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1. Product Description

1.1 Short Description

The 971 is a rotary unit for the sewing of e.g. flaps, strips and waistband extensions as well as for the runstitching of cuffs.

The rotation concept makes possible an overlapping work method and thus leads to high quantity outputs. Through an optimal work place design, short reach distances and a high operational comfort are achieved.

The 971 has work stations for feeding the material, for sewing, for trimming the protruding cloth ends and for stacking the finished pieces when sewn. They are feed via a turntable on which are mounted the individual material holders. Depending on the sub-class partitions with 4, 6 or 8 material holders are available. When sewing cuffs the size can be adjusted. The speed of rotation is continuously adjustable and can be adjusted to meet the appropriate requirements.

Through a special tape roll holder cuffs whose face fabric has previously been basted to a feed tape by a cuff basting unit and then wound onto a tape roll can be runstitched.

The double chain stitch sewing head of the 971 is equipped with a needle and hook thread monitor which automatically stops the sewing unit by thread breakage or the end of the yarn.

Parallel trimming and the cutting of the warp is conducted at the trimming head. With appropriate parts sets the trimming clearance can be changed.

For drawing off the trimming residue suction units with single or two sided suction are available. The appropriate air compressor can be supplied in versions with different voltages.

1.2 Description of the Proper Use and the Proper Application

The 971 is a sewing unit designed for use in sewing from very light to medium weight material. Such material is, as a rule, material composed of textile fibers. This sewing material is used in the garment industry.

In general, only dry material may be worked on this sewing unit. The material may not be thicker than 3 mm when it is pressed together by the closed material holder. The material may contain no hard elements because the sewing and trimming heads must otherwise be operated only with eye protection. Such an eye protection is, however, not available at this time.

The seam is generally made with sewing yarns of textile fibers in the size 80/2 Nm (synthetic) or 140/3 Nm (covering twist). Those wishing to use other threads must first calulate the dangers arising from this and take appropriate safety measures.

This sewing unit may only be installed and operated in dry and well cared-for areas. If the sewing unit is used in other areas, which are not dry and well cared-for, comprehensive, to be agreed upon, steps may become necessary (see EN 60204-3-1:1990).

We as a manufacturer of industrial sewing machines assume that at least semi-skilled personnel will work on our products, so that it can be presumed all normal operations and, if applicable, their dangers are known and recognized.

1.3 Sub-classes

971-805	Rotary sewing unit for sewing small pieces. Single needle-double chain stitch machine with needle and hook thread monitors, trimming head, trimming clearance dependent on parts set, magnetic roller control for sewing and trimming head, 4, 6 or 8 **non-**adjustable material holders.
971-825	Rotary sewing unit for runstitching of cuffs. Single needle-double chain stitch machine with needle and hook thread monitors, trimming head, trimming clearance dependent on parts set, magnetic roller control for sewing and trimming head, adjustable frame for accepting 6 adjustable material holders.

1.4 Technical Data

Noise level Lc = 83 dB (A)

Workstation related emmission according to DIN 45635-48-B-1
Sewing material: G1 DIN 23328 2x
Measuring point to DIN 4895 Part 1
x = 1000 mm y = -320 mm z = 300 mm

Nominal voltage

The final number of the sub-class designation represents the nominal voltage of the Sewing unit.

971-805/1	for 3 x 380 - 415 V+N 50Hz
971-805/2	for 3 x 220 - 240 V 50 Hz
971-805/3	for 3 x 220 - 240 V 60 Hz
971-825/1	for 3 x 380 - 415 V+N 50Hz
971-825/2	for 3 x 220 - 240 V 50 Hz
971-825/3	for 3 x 220 - 240 V 60 Hz

Sewing / trimming drive

AM 63 FX2

Turntable drive

AM 63 KY 4Q4

Motor protection switch

Setting by	3 x 220V = 4,8 A 3 x 230V = 4,8 A 3 x 240V = 5,0 A 3 x 380V = 2,5 A 3 x 400V = 2,5 A 3 x 415V = 2,7 A

Sewing head

Needle system:	971-B/1cf
Maximum number of stitches:	2800 rpm
Maximum stitch length:	2 mm
Maximum thread thickness:	
Synthetic:	80/2 Nm
Covering twist:	140/3 Nm

Trimming head

Trim clearance: 3.5 mm, 4.5 mm, 5.5 mm dependent on parts set

Compressed air

Operating pressure:	5 +/- 0,5 bar
Line pressure:	7-10 bar
Air comsumption per work cycle:	90-100 l/min

Dimensions / Weights

Space requirement:	2,0 x 2,0 m
Weight net / gross:	423/555 kg

1.5 Optional Equipment (depending on type of application)

Optional Equipment for Class 971-805

550 447529	AS2, suction unit with 2 collecting boxes, refuse container, filter, hose and connector piece
999 260032	Compressor 200 (380V/ 50HZ)
999 260033	Compressor 200 (220V/ 60HZ)
999 260034	Compressor 200 (440V/ 50HZ)
971 427604	Stacker ST5, Size of the stacking compartment: 300 x 165 mm

Optional Equipment for Material Holder 971-805

971 414220	Guide curve supplement for felling a corner
971 417543	Guide curve supplement for trimming a corner
971 417513	Fullness bar for material holder with interchangeable clamp set

Optional Equipment for Class 971-825

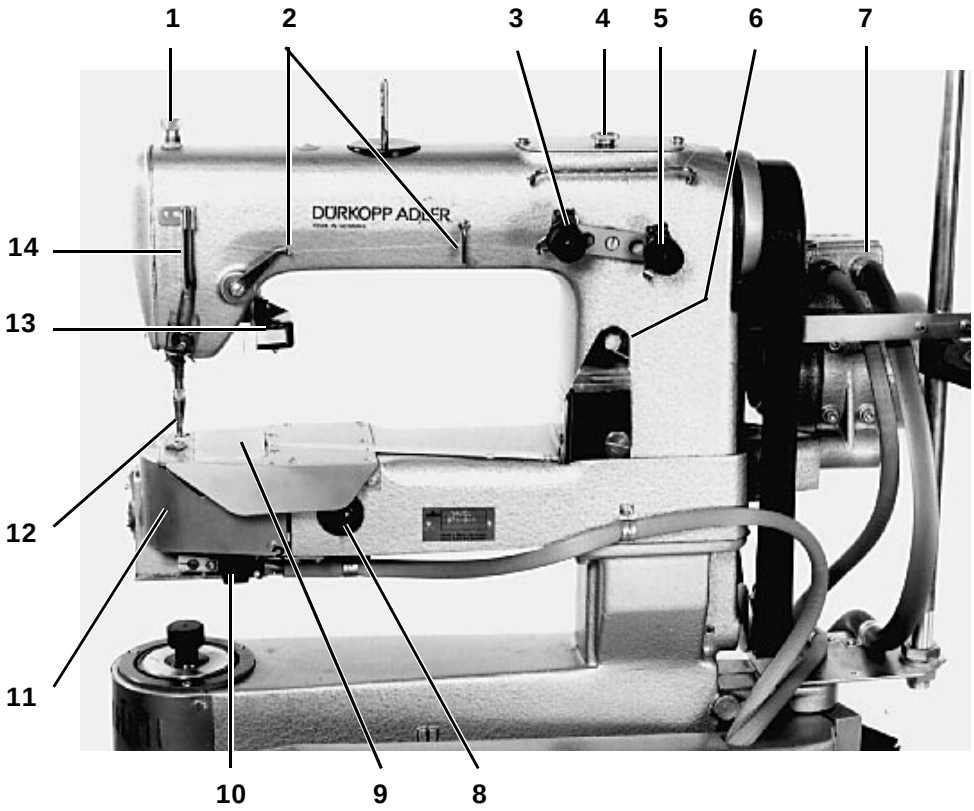
971 458104	Depth stop for cuff material holder
971 407599	Warp catcher set
971 407593	Activation lever for warp catcher
550 447529	AS2, suction unit with 2 collecting boxes, refuse container, filter, hose and connector piece
999 260032	Compressor 200 (380V/ 50HZ)
999 260033	Compressor 200 (220V/ 60HZ)
999 260034	Compressor 200 (440V/ 50HZ)
971 427604	Stacker ST5, size of the stacking compartment: 300 x 165 mm
971 407604	Tape roll holder Roll mounting and pneumatic shears for cutting the feed tape

Optional Equipment for Material Holder 971-825

971 458114	Guide curve supplement for felling a corner
971 458124	Guide curve supplement for trimming a corner

