DIRECTIONS

FOR

OPERATING

AND

MAINTAINING

THE

ROTTLER

Boring Bar

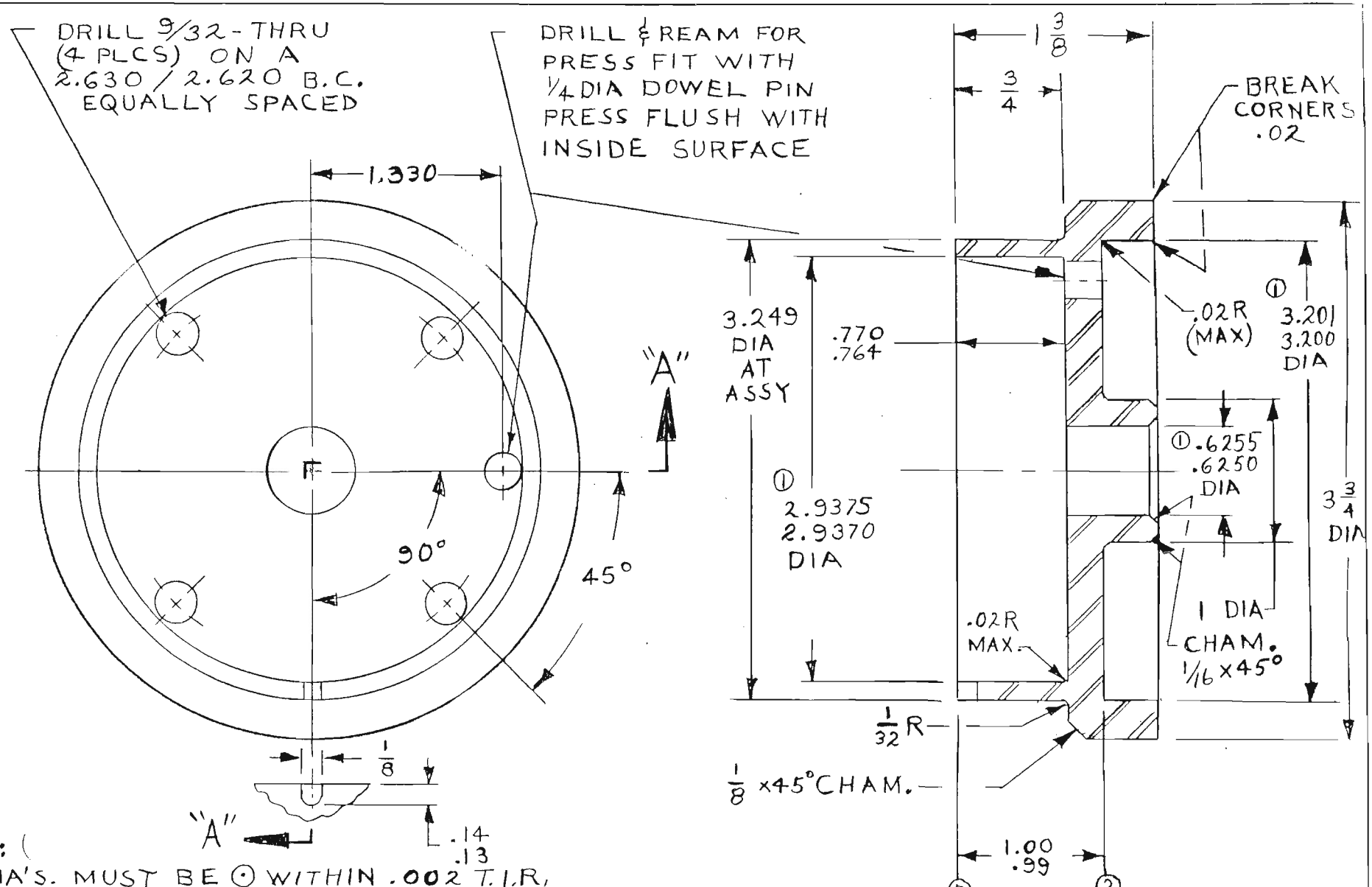
MODEL DA-4

MANUFACTURED BY

ROTTLER BORING BAR CO.

1221 POPLAR PLACE SOUTH

SEATTLE, WASHINGTON 98144



NOTE:
① DIA'S. MUST BE ⊙ WITHIN .002 T.I.R.
② SURFACES MUST BE // WITHIN .003 TOTAL

600-20-10 SECTION "A" - "A"

TOLERANCES UNLESS NOTED DECIMALS	ROTTLER BORING BAR CO. SEATTLE, WASHINGTON	
2 PLACE ±.010	ADAPTER CUTTER HEAD DA-45	
3 PLACE ±.001	DRWN. D.E	SCALE NONE
FRACTIONS ±1/64	APPRD.	FILE NO. 8
ANGLES ±1/2°	DATE 8-13-74	DRAWING NO. 600-20-10
FINISH √		

HEAT TREAT	NO.	DATE	REVISION
NONE			
MATERIAL STRESS PROOF			

DESCRIPTION

The Model DA-4S bar is a portable precision boring unit. This DA-4S model is equipped with a flange spindle nose for use in a wide variety of heavy duty diesel and industrial 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 ½ to 1½ HP depending upon spindle speeds required. 3 phase motor is also available. A quick change lever selects two spindle speeds. (A 3 speed belt case is also available to give 6 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 dampenedwith kerosene and remove the protective oil.

TO ORDER PARTS

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

G U A R A N T E E

Rottler Boring Bar Model DA-4S parts and equipment are guaranteed as to workmanship and material. This guarantee remains in effect for one year from date of delivery, provided machine is owned and operated by original purchaser.

Tools proven defective within the time limit will be remedied at the factory's option, either by replacement of parts and/or service by the factory.

We accept no responsibility for defects caused by external damage, wear, abuse, or misuse. Neither do we accept any obligation to provide compensation for other direct or immediate costs in connection with cases covered by the warranty.

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 feet lever (2) until it latches to engage rapid return travel. Bar will automaticly 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 hand feed cap 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.

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 pull release 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. Turn cutter head around to indexing detent, which will position tool to front, 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. 2-3/16" 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 useing 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.

CENTERING WITH CENTERING FINGERS
(BAR IN VERTICAL POSITION ONLY)

Place bar with spindle over the hole to be bored, check to make sure tool holder is not in bar and centering fingers are not extended. Start motor and rapid travel bar into hole for centering. Extend fingers by turning top centering knob and exert tension on the knob while tightening hold down bolt. 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.

IF It is necessary to change fingers to accomodate 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 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

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. Place the jig over the pin provided ON TOP OF THE MOTOR. 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 with a grinding wheel. This will make for quicker sharpening. Diamond wheel is designed for carbide only. Steel tends to load it.

B O R I N G

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.)

B O R I N G Cont.

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. Lightly lock set screw, with socket type screw driver provided with tools.

Engage spindle clutch and latch feed lever in down position. When bar has completed boring, set stop rod so lever will be thrown into neutral position. Stop rod will then be set for the other holes on the same cylinder block.

Disengage spindle clutch. Turn spindle to index tool to front and latch feed lever in up position, allowing machine to return to top. Turn off motor. Remove tool holder with tool puller. (always remove tool holder after boring.) Loosen anchor bolts and proceed to next cylinder. If bore is to be chamfered with bar this should be done before loosening anchor bolt.

B O R I N G H A R D S L E E V E S

Hard sleeves up to 500 Brinell Hardness can be bored with DA-4 boring bars equipped with a slow 41 RPM spindle speed, useing the R-H tool bit.

