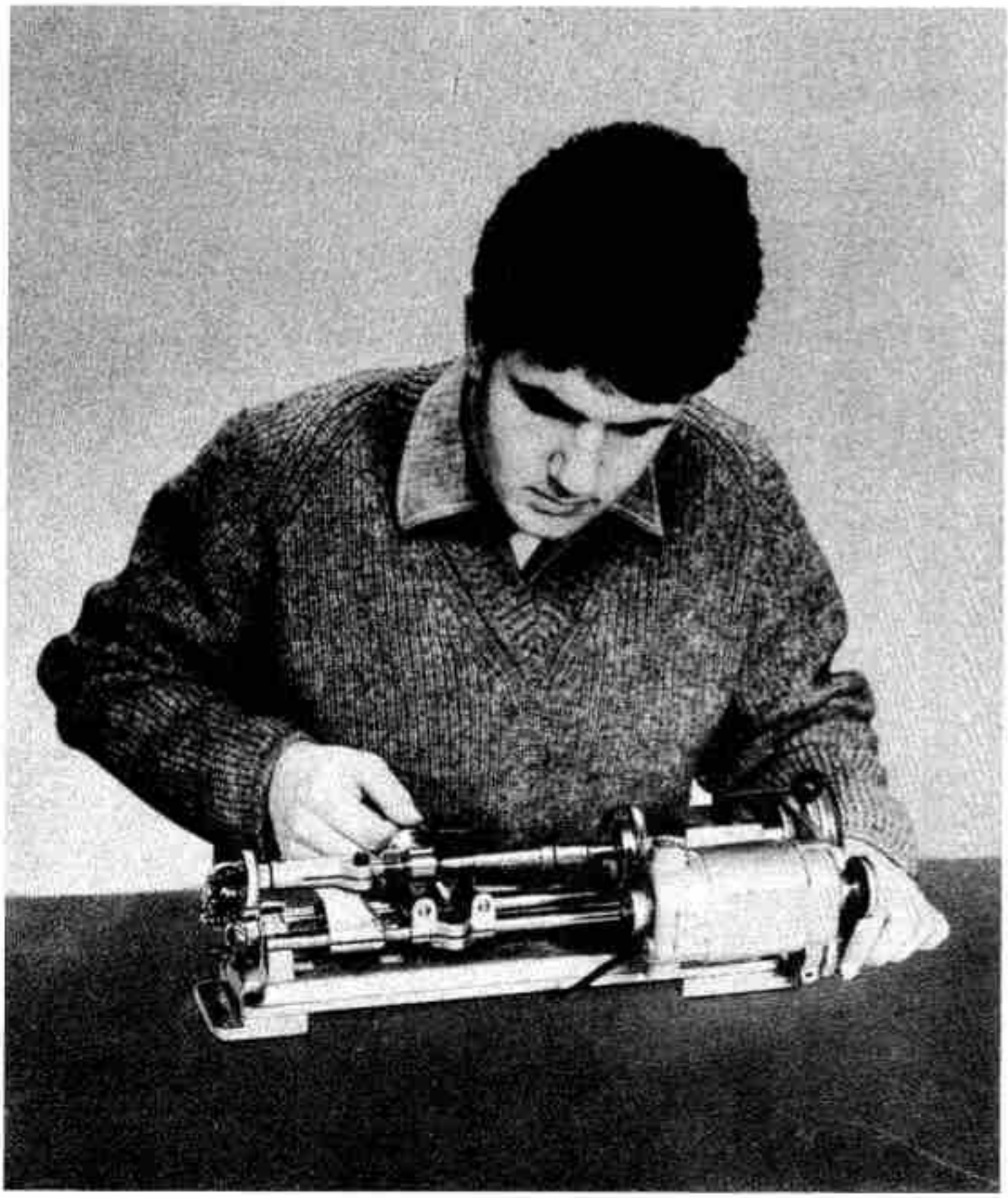
OPERATING INSTRUCTIONS
for the
emco-unimat
Model SL
SMALL MACHINE TOOL



Ref. EN2 020 Auflage 7606 Englisch

WHO USES THE UNIMAT ?