2. Elements and Their Function

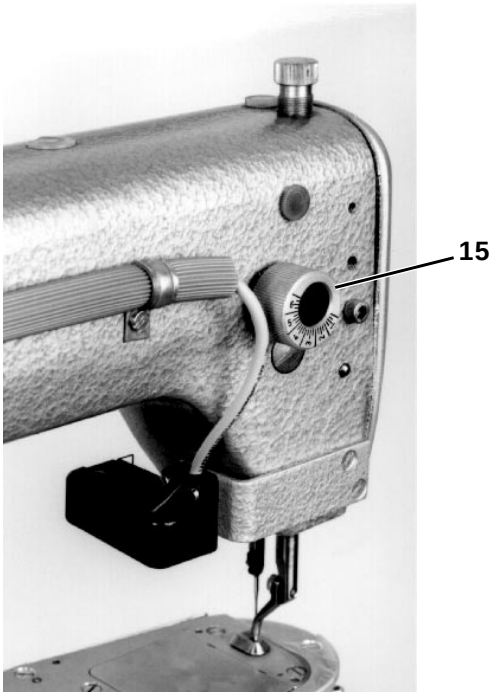
2.1 Elements at the Sewing Head

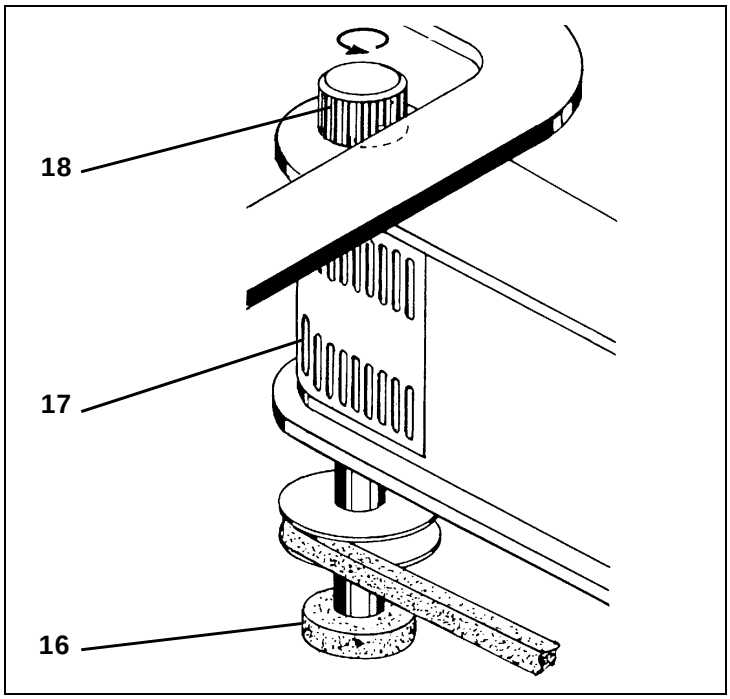


Element		Function	
1 -	Knurled screw	-	Setting of the pressure foot pressure
2 -	Thread guide	-	Guiding the needle thread
3 -	Knob	-	Setting needle thread tension
4 -	Viewing glass	-	Checking the oil feed for the sewing head
5 -	Knob	-	Setting hook thread tension
6 -	Guide plate	-	Thread guide for the hook thread
7 -	Motor	-	Drive motor for the sewing head
8 -	Oil level gauge	-	Indicating the oil level in the oilpan
9 -	Covering plate	-	Cover for the take-up lever. Remove for threading.
10 -	Thread monitor	-	Signals hook thread breakage
11 -	Flap	-	Cover for the hook area. Flip out for threading.
12 -	Needle	-	System 971-B-1

Caution Risk of Injury!
Before threading turn the main switch off.

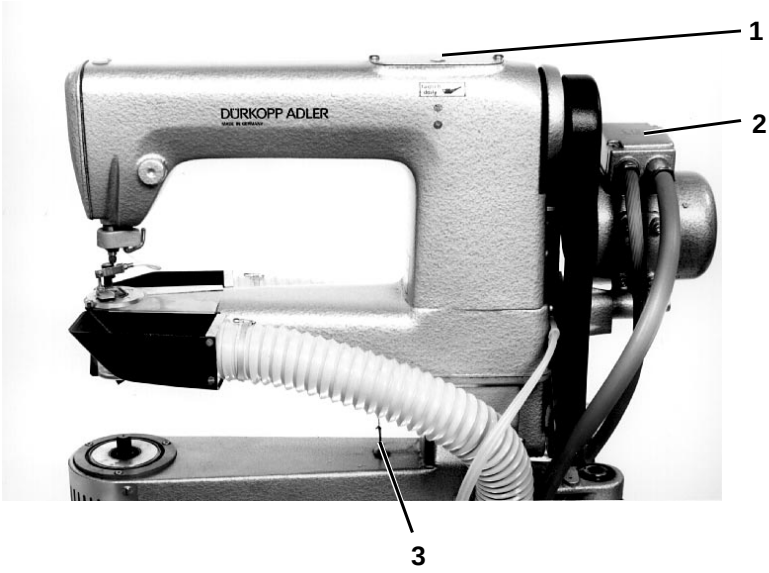
13 -	Thread monitor	-	Signals needle thread breakage
14 -	Thread regulator	-	Setting the correct needle thread quantity

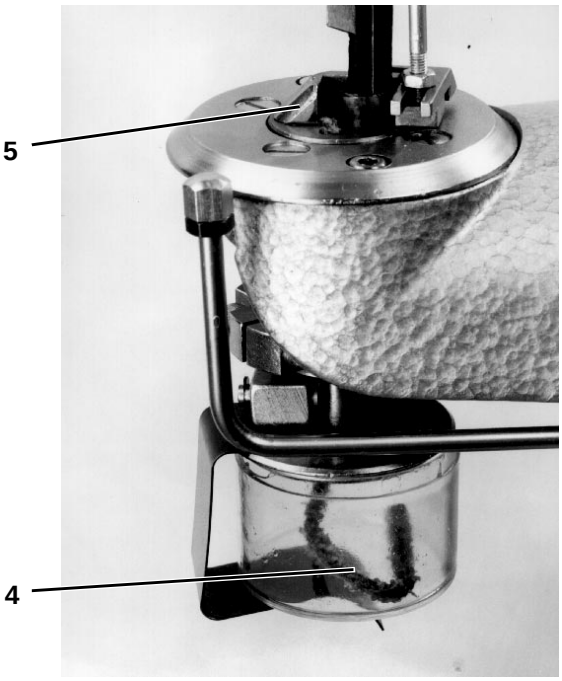




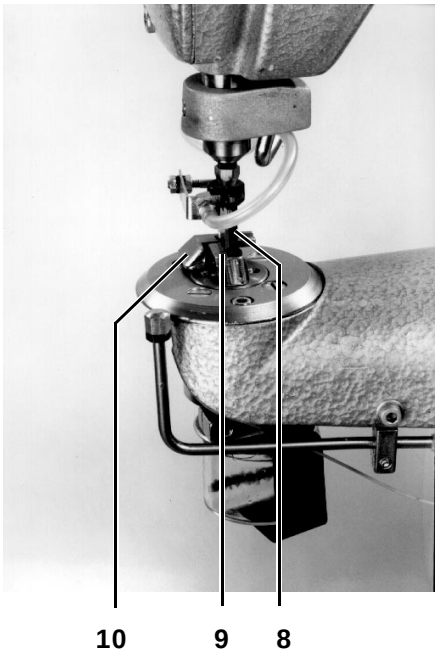
Element		Function
15 -	Knob	- Setting the pressure foot stroke position
16 -	Plastic washer	- Pulling down the magnetic roller to swing out the sewing head
17 -	Magnet	- Creating the magnetic field for the magnetic roller
18 -	Transport roller	- Moving the sewing head along the template of the material holder

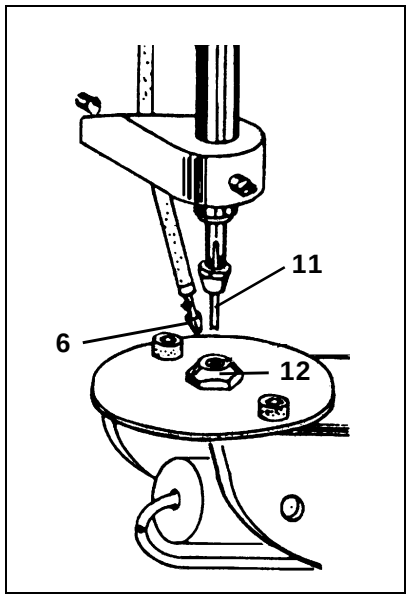
2.2 Elements at the Trimming Head





Elements		Function
1 -	Oil cup	- Lubricate all moving parts in the head
2 -	Motor	- Drive for the trimmer and the magnetic roller
3 -	Weight	- Presses the glide piece 5 of the shearing head sideways against the material support, so that the knives always lie parallel to the course of the seam.
4 -	Oil reservoir	- Supplies the upper knife support and the rotating body with oil. The reservoir must always be filled with oil. As necessary fill with "Esso SP-NK 10"-type oil.





