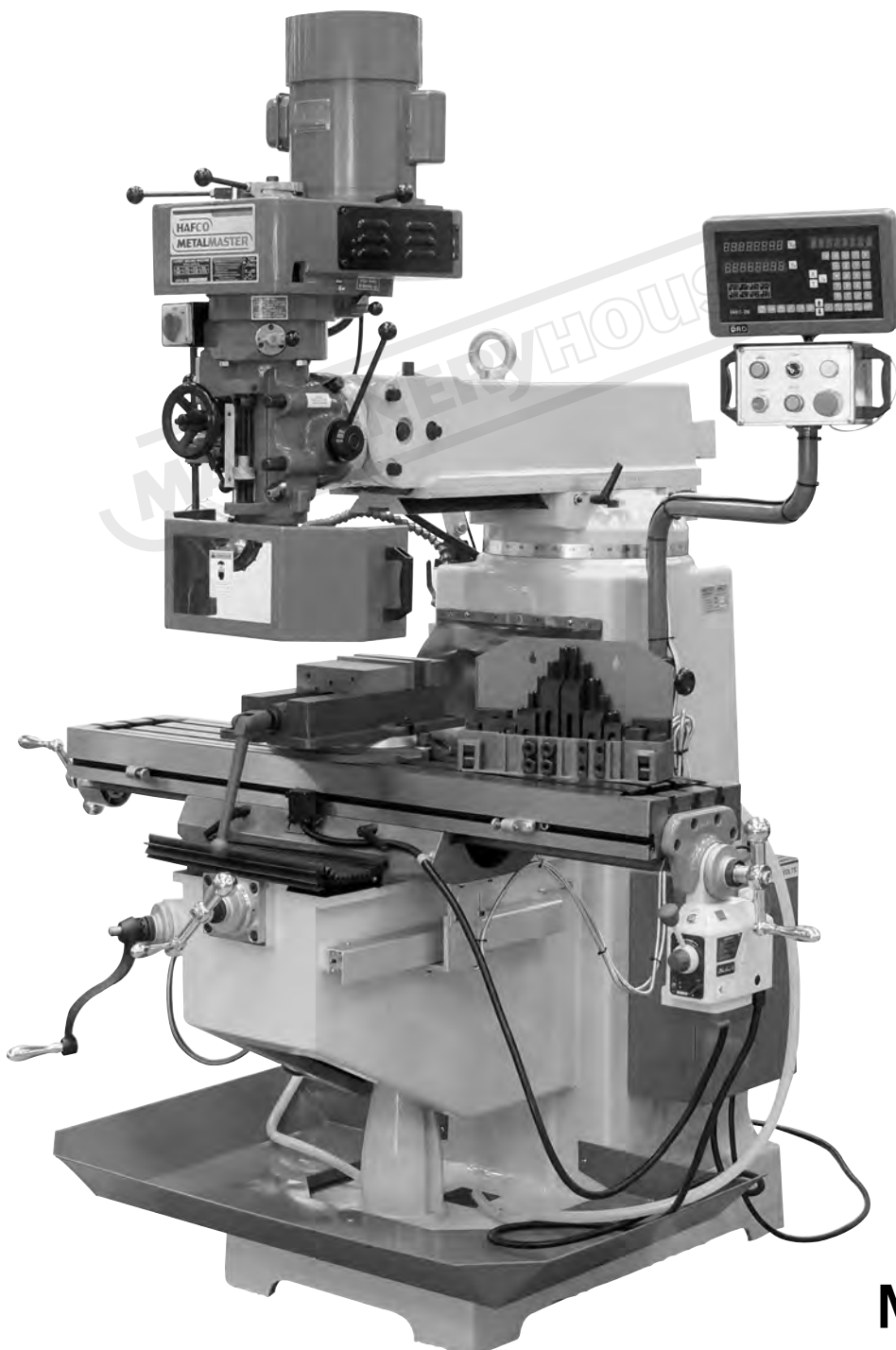


INSTRUCTION MANUAL

BM-30A Turret Milling Machine (240V) (X) 760mm (Y) 360mm (Z) 430mm



M603D

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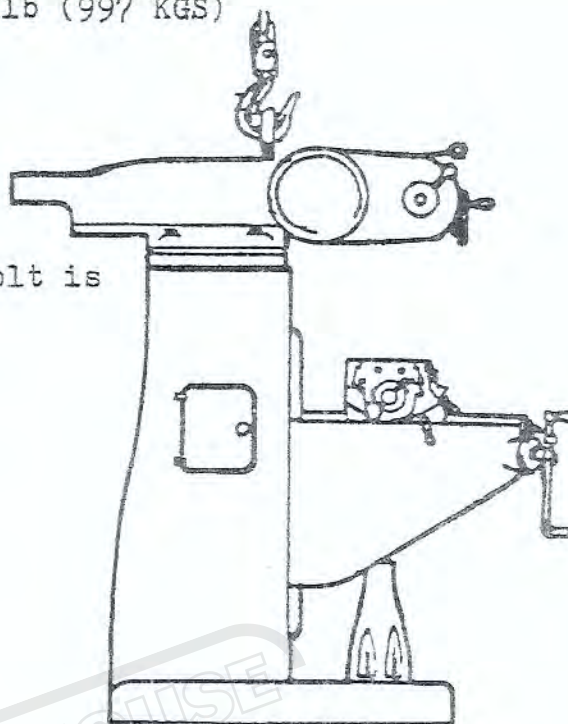
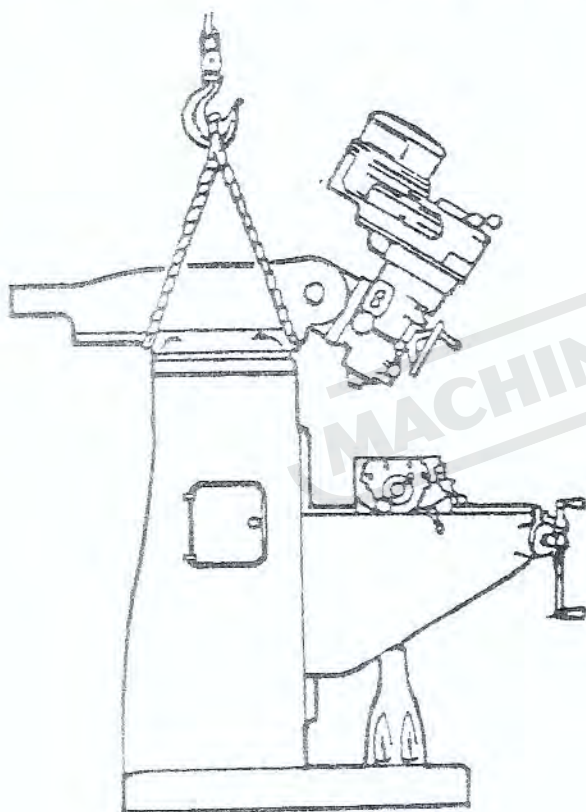
Weight

Machine weight approximately 2200 lb (997 KGS)

METHOD 1

Insert bolt in hole. Ensure bolt is fully secured before lifting.

It is advisable to swivel head before lifting machine.

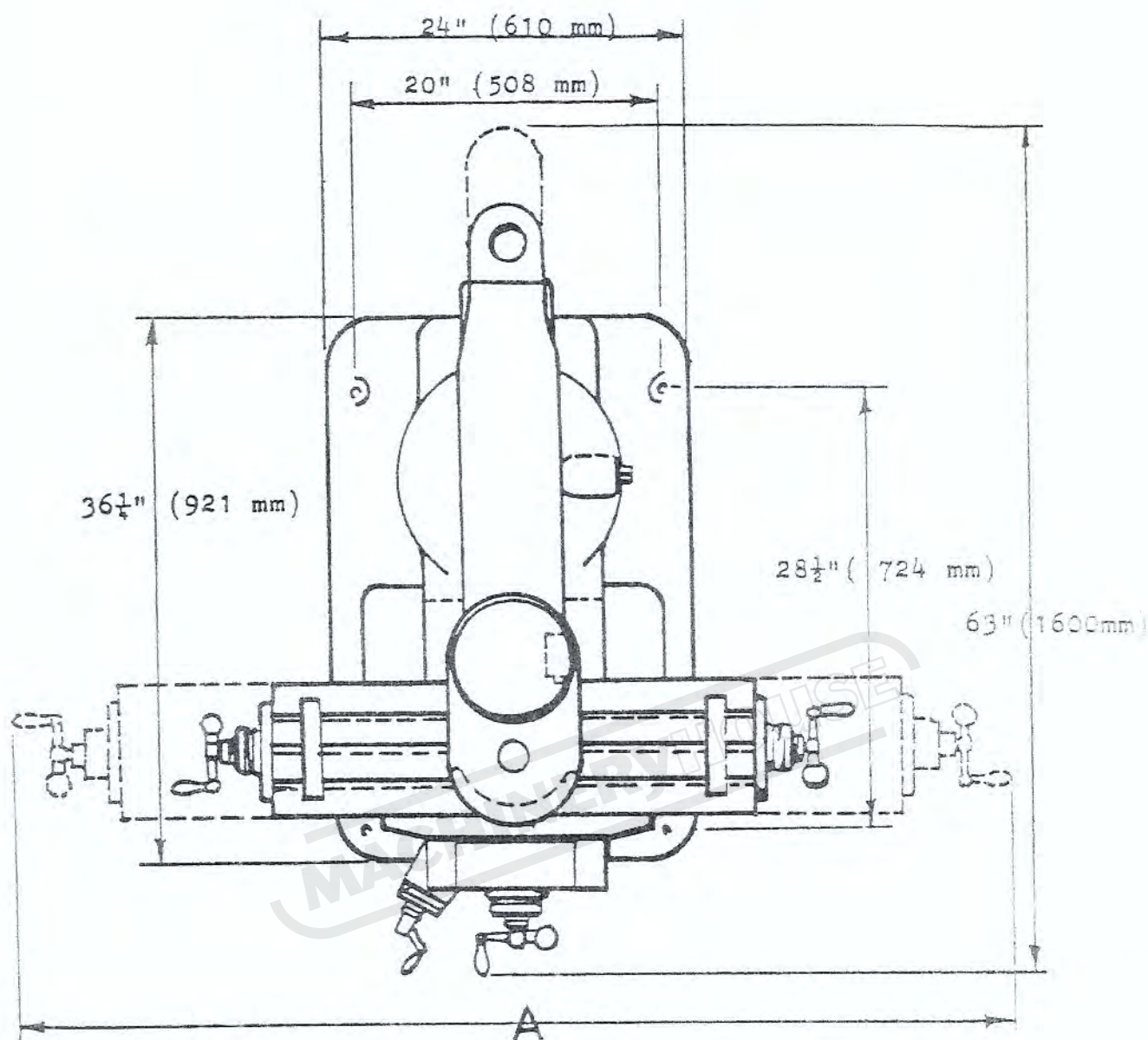


METHOD 2

Use rope sling as illustrated. Insert Pads of soft cloth between rope and machined edges. It is advisable to tilt the head before lifting machine.

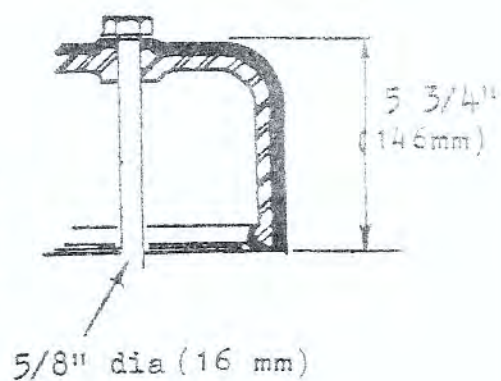
INSTALLATION

1. Remove rust preventative before moving any slideways.
2. The coating is best removed by using paraffin applied with a clean brush.
When the coating has softened, remove with clean rags.
3. Oil or grease all lubrication points.
Refer to the lubrication section of this manual.



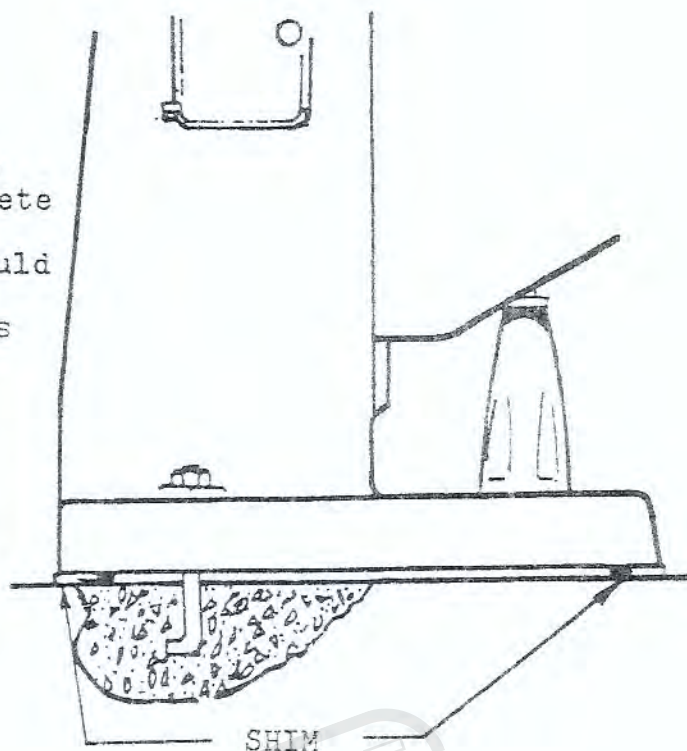
'A' DIMENSION

Table size	Plain machine	Power feed
36"(914 mm)	70"(1778 mm)	76"(1930 mm)
42"(1067mm)	76"(1930 mm)	82"(2083 mm)
48"(1219mm)	82"(2083 mm)	88"(2235 mm)



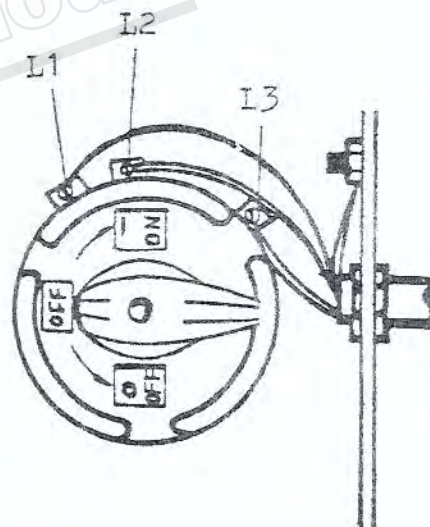
FOUNDATION

Ideally the milling machine should be bolted to a concrete foundation. The goldenhorse however should be placed on a solid level floor or anti-vibration pads to prevent any rocking movement.



POWER SUPPLY

- a) Check the panel voltage against the main supply.
- b) Connect the supply to the isolator (diagram)
- c) Check for correct spindle rotation (In the HIGH SPEED range the spindle should rotate clockwise when viewed from the top of the machine.)



ISOLATOR DIAGRAM

MACHINE SUPPLIED WITHOUT CONTROL PANEL

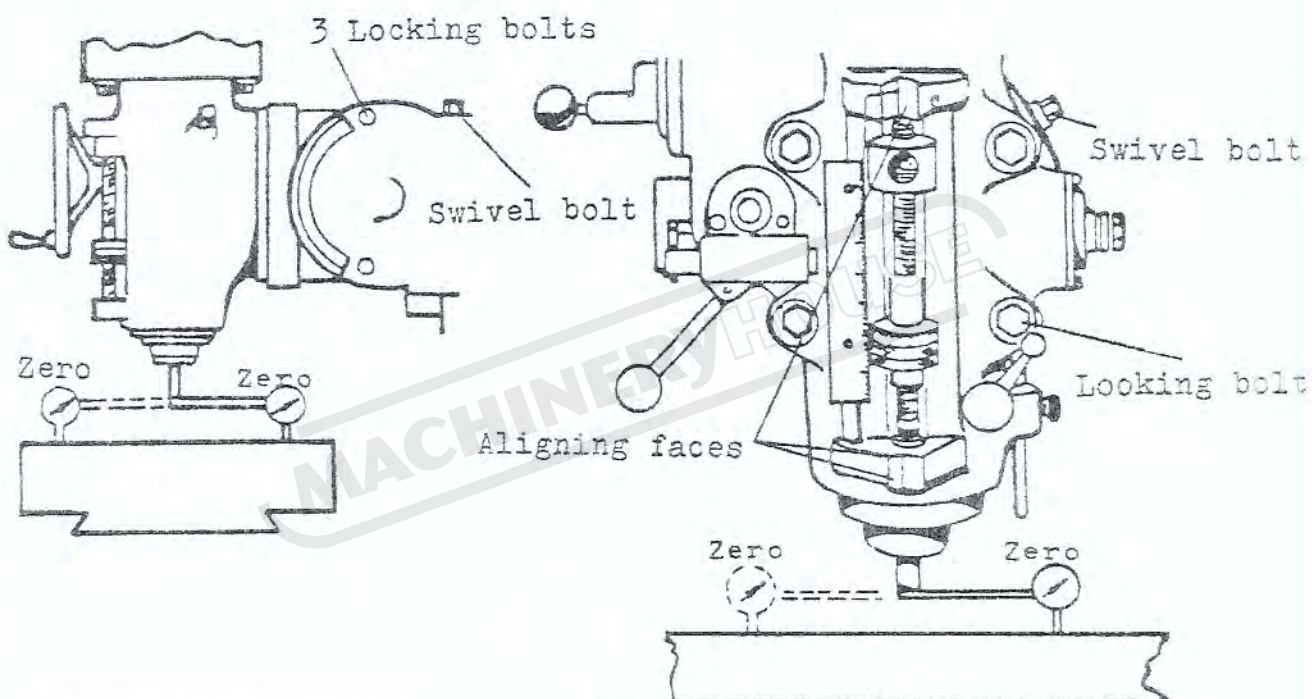
- a) Check motor voltages against supply.
- b) Ensure that the supply is connected to comply with the local safety regulations.

