

# **ROTTLER**

## **MANUFACTURING**

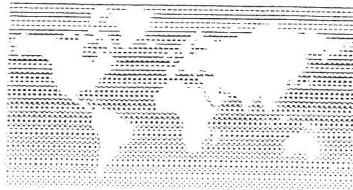
### **DA-4**

BORING MACHINE

MACHINE SERIAL NUMBER

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OPERATIONS AND MAINTENANCE  
MANUAL



MANUFACTURED BY:

ROTTLER MANUFACTURING COMPANY  
8029 South 200th Street  
Kent Washington 98032  
USA

Phone: (206) 872-7050

Fax: (206) 395-0230

**NOTE: WHEN ORDERING REPLACEMENT PARTS,  
PLEASE GIVE THE MODEL AND SERIAL NUMBER.**

ORDER BY PART NUMBER.

**THERE IS A MINIMUM ORDER OF \$25.00**

## DESCRIPTION

The Model DA-4 bar is a portable precision boring unit. The automotive model is complete with single point tooling and accessories for standard engine reborning work. The industrial model is equipped with a flange spindle nose and precision ball bearing spindle for a wide variety of work. All feeds and traverses are power operated and controlled from the upper gear housing unit. An auxiliary hand travel is located at the base of the feed screw. Power is furnished by end mounted AC single phase 110-220 Volt General Electric motor of 1/2 to 1-1/2 HP depending upon spindle speeds required. 3 phase motor is also available. A quick change lever selects two spindle speeds.

Gear housings are aluminum alloy in order to incorporate the lightest possible weight without sacrificing rigidity.

NOTE: When bar is shipped from factory the machined surfaces are protected with rust veto. After uncrating use clean cloth dampened with kerosene and remove the protective oil.

## TO ORDER PARTS

ORDER PARTS BY PART NUMBER AND ALWAYS GIVE SERIAL NUMBER OF BAR.

## C O N T R O L S

We suggest, before attempting to bore, you clamp the bar over an open area and actuate the controls to become familiar with them.

1. Feed lever is latching lever on side of bar. Press down until lever latches to engage cutting feed. To disengage press (3) feed release arm which will unlatch lever and allow it to return to neutral position. Lift feed lever (2) until it latches to engage rapid return travel. Bar will automatically return to neutral upon reaching top of travel. If you wish to return bar to neutral while it is in rapid up travel, again press (3) feed release which will unlatch lever and allow it to return to neutral position.

You will note stop rod that is held in base casting by thumb screw has a cone shaped end which will release cutting feed when it contacts lever. This is most conveniently raised up and locked by thumb screw in proper position on completion of first bore cut. This rod should not be used to hold close tolerance shoulders. Optional equipment for this is available.

2. The fast down travel lever is located next to feed lever. Check feed lever to see that it is in neutral position before actuating. Lever should be pulled down quickly and firmly and not allowed to ratchet. Control is spring loaded and will release when you release pressure. This control should be used on slow speed only on automotive and high RPM machines.

3. Spindle clutch control is located opposite side of feed lever. A rapid down movement will engage spindle rotation and a reverse action will disengage. In that this is a jaw clutch we recommend stopping the motor or jogging the motor to engage clutch on the high RPM of the higher speed machines. Standard procedure is to throw out clutch upon completion of the bore. Align marks by turning spindle knob, then reverse travel.

The small knob on top of the upper housing may be used for manually turning spindle when necessary. On the automotive type units this knob is also used for centering.

4. 2-1/2" manual travel is actuated by rotating handle attached to spline at top of base. This travel should always be left in full up position after using bar. Normal procedure is to rapid travel or feed bar to point requiring manual travel. If back feeding is necessary run hand travel down first and then rapid travel down to where tool can be inserted.

5. Speed control is operated by pulling knob at motor gear housing and raising for low speed and lowering for high. These may be changed when bar is running although it is desirable to jog motor when changing from low to high on higher speed machines.

