

# SCHAUBLIN 53

## UNIVERSAL MILLING MACHINE

# SERVICE INSTRUCTIONS

To be handed to the operator in charge of the machine.

Reproduction of the text, drawings and illustrations is prohibited. Dimensions, weights and illustrations are given for guidance only, and all details of design are subject to alteration without notice.

Machine N° :

BL \_\_\_\_\_ N° :

Voltage \_\_\_\_\_ :

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# SCHAUBLIN 53 UNIVERSAL MILLING MACHINE

## MAIN TECHNICAL DATA

### 1. TABLE :

Useful area	1100 x 255 mm
Number of T-slots	4
Width of T-slots	14 mm
Distance between T-slots	50 mm

### 2. TRAVERSES OF TABLE :

Long feed	700 mm - powered
Long feed for spiral milling	550 mm - powered
Vertical feed	430 mm - powered
Cross feed	250 mm - powered

27 1/2"  
21 1/2"  
17"  
10"

### 3. POWER FEEDS OF TABLE :

18 long and cross feeds	12 to 1000 mm/min.
18 vertical feeds	6 to 500 mm/min.
Quick-traverse long and cross feed	3500 mm/min.
Quick-traverse vertical feed	1750 mm/min.

### 4. MILLING SPINDLE :

Outside diameter of nose :	88,88 mm (3 1/2")
Internal taper, one end of spindle	VSM 33931 - size 44
other end of spindle	Bored for 25P collet
Reducing bush for	Worse 1, 2 and 3 collets
Diameter of short and long	
cutter arbors	16, 22, 25,4, 27 and 32 mm
Inclination of spindle	All angles in all planes

### 5. SPINDLE SPEEDS :

18 speeds	38 to 1500 r.p.m.
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### 6. ELECTRIC MOTORS

Spindle drive :	
Power	4 HP
Speed	1425 r.p.m.
Quick traverse :	
Power	1,1 HP
Speed	2800 r.p.m.

### 7. Approximate net WEIGHT of machine :

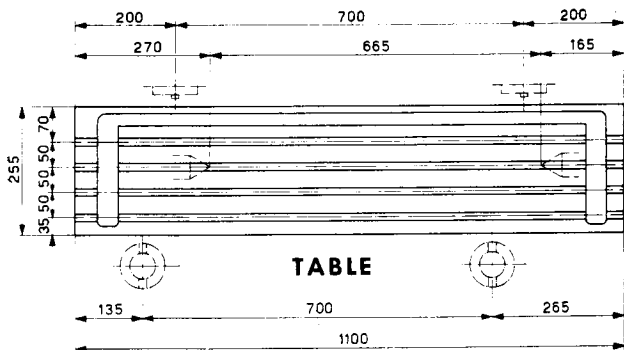
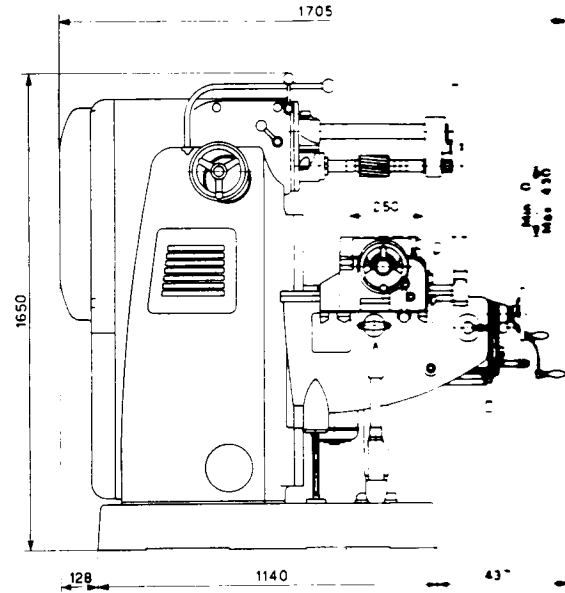
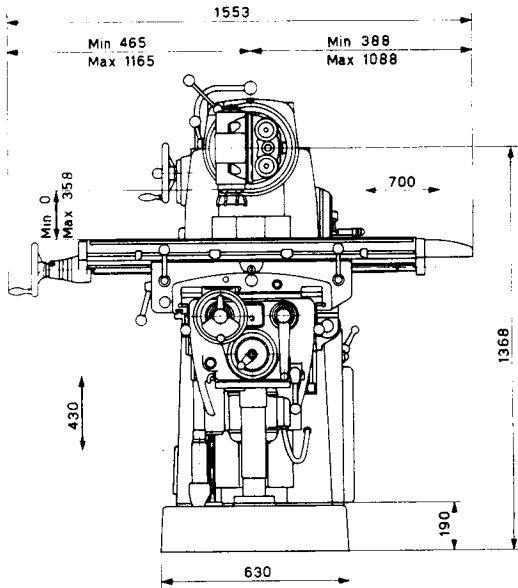
1650 kilograms  
(3660 lbs)

### OVERALL DIMENSIONS

Length, depth, height	226 x 172 x 165 cm
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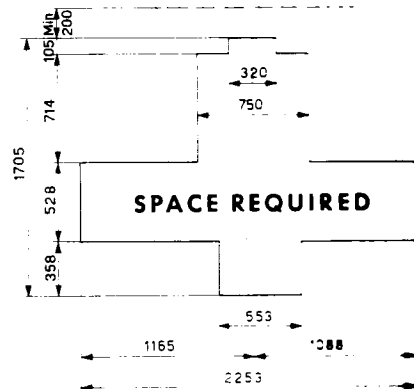
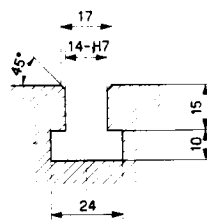


# SCHAUBLIN 53 HIGH-PRECISION UNIVERSAL MILLING MACHINE



TABLE

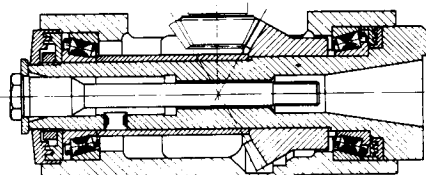
## T-SLOT



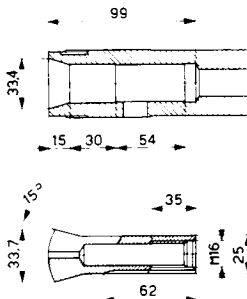
SPACE REQUIRED

## DOUBLE-NOSE CUTTER SPINDLE

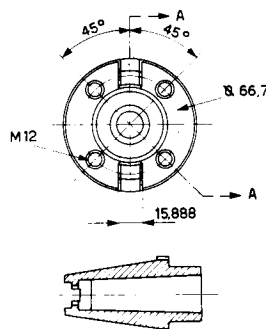
Bore for collet type P 25



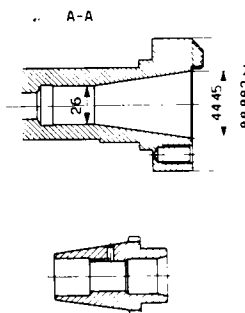
Taper: 80 40 NS 18 7  
SV 3393 528 48  
CN 209 528 48



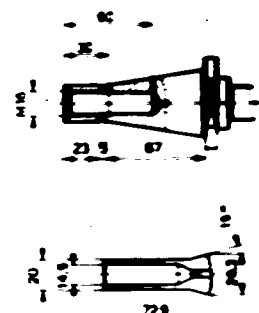
Collet type P 25  
Bores dia. 3 to 20 mm  
(1 1/8 to 25/32")



Reduction bush  
with Morse taper  
No. 1, 2, 3, or 4

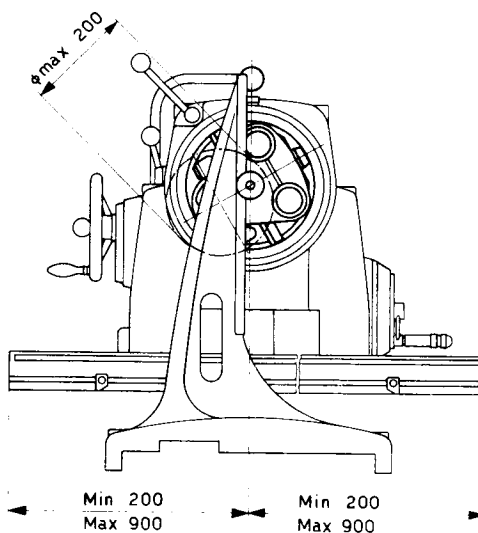
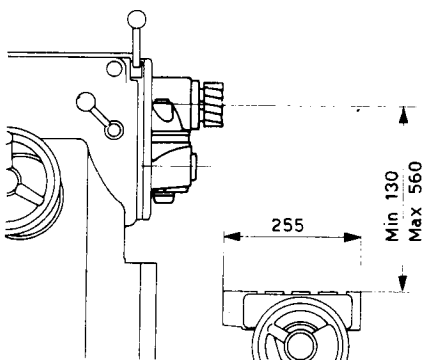
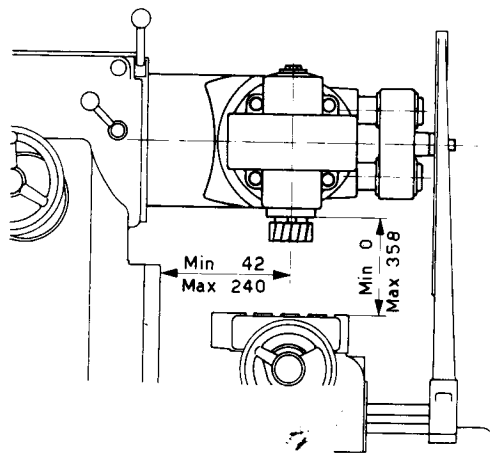
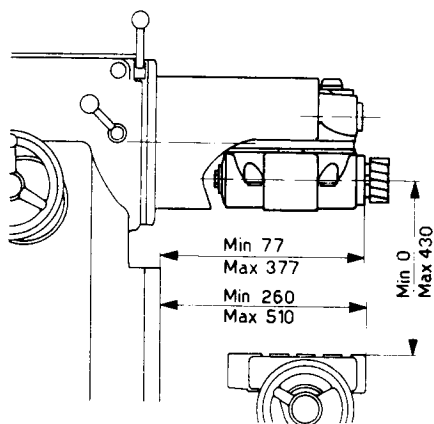
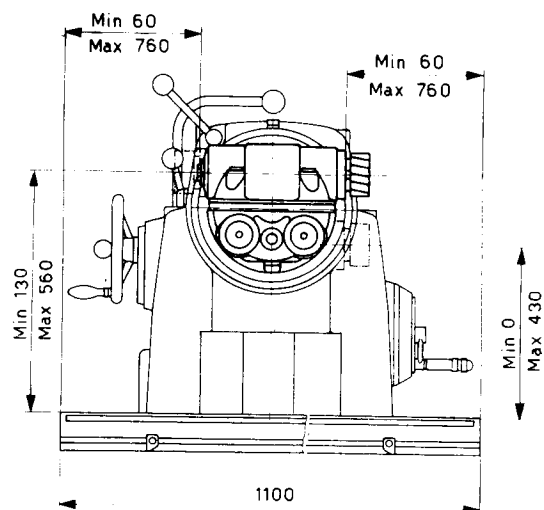
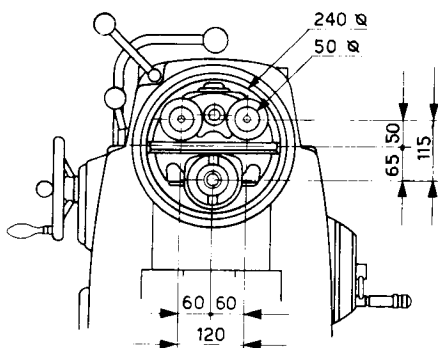


Reduction bush  
for collet  
type W 20



Collet type W 20  
Bores dia. 5 to 20 mm  
(3/16 to 25/32")

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## INSTALLATION

### HANDLING

On receipt of the machine, take off the top of the case and remove the sides. Take out the machine by unscrewing the four fixing bolts. Remove any accessories and attachments which may be included with the packing material.

The weight of the machine is approximately 1650 kilograms (3660 lbs.) When handling it with the aid of hoisting tackle, sling the ropes round the machine as shown in the sketch on page 9. It is first necessary, however, to remove the door 33 by unscrewing the two hinges. Pass two bars, 40 mm in diameter and approximately 850 mm long, through the screwed rings supplied with the machine for hoisting purposes.

Where the machine has to be rolled to its site of erection, place it on wooden rather than on metal rollers. For this purpose, two recesses are provided in the base to enable the end of a crowbar to be inserted.

### CONCRETE FOUNDATION

The Schaublin 53 Milling Machine is designed to be placed on a concrete foundation having the dimensions shown in the foundation drawing on page 10. The depth of the foundation depends on the nature of the ground; the concreting must be done on firm subsoil.

If the electrical supply is brought up to the machine by underground service lines, a conduit opening at the point 1 must be provided in the concrete slab. It is recommended that this be done by embedding in the concrete a steel tube 2 of 26 mm (1") internal diameter and a length of 120 mm (4 3/4"). The service cable should project about 16" above the floor.

The machine should be fixed to the ground by four stay-bolts provisionally wedged in the concrete foundation, and levelled by means of four flat steel packing strips inserted under the machine base (two at each end.)

The horizontality of the table should be verified both lengthwise and transversally by a precision spirit level. After levelling and truing in this way, grout in the fixing bolts, packing strips and base with cement, keeping a check on the levelling of the machine all the time.

The holes in the machine base provided to accommodate the stay-bolts are 18 mm in diameter. The bolts, nuts and washers for anchoring the machine are not supplied by us.

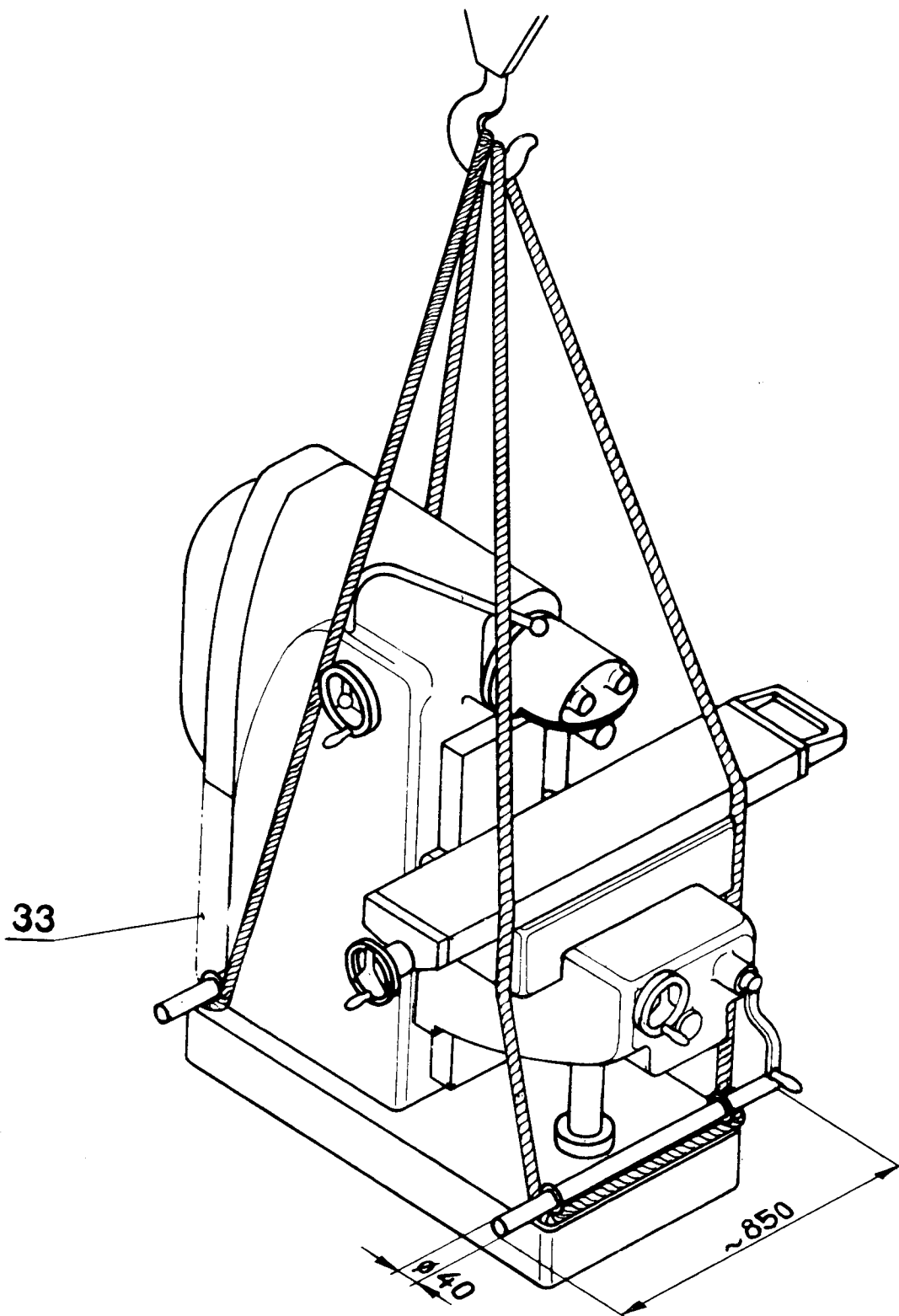
The machine should be accessible from every direction; see page 6.

### CLEANING

For degreasing and cleaning, use only clean and chemically neutral rags (preferably white).

First wipe off the anti-rust compound with a dry rag, then rub over with a clean rag dipped in paraffin oil (kerosene) and wrung out. As this anti-rust compound has no lubricating properties, it must be thoroughly removed, as its continued presence might cause serious seizing or jamming, sometimes as much as several weeks after the machine is put into service. Whilst cleaning the machine, take not to score or scratch, in particular, the vertical ways and the ways of the compound slide.

Finally, lightly coat all bare metal surfaces with lubricating oil.



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## LUBRICATION AND MAINTENANCE

Before starting up the milling machine, all its working parts must be thoroughly lubricated. For this purpose we advise the use of a good mineral oil answering to the following specification :

**VISCOSITY 4,5°E at 50° C.**

The viscosity of the oil in the machine's six oil baths must not exceed 4,5°E at 50° C.

### **IMPORTANT :**

As soon as the machine runs, make sure that the compressor 31 shown on sheet 16, really works and correctly supplies the atomizer 32 as described on sheet 15.

The correct procedure for filling the oil baths is as follows :

### **SPINDLE SPEED GEARBOX OIL BATH**

Unscrew the rear casing 5, remove the plug 6, and fill to the middle of the oil sight glass 7. Drain by removing screwed plug 8.

The gears are oil-bath lubricated, and, in addition are sprayed with oil. An immersion-type piston pump 9 automatically causes circulation of the lubricant. The lubrication should be periodically inspected through the inspection window 10. If there is no oil running out of the tube 11 inside the gearbox whilst the machine is running, the piston pump 9 needs cleaning. To clean the pump 9, drain the gearbox by removing screwed plug 8, then take out the pump after unscrewing the three screws 12.

See page 13, diagram A.

### **OIL BATH OF FEED GEARBOX IN KNEE BRACKET**

Unscrew plug 13 and fill to the middle of the oil level sight glass 14. Drain by screwing out plug 15.

The feed box built into knee bracket forms, together with the latter, a tank for the oil bath. It takes care of the lubrication of all the working parts in the knee. An immersion-type piston pump 16, mounted in the feed box and accessible from underneath the knee provides an automatic lubricating circuit which is inspected through the sight glass 17.

To clean the pump 16, proceed as in the case of the spindle speed gear box oil bath. See page 13, diagram B.

### **OIL BATH CARRIAGE**

Unscrew plug 18 and fill to middle of oil level sight glass 19. Drain by pumping the oil out through the same hole.

The oil bath in the carriage serves to lubricate the moving parts, including the long feed screw spindle.

See page 13, diagram C.

### **OIL TANK IN CROSS-SLIDE FOR BUILT-IN OIL GUN**

Traverse the table 20 to its extreme right-hand position.

Screw out plug 21 and fill to the middle of the oil level sight glass 22. Drain by unscrewing plug 23.

Should the oil gun 24 fail to circulate the oil after replenishing of the tank, unscrew the button a and push the ball b forwards by means of a rod not more than 2,8 mm in diameter, so as to enable the oil to enter the pump easily.

The oil gun (hand-operated oil pump) 24 serves to lubricate the table-cross-slide ways, the carriage-knee transversal ways, and the cross-feed screw spindle.

Give several shots of oil every day.

See page 14, diagram C.

#### OIL BATH OF VERTICAL SCREW SPINDLE

Lower the knee 25 as far as it will go. Take off door 26 and fill the oil tank 27 to the ~~middle~~ of the lever sight glass 28 by means of the funnel, supplied with the machine.

The oil tank cast integral with the frame is attached to the support in which the vertical screw spindle moves. The latter is continuously oiled by the communicating-vessel method.

When periodically checking the level of oil in the tank by the oil level sight glass 28, always lower the knee 25 as far as it will go.

See page 14, diagram D.

#### OIL BATH IN MACHINE BASE FOR FEED TRANSMISSION MEMBERS

Unscrew plug 29 and fill to the mark at the top of the dip rod 30 attached to plug 29. Drain by pumping the oil out through the same hole.

See page 14, diagram E.

#### DRAINING THE OIL BATHS

It is advisable to drain the six oil baths for the first time when the machine has been in operation for four to five months, so as to get rid of the impurities caused by running-in. Swill out with paraffin oil (kerosene) and renew the lubricating oil.

Afterwards, drain once annually.

#### LUBRICATION OF MOTORS

The bearings of the principal motor, the quick-traverse motor and the coolant pump motor should be lubricated with consistent grease for bearings. A set of instructions enclosed herewith provides all necessary information on the maintenance and greasing of the motors.

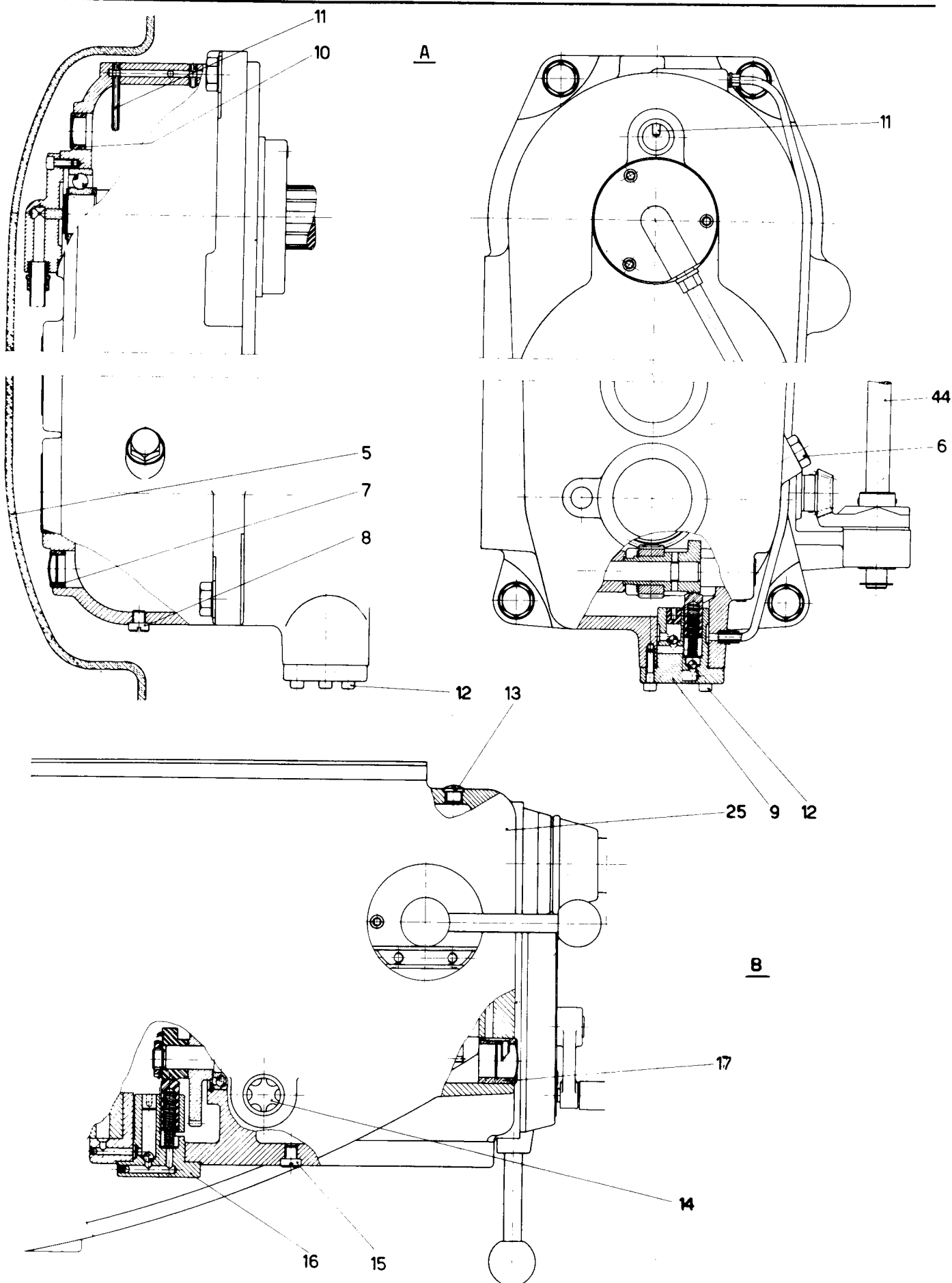
#### PRESSURE LUBRICATION

The other parts of the machine are lubricated by injection with an oil gun.

#### LUBRICATE THE FOLLOWING 8 POINTS ONCE A WEEK

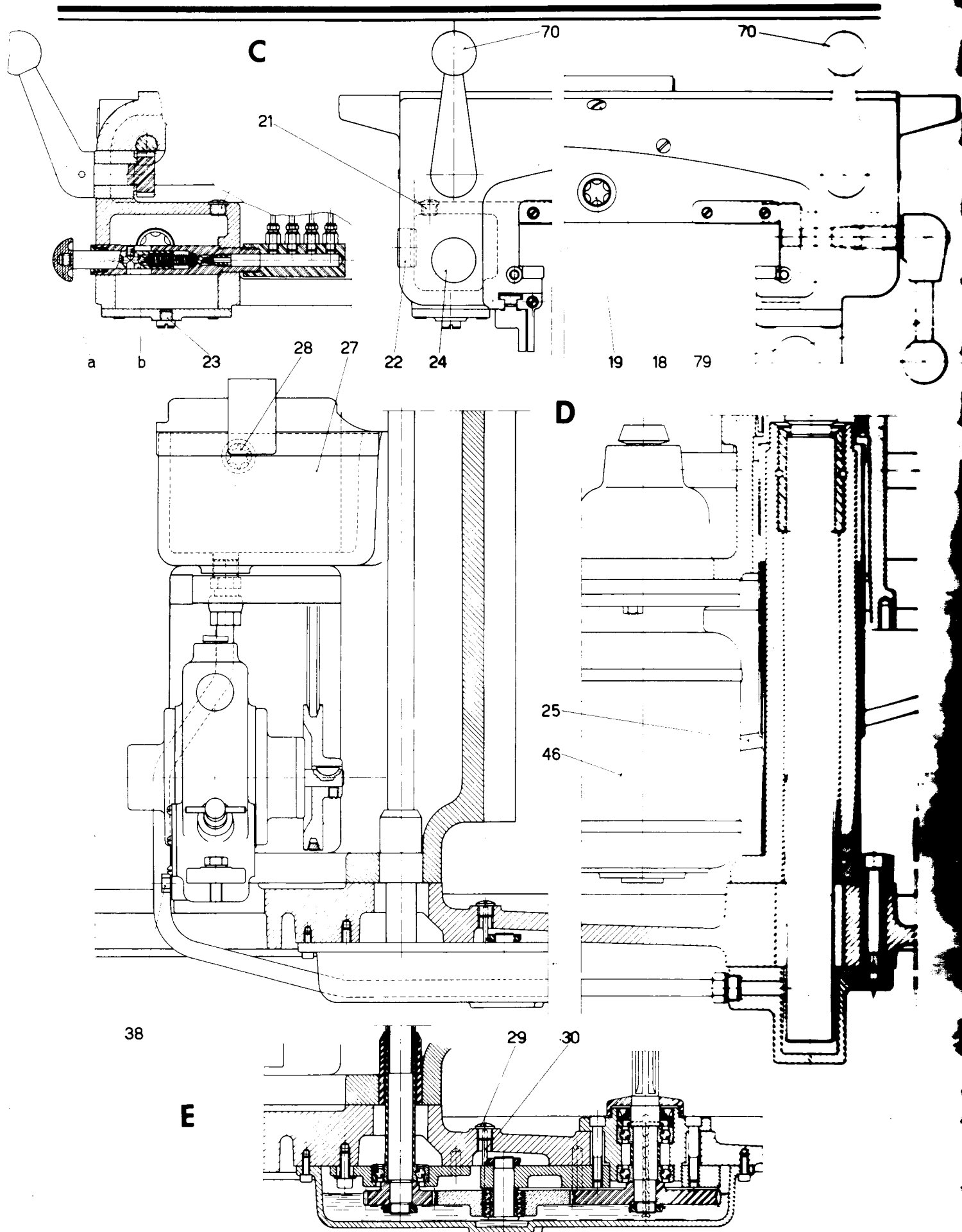
- 2 lubricators on the flange carrying the cylinder control handwheel
- 1 lubricator on the spindle of the spindle-speed selection lever.
- 2 lubricators, one at each side of the knee, for the vertical ways.
- 1 lubricator on the cross-feed automatic stop lever (left side of the knee)
- 1 lubricator at the left side of the frame for cylinder guiding bore.

Four or five shots of oil are sufficient for each lubricator.



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## OPERATION - ADJUSTMENT - CHECKING

The compressor (31) is driven by a vee belt and comes into operation as soon as the machine is started.

The compressed air is fed into the atomizer (32) through the valve (S). About one drop of oil in ten is atomized and injected into the pipes (a) and (b) in the form of mist (the drip feed can be observed under the transparent dome 42). As already mentioned, *the device is working normally when the reservoir (39) is emptied in two to three weeks*. Failing this, either there is no air pressure or the filter (FP) of the atomizer (32) is clogged. In that case, the device must be reset without delay, in accordance with the instructions below.

### ADJUSTMENT OF OIL DELIVERY OF ATOMIZER (32)

The amount of oil to be atomized is controlled by the internal-hexagon screw marked «Oil feed». Adjust the rate of delivery to 30 - 50 drops per minute by turning the screw more or less right in. The reservoir (39) will then be emptied in two to three weeks.

### ADJUSTMENT OF AIR PRESSURE

Before the machine is despatched, the valve (S) of the compressor is set to provide delivery of a sufficient amount of oil even the outlet valve (V) of the atomizer (right hand internal-hexagon screw) is set for minimum delivery (turned right in).

When the compressor has been running for some months, the pressure may be insufficient (see below under the heading «Checking delivery of oil mist»).

According to the circumstances, adjustment must then be carried out by one of the following methods :

1. Insufficient pressure for the oil mist, but correct delivery of oil drops :  
Open the outlet valve of the atomizer by undoing the screw (V) a number of turns.
2. Insufficient pressure for the oil mist and insufficient delivery of oil drops :  
Increase the outlet pressure of the compressor (31) by adjusting the safety valve (S) in the following manner :  
Unscrew and remove the cap (S1).  
Undo the locknut (S2).  
Tighten the screw (S3) a number of turns.  
Tighten the locknut and refit the cap.

### CHECKING DELIVERY OF OIL MIST

Disconnect the pipe (a) from the housing by undoing the nut (a1).

If the system is operating correctly, that is to say, if the pressure of the oil mist is sufficient, a sheet of paper held loosely at a distance of about a foot from the mouth of the tube (a) should be continuously agitated by the current of air. Adjust the valve (S) accordingly. (The cloud of oil escaping intermittently from the pipe is visible to the naked eye).

## **IMPORTANT!**

### **DEVICE FOR OIL-MIST LUBRICATION OF SCHAUBLIN 53 MILLING MACHINE (see page 16)**

One of the most important parts of the machine, the horizontal cylinder with the spindle head, cannot accommodate an oil bath, because of its rotary movement.

A compressor (31) combined with an atomizer (32) and housed in the frame delivers oil to the cylinder in the form of mist.

The feed-transmission assembly «TA», at its point of exit from the spindle gearbox, is lubricated by the same device.

Therefore, it is of the utmost importance that the device should function properly and that the user of the machine should pay very special attention to it.

## **DESCRIPTION AND MAINTENANCE**

1. The compressor (31) has its own oil bath. To fill, proceed as follows :

Open the rear guard (33), remove the cover (34), unscrew the plug (35), and insert the special funnel (36). Fill up to the middle of the oil-level indicator (37), which is visible from the rear. Never allow the level to drop below the point indicated.

Use a good-quality pure mineral oil with a viscosity of approximately 3°E at 50°C (Vacuum D.T.E. Light or Shell Vitrea Oil 27).

Drain once a year by removing the screwed plug (38).

Occasionally wash the suction filter (F) in petrol (gasoline)

The safety valve (S) is set during factory tests, but may have to be reset after a few months' running-in (see instructions below).

2. Check the atomizer (32) and the oil reservoir (39) every fortnight, first removing the door (26).

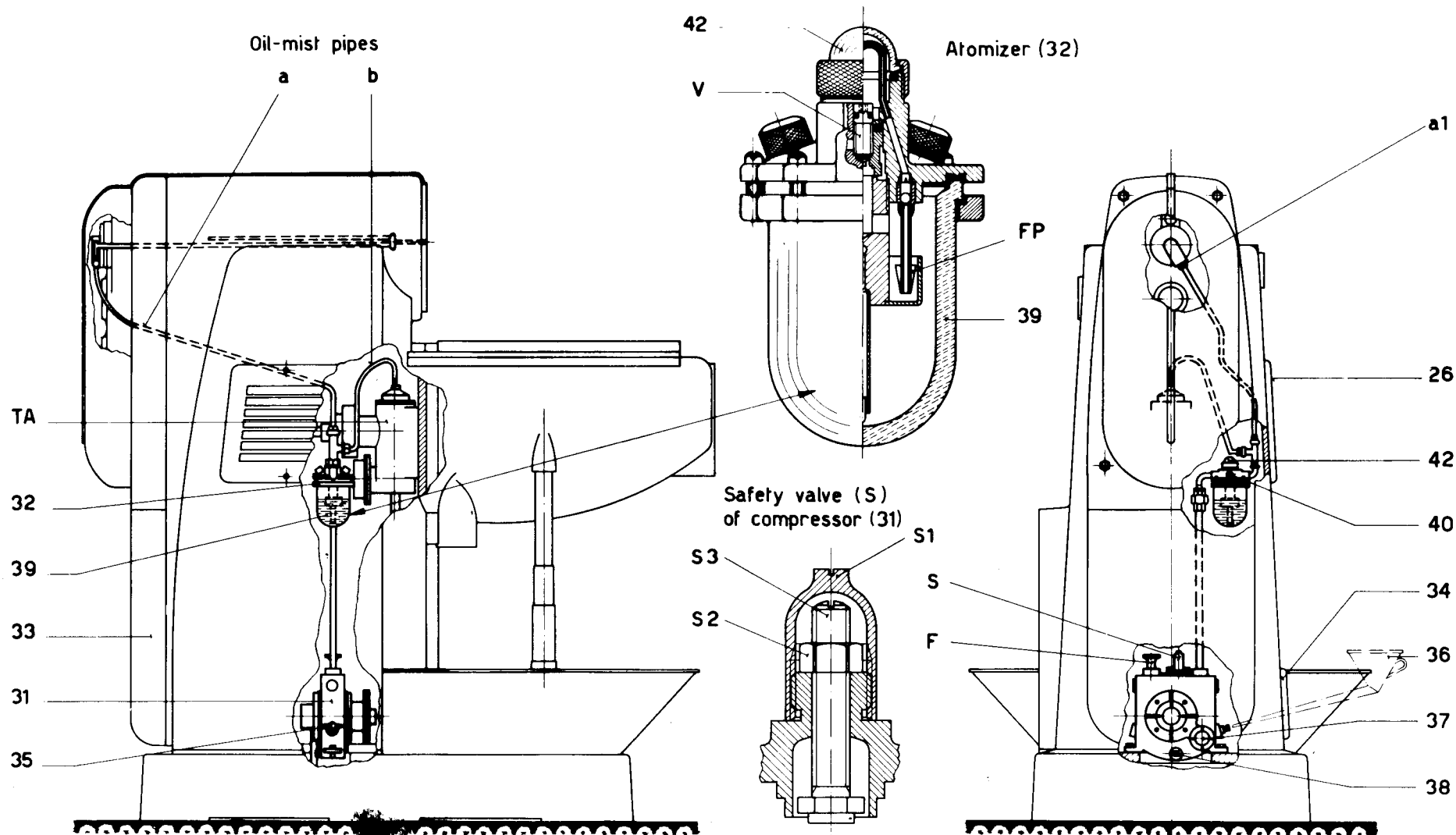
To refill the reservoir (39), it is necessary to stop the machine. Remove the plug (40) and fill up to the red mark (never go beyond this point).

Use a good-quality pure mineral oil with a viscosity of approximately 3°E at 50°C (Vacuum D.T.E. Light or Shell Vitrea Oil 27).

Thoroughly clean the atomizer (32) once a year in petrol (gasoline). For this purpose, withdraw the atomizer, first unscrewing the three unions of the air inlet and outlet pipes.

Occasionally wash the filter (FP) in petrol (gasoline). In any case, do this whenever the delivery of drops of oil becomes insufficient and before altering the setting of the valve (S).

The delivery of the atomizer is correctly set during factory tests (30-50 drops per minute). To reset, proceed in accordance with the instructions given below.



DEVICE FOR OIL-MIST LUBRICATION  
 of horizontal cylinder with spindle head  
 and of transmission assembly „TA” on  
SCHAUBLIN 53 universal milling machine

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## ELECTRICAL EQUIPMENT

The Schaublin 53 Universal Miller is always supplied complete with electrical equipment (motors, switches, protective switch, wiring), ready for connection to the power mains.

Before so connecting, make sure that the voltage shown on the motor data plates agrees with the mains supply voltage. For connection diagram, see page 19.

### CONNECTING UP

The Schaublin 53 Milling Machine is normally equipped with three-phase motors; the service line terminals are located in a terminal box in the machine base (see page 10). Earth the machine via the yellow terminal in the terminal box.

When switching on the current, check the direction of rotation of the motors by the following method :-

Set the handle of the switch 43 at either the left-hand or the right-hand cutter position. If the starting lever 44 is now pulled forward (when it is on the left; the starting lever should be pushed if it is directed to the right), the milling spindle should turn in the direction of the arrow shown by switch 43.

See pages 19 and 13 for lever 44.

### DESCRIPTION OF THE EQUIPMENT

The machine has three motors, one for driving the spindle and operating the normal feeds, the second for the quick-traverse table feeds and the third for the coolant pump.

#### MOTOR FOR SPINDLE DRIVE AND NORMAL FEEDS, 45

Type Brown Boveri Mu 112 M4, three-phase, with short-circuited rotor, power 4 HP, speed 1425 rpm.

#### QUICK-TRAVERSE TABLE FEED MOTOR, 46

Type Meidinger NTK 33J, three-phase, with short-circuited rotor, power 1,5 HP, speed 2800 r.p.m.

#### COOLANT PUMP MOTOR, 47

Vertical type, power 0,15 HP

These three motors are controlled by contactors housed in a box. The contactors are actuated by a compound switch 43 located on the left side of the machine, and a push-button 48 fitted right at the front of the knee bracket.

The compound switch 43 is used for starting the spindle motor 45 and, if required, for starting the pump motor 47 also. Either or both of these two motors is stopped by shifting the switch lever back to the central position.

By moving the handle of this switch to the left or right, the direction of rotation of the motor 45 can be reversed (left-hand or right-hand cutter). If it is desired to start the pump motor 47, this is done by shifting the switch handle to the second position, whether on the left or on the right. This motor, however, always runs in the same direction.

The push-button 48 is for starting the quick-traverse feed motor 46. The motor runs only whilst the push-button is pressed, i.e. whilst the desired quick traverse is proceeding.

The spindle and pump motors, 45 and 47, are protected from prolonged overloads by two thermal relays. On the tripping of either of these relays, the contactor coil exciting circuit is broken, with the result that both motors cut out.

The quick-traverse feed motor 46 has no thermal relay protection because it is not often used, and then only for very short periods.

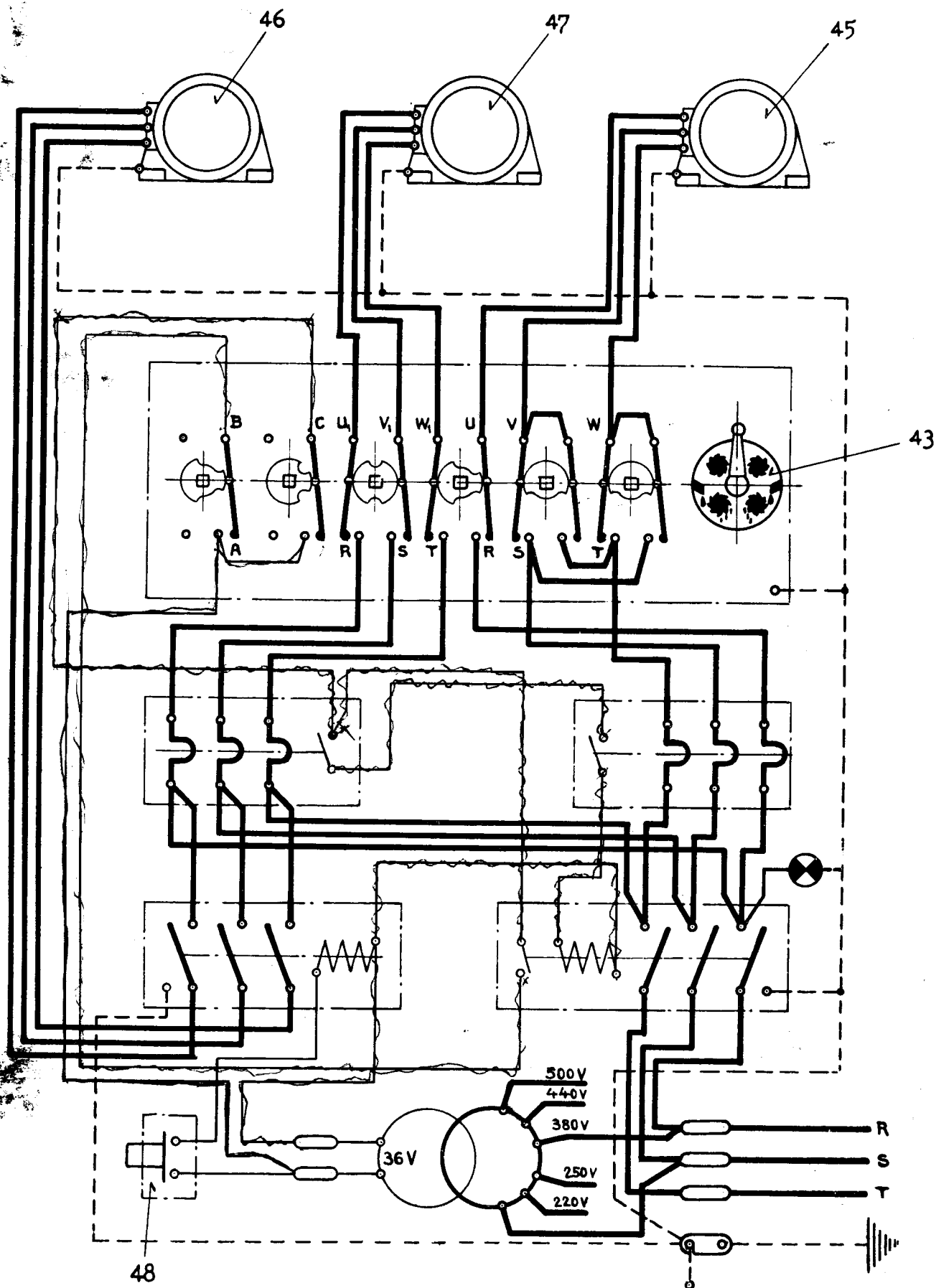
To reset the two relays, all that is necessary is to open the cover 49 (see page 20) and press buttons 50 and 51 (see page 20). It should be noted that if a machine is used normally these relays should never trip, so that resetting as just described is an operation necessitated only in exceptional cases.

