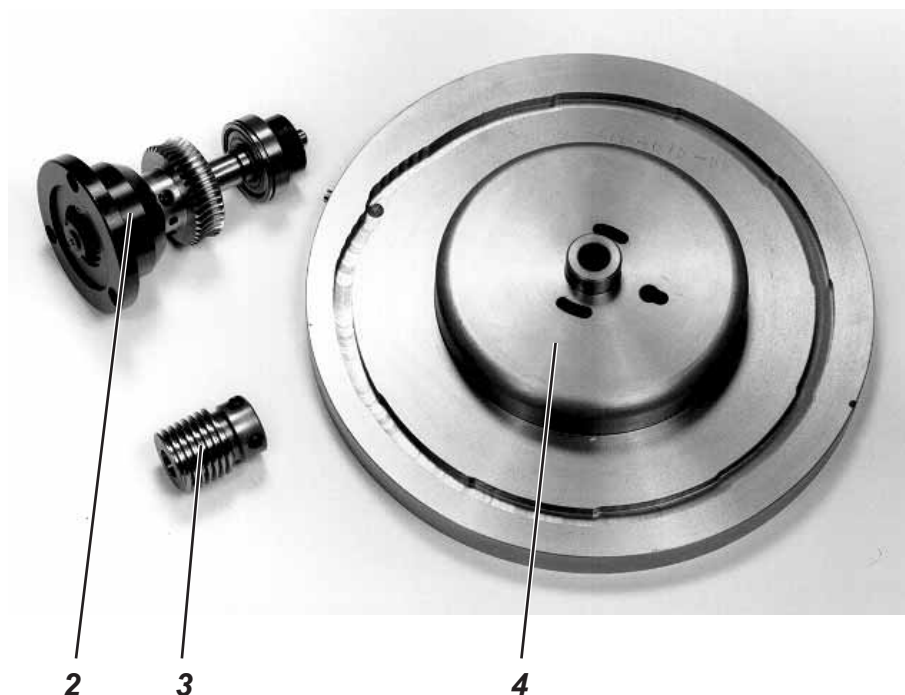
Example:                    **116 - 072 .- 1**

<b>116</b>	= number of stitches per disc-cam rotation
<b>072</b>	= stitch type
<b>1</b>	= calculation operation

When converting to a different seam type the clamps belonging to the installed disc cam must be fitted.

### Worm-gear set

When converting to a disc cam 4 with a different number of stitches the appropriate worm-gear set must also be fitted. A **worm-gear set** consists of worm drive 2 and worm screw 3.



### Intermediate transmission

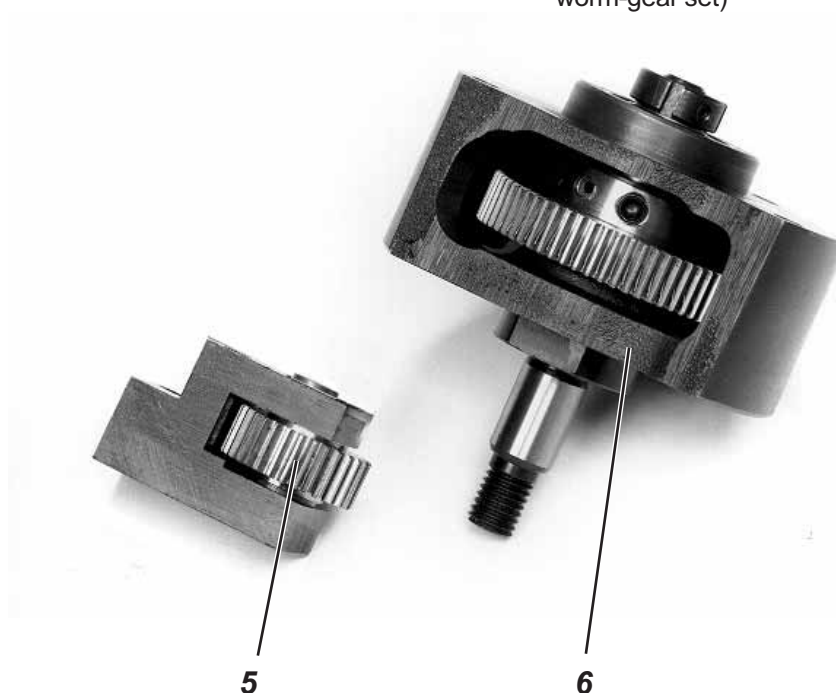
Fitting the intermediate transmission 6 with idler gear 5 doubles the number of stitches per disc-cam rotation (transmission ratio 2:1).

without intermediate transmission:

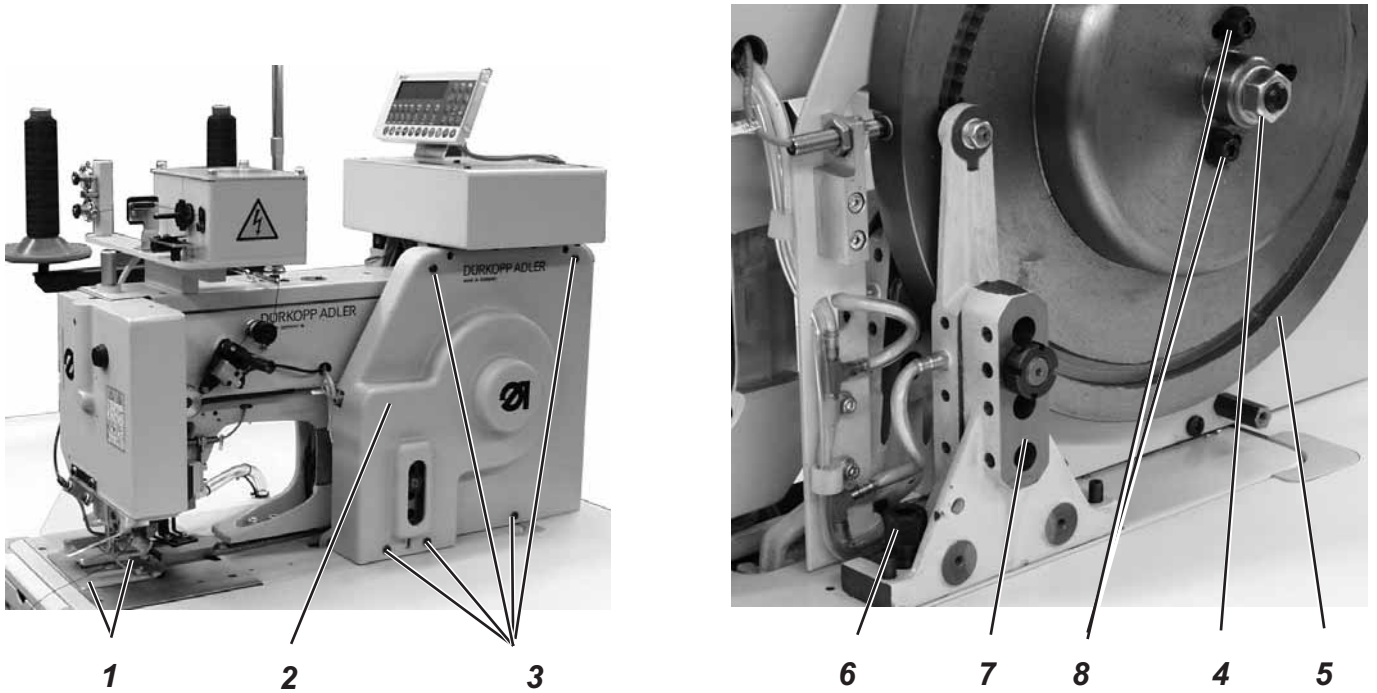
42, 58 and 72 stitches per disc-cam rotation (depending on the worm-gear set)

with intermediate transmission:

84, 116 and 144 stitches per disc-cam rotation (depending on the worm-gear set)



## 5.1 Replacing the disc cam



### **CAUTION: danger of injury**

Turn off the main switch.  
The disc cam may only be replaced with the main switch turned off.

### **Removing the material clamps and table plate**

- Remove the material clamps and table plate 1.

### **Removing the disc-cam cover**

- Remove screws 3.
- Remove disc-cam cover 2.

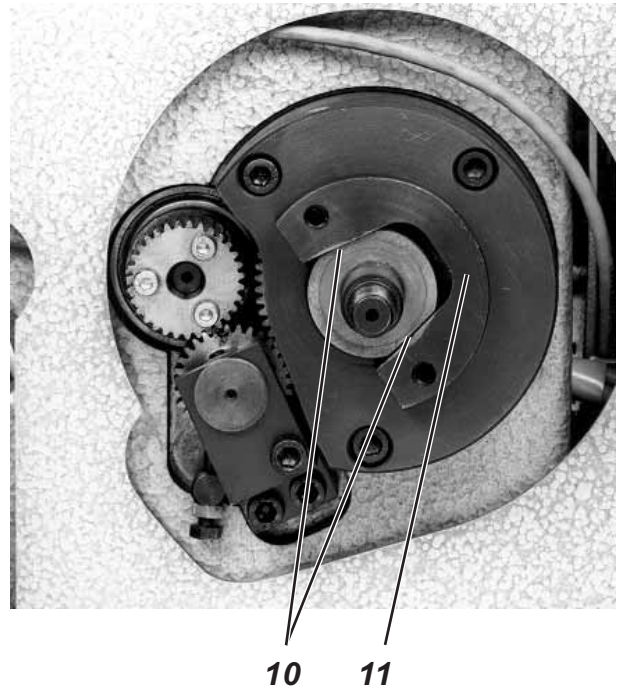
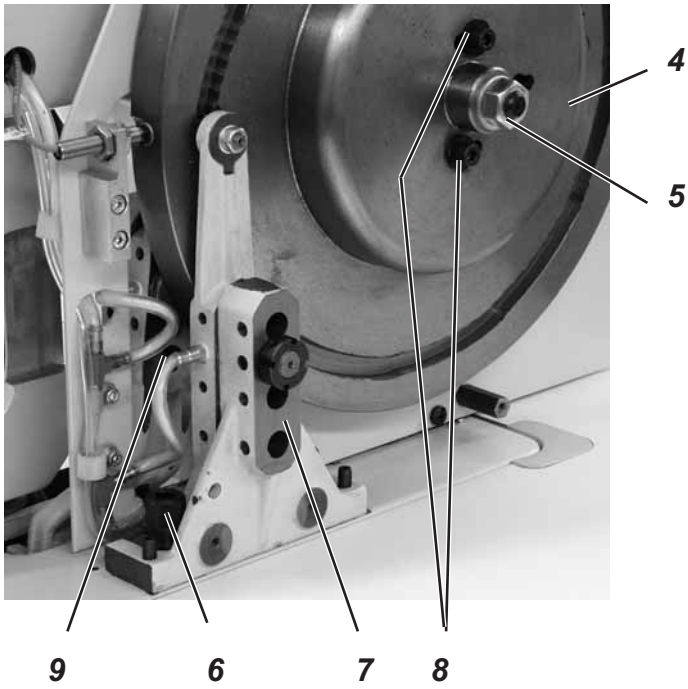
### **Removing the disc cam**

- Undo screws 6.
- Raise the bracket with drive lever 7 for transverse clamp movement and push aside.
- Undo nut 5 and screws 8.
- Carefully remove the disc cam 4.



