



*The*

# TREE

**MODEL 2UVR-C**

**VERTICAL  
MILLING MACHINE**



## **INSTRUCTIONS**

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# 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 with heavy lag screws.

## IV ELECTRICAL CONNECTIONS

The Mill is shipped with all electrical equipment wired for the current characteristics specified on your order. The electrical panel contains a magnetic starter for the spindle motor, a magnetic starter for the feed motor, one for the coolant system (if ordered with the machine for factory installation), and magnetic contactor for knee elevating unit (if ordered with the machine for factory installation).

Connect the power supply to the line terminals of the spindle motor starter. Check operation of both spindle and feed motors. The spindle should rotate right-hand when the switch is turned to "FORWARD".

**THE FEED MOTOR MUST RUN IN THE DIRECTION INDICATED BY ARROW ON MOTOR HOUSING.** Check direction by observing rotation – COUNTER CLOCKWISE – through window in housing. If at any time the feeds or rapid-traverse fail to function, check motor rotation before looking for trouble elsewhere.

## V 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; table screw and nut; table feed gearing and lever. One pull each day of operation.
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. Oil filler for feed gear box - Splash system lubricates entire gear box. Maintain oil level to be visible in filler glass. Change oil and flush with flushing oil or kerosene after first week of operation, and ever six months thereafter. Fill with Citgo Pacemaker #30 or equivalent.
13. Knee elevating screw fitting - Grease weekly with Citgo Premium Lithium #2 or equivalent.
14. Oil Drain plug (not shown)

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.

