

**Instruction Manual
Microtome 2030
Biocut**

Edition February 1986

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MICROTOME 2030 BIOCUT - Basic Instrument

1. Technical Description

The microtome 2030 BIOCUT is a smooth-running rotary microtome for producing thin sections of 1 to 60 microns section thickness. This microtome is primarily designed for sectioning paraffin embedded specimens.

It can be used in medicine, biology and industry. Nevertheless, in some cases, it is possible to section also plastic embedded specimens or industrial duroplastics and thermoplastics.

On this microtome, a specimen is vertically moved towards a stationary knife; this is how the section develops.

According to the selected section thickness, each vertical movement involves the automatic feed above the knife edge for the next section.

To our customers:

Before setting the microtome into operation, it is essential to thoroughly study this Instruction Manual, to exclude mistakes and disturbances caused by wrong handling.

The microtomes manufactured in our factory are precision instruments that are subject to quality control before shipment. We guarantee this quality and consequently grant a year's warranty on each microtome.

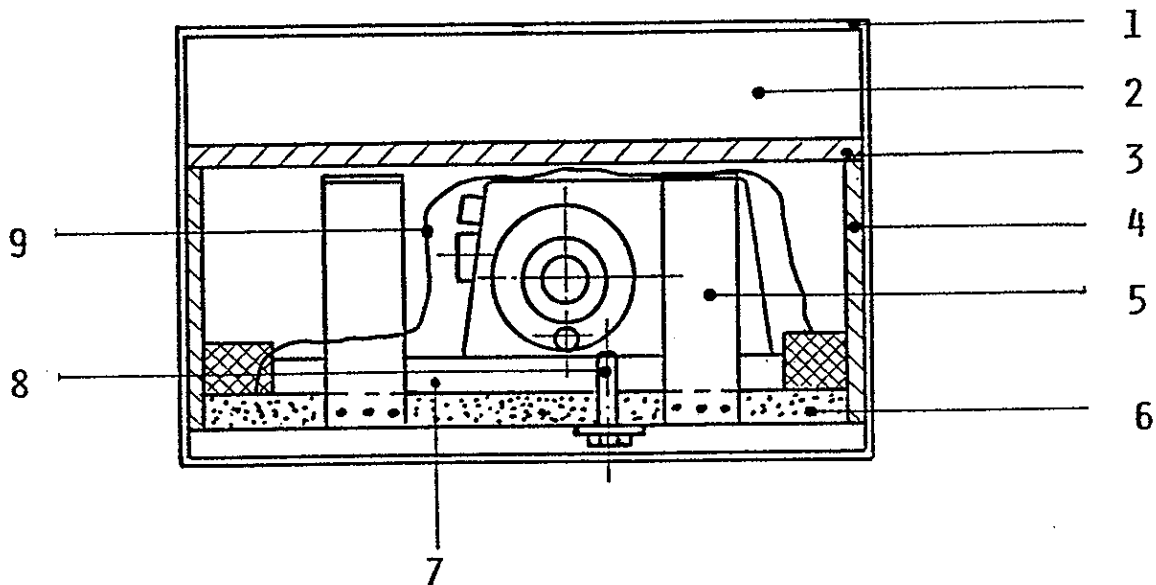
Please note, however, that all warranty claims will lapse in case of outside service or repair work performed without our prior consent.

In addition, R. Jung GmbH as well as some of our foreign representations offer a maintenance contract for every microtome. The required documents can be obtained from the appropriate location in your country.

2. Unpacking and Setup

After opening the cardboard box (1), first take out all the accessories (2). After removing the plate (3) and back-up ring (4), the microtome (7), which is mounted on a bottom plate (6), can be taken out of the cardboard box using the carry straps (5).

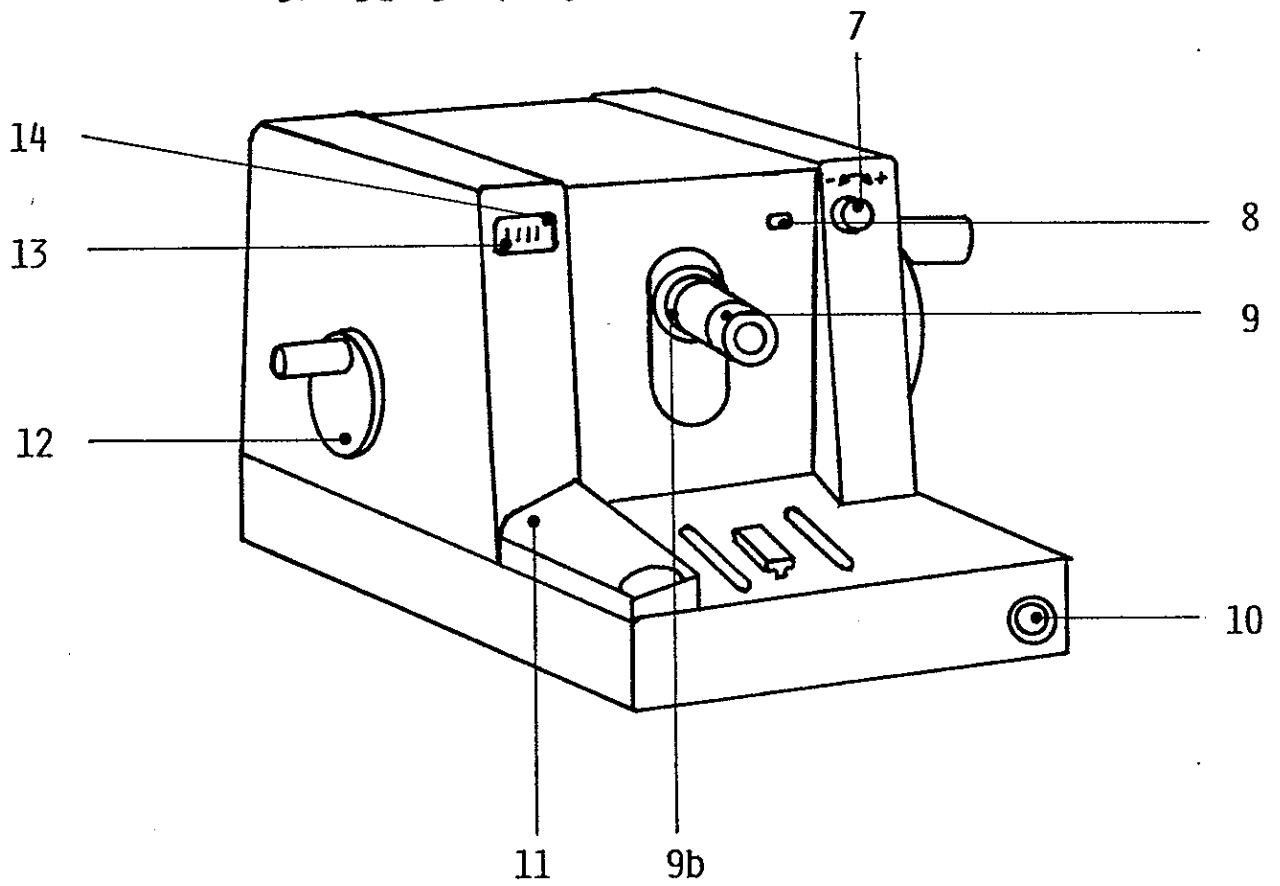
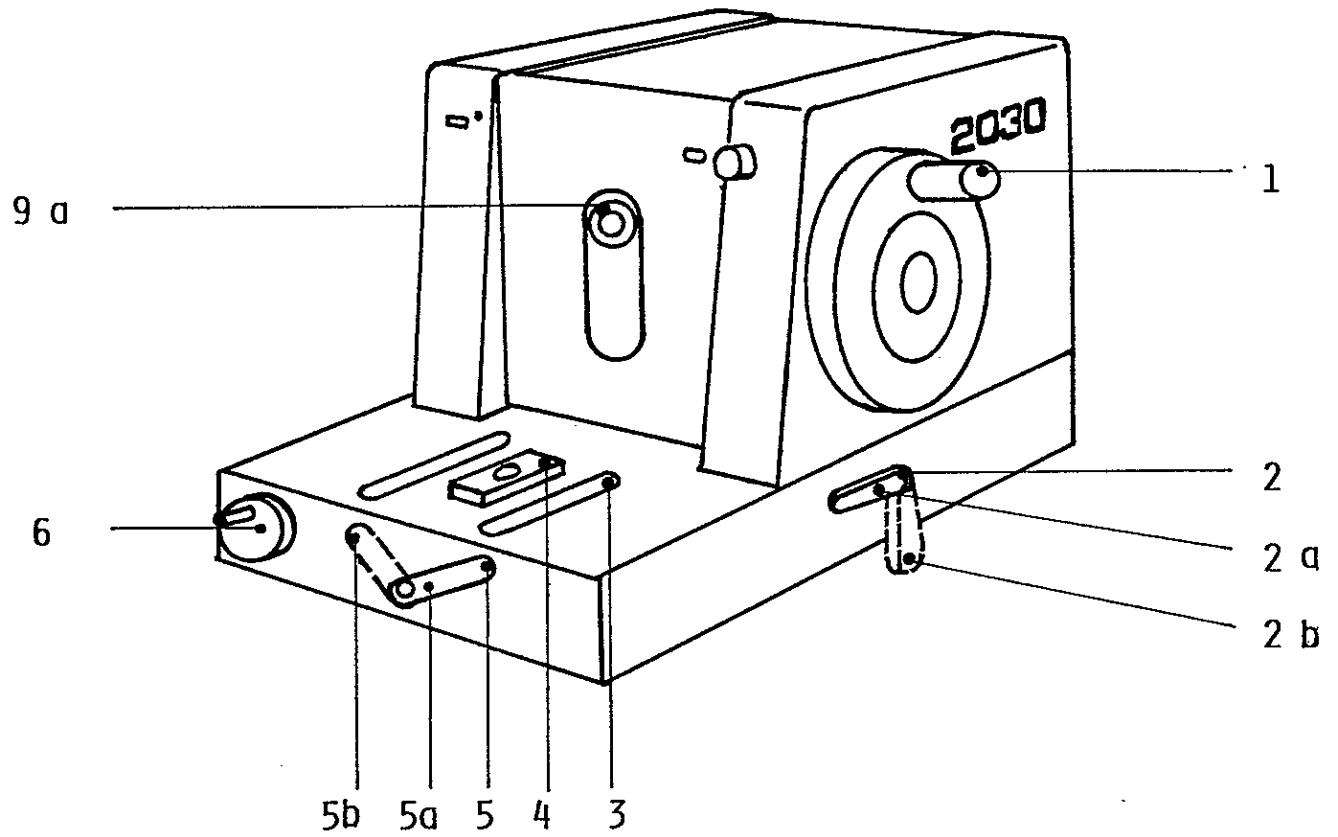
Carefully place the microtome (7) headfirst onto the plate (3), loosen the safety screw SW 17mm (8) and cut open the dust protective cover (9). The bottom plate (6) with the carry straps (5) can be removed.



