INSTRUCTIONS FOR THE ERECTION, OPERATION AND MAINTENANCE OF THE TREE 2UVR-C VERTICAL MILL

I FORWARD

The Tree Vertical Milling machine is a quality built machine designed for efficient operation under conditions of hard usage. To maintain accuracy and proper operation characteristics, it is necessary to observe certain rules of erecting and maintenance as set forth in this manual.

Periodic lubrication as specified and regular mechanical inspections are very important; neglect or abuse may cause permanent damage and the necessity of replacement of parts.

II UNPACKING

The Tree Vertical Mill is skidded, crated, covered with a plastic bag and has all finished surfaces protected with a slushing compound.

Carefully remove the crating and bag in such a manner that the machine and its parts are not marred, scratched or impaired. All handles, collets, cranks and wrenches are packed in a separate carton inside the column. The packing slip, attached to the crate, should be immediately checked against the goods received. Any shortage should be reported at once to the representative from whom the machine was purchased. The machine should be moved to its final location before removing the skid.

III ERECTING

After removing the skid, place the machine on a flat surface. The bottom of the base has been machined to aid in level installation.

The machine is shipped with the head inverted for compactness in crating. Loosen the three nuts which secure the head adapter to the ram, and move the head to its upright position by means of the worm adjustment shaft and handle provided, assisting by hand so entire weight of head is not on worm wheel.

Thoroughly clean the slushing compound from all exposed surfaces with clean solvent, being careful not to move any part until it has been cleaned and oiled. Move the table, saddle and knee to extreme stops in one direction, clean and lubricate the exposed ways, screw, etc., repeating the process after moving each unit to the other extreme stop.

Center the saddle to the knee and the table to the saddle and level the machine table crosswise and lengthwise. Taper wedges at the four corners will facilitate the leveling operation. When properly leveled, place additional wedges around the entire base and secure the machine to its foundation. As an alternate, the machine can be mounted on leveling type vibration absorbing mounts.

IV ELECTRICAL CONNECTIONS

The Mill is shipped with all electrical equipment wired for the current characteristics specified on your order. The Mill is shipped with all electrical equipment wired for the current characteristics specified on your order. A fused disconnect is provided and the power source should be connected to the terminals provided.

After turning on the disconnect and prior to resetting the drives, check the secondary voltage coming from the two transformers in the electrical cabinet. The voltage must be no lower than 110 volts or no higher than 130 volts. Too low a voltage will not allow the computer to function and too high a voltage may damage the drive amplifiers.

Also check the direction of rotation of the spindle motor.

V AIR CONNECTION

Connect air supply of at least 75 PSI to the filter-regulator-oiler unit on the rear of the column.

The regulator should be set to 80 PSI to provide proper action to the anti-backlash eliminator. This unit is activated by the micro-processor when point-to-point positions of the table and saddle are reached.

VI LUBRICATION

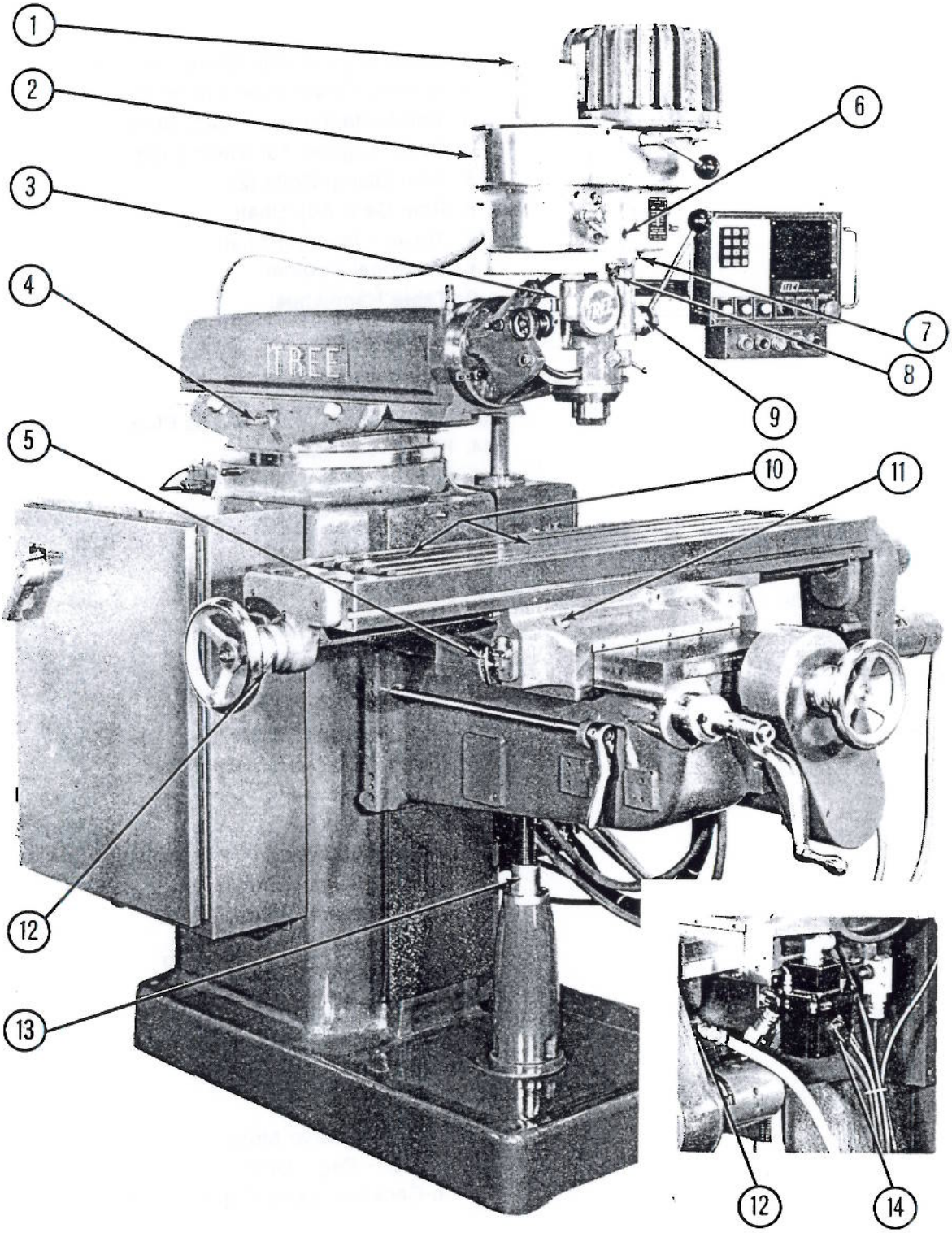
Before operating the 2UVR-C Mill, check the points of lubrication as illustrated on Fig. 1, and explained below.

As the 2UVR head has been inverted for shipment, the oil has been drained from the back gear compartment. A can of CITGO Sentry #80 oil is provided to refill this gear box. Approximately one pint is required and the speed range lever must be in the back gear (slow speed) position when checking the oil level in the front glass.

The following numbers refer to Fig. 1 describing the points and giving the frequency of lubrication:

1. Grease fittings - lubricate variable pulleys two or three times weekly with No. 2 grease.
2. Oil filler for back gear compartment - maintain level in front glass with speed range lever in back gear position. Capacity - approximately one pint CITGO Sentry #80 or equivalent (viscosity 85 sec. at 210° F) oil. To drain oil from this compartment, remove pipe plug provided on underside of aluminum housing.
3. Oil cup - lubricates quill, horizontal wormshaft and quill feed pinion shaft. Requires oil once each day of operation. Use Imperial Oil & Grease Co. Molub Alloy MWO #20 or equivalent.
4. Oil cup - lubricates ram adjusting pinion shaft. Oil weekly with SAE #20.
5. Bijur one-shot pump -- lubricates table, saddle and knee top ways; this is used in conjunction with No. 14 automatic oiler to insure adequate lubrication throughout the machine.
6. Oil sight glass - (see 2)
7. Grease fittings - lubricate variable pulleys two or three times weekly with No. 2 grease.
8. Remove pipe plug and move quill down to expose roller drive unit. A few drops of oil periodically will adequately lubricate this drive. SAE 20 oil.
9. Oil cup - (not shown) lubricates quill feed pinion shaft. Requires oil once each day of operation. SAE 20 oil.
10. Oil cups - (not shown) one each side. Lubricates vertical ways of knee. Oil weekly with Citgo Sliderite #2 or equivalent.
11. Oil reservoir for Bijur way lubricating pump - Fill as necessary with Citgo Sliderite #2 or equivalent.
12. Grease fitting - Timken Brgs. - Monthly
13. Knee elevating screw fitting - Grease weekly with Citgo Premium Lithium #2 or equivalent.
14. Automatic Bijur oil pump for lubrication of the lead screws and crossfeed gibs. It operates continuously when the drive motors and amplifiers are turned on. Fill reservoir with Citgo Sliderite.

All other bearings are greased and sealed at the factory. No further lubrication is necessary. Motor lubrication is given in motor manual at back of this book.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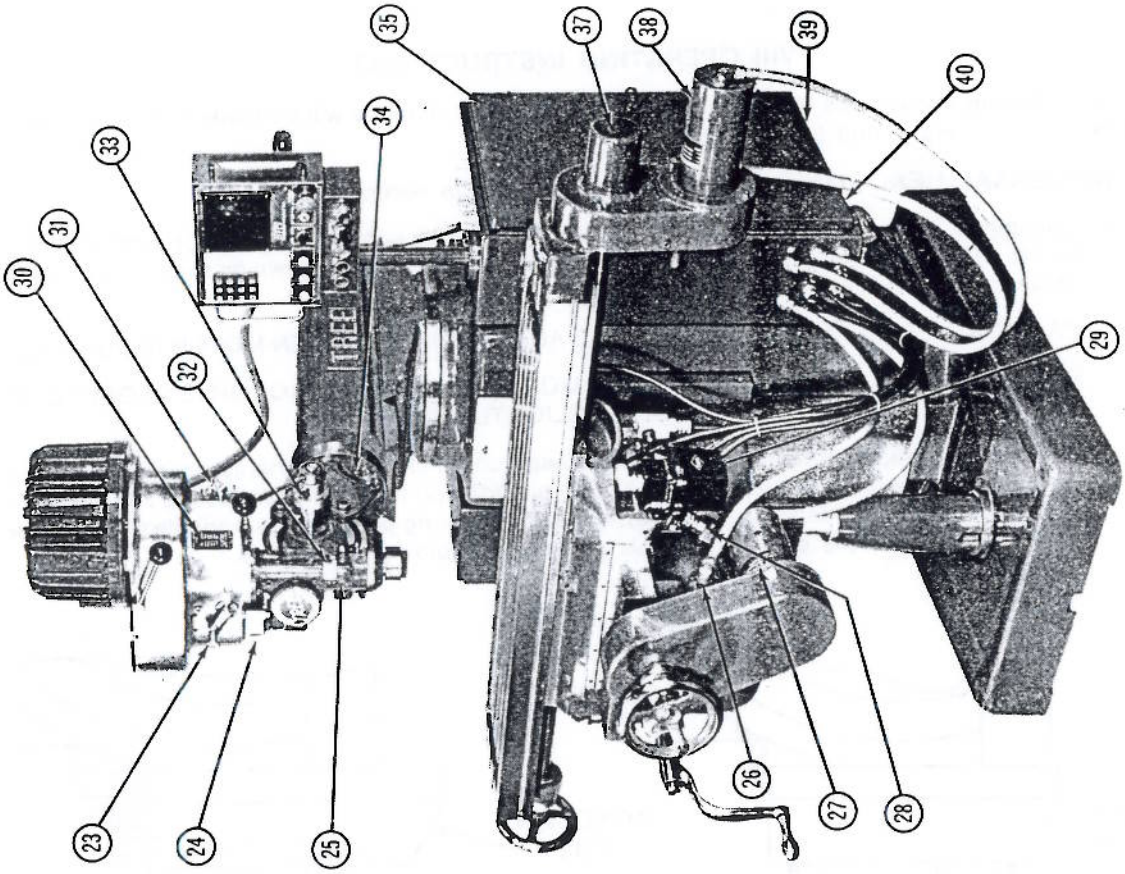
VII 2UVR-C MILLING MACHINE NOMENCLATURE