First of all any resourceful hobbyist, model maker and 'Do-it-yourself' enthusiast, of course. But also in the research laboratory, precision machine and optical workshops, etc. - in fact everywhere that precision and true-to-form models parts have to be turned out - the UNIMAT finds a ready application, thanks to its versatility. The UNIMAT is gaining increasing favour as a medium of instruction : In the physics laboratory it is a readily adaptable appliance - without the need for any supplementary mounting fixture - for centrifugal force tests, for demonstrations in the study of wave mechanics, for colour gyroscopics, rotating mirrors, perforated diaphragms and for many other theoretical tests. And if at any time any of the educational equipment has to be repaired, or some provisional item has to be replaced, the UNIMAT proves doubly valuable !

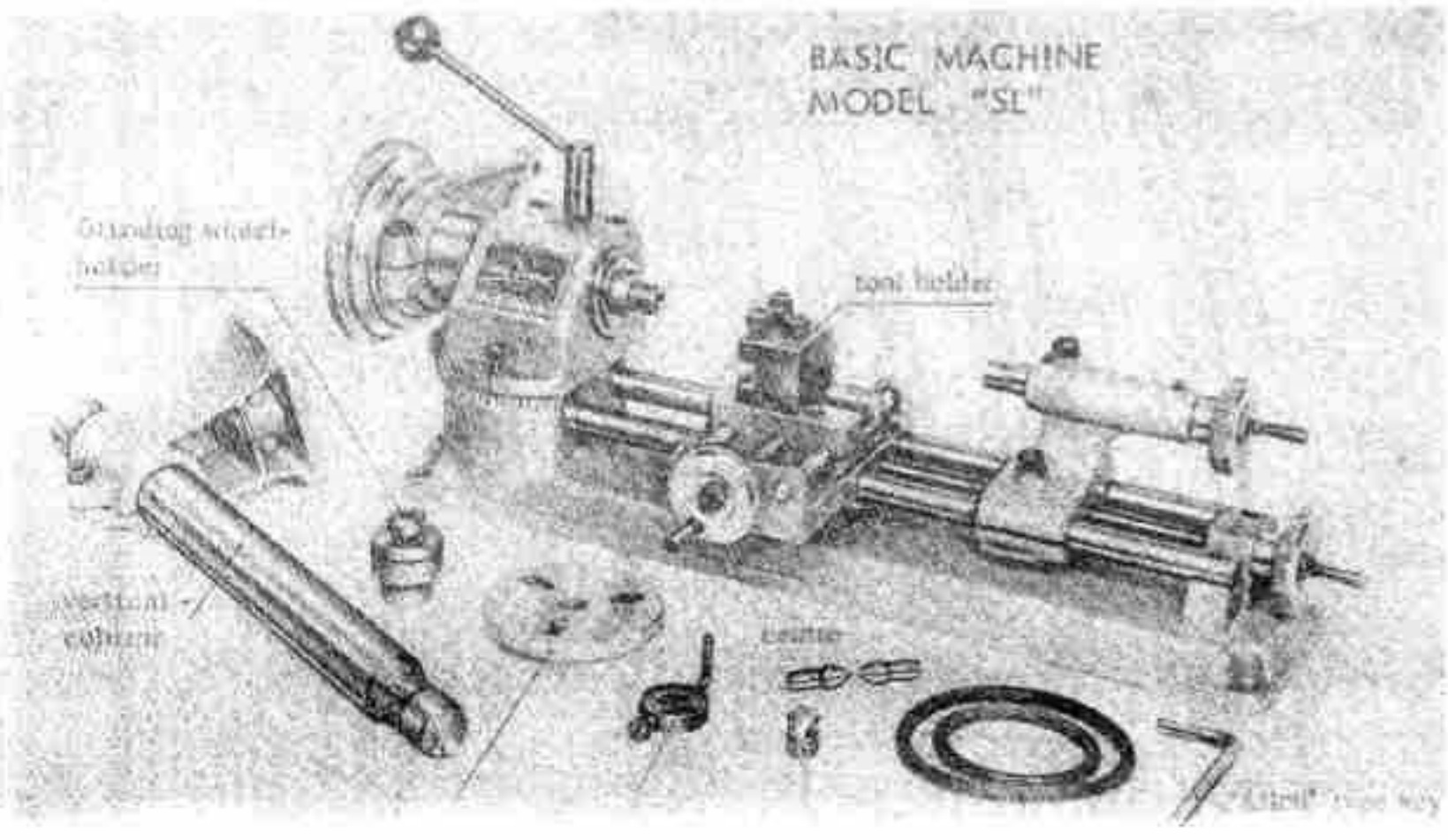
WHAT DOES THE UNIMAT DO ?