Elements		Function
6 -	Blower pipe	- Blowing the material in the cutting position
7 -	Blower pipe	- Blowing the warp in the cutting position

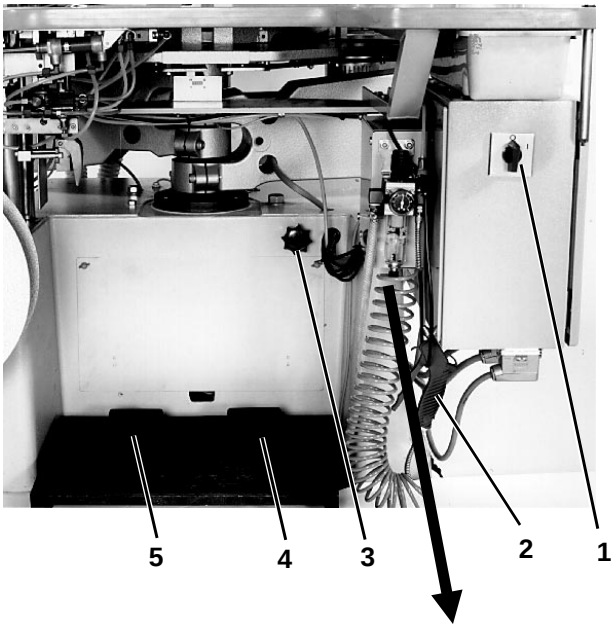
2.2.1 Elements at the Trimmer with Upper and Lower Knife

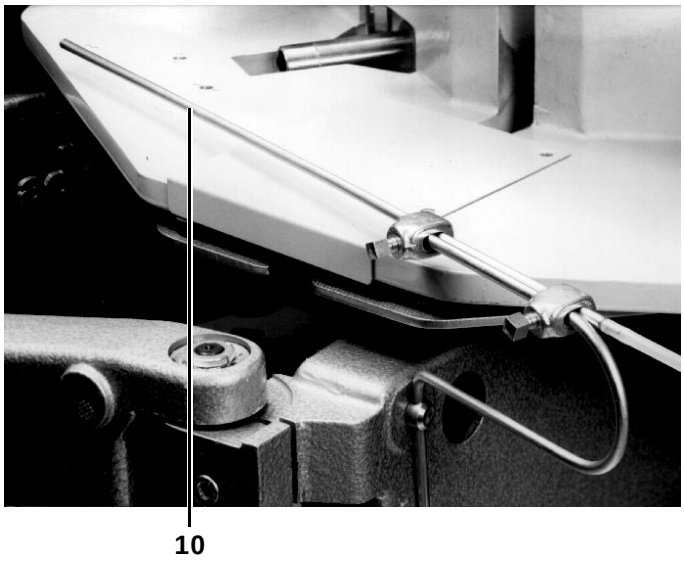
8/9 -	Upper and lower knife	- Trimming the material at the desired distance to the course of the seam
10 -	Glide piece	- Presses the shearing head sideways against the material support so that the knives always lie parallel to the course of the seam

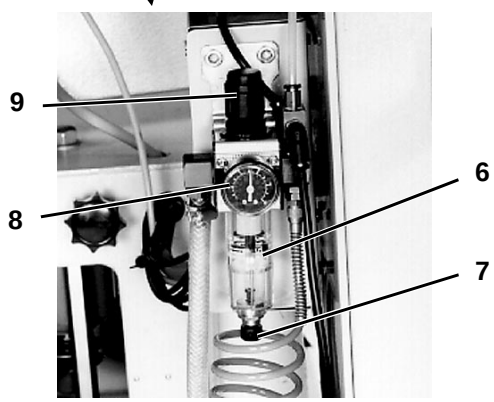
2.2.2 Elements at the Trimmer with Stamp and Template (Gloves)

11/12 -	Stamp and Template	- Trimming the material at the desired distance to the course of the seam

2.3 Elements on the Frame

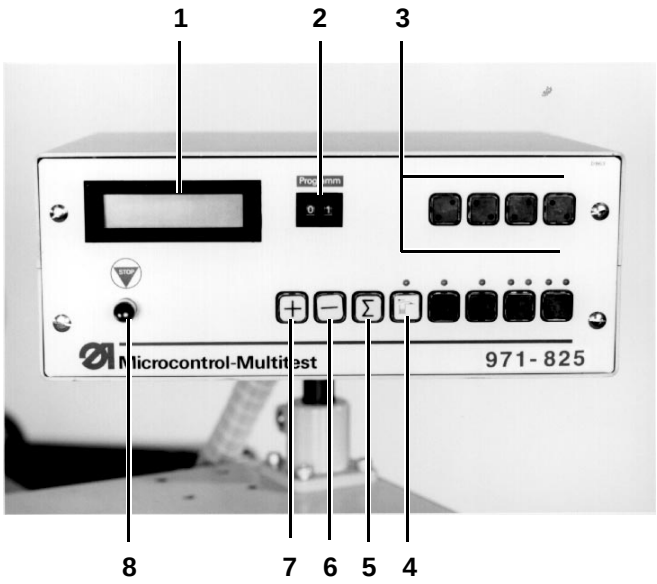


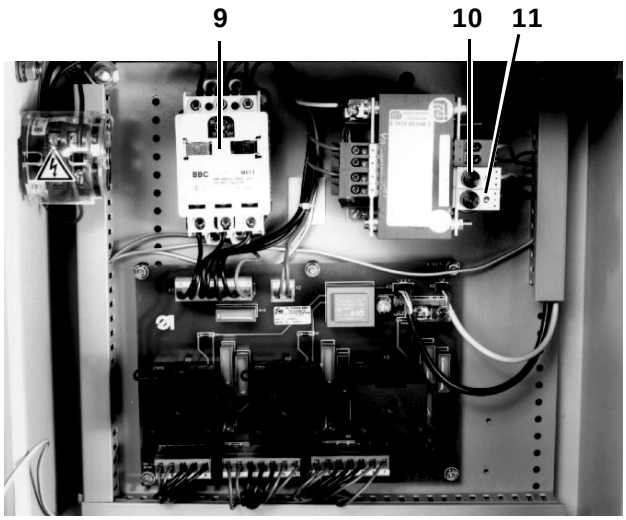




Elements		Function	
1 -	Main switch	-	Turning the sewing unit on and off
2 -	Air gun	-	Removing accumulations of lint from the sewing head, trimming head and turntable
3-	Knob	-	Setting the speed of the turntable
4 -	Foot switch	-	Switching automatic operation on and off
5 -	Foot switch	-	Opening the material clamp for intermediate airing, in order to align the material more precisely
Maintenance Unit			
6 -	Air filter and water separator	-	Before the water level reaches the filter, turn the screw 7 in far enough to drain water. The compressed air supply should ***not*** be interrupted.
8 -	Pressure regulator with pressure gauge	-	To set at 5 bar pull the sleeve 9 up and turn appropriately
10 -	Blower pipe	-	Blowing cloth waste from the turntable

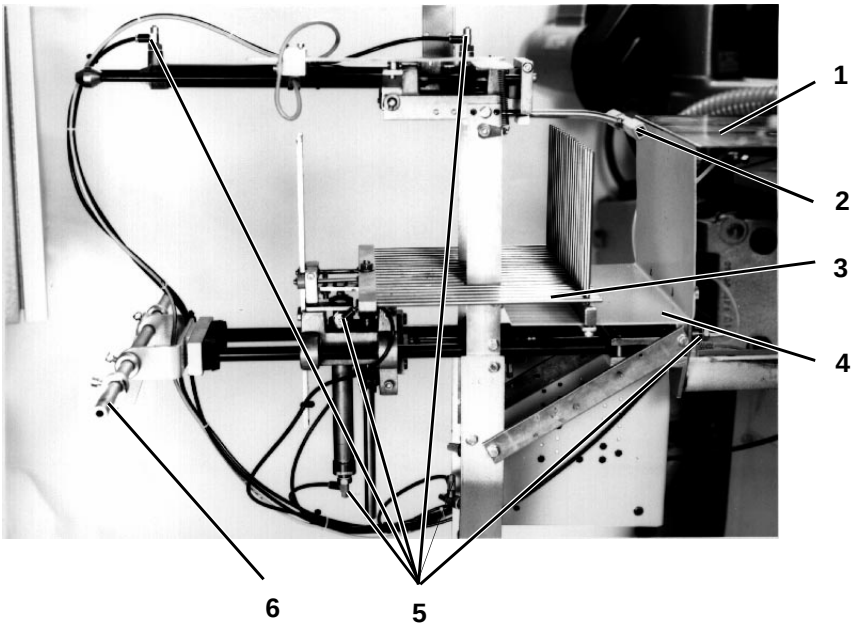
2.4 Elements at the Controls/ Control Panel

