# I N S T R U C T I O N  B O O K

f o r

UNIVERSAL MILLING MACHINE TYPE F 1

Machine No.: 37.949
Operating Voltage - Motor: 420 V.
Operating Voltage - Lighting and Controls:

Driving Belt Dimensions: 10 x 410

Name of Client: Messrs. Adam Machine Equipment Ltd, Harpenden.

Date supplied: 8.6.1971

A C I E R A SA - Machine Tool Manufacturers
L E L O C L E - (Switzerland)

01-96-0014-01

Liste des appareils électriques

Elektrische Geräte Liste

List of electrical components

| FABRICANT / HERSTELLER / MAKER | | TYPE / TYP |
|---|---|---|
| b1-b2 | Weber, Emmenbrücke/Lucerne (CH) | ME 10/30 |
| b3 | Weber, Emmenbrücke/Lucerne (CH) | SE 10/40 |
| b4 | Feller AG, Horgen/Zürich (CH) | 7730/61 |
| b5 | Feller AG, Horgen/Zürich (CH) | 8714 BT 60 3P+T |
| | Tschudin et Heid, Reinach (CH) | Buser 1104V 3P+T |
| e1 | Weber, Emmenbrücke/Lucerne (CH) | 1720 E + KII + SII + DTII 4A |
| e2 | Weber, Emmenbrücke/Lucerne (CH) | 1720 E + KII + SII + DII 2A |
| e3 | Schürter, Lucerne (CH) | 704 M + 709 + Sp 2.5A |
| h1 | Rütti, Bienne (CH) | F1 culot B15 |
| | Osram, Zürich (CH) | B15 24V 25W Ø 45 |
| L1 | Woertz, Bâle (CH) | 4001 J + 4001 Jgg |
| m1 | Marelli, Milan (I) | PMU 100 A1 B2 |
| m2 | Golay-Buchel, Lausanne (CH) | MBV 2 1/3 CV |
| m3 | Sormani, Magliaso/Tessin (CH) | A 35 35 VA |

Caract. électriques

Elektrische Daten

Electrical Charact.

| MOTEURS / MOTOREN / MOTORS | | | | 220 V | 380 V | 500 V |
|---|---|---|---|---|---|---|
| m1 | Pompe / Pumpe / Pump | 2750 | T/min / U/min / RPM | 80W | 0.5A | 0.3A | 0.18A |
| m2 | Broche / Spindel / Spindle | 2860 | T/min / U/min / RPM | CV 1/3 PS HP | 0.94A | 0.55A | 0.40A |

INTERRUPTEURS-DISJONCTEURS / MOTORSCHALTER / MOTOR SWITCH

| | Réglable - Einstellbereich Adjustable | Réglé - Eingestellt Adjusted |
|---|---|---|
| b1 | Pompe - Pumpe - Pump | |
| | 220 V | 0.35-0.52A | 0.5A |
| | 380 V | 0.25-0.38A | 0.3A |
| | 500 V | 0.18-0.26A | 0.18A |
| b2 | Broche - Spindel - Spindle | |
| | 220 V | 0.70-1.05A | 0.94A |
| | 380 V | 0.50-0.75A | 0.55A |
| | 500 V | 0.35-0.52A | 0.40A |

ACIERA

01-96-0014-01

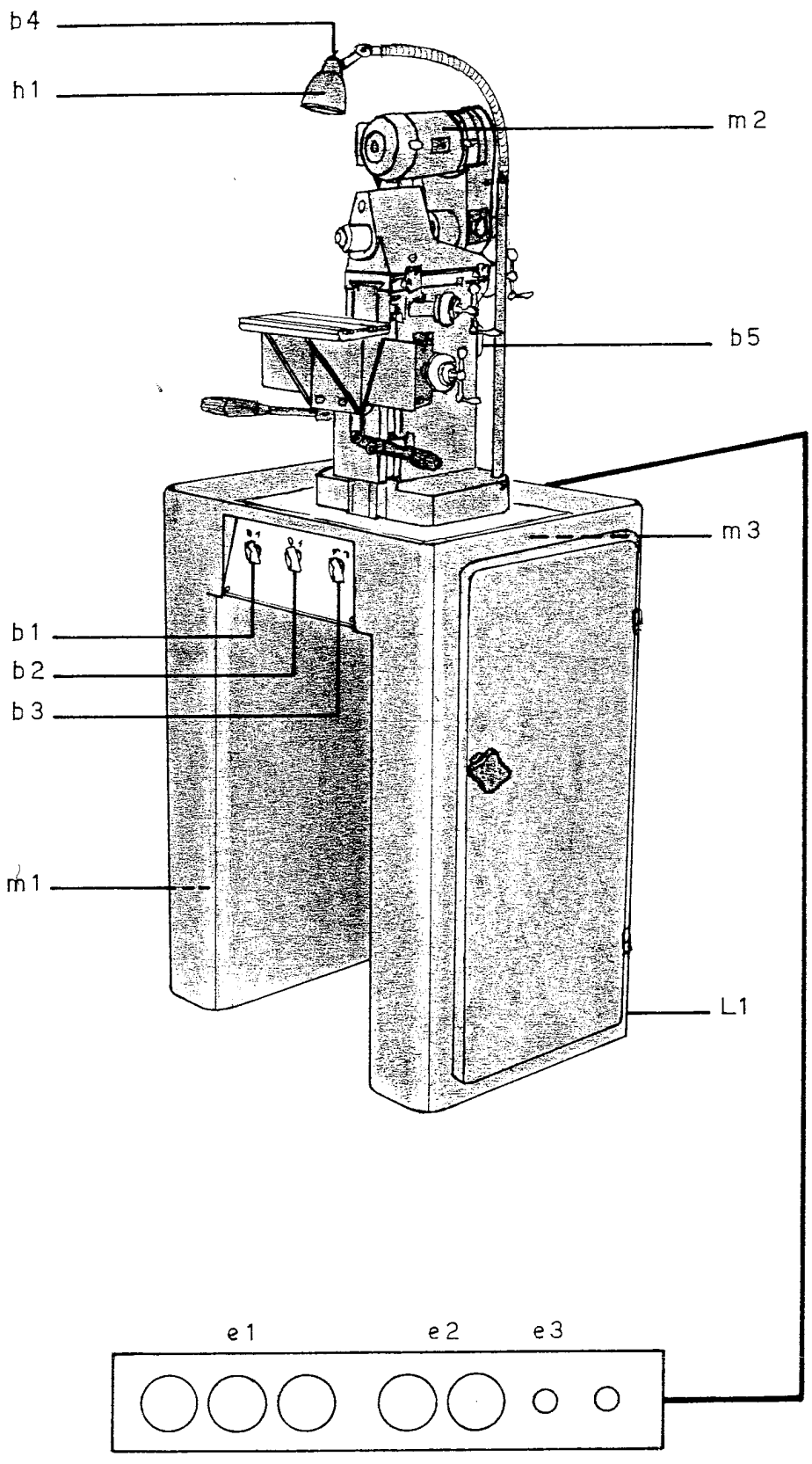
| | | | |
|---|---|---|---|
| b1-b2 | Interrupteurs disjoncteurs | b1 | Pompe d'arrosage m1 |
| | | b2 | Moteur broche m2 |
| b3 | Inverseur | | Moteur broche m2 |
| b4 | Interrupteur lumière | | Eclairage |
| b5 | Prise et fiche | | Moteur broche m2 |
| e1-e2 | Fusibles principaux | e1 | Entrée force |
| | | e2 | Entrée transformateur |
| e3 | Fusible du secondaire | | Circuit d'éclairage 24V |
| h1 | Lampe | | Eclairage |
| L1 | Groupe de bornes | | Entrée du courant |
| m1-m2 | Moteurs | m1 | Pompe d'arrosage |
| | | m2 | Moteur broche |
| m3 | Transformateur | | Eclairage |

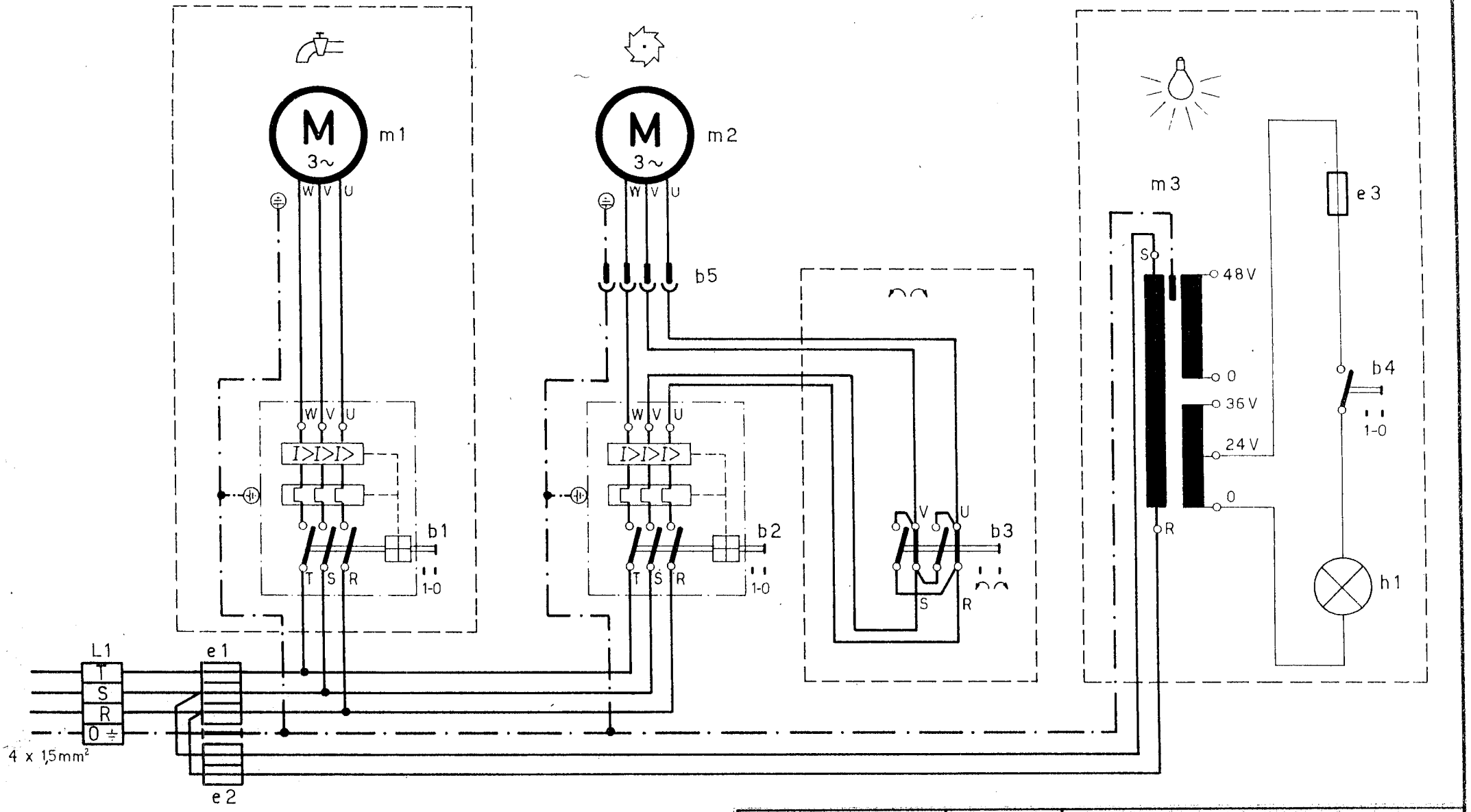
**********

| | | | |
|---|---|---|---|
| b1-b2 | Motorschalter | b1 | Kühlmittelpumpe m1 |
| | | b2 | Spindelmotor m2 |
| b3 | Drehrichtungschalter | | Spindelmotor m2 |
| b4 | Lichtschalter | | Beleuchtung |
| b5 | Steckdose und Stecker | | Spindelmotor m2 |
| e1-e2 | Hauptsicherungen | e1 | Starkstromeingang |
| | | e2 | Transformatoreingang |
| e3 | Sicherung für Steuerung | | Beleuchtung 24V |
| h1 | Lampe | | Beleuchtung |
| L1 | Klemmenleiste | | Stromeingang |
| m1-m2 | Motoren | m1 | Kühlmittelpumpe |
| | | m2 | Spindelmotor |
| m3 | Transformator | | Beleuchtung |

