

OPERATING INSTRUCTIONS  
and  
PARTS LIST

**14**  
**CLAUSING**

14-inch LATHES - 6900-series

**CLAUSING**

*DIVISION OF ATLAS PRESS COMPANY*

1915-2023 N. PITCHER ST., KALAMAZOO, MICHIGAN - U. S. A.

**This Manual Applies To Clausing 14 " Lathes  
From Serial No. 600342 To \_\_\_\_\_**

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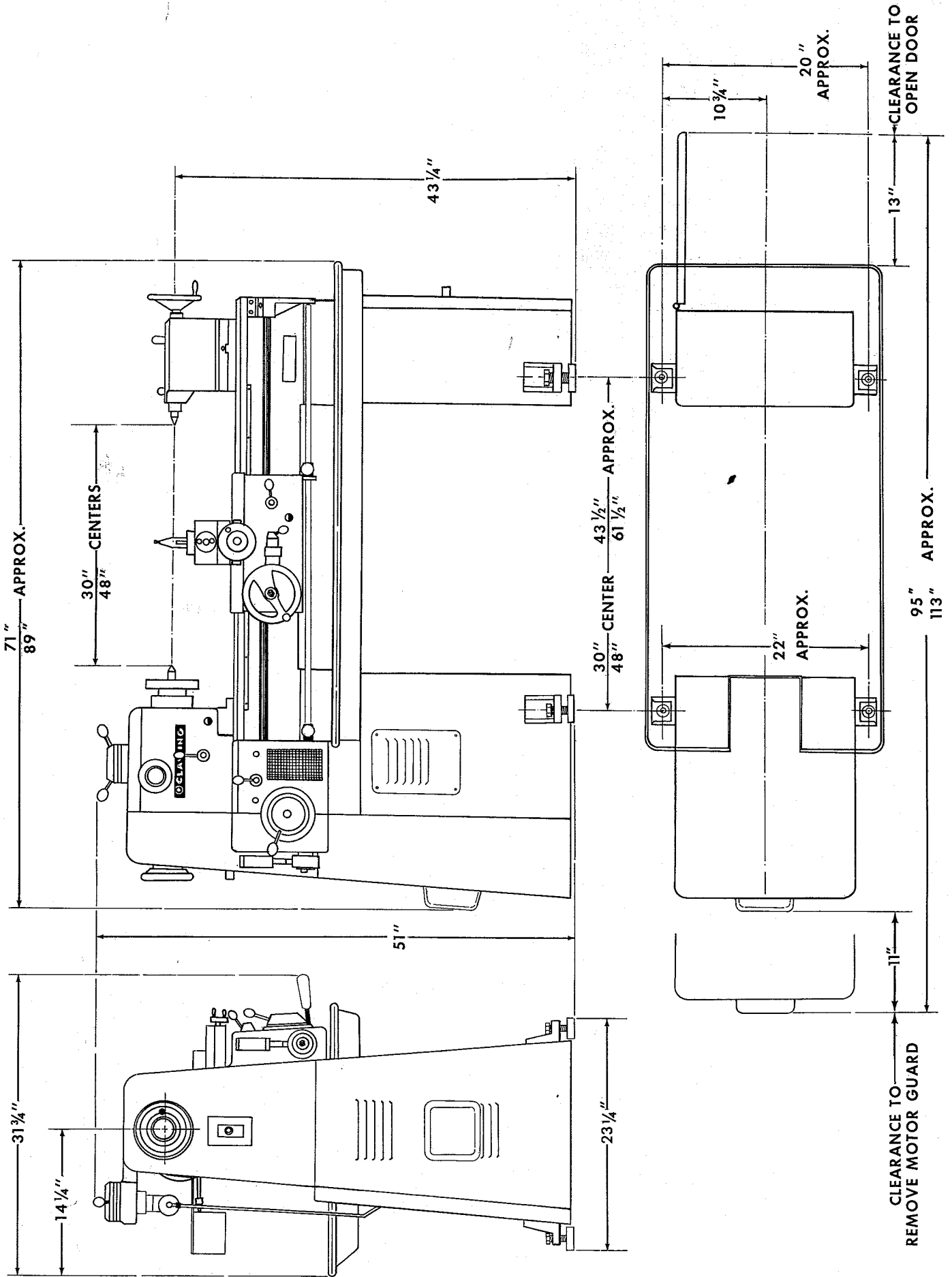
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GENERAL DIMENSIONS — 6900 SERIES CLAUSING LATHES



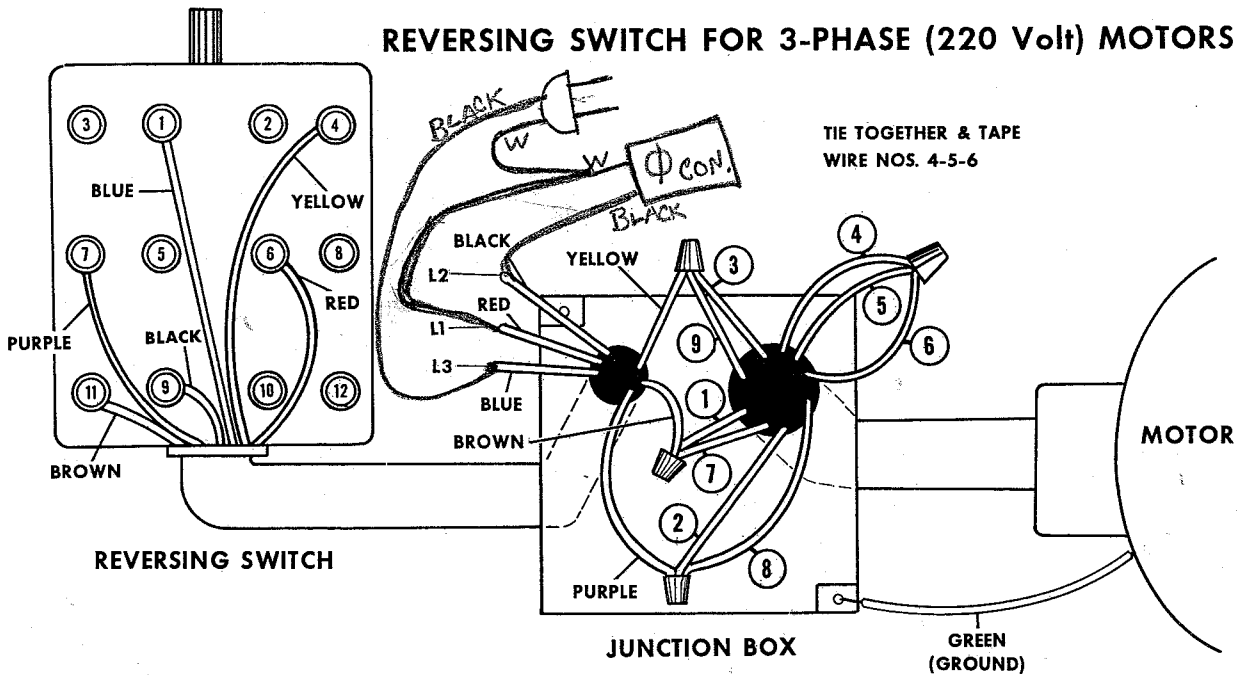


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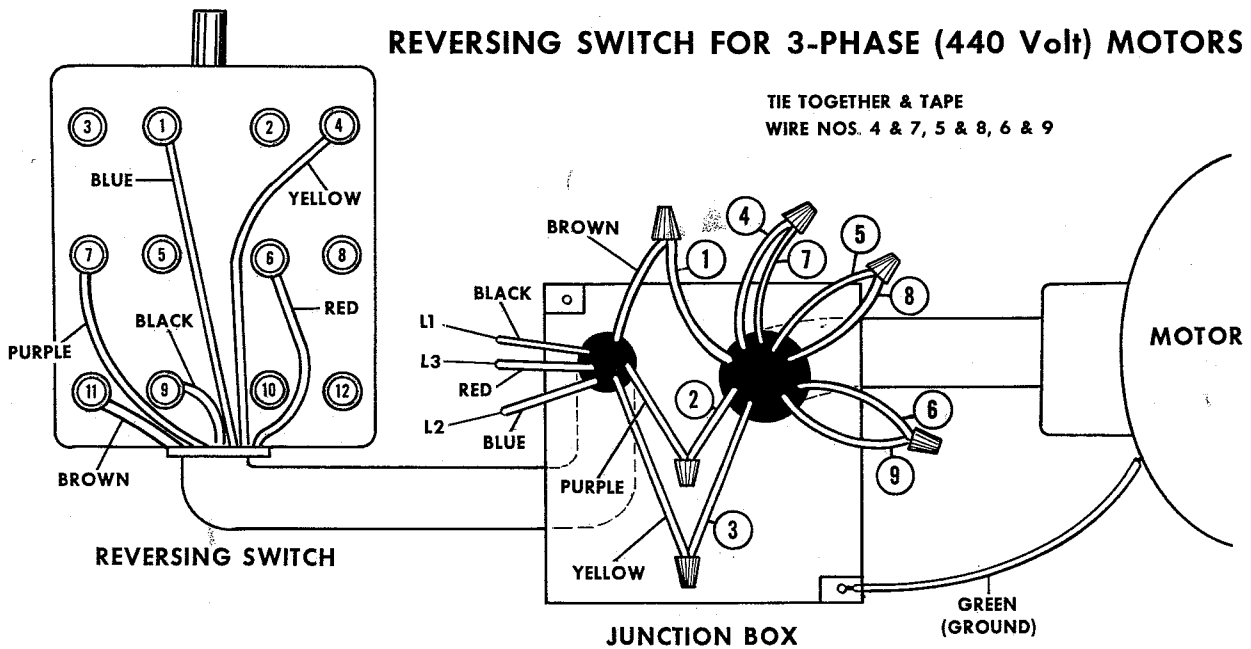
# WIRING INSTRUCTIONS

for  
6900 SERIES  
CLAUSING LATHES

SEPTEMBER 1963 FILE NO. 710-042-1



NOTE: TO REVERSE ROTATION OF MOTOR INTERCHANGE ANY TWO LINE LEADS L1, L2 OR L3.



# INSTALLATION

## FOUNDATION

Your Clausing lathe is a precision machine tool, and requires a solid foundation. The floor must be heavy enough to support the weight of the machine without noticeable deflection, and it must be level. If the floor does not meet these important requirements, a special foundation should be built.

**CONCRETE FLOORS** -- A reinforced concrete floor is the best foundation: it provides a rigid base, minimizes vibration from adjacent machines, and resists deflection.

**WOOD FLOORS** should be carefully checked for strength -- place a precision level on floor where lathe is to be located, and move a hand truck with average load past it. If bubble in level shows noticeable movement, the floor should be reinforced, or cut away and a concrete foundation installed.

## CLEANING

Before moving carriage or tailstock along the ways, use a good grease solvent to remove the rust-proof coating applied to all polished and unpainted surfaces.

Do not use an air hose -- it could force dirt or grit picked up during transit into bearing surfaces.

Use a stiff bristle brush to clean lead screw.

When thoroughly cleaned, cover the unpainted surfaces with a light coating of "Way Lubricant" for proper lubrication.

Frequent cleaning and lubrication is essential to long service life -- see page 5 for instructions.

## MOVING AND LIFTING

Leave lathe on skid -- simplifies moving to final location.

**IMPORTANT:** DO NOT slide lathe along floor.  
DO NOT USE fork lift under chip pan.

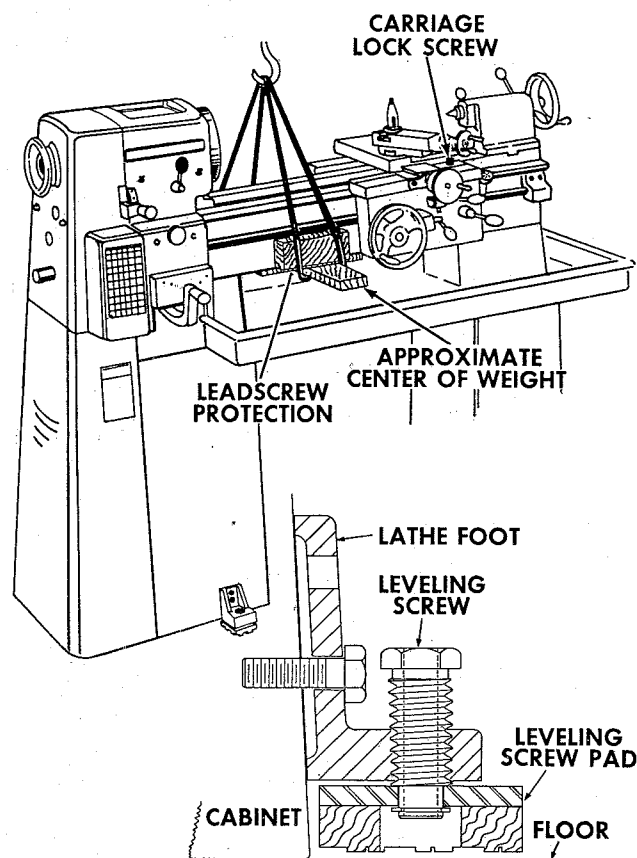


Figure 1

**CAUTION:** DO NOT LOWER LEVELING SCREW PADS UNTIL LATHE IS READY TO BE LEVELED -- refer to figure 1.

When using a sling -- clean bed ways, move tailstock to the right-hand end of the bed and lock it in place. To protect lead screw and bed, place a 3/4" thick hardwood board under approximate center of weight load, insert sling as shown in figure 1, and raise machine about one-inch off floor. Make any necessary adjustments for balance by moving carriage along bed. -- Before moving carriage, loosen lock screw -- located on top right side of the carriage.

If a fork lift is used, place 3/4" thick hardwood board under the bed so that the clutch rod will not be bent when the lathe is raised -- do not pick up by chip pan.

Mounting pads do not require anchoring.

Leveling screws are equipped with non-slip mounting pads which eliminate the need for anchoring or bolting machine to floor. Floor must be clean and free of oil.

## ELECTRICAL CONNECTIONS

The machine is wired at factory -- merely connect power supply to line leads in junction box on back of headstock cabinet. **IMPORTANT:** To reverse rotation of motor interchange any two line leads -- see WIRING INSTRUCTIONS.

Before connecting motor, make sure that voltage and other current requirements of the motor correspond with your power supply. If there is any question, verify your current and voltage by calling your power company.

## ANCHORING LATHE TO FLOOR

**CAUTION: DO NOT SLIDE LATHE ALONG FLOOR.**

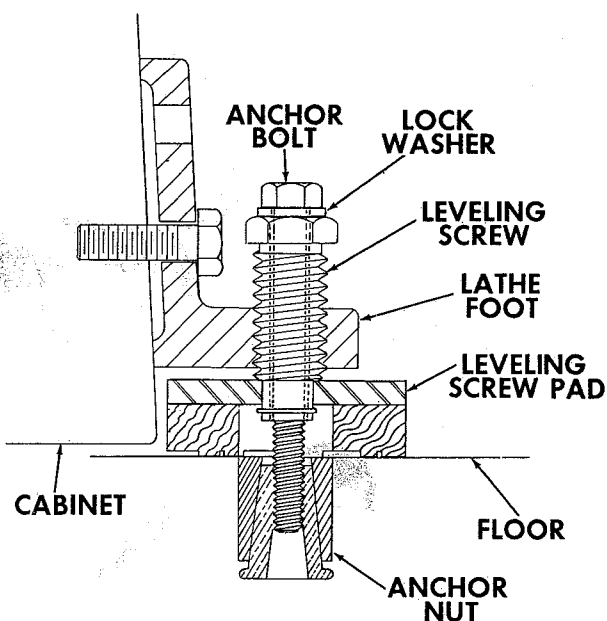


Figure 2

Use anchor bolts to secure lathe to concrete floor -- use lag screws to secure lathe to wood floor -- refer to figure 2.

With a hoist or lift, lower the lathe into position and mark the four leveling screw locations. **DO NOT LOWER LEVELING SCREW PADS.**

Lift machine out of the way, drill holes for anchor nuts and install anchor nuts -- for lag screws drill pilot holes.

Position and lower machine. Turn leveling screws until *no portion* of the lathe cabinet *touches the floor* -- shim under pads, if necessary.

Start anchor bolts or lag screws -- **DO NOT** tighten until lathe is level -- see Leveling Instructions.

## LEVELING

The lathe should be kept perfectly level at all times. When carelessly mounted, the bed may become twisted. Even a slight amount of twist will move centers out of alignment and result in inaccurate work and excessive wear. Make it a habit to regularly check the level of the bed.

**THIS IS IMPORTANT:**

Use *one* precision level at least 6" long -- level should show a distinct bubble movement when a .003" shim is placed under one end.

Clean the bed ways thoroughly.

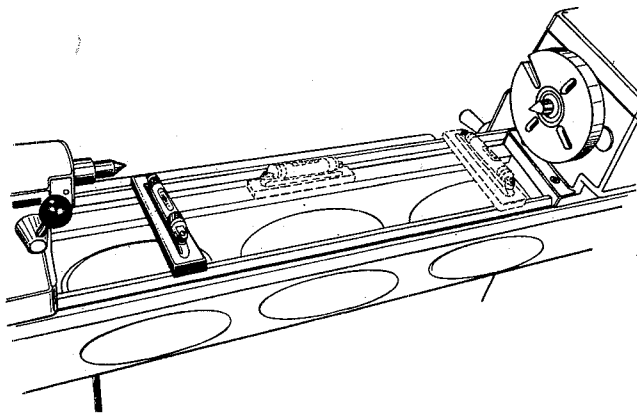


Figure 3

1. First level bed longitudinally, compensate for variations of bubble readings by turning the leveling screws on the cabinet base until bed is level -- refer to Figure 3 for level positions.

2. Next level both ends of the bed. The headstock and the tailstock -- must be checked with the level placed at right angles to the bed. Refer to Figure 3. Use a square to align the level. *Do not turn level end for end.*

Level reading at headstock and tailstock must be identical. Compensate for variations of bubble readings by turning the leveling screws until lathe is level.

**NOTE:** Avoid excessive adjustment of leveling screws by inserting shims between pads and floor.

3. Tighten the four anchoring bolts *not more than* finger-tight, or until the lock washers start to compress -- lag screws should be tightened, then backed off about one-quarter turn.

4. Recheck the level of the lathe -- unequal tightening of anchoring bolts may have pulled the bed out of level. Recheck leveling in 5 days.

Check level of bed at frequent intervals. Chatter -- turning taper -- boring taper -- facing convex or concave is the general result of an improperly leveled lathe.

# LUBRICATION CHART - - - 6900 SERIES CLAUSING LATHES

## CODE

**D-DAILY** oil with Texaco Way Lubricant "D" or equivalent.  
**W-WEEKLY** oil with Texaco Way Lubricant "D" or equivalent.  
**M-MONTHLY** clean with Kerosene, then oil with Texaco Way Lubricant "D" or equivalent.

## FREQUENTLY

**F1**-Check oil level in Window. Remove pipe plug and fill to mark with TEXACO REGAL PC-R&O oil or equivalent.

**F2**-With motor running and variable dial turned to low speed, fill with TEXACO REGAL PC-R&O oil or equivalent.

**F3**-With gear engaging lever in down position, check oil level in window. With lever in this position, fill to mark with TEXACO REGAL OIL G or equivalent.

