OPERATING INSTRUCTIONS AND SPARE PARTS LIST

MUBEA PUNCH

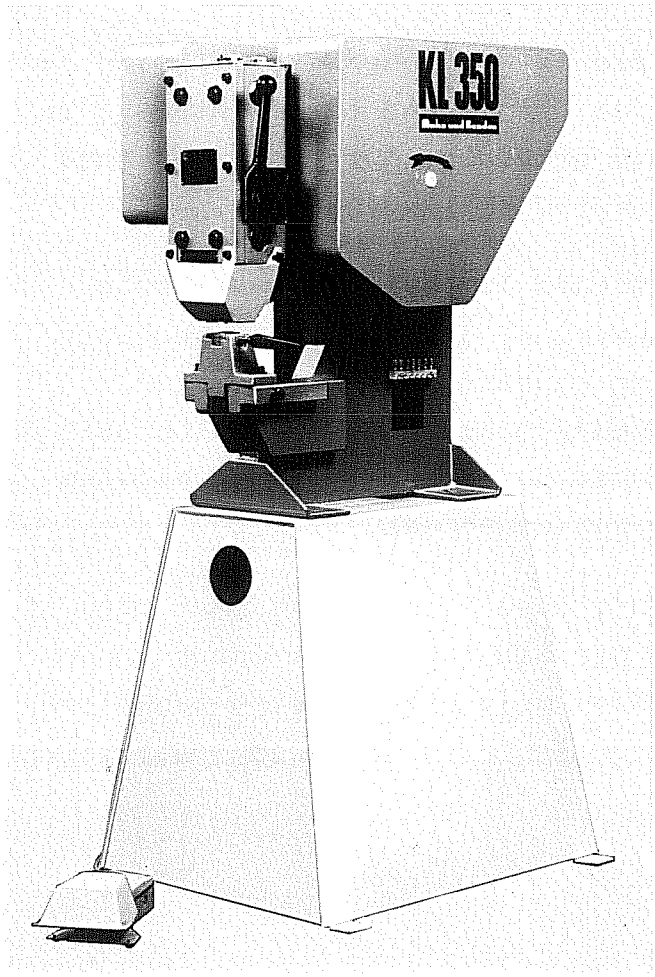
MODEL KL 350

Serial No.:
Type of Motor:
Motor Rating:
Operating Voltage:

OPERATING INSTRUCTIONS

SPARE PARTS LIST

General



You will soon realize that you have made a very good choice. Your MUBEA punch incorporates decades of experience as well as the latest technical knowledge in the punch and shear construction fields. Many satisfied customers confirm again and again that the merits of this machine become especially evident in everyday use.

Please read these operating instructions carefully and observe them closely so that you can be sure to truly benefit from all advantages of your punch.

Past experience has shown that this machine has an exceptionally long service life. All parts subject to normal wear can be replaced quickly and easily. It is essential to use original MUBEA replacement parts exclusively, as otherwise both the service life of the machine and the reliability of the punching results would be impaired. This also applies when you intend to install additional tools in order to extend the operative range of your machine.

It is indeed one of the special merits of MUBEA machines - as practical experience will convince you, too - that their operative range can be extended effectively, thus even increasing their versatility and efficiency.

A detailed survey of the individual machine components (including their ref. Nos.) and their interaction is provided in the back of these operating instructions.

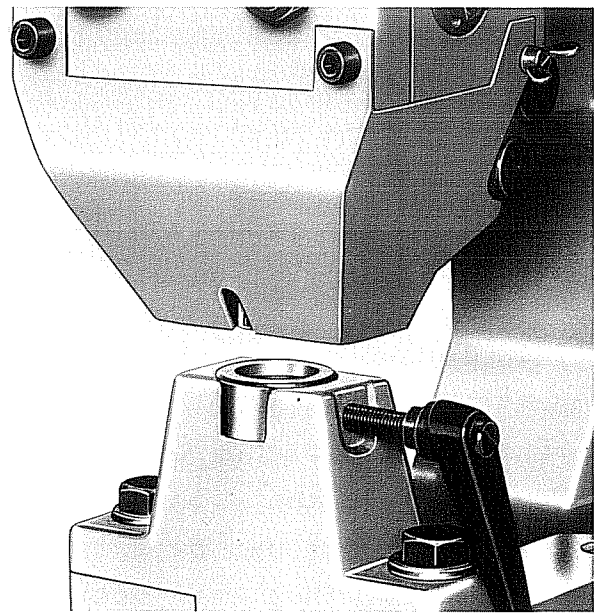
Should further information be desired, please do not hesitate to contact us - our Service Department is at your disposal. A service contract can be made on request on easy terms.

One more thing: Take good care of your machine, it is worth it. Some maintenance recommendations are included in these instructions.

Only punching equipment and tools may be used that are sufficiently guarded up to the cutting points to avoid injuries.

Your newly purchased MUBEA machine complys with the safety rules and the regulations for the prevention of accidents.

For the safety of the operator, the punching tool is provided with a guard, which is not shown in the pictures of the punch and the individual tools in these operating instructions in order to be able to demonstrate the functioning of machine and tools more clearly.



Punching tool guard

Transport

When moving the machine by means of a crane, it must be suspended by the lifting lug provided for that purpose.

For trucking, bolt the machine securely onto heavy boards.

The weight of your punch can be seen from the attached catalogue.

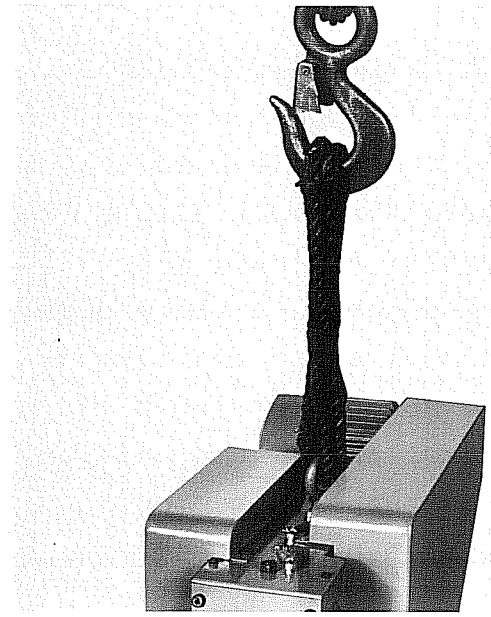


Fig. 1: Moving the punch with a crane

Installation

Machines purchased together with a rotary or stationary steel base can be installed on any level floor and need not be anchored. (The rotary or stationary steel base, which saves you the otherwise required foundation work, can be procured from us any time.)

