

DIRECTIONS
FOR
OPERATING AND MAINTAINING

THE
R O T T L E R

DA-4SB BORING MACHINE
6DA-4SB BORING MACHINE
6IDA-6B BORING MACHINE

MACHINE SERIAL No. _____

MANUFACTURED BY
ROTTLER BORING BAR COMPANY
8029 SOUTH 200TH STREET
KENT, WASHINGTON 98031

NOTE: WHEN ORDERING REPLACEMENT PARTS, PLEASE GIVE
MODEL AND SERIAL NUMBER.
(MINIMUM ORDER CHARGE OF \$10.00)

W A R N I N G

THE MODEL F-2B, F-24B, AND DA SERIES BORING MACHINES ARE NOT STANDARD EQUIPPED WITH MOTOR OVERLOAD OF LOW ELECTRICAL POWER PROTECTION.

THIS PROTECTION IS NOT BUILT INTO THE MACHINE BECAUSE THE ELECTRICAL CODE REQUIREMENTS VARY, AND IT IS MORE ECONOMICAL FOR THE PURCHASER TO BUY THESE DEVICES DIRECTLY FROM AN ELECTRICAL EQUIPMENT SUPPLIER.

OVERLOAD PROTECTION IS MOST IMPORTANT, AND IT IS A NECESSITY TO PASS ELECTRICAL CODE REQUIREMENTS. MAKE SURE YOU INSTALL THIS EQUIPMENT WITH MOTOR OVERLOAD PROTECTION IN ACCORDANCE WITH THE CURRENT REQUIREMENTS NOTED ON THE MOTOR NAME PLATE.

DESCRIPTION

THE MODEL DA-4SB BAR IS A PORTABLE PRECISION BORING UNIT, THIS DA-4SB MODEL IS EQUIPPED WITH A FLANGED AND A ROTTLER -B TYPE SOCKET SPINDLE NOSE TO ALLOW FOR A WIDE VARIETY OF HEAVY DUTY DIESEL AND INDUSTRIAL WORK, A ROTTLER -B TYPE SOCKET SPINDLE NOSE OFFERS THE APPLICATION OF OTHER -B TYPE CUTTER HEADS TO SUIT A VARIETY OF WORK AND USE REQUIREMENTS,

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 3/4 TO 1-1/2 HP DEPENDING UPON SPINDLE SPEEDS REQUIRED. 3 PHASE MOTOR IS ALSO AVAILABLE. A QUICK CHANGE LEVER SELECTS TWO SPINDLE SPEEDS, ON 6DA-4SB, AND 3 SPEED BELT CASE INCREASES THE AVAILABLE SPEEDS TO 6. THIS BAR IS ALSO EQUIPPED WITH A TWO SPEED FEED RATE UPPER HOUSING.

GEAR HOUSINGS ARE ALUMINUM ALLOY IN ORDER TO INCORPORATE THE LIGHTEST POSSIBLE WEIGHT WITHOUT SACRIFICING RIGIDITY.

NOTE: WHEN BAR IS SHIPPED FROM THE 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 AND MODEL NUMBER OF THE CYLINDER BORING MACHINE.

G U A R A N T E E
L I M I T E D

ROTTLER BORING BAR COMPANY MODEL DA PARTS AND EQUIPMENT ARE GUARANTEED AS TO WORKMANSHIP AND MATERIAL. THIS LIMITED GUARANTEE REMAINS IN EFFECT FOR ONE YEAR FROM DATE OF DELIVERY, PROVIDED MACHINE IS OWNED AND OPERATED BY ORIGINAL PURCHASER.

STANDARD ELECTRIC COMPONENTS ARE WARRANTED BY THEIR RESPECTIVE MANUFACTURERS.

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 INDIRECT COSTS IN CONNECTION WITH CASES COVERED BY THE WARRANTY.

GUARANTEE DOES NOT COVER SHIPPING OR FREIGHT CHARGES.

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

FEED LEVER IS THE LATCHING LEVER ON SIDE OF THE BAR. PRESS DOWN UNTIL THE LEVER LATCHES TO ENGAGE CUTTING FEED. TO DISENGAGE, PRESS FEED RELEASE ARM WHICH WILL UNLATCH LEVER AND ALLOW IT TO RETURN TO NEUTRAL POSITION. LIFT FEED LEVER 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 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 SET SCREW, HAS A ROUND SHAPED END WHICH WILL RELEASE CUTTING FEED, WHEN IT CONTACTS LEVER. THIS IS MOST CONVENIENTLY RAISED UP AND LOCKED BY THE SET SCREW IN PROPER POSITION ON COMPLETION OF FIRST BORE CUT. THIS ROD SHOULD NOT BE USED TO HOLD CLOSE TOLERANCE SHOULDERS.

2. FAST DOWN LEVER

THE FAST DOWN LEVER IS LOCATED TO THE RIGHT OF THE 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. DO NOT USE WHEN YOU ARE USING THE 200 OR 380 RPM SPINDLE SPEEDS, SHIFT TO A LOWER SPEED.

3. SPINDLE CLUTCH CONTROL

THE SPINDLE CLUTCH CONTROL IS LOCATED TO THE LEFT OF THE 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 WHEN YOU ARE USING SPINDLE SPEEDS OF 200 AND 330 RPM. 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 LOWER SMALL KNOB ON TOP OF THE UPPER HOUSING MAY BE USED FOR MANUALLY TURNING SPINDLE WHEN NECESSARY. THE UPPER KNOB IS USED FOR CENTERING.

4. MANUAL HAND FEED

A 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 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

THE SPEED CONTROL IS OPERATED BY THE PULL RELEASE KNOB AT THE MOTOR GEAR HOUSING, UP FOR LOW SPEED, DOWN FOR HIGH. THIS CONTROL MAY BE CHANGED WHEN BAR IS RUNNING ALTHOUGH IT IS DESIRABLE TO STOP MOTOR OR JOG MOTOR WHEN CHANGING FROM A SPINDLE SPEED OF 50 TO 200 AND FROM 100 TO 330 RPM.

6. TWO FEED SPEED CONTROL

THE TWO FEEDS PROVIDED ON YOUR DA-4SB ARE CONTROLLED BY A SLIDING KEY ARRANGEMENT, OPERATED BY A SMALL KNOB ON THE TOP OF THE UPPER HOUSING. THIS KNOB IS RAISED TO ENGAGE A LOW SPEED FEED RATE AND LOWERED TO SECURE A HIGHER FEED RATE. TO OPERATE THIS KNOB, LIFT THE FEED SHIFT LEVER TO NEUTRAL AND OPERATE THE KNOB AS REQUIRED, ALLOWING THE SHIFT LEVER TO RETURN TO FEED POSITION. IT WILL TAKE A MOMENT FOR THE SLIDING KEY TO DROP INTO DRIVE POSITION. THIS CONTROL MAY BE OPERATED WHILE THE MACHINE IS ACTUALLY IN A BORING OPERATION, ALTHOUGH THE DWELL OF THE TOOL MAY LEAVE A WITNESS MARK IN THE BORE.

7. CENTERING KNOB

THE CENTERING KNOB (UPPER KNOB) AT THE TOP OF THE UPPER SPINDLE HOUSING EXPANDS THE CENTERING FINGERS WHEN TURNED CLOCKWISE. BE CAREFUL NOT TO OVER-EXTEND THESE FINGERS WHEN SPINDLE IS NOT IN THE CYLINDER OR THEY WILL COME COMPLETELY OUT OF THE PINION DRIVE.

NOTE: NOT TO BE USED UNLESS BAR IS IN A VERTICAL POSITION.

8. SPEED CHANGE - BELT CASE 6DA-4SB ONLY

A THREE SPEED BELT CASE IS LOCATED TOWARD THE BACK OF THE BORING BAR. TO CHANGE SPEED IN THE BELT CASE, FIRST DISCONNECT POWER FROM BORING BAR, LOOSEN KNOB ON SIDE COVER, PIVOT COVERS TO GAIN ACCESS TO THE V-BELT. NOW LOOSEN THE CLAMP HANDLE AND PIVOT MOTOR FORWARD. NOW YOU CAN MOVE THE BELT TO NEW GROOVE LOCATION. UPPER GROOVE POSITION IS FOR LOW SPINDLE SPEED AND LOWER FOR HIGH SPINDLE SPEED. AFTER SELECTING THE SPEED YOU REQUIRE, PIVOT MOTOR BACK AND TIGHTEN BELT. (DO NOT OVER-TIGHTEN BELT.)

GDA-4SB ONLY

SPINDLE SPEEDS

| <u>V-BELT POSITION</u> | <u>LOW GEAR SPEED</u> | <u>HIGH GEAR SPEED</u> |
|------------------------|-----------------------|------------------------|
| UPPER | 20 | 80 |
| MIDDLE | 50 | 200 |
| LOWER | 100 | 330 |

OPERATING INSTRUCTIONS

WE RECOMMEND, PARTICULARLY FOR OPERATORS UNFAMILIAR WITH THE BORING BAR, TO PRACTICE ON A JUNK BLOCK IN ORDER TO BECOME ACQUAINTED WITH ALL CONTROLS AND DETAILS CONNECTED WITH THE USE OF THE MACHINE.

CAREFULLY CLEAN AND FILE OFF HIGH SPOTS, THREADED BURRS, ETC., ON TOP OF CYLINDER BLOCKS.

MEASURE EACH CYLINDER. DETERMINE THE AMOUNT OF METAL TO BE REMOVED FROM THE MEASUREMENT OF CYLINDER WHICH SHOWS THE MOST WEAR.

CLAMPING METHODS

IT IS LIKELY YOU WILL ENCOUNTER SOME COMPLICATED CLAMPING PROBLEMS IN BORING OCCASIONAL INDUSTRIAL AND HEAVY WET SLEEVE ENGINES AND COMPRESSORS. CLAMPING CAN OFTEN BE MOST EFFECTIVELY HANDLED BY BOLTING A SUB PLATE TO THE BLOCK SURFACE AND BOLTING THE BORING MACHINE TO THE SUB PLATE.

THE OUTER LIP OF THE BASE OF THE BORING BAR CAN BE USED FOR CLAMPING, BUT BE SURE THAT YOU HAVE ENOUGH CLAMP TO HOLD THE BASE SECURELY AND THAT THE BASE OF THE BORING BAR HAS GOOD CONTACT WITH THE CYLINDER BLOCKS.

BORING

IF TOOL IS PROPERLY SHARPENED, PLACE TOOL BIT AND PROPER TOOL HOLDER IN MICROMETER. (CHOOSE A TOOL HOLDER THAT WILL ALLOW MINIMUM TOOL BIT OVERHANG FOR THE SIZE YOU WISH TO BORE.) (WE RECOMMEND A MAXIMUM TOOL BIT OVERHANG OF 5/8" BEYOND THE TOOL HOLDER.) HOLD TOOL BIT LIGHTLY AGAINST THE MICROMETER ANVIL AND LOOSEN ALLEN SCREW WITH ROUND

BORING, CONT.

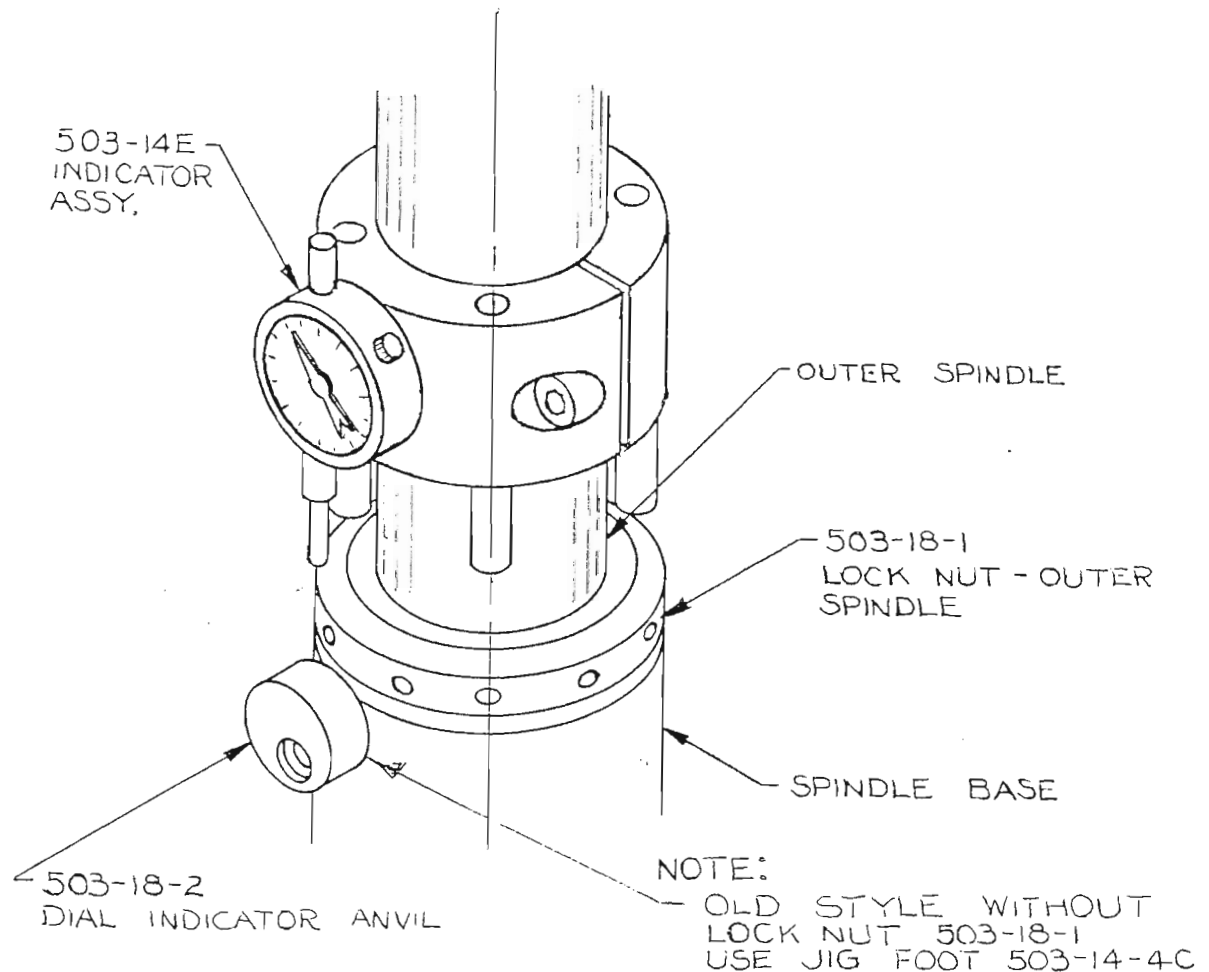
HEAD ALLEN WRENCH, GENTLY LET TOOL HOLDER SLIDE BACK TO MAKE CONTACT WITH MICROMETER SPINDLE. THIS PROCEDURE WILL PREVENT CHIPPING CARBIDE AND PITTING OF MICROMETER ANVIL. THIS MICROMETER IS .050 TO A REVOLUTION RATHER THAN .025 AS ON A CONVENTIONAL MICROMETER. SET MICROMETER TO SIZE THAT YOU WISH TO 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 LATCHES. 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.

COUNTERBORING

COUNTERBORING MAY BE BEST ACCOMPLISHED BY THE USE OF AN OPTIONAL 1" TRAVEL DIAL INDICATOR ASSEMBLY, #503-14E.



TO COUNTERBORE TO A CLOSE TOLERANCE DEPTH, CAREFULLY HAND FEED THE RF TYPE CUTTER BIT DOWN UNTIL THE CUTTER IS SLIGHTLY 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.

DEPTH OF CUT (MOTOR CYLINDER BLOCK)

PRECISION FINISH BORES MAY BE CUT IN ONE PASS WITH STOCK REMOVAL UP TO .050 IN DIAMETER, PROVIDED THE SUGGESTED SURFACE SPEEDS OF 380 FEET PER MINUTE ARE USED. GENERALLY WHERE THE FINEST FINISHES ARE REQUIRED AND/OR A HEAVY STOCK REMOVAL MAY BE MADE, USE THE LIGHT FEED RATE. EXTREME BORE LENGTH JOBS MAY REQUIRE .040 FINISH CUT.

ROUGHING CUTS FOR SLEEVING OR SUBSTANTIAL STOCK REMOVAL CAN BE MADE UP TO .200 ON THE DIAMETER, USING THE FAST FEED RATE AND APPROXIMATELY 200 FEET PER MINUTE SURFACE SPEED.

STUB BORING BAR (MOTOR CYLINDER BLOCK)

HEAVY CUTS UP TO .150 ON THE DIAMETER CAN BE MADE WITH THE STUB BORING BAR.

T O O L B I T S H A R P E N I N G

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 THE TOP OF THE MOTOR HOUSING AND SHARPEN BITS ON THE SMALL DIAMOND WHEEL PROVIDED ON THE MOTOR SHAFT. ALWAYS MAKE SURE YOU SHARPEN THE TOOL ON THE SIDE OF THE DIAMOND WHEEL THAT IS RUNNING TOWARD THE TOP FACE OF THE BIT. SHARPENING 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 WHEEL. AFTER SHARPENING A NUMBER OF TIMES, DRESS EXCESS STEEL AWAY FROM CARBIDE WITH A GRINDING WHEEL.

CAUTION: SEE SHEET FOR TOOL SHARPENING REQUIREMENT.

TOOL BIT SHARPENING, CONT.

DIAMOND WHEEL IS DESIGNED FOR CARBIDE ONLY AND IS NOT INTENDED FOR RAPID STOCK REMOVAL. STEEL TENDS TO LOAD IT. A TOOL BIT USED FOR ALUMINUM BORING SHOULD NEVER ALTERNATELY BE USED FOR CAST IRON OR STEEL. IRON WELD ON TOP OF THE BIT WILL CAUSE A ROUGH FINISH ON ALUMINUM WORK.

CAUTION: DO NOT ATTEMPT TO DRESS OR SHARPEN THE TOP OF THE TOOL BIT. GRIND OR DRESS FRONT AND SIDES ONLY.

CARE OF DIAMOND WHEEL

IF THE DIAMOND DISK IS HANDLED WITH CARE IT WILL PROVIDE MANY YEARS OF SERVICE.

AN ABRASIVE STONE IS FURNISHED WITH YOUR DIAMOND WHEEL FOR USE IN HONING THE FACE OF THE WHEEL. YOU SHOULD USE THIS STONE FREQUENTLY TO REMOVE THE PARTICLES THAT TEND TO LOAD THIS WHEEL, OTHERWISE YOU WILL NOT PRODUCE THE KEEN EDGE ON THE TOOL THAT ALLOWS THE MACHINE TO BORE ACCURATE HOLES WITH A FINE SURFACE FINISH.

TOOL LIFE

WITH TOOLS SHARPENED TO A PRECISION EDGE, IT SHOULD BE POSSIBLE TO BORE APPROXIMATELY 20 OVERSIZE CYLINDERS, PROVIDED THE CORRECT SPINDLE SPEED IS USED. THIS APPLIES TO MOST AMERICAN PASSENGER CAR BORES UNDER 4-1/2", PROVIDED NO HARD SPOTS OR FOREIGN MATERIALS ARE IN THE CYLINDERS. THE SAME NUMBER OF SLEEVING CUTS CAN BE MADE ON LOW SPEED WITH OUT FURTHER SHARPENING, PROVIDED THE TOOL HAS AN ORIGINAL KEEN EDGE.

CENTERING FINGERS

CENTERING FINGERS SHOULD BE KEPT ADEQUATELY ACCURATE TO CENTER THE NEW BORE WITHIN .002" OF THE CENTER OF THE WORN HOLE. CENTERING FINGERS CAN BE LAPPED PERIODICALLY TO OBTAIN NEAR PERFECT CENTERING.

CENTERING FINGERS CAN BE TAKEN OUT BY SIMPLY ROTATING THE CENTERING KNOB CLOCKWISE UNTIL FINGERS CAN BE REMOVED. WHEN THEY ARE REPLACED OR RESET IN THE CUTTER HEAD, THEY SHOULD BE REPLACED IN THE RESPECTIVE NUMBERED SLOTS AND THE CENTERING KNOB FIRST ROTATED CLOCKWISE AND THEN COUNTERCLOCKWISE TO INSURE THAT FINGERS ENTER PINION TEETH SIMULTANEOUSLY.

CENTERING FINGERS, CONT.

PERIODICALLY CHECK THE CENTERING FINGERS BY BORING A HOLE AND THEN WITHOUT UNCLAMPING THE SPINDLE UNIT, EXTEND THE FINGERS AGAINST THE WALL, CHECKING TO SEE THAT EACH FINGER TIP WILL LOCK A .001" SHIM. IF THE FINGERS WILL NOT DO THIS THEY SHOULD BE LAPPED BY ROTATING THEM BACK AND FORTH IN THIS TEST BORE WHILE HOLDING THE FINGERS AGAINST THE WALL. IF THIS DOES NOT QUICKLY BRING CONTACT AND PRESSURE TO ALL THE FINGERS, IT WILL BE NECESSARY TO DRESS CAREFULLY THE HIGHER FINGER OR FINGERS WITH A FILE AND REPEAT THE LAPPING PROCESS.

NOTE: NOT TO BE USED UNLESS BAR IS IN A VERTICAL POSITION.

M I C R O M E T E R

YOUR TOOL SETTING 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 THE MICROMETER WITHOUT ALLOWING BIT TO SNAP INTO MIKE ANVIL. CARE SHOULD BE USED IN THE METHOD OF LIGHTLY LOCKING THE 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 WOULD RECOMMEND TURNING THE ANVIL SLIGHTLY AND FINALLY END FOR END SO THAT A FLAT SURFACE IS EXPOSED TO THE TOOL BIT TIP.

S E T T I N G M I C R O M E T E R

(3-7/8" CUTTER HEAD)

TO SET DA-4SB MICROMETER TO HIGH OR LOW READING, USING A MICROMETER WITH A 2.9" TO 6" READING.

CAUTION: THE STANDARD FOR YOUR DA-4SB BAR IS SET. DO NOT CHANGE IT, EXCEPT WHEN IT IS NECESSARY TO RECALIBRATE THE MICROMETER, THEN THE STANDARD SHOULD BE RESET TO MATCH THE MICROMETER.

TO BORE FROM 3-5/16" TO 6", PLACE STANDARD MICROMETER AND ADJUST MIKE ANVIL SO THAT MIKE READS 6.0" (NOTE: READ DIRECTLY AS SHOWN ON MICROMETER SLEEVE.) TO BORE FROM 6.0" TO 9.0", PLACE STANDARD IN MIKE AND ADJUST MIKE ANVIL SO THAT MIKE READS 3.0". THE MIKE READING IS 2.9" TO 6.0" AND WILL NOW ACTUALLY GAUGE TOOL FROM 5.9" TO 9". WHEN MIKE IS SET FOR LARGER BORES, REMEMBER THAT BAR WILL BORE 3" LARGER THAN MIKE READS.

CALIBRATING MICROMETER

1. BORE A HOLE
2. REMOVE TOOL HOLDER AND BIT AND PLACE IN MICROMETER.
3. ADJUST MIKE SO THAT IT READS THE SAME SIZE AS THE HOLE YOU HAVE BORED. SMALL VARIATIONS MAY BE MADE BY TURNING THE MIKE SLEEVE WITH SPANNER WRENCH PROVIDED. LARGER CHANGES SHOULD BE MADE BY MOVING THE ANVIL.

PROCEDURE

FOR

CENTERING

USING CENTERING TELESCOPE

The cutter head and centering rod must be removed before you can use the centering telescope.

You can remove the cutter head by removing it's four attaching screws on the bottom of the cutter head.

The centering rod assembly can be removed by loosening socket SET screw in knob.

To attach the scope to the top of the inner spindle, first loosen the lock clamp then place the scope mount over the inner spindle making sure the key engages the key slot in the inner spindle. Then tighten the

To attach the scope to the cutter head end of the inner spindle, you must first attach the scope adapter, then attach the scope mount to the adapter.

Place a centering target in the hole you are trying to center to, then mount the boring bar over the other hole. Sight through the scope, focus the target with the object knob, then focus the cross hair with its focusing ring. Adjust the boring bar till the center of the cross hairs are on the center of the target, turn the inner spindle 180°. If the center is off, adjust the boring bar to half the distance it is off. Keep adjusting the boring bar, till you can rotate the cross hair about the center of the centering target and have an equal radial distance on all sides of the target's center or on the target's center.

Holes will be parallel if the mounting surface of the holes you mount the boring bar to, are parallel and are square to the bore. If these are not parallel and square you will have to place the centering target in one end of the hole you are centering to, then in the other end of the same hole and center the bar to both.

FOR CENTERING TELESCOPE

To make line of sight of scope parallel to inner spindle, mount scope on boring bar, then place boring bar in a horizontal position.

Now place a centering target in line with the center of the inner spindle and at six feet or more distance from it.