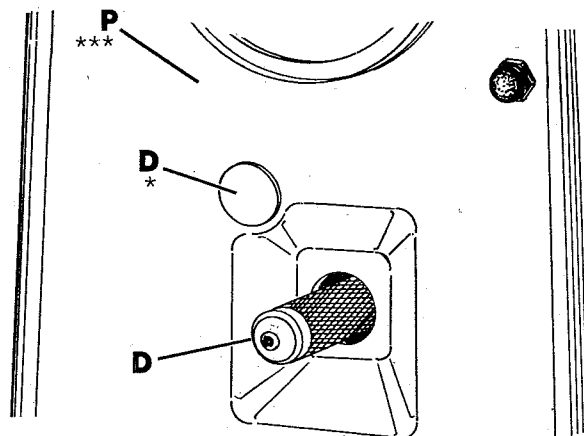
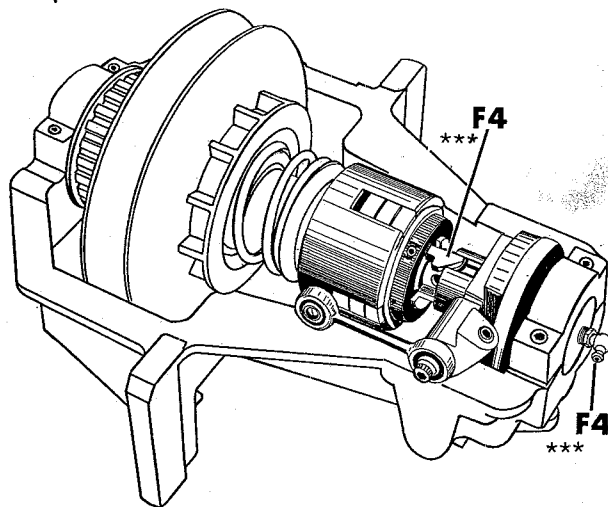
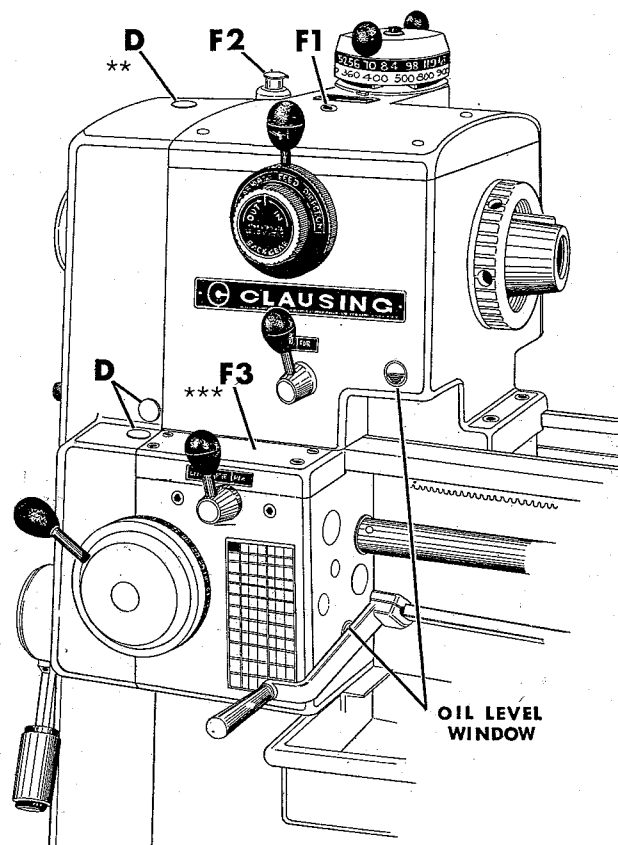
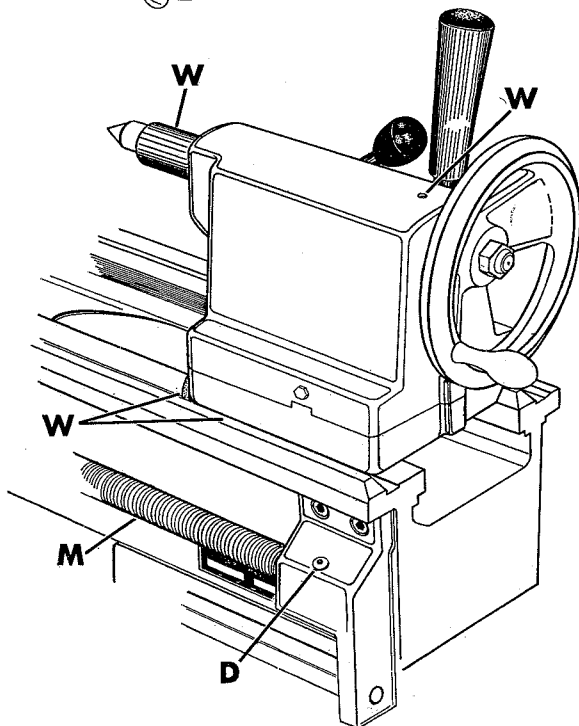
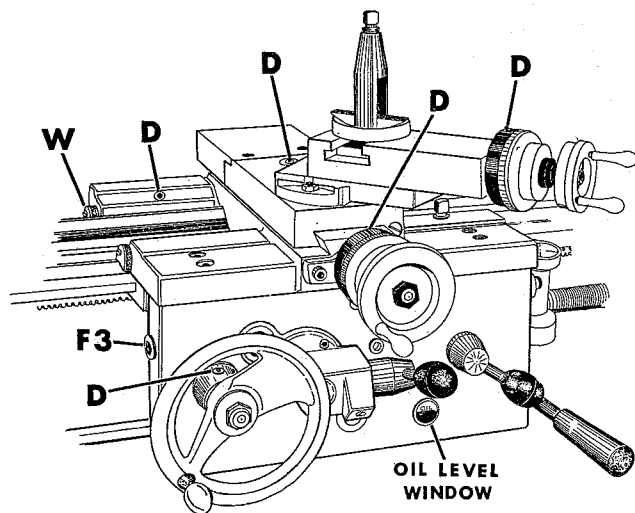
**F4**-Fill countershaft fitting and grease the two fingers with TEXACO MARFAX H.D.#2 grease or equivalent.

**P-PERIODICALLY** lubricate quadrant gear teeth with TEXACO CRATER No. 2X fluid or equivalent. Remove oil and dirt before applying.

\* Remove plug.

\*\* Remove plug and turn spindle until oiler shows.

\*\*\* Remove cover.



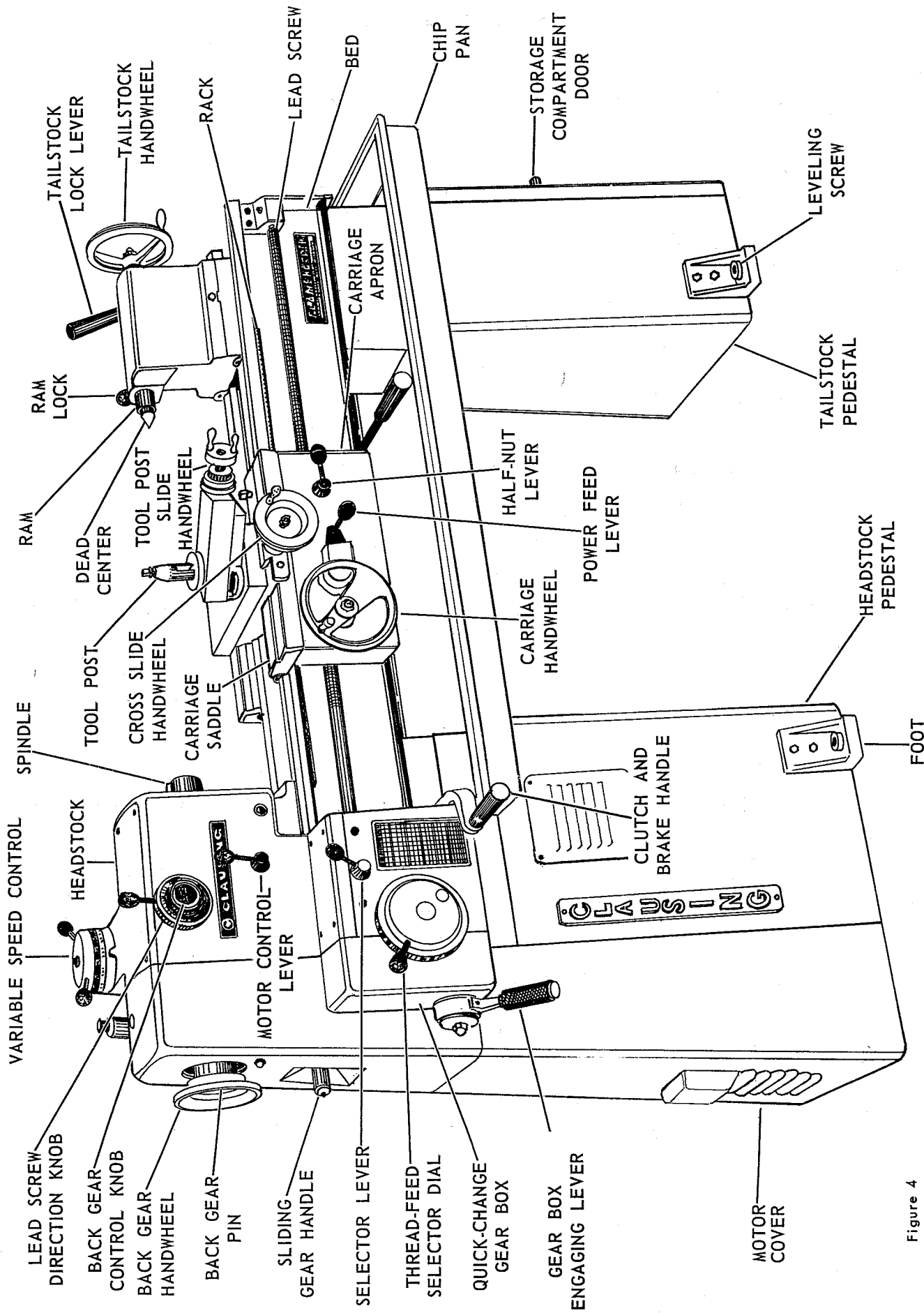


Figure 4



## CONTROLS AND OPERATIONS

Do not operate lathe until you are thoroughly familiar with all controls and their functions. The machine is shipped from factory with gears set for direct drive, and carriage locked to bed. Read the instructions carefully. Then, first operate the lathe in back gear -- get the "feel" of the controls -- set up different threads and feeds -- engage the power feeds -- get acquainted with the lathe before you start a job -- it will save time and produce better work.

### HEADSTOCK

The totally enclosed headstock houses and supports the spindle, spindle bearings and driving gears. Gears, shafts, bearings and spindle bearings travel in a bath of oil.

### BACK GEAR CONTROLS

BACK GEAR DRIVE provides the slow spindle speeds from 43 to 230 rpm required for heavy cuts and correct surface speeds for large diameter work.

**IMPORTANT:** The back gear knob should not be moved from one position to another unless motor is in "OFF" position. Spindle must come to a complete stop before changing drives.

To engage the back gear drive:

1. Stop lathe spindle.

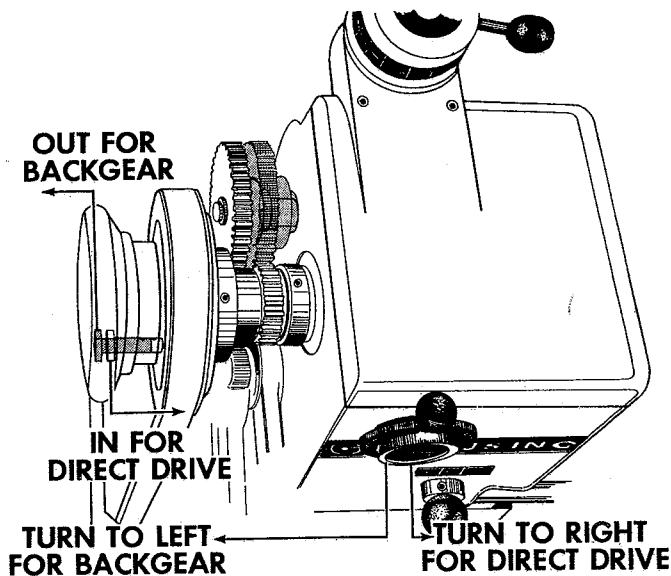


Figure 5

2. Turn back gear knob (figure 5) to the left -- rotate spindle by hand if gears do not mesh.
3. Disengage back gear pin from drive pulley by pulling pin away from headstock.

DIRECT DRIVE provides high spindle speeds from 300 to 1650 rpm.

To engage direct drive:

1. Stop spindle.
2. Turn back gear knob to the right.
3. Engage the back gear pin with drive pulley by pushing pin towards headstock -- rotate wheel if necessary.

### SPINDLE SPEEDS

Speeds are changed hydraulically. Control dial, located on top of the headstock, actuates hydraulic system. Speeds -- between 43 and 230 rpm in back gear drive, and 300 to 1650 rpm in direct drive -- are obtained by turning the dial control.

**Caution:** DO NOT TURN CONTROL DIAL UNLESS MOTOR IS RUNNING -- it makes dial reading incorrect in terms of spindle rpm.

**NOTE:** Hydraulic system, however, is equipped with a by-pass valve that prevents damage if control dial is accidentally turned while motor is not running.

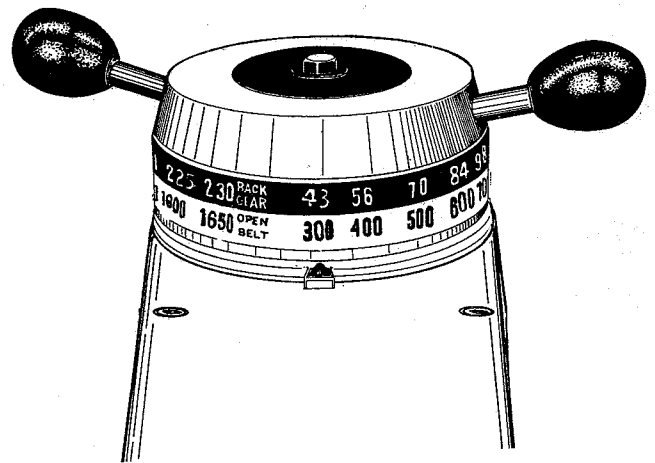


Figure 6

If dial reading is incorrect:

1. Start the motor -- turn variable speed control to 300 rpm (43 rpm if lathe is in back gear) -- refer to figure 6.
2. Hold at this speed, exerting slight pressure for 30 seconds.

## QUICK-CHANGE GEAR BOX

Quick-change mechanism determines the rate of rotation of lead screw in relation to the RPM of the spindle for threading, turning, and facing operations. Mechanism is totally enclosed, gears and shafts travel in bath of oil.

See figure 7 for the location of the controls described below.

**GEAR BOX ENGAGING LEVER.** To disengage, pull out handle of lever and move lever up as far as it will go. To engage, pull out handle of lever and move lever to down position.

**IMPORTANT:** When lever is in lowest position, stack gears are locked in mesh and thread-feed selector dial cannot be moved.

**SLIDING GEAR HANDLE** changes the ratio between the spindle and lead screw. There are two positions IN and OUT. *Do not shift while spindle is turning.*

**THREAD-FEED SELECTOR DIAL.** To operate, disengage gear box engaging lever and turn dial to number indicated on chart.

**SELECTOR LEVER** has three positions -- C, B or A. To shift, place lead screw direction knob in neutral (center position) and turn sliding gear handle until knob can be engaged -- *do not force.*

## CLUTCH AND BRAKE COUNTERSHAFT MODELS

Countershaft has friction clutch and brake for starting, stopping and jogging of spindle without stopping the motor. Moving clutch lever up engages spindle drive -- down disengages it and tightens the brake shoe and stops the spindle -- refer to figure 7.

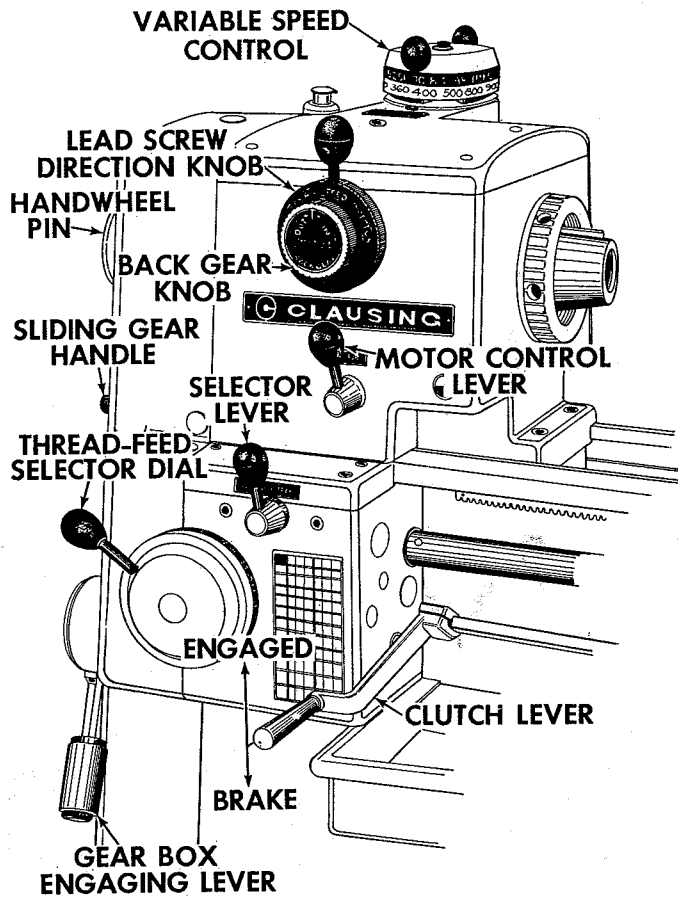


Figure 7

**MOTOR CONTROL LEVER** located on front of headstock controls rotation of lathe spindle. It has three positions -- REVERSE, OFF, and FORWARD -- refer to figure 7.

To reverse rotation of motor and spindle:

1. Move lever to "OFF" position and allow spindle to stop.
2. Move lever to FORWARD or REVERSE position.

*Caution:* Always allow spindle to stop before reversing rotation.

**LEAD SCREW DIRECTION KNOB** has three positions: Vertical is neutral -- lead screw does not turn; Left, moves carriage toward tailstock; Right, moves carriage towards headstock.

*CAUTION:* Always stop spindle before shifting lead screw direction knob.

## CARRIAGE

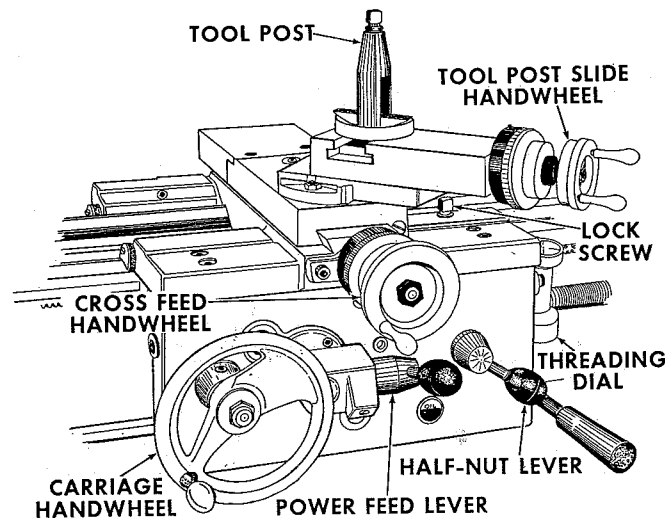


Figure 8

The function of the carriage is to rigidly support the cutting tool, and to move it along or across the bed -- refer to figure 8.

CARRIAGE LOCK SCREW locks carriage to bed for facing or cut-off operations. *Caution:* Be sure to release lock before moving carriage.

CARRIAGE HANDWHEEL moves carriage along the bed manually.

CROSS FEED SLIDE AND COMPOUND REST HANDWHEELS move the cross slide and compound rest in and out.

POWER FEED LEVER controls the operation of both power longitudinal feed and power cross feed. Lever has three positions: center disengages (neutral for hand feeding), to the left and down engages power cross feeds, to the right and up engages power longitudinal feeds.



*Caution:* The power feed lever and the half-nut lever are interlocked. Half-nuts must be disengaged (half-nut lever in down position) before power feeds can be engaged.

NOTE: Cross feed is  $\frac{1}{2}$  of the rate of longitudinal feed.

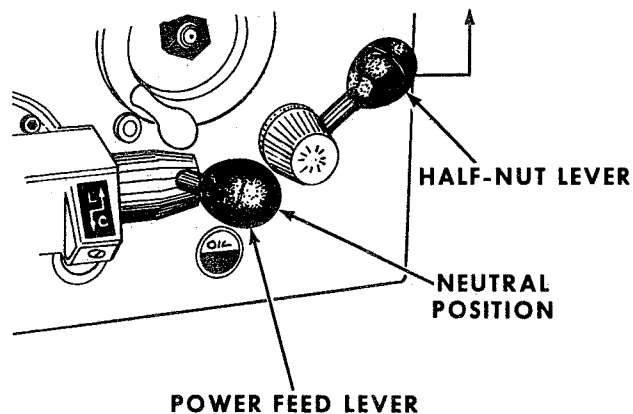


Figure 9

HALF-NUT LEVER engages half-nuts with lead screw for threading -- refer to figure 9.

To engage half-nuts:

1. Move power feed lever to center (disengaged or neutral position).
2. Move half-nut lever to up position.

NOTE: Safety lock prevents engaging feeds and half-nuts at same time -- do not force levers.

*Important:* Never use half-nuts for power feeds. Using half-nuts for threading only will maintain the accuracy of the lead screw.