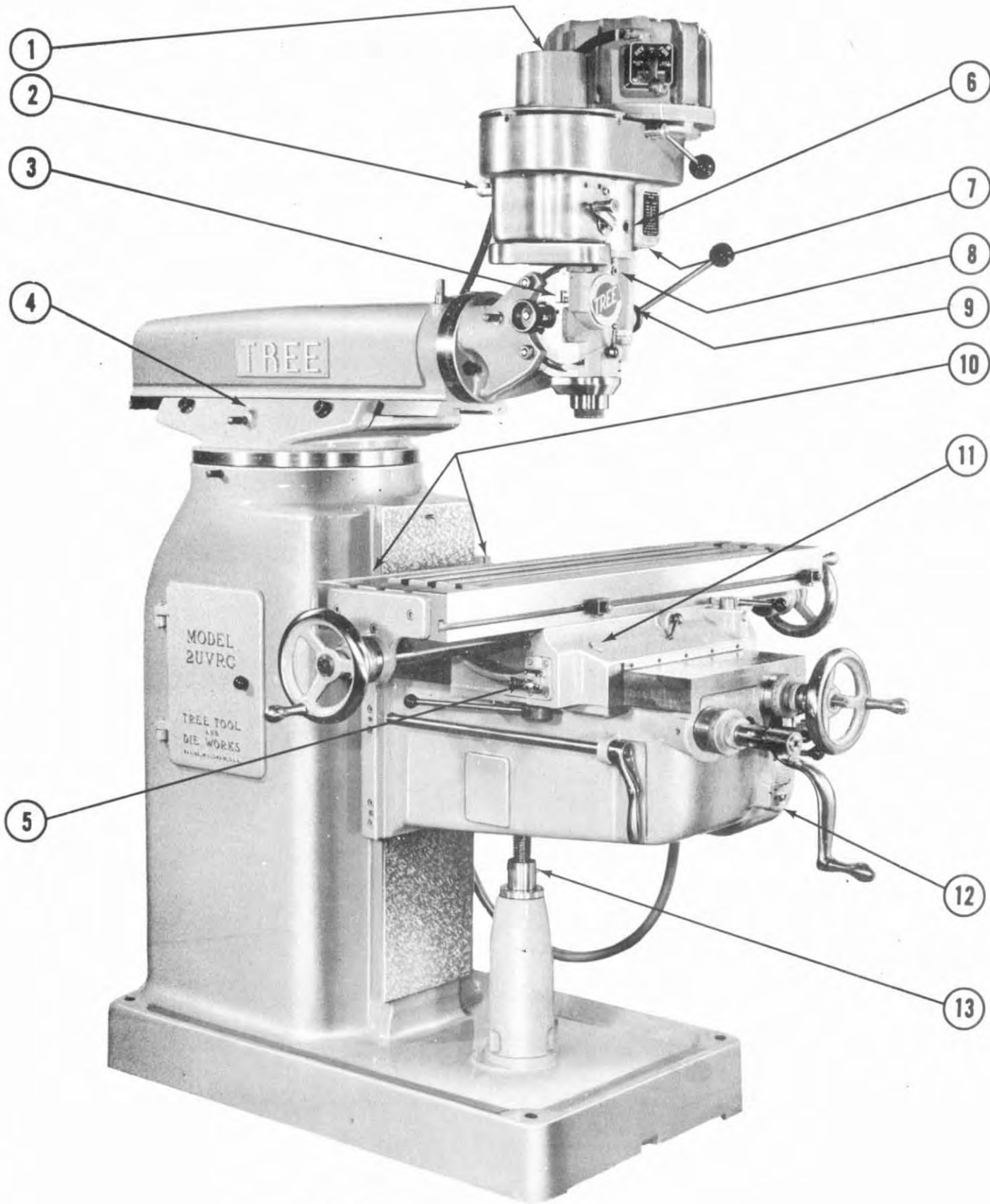


Fig. 1

VI 2UVR-C MILLING MACHINE

NOMENCLATURE

- |                                      |                                |                                  |
|--------------------------------------|--------------------------------|----------------------------------|
| 1. Head Angular Adj. Clamp Bolts (4) | 17. Collet Closer Yoke         | 32. Spindle Speed Plate          |
| 2. Spindle Power Feed Clutch Knob    | 18. Collet Closer Adj. Nose    | 33. Spindle Variable Speed Knob  |
| 3. Head Adapter Worm Adj. Shaft      | 19. Elevating Graduated Dial   | 34. Graduated Dial Lock Screw    |
| 4. Head Angular Adj. Gear Shaft      | 20. Elevating Dial Lock Screw  | 35. Hand Feed Graduated Dial     |
| 5. Ram Clamp Bolts (2)               | 21. Elevating Crank Handle     | 36. Micrometer Dial Lock Screw   |
| 6. Ram Gear Adj. Shaft               | 22. Knee Lock Handle           | 37. Head Adapter Clamp Bolts (3) |
| 7. Turret Clamping Shaft             | 23. Spindle Speed Range Lever  | 38. Power Control Box            |
| 8. Bijur Lubricating Pump            | 24. Quill Feed Indicator       | 39. Table Hand Feed Handle       |
| 9. Saddle Lock Lever                 | 25. Depth Stop Micrometer Dial | 40. Table Graduated Dial         |
| 10. Spindle Motor                    | 26. Table Adj. Stop            | 41. Feed Selector Dial           |
| 11. Motor Reverse Switch             | 27. Table Lock Handle          | 42. Cross Feed Adjustable Stops  |
| 12. Spindle Brake                    | 28. Table Feed Engage Lever    | 43. Rapid Traverse Lever         |
| 13. Spindle Drive Adj. Access Plug   | 29. Cross Feed Handle          | 44. Table Feed Motor             |
| 14. Hand Feed Handle                 | 30. Cross Feed Dial Lock Screw | 45. Table Feed Selector Handle   |
| 15. Quill Power Feed Adj. Ring       | 31. Cross Feed Graduated Dial  | 46. Cross Feed Engage Lever      |
| 16. Quill Lock Handle                |                                |                                  |

