OPERATOR'S MANUAL

Monarch

ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES

SERIES 61

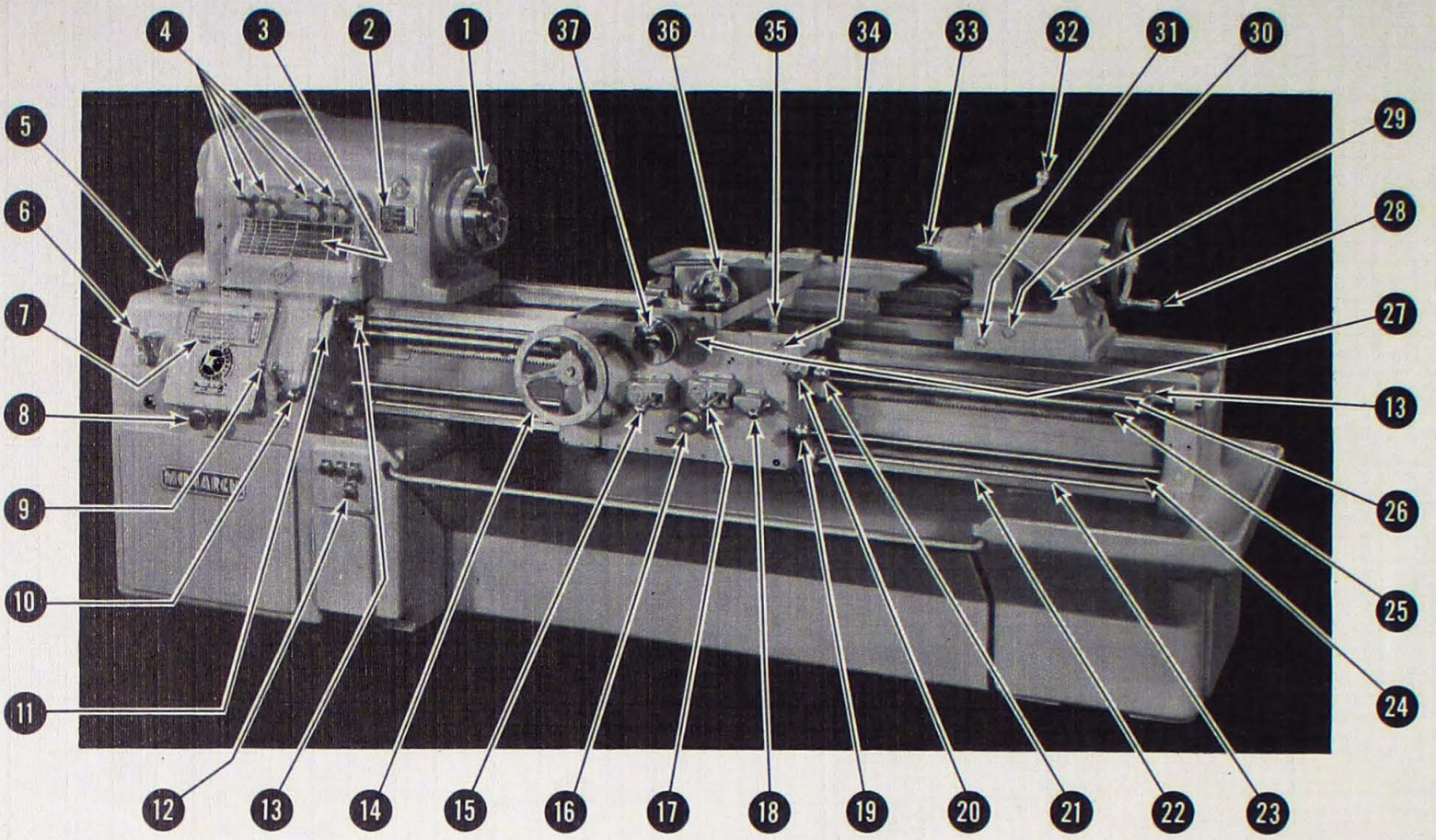
ENGINE AND TOOLMAKER'S LATHES

MONARCH MACHINE TOOL CO.
SIDNEY, OHIO U. S. A.

Monarch TURNING MACHINES

SERIES 61

OPERATORS MANUAL



OPERATING LEVERS AND CONTROLS

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2 Identification plate.
3 Spindle speed index plate.
4 Headstock spindle speed change levers.
5 Upper compound lever.
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7 Feed-thread index plate.
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37 Cross-feed dial and handle.

INTRODUCTION

Your Monarch lathe will produce more and better work with less operator fatigue.

It has inbuilt precision of the kind which has made Monarch the accepted standard in the lathe field for many years. It is provided with the higher speeds and with the ease of operating effort so necessary for maximum productiveness.

Give your Series 61 the care which a precision tool deserves. Follow the suggestions and instructions contained in this handbook and you will be rewarded by superlative performance over the years.

RECEIVING AND CLEANING

After the lathe has been uncrated down to the skids, remove the packing list from the parts box and check the shipment. Any shortage or discrepancy found should be reported immediately to The Monarch Machine Tool Company, Sidney, Ohio. Always, when referring to the machine, mention the serial number. This is stamped on the identification plate attached to the front of the headstock. The lathe should remain on the skids until it is moved as close as possible to the point of installation.

From the time the lathe is uncrated until all of the "anti-rust" compound is removed none of the working parts such as the carriage, tailstock and levers should be moved. The vigorous application of a brush and a suitable solvent removes this compound quickly. After the lathe has been thoroughly cleaned apply a thin film of oil to the bed ways.

LIFTING

Be sure to exercise great care when lifting and moving the machine. Serious damage can result if the lathe is dropped or the leadscrew and control rods at the front of the bed are bent.

CAUTION: Be sure to select cables with sufficient strength for the job, and always balance the load before lifting.

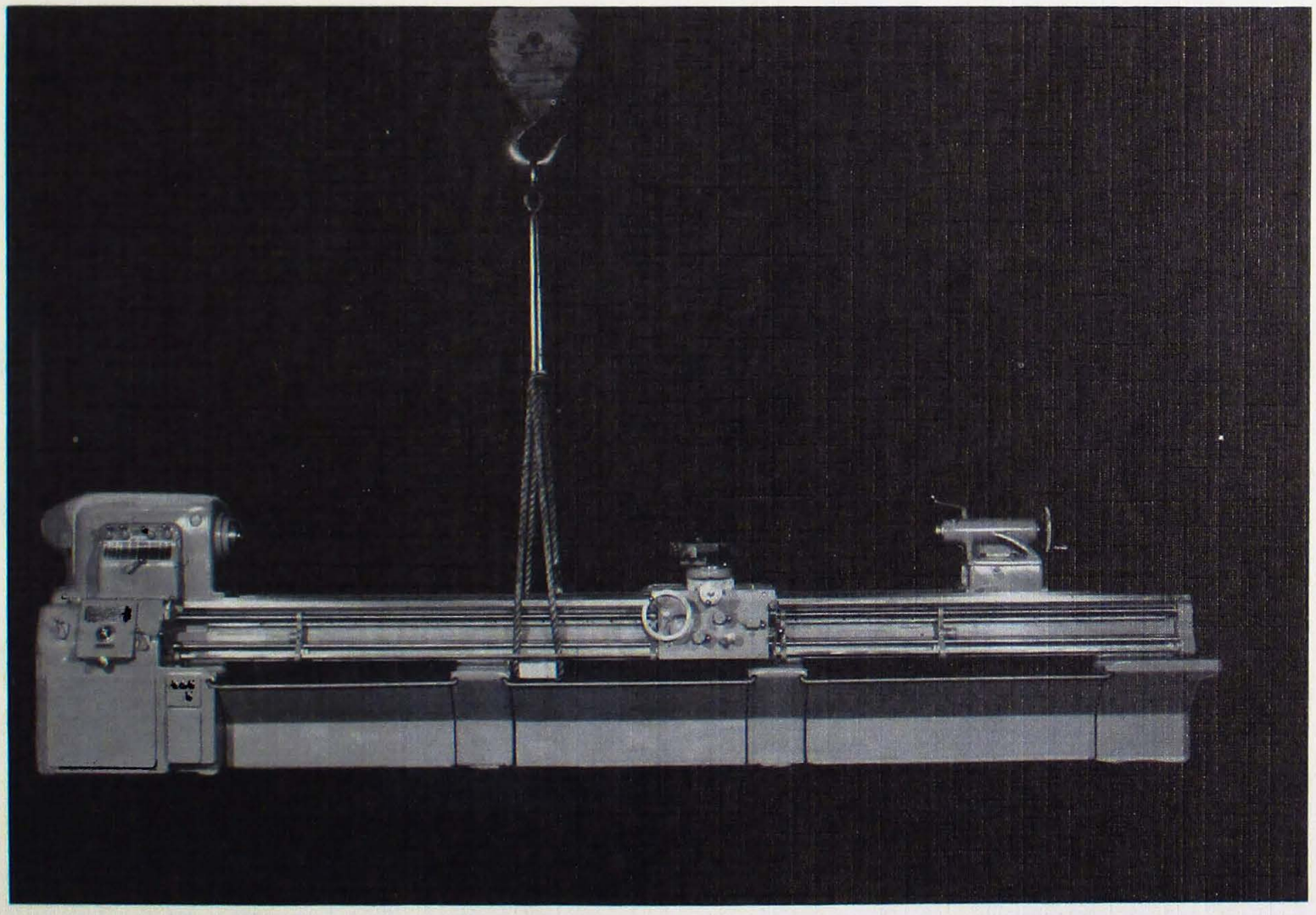

FIGURE 2 — Lifting a Series 61 Lathe.