After locating fingers properly, extend them by turning top centering knob and exert tension on the knob while tightening hold down bolt. Do not over tighten. Approximately 25 lb. tension on 8" wrench is adequate. Before tightening hold down bolt it is advisable to rock bar slightly to make sure fingers are making positive contact with cylinder wall. Retract fingers into head and return bar to up position by latching feed lever in up position.

4. It is necessary to change fingers to accommodate the entire range. The most convenient method is to lay bar on bench, control side up. Run spindle down a few inches with the rapid down travel, shut off motor and run the fingers out with top knob. Insert the other fingers in the slots being careful to match the numbers on the fingers to the numbers on the slots. Hold all fingers inward with one hand and rotate centering knob - first to right and then to left retracting them into the head. Check to see that all fingers are retracted equally and return bar to up position.

#### S H A R P E N I N G   C U T T E R

5. The performance of your boring bar and quality of work it will do is almost entirely dependent on the care of the cutting tool. It is the most frequent cause of size and finish problems in boring.

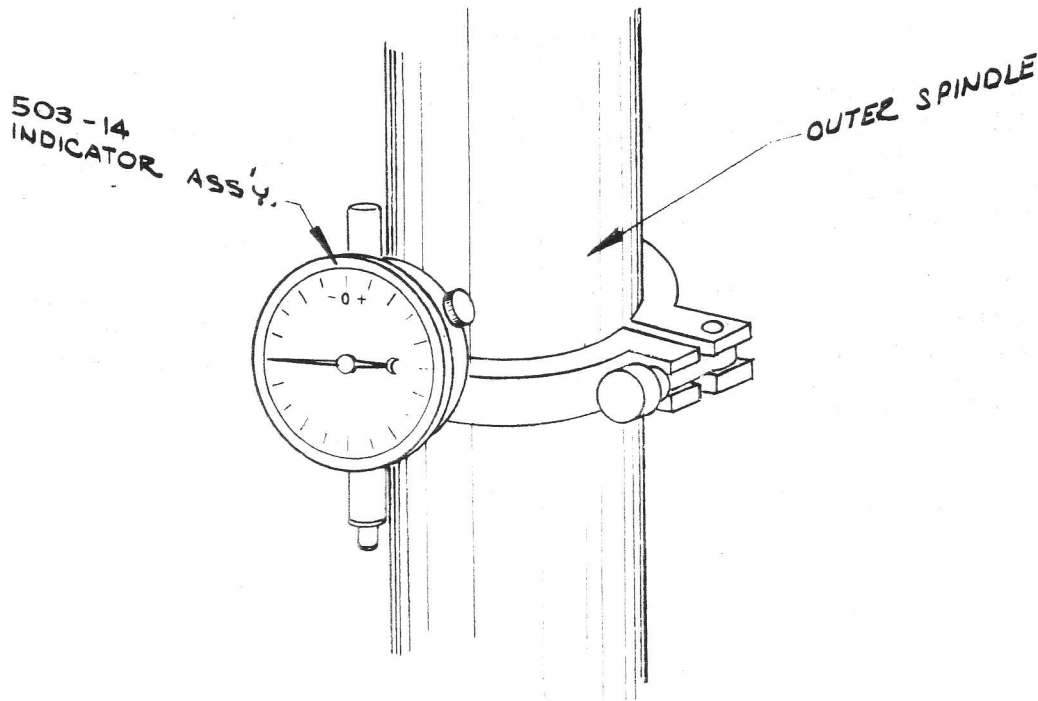
To sharpen the carbide bit insert tool holder in sharpening jig slot. Insert the jig shank in the hole provided in the upper housing and sharpen bit on the small diamond wheel provided on the large knob. Always make sure you sharpen the tool on the side of the diamond that is running toward the top face of the bit. Sharpening on the wrong side can readily chip the point. When sharpening use very light pressure, moving the tool back and forth across the diamond wheel to improve cutting and prevent grooving of diamond. After sharpening a number of times dress excess steel away from carbide on grinding wheel. This will facilitate use of chip remover hoods and make for quicker sharpening. Diamond wheel is designed for carbide only. Steel tends to load it.

