MONARCH Lathes

Lodge & Shipley Lathes
Olofsson Lathes

OPERATOR'S MANUAL

Model CK 12"

Lathe No. 18719

14½ x 30

MONARCH Lathes, L.P.

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SAFETY

There are many factors involved in the use of this lathe that could lead to or cause a personal injury accident. We at Monarch cannot anticipate and address all these factors, but we are providing some general safety considerations on this Safety sheet.

You must strive to eliminate factors that may contribute to an accident by strictly adhering to the following safety recommendations:

CAUTION Before operating this lathe, you must be familiar with the features, controls, and corresponding lathe movements that they produce. For more information, please consult the Programming and Operator's manuals.

CAUTION Always wear safety glasses and snug-fitting clothing when operating or standing near the lathe. Use extreme caution to keep hair, jewelry, and anything that may get caught, away from the spindle, workholding device, workpiece, or any other moving elements. Never operate this lathe if you are fatigued, ill, or under the influence of any medications or chemicals. Never operate this lathe if it is malfunctioning in any way.

CAUTION Metal-cutting machines use sharp tools and incorporate high-speed moving elements. Therefore, you must remain safety conscious at all times to avoid accidents that could result in crippling or fatal injury to anyone nearby.

CAUTION The cutting operation produces considerable heat and sharp edges on any part and any removed metal. You must never touch or reach past the workpiece while it is rotating.

CAUTION Maintain a clear area surrounding the lathe. Make sure that no obstructions exist to impede your movement and that no slippery spots exist on the floor.

CAUTION Do not stand on the machine elements. Keep all tools or other items clear of the machine surfaces.

CAUTION If the crank handle that is used to move the tailstock is removable, remove it after the tailstock has been relocated—before starting the next machining operation.

CAUTION While you are operating the lathe, minimize the possibility of distraction by keeping all observers a minimum of six feet away.

CAUTION Avoid any pinch points created by the movement of the carriage and slides.

CAUTION This lathe is powered by lethal voltage levels. Only authorized electricians may correct electrical component failures or perform electrical maintenance on this lathe.

CAUTION Ensure that all shields, covers, and doors are in place, closed and latched, while operating this lathe.

CAUTION Cutting tools and their associated holders must be securely fastened before attempting a cut.

CAUTION Use a work-loading assist to help load heavy parts. Before starting the lathe, be certain that the assist is fully clear of the lathe elements.

CAUTION

Before running a part:

- Determine that the workholding device (chuck or collet) is securely fastened to the spindle nose.
- Ensure that the workpiece is secured within the workholding device and is stabilized with the tailstock and/or steady rest(s), if used.
- Remove the knockout bar and all wrenches from the spindle and/or chuck before running.
- If you are using a rotating cylinder for power chucking, be certain that the chucking pressure is adequate and the speed does not exceed the rating for the particular chuck that is being used.

CAUTION Do not open the chuck or unclamp the tailstock while the workpiece is rotating.

CAUTION

This lathe is designed to be operated by one person at a time. Use the following precautions if a situation or condition exists where you are being assisted by another person:

- Depress the CONTROL OFF pushbutton before changing the workpiece and/or tools.
- During maintenance work or while cleaning the lathe, remove power from the lathe by placing and padlocking the main power disconnect switch in the OFF position.

CAUTION Improper setup, programming, and/or operation may result in an accident when sufficient clearance is not provided between high-speed rotating and stationary elements. Rotating elements consist of, but are not limited to, the following: chucks, chuck jaws, fixture plate clamps, and drivers. Cutting tools, turret(s), slides, tailstock cut-off slide, and other lathe accessories are examples of stationary or near-stationary elements that must be considered.

CAUTION All tools must be moved away from the rotating components to provide acceptable clearance before indexing to a new tool for another cutting operation.

CAUTION Never defeat or bypass safety interlocks.

CAUTION Bending or whipping material can cause serious injury. Material extending from the spindle or spindle-mounted device can bend or whip. Fully support, capture, and cover any material extending from the rear of the spindle or spindle-mounted device. Do not use wedges at the rear of the spindle, spindle-mounted device, or material support device. Their use can cause material to bend or whip.

LOCKOUT/TAGOUT

This section covers the Lockout/Tagout safety procedures mandated by OSHA 1910.147. These procedures are for disabling machinery and equipment to prevent the release of hazardous energy. These procedures are necessary to protect anyone working on the equipment from injury or even death. There are many types of energy to be concerned with, such as electrical, hydraulic, and pneumatic, just to name a few. We cannot possibly cover the entire OSHA standard as written. Instead we do encourage the customer to obtain a copy of the standard to use when developing or enforcing compliance procedures.

- The term Lockout refers to the physical removing and locking out of energy or power to the equipment.

- The term Tagout refers to the placement of approved tags or signs on equipment. This alerts others that machine service or maintenance is being performed.

Monarch designed this lathe to be operated by one person at a time. The machine must be made safe before maintenance can be performed. Most servicing and/or maintenance requires system shutdown. Perform the following Lockout/Tagout procedures to make the lathe safe for maintenance:

1. Position the main power switch on the power cabinet to the OFF position.

2. Padlock the switch.

   NOTE: Allow up to eight minutes for electrical energy to bleed down from servo drives, spindle drives, etc.

3. Bleed off any hydraulic and/or pneumatic systems energy.

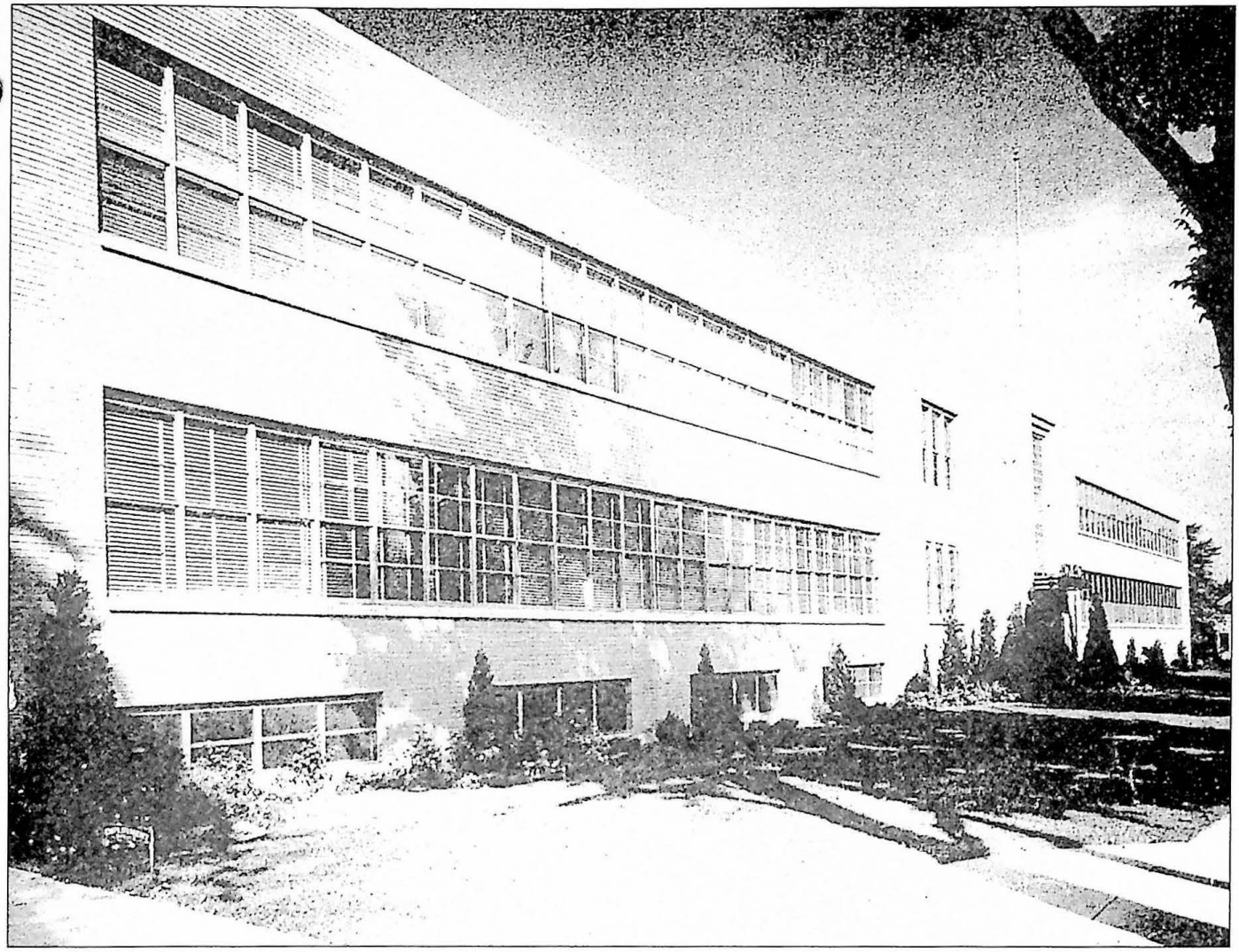
4. Padlock or tag the control valves.

5. Install safety blocks if required. (Example: Vertical slide support during disassembly or vertical servo brake maintenance.)

If these procedures cover all the potential energy hazards present on your machine, then the machine should be safe.

Some service and/or maintenance procedures may require machine power. The Customer Safety Committee must establish a Tagout procedure or some other measures that will give effective protection to the employee while performing maintenance or servicing machinery with power applied.

Read and become familiar with all the safety precautions in this manual and the safety signs or placards affixed to the equipment.



The Monarch plant at Sidney, Ohio. One of the most modern and best equipped machine tool plants in America.

MONARCH Lathes

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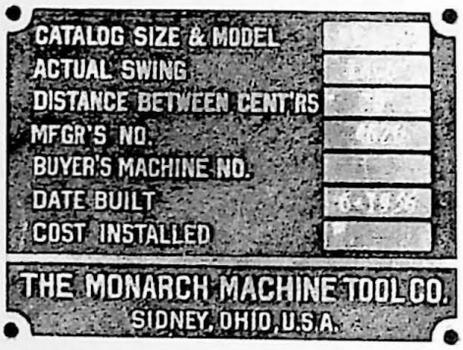
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HANDLING AND INSTALLATION

This Monarch lathe is a precision machine tool, built from the very finest materials, thoroughly tested for accuracy and performance, skidded and crated in the best manner to reach its destination in as near perfect condition as possible.

This lathe must be handled carefully to avoid injury. The photographs on the opposite page show the proper method of lifting the various models — check the model of the lathe on the identification plate shown below in order to select the picture for this particular lathe. Ropes are always better than chains. Please note that the skids should remain under the lathe until it is finally placed in its permanent location.



Identification Plate

This is the type of identification plate you will find on the front of the headstock on each Monarch lathe. It shows the correct catalog size and model number of the machine. Also the actual swing over the bed ways, as well as the exact distance between centers with the tailstock flush with the end of the bed. It also shows the manufacturer's number which is the Monarch serial number of the lathe, which number must positively be quoted on any order for repair parts, or any correspondence relating to service on this Monarch lathe. The next line on the identification plate is left blank for the buyer to insert his own plant ledger number or machine number. The next line indicates the month and the year this lathe was shipped from our factory at Sidney, Ohio. The next line may be filled in by the buyer if desired, showing the total cost of the machine. We recommend that this plate be always kept on the Monarch lathe, and full use made of it.

PACKING LIST

The packing list in the box of parts shows its contents, and should be carefully checked against the contents of the box or boxes, and any shortages or discrepancies should be immediately reported to the Monarch Machine Tool Co., Sidney, Ohio, of course mentioning the serial number of the lathe, which is clearly shown on the identification plate on the headstock.

CLEANING

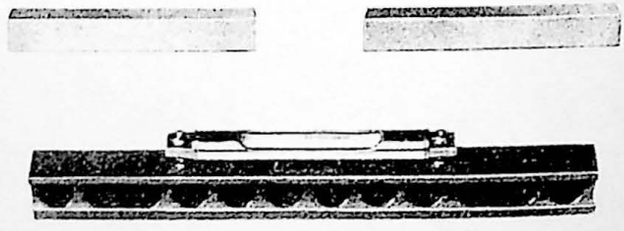
Before the carriage or tailstock are moved on the bed, the anti-rust slushing compound should be carefully wiped from all surfaces, preferably with rags dipped in gasoline or naphtha, to make sure that all grit or other foreign substance has been carefully removed. After this is done a thin film of oil should be applied to the bearing surfaces before these parts are moved along the bed. After the reservoir in the tailstock base, as well as the reservoir in the apron has been filled with the proper kind of oil, then the oiling of these flat way surfaces is taken care of automatically.

THE INSTALLATION

Every lathe, in order to turn or bore accurately, must be installed on a solid foundation, and the bed must be kept level and without twist or distortion, otherwise the lathe will not turn or bore true, and it would be a positive injury to the lathe to be operated with the lathe bed distorted, or on a twist.

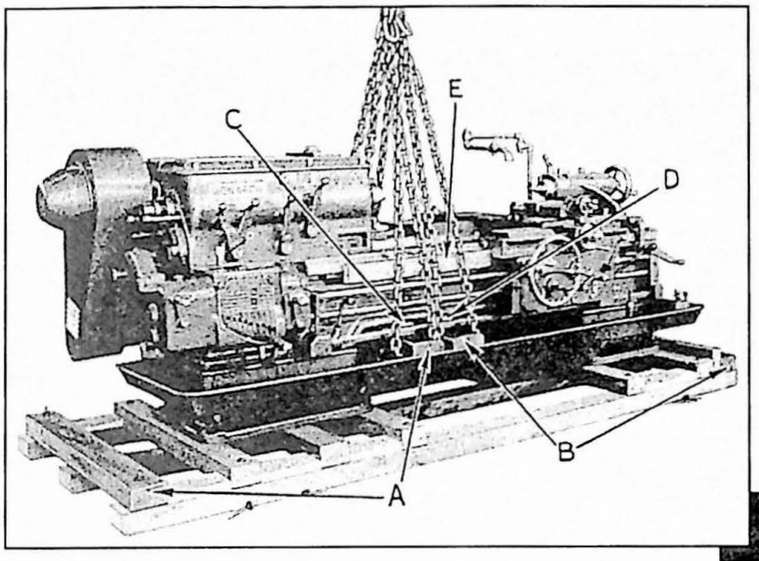
If it is not possible to provide a concrete foundation for the lathe, and if it must be installed on a wood floor, it should be installed at a point where the wood floor is properly supported from underneath. The importance of a solid foundation for a lathe or any other precision machine tool cannot be overemphasized. Neither can the importance of frequent checking with a precision machinists' level be stressed too much.

LEVELING TOOLS



Machinists' Level

This photograph shows the parallels and proper type of level to use for leveling the machine. Each graduation of this level equals .0005" The sensitivity is 10 sec.

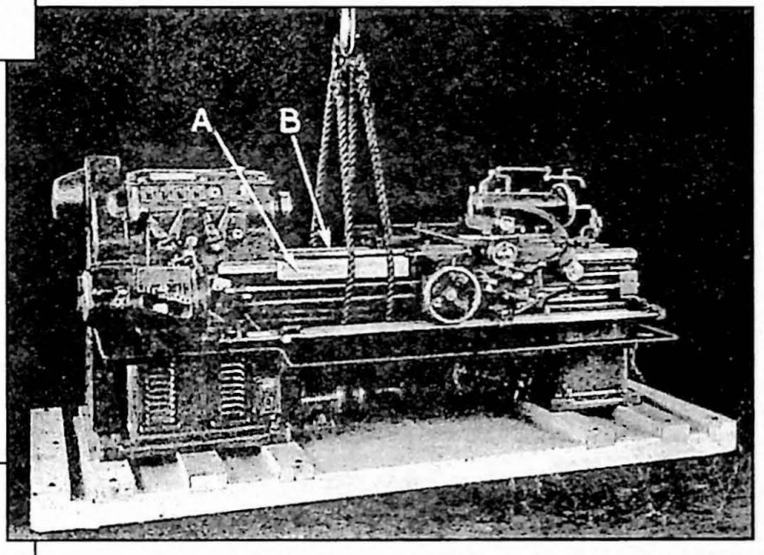


Before the carriage or tailstock are moved · read paragraph "CLEANING" on page 2.

MODELS M, N, and NN

Wood blocks A & B are taken from ends of skids — blocks C & D should be at least 2¼" high to clear the apron control rod. Place blocks E between sling and bedways.

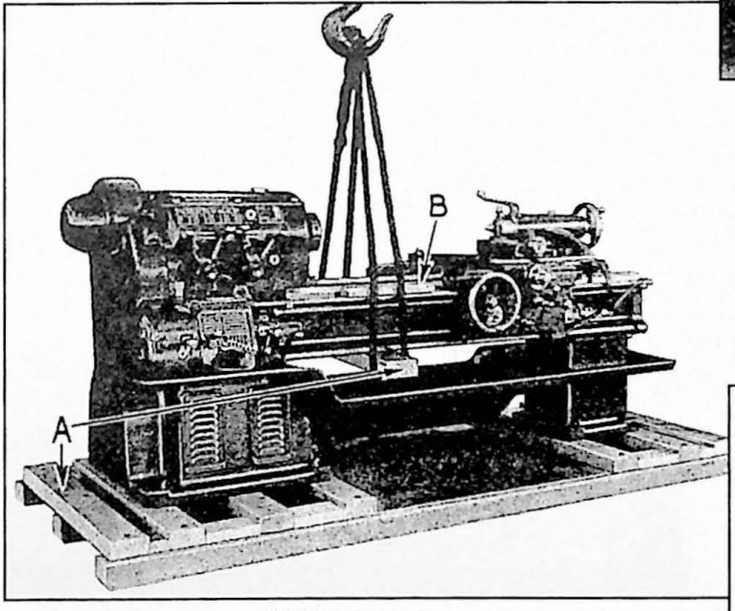
MAKE CERTAIN THAT LOAD IS ON BALANCE BEFORE LIFTING



MODELS AA, W, and BB

Wood blocks A & B are pieces of 2 x 4 placed on each side of bed ways — to make sure that sling does not touch leadscrew and feed rod.

MAKE CERTAIN THAT LOAD IS ON BALANCE BEFORE LIFTING



MODEL EE

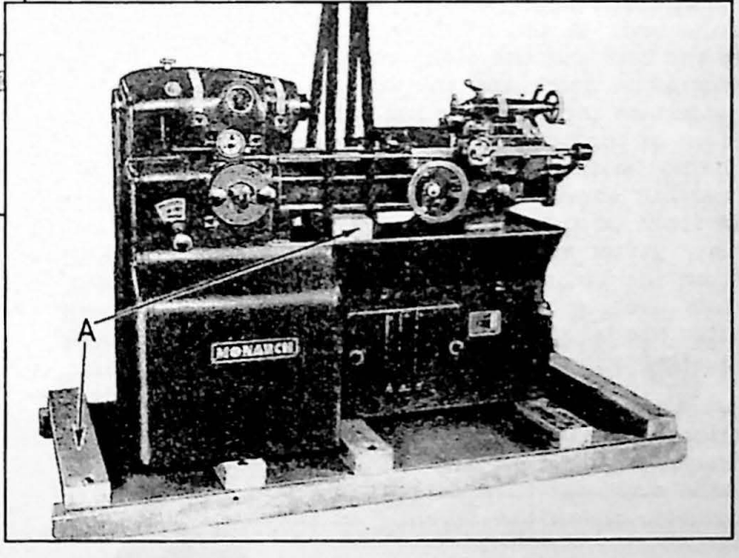
Wood block A is taken from the skid — note that the sling should go behind the leadscrew reverse rod on models that have this feature.

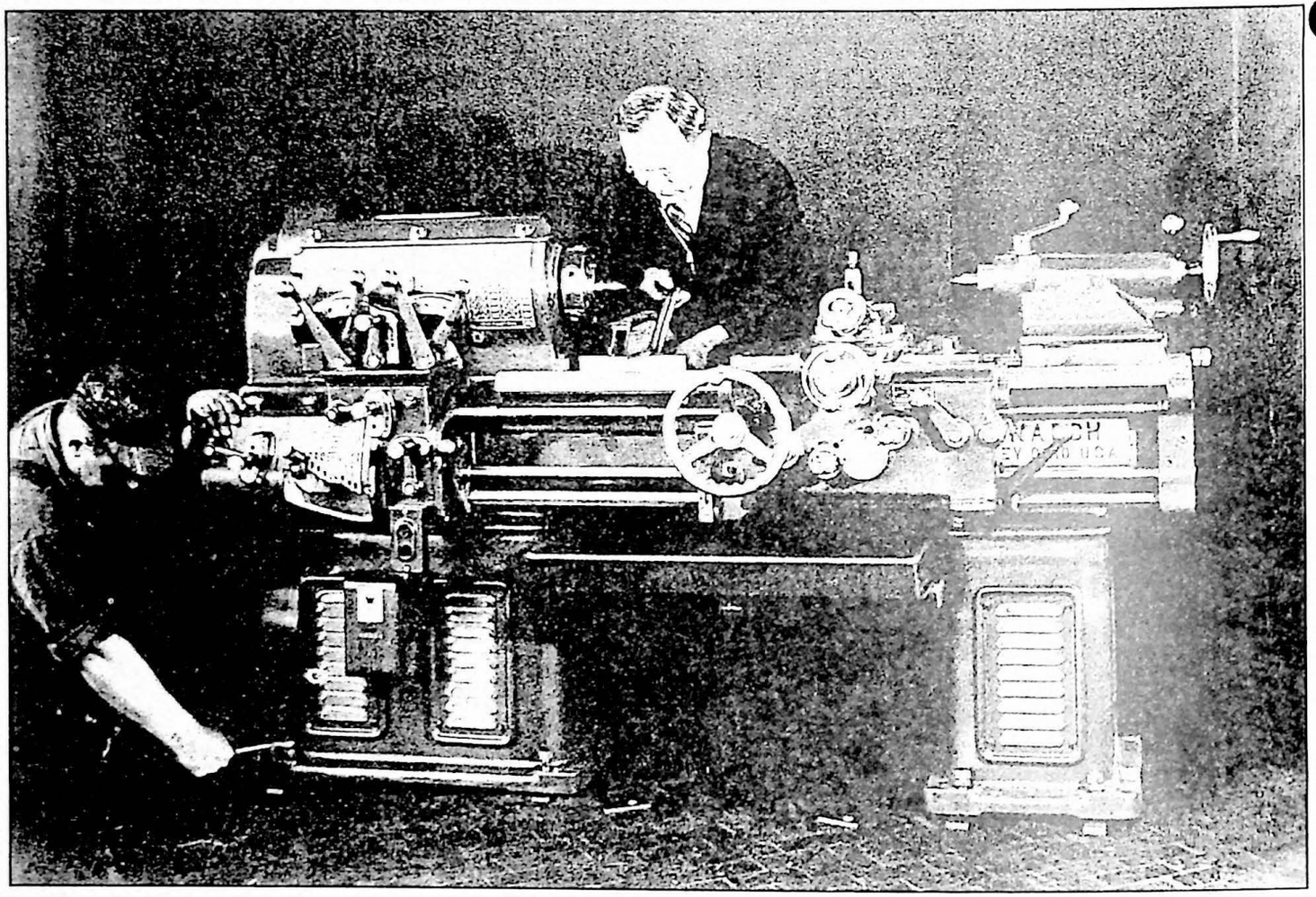
MAKE CERTAIN THAT LOAD IS ON BALANCE BEFORE LIFTING

MODELS K, CK, C, CY, and CU

Wood block A is taken from the skid and blocks B should be wide enough to keep the sling clear of the leadscrew reverse rod.