**********

| | | | |
|---|---|---|---|
| b1-b2 | Motor switches | b1 | Coolant pump motor m1 |
| | | b2 | Spindle motor m2 |
| b3 | Reversing switch | | Spindle motor m2 |
| b4 | Switch for light | | Lighting |
| b5 | Socket and plug | | Spindle motor m2 |
| e1-e2 | Main fuses | e1 | Input power |
| | | e2 | Input transformer |
| e3 | Fuse for control circuit | | Lighting circuit 24V |
| h1 | Lamp | | Lighting |
| L1 | Connection terminals | | Input main terminals |
| m1-m2 | Motors | m1 | Coolant pump motor |
| | | m2 | Spindle motor |
| m3 | Transformer | | Lighting |


b4
h1
m2
b5
m3
b1
b2
b3
m1
L1
e1
e2
e3




ACIERA

| | | |
|---|---|---|
| | KF 1 | FORCE ET LUMIERE |
| Dessiné | F. Hugonnard | 01-99-0014-01 |
| Date | 1 XI 68 | |

ACIERA

FABRIQUE DE MACHINES
LE LOCLE-SUISSE

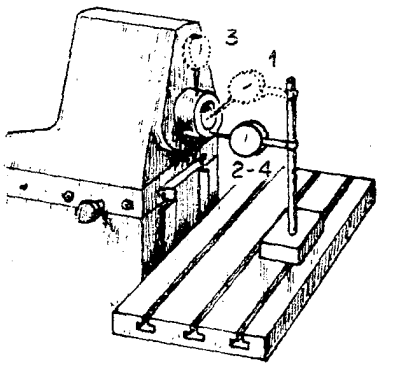
# TEST CHART FOR UNIVERSAL MILLING MACHINE

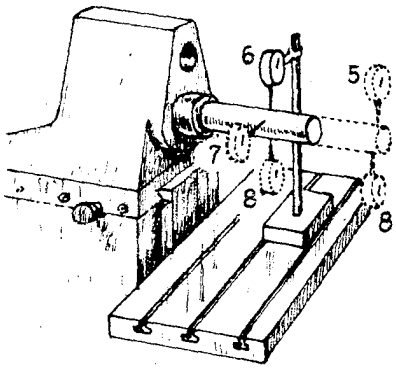
Machine Type : KF1 Order N° : AME 70618

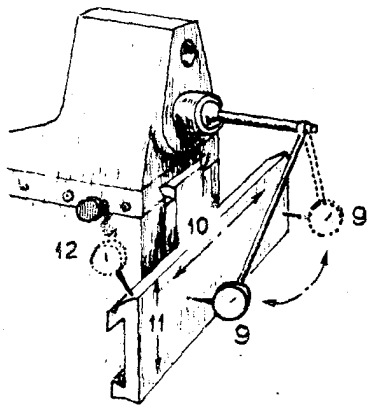
Machine N° : 37949

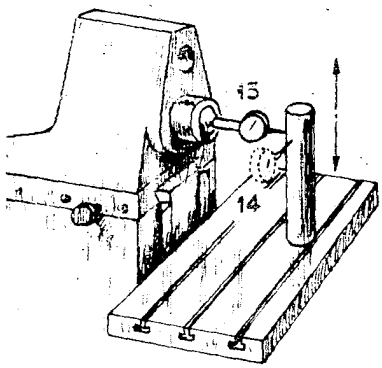
Customer : Messrs. Adam Machine Equipment Ltd, Harpenden.

| N° | Description of Measurament | Tolerance Permissible | Error Measured | Picture |
|---|---|---|---|---|
| | Quill spindle | | | |
| 1 | Eccentricity of internal taper | .0002<br>0,005 | 0,004 | |
| 2 | Axial play | .0002<br>0,005 | 0,005 | |
| 3 | Radial play | .0002<br>0,005 | 0,003 | |
| 4 | Spindle nose untrue | .0002<br>0,005 | 0,005 | |
| 5 | Eccentricity measured at the end of a mandrel 100 mm long | .0006<br>0,015 | 0,010 | |
| 6 | Spindle parallel to transverse movement over 75 mm measured on the mandrel | .0004<br>0,010 | 0,005 | |
| 7 | measured on the mandrel side | .0004<br>0,010 | 0,007 | |
| 8 | Spindle parallel to the table, measured under the mandrel x 75 mm (table high at front only) | .0004<br>0,010 | 0,006 | |
| 9 | Spindle square with the longitudinal slide, x 150 mm | .0004<br>0,010 | 0,007 | |
| | Longitudinal slide | | | |
| 10 | Front face parallel to the longitudinal slide, x 100 mm | .0002<br>0,005 | 0,004 | |
| 11 | Front face parallel to the vertical slide, x 85 mm | .0002<br>0,005 | 0,003 | |
| 12 | Top face parallel to the longitudinal slide, x 100 mm | .0002<br>0,005 | 0,004 | |
| | Vertical slide: square with the table: | | | |
| 13 | measured on the rear face of a cylinder, x 100 mm | .0004<br>0,010 | 0,005 | |
| 14 | measured on the side of a cylinder, x 100 mm | .0004<br>0,010 | 0,005 | |



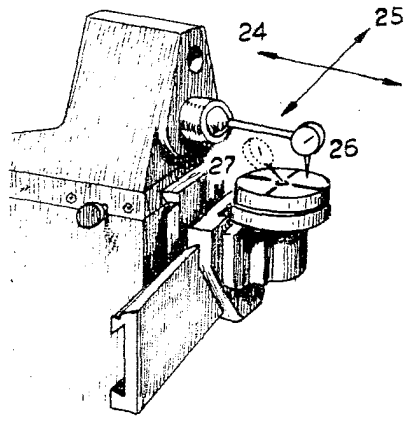



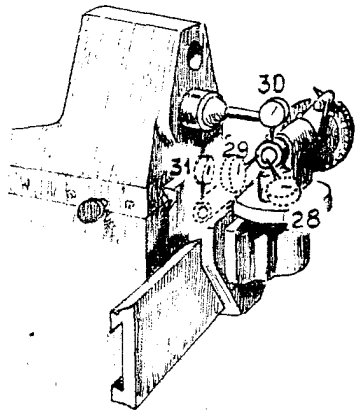



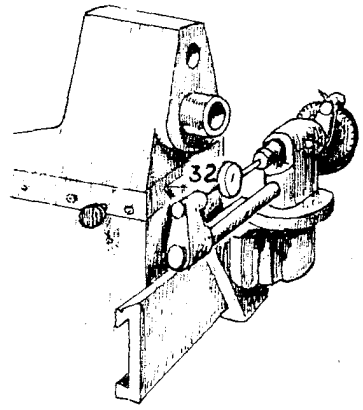



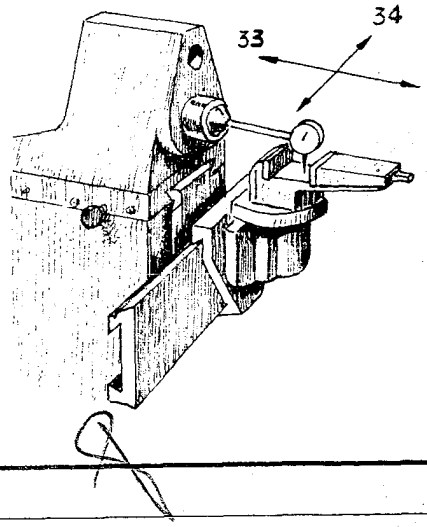
| N° | Description of Measurement | Tolerance Permissible | Error Measured | Picture |
|---|---|---|---|---|
| | Overhanging Arm Centre | | | |
| 15 | Bore concentric with cutter spindle, x 100 mm | .0008<br>0,020 | 0,010 | |
| | Work Table | | | |
| | plein * universal ** | | | |
| 16 | Parallel to transverse movement (table high at front), x 75 mm * | .0002<br>0,005 | 0,005 | |
| | ** | .0002<br>0,005 | - - - | |
| 17 | Parallel to longitudinal slide, x 100 mm * | .0004<br>0,010 | 0,005 | |
| | ** | .0004<br>0,010 | - - - | |
| 18 | Tee-slots parallel to longitudinal slide, x 100 mm * | .0004<br>0,010 | 0,006 | |
| | ** | .0004<br>0,010 | - - - | |
| 19 | Tee-slots square with cutter spindle, x 100 mm * | .0004<br>0,010 | 0,007 | |
| | ** | .0004<br>0,010 | - - - | |
| | Vertical support | | | |
| 20 | Bore square with the table A-A, x 100 mm | .0008<br>0,020 | - - - | |
| 21 | Bore square with the table B-B, x 100 mm | .0008<br>0,020 | - - - | |
| | Swivel Support | | | |
| | Bore parallel to the vertical slide: | | | |
| 22 | Measured behind the cylinder, x 100 mm | .0004<br>0,010 | 0,005 | |
| 23 | Measured on one side of the cylinder, x 100 mm | .0004<br>0,010 | 0,005 | |

| N° | Description of Measurement | Tolerance Permissible | Error Measured | Picture |
|---|---|---|---|---|
| | **Rotary Table** | | | |
| 24 | Parallel to transverse movement, x 75 mm | .0004<br>0,010 | 0,005 | |
| 25 | Parallel to longitudinal slide, x 100 mm | .0004<br>0,010 | 0,004 | |
| 26 | Flatness of platform | .0004<br>0,010 | 0,004 | |
| 27 | Eccentricity of bore | .0004<br>0,010 | 0,005 | |
| | **Dividing Head** | | | |
| 28 | Eccentricity of taper | .0002<br>0,005 | - - - | |
| 29 | Axial play | .0002<br>0,005 | - - - | |
| 30 | Radial play | .0002<br>0,005 | - - - | |
| 31 | Eccentricity, measured at the end of an arbor, 100 mm long | .0006<br>0,015 | - - - | |
| 32 | Eccentricity of tailstock centre in relation to dividing head spindle, x 100 mm | .0008<br>0,020 | - - - | |
| | **Vices** | | | |
| | Rotating * | | | |
| | Rotating and inclinable ** | | | |
| 33 | Support face, parallel to transverse movement * | .0004<br>0,010 | - - - | |
| | ** | .0004<br>0,010 | - - - | |
| 34 | Support face, parallel to longitudinal movement * | .0004<br>0,010 | - - - | |
| | ** | .0004<br>0,010 | - - - | |




LE LOCLE 8.6.1971

Inspector

## Characteristics of the Machine

| | |
|---|---|
| Longitudinal travel of the table | 100 mm ( 3,94") |
| Vertical travel of the table | 150 mm ( 5.90") |
| Transverse movement of the headstock | 75 mm ( 2.95") |
| Graduated feedscrew drums, 1 division | 0.01 mm (.0005") |
| Movement of quill in its housing | 50 mm ( 1.97") |
| Pitch of feedscrews (mm or threads per inch) | |
| longitudinal and transversal | 2 mm (10 TPI) |
| vertical | 3 mm (10 TPI) |
| Headstock movement, 1 turn of cranked handle | 2 mm (0.01 ) |
| Longitudinal movement, 1 turn of cranked handle | 2 mm (0.01 ) |
| Vertical movement, 1 turn of cranked handle | 2 mm (0.050") |

## Cutter Spindle

| | |
|---|---|
| Cutter spindle clamping collet, dia. of shank | 12 mm ( 0.47") |
| Collet clamping range, bore dia. 0 - 10 mm | (1/16" to 3/8") |
| Range of spindle speeds | 125 - 250 - 500 RPM<br>1000 - 2000 - 4000 RPM |
| Maximum cutter diameter (with overhanging steady) | 58 mm ( 2.28") |

## Electrical Equipement

| | |
|---|---|
| Motor power | 0.33 HP |
| Motor speed | 2800RPM |

## Dimensions and Weights

| | |
|---|---|
| Machine without cabinet base: | |
| Height | 570 mm ( 22.4") |
| Area of bench required (width x depth) | 600 x 575 mm (24" x 22.5") |
| Net weight of machine less accessories | 55 Kg (121 lbs) |
| Machine with cabinet base: | |
| Height | 1350 mm |
| Area of floor required (width x depth) | 1296 x 575 mm (51" x 22.5") |
| Net weight of machine less accessories | 105 Kg (231 lbs) |