In the event any accidental breakdown of the mains voltage the contactors trip automatically. The purpose of this arrangement is to prevent accidents when the current is restored. Where contactors trip owing to a mains break-down, no useful purpose is served by resetting the buttons 50 and 51, since the protective relays motors by means of switch 43. A signal lamp 110 shows whether the spindle motor is running or not.

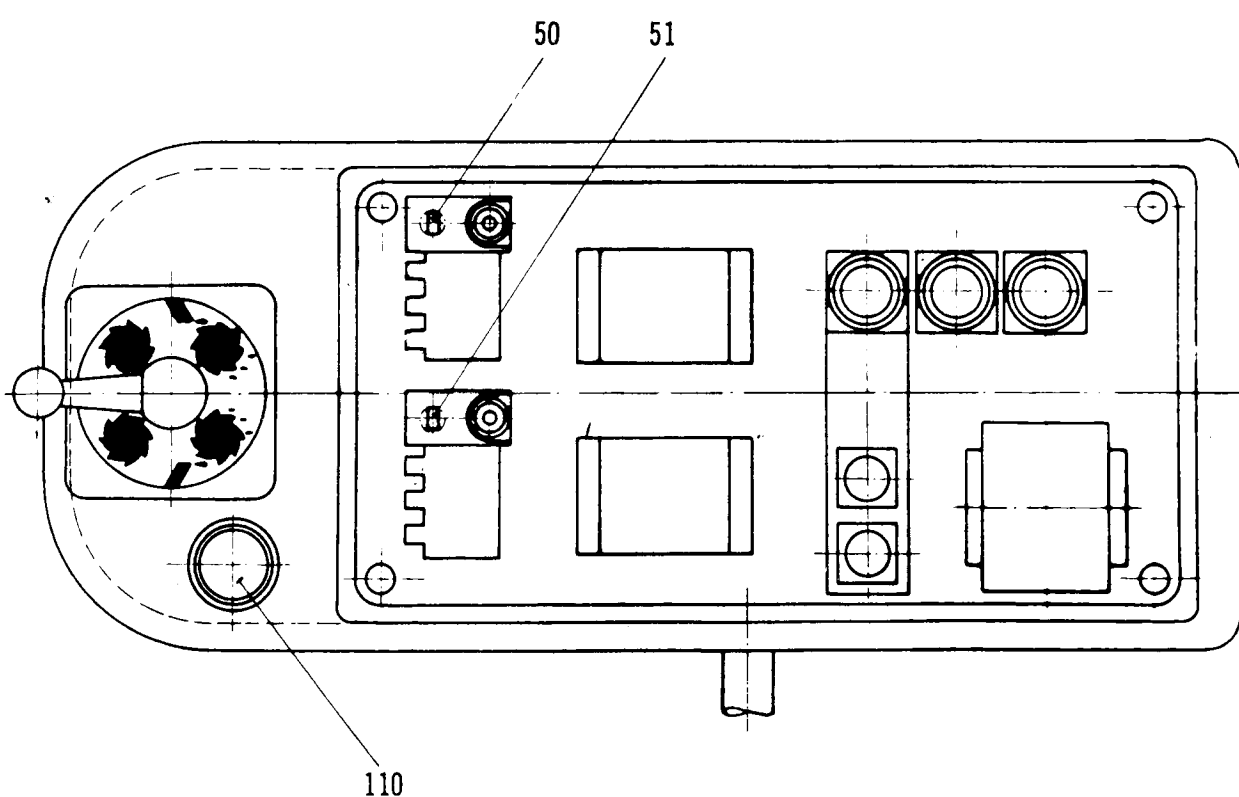
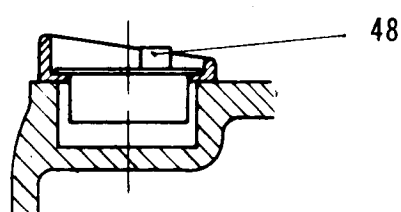
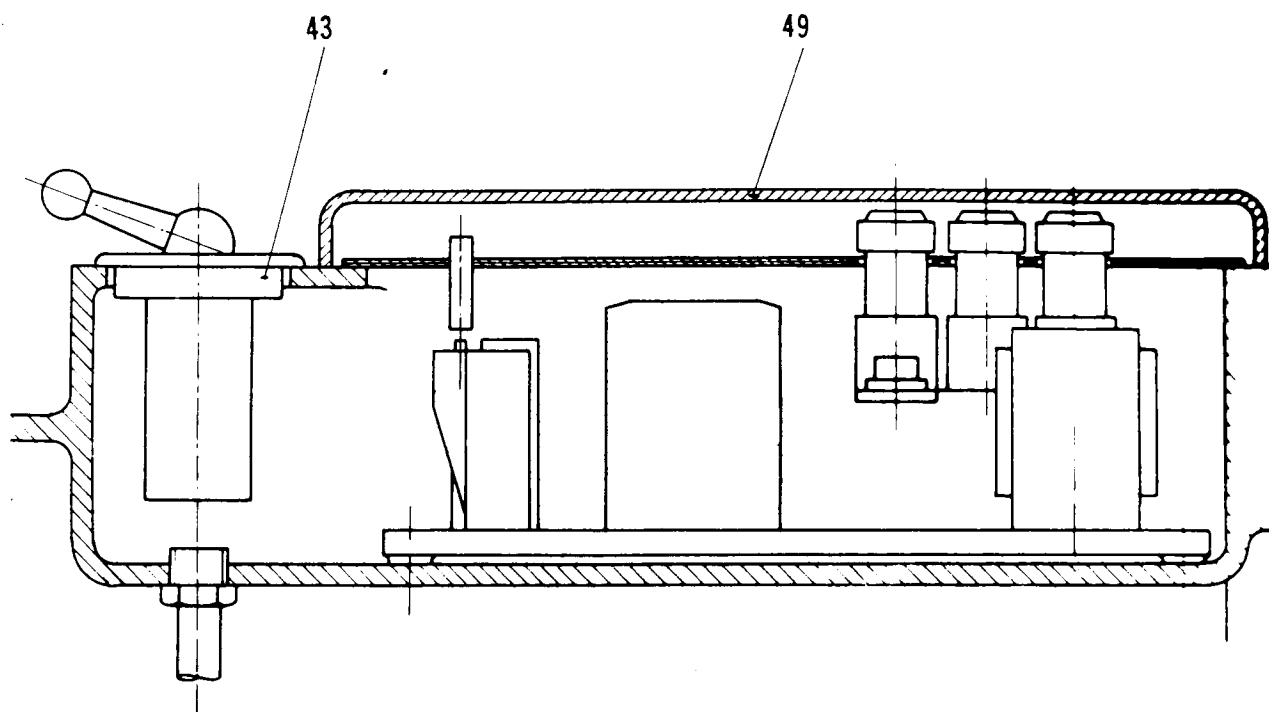
Instructions concerning the contactors and motors are included in this instruction book.

## STARTING UP THE MACHINE

When all the details relating to erection, cleaning, lubrication and electrical equipment have been thoroughly attended to, start up the machine and let it run idle for a few hours. Begin with a low speed so as to allow the bearings and transmission members to warm up normally, then gradually increase the speed to the maximum. Check each working part for correct functioning.



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## STRUCTURAL FEATURES AND CONTROLS

The Schaublin 53 Universal Milling Machine is distinguished by its universal spindle head, which is of absolutely new design and enables the machine to be converted in a few minutes into a horizontal, vertical or universal miller.

### SPINDLE HEAD

The head, attached to the cylinder by four nuts, swivels through any angle from 0° to 360° in a plane parallel to the axis of the cylinder. It can be clamped at every 30° & 45° interval by means of the eccentric 52. The base of the cylinder is graduated in degrees and enables any intermediate position to be set.

A special key supplied with the machine is used for drawing out and clamping the arms, manipulating the eccentric 52, and tightening the spindle head fixing nuts. The fact that the spindle head can be swivelled through 180° affords scope for a patented arrangement whereby either end of the spindle can be used for chucking tools.

At one end, two powerful stub members ensure positive drive of the tools. Centring is effected by the acute-angled internal taper of the spindle, this obviating any sticking or jamming of the tools and ensuring their rapid unchucking. Large milling cutters are centred by the external diameter of the spindle nose.

At the other end, the spindle bore is designed to accommodate the Schaublin P25 patented collet, which grips the tools rigidly. The same tightening key is used for both methods of tool chucking.

For details of spindle adjustment, types and dimensions of tapers, see pages 27 and 28.

### CYLINDER

The cylinder is clamped in its bore by the lever 53, which acts at two points. The cylinder can turn on its axis through any angle up to 360° and can be clamped at every 15-degree interval by means of lever 54. All the intermediate positions are shown by a dial calibrated in degrees.

*Rotation of cylinder* - Unclamp levers 63 and 54, push knob 55, and rotate the cylinder by means of handwheel 56.

*Traversing of cylinder* - Unclamp lever 53, pull knob 55, and traverse cylinder by means of handwheel 56.

For instructions on adjusting clamping of cylinder, see page 33

### EQUIPMENT AS HORIZONTAL MILLER

The eccentricity of the milling spindle in respect of the axis of the cylinder provides two positions, a higher and a lower, of the spindle in relation to the table. The lower position of the spindle, combined with the raised position of the table, enables very small components to be machined, whilst with the spindle in its elevated position and the table lowered, tall workpiece can be tackled.

The two arms 57 are mounted in the cylinder, and this arrangement, together with the rotation of the cylinder, affords better distribution of the pressure of the cutter over the two arms in the case of horizontal milling work using end-brace.

The two arms 57 are clamped by the nut 58. The knee-frame-arm combination is completed by a brace the broad seating of which is provided by the cross slideways.

#### EQUIPMENT AS VERTICAL MILLER

Operation of the handwheel 56 and the knob 55 enables the cylinder to be swung round and drawn out so as to have the spindle head at the top. Slacken the four nuts fixing the head and turn the latter through 90°. Retighten the four nuts and turn the cylinder through 90° to bring spindle into the vertical position.

The clearance between the frame and the spindle is adjustable, and the vertical spindle can be brought up close to the frame, thereby affording enhanced rigidity of the milling machine during operation. By combining the traversing of the cylinder with that of the table, a bulky workpiece can be machined from side to side without being unclamped from the table.

The two arms of the end-brace can be used when the spindle is in the vertical position, so that whatever the type of milling work being done, the rigid frame-knee-brace-overarm assembly can be completed. For particulars of the principal positions of the spindle, see page 7.

#### CONTROL AND SELECTION OF THE SPINDLE SPEEDS

The speed are obtained by means of a change-speed gear which affords a very wide range (18 speeds) from 38 to 1510 r.p.m.

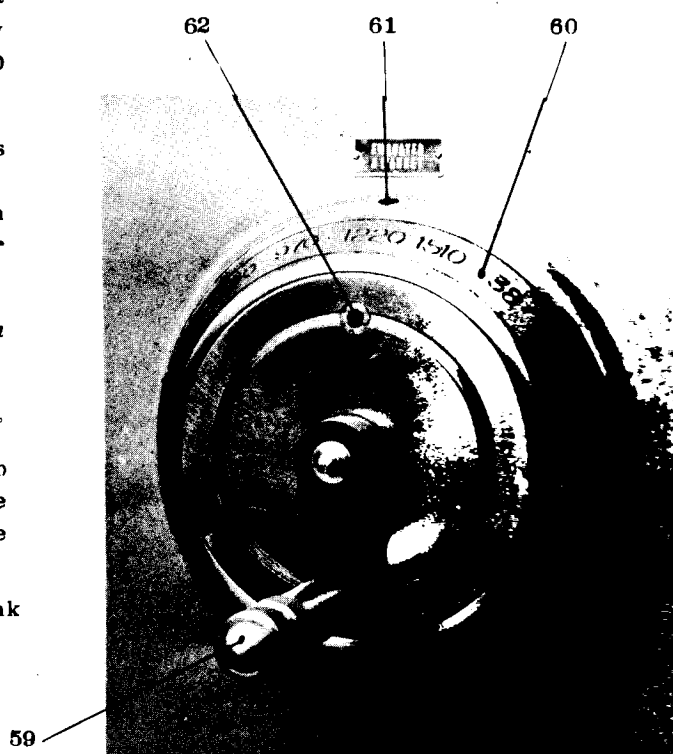
*Selection of the spindle speeds is effected by operating a single crank, 59, Every half-turn of the crank, in either direction, gives the next higher or next lower speed.*

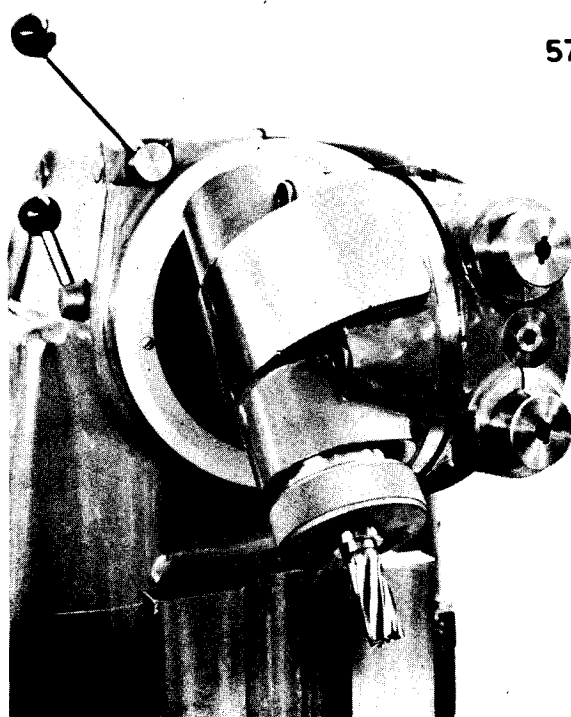
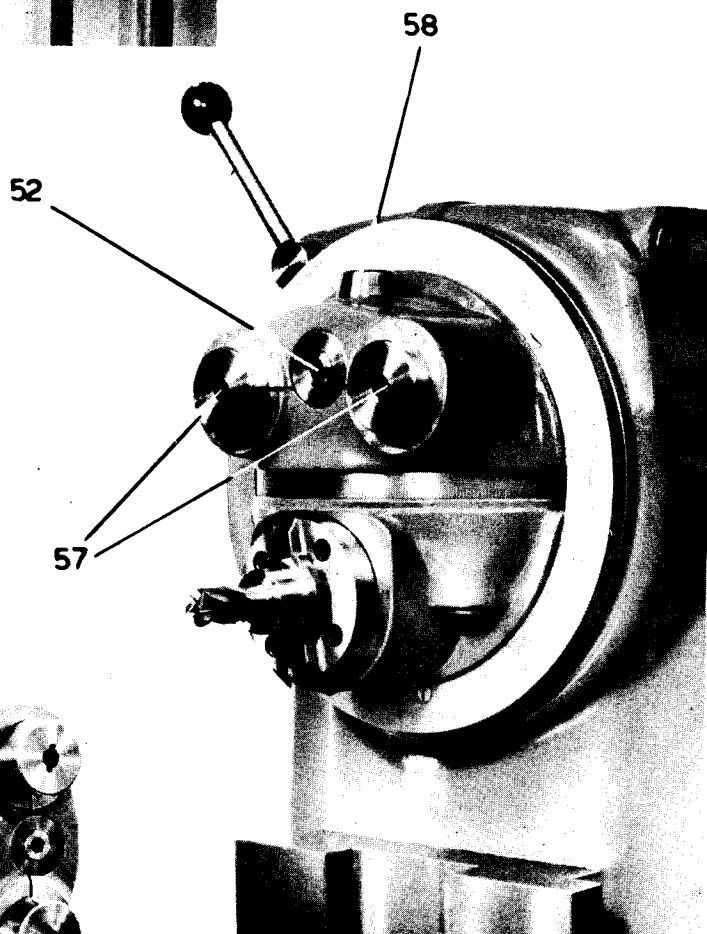
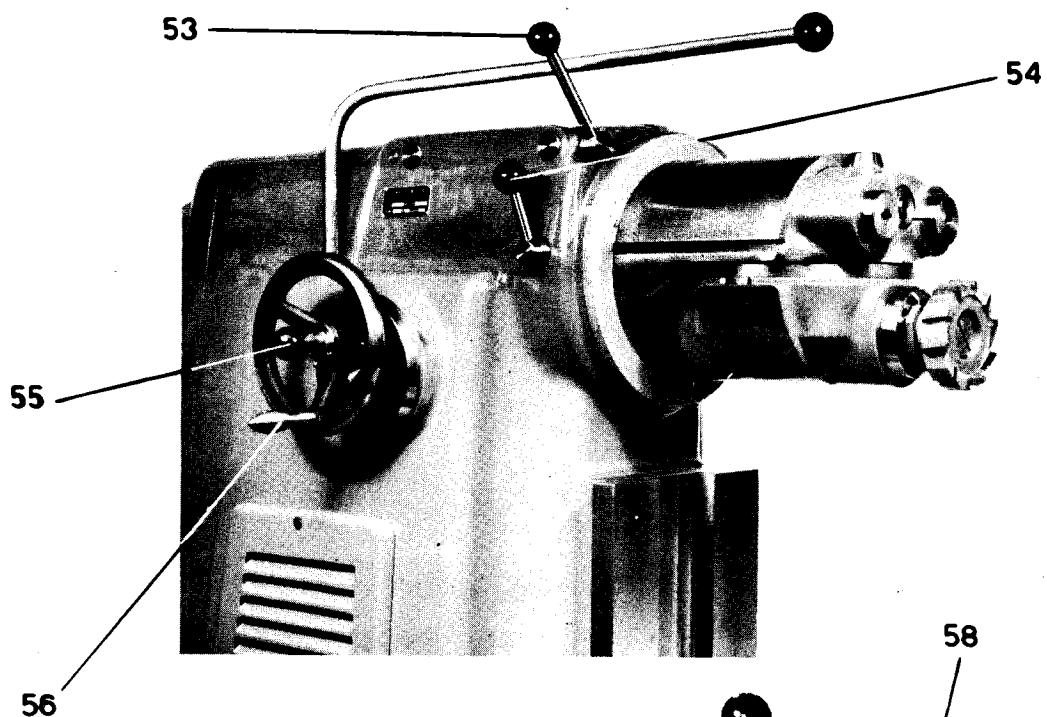
*This crank should never be operated when the spindle is working.*

The speeds are indicated on the dial 60.

To select a spindle speed, pull the knob of crank 59 and turn the crank until the desired speed on the dial 60 is opposite the index mark 61.

Release the knob so as to block the crank 59 in one of the two locking holes 62.





**FABRIQUE DE MACHINES SCHAUBLIN S.A. BÉVILARD/SUISSE**

## STARTING UP

The motors are started by means of the switch 43 and the push-button 48, in accordance with the instructions given on page 18.

Shifting the lever 44 in one direction starts the machine, and in the other direction stops it. The spindle, the feed, and the coolant circulation are simultaneously started or stopped without its being necessary to stop the motor.

On the primary shaft of the speed-change box is a double, plate-type clutch 63 controlled by the lever 44, which latter can be placed as desired, according to the operator's position. It merely has to be lifted and turned.

## FEEDS AND SELECTION OF FEEDS

The long, cross and vertical power traverses are obtained by means of a feed box (18 feeds), which transmits a range of feeds graduated from 12 to 1000 mm/min. in either direction, i.e. longitudinal or transverse, whilst the vertical feeds are graduated from 6 to 500 mm/min.

The desired feed is selected by operating a single crank, 64 located in front of the knee. Each half-revolution of the crank, in either direction, sets the next higher or next lower rate of feed.

The feeds can be changed whilst the machine is running. The change is much easier by operating the feed rapid (press on button 48).

The rates of feed are indicated on the dial 65.

To select a given rate of feed, pull the knob of crank 64 and turn the crank until desired rate of feed on the dial 65 is opposite the push-button 48. Then release the knob so that the crank 64 is immobilized in one of the two locking holes 67.

## TABLE

For the dimensions of the table and particulars of the the T-slots, see page 6.

### *Hand feed*

The disengageable handwheel 68 is used for the manual long feed of the table. The long-feed screw spindle has a pitch of 5 mm, and the divisions of the vernier 69 show each fiftieth of a millimeter. The vernier scale can be reset to zero.

For instructions on taking up axial play in the long-feed screw spindle, see page 32. B.

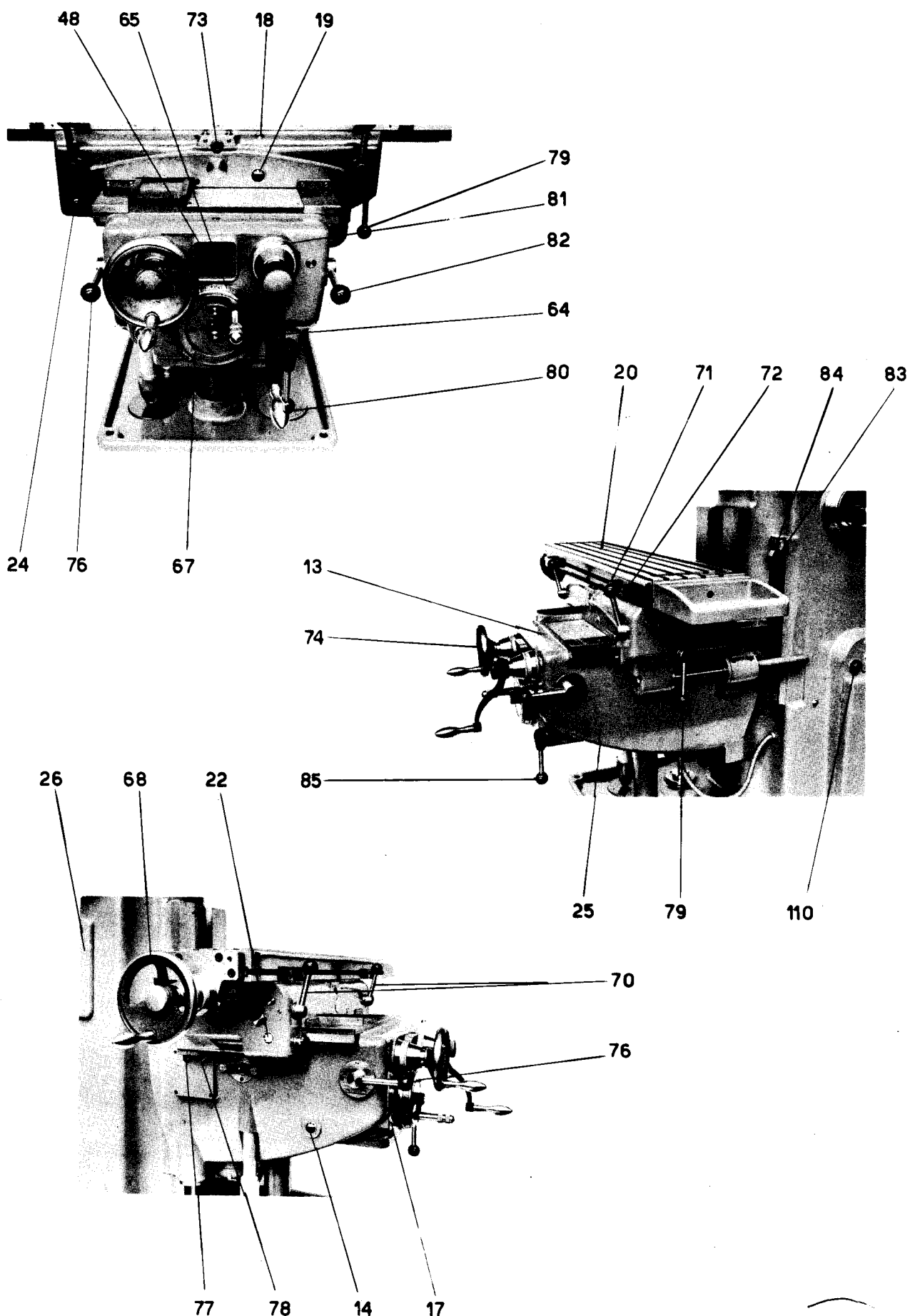
### *Power feed*

The two coupled levers 70 engage the long power feed. By shifting these levers to the right, the table is caused to traverse to the right, whilst if they are shifted to the left table will move to the left. The intermediate position (levers vertical) immobilizes the table.

The adjustable trips 71 automatically stop the traverse of the table wherever they are set, whilst the fixed stops 72 automatically stop the table at its extreme left-hand or right-hand position. (never dismantle these stops).

### *Clamping the table*

Tighten nut 73. Clamping the table automatically locks levers 70, thereby preventing wrong manipulations.



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## CROSS SLIDE

### *Manual feed*

The disengageable handwheel 74 controls the manual cross feed.

The cross feed screw spindle has a pitch of 5 mm, and the divisions of the vernier 75 show fiftieths of a millimetre. The vernier can be reset to zero.

### *Power feed*

The lever 76 engages the power cross feed.

If the lever is moved upwards the cross slide will travel towards the machine column, whilst if it is lowered the cross slide will traverse away from the frame.

The intermediate position (lever horizontal) stops the cross slide. The adjustable trips 77 automatically stop the cross slide at the points for which they are set, whilst the fixed stops 78 stop the cross slide at its extreme forward and rearward positions. (Never dismantle these stops).

### *Clamping of cross slide*

The cross slide is clamped by means of lever 79.

## KNEE BRACKET

### *Hand feed*

The vertical hand feed is operated by the disengageable crank 80.

The vertical feed screw has a pitch of 5 mm, but owing to the great mass to be coped with, one turn of the crank shifts the knee only 2,5 mm upwards or downwards. The divisions of the vernier 81 show the fiftieths of a millimeter; the vernier can be reset to zero.

### *Power feed*

The vertical power feed is engaged by the lever 82. When this lever is lowered the table descends, whilst it rises if the lever is raised. At the intermediate position (lever horizontal) the knee is stationary.

The adjustable trips 83 automatically stop the vertical feed at the points for which they are set. The fixed stops 84 the vertical feed automatically when the table reaches its uppermost lowermost positions. (Never dismantle these stops).

### *Clamping the knee*

The knee is blocked by operating the lever 85. Clamping the knee automatically blocks the lever 82, thereby eliminating the danger of wrong manipulations.

For instructions on adjusting the paper packing strips of the table, cross-slide and knee, see page 32, A.

For adjustments to the knee clamping action, see page 32, D.

### *Safety device for power feed*

A safety clutch mounted on the driven shaft of the feed box will engage when one of the 3 movements is overloaded. In this case a rattling noise is perceptible necessitating the immediate disengaging of all the feeds.

This device does not need adjusting.

## ADJUSTMENTS

The following adjustments call for a great deal of skill and care, and should be entrusted to experienced personnel only.

### WORK SPINDLE

The cutter arbors, end-mill arbors and various accessories are fitted to the spindle by means of

*a standard VSM 33930 taper, size 44.*

The other end of the spindle is arranged to accomodated Schaublin P25 patented collets for chucking straight shank milling cutters.

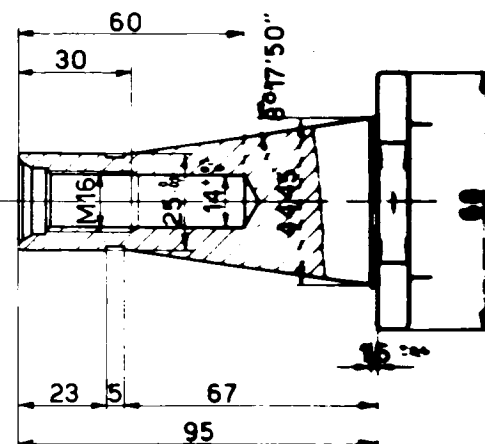
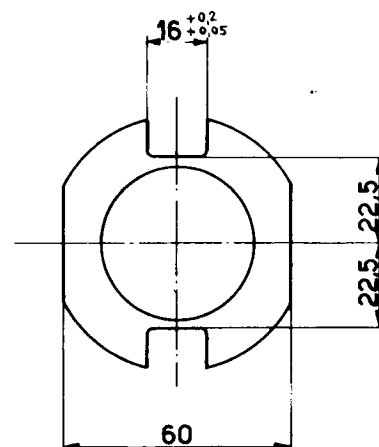
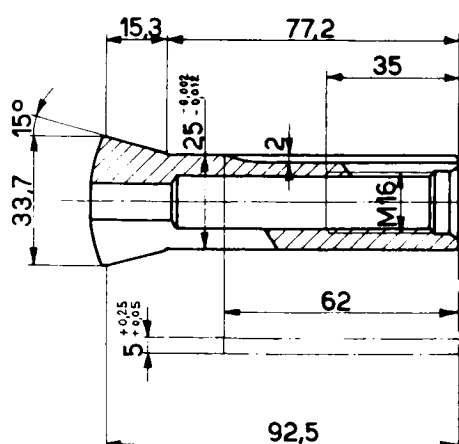
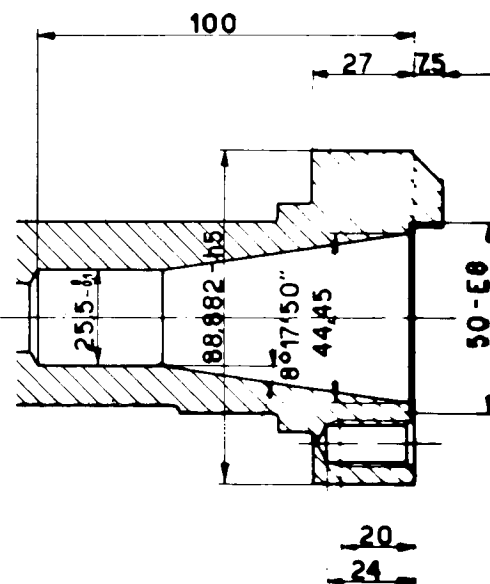
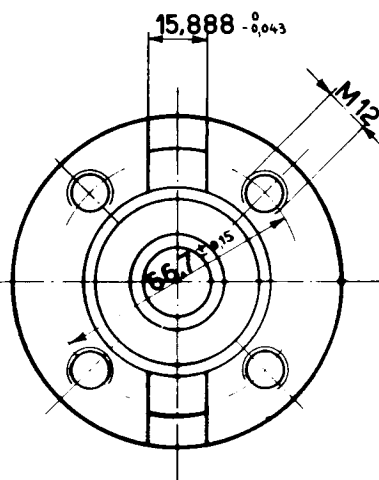
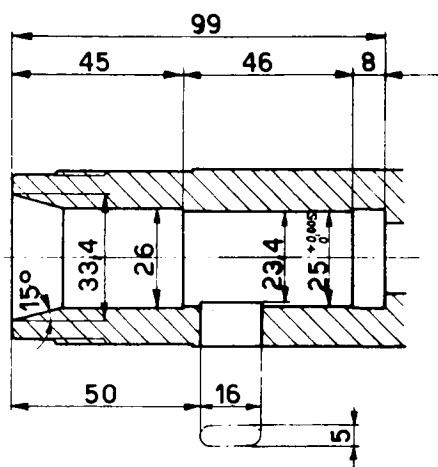
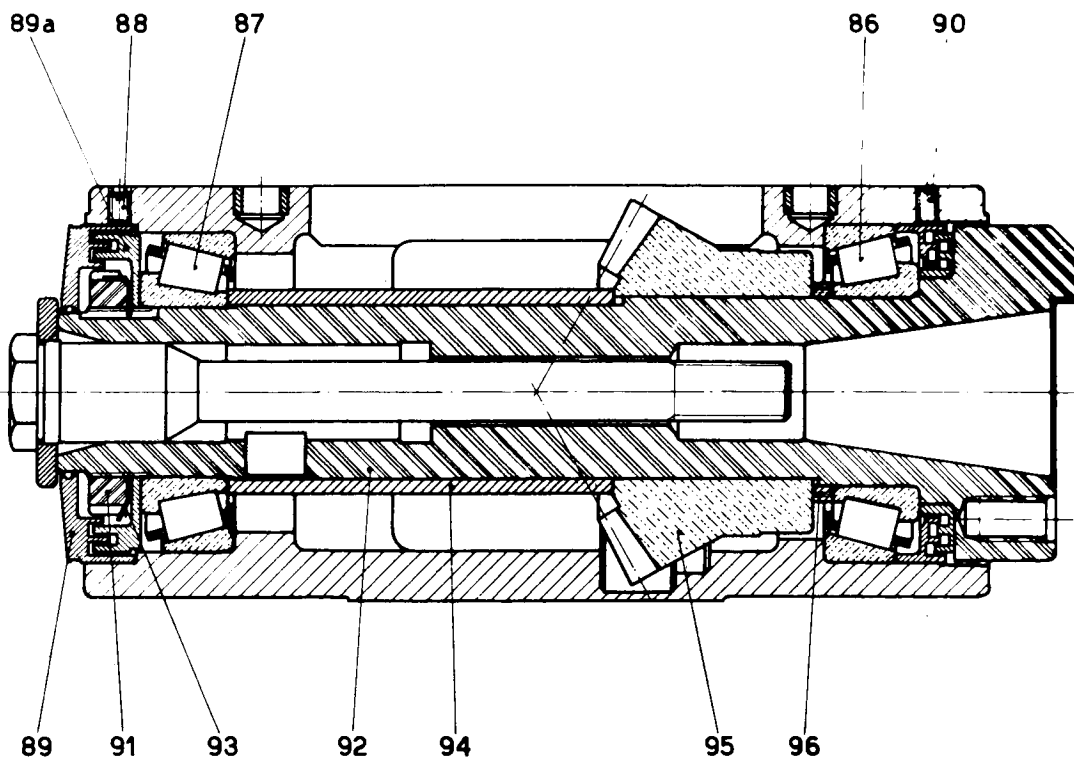
### ADJUSTMENT OF SPINDLE

The bearings are adjusted when each milling machine is being finally tuned up prior to shipment, so that readjustment will not be necessary until the machine has been in service for a comparatively long time. The front bearing comprises a high-precision taper roller bearing 86 (N° 32210).

The following is the procedure for taking up axial play :-

1. Ascertain by accurate measurement how much play has to be taken up.
2. Detach the spindle head from the cylinder by unscrewing the four fixing nuts (do not mislay the springs located under the heads of the nuts).
3. Slacken screw 88 and remove coverplate 89.
4. Slacken screw 90.
5. Unscrew nut 91, which is locked to the spindle 92 by means of the washer 93, by lifting the lug which engages in one of the recesses in the nut. Take off seal 89a.
6. Carefully drive out the spindle 92.
7. Take out the sleeve 94 and machine it down according to the amount of play to be corrected.
8. Reassemble the spindle 92, proceeding in the reverse order to that used for dismantling, and remembering to turn up the lug on the washer 93 which locks the nut 91, and to retighten screw 90.

If the amount of play to be taken up causes jamming in the toothing of gear 95, the thickness of the material to be removed is to be evenly divided between the sleeve 94 and the intermediate part 96.



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## CLUTCH AND BRAKE ON SPINDLE SPEED BOX

For the purposes of driving the spindle by the motor 45, a double plate-type clutch 63 controlled by the lever 44 has been mounted on the primary shaft 97 of the speed box. The machine is started or braked by manipulating the lever 44, without the necessity of stopping the motor 45. One section of the clutch drives the speed whilst the other acts as a brake.

Specification of the clutch :

Double steel-on steel "STROMAG" plate clutch, model DB 10/1010. Bore 22-H7, keyway 6 x 2,5

## ADJUSTMENT OF CLUTCH

Remove door 26. Screw off coverplate 98 to gain access to clutch 63. Withdraw the locking rod 100 from the adjusting nut 99, and turn slightly to retain it. Adjust the clutch by turning nut 99. Free the locking rod 100 to relock. Slightly turn the adjusting nut if the locking rod does not occupy its initial position.

Adjustment is performed separately for the section of the clutch which drives the speed box (same end as pulley 101) and for the section which acts as a brake (speed box end).

## ADJUSTING TENSION OF THE BELT

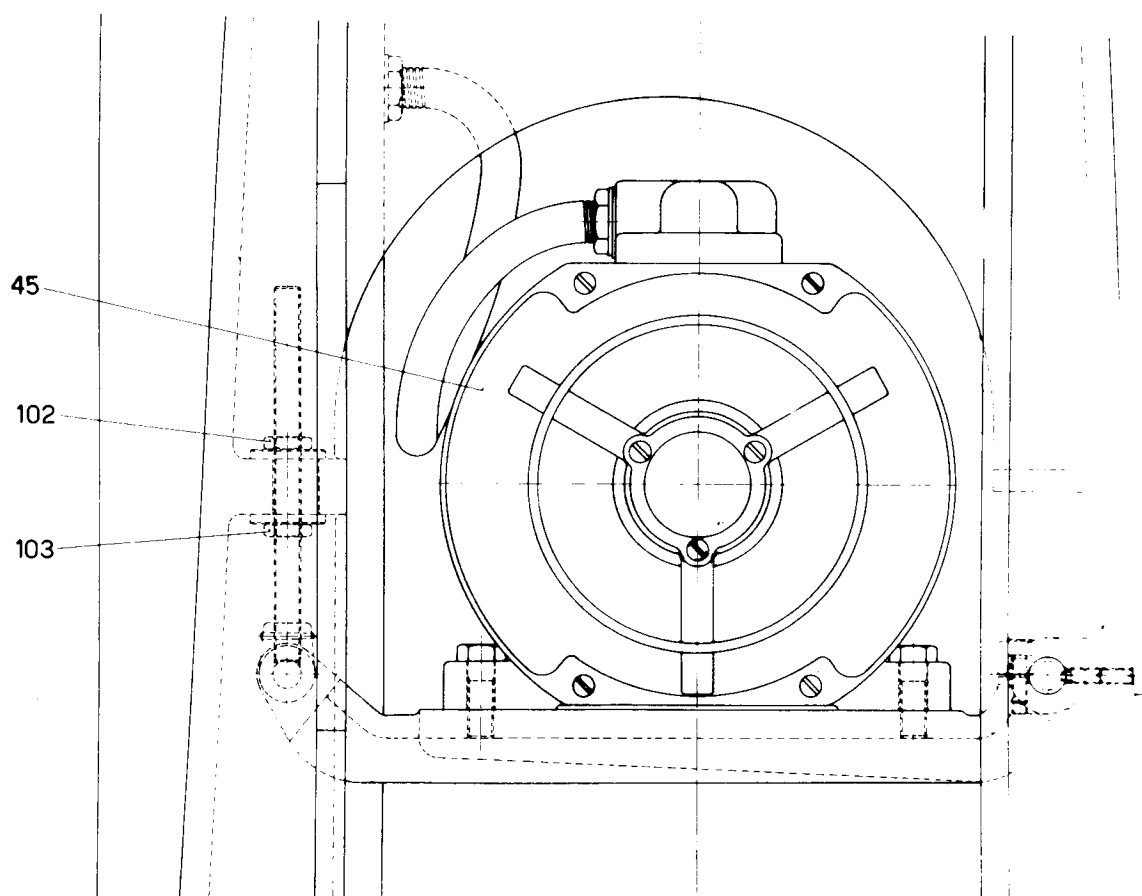
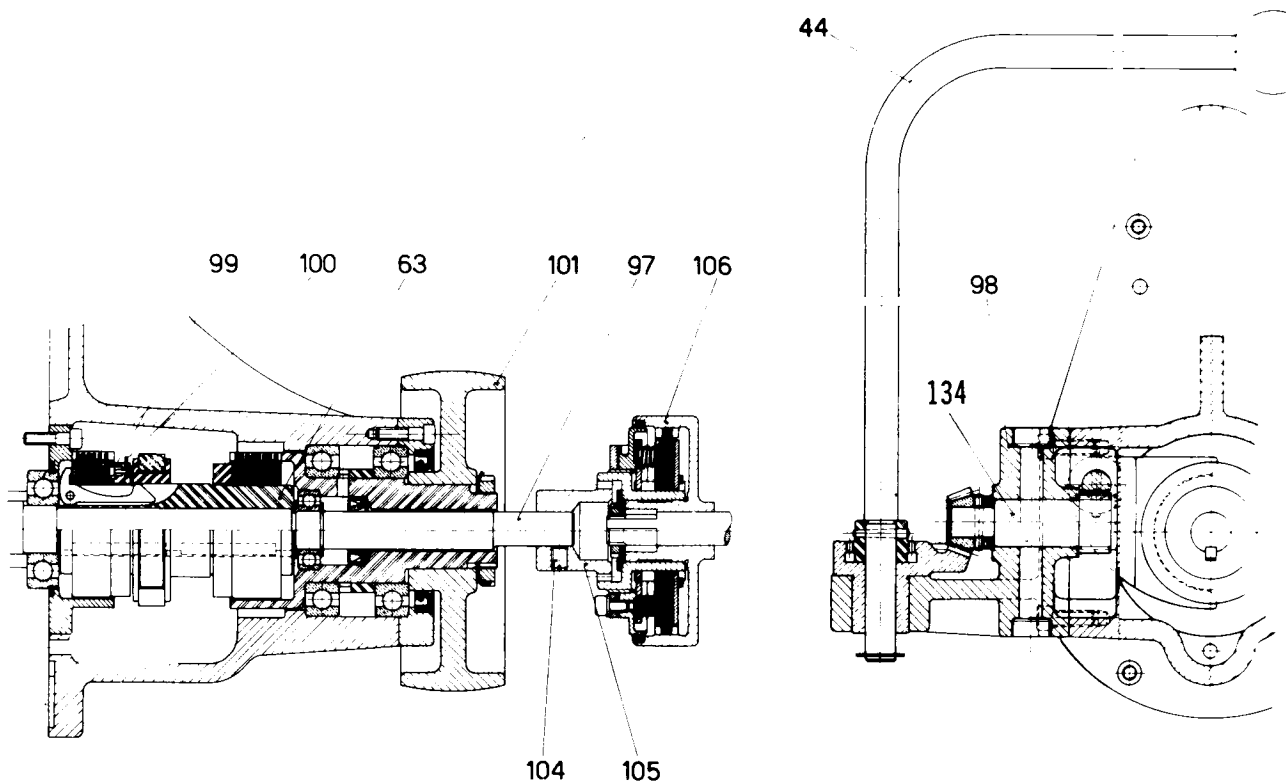
1. Unscrew nut 102
2. Take up slack of belt by tightening nut 103
3. Retighten nut 102.