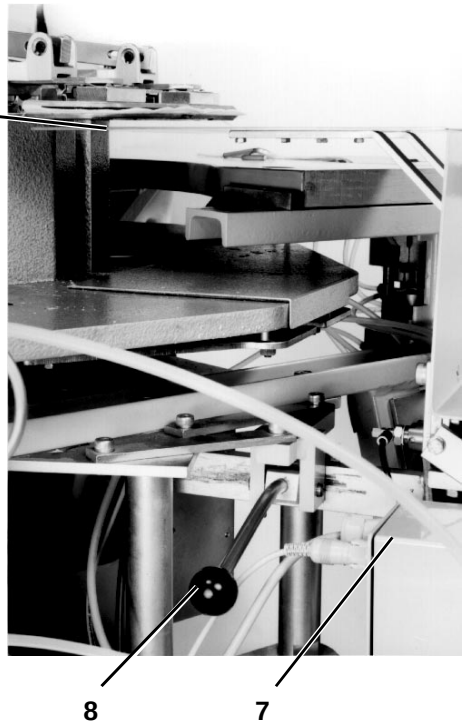




Element		Function	
Controls			
1 -	Display	-	Displaying the program number, piece count, error messages
2 -	Switch	-	Selecting the desired program
3 -	Keys	-	Keys without function
4 -	Key	-	Testing the stacker
5 -	Key	-	Setting the piece counter
6 -	Key	-	Setting the piece count "+"
7 -	Key	-	Setting the piece count "-"
8 -	Stop key	-	Interrupting the function sequence, activating the selected program with the main switch turned on
Control Panel			
9 -	Motor protection switch	-	By overload or short circuit, turns off the whole sewing unit
10 -	Fuse F1	-	By a short circuit in the controls, interrupts the transformer circuit
11 -	Fuse F2	-	By a short circuit in the magnet winding, interrupts the effected circuit

2.5 Elements on the Stacker

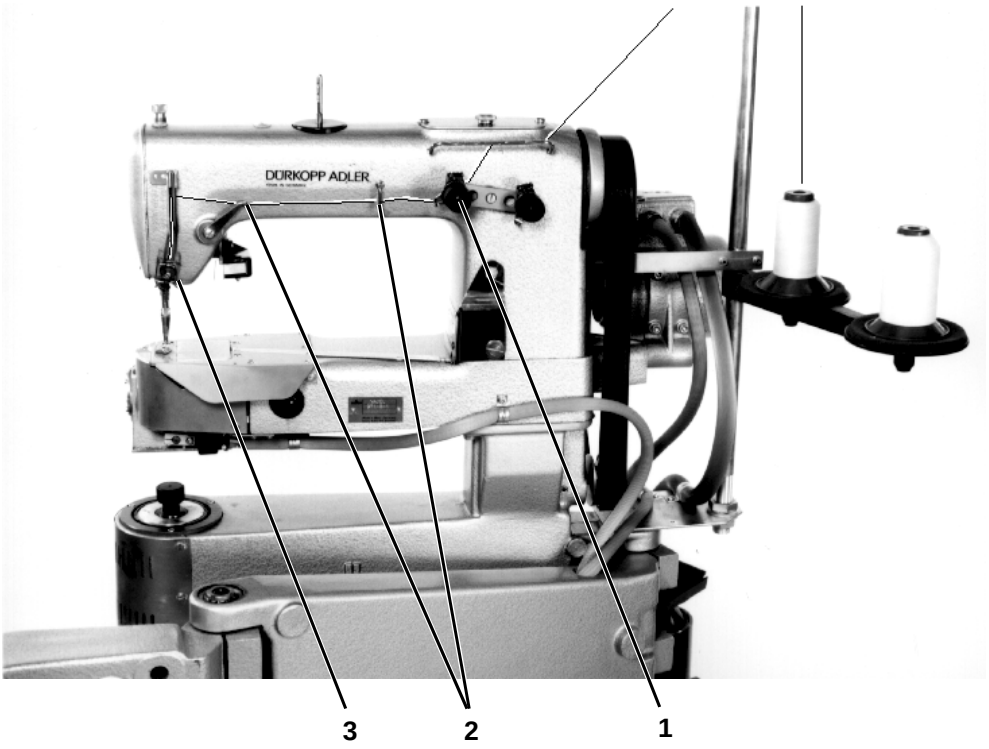




Element		Function	
1 -	Plate	-	Connecting plate between the material holder and the catcher of the stacker
2 -	Gripper	-	Transporting material from the clamp to the stacker catcher
3 -	Catcher	-	Moving material into the magazine
4 -	Magazine	-	Receiving sewn material
5 - Throttles		-	With the throttles the following speeds can be regulated: (Also see the Pneumatic Plan)
S1		-	Catcher rise
S3		-	Gripper rise
S4		-	Gripper lowering
S17		-	Catcher forward
S18		-	Gripper forward
S19		-	Catcher to the back
S20		-	Catcher lowering
S21		-	Gripper to the back
6 -	Mounting rail	-	Mounting of the stacker covering hood (removed for the photograph)
7 -	Box	-	Solenoids for the individual valves
8 -	Lever	-	Fastening the stacker to the frame of the sewing unit

3. Operating the Sewing Unit

3.1 Threading Needle Thread



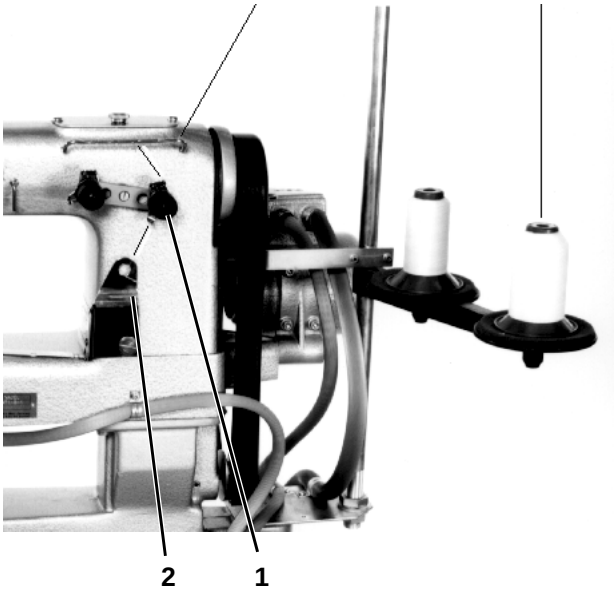
Caution Risk of Injury !

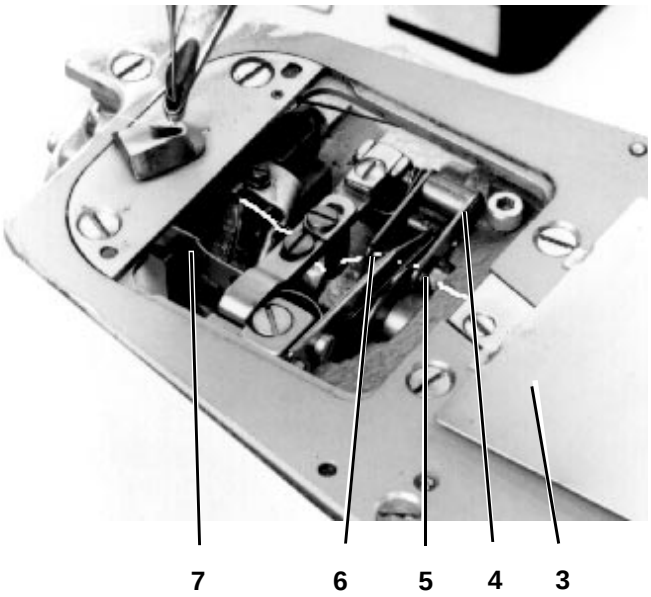
Before threading turn the main switch off.

