

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

MONARCH LATHES

COVER THE TURNING FIELD
SIDNEY... OHIO, U.S.A.

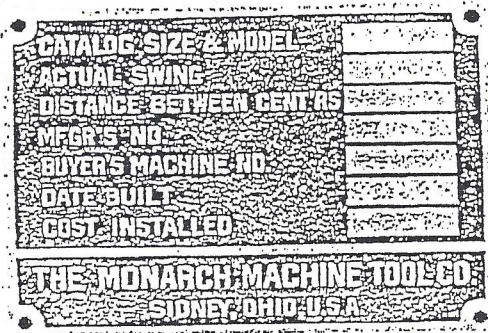
MONARCH lathes

MONARCH LATHES, L.P.
SIDNEY, OHIO USA

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

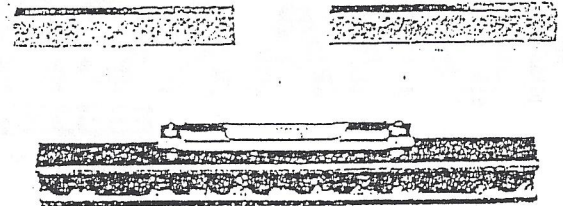
Before the carriage or tailstock are moved on the bed, the anti-rust slushing compound should be carefully wiped from all surfaces, preferably with rags dipped in gasoline or naphtha, to make sure that all grit or other foreign substance has been carefully removed. After this is done a thin film of oil 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 over-emphasized. Neither can the importance of frequent checking with a precision machinists' level be stressed too much.

LEVELING TOOLS



Machinists' Level

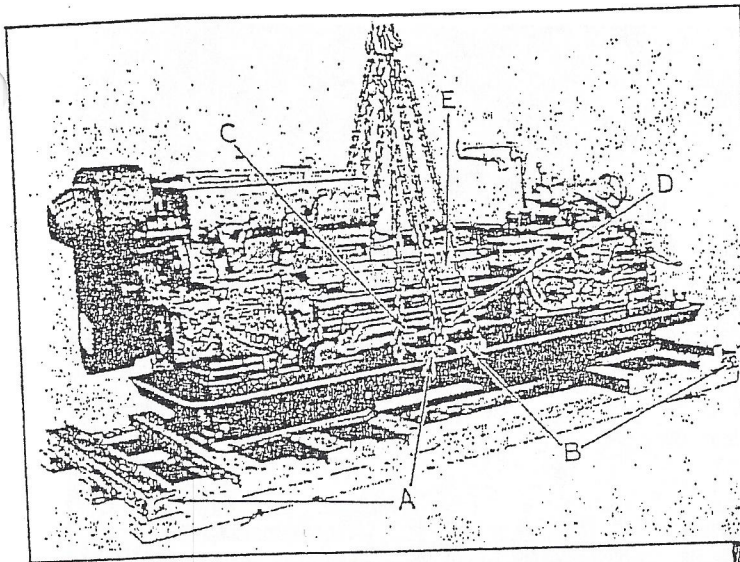
This photograph shows the parallels and the proper type of level to use for leveling the machine. Each graduation of this level equals .0005". The sensitivity is 10 sec.

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 2 1/4" high to clear the apron control rod. Place blocks E between sling and bedways.