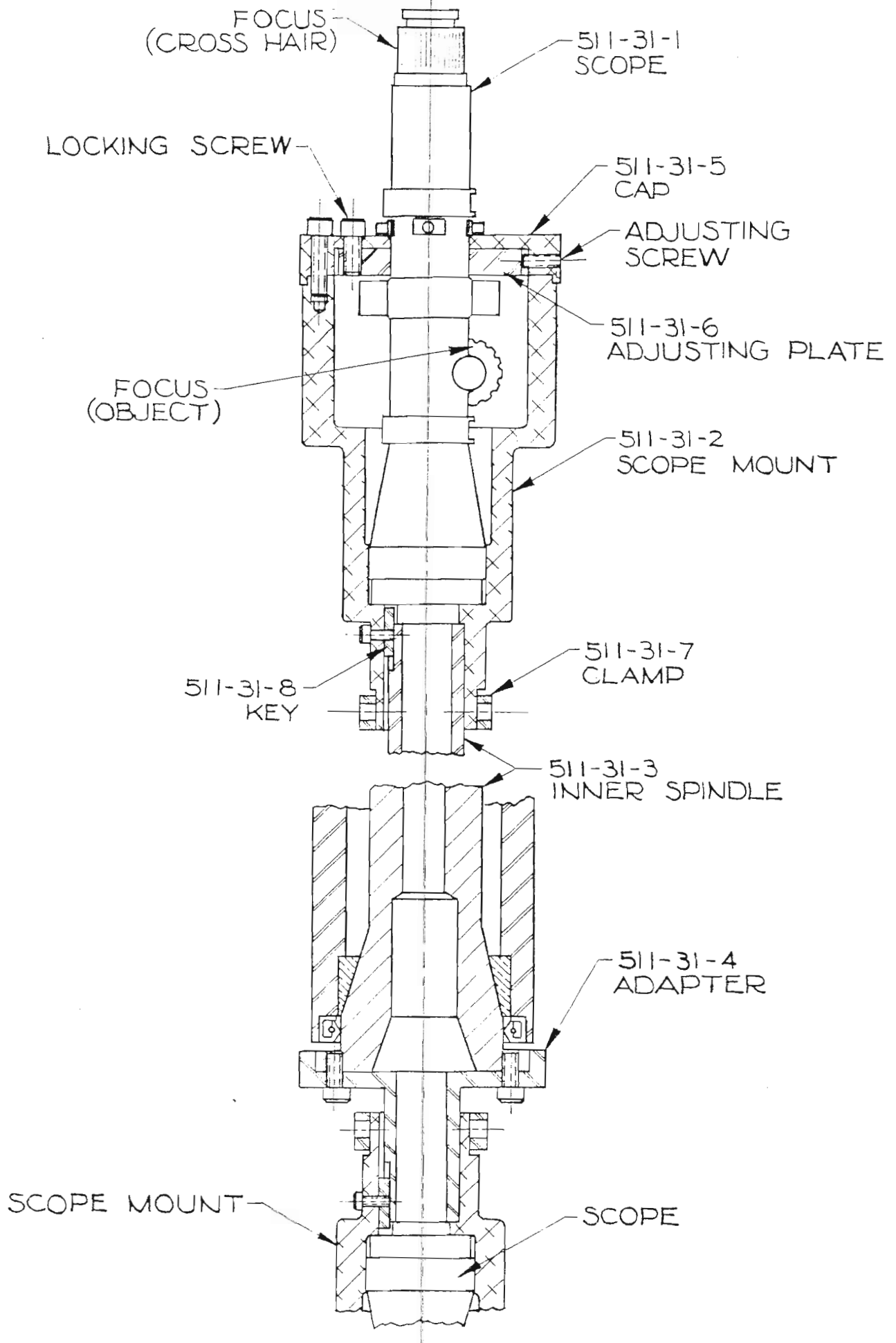
Sight through the scope and align the boring bar to the center of the target.

Now rotate inner spindle, if the cross hair does not rotate on an equal radial distance from the center of the target, move bar $1/2$ the distance that the bar is off.

Keep adjusting the bar until the center of the cross hair revolves around the center of the target at an equal distance from the target center. Now, the bar should be centered to the target.

To make scope line of sight parallel to the center of inner spindle, loosen locking screw on scope's mounting cap. Then, alternately loosen and tighten adjusting screw on side of cap until you can no longer reduce the radial distance to the center of the target when you rotate the inner spindle, retighten the locking screw.

Now run spindle all the way down, rotate inner spindle and check if the center of the cross hair will revolve around the center of the target at an equal radial distance from the center of the target. If not, repeat above procedure.



CENTERING TELESCOPE

-B TYPE CUTTER HEADS

ALTERNATE CUTTER HEAD ARRANGEMENTS

YOUR DA-4SB CAN BE EQUIPPED WITH A SINGLE DRAW BOLT THROUGH THE INNER SPINDLE ASSEMBLY SO THAT A NUMBER OF DIFFERENT STYLES OF CUTTER HEADS, TOOLS, AND INDICATORS, MAY BE RAPIDLY INTERCHANGED. TWO SPANNER WRENCHES ARE PROVIDED FOR LOCKING AND UNLOCKING THE CUTTER HEAD, THEY ARE USED ON THE TWO LOWER KNOBS ON TOP OF THE SPINDLE. WHEN INSERTING ALTERNATE TOOLS MAKE SURE THE SOCKET IS ABSOLUTELY CLEAN AND WHILE THREADING IN PLACE, MAKE SURE THE SPLINE IS EASILY ENGAGED WITHOUT BURRING.

BLIND HOLE CUTTER HEAD

600-20 (OPTIONAL)

THE BLIND HOLE CUTTER HEAD WITH A STANDARD BORE CAPACITY OF 3.250" TO 9" MAY BE QUICKLY ATTACHED TO THE DA-4SB MACHINE BY A SINGLE DRAW BOLT THROUGH THE INNER SPINDLE ASSEMBLY. TWO SPANNER WRENCHES ARE PROVIDED FOR LOCKING AND UNLOCKING OF CUTTER HEAD AT THE TOP OF THE SPINDLE, DO NOT OVER-TIGHTEN.

A DAMPENER WEIGHT IS ALSO PROVIDED IN THE CUTTER HEAD TO IMPROVE PERFORMANCE OF THE BORING SPINDLE. THIS WEIGHT 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 THIS HEAD AND IT WILL HAVE TO BE DISASSEMBLED AND CLEANED. IT IS SIMPLY DONE BY REMOVAL OF THE FOUR FLAT HEAD SCREWS, CAREFULLY DISASSEMBLE, CLEAN, AND REASSEMBLE.

OPTIONAL

1.5" (38MM) STUB BORING BAR

600-2

THIS STUB BORING HEAD WITH A CAPACITY OF 1.5" TO 4.1" (38MM TO 86MM) DIAMETER X 6.5" (165MM) DEPTH, MAY BE QUICKLY ATTACHED TO THE F-2B BORING MACHINE. AT ALL TIMES THE WORK SHOULD BE LOCATED IN THE MACHINE SO THE END OF THE STUB BORING HEAD IS NO FURTHER THAN 1" FROM THE BEGINNING OF THE WORK WHEN THE SPINDLE IS IN THE UPPER LIMIT OF TRAVEL.

UNLIKE THE PRODUCTION CUTTER HEAD, CENTERING FINGERS ARE LOCATED ABOVE THE CUTTING TOOL, REQUIRING TOOL REMOVAL TO CENTER EACH BORE.

TWO SETS OF CENTERING FINGERS ARE PROVIDED, THE SMALLER HAS A 1.5" TO 2.625" BORE DIAMETER RANGE AND THE LARGER A 2.625" TO 4.1" DIAMETER BORE RANGE.

IF CENTERING FINGERS REQUIRE DRESSING AFTER A PERIOD OF USE, APPLY THE SAME LAPPING PROCEDURE NOTED ON PAGE 12 AND 13. THE MICROMETER MAY ALSO BE PERIODICALLY CALIBRATED AS NOTED ON PAGE 12, 13 AND 14.

AN OFF-SET TOOL BIT IS ALSO PROVIDED IN ORDER TO BORE TO THE EXTREME BOTTOM OF BLIND HOLES.

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IMPORTANT GENERAL INFORMATION
FOR THE BEST USE OF
THE MODEL 1.5 STUB BORING TOOLING

CAUTION: INNER SPINDLE ADJUSTMENT (SEE PAGE 19) MUST BE CORRECT FOR PRECISION USE OF STUB BORING HEADS.

SINCE THE EXTENDED STUB BORING HEAD DESIGN HAS CONSIDERABLE OVERHANG WITH A SMALL SHAFT DIAMETER, THE CUTTING TOOL "B" LAMP MUST BE KEPT VERY NARROW, (.005" TO .015") (.127MM TO .381MM) WIDE. THIS WILL INSURE BEST RESULTS WITH NO CHATTER AT THE BOTTOM OF THE BORE.

THE SMALL HEAD WILL ALSO BE INCLINED TO DEFLECT WITH INCREASINGLY HEAVY CUTS. YOU MAY EXPECT, WITH PROPERLY SHARPENED TOOLS, THAT AFTER A .040" (1.016MM) (ON DIAMETER) CUT A SECOND PASS OF THE TOOL WILL REMOVE CLOSE TO .001" (.0254MM) MATERIAL ON THE DIAMETER. A SECOND PASS FOLLOWING A LESSER FIRST CUT WILL REMOVE LESS METAL.

THE .040" (1.016MM) CUT WILL ALSO LEAVE A LIGHT DRAG BACK MARK IN THE CYLINDER THAT CAN IN TURN BE ELIMINATED BY THE SECOND PASS.

THE DRAG BACK MARK IS GENERALLY ELIMINATED IN ANY EVENT BY FINISH HONING. IT MAY ALSO BE ELIMINATED BY REPOSITIONING THE BORING SPINDLE AWAY FROM THE TOOL POSITION ON THE RETURN STROKE.

YOU CAN USE THE SECOND PASS PERFORMANCE (SECOND PASS MUST BE MADE WITHOUT RE-CENTERING) TO PROVIDE A MOST PRECISE BORE.

IN GENERAL SIZE VARIATIONS IN A TYPICAL CYCLE BORE WILL APPROXIMATE .0007" (.01778MM). A SECOND PASS WILL REDUCE THESE VARIATIONS TO GENERALLY LESS THAN HALF AND PROVIDE A FINE FINISH. THIS FINISH WILL REQUIRE VERY LITTLE STOCK REMOVAL WITH A HONE IN ORDER TO CROSS HATCH FOR AN EXCELLENT RING SEATING CONDITION.

GENERAL INFO. FOR 1.5 STUB BORING TOOLING, CON'T

THE BORING HEAD ASSEMBLY AS NOTED IN STUB BAR ILLUSTRATION, IS EQUIPPED WITH A DAMPENING WEIGHT, PART #600-8-2. 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 THIS HEAD AND IT WILL HAVE TO BE DISASSEMBLED AND CLEANED.

PERFORMANCE OF THE STUB BORING BAR IS ALSO CLOSELY RELATED TO THE PROPER LUBRICATION AND ADJUSTMENT OF THE MACHINE INNER SPINDLE BEARING. CHECK THE INNER SPINDLE ADJUSTMENT TWO TO THREE TIMES PER YEAR TO MAKE SURE CLEARANCE IS CORRECT.

I M P O R T A N T
M A I N T E N A N C E

LUBRICATION

DA STYLE

- * THE DA STYLE 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 LID SHOULD BE REMOVED AND THE ORIGINAL LUBRICANT ENTIRELY REMOVED.
- △ THE UPPER HOUSING SPINDLE DRIVE GEAR BEARING SHOULD BE LUBRICATED MONTHLY, BY ADDING A FEW DROPS OF THREE AND ONE OIL TO IT. ADD BY REMOVING THE SMALL COVER ON THE FRONT OF THE UPPER HOUSING AND ADDING LUBRICANT TO THE TAKE UP NUT AREA BETWEEN THE CLUTCHING TEETH.
- THE LOWER MOTOR HOUSING UNITS' OIL LEVER SHOULD BE CHECKED MONTHLY. CHECK BY REMOVING THE PIPE PLUG ON THE LEFT SIDE OF THE LOWER GEAR HOUSING, OIL LEVER SHOULD BE JUST UP TO THE BOTTOM OF THIS HOLE.

CAUTION: WHEN ADDING OIL OR REFILLING, DO NOT OVER-FILL.

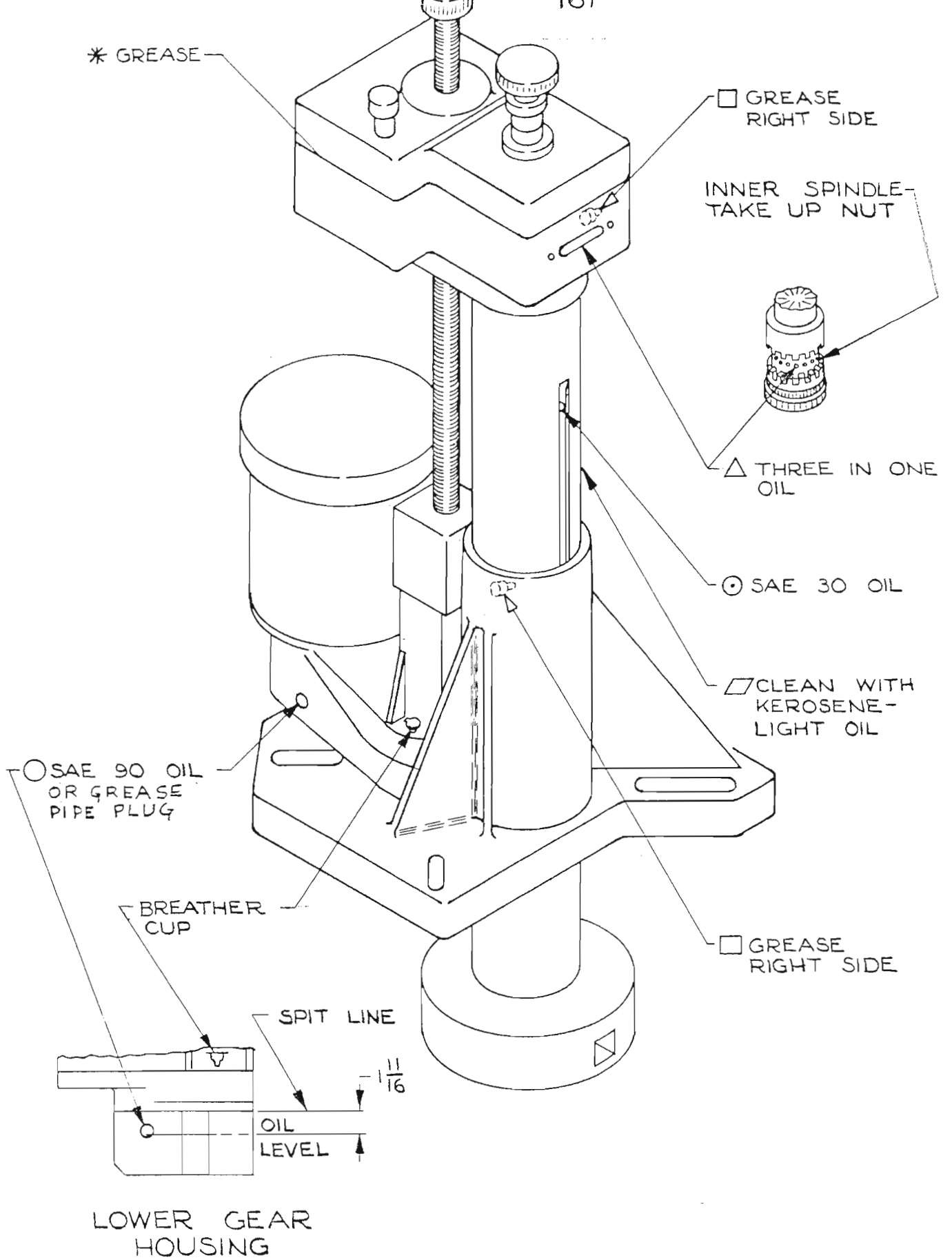
CHANGE THIS GEAR LUBRICANT EVERY 40,000 BORING CYCLES. ADD OR REFILL WHEN NEEDED, WITH 3 PARTS UNION OIL UNOBA F1 OR F2 LUBE TO 1 PART SAE 90 MULTIPURPOSE GEAR LUBRICANT.

- IF YOUR DA MACHINE IS OPERATED ON A CONTINUOUS BASIS, GREASE FITTINGS AT THE TOP OF THE SPINDLE UNIT AND AT THE BOTTOM OF FEED SCREW DRIVE, SHOULD BE LIGHTLY LUBRICATED DAILY, OR LESS OFTEN IF THE MACHINE IS NOT USED CONTINUOUSLY. LUBRICATE WITH UNOBA F1 OR F2 LUBRICANT (930 AAA LUBRICANT COULD BE AN ALTERNATIVE)

LUBRICATION, DA STYLE, CON'T.

- ⊙ TWO OR THREE DROPS OF S.A.E. 30 MACHINE OIL CAN BE ADDED WEEKLY TO THE BREATHER HOLE AT THE TOP OF THE KEY WAY IN THE MAIN SPINDLE, TO INSURE FLUIDITY OF MAIN SPINDLE BEARING LUBRICANT.

- ▭ MAIN SPINDLE SURFACE SHOULD BE CLEANED WITH KEROSENE WEEKLY AND OCCASIONALLY A LIGHT WEIGHT OIL APPLIED TO PREVENT EXCESSIVE DRYNESS.



LUBRICATION

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. UPPER BEARING IS PRELOADED IN PLACE BY A BELLEVILLE SPRING WASHER.

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 THE BASE, FORCING FELT UP AND ADJUST NUT WITH PUNCH. (FOR BORING BAR WITH SPINDLE LOCK ONLY USE PIN SPANNER ON UPPER LOCK NUT, SEE PAGE 38).

FOR LOWER BEARING, FIRST BACK OFF #8-32 SET SCREW AT BOTTOM SPINDLE BEARING. THEN REMOVE FELT RETAINER AND FELT AT BOTTOM BASE AND TURN WITH PUNCH.

ADJUSTING PROCEDURE

1. PLACE AND CLAMP BAR OVER HOLE OR OVERHANG SO SPINDLE CAN BE RUN DOWN. RUN SPINDLE DOWN APPROXIMATELY 4" TO 6". LOOSEN BOTH ADJUSTING NUTS AND SET SCREW.
2. TIGHTEN UPPER BEARING UNTIL APPROXIMATELY 10 TO 15 LBS. OF EFFORT IS REQUIRED TO OPERATE THE HAND FEED HANDLE.

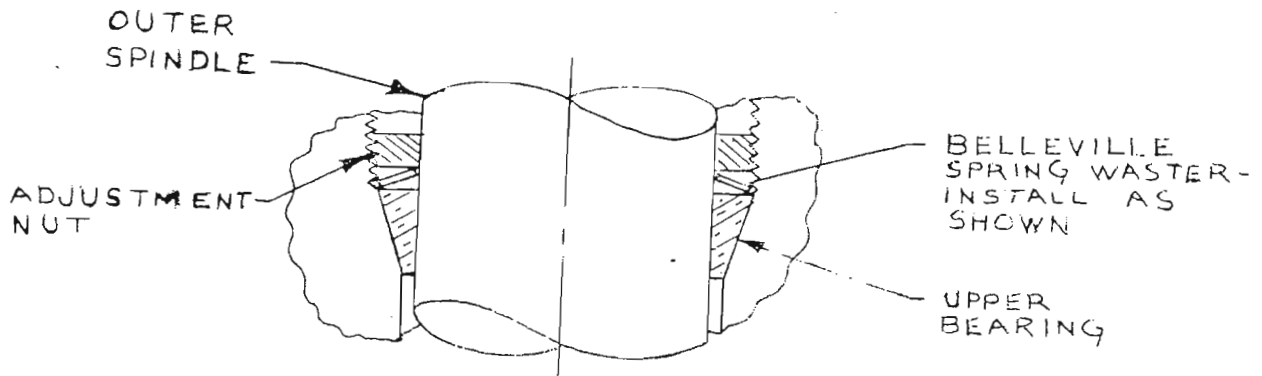
REPEAT THIS SEQUENCE (#2) ON LOWER BEARING, TAKING CARE THAT HAND FEED OPERATES ONLY SLIGHTLY TIGHTER OR 15 TO 20 LBS. OF EFFORT IS REQUIRED TO OPERATE THE HAND FEED HANDLE. THE RELOCK #8-32 SET SCREW.

OUTER SPINDLE

ADJUSTING PROCEDURE, CONT.

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 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.



A D J U S T M E N T O F I N N E R S P I N D L E

1. REMOVE TWO SCREWS AND SMALL COVER ON FRONT SIDE OF UPPER HOUSING.
2. REMOVE STOP SCREW RESTRICTING UP TRAVEL OF SPINDLE CLUTCH LEVER AND MOVE LEVER TO FULL UP POSITION (SEE DETAIL "G".) ROTATE SPINDLE APPROXIMATELY 1/2 TURN AWAY FROM THE DETENT SPRING. POSITION THE TOOL HOLDER SLOT TO REAR.
3. INSERT THE PIN (DIAMETER .180 OR LESS) IN ONE OF THE HOLES PROVIDED IN THE O.D. OF THE TAKE UP NUT. (SEE INNER SPINDLE NUT.) HOLD SPINDLE KNOB WITH ONE HAND AND TURN TAKE UP NUT TO THE LEFT (CLOCKWISE). YOU WILL NOTE THE NUT RATCHETS IN NOTCHES AS YOU TAKE UP. TAKE UP UNTIL THE SPINDLE IS TIGHT AND BACK OFF 3/4 TO 1-1/2 NOTCHES. RUN THE BAR ON HIGH SPEED MAKING SURE THERE IS ONLY SLIGHT HEATING AT THE BOTTOM SPINDLE. IF HEAT IS EXCESSIVE BACK OFF ONE NOTCH FURTHER. CAUTION: BE SURE DETENT IS IN A NOTCH, NOT MIDWAY BETWEEN NOTCHES.
4. REPLACE COVER. READJUST SPINDLE CLUTCH CONTROL STOP SCREW.

S P I N D L E C O N T R O L L E V E R A D J U S T M E N T

TO RE-ADJUST THE SPINDLE CONTROL LEVER, FIRST LOOSEN STOP SCREW LOCK NUT, THEN STOP SCREW.

NOW RAISE CONTROL LEVER TO ITS NEUTRAL (UP) POSITION (DETENT PIN ENGAGED) ADJUST STOP SCREW SO THAT THE LEVER WILL NOT GO ANY HIGHER, LOCK WITH LOCK NUT.

R A P I D R E T U R N T R A V E R S E A D J U S T M E N T

IF THE BORING BAR SHOULD EVER FAIL OR HESITATE TO RETURN TO THE 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 THE UPPER REAR OF UPPER HOUSING (REFER TO SECTION A-A). USE A 1/8 ALLEN WRENCH.

NOTE: THIS SET SCREW LOCKS TUMBLER ASSEMBLY (300-37)

3. AFTER LOOSENING THE HORIZONTAL SET SCREW, MOVE THE TUMBLER ASSEMBLY DOWN APPROXIMATELY $1/64$, USING THE $1/4$ VERTICLE SET SCREW IN THE TOP OF THE HOUSING - RELOCK WITH HORIZONTAL SET SCREW

STARTING WITH SHIFTING LEVER (500-38A, DETAIL F) IN NEUTRAL, LIFT THIS LEVER UNTIL IT CONTACTS THE SPRING CARTRIDGE ASSEMBLY (500-40 VIEW F). IMMEDIATELY ON LIFTING THE PIN IN THE CARTRIDGE ASSEMBLY (500-40) APPROXIMATELY $1/32$ THE RETURN TRAVEL CLUTCHES SHOULD START RATCHETING.

IF THE CLUTCHES RATCHET BEFORE THE PIN IS RAISED $1/32$, RESET THE TUMBLER ASSEMBLY HIGHER. DO THIS BY FIRST BACKING OFF BOTH SET SCREW IN THE TOP OF THE HOUSING, THEN FORCE THE TUMBLER UP WITH THE SHIFT LEVER. LOCK THE HORIZONTAL SCREW TIGHTLY AFTER THE ADJUSTMENT IS MADE PROPERLY.

NOTE: PIN IN SPRING CARTRIDGE ASSEMBLY 500-40, SHOULD BE ADJUSTED SO THAT IT IS JUST TOUCHING THE SHIFT LEVER WHEN SHIFT LEVER IS IN NEUTRAL.

S P I N D L E S T O P D E T E N T A D J U S T M E N T

A SPRING LOADED BALL SCREW IS LOCATED IN THE UPPER GEAR HOUSING. (SEE SECTION A-A) TO PREVENT THE SPINDLE FROM TURNING WHILE TRAVELING. THE BALL SCREW MAY BE ADJUSTED SLIGHTLY INWARD FOR ADDED RESISTANCE. OVER-ADJUSTING WILL DAMAGE THE BALL SCREW.

U P P E R H O U S I N G
B A C K F E E D A D J U S T M E N T

TO ADJUST THE FEED SCREW PLAY IN THE UPPER HOUSING:

FIRST, LOOSEN THE THREE ROUND HEAD SCREWS AROUND THE FEED SCREW, IN THE UPPER HOUSING. THEN LOOSEN THE THREE ADJUSTING SCREW LOCK NUTS, THEN ADJUSTING SCREWS.

NOW, ALTERNATING BETWEEN EACH SCREW, TURN THE ADJUSTING SCREWS EVENLY IN, UNTIL YOU HAVE COMPRESSED THE SPRING WASHER, (ALL SCREWS MUST BE TURNED IN THE SAME AMOUNT).

NOTE: A LIGHT TOUCH IS REQUIRED IN ADJUSTING THE BEARING CLEARANCE. SPRING SHOULD BE FLAT, BUT NO PRESSURE ABOVE THAT WHICH IS REQUIRED TO FLATTEN SPRING, SHOULD BE USED.

NOW TURN ADJUSTING SCREW BACK 1/4 TURN TO ALLOW FOR RUNNING CLEARANCE. HOLD ADJUSTING SCREW WITH AN ALLEN WRENCH AND LOCK THEM WITH THE LOCK NUT.

NOW RUN MOTOR WITH LOWER GEAR BOX ENGAGED, SO THAT THE FEED SCREW IS TURNING, TIGHTEN EVENLY THE (3) UPPER ROUND HEAD SCREWS.

M O T O R C L A M P A D J U S T M E N T
(6DA-4SB ONLY)

TO INCREASE PRESSURE ON CLAMP SHOE OF MOTOR PLATE, 502-9-24, FIRST LOOSEN CLAMP HANDLE, 502-9-31, THEN REMOVE CLAMP ARM SET SCREW, THEN ARM. NOW LOOSEN STUD'S LOCK NUT AND TURN STUD IN WITH A SCREW DRIVER, TILL YOU HAVE INCREASED THE CLAMP PRESSURE. RELOCK STUD WITH ITS LOCK NUT AND RELOCK CLAMP ARM WITH ITS SET SCREW.

T R O U B L E S H O O T I N G

(POOR FINISH, INACCURATE HOLES, EXCESSIVE TOOL BIT HEAT, EXCESSIVE TOOL DRAG BACK LINES, ETC)

THE GREAT MAJORITY OF THESE PROBLEMS ARE A RESULT OF TOOL BIT SHARPENING. CHECK TO MAKE SURE TOOL BIT "B" LAND IS OF PROPER WIDTH, WITH KEEN SHARP FACES AND THAT TOP OF BIT IS FREE FROM FLAWS, WITH ORIGINAL RAKE ANGLE AND SMOOTH FINISH. FREQUENTLY, A MINUTE FLAW, NOT VISIBLE TO THE NAKED EYE, WILL PREVENT A FINE FINISH.

