

MODEL C-A NO. 2 BAR

DIRECTIONS FOR CARE AND OPERATION

BORING BAR

FLY CUTTER BARS

- MODEL C-A NO. 000 CAPACITY 1.375" TO 3"; LENGTH 6-1/2"
- MODEL C-A NO. 00 CAPACITY 1.875" TO 4"; LENGTH 7"
- MODEL C-A NO. 0 CAPACITY 2.2" TO 4"; LENGTH 9"
- MODEL C-A NO. 2 CAPACITY 2.6" TO 5"; LENGTH 12-1/2"
- MODEL C-A NO. 4 CAPACITY 3-5/16" TO 8"; LENGTH 18"

HEAVY DUTY BAR

- MODEL DA-1 CAPACITY 2.9" TO 6.000" LENGTH 12-1/2"

ROTTLER MANUFACTURING

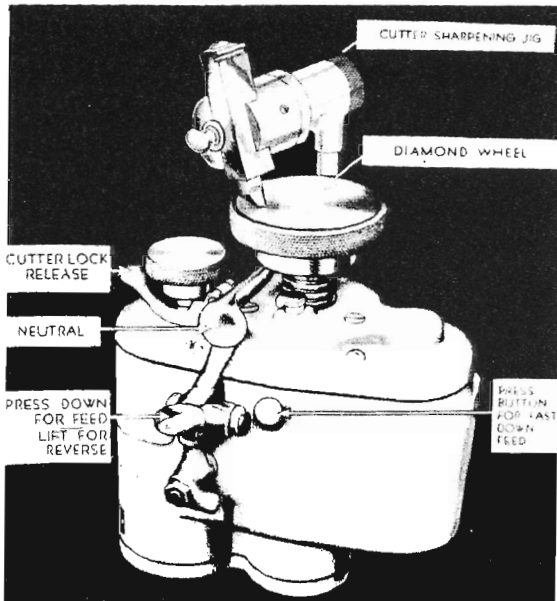
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Kent, WA 98032-1194

DESCRIPTION

The Model CA bars are single point tool precision portable boring bars, complete with tooling necessary for standard engine reboring work. All feeds and traverses are power operated and controlled from the upper gear housing unit. Power is supplied by ½ H.P.

series type AC-DC General Electric motor integral with the unit. Housings are aluminum alloy in order to incorporate the lightest possible weight without sacrificing rigidity.

CONTROLS



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

1. Cutter lock release lever is located under centering knob. Use your thumb to raise lever in order to either insert or remove tool bit.

2. Feed lever is latching lever on side of bar. Press down until lever latches to engage cutting feed. To disengage, press neutral 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 neutral feed release which will unlatch lever and allow it to return to neutral position.

3. The fast down travel button is located next to the feed lever. Check feed lever to make sure it is in neutral position before pressing. It is most convenient to operate fast down by extending fingers around back end of upper housing and exerting pressure on button with palm of hand. The button should be pressed in firmly and not allowed to ratchet. This control is spring loaded and will release when you release pressure.

You will note the stop rod, that is held in base casting by thumb screw, has a cone shaped end which will release cutting feed when it contacts lever. This is most conveniently raised up and locked by thumb screw in proper position on completion of first bore cut.

OPERATING INSTRUCTIONS

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

We recommend, particularly for operators unfamiliar with the CA bars, to practice on a junk block in order to become acquainted with all controls and details connected with the use of this machine. If you plan to chamfer bores, we also recommend practicing this operation (See No. 8)

1. Carefully clean and file off high spots, thread burrs, etc. on top of cylinder blocks. When using the

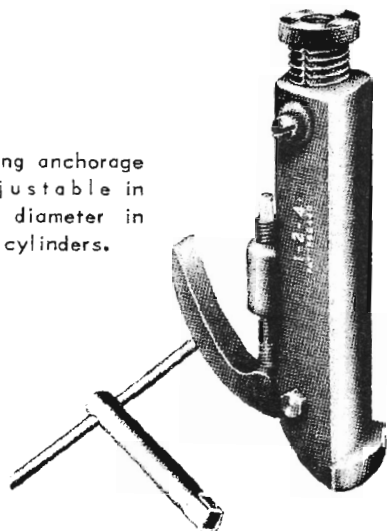
vacuum chip remover take care to remove oil and grease film from cylinders in order to prevent eventual loading of air passages and vacuum filters.

2. Measure each cylinder. Determine the amount of metal to be removed from the measurement of cylinder which shows the most wear.

3. Insert the proper size wing in the hold down clamp for the diameter of cylinder and adjust hold down length so that 5/8" anchoring screw will have at least a 3/8" length of thread holding. After placing through bar base, reach through cylinder and make sure there is an adequate square surface where you

IMPORTANT: Always give serial number of the Bar when ordering parts.

Self centering anchorage device, adjustable in length and diameter in all size cylinders.



intend to set hold down. Beware of fillets and chamfers around clamping area. In blocks which have relief, for connecting rod clearance, the hold down lug will most often straddle the relief with adequate holding surface on each corner. It is convenient to insert one of the 5/8" bolts in the hold down to hold it while expanding the wing with the T wrench. Use

light tension on T wrench. Excessive tightening will result in distortion of bores and marks in finished cylinders.