For threading proceed as follows:

- Place the yarn spool on the yarn stand.
- Alternatingly guide the thread through the guide eyes on the take-off arm,
- feed through the thread tension 1 and thread guides 2,
- through the thread lever,
- through the pre-tension, over the finger of the needle thread monitor, through the eye on the needle rod and through the needle.

3.2 Threading Hook Thread





Caution Risk of Injury!

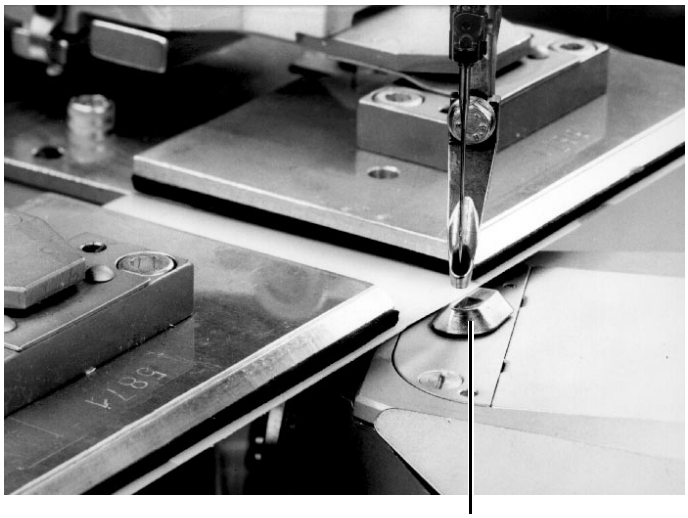
Before threading turn the main switch off.

- Place the yarn spool on the yarn stand.
- Alternatingly guide the thread through the guide eyes of the take-off arm.
- Feed the thread through thread tension 1 and thread guide 2.
- Remove cover plate 3.
- Lift the thread hold-down 4 out of its catch.
  The spring 7 must be pressed to the rear.
- Pull the thread through the holes 5 and 6.
- Lay the thread in front of the wire of the hook thread monitor.
- Pull the thread through the hook holes.
- Close the thread hold-down.
- Insert the cover plate.

3.3 Setting Thread Tensions

The thread tension of the needle thread should be higher than that of the hook thread. Too high thread tensions cause the material to bunch. Too low hook thread tensions can cause missing stitches.

3.4 Remedying Thread Breakage



1

At the sewing head there are two thread monitors, whose switching flags are freed when the needle or hook thread breaks. In this case automatic operation is stopped and the display of the control panel indicates the thread breakage.

Caution Risk of Injury!

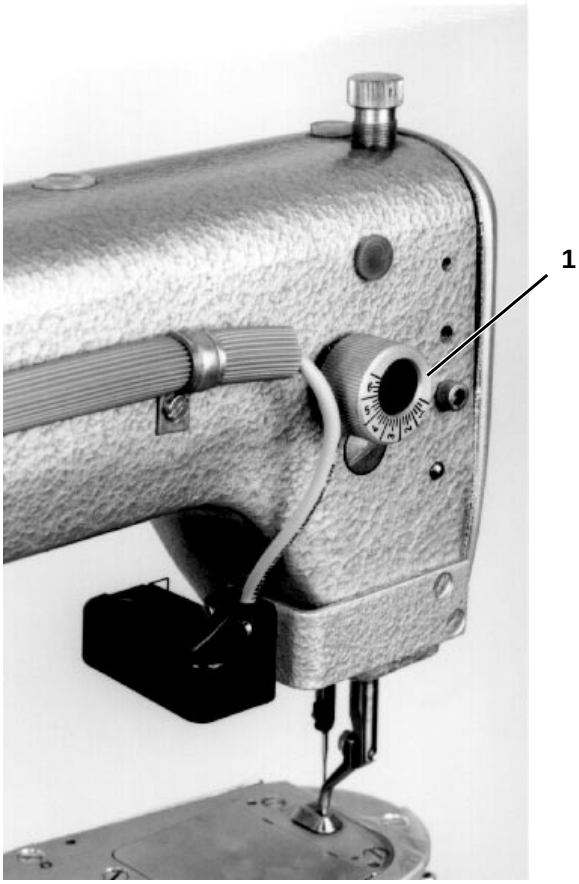
Before threading turn the main switch off.

– Bring the needle rod into the high position by turning the handwheel

By hook thread breakage

– Swing out the sewing head. For this pull the magnetic roller shaft down. (See also subject 3.7.1)
– Thread the thread (See subject 3.2)
– Swing the sewing head in again.
Here take care that the needle hole mushroom 1 is in the position shown in the illustration and that its left side is pressed against the material support.
– Sew 2 - 3 tying stitches
For this first hold the needle and hook threads fast and turn the handwheel accordingly.
– Turn on the machine

3.5 Setting Pressure Foot Height



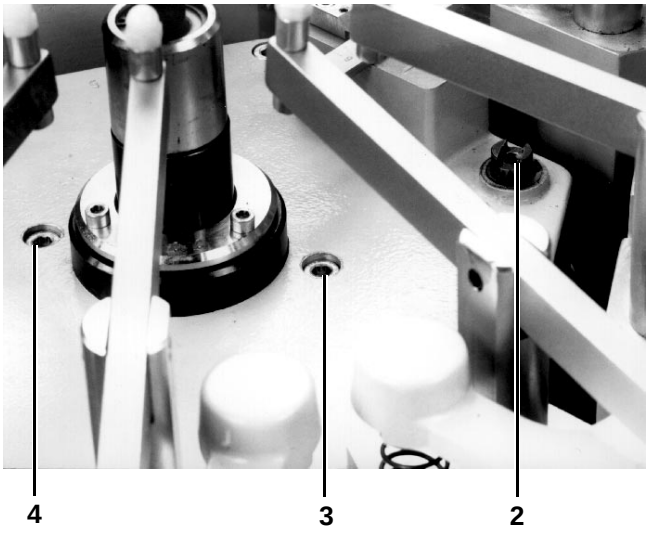
Caution Risk of Injury!

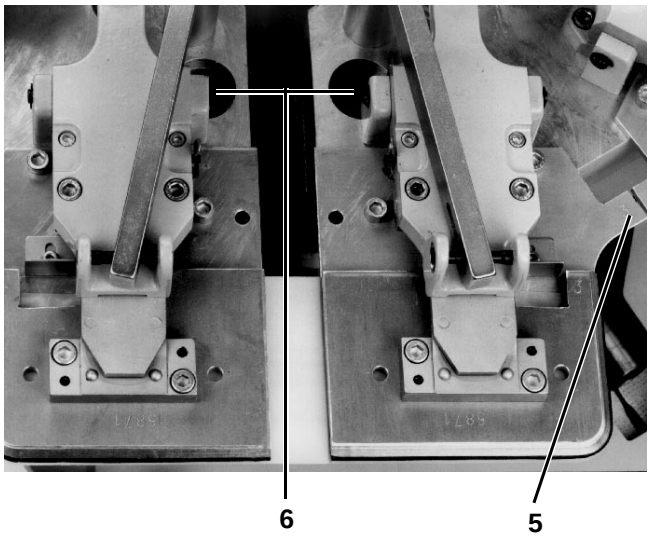
Before setting turn the main switch off.

- Bring the pressure foot into the lowest position with the handwheel
- Turn the dial 1 until the pressure foot lightly touches the material

3.6 Preparing, Starting and Interrupting Automatic Operation

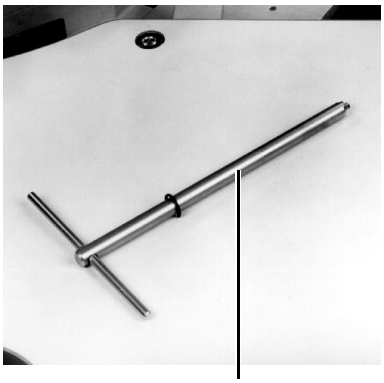
3.6.1 Changing Adjustable Material Holders





Caution Risk of Injury!

Before changing the material holders turn the main switch off.



