SERVICE MANUAL

for the

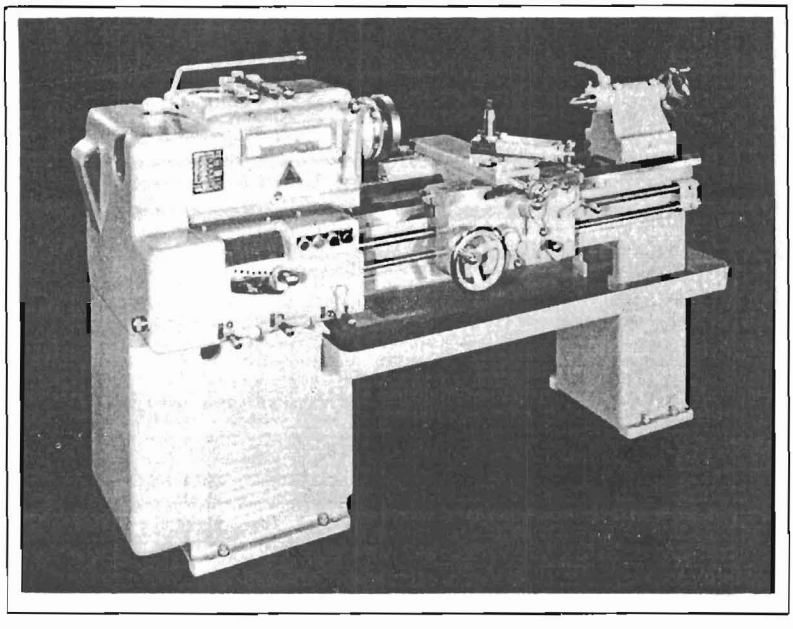
INSTALLATION OPERATION

and

MAINTENANCE

of the

ROCKFORD ECONOMY



LATHE

ROCKFORD MACHINE TOOL COMPANY

FOREWORD

This manual is intended to explain to the operator the method of handling the controls, the functions of the various parts, and the maintenance of the Rockford Economy Lathe.

It is assumed that the operator is experienced in the use of lathes and, therefore, no attempt has been made in this manual to cover the rudimentary principles of lathe operation such as might be required for the instruction of apprentices.

The principles of tool grinding, thread cutting, the difference in machinability of various materials, the use of chucks and collets, mounting work between centers, the purposes and uses of the steady rest, follow rest and taper attachment, the offset of tail stock spindle are all well known to lathe operators and, therefore, this manual is confined to an explanation of the operating controls of the Rockford Economy Lathe to accomplish the results desired.

The manual also gives instructions for the proper installation and maintenance of the lathe.

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ROCKFORD MACHINE TOOL COMPANY

2500 Kishwaukee Street

ROCKFORD ILLINOIS

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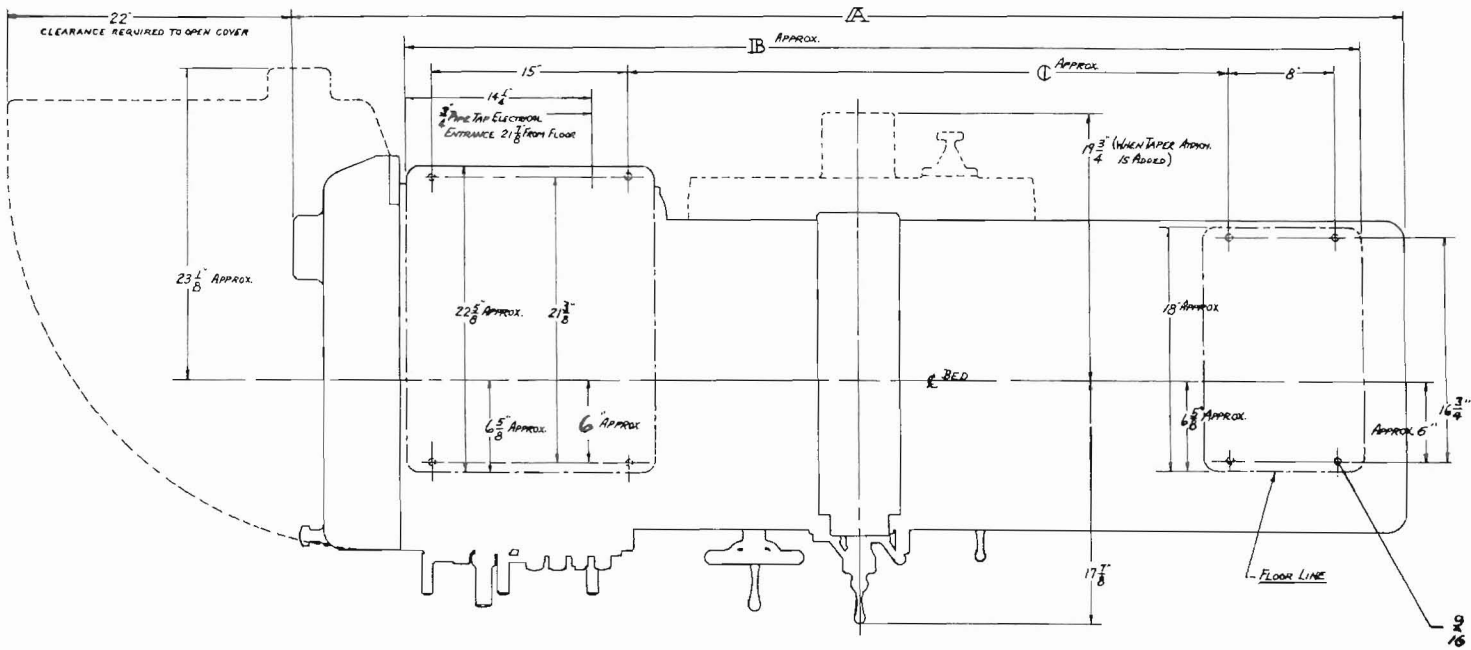
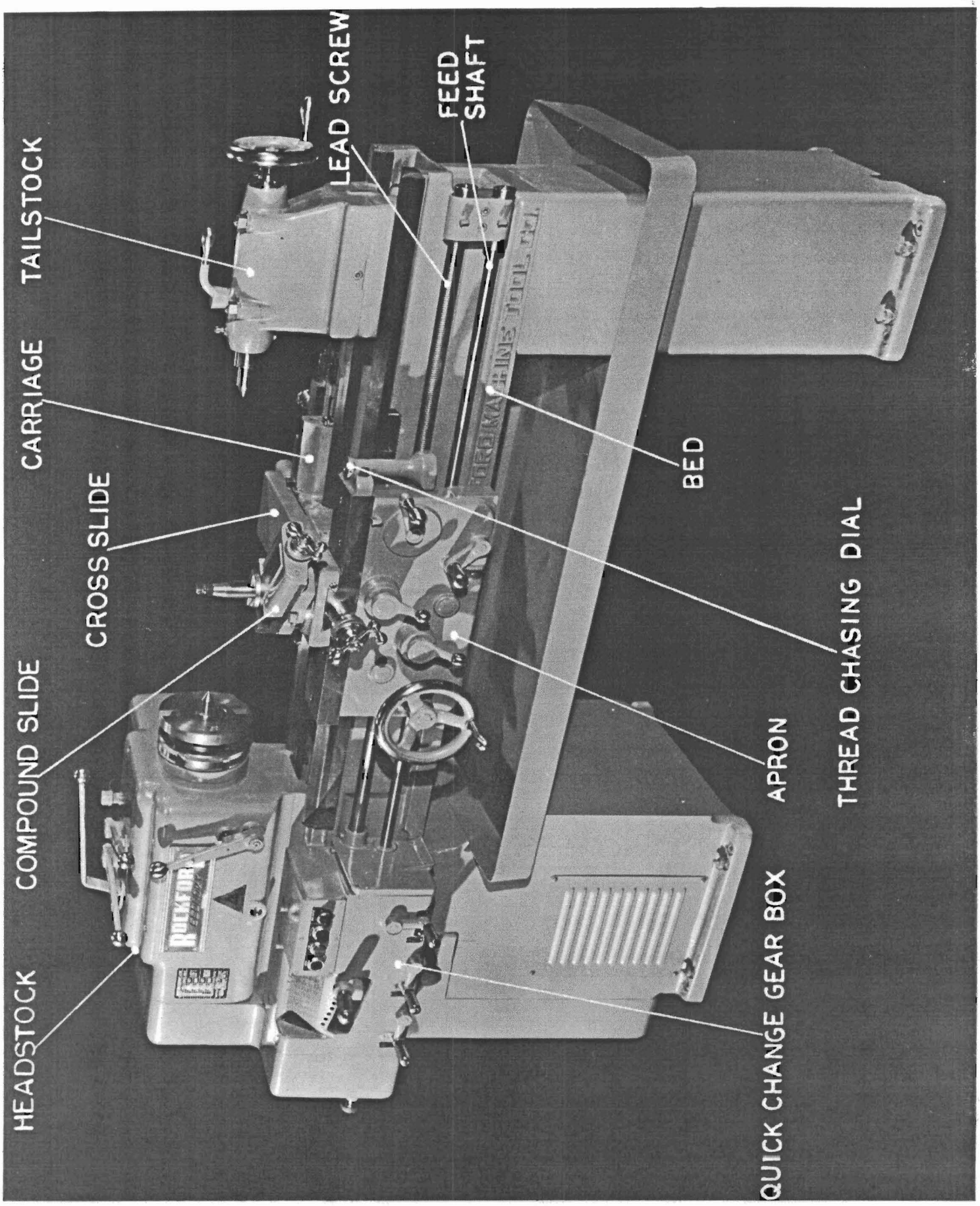
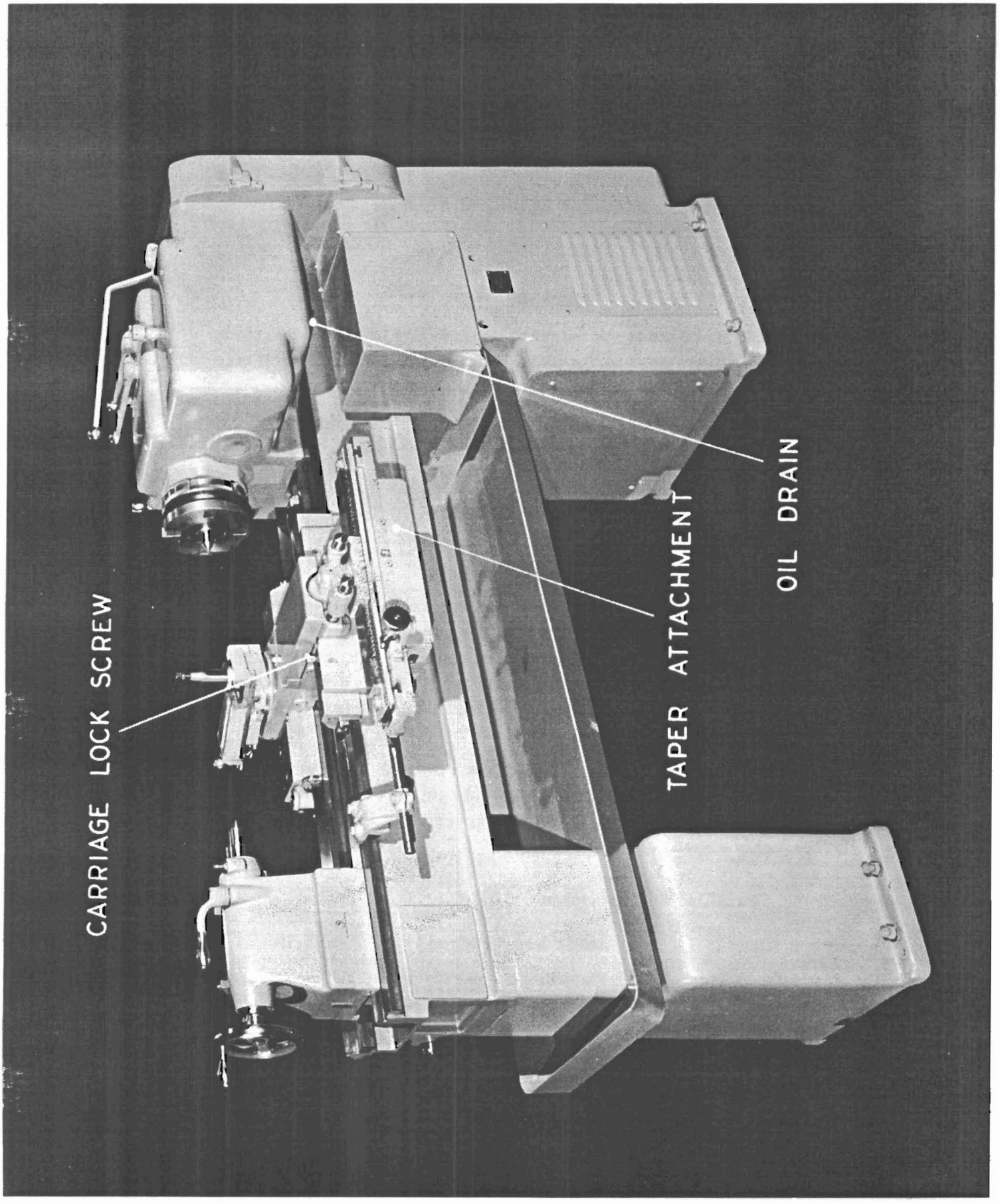


PART NO.	Ⓐ	Ⓑ	Ⓒ
A-HX-20-6'	84 1/4	72 7/8	45 7/8
A-HX-20-8'	108 1/4	96 7/8	69 7/8
A-HX-20-10'	132 1/4	120 7/8	93 7/8

FLOOR PLAN


HEADSTOCK
COMPOUND SLIDE
CROSS SLIDE
CARRIAGE
TAILSTOCK
LEAD SCREW
FEED SHAFT
BED
APRON
THREAD CHASING DIAL
QUICK CHANGE GEAR BOX


CARRIAGE LOCK SCREW
TAPER ATTACHMENT
OIL DRAIN

RECEIVING

Before accepting the machine from the transportation company, a preliminary examination should be made for any possible damage in transit. If there is evidence of such damage a notation to that effect should be made on the receipt and the machine received subject to thorough inspection. When the extent of the damage has been determined, your claim should be filed with the transportation company.