INSTALLATION

In order for the machine to turn, bore and face accurately the bed must at all times be free from twist and distortion. A good solid foundation is a "must" for a precision machine tool. Preferably, it should be of heavy concrete. If this is not possible, it is essential that the floor be rigidly supported.

The next step is leveling, and too much stress cannot be laid on the importance of doing this with the utmost care. Use a precision level graduated .0005" per foot and two parallels. Place the parallels on the front and rear flats and lay the level square across the parallels. Do this at both ends of the bed.

Inside the cabinet legs, and readily accessible by opening the doors, are the leveling screws. Eight or more round, countersunk leveling plates are supplied with the machine. Place a leveling plate under each leveling screw and adjust the screws until the lathe is level at both ends. The machine should be checked for level about once a week for the first two months. After that it should be checked every two months or so depending upon the nature of the foundation.

LUBRICATION

More than any other single factor, adequate lubrication will guarantee long, trouble-free operation of the machine. This subject is fully covered in the Lubrication Section beginning on page 13.

OPERATION

To benefit fully from the operational ease which has been built into the Monarch Series 61 and to avoid damage, the operator should familiarize himself completely with the functions of the various controls. These are explained mechanism by mechanism in the section which follows.

HEADSTOCK

On the front of the headstock are four levers for obtaining the entire range of sixteen spindle speeds. See (A), (B), (C) and (D), Figure 3. Immediately below the lever is the spindle speed chart showing the lever positions for each speed. Levers, (A) and (C) rotate left; (B) and (D) rotate right in shifting. Avoid undue strain and possible damage to the headstock by always drifting the spindle clutch when shifting levers (C) and (D) to a higher speed. Levers (A) and (B) can be shifted without drifting the clutch.

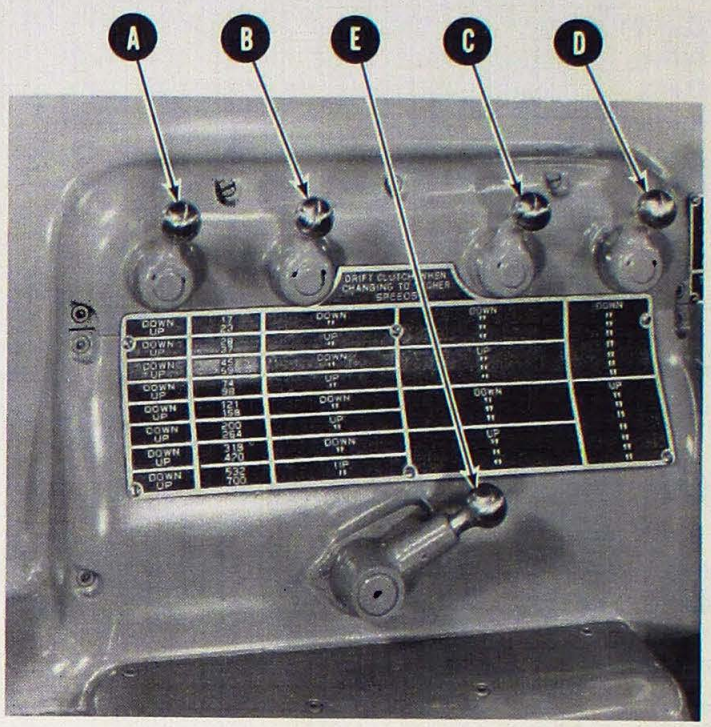

FIGURE 3 — Headstock Speed Change Levers

Selecting the required speed on the Monarch Series 61 is simplicity itself. Choose the speed needed, and read straight across the lever positions. Note, by referring to the chart, that the lowest speed in the range is obtained with all four levers in their "down" position while the highest speed is with all four levers in their "up" position. After a short period of experience familiarizes the operator with the controls, he may stand at the carriage and determine the spindle speed quickly by the lever positions.

Immediately below the spindle speed chart is leadscrew reverse lever (E) found on Series 61 engine lathes only. It is used to reverse the rotation of the leadscrew for right or left hand threads.

GEAR BOX

Large, easily read index plate (V) Figure 4 shows the wide range of threads and feeds obtainable by moving levers (Y) and (Z) in conjunction with knob (X). To set for a particular thread or feed, move tumbler lever (U) to the right and down. Turn knob (X) until number opposite index mark corresponds to number at top

of column on index plate which contains the feed or thread desired. Lift and lock lever (U). Set levers (Y) and (Z) according to plate.

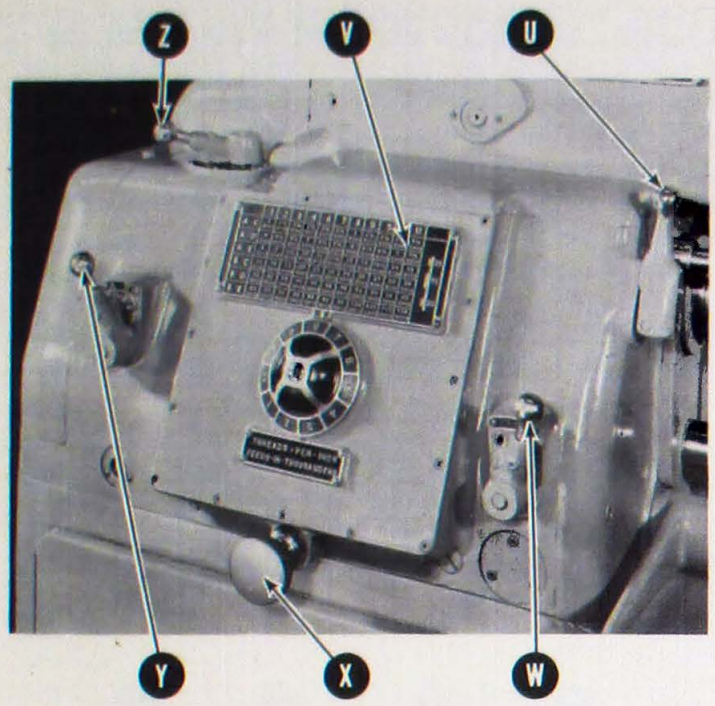

FIGURE 4 — Gear Box Control Levers

Lever (Y) can be positioned only on "A" or "B" setting while lever (Z) can be positioned on "C", "D" or "E" setting. Lever (W) selects either the feed rod for turning operations or the lead-screw for thread chasing operations. When shifting lever (Y) to position "A" it is necessary to jog the spindle except at very low speeds, because position "A" is the high speed side of the gear box.

The regular thread range of Monarch Series 61 machines is from 2 to 120 threads per inch with feeds from .0014" to .084" per revolution. Due to the extreme range it is seldom necessary to change end gears except for special threads.

APRON

Figure 5 indicates the functions of the various controls provided to impart the necessary movements to the cutting tool. (A), the apron handwheel, moves the cutting tool manually, parallel to the bed. Cross slide handwheel, (B), moves the tool manually, at a right angle to the bed. Compound rest handwheel (C) moves the tool manually, at any angle to the bed.