MAKE CERTAIN THAT LOAD IS ON BALANCE BEFORE LIFTING



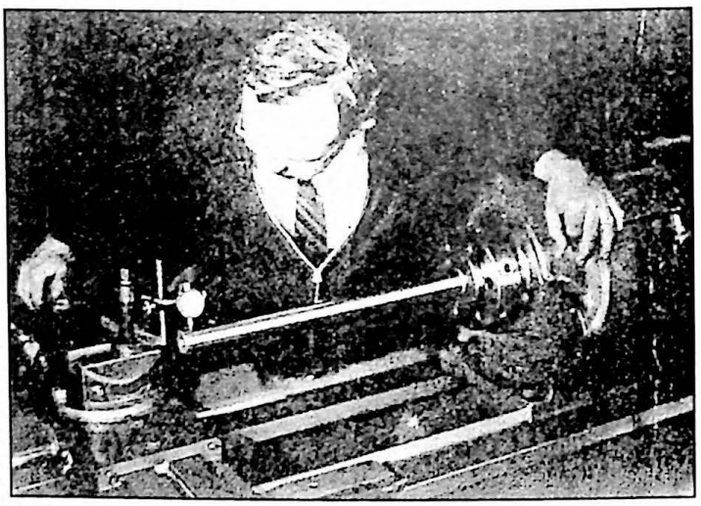


Lathe Being Leveled

ACCURATE LEVELING

Leveling a lathe and keeping it level is one of the first essentials in proper lathe operation. It is not necessary to level the lathe bed lengthwise. Even though one end of the lathe may be considerably higher or lower than the other end, the lathe will still do accurate work providing the lathe bed itself is not on a twist. Nothing but an accurate machinist's level should be used for leveling the lathe bed. A set of parallels, one on the front flat of the bed, and the other on the rear flat of the bed, should be used, and the accurate machinist's level placed on top of these parallels. Level directly in front of the headstock, using the leveling screws in the leg, with a steel plate between the floor and the leveling screw. Level in front of the headstock, in front of the tailstock, and in the center of the bed. After all twist and strain has been removed from the lathe bed, and it checks perfectly level, then the legs should be lagged to the floor, and after the lagging to the floor is completed, then the leveling should be rechecked again as before.

During the first few weeks or months of operation of the lathe this leveling should be rechecked frequently. If at any time it is found that the lathe does not turn or bore true the first thing to do is to check the leveling of the lathe bed.

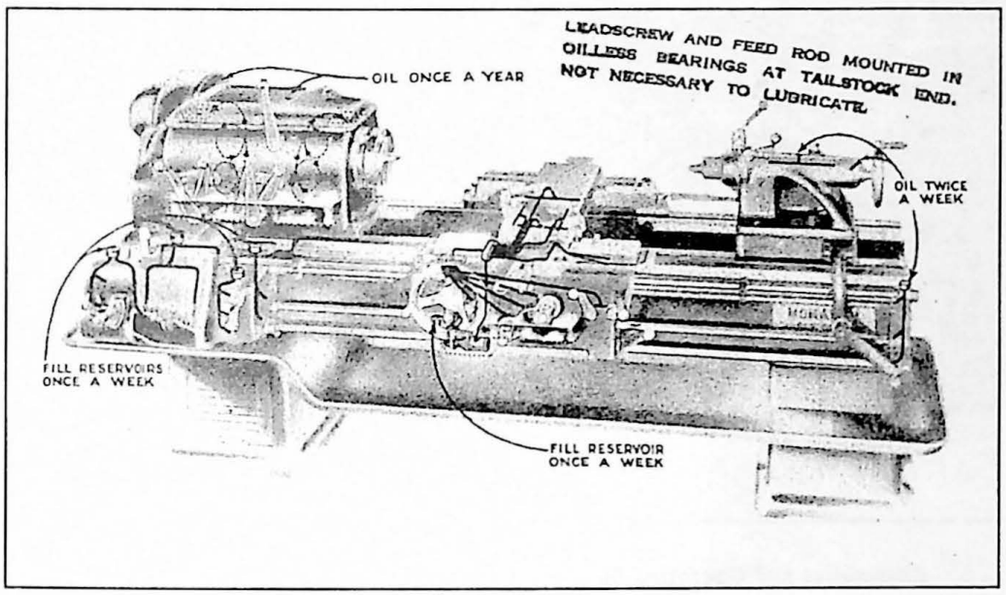


Checking Alignment

TESTING THE ACCURACY OF ALIGNMENT

We find the most convenient means of testing the alignment of the spindle of a lathe with the bed ways is by having a ground test bar with a

taper shank accurately fitting the ground taper hole in the headstock spindle. This test bar on the ground cylindrical part extending beyond the spindle should be at least 25 to 30" in length, and the bar of course should be perfectly accurate and straight. By putting an accurate dial test indicator in the tool post and running it along the test bar, both on the top and on the side of the bar, will indicate just how much misalignment there is in the bed ways in relation to the spindle of the lathe.



Force Feed Lubrication

LUBRICATION

Before this lathe was shipped, all oil was drained from the headstock and apron. Before the lathe is operated the headstock and apron must be filled to the proper level as indicated by the gauges and the lathe should be thoroughly oiled thruout. In the headstock and apron we recommend the use of a high grade oil the equivalent of SAE-30. The photograph shown illustrates how easy it is to keep this Monarch lathe properly lubricated and shows the thought which has been put into providing proper lubrication. The degree of service and satisfaction this machine provides in the future will depend in no small extent to the care it receives in proper lubrication.

Before this lathe was shipped from the factory the headstock was operated for a period of not less than four hours under a forced system of oil circulation, the oil being automatically cleaned by a Centrifuge machine, to make absolutely sure that every particle of dirt and foreign matter has been completely removed from the entire headstock mechanism. We recommend that once yearly all oil should be drained from the headstock and the headstock flushed out with kerosene, and clean, preferably filtered oil, used to refill it.

At least once yearly the Bijur circulating pump on the apron should be removed, and the apron reservoir, as well as the pump reservoir, be thoroughly cleaned of all dirt and sediment.

At least once each week the wipers on the carriage wings and on the tailstock base should be removed and thoroughly cleaned of the accumulation of chips and foreign matter, which will be found. If this plan is followed the accurate life of the lathe bed will be prolonged indefinitely, and the possibility of any scoring of the bed ways will be greatly reduced.

The headstock is automatically lubricated both by the splash system and a plunger type pump, which supplies clean filtered oil to the Timken spindle bearings.

The tailstock base is provided with a reservoir filled from the outside, which provides lubrication between the tailstock base and the bed ways.

As shown by the bronze caution plate, the main driving clutch pulley should not be greased more often than once per year, and then only a small quantity of grease should be applied, for the reason that the anti-friction bearings on which the clutch pulley is mounted require only a slight amount of lubrication, and an excess of lubricant would impair the proper functioning of the clutch faces, causing them to drag and not release properly.

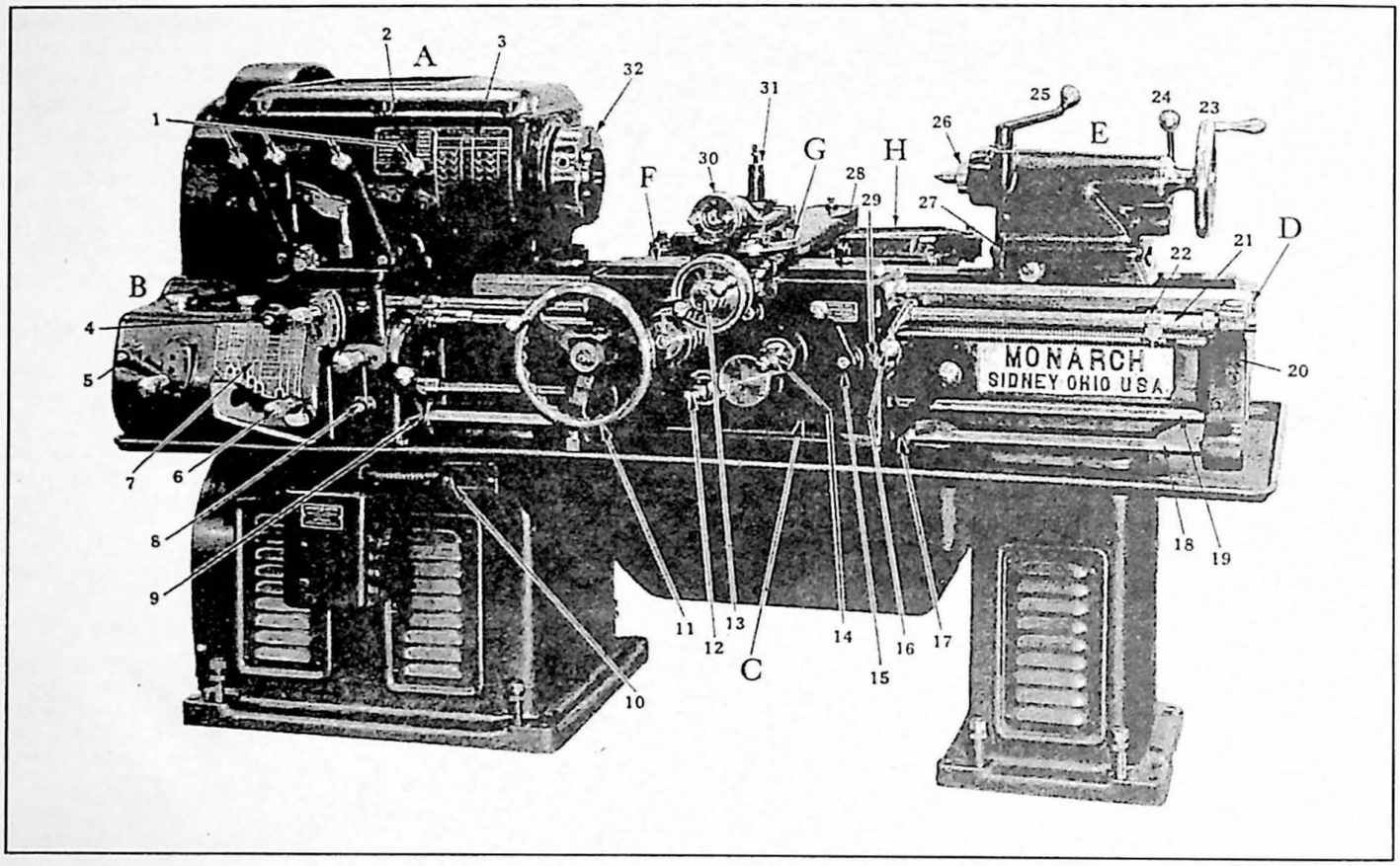
The bronze plate on the end gear train guard indicates that the end gearing should be oiled once per day.

Note: The right end bearings on Models EE, K, CK, C, CY, AA, W and BB, have oilless bearings and require no attention.

CARE AND OPERATION OF THE LATHE

Most of the features of ease and convenience of operation of this machine have been suggested from time to time by lathe operators, and we always welcome suggestions and criticisms. This lathe is built of the very finest materials obtainable, all the steel operating parts are made of nickel alloy steel electric furnace hardened, and the lathe is built to stand high speeds and heavy cuts, and with reasonable care and attention will stand up indefinitely to maximum service. "A good workman always takes pride in his tools," and we have tried in the building of this lathe to make it not only easy and convenient to operate, but also to *look well*. A weekly cleaning with a kerosene rag will give the finish a longer life.

This picture shows a typical Monarch lathe, naming the principal parts and levers used for operating the machine, and naming also the principal assembly units.



Assemblies and Operating Parts

PRINCIPAL ASSEMBLY UNITS

A. Headstock.
B. Gearbox.
C. Apron
D. Bed
E. Tailstock.
F. Carriage.
G. Compound rest.
H. Taper attachment.

NAMES OF LEVERS AND PARTS USED IN OPERATION

1. Headstock spindle speed change levers.
2. Identification plate.
3. Spindle speed index plate.
4. Upper compound lever.
5. Lower compound lever.
6. Tumbler lever.
7. Feed thread index plate.
8. Feed thread lever.
9. Spindle control lever.
10. Motor switch.
11. Apron handwheel.
12. Longitudinal friction lever.
13. Crossfeed handle and dial.
14. Crossfeed friction lever.
15. Halfnut closure lever.
16. Reverse lever.
17. Apron control lever.
18. Control rod.
19. Feed rod.
20. Leadscrew.
21. Reverse rod.
22. Reverse rod stop collar.
23. Tailstock handwheel.
24. Tailstock clamping lever.
25. Tailstock spindle binder lever.
26. Tailstock spindle.
27. Tailstock setover screw.
28. Carriage binder clamp.
29. Chasing dial.
30. Compound dial and handle.
31. Tool post.
32. Headstock spindle.

CHANGING SPINDLE SPEEDS

The levers on the front of the headstock are of course for changing spindle speeds. The levers move heavy jaw clutches inside the headstock in changing spindle speeds. In changing to slower speeds it is not necessary to disengage the driving clutch, but we do always recommend disengaging the driving clutch before changing to higher speeds. This is especially advisable if there is a heavy chuck or heavy work on the spindle or between centers. With a collet chuck or with light work between centers on the lathe, it is not necessary to disengage the driving clutch in changing to higher speeds. In changing spindle speeds, the thing to watch is to avoid the sudden shock that would be imposed on the headstock mechanism in changing from low to higher speeds, with the driving clutch engaged and with a load on the spindle. With just a little care and practice in changing spindle speeds any operator can soon learn to select any desired spindle speed and secure it almost instantly, even without referring to the spindle speed chart on the front of the headstock.

SPINDLE START AND STOP LEVERS

These levers, one located at the right hand wing of the apron, and the other at the headstock end of the lathe, in the upward position disengages the driving clutch, and by applying pressure n the upward position engages the cone brake inside the headstock to bring the spindle to a quick stop. The cone brake should function indefinitely without adjustment. Should it ever fail to properly serve as a brake to stop the spindle, it should be examined by removing the top cover plate of the headstock to discover the cause.

QUICK CHANGE GEAR BOX

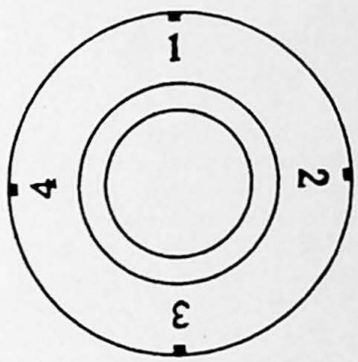
Since the index plate on the gear box clearly indicates all lever positions to secure any desired thread or rate of feed, no special instructions for its operation are required. At the right end of the quick change gear box is what is termed a slip-gear lever which is used to engage either the feed rod or the leadscrew.

THE APRON

The apron is anti-friction bearing thru out and is automatically lubricated by means of a cam which operates as the carriage traverses along the bed. If the lathe is to be used for a considerable period of time on facing work with the carriage clamped to the bed, the automatic force feed lubrication in the apron and to the compound rest will not function. In this case it is well to unclamp the carriage and occasionally move the carriage along the bed five or six turns of the apron handwheel to again force oil to all apron parts, as well as to the compound rest in its bearing on the carriage, so that proper lubrication will be given these parts.

The chasing dial on the front of the apron may be used in the following manner:

On any even thread where the lead being chased is divisible by four the operator may engage the halfnut at any point without paying attention to the chasing dial. For any even thread not divisible by four, such as 22 threads per inch, as well as any full odd thread, the halfnut may be engaged at any graduation. In other words, in chasing such threads the halfnut may be engaged when the chasing dial is at any one of the four graduation marks.



Chasing Dial

For half threads engage the halfnut at opposite graduations, as for instance No. 1, or No. 3, or No. 2, or No. 4. For quarter threads engage the halfnut at the same graduation each time. For other fractional threads the use of the thread chasing dial is not recommended.

LEADSCREW REVERSE MECHANISM

This feature is standard equipment on Model C toolroom lathes of 12″, 14″, 16″ and 18″ sizes; it is optional equipment on the EE model. Here are six of the many advantages of this device:

1. Chasing threads to a shoulder.
2. Chasing internal threads in a blind hole.
3. Chasing threads that have fractional leads.
4. Chasing odd leads of short lengths (in long lengths of odd leads it is faster to use the thread chasing dial).
5. Chasing odd leads in a sub-headstock.
6. Can be used as an automatic stop for feeds or threads in either direction by setting the stop collars.

SOME COMMON TURNING TROUBLES

Lathe Chatter

Should this Monarch lathe ever develop chatter, first make sure it is not work chatter, caused by springing of the work, or by an improperly set or an improperly ground tool. If after experiment you are convinced that the chatter may be caused by the lathe itself, we recommend the following procedure:

First examine the lathe bed to see if it is level and not on a twist. Then test the spindle in its anti-friction bearings to make sure that the bearings are properly adjusted. If they require adjustment they can be quickly adjusted by means of the lock nuts provided and shown on the headstock assembly sheet in this manual. The carriage gibs and compound rest gibs should be properly adjusted to remove lost motion and play. The headstock must of course be bolted tightly to the bed, and the tailstock base should fit firmly on the bed ways without any accumulation of dirt between the bed ways and the tailstock base. By making a careful analysis of the cause of the chatter, should chatter ever develop, we feel sure you will have no trouble in locating the cause and removing it.

Drunken Thread

A drunken thread is an alternately thick and thin thread, caused when the leadscrew thrust adjustment is improperly made. Proper adjustment of the leadscrew thrust eliminating lost motion will usually remedy this trouble.

The Lathe Turns Taper Between Centers

First see that the lathe bed is perfectly level, on a firm foundation, and that the bed is not on a twist, which would render it inaccurate. Make sure the tailstock center is correctly aligned with the headstock center. Of course the carriage and compound rest gibs should be properly adjusted.

If the Lathe Turns Taper on Work Held in a Chuck

First see that the lathe bed is properly leveled as described above and elsewhere in this manual. It will be well also to test the accuracy of the gripping surface and the face of the chuck jaws to see if they are accurate. It is well also to test the alignment of the spindle with the bed ways of the lathe as described elsewhere in the manual.

If the Lathe Bores Taper, or Faces Convex or Concave

The same procedure as above should be followed.

Every possible precaution to assure long trouble free service of this lathe has been taken by us, and the lathe should give satisfactory performance with reasonable care and attention for many years to come. If, however, you should ever experience difficulty in the successful operation of this lathe, that you cannot quickly correct yourself, we urge you to report your trouble to the dealer or agent who sold you the lathe, or to us direct, because every Monarch lathe must give complete satisfaction to the purchaser.

BULLETINS

The "Feature Bulletin" and the "Accessories Bulletin" have been sent with this operator's manual. By studying these bulletins, you will become more familiar with Monarch lathes.

The "Feature Bulletin" explains very thoroughly the construction of the machine, unretouched photographs being used for illustrations. We feel this bulletin will present you with a much clearer understanding of the machine.

The "Accessories Bulletin" shows the attachments and accessories which may be installed on a Monarch lathe, making it adaptable for almost any type of turning. A study of this bulletin may be the means of solving many of your turning problems.

We Believe that the Use of Compressed Air, for Cleaning Lathes, is the Cause of Future Troubles

2-47 Bulletin 1 - No. 2 2500

Litho, in U. S. A.

LUBRICATION MANUAL

10" Model EE Toolmaker's Lathes
Series 61 Engine and Toolmaker's Lathes
Series EE Model 1000 Precision Lathes
Series 62 Preselector Dyna-Shift Lathes
Models M, N and NN Heavy Duty Lathes
Series 80 and 90 Heavy Duty Dyna-Shift Lathes
And all C Series

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Lodge & Shipley Lathes

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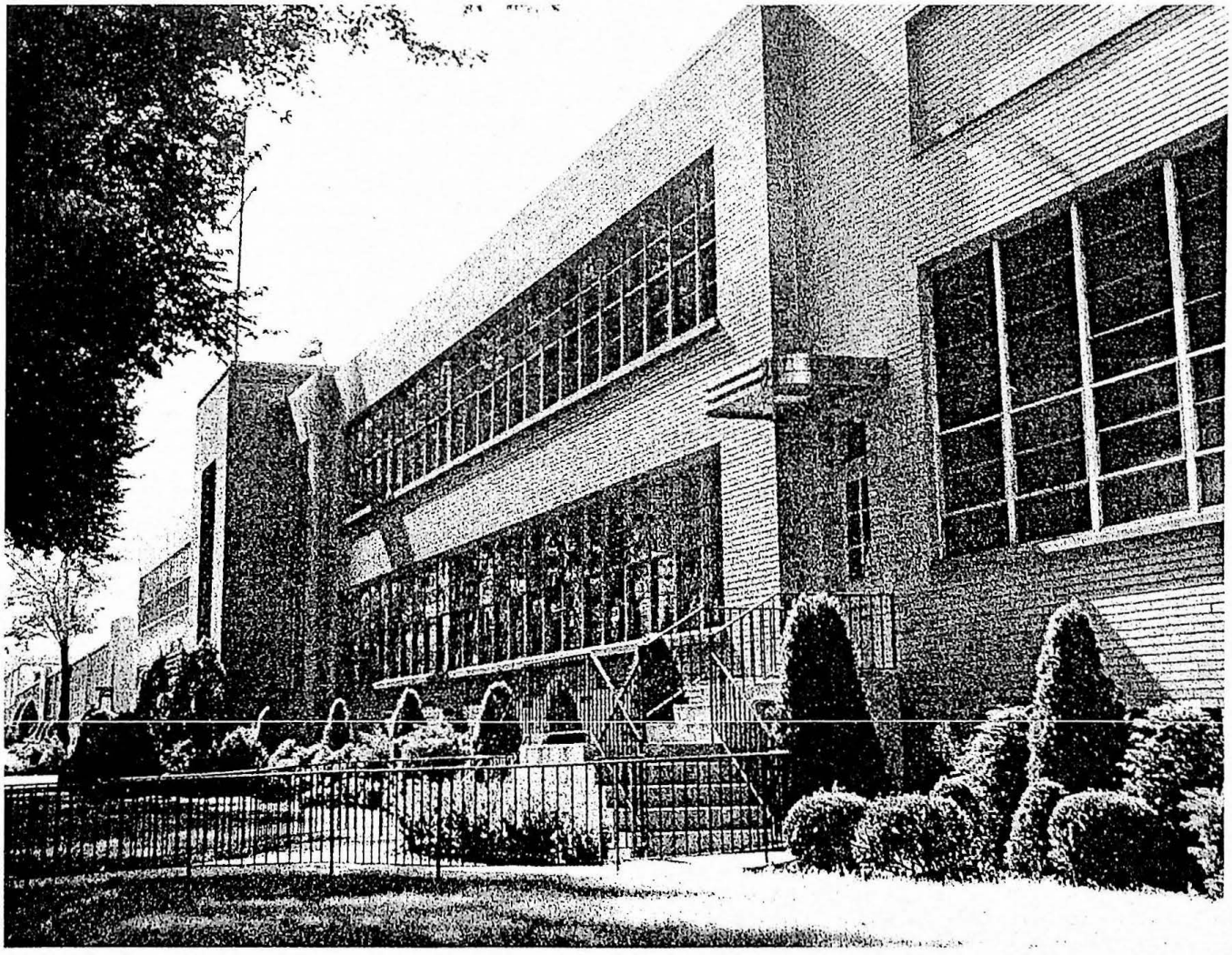
Introduction

The importance of proper and systematic lubrication cannot be overemphasized. Your Monarch lathe will produce more accurately and work faster by following the suggestions and instructions outlined in this handbook.

There are two major factors which govern the proper lubrication of your lathes. First, the method of application; second, the quality of lubricant used.

Specifications of lubricants do not satisfactorily determine their quality, thus as a guide and indication of first quality lubricants with world-wide distribution, we have listed Mobil products which are manufactured by the Socony Mobil Oil Company, Inc. Other brands of similar high quality may be used.

Proper maintenance of this lathe is a simple matter. With the proper use of the lubrication charts, a regular schedule should be arranged and maintained at all times. A lubrication schedule which is closely adhered to will help to insure years of trouble-free operation and low repair costs.



PREPARATION FOR OPERATION AND RUN-IN

An anti-rust slushing compound has been applied to all outside machined surfaces. For correct method of removing this compound, please refer to the Operator's Manual.

After removal of this anti-rust compound and before operation, a thin film of oil such as Mobil Vactra Oil Heavy Medium should be applied to the bedway surfaces. The head-stock and apron must be filled to proper levels with the recommended types of oil as indicated by the oil level gauges. The lathe should then be thoroughly oiled and greased throughout according to the lubrication charts.

The Series EE, Series 61, Model M, Model N and Model NN lathes are shipped without oil in the headstock, gearbox and apron. Furthermore, the headstock hydraulic power unit of the Model 1000, Series EE is drained before shipment. These oil reservoirs must be filled with the correct grades of lubricant, which are given in the following pages, before the lathe is operated.

