



**CINCINNATI**  
**MILACRON**

THE OLD PARTS  
427 456 3890

## **Service Manual & Parts List**

### **Cincinnati MT Toolmaster Milling Machines**

Publication No 8007 E

This manual includes servicing instructions for:—

- Manual drive machines
- One axis mechanical drive machines
- Two axis mechanical drive machines
- Three axis DC drive machines

# Foreword

Because of continual design improvements, it is possible that data contained in this manual may not fully apply to the machine delivered. Any differences indicate that the machine incorporates improvements to better fulfil your requirements.

The machines and attachments and parts thereof illustrated and described in this book are manufactured under and protected by issued and pending Patents.

The design and specification of these machines are subject to change without notice.

## Serial Number

The serial number of the machine is stamped on the face of the column and on the front of the table near the right hand end. The serial number is also shown on the identification plate located on the rear of the column

## How to use this book

Information for the Installation, Operation, and Maintenance, of the Cincinnati Milacron product for which this manual was written, is divided into Sections under Standard Headings. The Standard Headings and Sections are as follows:—

Introduction		Section 1
Installation		Section 2
Operating Instructions	— Standard Machines	Section 3
Operating Instructions	— Optional Equipment and Attachments	Section 4
Systems		Section 5
Maintenance		Section 6
Parts List		Section 7

The information is issued as two books comprising the sections as follows:—

Operator's Instruction Book	Sections 1, 2, 3, 4
Service Manual & Parts List	Sections 1, 5, 6, 7

Pages are not numbered, information blocks are identified by Section and sub-section numbers. For clarity in reading, individual paragraphs or instructions may be identified by further numbering or lettering but all cross-references are obtained using Section and sub-section numbers only; i.e. (Ref. 2.4) relates to Section 2 sub-section 4.

Illustrations are numbered in sequence starting at number one in each Section. A suffix number identifies the Section to which the figure belongs; i.e. Fig. 1/3 relates to Fig. 1 of Section 3.

# Contents

This is a Service Manual & Parts List comprising

**Introduction** ..... **Section 1**

**Systems** ..... **Section 5**

**Maintenance** ..... **Section 6**

**Parts List** ..... **Section 7**

# Introduction

## Section 1

General .....	1.1
Specification .....	1.2
MT Toolmaster with standard overarm and 2 HP vertical head, all models .....	1.2.1
MT Toolmaster one axis mechanical drive machine, additional specification .....	1.2.2
MT Toolmaster two axis mechanical drive machine, additional specification .....	1.2.3
MT Toolmaster three axis DC drive machine, additional specification .....	1.2.4
MT Toolmaster with 3 HP heavy duty overarm and HV head, all models .....	1.2.5
Net weight .....	1.2.6
Machine dimensions .....	1.3
List of equipment .....	1.4
Standard, all models .....	1.4.1
Additional standard, one axis mechanical drive machine .....	1.4.2
Additional standard, two axis mechanical drive machine .....	1.4.3
Additional standard, three axis DC drive machine .....	1.4.4
Standard extra cost attachments and accessories .....	1.5

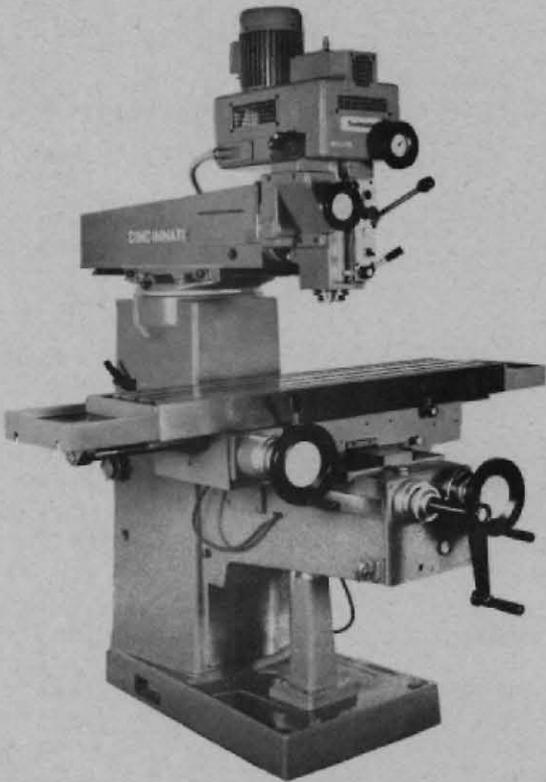


Fig. 1/1 Standard (Basic) Machine

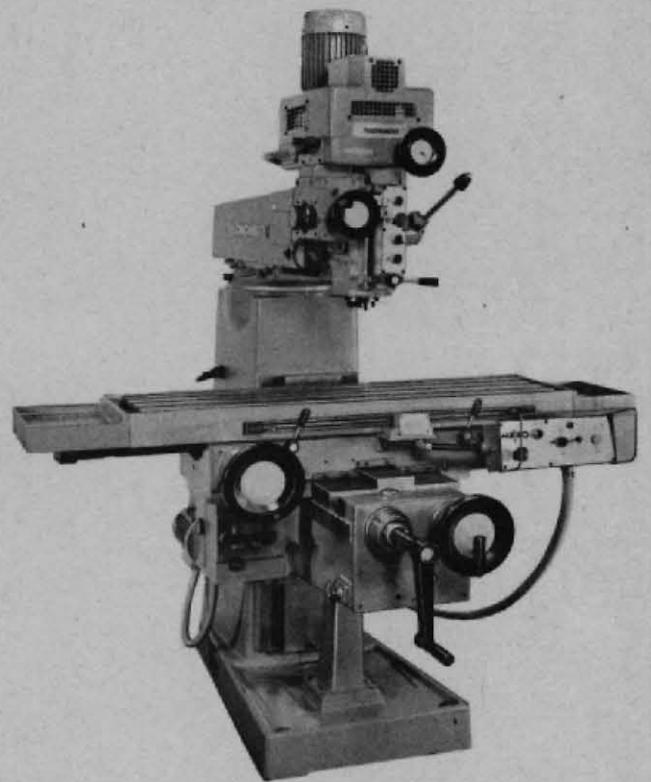


Fig. 2/1 One Axis Mechanical Drive Machine

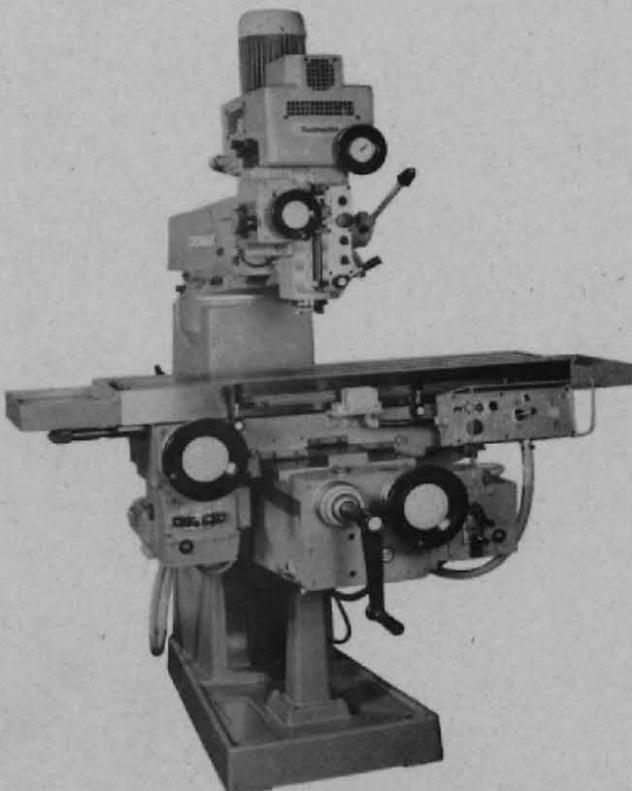


Fig. 3/1 Two Axis Mechanical Drive Machine

## 1.1 General

Cincinnati MT Toolmasters are produced in manual, one axis mechanical drive, two axis mechanical drive and three axis DC drive styles. Die sinking versions are also available.

This book relates only to the following versions:—

manual drive (basic) machine  
one axis mechanical drive machine  
two axis mechanical drive machine  
three axis DC drive machine

Additional books have been published to cover other versions.

The operating instructions for above listed machines are contained in Section 3 of this book. Additional information for operating with special equipment or attachments is given with general information on that equipment or attachment in Section 4. A list of equipment and attachments and the applicability is given in Section 1 subsection 4.

These machines have been designed to comply with the high standards of material and workmanship associated with precision machinery. Adequate lubrication is supplied by a standard one shot system or by a standard extra cost automatic system for sliding surfaces and by compliance with the instruments given in the Lubrication Schedule, Section 2.8. Adherence to the recommended procedures given in this manual will assist all operators in maintaining the precision and trouble free operation of their Cincinnati machine.

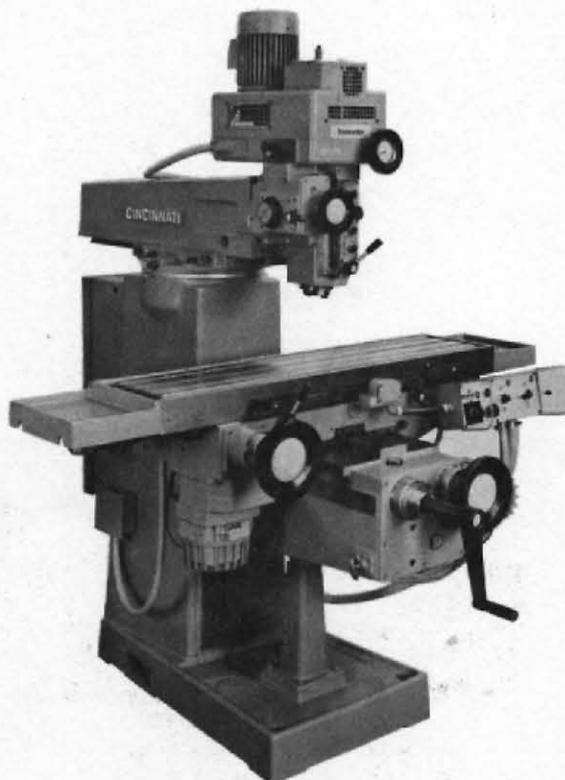


Fig. 4/1 Three Axis DC Drive Machine

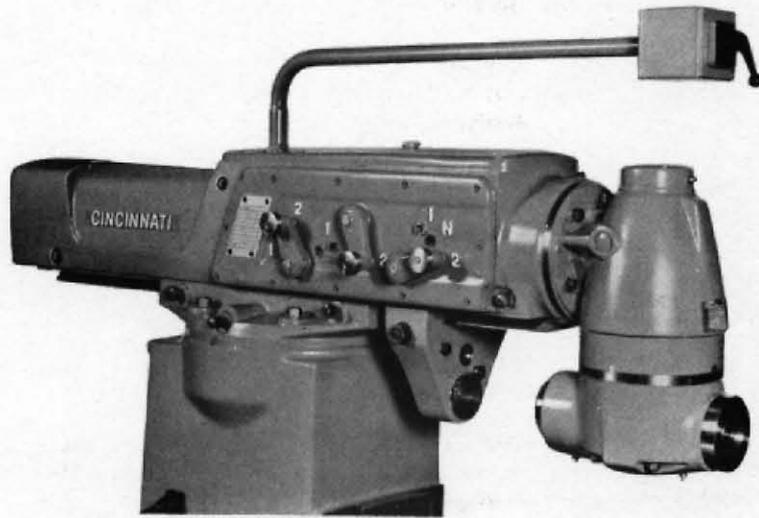


Fig. 5/1 3 HP Heavy Duty Overarm and HV Head

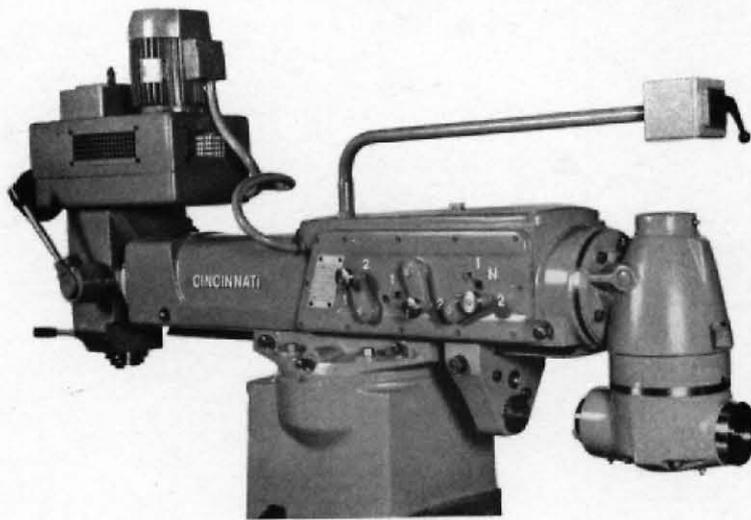


Fig. 6/1 3 HP Heavy Duty Overarm with HV Head and Extra 2HP Vertical Head

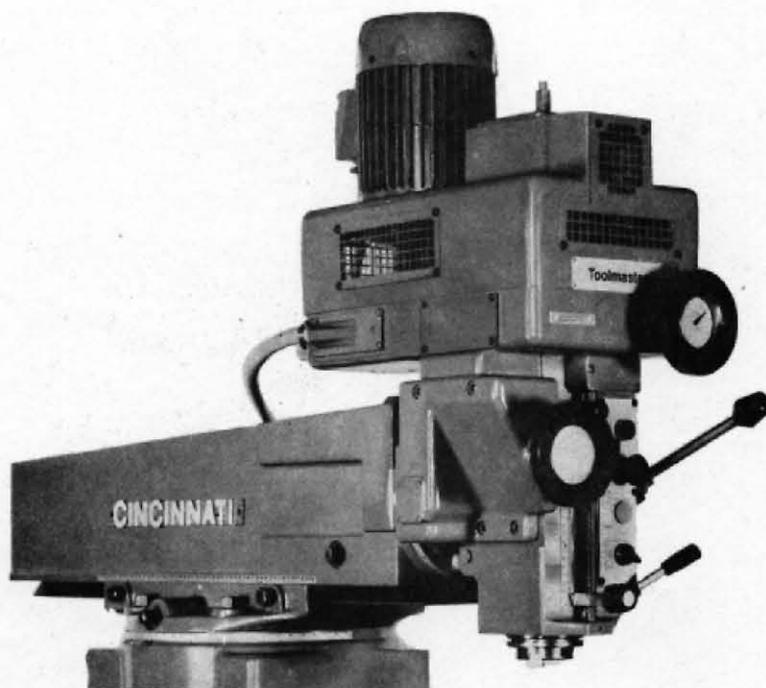


Fig. 7/1 3 HP High Speed Head with Standard Overarm

## 1.2 Specification

### 1.2.1 MT Toolmaster with standard overarm and 2 HP vertical head, all models

Table:—	
working surface	1140 x 300 mm (45" x 12")
size overall	1220 x 300 mm (48" x 12")
Tee slots	
— number	3
— size	16 mm
— size (USA only)	11/16" (17,462 mm)
— distance between slots	70 mm (2¾")
Spindle:—	
nose	SA 40 (40 NS)
speeds	
— 50 cycles	80–500 and 500–3100 RPM
— 60 cycles	80–480 and 600–3600 RPM
motor	1,5 KW (2 HP)
Quill feeds (optional):—	
metric	0,035–0,08–0,15 mm per rev. of spindle
inch	.0015–.003–.006 in. per rev. of spindle
Range:—	
longitudinal table travel (manual)	760 mm (30")
cross saddle travel (manual)	250 mm (10")
vertical knee travel (manual)	430 mm (17")
quill travel	125 mm (5")
overarm maximum extension	470 mm (18½")
head tilt, left and right	45°

### 1.2.2 MT Toolmaster one axis mechanical drive, additional specification

longitudinal table travel, automatic	720 mm (28.11/32")
longitudinal table feeds:	
— metric, 50 cycles:	18–28–38–50–80–105–165–260– 340 mm/min.
rapid traverse	2700 mm/min.
— metric, 60 cycles:	22–33–46–60–96–126–198–312– 480 mm/min.
rapid traverse	3240 mm/min.
— inch, 50 cycles:	½–1–1¼–1½–2½–3½–5½–8½–11¼ in/min.
rapid traverse	90 in/min.
— inch, 60 cycles:	¾–1½–1½–2–3¼–4¼–6⅝–10¼–13½ in/min.
rapid traverse	108 in/min.

### 1.2.3 MT Toolmaster two axis mechanical drive, additional specification

longitudinal table travel and feeds are identical to those of the one axis mechanical drive machine (see 1.2.2)	
cross saddle travel, automatic	215 mm (8.15/32")
cross saddle feeds and rapid traverse are the same as those of the table (see 1.2.2)	

### 1.2.4 MT Toolmaster three axis DC drive, additional specification

longitudinal table travel, automatic	730 mm (28.11/32")
longitudinal table feeds, infinitely variable within range	
— metric, 50 or 60 cycles	18 through 1200 mm/min.
rapid traverse	2800 mm/min.
— inch, 50 or 60 cycles	¾ through 47 in/min.
rapid traverse	93 in/min.
cross saddle travel, automatic	215 mm (8.15/32")
cross saddle feeds and rapid traverse are the same as those of the table	
vertical knee travel, automatic	390 mm (15.11/32")
vertical knee feeds, infinitely variable within range	
— metric 50 or 60 cycles	6 through 400 mm/min.
rapid traverse	930 mm/min.
— inch, 50 or 60 cycles	¼ through 15¾ in/min.
rapid traverse	31 in/min.

**1.2.5 MT Toolmaster with heavy duty overarm and 3 HP HV head, all models**

spindle nose	SA 40 (40 NS)
spindle motor	2,2 KW (3 HP)
spindle speeds	
— 50 cycles	
60—80—130—180—300—420—640—900 RPM or	
75—100—160—230—360—520—800—1130 RPM or	
90—130—200—280—450—650—980—1350 RPM or	
115—160—240—350—560—800—1210—1730 RPM	
— 60 cycles	
75—100—160—220—360—520—780—1080 RPM or	
90—130—190—280—440—620—960—1360 RPM or	
105—160—240—340—540—780—1180—1620 RPM or	
135—195—300—420—680—960—1480—2080 RPM	

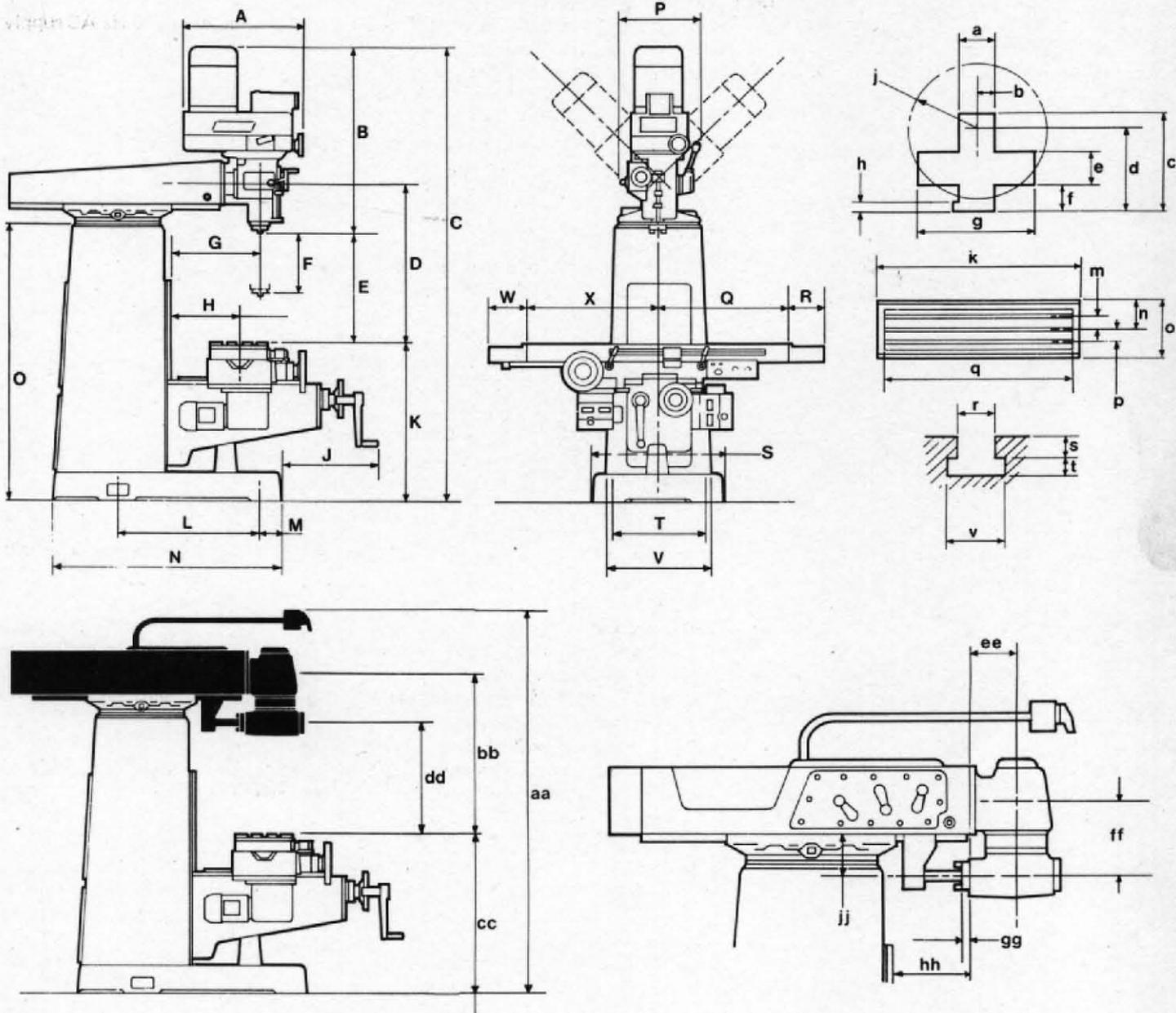
Note: if a 2 HP vertical head is fitted at the rear of the heavy duty overarm, see also specification 1.2.1.

heavy duty overarm maximum extension	540 mm (21¼")
--------------------------------------	---------------

**1.2.6 Net weight**

	Kg	Lbs
Manual drive machine		
with 2 HP vertical head	1250	2760
with 3 HP heavy duty overarm and HV head	1390	3070
with 3 HP heavy duty overarm, HV head and 2 HP vertical head	1530	3380
One axis machine, mechanical drive		
with 2 HP vertical head	1280	2820
with 3 HP heavy duty overarm and HV head	1420	3130
with 3 HP heavy duty overarm, HV head and 2 HP vertical head	1560	3440
Two axis machine, mechanical drive		
with 2 HP vertical head	1330	2930
with 3 HP heavy duty overarm and HV head	1470	3240
with 3 HP heavy duty overarm, HV head and 2 HP vertical head	1610	3550
Three axis machine, D.C. drive		
with 2 HP vertical head	1370	3020
with 3 HP heavy duty overarm and HV head	1510	3330
with 3 HP heavy duty overarm, HV head and 2 HP vertical head	1650	3640
Free standing console with plug board control	110	240

### 1.3 Dimensions



A.	550mm (21½ ins)	R.	200mm (8 ins)	q.	1150mm (45½ ins)
B.	870mm (34 ins)	S.	600mm (23¾ ins)	r.	16 H 7
C.	2110mm (83 ins)	T.	420mm (16½ ins) rear	s.	14mm (9/16 ins)
D.	285mm (11¼ ins) min. 715mm (28 ins) max.	V.	490mm (19¼ ins) front	t.	12mm (15/32 in)
E.	45mm (1¾ ins) min. 475mm (18½ ins) max.	W.	235mm (9¼ ins)	v.	27mm (1 in)
F.	125mm (5 ins)	X.	230mm (9 ins) min. 990mm (39 ins) max.	<b>MT HV Toolmaster</b>	
G.	130mm (5 ins) min. 610mm (24 ins) max. Travel 480mm (19 ins)	a.	600mm (24 ins)	aa.	1800mm (71 ins)
H.	175mm (6 ins) min. 425mm (16½ ins) max. Travel 250mm (10 ins)	b.	300mm (12 ins)	bb.	325mm (12¾ ins) min. 715mm (28 ins) max.
J.	600mm (23¾ ins)	c.	1530mm (60 ins)	cc.	745mm (29¼ ins) min. 1135mm (44½ ins) max. Travel 390mm (15¼ ins)
K.	745mm (29 ins) min. 1175mm (46 ins) max. Travel 430mm (17 ins)	d.	1265mm (50 ins)	dd.	85mm (3¼ ins) min. 475mm (18½ ins) max.
L.	660mm (26 ins)	e.	570mm (22½ ins)	ee.	127mm (5 ins)
M.	60mm (2¼ ins)	f.	465mm (18½ ins)	ff.	241mm (9½ ins)
N.	985mm (38½ ins)	g.	2415mm (95 ins) front	gg.	45mm (1¾ ins)
O.	1270mm (50 ins)	h.	120mm (4¾ ins)	hh.	692mm (17¼ ins)
P.	450mm (17½ ins)	j.	Overarm Swivel 975mm (38½ ins)	jj.	146mm (5¾ ins)
Q.	230mm (9 ins) min. 990mm (39 ins) max. Travel 760mm (30 ins)	k.	1220mm (48 ins)		
		m.	70mm (2¾ ins)		
		n.	150mm (6 ins)		
		o.	300mm (12 ins)		
		p.	70mm (2¾ ins)		

## **1.4 List of Equipment**

### **1.4.1 Standard, all models**

Complete electrical equipment for 220 or 380 volts, 3-phase, 50 Hz AC supply with 110 volt control circuit.  
Micrometer and sensitive hand down-feed.  
Depth stop.  
Built-in table backlash eliminator.  
One shot lubrication to knee, saddle and column.  
Direct reading speed indicator.  
Draw bar.  
Wrenches.

### **1.4.2 Additional standard, 1 axis mechanical drive machine**

Power feed to table including rapid traverse.

### **1.4.3 Additional standard, 2 axis mechanical drive machine**

Power feed to table including rapid traverse.  
Power feed to saddle including rapid traverse.

### **1.4.4 Additional standard, 3 axis D.C. drive machine**

Power feed to table including rapid traverse – feedrate infinitely variable within range.  
Power feed to saddle including rapid traverse – feedrate infinitely variable within range.  
Power feed to knee including rapid traverse – feedrate infinitely variable within range.

### **1.4.5 Optional extra cost, all models**

Electrical equipment for non-standard A.C. or unusual climatic conditions.  
3 HP high speed vertical head with infinitely variable spindle speeds from 1200 through 6000 RPM – supplied only with micrometer and sensitive hand down-feed to the quill.  
Cintiloc spindle for 2 HP or 3 HP vertical head.  
Erickson quick change spindle for 2 HP or 3 HP vertical head.  
Kwickswitch spindle for 2 HP or 3 HP vertical head.  
Power feed to quill for 2 HP vertical head.  
Manual tapping for 2 HP vertical head.  
Heavy duty overarm with 3 HP HV head.  
2 HP vertical head, extra, for use with the heavy duty overarm.  
Cutting light unit, 24 or 110 volts.  
Spindle draw bar lock for 2 HP vertical head.  
Coolant unit including splash pan.  
Optical precision measuring unit, longitudinal.  
Optical precision measuring unit, cross.  
Automatic lubrication pump.

### **1.4.6 Optional extra cost, D.C. drive 3 axis machine only**

Free standing console with plug board for programming cycles in 32 steps and 14 functions (longitudinal:4 – cross:4 – vertical:5 – rapid traverse).  
Two extra functions can be available for coolant, index table, cycle interrupt, etc.

## 1.5 Attachments and accessories

Shaping attachment to be fitted at the rear of the 2 HP vertical head overarm. Stroke adjustable from 0 through 75 mm (0 through 3").