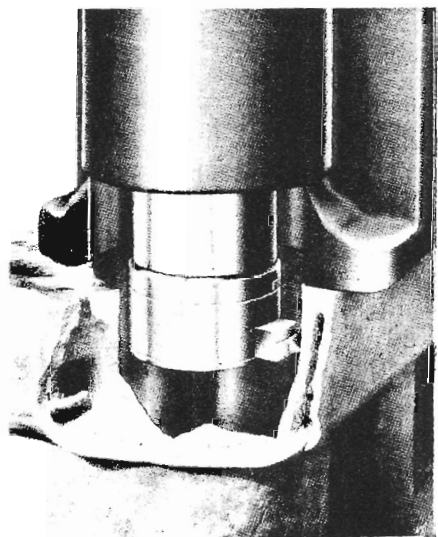
In many blocks it is possible to utilize the stud holes to anchor the bar, although cap screws to fit these holes are not furnished as standard equipment.

In any event attempt to set the hold down so the boring bar can be pivoted to bore adjacent cylinders on either side and hold down bolt is as close to spindle as practicable.

Check also to make sure there is good contact of boring bar base and block on all sides of hold down. 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.

Place the bar with spindle over the hole to be bored and insert the bolt in the hold down without tightening. Check to make sure tool holder is not in bar and centering fingers are not extended.

CENTERING



Start motor and press fast down button which will rapidly feed bar into cylinder for centering. It is usually desirable to locate fingers just under the ring wear ridge. Bear in mind that No. 2 and 4 centering fingers are slightly higher than others and must be under the ridge. The best method of centering when little stock is left for cleanup is to rotate spindle with top knob so that No. 2 finger straddles

the greatest wear under the ridge. These wear pockets generally occur in line with the block.

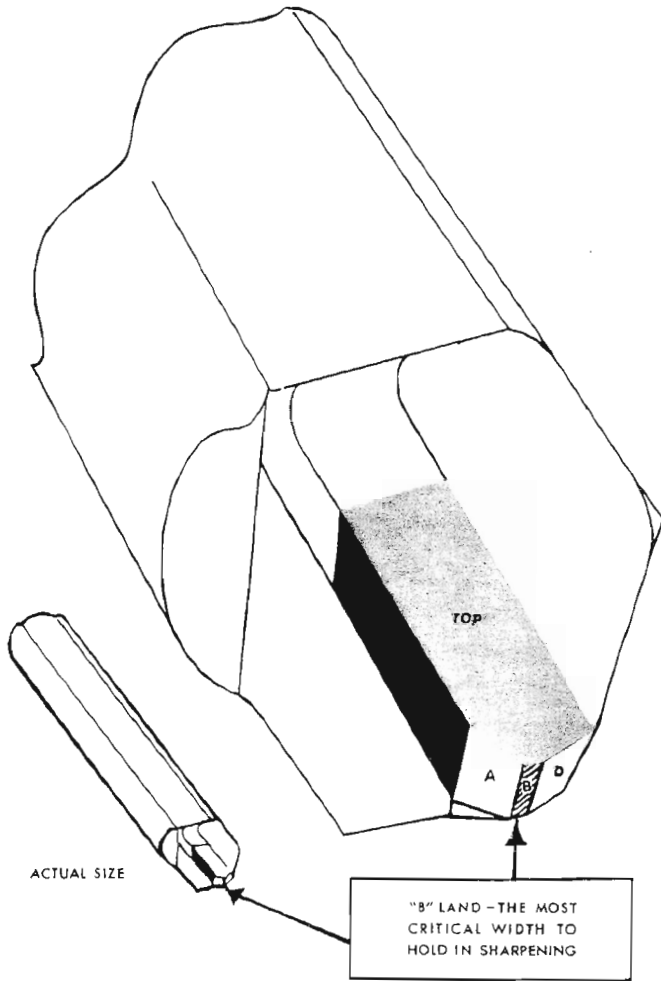
After locating fingers properly, extend them by turning top centering knob and exert tension on the knob while tightening hold down bolt. Do not over tighten. Approximately 25 lb. tension on 8" wrench is adequate. Before tightening hold down bolt, it is advisable to rock bar slightly to make sure fingers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

Retract fingers back into head and return bar to up position by latching feed lever in up position.

4. Changing center fingers on CA 000, CA 00 and CA 4 bars, it is necessary to change fingers to accommodate the entire range. The most convenient method is to lay the bar on bench, control side up. Run the spindle down a few inches with the fast down feed, shut the motor off and run the fingers out with centering knob. Insert the other fingers in the slots being careful to match the numbers on the fingers to the numbers on the slots. Hold all fingers inward with one hand and rotate centering knob - first to right and then to left retracting them into head. Check to see that all fingers are retracted equally and return bar to up position.

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SHARPENING CUTTER



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

Sharpening of the tool on CA bar is done by inserting tool holder in the sharpening Jig slot. Then insert the Jig shank in the hole provided in the upper housing and sharpen bit on the small diamond wheel provided on the large knob. Always make sure you sharpen the tool on the side of the diamond that is running toward the top face of the bit. Sharpening on the wrong side can readily chip the point. (Refer to control picture)

SHARPENING BIT FOR CA No. 000 BAR

With CA 000 use utmost care in following sharpening instructions. This bar has lighter feed than other models and requires less width on tool bit. Due to

When sharpening use very light pressure, moving the tool back and forth across the diamond wheel to improve cutting and prevent grooving of diamond.

After sharpening a number of times dress excess steel away from carbide on grinding wheel. This will facilitate use of chip remover hoods and make for quicker sharpening. Diamond wheel is designed for carbide only. Steel tends to load it.