The Series 62, Series 80 and Series 90 lathes are shipped without lubricant in the apron, so the aprons on these lathes must be filled before operation. The headstock hydraulic power unit is drained prior to shipment. Be sure to fill before operation.

The 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 slushing compound, already mentioned, cannot be stressed too strongly. Although over-lubrication is never recommended, special care should be exercised to assure full lubrication, wherever specified, from the very first moment of operation. It is 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 ninety 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 correct recommended product as shown in the lubrication charts. The hydraulic power unit reservoirs on the Model 1000, Series EE, Series 62, Series 80, and Series 90, as well as the "Air-Gage Tracer" hydraulic power units, should not be flushed with flushing oil, but should be drained, wiped clean with a clean lint-free cloth, and the filters cleaned or replaced. Thereupon the hydraulic power units should be filled with Mobil D.T.E. Oil Light. To adhere to this procedure is to remove the contaminated oil which might contain small metal particles and anti-rust coating compounds, thus destroying the lubrication value of the initial charge.

PERIODIC OIL LEVEL CHECK

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

CAUTION:—STOP THE LATHE AND ATTACHMENTS WHEN CHECKING OIL RESERVOIR LEVELS.

On the oil gauge for each unit will be found a line indicating the correct oil level. Never permit the level to fall too far below this line, as damage can result in a short period of operation due to lack of lubricant. Overfilling, however, can be detrimental and should be avoided at all times. This practice results in overheating due to excessive churning and unnecessary waste of oil.

REQUIRED OIL CHANGES

Following the initial run-in period, all oil reservoirs should be completely drained, *cleaned as described above* and refilled with a fresh charge of the recommended type of oil, as designated in the lubrication charts for each type of lathe.

It is recommended that, once every six months, the oil be drained from the reservoirs and power units and that they be cleaned as described above. At the same time the apron lubricating pump should be cleaned, as well as the head-stock lubricating pump in the Series 61 and the Models M, N, and NN. The hydraulic power unit filters of the Series EE, Model 1000, Series 62, Series 80 and Series 90 should be cleaned or replaced at this time. Then refill the

reservoirs with a fresh charge of the recommended oil. This same procedure should be followed on the Series 61 end gearing and gear box pump.

The constant re-circulation of the oil in the lathe and the contamination with impurities tend to gradually lessen the lubrication qualities of an oil. Such tendencies are most pronounced with inferior oils. The change period has, therefore, been based on the use of a high quality oil as designated.

CORRECT HAND OILING

Before the lathe is started each working day, all oil cups and hand oiling points should have a few drops of a good grade of machine oil applied therein, such as Mobil Vactra Oil Heavy Medium.

The use of the pneumatic type of can with plunger operation is recommended in preference to the ordinary spring bottom type of can. This pneumatic type has a greater control on the amount of oil applied and is superior in all positions of application. As always, the most important factor is regularity and the recommended quantity as shown in the charts following this section, in comparison to larger quantities at irregular intervals.

USE OF GREASE GUN

The operation of a grease gun is extremely simple but a few precautions are necessary to guarantee proper application. Air pockets forming in the grease chamber, particularly after refilling, should be eliminated by working the gun a few times prior to usage to make certain all entrapped air is removed. This will then allow the gun to eject the grease in a positive manner, thus controlling the amount applied.

The pressures possible with the ordinary grease gun are quite high, so extreme care must be taken, particularly when lubricating a bearing where grease has no provision for escape, as this will cause over-filling of the bearing so that when operated excessive heat is likely to result.

Then, too, seals may be damaged by the application of too much pressure which would allow the entrance of foreign matter, resulting in the contamination of the lubricant.

THE BIJUR SYSTEM

The Bijur Lubricating System consists of a pump unit which forces oil through branched lines to Meter-Units located at or near each point of application. This pump supplies a measured quantity of oil to the system, then the Meter-Units proportion this quantity according to the orifice size.

The lubricator is a small self-contained, non-adjustable piston pump installed in individual reservoirs at different points on the lathe. It is operated from the lathe through an eccentric or cam mounted on a rotating shaft. When the machine is in operation a lubricator pump forces a measured quantity of oil into the distributing system and assures a constant volume of oil being fed to the parts. The pump stroke is set at the factory to satisfy normal operating conditions. *No change* should be attempted unless running of the machine indicates a definite necessity.

It is extremely important that the lubricator never be starved of oil. An adequate level should be maintained in the oil reservoir, checked only when the machine is not in operation. Level is indicated by a glass sight gauge in the side of the reservoir. A regular schedule should be maintained to check and fill the reservoirs *to the proper level*. This will guard against insufficient oil in the system and avoid the possibility of extensive wear or operating difficulty.

A filter disc at the pump inlet protects the lubricating system from chips, dirt and other foreign substances. It is recommended that the filter disc be inspected every six months. If not clean, replace with a new one. When adding fresh oil, take every precaution that no dirt or chips are permitted to contaminate the new charge, as foreign matter of this nature can quickly clog the filter disc and impair its proper operation. Moreover, never use lubricants that contain compounds

which might be absorbed to an extensive degree by the filter discs, thus clogging and reducing the delivery of oil through the system. For a like reason, never use so-called "dripless" oil or grades containing graphite, soap or other foreign substances.

CARE OF THE HYDRAULIC SYSTEM

It is extremely important that these schedules be followed, thus insuring trouble-free operation. At all times, exercise extreme precaution that no water, dirt or grit be allowed to contaminate the system. A minute particle can cause expensive and time-consuming repairs.

The various pumps, valves and operating pistons of hydraulic systems are sensitive to the characteristics and condition of the oil used as the hydraulic fluid medium. With correct oil, these elements function smoothly, perform faithfully, respond quickly and require little attention. Efficient operation depends largely upon: (1) use of the correct oil and (2) scheduled maintenance of the system.

Along with the regular scheduled inspection as shown in the lubrication charts, the filter on the pump intake should be cleaned every six months. . . . . .

IMPORTANT LUBRICATION TIPS

The apron is anti-friction bearing throughout and is automatically lubricated by means of a cam which operates as the carriage traverses along the bed. CAUTION:— If the Models M, N and NN lathes are to be used for a considerable period of time on facing work with the carriage clamped to the bed, the automatic force feed lubrication in the apron and to the compound rest will not function properly. In this case it is well to unclamp the carriage and occasionally move the carriage along the bed five or six turns of the apron handwheel to again force oil to all apron parts, as well as to the compound rest in its bearing on the carriage, so that proper lubrication will be given these parts.

As shown by the caution plate, the main driving clutch pulley should not be greased more often than once per year and then only a small quantity of grease should be applied, for the reason that the anti-friction bearings on which the clutch pulley is mounted require only a slight amount of lubrication and an excess of lubricant would result in heating and leakage to the outside.

IMPORTANCE OF CLEANLINESS

The careless handling of lubricants, containers, etc. can quickly defeat the best lubrication procedure. Cleanliness is primarily a matter of systematic handling and proper storage facilities, which include well marked containers used for the same lubricant AT ALL TIMES.

The following are some suggested procedures which should be followed to avoid possible contamination of the fresh oil.

1: Wipe clean all filler openings BEFORE adding oil.

2: The use of a fine screen or mesh is recommended when refilling the hydraulic system.

3: Replace all covers, filler plugs, etc. immediately after oiling.

4: Clean all pressure fittings before application of grease.

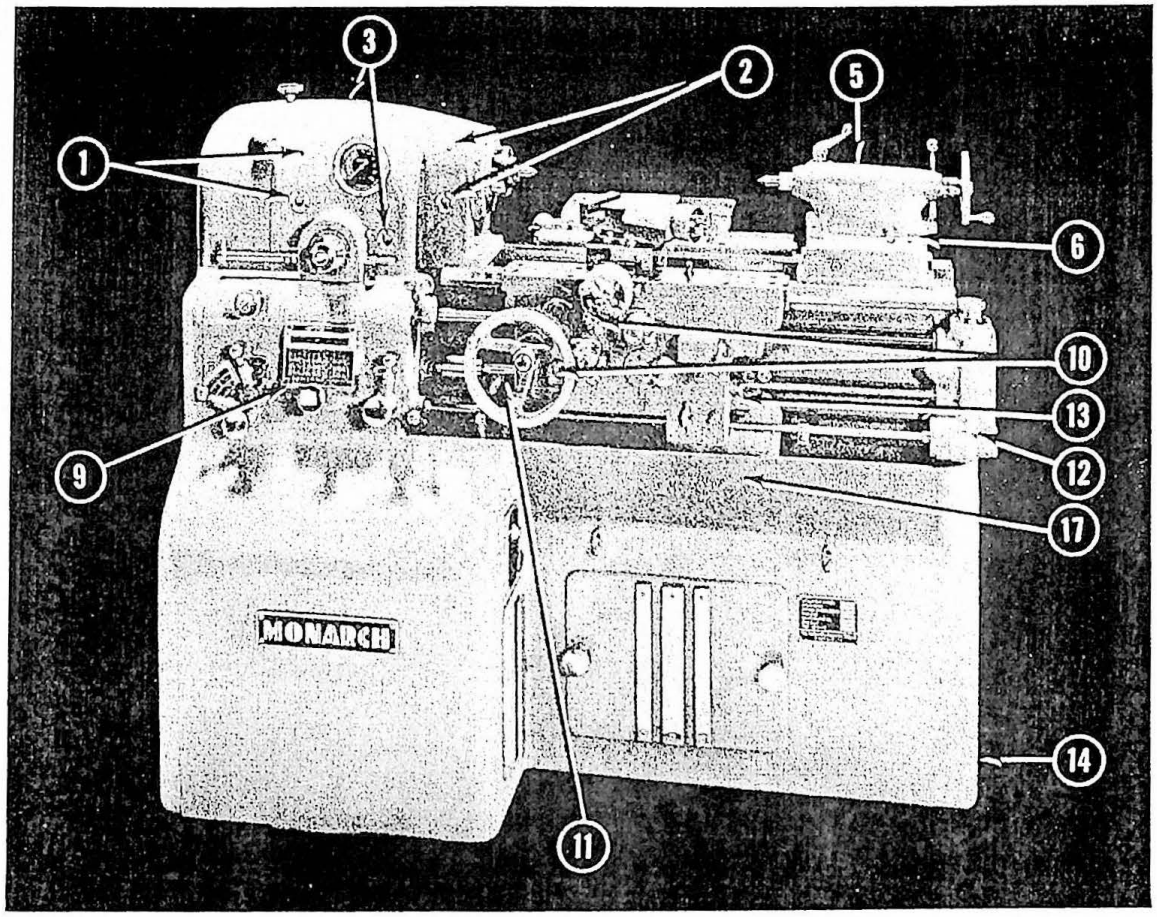


Figure 1. 10" Model EE Toolmaker's & Manufacturing Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
1	Rear Spindle Bearing Reservoir Filling Point and Oil Level Gauge		Mobil Vactra Oil Light	Check level each shift.
2	Front Spindle Bearing Reservoir Filling Point and Oil Level Gauge		Mobil Vactra Oil Light	Check level each shift.
3	Headstock Reservoir Filling Point and Oil Level Gauge	3 Qts.	Mobil Vactra Oil Light	Check level weekly. Drain every 6 months at point (4) Flush and refill with fresh oil.
5	Tailstock Spindle		Mobil Vactra Oil Heavy Medium	Oil each shift.
6	Tailstock Ways		Mobil Vactra Oil Heavy Medium	Oil each shift.
7	Gearbox—Reservoir Filling Point	1 Qt.	Mobil Vactra Oil Heavy Medium	Check level each shift. Drain every 6 months at point (8), flush and refill with fresh oil.
9	Gearbox—Oil Level Gauge			Check level each shift. See reference to point (7).

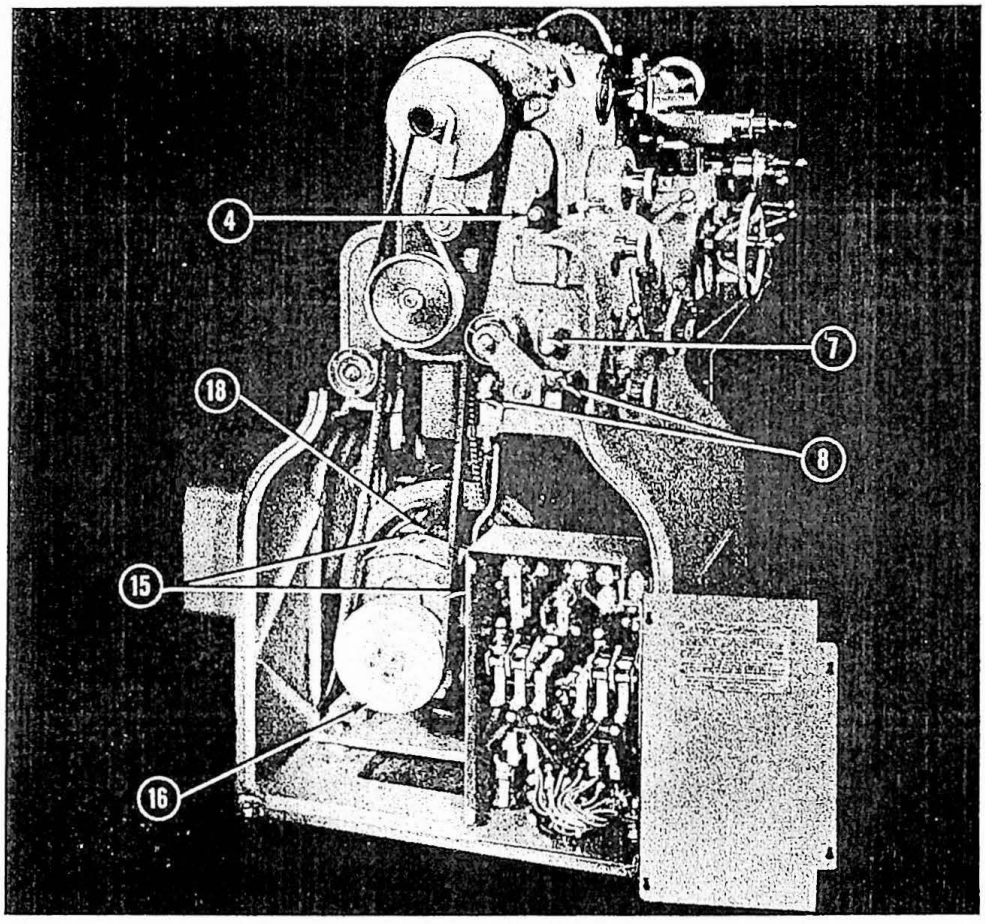


Figure 2. 10" Model EE Toolmaker's & Manufacturing Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
10	Apron—Reservoir Filling Point and Oil Level Gauge	1 Pt.	Special recommendation. See pink tipped in sheet on page 19.	Check level each shift. Drain every 6 months at point (11), flush and refill with fresh oil.
12	Leadscrew Reverse End Bearing		Mobil Vactra Oil Heavy Medium	Each shift
13	Leadscrew Reverse Stop Adjustment Mechanism		Mobilux Grease No. 2	Every 6 months.
*14	Motor Generator and Exciter. (Back of cover—three grease fittings—see footnote.)		Mobilux Grease No. 2	Every 6 months
15	Speed Reducing Unit — Reservoir Filling Point and Oil Level Gauge	½ Pt.	Mobil Vactra Oil Heavy Medium	Check oil level once weekly or every 50 hours of operation. Every 6 months drain at point (16), flush and refill with fresh oil.
17	Coolant Sump	3 Gals.		
18	Main Drive Motor		Mobilux Grease No. 2	Grease every 12 months. Sealed bearings—use caution to prevent seal blowout.

*No longer furnished. Electronic converter now standard.

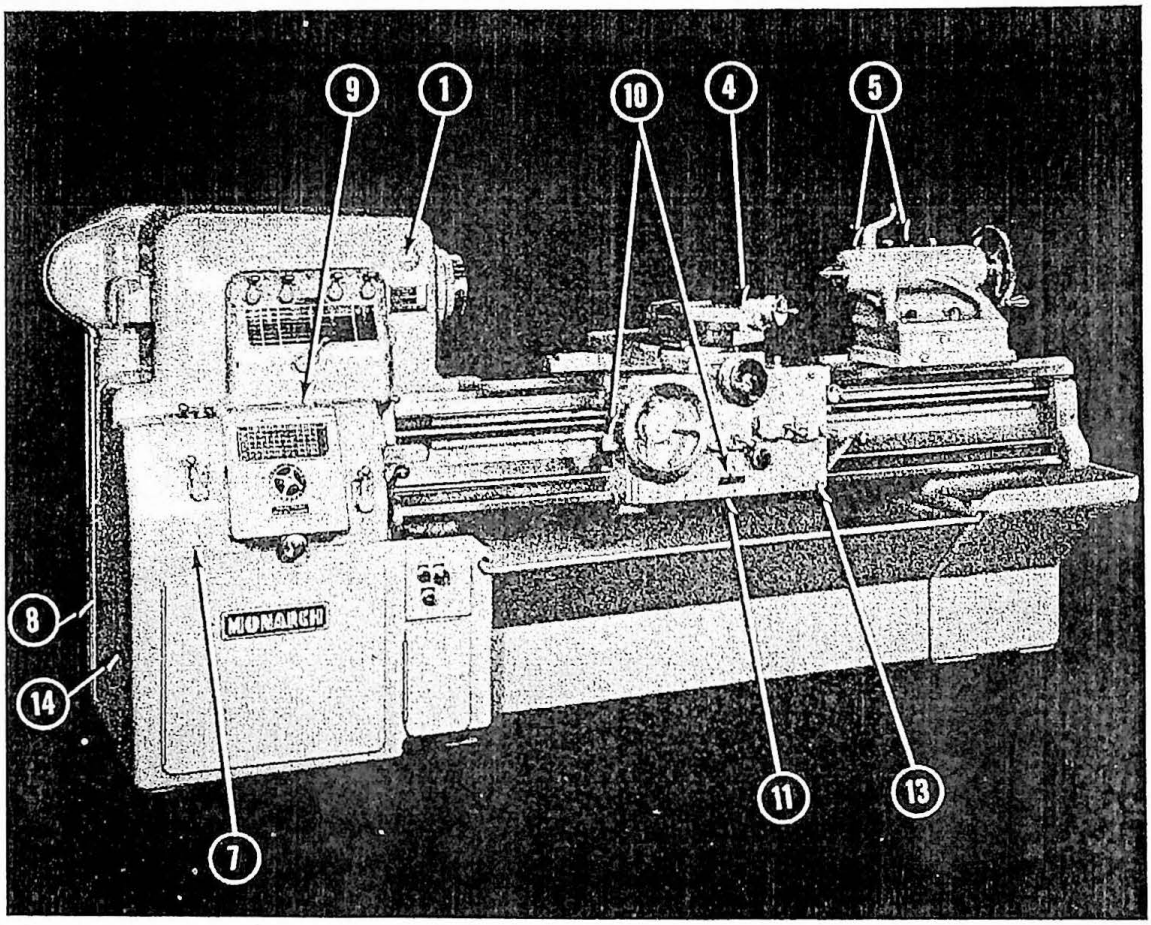


Figure 3. Series 61 Engine and Toolmaker's Lathe

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 Gauge		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.

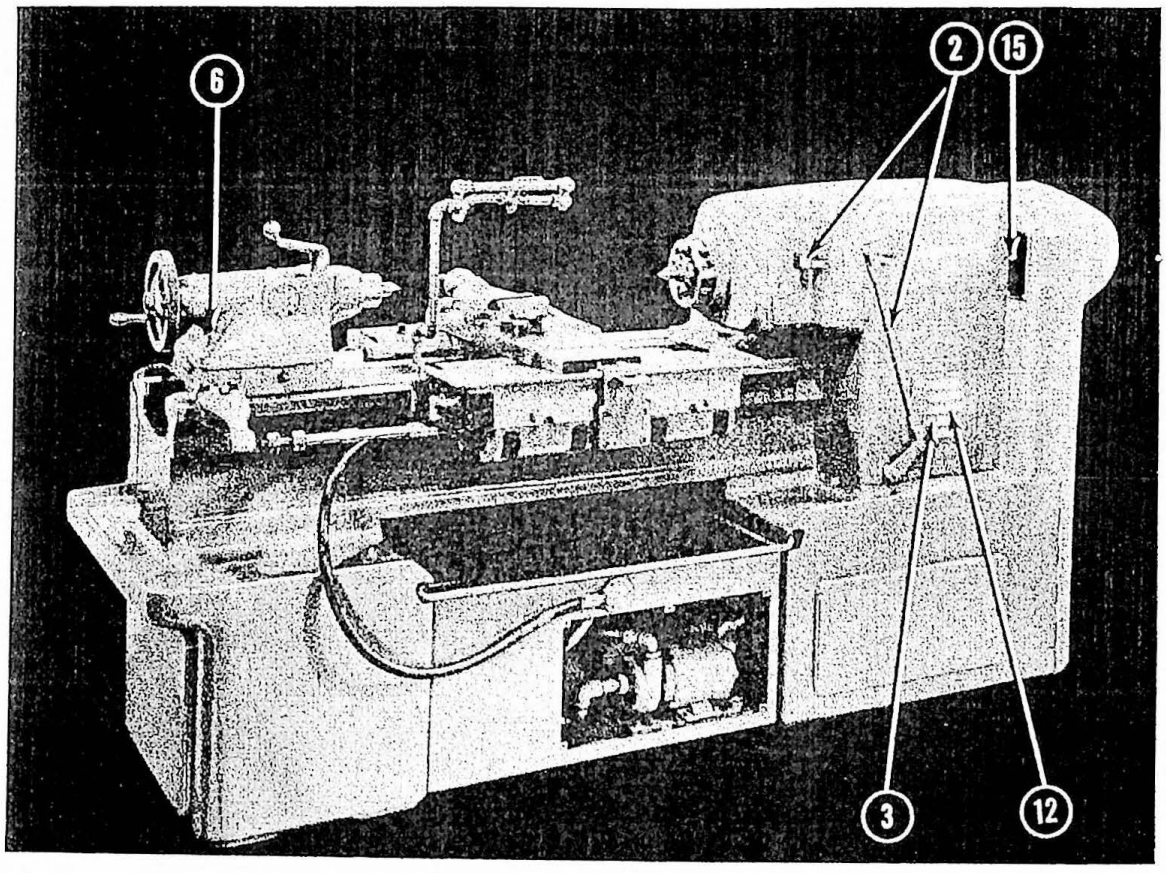


Figure 4. Series 61 Engine and Toolmaker's Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
10	Apron Reservoir Filling Point and Oil Level Gauge	13" 2½ Pts. 16" & 20" 3 Pts.	Special recommendation. See pink tipped-in sheet on page 19.	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 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.