HANDLING

The lathe comes to you mounted on skids and may be towed along the floor on these skids to the place of installation, or a lift truck may be used to carry the machine.

If the lathe is to be lifted by a crane be sure that the machine is well balanced in the slings and that there is no danger of the slings slipping out of place.

CLEANING

Before shipment all unpainted surfaces were coated with a rust preventive compound. This may be removed by wiping with rags saturated with kerosene. Gasoline or naphtha will work equally well but the hazard of fire is greatly increased. Clean only by wiping and brushing. Do not use compressed air as this tends only to force dirt and grit into the working parts.

After slushing compound has been removed wipe all finished surfaces with a cloth moistened with lubricating oil. Do not move any of the adjustments or moving parts until the machine has been thoroughly cleaned and lubricated.

INSTALLATION

To assure that a lathe will do accurate work and maintain its alignment it is important that the floor or foundation upon which it is mounted be sufficiently rigid to prevent vibration and warpage.

If the feet of the lathe pedestals are bolted to an uneven surface it is easily possible to twist or bow the lathe bed to an extent that will produce inaccurate and unsatisfactory work. It is therefore of primary importance that the lathe be accurately leveled and securely bolted to the floor.

Do not expect satisfactory results from a carpenter's or mason's level, nor from an ordinary machinist's level. They are not sufficiently sensitive and accurate for precision work. We use a level graduated to show .0005″ per foot and the use of a similar one is recommended for installing machines.

The machine should be leveled both lengthwise and crosswise, using the flat ways of the bed as leveling points. For lengthwise leveling the level may rest directly on the flat ways, but for crosswise leveling it is necessary to use a pair of parallels of sufficient width to raise the level above the V ways of the bed. Level at both the headstock and tailstock ends of the bed, using steel wedges under the feet of the pedestals. We recommend that the pedestals be grouted in after leveling.

After tightening the nuts on the hold down bolts, make a final check with the level and use thin shims under the pedestals to make any correction necessary.

ELECTRICAL CONNECTIONS AND WIRING

The Electrical connections and wiring of the Rockford Lathe are quite simple as only one motor is used and that is controlled by a reversing starter and suitable push button station.

Copies of the wiring diagram are enclosed in the control cabinet.

When connecting your line wires to the starter set the selector switch of the push button station to the FORWARD position and, with the start and stop buttons, jog the motor slightly to see that the driven sheave runs in the direction shown by the arrow on its side.

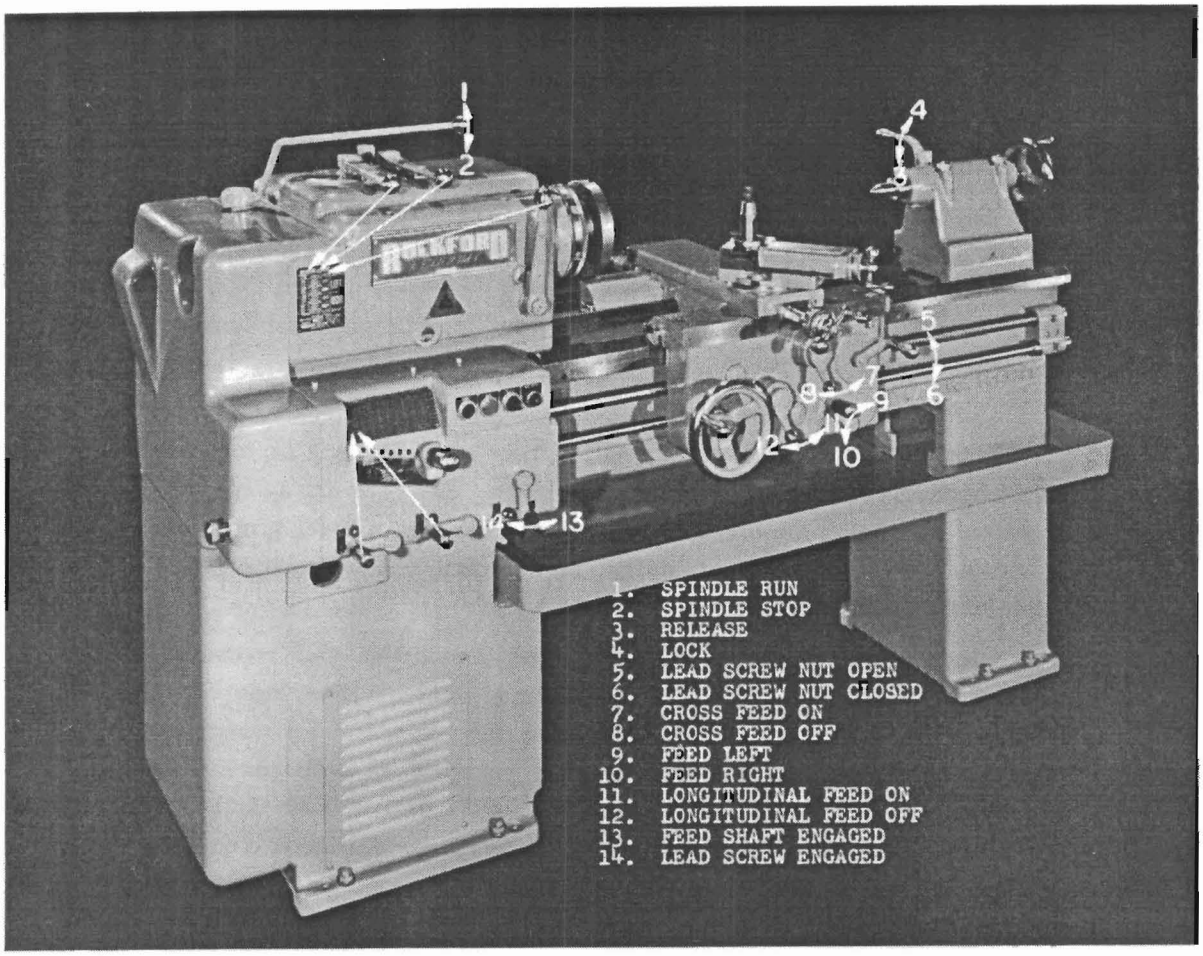


Illustration 1730-CA

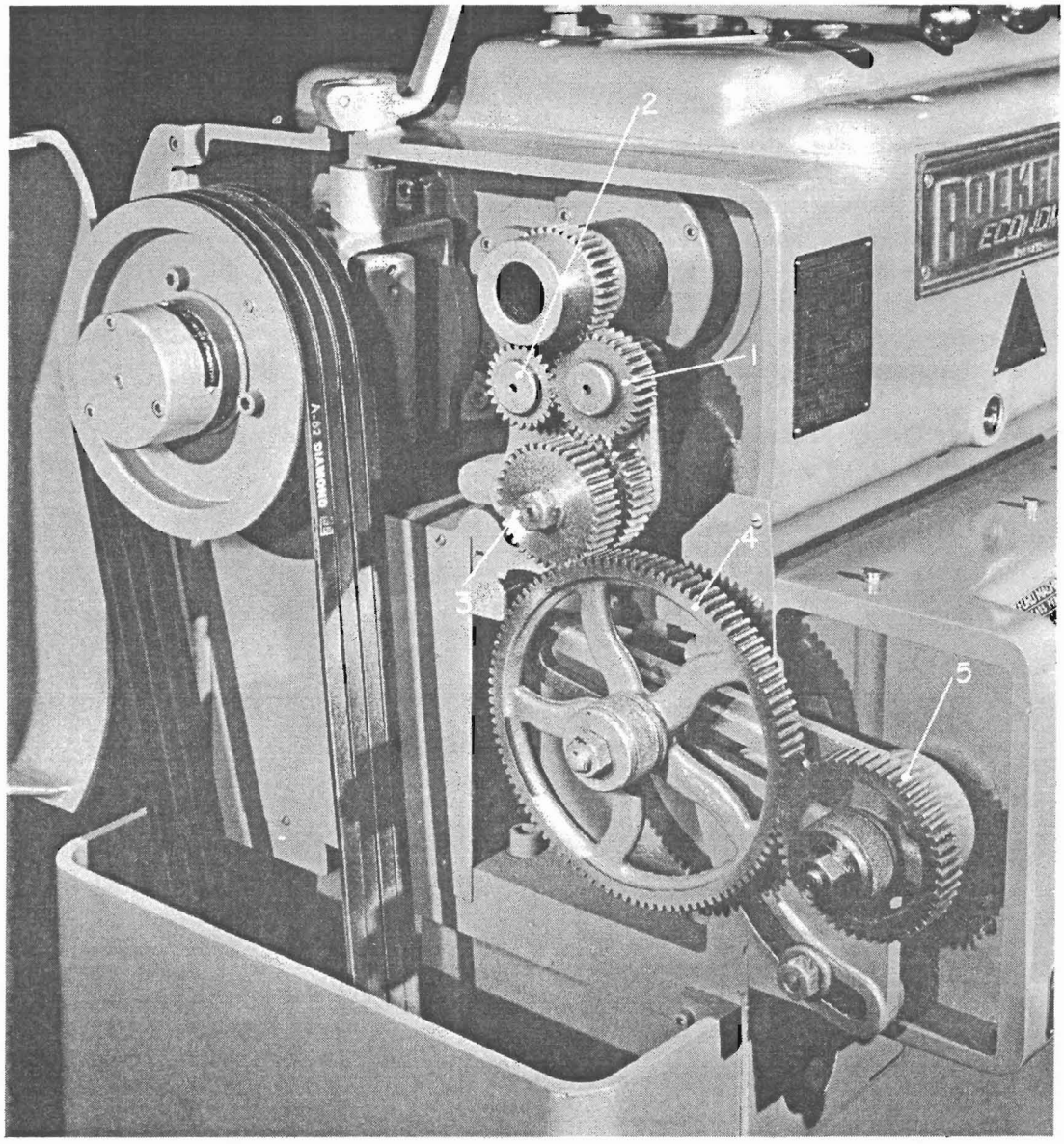
OPERATING THE MACHINE

Before starting to operate a new lathe it must be lubricated according to the instructions given in the Chapter on LUBRICATION.

Illustration above shows the operating controls and explains their functions and methods of operation.

The levers on the apron engaging the lead screw and the feed rod are interlocked so that it is impossible to engage both at the same time. The lead screw lever can not be shifted to position 6 unless the feed rod lever is half way between positions 9 and 10. Neither can the feed rod lever be shifted to position 9 or 10 unless the lead screw lever is in position 5.

Uses of the spindle speed selecting levers on the headstock are explained on the plate attached to the front of the headstock. Operation of the feed and thread selecting levers is explained on the plate attached to the quick change gear box.



The above illustration shows the gear train as used in a 16 inch lathe. Gears 1 and 2 determine the direction of rotation of the lead screw. Gear 1 is for all turning operations and for cutting right hand threads and is to be in mesh with the spindle and stud gears at all times, except when cutting left hand threads. Gear 2 is to be engaged only for cutting left hand threads. This gear reverses the direction of the whole feeding mechanism and therefore should never be in mesh except when cutting left hand threads.

In an 18 inch lathe there are two idler gears in the train between Gears 3 and 5 as shown in the above illustration. The addition of the second idler gear reverses the direction of the feeding mechanism from that used in the 16 inch lathe. This means that Gear 2 should be in mesh with the spindle and stud gears for all turning operations and for cutting right hand threads. Gear 1 is to be engaged only for cutting left hand threads in an 18 inch lathe.

If it is necessary to cut threads other than those obtainable by means of the quick change gear box, special gears may be substituted for those shown at 3, 4 and 5.

LUBRICATION

The lubrication of the gears and bearings in the headstock is automatic in operation if the correct amount of oil is maintained in the headstock. Use any good lubricating oil of 300 SSU at 100°, which is equivalent to SAE 20, and pour a sufficient quantity through the filler cap on the top of the headstock to bring the oil up to the line on the glass gage on the side. About seven quarts are required.

Other points to be lubricated are indicated and numbered on pages 12, 13 and 14.

1. Quick Change Gear Box
   Oil daily.
2. Apron Shaft Bearings
   Fill cup daily.
3. Crossfeed Screw Bearing
   Remove set screw and oil daily.
4. Tailstock Spindle and Screw
   Oil daily.
5. Feed Shaft and Lead Screw Bearings
   Oil daily.
6. Lead Screw Bearing
   Oil daily.
7. Motor
   Grease every six months.

8-9. Cross Slide Ways
   Oil daily.

10. Cross Feed Nut
    Remove set screw and oil daily.
11. Cross Feed Screw Bearing
    Oil daily.
12. Taper Attachment Ways
    Oil before using.