INSTALLATION

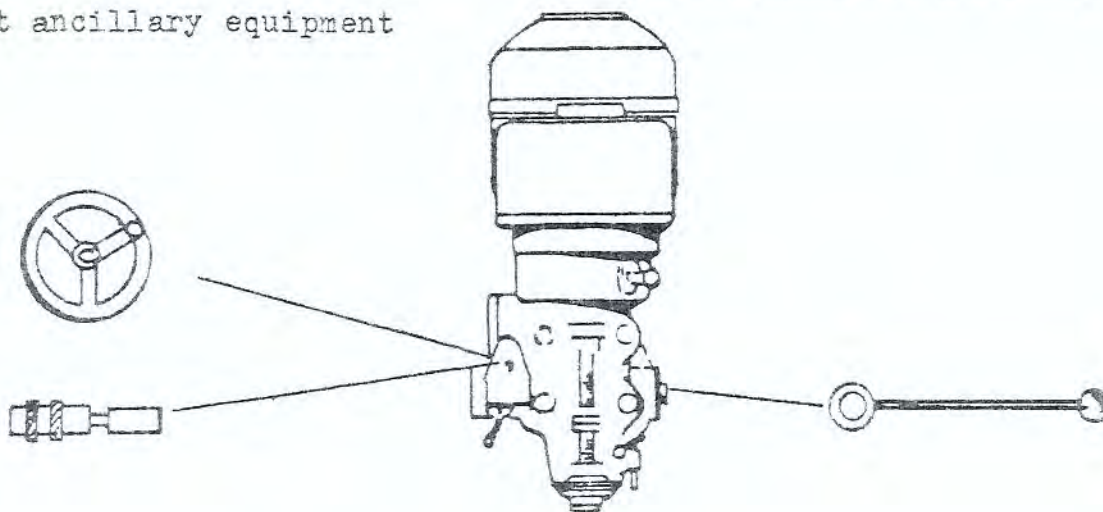
1. If the machine was delivered in a crate, the slideway handles will have been reversed. These should be fitted as illustrated.

NOTE: For continuous operation in the horizontal plane the head lubrication system must be modified. To set a milling head square to the table two methods are available:

- (a.) Using a large 90° setsquare mounted on the table, align faces with square.
- (b.) An indicator mounted in a spindle nose travelling in a 4 1/2" radius. It is important that each axis is set separately and locked.

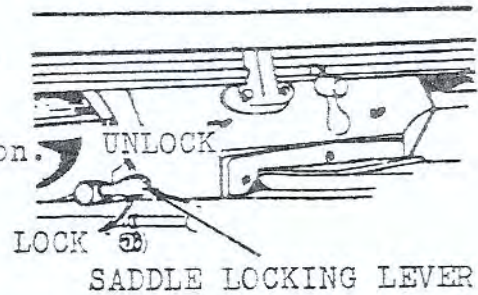


Fit ancillary equipment



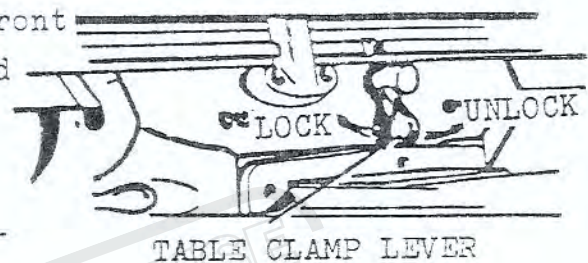
CLAMPING TABLE, SADDLE AND KNEE.

When milling with longitudinal table feed only, it is advisable to clamp the knee to the column and the saddle to the knee to add rigidity to these members and provide for heavier cuts with a minimum of vibration. The saddle locking lever is located on the left-hand side of saddle.

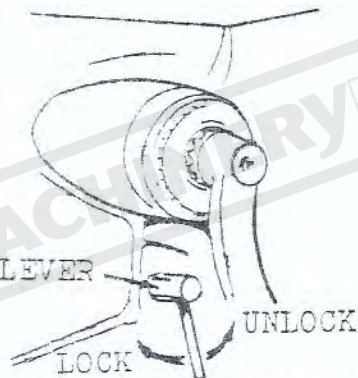


Excessive pressure can cause slight table bind. Use moderate clamping pressure, as this will hold saddle sufficiently.

The table clamp lever is located on front of saddle and should always be clamped when longitudinal movement is not required.



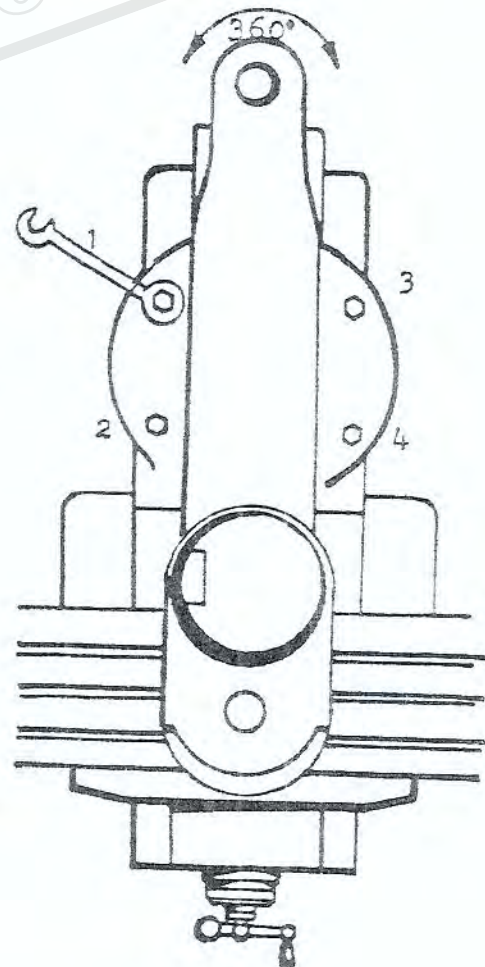
KNEE CLAMPING LEVER



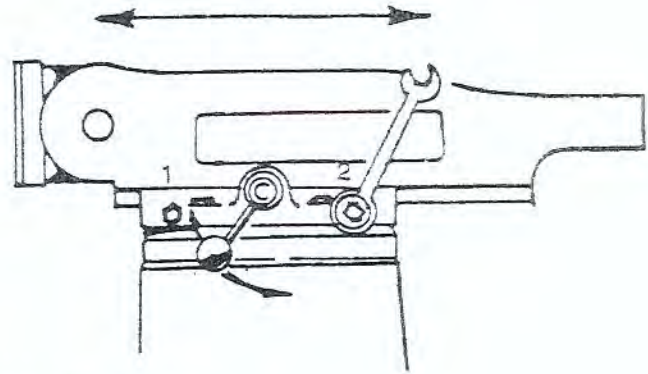
The knee clamping lever is at the left side of the knee and should be drawn upward to clamp the knee. This is only a tension brake and will not lock the knee completely. Leave clamped at all times unless using knee in operation.

SWIVEL TURRET

- Use spanner and unlock the 4 bolts.
- Index to the required setting.
- Lock the 4 bolts.



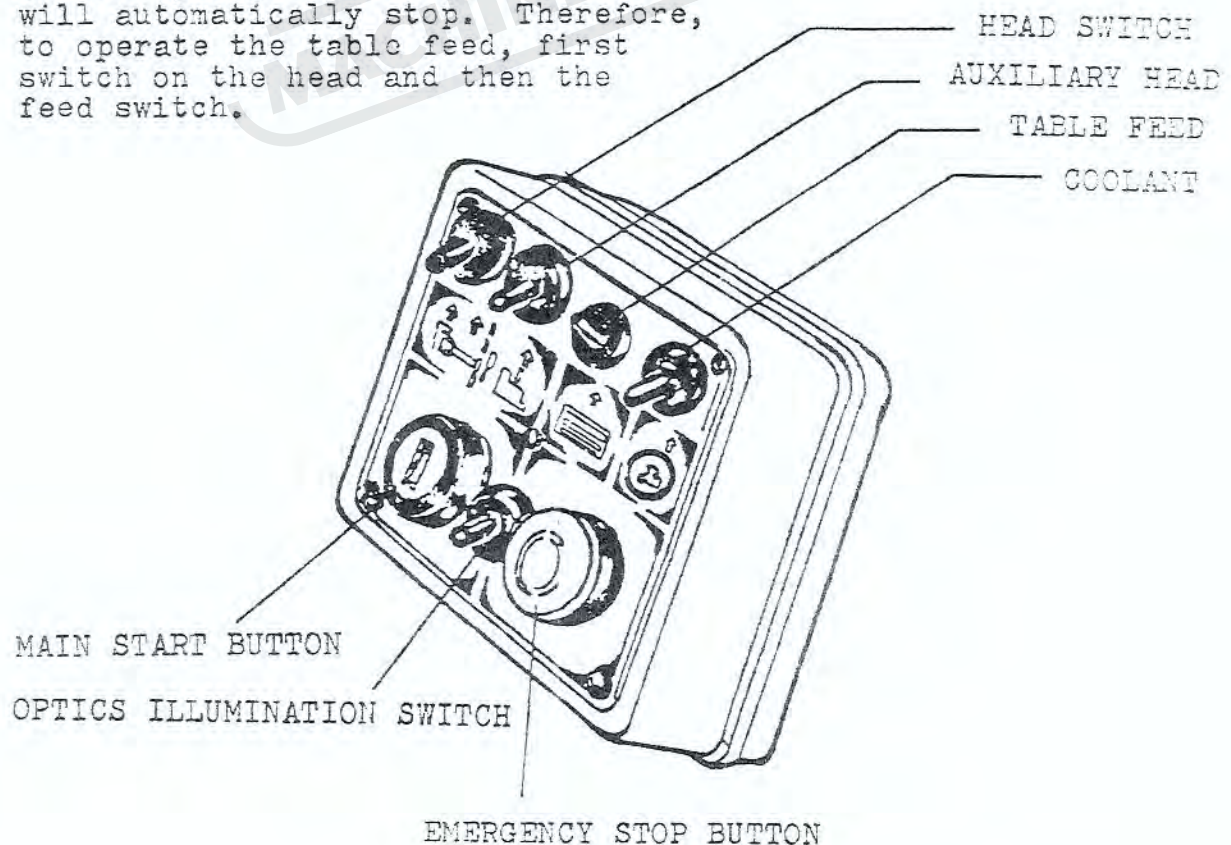
MOVE RAM SLIDE

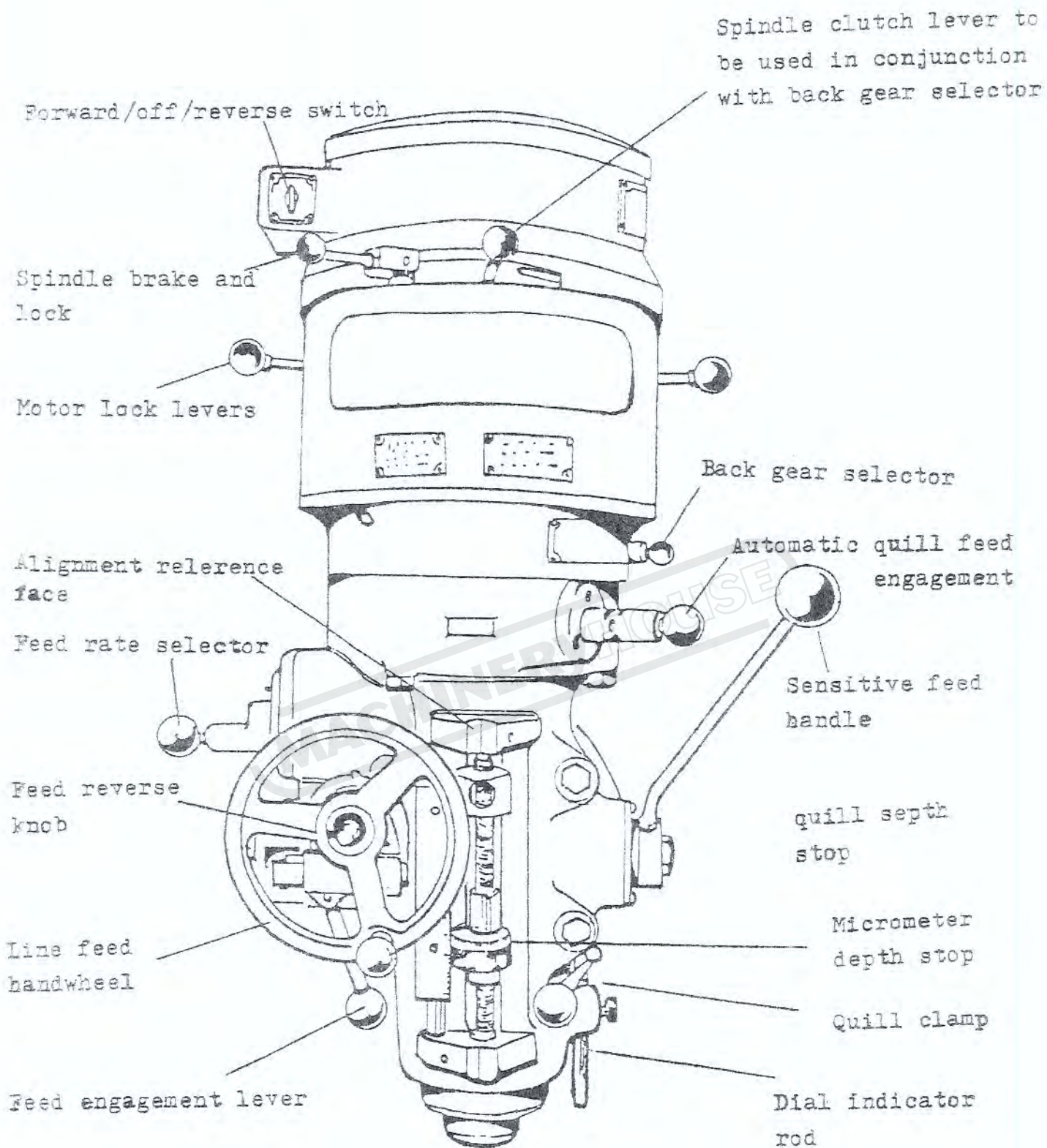


- a) Use spanner and unlock the two bolts.
- b) Turn the handle to move the slide to the desired position.
- c) Lock tightening the rear bolt first.

ELECTRIC CONTROLS

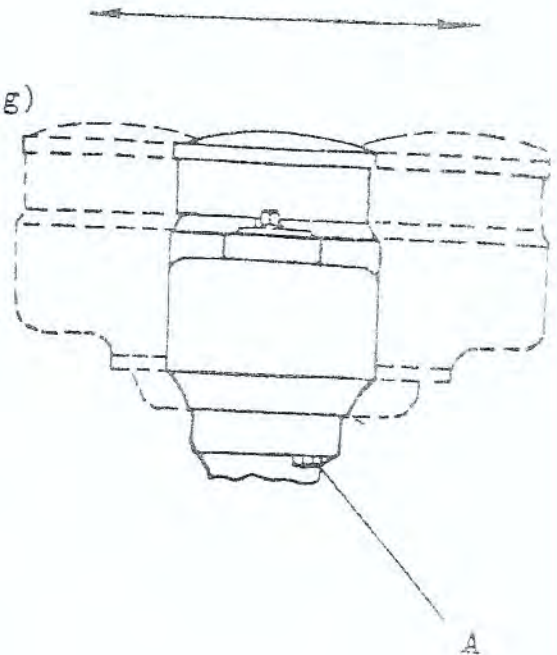
The circuitry is arranged to give full overload protection for all motors as an extra feature, the milling head table feed motors are interlocked so that in the event of the spindle stalling, the feed will automatically stop. Therefore, to operate the table feed, first switch on the head and then the feed switch.





SWIVEL BELT HOUSING

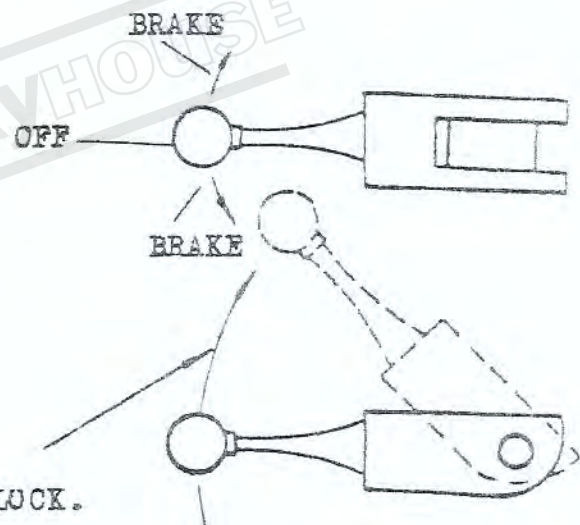
1. Slacken the locking nuts 'A' (retain sufficiently to stop binding)
2. Swivel to required angular setting.
3. Tighten the three locking nuts before finally securing the run spindle to give correct spline alignment.