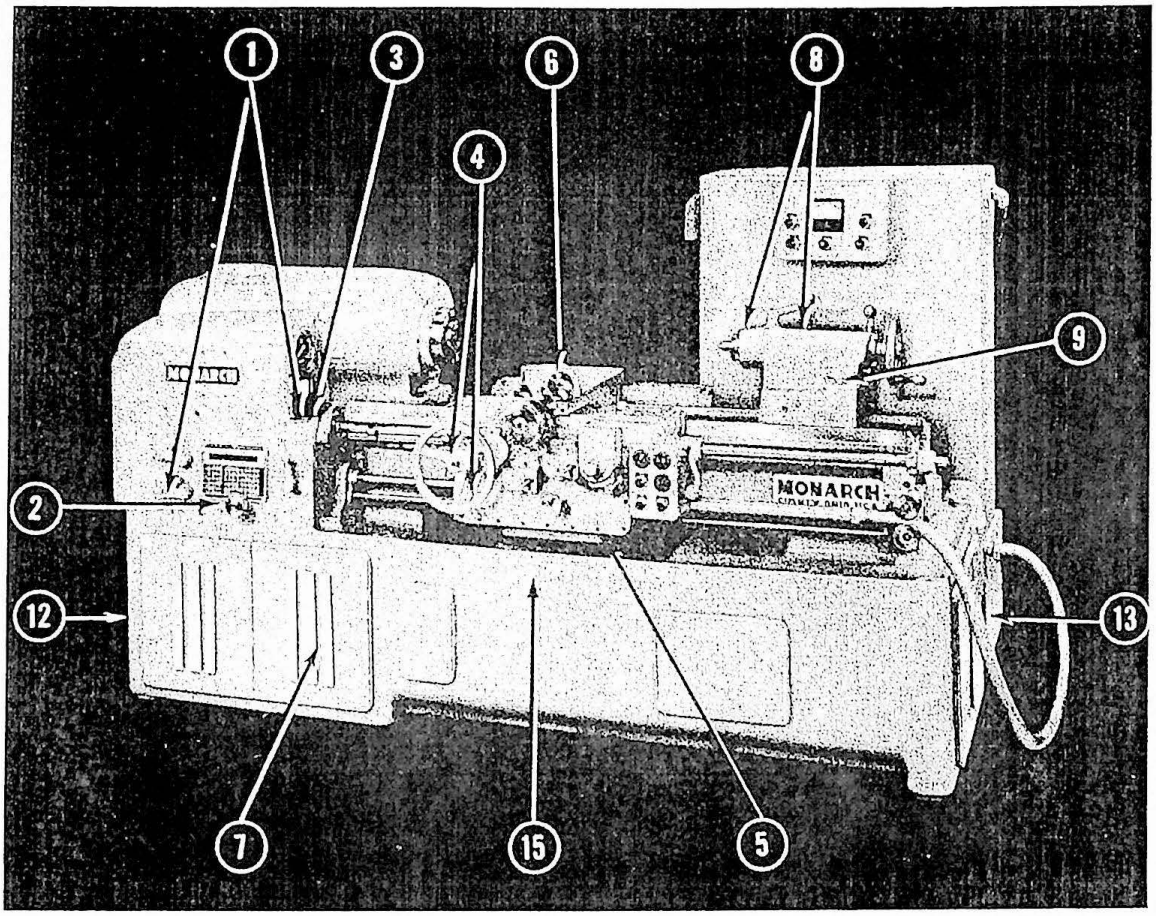


Figure 5. Series EE Model 1000 Precision Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
1	Gearbox Reservoir Filling Point and Oil Level Gauge	2 Qts.	Mobil Vactra Oil Heavy Medium	Check level each shift. Drain every 6 months at point (2), flush and refill with fresh oil.
3	Power Rapid Traverse Rod, Feed Rod and Leadscrew End Bearings		Mobil Vactra Oil Heavy Medium	Each shift.
4	Apron Reservoir Filling Point and Oil Level Gauge	1 Gal.	Special recommendation. See pink tipped-in sheet on page 19.	Check level each shift. Drain every 6 months at point (5), flush and refill with fresh oil.
6	Compound Rest		Special recommendation. Same as for point (4).	Each shift.
7	Rapid Traverse Gear Motor	¾ Pt.	Mobil Vactra Oil Heavy Medium	Drain every 6 months, flush and refill with fresh oil.
8	Tailstock Spindle (Standard Tailstock)		Mobil Vactra Oil Heavy Medium	Oil each shift.

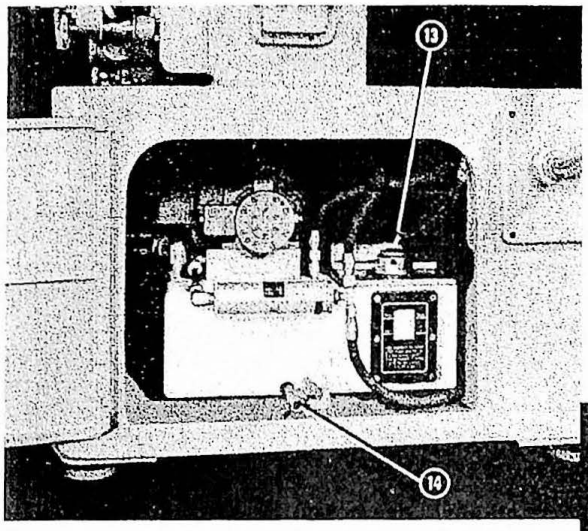


Figure 6. Series EE Model 1000 Precision Lathe

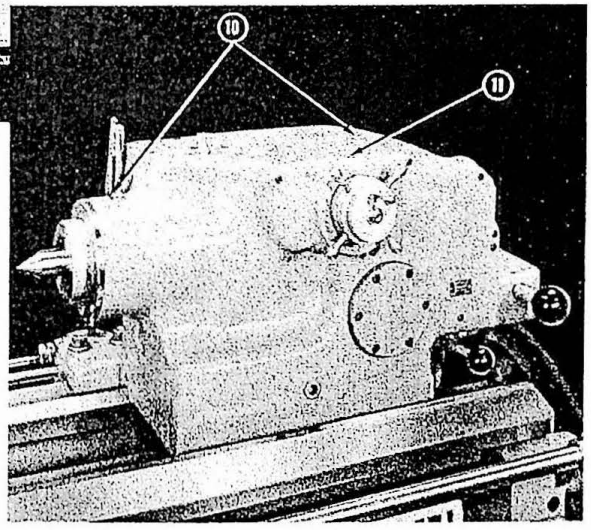


Figure 7. Series EE Model 1000 Precision Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
9	Tailstock Ways (Standard Tailstock)		Mobil Vactra Oil Heavy Medium	Each shift.
10	Tailstock Spindle (Hydraulic Tailstock)		Mobil Vactra Oil Heavy Medium	Oil each shift.
11	Tailstock Handwheel (Hydraulic Tailstock)		Mobil Vactra Oil Heavy Medium	Oil each shift.
12	Main Drive Motor		Mobilux Grease No. 2	Twice monthly or every 100 hours of operation.
13	Hydraulic Power Unit	8½ Gals.	Mobil DTE Oil Light	Check level each shift. Drain every 6 months at point (14) Fig. 7, clean and refill with fresh oil.
15	Coolant Sump 30" Bed 54" Bed	 27 Gals. 56½ Gals.		
	Misc. Hand-Oiled Points		Mobil Vactra Oil Heavy Medium.	Each shift.

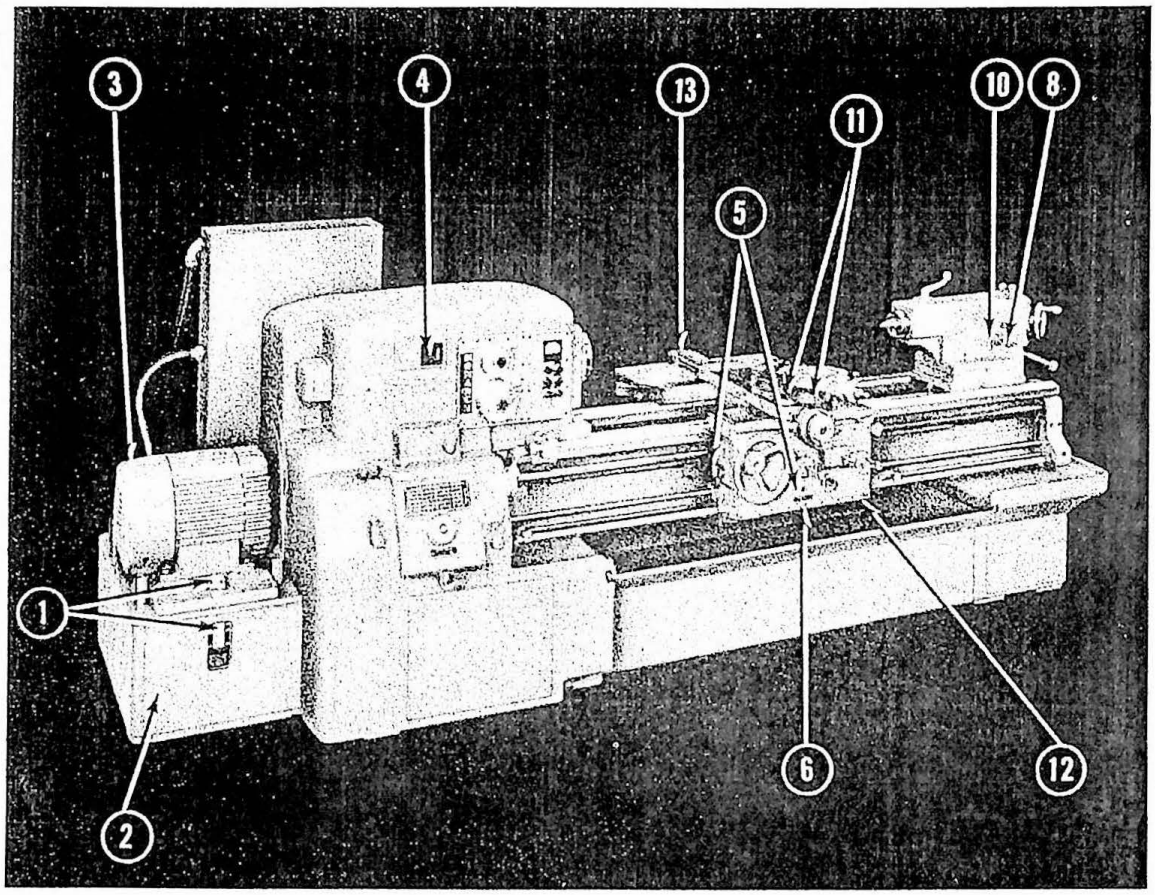


Figure 8. Series 62 Preselector Dyna-Shift Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
1	Hydraulic Power Unit Reservoir Filling Point and Oil Level Gauge (Unit Also Furnishes Oil for Lubrication of Headstock and Gear Box)	10½ Gals.	Mobil D.T.E. Oil Light	Check oil level at least twice a week. Drain every 6 months at point (2) (back of cover) and clean. Also clean filters.
3	Main Drive Motor		Mobilux Grease No. 2	On those makes of motors fitted with grease fittings grease every 12 months. Use caution to prevent blow-out of seals.
4	Viewing Port for Visual Inspection of Headstock Mist Lubrication			Observe mist each shift.
5	Apron Reservoir Filling Point and Oil Level Gauge	2½ Qts.	Special recommendation. See pink tipped-in sheet on page 19.	Drain (point 6) and flush twice a year. Check level each shift.
7	Tailstock Reservoir Filling Point	1 Pt.	Mobil D.T.E. Oil Light	Operate one-shot pump (8) once every four hours of operation. Drain (point 9) and flush twice a year.

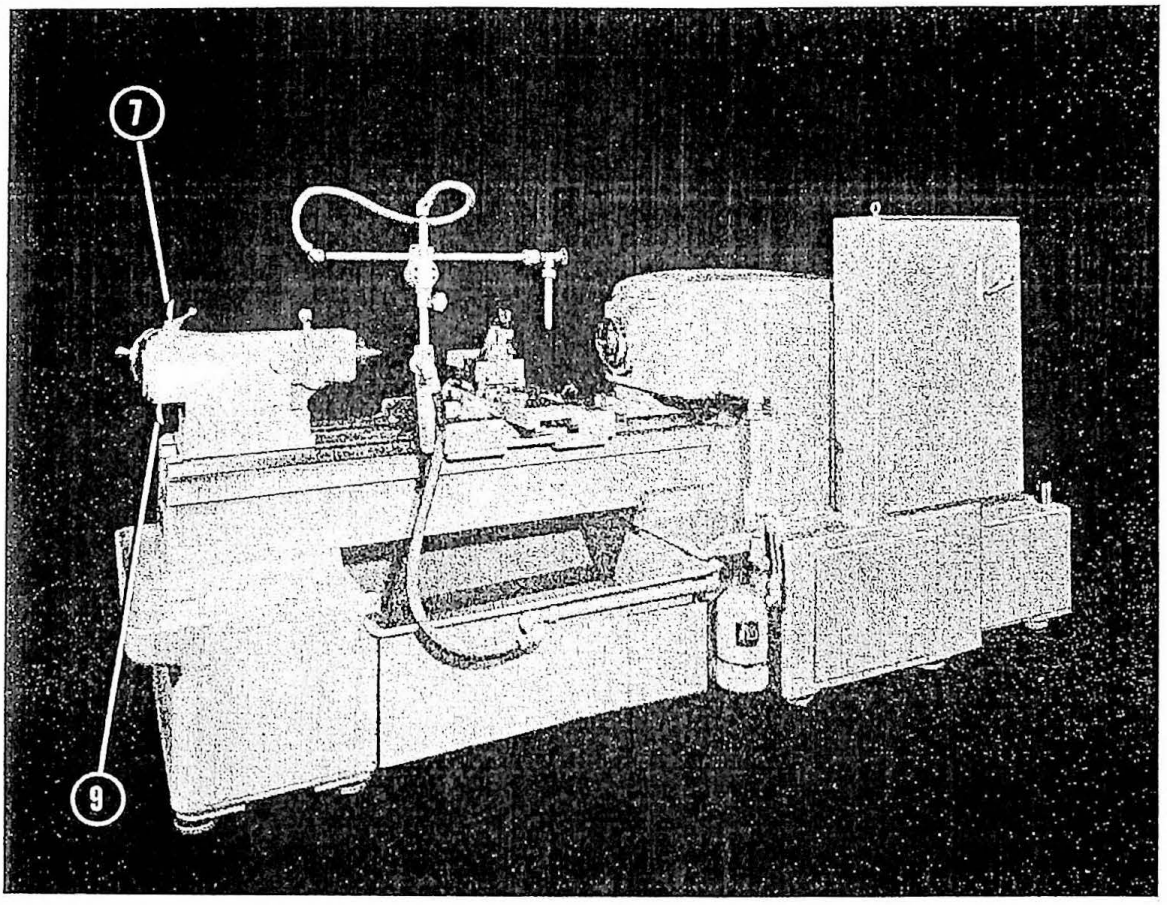


Figure 9. Series 62 Preselector Dyna-Shift Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
10	Tailstock Reservoir Oil Level Gauge			Check level each shift.
11	Compound Rest		Special recommendation. See pink tipped-in sheet on page 19.	Oil weekly.
12	Apron Control Rod Bearings		Mobilux Grease No. 2	Grease monthly.
13	Taper Attachment		Mobilux Grease No. 2	Grease weekly when in use.
14	Traveling Rod Supports (Where Used)		Special recommendation. See pink tipped-in sheet on page 19.	Oil weekly.

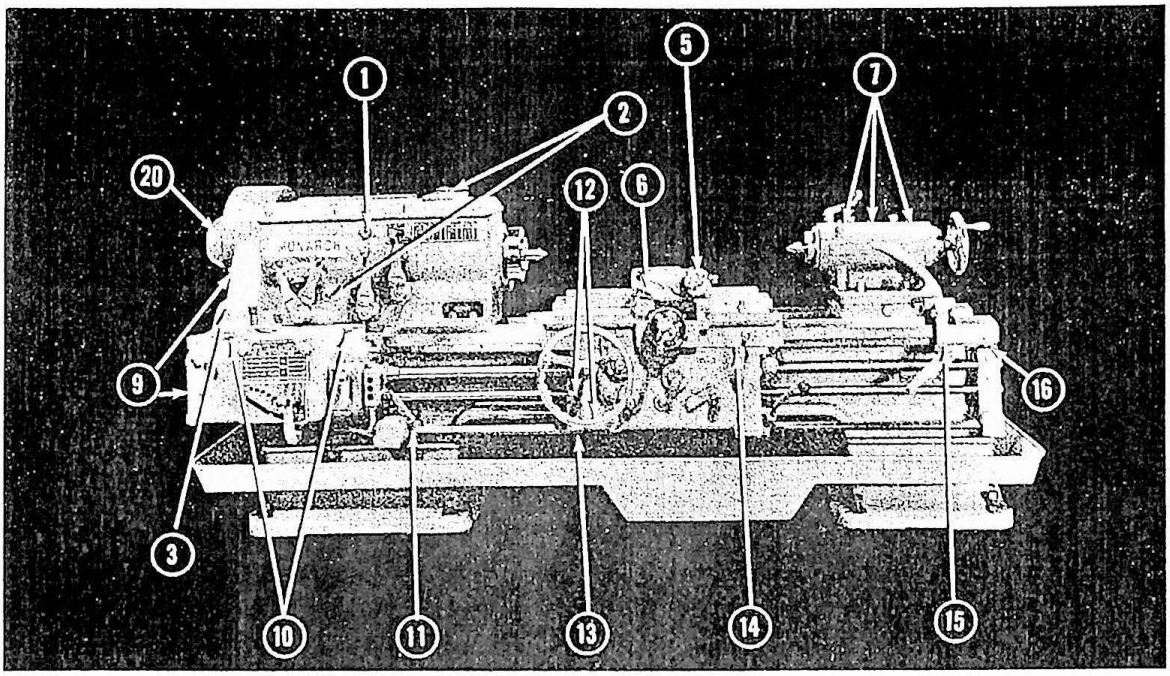


Figure 10. Models M, N and NN Heavy Duty Lathe all C series

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
1	Headstock Pump Operating Gauge			Check during each operation.
2	Headstock Reservoir Filling Point and Oil Level Gauge	M 7½ Gals. N 12 Gals. NN 15 Gals.	Mobil Vactra Oil Heavy Medium	Check oil level each shift. Drain every 6 months at point (3) (between end gearing cover and belt guard), flush and refill with fresh oil.
4	Headstock Lubricant Filter			Rotate handle once each week. Remove and clean element every 6 months.
5	Compound Screw Bushing		Mobil Vactra Oil Heavy Medium	Oil each shift.
6	Compound Slide (Model NN Only)		Special recommendation. See pink tipped-in sheet on page 19.	Oil weekly.
7	Tailstock Spindle		Mobil Vactra Oil Heavy Medium	Oil each shift.
8	Tailstock Ways		Mobil Vactra Oil Heavy Medium	Oil each shift.
9	End Gearing (Open Cover to Expose All Oilers)		Mobil Vactra Oil Heavy Medium	Oil each shift.
10	Gearbox	1½ Gals.	Mobil Vactra Oil No. 4	Check level each shift. Drain, flush and refill with fresh oil every 6 months.
11	Linkage		Mobil Vactra Oil Heavy Medium	Each shift.

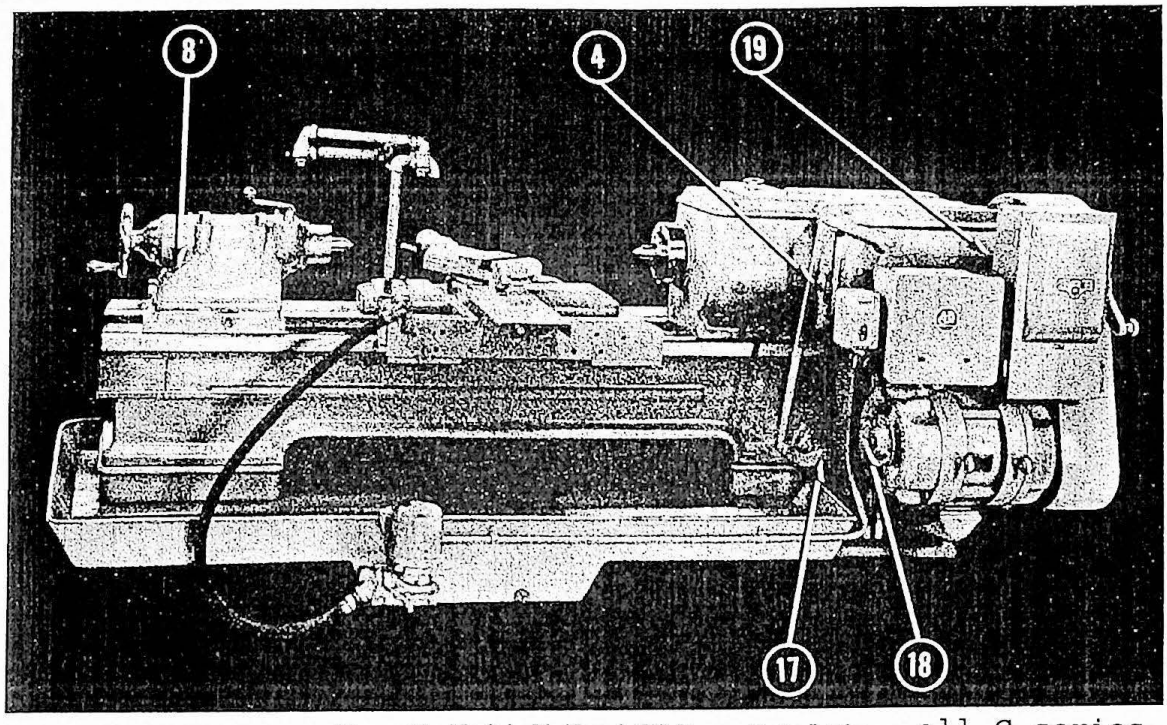


Figure 11. Models M, N and NN Heavy Duty Lathe all C series

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
12	Apron Reservoir Filling Point and Oil Level Gauge	M, N 1 Qt. NN 2 Qts.	Mobil Vactra Oil No. 4	Check oil level each shift. Drain every 6 months at point (13), flush and refill with fresh oil.
14	Leadscrew		Mobil Vactra Oil Heavy Medium	Lubricate hourly when using half nuts.
15	Tailstock Adjustment Lever		Mobil Vactra Oil Heavy Medium	Apply a few drops daily.
16	Leadscrew and Feed Rod End Bearings		Mobil Vactra Oil Heavy Medium	Each shift.
17	Linkage		Mobil Vactra Oil Heavy Medium	Each shift.
18	Main Drive Motor		Mobilux Grease No. 2	Twice monthly or every 100 hours of operation when motor has unsealed bearings. Yearly on motors with sealed bearings. Use caution to prevent blowout of seals.
19	Pulley Sheave Bearings	M	Mobilgrease BRB Lifetime	Every 6 months.
20	Pulley Sheave Bearings	N & NN	Mobil Vactra Oil Heavy Medium	Check level monthly.
	Misc. Hand-Oiled Points		Mobil Vactra Oil Heavy Medium	Each shift.
	Carriage Power Rapid Traverse	1 Gal.	Mobil D.T.E. Oil Light	Drain every 6 months. Flush and refill. Check oil level weekly.

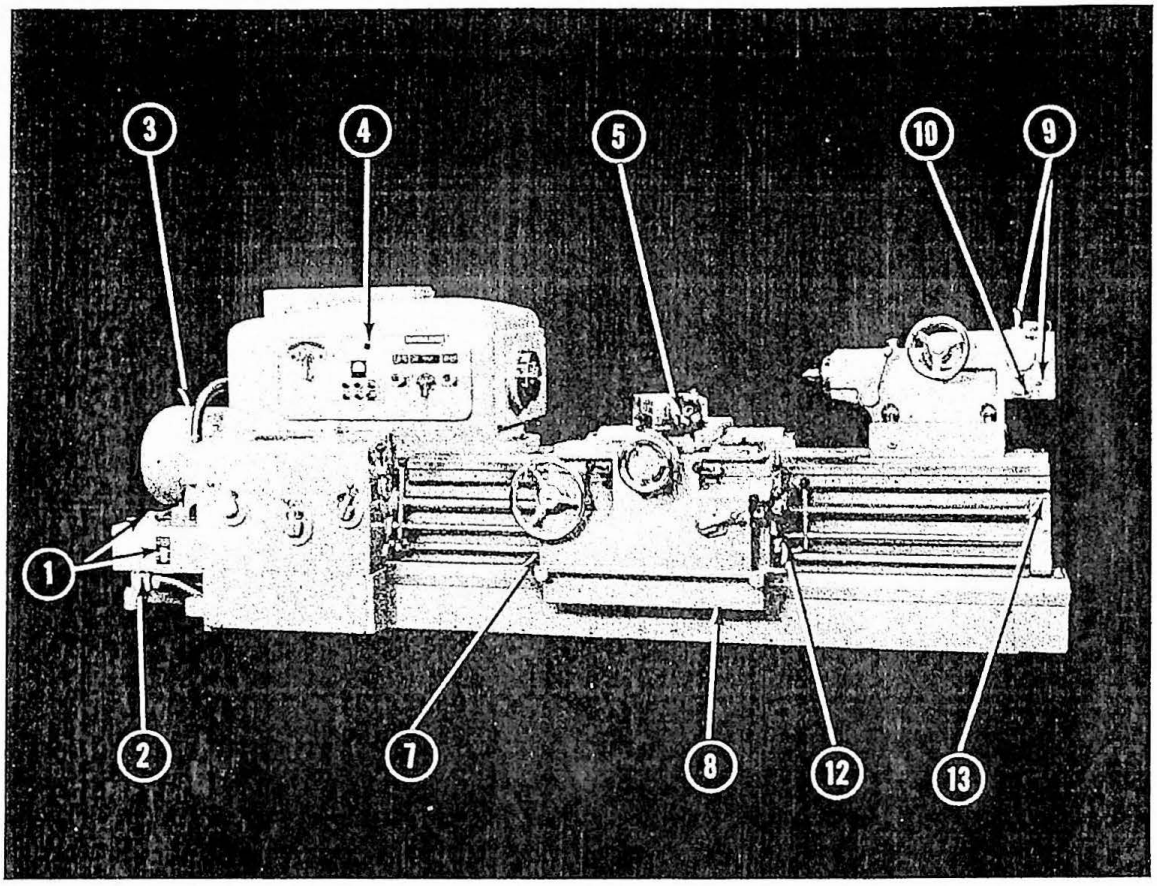


Figure 12. Series 80 Heavy Duty Dyna-Shift Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
1	Hydraulic Power Unit Reservoir Filling Point and Oil Level Gauge (Unit Also Furnishes Oil for Lubrication of Headstock and Gearbox)	18 Gals.	Mobil D.T.E. Oil Light	Check oil level at least twice a week. Drain and clean every 6 months at point (2). Also clean filters.
3	Main Drive Motor		Mobilux Grease No. 2	On motors having grease fittings, grease every 12 months. Use caution to prevent blowout of seals.
4	Viewing Port for Visual Inspection of Headstock Mist Lubrication			Observe mist each shift.
5	Compound Screw Bushing		Mobilux Grease No. 2	Grease monthly.
6	Compound Slide		Special recommendation. See pink tipped-in sheet on page 19.	Oil weekly.
7	Apron Reservoir Filling Point and Oil Level Gauge	3 Qts.	Special recommendation. See pink tipped-in sheet on page 19.	Drain (point 8) and flush twice a year. Check level each shift.