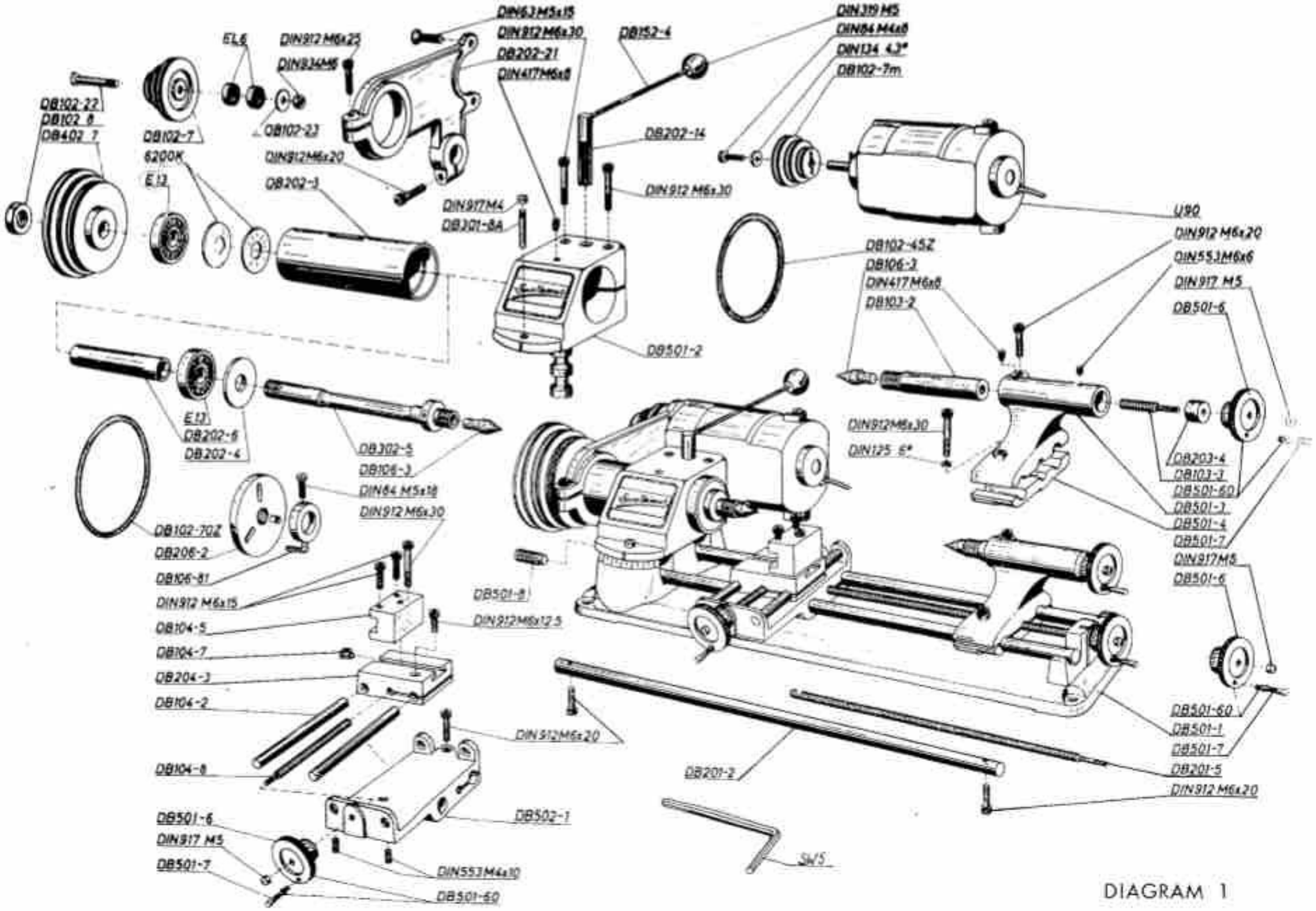
The EMCO - UNIMAT is a universal machine tool in the best sense of the word; all types of metalworking can be carried out expertly and precisely : turning, drilling and milling, thread-cutting, circular sawing and grinding; in addition to this the UNIMAT is also an ideal multi-purpose machine for woodworking and for the processing of synthetic resin and similar materials. By using the appropriate accessories you can carry out fretsawing, keyhole sawing and circular sawing, face and angular grinding, as well as lathe turning.
The motor output is 90 Watts, - power enough to perform all work processes expeditiously.