Attention!

For carrying the microtome do always lift it taking it at front and on the back of the base plate - never take it at the handle of the handwheel!

The microtome should be placed onto a stable vibration-free laboratory table for sectioning.



3. The Microtome

The microtome 2030 BIO CUT is a manually operated rotary microtome and has the following mechanical operating and function units.

3.1. Mechanical Operation

- 1 Handwheel with handle for vertical specimen movement
- 2 Brake for handwheel (2a = locked, 2b = unlocked)
- 3 Guides for knife holder support
- 4 Clamping piece for knife holder support
- 5 Clamping lever for clamping piece (5a=locked, 5b=unlocked)
- 6 Coarse feed at front for horizontal specimen movement
- 7 Control knob for section thickness setting
- 8 Window of scale dial
- 9 Cylinder for horizontal specimen movement (Please note 9a = green collar, 9b = red collar)
- 10 Connection for section ribbon guide
- 11 Arm rest right and left
- 12 Coarse feed at side for horizontal specimen movement
- 13 Section counter
- 14 Pin for counter reset

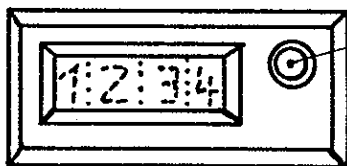
Attention!

Cylinder 9 may only be moved between 9a = green collar and 9b = red collar!

3.2. Electrical Operation

In the left-hand part of the microtome cover is a section counter (13). This LCD counter (13) is operated by a long-term battery which lasts for about 5 years. The LCD counter (13) is always active.

The battery should be replaced by a Service Technician.

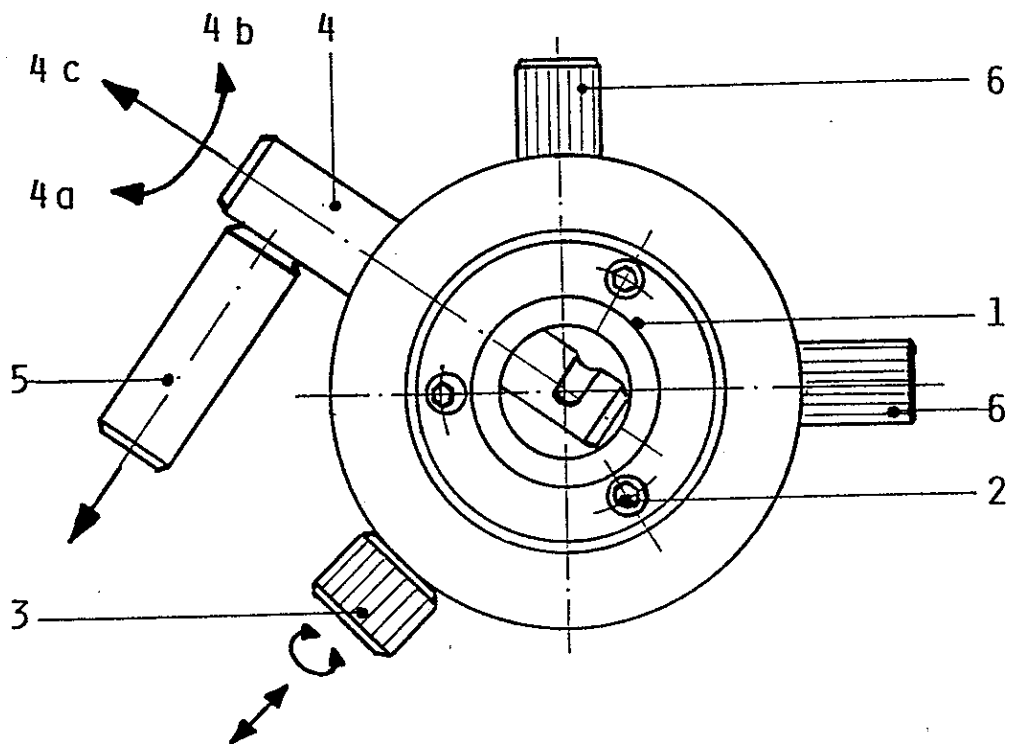


14 By pressing the pin (14) the counter can be reset any time.

4. Specimen Clamping Devices

4.1. Devices for Taking Specimens

4.1.1. Device with Specimen Orientation



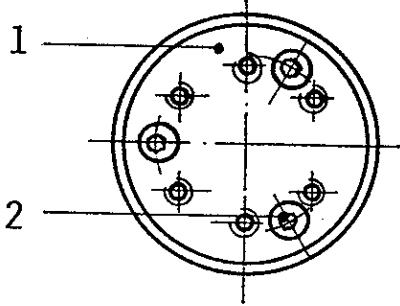
This device, with the red point (1) to the right, is attached to the cylinder of the microtome with three cheese head screws SW 3mm (2).

Unscrew the spring bushing (3) till a red ring becomes visible and take off (4c) the eccentric bolt (4), then the device will be prepared for taking specimen clamps.

The red point (1) serves as an orientation for a groove in the clamping shaft of the specimen clamp. If a specimen clamp is mounted on the device, the eccentric bolt (4) will be inserted, the spring bushing (3) screwed in, the specimen clamp oriented by the screws (6) and finally the eccentric bolt (4) clamped (4a) by its telescopic locking handle (5).