Spindle rotation is started and stopped by means of lever (D) which operations may also be performed at the headstock end of the machine

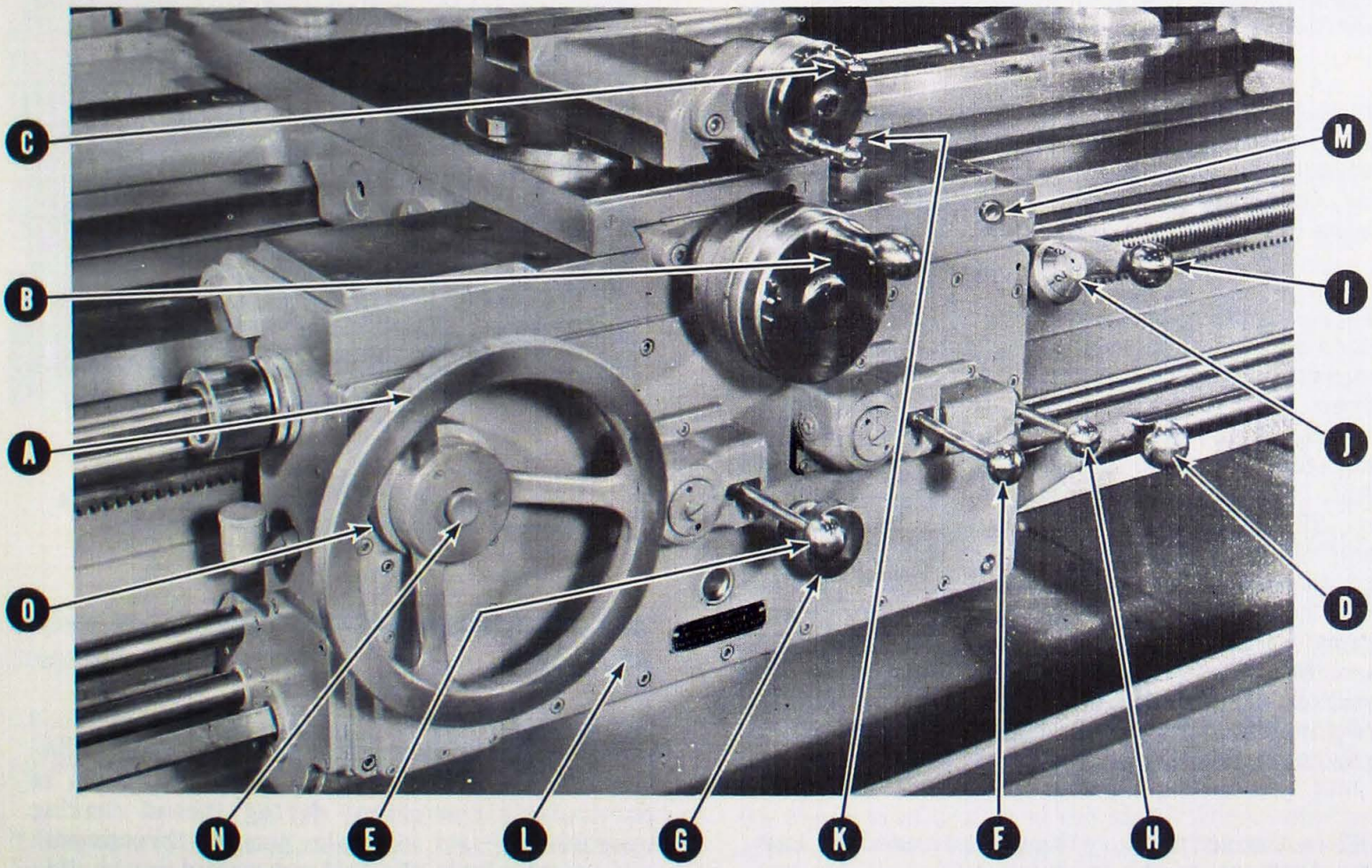

FIGURE 5 — Front of Apron, Equipped with Power Rapid Traverse

where a similar lever is attached to the control rod. (E) is the carriage power feed and traverse control lever which, when pushed downward, causes the carriage to move at the preselected feed either toward the headstock or the tailstock. Lever movement to the left gives traverse toward the headstock and to the right traverse toward the tailstock. Cross slide power feed and traverse control lever (F) when pushed downward, causes the cross slide to move at the preselected feed either toward or away from the operator. Lever movement to the right gives traverse in and to the left traverse out.

NOTE: When using levers (E) and (F) it is unnecessary to apply a great amount of pressure. If they do not engage about halfway down, they are in need of adjustment.

Feed directional knob (G), has three positions. In the in position the carriage feeds toward the tailstock and the cross slide feeds in. When in the out position, the carriage feeds toward the headstock and the cross slide feeds out. In neutral, the feed directional knob permits engagement of the half-nut.

If threads are to be chased, the carriage is engaged to the leadscrew by means of half-nut control lever, (H). It is illustrated in its disengaged position and should be straight down for full engagement. Always have knob (G) in its neutral position before attempting to engage lever (H).

When lever (H) is partly or fully engaged, lever (E) cannot be engaged. This is a safety feature intended to prevent damage to the lathe should the operator inadvertently attempt to engage lever (F) while lever (H) is also engaged.

Thread chasing dial (J), which has four graduations 90° apart, is used for determining when to engage the half nut during thread chasing operations. On any even thread where the lead being chased is divisible by four the half nut may be engaged at any point without reference to the dial. For any full number of threads such as 18, 22, 23 and so on (not divisible by four) the half nut may be engaged at any one of the four graduations. When chasing half threads such as 5-1/2, 6-1/2, 13-1/2 the half nut may be engaged at any two opposite graduations -- No. 1 and No. 3 or No. 2 and No. 4. The chasing of quarter threads such as 2-1/4, 3-1/4, 5-3/4 requires that the half nut be engaged at the same graduation each time.

(K) is the carriage locking stud, used to lock the carriage to the bedways when cutting with the cross slide.

Tailstock pickup plunger (M) engages a bushing on the tailstock base and allows positioning of the tailstock by means of the apron power rapid traverse.

A safety clutch (L) is provided in the power rapid traverse mechanism to prevent damage should the carriage or cross slide be locked in position. To adjust the safety clutch, loosen set screw locking outer collar and rotate clockwise to tighten. Adjust tight enough to ratchet when carriage is clamped.

Depressing button (N) frees the direct length reading dial (O) so that it may be set to zero.

The plain apron without power rapid traverse (Figure 6) is similar to the one shown in Figure 5. However, levers (A) and (B) give only power feed, and no direct length reading dial is provided as standard.

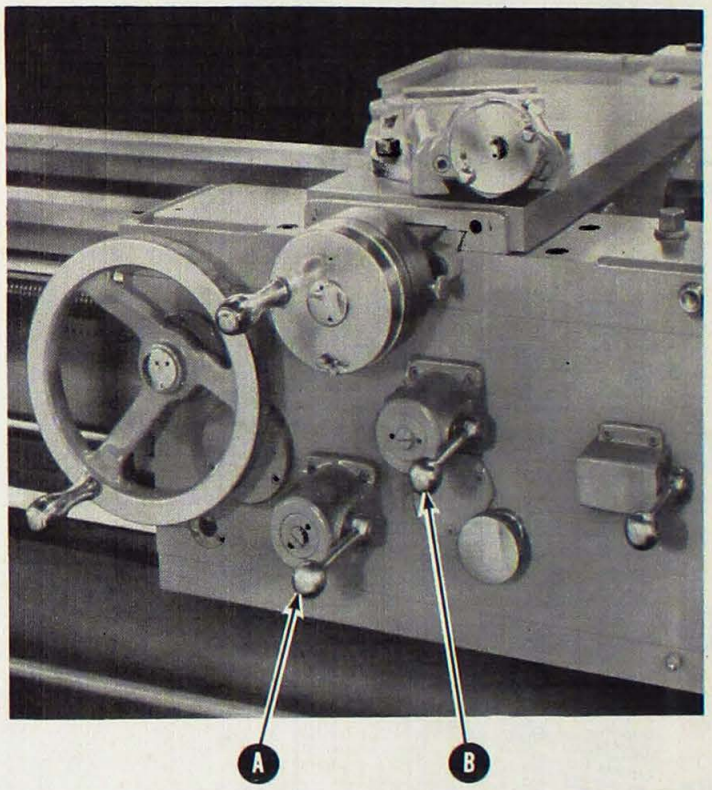

FIGURE 6
Front of Apron Without Power Rapid Traverse

APRON CONTROL LEAD SCREW REVERSE

Leadscrew reverse lever (I) Figure 5, is found on the apron on Toolmaker's models only. Control of leadscrew reverse from the apron is particularly convenient during thread chasing operations -- for example, chasing threads with odd leads where the half nut should not be disengaged; speed chasing of short threads, and,

in connection with the automatic length stop, chasing threads up to a shoulder or in a blind hole.

On an engine lathe the leadscrew reverse lever is found on the front of the headstock directly above the gear box.

Figure 7 shows the automatic length stop and adjusting collar at the left hand side of the apron. This stop is a time saver not only when chasing threads but also for ordinary turning operations. A similar stop on the right hand end of the leadscrew reverse control rod provides an automatic stop with the carriage moving toward the tailstock. To set stop (A), position the threading or turning tool to the required point on the work; then with the leadscrew reverse lever in neutral position, place stop (A) against adjusting collar (B) and tighten stud (C). Collar (B) is for the final close adjustment and is locked in place with nut (D).