HOW DOES THE UNIMAT WORK ?

The metalworking expert will, of course, quickly be "au fait" with the various functions of the UNIMAT , but even he, without doubt, will gain enthusiasm for various other application possibilities of the UNIMAT from these operation instructions.
For the beginner, naturally, the basic text of the operating instructions is an indispensable prerequisite of the expert handling of the machine and thus also of satisfactory working results.
With this in mind we wish you -

much pleasure and good results !

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DB102-7m
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DB402-7
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DB202-14
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DIN 917 M4
DB301-8A
DB501-2
U90
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DIN 553 M6x6
DIN 917 M5
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DB502-1
DIN 553 M4x10
DB501-60
DB201-2
SW5
DB501-60
DB501-1
DB501-7
DB201-5
DIN 912 M6x20

DIAGRAM 1

E M C O U N I M A T SL

TECHNICAL DATA :

Lathe	Height of centres over pillars		1 13/32"
	Width between centres		6 3/4"
Drilling and Milling machine	Drill height 3 7/8"	Overhang	3 3/8"
		Drill travel	3/4"
Grinding machine	Maximum diameter of grinding wheel		2 3/8"
Motor output	90 Watts 110 or 220 Volts 4,000 r.p.m. under load		

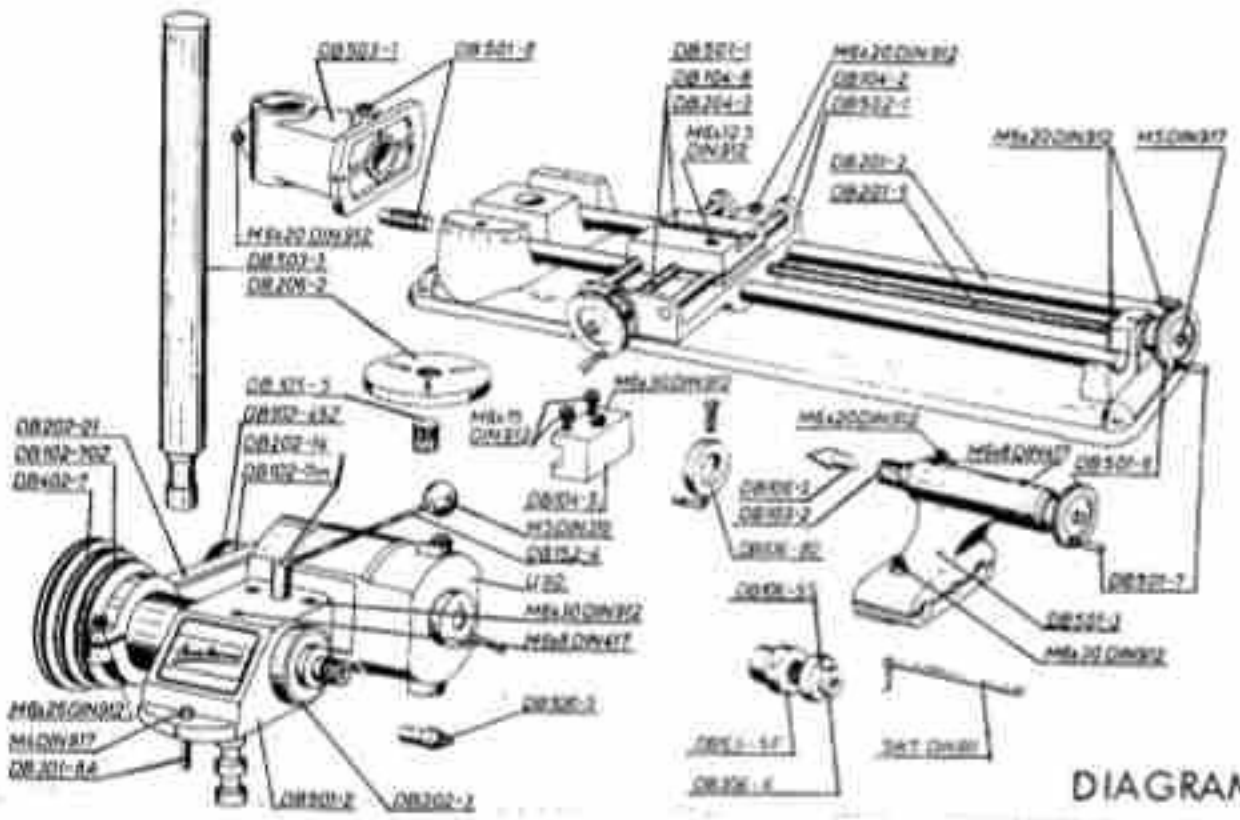
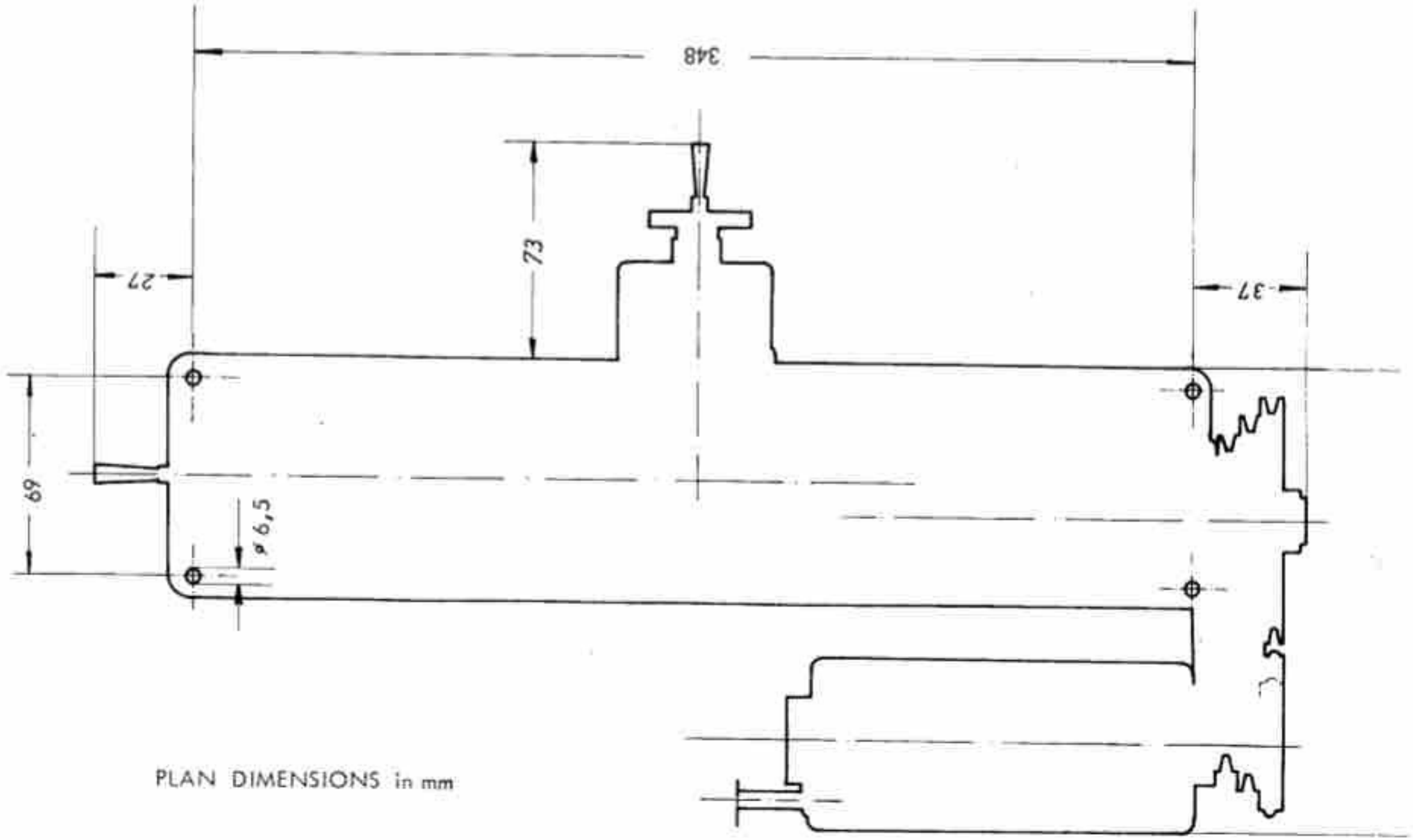