50, 80, 125 and 200 strokes/min. for 50 cycles motor

60, 96, 150 and 240 strokes/min. for 60 cycles motor

Ram tilting left and right – 15°.

Independent motor ½ HP

Note: – for use with standard overarm only

High speed milling attachment – 1 to 6 ratio, 9000 RPM maximum, 40 NS taper shank, either with 3 metric collets 4–5 and 6 mm diameter or 4 inch collets  $\frac{1}{8}$ " –  $\frac{3}{16}$ " –  $\frac{1}{4}$ " and  $\frac{5}{16}$ " diameter.

Heavy duty right angle milling attachment for horizontal milling. I/I ratio – n° 30 NS taper, with arbor support bearing ID 45 mm.

Note: – for use with 2 HP vertical head only.

Universal milling head I/I ratio, accommodates straight cylindrical "W 10" collets.

Note: – for use with 2 HP vertical head only.

Light duty right angle milling attachment for horizontal milling, I/I ratio, without arbor support, accommodates straight cylindrical "W 10" collets.

Note: – for use with 2 HP vertical head only.

Circular table 250 mm (10")

This table is equipped with plain handwheel ratio 1/20 no dividing plate, with positive stop dogs on table periphery.

Same as above with one indexing plate for divisions from 2 to 310 with positive stop dogs on table periphery.

Extra cost for one set of 3 precision plates for divisions from 50 to 127.

Index head and tailstock (centreline distance 150 mm – 6")

Chuck diameter 155 mm for above

Semi-universal dividing head, 260 mm swing, ratio 1/40 with tailstock 2 precision index plates for divisions 2 to 80 and their multiples. One set of wrenches.

Three jaw chuck 155 mm diameter, for above.

Vice plain 125 mm x 40 mm (5" x 1.9/16") mild steel jaws opening 150 mm (6"). Extra for hardened ground jaws.

Vice swivel base 125 mm x 40 mm (5" x 1.9/16") mild steel jaws opening 150 mm (6"), base graduated in degrees.

Extra for hardened ground jaws.

Clamping jaws, reversible jaw pads, width 85 mm, with wrench.

Set of No. 10

Set of No. 20

Metric off-set boring head AL-16 with No. 40 NS taper shank with boring tools and storage box.

Inch off-set boring head AL-16 with No. 40 NS taper shank with boring tools and storage box.

Metric off-set boring head AR-18 with 40 NS taper shank with boring tools and storage box.

Inch off-set boring head AR-18 with No. 40 NS taper shank with boring tools and storage box.

Straight cylindrical collets "W10" series to fit either light duty right angle milling attachment or universal milling head, without adapter.

Metric sizes from 1 to 8 in. increments of ½ mm.  
Inch sizes from 1/32" to 5/16" in increments of 1/32".

Spring collet adapter accommodates "A" and "C" series collets for metric sizes from 3 to 32 mm or 1/8" to 1¼" for straight shank cutter, No. 40 NS taper shank.

Straight cylindrical spring collets "A" series (requires intermediate collet adapter listed below)

Metric sizes from 1 mm to 12,5 mm in increments of ½"  
Inch sizes from 1/16" through ½" in increments of 1/32".

Collet adapter for use with "A" series collets

Straight cylindrical collets "C" series to be used with "A" and "C" adapters.

Metric sizes from 13 through 32,5 mm in increments of 0,5 mm

Inch sizes from 17/32" through 1¼" in increments of 1/32"

Taper hole collets No. 1, 2, 3 and 4 morse taper to be used with "A" and "C" collet adapter

Adapter for double end straight shank end mill metric capacity 4 to 20 mm, with 10 spring collets 4, 5, 6, 8, 10, 12, 14, 16, 18 and 20 mm.

No. 30 NS taper shank.  
No. 40 NS taper shank.

Adapter for double end straight shank end mill inch capacity 3/8" to ¾" with collets 3/8", ½", 5/8", ¾".

No. 30 NS taper shank.  
No. 40 NS taper shank.

Adapter for shell end mill – NS taper shank – size of stud denotes the size of hole in cutter.

No. 30 NS – ¾" (19,05 mm)  
No. 30 NS – 1" (25,40 mm)  
No. 30 NS – 1¼" (31,75 mm)  
No. 40 NS – ¾" (19,05 mm)  
No. 40 NS – 1" (25,40 mm)  
No. 40 NS – 1¼" (31,75 mm)

Adapter for shell end mill (metric size hole cutters). NS taper shank, size of stud denotes size of hole in cutter.

No. 30 NS –  $\phi$  16 mm  
No. 30 NS –  $\phi$  22 mm  
No. 30 NS –  $\phi$  27 mm  
No. 40 NS –  $\phi$  16 mm  
No. 40 NS –  $\phi$  22 mm  
No. 40 NS –  $\phi$  27 mm  
No. 40 NS –  $\phi$  32 mm

Stud arbor including collars and nuts – length 300 mm NS taper shank – bushing to fit 45 mm ID. Bearing for arbor dia. No. 30 NS 1" (25,40 mm) for use with heavy duty right angle milling attachment.

Stud arbor metric diameter, including collars and nuts, length 315 mm – bushing to fit 45 mm ID bearing for arbor dia. for use as above.

No. 30 NS —  $\phi$  22 mm  
No. 30 NS —  $\phi$  27 mm  
No. 30 NS —  $\phi$  16 mm

Reducing adapters with tang slot, for cutters with taper shank and tang.

No. 30 NS — MT 1  
No. 30 NS — MT 2  
No. 30 NS — MT 3  
No. 40 NS — MT 1  
No. 40 NS — MT 2  
No. 40 NS — MT 3  
No. 40 NS — MT 4

Reducing adapters without tang slot for cutters with threaded hole shanks.

No. 30 NS — MT 1  
No. 30 NS — MT 2  
No. 30 NS — MT 3  
No. 40 NS — MT 1  
No. 40 NS — MT 2  
No. 40 NS — MT 3  
No. 40 NS — MT 4

Drill chuck with wrench capacity 2, 3 to 16 mm with MT 2 shank.

Precision drill chuck automatic 2 to 16 mm with MT 2 shank.

Draw bar studs (on demand)

Part No. 732 165 — 5/8" — 14 mm threads — lengths 139 mm  
Part No. 732 166 — 5/8" — 10 mm threads — length 109 mm  
Part No. 732 167 — 5/8" — 12 mm threads — length 99 mm  
Part No. 732 663 — 5/8" — 12 mm threads — length 122 mm  
Part No. 732 664 — 5/8" — 10 mm threads — length 125 mm  
Part No. 732 665 — 5/8" — 14 mm threads — length 125 mm  
Part No. 732 060 — 5/8" — R-8 Adapter — length 125 mm

R-8 Tool holder adapter set includes special stud (737 060), adapter ring, allen wrench and two screws (does not include R-8 adapter).

R-8 Adapter

Stud arbor including spacing collars and nut, bearing collar to fit 45 mm 1D arbor support bushing for arbor diameter.

No. 40 NS —  $\phi$  27 mm — length 250 mm  
No. 40 NS —  $\phi$  32 mm — length 250 mm  
No. 40 NS —  $\phi$  27 mm — length 315 mm  
No. 40 NS —  $\phi$  32 mm — length 315 mm

Above stud arbors are for use with the 3 HP overarm only.

Raising block (fitted between column and turret)  
125 mm (5")  
200 mm (8")  
300 mm (12")

# Systems

## Section 5

Lubrication system —  
Additional servicing information  
not required, see O.I.B. Sect. 2.8.

# Maintenance

## Section 6

Removing Manual Quill Feed Box – 2HP or 3HP Vertical Head . . . . .	6.1
Removing Quill Power Feed Box . . . . .	6.2
Removing 2HP or 3HP Vertical Head . . . . .	6.3
Replacing Quill Feed Torsion Spring – 2HP or 3HP Vertical Head . . . . .	6.4
Replacing Vee Belt – 2HP or 3HP Vertical Head	6.5
Adjusting Backlash Eliminator . . . . .	6.6
Adjusting Machine Gibs . . . . .	6.7
Removing 3HP Heavy Duty Overarm . . . . .	6.8
Removing Mechanical Feed Box – table or saddle for 1 or 2 axis machines . . . . .	6.9
Replacing Cross Feed or Vertical Feed magnetic clutches – 2 or 3 axis machines . . . . .	6.10
Dismantling Mechanical Feed Box – table or saddle for 1 or 2 axis machines . . . . .	6.11
Dismantling Quill Power Feed Box – 2HP Vertical Head . . . . .	6.12

## **6.1 Removing manual quill feed box – 2HP or 3HP vertical head**

### **6.1.1 Machine without sensitive tapping attachment - reference 7 Fig.2**

1. Engage manual sensitive quill feed lever
2. Remove 2 screws item 20 and 2 screws item 1.
3. Pull unit out horizontally.
4. To replace the manual quill feed box, reverse the removal procedure.

### **6.1.2 Machine with sensitive tapping attachment - reference 7 Fig. 2**

1. Engage manual sensitive quill feed lever
2. Remove 4 screws item 27 maintaining the tapping microswitch holding plate.
3. Take tapping switch out of its location.
4. Remove screw item 25.
5. Take out rod item 9 and spring item 10.
6. Remove 2 screws item 20 and 2 screws item 1.
7. Pull unit out horizontally.
8. To replace the manual quill feed box, reverse the removal procedure.

## **6.2 Removing Quill power feed box**

### **6.2.1 Procedure for machine without sensitive tapping attachment - reference 7 Fig. 3**

1. Engage manual sensitive quill feed lever.
2. Remove two screws item 118 and two screws item 117.
3. Pull unit out horizontally.
4. To replace the quill feed box, reverse the removal procedure.

### **6.2.2 Procedure for machine with sensitive tapping attachment - reference 7 Fig. 3**

1. Engage manual sensitive quill feed lever.
2. Take out pin item 42 then remove lever item 41.
3. Remove seven screws item 78 and take out tapping switch holding plate.
4. Take tapping switch out of its location (ref. item 28 fig. 2/7).
5. Remove screw (ref. item 25 fig. 2/7).
6. Remove rod item 9 fig. 2/7 and spring item 10 fig. 2/7.
7. Take out 2 screws item 118 and 2 screws item 117.
8. Pull unit out horizontally.
9. To replace the quill feed box, reverse the removal procedure.

## **6.3 Removing 2HP or 3HP Vertical Head - Ref. 7 Fig. 15**

1. Take out 4 screws item 23, remove coupling item 24 then break electrical connections of the head.
2. Take out 4 screws item 25 and remove side protection cover item 26 from each side of head.
3. Rig a two point suspension sling with padded hooks and attach hooks to flanges above side openings in vee belt housing. Remove slack from lifting cables.
4. Remove 4 nuts item 27 and washers item 28 securing head to overarm.
5. Pull head out horizontally and withdraw from machine.
6. To put the head back in place reverse the removal procedure.

Note: To facilitate the engagement of the head gear with worm screw (ref. fig. 4, item 5), it may be necessary to operate the square adjuster on the side of the overarm to move worm screw.

#### **6.4 Replacing quill feed torsion spring — 2HP or 3HP vertical head - reference 7, fig. 1**

1. Remove quill feed box (ref. para. 6.1 or 6.2).
2. Retract completely quill using hand feed lever and clamp quill in upper position.
3. Take out 3 screws and remove housing item 75.
4. Remove pin item 77.
5. Take out circlip item 79.
6. Operate hand feed lever (by pushing it towards the head) to take out clutch item 151.
7. Take out circlip item 152.
8. Remove casing item 78 and take care not to lose ball item 85 and spring item 84.
9. Take out 6 screws item 62 and remove push button plate item 123.
10. Take out counterscrew item 154 and set screw item 153.
11. Take out 3 screws item 87.
12. Tap clutch shaft item 139 lightly to allow the casing item 88 to be removed, then take out 2 pins item 86.
13. Take out worn or broken torsion spring item 91.
14. Fit new torsion spring.
15. Replace bushing item 68.
16. Put back set screw item 153 and counterscrew item 154.
17. Unclamp quill and move it out to its lower position then reclamp.
18. To wind quill feed torsion spring as much as possible, insert a two pin wrench in any two holes of the three which are provided with casing item 88 and turn the whole unit clockwise.
19. Replace 2 pins item 86 and 3 screws item 87.
20. Complete remounting by accomplishing steps no. 8, 7, 6, 5, 4, 3, 2 and 1.

Note: The quill feed torsion spring is only strong enough to balance weight of quill assembly. It is not intended to return spindle to its upper position.

#### **6.5 Replacing vee belt — 2HP or 3HP vertical head - reference 7, fig. 15**

1. Start spindle rotation, turn clockwise varispeed drive handwheel so that the maximum rotation speed is obtained within the selected range, then stop spindle rotation.
2. Remove 8 screws item 25 and remove two side protection covers item 26.
3. Rig a two point suspension sling with padded hooks and attach hooks to flanges above side openings in vee belt housing. Remove slack from lifting cables. Remove 6 screws item 30 then lift housing.
4. Remove worn belt which is now accessible.
5. Depress the spindle pulley spring by pushing the sliding sheave as much as possible, then insert a wood wedge between the sliding and the fixed sheaves.
6. Put new belt in place and remove wood wedge.
7. Turn counterclockwise varispeed drive handwheel as much as possible.
8. Put back vee belt housing and screws item 29 then remove hooks.
9. Put back side covers item 26 then tighten screws item 25.

#### **6.6 Adjusting backlash Eliminator - reference 7, fig. 7**

Lunging table movements while climb milling would indicate that backlash eliminator nuts are loose or worn and need adjusting.

1. Remove locknut (item 16) at left hand end of longitudinal screw. Do not attempt to remove left table apron.
2. Remove bracket (item 46) at right hand end of longitudinal screw. At this stage the longitudinal screw is no longer attached to the table.
3. Push table by hand to extreme left position so leadscrew nuts are most accessible.
4. Loosen two socket head screws (item 100) and, by hand only, turn backlash eliminator nut (item 95) counterclockwise.
5. Retighten screws item 100 while holding backlash eliminator nut. The 2 screws item 100 can be placed in either set of two holes in nut item 95 that are 90° apart.

### **6.7 Adjusting machining gibs**

A Head type taper gib is provided to compensate for wear of bearing surfaces between sliding elements at knee and column. Headless type taper gibbs are provided to compensate for wear of bearing surfaces between sliding elements at knee and saddle, saddle and table. Keep these surfaces clean and lubricated to cut down wear.

#### **6.7.1 Adjusting knee gib**

Move knee by hand, turn gib adjusting screw in until movement of knee feels tight then back off screw until movement is just snug with a slight drag.

#### **6.7.2 Adjusting saddle gib**

Remove front and rear wipers thus giving access to the front and rear gib adjusting screws. Loosen first, the front gib adjusting screw then turn rear gib adjusting screw in until saddle movement towards the column feels tight then back off rear screw until movement is just snug with a slight drag. Retighten front screw to compensate axial displacement of gib.

#### **6.7.3 Adjusting table gib**

Loosen right hand gib adjusting screw. Turn left hand gib adjusting screw in until table movement to the right feels tight then back off left hand screw until movement is just snug with a slight drag. Retighten right hand table gib screw to compensate axial displacement of gib.

#### **6.7.4 Adjusting shaping attachment gib**

Loosen first the 3 locknuts then tighten slightly the 3 gib adjusting screws until movement of slide is felt to be snug as drive belt is pulled over by hand. Retighten the 3 locknuts.

**CAUTION:** Too tight an adjustment of the gib squeezes out the oil film, causing undue wear and scoring.

### **6.8 Removing 3HP Heavy duty overarm - Ref. 7, Fig. 5**

Before attempting to remove heavy duty overarm from machine, remove if any, 2HP or 3HP vertical head from rear of overarm. See instructions under "removing 2HP or 3HP vertical head".

1. Turn spindle housing so it is in line with overarm to prevent a twisting action as overarm is removed.
2. Remove one 1/2" screw from top of gear housing item 4 at motor end, insert an eyebolt and attach to a crane.
3. Remove electrical compartment cover item 81 and break electrical connections.
4. Wind overarm forward and slide out of turret. Make certain overarm is balanced as it is slid off, otherwise vee way in turret may be damaged.

### **6.9 Removing mechanical feed box — table or saddle — 1 or 2 axis machine - Reference 7, Figure 12.**

1. Break electrical connections at the motor terminal box.
2. Drain oil from box.
3. Remove 4 screws item 66 and withdraw box outwards until it is free from the transmission splined shaft.
4. Remove electrical junction box and break electrical connections of the magnetic clutches.
5. To replace the feed box reverse the removal procedure.

### **6.10 Replacing cross feed or vertical feed magnetic clutches — 2 or 3 axis machine - Reference 7, Figure 10**

1. Drain oil from knee.
2. Remove mechanical feed box (2 axis machine) or DC motor reducer assembly (3 axis machine).
3. Take out 2 screws item 102 then remove finger stop item 103.
4. Take out 3 screws item 29.
5. Remove shaft item 25 with all the parts mounted on it.
6. Remove locknut item 8 then take out bearing item 9a.
7. Remove sleeve item 10 then take out gear item 38.
8. Slide 2 magnetic clutches item 37 to take them out.
9. Replace new magnetic clutches.
10. Reverse the removal procedure.

**6.11 Dismantling mechanical feed box — table or saddle — 1 or 2 axis machine - Reference 7, Figure 12**

1. After feed box has been removed from machine, take off 4 nuts item 94 and washers item 95, then remove electrical motor item 1.
2. Take out 3 screws item 8 and remove ring item 4.
3. Take out worm screw item 7.
4. Remove pin item 46A then remove left feed selector lever.
5. Take out 4 screws item 49 to remove feed selector lever holding plate.
6. Take out 4 screws item 23 then turn 2 screws item 96 to extract cover item 16 and remove
7. Take out circlip item 25 then bearing item 97.
8. Take out locknut item 31
9. Remove the disc type rapid traverse clutch item 34.
10. Take out selector lever item 44.
11. Remove 4 screws item 92 which hold bracket item 91 then take out this latter.
12. For remounting, reverse removal procedure.

Note: To put back cover item 16, first centre the notches of the discs of the rapid traverse clutch, then couple clutch electrically so that discs form a solid part.

**6.12 Dismantling of quill power feed box — 2HP vertical head - Reference 7, Figure 3.**

1. Engage the sensitive quill feed.
2. Remove oil plug item 84 to drain oil from quill feed box.
3. Take out 2 screws item 118 and 2 screws item 117.
4. Pull out quill feed box horizontally and place it on a bench for dismantling.
5. Remove 2 plugs item 5 located on the side of the box and in base.
6. Take out 2 screws item 3 which hold in place bushings item 2 and item 64.
7. Take out bushing item 2 by pushing by hand shank type gear item 110 from the inside.
8. Take out handwheel item 22 which is held by screw item 23.
9. Remove woodruff key item 15.
10. Remove graduated dial.
11. Take out 4 screws item 19 and pull out plate item 18.
12. Take out bushing item 97 by tapping lightly against front end of shaft item 13 and remove this shaft with parts mounted on it.
13. Remove roll pin item 42B, take out trip finger item 109 then deburr the end of the shaft that has been freed.
14. Remove roll pin item 47.
15. Disengage at front end spring item 54.
16. Remove roll pin item 42A and take out lever item 41.
17. Push shaft item 46 by tapping lightly against smaller diameter end until key item 44 can be removed; then take out shaft item 46 by sliding in the opposite direction while holding notched cam item 55 and fork item 50, at this stage these two latter parts can be removed.
18. Take out screw item 37.
19. Take out screw item 40.
20. Remove bearing item 38 from the inside by pushing gear item 34 to remove shaft item 32, then take out gears item 27 and item 30 and double clutch item 33.
21. Remove 3 screws item 74 and pull out knurled knob of feed rate selector.
22. Remove 4 screws item 96 and take out plate item 95. Take out shaft item 62 and double gear item 68.
23. Remove 3 roll pins item 59 and take out shaft item 51.
24. Remove gears item 92, item 91, and item 90.
25. Remove screw item 116 and take out shaft item 77.

# Parts List and Drawings

## Section 7

Ordering replacement parts  
Parts schedule

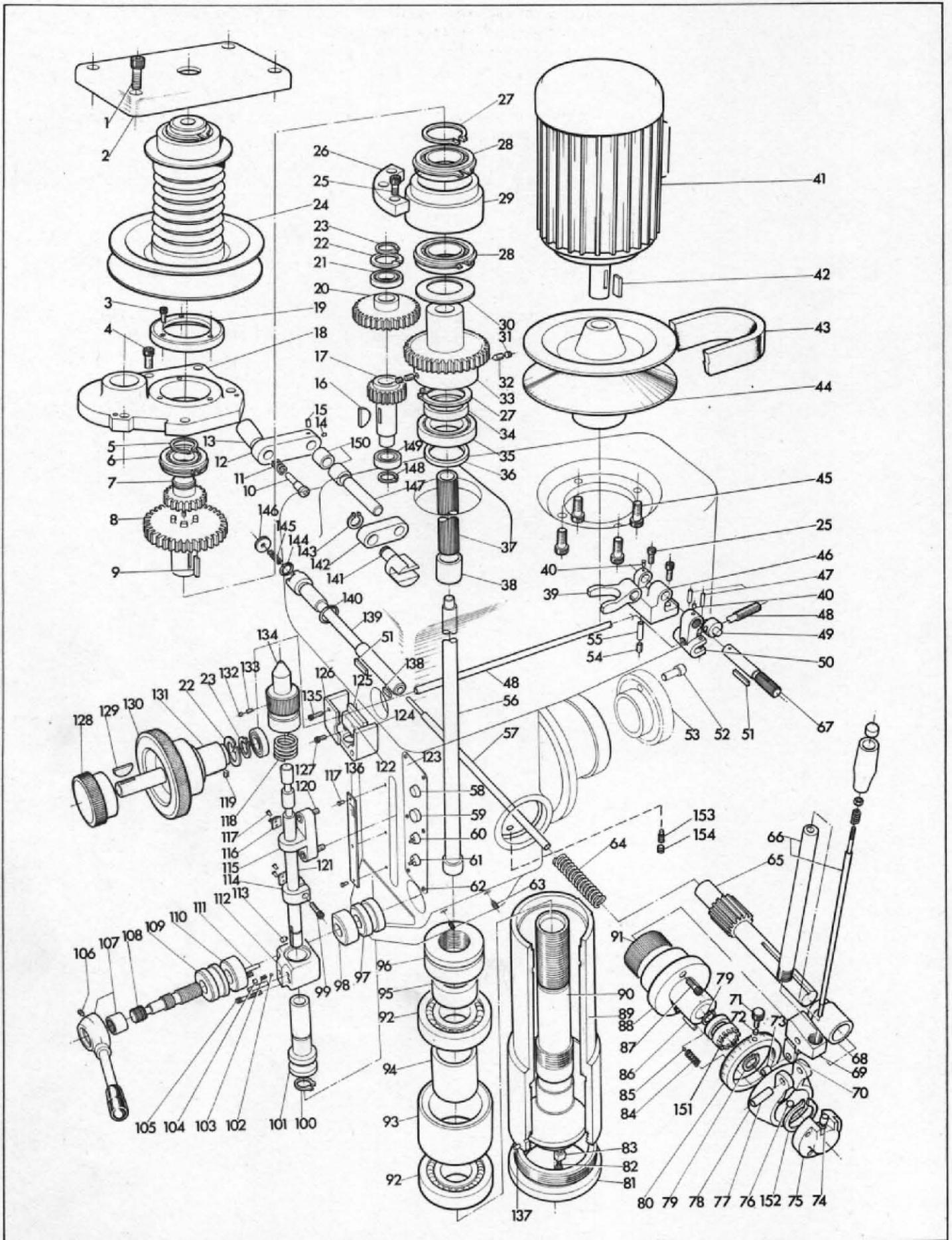
### **Ordering Replacement Parts for MT Toolmaster Milling Machines**

The following assembly parts lists are shown in four columns. In the first column are the index numbers of the parts illustrated. The second column contains part number, followed by the number of parts required for the assembly. The last column shows the part name.

You will get quicker and better service when ordering repair parts by adhering to the following procedure:

1. Give complete serial number of the machine. The machine serial number is stamped on the front of the table at the right hand end and also on a plate on the electrical compartment door.
2. State amount wanted.
3. Give catalogue index number, part number and name of part. If ordering parts by part number, specify where the number was obtained.
4. Specify each individual piece required. Never use the term "complete assembly"; it always raises a question as to how much of a unit to supply.
5. Specify how and where to ship. Do not state "Ship quickest way". Definitely name the method and/or agency desired, that is "Air Freight", "Air Mail", "Parcel Post", "Motor Freight", "Rail Freight", etc.

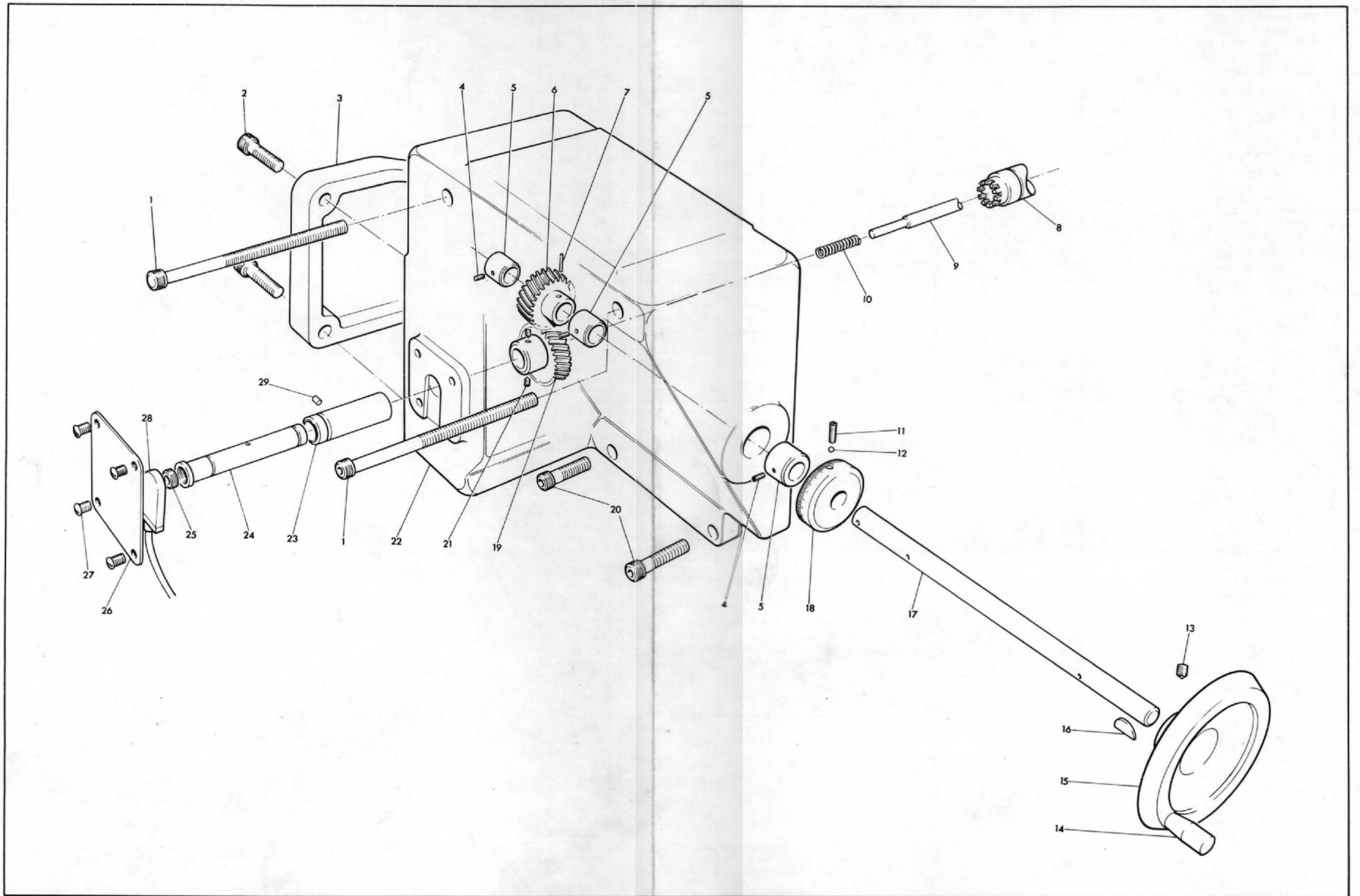
Note: In some cases, due to the nature of the part, it will be necessary, and less costly to you, for us to supply additional related pieces, especially if part wanted is obsolete.