#### B O R I N G - A U T O M O T I V E   O N L Y

If tool is properly sharpened place cutter and proper tool holder in micrometer. Hold tool bit lightly against mike anvil and loosen Allen screw with wing wrench. Gently let tool holder slide back to make contact with micrometer spindle. This procedure will prevent chipping carbide. This micrometer is .050 to a revolution rather than .025 as on a conventional mike. Set mike to size you wish to bore and tighten set screw lightly. Back off mike and tighten set screw. Here again excessive tightening only tends to nick mike anvil and make future setting difficult. After tightening recheck size. (Note: See Micrometer Page for re-setting mike to high or low range.)

Make sure tool holder and tool holder slot in head are free from dirt. Insert tool in slot making sure it is completely back and latched. Lock set screw, for heavy cuts only, with socket type screw driver provided with tools.

This may be best accomplished by the attachment of a 1" travel or longer dial indicator to read the spindle travel of the machine. You may wish to mount your own indicator or a 503-14 indicator assembly may be purchased for this.



To counterbore to a close tolerance depth, carefully hand feed the RF-type cutter bit down until the cutter is lightly touching the block surface. Adjust the dial reading to 0 and hand feed cut down to within .003 to .007 of desired depth. Check the exact depth of counterbore at this point with your depth micrometer and hand feed the remaining depth required by reading the proper number of graduations on the indicator.

#### AUTOMOTIVE

#### DA-4 Boring Bar - OPERATING INSTRUCTIONS

#### CENTERING FINGERS

Centering fingers are adequate to center the new bore within .002 of the centering of old bore; providing the old bore is reasonably round and if you follow operating instructions properly. Centering fingers can be lapped periodically to obtain near perfect centering. Use the following procedure in an undersize bore or junk block.

## LUBRICATION

Upper Housing should be packed with LUBRIPLATE 930-AAA grease, 1 part 30 weight machine oil approximately every 25,000 boring cycles.

Motor gear housing should be re-packed with LUBRIPLATE 930-AAA grease, 1 part 30 weight machine oil approximately every 50,000 boring cycles. A very occasional drop of oil in the motor gear pot (socket head screw near bottom) will help maintain lubrication at right consistency.

Every 2 days of operation fitting at top of spindle should be lubricated with LUBRIPLATE 930-AAA grease for top inner spindle bearing.

Socket set screw in key way of spindle should be removed and a few drops of oil put in approximately every 500 bores. Do not over fill. The oil cup on top of the motor adjacent to the feed screw should be oiled with 30 weight machine oil approximately every 50 bores.

## DA-4 BORING BAR

### ADJUSTMENT OF OUTER SPINDLE

Main spindle bearings are tapered split cast iron rings held in seat by adjustment nut. Tension on bearings is normally adequate to require no adjustment for many boring cycles.

Caution should be used in adjusting these bearings in order to avoid a too tight spindle which only serves to wear out machine and make control operation difficult. If it should be necessary to adjust proceed as follows:

Upper bearing is adjusted by removing felt retaining nut at top of base forcing felt up and adjust nut with punch.

For lower bearing first back off 8-32 nut lock screw at bottom spindle bearing. Then remove felt retainer at bottom of base and turn nut with punch.

1. Place and clamp bar over hole or overhang so spindle can be run down. Loosen both adjusting nuts and set screw.
2. Tighten upper bearing until additional pressure is required to operate hand feed.

Repeat this sequence on lower bearing taking care that hand feed operates only slightly tighter.

3. Traverse bar at all points of travel and make sure hand feed works easily. Spindles are ground slightly tapered to secure maximum rigidity at lower limits of travel where it is most required.

4. Spindle adjustment may also be checked by feeding spindle down and pulling slack out of feed mechanism by forcing down upper housing. Pressure required should be 50-75 lbs.