NOTE:

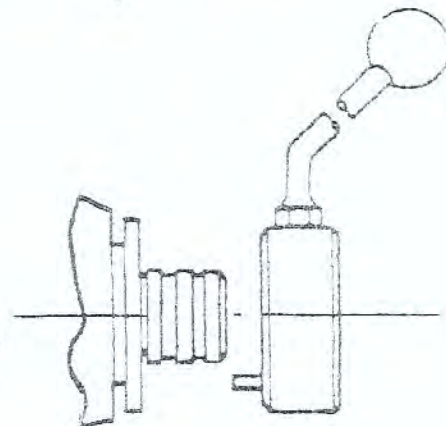
Incorrect spline alignment can be caused by unequal tightening of the locking nuts 'A' causing varying stiffness of the quill feed which can be felt through the sensitive feed handle.

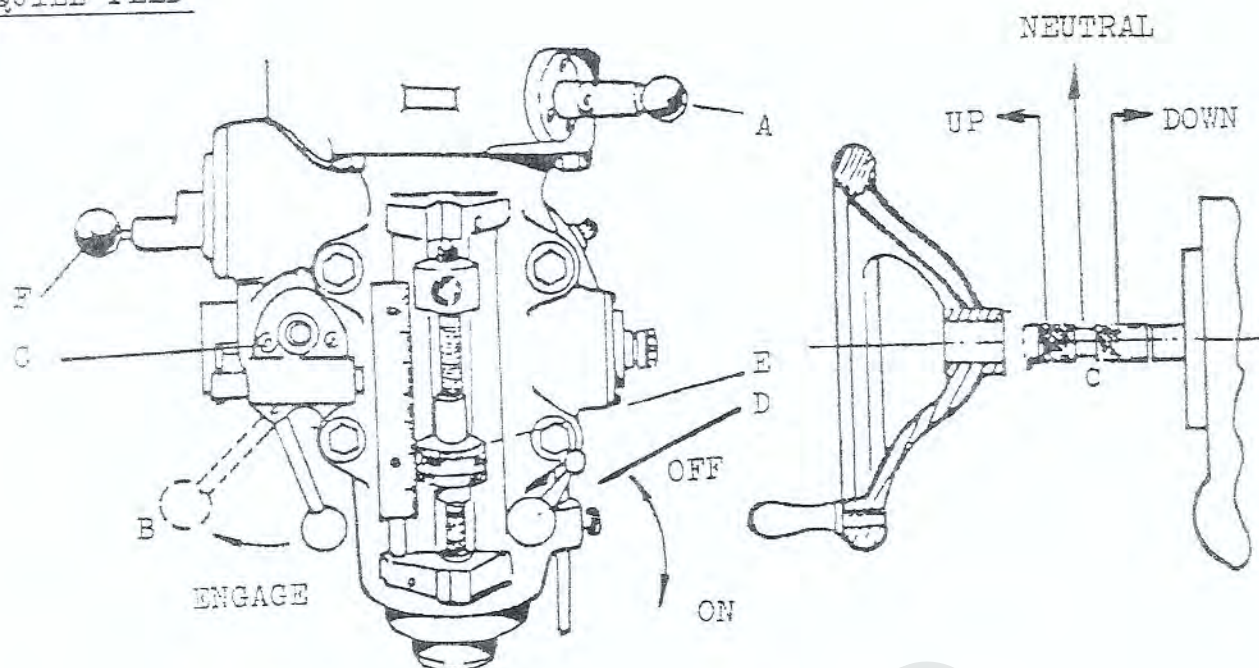
SPINDLE BRAKE



SENSITIVE HAND FEED

1. Place the handle on the boss.
2. Select the most suitable position.
3. Push home until the locating pin engages.



QUILL FEEDa) FINE HAND FEED

1. Disengage Auto quill feed 'A'
2. Locate 'C' in mid (neutral) position.
3. Engage Feed trip lever 'B'.
4. The Quill is now under hand wheel control.

b) AUTOMATIC FEED

1. Ensure quill lock is off 'D'
2. Set micrometer dial to required depth 'E'.
3. Engage auto quill feed 'A' (when motor has stopped).
4. Select feed rate 'F'
5. Select feed direction 'C'
6. Engage feed trip lever 'B'
7. The feed will automatically trip out at a depth within $\pm 0.10''$ (± 2.5 mm).
8. Hand feed to dead stop for repeating accuracy $\pm 0.001''$ (± 0.025 mm).

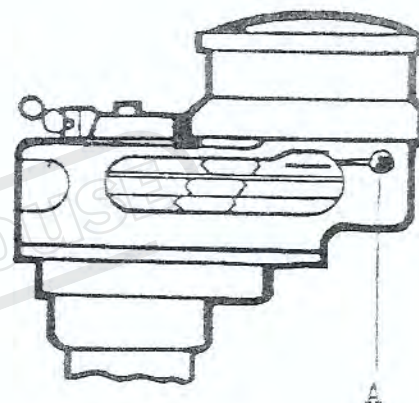
SPINDLE SPEEDS (Stop motor before changing speed)

60HZ					
80	135	210	325	BACK GEAR	SWITCH POS.1
660	1115	1725	2720	DIRECT	
160	270	420	650	BACK GEAR	SWITCH POS.2
1320	2230	3450	5440	DIRECT	

50HZ					
67	115	180	275	BACK GEAR	SWITCH POS.1
550	920	1500	2300	DIRECT	
134	230	360	550	BACK GEAR	SWITCH POS.2
1100	1840	3000	4600	DIRECT	

a) Change speed within range.

1. Isolate machine.
2. Slacken 2 motor lock levers 'A'
3. Slide motor forward.
4. Position belt on appropriate pulleys.
5. Slide motor to the rear to tension vee belt.
6. Tighten 2 motor locking levers.

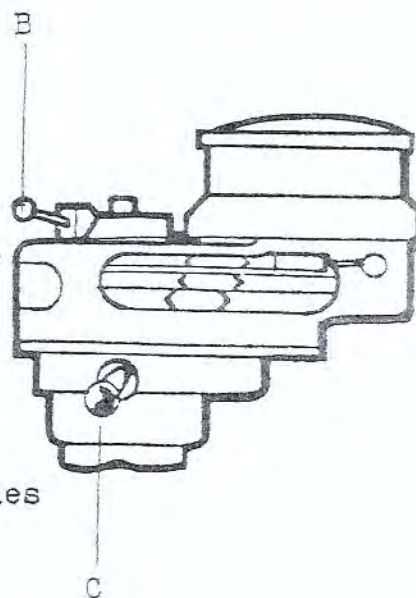


b) Change range

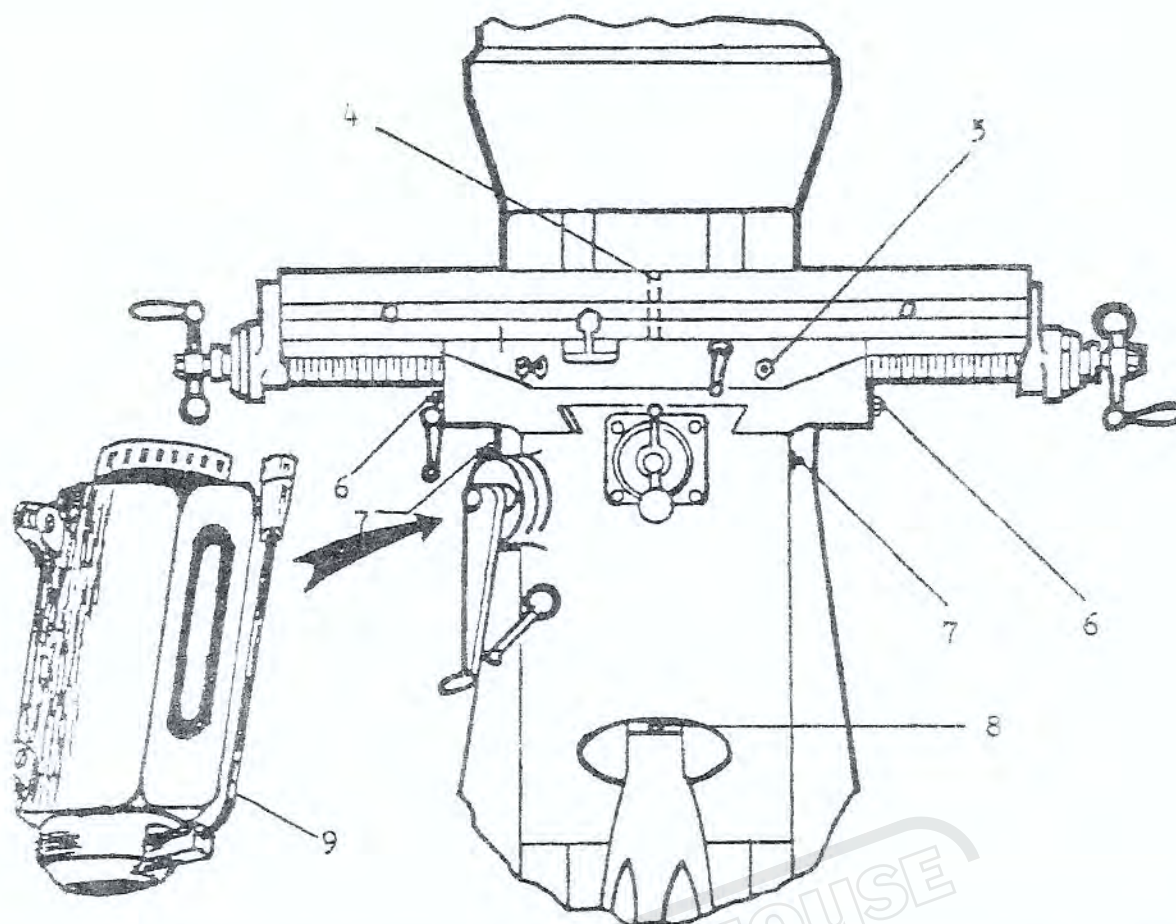
1. From direct to back gear drive.
2. Move lever 'B' to the right.
3. Move knob 'C' to 'IN' position.

NOTE: This action will REVERSE the spindle rotation. Move motor switch to reverse position to obtain original direction of spindle rotation.

From back gear to direct drive:
Move lever 'B' to the front position.
Rotate spindle by hand until the clutches are felt to engage. Move knob 'C' to "OUT" position.

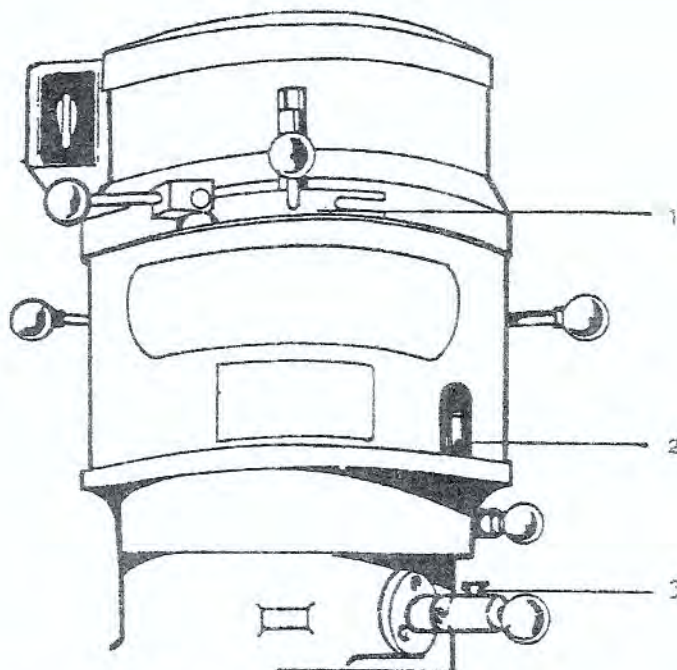


NOTE: This action will REVERSE the spindle rotation. Move motor switch to reverse position to obtain original direction of spindle rotation.



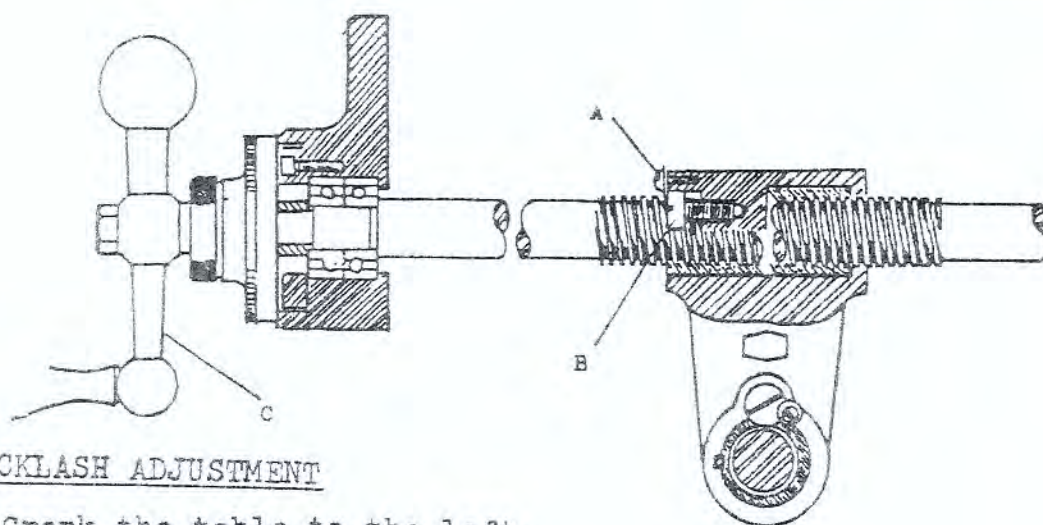
FREQUENCY	LUBRICATE	LUBRICANT	QUANTITY	LUB AT
Twice weekly	Lead screw	Mobil vactra No.2	5-10 drops	4
Weekly	Saddle-table ways	Vactra No.2	5 shots (oil gun)	5
Weekly	Saddle-knee ways	Vactra No.2	5 shots (oil gun)	6
Weekly	Knee column ways	Vactra No.2	5 shots (oil gun)	7
Twice weekly	Elevating screw	Vactra No.2	5 shots (oil gun)	8
Centralised lub. pump daily check level weekly	Screw ways	Vactra No.2	One pump.	9

*** To oil leadscrew adjust to bring line on its front face opposite line marked "Oil" on front of cross-slide and then lubricate through 4 after removing sealing screw located in



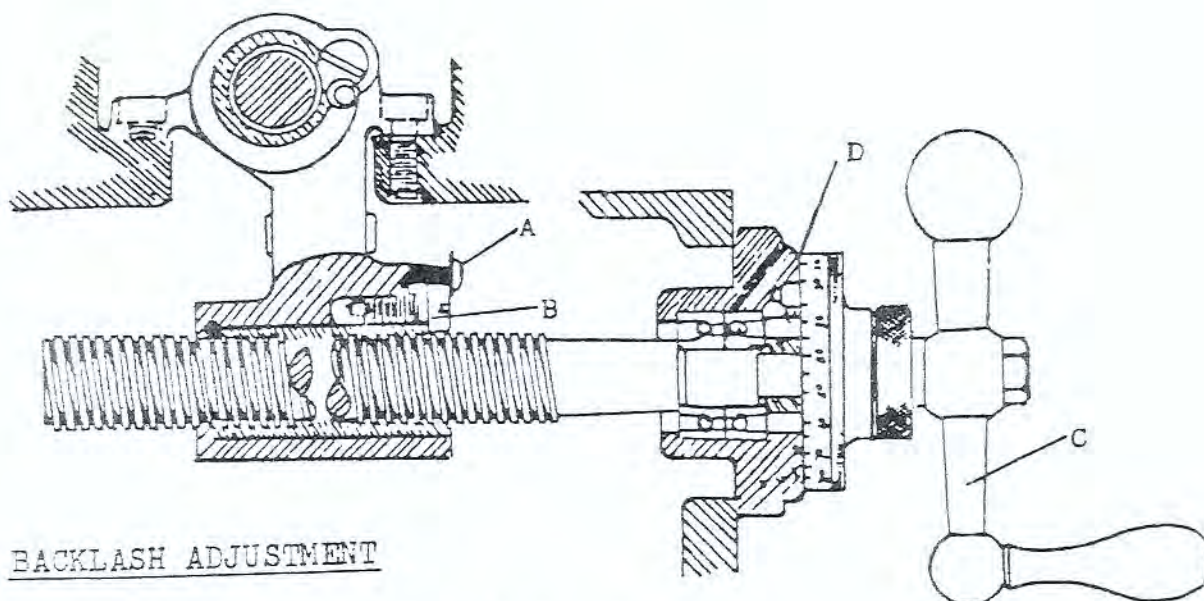
FREQUENCY	LUBRICATE	LUBRICANT	QUANTITY	LUB AT
TWICE WEEKLY	PULLEY CAM	VACTRA HEAVY MEDIUM	5 DROPS	1
TWICE DAILY	SPINDLE/QUILL HEARING/FEED	VACTRA WEAVY MEDIUM	TOP-UP	2
TWICE DAILY	QUILL BEARINGS	VACTRA HEAVY MEDIUM	TOP-UP	3

NOTE: Failure to lubricate "Quill bearings" at 3 can result in tight quills and partial seizure of quill in housing.