C H A M F E R I N G

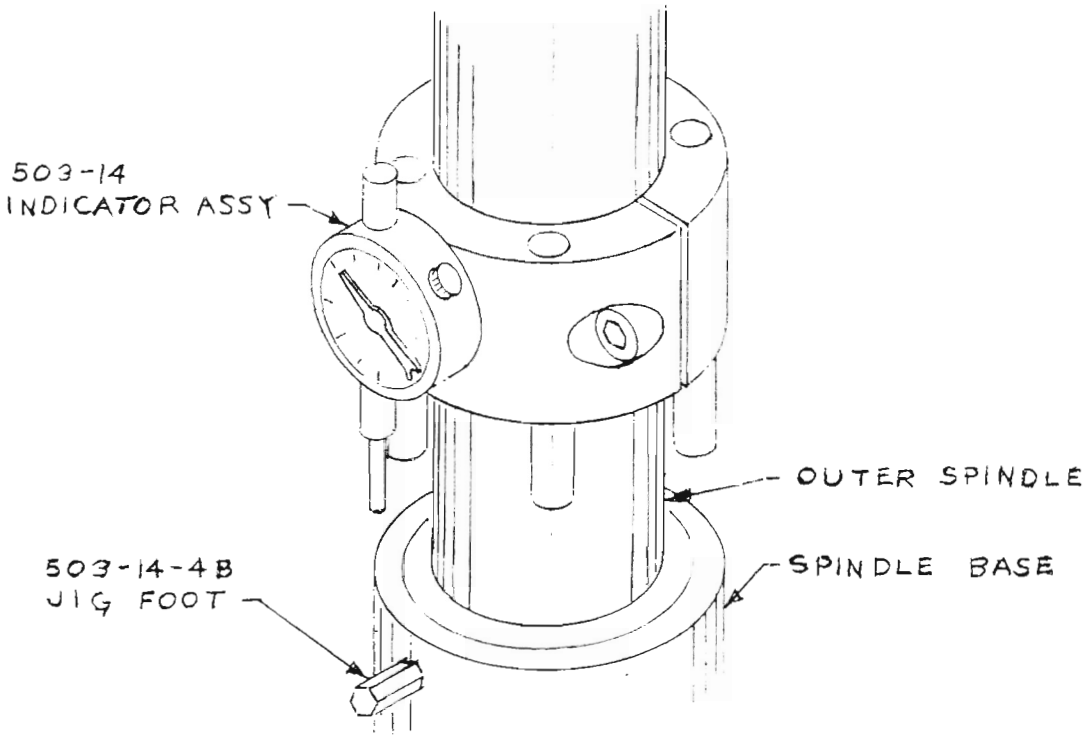
A special tool is available for chamfering. Tool may be set by either inserting in head and approximating setting or place in mike and set approximately .100 over bore size. Chamfering may be done either by useing feed and releasing when adequate chamfer has been developed or by use of hand feed.

Chamfering may also be simply done most efficiently with a Model CH-3 abrasive tool driven by a drill motor. This method will not require boring bar and develop a smooth burr-free entry for rings.

C O U N T E R B O R I N G

Counterboring will often be required in re-sleeving large engine blocks on your Model DA-4 machine and frequently a close tolerance depth must be maintained in order to properly secure the sleeve installation.

This may be best accomplished by the attachment of a 1" travel dial indicator, Assy 503-14E to read the spindle travel of the machine.



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.

DIESEL ENGINE

DA-4S 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.

TO LAP FINGERS

1. Bore hole and remove cutter but do not unclamp bar.
2. Rapid traverse bar down into hole.
3. Extend fingers and exert pressure on them against cylinder wall while rotating inner spindle knob to left by hand (counterclockwise).
4. After rubbing, examine points on all fingers to make sure they are all making contact.

MICROMETER

Your boring bar micrometer, as with any other measuring tool, should be used, delicately and with care to be assured of the greatest accuracy. Particular attention should be paid to inserting the tool in micrometer without allowing tool bit to snap into mike anvil. Care should be used in the method of lightly locking tool bit before tightening.

After a period of use you will note that the tool bit tip will force a depression in the micrometer anvil. This, of course, will result in inconsistent sizes, particularly after resharpening the bit. Periodically we recommend turning the anvil slightly and finally end for end so that a flat surface is exposed to the tool bit tip.

SETTING MICROMETER

CAUTION: The standards for your BA-45 bar is set, do not change it.

3.9" DIAMETER CUTTER HEAD MICROMETER

To bore from 3.9" to 9" diameter, use mike and standard marked "s".

To set micrometer for the 3.9" to 6" range, set mike marked "s" to read 0.000. Place standard marked "s" into mike and adjust anvil or sleeve to the micrometer reading of 0.000". Adjust anvil for large variation and sleeve for small variation, using spanner wrench on sleeve.

To set mike for the 6" to 9" range, set mike marked "s" to read 3.000". Place standard marked "s" into micrometer and readjust anvil. The mike reading of 2.9" to 6" will now actually gauge tool from 5.9" to 9". Remember when the micrometer is set for this range the bore will be 3" larger than the mike reading.

7.75" DIAMETER CUTTER HEAD MICROMETER

To bore from 7.9" to 12" diameter, use micrometer and standard marked "L".

To set mike for the 7.9" to 11" range, set mike marked "L" to read 0.000". Place standard marked "L" into mike and adjust anvil or sleeve to this 0.000" micrometer reading. The mike reading of 2.9" to 6" will now actually gauge tools

from 7.9" to 11". Remember when the micrometer is set for this range, the bore will be 8" larger than the mike reading.

To set mike for the 11 to 12.5" range, set mike marked "L" to read 4.000. Place standard marked "L" into mike and readjust anvil. The mike reading of 2.9" to 0" will actually gauge tools from 9.9" to 13". Remember when the micrometer is set for this range, the bore will be 7" larger than the mike reading.

NOTE: You should always verify reading and exact bore size with an inside mike after making adjustments to the micrometer.

TO VERIFY OR RESET STANDARD

First, make a test cut in the range of the micrometer you are checking. 3.9" to 6" diameter for the "S" mike, and 7.9" to 11" diameter for the "L" mike. Now with an inside mike measure the exact diameter you have bored. Place the tool holder and bit into the mike and adjust the anvil so the micrometer reads this diameter. Remove the tool holder and bit. Reset the mike to read 6.000 for "S" mike or 11.000(6.000) for the "L" mike. Now place the corresponding letter marked standard into the micrometer and adjust the pin in the standard to this reading on the mike.

LUBRICATION

The DA upper housing unit should be packed with Union Oil, UNOBA F1 or F2 Lube, approximately every 25,000 boring cycles. When this grease is changed, the upper housing cover should be removed and the original lubricant entirely removed.

The lower motor housing unit's oil level should be checked monthly and should be relubricated with Union SAE 90 multi-purpose gear lubricant or any equivalent SAE 90 gear lubricant, approximately every 40,000 boring cycles.

Assuming your DA machine is operated on a continuous basis, grease fittings at the top of the spindle unit and at the bottom of lead screw drive, should be lightly lubricated daily with 930-AAA lubricant.

Two or three drops of SAE 30 machine oil can be added weekly to the breather hole at top of key-way in main spindle, to insure fluidity of main spindle bearing lubricant.

Main spindle surfaces should be cleaned with kerosene weekly and occasionally a light-weight oil applied to prevent excessive dryness.

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 and felt 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.

ADJUSTMENT OF INNER SPINDLE

1. Remove two screws and small cover on back side of upper housing.

2. Remove pin restricting up travel of spindle clutch lever and move lever to full up position.

3. Insert pin (diam. .180 or less) in one of the holes provided in the O.D. of take up nut. (See inner spindle nit). Hold spindle knob with one hand and turn take up nut to right (clockwise). You will note the nut ratchets in notches as you take up. Take up until spindle is tight and back off 3/4 to 1 notches. Run bar on high speed making sure there is only slight heating at bottom of spindle. If heat is excessive, back off one notch further.

4. Replace over and pin.

EXCESSIVE LOADS

Note: If excessive loads are imposed on your Model DA-4 Boring Bar

1. Thrust loads - if bar is fed or rapid-travelled into object that imposes an excessive thrust load on spindle, the Brass Thrust Nut Part No. 500-41 will probably be sheared and require replacing. This accident could happen with spindle either rotating or stationary.

   The effect of this will be for the bar to continue to run but with no feed or down travel working. If bar is left in feed or down travel, drive spline will be pulled completely out of mesh at which point motor will continue to run but feed screw will not turn at all.

