ROTTLER
MANUFACTURING

DA-5B
BORING MACHINE

MACHINE SERIAL NUMBER

_____

OPERATIONS AND MAINTENANCE
MANUAL

MANUFACTURED BY:

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

Phone: (206) 872-7050
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NOTE: WHEN ORDERING REPLACEMENT PARTS,
PLEASE GIVE THE MODEL AND SERIAL NUMBER.

ORDER BY PART NUMBER.
THERE IS A MINIMUM ORDER OF $25.00

WARNING

THE MODEL F-2B, F-24B, AND DA SERIES BORING MACHINES ARE NOT STANDARD EQUIPPED WITH MOTOR OVERLOAD OR 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 PROTECTION IN ACCORDANCE WITH THE CURRENT REQUIREMENTS NOTED ON THE MOTOR NAME PLATE.

CAUTION horizontal or inverted

To ensure adequate lubrication for spindle bearing, the Boring Bar should be run in the vertical position (with feed controls up) for at least 5 minutes after each 8 hours of horizontal or inverted boring, at light or medium loads.

At heavy loads the time intervals should be reduced.

GUARANTEE

LIMITED

ROTTLER BORING BAR COMPANY MODEL DA-5B PARTS AND EQUIPMENT ARE GUARANTEED AS TO WORKMANSHIP AND MATERIAL. THIS LIMITED GUARANTEE REMAINS IN EFFECT FOR ONE YEAR FROM THE DATE OF DELIVERY, PROVIDED THE MACHINE IS OWNED AND OPERATED BY THE ORIGINAL PURCHASER AND IS OPERATED AND MAINTAINED AS PER INSTRUCTIONS IN THIS MANUAL.

STANDARD ELECTRIC COMPONENTS ARE WARRENTEED 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.

I M P O R T A N T

OPERATING SAFETY AND EMERGENCY PROCEDURES

ELECTRICAL POWER - MAKE SURE ALL ELECTRICAL EQUIPMENT HAVE THE PROPER ELECTRICAL OVERLOAD PROTECTION.

MACHINE OPERATOR - OPERATOR OF THIS BORING MACHINE SHOULD BE A SKILLED MACHINIST CRAFTSMAN, THAT IS, WELL VERSED IN THE CAUTION, CARE, AND KNOWLEDGE REQUIRED TO SAFELY OPERATE A METAL CUTTING TOOL.

IF THE OPERATOR IS NOT A SKILLED MACHINIST, THE OPERATOR MUST PAY STRICT ATTENTION TO THE OPERATING PROCEDURE OUTLINED IN THIS MANUAL, AND MUST GET INSTRUCTION FROM A QUALIFIED MACHINIST IN BOTH THE PRODUCTIVE AND SAFE OPERATION OF THIS BORING BAR.

ROTTLER BORING EQUIPMENT HAS THE FOLLOWING AREAS OF EXPOSED MOVING PARTS, THAT YOU MUST TRAIN YOURSELF TO RESPECT AND STAY AWAY FROM WHEN THEY ARE IN MOTION:

1. TOOL SHARPENING - MUST BE DONE WITH CARE AND DEXTERITY TO GET GOOD BORE RESULTS, BE ALERT TO THE LIGHT PRESSURE REQUIRED FOR SHARPENING.

CAUTION: EXPOSED DIAMOND WHEEL IS A POTENTIAL HAZARD TO YOUR HANDS, FINGERS, AND FACE.
NOTE: EYE PROTECTION IS A NECESSITY WHEN WORKING IN THIS AREA.

2. CUTTING TOOL AREA - ANY OPERATION INVOLVING HAND IN THE CUTTER HEAD AREA, SUCH AS CENTERING, CHANGING CENTERING FINGERS, TOOL INSERTION, AND REMOVAL, CUTTER HEAD CHANGES, SIZE CHECKING, ETC., REQUIRES THAT BOTH THE DRIVE MOTOR BE TURNED OFF AND THAT THE SPINDLE CLUTCH (SPINDLE ROTATION) LEVER BE DISENGAGED, IN IT'S FULL UP POSITION.

NOTE: PERIODICALLY CHECK THIS LEVER TO MAKE SURE THAT THE UPPER LEVER POSITION WILL LOCK OUT THE SPINDLE CLUTCH WHEN THE DETENT PIN IS ENGAGED.

OPERATING SAFETY & EMERGENCY PROCEDURES CON'T

3. BORING - EYE PROTECTION MUST BE WORN DURING THIS OPERATION AND HAND MUST BE KEPT COMPLETELY AWAY FROM CUTTER HEAD.

4. UPPER HOUSING CONTROLS - LEARN TO IDENTIFY AND INDEPENDENTLY OPERATE THESE CONTROL FUNCTIONS BY HABIT WHILE DEVELOPING THE AWARENESS OF KEEPING YOUR FINGERS AND HANDS WELL CLEAR OF THE ROTATING FEED SCREW AND THE KNOBS, BOTH ON TOP OF THE FEED SCREW AND THE SPINDLE.

5. BAR LOADING & UNLOADING - CAREFULLY DEVELOP HANDLING METHODS OF LOADING AND UNLOADING BORING BAR, SO THAT NO INJURY CAN RESULT IF HOIST EQUIPMENT OR LIFT CONNECTION SHOULD FAIL. BEFORE MOVING BORING BAR CHECK SHOULDER SCREW OF LIFTING EYE TO MAKE SURE IT IS TIGHT.

6. MACHINE MAINTENANCE - ANY MACHINE ADJUSTMENT, MAINTENANCE OR PART REPLACEMENT ABSOLUTELY REQUIRES A COMPLETE POWER DISCONNECT TO THE MACHINE. THIS MUST BE AN ABSOLUTE RULE.

E M E R G E N C Y P R O C E D U R E

ASSUMING ONE OF THE FOLLOWING HAS OCCURRED - TOOL BIT IS SET COMPLETELY OFF SIZE, WORK OR BORING SPINDLE IS NOT CLAMPED, SPINDLE IS NOT PROPERLY CENTERED, THESE MISTAKES WILL BECOME OBVIOUS THE INSTANT THE CUT STARTS. TURN OFF MOTOR IMMEDIATELY.

NOTE: YOU CAN KEEP YOUR FINGERS ON THE STOP SWITCH, IF YOU WISH TO INSURE INSTANT SHUT DOWN, WHEN IT IS REQUIRED.

AFTER FINDING OUT WHAT THE PROBLEM IS, METHODICALLY ORGANIZE THE CONTROLS TO RETURN THE SPINDLE TO ITS UP POSITION, WITHOUT CAUSING MORE PROBLEMS.

BE ALERT TO QUICKLY STOP THE MOTOR IN THE EVENT OF A SERIOUS DISRUPTION OF THE BORING PROCESS EITHER AT THE TOP OR BOTTOM OF THE BORE.

''REMEMBER'' METAL CUTTING TOOLS HAVE THE SPEED AND TORQUE TO SEVERLY INJURE ANY PART OF THE HUMAN BODY EXPOSED TO THEM.

DESCRIPTION

THE ROTTLER MODEL DA-5B IS A PRECISION PORTABLE BORING UNIT DESIGNED PARTICULARLY FOR DIESEL CYLINDER BLOCK UPPER AND LOWER DECK REPAIR. IT IS ALSO SUITED TO A VARIETY OF OTHER USES. 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 AND A 3 SPEED BELT CASE INCREASES THE AVAILABLE SPINDLE 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.

CARE SHOULD BE TAKEN TO AVOID FLUID ENTRY INTO THE CUTTER HEAD COUNTERWEIGHT AREA.

TO ORDER PARTS

ORDER PARTS BY PART NUMBER AND ALWAYS GIVE SERIAL NUMBER OF THE CYLINDER BORING MACHINE.

CONTROLS

WE SUGGEST BEFORE ATTEMPTING ANY CYLINDER BORING THAT YOU CLAMP THE BAR OVER AN OPEN AREA AND ACTUATE THE CONTROLS TO BECOME FAMILIAR WITH THE OPERATION OF THE MACHINE. NOTE: ALL CONTROLS ARE ILLUSTRATED ON THE SPINDLE BORING UNIT PAGE AND ON THE CONTROL PLATE ATTACHED TO THE FRONT OF THE BORING UNIT, ITSELF.

1. FEED LEVER

FEED LEVER IS THE LATCHING LEVER ON THE SIDE OF THE BAR. PRESS DOWN UNTIL THE LEVER LATCHES TO ENGAGE THE CUTTING FEED. TO DISENGAGE, PRESS THE FEED RELEASE ARM WHICH WILL UNLATCH THE LEVER AND ALLOW IT TO RETURN TO THE NEUTRAL POSITION. LIFT THE FEED LEVER UNTIL IT LATCHES TO ENGAGE THE RAPID RETURN TRAVEL. THE BAR WILL AUTOMATICALLY RETURN TO NEUTRAL UPON REACHING THE TOP OF THE TRAVEL. IF YOU WISH TO RETURN THE BAR TO NEUTRAL WHILE IT IS IN RAPID TRAVEL, AGAIN PRESS FEED RELEASE ARM WHICH WILL UNLATCH THE LEVER AND ALLOW IT TO RETURN TO NEUTRAL POSITION. AS A SAFETY PRECAUTION, WE RECOMMEND THAT THE MOTOR BE STOPPED WHEN CENTERING OR POSITIONING THE BAR. INADVERTANT SPINDLE ROTATION ENGAGEMENT COULD INJURE THE OPERATOR'S OTHER HAND OR DAMAGE THE CUTTER HEAD PARTS. YOU WILL NOTE THE STOP ROD, THAT IS HELD IN THE HAND FEED CAP BY SET SCREW, HAS A ROUND SHAPED END WHICH WILL RELEASE CUTTING FEED WHEN IT CONTACTS LATCHING LEVER. THIS IS MOST CONVENIENTLY RAISED UP AND LOCKED BY A SET SCREW IN THE PROPER POSITION ON THE COMPLETION OF THE FIRST BORE CUT. THIS ROD SHOULD NOT BE USED TO HOLD CLOSE TOLERANCE SHOULDERS.

2. FAST DOWN LEVER

THE FAST DOWN TRAVEL 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 THE PRESSURE. DO NOT USE WHEN YOU ARE USING THE 200 OR 380 R.P.M. SPINDLE SPEEDS, SHIFT TO A LOWER SPEED.

TO BECOME FAMILIAR WITH THE RAPID DOWN TRAVEL, WE SUGGEST THAT YOU PLACE A TOOL HOLDER INTO THE HOLDER SLOT AND PRACTICE RUNNING THIS TOOL HOLDER DOWN RAPIDLY (IN THE FAST SPINDLE SPEED) TO AN EXACT POINT, AND RETURNING IT TO THE UPPER POSITION. THIS CAN BE DONE RAPIDLY AND VERY ACCURATELY WITH A LITTLE PRACTICE.

3. SPINDLE CLUTCH CONTROL

SPINDLE CLUTCH CONTROL IS LOCATED TO THE LEFT SIDE 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 ON THE HIGH SPINDLE RPM. STANDARD PROCEDURE IS TO THROW OUT CLUTCH UPON COMPLETION OF THE BORE. TURN CUTTER HEAD AROUND TO INDEXING DETENT TO POSTION TOOL TO FRONT. THEN REVERSE THE TRAVEL. THE LOWER KNOB ON THE SPINDLE OF THE UPPER HOUSING MAY BE USED FOR MANUALLY TURNING THE 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 THE SPINDLE BASE. CAUTION: THIS TRAVEL SHOULD ALWAYS BE LEFT IN FULL UP POSITION AFTER USING, BEFORE SPINDLE IS RETURNED TO FULL UP POSITION. 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.

THIS MANUAL HAND FEED TRAVEL IS AVAILABLE FOR FACING SLEEVES AND COUNTERBORING, ETC. IT IS COMPLETELY SEPARATE FROM THE POWER SPINDLE TRAVEL, AND SHOULD ALWAYS BE RETURNED TO THE FULL POSITION AFTER BEING USED, BEFORE THE POWER UP TRAVEL RETURNS THE SPINDLE TO THE TOP.

5. SPEED CONTROL

THE SPEED CONTROL IS OPERATED BY THE PULL RELEASE KNOB AT THE MOTOR GEAR HOUSING, BACKWARD FOR LOW SPEED AND FORWARD 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 380 R.P.M.

6. TWO FEED SPEED CONTROL

THE TWO FEEDS PROVIDED ON YOUR DA-5B 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 OPERATES THE CENTERING FINGERS WHEN TURNED CLOCKWISE. BE CAREFUL NOT TO OVER-EXTEND THESE FINGERS WHEN THE SPINDLE IS NOT IN THE CYLINDER OR THEY WILL COME COMPLETELY OUT OF THE PINION DRIVE.

CAUTION: MOTOR MUST BE STOPPED WHEN CENTERING. INADVERTANT SPINDLE ROTATION ENGAGEMENT COULD INJURE THE OPERATOR'S HAND OR DAMAGE HEAD PARTS.

8. 6 SPEED BELT DRIVE

OPERATION OF 3 SPEED BELT CASE

TO CHANGE SPEED IN 3 SPEED BELT CASE:

CAUTION: FIRST DISCONNECT POWER FROM THE BORING BAR.

THEN LOOSEN THE KNOBS ON THE SIDE COVERS. PIVOT THE COVERS TO GAIN ACCESS TO V-BELT. NOW LOOSEN THE CLAMP HANDLE ON THE SIDE OF THE MOTOR AND PIVOT THE MOTOR FORWARD. NOW YOU CAN MOVE THE BELT TO A NEW GROOVE LOCATION. THE TOP GROOVE POSITION IS FOR LOW RPM, BOTTOM POSITION IS FOR HIGH SPINDLE RPM. AFTER SELECTING THE SPEED YOU REQUIRE, PIVOT MOTOR BACK TO TIGHTEN THE V-BELT. (DO NOT OVER-TIGHTEN BELT). THEN TIGHTEN THE CLAMP HANDLE.

AN OPTIMUM BORING SPEED FOR RAPID STOCK REMOVAL AND GOOD TOOL LIFE IS 380 SURFACE FEET PER MINUTE ON NORMAL OVERSIZE CUTS.

4'' BORE - 380

6'' BORE - 200

8'' BORE - 100

V-BELT LOCATION	SPINDLE RPM	
	LOW	HIGH
TOP	20	80
MIDDLE	50	200
BOTTOM	100	380

-B TYPE CUTTER HEAD

FOR DA-5B

YOUR DA-5B IS 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 CLEAR AND WHILE THREADING IN PLACE, MAKE SURE THE SPLINE IS EASILY ENGAGED WITHOUT BURRING.

BLIND HOLE CUTTER HEAD (OPTIONAL) 600-20

THE BLIND HOLE CUTTER HEAD WITH A STANDARD BORE CAPACITY OF 3.25'' TO 8'' MAY BE QUICKLY ATTACHED TO THE DA-5B MACHINE BY USE OF THE DRAW BOLT.

THE CENTERING FINGERS ON THIS CUTTER HEAD ARE LOCATED ABOVE THE CUTTER TOOL, REQUIRING TOOL REMOVAL TO CENTER EACH BORE. AN OFFSET TOOL BIT IS PROVIDED SO THAT EXTREME BLIND BORES MAY BE PROCESSED.

A DAMPENER WEIGHT IS ALSO PROVIDED IN THE CUTTER HEAD TO IMPROVE PERFORMANCE OF THE BORING SPINDLE. 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. IT IS SIMPLY DONE BY REMOVAL OF THE THREE FLAT HEAD SCREWS. CAREFULLY DISASSEMBLE, CLEAN, AND REASSEMBLE.

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, THREAD 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

THE MODEL DA-5B HOLD DOWN ASSEMBLY UTILIZES THE MAIN BEARINGS AS A SURFACE TO PULL PORTABLE BORING BAR EQUIPMENT SECURELY DOWN TO THE TOP OF THE BLOCK. THIS ORGANIZES THE THRUST, THROUGH THE BLOCK AND PREVENTS DISTORTION OF THE CYLINDERS, THEMSELVES, AS WELL AS GOOD SECURITY FOR THE BORING BAR, DURING SUBSTANTIAL CUTS. IT CAN BE USED REGARDLESS OF WHETHER BEARING CAPS ARE IN PLACE OR NOT. IT OBVIOUSLY CANNOT BE USED IF THE CRANKSHAFT REMAINS IN THE CYLINDER BLOCK.

TO MOST EFFECTIVELY USE THIS ASSEMBLY INSERT THE T-BOLT, 511-17-1, THROUGH THE SUPPORT PLATE INTO THE 501-37-2A, ADJUSTING TUBE, (FINGER TIGHT). THEN SELECT THE PROPER LENGTH STUD REQUIRED. INSERT IT INTO BOTH THE ADJUSTING TUBE AND THE EYE NUT. THEN LCOK WITH LOCK NUT. YOU CAN VISUALLY NOTE WHICH ONE WILL PROPERLY SPACE THE SUPPORT PLATE AWAY FROM THE MAIN BEARING BAR, 509-15. IN GENERAL, THE SHORT 5-3/4'' STUD WILL ACCOMMODATE A MAIN BEARING TO THE TOP OF THE BLOCK, HEIGHT OF 6-1/2'' TO 11-1/2''. THESE STUDS INCREASE IN LENGTH OF 3'' INCREMENTS.

NOW LAY THE SUPPORT PLATE, 511-18, OVER THE TOP OF THE BLOCK SO THAT THE ADJUSTING TUBE AND EYE NUT WILL HANG OVER THE END OF THE BLOCK TO THE MAIN BEARING LOCATION. WITH THE TUBE HANGING OVER THE END OF THE BLOCK YOU CAN READILY ROTATE THE ADJUSTING TUBE UNTIL THE EYE APPROXIMATELY LINES UP WITH THE MAIN BEARINGS. CAUTION: MAKE SURE THAT THE T-BOLT AND THE STUD ARE THREADED IN AT LEAST 1/2''.

NOW LOWER THE ASSEMBLY INTO THE HOLE NEXT TO THE ONE YOU WISH TO BORE AND ADJUST THE ADJUSTABLE STOP 511-18-1 & 511-18-2, SO THAT THE PINS ON THE OTHER SIDE OF THE PLATE ARE NEAR THE OPPOSITE WALL. THIS PREVENTS THE PLATE FROM DROPPING INTO THE CYLINDER. PLAN THE HOLD DOWN LOCATION SO THAT AFTER BORING THE FIRST HOLE THE BORING BAR MAY BE ROTATED OR SWUNG TO THE LEFT OR COUNTER-CLOCKWISE TO BORE THE NEXT CYLINDER.

CLAMPING CON'T

MAKE SURE THE EYE NUT IS TURNED PROPERLY, PLACE THE MAIN BEARING BAR, 509-15, THROUGH THE MAIN BEARING LINE AND EYE NUT. INSERT SUFFICIENTLY SO THE BAR RESTS ON THE MAIN BEARING ON BOTH SIDES OF THE EYE NUT.

ROTATE THE ADJUSTING TUBE FINGER TIGHT, THEN PULL THE BORING BAR OVER THE ASSEMBLY. NOTE: THE BOTTOM OF THE T-BOLT SLOT IN THE T-SLOT BEAM MUST BE LOWER THAN THE HEAD OF THE T-BOLT.