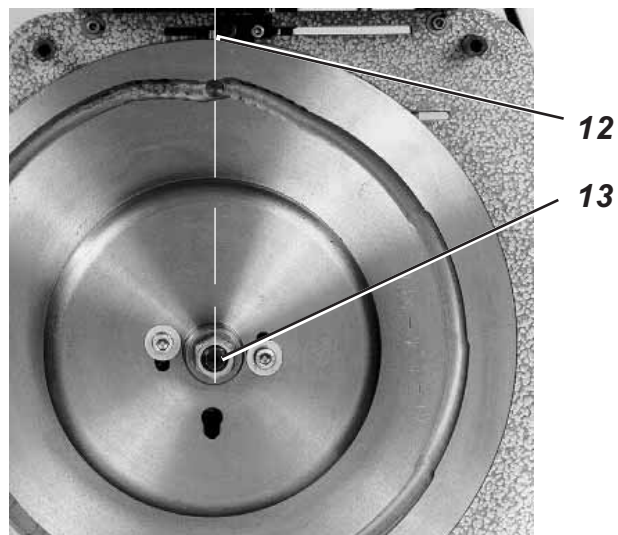
### **CAUTION:**

If converting to a different seam type requires the intermediate transmission to be installed, this must take place before the new disc cam is fitted. For the installation of the intermediate transmission see chapter 5.2.



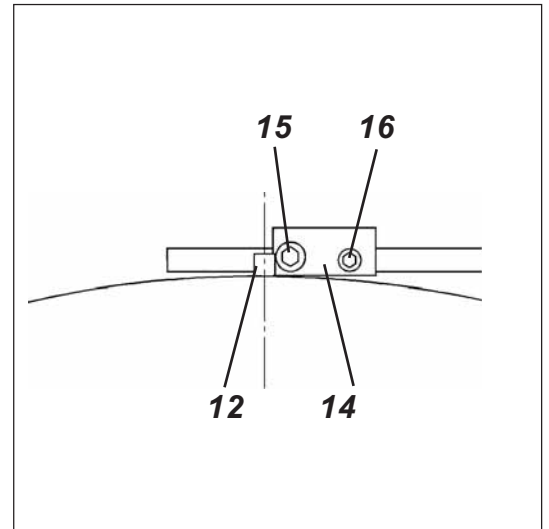
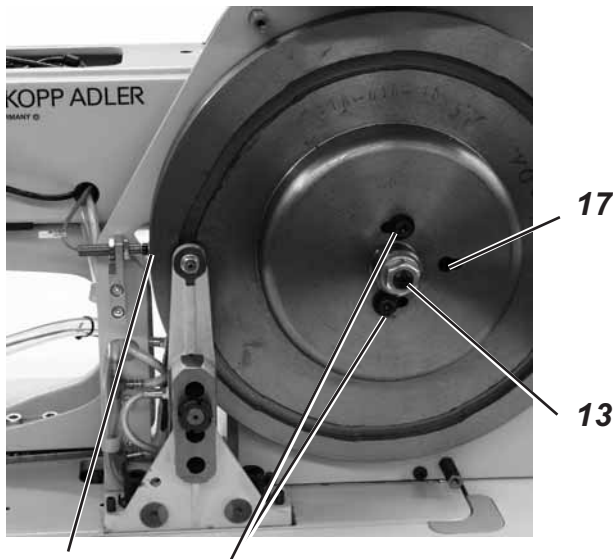
**Fitting new disc cam**

- Fit the new disc cam.
- CAUTION:**  
Ensure that the drive lever 9 for the longitudinal clamp movement engages in the inner cam track of the disc cam.  
The claw 11 must exactly fit the shaft edges 10.
- Remark:  
The illustration shows a machine with the intermediate transmission fitted.
- Turn the disc cam in the direction of rotation until the claw 11 perceptibly grasps the shaft edges 10.
- Fully tighten nut 5.
- Fit new clamps and new bearing plate.



- Continue to turn the disc cam in the direction of rotation until the cam 12 is vertically above the shaft 13.

- Turn the handwheel in the direction of rotation until the clamps no longer move.  
At this moment, if the setting is correct, the needle is just about to penetrate the material.



12      8

**Adjustment:**

- Continue to turn the disc cam in the direction of rotation until the cam 12 is vertically above the shaft 13.
- Slightly undo the screw 16 on the rider 14.
- Push the rider 14 with screw 15 onto the cam 12 of the disc cam as far as it will go.
- Fully tighten screw 16.  
The position of the disc cam is fixed.
- Undo nut 5.
- Turn the handwheel in the direction of rotation until the needle is about to penetrate the material.
- In this position insert a screwdriver into the slot 17 and press the claw 11 onto the shaft edges 8.
- Fully tighten nut 5 and screws 10.
- Push the rider 14 fully to the right and back.



**CAUTION: Danger of breakage**

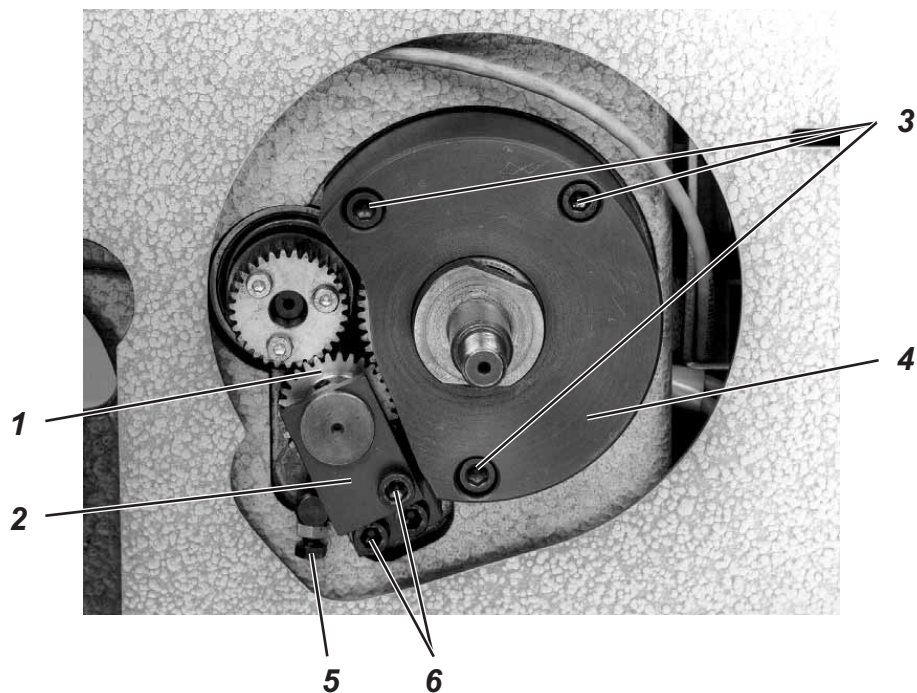
After the disc cam has been replaced it is essential to check the following settings:

- the position of the table plate with respect to the needle (see chapter 7.1)
- the position of the clamps with respect to the table plate (see chapter 7.2)

## 5.2 Fitting the intermediate transmission

Fitting the intermediate transmission 4 with idler gear 1 doubles the number of stitches per disc-cam rotation (transmission ratio 2:1).

The intermediate transmission must be fitted before the new disc cam is installed.



### **CAUTION: danger of injury**

Turn off the main switch.

The intermediate transmission may only be fitted with the main switch turned off.

- Remove the disc cam as described in chapter 4.1.
- Attach the intermediate transmission 4 from outside with screws 3 on the arm of the machine.
- Fit bracket 2 and position idler gear 1.
- First slightly tighten screws 5.
- Complete positioning of idler gear 1 by tightening screw 6.



### **CAUTION:**

Any gear play present is increased by the intermediate transmission. The idler gear 1 must therefore be exactly in position.

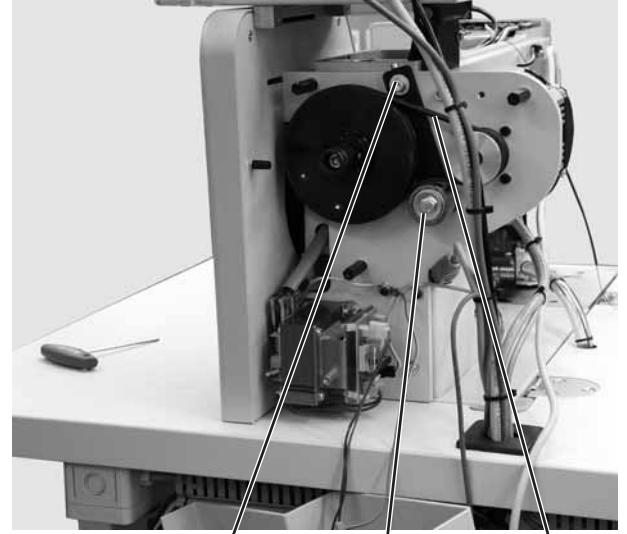
- Fully tighten screws 5 and secure with locknuts.
- Fit the disc cam as described in chapter 4.1.

## 5.3 Replacing the worm-gear pair and worm screw

### 5.3.1 Fit/Remove the synchronous motor



4 3 2 1



7 6 5

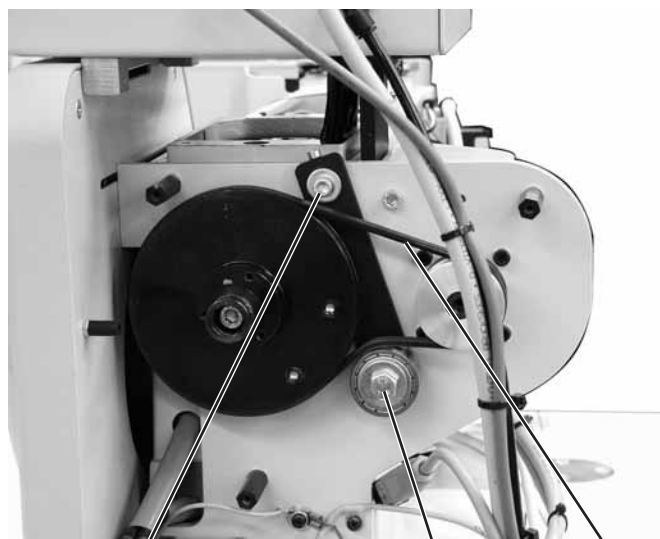


#### **CAUTION: danger of injury**

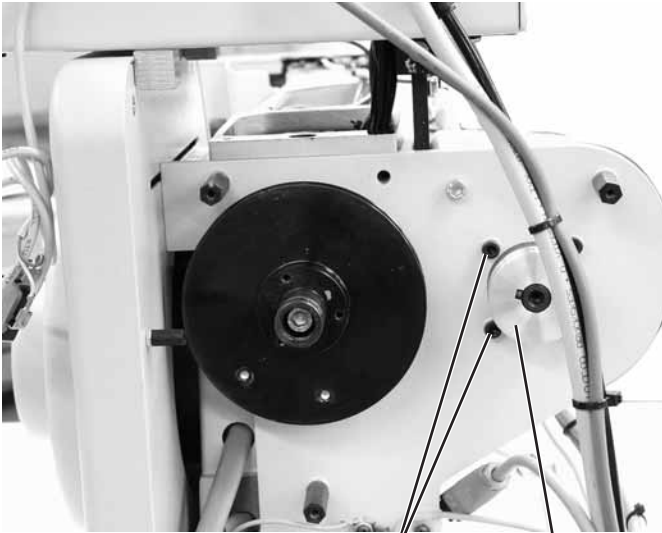
Turn off the main switch.