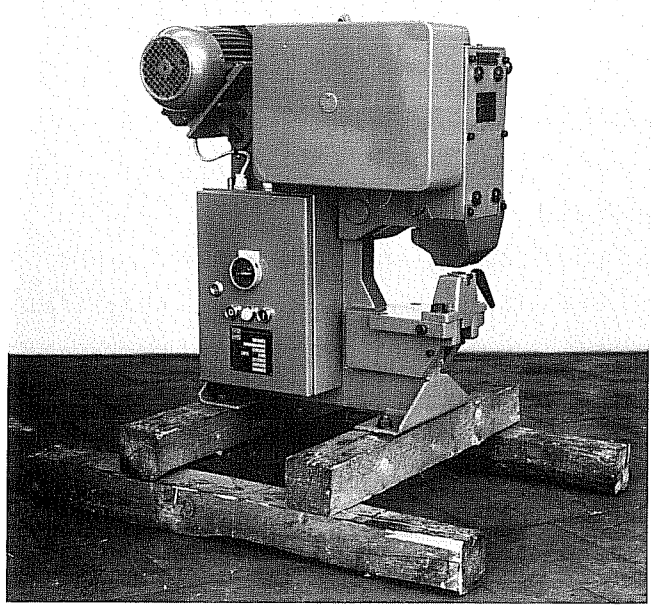


Fig. 2: Trucking the punch

If foundations are to be grouted, please refer to our attached foundation plan. Tighten the foundation bolts carefully after the grouting compound has set.

Make sure that the machine is in a perfectly vertical position.

As an alternative to the rotary or stationary base, an undercarriage can also be supplied by MUBEA subsequently. In case you already use an undercarriage, make sure that it is placed on a level floor and that its wheels are locked.

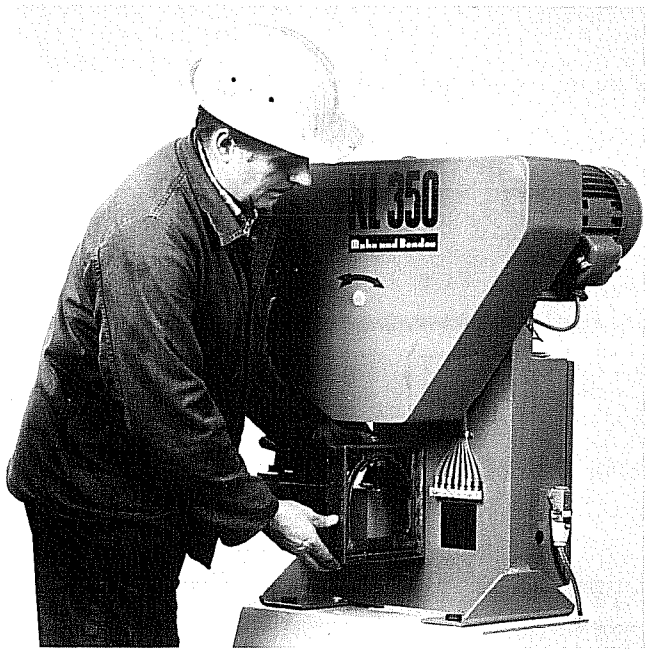


Fig. 3: Checking the position of the punch

Connecting and Commissioning

The machine is supplied ready for operation. The terminal to be connected to the power supply is in the control cabinet. For stationary punches, a cable duct is to be provided in the foundation. When punches are used in varying locations in conjunction with a base supplied by MUBEA, the connecting cable runs through the hole drilled through the side of the base.

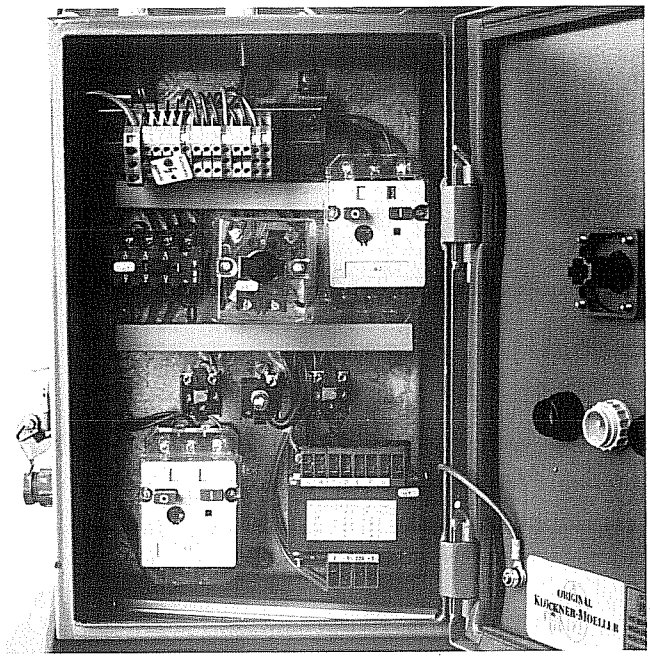


Fig. 4: Connection to the power supply

Connection must be made in accordance with the attached wiring diagram by a qualified electrician, who must make sure first of all that the voltage for which the punch has been designed is identical with the supply voltage.

Start the motor for a moment: If the flywheel does not rotate in the direction indicated by the arrow, two phases must be reversed.

Prior to starting operation, check the functioning of the slides and the tool setting. For that purpose the motor switch has to be actuated for a moment, while the pedal is closed, so that the engagement is released. To move the slides, turn the flywheel in the direction indicated by the arrow.

Lubricate the machine thouroughly, referring to the lubricating chart.

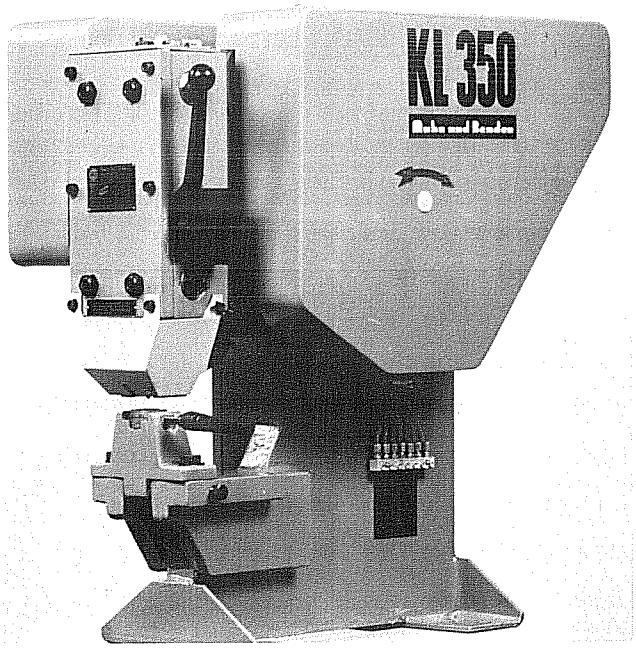


Fig. 5: Make sure the flywheel rotates in the right direction

CLUTCH AND ENGAGEMENT

1. Clutch

The machine is fitted with the well-proven MUBEA rolling key clutch, a rugged construction with reliable performance.

When the clutch is disengaged and the slide in its upper dead center position, the eccentric shaft does not move, while the clutch wheel turns on its journal.
By actuating the pedal, the rolling key stop A is swivelled off and the stop plate B thus released. The rolling key D is engaged by means of the tension spring C, whereby the eccentric shaft E comes into frictional connection with the clutch wheel. The rotating clutch wheel now drives the eccentric shaft and thus moves the slide (Fig. 7).