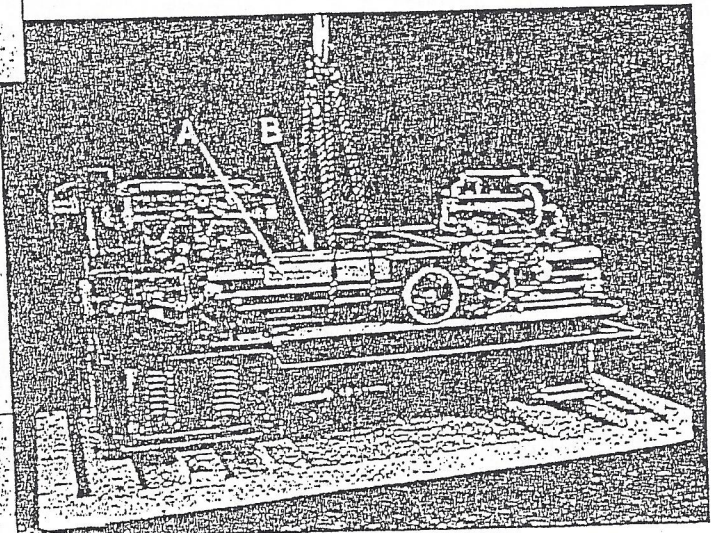
MAKE CERTAIN THAT LOAD IS ON BALANCE BEFORE LIFTING.



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.

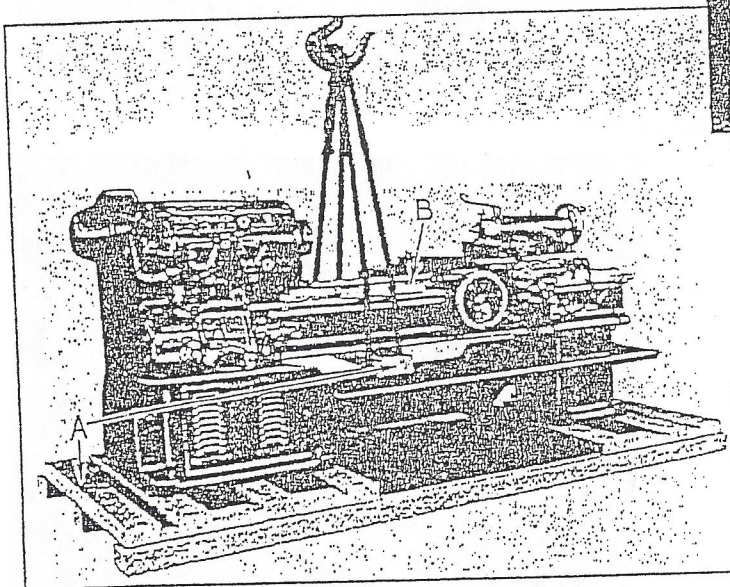
MAKE CERTAIN THAT LOAD IS ON BALANCE BEFORE LIFTING



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.