BACKLASH ADJUSTMENT

1. Crank the table to the left.
2. Withdraw screw 'A' $\frac{1}{2}$ a turn.
3. Tighten screw 'B' whilst slowly turning handle 'C' until .004" or .005" is obtained.
4. Finally lock screw 'A' on to 'B'.

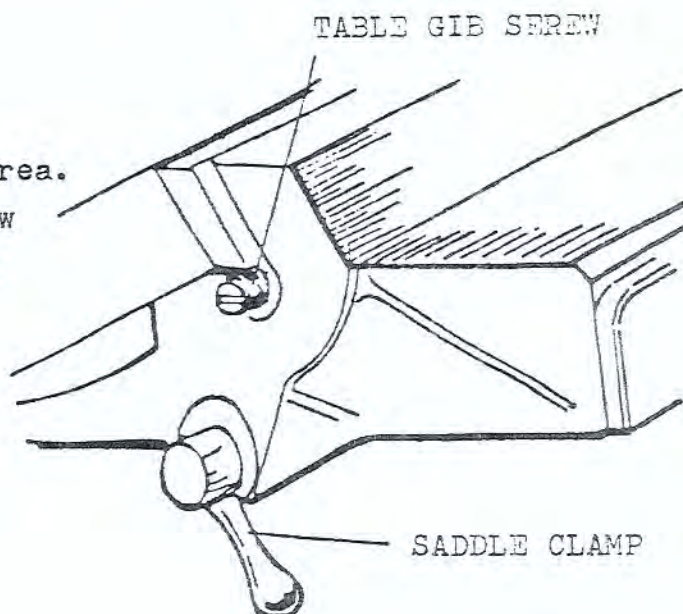


BACKLASH ADJUSTMENT

1. Crank the saddle to mid position.
2. Withdraw 4 screws 'D'.
3. Pull the saddle forward to expose screws 'A' & 'B'.
4. Withdraw screw 'A', $\frac{1}{2}$ a turn.
5. Whilst slowly turning handle 'C' tighten screw 'B' until ".004" or ".005" is obtained.
6. Lock screw 'A' onto 'B'.
7. Finally crank the saddle to the front of the knee and replace 4 screws 'D'.

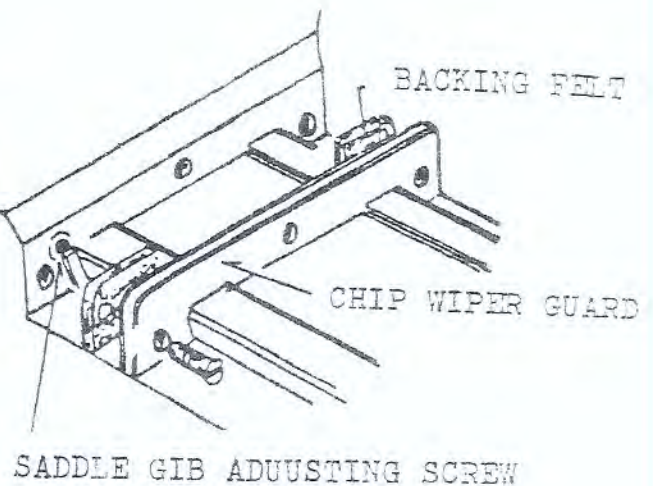
a) TABLE SADDLE WAYS

1. Remove all swarf from area.
2. Turn the table gib screw clockwise whilst moving the table until slight drag is felt.

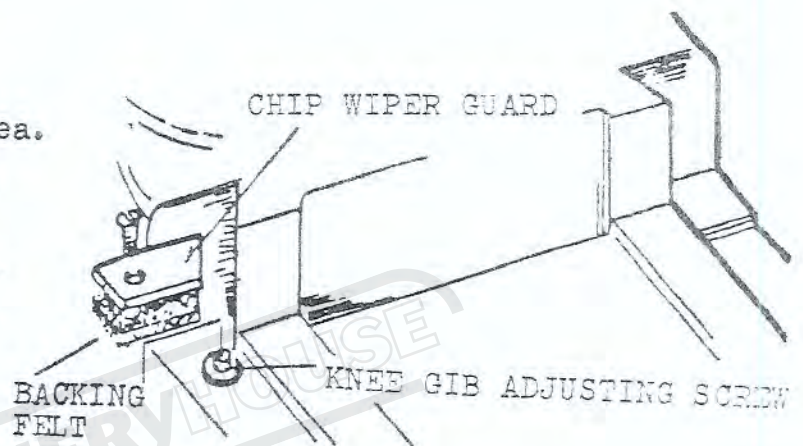


b) SADDLE KNEE WAYS

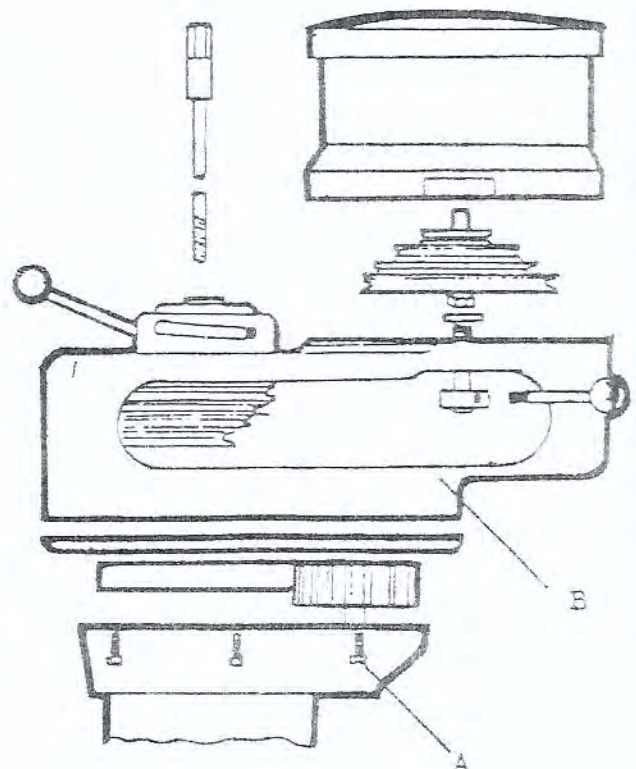
1. Remove all swarf from area.
2. Remove chip wiper guards and felt.
3. Turn gib adjusting screw clockwise whilst moving the saddle until slight drag is felt.
4. Ensure ship wiper guard and felt and replaced.

c) KNEE COLUMN WAYS

1. Remove all swarf from area.
2. Remove chip wiper guard.
3. Remove felt.
4. Turn gib adjusting screw clockwise whilst moving knee until slight drag is felt.
5. Ensure chip wiper guard and felt are replaced.

VEE AND TIMING BELT REPLACEMENT

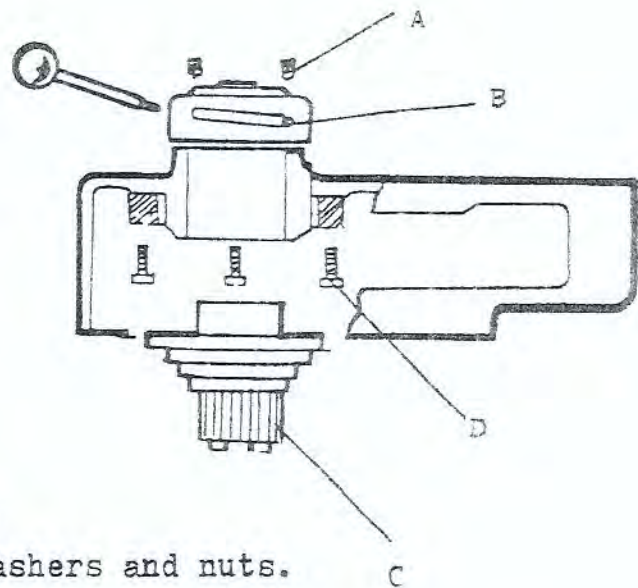
1. Isolate machine.
2. Remove drawbar.
3. Remove motor.
4. Lower quill to full extension.
5. Remove 6 screw 'A'.
6. Remove belt housing 'B' tap to withdraw from dowels.
7. The belts may now be changed.



BRAKE SHOE REPLACEMENT

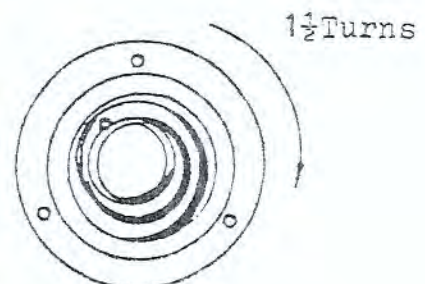
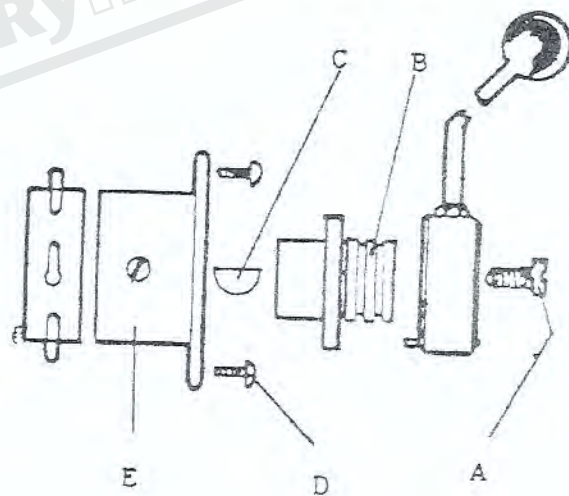
Repeat sequence 1 to 6 above

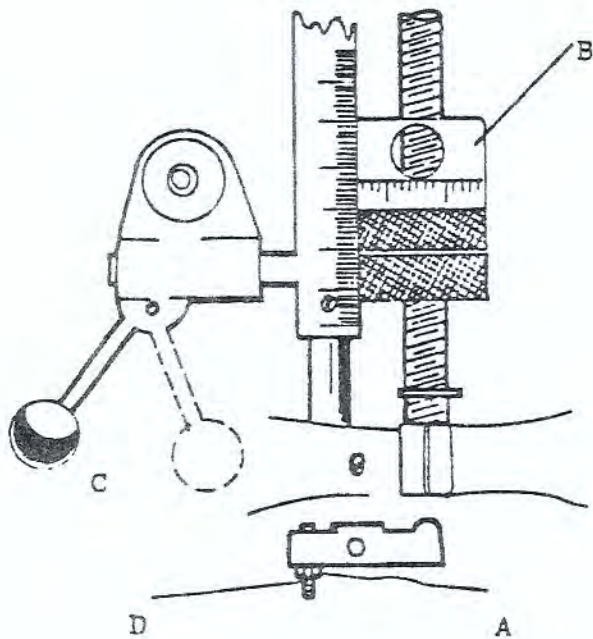
1. Remove 2 screws 'A'.
2. Remove 2 screws 'B'.
3. Push bearing hub 'C' clear of housing.
4. Remove 3 screws 'D'.
5. Replace shoe.
6. Ensure screws 'D' are fully tightened and locked with washers and nuts.



BALANCE SPRING REPLACEMENT

1. With quill at top of movement apply quill lock.
2. Remove screw 'A', hub 'B' and key 'C'.
3. Remove screws 'D', allowing housing to rotate slowly releasing spring tension.
4. Lift end of spring from peg on the pinion shaft.
5. Rotate housing 'E', anti-clockwise from head casting.
6. Remove spring from housing and replace.
7. Refit spring to main housing casting turning housing clockwise until spring locates on peg in pinion shaft.



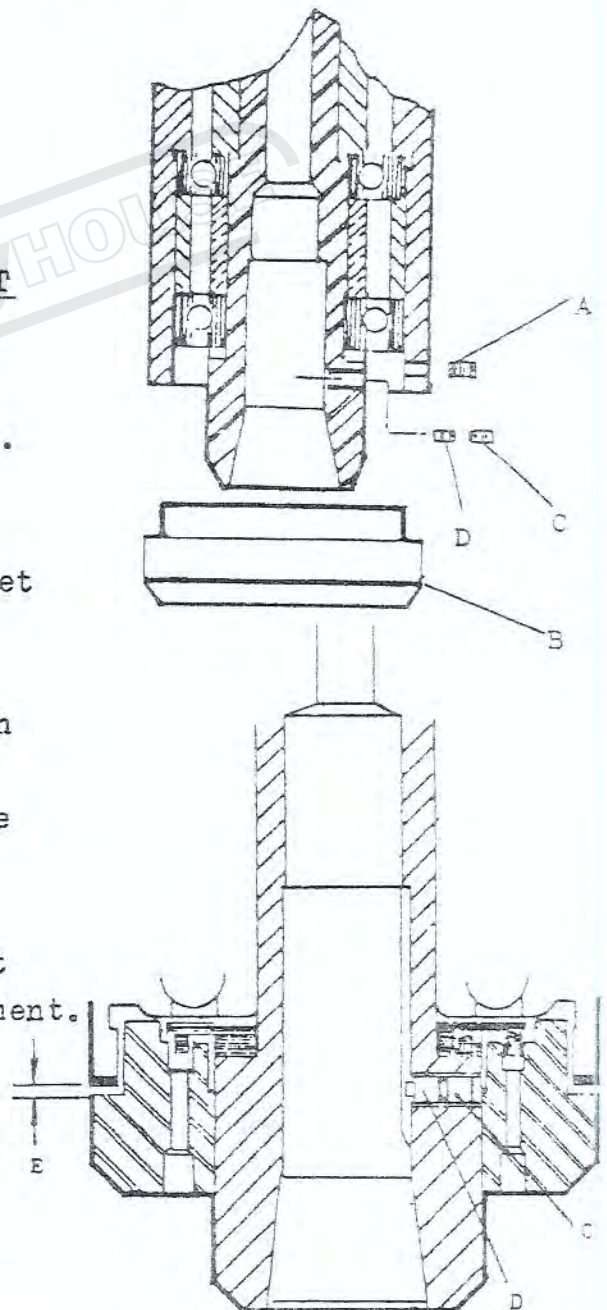


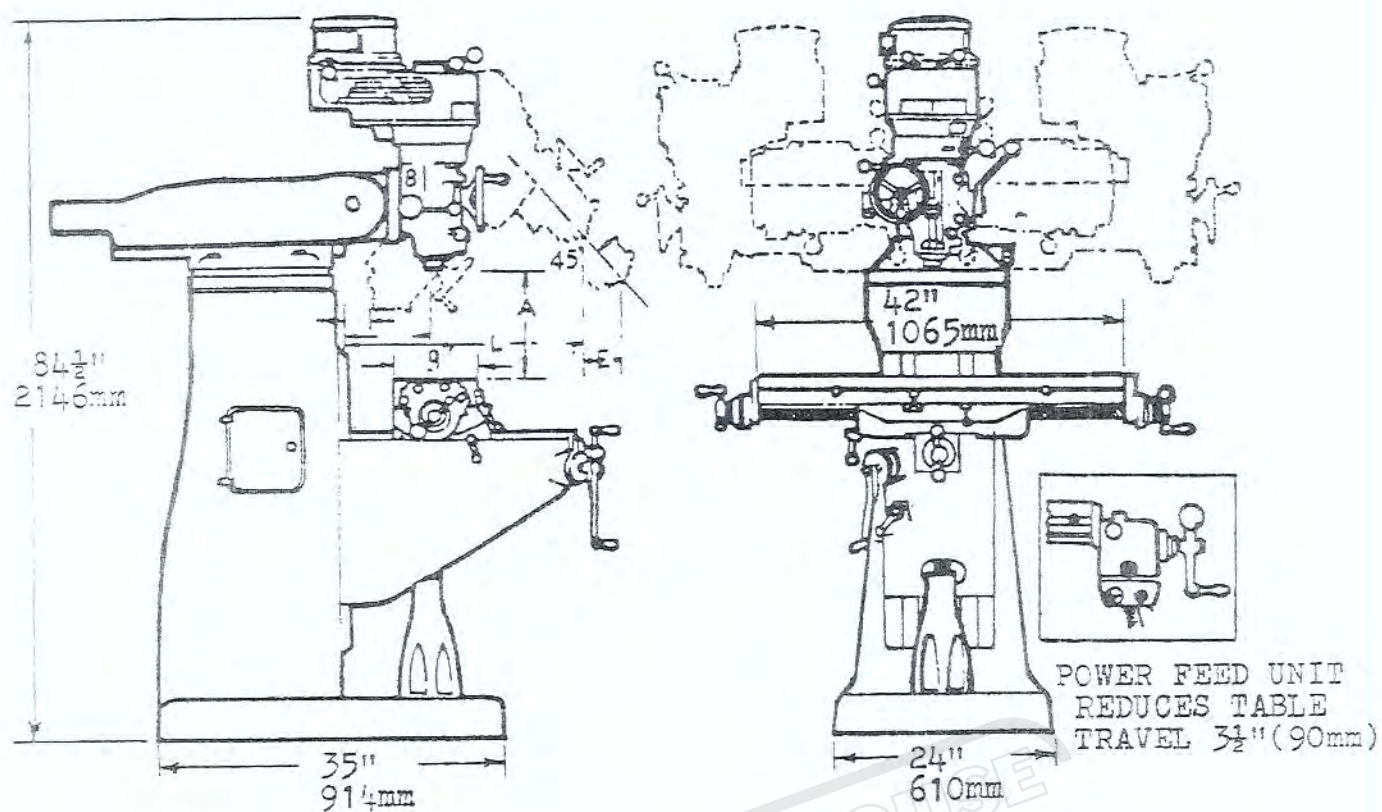
FEED TRIP ADJUSTMENT

1. Release locknut 'A'.
2. Engage trip handle 'C'.
3. Adjust micro nuts against quill stop 'B'.
4. Slowly turn adjusting screw 'D' until lever 'C' trips.
5. At this point secure locknut 'A'.
6. Check that smart trip action is obtained.