## THREADING DIAL

The threading dial performs the important function of indicating the proper time to engage the half-nut lever so that tool will enter the same groove of the thread on each successive cut.

To maintain the accuracy of the worm gear, loosen clamp screw and swing threading dial away from lead screw when not threading.

When cutting *even-numbered thread* (such as 12, 14, 16, 32, etc., per inch), engage the half-nut lever for the first cut when the stationary mark on the outside of the threading dial is in line with *any* of the marks on rotating portion of the dial. Any dial marking may be used for successive cuts.

When cutting *odd-numbered thread* (such as 7, 9, 11, 23, 27, etc., per inch), engage the half-nut lever for the first cut and all successive cuts when the stationary mark on the threading dial is in line with *any* of the numbered marks on the dial.

When cutting *half-numbered threads* (such as  $4\frac{1}{2}$ ,  $5\frac{1}{2}$ ,  $6\frac{1}{2}$ ,  $11\frac{1}{2}$ , etc., per inch), engage the half-nut lever at the *same* number on the threading dial for *each* cut.

The threading dial cannot be used for metric threads. For these, the half-nut is closed on the lead screw, and remains engaged until the thread is completed. After each cut and tool withdrawal, the tool is brought back to starting point by reversing the spindle.

### SEQUENCE OF ENGAGING CONTROLS FOR THREADING OR FEEDS

1. Disengage power feed or half-nut lever.
2. Set quick-change mechanism for thread or feed desired:
  - A. Pull out handle of GEAR BOX ENGAGING LEVER and move lever up as far as it will go.
  - B. Turn THREAD-FEED SELECTOR DIAL to the number indicated on chart.
  - C. Position SLIDING GEAR, as indicated on chart.
  - D. Position SELECTOR LEVER to C, B or A, as indicated on chart.
  - E. Pull out handle of GEAR BOX ENGAGING LEVER and move lever down to engaged position.
3. Shift LEAD SCREW DIRECTION KNOB for direction desired.
4. Select drive -- either direct or back gear -- according to spindle speed required.
5. Start motor.

6. Move variable speed control dial to spindle speed desired.
7. Engage carriage controls -- longitudinal power feed lever for feeds, half-nuts for threading.
8. With tool in position, make a "trial run" without touching work to make sure the set up is right.

NOTE: When threading, be sure threading dial is engaged with lead screw.

FOR CLUTCH and BRAKE MODELS -- be sure clutch is disengaged (handle in down position) before starting motor.

### TOOL POST

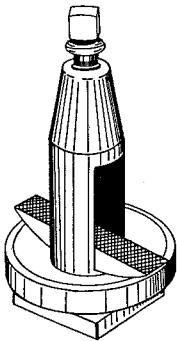


Figure 10

The tool post holds the tool rigidly in position for cutting operations -- refer to figure 10.

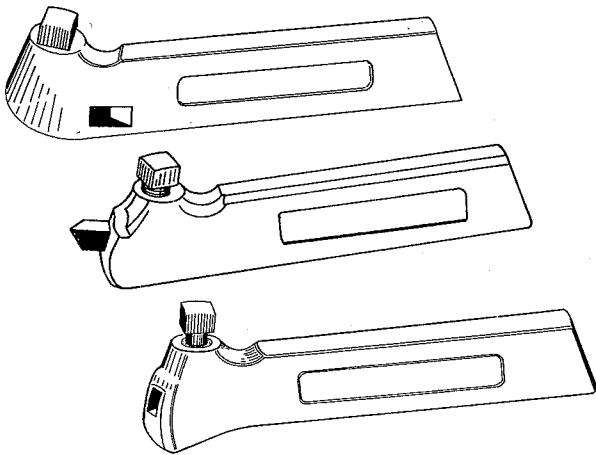


Figure 11

Tool bit holders permit the use of small, inexpensive and replaceable tool bits -- refer to figure 11.

In order to avoid undesirable overhang, tool bits should be clamped so the cutting end of the tool bit is as close to the holder as the work will permit, and, the tool holder should be as far back in the tool post as possible.

The cutting edge of the tool should be placed on lathe center line.

### PROPER POSITION OF TOOL POST SLIDE

For maximum tool support, the front edge of the tool post slide should be positioned flush with the front end of the upper swivel.

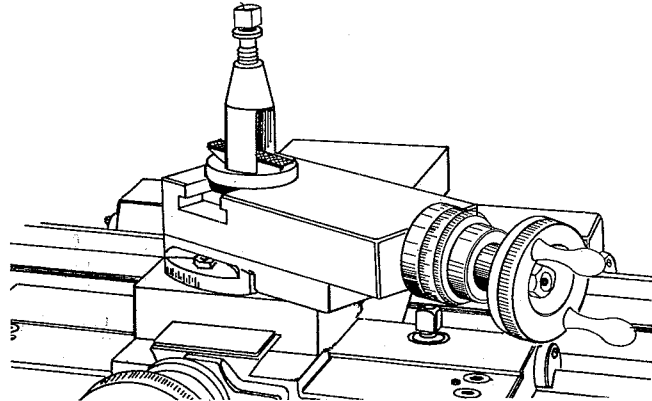


Figure 12

RIGHT -- Tool post slide is flush with front end of the upper swivel, therefore provides maximum tool support -- refer to figure 12.

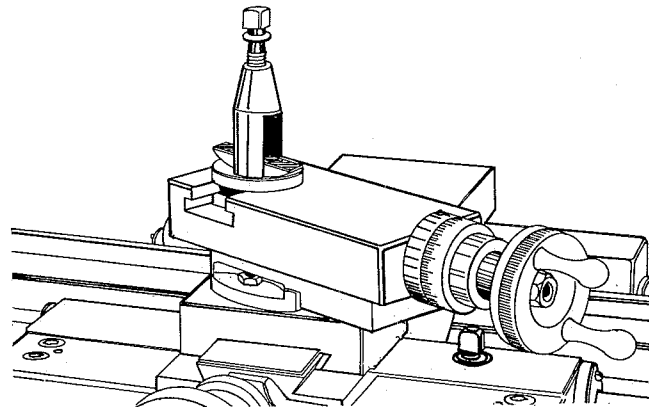


Figure 13

WRONG -- Unnecessary overhang of tool post slide will result in tool chatter, and could cause the tool post slide to break -- refer to figure 13.

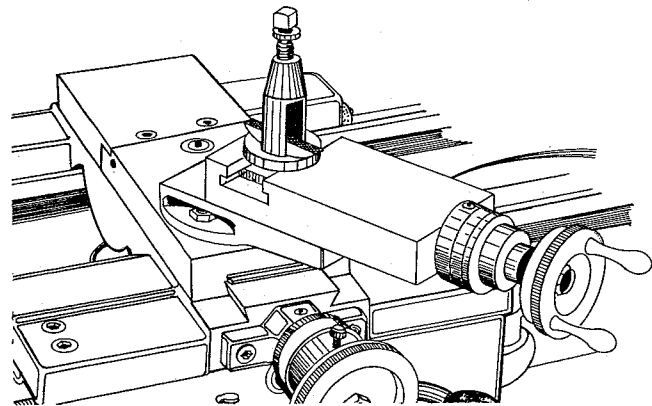


Figure 14

WRONG -- Tool post slide is too far back -- tool overhang is excessive -- refer to figure 14.

## TAILSTOCK

The tailstock supports long work, and holds tools for drilling and reaming operations.

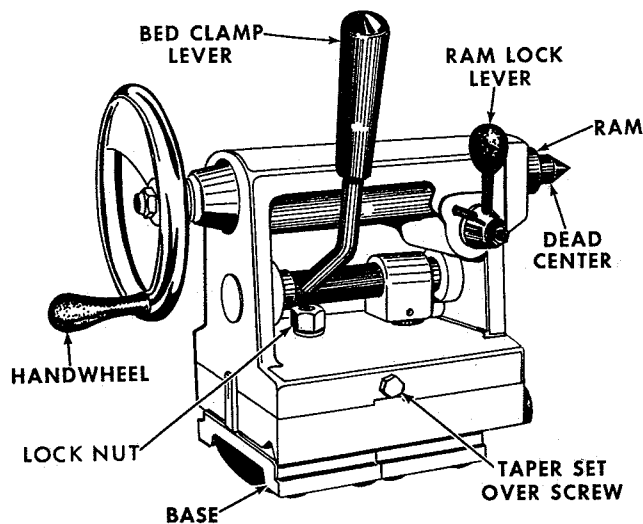


Figure 15

Base is fitted to bed ways to accurately align tailstock and headstock spindles, refer to figure 15. Tailstock slides along the ways, and may be anchored in any position by locking the bed clamp lever or tightening the auxiliary lock nut.

Ram is actuated by handwheel -- graduations simplify drilling and boring. Lever locks ram in position. Before inserting center or tools in ram, clean both tapers thoroughly with a clean, dry cloth.

Tailstock may be set over for taper turning by loosening the bed clamp and adjusting the screws on front and rear of tailstock base.

### MOUNTING CHUCKS AND FACE PLATES

Before mounting on lathe, carefully clean the following:

1. Taper on spindle nose.
2. Threads in spindle nose collar.
3. Taper in chuck or face plate.
4. Threads on chuck or face plate.

*Caution:* Chips and dirt may score mating surface causing an inaccurate fit.

To mount face plate or chuck:

1. Rotate spindle until key is up.

2. Lock spindle by:

- (A) Placing back gear knob in engaged position.
- (B) Pushing handwheel pin in.

3. Lock chuck or face plate on spindle nose:

- (A) Slide chuck or face plate on spindle nose.
- (B) Tighten collar by turning spanner wrench counterclockwise.

4. Unlock spindle.

NEVER TURN ON POWER WHEN SPINDLE IS LOCKED.

### TO REMOVE CHUCK OR FACE PLATE

1. Lock spindle.

- (A) Place back gear knob in engaged position.
- (B) Push handwheel pin in.

2. Place heavy board across bed to protect ways if chuck is dropped.

3. Loosen collar by turning spanner wrench clockwise.

4. Carefully remove chuck or face plate.

5. Unlock spindle.

NEVER TURN ON POWER WHEN SPINDLE IS LOCKED.

### CHUCK MAINTENANCE AND CARE

**PROTECT** -- when not in use, place chuck in a covered box -- don't leave it exposed to dirt or chips -- the accuracy of any chuck can be destroyed if dirt or chips collect in the scroll, threads, jaws, or slots.

**CLEAN and OIL FREQUENTLY** -- Most wear is due to dirt and lack of proper lubrication. Oil chuck jaws and scroll at regular intervals with a light film of clean No. 10 S.A.E. machine oil. *Caution:* Do not apply too much oil -- it collects dust and chips.

### IMPORTANT

**KEEP YOUR LATHE CLEAN** -- Oil and dirt form an abrasive compound which will damage bearing surfaces. Using way lubricant wipe the bed and all machined surfaces with a clean rag at frequent intervals. Use a brush to clean spindle, gear teeth, lead screw threads, etc.

# MAINTENANCE AND ADJUSTMENTS

## PREVENTIVE MAINTENANCE

The lathe should be kept clean and properly lubricated at all times.

Don't use your lathe for a work bench. Don't leave tools on bed ways.

Always shut off power before leaving lathe.

Recheck level of the bed frequently.

Lock tailstock to bed ways before turning between centers.

Before threading, clean chips and dirt from lead screw, and oil lightly.

Securely lock tool in position before taking a cut.

## CLUTCH ADJUSTMENT

Adjusting clutch -- if the countershaft clutch slips when spindle drive is engaged, adjust as follows:

1. Remove front cover.

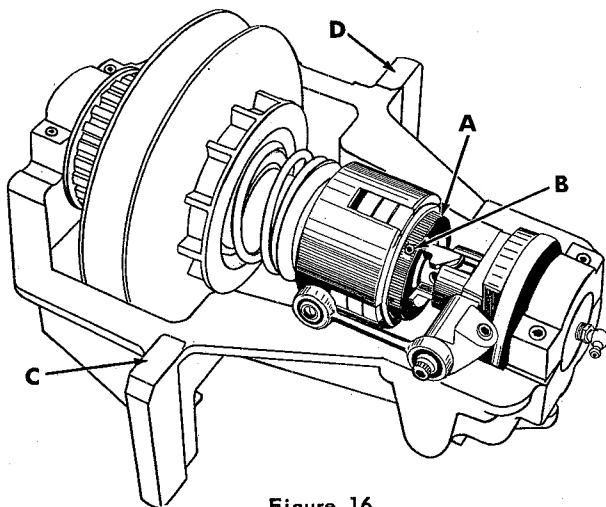


Figure 16

2. Loosen the lock screw (B, fig. 16) in the adjusting ring (A).
3. Turn the adjusting ring in a counterclockwise direction, when viewed from spindle pulley end. **DO NOT OVER-TIGHTEN** -- just enough to prevent slipping.

NOTE: If adjusting ring is turned too tightly -- clutch will not engage when clutch lever is moved up.

4. Retighten lock screw.

## ADJUSTING CARRIAGE BEARING PLATES

Bearing plates on the carriage, which bear on the underside of both the front and rear bed ways, anchor the carriage firmly to the bed in a vertical direction. Bearing plates have shims of varying thickness for adjustment of possible wear.

## CROSS SLIDE OR COMPOUND SLIDE GIB ADJUSTMENT

Gibs are properly adjusted, when tool post slide and cross slide move with a slight drag.

To adjust the tapered gibs:

1. Shift power feed lever to neutral position.
2. Loosen the rear adjusting screw several turns.

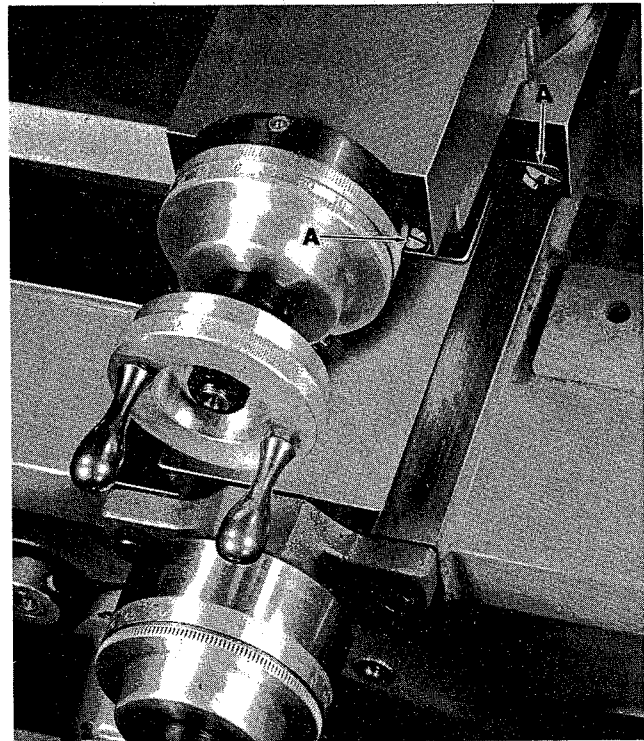


Figure 17

3. Turn front adjusting screw (A, fig. 17) until tight, then back off about one-half turn -- slide should move with a slight drag.
4. Retighten the rear adjusting screw.

## TENSIONING TIMING BELT

1. Loosen slightly the four hex nuts holding the countershaft bracket to pedestal.
2. With a soft hammer, tap on bottom or top of countershaft bracket until belt is properly tensioned.

NOTE: Properly tensioned, timing belt should depress approximately  $\frac{1}{2}$ " with light finger pressure -- too much tension causes excessive wear.

3. Measure to make sure that points (C & D, Fig. 16) on countershaft bracket are the same distance from top of head pedestal.
4. Tighten the four hex nuts securely.
5. Recheck belt tension.

## REPLACING SHEAR PIN IN LEAD SCREW

Shear pin, located at gear box end of lead screw, protects lead screw and gear box against overload. To replace broken shear pin:

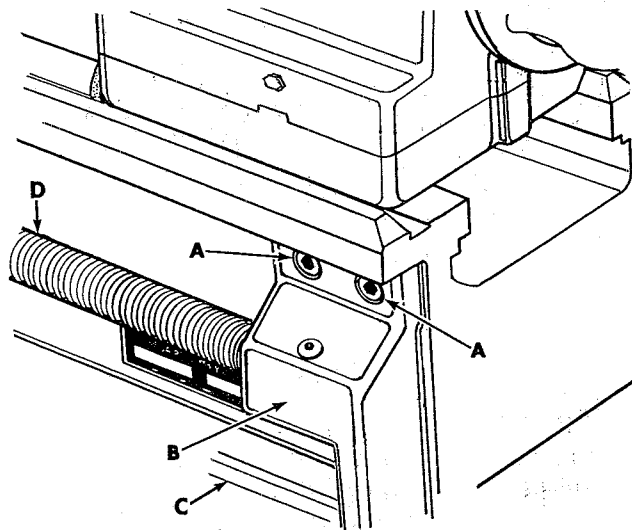


Figure 18

1. Remove two socket cap screws (A, fig. 18) from lead screw bracket (B). Remove bracket from lead screw (D) and clutch rod (C).
2. Engage half-nuts, turn carriage handwheel toward tailstock, pulling lead screw from gear box shaft. Disengage half-nuts and remove lead screw.

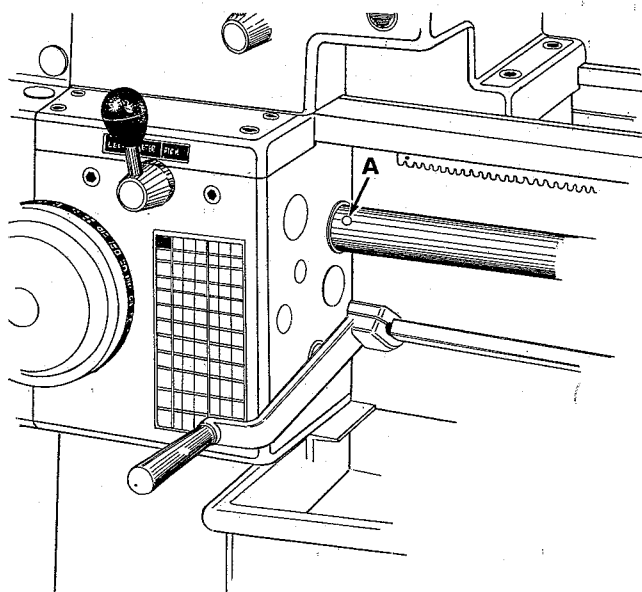


Figure 19

3. Remove sheared pin (A, fig. 19) from gear box shaft and lead screw.
4. Slide lead screw over gear box shaft -- check alignment of shear pin holes with punch -- turning lead screw 180° if necessary -- and install new shear pin.

5. Replace lead screw bracket -- CAUTION: Do not tighten the two socket cap screws.
6. Move carriage to tailstock end of bed, engage half-nuts to align lead screw and clutch rod, then tighten the two socket cap screws.

## ADJUSTING SPINDLE BEARINGS

Spindle bearings have been preloaded at factory and seldom require adjusting. Follow these instructions should adjustment be necessary:

1. Make adjustment only when spindle is at operating temperature -- run spindle at medium speed for one hour with 8" driving plate mounted on spindle.
2. Disengage back gear pin from drive pulley by pulling pin away from headstock.
3. Turn back gear knob to the right.
4. Move lead screw direction knob to vertical (NEUTRAL) position.
5. Give driving plate a sharp spin with your hand.

NOTE: If preload is correct -- drive plate should rotate about one turn.

To adjust:

1. Remove spindle handwheel and upper belt guard.

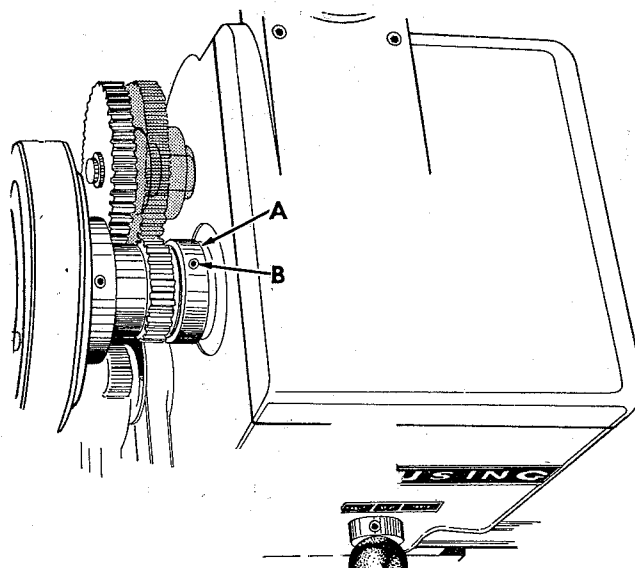


Figure 20

2. Loosen set screw (B) (fig. 20) in bearing adjusting nut (A) and tighten nut with spanner wrench until spindle end play has been removed.
3. Give driving plate a sharp spin with your hand -- drive plate should rotate about one turn. If it doesn't, adjust nut (A) and recheck.
4. Tighten set screw (B) in adjusting nut.
5. Replace guard and handwheel.