NOTE: SEE PARTS SECTION PAGE 11 FOR ORDERING PARTS

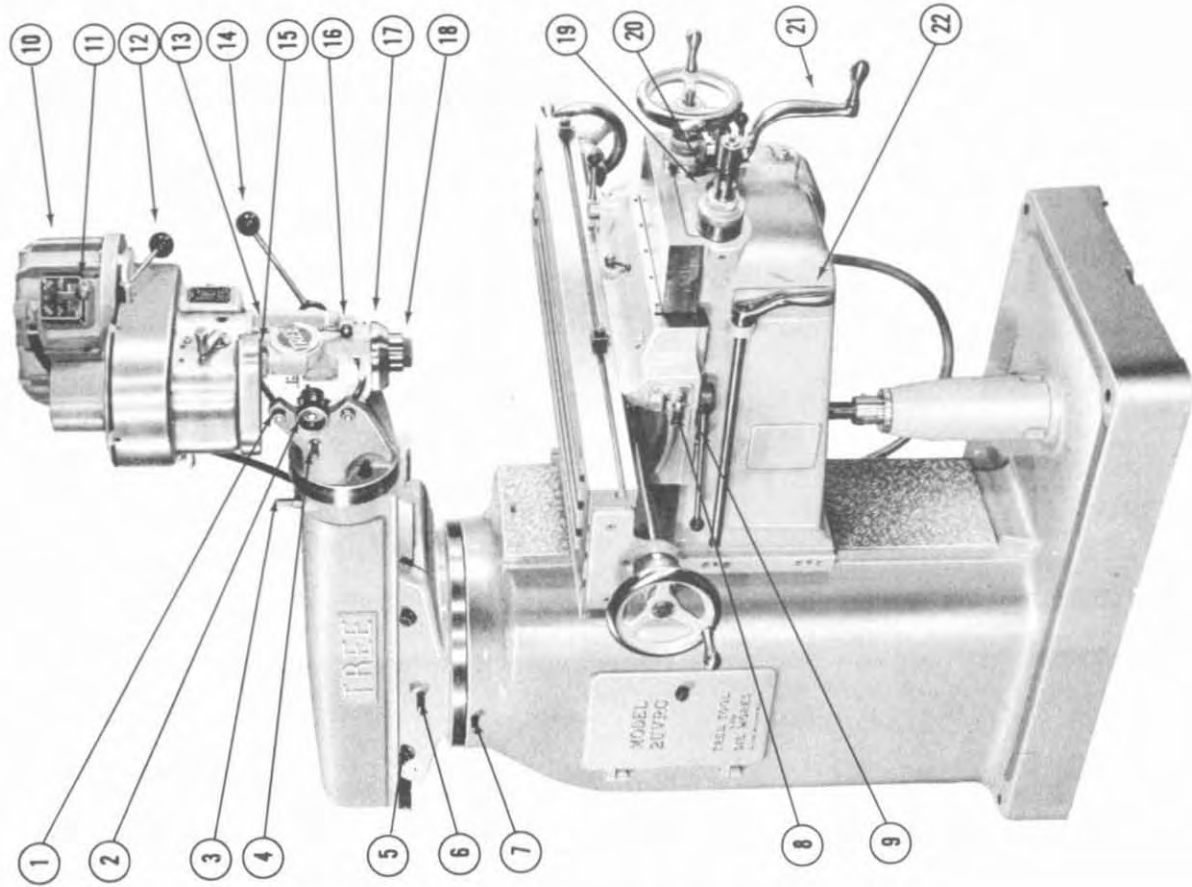
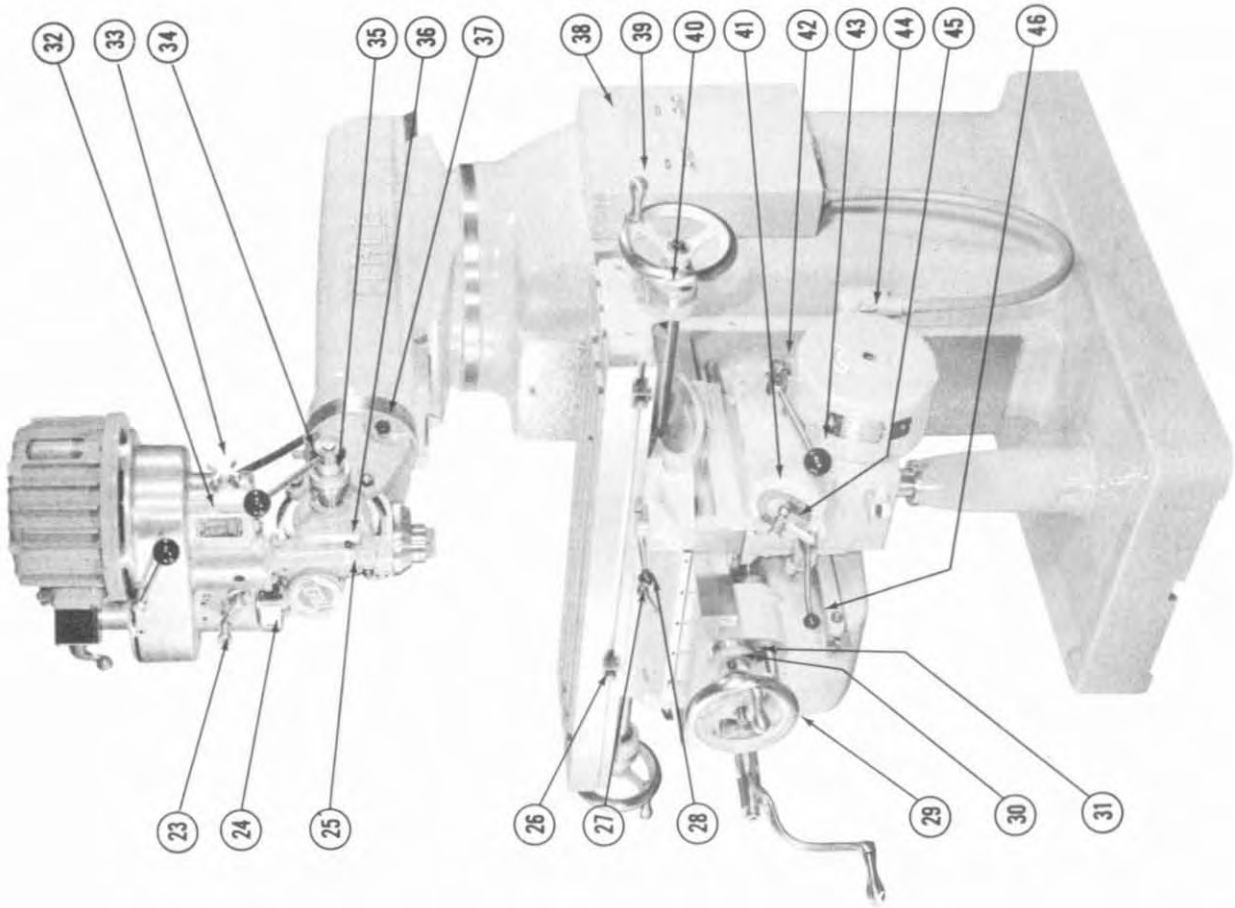