## REPLACING THE BELT

Specification of belt :

1 "Siegling" Extremultus endless belt, type L 1 BL, width 50 mm, length 1342 mm, less tension 1%

1. Unscrew nut 103 by about 20 to 30 mm
2. Slacken the belt by tightening nut 102
3. Slacken screw 104
4. Shift driver 105 towards pulley 101
5. Pass the belt between the driver 105 and the internally-toothed box 106.



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## ADJUSTING THE TAPER PACKING STRIPS

The table, cross slide and knee are equipped with taper packing strips to take up any play.

Adjustment is effected simply by manipulating the screw 107.

See page 32, sketch A.

## TAKING UP AXIAL PLAY OF LONG FEED SCREW SPINDLE

1. Screw off cap 108
2. Unscrew nut 109
3. Take off handwheel 68 and the various components fitted to the end of the screw spindle
4. Slacken the two screws 111, inserting the screwdriver through the hole of part 112
5. Tighten nut 113 according to the amount of play to be taken up, this having first been ascertained by exact test
6. Machine one of the faces of the spacing member 114 if the play of the vernier 69 is excessive. This play of clearance should be 0,05 mm.  
See page 32, sketch B.

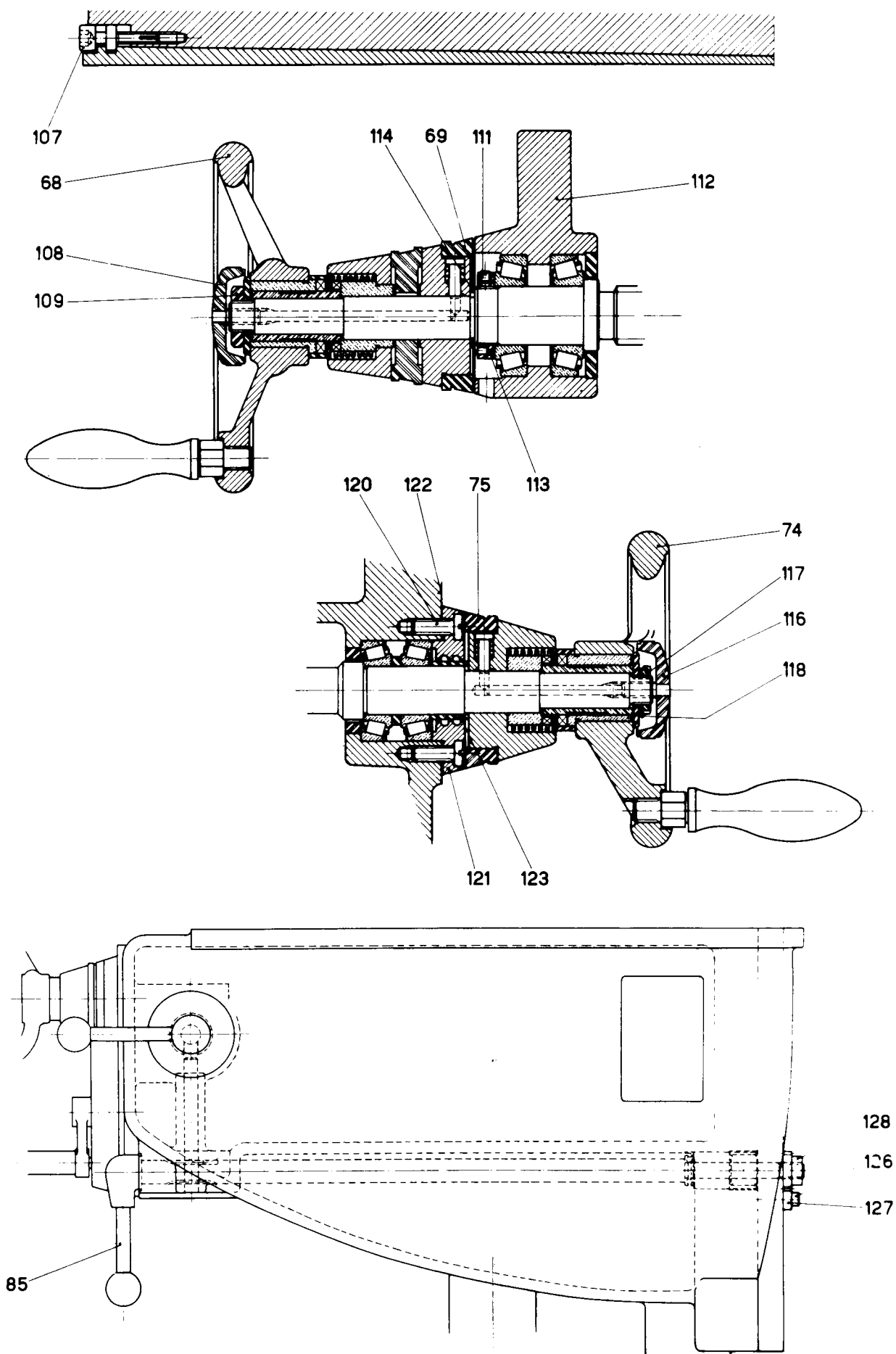
## TAKING UP AXIAL PLAY OF CROSS FEED SCREW SPINDLE

1. Screw off cap 116
2. Unscrew nut 117, which is locked by washer 118, by lifting the lug engaged in one of the recesses in the nut
3. Take off the handwheel 74 and the various components fitted to the end of the screw spindle
4. Unscrew the three screws 120 and remove coverplate 121
5. Machine the face 122 of the coverplate 121 according to the amount of play to be taken up, this having first been ascertained by accurate test
6. Correct also one face of the sleeve 123 by the same amount as the coverplate 121, making sure, however, that the play between the coverplate 121 and the vernier 75 is 0,05 mm.  
See page 32, drawing C.

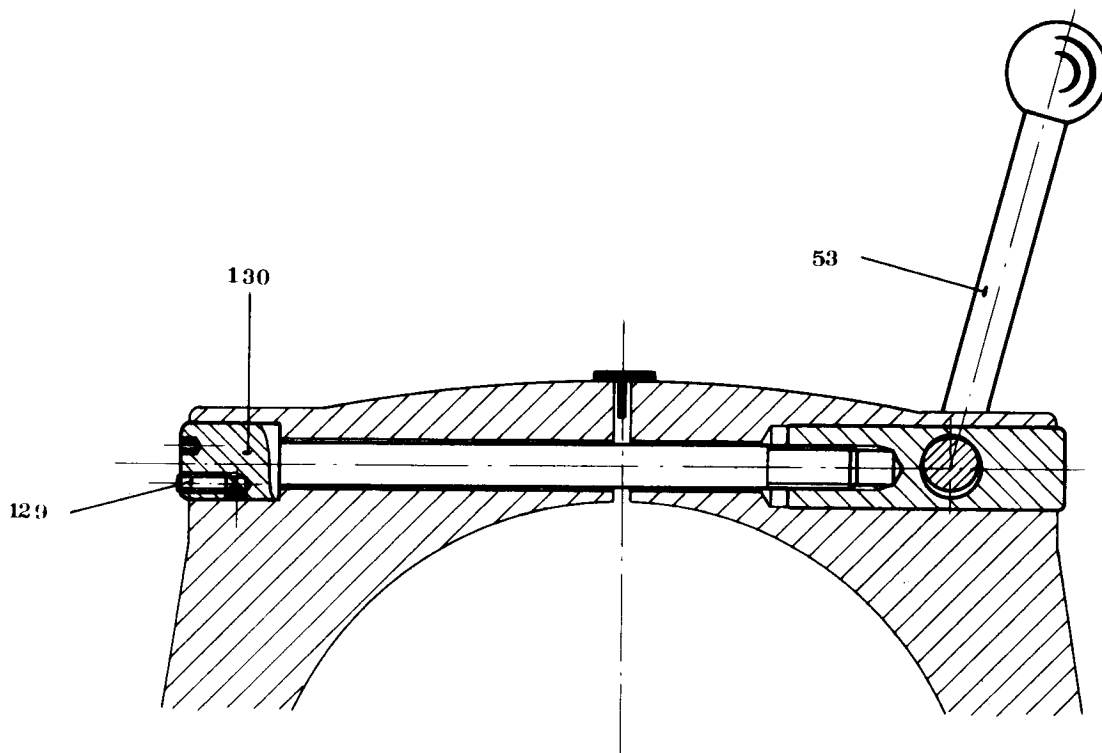
## ADJUSTING KNEE CLAMPING ACTION

When unclamped, lever 85 is vertical. It should clamp when moved through an angle of about 45°. If owing to wear, this should no longer be the case, readjustment should be effected as follows :

1. Slacken screw 126 and remove interlocking member 127
2. Turn gearwheel 128 by the necessary amount
3. Engage interlocking member 127 in the teeth of gearwheel 128 and retighten screw 126  
See page 32, drawing D.



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#### ADJUSTING CYLINDER CLAMPING ACTION

The cylinder is clamped in its seating bore by the lever 53, which actuates two-point eccentric clamping. Readjustment is necessary if :

- a) the lever 53 has to be shifted too far, owing to wear on the clamping members, or
- b) the two clamping actions are out of synchronism.

Readjustment is effected as follows :

1. Slacken the screw 129 which retains screw 130
2. Tighten or slacken 130 according to the amount of adjustment needed
3. Relock screw 130 by tightening screw 129.

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## COOLANT SYSTEM

Page 35 shows the arrangement of the coolant circuit.

The sheet steel (131) is fitted inside the machine base. It has a capacity of 50 litres (about 11 gallons) and should be filled to 20 millimetres (25/32") of the top. The motor-pump set is arranged above the tank.

The coolant feed pipe is taken through the frame of the machine. The nozzle of the flexible pipe which brings the coolant up to the milling cutter is held in position by the collar (132) fitted to the right side on the vertical stand. The delivery of coolant can be regulated by means of the cock (133).

Within the frame, the piping goes through the shaft (134) p.30 which actuates the clutch (63) p.30 so that when the machine is stopped the supply of coolant is cut off.

The pump, tank, piping, filters, etc., should be cleaned periodically (see ING-1E herewith). Access to the tank is gained by removing the two filters (135) and from the interior of the frame, from the rear.

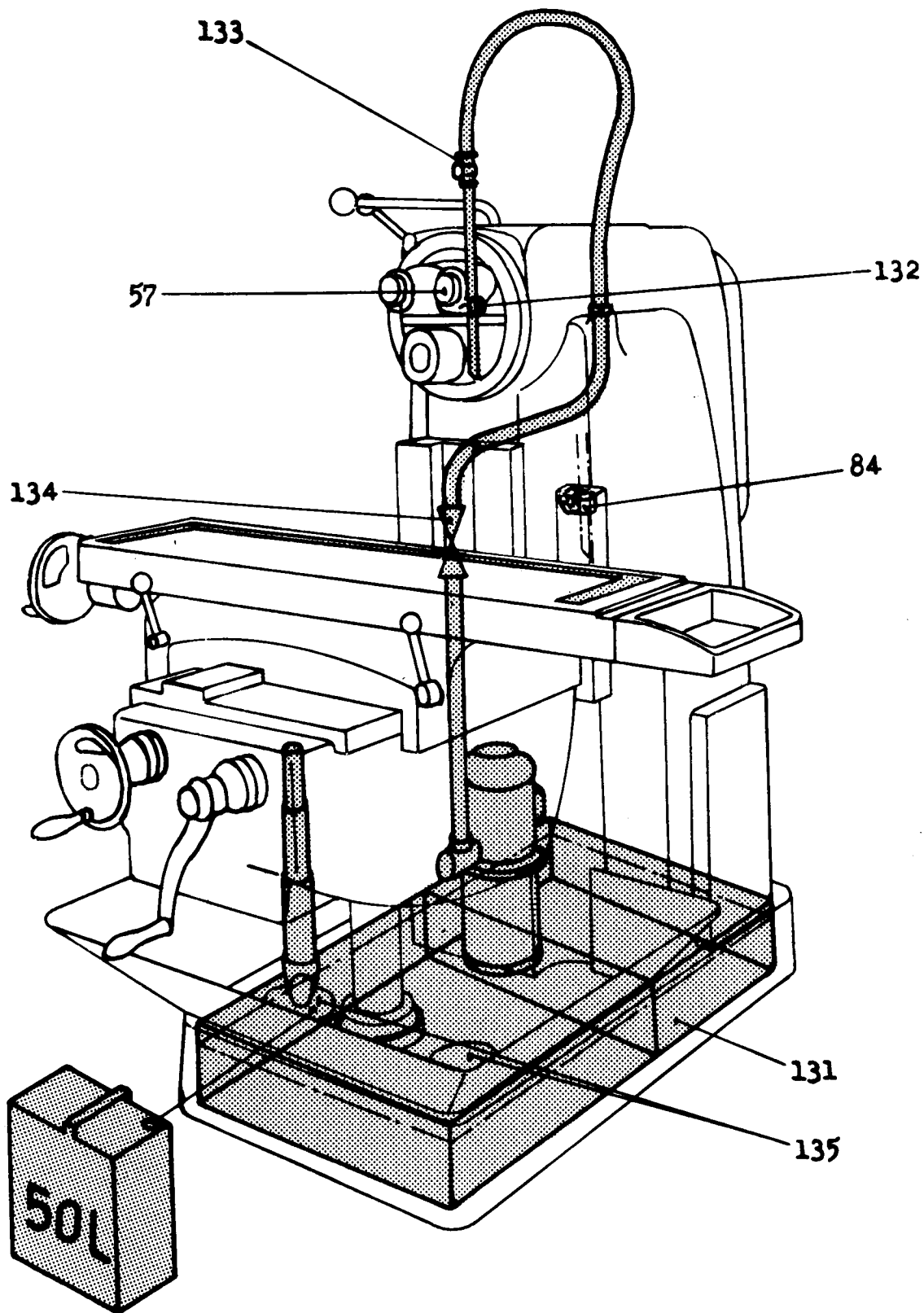
Drainage from the table is taken care of by a gutter running the entire length of the table. It collects the coolant and guides it into a telescope tube which in turn discharges it into the base through a swivelling spout.

When the coolant system is not in use, the mouthpiece of the flexible tube is slipped into the collar of the fixed upper vertical stop (84), which collar is provided specially for this purpose.

## RECOMMENDATION

Practice has revealed that it is preferable to use a good cutting oil as the lubricant.

Soluble oils decompose after prolonged use and may cause corrosion of working parts of the machine.



FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD/SUISSE

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## STANDARD ACCESSORIES SUPPLIED WITH THE MACHINE

- 1 cutter arbor, 22 mm diam. x 376 mm.
- 1 end-mill arbor, 27 mm diam. x 20 mm.
- 1 end-bearing with 1 fixing screw
- 1 end brace
- 4 screwed rings for hoisting the machine
- 1 oil gun
- 1 special funnel.

- 1 special spanner, 52-7035, for drawing out the overarms and for 10-mm hexagon socket heads
- 6 spanners for 2,3 - 4 - 5 - 6 - 8 and 10-mm hexagon socket head
- 3 fork spanners 8 - 22 - 27 mm.
- 1 flat double fork spanner, 14/17 mm.



# SERVICE INSTRUCTIONS FOR THE SCHAUBLIN 53 HIGHSPEED SPINDLE HEAD

## MAIN TECHNICAL DATA

Spindle for collet type

E25

Reducing bush for internal taper

Morse 1

Travel of spindle

180-6000 r.p.m.

Four times normal spindle speeds.

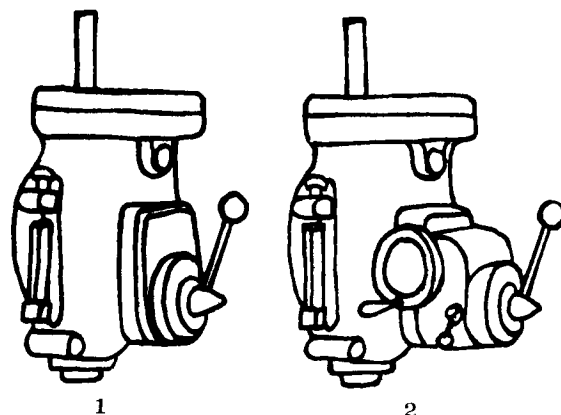
Weight 33 kilos  
(72 3/4 lbs)

Overall dimensions 38x28x27 cm

## QUILL FEEDS

Control facilities :

- 1 Manual control by lever
- 2 Manual control by lever and endless screw
- 3 Power control (see page 45)



## ACCESSORIES

437E Double taper concentric chucking collet, type E25, centre holes 4 to 14 mm

1184 Dial comparator for depth gauging, 1 division = 0,025 mm

Micrometer stop for depth gauging

36-mm-diameter boring bar for bores of 3 to 80 mm

Morse 1 taper shank.

## CLEANING, LUBRICATION AND MAINTENANCE

On receipt and during use of the high-speed spindle head, follow the same instructions as given in respect of the machine.

## FITTING

The high-speed head is fitted in place of the standard milling head.

### A DISMANTLING THE STANDARD MILLING HEAD

Disengage the locking plunger 6. Remove the four fixing nuts with their springs. Pass a brass bar 20 mm in diameter and about 500 mm (1 7 1/2") long through the spindle and with it, take off the standard milling head. Protect the latter from dust and take care not to spoil the abutment face. Remove two of the four tiebolts.

### B FITTING THE HIGH-SPEED SPINDLE HEAD

Turn the cylinder through 90°. Fitting of the high-speed head is facilitated by a fixture mounted on one of the T-slots of the table. Pull out the 65-mm quill 106 and block it in this position before inserting it into the above-mentioned fixture. The head is fixed to the cylinder by three correctly-placed tiebolts. Two of these tiebolts are those belonging to the standard spindle head and are already in position, whilst the third, which is longer, is supplied with the high-speed spindle head. The spindle is driven by a stub member which merely has to be aligned with the aperture for the bevel gearwheel of the milling machine.

The head is brought into its proper position by combining the three movements of the table, whereupon the head is fixed in this position by means of the three nuts and springs supplied with the high-speed head.

### C Dimensions of internal taper of the spindle for E25 collet.

#### A. MANUAL CONTROL BY LEVER

The vernier 112 indicates the depth as drilling proceeds. It is clamped by the handle 113 for zero-resetting. Pulling the lever 111, which disengages it from its toothing, enables it to be placed in the most convenient working position.

#### 2. MANUAL CONTROL BY LEVER AND ENDLESS SCREW

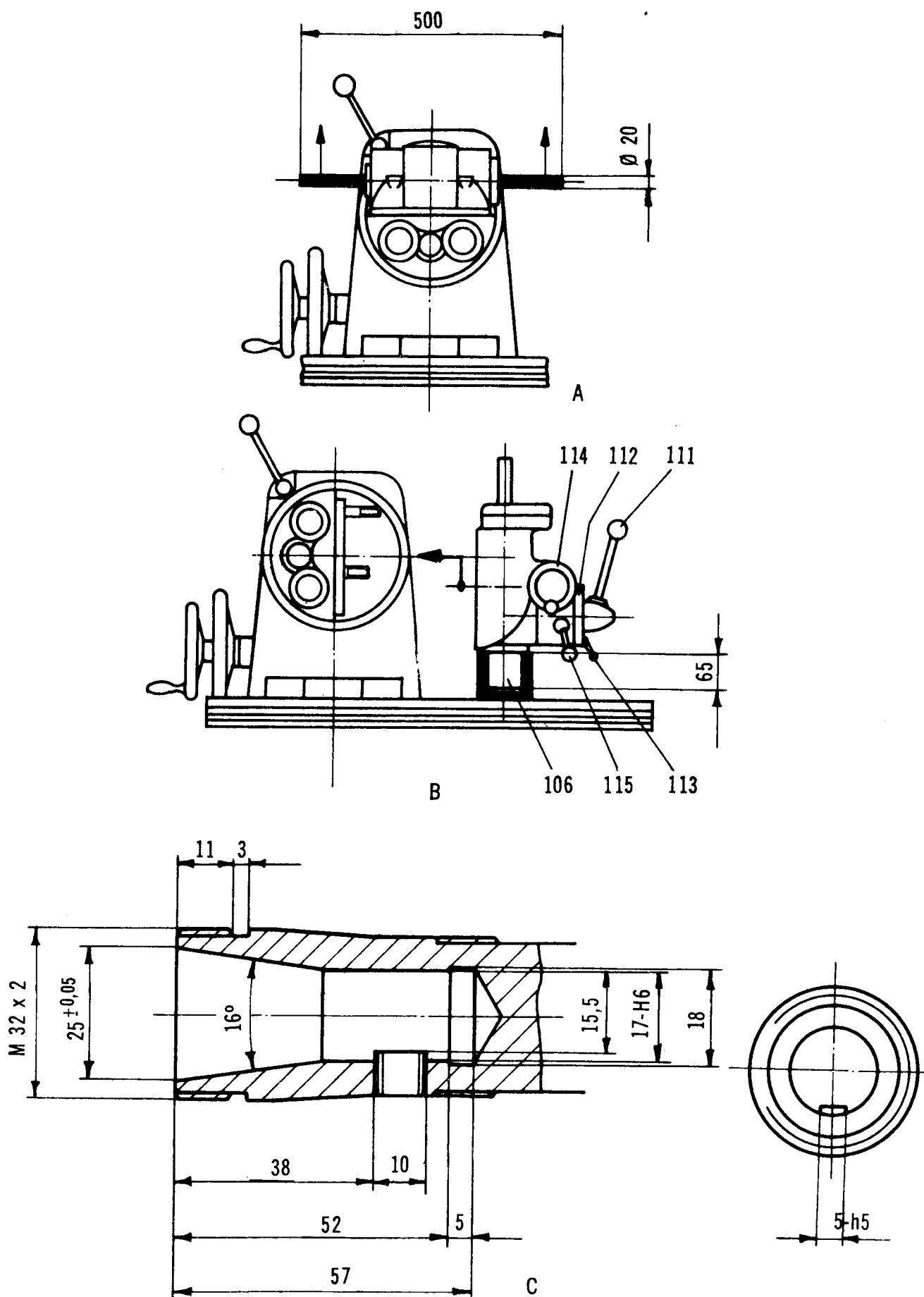
The vernier 112 is set to the desired depth before drilling commences, and is then clamped by the handle 113.

Pulling on lever 111, which disengages it from its toothing, enables it to be placed in the most convenient working position.

To use handwheel 114, engage the lever 115.

One turn of the handwheel 114 feeds the quill 106 through 1,5 mm.

Tripping at the end of the stroke takes place at the zero mark.



FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD/SUISSE

## ADJUSTMENTS

The following adjustments call for the exercise of great skill and care, and should be entrusted to experienced personnel only.

### TAKING UP AXIAL PLAY OF SPINDLE

The bearings are adjusted in the course of the final tuning up of each high-speed head, so that readjustment will not be necessary until the high-speed spindle head has been in service for a comparatively long time. The front and rear bearings comprise a double-row parallel roller bearing NUL 25e-C152, and two ball thrust bearings 51105-C05. Axial play, if any, can have no other cause than wear on the thrust collars.

### DISMANTLING THE QUILL

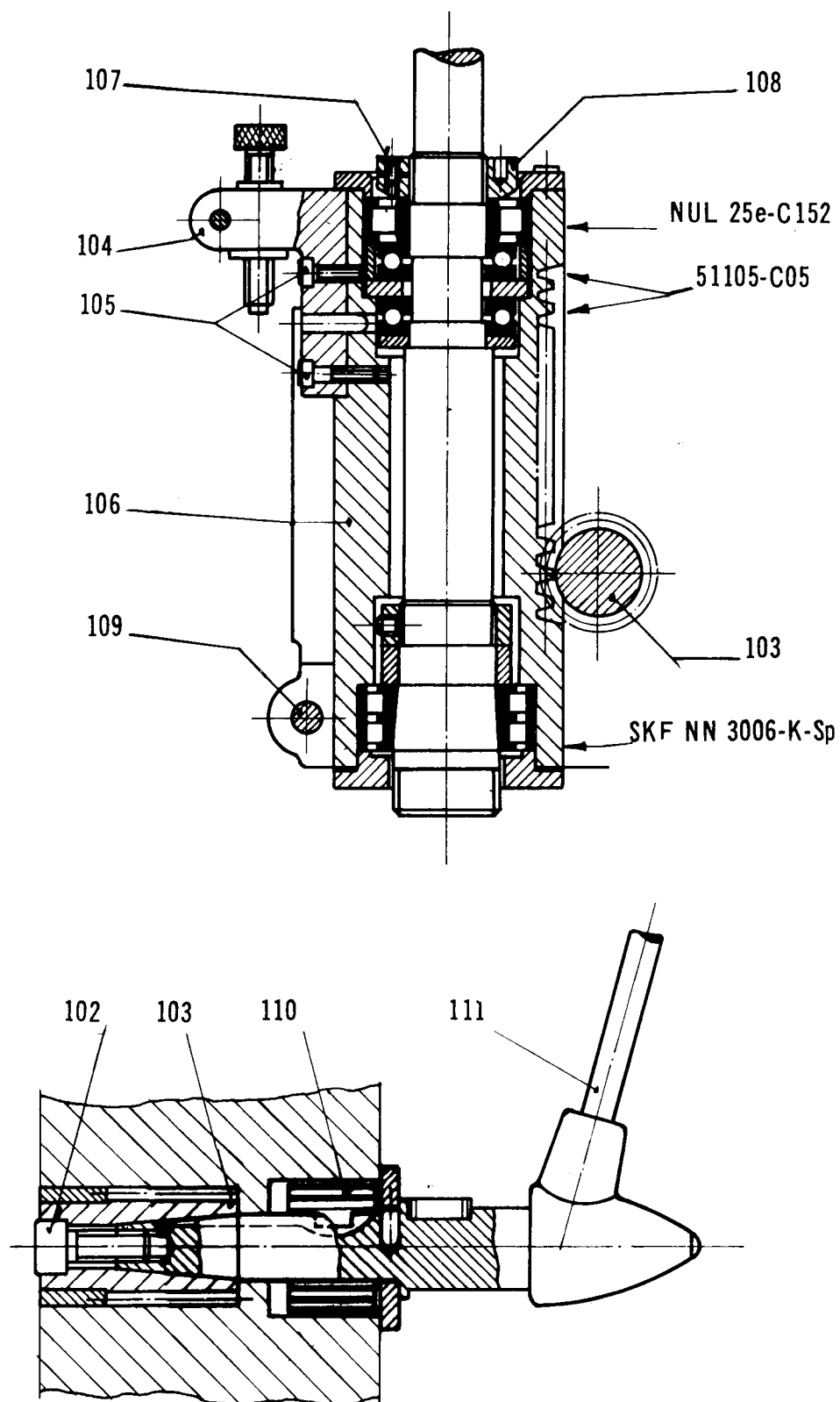
1. Remove screw 102 and take out pinion 103
2. Dismantle guide 104 maintained by the two screws 105
3. Take out the quill 106

### TAKING UP AXIAL PLAY

1. Slacken screw 107 and tighten nut 108 according to the amount of play to be taken up, which should first be determined by accurate measurement
  2. Retighten screw 107
- Refit the quill by proceeding in the reverse order to dismantling.

### REGULATING TENSION OF QUILL RETURN SPRING

1. Lock quill 106 by means of screw 109
2. Slacken the screw 102 which secures the pinion 103 on its taper
3. Tighten or slacken spring 110 by means of lever 111 according to requirements, then retighten screw 102.



FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD/SUISSE

### 3 POWER CONTROL OF HIGH-SPEED SPINDLE HEAD

This assembly comprises :

- a) Upper portion fitted on the high-speed head
- b) Lower portion fitted at right-hand end of table
- c) Flexible cable 1 1/2 meters long

#### A FITTING UPPER PORTION

- 1. Completely remove screw 159 and take out bearing 150
- 2. Fit the upper portion, replace screw 159, and lock the swivelling bracket in the desired position

#### B FITTING LOWER PORTION

- 1. Remove the plate 151, which is fixed by screw 152
- 2. Push driving bar 153 in the special guide bearing which is placed under the table in the middle of the cross-slide
- 3. Push driving bar through its bore and fix the lower portion by means of the 4 bolts 154, then tighten screw 155 as far as it will go
- 4. Clamp swivelling bracket 156 in the desired position by means of screw 157.

#### C FITTING CABLE

Engage the cable in the upper portion, then position it in the lower portion.

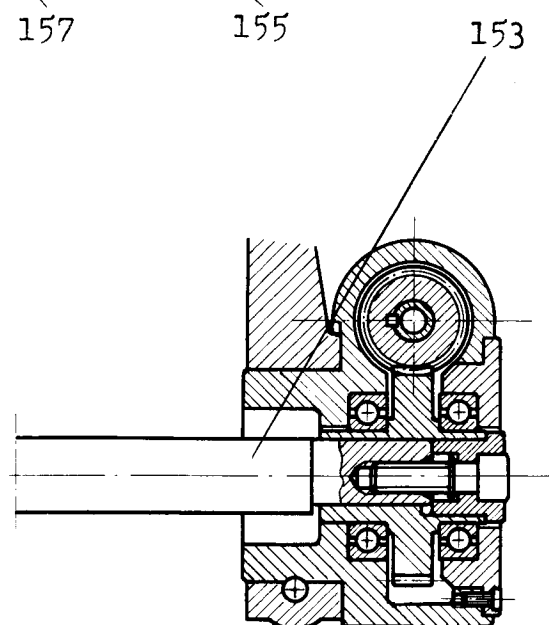
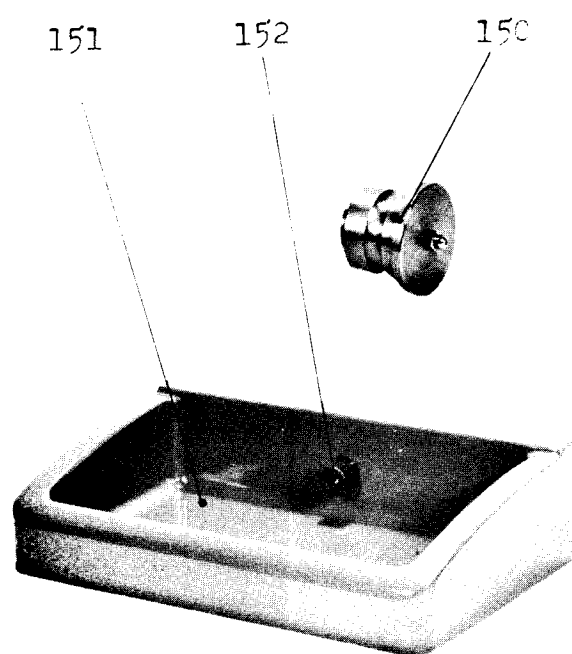
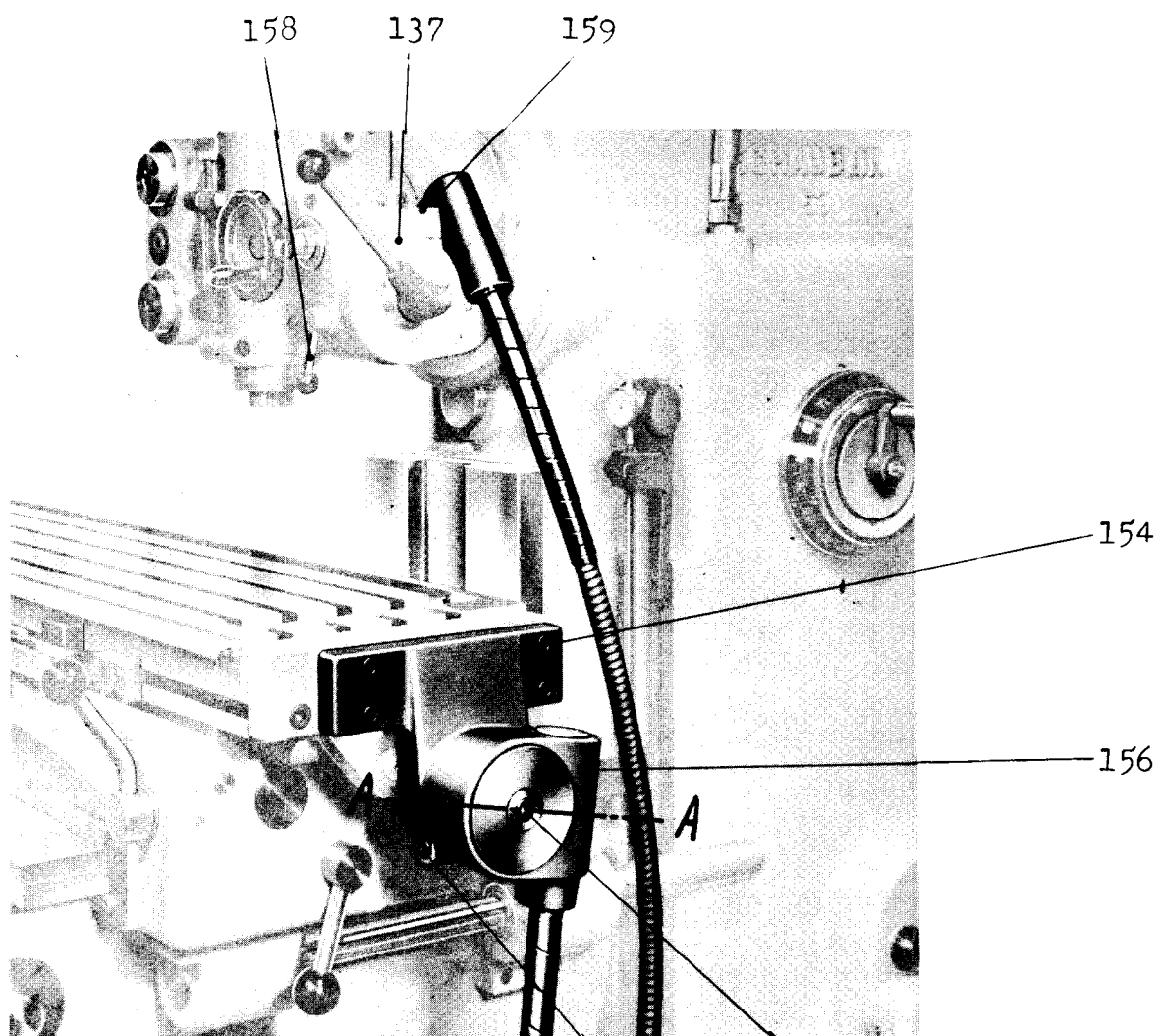
#### CLAMPING OF TABLE (see page 24)

Tighten nut 73. Clamping the table automatically locks levers 70, thereby preventing wrong manipulations. In this position the table and the long feed screw spindle are disengaged from one another. The screw spindle can rotate without communicating any movement to the table. The power feed of the quill is engaged by means of the lever 158. Automatic tripping at the end of the feed stroke takes place at the zero division.

To obviate any wrong manipulation, which would entail the breakage of some working part. *all depth setting performed with the aid of the vernier 137 must be done with the quill in its raised position.*

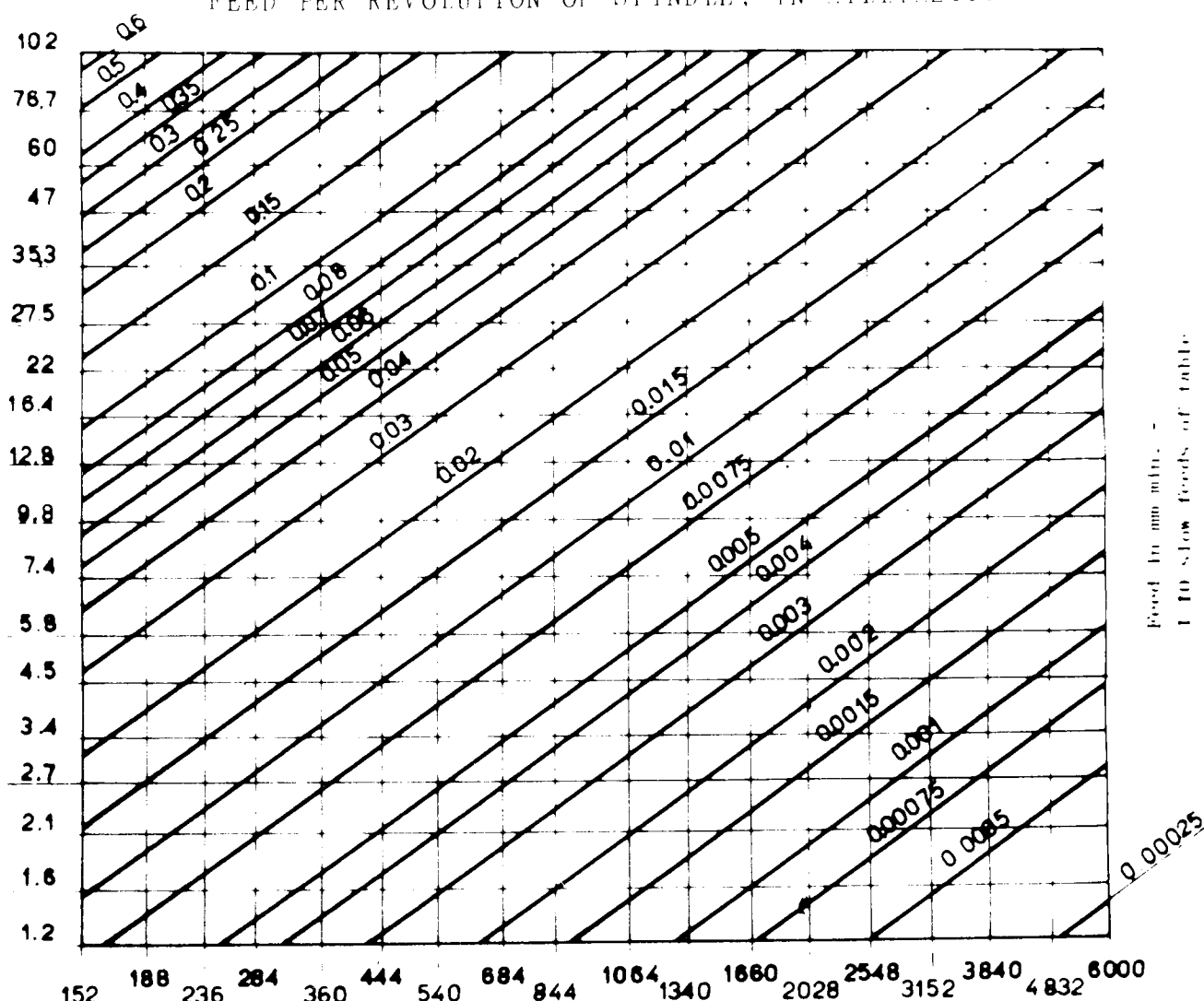
The feeds range from 1,2 to 100 mm per minute, and are tenth the slow feeds of the table.

The graph and chart on pages 45 and 46 show the feeds per spindle revolution as a function of the r.p.m. speed of the spindle and of the feed of the quill in mm per minute, and also the cutting speeds recommended for high-precision work.



Coupe A-A

# FEED PER REVOLUTION OF SPINDLE, IN MILLIMETERS



R.p.m. speed of spindle = 4 times r.p.m. speed of standard spindle

## CUTTING SPEEDS IN METERS PER MINUTE RECOMMENDED FOR HIGH PRECISION WORK

Operation		Speed in meters per minute			
		Mild steel	Hard steel	Cast iron	Aluminium
Drilling with carbon steel twist drills		12	9	12	20
Drilling with high speed steel twist drills		25	15	18	40
Boring cutters		5	4	5	10
Boring high-speed-tool	Rough cut	20	15	20	35
	Finishing cut	25	20	25	40
Boring with cemented carbide tool	rough or finishing	65	50	65	100-150

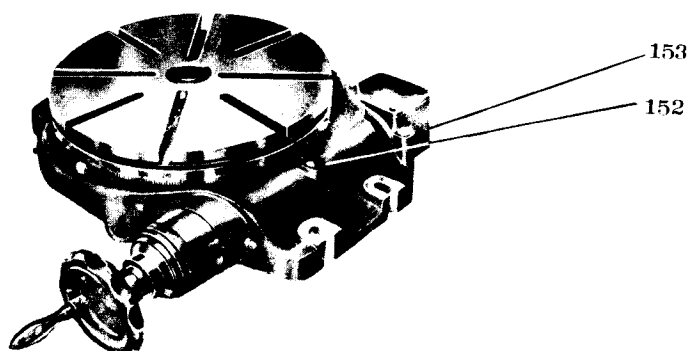
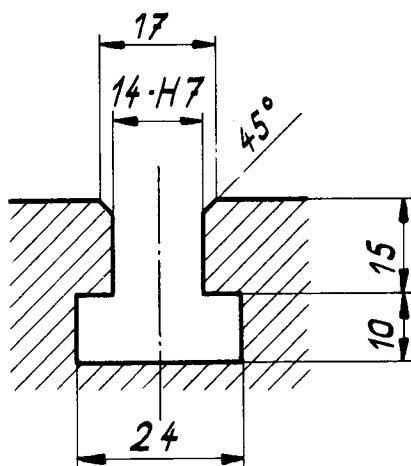


# SERVICE INSTRUCTIONS FOR SCHAUBLIN 53 CIRCULAR TURNTABLE

## MAIN TECHNICAL DATA

Diameter of turntable	280 mm
Overall height	105 mm
Internal taper of turntable	Morse 3
Plate graduated every degree to	360°
One turn of handwheel to	3°
One division of vernier to	0° 01'
Number of T-slots	8

Dimensions of T-slots as per  
VSM 33811 standard



## ACCESSORIES

- 1070 Power drive of circular turntable by cardan and gearbox. See page 51
- 1050 Three-index-plate indexing attachment fitting the circular turntable  
Division : 2 to 360.

## CLEANING, LUBRICATION AND MAINTENANCE

On receipt and during use, the general instructions given in connection with the machine must be adhered to. Never lift the turntable by its top, only its base.

### OIL BATH

The endless screw and the gears of the power control assembly are oil-bath lubricated. The oil should be filled as follows, using an oil of viscosity 4,5°E at 50°C.

Screw out plug 152 and fill to the middle of the oil level sight glass 153. See page 47. Once a year, drain the oil bath, swill out with paraffin (kerosene), and renew the oil. The turntable also has two lubricators for pressure lubrication by means of the oil gun supplied with the machine.

