INSTRUCTIONS

FOR THE

ERECTION, OPERATION and MAINTENANCE

OF

BARDONS & OLIVER

No. 2 GEARED ELECTRIC TURRET LATHE

BARDONS & OLIVER, Inc.
1133 W. 9th STREET • CLEVELAND, OHIO

THE BARDONS & OLIVER NO.2 GEARED ELECTRIC TURRET LATHE is an accurate piece of machinery, well built and thoroughly inspected at the factory before being sent out into service. To preserve the original efficiency and accuracy it will be necessary to follow certain rules of maintenance, here set forth. All of the mechanisms are designed to operate under conditions of hard usage; however, neglect or abuse may cause permanent damage or the necessity of replacing certain parts. Thorough inspections are advisable at intervals depending on the type of work handled and the accuracy desired.

UNPACKING

Turret Lathes for domestic customers are shipped in individual crates while those for foreign customers are shipped in individual boxes. After machine is unloaded, particular care should be taken not to mar the lacquer finish or damage the working parts.

Wherever possible, tools, chucks, and fixtures are attached directly to the machine. Wrenches and miscellaneous parts which cannot be directly attached, together with a complete packing list, will be found in a separate box which is fastened to the platform or skids.

Be sure to check and account for each item on the packing list before disposing of any crating or boxing material.

ERECTING

Machines are mounted on very heavy wooden skids to prevent any possibility of bed warpage in shipping. Do not remove these skids until machine has been placed in the approximate position where it is to be erected. In removing skids care must be taken to prevent undue twisting or warping which might cause permanent distortion of the bed and thus ruin the accuracy originally built into the machine.

If possible, the legs should rest on a concrete foundation. A wooden floor lacks rigidity and its surface swells or shrinks according to climatic conditions.

To maintain accuracy after leveling, steel bearing plates should be placed under each leg, as shown on the outline drawing of the machine. When possible, these plates should be grouted in concrete, flush with the floor. In cases where it is impossible to set these plates in or on concrete, they may be bolted down to a wooden floor. Here it is advisable to use plates affording a much larger bearing area on the floor. In extreme cases a single plate may be used with success. Drilling and tapping for the holding down screws should not be done until the bearing plates are firmly fastened to the floor. Regardless of the foundation or location, turret lathes must be bolted down in order to maintain accuracy.

CLEANING

Do not attempt to operate the machine until it is thoroughly cleaned. Wipe slushing compound from all finished parts with clean rags soaked in kerosene. Do not use an air hose when cleaning.

When in actual use, machines should be thoroughly cleaned at least once a week to insure long life and satisfactory performance.

Bardons & Oliver turret lathes are finished with highest grade lacquer, sprayed on. The cutting coolants ordinarily used will soon deposit a film or stain on this finish, which should be polished out at least once a week with a kerosene soaked rag. To further maintain the original fine appearance, all the lacquered surfaces should be cleaned about twice a year with "Glidden #75-C Rubbing Compound" or its equivalent.

LEVELING

To produce accurate work, the bed must be accurately leveled. Then, periodic checks should be made to see that original alignment is maintained. To aid in the ease and accuracy of leveling, our turret lathes are provided with two leveling screws in each leg, located as closely as possible to the holding down screw holes.

For proper leveling, a high grade adjustable spirit level is essential. No satisfactory results can be expected if an ordinary carpenter's level is used. Place the level across the bed ways and at right angles to them, first at one end of the bed, then at the other. After leveling at each end, it will be necessary to repeat this operation at least once more to eliminate additional errors set up. After proper alignment has been obtained, the legs should be solidly bolted down, and then the leveling once more rechecked.

If extremely accurate work is to be done on the machine, the above leveling may be

further checked by chucking a round bar and taking a turning cut with the carriage or hexagon turret. Any remaining misalignment will be indicated by the amount of taper in the turned diameter and can be corrected by a slight adjustment of the leveling screws.

ELECTRICAL CONNECTIONS

The turret lathe is shipped from the factory with all electrical equipment wired. It is only necessary to connect the main power lines to the proper terminals at the magnetic starting switch. All electric circuits are carried from this one set of main line terminals regardless of the auxiliary equipment installed. Make sure that when the spindle is rotating in the forward direction as indicated by the forward and reverse lever, the motor is running in the direction indicated by the small arrow mounted on top of the motor. If this is not the case, the main line connections to the magnetic starter should be reversed.

LUBRICATION

The headstock and saddle apron gear box are fully enclosed and splash lubricated. Before starting the machine, fill each of these two reservoirs to the center of the gauge glass. Oil levels should always be checked when the machine is not running since the level drops somewhat after the machine is started. Raising the level above the center of the gauge glass will cause leakage at various points, also excessive oxidation or gumming of the oil.

Use only the highest grade oil of about SAE 10 viscosity. The hand plunger pump on the side of the saddle apron lubricates the bearing areas between the turret slide and the saddle as well as certain places in the saddle apron not reached by the splash system. Two or three strokes of the pump handle about every two or three hours operating time will provide sufficient lubrication. Since the plunger pump takes oil from the saddle apron it will be necessary to add oil here more often than to the headstock.

After 200 to 250 hours of operating time the oil in the headstock should be drained completely, and refilled to the correct level with fresh oil. Under average operating conditions, the saddle apron should likewise be drained and refilled about four times a year. If the machine is running more than one shift per day, this oil change should be made more frequently.

All oil holes should be filled before starting the machine, and about twice during each eight hours operating time thereafter.

If machine is equipped with automatic chuck, the chuck wedge bearing on the rear end of the spindle should be lubricated with heavy oil at frequent intervals during the first few days of operation and should be lubricated about once a day thereafter.

HEAD

The head unit is shown in Figures 2, 3, 4, and 5. The spindle is mounted on precision tapered roller bearings. The advantages of this type of spindle mounting are three-fold:

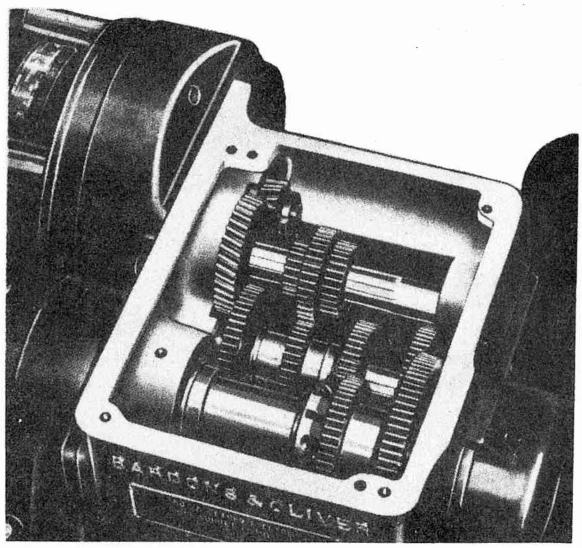


Fig. 2

The greatest possible rigidity for both radial and thrust loads and consequently a remarkable freedom from chatter.