13. Taper Adjustment Screw Bearing
    Oil as needed.

14. Taper Attachment Slide Rods
    Oil before using.

15. Carriage Ways
    Fill cups daily.

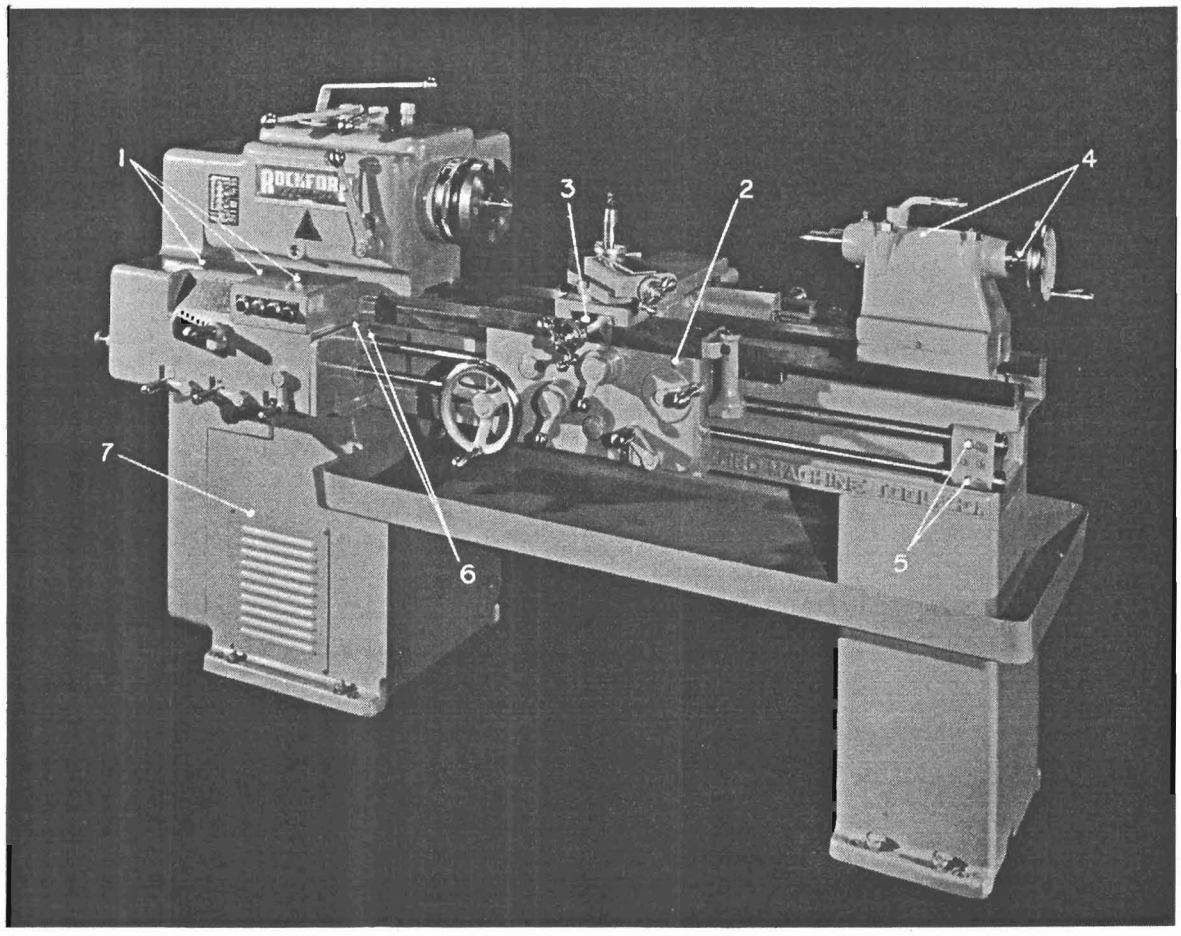
16. Compound Rest Screw Bearing
    Oil daily.

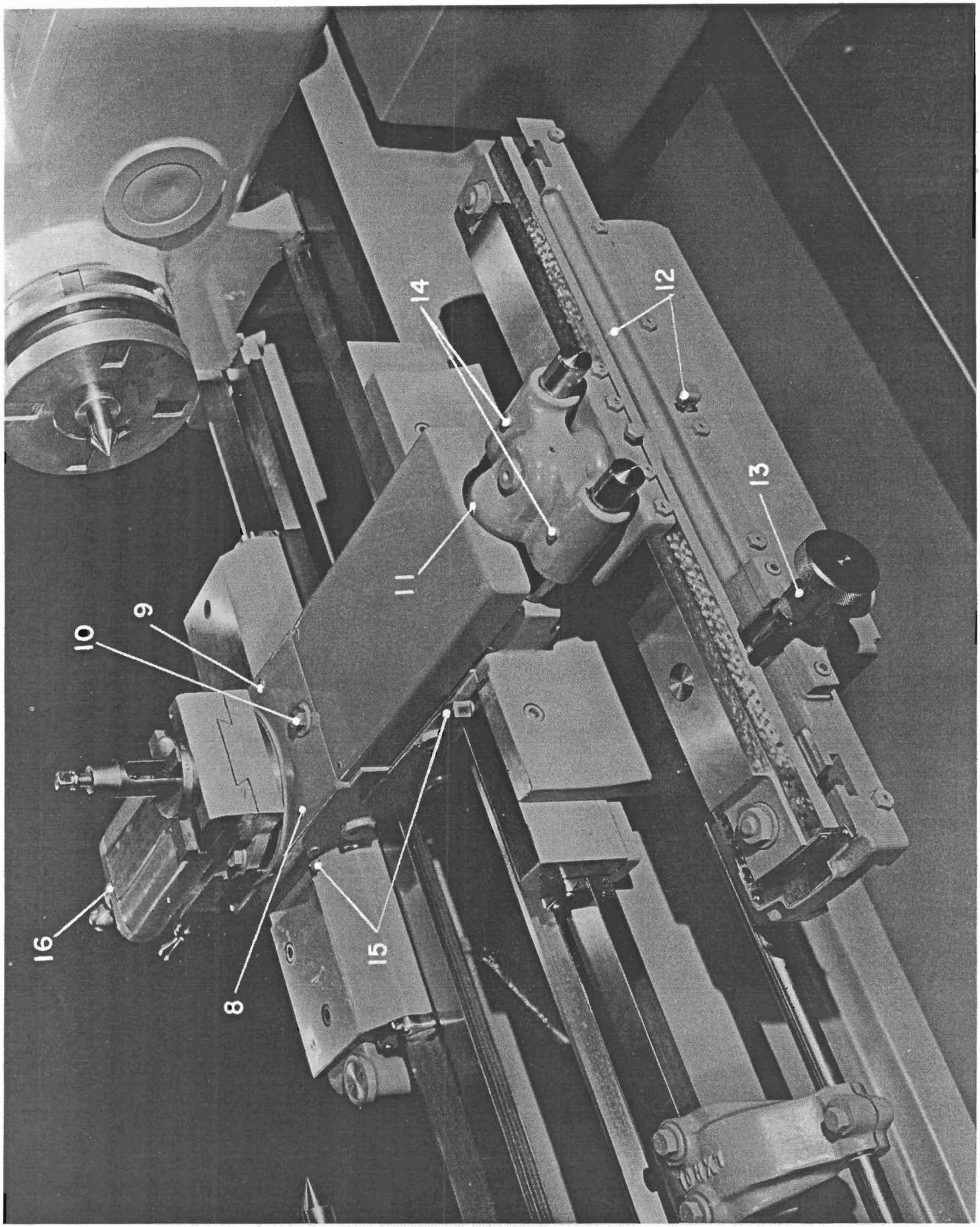
17. Clutch Bearings
    Grease every 6 months.

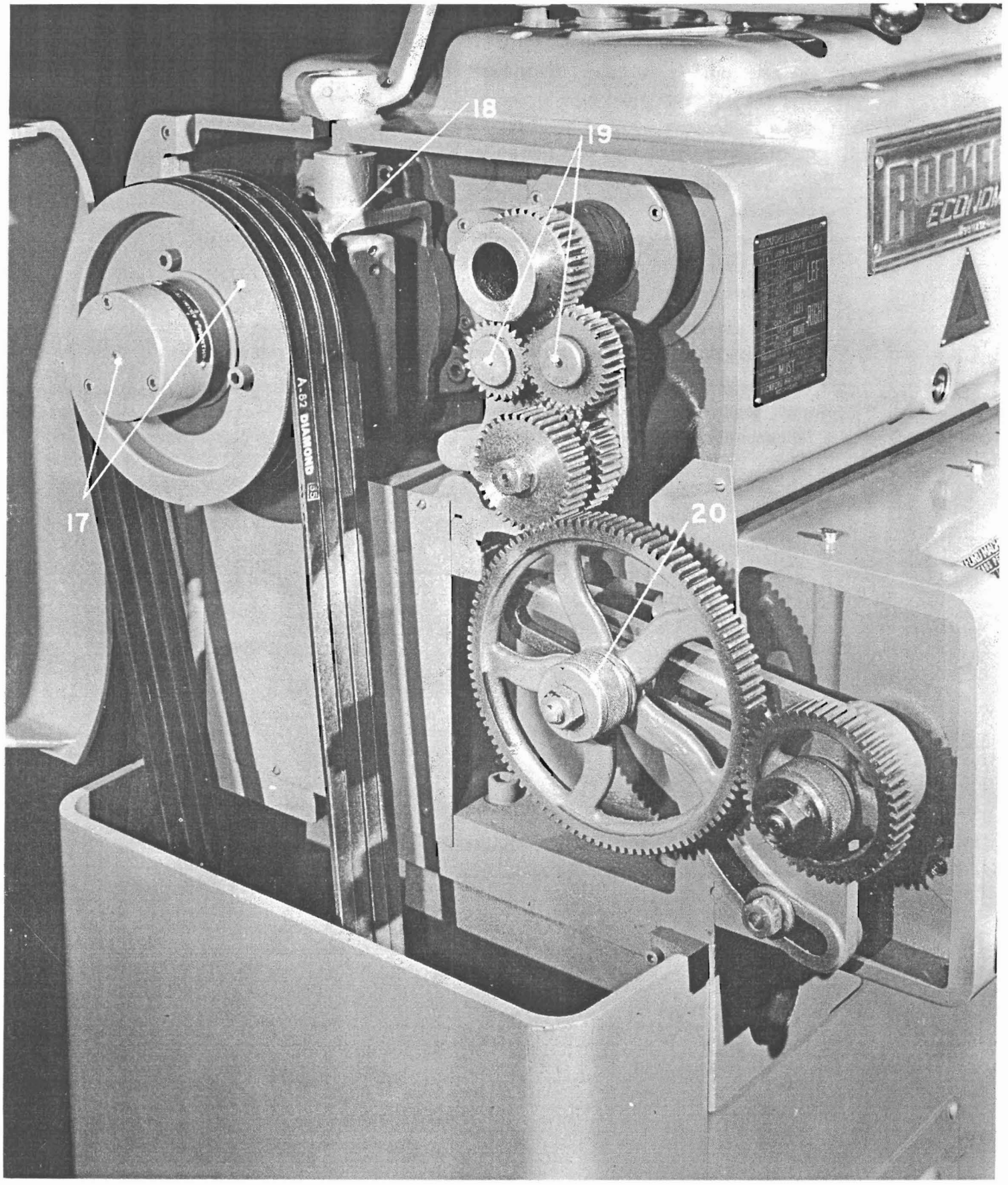
18. Clutch Shifter Shoe
    Grease weekly.

19. Rocker Gear Bearings
    Oil daily.

20. Idler Gear Shaft
    Oil daily.




16
8
15
10
9
11
14
12
13


18
19
17
20
A-52 DIAMOND
LEFT
RIGHT
MUST

TAPER ATTACHMENT

The Taper Attachment, available as an optional accessory, is of the telescopic screw type. This type offers considerable advantage over the old style yoke type in that it does not render the cross slide screw inoperative while in use. In this way, it greatly facilitates the cutting of taper threads and the boring of taper holes.

The operator, however, must keep in mind that in cutting an increasing taper, the cross slide screw pushes back against the cross slide nut. Therefore, backlash should be taken out of the screw by turning cross slide dial past the desired setting and returning to it in a counterclockwise rotation.

If it is desired to move the tool into the work while feeding longitudinally, this can best be accomplished with the compound rest screw.

The operator will find that if these simple rules are followed, the work produced will be of the highest accuracy and no trouble should be encountered on any type of taper work.

INSTRUCTIONS ON OPERATION OF THREAD DIAL

The chasing dial on the front of the apron may be used in the following manner:

On any even thread, such as 20, 22, or 24 threads per inch, the dial may be engaged at any line, short or long.

On any full odd thread, such as 11 or 13 threads per inch, the dial may be engaged at any long line.

For half threads, such as 11½, 4½ or 6½ threads per inch, every other long mark may be used, as for instance 1, 3 and 5 or 2, 4 and 6.

For any other threads, such as 5¾ threads per inch, engage at one long mark only.