2. Radial loads - If bar has a tool in cutter head that turns into an object an excessive radial shock will be imposed on spindle and will probably shear motor drive key No. 500-62. This would likely happen only when spindle drive clutch is in.

   The immediate effect of this will be for the motor only to run not turning any visible parts of the boring bar. A movement of the speed change lever will indicate the lower gear box is entirely inoperative.

REMOVAL OF MOTOR FIELD ASSEMBLY

Note: This is the only disassembly required to replace Micarta motor drive key in cases of excessive radial load on machine spindle.

[illegible]

Remove fan shroud cover and shield. Remove 4 long motor end- [illegible] and lift off motor field assembly. Be careful not to lose [illegible] washer on top bearing, and replace properly in reassembly.

Lay blocks or shims on bottom end bell and pry up stator out of drive to remove stator.

REMOVAL OF DA-4S 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 500-97-2 hand feed bracket and 2 screws holding 500-96-2 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.

DISASSEMBLY 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 housing 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, ~~500-28~~ 500-64, and screw drive gear, ~~500-88~~ 501-40, and housing will come apart. Pinion shaft, ~~500-57~~ 501-6, 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 502-10-11 knob. Remove ~~500-16A~~ 502-27-2A knob by releasing socket set screw. Remove ~~500-12-2A~~ 500-17 knob by releasing socket set screw. Unscrew spindle clutch lever stop pin. Raise lever to extreme top, which will allow removal of countersunk screw and lever assembly. Remove cap screw to disassemble trip lever, 502-10A. (Caution: Do not lose trip spring). Remove 6 screws holding upper housing sections together and lift off upper lid, 502-9-14.

Now shifting lever, 503-10A, with springs may be removed along with 500-25 upper fast return gear with plunger and spring, spindle clutch and key, 500-3, ball bearing with take up spring, 500-18, (be sure spring is reassembled properly), sleeve gear, 500-1, feed nut, 500-2, and feed gear with thrust washer, 502-10-12 with its thrust washer.

Remove snap ring 5100-125 from two speed feed shaft and gear 502-10-10, upper feed drive gear 502-10-8, thrust washer 501-21, lower feed drive gear 502-10-9, then remove retainer 502-9-15, bend lockwasher tab out of slot in bearing lock nut and remove lock nut and lock washer, now press feed shaft and gear 502-10-10, out of bearing 500-74.

If the bar is in a vertical spindle position we suggest you place something under the spindle nose to prevent lubrication from running out and then remove 500-5 spindle nut. Nut can be started off through adjusting access hold and then hand turned. Now drive gear, 503-6-1, may be worked off along with 500-4 spacer and woodruff key.

Inner spindle may now be removed.

2 Hex cap screws in upper housing should be removed and housing may be driven off spindle. Heat on housing will simplify removal of this sweat fit.

Lift off of feed screw.

Nut should be removed from 500-29 shaft and shaft may be pressed out with gear.

500-7 long gear with radial and thrust bearings may be removed along with oil seal.

Extreme care should be taken when removing long gear out of seal or seal out of housing. Seal is fragile and garter spring will come out easily. When reassembling, open seal as long gear is pushed in to prevent garter spring from snapping out.

RAPID RETURN TRAVERSE

If the boring bar should ever fail or hesitate to return to top of travel when shift lever is lifted and latched, the following procedure may be used to adjust return traverse clutches.

1. Run bar down into hole a few inches.

2. Loosen horizontal locking set screw at top of upper housing (refer sec. AA.)

3. Inward rotation of vertical set screw will allow you to adjust rapid return tumbler assembly which will result in deeper engagement of clutches. Adjust tumbler shaft so that when shift lever is in neutral, clutches do not chatter. Clutches should engage immediately upon latching lever.

4. Tighten set screw to relock SHAFT. Check to see adjustment has not been changed by set screw.

BOLT ON CUTTER HEADS

The bolt on cutter heads with a standard bore capacity of 3-7/8" to 8" for the small head, to 8" to 12.3" for the large head, can be quickly attached to the BA-48 machine by 4 screws. These cutter heads are used where heavy cutting requires a very rigid boring head.

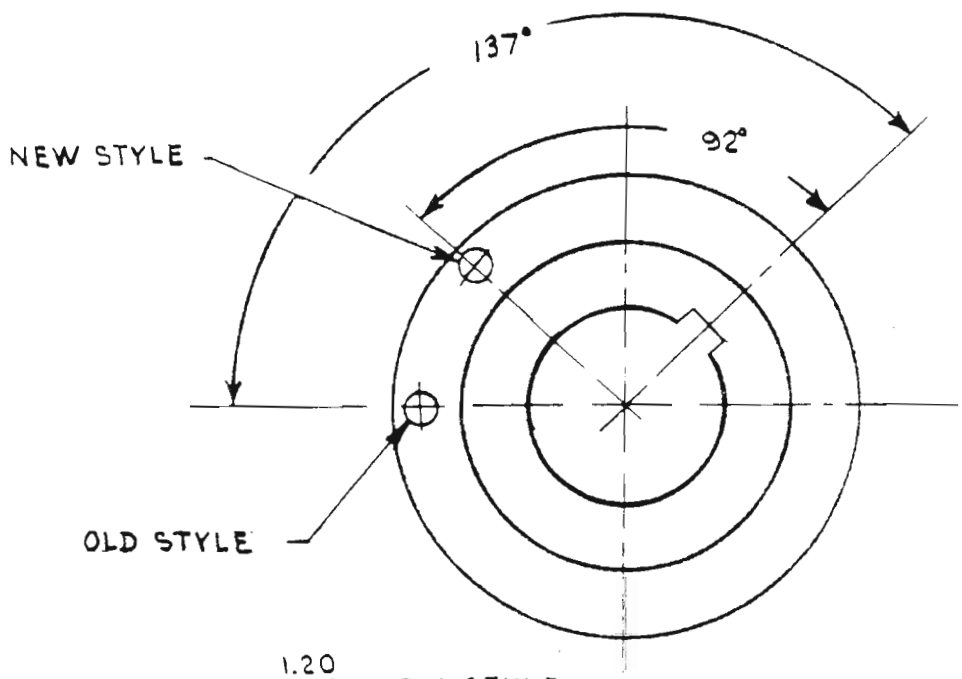
This boring head assembly is equipped with a damping weight part 600-20-11. This requires little or no maintenance, as long as liquids or contamination do not enter the weight cavity. Should this occur, the operator will experience chatter problems with the head and it will have to be disassembled and cleaned.

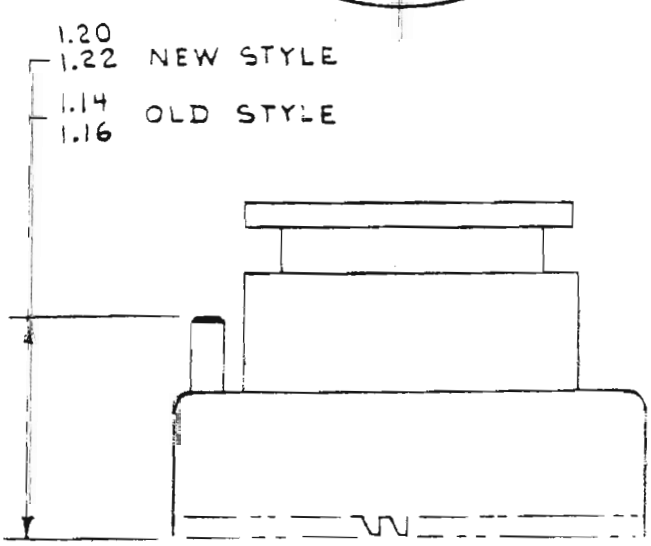
# STOP PIN ASSEMBLY IN 500-3 CLUTCH SLEEVE
for (old and new style ball detent)