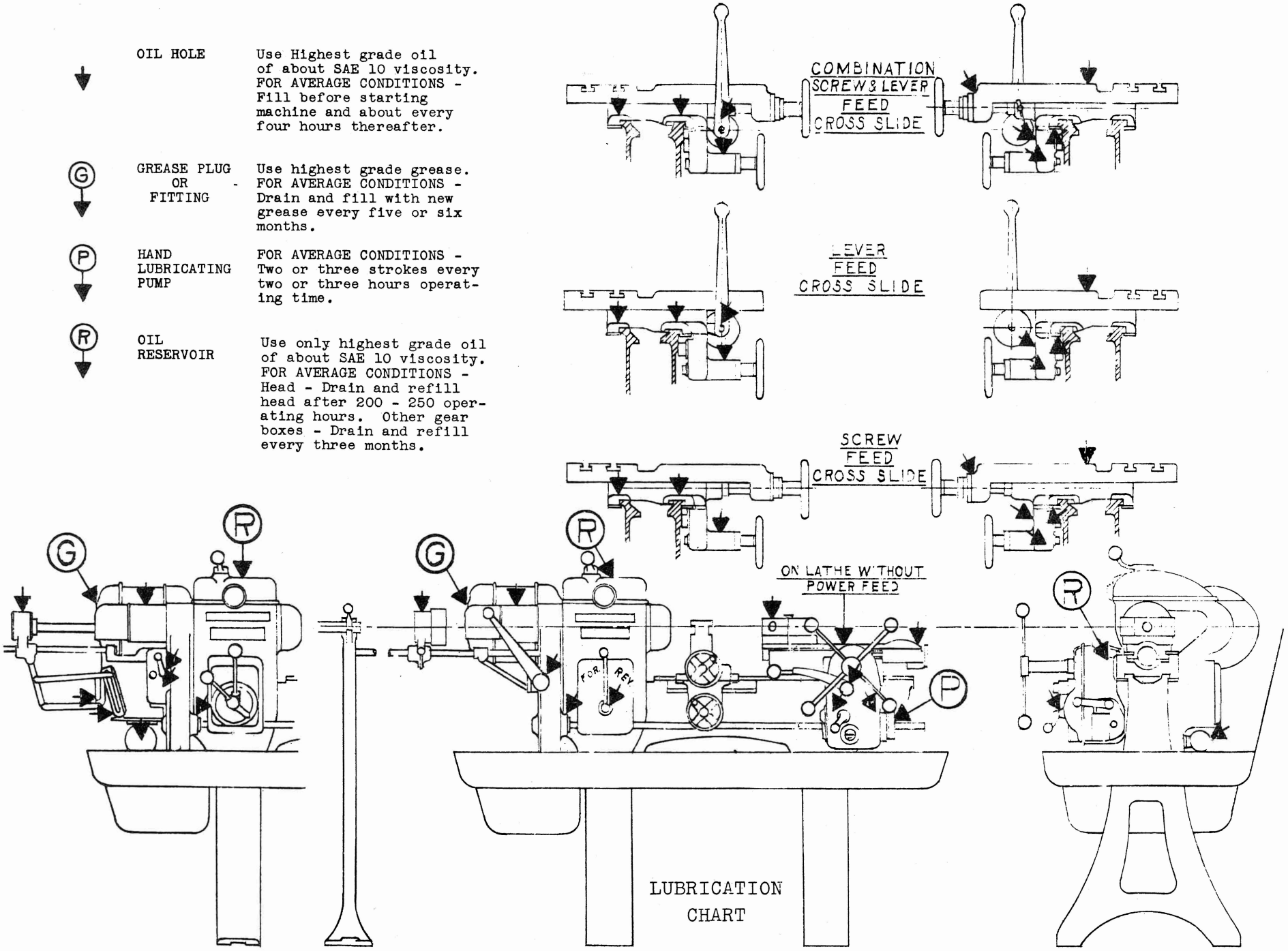
High spindle speeds without undue heating of bearings.

Long life.

To obtain these advantages to the fullest, it is necessary for the user to extend PROPER CARE TO THE MACHINE. The lubrication of bearings is important. We recommend strongly the use of a high grade SAE 10 motor oil in the head.

Dirt and foreign particles will ruin bearings rapidly. At all times TAKE CARE TO

↓	OIL HOLE	Use Highest grade oil of about SAE 10 viscosity. FOR AVERAGE CONDITIONS - Fill before starting machine and about every four hours thereafter.
Ⓖ ↓	GREASE PLUG OR FITTING	Use highest grade grease. FOR AVERAGE CONDITIONS - Drain and fill with new grease every five or six months.
Ⓟ ↓	HAND LUBRICATING PUMP	FOR AVERAGE CONDITIONS - Two or three strokes every two or three hours operating time.
Ⓡ ↓	OIL RESERVOIR	Use only highest grade oil of about SAE 10 viscosity. FOR AVERAGE CONDITIONS - Head - Drain and refill head after 200 - 250 operating hours. Other gear boxes - Drain and refill every three months.



LUBRICATION CHART

Fig. 1

KEEP HEAD AND BEARINGS SCRUPULOUSLY CLEAN.

If it is suspected that the spindle bearings are in need of adjustment, test the looseness as shown by Figure 5. When undue looseness is indicated proceed as follows.

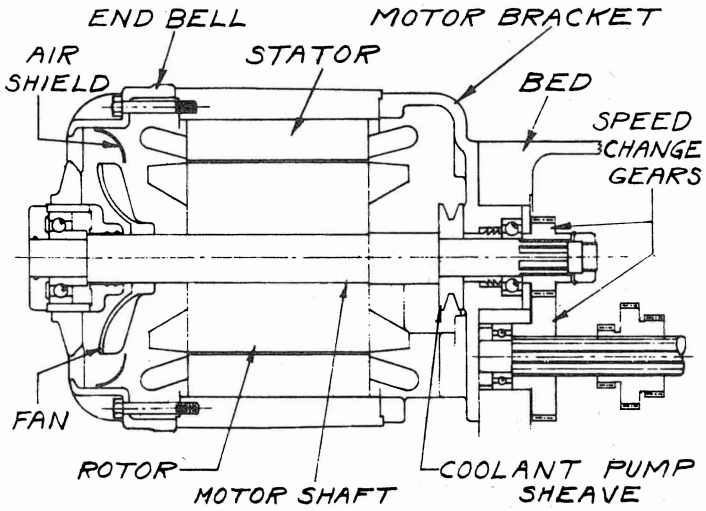


Fig. 3

Remove head housing and small cover on top of head end bracket. Test axial spindle play as per Figure 4, and the radial spindle play as per Figure 5. When doing this hold spindle from rocking to prevent incorrect indicator reading. If play is found to exist tighten Nut A slightly and make new readings. Proceed thus step by step until dial readings show that all play has been eliminated. But be absolutely certain NOT TO TIGHTEN NUT A BEYOND THE POINT WHERE THE PLAY DISAPPEARS, as doing so would preload the tapered roller bearings and result in greatly shortening their life.

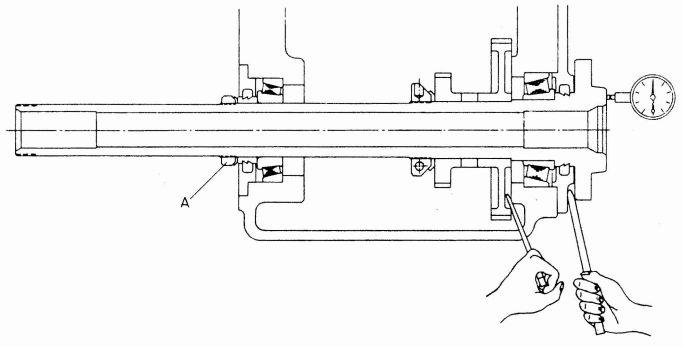


Fig. 4

When making indicator readings be sure to hold spindle from being rocked by the action of the lever as this would result in an error in indicator reading.

When the adjustments are finished be sure to lock the nut.

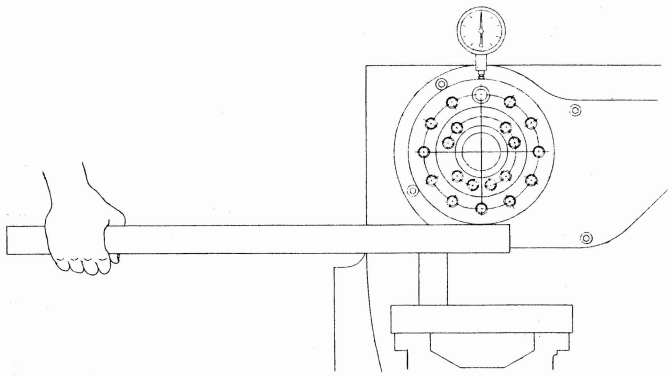


Fig. 5

During this work of adjusting BE VERY CAREFUL NOT TO ALLOW DIRT OR FOREIGN PARTICLES TO GET INTO THE HEAD as these would be apt to cause serious damage to bearings and gears.

All other shafts are supported by radial ball bearings, which do not require adjusment.

The spindle driving motor is a reversing motor of the high torque type, built to deliver the maximum number of complete reversals per minute. When changing the direction of rotation of the spindle, move the forward and reverse lever directly from forward to reverse, or vice versa. It is not necessary to move the lever into the neutral position to allow the motor to coast to a stop before reversing.

The quickest way to stop the spindle rotating is to manually plug the motor. Move the forward and reverse lever to the position giving the opposite rotation to the motor. Hold it there for the length of time necessary to reduce the spindle rotation to a small number of revolutions per minute, then move the lever into the neutral position. With a little practice, the spindle can be stopped instantly every time. The motor is so constructed and protected that this method of stopping is in no way harmful.