## REPLACING VARIABLE SPEED BELT

1. With lathe running, turn variable dial to highest speed -- 1650 rpm in open belt or 230 rpm in back gear. Then turn off motor.

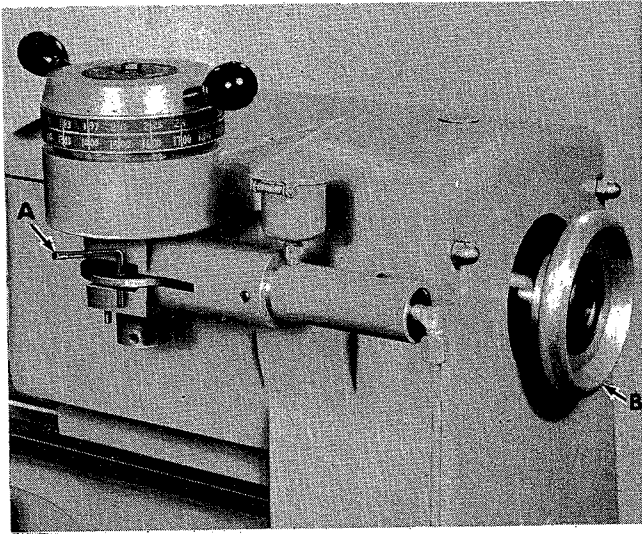


Figure 21

2. Remove spindle handwheel (B) (fig. 21), belt guards and front cover.
3. Turn variable dial back to lowest speed and lock dial in place with pin (A).

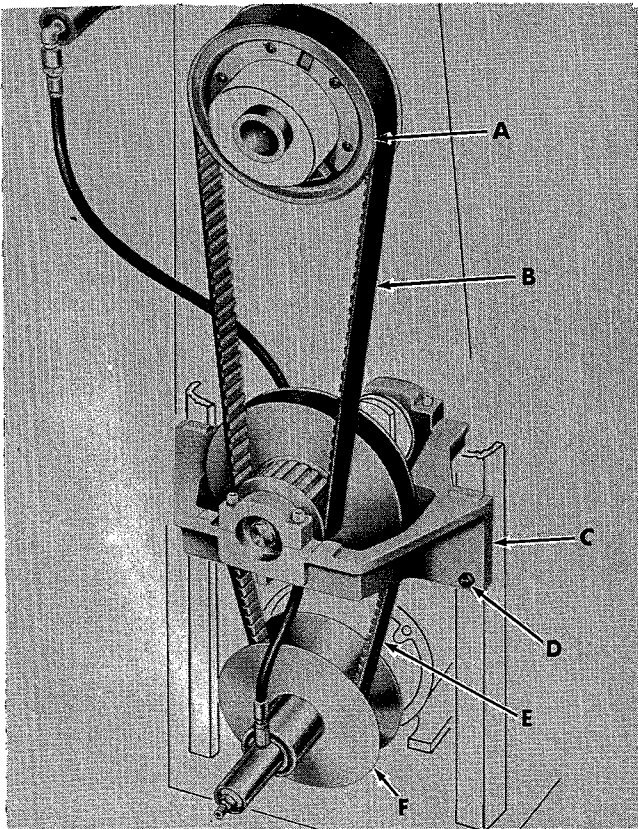


Figure 22

4. Holding variable dial against low speed stop, pull on outer sheave of lower variable motor pulley (F) (fig. 22) until variable belt (E) is loose.

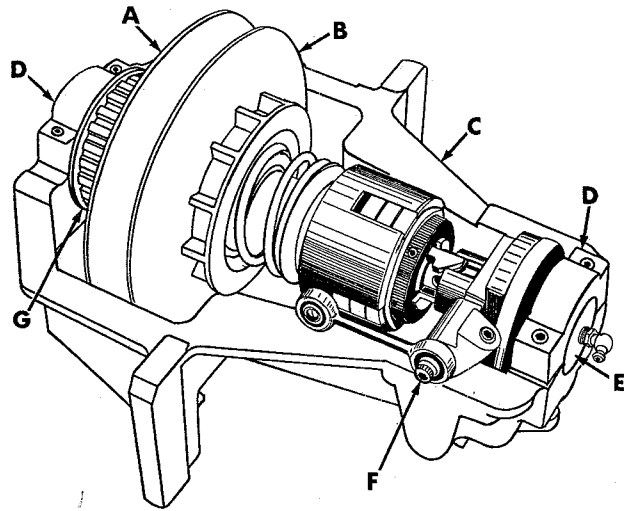


Figure 23

5. Thru front cover opening, remove 5/16"-18 hex cap screw (F) (fig. 23) and spacer from clutch linkage.
6. Remove four hex nuts (D) (fig. 22). Raise countershaft (C) slightly and slip timing belt (B) off spindle pulley (A). Lower countershaft and slip variable belt (E) off variable motor pulley (F).
7. Place countershaft on bench.
8. Remove bearing caps (D) (fig. 23), snap rings and countershaft spindle (E) from bracket (C).
9. Twist variable belt off countershaft pulley. CAUTION: Variable pulley is spring loaded and will snap closed when belt is removed.
10. Place new variable belt on countershaft pulley.
11. Install spindle in countershaft bracket and secure in place with snap rings and bearing caps (D). IMPORTANT: Make sure timing belt is in place before installing bearing caps.
12. Standing on countershaft bracket, pull variable belt into bottom of variable pulley sheaves (A & B).
13. Position the countershaft (C) (fig. 22) so variable belt (E) can be slipped on motor pulley (F), then raise countershaft so timing belt (B) can be slipped on spindle pulley (A).
14. Place countershaft assembly on the four mounting studs (D), then snug up the four hex nuts. Refer to Tensioning Timing Belt steps 2-5.
15. Thru front cover opening, install 5/16"-18 hex cap screw and spacer in clutch linkage.
16. Remove lock pin (A, fig. 21) from variable cam housing.
17. Start lathe motor.



18. Hold variable control against low speed stop for 30 seconds, then turn through entire range.
19. Check adjustment of variable drive belt -- refer to ADJUSTING VARIABLE DRIVE BELT.
20. Replace belt guards and front cover.

### ADJUSTING VARIABLE DRIVE BELT

With motor on, turn variable control dial to HIGHEST SPEED -- use a tachometer to check spindle speed. If tachometer doesn't register approximately 1650 rpm:

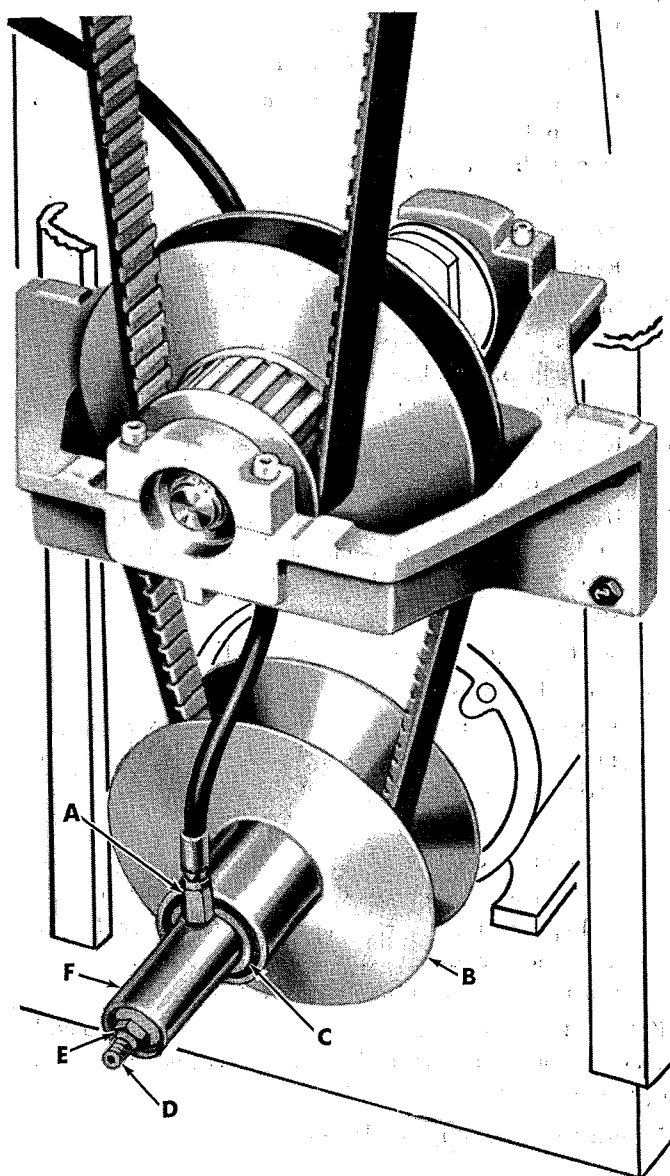


Figure 24

1. Hold nut (E, fig. 24) with wrench, and turn shaft (D) with a socket set screw wrench -- clockwise if speed is too low, counter-clockwise if speed is too high.

If tachometer is not available: Belt should be flush with out side of motor pulley at high speed and flush with outside of countershaft pulley at low speed.

*Motor base brackets are bolted and doweled for permanent alignment.*

### REPLACING TIMING BELT

1. With lathe running, turn variable dial to highest speed -- 1650 rpm in open belt or 230 rpm in back gear. Then turn off motor.
2. Remove spindle handwheel (B) (fig. 21), belt guards and front cover.
3. Turn variable dial back to lowest speed and lock dial in place with pin (A).
4. Pull on outer sheave of lower variable motor pulley (F) (fig. 22) until variable belt (E) is loose.
5. Thru front cover opening, remove 5/16"-18 hex cap screw (F) (fig. 23) and spacer from clutch linkage.
6. Remove four hex nuts (D) (fig. 22). Raise countershaft (C) slightly and slip timing belt (B) off spindle pulley (A). Lower countershaft and slip variable belt (E) off variable motor pulley (F).
7. Place countershaft on bench.
8. Remove bearing caps (D) (fig. 23), snap rings and countershaft spindle (E) from bracket (C).
9. Remove timing belt from countershaft pulley (G).
10. Place new timing belt on countershaft pulley (G).
11. Install spindle in countershaft bracket and secure in place with snap rings and bearing caps (D). **IMPORTANT:** Make sure variable belt is in place before installing bearing caps.
12. Position the countershaft (C) (fig. 22) so variable belt (E) can be slipped on motor pulley (F), then raise countershaft so timing belt (B) can be slipped on spindle pulley (A).
13. Place countershaft assembly on the four mounting studs (D), then snug up the four hex nuts. Refer to Tensioning Spindle Belt steps 2-5.
14. Thru front cover opening, install 5/16"-18 hex cap screw and spacer in clutch linkage.
15. Remove lock pin (A, fig. 21) from variable cam housing.
16. Start lathe motor.
17. Hold variable control against low speed stop for 30 seconds, then turn through entire range.
18. Replace belt guards and front cover.

## REPLACING UPPER VARIABLE CONTROL CYLINDER

1. With lathe running, turn variable speed dial to highest range (230 or 1650 rpm), then turn motor off.

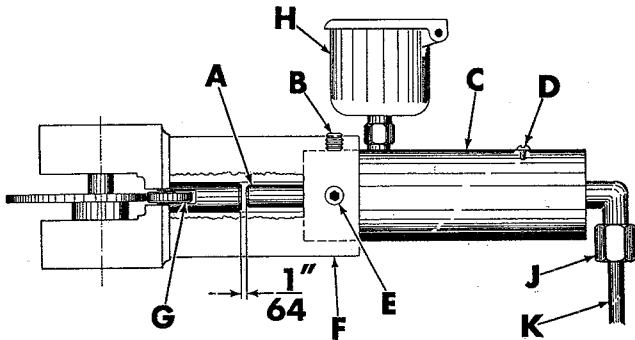


Figure 25

2. Remove nut (J, fig. 25) on end of variable control cylinder -- catching oil in pan.
3. Remove set screws (B) and (E) in variable cam housing (F).
4. Pull out upper variable control cylinder (C).
5. Remove the oil from old variable control cylinder oil reservoir (H).
6. While holding variable speed dial against low speed stop, slide new control cylinder (C) into variable housing (F) until variable plunger (A) is about 1/64" from cam roller plunger (G). Lock in place with set screws (B) and (E).
7. Install hydraulic line (K) and tighten nut (J).
8. Remove bleeder screw (D) and fill oil reservoir.
9. Keeping oil reservoir filled, hold variable dial against low speed stop until oil runs out bleeder hole -- it takes a few minutes for oil to run down.
10. Replace bleeder screw (D).
11. Start lathe motor. Hold variable control against low speed stop for 30 seconds -- turn variable dial to highest speed -- then back to lowest speed. Control should stay at 43 rpm.

NOTE: Watch dial for a few seconds. If it doesn't remain at 43 rpm, the hydraulic system must be bled to remove trapped air.

To remove air from hydraulic system:

- A. Run variable to highest speed.
- B. Loosen bleeder screw (D, fig. 25) a few turns until oil starts coming out around the screw.
- C. Retighten bleeder screw.
- D. Turn variable dial to low speed stop and release -- pointer should remain at 43 rpm.

NOTE: If dial moves, repeat steps A, B and C.

12. Permanently mark variable control cylinder location:

- A. Remove set screw (E).
- B. With a 1/4-inch drill, spot the cylinder for the 5/16" set screw (E).

NOTE: This drill mark simplifies future positioning of cylinder.

- C. Replace set screw (E).

## REPLACING LOWER VARIABLE CONTROL CYLINDER

1. With lathe running, turn variable speed dial to highest range (230 or 1650). Then, turn motor off.
2. Measure distance from end of shaft (D, fig. 24) to nut (E). NOTE: *Record this dimension.*
3. Disconnect fitting (A) and drain oil from unit.
4. While holding shaft (D) with a socket set screw wrench, remove nut (E) and washer.
5. Remove, sleeve from hydraulic cylinder.
6. Pull hydraulic cylinder (F) and outer half of variable pulley (B) off the shaft (D) and remove stop washer from pulley (B).
7. Press hydraulic cylinder (F) with bearing (C) from variable pulley (B).
8. Replace the two "O" rings on shaft (D).
9. Install stop washer in pulley (B).
10. Press new hydraulic cylinder with bearing into variable pulley hub (B), then slide the assembly onto shaft (D) and pulley hub.
11. Install sleeve and washer on shaft (D).
12. Start nut (E) on shaft (D).
13. Hold the shaft in place with a socket set screw wrench and then turn nut onto rod until distance from the end shaft (D) to nut (E) is the same as step 3.
14. Start fitting (A) onto hydraulic cylinder (F).
15. Fill oil reservoir.
16. Keep oil reservoir filled, hold variable dial against low speed stop until oil runs out around fitting (A) -- it takes a few minutes for oil to run down.
17. Tighten fitting (A).
18. Start lathe motor. Hold variable control against low speed stop for 30 seconds -- turn variable dial to highest speed -- then back to lowest speed a few times. Control should stay at 43 rpm.

NOTE: Watch dial for a few seconds. If it doesn't remain at 43 rpm, the hydraulic system must be bled to remove trapped air.

To remove air from hydraulic system:

- A. Run variable to highest speed.
- B. Loosen bleeder screw (D, fig. 25) a few turns until oil starts coming out around the screw.
- C. Retighten bleeder screw.
- D. Turn variable dial to low speed, stop and release -- pointer should remain at 43 rpm.

NOTE: If dial moves, repeat steps A, B, and C.

## PARTS INDEX

### For Lathes From Serial No. 600342 To \_\_\_\_\_

Cabinet .....	18.1
Bed .....	19.1
Headstock Casting and Gear Train Guard .....	20
Headstock .....	21.1
Quick-Change Gear Box .....	22
Gear Train .....	23
Electrical Assembly .....	24
Countershaft .....	25.1
Countershaft with Clutch and Brake .....	26.1
Motor Base Assembly .....	27
Variable Speed Control .....	28
Variable Speed Motor Pulley .....	29.2
Cross Slide .....	30.2
Carriage .....	31
Apron .....	32 & 33
Tailstock .....	34.2

### INSTRUCTIONS FOR ORDERING REPAIR PARTS

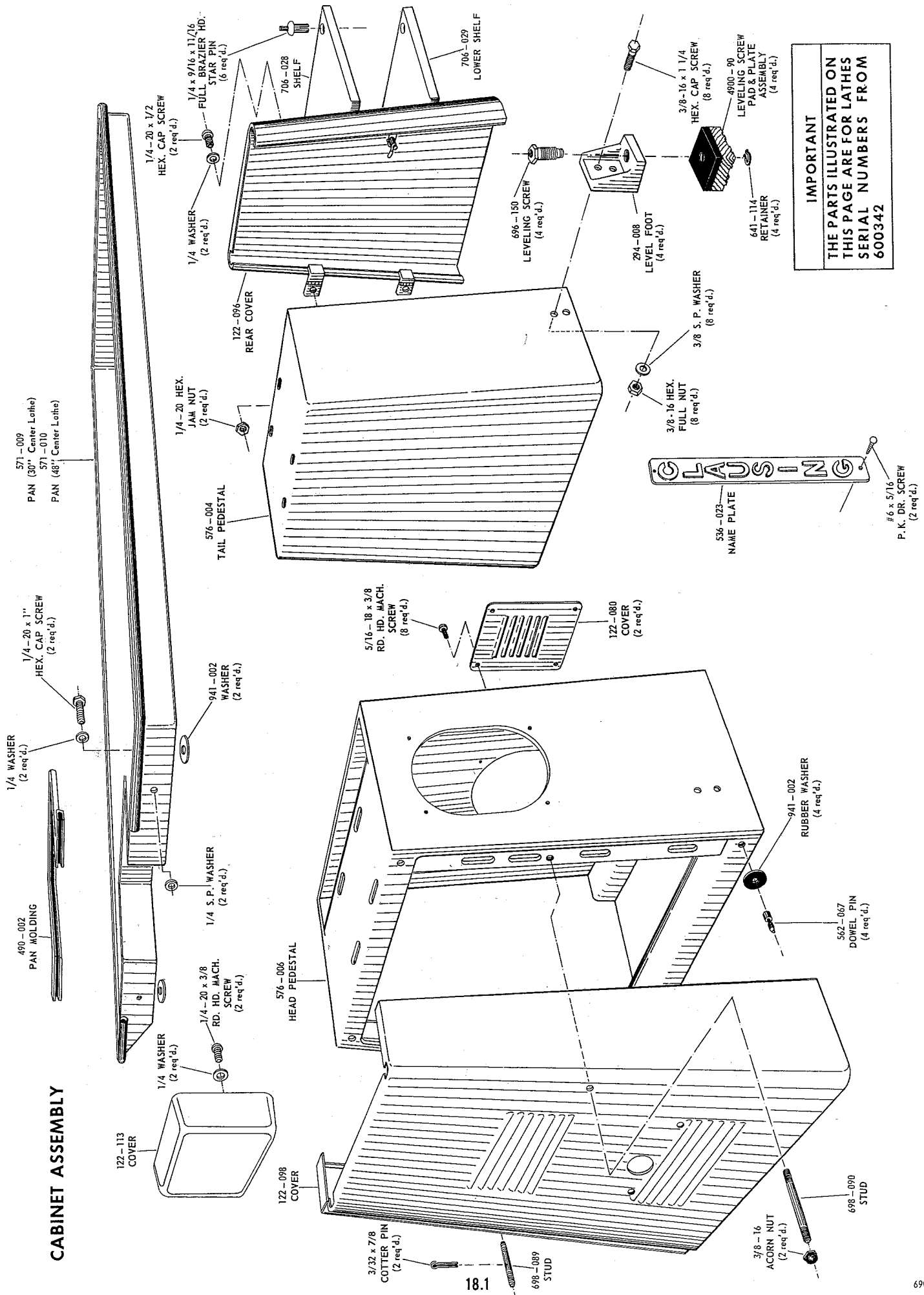
It is important to furnish the following information in addition to QUANTITY required:

1. PART NUMBER
2. PART NAME
3. MODEL and SERIAL NUMBER of machine tool -- you'll find both on the metal plate attached to machine -- note illustration below.