1. Head Angular Adj. Clamp Bolts (4)
2. Spindle Power Feed Clutch Knob
3. Head Adapter Worm Adj. Shaft
4. Head Angular Adj. Gear Shaft
5. Ram Clamp Bolts (2)
6. Ram Gear Adj. Shaft
7. Turret Clamping Shaft
8. Electrical Cabinet
9. Table Handwheel
10. Bijur Hand Lubricator
11. Spindle Motor
12. Spindle Brake
13. Spindle Drive Adj. Access Plug
14. Hand Feed Handle
15. Quill Power Feed Adj. Ring
16. Quill Lock Handle
17. Collet Closer Yoke
18. Collet Closer Adj. Nose
19. Console
20. Cross Feed Handle
21. Elevating Crank Handle
22. Knee Lock Handle
23. Spindle Speed Range Lever
24. Quill Feed Indicator
25. Depth Stop Micrometer Dial
26. Y Axis Resolver
27. Cross Feed Servo Motor
28. Automatic Oiler
29. Anti-Backwash Eliminator
30. Spindle Speed Plate
31. Spindle Variable Speed Knob
32. Micrometer Dial Lock Screw
33. Hand Feed Graduated Dial
34. Head Adapter Clamp Bolts (3)
35. Micro-Processor Cabinet
37. X Axis Resolver
38. Table Feed Servo Motor
39. Air Filter - Reg - Oiler
40. Anti-Backlash Operating Soc. Valves

NOTE: SEE PARTS SECTION PAGE 11 FOR ORDERING PARTS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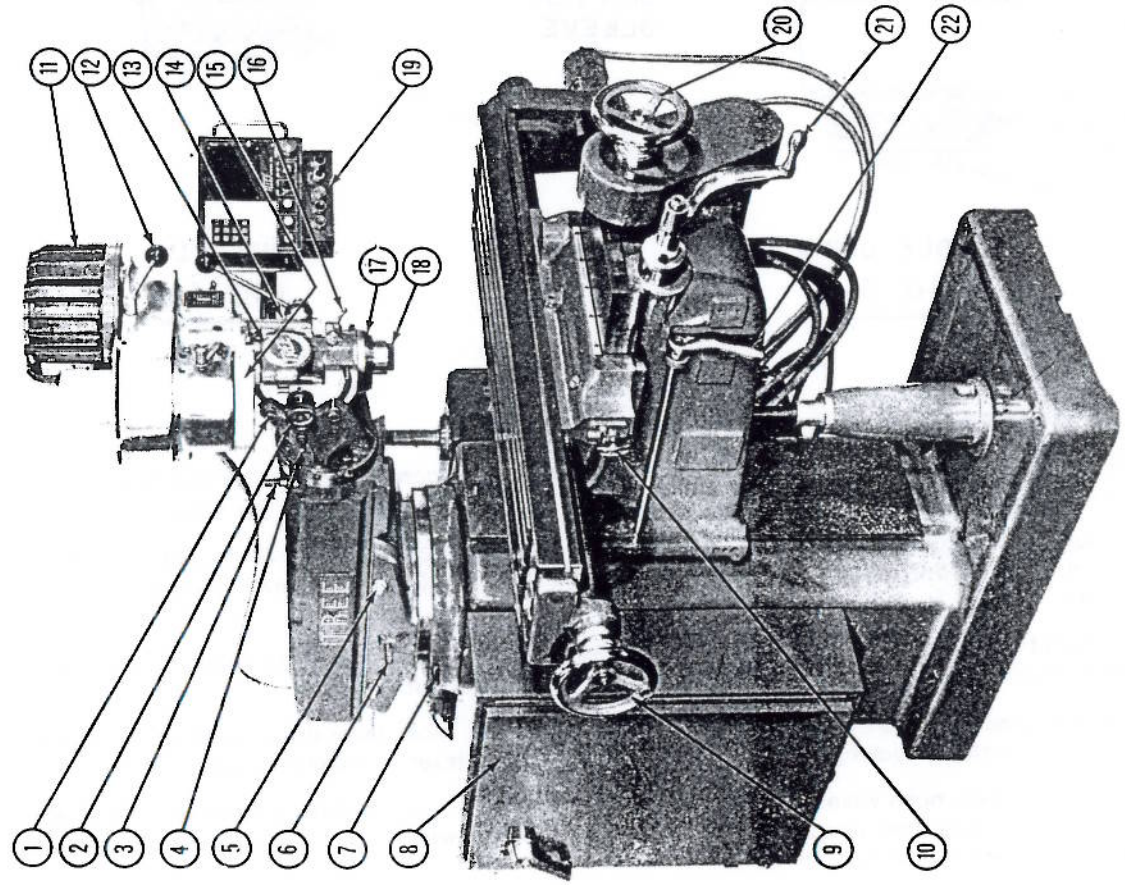
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VIII OPERATING INSTRUCTIONS

In the following instructions for operating the 2UVR-C Mill reference will be made to the numbered parts shown on Fig. 2 and further explained on page 4.

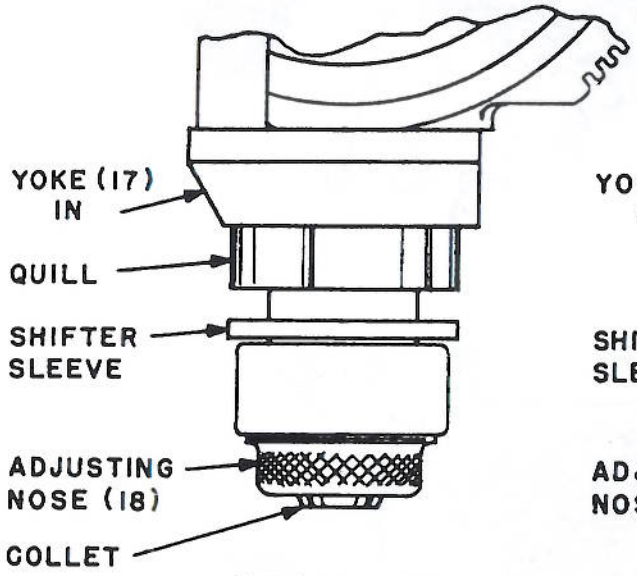
1. UNIVERSAL HEAD (Motor instructions will be found in section X)

A. Changing speeds - spindle speeds are variable, adjusted by knob (31). The range in back gear is 60-420 RPM and in open belt 450-3300 RPM. Lever (23) is shifted as shown on speed plate (30) to obtain desired range.

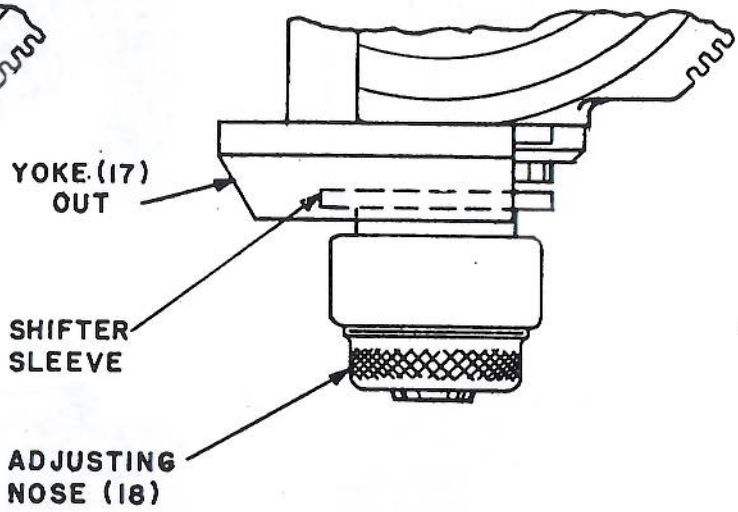
CAUTION - SPEED KNOB (31) SHOULD BE ADJUSTED ONLY WHEN MOTOR IS RUNNING.

SPEED RANGE LEVER (23) SHOULD BE MOVED ONLY WHEN MOTOR IS STOPPED. IF DIFFICULT TO ENGAGE TURN SPINDLE SLIGHTLY BY HAND.

B. Using the automatic collet closer - the automatic collet closing mechanism mounted on the spindle nose is actuated by using the yoke (17) provided on the main head casting and the hand feed lever (14). Illustrations Fig. 3 and Fig. 4 and the following procedure will enable the operator to fully understand the operation of this unique tool holding mechanism.



SPINDLE DOWN
FIG. 3



SPINDLE UP
FIG. 4

1. Place hand feed lever (14) in extreme up position.
2. Pull yoke (17) approximately 3/4" Fig. 4. Lower groove in yoke contacts the shifter sleeve confining so that it remains stationary when quill moves up and down by means of the hand feed lever.
3. Pull down hand feed lever to release collet tension. Tools can be inserted and removed from collet when in this position. To remove collet, unscrew adjusting nose (18) while hand feed lever is in this position.
4. With collet in place, insert tool and hold in desired position. Turn adjusting nose (18) counter-clockwise until snug, and then back it off approximately 1/2 turn.
5. Push hand feed lever to up position. If tool is not tightened, move lever down and turn adjusting nose until a definite locking action is felt when hand feed lever is moved to up position.
6. With tool in place, push yoke back into original position Fig. 3, and the milling attachment is ready for work. Changing tools or collets takes only a few seconds when the operator becomes familiar with the operation of this closer.

C. Power quill feed - The power quill feed is infinitely variable within the range of .0015" - .008" per rev. Adjustment is made by turning knurled ring (15). The feed is visually indicated (24).

Engage feed by turning knurled knob (2) on left end of pinion feed shaft clockwise. Feed can be engaged at any point throughout quill travel.

Disengage feed by loosening knurled knob (2).

D. Quill lock - The quill lock (16) provided is a separate unit which when operated, should not disturb the quill adjustment.

E. Enclosed micrometer depth stop (25) - The enclosed micrometer depth stop is graduated in thousandths of an inch and has a hardened and accurately ground acme screw. To increase quill travel, turn graduated dial (25) to left; to decrease, turn dial to the right. To lock in position, turn lock screw (32). Unit is so constructed that when power feed is in operation, feeding against depth stop will not cause damage. Consequently this may be used as a positive stop for boring operations. Bronze friction clutch will slip under pressure.

F. Hand spindle feed lever (14) - is provided to facilitate operations that do not require the power feed. This lever is also used to bring the tool into position for power feeding and rapidly returning after the operation is completed. This lever can be positioned as desired by pulling out at the hub and repositioning in the notches provided.

A dial graduated in 1/32's is provided for depth operations that do not require the accuracy of the micrometer depth stop.

G. Angular setting of the head - The head can be moved 45° each way from the vertical position acros the table. An arc graduated in degrees is provided for accurate angular setting.

To make this angular adjustment, loosen the four clamp bolts (1). The gear adjustment shaft (4) can then be operated and the desired angle obtained.

2. RAM

A. The adapter fastened to the ram can be rotated parallel with the table to position the spindle angularly in that plane. A circle graduated in degrees is provided for accurate setting.

To move the adapter, loosen the three clamp bolts (34). The gear adjustment shaft (3) can then be operated and desired angle obtained.

B. The entire ram assembly is movable to greatly increase the range of the machine. To move the ram, loosen the two clamp bolts (5) and operate gear shaft (6).

3. RAM SADDLE

A. The ram saddle can be swung through 360° if necessary. Graduations in degrees are provided for 90° movement in each direction. To move the ram saddle, loosen clamp (7). This clamp locks the ram saddle solidly through an internal clamping ring which also secures it to the column top for greater rigidity.

