CLEEREMAN
co-ordinate
DBM Machine

Instruction and Parts Manual

Chas. G. Allen Co., Inc.
25 Williamsville Road
Barre, MA 01005

Telephone: (978) 355-2911 Fax: (978) 355-2917

INTRODUCTION

This manual is designed to assist you in using your Cleereman machine tool.

It is a handbook for the operator, service department, shop foreman, plant engineer, master mechanic, methods and processing department and tool design personnel.

The following pages give details covering installation, lubrication, operation and care of the machine. Instructions, supplemented by drawings and parts lists, are included for your guidance in disassembling the components of the machine and identifying parts.

Your machine was work-tested and performed actual drilling; it was adjusted for accuracy, alignments and proper operation before being shipped to you. Cleereman design and manufacture assures long, reliable machine life; however, should natural wear or accidental damage cause a stoppage, the procedures outlined herein will be a definite help in accomplishing quickly and accurately any repair work which may be necessary.

Cleereman Machine Tool Division keeps a record by serial number of each machine built. To insure prompt and efficient service, include the serial number of your machine with any inquiry or parts order. The serial number will be found at the bottom of the sliding head way.

A Cleereman Machine Tool is precision equipment - keep it clean and well lubricated and it will render efficient service for many years.

Study this manual and keep it for future reference. Additional copies are available upon request.

INDEX

UNCRATING AND SETTING UP

1. Remove the crating but be careful to save any small boxes which may be attached. They contain important parts of the machine. The skids should remain attached to the machine until it has been moved to its permanent location or under a crane. Lift the machine. On DBM II models, install four eye bolts (not furnished) in the holes at each corner on top of the base and use these for lifting the machine. On DBM I models, slide a rod through the hole in the side of the column and use the bar, with additional hooks with slings to the front of the base, to lift the machine.

2. Cleereman Upright Drills have a large base in proportion to their size and weight so they may be located on any good floor. However, it is well to remember that the more solid the foundation, the less trouble there will be from vibration and distortion and the more accurate will be the results. If machines are to be placed on balconies or upper floors, place the machines as near to a pillar or supporting wall as possible.

3. It is recommended that all machines be bolted down but if the machine is placed on a rigid floor with little or no vibration it is not necessary to bolt the machine down.

4. Remove the blocking which holds the counterweight inside the column.

CAUTION

Do not move the spindle up before removing blocking because of the possibility of getting the counterweight chain off the sheaves.

5. Carefully, remove all slushing compound from the spindle, quill, table and ways. Use new clean kerosene and clean rags free from lint. Use a stiff bristle brush to get into corners. Do not use an air hose for cleaning because air pressure will drive grit and dirt into bearing surfaces.

6. All machines are normally shipped completely wired and ready to connect to the line. Connect the wires to the proper terminals of the magnetic switch as indicated on the diagram in the switch cover. The connections should be such that pushing the starting lever on the left side of the head down will cause the spindle to rotate right hand or ready to drive a drill or right hand tap.

7. Fill transmission head and sliding head with oil and oil machine at all oil hole covers on sliding head and table before operating machine under power. See instruction plate on machine and lubricating instructions in this book for full details.

8. All sliding ways including sliding head ways on the column and quill bearing in sliding head have been scraped to a very close fit, in fact almost metal to metal contact. **All the gibs have been set quite tight, consequently the machine will operate a little stiffly for the first few weeks. Keep all these surfaces clean and well lubricated to prevent scoring.**

9. Keep screws for saddle and table movement well lubricated. **This machine is equipped with precision hardened and ground lead screws, so they should be oiled at least twice daily to avoid wear and thus keep their accuracy. Never attempt to move saddle or table when in their clamped positions, so as not to injure the precision screws.**

LUBRICATION

HEAD

Fill head with #30 industrial transmission oil up to the mark "Oil Level." The capacity of the head is about 4 quarts. The head should be drained, flushed and refilled once a year. Check the oil level once a week and replenish as necessary. The pressure gauge shows at a glance if head is being properly lubricated. Low pressure indicates low oil level or leak in the oil line; high pressure indicates a plugged oil line. If either of these conditions exist, investigate at once. Remove top cover to examine piping.

SLIDING HEAD

Fill feed worm gear case with a "worm gear oil" up to the mark "Oil Level." This requires about 2 quarts of oil. The worm gear case should be drained, flushed and refilled once a year. Check the oil level once a week and replenish as necessary.

SPINDLE

The spindle bearings are packed with a high grade ball bearing grease suitable for long service. Apply oil once a week to the splined driving end of the spindle, being sure to get oil on the sides of the splines.

SLIDING HEAD WAYS

The sliding head ways on the column and also the bearing for the spindle quill in the sliding head should be oiled once a day using a good grade of SAE 10 Mineral Oil (MIL-L-2104A). The same oil should also be used at the points listed below.

MISCELLANEOUS OIL CUPS

Oil these bearings daily by means of an oil can.

1. Two oil cups on top head; change gear selectors.
2. One oil cup above off-on lever.
3. Six oil cups on sliding head.
4. Counterweight chain – lubricate every week.

TABLE AND CARRIAGE WAYS

These ways are lubricated by a one-shot Bijur oiling system. The pump is located on the left, rear of the carriage. Operate the pump at the start of each shift (every 8 hours). Fill pump with Mobil Vactra No. 2 as necessary. Remove cover and check level in pump.

TABLE AND CARRIAGE TRANSMISSIONS

Add grease every six months through zerk fittings provided on the housings. These transmissions are filled with grease at the factory prior to shipment.

OPERATING INSTRUCTIONS

GENERAL

1. In general, it is better to increase the speed and use a lighter feed on all sizes of drills to obtain the maximum drill life (except in cast iron where a heavy feed is desirable).

2. In setting up a job, the first consideration is convenience of operation. Position sliding head with a drill in the spindle to suit. Always keep the spindle well up in the sliding head when setting up. Never attempt to do any heavy work with the spindle extended way down out of the sliding head. In other words, keep the sliding head down as close to work as possible to afford the best support for the spindle. This is especially important where accuracy and good finish are required.

3. Where drills with shanks smaller than No. 4 Morse Taper must be used, always use only one reducing sleeve. Multiple reducing sleeves tend to produce excessive runout.

4. Keep all drills properly ground. It is impossible to drill a clean accurate hole with a drill which is dull or improperly sharpened.

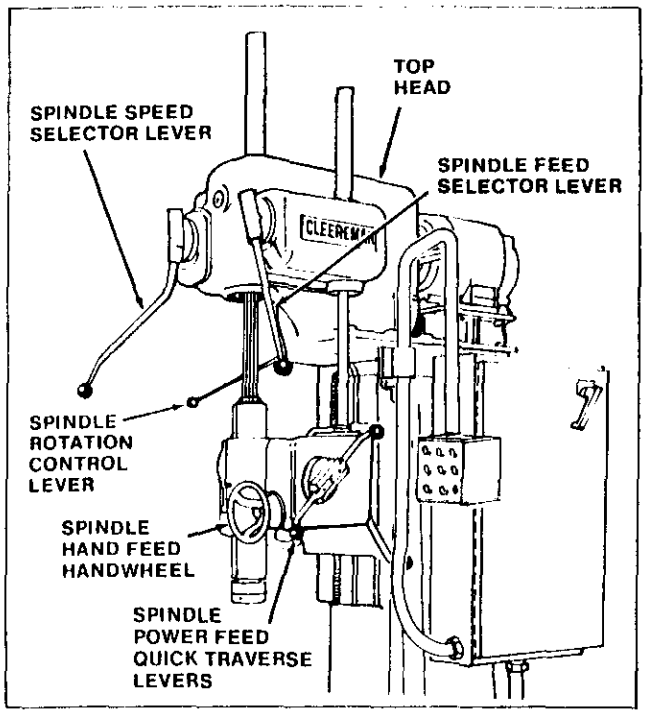


Figure 1. Location of Controls for Spindle Rotation, Spindle Speed and Spindle Feed

DIRECTION OF SPINDLE ROTATION (See Figure 1)

The rotation of the spindle is controlled by means of the spindle rotation control lever on the left side of the top head. The motor should be wired so that pushing the lever down causes the spindle to rotate clockwise. Lifting the lever up should reverse the spindle for backing out taps.

OPERATING SEQUENCE (See Figure 2)

1. Depress the "CONTROL ON" switch located on the pendant control to turn on power to the machine.

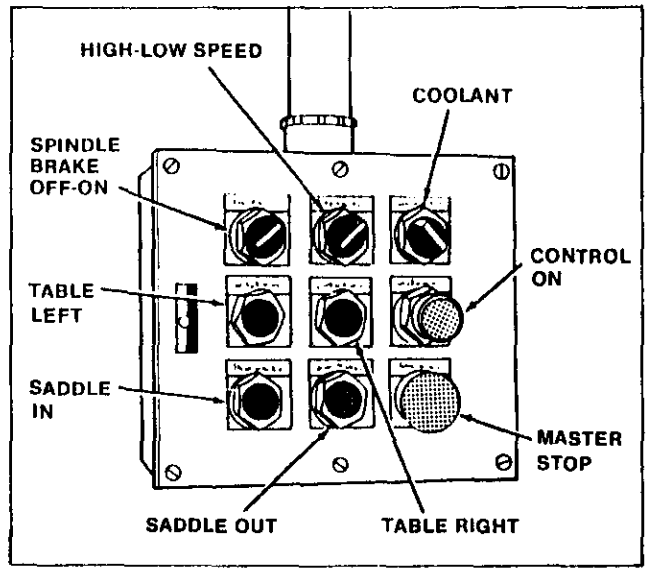


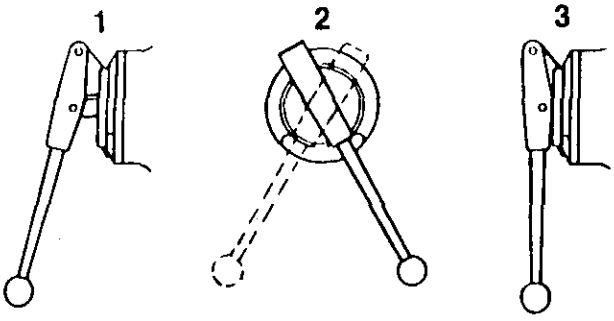
Figure 2. Pendant Controls

2. Turn on "COOLANT" switch on pendant control.

3. Turn "SPINDLE BRAKE" switch to "ON" position. This switch should be turned to "OFF" only when an indicator is to be used to check spindle or to manually rotate the spindle.

4. Turn "HIGH-LOW SPEED" selector switch, on pendant control, to spindle speed range desired. This switch can be operated when machine is running or not running.

5. Follow operating instructions in the following paragraphs.



1. Draw lever out as far as it will go. This does not shift gears but merely unlocks them.
2. Swing lever about its axis until pointer indicates desired speed or feed.
3. Thrust lever quickly all the way back to the normal position. This shifts the gears.

Figure 3. Changing Spindle Speeds or Feeds

CHANGING SPINDLE SPEEDS (See Figures 1 2 and 3)

To change speeds, pull outward on the spindle speed selector lever, swing to right or left until the arrow points at the desired speed and then thrust the lever all the way in toward the machine.

Thrusting the lever toward the machine shifts the gears, so this should be done with one strong quick motion.

It is always best to shut off the motor when changing speeds and it is also helpful to change speeds after the motor is shut off and the machine is coasting to a stop.

Any of the four lowest speeds may be selected while the machine is running idle.

We recommend that the eight highest speeds be selected only with the motor shut off (operating lever in neutral).

The speed chart, located below the spindle speed selector, indicates directly the proper speed for each drill size at a cutting speed of 80 feet per minute. The speeds indicated are generally suitable for soft tool or machinery steel and for cast iron. Somewhat slower speeds must be used when drilling alloy steels. Materials such as brass, aluminum and magnesium may be drilled at much higher speeds, a good average being 2½ to 3 times as fast as indicated on the chart. For additional information, see "Speed and Feed Changes - General".

FEED CHANGES (See Figures 1 and 3)

1. Feed changes may be made while the machine is running at idle.

2. To change feed, pull outward on the spindle feed selector lever and swing it to left or right until the arrow points to the desired feed.

3. Feeds shown on the chart are in thousandths of an inch per revolution of the spindle. In general, feeds should be from .005" to .007" for drills up to ½ inch; from .007" to .015" for drills from ½" to 1"; and from .015" to .020" for drills larger than 1 inch. For additional information see "Speed and Feed Changes - General."

SPEED AND FEED CHANGES – GENERAL

The speeds and feeds given above are for the average application and may vary considerably on any specific job. They are given as being a good starting point. If conditions are favorable, either the speed or the feed, or both, may be increased. Harder material may cause the drill to wear away too quickly or chip out on the cutting edges in which case the speed and the feed must be reduced. The speeds outlined are for high speed drills only and at these speeds and feeds, a good cutting lubricant is recommended.

For drills larger than 1½", horsepower requirements may be greater than the capacity of the motor, especially when drilling in steel. Obviously it will be necessary to reduce the speed and feed to stay within the capacity of the motor.

In general, it is better to increase the speed and use a lighter feed on all sizes of drills to obtain the maximum drill life (except in cast iron where a heavy feed is desirable).

POWER FEED

1. To engage the power feed, thrust either of the quick traverse (turnstile) levers outward or to the right (see Figure 4). A light thrust inward will disengage the power feed. It is not necessary to hold the power feed engaged, merely thrust out on the lever and then let it go. **DO NOT RIDE YOUR HAND ON THE QUICK TRAVERSE LEVERS.** Holding the power feed engaged will cause the spindle to feed past the desired point.

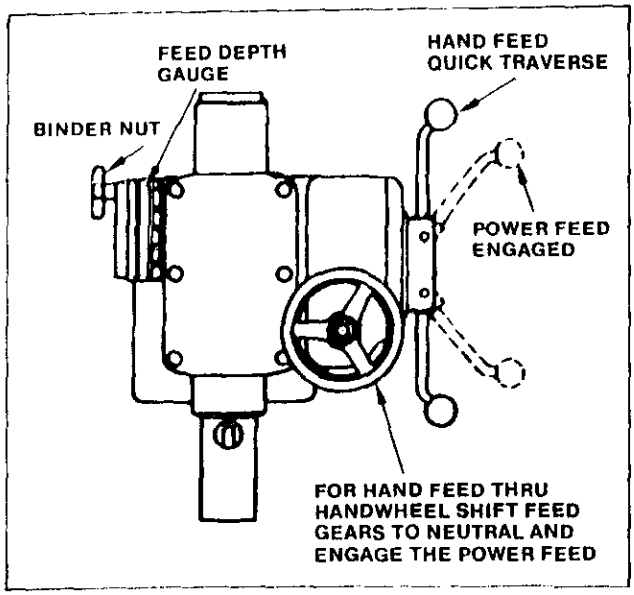


Figure 4. Hand Feed and Power Feed Controls

2. To set the feed depth gauge, run the drill down against the work by means of the quick traverse lever. Loosen the binder nut on the feed depth gauge on the left side of the sliding head and turn the knurled dial until the arrow points at the desired depth. Tighten the binder nut, start the machine and engage the power feed.

HAND FEED

To use the hand feed through the hand wheel, shift the feed gears to "Neutral" and thrust the quick traverse levers to the right as when engaging the power feed. The small handwheel on the front of the sliding head may then be used to feed the spindle for boring, counter-boring, spotfacing, heavy drilling, etc.

CARRIAGE AND TABLE (See Figure 5)

From a starting (pickup) point, use rapid traverse (pendant controls) to move the carriage and table to within approximately 1/4 inch of the new position. Then use the fine feed knob, located below the manual feed handwheel, to reach final position.

A vernier scale is provided to read increments of 0.0005" on a fixed dial on the carriage and table feed screws.

The adjustable dial can be locked with a 3-handled capstan dial lock. As an additional aid, scales graduated in 0.1" increments are provided on the table and base.

Clamping locks are provided for the carriage and table to maintain their position while machining holes. Limit switches limit travel of the table and saddle.

When machine is equipped with a 0.0001" resolution readout system, tension on the screws must be relieved after reaching position. Do this by reversing travel direction slightly by using the fine feed handwheel.