HOLES WITH INCONSISTENT PATTERNS AND EXCESSIVE CHIPPING OF TOOL BITS IN INTERRUPTED CUTS AT BOTTOM OF BORE ARE AN INDICATION OF A LOOSE INNER SPINDLE BEARING.

EXCESSIVE LOADS

NOTE: IF EXCESSIVE LOADS ARE IMPOSED ON YOUR MODEL DA-BORING BAR, THE FOLLOWING OCCURS.

THRUST LOADS

IF THE BAR IS FED OR RAPID TRAVELLED INTO OBJECT THAT IMPOSES AN EXCESSIVE THRUST LOAD ON SPINDLE, THE BRASS THRUST NUT, PART NUMBER 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 THE 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. SEE REMOVAL OF FEED SLEEVE AND BEARING.

RADIAL LOADS (DA-4SB ONLY)

IF THE BAR HAS A TOOL IN THE CUTTER HEAD THAT TURNS INTO THE OBJECT, AN EXCESSIVE RADIAL SHOCK WILL BE IMPOSED ON THE SPINDLE AND WILL PROBABLY SHEAR MOTOR DRIVE KEY, 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 WITHOUT TURNING ANY VISIBLE PARTS OF THE BORING BAR. A MOVEMENT OF THE SPEED CHANGE LEVER WILL INDICATE THE LOWER GEAR BOX IS ENTIRELY INOPERATIVE. FOR REPLACEMENT OF THE MOTOR DRIVE KEY, 500-62, SEE REMOVAL OF MOTOR FIELD ASSEMBLY. LESS ABRUPT LOADS THAT WILL STALL MOTOR MAY CAUSE THE MOTOR OVERLOAD PROTECTION WHICH YOU HAVE ARRANGED IN THE ELECTRICAL CONNECTION TO BREAK.

REMOVAL OF MOTOR FIELD ASSEMBLY
(DA-4SB ONLY)

NOTE: THIS IS THE ONLY DISASSEMBLY REQUIRED TO REPLACE MICARTA MOTOR DRIVE KEY IN CASES OF EXCESSIVE RADIAL LOAD ON THE MACHINE SPINDLE.

SECTION B-B

REMOVE FAN SHROUD COVER AND SHROUD. HOLD FAN AND UNSCREW DIAMOND MOUNTING ADAPTOR. REMOVE (4) LONG MOTOR SCREWS AND LIFT OFF THE MOTOR FIELD ASSEMBLY. BE CAREFUL NOT TO LOSE SPRING WASHER ON TOP BEARING, AND REPLACE PROPERLY IN REASSEMBLY.

LAY BLOCKS OR SHIMS ON BOTTOM END BELL (FLAT SURFACE OF GEAR BOX) AND PRY UP ROTOR UNIT OF DRIVE TO REMOVE ROTOR.

DISASSEMBLY OF V-BELT CASE

(GDA-4SB ONLY)

TO CHANGE V-BELT

FIRST DISCONNECT POWER FROM BORING BAR, THEN LOOSEN KNOBS ON SIDE COVERS AND PIVOT COVER TO GAIN ACCESS TO V-BELT, LOOSEN CLAMP HANDLE AND PIVOT MOTOR FORWARD. PASS V-BELT UNDER MOTOR SHEAVE AND OVER DRIVEN SHEAVE. (DO NOT OVER-TIGHTEN BELT AFTER REPLACING.)

TO REMOVE MOTOR

LOOSEN LOCKING NUT OF CLAMP HANDLE STUD THEN REMOVE STUD SHOE AND CLAMP HANDLE. NOW REMOVE LOCK NUT, (LOCATED ON OPPOSITE SIDE OF MOTOR). THIS WILL ALLOW YOU TO REMOVE MOTOR, SHEAVE AND ADJUSTING PLATE.

TO REMOVE V-BELT CASE

FIRST REMOVE COVER 502-9-21, THEN DRIVEN SHEAVE, THEN THE 4 MOTOR GEAR HOUSING SCREWS LOCATED UNDER SHEAVE, THEN THE 2 SCREWS IN THE CASE SUPPORT. NOW YOU CAN LIFT OFF V-BELT CASE.

REINSTALLATION OF V-BELT CASE

FIRST REINSTALL THE 4 MOTOR GEAR HOUSING SCREWS. THEN THE 2 SOCKET HEAD CAP SCREWS IN THE CASE SUPPORTS SHOULD BE INSERTED. ALIGN CASE, THEN TIGHTEN THE 4 MOTOR GEAR HOUSING SCREWS, THEN INSTALL THE SHEAVE, COVER 502-9-21, AND MOTOR ETC.

NOW LOOSEN THE 2 SOCKET HEAD CAP SCREWS IN THE CASE SUPPORT. THEN LOOSEN THE 2 JACKING SET SCREWS IN THE SAME SUPPORT.

NOW TURN THE JACKING SET SCREW IN TILL YOU RAISE THE MOTOR SLIGHTLY. NOW TIGHTEN THE 2 SOCKET HEAD CAP SCREWS.

DISASSEMBLY OF MOTOR HOUSING

NOTE: MOTOR HOUSING MAY BE REMOVED WITHOUT DISASSEMBLY OF UPPER HOUSING AND FEED SCREW.

REMOVE 2 HEX SOCKET SCREWS ON BOTTOM OF 500-97-2 FEED BRACKET AND 2 SCREWS HOLDING 500-96-3A PLATE TO 500-70-1 HOUSING. TURN OUT (COUNTER-CLOCKWISE) BEVEL GEAR.

REMOVE 4 SOCKET HEAD CAP SCREWS IN 500-70-1 HOUSING. LIFT OUT FEED SCREW, OR IF UPPER HOUSING IS STILL INTACT, HOLD IN RAPID DOWN LEVER (502-27-10) 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 & BEARING

NOTE: FOR REMOVAL OF BRASS NUT ONLY. (THIS DISASSEMBLY IS NOT NECESSARY TO REMOVE MOTOR HOUSING.)

SECTION C-C

REMOVE SNAP RING 506-10, 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.

REMOVAL OF MOTOR HOUSING

TO REMOVE MOTOR HOUSING, TAKE OUT 4 BOLTS IN HOUSING FLANGE.

NOTE: IN REASSEMBLY, MOTOR HOUSING ALIGNMENT MUST BE CHECKED AFTER FEED SCREW IS IN PLACE BEFORE FLANGE BOLTS ARE PERMANENTLY LOCKED. USE SURFACE PLATE OVER SCREW AND SPINDLE.

REMOVAL OF MOTOR HOUSING, CON'T.

TO DISASSEMBLE HOUSING, REMOVE TWO PINS AND SIX 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, 502-9-28, OR 500-64, AND SCREW DRIVE GEAR, 500-88, OR 501-20, AND HOUSING WILL COME APART. PINION SHAFT 500-87 OR 501-6, WITH CLUTCH AND GEARS MAY BE TAPPED OUT WITH SMALL PUNCH THROUGH CENTER HOLE IN BOTTOM OF GEAR POT.

DISASSEMBLY OF UPPER HOUSING AND SPINDLE REMOVAL

REMOVE CUTTER HEAD.

REMOVE 502-10-11 KNOB AND THE 502-27-22 KNOB BY REMOVING ITS SCREW. REMOVE 511-31-9 or 511-31-10 KNOB BY RELEASING SOCKET SET SCREW. YOU MAY THEN REMOVE CENTER ROD. UNSCREW SPINDLE CLUTCH LEVER STOP SCREW. 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, 502-9-14.

NOW SHIFTING LEVER 503-10A, 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 500-14, (BE SURE SPRING IS REASSEMBLED PROPERLY) SLEEVE GEAR, 500-1, FEED NUT, 500-2, AND FEED GEAR 502-10-12 WITH ITS THRUST WASHER, 500-15.

NOW REMOVE SNAP RING, 502-10-16, FROM TWO SPEEDS FEED SHAFT, 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 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 INNER SPINDLE FROM FALLING OUT AND THEN REMOVE 500-5 SPINDLE NUT. NUT CAN BE STARTED OFF THROUGH ADJUSTING ACCESS HOLE 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 BE REMOVED NOW.

CAUTION: LUBRICATION WILL RUN OUT WHEN SPINDLE IS REMOVED.

DISASSEMBLY OF UPPER HOUSING AND SPINDLE REMOVAL, CON'T

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.

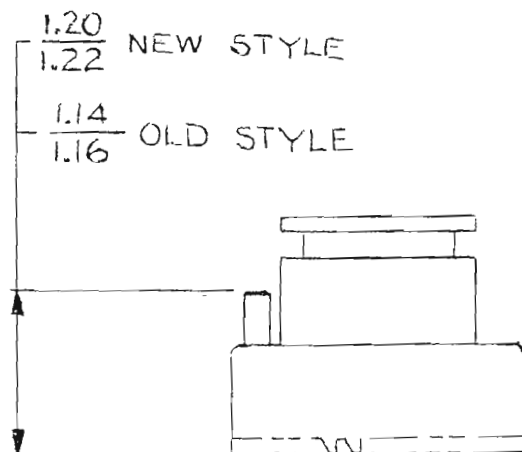
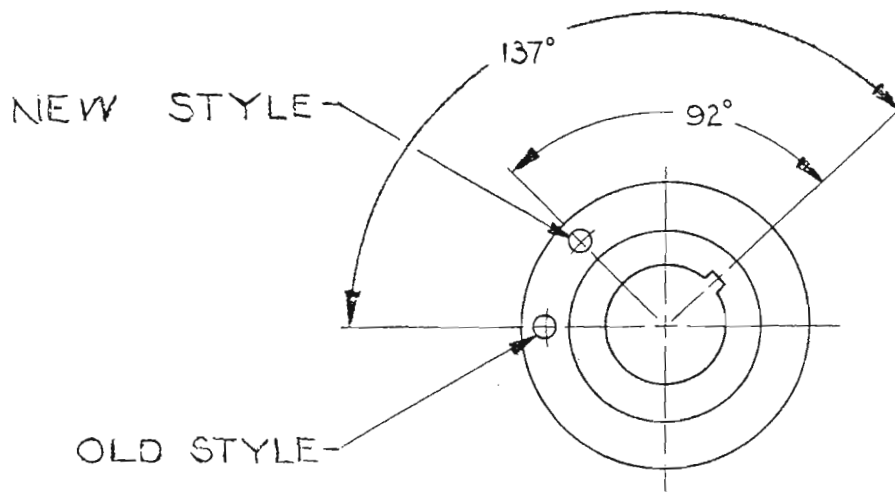
EXTREME CARE SHOULD BE TAKEN WHEN REMOVING LONG GEAR OUT OF SEAL OR SEAL OUT OF HOUSING. SEAL IS FRAGIL AND GARTER SPRING WILL COME OUT EASILY. WHEN REASSEMBLING, OPEN SEAL AS LONG GEAR IS PUSHED IN, TO PREVENT GARTER SPRING FROM SNAPPING OUT.

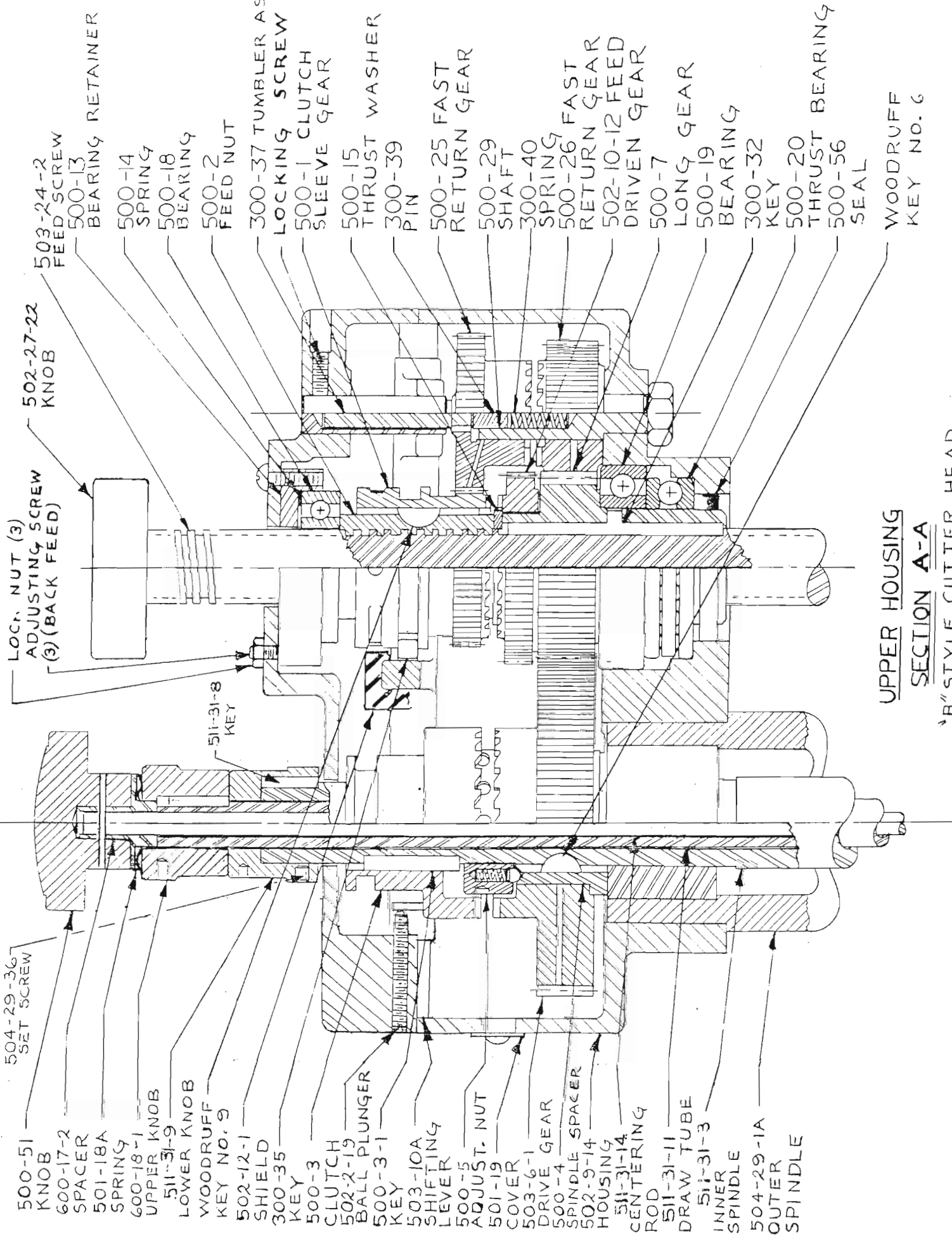
STOP PIN ASSEMBLY IN 500-3 CLUTCH SLEEVE
FOR (OLD AND NEW STYLE BALL DETENT)

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.

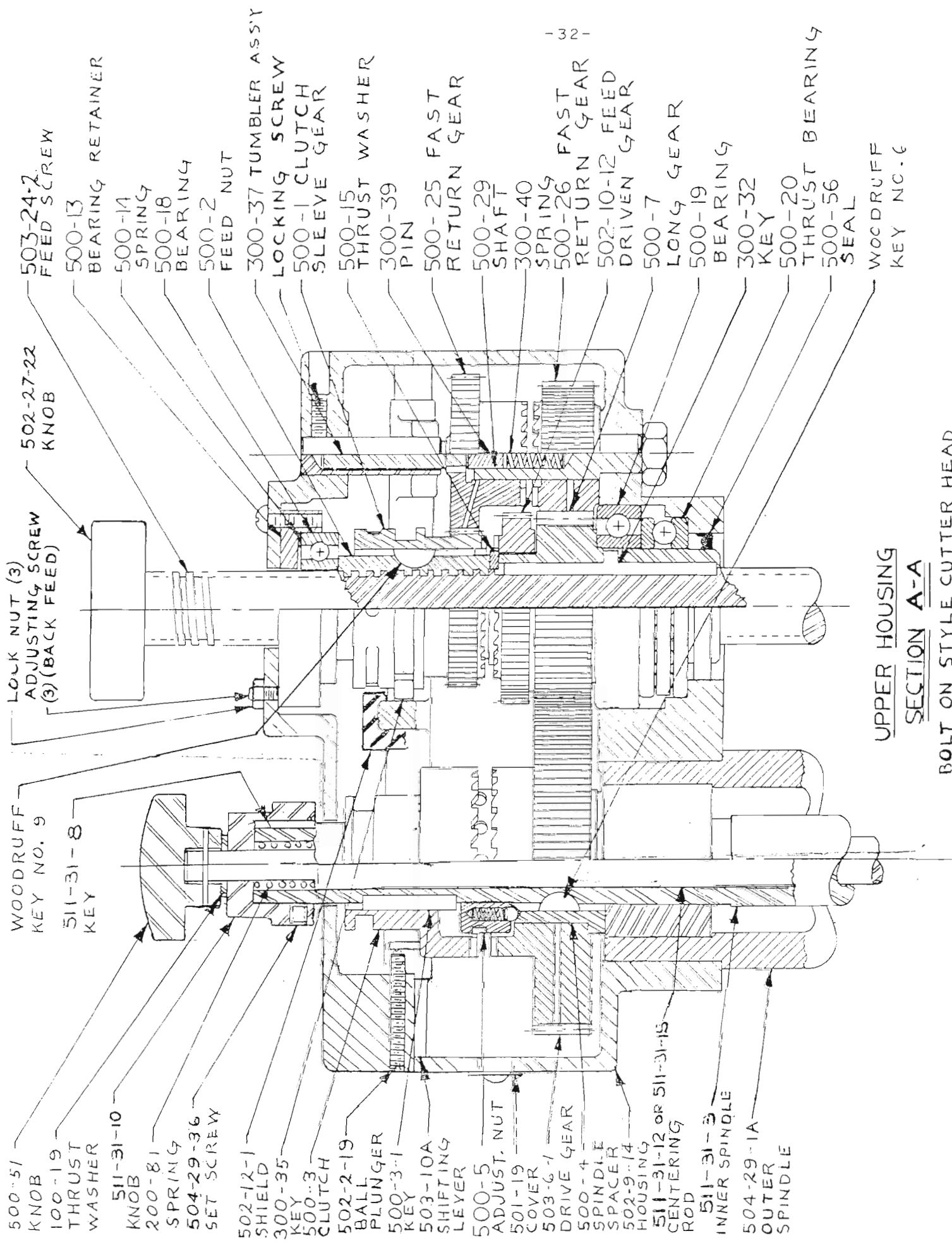




UPPER HOUSING

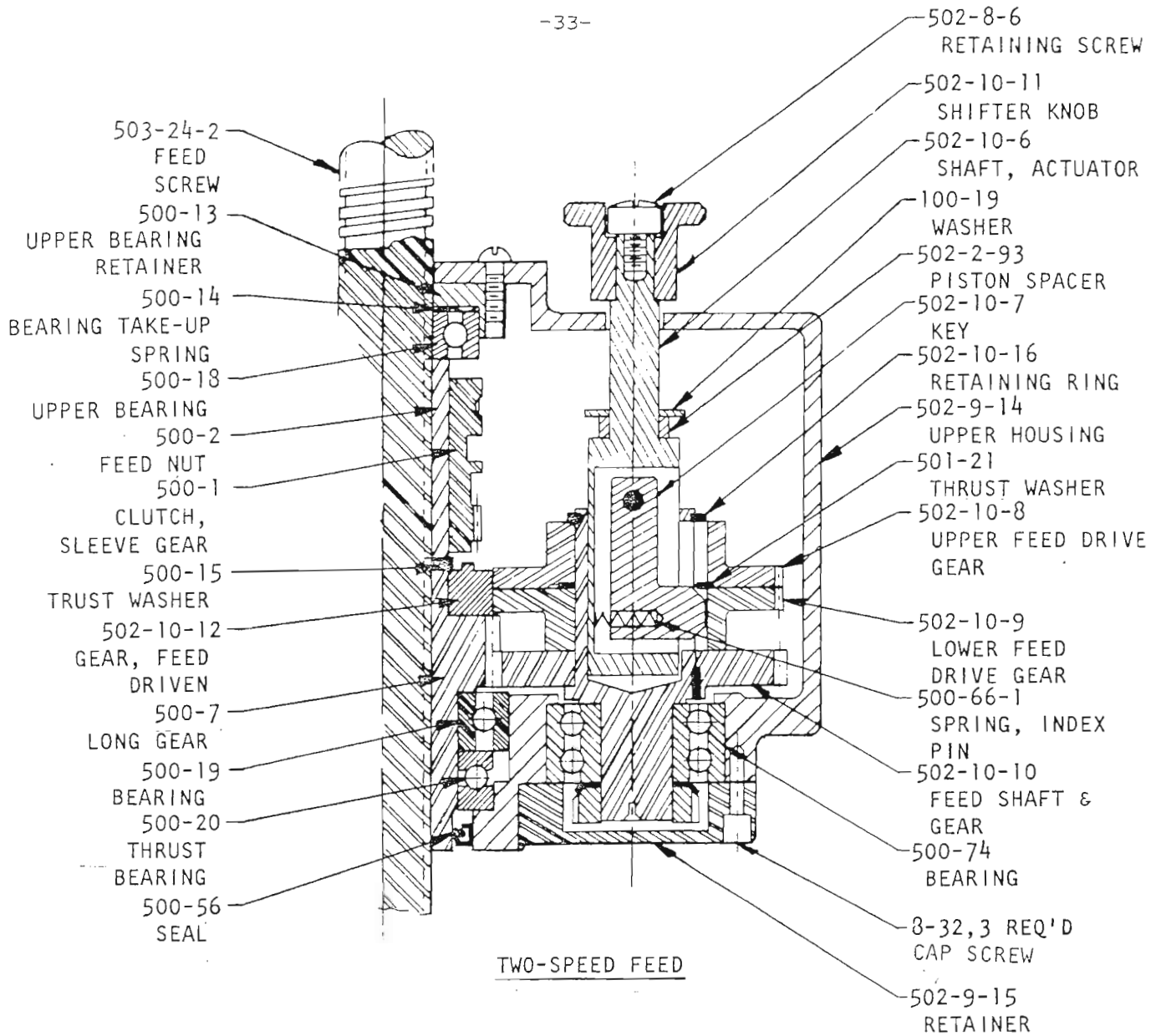
SECTION A-A

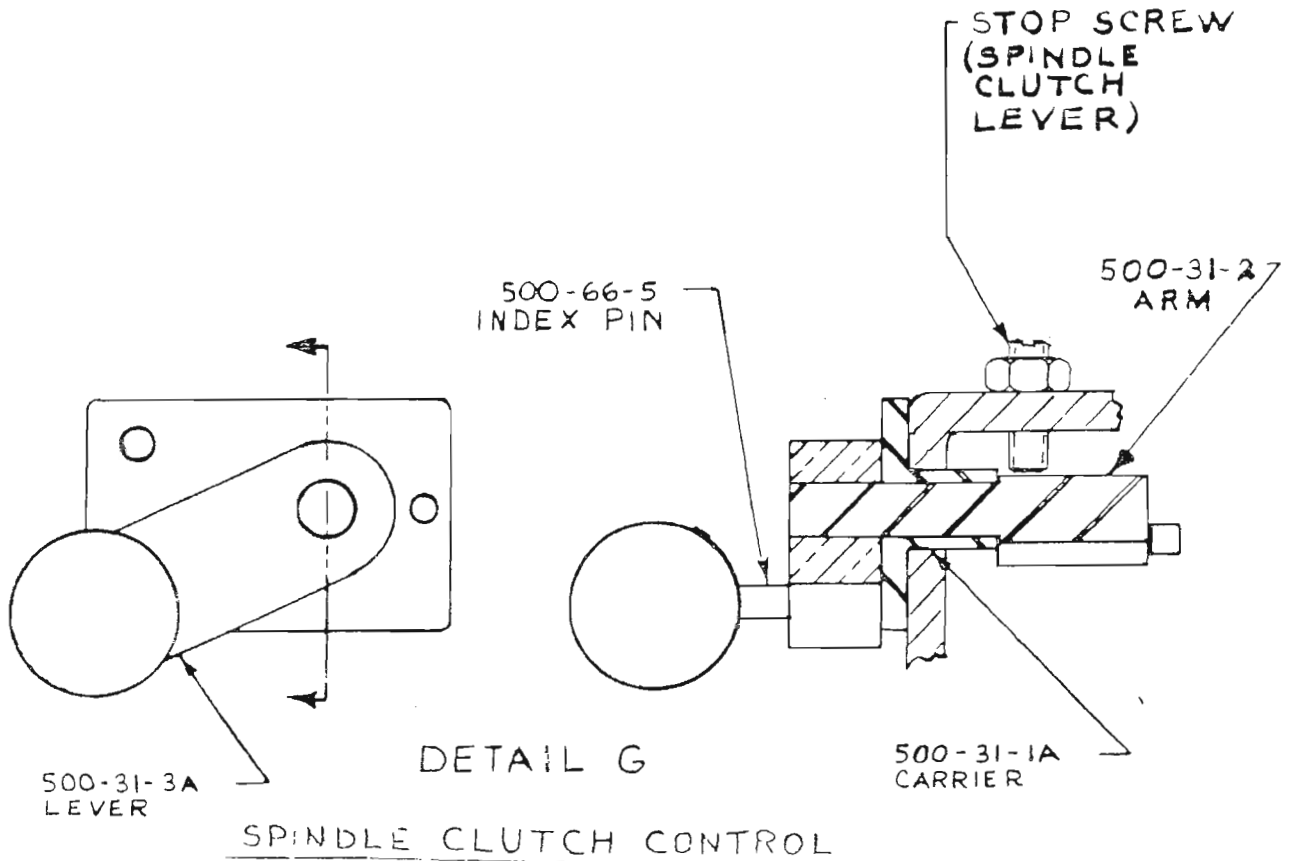
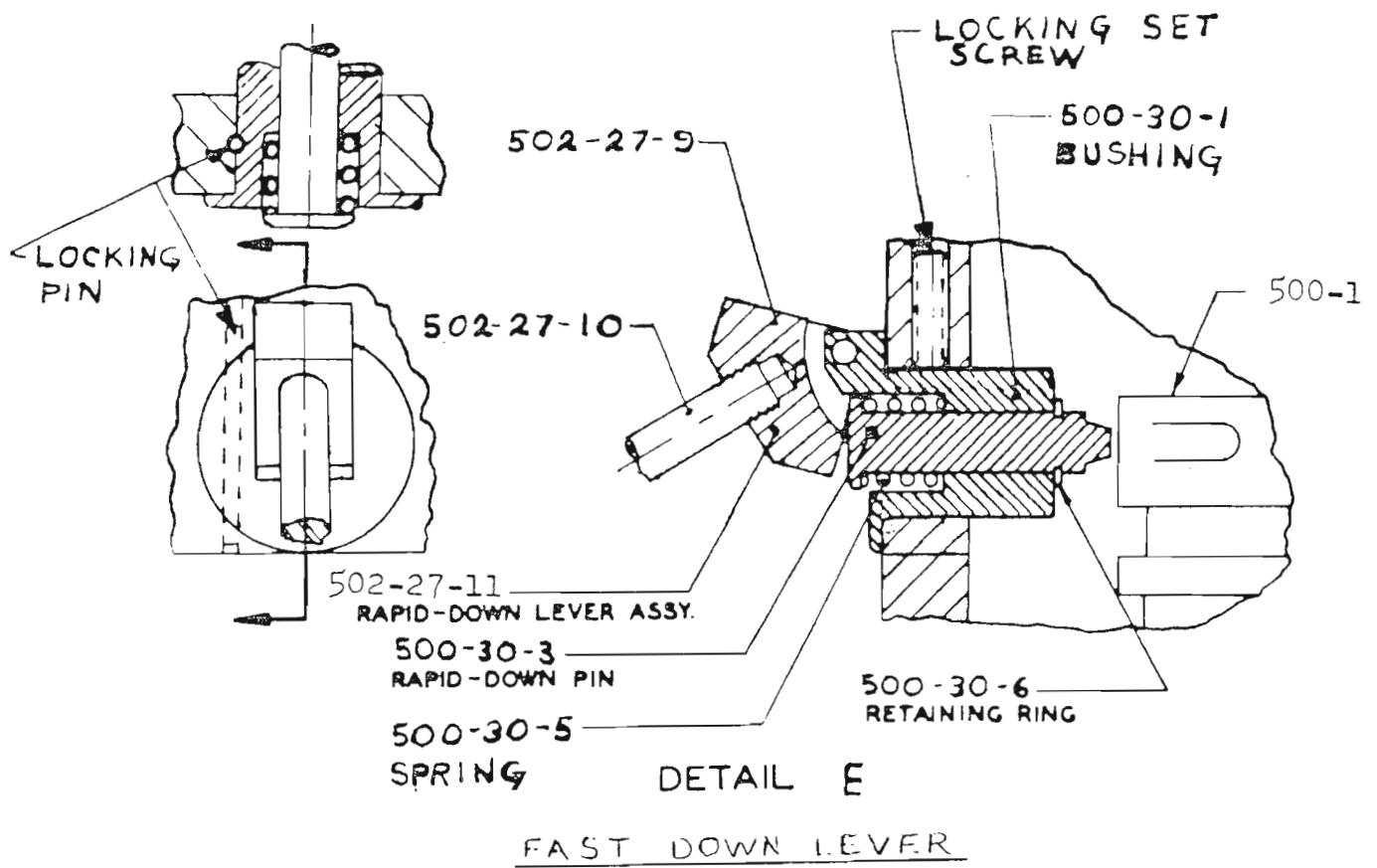
1 1/2" STYLE CUTTER HEAD

