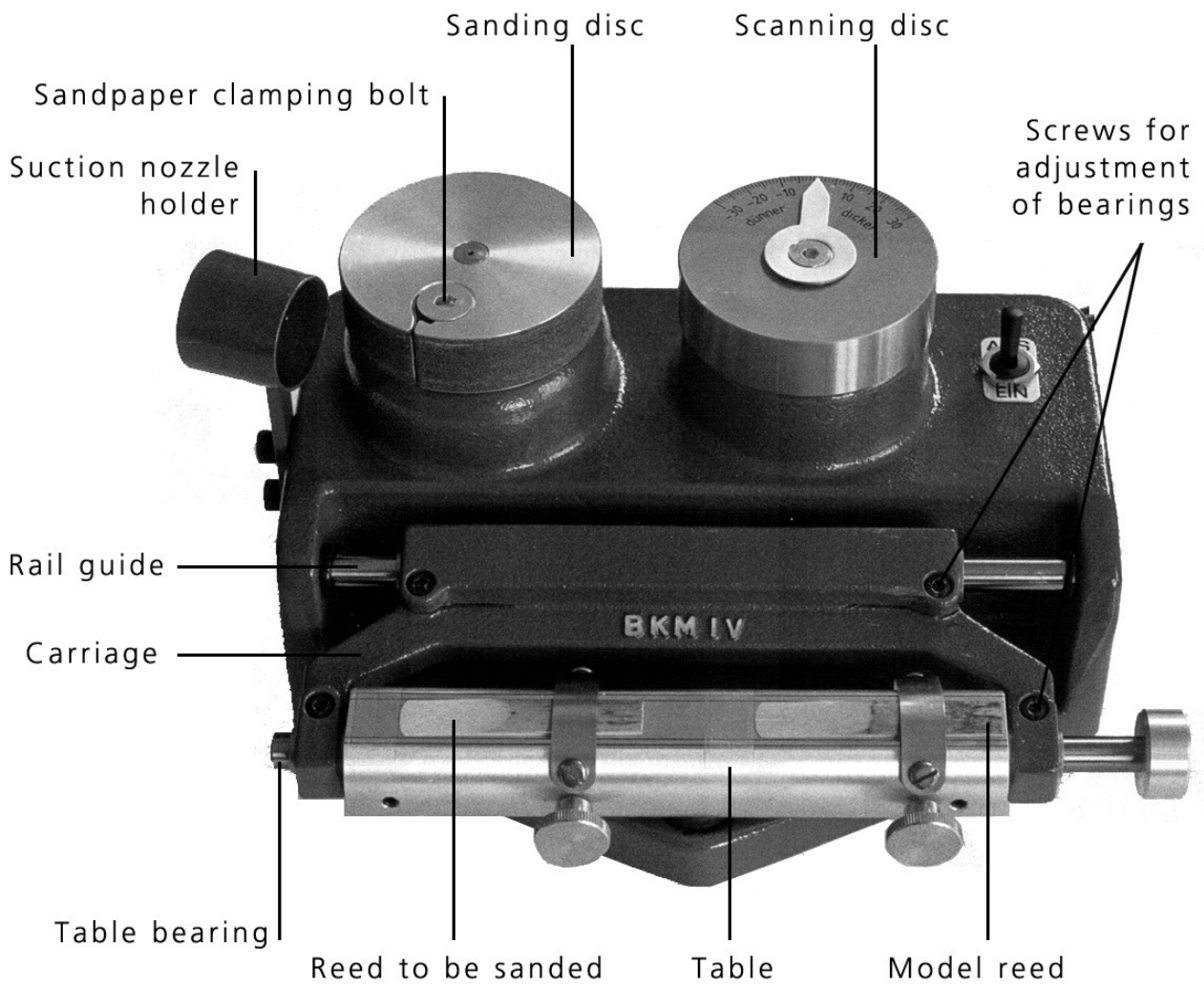


# Operating instructions for the reed machine BKM 4



The reed machine BKM 4 is suitable for sanding all single reeds (clarinet, saxophone and basset horn reeds). It can be used to copy the taper of a model reed onto a blank with or without pre-worked taper or onto a finished but poorly functioning reed. The machine is supplied ready for operation with clamped sandpaper and a coarse thickness setting. If you have already used this type of reed machine, you can proceed as usual and read through the individual sections of these operation instructions as required. Otherwise, please take the time and proceed in accordance with sections 1 to 5 to familiarise yourself with the machine. You need a correctly functioning reed as a model, which may also have been already used, and blanks or finished reeds to be processed. These must correspond in width and thickness with the model reed and the back of the reed must be clean and ground flat. These instructions only describe the sanding of the cut with the BKM 4; for the selection and pre-treatment of timber we refer to the little book "Das Klarinettenblatt - eine Bauanleitung, Moeck Verlag Celle" ("The Clarinet Reed - Modelling Instructions", published by Moeck Verlag Celle) by Otto Kronthaler.