MAINTENANCE

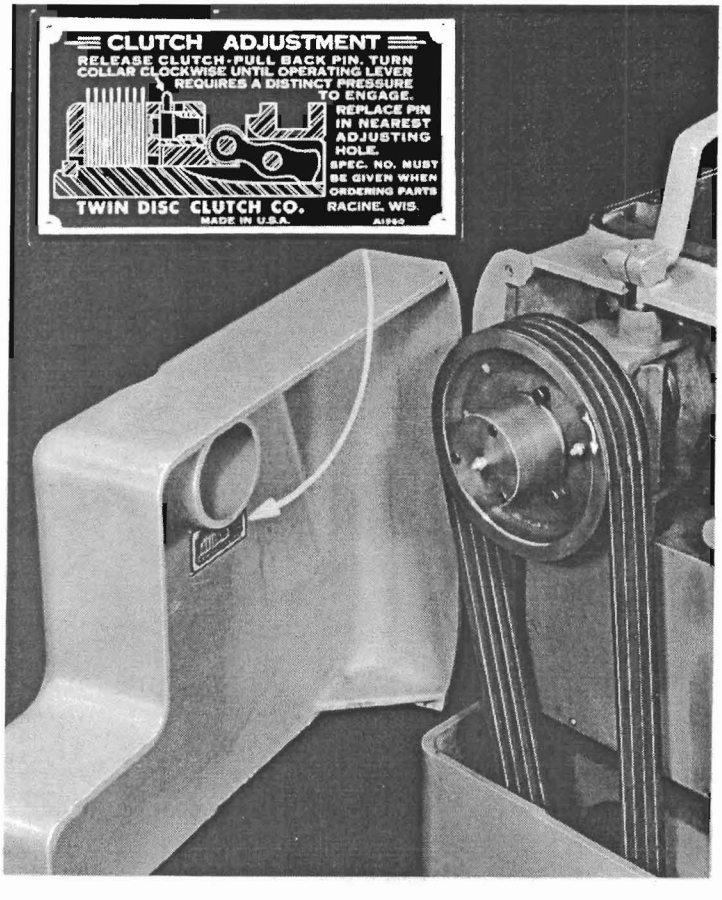
Before shipment each machine is given a serial number and is individually checked and tested by an inspector. A record of the construction and data on the tests are kept in our files. Whenever reference is made to the machine the serial number should be stated. This number is stamped on the top front bed way near the tailstock end.

Except for regular lubrication and checking the level of the oil in the headstock, the lathe requires little maintenance. However, a little time spent regularly in keeping it clean and free from dirt and chips will be well repaid by the service it will give. Clean the machine by wiping and brushing. Do not use compressed air as it only tends to force dirt and grit into the working parts.

Each piece used in the construction is carefully made and passes a rigid inspection before being built into the machine. After assembly each machine is tested on actual turning work. It therefore merits care and consideration if it is to maintain the accuracy and long life which are built into it.

The oil in the headstock should be drained and new oil put in after each 1200 hours of service.

TWIN DISC CLUTCH ADJUSTMENT



Adjustment is indicated when Lathe appears to lack power, or when clutch obviously slips. Remove pin, as shown in the inset. Adjust clutch clockwise until tension is apparent on the lever. Usually adjustment of one or two holes is sufficient.

SPECIFICATIONS

6′ Bed

	16″	18″
Swing over bed	17″	18½″
Swing over carriage	9¼″	10⅞″
Distance between centers	30″	
Hole through spindle (Diam.)	1 9/16″	
Taper for center in headstock spindle	No. 5 Morse	
Spindle Nose	No. 1 Tapered Key Drive	
Tailstock spindle (Diam.)	2″	
Taper for center in tailstock spindle	No. 4 Morse	
Tailstock spindle travel	5¾″	
Number of spindle speeds	12	
Spindle speeds (standard) R.P.M.	32 to 804	
Threads per inch (32 changes)	4 to 56	
Feeds per revolution of spindle	.004″ to .060″	
Lead screw diameter and thread	1⅛″ 6 thd.	
Steady rest capacity (standard)	4″	
Collet capacity (Maximum)	1⅜″	
Size of tool shank	⅝″ x 1½″	
Motor recommended (Maximum)	5 H.P.	
Motor speed (standard)	1200 or 1800 R.P.M.	
Weight, 6 ft. bed	3000 lbs.	

MECHANICAL CONSTRUCTION and PARTS LIST

The following drawings are presented for the purpose of acquainting the operator with the construction of the machine, to assist in making adjustments and repairs, and to facilitate the ordering of repair parts whenever that occasion arises.

In ordering repairs remember, please, that the only information we have of your needs is what you put on paper and send to us. We urge, therefore, that in your first communication you give as full a description as possible of the parts wanted.

In many cases it will save much correspondence and down time on your machine if full information is given in your first request. Free hand sketches with the principal dimensions are very helpful.

Always refer to the machine by its Serial Number and give the Series Number of this book.

PARTS LIST

1 End Cover-Hinged
2 Knurled Knob
3 Vee Belt Drive Cover
4 Motor Leg
5 Chip Pan
6 Tailstock Leg
7 Tailstock Leg Spacer
8 Bed
9 Small Face Plate
10 Center Collet
11 Center
12 Carriage Lock Screw
13 Thread Indicator Lock Screw
14 Center
15 Lead Screw Bracket
16 Feed Screw End Cover
17 Collar
18 Feed Shaft
19 Lead Screw
20 Retaining Ring
21 Shifter Shoe
22 Clutch Shift Lever
23 Gear Shift Lever
24 Shift Lever Shaft
25 Shifter Crank
26 Shifter Crank
27 Crank Stud
28 Shifter Shoe
29 Clutch Shifter Crank
30 Headstock
31 Headstock Cover
32 Shifter Lever Stud
33 Clutch Shift Lever
34 Headstock Cover Gasket
35 Shifter Lever
36 Shifter Shoe
37 Gear Shift Stud
38 Gear Shift Crank
39 Gear Shift Shaft
40 Rocker Gear—Front
41 Rocker Gear—Rear
42 Rocker Gear Stud
43 Washer
44 Stud
45 Shifter Crank Pin
46 Small Spindle Gear
47 Oil Seal
48 Seal Retainer Cap
49 Key
50 Intermediate Shaft Gear
51 Ball Bearing
52 Bearing Thrust Collar
53 Bearing Retainer
54 Drive Shaft Sleeve
55 Bearing Spacer
56 Retaining Ring
57 Locknut
58 Lockwasher
59 Drive Shaft Cap
60 Ball Bearing
61 Ball Bearing
62 Pulley Hub
63 Vee Belt Drive Pulley
64 Tapered Roller Bearing
65 Clutch Drive Ring
66 Clutch Collar
67 Clutch
68 Clutch Housing
69 Drive Ring
70 Fiber Clutch Plates
71 Brake Housing
72 Oil Seal
73 Tapered Roller Bearing
74 Drive Shaft Sliding Gear
75 Clutch Shaft Sliding Gear
76 Spacer
77 Main Drive Shaft
78 Intermediate Shaft Gear
79 Intermediate Shaft Gear
80 Thrust Washer
81 Back Gear
82 Needle Bearing
83 Back Gear Pinion and Sleeve
84 Oilite Thrust Washer
85 Bearing Spacer
86 Ball Bearing
87 Intermediate Shaft
88 Spindle Gear
89 Spindle Gear Clutch
90 Front Bearing Retainer
91 Headstock Spindle
92 Spindle Nose Key
93 Spindle Nose Collar
94 Tapered Roller Bearing
95 Front Spindle Bearing Cap
96 Front Bearing Gasket

PARTS LIST (Continued)

97 Spindle Bearing Nut
98 Triple Sliding Gear
99 Triple Sliding Gear
100 Triple Sliding Gear
101 Triple Gear Sleeve
102 Rear Spindle Bearing Retainer
103 Duplex Ball Bearing
104 Lockwasher
105 Locknut
106 Rocker Arm
107 Oilite Bushing
108 Washer
109 Change Gear
110 Head Stud Gear
111 Rocker Stem
112 Oilite Bushing
113 Thrust Washer
114 Head Stud
115 Oil Level Gage
116 Spindle Sleeve
117 Clutch Gear
118 Thrust Washer
119 Tailstock Body
120 Tailstock Base
121 Anchor Bolt
122 Anchor
123 Tailstock Butt
124 Tailstock Handwheel
125 Machine Handle
126 Washer
127 Tailstock Spindle Clamp Lever
128 Oil Well Cap
129 Oil Well
130 Oil Well Point
131 Allen Nut
132 Spindle Clamp
133 Spindle Clamp
134 Spindle Clamp Stud
135 Spindle Key Screw
136 Tailstock Spindle
137 Tailstock Spindle Screw
138 Spindle Nut
139 Spacing Washer
140 Thrust Bearing
141 Washer
142 Yoke Gear
143 Yoke Gear
144 Yoke Gear
145 Intermediate Gear Yoke
146 Stud
147 Washer
148 Gear Box
149 Tee Slot Bolt
150 Washer
151 Washer
152 Adjusting Screw
153 Change Gear Distance Collar
154 Change Gear
155 Spacing Washer
156 Yoke Pivot Bushing
157 Needle Bearing
158 Thrust Washer
159 Tumbler Gear Stud
160 Tumbler Gear Driven
161 Bronze Bushing
162 Tumbler Lever Gear
163 Tumbler Lever
164 Spacer
165 Clutch Gear
166 Needle Bearing
167 Retaining Ring
168 Spacing Collar
169 Retaining Ring
170 Tumbler Shaft
171 Sliding Clutch Gear
172 Cone Shaft
173 Lead-Feed Clutch Gear
174 Lead-Feed Clutch Ring
175 Lead-Feed Clutch
176 Lead Screw Clutch
177 Gear Box Cover
178 Needle Bearing
179 Needle Bearing
180 Needle Bearing
181 Feed Shaft Sleeve
182 Feed Shaft Gear
183 Cone Shaft Bushing
184 Intermediate Shaft
185 Spacing Washer
186 Intermediate Shaft Gear
187 Intermediate Shaft Gear
188 Spacing Collar
189 Oilite Bushing
190 Retaining Ring
191 Clutch Gear
192 Sliding Clutch

PARTS LIST (Continued)

193 Oilite Bushing
194 Clutch Gear
195 Thrust Washer
196 Yoke Gear Sleeve
197 Spacer
198 Cone Gear — 56T
199 Cone Gear — 52T
200 Cone Gear — 48T
201 Cone Gear — 46T
202 Cone Gear — 44T
203 Cone Gear — 40T
204 Cone Gear — 36T
205 Cone Gear — 32T
206 Cone Bushing Gear
207 Shifter Shoe
208 Shifter Shoe Pin
209 Shifter Crank
210 Bronze Bushing
211 Shifter Lever
212 Intermediate Shifter Shaft
213 Spring
214 Tumbler Handle Core
215 Tumbler Handle Plunger
216 Tumbler Handle
217 Retaining Collar
218 Oilite Bushing
219 Feed Shifter Shaft
220 Shifter Handle
221 Shifter Crank
222 Yoke Gear Bushing
223 Needle Bearing
224 Locknut
225 Tapered Roller Bearing
226 Thrust Bushing
227 Chip Guard
228 Crossfeed Nut
229 Crossfeed Nut Bracket
230 Washer
231 Crossfeed Nut Screw
232 Cross Slide
233 Compound Swivel
234 Tool Post Screw
235 Tool Post
236 Tool Post Wedge
237 Tool Post Washer
238 Tool Post Ring
239 Compound Rest Slide
240 Compound Rest Nut
241 Washer
242 Collar
243 Compound Slide Cap
244 Micrometer Collar
245 Distance Collar
246 Distance Collar Spring
247 Ball Crank
248 Distance Collar
249 Micrometer Collar
250 Pinion Bearing
251 Pinion and Sleeve
252 Ball Handle Shaft
253 Cross Feed Screw
254 Pinion Spline
255 Carriage
256 Front Gib
257 Rear Gib
258 Bearing Bracket
259 Oil Seal
260 Bearing Bracket Cover
261 Bearing Spacer
262 Lock Washer
263 Oil Wiper
264 Clamp Bolt
265 Washer
266 Ball Crank
267 Compound Rest Gib
268 Gib Adjusting Screw
269 Thread Indicator Bracket
270 Thread Indicator Spindle
271 Thread Indicator Gear
272 Cross Slide Gib
273 Compound Rest Screw
274 Reverse Lever Plunger
275 Plunger Spring
276 Feed Reverse Handle
277 Apron
278 Feed Reverse Lever
279 Reverse Lever Shaft
280 Lead Screw Nut
281 Bevel Plug
282 Spring
283 Lead Screw Nut Gib
284 Machine Handle
285 Lead Screw Lever
286 Lead Screw Cam Shaft
287 Lead Screw Nut Cam
288 Lead Screw Nut Gib

PARTS LIST (Continued)

289 Feed Reverse Shoe
290 Feed Reverse Lever
291 Oilite Bushing
292 Handwheel Shaft
293 Handwheel Shaft Gear
294 Apron Back Plate
295 Rack Pinion and Shaft
296 Rack Pinion Shaft Collar
297 Oilite Bushing
298 Rack Wheel Gear
299 Oilite Bushing
300 Quick Acting Machine Handle
301 Handwheel
302 Long. Feed Friction Shaft
303 Oilite Bushing
304 Cross Feed Friction Gear
305 Cross Feed Friction Gear
306 Cross Feed Friction Shaft
307 Oilite Bushing
308 Friction Control Washer
309 Friction Lever Nut
310 Lockwasher
311 Locknut
312 Feed Friction Lever
313 Thrust Bearing
314 Long. Feed Friction Gear
315 Long. Feed Friction
316 Bevel Pinion
317 Tit Key
318 Backplate Cap
319 Oilite Bushing
320 Bevel Pinion Sleeve
321 Grooved Bevel Pinion
322 Bevel Gear
323 Bevel Gear Shaft and Pinion
324 Oilite Bushing
325 Anchor
326 Washer
327 Anchor Bolt
328 Adjusting Screw Knob
329 Base
330 Spacer
331 Rod End Bolt
332 Hinge
333 Washer
334 Jaw Friction Pad
335 Plunger Nut
336 Jaw Adjusting Screw
337 Adjusting Screw Retainer
338 Adjusting Screw Knob
339 Adjusting Screw Retainer
340 Jaw Adjusting Screw
341 Plunger Nut
342 Follow Rest Body
343 Friction Pad
344 Washer
345 Shoulder Screw
346 Connecting Bar
347 Clamp Bolt
348 Guide Rod
349 Clamp Bracket
350 Bed Bracket Clamp
351 Adjusting Screw Nut
352 Adjusting Screw
353 Adjusting Screw Collar
354 Adjusting Screw Swivel
355 Adjusting Screw Knob
356 Adjusting Screw Bracket
357 Adjusting Screw Swivel Collar
358 Washer
359 Graduated Plate
360 Graduated Plate
361 Washer
362 Lower Slide Gib
363 Special Dowel
364 Lower Slide
365 Taper Bar
366 Upper Slide
367 Upper Slide Gib
368 Bearing Housing Stud Swivel
369 Bearing Housing
370 Bearing Bracket Cover
371 Carriage Bracket
372 Dovetail Insert
373 Swivel Stud
374 Collar
375 Screw Return
376 Screw
377 Spindle
378 Spindle Tip
379 Bracket Gib
380 Micrometer Bracket
381 Lock Screw