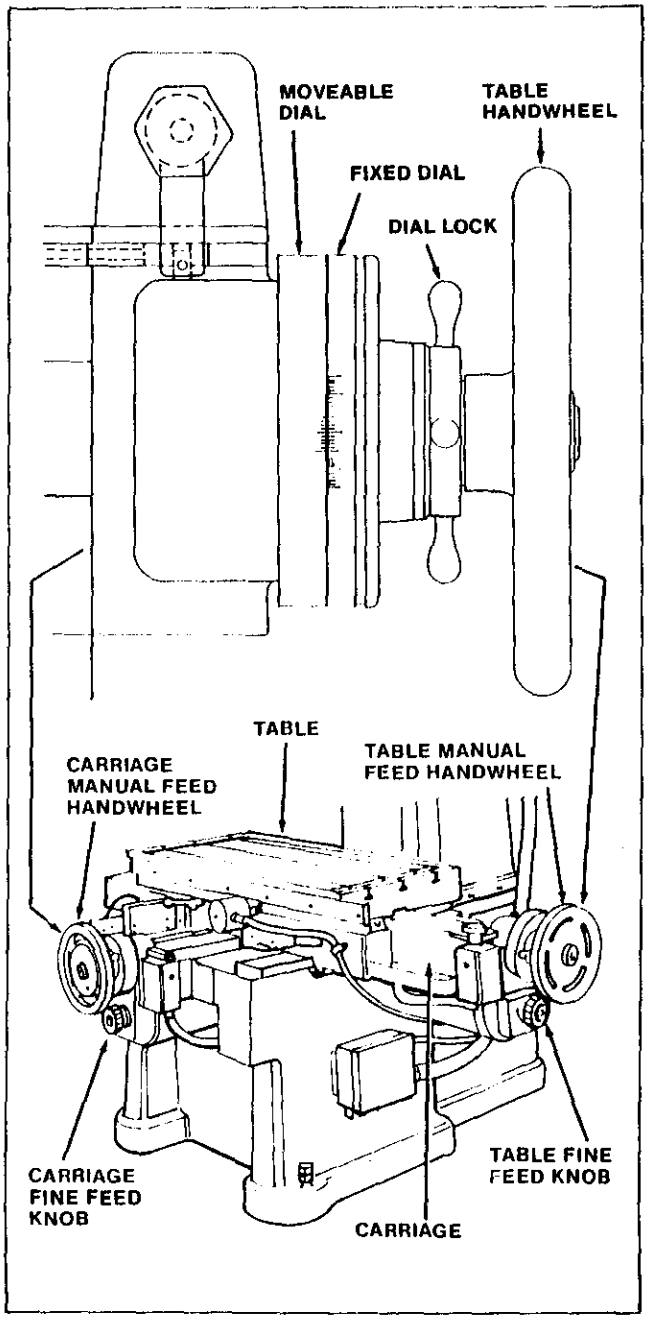


Figure 5. Carriage and Table Controls

MAINTENANCE ADJUSTMENTS

SLIDING HEAD GIB (See Figure 6)

The sliding head gib is tapered .007" per inch. To adjust, loosen the gib screw at the top and tighten the bottom screw evenly so that the sliding head can be moved up and down freely, with elevating handwheel. Then check with a .0015 shim to see if all ways on sliding head are closed to the column ways thus giving you proper bearing surface between sliding head and column.

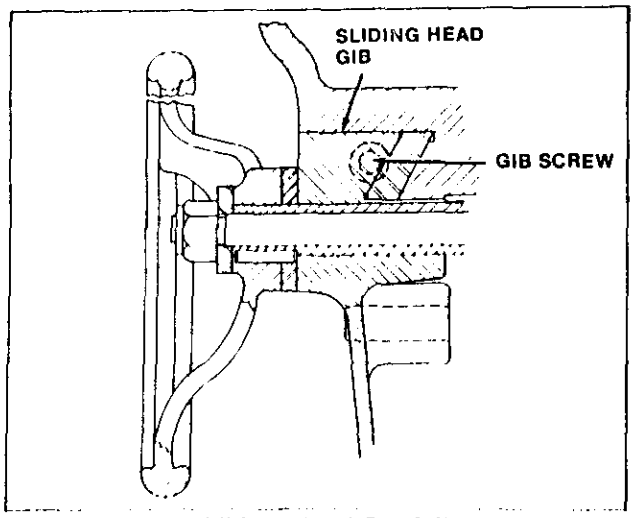


Figure 6. Sliding Head Gib Adjustment

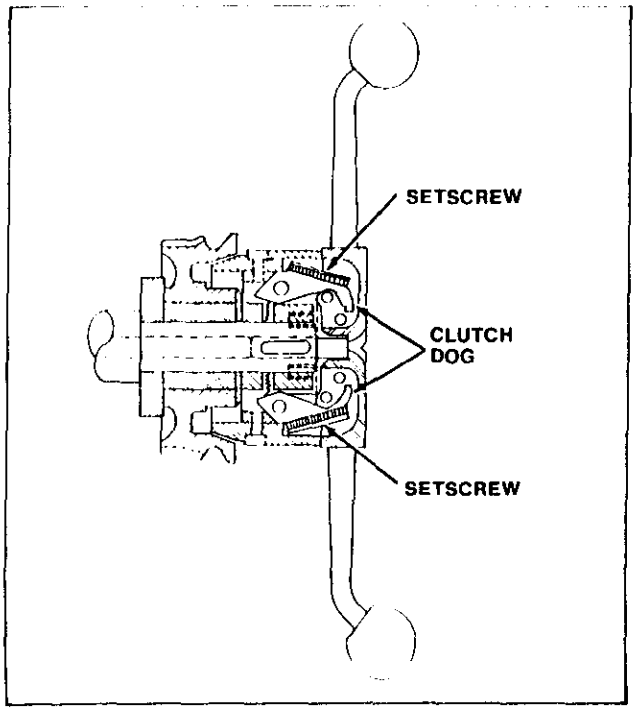


Figure 7. Feed Clutch Adjustment

FEED CLUTCH ADJUSTMENT (See Figure 7)

It may be necessary to tighten the feed clutch after two years of use to eliminate any slippage in the feed thrust. Tighten the setscrew in each of the clutch dogs an equal amount — about 45° at a time until the desired tension is obtained and slippage is eliminated.

TABLE GIB (See Figure 8)

A straight gib for the table is held by six pins, setscrews and jam nuts located along the back edge of the table. Use these setscrews to tighten the gib when wear occurs. Tighten so there is slight drag on the table screw when traversing by hand.

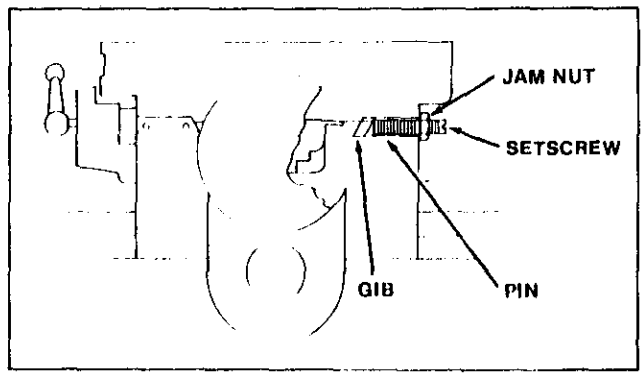


Figure 8. Table Gib Adjustment

SADDLE GIB (See Figure 9)

The tapered saddle gib has gib screws at each end. Loosen the rear gib screw and tighten the front gib screw. This provides positive alignment of saddle travel to table travel on the square.

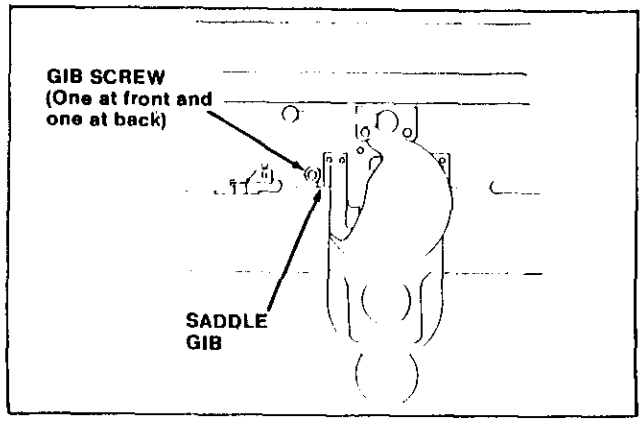


Figure 9. Saddle Gib Adjustment

SERVICE INSTRUCTIONS

FEED TRANSMISSION REMOVAL (Figure M-1)

The feed gear box is a complete unit in itself and may be removed from the head and taken to the bench for disassembly. The feed gear box must be removed before attempting any disassembly of the head.

1. Unscrew and remove shaft guard (6).

2. Loosen cap screws on feed shaft bearing (5, Figure M-6) on sliding head.

3. Raise feed shaft (10, Figure M-1) up high enough to entirely clear the sliding head and lock in place by means of a 1" set collar or lathe dog slipped over the upper end of the shaft.

4. The cap screws in the flange of the feed gear box may now be loosened and the gear box removed from the head.

The long feed shaft (10) may now be withdrawn from the feed box.

DISASSEMBLY OF FEED GEAR BOX (Figure M-1)

1. Remove the set screw from the end of the first shaft (7) and the large take-off gear (8).

2. Remove set screws which hold the two bearing retainer rings (9) on the upper side of the feed gear box.

3. With a bronze rod against the lower end of the intermediate shaft, drive the shaft out until the lower ball bearing is unseated from the shaft. The shaft may then be drawn out and the gears lifted out.

4. Remove the lower bearing cap (11) from the gear box.

5. Proceed as in step 3 to [illegible] the first and third shafts (7 and 12).

GEAR SHIFTING MECHANI[illegible]OVAL – FEED OR SPEED (Figure M-1)

1. Loosen three cap screws in the plated dial (1) or (4) and lift out the entire unit.

2. Screw a ⅜" threaded rod into the end of the lever shaft (2) or (5). Place a fairly heavy collar over the rod and then a large washer and finally a ⅜" nut. Using the collar as a bumper, withdraw the shaft leaving the levers free to be lifted out.

LEGEND – Figure M-1

1. Dial
2. Lever Shaft
3. Collar
4. Dial
5. Lever Shaft
6. Shaft Guard
6. Shaft Guard
7. Shaft
8. Large Take-Off Gear
9. Bearing Retainer Rings
10. Feed Shaft
11. Lower Bearing Cap
12. Shaft

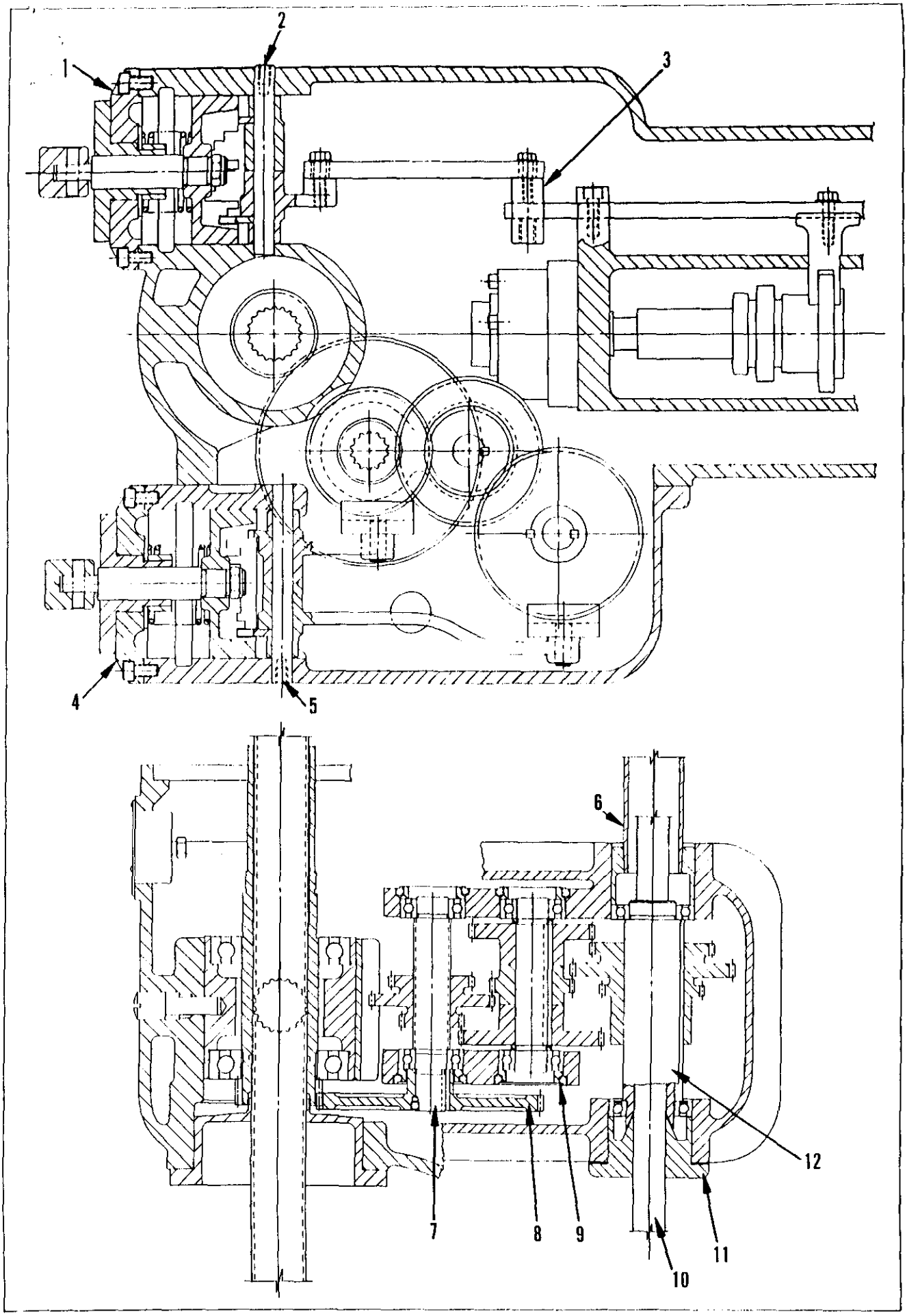


Figure M-1. Top Head – Feed Transmission

SPEED GEAR TRAIN REMOVAL (Figure M-2)

The transmission gears are assembled as a unit in the transmission frame which may be removed from the head for further disassembly.

1. Loosen the cap screws from the cover (2) around the motor shaft.

2. Remove the cap screws which hold the motor down and lift the motor off the dowel pins. Slide the motor back far enough so that the motor gears are completely out of mesh.

3. Remove the top cover (10).

4. Disconnect the copper tubing from the back of the oil pressure gauge.

5. It is necessary at this point to remove the feed gear box as described previously.

6. Reach through the feed box opening and loosen the set screws in the square collars (3, Figure M-1), which are mounted on the gear shifter bars. By pulling out on the speed change lever, the collars can be slipped off the shifter bars.

7. Remove the transmission frame (1, Figure M-2).

8. To remove the spiral bevel gear unit (after transmission is removed), remove the bottom closure (7) and unscrew the locating plug (9). Drive the bearing cartridge upward using a bronze rod to drive against the lower end of the cartridge (8).

DISMANTLING THE TRANSMISSION FRAME (Figure M-2)

1. Remove the pump including its mounting bracket, the piping and oil distributing trough.

2. Remove the two shifter bars.

3. Remove the three bearing caps (3, 5 and 11) and the ball bearing locknuts on the rear end of the shafts.

4. Pull the motor drive gear (4).

5. Drive the intermediate shaft to the rear sufficient to place two small spacers between the large gear (12) and the frame (1). Drive on the rear end of the shaft with a babbitt hammer, driving the shaft out of the front end of the frame.

6. Remove the lower shaft, driving on the rear end of the shaft with a babbitt hammer to unseat the rear ball bearing. It is then possible to withdraw the shaft through the front of the transmission frame.

7. Remove the wire snap ring from the outer race of the double row ball bearing on the front end of the top shaft. Cut two spacers from bar stock about 8¼" long, to be placed between the large gear (14), and the transmission frame. Drive on the rear end of the shaft with a babbitt hammer to unseat the rear ball bearing. The shaft may then be withdrawn through the front of the frame.

LEGEND – Figure M-2

1. Transmission Frame
2. Cover
3. Bearing Cap
4. Motor Drive Gear
5. Bearing Cap
6. Clutch & Idler Gear
7. Bottom Closure
8. Bearing Cartridge
9. Locating Plug
10. Top Cover
11. Bearing Cap
12. Large Gear
13. Cluster Gear
14. Clutch & Idler Gear

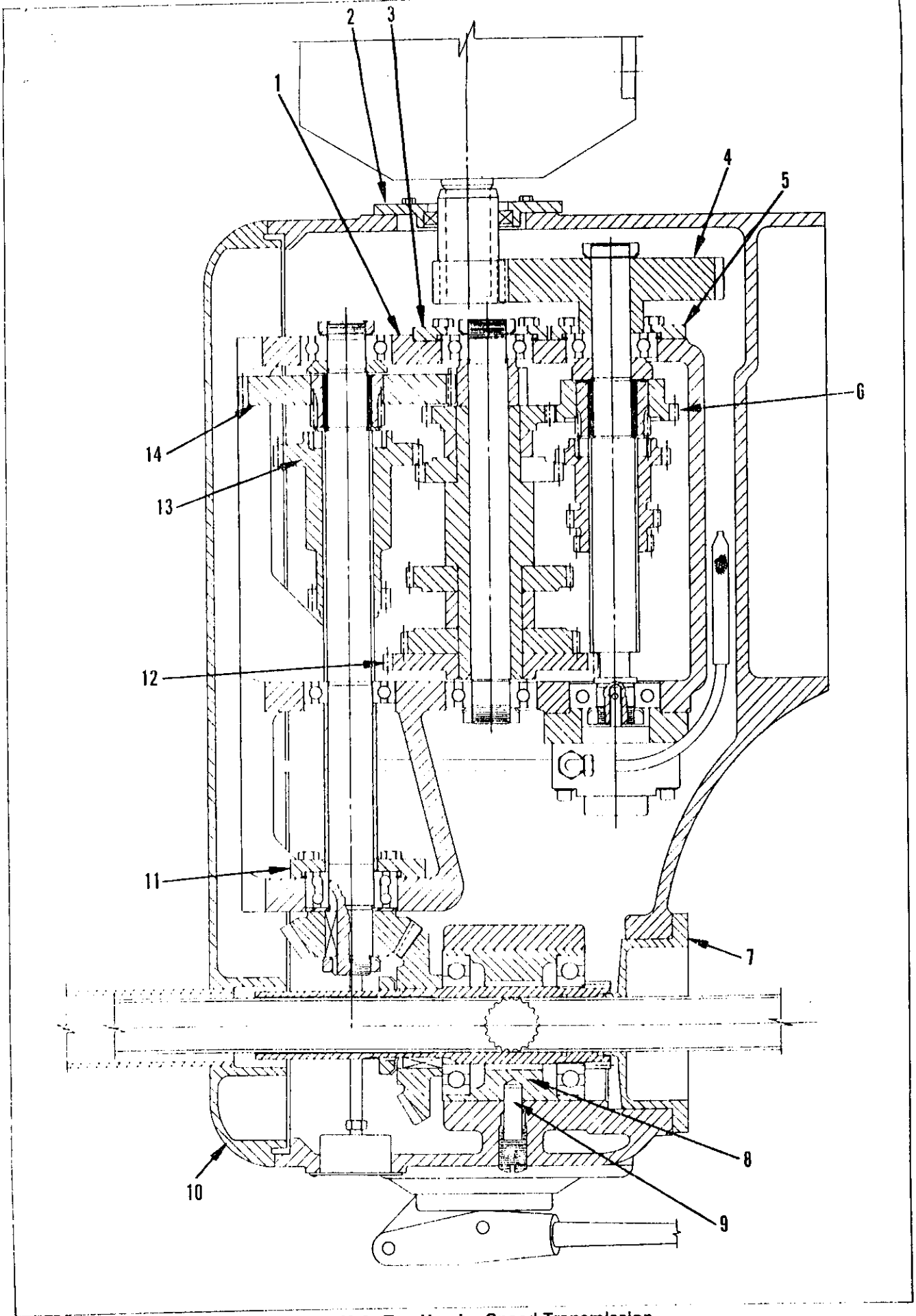


Figure M-2. Top Head – Speed Transmission

SLIDING HEAD

Most repairs to the sliding head are of a nature that will not require the removal of the sliding head from the column, so we will deal with this phase first. It is to be strongly urged that these steps be followed carefully and no more parts removed than necessary due to the time involved in making adjustments and timing the various functions (see Sliding Head Removal).