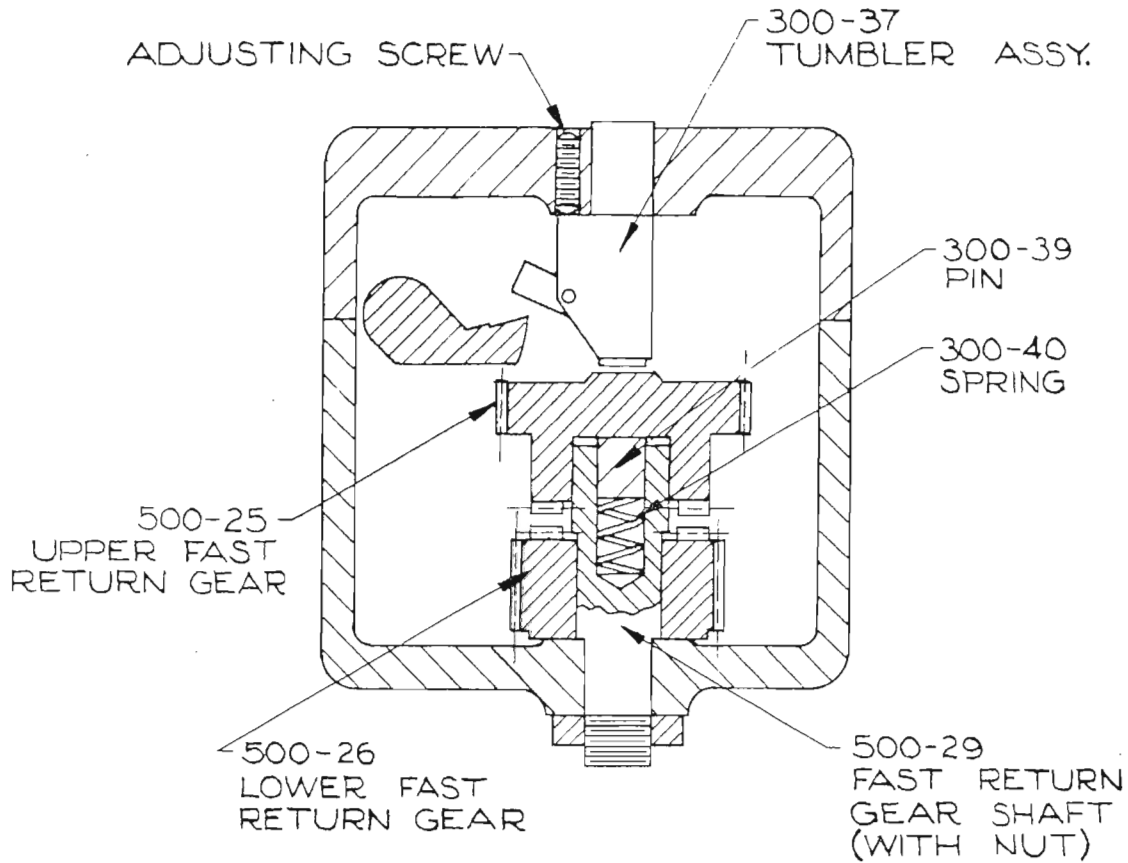


UPPER HOUSING
 SECTION A-A

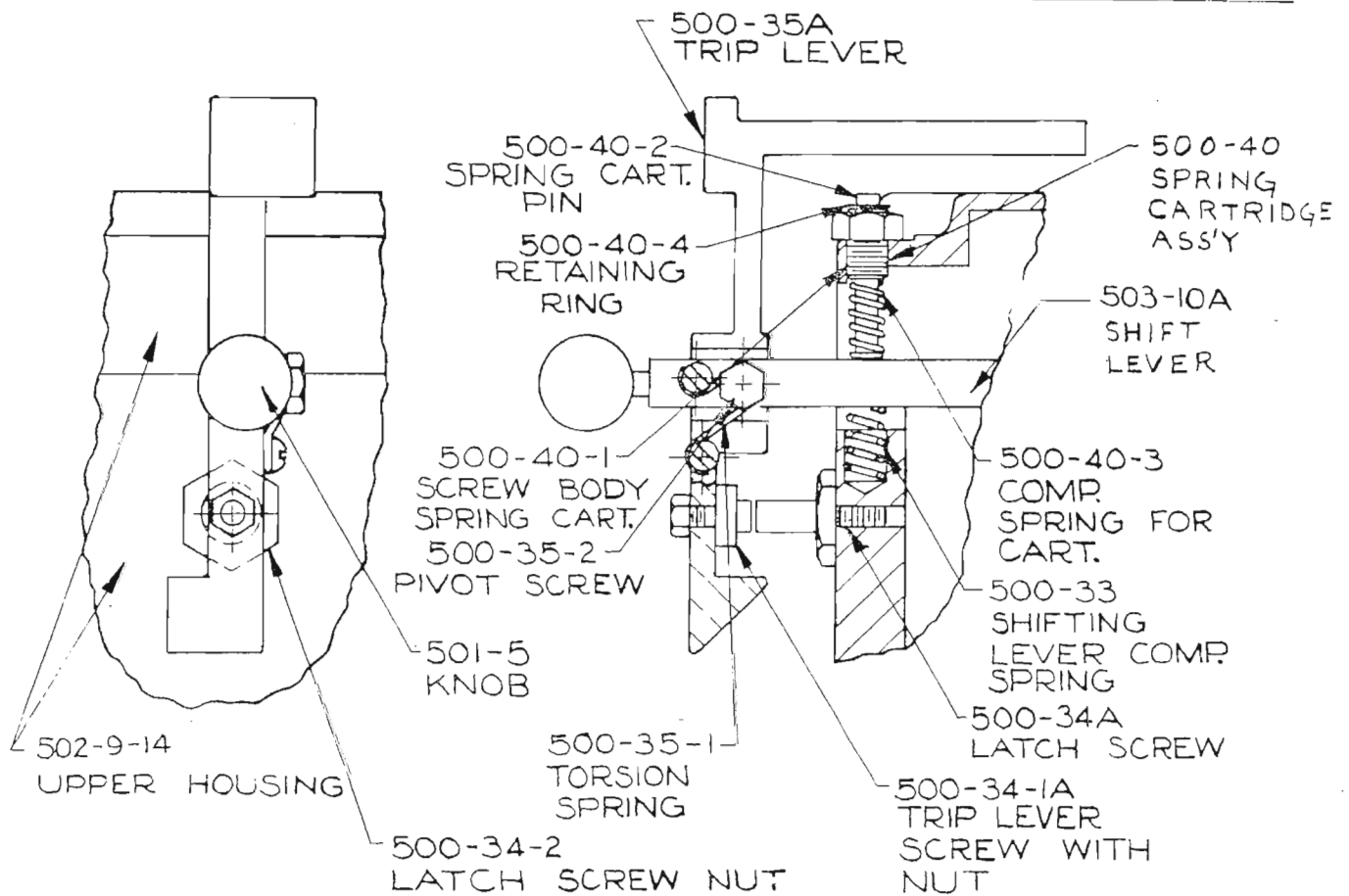
BOLT ON STYLE CUTTER HEAD



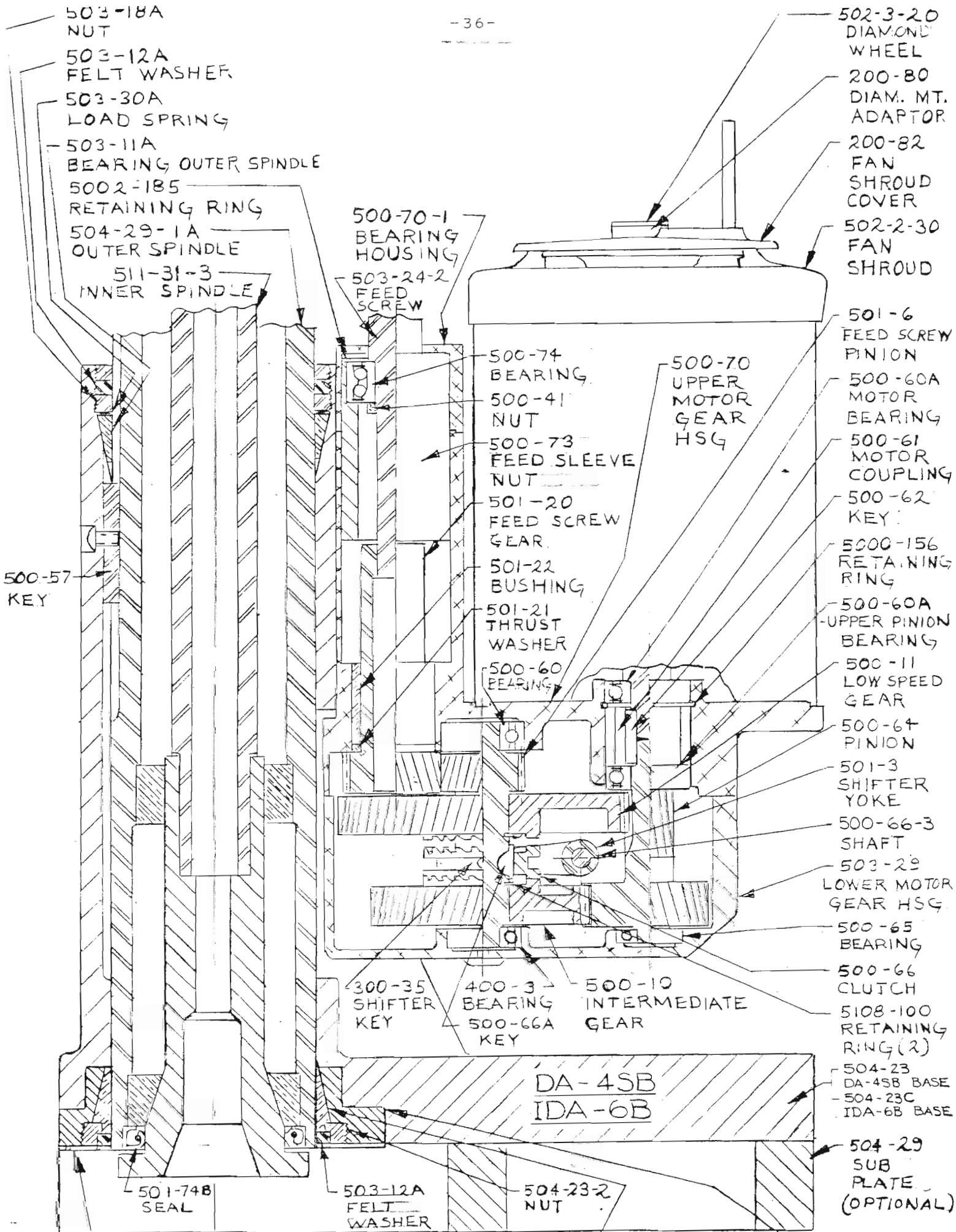




SECTION D-D



DETAIL F
(FEED LEVER)



503-18A
NUT
503-12A
FELT WASHER
503-30A
LOAD SPRING
503-11A
BEARING OUTER SPINDLE
5002-185
RETAINING RING
504-29-1A
OUTER SPINDLE
511-31-3
INNER SPINDLE

500-57
KEY

500-70-1
BEARING HOUSING

503-24-2
FEED SCREW

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

300-35
SHIFTER
KEY

400-3
BEARING
500-66A
KEY

500-10
INTERMEDIATE
GEAR

DA-4SB
IDA-6B

502-3-20
DIAMOND
WHEEL
200-80
DIAM. MT.
ADAPTOR
200-82
FAN
SHROUD
COVER
502-2-30
FAN
SHROUD

501-6
FEED SCREW
PINION
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
500-65
BEARING

500-66
CLUTCH
5108-100
RETAINING
RING (2)
504-23
DA-4SB BASE
504-23C
IDA-6B BASE

504-29
SUB
PLATE
(OPTIONAL)

501-74B
SEAL

503-12A
FELT
WASHER

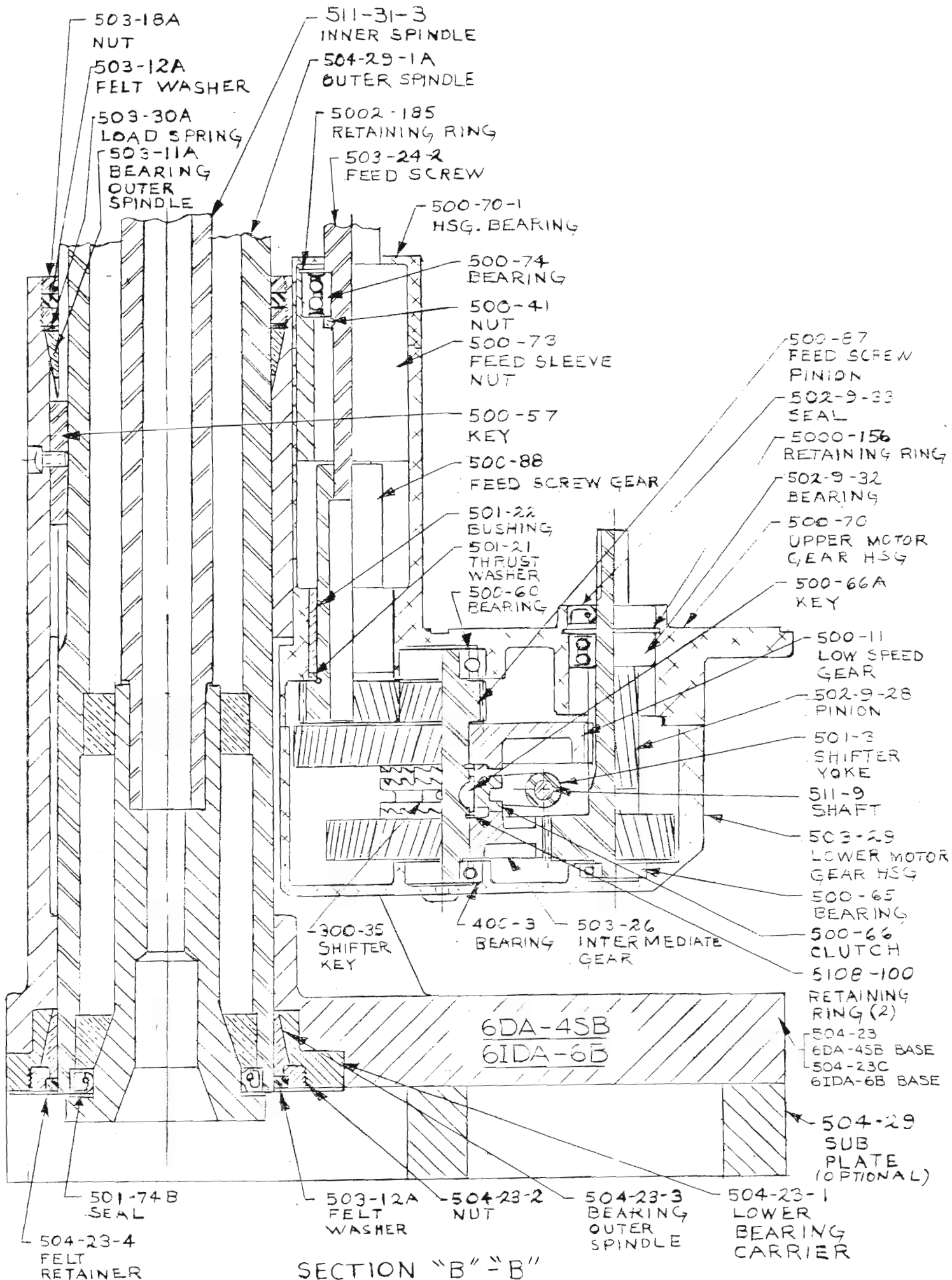
504-23-2
NUT

504-23-4
FELT RETAINER

504-23-3 BEARING
OUTER SPINDLE

504-23-4 LOWER
BEARING CARRIER

SECTION "B"- "B"

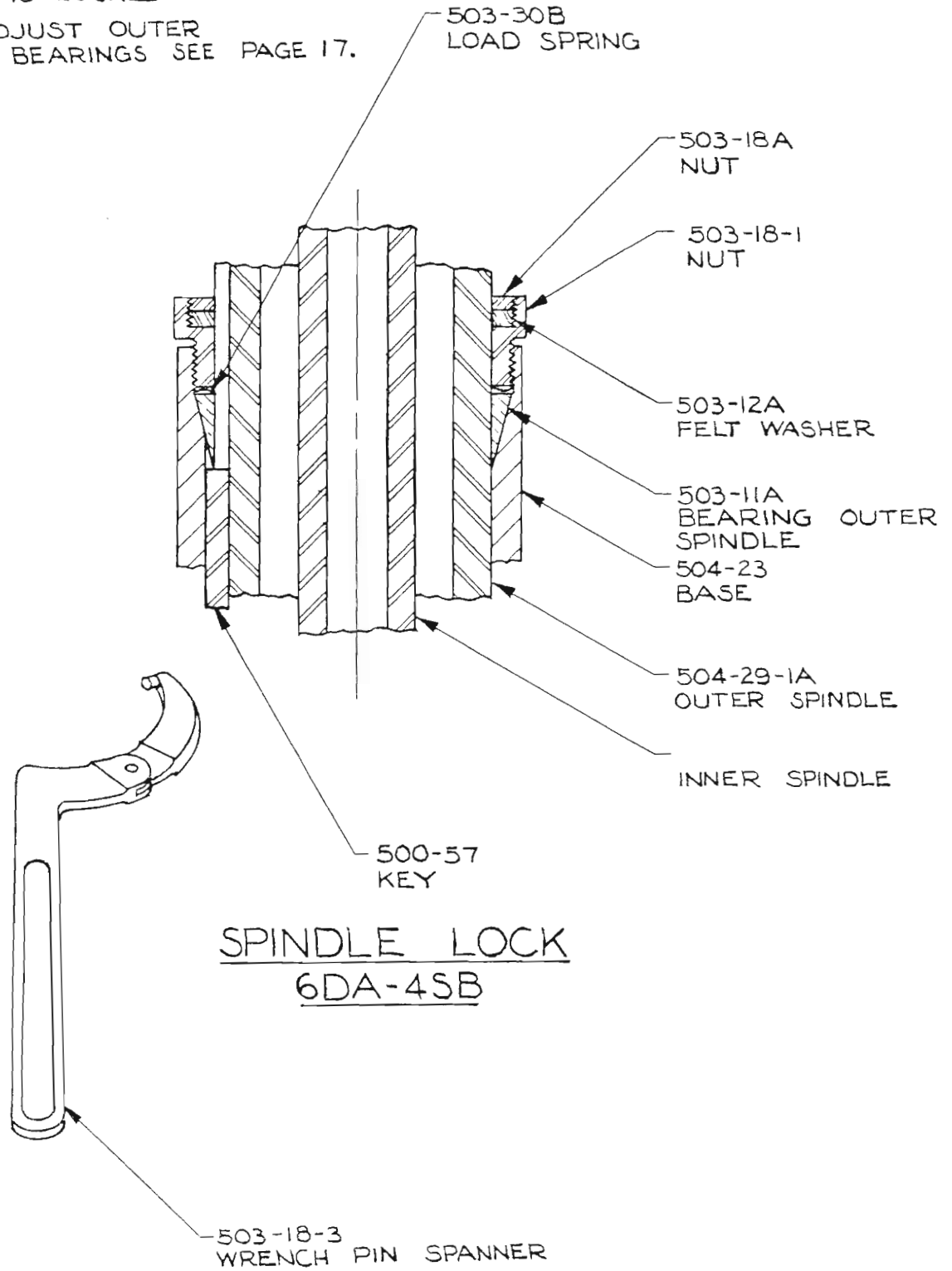


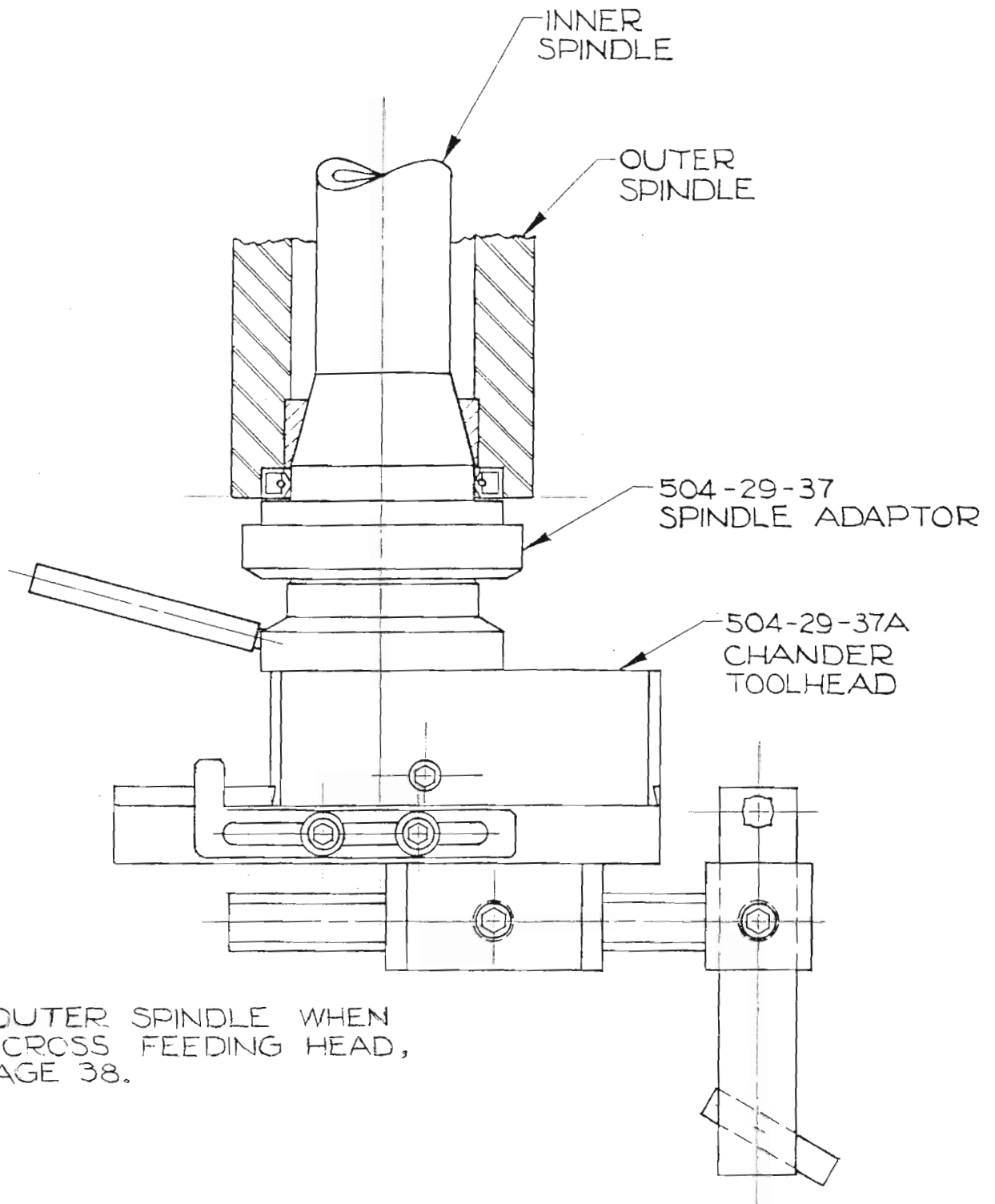
SECTION "B"-"B"

CAUTION

DO NOT ACTIVATE ANY FEEDS
OR RAPID TRAVELS WHEN
SPINDLE IS LOCKED.