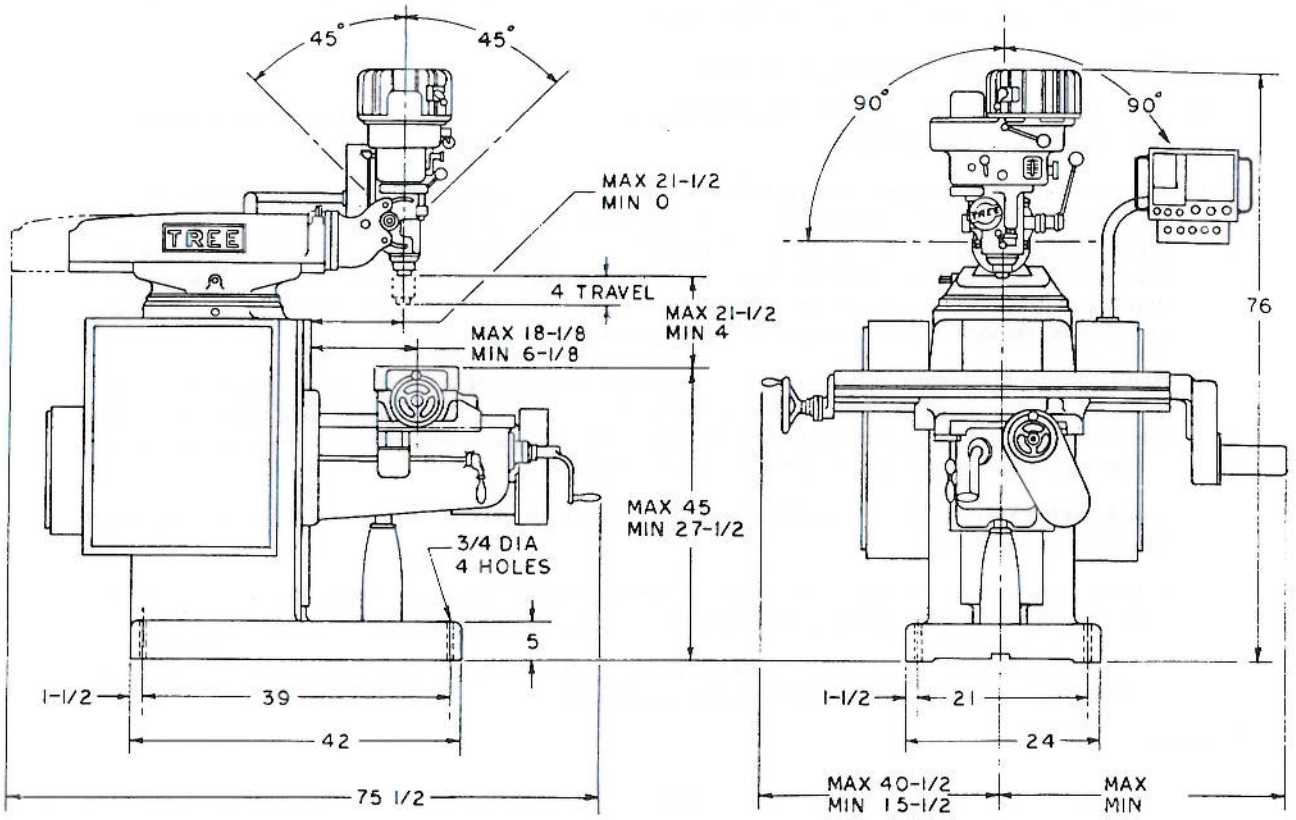
4. MACHINE OPERATION

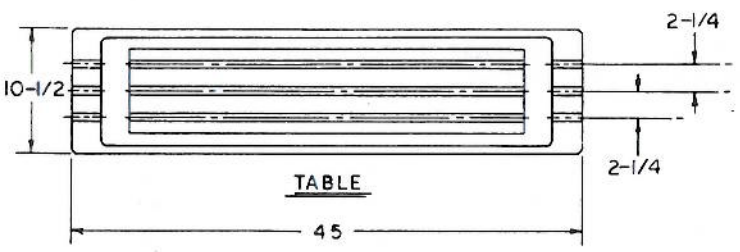
Operation of the Journeyman System in either the hand feed, MDI, or programable mode will be covered in a separate manual.

MODEL 2UVR-C JOURNEYMAN

VERTICAL MILLING MACHINE

DIMENSIONAL DRAWING





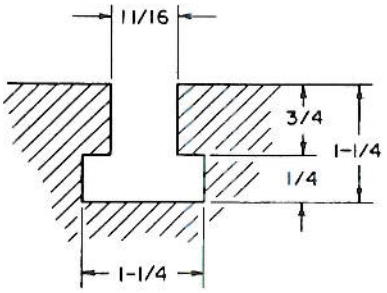
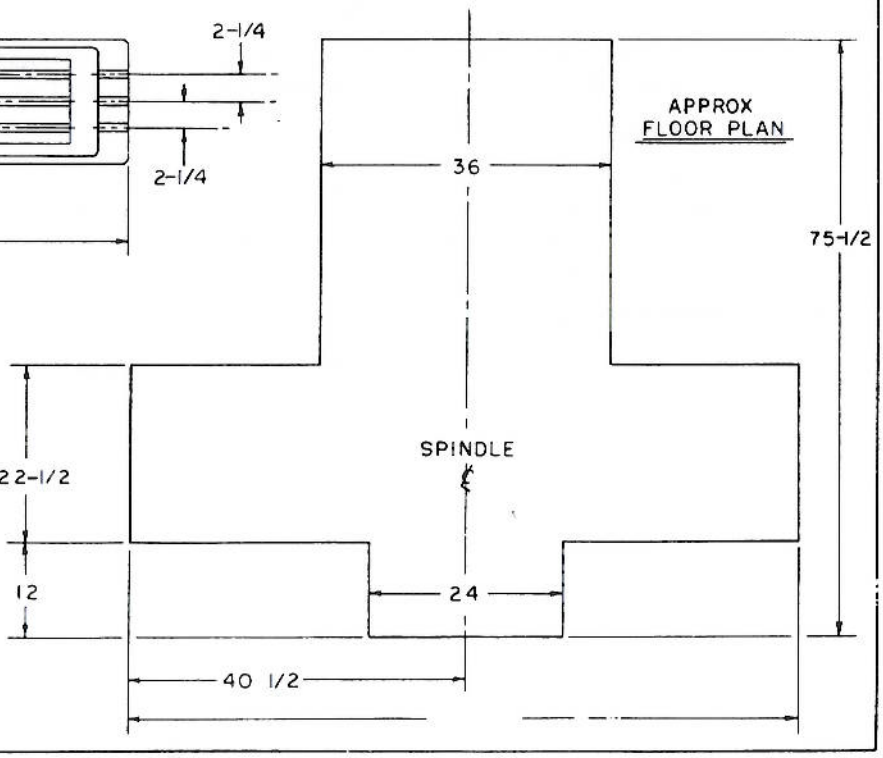


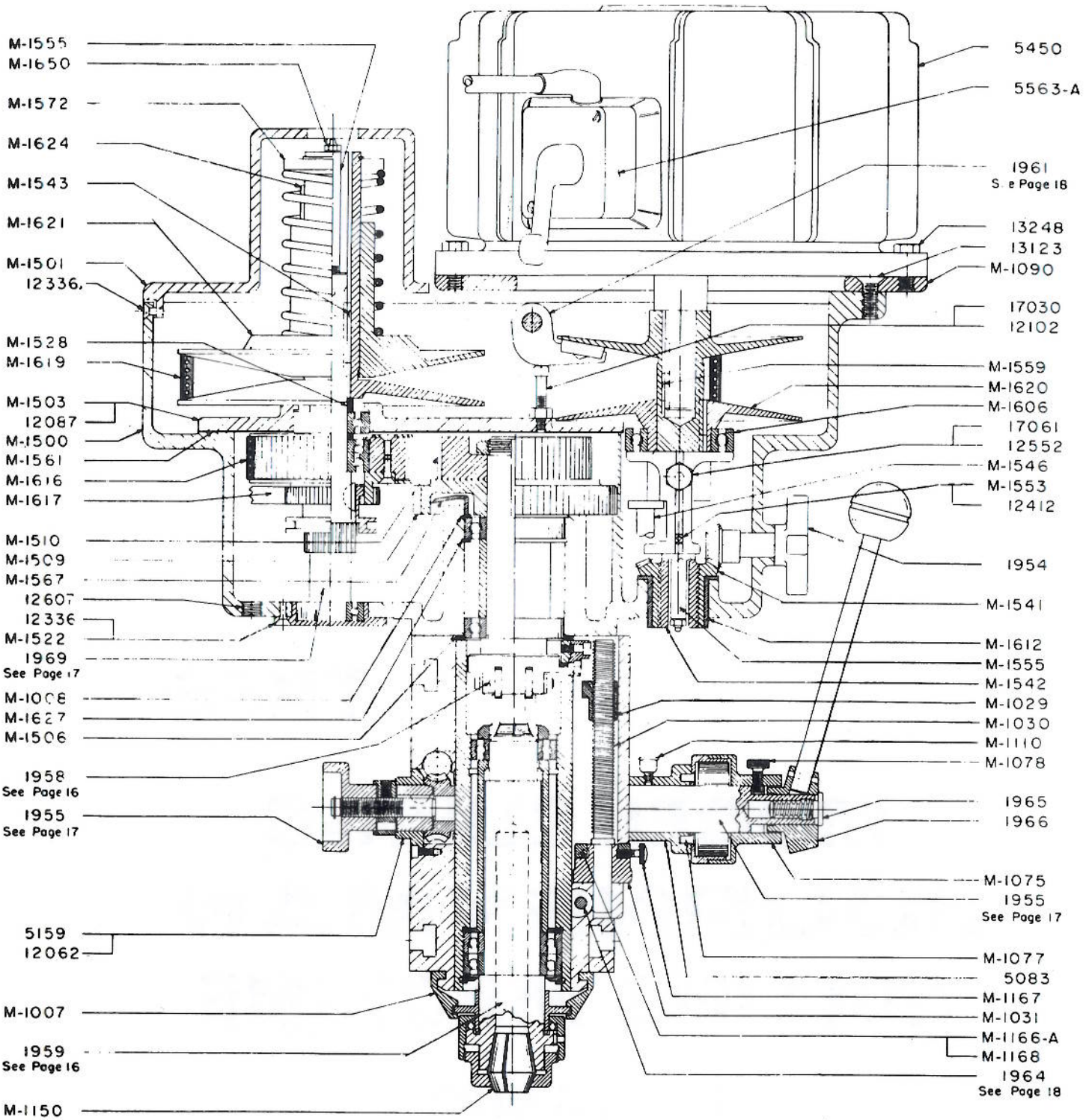
TABLE T-SLOT
DETAIL



TREE

MODEL 2UVR-C
JOURNEYMAN
MILLING MACHINE

PARTS LIST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12336
M-1522
1969
See Page 17
M-1008
M-1627
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See Page 17
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See Page 18
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M-1078
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M-1075
1955
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M-1077
5083
M-1167
M-1031
M-1166-A
M-1168
1964
See Page 18

PARTS LIST

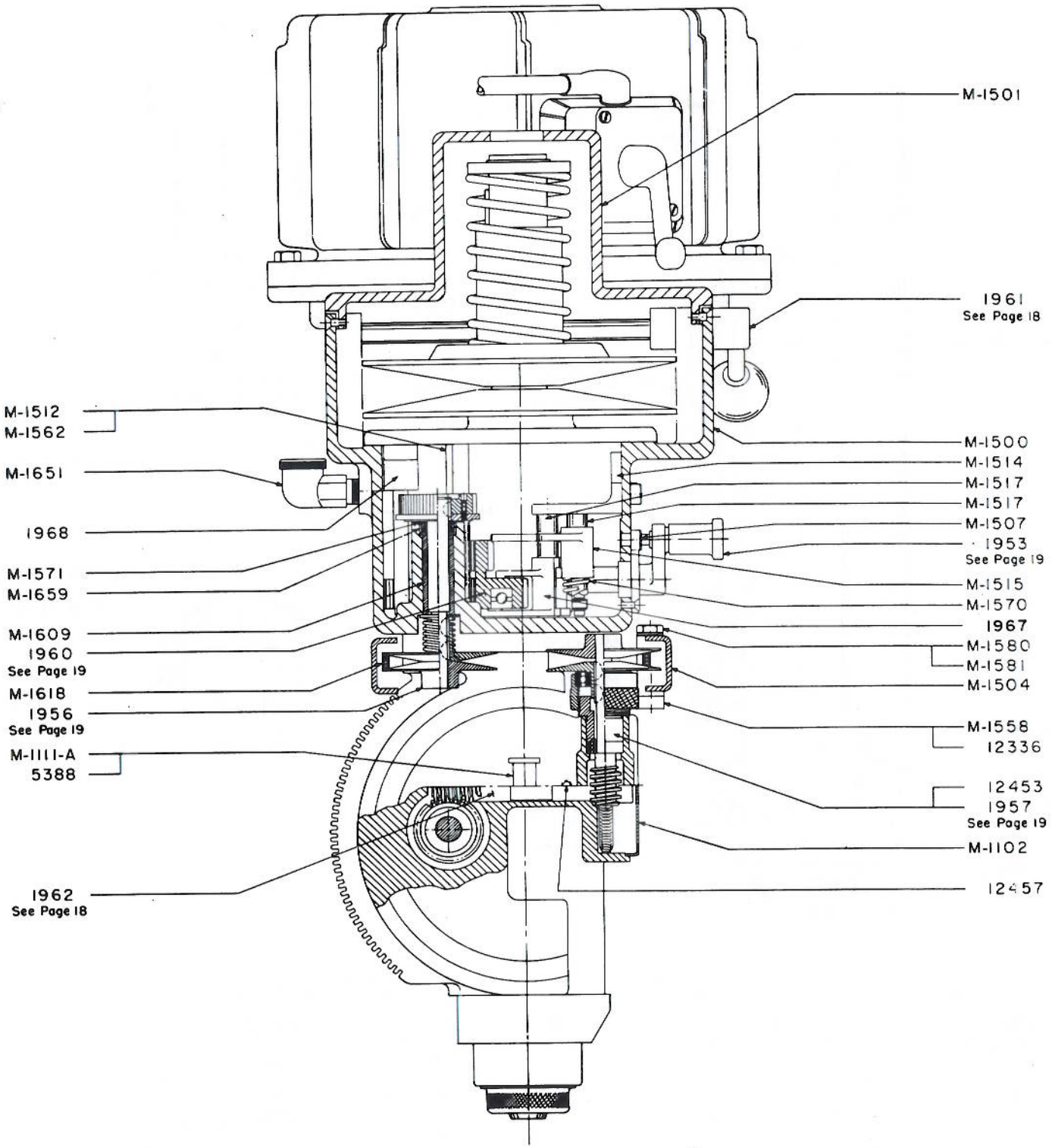
M-1007	Collet Closer Yoke
M-1008	Retaining Ring
M-1029	Depth Stop Screw Nut
M-1030	Depth Stop Screw
M-1031	Depth Stop Micrometer
M-1075	Return Spring Cover
M-1077	Retaining Pin
M-1078	Cover Screw
M-1090	Motor Adapter Plate
M-1110	Oiler
M-1150	All Collets are Type "Z"
	Collets - 1/16 to 3/4 by 1/64 ths
	Collets - in Number Sizes
	Collets - in Letter Sizes
	Collet - No. 2 Morse Taper
	Collet - No. 7 Brown & Sharp
M-1166-A	Micrometer Lock Collar
M-1167	Lock Screw
M-1168	Lock Pin
M-1500	Gear Box & Pulley Housing
M-1501	Pulley Cover
M-1503	Gear Housing Cover
M-1506	Locator Ring
M-1509	Driver Spur Gear
M-1510	Driver Timing Pulley
M-1522	Bearing Cap
M-1528	Variable Pulley Spacer
M-1541	Speed Selector Bevel Gear
M-1542	Speed Selector Screw
M-1543	Key
M-1546	Screw Stop
M-1553	Speed Indicator Needle
M-1555	Grease Pipe
M-1559	Key
M-1561	Cover Gasket
M-1567	Oil Shield
M-1572	Variable Pulley Washer
M-1606	Bearing N.D. #773 L08
M-1612	Bearing Oilite #F-1506-4
M-1616	Timing Belt #9350 x 1 x S2B4
M-1617	Timing Belt #9246 x 1/2 x S3B4
M-1619	Reeves Belt #FS 20317
M-1620	Drive Pulley
M-1621	Driven Pulley
M-1624	Nylon Key
M-1627	Tru-Arc Ring
M-1650	Grease Fitting
1954	Speed Selector Crank Assy.
* 1955	Quill Feed Pinion Shaft Assy.
* 1958	Spindle Driver Assy.
* 1959	Spindle and Sleeve Assy.
* 1961	Brake Assy.
* 1964	Quill Lock Assy.
1965	Clutch Handle Retaining Pin Assy.
1966	Hand Feed Clutch Assy.
* 1969	Clutch Shaft Assy.
5083	Pinion Shaft Bushing
5159	Clutch Bushing
5450	Motor
5563-A	Motor Reversing Switch
12062	Soc Head Screw 10-32 x 3/8
12087	Soc Head Screw 1/4-20 x 5/8
12102	Soc Head Screw 1/4-20 x 1-1/2
12336	Soc Flat Head Screw 10-24 x 1/2
12412	Soc Set Screw 7/16-14 x 7/8
12552	Soc Set Screw 7/16-14 x 7/8
12607	Soc Pipe Plug 1/4
13123	Slot. Flat Head Screw 3/8-16 x 3/4
13248	Hex Head Screw 3/8-16 x 1
17030	Hex Nut 1/4-20
17061	Hex Jam Nut 7/16-14