## **1. Starting up**

Place the machine on a steady table with good lighting and connect to the mains (220 V alternating voltage). Switch the motor on briefly to check that it is working. The sanding disc should be turning in a clockwise direction. Always switch off the motor when clamping or removing the reeds or if the work is otherwise interrupted.

In order to prevent the spread of sanding dust, the motor of the BKM 4 does not have a ventilator, the heat is dissipated through the heavy cast housing. A gradual warming up of the machine is thus normal and no cause for concern. If the motor should overheat as a result of prolonged, uninterrupted use, a thermostat automatically breaks the power circuit. If this happens, you must switch the machine off (AUS) in order to prevent an unintended restart of the machine after it has cooled down.

The BKM 4 has a second cable for the connection of a vacuum cleaner to draw off the sanding dust. The vacuum cleaner is switched on and off simultaneously with the sander motor. It is recommended that you carry out the first sanding trials without the dust extractor in order to have better control over the sanding process by being able to hear the noise of the machine at work.

## **2. Checking the fit of the sandpaper and the thickness setting**

First check that the sandpaper is taut and resting closely on the sanding disc over its whole surface area. Then check the thickness setting: the aluminium table with the two clamps can be turned or moved back and forth and towards the sanding disc. Raise the flat surface of the table with the right-hand protective foil up towards the scanning disc. The sandpaper wrapped around the sanding disc should now just be touching the left-hand protective foil. If the sanding disc is turned by hand, there should be only some slight scratches on the foil. Otherwise the scanning disc must be re-set (see Section 7).

## **3. Clamping the reeds**

Now clamp the model reed in the right-hand clamp. Align it in the exact centre of the table using the longitudinal lines as a guide and align the tip of the reed, depending on the length of the taper, exactly at one of the three perpendicular lines (Fig. 1). For B clarinet reeds, for example, the right-hand line should be used. The protective foil must be adhered to the left of the selected perpendicular line. If it is lying on another line, you must first change it (see Section 9). Hold the aligned reed firmly in place and tighten the knurled screw.

If you want to re-work a reed, which has already been tapered, cut the tip as necessary back so that it is thicker all over than the model reed and then clamp it, just as the model reed, on the left-hand side of the table. Make sure that table and back of the reed are clean. The reed must rest flat on the table. A blank with or without a pre-worked taper is placed with the not yet cut tip at the corresponding perpendicular line. In the first step the cut is ground roughly and then the tip cut off. The reed with the cut-off tip is then exactly aligned and sanded to a finish.

If the right-hand or middle lines are used, a piece of protective foil should be stuck on at the reed to be sanded. This serves to protect the table and as a pre-setting of the reed thickness.