The synchronous motor may only be replaced with the main switch turned off.

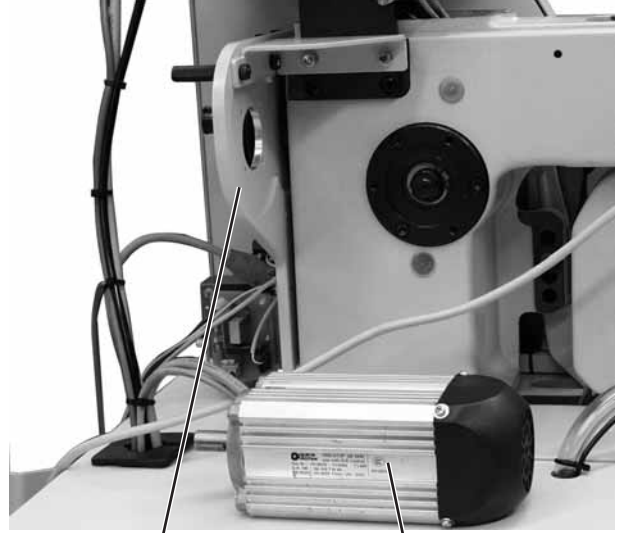
- Remove proximity switch 4.
- Remove handwheel 2.
- Unplug connector 3.
- Remove cover 1.
- Dismantle belt tensioner 6.  
Loosen screw 7 and pull out the belt tensioner.
- Remove the belt 5.



7 6 5



9 8



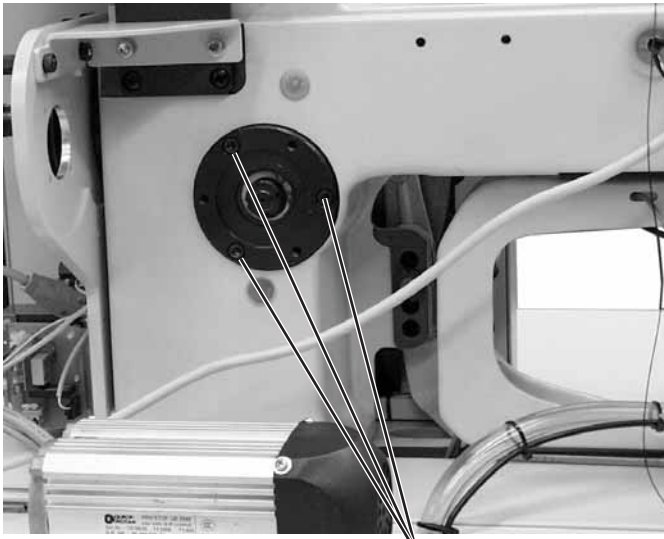
11 10

- Loosen the screw of the pulley 8 and separate the pulley from the motor shaft.
- Loosen the mounting screws 9 and remove carefully the motor 10 from the fixing plate 11.

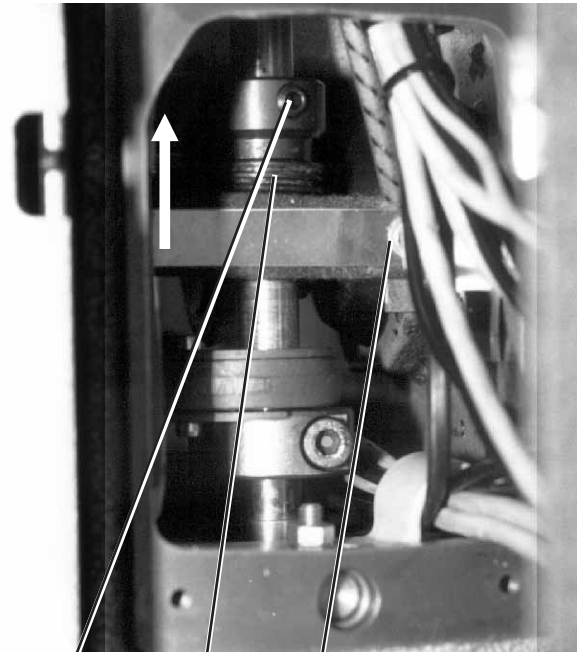
#### **Fitting the synchronous motor**

- Fit the synchronous motor 10, pulley 8 and the belt again.

### 5.3.2 Replacing the worm-gear pair and worm screw



12



15

14

13



#### **CAUTION: danger of injury**

Turn off the main switch.

The worm-gear pair and worm screw may only be replaced with the main switch turned off.

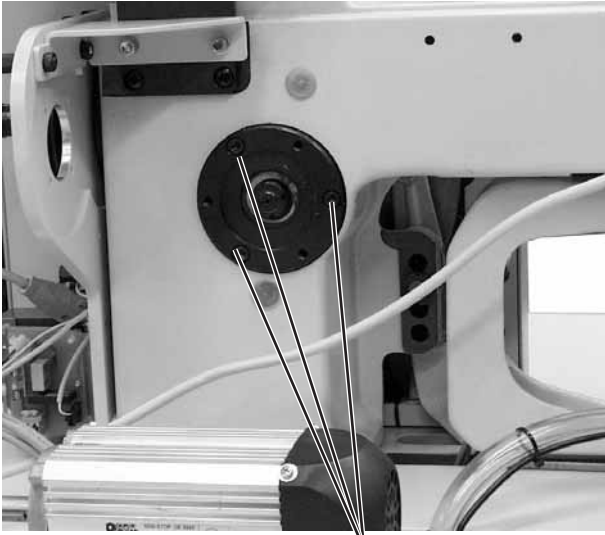


#### **CAUTION: Danger of breakage**

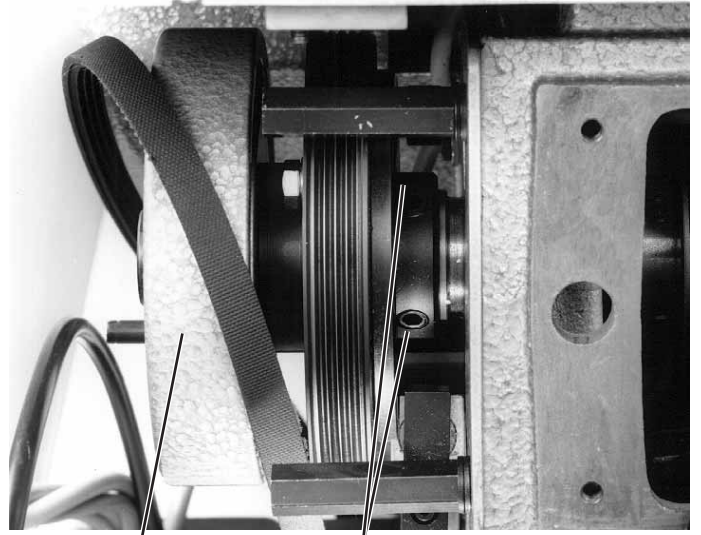
It is essential to remove the clamps and needle before replacing the worm-gear pair and worm screw.

- Remove clamps and needle.
- Swivel the control unit aside and remove the arm cover (see chapter 2).
- Remove screw 13 and oil felt.
- Loosen locking screws 15 on worm screw 14.
- To remove the worm-gear pairs first push worm screw 14 to the rear in the direction of the arrow.
- Undo and remove screws 12 on the bearing.  
The fixing screws 12 also act as extractor screws for the worm-gear pair.
- Insert screws 12 into the threaded holes of the bearing.
- Carefully extract the worm-gear pair from the housing by evenly screwing in the extractor screws.

- Undo locking screws 16.
  - Pull the handwheel 17 with belt pulley off the arm shaft.
  - Undo locking screws 22 on the bearing collar 19.  
The locking screws 22 are accessible through the slot 21.
  - Undo and remove screws 23 on bearing 20.  
The fixing screws 23 also act as extractor screws for the bearing.
  - Insert screws 23 into the threaded holes 18.
  - Carefully extract the entire bearing 20 from the housing by evenly screwing in the extractor screws.
  - Unscrew screws 26 on the eccentric and remove cover plates 25.
  - Undo cheese-head screw 24 and punch-screw 27.
  - Press eccentric bearing to the left out of the eccentric and remove from the arm shaft.
  - Remove the worm screw 11 from the arm shaft.
  - Fit new worm screw onto the arm shaft.
  - Successively replace and secure the eccentric bearing, bearing 20 and handwheel 17.
- CAUTION:**  
Care must be taken that the punch screw engages in the mark on the shaft, as this ensures that the eccentrics are exactly positioned.
- Fit new worm-gear pair and secure with screws 12.
  - Push worm screw 11 over the worm gear and adjust worm-gear play (see chapter 5.4).
  - Replace all the parts which have been removed (motor, belt, etc ...) and put them together again.