SLIDE THE MACHINE FURTHER UNTIL THE SPINDLE IS APPROXIMATELY CENTERED OVER THE HOLE TO BE BORED. CAUTION: MAKE SURE THE T-BOLT HEAD IS COMPLETELY WITHIN THE T-SLOT.

NOW USE HAND KNOB TO RAISE T-SLOT BEAM. THEN, WHILE EXERTING PRESSURE ON THE CENTERING FINGERS, WE SUGGEST YOU SHIFT THE BAR SLIGHTLY TO INSURE THAT CENTERING FINGERS ARE MAKING GOOD CONTACT. USE THE RATCHET WRENCH, TO LOCK THE BORING BAR WHILE YOU ARE STILL HOLDING PRESSURE ON THE CENTERING FINGERS.

REMEMBER THEN, IN ORDER TO ROTATE A 180° TO THE OTHER BORE ALWAYS TURN THE MACHINE COUNTER-CLOCKWISE, VIEWING THE MACHINE FROM THE TOP. IF YOU SHOULD TURN IT THE OTHER WAY, IT ISPOSSIBLE YOU MAY LOCK THE ADJUSTING TUBE OR T-BOLT MORE THAN FINGER TIGHT. PIN HOLES ARE PROVIDED IN THE TOP FLANGE OF THE ADJUSTING TUBE IN ORDER TO LOOSEN IT, SHOULD THIS DIFFICULTY OCCUR.

CHECK ALSO TO MAKE SURE THERE IS GOOD CONTACT OF BORING BAR BASE AND CYLINDER BLOCK. IF THIS IS QUESTIONABLE, PARTICULARLY ON LONG INDUSTRIAL JOBS, IT IS ADVISABLE TO USE ADDITIONAL CLAMPS AFTER CENTERING BAR SUCH AS MILLING MACHINE TYPE CLAMP ON THE STEPS OF THE BASE.

ALTERNATE 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 CLAMPING THE BORING MACHINE TO BE 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.

IF YOUR CLAMPING REQUIRES THAT YOU USE A BOLT OR STUD IN PLACE OF THE T-BOLT YOU CAN REMOVE THIS CHAIN DRIVEN INTERNAL CLAMP DEVICE BY REMOVING THE END COVER AND SPROCKET COVER. THEN TURN THE HAND KNOB TO RAISE THE T-SLOT BEAM ALL THE WAY UP, NOW YOU CAN LIFT OUT THE CHAIN DRIVE ASSEMBLY.

A CLAMP PLATE OF YOUR OWN DESIGN CAN NOW BE INSERTED IN ITS PLACE.

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 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 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.

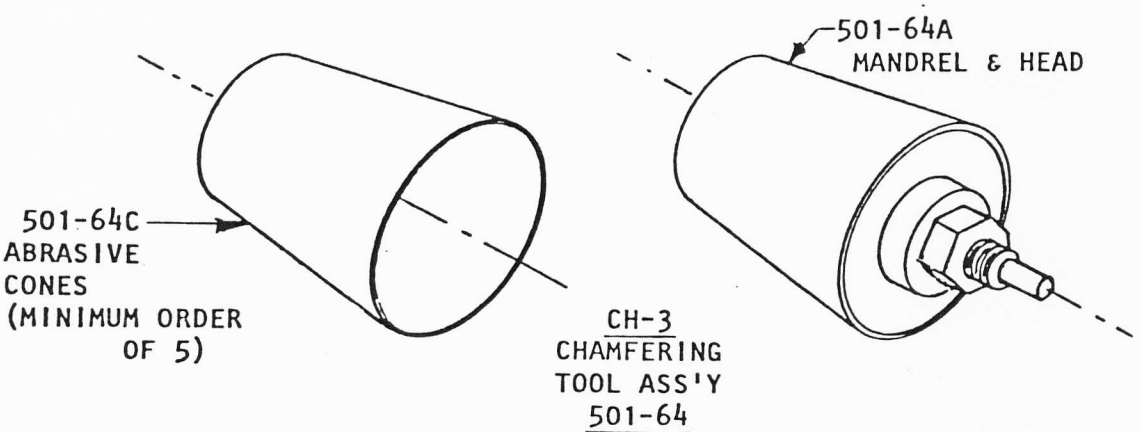
BORING CON'T

DISENGAGE SPINDLE CLUTCH. TURN SPINDLE TO INDEX TOOL TO FRONT AND LATCH FEED LEVER IN UP POSITION, ALLOWING MACHINE TO RETURN TO THE TOP. TURN OFF THE MOTOR, REMOVE THE TOOL HOLDER WITH TOOL PULLER, (ALWAYS REMOVE TOOL HOLDER AFTER BORING).. LOOSEN CLAMPING DEVICE AND PROCEED TO NEXT CYLINDER. IF BORE IS TO BE CHAMFERED WITH BAR THIS SHOULD BE DONE BEFORE LOOSENING CLAMPING DEVICE.

CHAMFERING

A SPECIAL TOOL IS AVAILABLE FOR CHAMFERING. TOOL MAY BE SET BY EITHER INSERTING IN THE HEAD AND APPROXIMATELY SETTING OR PLACING IN A MICROMETER AND SET APPROXIMATELY .100 OVER THE BORE SIZE. CHAMFERING CAN BE DONE EITHER BY USING SLOW FEED AND RELEASING WHEN ADEQUATE CHAMFER HAS BEEN DEVELOPED OR BY USE OF HAND FEED.

CHAMFERING MAY ALSO BE SIMPLY DONE MOST EFFECTIVELY WITH AN OPTIONAL MODEL CH-3 ABRASIVE TOOL DRIVEN BY A DRILL MOTOR. THIS METHOD WILL NOT REQUIRE BORING BAR AND DEVELOPS A SMOOTH BURR FREE ENTRY FOR RINGS.



CH-3
CHAMFERING
TOOL ASS'Y
501-64

COUNTERBORING

COUNTERBORING WILL OFTEN BE REQUIRED IN RE-SLEEVING LARGE ENGINE BLOCKS ON YOUR MODEL MACHINE AND FREQUENTLY A CLOSE TOLERANCE DEPTH MUST BE MAINTAINED IN ORDER TO PROPERLY SECURE THE SLEEVE INSTALLATION.

NOTE: USE HAND FEED.

UPPER AND LOWER DECK REPAIR OF DIESEL CYLINDER BLOCKS

MOST DIESEL BLOCKS USE THE CYLINDER HEAD TO CLAMP THE LIP OF THE WET SLEEVE AGAINST THE COUNTERBORE AND AT THE SAME TIME, LOCATION OF THE SLEEVE IS DETERMINED BY THE UPPER AND LOWER FIT,

THIS REQUIRES A GOOD DEAL OF CAUTION TO DETERMINE THAT:

1. COUNTERBORE IS PARALLEL TO THE TOP DECK
2. COUNTERBOR IS EXACTLY SQUARE WITH THE CONCENTRIC UPPER AND LOWER DECK BORE FIT DIAMETERS.

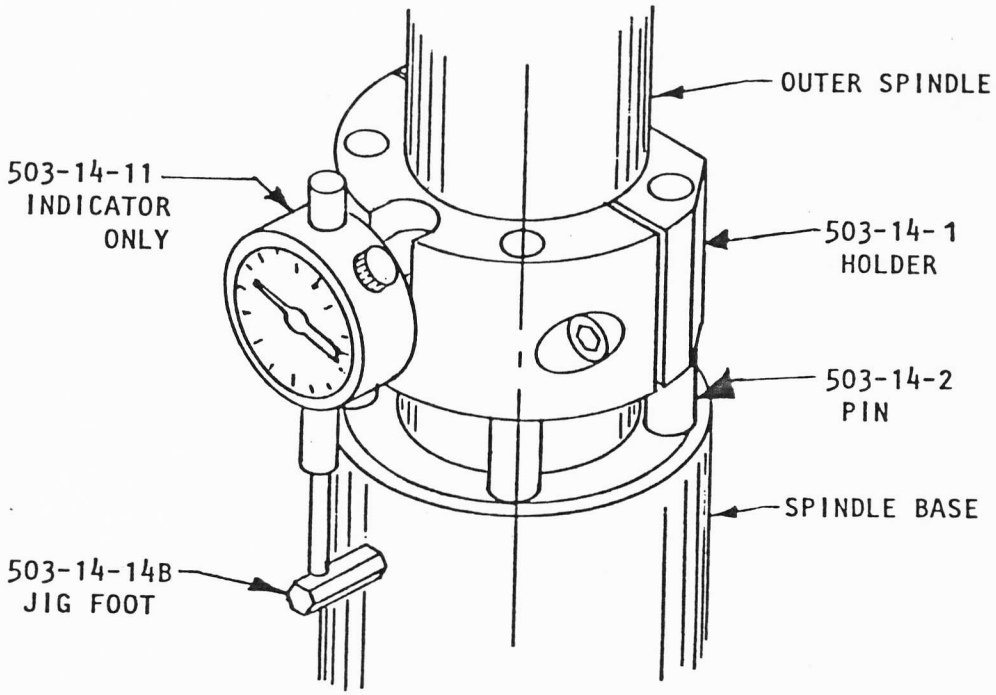
COUNTERBORING MAY BE BEST ACCOMPLISHED BY THE USE OF AN OPTIONAL 1'' TRAVEL DIAL INDICATOR ASSEMBLY, 503-14A.

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.

COUNTERBORING CON'T

THE DIAL DEPTH INDICATOR CLAMP IS MANUFACTURED WITH SPRING PINS SO IT WILL COMPENSATE FOR THE WEIGHT OF THE SPINDLE AND ALLOW VERY ACCURATE DEPTH CONTROL. IT MAY BE CLAMPED INTO ANY POSITION WITHIN THE MACHINE'S SPINDLE TRAVEL.

NOTE: 1/4 TURN OF THE RIGHT HAND CLAMP SCREW IS SUFFICIENT TIGHTENING FORCE. THIS WILL ALLOW THE COLLAR TO SLIP ON THE COLUMN (AFTER THE PINS RETRACT INTO COLLAR) IF THE COLLAR IS INADVERTENTLY LEFT IN WRONG POSITION DURING NORMAL CYCLE BORING OPERATION.



503-14A
DEPTH DIAL INDICATOR
ASS'Y

DEPTHS OF CUT

PRECISION FINISH BORES MAY BE CUT IN ONE PASS WITH STOCK REMOVAL UP TO .060 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

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

TOOL BIT SHARPENING

CAUTION: EYE PROTECTION MUST BE WORN WHEN SHARPENING TOOL BITS.

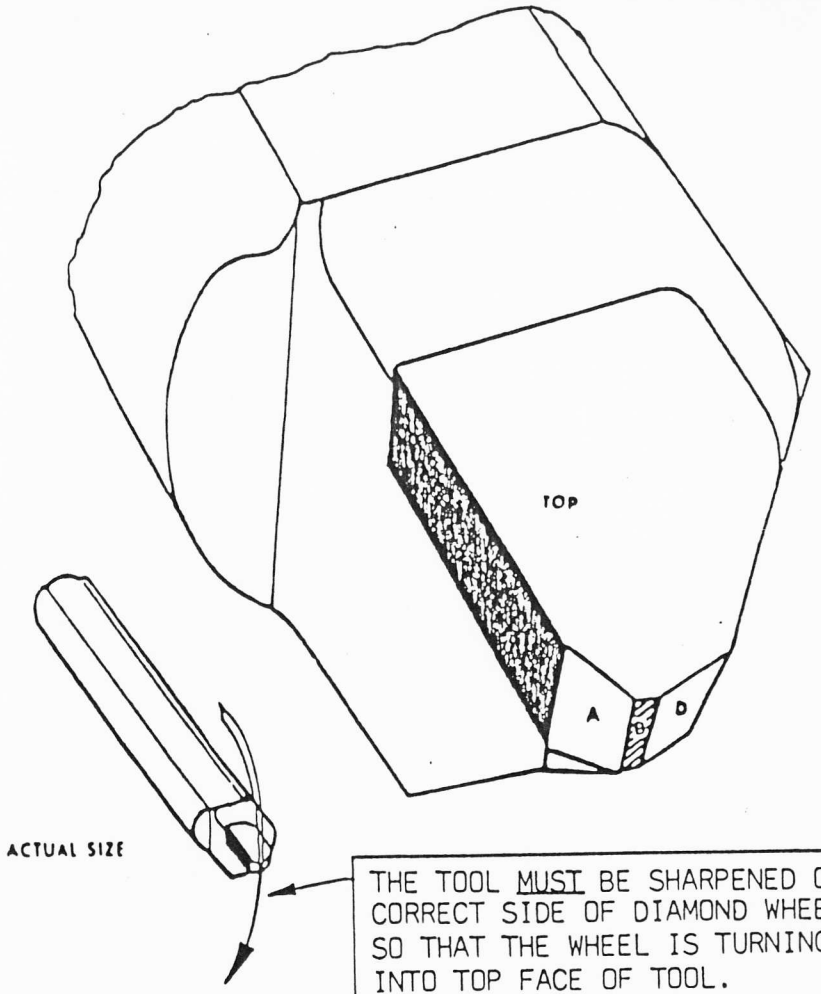
THE PERFORMANCE OF YOUR BORING BAR AND QUALITY OF WORK IT WILL DO, IS ALMOST ENTIRELY DEPENDENT OF THE CARE OF THE CUTTING TOOL. IT IS THE MOST FREQUENT CAUSE OF SIZE AND FINISH PROBLEMS IN BORING.

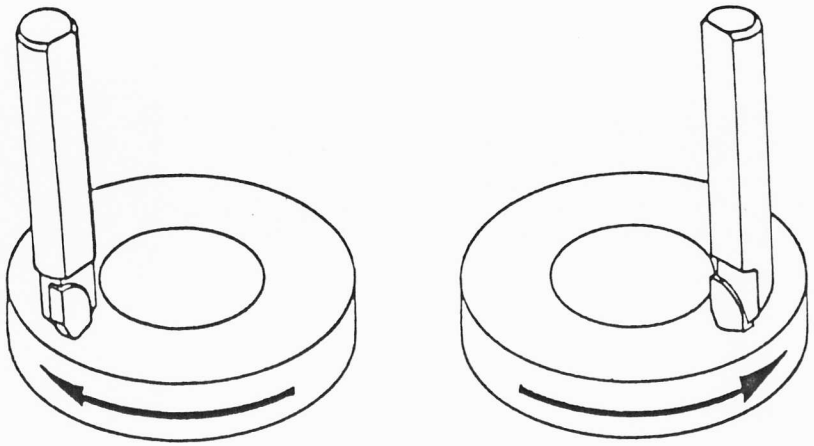
TO SHARPEN THE CARBIDE BIT, INSERT TOOL HOLDER IN THE SHARPENING JIG SLOT. PLACE THE JIG OVER THE PIN PROVIDED ON THE TOP OF THE MOTOR HOUSING AND SHARPEN BITS ON THE SMALL DIAMOND WHEEL PROVIDED ON THE MOTOR SHAFT. ALWAYS MAKE SURE YOU SHARPEN THE TOOL ON THE SIDE OF THE DIAMOND WHEEL THAT IS RUNNING 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 WHICH WILL IMPROVE CUTTING AND PREVENT GROOVING OF THE DIAMOND WHEEL. AFTER SHARPENING A NUMBER OF TIMES DRESS EXCESS STEEL AWAY FROM THE CARBIDE WITH A GRINDING WHEEL. CAUTION: SEE SHEETS FOR TOOL SHARPENING REQUIREMENTS.

NOTE: THE TOP SURFACE WILL CRATER .010 TO .015 BACK OF THE TIP WITH CONSIDERABLE BORING, SO THE TIP SHOULD BE OCCASIONALLY DRESSED BACK .020 TO .025. A SILICON CARBIDE (GREEN) GRIT GRINDING WHEEL WILL REMOVE THE CARBIDE MATERIAL QUICKLY, WHICH WILL REDUCE WEAR ON DIAMOND WHEEL.

CAUTION: THE DIAMOND WHEEL IS NOT SUITABLE FOR RAPID STOCK REMOVAL AND IS DESIGNED FOR CARBIDE ONLY. 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 TOP OF THE TOOL BIT. GRIND OR DRESS FRONT AND SIDES ONLY.





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 .015 ON ALL STUB BORING HEADS AND LONG BORE OPERATIONS. SEE PAGE 19 FOR EXACT ''B'' LAND REQUIREMENT.

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 TOO 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.

TOOL SHARPENING REQUIREMENTS

CAUTION: BORING DEPTH VS. TOOL SHARPENING

THE DA-5B 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 OF 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.

MAINTENANCE 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 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 TOOL SHARPENING TO PRECISION EDGE, IT SHOULD BE POSSIBLE TO BORE APPROXIMATELY TWENTY OVERSIZE CYLINDERS, PROVIDED THE CORRECT SPINDLE SPEED IT USED. THIS APPLIES TO MOST PASSENGER CAR BORES UNDER 4'', PROVIDED NO HARD SPOTS OR FOREIGN MATERIALS ARE IN THE CYLINDERS. THE SAME NUMBER OF SLEEVING CUTS CAN BE MADE ON LOW SPEED WITHOUT FURTHER SHARPENING, PROVIDED THE TOOL HAS AN ORIGINAL KEEN EDGE.

CENTERING FINGERS

CAUTION: MOTOR MUST BE TURNED OFF AND SPINDLE CLUTCH LEVER MUST BE IN THE UP DETENT POSITION DURING ANY CENTERING FINGER OPERATION.

CHANGING OR INSTALLATION OF CENTERING FINGERS

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 COUNTER-CLOCKWISE TO INSURE THAT FINGERS ENTER PINION TEETH SIMULTANEOUSLY.

CENTER ACCURACY CHECK

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.

PERIODICALLY CHECK THE CENTERING FINGERS BY BORING A HOLD 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 HIGH FINGER OR FINGERS WITH A FILE AND REPEAT THE LAPPING PROCESS.

CENTER ACCURACY CHECK, CONT'D

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 high finger or fingers with a file and repeat the lapping process.

MICROMETER

Your boring micrometer, as with any 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 tool bit to snap into micrometer anvil. Care should be used in the method of lightly locking the tool bit before tightening, move the micrometer spindle away from the tool holder, before tightening.