### DESCRIPTION

The turntable is fixed to two T-slots in the table by means of four 10-mm staybolts supplied with this attachment. Two guide blocks take care of its alignment on the table, and the turntable is clamped by two eccentric clamping motions.

*Unclamp the circular turntable and release plunger 163 before operating handwheels 127 or 167 or engaging the power feed.*

### DISMANTLING THE VERNIER

1. Slacken screw 128
2. Take off handwheel 127 with the vernier 129

### DISMANTLING THE INDEX PLATES

1. Screw off nut 164 and take off washer 165
2. Remove the crank 167 bearing the plunger 163 and the bush 177
3. Take out needles 169 and 170
4. Unscrew the three screws 171 and take off plate 172

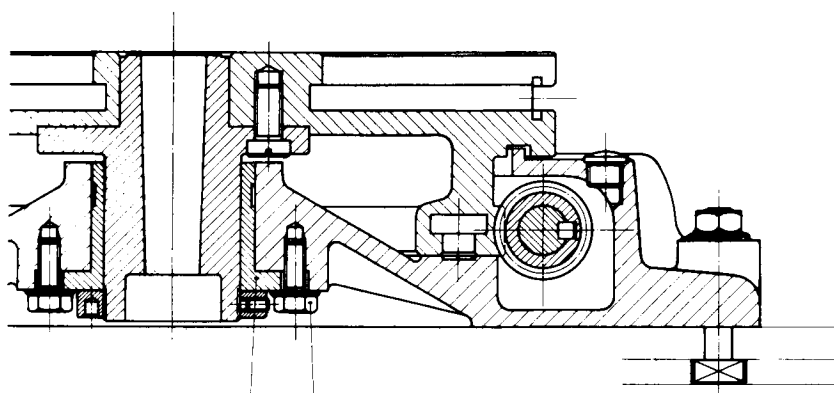
### TAKING UP AXIAL PLAY OF ENDLESS SCREW (WORM)

If the axial play is caused by the teeth :

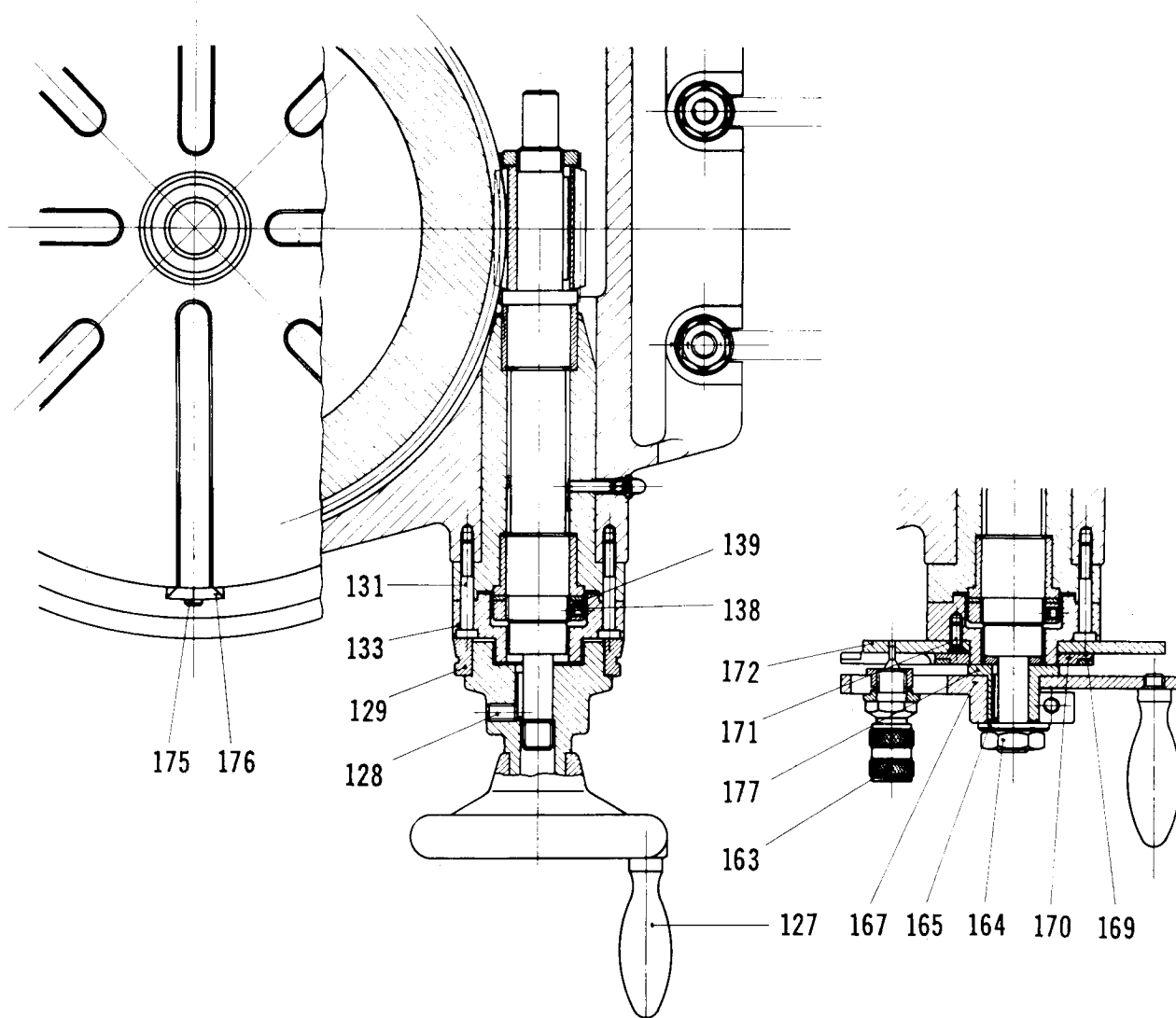
1. Slacken the two screws 173 and turn the eccentric sleeve 174 according to the amount of play to be taken up
2. Firmly tighten the two screws 173
3. Slacken screw 175 and position the index 176 perpendicularly to the axes of the guide blocks.

If the axial play is caused by the spindle of the worm :

1. Dismantle the vernier or the index plate in accordance with the foregoing instructions
2. Screw out the four screws 131 and remove bush 133
3. Slacken screw 138 and tighten nut 139. firmly retighten screw 138.



174 173



FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD/SUISSE

# POWER CONTROL OF CIRCULAR TURNTABLE SCHAUBLIN 53

## FITTING

The powered-actuation assembly for the circular turntable is fitted at the extreme right-hand end of the table.

The plate 151 normally fitted at this site should be removed, together with the tapered spacer at the end of the long feed screw spindle. (See page 25)

1. Push driving bar 153 in the special guide bearing which is placed under the table in the middle of the cross-slide
2. Fix the assembly by means of the 4 bolts 178, push driving bar through its bore, then tighten screw 179 as far as it will go
3. Attach end of the cardan to the gearbox of the circular turntable by means of the screw 180, locking the latter with locknut 181.

*If the Rotary Table is being used together with its attachment for automatic rotation, the table movement to the left must be reduced, in order to avoid accidents.*

*For this reason, the special DOUBLE STOP which is fixed to point "A" as per fig. 1 will have to be removed to point "B" and fixed there again.*

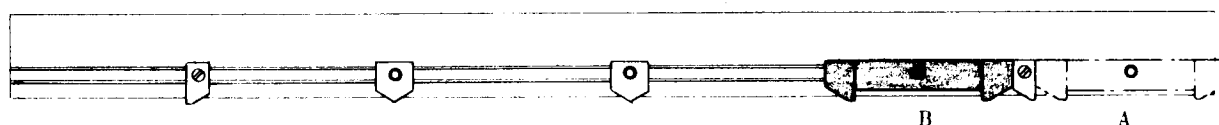


Fig. 1

## CLAMPING THE TABLE (see also pages 24 & 25)

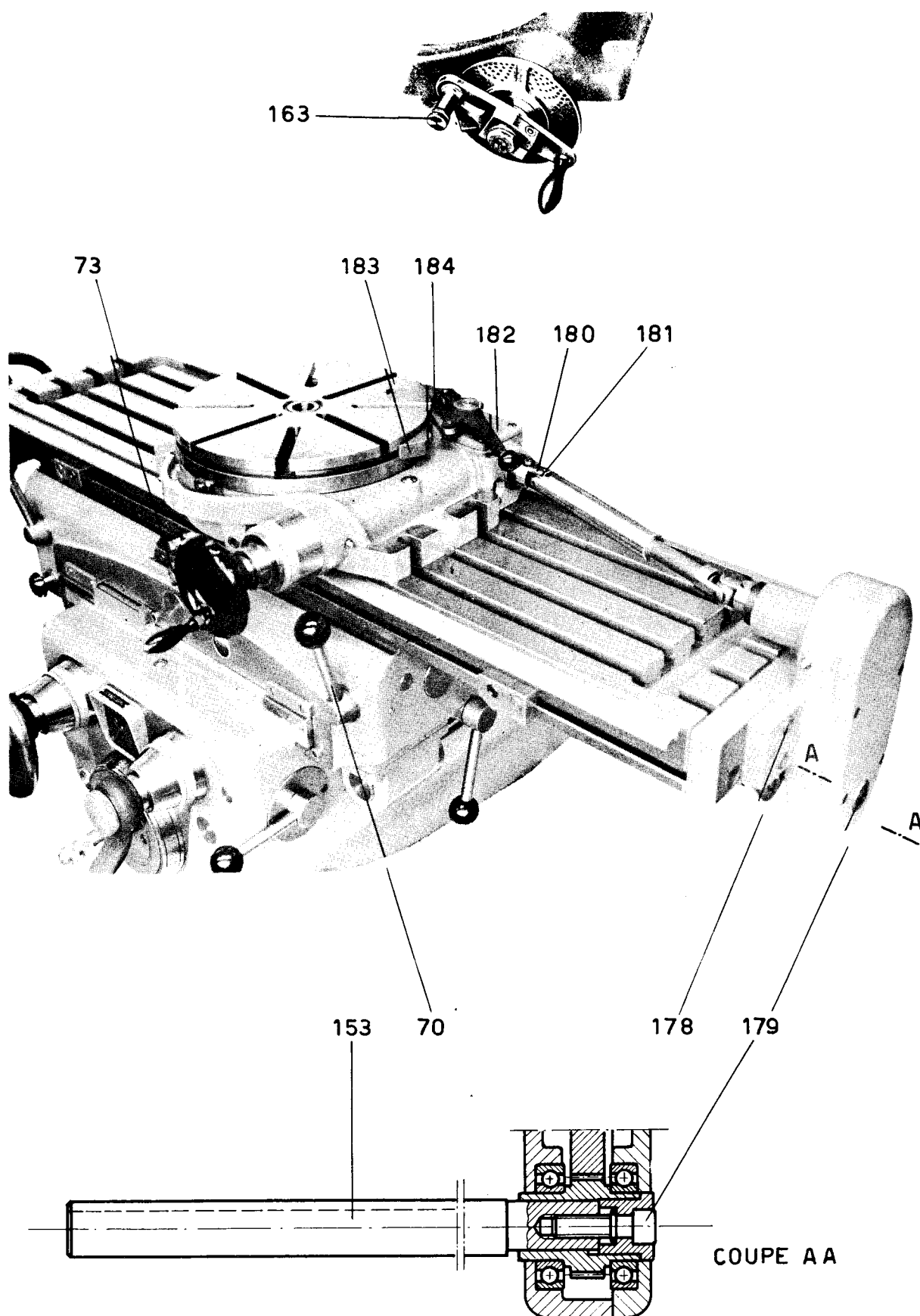
Tighten nut 73. Clamping the table, automatically locks levers 70, thereby preventing wrong manipulation. In this position the screw spindle can rotate without communicating any movement to the table.

## THROWING IN AND OUT OF ENGAGEMENT

The circular turntable is engaged, disengaged and reversed, by manual control with lever 182.

Automatic uncoupling at the end of the stroke is taken care of by the adjustable trips 183, which are clamped in position by the screws 184.

**IMPORTANT!** *Always unclamp the circular turntable and disengage plungers at the end of engaging the power feed.*



FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD / SUISSE

# SERVICE INSTRUCTIONS FOR THE SCHAUBLIN 53 SLOTTING ATTACHMENT

## MAIN TECHNICAL DATA

Adjustable stroke	70 mm
Number of strokes per minute	17 - 500
Inclination	2 x 90°
Dimensions of tool	12 x 12 mm

## CLEANING, LUBRICATION AND MAINTENANCE

On receipt and during use of the slotting attachment, the general instructions given in respect of the machine must be adhered to.

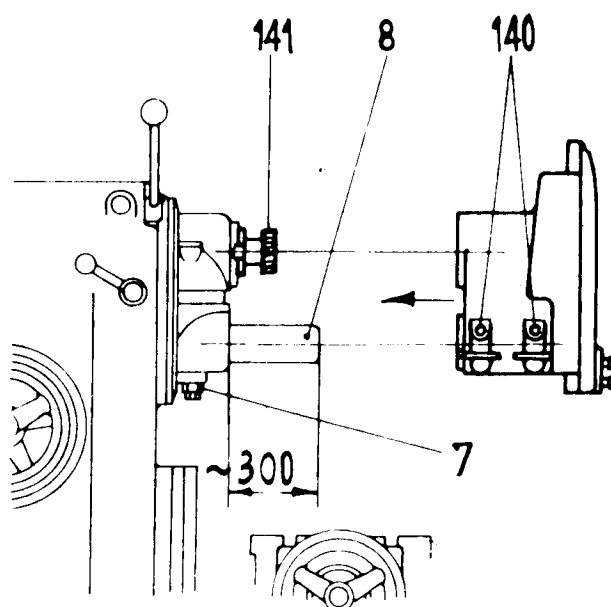
The slotting attachment has 7 lubricators for pressure lubrication by means of the oil gun supplied with the machine

## FITTING

The slotting attachment is positioned and fixed by the two supporting arms 8. Withdraw the cylinder completely out and turn it to bring the spindle to its elevated position. (See drawing below). To fit the attachment, put the arbor 141 into the spindle and fasten by means of the draw-in-bar. Draw out one of the supporting arms 8 by about twelve inches and tighten the nut 7.

Slip the slotting attachment on the arm thus feed, slacken nut 7 and insert the second supporting arm into the corresponding bore in the attachment. Then bring the slotting attachment up against the face of the spindle head, taking care not to damage the teeth of the drive pinions lock the supporting arms 8 in position by means of the nut 7 and tighten the four screws 140, at the same time holding the slotting attachment firmly against the spindle head so as to prevent any twisting.

The number of strokes per minute should be *limited to 500* which is in conformity with the spindle speed of 1000 r.p.m.



#### ADJUSTING THE STROKE OF THE RAM

1. Bring the screw 144 in front of the adjusting aperture so that it can be reached with the key in turning the machine by light impulsions
2. Slacken nut 145
3. Set the stroke by means of screw 144. This adjustment is facilitated by the scale 146 along which the cursor 147 slides
4. Tighten nut 145

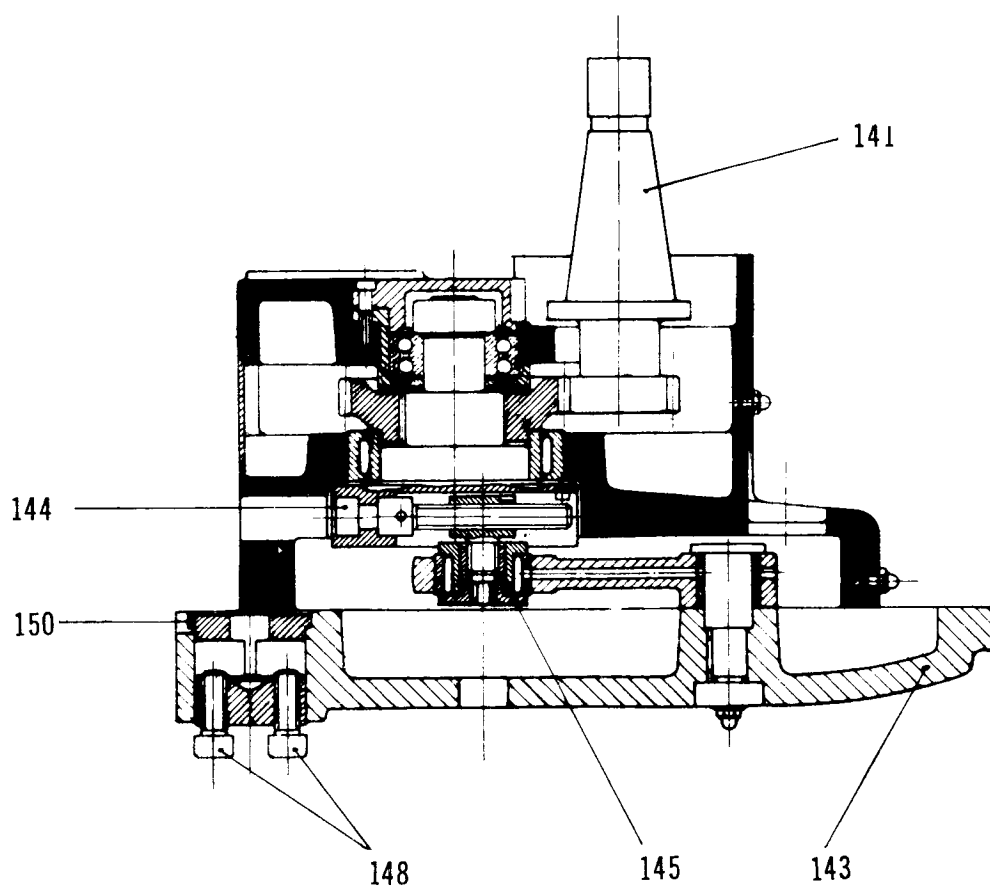
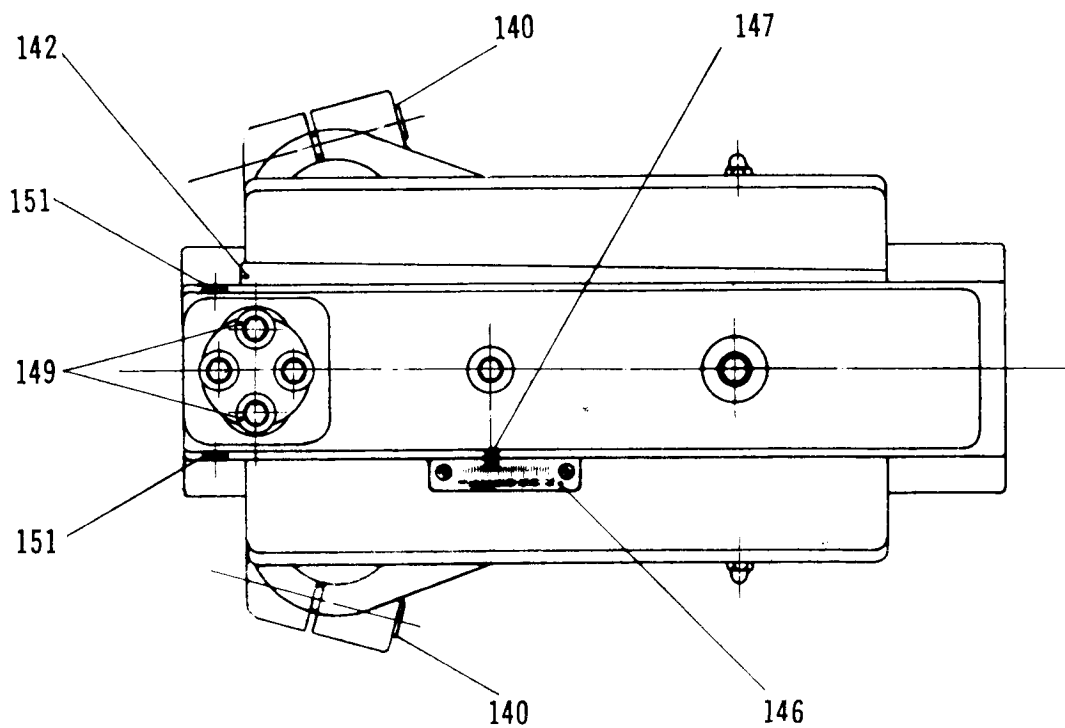
#### SETTING INCLINATION OF TOOL

The tool is clamped by means of the two screws 148

1. Slacken the two screws 149
2. Set the inclination of the toolholder 150 as desired by means of the screws 151
3. Retighten the two screws 149.

#### ADJUSTING THE TAPER PACKING STRIP

The taking up of any play developed by the taper packing strip 142 of the ram 143 can be effected by means of the two screws being at each end of the taper.



FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD/SUISSE



# SERVICE INSTRUCTIONS FOR THE SCHAUBLIN 53 UNIVERSAL DIVIDING HEAD

## MAIN TECHNICAL DATA

Height of centre	120 mm
Inclination	0 to 90° and 0 - 10°
Spindle nose threaded like W25 lathe headstock, for three-jaw chuck	N° 21
Morse taper of bore	N° 4
Male centre and driver	
24-hole index plate and three additional index plate	

## ACCESSORIES

- 940B Power driver coupled to table feed and comprising : 1 quadrant with set of changewheels for fitting to dividing head
- 1000 Tailstock adjustable for height from 105 to 145 mm. Inclination  $\pm 15^\circ$ . Dead centre with N° 1 Morse taper
- 21 130-mm. diameter chuck with two sets of 3 concentric jaws, fixed to faceplate
- 994 Extension for using dividing attachment with power drive in middle of table
- 12 Reducing sleeve (closer) with extractor nut, tightening key, for use of type W20 collets
- 890 Dividing attachment for multiple threads (close pitches)

## FITTING

The dividing head is fixed to the table by two tiebolts supplied with the attachment. The dividing head can be used for simple indexing operations by worm and differential, spiral milling (close or wide pitch) and milling cams. All these jobs can be done with ease with the aid of the indexing tables.

*If the dividing head is used in conjunction with the quadrant, the feed of the table to the right must be limited, i.e., reduced, in order to avoid accidents. For this purpose the special double stop, as fixed at A in Fig. 1 should be shifted to the point B and there secured.*

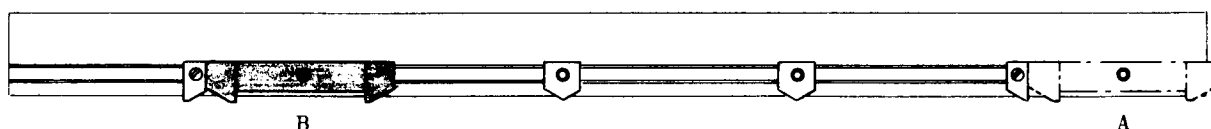


Fig. 1

## CLEANING, LUBRIFICATION AND MAINTENANCE

On receipt and during use of the dividing head, the instructions given in respect of the machine should be applied. The dividing attachment has six lubricating points which should be serviced with the oil gun supplied with the machine.

### TAKING UP SPINDLE PLAY

#### a) Adjusting spindle in front bearing bush

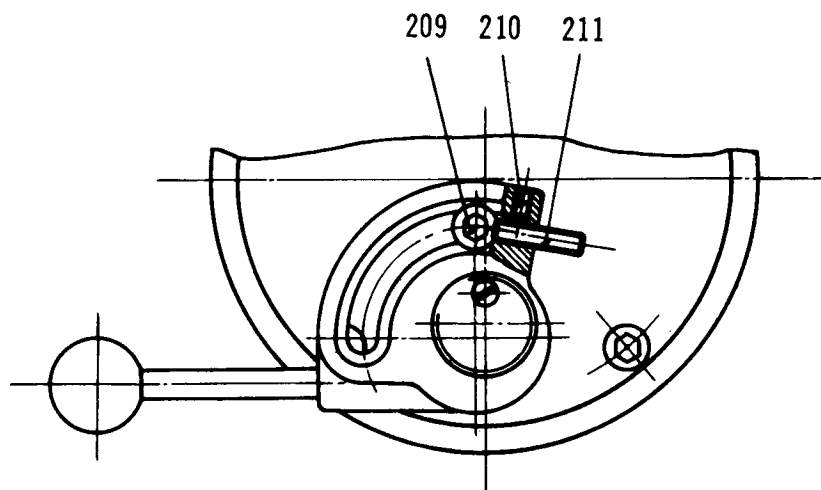
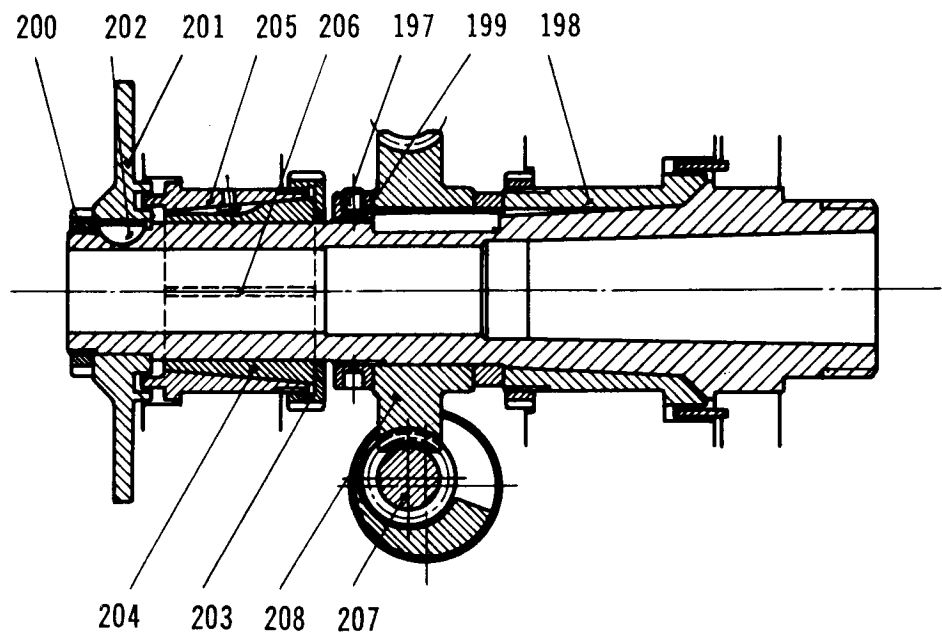
1. Slacken the two screws 197
2. Adjust spindle play in bush 198 by means of adjusting nut 199
3. Lock by tightening the two screws 197 (the axial play, measured with a dial gauge, should be about 0.01 mm).

#### b) TAKING UP RADIAL PLAY IN REAR BEARING BUSH

1. Remove nut 200, washer 201 and key 202
2. Slacken nut 203 and remove bushes 204 and 205. Withdraw leaf 206
3. Machine down thickness of leaf 206 absolutely evenly so that the spindle turns freely, without noticeable play, when the adjusting nut 203 has been firmly retightened. (Clearance of 0.01 mm should be left for the film of lubricant). If necessary re-scrape the bearing bush to suit the spindle.

### ADJUSTING PLAY BETWEEN WORM 207 AND WORMWHEEL 208

1. Slacken screws 209 and 210
2. Take up play by means of stop-screw 211
3. Lock by retightening screw 209 and 210.



---

# SERVICE INSTRUCTIONS FOR VICE 35 FOR USE ON SCHAUBLIN 53 UNIVERSAL MILLING MACHINE

## MAIN TECHNICAL DATA

Width of jaws	140 mm
Maximum opening	102 mm
Overall height with rotating baseplate	133 mm
Overall height without rotating baseplate	97 mm
Swivels through	360°

## CLEANING, LUBRICATION AND MAINTENANCE

On receipt and during use of the vice, the same instructions apply as in the case of the machine. The vice has one lubricating point, lubrication being done by means of an oil can. By swivelling over the vice, the spindle is easily rendered accessible for periodical lubrication.

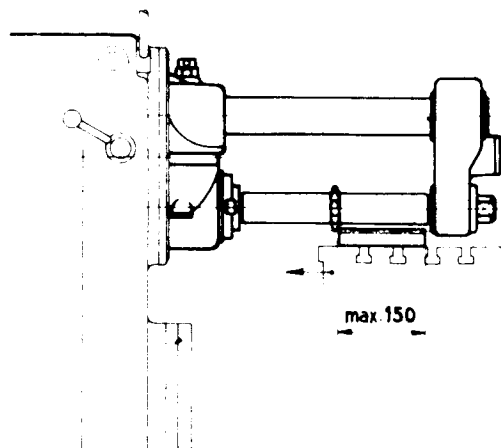
## USE

The base is fixed to one of the T-slots of the table by means of two bolts. Two stones are provided for aligning purpose. The vice is locked in all its positions on the base by means of 2 bolts, in addition to which a central bolt holds the base and the vice itself firmly against the table. This highly effective clamping system operates at the point of attack of the tool.

For straightforward types of work the vice is used without the base. The guide stones for the base can be secured in two positions in the body of the vice, viz., parallel or at right-angles to the jaws. The vice is then secured in one of the table T-slots by means of 2 bolts of the baseplate, and also by means of a somewhat shorter central bolt, included among the accessories, the firm tightening of which must not be overlooked.

# CUTTING OF RACKS

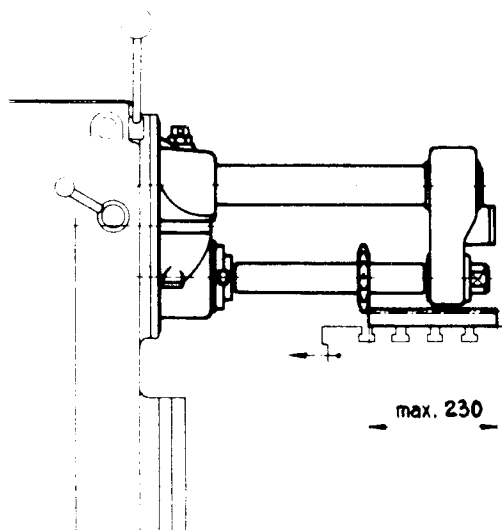
## ON TYPE SCHAUBLIN 53 UNIVERSAL MILLING MACHINE



Pos. 1

By means of current standard cutters :

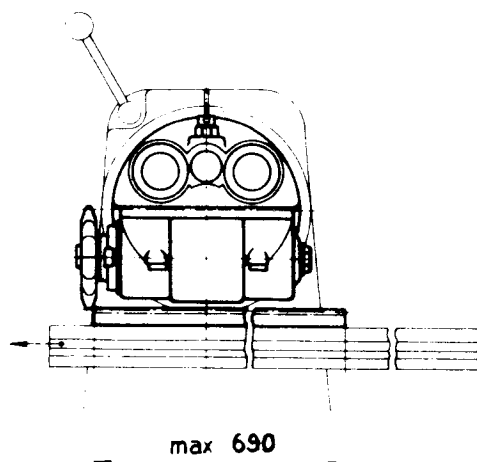
max. length of rack 150 mm



Pos. 2

By means of special cutters,  
minimum dia. 90 mm :

max. length of rack 230 mm



Pos. 3

By means of special cutters,  
minimum dia. 130 mm :

Max. length of rack 690 mm

# UNIVERSAL MILLING MACHINES 12 - 13 - 53

Rotary Table

## INDEX TABLE

Dividing attachment with 3 index plates

Circles of index holes : 15, 16, 17, 18, 19, 20, 21, 23, 27,  
29, 31, 33, 37, 39, 41, 43, 47, 49

Division	Circle of holes	Number of turns of hand crank	Angle of pointers	D	Coh	N t hc	Aop	D	Coh	N t hc	Aop
				27	18	4 8/18	160°	56	21	2 3/21	52°
				28	21	4 6/21	103°	57	19	2 2/19	38°
				29	29	4 4/29	50°	58	29	2 2/29	25°
2		60		30		4		60		2	
3		40		31	33	3 27/33	66°*	62	31	1 29/31	24°*
4		30		32	16	3 12/16	90°*	63	21	1 19/21	35°*
5		24		33	33	3 21/33	131°*	64	16	1 14/16	45°*
6		20		34	17	3 9/17	170°*	65	39	1 33/39	56°*
7	21	17 3/21	52°	35	21	3 9/21	155°	66	33	1 27/33	66°*
8		15		36	15	3 5/15	120°	68	17	1 13/17	85°*
9	18	13 6/18	120°	37	37	3 9/37	88°	69	23	1 17/23	94°*
10		12		38	19	3 3/19	57°	70	21	1 15/21	103°*
11	33	10 30/33	33°*	39	39	3 3/39	28°	72	15	1 10/15	120°*
12		10		40		3		74	37	1 23/37	137°*
13	39	9 9/39	84°	41	41	2 38/41	27°*	75	15	1 9/15	144°*
14	21	8 12/21	155°*	42	21	2 18/21	52°*	76	19	1 11/19	152°*
15		8		43	43	2 34/43	76°*	78	39	1 21/39	167°*
16	16	7 8/16	180°	44	33	2 24/33	99°*	80	20	1 8/16	180°
17	17	7 1/17	22°	45	15	2 10/15	120°*	81	27	1 13/27	174°
18	18	6 10/15	120°*	46	23	2 14/23	141°*	82	41	1 19/41	167°
19	19	6 6/19	114°	47	47	2 26/47	161°*	84	21	1 9/21	155°
20		6		48	16	2 8/16	180°	85	17	1 7/17	149°
21	21	5 15/21	103°*	49	49	2 22/49	162°	86	43	1 17/43	143°
22	33	5 15/33	164°	50	15	2 6/15	144°	87	29	1 11/29	137°
23	23	5 5/23	79°	51	17	2 6/17	128°	88	33	1 12/33	131°
24		5		52	39	2 12/39	111°	90	15	1 5/15	120°
25	15	4 12/15	72°*	54	27	2 6/27	80°	92	23	1 7/23	110°
26	39	4 24/39	139°*	55	33	2 6/33	66°	93	31	1 9/31	105°

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D	coh	N t hc	Aop	D	coh	N t hc	Aop	D	coh	N t hc	Aop
94	47	1 13/47	100°	156	39	30/39	84°*	248	31	15 31	175°
95	19	1 5/19	95°	160	16	12/16	90°*	252	21	10 21	172°
96	16	1 4/16	90°	162	27	20/27	94°*	255	17	8 17	171°
98	49	1 11/49	81°	164	41	30/41	97°*	258	43	20 43	168°
99	33	1 7/33	77°	165	33	24/33	99°*	260	39	18 39	167°
100	15	1 3/15	72°	168	21	15/21	103°*	264	33	15 33	164°
102	17	1 3/17	64°	170	17	12/17	106°*	270	18	8 18	160°
104	39	1 6/39	56°	172	43	30/43	109°*	276	23	10 23	157°
105	21	1 3/21	52°	174	29	20/29	112°*	280	21	9 21	155°
108	18	1 2/18	40°	180	15	10/15	120°*	282	47	20 47	154°
110	33	1 3/33	33°	184	23	15/23	126°*	285	19	8 19	152°
111	37	1 3/37	30°	185	37	24/37	127°*	290	29	12 29	149°
114	19	1 1/19	19°	186	31	20/31	128°*	294	49	20 49	147°
115	23	1 1/23	16°	188	47	30/47	131°*	296	37	15 37	146°
116	29	1 1/29	13°	190	19	12/19	133°*	300	15	6 15	144°
117	39	1 1/39	10°	192	16	10/16	135°*	310	31	12 31	140°
120		1		195	39	24/39	139°*	312	39	15 39	139°
123	41	40/41	9°*	196	49	30/49	140°*	315	21	8 21	138°
124	31	30/31	12°*	198	33	20/33	142°*	320	16	6 16	135°
126	21	20/21	18°*	200	20	12/20	144°*	324	27	10 27	134°
128	16	15/16	23°*	204	17	10/17	149°*	328	41	15 41	132°
129	43	40/43	26°*	205	41	24/41	150°*	330	33	12 33	131°
130	39	36/39	28°*	210	21	12/21	155°*	340	17	6 17	128°
132	33	30/33	33°*	215	43	24/43	159°*	344	43	15 43	126°
135	18	16/18	40°*	216	18	10/18	160°*	345	23	8 23	126°
136	17	15/17	43°*	220	33	18/33	164°*	348	29	10 29	125°
138	23	20/23	47°*	222	37	20/37	166°*	360	18	6 18	121°
140	21	18/21	52°*	225	15	8/15	168°*	* Measured at the outer edges of the pointers			
141	47	40/47	54°*	228	19	10/19	171°*				
144	18	15/18	60°*	230	23	12/23	173°*				
145	29	24/29	63°*	232	29	15/29	174°*				
147	49	40/49	67°*	234	39	20/39	176°*				
148	37	30/37	69°*	235	47	24/47	177°*				
151	15	12/15	72°*	240	16	8/16	180°*				
152	19	15/19	76°*	245	49	24/49	177°				
155	31	24/31	82°*	246	41	20/41	176°				

17.7.59 MCh

FABRIQUE DE MACHINES **SCHAUBLIN S.A. BÉVILARD / SUISSE**

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# TYPE 12-13 -53

## HIGH PRECISION MILLING MACHINES

Rotary Table with Vernier-Type Dividing Attachment

### INDEX TABLE

Ratio 1 : 120

Divi- sions	Turns	Marks	Divi- sions	Turns	Marks	Divi- sions	Turns	Marks
2	60	--	16	7	90	48	2	90
3	40	--	18	6	120	50	2	72
4	30	--	20	6	-	60	2	--
5	24	--	24	5	-	72	1	120
6	20	--	25	4	144	75	1	108
8	15	--	30	4		80	1	90
9	13	60	32	3	136	90	1	60
10	11	--	36	3	60	96	1	45
12	10	--	40	3	-	100	1	36
15	8	--	45	2	120	120	1	--

Divi- sions	Marks	Divi- sions	Marks
144	150	600	36
150	144	720	30
160	135	800	27
180	120	900	24
200	108	1200	18
225	96	1440	15
240	90	1800	12
288	75	2400	9
300	72	3600	6
360	60	7200	3
400	54	10800	2
450	48	21600	1
480	45		



# LOCATING MICROSCOPE

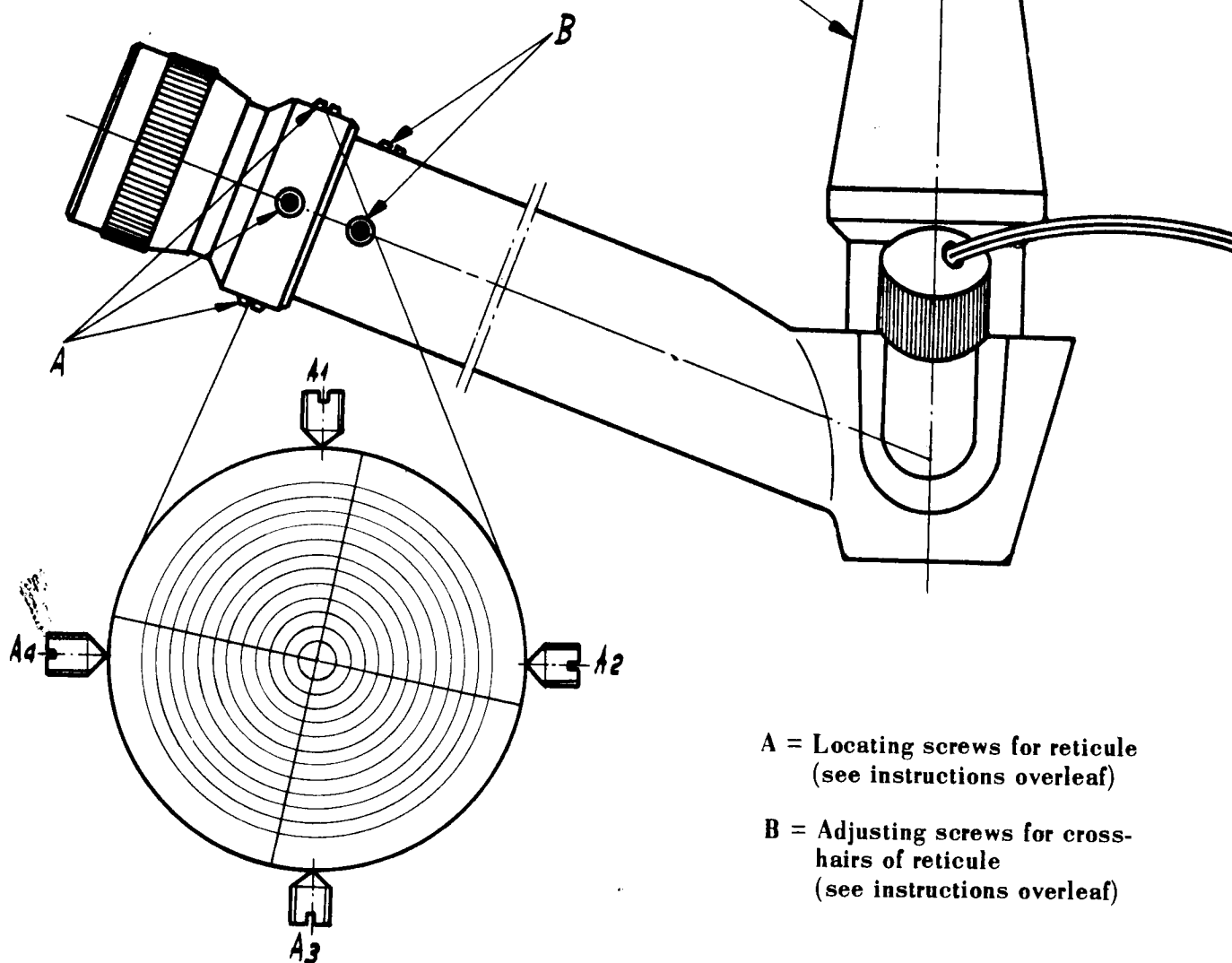
with built-in lighting

## For use on :

SCHAUBLIN	milling machine type	12
"	"	13
"	"	13 (rapid head)
"	"	53
"	"	53 (rapid head)

## with arbor :

Morse taper 4  
 ISO 30 taper (VSM 33931)  
 Collet type E20  
 ISO 40 taper (VSM 33931)  
 Collet type E25



A = Locating screws for reticule  
 (see instructions overleaf)

B = Adjusting screws for cross-hairs of reticule  
 (see instructions overleaf)

## SPECIFICATION

Magnification.....	20 x
Line of sight of eyepiece inclined at.....	60°
Rotation of eyepiece with reticule.....	360°
Reticule with cross-hairs and 12 concentric circles	
Built-in lighting : 1 bulb.....	3.5 volts

Supplied with : approximately 5 feet of flex and miniature plug  
 1 transformer plug 220/ 3.5 volts

FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD / SUISSE

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## APPLICATIONS

Location of centres and small bores.

Accurate alignment of components with the axis of the spindle.

Very accurate displacements by sighting centres previously marked on the component with a jig boring machine.

## CHECKING LOCATION OF MICROSCOPE

1. Fix a 60° centre in the vertical spindle of the milling machine (the centre must be in perfect condition). Check it for location by means of the dial indicator (maximum permissible error : 0.005 mm on diameter).
2. Fix a very smooth steel plate on the table of the milling machine, with the longitudinal and cross slides locked. Mark it with a very light centre by lowering the spindle or raising the table.
3. Replace the 60° centre by the microscope.
4. With the microscope, sight the previously marked centre on the plate, without touching the longitudinal or cross slide.