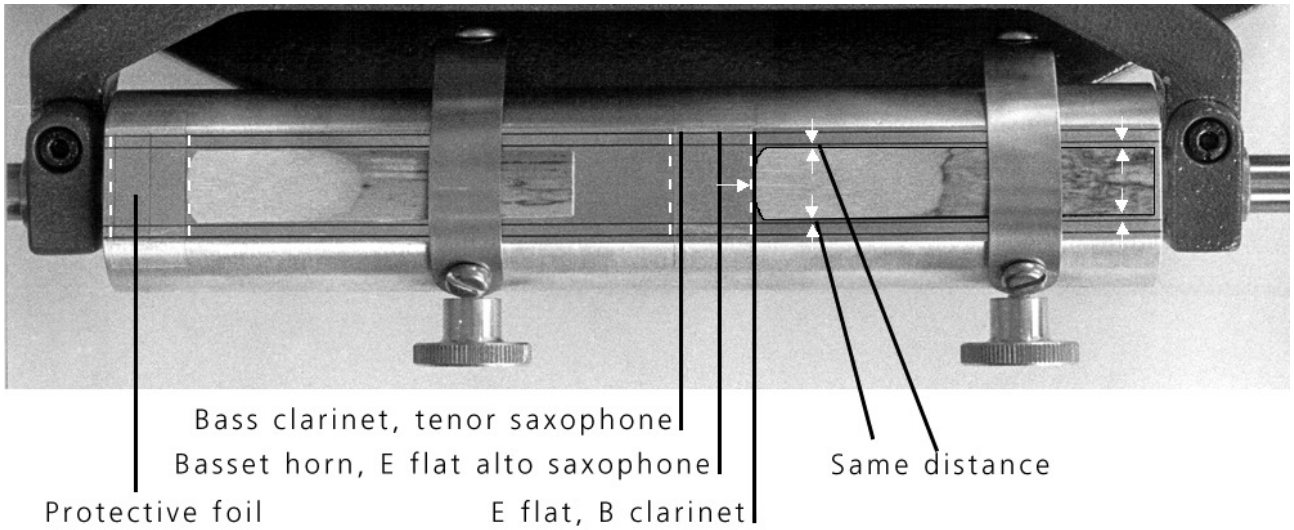


Fig. 1: Alignment of the reeds

#### 4. Sanding the taper

Switch on the motor and raise the table with the model reed towards the scanning head. Only hold the table when sanding with your right hand at the grip and never press hard, as this will influence the accuracy of the copy (Fig. 2).