* See Pages 16 thru 19 for Assembly Parts

PARTS LIST

M-1102	Wormwheel Cover
M-1111-A	Horizontal Wormshaft Oiler
M-1500	Gear Box & Pulley Housing
M-1501	Pulley Cover
M-1504	Feed Pulley Guard
M-1507	High & Low Plunger Plug
M-1512	Idler Gear Shaft
M-1514	Shifter Pin Bracket
M-1515	Shifter Clutch
M-1517	Shifter Pin
M-1554	Speed Plate (not shown)
M-1558	Feed Pulley Guard Bracket
M-1562	Idler Shaft Bushing (not shown)
M-1568	Speed Control Lock Screw (not shown)
M-1570	Shifter Spring
M-1571	Feed Shaft Thrust Washer
M-1580	Shoulder Screw
M-1581	Thrust Washer
M-1609	Oilite Bearing #A-742
M-1618	Truflex Belt #1150
M-1651	Oiler #5302
M-1652	Oil Window (not shown)
M-1659	National Oil Seal #6549
*1953	Speed Selector Crank Assy.
*1960	Speed Selector Idler Gear Assy.
*1961	Brake Assy.
1967	Gear Shifter Assy.
1968	Oil Pump Assy.
5388	Felt Wick 1/4" dia. (not shown)
12336	Flat Head Socket Screw #10-24 x 1/2"
12453	Socket Head Set Screw 1/4-20 x 1/4"
12457	Socket Head Set Screw 1/4-20 x 5/16"
14320	Stud 5/16-18 x 1-1/2 (not shown)
17040	Hex nut 5/16-18 (not shown)

* See Pages 16 thru 19 for Assembly Parts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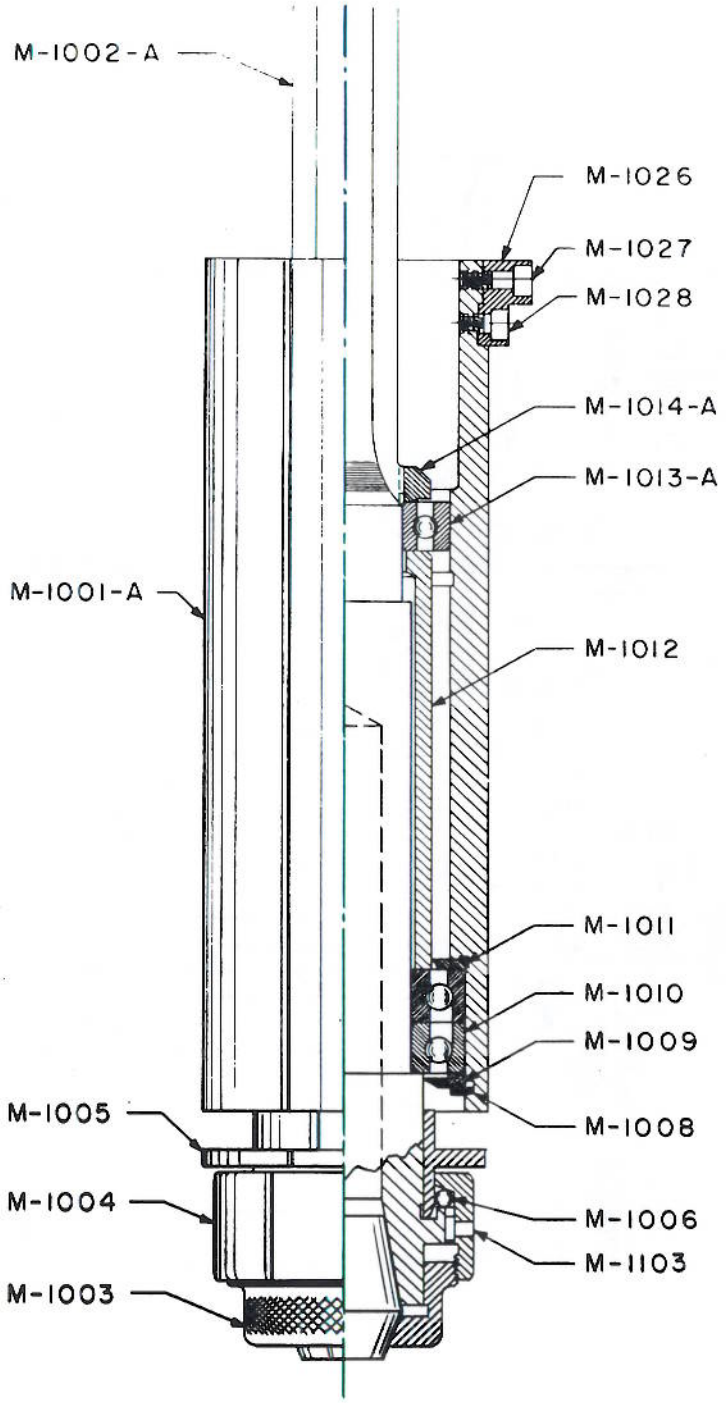
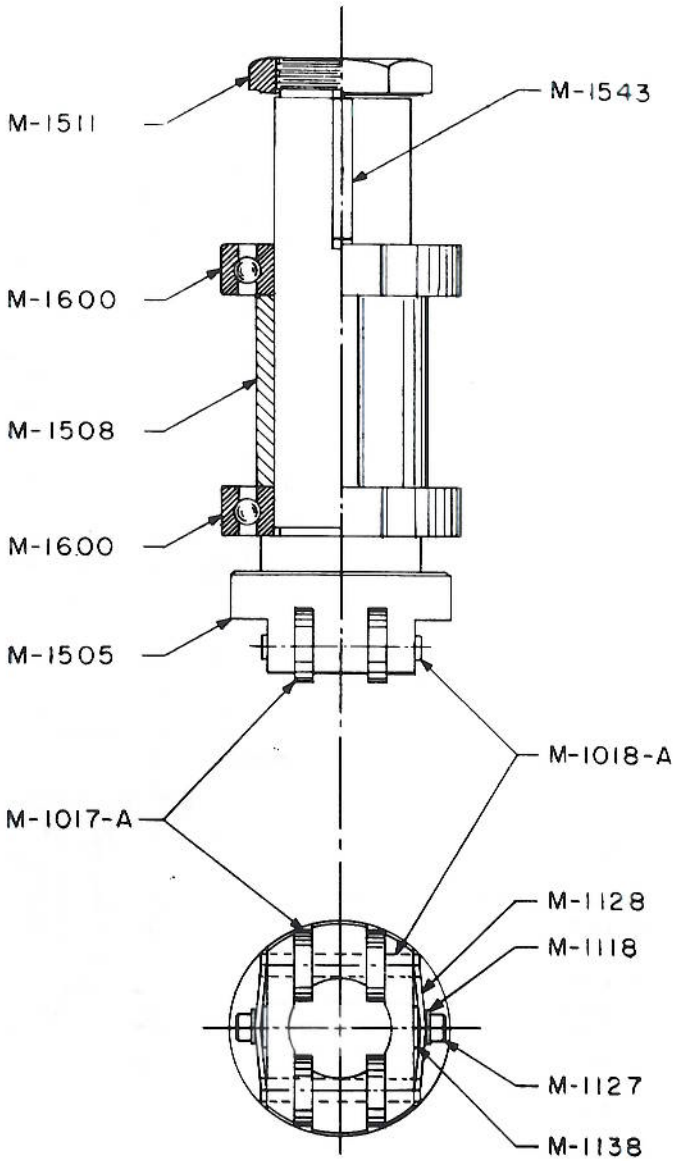