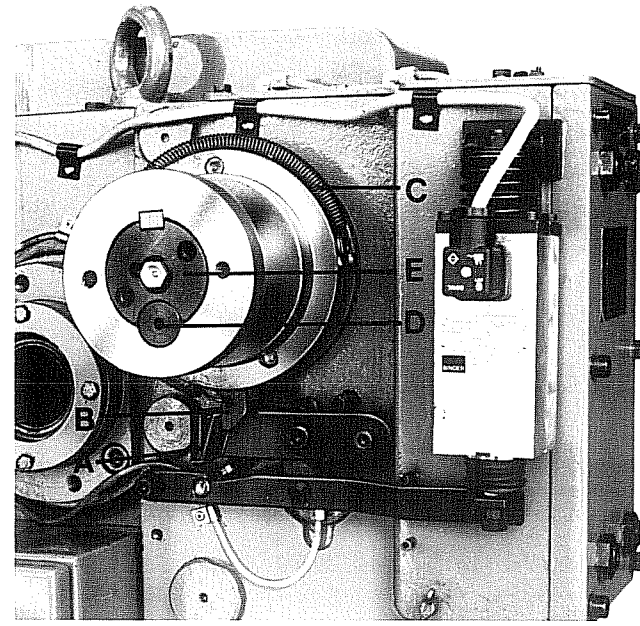


Fig. 6: Rolling key in disengaged position

After one complete revolution of the eccentric shaft the rolling key is disengaged again, and the eccentric shaft stops in the upper dead center position, while the clutch wheel continues to rotate freely.
If the rolling key starts to produce a clicking sound after the machine has been operated for some time, the eccentric brake A must be adjusted by tightening the fillister head screw B. (Fig. 8)

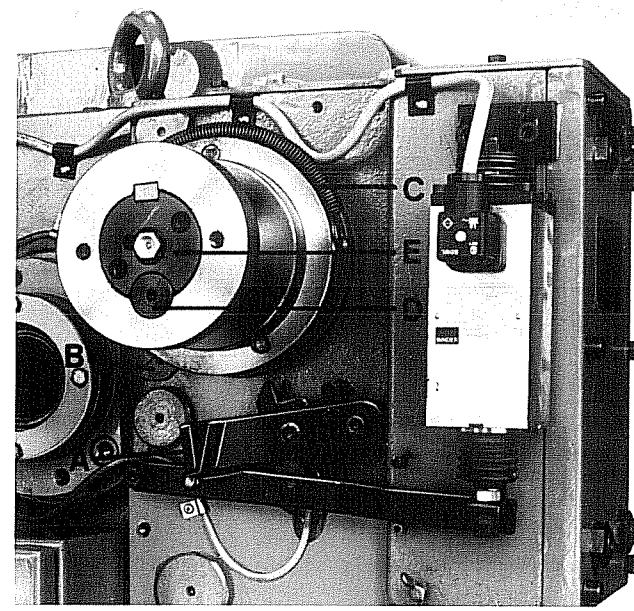


Fig. 7: Rolling key in engaged position

The clicking sound may also occur when the slide has too much play, so the slide guide must also be checked and reset, if required. (Please refer to the item headed "Resetting the Slide Guide".)

If during the punching operation the machine stops for some reason (e.g. because of a power failure or a blown fuse), the motor must be switched off immediately. If at that particular moment there is stock under the punching tool, the machine is subjected to heavy compressive strain. In order to relieve this strain, the flywheel and with it the clutch wheel must be turned back. The now unstressed rolling key can be swivelled out.

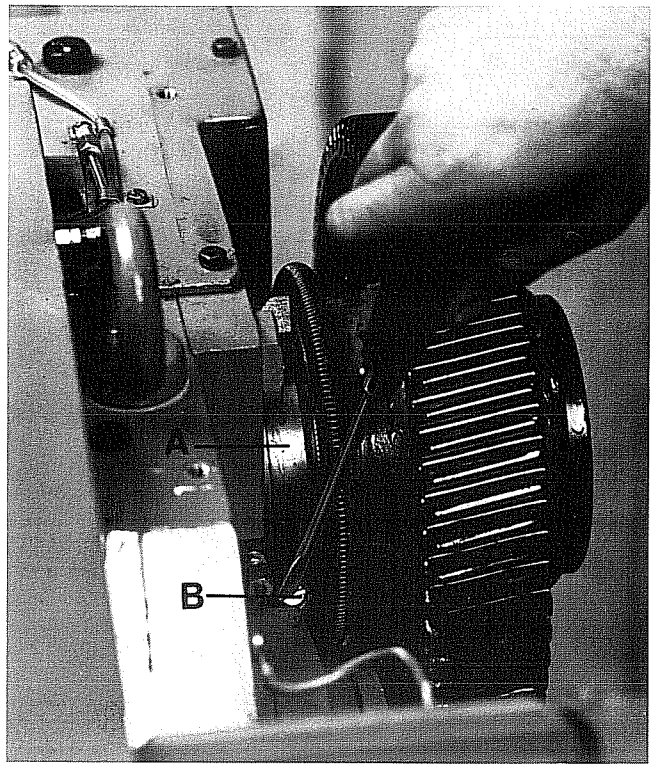


Fig. 8: Adjusting the eccentric brake

Since the eccentric has s t o p p e d at some point, stop plate B must be retained by hand. Then switch the motor on again, let flywheel and gear run up to top speed, and release the rolling key. It engages again, and the punching operation can be completed.

If the machine stops because it is overstrained (i.e. if the cross section of the stock to be processed is too large or its tensile strength too high), check first of all if the machine still functions properly or if it has been damaged. Stop the machine, turn on the slide, and then turn the flywheel by hand. (See "Commissioning".)

2. Single-stroke or repeat safety device

This safety device is absolutely reliable and complies with the accident prevention regulations. It prevents repeat of a working stroke even when the pedal switch is actuated. If the punch is to operate with continuous stroke, the single-stroke safety device must be neutralized by removing the disengaging pin (Fig. 10).

With the single-stroke safety device neutralized, the punch can be operated with continuous stroke for as long as the pedal switch is actuated.