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

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

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

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

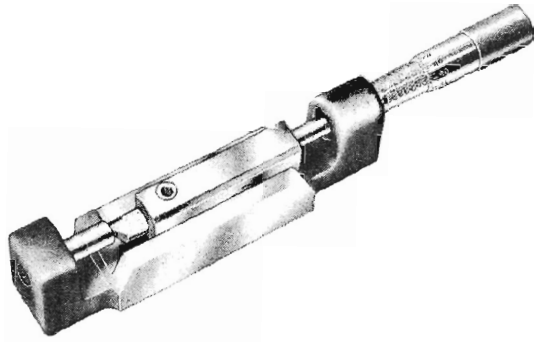
The top surface of the bit is finely finished at the factory and requires no further resurfacing. This also means no honing or in any way attempting to break off the chip that sometimes seems to be apparent. The practice of doing these things will inevitably result in poor surface finish and impair the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

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

small spindle dia. you must limit B land on tool bit to .003 to .008 in width.

IMPORTANT: Always give serial number of the Bar when ordering parts.

TOOL SETTING



6. Tool Setting. One cut is adequate to finish bores to .040 oversize. If tool is properly sharpened place cutter and proper tool holder in mike. Hold tool bit lightly against mike anvil and loosen allen screw with wing wrench. Gently let tool holder slide back to make contact with mike spindle. This procedure will prevent chipping carbide. This mike will read directly to the size you wish to bore. However, bear in mind there is .050 to a revolution rather than .025 as on conventional mikes. Set mike to size you wish 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.

SPECIAL INSTRUCTIONS

for setting CA-4 mike to high and low range
using micrometer with 2.600'' to 5.000'' reading.

CAUTION: THE STANDARD FOR YOUR CA-4 BAR IS SET. DO NOT CHANGE IT.

To bore from 3.600'' to 6.000''. Place the standard in the micrometer and adjust mike anvil so that the mike reads 5.000''.

Note: On the No. 4 micrometer sleeve — read the 2.600'' to 5.000'' as 3.600'' to 6.000''. On bores under 6.000'' always remember that the bar is boring 1'' larger than the mike reads.

To Bore from 6.000'' to 8.000''. Place the standard in the micrometer and adjust the mike anvil so that

the mike reads 3.000''. The micrometer reading of 2.600'' to 5.000'' will now actually be 5.600'' to 8.000''. On bores over 6.000'' remember that the bar is boring 3'' larger than the mike reads.

Always bear in mind that on the small setting, 3.600'' to 6.000'', the bar will bore 1'' larger than the mike indicates, and on the large setting, 6.000'' to 8.000'', the bar will bore 3'' larger than the mike indicates.

SPECIAL INSTRUCTIONS

for setting CA-4 mike to high and low reading
using micrometer with 2.9'' to 6.000'' reading.

CAUTION: THE STANDARD FOR YOUR CA-4 BAR IS SET. DO NOT CHANGE IT.

To bore from 3-5/16'' to 6.000'' place Standard in micrometer and adjust mike anvil so that mike reads 6.000''. NOTE: Read directly as shown on micrometer sleeve.

To bore from 6.000'' to 8.000'' place Standard in mike and adjust mike anvil so that mike reads 4.000''. The mike reading of 2.9'' to 6'' will now actually gauge tool from 4.9'' to 8''. When micrometer is set for larger bores remember that bar will bore 2'' larger than mike reads.

BORING

7. Make sure tool holder and tool holder slot in head are free from dirt. Insert tool in slot at the same time lifting the cutter lock lever under the centering knob. Do not release lever until you are sure cutter is fully back and latched.

Start boring bar motor 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.

IMPORTANT: Always give serial number of the Bar when ordering parts.

FOR CHIP REMOVER USE ONLY

Insert proper length vacuum hood in hold provided in cutter head and press in until tool bit tip extends out of hole in hood at least .025. Insert vacuum goose-neck in ball bearing on top of centering knob. Start vacuum motor.

Latch feed lever in up position and when bar reaches top turn motor off. Remove vacuum hood and tool

holder with tool puller. (always remove tool holder after boring) Loosen anchor bolt and proceed to next cylinder. (If bore is to be chamfered with bar see No. 8). This should be done before loosening anchor bolt. If vacuum is used, a cylinder block can generally be bored before emptying filter bag. Keep bag and filter clean. An oil saturated bag or filter will restrict the flow of air.

CHAMFERING

8. If chamfering is to be done at top of bore the special chamfering bit and tool holder must be used. Tool may be set by either inserting in head and approximating setting or place in mike and set approximately .100 over bore size. Insert tool in cutter

head, start motor and latch feed in down position. Hold thumb on feed lever release arm and press when tool has developed adequate chamfer. You will find this can be done very quickly and with surprising consistency after becoming familiar with it.

BORING WITH CA 00 AND CA 000 ON ADAPTER PLATE.

9. (Note: The adapter plates are normally supplied to clamp Briggs Stratton and Clinton Engines. Factory will supply plates drilled for other engine makes on customer order. If you run into other engine models to bore in any quantity we recommend that you (or your local machine shop) drill holes to provide for clamping. These holes can often be adequately located from head gaskets if drilled oversize. If you bore cylinders that are seldom repeats we suggest you hold them carefully by 2 or 3 temporary clamps.

Clean and file cylinder surface that will be clamped to plate to make sure there are no high spots. Make

sure there is no dirt on cylinder surface or bottom of plate. Clamp cylinder to plate using socket head cap screws in holes provided. Check cylinder for amount of stock you wish to bore. If you are boring a blind hole, measure with scale the distance from the top of the boring plate to the depth you wish the cutter to bore (Distance A).

Place boring bar on plate and insert 5/8 bolt in hole provided in plate. Traverse bar down for centering and return to top. Insert sized cutting tool. Proceed with boring cycle — always remove tool after boring.