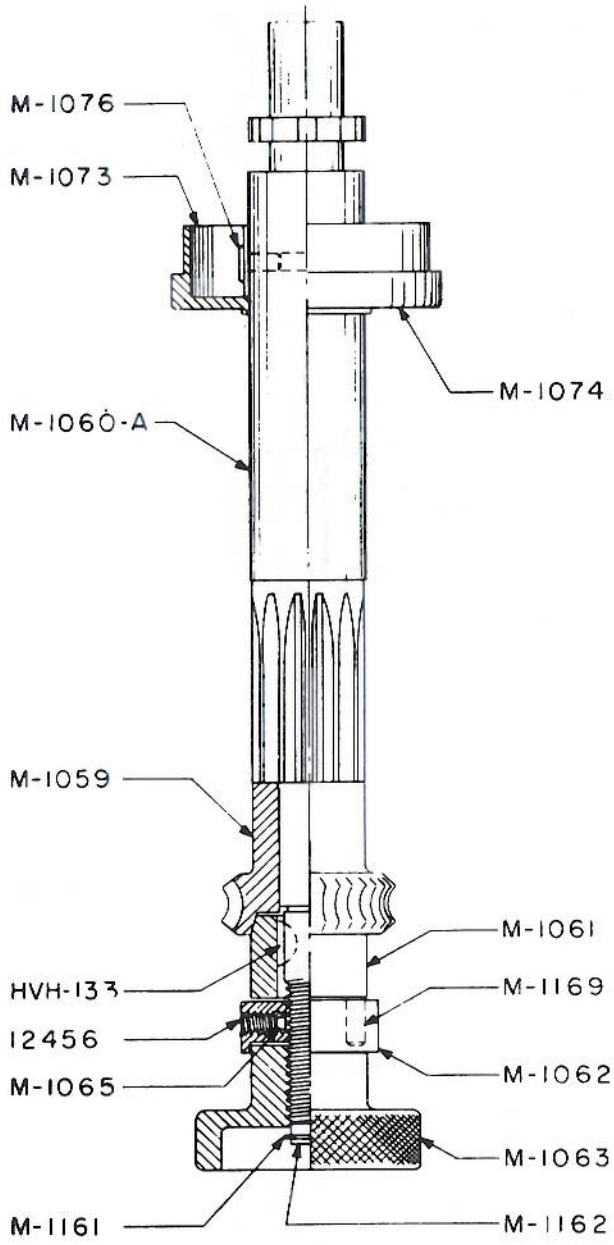


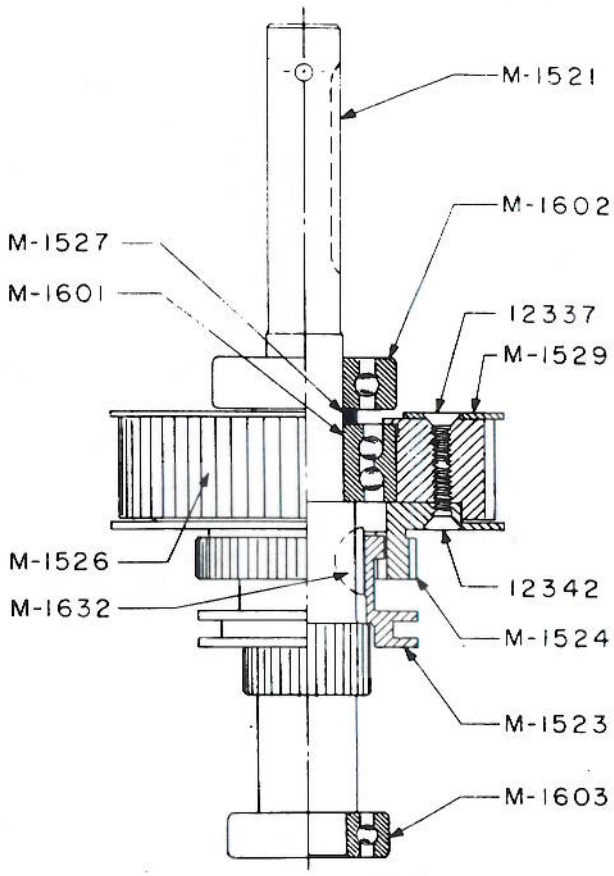
1959 SPINDLE & SLEEVE ASSY

M-1001-A	UNIVERSAL MILLING HEAD SLEEVE
M-1002-A	UNIVERSAL MILLING HEAD SPINDLE
M-1003	COLLET CLOSER NOSE
M-1004	COLLET CLOSER ADAPTER
M-1005	COLLET CLOSER SHIFTER SLEEVE
M-1006	COLLET CLOSER BALL
M-1008	RETAINING RING
M-1009	LOWER GREASE SHIELD
M-1010	LOWER SPINDLE BEARING
M-1011	UPPER GREASE SHIELD
M-1012	SPINDLE BEARING SPACER
M-1013-A	UPPER SPINDLE BEARING
M-1014-A	UPPER SPINDLE BEARING NUT
M-1026	SLEEVE STOP KEY
M-1027	STOP KEY SCREW
M-1028	STOP KEY SCREW
M-1103	COLLET CLOSER KEY

1958 SPINDLE DRIVER ASSY

M-1017-A	DRIVER ROLLER
M-1018-A	ECCENTRIC PIN
M-1118	LOCK WASHER
M-1127	SOC HD CAP SCREW
M-1128	SPRING CLIP
M-1138	LOCK WASHER
M-1505	SPINDLE DRIVER
M-1508	BEARING SPACER
M-1511	DRIVE NUT
M-1543	KEY
M-1600	BEARING



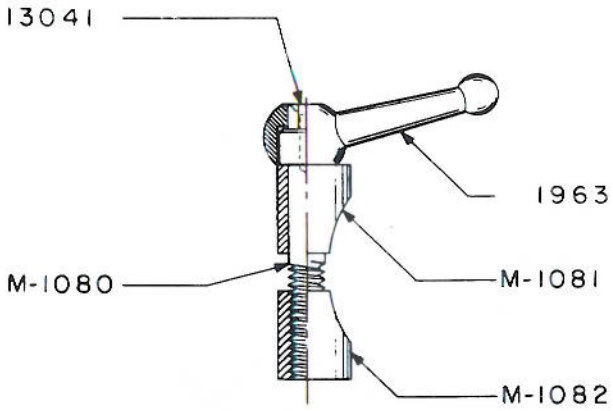


1955 QUILL PINION SHAFT ASSY

HVH-133	WOODRUFF KEY
M-1059	WORM GEAR
M-1060-A	PINION SHAFT
M-1061	POWER FEED CLUTCH
M-1062	PIN RETAINER
M-1063	HAND WHEEL
M-1065	BRASS PLUG
M-1073	RETURN SPRING
M-1074	SPRING HOUSING
M-1076	RETAINING PLUG
M-1161	RETAINING RING
M-1162	RETAINING PLUG
M-1169	CLUTCH PIN
12456	SOC HD SET SCREW

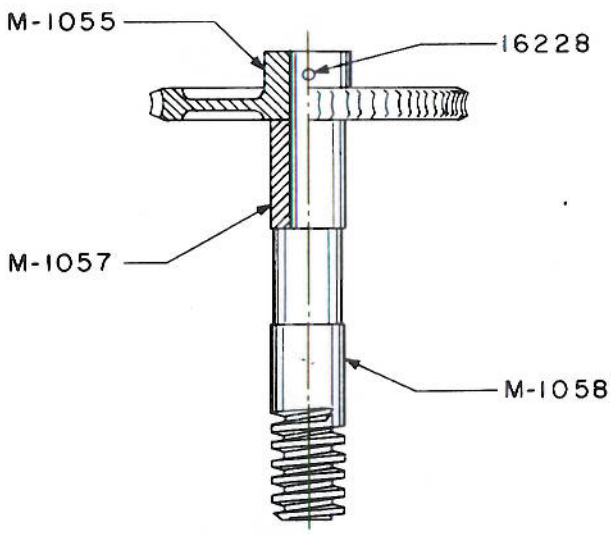
1969 CLUTCH SHAFT ASSY

M-1521	CLUTCH SHAFT
M-1523	MALE CLUTCH
M-1524	FEMALE CLUTCH
M-1526	IDLER TIMING PULLEY
M-1527	SPACER
M-1529	PULLEY FLANGE
M-1601	BEARING
M-1602	BEARING
M-1603	BEARING
M-1632	WOODRUFF KEY
12337	SOC FLAT HD SCREW
12342	SOC FLAT HD SCREW



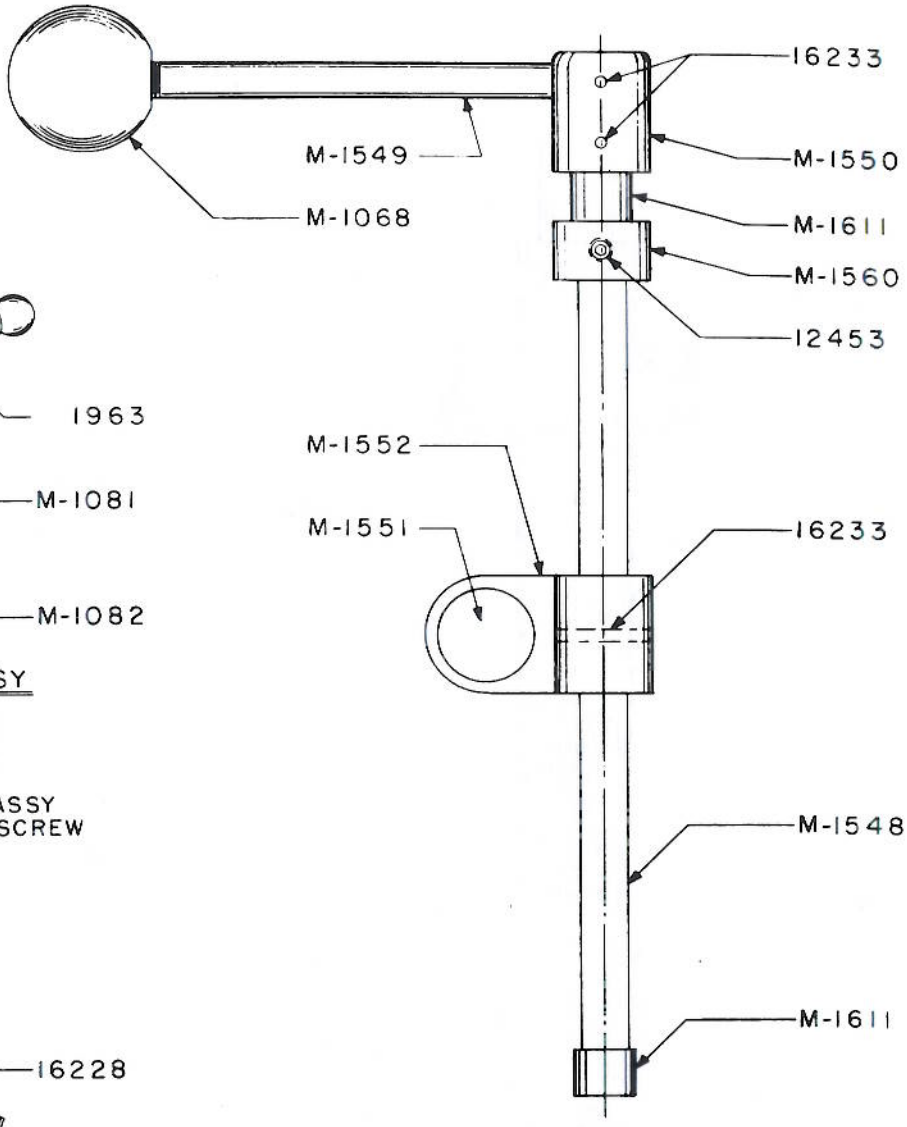
1964 QUILL LOCK ASSY

M-1080	LOCK SCREW
M-1081	LOCK BUSHING
M-1082	LOCK BUSHING
1963	LOCK HANDLE ASSY
13041	SLOT FLAT HD SCREW



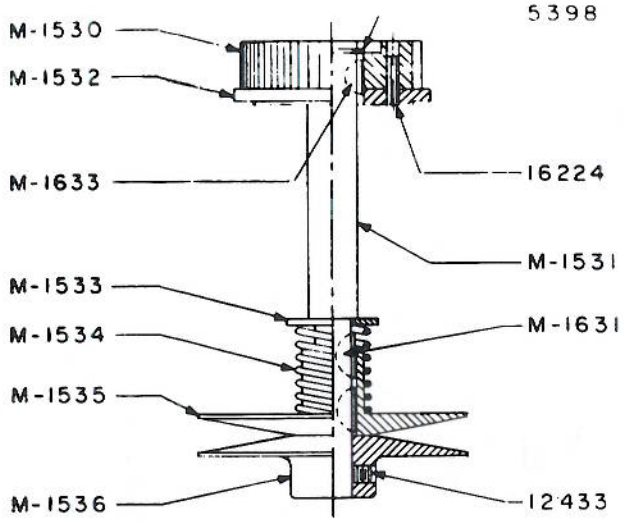
1962 HORIZONTAL FEED SHAFT ASSY

M-1055	FEED WORM GEAR
M-1057	BUSHING
M-1058	WORMSHAFT
16228	SPRING PIN



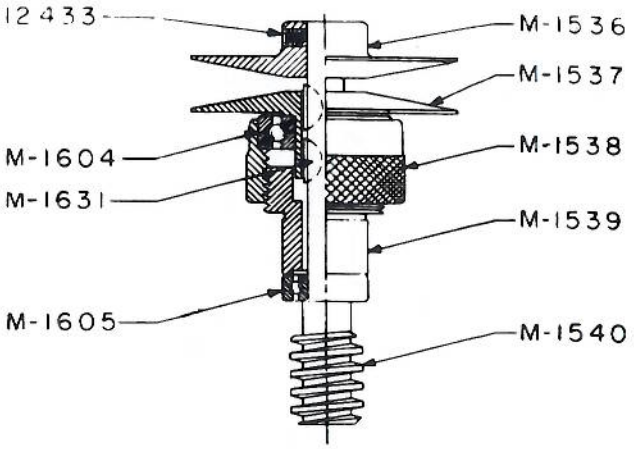
1961 BRAKE ASSY

M-1068	BALL HANDLE
M-1548	SHAFT
M-1549	ROD
M-1550	KNOB
M-1551	CORK
M-1552	CORK BRACKET
M-1560	BUSHING
M-1611	OILITE BEARING
12453	SOC HD SET SCREW
16233	SPRING PIN