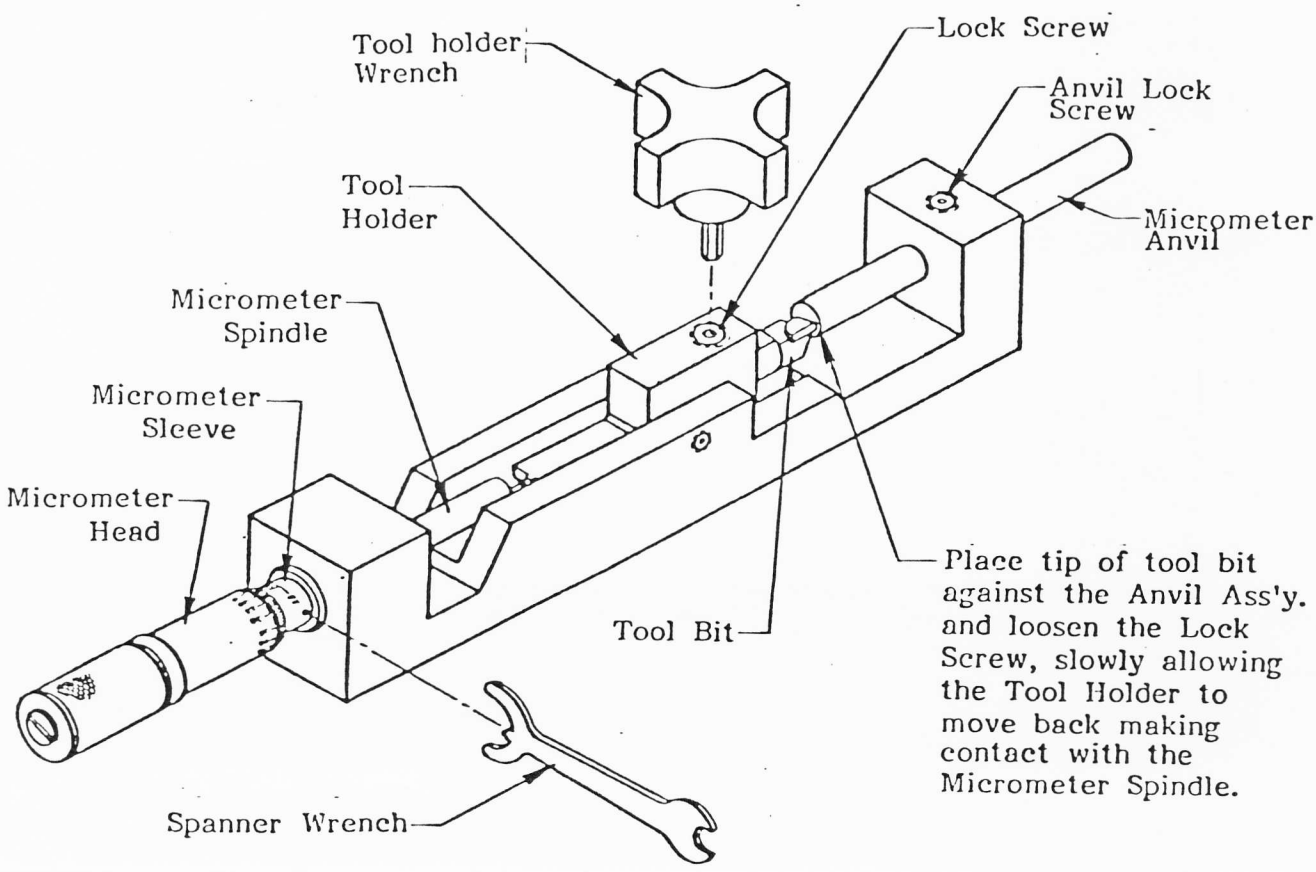
After a period of use, you will note that the tool bit tip will force a depression into the micrometer anvil. This, of course, will result in the inconsistent sizes, particularly after resharpening the bit. Periodically we recommend turning the anvil slightly and finally end for end so that a flat surface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

CALIBRATING TOOL SETTING MICROMETER

1. Bore a hole.

2. Remove tool holder and bit and place in micrometer.

3. Adjust micrometer so that it reads the same size as the hole you have bored. Small variations may be made by turning the micrometer sleeve with spanner wrench provided. Larger changes should be made by moving the anvil.



SETTING MICROMETER

TO SET DA-5B MICROMETER TO HIGH AND LOW READING, USING A MICROMETER WITH A 2.9'' TO 6'' READING.

CAUTION: THE STANDARD FOR YOUR DA-5B 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 IN MICROMETER AND ADJUST MIKE ANVIL SO THAT MIKE READS 6''. (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 NOT 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.

IMPORTANT

MAINTENANCE

LUBRICATION

DA-5B STYLE

✳ THE DA-5B 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 BEARINGS SHOULD BE LUBRICATED MONTHLY. BY ADDING A FEW DROPS OF THREE AND ONE OIL, OR UNION OIL - UNION 75, OR A VERY LIGHT SPINDLE OR SEWING MACHINE OIL. (LESS THAN S.A.E. 5) TO THE BEARING, ADD BY REMOVING THE SMALL COVER ON THE FRONT OF THE UPPER HOUSING AND ADD LUBRICANT TO THE TAKE UP NUT AREA BETWEEN THE CLUTCHING TEETH.

○ THE LOWER MOTOR HOUSING UNITS' OIL LEVEL SHOULD BE CHECKED MONTHLY. CHECK BY REMOVING THE PIPE PLUG ON THE LEFT SIDE OF THE LOWER GEAR HOUSING, OIL LEVEL 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. USE UNION SAE 90 MULTIPURPOSE GEAR LUBRICANT OR ANY EQUIVALENT S.A.E. 90 GEAR LUBRICANT.

NOTE: ON OLDER MACHINES, WHICH DO NOT HAVE OIL BREATHER CUP ON LEFT SIDE OF LOWER GEAR HOUSING, REQUIRE GREASE IN THIS HOUSING. THIS GREASE SHOULD BE KEPT AT THE SAME LEVEL AS THE OIL GEAR HOUSING ABOVE. ADD, WHEN NEEDED, 3 PARTS UNION OIL UNOBA F1 OR F2 LUBE TO 1 PART SAE 90 MULTIPURPOSE GEAR LUBRICANT.

LUBRICATION, DA-5B, STYLE, CON'T

□ IF YOUR DA-5B 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, OR LUBRIPLATE #930-AAA, OR ANY EQUIVALENT LITHUIM BARIUM GREASE.

⊙ 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.

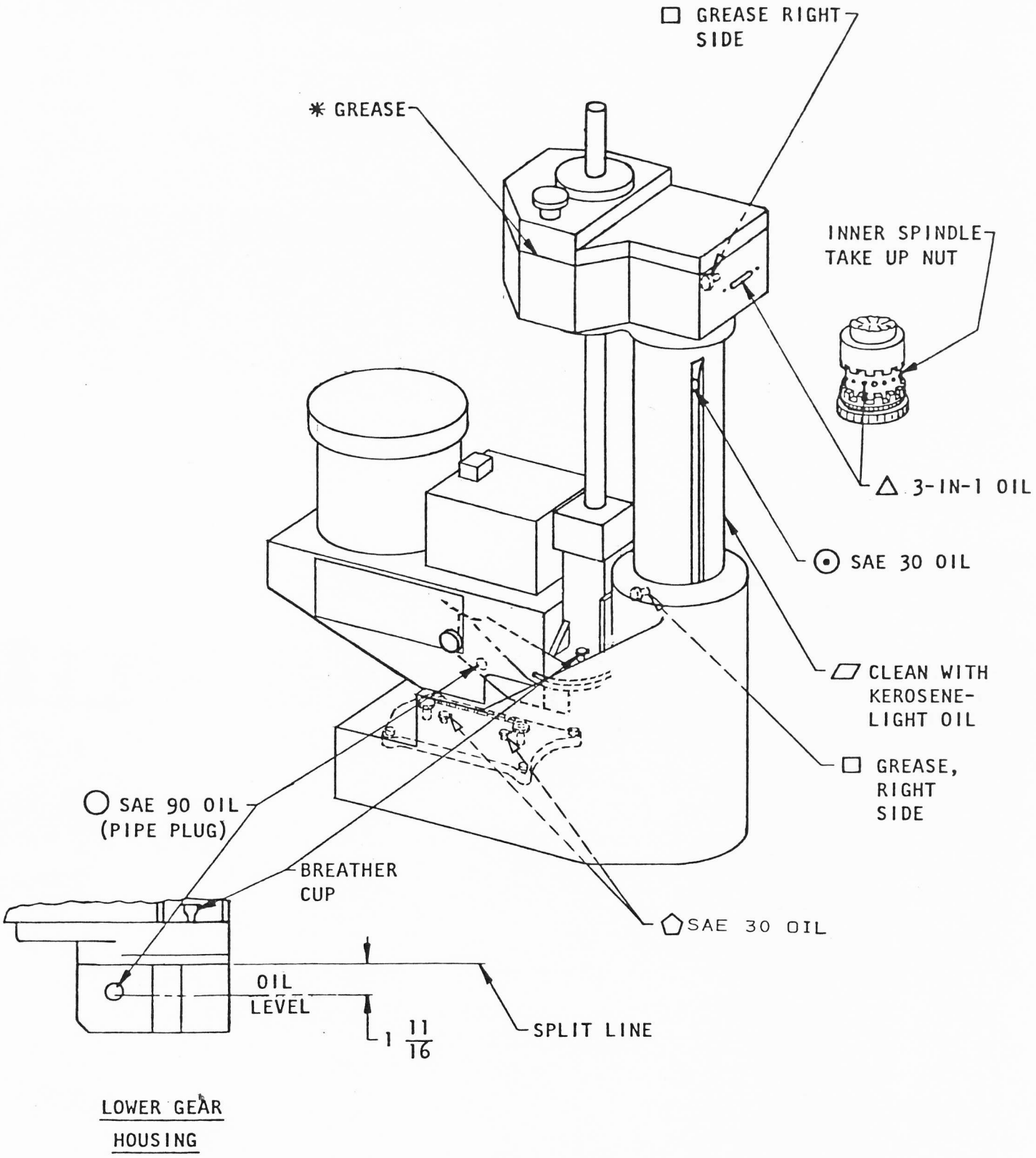
▱ MAIN SPINDLE SURFACE SHOULD BE CLEANED WITH KEROSENE WEEKLY AND OCCASIONALLY A LIGHT WEIGHT OIL APPLIED TO PREVENT EXCESSIVE DRYNESS.

⬠ A SMALL AMOUNT OF S.A.E. 30 MACHINE OIL CAN BE ADDED WEEKLY TO THE OIL CUPS ON THE HOLD DOWN BRACKET PLATE, ALSO AT THE SAME TIME A SMALL AMOUNT OF OIL CAN BE APPLIED TO THE CHAIN.

CAUTION horizontal or inverted

To ensure adequate lubrication for spindle bearing, the Boring Bar should be run in the vertical position (with feed controls up) for at least 5 minutes after each 8 hours of horizontal or inverted boring, at light or medium loads.

At heavy loads the time intervals should be reduced.



LOWER GEAR HOUSING

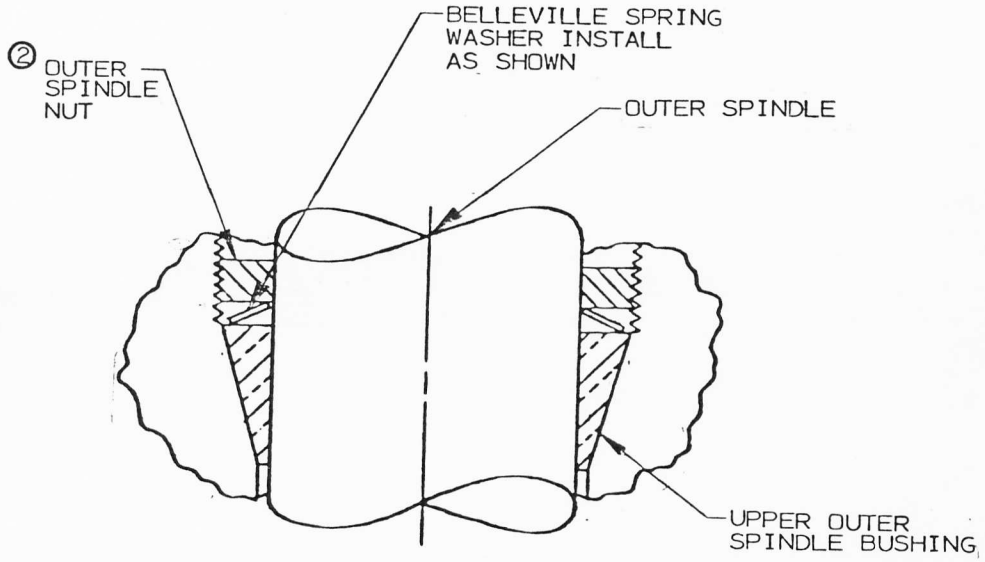
LUBRICATION

ADJUSTMENT OF OUTER SPINDLE

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

The upper bearing is preloaded in place by a Belleville spring washer, below the adjustment nut. This adjustment should be checked after the shipment of the machine, since shock to the machine during shipment may result in some set of the spring.

CAUTION: Caution should be used in adjusting these bearings in order to avoid a too tight spindle which only serves to wear out the machine and make control operation difficult. If it should be necessary to adjust, see Page 42



1. Run spindle down approx. 4" to 6" loosen the #8-32 set screw & loosen all outer spindle nuts (503-18).

2. Tighten the lower bushing (503-11B), by tightening the outer spindle nut marked 1, until 10 to 15 lbs. of effort is required to operate the hand feed handle. Lightly tighten #8-32 set screw.

3. Repeat this sequence (2) on the upper bushing, by tightening the outer spindle nut mark 2, Take care that the hand feed operates only slightly tighter or 15 to 20 lbs. of effort is required to operate the hand feed handle.

4. Traverse the bar at all points of travel and make sure the hand feed works easily. Spindles are ground slightly tapered to secure max. rigidity at lower limits of travel.

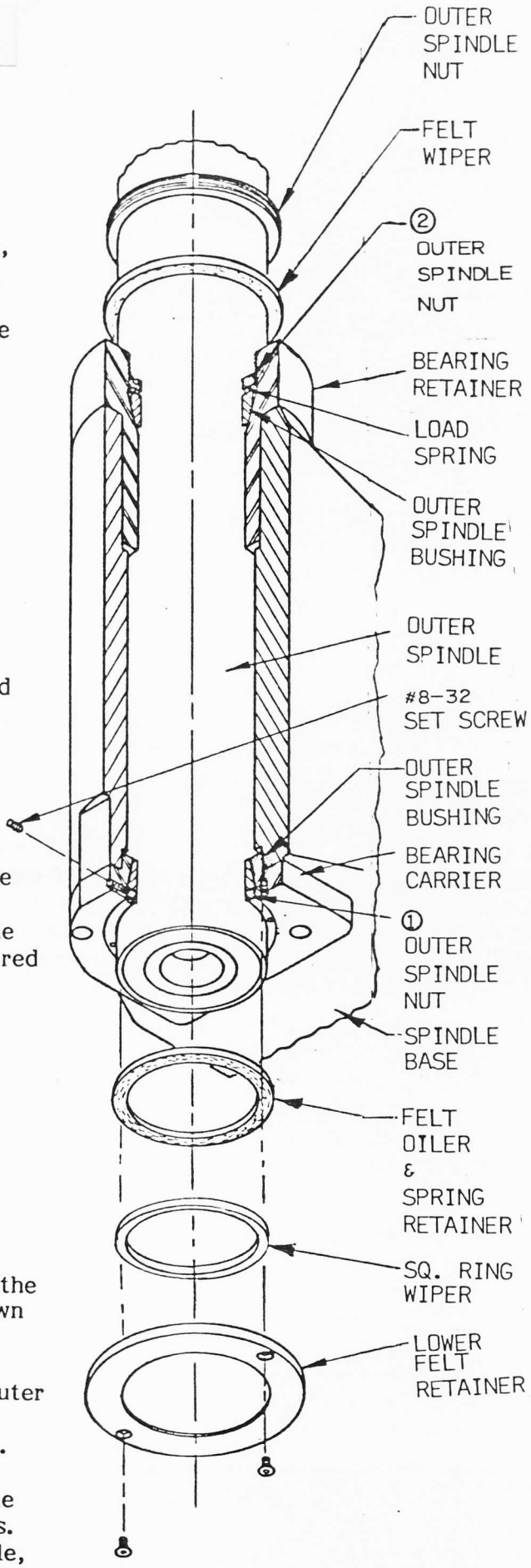
5. Spindle adjustment may also be checked by hand feeding the spindle down and pulling the slack out of feed mechanism by pulling down the upper gear housing. Pressure required at tightest point is indicated in chart below.

STYLE MACH.	PRESSURE REQUIRED
DA-0, -0B & -OC	30 - 50 lbs.
FA & F-2B	50 - 75 lbs.
FA-4 , IDA-4 DA-5 & 6IDA-6B	60 - 80 lbs.

In order to recheck the fiction on the spindle it is necessary to crank down again to create backlash.

6. Avoid excessive tension on upper outer spindle nut 2, otherwise tool bit dragback marks will appear in bore.

7. Excessive tightening of outer spindle nuts will cause strain on feed gears. and cause spindle to have an audible, excess resistance.



VITAL OUTER SPINDLE ADJUSTMENT

ADJUSTMENT OF INNER SPINDLE

1. REMOVE TWO SCREWS AND SMALL COVER ON THE FRONT SIDE OF THE UPPER HOUSING.

2. REMOVE THE STOP SCREW RESTRICTING THE UP TRAVEL OF THE SPINDLE CLUTCH LEVER AND MOVE THE LEVER TO FULL UP POSITION (SEE DETAIL 6). ROTATE THE SPINDLE APPROXIMATELY 1/2 TURN AWAY FROM THE DETENT SPRING. POSITION THE TOOL HOLDER SLOT TO THE REAR.

3. INSERT A 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 THE SPINDLE KNOB WITH ONE HAND AND TURN THE 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 THE HIGH SPEED MAKING SURE THERE IS ONLY SLIGHT HEATING AT THE BOTTOM SPINDLE. IF THE HEAT IS EXCESSIVE, BACK OFF ONE NOTCH FURTHER.

CAUTION: BE SURE THE DETENT IS IN A NOTCH, NOT MIDWAY BETWEEN THE NOTCHES.

4. REPLACE THE COVER. READJUST THE SPINDLE CLUTCH CONTROL STOP SCREW.

RAPID RETURN TRAVERSE

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 (550-40 VIEW F). IMMEDIATELY ON LIFTING THE PIN IN THE CARTRIDGE ASSEMBLY (550-40) 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.

UPPER HOUSING BACK FEED ADJUSTMENT

TO ADJUST THE FEED SCREW PLAY IN THE UPPER HOUSING:

First loosen and back off approximately 1/16" the three round head screws around the feed screw, in the upper housing. Then loosen the three (3) adjusting screw lock nuts, then adjusting screws.

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 this bearing clearance. Spring should be flat, but no pressure above that which is required to flatten spring, should be used.