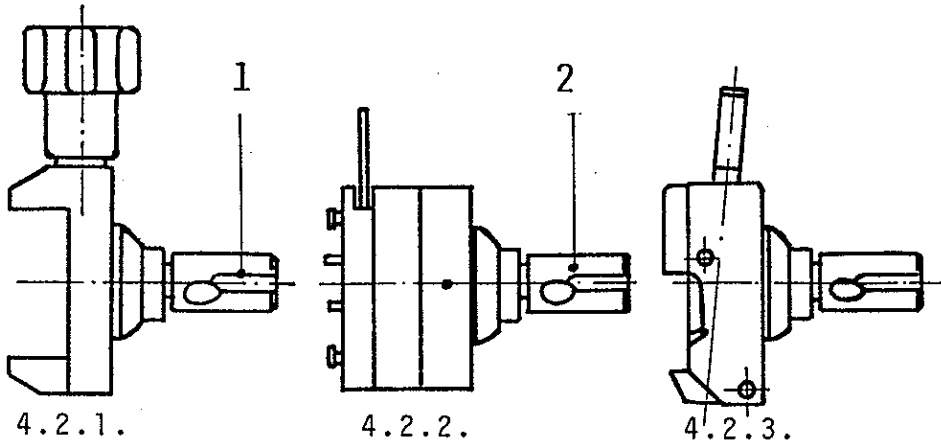
It is possible at any time to orient even a clamped specimen by releasing the eccentric bolt (4).

4.1.2. Device without Specimen Orientation



This device, with the red point (1) up, is attached to the cylinder of the microtome by three cheese head screws SW 3mm (2).

4.2. Specimen Clamps - Orientable



4.2.1.

Standard Specimen Clamp

4.2.2.

Reichert-Jung Cassette Clamp

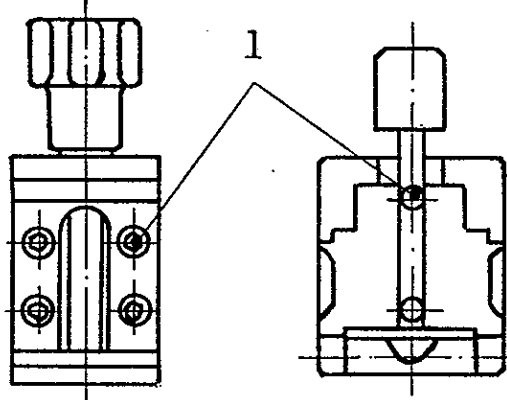
4.2.3.

Universal Cassette Clamp

Attention!

On mounting a specimen clamp, the groove (1) of the clamping shaft (2) must coincide with the red point (1) of the device (4.1.1.)!

4.3. Specimen Clamps - Not Orientable



4.3.1.

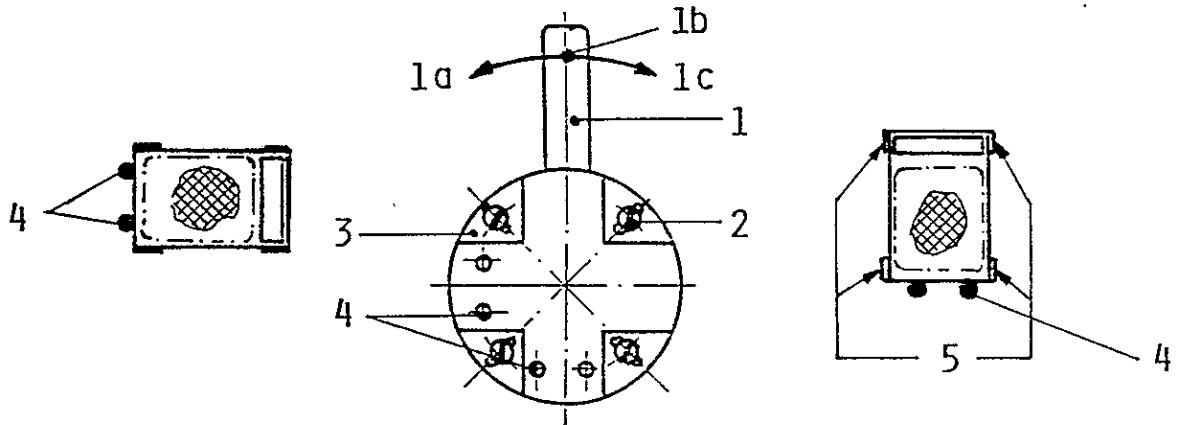
Standard Specimen Clamp

4.3.2.

Universal Cassette Clamp

These specimen clamps are directly mounted on the device (4.1.2.) with three cheese head screws SW 3mm (1).

4.2.2. Reichert-Jung Cassette Clamp

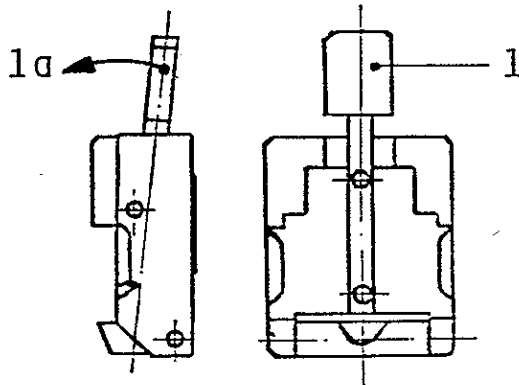


On the front of the cassette clamp there are 4 bearing areas (3), 4 pins (4) and 4 straining screws (2), allowing Reichert-Jung cassettes to be clamped distortion-free in horizontal and vertical position.

If the lever (1) is moved to the left (1a) the straining screws (2) move outwards; insert the cassette. Now let the lever (1) spring in a middle position (1b); the straining screws (2) will center the cassette. If the lever (1) is moved to the right (1c), the heads of the straining screws (2) press the cams (5) of the cassette against the bearing areas (3).

4.2.3. Universal Cassette Clamp

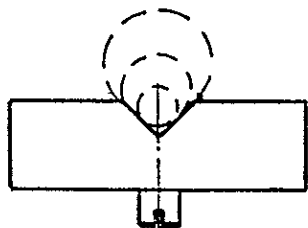
In this cassette clamp both Reichert-Jung cassettes and other products offered in the market can be clamped horizontally and vertically in the simplest way.



Pull lever (1) to 1a!
Place the cassette either horizontally or vertically into the clamp!
Let lever (1) off!
The cassette will be clamped by a spring system!

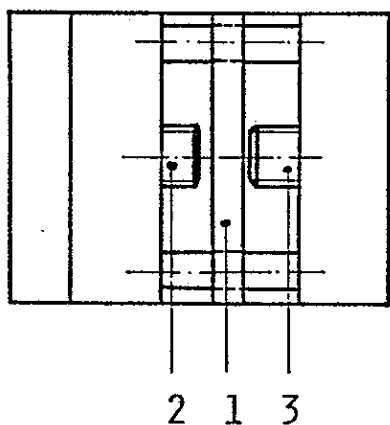
4.4. Inserts for Standard Specimen Clamps (4.2.1. + 4.3.1.)

4.4.1. Vee Insert

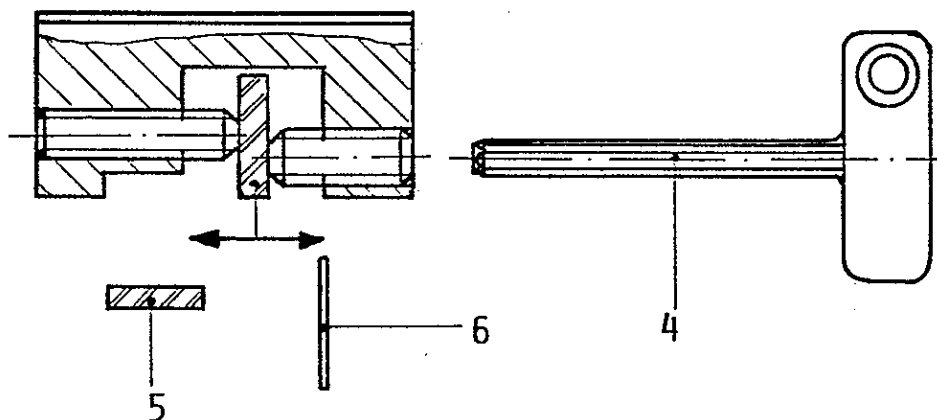


The vee insert is placed in the lower movable jaw of the standard specimen clamp and designed to take round specimens.

4.4.2. Foil Clamp



The foil clamp is clamped in the standard specimen clamp as shown on the drawing.