There is a thermostatically operated protection device built directly into the frame of the motor. In the event that the motor

becomes overheated from too frequent reversing, the current to the motor is automatically broken. The thermostat is installed and set by the motor manufacturer to break the current before a dangerous motor temperature is reached. The motor will not start until the temperature has dropped into the safe operating range.

When removing the motor, first disconnect the wiring at the conduit box on the underside. Be sure to clearly tag or otherwise mark each pair of leads to simplify the job of reconnecting. Remove the vee-belt from the oil pump pulley. Remove the four socket head cap screws holding the motor bracket to the bed. The entire motor and bracket may now be lifted out of the head.

In further disassembling the motor and motor bracket, first remove the end bell and, second, the stator. The exact construction of the end bell and the method of supporting the rear bearing differs slightly with the make of motor and may not correspond to that shown in Fig 3. To take out the shaft, remove the locknut, lockwasher, and gear. The rotor and any separate fan on the shaft are pressed on and must likewise be pressed off. The exact positions of the rotor and any fan or removable air shields are important. Make a note of their locations before removing.

When changing the set of gears indicated in Fig. 3 as "speed change gears", the motor bracket and motor unit must be taken out as explained above. Remove the screws holding the front bearing cover on the head as well as the lock washer and lock nut at the motor end of the first intermediate shaft. Slide the second intermediate shaft as far as possible in the direction of the spindle flange. Slide the first intermediate shaft in the same direction sufficiently to drive out the taper pin. Further motion will allow for removal of the gear and the shaft bearing. The new gear can now be substituted. Changing the gear on the motor shaft is accomplished by taking off the lock nut and lock washer.

TURRET SLIDE AND SADDLE

When the turret lathe has been in operation a few months, it may become necessary to adjust the two taper gibs for the turret slide. These are shown in Fig. 6. In adjusting these gibs, it is important that each nut is turned an equal amount, in order not to throw the turret holes out of lateral alignment with the spindle. The slide should not be adjusted sideways unless an indicator test has proven definitely that

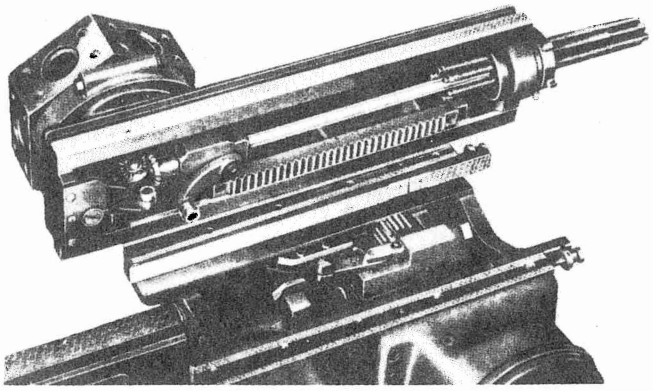


Fig. 6

the tool holes in the turret have become out of line with the spindle. Under usual conditions, gib adjustments are not required more than once or twice a year.

The hexagon turret is clamped to its seat on the slide by a powerful double bevel circumference clamp ring. The clamping action is supplied by heavy springs and may be adjusted in tension to suit the nature of the work. To adjust, dismount the turret clamp guard, remove the cotter pin from the castellated nut, and holding the nut with a wrench, turn the screw to increase or decrease clamping action. Fig. 7 shows these parts.

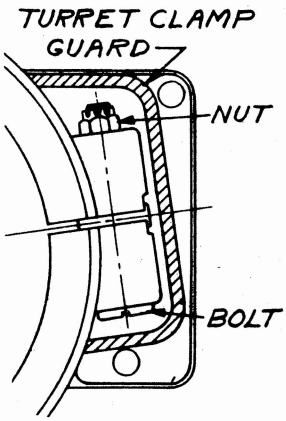


Fig. 7

To remove the turret, take off the turret clamp guard, withdraw all clamp bolts, the clamp itself, and lift the turret from the slide. This is illustrated in Fig. 8.

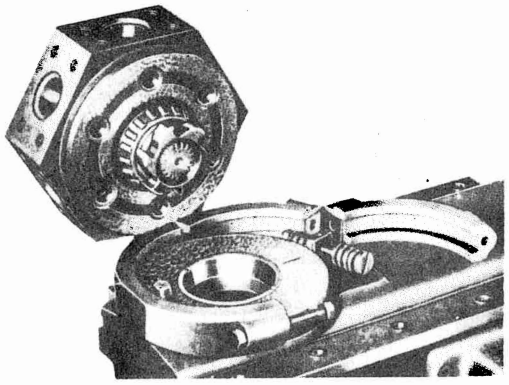


Fig. 8

The turret revolves on and is located centrally by a large taper roller bearing, whose outer race is threaded into the slide and held in place by a detent engaging one of a series of vertical slots around the outside of the outer race. The clamp ring tightens the turret against the slide and preloads the bearing for accurate centering and vertical alignment.

Adjustment for wear will not become necessary for many years even under the most severe operating conditions. Do not adjust the turret center bearing unless an indicator test proves conclusively that it has become necessary.

The front end of the turret slide directly below the turret is fitted with a neoprene apron to keep chips and dirt out of the indexing mechanism. Under certain conditions, foreign matter may still work in. Therefore we recommend that the slide be removed from the saddle and both be cleaned periodically. When taking the turret slide out of the saddle, place a board across the bed ways beneath the front end of the slide. After removing the saddle caps, raise the slide at the rear until it rests on the board. From here it can be easily removed from the machine, if desired.

SADDLE APRON

The power feed to the turret slide is controlled by a friction clutch located in the apron. This clutch should be kept in proper adjustment, since slippage will cause undue wear to the clutch faces and result in failure to release properly. A split adjusting nut is provided at the end of the feed lever shaft, as shown in Fig. 10. To adjust the clutch, loosen the split closing screw and tighten the nut. The lever should be worked up and down constantly while the nut is being tightened in order to obtain the correct setting. If the feed clutch becomes frozen due to slippage and will not release, it will be necessary to take off the apron cover, dismantle the clutch and thoroughly clean and lubricate the same.

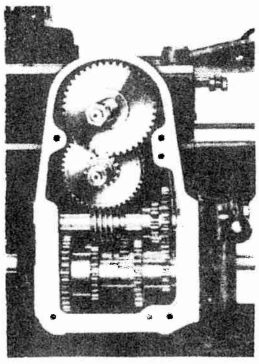


Fig. 9

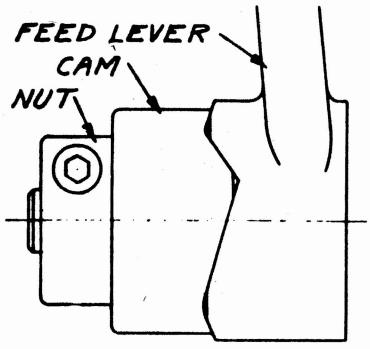


Fig. 10

CROSS SLIDE AND CARRIAGE

The carriage is gibbed to the rear side of the front bed way and the cross slide to the carriage. After a few months of operation it may be necessary to give each gib an initial adjustment. When adjusting the carriage gib, first loosen the small hollow set screw found at each end of the gib. Then tighten the socket head cap screw in each carriage wing directly above and threaded into the gib. Move the carriage longitudinally, after turning the screws, to check the results. When adjusted properly, tighten the small set screws at the ends. The cross slide gib is adjusted from the rear, by a gib nut held in place by a lock nut. Again, the cross slide should be moved back and forth to check the results during the adjustment.

On the left hand front carriage wing is a socket head cap screw which serves the purpose of clamping the carriage longitudinally on the bed ways. The carriage is moved longitudinally by means of a handwheel and rack and pinion drive, equipped with a direct reading micrometer dial. Each graduation is equivalent to a movement of eight thousandths of an inch.

The SCREW FEED CROSS SLIDE, shown in Fig. 11, is fitted with two latch and disc type adjustable stops. Adjacent to the milled flat on each disc will be found a small hollow set screw. By loosening this screw, the disc can be rotated to the desired setting. The feed screw binder on the left hand side of the cross slide, and close to the front end, clamps the cross slide in any position desired. The feed screw is fitted with a direct reading micrometer dial. Each graduation is equivalent to a movement of four thousandths of an inch.