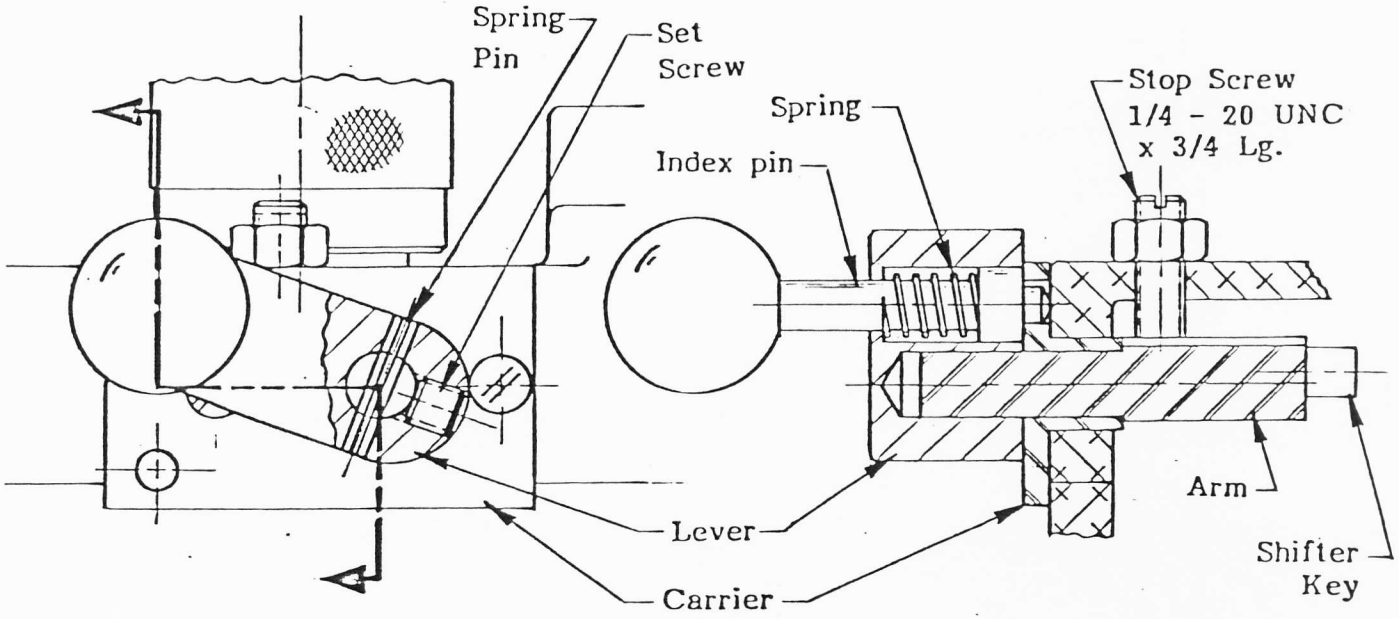
Turn adjusting screw back 1/3 turn to allow for running clearance. Hold adjusting screw with and allen wrench and lock them with lock nut.

Run motor with lower gear box engaged, so that the feed screw is turning, to center bearing retainer. Turn off motor, tighten evenly the (3) upper round head screws.

SPINDLE CONTROL LEVER ADJUSTMENT

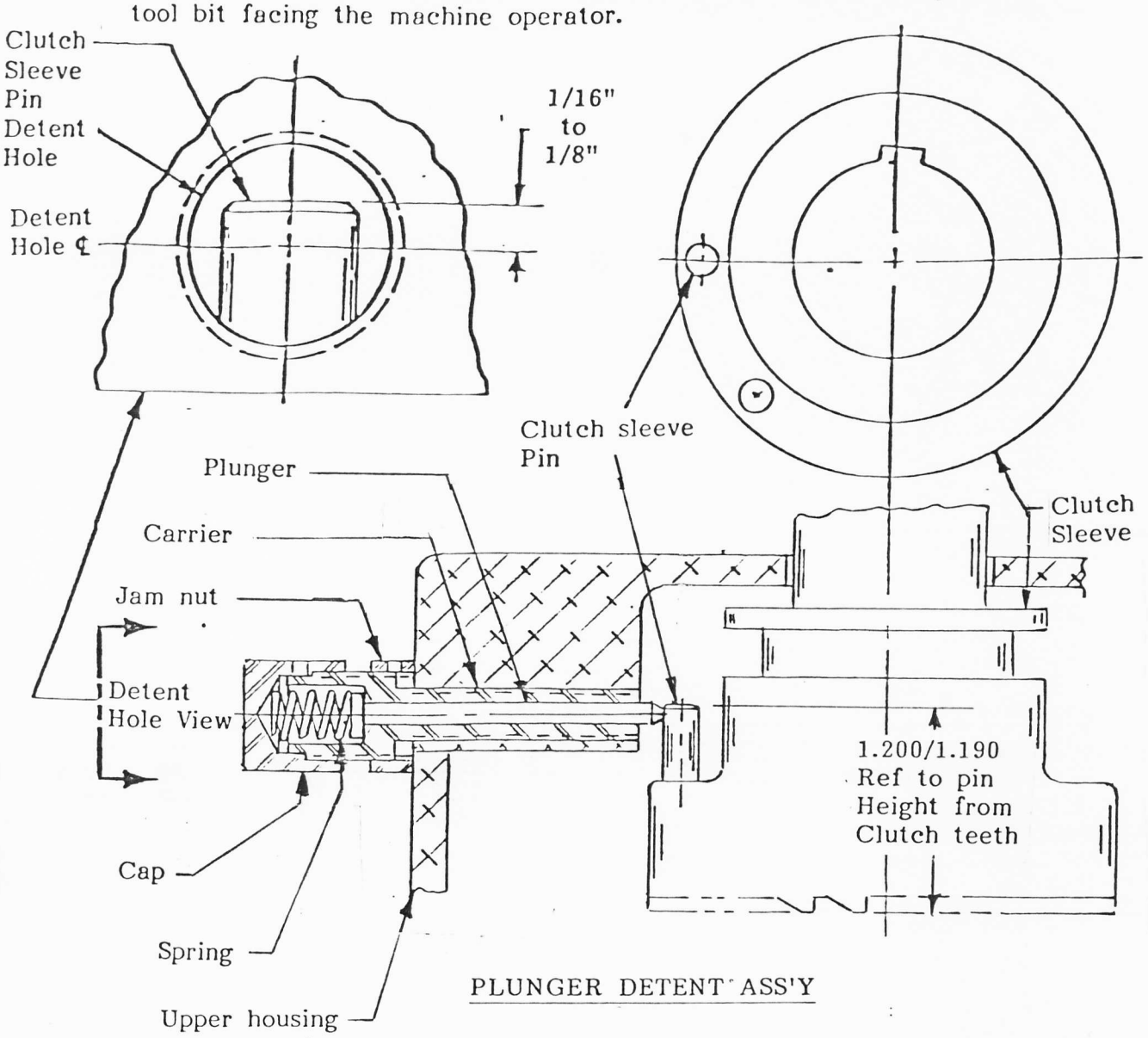
To re-adjust the spindle control lever, first loosen the stop screw lock nut, then the stop screw.

Raise the control lever to its neutral (up) position (detent pin engaged) adjust the stop screw so that the lever will not go any higher, lock with the lock nut.



SPINDLE STOP DETENT ADJUSTMENT

The purpose of the detent is to stop the spindle from turning with the tool bit facing the machine operator.

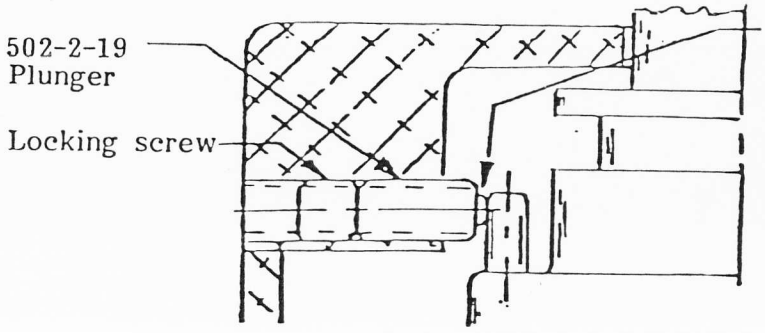


PLUNGER DETENT ASS'Y

TO SET PLUMGER DETENT

(1) Remove plunger detent
(2) Raise clutch lever to upper detent position.
(3) Inspect clutch pin thru detent hole to be sure top of pin is above center of hole (see above view). Replace pin if it is below
(4) Screw in plunger detent until it touches pin.
(5) Turn plunger 3/4 to 1 turns beyond touch position.
(6) Tighten jam nut against gearbox.

OLD STYLE PLUNGER DENTENT 502-2-19



DO NOT EXCEED 1/2 TURN OF DETENT FROM POINT OF CONTACT WITH CLUTCH PIN. IF EXCEEDED, THE BALL MAY DISLODGE AND DAMAGE THE INTERNAL COMPONTENTS.

EXCESSIVE LOADS

NOTE: IF EXCESSIVE LOADS ARE IMPOSED ON YOUR BORING BAR THE FOLLOWING OCCURS:

1. THRUST LOADS

IF THE BAR IS FED OR RAPID TRAVELED INTO AN OBJECT THAT IMPOSES AN EXCESSIVE THRUST LOAD ON THE 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 THE MOTOR WILL CONTINUE TO RUN BUT FEED SCREW WILL NOT TURN AT ALL. FOR REPLACEMENT OF BRASS THRUST NUT, 500-41, SEE REMOVAL OF FEED SLEEVE AND BEARING.

CAUTION: DISCONNECT ALL ELECTRICAL POWER TO BORING BAR BEFORE MAKING ANY REPAIRS.

DISASSEMBLY OF V-BELT CASE

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 SIDE 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 SIDE 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.

MOTOR CLAMP ADJUSTMENT

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.

DISASSEMBLY OF MOTOR HOUSING

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

CAUTION: DISCONNECT ALL ELECTRICAL POWER TO BORING BAR BEFORE MAKING ANY REPAIRS.

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 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.

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, AND SCREW DRIVE GEAR, 500-88, AND HOUSING WILL COME APART. PINION SHAFT 500-87, WITH CLUTCH AND GEARS MAY BE TAPPED OUT WITH SMALL PUNCH THROUGH CENTER HOLE IN BOTTOM OF GEAR POT.

DISASSEMBLY OF UPPER HOUSING AND SPINDLE REMOVAL

REMOVE CUTTER HEAD.

REMOVE 502-10-11 KNOB AND THE 502-27-22 KNOB BY REMOVING ITS SCREW. REMOVE 600-18-2 KNOB BY RELEASING SOCKET SET SCREW. YOU MAY THEN REMOVE DRAW TUBE AND 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, 500-35A. CAUTION: DO NOT LOSE TRIP SPRING. REMOVE 6 SCREWS HOLDING UPPER HOUSING SECTIONS TOGETHER AND LIFT OFF UPPER LID, 502-9-14D.

NOW SHIFTING LEVER 500-38A, 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, 502-10-12A WITH ITS THRUST WASHER, 500-15.

NOW REMOVE SNAP RING, 502-10-16, FROM TWO SPEEDS FEED SHAFT, UPPER FEED DRIVE GEAR, 502-10-8A, THRUST WASHER, 501-21, LOWER FEED DRIVE GEAR, 502-10-9A, THEN REMOVE RETAINER, 502-9-15, BEND L OCK 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 the 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, woodruff key and two Belleville washer 502-9-72A. Inner spindle may be removed.
Press off tapered roller bearing 502-9-67. When reassembling make sure cone and cup are solidly seated against their shoulders.

NOTE: Do not hit or damage bearing case.

Press off thrust ball bearing 502-9-72 out of outer spindle.

NOTE: Direction of thrust and reassembly the same way.

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

DISASSEMBLY OF UPPER HOUSING AND SPINDLE REMOVAL CON'T

NOTE: On reassembly, thrust bearing has one race with a small I.D. which is mounted "UP" in gear housing.

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 spring from snapping out.

REMOVAL AND DISASSEMBLY OF CHAIN DRIVEN INTERNAL CLAMP DEVICE

TO REMOVE CLAMP DEVICE FROM SPINDLE BASE, FIRST REMOVE SPROCKET COVER AND END COVER. THEN TURN HAND KNOB TILL T-SLOT BEAM IS UP AGAINST THE HOLD DOWN BRACKET, NOW YOU CAN LIFT OUT THE ASSEMBLY.

TO REMOVE CHAIN, REMOVE SPRING CLIP OF CONNECTING LINK, THEN TAP OUT CONNECTING LINK.

NOTE: ON REASSEMBLY OF CLAMP DEVICE, THE CHAIN AND THREAD OF SPROCKED SHAFT IN T-SLOT BEAM, MUST BE TIMED SO THAT T-SLOT BEAM IS PULLED UP PARALLEL WITH HOLD DOWN BRACKET, 511-3-1.

COMMON CAUSES OF TROUBLE

(POOR FINISH, INACCURATE HOLES, EXCESSIVE TOOL BIT HEAT, EXCESSIVE TOOL DRAG 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.

IT IS POSSIBLE DIRT OR LUBRICANT USED TO CLEAN OUTER SPINDLE MAY ENTER LOWER CUTTER, AND THE ASSEMBLY CONTAINING A CHATTER DAMPENING DEVICE. (600-20-9). THE RESULT OF THIS WOULD BE TO ENCOUNTER SPINDLE CHATTER AT BOTTOM OF BORE, PARTICULARLY ON LONG BORES.

CLEAN THE INSIDE OF THIS ASSEMBLY EXTREMELY CAUTIOUSLY AND THOROUGHLY, LEAVING COMPLETELY DRY. TOLERANCES ON THESE PARTS ARE EXTREMELY CLOSE AND MUCH CARE SHOULD BE USED.

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.

A LOOSE OUTER SPINDLE BEARING WILL NOT GENERALLY RESULT IN TAPER OR INACCURATE BORES, BUT CAN ALLOW SPINDLE TO DROP SLACK IN FEED NUT, RESULTING IN A MARK IN THE CYLINDER.

CUTTING TOOL DRAG BACK LINES

STANDARD 'F' & 'D' SERIES ROTTLER CYLINDER REBORING EQUIPMENT IS DESIGNED TO MINIMIZE TOOL RETURN DRAG BACK LINES BY BRINGING THE TOOL BIT TO THE FRONT OF THE MACHINE SO THAT THE OFFSET RETURN THRUST OF THE FEED SCREW CAN SLIGHTLY DEFLECT THE SPINDLE AWAY FROM THE CYLINDER WALL.

IT IS COMMON FOR MACHINES TO MAKE A FAINT WITHDRAWAL MARK PARTICULARLY AT THE BOTTOM OF THE CYLINDER. VERY LIGHT HONING (.0005'') SHOULD REMOVE ALL TRACES OF THE MARK.

TOOL MARKS CAN, OF COURSE, BE COMPLETELY ELIMINATED BY OFF SETTING THE SPINDLE AWAY FROM TOOL BIT WHILE RETURNING THE SPINDLE.

HERE ARE THE MAINTENANCE STEPS YOU CAN TAKE TO MINIMIZE TOOL DRAG BACK:

1. CHECK TOOL BIT FOR SHARP FREE CUTTING ABILITY. A TOO WIDE B LAND AND NEGATIVE RAKES WILL CAUSE DRAG BACK PARTICULARLY ON STUB BORING HEADS.

2. CHECK INNER SPINDLE BEARING ADJUSTMENT IN ACCORDANCE WITH MANUAL.

3. CHECK OUTER SPINDLE BEARING ADJUSTMENT IN ACCORDANCE WITH MANUAL. A SLIGHTLY HEAVIER DRAG ON THE LOWER OUTER SPINDLE BEARING AND FREE UPPER ADJUSTMENT WILL IMPROVE TOOL DRAG MARKS. IT MAY BE NECESSARY, IF PROBLEMS PERSIST, TO ROTATE THE UPPER SLEEVE BEARING APPROXIMATELY 90 DEGREES IN ORDER TO RESEAT THE BEARING FOR BETTER UP STROKE RELIEF.

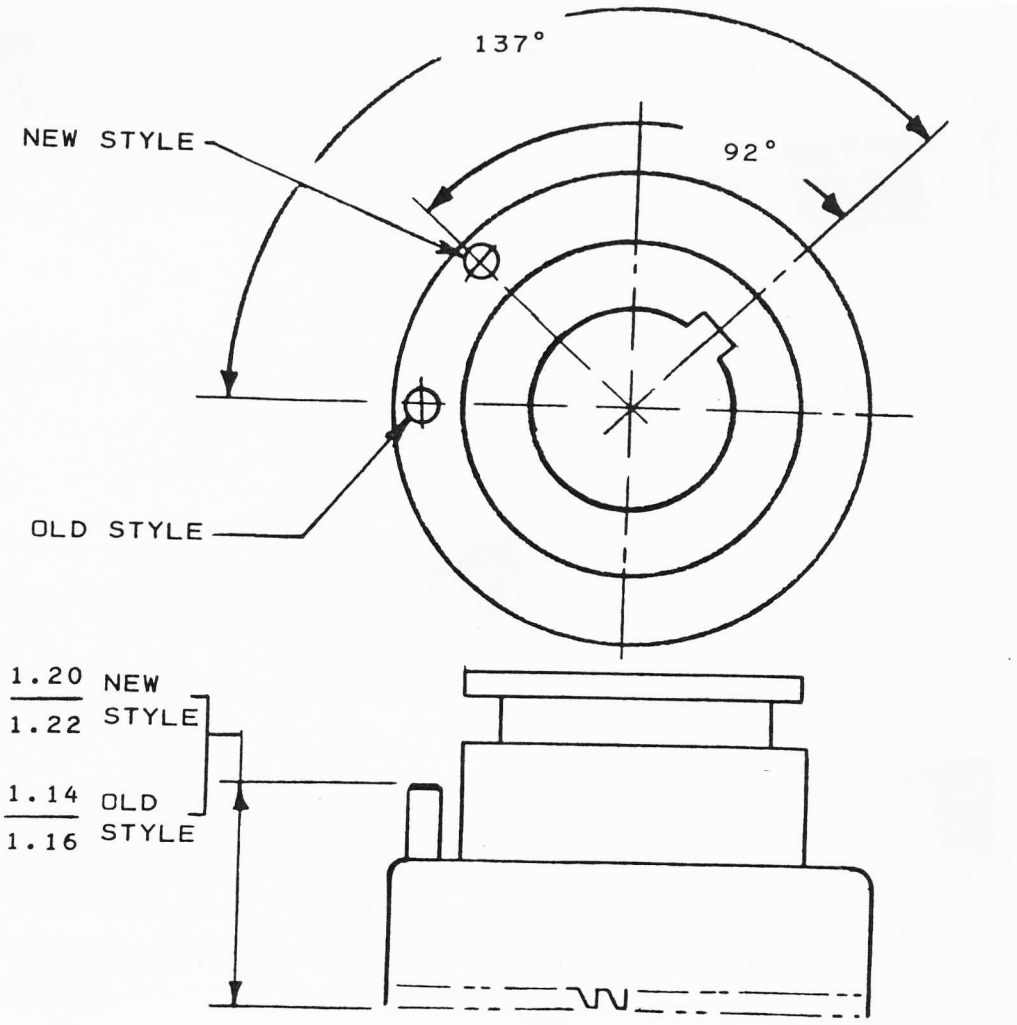
STOP PIN ASSEMBLY IN 500-3 CLUTCH SLEEVE