TO READJUST OUTER
SPINDLE BEARINGS SEE PAGE 17.





CHANDLER CROSS FEED
HEAD & BOLT ON SPINDLE ADAPTOR

INSTRUCTIONS

For Care and Use of the Chandler-Duplex Combined Boring and Facing Toolheads

OPERATION

When placing Toolhead in machine be sure that hole in spindle and shank of Toolhead are clean and free of oil or grease.

There is a hex hole in end of feed screw that is broached to fit T-wrench furnished. T-wrench is used for adjusting slide to position or for traversing slide rapidly in either direction. One revolution of the feed screw (or dial) moves the slide .025 inch.

To engage the power feed for facing and grooving cuts have spindle stationary. Then insert T-wrench into end of feed screw and turn feed screw until clutch pin can be screwed into engagement. This clutch pin is a threaded pin with knurled head and is located in the graduated dial at rear end of body.

On the inside of the Toolhead are six holes for the clutch pin to enter. Turn the T-wrench and at the same time screw in the clutch pin until it engages one of these six holes. When the clutch pin enters hole screw it in as far as it will go. Now the slide can be moved by turning the knurled feed ring located at top of Toolhead. By holding this feed ring stationary while Toolhead revolves the slide is now caused to move outward .0025 inch per revolution. Thus facing cuts or grooving may be done and the feeding action ceases the instant that the feed ring is released. This feed ring is merely held by hand as the cut is being taken. There is a threaded handle furnished which may be screwed into the feed ring (except Model J). This handle provides a convenient way of holding the feed ring while taking facing or grooving cuts. It need be used only on the longer or heavier cuts. This handle screws in the hole in side of feed ring. Remove small screw in ring to insert handle.

To return slide back to center or starting point either reverse the spindle and hold the feed ring or stop spindle, back out clutch pin and return slide rapidly with T-wrench. The slide has a tee slot (except Model J) which enables the operator to position the boring bars to the desired place. In boring and facing large diameters set the tool bar as far off center in the tee slot as possible. This keeps the slide near center and will offer greater rigidity. Keep dovetail binding screw at proper tension. Lock this screw at each boring cut but do not have it tight when facing or grooving.

Tapped hole in end of slide on Models "J" and "D" is for inserting the limit stop screw furnished.

This stop is used to limit the slide travel or to cause slide to stop at any predetermined point when grooving or facing to a shoulder. To use first remove filler screw in slide and insert stop screw. Set this stop screw firmly to bottom of tapped hole. Next set knurled nut to required length of travel with gage or feeler gage. When stop nut engages body, slide will cease to travel further, thus controlling depth of cut.

All size shanks are interchangeable and screw in the body. Thread on shank is right hand. To change shanks grip lower end of slide in vise and with wrench on upper end of shank screw out of body.

An occasional few drops of oil in oil hole at top will thoroughly lubricate all working parts. Use ordinary medium-grade machine oil.

In boring the slide may be adjusted either by using feed ring or by using T-hex-wrench placed in end of feed screw. Finer adjustments can be made by using feed ring calibrations.

Should your Toolhead need repair or replacement of parts, return it to the factory. We are better equipped for this work and will put it right and return it as soon as possible.

Keep this instruction sheet on file for future reference.

IMPORTANT

PROPER PRACTICE WHEN TAKING FACING CUTS.

BE SURE TO READ AND UNDERSTAND THE FOLLOWING

It is not intended that heavy facing cuts be taken with this Tool. In the first place it isn't necessary and since this is a precision Tool heavy facing cuts may cause damage to the gear train.

If there is considerable stock to be removed or faced from the top face of the work piece, proceed as follows: First remove this stock by taking a series of boring cuts just as you would in enlarging a hole. When taking these cuts bore straight down to within about .025 of the finished depth, boring out to required diameter or distance outward, now bring point of tool back to starting point, lower spindle the required amount, engage clutch pin for facing and with tool revolving hold feed ring and take the finish facing cut.

Use feed ring handle for feeding feed ring while facing.

Heavy cuts may be taken when boring but avoid heavy cuts when facing.

Always run the Toolhead at highest practical speeds, especially on facing cut.

SIMPLIFIED LUBRICATION

The one oil hole at the top of Toolhead provides oil to all working parts inside. By a unique arrangement the oil gets to all places requiring lubrication. A few drops at frequent intervals will suffice. Use medium-grade machine oil. The working parts on inside of Toolhead operate in bronze bushings and sufficient oil will get to the points when needed through use of the one oil cup.

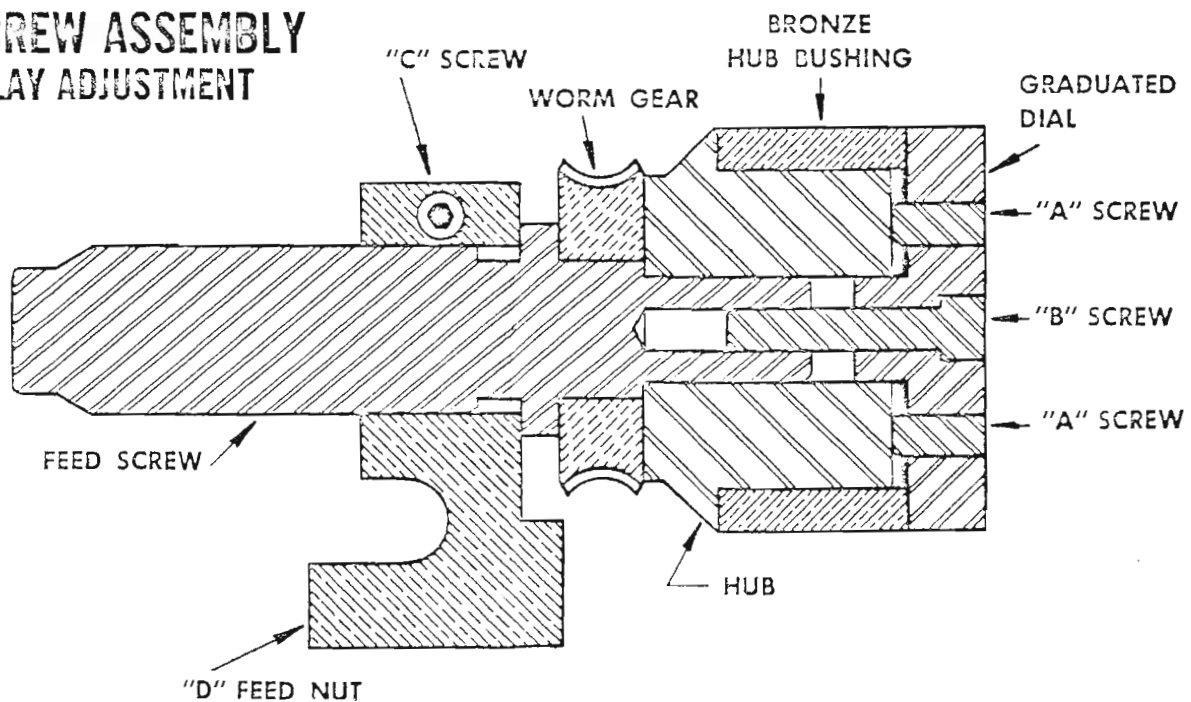
BACK-LASH ADJUSTMENT OF FEED SCREW—READ CAREFULLY

When this tool left our factory all back-lash was taken up and none should develop for a long time with proper use.

Eventually slight amounts of back-lash will develop through use.

Our feed screw assembly design, shown here, permits taking up this back-lash as needed.

FEED SCREW ASSEMBLY END PLAY ADJUSTMENT



First of all, the bronze feed nut, letter "D," is tight and any play may be taken up by a slight tightening of small screw, letter "C." Access to this small screw "C" is through a tapped hole in the side of the body. Remove the 1/4"-28 screw in this hole in body and insert small bent hex wrench through the hole and into the hex head of small screw "C" which is a No. 4-40 socket cap screw. Be sure not to tighten this 4-40 screw too tight or it will bind the feed screw.

For making this nut adjustment have slide run back to starting position or at beginning of travel.

To adjust end play in hub unloosen cap screw "B" which is in the center of the graduated dial and then back out the three set screws "A" a slight amount and then retighten cap screw "B."

If you back out the three "A" screws too much it will cause the hub to bind. These "A" screws must be adjusted just the right amount to take out end play but not to bind. Each of these "A" screws must be backed out an equal amount to keep the dial true-running.

Do not remove the clutch pin while making adjustment. This clutch pin is not shown on drawing but is threaded into the dial and has a knurled head.

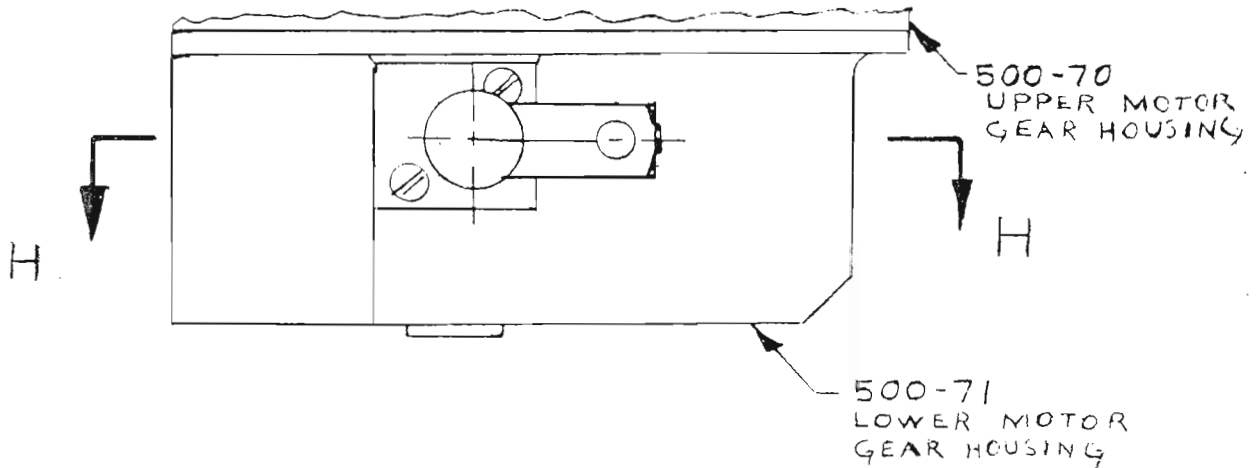
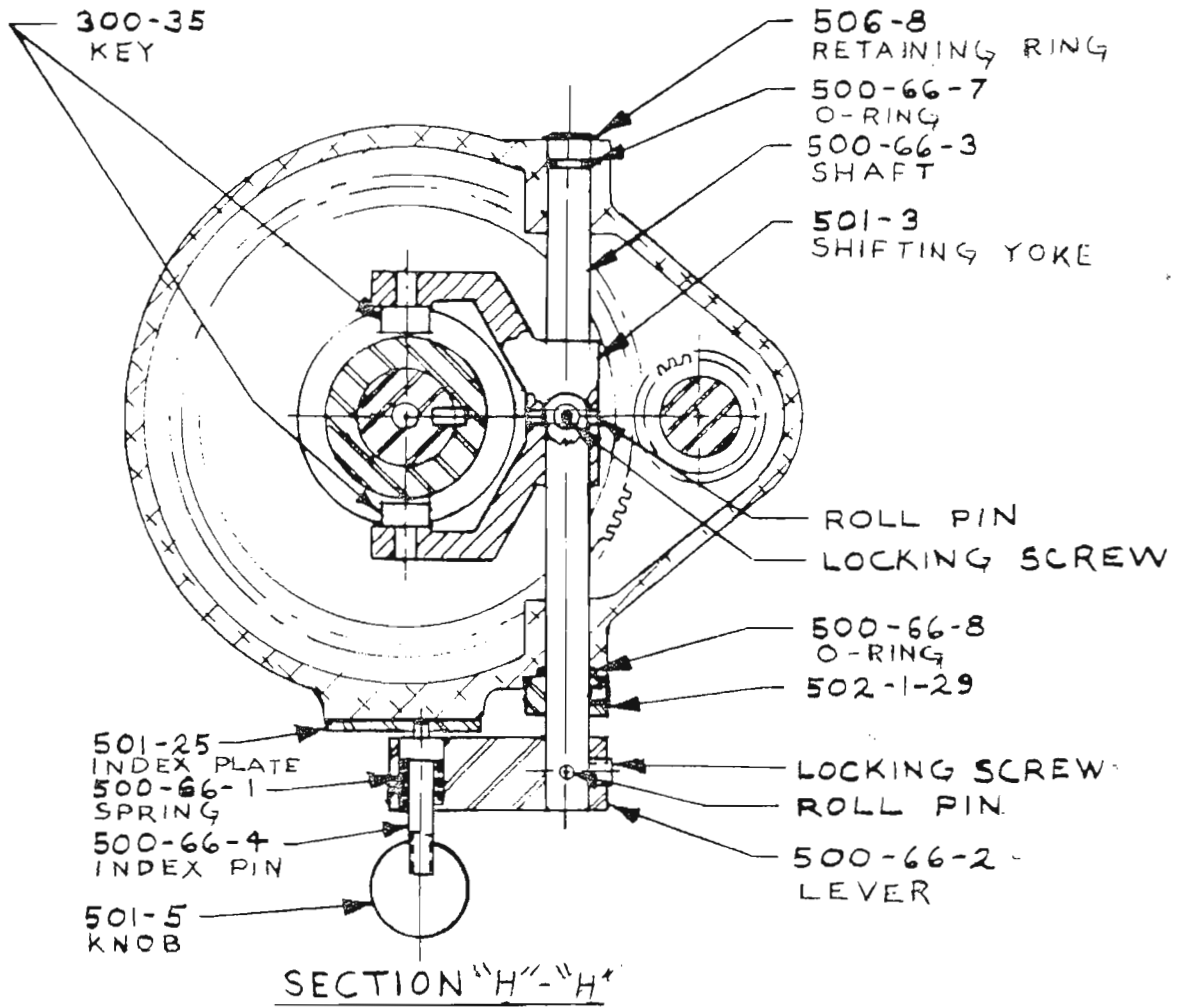
If you will follow the above directions carefully you will never be troubled with back-lash. It will not be necessary to make these adjustments only over long periods of time and only when wear develops.

Save this sheet for future reference.

Chandler Tool Company, Inc.

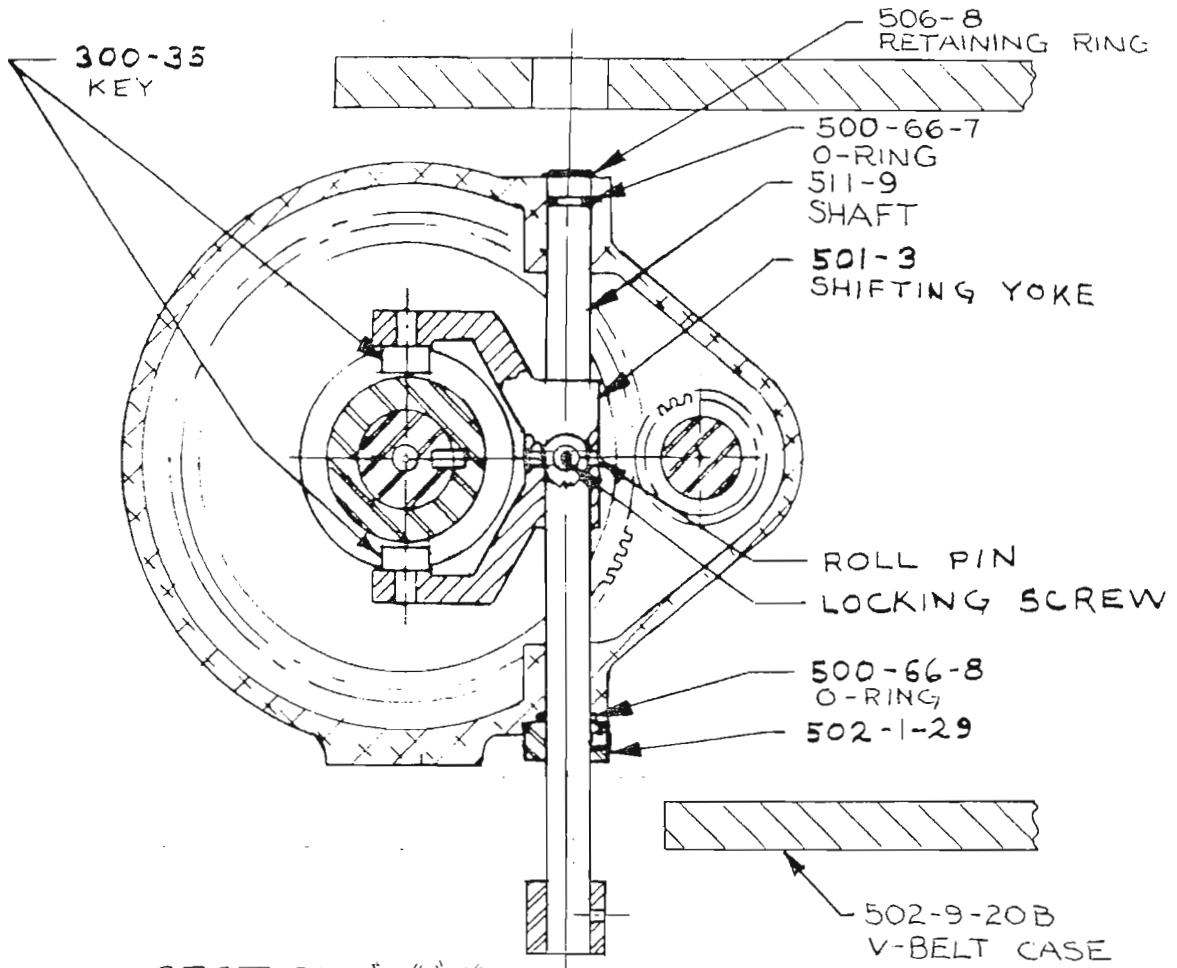
6300 KILGORE AVE.

MUNCIE, INDIANA 47304 PH. 317-759-7349

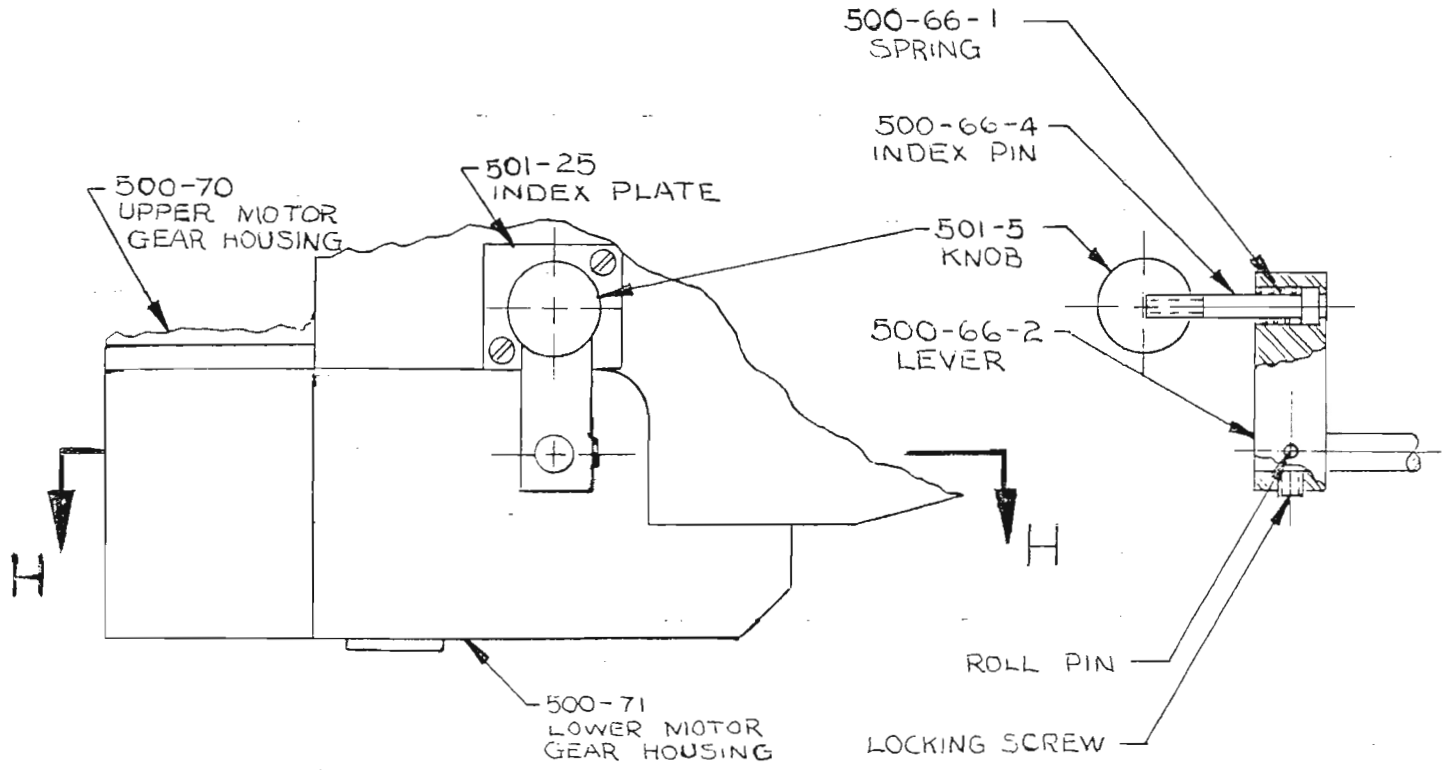


SHIFTING CONTROL
LOWER MOTOR HOUSING

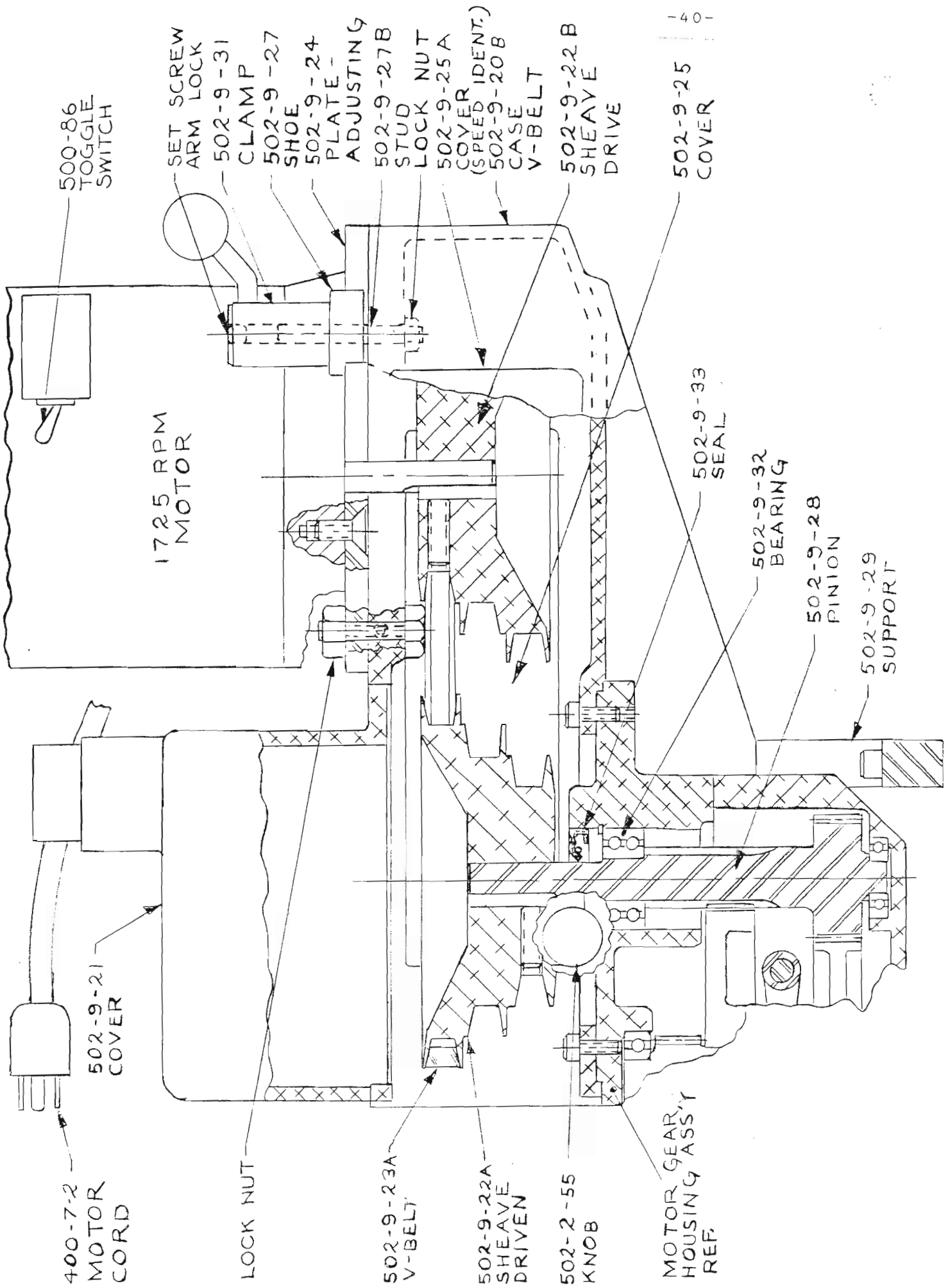
DA-45B SHOWN ONLY



SECTION "H-H"



SHIFTING CONTROL
 LOWER MOTOR HOUSING
 6DA-4SB ONLY



500-86
TOGGLE
SWITCH

1725 RPM
MOTOR

502-9-21
COVER

400-7-2
MOTOR
CORD

SET SCREW
ARM LOCK
502-9-31
CLAMP
502-9-27
SHOE
502-9-24
PLATE -
ADJUSTING
502-9-27B
STUD
LOCK NUT
502-9-25A
COVER
(SPEED IDENT.)
502-9-20B
CASE
V-BELT

LOCK NUT

502-9-23A
V-BELT

502-9-22A
SHEAVE
DRIVEN

502-2-55
KNOB

MOTOR GEAR,
HOUSING ASSY
REF.