If the cross-hairs of the reticule do not coincide with the centre, locate as follows :

- Slightly loosen the four screws A supporting the reticule (avoid loosening them too much, otherwise the reticule will move from its seating on the screw points).
- Move the reticule by adjusting one or another of the four screws A as necessary, that is to say, until the cross-hairs again coincide exactly with the centre.
- Slightly tighten the four screws A.

### Note :

Location of the reticule calls for extreme care and must not be carried out by anyone other than a skilled person.

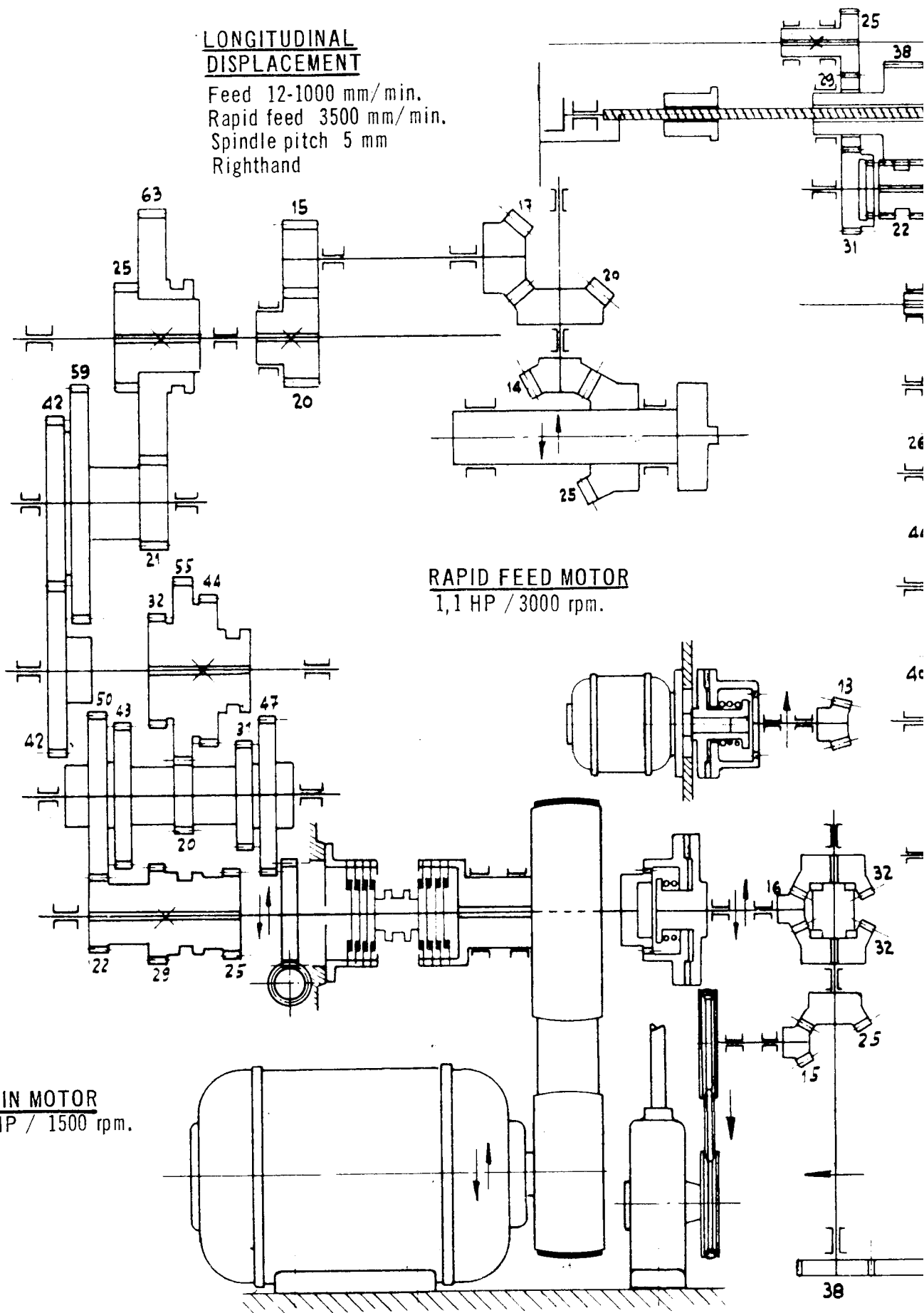
The location must be periodically checked during operation.

## ALIGNMENT OF CROSS-HAIRS OF RETICULE WITH AXIS OF ONE OF THE SLIDES

1. Slightly loosen the two screws B.
2. Turn the lens mounting in its tube as required.
3. Slightly tighten the two screws B.

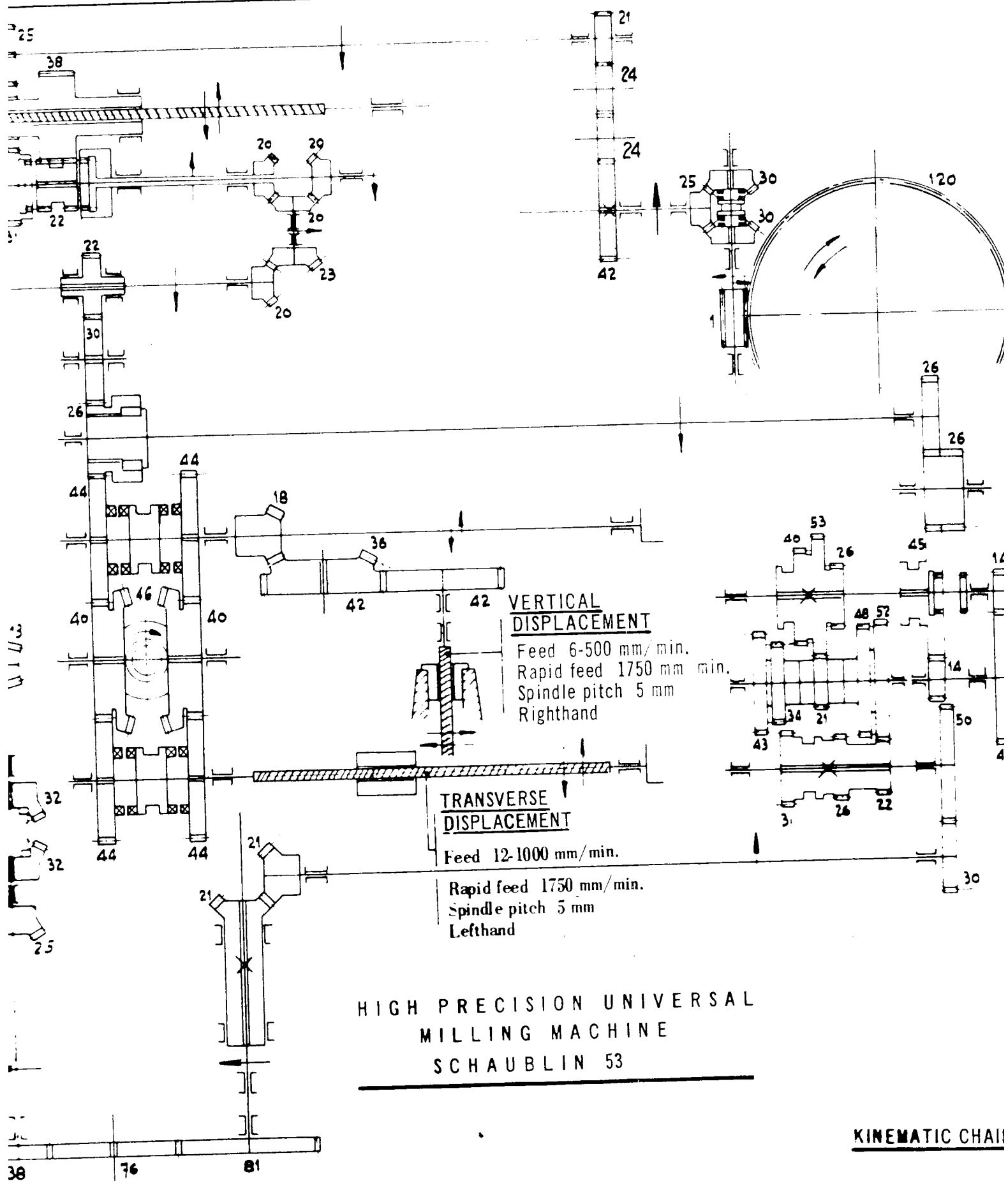
# LONGITUDINAL DISPLACEMENT

Feed 12-1000 mm/min.  
Rapid feed 3500 mm/min.  
Spindle pitch 5 mm  
Righthand



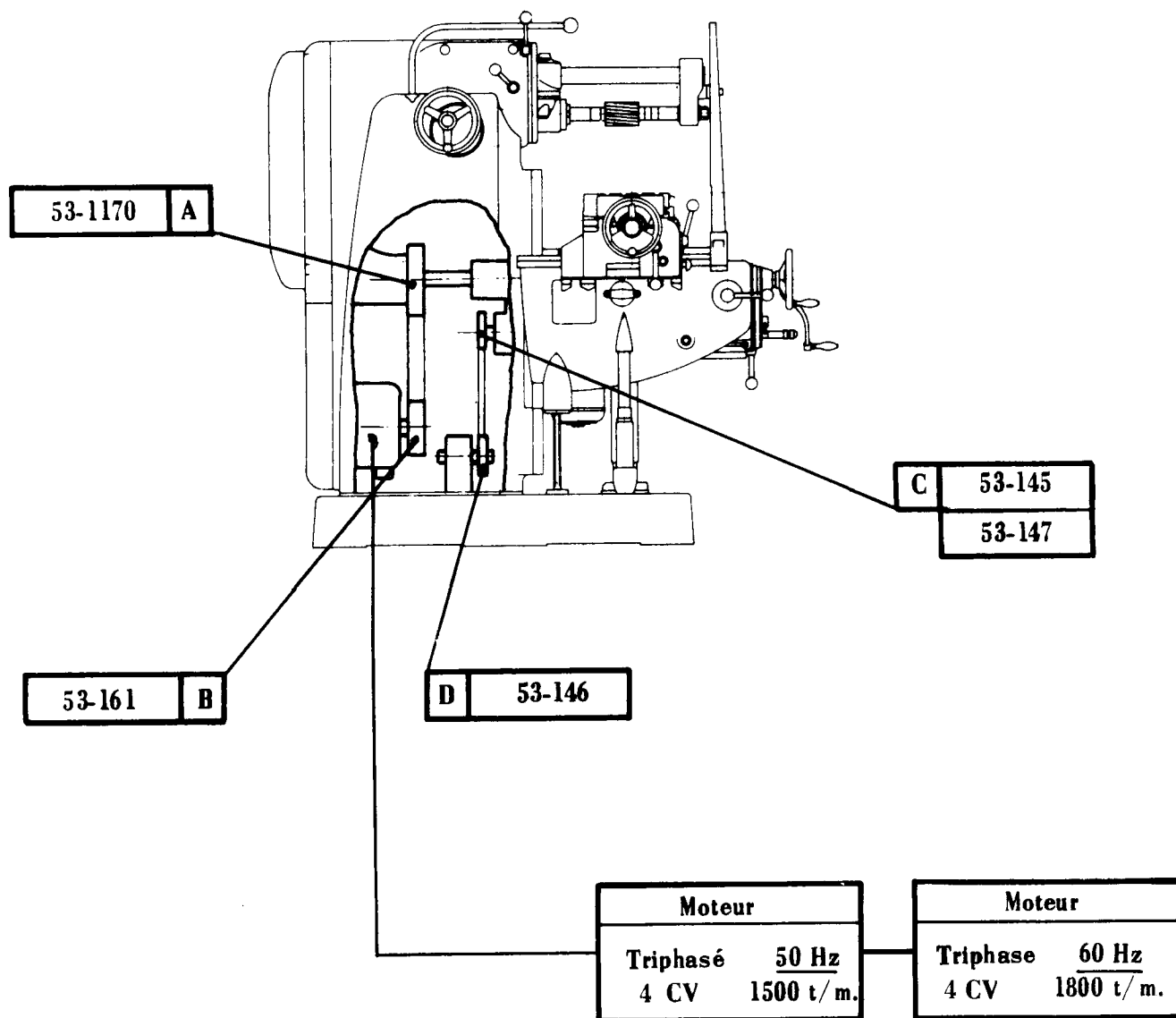
MAIN MOTOR  
4 HP / 1500 rpm.

RAPID FEED MOTOR  
1,1 HP / 3000 rpm.



KINEMATIC CHAIN

# **ORGANES DE TRANSMISSION** **Fraiseuse universelle SCHAUBLIN 53**



Ø Poulie (mm)				Courroies (mm)				
A	B	C	D	Liaison	Longueur	Largeur	Marque	Désignation
168	132	105	113	A/ B	1342 *	50	Siegling	extrémultus LIBT
				C/ D	1400	10/ 6	Pallas	N° 6184

\* Courroie Siegling collée : prévoir pour le collage 50 mm en plus de la longueur indiquée.

**FABRIQUE DE MACHINES SCHAUBLIN S.A. BÉVILARD / SUISSE**

**LIST OF BALL-AND ROLLER-BEARINGS USED ON THE  
UNIVERSAL MILLING MACHINE  
SCHAUBLIN 53**

MACHINE PART	Number	Type	Dimensions	Supplier	see page
FRAME					
Displacement of cylinder	6	NADELLA-AX 1730	17 x 30 x 2,8	SKB	1
Drive	2	6004	20 x 42 x 12	SKF	2
	4	6204	20 x 47 x 14	SKF	2
	6	ROLLERS	7 c 7	KFA	2
Base	2	6003	17 x 35 x 10	SKF	3
	2	6204	20 x 47 x 14	SKF	3
	1	6204Z	20 x 47 x 14	SKF	3
SPINDLE GEARBOX	1	6004	20 x 42 x 12	SKF	6
	2	6011	55 x 90 x 18	SKF	6
	1	6209 NR	45 x 85 x 19	SKF	4
	3	6305	25 x 62 x 17	SKF	4
	4	6305 NR	25 x 62 x 17	SKF	4
	2	6306	30 x 72 x 19	SKF	4
CYLINDER	1	3207	35 x 72 x 27	SKF	7
	1	3210	50 x 90 x 30,2	SKF	7
	1	3212	60 x 110 x 36,5	SKF	7
	1	NJ 305	25 x 62 x 17	SKF	7
	1	INA-Na 6909	45 x 68 x 40	HYDREL	7
MILLING HEAD	1	32209-C08	45 x 85 x 25	SKF	8
	1	32210-C08	50 x 90 x 25	SKF	8
KNEE	2	6004	20 x 42 x 12	SKF	14
	1	6005	25 x 47 x 12	SKF	13
	2	6007	35 x 62 x 14	SKF	16
	9	6204	20 x 47 x 14	SKF	13/ 16
	2	6205	25 x 52 x 15	SKF	11/ 12
	2	6303	17 x 47 x 14	SKF	11/ 12
	2	NU 206	30 x 62 x 13	SKF	14
	2	30204	20 x 47 x 15,5	SKF	15
	4	30205-C05	25 x 52 x 16,5	SKF	11/ 12
	2	30207	35 x 72 x 18,5	SKF	15
	1	32207	35 x 72 x 24,5	SKF	15
	1	51103	17 x 30 x 9	SKF	14
	352	NEEDLES	2,5 x 9,8	KFA	21/ 12
	76	NEEDLES	3 x 11,8	KFA	13

**FABRIQUE DE MACHINES SCHAUUBLIN S.A. BÉVILARD/SUISSE**

MACHINE PART	Number	Type	Dimensions	Supplier	see page
FEED GEARBOX	9	6204	20 x 47 x 14	SKF	17 12
	1	6205	25 x 52 x 15	SKF	18
TRANSVERSE SLIDE	1	6203	17 x 40 x 12	SKF	22
	3	6204	20 x 47 x 14	SKF	22
	1	6205	25 x 52 x 15	SKF	22
	2	NAL 25	25 x 45 x 14	KFA	22
	2	NA 25	25 x 47 x 22	KFA	22
	2	NA 30	30 x 52 x 22	KFA	22
	43	NEEDLES	3 x 17,8	KFA	22
TABLE	2	30206-C05	30 x 62 x 17,5	SKF	23
HIGH-SPEED HEAD	2	6006	30 x 55 x 13	SRO	31
	2	6203	17 x 40 x 12	SRO	31
	2	6204	20 x 47 x 14	SRO	31
	1	NU 205-C151	25 x 52 x 15	SKF	31
	1	51105	25 x 42 x 11	SRO	31
	2	51105-C05	25 x 42 x 11	SRO	31
	1	NN 3006-K-Sp	30 x 55 x 19	SKF	31
SUPPLEMENT for handfeed of spindle of high-speed head	1	51103	17 x 30 x 9	SKF	32
SUPPLEMENT for automatic feed of spindle of high-speed head	2	6001	12 x 28 x 8	SKF	33
	2	6006	30 x 55 x 13	SKF	33
	2	6203	17 x 40 x 12	SKF	33
SLOTING HEAD	1	4205	25 x 52 x 18	SRO	34
	1	NAL 60	60 x 90 x 20	KFA	34
	29	NEEDLES	3 x 11,8	KFA	34
DRIVE OF ROTARY TABLE (automatic)	2	6006	30 x 55 x 13	SKF	30
COPYMILLING ATTACHMENT	1	6203	17 x 40 x 12	SKF	---

FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD/SUISSE

## LUBRICATING CHART FOR UNIVERSAL MILLING MACHINE SCHAUBLIN 53

Description of lubricating products recommended by the different suppliers \*

Machine part	Type of lubrication		Lubricating and checking frequency	MOBIL OIL	ESSO	SHELL	VALVOLINE	GULF	GASOLIN	ANTAR
Milling head and cylinder	Oil	Oil mist	daily	DTE Oil Light	Teresso 43	Vitrea Oil 27	Magnet 4	1327 Harmony Oil A	Spezialöl KRG	Misola A
Feed drive in machine stand	Oil	"	"	"	"	"	"	"	"	"
Compressor in stand	Oil	Bath	yearly	"	"	"	"	"	"	"
General lubrication of machine	Oil	Gun	weekly	"	"	"	"	"	"	"
Rotary table (Accessory)	Oil	Bath and gun	yearly weekly	"	"	"	"	"	"	"
Universal high-speed head (Acc.)	Oil	Gun	daily	"	"	"	"	"	"	"
Slotting head (Accessory)	Oil	Gun	daily	"	"	"	"	"	"	"
Universal dividing head (Accessory)	Oil	Gun	weekly	"	"	"	"	"	"	"
Milling spindle gear-box	Oil	Bath and circulation	yearly	DTE Oil Heavy medium	Teresso 47	Vitrea Oil 33	R-306	1329 Harmony Oil C	Spezialöl K	Misola B
Feed gear in machine stand	Oil	"	"	"	"	"	"	"	"	"
Table slide with longitudinal screw	Oil	Bath	"	"	"	"	"	"	"	"
Transversal slide and screw	Oil	Central lubricat. Reservoir	daily	"	"	"	"	"	"	"
Vertical screw	Oil	Bath	yearly	"	"	"	"	"	"	"
Feed driving elements in base	Oil	"	"	"	"	"	"	"	"	"
Electric motors	Grease	Packed	"	Mobilux Grease N° 2	Andok B	Alvania Grease N° 2	LB Grease	1314 Antifric. Grease N° 3	Deganol Spezialfett II	Pebron RT 33

\* see overleaf the addresses of the lubricant companies



Constant qualities of the products listed on this chart are guaranteed  
if supplied by the following companies :

**MOBIL OIL** (Switzerland), Basel, Dufour street 29

**ESSO STANDARD** (Switzerland), Zürich 1, Post office box

**SHELL** (Switzerland), Zürich-Affoltern

**VALVOLINE OIL CO LTD**, Zürich

**GULF OIL** (Switzerland) Ltd, Zürich 48

**DEUTSCHE GASOLIN AKTIENGESELLSCHAFT**, Hannover

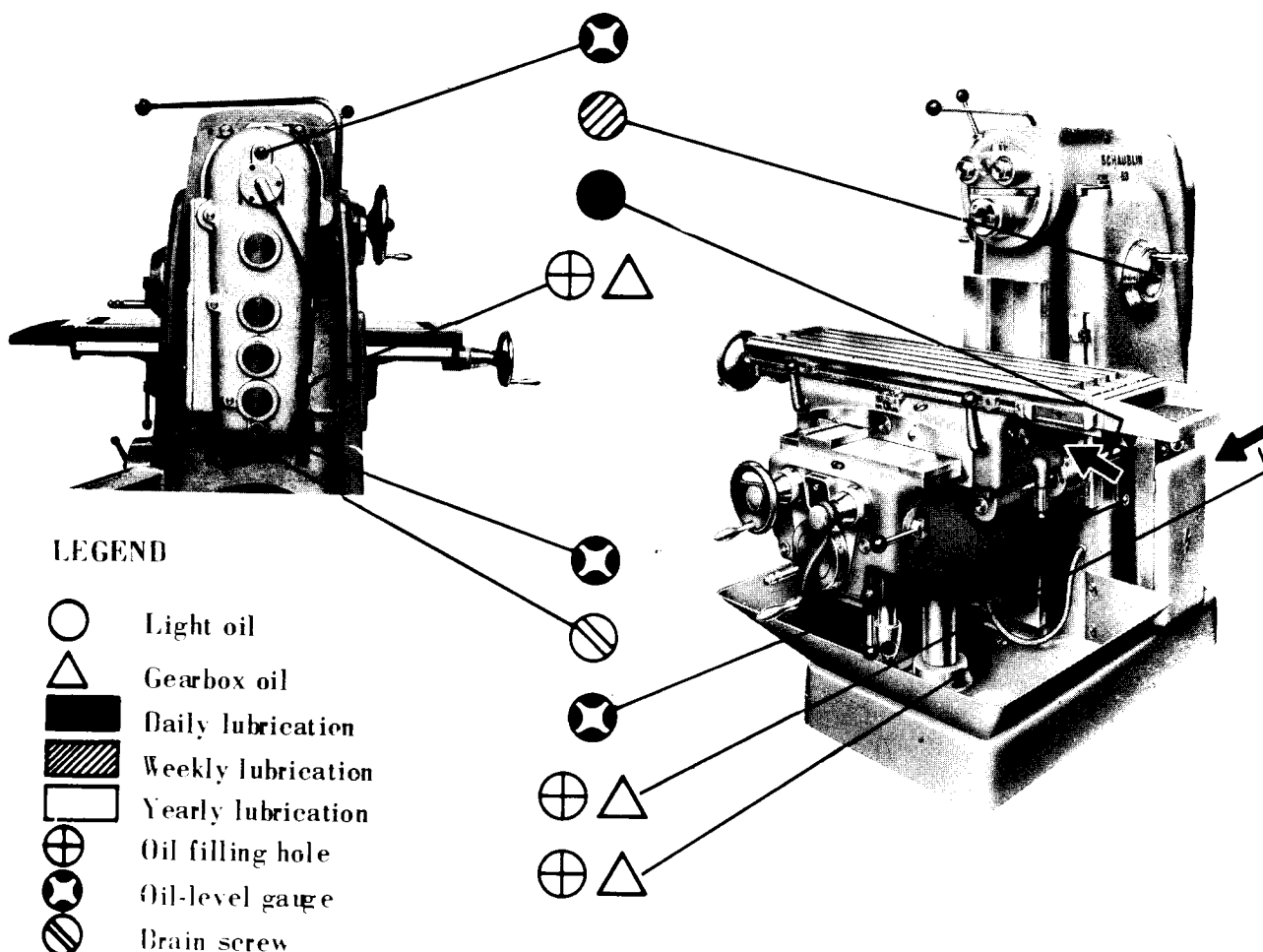
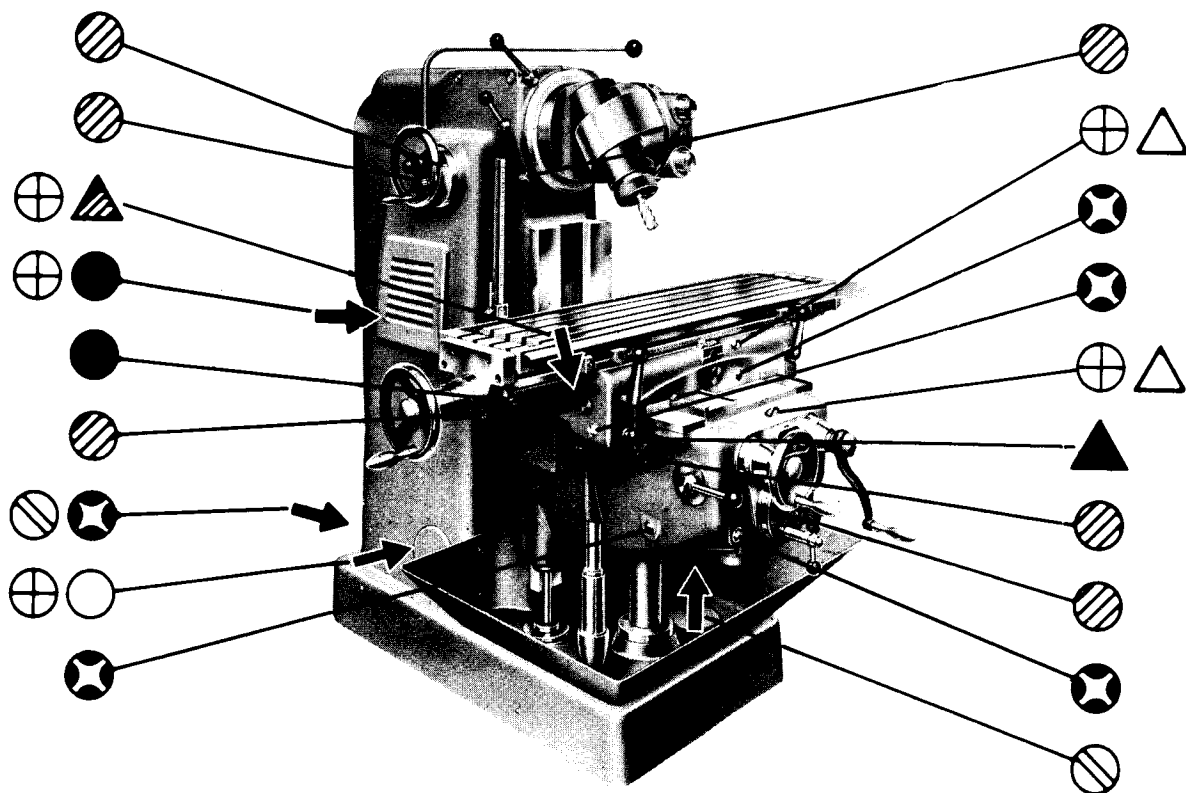
and

**IMPAG**, Chemie-import, Zürich, Färber street 8

**ANTAR**, Pétroles de l'Atlantique, PARIS 17e, 4, Léon Jost street 4

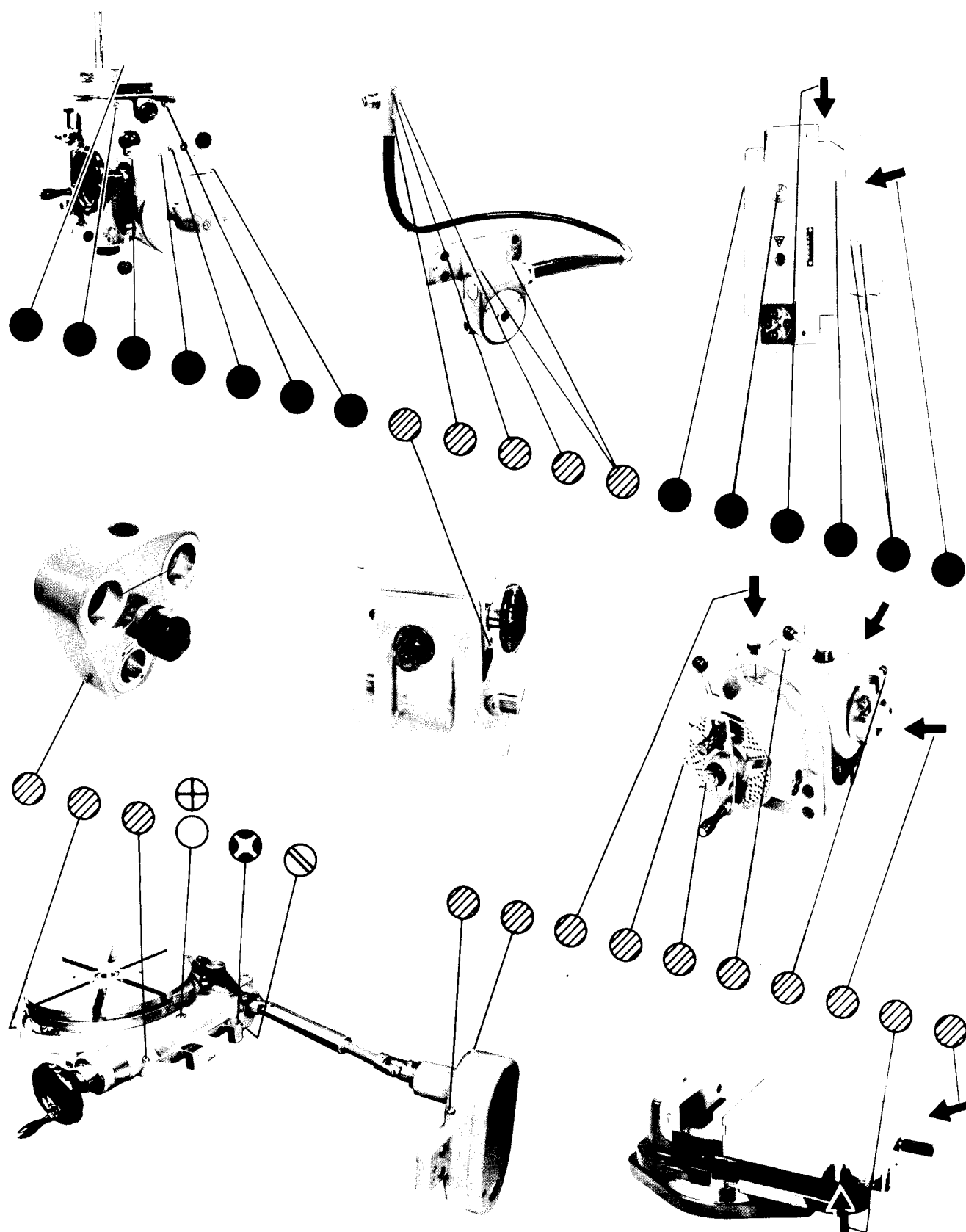
# High precision Universal Milling Machine SCHAUBLIN 53

## LUBRICATING PLAN



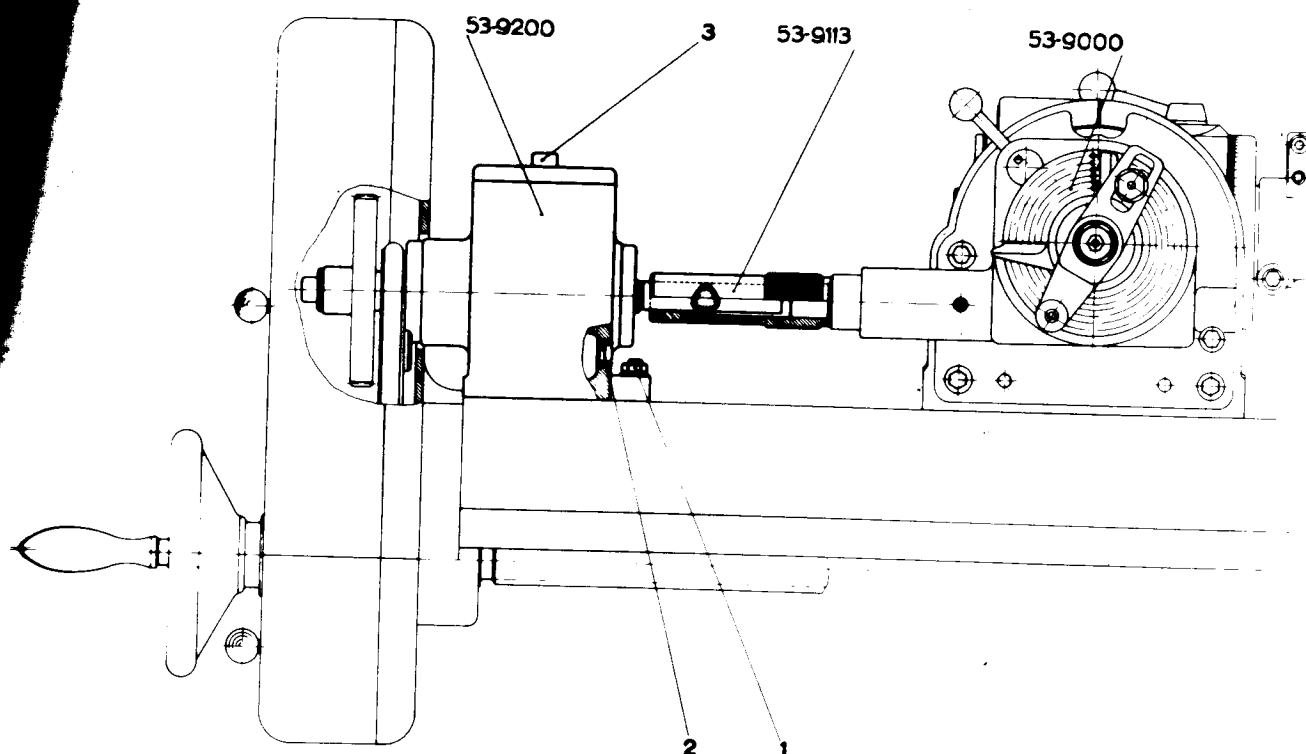
FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD/SUISSE

ACCESSORIES



# 10:1 SPEED-INCREASING UNIT (item 9200)

for use with type 53 universal dividing head (item 900) for machining short pitches (minimum 3.7 mm)



This unit, which is fitted between the quadrant and the universal dividing head (53-9000), enables the speed of the head to be increased without loss of versatility (no inclination is possible with direct drive to the shaft). It permits machining of pitches of from 3.72 to 500 mm (with the possibility of inclining the head), whereas, with direct drive to the shaft, only pitches of from 0.5 to 35 mm can be cut (without inclination of the spindle). It is connected to the head by the special sleeve (53-9113).

## Fitting

To fit the unit, it is necessary to increase the diameter of the hole in the drive shaft from to 75 mm (2 23/64 to 2 61/64"). The unit is secured to the lefthand end of the table with the bolt (1) and is positioned by locating it against the quadrant case.

## Lubrication

An oil bath is provided for lubrication of the unit, and the oil level can be checked through the sightglass (2). To fill or empty, remove the plug (3).

Use a good mineral oil with a viscosity of about 3°E at 50°C.

## MAINTENANCE OF COOLANT PUMPS

With single-shift operation the coolant pump should be thoroughly cleaned at least twice a year, and at least three times where more than one shift daily is worked. For this purpose the pump should be completely dismantled. All parts should then be thoroughly cleaned with paraffin or benzene. The coolant tank, pipes grids and filters should also be carefully cleaned.

Unless this is done the coolant pump will be subject to excessively rapid wear, especially when water-soluble coolants are employed. On reassembling, gaskets and stuffing-box packing should be renewed where necessary.

It is of paramount importance to replace and adjust the stuffing-box correctly on the pump drive shaft. When working without coolants, as when machining coatings, the pump should be shut off. Running the pump without coolant will rapidly and seriously damage it.

Should the coolant pumps still cause trouble notwithstanding compliance with the foregoing rules, the cause will usually be found to be one or other of the following:-

1. The coolant - especially if an emulsion - is not changed sufficiently often. As a result of decomposition, the fatty ingredient of the emulsion forms, together with the fine chips (especially shavings of of light alloys) and other dirt, a sticky, tough sludge which blocks all gratings, filters pipes and fittings.
2. The coolant tanks are not cleaned with sufficient thoroughness when the coolant is changed, with the result that the fresh emulsion decomposes and the change is rapidly rendered pointless.
3. It often happens that for some reason - forgetfulness, thoroughlessness - the coolant pump is not switched off, and continues running even when no coolant is being pumped. As the pump runs almost inaudibly, it then continues to run even when the machine is shut down, and may be left running for as much as 24 hours a day.

*THE COOLANT PUMP IS A NECESSARY AND VITAL UNIT IN ANY MACHINE TOOL.*

The exceptions to this rule are negligible. The purpose of the pump is to convey the coolant to the site of chip-removal, whence the coolant conducts the heat generated there.

The result is a substantial increase in chip-removing capacity on the one hand, and a considerable lengthening of the useful life of the tool on the other. Correct supply of coolant also influences the quality of the work done by enhancing precision and improving the finish.