Hy-Draulic ROCKFORD MACHINE TOOL CO.
ROCKFORD, ILLINOIS U.S.A.
SHAPERS • PLANERS • SLOTTERS • SHAPER PLANERS

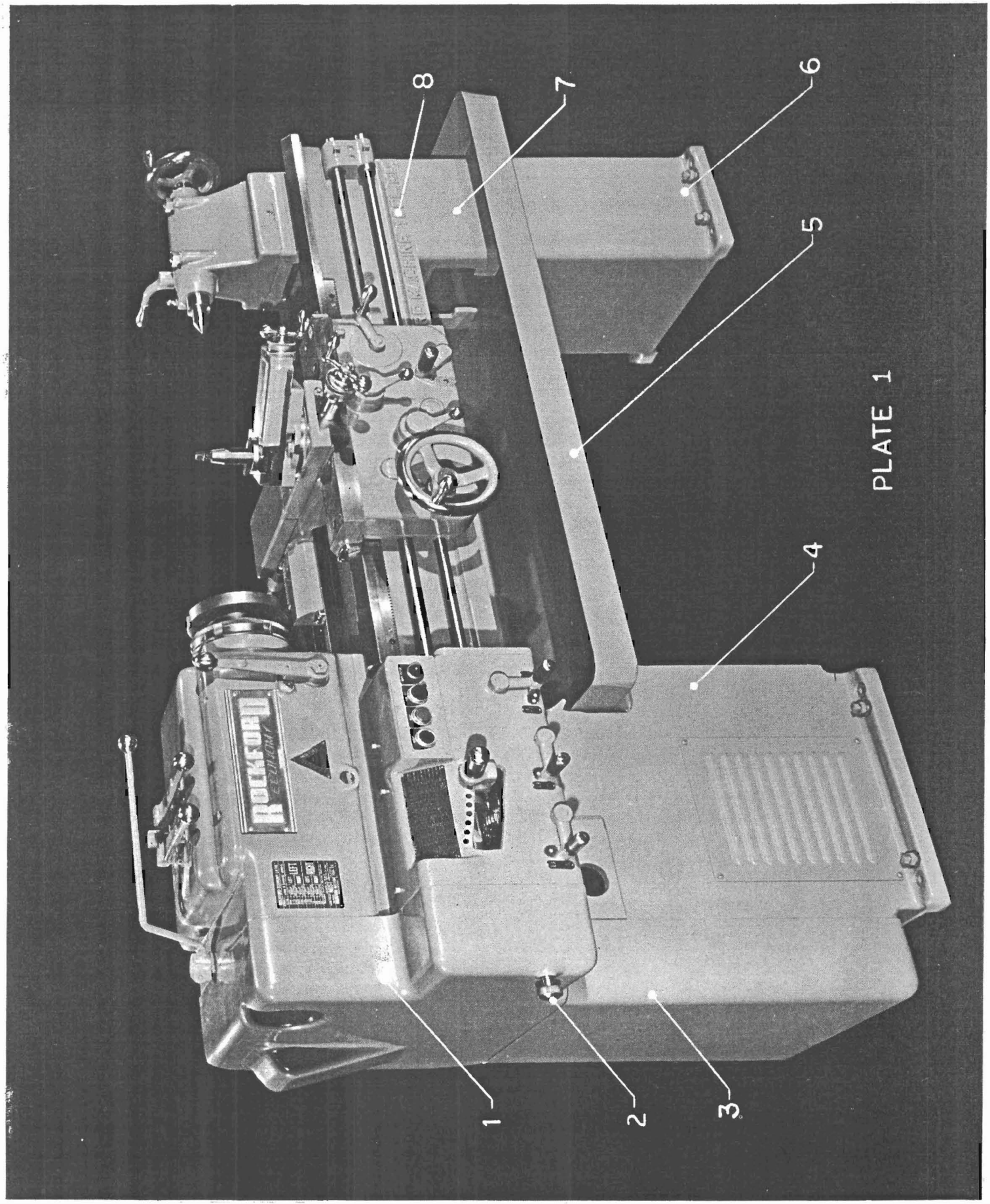


PLATE 1

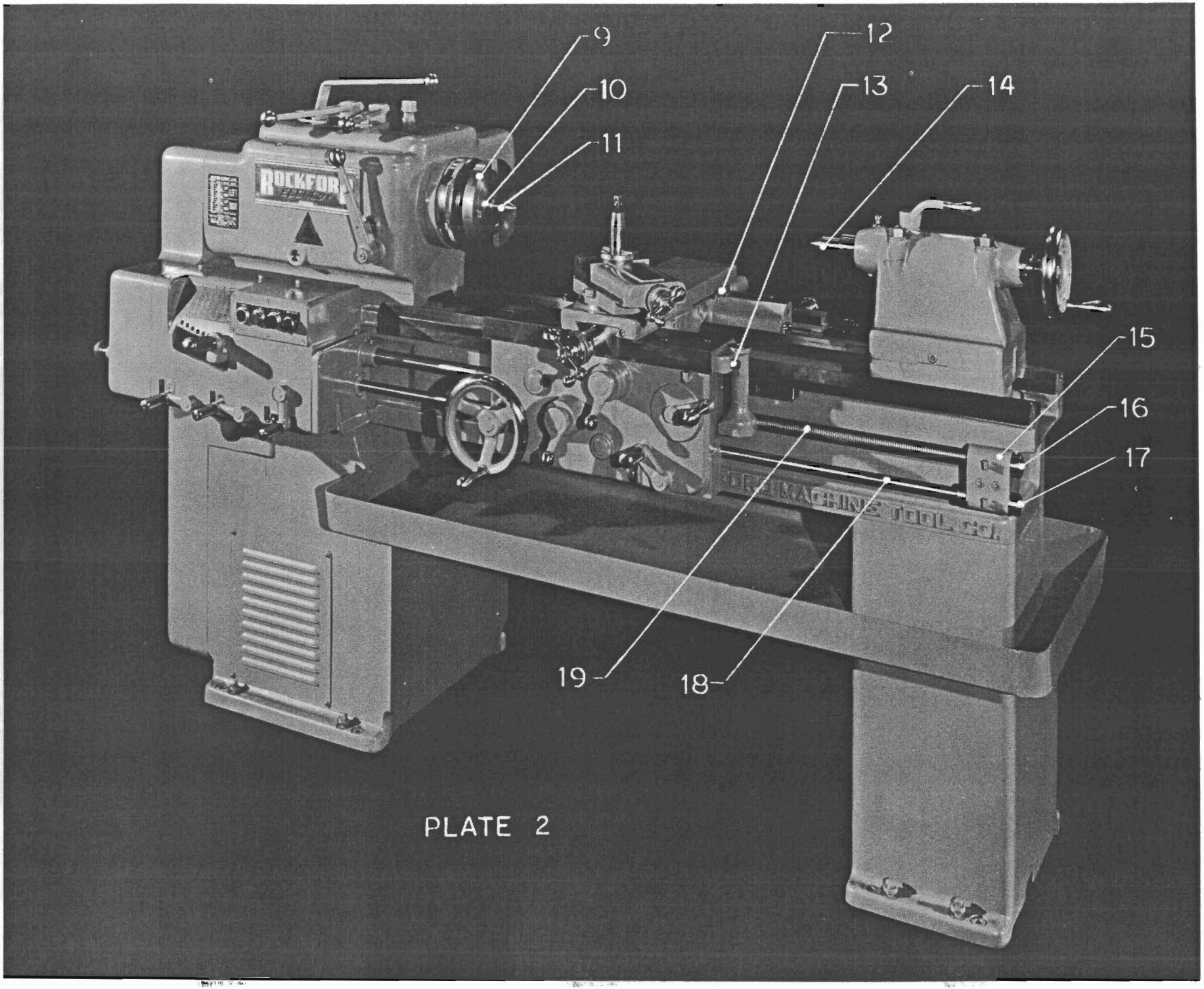
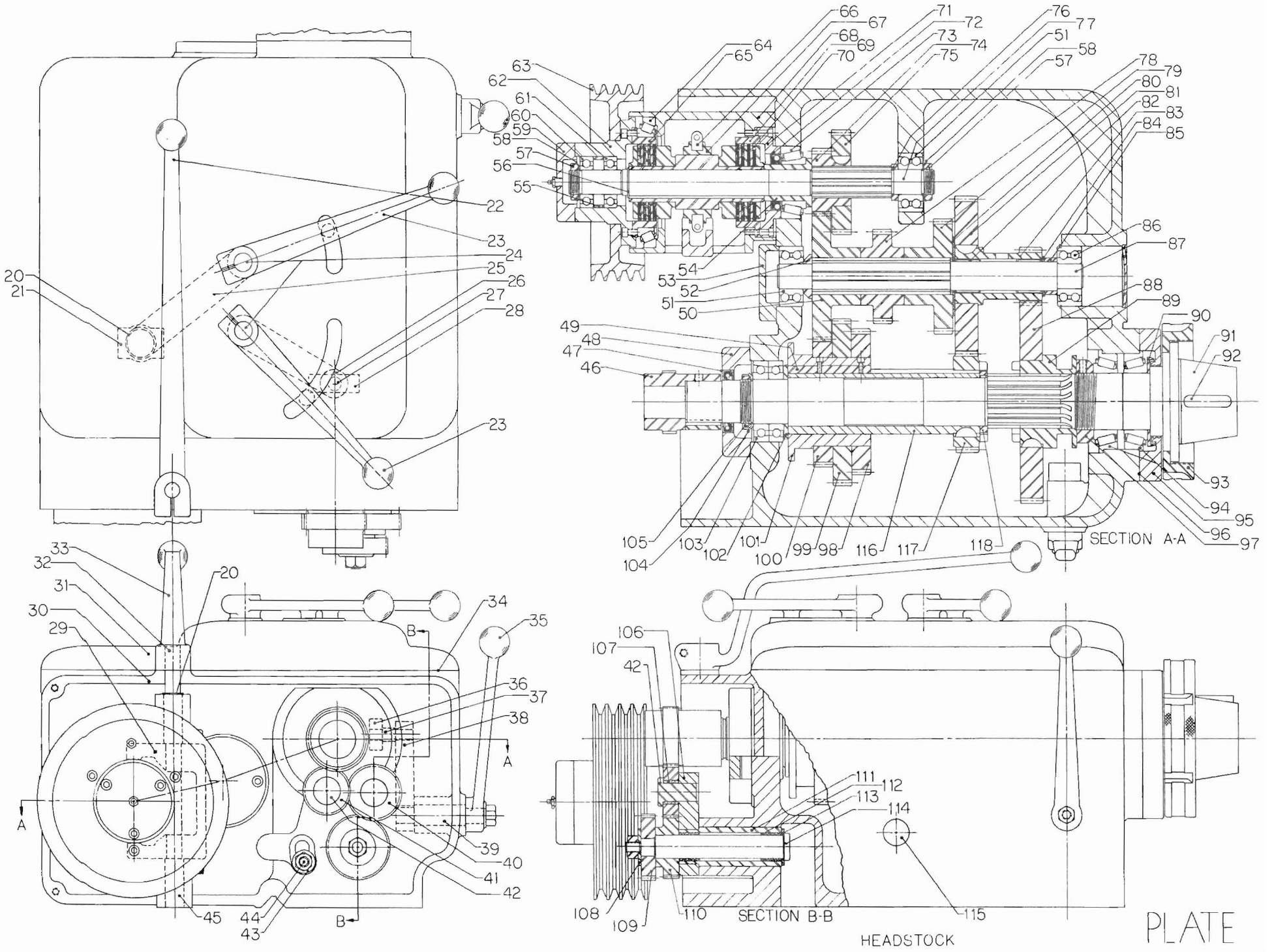
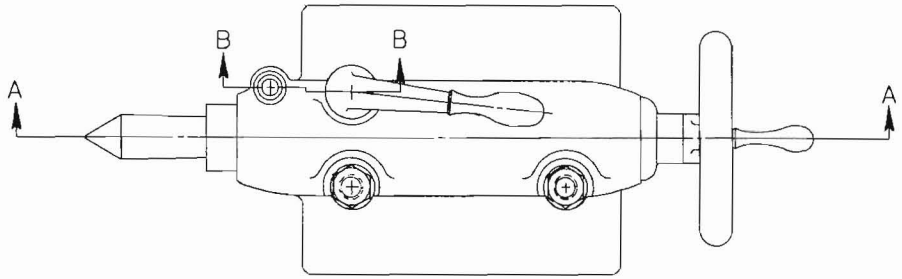
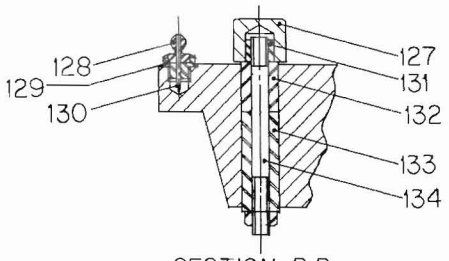