## No. 101 Plain Table

| | |
|---|---|
| Clamping surface | 100 x 220 mm (4" x 8.5") |
| 3 Tee-slots | 8 mm ( 0.315") |
| Distance between Tee-slots | 35 mm ( 1.38") |
| Distance between the table and horizontal cutter spindle axis | |
| minimum | 10 mm ( 0.394") |
| maximum | 160 mm ( 6.30") |
| Distance between the table and vertical cutter spindle nose | |
| minimum | 10 mm ( 0.394") |
| maximum | 175 mm ( 6.89") |
| Distance between the vertical cutter spindle axis and centre Tee-slot | |
| forwards | 35 mm ( 1.38") |
| backwards | 40 mm ( 1.58") |
| Displacement of the table on horizontal slide | 150 mm ( 5.91") |

## No. 102 Universal Table

| | |
|---|---|
| Clamping surface | 100 x 220 mm (4" x 8.5") |
| 2 Tee-slots | 8 mm ( 0.315") |
| Distance between Tee-slots | 50 mm ( 1.97") |
| Distance between the table and horizontal cutter spindle axis | |
| minimum | 0 mm |
| maximum | 115 mm ( 4.53") |
| Distance between the table and vertical cutter spindle nose | |
| minimum | 0 mm |
| maximum | 130 mm ( 5.12") |
| Distance between the vertical cutter spindle axis and rear Tee-slot | |
| forwards | 53 mm ( 2.09") |
| backwards | 22 mm ( 0.87") |
| Displacement of the table on horizontal slide | 160 mm ( 6.30") |
| Tilting to left or right | $20^{\circ}$ - 0 - $25^{\circ}$ |
| Tilting backwards or forwards | $30^{\circ}$ - 0 - $30^{\circ}$ |
| Swivelling (when in centre of machine column) | $20^{\circ}$ - 0 - $20^{\circ}$ |

## No. 103 Rotary Table

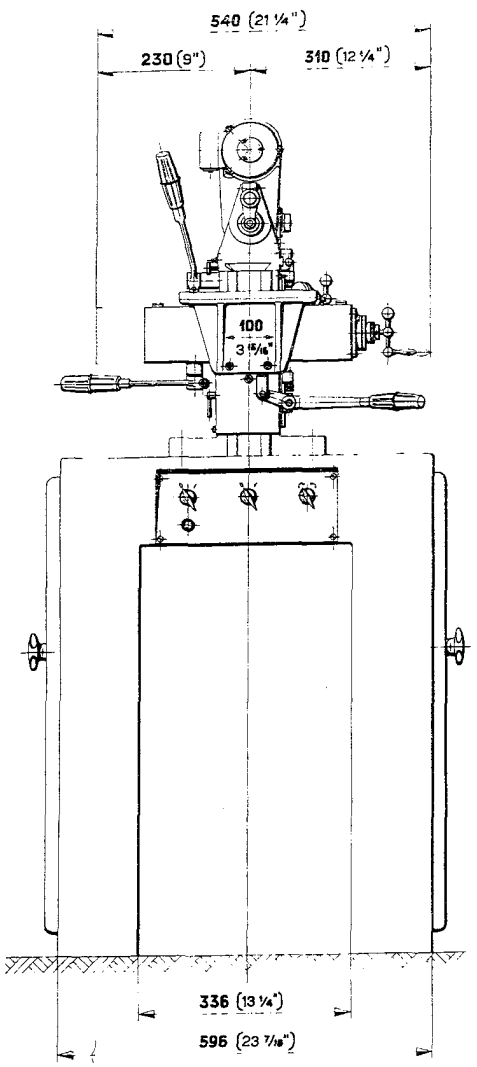
| | |
|---|---|
| Diameter | 120 mm ( 4.72") |
| 4 Tee-slots - at $90^{\circ}$ to each other | 8 mm ( 0.315") |
| Graduation | $360^{\circ}$ |
| Tilting each way | $20^{\circ}$ - 0 - $20^{\circ}$ |
| Rotates with stops | $180^{\circ}$ |
| Central bore diameter | 5 H6 mm |

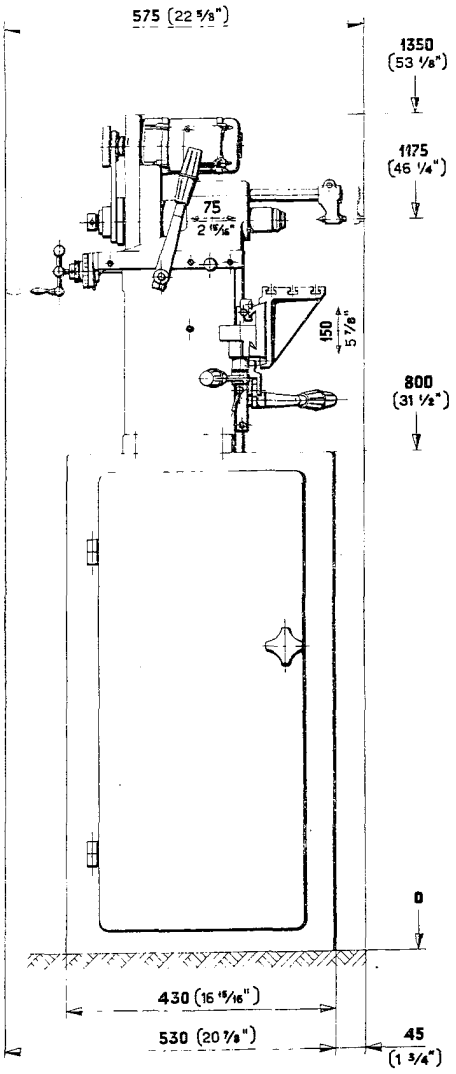
| | | |
|---|---|---|
| Housing bore diameter | 35 mm ( 1.38") | No. 104 Swivel Support |
| Swivels to left and right | 45° - 0 - 100° | |
| Distance between the support face and the horizontal cutter spindle axis | | |
| minimum | 17 mm ( 0.67") | |
| maximum | 167 mm ( 6.58") | |
| Distance between the support face and the vertical cutter spindle nose | | |
| minimum | 32 mm ( 1.26") | |
| maximum | 182 mm ( 7.17") | |
| Distance between the housing bore axis and the vertical cutter spindle axis | | |
| forwards | 28 mm ( 1.10") | |
| backwards | 47 mm ( 1.85") | |
| Displacement of the support on the horizontal | 160 mm ( 6.30") | |
| Housing bore diameter | 40 mm ( 1.58") | No. 111 Vertical Support No. 121 Swivel Vice |
| Swivels to left and right | 45° - 0 - 45° | |
| Jaws open | 55 mm ( 2.17") | |
| Breadth of jaws | 60 mm ( 2.36") | |
| Height of jaws | 15.5 mm ( 0.61") | |
| Swivels to left and right | 45° - 0 - 100° | |
| Rotates through | 180° | |
| Total height (measured from support face) | 46 mm ( 1.81") | |
| Jaws open | 55 mm ( 2.17") | No. 122 Compound Vice |
| Breadth of jaws | 60 mm ( 2.36") | |
| Height of jaws | 15.5 mm ( 0.61") | |
| Swivels to left and right | 45° - 0 - 100° | |
| Rotates through | 180° | |
| Tilts through | 90° | |
| Total height (measured from support face) | 84 mm ( 3.31") | |
| Housing bore diameter | 35 mm ( 1.38") | No. 123 Simple Dividing Head with Swivel Body |
| Maximum workpiece diameter with tailstock | 58 mm ( 2.28") | |
| Swivels to left and right | 45° - 0 - 100° | |
| Rotates through | 180° | |
| Quill nose thread - diameter | 22.6 mm ( 0.88") | |
| thread pitch | 2 mm (0.079") | |
| Spindle bore and collet shank diameter | 12 mm ( 0.47") | |
| Diameter of dividing plate | 90 mm ( 3.54") | |
| Number of divisions (normal) | 60 | |
| Maximum distance between quill nose and tailstock centre | 100 mm (3.94") | |

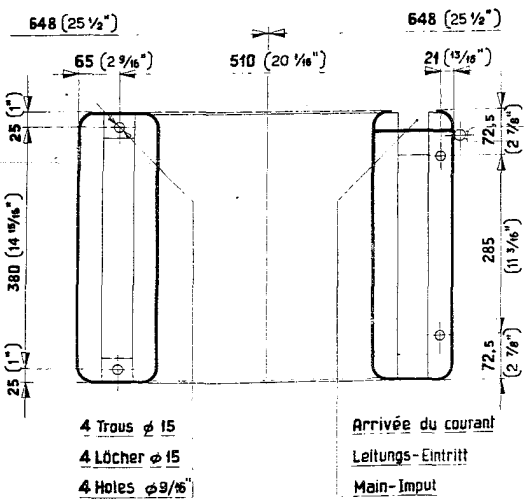
Encombrement

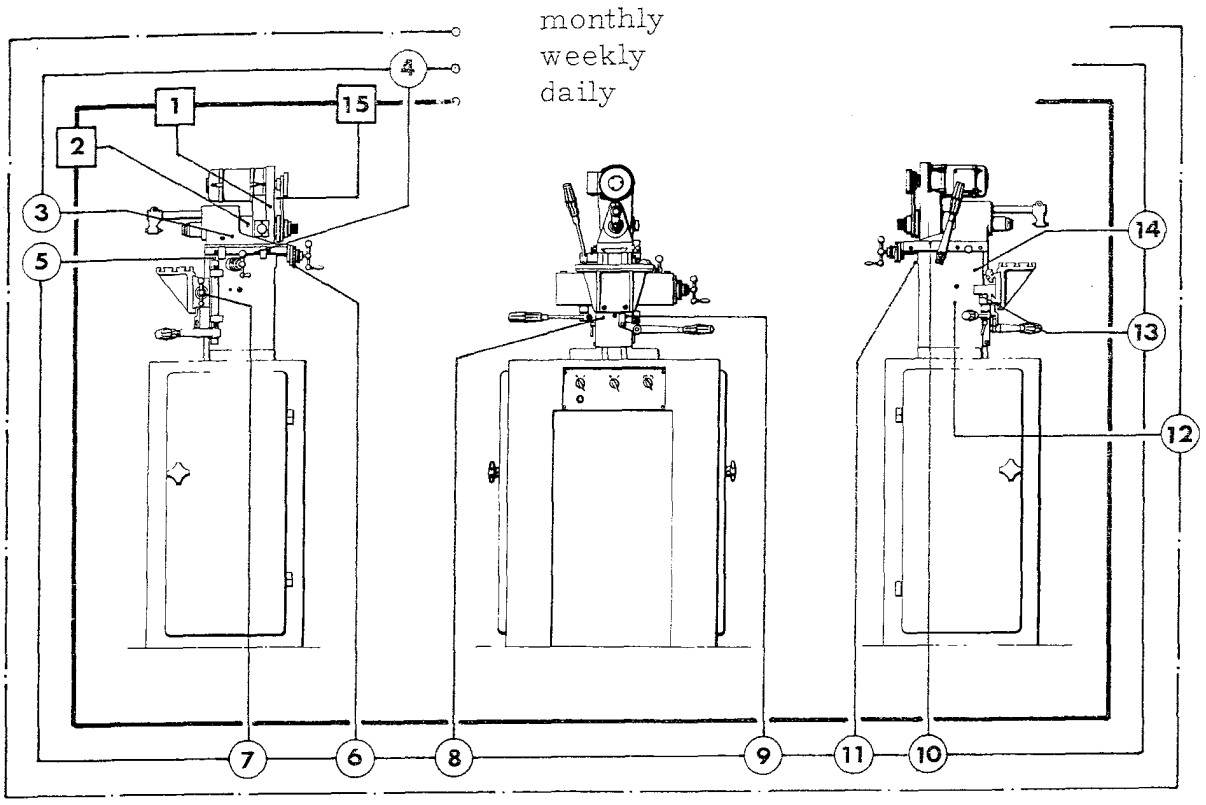
Platzbedarf

Overall-dimensions






| D E S I G N A T I O N S | | |
|---|---|---|
| ORGANS | QUALITY | SYMBOL |
| General lubrication | Shell Vitrea Oil 33 | ○ |
| Milling Spindle | Shell Tellus 11 | □ |

| I N S T R U C T I O N S | | |
|---|---|---|
| FREQUENCY | No. | QUANTITY |
| Daily | 1 - 2 - 15 | 2 pump pushes |
| Weekly | 4 - 6 - 7<br>3 - 5 - 8 - 9<br>10 - 11 - 13 - 14 | 1-2 pump pushes<br>2-3 pump pushes |
| monthly | 12 | 1-2 pump pushes |

ACIERA

Unpacking

It is best that the machine be moved to its site, by means of rollers slide underneath the base of the packing case. Remove the top and sides of the case. Take all necessary precautions to prevent damage to the machined parts and paintwork.