BLIND CYLINDER - USE OF OFFSET TOOL BIT

If you are boring blind holes use off set tool bit. Feed spindle down until tool bit tip is level with top of adapter plate. Shut motor off and with scale measure same Distance A (Refer Adapter Plate instruction) from top felt-retainer on base to a scribed pencil mark up the spindle. Start motor, engage feed

and press feed release button when pencil mark is level with top of felt retainer. If you have more than one of these cylinders, set stop rod for automatic stop from pencil mark. Return bar to top and **always** remove tool holder.

IMPORTANT: Always give serial number of the Bar when ordering parts.

SERVICE and MAINTENANCE

LUBRICATION

UPPER HOUSING GEARS

After approximately 6000 bores we recommend replacing grease using Union Ebon Cup Light. Dilute

6 parts of grease to one part oil. Do not overload. 1/4 pint should be sufficient.

MOTOR HOUSING

Same as upper housing. Use approximately 1/8 pint of the Ebon Cup Light and dilute 6 to 1.

FEED SCREW LOWER THRUST

Occasionally apply a few drops of oil at bottom of feed screw shaft.

OUTER SPINDLE

Occasionally apply light film of oil to outer spindle.

INNER SPINDLE

On CA-2 bars after serial No. CA-20484. After 3000 holes approximately a thimble full of oil in the keyway hole of the outer spindle.

SERVICE

SHEAR PIN

A shear pin, retained by a collar, is provided in the lower end of the feed screw. This will shear, in most cases, when an extreme load is exerted on the cutter

head. This pin should occasionally be replaced regardless of breakage as it tends to wear from the constant shock of intermittent cuts.

REPLACEMENT INSTRUCTIONS

1. Lift retaining collar above pin hole.
2. Hold fast down travel button in and manually rotate sharpening knob by hand to the left until bottom of screw is clear of the motor drive shaft.
3. Remove remnants of sheared pin.
4. Jog motor until pin hole in motor drive shaft lines up for convenient inserting of new pin.
5. Using Union Ebon Cup light, grease top of motor drive shaft.
6. Hold fast down travel button in and rotate sharpening knob to right until screw is fully down and drive holes line up.
7. Use pointed tool to align holes. Insert pin and force collar back down.

IMPORTANT: Always give serial number of the Bar when ordering parts.

DISASSEMBLY UPPER HOUSING

Should it be necessary to disassemble the upper housing use following procedure.

1. Insert tool holder in cutter head.
2. Remove sharpening and centering knobs.
3. Remove trip lever by removing 1/4 Cap Screw being careful not to lose spring retained in shift lever.
4. Take off top housing by removing (4) Round Head Screws.
5. Loosen (2) set screws on shaft collar on centering rod and force off of rod.
6. This will allow you to remove shifting lever and most of upper housing mechanism.

REASSEMBLY UPPER HOUSING

1. It is very important to reset centering rod collar properly. Make sure tool holder is in cutter head and shaft bushing and washer are under collar.
2. Hold shaft lever down so it doesn't interfere with adjustment and set collar so that there is approximately .010 - .015 clearance between collar and washer. Tighten both set screws tightly. Recheck to see if this has altered adjustment.
3. Reverse disassembly procedure. Set sharpening knob at proper height so bar will go into neutral before cutter head enters lower felt retainer. Set centering knob so that when tool holder is removed from bar, bottom of knob hub does not rub tool lock lever.

UPPER HOUSING

RAPID RETURN TRAVERSE

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

1. Insert tool holder in cutter head and run bar down into hole a few inches.
2. Loosen set screw at top of upper housing. (Refer Sec. EE Part No. 300-41.)
3. This will allow you to tap rapid return tumbler assembly, (Top of shaft located on top of upper housing opposite spindle side) down slightly which will result in deeper engagement of clutches. Adjust tumbler shaft so that when shift lever is in neutral, clutches do not clatter. Clutches should engage immediately upon latching lever.
4. Tighten set screw to relock shaft. Check to see adjustment has not been changed by set screw.

IMPORTANT: Always give serial number of the Bar when ordering parts.

INNER SPINDLE

Spindle will seldom require any adjustment. A great many holes can generally be bored before excessive clearances develop. Indications of a loose inner

spindle are an inconsistent finish and an excessive amount of clamor when bar is making an intermittent cut.

PROCEDURE TO ADJUST

1. Remove 2 screws and small cover on upper housing next to feed lever.
2. Insert pin (Diameter .180 or less) into one of the holes provided in the O.D. of take up nut. (See Sect. AA Part No. 300-33.) Hold top sharpening knob with one hand and turn take up nut to right (Clockwise). You will note the nut ratchets in notches as you take up. Take up until spindle is

tight. On CA-2 bars from Serial 20484 up, back off 1/2 to 1 notch.

On all other CA-2 bars back off 1 to 2 notches. In either case run bar after adjustment making sure there is only slight heating at bottom of spindle. If heat is excessive, back off one notch further.

3. Replace cover with (2) screws.

CENTERING FINGERS

Centering fingers are adequate to center the new bore within .002 of the centering of old bore; providing the old bore is reasonably round and if you follow operating instructions properly. Centering

fingers can be lapped periodically to obtain near perfect centering. Use the following procedure in an undersize bore or junk block.

TO LAP FINGERS

1. Bore hole and remove cutter but do not **unclamp bar.**
2. Rapid traverse bar down into hole.

3. Extend fingers and exert pressure on them against cylinder wall while rotating sharpening knob to right, by hand, (Clockwise).
4. After rubbing, examine points on all fingers to make sure they are all making contact.