CROSS SPINDLE AND SPINDLE REMOVAL (Figures M-3 and M-4)

1. Drain the oil from the sliding head.

2. Run the spindle and sleeve down as far as it will go in the sliding head. Mark the sleeve so that it may be reassembled at the same point.

3. Note carefully the exact reading on the feed depth scale and tighten the handnut so that this reading will not be changed.

4. Block counterweight inside of column.

5. Raise the sliding head until the counterweight chain is just barely slack and clamp the head.

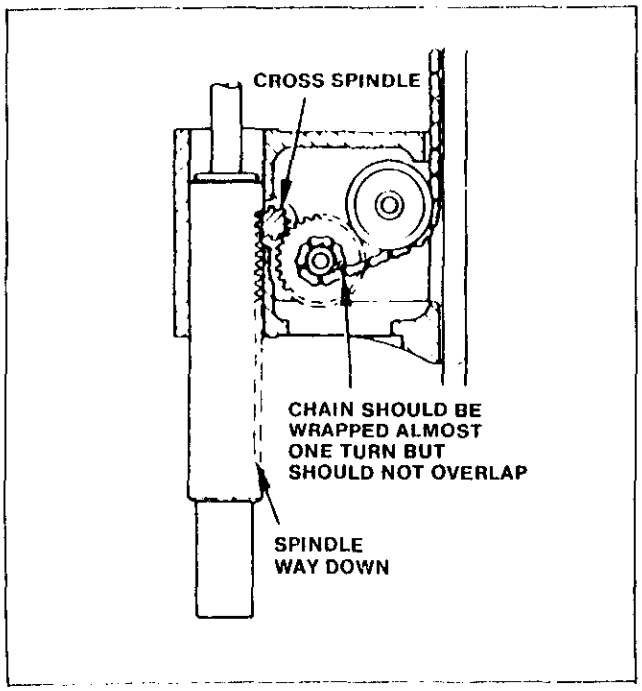


Figure M-3. Chain Position

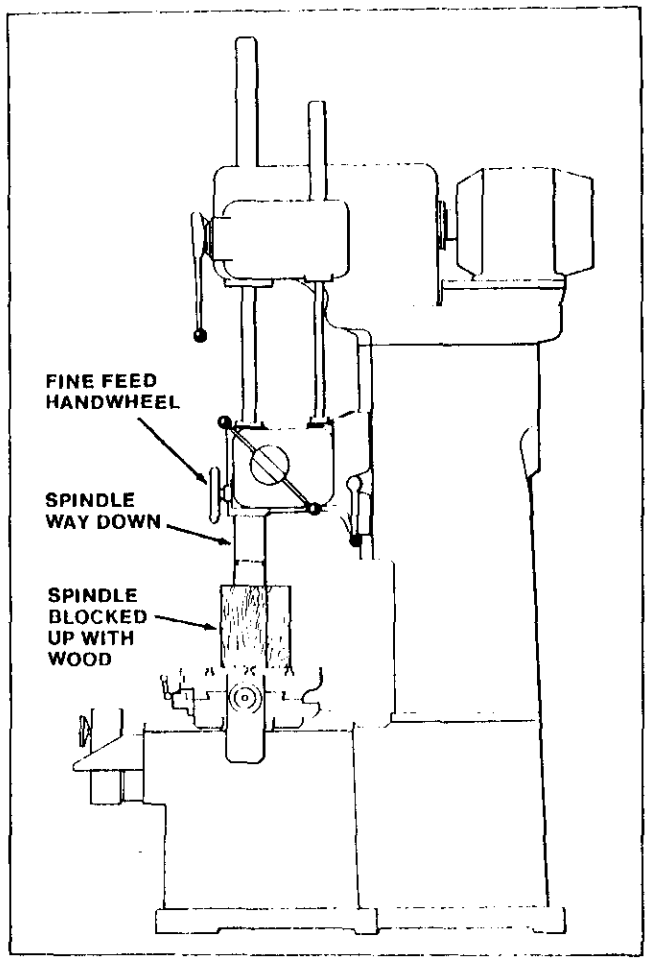


Figure M-4. Blocking Up Sliding Head

6. Remove the sheet steel cover from the underside of the sliding head and note the position of the chain on the chain gear so that this can be placed in the same position at reassembly (see Figure M-3).

7. Block up the spindle and sleeve with wooden blocking built up from the table (see Figure M-4).

8. Remove one of the turnstile levers (1 and 12, Figure M-5) and remove the screws and the cover (24, Figure M-6).

9. Reinstall the turnstile lever.

10. Remove the two set screws from the center of the screw in the feed dial and then remove the screw and the feed dial.

11. The cross spindle, worm gear and feed clutch assembly may then be removed as a unit. Push out the transfer pinion (13, Figure M-5).

12. To remove spindle and quill:

a. Unscrew closure nut at top of quill.

b. Move drive shaft up and out of quill and secure it on top head with a set collar.

c. The spindle and quill may now be lowered to the table and be removed.

CROSS SPINDLE DISASSEMBLY (Figure M-5)

1. Remove the two turnstile levers (1 and 12).

2. Remove the two set screws (2 and 5).

3. Remove the hub (11) being careful not to loose the two springs (7 and 8).

4. Disassemble remaining parts.

CROSS SPINDLE REASSEMBLY (Figure M-5)

1. Install clutch dogs (3 and 4) and springs (7 and 8) into hub (11). Use a short stub shaft with the same diameter as cross spindle, and insert it into the hub to keep the springs in position.

2. With the clutch cone (9) installed on the hub (11), install the hub onto the cross spindle. The stub shaft will slide out of the hub and the spring should remain in position under the clutch dogs.

3. Secure the hub (11) to the shaft with the two setscrews (6 and 10).

4. Install the turnstile levers (1 and 12). Use a hook to pull one of the clutch dogs toward the outside of hub and, with dog in this position, work the handle into hub so the pin on the handle gets into position under the dog. Use the hook and position opposite handle the same way.

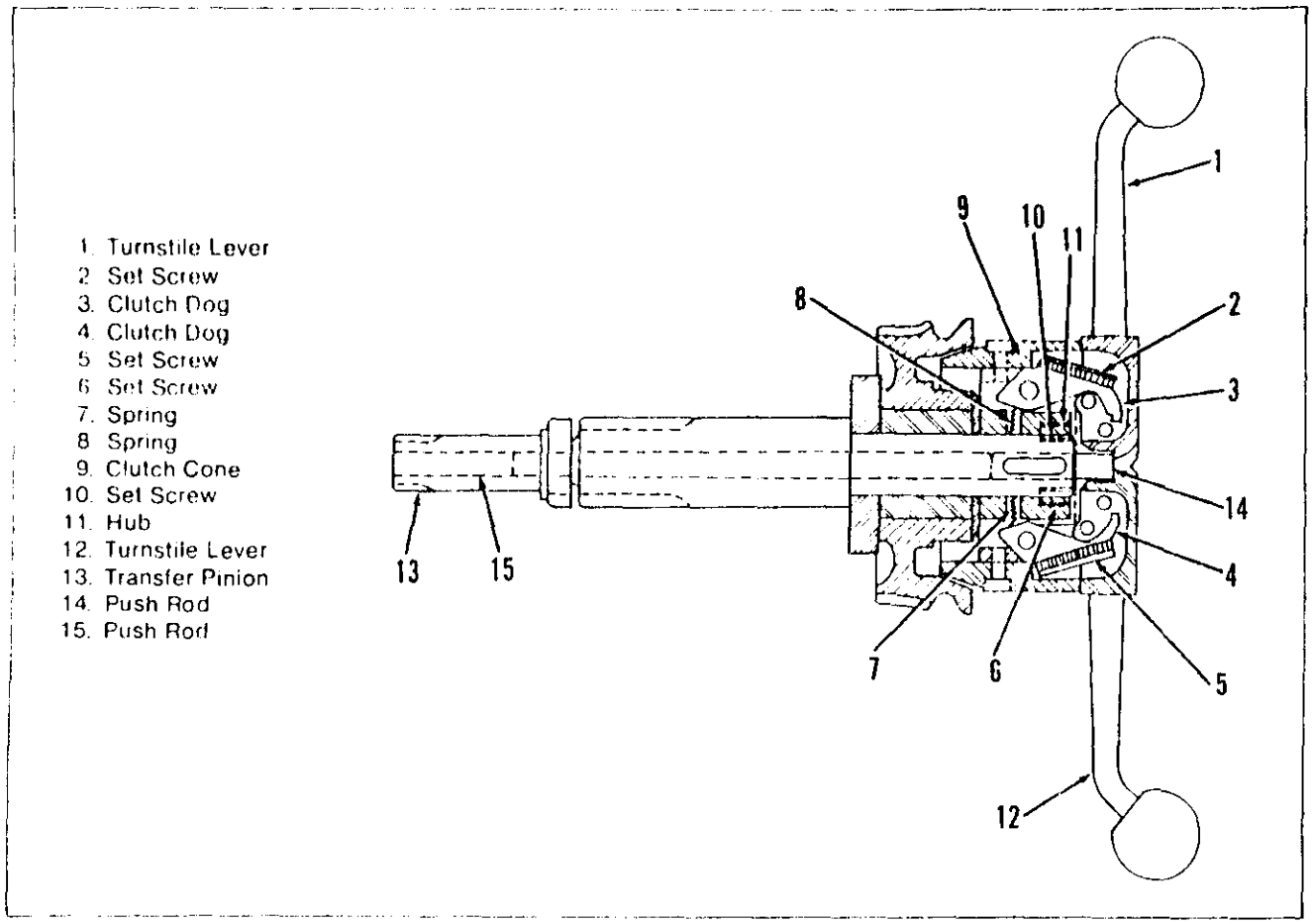


Figure M-5. Cross Spindle Assembly

FEED DIAL ASSEMBLY (Figure M-6)

1. Tap out the ball bearing (13) using a brass rod against the inner race.

2. Drive the needle bearing (9) out far enough to clear the safety trip dog (12).

3. Loosen and remove the handnut (11).

4. Push the safety trip dog (12) into the bore of the hub (14) enough to clear the knurled dial (10).

5. The knurled dial may then be lifted from the hub.

6. The safety trip dog may then be slipped out of the hub and the feed trip dog may be removed by loosening one screw.

SLIDING HEAD REMOVAL

Any part of the sliding head which may become damaged or worn may be removed in accordance with the foregoing instruction. If for any reason it becomes necessary to remove the sliding head, proceed as follows:

1. Block up the counterweight.

2. Disconnect the chain at the connecting link which is located about the middle of the chain.

3. Remove the sliding head stop located toward the bottom of the elevating rack.

4. Use the elevating handwheel and lower the head until it reaches the lower end of the ways. Then support the head with wooden blocks.

5. Remove the lower gib screw and the sliding head gib should then slide down out of the head.

6. The sliding head should then be inched away from the column.

REASSEMBLING THE SLIDING HEAD (Figure M-4)

1. Hold or block spindle and sleeve up as directed in paragraph on "Cross Spindle & Spindle Removal."

2. Reach through the opening in the underside of the sliding head and turn the chain gear with the chain passing **UNDER** the gear to take up the slack in the chain or to the same relative position as noted in "Cross Spindle Removal."

3. With spindle down near the end of rack travel, insert transfer pinion (13, Figure M-5) into the head and install the cross spindle assembly. Move spindle to the same location as when depth dial was removed and marked and re-install the depth dial.

4. Try moving the spindle by hand. There should be little or no movement down since the spindle should be at its lower limit of travel. Movement up should be difficult because with the counterweight blocked, it is necessary to lift the weight of the spindle and sleeve. Remove the blocking and try the spindle through its full travel. The chain should be wrapped on the hub of the chain gear almost a full turn (but not overlapping) (see Figure M-3) when the spindle is down and tangent to the hub when the spindle is up.

5. To replace the feed trip dial, run the spindle down to the end of its travel (see Figure M-7). See that the scribed lines on the rim of the dials are in line and then place the dial back on the stud so that the arrow points at the **SAME FIGURE** as it did when the dial was removed.

LEGEND Figure M-6

1. Worm Shaft
2. Bevel Gear & Worm
3. Ball Bearing
4. Feed Shaft
5. Bearing
6. Adjusting Screws
7. Clutch Dogs
8. Turnstile Lever
9. Needle Bearing
10. Dial
11. Hand Nut
12. Safety Trip Dog
13. Ball Bearing
14. Hub
15. Gear
16. Sheave
17. Spacer
18. Head Cover
19. Push Rods

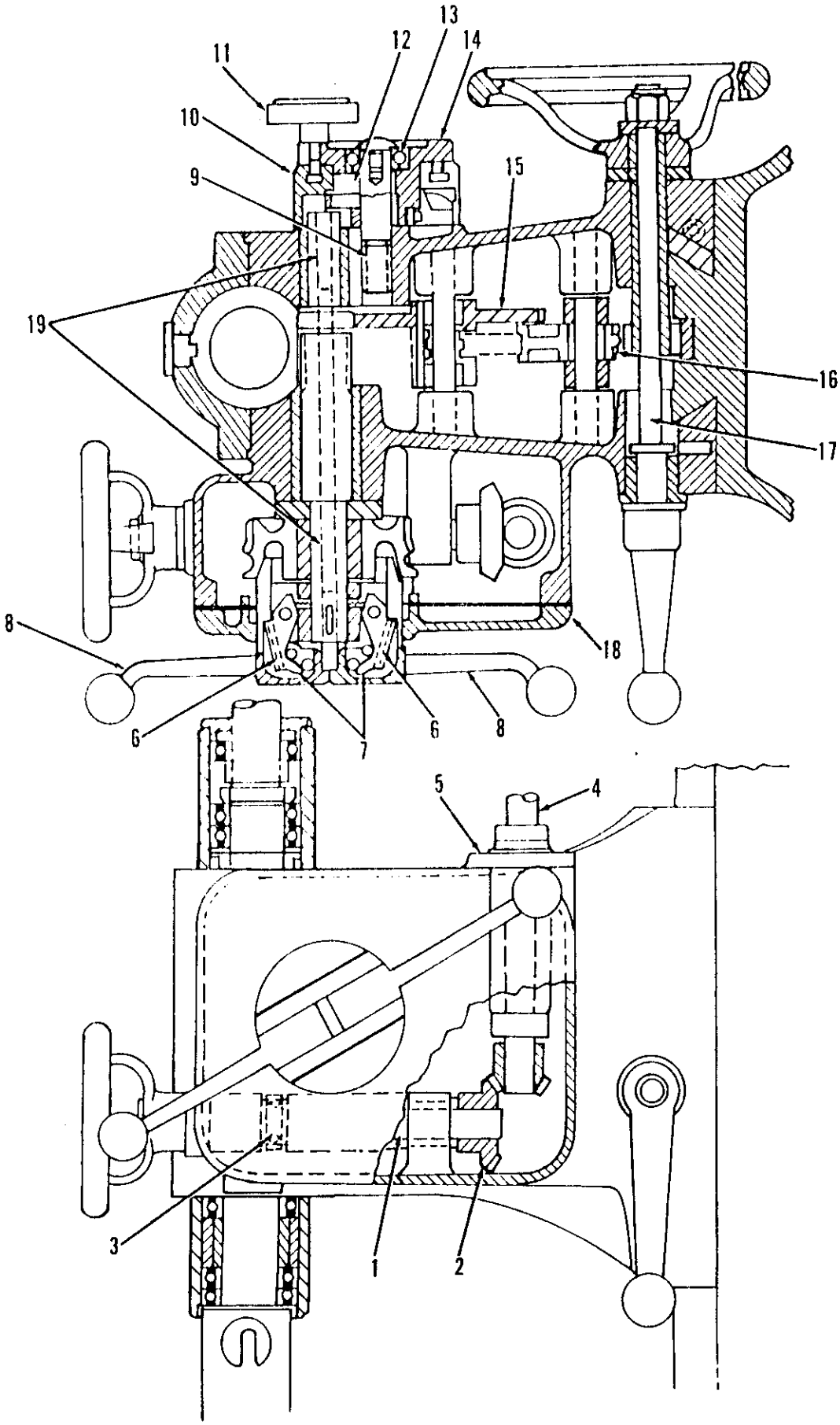


Figure M-6. Sliding Head

6. If the dial has been removed without close attention to the instructions, or if a new dial is to be mounted, proceed as follows:

a. Run the spindle down as far as it will go.

b. Be sure the push rods (19, Figure M-6) are in place in the cross-spindle.

c. Place the feed depth dial on the stud and with the hand nut directly under the center of the stud, push it back against the head.