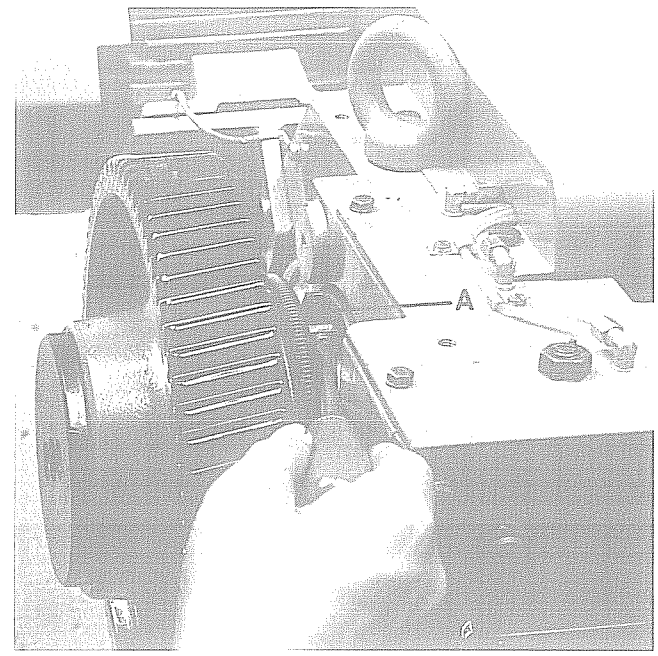


Fig. 10: Removing the disengaging pin

operator free to hold the work-piece. In addition, depending on the length of the cable, the pedal switch can be actuated from any point convenient to the operator.

3. Engagement

The clutch is actuated by a pedal switch, leaving both hands of the

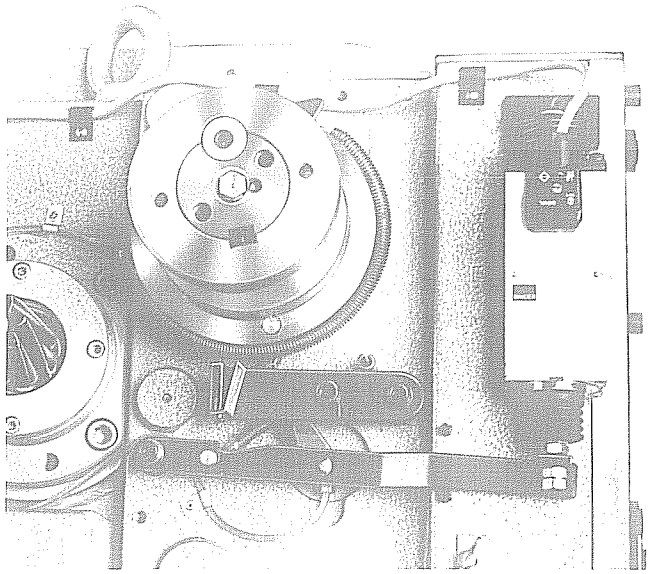


Fig. 9: Single-stroke safety device

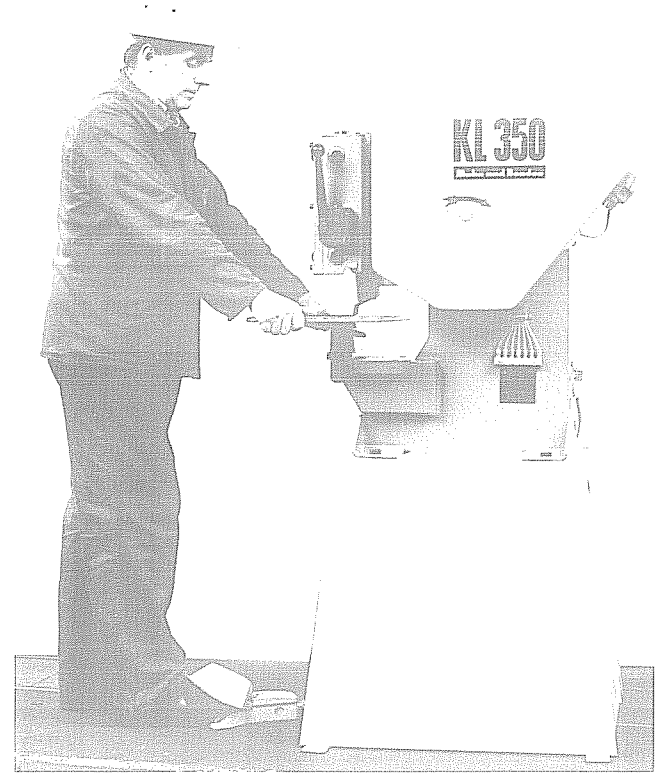


Fig. 11: Foot engagement

LUBRICATION

a) Lubricant

The punch must be lubricated with oil exclusively; the same oil can be applied to all lubricating points.
At the customer's option, the following brands can be used:

ARAL - Deganit B 220
viscosity 220 mm²/sec. at 40° C

SHELL - Tonna Oil T 220
viscosity 220 mm²/sec. at 40° C

MOBIL OIL AG - Vactra Oil No. 4
viscosity 212 mm²/sec. at 40° C

ESSO AG - Millcot K 220
viscosity 230 mm²/sec. at 40° C

BP - Energol HP - C 220
viscosity 220 mm²/sec. at 40° C

All lubricating points of the machine are painted yellow.

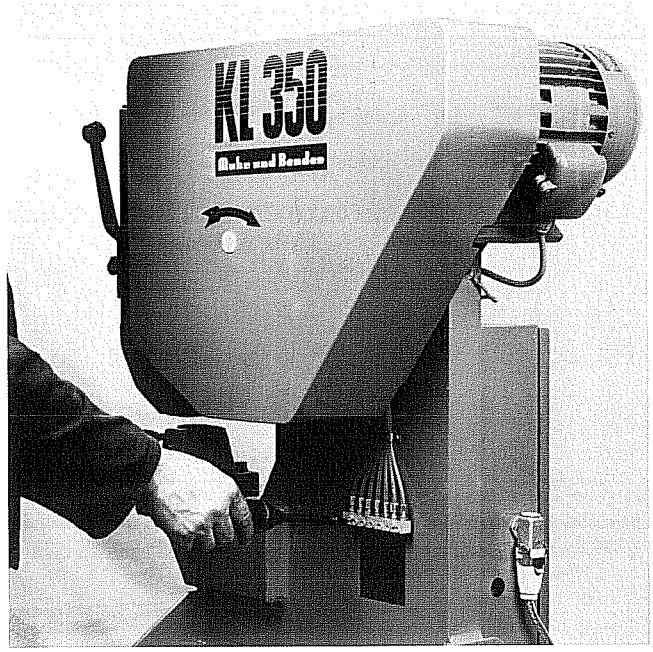


Fig.12: Lubrication with the oil gun

b) Manual Lubrication

Lubrication is made in accordance with the attached lubrication chart by means of an oil gun supplied with the machine. Make sure that the specified oil quantities are injected at regular intervals.
The grease on the gears will have been used up after a certain period of operation, which becomes noticeable through the increased noise of the gears. The gears must then be greased with a suitable gear grease (UNIGEAR ST 2 M, supplied by Klüber).

THE PUNCH

1. General

The design of MUBEA punches offers many advantages inasmuch as its operative range is far beyond the ordinary scope of a simple punch. It can perform many jobs that used to require an eccentric press.

Thanks to the very long slide with its large, nearly square clamping surface, large an projecting tools can be installed without any difficulties, as the length of the slide makes it possible to handle tilting forces.