7-Fig. 1 Tête verticale 2 CV  
 2 HP vertical head  
 Senkrechter Antriebskopf mit 2PS - Motor

7.1 Tête Verticale 2CV  
2 HP vertical head  
Senkrechter Antriebskopf mit 2PS - Motor

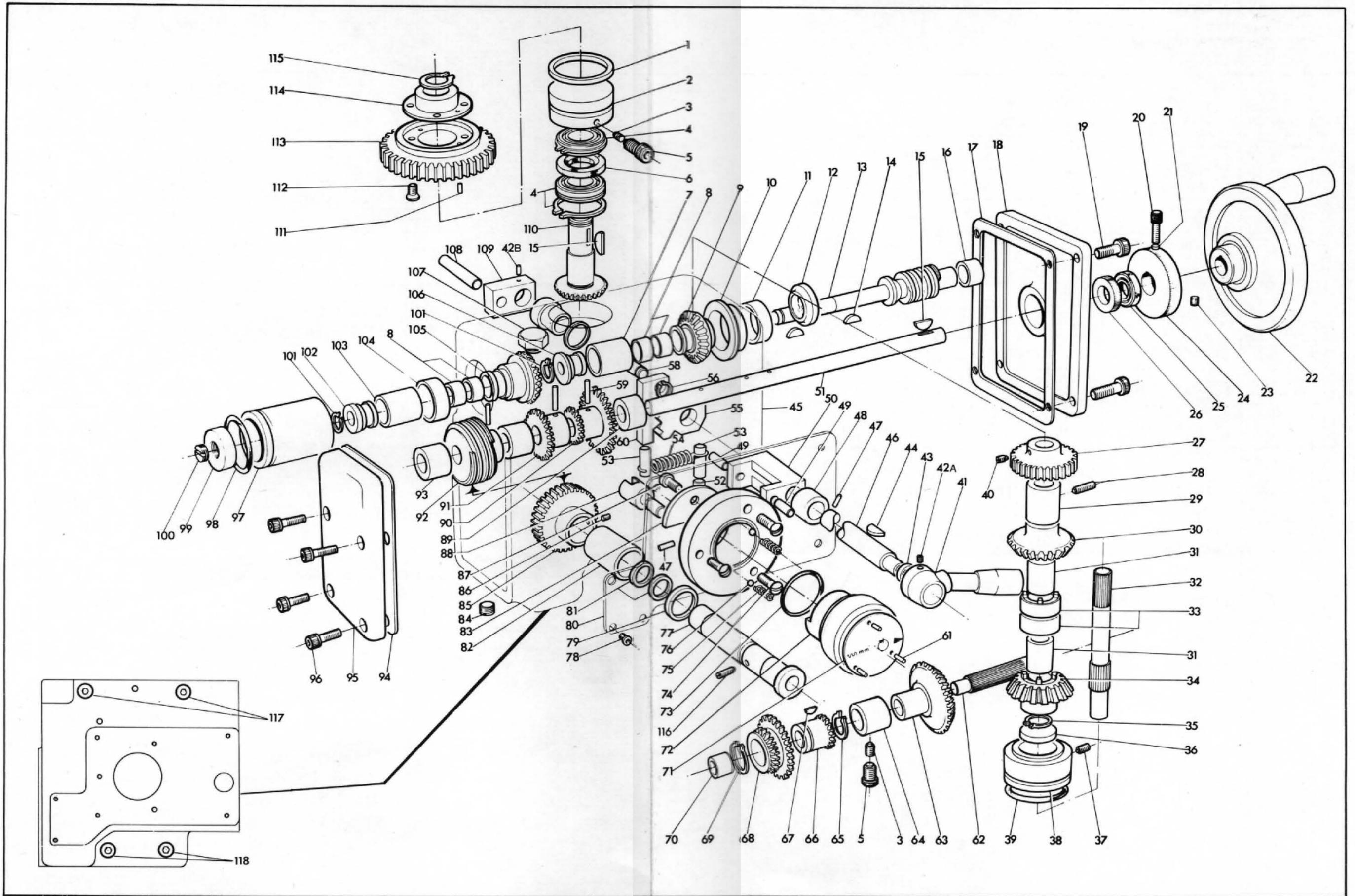
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qte	Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qte	Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qte
1	743980	Vis CHC M8 x 15	Screws	4	55	744183	Vis STHC M8 x 40	Screw	1	110	733210	Noix de Blocage	Clamp Nut - Front	1
2	732146	Couvercle du Carter	Cover Plate	1	56	735454	Tige de Blocage	Draw Bar	1	111	741113	Goupille 5 x 50	Pin	2
3	743970	Vis CHC M6 x 20	Screws	3	57	732108	Tige de Mini-Rupteur	Push Rod	1	112	732182	Palier	Bracket	1
4	743985	Vis CHC M8 x 35	Screws	5	58	745633	Bouton Poussoir	Push Button	1	113	744453	Vis STHC M6 x 12	Screw	1
5	741465	Circlips Ø 40E	Circlip	1	59	745625	Bouton Poussoir	Push Button	1	114	736053	Butée Mobile	Stop - Sliding	1
6	189947	Roulement à Billes (6008ZZNR)	Bearing	1	60	745805	Commutateur	Switch	1	115	733586	Butée Fixe	Stop - Fixed	1
7	737933	Pignon 35 dts (50N)	Gear Wheel - 50Hz M/Cs	1	61	745615	Commutateur	Switch	1	116	733587	Index Butée Fixe	Index Plate - Fixed Stop	1
7	737934	Pignon 30 dts (60N)	Gear Wheel - 60Hz M/Cs	1	62	744555	Vis TBHC M5 x 10	Screw	6	117	741775	Clou Parker	Screw - Self Tapping	4
8	735475	Pignon Baladeur (80 dts)	Gear Wheel	1	63	744265	Vis STHC M8 x 15	Screw	2	118	222029	Ressort de Vernier	Spring	1
9	741516	Clavette 5 x 5 x 35	Key	1	64	732354	Ressort	Spring	1	119	744255	Vis STHC M6 x 8	Screw	1
10	733902	Axe Support Boule	Pivot Pin	1	65	732103	Pignon de Descente (métrique)	Gear Shaft - Down Feed, Metric	1	120	743969	Vis CHC M6 x 15	Screw	2
11	732312	Ressort	Spring	1	65	732497	Pignon de Descente (Inch)	Gear Shaft - Down Feed, Inch	1	121	736051	Tige de Micro-Rupteur (Métrique)	Push Rod - Metric M/Cs	1
12	735437	Levier de Harnais	Lever - Gear Change	1	66	746206	Poignée de Cde. Taraudage	Handle Assy.	1	121	736052	Tige de Micro-Rupteur (Inch)	Push Rod - Inch M/Cs	1
13	750230	Boule	Handle	1	67	731997	Axe de Fourchette	Fork Pin	1	122	745210	Micro-Rupteur	Micro Switch	1
14	744152	Vis STHC M4 x 6	Screw	1	68	732119	Bague	Bush	1	123	732780	Plaque Support Boutons	Plate	1
15	741257	Goupille Conique 5 x 20	Pin	1	69	738532	Fourchette	Fork	1	124	732185	Carter Micro-Rupteur	Housing	1
16	3280	Clavette 4, 8 x 7, 9	Key	1	70	738532	Fourchette	Fork	1	125	737191	Plaque Support Micro-Rupteur	Switch Plate	1
17	735478	Pignon 22 dts	Gear Wheel	1	71	732327	Vis Blocage Vernier	Screw	1	126	732185	Couvercle	Cover Plate	1
18	732035	Couvercle	Cover Plate	1	72	7332324	Pion Blocage Vernier	Plug	1	127	743929	Vis CHC M5 x 15	Screw	2
19	732148	Rondelle de Roulement	Retaining Ring	1	73	738532	Fourchette	Fork	1	128	735873	Tachymetre (50N)	Tachometer	1
20	732038	Pignon 59 dts (50N)	Gear Wheel - 50Hz M/Cs	1	74	732114	Pion	Taper Plug	1	128	737022	Tachymetre (60N)	Tachometer	1
20	732701	Pignon 63 dts (60N)	Gear Wheel - 60Hz M/Cs	1	75	732107	Couvercle Cabestan	End Cover	1	129	741545	Clavette 6 x 9	Key	1
21	747809	Roulement (6003Z)	Bearing	1	76	741628	Bille	Ball	1	130				
22	741483	Circlips 35l	Circlip	1	77	732128	Axe de Fourchette	Fork Pin	1	131	746361	Volant	Hand Wheel	1
23	741455	Circlips 17E	Circlip	2	78	732101	Cabestan	Swivel Housing	1	(22)	741483	Circlips 35l	Circlip	1
24	740507RF	Poulie Avant	Pulley Assembly - Front	1	79	741454	Circlips 16E	Circlip	2	(23)	741455	Circlips 17E	Circlip	1
25	743982	Vis CHC M8 x 20	Screw	3	80	732336	Vernier Métrique	Scale - Metric	1	132	744151	Vis STHC M4 x 4	Screw	1
26	732126	Rondelle de Blocage	Clamp Plate	1	80	732500	Vernier Inch	Scale - Inch	1	133	744451	Vis STHC M4 x 8	Screw	1
27	741467	Circlips 45E	Circlip	1	81	735554	Ecrou de Blocage	Clamp Unit	1	134	737225	Vernier Métrique	Scale - Metric	1
28	189948	Roulement (6009NRZ)	Bearing	2	82	743970	Vis CHC M6 x 20	Screw	2	134	737226	Vernier Inch	Scale - Inch	1
29	735476	Palier de Roulements	Bearing Housing	1	83	730112	Carre d'Entraînement	Drive Key	2	135	743963	Vis CHC M5 x 35	Screw	2
30	741955	Rondelle Ressort	Spring Washer	1	84	731265	Ressort	Spring	1	136	732208	Réglette Métrique	Scale - Metric	1
31	744158	Vis STHC M6 x 6	Grub Screw	2	85	741630	Bille	Ball	1	136	732498	Réglette Inch	Scale - Inch	1
32	744454	Vis STHC M6 x 15	Grub Screw	2	86	740976	Goupille 6 x 16	Pin	2	137	744181	Clou Parker	Screw	3
33	735491	Pignon Arbre	Gear Wheel	1	87	743959	Vis CHC M5 x 15	Screw	3	138	741510	Clavette 5 x 5 x 15	Key	1
34	732624	Entretoise Arrière	Spacer - Rear	1	88	732104	Boftier Ressort	Spring Housing	1	139	732105	Arbre Crabot	Clutch Shaft	1
35	747816	Roulement (6009)	Bearing	1	89	189940	Fourreau Métrique	Quill - Metric M/Cs	1	140	745918	Bague d'Etanchéité (No. 9)	'O' Ring Seal	1
36	732623	Entretoise Avant	Spacer - Front	1	89	167493	Fourreau Inch	Quill - Inch M/Cs	1	141	737476	Fourchette du Harnais	Fork - Gear Shift	1
37	732122	Arbre Cannelé	Splined Shaft	1	90	735553	Broche SA40	Spindle - 40NS	1	142	732299	Bielle Du Marnais	Lever - Gear Change	1
38	732285	Manchon Cannelé	Splined Bush	1	91	732174	Ressort de Rappel	Balance Spring	1	143	741450	Circlips 10E	Circlip	1
39	732169	Fourchette	Shifting Fork	1	92	747858	Roulement 17010	Bearing	2	144	745916	Joint d'Etanchéité (No. 9)	'O' Ring Seal	2
40	744467	Vis STHC M6 x 10	Grub Screw	2	93	732329	Entretoise Extr.	Spacer - External	1	145	732348	Ressort	Spring	1
41	744726	Moteur 220/380 - 50Hz	Motor - 50Hz M/Cs	1	94	732330	Entretoise Interne	Spacer - Internal	1	146	732111	Ecrou	Nut	1
41	744767	Moteur 440 - 50Hz	Motor - 50Hz M/Cs	1	95	735671	Entretoise	Spacer	1	147	732177	Axe Fourchette	Fork Pin	1
41	744724	Moteur 208 - 60Hz	Motor - 60Hz M/Cs	1	96	742453	Ecrou de Blocage	Clamp Nut	1	148	741455	Circlips 17E	Circlip	1
41	744723	Moteur 230/460 - 60Hz	Motor - 60Hz M/Cs	1	97	732211	Butée Arrière	Plug - Rear	1	149	747808	Roulement 6003	Bearing	1
42		Clavette Avec le Moteur	Key - Supplied with motor	1	98	732213	Noix de Blocage	Clamp Nut	1	150	748205	Bague 12 x 18 x 20	Bush	2
43	158588	Courroie	Drive V-Belt	1	99	743970	Vis CHC M6 x 20	Screw	1	151	732120	Crabot	Clutch	1
44	740502RF	Poulie Arrière	Pulley Assy. (Rear)	1	100	741451	Circlips 12E	Circlip	1	152	741465	Circlips	Circlip	1
45	743980	Vis CHC M8 x 15	Screws	4	101	732184	Moyeu Vernier Métrique	Vernier Sleeve - Metric	1	153	744457	Vis STHC téton M8 x 15	Screw	1
46	732170	Support Fourchette	Fork Bracket	1	101	732510	Moyeu Vernier Inch	Vernier Sleeve - Inch	1	154	744167	Vis STHC bout plot M8 x 8	Screw	1
47	740971	Goupille 5 x 30	Pin	2	102	741630	Bille	Ball	1					
48	732173	Tige Commande Variateur	Shaft Assy.	1	103	731265	Ressort Moyeu	Spring	1					
49	732171	Ecrou	Pivot	1	104	744158	Vis STHC M6 x 6	Screw	1					
50	731996	Bielle de Variateur	Pivot Lever	1	105	743964	Vis CHC M5 x 45	Screw	2					
51	741515	Clavette 5 x 5 x 30	Key	1	106	744451	Vis STHC M4 x 8	Screw	1					
52	743984	Vis CHC M8 x 20	Screw	3	107	736540	Levier	Handle Assy.	1					
53	731916	Pignon d'Orientation	Spiral Gear	1	108	732209	Vis de Blocage	Screw Clamp	1					
54	744170	Vis STHC M8 x 15	Screw	1	109	732212	Butée Avant	Plug - Front	1					



7-Fig. 2 Boîte de descente manuelle  
 Manual down feed box  
 Senkrechtvorschubkasten (manuell)

**7.2 Boîte de Descente Manuelle**  
**Manual down feed box**  
**Senkrechtvorschubkasten (manuell)**

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qte
1	743997	Vis	Screw	2
2	743970	Vis CHC M6 x 20	Screw	4
3	732201	Couvercle Arrière	End Cover	1
4	744453	Vis STHC M6 x 12	Screw	3
5	170486	Bague	Bush	3
6	732053	Pignon	Worm Wheel	1
7	740969	Goupille Elastique E5 x 20	Pin	1
8		Fig. 1. No Repère 139	Fig. 1. Item 139	
9		Fig. 1. No Repère 57	Fig. 1. Item 57	
10		Fig. 1. No Repère 145	Fig. 1. Item 145	
11	735440	Vis de Blocage	Screw	1
12	1994	Pion	Plug	1
13	744160	Vis STHC M6 x 10	Screw	1
14				
15	746364	Volant	Hand Wheel	1
16	741540	Clavette Disque 5 x 7,5	Key	1
17	172713	Axe de Cde Manuelle	Shaft	1
18	732353	Vernier - Métrique	Scale - Metric	1
18	732506	Vernier - Inch	Scale - Inch	1
19	732054	Pignon	Worm Wheel	1
20	743989	Vis CHC M10 x 20	Screw	2
21	744452	Vis STHC M6 x 8	Screw	2
22	732057	Corps de Boîte	Casting	1
23	782112	Bague	Sleeve	1
24	732110	Axe Support Pignon	Shaft	1
25			Fig. 1. Item 146	
26	732200	Couvercle Mini-Rupteur	Cover	1
27	744550	Vis CBHC M4 x 8	Screw	4
28	745212	Mini-Rupteur	Micro Switch	1
29	744455	Vis STHC M6 x 20	Screw	1



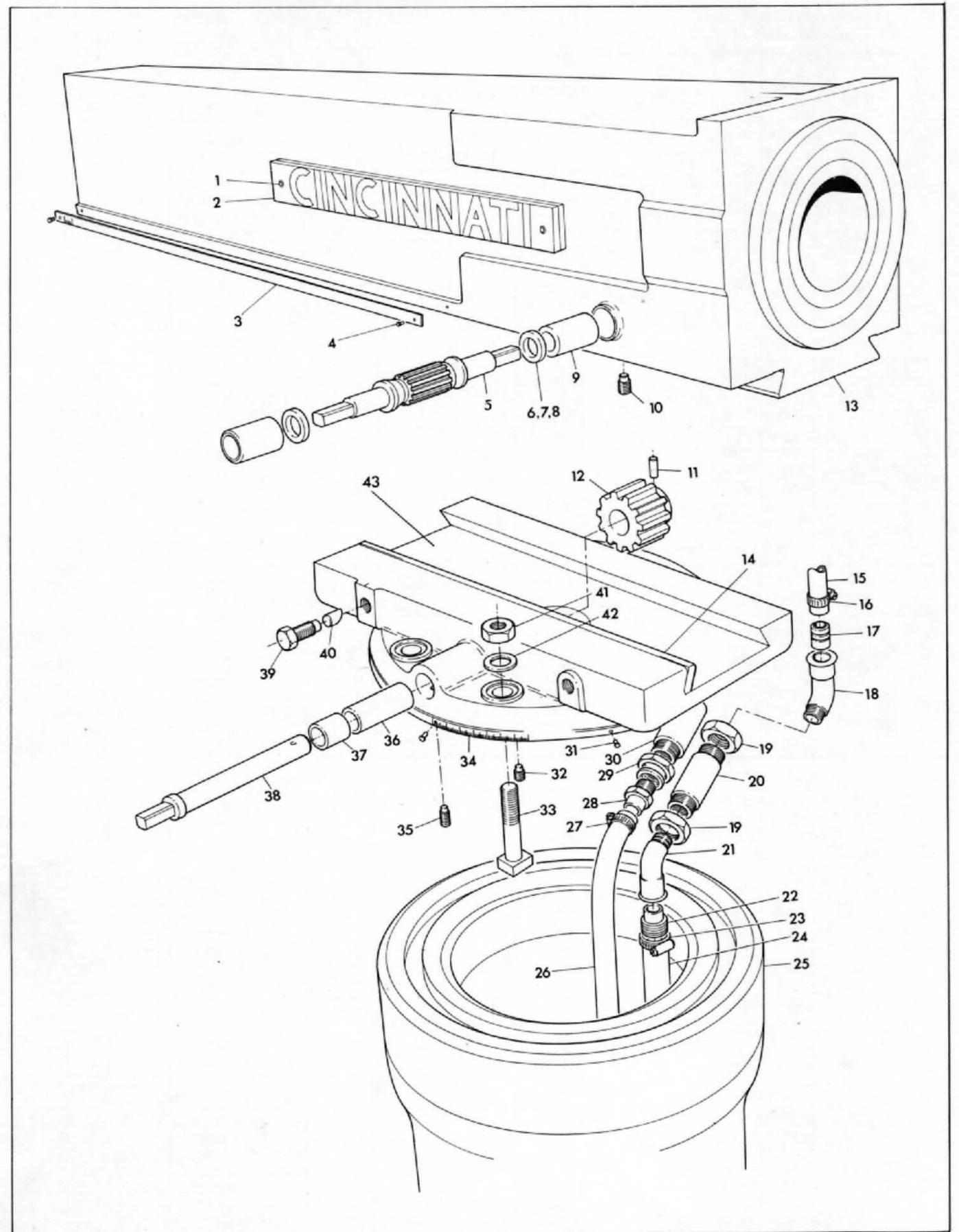
7-Fig. 3 Boîte de descente automatique  
 Quill power feed box  
 Pinolenantriebskasten (maschineller Vorschub)

7.3 Boite de Descente Automatique  
 Quill power feed box  
 Pinolenantriebskasten (maschineller Vorschub)

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	745921	Bague R No. 27	'O' Ring Seal	1
2	732187	Palier de Roulements	Bearing Housing	1
3	744455	Vis STHC M6 x 20	Screw	1
4	747887	Roulement à Billes	Bearing	2
5	76644	Vis	Screw	1
6	745911	Entretoise Interne	Spacer Internal	1
7	158696	Ressort	Clutch Spring	1
8	116965	Roulement	Needle Bearings	2
9	173332	Pignon	Bevel Gear	1
10	732833	Palier de Roulements	Bearing Housing	1
11	79526	Roulement	Needle Bearing	1
12	746824	Voyant Bijur B5184	Oil Sight Gauge	1
13	732829	Arbre Crabot	Clutch Shaft	1
14	3279	Clavette	Key	1
15	741540	Clavette Disque 5 x 7,5	Key	1
16	748208	Bague	Bush	1
17	166474	Joint Excelsior	Gasket	1
18	166217	Couvercle	Front Cover	1
19	743969	Vis CHC M6 x 15	Screw	4
20	735440	Vis	Screw	1
21	1994	Pion	Plug	1
22	746364	Volant	Hand Wheel	1
23	744256	Vis STHC Cuvette M6 x 10	Screw	1
24	732353	Vernier - Métrique	Scale - Metric	1
24	732506	Vernier - Inch	Scale - Inch	1
25	166219	Fentre	Seal	1
26	166220	Bague	Bush	1
27	732045	Pignon d'Orientation	Spiral Gear	1
28	744455	Vis STHC Téton M6 x 20	Screw	1
29	732848	Bague	Bush	1
30	732046	Pignon	Bevel Gear	1
31	259598	Bague	Bush	1
32	732304	Arbre Cannelé	Splined Shaft	1
33	732307	Crabot	Clutch	1
34	732047	Pignon	Bevel Gear	1
35	236956	Circlips	Circlip	1
36	166211	Butée	Plug	1
37	744453	Vis STHC Téton M6 x 12	Screw	1
38	166209	Roulement	Bearing	1
39	745922	Bague R No. 29	'O' Ring Seal	1
40	744468	Vis STHC M5 x 10	Screw	1
41	736539	Levier	Handle Assy.	1
42	740965	Goupille Mécanidus 4 x 25-	Pin	1
43	745916	Bague JF 4 No. 9	'O' Ring Seal	1
44	3280	Clavette	Key	1
45	732021	Corps de Boîte	Housing	1
46	173342	Arbre	Shaft	1
47	740970	Goupille	Pin	1
48	166246	Bague	Bush	1
49	158618	Goupille Mécanidus	Dowel	2
50	173340	Fourchette	Fork	1
51	170482	Arbre	Shaft	1
52	733540	Butée	Plug	1
53A	741051	Goupille LGC GGP2 - 6 x 28	Peg	1
53B	741050	Goupille LGC GGP2 - 6 x 20	Peg	1

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
54	166248	Ressort	Spring	1
55	178275	Levier de détente	Detent - Shifting Shaft	1
56	253007	Circlips	Circlip	1
57	—	—	—	—
58	732637	Axe Support Boule	Pivot Pin	1
59	740969	Goupille	Pin	3
60	166451	Levier	Detent Arm	1
61	741775	Clou Parker No. 2 lg 6,4	Screw - Self Tapping	3
62	732305	Arbre	Intermediate Shaft	1
63	732048	Pignon	Bevel Gear	1
64	170494	Bague	Bush	1
65	741468	Circlips	Circlip	1
66	732049	Pignon	Idler Gear	2
67	741552	Clavette Disque	Key	1
68	732050	Pignon	Idler Gear	1
69	741458	Circlips	Circlip	1
70	170495	Bague	Bush	1
71	732323	Plaque d'instruction - Métrique	Feed Indicator Plate - Metric	1
71	733307	Plaque d'instruction - Inch	Feed Indicator Plate - Inch	1
72	732345	Bouton Sélection	Selector Knob	1
73	745919	Bague JF 4 No. 25	'O' Ring Seal	1
74	744551	Vis TBHC M6 x 15	Screw	3
75	237417	Ressort	Spring	2
76	218832	Bille	Ball	2
77	732110	Axe Support Pignon	Item 24. Fig. 2	1
78	744550	Vis TBHC M4 x 10	Screw	7
79	745920	Bague	Bush	1
80	732205	Couvercle - Métrique	Cover Plate - Metric M/Cs	1
80	732513	Couvercle - Inch	Cover Plate - Inch M/Cs	1
81	745916	Bague	Bush	1
82	732112	Entretoise	Spacer	1
83	172721	Rondelle Butée	Selector Plate	1
84	76644	Butée	Drain Plug	1
85	732054	Pignon	Gear	1
86	744452	Vis STHC Téton Court M6 x 8	Screw	2
87	2364	Vis	Screw	1
88	173313	Fourchette	Fork	1
89	170483	Bague	Bush	1
90	732052	Pignon	Idler Gear	1
91	732051	Pignon	Idler Gear	1
92	732053	Pignon	Worm Wheel	1
93	170486	Bague	Bush	1
94	732202	Joint Excelsior	Gasket	1
95	732201	Couvercle	Cover	1
96	743969	Vis CHC M6 x 15	Screw	1
97	732822	Entretoise	Spacer	1
98	745921	Bague R No. 27	Sealing Ring	1
99	732823	Bouchon	Plug	1
100	744167	Vis STHC M8 x 8	Screw	1
101	140228	Circlips	Circlip	2
102	158697	Butée	Retainer	1
103	158696	Ressort	Clutch Spring	1
104	79526	Roulement	Needle Bearing	1
105	173333	Pignon	Gear Shaft	1
106	158697	Butée	Retainer	1
107	746849	Bouchon Eléatco 1/4" gaz	Plug	1
108	736827	Axe	Selector Pin	1
109	736826	Levier	Lever	1
110	184668	Pignon	Gear Shaft	1