7. Assemble the lock screw in the end of the stud only enough to eliminate all end play in the dial.

8. Raise the spindle about 1½" and set the depth gauge at about six inches. Engage the feed clutch by thrusting out on the turnstile levers. Shift the feed gears to neutral and feed the spindle down by means of the handwheel on the front of the sliding head. The clutch should disengage before the limit of travel is reached. Try it again, this time holding the turnstile levers in engagement. The clutch should be positively disengaged about ¼" to ⅜" before the limit of travel is reached, and it should be impossible to re-engage the feed without first raising the spindle.

9. Repeat this procedure near the upper limits of travel by feeding upward. To obtain the desired results, it may be necessary to rotate the dial forward or back one tooth. To back off the dial easily, remove the lock screw, set the dial between 0 and 12½ and thrust outward on the turnstile levers.

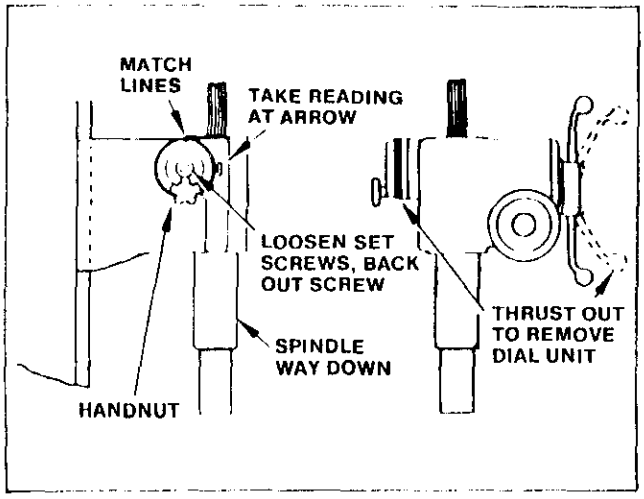


Figure M-7. Feed Dial Removal

10. After the desired setting is obtained, lock the lock screw (Figure M-7) against rotation by tightening the two small set screws in the head of the screw.

11. Set the dial to trip out at a small distance, say one inch, and note the position of the 0 at the point where the feed trips out. Set the pointer at this position so that it points at 0 when the feed trips out.

12. Do not use the power feed until you have checked the operation of the counterweight and the feed trip.

REMOVING TABLE SCREW (WITH ACME THREAD) (Figure M-8)

1. Position table at extreme left end of travel.

2. Remove the screw guard (4).

3. Remove the nut (13) securing the handwheel (12) and remove the handwheel.

4. Take out the dial sleeve (11) and dial assembly (10).

5. Take off the fixed dial (9).

6. Remove the cover (7) and bearing (1).

7. Pull out the idler shaft (8).

8. Re-install handwheel on screw (5). Turn handwheel to right and the screw and handwheel assembly will back out of the nut.

9. Carefully pull screw bearing (3) and gear (2) from the table.

10. Replace bearings or any parts in the transmission as necessary.

11. Reassemble in reverse order of disassembly.

REMOVING SADDLE SCREW (WITH ACME THREAD)

1. Move the saddle to maximum rear position (away from operator).

2. Follow procedure in steps 2 through 11 under "Removing Table Screw."

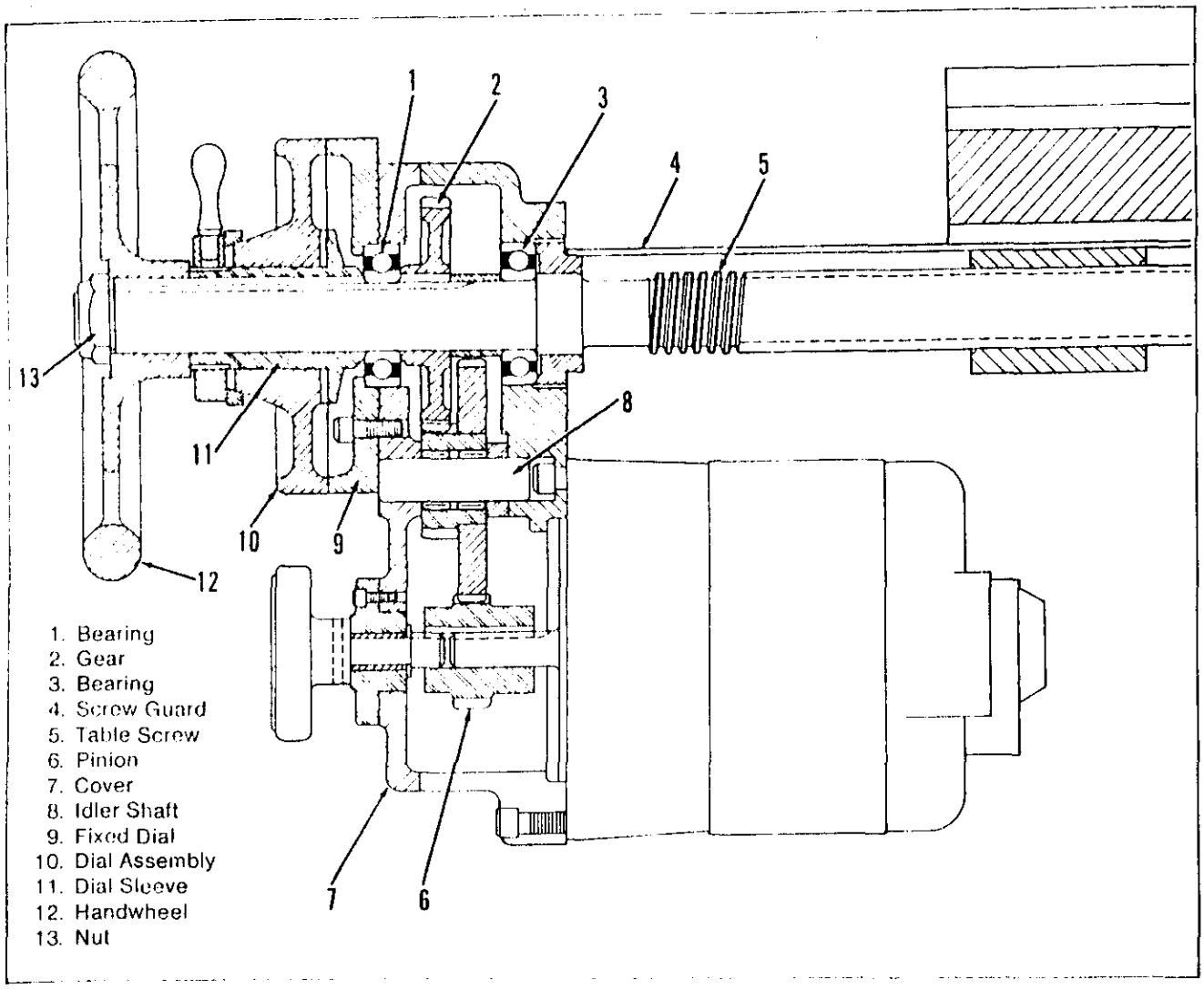


Figure M-8. Feed Screw Assembly (With Acme Threads) For Table And Saddle

REMOVING MOTOR PINION ON TABLE OR SADDLE (Figure M-8)

1. Remove the nut (13) securing the handwheel (12) and remove the handwheel.

2. Remove the dial sleeve (11) and dial assembly (10).

3. Remove the fixed dial (9).

4. Take off the cover (7).

5. Loosen the set screw securing the pinion (6) to the shaft and remove the pinion for replacement if necessary.

REMOVING TABLE OR SADDLE FEED SCREW NUT (WITH ACME THREAD)

1. Remove the table screw or saddle screw as described in previous paragraphs.

2. Remove the transmission housing.

3. Slide the table to the left or saddle toward the operator, until the mounting bolts which hold the table nut, or saddle nut are accessible. Take out the mounting bolts and remove the nut.

REMOVING TABLE OR SADDLE BALL SCREW (Figure M-9)

1. Move table or saddle until the ball screw nut is over the access hole.

2. Remove the nut (6) securing the handwheel (5) and remove the handwheel.

3. Remove the dial sleeve (17) and dial assembly (16).

4. Remove the fixed dial (15).

5. Take off the cover (14).

6. Remove the four screws (18) holding the motor (11) to the housing (13) and remove the motor.

7. Take out the screws (4) holding the retaining bracket (1).

8. Remove the screws holding the cover (2) to the bracket.

9. Remove the screws (12) attaching housing (13) to saddle or base and remove the housing (13).

10. Take the ball screw and housing assembly from the saddle or base.

CAUTION

Do not run the nut off the thread on the screw.

11. Loosen setscrew (7) and unscrew the bearing retaining nut (8) from the housing (13).

12. Pull the ball screw out of the housing.

13. Reassemble in reverse order of diasssembly.

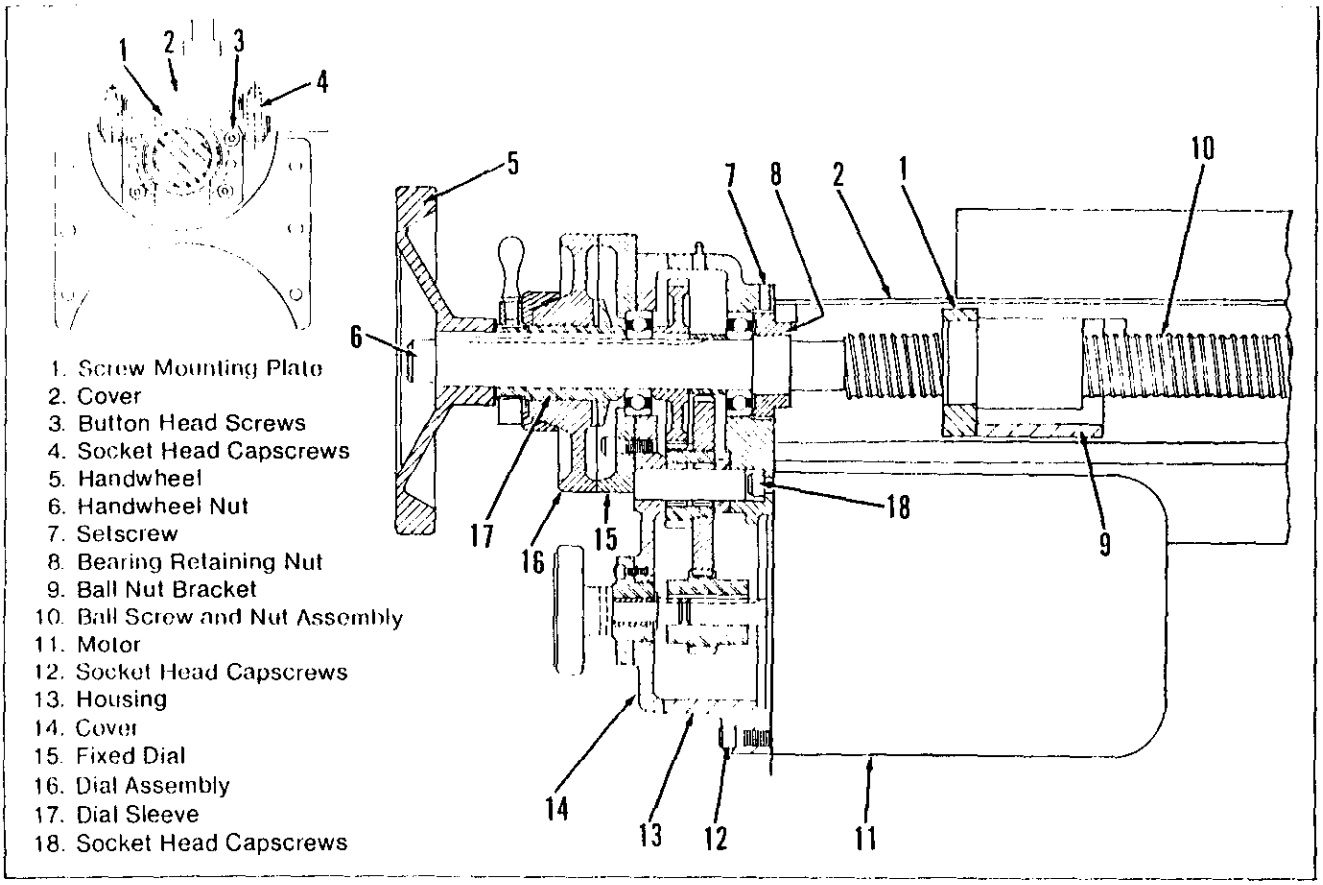


Figure M-9. Ball Screw Assembly For Table And Saddle

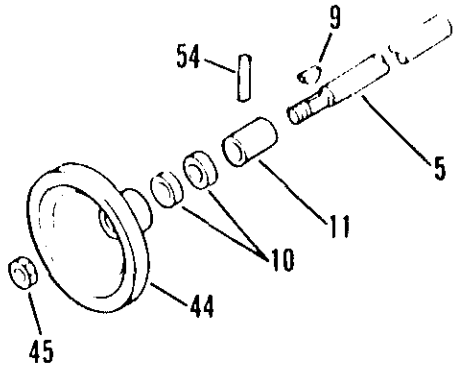
PARTS MANUAL

This is a replacement parts manual for your Cleereman - Appleton machine tool. These precision built machines are designed and manufactured so as to assure long life performance. However, over a period of time, natural wear or accidential damage may occur which may require the replacement of parts. This manual is provided to assist you with your machine maintenance and to enable you to order replacement parts quickly and correctly should this become necessary.

Every effort has been made to make this manual accurate, clear, concise and easy to use. The assemblies are arranged in a natural sequence and are indexed visually on the visual index page. However, the design of this machine is subject to change and your machine may have modifications which may differ slightly from that shown on the exploded views in this manual. Cleereman - Appleton maintains a complete record of every machine we manufacture based on **MACHINE SERIAL NUMBER.** To assure prompt and efficient service, it is imperative to include the **MACHINE MODEL, SIZE** and **SERIAL NUMBER** with every inquiry or order for replacement parts. Refer to the visual index page for instructions showing the location of the serial number on this machine.

In several instances in this manual it will be noted that certain parts are mated at the factory. Such parts should never be replaced individually and are to be ordered in pairs or sets. By carefully following the instructions for ordering replacement parts given on the next page you will aid us in giving you prompt service. It is our desire to provide you with the best in machine tools and service.

HOW TO IDENTIFY AND ORDER REPLACEMENT PARTS



1. Refer to the Visual Index, to locate the exploded view which contains the desired part.

2. Locate the desired part and its item number in the exploded view.

3. Find the corresponding item number in the parts list on the facing page, to determine the part name, description, code number and quantity.

4. Send the part name, description, quantity and the **SERIAL NUMBER OF THE MACHINE** to:

Parts Department
Chas. G. Allen Co., Inc.
25 Williamsville Road
Barre, MA 01005

Tel: 1-978-355-2911
FAX: 1-978-355-2917

5. For service by telephone:

1-978-355-2911

and give the information in paragraph 4 above.

6. Majority of parts can be furnished individually, except for some critically mated or processed parts which must be purchased as service sub-assemblies.

7. There are many standard commercial articles such as screws, bolts, pipes, fittings and similar items which may be in your stock room, or can be purchased from your local hardware store. Orders for such parts will be supplied upon request but it is recommended that they be purchased locally whenever possible.

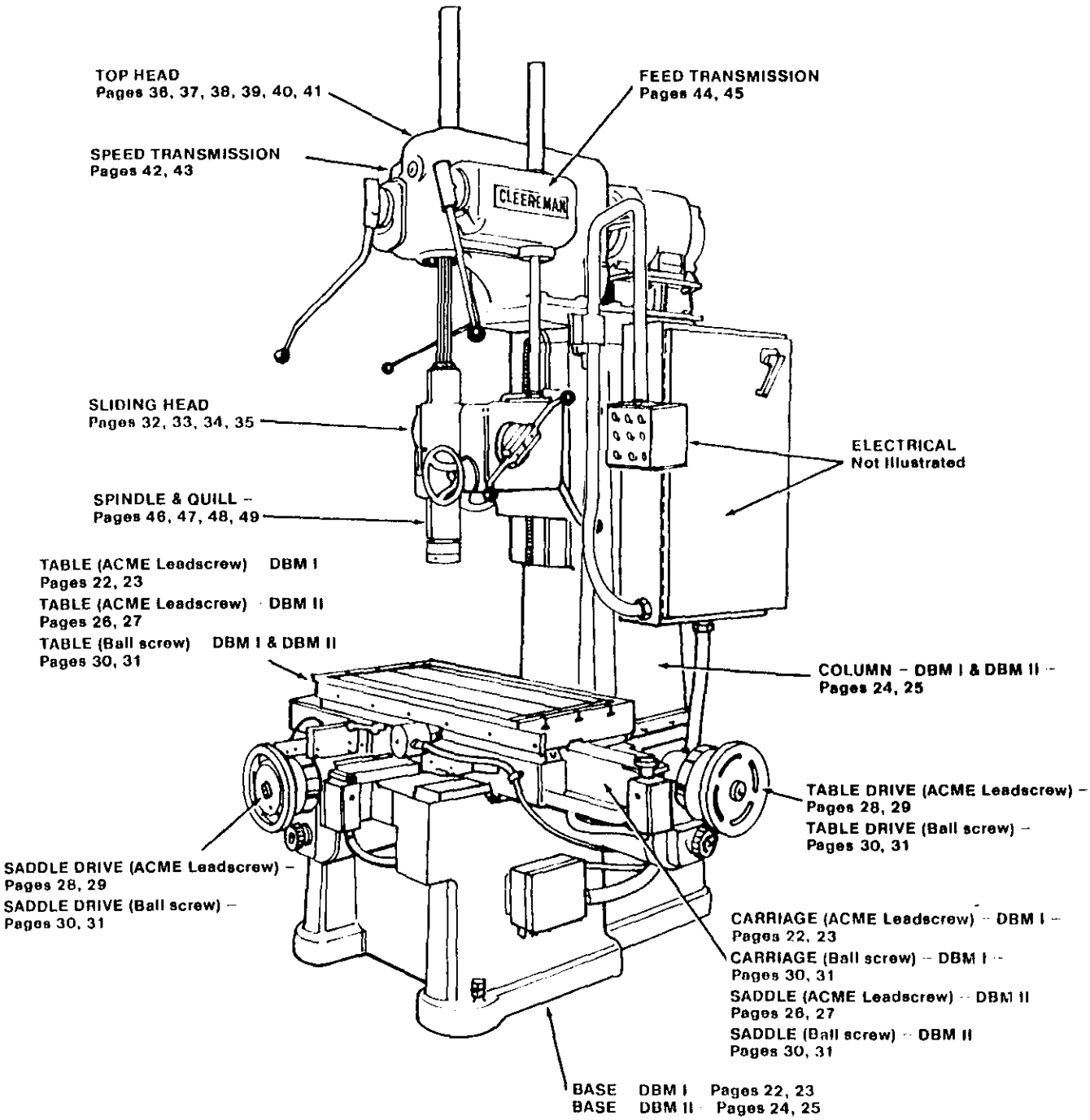
8. **FASTER DELIVERY** can be obtained by ordering electrical repair parts directly from the manufacturer or nearest distributor, because many of these parts are not stocked by Cleereman.