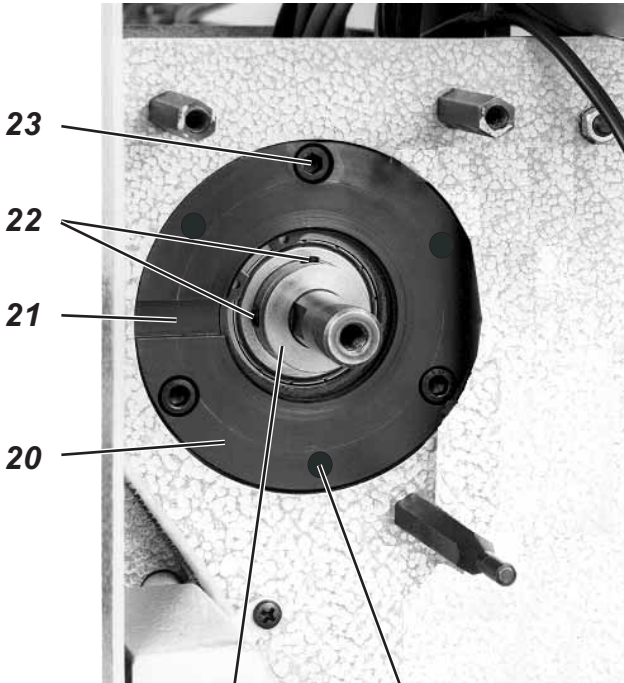


12



17

16



23

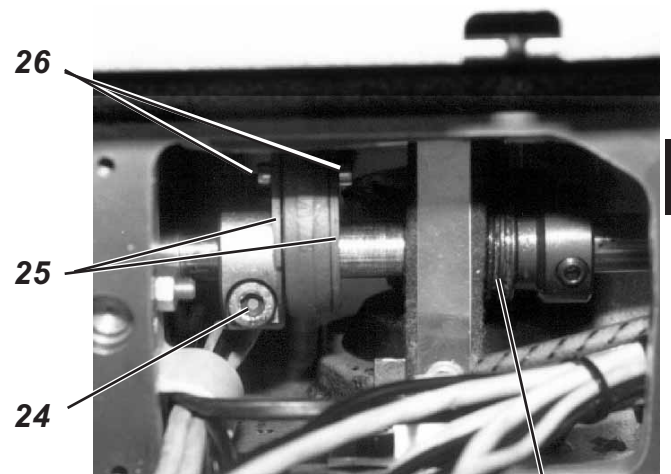
22

21

20

19

18



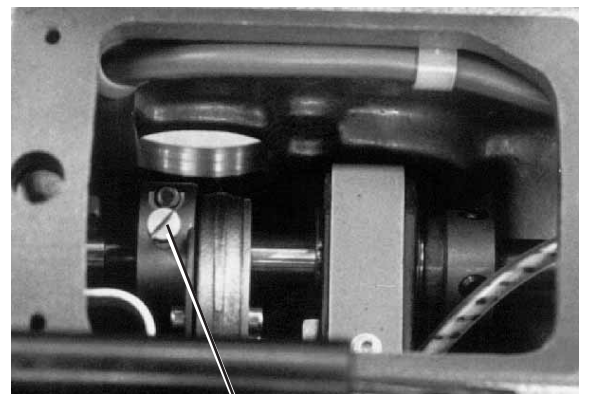
26

25

24

11

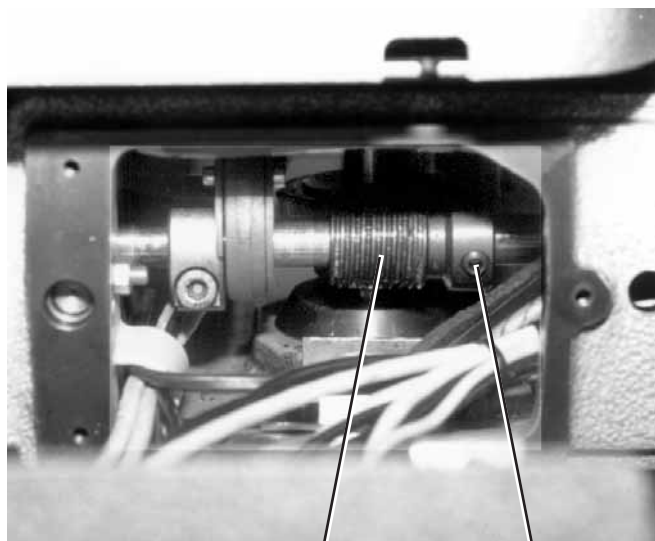
3



27

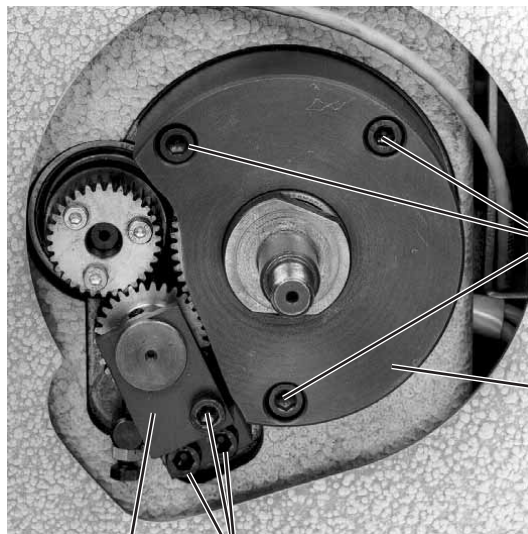
## 5.4 Worm-gear play

There must be as little as possible gear play between the worm screw 11 and worm gear.



11

12



7

6

4

5



### **CAUTION: danger of injury**

Turn off the main switch.

The worm-gear play may only be adjusted with the main switch turned off.

### **CAUTION:**

If an intermediate transmission is fitted it must be removed before this check.

#### **Removing the intermediate transmission**

- Remove disc cam as described in chapter 4.1.
- Unscrew screws 4 and remove intermediate transmission 5.
- Unscrew screws 6 and remove bracket 7.

#### **Checking the worm-gear play**

- Turn the disc cam to right and left.  
A degree of play must be perceptible.  
There must be play at all points of the worm gear. Continue to turn the disc cam and check at all points.

#### **Adjustment:**

- Remove arm cover.
- Loosen bracket with oil felt 10 (see page 21).
- Loosen cheese-head screws 12.
- Adjust the gear play by axially shifting the conical worm screw 11 along the arm shaft.

#### **CAUTION:**

The first screw 12 of the worm screw - seen in the direction of rotation - must be on the surface of the arm shaft.

- Tighten locking screws 12.
- Adjust bracket with oil felt to exert slight pressure and tighten.
- Replace arm cover.
- Replace intermediate transmission (see chapter 4.2).

## 6. Shut-down devices

### 6.1 Basic stop position (switch S7)

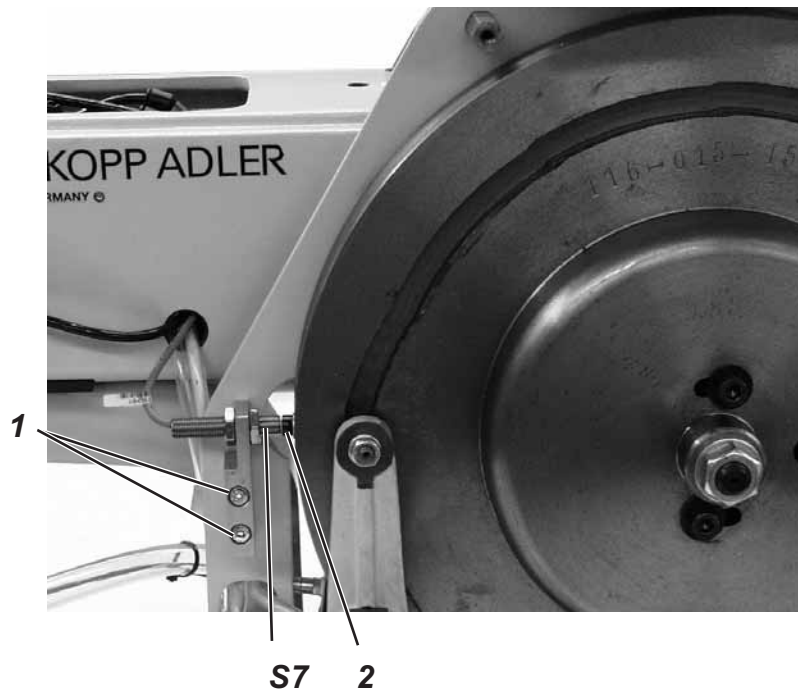
Each disc cam (number of stitches) has its own cam 2 with a particular diameter.

The diameter is such that switch **S7** is not operated by the cam one stitch before or after the initial position.

If the cam is replaced by another with a larger diameter (e.g. in the event of loss or damage), the following problem may occur:

When the machine is switched on switch **S7** is operated, but the disc cam is one stitch before or after the initial position.

If this happens the control unit does not issue an error message.



3



#### CAUTION:

Only the cam 2 belonging to the disc cam, or another cam of the same diameter, may be used.

The cam may only be wide enough to ensure that switch **S7** is not operated one stitch before or after the initial position.

Before switch **S7** is set the setting of the proximity switch must first be checked.

The following conditions govern initial positioning for reference travel:

- The sewing drive operates until cam 2 operates the switch.
- Once the 1st position has been reached the sewing drive halts in position 2.

If an error message then appears in the display, the disc cam is positioned one stitch too far.

The switch **S7** must be reset.

#### Setting switch **S7**

- Loosen screws 1 slightly.
- Push switch **S7** upwards so that cam 2 reaches the switch sooner.
- Tighten screws 1.

The outgoing flank of the 1st position must not coincide with the incoming flank of switch **S7**.

- Adjust switch **S7** as described above for cam 2.
- Check position 1 (thread-lever low point) of the proximity switch (see chapter 10.5).
- Readjust switch **S7** if necessary.

## 7. Clamps and table plate

### 7.1 Position of table plate with respect to the needle

The transmission of the movement from the disc cam to the clamps and the table plate is effected by lever systems. Within certain limits seam-type sizes can be altered by changing the lever transmission ratios.

The size of the safety gap between the table plate 1 and the needle is determined by the extent of the transverse and longitudinal movement of the table plate.

For safety reasons the edges of the hole in the table plate 1 must be at a constant minimum distance from the needle when it penetrates the material.

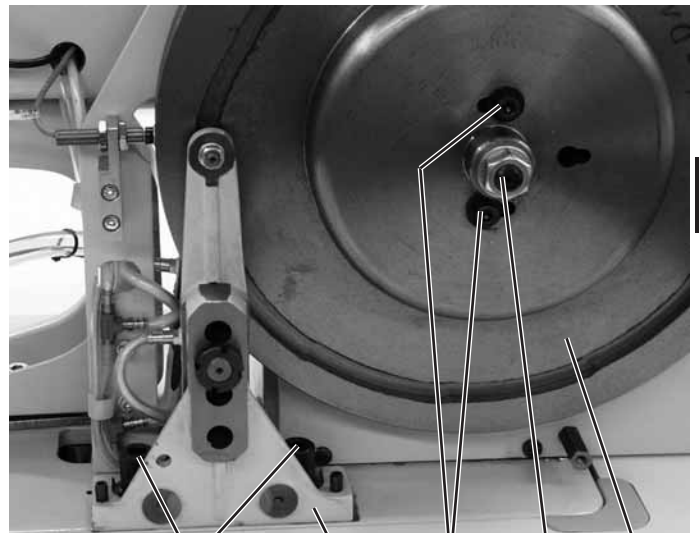


#### **CAUTION: Danger of breakage**

If this safety distance is not observed, the needle will strike the table plate 1.



1



3

4

2

5

6

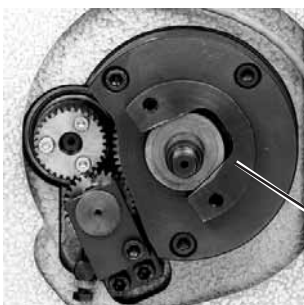
3



#### **CAUTION: danger of injury**

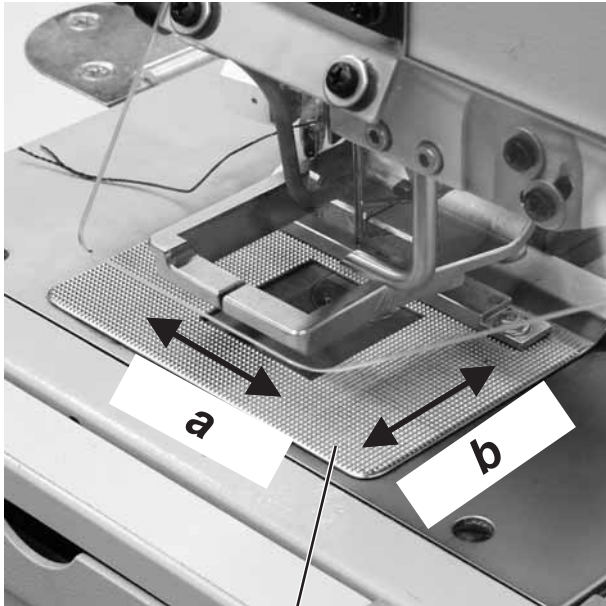
Turn off the main switch.