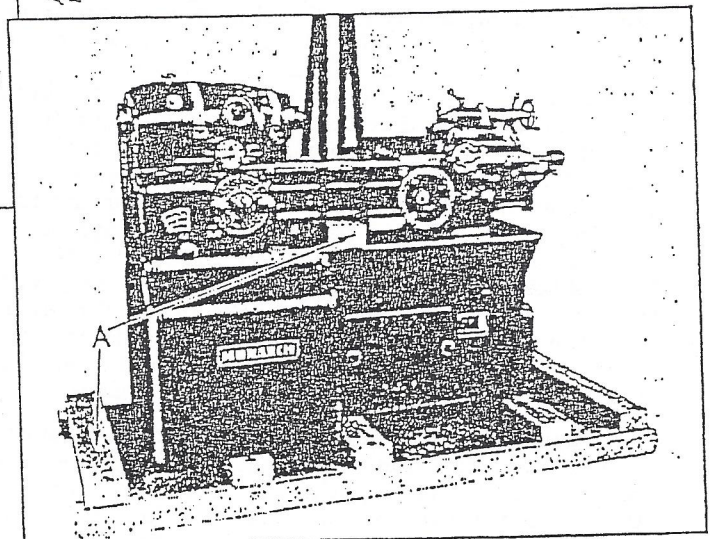
MAKE CERTAIN THAT LOAD IS ON BALANCE BEFORE LIFTING

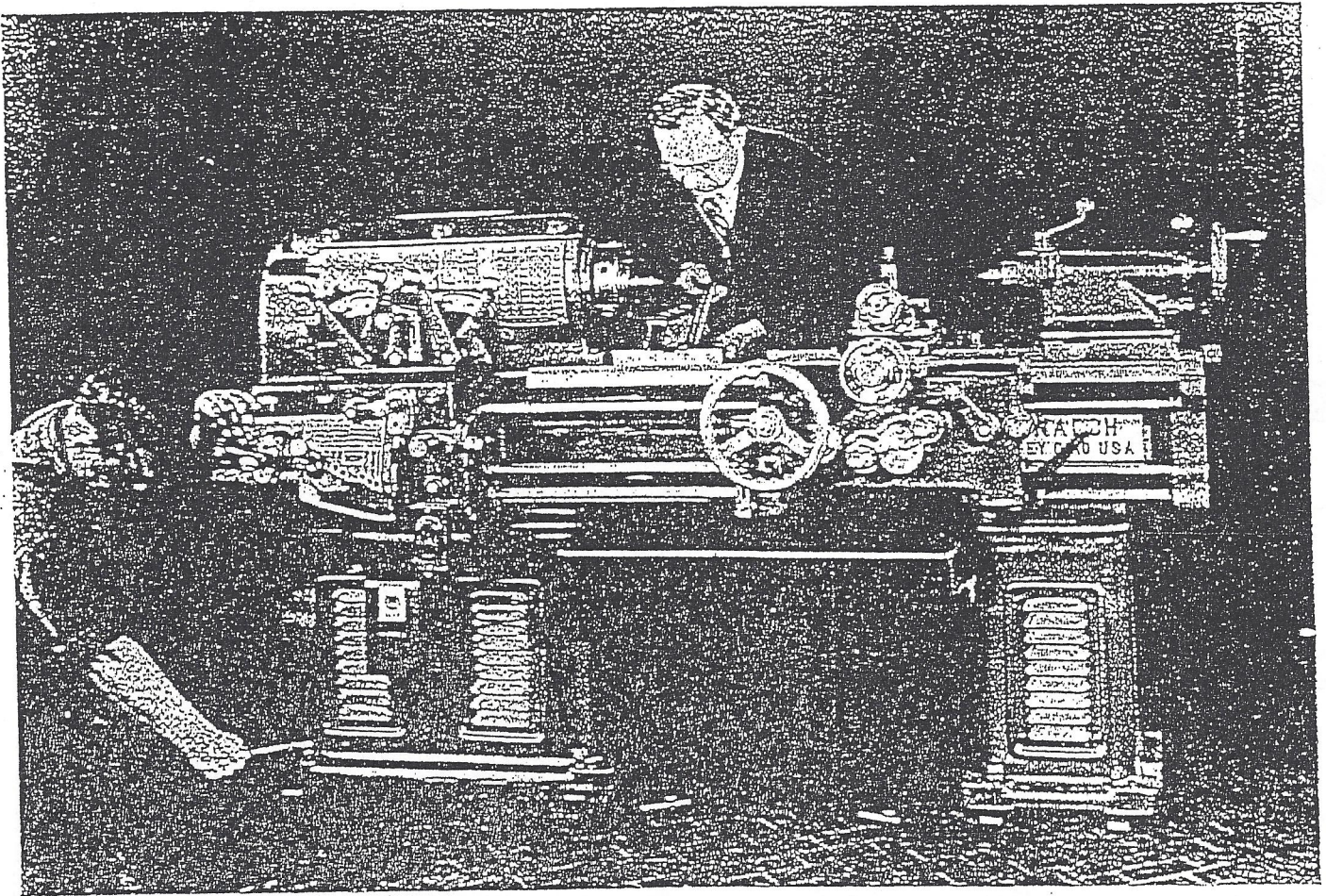


MODEL EE

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



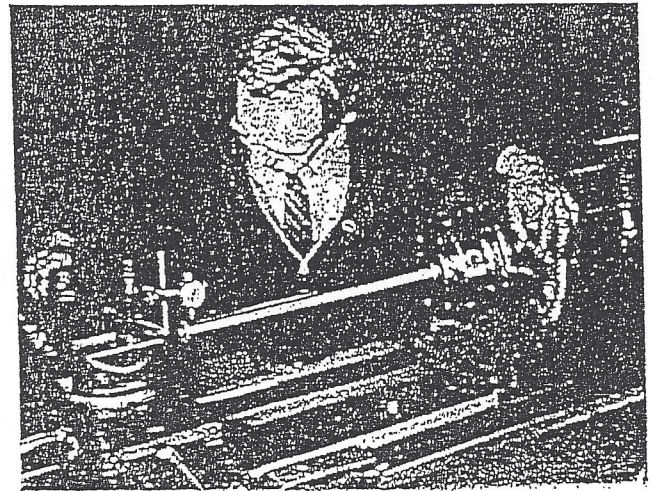


Lathe Being Leveled

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

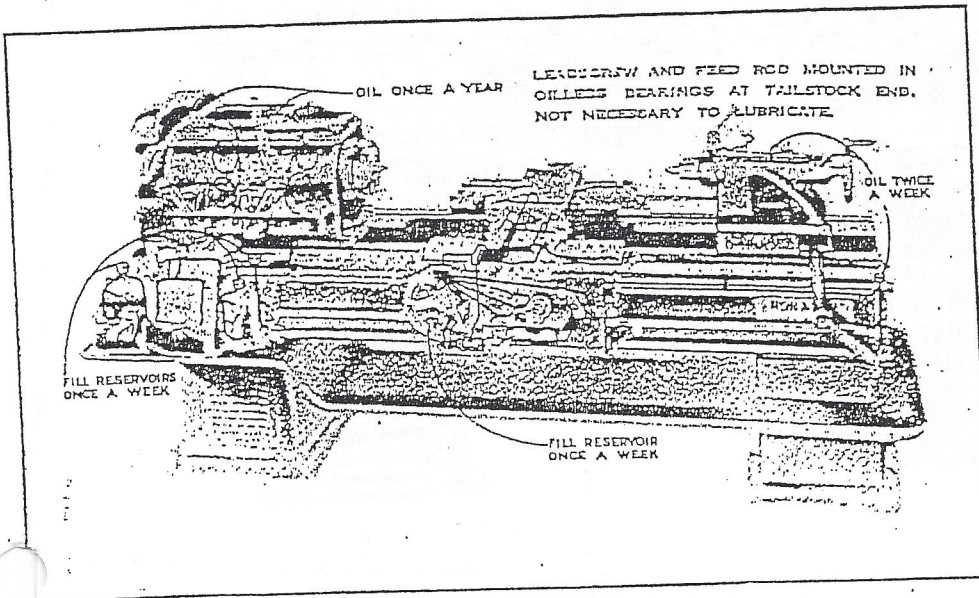
aper shank accurately. fitting the ground taper in the headstock spindle. This test bar on the ground cylindrical part extending beyond the spindle should be at least 25 to 30" in length, and the bar of course should be perfectly accurate and straight. By putting an accurate dial test indicator in the 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.

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.



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.