MICROMETER

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

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

SETTING MICROMETER

1. Bore a hole.
2. Remove tool holder and bit and place in mike.
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.

IMPORTANT: Always give serial number of the Bar when ordering parts.

DIAMOND WHEEL

CARE OF DIAMOND SHARPENING DISK

If the diamond disk is handled with care it will provide many years of service.

Occasionally diamond surface can load up if steel part of tool bit is not ground back as sharpening

instructions indicate. To clean disk apply a small amount of solvent or thinner and rub off.

OUTER SPINDLE ADJUSTMENT

ALL MODEL BORING BARS

These machines have tapered main spindle bearing held in a seat by a spring and adjusting nut. The tension on these bearings is normally adequate to last indefinitely under normal boring operations.

Caution should be used in adjusting these bearings in order to avoid a too tight spindle which only serves to wear out machine and load down motor. If it should be necessary to adjust bearings, proceed as follows.

Upper bearing is adjusted by turning aluminum collar at top of base. On older models it is necessary to remove (2) screws and lift felt retainer in order to reach adjusting nut with punch.

Lower bearing is adjusted by removing lower adjusting cover and turning adjusting nut with punch. Also see below, Lower Bearing Adjustment.

1. Place and clamp bar over hole or overhang so spindle can run down. Loosen both adjusting nuts.

2. Allowing bar to run in feed, tighten lower adjusting nut until you detect a slight drop in motor RPM.
3. Stop motor leaving bar in feed. Pull down on upper housing by hand. You will note spindle will drop approximately 1/32" taking slack out of feed. Minimum pressure required to pull down should be about 30 lbs.
4. Start bar again, leaving in feed, and repeat above operation to adjust upper bearing. Pressure required now to drop spindle should be approximately 50 lbs.
5. Check this spindle tightness at both limits of spindle travel to make sure that spindle is not excessively tight at any point.

LOWER BEARING ADJUSTMENT

On boring bars that do not have clip at side of base, adjustment of lower bearing is made at bottom of base.

Lower bearing take up is located at bottom of base. Remove lower bearing felt wiper to adjust. Before adjusting, back off the friction screw (3/8 Allen screw at bottom of base). Proceed with adjustment as outlined previously, adjusting upper bearing first.

After double checking adjustment, screw in friction screw until tight and back off approximately 1/10 of a revolution. Recheck spindle adjustment to make sure it is not excessively tight at any part of travel. Back off friction screw if necessary.

Note: An over tight innerspindle adjustment will generate heat at bottom of spindle and resulting expansion will make spindle tight at top of travel.

IMPORTANT: Always give serial number of the Bar when ordering parts.

CUTTER HEAD TOOL RETRACTION

The cutter retraction is actuated by lifting the upper housing shift lever, which in turn lifts the centering rod allowing the back of the tool holder to be raised by the tool lock spring located under the tool holder in the cutter head cap.

Should the tool holder fail to retract we suggest you inspect as follows.

1. Check to see that the tool holder slot is clean and free of dirt.
2. Check for broken tool lock spring in cutter head.
3. Run spindle up and down making sure the centering rod raises at least 1/16" when shift lever

is raised from neutral to return travel. (If centering rod does not raise, see Service Upper Housing.)

4. Insert tool holder and raise tool lock lever watching tool to see that it is cocking properly. (Should tool fail to cock, recheck for broken spring and dirt in tool holder slot.)
5. If tool holder fails to cock remove (4) cutter head screws and tap off cutter head. Leave tool holder in and press button checking that tool action is working properly. Be careful to replace head so that tool slot opening is under No. 1 centering finger slot.

MOTOR CARE and SERVICE

Clean and blow dust off motor as often as possible and longer life will result. Should the motor appear to lack power or you detect a slight short circuit in boring bar, clean carefully and check motor brushes, also brushholders. Brushholders can cause a short in a dirty motor. If there is any question, replace them. Always give serial number of the bar when ordering replacement parts.

Should upper bearing in motor or switch ever require replacement, this generally can be accomplished by removing the end bell without removing complete motor unit.

If lower motor ball bearing should require replacement, both end bell and complete motor unit must be removed. (See section BB Disassembly of motor). Be sure and remove motor field before attempting to press out motor armature.