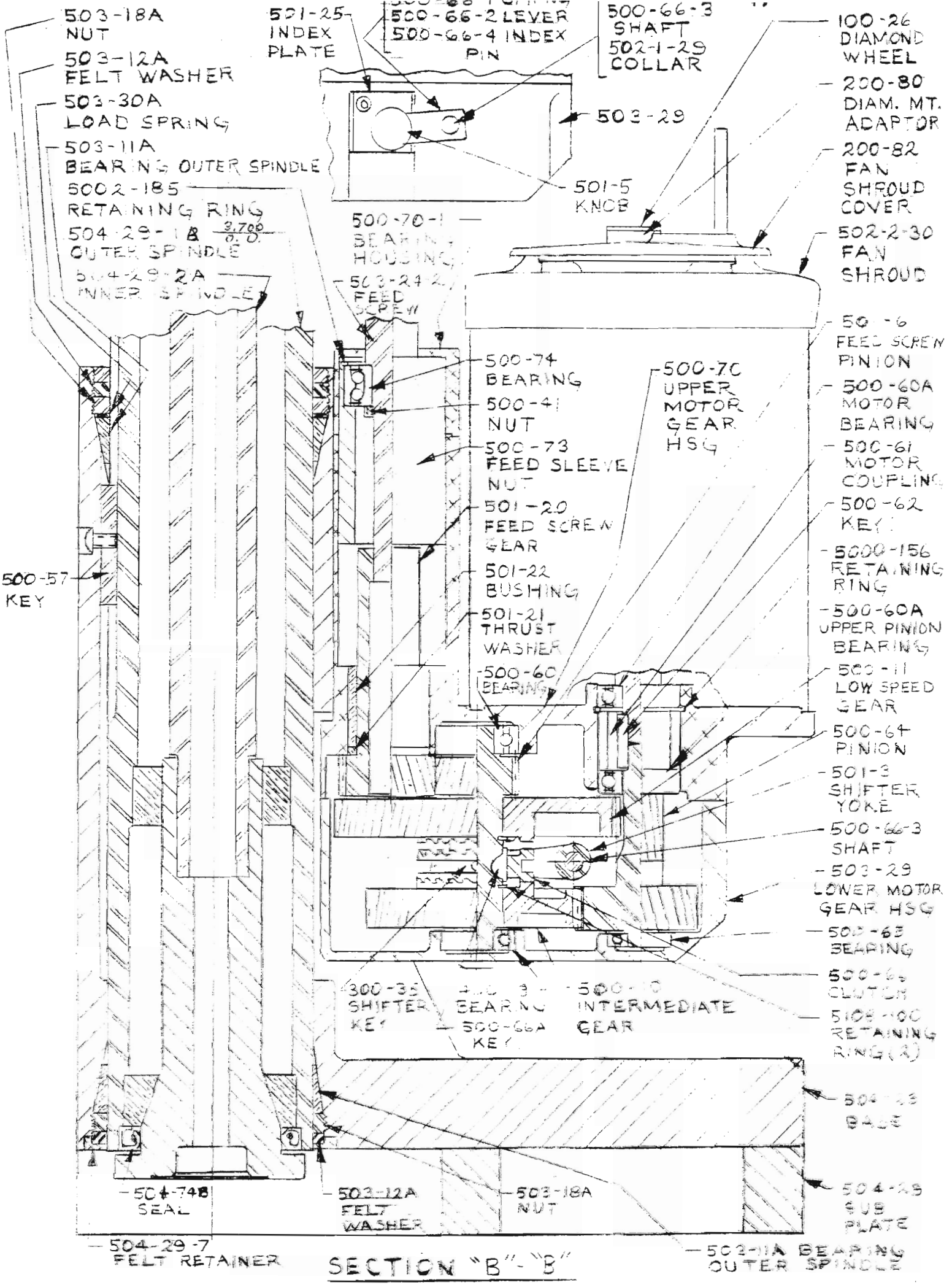
Refer to the upper housing drawing for the old and new ball detent styles. Press pin into correct clutch sleeve hole to the height shown below.

The purpose of the ball detent is to stop the spindle from turning with the tool bit facing the machine operator. The new style has the advantage of being able to adjust the ball detent plunger, 502-2-19, from the outside while the old style had to be taken out of the upper housing case to be adjusted.

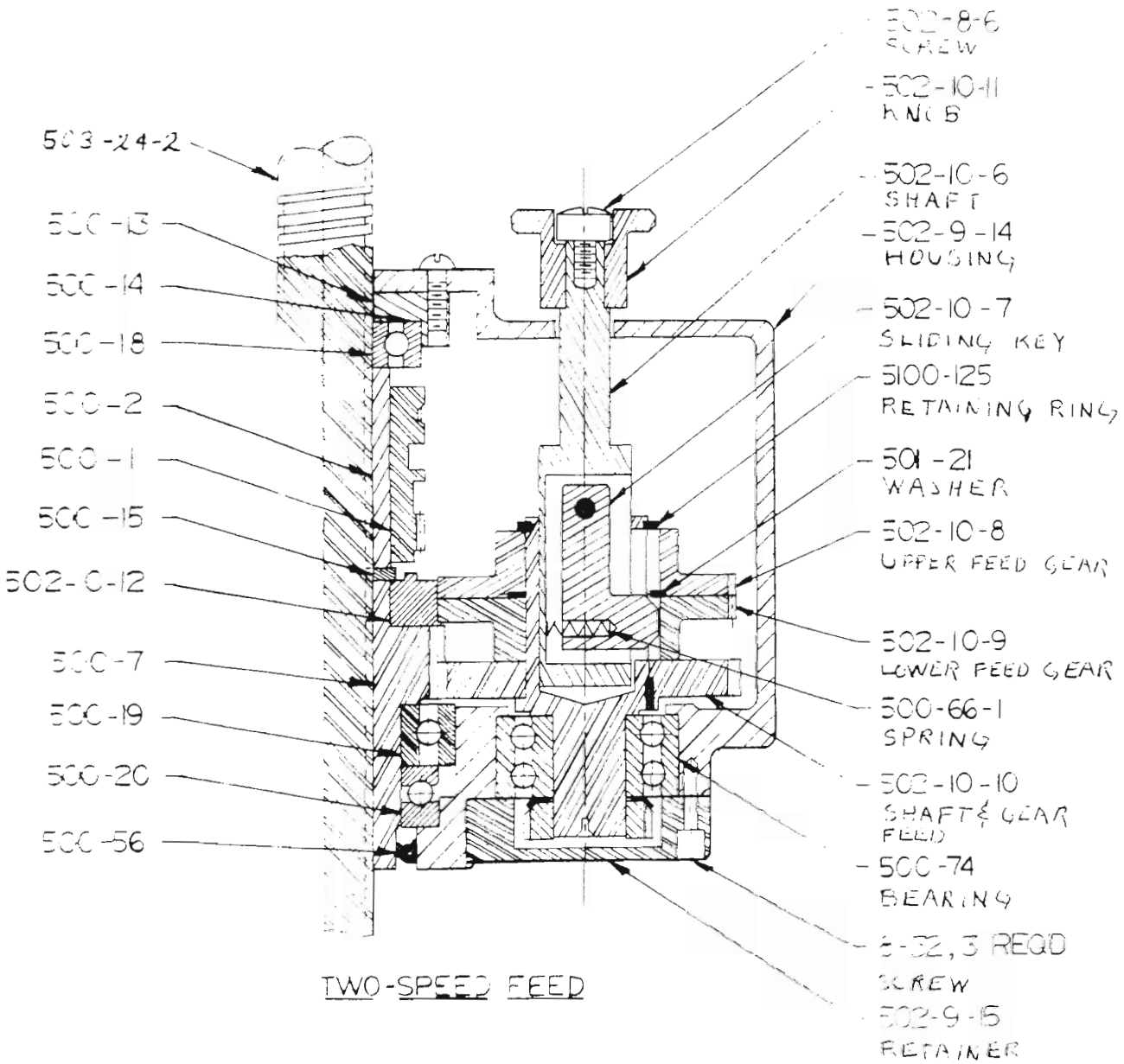
Assemble clutch in upper housing and adjust the ball detent plunger so that when the machine is idling and the spindle clutch is disengaged, the spindle will stop turning with the tool bit facing the machine operator.