502-9-33
SEAL

502-9-32
BEARING

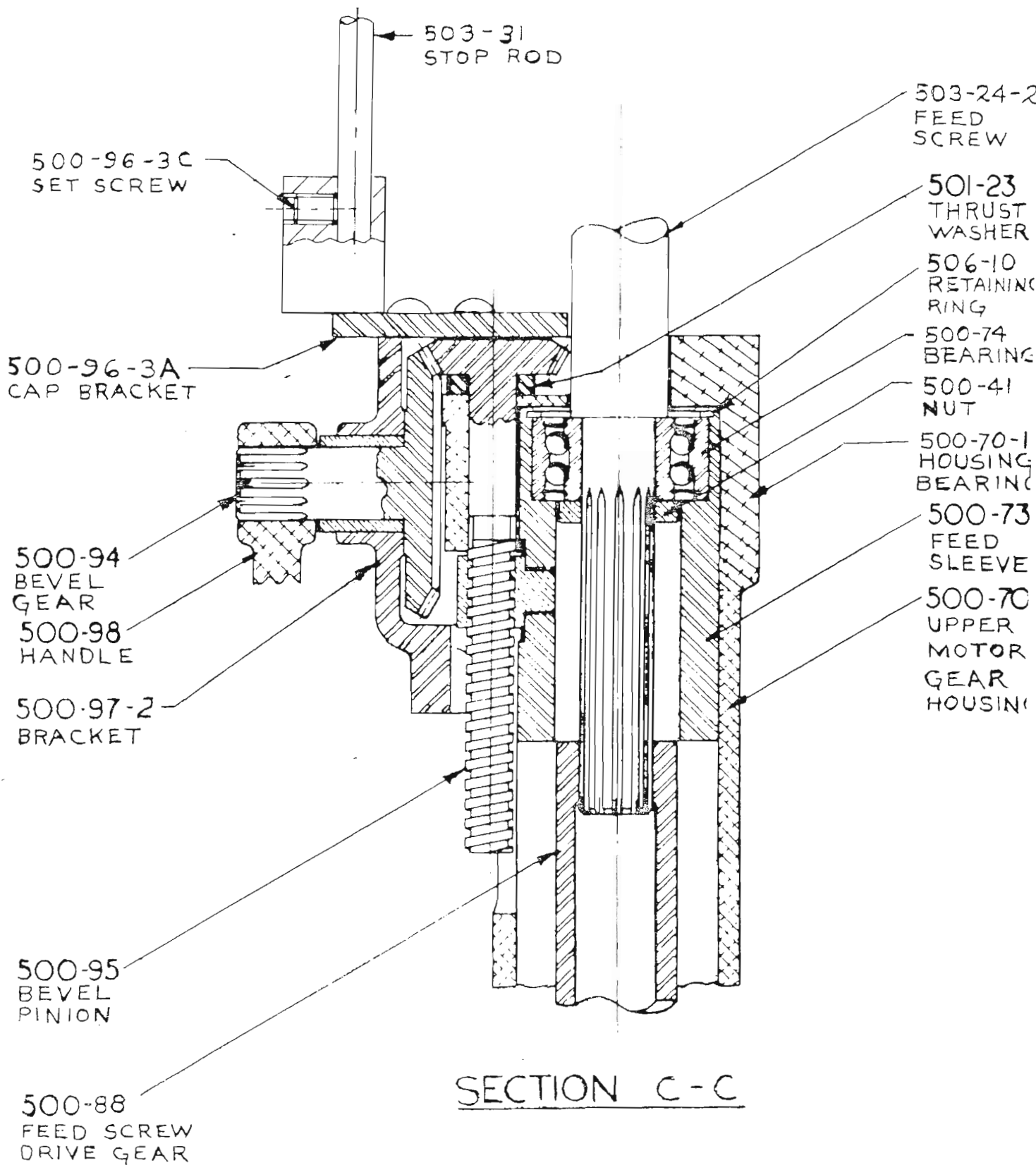
502-9-28
PINION

502-9-29
SUPPORT

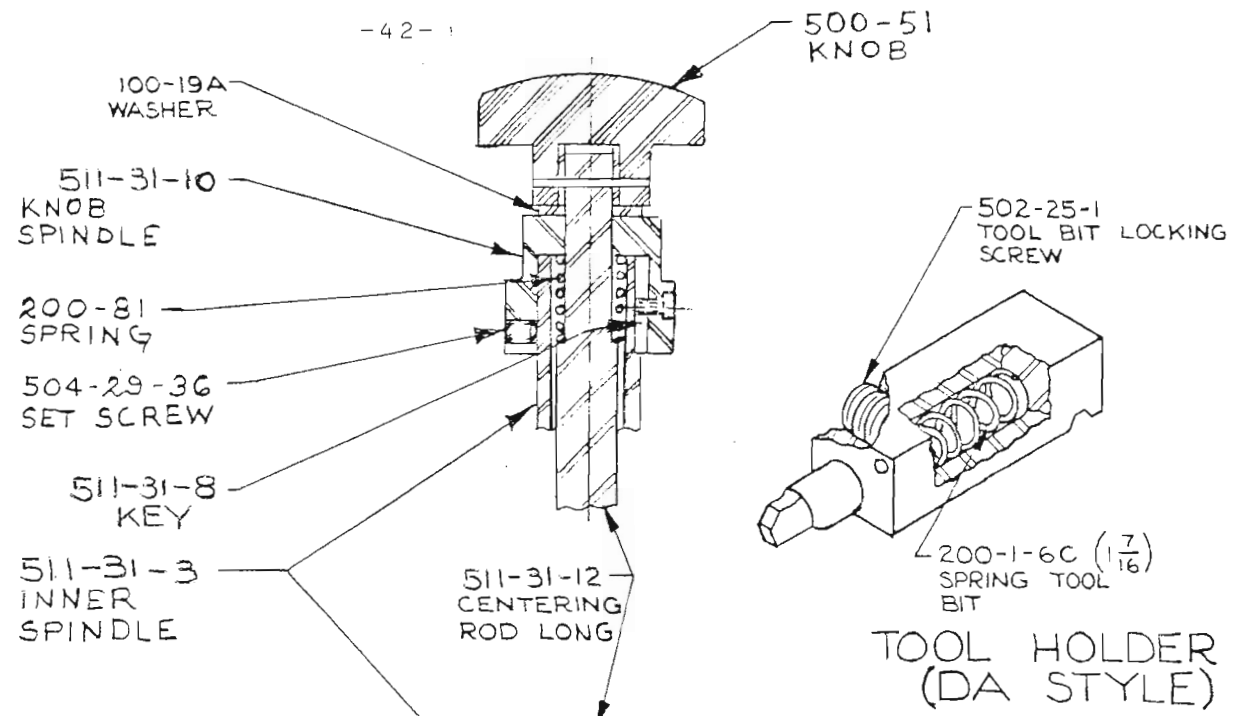
502-9-22B
SHEAVE
DRIVE

502-9-25
COVER

3 SPEED V-BELT CASE
6DA-4SB



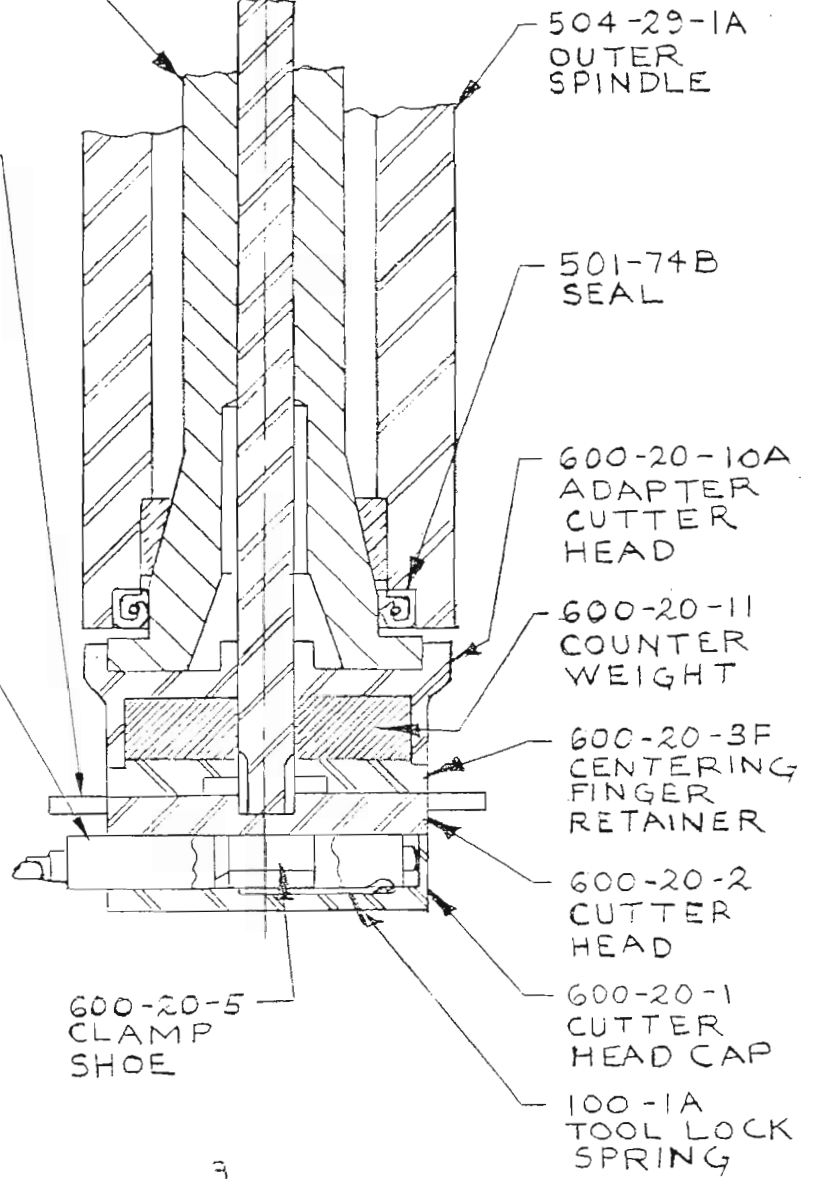
HAND FEED



TOOL HOLDER (DA STYLE)

| CENTERING FINGERS | | |
|-------------------|-------|----------------|
| PART NO. | LG | CENTERING DIA. |
| 600-20-6A | 3.125 | 3.250-6.000 |
| 600-20-6B | 4.625 | 4.750-9.000 |
| 600-20-6C | 7.500 | 7.625-9.875 |

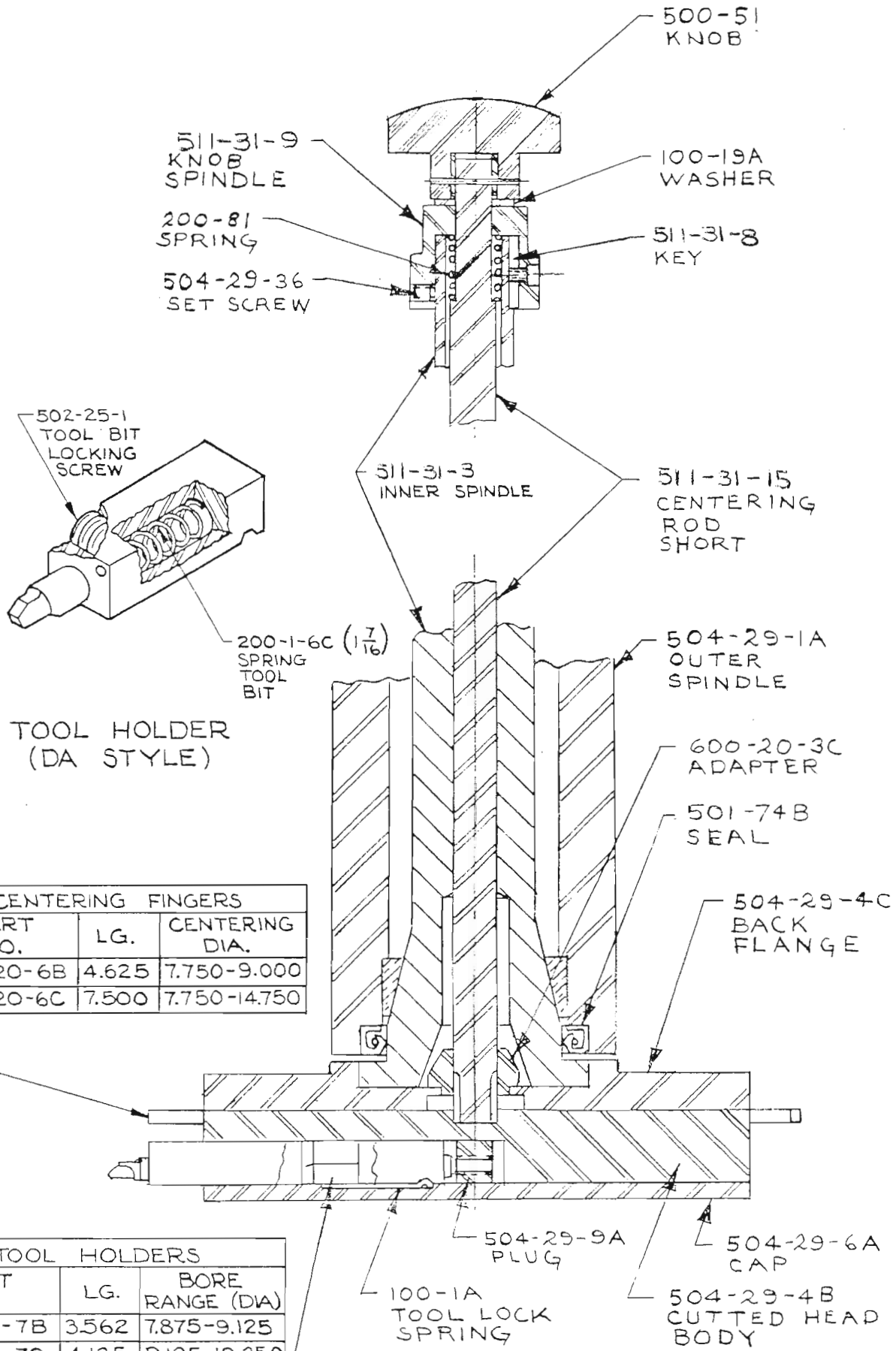
| TOOL HOLDERS | | |
|--------------|-------|-------------------|
| PART NO. | LG. | BORE RANGE (DIA.) |
| 600-20-7A | 3.000 | 3.875-4.250 |
| 600-20-7B | 3.562 | 4.250-5.312 |
| 600-20-7C | 4.125 | 5.312-6.500 |
| 600-20-7D | 4.687 | 6.500-8.000 |
| 600-20-7E | 5.250 | 7.562-8.750 |
| 600-20-7F | 5.812 | 8.750-9.875 |



OPTIONAL

3 3/8 DIA
CUTTER HEAD
(BOLT ON - 504-29-3)

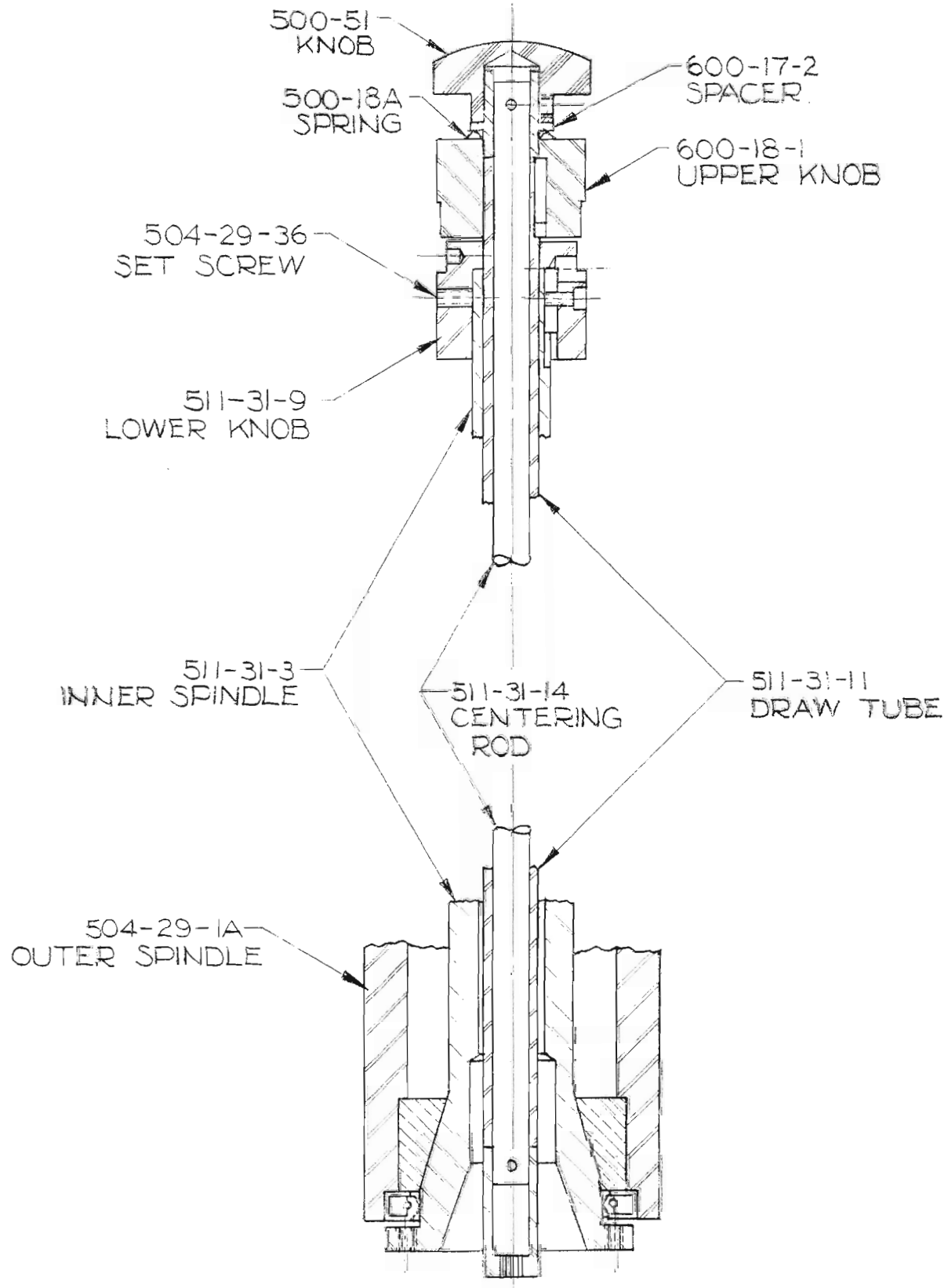
DA-4SB
6DA-4SB
6IDA-6B



| CENTERING FINGERS | | |
|-------------------|-------|----------------|
| PART NO. | LG. | CENTERING DIA. |
| 600-20-6B | 4.625 | 7.750-9.000 |
| 600-20-6C | 7.500 | 7.750-14.750 |

| TOOL HOLDERS | | |
|--------------|-------|------------------|
| PART NO. | LG. | BORE RANGE (DIA) |
| 600-20-7B | 3.562 | 7.875-9.125 |
| 600-20-7C | 4.125 | 9.125-10.250 |
| 600-20-7D | 4.687 | 10.250-11.375 |
| 600-20-7E | 5.250 | 11.375-12.500 |

500-51 KNOB
 100-19A WASHER
 511-31-8 KEY
 511-31-9 KNOB SPINDLE
 200-81 SPRING
 504-29-36 SET SCREW
 511-31-3 INNER SPINDLE
 511-31-15 CENTERING ROD SHORT
 502-25-1 TOOL BIT LOCKING SCREW
 200-1-6C (1 7/16) SPRING TOOL BIT
 504-29-1A OUTER SPINDLE
 600-20-3C ADAPTER
 501-74B SEAL
 504-29-4C BACK FLANGE
 504-29-9A PLUG
 504-29-6A CAP
 100-1A TOOL LOCK SPRING
 600-20-5 CLAMP SHOE
 504-29-4B CUTTED HEAD BODY
 DA-4SB
 6DA-4SB
 6IDA-6B
 CUTTER HEAD 7 3/4 DIA (BOLT ON 504-29-4) OPTIONAL



DRAW TUBE & CENTERING
ROD ASS'Y ILLUSTRATION

PROCEDURE FOR LINE OF SIGHT ADJUSTMENT

FOR CENTERING TELESCOPE

To make line of sight of scope parallel to inner spindle, mount scope on boring bar, then place boring bar in a horizontal position.

Now place a centering target in line with the center of the inner spindle and at six feet or more distance from it.

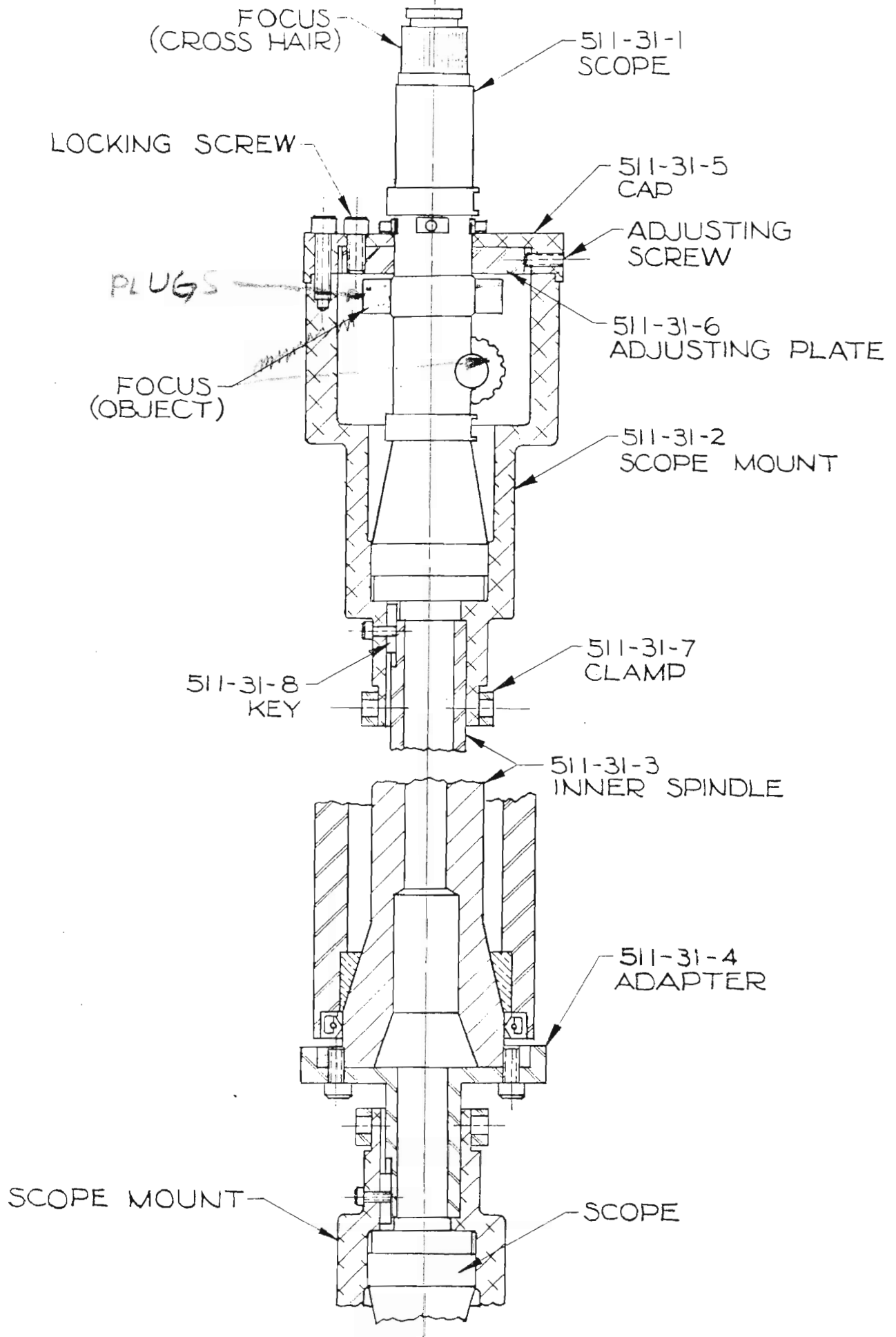
Sight through the scope and align the boring bar to the center of the target.

Now rotate inner spindle, if the cross hair does not rotate on an equal radial distance from the center of the target, move bar $1/2$ the distance that the bar is off.

Keep adjusting the bar until the center of the cross hair revolves around the center of the target at an equal distance from the target center. Now, the bar should be centered to the target.

To make scope line of sight parallel to the center of inner spindle, loosen locking screw on scope's mounting cap. Then, alternately loosen and tighten adjusting screw on side of cap until you can no longer reduce the radial distance to the center of the target when you rotate the inner spindle, retighten the locking screw.

Now run spindle all the way down, rotate inner spindle and check if the center of the cross hair will revolve around the center of the target at an equal radial distance from the center of the target. If not, repeat above procedure.



CENTERING TELESCOPE

PROCEDURE

FOR

CENTERING

USING CENTERING TELESCOPE

The cutter head and centering rod must be removed before you can use the centering telescope.