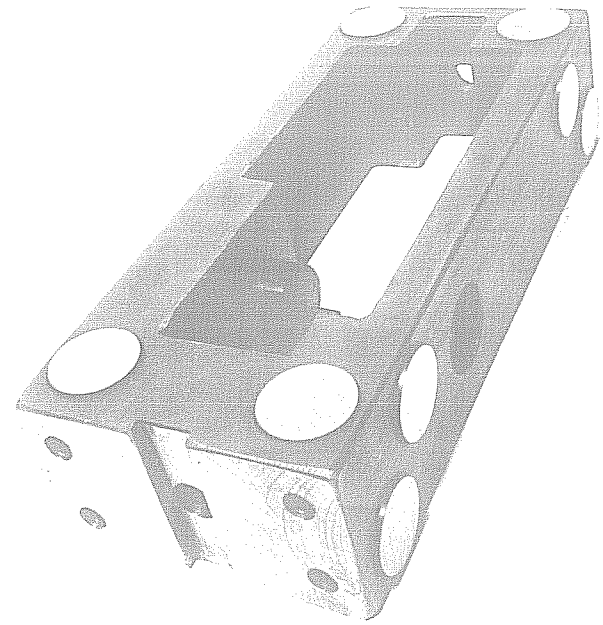


Fig. 13: Punch slide

2. Resetting the Slide Guide

After a long period of use, normal wear of the slide guides will allow horizontal movement at the bottom of the slide, especially when the slide is at the bottom of the stroke. This could allow the punch to hit the die and cause damage. The slide guides must be reset (see Paragraph 8).

Proceed as follows (Fig. 14 and 15):

a) Lateral adjustment

Loosen the locking screws A, and adjust the gibs B. Tighten them firmly, and then loosen them again by 1/16 of a turn to ensure a perfect running fit of the slide. Then drill a 4.5 mm hole into the gibs, and secure them by means of the locking screws A.

b) Adjustment at the front

Loosen the counternuts A by 1.h. turns. Use a screw driver to adjust the setting screws B, and with them the gibs.

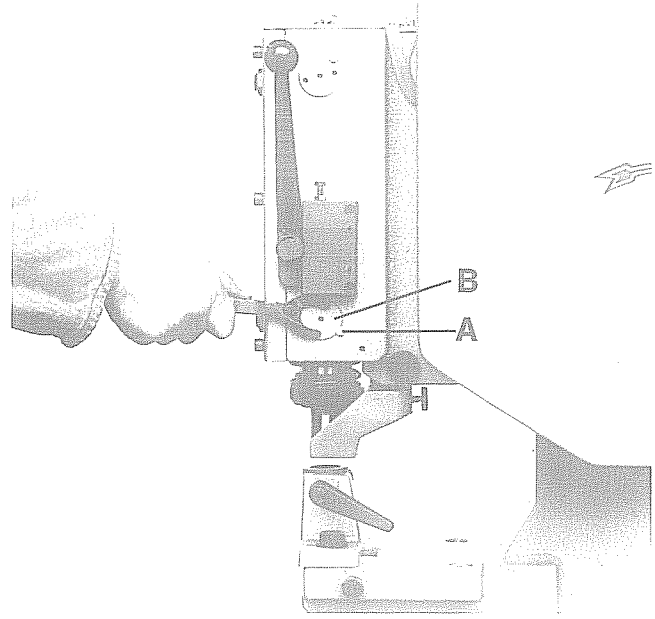


Fig. 14: Lateral adjustment of the slide guide

The setting of the guides is correct when, by actuating the spotter lever C, the slide can be moved up and down smoothly and cannot be moved horizontally by hand. The spotter lever automatically returns to its starting position when it is released. Retighten the counternuts A when the adjustment has been completed.

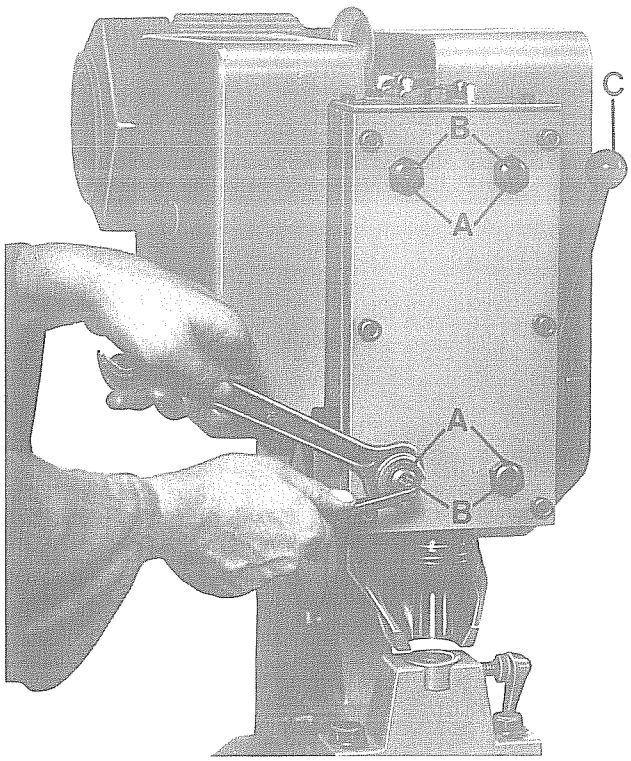


Fig. 15: Front adjustment of the slide guide

3. Punch Saddle

The design of MUBEA punches provides for a securely supported punch saddle A (Fig. 16 and 20). The saddle can neither move horizontally nor tilt, an essential advantage as far as tool life is concerned.

The punch support is amply dimensioned so that even projecting tools are safely supported and protected.