NOTE

This manual is not intended for use in assembly or disassembly purposes. It is to be used for part identification only.

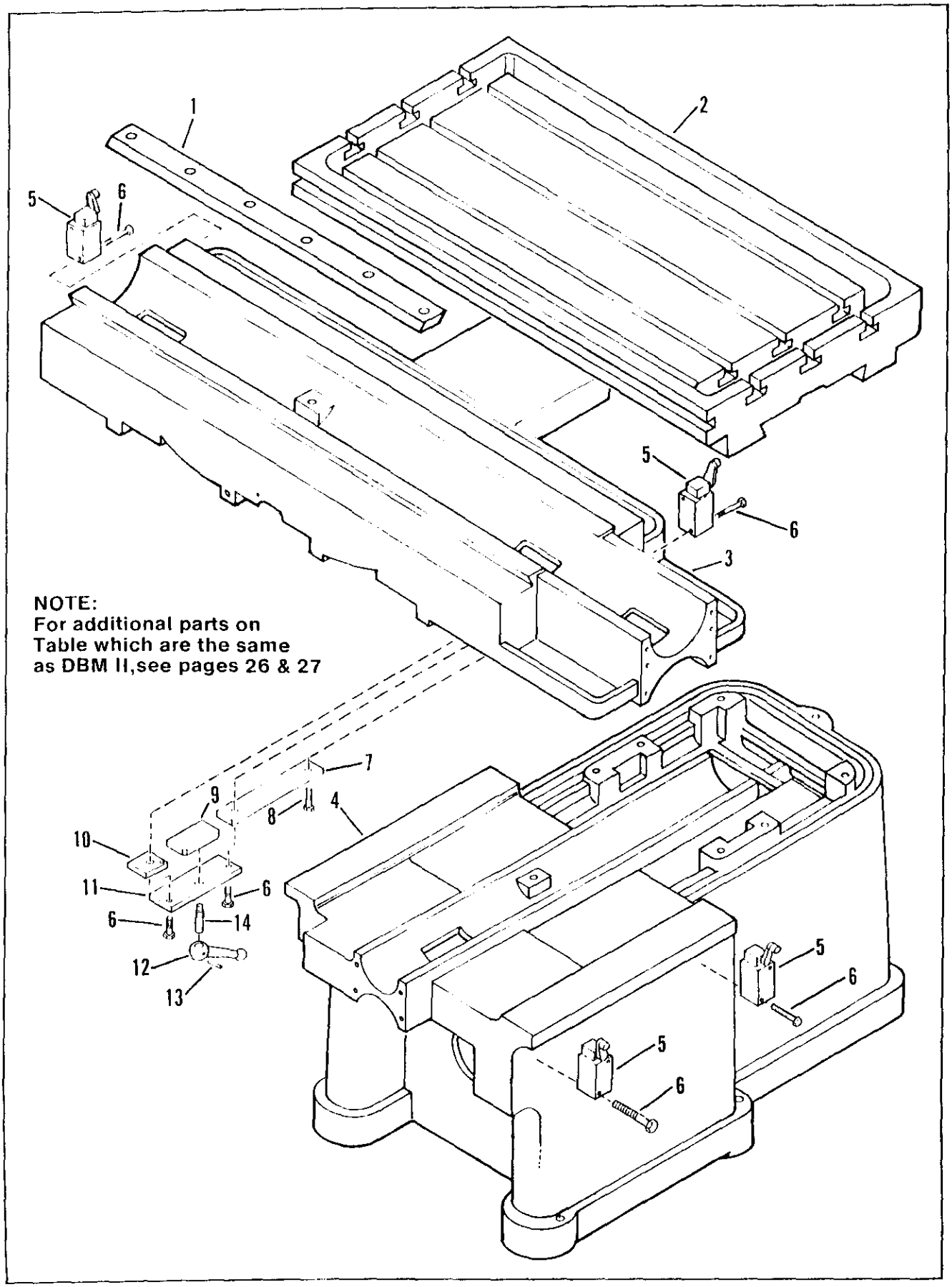
VISUAL INDEX
FOR LAYOUT DRILLING MACHINE
MODELS DBM I AND DBM II

Use this index to determine the title, figure and page number of the exploded view



MODEL DBM-I SHOWN

BASE, CARRIAGE & TABLE - DBM I



BASE, CARRIAGE & TABLE – DBM I

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	34568	1	GIB, Table
2	34560	1	TABLE (for ACME Leadscrew)*
3	34562	1	CARRIAGE (for ACME Leadscrew)*
4	34563	1	BASE
5	E7779	4	SWITCH, Limit
6	K270	8	CAPSCREW, Hex head
7	34571	1	GIB, R.H. Rear
8	K268	1	BOLT, Head
9	34573	1	GIB, Locking
10	34570	1	GIB, R.H. Front
11	34572	1	STRAP, Gib
12	34575	1	LEVER, Binder
13	K471	1	PIN, Taper
14	34574	1	PIN

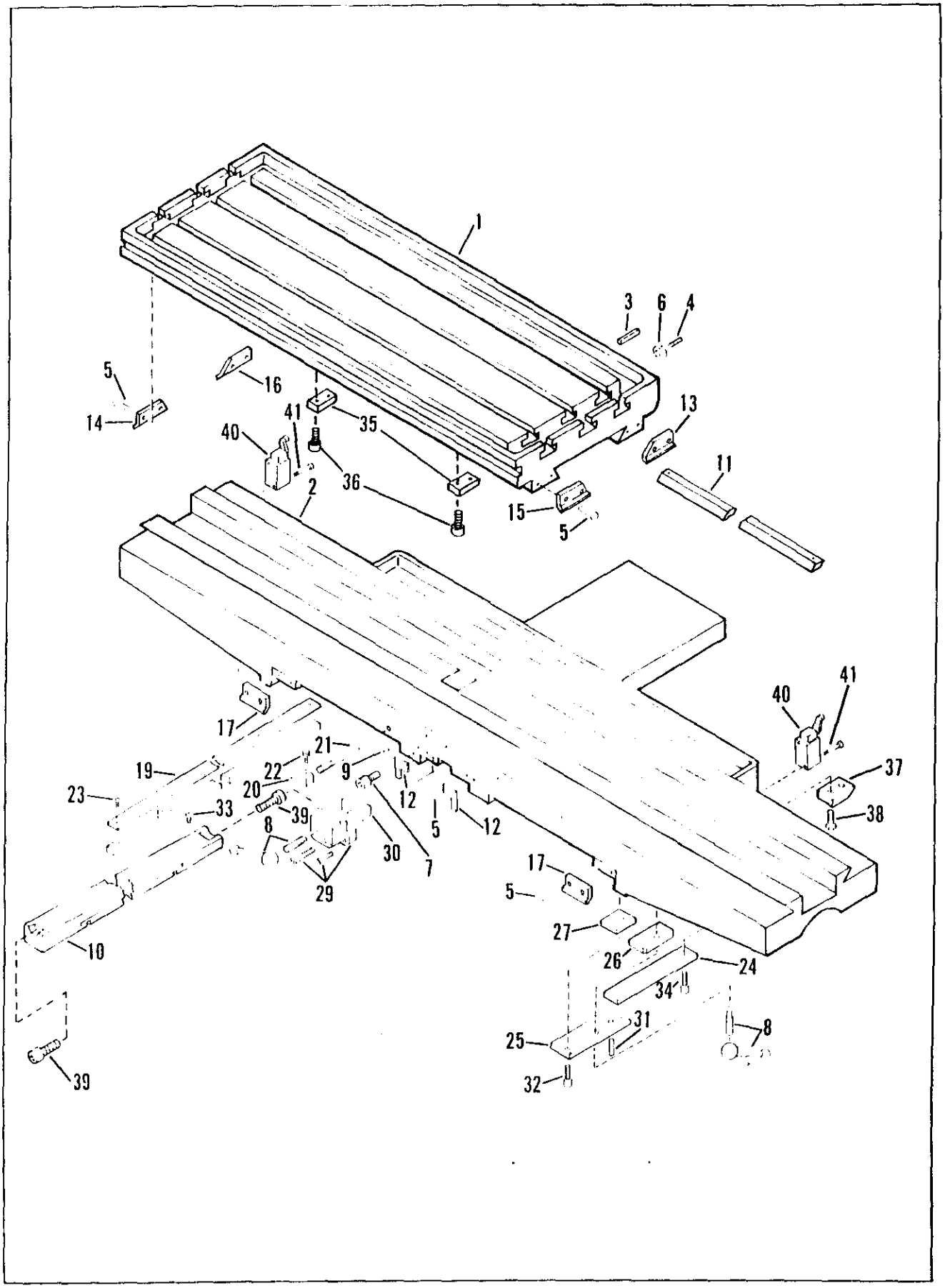
*For ball screw parts see pages 30 and 31

BASE – DBM II & COLUMN – DBM I & II

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	K11427	2	CHAIN, Roller
2	34184	1	STUD
3	K3562	2	PIN, Cotter
4	34188	1	PIN
5	34607	1	COUNTERWEIGHT
6	34606	1	PIN, Sheave
7	34564	1	COLUMN, Layout drill
8	82750	6	CAPSCREW
9	37439	1	BASE – DBM II
10	34227	1	COLLAR, Table stop
11	K153	1	SCREW, Socket
12	K135	3	SCREW, Socket
13	K3587	1	SCREW, Socket
14	K3808	2	PIN, Dowel
15	34174	1	STOP, Rack
16	34173	1	RACK, 30"
	34170	1	RACK, 25"
17	K456	2	WASHER, Wrought
18	K11230	1	BEARING
19	34505	1	SHEAVE
20	34180	1	PIN, Gear
21	30242	5	SCREW, Leveling
22	37458	1	BRACKET, Mounting
23	K5388	2	CAPSCREW, But head
24	E7779	2	SWITCH, Limit
25	K270	4	CAPSCREW

SADDLE/TABLE – DBM II (ACME LEAD SCREWS)

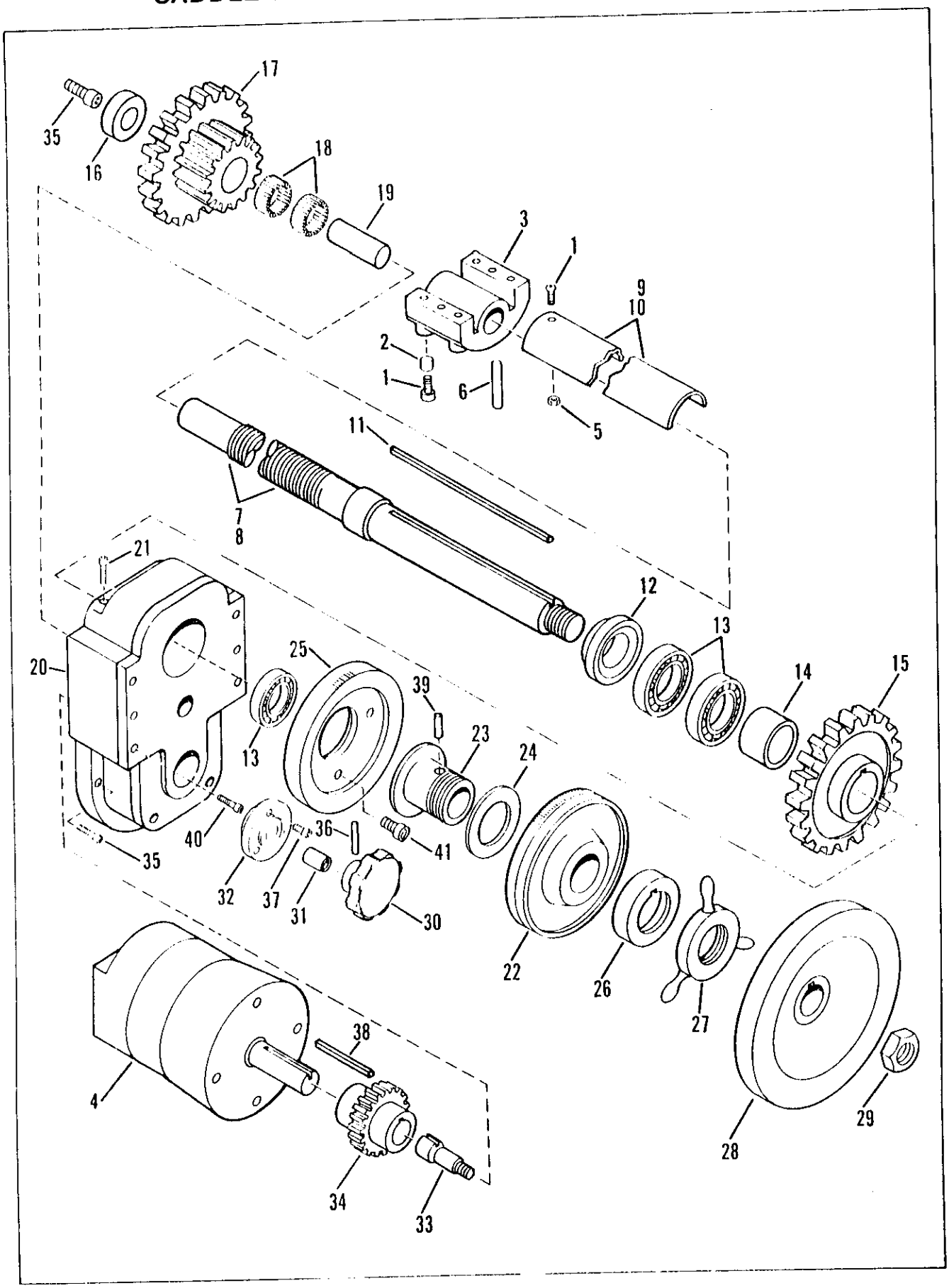


SADDLE/TABLE – DBM II (ACME LEAD SCREWS)

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	35062	1	TABLE
2	37438	1	CARRIAGE
3	K5804	7	PIN, 5/16 x 2-1/4
4	K2314	7	SCREW, Socket set, fl. pt., 3/8-16 x 1
5	K395	20	SCREW, Round head
6	K298	6	NUT, Hex jam
7	34451	2	SCREW, Gib
8	34485	1	LEVER, Binder
9	K2023	1	FITTING, Lub.
10	35748	1	GIB, Saddle
11	35742	1	GIB, Table
12	34651	2	WIPER
13	34649	1	WIPER
14	34696	1	WIPER
15	34697	1	WIPER
16	34648	1	WIPER
17	34791	4	WIPER
18	34588	1	BAR, Scale
19	34592	1	SCALE, Transverse
20	34589	1	SLIDE, Pointer
21	34587	1	ROD, Pointer
22	34590	1	SCREW, Thumb
23	K153	2	CAPSCREW, Socket head
24	35756	1	GIB, R.H. Rear
25	34572	1	STRAP, Gib
26	34573	1	GIB, Locking
27	34570	1	GIB, R.H. Front
28	34575	1	LEVER, Locking
29	34580	1	BRACKET, Binder
30	34583	1	BAR, Clamp
31	K9614	2	PIN, Dowel, hard 1/4 x 2
32	K153	2	CAPSCREW, Socket, 3/8-16 x 1-1/2
33	K151	4	CAPSCREW, Socket, 3/8-16 x 1
34	K151	12	SCREW, Socket head
35	37457	2	TRIP DOG
36	K5388	4	CAPSCREW, But head
37	38210	2	TRIP DOG
38	K1991	4	CAPSCREW, Socket head
39	34451	2	SCREW, Gib
40	E7779	2	SWITCH, Limit
41	K270	4	CAPSCREW, Hex head

SADDLE & TABLE DRIVE (ACME LEAD SCREWS)