The LEVER FEED CROSS SLIDE, shown in Fig. 12, is fitted with adjustable stop blocks mounted on the cross slide in connection with a swinging stop on the carriage for the duplication of diameters.

The COMBINATION LEVER AND SCREW CROSS SLIDE, shown in Fig. 13, is actuated either by a handwheel or by a lever. When using the handwheel, or screw feed to the cross slide, loosen the feed screw binder on the cross slide and tighten the feed nut binder on the right hand side of the carriage.

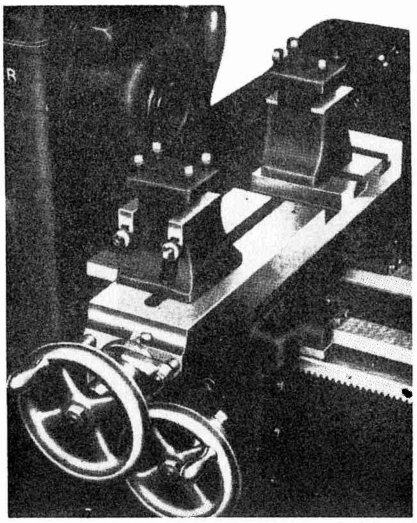


Fig. 11

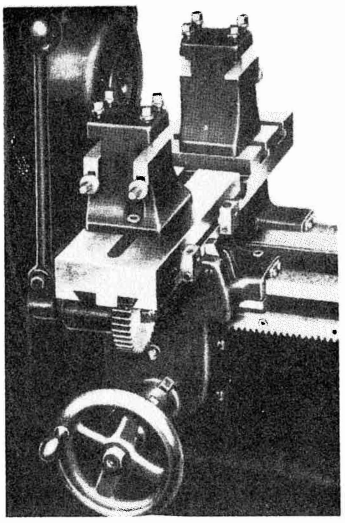


Fig. 12

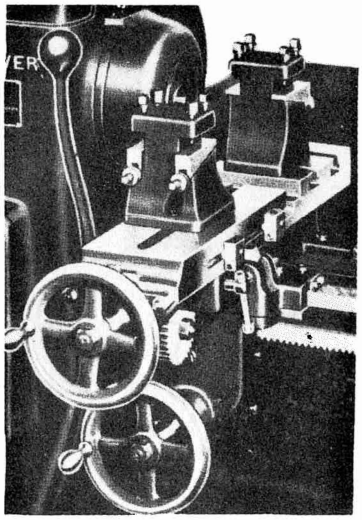


Fig. 13

When using the lever operation of the cross slide, loosen the feed nut binder on the carriage and tighten the feed screw binder on the cross slide. A higher degree of accuracy is obtainable by means of the disc and latch type of stops than by means of the stop blocks. Each graduation marked on the cross slide micrometer dial is equivalent to a movement of four thousandths of an inch.

When using the lever feed, the position of the arc of travel of the lever for any particular job may be adjusted to suit the operator by loosening both binder screws and moving the lever into approximately the center of the arc of motion desired.

HEAD END BRACKET

Power from the spindle is transmitted to the feed shaft by means of a vee belt and sheaves located in the head end bracket. The lower sheave is of the adjustable type, to provide for taking up of the belt. Fig. 14 shows the construction of the lower sheave as well as other parts of this unit. When making adjustment, first remove the cover. Release the lock washer from the lock nut, and advance the lock nut. The closing together of the two halves increases the diameter of the belt groove, thus tightening the belt. After adjustment, run the machine at the lowest spindle speed for a few seconds to allow the belt to reseat itself, and then check the belt tension. When the desired tension has been obtained, secure the lock nut in place with the lock washer.

The vee belt used is of the adjustable length, non-endless type. When it becomes necessary to install a new belt, remove the rear end spindle guard to gain acess to

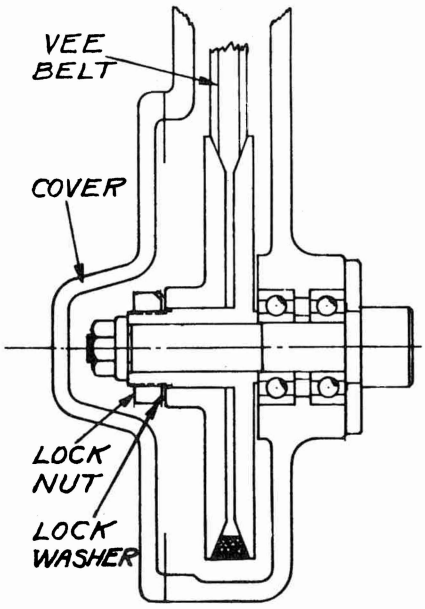


Fig. 14

the opening in the head end bracket around the spindle. Remove the left half of the lower sheave. Insert a new length of belt through the top opening and place over the upper sheave. Adjust the length and close the belt, after which the lower sheave may be reassembled. Since a new piece of belting will stretch a certain amount shortly after being put into service, it is best to start with the belt acting at the smallest pulley diameter to allow for further adjustment. With the adjustable length belt, a single piece or section can be removed when the belt has stretched so much that it can no longer be tightened by pulley adjustment.

COOLANT PUMP AND CLUTCH

The coolant pump is driven by an endless vee belt from a sheave on the motor shaft through the oil pump clutch. The motor shaft sheave is shown in Fig. 3. If it becomes necessary to replace this belt, another endless vee belt may be installed by removing the motor bracket and disassembling that unit, as described fully in the section devoted to the HEAD. An easier way to replace the belt is to use the adjustable length non-endless type. It can be attached without dismantling any part of the machine.

To engage the oil pump clutch, move the outermost member on the shaft toward the sheave until the jaws become fully engaged.

AUTOMATIC CHUCK

The automatic chuck may be either hand operated or power operated, but regardless of the type, the adjustments are the same. To change collets unscrew the collet ring. The grip of the collet is adjusted by the finger holder threaded onto the rear end of the spindle. The rear end spindle guard cap is hinged to lift out of the way sufficiently to afford free access to the finger holder. A hollow set screw and shoe clamp the holder to the spindle. When varying the collet gripping power loosen this screw and screw the finger holder in either direction - further onto the spindle to cause a tighter grip, and vice versa.

When changing the wedge shoes, the entire rear end spindle guard must be removed. Raise the spindle guard cap in order to reach the screws holding the guard to the head end bracket. Wedge shoe studs, one on each side of the yoke lever, hold the wedge shoes. These have hexagon heads and may be removed with a wrench, permitting the insertion of new shoes. These adjustments and parts are shown in Fig. 15.

RATCHET BAR FEED

The automatic chuck and bar feed are both operated by a single lever. The bar is held by a two jaw revolving chuck in a sliding head, moved along the support bars by a ratchet. The chuck jaws are opened and closed by a socket head screw, reached by raising a hinged portion of the bar chuck guard. This unit is shown in Fig. 15.

FINGER BAR FEED

This unit is shown in Fig. 16. The automatic chuck and bar feed lever opens the collet, feeds the bar forward and closes the collet. The finger withdrawing lever moves the feed finger back on the bar. To adjust the feeding length of the bar, move the front stop collar on the support bar. The front and rear stop collars serve as