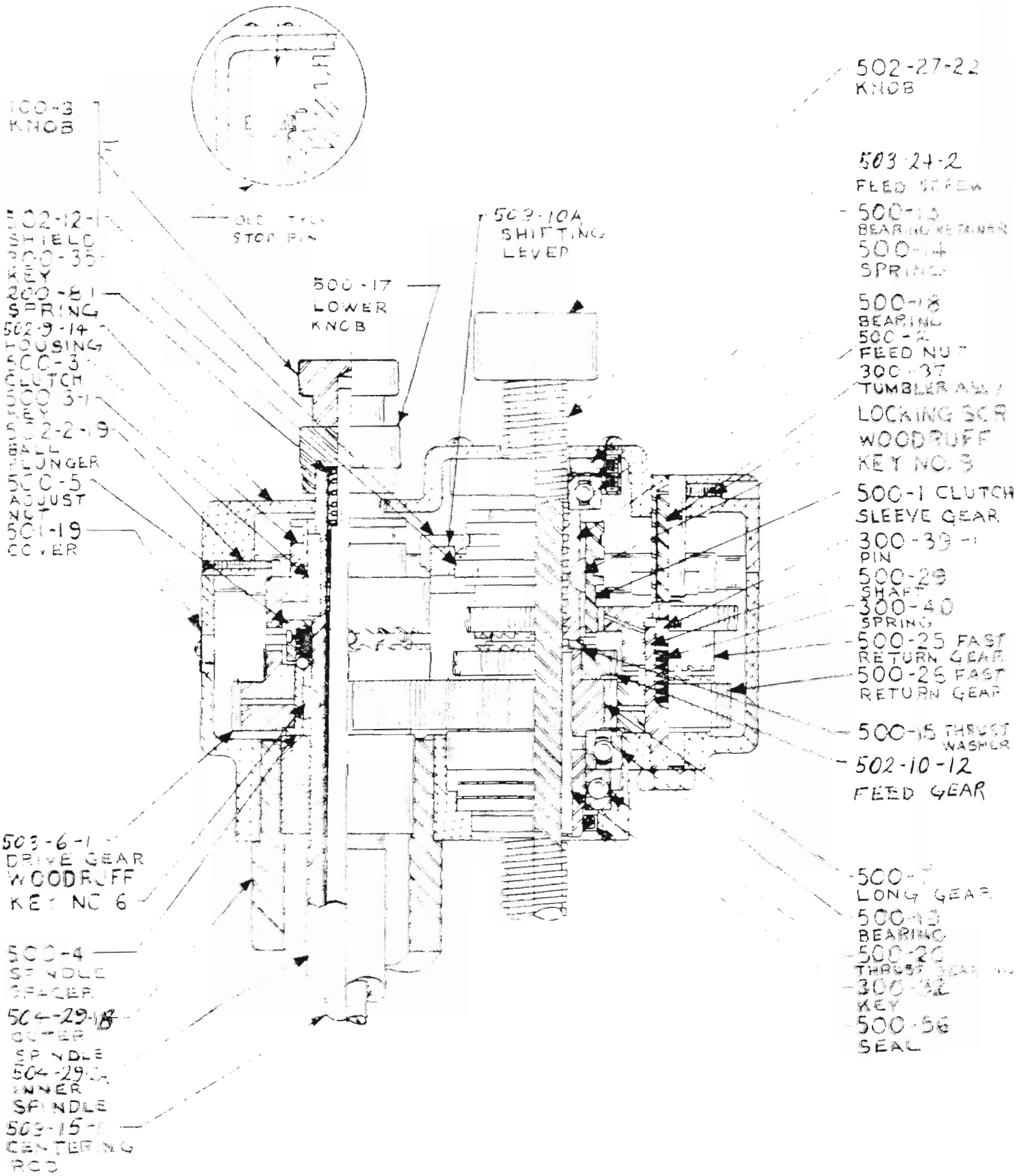



503-18A NUT
503-12A FELT WASHER
503-30A LOAD SPRING
503-11A BEARING OUTER SPINDLE
5002-185 RETAINING RING
504-29-1B 3.706 O.D. OUTER SPINDLE
504-29-2A INNER SPINDLE
501-25 INDEX PLATE
500-66-2 LEVER
500-66-4 INDEX PIN
500-66-3 SHAFT
502-1-29 COLLAR
503-29
501-5 KNOB
100-26 DIAMOND WHEEL
200-80 DIAM. MT. ADAPTOR
200-82 FAN SHROUD COVER
502-2-30 FAN SHROUD
500-70-1 BEARING HOUSING
503-24-2 FEED SCREW
500-6 FEED SCREW PINION
500-74 BEARING
500-41 NUT
500-73 FEED SLEEVE NUT
501-20 FEED SCREW GEAR
501-22 BUSHING
501-21 THRUST WASHER
500-60 BEARING
500-70 UPPER MOTOR GEAR HSG
500-60A MOTOR BEARING
500-61 MOTOR COUPLING
500-62 KEY
5000-156 RETAINING RING
500-60A UPPER PINION BEARING
500-11 LOW SPEED GEAR
500-64 PINION
501-3 SHIFTER YOKE
500-66-3 SHAFT
503-29 LOWER MOTOR GEAR HSG
500-63 BEARING
500-65 CLUTCH
5109-100 RETAINING RING (A)
500-57 KEY
300-35 SHIFTER KEY
500-66A KEY
500-0 INTERMEDIATE GEAR
504-28 BASE
504-748 SEAL
503-12A FELT WASHER
503-18A NUT
504-29 SUB PLATE
504-29-7 FELT RETAINER
503-11A BEARING OUTER SPINDLE

SECTION "B"-"B"