You can remove the cutter head by removing it's four attaching screws on the bottom of the cutter head.

The centering rod assembly can be removed by loosening the socket head cap screw in the split knob.

To attach the scope to the top of the inner spindle, first loosen the ~~scope nut~~ ^{bore nut} then place the scope mount over the inner spindle making sure the key engages the key slot in the inner spindle. Then tighten the ~~scope nut~~ ^{bore nut} with the ~~pin~~ ^{spanner}.

To attach the scope to the cutter head end of the inner spindle, you must first attach the scope adapter, then attach the scope mount to the adapter.

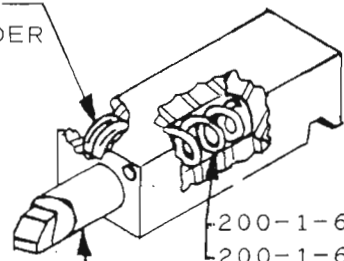
Place a centering target in the hole you are trying to center to, then mount the boring bar over the other hole. Sight through the scope, focus the target with the object knob, then focus the cross hair with its focusing ring. Adjust the boring bar till the center of the cross hairs are on the center of the target, turn the inner spindle 180°. If the center is off, adjust the boring bar to half the distance it is off. Keep adjusting the boring bar, till you can rotate the cross hair about the center of the centering target and have an equal radial distance on all sides of the target's center or on the target's center.

Holes will be parallel if the mounting surface of the holes you mount the boring bar to, are parallel and are square to the bore. If these are not parallel and square you will have to place the centering target in one end of the hole you are centering to, then in the other end of the same hole and center the bar to both.

NOTE:
USE WITH MICROMETER
ASSEMBLY 900-2-11

-44A-

502-25-1
TOOL HOLDER
LOCKING
SCREW



200-1-6C (1-7/16)
200-1-6D (3/4)
SPRING TOOL
BIT

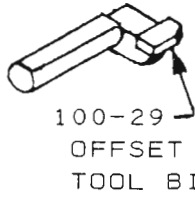
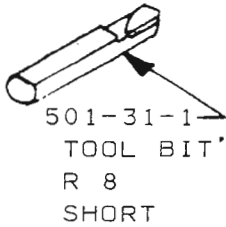
TOOL HOLDER
(DA STYLE)

TOOL BIT

502-8-21
KEY

600-8-1
BODY

600-9
CENTERING
PINION



600-8-2
COUNTER
WEIGHT

| CENTERING FINGERS | | |
|-------------------|-------|----------------|
| PART NO. | LG. | CENTERING DIA. |
| 200-26-1 | 1-3/8 | 1-1/2 - 2-5/8 |
| 200-26-2 | 2-1/8 | 2-5/8 - 4-1/8 |

| TOOL HOLDERS | | |
|--------------|-------|-------------------|
| PART NO. | LG. | BORE RANGE (DIA.) |
| 199-96 | 1-1/4 | 1-1/2 - 2-1/2 |
| 199-89 | 1-1/2 | 2 - 3 |
| 199-90 | 1-3/4 | 2-1/2 - 3-1/2 |
| 199-94 | 2-1/4 | 3-1/2 - 4-1/8 |

600-7-2
LOWER BODY

502-25-1
TOOL HOLDER
LOCKING
SCREW

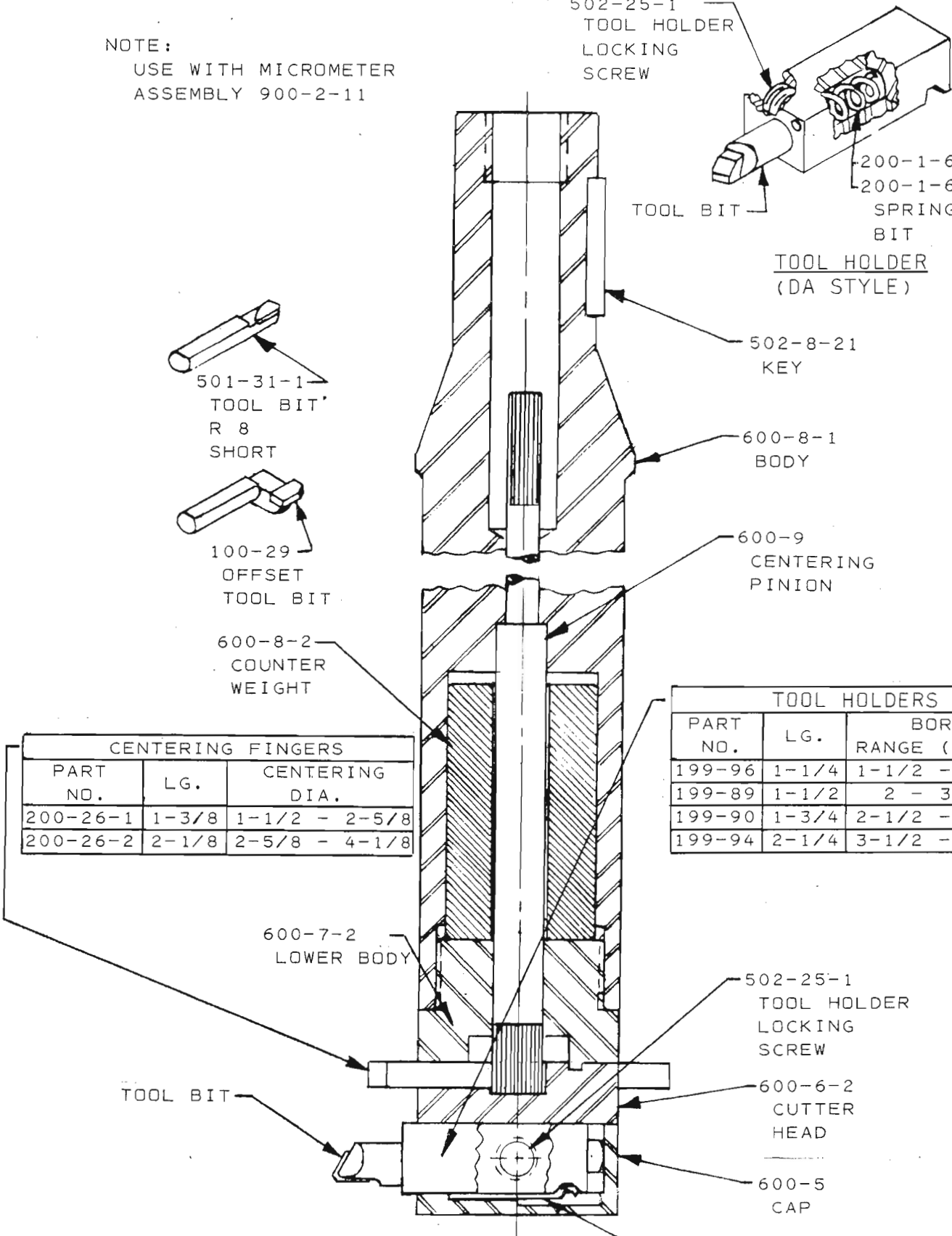
600-6-2
CUTTER
HEAD

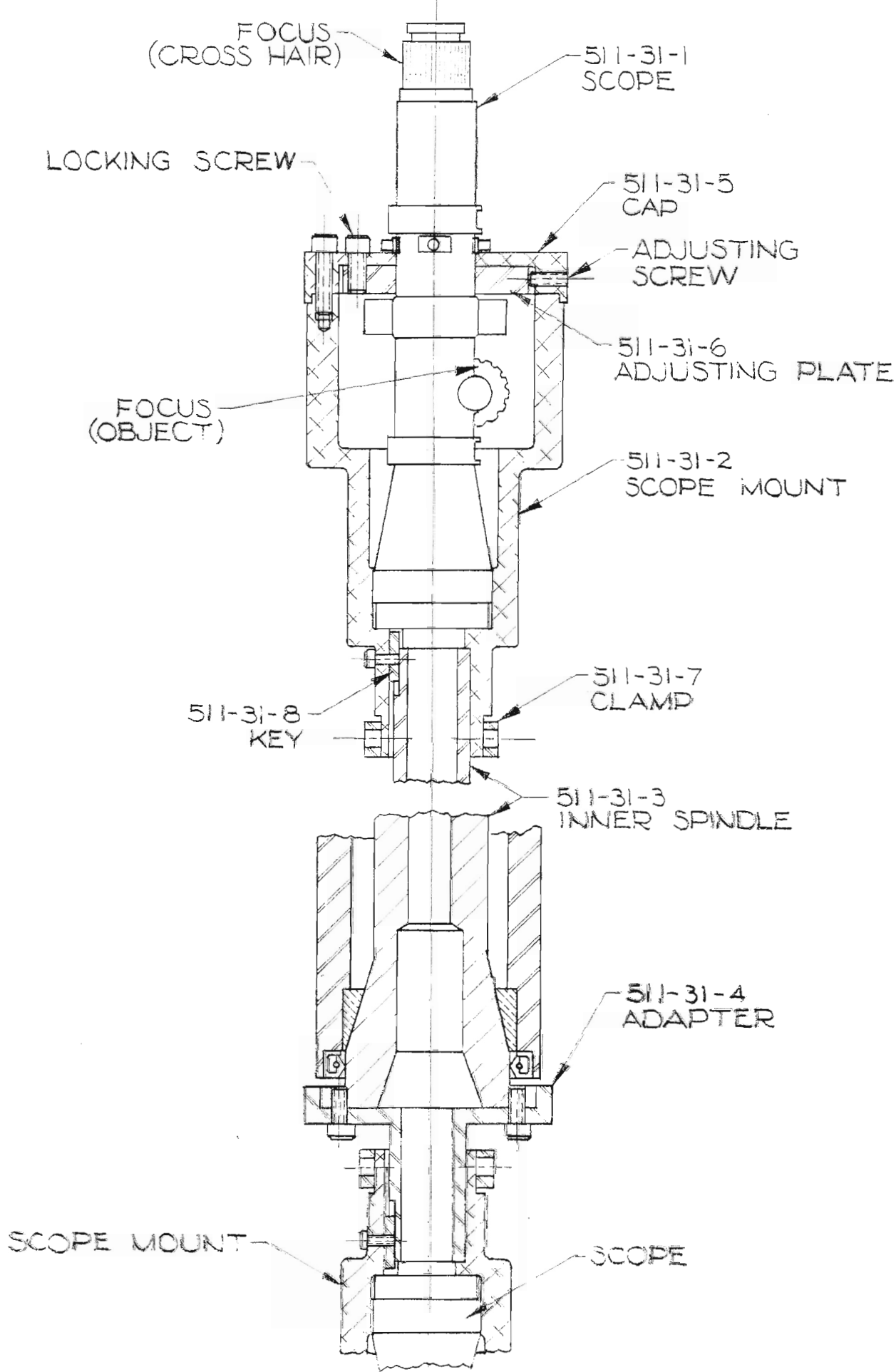
600-5
CAP

TOOL BIT

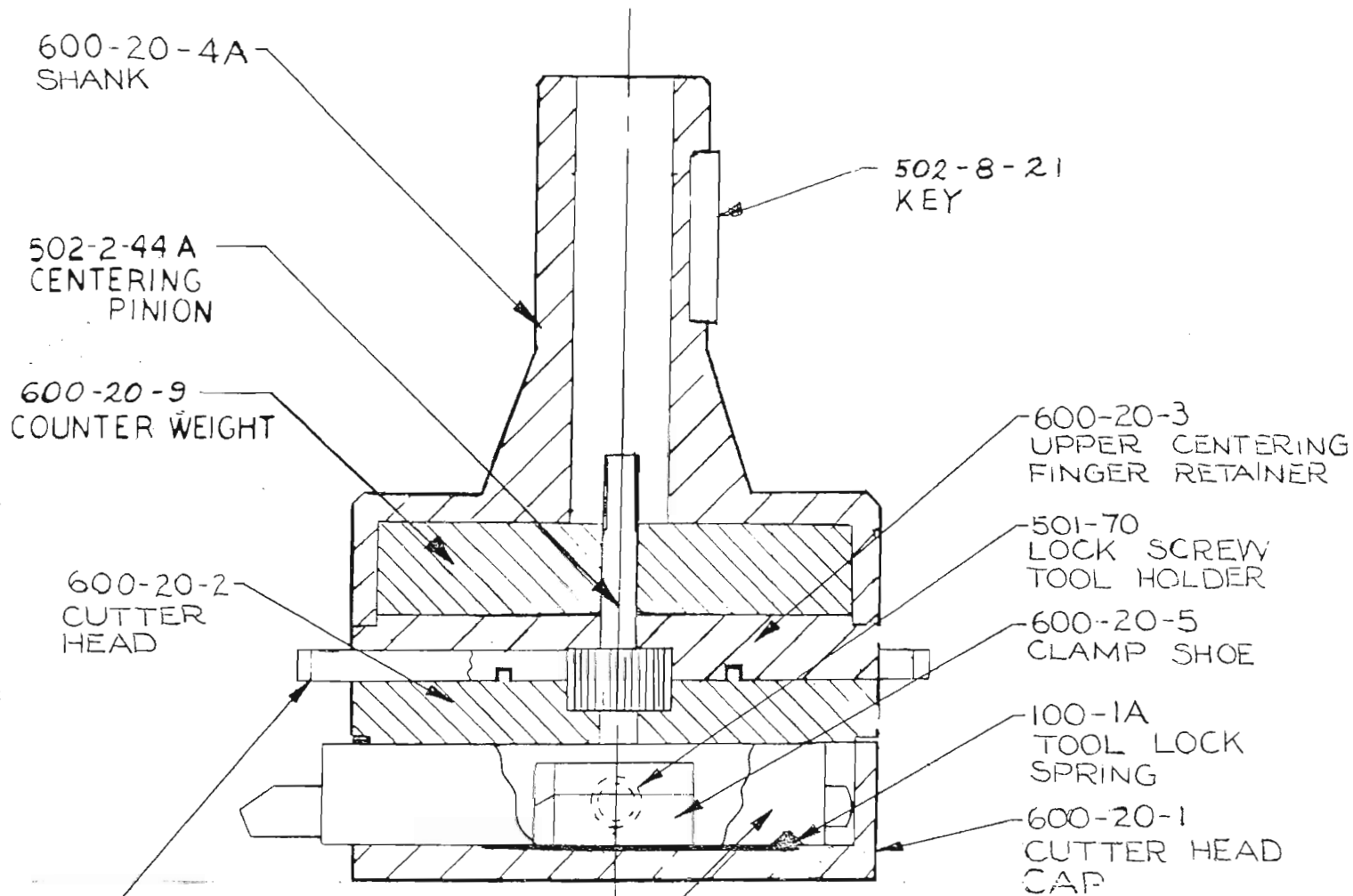
100-1B
SPRING, LOCK
TOOL HOLDER

STUB BAR
1.5 DIA. X 6.5 STROKE
600-2
(OPTIONAL)





CENTERING TELESCOPE

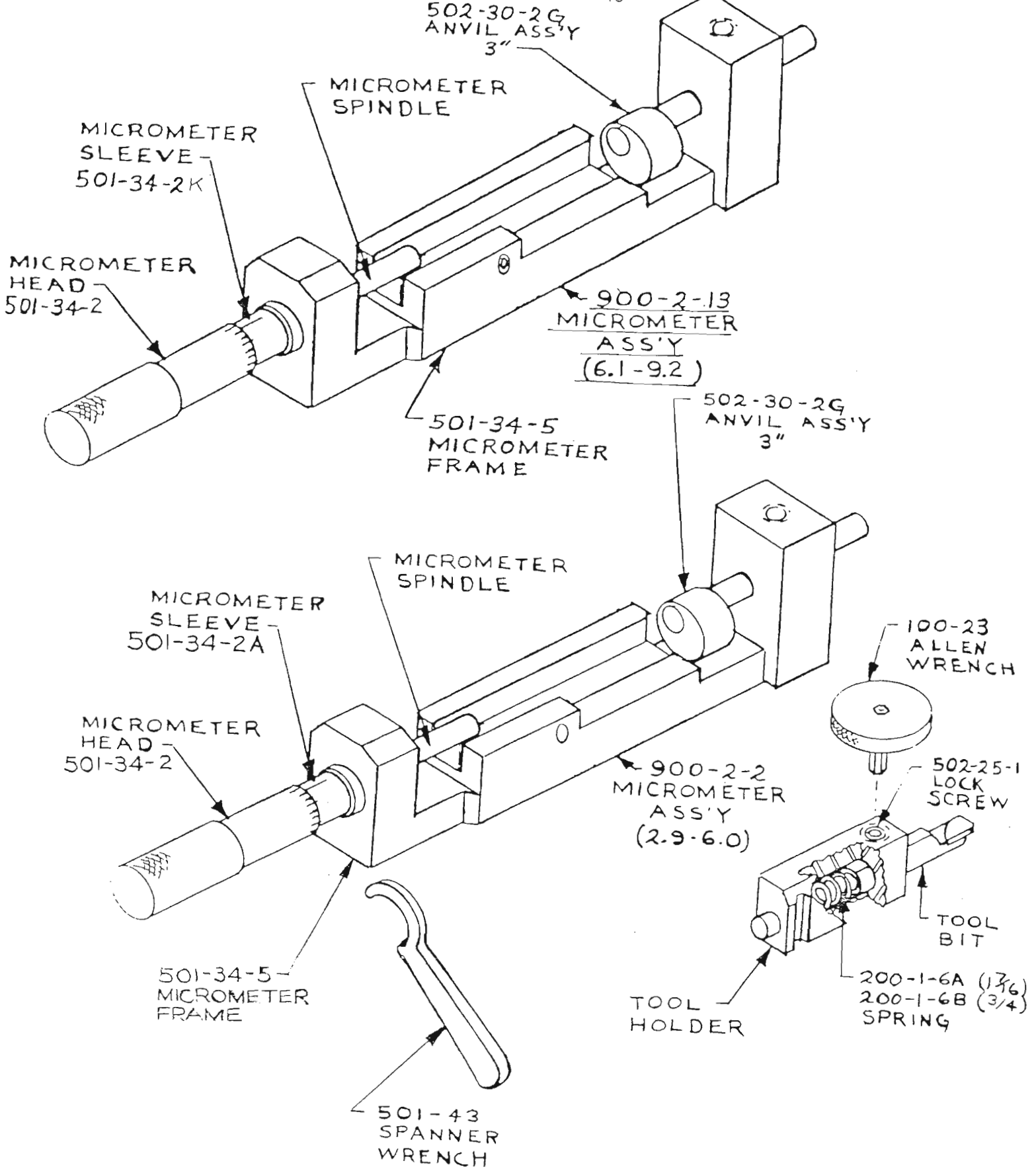


| CENTERING FINGERS | | |
|-------------------|-------|----------------|
| PART NO. | LG. | CENTERING DIA. |
| 600-20-6A | 3.125 | 3.250-6.000 |
| 600-20-6B | 4.625 | 4.750-9.000 |
| 600-20-6C | 7.500 | 7.625-9.875 |

| TOOL HOLDERS | | |
|--------------|-------|------------------|
| PART NO. | LG. | BORE RANGE (DIA) |
| 600-20-7A | 3.000 | 3.875-4.250 |
| 600-20-7B | 3.562 | 4.250-5.312 |
| 600-20-7C | 4.125 | 5.312-6.500 |
| 600-20-7D | 4.687 | 6.500-8.000 |
| 600-20-7E | 5.250 | 7.562-8.750 |
| 600-20-7F | 5.812 | 8.750-9.875 |

3 1/4 DIAMETER BLIND HOLE
CUTTER HEAD ASS'Y

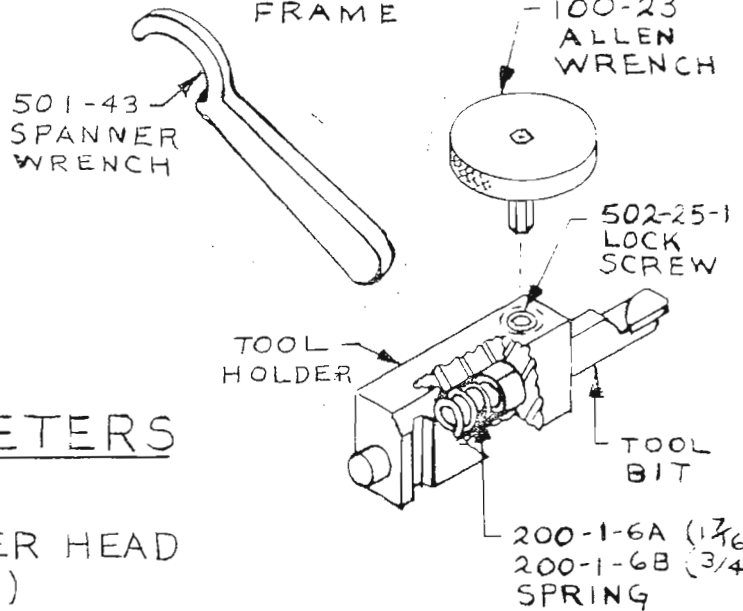
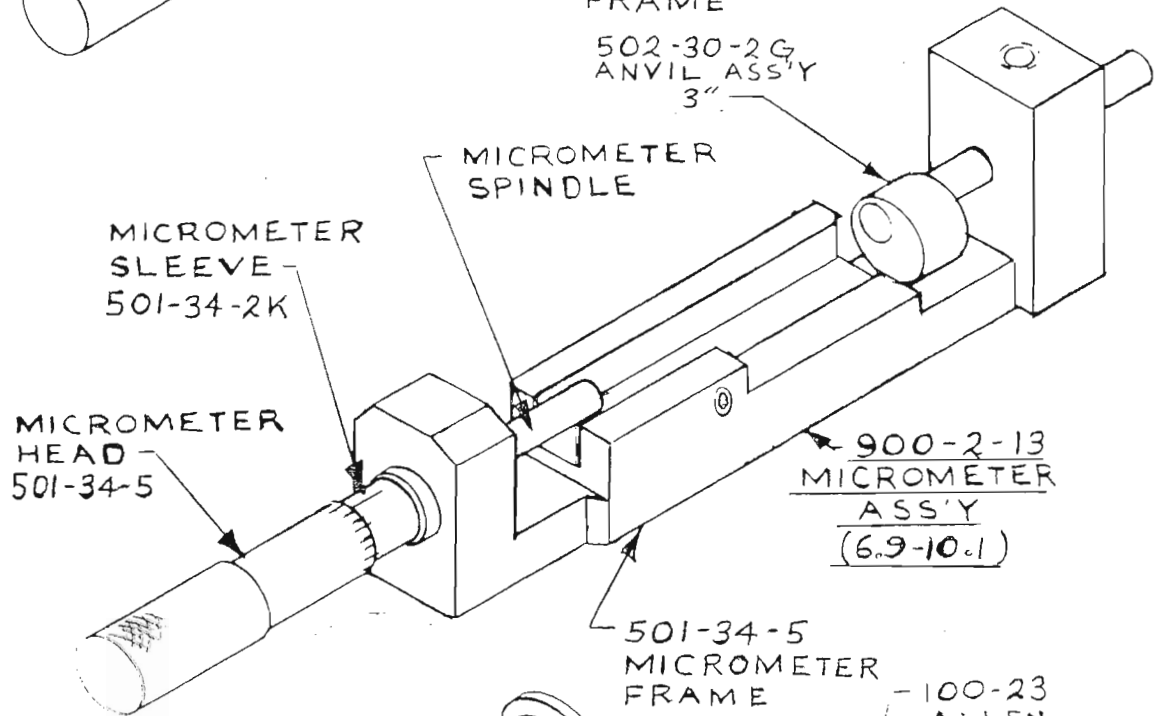
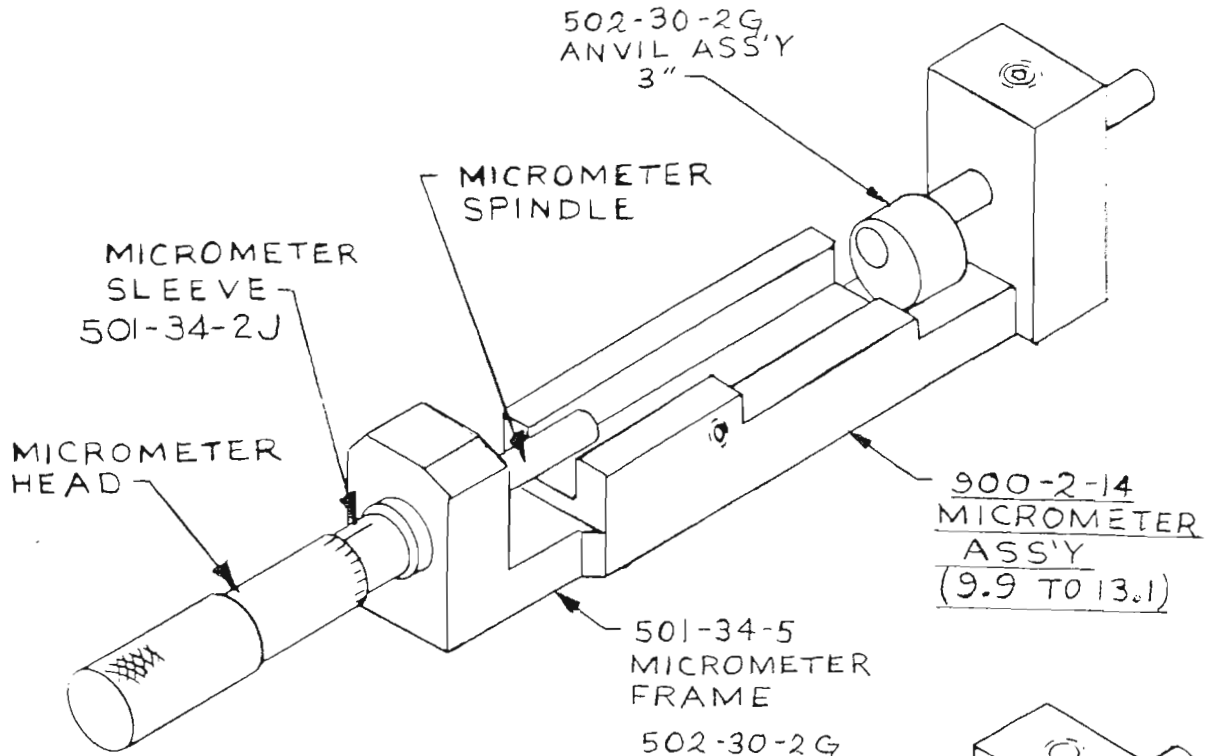
600-20
"B" TYPE OPTIONAL