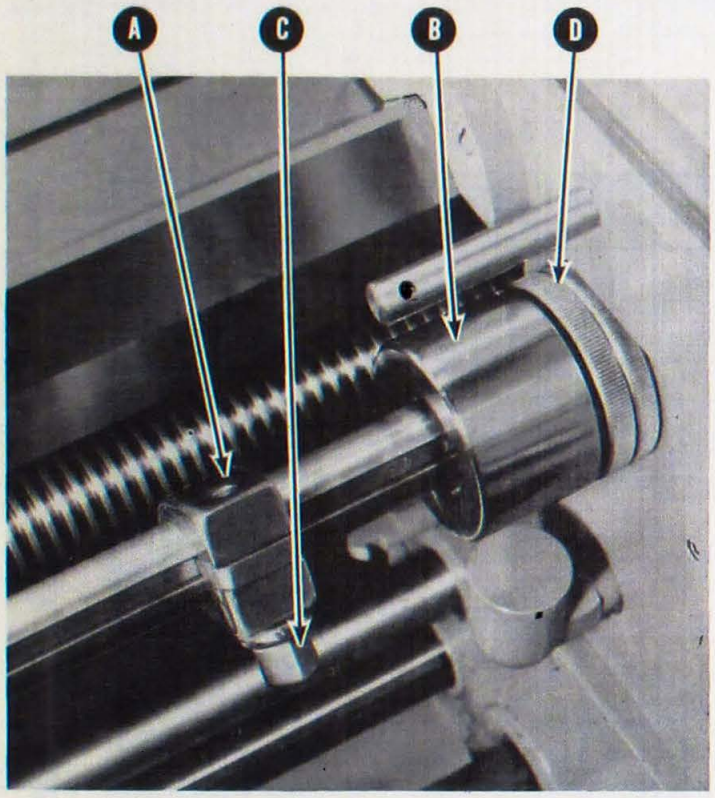

FIGURE 7

Automatic Length Stop at Left Hand Side of Apron

CROSS FEED DIAL AND THREAD CHASING STOP

Cross feed diameter dial (A), Figure 8, is graduated to read in one thousandths of an inch.

There are two sets of numbers. The set nearer to the operator is for reading when the cross slide is feeding toward the front of the machine.

The second set of numbers is used when the cross slide is feeding toward the rear of the machine. The dial is graduated to read direct,

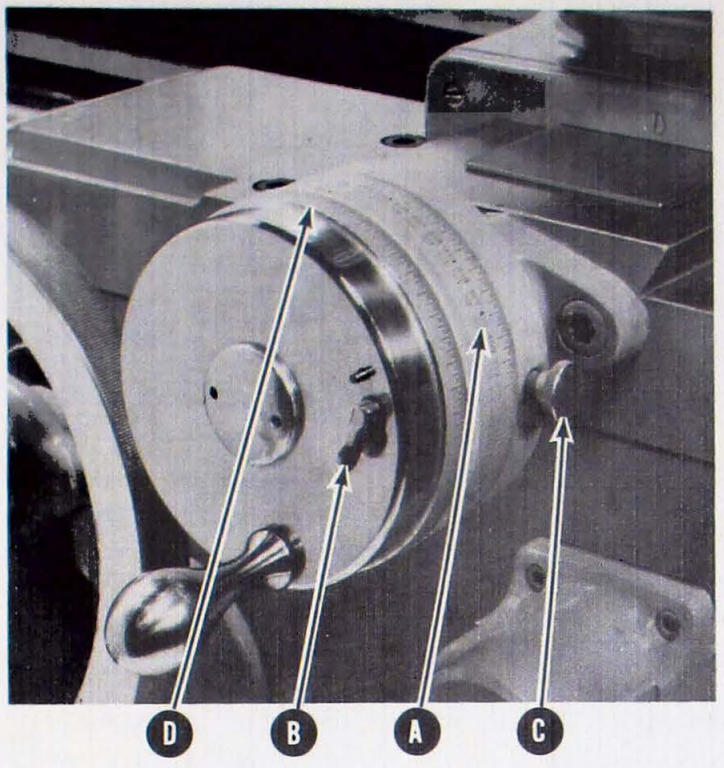

FIGURE 8

Close-up of Cross Feed Micrometer Dial

that is, .001" on the dial equals .001" on the diameter or the bore of the work.

The cross feed dial is locked by means of lever (B) whenever it is necessary to move the dial for repositioning in relation to the tool. Thread chasing stop (C) is used to eliminate the slow and tedious operation of repositioning the tool to zero or some other reading on the cross feed dial, after each cut. With the thread chasing stop, the operator need not look at the dial when repositioning the tool. It is necessary only to run the cross slide in to the stop and proceed with the next cut. When the thread chasing stop is engaged (by turning the knob all the way in), there are three complete turns of the cross feed handwheel between the in and out stop positions at which two points the diameter dial always reads the same.

Graduations (D) close to the front of the dial are used in conjunction with lock (B) for the finishing cuts. This permits straight feed in of the tool instead of an angle feed in with the result that the finishing cuts are taken on both sides of the thread. The following is the procedure. Run the cross feed dial in to the stop. Then, unlock lever (B) which allows the cross slide to be moved in without disengaging stop (C). Each of the graduations (D) equals .001".

TAILSTOCK

The tailstock on any lathe is primarily a work supporting device but it may be used to perform other important functions such as drilling, reaming and tapping.

Tailstock handwheel (A), Figure 9, is used to traverse or feed spindle (B) in or out. To permit accurate drilling to depth spindle (B) is graduated in inches. Tang slot (C) facilitates the removal of drills and reamers from the taper center hole. To remove the center, crank the spindle back into the tailstock until the center is automatically ejected.

Pulling lever (D) in a clockwise direction locks the spindle in position. This should always be done before the start of the cut. (E) is a clamping lever which quickly clamps the tailstock to the bed for such operations as drilling and reaming. It is a feature found on all Monarch Series 61 Toolmaker's Lathes but not on Series 61 Engine Lathes.

On 16" machines clamping lever (E) is supplemented by clamping nut (F) which should be tightened when turning work between centers or in any case when there is a considerable amount of pressure against the tailstock. On 20" machines there is an additional clamping nut on top of the tailstock. Series 61 16" and 20" Engine Lathe tailstocks, while not provided with quick-clamping lever (E), have double the number of clamping nuts.

Aligning stud (G) is used to bring the tailstock to true center with the headstock. On machines not equipped with a taper turning attachment, it is sometimes utilized to move the tailstock off center for taper turning. There are two of these studs, the other being at the rear of the tailstock. Tailstock pickup bushing (H) is engaged by a plunger on the right hand carriage wing for positioning the tailstock along the bed by means of the power rapid traverse.

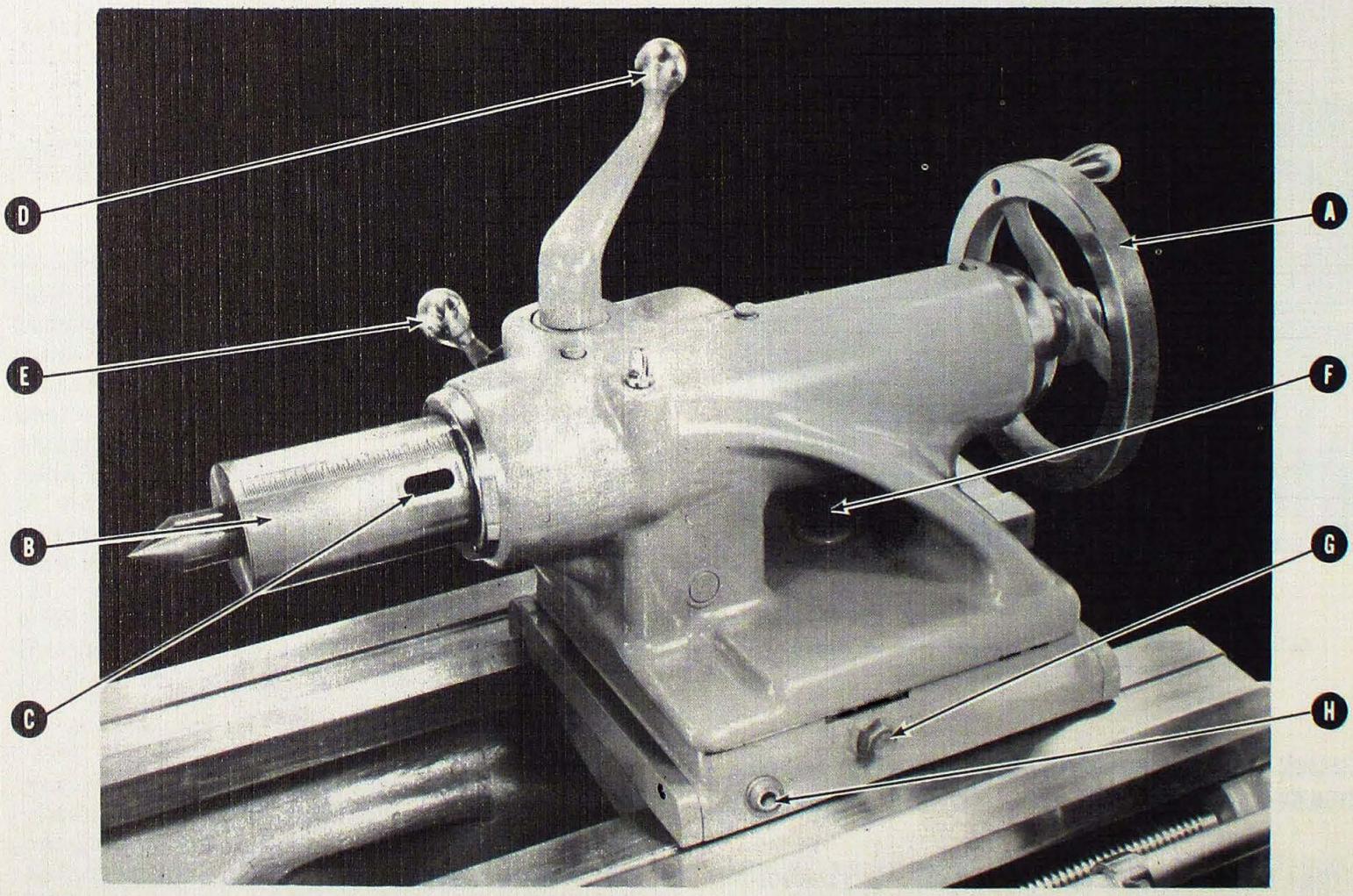

FIGURE 9 — Quick Acting Type Tailstock Supplied on Series 61 Toolmakers' Lathes.