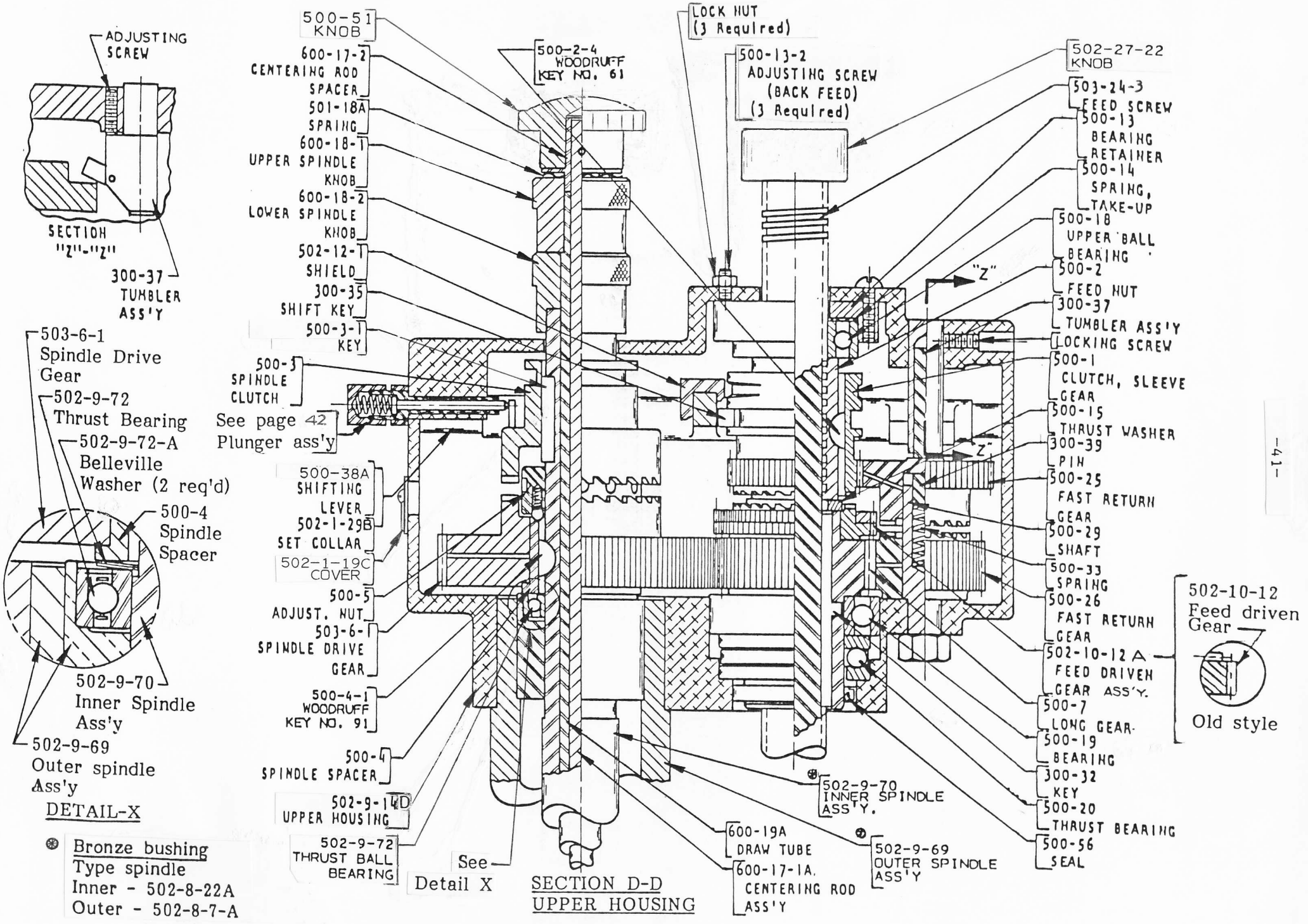
FOR (OLD AND NEW STYLE BALL DETENT)

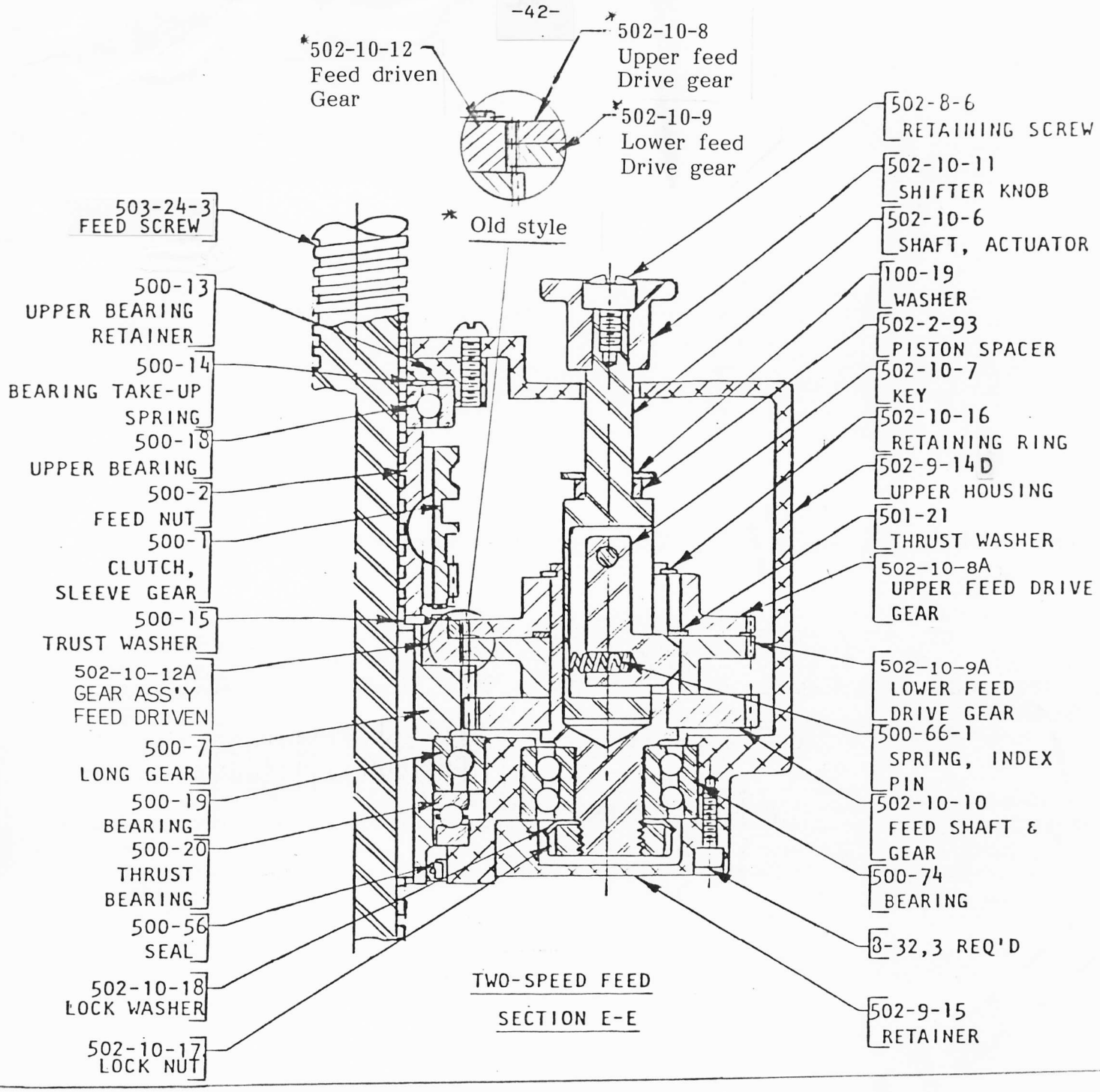
REFER TO THE UPPER HOUSING DRAWING FOR THE OLD AND NEW BALL DETENT STYLES. PRESS PIN INTO CORRECT CLUTCH SLEEVE HOLE TO THE HEIGHT SHOWN BELOW.

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.

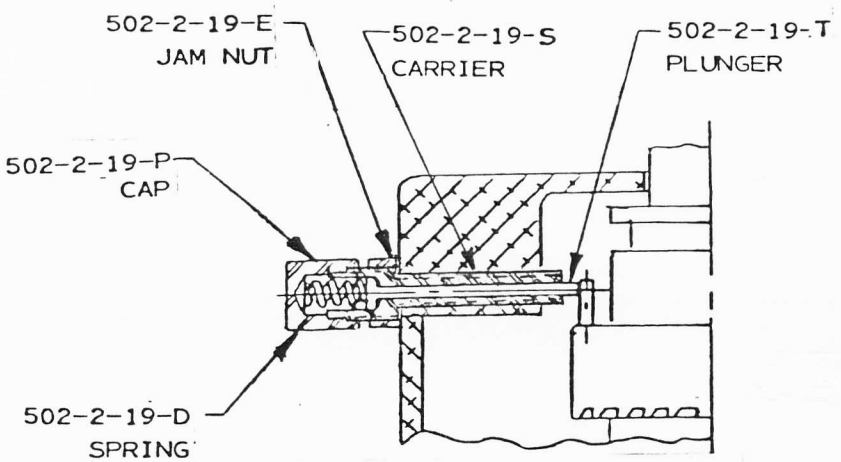



ADJUSTING SCREW
SECTION "Z"-"Z"
300-37 TUMBLER ASS'Y
503-6-1 Spindle Drive Gear
502-9-72 Thrust Bearing
502-9-72-A Belleville Washer (2 req'd)
500-4 Spindle Spacer
502-9-70 Inner Spindle Ass'y
502-9-69 Outer spindle Ass'y
DETAIL-X
500-51 KNOB
600-17-2 CENTERING ROD SPACER
501-18A SPRING
600-18-1 UPPER SPINDLE KNOB
600-18-2 LOWER SPINDLE KNOB
502-12-1 SHIELD
300-35 SHIFT KEY
500-3-1 KEY
500-3 SPINDLE CLUTCH
See page 42 Plunger ass'y
500-38A SHIFTING LEVER
502-1-29B SET COLLAR
502-1-19C COVER
500-5 ADJUST. NUT
503-6-1 SPINDLE DRIVE GEAR
500-4-1 WOODRUFF KEY NO. 91
500-4 SPINDLE SPACER
502-9-14D UPPER HOUSING
502-9-72 THRUST BALL BEARING
500-2-4 WOODRUFF KEY NO. 61
LOCK NUT (3 Required)
500-13-2 ADJUSTING SCREW (BACK FEED) (3 Required)
See Detail X
SECTION D-D UPPER HOUSING
600-19A DRAW TUBE
600-17-1A. CENTERING ROD ASS'Y
502-9-70 INNER SPINDLE ASS'Y.
502-9-69 OUTER SPINDLE ASS'Y
502-27-22 KNOB
503-24-3 FEED SCREW
500-13 BEARING RETAINER
500-14 SPRING, TAKE-UP
500-18 UPPER BALL BEARING
500-2 FEED NUT
300-37 TUMBLER ASS'Y
LOCKING SCREW
500-1 CLUTCH, SLEEVE GEAR
500-15 THRUST WASHER
300-39 PIN
500-25 FAST RETURN GEAR
500-29 SHAFT
500-33 SPRING
500-26 FAST RETURN GEAR
502-10-12 A FEED DRIVEN GEAR ASS'Y.
500-7 LONG GEAR
500-19 BEARING
300-32 KEY
500-20 THRUST BEARING
500-56 SEAL
"Z"
"Z"
502-10-12 Feed driven Gear
Old style
Bronze bushing Type spindle
Inner - 502-8-22A
Outer - 502-8-7-A



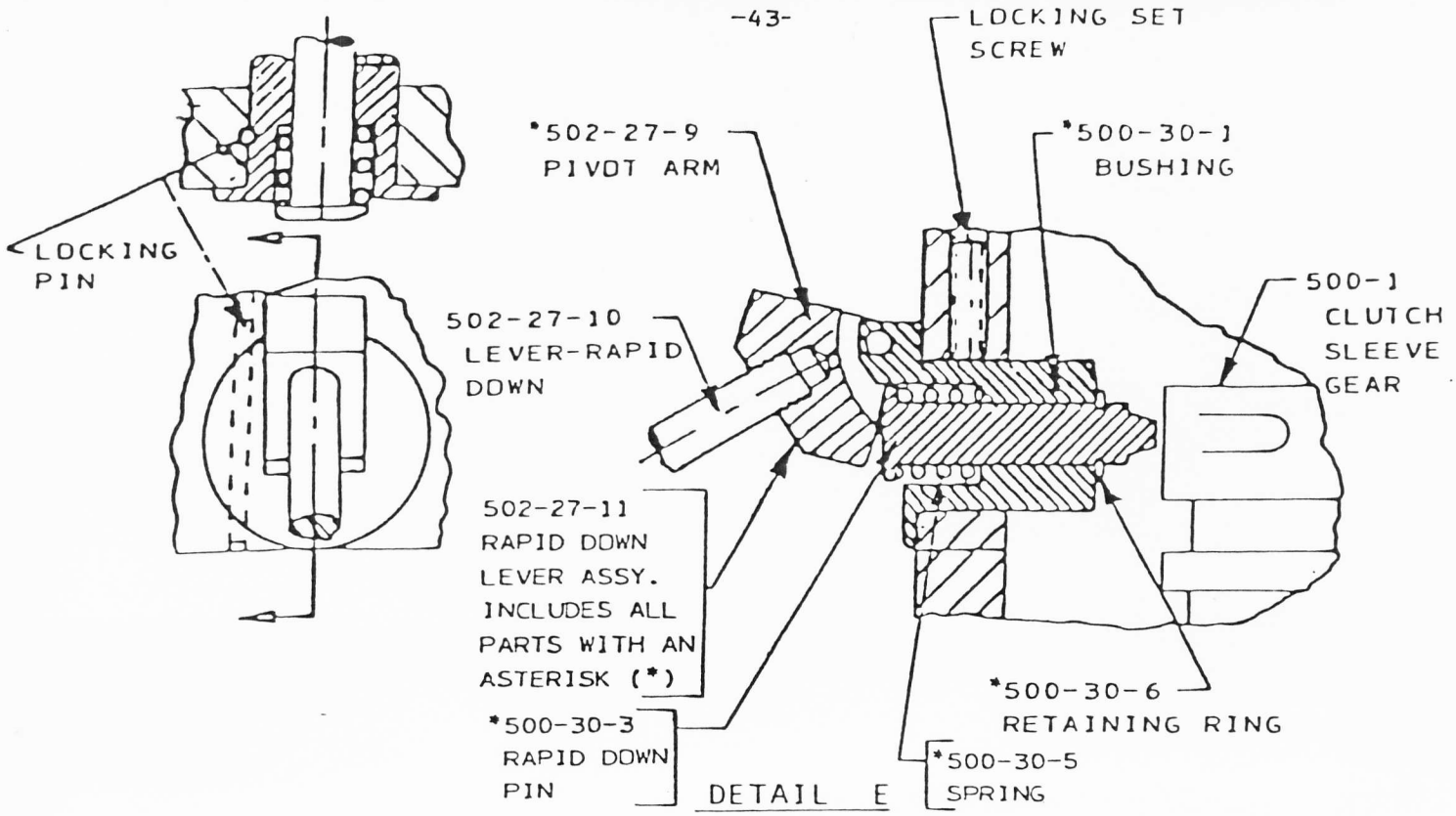
TWO-SPEED FEED

SECTION E-E

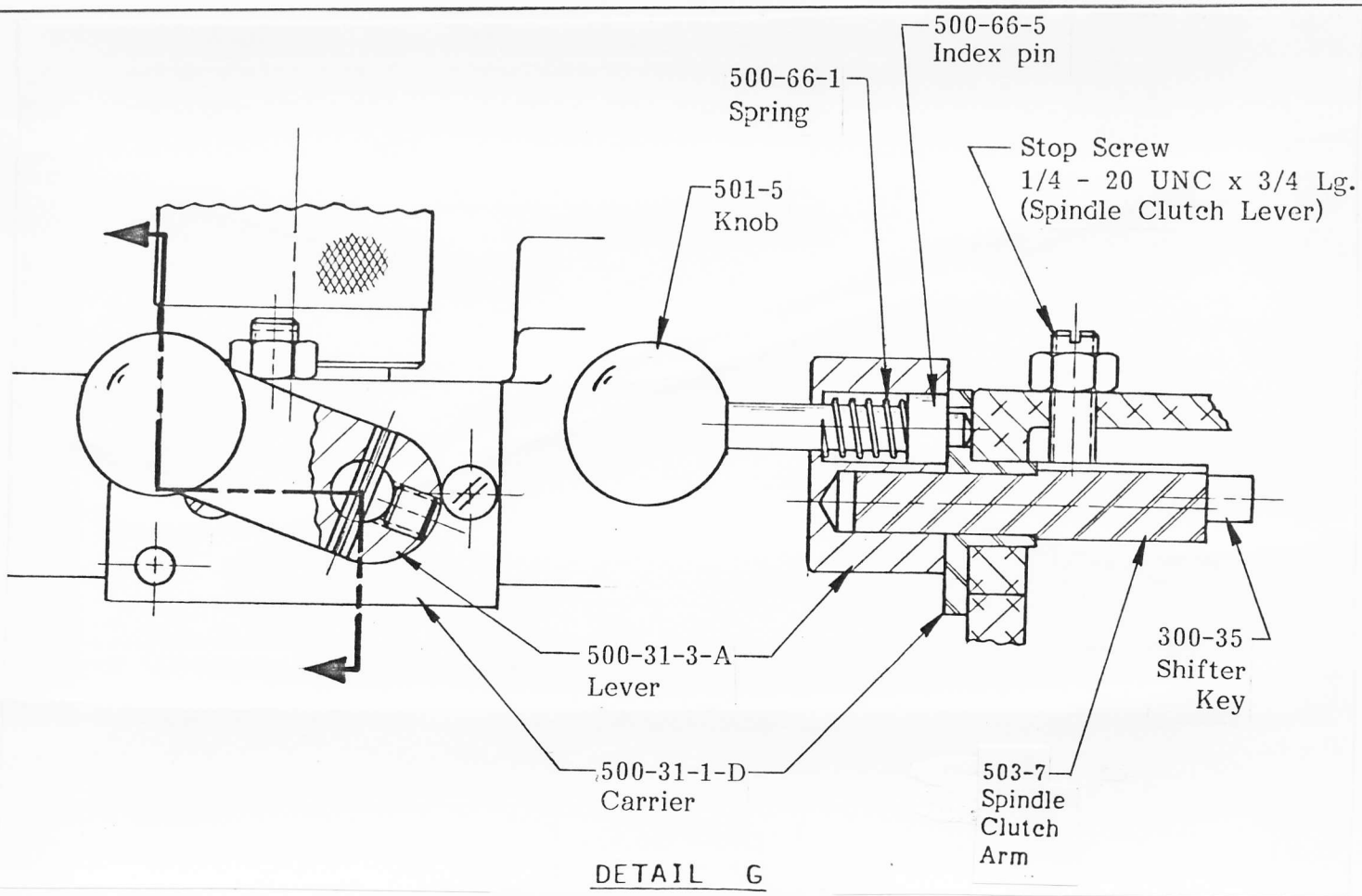


PLUNGER DETENT ASS'Y.