COLLET ALIGNING SCREW REPLACEMENT

1. Use felt pen, mark reference line on quill and nose cap 'B'.
2. Remove set screw 'A'.
3. Unscrew nose cap 'B'.
4. Remove lock screw 'C' and collet aligning screw 'D'.
5. Replace 'D' insert R-8 collet and check that the dog on the end of the screw does not foul on the bottom of the guide slot.
6. Replace lock screw 'D'.
7. Replace nose cap 'B' check felt pen markings for correct alignment.
8. Replace set screw 'A'.
9. Check gap 'E'. (.003"=.08mm)





INCHES

	A	B	C	D	E
MIN	0	0	6 3/4	9	0
MAX	19	11 1/4	19	21	3 1/2

METRIC

	A	B	C	D	E
MIN	0	0	171	228	0
MAX	482	114	482	533	89

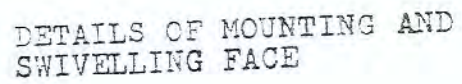
SPECIFICATION

Table size -----	42"x9"	1065x228 mm
Longitudinal travers		
hand only -----	30"	762 mm
Power feed fitted -----	26 ½"	675 mm
Cross traverse -----	12"	305 mm
Vertical traverse -----	16"	406 mm
Number of tee slots -----	3	3
Width and centers -----	5/8" at 2 ½"	15.87 mm at 63.5 mm
Ram movement -----	12"	305 mm
Spindle taper -----	R-8 (or N.S.T#30)	R-8
Range rpm -----	80-2720(50HZ 67-2300)	80-2720(50HZ 67-2300)
Spindle to tabler to		
column face -----	6 ¾"-19"	171-482 mm
Spindle to table -----	0-19"	0-480 mm
Quill feeds per rev of		
spindle -----	0.0015"-0.003"-0.006"	0.04 mm-0.08 mm-0.15 mm
Motor HP -----	2	2
Floor area occupied -----	64"x82"	1626x2085 mm
Shipping particulars		
space occupied -----	58"x52"x68"	1473x1321x1727 mm
Net Weight (Basic		
machine) -----	1960 lb	889 KGS.
Gross Weight (Basic		
machine)-----	2756 lb	1168 KGS.

SPECIAL NOTES:

Machine can also be fitted with a 36"x9" or 48"x9" table with longitudinal travel of 24" and 36" respectively.

If longitudinal power feed unit is fitted the table traverse is reduced by 3 ½".



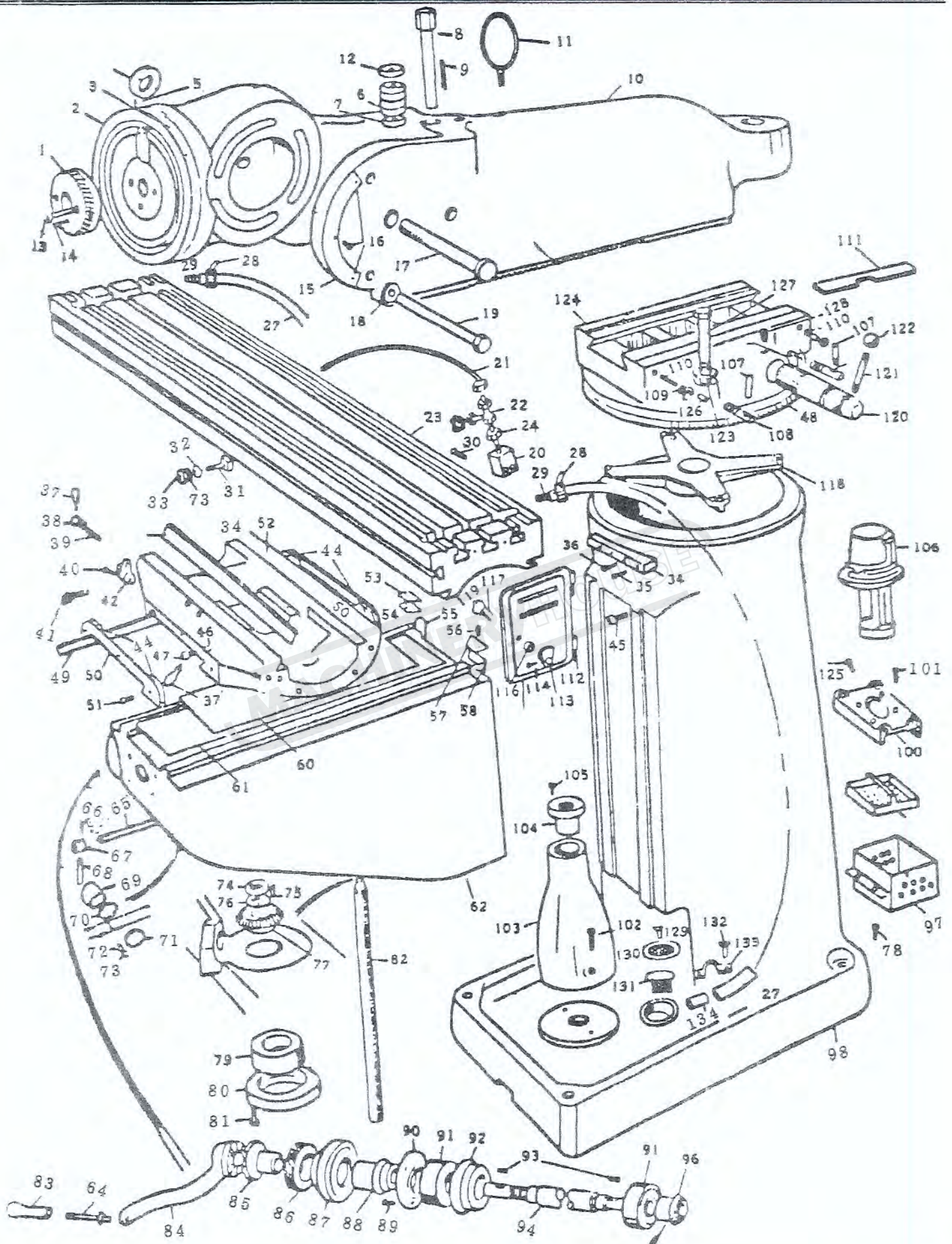
76 KGS.

When ordering replacement parts please quote:—

- ◆ THE MACHINE SERIAL NO.
stamped on the lubrication plate.
- ◆ THE HEAD SERIAL NO.
found on the front of the Belt Housing.
- ◆ ITEM NUMBER.
- ◆ COMPUTER NUMBER.
- ◆ PART NUMBER.
- ◆ DESCRIPTION.
- ◆ QUANTITY.

* PARTS OBTAINABLE IN ENGLISH OR METRIC.

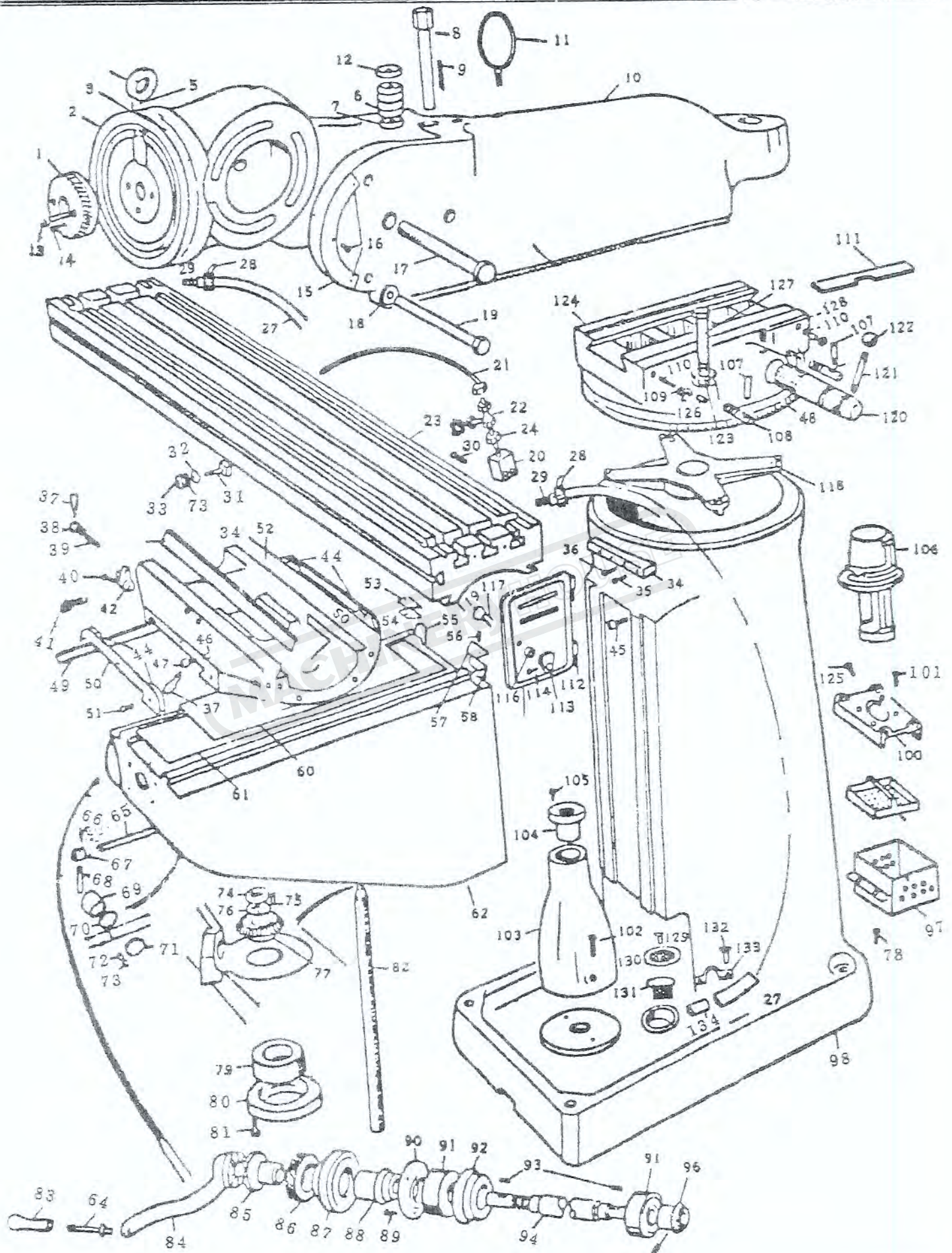
Spare parts BASIC MACHINE



Spare parts BASIC MACHINE

ITEM NO	DESCRIPTION
C- 1	Quill Housing ADJ. Gear
2	Ram Adaptor
3	Adaptor Scale
4	Adaptor Pivot Stud Locknut
5	Grub Screw 10-32 UNF x 3/16"
6	Vertical Adjusting Worm
7	Worm Thrust Washer
8	Vertical Adjusting Worm Shaft
9	Worm Key 3/16" x 1 7/8"
10	Ram
11	Avdel Chebaert Rivets
12	Ram Plates
13	1/4" x 1" Socket Cap Screw
14	Roll Dowel Pin 5/16" x 1 1/4"
15	Angle Plate
16	Round HD Drive Screws No 6x3/8" Long
17	Adaptor Pivot Stud
18	1/2"x1/8"x1" Chamfered & Hardened Washer
19	Adaptor Locking Bolt
20	Tap Bracket (Plastic)
21	LP 398 Suds Tap
22	5/16"-18x5/16" Socket Set Screw
23	Table
24	Knob and Screw
25	Hose Clip 3/4"
26	Plastic Hose 1/2" Bore 42" Long
27	Plastic Hose 3/4" Bore 44" Long
28	Hose Clip 1"
29	Gas Adaptor 1/2"
30	Plug for 5/8" Hole
31	Stop Piece T-Bolt
32	Table Stop Piece
33	3/8"-16 Hexagon Nut
34	Stop Collar
35	1/4"x20x1/4" Socket Set Screw
36	Stop Rod Clamp
37	Table Lock Bolt Handle
38	Saddle Lock Bolt
39	Saddle Lock Plunger
40	3/8"-16x1/2" Hollow HD Cap Screw
41	Strip Adjusting Screw
42	Table Stop Bracket
43	Saddle/Table Gib
44	Felt Wipers
45	Gas Grease Nipple (Straight)
46	Table Lock Plunger
47	Table Lock Bolt
48	Table Lock Bolt Handle
49	Saddle/Knee Gib
50	Saddle Knee Wiper Plate

ITEMS 51 CONTINUED.....

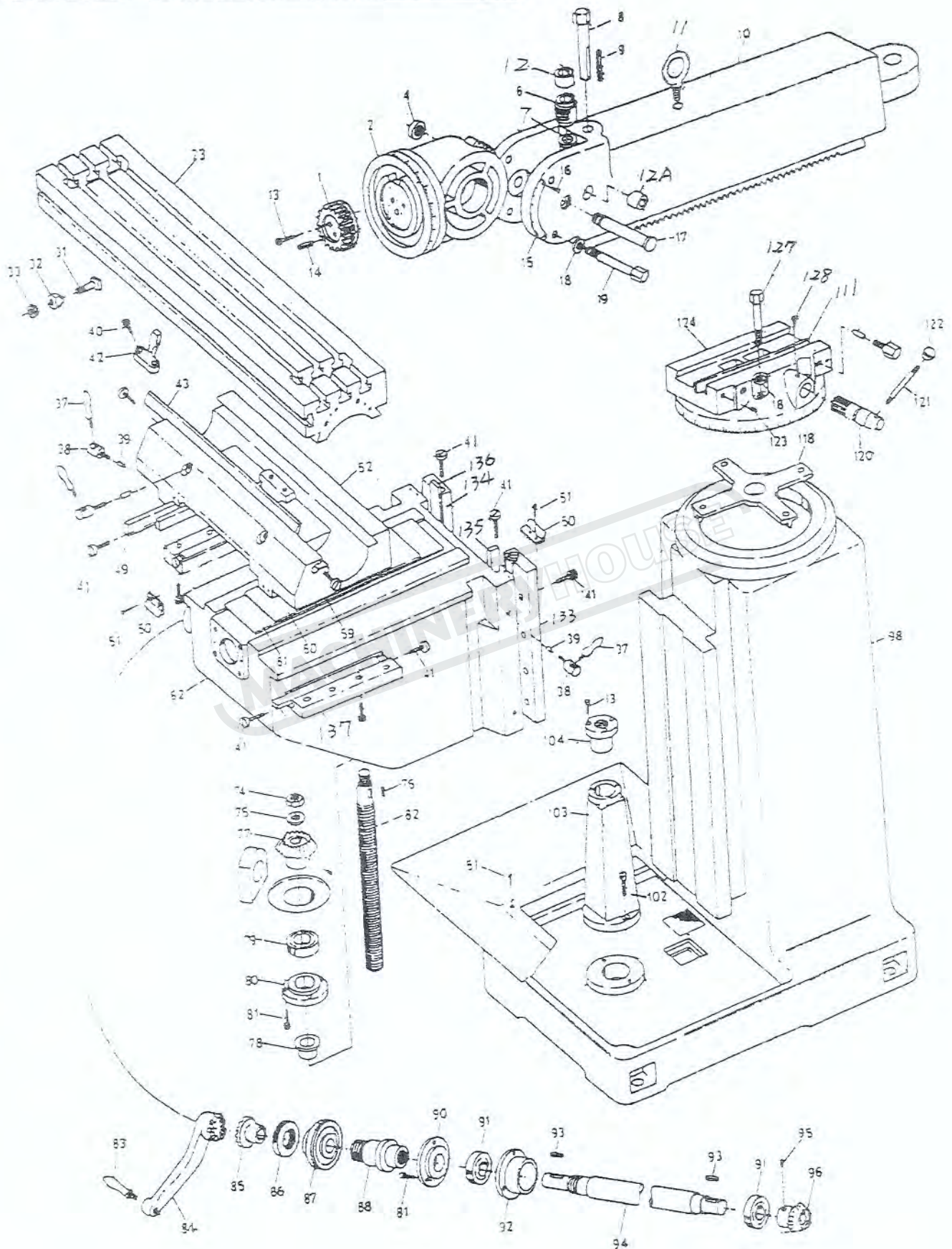
Spare parts ° BASIC MACHINE

Spare parts BASIC MACHINE

ITEM NO	DESCRIPTION
C- 51	No 10-32 x $\frac{1}{2}$ " Oval Head Screw
52	Saddle
53	Left Hand Column Wiper Holder
54	Knee Wiper Felt
55	Knee/Column Gib
56	$\frac{1}{4}$ " - 20 UNC x 1" Allen Cap Screw
57	Right Hand Column Wiper Holder
58	Knee Wiper Felt
59	$\frac{1}{8}$ " Gas Grease Nipple (Angle)
60	Chip Guards)
61	Chip Guards)
62	Knee 12"
63	Gas Grease Nipples (Straight)
64	$\frac{3}{16}$ " - 16 x $\frac{1}{2}$ " Cap Screw
65	Knee Lock Shaft
66	No 1 x 1" Taper Pin
67	Lock Shaft Boss
68	Lock Shaft Handle
69	Knee Lock Plunger
70	Washer Distance/Spacer
71	Knee Binder Plug (Plastic)
72	$\frac{5}{16}$ " - 18 x $\frac{5}{16}$ " Dog Point Set Screw
73	$\frac{5}{16}$ " - 18 x $\frac{5}{16}$ " Set Screw
74	$\frac{1}{2}$ " - 20 Jam Nut
75	$\frac{3}{16}$ " x $\frac{3}{16}$ " x $\frac{7}{8}$ " Key
76	$\frac{1}{2}$ " x 1" x $\frac{1}{8}$ " Thick Washer
77	Bevel Gear
78	Bearing Bush
79	No 3606 - J Grease Sealed Ball Bearing
80	Bearing Retainer Ring
81	$\frac{1}{4}$ " x 20 x $\frac{1}{2}$ " Hollow Head Cap Screw
82	Elevating Screw
83	Handle
84	Elevating Crank
85	Gearshaft Clutch Insert
86	Dial Lock Nut
87	Dial with 100 Graduations
88	Dial Holder
89	$\frac{1}{4}$ " x 20 x $\frac{1}{2}$ " Hollow Head Cap Screw
90	Bearing Retaining Ring
91	No 77020 Grease Sealed Bearing
92	Bearing Cap
93	No 7 Woodruff Key
94	Elevating Shaft for 12" knee
95	No 77020 Grease Sealed Bearing
96	Bevel Pinion
97	$\frac{1}{2}$ " - 20 Jam Nut
98	Column
99	Clip N5
100	Self Tapping Screw 10-24 x $\frac{5}{8}$ "