Fig. 2

## VII 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.

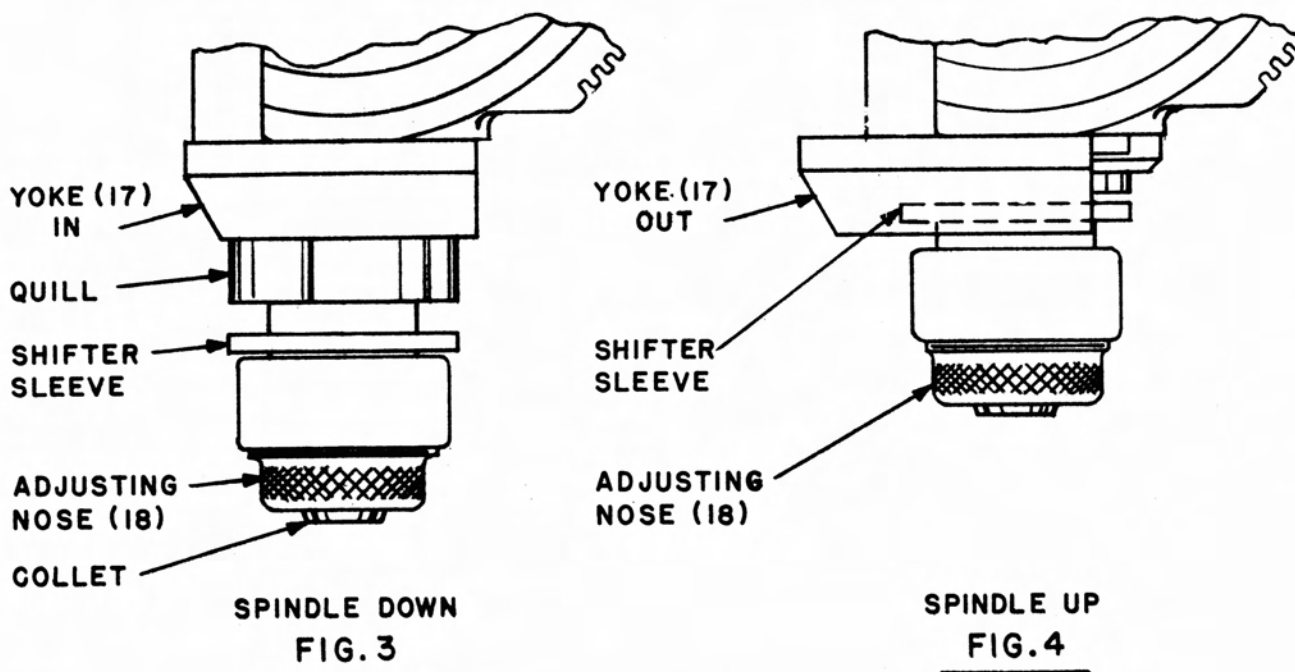
### 1. UNIVERSAL HEAD (Motor instructions will be found in section X)

- A. Changing speeds - spindle speeds are variable, adjusted by knob (33). 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 (32) to obtain desired range.

CAUTION - SPEED KNOB (33) 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.



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 it 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 (36). 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 (35) 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 across 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 (37). 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. TABLE HAND AND POWER FEED

- A. The table screw has a 5 pitch acme thread and is hardened and ground for long life. Hand-wheels (39) are provided at each end together with movable dials (40).
- B. The power feed is obtained through a gear box driven by an individual motor (44). Nine rates of feed are provided and indicate in inches/min. by dial (41). The rate of feed can be changed at any time the gear box motor is in operation whether the table is feeding or not. Changing the rate of feed is done by crank (45). One turn in either direction brings into operation another rate of feed.

The rapid traverse to the table is operated by lever (43). The rate of travel is approximately 70 inches/min.

The table feed is engaged by directional lever (28). Two adjustable stops (26) are provided to limit the feed in both directions. The stops are constructed so that after stopping the table feed the table can be hand fed or rapid traversed beyond the stops without having to move the stops. The ball handle on the feed lever is pushed in the direction to be fed. When the table is feeding, the rapid traverse can operate at any time by pulling up on lever (43) and holding as long as the rapid feed is desired. When released, this lever drops out of rapid traverse and the table is again feeding.

An Overload device is provided in the feed gear train to protect the gears if an obstruction is encountered when the table feed is in operation. This device is evidenced by a clicking noise which stops when the obstruction is no longer contacted. The feed automatically returns to normal operation.

NOTE: Should the rapid traverse and feeds fail to operate, check direction of feed motor rotation as the first step in determining the source of trouble.

Table lock (27) is provided to hold the table in position for drilling and boring operations.

#### 5. SADDLE HAND AND POWER FEED

- A. The saddle cross feed screw has a five pitch acme thread and is operated by handwheel (29) together with movable dial (31) graduated in thousandths.
- B. The power feed is driven and has the same operating characteristics as that described for table power feed. The saddle feed is engaged by lever (46) and is limited by adjustable stops (42).

Saddle lock (27) is provided to hold the saddle in position for drilling or boring operations.

#### 6. KNEE

The knee is raised and lowered by crank handle (21). Movable dial (19) is graduated in thousandths.

The knee is held in position by the lock handle (22).

# MODEL 2UVR-C VERTICAL MILLING MACHINE DIMENSIONAL DRAWING