1. Set the material holder to the largest size.

- With the special wrench 1 loosen the screws 3 and 4
- Turn the adjustment screws 2 accordingly

2. Swing out the sewing and trimming heads

- Pull down the magnetic roller shafts and swing the heads out (See subject 3.7.1 and 3.7.2)

3. Remove the material holder

- Loosen the mounting screws 6 on each holder with the special wrench 1 and remove the material holder

4. Screw "new" material holders onto the turntable

- The numbering 5 (1, 2, 3, 4 etc.) on the holders shows their position on the turntable

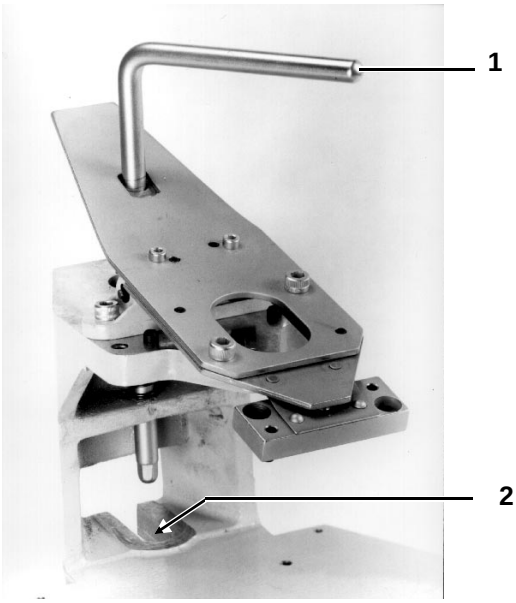
5. Set the desired size

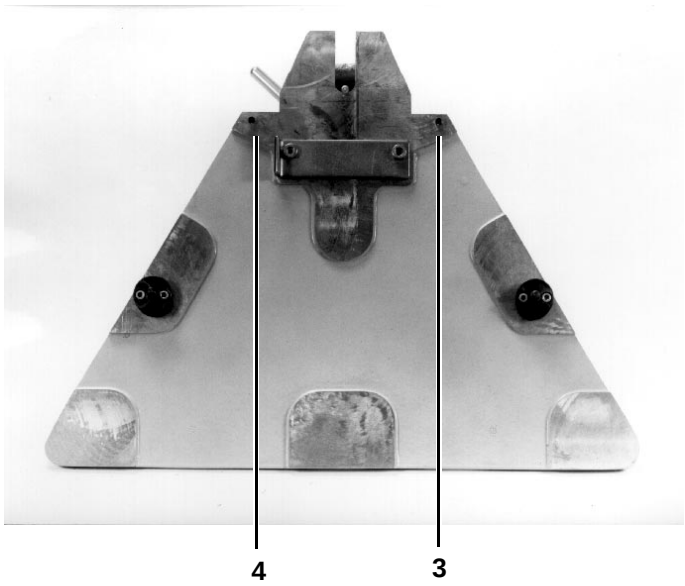
- Turn adjustment screw 2 with the special wrench 1. See also subject 3.6.3

6. Swing the sewing and trimming head in

- See subject 3.7.1 and 3.7.2

3.6.2 Changing Non-adjustable Material Holders





Caution Risk of Injury!

Before changing the material holders turn the main switch off.

1. Swing the sewing and trimming head out

– Pull the magnetic roller shaft down and swing the heads out. (See subject 3.7.1 and 3.7.2)

2. Remove the material holder

– Loosen mounting screw 2 with wrench 1. Remove the material holder

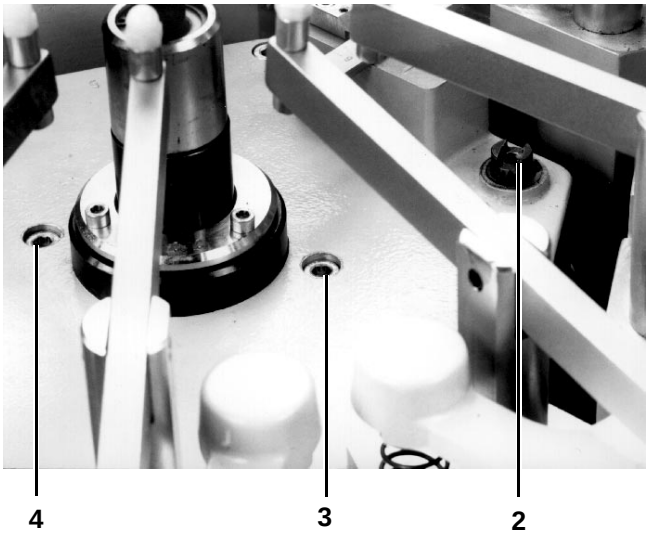
3. Screw the "new" material holders onto the turntable

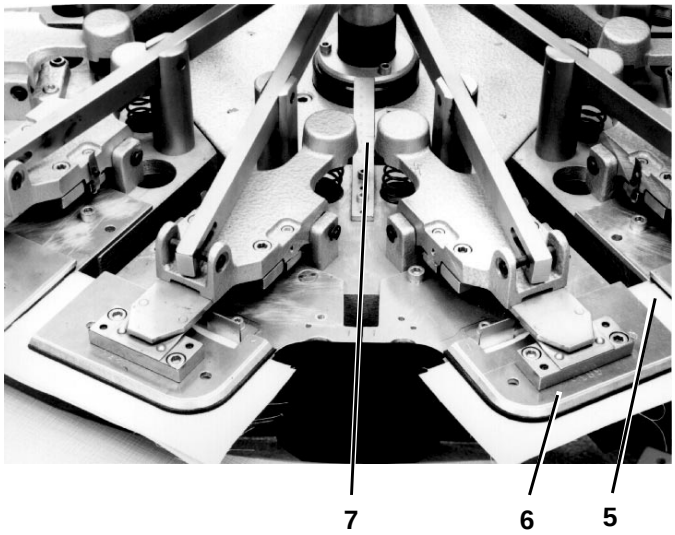
– When inserting take care that the two pins 3 and 4 touch below the holder on the ring of the turntable.
– Turn the leg of the wrench 1 so far toward the inside that a collision with the sewing head is not possible

4. Swing the sewing and trimming head in

– See Chapter 3.7.1 and 3.7.2

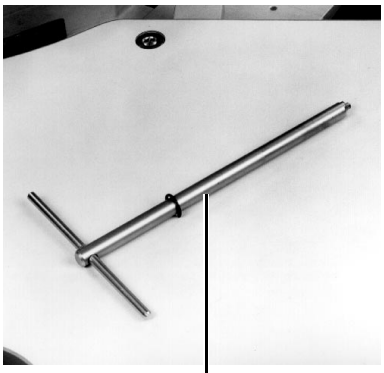
3.6.3 Changing the Size of Adjustable Material Holders





Caution Risk of Injury!

Before setting turn the main switch off.



1. Loosen the fastening

– Loosen screws 3 and 4 with the special wrench 1

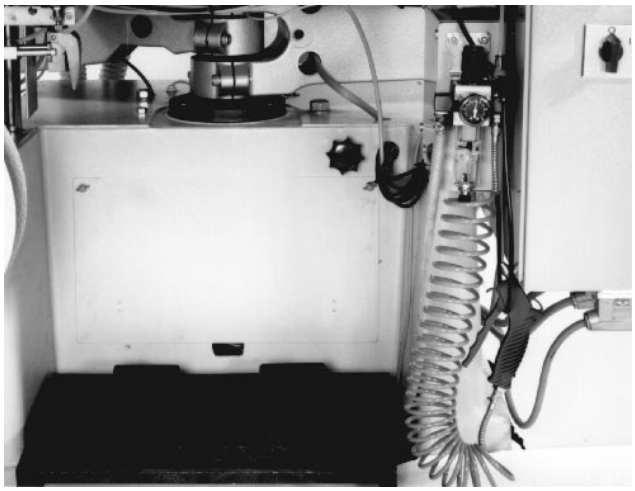
2. Set the size

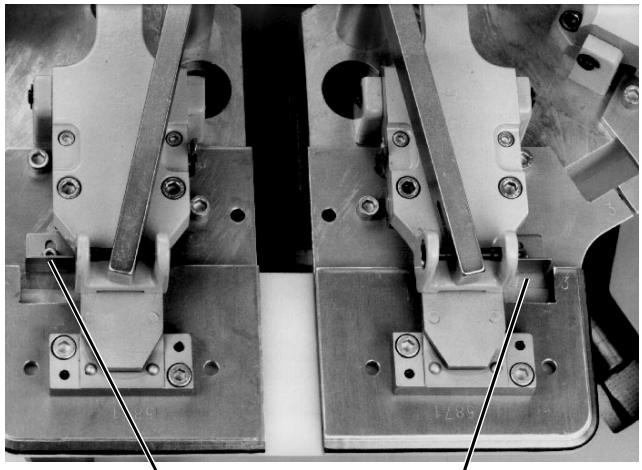
– Appropriately turn the adjustment screw 2 with the special wrench 1.
The set value is shown on the scale 7.
When setting a smaller size, open the left half of the clamp 6 in due time in order to bring the upward arched Delrin 5 back into the required position again.