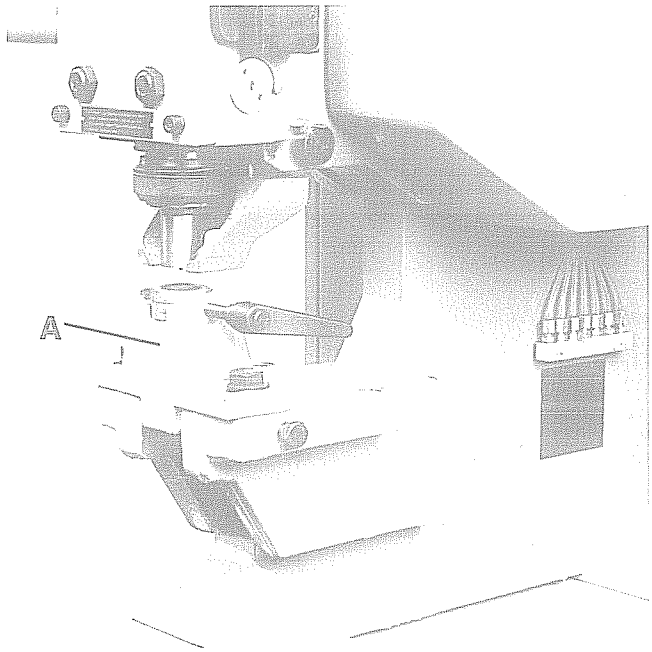


Fig. 16: Punch saddle

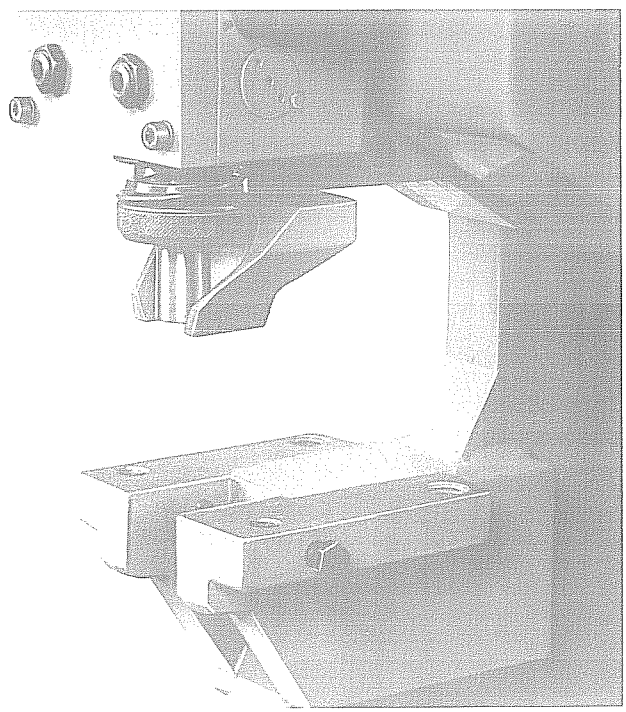


Fig. 17: Saddle support

4. Standardized MUBEA Punches and Dies

MUBEA punches and dies are available in 4 standard sizes, which fit all machines.

Size I up to and incl. 15 mm dia.
Size II from 15.5 to 30 mm dia.
Size III from 30.5 to 40 mm dia.
Size IV from 40.5 to 50 mm dia.

Standard tool holding fixtures hold punches and dies up to size II.

For punches and dies larger than size II, please refer to the item headed "Special Tool Holding Fixtures".

NOTE: For North America, the above does does not apply as machines use H I punches and dies in all standard sizes and shapes.

For punching holes in the flanges of channels or beams, we supply special flange dies with an inclined surface corresponding to the slope of the section flange. In addition, special punching equipment is required for this purpose.
For punching holes close to the web, flange or leg of small angles, channels or beams, eccentric dies with an offcenter hole near the edge of the die are required. When fitting eccentric dies, slide the punch saddle backwards until punch and die hole are co-axial again.

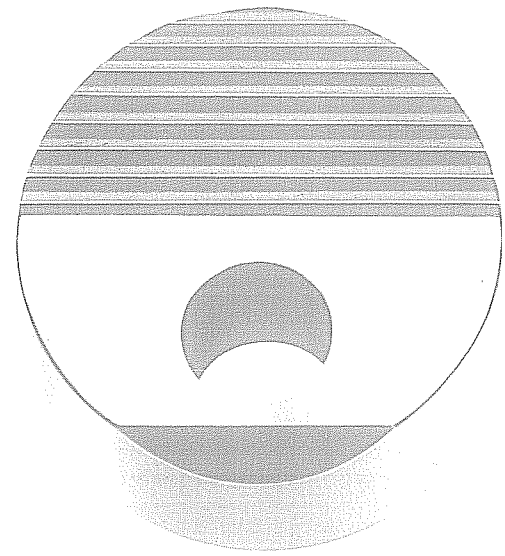


Fig. 18: Flange die for beams

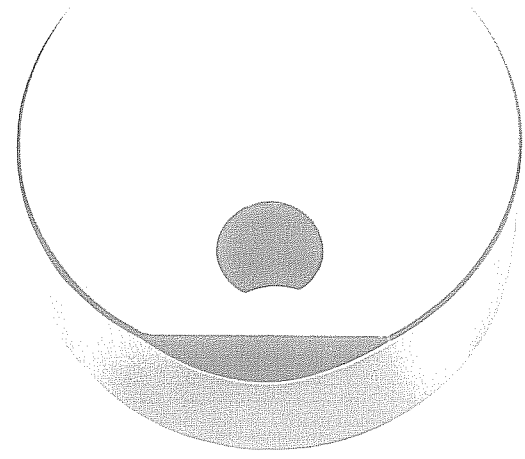


Fig. 19: Eccentric die for small angles

Eccentric dies are also required when angles under 45 mm leg length are to be punched.

Please ask for our detailed catalogue on standardized MUBEA punches and dies.

Only punching equipment and tools may be used that are sufficiently guarded up to the cutting points to avoid injuries.

5. Adjusting Punch and Die(Fig.20)

Punch and die must always be arranged concentrically. The die clearance should be approximately 5 percent of the thickness of the material to be processed. (E.g. when punching a thickness of 10 mm, the die hole diameter must exceed the punch diameter by 1 mm. The resulting die clearance is 0.5 mm.) Please be sure, therefore, to always indicate the thickness of the material to be punched, when placing orders.

Loosen the fastening bolts B to move the saddle forward and backward, and the setting screws C to adjust its lateral position. After punches and dies have been properly adjusted, the setting screws C and the fastening bolts B must be carefully tightened again.

6. Anti-Twist Device for Shaped Punches

Check the position of the tools from time to time during punching by lowering the punch into the die by means of the spotting device.
Square, oblong, or other shaped punches must be guarded against twisting. For that purpose every punch holder has a groove at the contact surface of the punch, and every shaped punch at the head surface. A round pin (dia. 4.7 mm = 0.185") is to be inserted into that groove.

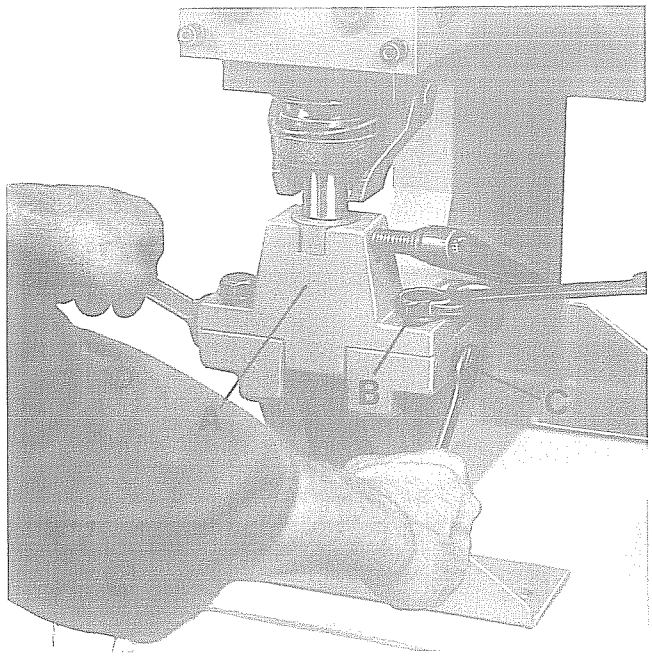


Fig. 20: Adjusting punch and die

7. The Stripper

The rugged stripper is adjustable to any stock thickness.