Erection

The bolts attaching the machine to the wooden base are accessible through the doors in the cabinet base.

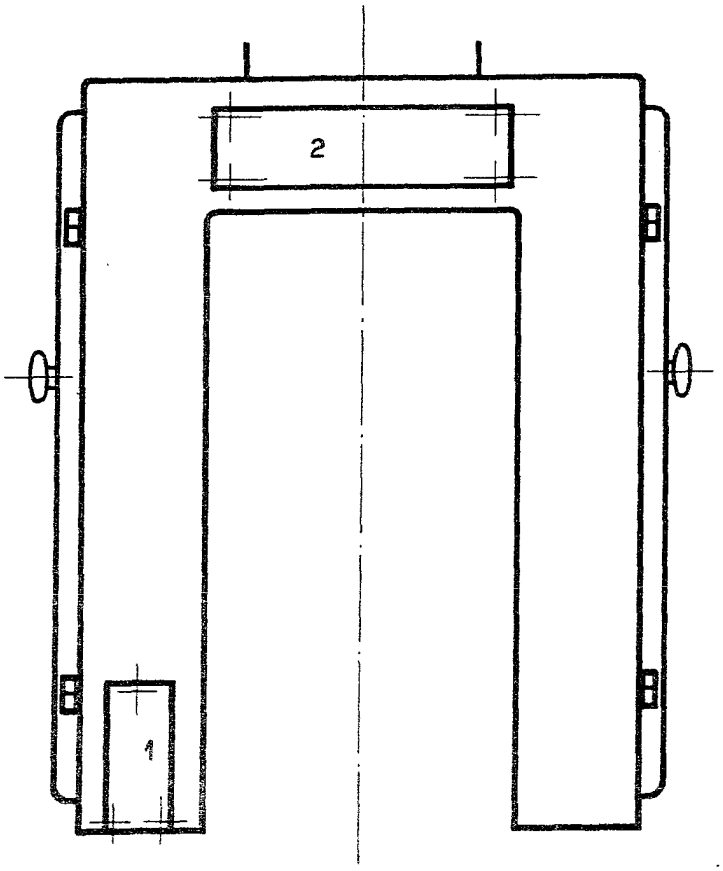
It is not absolutely necessary to bolt the machine to the floor, but it should at least be level.

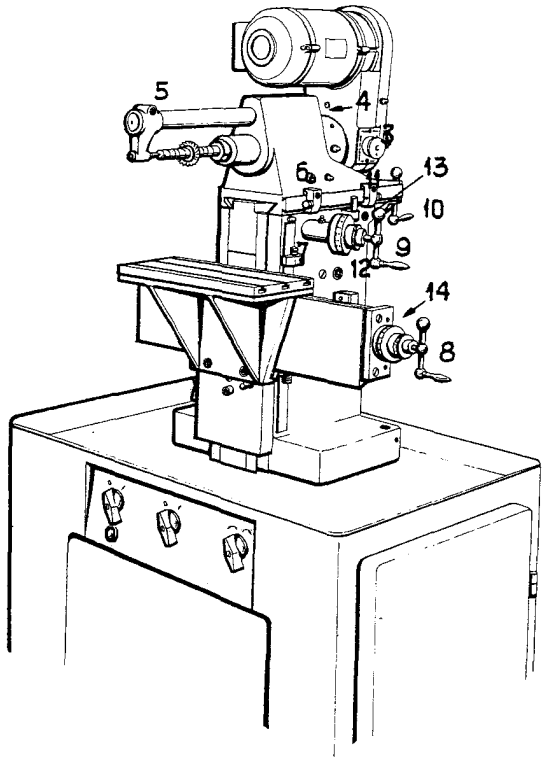
Cleaning

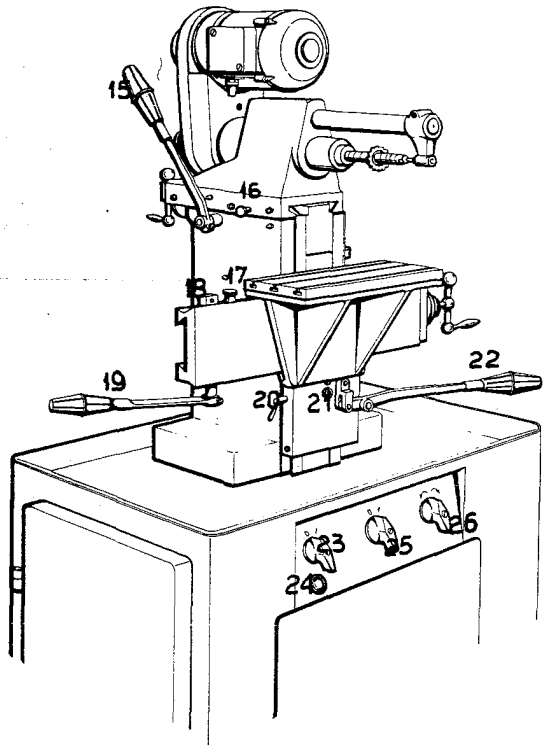
All the machined parts have been given a coat of rust preventative grease for protection during transport. This should be removed completely with a rag soaked in paraffin (kerosene).

Electrical Connections

Connection to the mains supply is by means of terminals located in the compartment (1) of the cabinet base. The fuses are located in the compartment (2). Insert the motor cable plug in the socket behind the machine body. Check the direction of rotation of the cutter spindle. When viewed from the front this should rotate anti-clockwise, if the machine has no reversing switch. If the machine has a reversing switch, the spindle should rotate as indicated on the control panel.






3) Knob to engage or disengage reduction gear drive.
4) Screw to lock overhanging steady arm.
5) Screw to clamp steady centre.
6) Screw to clamp the quill.
7) Adjustable stops for the vertical slide.
8) Cranked handle for longitudinal table traverse.
9) Cranked handle for vertical table traverse.
10) Cranked handle for transverse headstock traverse.
11) Adjustable stops for transverse headstock slide.
12) Shaft for adjustment of vertical slide compensating spring.
13) Screw for clamping transverse movement feedscrew nut.
14) Screw for clamping longitudinal movement feedscrew nut (situated behind the vertical slide).
15) Lever for cross traverse.
16) Transverse movement locking screw.
17) Longitudinal movement locking screw.
18) Adjustable stops for longitudinal slide.
19) Lever for longitudinal traverse.
20) Vertical movement locking screw.
21) Screw for clamping vertical movement feedscrew nut.
22) Lever for vertical traverse.
23) Coolant pump switch.
24) Coolant pump indicator light.
25) ON/OFF Switch for machine.
26) Switch for reversal of motor rotation.

Traverse of the slides by lever

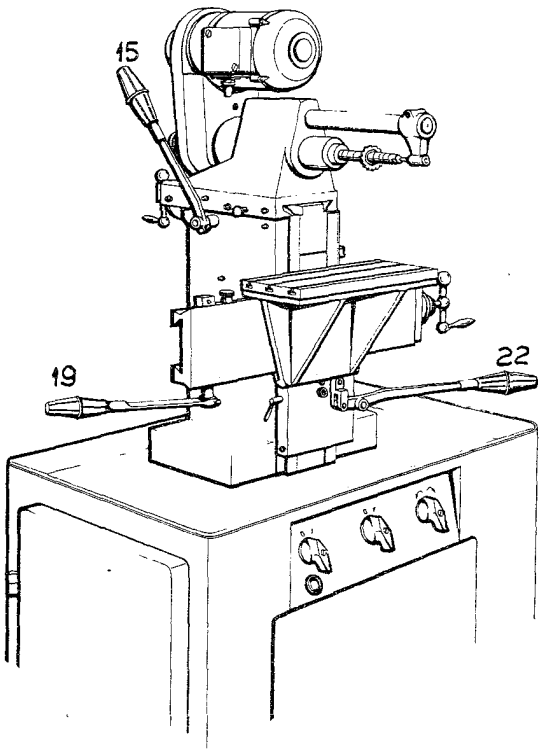
In addition to the feedscrews, each slide is provided with adjustable levers (15 - 19 - 22) for the purpose of rapid traverse. To operate the slides by means of the levers, it is necessary to slacken off the screws (13 - 14 - 21, page DE/1) which retain the bronze feedscrew nuts in their housings. Loosen these screws (13 - 14 - 21) with the slides in the following positions:

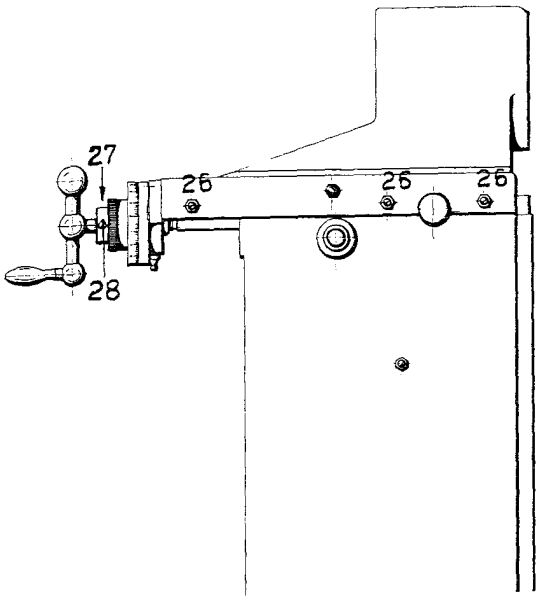
| | |
|---|---|
| Transverse slide: | Fully forward |
| Horizontal slide: | Fully to the left |
| Vertical slide: | Fully lowered |

The bronze nuts should never be used as stops. For this purpose special stops (7 - 11 - 18, page DE/1) have been provided on each slide to limit the travel.

The levers can be repositioned by loosening the socket-screws which secure them on their shafts. The vertical slide lever is repositioned by shifting the support on the dove-tail slide.

When the levers are not being used, it is recommended that they should be removed. With regard to the vertical slide, the support on the dove-tail slide should be lifted off.





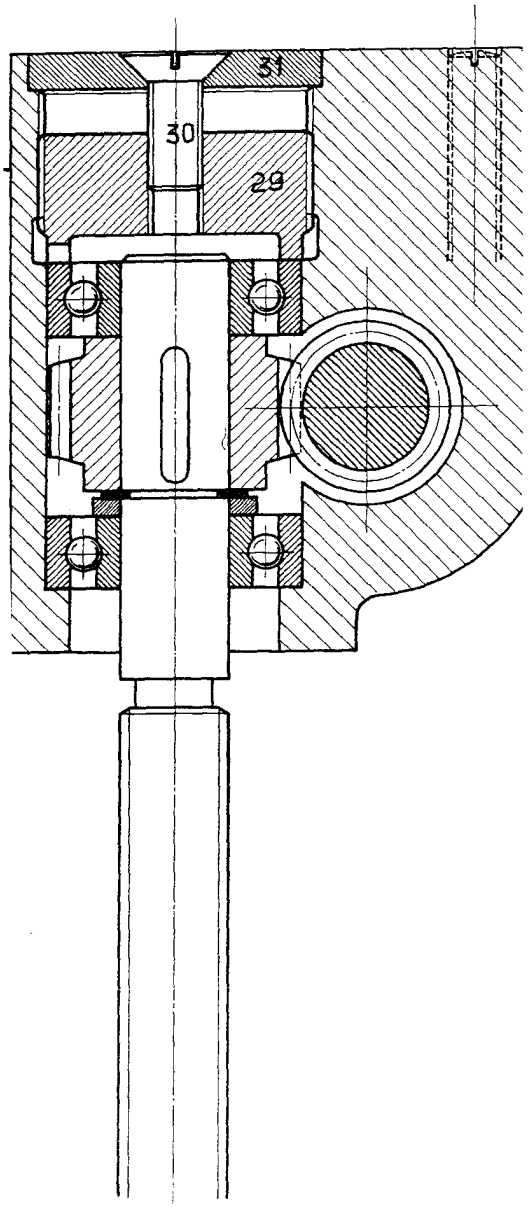

Play in the slides can be taken up by means of the thrust-screws (26) which bear on the tapered gibstrips. These screws are provided with lock nuts.

Play in the Slides

Adjustment of axial play in the headstock feed-screw bearing plate is effected by means of the nut (27). The grub-screw (28) ensures that this nut is firmly held onto the feed-screw. Adjustment of the vertical and longitudinal slide feed-screws is carried out in exactly the same way.

Axial play in the Feed-screws

These adjustments do not take up the play caused by wear in the bronze nuts.