DIAGRAM 2

PART NUMBERS:

DB 102 - 7	Idler pulley	DB 202 - 14	Pinion
DB 102 - 7 m	Motor pulley	DB 202 - 21	Motor bracket
DB 102 - 8	Nut	DB 203 - 4	Guide pin
DB 102 - 22	Bearing bolts	DB 204 - 3	Carriage
DB 102 - 23	Cover disc	DB 206 - 2	Face plate
DB 102 - 45 z	Belt	DB 301 - 8 A	Marker pin
DB 102 - 70 z	Belt	DB 302 - 5	Main spindle
DB 103 - 2	Tailstock sleeve	DB 402 - 7	Belt pulley for spindle
DB 103 - 3	Drive screw	DB 501 - 1	Bed
DB 104 - 2	Guide column	DB 501 - 2	Headstock
DB 104 - 5	Tool holder	DB 501 - 3	Tailstock
DB 104 - 7	T-nut	DB 501 - 4	Clamping plate
DB 104 - 8	Threaded spindle	DB 501 - 6	Hand wheel
DB 106 - 3	Centre	DB 501 - 7	Tapered handle
DB 106 - 81	Lathe dog	DB 501 - 8	Tension screw
DB 152 - 4	Long locking handle	DB 502 - 1	Support
DB 201 - 2 V	Guide column	6200 K	Cup spring
DB 201 - 5	Threaded spindle	SW 5	Allen key
DB 202 - 3	Spindle head sleeve	EL 6	Ball bearing
DB 202 - 4	Spindle wheel	E 13	Ball bearing
DB 202 - 6	Distance bush	U 50	Motor