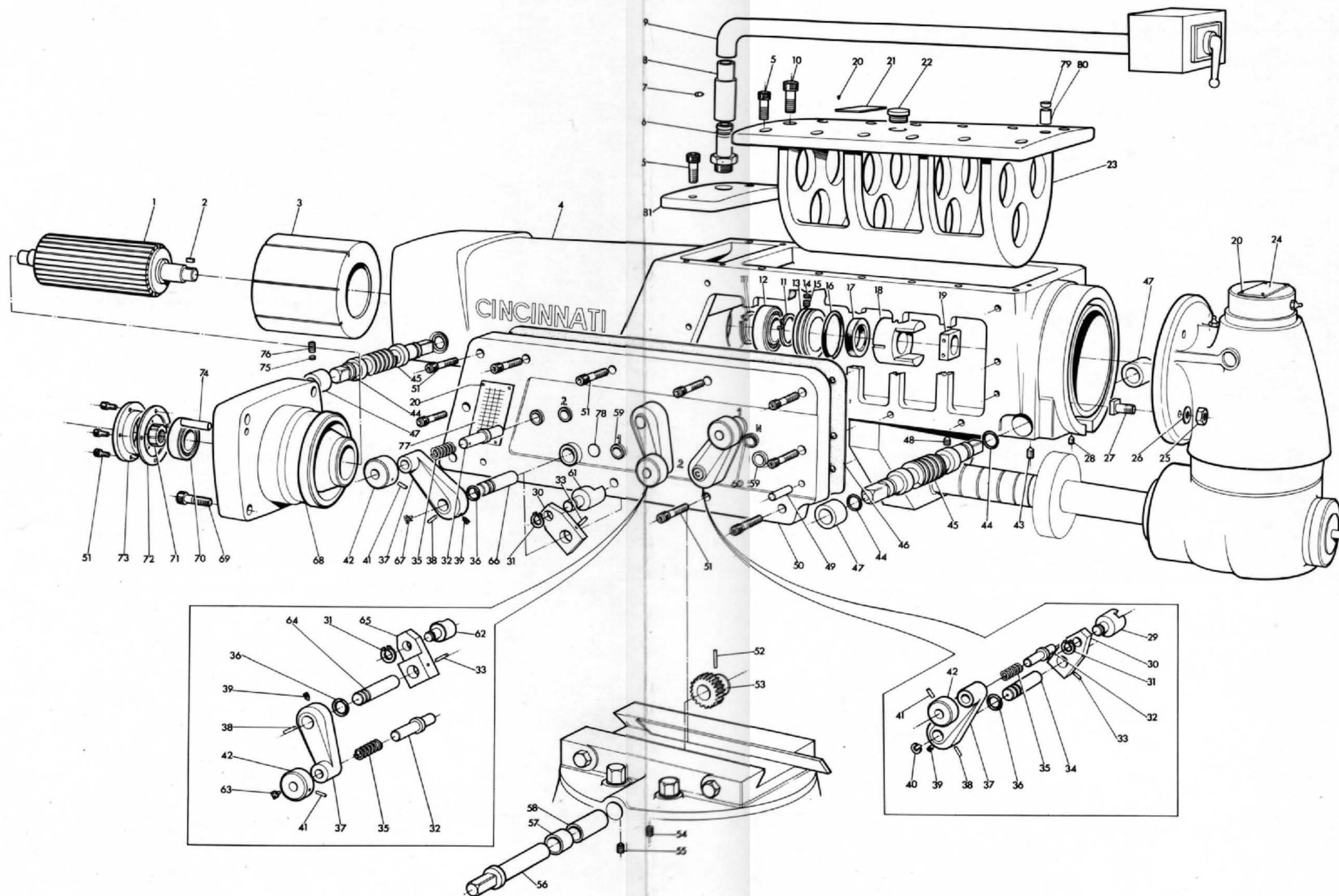
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
111	741105	Goupille Cylindrique 4 x 10	Pin	2
112	743010	Vis TF/90 M5 x 10	Screw	4
113	732041	Pignon	Gear	1
114	732807	Butée	Retainer	1
115	240852	Circlips	Circlip	1
116	744455	Vis - Allen St. téton 6 x 20	Screw	1
117	743997	Vis - Allen M10 x 116	Screw	2
118	743989	Vis - Allen CC 10 x 20	Screw	2



7-Fig. 4 Bras - Tourelle - Colonne  
 Overarm - Turret - Column  
 Gegenhalter - Schwenkopf - Saule

7.4 Bras - Tourelle - Colonne  
Overarm - Turret - Column  
Gegenhalter - Schwenkkopf - Saule

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	744570	Vis	Screw	2
2	1425031	Plaque de Fabrication	Name Plate	2
3	736963	Règle - Métrique	Scale - Metric	1
	737105	Règle - Inch	Scale - Inch	1
4	741775	Clou Parker	Self-tapping Screw	2
5	731937	Vis sans fin	Wind Shaft	1
6	748081	Butée à aiguilles	Needle Thrust	2
7	748082	Rondelle	Plate	2
8	748083	Rondelle	Plate	2
9	731938	Bague	Bush	2
10	744473	Vis CTHC Téton Court M12 x 20	Plug	2
11	740978	Goupille Elastique	Dowel	1
12	735964	Pignon d'avance du bras	Gear	1
13	735950	Bras	Overarm	1
14	735442	Lardon	Gib	1
15	747270	Tuyau	Pipeline	1
16	745709	Collier	Pipe Clip	1
17	735963	Raccord	Pipe Adaptor	1
18	747430	Adapteur condensé	Elbow	1
19	745436	Ecrou	Nut	2
20	735962	Tuyau	Pipe	1
21	747430	Adapteur condensé	Elbow	1
22	735481	Raccord	Pipe Adaptor	1
23	745710	Collier	Pipe Clip	1
24	747271	Tuyau	Pipeline	1
25	737549	Colonne	Column	1
26	745048	Tuyau	Pipeline	1
27	745703	Collier	Pipe Clip	1
28	745453	Raccord	Pipe Adaptor	1
29	745437	Ecrou	Nut	1
30	736911	Tuyau	Pipe	1
31	741775	Clou Parker	Self-tapping Screw	2
32	744457	Vis STHC Téton M8 x 15	Screw	1
33	742463	Tirant a T - 16A x 80	Tee-bolt	4
34	736964	Règle	Scale	1
35	744458	Vis STHC Téton M8 x 20	Screw	1
36	731954	Bague	Bush	1
37	731953	Bague	Bush	1
38	735959	Arbre	Shaft	1
39	733366	Vis de Blocage	Clamping Screw	2
40	731976	Doigt de Blocage	Shoe	2
41	736039	Ecrou	Nut	4
42	736040	Rondelle	Washer	4
43	735949	Tourelle	Turret	1

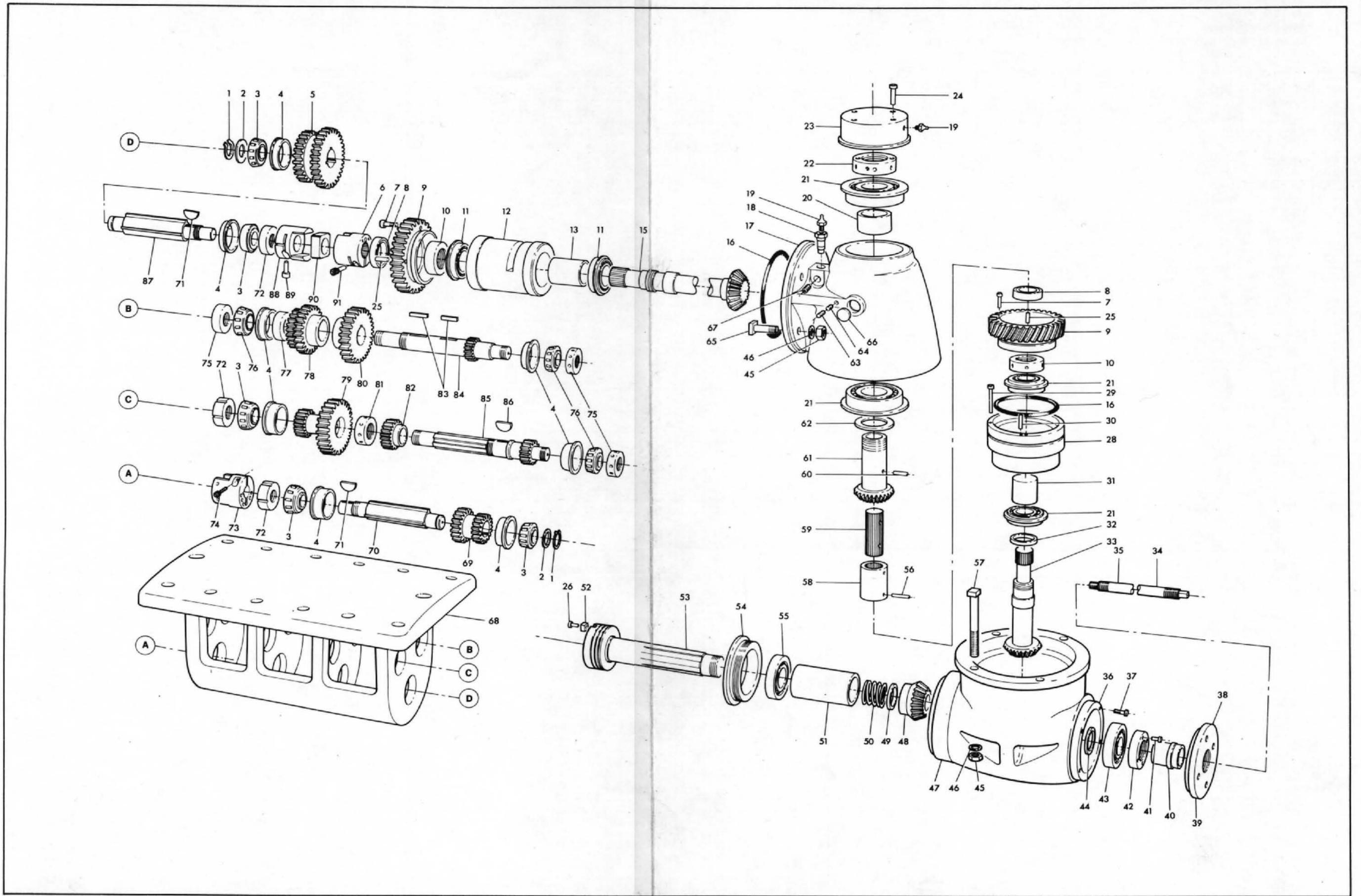


7-Fig. 5 Bras HD  
 Heavy Duty Overarm  
 Gegenhalter in schwerer Ausführung

7.5 Bras - HD  
Heavy Duty Overarm  
Gegenhalter in schwerer Ausführung

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	736397	Arbre	Shaft - Motor	1
2	3307	Clavette	Key	1
3	744758	Moteur	Motor	1
4	183616	Bras	Overarm	1
5	3266	Vis CHC 3/8" - 1"	Screw	12
6	736354	Raccord	Connector	1
7	744367	Vis STHC bout pointu 4 x 6	Screw	1
8	736355	Guide Tube	Sleeve	1
9	736356	Boftier de Cte	Pendant - Switch Support	1
10	3251	Vis STHC 1/2" - 1/2"	Screw	2
11	122094	Circlips	Circlip	2
12	221123	Roulement	Bearing	2
13	143298	Bague	Retainer - Oil Seal	1
14	2355	Vis	Screw	1
15	2343	Vis	Screw	1
16	139787	Joint d'Etanchéité	'O' Ring Seal	1
17	93235	Fentre	Oil Seal	1
18	227570	Fourchette	Coupling	1
19	97264	Bloc	Coupling Centre	1
20	2209	Clou Parker	Screw - Self Tapping	12
21	167039	Plaque	Name Plate	1
22	60959	Bouchon Remplissage	Plug	1
23	143317	Carter Boîte	Gear Housing	1
24	167038	Plaque	Name Plate	1
25	2057	Ecrou	Nut	4
26	143300	Rondelle	Washer	4
27	3311	Tirant a 'T' 1/2" - 2"	Tee Bolt	1
28	105147	Vis STHC 3/8" - 3/8"	Set Screw	2
29	144315	Fourchette	Fork - Shifter 'C'	1
30	143310	Levier	Arm - Speed Shifter 'A' & 'C'	2
31	236956	Rond - Truarc	Ring - Truarc	1
32	178278	Axe Levier	Pin - Index	3
33	143319	Goupille	Roll Pin	1
34	143308	Axe	Shaft - Speed Shifter 'C'	1
35	134367	Ressort	Spring	3
36	129871	Joint d'Etanchéité	'O' Ring Seal	3
37	178277	Levier	Lever - Speed Selector	3
38	143311	Goupille	Roll Pin	3
39	78600	Vis STHC 1/4" x 3/8"	Set Screw	3
40	3336	Lettre 'C'	Letter 'C'	1
41	143329	Goupille	Roll Pin	3
42	151453	Bouton	Knob	3
43	105147	Vis STHC 3/8" - 3/8"	Set Screw	2
44	246308	Joint d'étanchéité	'O' Ring Seal	4
45	148623	Axe	Shaft	2
46	143332	Joint Exelsior	Gasket	1
47	148624	Bague	Bush	4
48	216607	Vis - 3/8"	Screw Plug	1
49	1966	Goupille	Pin	2
50	178251	Plaque	Plate - Speed Control	1
51	2320	Vis CHC 5/16" - 3/4"	Screw	12
52	740978	Goupille	Pin	1
53	735964	Pignon	Pinion	1
54	744458	Vis	Screw	1
55	744457	Vis	Screw	1
56	735959	Axe	Pinion Shaft	1
57	731953	Bague	Bush	1
58	731954	Bague	Bush	1
59	143303	Butée	Stop - Speed Change	1

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
60	143304	Butée	Stop - Speed Change	1
61	143309	Fourchette	Fork - Shifter 'A'	1
62	143312	Fourchette	Fork - Shifter 'B'	1
63	3335	Lettre 'B'	Letter 'B'	1
64	143313	Axe	Shaft - Speed Shifter 'B'	1
65	143314	Levier	Arm - Speed Shifter 'B'	1
66	143308	Axe	Shaft - Speed Shifter 'A'	1
67	3334	Lettre 'A'	Letter 'A'	1
68	736188	Courvercle	End Bracket	1
69	3406	Vis - CHC 1/2" - 2 3/4"	Screw	4
70	181120	Roulement	Bearing	1
71	748262	Ecrou	Locknut	1
72	143537	Rondelle de roulement	Retainer	1
73	181119	Palier Support	Retainer	1
74	736184	Goupille	Pin	2
75	2356	Vis	Screw	1
76	3233	Vis	Screw	1
77	736668	Plaque	Plate - Speed Selector	1
78	115591	Voyant Bijur	Oil Sight Gauge	1
79	23173	Bouchon	Plug	2
80	1664	Goupille	Pin	2
81	143301	Courvercle	Cover	1

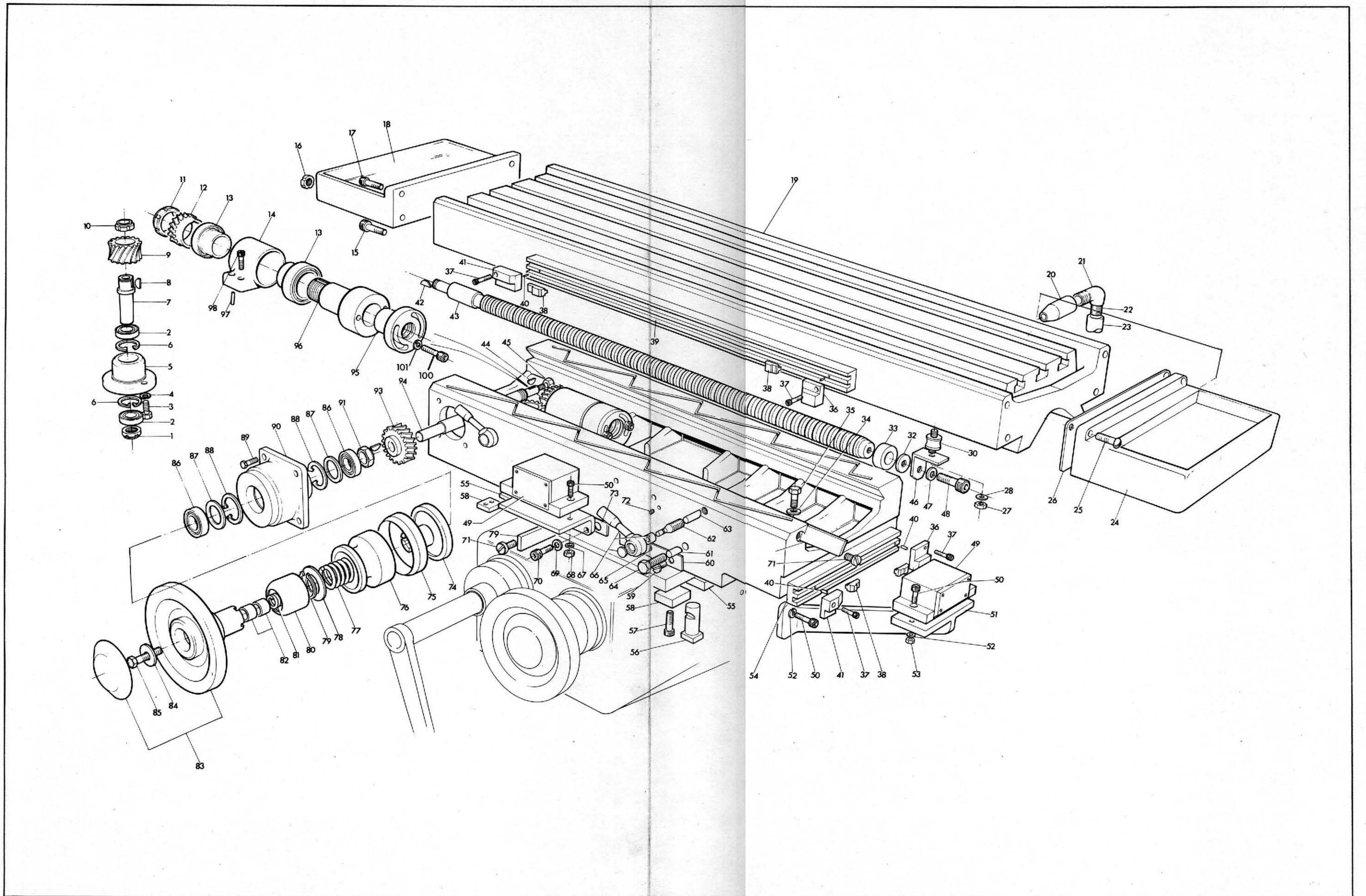


7-Fig. 6 Bras HD  
 Heavy Duty Overarm  
 Gegenhalter in schwerer Ausführung

7.6 Bras - HD  
Heavy Duty Overarm  
Gegenhalter in schwerer Ausführung

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	113079	Circlips	Circlip	2
2	143320	Rondelle de Roulements	Retainer	2
3	202876	Roulement	Bearing	5
4	202877	Palier de Roulements	Bearing Cup	5
5	143328	Pignon	Gear	1
6	168146	Fourchette	Coupling	1
7	3227	Vis 1/4" - 1"	Screw	8
8	93233	Fentre	Oil Seal	2
9	168147	Pignon	Gear	1
10	4244	Ecrou	Lock Nut	2
11	252554	Roulement	Bearing	2
12	167900	Palier de Roulements	Housing - Bearing	1
13	178950	Entretoise	Spacer	1
15	168145	Axe	Shaft	1
16	251229	Joint d'Étanchéité	'O' Ring Seal	2
17	167875	Corps de Boîte	Housing - Swivel	1
18	150741	Adaptateur	Adapter	1
19	3342	Bout	Nipple	1
20	170951	Entretoise	Spacer	1
21	78394	Roulement	Bearing	4
22	4246	Ecrou	Nut	1
23	143337	Courvercle	End Cover	1
24	3217	Vis	Screw	4
25	3543	Goupille	Pin	2
26	3396	Vis	Screw	2
28	168141	Palier de Roulements	Housing - Bearing	1
29	3158	Vis	Screw	4
30	3543	Goupille	Pin	1
31	178952	Entretoise	Spacer	1
32	102729	Entretoise	Spacer	1
33	168162	Axe	Shaft	1
34	736340	Barre de Rappel - Métrique	Draw-in Bolt - Metric	1
35	736450	Barre de Rappel - Inch	Draw-in Bolt - Inch	1
36	184672	Courvercle	End Housing - Bearing	1
37	3227	Vis	Screw	4
38	736341	Ecrou - Métrique	Arbor Nut - Metric	1
39	736451	Ecrou - Inch	Arbor Nut - Inch	1
40	78986	Ecrou de rappel	Draw-in Plug	1
41	3218	Vis CHC 1/4" - 1/2"	Screw	1
42	103308	Ecrou	Nut - Spindle Lock	1
43	76669	Roulement	Bearing	1
44	102727	Entretoise	Spacer	1
45	2057	Ecrou	Nut	4
46	143300	Rondelle	Washer	4
47	168151	Corps de Boîte	Casing	1
48	143352	Pignon	Gear	1
49	78387	Rondelle de Ressort	Retainer - Spring	1
50	78388	Ressort	Spring	1
51	168160	Entretoise	Sleeve	1
52	70049	Clavette	Key	1
53	186581	Broche	Spindle	1
54	78982	Ecrou	Retainer	1
55	217925	Roulement	Bearing	1
56	148045	Goupille	Roll Pin	1
57	3311	Tirant a 'T' 1/2" - 2"	Tee Bolt	4
58	170764	Entretoise	Sleeve	1
59	170765	Axe	Shaft	1
60	148417	Goupille	Pin	1

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
61	170763	Pignon	Gear	1
62	102729	Entretoise	Spacer	1
63	1911	Vis STHC bt plat 3/8 NIC	Screw	1
64	3211	Vis STHC bt plat 3/8 NIC	Screw	1
65	3311	Tirant a 'T' 1/2" - 2"	Tee Bolt	4
66	69448	Bouchon	Plug - Expansion	1
67	3232	Vis	Screw	1
68	143317	Corps de Boîte	Housing	1
69	143321	Pignon 60Hz	Gear 60Hz M/Cs	1
69	158507	Pignon 50Hz	Gear 50Hz M/Cs	1
70	143320	Axe	Shaft	1
71	703074	Clavette	Key	2
72	4242	Ecrou	Lock Nut	3
73	225482	Fourchette	Coupling	1
74	3400	Vis CHC 3/8" - 2"	Screw	1
75	4243	Ecrou	Lock Nut	3
76	108345	Roulement	Bearing	3
77	221399	Ecrou	Adjusting Nut	1
78	143324	Pignon 60Hz	Gear 60Hz	1
78	158508	Pignon 50Hz	Gear 50Hz	1
79	143327	Pignon	Gear	1
80	143323	Pignon	Gear	1
81	4188	Ecrou	Lock Nut	1
82	143326	Pignon	Gear	1
83	814	Clavette	Key	2
84	143322	Axe	Shaft	1
85	143325	Axe	Shaft	1
86	3281	Clavette	Key	1
87	143320	Axe	Shaft	1
88	225482	Fourchette	Coupling	1
89	3400	Vis CHC 3/8" - 2"	Screw	1
90	97264	Bloc	Coupling	1
91	2322	Vis	Screw	1

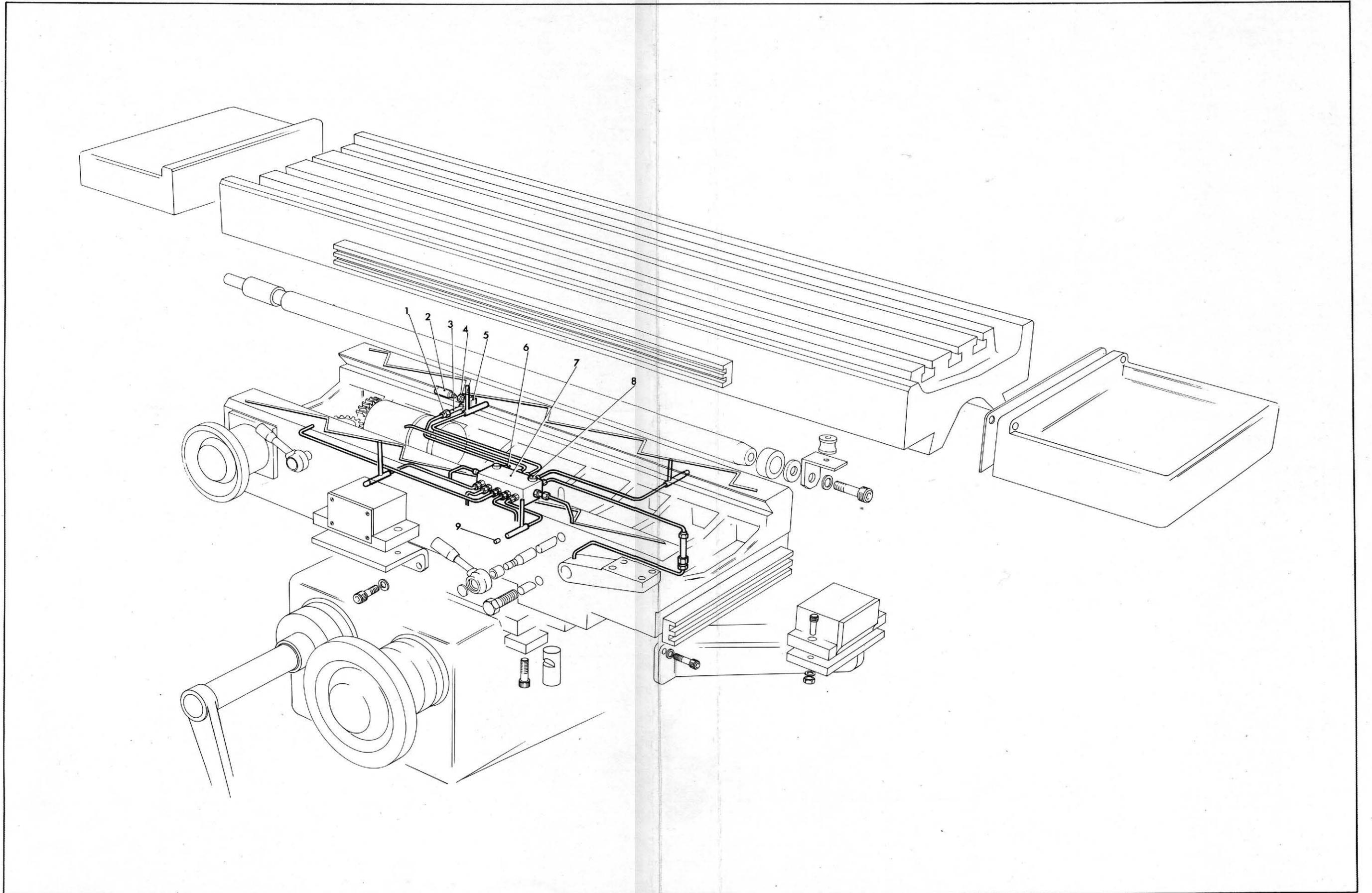


7-Fig. 7 Table et Chariot  
Table and Saddle  
Tisch und Kreuzschieber

7.7 Table et Chariot  
Table and Saddle  
Tisch und Kreuzschieber

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	4748262	Ecrou Autobloquant CN70-25	Nut	2
2	4747812	Roulement 25BC-10	Bearing	2
3	4742619	Vis H M8 x 30	Screw	3
4	4742013	Rondelle Z 8U	Washer	3
5	4735888	Palier Support	Housing	1
6	4741485	Circlips 471	Circlip	2
7	4735886	Axe Support Pignon	Shaft	1
8	4741545	Clavette Disque 6 x 9	Key	2
9	4735887	Pignon - Intermède Longitudinal	Gear	1
10	4748263	Ecrou CN 70 - 30	Nut	1
11	4748270	Ecrou CN 70 - 45	Nut	1
12	4735890	Pignon 31 dents	Gear	1
13	4748068	Roulement Combine	Bearing	2
14	4735755	Support D'écrou	Housing	1
15	4743990	Vis CHC M10 x 25	Screw	2
16	748266	Ecrou CN 70-17	Nut	1
17	743970	Vis CHC M6-20	Screw	2
18	4736483	Embout de table gauche	Table end tray	1
19	4736941	Table	Table	1
20	737128	Tuyau	Nozzle	1
21	747484	Coude	Elbow	1
22	736700	Adaptateur	Adaptor	1
23	747278	Tuyau	Pipe	1
24	4735754	Embout de table droit	Table end tray	1
25	744562	Vis CBHC M6 x 25	Screw	4
26	4737458	Joint embout de table	Joint	1
27	742305	Ecrou H8	Nut	1
28	742005	Rondelle M8	Washer	1
29	—	—	—	—
30	4734089	Silent bloc-Paulsha Radialoc R type R00	Silent block mounting	1
31	—	—	—	—
32	4742211	Rondelle à dents DD10	Washer	1
33	4737227	Rondelle d'arrêt	Washer	1
34	4742006	Rondelle M10	Washer	4
35	4742677	Vis H M10 x 60 Classe 10,9	Bolt	4
36	4736980	Butée - fixe droite	Fixed Stop - Right	1
37	743873	Vis CHC M6 x 35	Screw	2
38	744964	Came Eucaner U.12, 16, 10	Sliding Cam	2
39	4736976	Règle - Longitudinal	Stop rail	1
40	741134	Goupille Cyl. 6 x 15	Pin	2
41	4736975	Butée - fixe gauche	Fixed Stop - Left	1
42	741545	Clavette Disque 6 x 9	Key	1
43	4735880	Vis - Longitudinale Métrique	Lead Screw - Metric	1
43	4736727	Vis - Longitudinale Inch	Lead Screw - Inch	1
44	741538	Clavette Disque 5 x 65	Key	1
45	748266	Ecrou CN 70 - 17	Nut	1
46	735941	Equerre Vis de Table	Bracket	1
47	742006	Rondelle M10	Washer	1
48	743993	Vis CHC M10 x 40	Screw	1
49	745227	Honeywell 103LD2 PG	—	1
50	743972	Vis CHC M6 x 30	Screw	4
51	737441	Support	Bracket	1
52	742012	Rondelle Z6U	Washer	2
53	742552	Ecrou HM M6	Nut	2
54	736979	Règle - Transversale	Stop Rail	1
55A	735909	Lardon - Fixe 735907	Retainer - Rear	1
55B	735908	Lardon - Inférieur fixe Arrière	Retainer - Rear	1

