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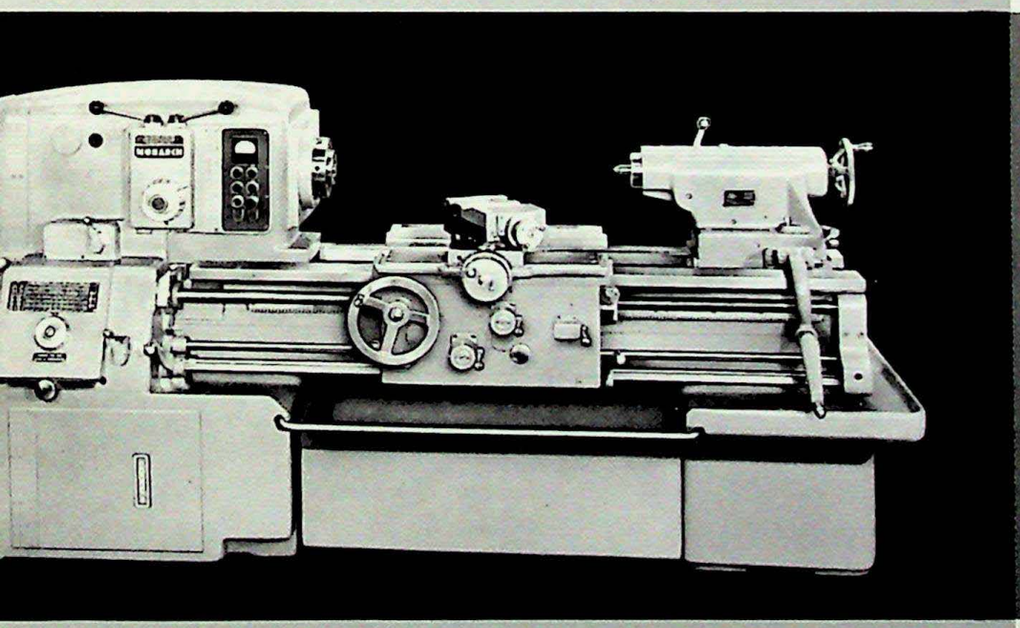
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Monarch
TURNING MACHINES



SERIES 610 and 612 LATHES

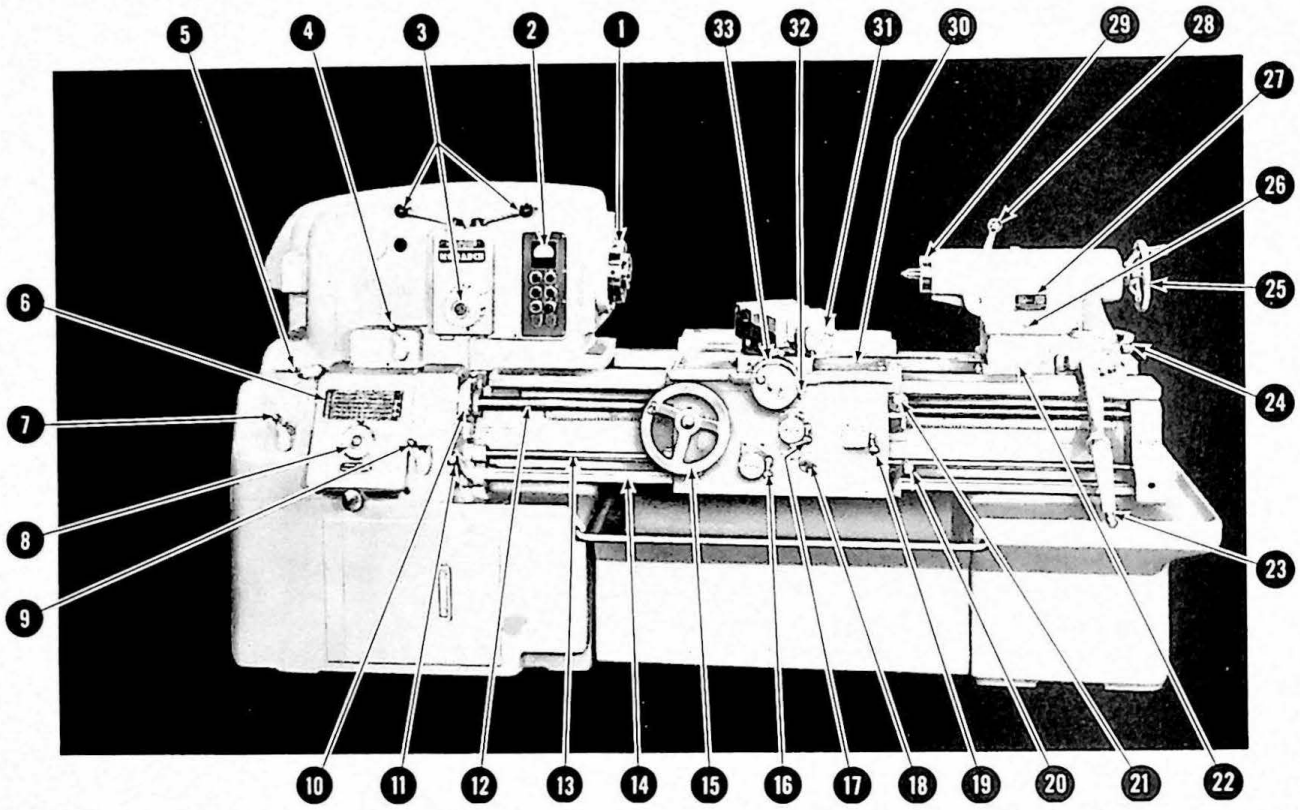
OPERATOR'S MANUAL

THE MONARCH MACHINE TOOL COMPANY SIDNEY, OHIO

Monarch TURNING MACHINES

610 and 612 LATHES

OPERATOR'S MANUAL



OPERATING LEVERS AND CONTROLS

1 Headstock spindle
2 Electrical switch grouping
3 Headstocks control dial and levers
4 Leadscrew reverse lever
5 Upper compound lever
6 Feed-thread index plate
7 Lower compound lever
8 Gearbox setting dial
9 Feed-thread lever
10 Tumbler lever
11 Spindle control lever
12 Leadscrew
13 Feedrod
14 Control rod
15 Apron handwheel
16 Carriage power feed lever
17 Cross slide power feed lever
18 Carriage and cross slide feed directional knob
19 Halfnut closure lever.
20 Spindle control lever
21 Chasing dial
22 Tailstock Base
23 Tailstock conveyor
24 Tailstock quick clamping lever
25 Tailstock handwheel
26 Tailstock aligning screw
27 Identification plate
28 Tailstock spindle binder
29 Tailstock spindle
30 Carriage binder clamp
31 Compound rest dial and handle
32 Thread chasing stop
33 Cross feed dial and handle