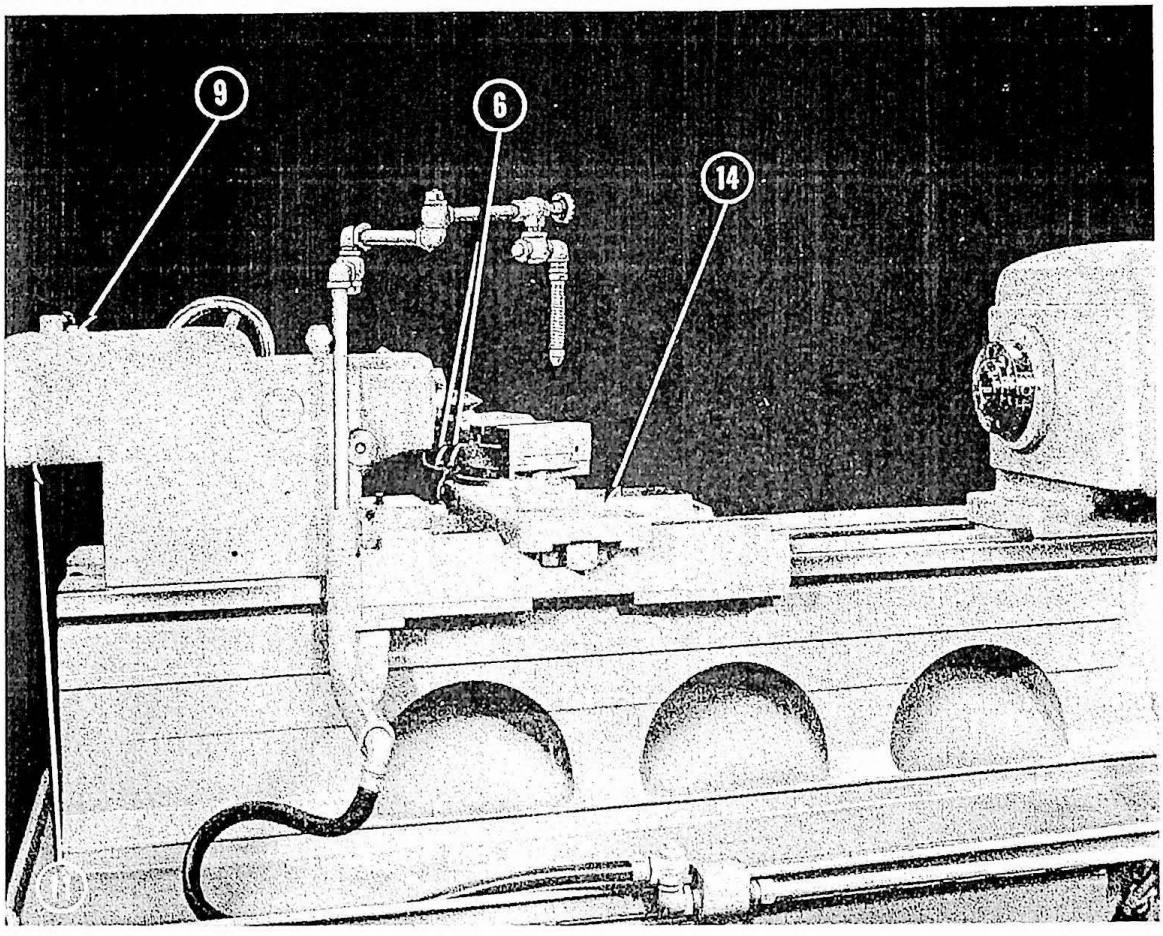


Figure 13. Series 80 Heavy Duty Dyna-Shift Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
9	Tailstock Reservoir Filling Point and Oil Level Gauge	1 Gal.	Mobil D.T.E. Oil Light	Operate one-shot pump (10) once every four hours of operation. Drain (point 11) and flush twice a year. Check oil level each shift.
12	Apron Control Bracket		Mobilux Grease No. 2	Grease monthly.
13	Leadscrew End Bracket		Special recommendation. See pink tipped-in sheet on page 19.	Oil weekly.
14	Cross Feed Screw Nut		Mobilux Grease No. 2	Grease weekly.
	Traveling Rod Supports (Where Used)		Special recommendation. See pink tipped-in sheet on page 19.	Oil weekly.

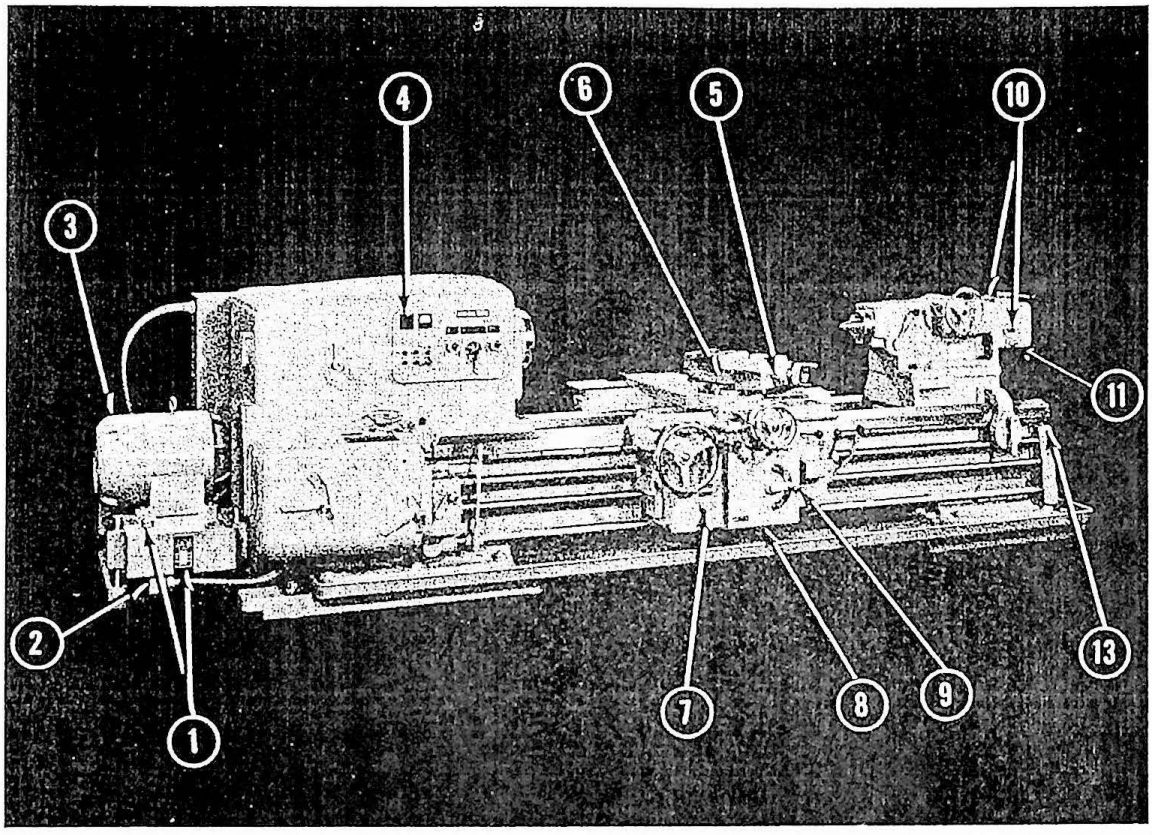


Figure 14. Series 90 Heavy Duty Dyna-Shift Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
1	Hydraulic Power Unit Reservoir Filling Point and Oil Level Gauge (Unit Also Furnishes Oil for Lubrication of Headstock and Gearbox)	18 Gals.	Mobil D.T.E. Oil Light	Check oil level at least twice a week. Drain and clean every 6 months at point (2). Also clean filters.
3	Main Drive Motor		Mobilux Grease No. 2	On motors having grease fittings, grease every 12 months. Use caution to prevent blowout of seals.
4	Viewing Port for Visual Inspection of Headstock Mist Lubrication			Observe mist each shift.
5	Compound Screw Bushing		Mobilux Grease No. 2	Grease monthly.
6	Compound Slide		Special recommendation. See pink tipped-in sheet on page 19.	Oil weekly.
7	Apron Reservoir Filling Point and Oil Level Gauge	3 Qts.	Special recommendation. See pink tipped-in sheet on page 19.	Drain (point 8) and flush twice a year.
9	Apron Reservoir Oil Level Gauge			Check level each shift.

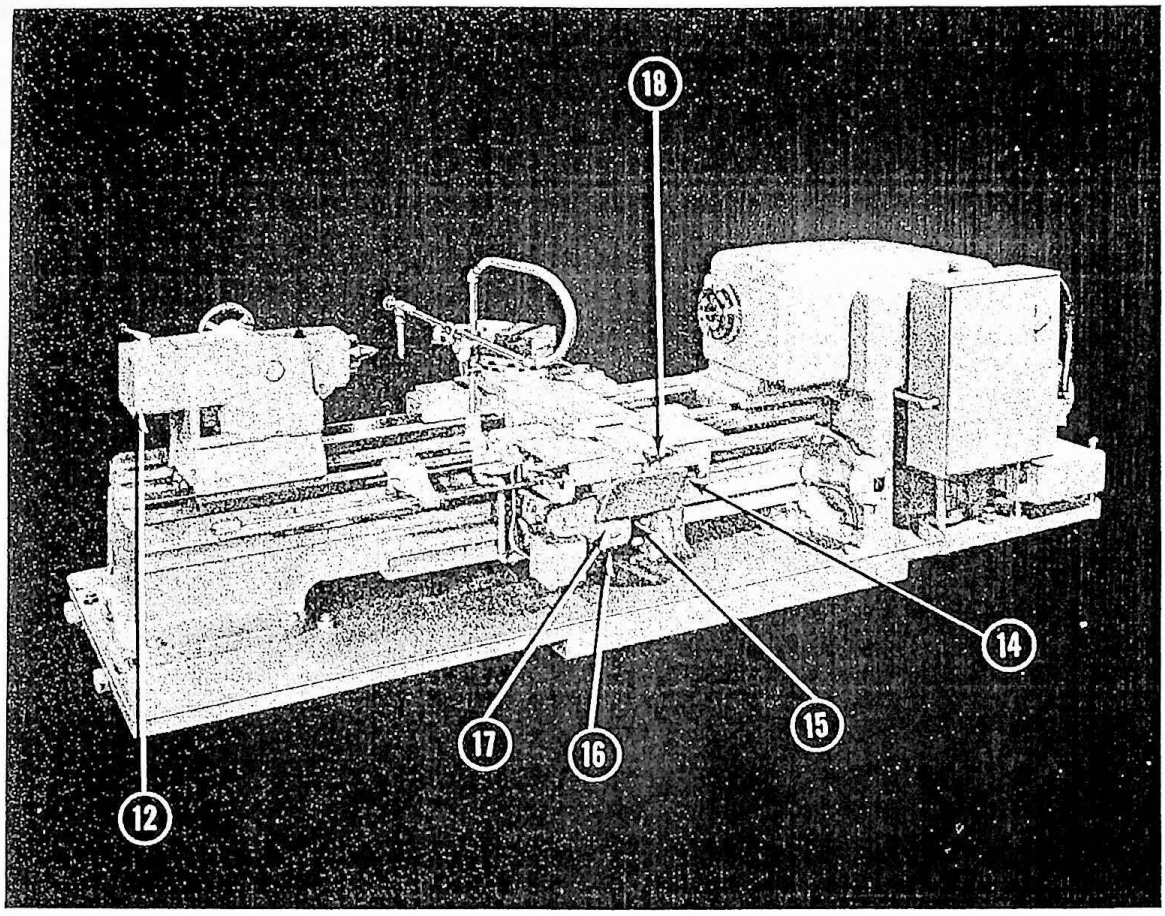


Figure 15. Series 90 Heavy Duty Dyna-Shift Lathe

Reference Number	*Part*	*Capacity*	*Lubricant*	*Schedule*
10	Tailstock Reservoir Filling Point and Oil Level Gauge	6 Qts.	Mobil D.T.E. Oil Light	Operate one-shot pump (11) once every four hours of operation. Drain at (12) and flush twice a year. Check oil level each shift.
14	Traverse Motor		Mobilux Grease No. 2	Grease every 6 months.
15	Carriage Power Rapid Traverse Filling Point	1 Gal.	Mobil D.T.E. Oil Light	Drain (point 16) and flush twice a year.
17	Carriage Power Rapid Traverse Oil Level Gauge			Check level weekly.
18	Taper Attachment		Mobilux Grease No. 2	Grease weekly when in use.
	Traveling Rod Supports (Where Used)		Special recommendation. See pink tipped-in sheet on page 19.	Oil weekly.

THE PROPER LUBRICANT

Quality

False economy is the result of purchasing lubricants on price alone. When you purchase an oil for lubrication purposes, the job is not finished with the purchase; it has just begun. The oil purchased, when applied to the machine must maintain its inherent qualities and properly lubricate all moving parts. Excessive wear, failure of bearings, the formation of sludge, etc. can quickly offset any saving that might have been realized.

Some users may buy lubricants on the basis of physical specifications with price the determining factor in selection. This practice usually represents a false measure of economy and may lead to penalizing performance of the machine itself. The reasons lies in the fact that physical specifications are not a reliable guide to suitability for a given requirement. The readings of an inferior low grade product may closely match those of a superior well refined lubricant.

Because the specifications or a physical description of the oil does not necessarily determine the quality of the oil, we have specified a particular brand in each case which is manufactured by Socony Mobil Oil Company, Inc. These products have world-wide distribution, are of dependable quality and have been found to contain the lubricating qualities desirable for maximum performance of our lathes.

Type

For the headstock and speed reducer a high grade medium bodied machine oil having high resistance to oxidation, or tendencies to form deposits while in service for the specified period, is recommended.

High film strength and freedom from any tendency to corrode are primary requirements of an oil to lubricate the rapid traverse box, apron and ways. The oil should also be able to withstand continued service in a closed system without chemical break-down or formation of a deposit in any quantity for the recommended period between oil changes. To afford ready circulation, the body or viscosity should be of the medium class.

A general purpose grease of high quality suitable for service in ball, roller or plain bearings is suggested for all grease fittings. This grease should have non-caking properties, be stable and non-corrosive under all operating conditions, and have a soft or medium consistency to permit easy handling and application by the grease gun.

The hydraulic oil filling for the accessories should be of high quality, suitably refined to operate efficiently for long periods without excessive wear. Such an oil should have inherent properties as follows:—

1: High chemical stability.
2: Should not vaporize when subjected to sudden changes in pressure.
3: Ability to quickly release entrapped air without tendency to foam.
4: Complete resistance to formation of deposit or sludge due to chemical break-down.
5: Remain sufficiently fluid at lower temperatures to assure good operation and not lose body at higher temperatures to assure proper lubrication and sealing.
6: Possess the ability to separate from water readily.

Monarch
TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

Service Instructions

For systems with lubricator type "G——"

BIJUR automatic lubricating system

Your machine is protected by a built-in Bijur central lubricating system —by CORRECT lubrication of all bearings served, it assures smooth operation of your machine for years, if properly maintained.

The Bijur system consists of three basic elements: (1) a **lubricator** (pump) which periodically forces a measured volume of oil into (2) a single **line of distribution tubing** branched to supply oil to the bearing surfaces through (3) **Meter-Units** which proportion the correct oil film to each bearing.

OIL: Use only non-compounded clean mineral oil of type and viscosity recommended by machine manufacturer.

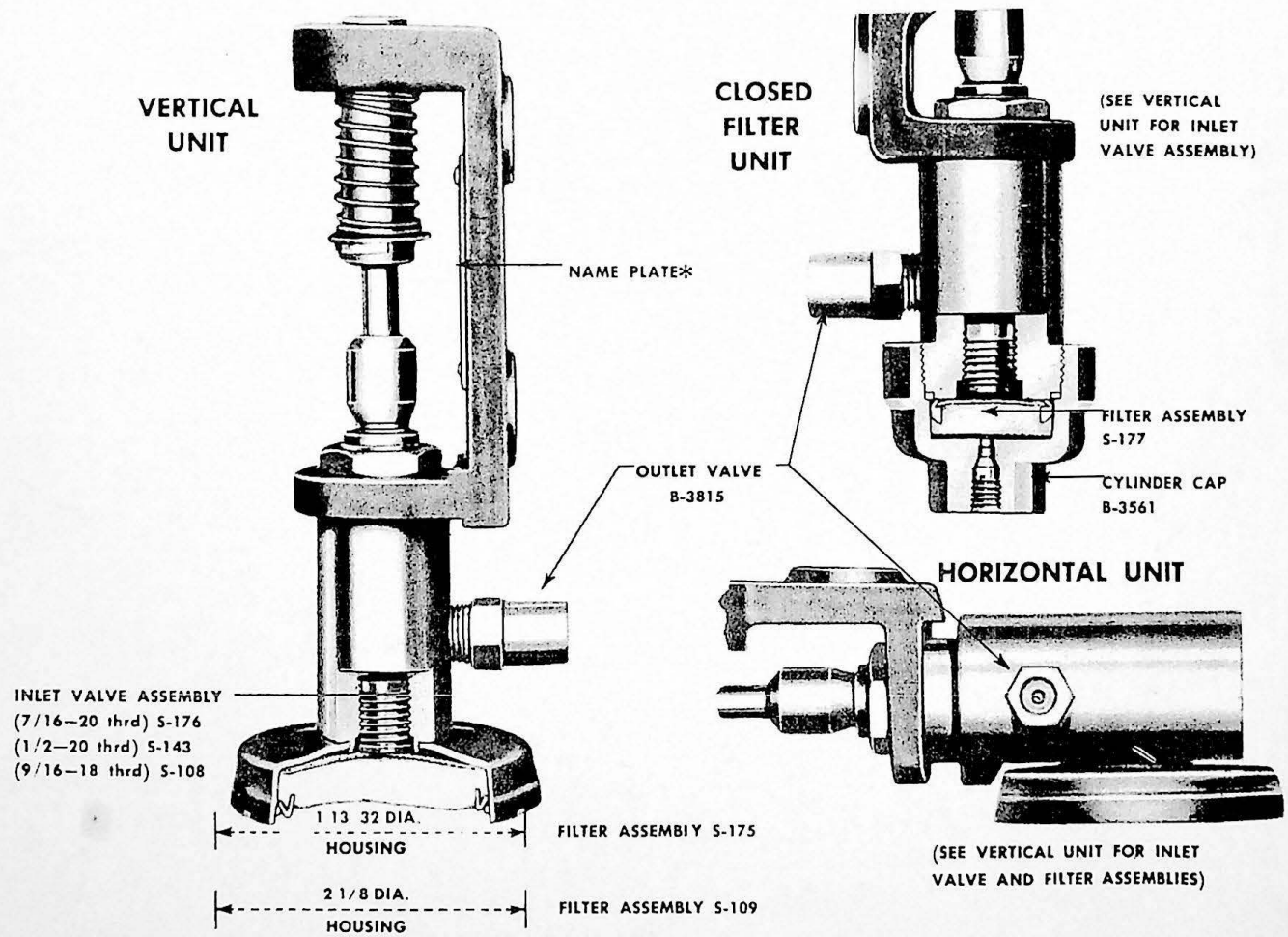
OPERATION: This fully automatic lubricating system is pre-set by the machine manufacturer for best operation. Lubricator Type G is a piston pump mounted in a reservoir or sump in the machine, and actuated by a moving machine element. Oil volume is determined by the original pump setting and is not adjustable; discharge frequency is determined by operation of the machine.

STARTING A NEW MACHINE: Fill reservoir with oil recommended by manufacturer.

MAINTENANCE: Check oil level daily and refill reservoir when required. **Replace filter assembly annually.** Check system periodically for loose or broken tubing, worn hoses, loose fittings and connections.

SERVICE: Too little oil at **all bearings**—check for low oil level, broken or cracked tubes, loose connections, flattened lubricator outlet tube, or clogged filter. For **too little** or **too much** oil at **one bearing** see other side.

SERVICE PARTS: Order by **Part Number** and **Name** shown below—if provided with Name Plate*, also specify lubricator **Type** symbol and **Serial** letters. Example: "S-109 Filter Assembly for Lubricator Type GBF Ser. LF." For major repairs requiring parts not numbered below, return lubricator for factory rebuilding and adjustment. If a new lubricator is required for replacement, order by **Type** symbol and **Serial** letters if provided with Name Plate*; if Name Plate is not provided, return lubricator and specify type of machine on which used. Prompt shipment can be made on parts and lubricators.



IMPORTANT: REPLACE FILTER ASSEMBLY ONCE A YEAR

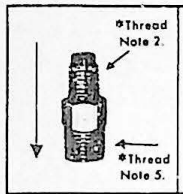
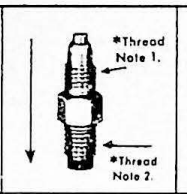
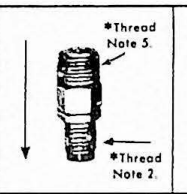
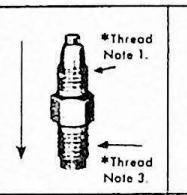
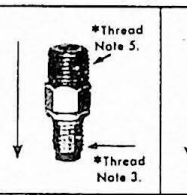
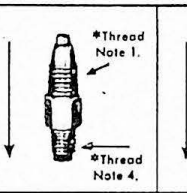
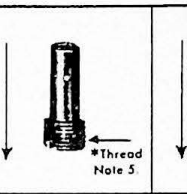
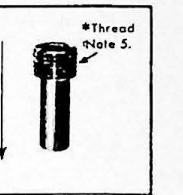
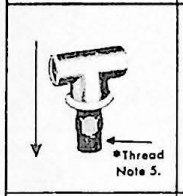
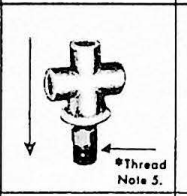
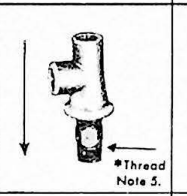
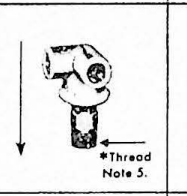
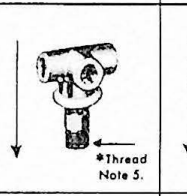
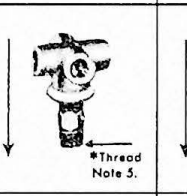
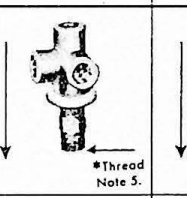
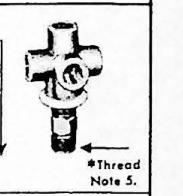
Service Instructions • BIJUR Automatic Lubricating System

SERVICE *(Meter-Units)*

If **one bearing** receives **too much oil**, remove Meter-Unit and replace with one of same type but next **lower** Flow Rate Number. For **too little oil at one bearing**, replace Meter-Unit with one of same Type but next **higher** Flow Rate Number. Each increase in Flow Rate Number **doubles** oil feed. Don't attempt to adjust, disassemble, blow through or drill out Meter-Units.