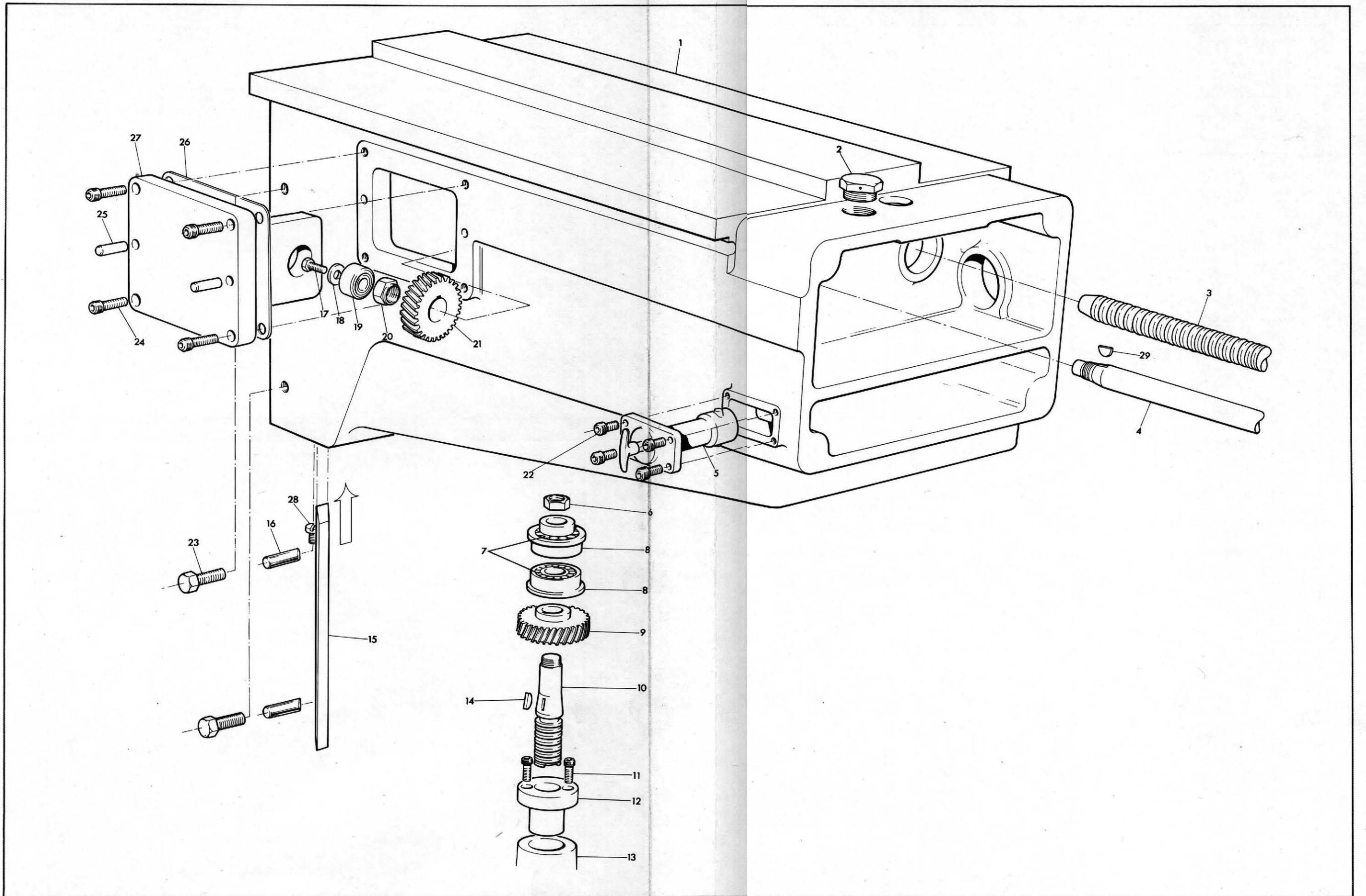
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
56	735906	Blocage - Droite	Clamp Bolt - Right	1
56	743990	Blocage - Gauche	Clamp Bolt - Left	1
57	744551	Vis CHC M10 x 25	Screw	11
58	735910	Lardon - Inférieur Fixe	Retainer	2
59	844551	Vis CBHC M6 x 15	Screw	12
60	735914	Râcleur	Wiper	4
61	735905	Pion Blocage Chariot	Lock-Pin	2
62	736541	Vis de Blocage	Screw-Shaft	2
63	735430	Pion de Blocage - Droite	Lock-Pin	1
63	735428	Pion de Blocage - Gauche	Lock-Pin	1
64	733366	Vis de Blocage	Lock-Screw	2
65	744451	Vis STHC Téton M4 x 8	Screw	2
66	736540	Volant à un Bras	Handle	2
67	742012	Rondelle Z6U	Washer	2
68	742552	Ecrou HM M6	Nut	2
69	742013	Rondelle Z8U	Washer	2
70	743981	Vis CHC M8 x 20	Screw	2
71	735904	Vis Réglage delLardon	Screw	2
72	732857	Bouchon	Plug	4
73	735913	Râcleur	Wiper	2
74	737548	Vernier - Métrique	Scale - Metric	1
74	737405	Vernier - Inch	Scale - Inch	1
75	737241	Bague - Porte Repère Zéro	Scale - Zero Ring	1
76	737546	Vernier - Métrique	Scale - Metric	1
76	737389	Vernier - Inch	Scale - Inch	1
77	737390	Ressort	Spring	1
78	737534	Rondelle-Appui Ressort	Washer - Spring Retainer	1
79	741465	Circlips 40E	Circlip	1
80	737536	Protection de Volant	Cover	1
81	737537	Ressort	Spring	1
82	748014	Roulement à Aiguilles 1NA HK 2012	Needle Bearings	2
83	746076	Volant	Hand Wheel	1
84	737535	Rondelle	Washer	1
85	742508	Vis H M6 x 20	Screw	1
86	747812	Roulement 25BC10	Bearing	2
87	742042	Rondelle - Seeger SS37 x 47 x 25	Washer	2
88	741485	Circlips 471	Circlip	2
89	743981	Vis CHC M8 x 20	Screw	4
90	735759	Palier Support	Housing	1
91	748262	Ecrou	Nut	1
92	—	—	—	—
93	735883	Pignon Longitudinal Manuel	Gear	1
94	737530	Axe de Cde Manuel	Shaft	1
95	735891	Ecrou de Réglage - Métrique	Backlash eliminator nut Metric	1
95	736728	Ecrou de Réglage - Inch	Backlash eliminator nut Inch	1
96	735889	Ecrou Longitudinal - Métrique	Lead Screw Nut - Metrique	1
96	736729	Ecrou Longitudinal - Inch	Lead Screw Nut - Inch	1
97	741264	Goupille Conique DIN7978 10 x 40	Pin	2
98	743984	Vis CHC M8 x 30	Screw	4
99	735904	Vis Réglage de Lardon	Screw	2
100	743992	Vis CHC 10 x 35	Screw	2
101	742103	Rondelle W10	Washer	2



7-Fig. 8 Lubrification - Table et Chariot  
Table and Saddle Lubrication  
Schmierung des Tisches und des Kreuzschiebers

**7.8 Lubrification Table et Chariot  
Table and Saddle Lubrication  
Schmierung des Tisches und des Kreuzschiebers**

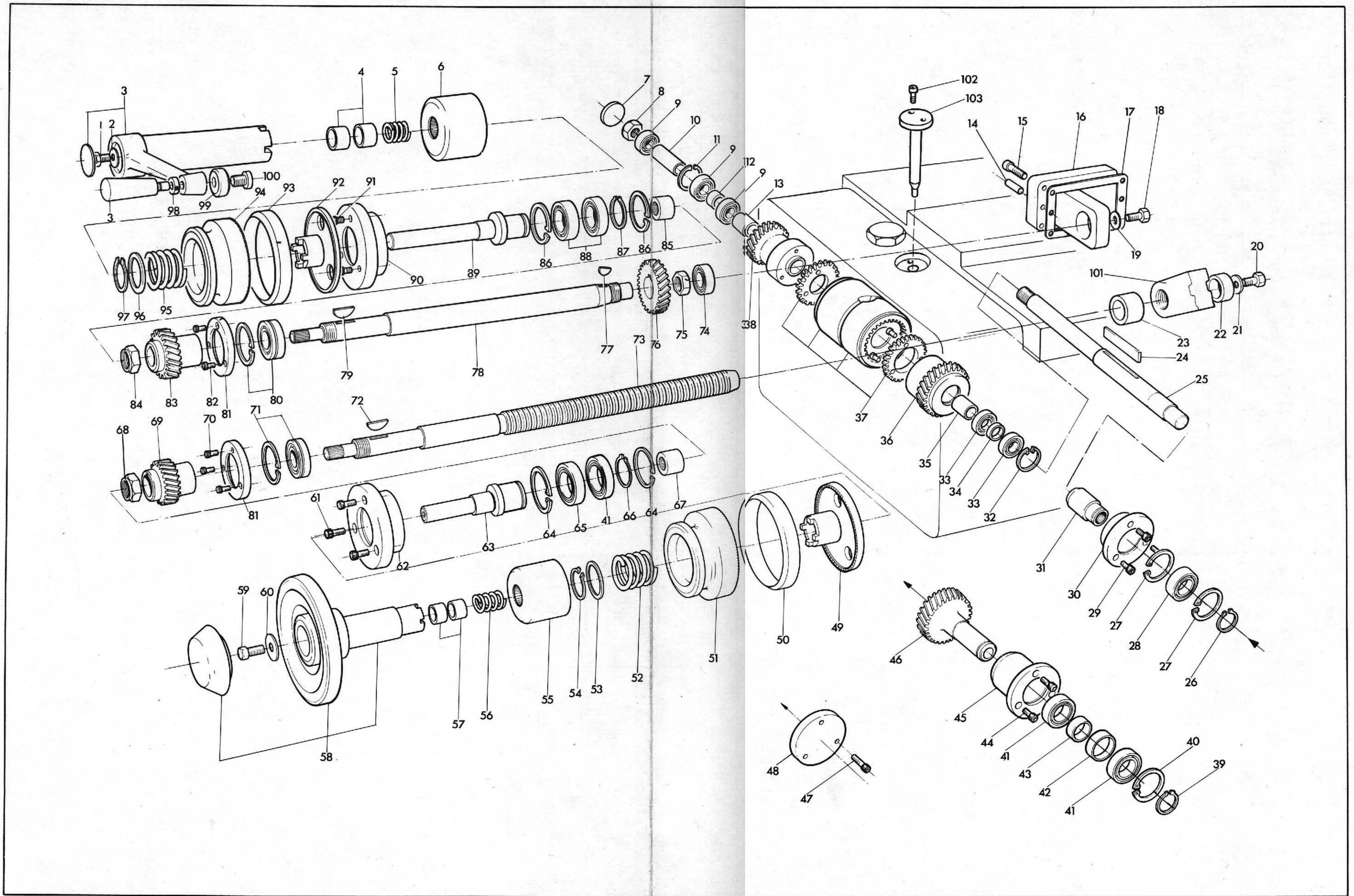
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	747590	Ecrou B1095	Nut	1
1	747650	Bicône B1061	Olive	1
2	747764	Flexible SS B3532	Hose	1
3	747352	Adapteur droit B4856	Adaptor	1
4	747591	Vis raccordement B1371	Union	1
4	747650	Bicône B1061	Olive	1
5	747360	Adapteur Coudé A3080	Adaptor	1
6	747591	Vis raccordement B1371	Union	1
6	747650	Bicône B1061	Olive	1
7	747707	Junction 12 voies - double B3249	Distribution Block	1
8	744562	Vis CBHC M6 x 25	Screw	2
9	732857	Bouchon	Plug	1



7-Fig. 9 Console  
Knee  
Kolsole

7.9 Console  
Knee  
Konsole

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	736484	Console	Knee	1
2	746852	Bouchon de remplissage	Oil Filler Plug	1
3	735879	Vis - transversale - métrique	Lead Screw - Metric	1
4	736725	Vis - transversale - inch	Lead Screw - Inch	1
5	746802	Pompe Bijur C2367	Oil Pump	1
6	748261	Ecrou - Simmonds RN10. 20NC	Nut	1
7	113515	Roulement à Rouleaux coniques	Roller Taper Bearing	2
8	113516	Bague de Roulement	Bearing Outer Race	2
9	733370	Pignon d'élévation	Gear	1
10	733361	Vis d'élévation - métrique	Lead Screw - Metric	1
10	737362	Vis d'élévation - inch	Lead Screw - Inch	1
11	743971	Vis CHC M6 x 25	Screw	2
12	737206	Ecrou d'élévation - métrique	Lead Screw Nut - Metric	1
12	737207	Ecrou d'élévation - inch	Lead Screw Nut - Inch	1
13	737954	Pied	Pedestal	1
14	741546	Clavette disque 6 x 11	Key	1
15	735469	Lardon	Gib	1
16	733365	Pion de blocage lardon	Clamp Pin	2
17	742607	Vis H6 x 15	Screw	1
18	742020	Rondelle LL6	Washer	1
19	748086	Roulement à aiguilles	Bearing	1
20	748262	Ecrou - Simmonds CN70-25	Nut	1
21	733369	Pignon d'arbre d'élévation	Gear	1
22	743969	Vis CHC 6 x 15	Screw	4
23	733366	Vis de blocage lardon	Clamp Screw	2
24	743990	Vis CHC 10 x 25	Screw	4
25	741162	Goupille cylindrique 10 x 35	Dowel	2
26	733359	Joint d'étanchéité	Gasket	1
27	733358	Palier d'arbre d'élévation	Shaft Support Bracket	1
28	735470	Vis de réglage lardon	Screw	1
29	741545	Clavette disque 6 x 9	Key	1

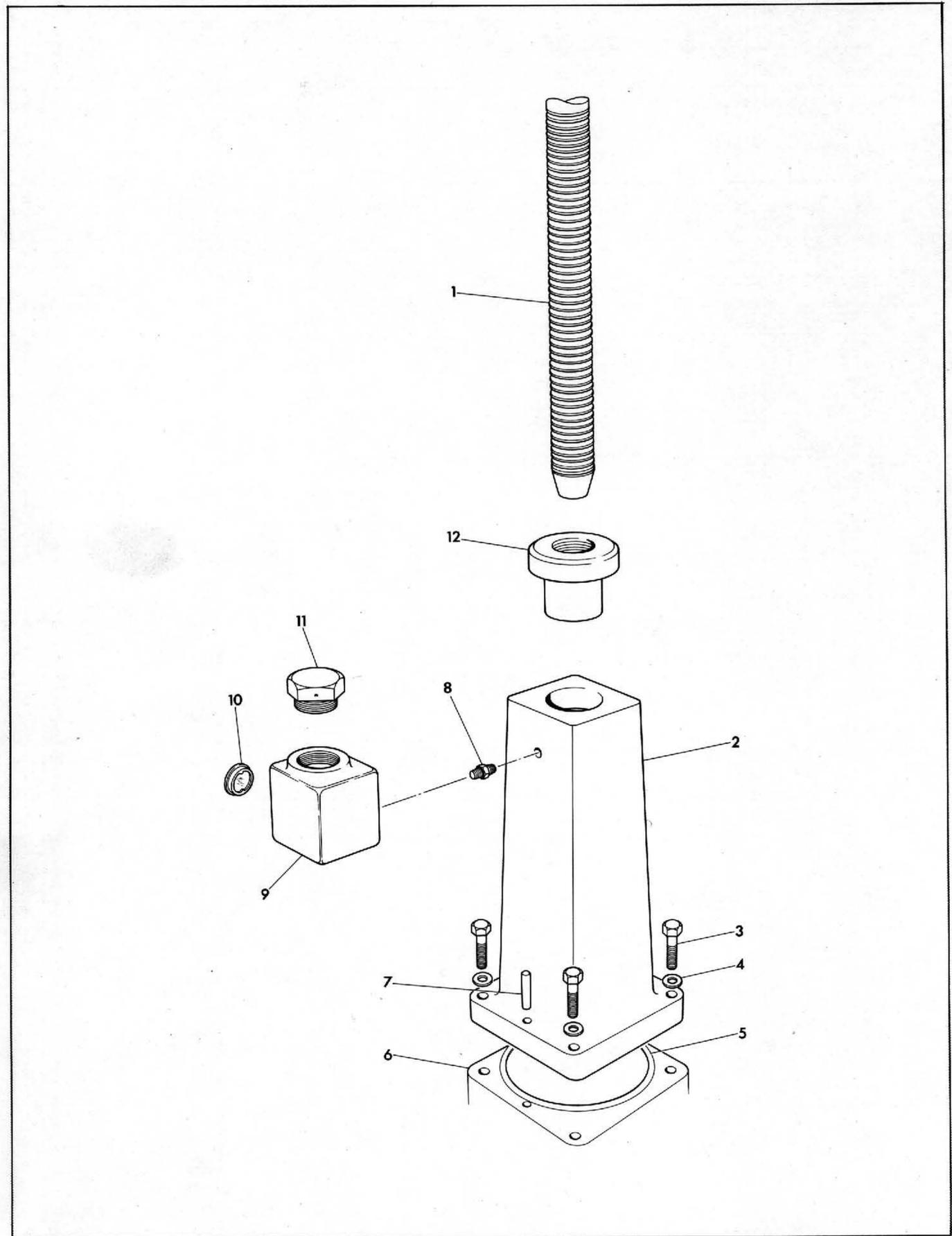


7-Fig. 10 Transmission mouvements transversal et vertical  
 Cross and vertical drive mechanisms  
 Antriebsmechanismen für Quer- und Senkrechtbewegungen

**7.10 Transmission Mouvements Transversal et Vertical**  
**Cross and Vertical drive mechanisms**  
**Antriebsmechanismen für Quer - und Senkrechtbewegungen**

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	742608	Vis H M6 x 20	Screw	1
2	737535	Rondelle d'arrêt	Washer	1
3	737532	Manivelle d'élévation	Handle	1
4	748014	Roulement à aiguilles	Bearing	2
5	737537	Ressort	Spring	1
6	737536	Protection de volant	Cover	1
7	735947	Bouchon	Blanking Disc	1
8	748266	Ecrou simmond cn70,17	Nut	1
9	747808	Roulement à billes 6003	Bearing	1
10	736465	Bague	Sleeve	1
11	741483	Circlips 35 I	Circlip	1
12	736466	Bague	Sleeve	1
13	735944	Bague	Sleeve	1
14	741162	Goupille cylindrique 10 x 35	Dowel	2
15	743990	Vis CHC 10x25	Screw	4
16	733358	Palier d'arbre d'élévation	Shaft Support Bracket	1
17	733359	Joint d'étanchéité	Gasket	1
18	742607	Vis H6 x 15	Screw	1
19	742020	Rondelle LL6	Washer	1
20	742626	Vis HM 10 x 25	Screw	1
21	742103	Rondelle W10	Washer	1
22	737168	Bague butée arrière	Sleeve	1
	736467	Ecrou transversal - métrique	Lead Screw Nut - Metric	1
	736726	Ecrou transversal - inch	Lead Screw Nut - Inch	1
23	737189	Bague - butée avant métrique	Sleeve - Metric	1
23	737188	Bague - butée avant inch	Sleeve - Inch	1
24	741155	Clavette	Key	2
25	735939	Axe	Shaft	1
26	741462	Circlips 30F	Circlip	1
27	741903	Circlips 55T	Circlip	2
28	747869	Roulement à billes 6006RS	Bearing	2
29	743970	Vis CHC M6 x 20	Screw	3
30	735937	Palier - Support roulement	Bearing Housing	1
31	735938	Palier support	Bearing Sleeve	1
32	741925	Circlips 37I	Circlips	1
33	747871	Roulement à billes ADRAY 20	Bearings	2
34	735946	Bague	Sleeve	1
35	735945	Bague	Sleeve	1
36	735942	Pignon.	Gear	1
37	746542	Embrayage électromagnétique	Warner France WAD2	1
38	735943	Pignon	Gear	1
39	741462	Circlips 30F	Circlips	1
40	741903	Circlips 55T	Circlip	1
41	747869	Roulement à billes 6006RS	Bearing	2
42	735935	Bague	Sleeve	1
43	735936	Bague	Sleeve	1
44	743970	Vis CHC M6 x 20	Screw	3
45	735937	Palier - support roulement	Bearing Housing	1
46	735934	Pignon	Gear	1
47	743970	Vis	Screw	3
48	737210	Couvercle	Cover Plate	1
49	737548	Bague - crantée métrique	Sleeve - Metric	1
49	737405	Bague - crantée inch	Sleeve - Inch	1
50	737241	Bague - porte repère 'O'	Scale - Zero Ring	1
51	737546	Vernier - métrique	Scale - Metric	1
51	737389	Vernier - inch	Scale - Inch	1
52	737390	Ressort	Spring	1

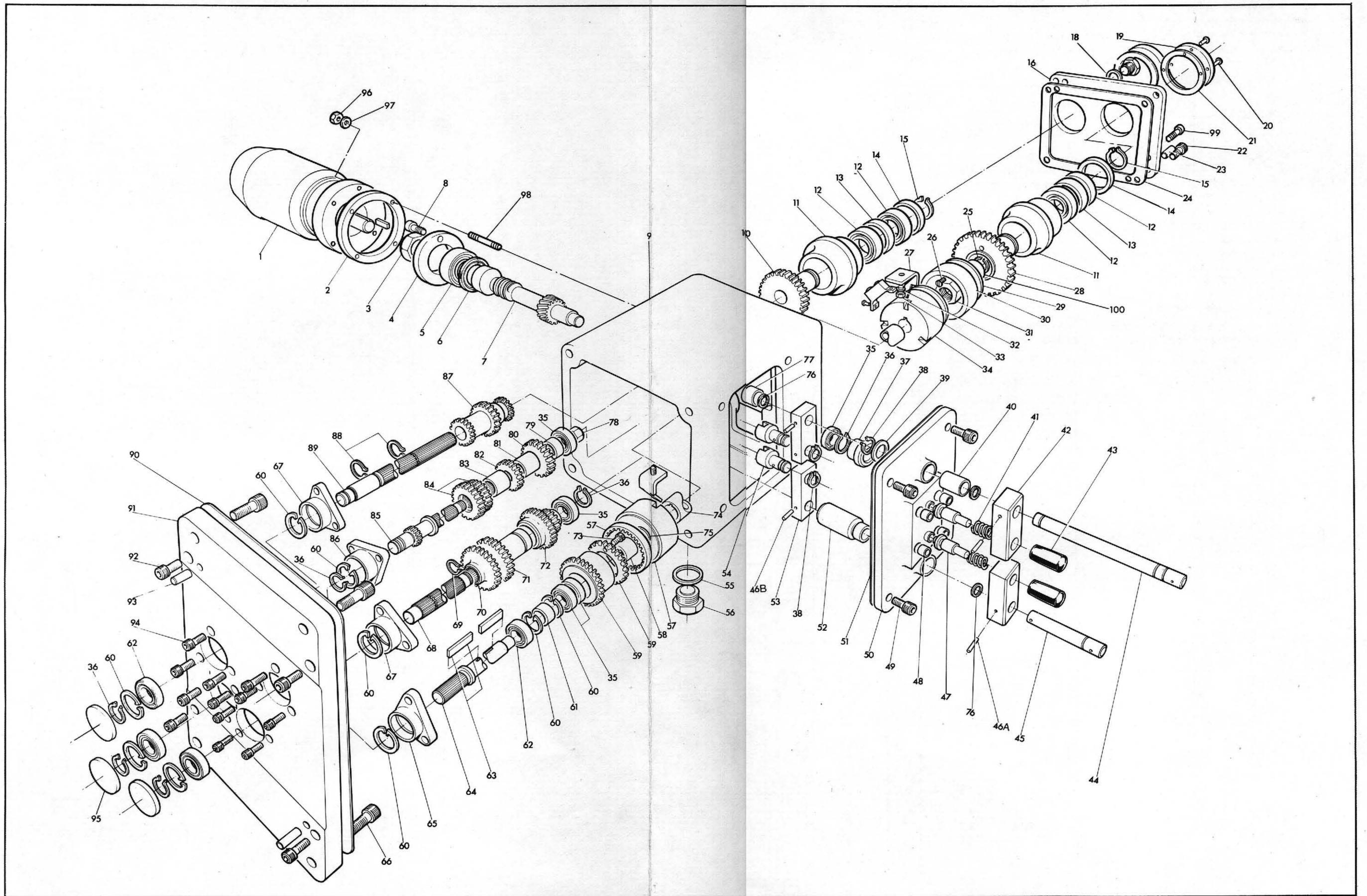
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
53	737534	Rondelle appui ressort	Washer - spring retaining	1
54	741465	Circlips	Circlip	1
55	737536	Protection de volant	Cover	1
57	748014	Roulement à aiguilles	Bearing	2
58	737533	Volant - automatique	Hand Wheel - automatic	1
58	737929	Volant - manuel	Hand Wheel - manual	1
59	742608	Vis H M6 x 20	Screw	1
60	737535	Rondelle d'arrêt	Washer	1
61	743970	Vis CHC 6 x 20	Screw	3
62	735918	Palier - support roulement	Bearing Housing	1
63	737529	Axe de Cde manuel	Shaft	1
64	741903	Circlips	Circlip	2
65	747869	Roulement à billes 6006RS	Bearing	2
66	741462	Circlips	Circlip	1
67	737399	Bague cannelé	Sleeve	1
68	748104	Ecrou	Nut	1
69	735920	Pignon avance transversales	Gear	1
70	744562	Vis CBHC M6 x 20	Screw	3
71	143375	Roulement à billes (circlips incorporé)	Bearing - complete with circlip	1
72	741547	Clavette disque 8 x 15	Key	1
73	735879	Vis transversale métrique	Lead Screw - Metric	1
73	736725	Vis transversale inch	Lead Screw - Inch	1
74	748086	Roulement à aiguilles	Bearing	1
75	748262	Ecrou autobloquant	Nut	1
76	733369	Pignon d'arbre d'élévation	Gear	1
77	741545	Clavette disque	Key	1
78	735917	Arbre de Cde d'élévation	Shaft	1
79	741547	Clavette disque	Key	1
80	143375	Roulement à billes (circlips incorporé)	Bearing - complete with circlip	1
81	735919	Chapeau	Bearing Retainer	1
82	744562	Vis CB HC M6 x 20	Screw	3
83	735921	Pignon	Gear	1
84	748104	Ecrou	Nut	1
85	737399	Bague cannelé	Sleeve	1
86	741903	Circlips	Circlip	2
87	741462	Circlips	Circlip	1
88	747869	Roulement à billes 6006RS	Bearing	2
89	738650	Axe support manuel	Shaft	1
90	735918	Palier - support roulement	Bearing Housing	1
91	743970	Vis CHC 6 x 20	Screw	3
92	737548	Bague - crantée - métrique	Sleeve - Metric	1
92	737405	Bague - crantée - inch	Sleeve - Inch	1
93	737241	Bague - porte repère zero	Scale - Zero Ring	1
94	737547	Vernier - métrique	Scale - Metric	1
94	737404	Vernier - inch	Scale - Inch	1
95	737390	Ressort	Spring	1
96	737534	Rondelle - appui ressort	Washer spring retaining	1
97	741465	Circlips	Circlip	1
98	737063	Masse Lotte de poignée	Spacer	1
99	737064	Masselotte de manivelle	Spacer	1
100	744020	Vis CHC M10 x 15	Screw	1
101	736467E	Ecrou de réglage - métrique	Lead Screw Nut - Metric	1
101	736726	Ecrou de réglage - inch	Lead Screw Nut - Inch	1
102	743967	Vis CHC 176 x 10	Screw	2
103	736488	Doigt D'Arrêt	Finger Stop	1