THE MONARCH MACHINE TOOL COMPANY SIDNEY, OHIO

INTRODUCTION

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

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

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

RECEIVING AND CLEANING

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

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

LIFTING

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

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

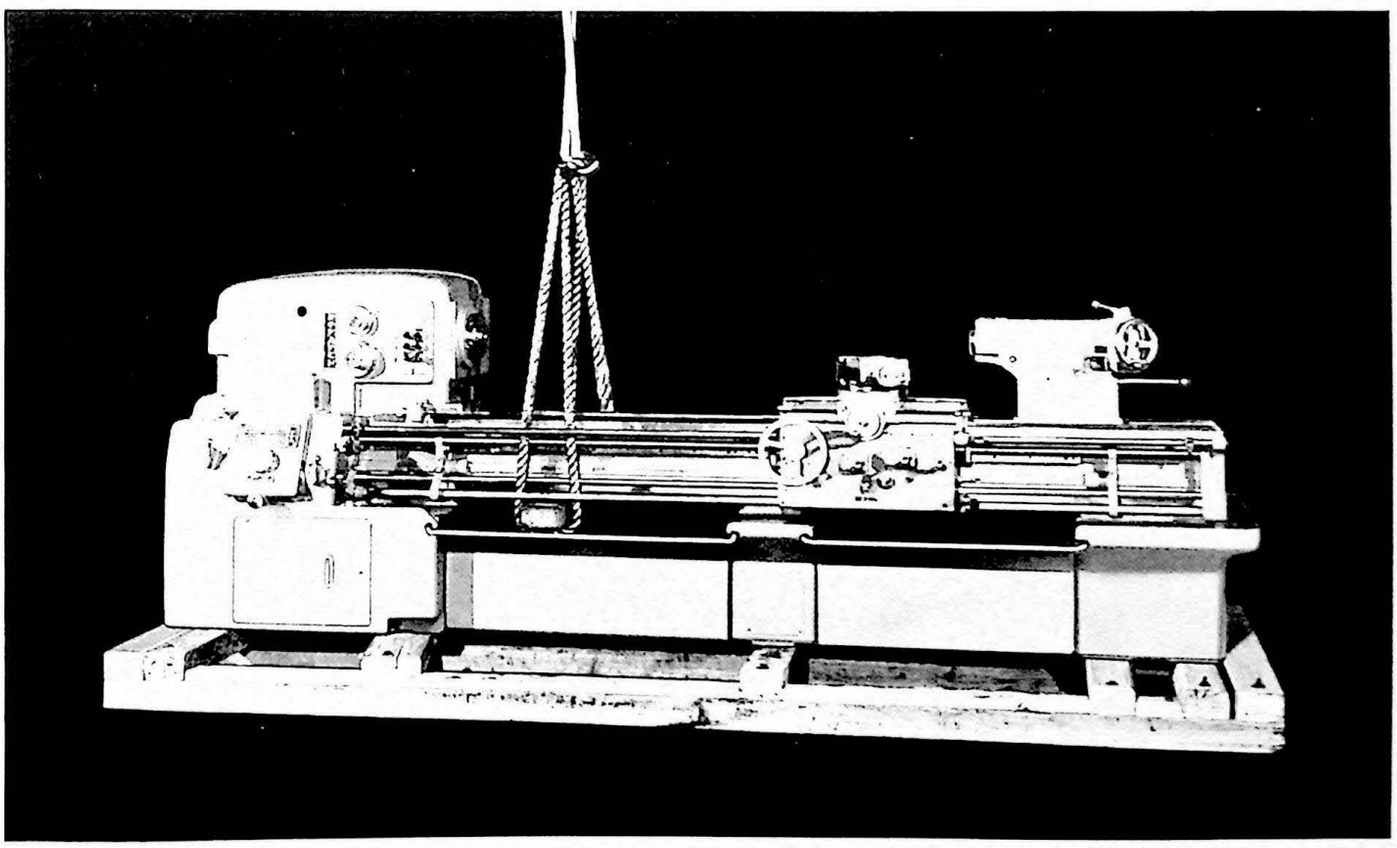


FIGURE 2 MANNER OF LIFTING 610 & 612 LATHE

INSTALLATION

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

The next step is leveling and too much stress cannot be laid on the importance of doing this with the utmost care. Use a good machinist's level and two parallels. Place the parallels on the front and rear flats and lay the level square across the parallels. Do this at both ends of the bed.

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

Viewed from the outer end, main drive motor rotation should be clockwise.

LUBRICATION

More than any other single factor, adequate lubrication will guarantee long, trouble-free operation of the machine. This subject is fully covered later in this manual.

OPERATION

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

HEADSTOCK

On the front of the headstock are a dial and two levers for selecting the entire range of 36 spindle speeds. Figure 3.

Dial (A) is the speed selector dial and is turned by the knurled knob.

Lever (B) selects between the high range and low range speeds, both of which are shown on dial (A).

Lever (C) has shift and run positions. Moving lever (C) from run to shift position prepares