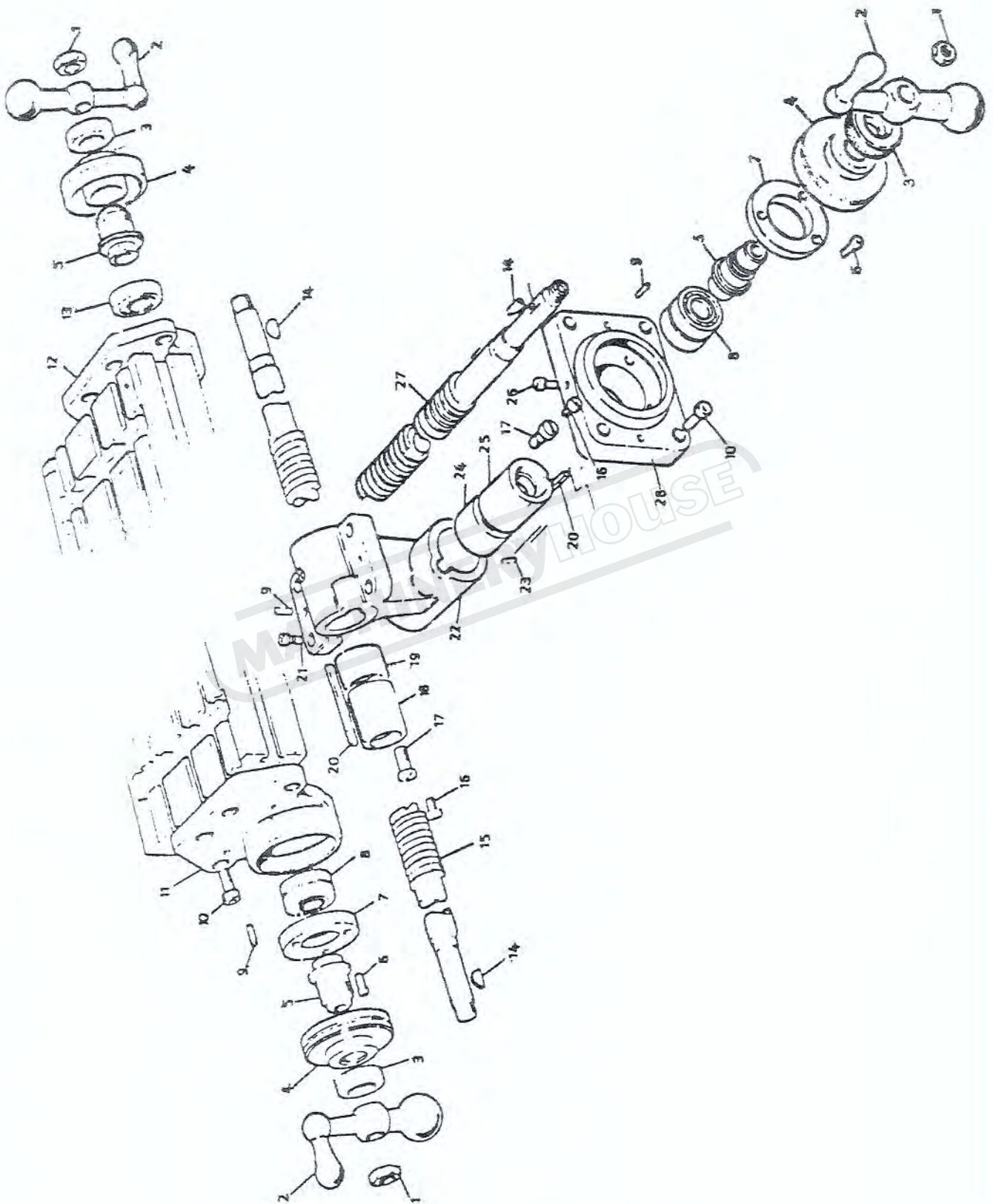
ITEMS 101 CONTINUED

Spare parts BASIC MACHINE



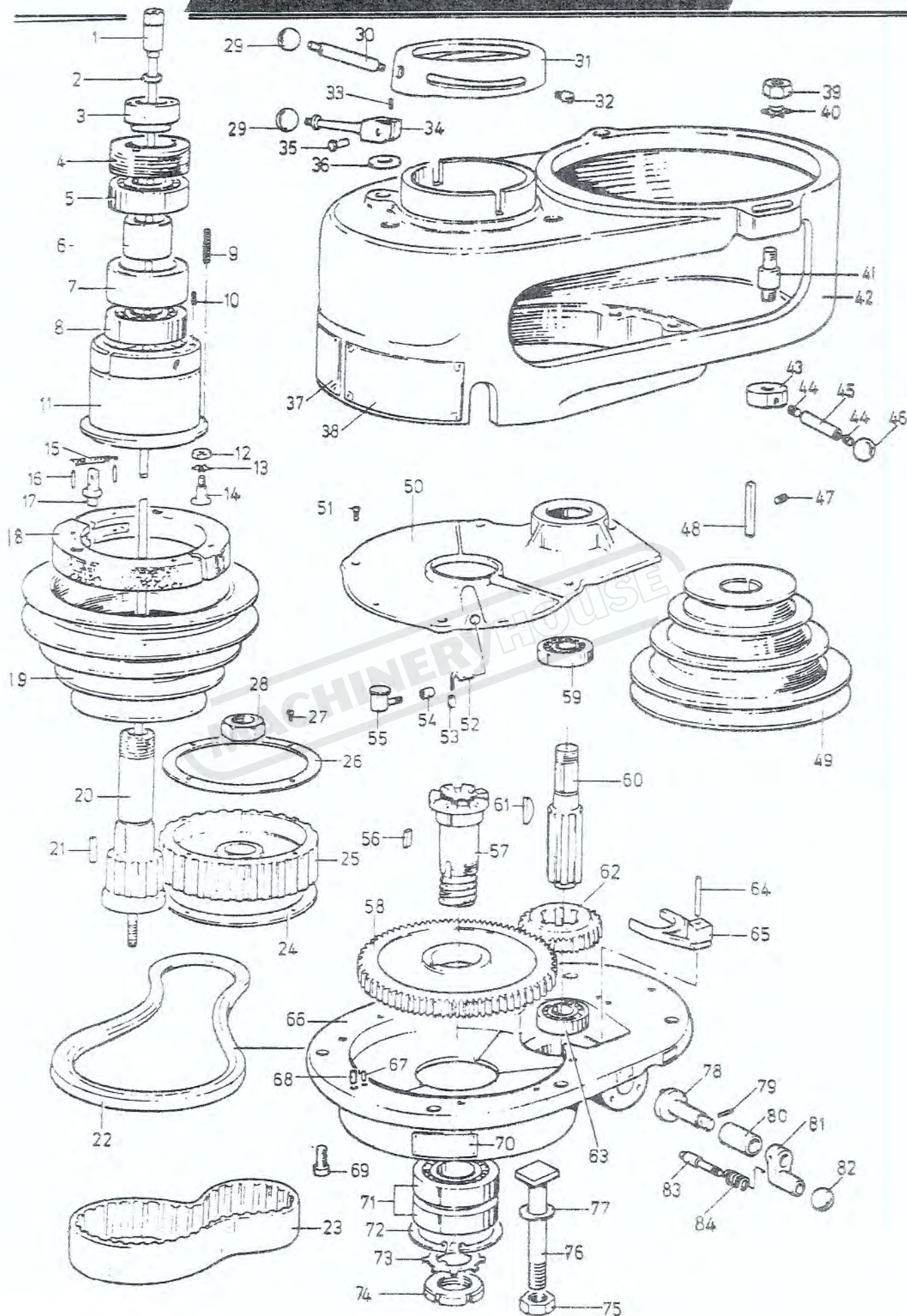
Spare parts BASIC MACHINE

ITEM NO	DESCRIPTION
C- 101	Strainer
102	3/8" - 16 x 1" Hollow Head Cap Screw
103	Elevating Screw Housing
104 *	Elevating Screw Nut
105	1/4" - 20 x 3/4" Hollow Head Cap Screw
106	Clamp Bar
107	Socket Cap Screw 1/4" UNC x 1"
108	MG Electric Coolant Pump Motor No A030
109	Column Cover
110	Self Tapping Screw 10 -24 x 5/8"
111	Wooden Shelf (2 Halves)
112	3/16" x 1 1/2" Hinge Pin
113	Door Locking Cam
114	1/4" - 20 x 1/4" Set Screw
115	Door
116	17/32" x 1" Spacer
117	Door Knob
118	Spider
119	Ram Lock Stud
120	Ram Pinion
121	Ram Pinion Handle
122	3/8" x 16 Ball 1 1/4" x 3/8" UNC
123	1/2" x 1/8" x 1" Chamfered x Hardened Washer
124	Turret
125	Ram Clamp Bar
126	Ram Clamp
127	Ram Clamp
128	Split Pin 3/8" x 2 1/2"
129	Locking Bolt
130	Ram Pinion Screw
131	1 1/4" Open End and 1 1/16" Box End Wrench
132	Grease Gun
133	Sliding Rail (Left)
134	Sliding Rail (Right)
135	Knee/Column Gib
136	Sliding Rail Gib
137	Sliding Rail (Left)
138	Sliding Rail (Right)
139	Saddle/Knee Taper Gib
140	Sliding Rail Gib
141	Infiltration Net



ITEM NO	DESCRIPTION
D- 1	1/2" - 20 Jam Nut
2	Ball Crank Handle
3	Dial Lock Nut
4	Dial with 200 Graduations
5	Dial Holder
6	1/4"-20 x 1/2" Hollow Head Cap Screw
7	Bearing Retainer Ring
8	No XF-12 Grease Sealed Ball Bearings
9	3/16" x 1" Dowel Pins
10	3/8"-16 x 1" Hollow Head Cap Screw
11	Right Bearing Bracket
12	Left Bearing Bracket
13	No 77020 Grease Seal Ball Bearing
14	No 7 Woodruff Key
15*	Longitudinal Feed Screw (36", 42", 48", also available)
16	No 8-32 x 3/8" Washer Head Screw
17	Cross Feed Nut Retaining Screw
18*	Longitudinal Feed Nut A) supplied as
19*	Longitudinal Feed Nut B) one unit
20	3/16" x 3/16" x 2 1/4" Key
21	3/8" - 16 x 1" Hollow Head Cap Screw
22	Feed Nut Bracket
23	Key Pin
24*	Cross Feed Nut A) supplied as
25*	Cross Feed Nut B) one unit
26	No 10 -32 x 5/8" Stop Screw
27*	Cross Feed Screw for 12" knee
28	Cross Feed Bearing Bracket