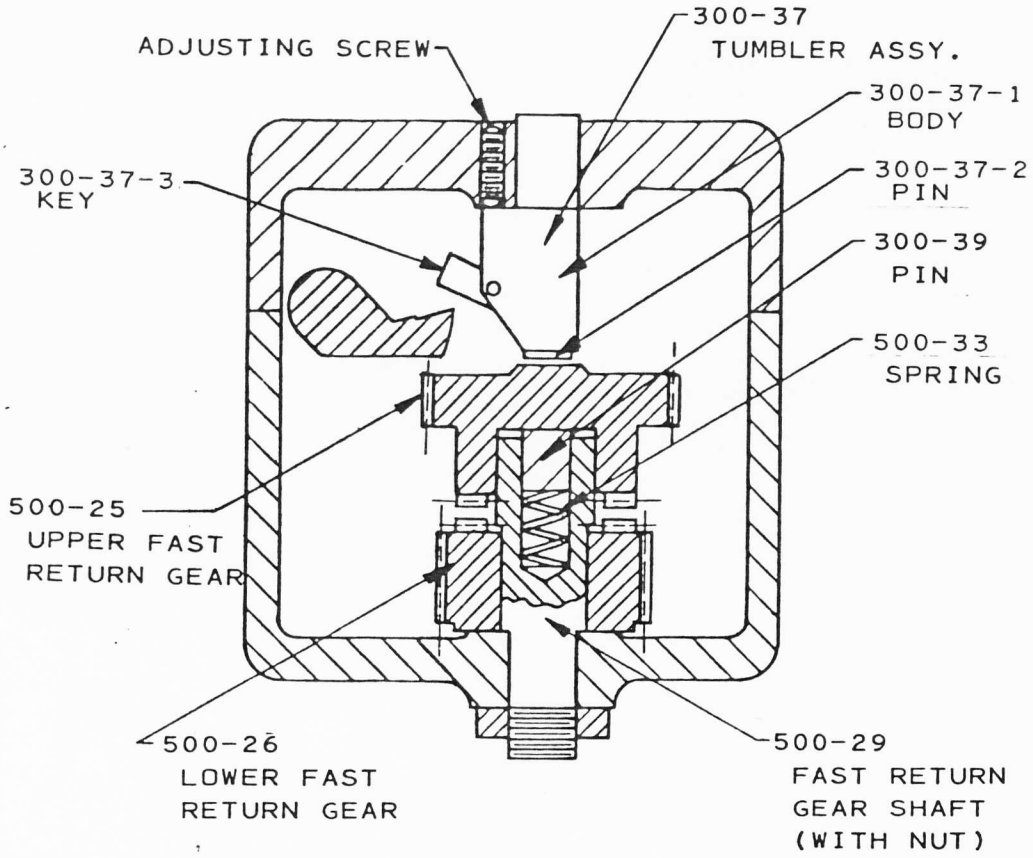
Pin type



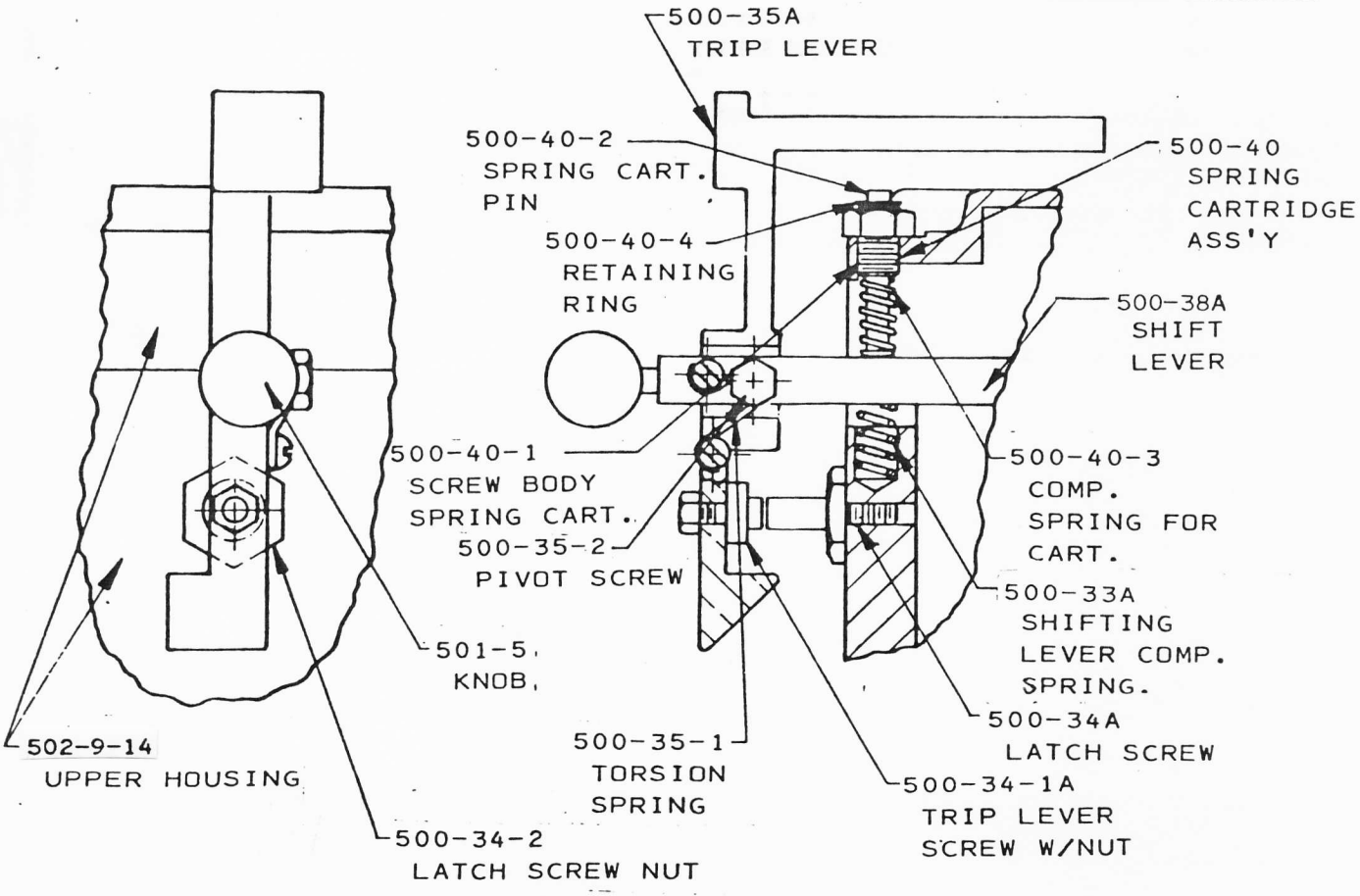
FAST DOWN LEVER



SPINDLE CLUTCH CONTROL

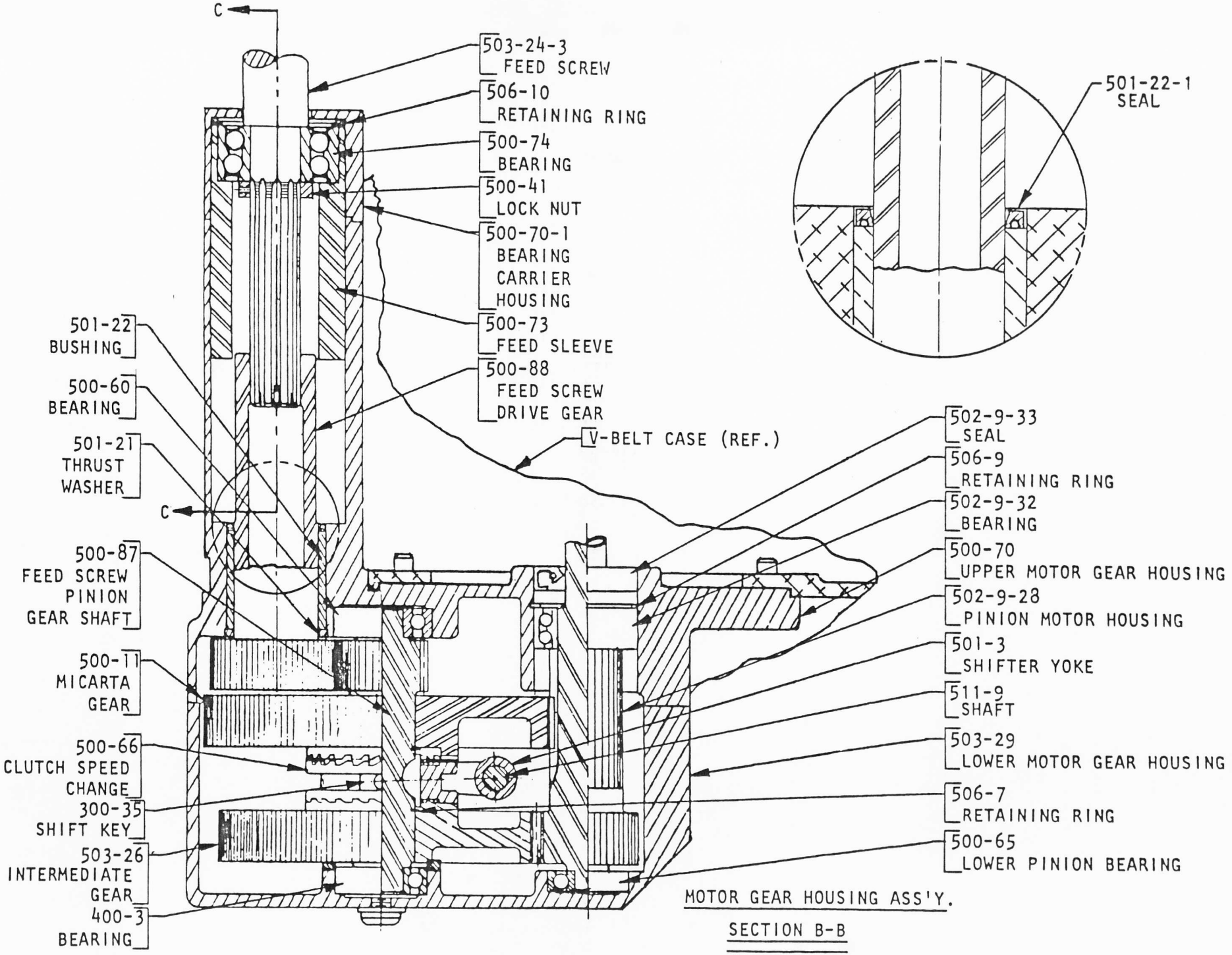


SECTION D - D



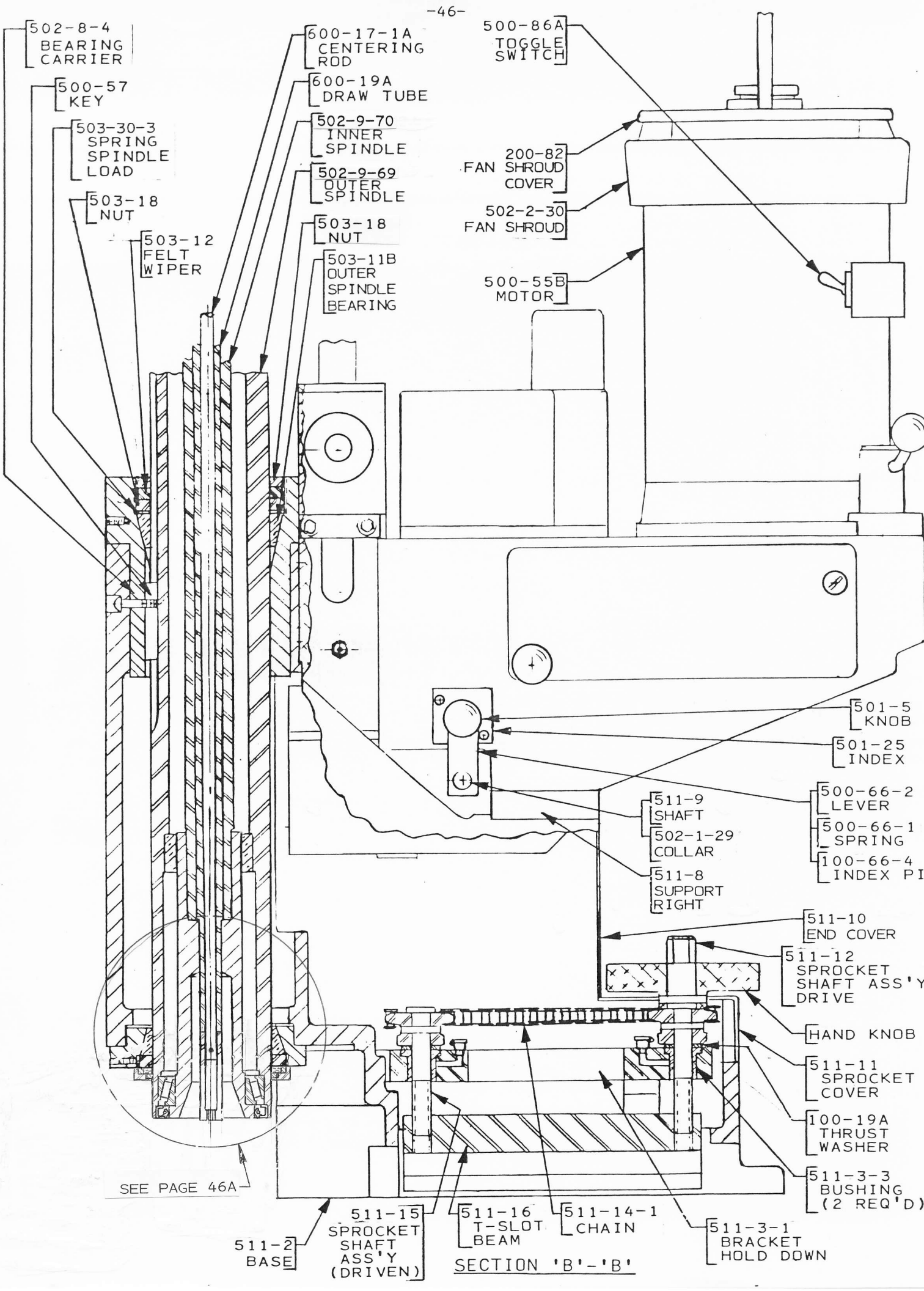
DETAIL F

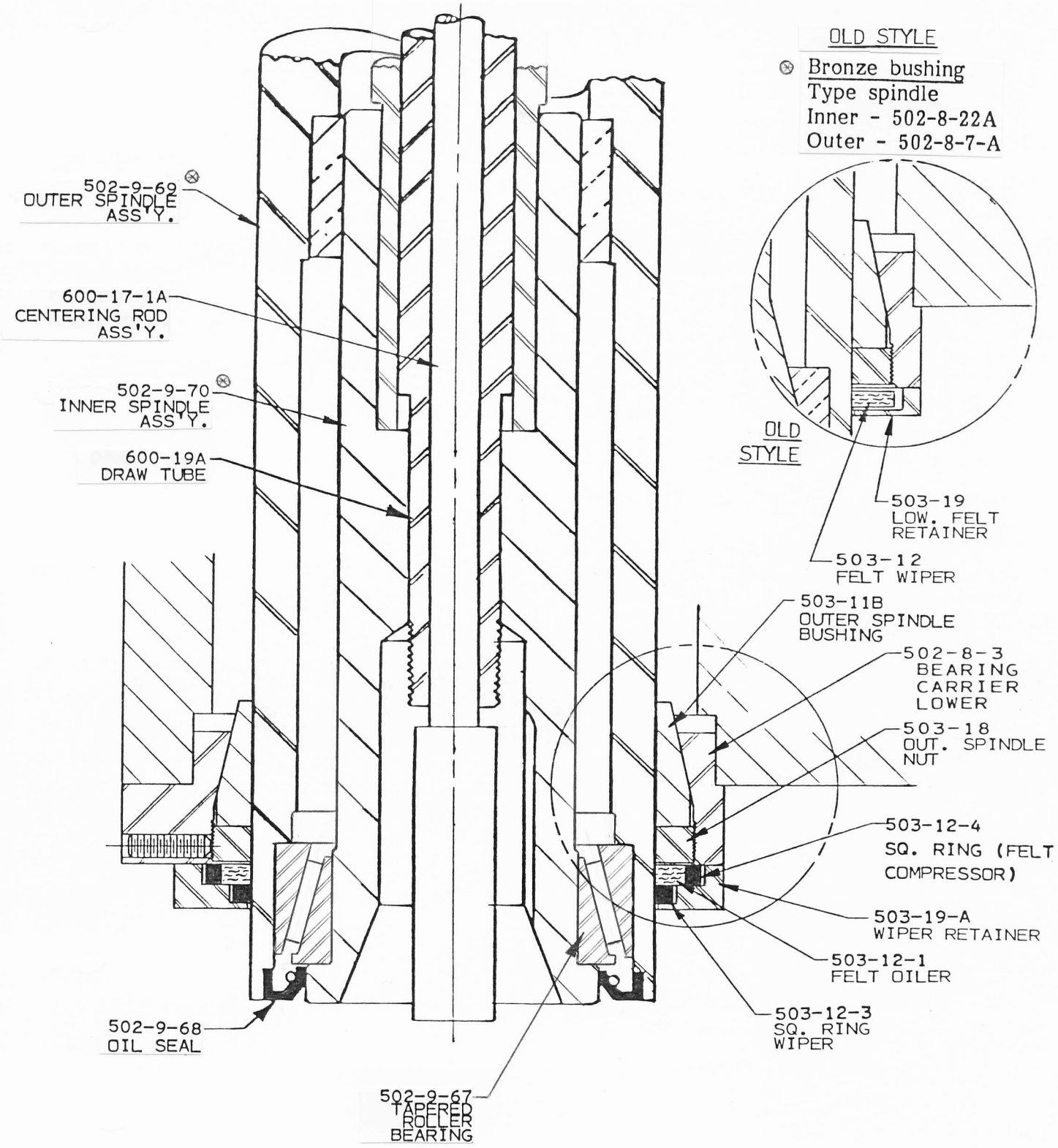
(FEED LEVER)

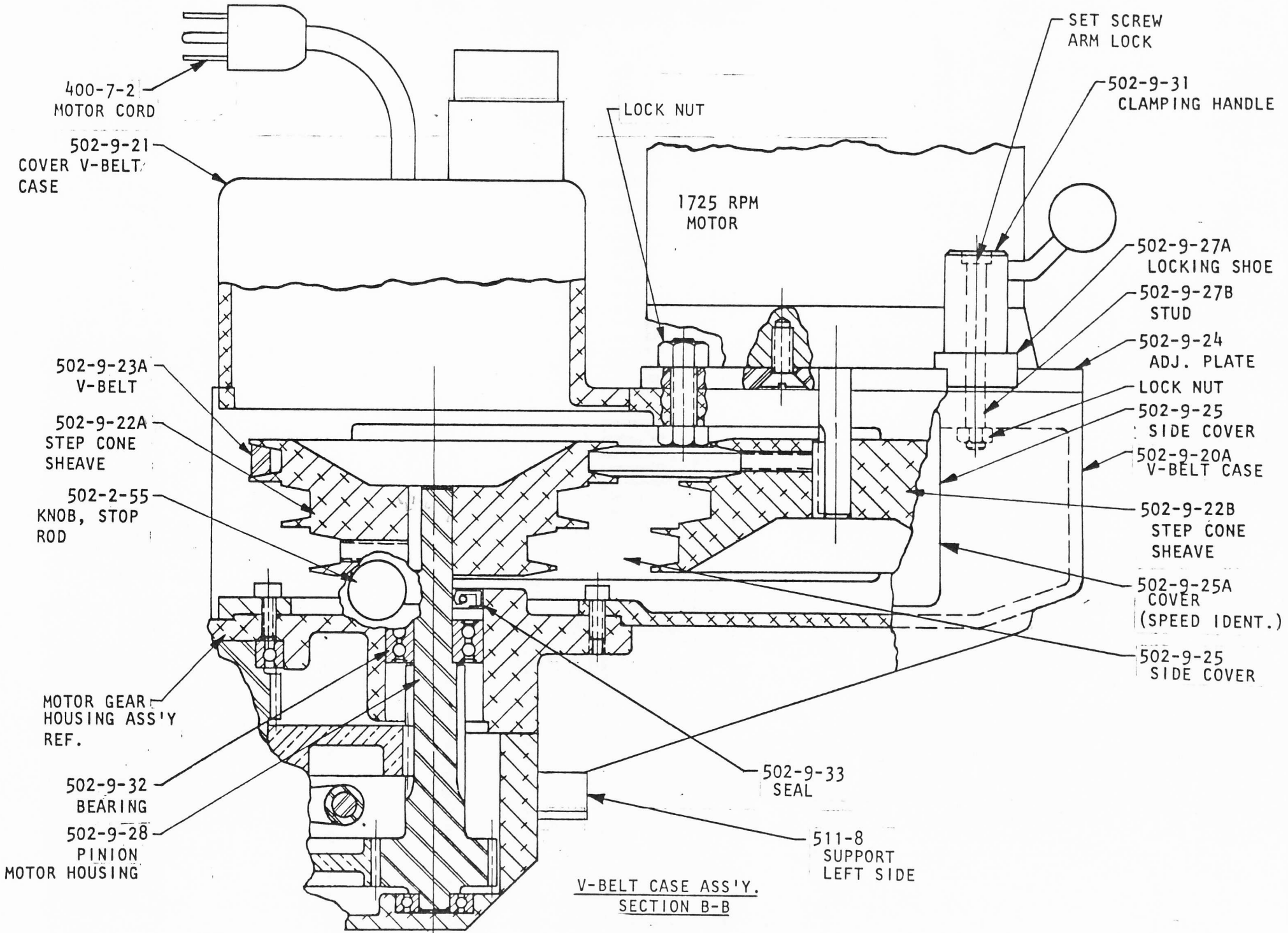


MOTOR GEAR HOUSING ASS'Y.