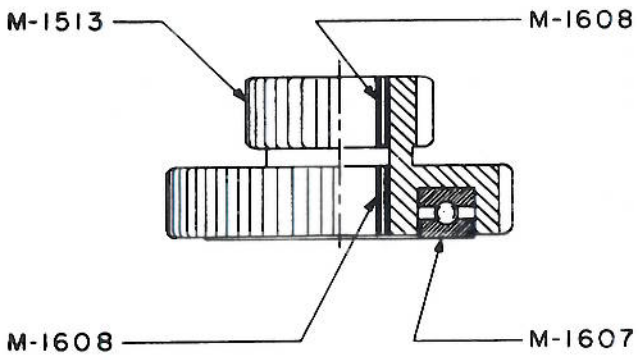
1956 FEED DRIVE SHAFT ASSY

M-1530	TIMING PULLEY
M-1531	FEED SHAFT
M-1532	FLANGE
M-1533	RETAINING WASHER
M-1534	SPRING
M-1535	VARIABLE PULLEY
M-1536	STATIONARY PULLEY
M-1631	KEY
12433	SOC HD SET SCREW
16224	SPRING PIN
M-1633	KEY
5398	RETAINING RING



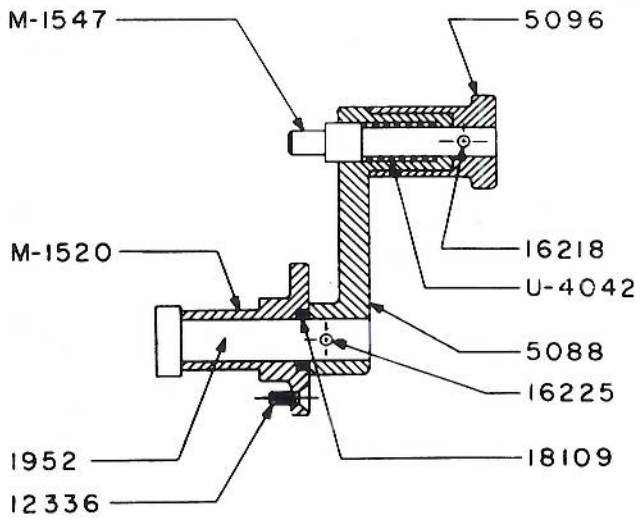
1957 VERTICAL FEED SHAFT ASSY

M-1536	STATIONARY PULLEY
M-1537	VARIABLE PULLEY
M-1538	FEED ADJ NUT
M-1539	WORMSHAFT BUSHING
M-1540	VERTICAL WORMSHAFT
M-1604	BEARING
M-1605	BEARING
M-1631	KEY
12433	SOC HD SET SCREW



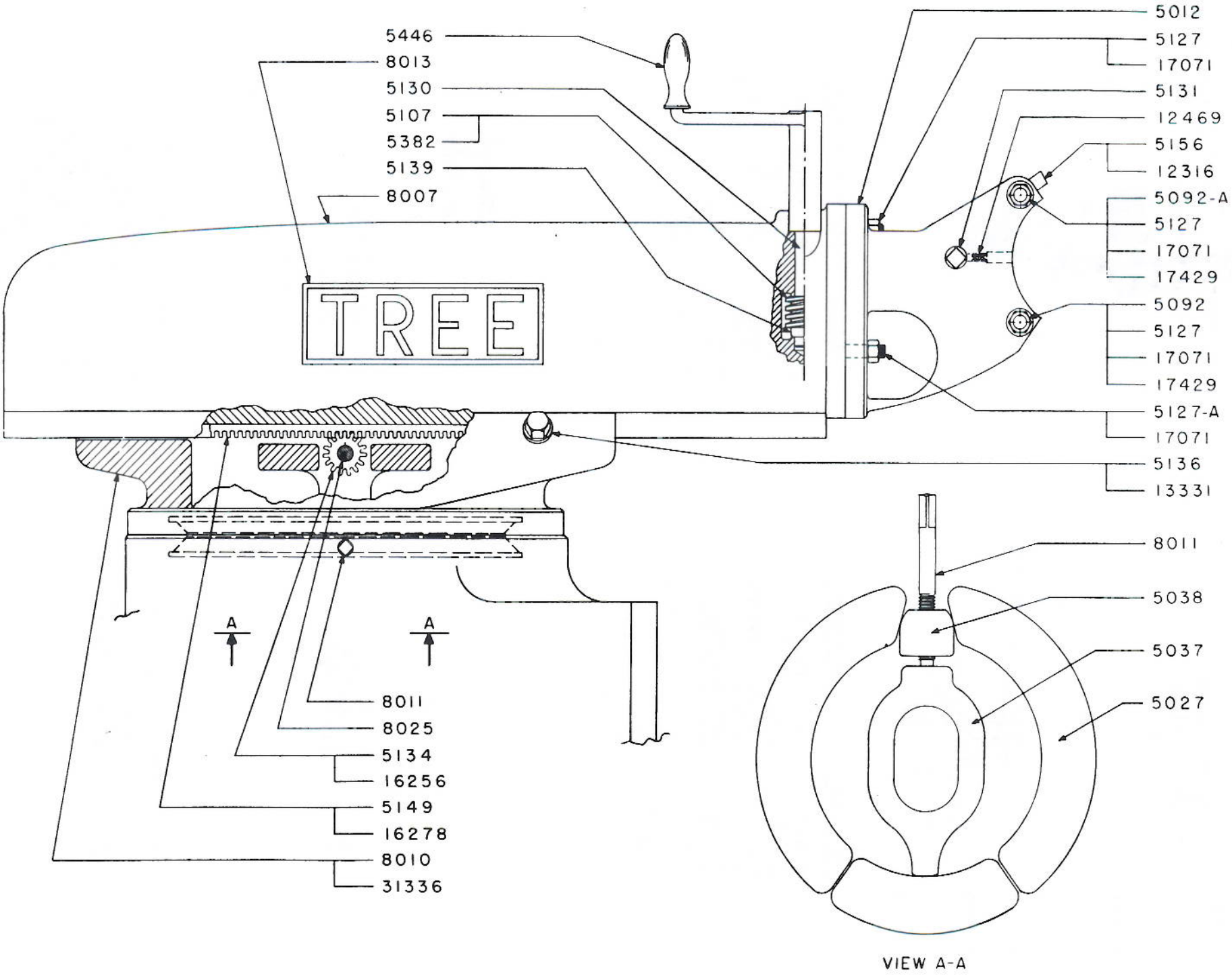
1960 SPEED SELECTOR IDLER GEAR ASSY

M-1513	IDLER GEAR
M-1607	THRUST BEARING
M-1608	NEEDLE BEARING



1953 SPEED SELECTOR CRANK ASSY

M-1520	SHIFTER BUSHING
M-1547	SELECTOR PLUNGER
U-4042	PLUNGER SPRING
1952	SHIFTER LINK ASSY
5088	SELECTOR CRANK
5096	SELECTOR HANDLE
12336	SOC FLAT HD SCREW
16218	SPRING PIN
16225	SPRING PIN
18109	"O" RING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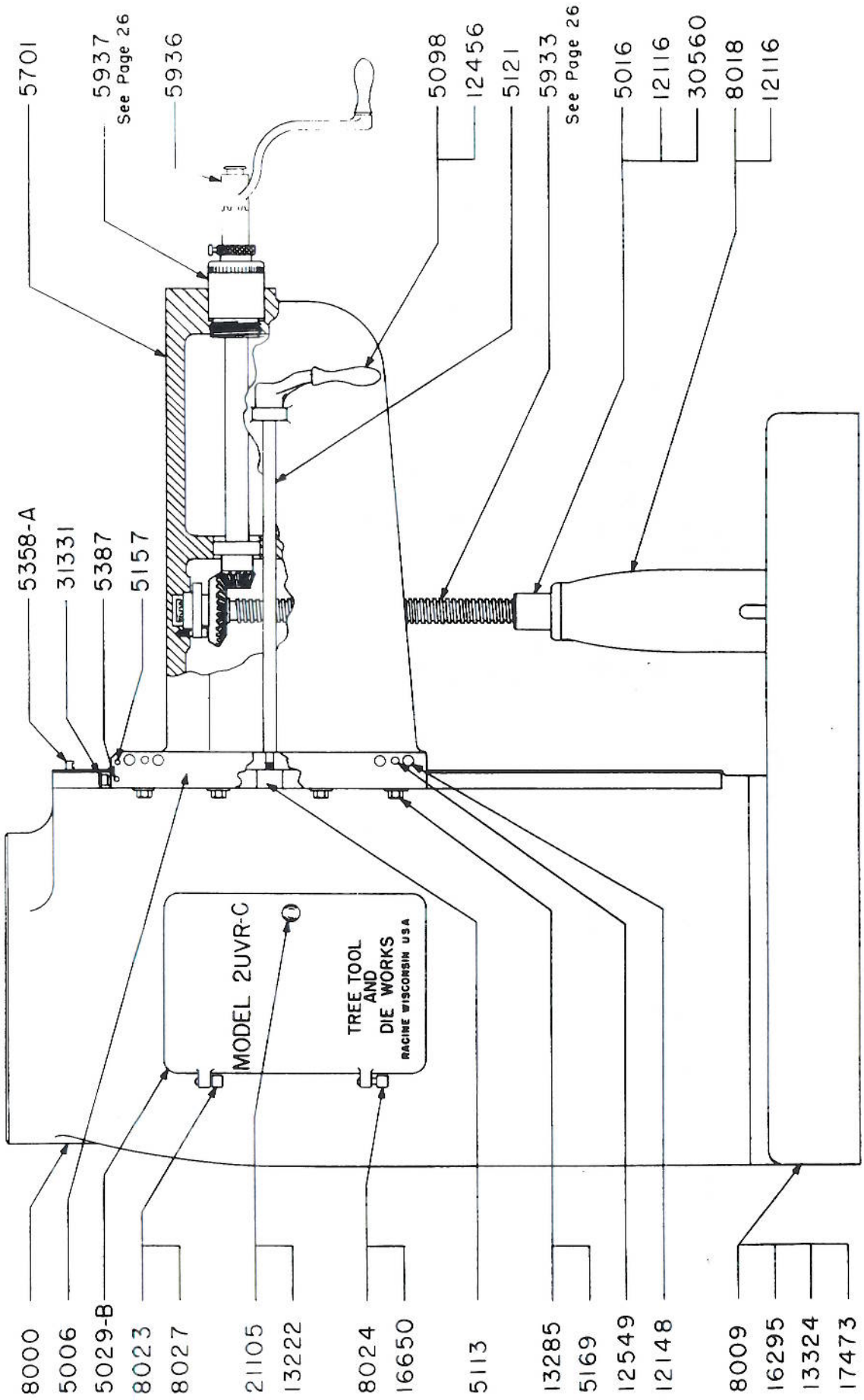
8013
5130
5107
5382
5139
8007
TREE
5012
5127
17071
5131
12469
5156
12316
5092-A
5127
17071
17429
5092
5127
17071
17429
5127-A
17071
5136
13331
A
A
8011
8025
5134
16256
5149
16278
8010
31336
8011
5038
5037
5027
VIEW A-A

PARTS LIST

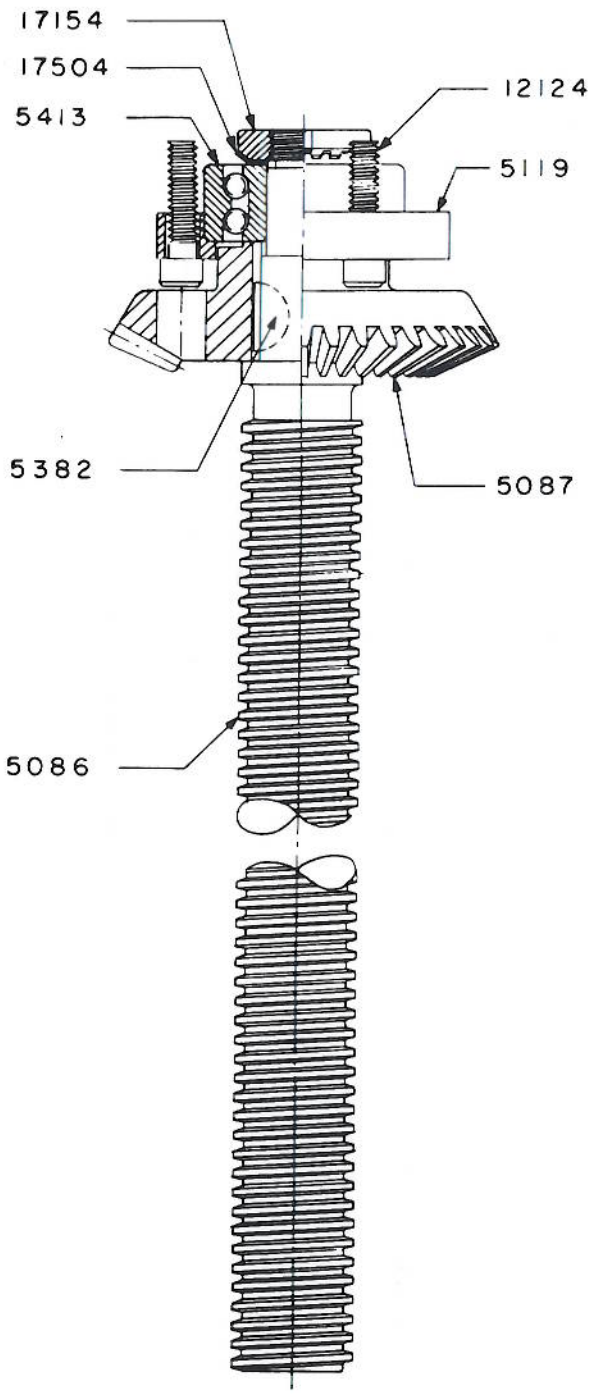
5012	Ram and Head Adapter
5027	Ram Saddle Lock Ring (3 pieces)
5037	Thrust Bar
5038	Lock Segment
5092	Adapter Track Bushing
5092-A	Adapter Track Bushing tapped
5107	Ram Safety Worm
5127	Adapter Bolt 1 3 4
5127-A	Adapter Bolt 1 15 16
5130	Ram Safety Wormshaft
5131	Head Safety Pinion
5134	Ram Adjusting Pinion
5136	Saddle Washer
5139	Worm Spacer
5149	Ram Adjusting Rack
5156	Zero Line Marker
5382	Woodruff Key
5446	Crank Handle
8007	Ram
8010	Ram Saddle - Low
8011	Lock Segment Screw
8013	Tree Nameplate
8025	Ram Adjusting Pinion Shaft
12316	Soc. Flat Head Screw 6-32 x 3 4
12469	Soc. Set Screw 1 4-20 x 5 8
13331	Hex Head Screw 5 8-11 x 3
16256	Spring pin 3 16 x 1
16278	Spring pin 1 4 x 3 4
17071	Hex Full Nut 1 2-13
17429	Washer 17 23 ID
31336	Oiler 324 Gits