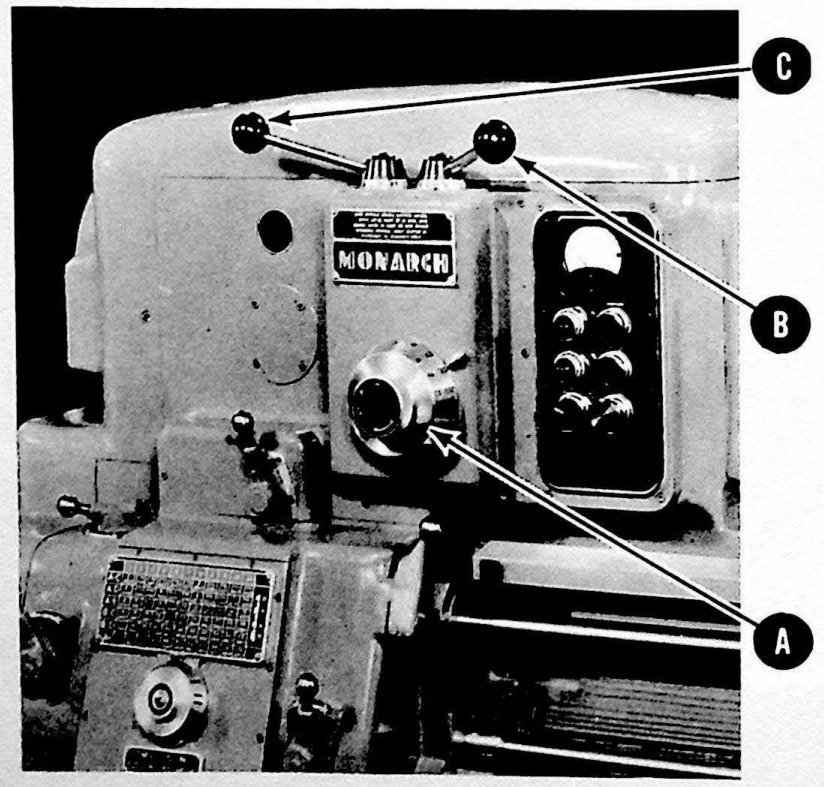


FIGURE 3 SPEED DIAL, 610 LATHE

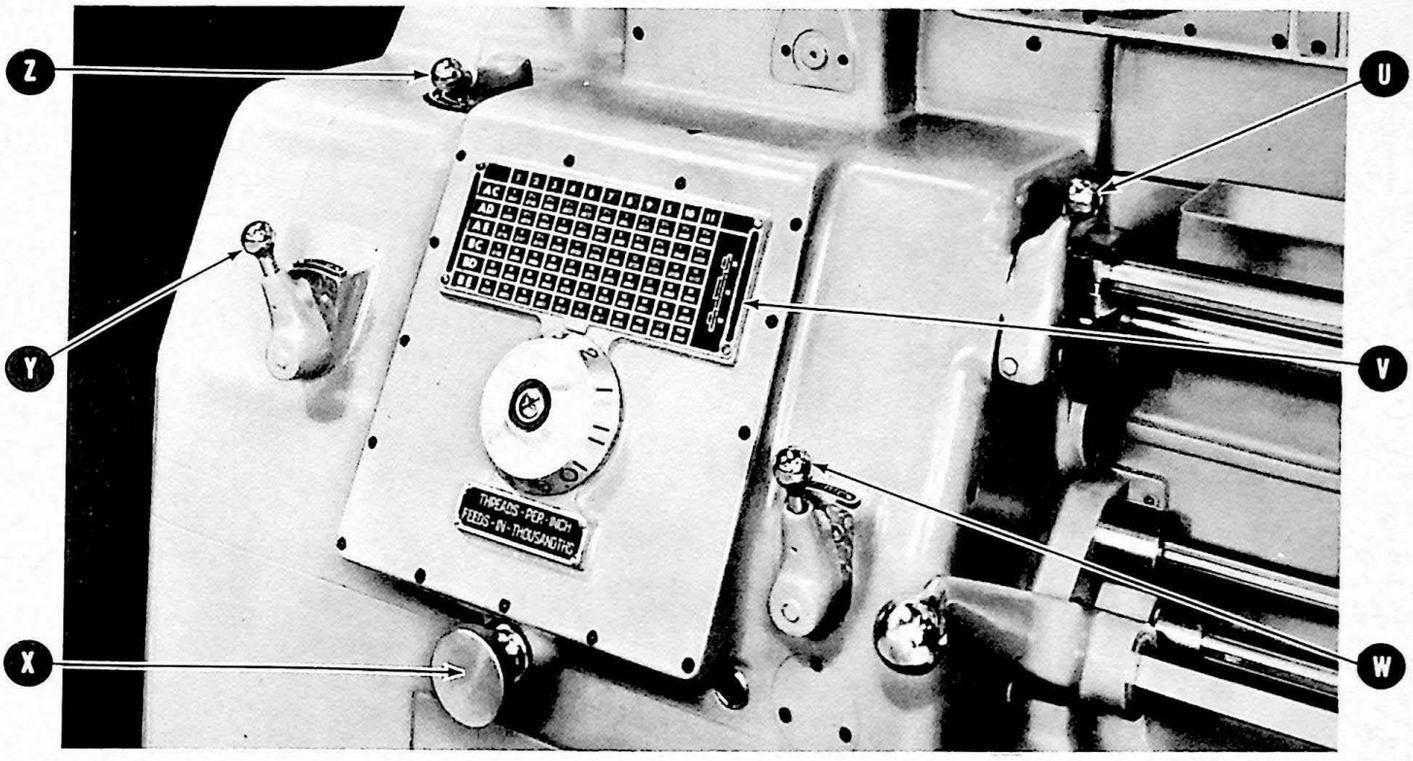


FIGURE 4 GEAR BOX CONTROL LEVERS

the shift mechanism so that dial (A) can be rotated to select a new speed. When a new speed selection is made, moving lever (C) to the run position shifts the necessary gears to establish the correct gear ratio to obtain the selected speed.

If the gears occasionally fail to easily engage, the main drive clutch is drifted by lightly pressing down the clutch control lever.

The upper belt sheave guard covers the main drive clutch. This clutch is adjusted by removing this guard, lifting the locking pin in the adjusting ring and turning the adjusting ring. Turning the ring clockwise tightens the clutch. The locking pin must be re-engaged before the clutch is run. The clutch should be tightened until the operator experiences a definite detenting action of the apron control lever. Caution must be used not to tighten excessively as the control lever may hang up before reaching the fully engaged position which could result in continuous engagement of both clutch and brake or of clutch and drift clutch. The clutch may have to be adjusted as often as every month depending on duty cycle. "Feel" at the operating lever is the best method of determining proper adjustment.

To free the spindle from the rest of the gear train place lever (B) in neutral position. This permits easy rotation of the spindle by hand and also acts as a safety when chucking or measuring work pieces since the spindle cannot be started accidentally while lever (B) is in the neutral position.

GEAR BOX

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

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

The regular thread range of Monarch machines is from 2 to 120 threads per inch with feeds from .0010" to .0615" per revolution on the Model 1610 and .0011" to .068" per revolution on the Models 2013 and 2516. Due to the extreme range it is seldom necessary to change end gears except for special threads.

APRON

Figure 5 and 6 indicate the functions of the various controls provided to impart the necessary movements to the cutting tool. (A), the apron handwheel, moves the cutting tool manually parallel to the bed. Cross slide handwheel, (B), moves the tool manually at a right angle to the bed. Compound rest handwheel (C) moves the tool manually at any angle to the bed.

Spindle rotation is started and stopped by means of lever (D) which operations may also be performed at the headstock end of the machine where a similar lever is attached to the control rod.

WITHOUT RAPID TRAVERSE

Lever (E) is the carriage power feed control lever which, when pushed downward, causes the carriage to move at the preselected feed either toward the headstock or the tailstock. Cross slide power feed control lever (F) when pushed downward, causes the cross slide to move at the preselected feed either toward or away from the operator.

WITH RAPID TRAVERSE

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

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

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

Feed directional knob, (G), is shown in neutral position. In the in position the carriage feeds toward the tailstock and the cross slide feeds in. When in the out position, the carriage feeds toward the headstock and the cross slide feeds out.

If threads are to be chased, the carriage is engaged to the leadscrew by means of half nut control lever, (H). It is illustrated in its disengaged position and should be straight down for full engagement. When lever (H) is partly or fully engaged lever (E) cannot be engaged. This is a safety feature intended to prevent damage to the lathe should the operator inadvertently attempt to engage lever (E) while lever (H) is also engaged.

Thread chasing dial (J), which has four graduations 90° apart, is used for determining when to engage the half nut during thread chasing operations. On any even thread where the thread being chased is divisible by four the half nut may be engaged at any point without reference to the dial. For any full number of threads such as 18, 22, 23 and so on (not divisable by four) the half nut may be engaged at any one of the four graduations.