# **HIGH-PRECISION FACING AND BORING HEAD** (type 240 C)

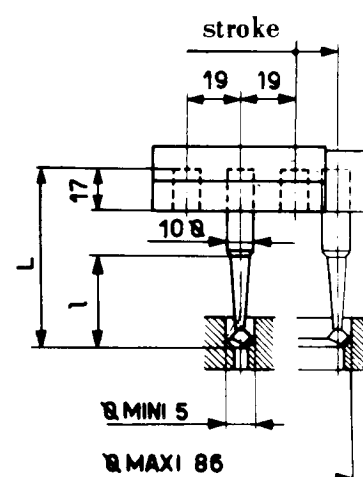
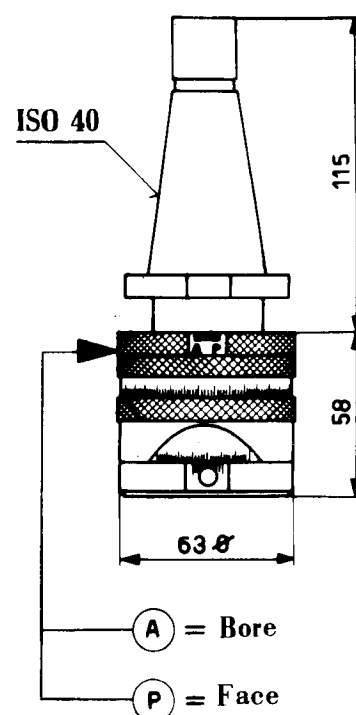
## **SPECIFICATION**

<b>Maximum outside diameter</b>	<b>65 mm (2 9/16")</b>
<b>Height of head, without shank</b>	<b>58 mm (2 9/32")</b>
<b>Taper of shank</b>	<b>ISO 40</b> (VSM 33930-DIN 2080)
<b>Facing stroke</b>	<b>30 mm (1 3/16")</b>
<b>Radial facing feed</b>	<b>0.05 mm/rev</b> (.002 in/rev.)
<b>Size of chip permissible for 0.05-mm (.002 in) feed in steel</b>	<b>approx. 3 mm (1/8")</b>
<b>Rapid return</b>	<b>2.5 mm/rev.</b> (3/32 in/rev.)
<b>Bores for tool and toolholder (3 axial, 1 radial)</b>	<b>dia. 10 mm (13/32")</b>
<b>Adjustable facing stop with vernier with graduation</b>	<b>1/10 mm (5/1000")</b>
<b>Return stop, adjustable at will</b>	
<b>Automatic tripping by advance and return stops</b>	
<b>Boring capacity</b>	<b>dia. 2 to 180 mm</b> (5/64 to 7 3/32")
<b>Accuracy of adjustment on diameter by vernier (for boring)</b>	<b>dia. 0.005 mm (2/10000")</b>
<b>Supplied with :</b>	
1 stop bar for facing	
1 double-ended hexagon spanner	
2-3 mm (5/64-1/8")	
<b>Weight :</b>	<b>1.370 kg (3.016 lbs)</b>
<b>Weight of box complete with following standard accessories :</b>	<b>4.300 kg (9.480 lbs)</b>

## **STANDARD ACCESSORIES**

- 1 set of 5 high-speed-steel boring tools, shank dia. 10 mm (13/32")
- 1 set of 5 boring tools for flat facing shank dia. 10 mm (13/32")

Designation		Specification (mm)			
Boring tools	Flat-facing tools	D	I	L	Weight (g)
A 5/10 SS	E 5/10 SS	5	26	52	26
A 7/10 SS	E 7/10 SS	7	30	56	30
A 9/10 SS	E 9/10 SS	9	33	65	35
A13/10 SS	E13/10 SS	13	53	70	50
A18/10 SS	E18/10 SS	18	83	100	90



7.7.60 MD/MCh

**FABRIQUE DE MACHINES SCHAUBLIN S.A. BÉVILARD/SUISSE**

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## STANDARD ACCESSORIES (continuation)

c) 1 axial toolholder (PAVR 28)

Shank dia. 10 x 16 mm (3/32 x 5/8")

Hole for square tool 6 x 6 mm (15/64 x 15/64")

inclined at 45°

Boring capacity :

in diameter

min. 28 mm (1 3/32")

max. 98 mm (3 7/8")

in depth

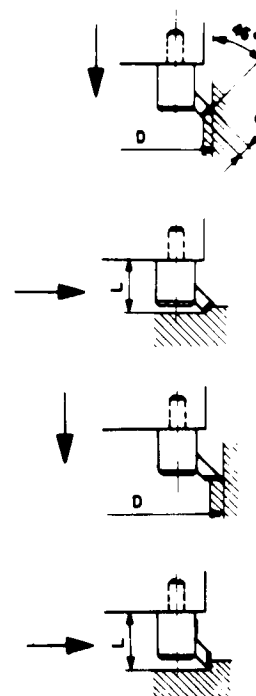
28 mm (1 3/32")

Weight :

55 g (.121 lbs)

with: 1 set of high-speed-steel  
square tools 6 x 6 mm

Type	for cast iron	for steel	Weight(lbs)
	PA Ge SS	PA St.SS	7 (.016)
	PE Ge SS	PE St.SS	7 (.016)
	PEP Ge SS	PEP St.SS	7 (.016)

d) 1 radial toolholder (PAH)

Shank dia. 10 x 63 mm (3/32 x 2 7/16")

Hole for square tool 6 x 6 mm, (15/64 x 15/64")

inclined at 45°

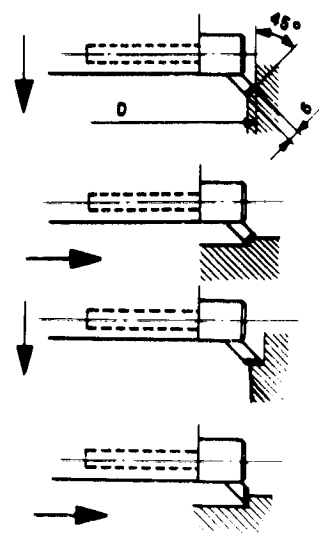
Boring capacity in diameter

min. 92 mm (3 5/8")

max. 180 mm (7 3/32")

Weight :

55 g (.121 lbs)

Same set of tools as abovee) 1 axial recessing toolholder (PE 23)

Shank dia. 10 x 16 mm (3/32 x 5/8")

Hole for square tool 6 x 6 mm (15/64 x 15/64"),  
horizontal

Capacity :

internal diameter min. 25 mm (1")

external diameter max. 98 mm (3 7/8")

external diameter min. 0

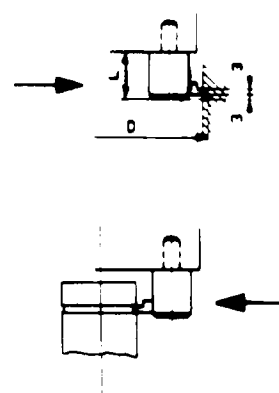
max. 45 mm (1 3/4")

L =

23 mm (29/32")

Weight :

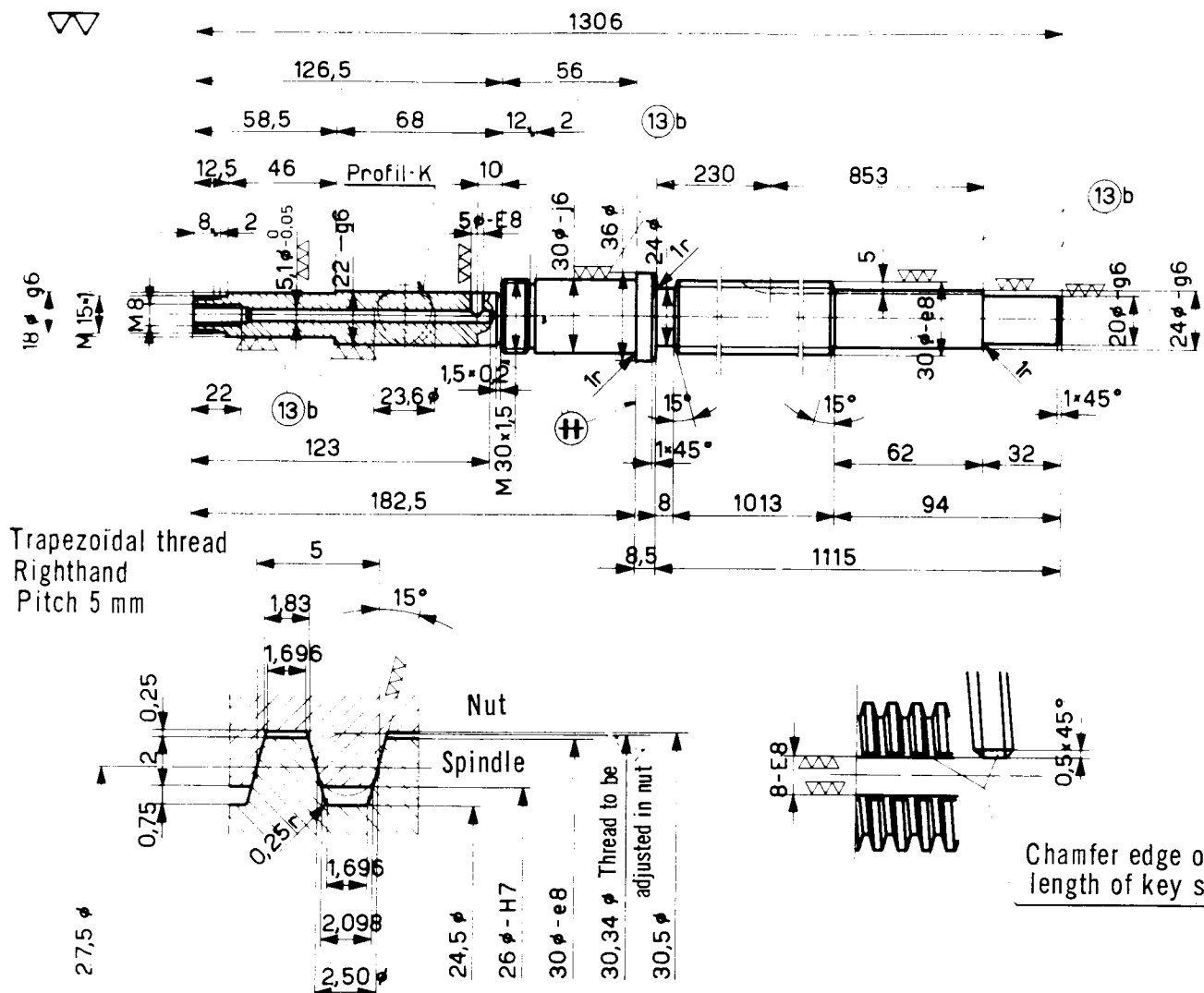
50 g (.110 lbs)

with : 1 recessing tool 6 x 6 mm (15/64 x 15/64"),  
3 mm (1/8") wide

## LONGITUDINAL SPINDLE

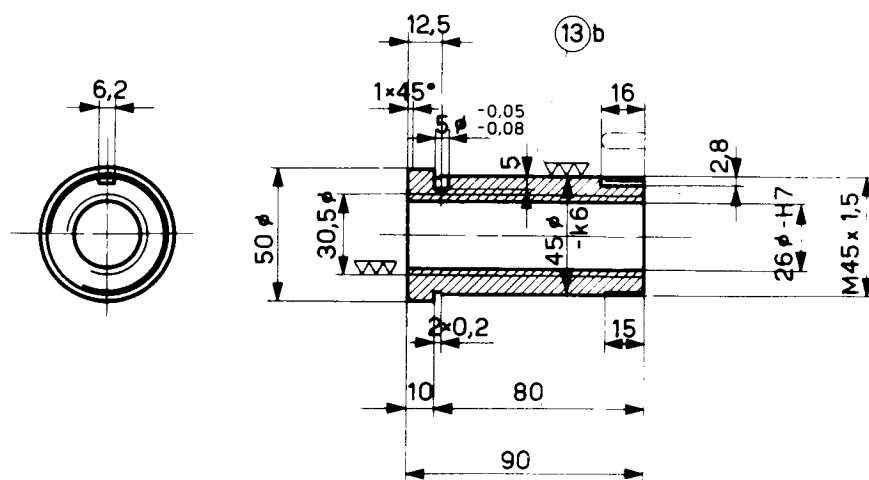
53-5505

St 70.11



53-5062

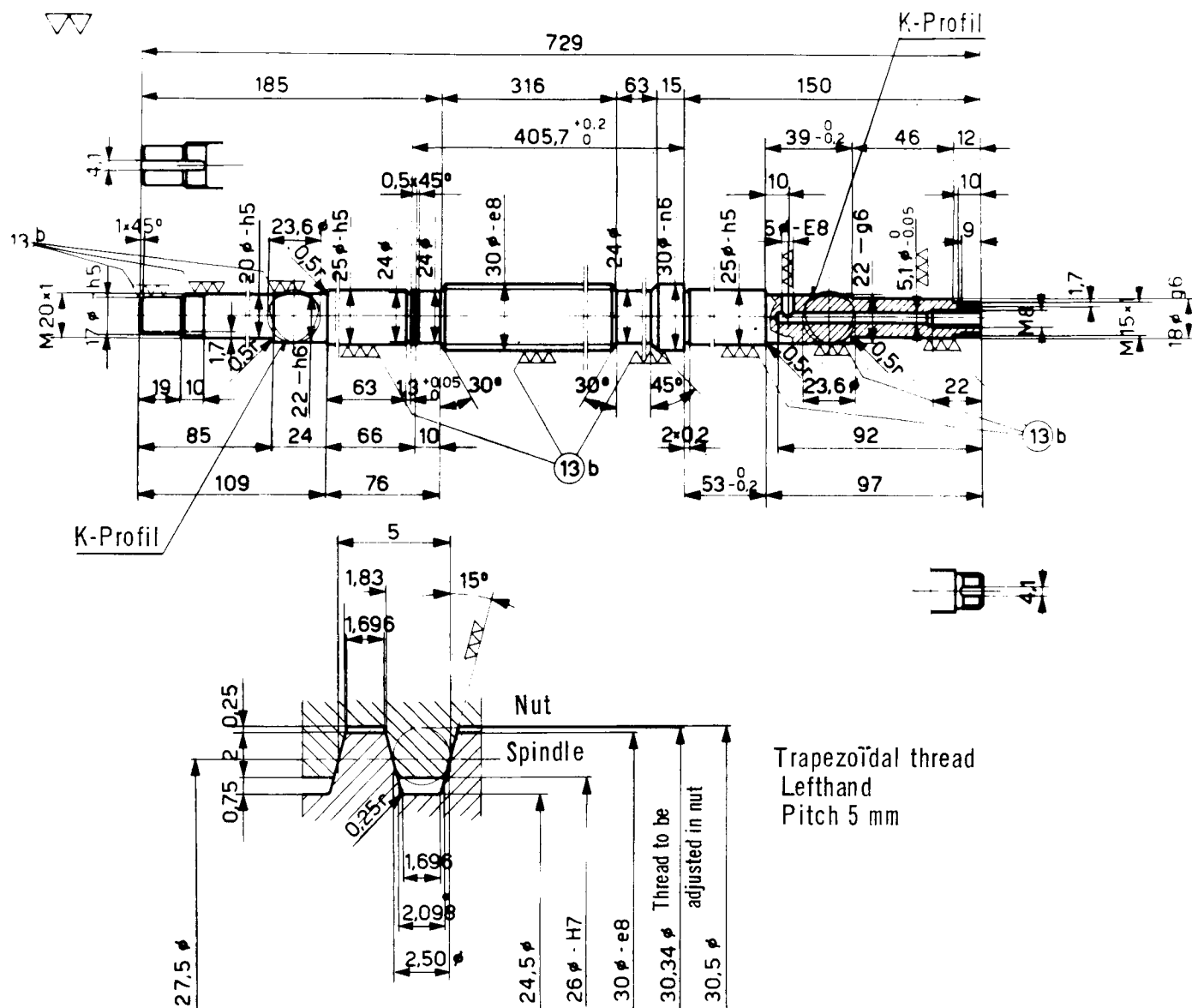
Tokat 80 Bronze



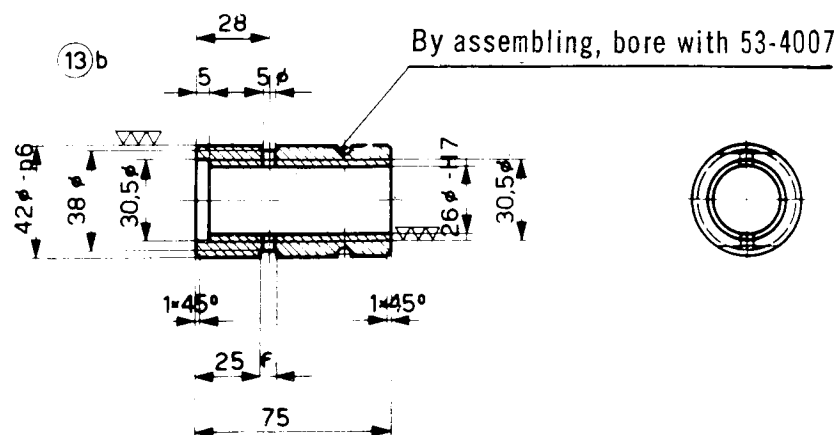


53-4126  
St. 70.11

# TRANSVERSAL SPINDLE

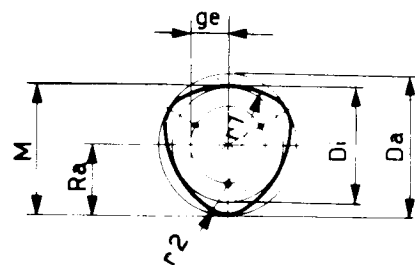
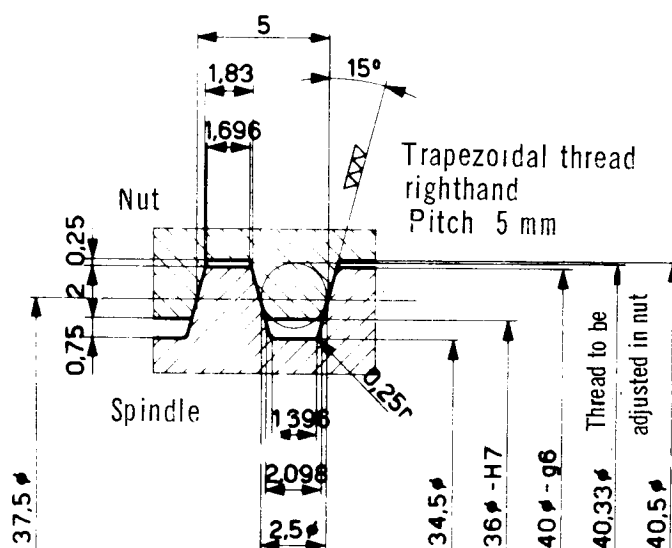
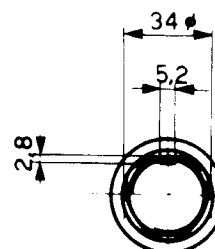
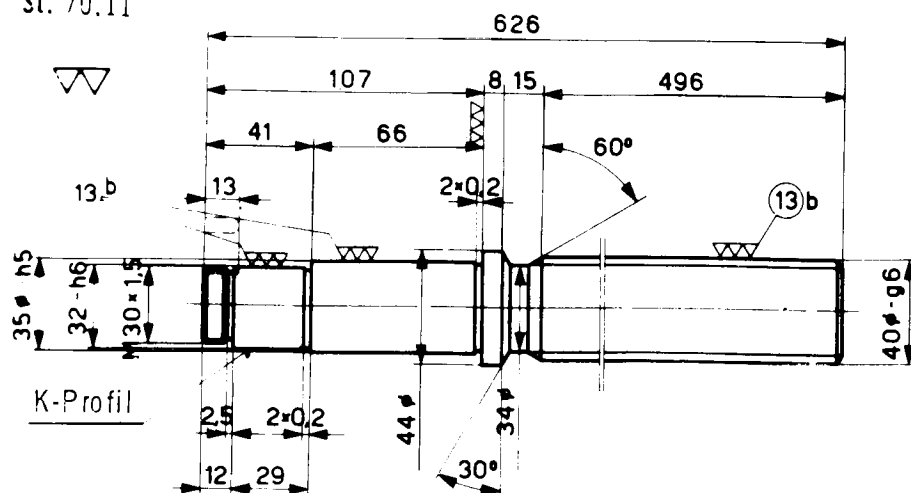


53-4165  
Tokat 80 Bronze



## VERTICAL SPINDLE

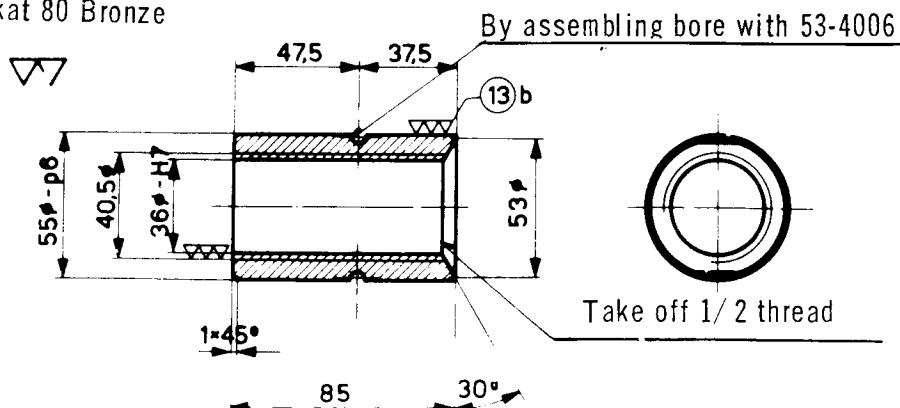
53-4210  
St. 70.11



K-Profil

M	22	32
Da	23,60	34
Ra	11,8	17
Di	20,40	30,0
ge	7,2	9,0
r1	17,4	24
r2	4,6	8

53-4146  
Tokat 80 Bronze

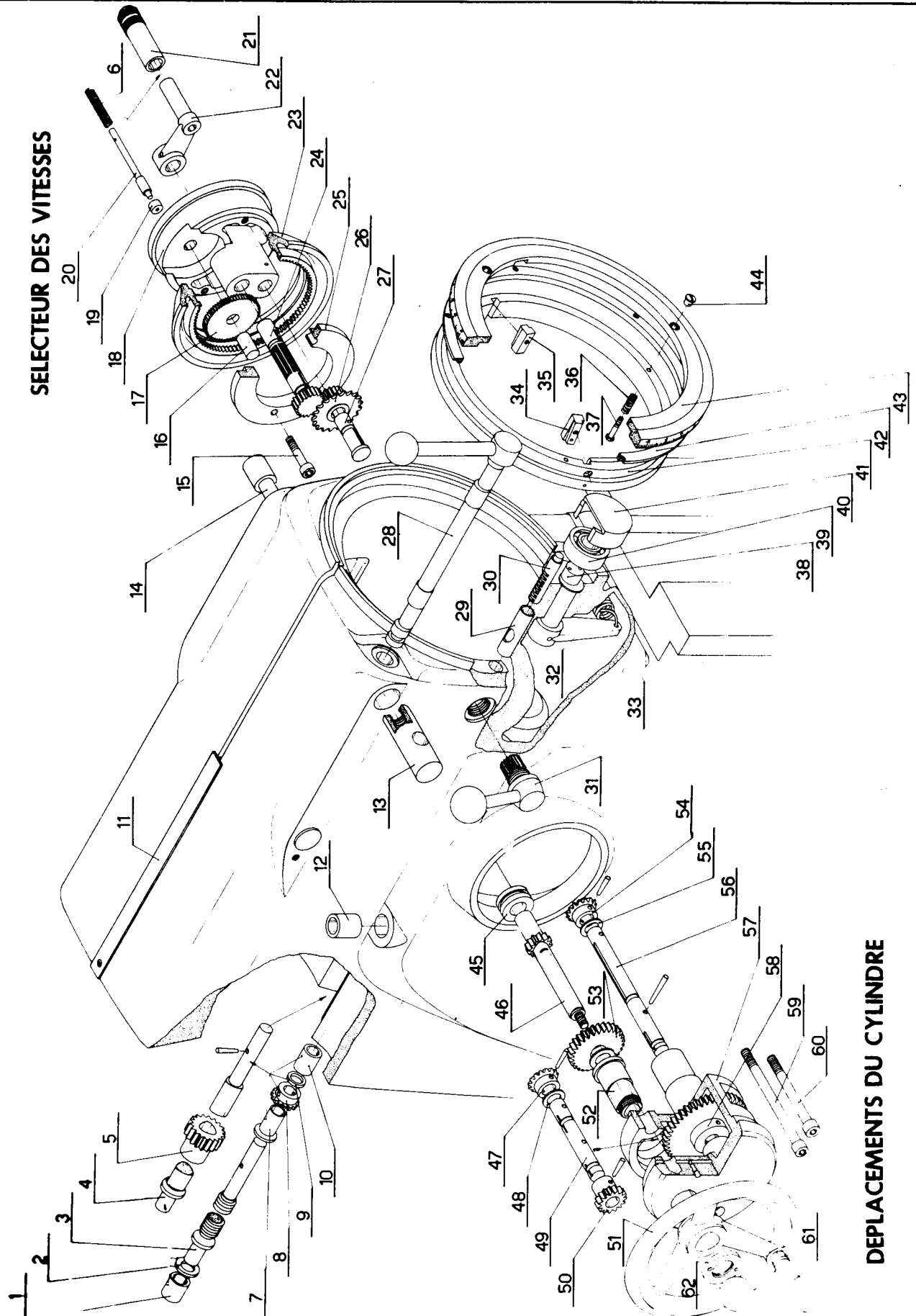


3.11.60 MD/MCh

FABRIQUE DE MACHINES **SCHAUBLIN S.A.** BÉVILARD/SUISSE

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## SELECTEUR DES VITESSES

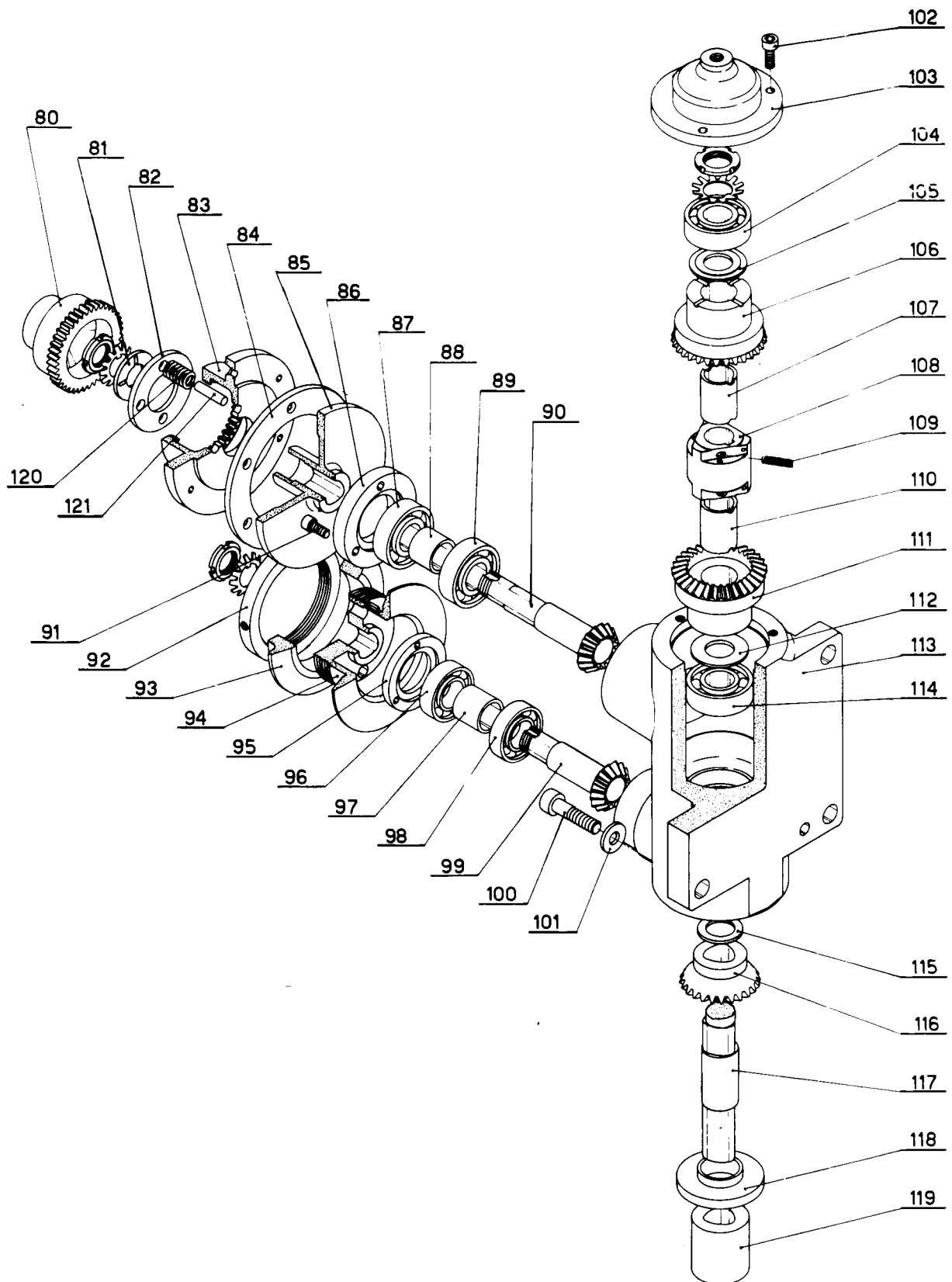


## DEPLACEMENTS DU CYLINDRE

93-0 93-50 (1)  
 93-10 21-950  
 93-10 25-950

**SCHAUBLIN S.A.**  
**BÉVILARD/SUISSE**

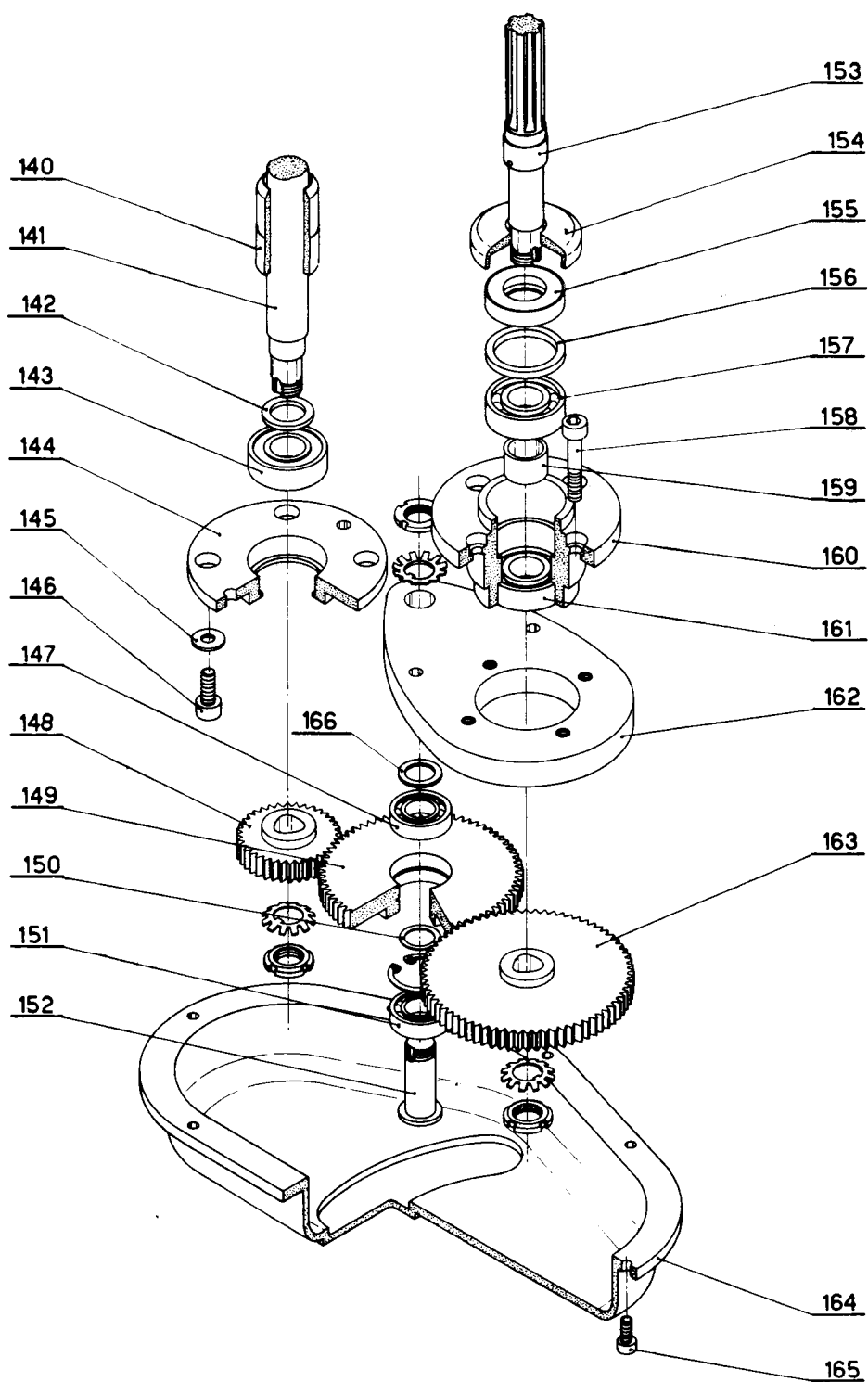
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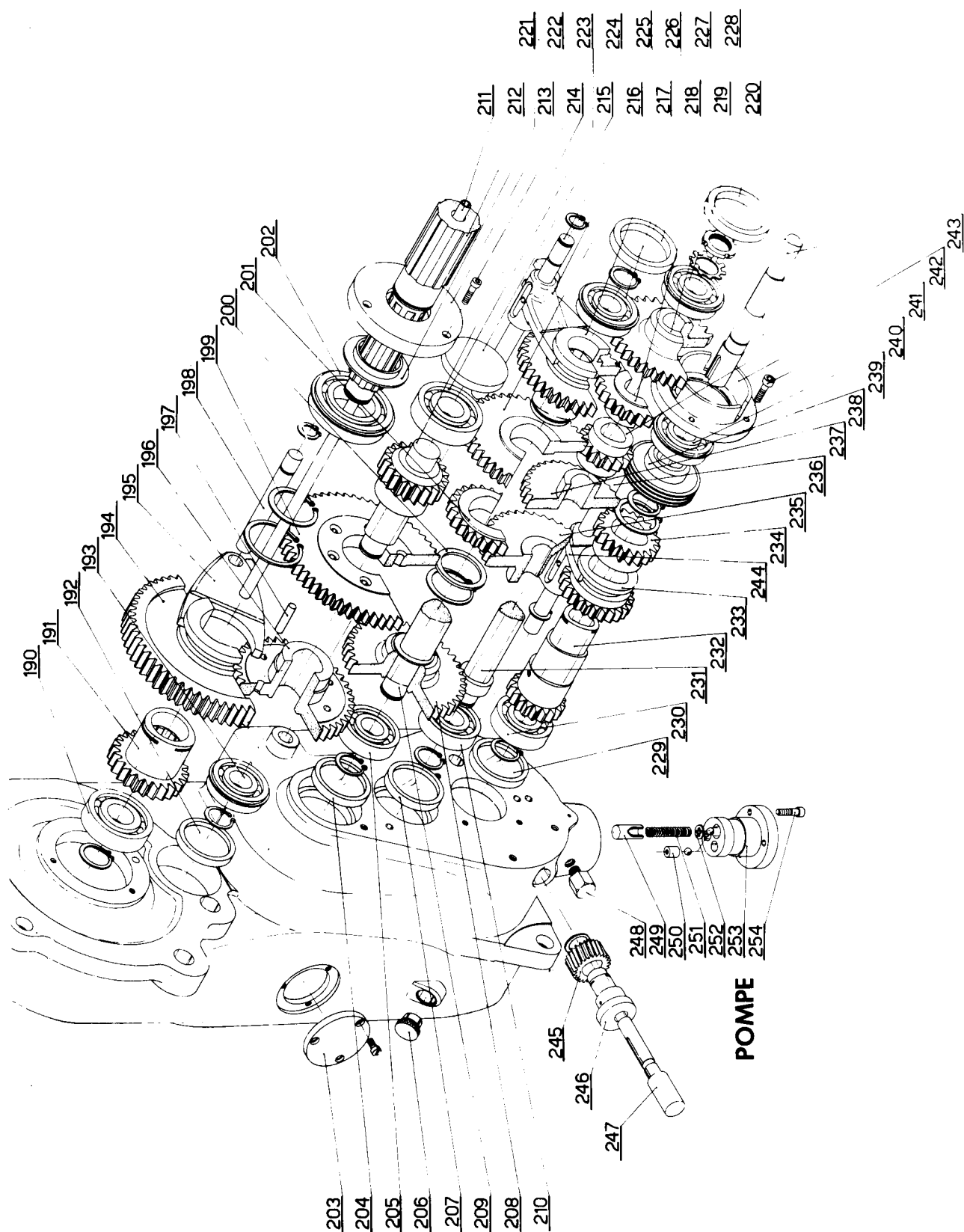


**SCHAUBLIN S. A.**  
**BÉVILARD (SUISSE)**

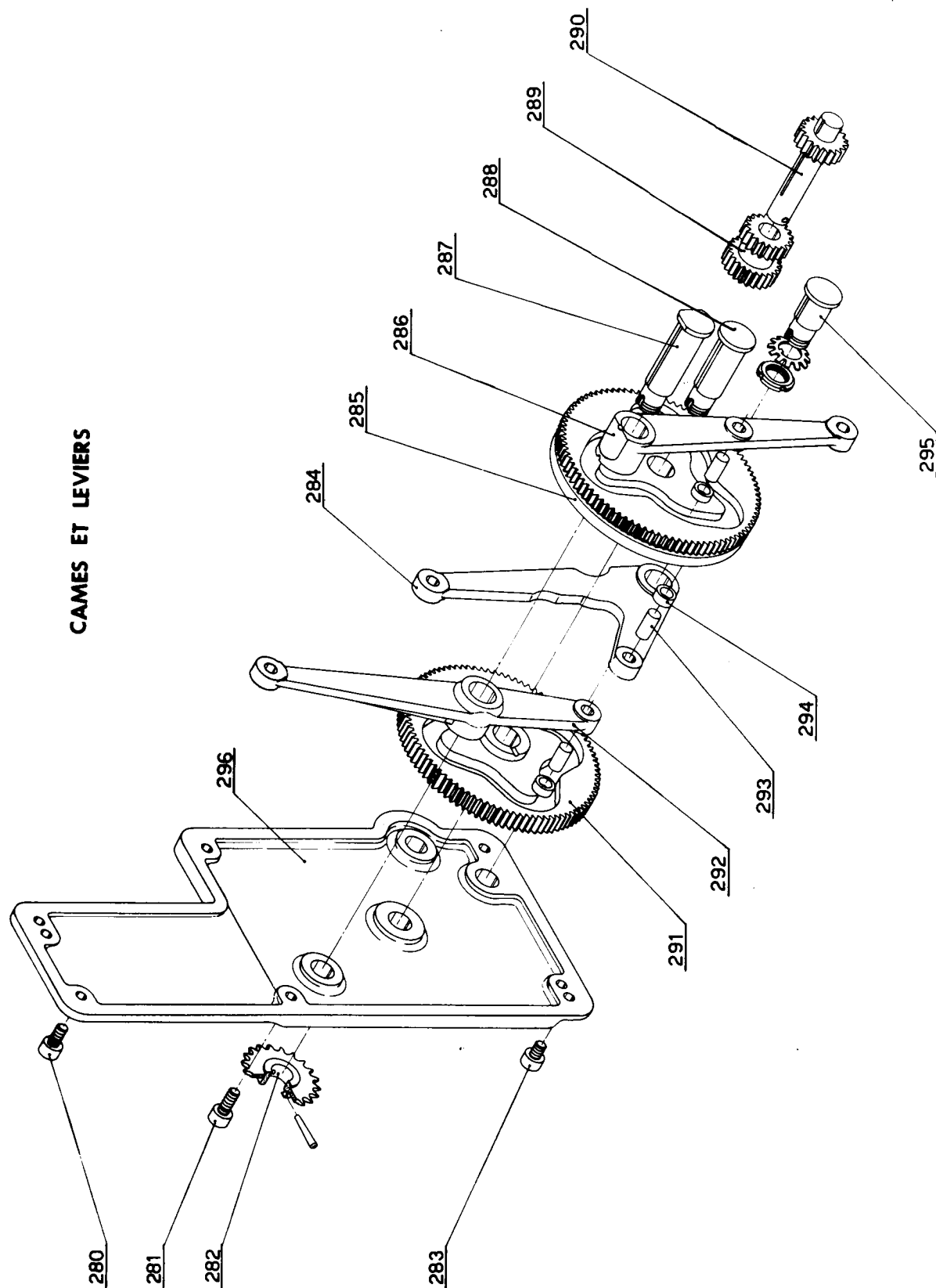
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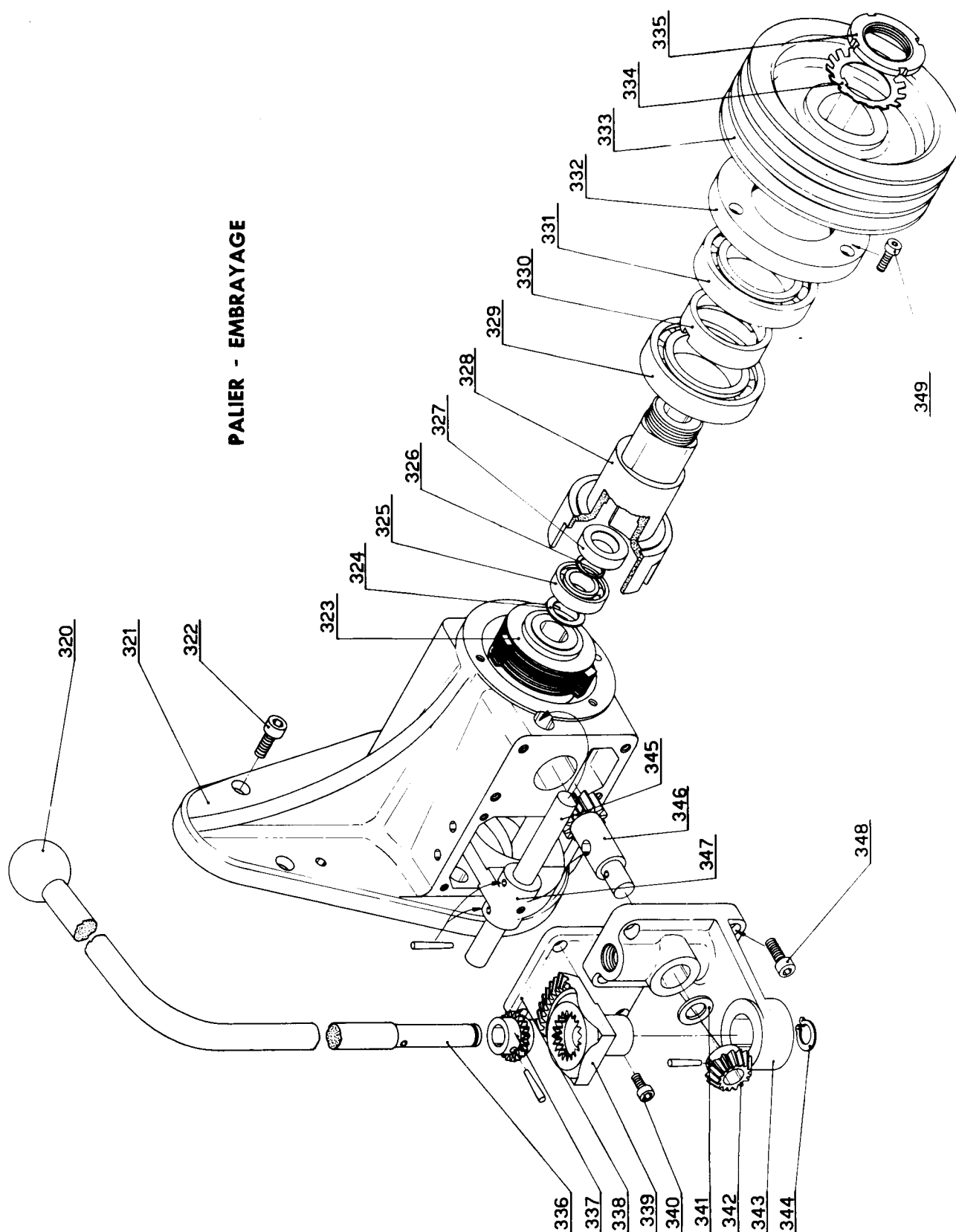