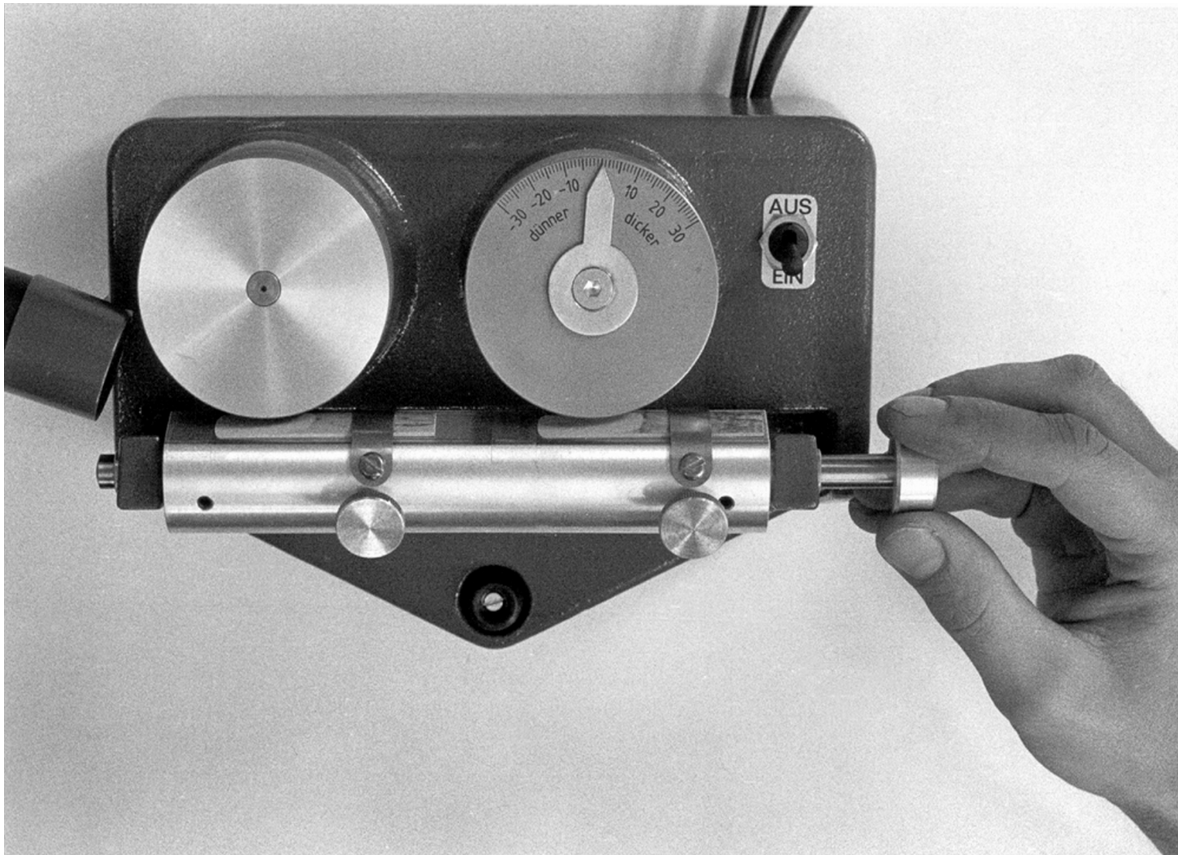


Fig. 2: The table is held at the grip on the right during sanding

The taper is sanded from the right to the left, from the reed shoulder to the reed tip. The table must thus be moved from left to right. When sanding begins, move the table back and forth in such a way that the cross section of the reed is shaped. Pull the table slowly to the right to get to the reed tip and reduce the back and forth motion as the cross section at the tip is almost straight (Fig. 3a). Repeat this process until the whole taper has been shaped that the model is in contact with the scanning disc in every position of the table. Sand a couple of times over the reed without back and forth movement by placing the model reed with the reed shoulder at various angles to the scanning disc and turning the table back to the parallel position when pulling through to the tip.

When the surface of the processed reed looks smooth and uniform you can assume that the model reed has been fully copied. Do not sand for much longer as otherwise the reed tip, if it is standing slightly away from the table, can be ground too thin.

Now you can remove the reed and try it or, if the tip still has to be cut off, you can do this and then process the reed in the manner described.

Clean the dust from the sandpaper occasionally by moving the enclosed black rubber gently over the running sanding disc.



Fig. 3a: Pre-sanding

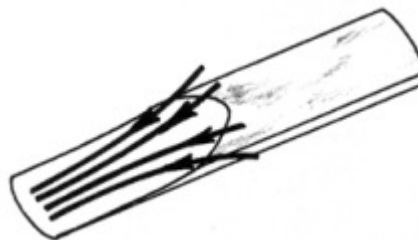


Fig. 3b: Finishing

## 5. Correction of the reed thickness

It is possible that the finished reed still does not have the required thickness so that a fine adjustment is necessary. You must also make a fine adjustment after changing the sandpaper, particularly if using a sandpaper with a different grit.

The eccentric scanning disc is turned to adjust the thickness. This causes it to move slightly forwards (the reed is thicker) or backwards (the reed is thinner). One increment on the scale represents a change in thickness of 0.01 mm (Fig. 4).

If you think the reed is too thick (heavy), simply clamp it in again turn the scanning disc by one or two increments in a clockwise direction ("thinner") and then sand it again.

If the reed is too thin (light), it must first, of course, be cut back, and then re-worked with the scanning disc at a "thicker" setting. After this correction of the reed thickness you should have a reasonably usable reed which corresponds roughly to the model reed. If this is not the case, try it again with a different blank, and pay special attention that the reed is flatly bedded and precisely aligned.

However, alongside the shape, the properties of a reed depend on a large number of other factors: quality and grain of the wood, pre-treatment of the blank etc. You may need to have some patience in selecting and trying the material. If you persevere, however, you will soon be satisfied with the results.

Once you have found the exact zero position of the scanning disc - which also depends on the thickness of the sandpaper used - you can set the indicator at zero in this position.

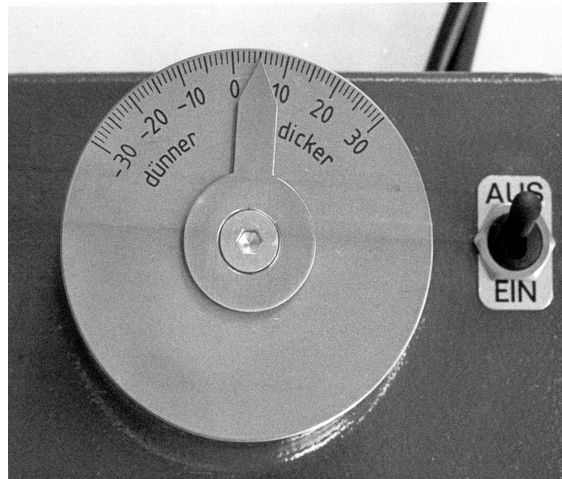


Fig. 4: One increment corresponds to 0.01 mm. In the setting shown here, the reed is made 0.05 mm thicker.

## 6. Changing the sandpaper

Wet sandpaper of grit 150, 180 and 220 has proved right in practice. Sandpaper should not be too stiff for the curve of the sandpaper clamp. You need strips of 20 mm x 259 mm. 50 spares are supplied with the machine. You can reorder additional strips when required. If you cut the sandpaper to size yourself, make sure to observe the exact length and width as specified. The sandpaper must be changed when it has become smooth or worn so irregularly that an exact copy is not longer possible. To remove the old strip the clamping bolt is released using the supplied 5 mm Allen key. Turn the bolt in a counter clockwise direction until the stop. Then the strip may be removed.