The safety distance between the table plate 1 and the needle may only be adjusted with the main switch turned off.



7

- Remove screws 3 and support 4.
- Loosen nut 5 and screws 2.
- Remove disc cam 6.
- Remove claw 7 from disc cam.
- Replace disc cam on the shaft without the claw.
- Turn the handwheel to lower the needle.
- Turn the disc cam in the direction of rotation and follow the outer contour of the seam profile, checking that the safety distance between the table plate 1 and the needle remains constant.



1



5

6

10

9

7

8

### Aligning the table plate

#### a) Transverse:

- Turn the handwheel to lower the needle.
- Turn the disc cam in the direction of rotation until one side of the table plate (in the transverse direction) reaches the needle.
- Undo nuts 5 and 7.
- Twist the threaded rod 6 to set the distance between the table plate and the needle.
- Continue to turn the disc cam in the direction of rotation until the opposite side of the table plate reaches the needle.
- Twist the threaded rod 6 to set the distance between the table plate and the needle.
- Fully tighten nuts 5 and 7.

#### b) Longitudinal:

- Turn the disc cam in the direction of rotation until one side of the table plate (in the longitudinal direction) reaches the needle.
- Slightly undo screw 9.
- Twist the eccentric 10 to set the distance between the table plate and the needle.
- Continue to turn the disc cam in the direction of rotation until the opposite side of the table plate reaches the needle.
- Check the distance to the needle.
- Tighten screw 9.



1



5

6

10

9

7

8

### Setting the extent of the movement of the table plate 1:

In the transverse direction:

- Slightly undo nut 8.
- Set the extent of the movement in the transverse direction by moving the crank along the slot.
- Tighten nut 8.

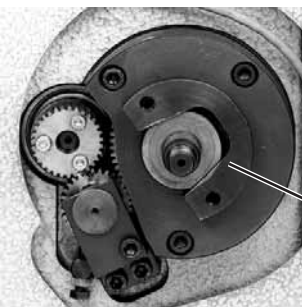
In the longitudinal direction:

- Undo screw 9.
- Set the extent of the movement in the longitudinal direction by moving the crank along the slot.

**CAUTION:**

Do not change the setting of the eccentric 10.

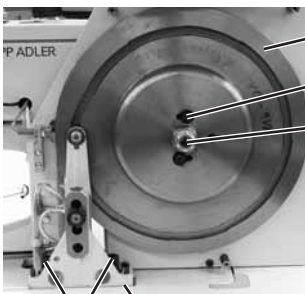
- Tighten screw 9.



7

### Replacing parts which have been removed

- Remove the disc cam 6.
- Replace the claw 7.
- Replace the disc cam 6 and secure with screws 2 and nut 5.
- Fit support 4 and secure with screws 3.



6

2

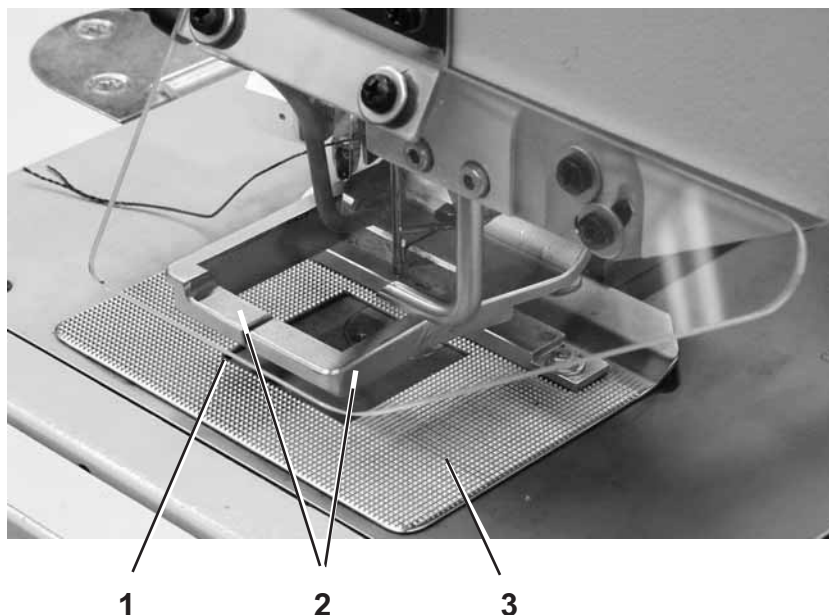
5

3

4

## 7.2 Position of clamps with respect to the table plate

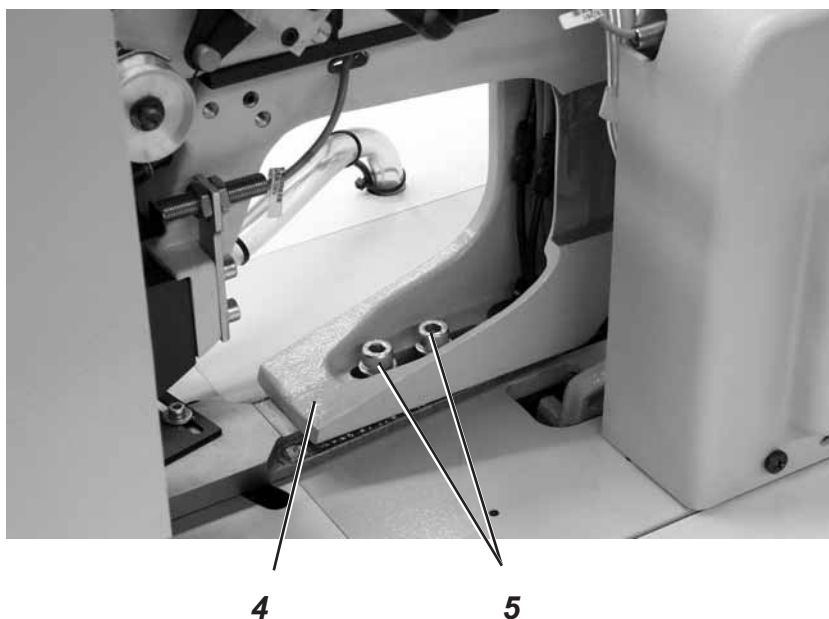
The clamps 2 must be symmetrically aligned with the hole 1 in the table plate 3.



### **CAUTION: danger of injury**

Turn off the main switch.  
Clamps may only be aligned with the main switch turned off.

- Operate the pressure regulator to lower the operating pressure to 1 bar.
- Lower the clamps.
- Slightly undo screws 5 on the clamp bracket 4.
- Move the clamp brackets 4 to align clamps 1 and 2 symmetrically with the hole in the table plate 3.
- Fully tighten screws 5.
- Raise the clamps.
- Restore the operating pressure to 6 bar again.



## 8. Thread advance

To ensure that the seam is properly started a certain length of upper thread must be advanced.

The advance takes place on completion of the previous seam with the clamps still lowered.

### Operational sequence

- The upper-thread tensioner opens.
- The burner descends.
- The thread advance 1 advances the required length of thread.
- The thread advance 1 moves back to its initial position.
- The upper-thread tensioner closes.
- The thread extractor draws the upper thread into the burn position.
- The thread is burned through.
- A new sewing run may commence.

### Setting

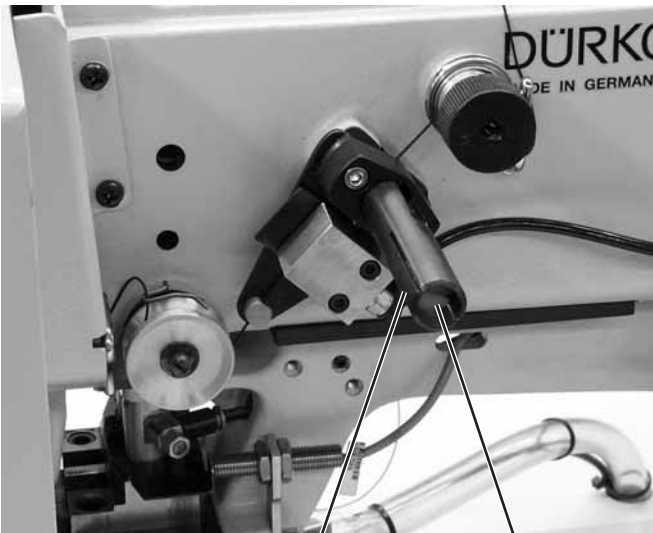
The setting of the thread advance 1 must be such as to ensure that the seam is properly begun. This will depend on the material being sewn.



### CAUTION:

If not enough thread is advanced, it will be under too much tension when it is burned through and the end of the thread will not "fuse".

3



1

2

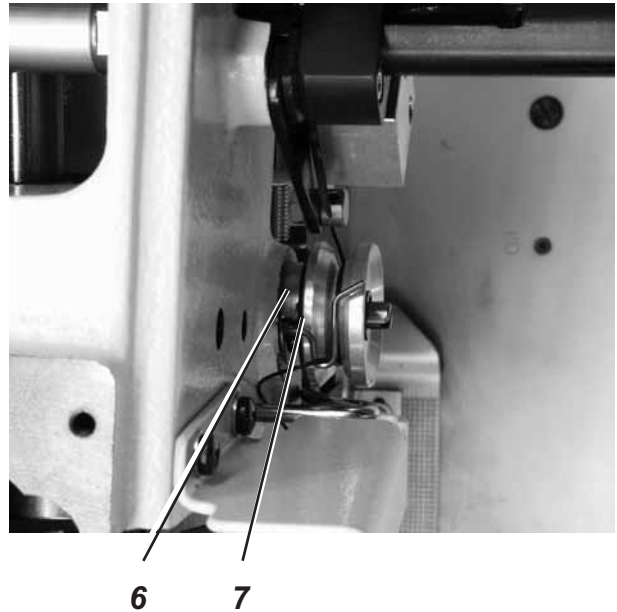
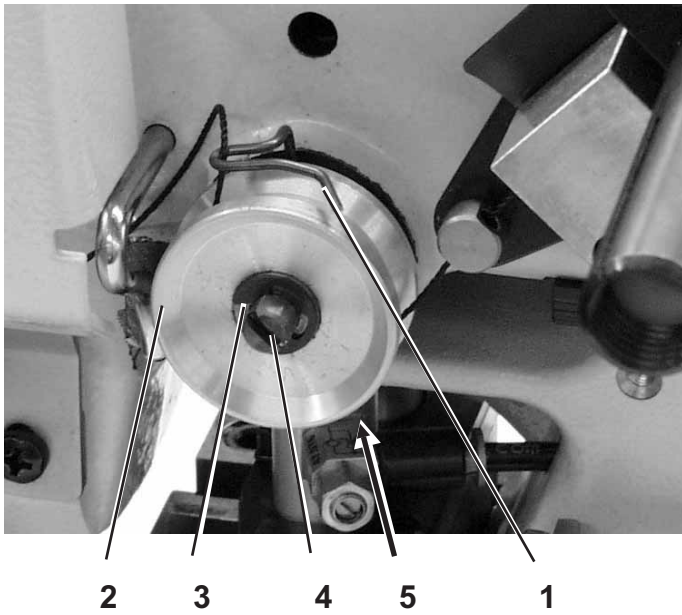


3

### Adjustment:

- Set the length of the thread advance by twisting the stop screw 2. The stop screw 2 limits the stroke of the cylinder 3.