MICROMETERS FOR

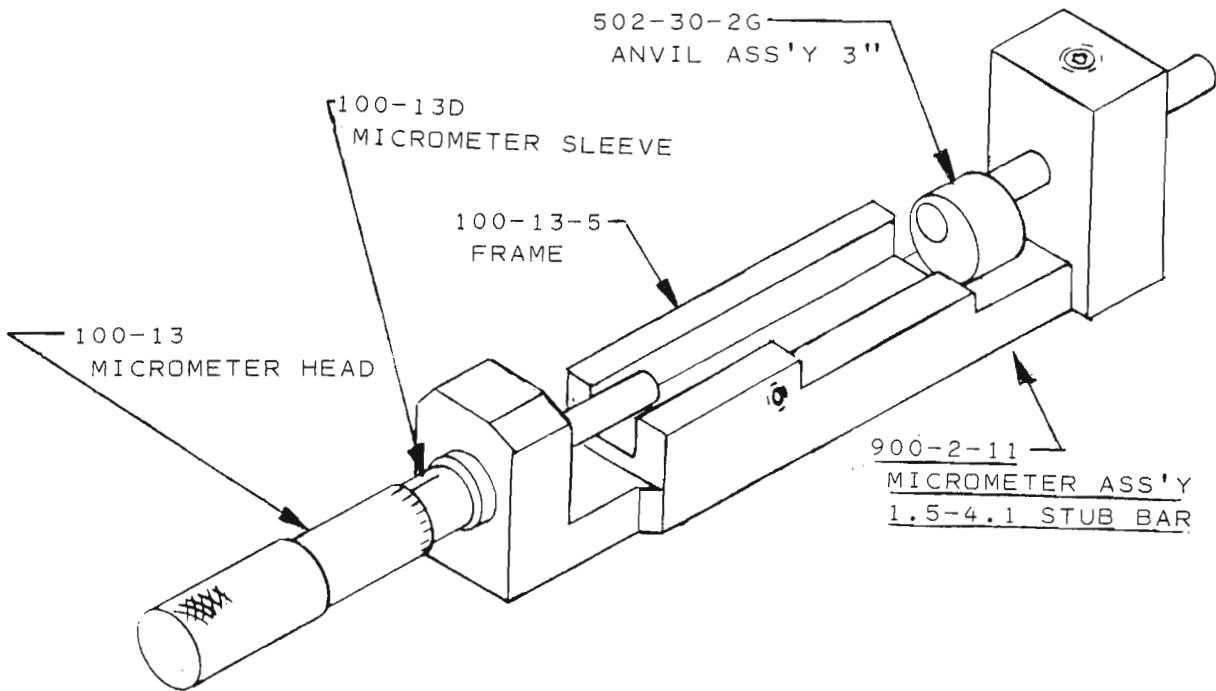
$3\frac{7}{8}$ DIA. CUTTER HEAD (BOLT ON) 504-29-3

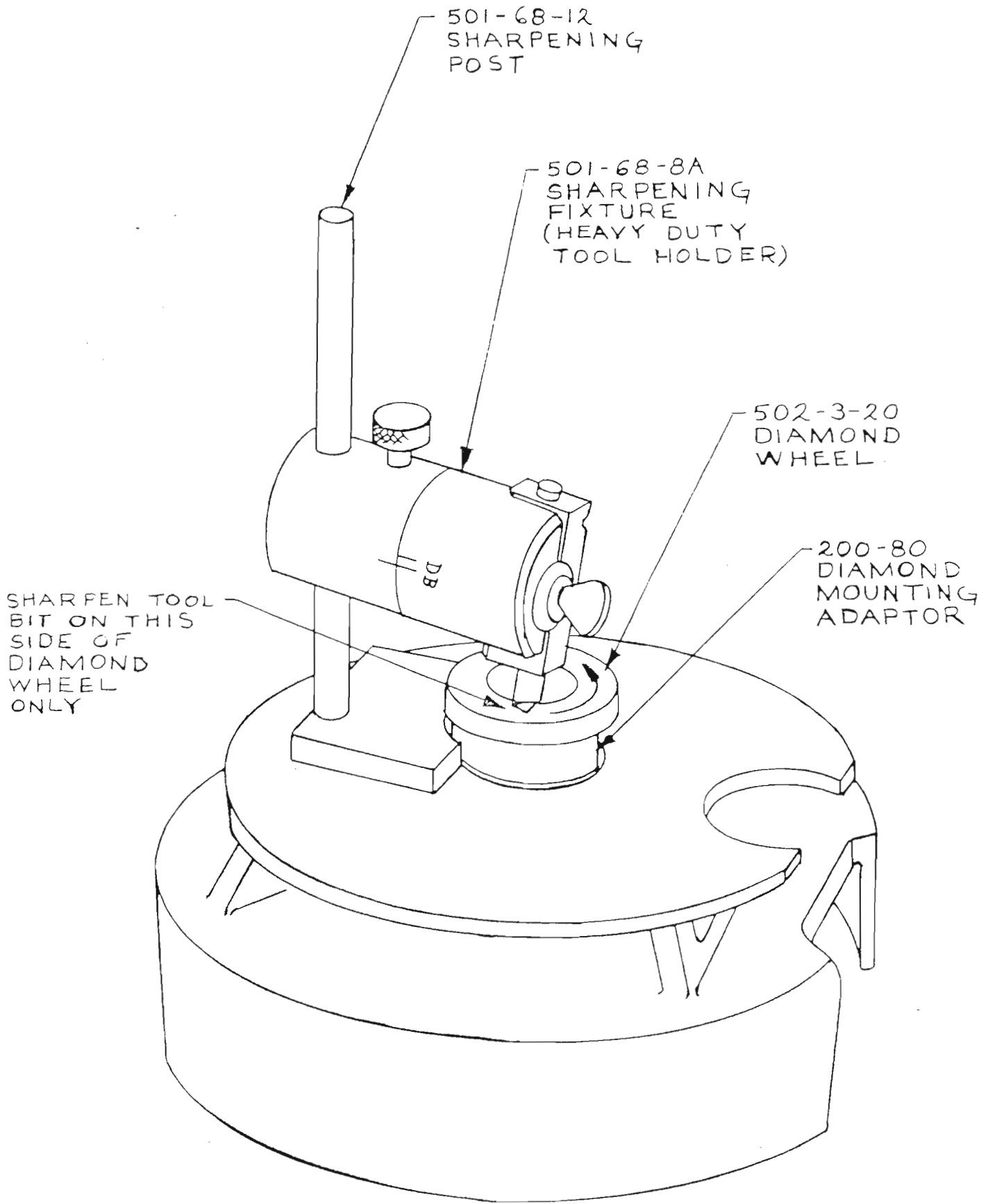
AND $3\frac{1}{4}$ DIA. CUTTER HEAD (WITH DRAW TUBE) 600-20



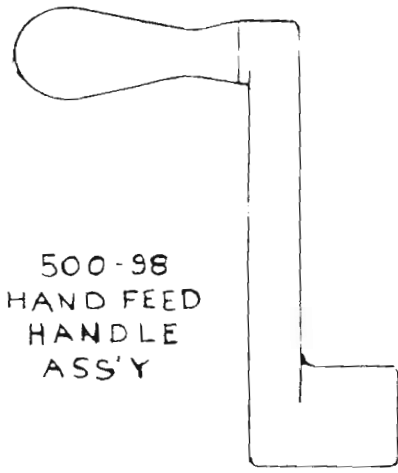
MICROMETERS
FOR

7 3/4 DIA. CUTTER HEAD
(BOLT ON)
504-29-4





TOOL BIT SHARPENING
OPTIONAL



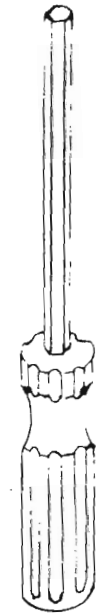
500-98
HAND FEED
HANDLE
ASS'Y



502-12-2
SPANNER
WRENCH



100-24
TOOL
PULLER



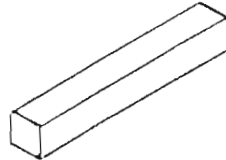
HEX
DRIVER
501-72 ($\frac{7}{32}$)
(501-72A $\frac{5}{32}$)
OPTIONAL



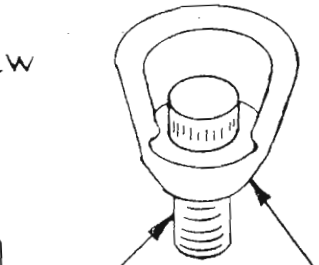
500-41
LOCK NUT
FEED SCREW



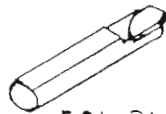
500-62
KEY
MICARTA
(DA-4SB ONLY)



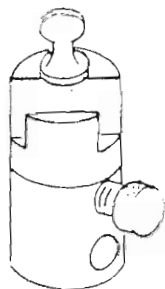
502-3-20A
DRESSING
STICK



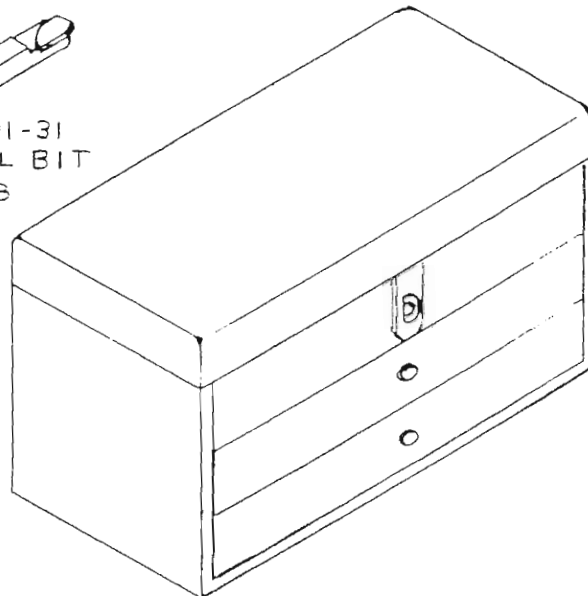
502-3-13A
LIFTING
EYE NUT
502-3-13B
SHOULDER
SCREW



501-31
TOOL BIT
R8



501-68-8A
SHARPENING
FIXTURE
(OPTIONAL)



506-5
TOOL BOX

SEE DETAIL G
SPINDLE CLUTCH CONTROL

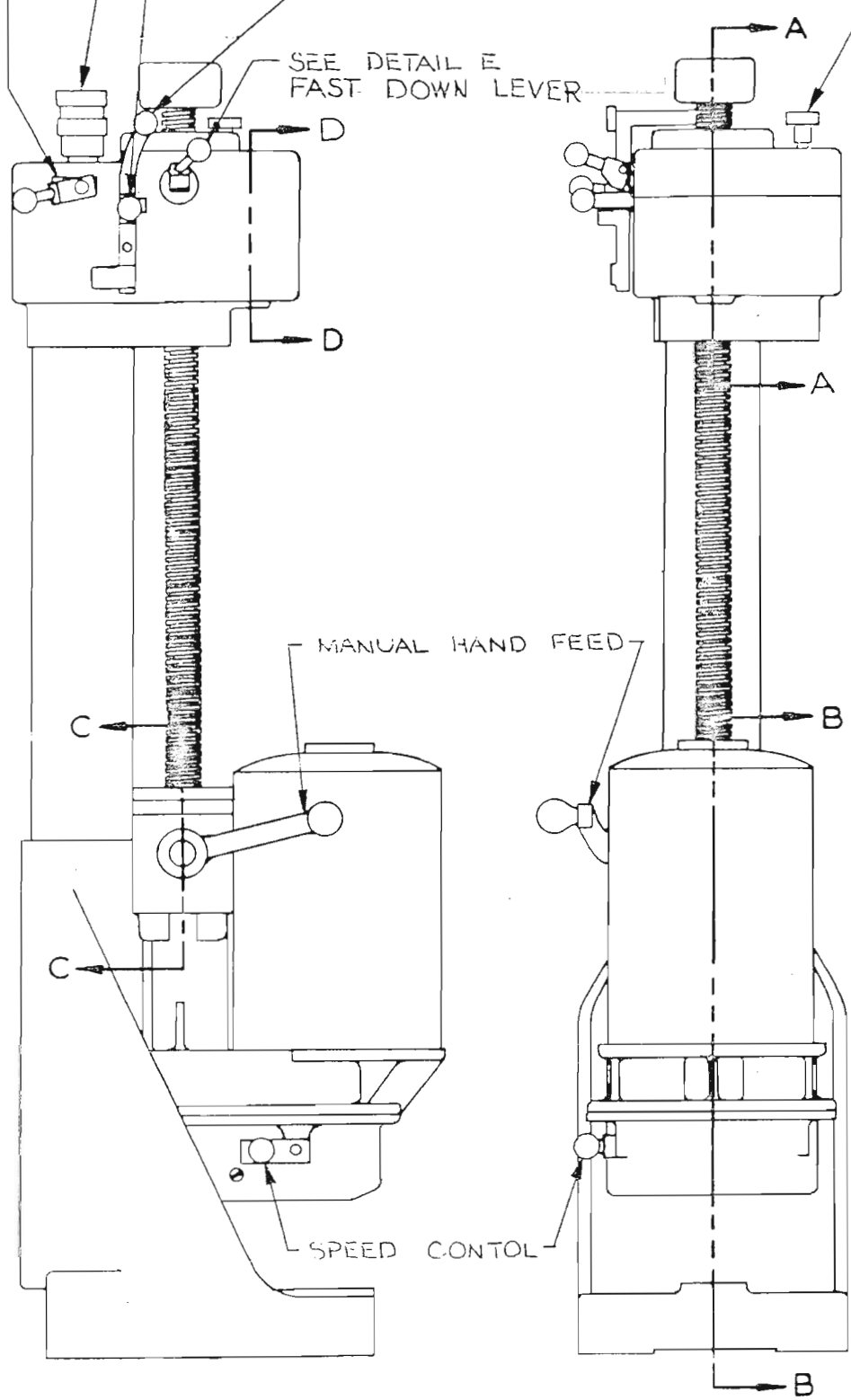
CENTERING KNOB

SEE DETAIL F
FEED LEVER

FEED RELEASE

SEE DETAIL E
FAST DOWN LEVER

TWO SPEED
FEED



SPINDLE BORING UNIT

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.

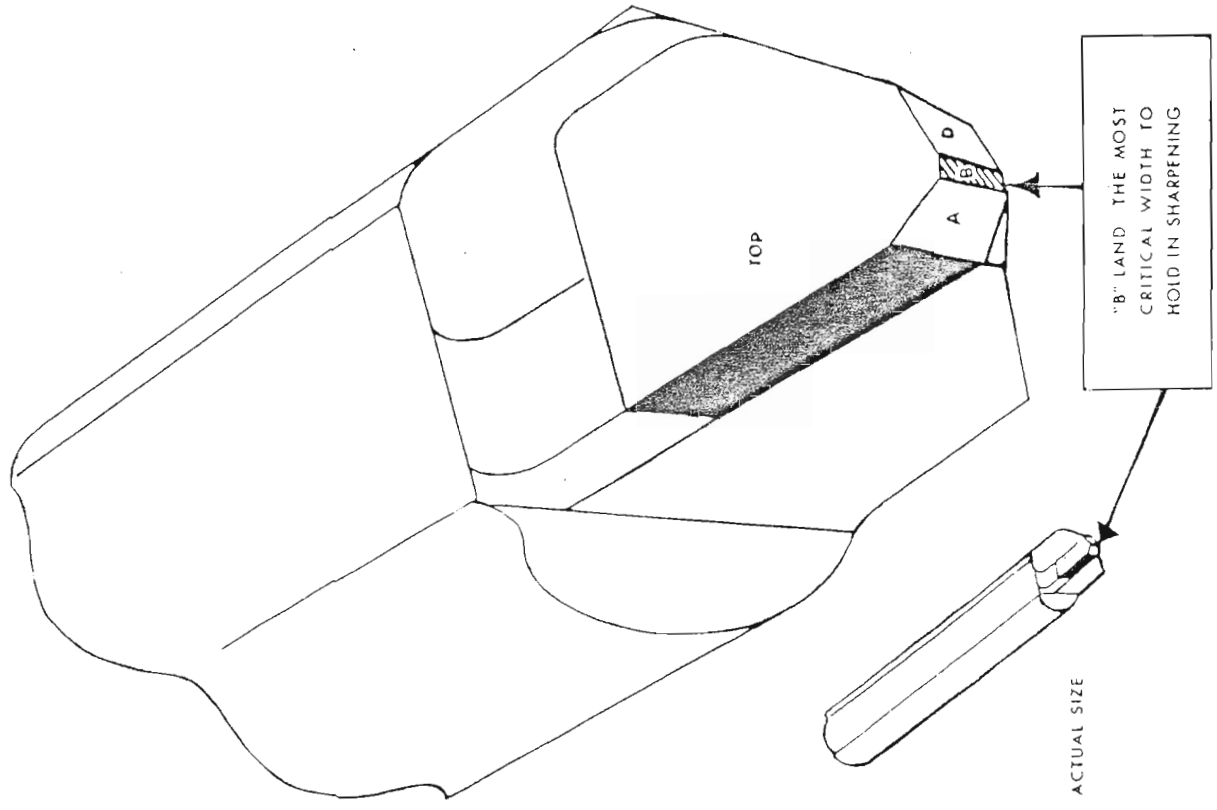
The most critical point of this sharpening is the width of the "B" land (as indicated by the diagonal line shading). This width should be maintained at about .015 to .025. This width is held by cutting back the "D" land as required. The "B" land must be reduced to .005 to .010 on all stub boring heads and long bore operations. See Sheet 2 for exact "B" land requirements.

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

The "A" cutting land is not critical 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 will vary depending on the type of iron being bored. A six cylinder block can sometimes be bored without resharpening but often it is advisable to touch up the cutting tool on every hole for best results.

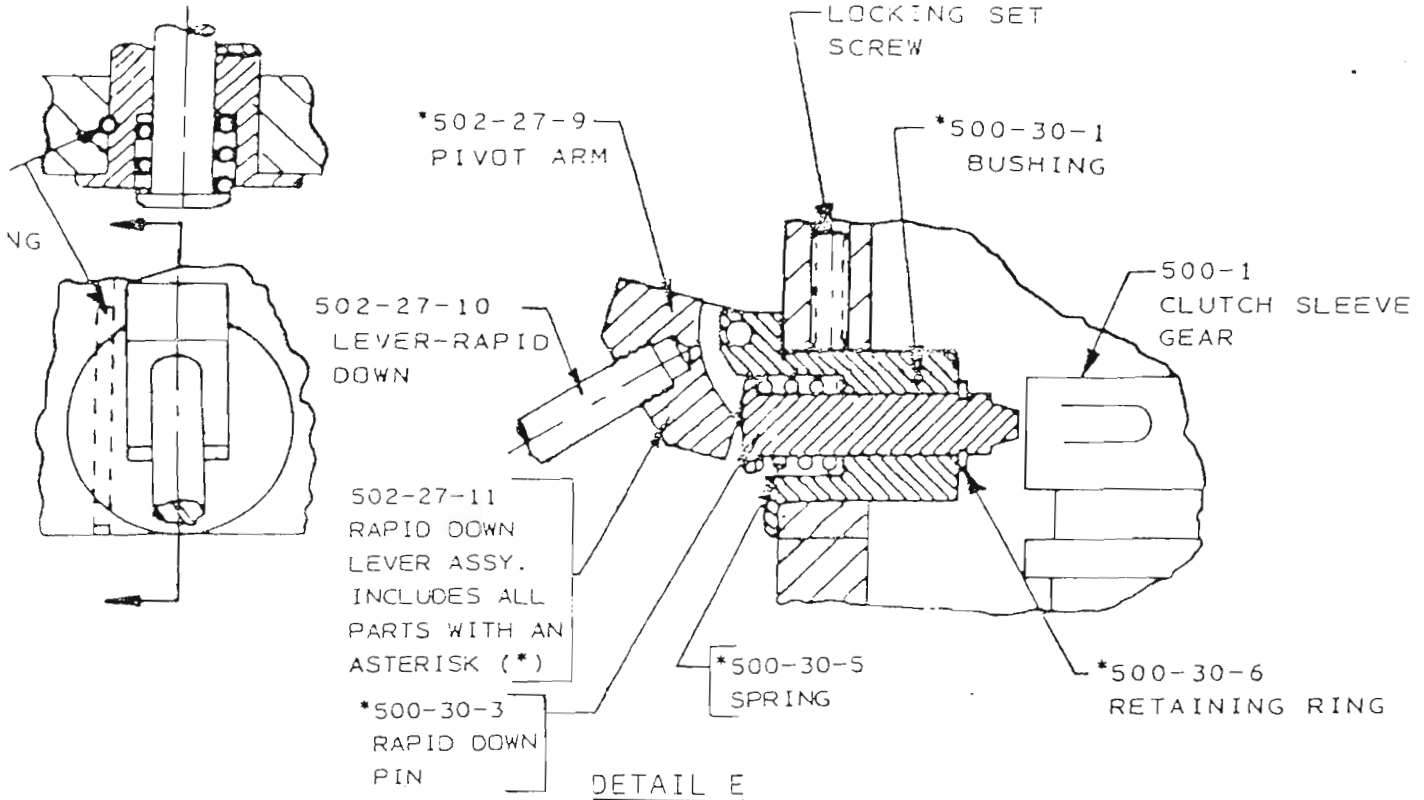


CAUTION: BORING DEPTH VS. TOOL SHARPENING

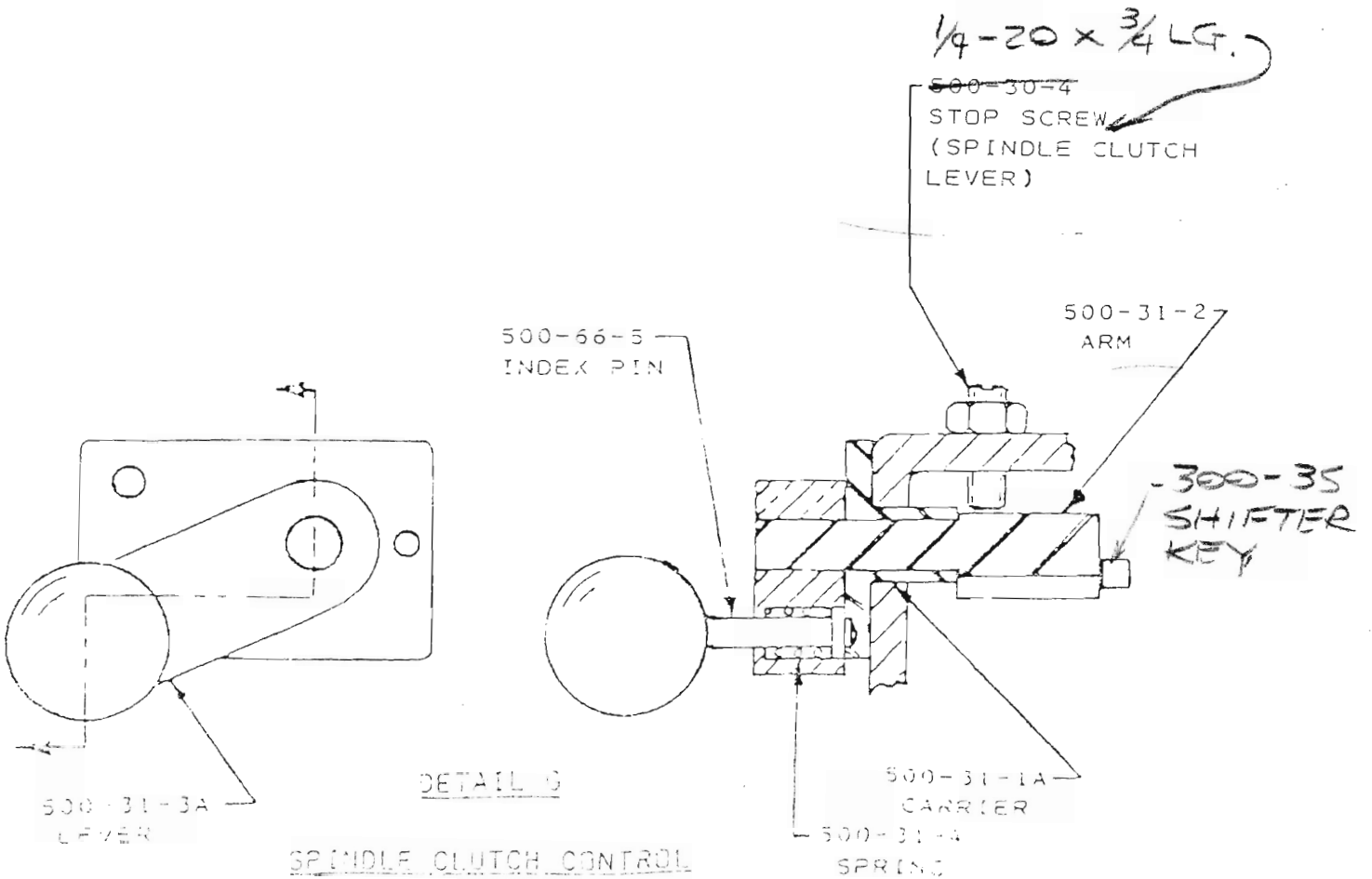
The DA-4SB boring bar tool sharpening does not require extremely close attention to "B" land width for the great bulk of passenger car boring up to 11" cylinder length, although a .025 width "B" land should not be exceeded.

Cylinder lengths longer than 11" require tool bit "B" lands to be .005 to .010 wide or chatter will likely result at the bottom of the hole.

To produce the best result at the extreme length capacity, use a RF facing tool, 501-29A, and do not sharpen an "A" land. This tool bit is particularly useful for heavy stock removal on long bores.



FAST DOWN LEVER



SPINDLE CLUTCH CONTROL

