
THE MONARCH MACHINE TOOL COMPANY
SIDNEY, OHIO, U. S. A.
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

The 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.
MONARCH

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 M, N, and NN
Wood blocks A & B are taken from ends of skids—blocks C & D should be at least 2" high to clear the apron control rod. Place blocks E between sling and bedways.
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

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

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.

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.
10. Motor switch.
11. Apron handwheel.
12. Longitudinal friction lever.
13. Crossfeed handle and dial.
15. Halfnut closure 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.
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 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.

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.
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.
This part of the manual 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 is on each Monarch Lathe.

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

1. The number 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 delivery service can be rendered on the part desired. Otherwise it will be delayed, until the information is obtained.

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**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 required. 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
The parts shown in this photograph make up the end gearing of the lathe, located on the rear of the headstock. The gears are mounted on ball bearings which require no lubrication, sufficient lubricant being sealed in them to last the life of the bearing. The Quadrant Assembly is found on all models, while the Idler Assembly is used only on lathes with raised headstocks.

ADJUSTMENT

The end gearing is adjusted by loosening the nuts on the quadrant studs Nos. 3 and 6, and the nut on the quadrant bolt No. 12. The gears should be positioned so there will be about .003” backlash between the teeth. After making any adjustment be sure that all nuts are securely tightened.

WHEN ORDERING PARTS SEND NAME, PART NUMBER, PARTS SHEETS NUMBER, AND LATHE SERIAL ID．

END GEAR TRAIN PARTS LIST

QUADRANT ASSEMBLY

1. Quadrant.
2. Quadrant Bushing.
3. Quadrant Clamp Stud.
4. Quadrant Clamp Stud Washer.
5. Quadrant Clamp Stud Washer.
6. Quadrant Clamp Stud.
7. Bearing Retainer Ring.
8. Ball Bearing.
10. Quadrant Gear.
11. Quadrant Gear Bushing.
12. Quadrant Bolt.
13. Washer.
15. Bearing Retainer Ring.
16. Ball Bearing.
17. Bearing Spacer.
18. Quadrant Gear.

IDLER ASSEMBLY

(These Parts Are Found Only On Lathes With Raised Headstocks)

22. Ball Bearing.
23. Idler Gear.
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 NUMBER TO THE FACTORY.
HEADSTOCK LEVERS PARTS LIST

1. Clutch shifter shaft lever.
2. Plunger spring.
3. Plunger plug.
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.
13. Clutch shifter tube lever.
15. Plunger plug.
17. Tit key.
18. Long intermediate shaft fork L. H.
19. Clutch shoe pin.
22. Outside reverse segment.
23. Reverse clutch shifter shaft.
24. Tit key.
25. Inside reverse segment.
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.
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.
63. Oil gauge.
64. Oil gauge nipple.
65. Spindle speed index plate.

When ordering parts send name, part number, parts sheet number, and lathe serial.
The gearbox is located on the front of the lathe under the headstock. Its purpose is to provide changes in the rotation speed of the lead screw and feed rod. This 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 the name, part number, parts sheet number and the lathe serial.

**GEARBOX PARTS LIST**

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

<table>
<thead>
<tr>
<th>PART</th>
<th>DESCRIPTION</th>
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<tbody>
<tr>
<td>1.</td>
<td>Handwheel shaft and pinion.</td>
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<td>2.</td>
<td>Pump cam.</td>
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<td>3.</td>
<td>Spacer.</td>
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<td>4.</td>
<td>Timken bearing.</td>
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<td>5.</td>
<td>Handwheel bearing spacer.</td>
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<tr>
<td>6.</td>
<td>Timken bearing.</td>
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<tr>
<td>7.</td>
<td>Spacer.</td>
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<td>8.</td>
<td>Apron handwheel.</td>
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<td>9.</td>
<td>Handwheel handle.</td>
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<td>10.</td>
<td>Rack pinion shaft.</td>
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<td>11.</td>
<td>Rear rack pinion collar.</td>
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<td>12.</td>
<td>Roller bearing.</td>
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<td>15.</td>
<td>Rack gear spacer.</td>
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<td>17.</td>
<td>Rack pinion collar.</td>
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<td>18.</td>
<td>Washer.</td>
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<td>19.</td>
<td>Longitudinal friction pinion.</td>
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<td>20.</td>
<td>Longitudinal friction disc.</td>
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<td>21.</td>
<td>Longitudinal friction gear.</td>
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<td>Friction stem key.</td>
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<td>Friction sleeve.</td>
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<td>Wormwheel bearing spacer.</td>
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<td>41.</td>
<td>Wormshaft gear.</td>
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<td>42.</td>
<td>Wormwheel shaft and pinion.</td>
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<td>43.</td>
<td>Timken bearing.</td>
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<td>44.</td>
<td>SKF washer.</td>
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<td>SKF nut.</td>
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<td>Wormwheel shaft cap.</td>
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<td>47.</td>
<td>Crossfeed friction pinion.</td>
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<td>Crossfeed friction stem.</td>
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<td>Friction stem key.</td>
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<td>Thrust bearing.</td>
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<td>Spring thrust bearing.</td>
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<td>Friction stem bushing.</td>
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<td>Halfnut clamp, L. H.</td>
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<td>79.</td>
<td>Interlock bar.</td>
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<td>Interlock key.</td>
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<td>Chasing dial head.</td>
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<td>Halfnut clamp, R. H.</td>
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<td>Reverse control adjustment bushing.</td>
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<td>Pump cam follower pin.</td>
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<td>Pump case.</td>
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<td>Oil gauge.</td>
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<td>Oil header.</td>
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<td>Oil sleeve.</td>
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<td>102.</td>
<td>Oil bushing.</td>
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<td>103.</td>
<td>Instruction plate.</td>
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CARRIAGE AND COMPOUND REST

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 gib 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 adjusting 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.
15. Washer.
17. V carriage wiper. (Clean often).
18. Flat carriage wiper holder.
19. Flat carriage wiper. (Clean often).
20. Clamp screw.
22. Clamp screw.
23. Compound screw handle.
24. Compound knob.
25. Compound dial.
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 nm.
38. Sleeve key.
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 microgauging dials do not include parts numbered, 70 and 71. Crossfeed screws without microgauging dials do not include parts numbered from 51 to 61, inclusive, parts 70 and 71, being used instead.

Parts Sheet No. 19
ANTI-FRICTION BEARING TAPER ATTACHMENT

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

When turning tapers 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 NUMBER.

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.
7. Bearing shim.
8. Carriage bracket.
9. Bracket wiper, L. H.
10. Bracket wiper, R. H.
11. Slide gib.
12. Slide.
15. Rack.
16. Slide bushing.
17. Swivel stud.
18. Swivel.
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.
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
Loosen upper F
Tighten upper B
Tighten lower F
Loosen lower B

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

Form turning or boring with "Variator"
1. Tighten "A"; 2. Use rack positions and gear positions as 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 of 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.
8. Handwheel handle.
12. Spindle retaining plate.
13. Set over screw.
15. Binder stud.

16. Binder lever.
17. Tailstock clamp.
18. Tailstock clamp bolt.
20. Tailstock clamp nut.
22. Eccentric shaft bushing.
23. Eccentric shaft.
24. Eye-bolt bushing.
25. Eye-bolt.

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