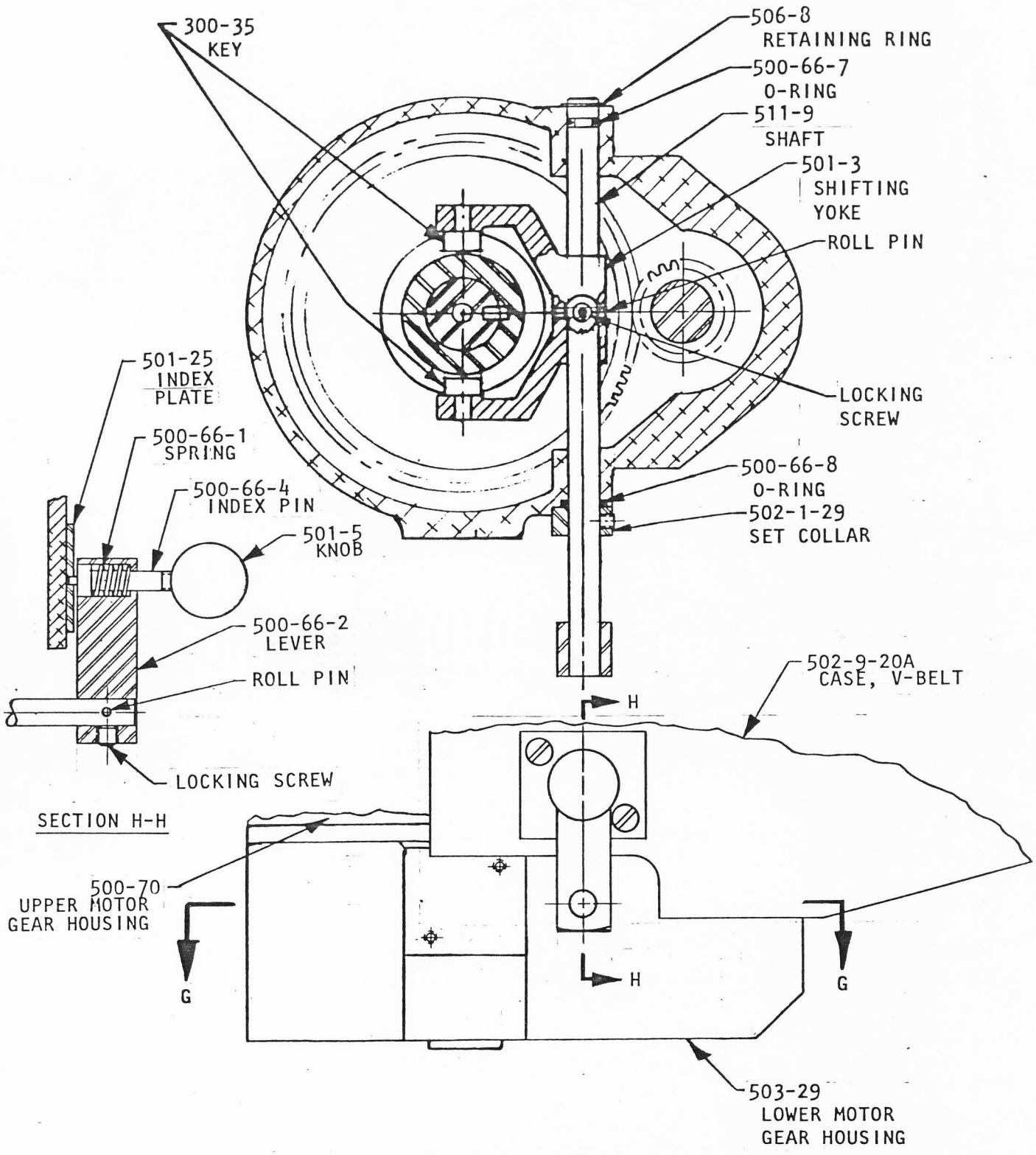
SECTION B-B


502-8-4
BEARING
CARRIER
500-57
KEY
503-30-3
SPRING
SPINDLE
LOAD
503-18
NUT
503-12
FELT
WIPER
600-17-1A
CENTERING
ROD
600-19A
DRAW TUBE
502-9-70
INNER
SPINDLE
502-9-69
OUTER
SPINDLE
503-18
NUT
503-11B
OUTER
SPINDLE
BEARING
500-86A
TOGGLE
SWITCH
200-82
FAN SHROUD
COVER
502-2-30
FAN SHROUD
500-55B
MOTOR
501-5
KNOB
501-25
INDEX
500-66-2
LEVER
511-9
SHAFT
500-66-1
SPRING
502-1-29
COLLAR
100-66-4
INDEX PI
511-8
SUPPORT
RIGHT
511-10
END COVER
511-12
SPROCKET
SHAFT ASS'Y
DRIVE
HAND KNOB
511-11
SPROCKET
COVER
100-19A
THRUST
WASHER
511-3-3
BUSHING
(2 REQ'D)
SEE PAGE 46A
511-2
BASE
511-15
SPROCKET
SHAFT
ASS'Y
(DRIVEN)
511-16
T-SLOT
BEAM
511-14-1
CHAIN
511-3-1
BRACKET
HOLD DOWN
SECTION 'B'-'B'


OLD STYLE
⊗ Bronze bushing
Type spindle
Inner - 502-8-22A
Outer - 502-8-7-A
OLD STYLE
503-19
LOW. FELT
RETAINER
503-12
FELT WIPER
502-9-69 ⊗
OUTER SPINDLE
ASS'Y.
600-17-1A
CENTERING ROD
ASS'Y.
502-9-70 ⊗
INNER SPINDLE
ASS'Y.
600-19A
DRAW TUBE
503-11B
OUTER SPINDLE
BUSHING
502-8-3
BEARING
CARRIER
LOWER
503-18
OUT. SPINDLE
NUT
503-12-4
SQ. RING (FELT
COMPRESSOR)
503-19-A
WIPER RETAINER
503-12-1
FELT OILER
503-12-3
SQ. RING
WIPER
502-9-68
OIL SEAL
502-9-67
TAPERED
ROLLER
BEARING

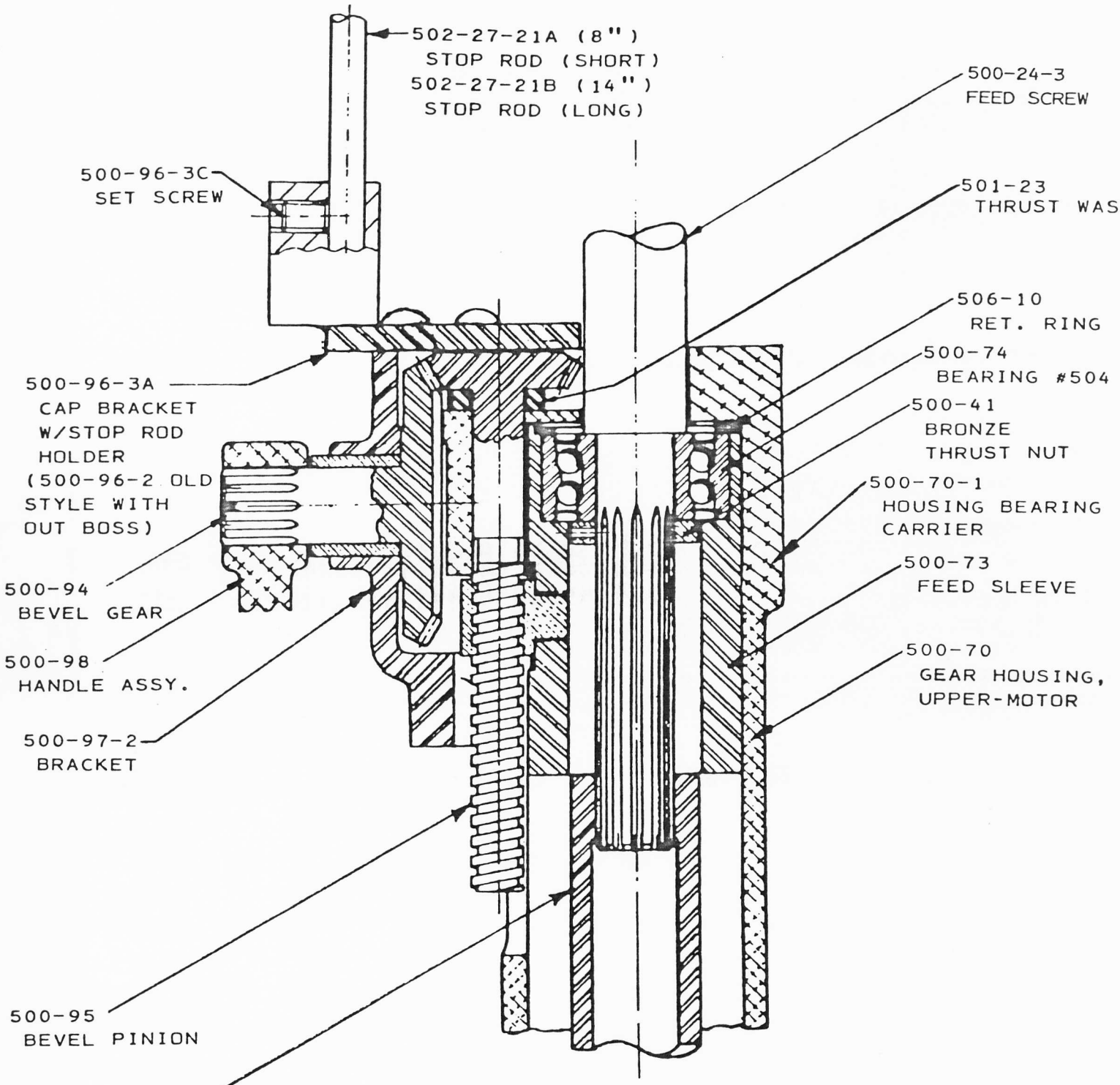


V-BELT CASE ASS'Y.
SECTION B-B



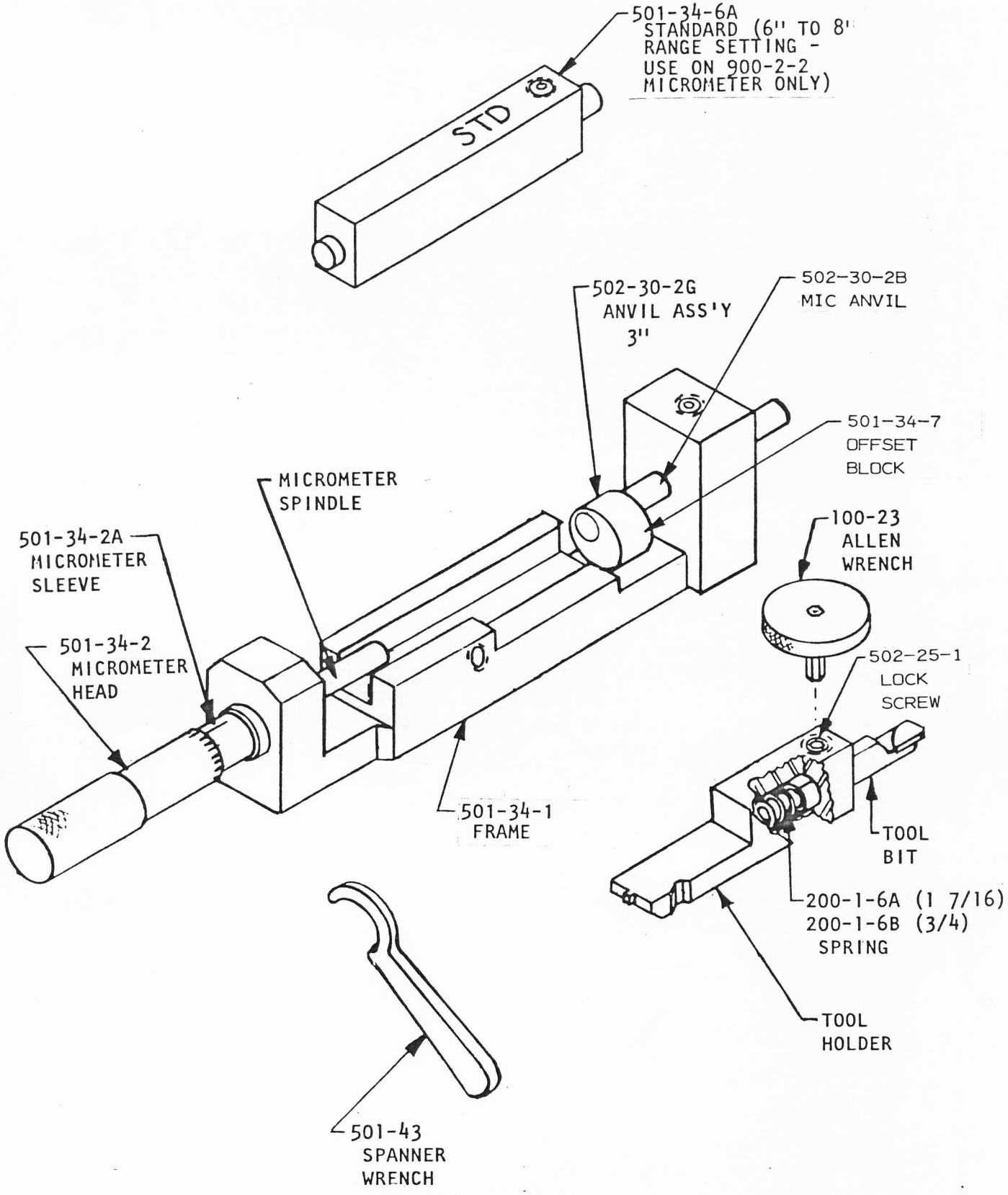
SHIFTING CONTROL

LOWER MOTOR HOUSING



SECTION A - A

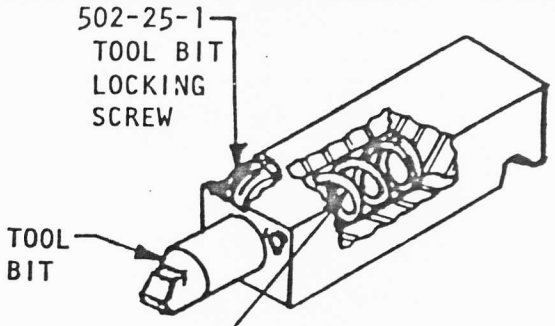
HAND FEED



900-2-2

MICROMETER ASS'Y.
(2.9-6.0)

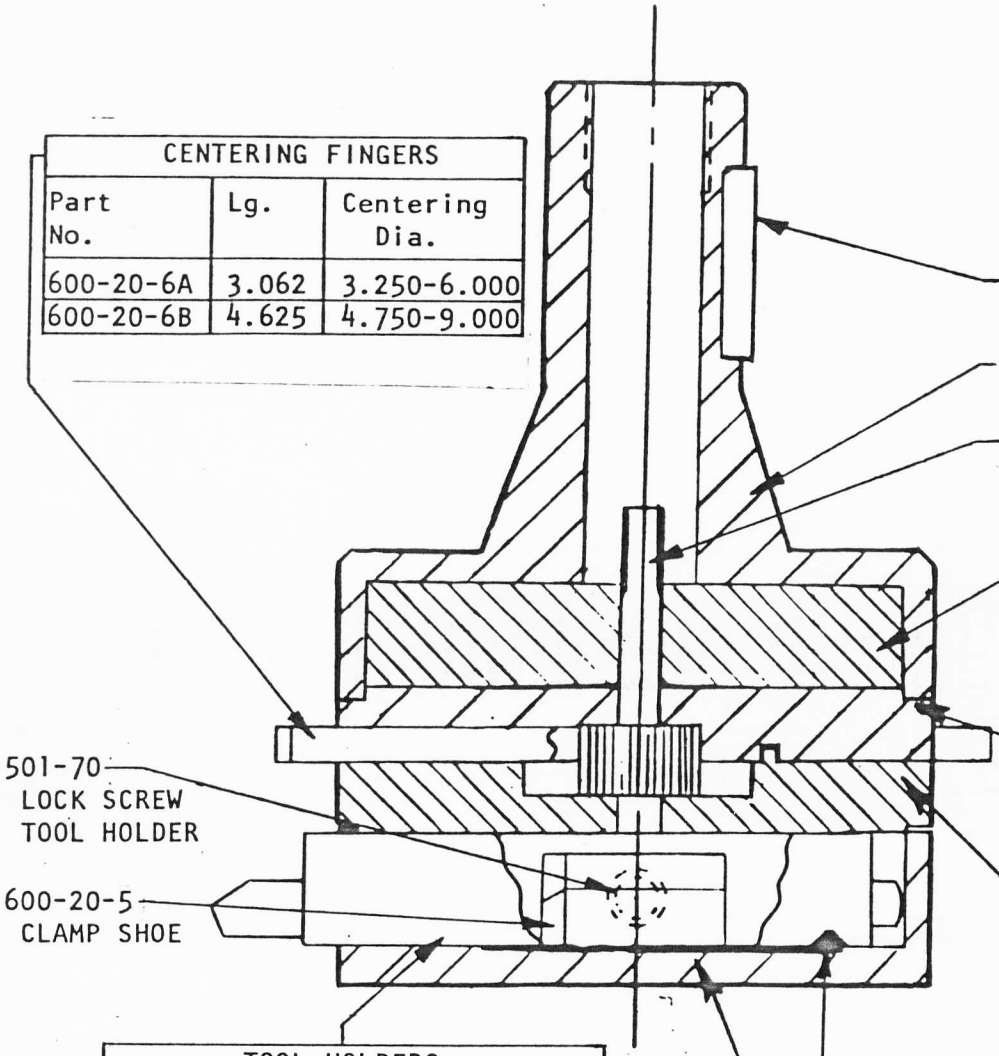
NOTE:
USE WITH
MICROMETER
ASSEMBLY
900-2-2



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

TOOL HOLDER
DA STYLE FOR
HEAVY DUTY
CUTTER HEAD

CENTERING FINGERS		
Part No.	Lg.	Centering Dia.
600-20-6A	3.062	3.250-6.000
600-20-6B	4.625	4.750-9.000

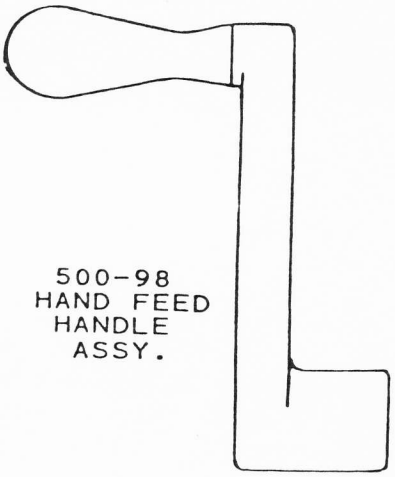


TOOL HOLDERS		
Part No.	Lg.	Bore Range (Dia.)
600-20-7A	3.000	3.250-4.263
600-20-7B	3.562	4.250-5.312
600-20-7C	4.125	5.312-6.500
600-20-7D	4.688	6.500-7.562
600-20-7E	5.250	7.562-8.750
600-20-7F	5.812	8.750-9.875

BLIND HOLE CUTTER HEAD ASS'Y.