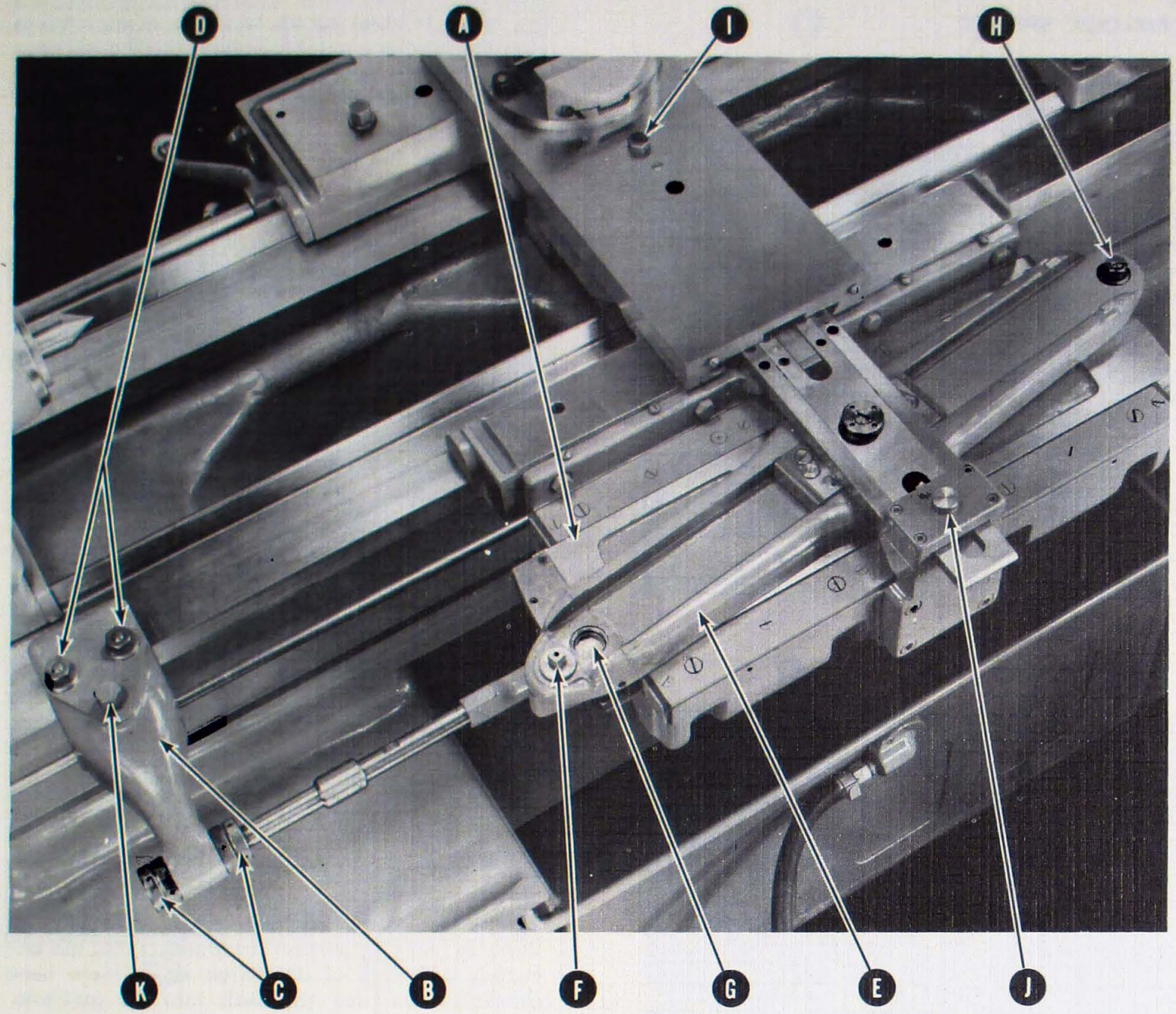

FIGURE 10 — Top Top View of Anti-friction Bearing Taper Attachment

TAPER ATTACHMENT

The following are the steps in the setting of the Monarch anti-friction taper attachment.

1. Position the carriage so the turning tool is about 1" from the end of the work.

2. Loosen stud (J) and push slide (A), Figure 10, all the way in toward the headstock, position bed clamp (B) as illustrated, tighten knurled nuts (C) and hex nuts (D).

3. Set swivel (E) at required taper by turning stud (F) and reading the graduations at the hairline through magnifying lens (G).

4. Lock nut (H) at the right hand end of the swivel and a similar nut on the underside of the swivel at the left hand end. Tighten stud (I).

5. Now, turn the taper by feeding the tool to depth in the usual manner with the compound slide.

To disconnect the taper attachment for straight turning, loosen stud (I), tighten stud (J), loosen nuts (D) and tighten stud (K). After the tightening of stud (K), bracket (B) will slide along the bed with the carriage. Therefore it does not have to be taken off unless extreme movement of the carriage would run it off the end of the bed.

The Monarch taper attachment can be used to turn tapers, bore tapers or chase tapered threads. Maximum taper per foot is 4" and maximum length at one setting is 18".

CAMLOCK SPINDLE

The spindle on Monarch Series 61 lathes is known as the Camlock spindle because of the method of attaching chucks, plates and fixtures.

There are six camlocks in the spindle nose. Two of them, (A) Figure 11, clearly show in the illustration. The small indicating line on camlocks (A) indicates that they are in the unlocked position because these lines are parallel with the spindle face. Arrows (B) show the direction in which the camlocks should be rotated for tightening. When this is done, it is important that the camlocks be tightened evenly. Do this gradually, rotating the spindle from one to the other until all the locks are tight.

It is equally important that the cam studs, the face of the spindle and the back of all chucks, plates and fixtures be free from dirt and burrs before mounting takes place.

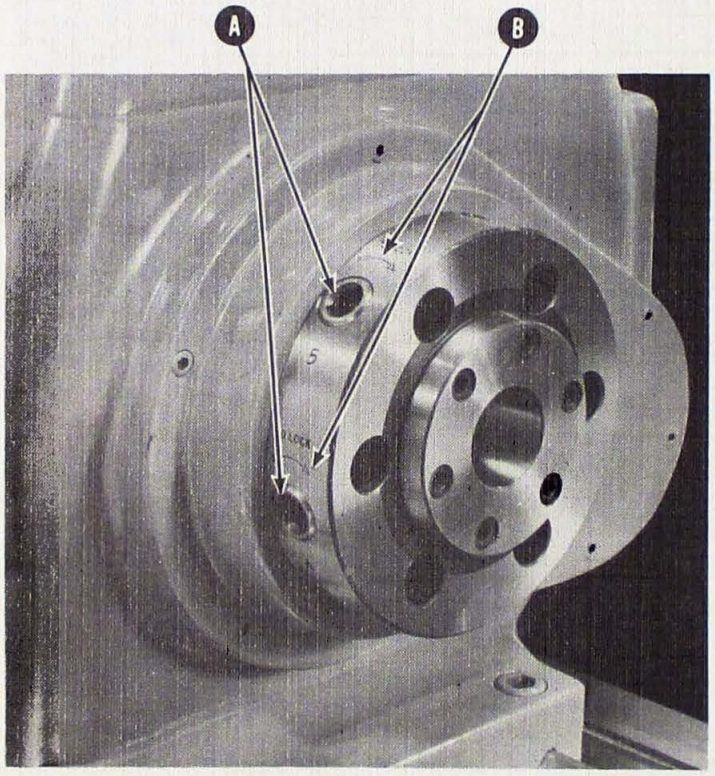

FIGURE 11

Series 61 American Standard Camlock Spindle Nose

ELECTRICAL CONTROL PANEL

The electrical control panel, Figure 12, is located on the front of the left hand cabinet leg, directly below the gear box. It is within easy reach of the operator at all times with the control buttons clearly marked for quick identification.