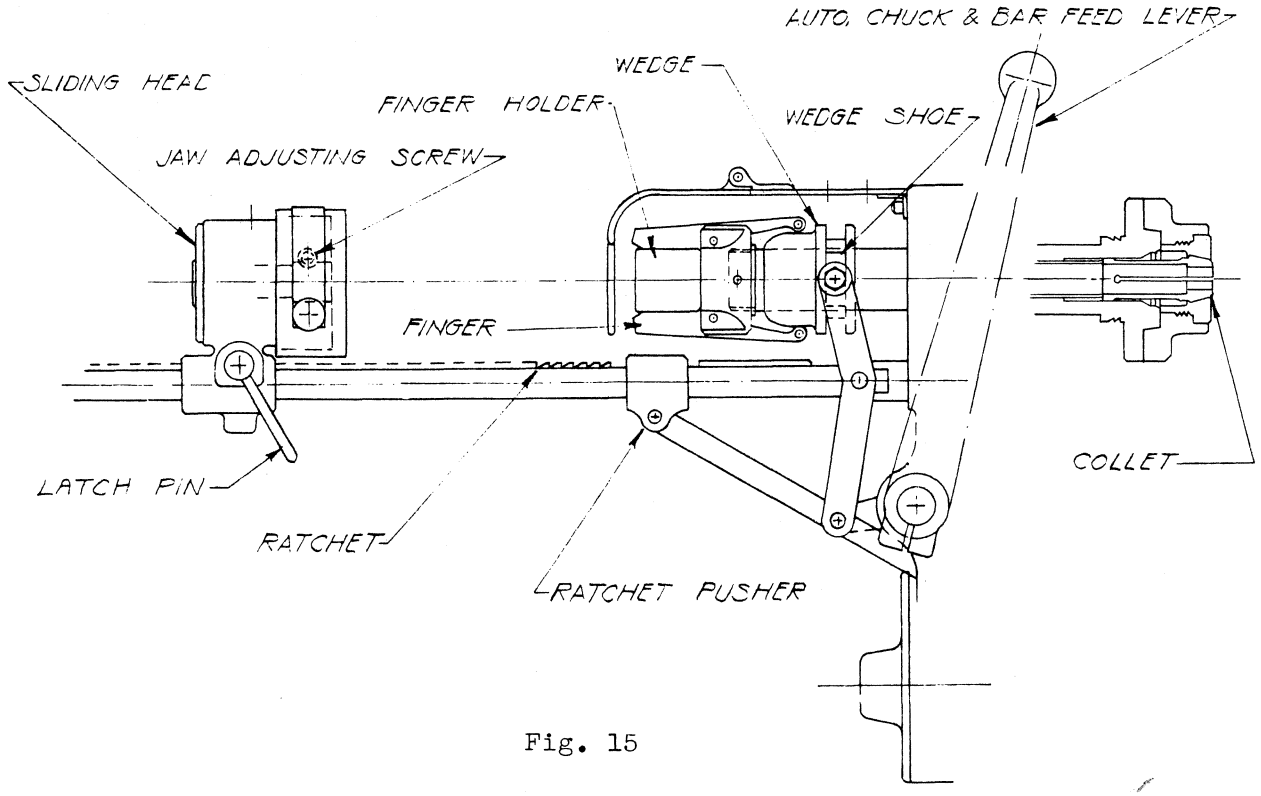


Fig. 15

positive abutments for the sliding head. For accurate feeding length of the bar it is necessary to use the stock stop in the turret.

Both the inside and outside feed fingers, when of standard design, are of the master type. To change the capacity of either requires only the change of the feed finger pads. When changing the inside feed finger pads, move the rear stop collar back toward the bar support stand. Pull out the bar feed disconnecting pin, allowing the linkage to drop clear of the sliding head. Move the sliding head back toward the bar stand far enough to allow the feed finger to clear the end of the spindle guard and cap. Spread the feed finger with the wrench provided for that purpose. The pads may now be removed and replaced with those of the desired size. In this rearward position, the feed finger may be removed from the pusher tube by holding the pusher tube and unscrewing the feed finger. Pin wrench holes are provided in each piece for this purpose.

To remove the inside feed finger and pusher tube and replace with the outside feed finger, move the sliding head to the rearward position as described in preceding paragraph. The pusher tube is connected with the revolving member of the sliding head by means of a threaded coupling. By holding this revolving member, the coupling can be unscrewed. A spanner wrench and slot are provided for the sliding head member, and a pin wrench and hole for the coupling. Thus the coupling, pusher tube, and inside feed finger are removed in one piece. The outside feed finger is threaded directly into the sliding head revolving member. Interchangeable pads can be inserted when the feed finger is spread open with the wrench for that purpose. The thread on the outside feed finger is left handed; all others are right handed.

When inserting a new bar in the machine, open the bar feed vise jaws enough to permit free passage of the bar. Move the feed finger into a forward position with the bar feed lever. Load the bar into the support tube and feed forward by hand until the end is directly behind the feed finger pads. Close the bar feed vise. Pull the feed finger over the end of the bar with the finger return lever. Release the grip of the bar feed vise before starting the machine. The insertion of a new bar may be made easier by pointing or chamfering the end.