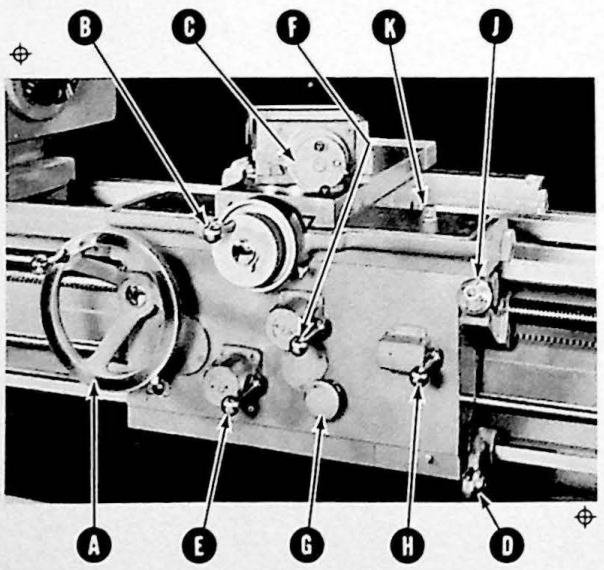


FIGURE 5 FRONT OF APRON, CARRIAGE AND COMPOUND REST WITHOUT POWER RAPID TRAVERSE

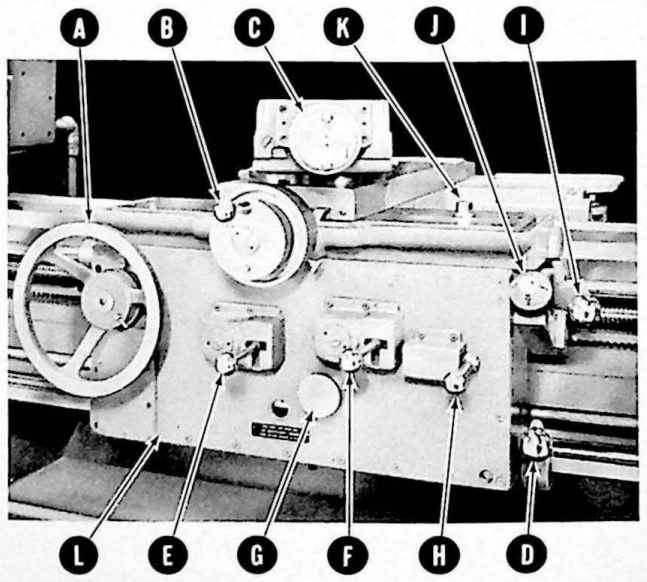


FIGURE 6 FRONT OF APRON, CARRIAGE AND COMPOUND REST WITH POWER RAPID TRAVERSE

When chasing half threads, the half nut may be engaged at any two opposite graduations—No. 1 and No. 3 or No. 2 and No. 4. The chasing of quarter threads requires that the half nut be engaged at the same graduation each time.

(K) is the carriage locking stud to lock carriage to bed ways when cutting with the cross slide.

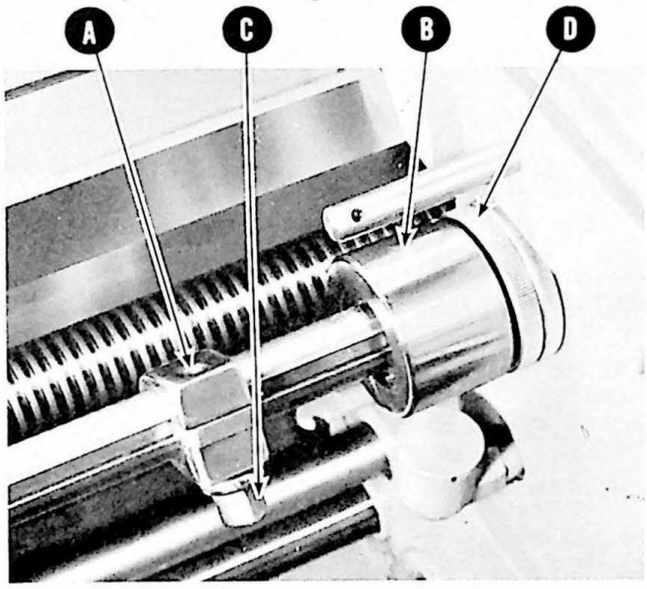


FIGURE 7 AUTOMATIC LENGTH STOP AT LEFT HAND SIDE OF APRON

APRON CONTROLLED LEADSCREW REVERSE

A leadscrew reverse lever on the right end of the apron is found on Models 1610T, 2013T and 2516T. Control of leadscrew reverse from the apron is particularly convenient during thread chasing operations -- for example, chasing threads with odd leads where the halfnut should not be disengaged; speed chasing of short threads, and, in connection with the automatic length stop, chasing threads up to a shoulder or in a blind hole.

On Models 1610, 2013 and 2516 the leadscrew reverse lever is found on the front of the headstock directly above the gearbox.

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

To prevent damage to the leadscrew reverse mechanism, do not reverse at spindle speeds above 340 R. P. M. It may be disengaged at any spindle speed.

CROSS FEED DIAL AND THREAD CHASING STOP

Cross feed diameter dial (A), Figure 8, is graduated to read in one thousandths of an inch. There are two sets of numbers. The set nearest the operator is for reading when the cross slide is feeding toward the operator. The second set of numbers is used when the cross slide is feeding away from the operator. The dial is graduated to read direct, that is, .001" on the dial equals .001" on the diameter or the bore of the work.

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

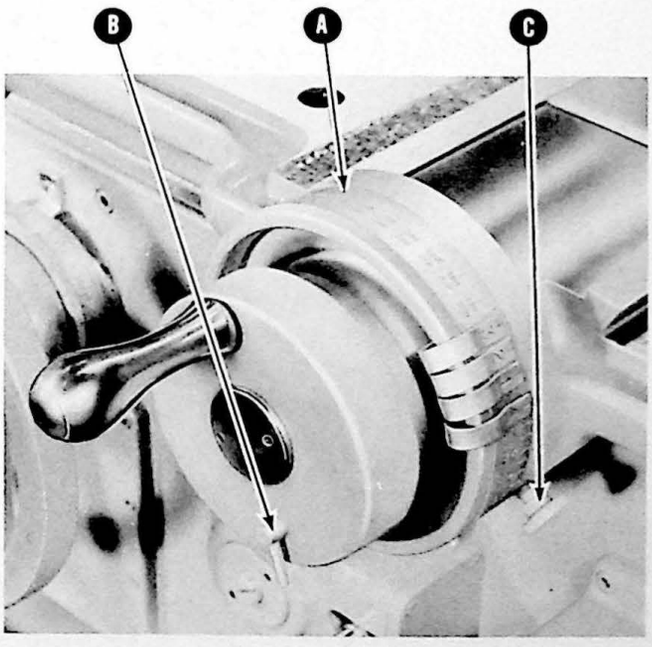


FIGURE 8 CROSS FEED MICROMETER DIAL

CROSS FEED DIAL AND THREAD CHASING STOP WITH MICRO-GAGING DIALS

The cross feed dial (A) is graduated to read in thousandths of an inch. There are two sets of numbers. The set nearest the operator is for reading when the cross slide is feeding toward the operator. The second set of numbers is used when the cross slide is feeding away from the operator. The dial is graduated to read direct, that is, .001 on the dial equals .001 on the diameter or the bore of the work. The inner dial (B) is graduated to read in inches. It also has two sets of graduations for use in the same manner as the outer dial.