## 9. Thread-tensioning spring



### Spring travel

When the needle penetrates the material the thread-tensioning spring 1 must be in contact with the thread-tensioner support 6. When the eye of the needle enters the material the spring will then be just free of tension.

#### Adjustment:

- Undo locking screw 5.  
This locking screw is located behind the thread-guide roller 2 under the arm.
- Twist the thread-tensioner support 6.
- Fully tighten locking screw 5.

### Spring tension

The spring must keep the advanced thread under tension until the eye of the needle penetrates the material.  
The spring tension necessary for this depends on the material.

#### Adjustment:

- Remove retaining ring 3 and shim.
- Remove thread-guide roller 2.
- Slightly undo screw 4.
- Hold the screw 4 in position with a screwdriver to stop it twisting.
- Set the spring tension by twisting the knurled nut 7:  
clockwise to increase spring tension  
anticlockwise to reduce spring tension.
- Hold the knurled nut 7 in place and fully tighten screw 4.
- Replace thread-guide roller 2.
- Replace shim and retaining ring 3.

## 10. Needle cooling

The needle cooling can be switched from normal to continuous operation.

In normal operation needle cooling is only activated during sewing.

The air stream emerging from the nozzle 2 must be pointed at the needle and be of adequate power.



1



2

3

Adjustment:

- Slightly undo locking screw.
- Point the nozzle 2 at the needle.



### CAUTION:

Under no circumstances may the air stream emerging from the nozzle 2 interfere with the burner.

- Tighten locking screw.
- Adjust the strength of the air stream with the setting screw 1 of the throttle valve.

## 11. Thread-burning device

The electrical thread-burning device severs the upper and lower threads by burning them through.

The end of the upper thread is fused.

The resulting small hardenings prevent the seam from working loose.

To ensure that the thread ends fuse properly it is essential to use only **synthetic** threads.

The length of the burned-off lower thread on the material is equal to the thickness of the needle plate at about 3.5 mm.

### 11.1 Thread extractor

The thread extractor 3 draws the thread advanced by the thread advance into the correct position for the severing process.

#### Swivelling movement

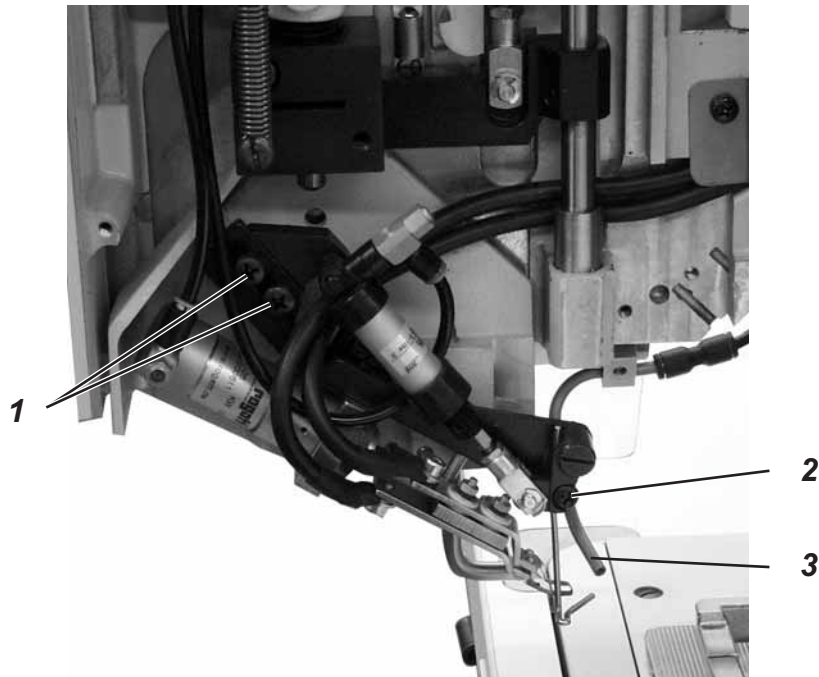
The thread extractor 3 draw forward as much thread as possible.

However, the amount of thread drawn forward must not be so great that it is not under tension.



#### CAUTION:

Excessive tension causes the thread to fray when it is severed and prevents the thread ends from fusing.



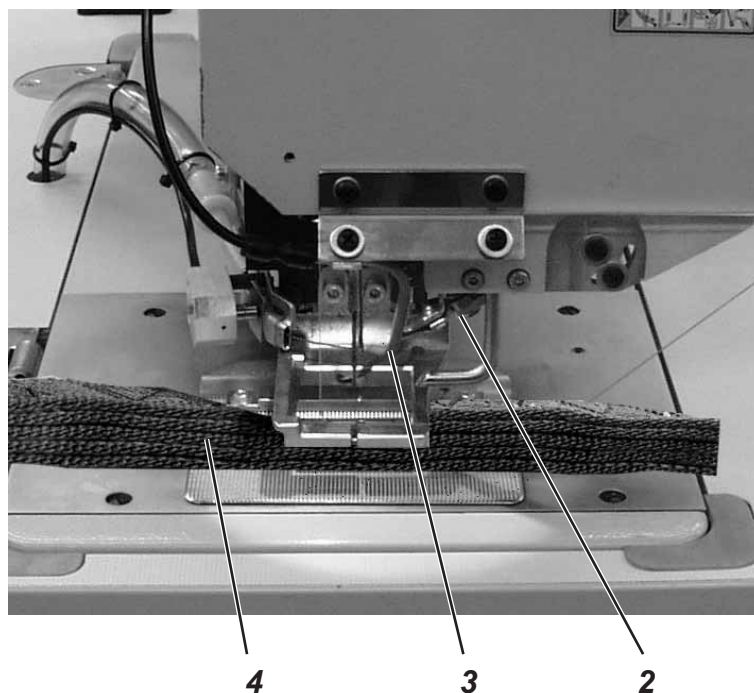
Open the head cover.

All control functions are blocked.

- Undo nuts 1.
- Adjust the swivelling movement of the thread extractor 3 by moving the cylinder suspension up or down.
- Fully tighten nuts 1.

### Thread-extractor height

With the thread lever in its highest position the thread extractor 3 should pass freely under the needle.



- Place material 4 of the maximum permissible thickness ( $t = 16 \text{ mm}$ ) or a shim under the clamps.
- Lower clamps.
- Turn off the main switch.

3



#### **CAUTION: danger of injury**

Turn off the main switch.

The height of the thread extractor 3 may only be checked with the main switch turned off.

- Manually swivel the thread extractor 3 beneath the needle. The thread extractor 3 must not touch the needle.

Adjustment:

- Undo locking screw 2.
- Adjust height of thread extractor 3.
- Fully tighten locking screw 2.

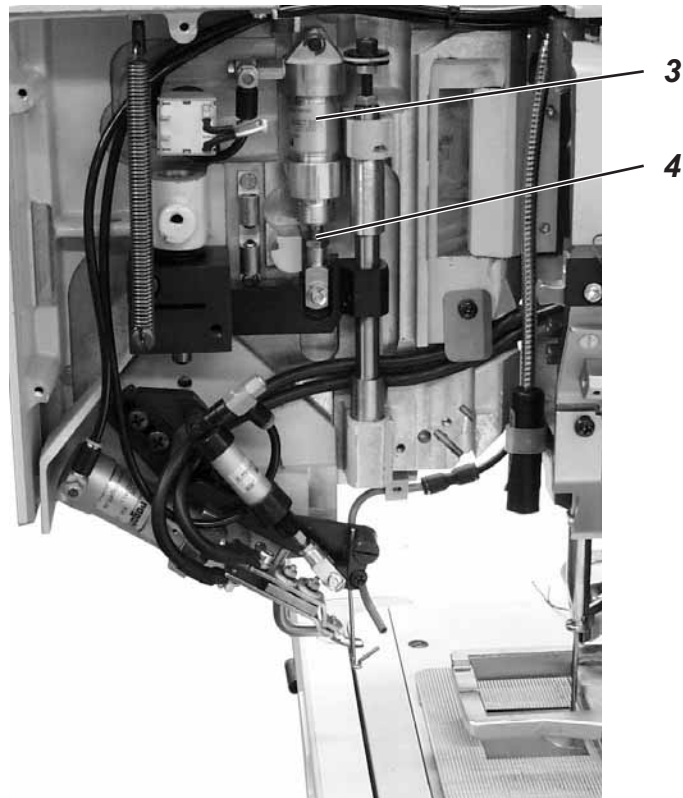
## 11.2 Upper burning device

The correct lateral position of the burner with respect to the thread is automatically set when the burning device is secured.

### 11.2.1 Starting position

The burner is in the starting position when the piston rod 4 of the cylinder 3 is fully retracted.

In this position the thread extractor is located outside the needle-hole area.