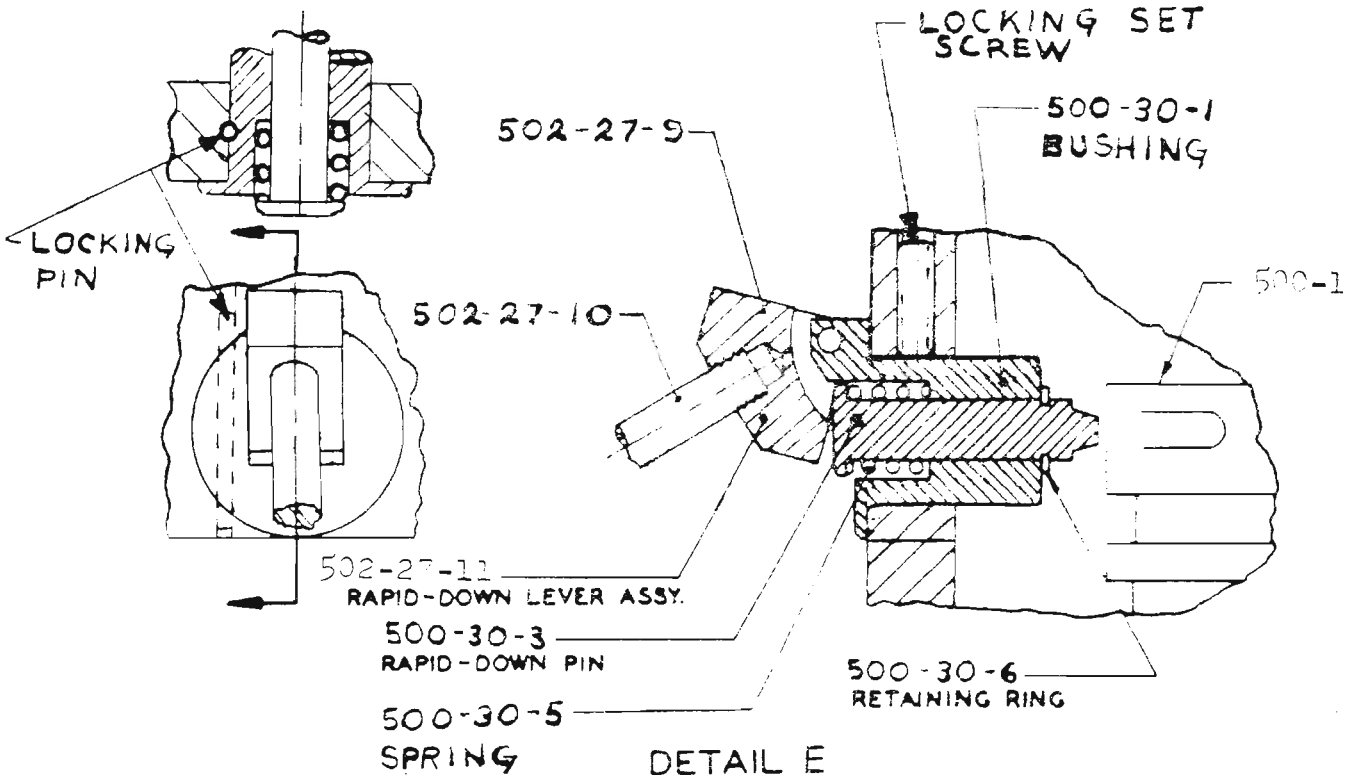
TWO-SPEED FEED



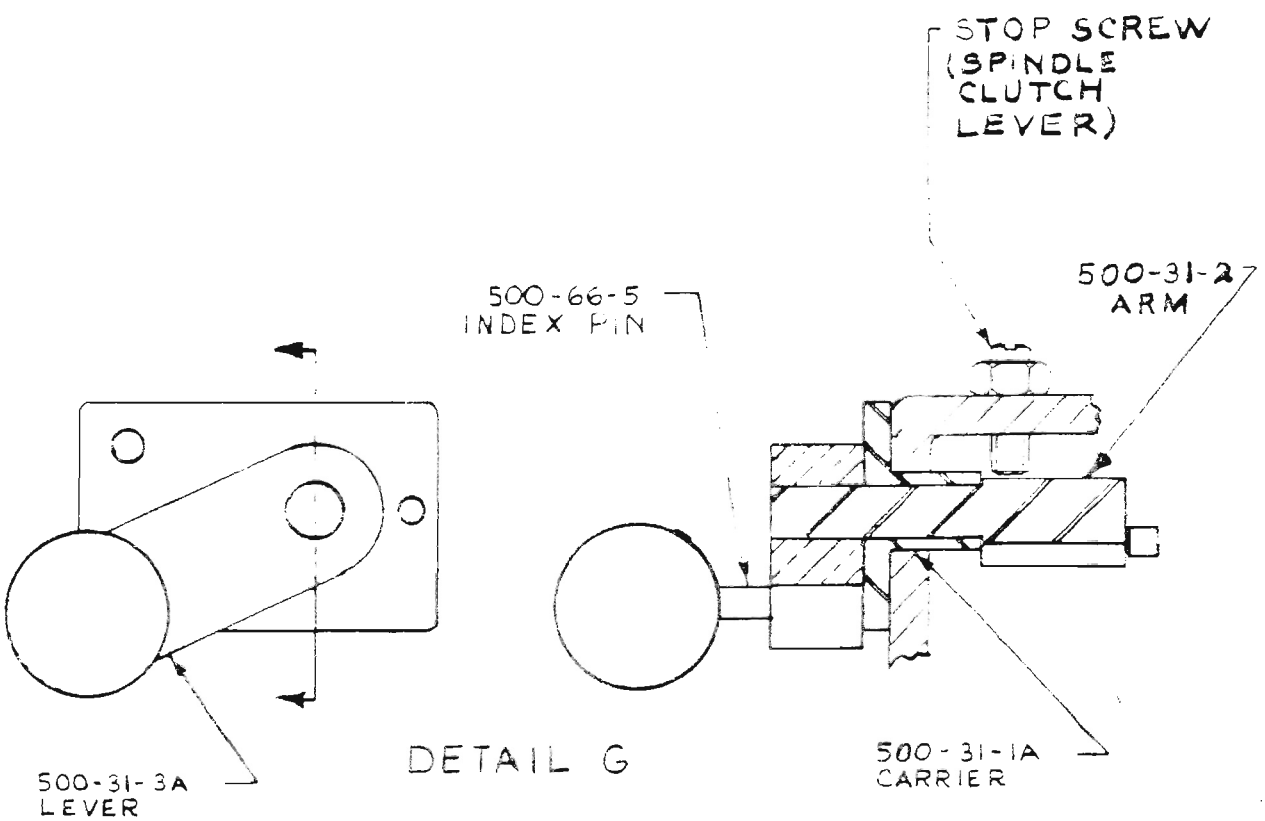
SECTION A-A

UPPER HOUSING

DA-45



DETAIL E