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

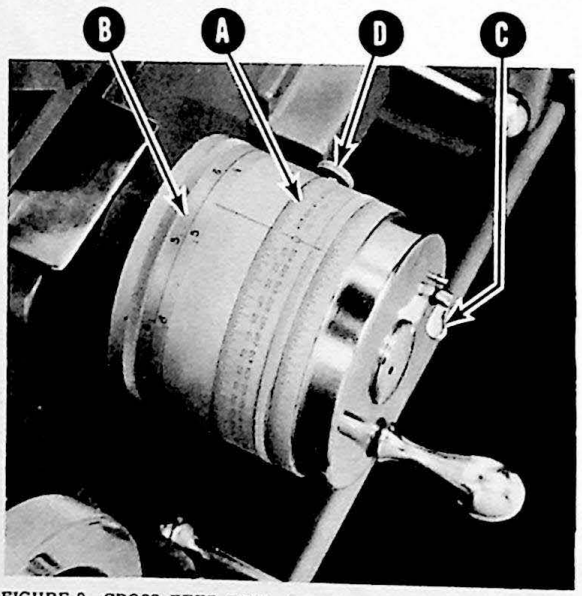


FIGURE 9 CROSS FEED DIAL AND THREAD CHASING STOP WITH MICRO-GAGING DIALS

MULTIPLE AUTOMATIC LENGTH STOP (WITH 4-WAY POWER RAPID TRAVERSE)

Machines equipped with multiple automatic length feed stops may also be used in the conventional manner. When used in this way the thumb screw (A) should be dis-engaged (turned as far as possible in the counterclockwise direction). This permits the longitudinal feed lever (B) to be engaged and dis-engaged at the operators will. When the stops are not in use the plunger (C) should be manually forced up and the latch (D) engaged to hold it. This eliminates the possibility of marking the work as the plunger rides over the stops.

When the stops are in use the latch (D) must be dis-engaged and the thumb screw (A) must be-engage (turned as far as possible in the clockwise direction). (B) is the carriage power feed and traverse control lever which, when pushed downward, causes the carriage to move at the preselected feed either toward the headstock or the tailstock. Lever movement to the left gives traverse toward the headstock and to the right traverse toward the tailstock. When the lever is pushed down to give feed, it will be latched by the stop mechanism and will remain latched until the plunger (C) comes in contact with one of the stop dogs (E). When the plunger contacts the stop dog it is forced up, which dis-connects the latch and stops the feed. Once the feed has been stopped automatically, the lever (B) may again be pushed down and the feed continued even though the plunger (C) is still in contact with the stop dog. As soon as the plunger comes in contact with the next stop dog the feed with automatically stop again. If the operator so chooses he may stop the feed at any time by pulling up on the small lever (F).

The flag stop (G) is hinged to swing down and act as a set up stop for positioning the stop dogs along the rail (H). When not in use it is spring loaded out of the way.

All other functions of this apron and carriage are the same as the apron with rapid traverse without multiple automatic length feed stops and are described in another section of this manual.

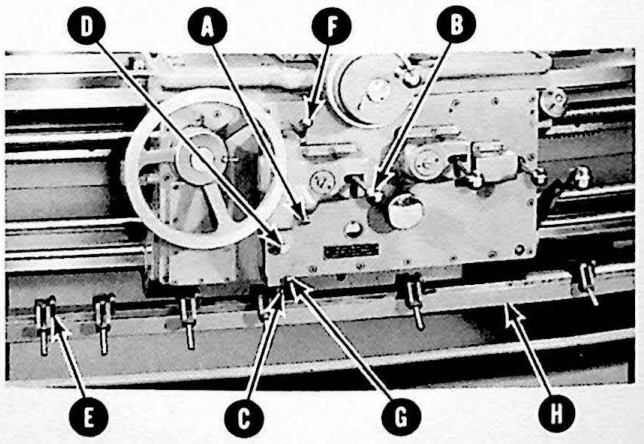


FIGURE 10 MULTIPLE AUTOMATIC LENGTH STOP (WITH 4-WAY POWER RAPID TRAVERSE)

TAILSTOCK

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

Clamping lever (D) is supplemented by a clamping nut which should be tightened when turning work between centers or in any case when there is a considerable amount of pressure against the tailstock.

Aligning screw (E) is used to bring the tailstock to true center with the headstock. On machines not equipped with a taper turning attachment, it is sometimes utilized to move the tailstock off center for taper turning. There are two of these screws, the other being at the rear of the tailstock.

SINGLE SPEED TAILSTOCK
(Figure 11)

Tailstock handwheel (A), Figure 11, is used to traverse or feed spindle (B) in or out. To remove the center or drill, crank the spindle back into the tailstock until it is automatically ejected.

Lever (C) locks the spindle in position. This should always be done before the start of the cut. (D) is a clamping lever which quickly clamps the tailstock to the bed for such operations as drilling and reaming.

Conveyor mechanism (H) is used for transporting the tailstock along the bed.

TWO-SPEED TAILSTOCK

Tailstock handwheel (A), Figure 12, is used to traverse or feed spindle (B) in or out. Lever (G) provides a 3 to 1 spindle feed reduction useful in drilling. Although the spindle is of the anti-friction type, a tang lock makes normal drilling possible. Where heavy duty drilling is desirable the heavy duty drill adapter is recommended. To remove the center or drill, crank the spindle back into the tailstock until it is automatically ejected.

Pulling lever (C) in a clockwise direction locks the spindle in position. This should always be done before the start of the cut. (D) is a clamping lever which quickly clamps the tailstock to the bed for such operations as drilling and reaming.

The one shot lubricator (F) oils the entire tailstock including the spindle bearings.

Conveyor mechanism (H) is used for transporting the tailstock along the bed.