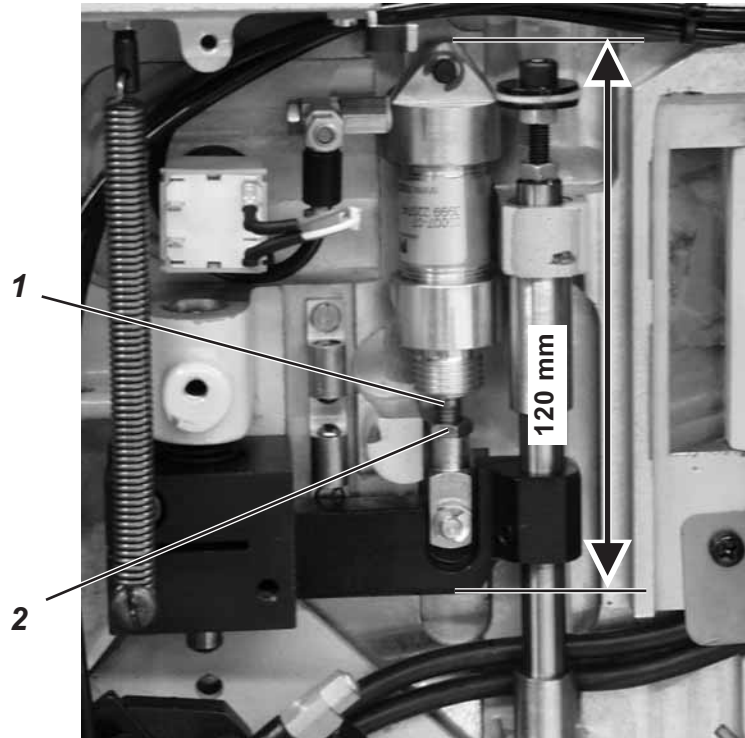


## 11.2.2 Position of fully-extended burner

When the setting is correct:

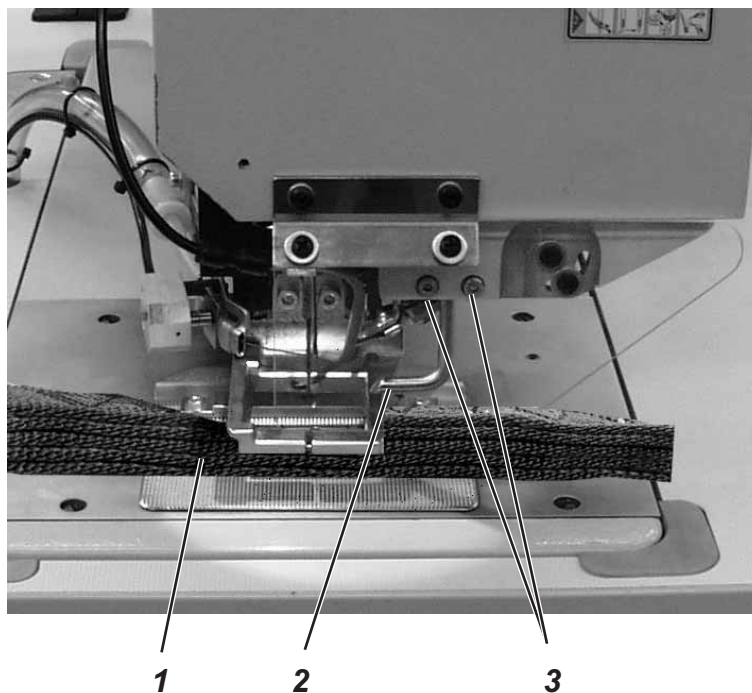
- the fully-extended burner must be at a distance of approx. 1 mm from the clamped material
- the fully-extended burner must be in contact with the thread positioned by the thread extractor and exert slight pressure on it.

Both these requirements are met if the distance between the upper edge of the cylinder suspension and the lower edge of the attachment bracket is 120 mm.



- Open the head cover.  
All control functions are blocked.
- Loosen locknut 2 on piston rod 1.
- Set the distance between the upper edge of the cylinder suspension and the lower edge of the attachment bracket by twisting the piston rod 1.
- Tighten locknut 2.

### 11.2.3 Adjusting the burner height-stop



- Place material 1 of the maximum permissible thickness ( $t = 16 \text{ mm}$ ) or a shim under the clamps.
- Lower clamps.
- Turn off the main switch.



#### **CAUTION: danger of injury**

Turn off the main switch.  
The burner height-stop may only be adjusted with the main switch turned off.

- Remove eye-protection guard after undoing the fixing screws. The locking screws 3 are freely accessible.
- Slightly undo locking screws 3.
- Pull the height-stop 2 down until it makes contact with the lowered clamps.
- Fully tighten locking screws 3.
- Replace eye protection.

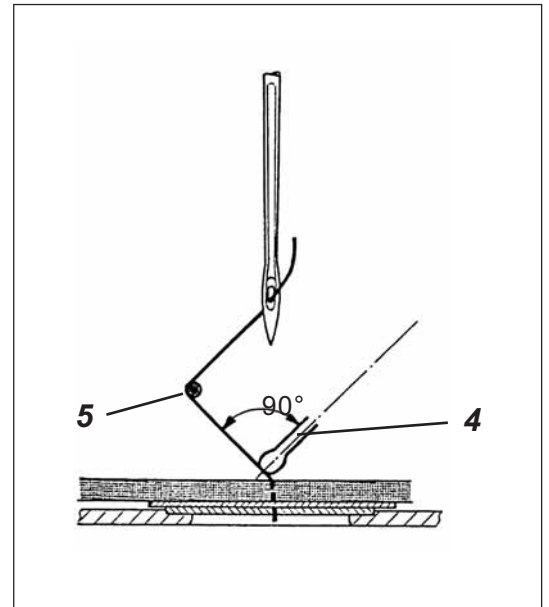
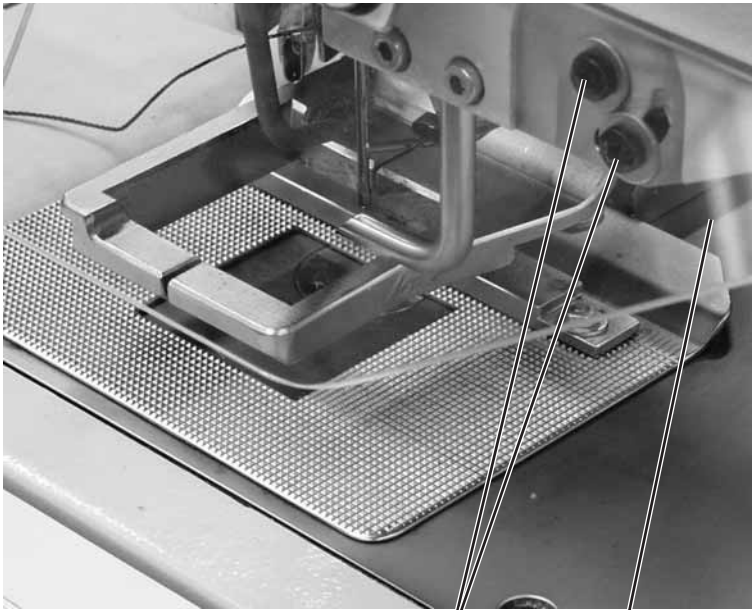


#### **CAUTION: danger of injury**

Replace eye-protection guard after completing adjustment work.

## 11.2.4 Burner angle

The burner 4 must be at an angle of approx. 90° to the thread positioned by the thread extractor 5.



1 6

3



### **CAUTION: danger of injury**

Turn off the main switch.

The burner angle may only be adjusted with the main switch turned off.

- Remove eye-protection guard 6 after undoing the fixing screws. The locking screws 1 are freely accessible.
- Slightly undo locking screws 1.
- Swivel the burner to the correct angle.
- Fully tighten locking screws 1.
- Replace eye-protection guard 6.



### **CAUTION: danger of injury**

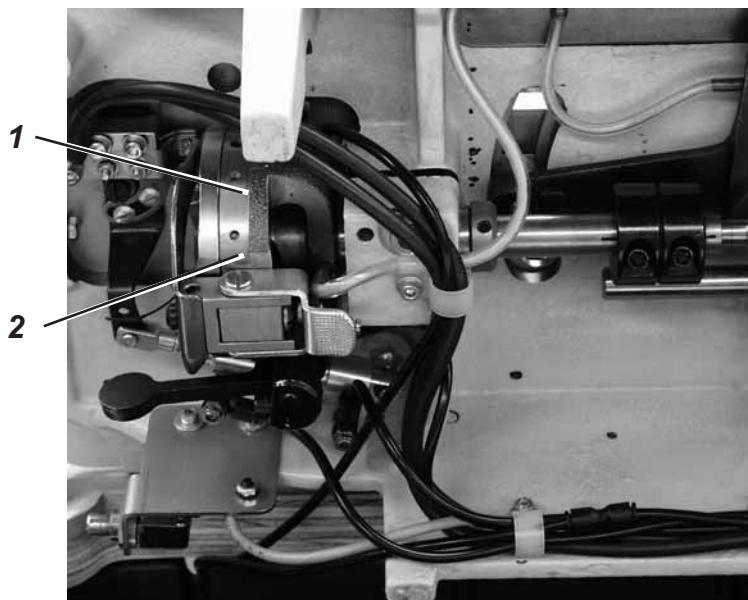
Replace eye-protection guard 6 after completing adjustment work.

## 11.3 Lower burning device

### 11.3.1 Adjustment preconditions

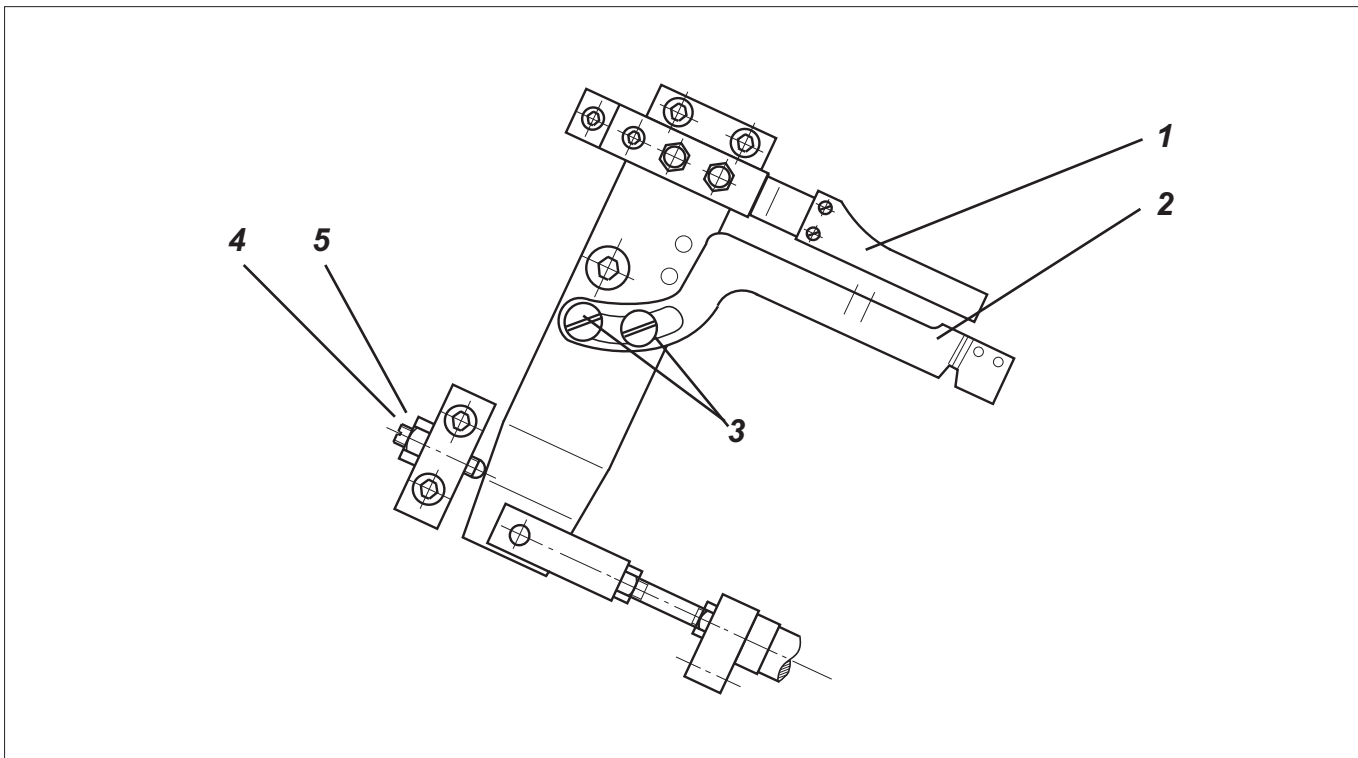
The setting of the lower burning device must be such that:

- the surface 2 on the shuttle-track support 1 must be parallel to the throat plate.