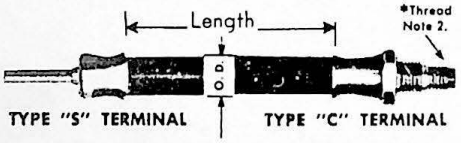
SERVICE PARTS *(Meter-Units)*

Order by **Name, Type** and **Flow Rate Number.** Example: "Meter-Unit FSA-O". Note carefully:—**F and M types are different,** even though they look alike, and they **are not interchangeable.** Type (FJD, MTK, etc.), Flow Rate Number (00, 0, 1, 2, 3, 4 or 5) and flow direction arrow are stamped on body of each Meter-Unit. All types are illustrated below (arrows show flow direction). See "*Thread Notes" at bottom of page.

							
FSA or MSA	FJB or MJB	FRA or MRA	FJC or MJC	FRC or MRC	FJD	FKA or MKA	FKB or MKB
							
FTA or MTA	FTB or MTB	FTC or MTC	FTD or MTD	FTG or MTG	FTH or MTH	FTK or MTK	FTL or MTL

SERVICE PARTS *(Distribution System)*

FLEXIBLE HOSE—Available with 5/32 tube terminals both ends (Type SS), 5/16-24 thread both ends (Type CC), or one of each (Type SC). Measure flexible length between terminals, and order from table below. Specify **Name** and **Part No.** Example: "Flexible Hose, B-4863."



LENGTH (INCHES)	Type SS		Type CC	Type SC
	5 16"O.D.	7 16"O.D.	7 16"O.D.	7 16"O.D.
4	B-4514	—	—	—
5	B-4515	B-2962	B-4873	B-4857
6	B-4516	B-3134	B-4874	B-4858
7	B-4517	B-2963	B-4875	B-4859
8	B-4518	B-3433	B-4876	B-4860
9	B-4519	B-2542	B-4877	B-4861
10	B-4520	B-3145	B-4878	B-4862
12	B-4588	B-3135	B-4879	B-4863
14	B-4589	B-3530	B-4880	B-4864
16	—	B-3531	B-4881	B-4865
18	—	B-3137	B-4882	B-4866
20	—	B-3532	B-4883	B-4867
22	—	B-3528	B-4884	B-4868
24	—	B-3508	B-4885	B-4869
27	—	B-3533	B-4886	B-4870
30	—	B-3534	B-4887	B-4871
33	—	B-3735	B-4888	B-4872

TUBING—Available in 12 foot lengths **only.** Check outside diameter, material and wall thickness. Order by **Name** and **Part No.** Example: "Tubing, 5B25."

	5/32" O.D.				3/32" O.D.	
MATERIAL	Brass	Copper	Copper	Steel	Copper	Steel
WALL	.025	.025	.055	.020	.022	.020
PART NO.	5B25	5C25	5C55	5S20	3C22	3S20

COMPRESSION FITTINGS—Check tubing O.D. and thread and hex on nuts and bushings. See "thread notes" at bottom of page. Sleeves of proper tubing size are required for all connections. Order by **Name** and **Part No.** Example: "Bushing, B-3783."

Item	Tube O.D.	Hex	See *Thread Note	Part No.
NUT	5/32	3/8	2	B-1095
	3/32	3/8	3	B-3312
	3/32	5/16	4	B-3610
BUSHING	5/32	3/8	2	B-1371
	5/32	5/16	2	B-3783
SLEEVE	5/32	—	—	B-1061
	3/32	—	—	B-3313

JUNCTIONS — Check number of tapped holes —identify in tables from illustrations and number of **mounting** holes (untapped). All **"One Mounting Hole"** types shown. Typical examples of **"Two Mounting Holes"** types — both "Single" and "Double" are shown. Order by **Name** and **Part No.** Example: "Junction, B-3264."

JUNCTION One Mounting Hole				
TYPE	2-Way	3-Way	3-Way	4-Way
PART NO.	B-3288	B-3065	B-1092	B-4231

	TYPE	SINGLE	DOUBLE
JUNCTION Two Mounting Holes	4-Way	B-3262	—
	5-Way	B-3263	—
	6-Way	B-3264	B-3109
	7-Way	B-3289	—
	8-Way	B-3265	B-3253
	9-Way	B-4508	—
	10-Way	B-3704	B-3254
	12-Way	B-3471	B-3249
	14-Way	—	B-4020
	16-Way	—	B-4025


JUNCTION 6-Way Single


JUNCTION 10-Way Double

***THREAD NOTES**—All unnumbered tapped holes 5/16-24 Bijur standard.

1 5/16-24 for Bijur tapped holes only,
2 5/16-24 for 5/32 tubing connections,
3 5/16-24 for 3/32 tubing connections,
4 1/4-28 for 3/32 tubing connections,
5 1/8 pipe thread.

DESCRIPTION of ASSEMBLIES, ADJUSTMENTS, and PARTS CATALOGUE

This part of the manuel covers the construction of the machine, and the adjustments that may be made on each unit. With this description are photographs showing the parts of which each unit is constructed. These have been arranged in the same relative position, when possible, as they appear in the construction of the machine.

INSTRUCTION FOR ORDERING PARTS

An identification plate like this is on each Monarch Lathe.

When ordering parts there are five points of information that must be sent. These are as follows:

1. The amount of pieces required.
2. The name of the part.
3. The number of the part.
4. The parts sheet number.
5. The lathe serial number.

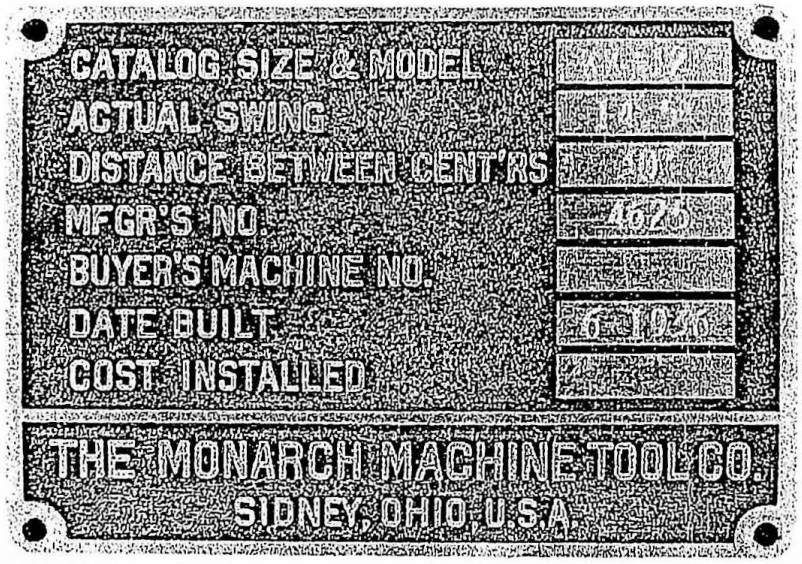
This information must be sent in order for the part to be correctly identified. The parts sheet number is the number of the sheet, on which the parts photograph appears.

Example of how to order a part.

SEND ONE BRAKE ROD, PART NUMBER 1, PARTS SHEET NUMBER 3, LATHE SERIAL NUMBER 4625.

Note: Use the serial number on the identification plate on the lathe.)

If the information is sent in this manner prompt service can be rendered on the delivery of the part desired. Otherwise it will have to be delayed, until the information is obtained.



An Identification Plate Like This is On Each Monarch Lathe

MOTOR MOUNTING AND DRIVING CLUTCH

Most motors are mounted in the housing under the headstock. This photograph illustrates the parts used in that type of mounting. On page 5 of the "Accessories Bulletin" are shown a rear leg vertical mounting, and a motor mounted on top of the headstock. A rear leg horizontal mounting is shown on page 6, of the same bulletin. The mountings are all very similar except for their location on the lathe.

ADJUSTMENTS

Motor drive

The motor V belts are adjusted by shifting the position of the motor. This is done by removing the plate on the front of the housing under the headstock, and shifting the position of the nuts, No. 20, on the eye-bolt, No. 18, which is attached to the front of the motor base, No. 16. Do not keep the belts too tight. After making the adjustment, securely tighten the nuts on the eye-bolt.

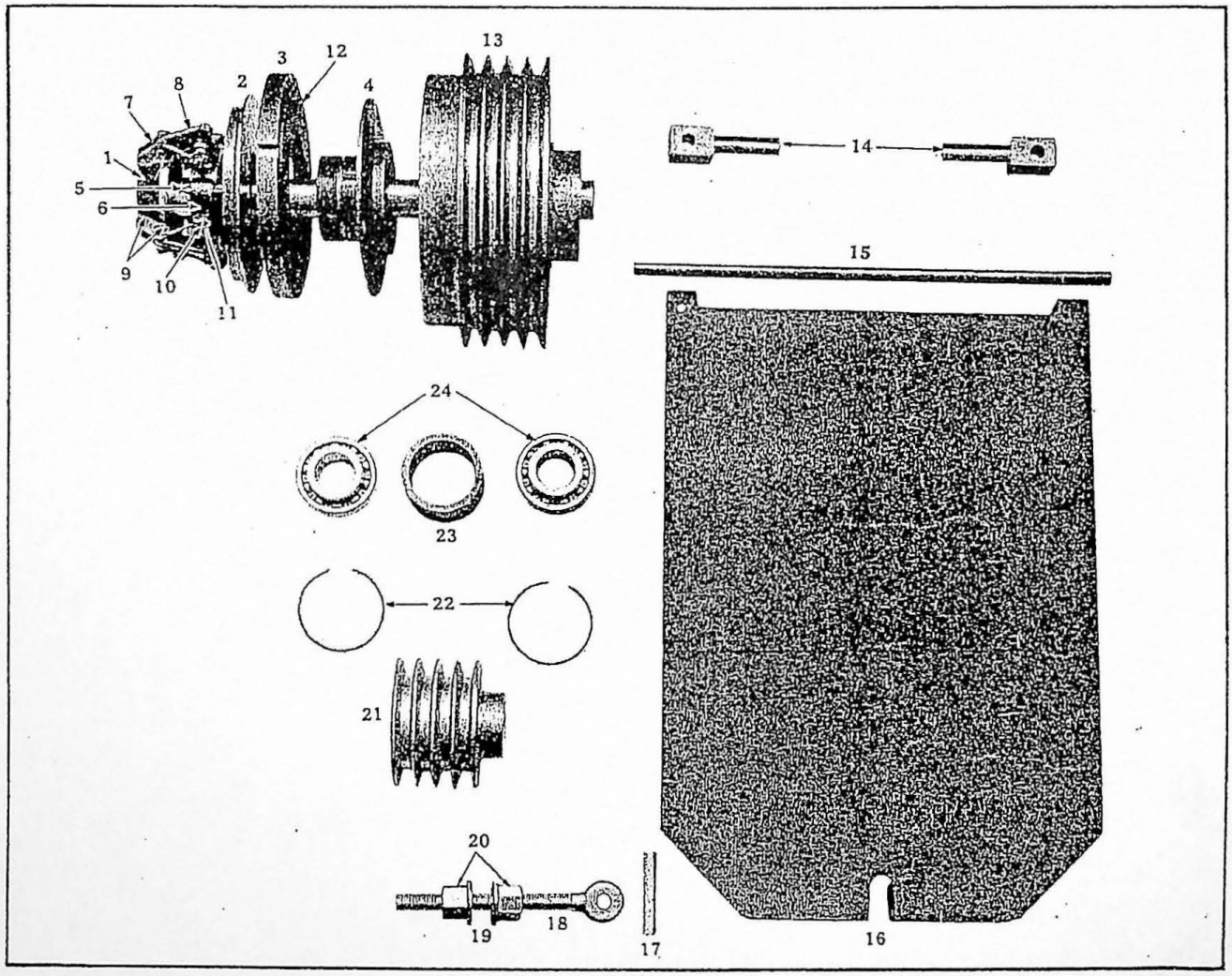
Driving clutch

The driving clutch is adjusted by withdrawing the adjustment lock pin, No. 5, and turning the adjusting yoke, No. 6, "in", to tighten, "out," to loosen. One notch is usually all the adjustment requires. After making the adjustment, be sure the locknut on the end is securely tightened.

Sticking clutch

Excessive lubrication causes grease to be thrown on the composition discs No. 12, of the driving clutch, causing it to stick or drag. To eliminate this trouble remove the disc and clean the faces.

WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEET NUMBER, AND LATHE SERIAL



MOTOR MOUNTING and DRIVING CLUTCH PARTS LIST

1. Sliding sleeve.
2. Floating plate.
3. Driving plate.
4. Hub and back plate.
5. Adjustment lock pin.
6. Adjusting yoke.
7. Lever link.
8. Lever.
9. Lever link pin.
10. Lever spring.
11. Lever pin.
12. Friction disc.
13. Disc clutch sheave.
14. Motor base hinge.
15. Motor base shaft.
16. Motor base.
17. Motor base adjustment stud.
18. Motor base adjustment screw.
19. Washer.
20. Nut.
21. Motor sheave.
22. Spring collar.
23. Sheave bearing spacer.
24. Sheave bearing.

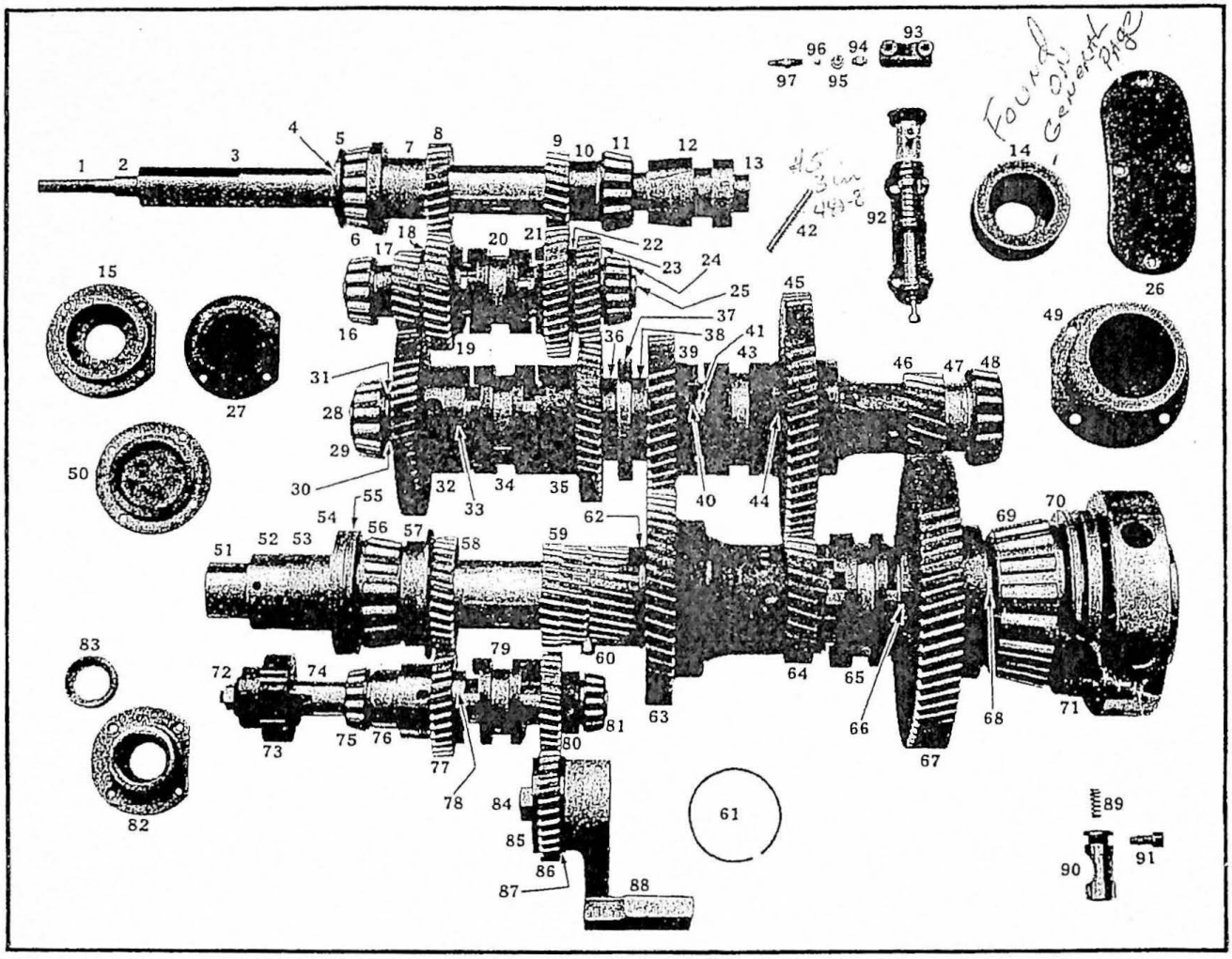
HEADSTOCK

This photograph shows the shafts in the headstock and the parts mounted on them. The headstock levers assembly is shown on the other side of this page. On page 11, of the, "Features Bulletin" is a picture of an assembled headstock, showing clearly the construction.

SPINDLE ADJUSTMENT

To take up on the spindle bearings tighten the spindle nuts, No. 52. Adjust tight enough to remove all play and yet not tight enough to heat at ordinary spindle speeds.

WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEET NUMBER, AND LATHE SERIAL

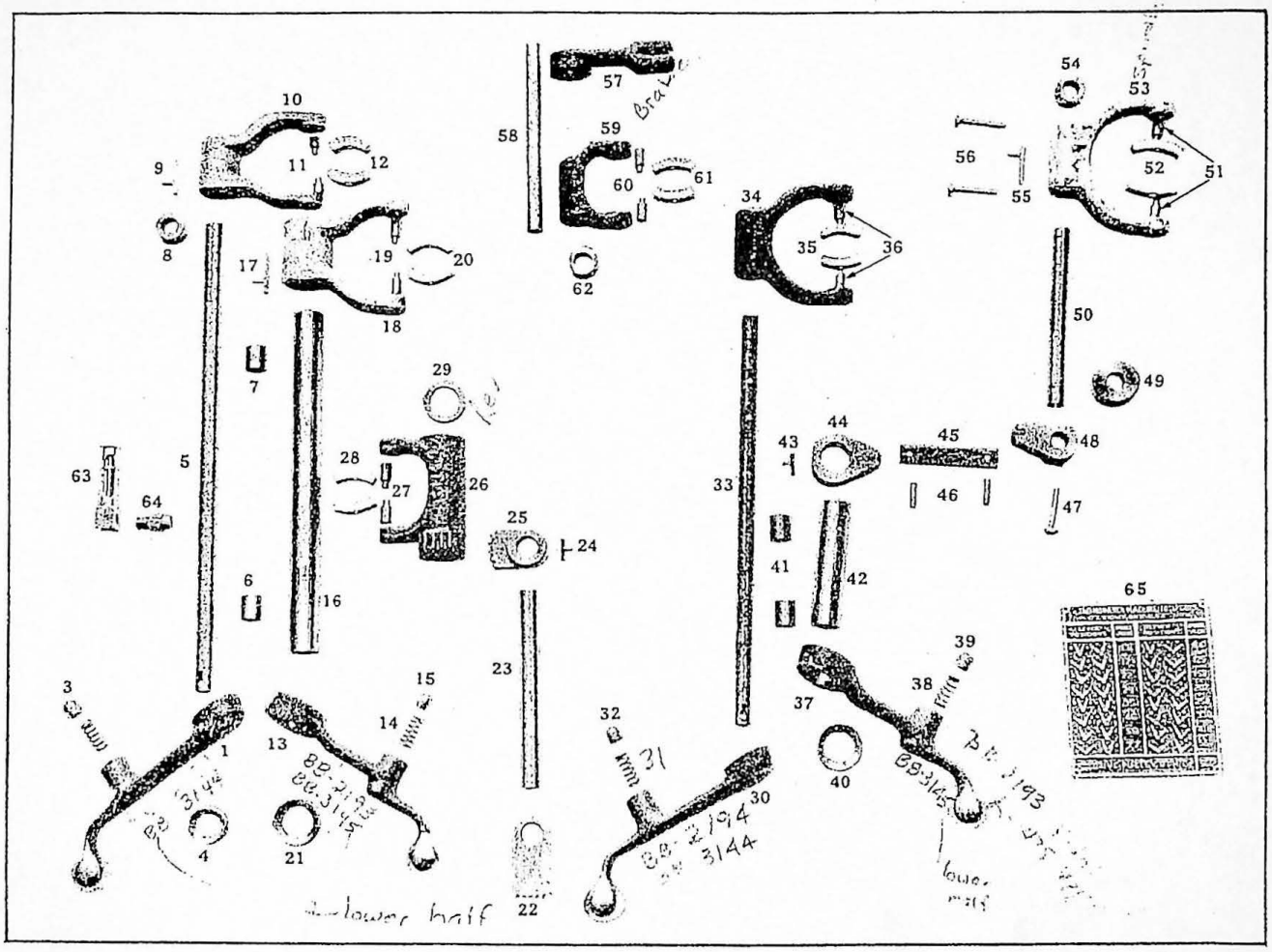


HEADSTOCK PARTS LIST

1. Brake rod.
2. Pulley shaft bushing.
3. Pulley shaft.
4. Pulley shaft lock collar.
5. Pulley shaft oil deflector.
6. Timken bearing.
7. Pulley shaft spacer.
8. Pulley shaft gear, L. H.
9. Pulley shaft gear, R. H.
10. Pulley shaft gear spacer.
11. Timken bearing.
12. Brake cone.
13. Brake cone plug.
14. Brake.
15. Pulley shaft cap, L. H.
16. Timken bearing.
17. Short intermediate shaft drive gear, L. H.
18. Gear spacer.
19. Short intermediate shaft clutch gear, L. H.
20. Short intermediate shaft clutch.
21. Short intermediate shaft clutch gear, R. H.
22. Gear spacer.
23. Short intermediate shaft drive gear, R. H.
24. Timken bearing.
25. Short intermediate shaft.
26. Short intermediate and pulley shaft plate.
27. Short intermediate shaft bearing cap.
28. Long intermediate shaft.
29. Timken bearing.
30. Thrust collar.
31. Gear spacer.
32. Long intermediate shaft gear, No. 1.
33. Clutch gear ring.
34. Long intermediate shaft clutch, L. H.
35. Long intermediate shaft gear, No. 2.
36. Bearing spacer.
37. Radial thrust bearing.
38. Center bearing sleeve.
39. Long intermediate shaft gear, No. 3.
40. Clutch gear spacer.
41. Thrust collar.
42. Thrust Collar pin.
43. Long intermediate shaft clutch, R. H.
44. Gear spacer.
45. Large back gear.
46. Small back gear.
47. Bearing spacer.
48. Timken bearing.
49. Front intermediate shaft cap.
50. Long intermediate shaft cap, L. H.
51. Spindle.
52. Spindle nut.
53. Spindle spacing collar.
54. Rear oil ring.
55. Rear oil deflector ring.
56. Timken bearing.
57. Inside oil deflector.
58. Large reverse gear.
59. Small reverse gear.
60. Reverse gear pin.
61. Collar ring.
62. Spindle drive gear spacer.
63. Large spindle drive gear.
64. Small spindle drive gear.
65. Spindle clutch.
66. Bull gear ring.
67. Bull gear.
68. Bull gear spacer.
69. Timken bearing.
70. Front oil throw plate.
71. Front oil deflector.
72. Washer.
73. Reverse shaft gear.
74. Reverse shaft.
75. Timken bearing.
76. Reverse shaft spacer.
77. Large reverse clutch gear.
78. Clutch gear ring.
79. Reverse clutch.
80. Small reverse clutch gear.
81. Timken bearing.
82. Reverse shaft cap.
83. Reverse shaft packing gland.
84. Reverse idler gear stud.
85. Reverse idler gear washer.
86. Reverse idler gear.
87. Spacer.
88. Reverse shaft support.
89. Cam spring.
90. Cam.
91. Cam screw.
92. Bijur pump.
93. Oil header.
94. Oil nut.
95. Oil bushing.
96. Oil sleeve.
97. Metering pin.