7-Fig. 11 Graissage vis verticale  
Elevating screw lubrication - 3 axis machines  
Schmierung der Konsolenverstellspindel - 3-Achsen - Maschine

7.11 Graissage vis Verticale  
 Elevating Screw Lubrication - 3 Axis Machines  
 Schmierung der Konsolenverstellspindel - 3-Achsen - Maschine

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	733361	Vis d'élévation - métrique	Lead Screw - Metric	1
1	733362	Vis d'élévation - inch	Lead Screw - Inch	1
2	737954	Pied	Pedestal	1
3	742628	Vis H M10 x 35	Bolt	4
4	742202	Rondelle DE10	Washer	4
5	745969	Joint torique No. 62	Joint Ring	1
6	737953	Base	Base	1
7	741116	Goupille cylindrique 6 x 30	Dowel Pin	2
8	747354	Connecteur A4019	Connector	1
9	737955	Réservoir	Reservoir	1
10	746824	Voyant B5184	Oil Sight Gauge	1
11	746852	Bouchon TCF1	Oil Filler Plug	1
12	738101	Ecrou d'élévation - métrique	Lead Screw Nut - Metric	1
12	738102	Ecrou d'élévation - inch	Lead Screw Nut - Inch	1

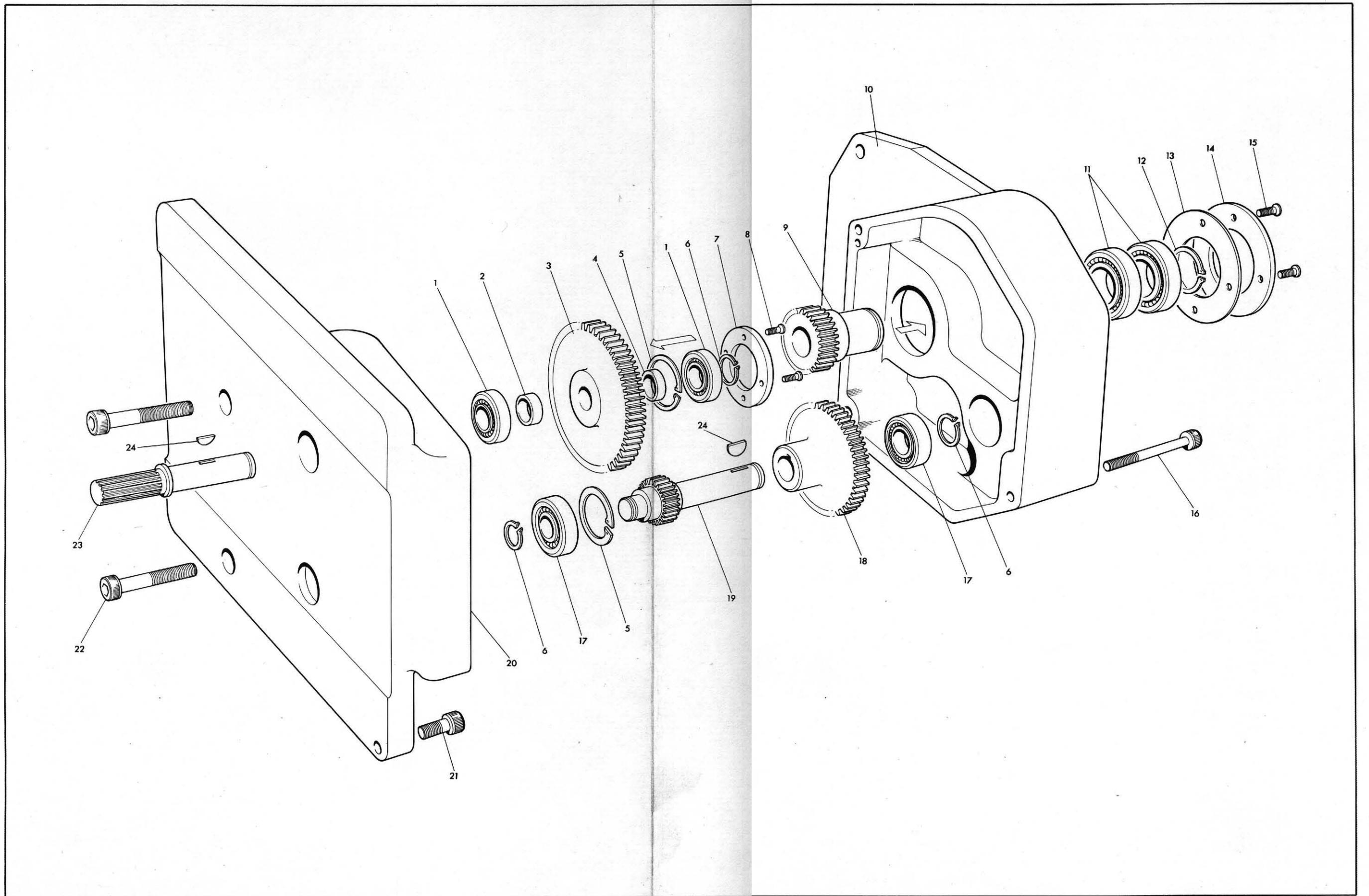


7-Fig. 12 Boîte mécanique des avances - MVTS Longitudinal - Transversal  
 Mechanical feed box - Longitudinal and Cross  
 Vorschubkasten (maschineller Vorschub) - Längs - und Querbewegungen

**7.12 Boîte Mécanique des Avances - MVTs Longitudinal – Transversal**  
**Mechanical Feed Box – Longitudinal and Cross**  
**Vorschubkasten (maschineller Vorschub) - Langs - und Querbewegungen**

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	744669	220/280 - 50Hz - Moteur	220/280 - 50Hz - Motor	1
1	744672	440 - 50Hz - Moteur	440 - 50Hz - Motor	1
1	744778	208 - 60Hz - Moteur	208 - 60Hz - Motor	1
1	744670	230/460 - 60Hz - Moteur	230/460 - 60Hz - Motor	1
2	736459	Rondelle Entretoise	Spacing Washer	1
3	748263	Ecrou Autoblôquant	Nut	1
4	736705	Rondelle de Blocage	Retaining Ring	1
5	747882	Roulement à Billes	Bearing	1
6	746008	Joint d'étanchéité	Seal	1
7	736457	Arbre Moteur vis sans fin	Shaft with Key	1
8	743969	Vis CHC	Socket Head Screw	3
9	736454	Carter Boîte	Main Casting	1
10	736527	Pignon de vis sans fin	Gear	1
11	736531	Palier de Rlt Ligna E - B	Bearing Housing. Shafts E & B	2
12	747868	Roulement à Billes	Bearing	4
13	736533	Entretoise	Spacer	2
14	736532	Entretoise	Spacer	2
15	741462	Circlip	Circlip	2
16	736534	Couvercle Support Palier	Cover Support Plate	1
17				
18	746852	Bouchon Remplissage TCF 1'' Rouge	Plug - Oil Filler	1
19	736528	Couvercle de Palier	Cover Plate	2
20	744558	Vis CB HC M5 x 20	Screw	6
21	736535	Joint D'Etanchéité Ligne EB	Gasket (Cover Plate for Shafts E & B)	2
22	743983	Vis C HC	Screw	4
23	735490	Goupille Cyl Double Dia	Dowel Pin	2
24	736462	Joint Excelsior	Gasket (Cover Support Plate)	1
25	741902	Circlip Inverse 17E	Circlip	2
26	744574	Vis F Hc/90	Screw	3
27	735800	Equerre D'Embrayage	Bracket	2
28	736526	Pignon du Rapide	Gear	1
29	736536	Cole Pelable		
30	735801	Cloche Fixation Embrayage	Clutch Bell	1
31	748260	Ecrou	Nut	1
32	742207	Rondelle Eventail	Washer	2
33	742604	Vis H	Screw	2
34	746541	Embrayage Electro	Clutch	1
35	747807	Roulement à Billes	Bearing	1
36	741453	Circlip	Circlip	2
37	746833	Voyant d'Huile	Oil Sight Gauge	1
38	741450	Circlip 10E	Circlip	3
39	742006	Rondelle	Washer	1
40	748250	Bague Bronze CT10-13 x 16	Bush Bronze	2
41	732312	Ressort	Spring	2
42	735794	Levier de Sélection	Selection Lever	2
43	746199	Poignée	Handle	2
44	736458	Axe Levier Sélection	Selection Shaft	1
45	735795	Axe Levier Sélection	Selection Shaft	1
46	740964			2 off
	740963	Goupille Elastique	Pin	each
47	733902	Axe Support	Plunger Stop	2
48	748245	Bague Acier	Plunger Bush	6
49	743981	Vis C HC	Screw	4
50	735756	Couvercle Support Levière	Cover Plate	1
51	735791	Joint d'étanchéité	Gasket	1

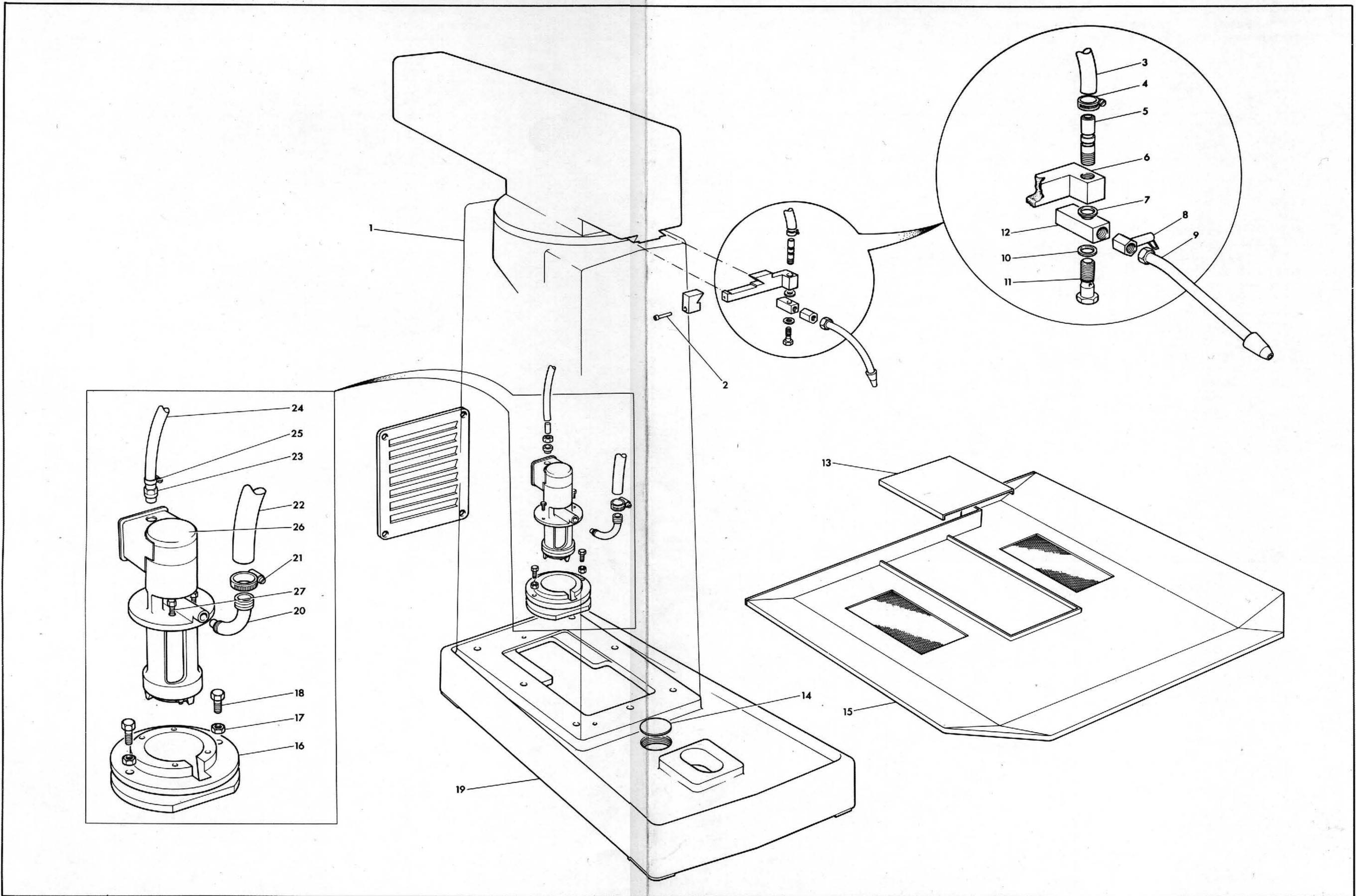
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
52	735798	Manchon Support	Sleeve	1
53	735793	Levier de Sélection	Selection Lever	2
54	735799	Fourchette de Pignon	Fork	2
55				
56	746853	Bouchon de Vindage TS0 1'' Noir	Plug - Oil Drain	1
57*	746540	Embrayage Electro	Clutch Assy.	1
58	735803	Entretoise	Spacer	1
59	735778	Pignon 73 dts	Gear	1
60	741481	Circlip	Circlip	9
61	735809	Entretoise	Spacer	1
62	747867	Roulement à Billes 735786	Bearing	4
63	741514	Clavette	Key	2
64	736529	Arbre du Rapide (E)	Shaft (E)	1
65	735797	Palier - Support Roulement	Bearing Housing	1
66	743999	Vis Fixation Boîte	Screw	4
67	735788	Boîter de Roulement	Bearing Housing	2
68	735786	Arbre de Baladeur	Shaft (D)	1
69	741455	Circlip	Circlip	2
70	735777	Pignon Fixe 72 dts	Gear	1
71	735775	Pignon Baladeur 70 dts	Gear	1
72	735779	Pignon Double Baladeur	Double Gear	1
73	743951	Vis CHC	Screw	3
74	735802	Entretoise	Spacer	1
75	745992	Rondelle Bleuie	Washer	1
76	745915	Joint Torique	Seal	3
77	748250	Bague Bronze	Bush Bronze	2
78	748101	Ecrou	Nut	1
79	735805	Entretoise	Spacer	1
80	735771	Pignon Fixe	Gear	1
81	735806	Entretoise	Spacer	1
82	735772	Pignon Fixe	Gear	1
83	735807	Entretoise	Spacer	1
84	735773	Pignon Double Fixe	Double Gear	1
85	735776	Arbre Pignon	Shaft	1
86	735813	Boîtier de Roulement	Bearing Housing	1
87	735774	Pignon Triple Baladeur	Triple Gear	1
88	741901	Circlip	Circlip	2
89	736530	Arbre de Baladeur	Shaft	1
90	736456	Joint D'Etanchéité	Gasket	1
91	736455	Couvercle Support Boîter Rlts.	Bearing Support End Plate	1
92	743983	Vis C HC	Screw	4
93	735490	Goupille Cyl. Double Dia.	Dowel Pin	2
94	743959	Vis CHC	Screw	12
95	736350	Couvercle	Cap	3
96	742504	Ecrou	Nut	4
97	742005	Rondelle	Washer	4
98	736460	Goujon	Stud	4
99	744169	Vis STHC	Screw	2
100	748054	Roulement à billes - extérieur	Bearing - Outer	1
100	748055	Roulement à billes - intérieur	Bearing - Inner	1



7-Fig. 13 Reducteur rapport 1/8 (Machine 3 axes)  
 1/8 ratio Differential unit (3 axis machines only)  
 Ausgleichsgetriebe, Übers. 1/8 (nur an 3-Achsen Maschinen)

**7.13 Réducteur Rapport 1/8 - Machine 3 Axes**  
**1/8 ratio Differential unit (3 axis machines only) Coolant System**  
**Ausgleichsgetriebe, Übers. 1/8 (nur an 3-Achsen - Maschinen)**

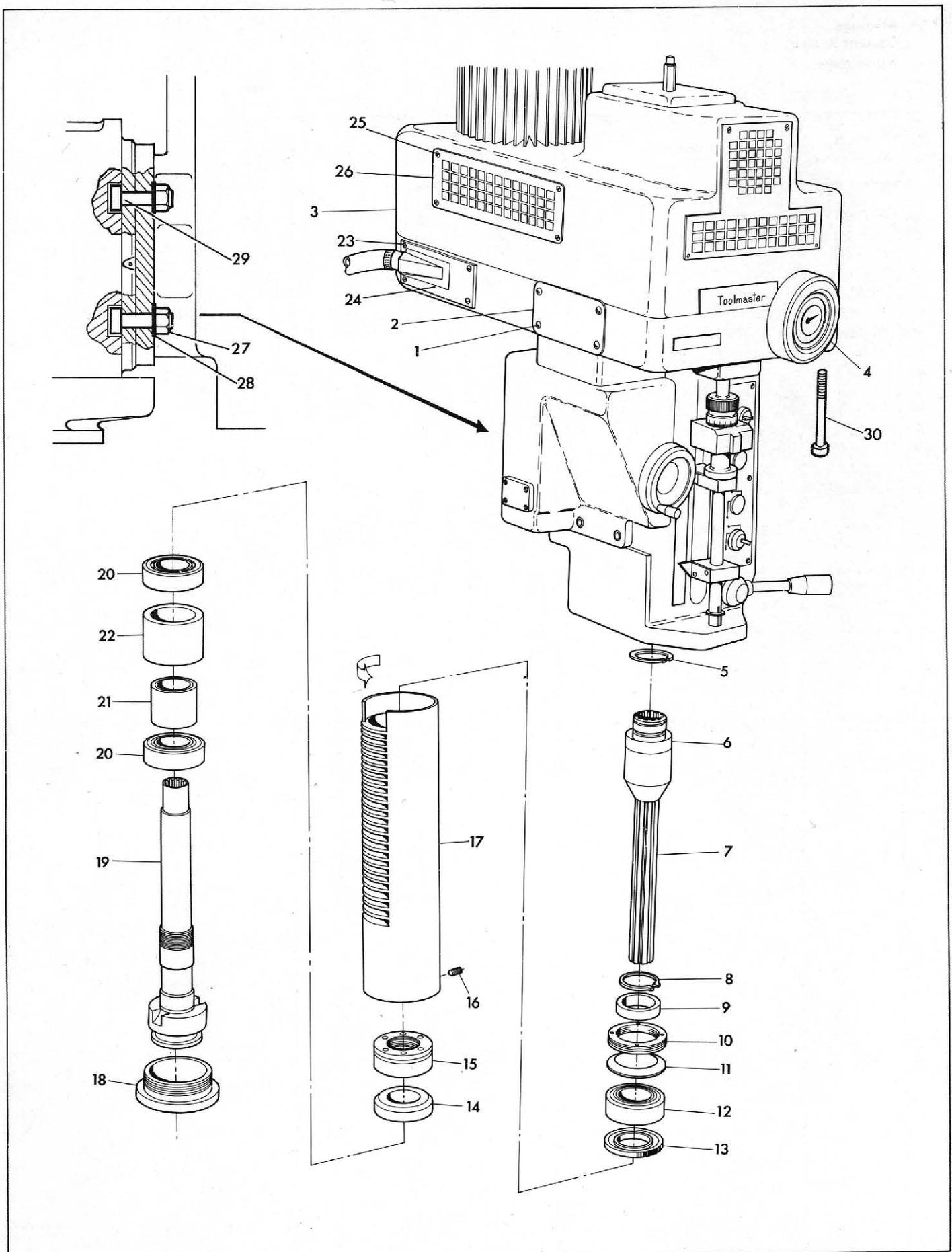
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	747878	Roulement à billes SKF 6003RS	Bearing	2
2	736819	Bague Entretoise	Bush	1
3	738149	Pignon de Sortie 80 dts	Gear	1
4	736818	Bague Entretoise	Bush	1
5	741483	Circlips 35l	Circlip	2
6	741455	Circlips 17E	Circlip	3
7	736824	Rondelle d'appui	Washer	1
8	744556	Vis CBHC5,15	Screw	3
9	736813	Pignon d'entrée 31 dts	Gear	1
10	736810	½ Carter coté moteur	Gear Casing	1
11	747869	Roulement à billes SKF 6006RS	Bearing	2
12	741462	Circlips 30E	Circlip	1
13	736825	Joint d'étanchéité	Gasket	1
14	736823	Rondelle d'appui	Cover	1
15	744575	Vis FHC 90	Screw	4
16	744015	Vis CHC M10 x 45	Screw	2
17	747878	Roulement à billes SKF 6003RS	Bearing	2
18	738148	Pignon intermédiaire 59 dts	Gear	1
19	738147	Pignon arbre 19 dts	Gear Shaft	1
20	736811	½ Carter coté	Gear Casing	1
21	743999	Vis CHC M12 x 30	Screw	4
22	744034	Vis CHC M10 x 65	Screw	2
23	736817	Arbre de sortie	Drive Shaft	1
24	741538	Clavette disque 5,6,5	Key	2



7-Fig. 14 Arrosage  
 Coolant System  
 Kuhlanlage

7.14 Arrosage  
Coolant System  
Kuhlanlage

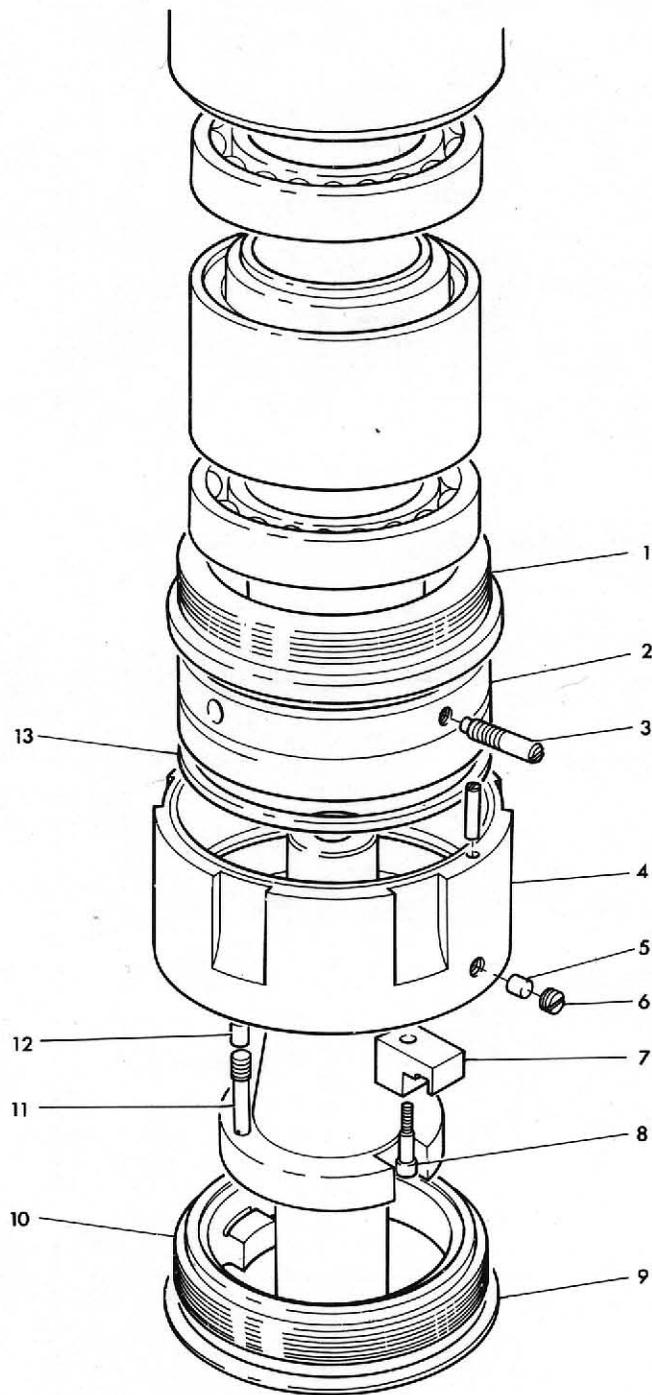
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	737549	Colonne	Column	1
2	743986	Vis CHC M8 x 40	Screw	1
3	747270	Tuyau 12 x 16 lg 800	Pipe Line	1
4	745709	Collier "Serflex" No. 000	Hose Clip	1
5	735963	Adapteur	Adapter	1
6	736959	Support	Clamp Block	1
7	747564	Bague BS 16,6	Seal Ring	1
8	747227	Robinet 3/8" Gaz	Cock	1
9	747226	Jet	Nozzle	1
10	747564	Bague BS 16,6	Seal Ring	1
11	736961	Vis	Union	1
12	736960	Manchon	Swivel Block	1
13	737554	Plaque Retenue Bac	Cover	1
14	732658	Bouchon	Drain Plug	1
15	737553	Bac	Splash Pan	1
16	738103	Support de Pompe	Mounting Plate	1
17	742558	Erou Hm 10	Nut	2
18	742622	Vis Hm 10 x 30	Screw	2
19	737953	Base	Base	1
20	747484	Coude ¾ Gaz GF No. 130	Elbow	1
21	745710	Collier "Serflex" No. 00	Pipe Clip	1
22	747271	Tuyau 20 x 25 lg 1000	Pipe Line	1
23	745449	Raccord Conducto R509. 9b	Adaptor	1
23	745575	Réduction Conducto 11/9	Adaptor	1
24	745047	Gaine 'Nomo' 15 x 21 Long 1000	Pipe Line	1
25	745701	Collier "Serflex" 14 à 24	Pipe Clip	1
26	747217	Pompe "Vauquier" LC212	Pump	1
27	742608	Vis H M6 x 20	Bolt	4



7-Fig. 15 Tête verticale haute vitesse 3 CV  
 3 HP high speed vertical head  
 Senkrechter Antriebskopf mit 3PS - Motor, Eilverstellung

**7.15 Tête Verticale Haute Vitesse 3C**  
**3HP high speed vertical head**  
**Senkrechter Antriebskopf mit 3PS - Motor, Eilverstellung**