To adjust the height and whenever tools are changed, the stripper must be moved backwards into the throat after the locking screw A has been loosened (Fig. 21).

For height adjustment the knurled screw B (Fig. 21) must be loosened. When the stripper has become loose, the height adjustment to the specified stock thickness can be made.

Be sure to tighten the knurled screw again carefully after the adjustment has been completed.

8. The Punch Center Spotter

By means of the punch center spotter the slide with the punch can be lowered by actuating spotter lever C (Fig. 21) so that the point of the punch touches the punch mark in the material.

To actuate the center spotter, move the spotter lever down and then to the left to release the punch slide. It can now be moved down by raising the spotter lever again. The punch slide can only be moved to the top position by a new working stroke.
Release the spotter lever prior to starting the punching operation. The punch will remain in position on the workpiece, which can no longer be displaced.
Faulty punching is thus eliminated. The punch can now be engaged for the working stroke.

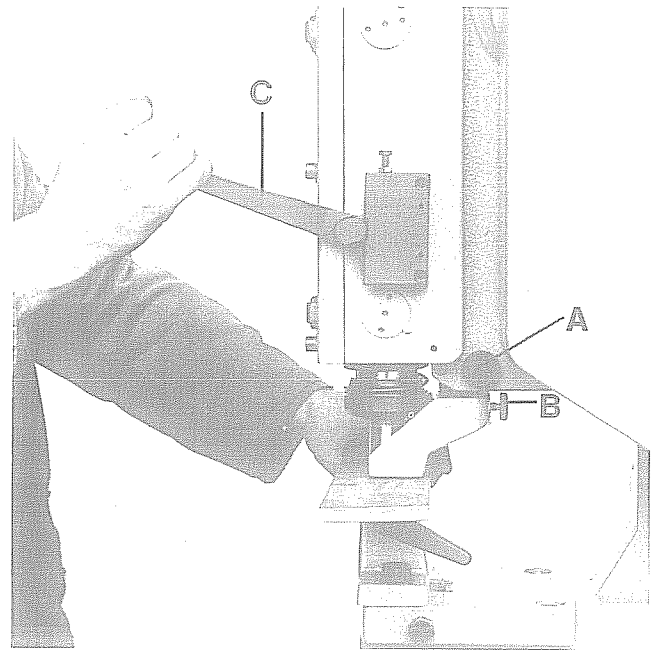


Fig. 21: Punch center spotter

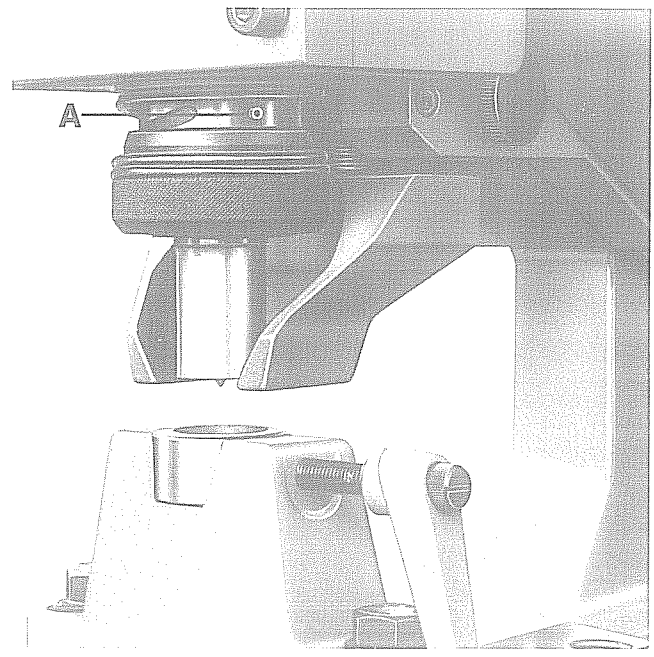


Fig. 22: Quick-change device for punches and dies

9. Regrinding the Punching Tools

Regrind punching tools at their faces only, as otherwise the clearance of punch and die would be altered. Apply oil to the cutting edges from time to time to achieve maximum tool life.

In many instances ordering new tools, perfectly ground and available at reasonable prices, is a better solution.

10. Quick-Change Device for Punches and Dies

The standard equipment of the machine includes a quick-change device for round punches and dies, which enables easy and reliable changing of both tools in no time at all.
This device is particularly recommended for small quantities requiring frequent tool changes.

The quick-change device can also be used for shaped punches and dies, but the die clearance must be checked on each change. Frequently, the saddle will have to be realigned, too. In addition, the outer punch ring must be retightened after the first hole has been punched, since the center pin will have been pressed into the alignment slot only after the first punching stroke; this is also required when the punch is secured by a coupling nut.

For processing larger quantities, we recommend the more positive punch securement by means of a coupling nut. To change from the quick-change device to the coupling nut, loosen the threaded pin A (Fig. 22) and screw off the now released centring ring. The coupling nut can then be used.
The quick-change device is installed in reverse order. If a punch cannot be fastened securely for some reason, the basic position of the centring ring must be adjusted. Loosen the threaded pin A (Fig. 22), adjust the centring ring slightly, and secure it again by means of the threaded pin.

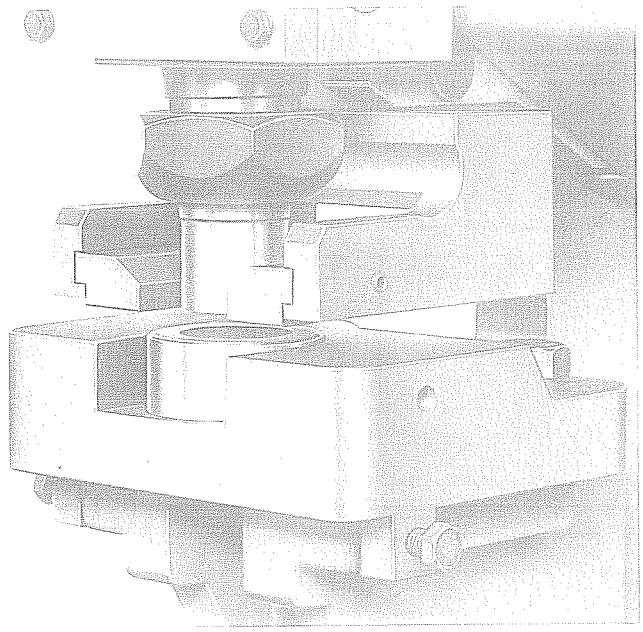


Fig. 23: Punching equipment accomodating punches and dies within the cutting range of 30.5 to 50 mm