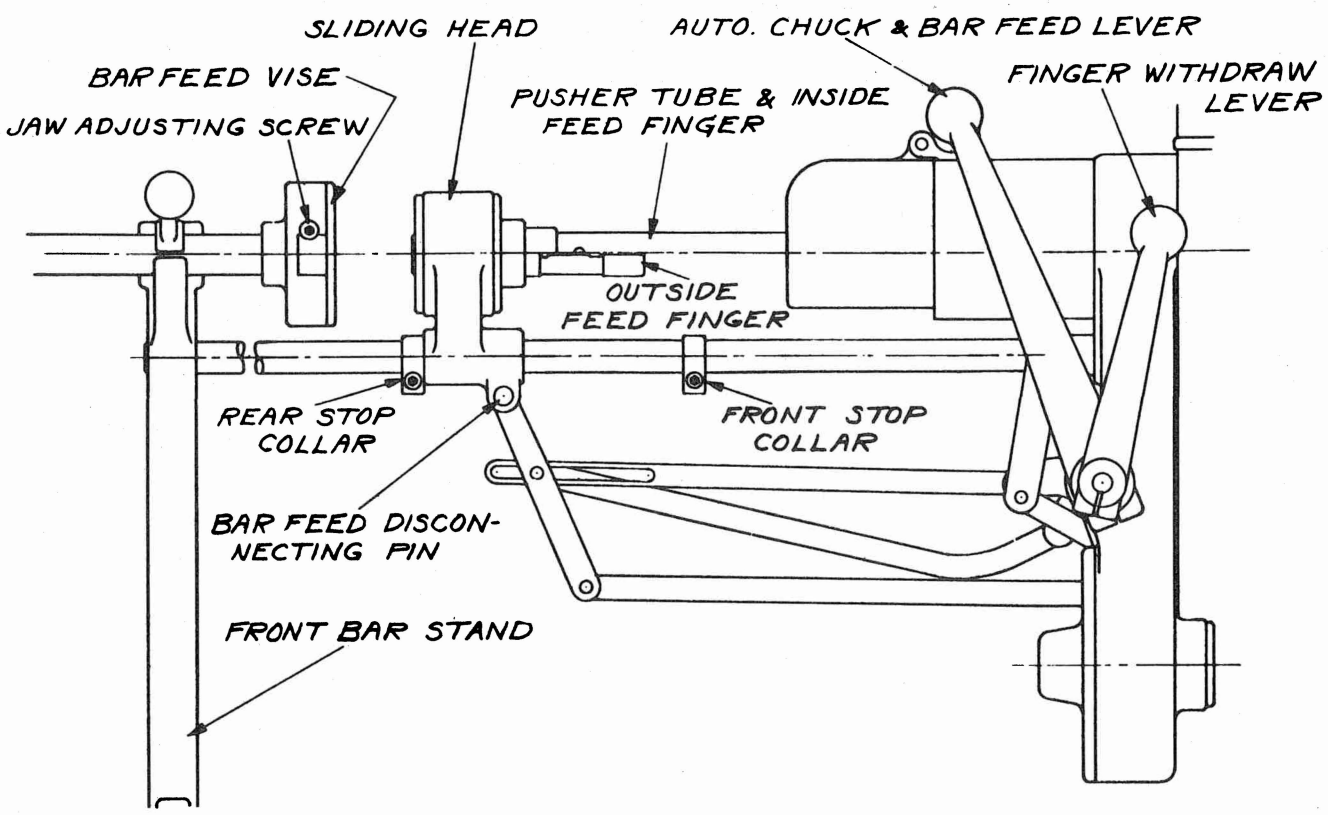


Fig. 16

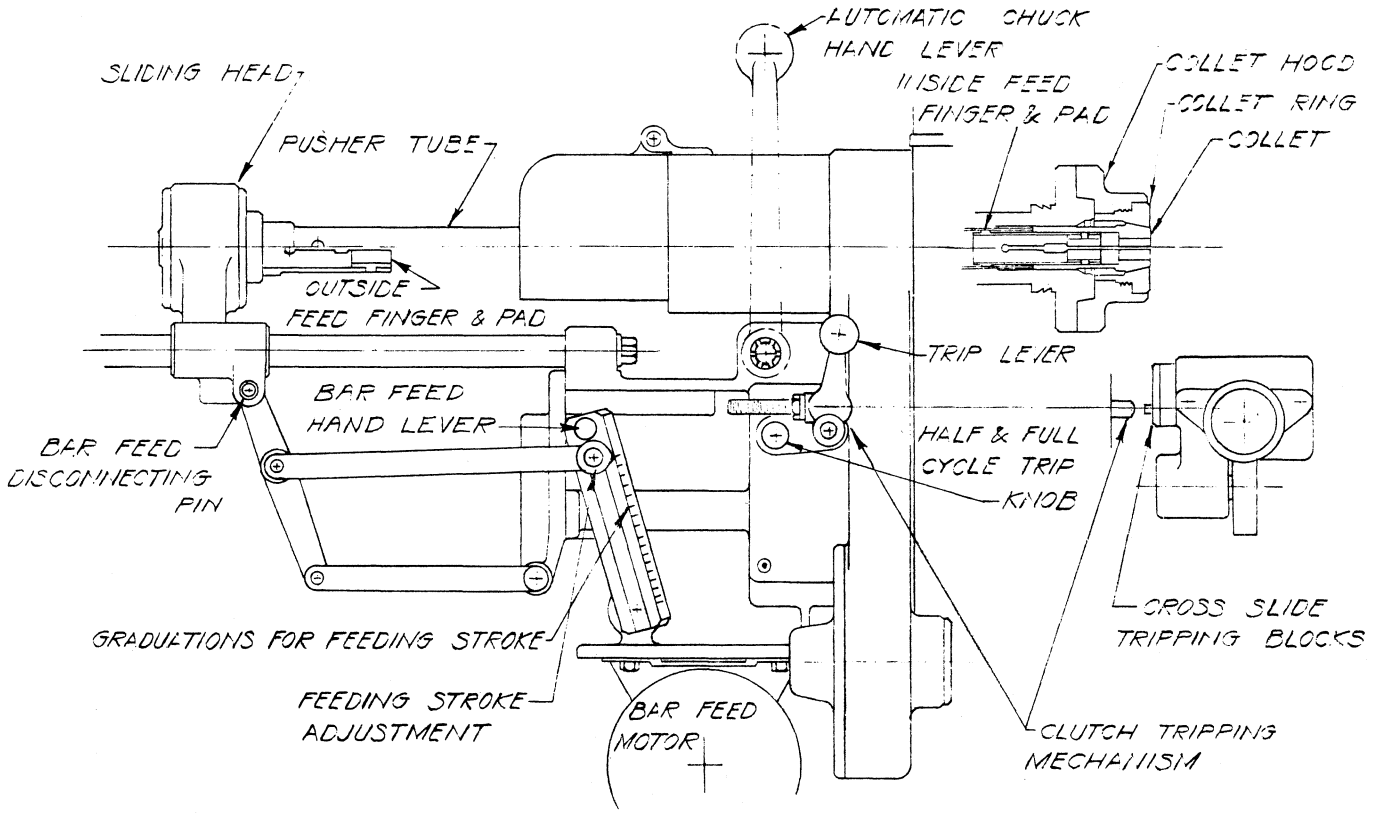


Fig. 17

CHANGING FROM RATCHET BAR FEED TO FINGER BAR FEED AND VICE VERSA

Certain additional parts are necessary before the change from RATCHET BAR FEED TO FINGER BAR FEED can be made. If these are not supplied as original equipment, they may be purchased at a later date. When changing from either type to the other, remove all operating mechanisms except the yoke lever that engages the wedge on the spindle. Loosen the set screws anchoring the two bars to the front bar stand and move the latter sufficiently to take the sliding head off. Remove the ratchet and ratchet pusher or assemble on the bar as the case may be. Put the new sliding head on the bars and re-anchor them in the bar stand. Assemble the new linkage and levers, etc. The linkage is shown for the most part in Figs. 15 and 16. In the case of the double crank lever on the finger bar feed, the longer lever is connected to the sliding head lever.

When the conversion from the finger type to the ratchet type is made after the original purchase, a slotted bar for the ratchet must be installed in place of the rear round bar. A hollow set screw anchors this to the head end bracket. It is not necessary to replace the slotted bar with the round bar when conversion is made the other way. Also, the support tube must be threaded to receive the bar vise chuck. This thread is 1-1/4" - 12 - N.F.

POWER OPERATED AUTOMATIC CHUCK AND BAR FEED

Normally, the automatic chuck and the bar feed are operated by power, however, provisions are made for hand operation while setting up for a new job or for an occasional small lot job. On work made from bar stock, a single cycle of operation consists of opening the collet, feeding the bar, closing the collet, and withdrawing the feed finger. For second operation work, the collet canbe alternately opened and closed by power. This complete unit is shown in Fig. 17.

The bar is gripped and fed by feed fingers, either inside or outside the spindle depending on the size stock used. The method of changing the removable feed finger pads and of changing from one type of feed finger to the other is described fully in the section devoted to FINGER BAR FEED.

Adjacent to the trip lever as shown on Fig. 14 is the half and full cycle trip knob. When this knob is in its inward position, the power cycle includes alternate opening and closing of the collet. If the collet is opened during one cycle it will be closed during the next. This is entirely for second operation work. When the knob is in its outward position, the power cycle includes all of the motions necessary for automatic bar feeding.

The power cycle may be started at either one of two places. On the head end bracket proper is a trip lever for hand operation. Motion of the lever to the left engages the power. Disengagement is automatic. This lever may be operated by remote control by either one of two tripping blocks attachable in a tee slot on the left hand side of the cross slide. Each block has a member that operates the adjustable length trip rod carried through the bed and connecting with the trip lever. The blocks are constructed so that as they pass the trip rod in one direction, the rod is moved, whereas, if they pass in the other direction, there is no motion to the rod. Two blocks are provided so that the power cycle may be started by either the inward or the outward motion of the cross slide. The effective length of the trip rod can be changed to accommodate variation in position of the carriage from one job to the next. Loosen the lock nut on the left hand side of the trip lever, and turn the rod either direction with a wrench on the two flats provided at the right end of the rod. Then tighten the lock nut. The most efficient relation between the tripping block and the cutting tool is such that the power cycle is started just after the cutting off tool clears the work on the way out.

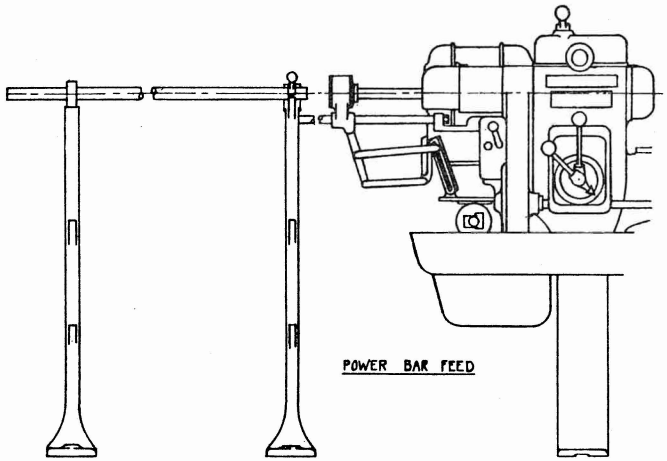
The length of the bar feed stroke is adjusted by moving the bar feed link up or down in the tee slot bar. This bar has graduations on the side to indicate directly in inches the length of the feeding stroke. For extreme accuracy, it is necessary to use a stock stop in one of the turret holes. When the desired length of feeding stroke exceeds the maximum length available, operate the trip lever two or more times in quick succession.

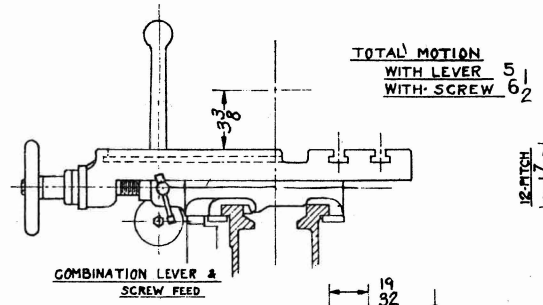
Adjacent to the trip lever is a removable hand operated automatic chuck lever. At the upper end of the tee slot bar is a handle which may be used for hand feeding of the bar. These are to facilitate setting up for a new job or for occasional small lot jobs. Before starting power operation, dismount the hand automatic chuck lever for the sake of safety.