When fitting a new strip you must work with great care because a high degree of copying accuracy can only be achieved if the sandpaper lies perfectly flat on the sanding disc.

First the ends of the new sandpaper strip are drawn over the edge of a table with the smooth side down (Fig. 5).

Then place the two ends with the sanding sides exactly over each other to form a ring and hold it together with thumb and forefinger (Fig. 6).

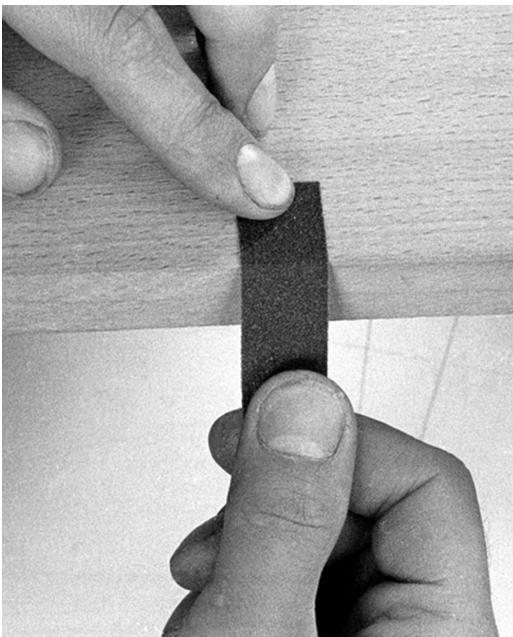


Fig. 5: Draw the ends of the sandpaper strip over the edge of a table

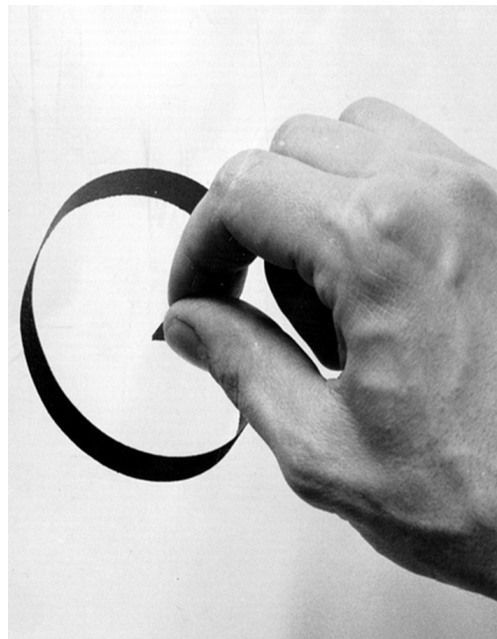


Fig. 6: ... and place it on top of each other to form a ring

Holding the ends together, slide them into the slot in the sanding disc from the top so that the ring is wrapped around the sanding disc. Make sure that the strip is lying perfectly flat on the sanding disc (also at the curves in the slot) and is flush with the upper edge. Pretension the strip by pressing the ends together and into the slot (Fig. 7). Hold the ends of the pretensioned strip firmly with thumb and forefinger and then close the clamping bolt tightly by turning in a clockwise direction (Fig. 8). This draws in the sandpaper a little bit more and clamps it. Check that the sandpaper lies perfectly flat over its whole surface and is properly tensioned. It should be difficult to move it up or down on the side opposite to the clamping device. Tighten again as necessary and try it with a new strip if the old one comes loose at the ends, which may occur if it has been fitted and removed a number of times. If you have fitted sandpaper of a different make or different grit, you should make a rough readjustment of the scanning disc in order to prevent damaging the table (see section 7).

Before use or before the rough adjustment it is recommended that the new sandpaper is "run in" on an old reed by moving the reed evenly from top to bottom over the running sanding disc. Do not hold the reed against the direction of sanding.

This removes surplus grit, so that the processed reeds are more even.