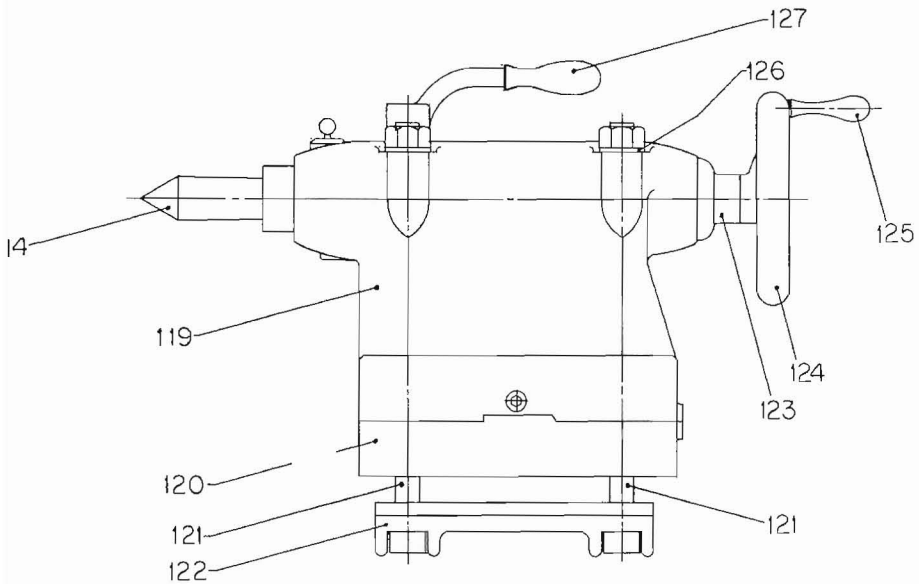
PLATE 2


SECTION A-A
SECTION B-B
HEADSTOCK
PLATE

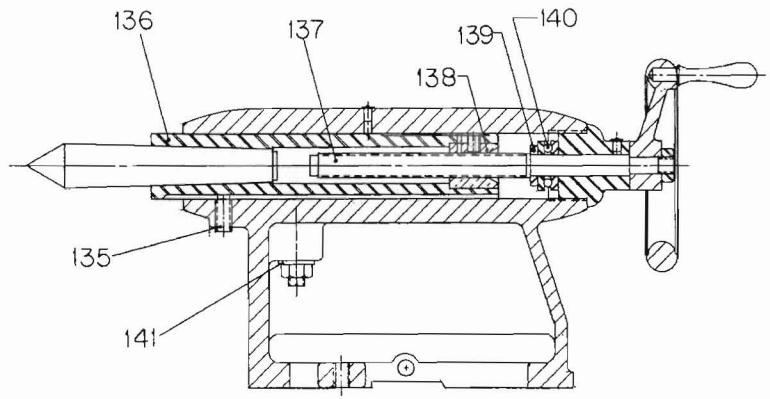




SECTION B-B

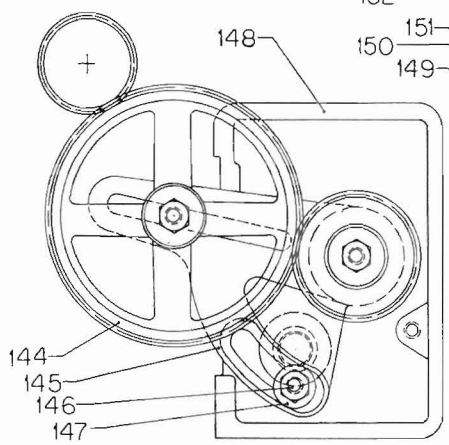


TAILSTOCK

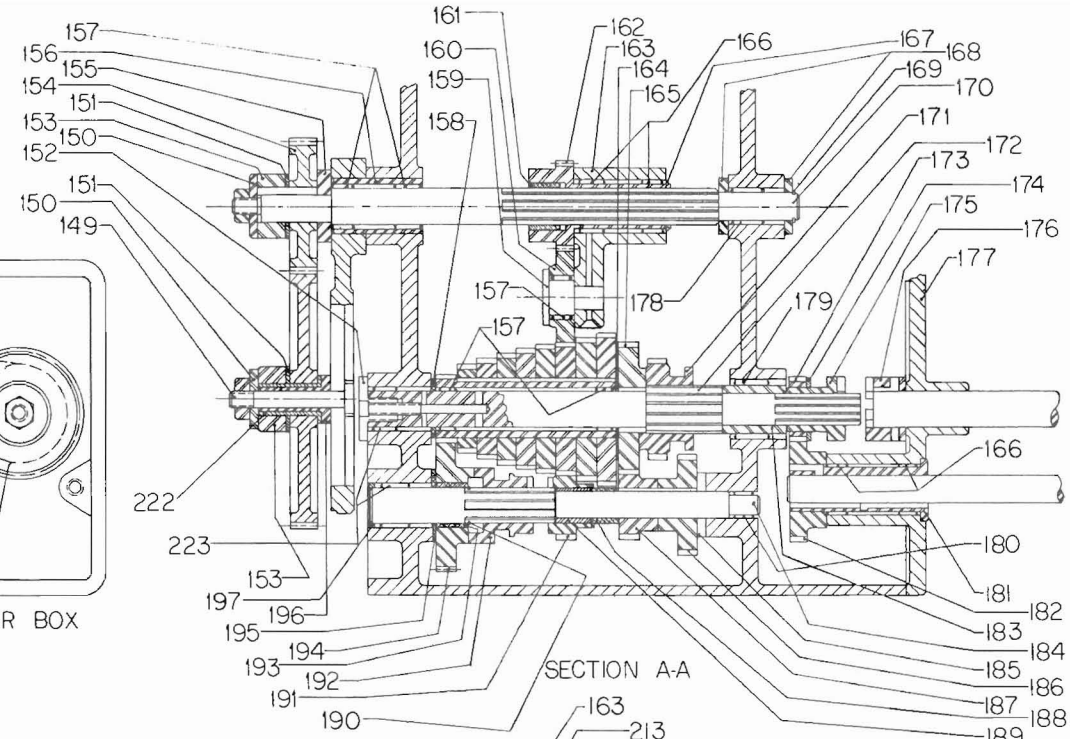


SECTION A-A

PLATE 4

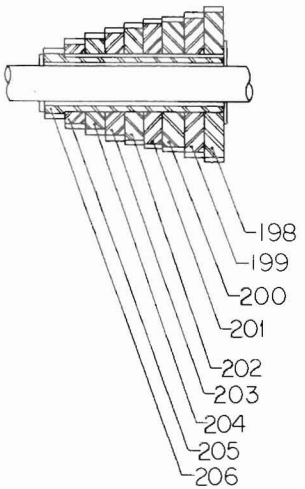


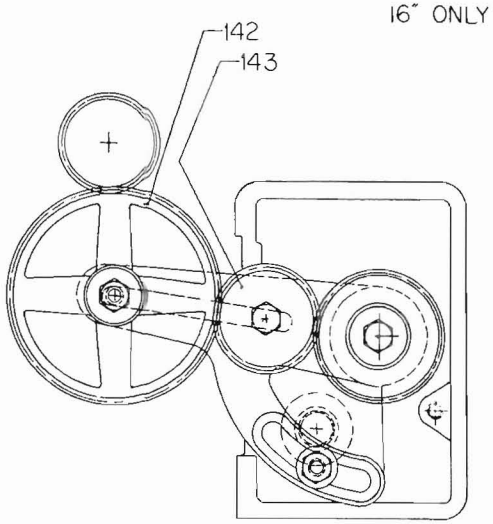
END VIEW OF GEAR BOX
16" ONLY



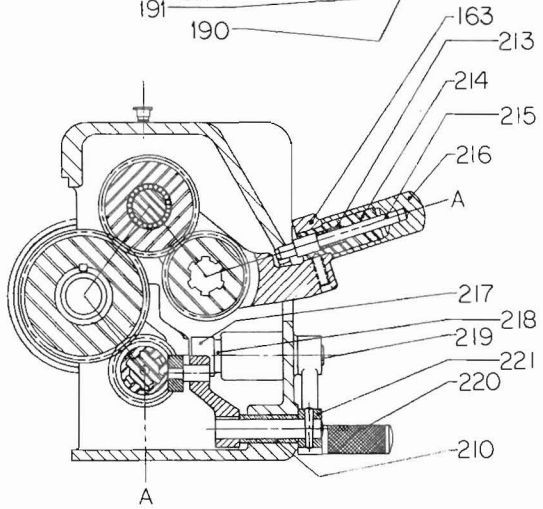
SECTION A-A

CONE GEARS

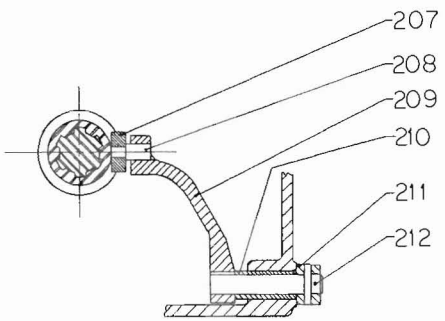




END VIEW OF GEAR BOX
18" ONLY



QUICK CHANGE GEAR BOX



FEED-THREAD CHANGE LEVER

PLATE 5

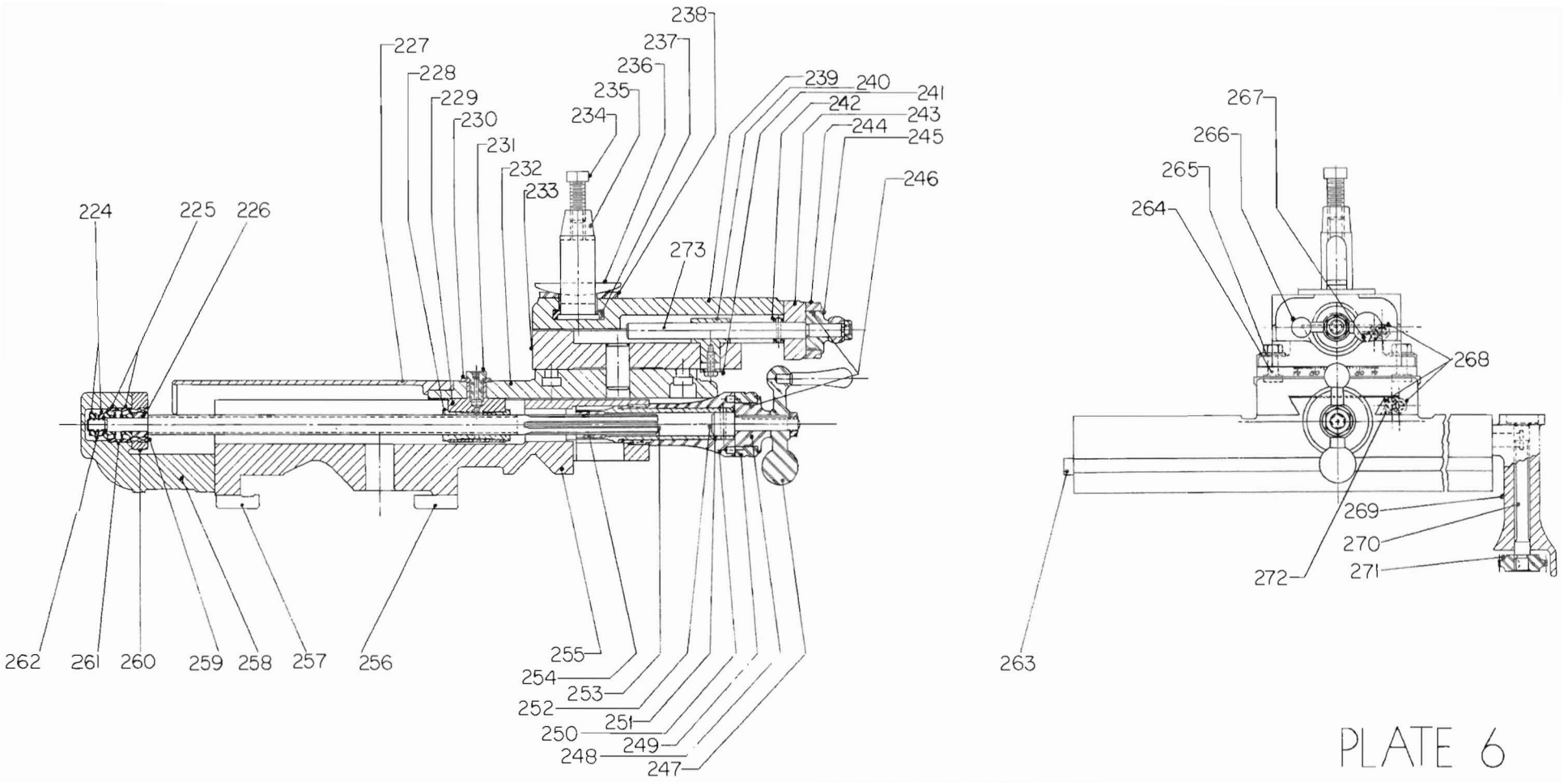
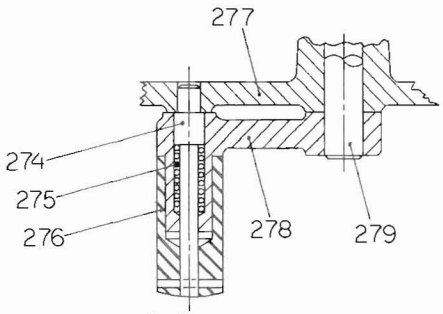
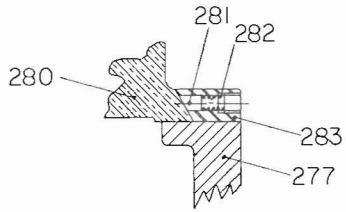