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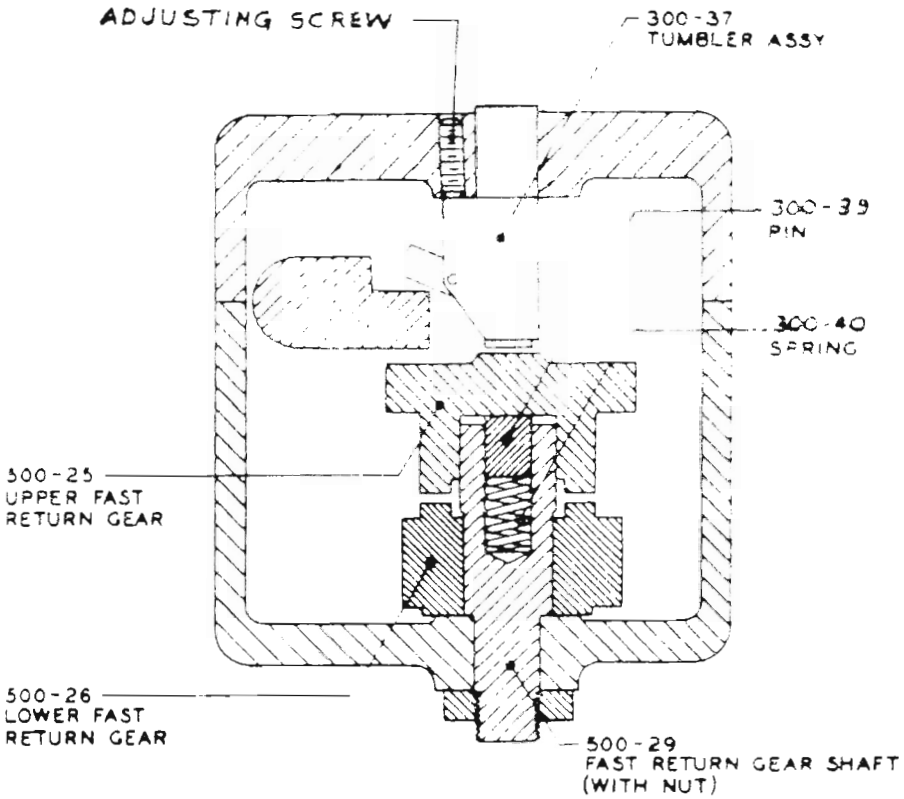
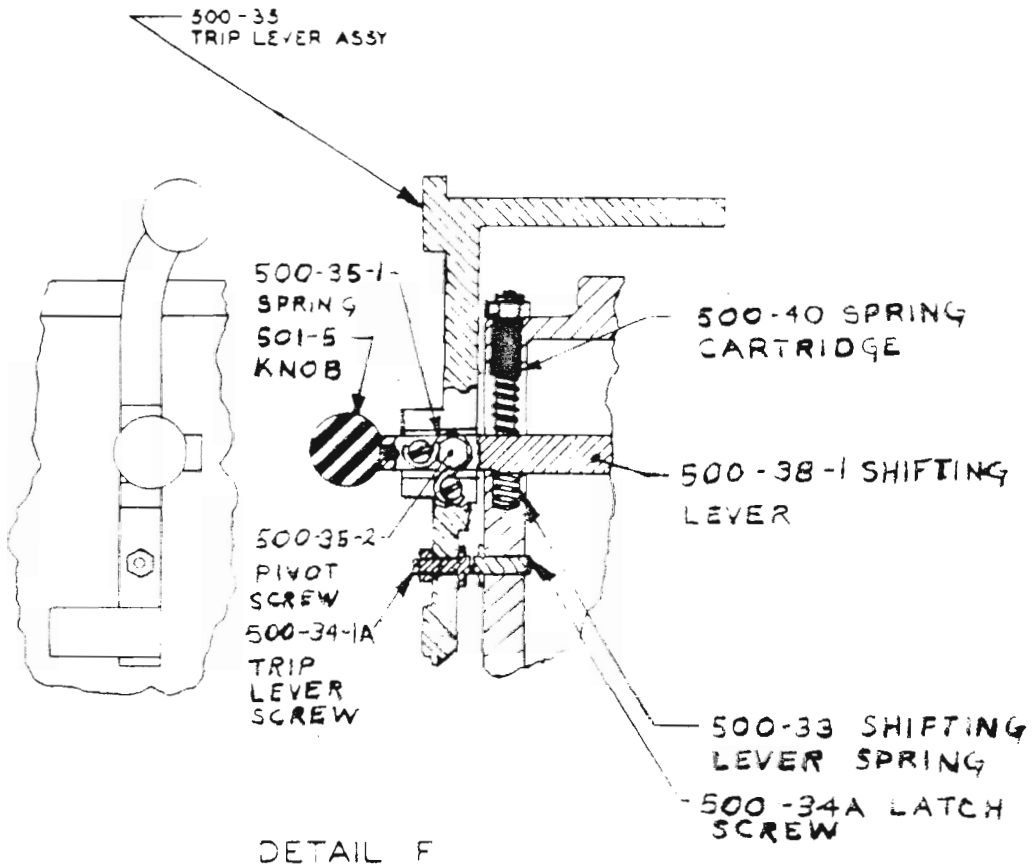
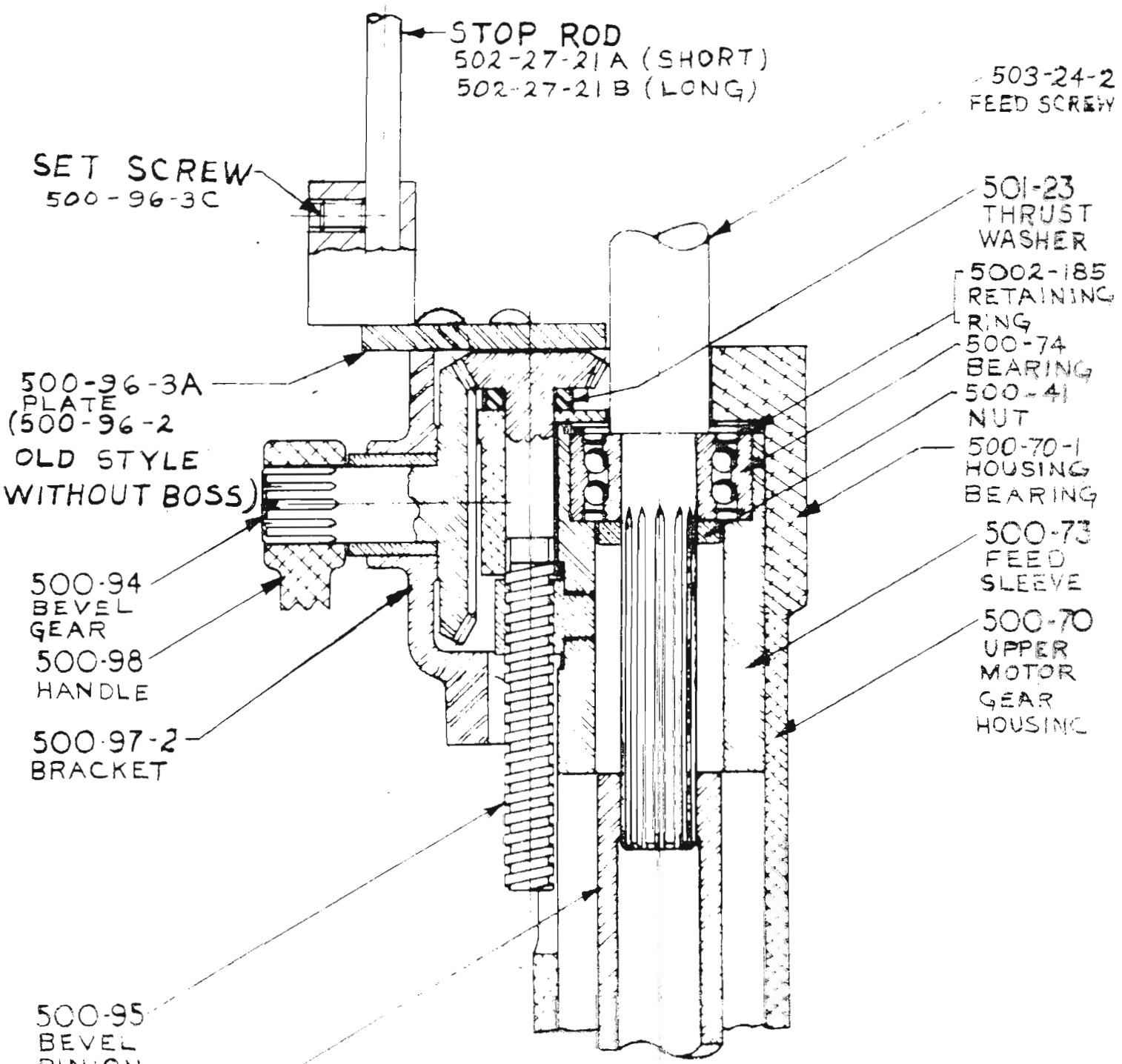