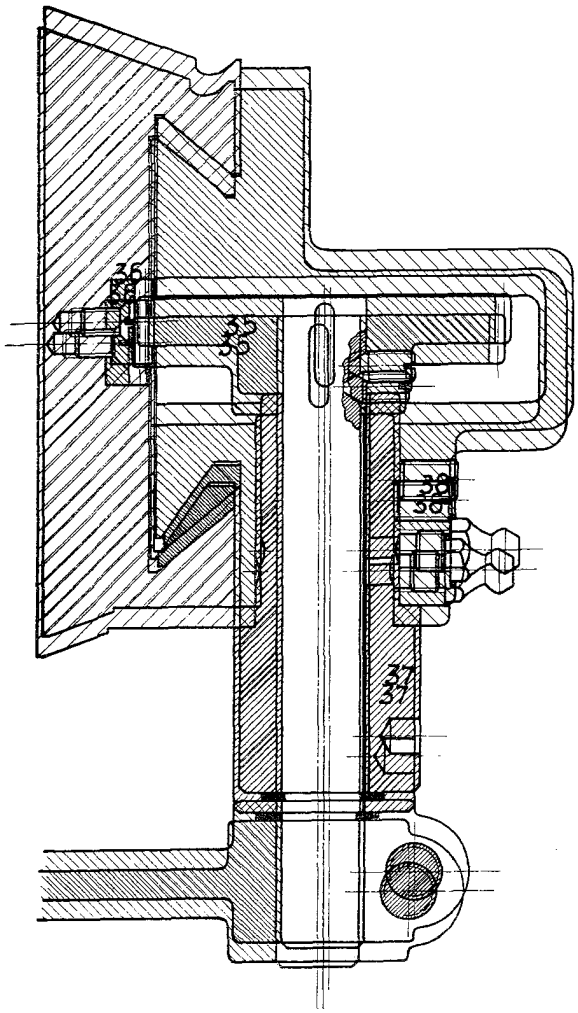



With regard to the vertical feed-screw, after having adjusted the nut (27), the axial play in the feed-screw can be taken up by the nut (29). This can be reached having first removed the screw (30) and the washer (31).

Vertical Feed-screw

It is recommended not to put too much strain on the bearings.

After adjustment, replace the washer (31) and the screw (30). The latter serves to lock the nut (29).




## Adjustment of the Lever Feed Mechanism

Any play between the pinion (35) and the rack (36), can be taken up by turning the eccentric sleeve (37). This sleeve is secured by means of the screw (38).

The same system applies to the transverse (headstock) slide. The clamping screw (38) is located at the rear of the machine column.

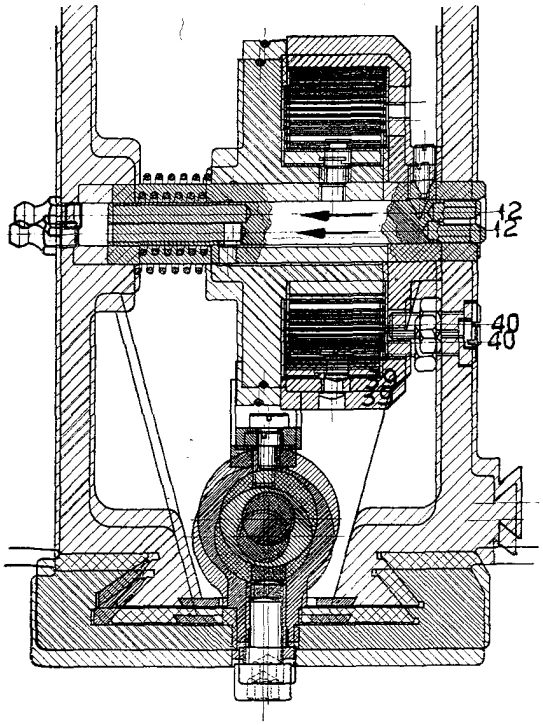
The eccentricity of the sleeve (37) enables one to swing the pinion (35) out of the rack (36), when dismantling either the longitudinal or transverse slides.

## Vertical Slide Weight Compensating Spring

The weight of the vertical slide is compensated for by a spiral spring, mounted inside the machine column.

The tension of this spring is adjustable.

To effect this adjustment, insert the Allen Key in the socket of the shaft (12). Push inwards as shown by the arrow, holding the key firmly to avoid a rapid unwinding of the spring when the housing (39) is freed from the retaining screw (40). Turn the key in the required direction and when the spring tension is correct, release the axial pressure so that the screw (40) engages another hole in the housing (39).



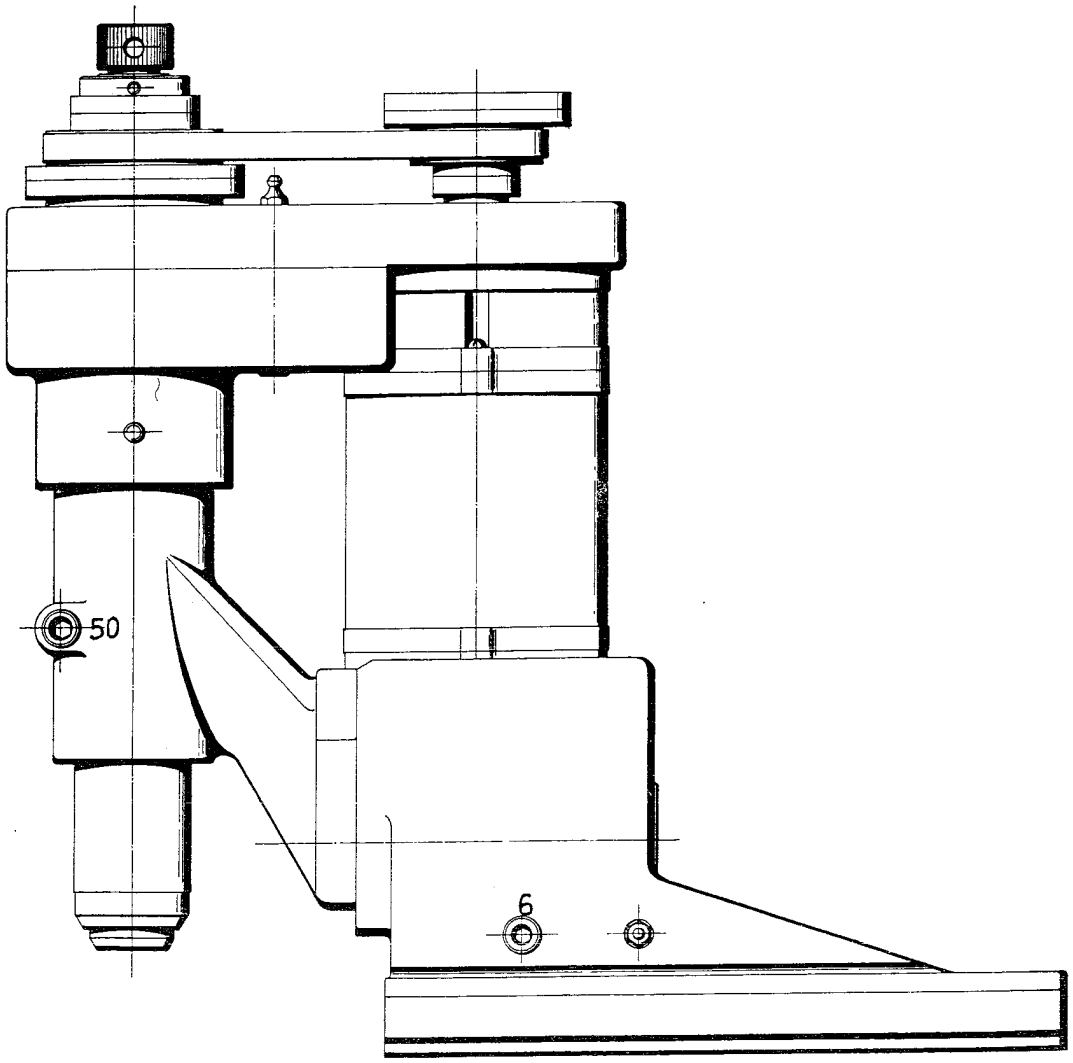

NOTE: This adjustment should be carried out when the vertical slide is in the lowest position. This will avoid undue tension on the spring.

To dismantle the compensating spring assembly, the machine must be lifted off its stand. The attaching bolts are underneath.

The quill with its motor, forms an independent unit, which can be mounted horizontally directly in the bore of the headstock, or vertically in the support No. 111 designed for this purpose.

To change from the horizontal to the vertical position, one proceeds as follows:

1) Remove the electric plug from behind the column.
2) Rotate the transverse slide cranked handle into a horizontal position.
3) Loosen the screw (6).
4) Withdraw the quill.
5) Install the support (111).
6) Tighten the screw (6).
7) Place the quill in the bore of the support.
8) Tighten the screw (50) after having placed the quill at the required height.
9) Replace the electric plug in the socket behind the column.



List of Bearings and Sealing Rings

## Quill

| | | |
|---|---|---|
| 1 Sealing Ring | F 1 - 4264 | |
| 1 Needle Bearing | INA | 26 x 30 x 13 mm |
| 2 Ball Bearings | 6004 | 20 x 42 x 12 mm |
| 2 Ball Bearings | 16005 | 25 x 47 x 8 mm |

## Vertical feedscrew

| | | |
|---|---|---|
| 2 Ball Bearings | 6001 | 12 x 28 x 8 mm |

## Quill

### Radial play

Radial play in the spindle (41) is adjusted by means of the nut (42). To reach this nut, proceed as follows:

1) Remove the belt, motor pulley and the motor.
2) Remove the screws holding the plate (43) and lift out the whole sliding-gear assembly.
3) Remove the 4 fixing screws from the rear part of the gear-case (44).
4) Gently lift off the rear part and also the sliding gear (45). One is then able to remove the nut (46), having first loosened its locking screw.
5) Carefully withdraw the spindle (41).
6) As the needle bearing is mounted on a tapered ring, one screws up the nut (42) to make the necessary adjustment.

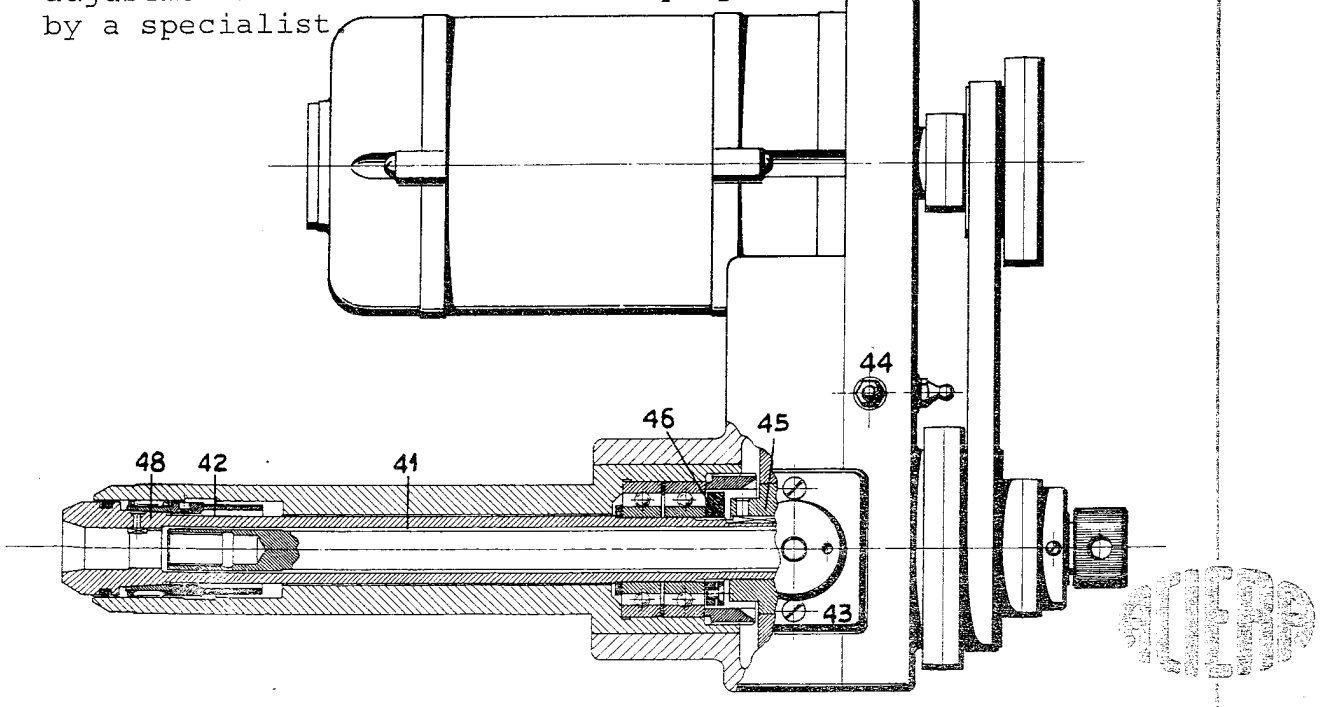
NOTE: A maximum play of 0.02 mm (.0008") can be taken up in this way. If the play still proves to be too great, it will be necessary to change the bearing and the tapered ring (48). The latter is ground on the spindle.