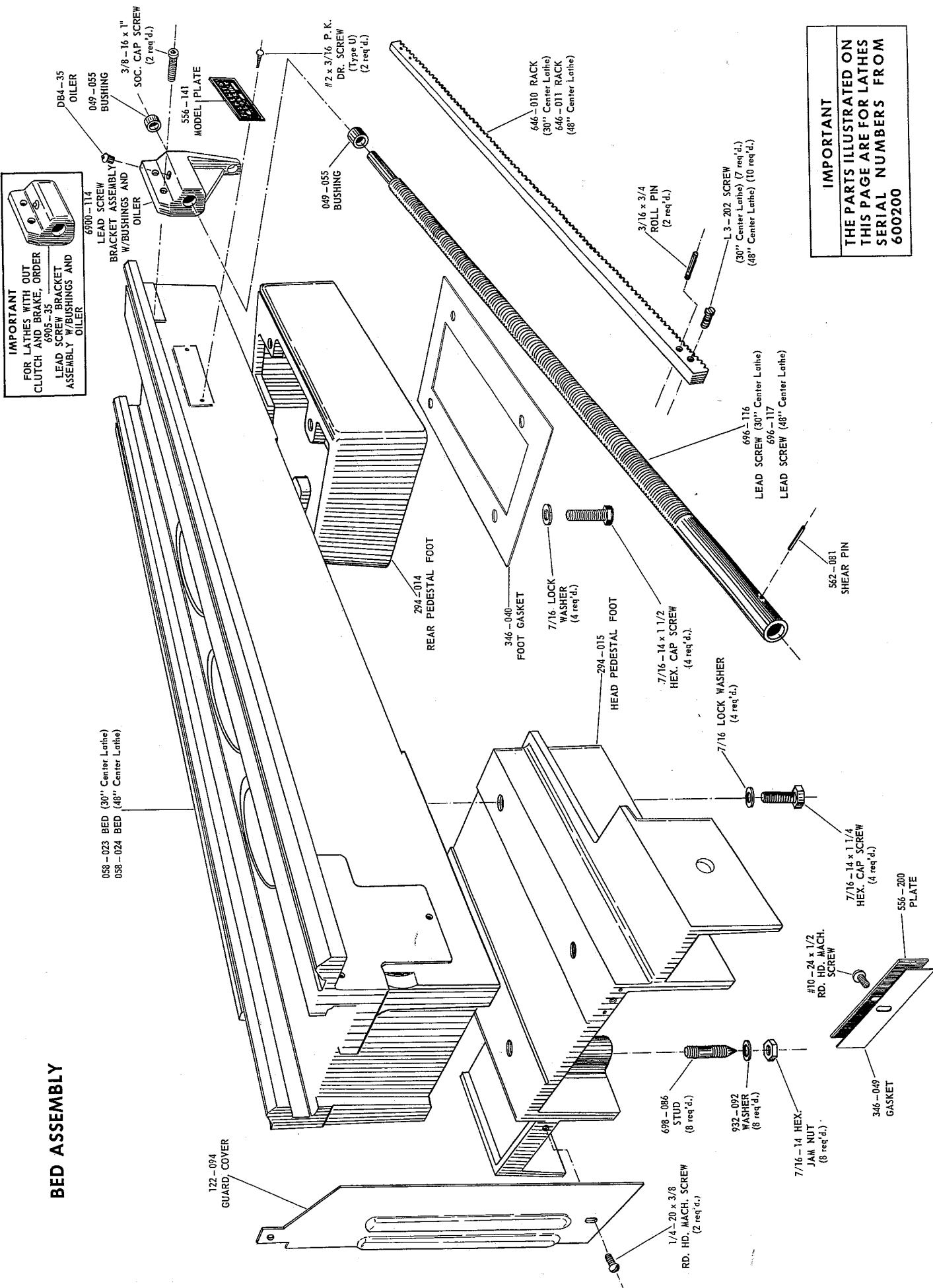
NOTE: Screws and nuts shown without part numbers should be purchased locally.  
We reserve the right to make changes in design and specifications without notice.

# CABINET ASSEMBLY



**IMPORTANT**  
 THE PARTS ILLUSTRATED ON  
 THIS PAGE ARE FOR LATHES  
 SERIAL NUMBERS FROM  
 600342

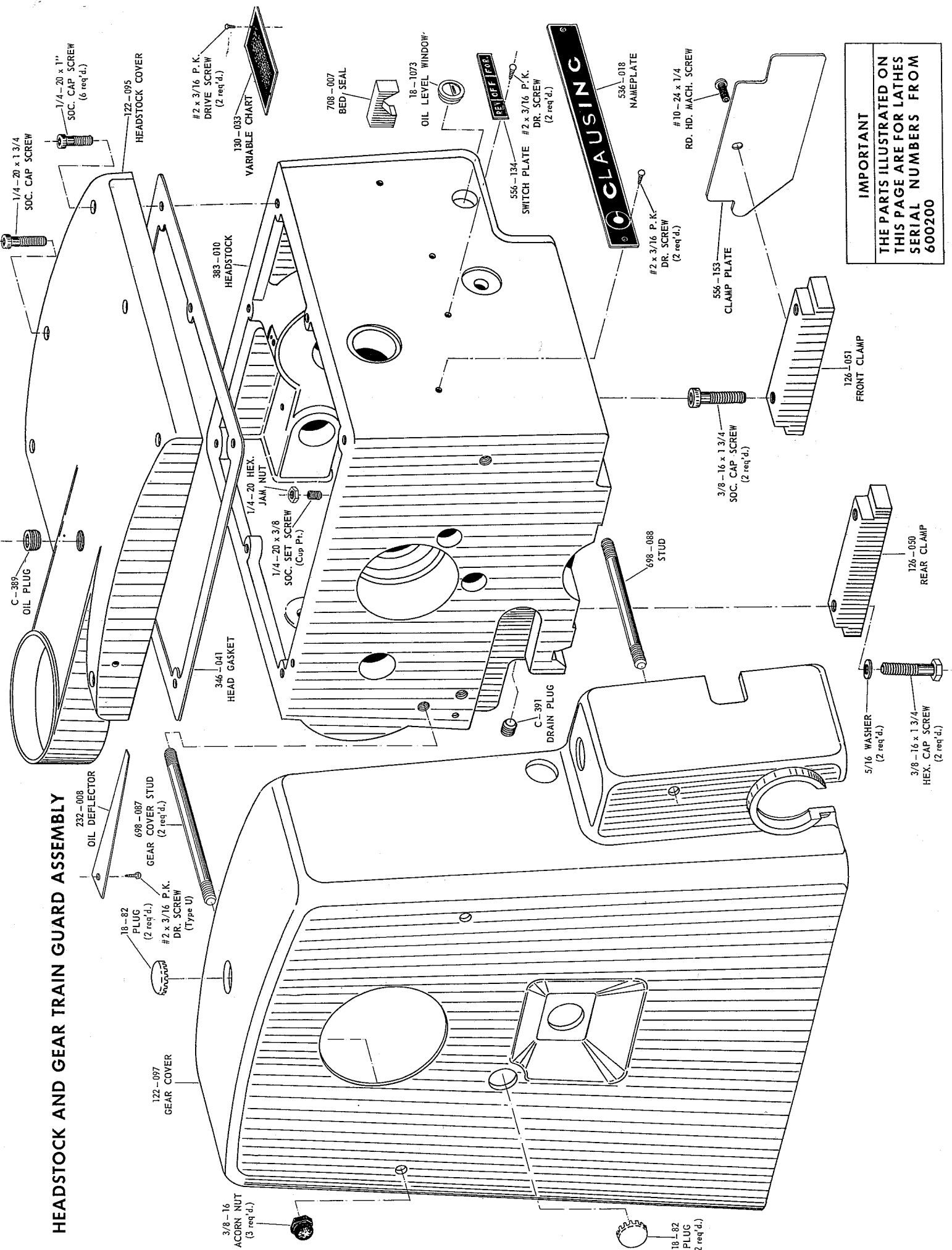
# BED ASSEMBLY



**IMPORTANT**  
 FOR LATHES WITH OUT  
 CLUTCH AND BRAKE, ORDER  
 6905-35  
 LEAD SCREW BRACKET  
 ASSEMBLY W/BUSHINGS AND  
 OILER

**IMPORTANT**  
 THE PARTS ILLUSTRATED ON  
 THIS PAGE ARE FOR LATHES  
 SERIAL NUMBERS FROM  
 600200

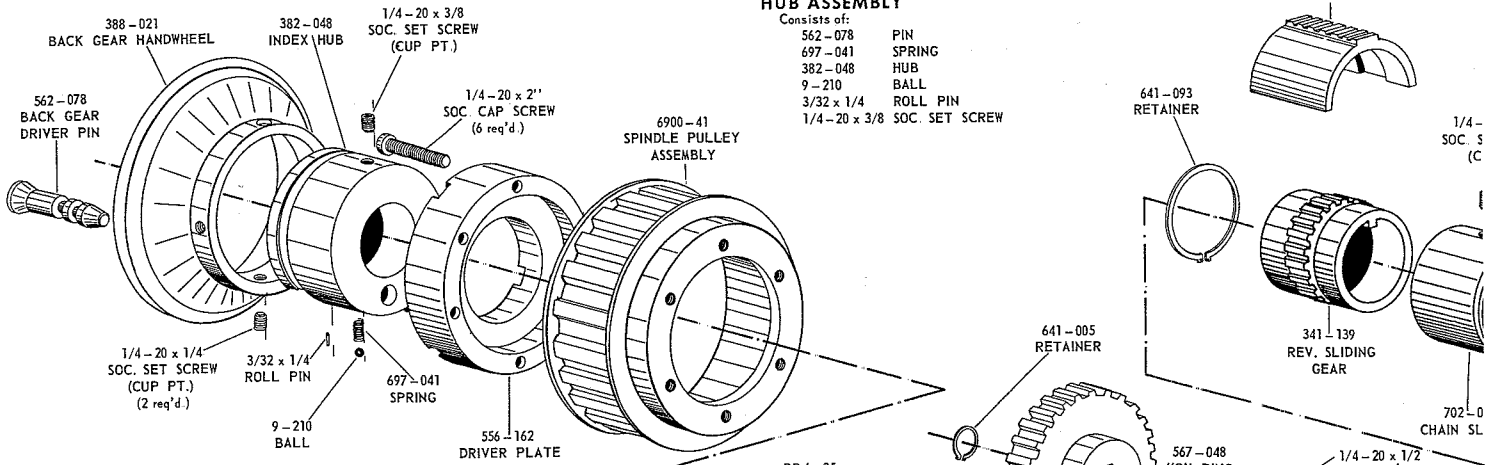
# HEADSTOCK AND GEAR TRAIN GUARD ASSEMBLY



**IMPORTANT**  
 THE PARTS ILLUSTRATED ON  
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 SERIAL NUMBERS FROM  
 600200

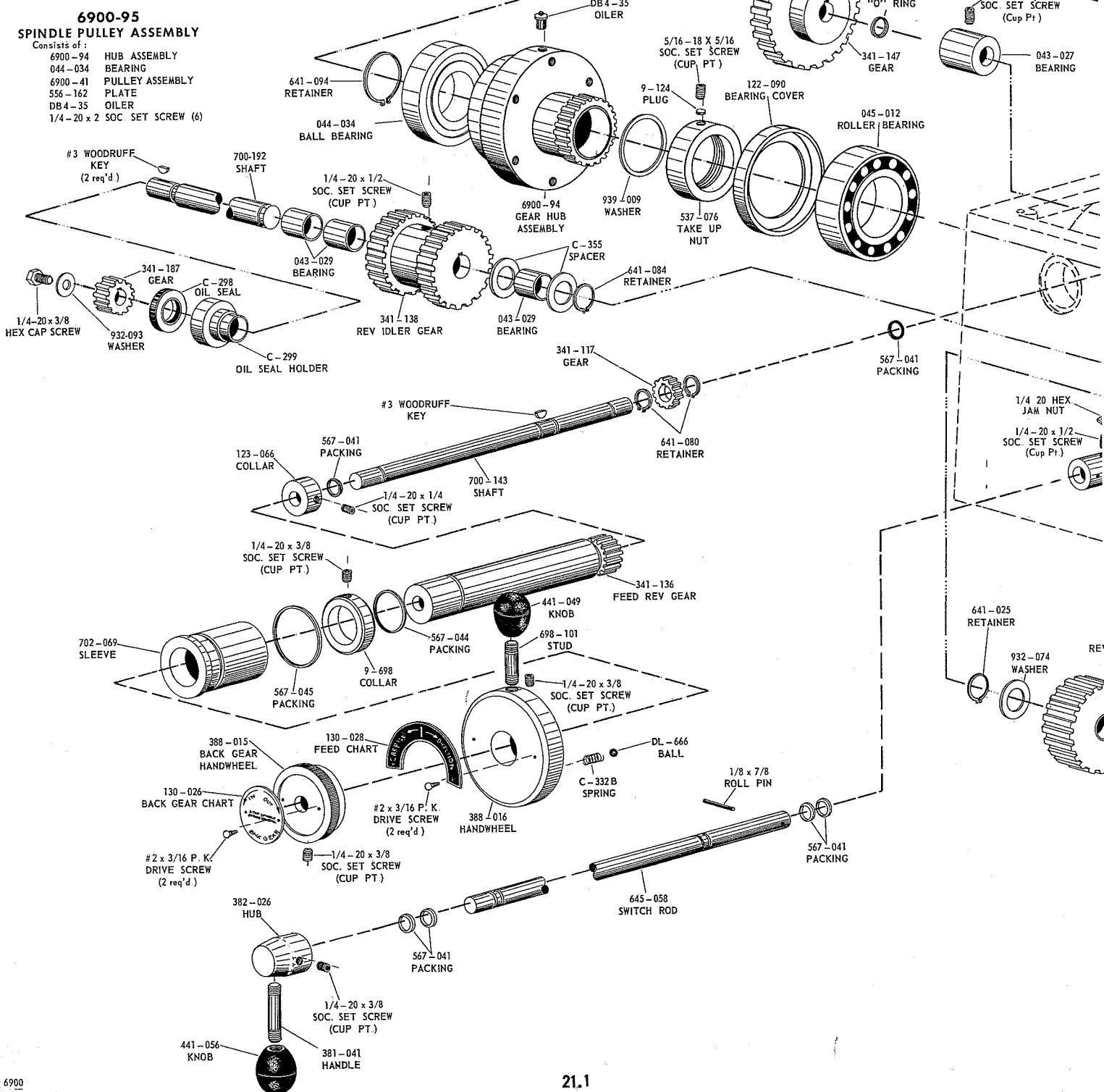
**6900-70  
BACK GEAR ENGAGE  
HUB ASSEMBLY**

- Consists of:  
 562-078 PIN  
 697-041 SPRING  
 382-048 HUB  
 9-210 BALL  
 3/32 x 1/4 ROLL PIN  
 1/4-20 x 3/8 SOC. SET SCREW

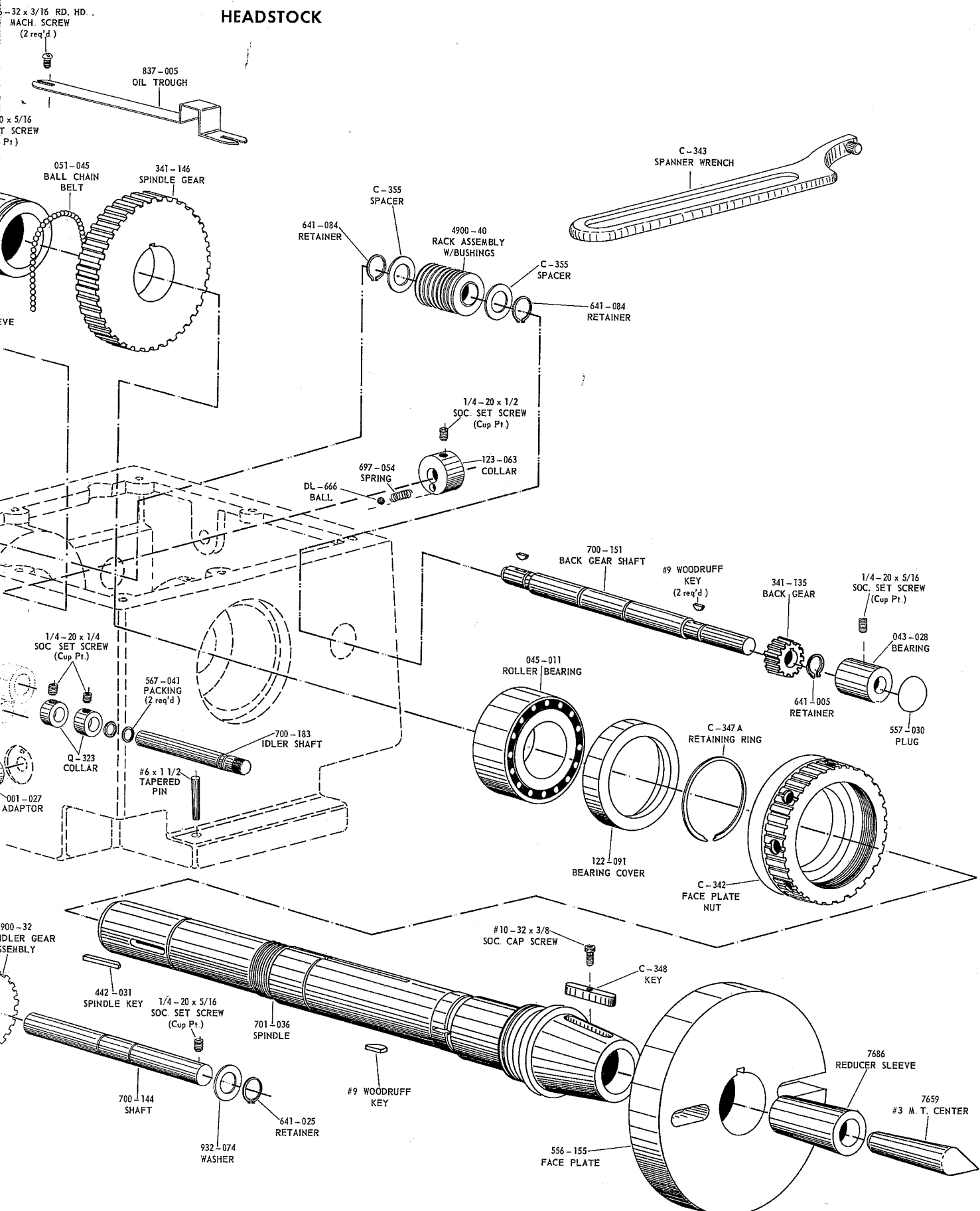


**6900-95  
SPINDLE PULLEY ASSEMBLY**

- Consists of:  
 6900-94 HUB ASSEMBLY  
 044-034 BEARING  
 6900-41 PULLEY ASSEMBLY  
 556-162 PLATE  
 DB4-35 OILER  
 1/4-20 x 2 SOC. SET SCREW (6)