### 11.3.2 Distance between thread extractor and burner

The distance between the thread extractor 2 and the burner 1 must be as small as possible in the front area.



3



**CAUTION: danger of injury**

Turn off the main switch.  
The distance between the thread extractor 2 and the burner 1 may only be adjusted with the main switch turned off.

- Fold the upper part of the machine aside.
- Slightly undo screws 3.
- Set the correct distance by moving the thread extractors 2.
- Fully tighten screws 3.

### 11.3.3 Position of burner when swivelled forwards

The left-hand side of the burner 1 must be on a level with the outer edge of the needle-hole sleeve 6.



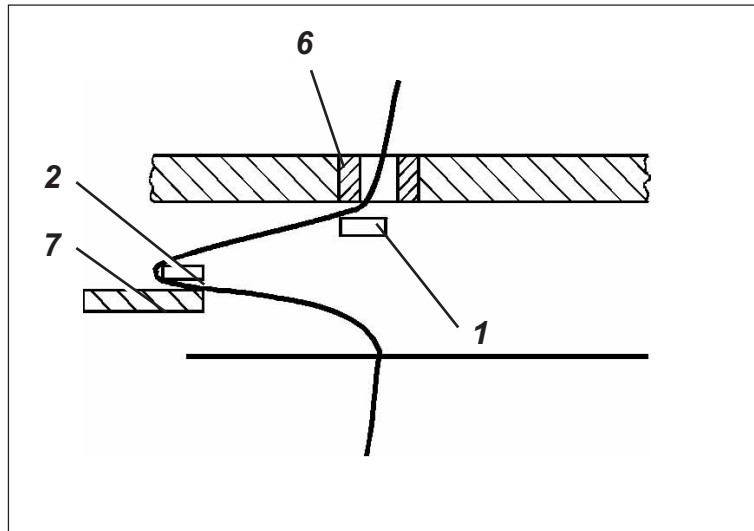
**CAUTION: danger of injury**

Turn off the main switch.  
The position of the burner 1 may only be adjusted with the main switch turned off.

- Undo locknut 5.
- Set the position of the burner by twisting the stop-screw 4.
- Fully tighten locknut 5.

### 11.3.4 Burner height

When swivelled forwards the burner 1 exert slight pressure on the needle-hole sleeve 6.  
In the starting position the burner 1 must not touch any other part.



#### **CAUTION: danger of injury**

Turn off the main switch.  
The height of the burner 1 may only be adjusted with the main switch turned off.

Adjustment:

- Bend the burner 1 as required.

### 11.3.5 Thread-extractor height

The distance between the thread extractor 2 and the thread-guide plate 7 must be as small as possible.

The resulting slanting position of the threads favors the severing process.

However, the lower thread must not be jammed between the thread extractor 2 and the thread-guide plate 7.



#### **CAUTION: danger of injury**

Turn off the main switch.  
The height of the thread extractor 1 may only be adjusted with the main switch turned off.

Adjustment:

- Bend the thread extractor 1 downwards as required.

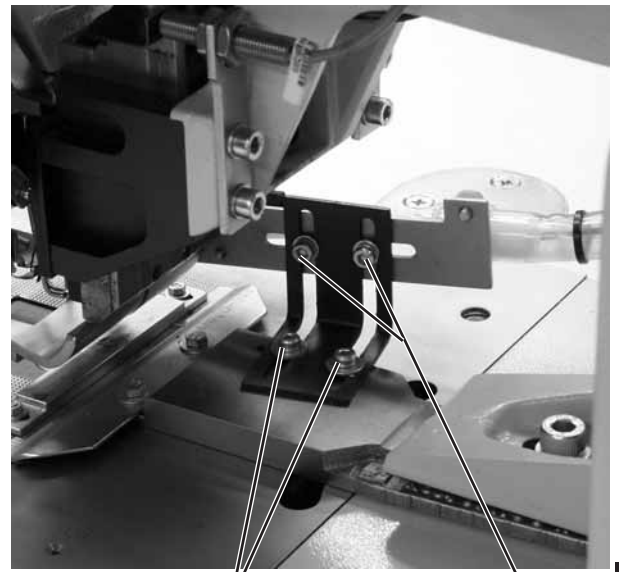
## 12. Thread-suction device

The thread-suction device 1 picks up the needle thread and holds it fast at the beginning of the seam.

This prevents the needle thread from slipping out of the needle when sewing begins.



1



2

3

3



### **CAUTION: danger of injury**

Turn off the main switch.

The position of the thread-suction device may only be adjusted with the main switch turned off.



### **CAUTION: Danger of breakage**

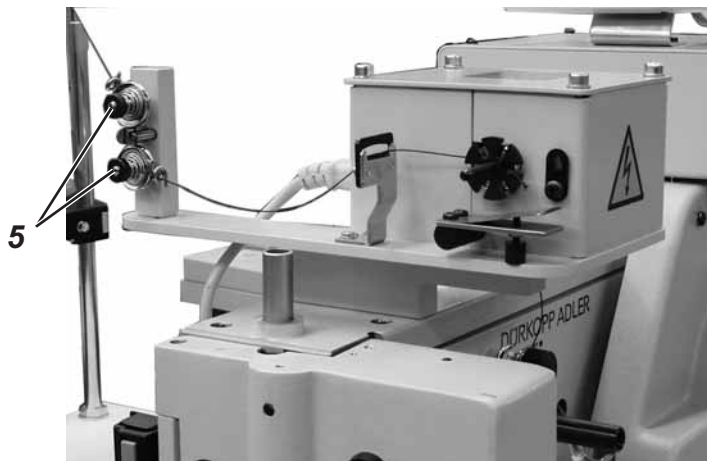
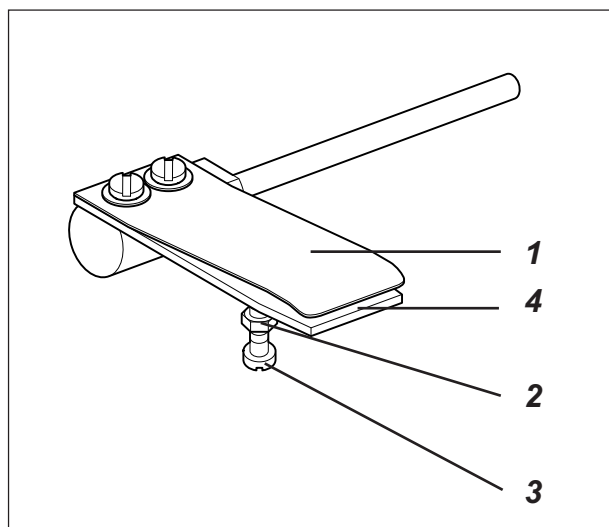
Ensure that the thread-suction device is at the proper distance from the clamp.

- Undo screws 2 and 3.
- Adjust the thread-suction device so that the starting and needle threads are reliably picked up.
- Retighten screws 2 and 3.

## 13. Bobbin-winder adjustment

The setting of the spring 1 of the thread layer 4 must be such that the thread layer switches off when the bobbin is full.

The thread to be wound on should be tightly pre-tensioned. Adjust the two tensioners 5 accordingly.



### **CAUTION: danger of injury**

Turn off the main switch.

The bobbin winder may only be adjusted with the main switch turned off.

Adjustment:

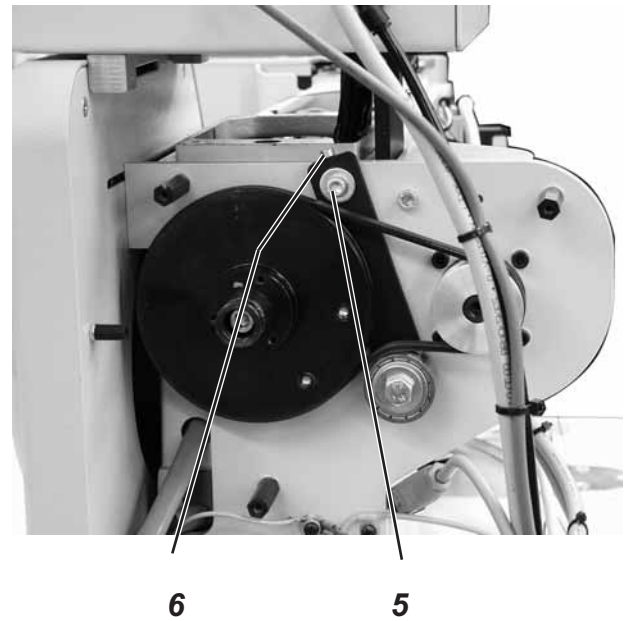
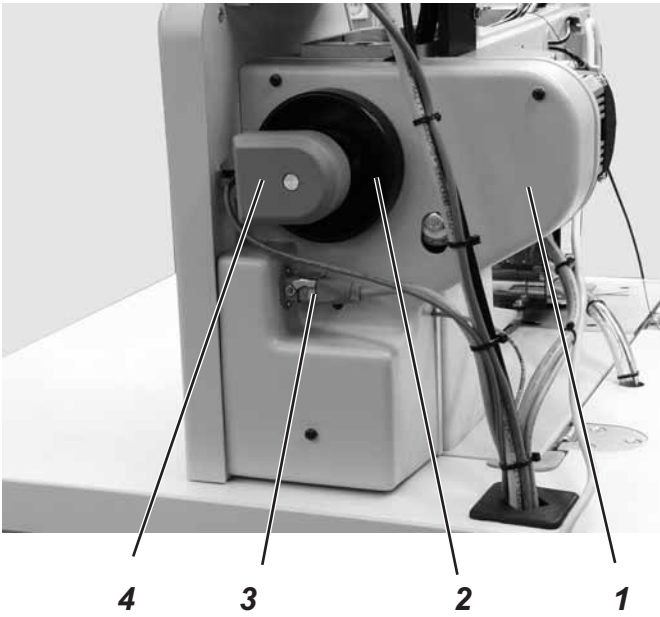
- Undo locknut 2.
- Turn the screw 3 to adjust the spring of the thread layer 4 accordingly.
- Tighten locknut 2.

### **CAUTION:**

The bobbin winder is fitted with a thermal switch.

In the event of overheating the power is interrupted. After cooling-off the winding process is automatically resumed.

## 14. V-belt tension



### **CAUTION: danger of injury**

Turn off the main switch.  
The V-belt tension may only be adjusted with the main switch turned off.

- Remove proximity switch 4.
- Remove handwheel 2.
- Unplug connector 3.
- Remove cover 1.
- Loosen screw 5 slightly.
- Stretch the belt via screw 6.
- Tighten screw 5 again.
- Fit the cover, connector, handwheel, proximity switch again.