### Axial play

Axial play in the spindle (41) is adjusted by means of the nut (46). To reach this nut, proceed as follows:

1) Remove the belt, motor pulley and the motor.
2) Remove the screws holding the plate (43) and lift out the whole sliding gear assembly.
3) Remove the 4 fixing screws from the rear part of the gear-case (44).
4) Gently lift off the rear part and also the sliding gear (45).
5) One is then able to reach the nut (46) and make the necessary adjustment, having first loosened its locking screw.

NOTE: The quill should not be clamped at the nose end. The adjustments of radial and axial play should only be carried by a specialist.



Simple dividing head

The quill of the dividing head can be mounted directly on its support (lock screw 52), or on the swivel support No. 104.

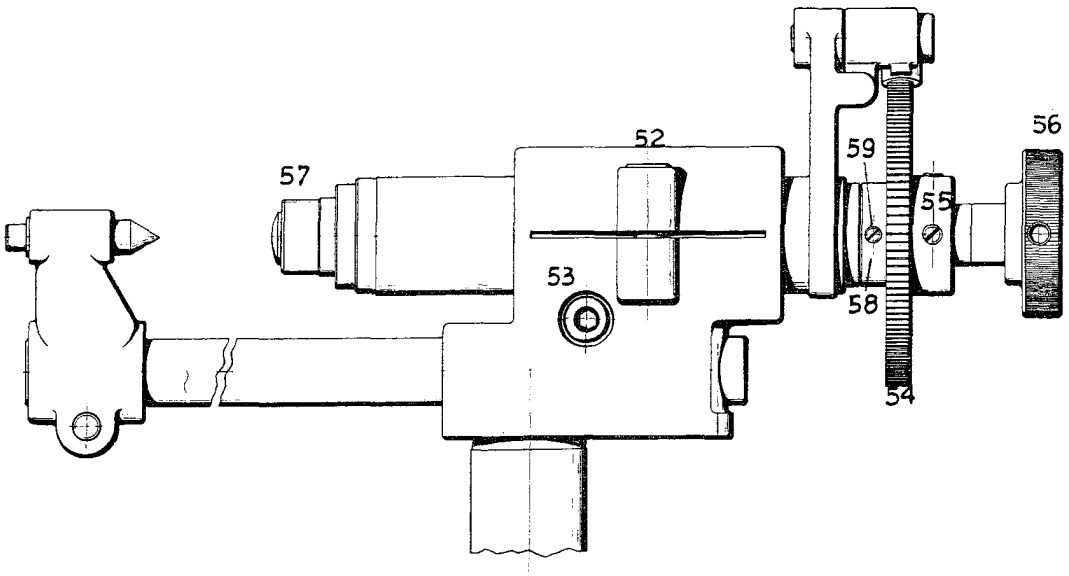
Screw (53) blocks the arm of the tail centre.

The direct divisions are to be executed with the disc with notches (54). To change this disc, unscrew screw (55) and take it off, after having taken away the drawbar (56).

The nose (57) of the dividing head is provided with a thread dia. 22.6 x 2, which allows to adapt a chuck No. 148 or a plate No. 149.

Axial and radial play

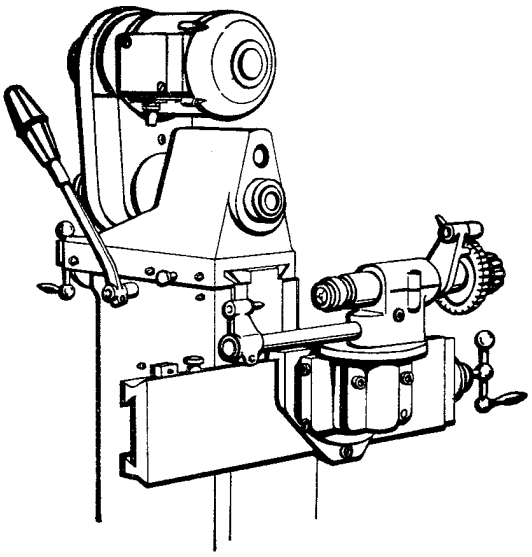
To take up the axial and radial play of the spindle, unscrew screw (59) and adjust nut (58).

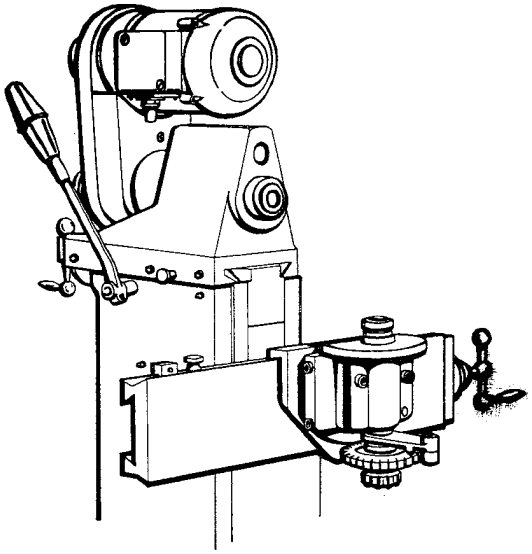


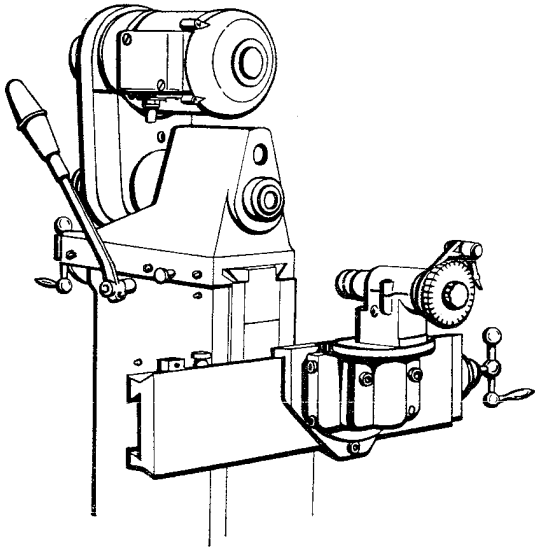
Exemple de montage

Montage-beispiel

Example of assembly







ACIERA

## Universal Dividing Attachment

The Universal Dividing Attachment is an accessory which mounts on the simple dividing head.

## Installation

Installation is as follows:

1) Remove the draw-bar (56)
2) Loosen the screws (55) and remove the index plate (54).
3) Take the universal dividing attachment and place the worm-wheel (60) on the shaft (57).
4) Hold up the lever (61) and push the attachment until the worm-wheel (60) butts against the nut (58) and the finger (62) engages in the notch (63).
5) Clamp the nut (64).
6) Tighten the screw (65).
7) Replace the draw-bar (56).

The position of the attachment can be adjusted by tightening or loosening the screw (52).

## Divisions

The rotation of the workpiece is via the worm (66) and the worm-wheel (60). Any play between them can be taken up by turning the sleeve (67) having first slackened off the screw (68).

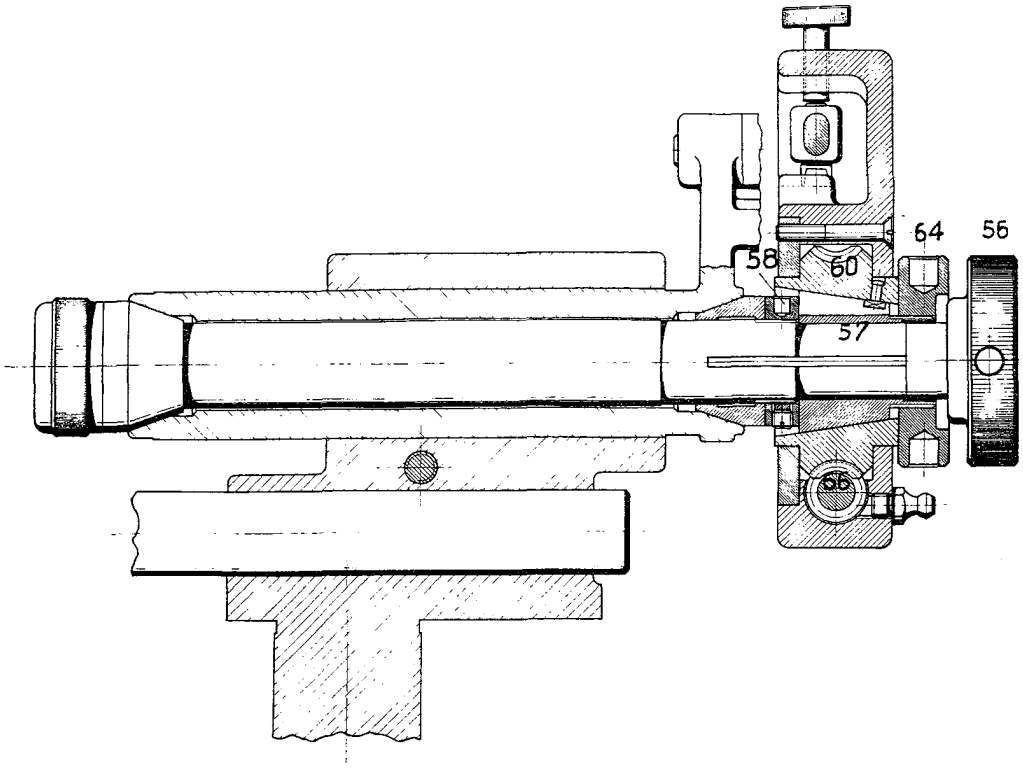
The ratio is 1 : 40 , that is to say 40 turns of the handle corresponds to 1 rotation of the workpiece.

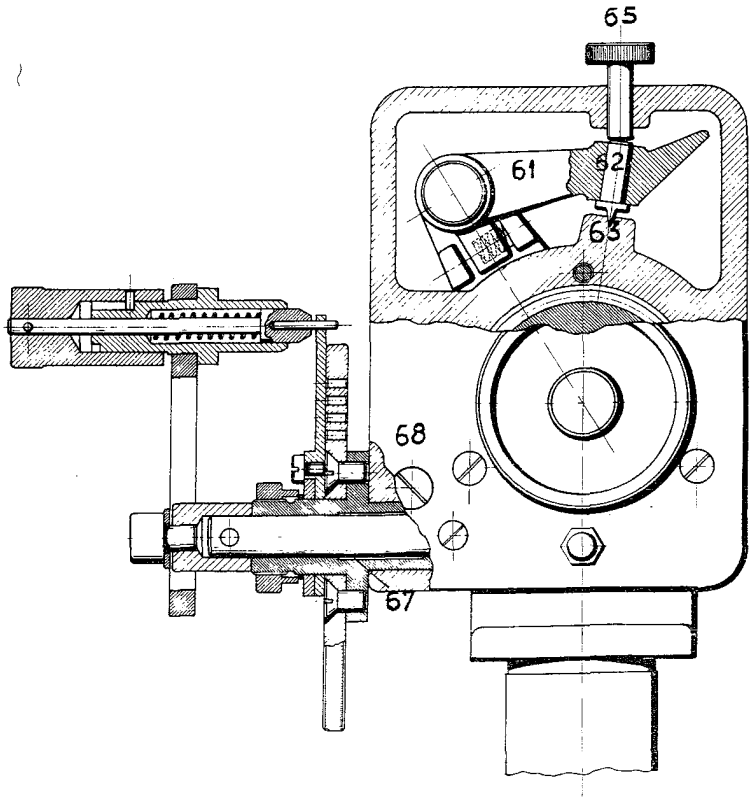
From 0 to 50 all divisions can be made, with the exception of 47 and 49. In addition the majority of divisions between 50 and 360 can be obtained. The dividing table shows exactly all the divisions obtainable. The No. 3 Indexing Plate is provided with divisions in degrees. One turn of the handle corresponds to a rotation of the workpiece through $9^{o}$

Poupée diviseur universelle

Universal-Teilapparat

Universal dividing head

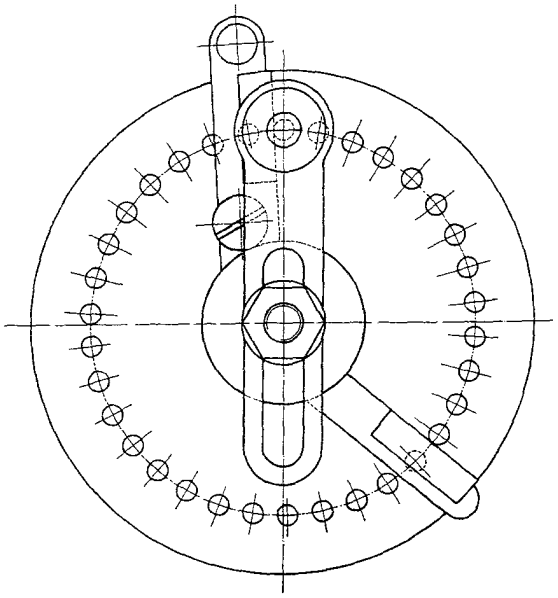



ACIERA

## To index through 17 divisions

Example of Dividing



Look for the number 17 in the chart, in the column "Number of Divisions".