PLATE 6

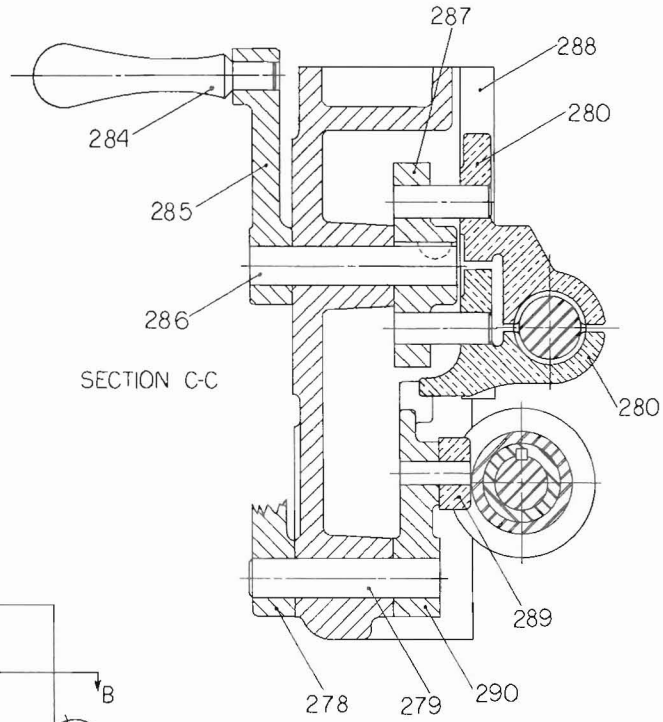
CARRIAGE AND CROSS SLIDE



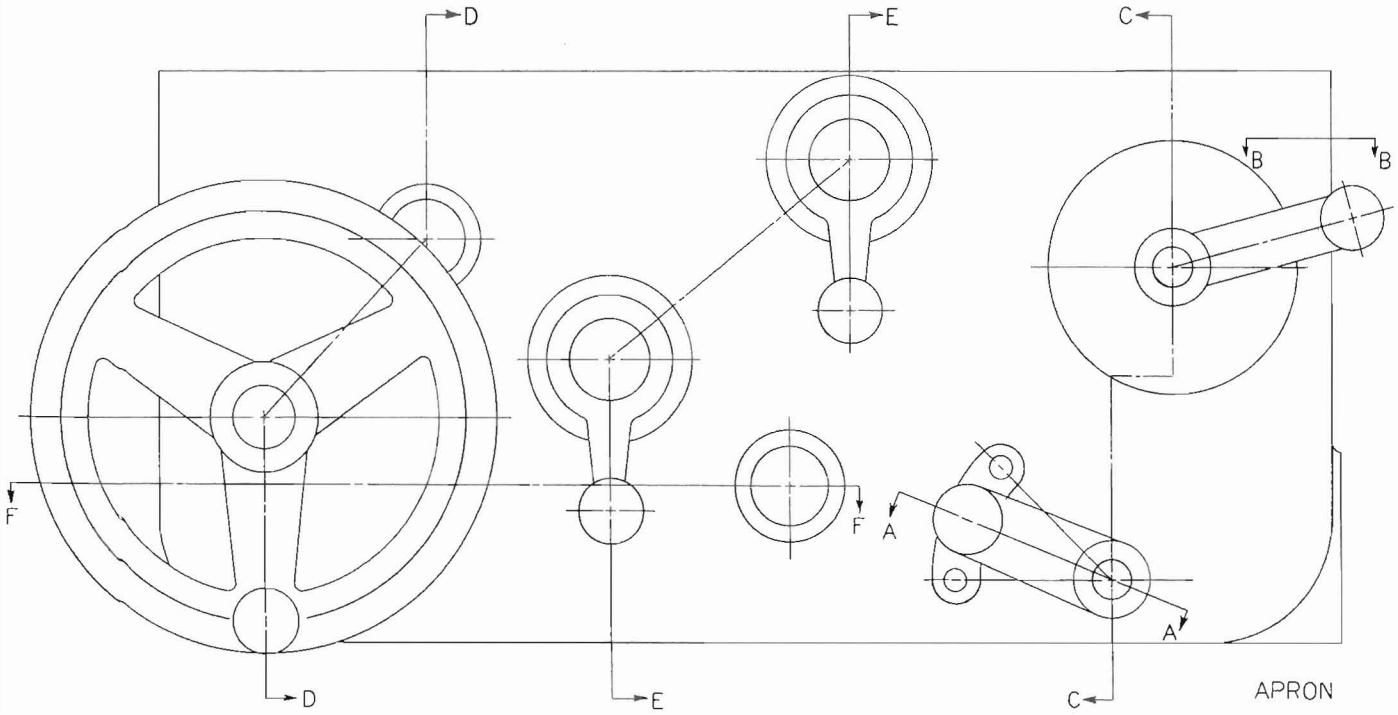
SECTION A-A



SECTION B-B

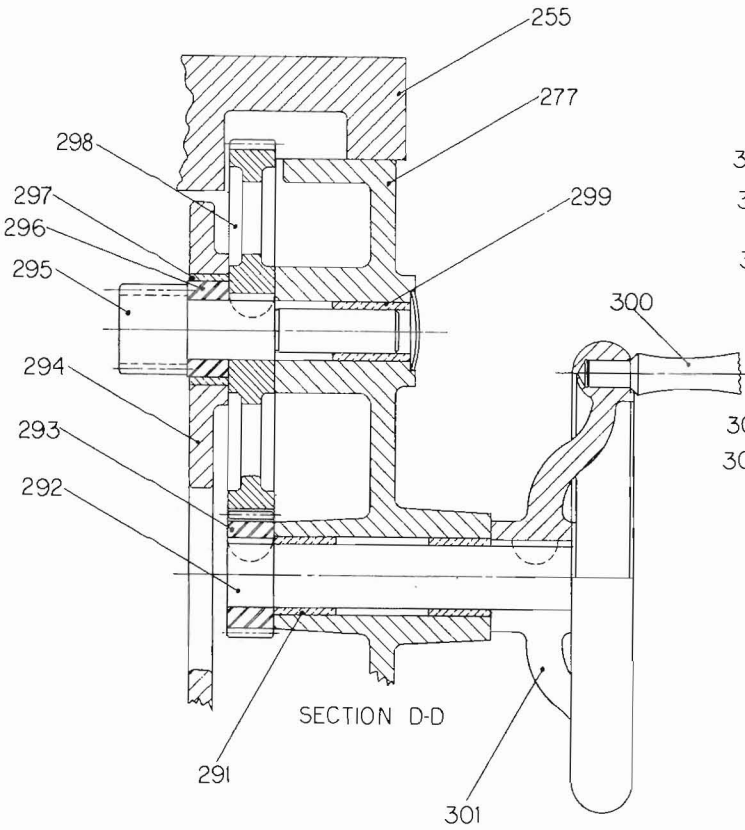


SECTION C-C

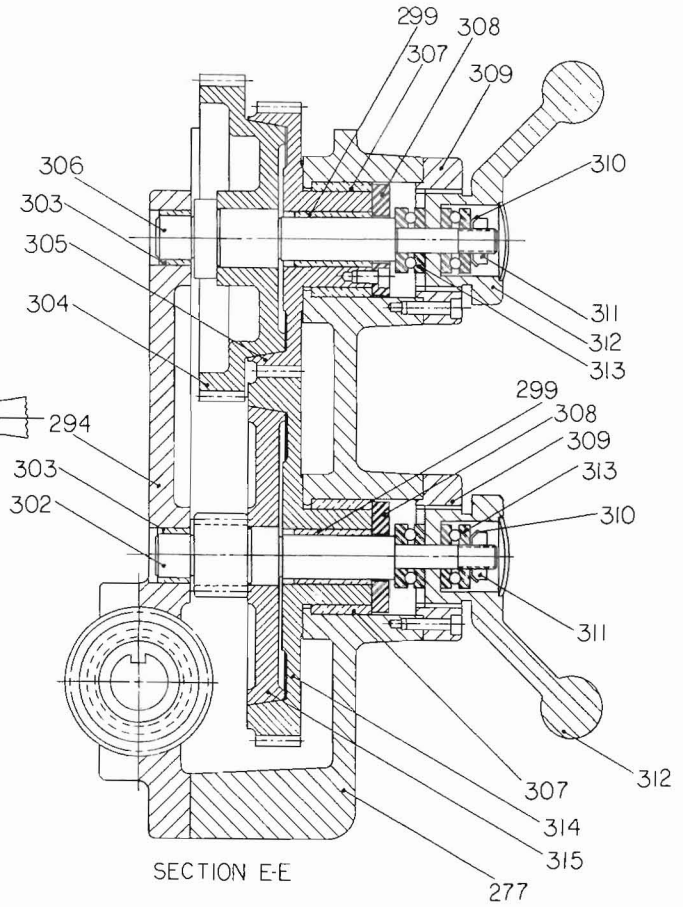


APRON

PLATE 7

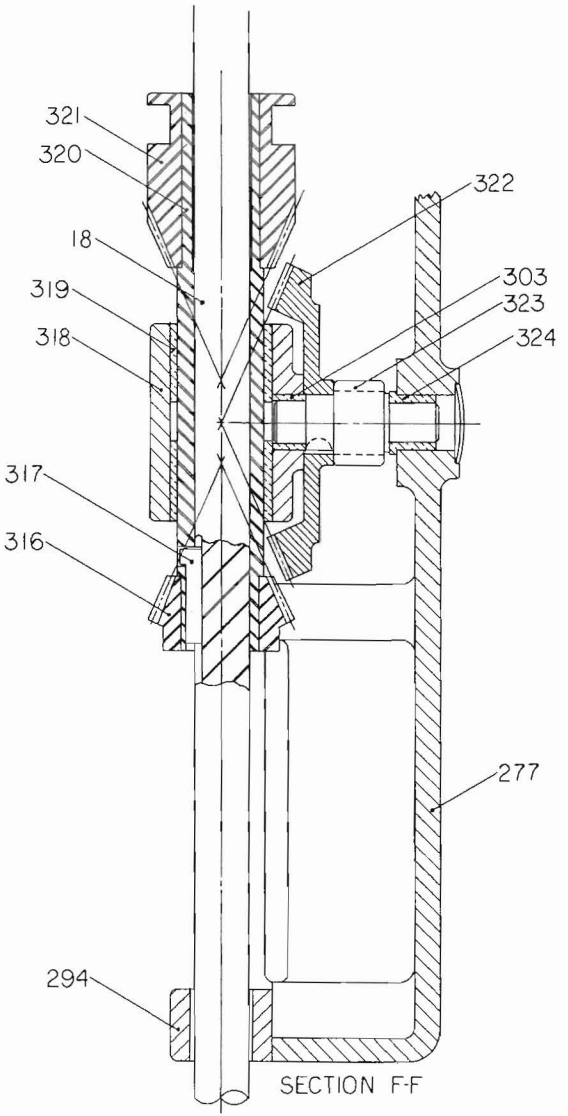


SECTION D-D



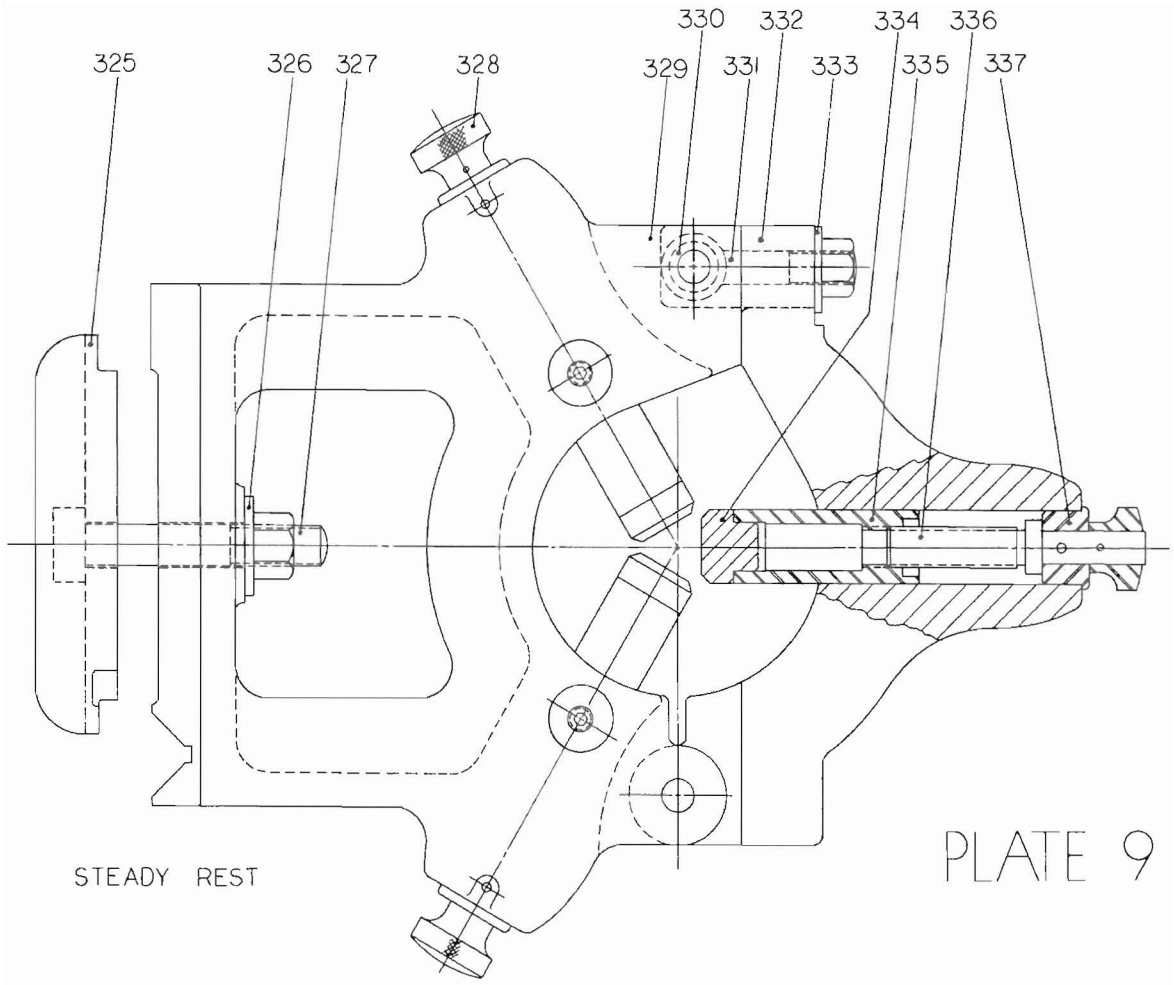
SECTION E-E

APRON



SECTION F-F