SECTION D-D

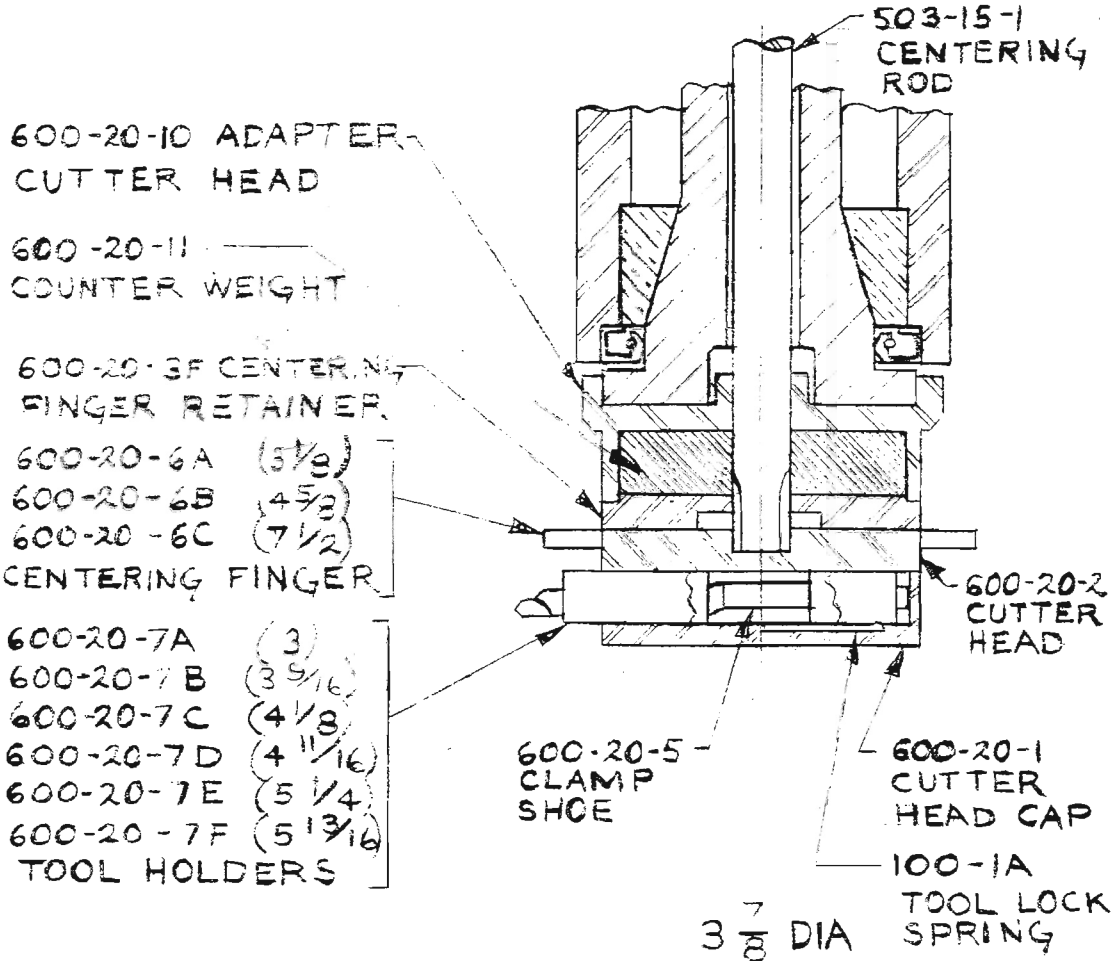


DETAIL F

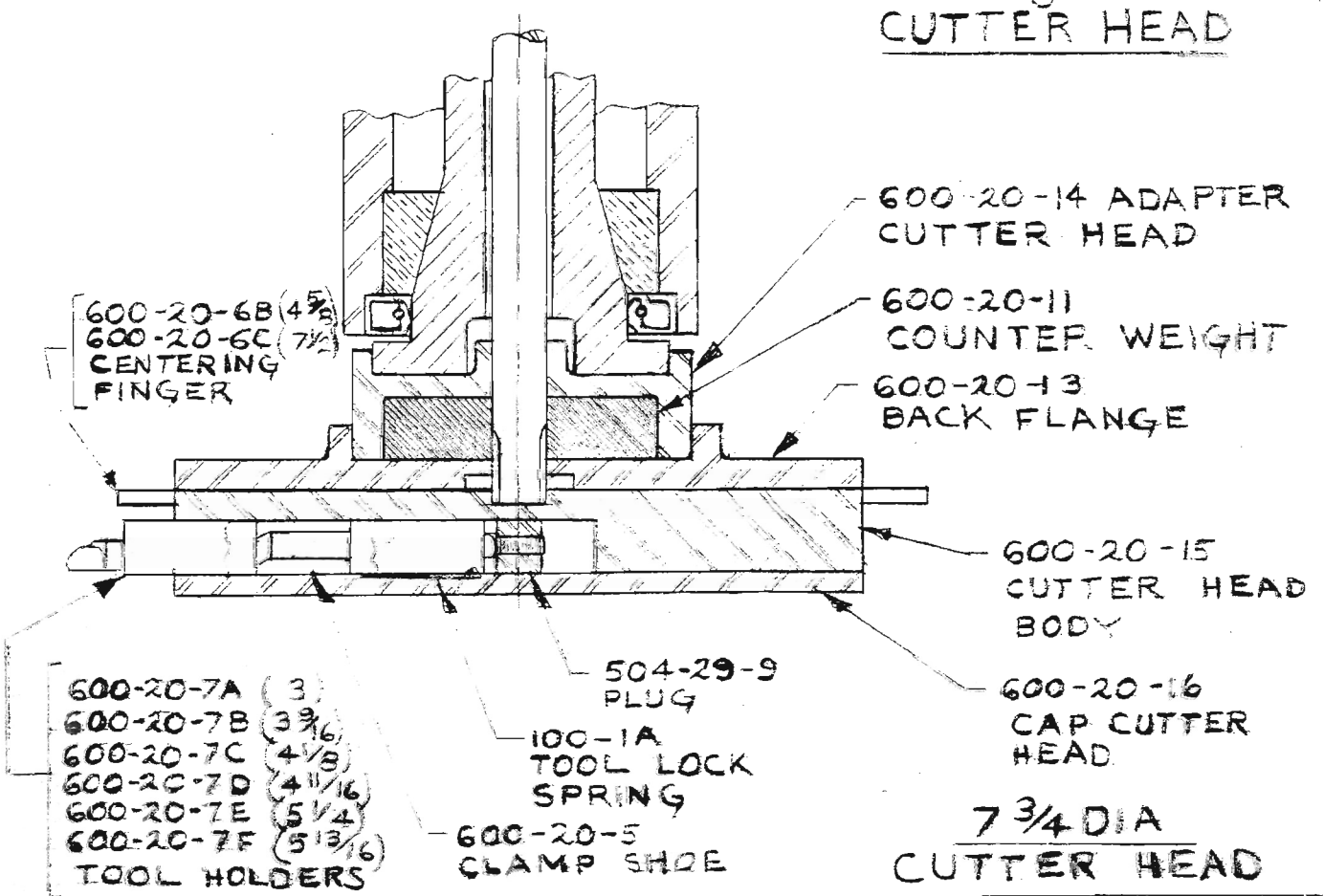


SECTION C-C

HAND FEED



3 7/8 DIA
CUTTER HEAD

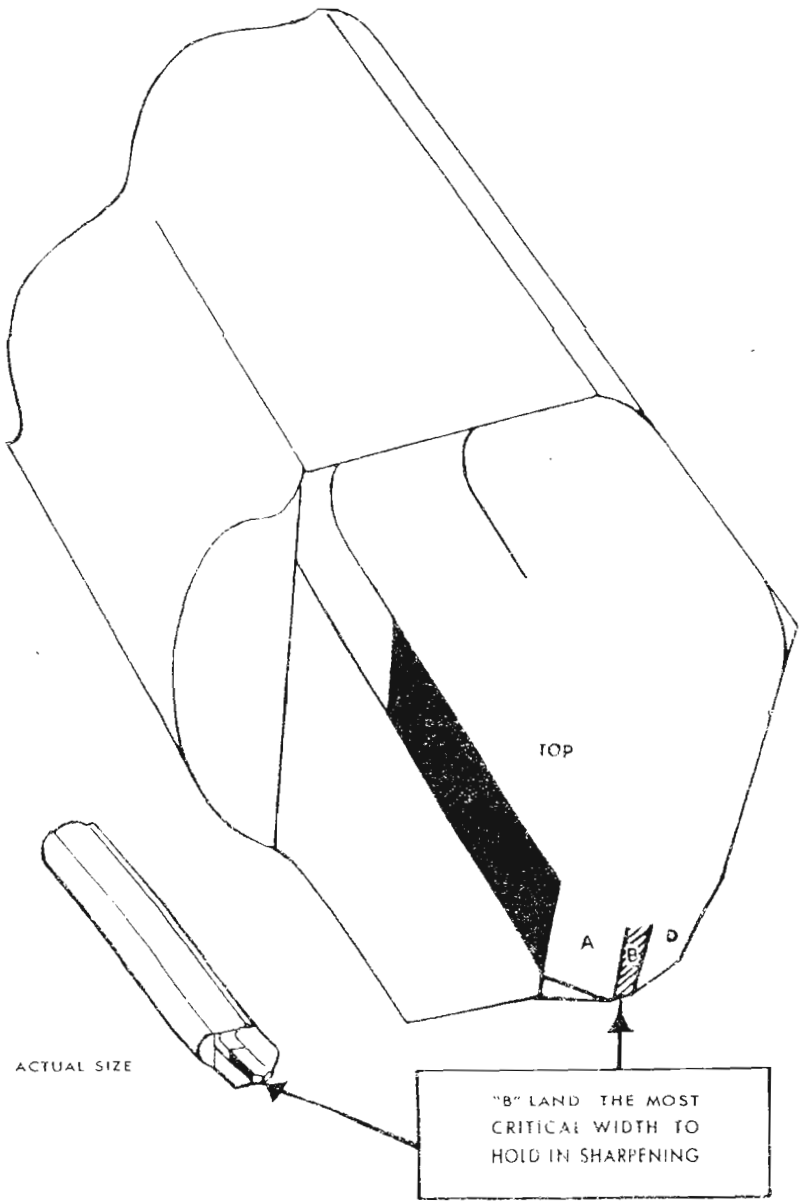


7 3/4 DIA
CUTTER HEAD

BOLT ON CUTTER HEADS

DA-45

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 .025. This width is held by cutting back the "D" land as required. The "B" land must be reduced to .005 to .010 on all stub boring heads and extreme long bore operations.

In the event your bar chatters or bores a rough finish at the bottom of the cylinder, it is very probably the "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.