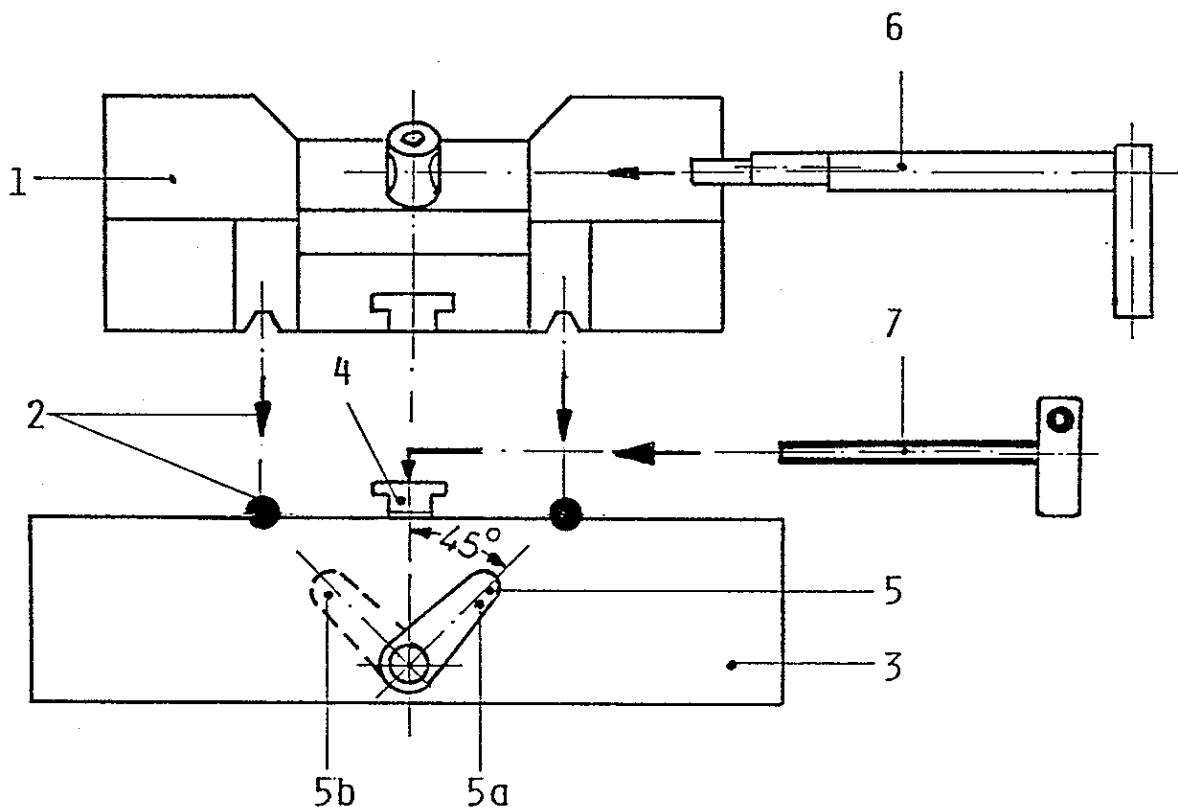
By turning the set screws (2 + 3) with the wrench (4) SK 4mm the movable jaw (1) can be moved to the left and right for clamping flat specimens (5) or thin foils (6).

5. Knife Carrier Equipment

A universal knife carrier system allows rapid changing of the cutting tools according to the individual requirements in practical work.

It consists of a knife holder support, on which can be mounted several knife holders.

5.1. Knife Holder Support

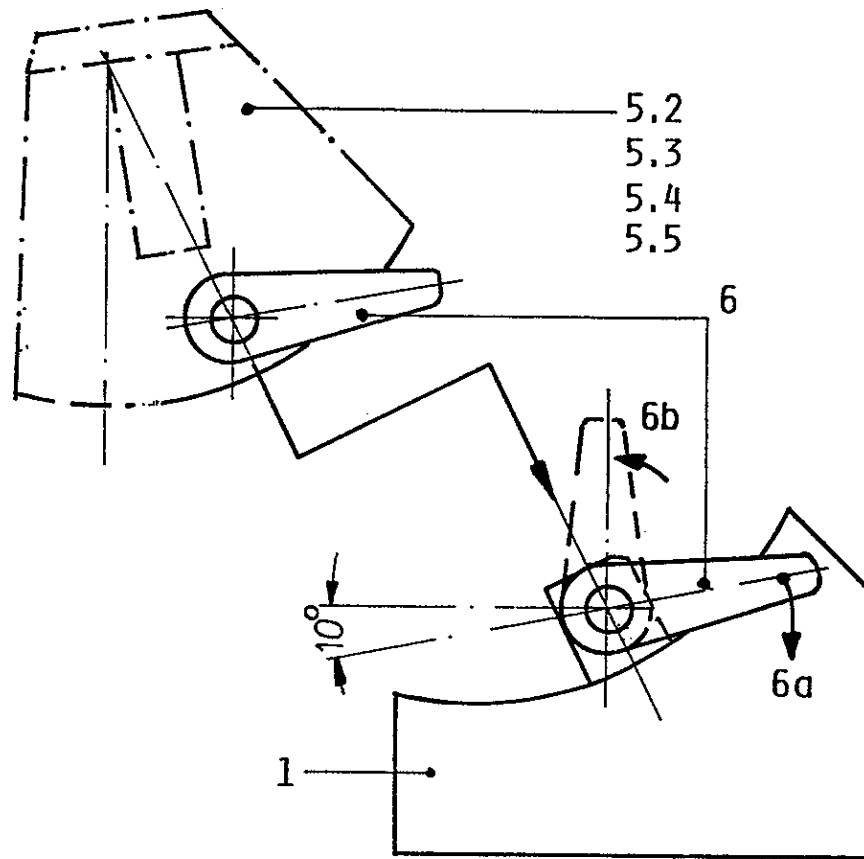


Place the knife holder support (1) onto the round rod guides (2) of the base plate (3) and fix it (5b) by a clamping piece (4) with the clamping lever (5); release it according to 5b. The eccentric clamping lever (6) serves for the subsequent assembly of the knife holders (5.1.).

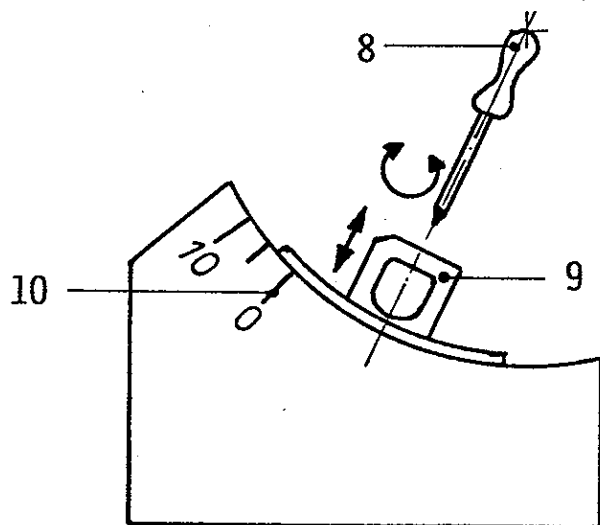
Attention!

Should the clamping piece (4) have moved out of position, use the wrench (7) SW 4.0mm for adjusting a screw in the clamping piece until the clamping lever (5) is in an ideal position (45°; 5a) for clamping.

5.1. Knife Holder Support



The knife holders (5.2. to 5.5.) are placed onto the support (1). Introduce the eccentric clamping lever (6) from the left and clamp it (6a). By releasing (6b) and clamping it again (6a) it is possible to adjust the clearance angle!

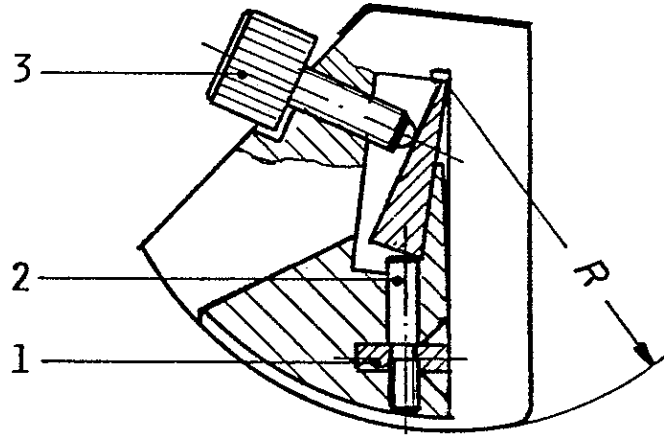


The pulling bolt (9) can be adjusted with a screw driver (8) till the ideal position (10°; 6a) for the eccentric clamping lever (6) is reached.