Stop switch (A) is red in color and protrudes forward from the panel somewhat farther than the other buttons so as to make it possible to stop the machine quickly should this be necessary. This is a safety feature for the protection of both the operator and the machine.

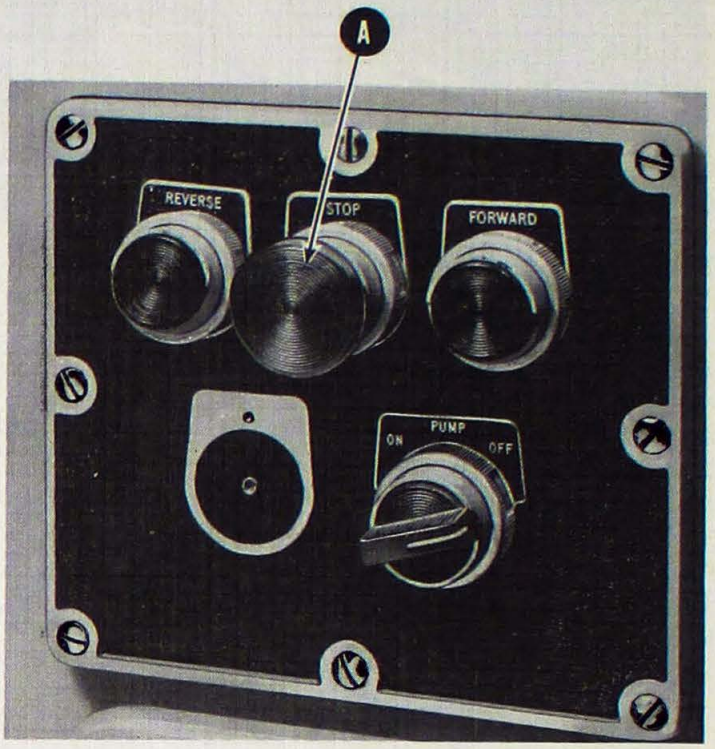

FIGURE 12 — Electrical Control Panel

CARE AND ADJUSTMENT

The proper care and adjustment of your Monarch lathe is very important for maintaining the accuracy and ease of operation which have been carefully designed and built into the machine

A good machinist is judged by the appearance and condition of the tools with which he works. The Monarch Series 61 has a very fine finish which is easy to keep clean. Occasional wiping with a clean, dry cloth or solvent soaked cloth will keep the finish looking bright and new for a long while.

All adjustments are expertly made at the factory before shipment of the machine. Occasionally, however, certain further adjustments may have to be made.

The longitudinal feed friction clutch is adjusted by turning screw (A), Figure 13, either in or out so the lever is moderately tight about halfway down toward the apron from the neutral position shown. The cross feed friction clutch is similarly adjusted by means of screw (B).

Screws (C) and (D) are for adjustment of the cross feed slide and compound slide gibs. There is a similar screw adjustment at the rear of each slide. The gibs should be adjusted to give

a slight drag to the slides. If the adjusting screws are drawn too tightly against each end of the gibs, they may create a bad bearing surface by throwing the gibs out of line.

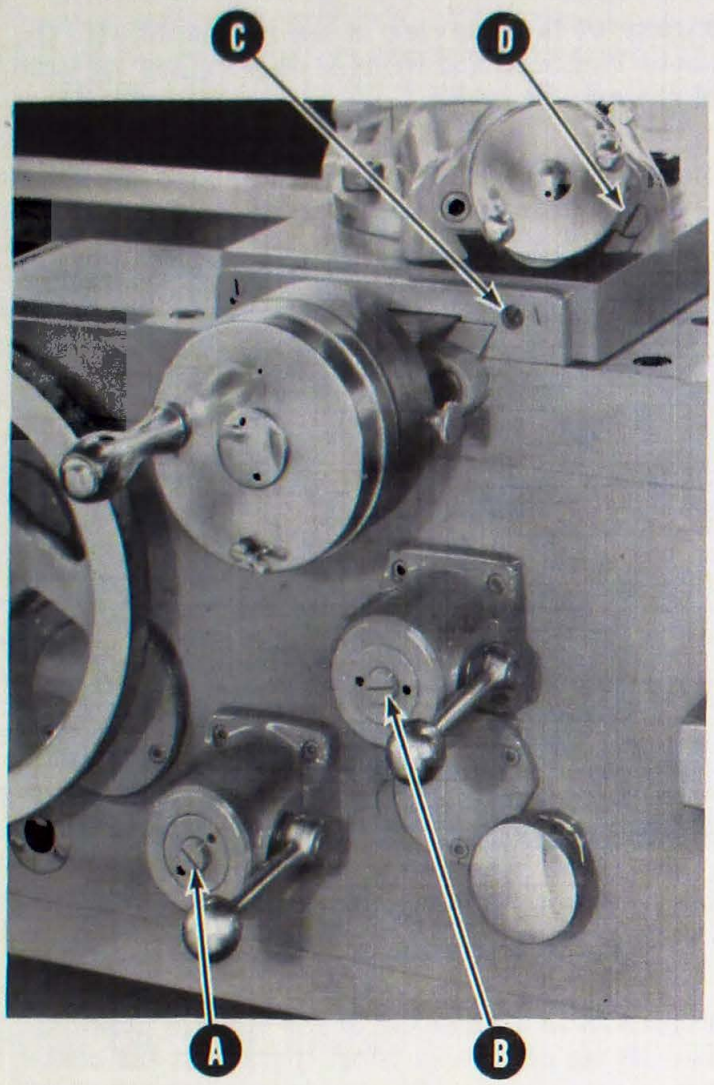

FIGURE 13

Apron and Slide Adjustments

VEE BELTS

The main drive motor is mounted on an adjustable base inside the left hand cabinet leg. This base is hinged at the front and supported at the rear by adjusting bolts (A) and (B), Figure 14.

To tighten vee belt tension, loosen the top nuts on each adjusting bolt and tighten the lower nuts. Reverse the operation to loosen the belt tension.

Always be careful not to place too much tension on the belts. Adjusting bolts (A) and (B) may be reached easily by removing the two covers at the back of the cabinet base.

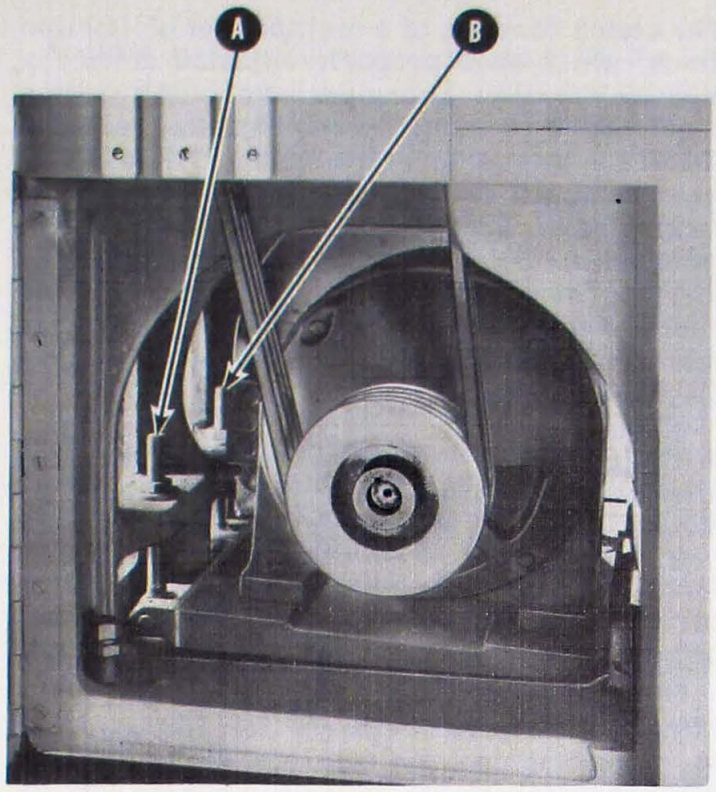

FIGURE 14

Cover Removed to Show Main Drive Motor Mounting

HEADSTOCK SPINDLE DRIVE CLUTCH

The spindle drive clutch is readily accessible by the removal of the cover at the left hand end of the headstock. This cover may be lifted off after taking out stud (A), Figure 15.