3. Tighten the fastening

– Tighten screws 3 and 4 with the special wrench

3.6.4 Inserting Material and Starting Automatic Operation





1. Turn the main switch on

2. Set the controls to sewing program 01

3. Operate the stop key to activate the program

4. Insert material

- Operate the left pedal and hold in this position
- Lay the material onto the two rear stops 1 and 2 and align centered to the clamp
- Release the pedal

5. If necessary, "intermediate air" the clamp for more precise alignment of the material

- Operate the left pedal and hold down
- Align the material
- Release the pedal

6. Start automatic operation

- Operate the right foot switch

3.6.5 Extending the Duration of the Opening of the Clamp

The clamp is opened after the table turns and closed again after the stacker sequence is completed. Thus, there is only a limited time available for the feed procedure.

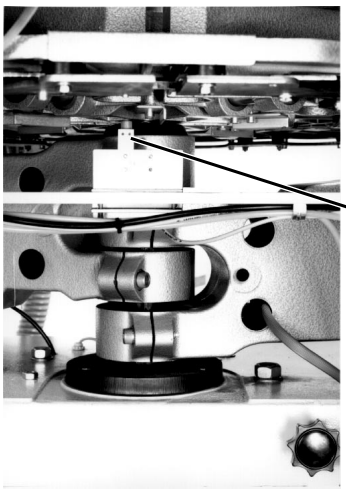
If the period is not sufficient for correct insertion, the duration of the opening of the clamp can be extended by operating the left foot pedal.

If the clamp is opened too long, automatic operation is stopped.

3.6.6 Automatic Operation

Caution Risk of Injury!

During automatic operation do not reach into the area of the turntable or the sewing /trimming heads.



1. Operation of the right foot pedal

- The sewing head is turned on
- The trimming head is turned on
- The turntable is turned on when the trimming head and sewing head have run onto the switch.
  The turntable turns counterclockwise.

2. The turntable operates switch b19 (loading position)

- The turntable is turned off
- The clamp in feed position is opened after a delay.
  The clamp can be fed.

3. The clamp with material is opened

- The gripper 1 runs to the material holder.

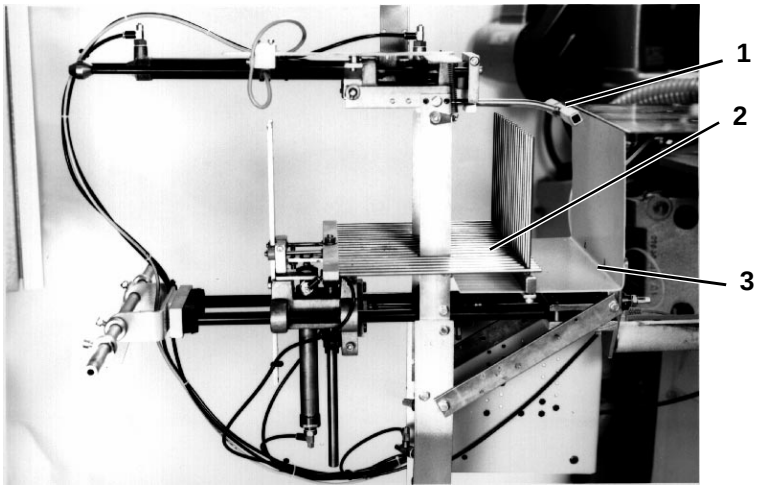
4. Stacking procedure

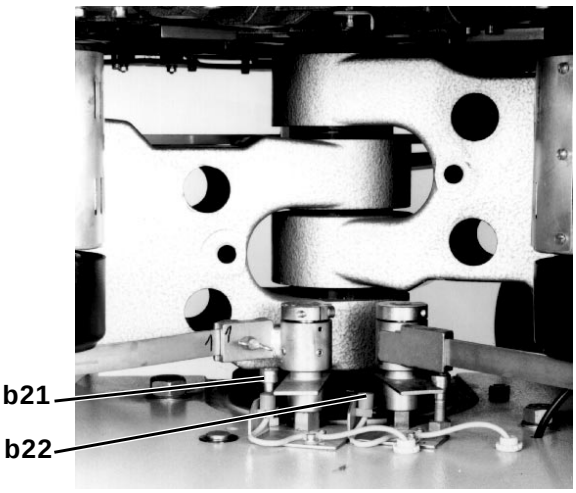
- The gripper 1 pulls the material onto the catcher 2
- The catcher lowers with the material
- The gripper runs up
- The catcher runs to the back. During this movement the material is "stripped off" and thus moved into the magazine 3.
- The catcher runs up and forward into its initial position.

5. Stopping and starting the sewing cycle

The trimming head reaches the initiator b22 and switches the trimmer off.

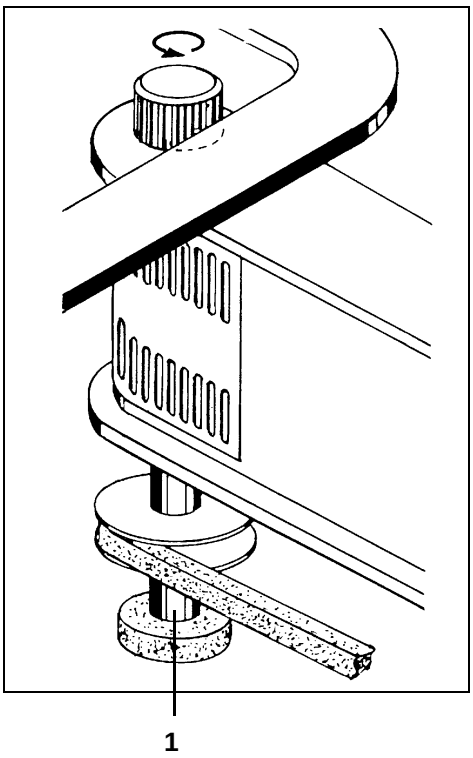
The sewing head reaches the initiator b21 and starts the turntable.

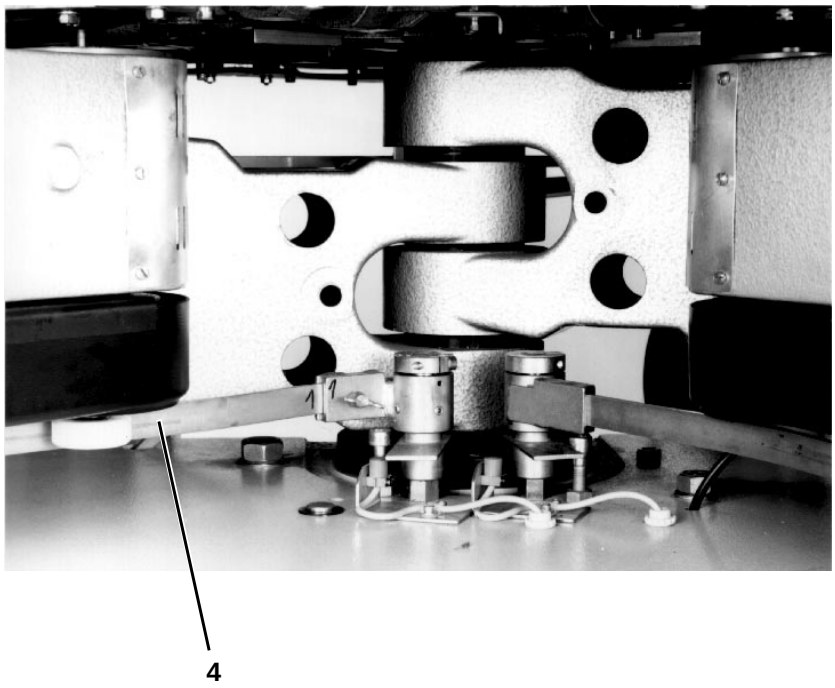




3.7 Diverse Procedures

3.7.1 Slewing the Sewing Head In and Out

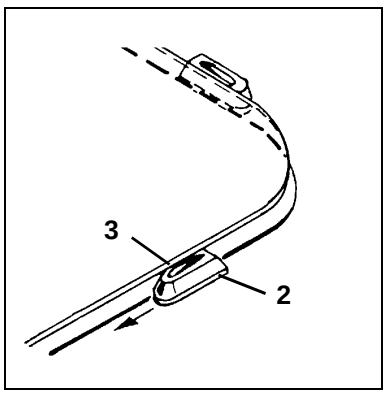




For threading the hook thread, service or maintenance work, the sewing head can be swung out.