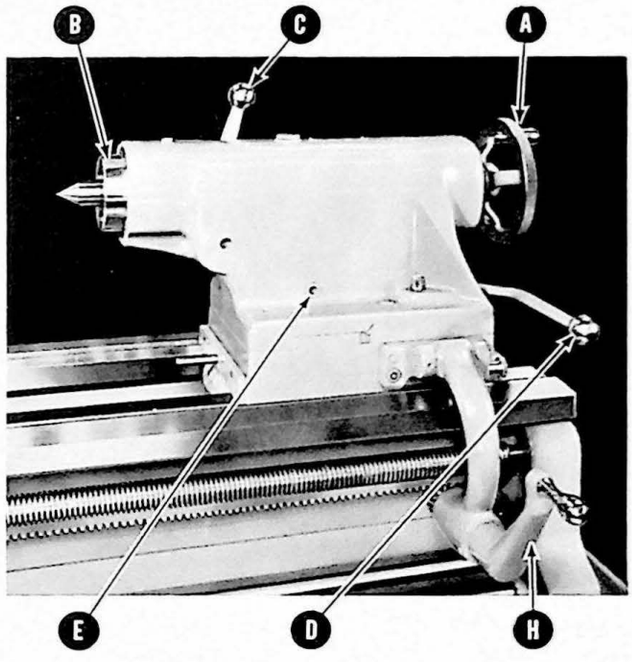


FIGURE 11 SINGLE SPEED TAILSTOCK

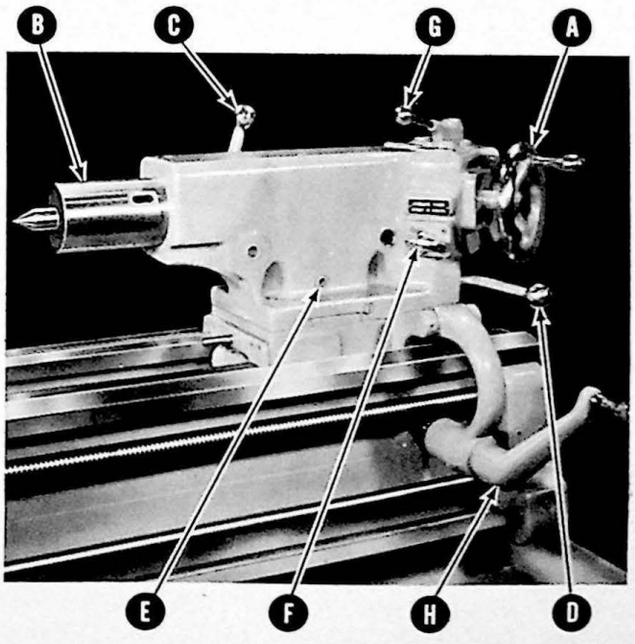


FIGURE 12 TWO-SPEED TAILSTOCK

AIR OPERATED TAILSTOCK

The air operated tailstock is used for quickly advancing and retracting the spindle. The force exerted on the center is varied by changing the air regulator located inside the tailend leg. Also located in the same compartment with the regulator is a filter and lubricator for removing the water from the air and providing the necessary lubrication for the air cylinder. The one shot lubricator (A) oils the spindle bearings, the spindle and the bedway.

The operating lever (B) serves the dual purpose of controlling the in and out movement of the spindle as well as clamping the spindle. As the lever is moved toward the headstock the spindle advances toward the work. When the lever has moved through an arc of approximately 35° it will encounter an interlock preventing any further lever movement until the spindle encounters the work. After the spindle has encountered the work the interlock is automatically retracted and the lever can be rotated through an additional arc which mechanically clamps the spindle. The spindle should always be securely clamped before the start of a cut. When retracting the spindle the sequence of operations is reversed. The interlock is not required when the spindle is retracted and therefore is inoperative.

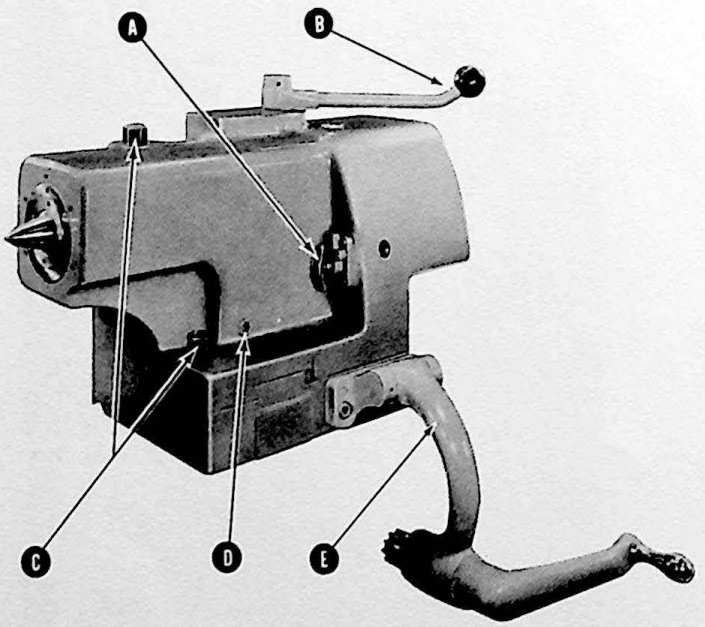


FIGURE 13 AIR OPERATED TAILSTOCK

Clamping the tailstock to the bed is by 4 clamp bolts, two of them shown as "C" and two more not visible at the right hand end. These should always be securely clamped when the tailstock is in use.

Aligning screw "D" is used to bring the tailstock to true center with the headstock. On machines not equipped with a taper turning attachment, it is sometimes utilized to move the tailstock off center for taper turning. There are two of these screws, the other being at the rear of the tailstock.

Conveyor mechanism "E" is used for transporting the tailstock along the bed.

TAPER ATTACHMENT

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

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

2. Loosen stud (J) and push slide (A), Figure 14, all the way in toward the headstock, position bed clamp (B) as illustrated, tighten lever (C) and lock camlock (D).

3. Set swivel (E) at required taper by turning stud (F) and reading the vernier dial (G).

   Move the "O" on the inner (vernier) scale to the graduation on the outer scale that is nearest to, but less than, the required setting. Then select the vernier graduation representing the amount to be added and move this graduation to alignment with the next graduation on the outer dial. When working to the right of the "O" on the outer dial, use the vernier graduations to the left of "O" and when working to the left of "O" on the outer dial use the vernier graduations to the right of "O". The vernier graduations represent 64ths of an inch or, on the degree scale, 5 minutes.