HEADSTOCK LEVERS

WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEET NUMBER, AND LATHE SERIAL



HEADSTOCK LEVERS PARTS LIST

1. Clutch shifter shaft lever.
2. Plunger spring.
3. Plunger plug.
4. Clutch tube packing nut.
5. Clutch shifter shaft.
6. Clutch shifter tube bushing.
7. Clutch shifter tube bushing.
8. Fork collar.
9. Tit key.
10. Short intermediate shaft fork.
11. Clutch shoe pin.
12. Clutch shifter shoe.
13. Clutch shifter tube lever.
14. Plunger spring.
15. Plunger plug.
16. Clutch tube.
17. Tit key.
18. Long intermediate shaft fork, L. H.
19. Clutch shoe pin.
20. Clutch shifter shoe.
21. Packing nut.
22. Outside reverse segment.
23. Reverse clutch shifter shaft.
24. Tit key.
25. Inside reverse segment.
26. Reverse shifter fork.
27. Clutch shoe pin.
28. Clutch shifter shoe.
29. Fork collar.
30. Clutch shifter shaft lever.
31. Plunger spring.
32. Plunger plug.
33. Clutch shifter shaft.
34. Long intermediate shaft fork, R. H.
35. Clutch shifter shoe.
36. Clutch shoe pin.
37. Clutch shifter tube lever.
38. Plunger spring.
39. Plunger plug.
40. Packing nut.
41. Clutch shifter tube bushing.
42. Clutch shifter tube.
43. Tit key.
44. Clutch shifter link.
45. Link connecting bar.
46. Shifter link pin.
47. Segment pin.
48. Clutch shifter link.
49. Collar.
50. Clutch shifter shaft.
51. Clutch shoe pin.
52. Clutch shifter shoe.
53. Spindle fork.
54. Collar.
55. Tit key.
56. Segment pin.
57. Upper control link.
58. Clutch shifter shaft.
59. Brake cone shifter fork.
60. Clutch shoe pin.
61. Clutch shifter shoe.
62. Collar.
63. Oil gauge.
64. Oil gauge nipple.
65. Spindle speed index plate.

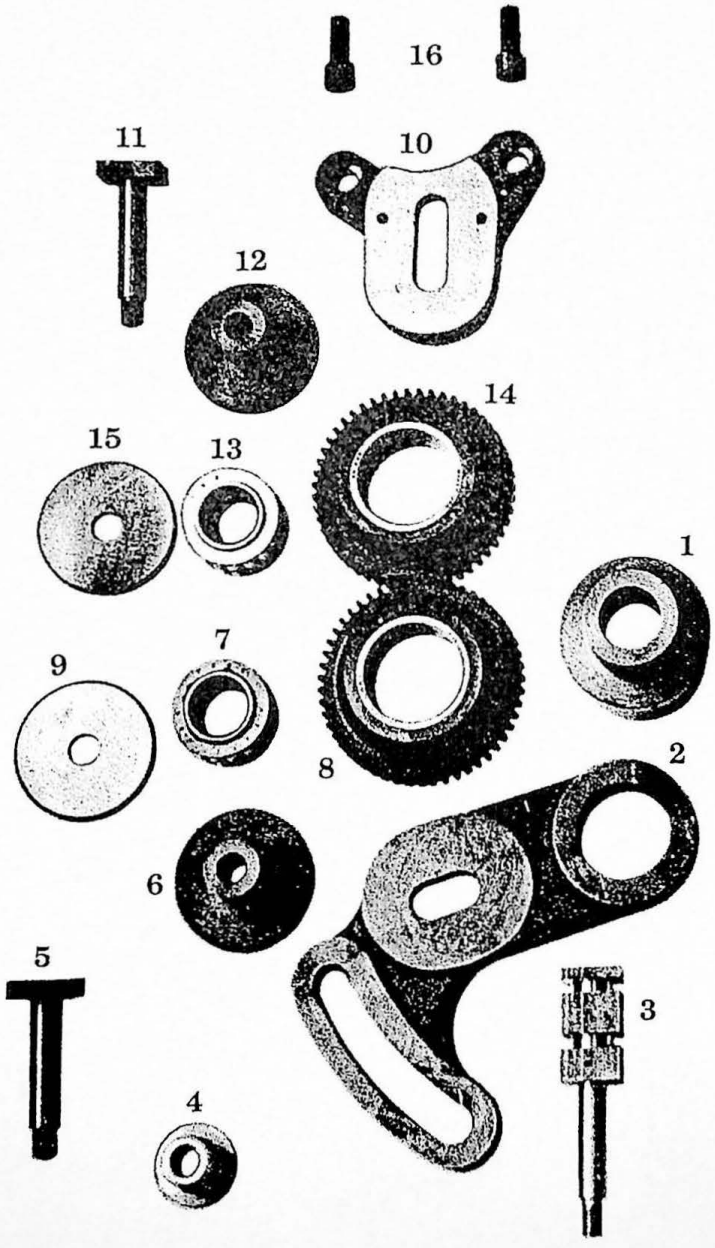
END GEAR TRAIN

This photograph shows each part of the end gear train. Figure 40, on page 22, of the "Features Bulletin," shows exactly the manner in which the end gearing is mounted on the lathe.

ADJUSTMENT

The end gearing is adjusted by loosening the nut on the babbitt stud, No. 3, and the nuts on the quadrant gear bolts, Nos. 5 and 11. After correctly positioning the gears, so there is about .003" space between the teeth, securely tighten the nuts.

WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEET NUMBER, AND LATHE SERIAL



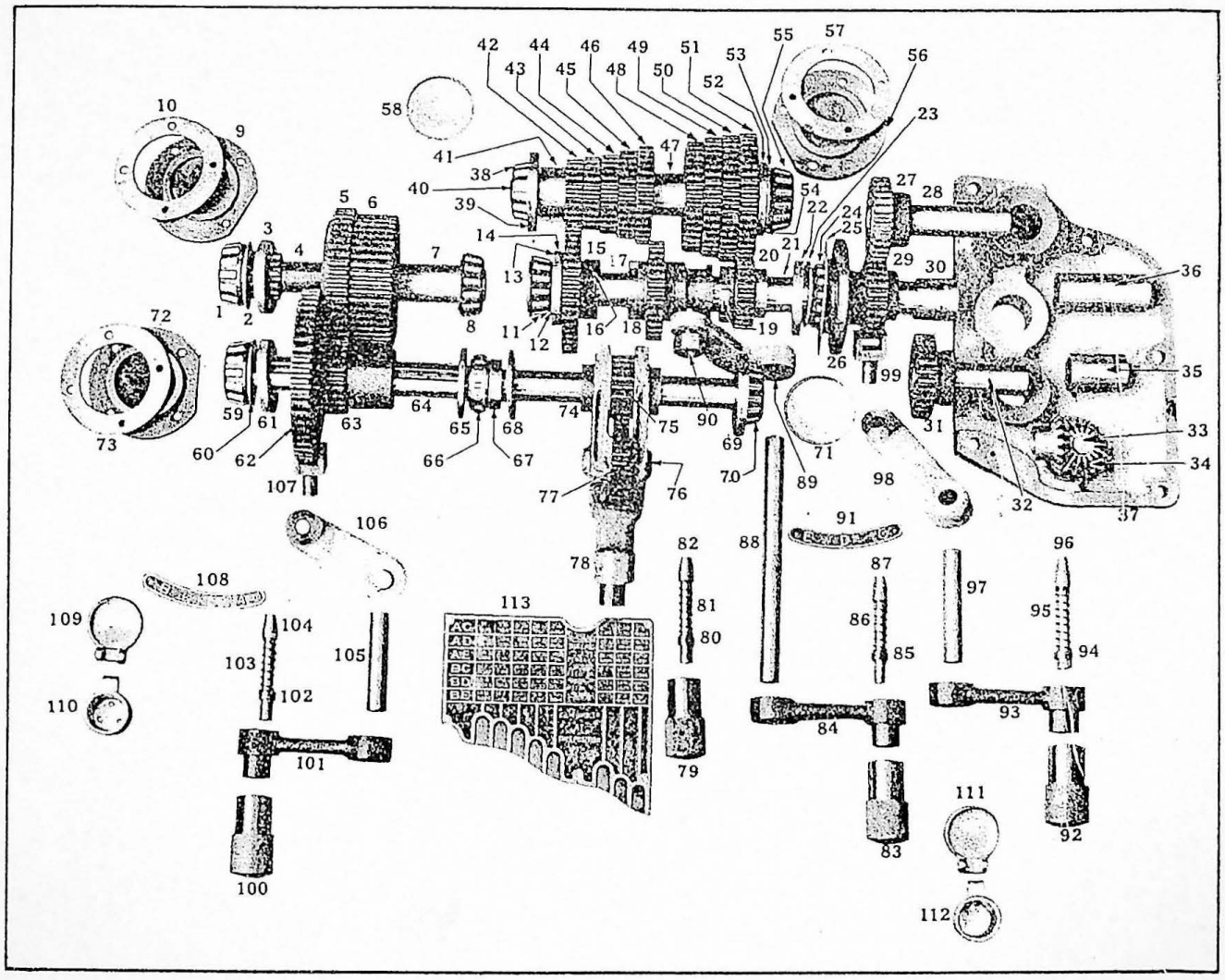
End Gear Train Parts List

1. Quadrant bushing.
2. Quadrant.
3. Babbitt stud.
4. Babbitt stud washer.
5. Quadrant gear bolt.
6. Quadrant gear bushing.
7. Roller bearing.
8. Quadrant gear.
9. Washer.
10. Quadrant gear bracket.
11. Quadrant gear bolt.
12. Quadrant gear bushing.
13. Roller bearing.
14. Quadrant gear.
15. Washer.
16. Gear bracket bolts.

GEARBOX

The gearbox is located on the front of the lathe under the headstock. Its purpose is to provide changes in the speed of rotation of the leadscrew and feedrod, which is accomplished by sliding gears and clutches. The photograph on page 25 of the "Features Bulletin" clearly shows the construction of the gearbox, as well as the headstock and apron.

WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEET NUMBER, AND LATHE SERIAL



GEARBOX PARTS LIST

1. Timken bearing.
2. Straight deflector
3. Cup deflector.
4. Compound shaft and pinion.
5. Compound gear.
6. Compound gear.
7. Spacer.
8. Timken bearing.
9. Bearing cap.
10. Shim.
11. Timken bearing.
12. Bearing spacer.
13. Straight deflector.
14. Cup deflector.
15. Large clutch gear.
16. Clutch gear ring.
17. Clutch shaft.
18. Sliding clutch gear.
19. Clutch gear ring.
20. Small clutch gear.
21. Bearing spacer.
22. Cup deflector.
23. Straight deflector.
24. Timken bearing.
25. Shim.
26. Bearing cap.
27. Leadscrew gear.
28. Leadscrew.
29. Slip gear.
30. Clutch shaft bushing.
31. Feedrod gear.
32. Feedrod.
33. Gearbox control lever stem.
34. Miter gear.
35. Feedrod bushing.
36. Leadscrew bushing.
37. Leadscrew and feedrod support.
38. Timken bearing.
39. Cup deflector.
40. Cone shaft.
41. Spacer.
42. First cone gear.
43. Second cone gear.
44. Third cone gear.
45. Fourth cone gear.
46. Fifth cone gear.
47. Cone gear spacer.
48. Sixth cone gear.
49. Seventh cone gear.
50. Eighth cone gear.
51. Ninth cone gear.
52. Cup deflector.
53. Straight deflector.
54. Bearing spacer.
55. Timken bearing.
56. Bearing cap.
57. Shim.
58. Cup deflector.
59. Timken bearing.
60. Straight deflector.
61. Cup deflector.
62. Large compound gear.
63. Small compound gear.
64. Tumbler shaft.
65. Cup deflector.
66. Radial thrust bearing.
67. Bearing spacer.
68. Cup deflector.
69. Cup deflector.
70. Timken bearing.
71. Cup deflector.
72. Bearing cap.
73. Shim.
74. Tumbler lever bushing.
75. Tumbler gear.
76. Tumbler idler gear stud.
77. Tumbler idler gear.
78. Tumbler lever.
79. Plunger knob.
80. Plunger pin bushing.
81. Plunger pin spring.
82. Plunger pin.
83. Plunger knob.
84. Shifter lever.
85. Plunger pin bushing.
86. Plunger pin spring.
87. Plunger pin.
88. Clutch lever stem.
89. Clutch lever.
90. Clutch lever pin.
91. Sliding clutch plate.
92. Plunger knob.
93. Shifter lever.
94. Plunger pin bushing.
95. Plunger pin spring.
96. Plunger pin.
97. Slip gear stem.
98. Slip gear lever.
99. Slip gear shoe.
100. Plunger knob.
101. Shifter lever.
102. Plunger pin bushing.
103. Plunger pin spring.
104. Plunger pin.
105. Compound lever stem.
106. Compound lever.
107. Compound gear shoe.
108. Compound plate.
109. Oil plug cap.
110. Oil plug.
111. Oil plug cap.
112. Oil plug.
113. Index plate.

BED PARTS

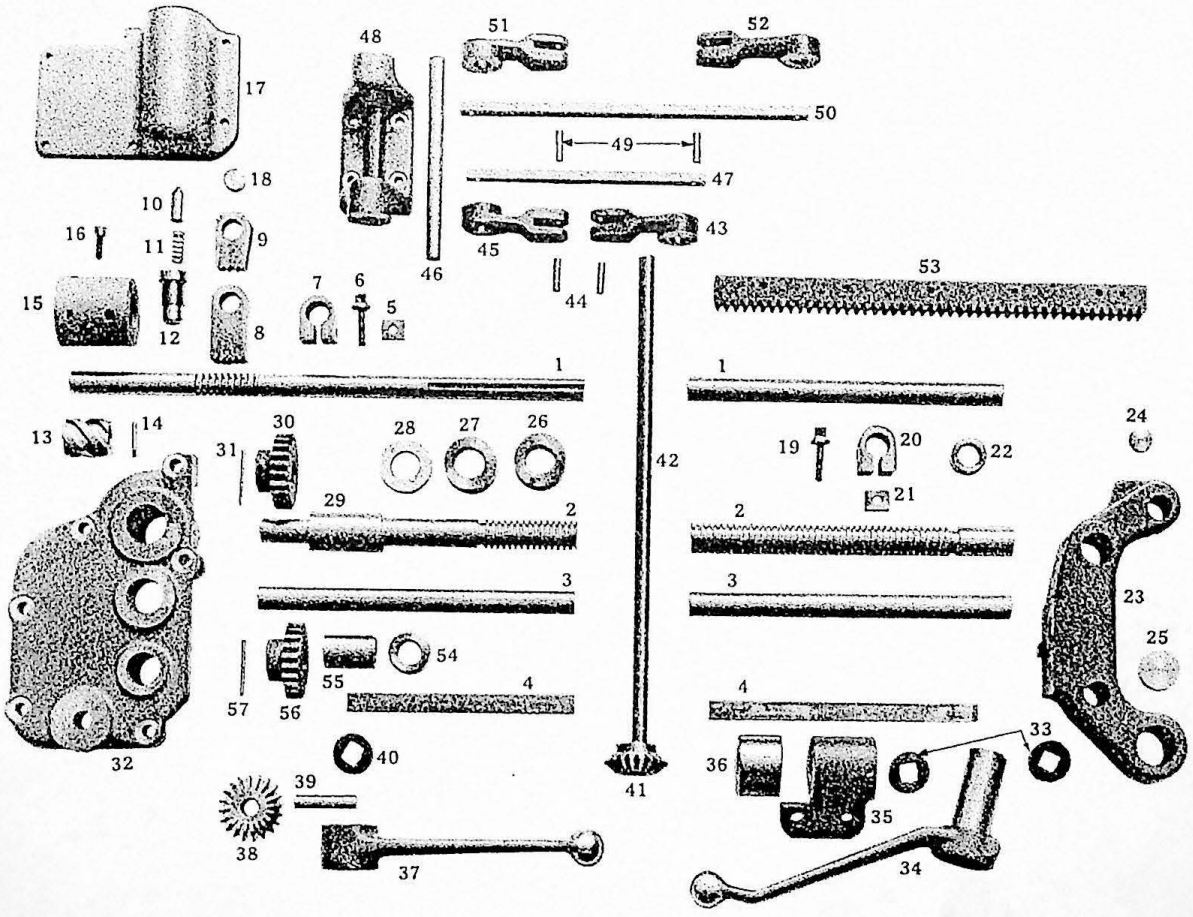
This photograph shows the reverse rod, No. 1, the leadscrew, No. 2, the feedrod, No. 3, the control rod, No. 4, and the parts by which they are mounted on the bed. The complete starting and stopping control mechanism is also shown including the upper control link, which operates the brake cone in the headstock.

ADJUSTMENTS

Leadscrew thrust

The leadscrew thrust is adjusted by tightening the thrustnut, No. 27. After making the adjustment be sure to tighten the locknut, No. 26. The adjustment should be made just tight enough to take up all lost motion.

WHEN ORDERING PARTS SEND THE NAME, PART NUMBER, PARTS SHEET NUMBER, AND THE LATHE SERIAL



BED PARTS LIST

1. Reverse rod.
2. Leadscrew.
3. Feedrod.
4. Control rod.
5. Reverse stop key.
6. Reverse stop bolt.
7. Reverse stop collar.
8. Outside reverse segment.
9. Index sector.
10. Detent plunger.
11. Detent spring.
12. Detent case.
13. Reverse rod worm.
14. Reverse worm pin.
15. Reverse rod worm nut.
16. Set screw.
17. Gearbox cover.
18. Gearbox cover plug.
19. Reverse stop bolt.
20. Reverse stop collar.
21. Reverse stop key.
22. Reverse rod collar.
23. Rear leadscrew box.
24. Oil plug.
25. Oil plug.
26. Leadscrew locknut.
27. Leadscrew thrust nut.
28. Thrust collar
29. Leadscrew bushing.
30. Leadscrew gear.
31. Leadscrew gear pin.
32. Leadscrew and feedrod support.
33. Control rod collar.
34. Apron control lever.
35. Apron control bracket.
36. Lever bushing.
37. Control lever.
38. Miter gear.
39. Miter gear stem.
40. Control rod collar.
41. Miter gear.
42. Cross rod.
43. Control link.
44. Connecting pin.
45. Control link.
46. Head bracket rod.
47. Lower connecting rod.
48. Head bracket.
49. Connecting pin.
50. Upper connecting rod.
51. Control link.
52. Upper control link.
53. Feed rack.
54. Feedrod collar.
55. Feedrod bushing.
56. Feedrod gear.
57. Feedrod gear pin.

APRON

A picture of the apron, assembled, is shown on page 23, figure 42, of the "Features Bulletin." This view will enable one to better understand the parts photograph.

ADJUSTMENTS

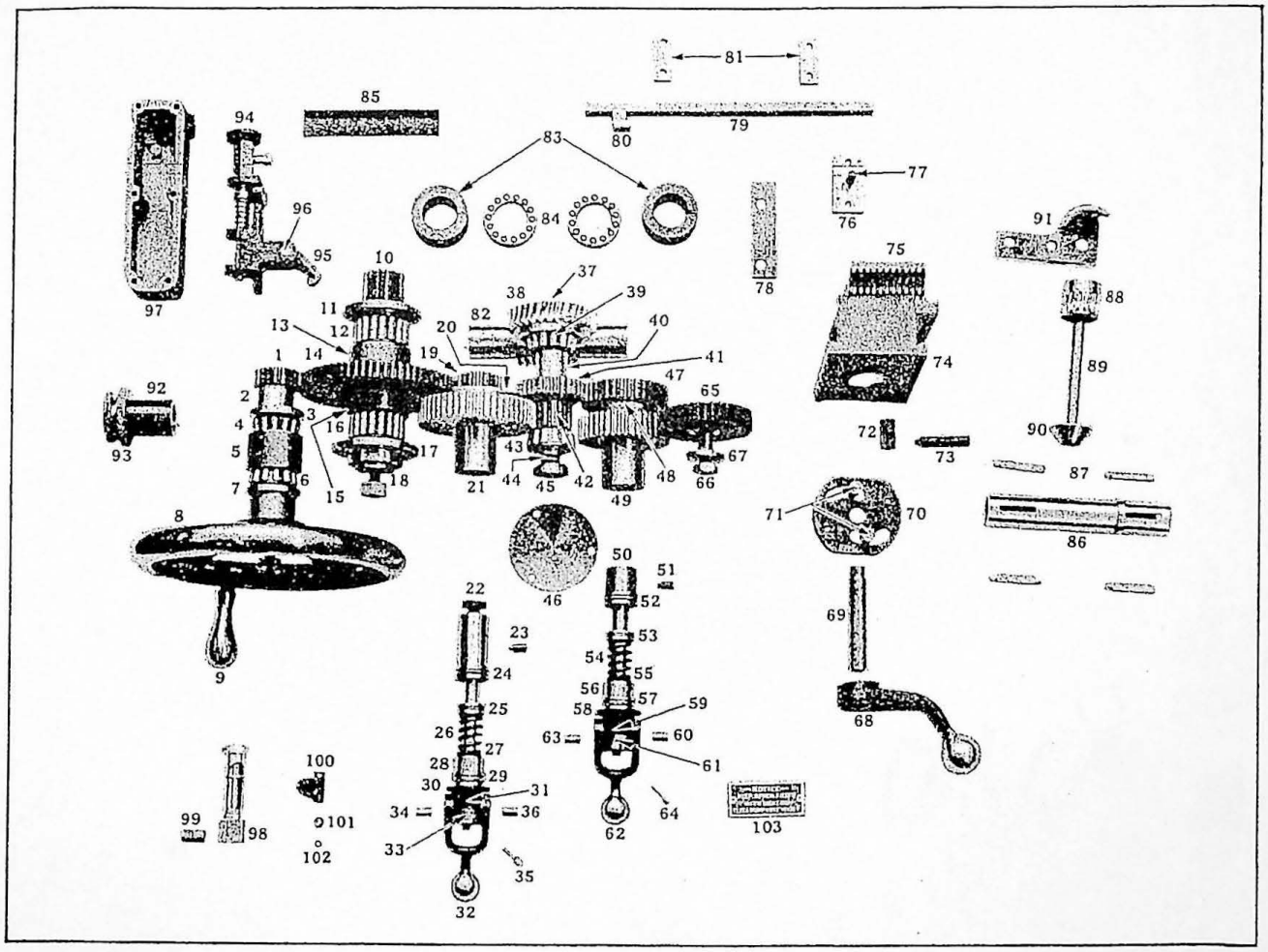
Apron frictions

To adjust the apron frictions remove the locknut pin, Nos. 35 or 64. Turn the friction locknut, Nos. 33 or 61, "In", to tighten, "Out", to loosen. Keep the adjustment tight enough to prevent the discs from slipping. After making the adjustment replace the locknut pin.

Halfnut closure

The halfnut closure is adjusted by the set screw, No. 73. Turning the screw, "Out", permits more closure of the halfnut, turning the screw, "IN", has the opposite effect.

WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEET NUMBER, AND LATHE SERIAL



APRON PARTS LIST

1. Handwheel shaft and pinion.
2. Pump cam.
3. Spacer.
4. Timken bearing.
5. Handwheel bearing spacer.
6. Timken bearing.
7. Spacer.
8. Apron handwheel.
9. Handwheel handle.
10. Rack pinion shaft.
11. Rear rack pinion collar.
12. Roller bearing.
13. Rack gear spacer.
14. Rack gear.
15. Rack gear spacer.
16. Roller bearing.
17. Rack pinion collar.
18. Washer.
19. Longitudinal friction pinion.
20. Longitudinal friction disc.
21. Longitudinal friction gear.
22. Longitudinal friction stem.
23. Friction stem key.
24. Thrust bearing.
25. Spring thrust bearing.
26. Friction spring.
27. Spring washer.
28. Friction stem bushing.
29. Thrust bearing.
30. Cam ring.
31. Friction sleeve.
32. Longitudinal friction knob.
33. Friction locknut.
34. Cam fulcrum pin.
35. Locknut pin.
36. Cam fulcrum pin.
37. Collar.
38. Wormwheel.
39. Timken bearing.
40. Wormwheel bearing spacer.
41. Wormshaft gear.
42. Wormwheel shaft and pinion.
43. Timken bearing.
44. SKF washer.
45. SKF nut.
46. Wormwheel shaft cap.
47. Crossfeed friction pinion.
48. Crossfeed friction disc.
49. Crossfeed friction gear.
50. Crossfeed friction stem.
51. Friction stem key.
52. Thrust bearing.
53. Spring thrust bearing.
54. Friction spring.
55. Spring washer.
56. Friction stem bushing.
57. Thrust bearing.
58. Cam ring.
59. Friction sleeve.
60. Cam fulcrum pin.
61. Friction locknut.
62. Crossfeed friction knob.
63. Cam fulcrum pin.
64. Locknut pin.
65. Crossfeed intermediate gear.
66. Crossfeed intermediate gear stem.
67. Washer.
68. Halfnut lever.
69. Halfnut cam stem.
70. Cam plate.
71. Cam guide pin.
72. Halfnut adjustment stop pin.
73. Halfnut adjustment stop screw.
74. Upper halfnut.
75. Lower halfnut.
76. Interlock guide.
77. Interlock guide pin.
78. Halfnut clamp. L. H.
79. Interlock bar.
80. Interlock key.
81. Interlock cap.
82. Worm.
83. Worm bushing.
84. Thrust bearing.
85. Worm splash shield.
86. Reverse control sleeve.
87. Reverse control sleeve key.
88. Chasing dial worm.
89. Chasing dial stem.
90. Chasing dial head.
91. Halfnut clamp. R. H.
92. Reverse control adjustment bushing.
93. Reverse control adjustment nut.
94. Bijur pump.
95. Pump cam follower.
96. Pump cam follower pin.
97. Pump case.
98. Oil gauge.
99. Oil gauge sleeve.
100. Oil header.
101. Oil sleeve.
102. Oil bushing.
103. Instruction plate.

ADJUSTMENTS

Carriage hold down clamps

There are five carriage hold down clamps bearing on the bed underneath the ways. Two are in the front and two are in the rear, on each end of the carriage. The other clamp bears underneath the rear of the front ways of the bed. The front clamps do not need adjustment. The other clamps are adjusted by the adjusting screws which change the tension of the gibs on the bed. These should be adjusted just tight enough to remove excessive play.

Top block gib

The top block gib, No. 9, is adjusted by the adjusting screws, No. 10. To adjust loosen one screw and tighten the other.

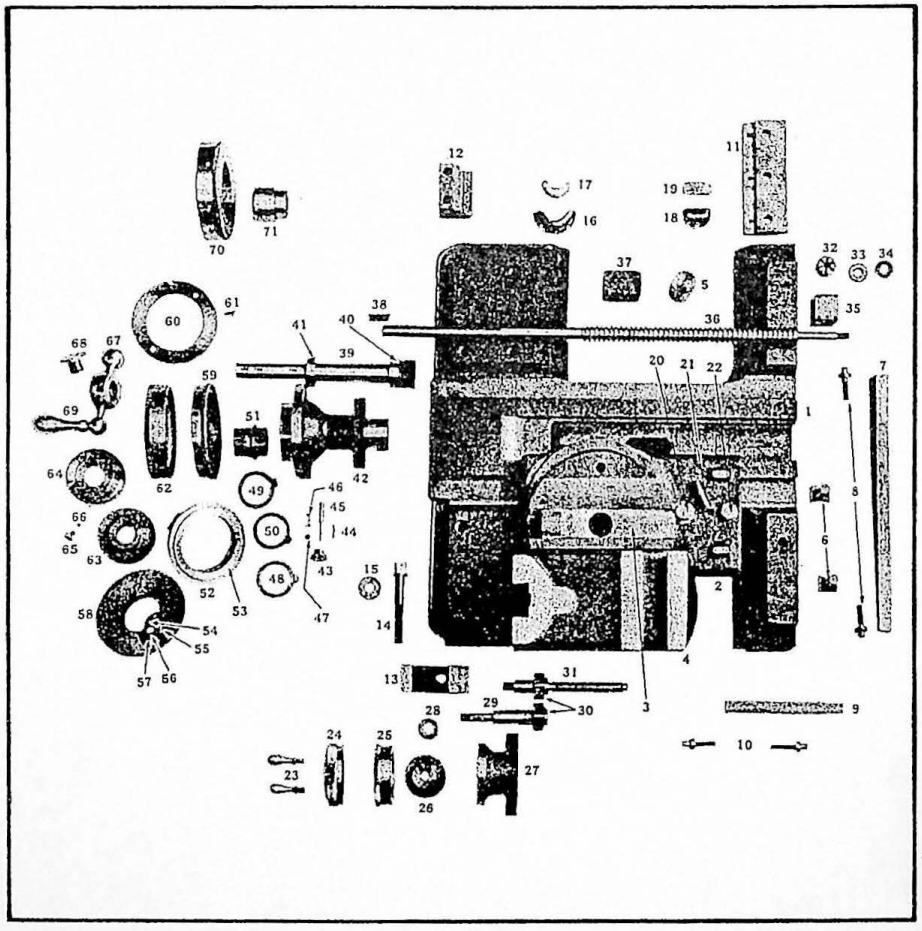
Bottom slide gib

The bottom slide gib, No. 7, is adjusted by the adjustment screws, No. 8, one on each end of the gib. To adjust, loosen one screw and tighten the other. Adjust just tight enough to take up all lost motion.

Crossfeed nut

Backlash between the crossfeed screw, No. 36, and the crossfeed nut, No. 37, may be taken up by tightening the screw in the top of the crossfeed nut.

WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEET NUMBER, AND LATHE SERIAL



CARRIAGE AND COMPOUND REST PARTS LIST

1. Carriage.
2. Bottom slide.
3. Swivel.
4. Top block.
5. Swivel stud.
6. Swivel bolt.
7. Bottom slide gib.
8. Bottom slide adjustment screw.
9. Top block gib.
10. Top block gib adjustment screw.
11. Rear carriage hold down clamp.
12. Front carriage hold down clamp.
13. Carriage binder clamp.
14. Carriage binder clamp screw.
15. Washer.
16. V carriage wiper holder.
17. V carriage wiper. (Clean often).
18. Flat carriage wiper holder.
19. Flat carriage wiper. (Clean often).
20. Clamp screw.
21. Crossfeed nut lock screw.
22. Clamp screw.
23. Compound screw handle.
24. Compound knob.
25. Compound dial.
26. Compound dial bushing.
27. Compound bushing.
28. Compound screw washer.
29. Compound gear stud.
30. Compound gear.
31. Compound screw.
32. Locknut.
33. Thrust collar.
34. Thrust bearing.
35. Crossfeed screw bearing.
36. Crossfeed screw.
37. Crossfeed nut.
38. Sleeve key.
39. Crossfeed screw sleeve.
40. Sleeve thrust collar.
41. Sleeve thrust collar.
42. Crossfeed bushing.
43. Plunger knob.
44. Stop pin.
45. Plunger pin.
46. Plunger spring.
47. Plunger bushing.
48. Lock collar.
49. Lock collar.
50. Loose collar.
51. Sleeve drive gear.
52. Diameter dial bushing.
53. Dial bushing internal gear.
54. 46 Teeth spacer gear.
55. 12 Teeth spacer pinion.
56. 12 Teeth pinion.
57. 30 Teeth gear.
58. Dial Spacer.
59. Diameter dial.
60. Dial retaining plate.
61. Spring.
62. Crossfeed micrometer dial.
63. Sleeve micrometer dial bushing.
64. Micrometer dial lock collar.
65. Dial screw.
66. Binder plug.
67. Ball crank.
68. Dial screw.
69. Ball crank handle.
70. Bushing spacer.
71. Sleeve spacer.

Note: Crossfeed screws with micro-gauging dials do not include parts numbered, 70 and 71. Crossfeed screws without micro-gauging dials do not include parts numbered from 51 to 61, inclusive; parts 70 and 71, being used instead.

ANTI-FRICTION BEARING TAPER ATTACHMENT

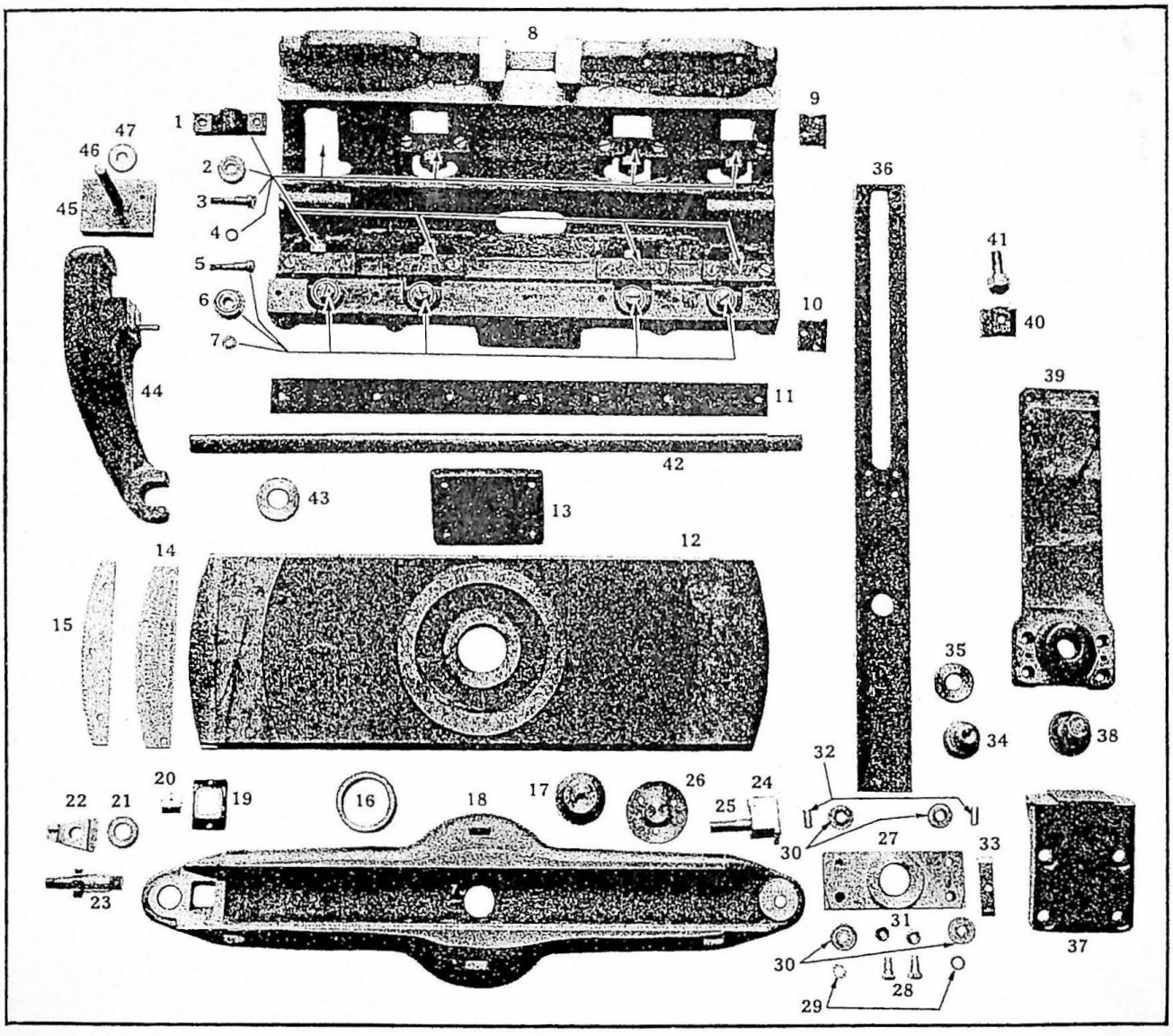
An assembled view of the taper attachment is shown on page 3, of the "Accessories Bulletin."

When turning taper loosen the bar rail clamp screw No. 38, and tighten the clamp nut screw, No. 41. For straight turning tighten the bar rail clamp screw, No. 38, and loosen the clamp nut screw, No. 41.

ADJUSTMENTS

Adjustment of the anti-friction bearings, if any is ever required, is made by turning the eccentric studs, Nos. 3 and 5 on the carriage bracket, and No. 28, on the shoe.

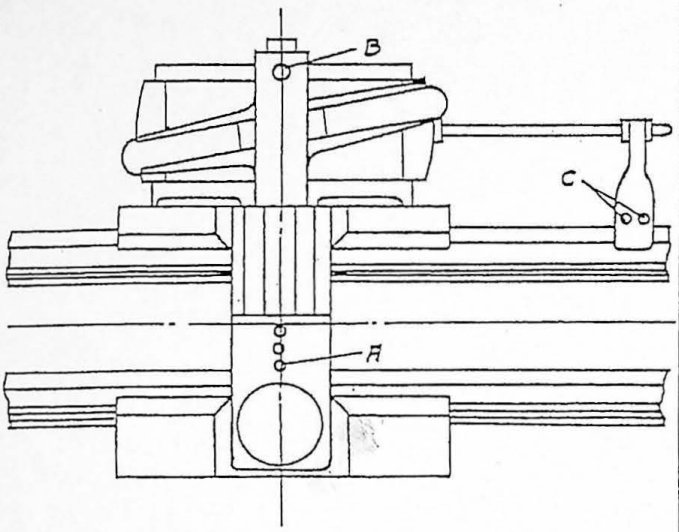
WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEET NUMBER, AND LATHE SERIAL



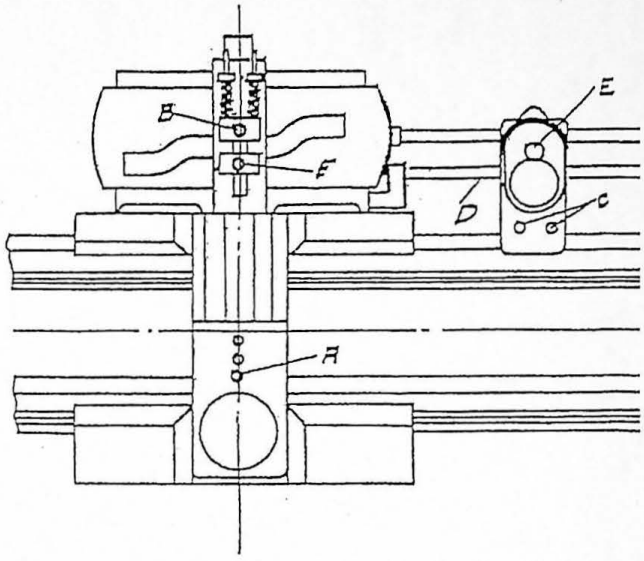
TAPER ATTACHMENT PARTS LIST

1. Lower bearing support.
2. Lower carriage bracket bearing.
3. Lower bearing eccentric stud.
4. Bearing shim.
5. Side bearing eccentric stud.
6. Carriage bracket side bearing.
7. Bearing shim.
8. Carriage bracket.
9. Bracket wiper, L. H.
10. Bracket wiper, R. H.
11. Slide gib.
12. Slide.
13. Draw rod bracket.
14. Index plate.
15. Rack.
16. Slide bushing.
17. Swivel stud.
18. Swivel.
19. Glass frame.
20. Pointer.
21. Swivel gear collar.
22. Swivel clamp, L. H.
23. Swivel setting gear.
24. Swivel clamp, R. H.
25. Swivel clamp stud.
26. Swivel stud cap.
27. Shoe.
28. Shoe bearing eccentric stud.
29. Shoe bearing shim.
30. Shoe bearing.
31. Eccentric stud lock collar.
32. Shoe bearing pin.
33. Outside wiper plate.
34. Shoe stud.
35. Shoe stud nut.
36. Draw bar.
37. Rear bar support.
38. Bar rail clamp screw.
39. Bar rail.
40. Clamp nut.
41. Clamp nut screw.
42. Draw rod.
43. Draw rod nut.
44. Bed bracket.
45. Bed bracket clamp.
46. Bed bracket stud.
47. Washer.

Instructions for Operating the Anti-Friction Bearing Taper Attachment



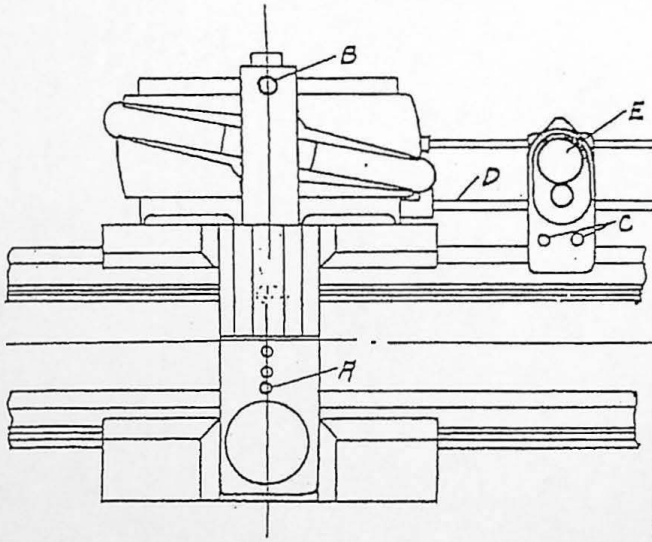
1. To turn taper, lock "A", loosen "B", lock clamp "C".
2. To turn straight, loosen "A", lock "B", loosen "C".
3. Caution: Always lock "B" when straight turning.



For Form Turning	For Form Boring
Loosen upper F	Tighten upper F
Tighten upper B	Loosen upper B
Tighten lower F	Loosen lower F
Loosen lower B	Tighten lower B

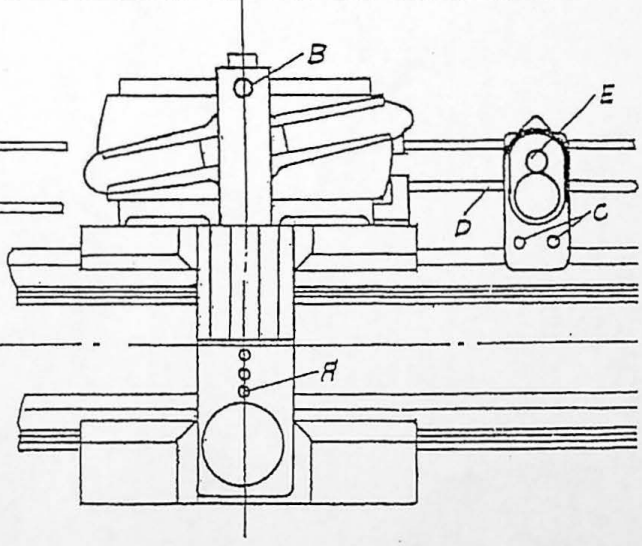
Form turning or boring with "Variator"

1. Tighten "A". 2. Use rack positions and gear positions shown when the template is to be longer than the work. 3. Where the template is shorter than the work, the position of the inside rack must be reversed and the gear positions the Variator must also be reversed from that shown in drawing.



Long length turning with "Variator"

1. Tighten "A", loosen "B", use rack and gear positions as shown.



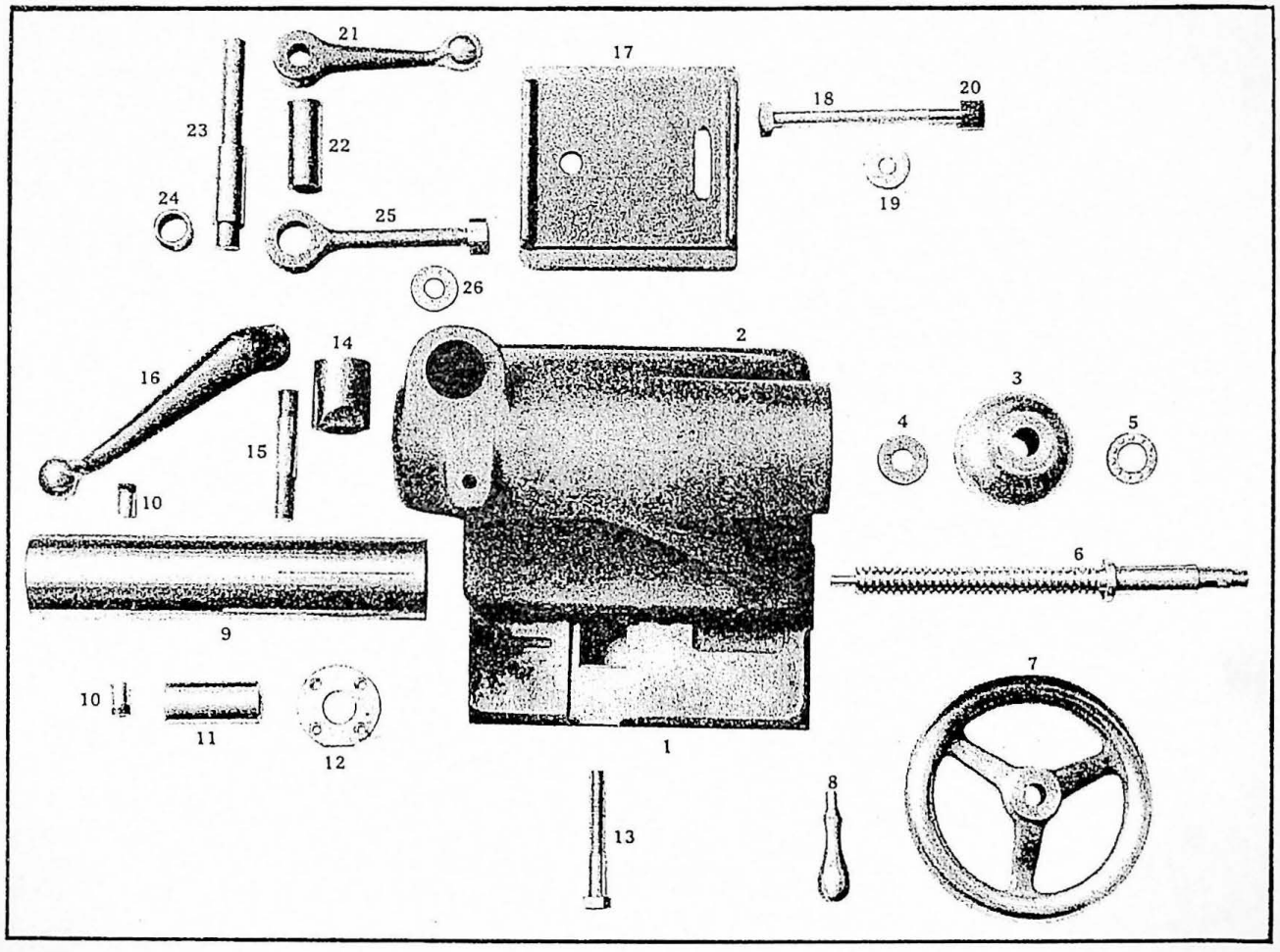
Steep angle turning with "Variator"

1. Tighten "A", loosen "B", use rack and gear positions as shown.

TAILSTOCK

This photograph shows the parts of a quick clamp tailstock, having an auxiliary bolt that is used, in addition to the quick clamp lever when doing extremely heavy work. The smaller tailstocks have only the quick clamp lever, No. 21, so parts Nos. 18, 19, and 20 will not be found on this type.

WHEN ORDERING PARTS SEND THE NAME, PART NUMBER, PARTS SHEET NUMBER, AND THE LATHE SERIAL



TAILSTOCK PARTS LIST

1. Tailstock base.
2. Tailstock top.
3. Handwheel bell.
4. Washer.
5. Thrust bearing.
6. Tailstock Screw.
7. Handwheel.
8. Handwheel handle.
9. Tailstock spindle.
10. Tang screw.
11. Spindle Nut.
12. Spindle retaining plate.
13. Set over screw.
14. Binder plug.
15. Binder stud.
16. Binder lever.
17. Tailstock clamp.
18. Tailstock clamp bolt.
19. Washer.
20. Tailstock clamp nut.
21. Eccentric shaft lever.
22. Eccentric shaft bushing.
23. Eccentric shaft.
24. Eye-bolt bushing.
25. Eye-bolt.
26. Washer.

Note: Keep oil reservoir in tailstock base filled. Clean Bed-way wipers often.