# HEADSTOCK

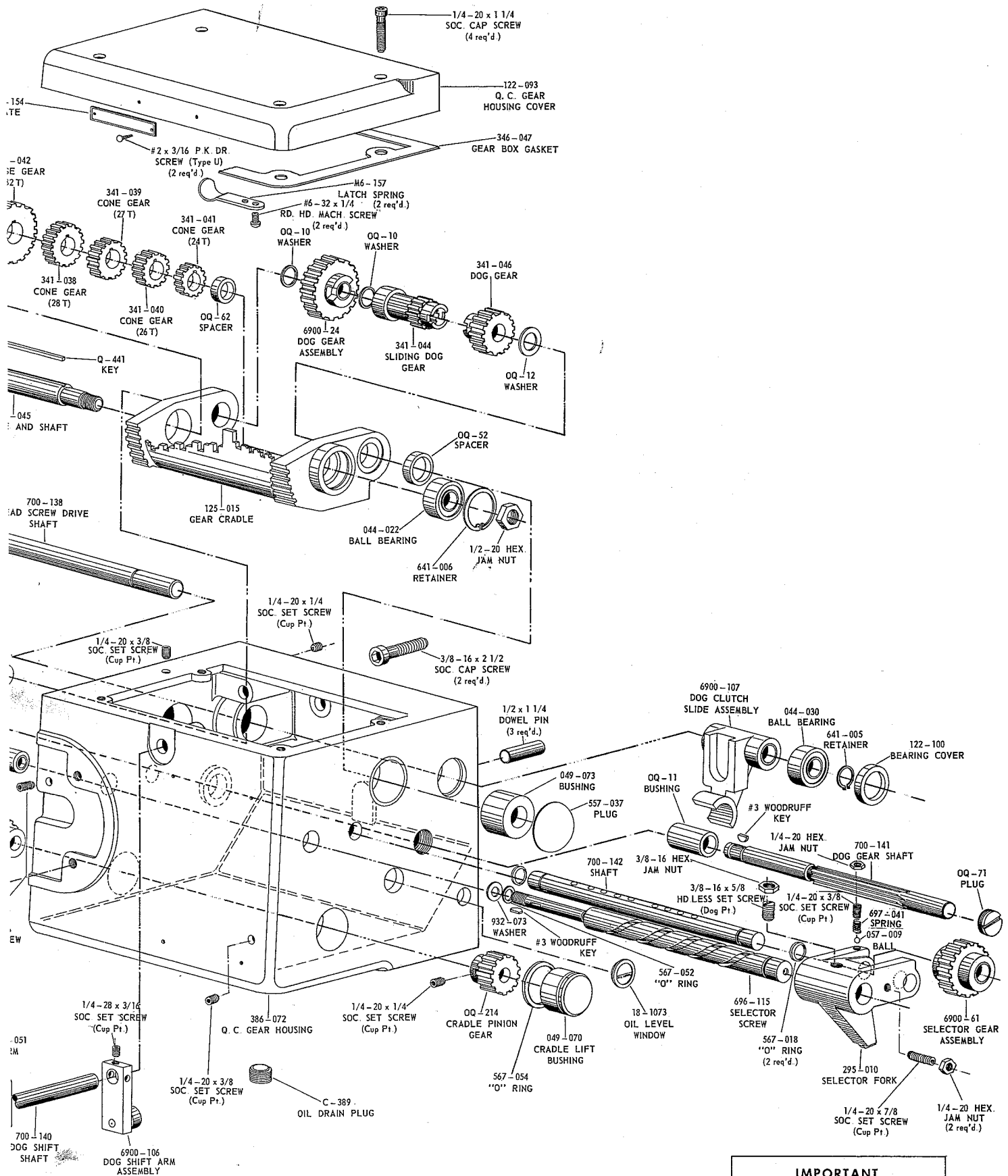


**IMPORTANT**

THE PARTS ILLUSTRATED ON THIS PAGE ARE FOR LATHES SERIAL NUMBERS FROM 600281



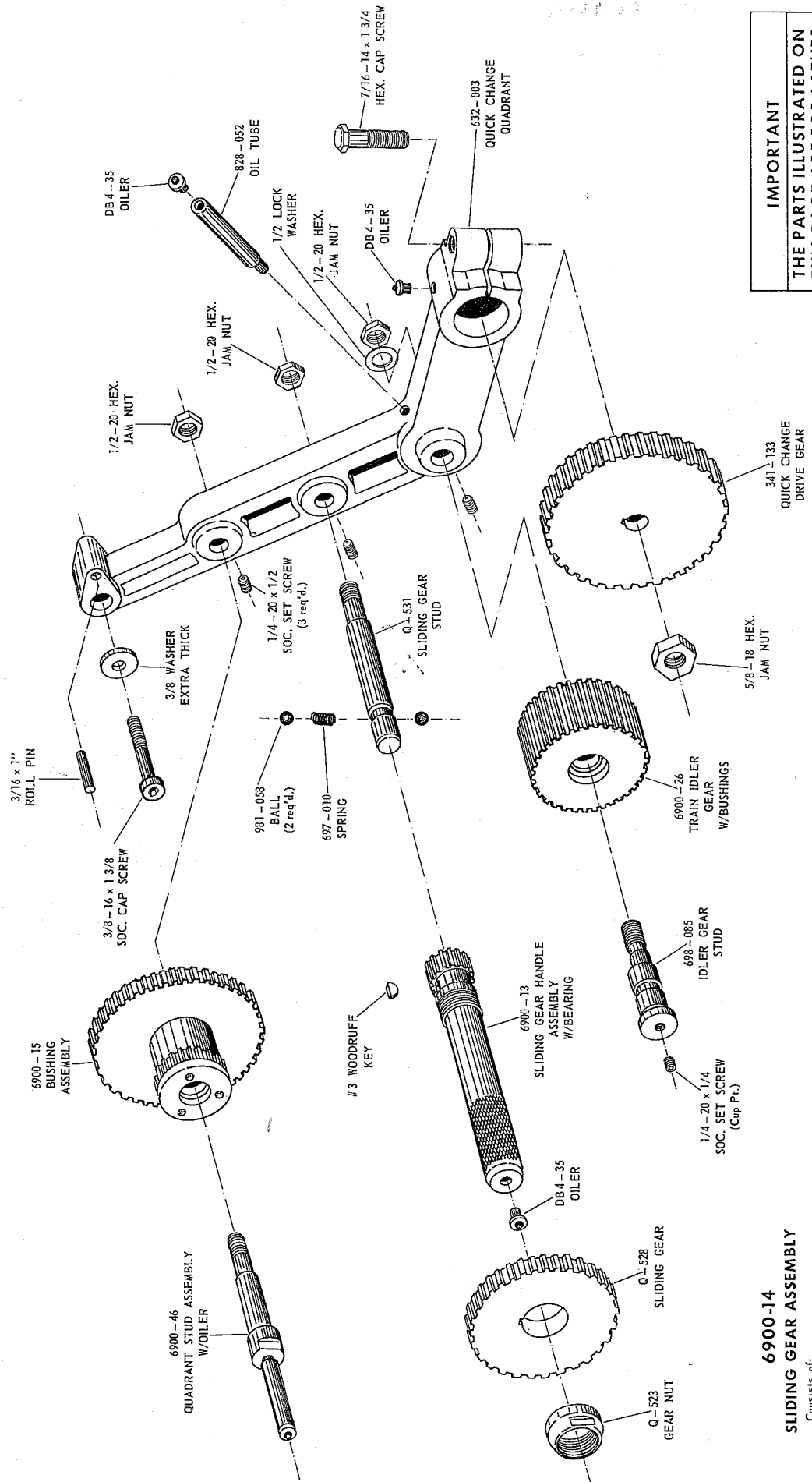




**IMPORTANT**

THE PARTS ILLUSTRATED ON THIS PAGE ARE FOR LATHES SERIAL NUMBERS FROM 600200

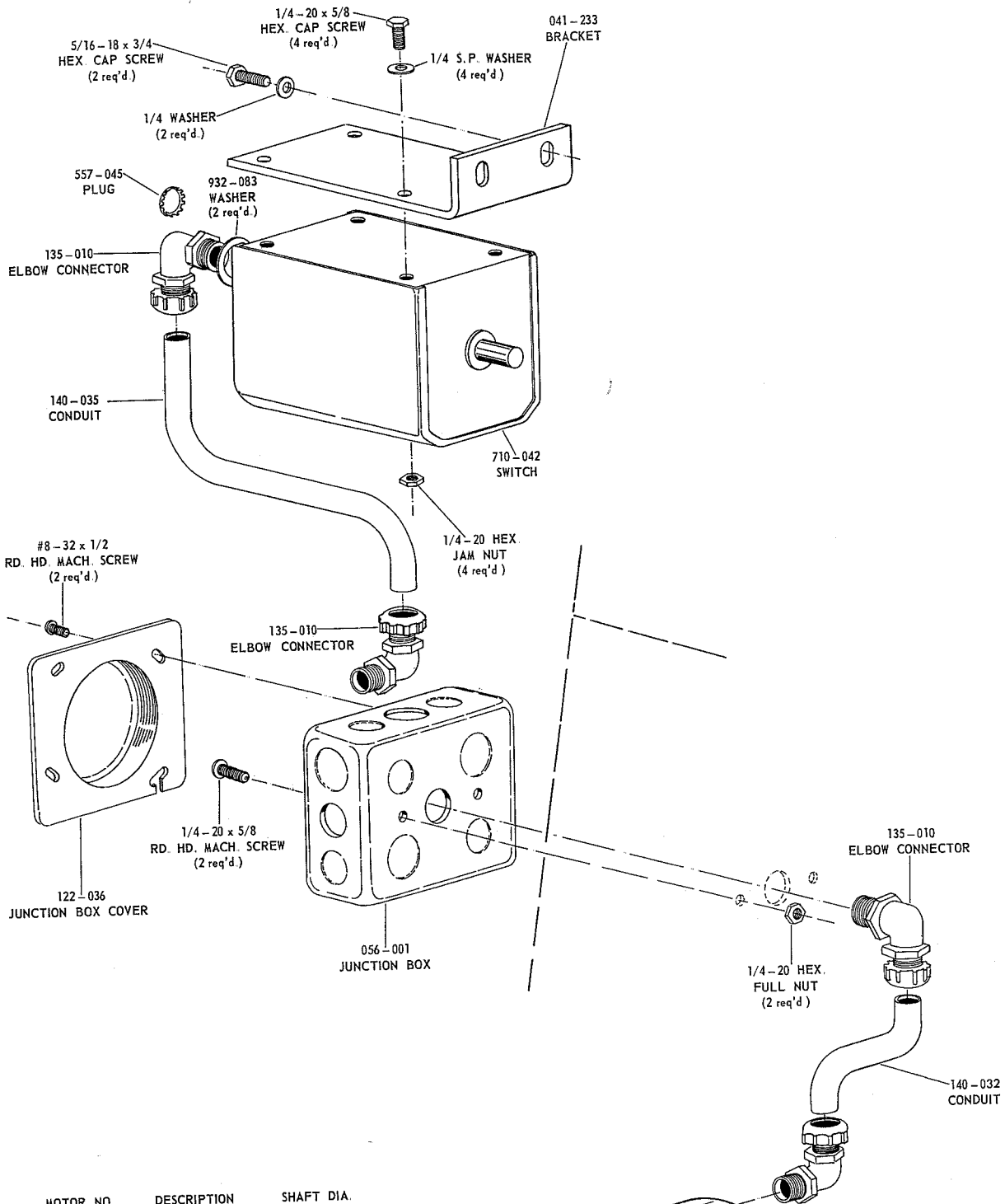
# QUADRANT ASSEMBLY 6900-501



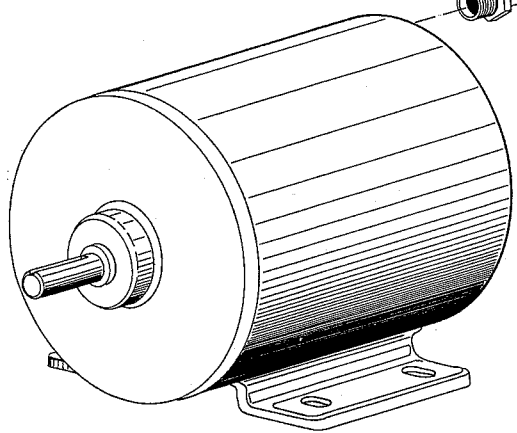
**IMPORTANT**  
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 SERIAL NUMBERS FROM  
 600200

**6900-14**  
**SLIDING GEAR ASSEMBLY**  
 Consists of:  
 6900-13 GEAR ASSEMBLY  
 Q-523 NUT  
 Q-528 GEAR  
 DB4-35 OILER  
 #3 WOODRUFF KEY

# ELECTRICAL ASSEMBLY



MOTOR NO.	DESCRIPTION	SHAFT DIA.
2826	3 H.P. 3 PHASE	1 1/8



**IMPORTANT**  
 THE PARTS ILLUSTRATED ON  
 THIS PAGE ARE FOR LATHES  
 SERIAL NUMBERS FROM  
 600200

**COUNTERSHAFT  
6900-502**

**6905-42  
C'SHAFT SPINDLE  
ASSEMBLY**

- Consists of:
- 044-017 BEARING (2)
  - 238-003 DRIVER
  - 382-056 HUB
  - 442-052 KEY
  - 442-052 HUB KEY
  - 442-052 DRIVER KEY
  - 641-011 RETAINER (4)
  - 641-086 RETAINER
  - 699-138 SPACER
  - 701-049 SPINDLE
  - 6900-33 PULLEY ASSEM.
  - 6900-40 C'SHAFT VARI. PULLEY ASSEM.
  - 699-146 SPACER

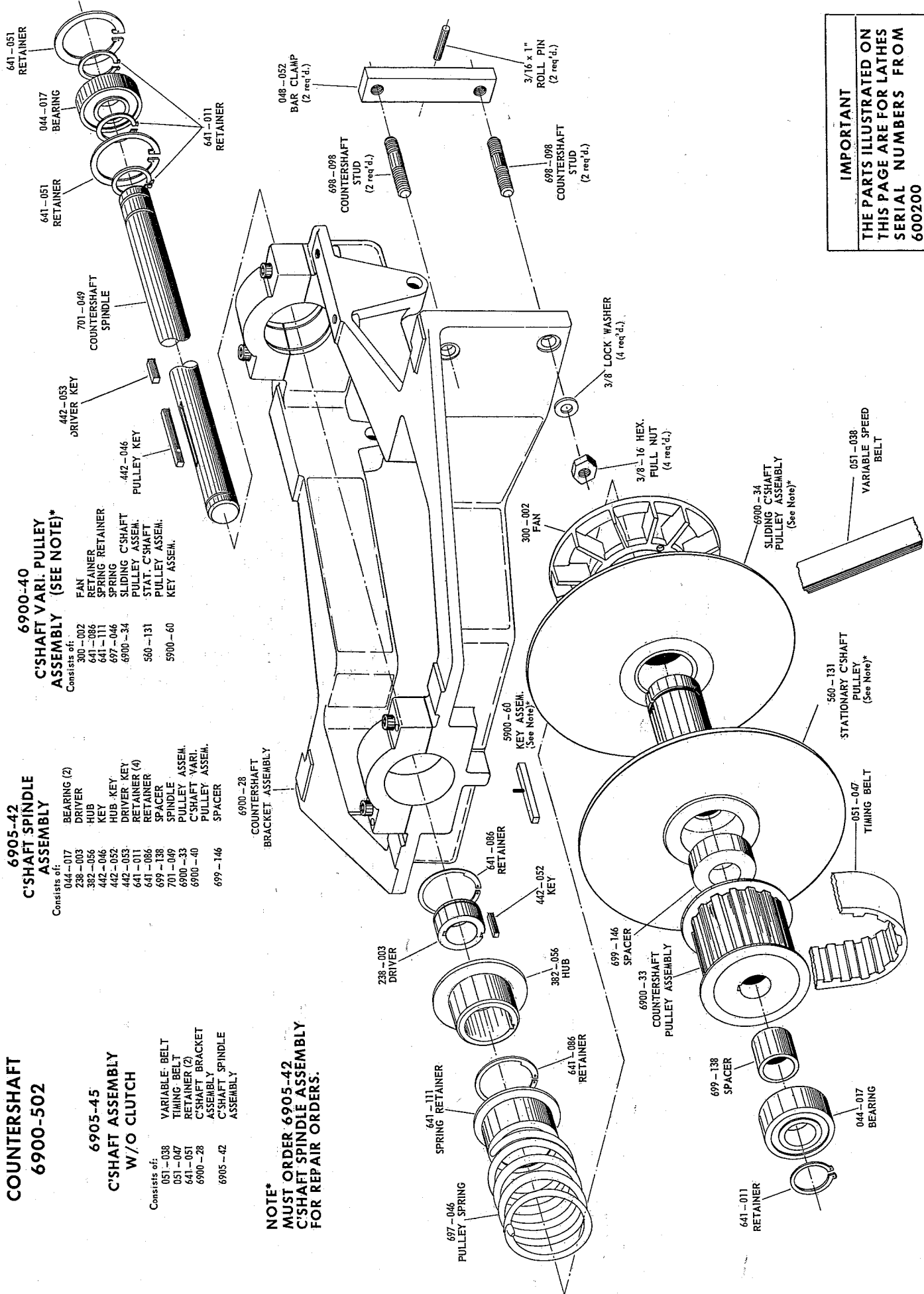
**6905-45  
C'SHAFT ASSEMBLY  
W/O CLUTCH**

- Consists of:
- 051-038 VARIABLE BELT
  - 051-047 TIMING BELT
  - 641-051 RETAINER (2)
  - 6900-28 C'SHAFT BRACKET ASSEMBLY
  - 6905-42 C'SHAFT SPINDLE ASSEMBLY

**NOTE\***  
**MUST ORDER 6905-42  
C'SHAFT SPINDLE ASSEMBLY  
FOR REPAIR ORDERS.**

**6900-40  
C'SHAFT VARI. PULLEY  
ASSEMBLY (SEE NOTE)\***

- Consists of:
- 300-002 FAN
  - 641-086 RETAINER
  - 641-111 SPRING
  - 697-046 SLIDING C'SHAFT PULLEY ASSEM.
  - 6900-34 STAT. C'SHAFT PULLEY ASSEM.
  - 560-131 KEY ASSEM.
  - 5900-60



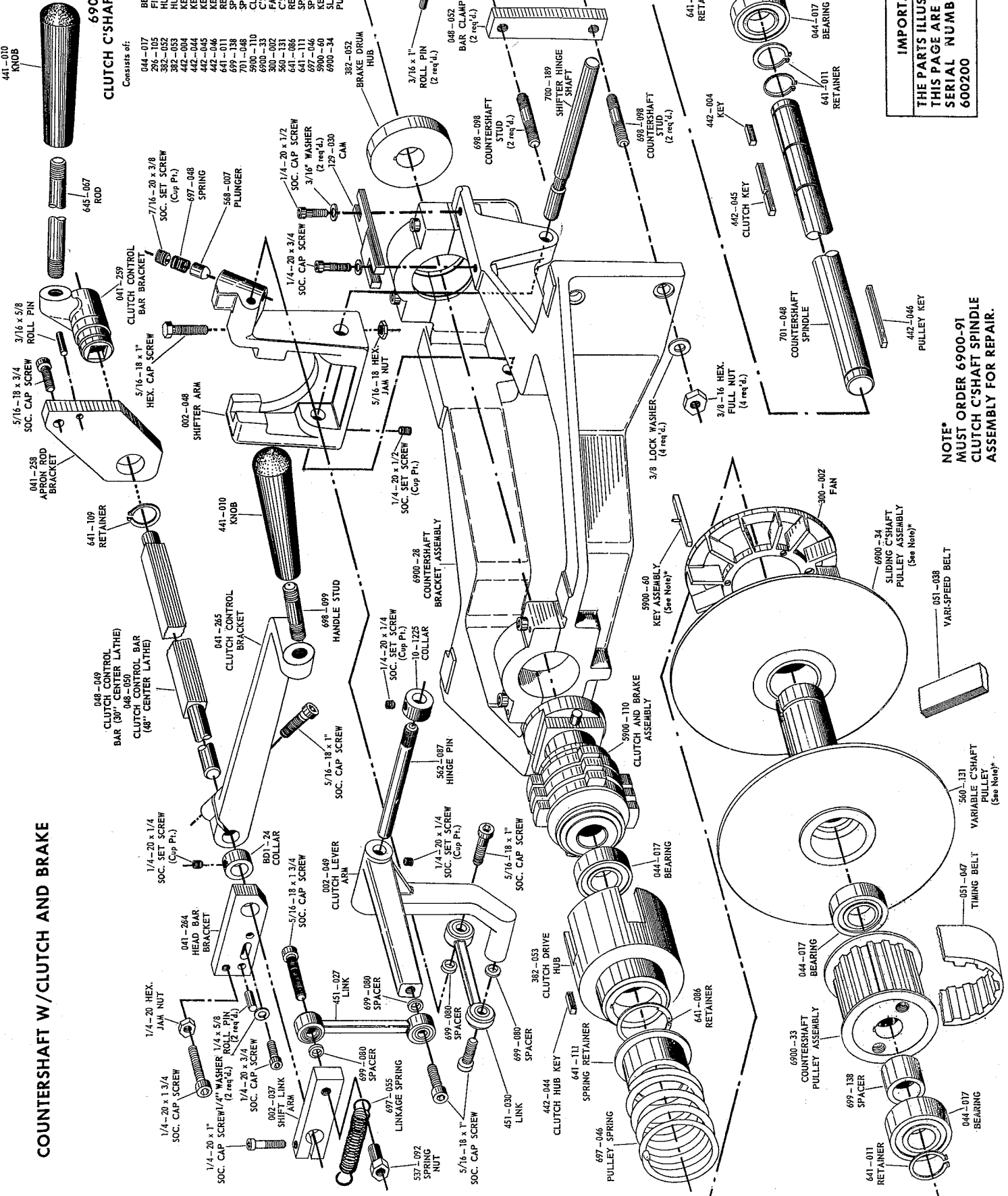
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SERIAL NUMBERS FROM  
600200**

# COUNTERSHAFT W/CLUTCH AND BRAKE

## 6900-91 CLUTCH C'SHAFT SPINDLE ASSEM.

Consists of:

- 044-017 BEARING (4)
- 323-025 FITTING
- 382-052 HUB
- 382-053 HUB
- 442-004 KEY
- 442-004 KEY
- 442-045 KEY
- 442-046 KEY
- 641-011 RETAINER (4)
- 699-138 SPACER
- 701-048 SPINDLE
- 5900-110 CLUTCH & BRAKE ASSEM.
- 6900-33 C'SHAFT PULLEY ASSEM.
- 300-002 FAN
- 641-011 RETAINER
- 641-011 RETAINER
- 697-016 SPRING
- 5900-60 KEY ASSEMBLY
- 6900-34 SLIDING C'SHAFT PULLEY ASSEMBLY

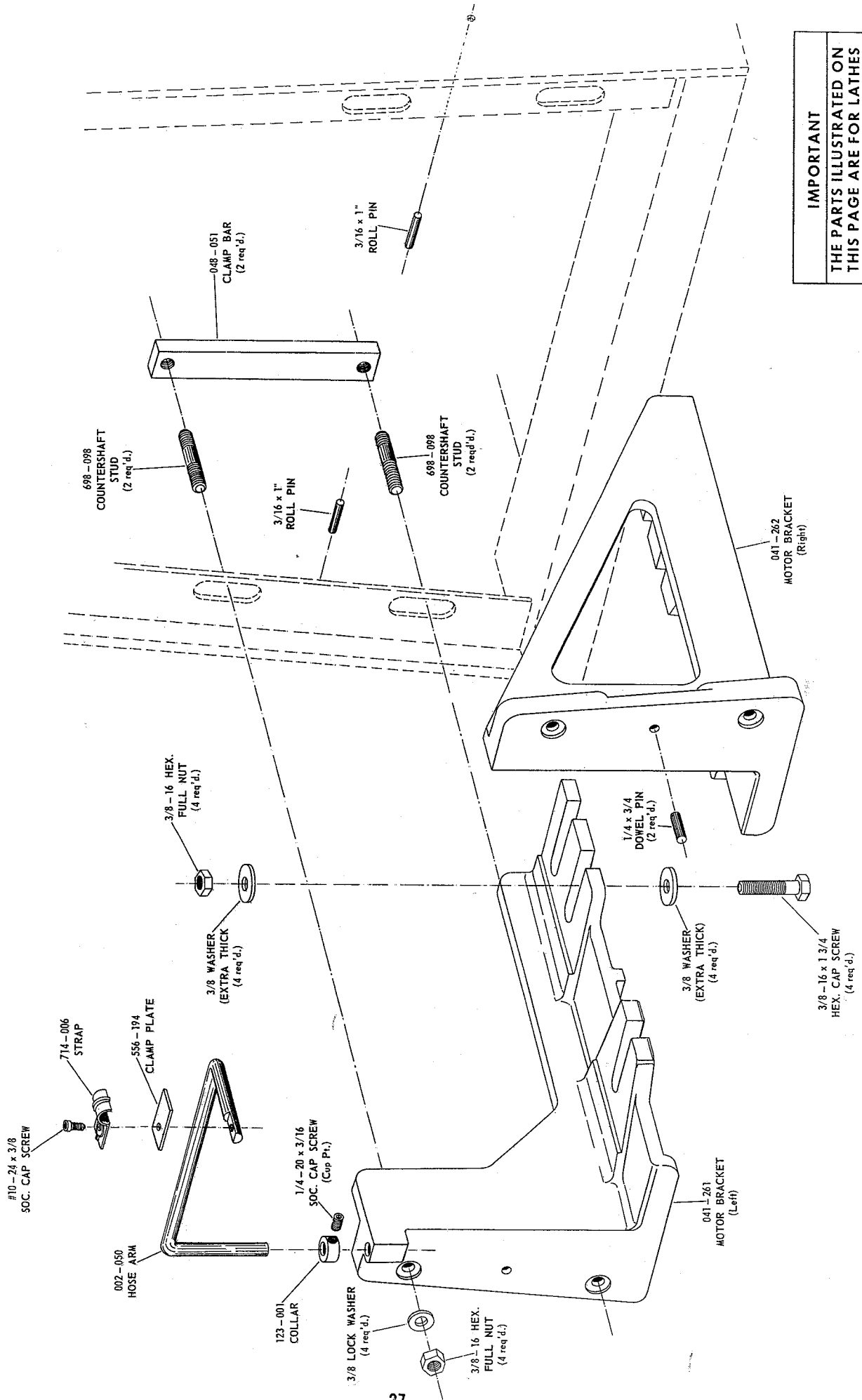


**IMPORTANT**  
THE PARTS ILLUSTRATED ON THIS PAGE ARE FOR LATHES SERIAL NUMBERS FROM 600200

**NOTE\***  
MUST ORDER 6900-91 CLUTCH C'SHAFT SPINDLE ASSEMBLY FOR REPAIR.

# MOTOR BASE ASSEMBLY

## 6900-503

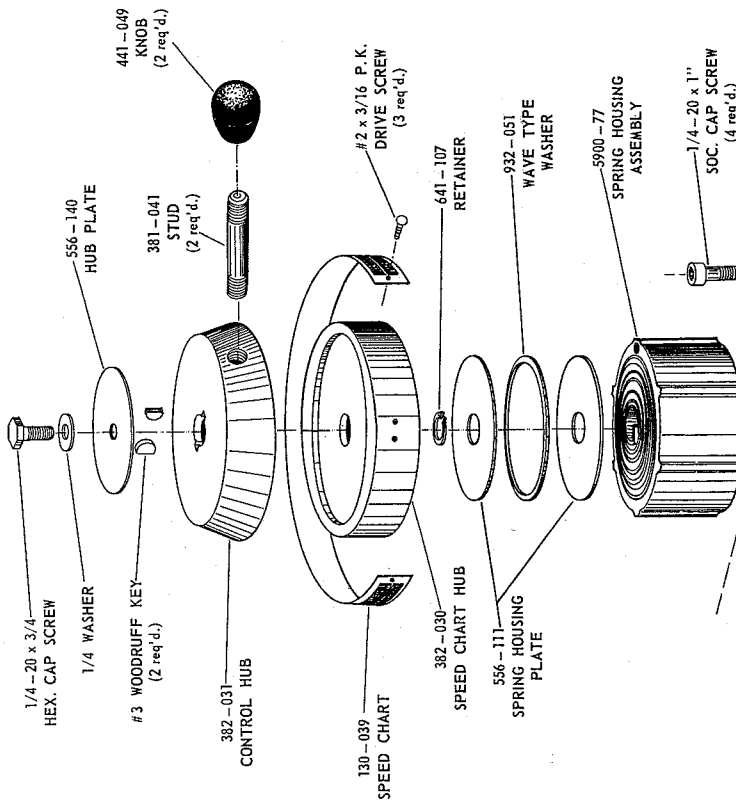


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# VARIABLE SPEED CONTROL

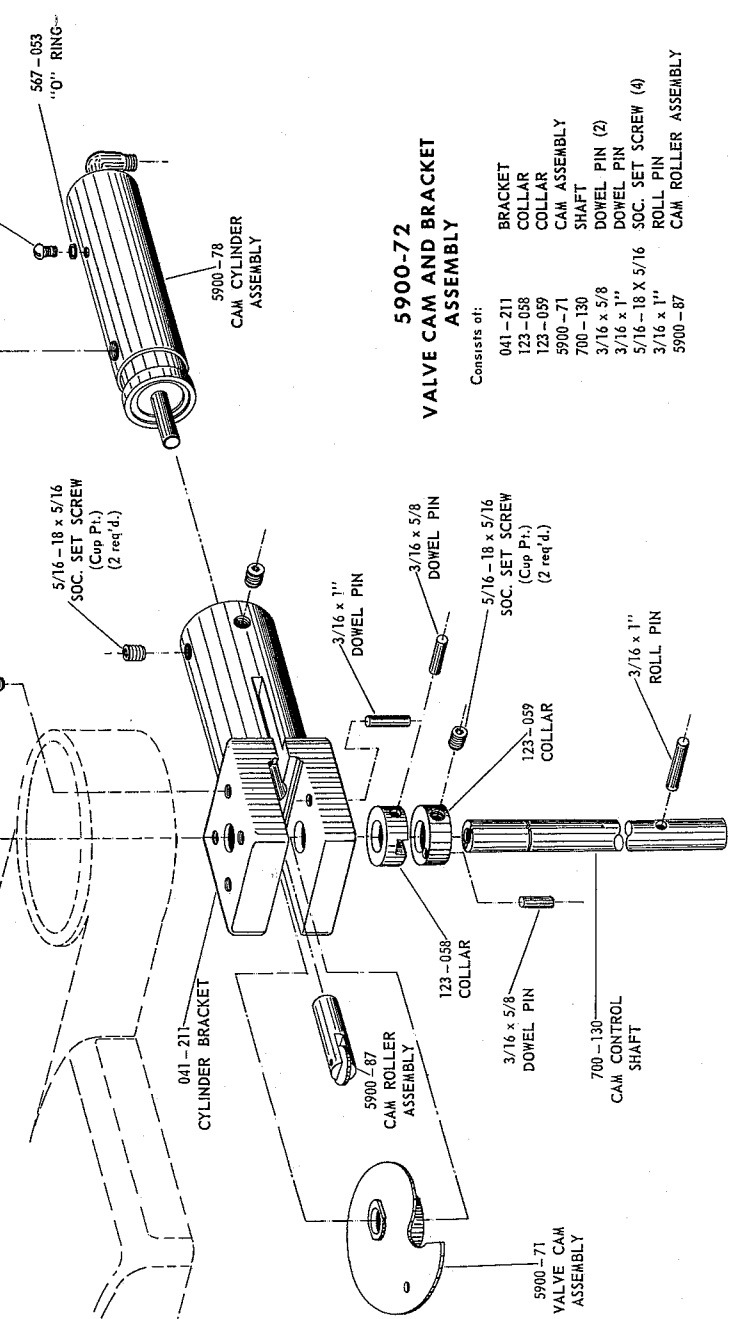
## 6900-76 SPEED CHART HUB ASSEMBLY

Consists of:  
 130-039 CHART HUB  
 382-030 #2 x 3/16 P.K. DRIVE SCREW (3)



## 5900-72 VALVE CAM AND BRACKET ASSEMBLY

Consists of:  
 041-211 BRACKET  
 123-058 COLLAR  
 123-059 COLLAR  
 5900-71 CAM ASSEMBLY  
 700-130 SHAFT  
 3/16 x 5/8 DOWEL PIN (2)  
 3/16 x 1" DOWEL PIN  
 5/16-18 X 5/16 SOC. SET SCREW (4)  
 3/16 x 1" ROLL PIN  
 5900-87 CAM ROLLER ASSEMBLY



**IMPORTANT**  
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 SERIAL NUMBERS FROM  
 600200

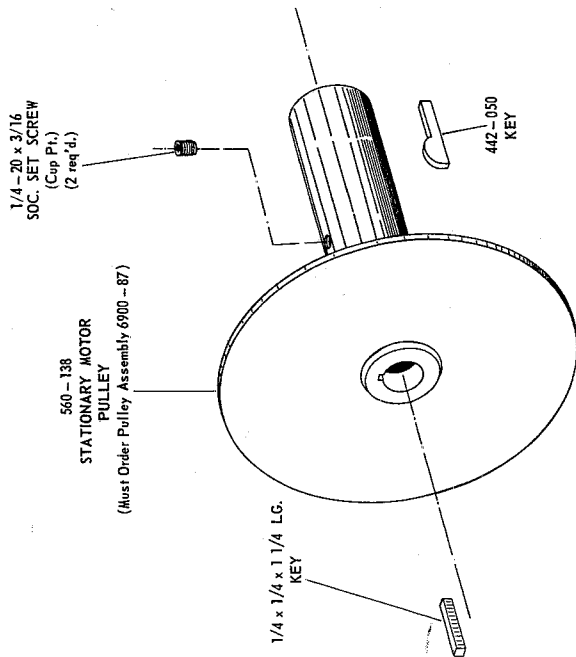


# VARIABLE SPEED MOTOR PULLEY ASSEMBLY

## 6900-87

### MOTOR VARI-PULLEY ASSEMBLY

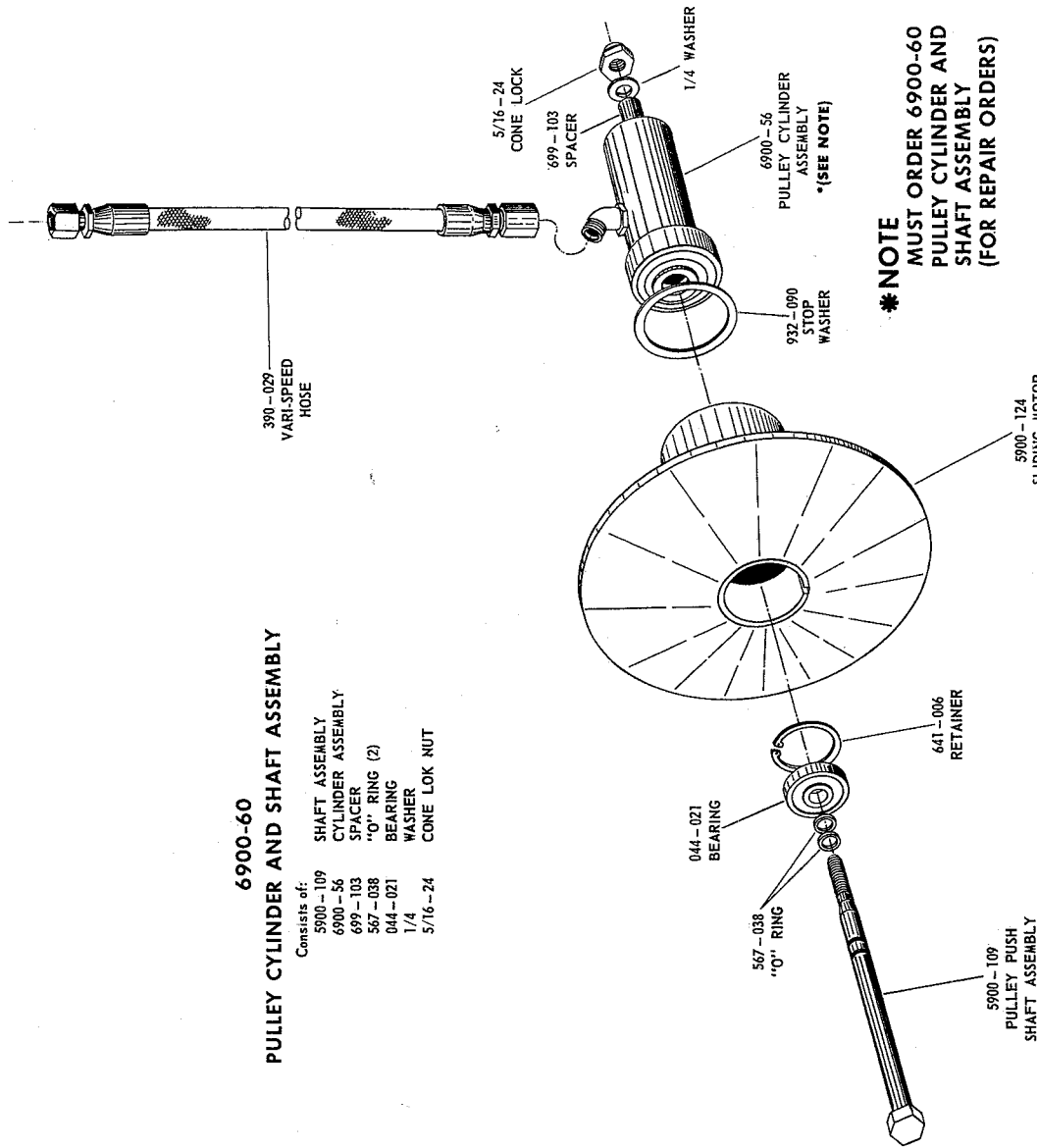
- Consists of:
- 5900-124 PULLEY ASSEMBLY
  - 1/4-20 x 3/16 SOC. SET SCREW (2)
  - 560-138 MOTOR PULLEY ASSEMBLY
  - 442-050 KEY



## 6900-60

### PULLEY CYLINDER AND SHAFT ASSEMBLY

- Consists of:
- 5900-109 SHAFT ASSEMBLY
  - 6900-56 CYLINDER ASSEMBLY
  - 699-103 SPACER
  - 567-038 "O" RING (2)
  - 044-021 BEARING
  - 1/4 WASHER
  - 5/16-24 CONE LOK NUT

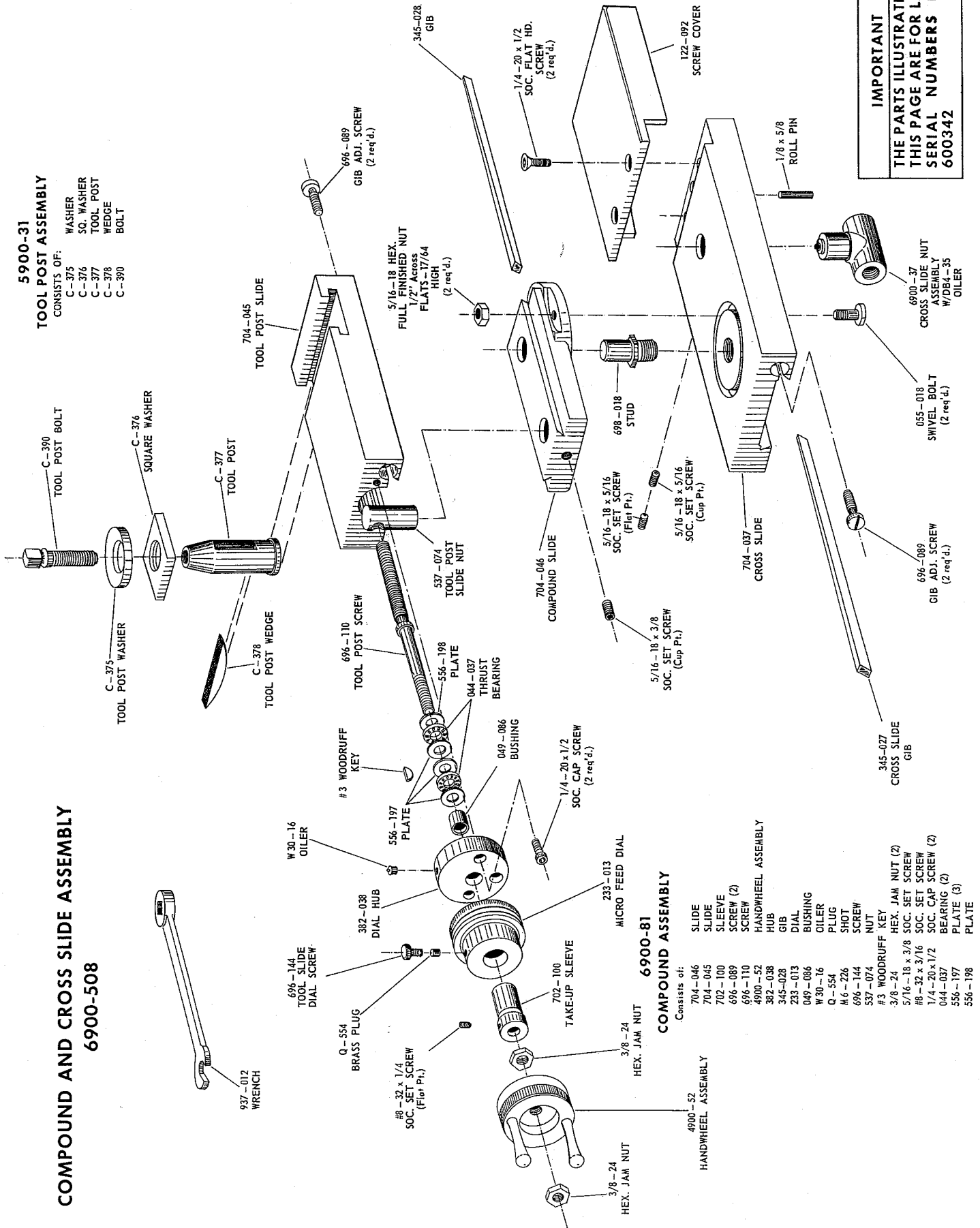


**\*NOTE**  
MUST ORDER 6900-60  
PULLEY CYLINDER AND  
SHAFT ASSEMBLY  
(FOR REPAIR ORDERS)

**IMPORTANT**  
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THIS PAGE ARE FOR LATHES  
SERIAL NUMBERS FROM  
600200