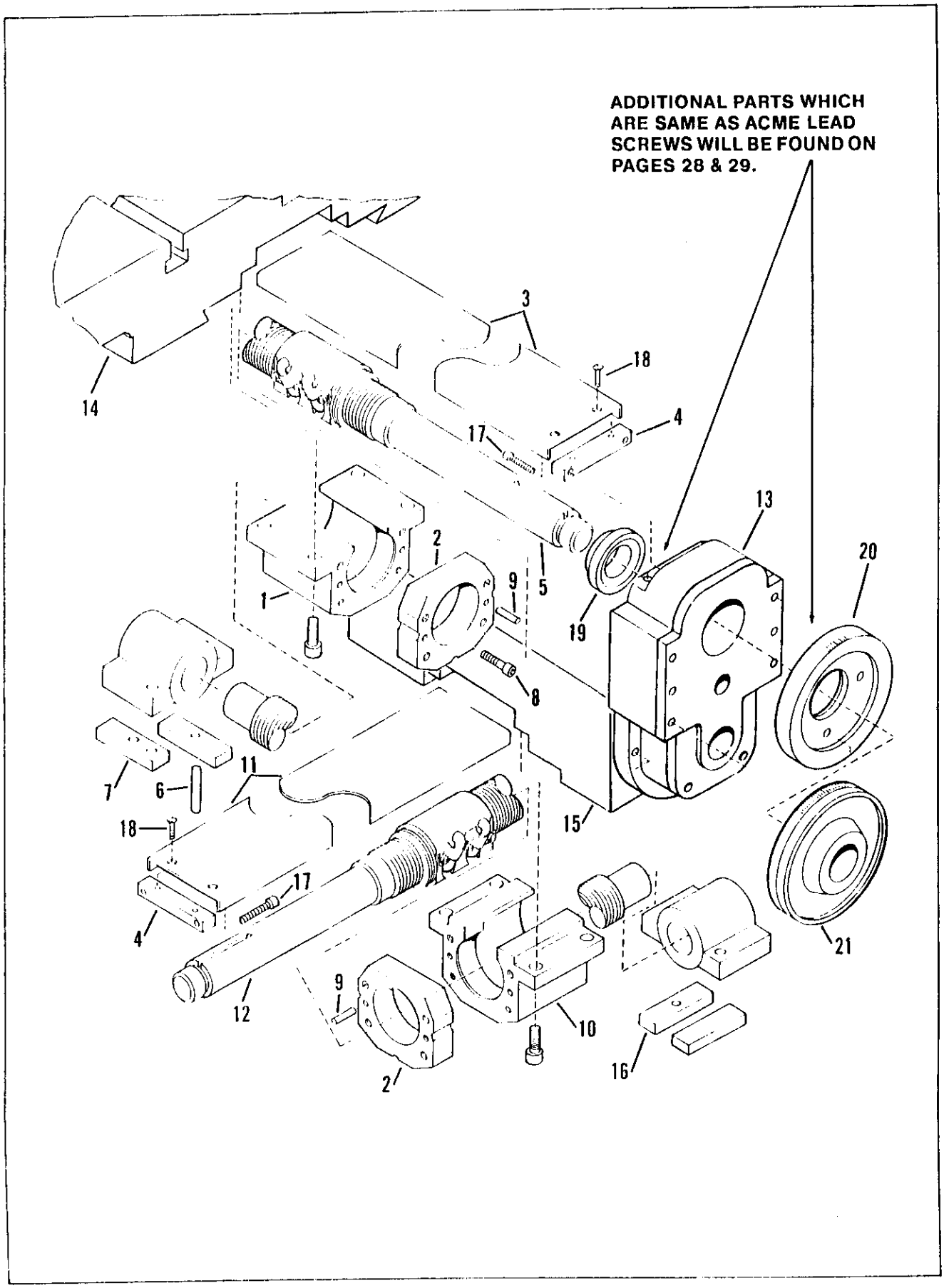


SADDLE & TABLE DRIVE (ACME LEAD SCREWS)

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	K151	12	CAPSCREW, Socket
2	K11257	1	BUSHING, Bronze
3	34567	2	NUT, Lead screw
4	E1310	1	MOTOR
5	34567	2	NUT, Lead screw
6	K4059	4	PIN, Hardened dowel
7	37450	1	SCREW, Carriage lead (DBM II)
	34566	1	SCREW, Carriage lead (DBM I)
8	35753	1	SCREW, Table lead (DBM II)
	34565	1	SCREW, Table lead (DBM I)
9	34577	1	GUARD, Table lead screw (DBM I)
	35757	1	GUARD, Table lead screw (DBM II)
10	34578	1	GUARD, Table lead screw (DBM I & II)
11	K9828	1	KEY
12	34594	2	CLOSURE, Bearing
13	KB34	2	BEARING, Ball, pair
14	34615	1	SPACER
15	34610	1	GEAR, Lead screw
16	34617	1	SPACER
17	34611	1	GEAR, Idler
18	KB5258	2	BEARING, Needle
19	34619	1	SHAFT, Idler
20	CP3174	1	HOUSING
21	K191	2	SCREW, Socket set, 1/4-20 x 1/2
22	34598	2	DIAL, Feed
23	34593	2	SLEEVE, Dial
24	34596	2	WASHER
25	34597	2	DIAL, Fixed
26	34599	2	RING, Taper lock
27	CP3095	2	NUT, Capstan
28	34620	2	WHEEL, Traverse
29	K11456	2	NUT, Stop
30	K11508	1	KNOBS, Hand
31	K11223	1	BUSHING
32	34616	1	BEARINGS, Hand feed
33	34618	1	SHAFT, Hand feed
34	34613	1	GEAR, Motor
35	K153	7	CAPSCREW, Socket head, 3/8-16 x 1-1/2
36	K8186	1	PIN, Taper
37	K135	3	CAPSCREW, Socket head, 1/4-20 x 3/4
38	13659	1	KEY, Square, 3/16 x 1-1/2
39	K6348	1	PIN, Dowel, 1/4 x 5/8
40	K2870	4	CAPSCREW, Socket head, 3/8 x 3-1/2
41	K143	4	CAPSCREW, Socket head, 5/16 x 1

SADDLE/TABLE – DRIVE WITH BALL SCREW – DMB I & II

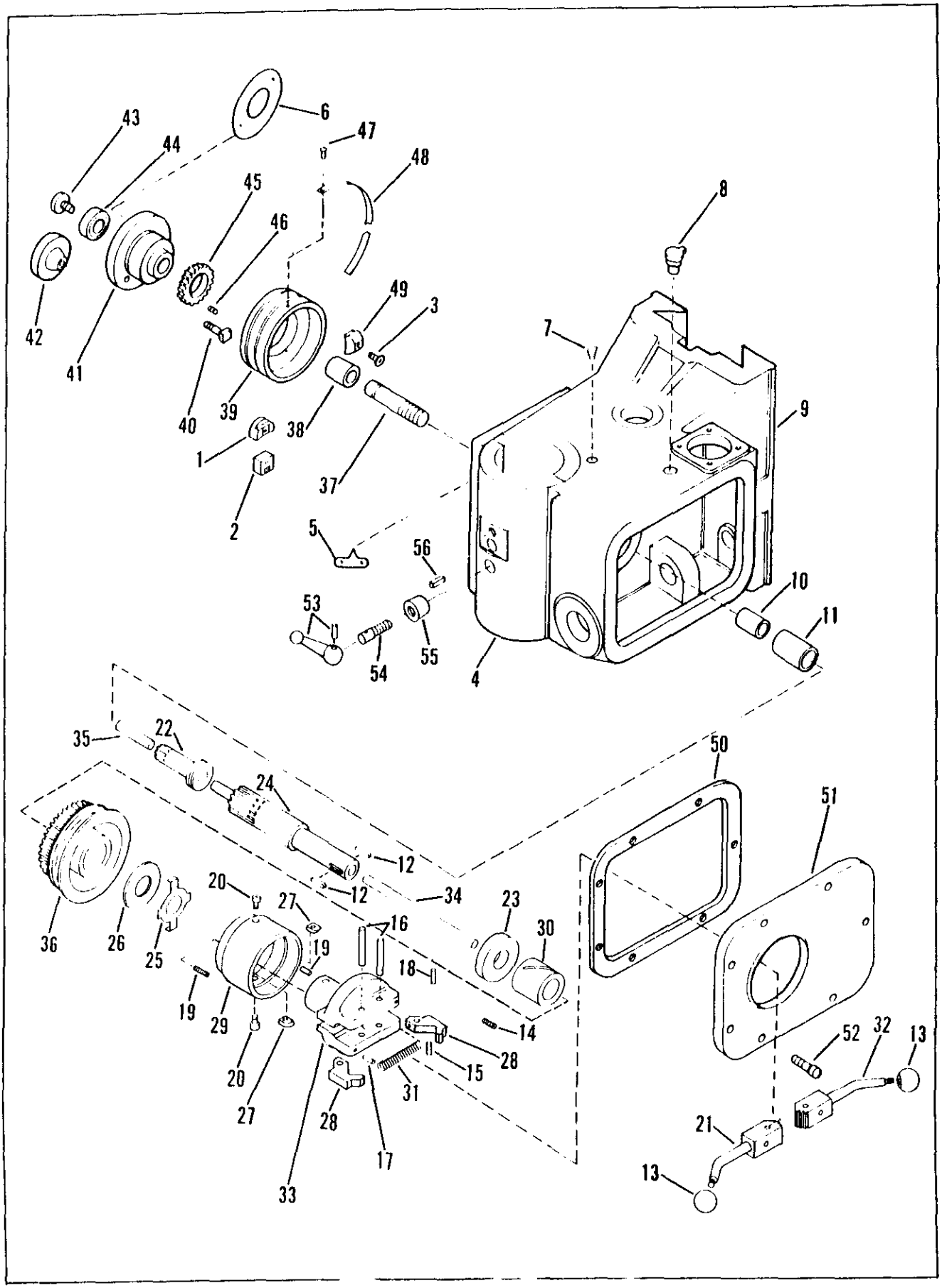


SADDLE/TABLE – DRIVE WITH BALL SCREW – DMB I & II

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	38336	1	BRACKET, Ball nut
2	38334	2	PLATE, Screw mounting
3	38383	1	COVER, Ball screw (DBM I)
	38335	1	COVER, Ball screw (DBM II)
4	38338	2	BRACKET, Cover mounting
5	38384	1	SCREW, Ball (DBM I)
	38332	1	SCREW, Ball (DBM II)
6	K004543	2	DOWEL, 3/8 dia. x 1-1/2
7	38339	2	SHIM
8	K001568	8	SCREW, Socket head, 1/4-20 x 1-1/2
9	K005719	4	DOWEL, 1/4 dia. x 1-1/4
10	38337	1	BRACKET, Ball nut
11	38342	1	COVER
12	38407	1	SCREW, Ball (DBM I)
	38333	1	SCREW, Ball (DBM II)
13	38331	1	BRACKET, Lead screw
14	38405	1	TABLE, Layout drilling (DBM I)
	37338	1	TABLE, Layout drilling (DBM II)
15	38406	1	CARRIAGE (DBM I)
	38330	1	CARRIAGE (DBM II)
16	38340	2	SHIM
17		4	SCREW, Socket head, No. 8-32 x 1/2
18		4	SCREW, Flat head, No. 10-24 x 3/8
19	38382	2	CLOSURE, Bearing
20	32344	2	DIAL, Feed
21	38343	2	DIAL

SLIDING HEAD – PART ONE



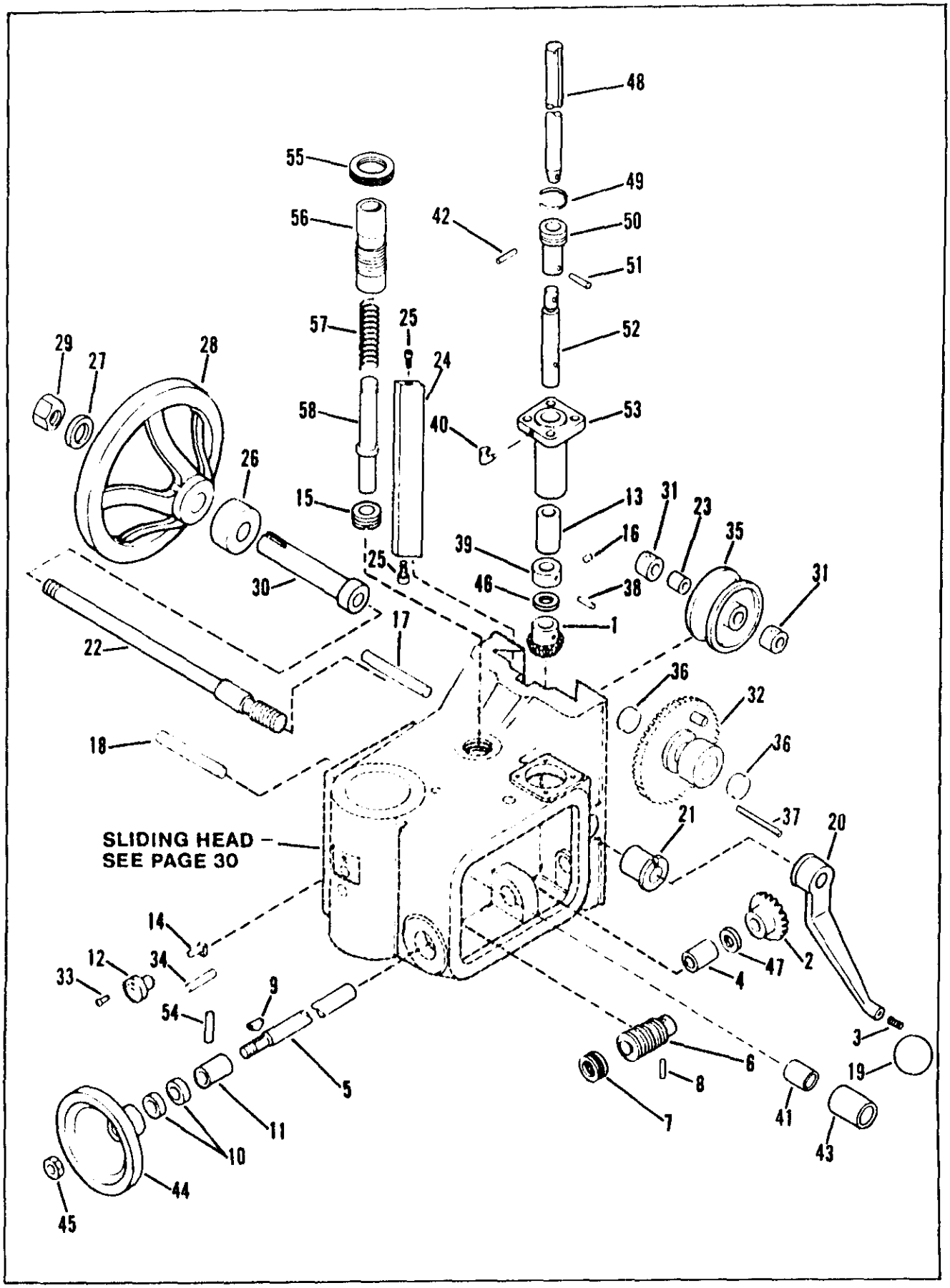
SLIDING HEAD – PART ONE

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	34211	1	DOG, Feed trip
2	34213	1	DOG, Safety trip
3	K7274	1	SCREW
4	34788	1	CAP, Bearing
5	K11480	1	ARROW, Indicating
6	K11922	1	PLATE, Round important
7	K9994	2	COVER, Oil
8	K9998	1	COVER, Oil
9	34165	1	HEAD, Sliding
10	K11260	1	BUSHING
11	K11262	1	BUSHING
12	K9832	2	KEY, 5/16 sq. x 1-3/8 lg. rd. hd.
13	K12409	2	BALL, Black
14	K11798	2	SCREW, Set, socket, fl. pt.
15	K5719	2	PINS, Dowel
16	K4560	2	PINS, Dowel
17	K3405	2	PINS, Dowel
18	K2651	2	PINS, Taper
19	K1379	2	SCREW, Set, socket, dog pt.
20	K133	2	SCREW, Cap, socket hd.
21	34755	1	LEVER, L.H.
22	34602	1	PINION
23	34601	1	SPACER
24	34600	1	SPINDLE, Cross
25	34504	1	SPRING, Clutch
26	34503	1	WASHER

Item	Part No.	Qty.	Description
27	34500	2	KEY
28	34499	2	DOGS, Clutch
29	34498	1	CONE, Clutch
30	34497	1	SLEEVE
31	34274	2	SPRING
32	34273	1	LEVER
33	34270	1	HUB, Return
34	34262	1	ROD, Push
35	K14465	2	PIN, Cam
36	34235	1	GEAR, Worm
37	34209	1	STUD
38	KB5348	1	BEARING
39	34201	1	DIAL
40	34204	1	SCREW
41	34749	1	HUB, Dial
42	34203	1	KNOB
43	34210	1	SCREW
44	KB2544	1	BEARING, Ball
45	34205	1	GEAR
46	K1569	2	SCREW, Set
47	K383	3	SCREW
48	34207	1	SCALE
49	34756	1	DOG, Trip
50	34675	1	GASKET
51	34208	1	COVER, Head
52	K151	7	SCREW
53	34486	1	LEVER, Quill binder
54	34584	1	STUD, Locking
55	34585	1	BUSHING, Stud
56	34586	1	KEY, Clamp