Fig. 7: Pretensioning

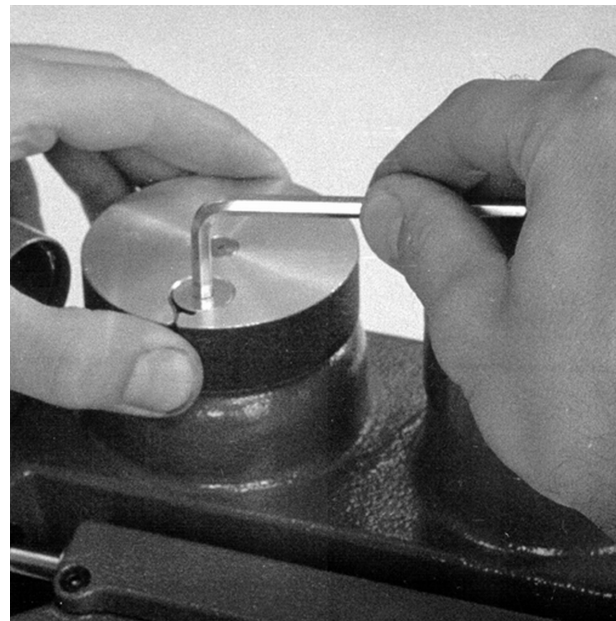


Fig. 8: ... and tightening the sanding paper

## 7. Rough adjustment of the reed thickness

First the scanning disc is set at "thicker" (it moves forward) so that the table in contact with it with the protective foil on the right is no longer in contact with the sandpaper with the left-hand protective foil. This is definitely the case when the indicator is at "10" to "20".

Then you turn the scanning disc slowly backwards moving the table back and forth along it but not beyond the protective foil. When the sanding disc just begins to move with it, you have reached the approximate zero position.

You find the exact zero position by trial and error when sanding the first reed. In the case of doubt you can start with the scanning disc turned back somewhat "thicker".

## 8. Protective foil for the table

In order to protect the table when the reed thickness is roughly adjusted and when sanding beyond the tip of the reed, a piece of plastic foil of approx. 0.1 mm thickness is stuck to the table directly before the tip of the model reed and the tip of the reed to be sanded.

The machine is supplied with the protective foil at the line on the right (for B clarinets). If you want to place reeds with a longer cut at the centre or left-hand line, you must first move the foil (when using the centre line half a protective foil strip is stuck at the reed to be sanded and when using the left-hand line no protective foil is required). Before applying the foil, the surface of the table must be cleaned as necessary, but not with solvent as this can damage the line markings. The machine is supplied with spare foils and extra can be ordered as necessary.

## 9. Dust extraction

The BKM 4 has a suction nozzle holder and a connection cable for a vacuum cleaner with tube (floor vacuum cleaner).

When ordering the machine, please state the exact outer diameter of the nozzle of your vacuum cleaner. The holder is suited for 32 mm nozzles. With the aid of adapters it can hold nozzles of 30 mm or 35 mm outer diameter.

Insert the nozzle of the vacuum cleaner tube, with adapter if necessary, into the suction nozzle holder and check that the sanding disc is not in contact with it and that the table cannot knock against it. The vacuum cleaner is connected to the sanding machine coupling and thus switched on and off simultaneously with the sanding motor.

Dust extraction not only keeps your workplace free of sanding dust, but also protects the bearings and guides on the machine and is thus highly recommended.

## 10. Readjustment of the guide bushes

Decisive factors for the copying accuracy of the BKM 4 are the two pairs of bearings (sintered bronze bushes and hardened steel shafts), which allow the motion of the table. The rail guide allows back and forth motion and a swivelling of the carriage, the table bearings allow a rotation of the table. The play in these bearings should be as low as possible, but at the same time they must move smoothly without the exertion of force.

There are screws, which press the bronze bushes together from the outside to reduce their diameter by some hundredths of a millimetre in order to readjust the play in the bearings.

On delivery these bearings have the optimum setting - so don't change anything!

With intensive use of the machine, the bushes wear over time and the play in the bearings becomes larger. This usually happens only upwards and downwards (in the working position, i.e. with the carriage folded up), which does not affect the accuracy of copying. Equally, if the table moves to the right and left within the table bearings, this will not cause any damage. What is important is the play in the bearings to the front and back, that is, the possibility of rotating the table around a vertical axis. This can be determined with a little sensitivity by holding the table gently at the left and right and executing this rotational movement.

If, in exceptional cases, readjustment should be necessary, this is done bearing for bearing. The screw is tightened somewhat so that the bearing is now difficult to move. Then the screw is turned back slowly until the necessary smoothness of run is achieved. This must always be tested in the working position. The table must, for example, be easily moveable from the parallel position by around 20° in both directions. If it is somewhat tighter beyond this point, this is no harm.