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

5. Adjust and lock backlash eliminator (I).

6. Now, turn the taper by feeding the tool to depth in the usual manner.

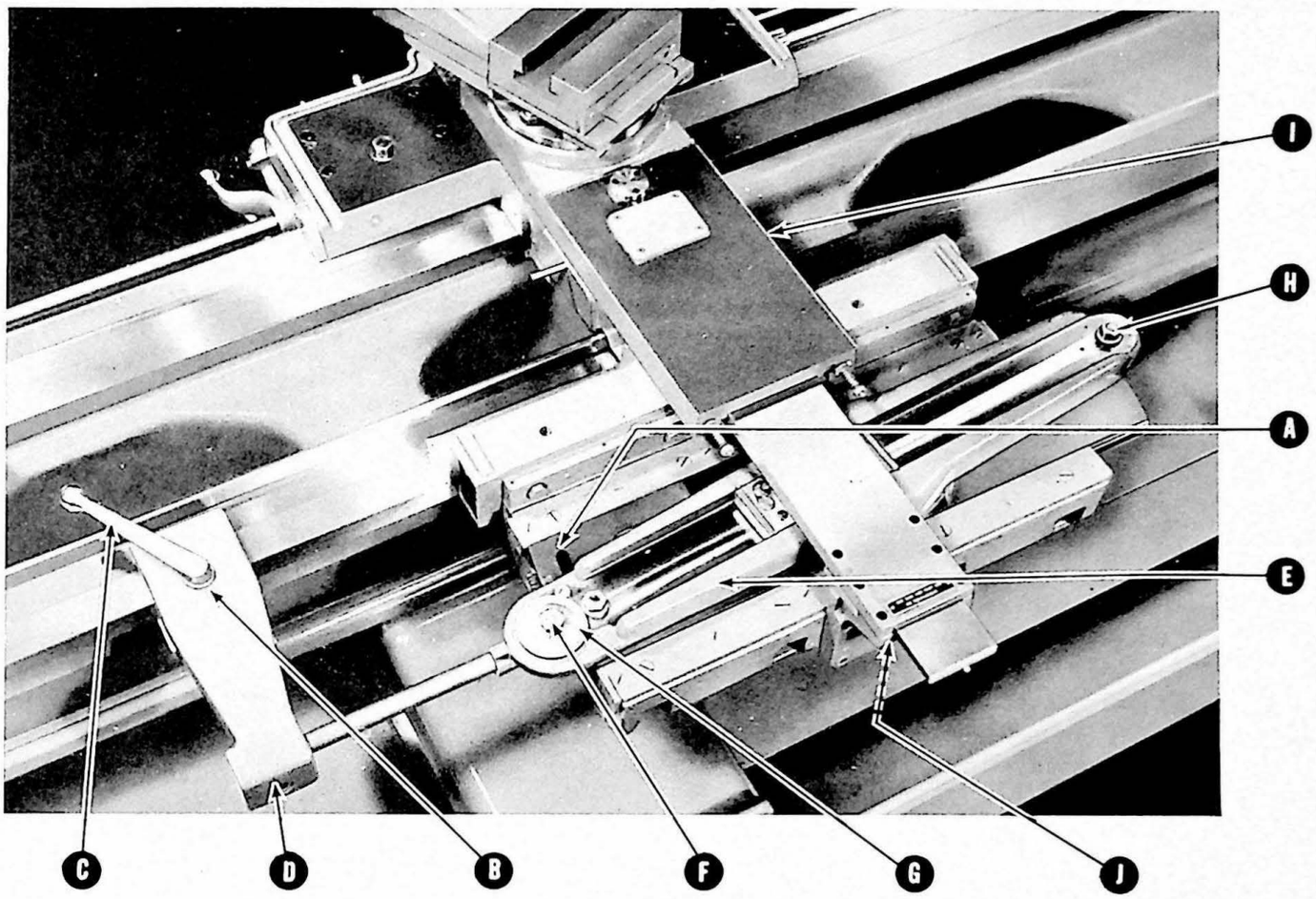


FIGURE 14 TOP VIEW OF MONARCH BALL BEARING TAPER ATTACHMENT

To disconnect the taper attachment for straight turning, loosen backlash eliminator (I), tighten stud (J), loosen camlock (D) and lever (C). Slide bracket (B) to extreme tailstock end of bed.

The Monarch taper attachment can be used to turn tapers, bore tapers or chase tapered threads. Maximum taper per foot is 4" and maximum length at one setting is 12" on the model 1610 and 18" on the models 2013 and 2516.

CAMLOCK SPINDLE

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

There are six camlocks in the spindle nose. Two of them, (A) Figure 15, clearly show in the illustration. The small indicating line on camlocks (A) indicates that they are in the unlocked position because these lines are parallel with the spindle face. Arrows (B) show the direction in which the camlocks should be rotated for tightening. When this is done, it is important that the camlocks be tightened evenly. Do this gradually, rotating the spindle from one to the other until all the locks are tight.

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

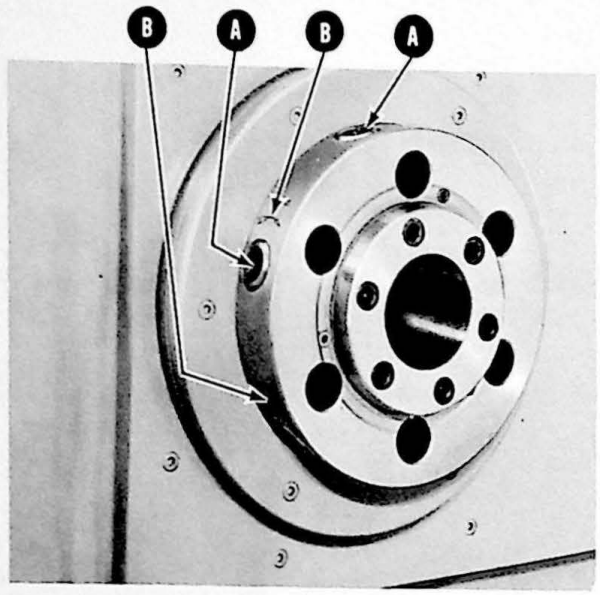


FIGURE 15 610 & 612 LATHE AMERICAN STANDARD CAMLOCK SPINDLE NOSE

ELECTRICAL CONTROL PANEL

The electrical control panel, Figure 16 is located on the front of the headstock. It is within easy reach of the operator at all times with the control buttons clearly marked for quick identification. (A) is the load meter, (B) forward, (C) reverse, (D) stop, (E) coolant pump starter.

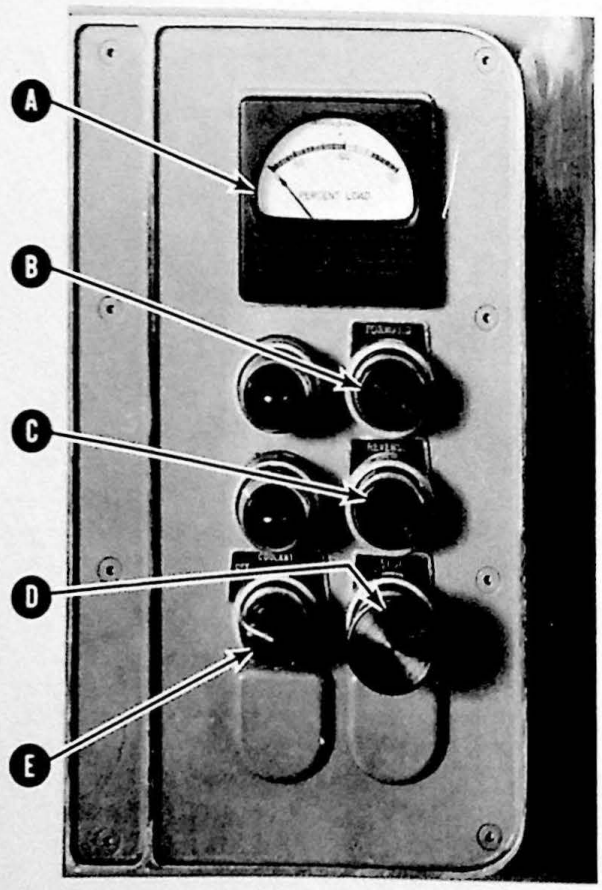


FIGURE 16 ELECTRICAL CONTROL PANEL

CARE AND ADJUSTMENT

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

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

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

APRON AND SLIDES

The longitudinal feed friction clutch is adjusted by turning screw (A), Figure 17, either in or out so the lever is moderately tight about halfway down toward the apron from the neutral position shown. The cross feed friction clutch is similarly adjusted by means of screw (B).