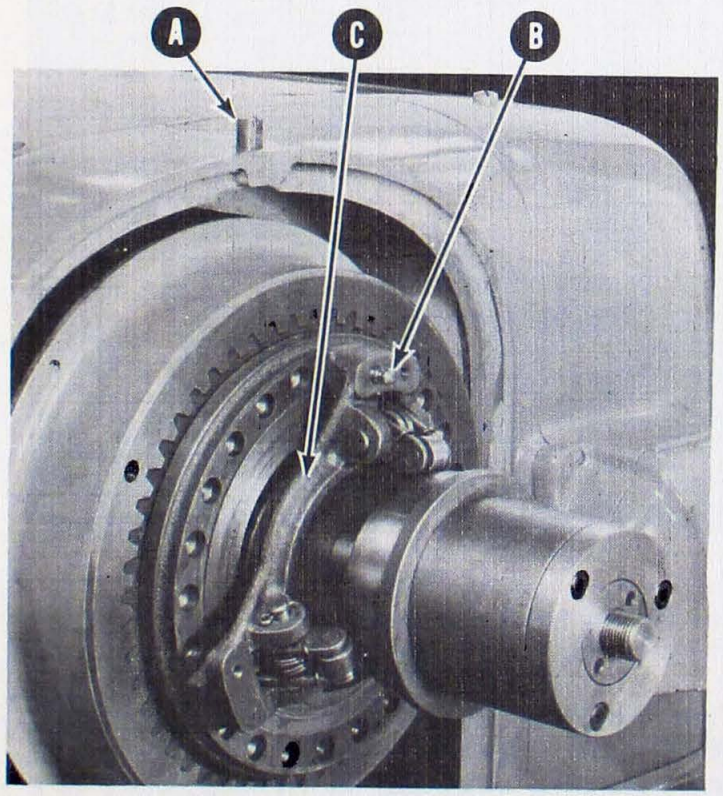

FIGURE 15

Cover Removed to Show Spindle Drive Clutch

The clutch consists of a multiple set of friction discs, which when properly adjusted deliver a positive drive for a long period with no attention required. If the clutch needs adjusting, pull pin (B) all the way out and turn spider (C) in a clockwise direction until pin (B) drops into the next locking hole. In case this does not give a sufficient amount of adjustment, turn the spider to the next hole, repeating the operation until the clutch control lever at the front of the machine snaps into position with a moderate amount of pressure

In the event the clutch is too tight or too much pressure is required to engage it, adjust by turning spider (C) in a counter-clockwise direction.

HEADSTOCK SPINDLE BEARINGS

After your lathe has been run for 200 hours or so, depending upon the nature of the work being performed, check the spindle for drag. To do this, shift all headstock levers to neutral position, that is, on a line parallel with the spindle. Then, turn the spindle by hand at the spindle nose and if there is very little or no drag, the bearings need adjusting.

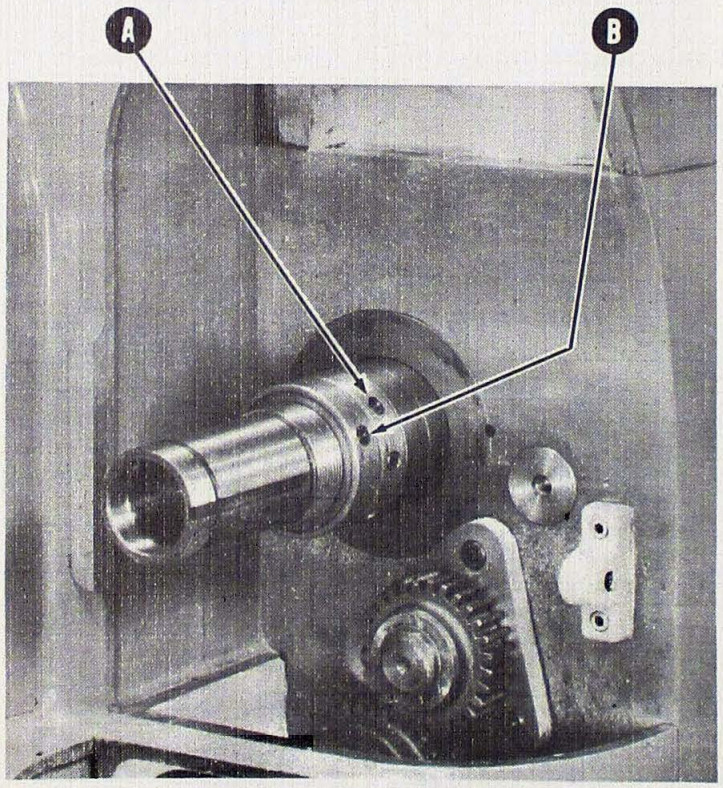

FIGURE 16

Cover Removed to Show Left End of Spindle

This is done by loosening the set screws in nuts (A) and (B), Figure 16; loosening lock nut (B) and tightening adjusting nut (A) until there is a noticeable amount of drag on the spindle. Carefully avoid over-adjustment which will give too much drag. The new adjustment is secured by locking adjusting nut (A) in position with its set screw and tightening lock nut (B) as well as locking its set screw. Do this with care to avoid getting the bearings too tight.

HEADSTOCK SPINDLE BRAKE

Figure 17 is a top view of the headstock with the cover removed and with (A) showing the location of the spindle brake.

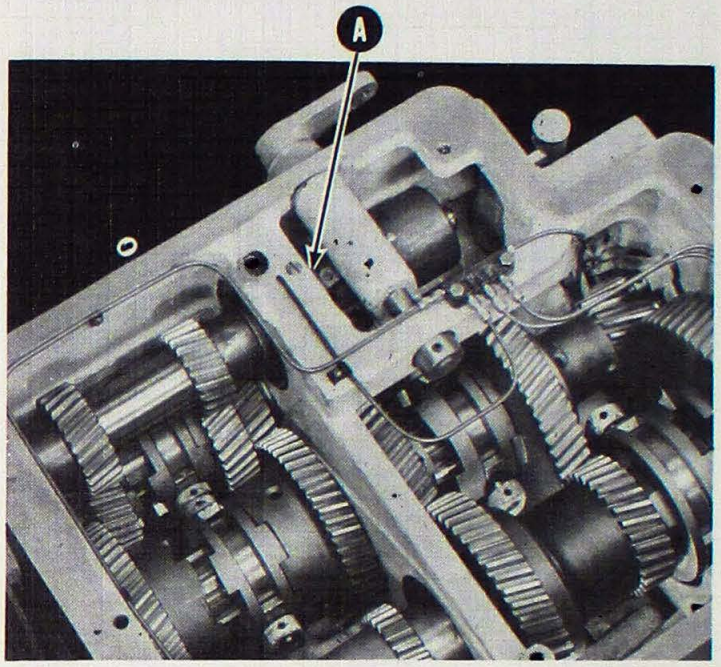

FIGURE 17

Top View of Headstock with Cover Removed

Figure 18 is a close-up of the spindle brake assembly out of the machine. To adjust the brake, lift locking spring (B) to clear the teeth of adjusting gear (A), turn gear (A) clockwise to tighten and counter-clockwise to loosen. Do not adjust the brake too tightly.

The spindle brake is engaged when the spindle start and stop lever at the front of the machine is all the way up. No upward pressure is required with the lever in the up position.

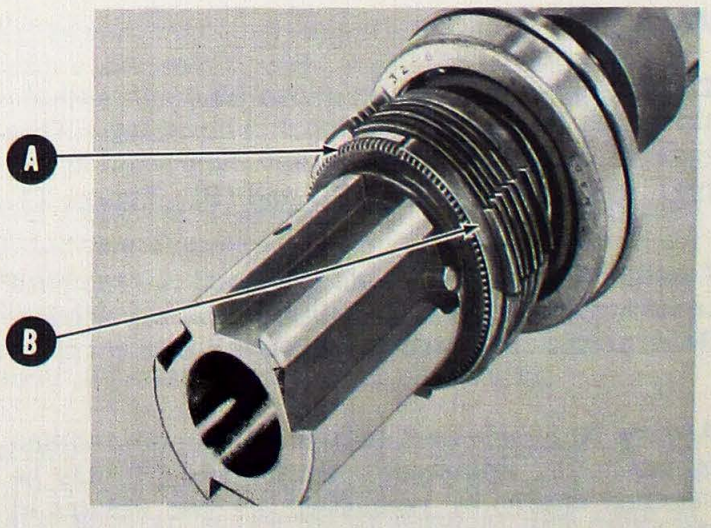

FIGURE 18 — Close up of Spindle Brake Assembly

LUBRICATION PROCEDURE

PREPARATION FOR OPERATION AND RUN-IN

When you first receive your Series 61 lathe, you will find that an anti-rust compound has been applied to all outside machined surfaces. After removing the compound as suggested in the section on receiving and cleaning (Page 3) apply a thin film of medium grade oil to bedway surfaces.

Since the machine is shipped without oil in the headstock, gear box or apron, these reservoirs must be filled to proper levels with the recommended types of lubricant. Each reservoir has an individual oil level gage. The lathes should then be thoroughly oiled and greased throughout according to the lubrication charts on page 14.

A few extra precautions taken during the first few weeks of operation of the lathe will pay dividends in the life of the machine. Complete removal of all anti-rust compound cannot be stressed to strongly. Although over-lubrication is never recommended, special care should be exercised also to assure full lubrication wherever specified, from the very first moment of operations. It is also desirable to avoid maximum speed, feed and depth of cut during the first few days of continuous operation.