PLATE 8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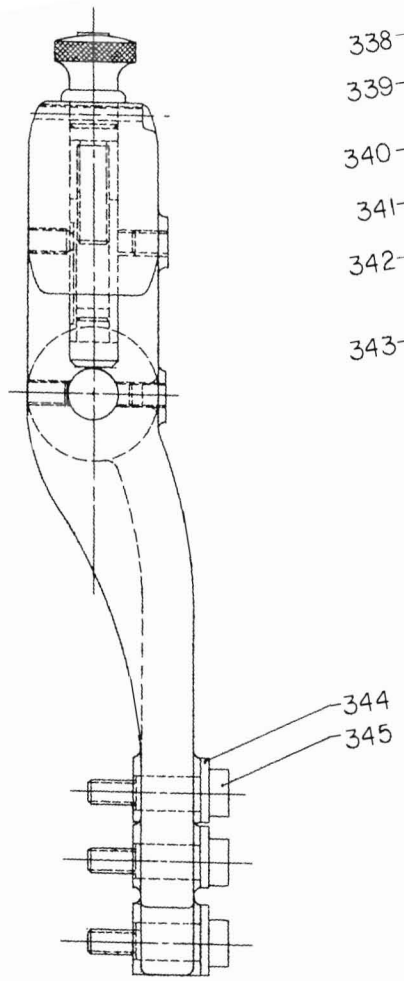
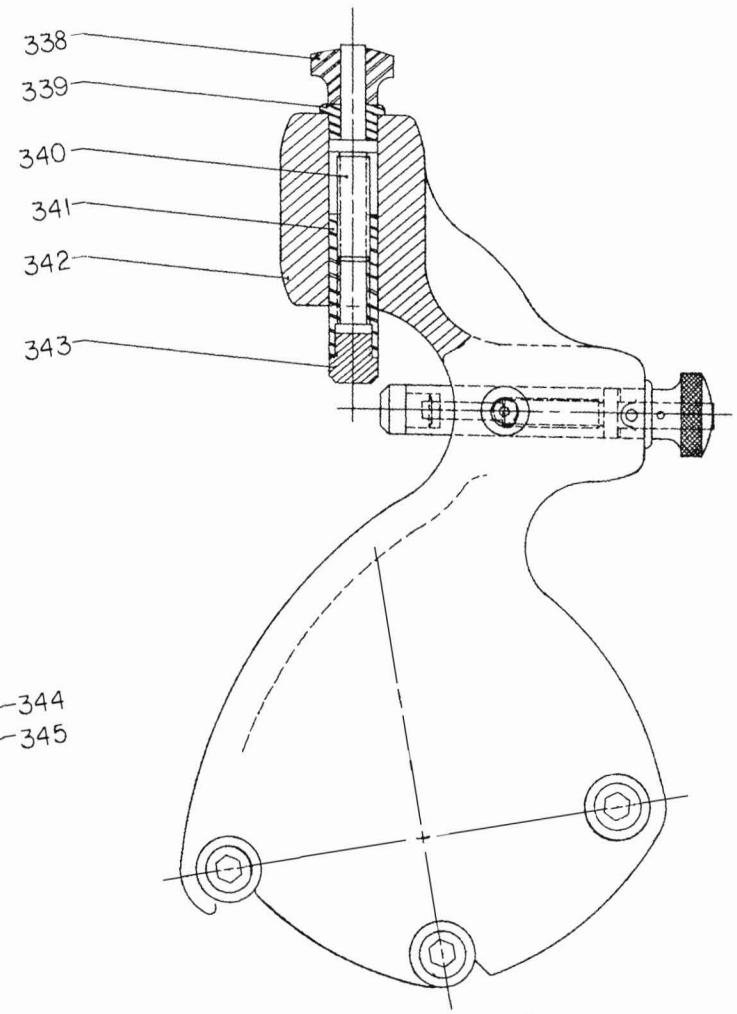
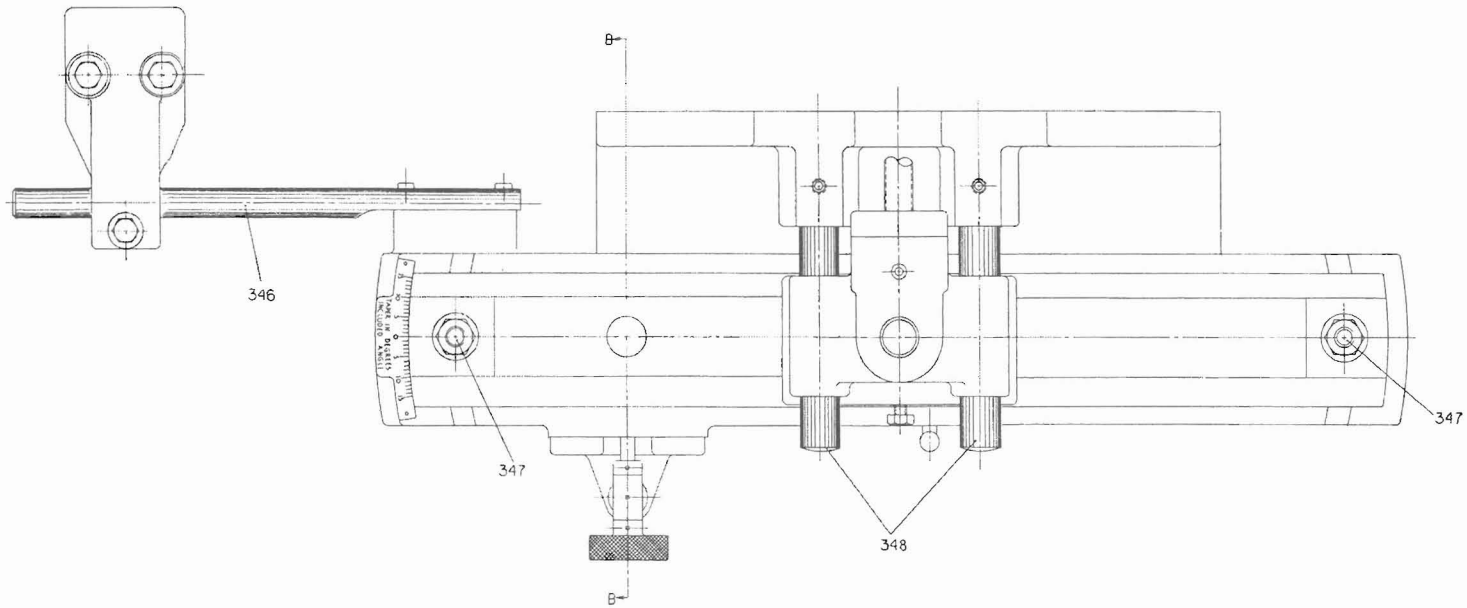
STEADY REST
PLATE 9

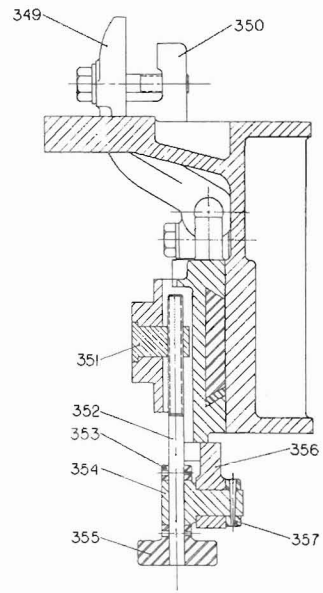




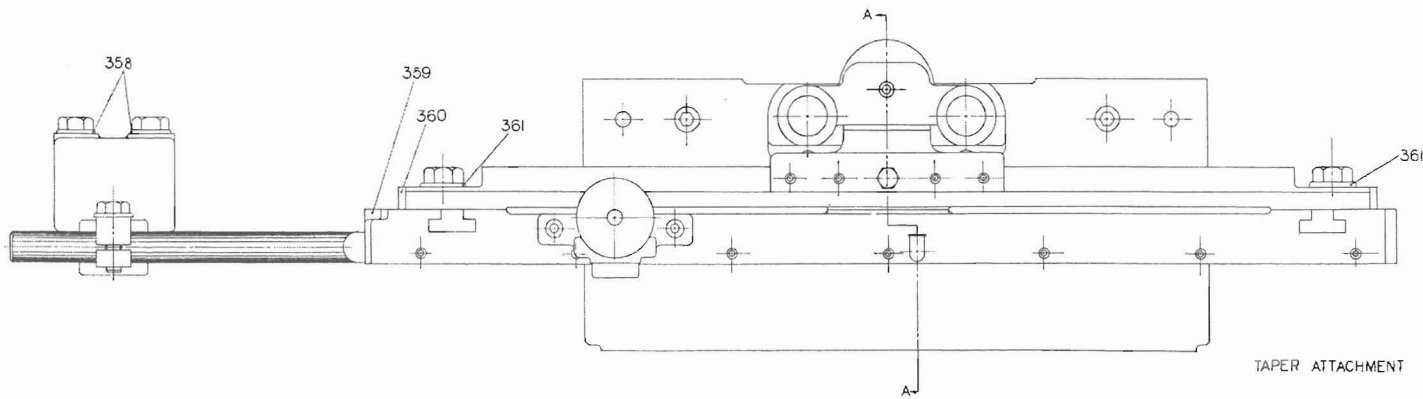
FOLLOW REST

PLATE 10

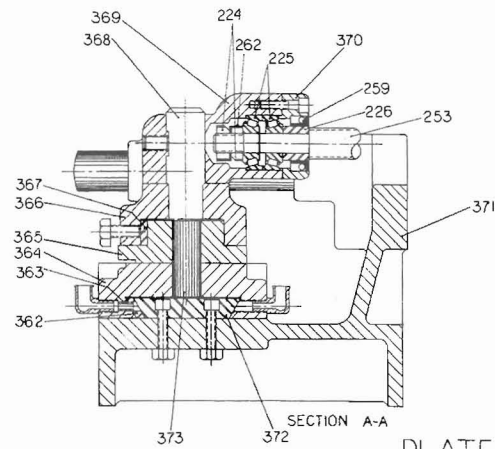




SECTION B-B

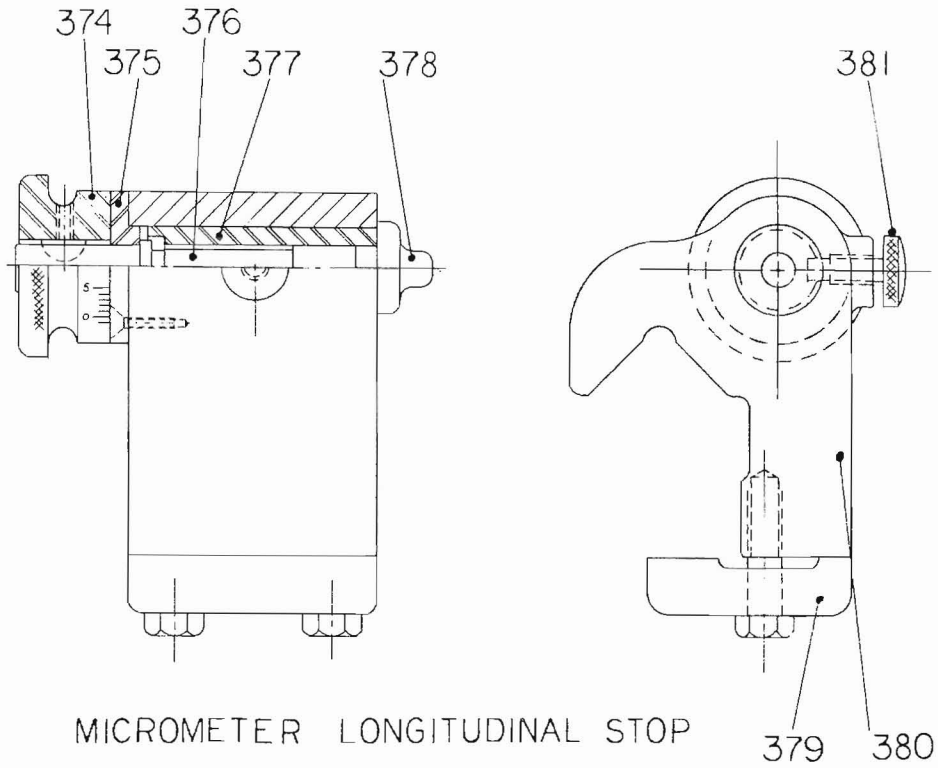


TAPER ATTACHMENT



SECTION A-A

PLATE 11



MICROMETER LONGITUDINAL STOP

PLATE 12