DIAGRAM 3

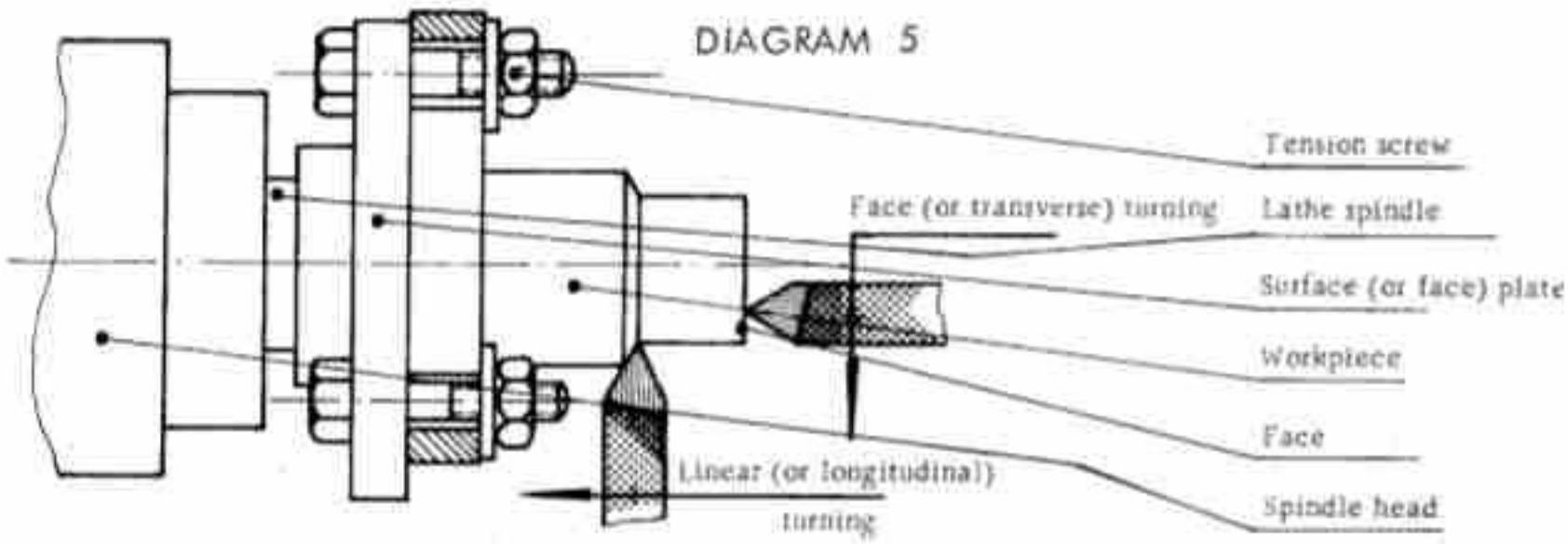


PLAN DIMENSIONS in mm

Basic work procedures on the lathe :

What, in fact, do we understand by turning ?
If we tension a workpiece in a suitable appliance, e.g. between centres, on a surface (or face) plate, in a lathe chuck, or a tensioned clamping device and drive this by means of a motor (over belt pulleys connected to the driving belt), the workpiece rotates with it in the corresponding gear ratio. From this rotary movement of the workpiece we derive the definition "turning." Basically we differentiate between two operating possibilities of the lathe :
On the one hand linear (or longitudinal) turning, by which we understand the circumferential turning down of a workpiece, i.e. to a specific diameter. On the other hand face (or transverse) turning, by which method of turning the face of a workpiece is machined.

DIAGRAM 5



With all lathe turning work care must be taken to ensure that the workpiece is securely tensioned. From time to time you should also check the workpiece to make sure it is firmly held. (Grip the tensioning device with one hand and try to move the workpiece with the other. If the workpiece is loose, thghten up the tensioner.)

Tensioning of the workpiece :

We differentiate between various methods.
We can clamp the workpiece (a round metal rod) between the centres of the tailstock and the spindle head and ensure by means of a take-up device (in this case the driver) that it is taken up by the surface (or face) plate. (See diagram.) In order that the workpiece may be tensioned between the centres, centre holes must be drilled on the face ends of the workpiece. One can, however, insofar as the workpiece is of suitable shape (e.g. flange-shaped), clamp it to the surface plate. (See Diagram 5). Tensioning is by means of tension screws. After clamping a check is taken by a short trial run that the workpiece runs true and does not hit. If it only touches slightly the error may be corrected by light taps on the workpiece, with the machine stationary. If it touches very much, the workpiece must be re-tensioned.
A workpiece clamped to the surface plate can be transverse - as well as longitudinally turned.
As further methods of clamping the threee-jaw lathe chuck (Order No. 1001) may be mentioned here. The three jaws provide automatic centering, as with a drill chuck.

Now for the work :

As longitudinal turning is one of the simplest operations, we will for the first time

workpiece down to a specific diameter. Take a circular aluminium or brass rod (soft metals are more suitable for the first attempt than steel), of about 3/8 " diameter and with a hacksaw cut it to a length of about 2". Try to make sure that the saw cuts are as far as possible perpendicular to the axis of the rod (i.e. square), as this simplifies the work considerably (if necessary true up the cut faces with a file).

Centering and drilling the centre holes :

So that the workpiece can run true between the tailstock and spindle head centres, centre holes must be drilled at the middle of the two face surface of the workpiece, into which the tips of the tailstock and spindle head centres are inserted. Before a hole is drilled in a workpiece the hole centre must be centre punched, otherwise the drill will run off centre. To centre mark the workpiece clamp it in a vice and locate a centre punch (obtainable from any hardware shop) exactly at the centre point of the face end, making a pot mark by means of a hammer blow, so that the drill can be centred in the indentation. This process is repeated on the other face end.

Drilling the centre holes :

Drilling of the centering holes can be done on the lathe. To do this we unscrew the face plate (see Diagram 7) and in its place screw on a three-jaw drill chuck, available as an accessory (Order No. 1005), insert the centering drill bit into the chuck and clamp it tight with the key. We then insert the centre into the tailstock, hold the workpiece between the centering drill and the centre tip and, after slackening the bottom clamping screw in the tailstock, move it by hand in the direction of the spindle head until the drill contacts the workpiece at the other centering hole. By re-tightening the internal hexagon-headed screw in the base of the tailstock, the latter is firmly clamped to the guide pillars of the lathe bed.