Following the operation of the lathe for the first 90 days, or approximately 750 hours, it is always a good practice to drain all lubrication reservoirs, flush (preferably with a light clean flushing oil) and then refill to the proper level with the recommended lubricant.

PERIODIC OIL LEVEL CHECK

Oil reservoir levels should be checked at least twice a week.

CAUTION: Turn off the main drive motor when checking oil reservoir levels.

On the oil gage for each unit is a line which indicates the correct oil level. Never permit the level to fall very far below this line as lack of lubrication can result in damage to the machine in a relatively short period of time. Over-filling should also be avoided since it results in oil wastage and may cause a certain amount of over-heating due to excessive turning of the oil.

REQUIRED OIL CHANGES

It is recommended that once every six months the oil be drained from the reservoirs and that they be flushed with a light clean flushing oil and then refilled to the proper level. At the same time the apron and headstock lubricating pumps should be inspected and cleaned. These pumps are small self-contained, non-adjustable piston pumps installed in individual reservoirs. The pump stroke is set at the factory to satisfy normal operating conditions. No change should be attempted unless the operation of the machine indicates a definite necessity.

A filter disc at the pump inlet protects the lubricating system from chips, dirt and other foreign substances. It is recommended that when the pump is inspected every six months this disc be replaced.

When adding fresh oil take every precaution that no dirt or chips are permitted to contaminate the reservoir since such foreign matter can quickly clog the filter discs of the pumps and impair their proper operation. Also it is important never to use lubricants that contain compounds that might be absorbed by the filter discs thus clogging and reducing the delivery of oil through the system. The reason so-called "dripless" oils, or grades containing graphite, soap or other foreign substances should not be used. In the case of the Series 61 apron with power rapid traverse the apron pump can be reached by removing the pump cover from the front of the apron just behind the apron handwheel. In the case of the Series 61 with plain apron, it is necessary to remove the bottom cover from the apron in order to reach the lubrication pump.

To remove the headstock lubrication pump it is necessary to remove the right angle plate from the back of the headstock. This exposes the pump and permits its removal for inspection and cleaning.

CORRECT HAND OILING

Before the lathe is started each working day all oil cups and hand oiling points should be oiled according to the lubrication charts on page 14.

The use of the pneumatic type oil can with plunger operation, rather than the ordinary spring bottom type, is recommended since it permits better oiling at many points and gives better control over quantity of oil used.

USE OF GREASE GUN

Be sure to eliminate air pockets by operating the gun a few times before using.

Be sure to clean all grease fittings before using grease gun.

Be careful not to over-lubricate since the high pressure exerted by a grease gun may cause over-filling of the bearings or damage to seals.

IMPORTANCE OF CLEANLINESS

It is extremely important that lubricants and lubricant containers be handled carefully. Careless handling can quickly defeat the best lubrication procedure. Cleanliness is primarily a systematic handling and proper storage facilities which include well marked containers used for the same lubricant at all times.

The following suggestions will be helpful in maintaining the cleanliness of the lubrication system:

1. Wipe all filter openings before adding oil.
2. Replace all covers, filler plugs, etc. immediately after oiling or filling.
3. Clean all pressure fittings before using grease gun.

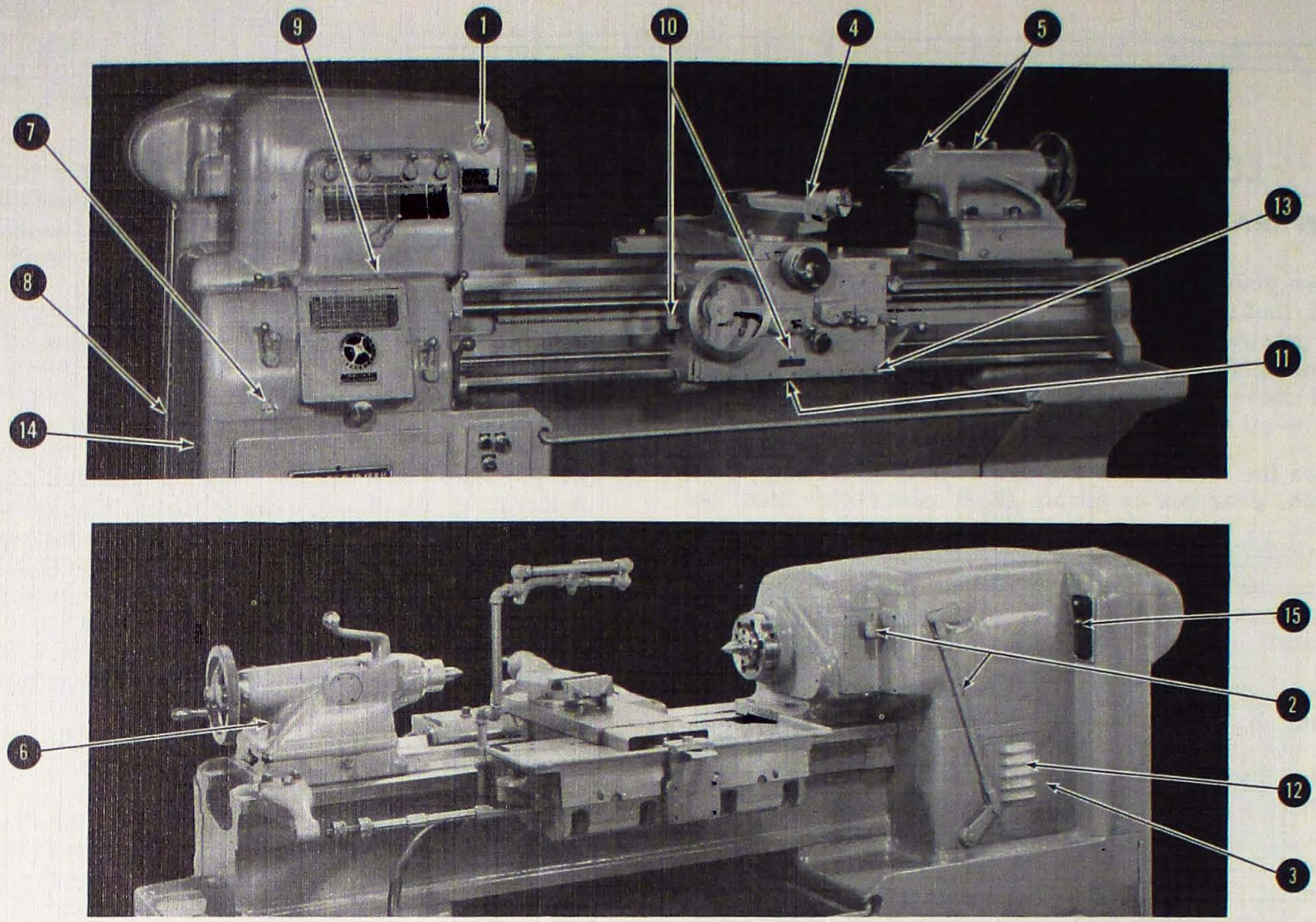

FIGURE19 — Series 61 Engine and Toolmaster Lathe

LUBRICATION STATIONS

Reference Number	Part	Capacity	Lubricant	Schedule
1	Headstock Pump Operating Gauge			Check operation during each shift.
2	Headstock Reservoir Filling Point and Oil Level Gauge	5 Gals.	Mobil Vactra Oil Heavy Medium	Check oil level each shift. Drain every 6 months at point (3) (back of cover), flush and refill with fresh oil.
4	Compound Screw Bushing		Mobil Vactra Oil Heavy Medium	Each shift.
5	Tailstock Spindle		Mobil Vactra Oil Heavy Medium	Each shift.
6	Tailstock Ways		Mobil Vactra Oil Heavy Medium	Each shift.
7	End Gearing and Gearbox Reservoir Oil Level Guage		Mobil Vactra Oil Heavy Medium	Check oil level each shift.
9	End Gearing and Gearbox Filling Point	1 Gal.	Mobil Vactra Oil Heavy Medium	Drain every 6 months at point (8) (back of door), flush and refill with fresh oil.
10	Apron Reservoir Filling Point and Oil Level Gauge	13" 2-1/2 Pts. 16" & 20" 3 Pts.	Sun Oil Company No. 80 Way Oil	Check oil level each shift. Drain every 6 months at point (11), flush and refill with fresh oil.
12	Rapid Traverse Gear Motor Drive	1 Pt.	Mobil Vactra Oil Heavy Medium	Drain every 6 months, flush and refill with fresh oil. Grease rear motor bearing yearly with Mobilux Grease No. 2.
13	Apron Control Rod Support Bearings		Mobilux Grease No. 2	Grease monthly.
14	Main Drive Motor		Mobilux Grease No. 2	On those makes of motors that are fitted with grease fittings, grease every 12 months. Use caution to prevent blowout of seals.
15	Pulley Sheave Bearings		Mobilgrease BRB Lifetime.	Every 12 months.
	Misc. Hand-Oiled Points		Mobil Vactra Oil Heavy Medium	Each shift.

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