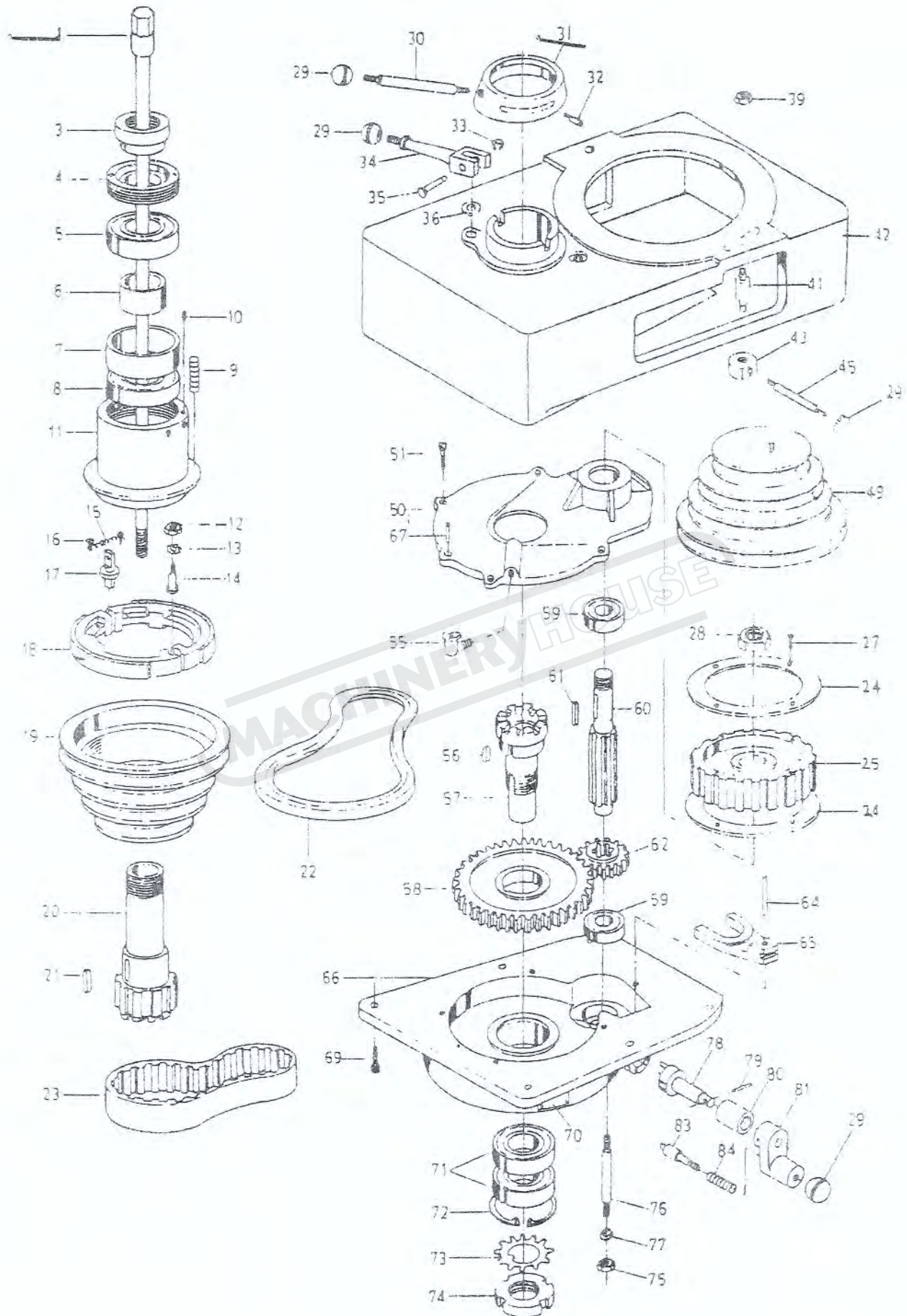
Spare parts HEAD TOP HOUSING



Spare parts HEAD TOP HOUSING

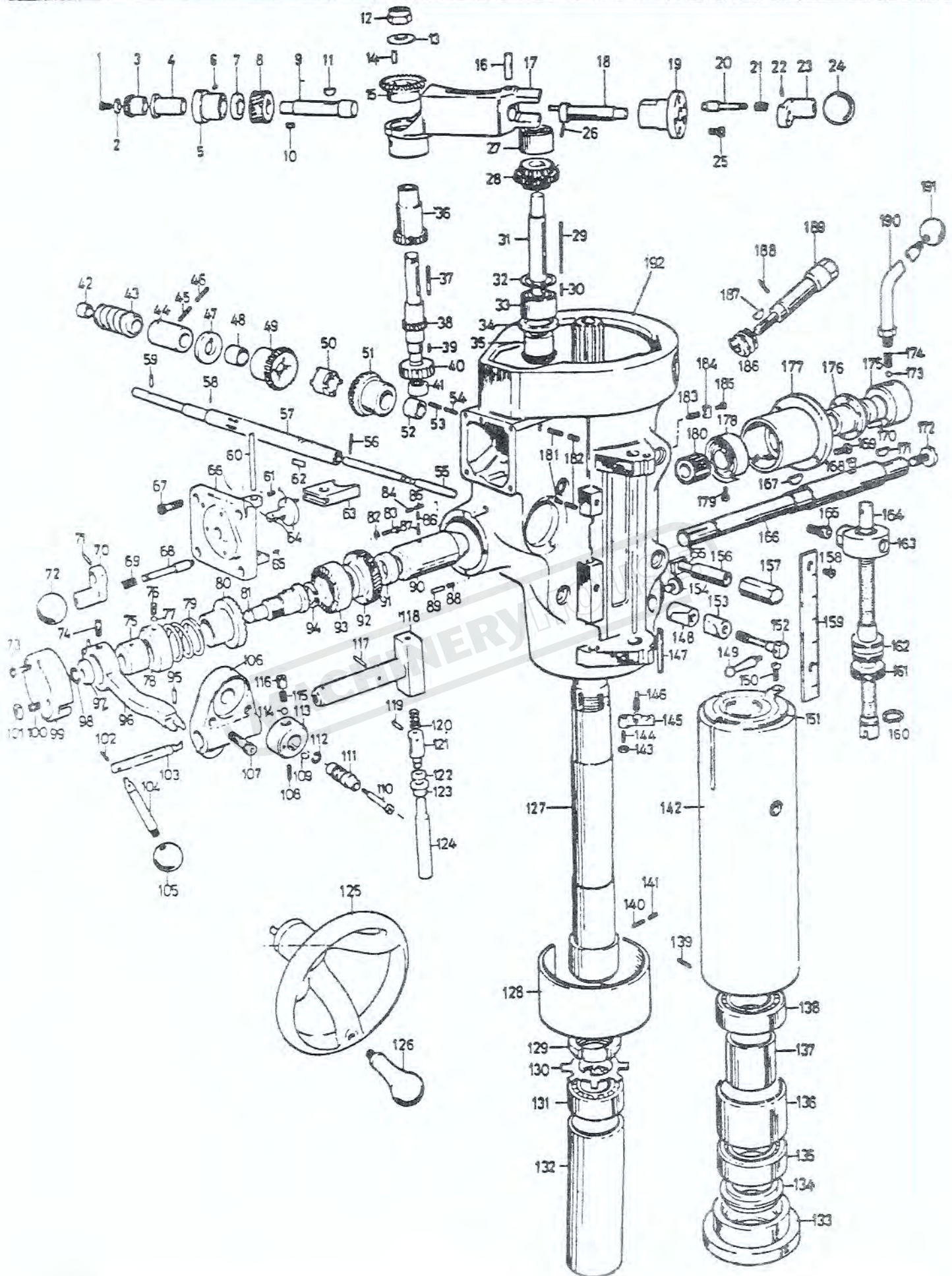
ITEM NO	DESCRIPTION
A- 1	Drawbar for R.8 Collet) supplied as
2	Drawbar Washer) 1 unit
3	Upper Bearing Locknut
4	Bearing Sleeve Locknut
5	ND 9507 Single Plate Ball Bearing (5 and 8)
6	Upper Bearing Spacer (small)
7	Upper Bearing Spacer (large)
8	ND 9507 Single Plate Ball Bearing
9	Compression Spring
10	6-32 NC x $\frac{1}{4}$ " KP Socket Set Screw
11	Spindle Pulley Bearing Sleeve
12	5/16" - 18 Jam Nut
13	5/16" External Lock Washer
14	Brake Ring Screw
15	WB Jones No 167 - A External Spring
16	3/32" x 5/8" Long Roll Pin
17	Brake Lock Stud
18	Brake Block
19	Spindle Pulley
20	Spindle Pulley Hub
21	Spindle Pulley Key
22	'V' Belt Gilmer 4LS 345
23	Timing Belt 1 - $1\frac{1}{4}$ " Wide
24	Timing Belt Pulley Flange
25	Timing Belt Pulley
26	Timing Belt Pulley Flange
27	Flat Head Screw No 6-32 x 3/8" Long
28	5/8" - 18 Hex Jam Nut
29	Black Plastic Ball 1" Dia.
30	Spindle Clutch Lever
31	Cam Ring
32	Spindle Clutch Cam Ring Pin
33	10-32 x $\frac{1}{4}$ " Long Socket Set Screw
34	Brake Lock Handle
35	Brake Lock Pin
36	Brake Lock Washer
37	Spindle Speed Plate
38	Operating Instruction Plate
39	3/8" -24 Hex Jam Nut
40	3/8" Lock Washer
41	Motor Mounting Studs
42	Belt Housing
43	Motor Locknut
44	$\frac{1}{4}$ " UNC x 3/4" Socket Set Screw
45	Motor Locknut Handle
46	Black Plastic Ball 1" Dia.
47	Socket Set Screw 5/16"-18 x $\frac{1}{2}$ " Long KP
48	Key 3/16" x 3/16" x 2 $\frac{1}{2}$ " Square Ends
49	Motor Pulley
50	Gear Housing Cover

ITEMS 51 CONTINUED.....



Spare parts HEAD TOP HOUSING

COMP NO	ITEM NO	DESCRIPTION
A-	51	Round HD Screw No 10 -24 x 3/8" Long
	52	Wick 1/8" OD
	53	Oiler Tube
	54	Oiler Plug
	55	Gits Oil Cup No 1207
	56	Bull Gear Key
	57	Splined - Gear Hub
	58	Spindle Bull Gear
	59	ND. No 99503 Double Seal Bearing ABEC3
	60	Countershaft
	61	No 9 Woodruff Key
	62	Countershaft Gear
	63	ND No 99503 Double Seal Bearing ABEC3
	64	5/16" x 2" Long Dowel Pin
	65	Back Gear Shifter Fork
	66	Gear Housing
	67	Dowel Pin 3/16" x 1/2" Long
	68	1/4" x 3/4" Roller Pins
	69	5/16"-18 x 5/8" Long Socket Cap Screw
	70	Disengage Feed Instruction Plate
	71	ND 3208 Ball Bearing
	72	Kohinoor No 5000 - 315 Snap Ring
	73	W-08 Lockwasher
	74	N-08 Special 5/16" Thick Bearing Locknut
	75	7/16" - 14 Hex Nut Hardend
	76	Vertical Tee Bolt
	77	Vertical Bolt Washer
	78	Back Gear Shift Crank
	79	1/8" x 7/8" Long Roll Pin
	80	Back Gear Shift Bushing
	81	Shift Crank
	82	Black Plastic Ball 1" Dia.
	83	Gearshift Plunger
	84	Compression Spring
	85	Plastic Guard for Head (extra)

Spare parts HEAD ASSEMBLY

Spare parts HEAD ASSEMBLY

ITEM NO.	DESCRIPTION
B- 1	No 10 - 24 x 3/8" Long RD. HD. Screw
2	Bevel Pinion Washer
3	Feed Bevel Pinion
4	Feed Worm Gear Shaft Sleeve
5	Worm Cradle Bushing
6	1/4" - 20 x 5/16"
7	Worm Gear Spacer
8	Feed Drive Worm Gear
9	Feed Drive Worm Gear Shaft
10	Feed Drive Gear Key 3/8" x 5/16"
11	No. 7 Woodruff Key
12	3/8 - 24 Floploc Stop & Locknut
13	Washer 3/8"
14	Feed Drive Gear Key 3/8" x 5/16"
15	Feed Reverse Bevel Gear
16	Feed Engage Pin
17	Worm Gear Cradle
18	Worm Gear Cradle Throw-out
19	Shift Sleeve
20	Gearshift Plunger
21	Compression Spring
22	1/8" x 7/8" Roll Pin
23	Shift Crank
24	Black Plastic Ball 1" Dia.
25	No 10 -24 x 1/2" Long Cap Screw
26	No 10 24 x 3/8" Set Screw
27	Cluster Gear Shaft Upper Bearing
28	Cluster Gears Assembly
29	Cluster Gear Key
30	1/8" x 9/16" Round End Key
31	Cluster Gear Shaft
32	Waldes Circlip
33	Bevel Gear Bearing
34	Bevel Gear Thrust Spacer
35	Feed Reverse Bevel Pinion
36	Feed Driving Gear
37	1/8" x 3/8" Key Round Ends
38	Cluster Gear Input Shaft
39	3/8" x 5/16" Feed Drive Gear Key
40	Feed Drive Gear
41	B-66 Thorrrington Needle Bearing
42	Bushing
43	Boston Worm No. HLVH
44	Feed Worm Shaft Bushing
45	1/4" - 20 x 1/2" Long Socket Set Screw
46	1/4" - 20 Mock-it Lockscrew
47	Feed Worm Shaft Thrust Washer
48	A-672-4 Oilite Bearing
49	Feed Reverse Bevel Gear
50	Feed Reverse Clutch

ITEMS 51 CONTINUED.....

YS-5V/4V/3V/942V

Spare parts HEAD ASSEMBLY

ITEM NO.	DESCRIPTION
B- 51	Feed Reverse Bevel Gear
52	A-672-4 Oilite Bearing
53	Special Hollow Set Screw 5/32" Chem B1
54	5/16" - 18 x 5/16" Socket Set Screw
55	Reverse Clutch Rod
56	3/32" x 3/4" Long Roll Pin
57	Feed Worm Shaft
58	3/32" x 5/16" Long Pin
59	110 x 7/16 Long Pin
60	Feed Shift Rod
61	10 - 32 x 1/4" Long KP. Set Screw
62	1/8" x 9/16" Key Round Ends
63	Feed Gear Shift Fork
64	Cluster Gear Shift Crank
65	10-32 x 1/4" Socket Set Screw
66	Cluster Gear Cover
67	No 10 - 24 x 1/2" Long Cap Screw
68	Gearshift Plunger
69	Compression Spring
70	Shift Crank
71	1/8" x 7/8 Long Roll Pin
72	Black Plastic Ball 1" Dia.
73	10 -24 x 1 1/2" Cap Screw
74	Clutch Ring Pin
75	Clutch Ring
76	1/4" - 20 x 1/4" Long Socket Set Screw
77	Brass Plug
78	Overload Clutch Locknut
79	Safety Clutch Spring
80	Overload Clutch
81	Overload Clutch Sleeve
82	Single Spring Washer
83	8 - 32 x 5/8" Round Head Screw
84	1/4" - 20 Mock - it Lockscrew
85	1/4" - 20 x 1/2" Socket Set Screw
86	1/4" - 20 Mock - it Lockscrew
87	1/4" -20 x 1/2" Socket Set Screw
88	Compression Spring 1/4" Dia. x 1 1/4"
89	Overload Clutch Lever Spring Plunger
90	Quill Pinion Shaft Bushing
91	Pinion Shaft Worm Gear Spacer
92	Overload Clutch Worm Gear
93	Overload Clutch Ring
94	Kohinoor Circlip
95	3/16" x 5/8" Dowel Pin
96	Overload Clutch Trip Lever
97	Overload Clutch Washer
98	5108 - 37 Kohinoor Snap Ring
99	Clutch Alm Cover
100	1/4" - 20 x 1/2" Socket Set Screw

ITEMS 101 CONTINUED.....

ARIABLE SPEED

STEP PULLEY TYPE

Spare parts HFAD ASSEMBLY

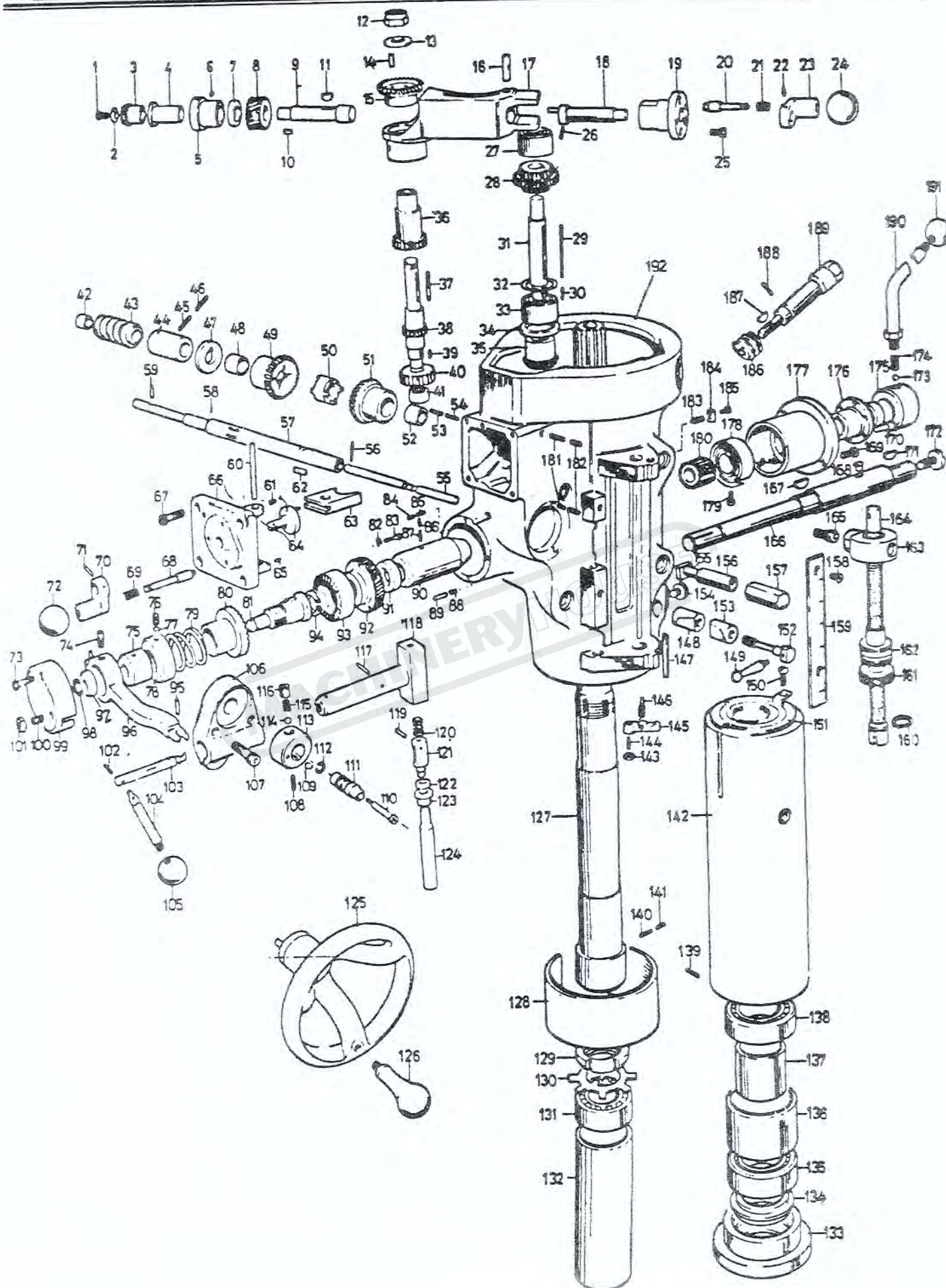
ITEM NO.	DESCRIPTION
B- 101	Chem Blacked Locknut $\frac{1}{2}$ x 20 UNC
102	$\frac{3}{16}$ " x $\frac{3}{4}$ " Dowel Pin
103	Cam Rod
104	Trip Handle
105	Black Plastic Ball 1" Dia.
106	Feed Trip Bracket
107	$\frac{1}{4}$ " - 20 x 1" Long Cap Screw
108	$\frac{1}{2}$ " x 20 x $\frac{5}{16}$ "
109	Key
110	Feed Reverse Knob Stud
111	Reverse Knob
112	Snap Ring 5100 - 25
113	Handwheel Clutch
114	$\frac{3}{16}$ " Dia. Steel Ball
115	Compression Spring
116	Handwheel Clutch Spring Screw
117	$\frac{1}{8}$ " x $\frac{9}{16}$ " Long Roll Pin
118	Cam Rod Sleeve Assembly
119	$\frac{1}{8}$ " x $\frac{7}{16}$ " Long Roll Pin
120	Compression Spring
121	Trip Plunger
122	Feed Trip Plunger Bushing
123	Trip Plunger Bushing
124	Feed Trip Plunger
125	Handwheel
126	Handwheel Handle
127	Spindle (Serial J-1200 and up)
128	Quill Skirt
129	No. 06 Locknut
130	W-06 Lockwasher
131	Fafnir Bearing M206K 132J30
132	Sleeve From Ser J-1750
133	Nose-piece
134	Spindle Dirt Shield
135	Fafnir MM207 LU35T Bearing
136	Bearing Spacer - Large From J-1750
137	Bearing Spacer - Small
138	Fafnir MM207 LU35T Bearing
139	$\frac{1}{4}$ " - 20 x $\frac{1}{4}$ " Socket Set Screw
140	$\frac{1}{4}$ " x 32 UNF x $\frac{3}{4}$ " Special Socket Set Screw
141	Collet Alignment Screw
142	Quill
143	Steel Nut 6-32 NC
144	6-32 x $\frac{3}{8}$ " Socket Set Screw
145	Feed Trip Lever
146	Trip Lever Pin
147	Indicator Rod
148	Drilled Lock Sleeve
149	Lock Handle
150	10-32 x $\frac{5}{16}$ " Long RD. HD. Screw