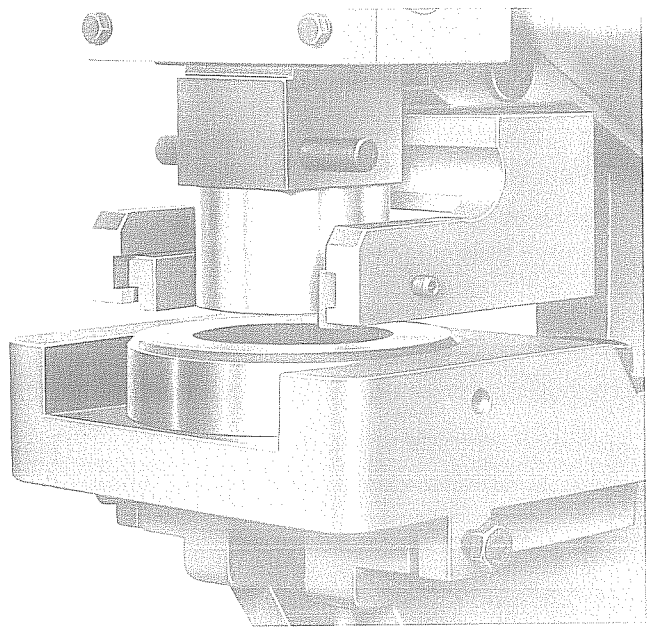


Fig. 24: Punching equipment accomodating punches and dies within the cutting range of 50.5 to 100 mm

11. Special Tool Holding Fixtures

The standard punch is equipped with a holding fixture for punches and dies with a cutting diameter of up to 30 mm.

For larger punches and dies, Muhr und Bender supply the following special tool holding fixtures:

Punching equipment accomodating punches and dies with cutting diameters ranging from 30.5 to 50 mm

All punching tools, e.g. round, square, rectangular, and oblong tools within the above cutting range can be installed in this tool holding fixture.

The complete equipment includes: Punch holder M 64, coupling nut M 64 with a 50 mm through hole, insert with a 40 mm through hole, stripper, saddle with an 80 mm seat, and die holder 80/60.

The punches are secured with a coupling nut. All shaped punches are grooved so that the tools can be fitted both longitudinally and laterally. When ordering tools, please indicate the thickness of the material to be punched and its tensile strength.

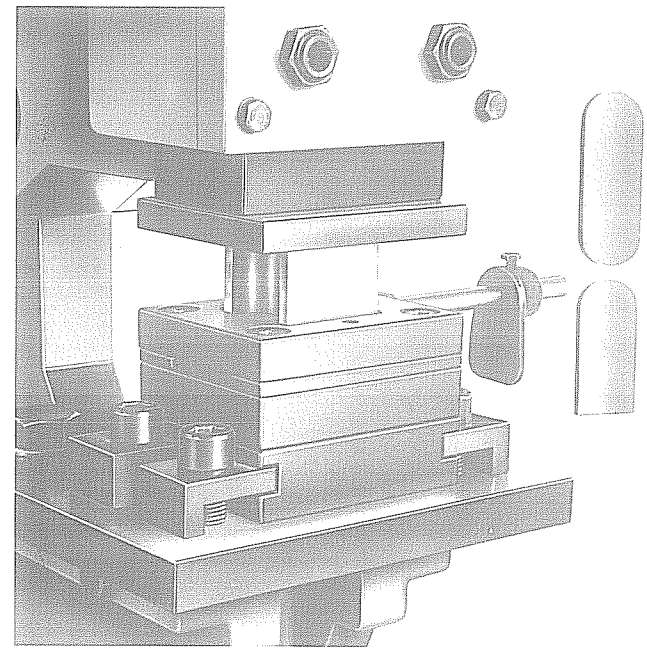


Fig. 25: Tool for fishplate production

Punching equipment accomodating punches and dies within the cutting range of 50.5 to 100 mm

This tool holding fixture, which consists of punch holder, stripper, and punch saddle, accomodates all punching tools, e.g. round, square, rectangular, and oblong tools, within the above cutting range.

When ordering shaped punches (oblong and rectangular), please indicate whether the tools are to be fitted longitudinally or laterally. In addition, the thickness of the material to be punched and its tensile strength must always be indicated. The punches are fixed with a wedge.

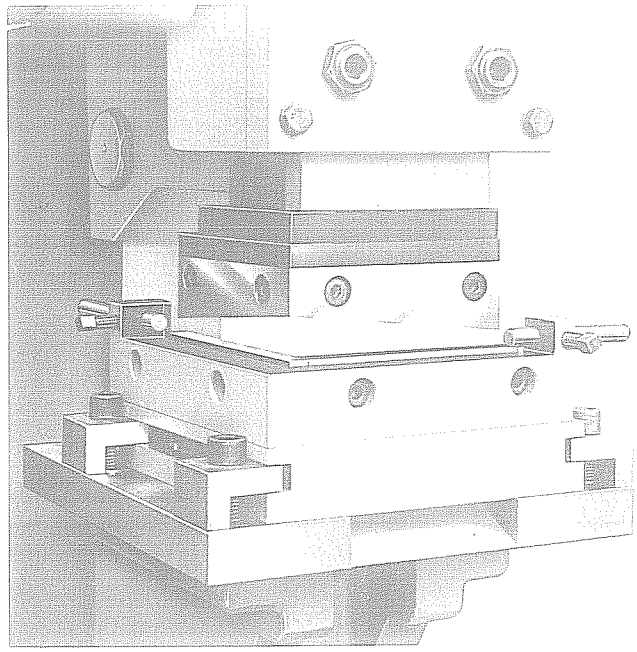


Fig. 26: Corner shears

12. Special Tools

With MUBEA's various special tools, manufactured in the company-owned tool shop, precise results are achieved even when intricate punching and coping jobs must be handled.

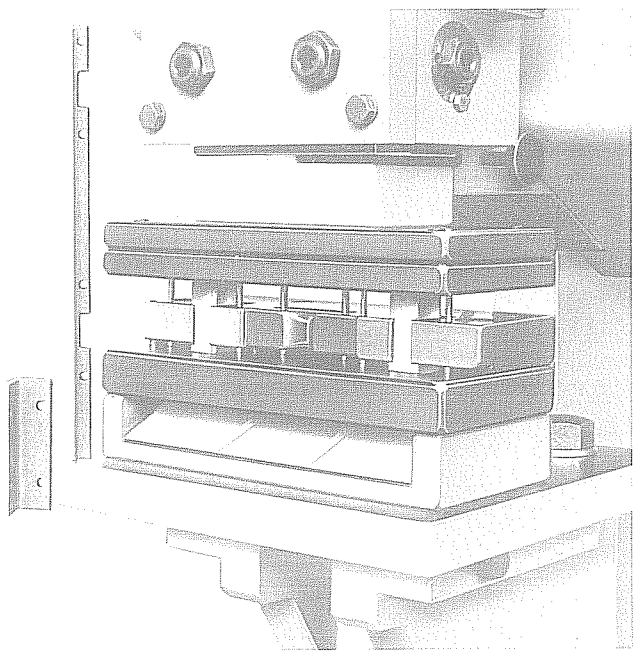


Fig. 27: Special shearing and coping tool