On the same line one finds in the column "Complete Turns", the figure 2, and in the column "Index Plate with 34 holes", the fraction 12/34.

This signifies that after having made 2 turns of the index cranked handle, it is necessary to turn through a further 12 divisions on the 34 hole circle of the Index Plate No. 1.

This fraction of a turn can be controlled by means of the two sector arms.

Place the index handle between the arms, with the pin in the first hole and the first sector arm against it.

Count 12 holes round the circle, not including the first hole and, having re-inserted the pin in the 12th hole, bring the second sector arm up to it.

D o n o t c o u n t t h e h o l e o c c u p i e d b y i n d e x p i n.

# TABELLE DE DIVISIONS
Poupée diviseur universelle Type F3, F4 et F1

# TEIL-TABELLE
Universal-Teilapparat Type F3, F4 und F1

| Nombre de divisions / Anzahl der Teile | Angle de rotation de la table / Gradteilung | Tours entiers / Volle Umdrehung | Nombre de tours de la manivelle - Umdrehungen der Kurbel fractionnaires - in Bruchteilen | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Disque 1 - Lochscheibe 1 | | | | | Disque 2 - Lochscheibe 2 | | | | | Disque 3 - Lochscheibe 3 | | | |
| | | | 27 | 31 | 34 | 41 | 43 | 33 | 38 | 39 | 42 | 46 | 29 | 36 | 37 | 40 |
| 2 | 180 | 20 | | | | | | | | | | | | | | |
| — | 175 | 19 | 12/27 | | | | | | | | | | | 16/36 | | |
| — | 170 | 18 | 24/27 | | | | | | | | | | | 32/36 | | |
| — | 160 | 17 | 21/27 | | | | | | | | | | | | | |
| — | 150 | 16 | 18/27 | | | | | 22/33 | | 26/39 | 28/42 | | | 24/36 | | |
| — | 140 | 15 | 15/27 | | | | | | | | | | | 20/36 | | |
| — | 135 | 15 | | | | | | | | | | | | | | |
| — | 130 | 14 | 12/27 | | | | | | | | | | | 16/36 | | |
| — | 125 | 13 | 24/27 | | | | | | | | | | | 32/36 | | |
| 3 | 120 | 13 | 9/27 | | | | | 11/33 | | 13/39 | 14/42 | | | 12/36 | | |
| — | 110 | 12 | 6/27 | | | | | | | | | | | 8/36 | | |
| — | 100 | 11 | 3/27 | | | | | | | | | | | 4/36 | | |
| 4 | 90 | 10 | | | | | | | | | | | | | | |
| — | 80 | 8 | 24/27 | | | | | | | | | | | 32/36 | | |
| — | 75 | 8 | 9/27 | | | | | 11/33 | | 13/39 | 14/42 | | | 12/36 | | |
| 5 | 72 | 8 | | | | | | | | | | | | | | |
| — | 70 | 7 | 21/27 | | | | | | | | | | | 28/36 | | |
| — | 65 | 7 | 6/27 | | | | | | | | | | | 8/36 | | |
| 6 | 60 | 6 | 18/27 | | | | | 22/33 | | 26/39 | 28/42 | | | 24/36 | | |
| — | 55 | 6 | 3/27 | | | | | | | | | | | | | |
| 7 | — | 5 | | | | | | | | | 30/42 | | | | | |
| — | 50 | 5 | 15/27 | | | | | | | | | | | 20/36 | | |
| 8 | 45 | 5 | | | | | | | | | | | | | | |
| 9 | 40 | 4 | 12/27 | | | | | | | | | | | 16/36 | | |
| 10 | 36 | 4 | | | | | | | | | | | | | | |
| — | 35 | 3 | 24/27 | | | | | | | | | | | 32/36 | | |
| 11 | — | 3 | | | | | | 21/33 | | | | | | | | |
| 12 | 30 | 3 | 9/27 | | | | | 11/33 | | 13/39 | 14/42 | | | 12/36 | | |
| 13 | — | 3 | | | | | | | | 3/39 | | | | | | |
| 14 | — | 2 | | | | | | | | | 36/42 | | | | | |
| — | 25 | 2 | 21/27 | | | | | | | | | | | 28/36 | | |
| 15 | 24 | 2 | 18/27 | | | | | 22/33 | | 26/39 | 28/42 | | | 24/36 | | |
| 16 | — | 2 | | | 17/34 | | | | 19/38 | | 21/42 | 23/46 | | 18/36 | | 20/40 |
| 17 | — | 2 | | | 12/34 | | | | | | | | | | | |
| 18 | 20 | 2 | 6/27 | | | | | | | | | | | 8/36 | | |
| 19 | — | 2 | | | | | | | 4/38 | | | | | | | |
| 20 | 18 | 2 | | | | | | | | | | | | | | |
| — | 16 | 1 | 21/27 | | | | | | | | | | | 28/36 | | |
| 21 | — | 1 | | | | | | | | | 38/42 | | | | | |
| 22 | — | 1 | | | | | | 27/33 | | | | | | | | |
| 23 | — | 1 | | | | | | | | | | 34/46 | | | | |
| 24 | 15 | 1 | 18/27 | | | | | 22/33 | | 26/39 | 28/42 | | | 24/36 | | |
| 25 | — | 1 | | | | | | | | | | | | | | 24/40 |
| 26 | — | 1 | | | | | | | | 21/39 | | | | | | |
| 27 | — | 1 | 13/27 | | | | | | | | | | | | | |

# TABELLE DE DIVISIONS
Poupée diviseur universelle Type F3, F4 et F1

# TEIL-TABELLE
Universal-Teilapparat Type F3, F4 und F1

| Nombre de divisions / Anzahl der Teile | Angle de rotation de la table / Gradteilung | Tours entiers / Volle Umdrehung | Nombre de tours de la manivelle - Umdrehungen der Kurbel fractionnaires - in Bruchteilen | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Disque 1 - Lochscheibe 1 | | | | | Disque 2 - Lochscheibe 2 | | | | | Disque 3 - Lochscheibe 3 | | | |
| | | | 27 | 31 | 34 | 41 | 43 | 33 | 38 | 39 | 42 | 46 | 29 | 36 | 37 | 40 |
| 29 | — | 1 | | | | | | | | | | | 11/29 | | | |
| 30 | 12 | 1 | 9/27 | | | | | 11/33 | | 13/39 | 14/42 | | | 12/36 | | |
| 31 | — | 1 | | 9/31 | | | | | | | | | | | | |
| 32 | — | 1 | | | | | | | | | | | | 9/36 | | 10/40 |
| 33 | — | 1 | | | | | | 7/33 | | | | | | | | |
| 34 | — | 1 | | | 6/34 | | | | | | | | | | | |
| 35 | — | 1 | | | | | | | | | 6/42 | | | | | |
| 36 | 10 | 1 | 3/27 | | | | | | | | | | | 4/36 | | |
| 37 | — | 1 | | | | | | | | | | | | | 3/37 | |
| 38 | — | 1 | | | | | | | 2/38 | | | | | | | |
| 39 | — | 1 | | | | | | | | 1/39 | | | | | | |
| 40 | 9 | 1 | | | | | | | | | | | | | | |
| 41 | — | — | | | | 40/41 | | | | | | | | | | |
| 42 | — | — | | | | | | | | | 40/42 | | | | | |
| 43 | — | — | | | | | 40/43 | | | | | | | | | |
| 44 | — | — | | | | | | 30/33 | | | | | | | | |
| 45 | 8 | — | 24/27 | | | | | | | | | | | 32/36 | | |
| 46 | — | — | | | | | | | | | | 40/46 | | | | |
| 48 | — | — | | | | | | | | | 35/42 | | | 30/36 | | |
| 50 | — | — | | | | | | | | | | | | | | 32/40 |
| — | 7 | — | 21/27 | | | | | | | | | | | 28/36 | | |
| 52 | | | | | | | | | | 30/39 | | | | | | |
| 54 | — | — | 20/27 | | | | | | | | | | | | | |
| 55 | — | — | | | | | | 24/33 | | | | | | | | |
| 56 | — | — | | | | | | | | | 30/42 | | | | | |
| 58 | — | — | | | | | | | | | | | 20/29 | | | |
| 60 | 6 | — | 18/27 | | | | | 22/33 | | 26/39 | 28/42 | | | 24/36 | | |
| 62 | — | — | | 20/31 | | | | | | | | | | | | |
| 64 | — | — | | | | | | | | | | | | | | 25/40 |
| 65 | — | — | | | | | | | | 24/39 | | | | | | |
| 66 | — | — | | | | | | 20/33 | | | | | | | | |
| 68 | — | — | | | 20/34 | | | | | | | | | | | |
| 70 | — | — | | | | | | | | | 24/42 | | | | | |
| 72 | 5 | — | 15/27 | | | | | | | | | | | 20/36 | | |
| 74 | — | — | | | | | | | | | | | | | 20/37 | |
| 76 | — | — | | | | | | | 20/38 | | | | | | | |
| 78 | — | — | | | | | | | | 20/39 | | | | | | |
| 80 | — | — | | | 17/34 | | | | 19/38 | | 21/42 | 23/46 | | 18/36 | | 20/40 |
| 82 | — | — | | | | 20/41 | | | | | | | | | | |
| 84 | — | — | | | | | | | | | 20/42 | | | | | |
| 85 | — | — | | | 16/34 | | | | | | | | | | | |
| 86 | — | — | | | | | 20/43 | | | | | | | | | |
| 88 | — | — | | | | | | 15/33 | | | | | | | | |
| 90 | 4 | — | 12/27 | | | | | | | | | | | 16/36 | | |
| 92 | — | — | | | | | | | | | | 20/46 | | | | |
| 95 | — | — | | | | | | | 16/38 | | | | | | | |