The index lines (10) for clearance angle adjustment are on the right side of the knife holder support (1).

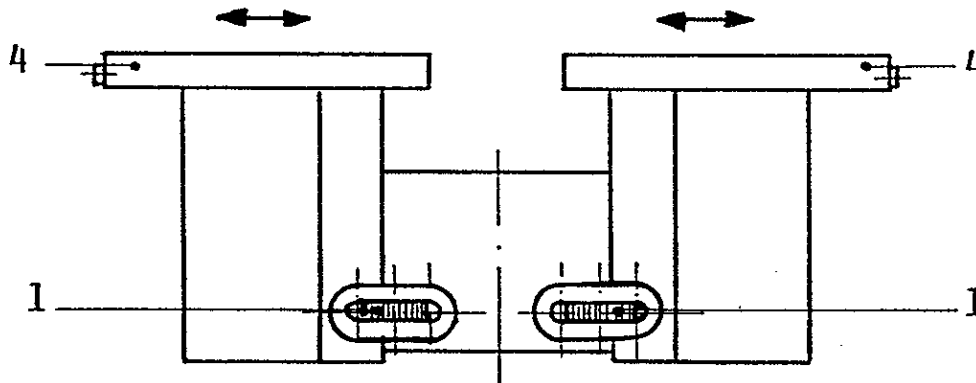
5.2. Knife Holder N

This knife holder is appropriate for conventional and tungsten carbide microtome knives up to 16 cm long.



When the microtome knife is placed into the holder, the knife edge can be moved to the center of rotation of the radius R by means of a height adjustment.

By turning two knurled disks (1), two bolts (2) are moved, which simultaneously serve as a support for the knife. The knife is clamped by the screws (3).



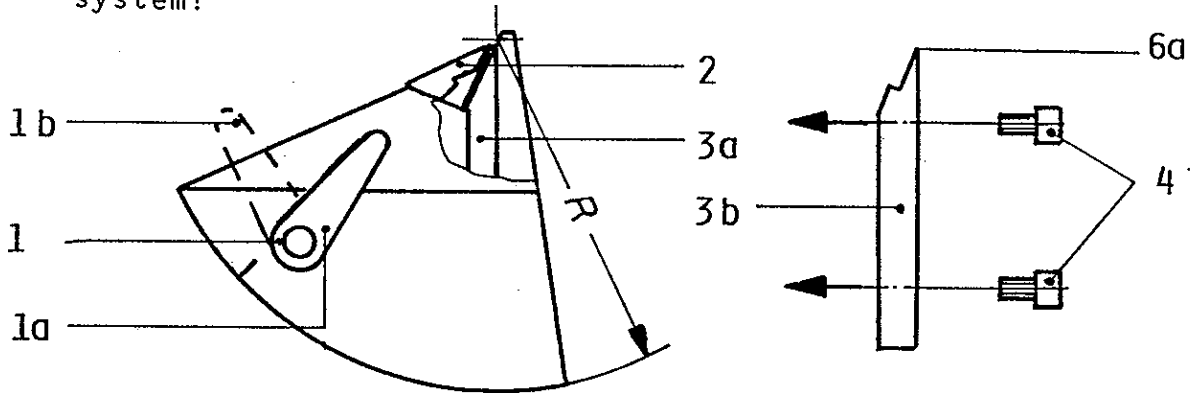
The adjustable knife guards (4) cover the knife edge.

Attention!

Before inserting the microtome knife, the bolts (2) and screws (3) must be screwed back to avoid any damage to the knife edge!

5.3. Knife Holder E

This knife holder is especially designed to take various disposable blades, which are fixed by a quick clamp system!

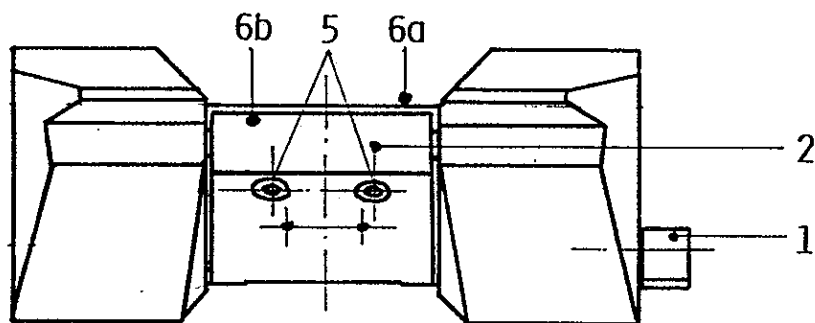


Before inserting the disposable blade, shift the lever (1) in position (1b); introduce the blade into the groove between pressure plate (2) and locating plate (3a; 3b) from the left or right. Bring the plate in the desired position and clamp it (1a) by relocating the lever (1).

The cutting edge of the disposable blade is about in the center of rotation of the radius R.

If it becomes necessary to change from one blade width to another, only the locating plate (3b), which is fixed by the screws (4), has to be exchanged!

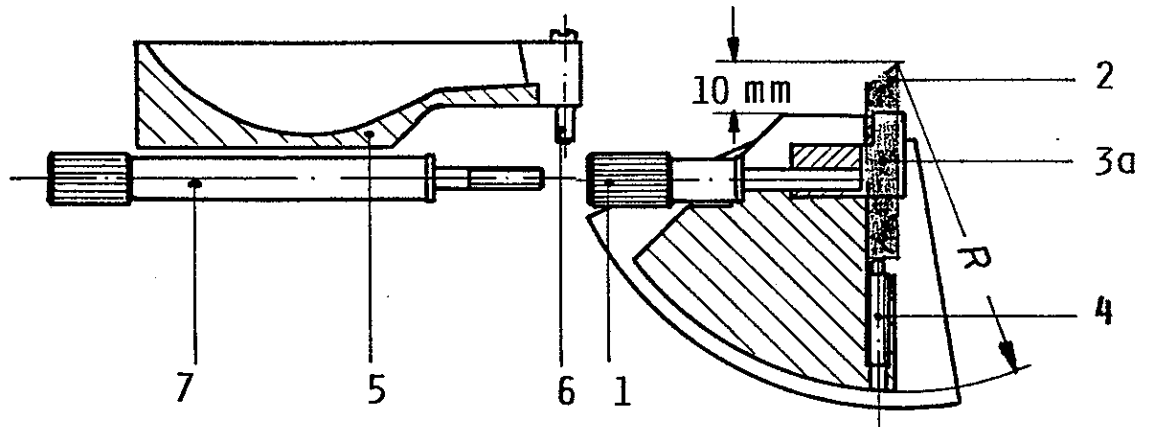
Attention! Parallel the edges (6a; 6b) exactly!



If only one side of the blade is clamped by the pressure plate (2), adjust the screws (5) with wrench SW 3, till blade and pressure plate (2) parallel.

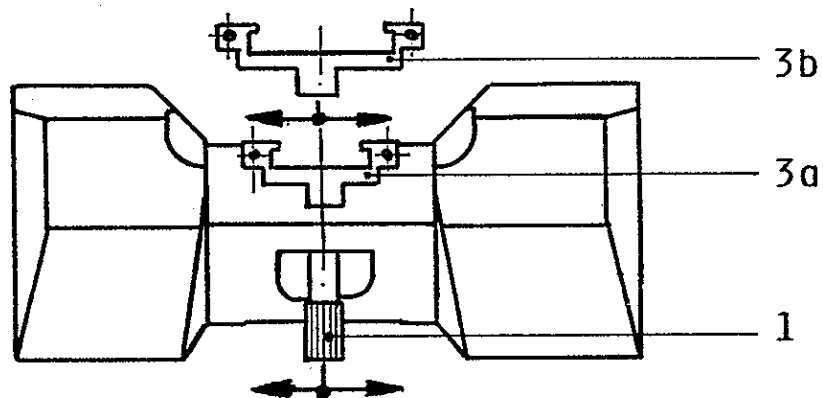
5.4. Knife Holder R

This knife holder takes RALPH glass knives 25 to 38mm wide of different glass thicknesses.



After having released the straining screw (1), place the RALPH glass knife (2) into the clamping frames (3a; 3b) from above. The knife edge can be moved into the center of rotation of the radius R by means of the set screws (4).