DISASSEMBLY and ASSEMBLY of MOTOR HOUSING

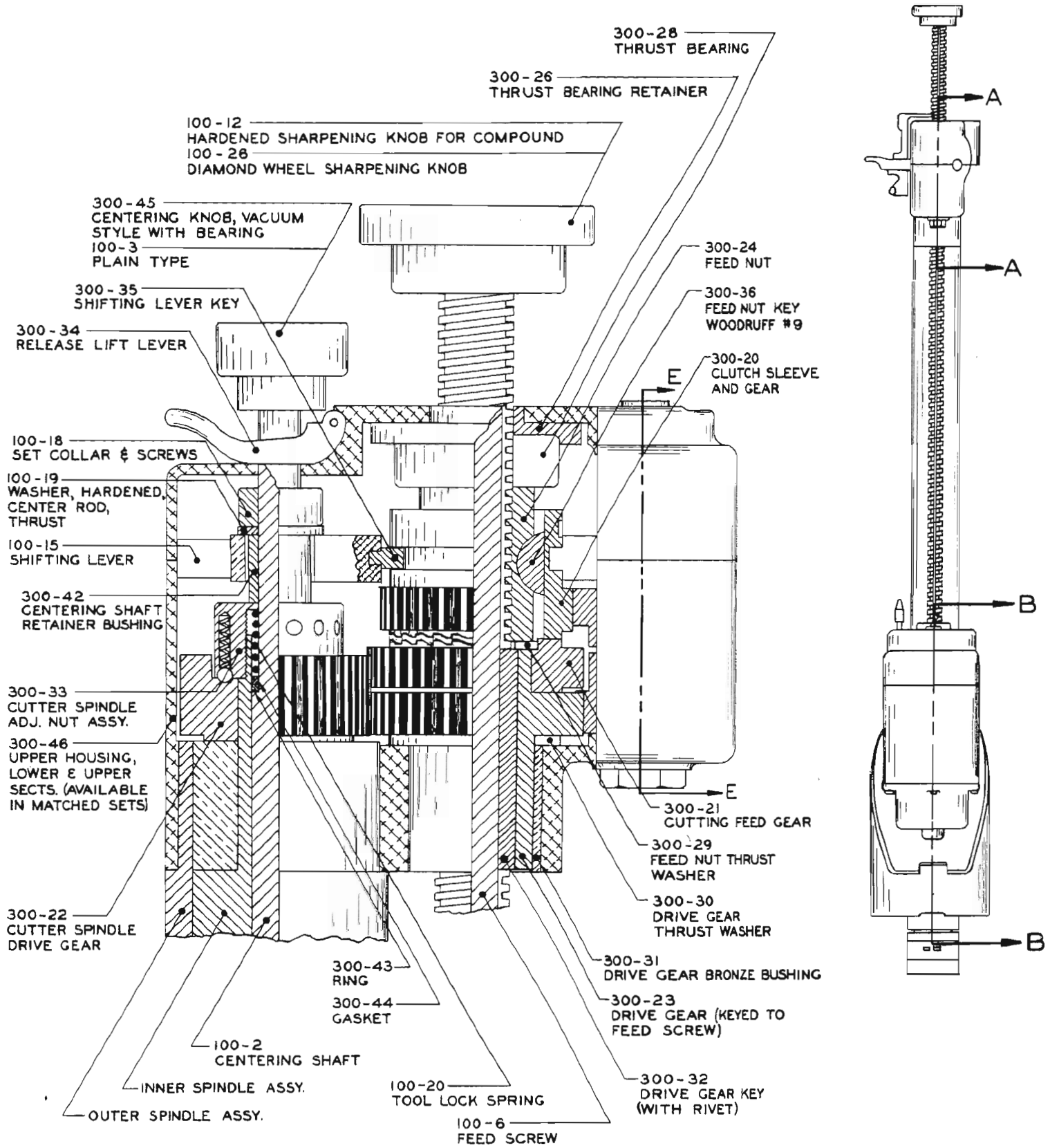
Should it be necessary to remove the motor housing or lower gear pot from the bar, do so in the following manner.

1. Remove the feed screw shear pin and unscrew feed screw shaft clear of motor drive shaft, as outlined in Section BB Shear Pin Replacement.
2. Remove (2) 3/8 Cap Screws and entire motor drive will come free.
3. To take gear pot off of motor housing, remove (3) 1/4 fillister head screws. All bars have a hard thrust disk in the bottom of the bronze bearing in motor pot. In some bars this disk may fall out or stick to gear shaft when pot is removed. Make sure this disk is in place before reassembling. If you are replacing micarta gear and have not ordered shaft with gear, make sure you press in

new gear squarely. Check to make sure that gear face and shaft run true. Relubricate (See section BB) before reassembling motor pot.