# COMPOUND AND CROSS SLIDE ASSEMBLY 6900-508

**5900-31  
TOOL POST ASSEMBLY**  
CONSISTS OF:  
C-375 WASHER  
C-376 SO. WASHER  
C-377 TOOL POST  
C-378 WEDGE  
C-390 BOLT



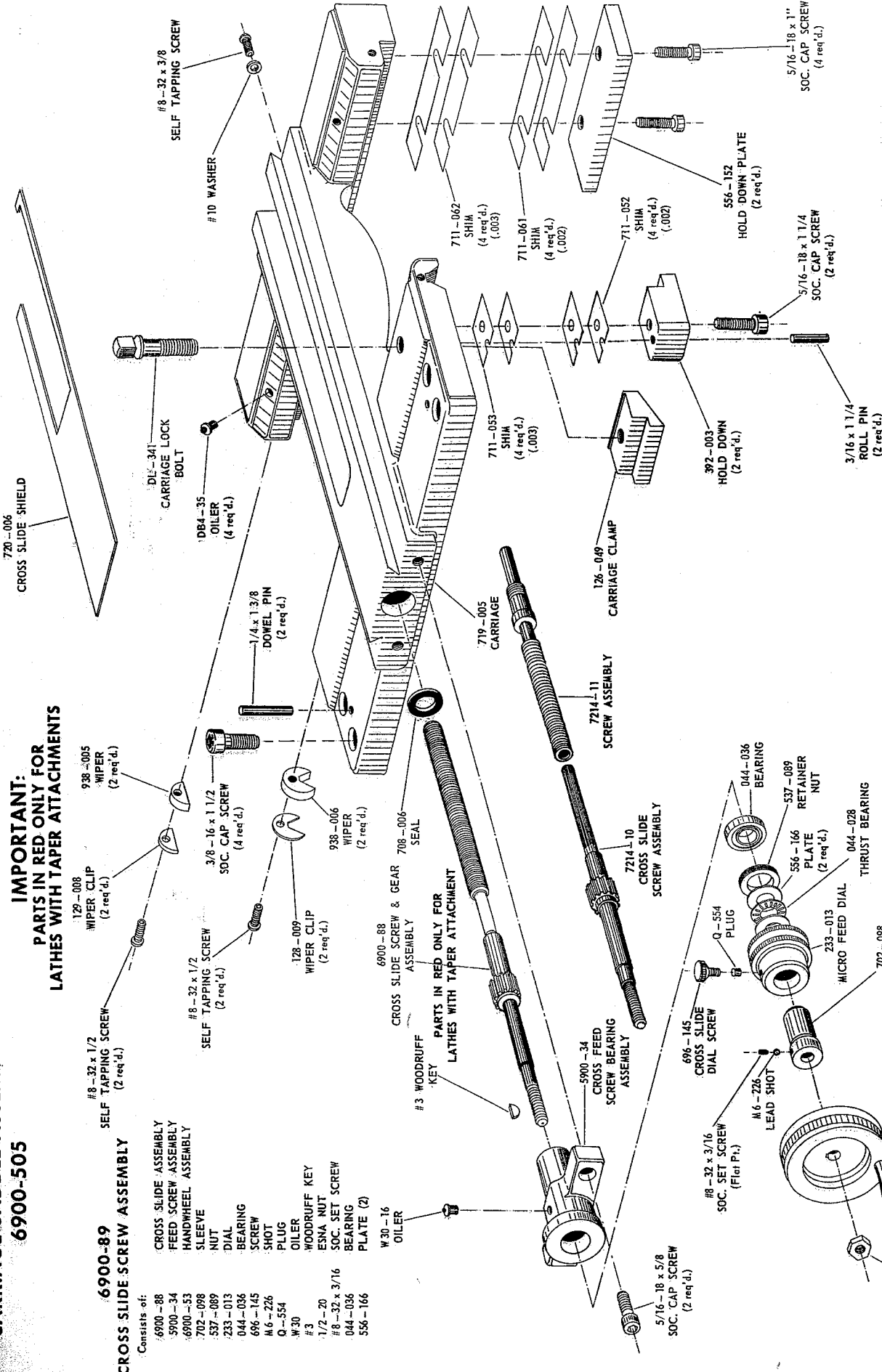
**IMPORTANT**  
THE PARTS ILLUSTRATED ON  
THIS PAGE ARE FOR LATHES  
SERIAL NUMBERS FROM  
600342

## COMPOUND ASSEMBLY 6900-81

- Consists of:
- 4900-52 HANDWHEEL ASSEMBLY
  - 3/8-24 HEX. JAM NUT
  - 3/8-24 HEX. JAM NUT
  - 702-100 TAKE-UP SLEEVE
  - 233-013 MICRO FEED DIAL
  - 382-038 DIAL HUB
  - 696-144 TOOL SLIDE DIAL SCREW
  - Q-554 BRASS PLUG
  - #8-32 x 1/4 SOC. SET SCREW (Flt Pt.)
  - #3 WOODRUFF KEY
  - 556-197 PLATE
  - W 30-16 OILER
  - 556-198 PLATE
  - 049-086 BUSHING
  - 1/4-20 x 1/2 SOC. CAP SCREW (2 req. d.)
  - 044-037 THRUST BEARING
  - 556-198 PLATE
  - 696-110 TOOL POST SCREW
  - 537-074 TOOL POST SLIDE NUT
  - 704-046 COMPOUND SLIDE
  - 704-037 CROSS SLIDE
  - 698-018 STUD
  - 696-089 GIB ADJ. SCREW (2 req. d.)
  - 6900-37 CROSS SLIDE NUT ASSEMBLY W/DB4-35 OILER
  - 065-018 SWIVEL BOLT (2 req. d.)
  - 5/16-18 x 5/16 SOC. SET SCREW (Cup Pt.)
  - 5/16-18 x 3/8 SOC. SET SCREW (Cup Pt.)
  - 345-027 CROSS SLIDE GIB
  - 122-092 SCREW COVER
  - 1/8 x 5/8 ROLL PIN
  - 1/4-20 x 1/2 SOC. FLAT HD. SCREW (2 req. d.)

# CARRIAGE SADDLE ASSEMBLY 6900-505

**IMPORTANT:**  
PARTS IN RED ONLY FOR  
LATHES WITH TAPER ATTACHMENTS



## CROSS SLIDE SCREW ASSEMBLY

Consists of:

- 6900-88 CROSS SLIDE ASSEMBLY
- 5900-34 FEED SCREW ASSEMBLY
- 6900-53 HANDWHEEL ASSEMBLY
- 702-098 SLEEVE
- 537-089 NUT
- 233-013 DIAL
- 044-036 BEARING
- 696-145 SCREW
- M6-226 SHOT
- Q-554 PLUG
- #30 OILER
- #3 WOODRUFF KEY
- 1/2-20 ESNA NUT
- #8-32 x 3/16 SOC. SET SCREW
- 044-036 BEARING
- 556-166 PLATE (2)
- W30-16 OILER

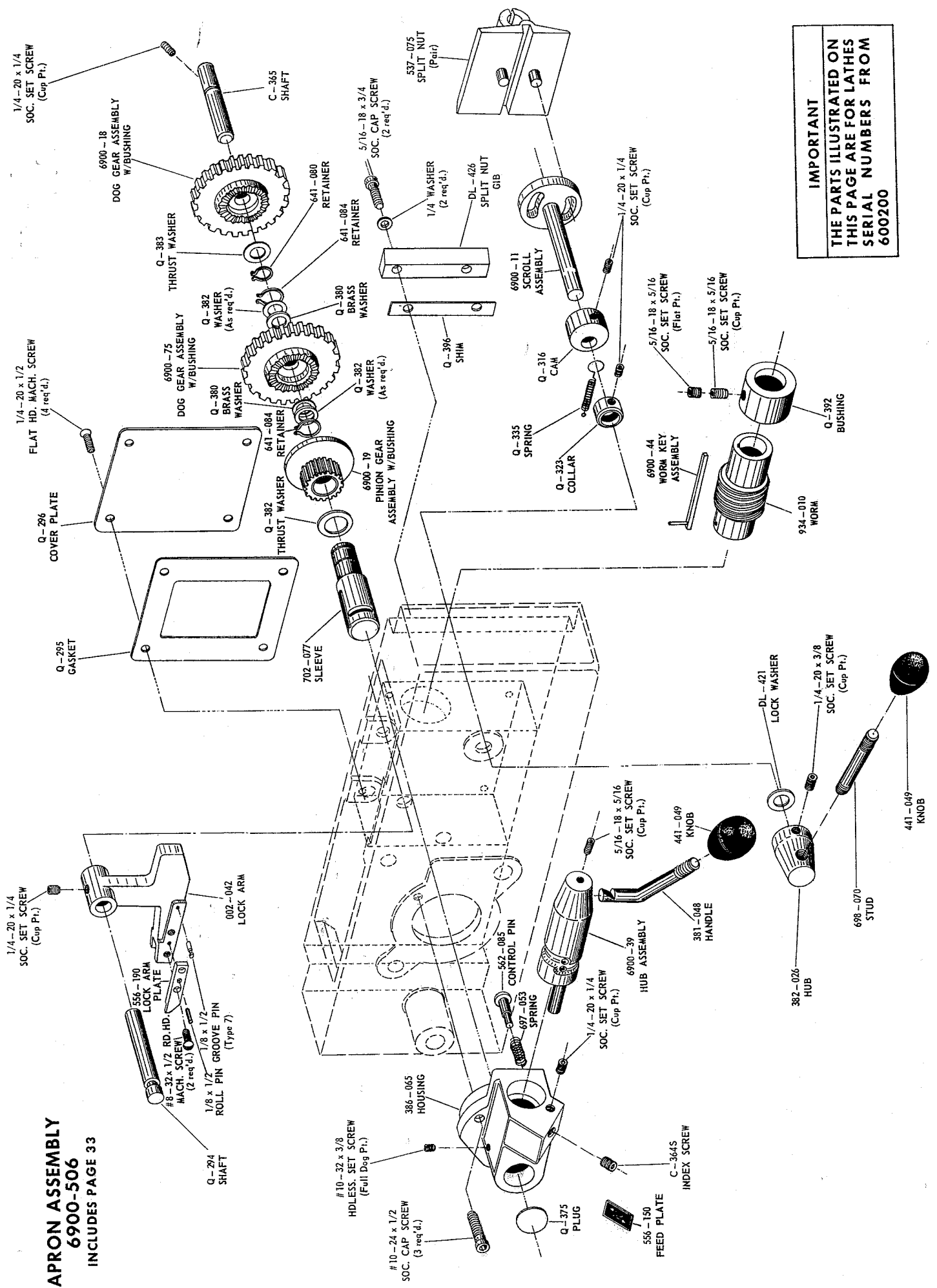
## CROSS SLIDE SCREW & GEAR ASSEMBLY

Consists of:

- 7214-11 SCREW ASSEMBLY
- 7214-10 CROSS SLIDE SCREW ASSEMBLY
- 5900-34 CROSS FEED SCREW BEARING ASSEMBLY
- 044-036 BEARING
- 537-089 RETAINER NUT
- 556-166 PLATE (2 req'd.)
- 044-028 THRUST BEARING
- 702-098 TAKE-UP SLEEVE
- 6900-53 CROSS SLIDE HAND WHEEL ASSEMBLY
- 1/2-20 ESNA NUT (17pt TE) (Light)
- #8-32 x 3/16 SOC. SET SCREW (Flat Pt.)
- M6-226 LEAD SHOT
- 696-145 CROSS SLIDE DIAL SCREW
- Q-554 PLUG
- 233-013 MICRO FEED DIAL
- 044-036 BEARING
- 537-089 RETAINER NUT
- 556-166 PLATE (2 req'd.)
- 044-028 THRUST BEARING
- 702-098 TAKE-UP SLEEVE
- 6900-53 CROSS SLIDE HAND WHEEL ASSEMBLY
- 1/2-20 ESNA NUT (17pt TE) (Light)

**IMPORTANT**  
**THE PARTS ILLUSTRATED ON THIS PAGE ARE FOR LATHES SERIAL NUMBERS FROM 600200**

**IMPORTANT**  
**THE PARTS ILLUSTRATED ON**  
**THIS PAGE ARE FOR LATHES**  
**SERIAL NUMBERS FROM**  
**600200**

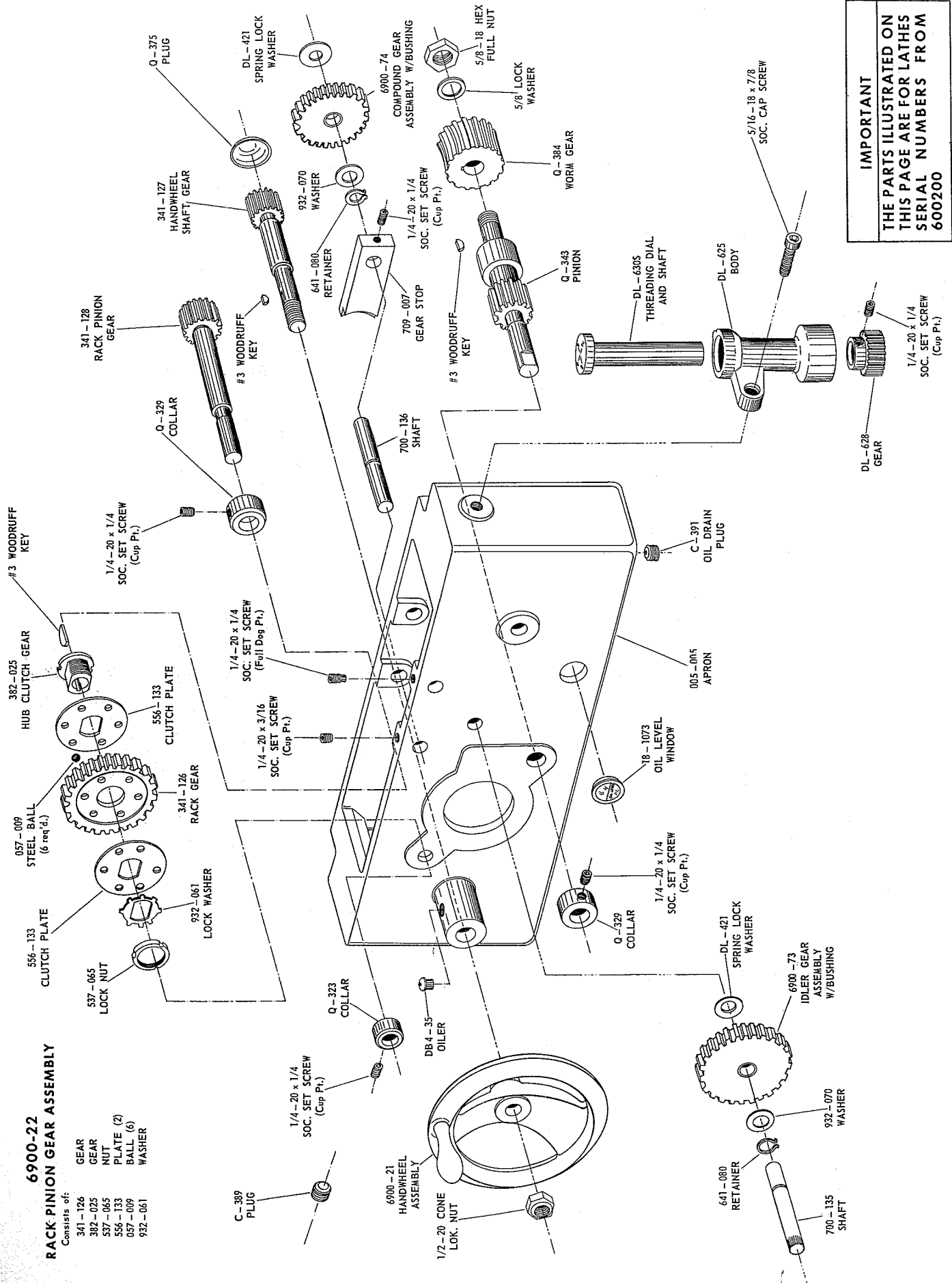


**APRON ASSEMBLY**  
**6900-506**  
**INCLUDES PAGE 33**

# 6900-22 RACK PINION GEAR ASSEMBLY

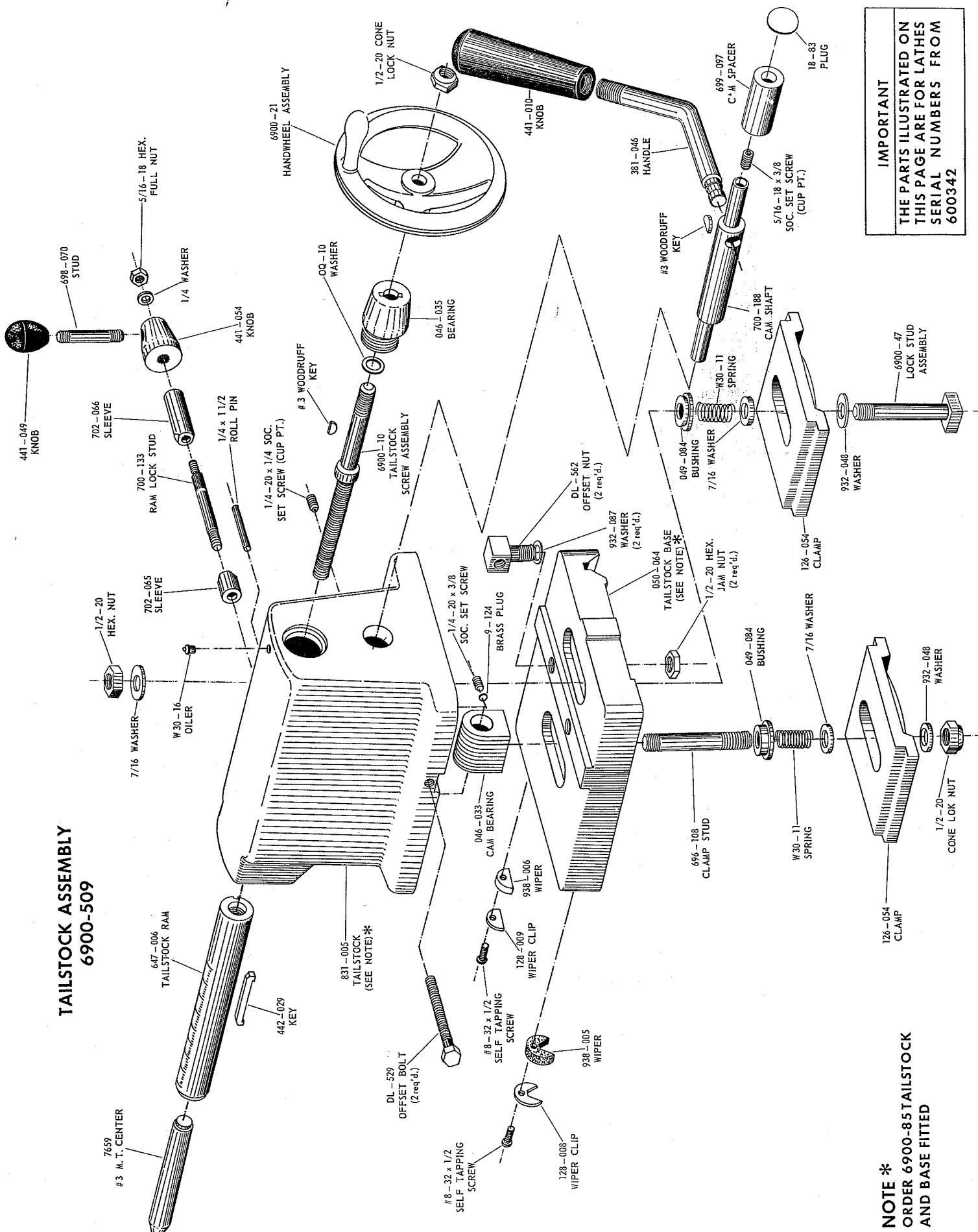
Consists of:

- 341 - 126 GEAR
- 382 - 025 GEAR
- 537 - 065 NUT
- 556 - 133 PLATE (2)
- 057 - 009 BALL (6)
- 932 - 061 WASHER



**IMPORTANT**  
THE PARTS ILLUSTRATED ON  
THIS PAGE ARE FOR LATHES  
SERIAL NUMBERS FROM  
600200

# TAILSTOCK ASSEMBLY 6900-509



**IMPORTANT**  
THE PARTS ILLUSTRATED ON  
THIS PAGE ARE FOR LATHES  
SERIAL NUMBERS FROM  
600342

**NOTE \***  
ORDER 6900-85 TAILSTOCK  
AND BASE FITTED