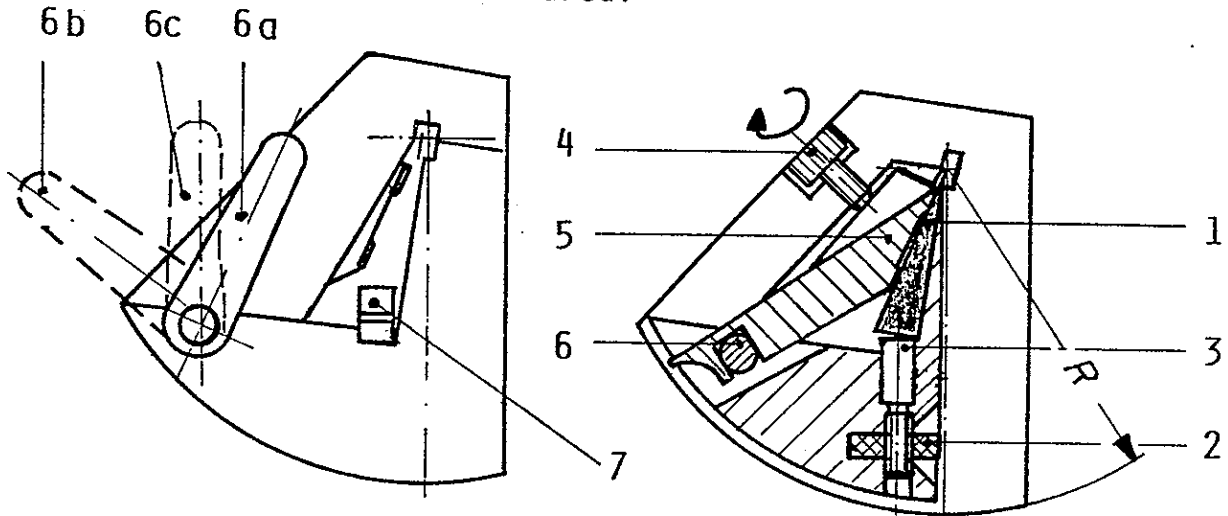
If a water bath is used, it is to be fixed to the clamping frame (3) with the screws (6); the straining screw (1) should be replaced by a longer straining screw (7). It is possible to seal the gap between the water bath and the glass knife (2) with wax or elastic silicon cement.



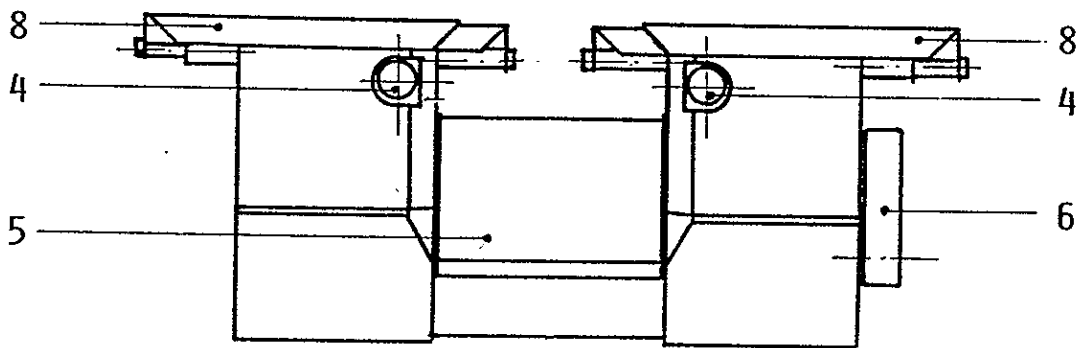
For a maximum use of the knife edge, the clamping frame (3a; 3b) can be moved to the right or left, if the straining screw (1) has been released.

5.5. Knife Holder Z

With its principle of central clamping, knife holder Z represents a new concept, as it permits the full use of the whole cutting edge without any cumbersome attachment screws in the section removal area.



The microtome knife (1) is laterally introduced into the holder; the knurled disks (2) move the bolts (3) which raise the knife and bring the knife edge in the center of rotation of the radius R. Adjust the set screws (4) that the clamping plate (5) sits close to the knife (1) (6a). For adjusting the clamping plate (5) the eccentric clamping lever (6) must be in position (6c). When using resharpened knives, a distance piece (7) can be placed under the knife back.

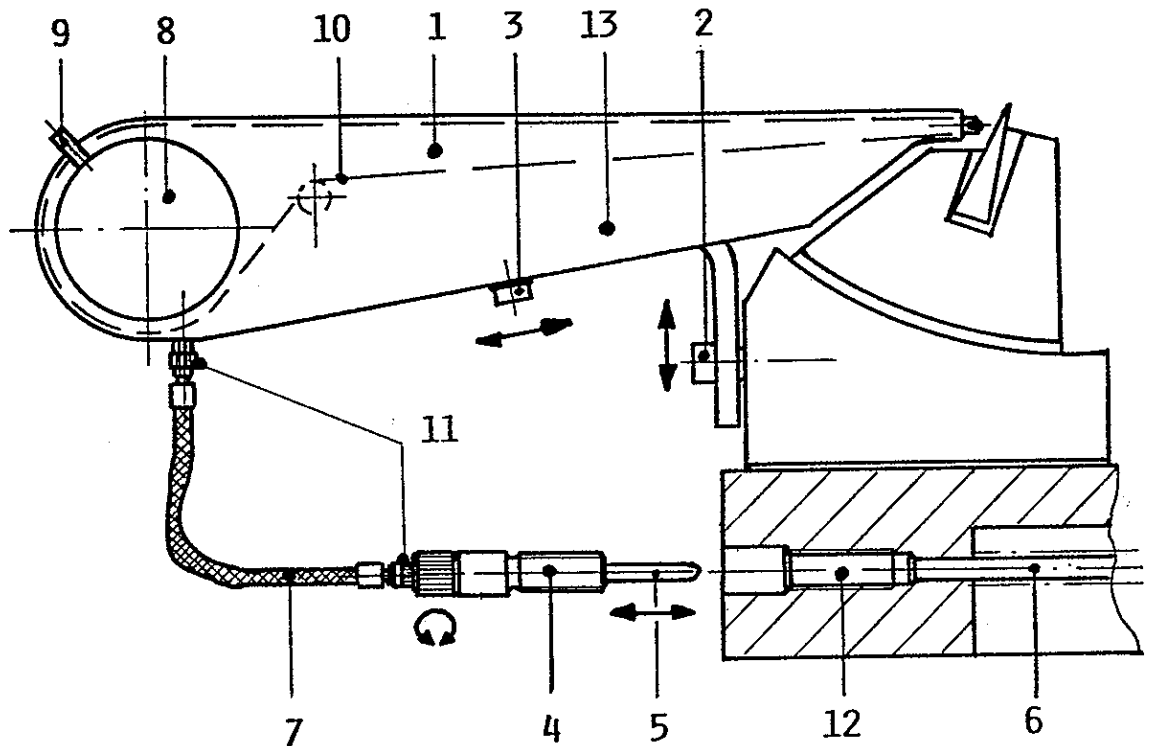


The knife can be moved laterally, if the eccentric clamping lever (6b) is released. The knife edge is covered by the detachable and movable knife guards (8).

6. Special Equipment

6.1. Section Ribbon Guide

The automatic section ribbon guide (1) is fixed on the knife holder support (5.1.) by the screw (2). After loosening the screws (2 + 3) the device can be aligned in relation to the knife edge.