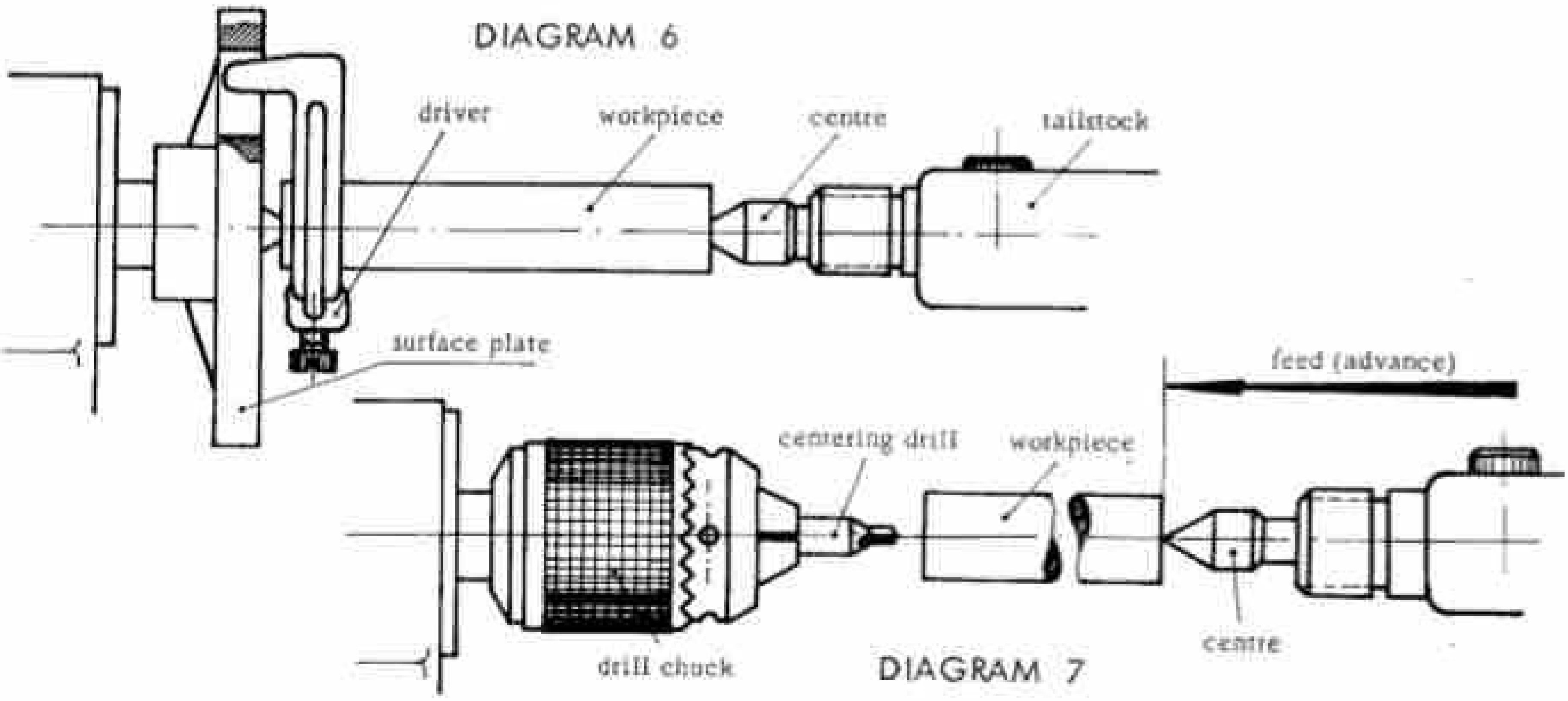


DIAGRAM 6

DIAGRAM 7

The workpiece remains clamped between the drill centre on the left hand and the lathe centre on the right hand side, which centres rest in the shallow centering holes. Now unclamp the tailstock sleeve by anti-clockwise turns of the upper clamping screw. If you turn the handwheel [illegible] stock to the right, the tailstock sleeve with centre [illegible] [illegible]