## DISASSEMBLY OF DA-4 MOTOR HOUSING

Note: Motor housing may be removed without disassembly of upper housing and feed screw.

### SECTION A-1

Remove 2 hex socket screws on bottom of 500-97 hand feed bracket and 2 screws holding 500-96 plate to 500-70 housing. Turn out (counter clockwise) bevel gear.

Remove 4 flat head hex socket screws in 500-70 housing. Lift out screw, or if upper housing is still intact hold in rapid down lever, 500-30, and rotate screw counter clockwise until feed screw is clear of motor unit. On reassembly it may be necessary to rotate motor and screw, using care in aligning spline in gear to match screw spline. Make sure threaded key does not jam on entering slot.

### REMOVAL OF FEED SLEEVE AND BEARING

Note: For removal of brass nut only. (This disassembly is not necessary to remove motor housing).

### SECTION A-2

Remove snap ring 5002-185, and press sleeve assembly, 500-73, off bearing. Back out socket set screw from brass thrust nut and screw off nut. Bearing may now be removed from shaft.

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### REMOVAL OF MOTOR HOUSING

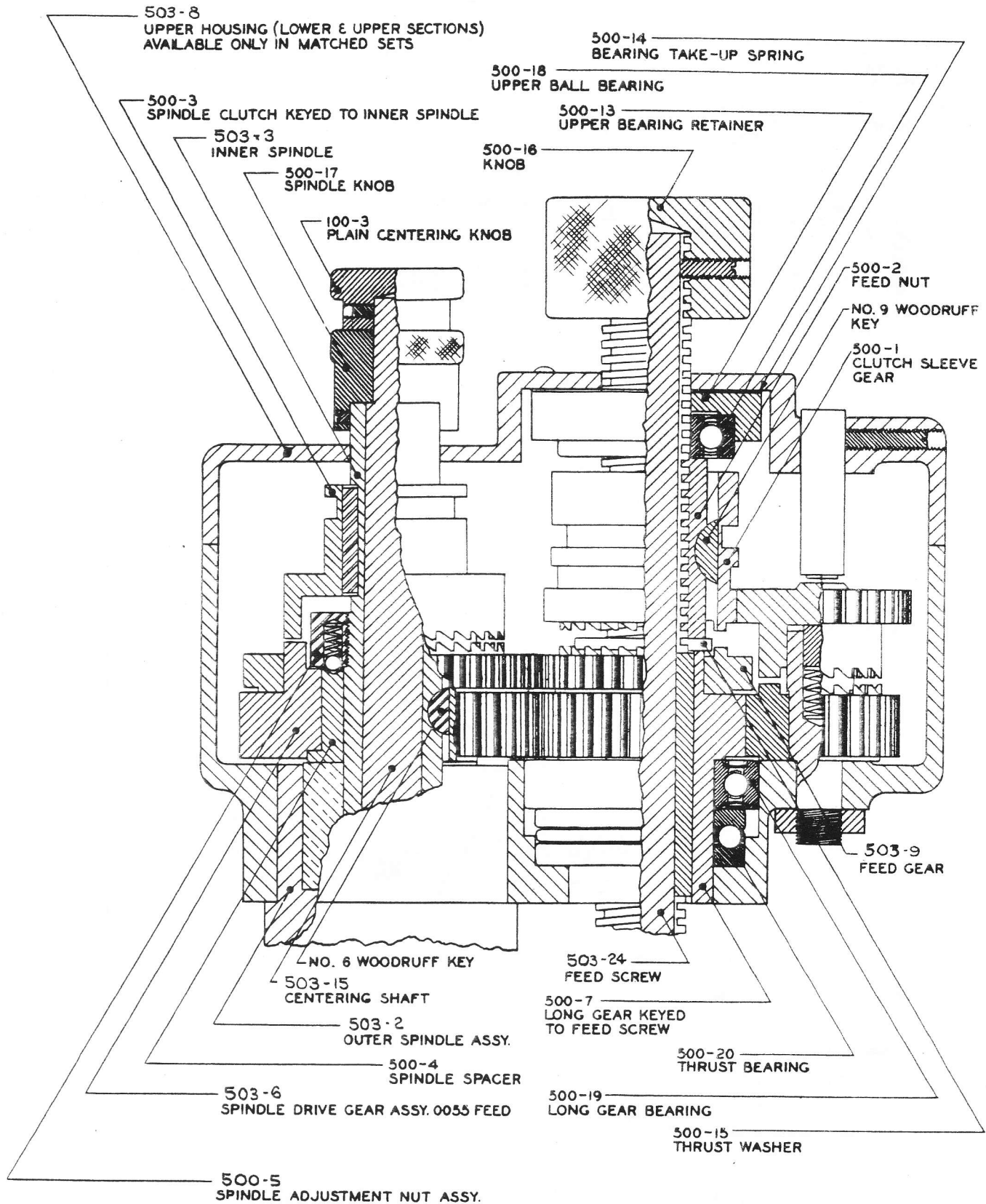
To remove motor housing back off 2 base set screw supports and take out 4 bolts in housing flange. Note: In reassembly motor alignment must be checked after screw sleeve is in place before flange bolts are permanently locked. Use surface plate over screw and spindle.