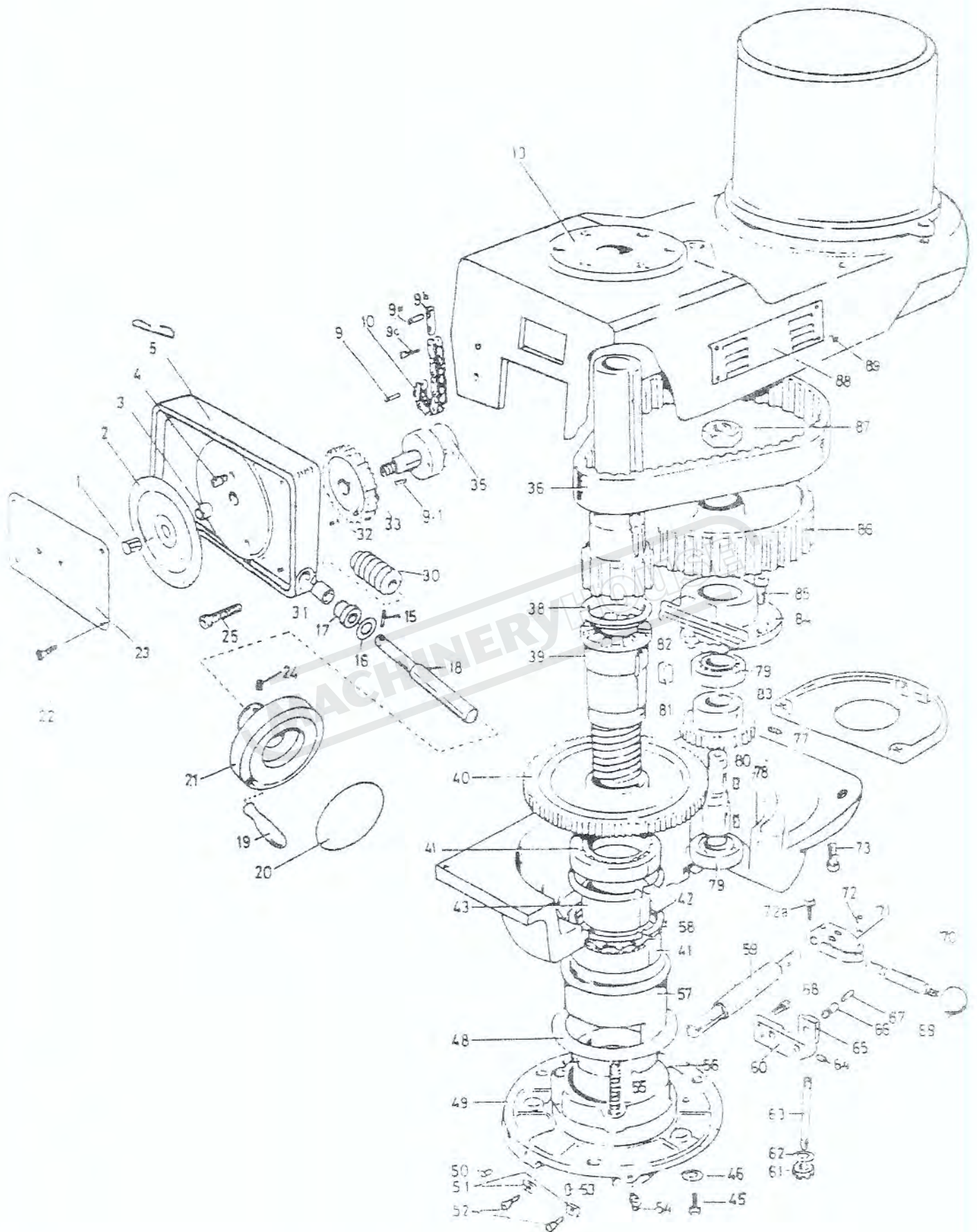
ITEMS 151 CONTINUED.....

Spare parts HFAD ASSEMBLY

ITEM NO	DESCRIPTION
B- 151	Oil Strainer for Quill Bearing
152	Quill Lock Bolt
153	Quill Lock Sleeve Tapped
154	Indicator Rod Screw
155	$\frac{1}{2}$ " x 6 $\frac{3}{16}$ " Tee Bolt
156	Lower Clamping Bolt Spacer
157	$\frac{1}{2}$ " x $1\frac{1}{2}$ " Adaptor Nut
158	6 - 32 x $\frac{3}{16}$ " Chem Blacked RD,HD. Screws
159	Micrometer Scale
160	5108 - 62 Waldes Snap Ring
161	Quill Micro-stop Nut
162	Micrometer Nut
163	Quill Stop Knob
164	Quill Stop Micro-screw
165	$\frac{3}{8}$ - 24 x $\frac{5}{8}$ " Screw
166	Quill Pinion Shaft
167	No. 7 Woodruff Key
168	Spring Pin
169	No 10 - 24 x $\frac{3}{8}$ " Long RD. Head Screw
170	$\frac{3}{16}$ " x $\frac{3}{4}$ " Long Dowel Pin
171	No. 3 Woodruff Key
172	Pinion Shaft Hub Screw
173	$\frac{3}{16}$ " Steel Ball
174	Compression Spring
175	Rack Feed Handle Hub
176	Pinion Shaft Hub Sleeve
177	Spring Cover
178	Clock Spring 1" x .020" x 42"
179	Outside Spring Pin
180	Quill Pinion
181	$\frac{1}{4}$ " - 20 x $\frac{1}{2}$ " Long Socket Set Screw
182	$\frac{1}{4}$ " - 20 Mock-it Lockscrew
183	Reverse Trip Ball Lever
184	Feed Reverse Trip Plunger
185	Reverse Trip Ball Lever Screw
186	Worm Gear
187	No. 5 Woodruff Key
188	Socket Set Screw $\frac{1}{4}$ UNC x 20 x $\frac{1}{4}$
189	ADJ Worm Shaft
190	Pinion Shaft Hub Handle
191	Black Plastic Ball Handles 1 $\frac{3}{8}$ " Dia. same as M-54
192	Quill Housing

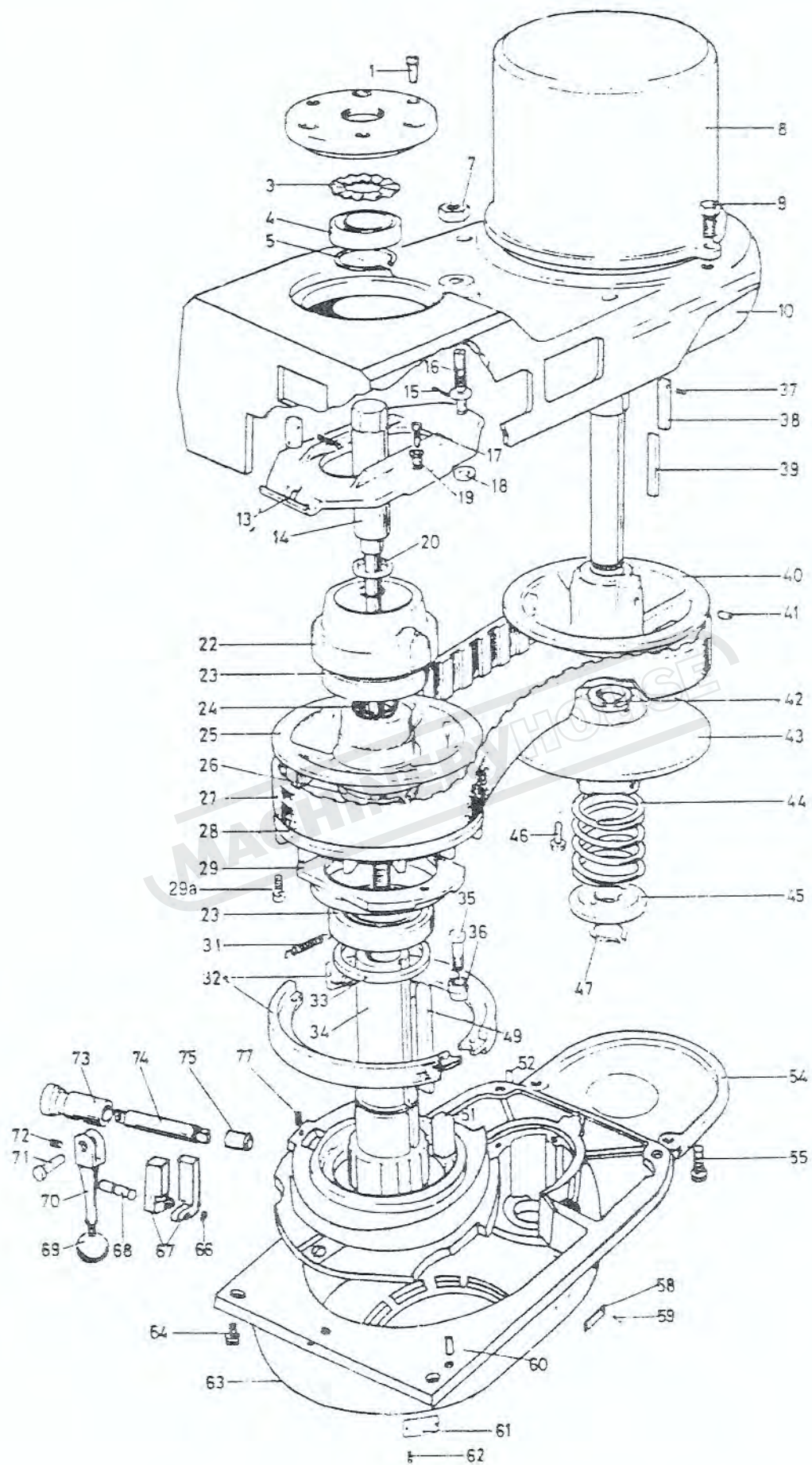
Spare parts HEAD ASSEMBLY





HEAD TOP HOUSING

ITEM NO.	PARTS NO.	DESCRIPTION	ITEM NO.	PARTS NO.	DESCRIPTION
1	H 7001	Hex Cap Nut	50	H 7050	Oil Cup
2	H 7002	Vari-Speed Dial	51	H 7051	Guide for Clutch Bracket
3	H 7003	Bronze Bearing	52	H 7052	Flat HD Socket Cap Screw (2 Req.)
4	H 7004	Full Dog Socket Set Screw	53	H 7053	Dowel Pin
5	H 7005	Speed Changer Housing	54	H 7054	Oil Cup
9	H 7008	Roll Pin	55	H 7055	Compression Spring (3 Req.)
9-1	H 7008-1	Roll Pin	56	H 7056	Bearing Locknut
9a	H 7008-2	Roll Pin	57	H 7057	Bearing Sleeve
9b	H 7008-3	Speed Change Stud	58	H 7058	Wave Spring Washer
9c	H 7008-4	Cotter Pin	59	H 7059	Bull Gear Shift Pinion
10	H 7010	Speed Changer Chain	60	H 7060	HI-LOW Detent Plate
13	H 7013	Top Bearing Cap	61	H 7061	Hex Nut (3 Req.)
15	H 7015	Roll Pin	62	H 7062	Lock Washer (3 Req.)
16	H 7016	Spring	63	H 7063	Studs (3 Req.)
17	H 7017	Bearing	64	H 7064	Socket Set Screw
18	H 7018	Speed Change Shaft	65	H 7065	Adjustable Plate
19	H 7019	Handle	66	H 7066	HI-LOW Detent Plunger
20	H 7020	Caution Plate	67	H 7067	Spring
21	H 7021	Speed Change Handwheel	68	H 7068	Socket Cap Screw (2 Req.)
22	H 7022	Flat Hd. Cap Screw (2 Req.)	69	H 7069	Bakelite Ball Handle
23	H 7023	Plastic Face Plate	70	H 7070	HI-LOW Shift Crank
24	H 7024	Set Screw	71	H 7071	HI-LOW Pinion Block
25	H 7025	Socket HD Cap Screw (4 Req.)	72	H 7072	Roll Pin (1 Req.)
30	H 7030	Worm Gear	72a	H 7072a	Socket HD Cap Screw (2 Req.)
33	H 7033	Speed Changer Spur Gear	73	H 7073	Socket Cap Screw (4 Req.)
35	H 7035	Speed Change Chain Drum	77	H 7077	Socket Set Screw
36	H 7036	Belt	78	H 7078	Key (2 Req.)
38	H 7038	Timing Pulley Clutch Sleeve	79	H 7079	Ball Bearing (2 Req.)
39	H 7039	Splined Gear Hub	80	H 7080	Bull Gear Pinion Counter Shaft
40	H 7040	Spindle Bull Gear Assembly	81	H 7081	Key
41	H 7041	Ball Bearing (2 Req.)	82	H 7082	Wave Spring Washer
42	H 7042	Snap Ring (2 Req.)	83	H 7083	Bull Gear Pinion
43	H 7043	Bull Gear Bearing Spacer	84	H 7084	Bull Gear Pinion Bearing Cap
45	H 7045	Vert. Tee Bolts (3 Req.)	85	H 7085	Socket HD Cap Screw (2 Req.)
46	H 7046	Steel Washer (3 Req.)	86	H 7086	Timing Belt Pulley
48	H 7048	Ball Bearing Gear Sleeve Washer	87	H 7087	Jam Nut
49	H 7049	Fixed Clutch Bracket	88	H 7088	Ventilator (2 Req.)
			89	H 7089	Round HD. Machine Screw (8 Req.)



HEAD BACK GEAR

ITEM NO.	PARTS NO.	DESCRIPTION	ITEM NO.	PARTS NO.	DESCRIPTION
1	H8001	Socket Cap Screw (3 Req.)	40	H8040	Stationary Motor Varidisc
3	H8003	Spring Washer	41	H8041	Socket Set Screw
4	H8004	Ball Bearing	42	H8042	Plastic Insert (2 Req.)
5	H8005	Snap Ring	43	H8043	Adjustable Motor Varidisc Assembly
7	H8007	Hex Jam Nut	44	H8044	Spring for Varidisc Motor Shaft
8	H8008	Motor 2 HP (complete unit) 230/460 3/60	45	H8045	Adjustable Varidisc Spring Collar
9	H8009	Hex HD Screw (2 Req.)	46	H8046	Socket HD Cap Screw (2 Req.)
10	H8010	Belt Housing	47	H8047	Ret. Ring
13	H8013	Speed Change Plate	48	H8048	Socket Cap Screw
14	H8014	Drawbar	49	H8049	Plastic Key
15	H8015	Cotter Pin	51	H8051	Key
16	H8016	Speed Change Plate Pivot Stud	52	H8052	Taper Pin
17	H8017	Socket HD Cap Screw (2 Req.)	53	H8053	Belt Housing Base
18	H8018	Washer	54	H8054	Motor Pulley Cover
19	H8019	Pivot Sleeve (2 Req.)	55	H8055	Socket Cap Screw
20	H8020	Draw Bar Washer	58	H8058	Hi-LOW Range Nameplate
22	H8022	Spindle Pulley Bearing Sliding Housing	59	H8059	Drive Screw (4 Req.)
23	H8023	Ball Bearing (2 Req.)	60	H8060	Taper Pin (2 Req.)
24	H8024	Plastic Insert (2 Req.)	61	H8061	Quill Feed Nameplate
25	H8025	Adjustable — Driven Varidisc	62	H8062	Rivets (4 Req.)
26	H8026	Snap Ring No.	63	H8063	Gear Housing
27	H8027	Belt	64	H8064	Socket Cap Screw (6 Req.)
28	H8028	Stationary Driven Varidisc	66	H8066	Snap Ring
29	H8029	Brake Bearing Cap	67	H8067	Brake Finger Pivot Stud
29a	H8029-1	Socket HD Cap Screw (2 Req.)	68	H8068	Brake Operating Finger
31	H8031	Brake Spring (2 Req.)	69	H8069	Bakelite Ball Handle
32	H8032	Brake Shoe Assembly (2 Req.)	70	H8070	Brake Lock Handle
33	H8033	Spindle Pulley Spacer	71	H8071	Brake Lock Pin
34	H8034	Spindle Pulley Hub	72	H8072	Socket Set Screw
35	H8035	Hex HD. Screw	73	H8073	Sleeve for Brake Lock Shaft
36	H8036	Brake Shoe Pivot Sleeve	74	H8074	Brake Lock Shaft
37	H8037	Roll Dowel Pin	75	H8075	Bushing
38	H8038	Drive Key	77	H8077	Socket Set Screw
39	H8039	Key for ADJ Varidisc Motor Shaft			