Caution Risk of Injury!

Before swinging the sewing head out or in turn the main switch off.



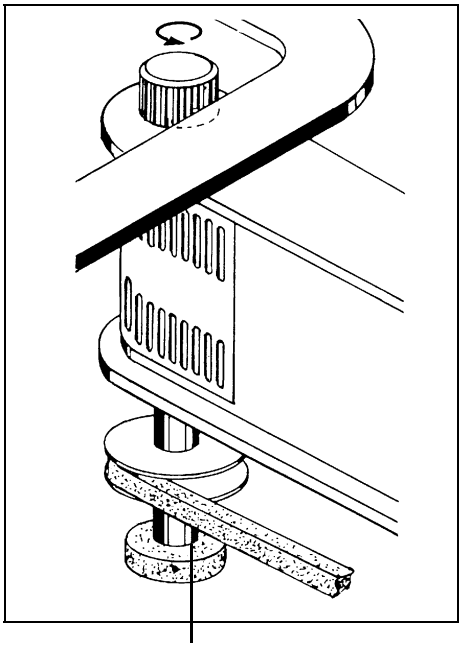
1. Swinging the sewing head out

- Bring the needle into the "high position".
  For this turn the handwheel counter to the run direction until the needle is out of the material.
- Pull the magnetic roller shaft 1 all the way down
- Swing the sewing head out to the side
- Release the magnetic roller shaft.

2. Swinging the sewing head in

- Pull the magnetic roller shaft 1 all the way down
- Turn the needle hole mushroom 2 clockwise against the spring pressure
- Swing the sewing head into the turntable.
  Take care, that
  - the side 3 of the needle hole mushroom 2 lays onto the material support under pressure.
  - the switching flag 4 is behind the magnetic roller
- Press the magnetic roller shaft up.

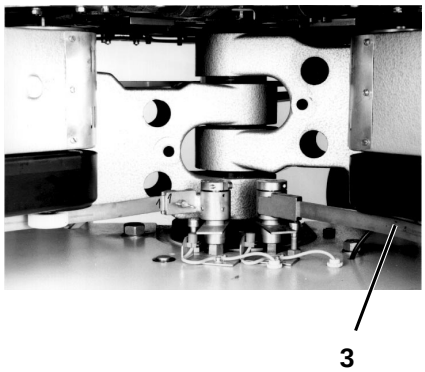
3.7.2 Slewing the Trimming Head In and Out



For service or maintenance work the trimming head can be swung out.

Caution Risk of Injury!

Before slewing the trimming head in or out turn the main switch off.



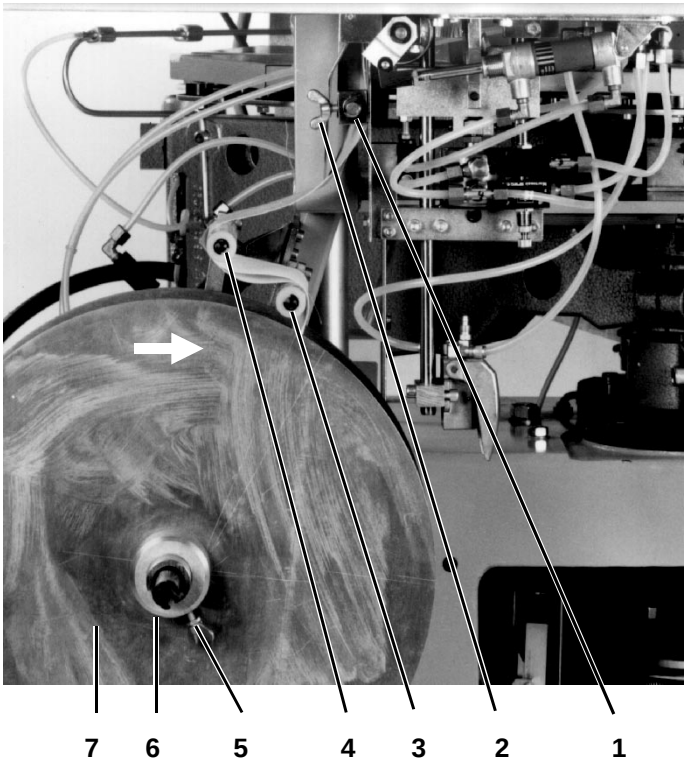
1. Swinging the trimmer out

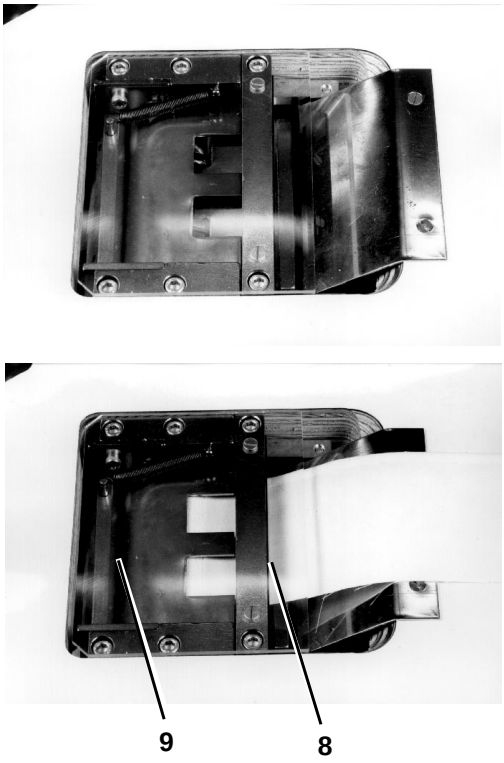
- Pull the magnetic roller shaft 1 all the way down
- Swing the trimmer to the side
- Release the magnetic roller shaft

2. Swinging the trimmer in

- Pull the magnetic roller shaft all the way down
- Turn the guide piece 2 clockwise against the force of the counterweight
- Swing the trimmer into the turntable.
  Take care, that:
  The guide piece 2 must touch the material support under pressure.
  The switching flag 3 must be in front of the magnetic roller.
- Press the magnetic roller shaft 1 up.

3.7.3 Tape Roll Holder. Changing the Feed Tape and Guiding It into the Unit





The tape roll holder of the 971 makes possible the working of sports cuffs whose face cloth was previously basted to a feed tape with a cuff basting unit and then wound onto a roll.

The basted cuffs are pulled off of the roll and separated with a pneumatic scissors 8.

Caution Risk of Injury!

When changing the roll or feeding the tape do not touch key 2. Do not reach into the area of the scissors.

- Loosen screw 5 and pull off block 6.
- Pull off the front tape roll plate 7.
- Push in the catch and pull off the tape roll holder.
- Push on a new roll with take-off device clockwise.
- Push on the tape roll plate and secure with the mounting block.
- Guide the tape to the right around roller 3 and to the left around roller 4.
- Pull the tape through behind the guide 1. With screw 2 set the limiter block to the roll width.
- Push the tape into the device 9.
- Press the lever to the right and push the tape into the tape scissors 8.
- Push the tape so far that it can be pulled out unhindered from the top.

4. Maintenance

Caution Risk of Injury!

Before cleaning the sewing unit turn the main switch off.

At the latest the maintenance work must be conducted after the number of operating hours listed in the column "Hours".

Procedure	Hours	Remarks
Sewing head		
Removal of lint accumulations	8	
Check the oil level in the oilpan	40	If the oil, with the machine not running, drops below the middle of the oil level gauge, top up with "Esso-SP-NK10"-type oil. (See Mechanic's Instructions)
Check the oil feed at the viewing glass	40	Check with the machine running
Check the timing belts	500	Condition and Tension to be checked by a mechanic
Check V-belt tension	500	Condition and tension to be checked by a mechanic
Trimming head		
Removal of lint accumulations	8	
Check the oil level in the reservoir	8	
Check the oil level in the plastic reservoir of the shearing head	8	There must always be oil in the reservoir. Top up with "Esso SP-NK 10"-type oil
Check the oil feed to the head	500	Have a mechanic check this
Test the V-belt tension	40	Have a mechanic check this
T**urntable and clamp**		
Check the condition of the Delrin	40	
Lubricate the planet wheel	40	Have a mechanic conduct this
Pneumatic System		
Clean the filter insert in the filter	500	First close the lock valve and vent the system. (See Service Instructions)
Test the pneumatic system for "air-tightness"	500	