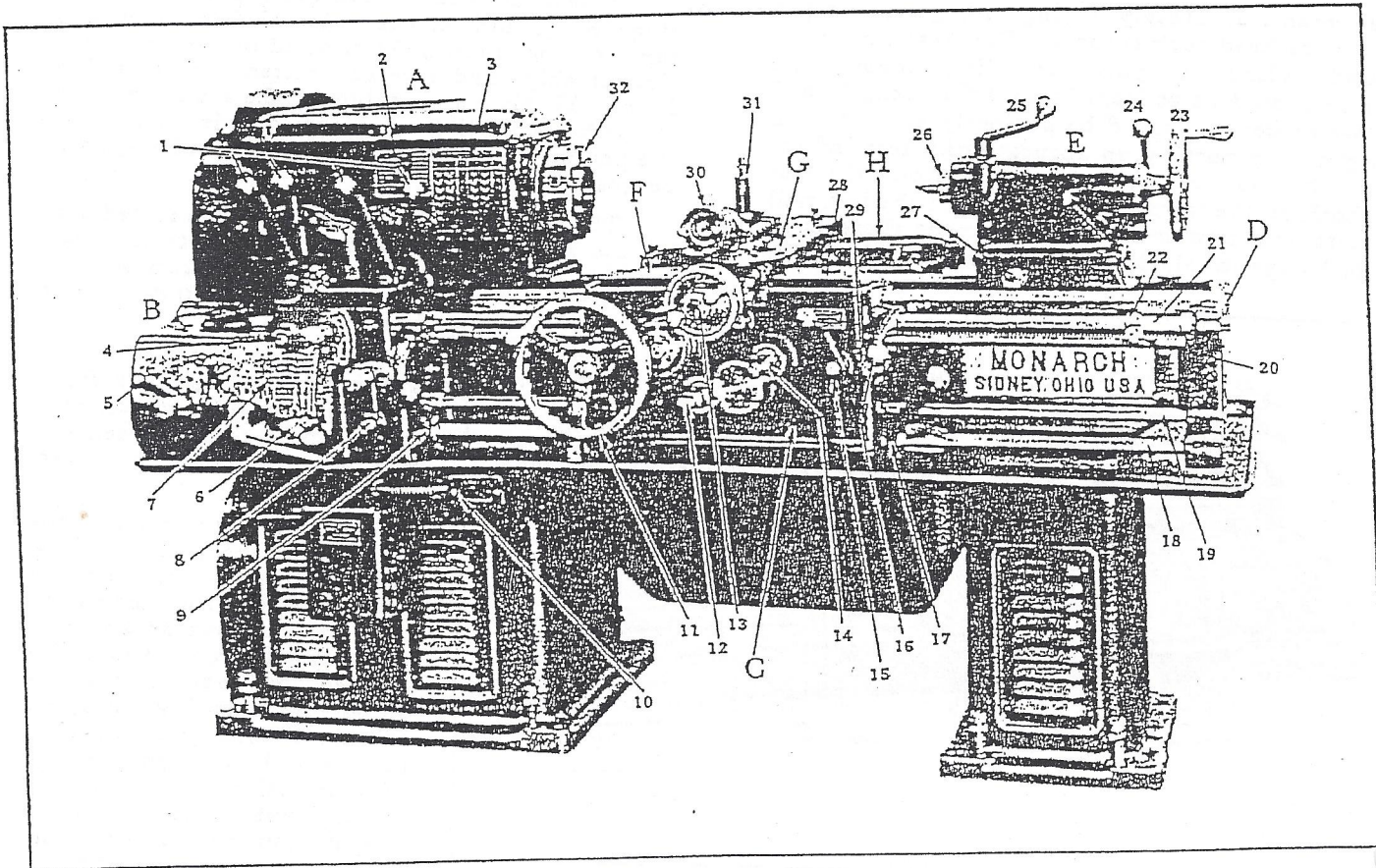
The bronze plate on the end gear train guard indicates that the end gearing should be oiled once per day.

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

NAMES OF LEVERS AND PARTS USED IN OPERATION

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

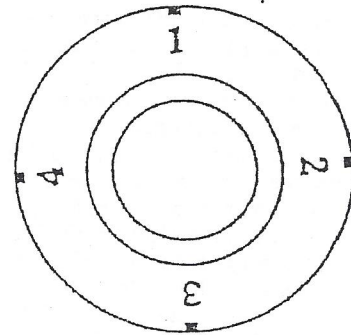
Since the index plate on the gear box clearly indicates all lever positions to secure any desired thread or rate of feed, no special instructions for its operation are required. At the right end of the quick change gear box is what is termed a slip-gear lever which is used to engage either the feed rod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