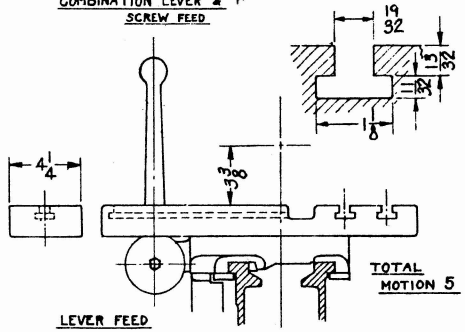
A vee belt and sheaves are used to transmit the power from the bar feed motor. The motor may be moved longitudinally to make allowance for any slack that develops in the belt. Four screws hold the motor to its mounting surface. The belt may be replaced with one of the endless type or one of the adjustable length, non-endless type.

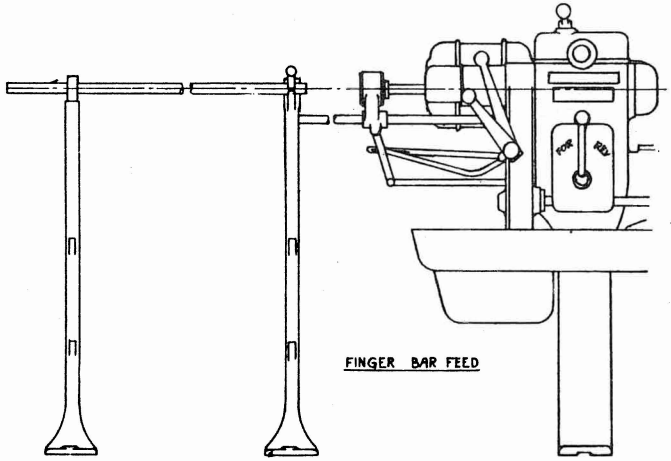
REPLACEMENTS

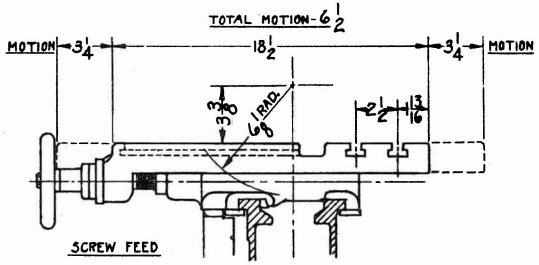
In order to maintain the accuracy and finish requirements of today, it is necessary and economical to replace worn parts. The 'PARTS CATALOG' has been prepared to simplify and explain the procedure of ordering repair parts.

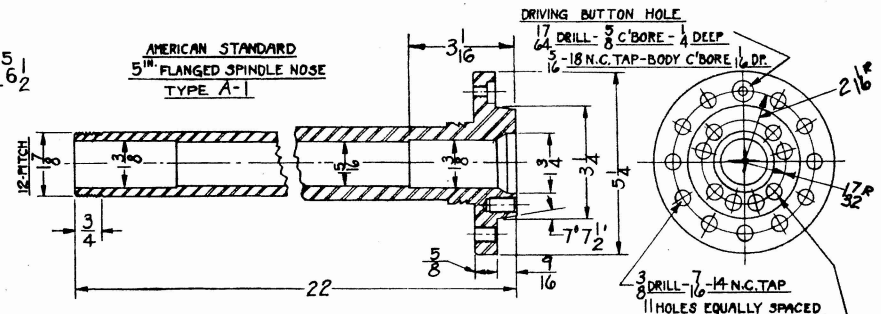


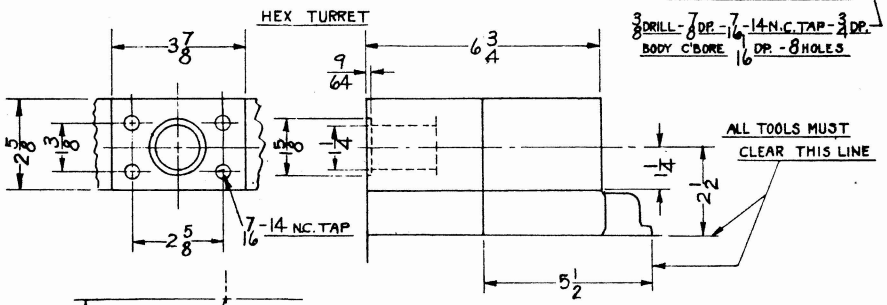


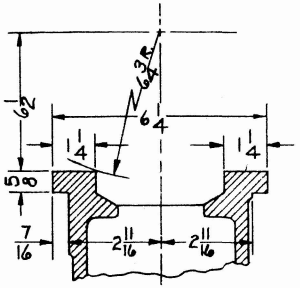


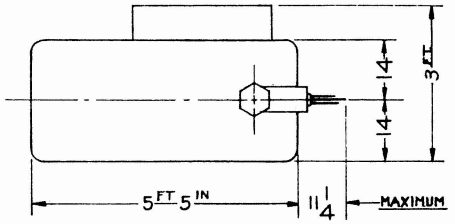


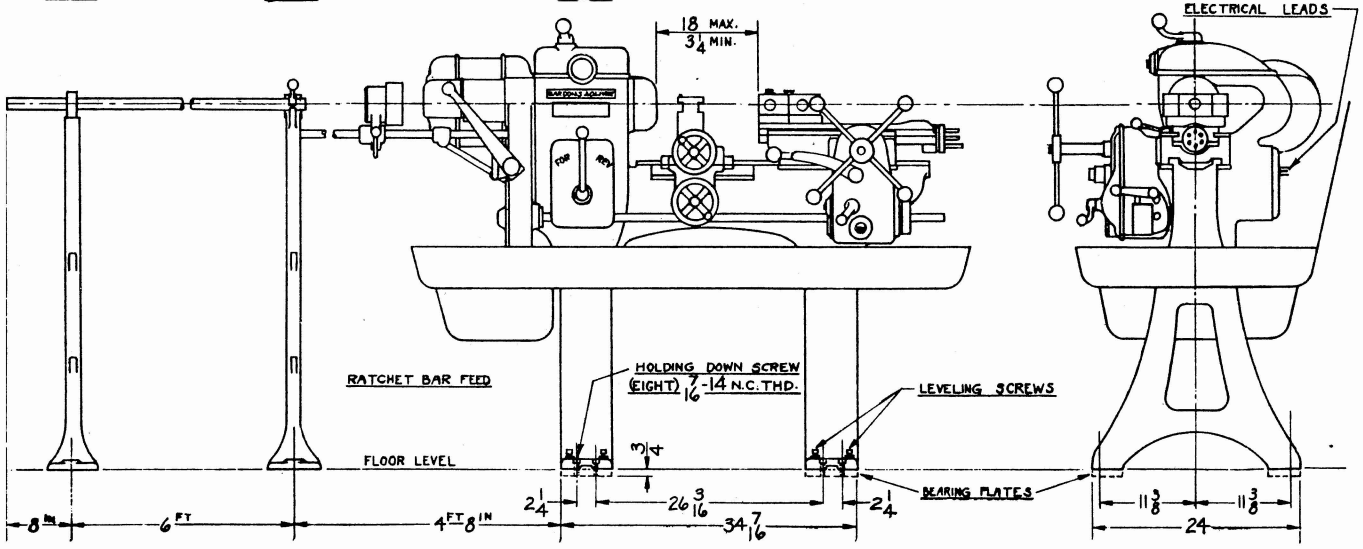












SPINDLE SPEEDS

SPEED RANGES WITH:

1500 R.P.M. OR 1800 R.P.M. MOTOR
100-160-250-400-640-1000
125-205-320-505-810-1250
150-250-390-610-980-1500

3000 R.P.M. OR 3600 R.P.M. MOTOR
200-320-500-800-1280-2000
250-410-640-1010-1620-2500

TWO SPEED 750 & 1500 R.P.M. MOTOR
50-80-100-125-160-200-250-320-400-500-640-1000

TWO SPEED 900 & 1800 R.P.M. OR 1500 & 3000 R.P.M.
75-125-150-195-250-305-390-490-610-750-980-1500

TWO SPEED 1500 & 3000 R.P.M. OR 1800 & 3600 R.P.M.
100-160-200-250-320-400-500-640-800-1000-1280-2000
125-205-250-320-410-505-640-810-1010-1250-1620-2500

POWER FEEDS

TO TURRET SLIDE -.0035 - .006 - .010 - .013 - .021 - .033

N° 2 GEARED ELECTRIC TURRET LATHE

BARDONS & OLIVER INC.