5701
5937
See Page 26
5936
5098
12456
5121
5933
See Page 26
5016
12116
30560
8018
12116
5358-A
31331
5387
5157
MODEL 2UVR-C
TREE TOOL AND DIE WORKS
RACINE WISCONSIN U.S.A.
8000
5006
5029-B
8023
8027
21105
13222
8024
16650
5113
13285
5169
12549
12148
8009
16295
13324
17473

PARTS LIST

5701	Square Way Knee	8000	Column	
5006	Knee Adj. Gib	8009	Column Base	
5016	Elevating Screw Nut	8018	Knee Post	
5029-B	Column Door	8023	Door Hinge Upper	
5098	Knee Lock Handle	8024	Door Hinge Lower	
		8027	Door Spring	
5113	Knee Lock Block			
5121	Knee Lock Shaft	12116	Soc. Head Screw	5/16-18 x 5/8
5157	Oil Plug	12148	Soc. Head Screw	3/8-16 x 1
5169	Knee Bolt Washer	12456	Soc. Head Set Screw	1/4-20 x 5/16 D.P.
		12549	Soc. Head Set Screw	7/16-20 x 3/4 O.P.
5358-A	Dowel Pin	13222	Hex Head Screw	5/16-24 x 5/8
5387	Felt Plug	13285	Hex Head Screw	1/2-13 x 1 5/8
		13324	Hex Head Screw	5/8-11 x 1 3/4
*5933	Knee Elevating Screw Assy.	16295	Spring Pin	1/2 x 1 3/4
5936	Knee Elevating Crank Assy.	16650	Round Head Rivet	
*5937	Knee Elevating Shaft Assy.	17473	Lock Washer	5/8
		21105	Ball Handle 1" dia	5/16-24
		30560	Grease Fitting	#1681 Alemite
		31331	Oiler	#5302 Gits

* SEE PAGE 26 for ASSEMBLY PARTS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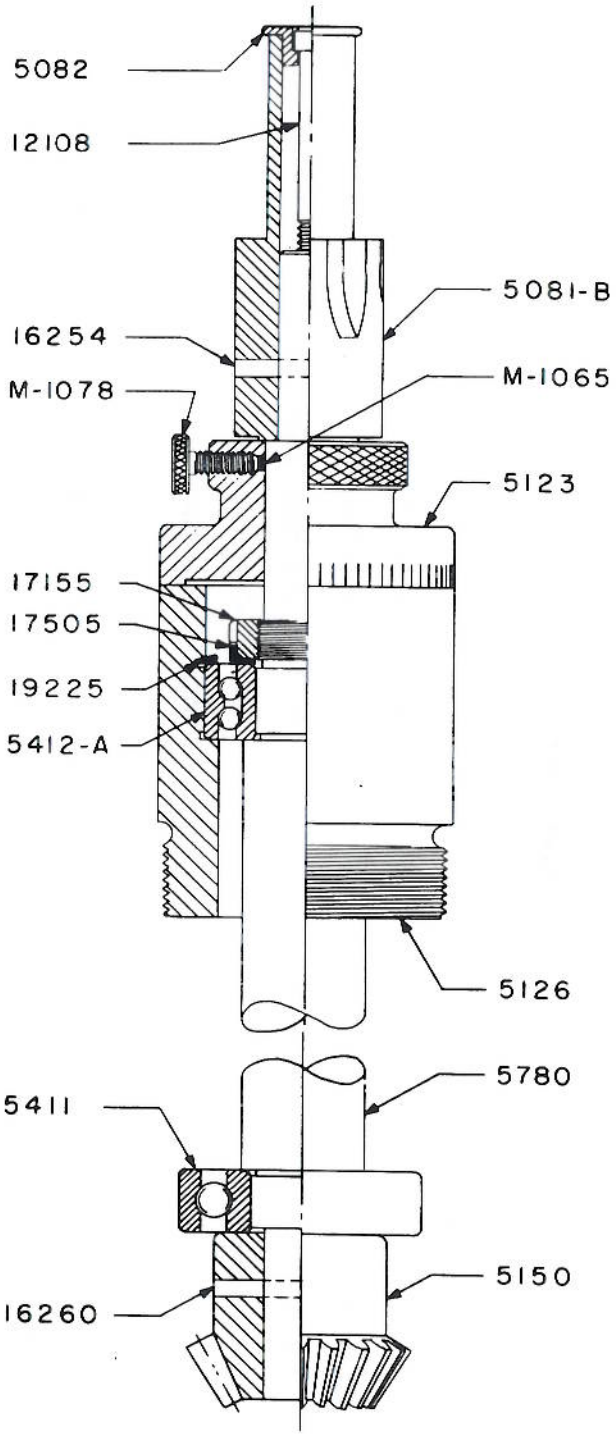
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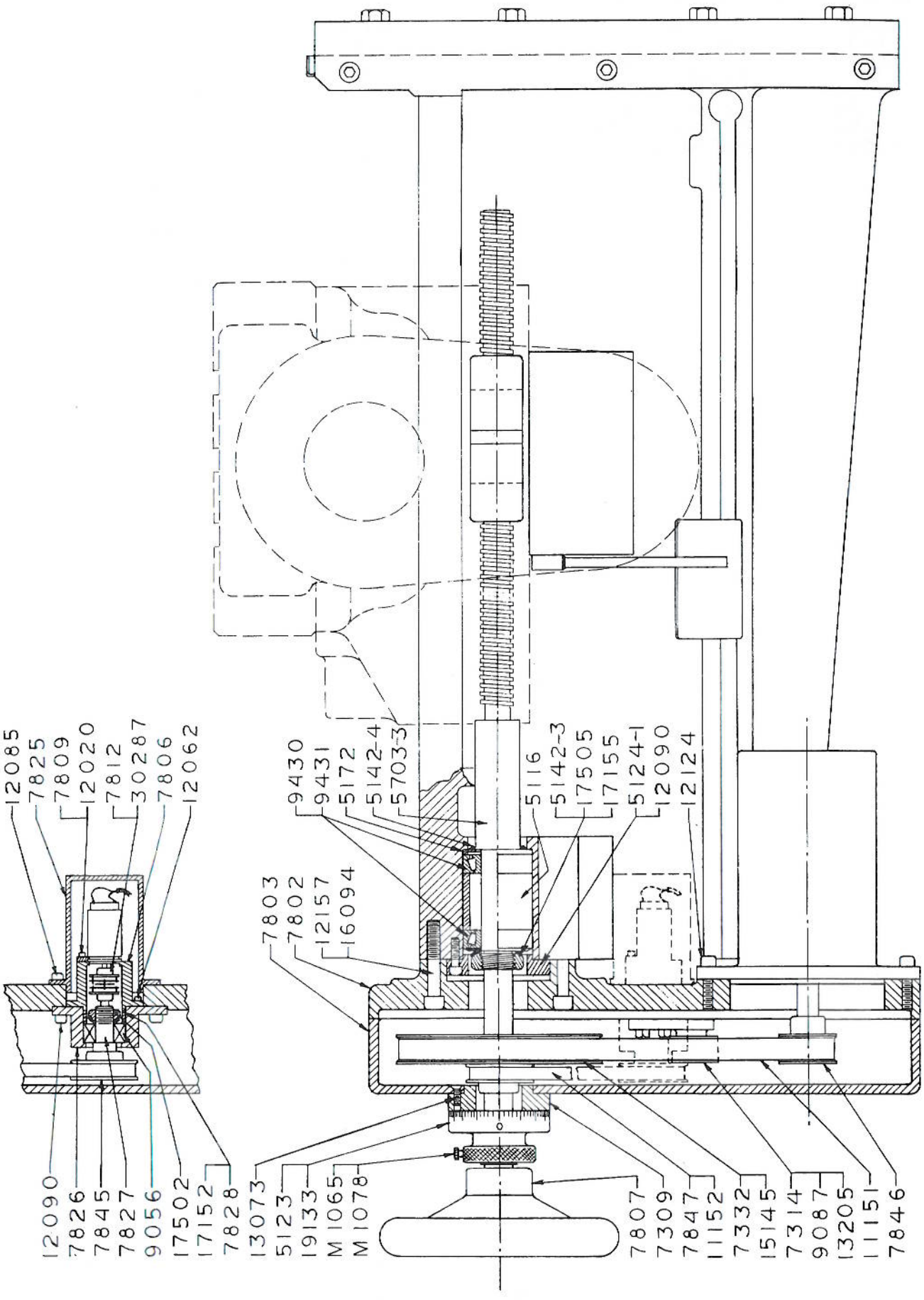
12108
5081-B
16254
M-1065
M-1078
5123
17155
17505
19225
5412-A
5126
5780
5411
5150
16260

5933 KNEE ELEVATING SCREW ASSY

5086	ELEVATING SCREW
5087	BEVEL GEAR
5119	RETAINER PLATE
5382	WOODRUFF KEY
5413	BEARING
12124	SOC HD CAP SCREW
17154	BEARING LOCKNUT
17504	BEARING LOCKWASHER

5937 KNEE ELEVATING SHAFT ASSY

M-1065	RETAINER PLUG
M-1078	LOCK SCREW
5081-B	CRANK CLUTCH
5082	RETAINING CAP
5123	SCREW DIAL
5126	BEARING HOUSING
5150	BEVEL GEAR
5411	BEARING
5412-A	BEARING
5780	ELEVATING SHAFT
12108	SOC HD CAP SCREW
16254	SPRING PIN
16260	SPRING PIN
17155	BEARING LOCKNUT
17505	BEARING LOCKWASHER
19225	RETAINING RING