## 11. Other maintenance and care

If the machine is operated without dust extraction, the bearings of the rail guide and the table bearings should not be oiled. The self-lubrication of the porous, grease-soaked sintered bronze bushes is sufficient. Additional oil would only form a paste with the sanding dust and cause jamming. If dust extraction is installed, the slots of the rail guide should receive an occasional drop of thin oil (sewing machine oil) (Fig. 7). This is then spread evenly over the guide rail. The ball bearings of the motor are permanently lubricated. No other regular maintenance is required.

**Please avoid dismantling the machine.** Some of the components are set precisely and reassembling them in the exact position can be difficult.

**If carrying out repairs on the machine, particularly if the cover on the bottom of the machine is removed, always first disconnect from the mains!**

Do not keep the BKM 4 in rooms with high relative humidity (damp cellar, garage); the guide rail and the axles of the table bearings might corrode. For a prolonged period of non-use, these parts should receive a few drops of oil.  
In the case of defects in the machine or if you need spare parts, please contact the manufacturer directly.

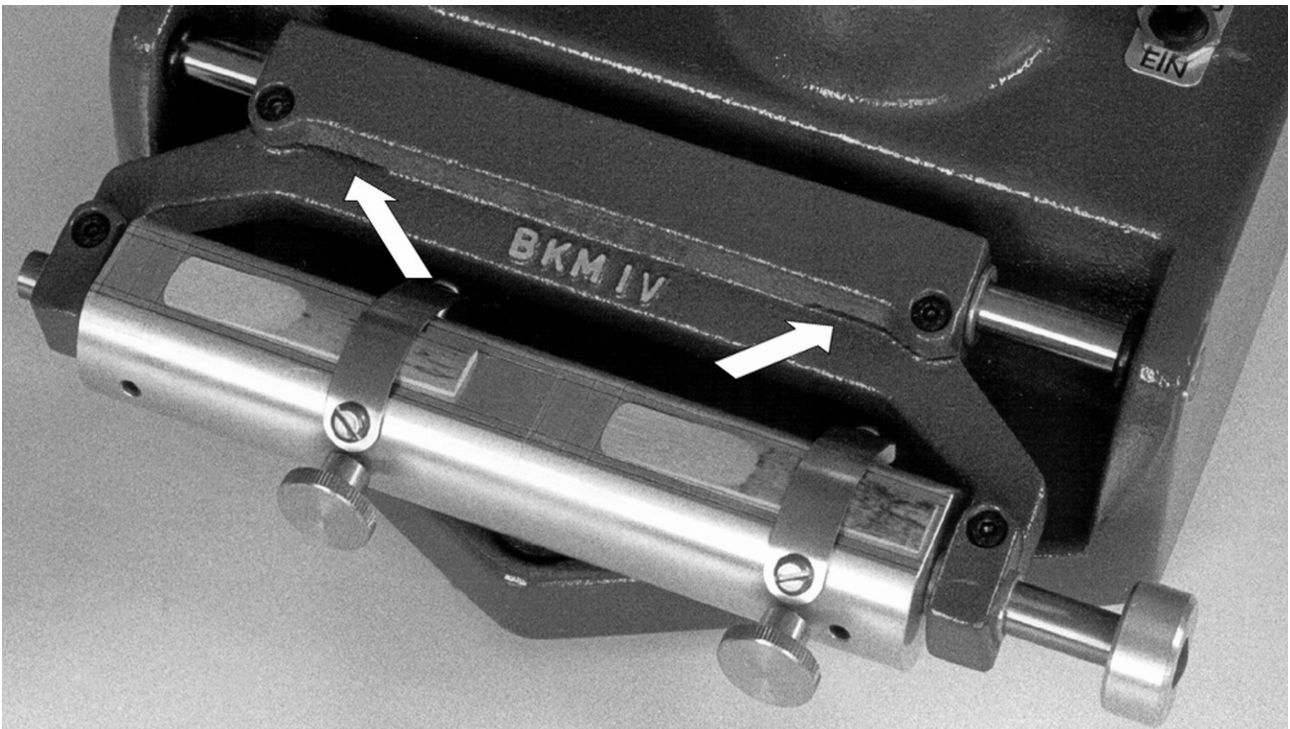


Fig. 9: Here you can lubricate the rail guide

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