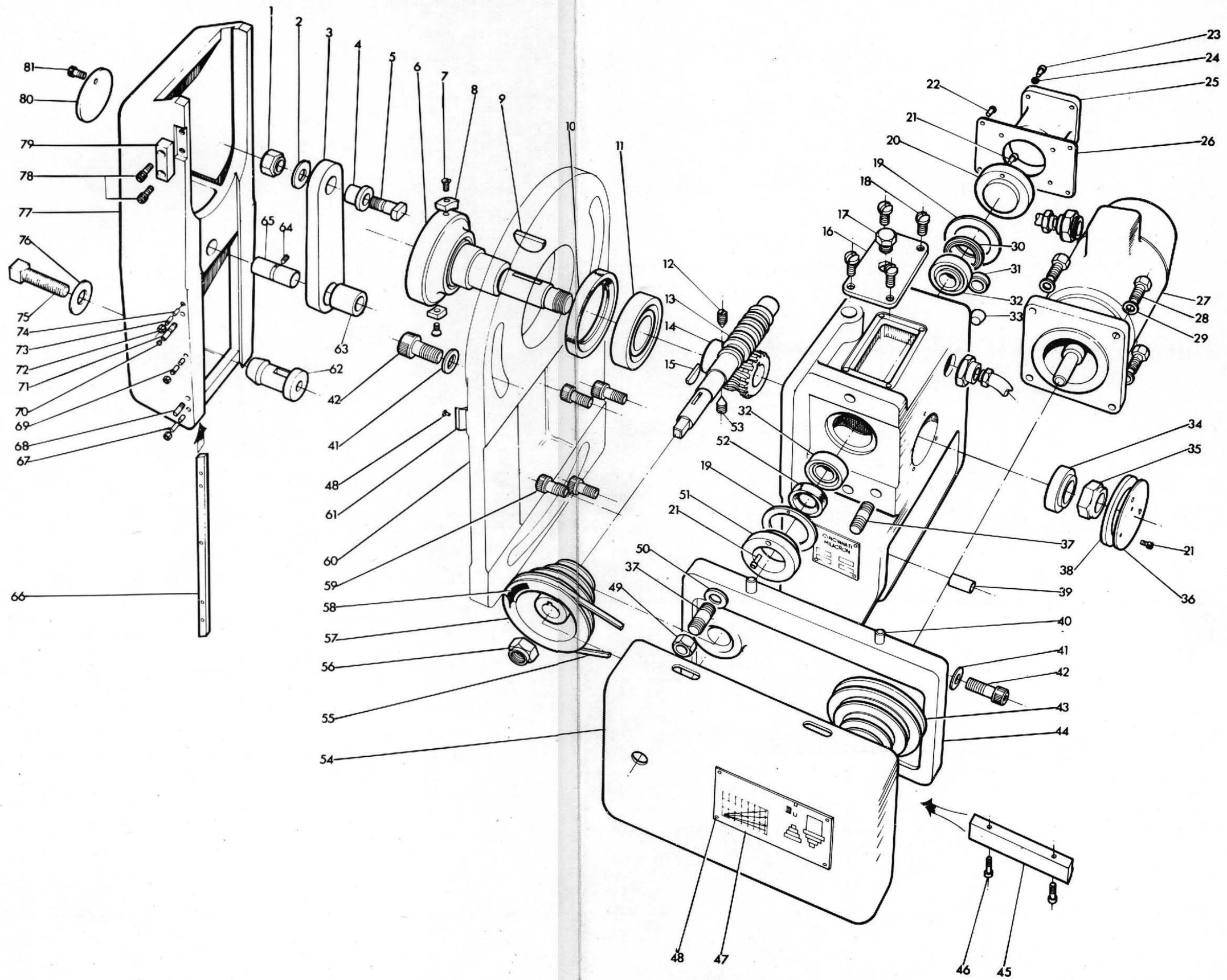
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	744556	Vis CBHC M5 x 15	Screw	4
2	738125	Plaque Fermature	Plate	1
3	738126	Carter	Casing	1
4	738111	Cadran 50Hz	Dial Indicator 50Hz	1
4	738112	Cadran 60Hz	Dial Indicator 60Hz	1
5	741465	Circlips 40E	Circlip	1
6	738122	Ebouche bague can.	Sleeve	1
7	738123	Ebouche arbre can.	Shaft	1
8	741467	Circlips 45E	Circlip	1
9	737010	Entretoise Arrière	Spacer	1
10	737011	Ecrou de Précharge	Retainer	1
11	742051	Rondelle "Schnor" K6009	Washer - Preload	1
12	747889	Roulement SNR 6009-G91-J04	Bearing	1
13	737012	Entretoise Avant	Spacer	1
14	737009	Entretoise	Spacer	1
15	742453	Ecrou "Spieth" MSB50 x 1,5	Retainer	1
16	744181	Vis ST HC bt plat M5 x 5	Screw	1
17	737013	Corps de broche	Quill	1
18	735554	Ecrou	Nut	1
19	735553	Broche	Spindle	1
20	747888	Roulément à billes	Bearing	2
21	737006	Entretoise Int de broche	Spacer	1
22	737007	Entretoise Ext de broche	Spacer	1
23	744556	Vis - CBHC M5 x 15	Screw	1
24	732729	Raccord	Coupling	1
25	744544	Vis	Screw	8
26	737431	Plaque	Plate	2
27	736039	Ecrou	Nut	4
28	836040	Rondelle	Washer	4
29	742462	Tirant - T	T - Bolt	4
30	734996	Vis CHC 10 x 80	Screw	6



7-Fig. 16 Broche Cintiloc  
Cintiloc spindle nose  
Cintiloc - Spindelkopf

7.16 Broche Cintiloc  
 Cintiloc spindle nose  
 Cintiloc - Spindelkopf

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	735064	Ecrou de Blocage	Retainer	1
2	735013	Broche SA40	Spindle	1
3	825279	Goupille	Pin	1
4	735089	Ecrou de Sorage	Retainer	1
5	825194	Bouchon	Plug	2
6	2354	Vis STHC bt plat 1/4" 20NC x 1/8"	Screw	2
7	825281	Bloc de transmission	Driving Dog	2
8	187585	Vis CHC No. 6 x 32NC	Screw	2
9	825280	Feutre	Dust Ring	1
10	825283	Ecrou	Nut	1
11	825336	Vis	Screw	2
12	2008	Bouchon	Plug	2
13	825280	Feutre	Dust Ring	1

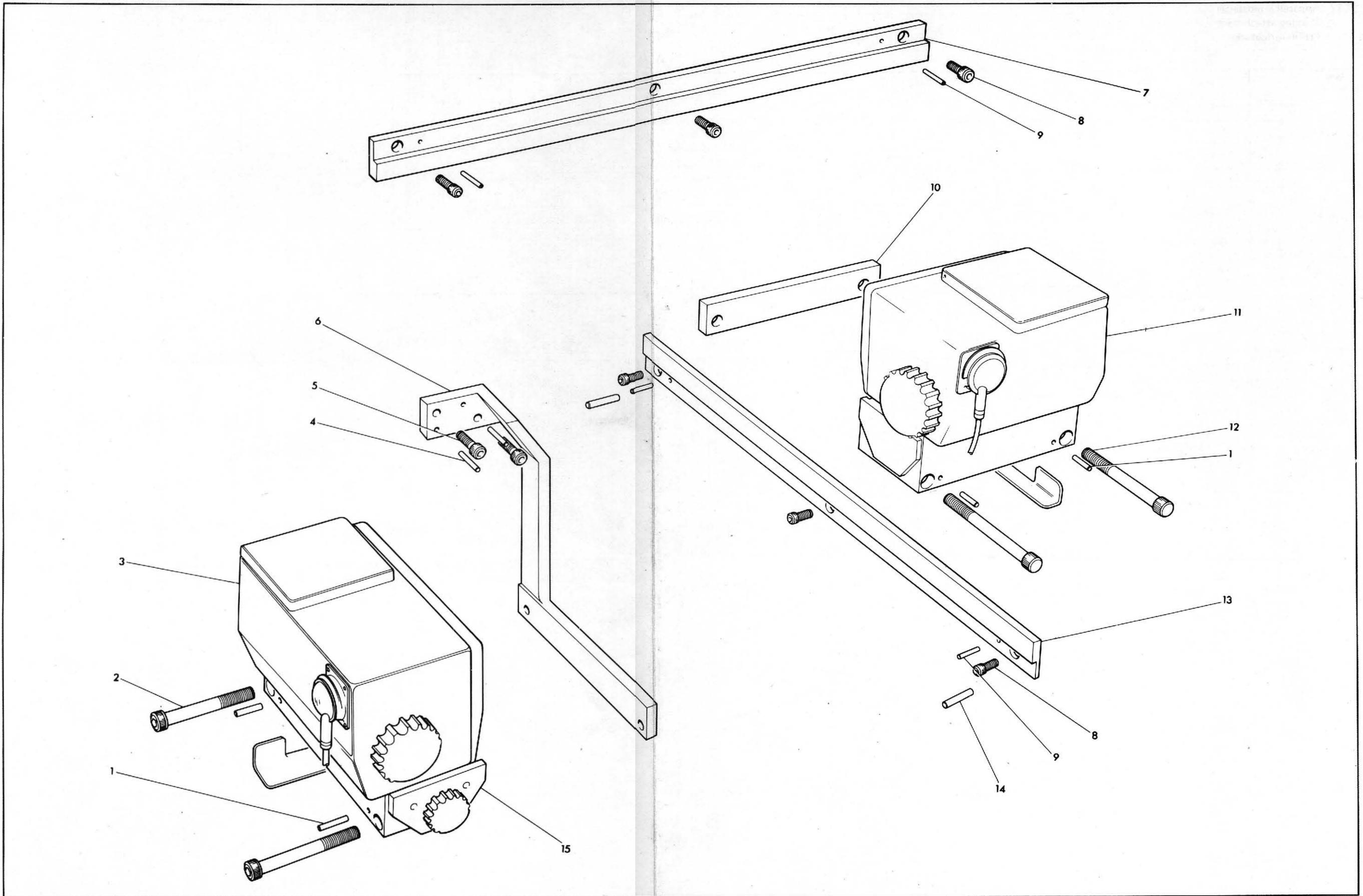


7-Fig. 17 Appareil a mortaiser  
 Shaping attachment  
 Profileinrichtung

**7.17 Appareil à mortaiser**  
**Shaping attachment**  
**Profileinrichtung**

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	733285	Ecrou de Goujon	Nut	1
2	733271	Rondelle D'axe Manivelle	Washer	1
3	733281	Bielle	Con Link	1
4	733270	Douille D'axe Manivelle	Sleeve	1
5	733269	Axe de Manivelle	Tee Bolt	1
6	733265	Plateau Manivelle Arbrée	Screw	1
7	743010	Vis TF/90	Screw	2
8	733288	Plaquette D'Arrêt	Shoe	2
9	741547	Clavette Disque	Key	1
10	745959	Bague D'Etanchéité	Seal	1
11	747892	Rit à Rouleaux Coniques	Bearing	1
12	744259	Vis STHC Bt Cuvette	Screw	1
13	733266	Vis Sans Fin	Worm Shaft	1
14	733264	Roue Creuse	Worm Gear	1
15	741546	Clavette Disque	Key	1
16	733278	Couvercle	Cover Plate	1
17	746850	Bouchon Remplissage	Plug	1
18	743952	Vis CHC	Screw	4
19	733291	Joint de Flasque Latéraux	Gasket	1
20	733268	Flasque Gauche	Flange	1
21	743957	Vis CHC	Screw	6
22	743611	Vis 5 x 8	Screw	4
23	743006	Vis TF/90	Screw	4
24	742501	Ecrou H	Washer	4
25	744878	Discontacteur	Switch	1
26	737247	Plaque Support Discontacteur	Cover Plate (Switch Support)	1
27	744669	Moteur 0,5 cy	Motor 5 Cyl.	1
27	744670	Moteur 0,6 cy	Motor 6 Cyl.	1
28	742618	Vis TII	Screw	4
29	742005	Rondelle	Washer	4
30	741953	Rondelles Elast Borelly	Washer	1
31	746824	Voyant Bijur	Oil Sight Gauge	1
32	747830	Rit à Rouleaux Coniques SKF	Bearing	2
33	216607	Plug (XC 38F)	Plug	1
34	747838	Rit à Rouleaux Coniques	Bearing	11
35	748263	Ecrou Simmonds	Nut	1
36	733287	Flasque Arrière	Cover Plate	1
37	733276	Goujon Plaque Moteur	Stud	3
38	733290	Joint de Flasque Arrière	Gasket	1
39	733699	Chandelle	Dowel Pin	2
40	733277	Pion de Retenue Capot	Retaining Pin	2
41	742007	Rondelle	Washer	3
42	744019	Vis CHC Intravis Type KN	Screw	3
43	733262	Poulie Menante	Pulley	1
44	732896	Plaque Support	Pully Mounting	1
45	733284	Crémaillère Plaque Moteur	Block	1
46	743969	Vis CHC	Screw	2
47	733716	Plaque de Vitesse (En Anglais)	Plate	1
47	733889	Plaque de Vitesse (Bilinque)	Plate	1
48	741776	Clou Parker	Tap Screw	4
49	742307	Ecrou HL	Nut	3
50	742006	Rondelle	Washer	3
51	733267	Flasque Droit	Flange	1
52	745960	Bague D'Etanchéité B1	Seal	1
53	744169	Vis ST HC Bt Plat	Screw	1
54	733286	Capot	Cover	1
55	746661	Courroie Trap Virex GC	Pulley Belt	1
56	748261	Ecrou Simmonds	Nut	1

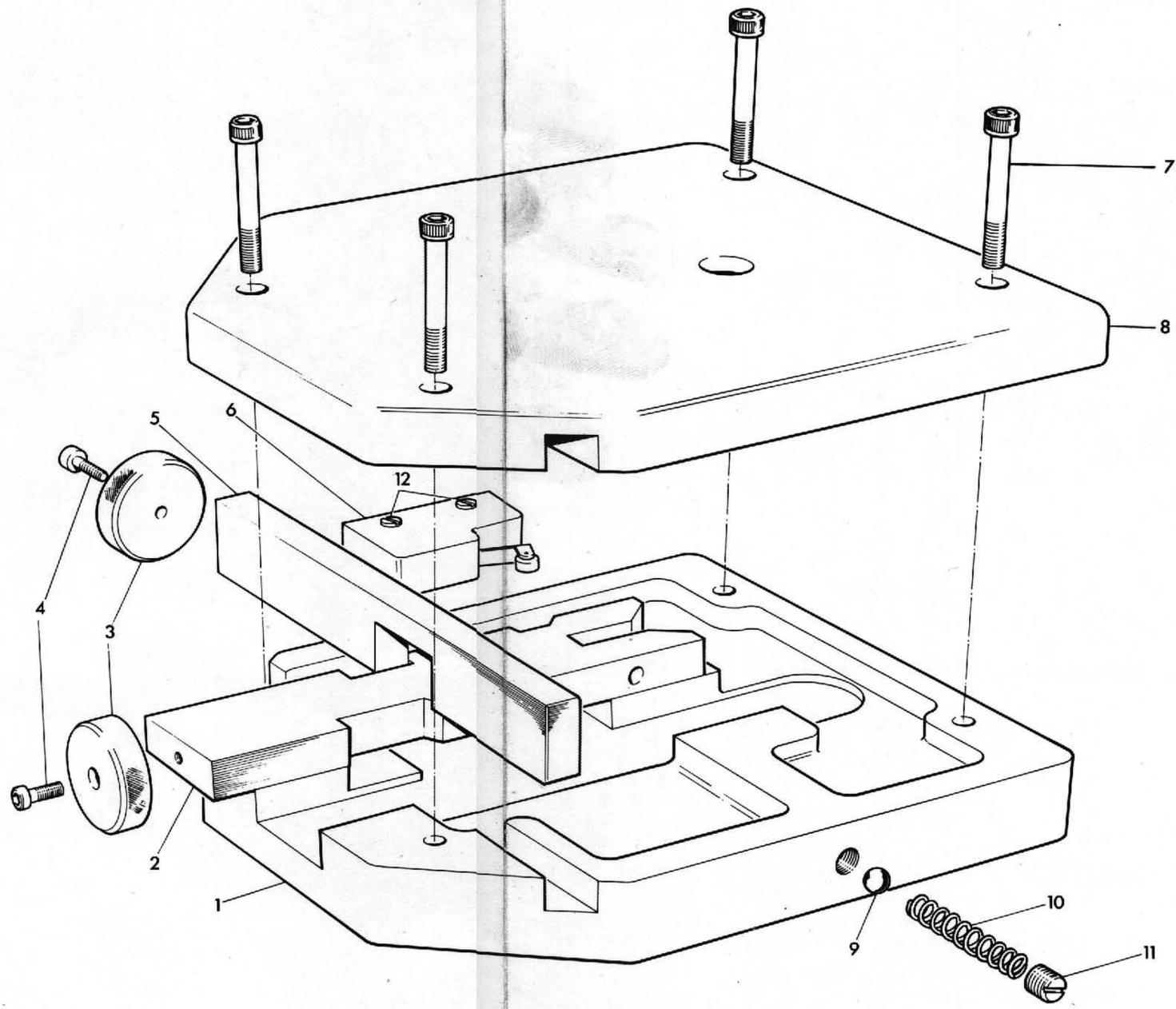
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
57	733263	Poulie (Menée)	Pulley	1
58	733718	Delcalcomanie (Flèche Rouge)	Direction Arrow	11
59	743999	Vis CHC	Screw	4
60	732894	Glissière	Mounting Plate	1
61	733698	Reglette Gradué	Scale	1
62	650	Porte Outil	Tool Holder	1
63	733273	Palier intérieur	Bush Lower	1
64	744354	Vis ST HC Bt Pointu	Screw	1
65	733274	Axe de bielle	Shaft	1
66	733261	Lardon	Gib	1
67	744172	Vis ST HC Bout Plat	Screw	1
68	732970	Chandelle Lardon	Pin	1
69	744173	Vis ST HC Bout Plat	Screw	1
70	747110	Graisneur JL h 710 type 700	Oil Fitting	2
71	732974	Chandelle Lardon (Haut)	Pin	1
72	742553	Ecrou Hm	Nut	3
73	744174	Vis ST HC Bout Plat	Screw	1
74	741149	Goupille Cylindrique	Pin	3
75	4628	Vis de Blocage	Tee Bolt	1
76	674	Rondelle D'Appuis	Washer	1
77	732895	Coulisseau	Front Housing	1
78	743968	Vis CHC	Screw	2
79	733283	Crémaillère Coulisseau	Block	1
80	733697	Plaque Fermeture	Cover Plate	1
81	742881	Vis TC	Screw	1



7-Fig. 18 Lecteurs optiques  
 Optical measuring equipment  
 Optische Messeinrichtung

**7.18 Lecteurs Optiques**  
**Optional measuring equipment**  
**Optische Messeinrichtung**

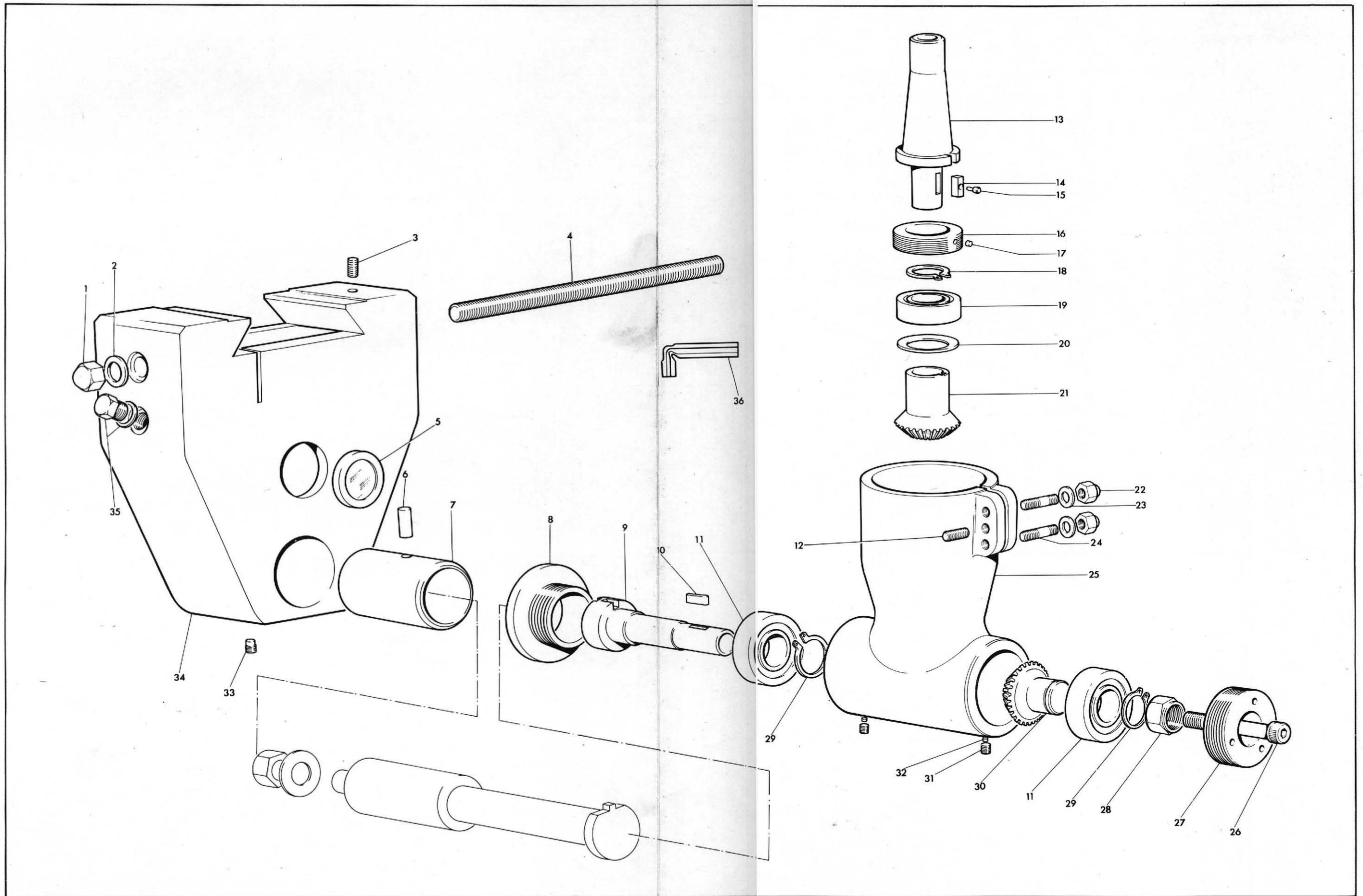
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	741112	Goupille cyl 5 x 30	Pin	4
2	744039	Vis CHC M8 x 60	Screw	2
3	740379	Lecteur Optique(OPL) -Métrique	Optical Unit - Table - Metric	1
3	740384	Lecteur Optique (OPL) - Inch	Optical Unit - Table - Inch	1
4	741144	Goupille cyl 5 x 25	Pin	2
5	743983	Vis CHC M8 x 25	Screw	2
6	735955	Support Lecteur	Mounting Bracket	1
7	740372	Règle (OPL) - Métrique	Scale - Metric	1
7	740373	Règle (OPL) - Inch	Scale - Inch	1
8	743952	Vis CHC M4 x 10	Screw	6
9	741138	Goupille cyl 3 x 10	Pin	4
10	735956	Cale	Packer	1
11	740365	Lecteur Optique (OPL) - Métrique	Optical Unit - Saddle - Metric	1
11	740368	Lecteur Optique (OPL) - Inch	Optical Unit - Saddle - Inch	1
12	744023	Vis CHC M8 x 70	Screw	2
13	740383	Règle (OPL) - Métrique	Scale - Metric	1
13	740385	Règle (OPL) - Inch	Scale - Inch	1
14	741159	Goupille cyl 5 x 25	Pin	2
15	740386	Dispositif de recalage (OPL)	Zeroing Unit	2



7-Fig. 19 Blocage tige de rappel  
Spindle draw bar lock  
Anzugstangenverschluss (für Spindel)

**7.19 Blocage Tige de Rappel**  
**Spindle Draw Bar Lock**  
**Anzugstangenverschluss (für Spindel)**

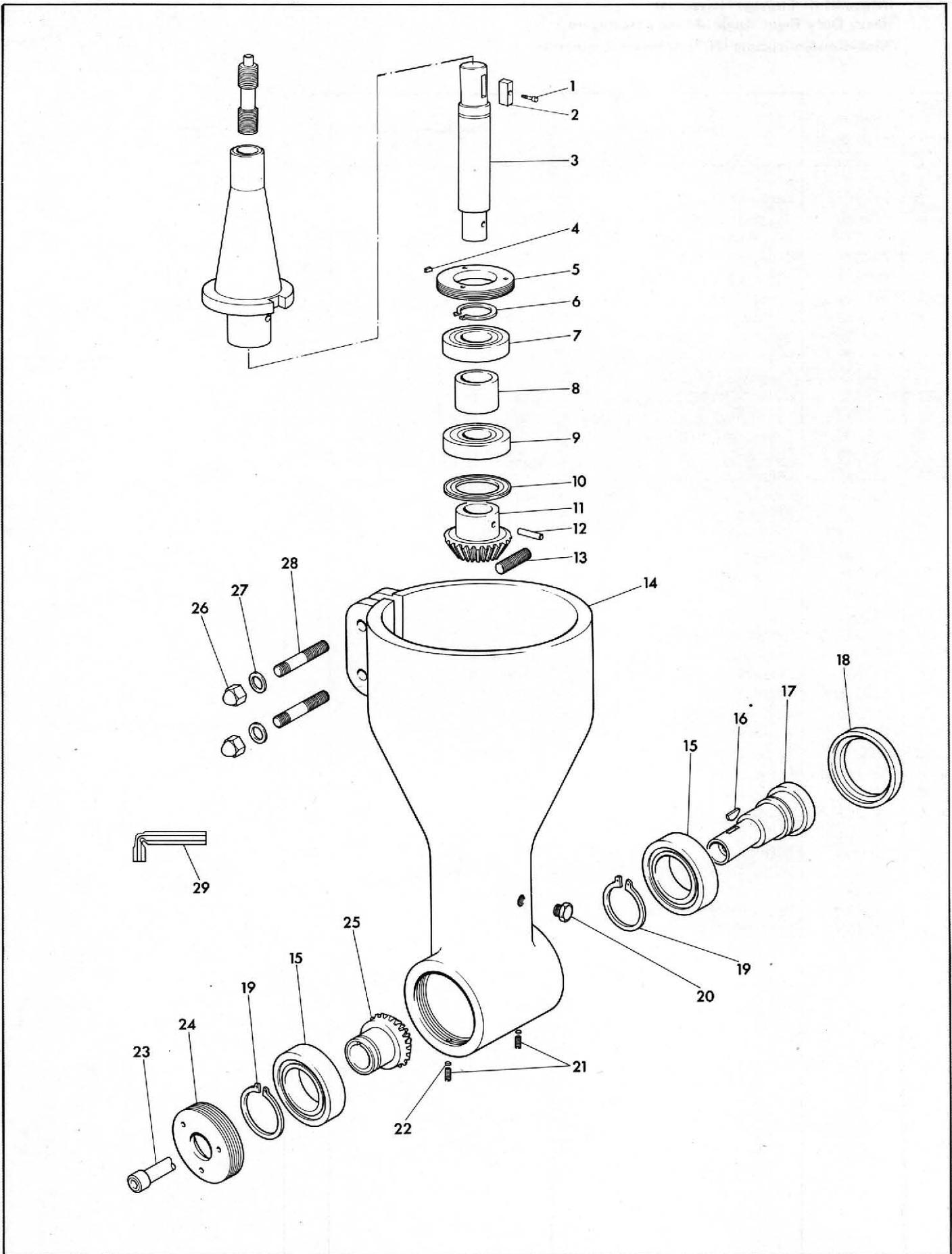
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	735455	Boîtier Blocage d.b.	Housing	1
2	735457	Barrie de Blocage	Locking Bar	1
3	735459	Poignée	Knob	2
4	743970	Vis CHC M6 x 20	Screw	2
5	735458	Verron de Blocage	Safety Bar	1
6	BZ2RW822A2	Microrupteur - Honeywell	Micro Switch	1
7	743988	Vis CHC M6	Screw	4
8	735456	Couvercle Blocage d.b.	Cover	1
9	13665	Bille acier 7, 93	Ball	1
10	877	Ressort	Spring	1
11	744190	Vis STHC bt plat M10 x 16	Screw	1
12	745503	Vis CBL M3, 5 x 25	Screw	2