To disassemble housing, remove pin and 6 Filluster screws and bottom screw in middle of bottom of gear pot. Remove set screw and pin on speed shifter lever.

Tap lightly on motor pinion, 501-51, and screw drive gear, 500-88, and housing will come apart. Pinion shaft, 500-87, with clutch and gears may be tapped out with small punch through center hole in bottom of gear pot.

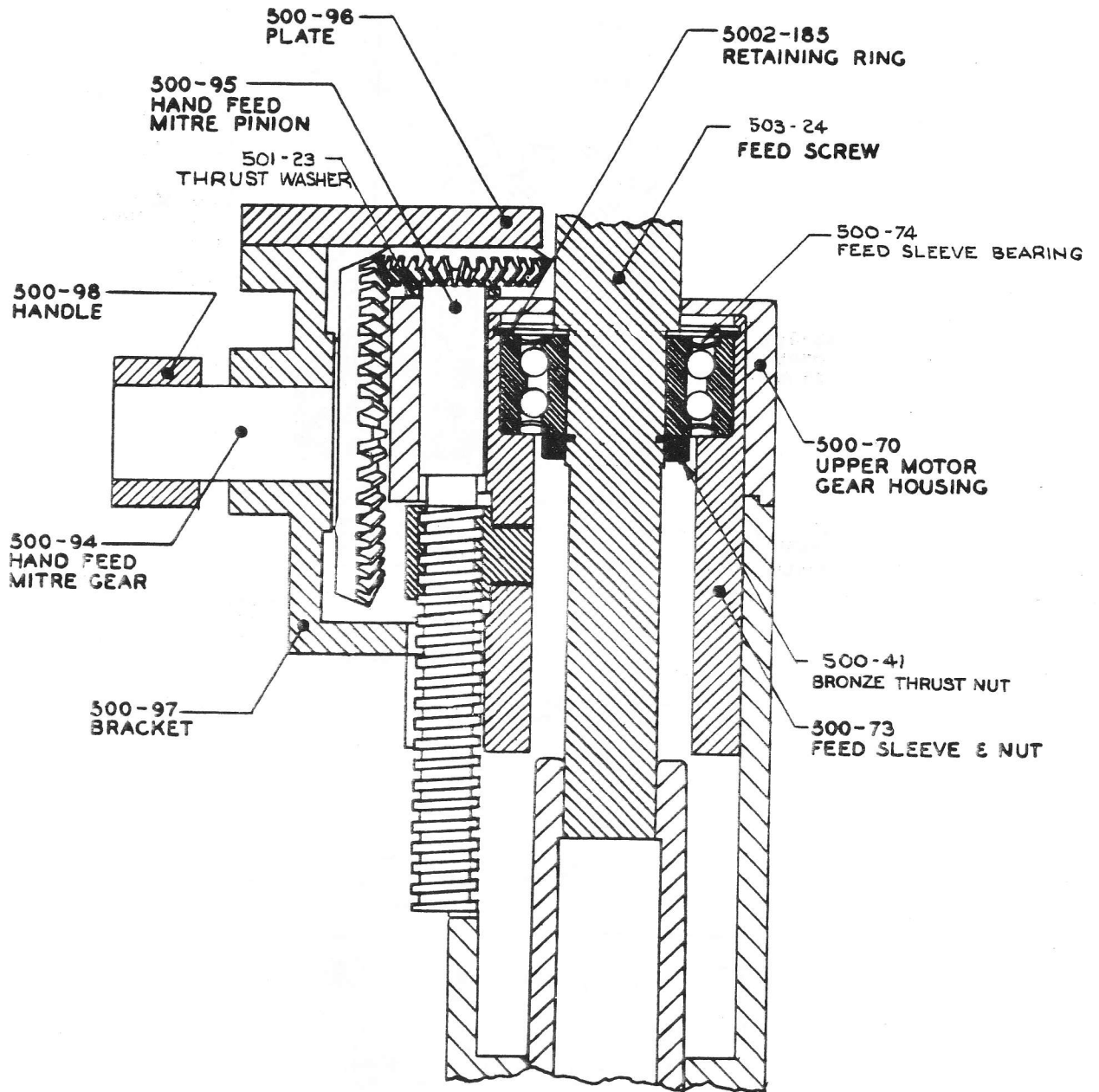
### DISASSEMBLY OF DA-4 UPPER HOUSING & SPINDLE REMOVAL

Remove 500-16 knob by releasing socket set screw. Remove 500-17 knob by releasing socket set screw. (On automotive units you may then draw out centering rod). Unscrew spindle clutch lever stop pin, 500-3. Raise lever to extreme top, which will allow removal of countersunk screw and lever assembly. Remove cap screw to disassemble trip lever, 500-35. (Caution: Do not lose trip spring). Remove 6 screws holding upper housing sections together and lift off upper lid, 503-8.