## CAMES ET LEVIERS

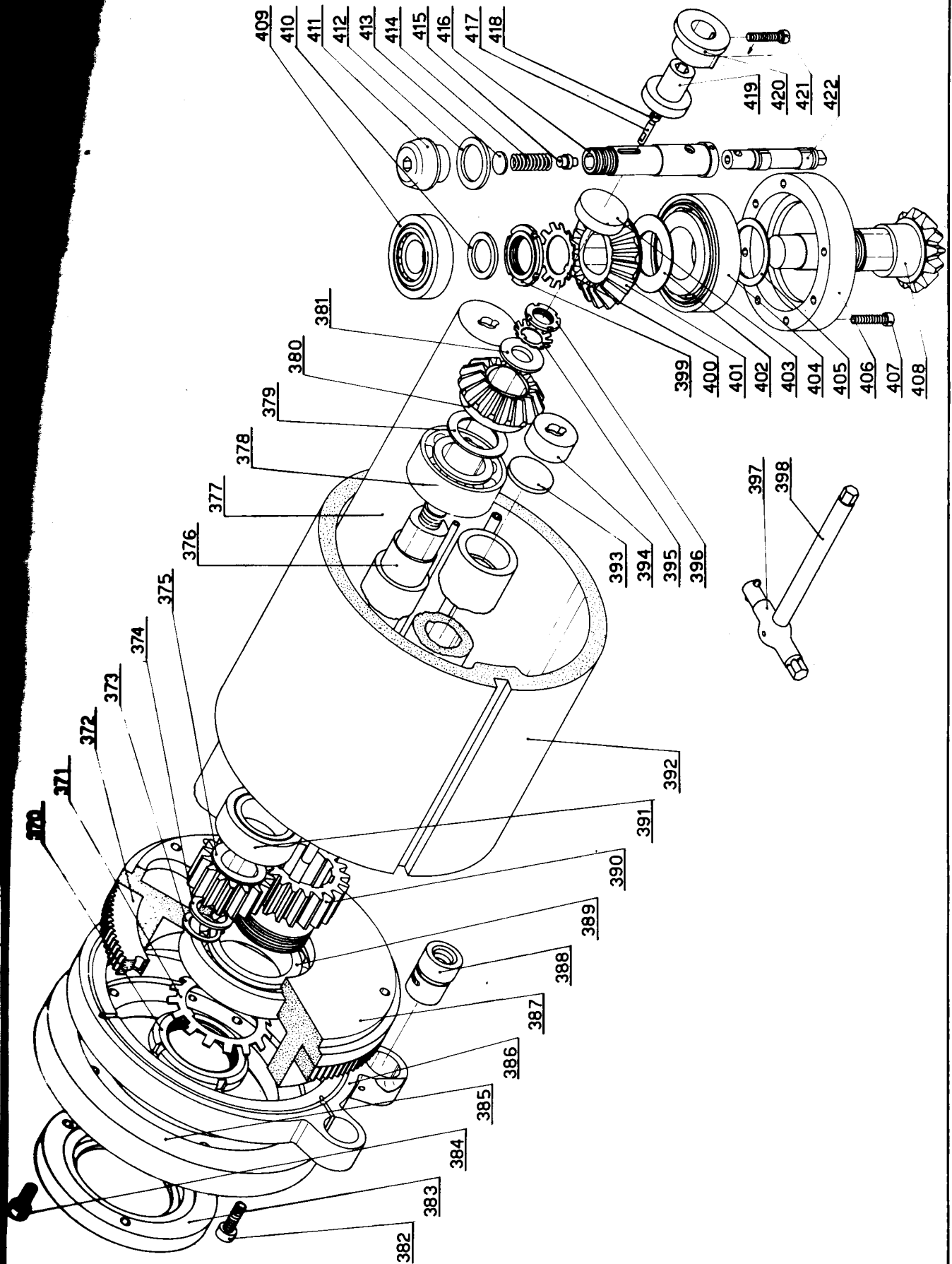


## PALIER - EMBRAYAGE



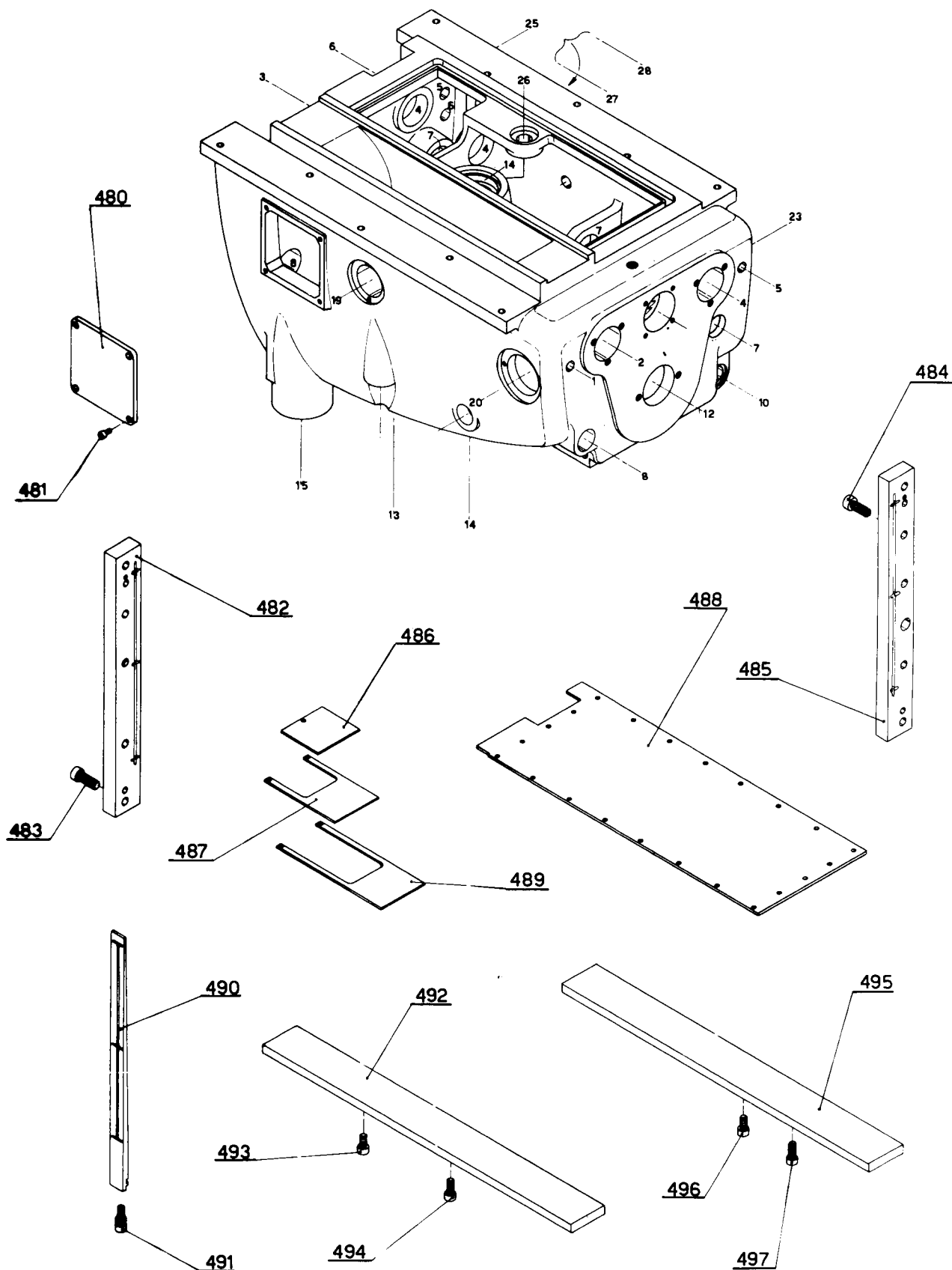


# CYLINDRE

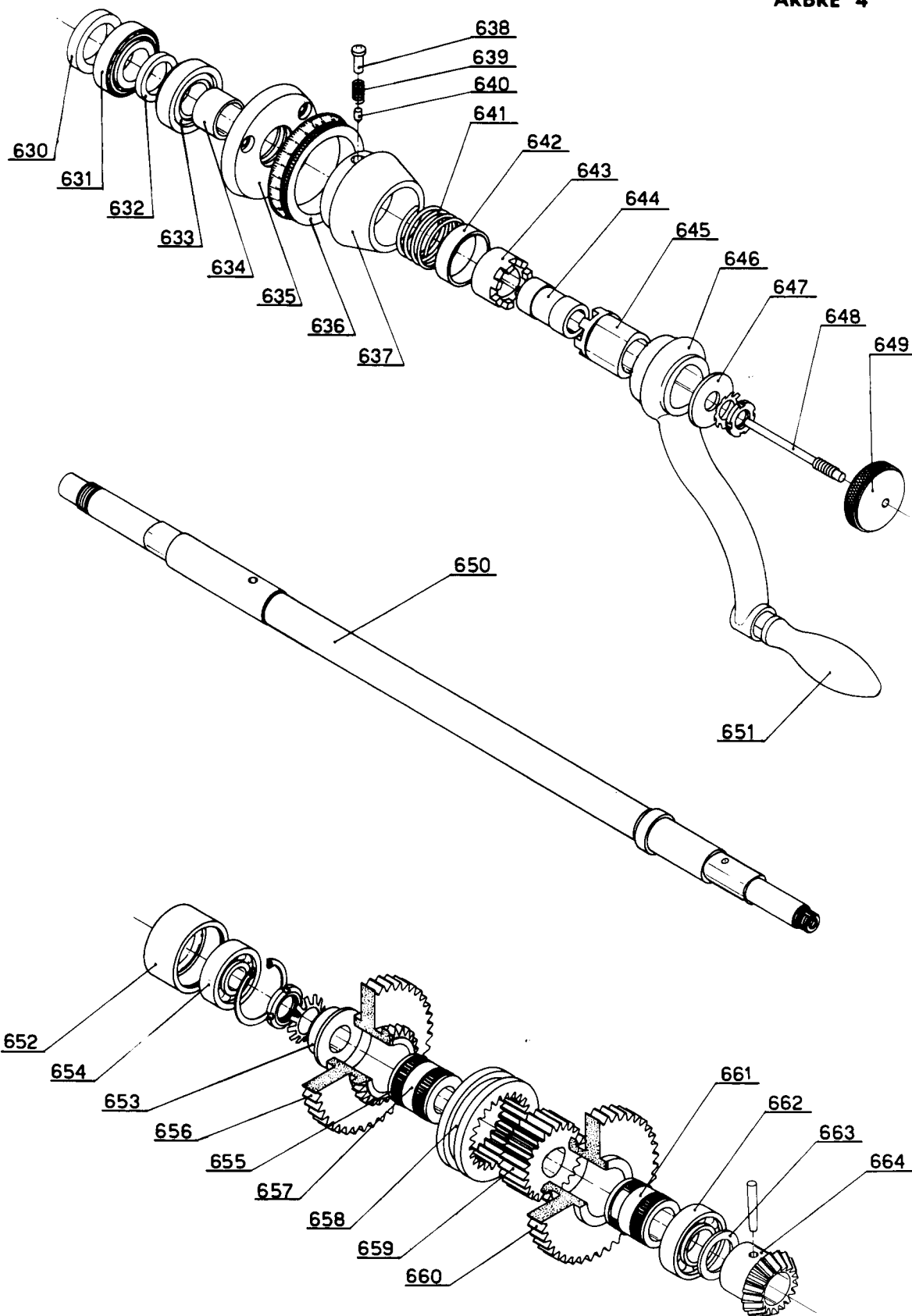




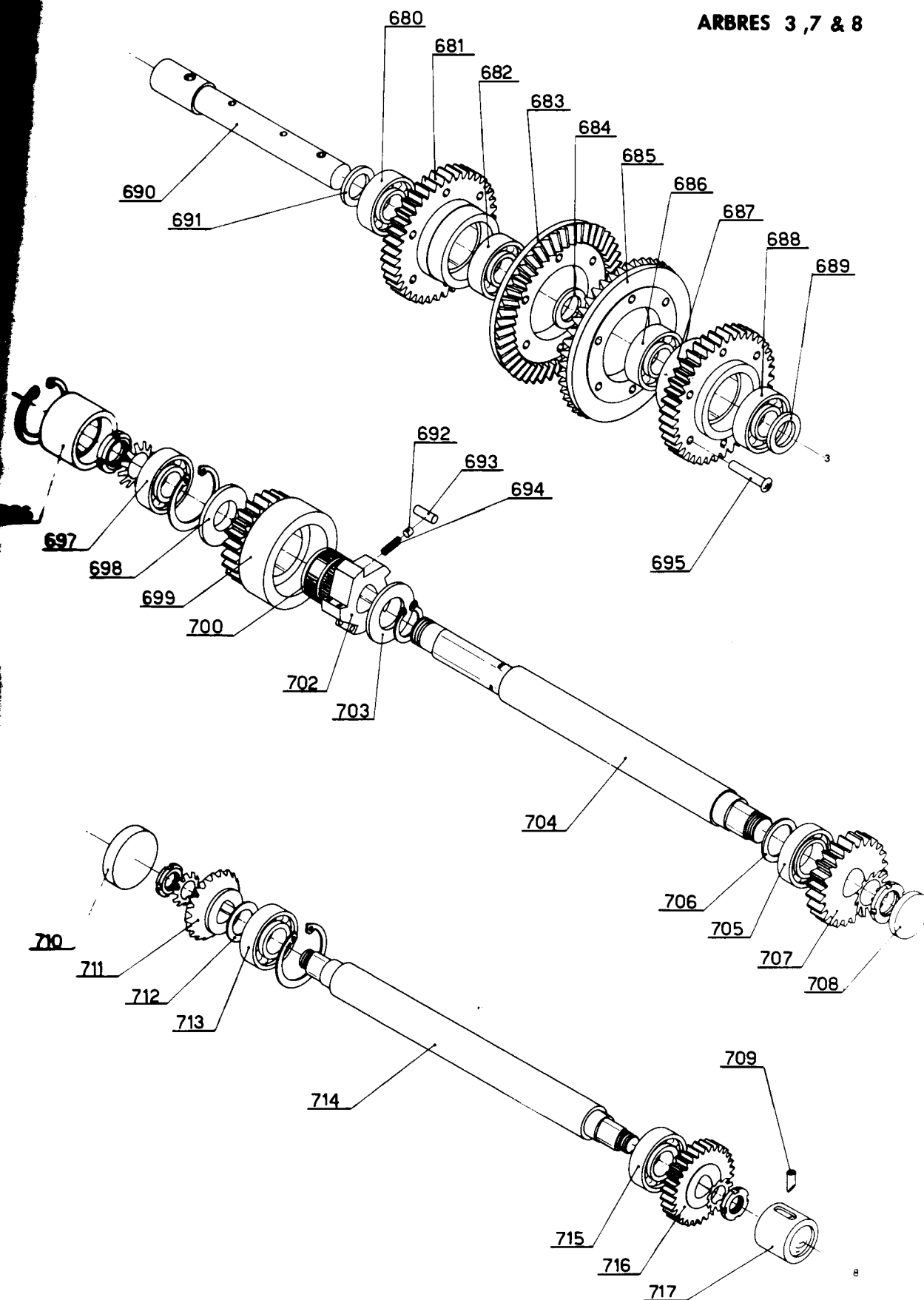
## BATI, LARDONS &amp; PLAQUES DE PROTECTION

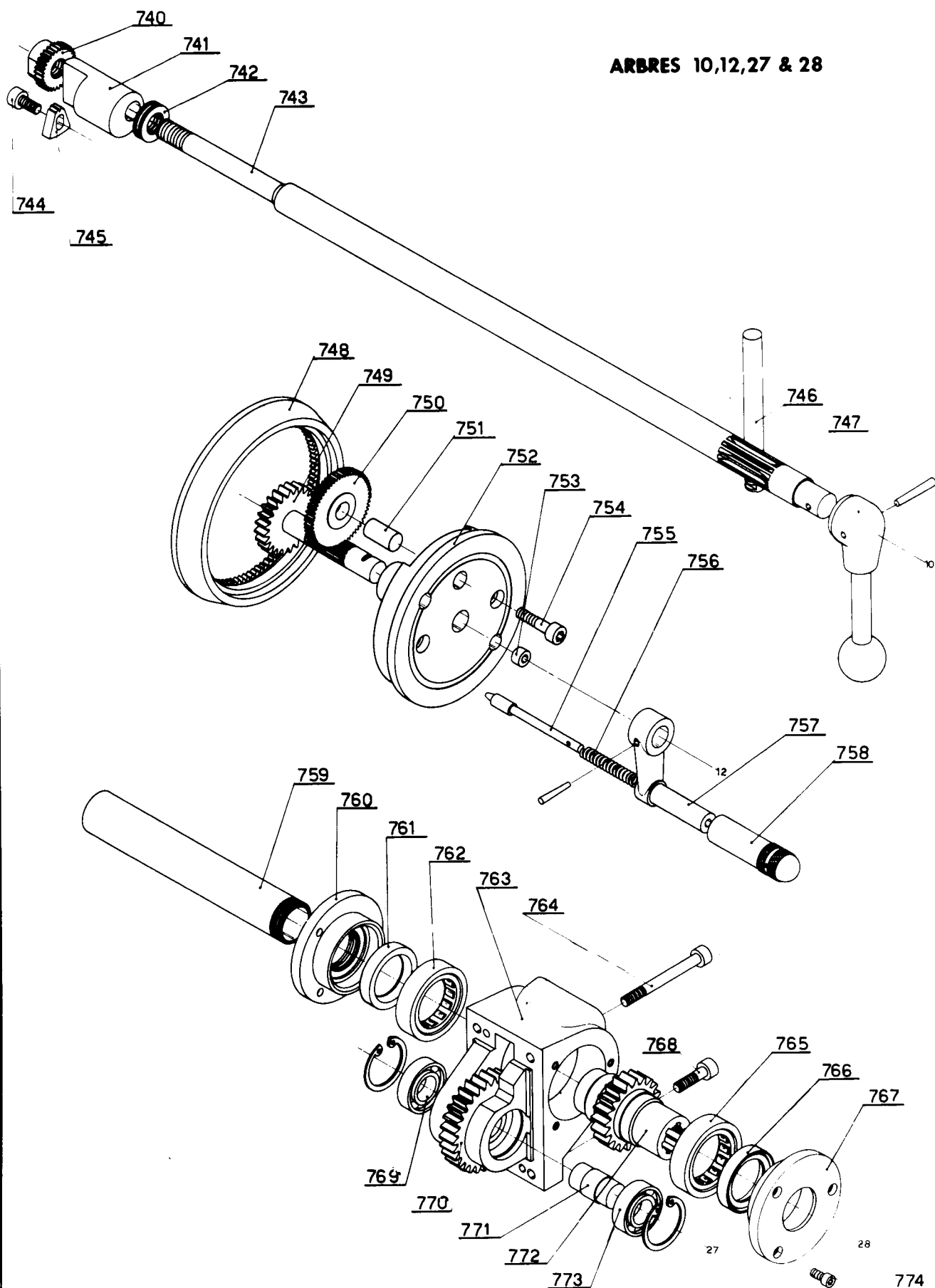


## ARBRE 4



## ARBRES 3, 7 &amp; 8

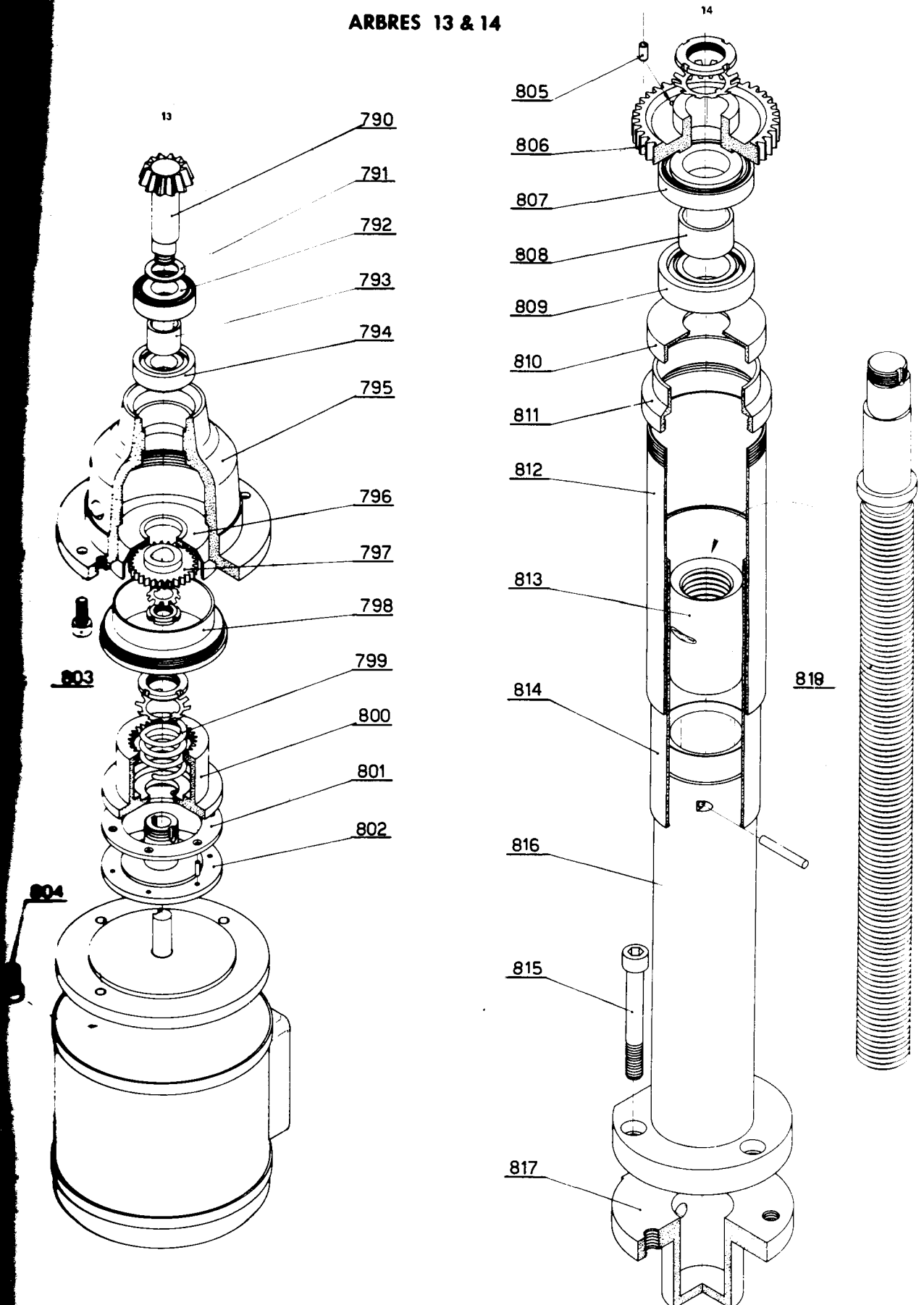




**SCHAUBLIN S. A.**  
**BÉVILARD (SUISSE)**

# CONSOLE

## ARBRES 13 & 14

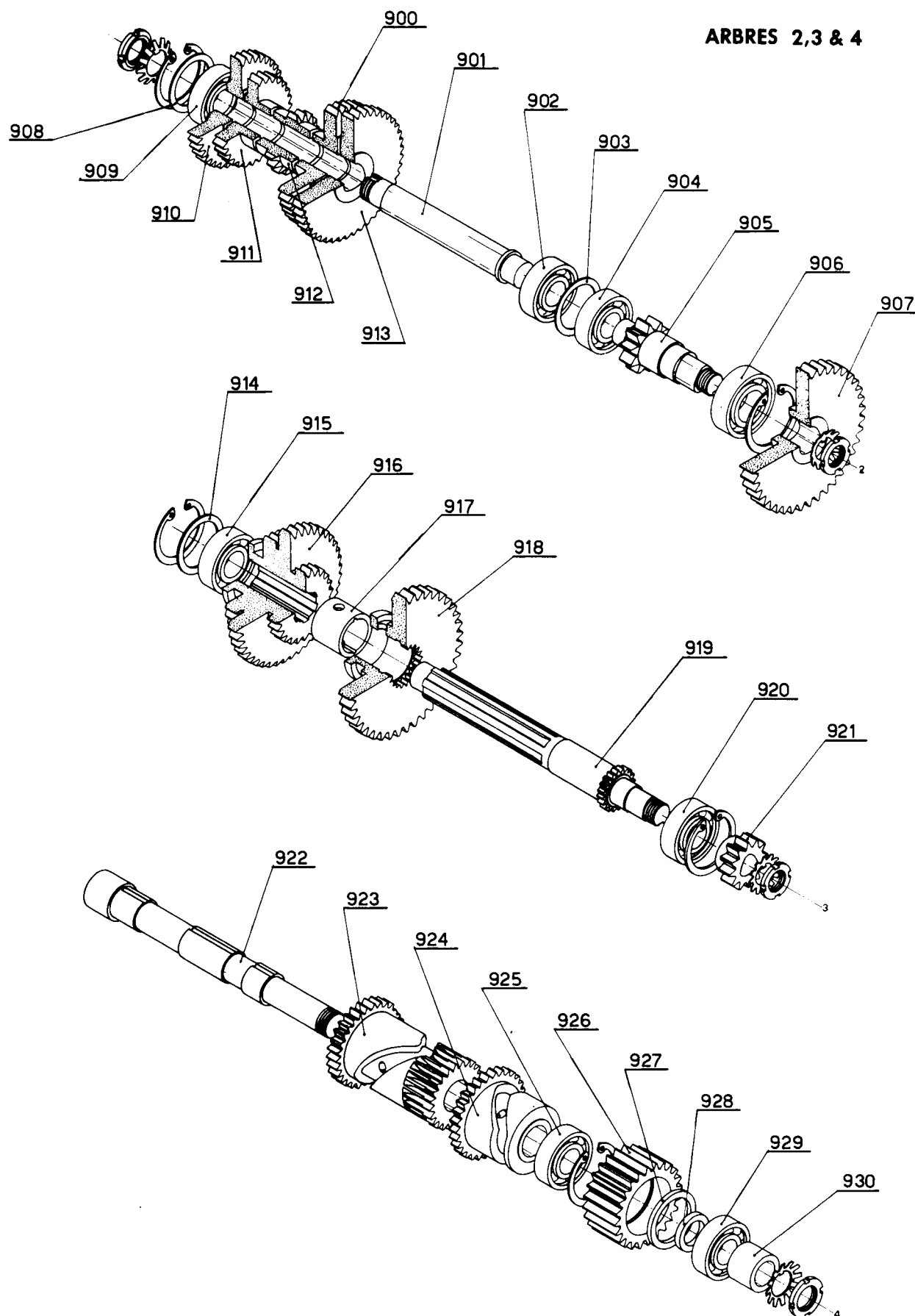


**SCHAUBLIN S. A.**  
**BÉVILARD (SUISSE)**

MARS 54

# CONSOLE

# BOITE DE VITESSES

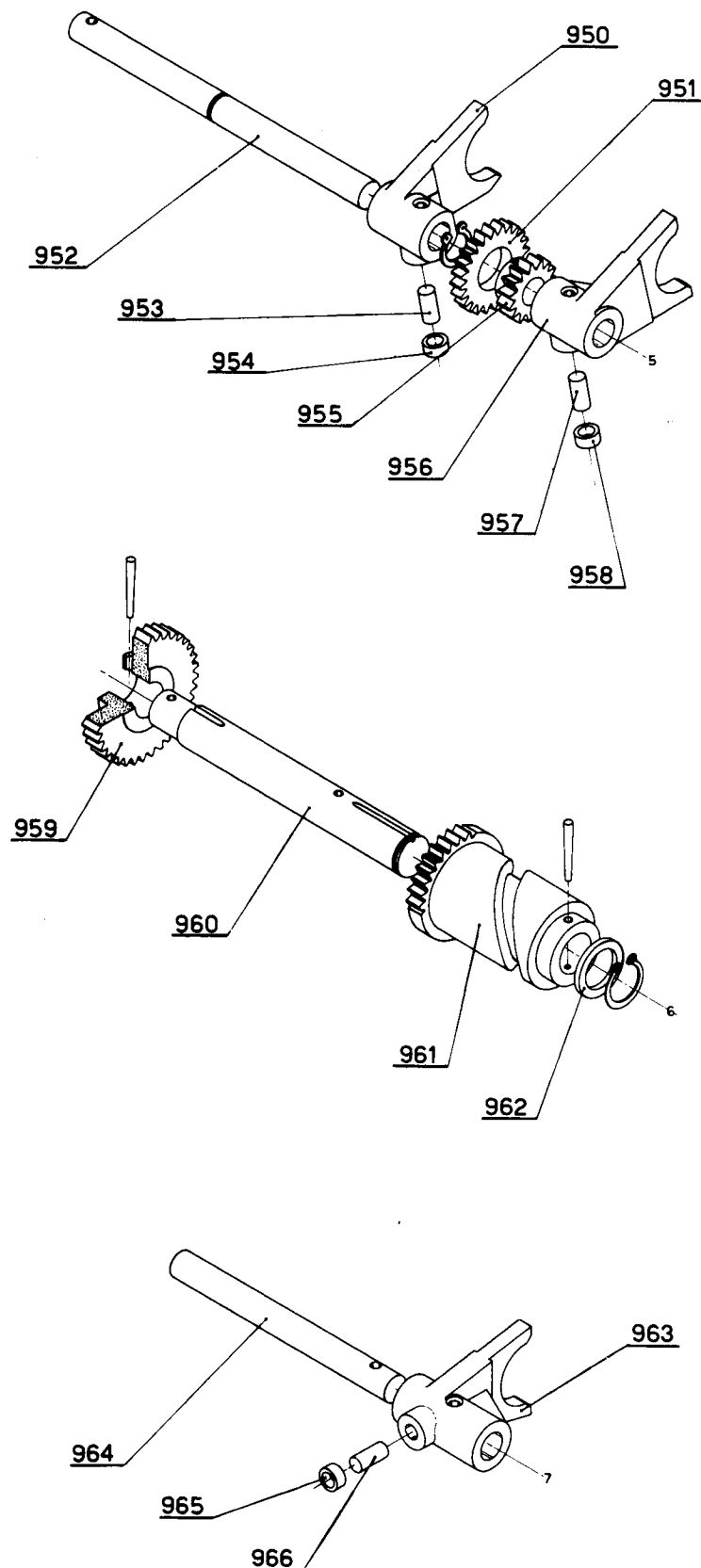


**SCHAUBLIN S. A.**  
**BÉVILARD (SUISSE)**

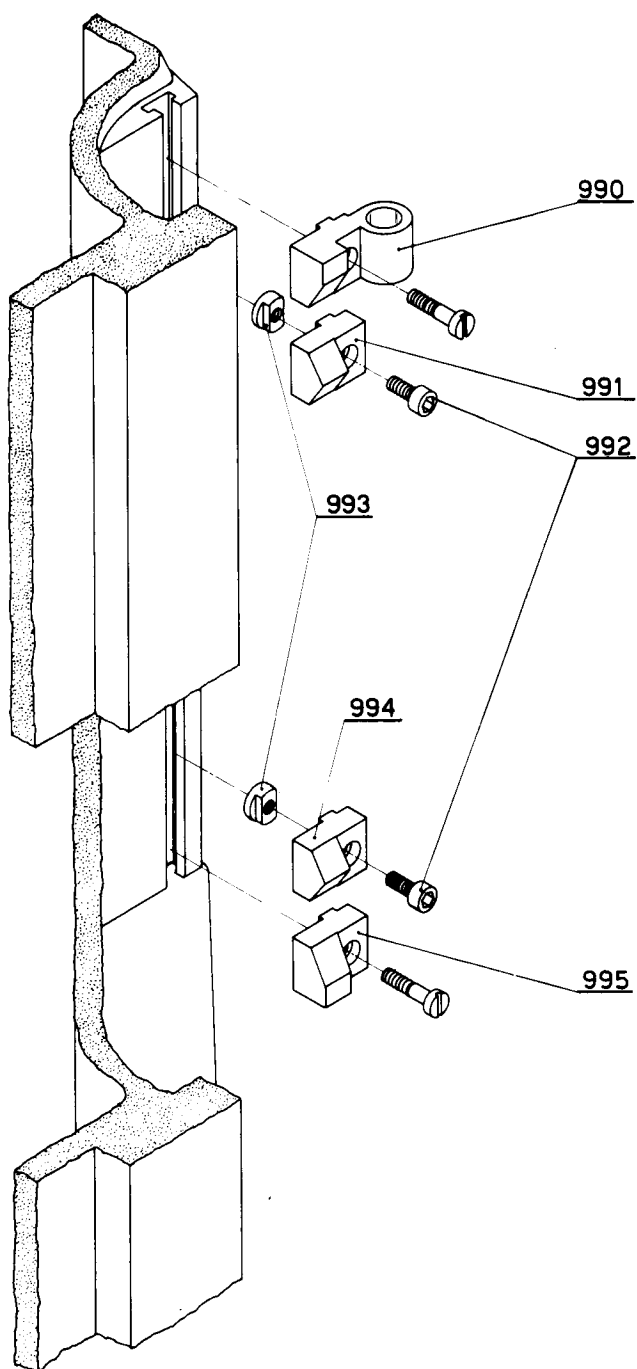
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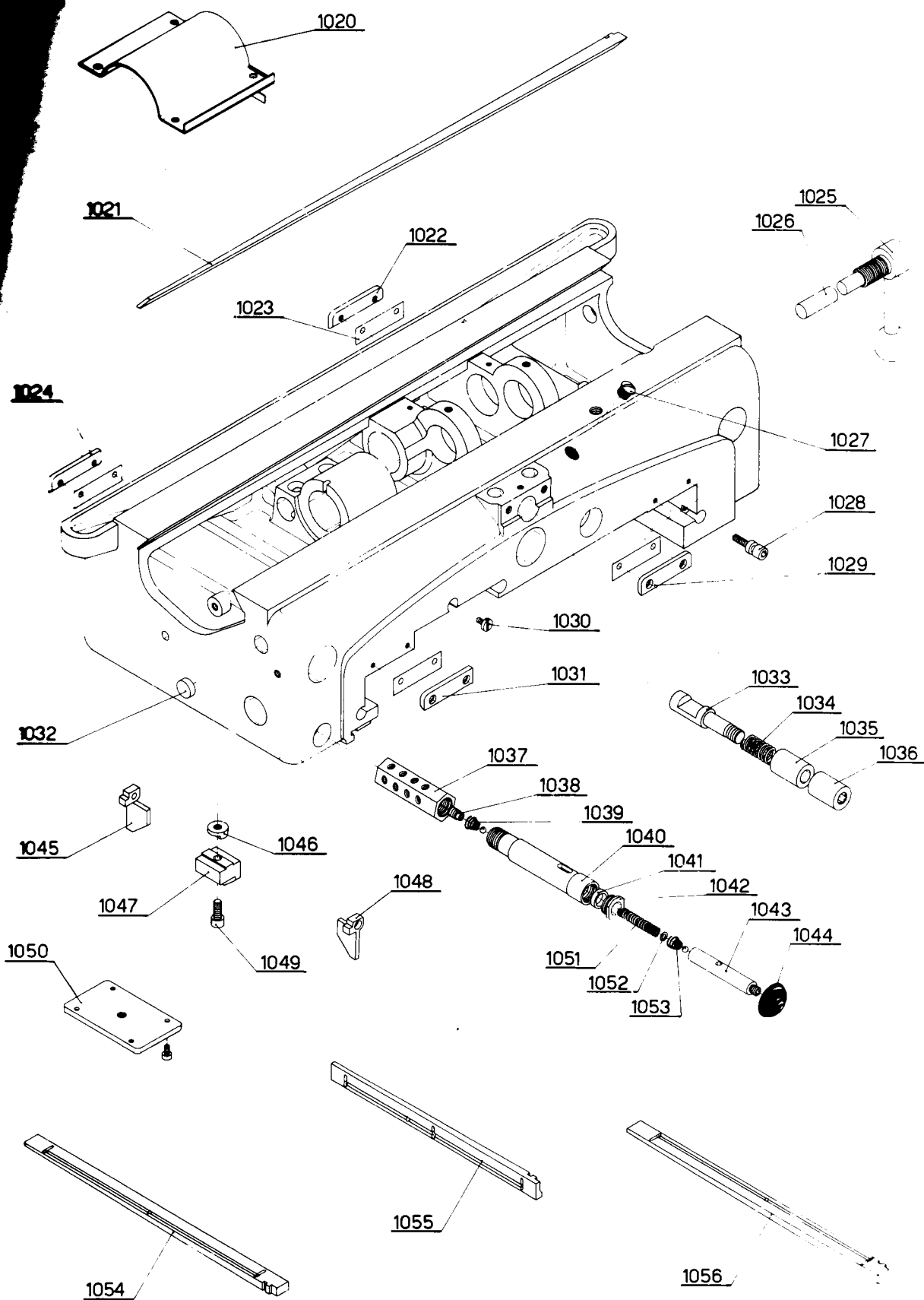
ARBRES 5, 6 & 7