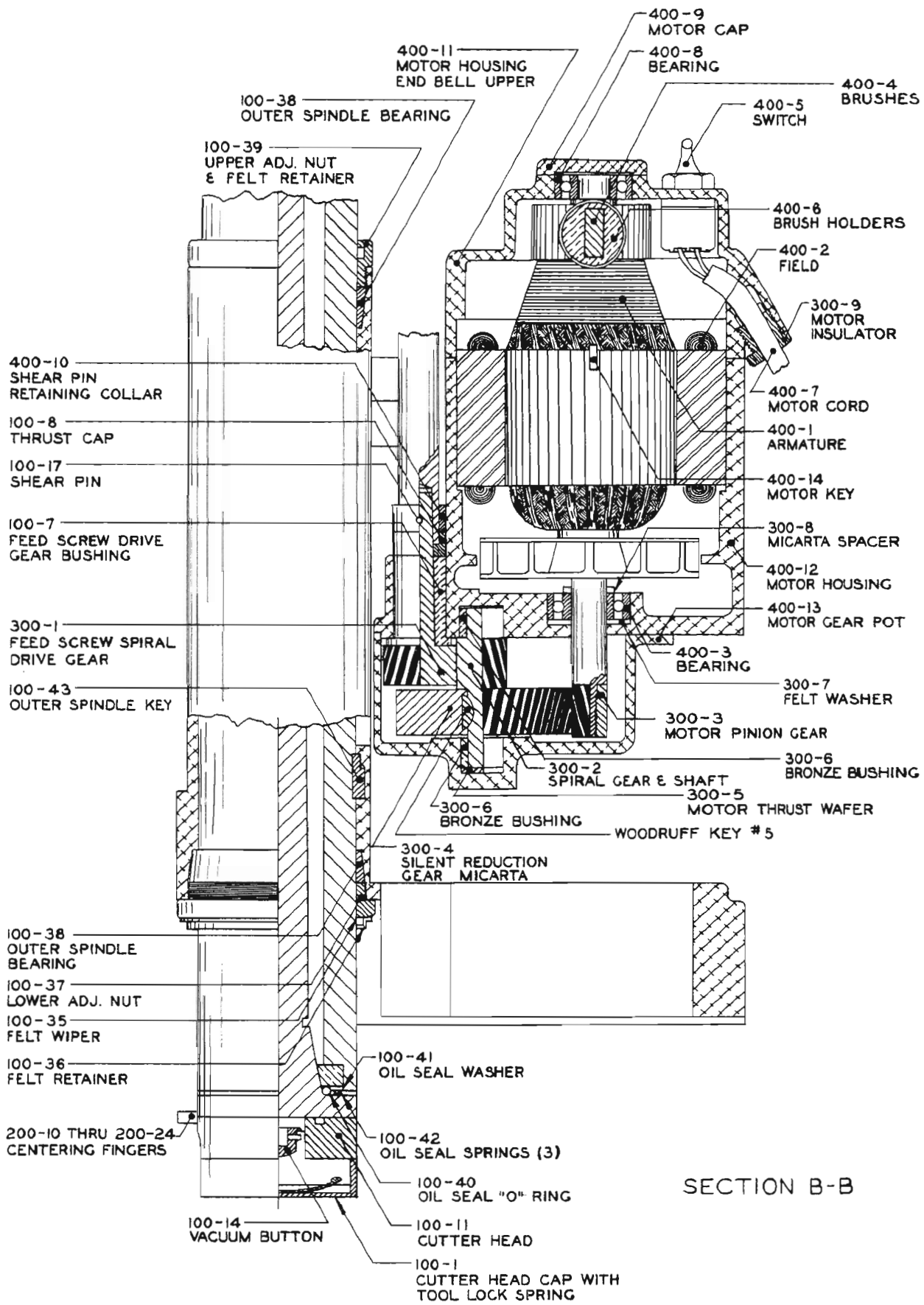
4. To reinstall motor unit on bar, slide on and insert cap screws and washers but do not tighten.
5. Turn drive shaft to proper position. Screw feed screw shaft down over drive shaft and install shear pin as per Section BB (See shear pin instructions).
6. Take a very light tension on motor bolts and check alignment of motor with upper housing. This can be best accomplished by miking outer spindle and screw at top and bottom. Place flat plate across screw and spindle making sure the plate makes full length contact on both spindle and screw. Tap motor carefully until perfect alignment is secured and tighten motor bolts.

IMPORTANT: Always give serial number of the Bar when ordering parts.

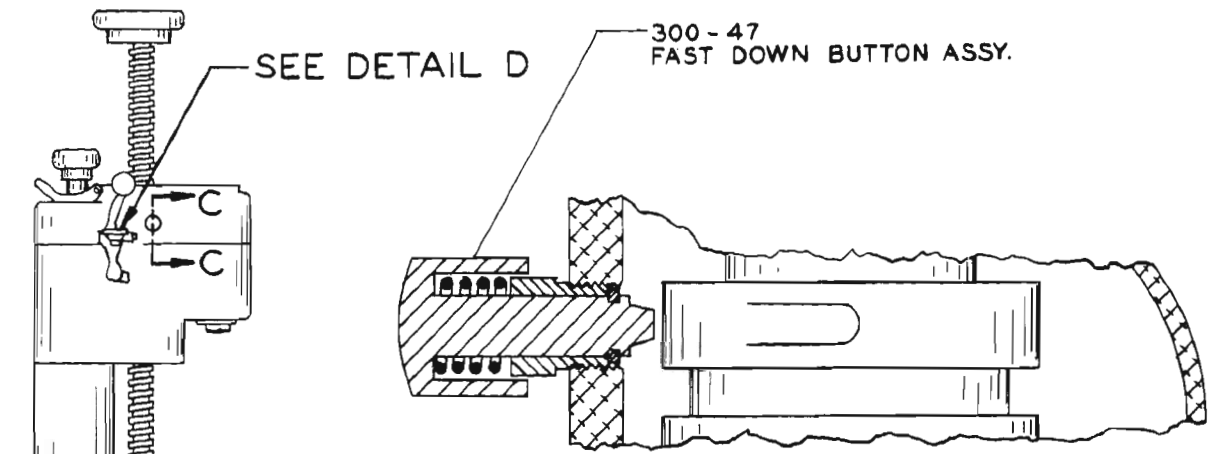


SECTION A-A
SHOWN IN NEUTRAL POSITION

IMPORTANT: To avoid shipping delays -
always give Serial Number of Bar when ordering parts.