SLIDING HEAD –PART TWO

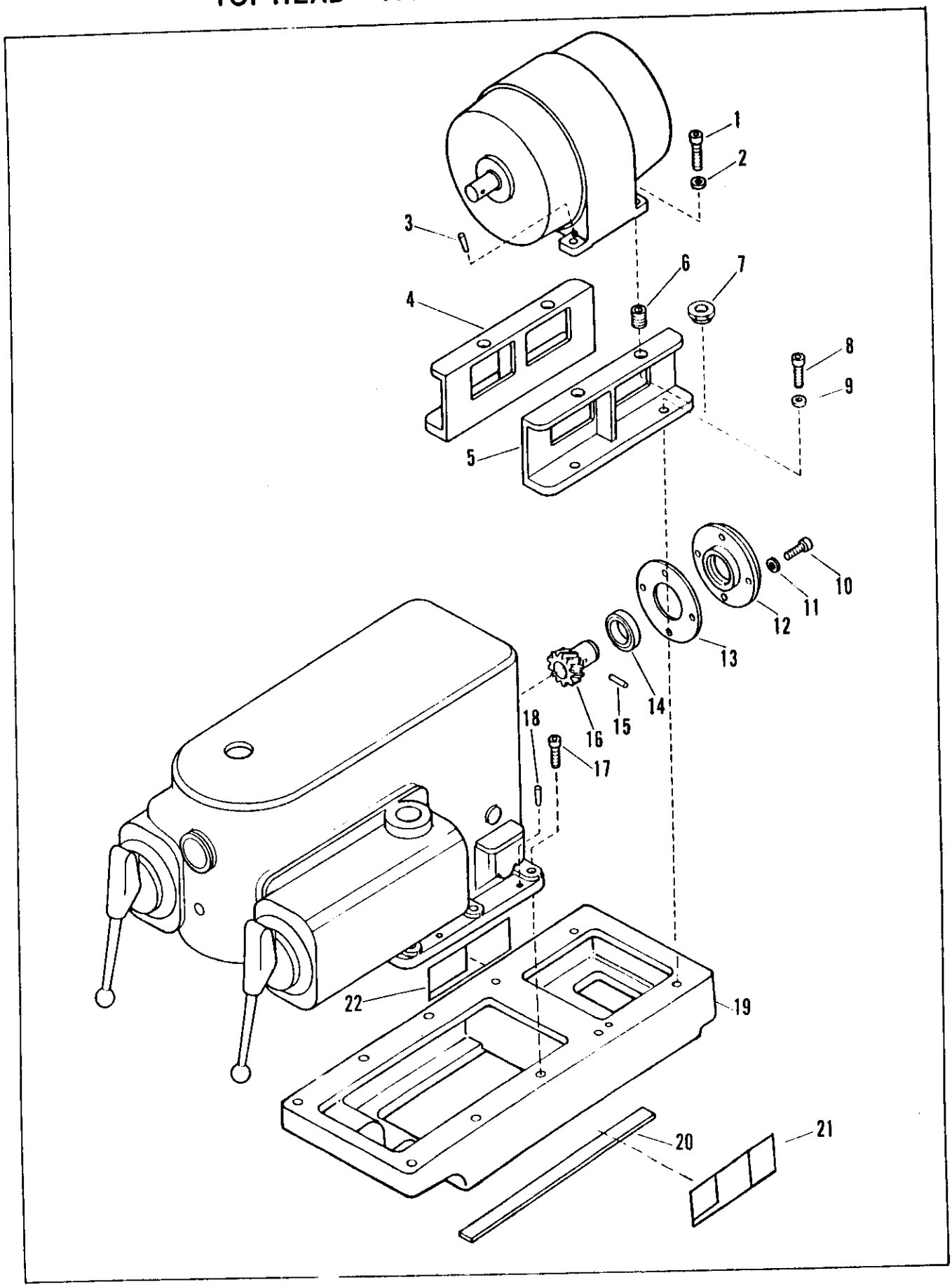


SLIDING HEAD – PART TWO

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	36420	1	PINION, Bevel
2	36421	1	GEAR, Bevel
3	K4692	1	SCREW, Set
4	K11257	1	BEARING
5	34229	1	SHAFT, Worm
6	34234	1	WORM
7	KB5124	1	BEARING
8	K5719	1	PIN, Dowel
9	K556	1	KEY
10	K9978	2	SEAL, Oil
11	K14572	1	BUSHING
12	36323	1	PLUG, Key
13	K11256	1	BEARING
14	36367	1	KEY
15	34332	1	NUT, Closure
16	K1569	1	SCREW, Set
17	34484	1	PIN, Sheave
18	34177	1	PIN
19	K12409	1	KNOB, Ball
20	34496	1	LEVER, Binder
21	34655	1	BUSHING
22	34653	1	SCREW, Binder
23	K11230	1	BEARING
24	34658	1	GIB, Head
25	34451	2	SCREW, Gib
26	34657	1	SPACER
27	34656	1	WASHER
28	34652	1	WHEEL, Hand
29	K11210	1	NUT, Lock
30	34654	1	PINION, Rack
31	34189	2	SPACER
32	CP3048	1	GEAR, Balance (for shock absorber)
33	K7466	6	SCREW, Socket hd. cap, 10-32 x 5/8"
34	K6477	1	PIN, Roll
35	34183	1	SHEAVE
36	K11232	2	BEARING
37	34502	1	PIN, Gear
38	K487	1	PIN
39	34252	1	COLLAR, Set
40	K518	1	CUP, Oil
41	K11258	1	BUSHING
42	34824	1	PIN
43	34603	1	BUSHING
44	K14149	1	WHEEL, Hand
45	K3760	1	NUT
46	36418	1	SPACER
47	34619	1	SPACER
48	34641	1	SHAFT, Feed
49	34258	1	RING, Snap
50	34256	1	COLLAR, Shoulder
51	K484	1	PIN
52	34255	1	SHAFT, Pinion
53	34251	1	BRACKET, Bearing
54	K8285	1	PIN, Pull dowel
55	34337	1	NUT, Lock
56	34333	1	SHELL
57	34335	1	SPRING
58	34334	1	PLUNGER, Spring
59	34332	1	BUSHING

TOP HEAD – TRANSMISSION ADAPTER

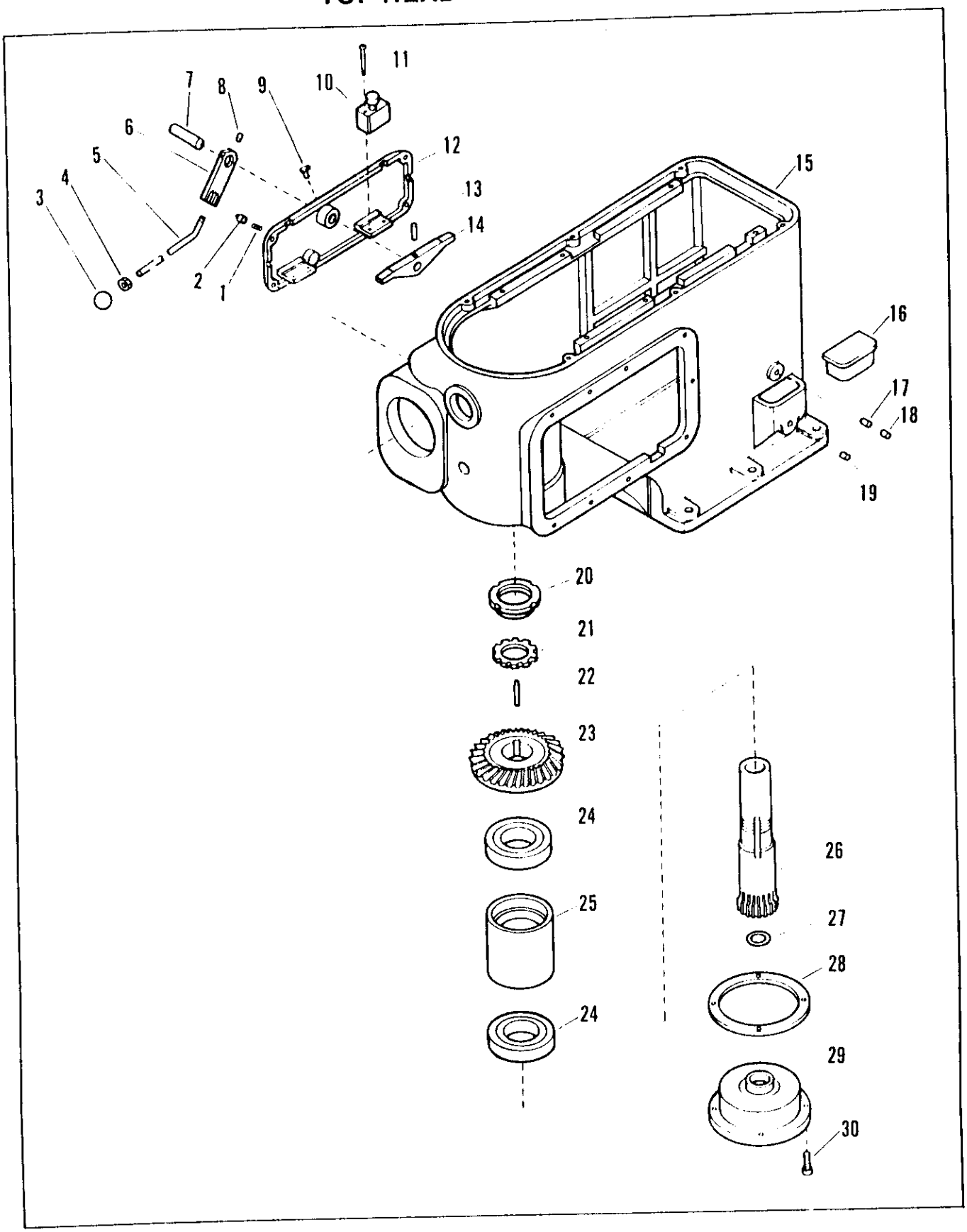


TOP HEAD – TRANSMISSION ADAPTER

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	K135	1	SCREW
2	K454	4	WASHER
3	K487	4	PIN
4	34148	1	BLOCK, Right motor
5	34754	1	BLOCK, Left motor
6	34555	4	SCREW, Adjustment
7	K12431	4	NUT
8	K161	4	SCREW
9	K2445	4	WASHER
10	K135	4	SCREW
11	K452	4	WASHER
12	34122	1	SEAL
13	34673	1	GASKET
14	K11115	1	SEAL, Oil
15	K487	1	PIN
16	34158	1	PINION, High speed head
	34159	1	PINION, Low speed head
17	K2674	6	SCREW
18	K11079	4	PIN
19	34215	1	PLATE, Adapter
20	26199	2	SPACER 30"
21	K12003	1	PLATE, Lube & Instr.
22	K12517	1	PLATE, Instruction

TOP HEAD – PART ONE

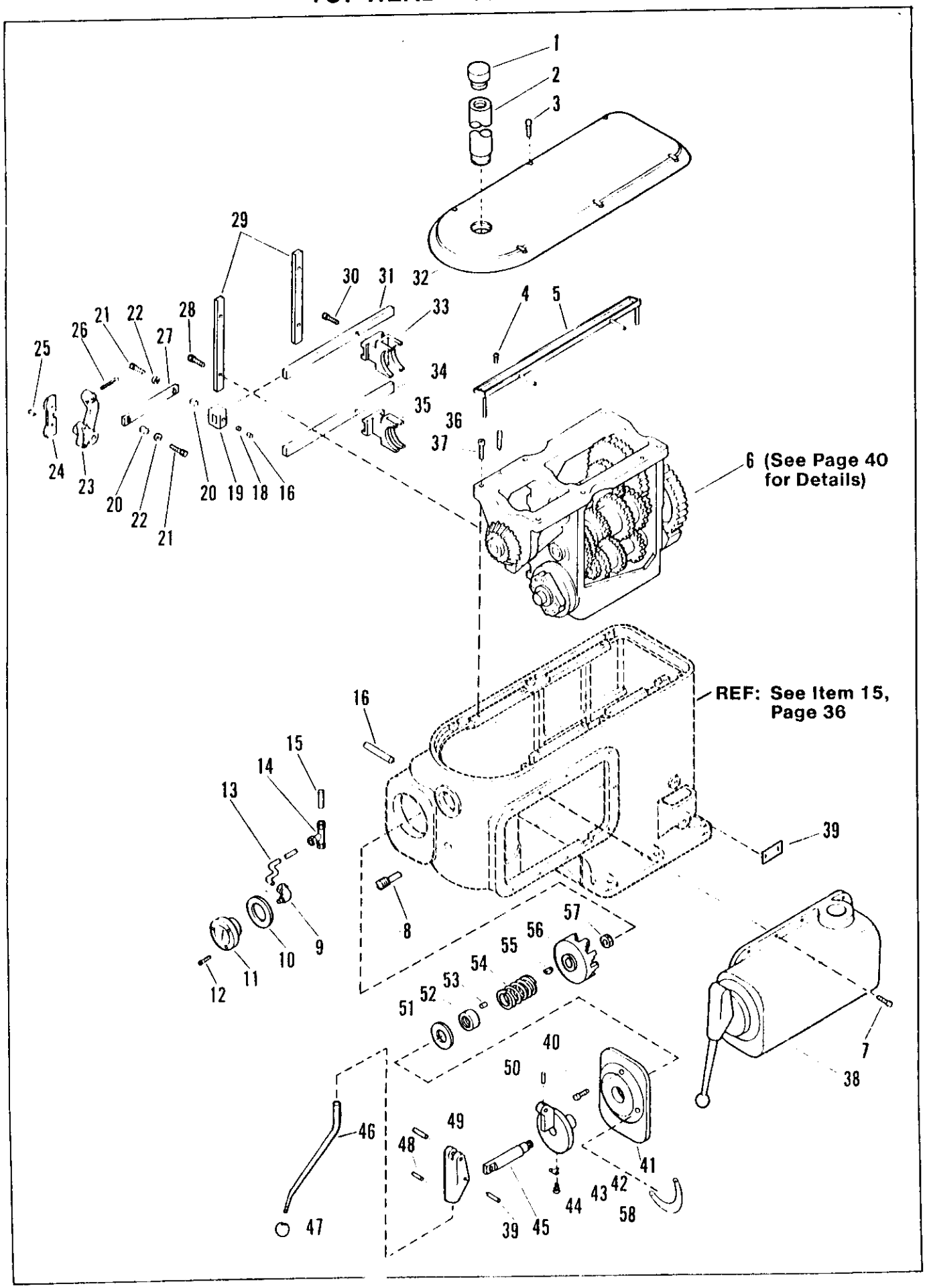


TOP HEAD – PART ONE

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	34429	1	SPRING
2	34328	1	DETENT
3	K11425	1	BALL
4	K1345	1	NUT
5	34325	1	OPERATING LEVER 24"
6	34324	1	LEVER SOCKET
7	34317	1	PIN
8	K216	1	SCREW
9	K9994	1	COVER, Oil
10	E6350	2	BUTTON, Push
11	K9794	4	SCREW
12	34315	1	COVER, Switch
13	K6071	2	DOWEL
14	34316	1	LEVER, Switch
15	34080	1	HEAD, Top
16	34078	1	COVER, Oil
17	K11660	2	SCREW, Set
18	K5439	2	SCREW
19	K657	1	PLUG, Pipe
20	K3352	1	NUT, Lock
21	K3353	1	WASHER, Lock
22	L9817	1	KEY
23	34149	1	PINION, Beveled - 31T Low Range
23	34153	1	PINION, Beveled - 26T High Range
24	KB11177	2	BEARING, Ball
25	34117	1	CARTRIDGE, Bearing
26	34116	1	SLEEVE, Splined
27	K11060	1	"O" RING
28	34672	1	GASKET
29	34118	1	CLOSURE, Bearing
30	K683	7	SCREW