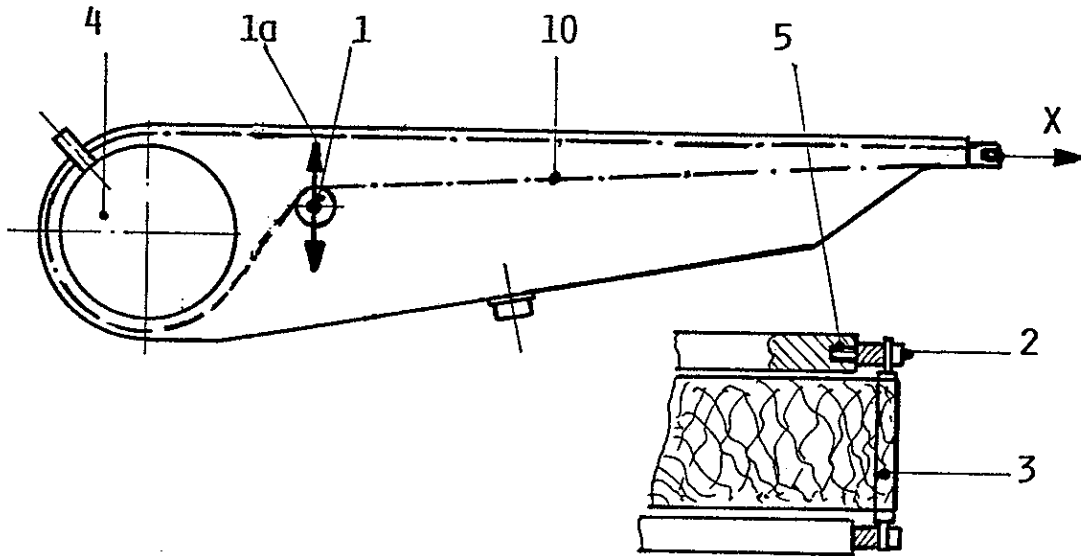
The connection for the section ribbon guide (1) is on the right in the base plate. The adjusting screw (4) is screwed into a tap hole (12). A slide rod (6) moves the slide (5) horizontally; the tripping device (7) actuates a controlling unit (8); the band (10) moves.

The beginning (4) and end (9) of the band movement are set by the controlling elements (4 + 9) according to the length of the specimen.

If the tripping device (7) is worn-out, remove the screw joints (11) from the adjusting screw (4) and lateral part (13); mount a new tripping device and fix it with screws using a tool (pincers).

6.1.1. Replacement of the Band

The band (19) can be removed through a slot between the driving pulley (4) and left-hand lateral part after the shaft (3) has been taken out of the slotted bearing by slightly extending the band longitudinally (X).



For mounting the new band, proceed in reversed order.

6.1.2. Adjustment and Tensioning of the Band

Fix the tension pulley (1) in position (1a) with screws that the band will be carried evenly by the driving pulley (4).

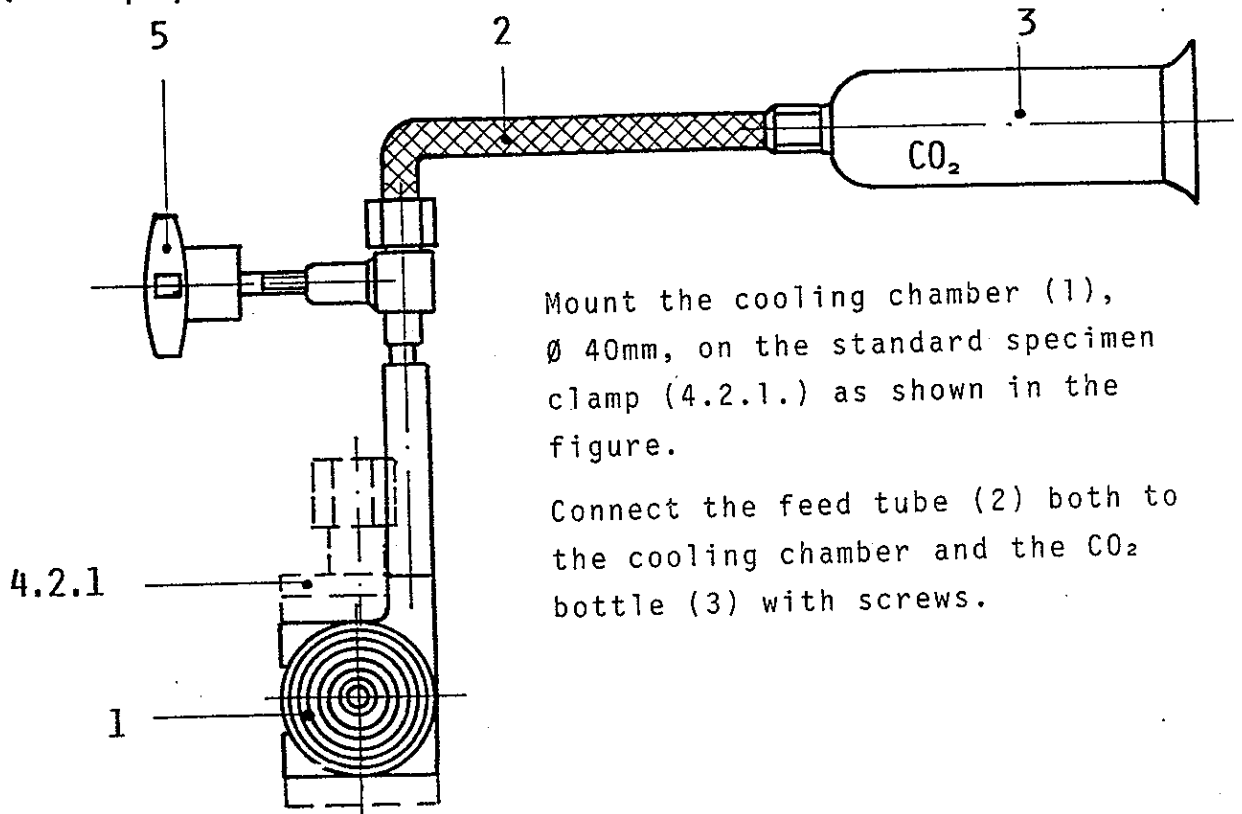
To prevent lateral slipping of the band, the shaft (3) in the left-hand lateral part can be shifted lengthwise by the adjusting screw (5), which is integrated in the bearing (2) as a hidden set screw.

6.1.3. Drive of the Section Ribbon Guide

The drive of the section ribbon guide can be assembled in the base plate of the microtome ex factory or later by a Service Technician.

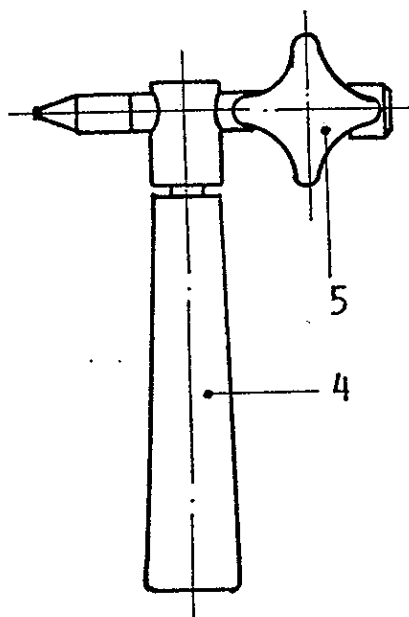
7. Equipment for Frozen Sections

7.1. Equipment for Frozen Sections with CO₂



Mount the cooling chamber (1), Ø 40mm, on the standard specimen clamp (4.2.1.) as shown in the figure.

Connect the feed tube (2) both to the cooling chamber and the CO₂ bottle (3) with screws.



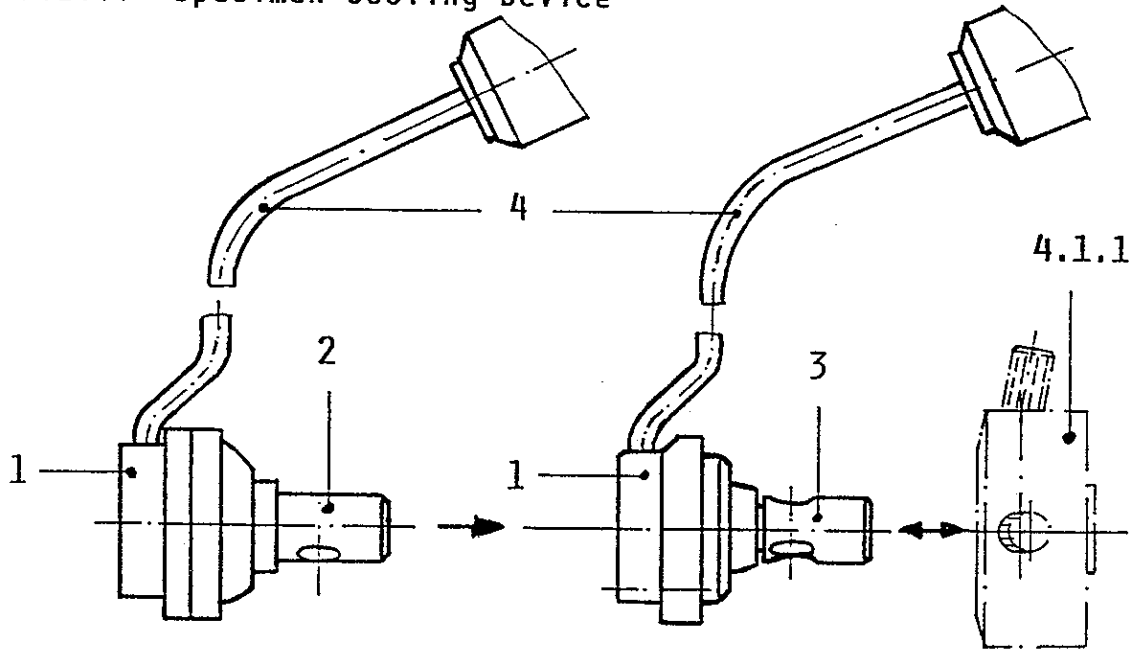
In addition to the cooling chamber (1), a quick freezing nozzle (4) can be used for specimen cooling.