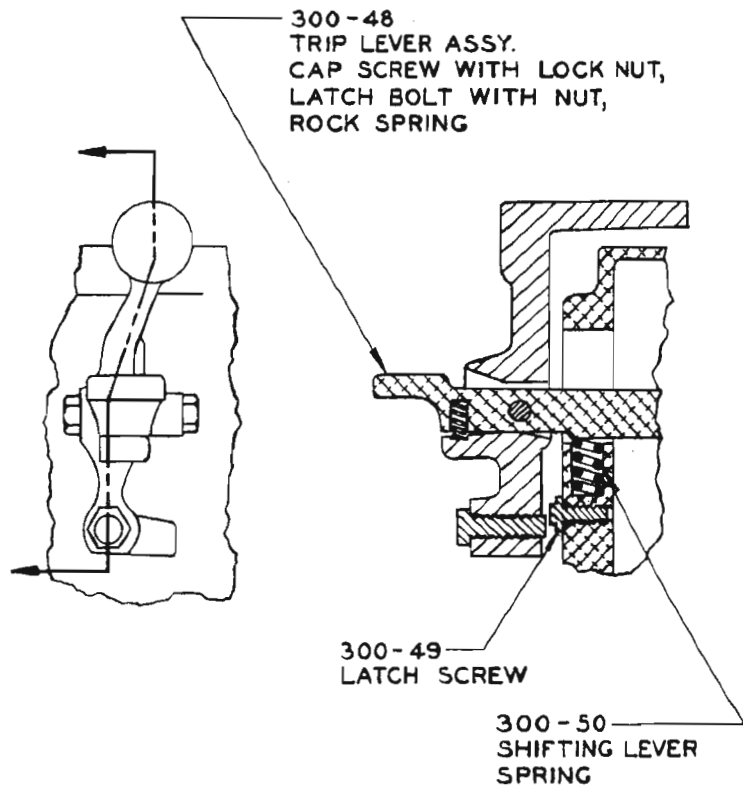
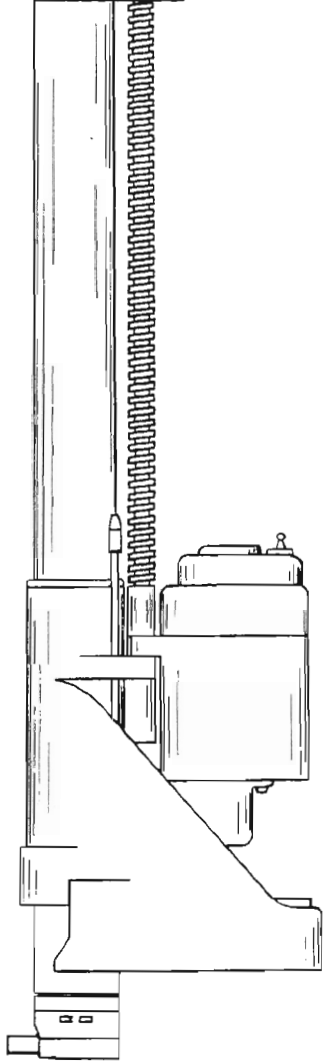
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SEE DETAIL D

300-47
FAST DOWN BUTTON ASSY.

SECTION C-C



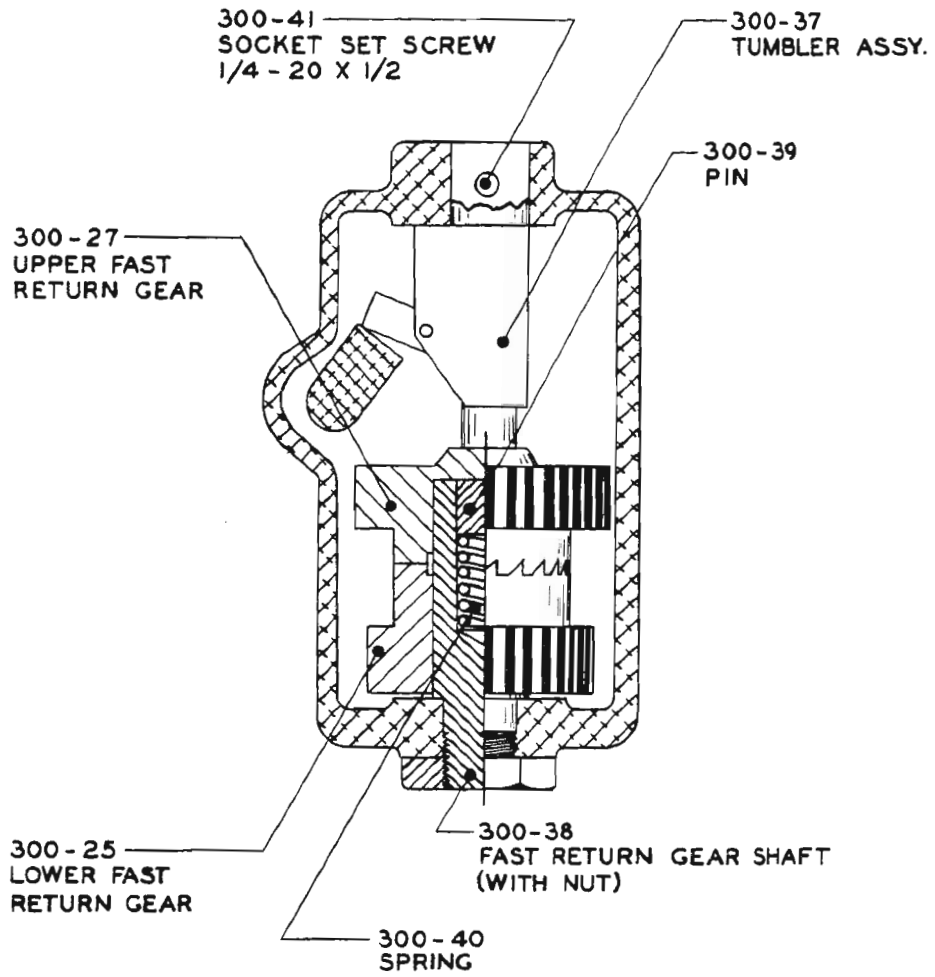
300-48
TRIP LEVER ASSY.
CAP SCREW WITH LOCK NUT,
LATCH BOLT WITH NUT,
ROCK SPRING

300-49
LATCH SCREW

300-50
SHIFTING LEVER
SPRING

DETAIL D

IMPORTANT: To avoid shipping delays –
always give Serial Number of Bar when ordering parts.



SECTION E-E
SHOWN IN RAPID
RETURN POSITION

IMPORTANT: To avoid shipping delays -
always give Serial Number of Bar when ordering parts.