TOP HEAD -- PART TWO



TOP HEAD – PART TWO

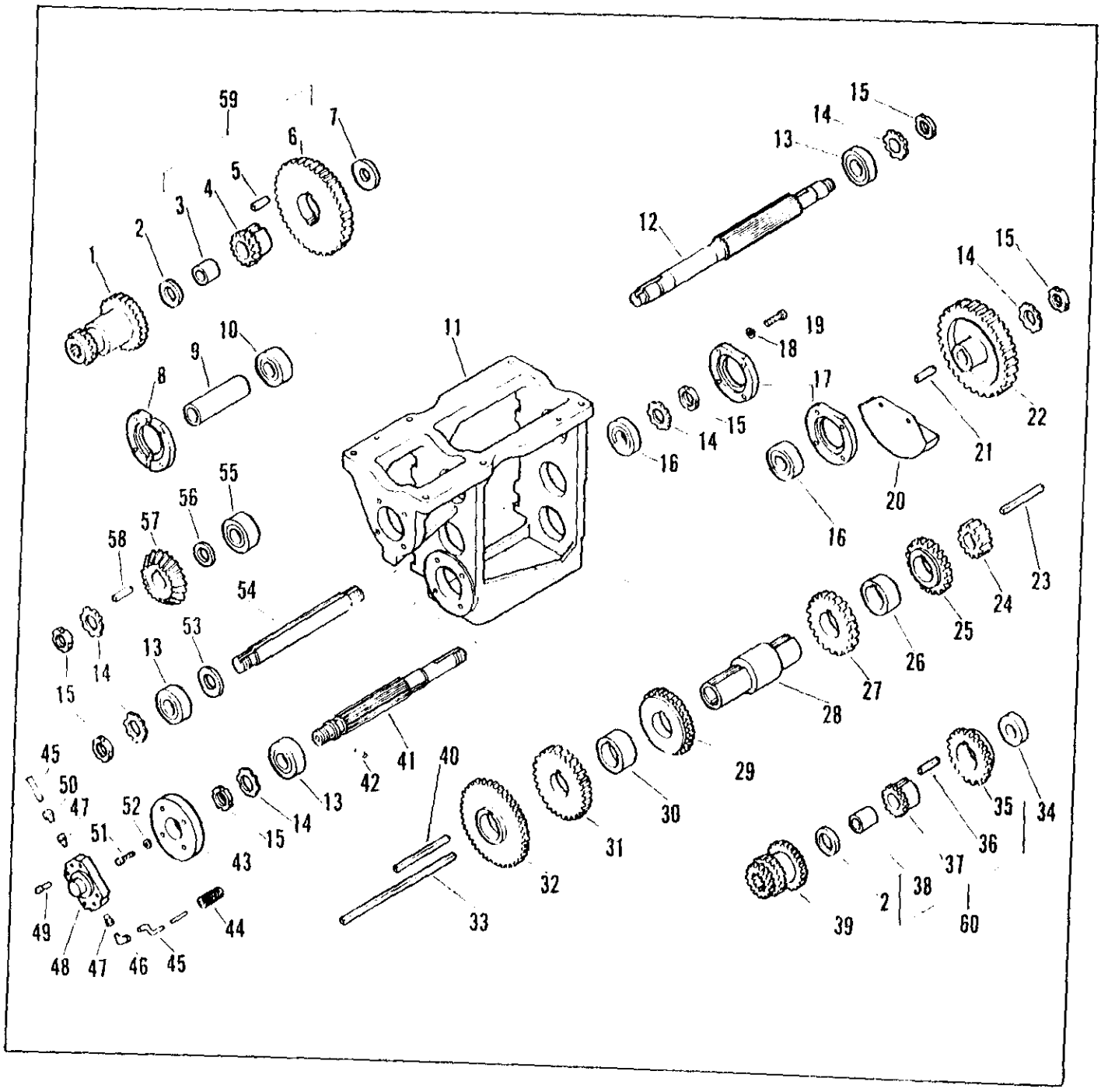
NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	K11657	1	CAP
2	34225	1	GUARD, Spindle
3	K152	6	SCREW
4	K394	2	SCREW
5	34216	1	TROUGH, Oil
6*	CP3019	1	TRANS., Speed
7	K151	9	SCREW
8	34120	1	PLUG, Locating
9	K11028	1	ELBOW, Female
10	34670	1	GASKET
11	K12378	1	GAGE, Oil
12	K1346	3	SCREW
13	K11030	1	TUBING
14	K11013	1	TEE, Union
15	34218	1	DISTRIBUTOR, Oil
16	34289	1	PIN
17	K5439	2	SCREW
18	K4577	2	SCREW
19	34314	2	COLLAR
20	34304	4	BUSHING
21	K269	4	SCREW
22	K6946	4	WASHER
23	34301	2	ARM, Shift
24	34296	2	LOCK, Gear shift
25	K6754	4	SCREW
26	K11658	4	PIN, Cotter
27	34305	2	LINK
28	K683	4	SCREW
29	34297	2	BAR, Keeper
30	K268	2	SCREW
31	34759	1	BAR, Top shift
32	34099	1	COVER, Top

Item	Part No.	Qty.	Description
33	34313	1	SHOE, Shift
34	34311	1	BAR, Lower shift
35	34312	1	SHOE, Shift
36	K11078	2	PIN
37	K152	6	SCREW
38	G60-901	1	FEED & SPEED ASSY.
39	K11481	1	PLATE, Oil level
40	K683	7	SCREW
41	34292	1	CAP, Dial
42	34279	1	HUB, Lever
43	K11480	1	ARROW, Indication
44	K4717	2	SCREW
45	34287	1	ROD, Speed
46	34286	1	HANDLE, Lever
47	K12409	1	BALL
48	K187	1	SCREW, Set
49	K4543	2	PIN, Dowel
50	K11663	2	SCREW, Set
51	34303	1	WASHER
52	34302	1	BUSHING
53	K11663	2	SCREW, Set
54	34291	1	SPRING
55	K11634	1	KEY
56	34293	1	SELECTOR, Speed
57	K11977	1	NUT, Lock
58	K12250	1	PLATE, Speed (50-1000)
	K12251	1	PLATE, Speed (75-1500)
	K12249	1	PLATE, Speed (Dual plate)

*See page 40 for details.

TOP HEAD – SPEED TRANSMISSION



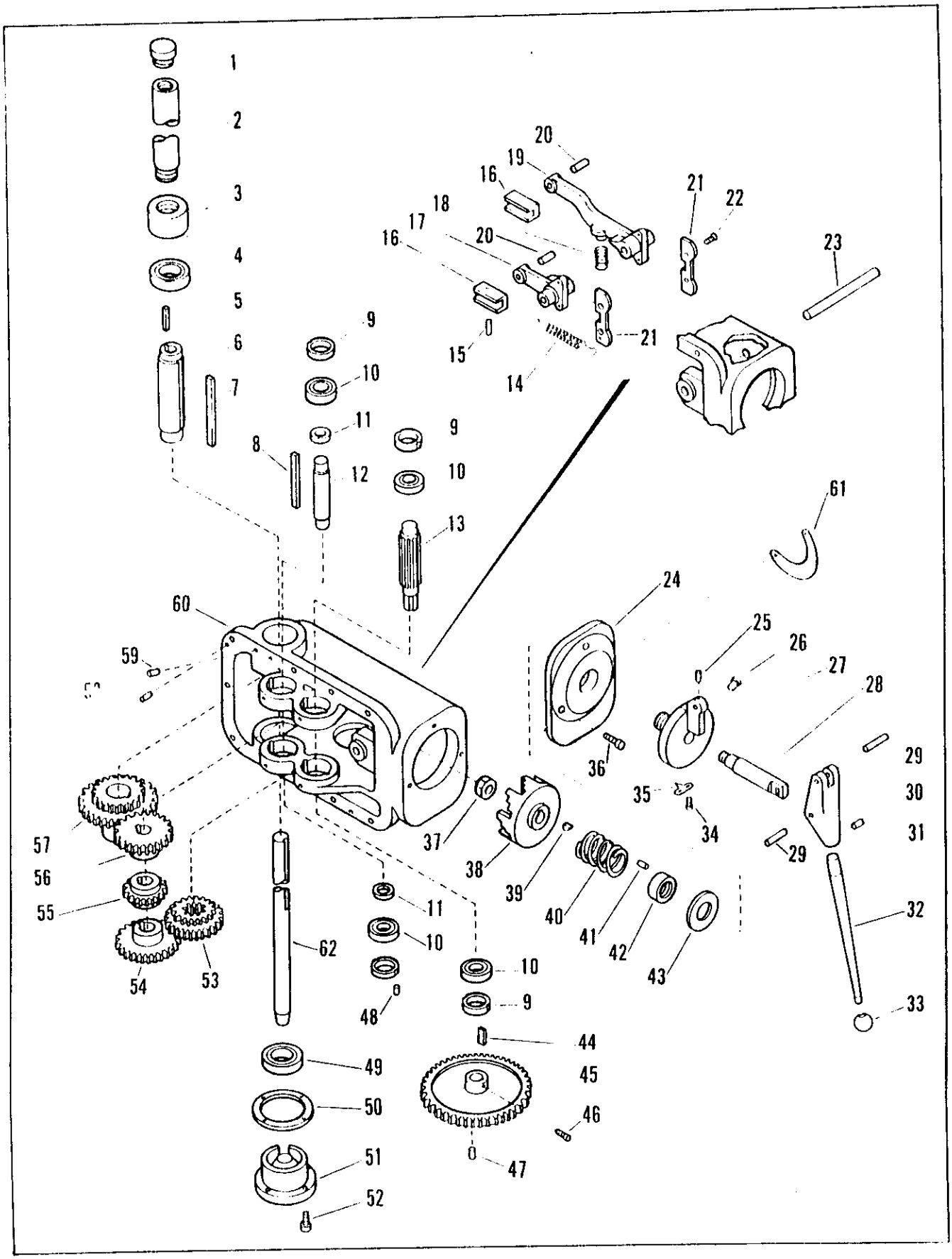
TOP HEAD – SPEED TRANSMISSION

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	36398	1	GEAR, Cluster
2	34138	2	WASHER
3*	K11625	1	BEARING
4*	34141	1	GEAR, Clutch
5*	K9836	2	KEY
6*	36394	1	GEAR
7	34137	1	SPACER
8	34760	1	CAP, Bearing
9	34145	1	SPACER, Bearing
10	KB2450	1	BEARING, Ball
11	34101	1	FRAME, Speed trans.
12	34146	1	SHAFT, 3rd
13	KB11147	3	BEARING, Ball
14	K2669	6	WASHER, Lock
15	K2668	6	NUT, Lock
16	KB11148	2	BEARING, Ball
17	34121	2	CAP, Bearing
18	K442	12	WASHER, Lock
19	K268	12	WASHER, Lock
20	34161	1	PAN, Oil
21	K9819	1	KEY
22	34160	1	GEAR, Drive
23	K9821	1	KEY
24	34131	1	GEAR
25	34129	1	GEAR
26	34135	1	SPACER
27	34132	1	GEAR
28	34133	1	SLEEVE, Gear
29	36396	1	GEAR
30	34134	1	SPACER
31	34127	1	GEAR
32	36395	1	GEAR
33	K9830	1	KEY
34	34139	1	SPACER
35*	34124	1	GEAR
36*	K9814	1	KEY
37*	34123	1	GEAR
38*	K11625	1	BEARING
39	36397	1	GEAR, Cluster
40	K9825	1	KEY
41	34147	1	SHAFT, 1st
42	K5665	1	PIN, Roll
43	34664	1	BRACKET, Pump
44	34219	1	STRAINER, Oil
45	K11030	2	TUBING
46	K11023	1	ELBOW
47	K12765	2	REDUCER
48	K9842	1	PUMP, Oil
49	K2027	4	SCREW, Cap
50	K11029	1	CONNECTOR
51	K151	4	SCREW, Cap
52	K441	4	WASHER, Lock
53	34136	1	WASHER
54	34144	1	SHAFT, 2nd
55	KB11158	1	BEARING, Ball
56	34151	1	SPACER
57	34150	1	PINION, Bevel
57	34152	1	PINION, Bevel
58	K9817	1	KEY
59	CP3017	1	GEAR, Clutch & Idler
60	CP3018	1	GEAR, Clutch & Idler

*Individual parts not sold separately, must purchase sub-assembly

TOP HEAD – FEED TRANSMISSION



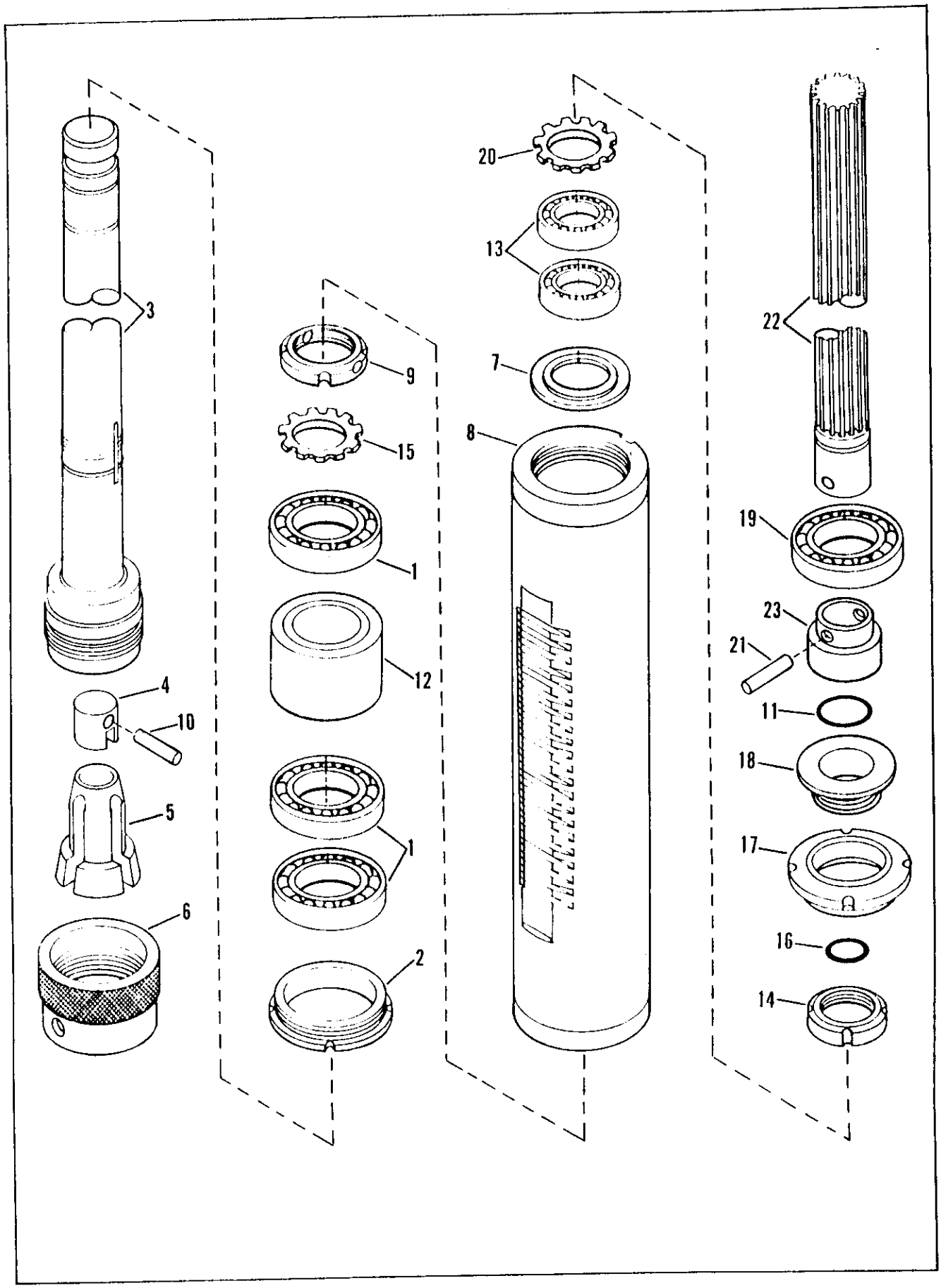
TOP HEAD – FEED TRANSMISSION

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
1	K11656	1	CAP
2	34226	1	GUARD, Shaft
3	34224	1	CLOSURE, Bearing
4	KB11298	1	BEARING, Ball
5	K11094	1	KEY
6	35047	1	QUILL
7	K9829	1	KEY
8	K9326	1	KEY
9	34246	4	COLLAR, Bearing
10	KB5066	4	BEARING, Ball
11	34242	2	SPACER
12	34241	1	SHAFT, 2nd
13	34239	1	SHAFT, Splined
14	34299	1	SPRING
15	K6071	1	DOWEL
16	34308	2	SHOE, Shifter
17	34307	1	ARM, Shifter
18	34309	1	SPRING
19	34306	1	ARM, Shifter
20	K7203	2	DOWEL
21	34296	2	LOCK, Gear shift
22	K6754	4	SCREW
23	34290	1	PIN
24	34292	1	CAP, Dial
25	K11663	2	SCREW, Set
26	K9994	1	COVER, Oil hole
27	34279	1	HUB, Lever
28	34288	1	ROD, Feed
29	K4543	2	DOWEL
30	34281	1	LEVER
31	K187	1	SCREW, Set
32	34283	1	HANDLE, Lever

Item	Part No.	Qty.	Description
33	K12409	1	BALL
34	K4717	2	SCREW
35	K11480	1	ARROW, Indication
36	K683	3	SCREW
37	K11977	1	NUT, Lock
38	34294	1	SELECTOR, Feed
39	K11634	1	KEY
40	34291	1	SPRING
41	K11663	2	SCREW, Set
42	34302	1	BUSHING
43	34303	1	WASHER
44	K9815	1	KEY
45	34238	1	GEAR
46	K11662	1	SCREW, Cap
47	K187	1	SCREW, Set
48	K187	8	SCREW, Set
49	KB11297	1	BEARING, Ball
50	34676	1	GASKET
51	34223	1	CAP, Bearing
52	K133	4	SCREW
53	34240	1	GEAR, Cluster
54	34245	1	GEAR
55	34244	1	GEAR
56	34243	1	GEAR
57	34248	1	GEAR
58	K3934	2	DOWEL
59	K2006	2	SCREW, Set
60	34100	1	BOX, Feed gear
61	K12242	1	PLATE, Feed (5 to 45)
	K12241	1	PLATE, Feed (2.3 to 23)
	K12246	1	PLATE, Feed (1.0 to 10)
62	34641	1	SHAFT, Feed

SPINDLE & QUILL ASSEMBLY – Collet Type



SPINDLE & QUILL ASSEMBLY – Collet Type

NOTE: Order by your machine serial number and this parts list.

Item	Part No.	Qty.	Description
—	CP3582	1	SPINDLE & QUILL ASSEMBLY, Collet Type (Incl. Items 1 thru 20)
1	KB11271	3	BEARING
2	34643	1	CLOSURE, Bottom
3	38425	1	SPINDLE, Collet Type
4	34114	1	PLUG, Tang
5	34456	1	COLLET Morse Taper
6	38426	1	NUT, Hand
7	34636	1	SPACER
8	38428	1	QUILL, Spindle
9	K1349	1	NUT, Lock
10	K406	1	PIN, Dowel
11	K11059	1	WASHER
12	CP3586	1	RING SPACER ASSEMBLY
13	KB11270	2	BEARING
14	K5180	1	NUT, Lock
15	K5181	1	WASHER, Tab
16	K11057	1	"O" RING
17	38427	1	CLOSURE, Top
18	34637	1	SLINGER
19	KB11172	1	BEARING
20	K95	1	WASHER, Tab
—	CP3030	1	DRIVE SHAFT ASSEMBLY, Spindle (Incl. Items 21 thru 23)
21	K11797	1	PIN, Dowel
22	34639	1	SHAFT, Spindle drive
23	34640	1	COUPLING, Spindle

SPINDLE & QUILL ASSEMBLY – #4 M.T. Type