12085
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12020
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7806
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9431
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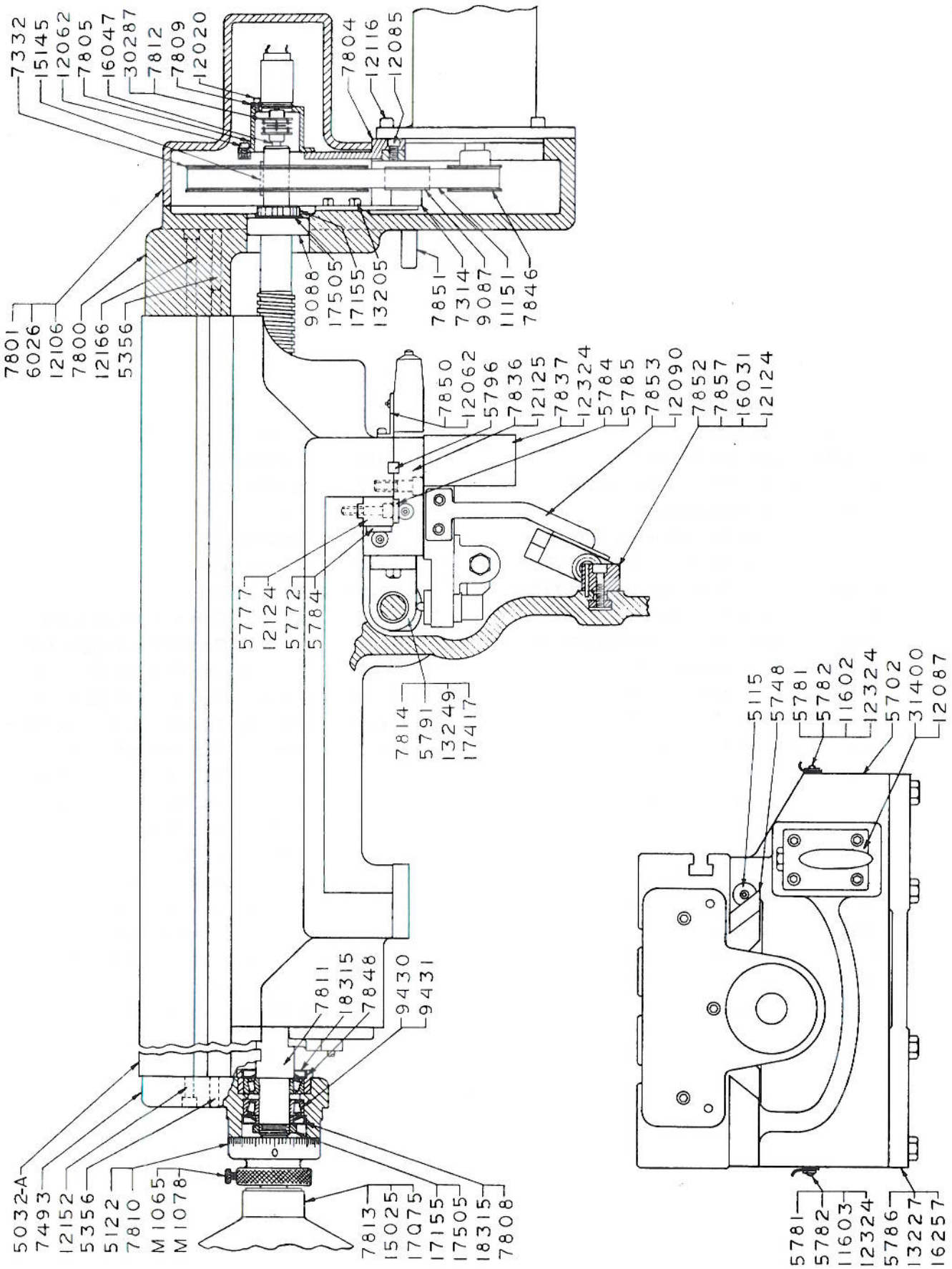
5142-4
5703-3
5116
5142-3
17505
17155
5124-1
12090
12124
7803
7802
12157
16094
12090
7826
7845
7827
9056
17502
17152
7828
13073
5123
19133
M1065
M1078
7807
7309
7847
11152
7332
15145
7314
90887
13205
11151
7846

2UVR-C JOURNEYMAN

KNEE

M-1065	Brass Plug
M-1078	Retaining Screw
5116	Knee Cross Feed Bearing Spacer
5123	Dial-100 Graduation
5124-1	Cross Feed Bearing End Plate
5142-3	Cross Feed Bearing Seal-Rear
5142-4	Cross Feed Bearing Seal-Front
5172	Cross Feed Bearing Retainer
5703-3	Extended Cross Feed Screw
7309	Cross Feed Dial Spacer
7314	Belt Tightener Bracket
7332	Timing Pulley-48T
7802	Y-Axis Motor Support
7803	Y-Axis Motor Support Corer
7806	Y-Axis Resolver Housing
7807	Handwheel
7809	Resolver Mounting Clips
7812	Flexible Coupling Bushing
7825	Y-Axis Resolver Housing Cover
7826	Y-Axis Resolver Bearing Housing
7827	Y-Axis Resolver Shaft
7828	Y-Axis Resolver Shaft Bearing Spacer
7845	Timing Pulley-28T
7846	Timing Pulley-12T
7847	Timing Pulley-28T
9056	Ball Bearing
9087	Ball Bearing
9430	Timken Cone
9431	Timken Cup
11151	Timing Belt
11152	Timing Belt
12020	Soc. Hd. Cap Scr. #6-32 x 1/4
12062	Soc. Hd. Cap Scr. #10-32 x 3/8
12085	Soc. Hd. Cap Scr. 1/4-20 x 1/2
12090	Soc. Hd. Cap Scr. 1/4-20 x 3/4
12124	Soc. Hd. Cap Scr. 5/16-18 x 1 1/4
12157	Soc. Hd. Cap Scr. 3/8-16 x 2
13073	Sltd. Flt. Hd. Scr. #10-32 x 3/8
13205	Hex Hd. Cap Scr. 1/4-20 x 3/4
15145	Square Key 3/16 x 1 1/4
16094	Dowel Pin 3/8 x 2
17152	Bearing Locknut N-02
17155	Bearing Locknut N-05
17502	Bearing Lockwasher W-02
17505	Bearing Lockwasher W-05
19133	Tru-Arc Ring
30287	Resolver Coupling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7850
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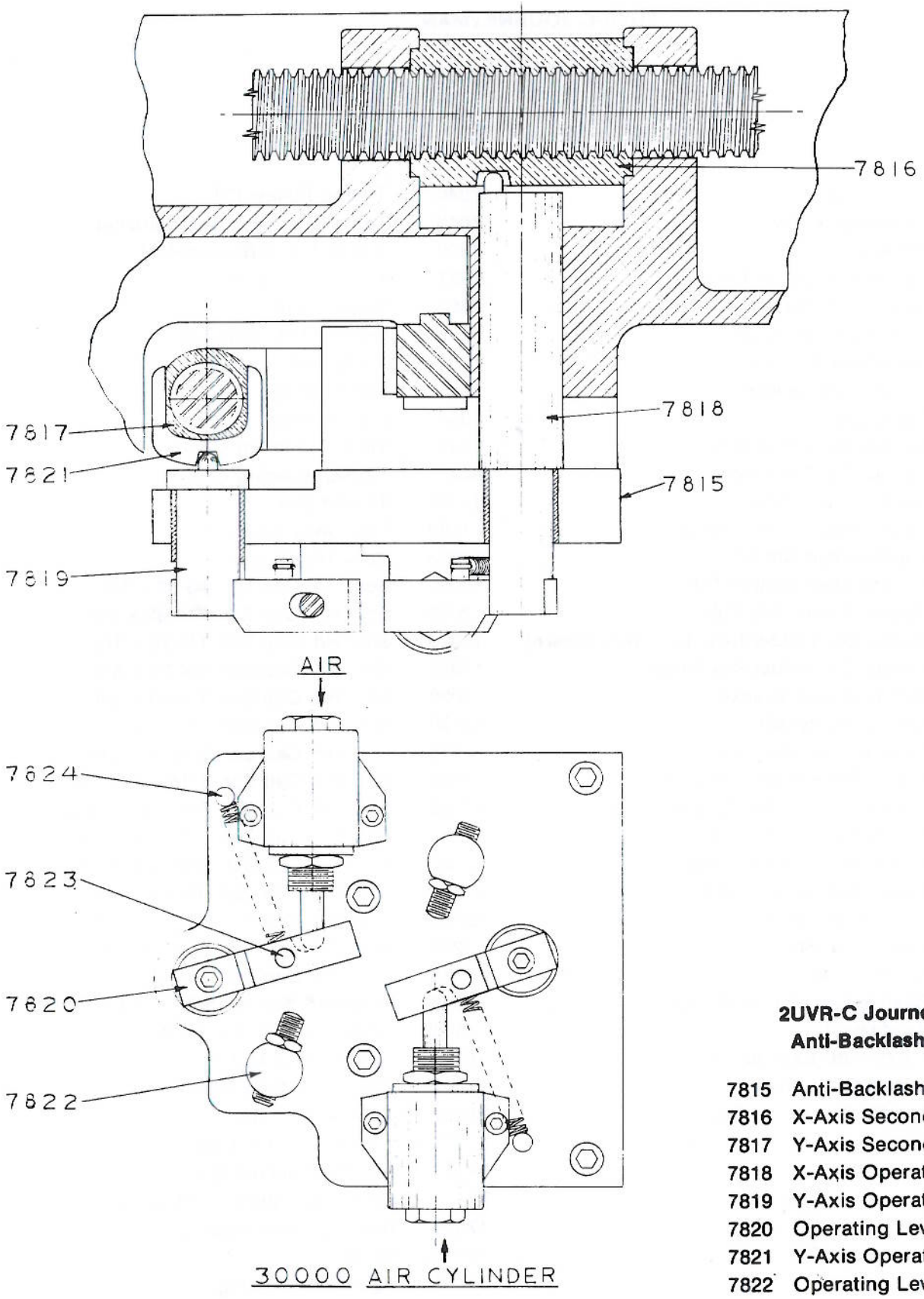
5781
5782
11602
12324
5702
31400
12087
5781
5782
11603
12324
5786
13227
16257

TABLE & SADDLE

M-1065	Brass Plug
M-1078	Retaining Screw
5032-A	Table 48"
5115	Saddle Gib Screw-Long
5115-A	Saddle Gib Screw-Short (Not Shown)
5122	Dial-200 Graduation
5356	Dowel Pin 5/16 x 2
5702	Square Gib Saddle
5748	Table Gib
5772	Square Knee Side Gib
5777	Square Gib Knee Key
5781	Square Knee Wiper
5782	Square Knee Wiper Insert
5784	Square Knee Gib Scr.
5785	Square Knee Bottom Gib
5786	Square Saddle Flat Gib
5795	Saddle Gib Holder Key-Rear (Not Shown)
5796	Saddle Gib Holder Key-Front
7314	Belt Tightener Bracket
7332	Timing Pulley-48T
7493	Table End Bracket-L.H.
7800	X-Axis Drive Motor Support
7801	X-Axis Drive Motor Support Cover
7804	X-Axis Resolver Housing Plate
7805	X-Axis Resolver Housing
7808	X-Axis Seal & Bearing Spacer
7809	Resolver Mounting Clip
7810	X-Axis Dial Spacer
7811	Table Screw
7812	Flexible Coupling Bushing
7813	Handwheel
7814	Y-Axis Anti-Backlash Feed Nut
7836	Saddle Gib Holder
7837	Anti-Backlash Unit Guard
7846	Timing Pulley-12T
7848	Table Bearing & Seal Retainer
7850	X-Axis Micro Bracket-L.H.
7851	X-Axis Stop-R.H.
7852	Y-Axis Stop
7853	Y-Axis Micro Bracket
7857	T-Slot Nut
9087	Ball Bearing
9088	Ball Bearing
9430	Timken Bearing Cone
9431	Timken Bearing Cup
11151	Timing Belt
11602	Front Way Cover
11603	Back Way Cover
12020	Soc. Hd. Cap Scr. #6-32 x 1/4
12062	Soc. Hd. Cap Scr. #10-32 x 3/8
12085	Soc. Hd. Cap Scr. 1/4-20 x 1/2
12087	Soc. Hd. Cap Scr. 1/4-20 x 5/8
12090	Soc. Hd. Cap Scr. 1/4-20 x 3/4
12106	Soc. Hd. Cap Scr. 1/4-20 x 2 1/4
12116	Soc. Hd. Cap Scr. 5/16-18 x 3/4
12124	Soc. Hd. Cap Scr. 5/16-18 x 1 1/4
12125	Soc. Hd. Cap Scr. 5/16-18 x 1 1/2
12152	Soc. Hd. Cap Scr. 3/8-16 x 1 1/2
12166	Soc. Hd. Cap Scr. 3/8-16 x 3 1/2
12324	Soc. Bttn. Hd. Scr. #8-32 x 1/2
13205	Hex. Hd. Cap Scr. 1/2-20 x 3/4
13227	Hex. Hd. Cap Scr. 5/16-18 x 1
13249	Hex. Hd. Cap Scr. 3/8-16 x 1 1/4
15025	Woodruff Key #8 (5/32 x 3/4)
15145	Square Key 3/16 x 1 1/4
16031	Dowel Pin 3/16 x 1 1/2
16047	Dowel Pin 1/4 x 7/8
16257	Sel-lok Pin 3/16 x 1 1/4
17075	Hex Jam Nut 1/4-20
17155	Bearing Locknut N-05
17417	Clamp Belt Washer-13/32 ID.
17505	Bearing Lockwasher W-05
18315	Oil Seal
30287	Resolver Coupling
31400	Lubricating Pump



2UVR-C Journeyman
Anti-Backlash Unit

7815	Anti-Backlash Base Plate
7816	X-Axis Secondary Nut
7817	Y-Axis Secondary Nut
7818	X-Axis Operating Shaft
7819	Y-Axis Operating Shaft
7820	Operating Lever
7821	Y-Axis Operating Yoke
7822	Operating Lever Stop Block
7823	Return Spring Lever Pin
7824	Return Spring Base Pin
30000	Air Cylinder