HEAVY DUTY 3 1/4 DIAMETER

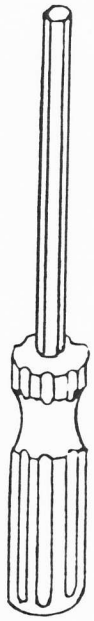
600-20



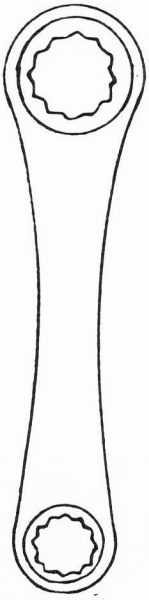
500-98
HAND FEED
HANDLE
ASSY.

502-12-2
SPANNER
WRENCH
(2 REQD)

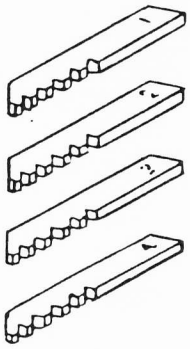
100-24
TOOL
PULLER



501-72
(7/32)
HEX
DRIVER

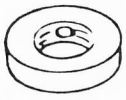


501-37-1
WRENCH

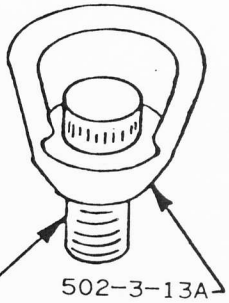


CENTERING FINGER SET

600-20-6A (3.062 LG)
600-20-6B (4.625 LG)

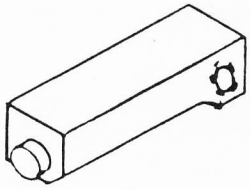


500-41
LOCK NUT
FEED SCREW



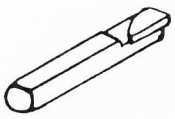
502-3-13A
LIFTING
EYE NUT

502-3-13B
SHOULDER
SCREW

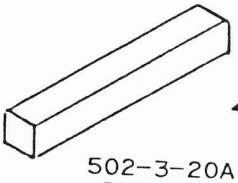


TOOL HOLDER

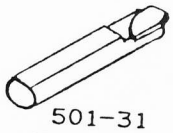
600-20-7A (3.000 LG.)
600-20-7B (3.562 LG.)
600-20-7C (4.125 LG.)
600-20-7D (4.688 LG.)
600-20-7E (5.250 LG.)
600-20-7F (5.812 LG.)



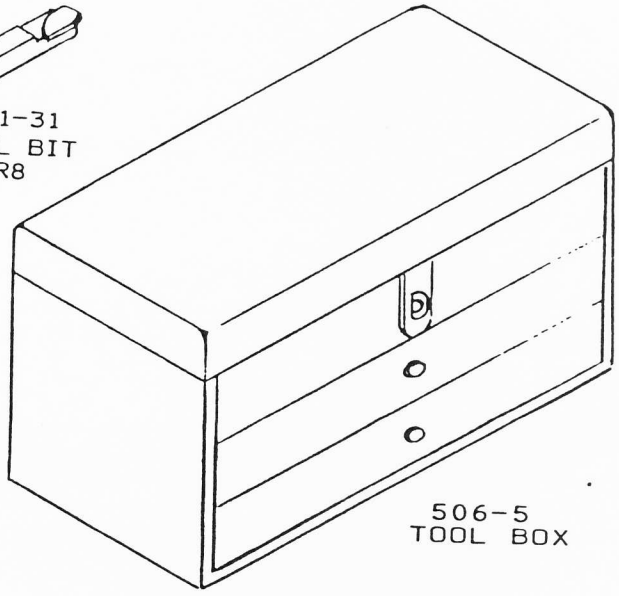
501-29A
RF FACING
TOOL BIT



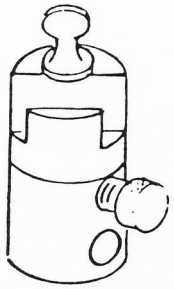
502-3-20A
DRESSING
STICK



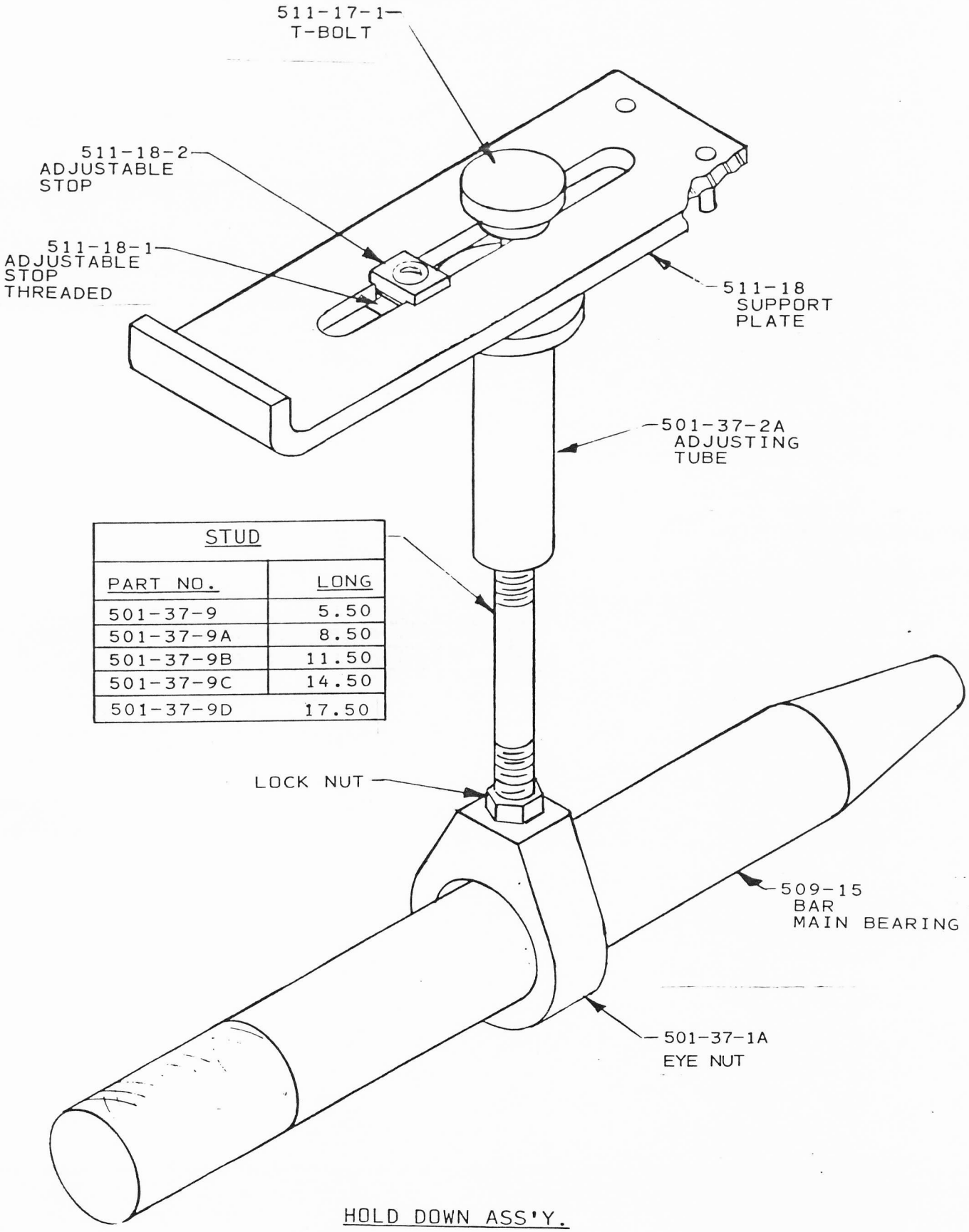
501-31
TOOL BIT
R8



506-5
TOOL BOX

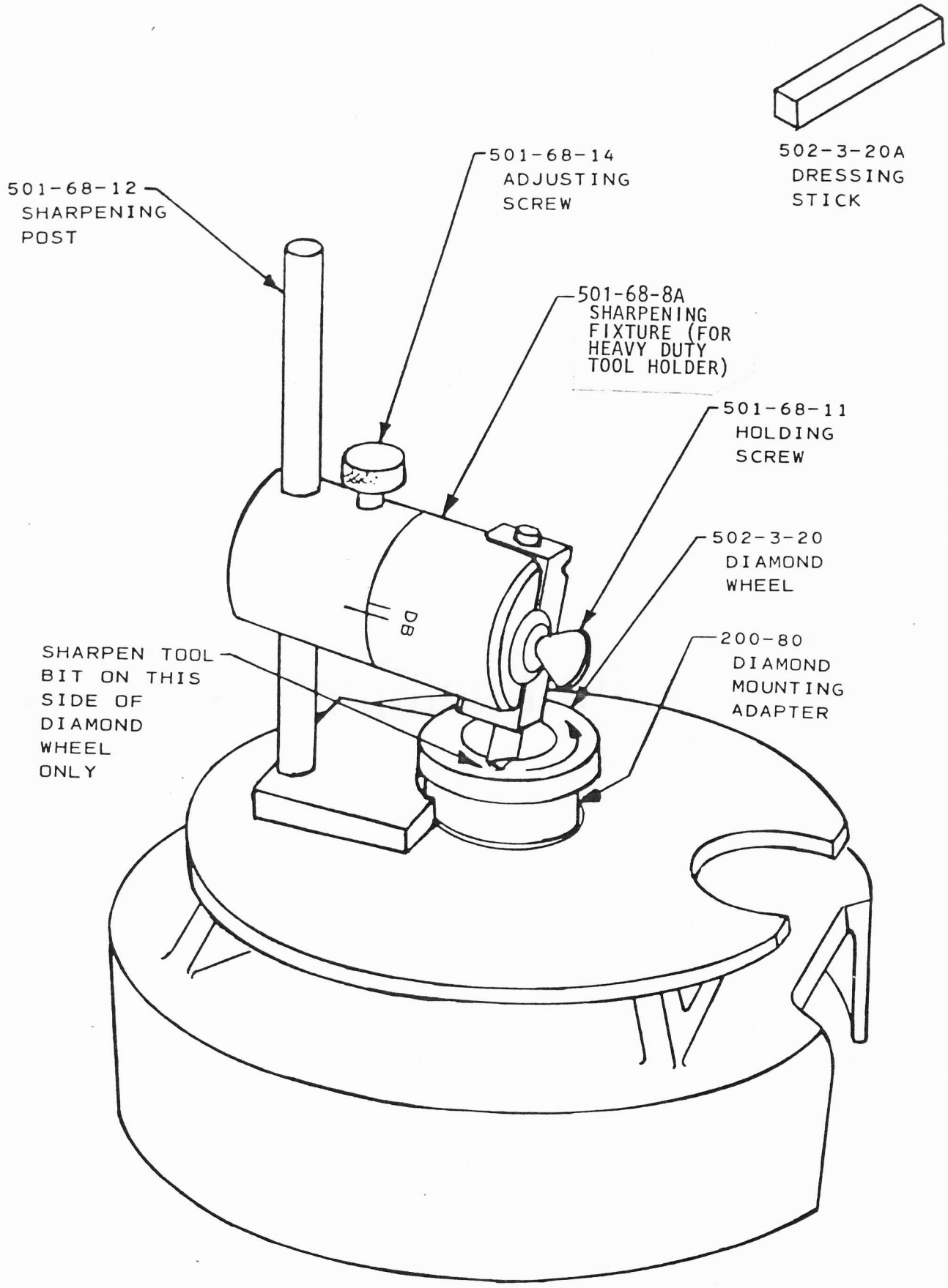


501-68-8A
SHARPENING
FIXTURE
(FOR HEAVY
DUTY TOOL
HOLDER)

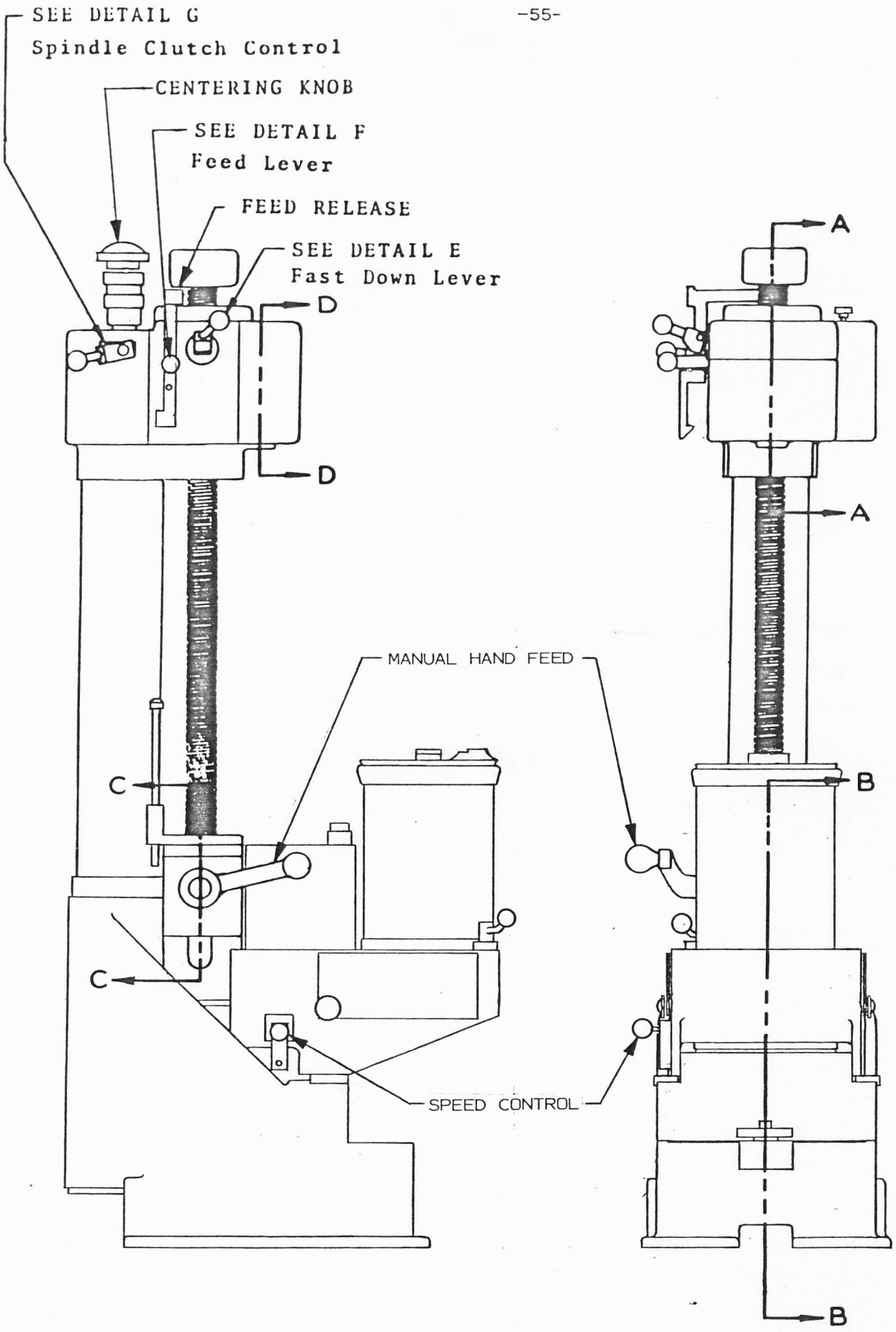


STUD	
PART NO.	LONG
501-37-9	5.50
501-37-9A	8.50
501-37-9B	11.50
501-37-9C	14.50
501-37-9D	17.50

HOLD DOWN ASS'Y.
MAIN BEARING TYPE
DA-5B

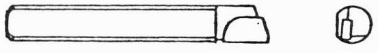


TOOL BIT SHARPENING


SEE DETAIL G
Spindle Clutch Control
CENTERING KNOB
SEE DETAIL F
Feed Lever
FEED RELEASE
SEE DETAIL E
Fast Down Lever
D
D
A
A
MANUAL HAND FEED
C
C
B
SPEED CONTROL
B

TOOL BITS

DA-5B

PART NUMBER		DESCRIPTION
100-29		OFFSET TOOL BIT (FOR BORING BLIND CYLINDER HOLES)
501-28		C.C. STEEL CUTTING TOOL BIT W/CHIP CURLER TO BREAK UP CHIPS WHILE BORING
501-29A		R.F. FACING & COUNTERBORING TOOL BIT FOR FACING & COUNTERBORING OF CYLINDER BLOCK, FOR CUTTING OFF SLEEVE.
501-31-2		R8 CARBIDE TOOL BIT, 1 3/8" LONG (FOR GENERAL PURPOSE & HEAVY CUTS, CAST IRON). (RECOMMENDED FOR INTERRUPTED CUTS).
501-31-1		R8 CARBIDE TOOL BIT, 1" SHORT
501-31A		C.C.B. CUMMINS COUNTER BORING TOOL BIT FOR COUNTERBORING OF CUMMINS DIESEL CYLINDER BLOCK
501-31		R8 CARBIDE TOOL BIT, 1 3/4" LONG (FOR GENERAL PURPOSE & HEAVY CUTS, CAST IRON) (RECOMMENDED FOR INTERRUPTED CUTS)

TOOL BITS

DA-5B

PART NUMBER	DESCRIPTION
501-33B 	15° CUMMINS CHAMFER TOOL BIT (CHAMFERING CUMMINS BLOCKS)
501-33D 	30° CHAMFER TOOL BIT (FOR GENERAL PURPOSE CHAMFERING CAST IRON)
501-33-1 	R8 (12° RAKE) LONG ROUGHING CUT