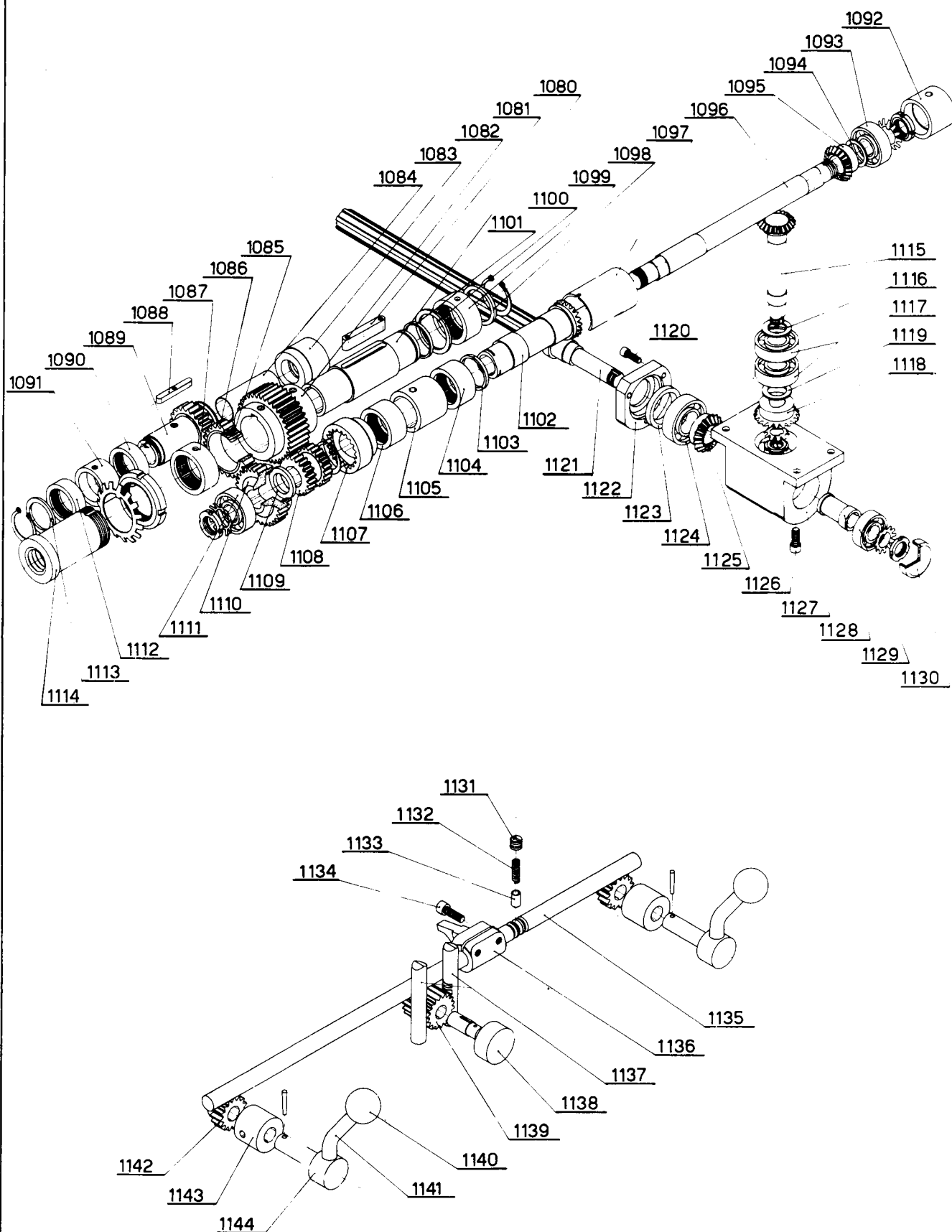


# CONSOLE BUTEES DE DECLANCHEMENT VERTICAL

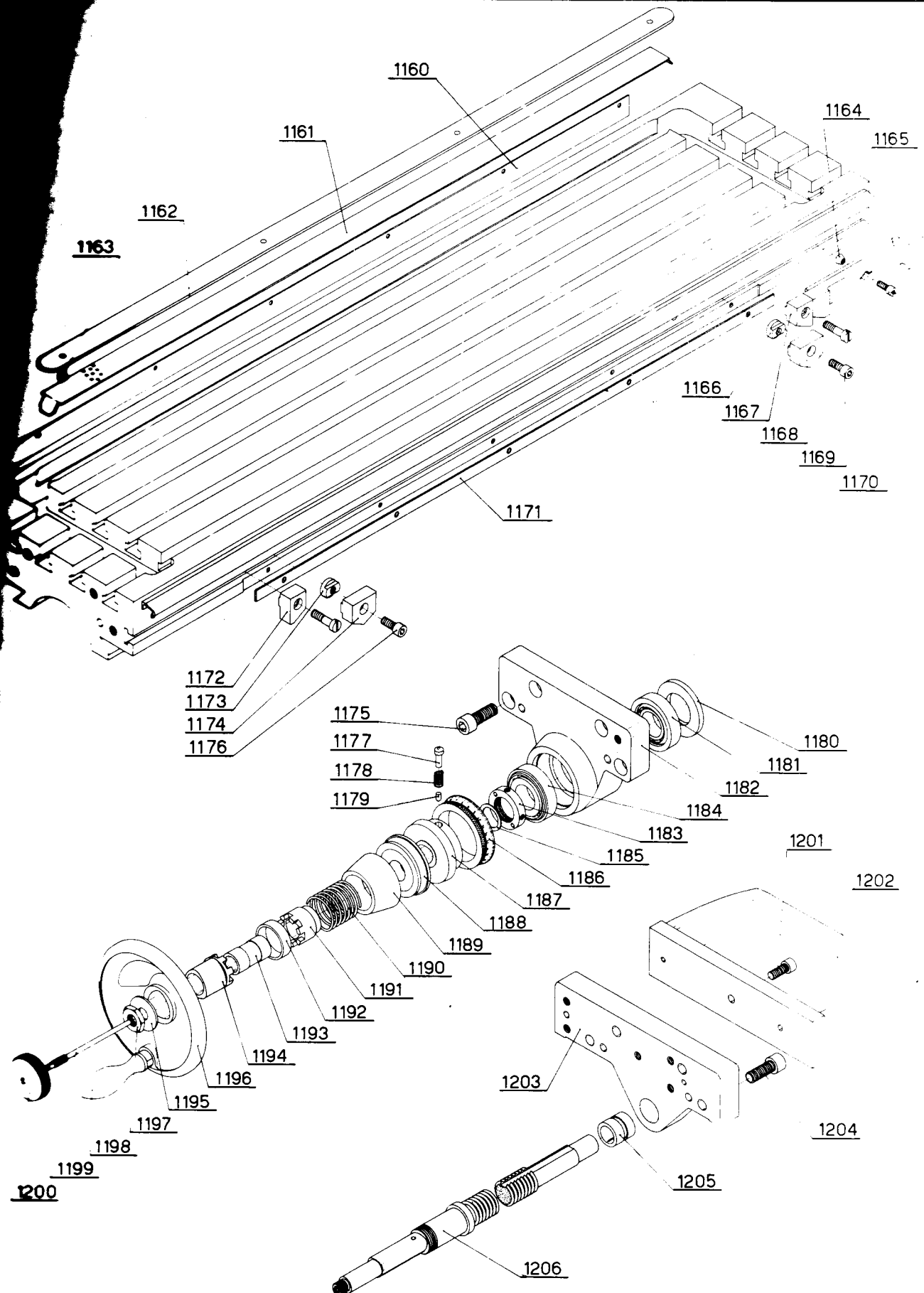


# CHARIOT





# TABLE

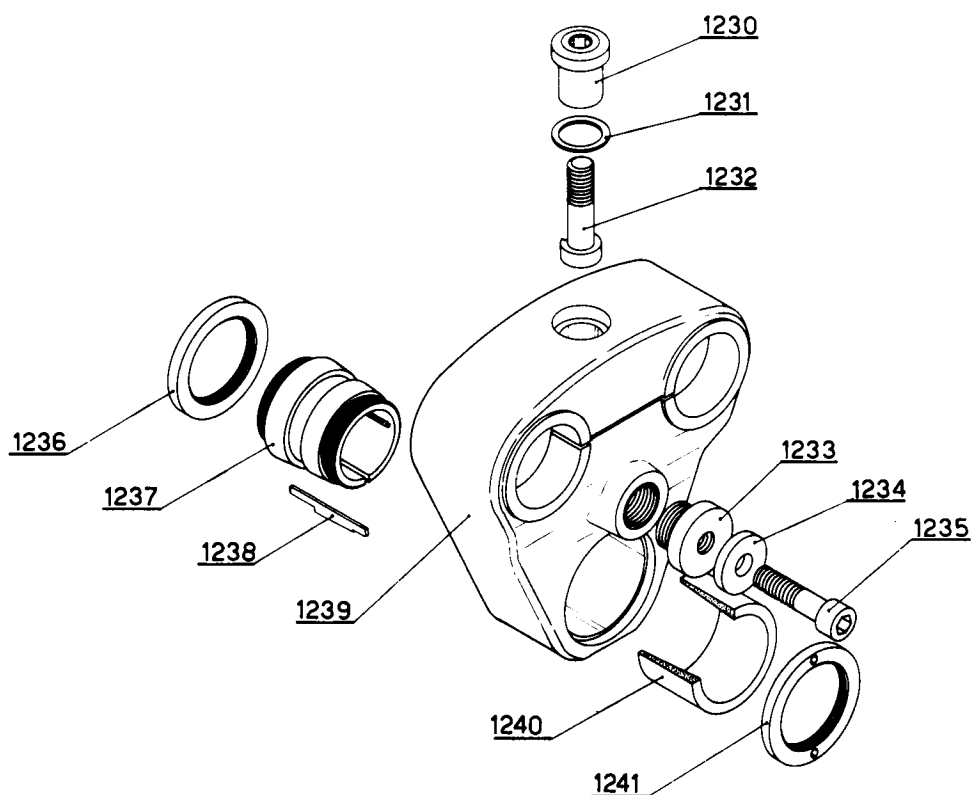


Exs 53 - 5500 du 24 1 50

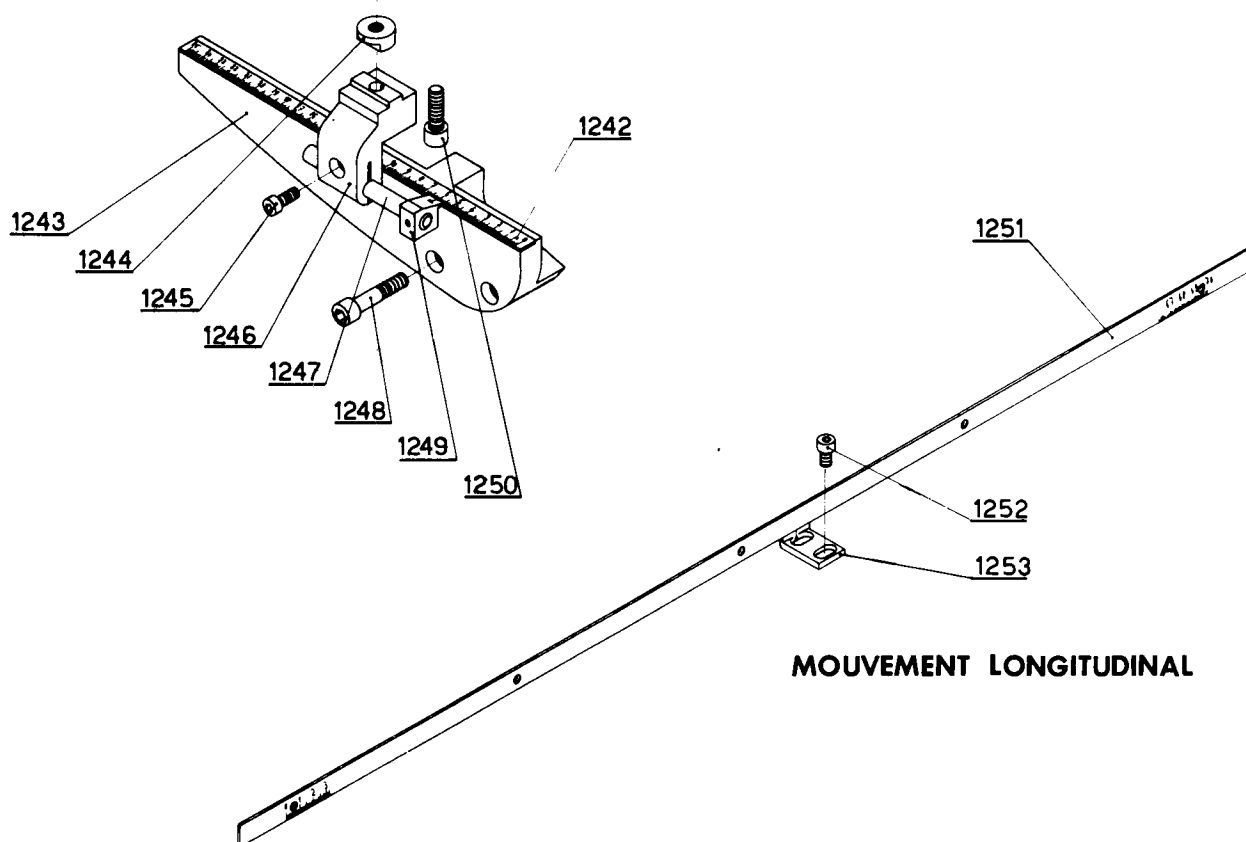
**SCHAUBLIN S.A.**  
BÉVILARD/SUISSE

**23**

Avril 54

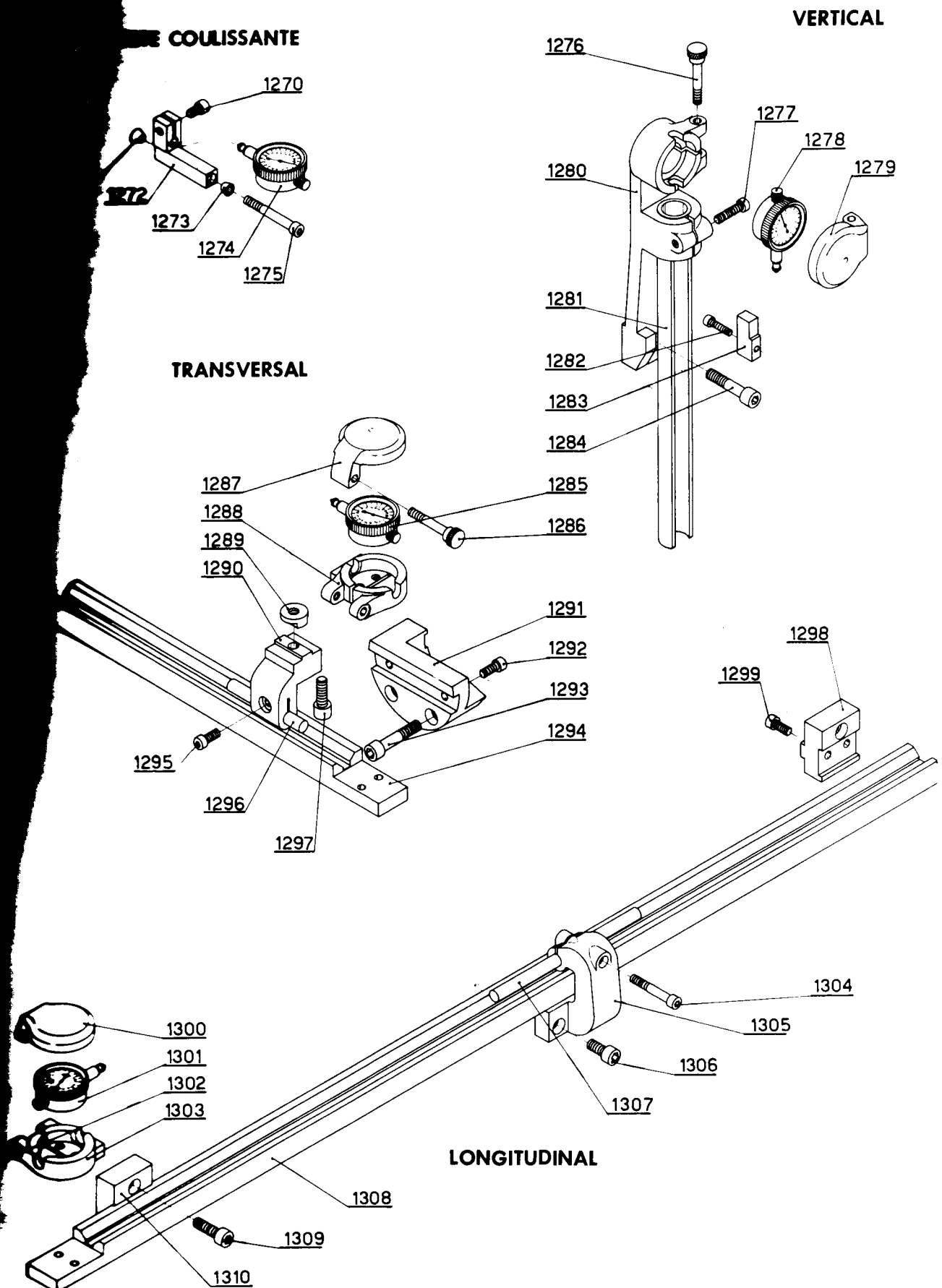


MOUVEMENT TRANSVERSAL



MOUVEMENT LONGITUDINAL

# SUPPORTS DE CALES AVEC COMPARATEURS



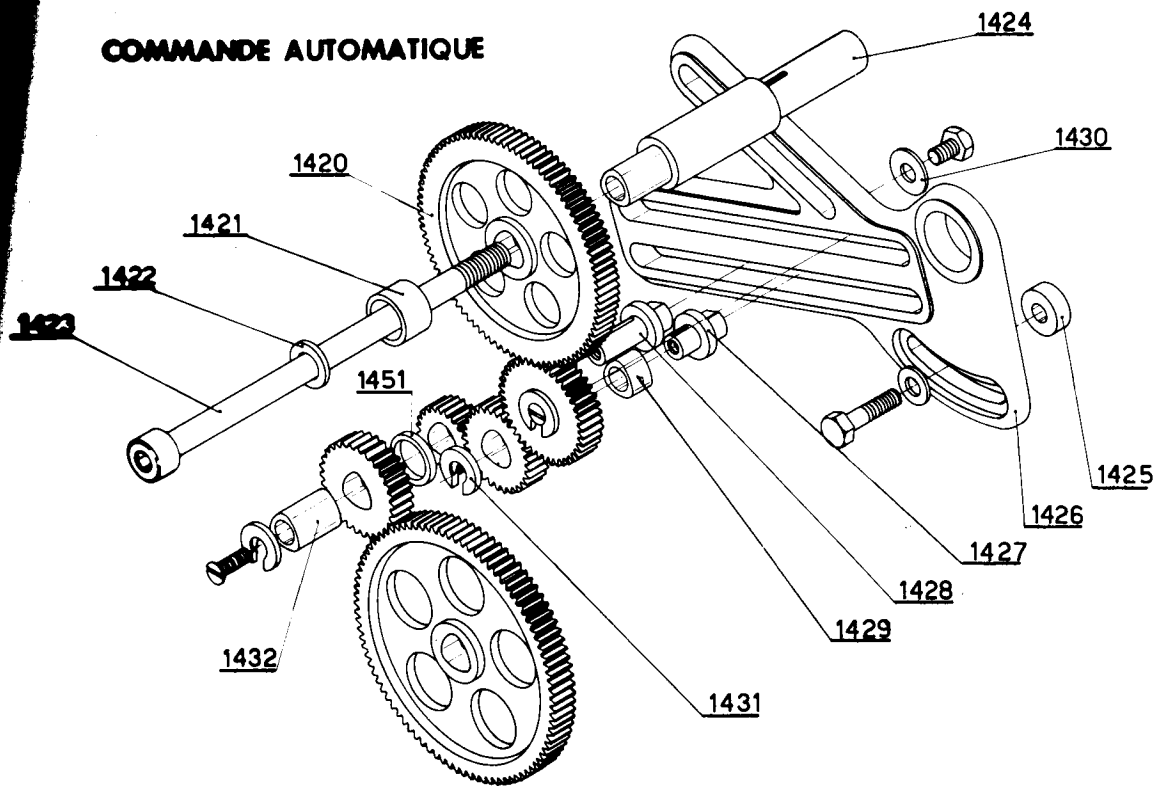


Ens. 53-9000 du 5.9 50

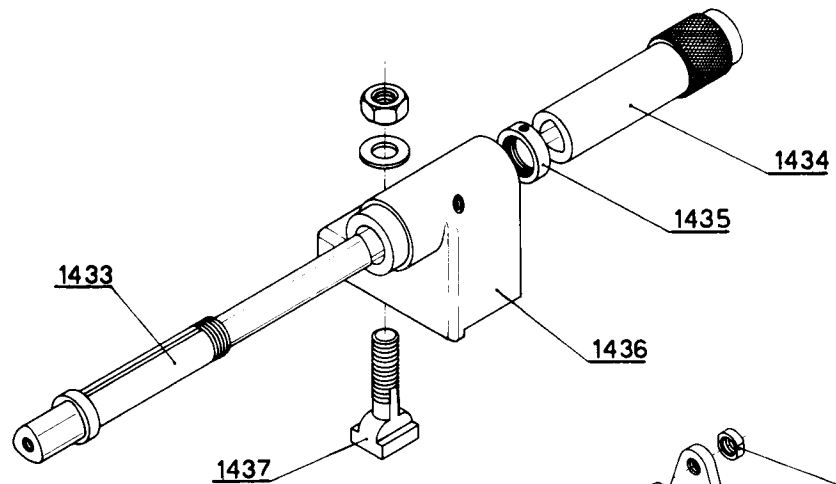


# ACCESSOIRES POUR DIVISEUR UNIVERSEL

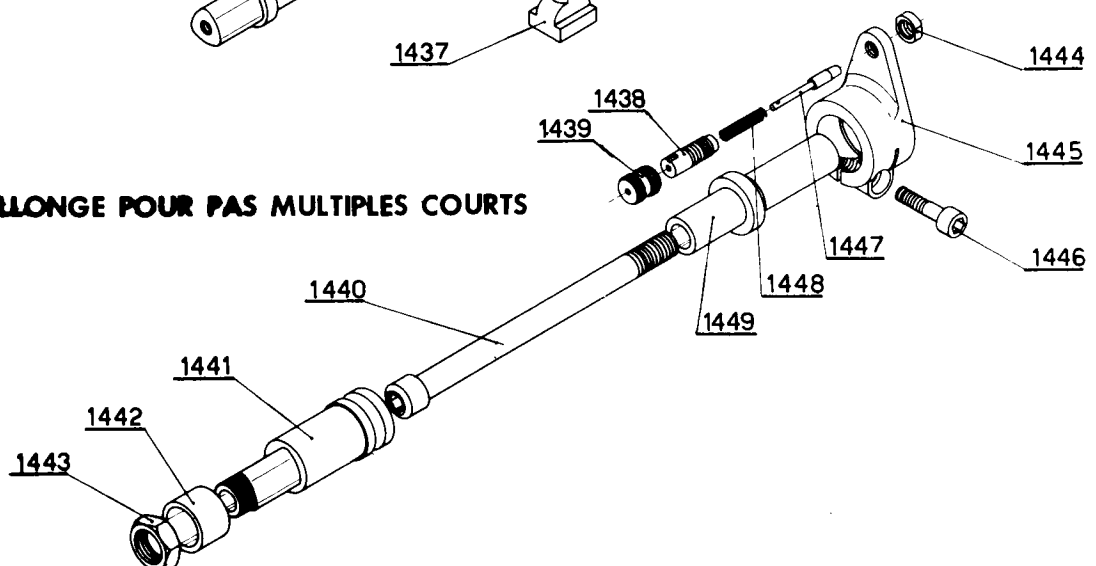
## COMMANDE AUTOMATIQUE



## RALLONGE

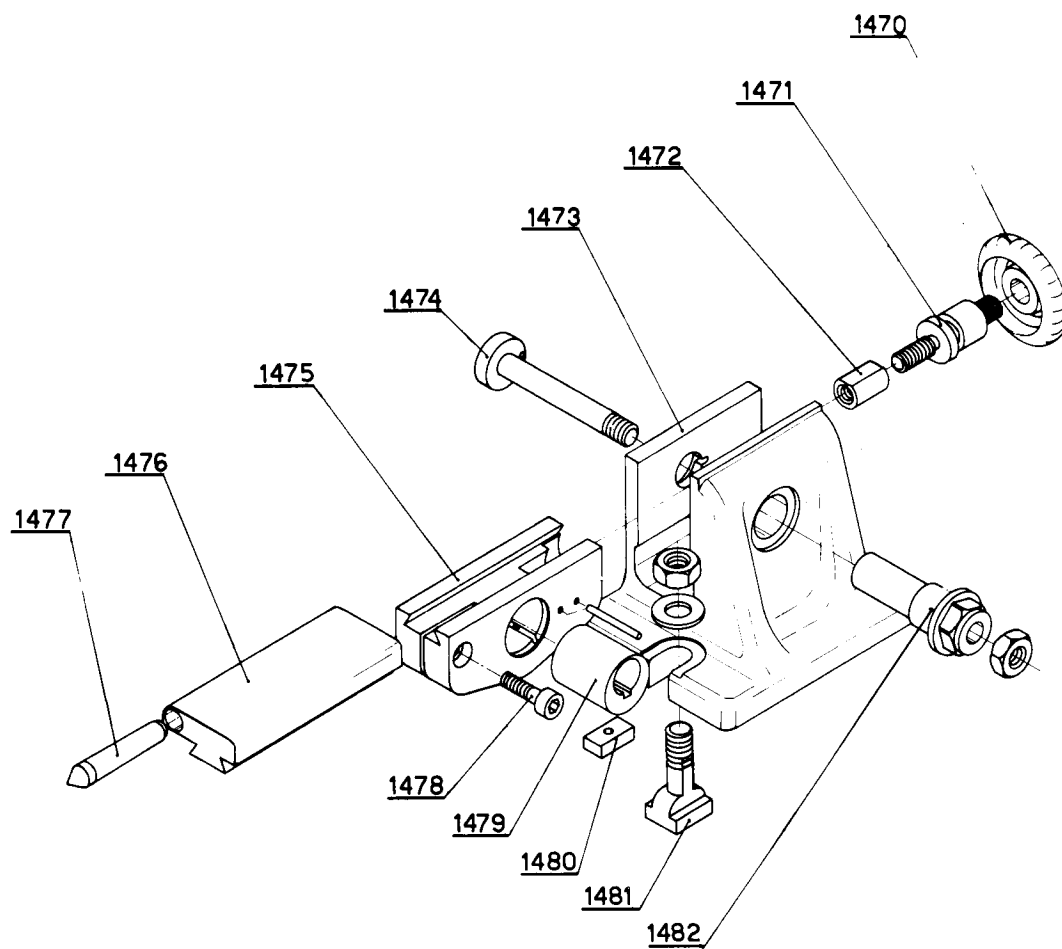


## RALLONGE POUR PAS MULTIPLES COURTS

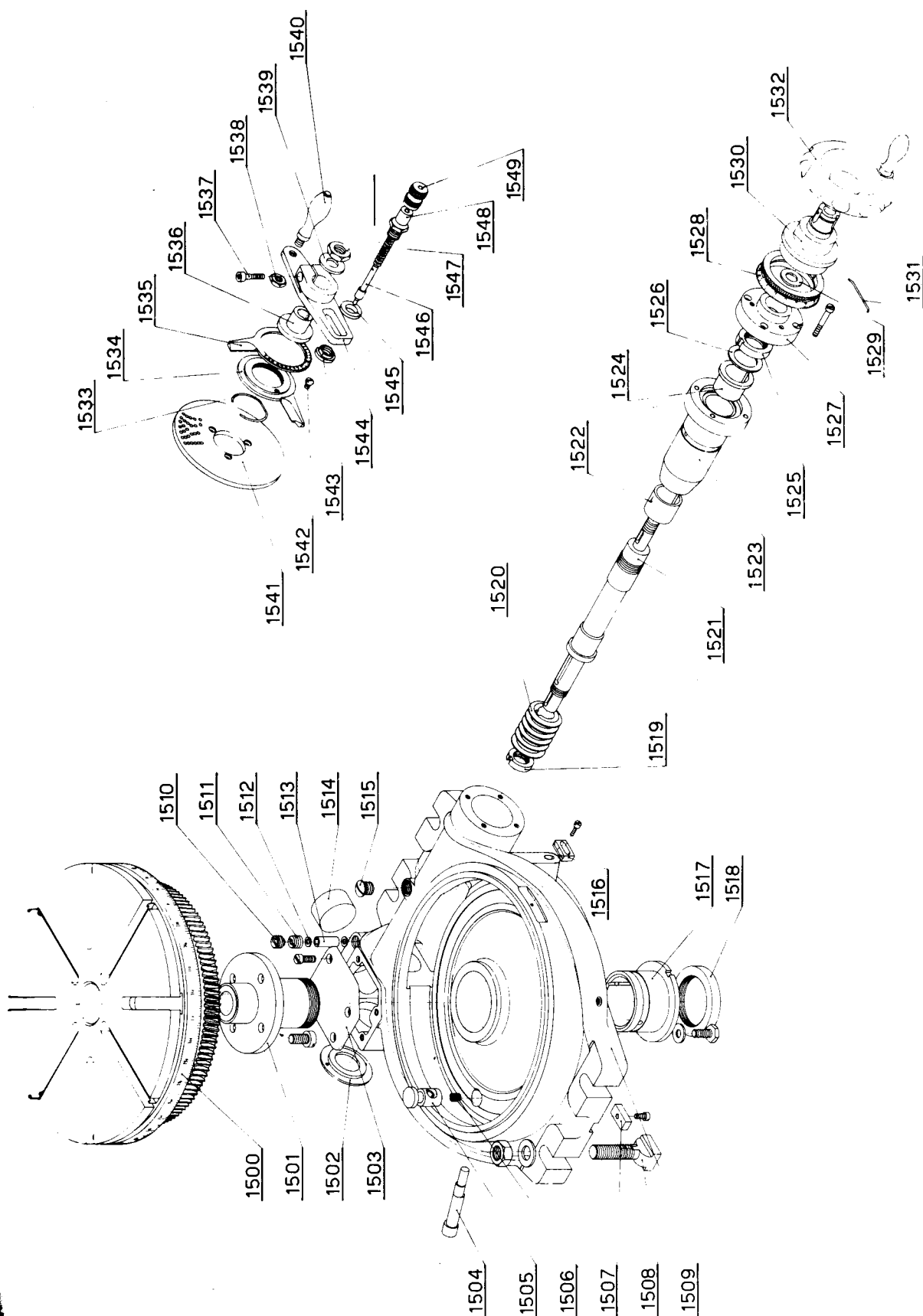


Ref. 53-9100 du 14.2.51  
 Ref. 53-9101 du 26.9.51  
 Ref. 53-9120 du 18.7.51

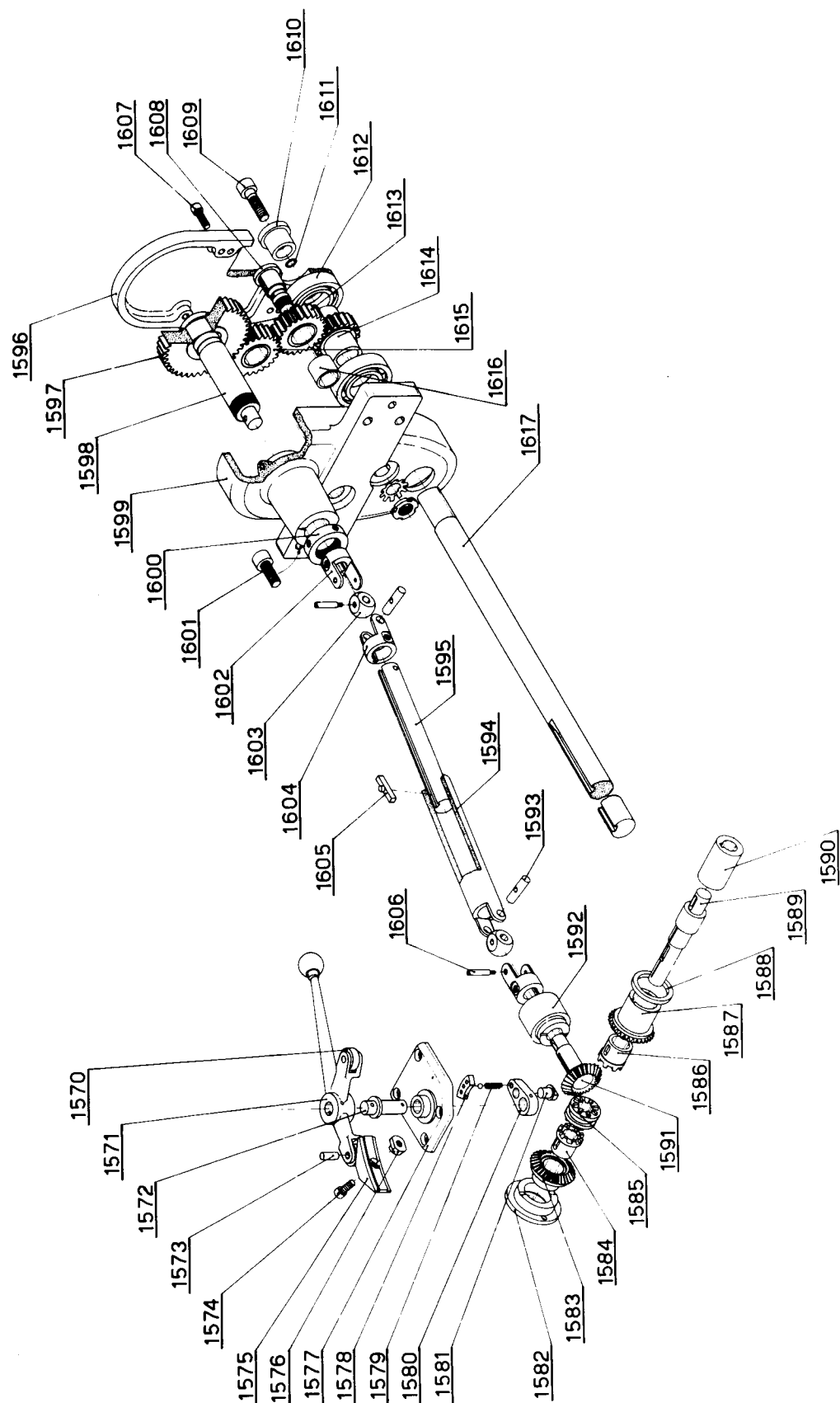
**SCHAUBLIN S. A.**  
**BÉVILARD (SUISSE)**



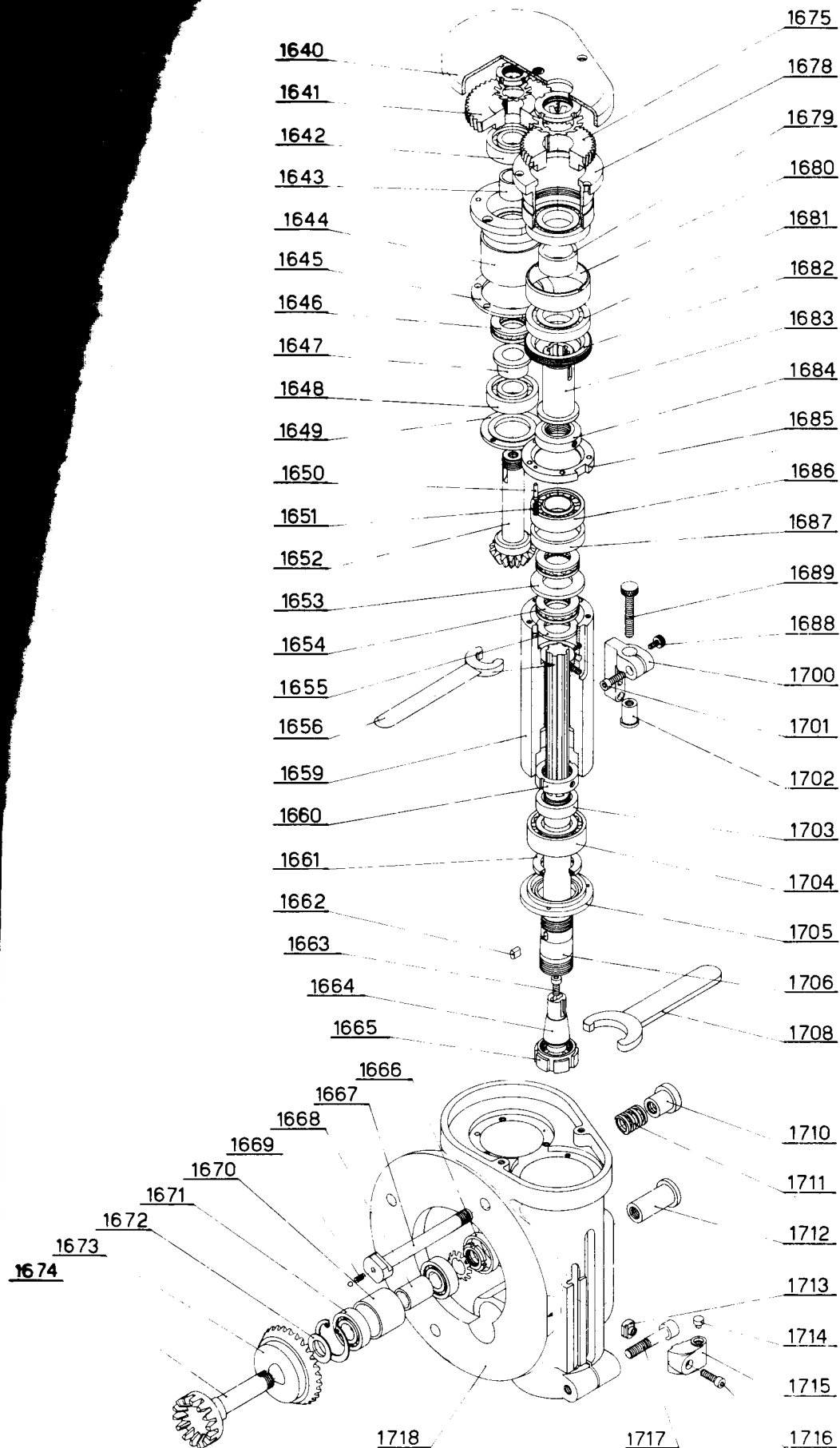
# PLATEAU CIRCULAIRE A VERNIER DIVISEUR A 3 DISQUES



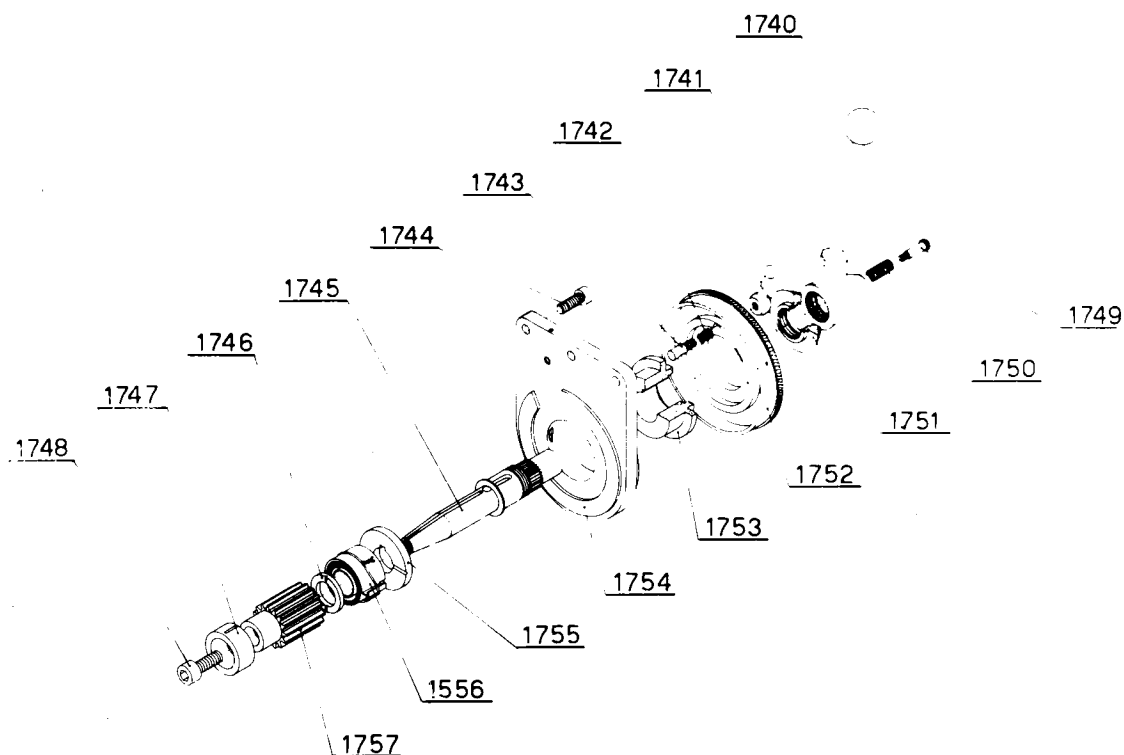
# COMMANDE AUTOMATIQUE PAR CARDAN POUR PLATEAU CIRCULAIRE



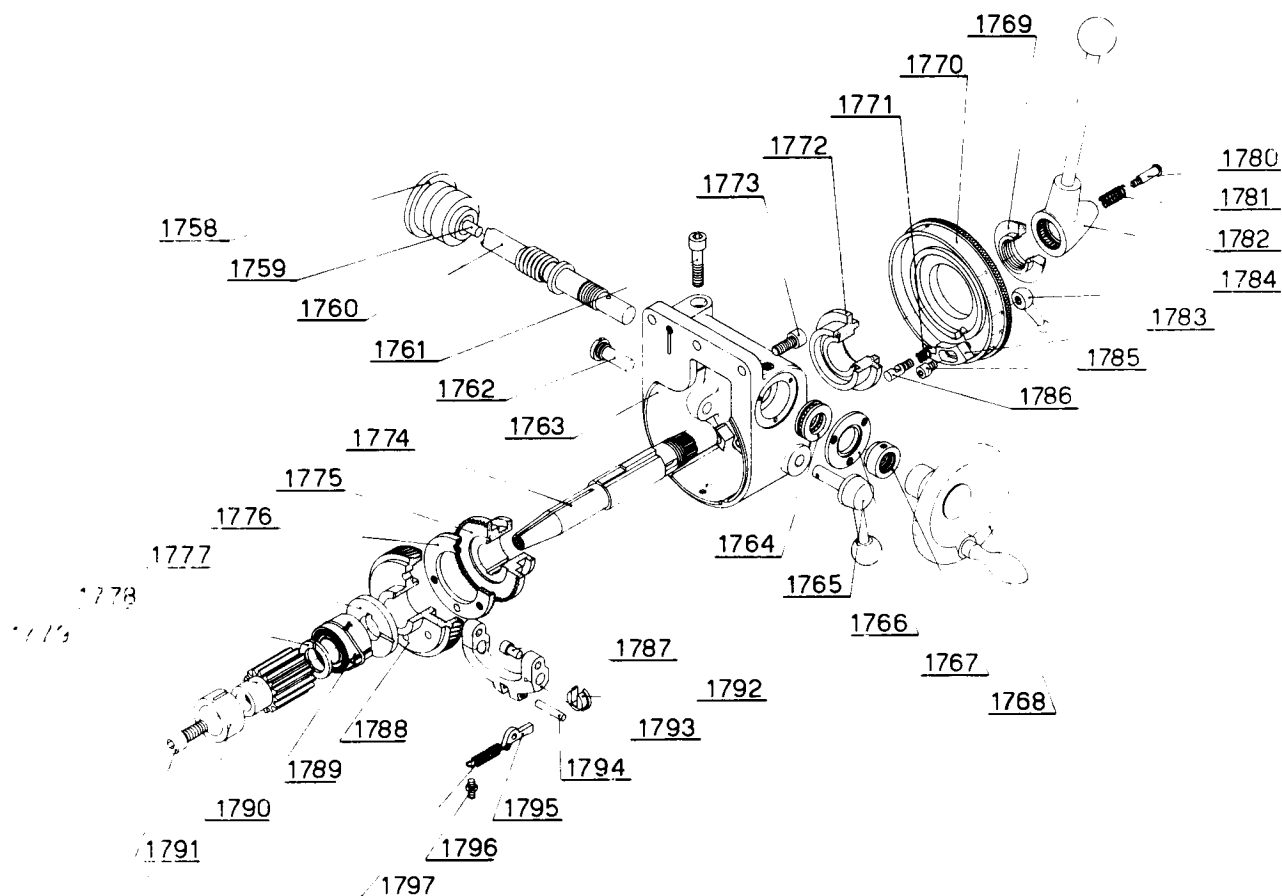
# TETE RAPIDE UNIVERSELLE



## PAR LEVIER

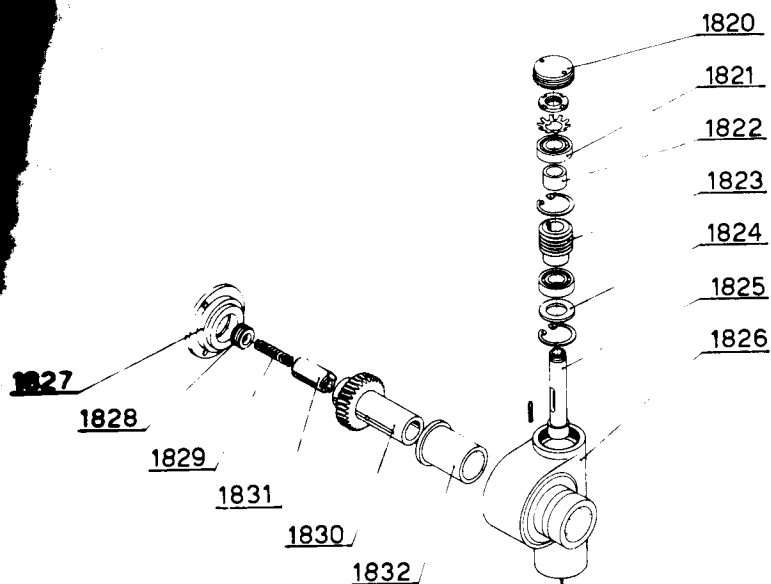


## PAR LEVIER ET VIS-SANS-FIN

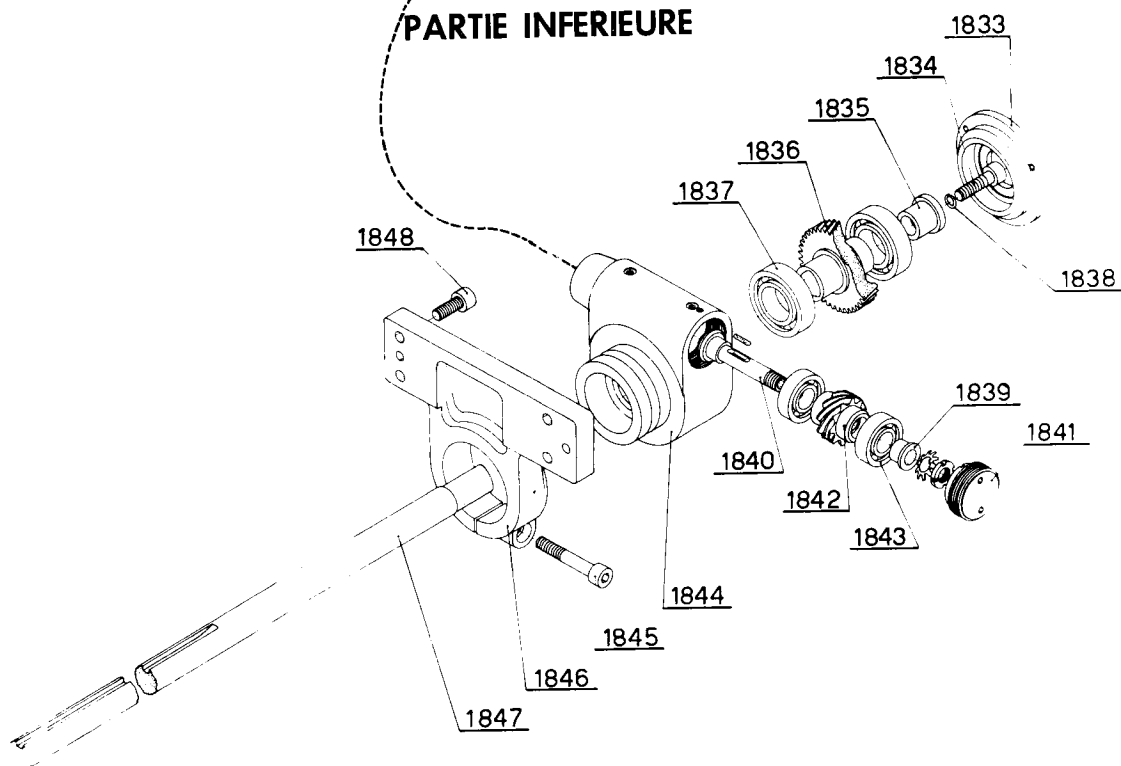


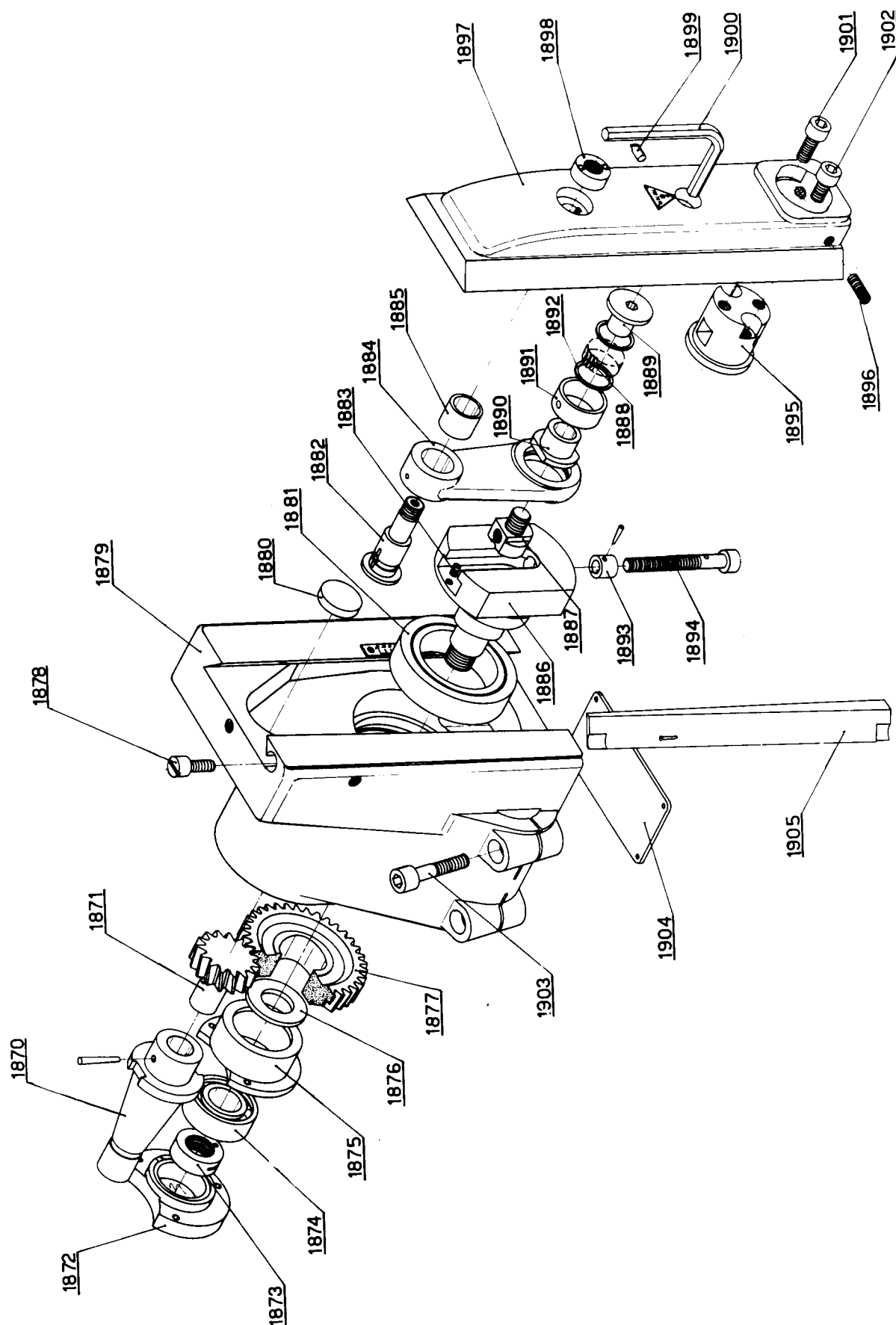
# DISPOSITIF DE COMMANDE AUTOMATIQUE POUR TETE RAPIDE

## PARTIE SUPERIEURE



## PARTIE INFERIEURE







# ETAU