7-Fig. 20 Dispositif de fraisage horizontal  
 Heavy duty right angle milling attachment  
 Winkelfraseinrichtung (90°), schwere Ausführung

**7.20 Dispositif de Fraisage Horizontal**  
**Heavy Duty Right Angle Milling Attachment**  
**Winkelfraseinrichtung (90°), schwere Ausführung**

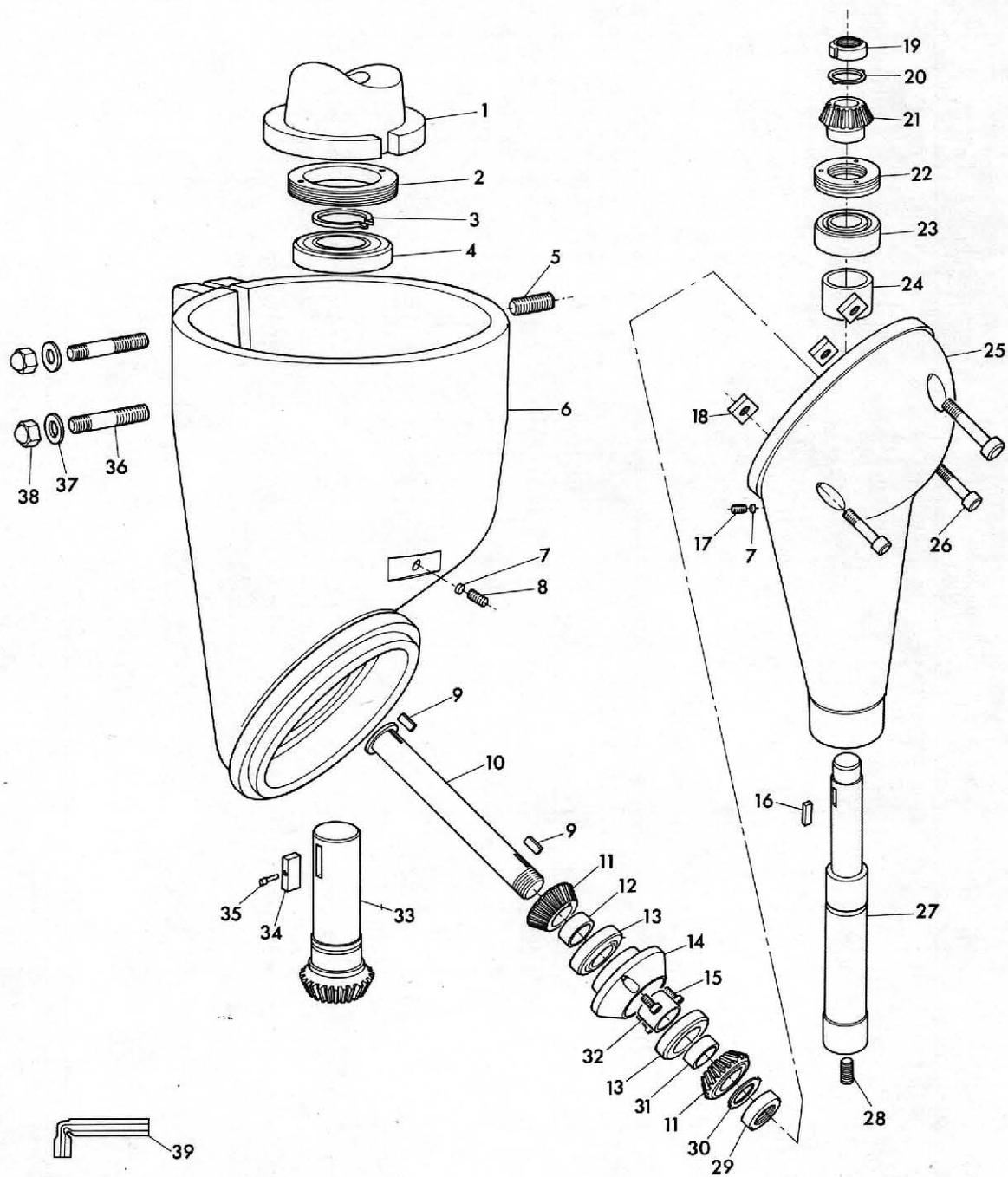
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	742353	Ecrou Borgne	Nut	1
2	742008	Rondelle M14U	Washer	1
3	744172	Vis - Allen St. téton M8 x 20	Screw	1
4	732094	Goujon	Clamp Screw	1
5	746826	Voyant Bijur B5582	Oil Sight Gauge	1
6	745906	Feutre 10 x 25	Pin	1
7	732092	Coussinet	Bush	1
8	732086	Ecrou de réglage à avant	Retainer	1
9	732082	Broche SA30	Shaft	1
10	741505	Clavette bts ronds	Key	1
11	747815	Roulement à Billes 6008E SNR	Bearing	2
12	743993	Vis - Allen St. M10 x 40	Stud	1
13	735562	Adapteur Cône - Métrique	Adaptor - Metric	1
13	732089	Adapteur Cône - Inch	Adaptor - Inch	1
14	732093	Clavette bt's ronds	Key	1
15	743601	Vis - M3 x 6	Screw	1
16	732635	Ecrou de blocage	Retainer	1
17	732087	Frein - Nylon	Nylon Peg	1
18	741463	Circlips 35E	Circlip	1
19	747824	Roulement à Billes 6207E SNR	Bearing	1
20	742032	Rondelle élast Borrelly	Washer	1
21	732084	Pignon conique	Gear	1
22	742354	Ecrou Borgne	Washer	2
23	742006	Rondelle M10U	Washer	2
24	733344	Goujon 10 x 90	Stud	2
25	732078	Corps	Casting	1
26	744005	Vis Allen CHC M12 x 70 Métrique	Screw - Metric	1
26	2315	Vis Allen CHC M12 x 70 Inch	Screw - Inch	1
27	732085	Ecrou de réglage arrière	Retainer	1
28	748263	Ecrou - Simmonds RN30MC	Nut	1
29	741465	Circlips 40E	Circlip	2
30	732083	Pignon Conique	Gear	1
31	744171	Vis - Allen M4 x 8	Grub Screw	2
32	746062	Pastille	Plug	
33	744456	Vis - Allen St. téton M8 x 12	Grub Screw	1
34	732081	Support d'Arbre	Casting	1
35	746850	Bouchon remplissage	Wrench	1
36	740406	Clé à tube		



7-Fig. 21 Renvoi d'angle léger  
 Light duty right angle milling attachment  
 Winkelfraseinrichtung (90°), leichte Ausführung

**7.21 Renvoi d'Angle Léger**  
**Light Duty Right Angle Milling Attachment**  
**Winkelfraseinrichtung (90°), leichte Ausführung**

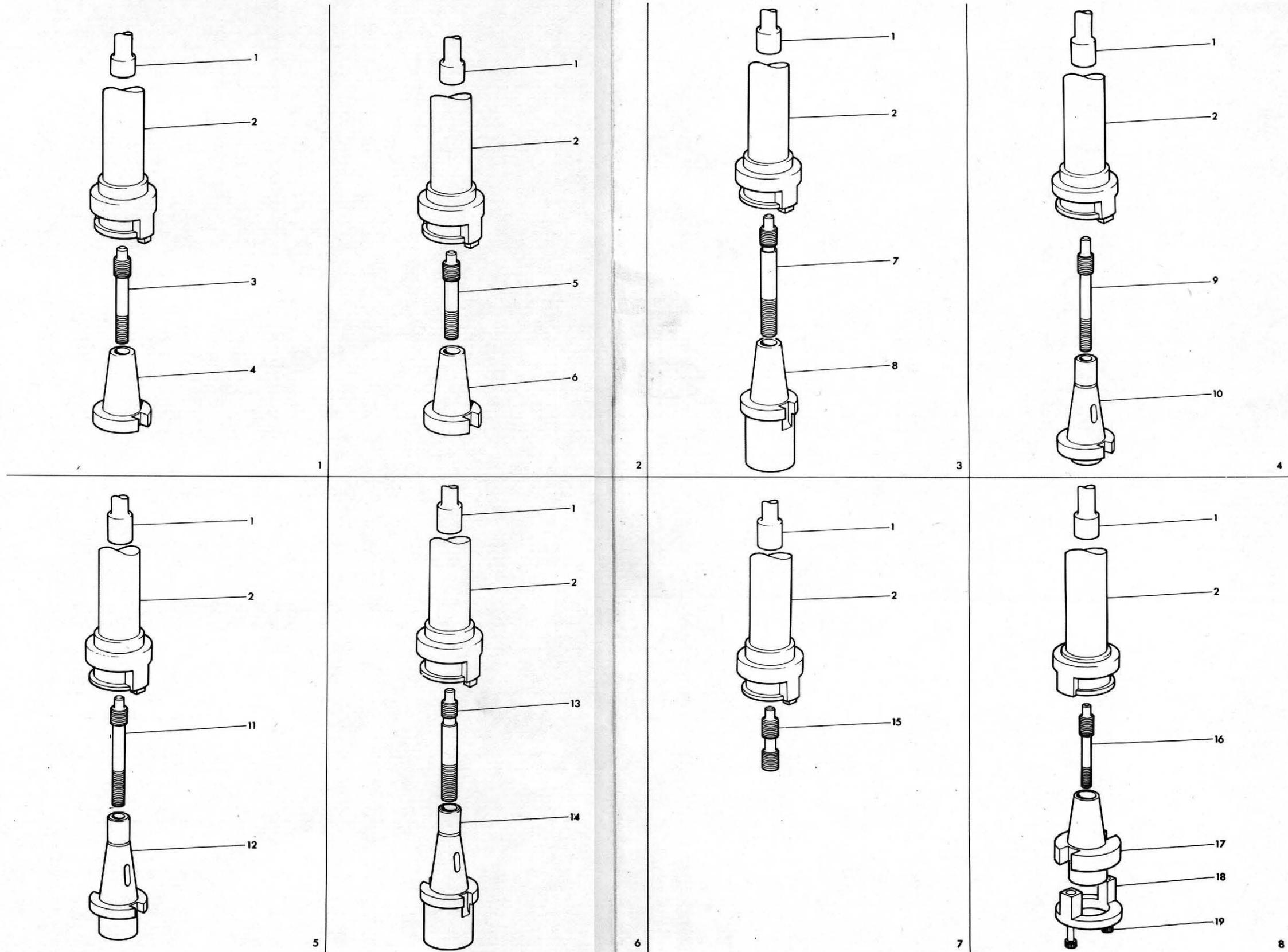
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	743401	Vis M3 - 8	Screw	1
2	732410	Clavette - bts ronds 6 x 6 x 20	Key	1
3	732403	Arbre	Shaft	1
4	732411	Frein - Nylon	Nylon Peg	1
5	732636	Ecrou de Blocage	Retainer	1
6	741455	Circlips 17E	Circlip	1
7	747809	Roulement rigide Adr 6003Z	Bearing	1
8	732405	Entretoise Roulements	Spacer	1
9	747808	Roulement rigide ADR6003	Bearing	1
10	742031	Rondelle - élastique Borrely	Washer	1
11	732409	Pignon Conique	Gear	1
12	741225	Goupille Conique 3 x 20	Pin	1
13	744177	Vis - Allen M10 x 35	Set Screw	1
14	732383	Carter	Casting	1
15	747837	Roulement Rigide ADR-Y-20-Z	Bearing	2
16	735001	Clavette de Broche	Key	1
17	732404	Broche porte pince	Shaft	1
18	732406	Ecrou de réglage - avant	Retainer	1
19	741458	Circlips 20E	Circlip	2
20	747105	Graisseur Trecalmit 8LUBG83	Plug	1
21	744150	Vis - Allen CHC M3 x 6	Screw	2
22	746073	Pastille Cuivre 2,3 x 1,5	Plug	2
23	732532	Vis - Allen CHC - Métrique	Screw - Metric	1
23	3217	Vis - Allen CHC - Inch	Screw - Inch	
24	732407	Ecrou de réglage - arrière	Retainer	1
25	732408	Pignon Conique	Gear	1
26	742354	Ecrou Borgne	Nut	2
27	742006	Rondelle	Washer	2
28	733345	Goujon	Stud	2
29	740406	Clé à tube	Wrench	1



7-Fig. 22 Renvoi d'angle universel  
 Universal milling attachment  
 Universal - Fraseinrichtung

**7.22 Renvoi d'Angle Universel**  
**Universal Milling Attachment**  
**Universal - Fraseinrichtung**

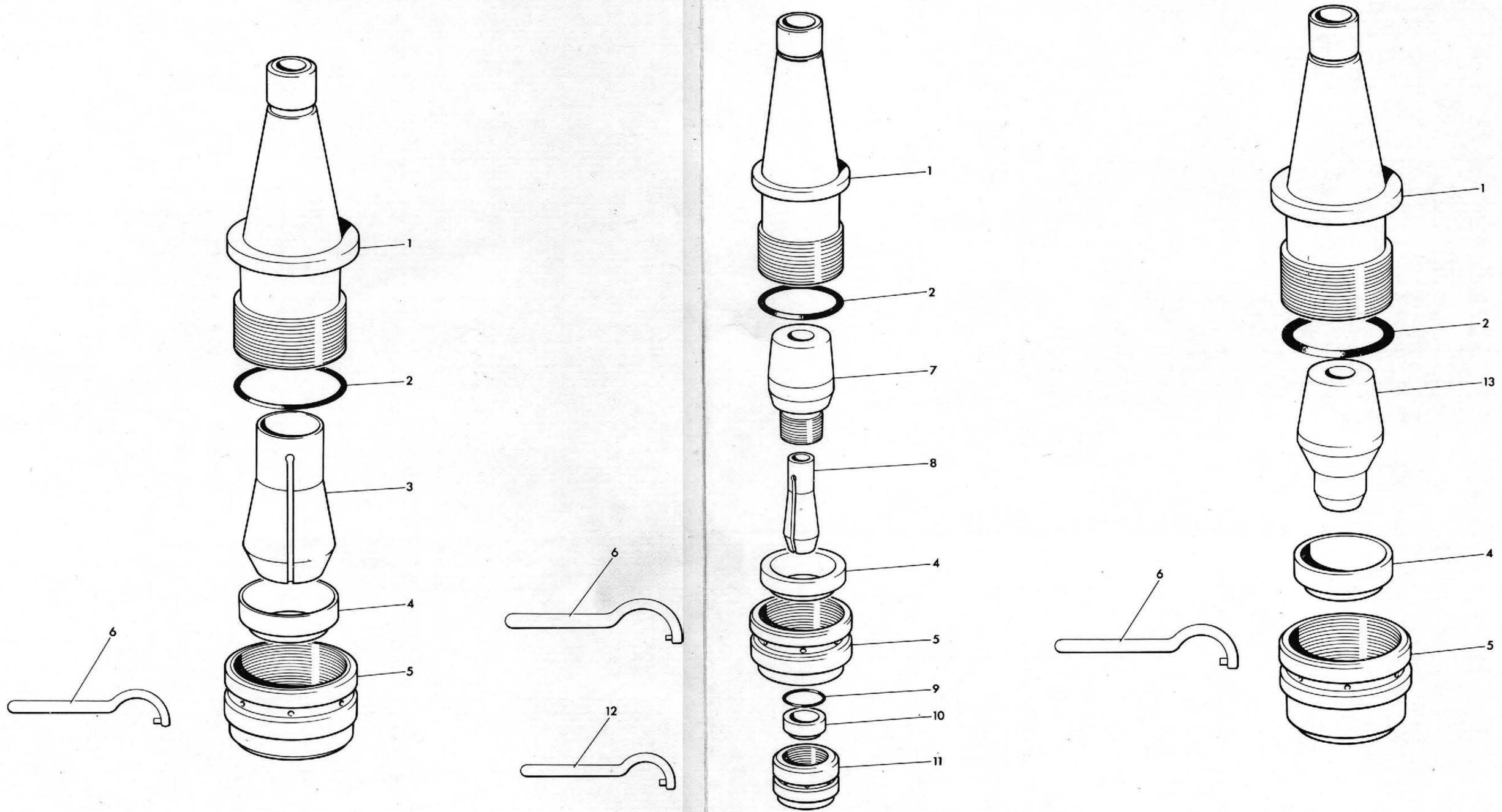
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	732640	Cône SA40 – Métrique	Adaptor – Metric	
1	735561	Cône SA40 – Inch	Adaptor – Inch	
2	732647	Ecrou	Retainer	1
3	741453	Circlips 15E	Circlip	1
4	747841	Roulement 6202 2RS1	Bearing	1
5	744177	Vis – Allen St bt plot M3 x 6	Stud	1
6	732638	Corps	Casting	1
7	746073	Pastille 2,3 x 1,5	Copper Plug	2
8	744186	Vis M3 x 15	Screw	1
9	732654	Clavette Renvoi	Key	1
10	732643	Axe Renvoi	Shaft	1
11	732650	Pignon Renvoi 24 dts	Gear	2
12	732646	Entretoise Supérieure	Spacer	1
13	747840	Roulement à Billes 6000	Bearing	2
14	732641	Palier	Spacer	1
15	743959	Vis M5 x 15	Screw	3
16	732655	Clavette	Key	1
17	744150	Vis M3 x 6	Screw	1
18	732652	Ecrou	Nut	3
19	748109	Ecrou de serrage R932 - 09	Nut	1
20	748148	Rondelle - Frein R933 - 03	Lock Washer	1
21	732651	Pignon de Broche 25 dts	Gear	1
22	732648	Ecrou	Retainer	1
23	747839	Roulement à Billes 3200	Bearing	1
24	748085	Roulement à Aiguilles 1NA	Needle Bearing	1
25	732639	Fourreau Articule	Casting	1
26	743962	Vis M5 x 30	Screw	3
27	73264	Broche - Métrique	Spindle - Metric	1
27	732642	Broche - Inch	Spindle - Inch	1
28	734090	Vis de fixation - Métrique	Stud — Metric	1
28	744189	Vis de fixation - Inch	Stud — Inch	1
29	748108	Ecrou - SKF KMOX	Nut	1
30	748147	Rondelle - Frein SKF MBO	Washer	1
31	732645	Entretoise - Inférieure	Spacer	1
32	732644	Entretoise - Intermédiaire	Spacer	1
33	732649	Pignon Arbre 25 dts	Gear	1
34	732653	Clavette - Entraîneur	Key	1
35	743401	Vis M3 x 8	Screw	1
36	733345	Goujon	Stud	2
37	742006	Rondelle	Washer	2
38	742354	Ecrou M10	Cap Nut	2
39	740406	Clé à tube	Wrench	1



7-Fig. 23 Goujons de fixation et douilles de reduction  
 Draw bar studs and adaptors  
 Gewindebolzen und Zwischenstücke für Anzugsstange

**7.23 Goujons de fixations et douilles de réduction**  
**Draw Bar Studs and Adaptors**  
**Gewindebolzen und Zwischenstücke für Anzugsstange**

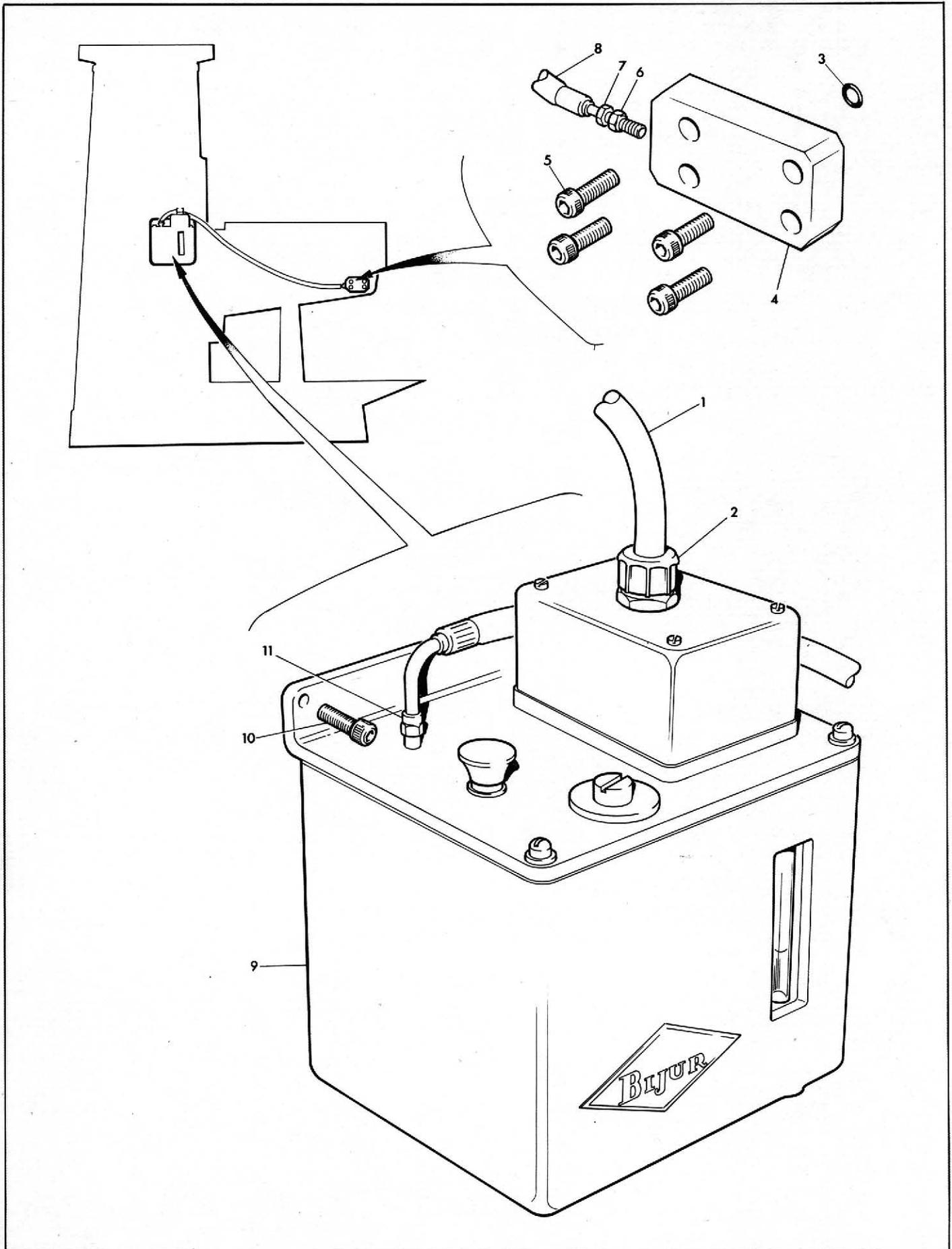
Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	735454	Barre de Rappel	Draw Bar	1
2	735553	Broche	Spindle	1
3	332166	Goujon de barre de rappel	Draw Bar Stud	1
4	740274	Douille de réduction SA40 - CM2	Adaptor	1
5	732167	Goujon de barre de rappel	Draw Bar Stud	1
6	740275	Douille de réduction SA40 - CM3	Adaptor	1
7	732165	Goujon de barre de rappel	Draw Bar Stud	1
8	740276	Douille de réduction SA40 - CM4	Adaptor	1
9	732664	Goujon de barre de rappel	Draw Bar Stud	1
10	740257	Douille de réduction SA40 - CM2	Adaptor	1
11	732663	Goujon de barre de rappel	Draw Bar Stud	1
12	740258	Douille de réduction SA40 - CM3	Adaptor	1
13	732665	Goujon de barre de rappel	Draw Bar Stud	1
14	740259	Douille de réduction SA40 - CM4	Adaptor	1
15	732164	Goujon de barre de rappel - métrique	Draw Bar Stud - Metric	1
15	732815	Goujon de barre de rappel - inch	Draw Bar Stud - Inch	1
16	737060	Goujon de barre de rappel	Draw Bar Stud	1
17	305709	Adaptateur 40 MMT pour R8	Adaptor	1
18	737059	Fourche de Transmission	Drive Dog	1
19	743974	Vis CHC M6 x 40	Screw	2



7-Fig. 24 Adapteurs, Pirces "A" et "C", Douilles  
 "A" and "C" Series Collets and Adaptors  
 Spannzangen und Spannhulsen, Serien "A" und "C"

**7.24 Adapteurs, Pincés 'A' et 'C', Douilles  
'A' and 'C' Series Collets and Adaptors  
Spannzangen und Spannhulsen, Serien "A" und "C"**

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
		Adapteur avec queue SA40 pour pincés Série 'C'	'A' and 'C' Series collet adaptor with 'C' Series collet	
1	732098	Adapteur - SA40 - métrique	Adaptor - SA40 - Metric	1
1	732099	Adapteur - SA40 - inch	Adaptor - SA40 - Inch	1
2	733708	Joint	Seal	1
3	731990	Pincés - Série 'C' - métrique	Collet - Series 'C' - Metric	1
3	731991	Pincés - Série 'C' - inch	Collet - Series 'C' - Inch	1
4	736667	Rondelle d'écrou nez de mandrin	Collar	1
5	183686	Ecrou du nez de mandrin	Adaptor Nose Cap	1
6	101758	Clé	Wrench	1
		Adapteur avec queue SA40 pour pincés Série 'A'	'A' and 'C' Series collet adaptor with 'A' Series collet adaptor and 'A' Series collet	
1	732098	Adapteur - SA40 - métrique	Adaptor - SA40 - Metric	1
1	732099	Adapteur - SA40 - inch	Adaptor - SA40 - Inch	1
2	733708	Joint	Seal	1
4	736667	Rondelle d'écrou nez de mandrin	Collar	1
5	183686	Ecrou du nez de mandrin	Adaptor Nose Cap	1
6	101758	Clé	Cap Wrench	1
7	128929	Adapteur petite pincés - Série 'A'	Collet Adaptor	1
8	731968	Pincés - Série 'A' - métrique	Collet - Series 'A' - Metric	1
8	731961	Pincés - Série 'A' - inch	Collet - Series 'A' - Inch	1
9	101694	Joint	Seal	1
10	183684	Rondelle d'écrou nez de mandrin	Collar	1
11	183683	Ecrou d'adaptateur petites pincés	Collet Adaptor Nose Cap	1
12	101759	Clé	Wrench	1
		Adapteur avec queue SA40 - pour douille de réduction à cône morse	'A' and 'C' Series collet adaptor with morse taper hole collet	
1	732098	Adapteur - SA40 - métrique	Adaptor - SA40 - Metric	1
1	732099	Adapteur - SA40 - inch	Adaptor - SA40 - Inch	1
2	733708	Fentre	Seal	1
4	736667	Rondelle d'écrou nez de mandrin	Collar	1
5	183686	Ecrou du nez de mandrin	Adaptor Nose Cap	1
6	101758	Clé	Cap Wrench	1



7-Fig. 25 Groupe de lubrification automatique  
 Automatic lubrication unit  
 Autom. Schmiergerät

**7.25 Groupe de Lubrification Automatique**  
**Automatic Lubrication Unit**  
**Autom. Schmiergerat**

Item No. Nore-père	Part No. No de pièce	Désignation	Part Name	Qty Qté
1	745024	Cable 4500 SC1N (3 conducteurs x T2,5mm <sup>2</sup> )	Cable	1
2	745130	Presse étoupe	Union	2
3	745945	Bague R No. 4	'O' Ring Seal	1
4	737498		Distribution Block	1
5	743970	Vis CHC M6 x 20	Screw	4
6	747351	Adapteur Bijur A2835	Adapter	1
7	747591	Vis Bijur B1371	Union	1
7	747650	Bicône B1061	Olive	1
8	747283	Flexible "CDB" SL6 lg 1, 2m	Flexible Hose	1
9	746805	Pompe auto "Bijur" type TM5 - D3000	Pump Unit	1
10	743969	Vis CHC M6 x 15	Screw	2

**CINCINNATI  
MILACRON**

Machine Tools  
Plastics Machinery  
Electronic Controls  
Specialty Chemicals  
Bonded Abrasives