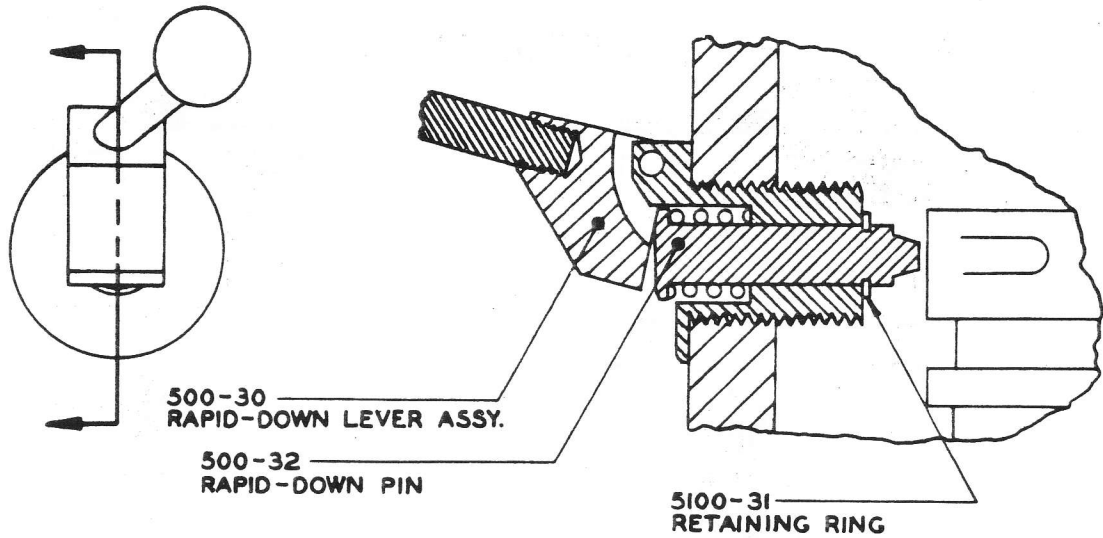


SECTION A-A

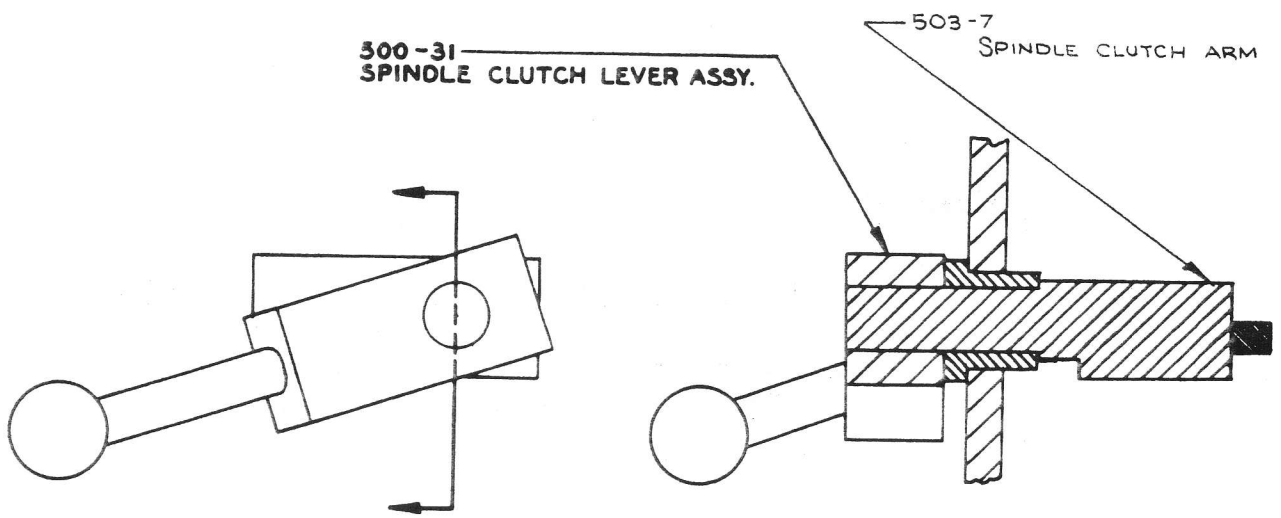




SECTION C-C



DETAIL E



DETAIL G

## SHARPENING OF THE CUTTING TOOL

The performance of your boring bar and the quality of work it will do is almost entirely dependent on the care of the cutting tool.

In the accompanying sketch, letters A, B, D correspond to the letters indicated on your sharpening jig, in other words, when your jig is set in the A position it will sharpen the "A" land as shown in the sketch.

The most critical point of this sharpening is the width of the "B" land (as indicated by the diagonal line shading). This width should be maintained at about .015 to .020 or  $1/64$ ". This width is held by cutting back the D land as required.

In the event your bar chatters or bores a rough finish at the bottom of the cylinder, it is very probable this "B" land is too wide.

The A cutting land is not critical as to width but should be maintained in good condition to obtain free cutting, particularly on heavy cuts.

The top surface of the bit is finely finished at the factory and requires no further resurfacing. This also means no honing or in any way attempting to break off the chip that sometimes seems to be apparent. The practice of doing these things will inevitably result in poor surface finish and impair the accuracy of the machine.

The frequency of sharpening the bit required will vary depending on the type of iron being bored. A six cylinder block can sometimes be bored without resharpening, and often it is advisable to touch up the cutting tool on every hole for best results.

**WHEN SHARPENING CA 000 CUTTERS MAINTAIN THE B**

**LAND FROM .003 TO .010**