ACIERA

# TABELLE DE DIVISIONS
Poupée diviseur universelle Type F3, F4 et F1

# TEIL-TABELLE
Universal-Teilapparat Type F3, F4 und F1

| Nombre de divisions / Anzahl der Teile | Angle de rotation de la table / Gradteilung | Tours entiers / Volle Umdrehung | Nombre de tours de la manivelle - Umdrehungen der Kurbel fractionnaires - in Bruchteilen | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Disque 1 - Lochscheibe 1 | | | | | Disque 2 - Lochscheibe 2 | | | | | Disque 3 - Lochscheibe 3 | | | |
| | | | 27 | 31 | 34 | 41 | 43 | 33 | 38 | 39 | 42 | 46 | 29 | 36 | 37 | 40 |
| **96** | — | — | | | | | | | | | | | | 15/36 | | |
| **100** | — | — | | | | | | | | | | | | | | 16/40 |
| **104** | — | — | | | | | | | | 15/39 | | | | | | |
| **105** | — | — | | | | | | | | | 16/42 | | | | | |
| **108** | — | — | 10/27 | | | | | | | | | | | | | |
| **110** | — | — | | | | | | 12/33 | | | | | | | | |
| **112** | — | — | | | | | | | | | 15/42 | | | | | |
| **115** | — | — | | | | | | | | | | 16/46 | | | | |
| **116** | — | — | | | | | | | | | | | 10/29 | | | |
| **120** | 3 | — | 9/27 | | | | | 11/33 | | 13/39 | 14/42 | | | 12/36 | | |
| **124** | — | — | | 10/31 | | | | | | | | | | | | |
| **130** | — | — | | | | | | | | 12/39 | | | | | | |
| **132** | — | — | | | | | | 10/33 | | | | | | | | |
| **135** | — | — | 8/27 | | | | | | | | | | | | | |
| **136** | — | — | | | 10/34 | | | | | | | | | | | |
| **140** | — | — | | | | | | | | | 12/42 | | | | | |
| **144** | — | — | | | | | | | | | | | | 10/36 | | |
| **145** | — | — | | | | | | | | | | | 8/29 | | | |
| **148** | — | — | | | | | | | | | | | | | 10/37 | |
| **152** | — | — | | | | | | | 10/38 | | | | | | | |
| **155** | — | — | | 8/31 | | | | | | | | | | | | |
| **156** | — | — | | | | | | | | 10/39 | | | | | | |
| **160** | — | — | | | | | | | | | | | | 9/36 | | 10/40 |
| **164** | — | — | | | | 10/41 | | | | | | | | | | |
| **165** | — | — | | | | | | 8/33 | | | | | | | | |
| **168** | — | — | | | | | | | | | 10/42 | | | | | |
| **170** | — | — | | | 8/34 | | | | | | | | | | | |
| **172** | — | — | | | | | 10/43 | | | | | | | | | |
| **180** | 2 | — | 6/27 | | | | | | | | | | | 8/36 | | |
| **184** | — | — | | | | | | | | | | 10/46 | | | | |
| **185** | — | — | | | | | | | | | | | | | 8/37 | |
| **190** | — | — | | | | | | | 8/38 | | | | | | | |
| **195** | — | — | | | | | | | | 8/39 | | | | | | |
| **200** | — | — | | | | | | | | | | | | | | 8/40 |
| **205** | — | — | | | | 8/41 | | | | | | | | | | |
| **210** | — | — | | | | | | | | | 8/42 | | | | | |
| **215** | — | — | | | | | 8/43 | | | | | | | | | |
| **216** | — | — | 5/27 | | | | | | | | | | | | | |
| **220** | — | — | | | | | | 6/33 | | | | | | | | |
| **230** | — | — | | | | | | | | | | 8/46 | | | | |
| **232** | — | — | | | | | | | | | | | 5/29 | | | |
| **240** | — | — | | | | | | | | | 7/42 | | | 6/36 | | |
| **248** | — | — | | 5/31 | | | | | | | | | | | | |
| **260** | — | — | | | | | | | | 6/39 | | | | | | |
| **264** | — | — | | | | | | 5/33 | | | | | | | | |

ALTHA

TABELLE DE DIVISIONS

Poupée diviseur universelle Type F3, F4 et F1

Universal-Teilapparat Type F3, F4 und F1

| Nombre de divisions / Anzahl der Teile | Angle de rotation de la table / Gradteilung | Tours entiers / Volle Umdrehung | Nombre de tours de la manivelle - Umdrehungen der Kurbel fractionnaires - in Bruchteilen | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Disque 1 - Lochscheibe 1 | | | | | Disque 2 - Lochscheibe 2 | | | | | Disque 3 - Lochscheibe 3 | | | |
| | | | 27 | 31 | 34 | 41 | 43 | 33 | 38 | 39 | 42 | 46 | 29 | 36 | 37 | 40 |
| 272 | — | — | | | 5/34 | | | | | | | | | | | |
| 280 | — | — | | | | | | | | | 6/42 | | | | | |
| 288 | — | — | | | | | | | | | | | | 5/36 | | |
| 290 | — | — | | | | | | | | | | | 4/29 | | | |
| 296 | — | — | | | | | | | | | | | | | 5/37 | |
| 304 | — | — | | | | | | | 5/38 | | | | | | | |
| 310 | — | — | | 4/31 | | | | | | | | | | | | |
| 312 | — | — | | | | | | | | 5/39 | | | | | | |
| 320 | — | — | | | | | | | | | | | | | | 5/40 |
| 328 | — | — | | | | 5/41 | | | | | | | | | | |
| 330 | — | — | | | | | | 4/33 | | | | | | | | |
| 336 | — | — | | | | | | | | | 5/42 | | | | | |
| 340 | — | — | | | 4/34 | | | | | | | | | | | |
| 344 | — | — | | | | | 5/43 | | | | | | | | | |
| 360 | 1° | — | 3/27 | | | | | | | | | | | 4/36 | | |
| — | 54' | | | | | | | | | | | | | | | 4/40 |
| — | 40' | | 2/27 | | | | | | | | | | | | | |
| — | 30' | | | | | | | | | | | | | 2/36 | | |

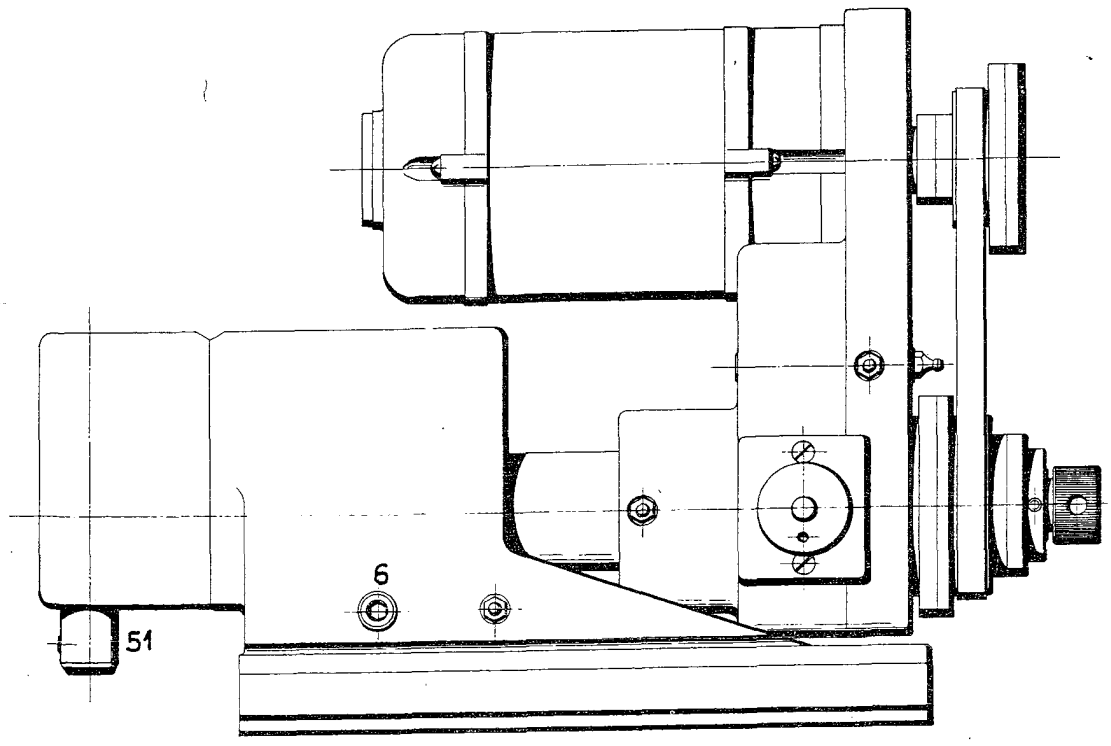
## Installation

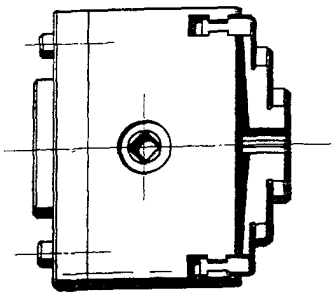
The slotting attachment is actuated by an eccentric driver. For this reason the stroke of 10 mm (3/8") is not variable.

To install the attachment, proceed as follows:

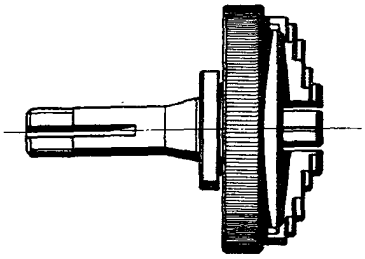
1) Loosen off the screw (6) and slide the quill forwards until it projects 21 mm from the front of the headstock.
2) Tighten the screw (6).
3) Insert the eccentric driver in the attachment, with the ball-bearing in the slot of the slide (51).
4) Insert the 20 mm dia. spigot in the upper bore of the attachment with the key directed downwards.
5) Place the attachment in position, at the same time rotating the cutter spindle, so that the driver key-way engages with the spindle key.
6) Tighten the clamping screw located on the left-hand side of the attachment.
7) Tighten the quill draw-bar.

NOTE: Maximum driving speed 250 R.P.M.

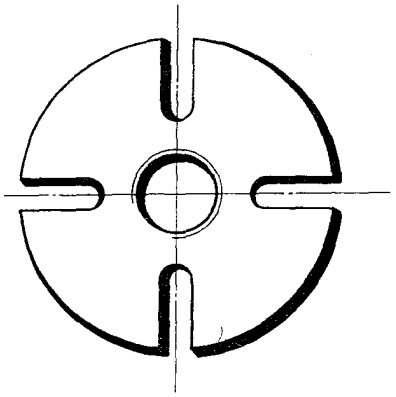




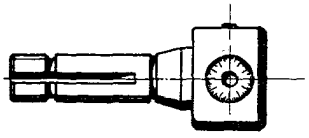
No. 148 3-Jaw Self-Centring Chuck 70 mm (2.75") diameter. Mounted on backplate with thread suitable for the nose of the No. 123 Dividing Head.



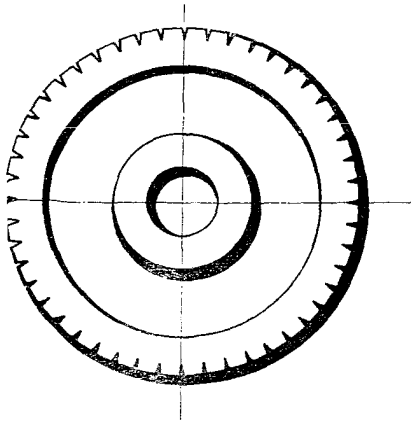
No. 140 3-Jaw Self-Centring Chuck 63 mm (2.48") diameter. With collet-type spindle insert.



No. 149 Face-plate with 4 Tee-slots. With thread suitable for the nose of the No. 123 Dividing Head.

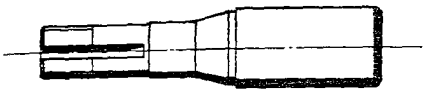


No. 139 Boring head 24 mm (0.95") dia. Capacity 0.5 - 30 mm (0.020" - 1.20") With collet-type spindle insert.



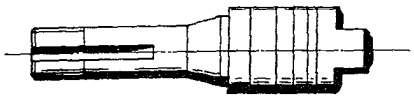
No. 124 Dividing plates 90 mm (3.55") dia. Number of Notches 0 to 120

ACIERA

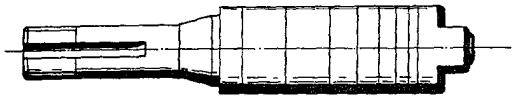


No. 141a Cutter Arbor - blank
20 mm dia.x 40 mm long

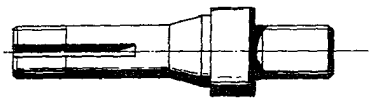
No. 141b Cutter Arbor - blank
16 mm dia.x 120mm long.



No. 142 Cutter Arbor - short
dia.4 - 5 - 6 - 8 -
10 - 12 - 13 mm or
1/4" - 3/8" - 1/2"



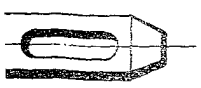
No. 143 Cutter Arbor - long
dia.4 - 5 - 6 - 8 -
10 - 12 - 13 mm or
1/4" - 3/8" - 1/2"



No. 144 Cutter Arbor -
threaded
Thread dia. M 6 - 8 -
10 - 12 or
1/4" - 3/8" - 1/2"

No. 145 Collets
Shank dia. = 12 mm
Capacity = 0-10 mm
Capacity = 0-3/8"

No. 146 Clamping Bolts
Length = 40 mm
= 1.58"
with washer and nut



No. 147 Clamping Piece
Hardened.
Length 40 mm

ACIERA

Armoire pour accessoires

Werkzeug-schrank

Tool cupboard