The quick freezing nozzle is supplied with CO₂ via a second feed tube through a two-way connector.

The CO₂ supply is controlled by the turning knobs (5).

7.2. Connection of the Electric Freezing Unit FRIGOMOBIL

7.2.1. Specimen Cooling Device

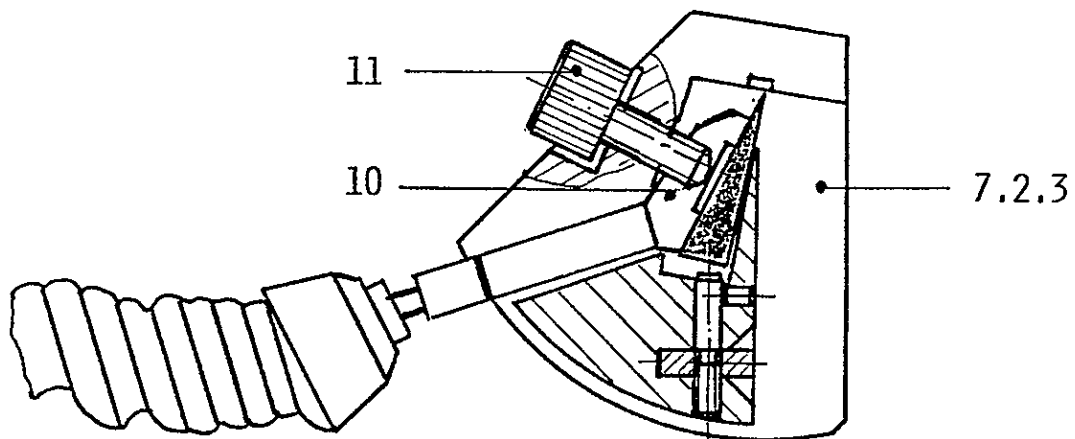


The specimen cooling device (1) of the electric freezing unit FRIGOMOBIL exists both in rigid (2) and orientable (3) version and is attached to the device (4.1.1.).

Attention!

The heavy feed tube (4) should be fixed onto the laboratory table by a holder.

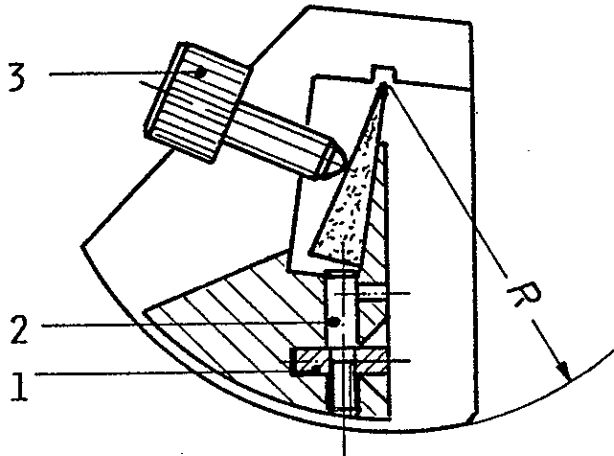
7.2.2. Knife Cooling Device



The knife cooling device (10) of the electric freezing unit FRIGOMOBIL is fixed to the knife holder OM (7.2.3.) near the knife back with two straining screws .

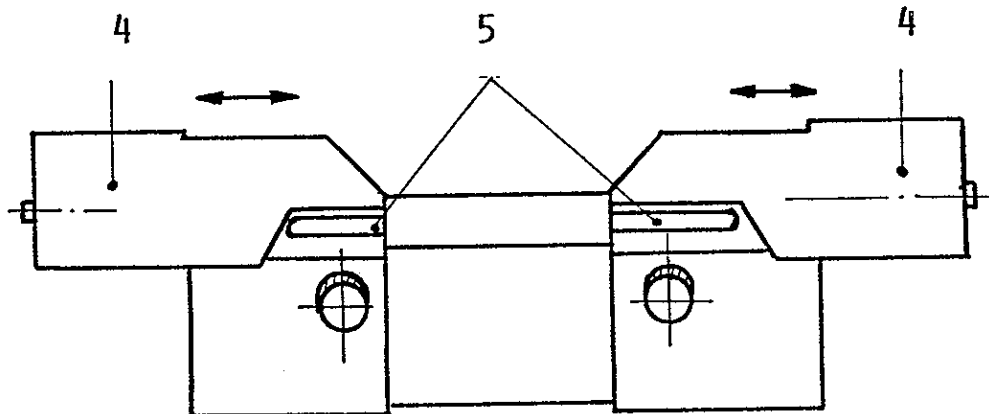
7.2.3. Knife Holder OM

This knife holder is especially designed to take conventional and tungsten carbide knives up to 16cm long and can take in addition the knife cooling device of the electric freezing unit FRIGOMOBIL OM.



When the microtome knife is inserted in the holder, the knife edge can be moved to the center of rotation of the radius R by means of a height adjustment.

By turning two knurled disks (1) bolts (2) are moved, which simultaneously serve as a support for the knife. The knife and knife cooling device are clamped with the screws (3).



The knife edge is covered by movable knife guards (4). The knife cooling device of the FRIGOMOBIL OM is mounted through the slots (5).

8. **Safety Instructions**

Please note the following safety measures when working with the microtomes and microtome knives:

Attention! When clamping or changing a specimen, the specimen orientation devices (4) must always be brought in top position!

Lock handwheel brake!

Attention! When starting sectioning, the specimen orientation device must always be brought in a rear position!

Attention! The specimen should always be clamped before the knife!

Attention! When changing the specimen cover the knife edge by the knife guards or remove the knife holder!

Attention! Never place a microtome knife with its cutting edge up onto the table! Do always keep it in the knife case!

Attention! Due to its engineering design, the handwheel of the 2030 BIO-CUT can be turned very easily! Do not overestimate the expenditure of force in the cutting action!

Attention! Be careful when removing the section, as the knife edge is bare!

Attention! The range of horizontal specimen movement is limited to 25mm. The end points are marked by a green collar (behind) and a red collar (in front) on the specimen cylinder.

When the front end point is reached (red collar), stop the cutting action!

Move specimen cylinder in rear end position through the coarse feed!

9. **Sectioning**

The facing of the block is effected by a horizontal specimen movement in the direction of the microtome knife, which is triggered by the (lateral/front) coarse feed.

The same effect can be achieved by selecting a big section thickness (max. 60 microns).

The desired section thickness can be set as described in step 3.1.

Attention! The microtome is very smooth-running.

10. **Maintenance and Service**

The microtome 2030 BIO CUT is maintenance-free to a great extent. Lubrication inside the instrument is not required.

The delivered oil no. 404 should be applied to the round rod guides, slideways of the knife guides and accessories.

The microtome can be cleaned with a cloth and alcohol/xylene; then wipe it with a dry cloth!

Attention!

To ensure the high quality standard of the instrument, a routine maintenance should be carried out every year.

For this purpose, R. Jung GmbH offer a maintenance and service contract.

*one drop!
every 6 mo.*

5/11/87

4/28/88

11. **Technical Specifications**

Section thickness range	0 - 60 μm
Section thickness setting	
1 μm increments from	0 - 10 μm
2 μm increments from	10 - 20 μm
5 μm increments from	20 - 60 μm
Horizontal specimen movement	
Feed range	25 mm
Vertical specimen movement	59 mm
Maximum specimen size	
Height x width	40 x 55 mm
Section counter with reset	4-digit
Dimensions	
Length	47 cm
Width	40 cm
Height	27 cm
Space requirement	60 x 60 cm
Weight	29 kg