CLEVELAND, OHIO -- U.S.A.

DEC. 1939 J.F.B.

BARDONS & OLIVER NO. 2 GEARED ELECTRIC TURRET LATHE

PROCEDURE FOR THE ADJUSTMENT OF THE SPINDLE BEARINGS

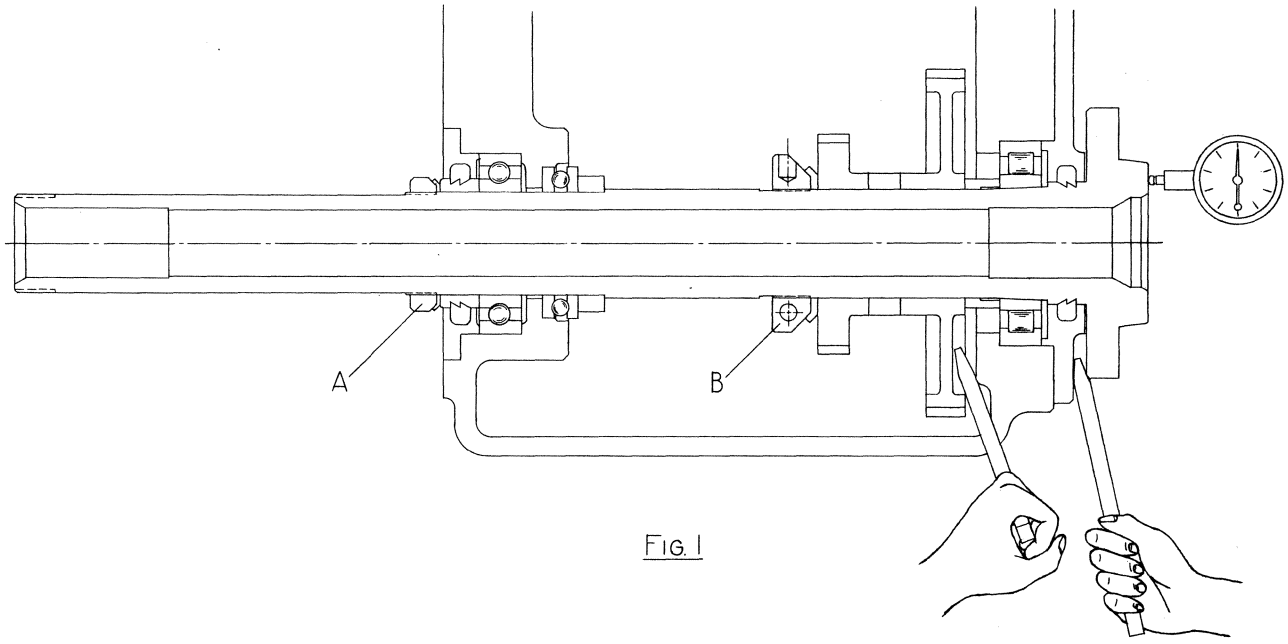


FIG. 1

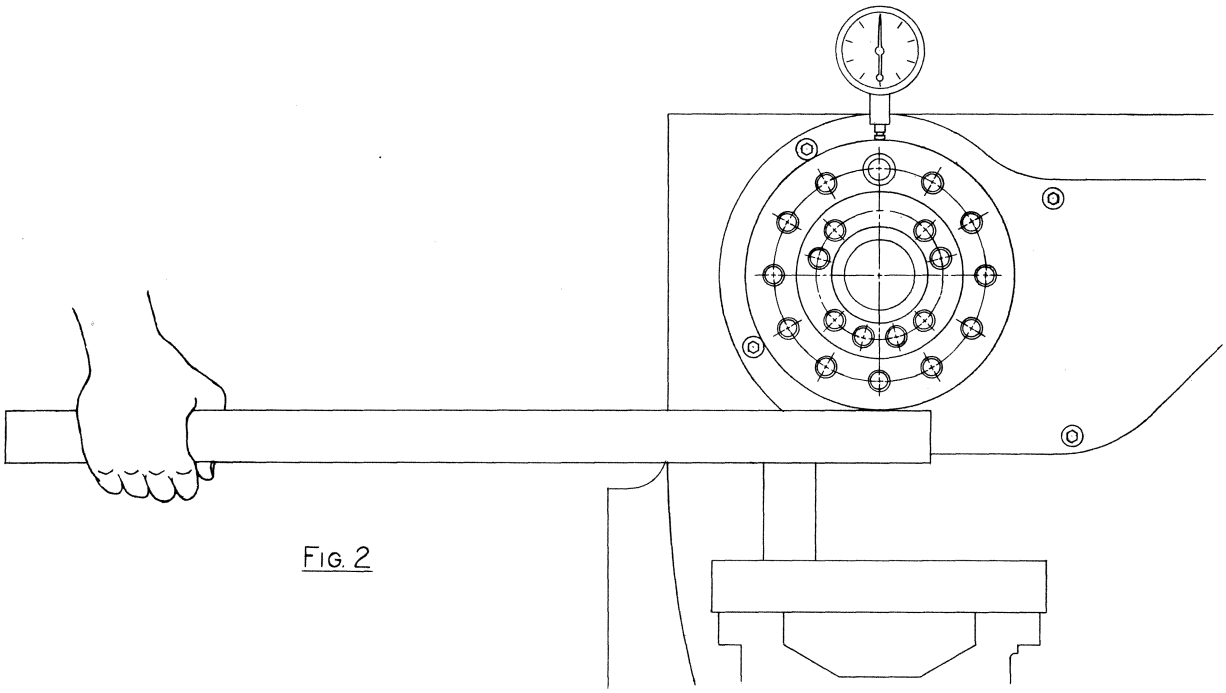


FIG. 2

As shown by Figure 1 the spindle is mounted on a precision cylindrical roller bearing at the head end and a precision deep groove ball bearing in combination with a ball thrust bearing at the tail end. The advantages of this type of spindle mounting are three-fold:

The greatest possible rigidity for both radial and thrust loads and consequently a remarkable freedom from chatter.

High spindle speeds without undue heating of bearings.

Long life.

To obtain these advantages to the fullest extent, it is necessary for the user to extend PROPER CARE TO THE MACHINE. The lubrication of bearings is important. We recommend strongly the use of a high grade SAE 10 motor oil in the head.

Dirt and foreign particles will ruin bearings rapidly. At all times TAKE CARE TO KEEP HEAD AND BEARINGS SCRUPULOUSLY CLEAN.

If it is suspected that the spindle bearings are in need of adjustment test the looseness as shown by Figure 2. When undue looseness is indicated procede as folows:

Remove head housing and small cover on top of head end bracket. Test axial spindle play as per Figure 1. When doing this hold spindle from rocking to prevent incorrect indicator reading. If axial play is found to exist tighten Nut A slightly and make a new reading. Procede thus step by step until dial reading shows that all axial play has been eliminated. But be absolutely certain NOT TO TIGHTEN NUT A BEYOND THE POINT WHERE THE AXIAL PLAY DISAPPEARS, as doing so would preload the ball bearings and result in greatly shortening their life.

The cylindrical roller bearing at head end of spindle has a tapered bore. It can be adjusted by Nut B. Tighten the nut slightly, a little at a time, and at each step read the bearing looseness on indicator as shown by Figure 2. Procede thus until all bearing looseness has been removed, BUT BE VERY CERTAIN NOT TO TIGHTEN THE BEARING BEYOND THIS POINT. To do so would preload the bearing and result in greatly diminishing its life.

When making indicator readings be sure to hold spindle from being rocked by the action of the lever as this would result in an error in indicator reading.

When the adjustments are finished be sure to lock the nuts.

During this work of adjusting BE VERY CAREFUL NOT TO ALLOW DIRT OR FOREIGN PARTICLES TO GET INTO THE HEAD as these would be apt to cause serious damage to bearings and gears.

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