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

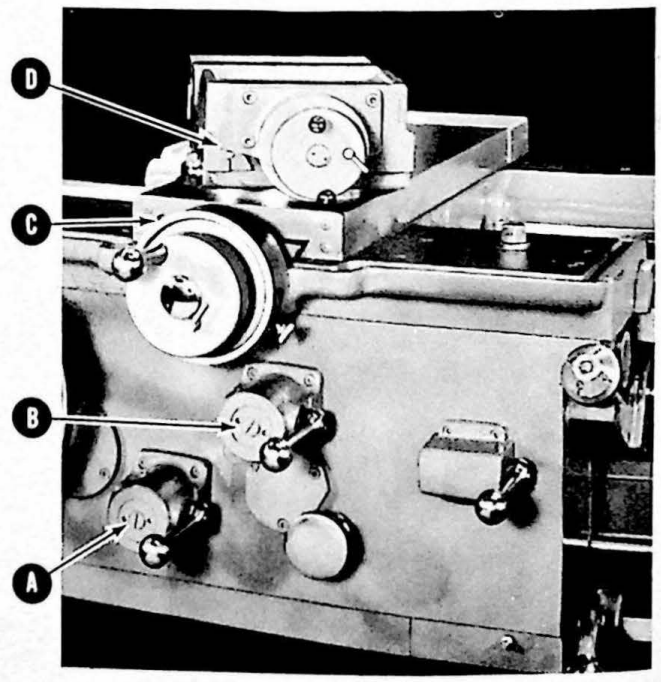


FIGURE 17 APRON AND SLIDE ADJUSTMENT SCREWS

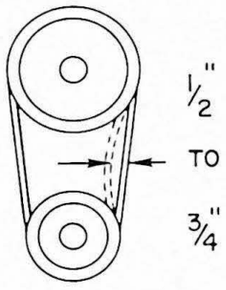
to give a slight drag to the slides. If the adjusting screws are drawn too tightly against each end of the gibs, they may create a bad bearing surface by throwing the gibs out of line.

SPINDLE CLUTCH AND BRAKE

The spindle brake is of the multiple disc type, hydraulically actuated. It is self adjusting and continuously lubricated. Clutch adjustment is described in the headstock section, page 5.

VEE BELTS

The main drive motor is mounted in the head end leg. To adjust Vee belt tension: remove access door at the rear of the head end leg. Loosen nuts (A). Adjust nuts (B) clockwise - to loosen belt tension; or counterclockwise - to tighten belt tension. Tighten nuts (A). Vee belt tension should be maintained as follows:



Light hand pressure against a single belt should move it 1/2" to 3/4".

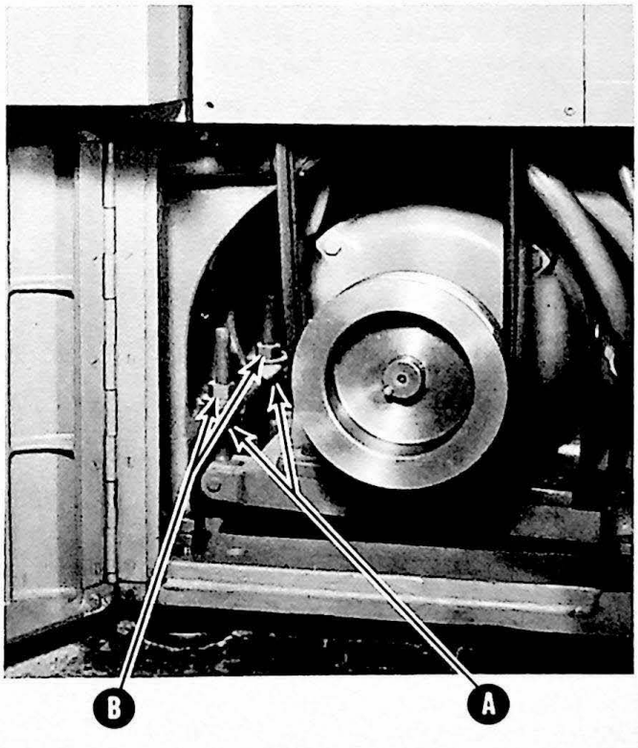


FIGURE 18 VEE BELT ADJUSTMENT

LUBRICATION PROCEDURE

PREPARATION FOR OPERATION AND RUN-IN

When you first receive your lathe you will find that an anti-rust compound has been applied to all outside machined surfaces. After removing the compound as suggested in the section on Receiving and Cleaning (Page 3) apply a thin film of a medium grade oil to bedway surfaces. Also check the level of the oil in the hydraulic power unit and apron. The lathe should then be thoroughly oiled and greased according to the lubrication chart.

Following the operation of the lathe for the first ninety days or approximately 750 hours, it is recommended practice to drain the apron, and flush with a light clean flushing oil and refill it to the proper level with the recommended lubricant.

The hydraulic power unit reservoir should not be flushed with flushing oil, but should be drained; the cover removed so that it can be wiped clean with a clean,. lint-free cloth; the cover replaced; the suction filter element replaced. Following this the reservoir should be refilled to the proper level with the recommended hydraulic oil.

PERIODIC OIL LEVEL CHECK

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

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

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

REQUIRED OIL CHANGES

It is recommended that once every six months the oil be drained from the apron and power unit, and that they be cleaned and refilled as previously described.

At the same time the apron lubricating pump should be removed and the felt filter disc inspected. If the disc is not clean it should be replaced with a new one and the pump reinstalled.

The pump can be reached by removing the pump cover from the bottom of the apron.

The hydraulic power unit filter should also be replaced at this time.

CORRECT HAND OILING

Before the lathe is started each working day, all oil cups and hand oiling points should be oiled according to the chart.

The use of the pneumatic type of oil can with plunger operation rather than the ordinary spring bottom type is recommended since it permits better oiling at many points and gives better control over quantity of oil used. Refer to chart for detailed hand-oiling instructions.

IMPORTANT: When refilling or adding oil to lubrication reservoirs take every precaution to prevent dirt or chips from getting into the system, since foreign matter of this nature can quickly clog the pump filters. Also avoid using lubricants which tend to be absorbed extensively by the filter discs, thus clogging and reducing the flow of oil through the system. For the same reason do not use the so-called "dripless" oils or grades containing graphite, soap or other foreign substances.

USE OF GREASE GUN

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

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

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

CARE OF HYDRAULIC SYSTEM

It is very important that extreme precautions be taken to prevent water, dirt and grit from entering the hydraulic system.

The pump, valves and operating pistons of the hydraulic system are sensitive to both the characteristics and the condition of the hydraulic oil used. With the right oil they will operate smoothly, perform faithfully, respond quickly and require little attention. Efficient operation depends largely upon:

1. Use of the correct oil.
2. Scheduled maintenance of the system as previously outlined.

IMPORTANCE OF CLEANLINESS

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

1. Wipe all filler openings carefully 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 or filling.
4. Clean all pressure fittings before using grease gun.

SPECIFIC LUBRICANTS

The below listed lubricants are satisfactory for the applications shown on the following lubrication chart.

SPEC.	SOURCE	LUBRICANT
MG-2	Socony-Mobil Oil Co.	Mobilux #2
	Shell Oil Co.	Alvania #2
	Standard Oil Co. (Ohio)	Sohiotran #2
	Sun Oil Co.	Prestige #42
MO-12	Socony-Mobil Oil Co.	Vactra Heavy - Medium
	Shell Oil Co.	Hydraulic Oil 33
	Sun Oil Co.	Solnus 300
MO-14	Sun Oil Co.	Sunoco Way Lubricant #80

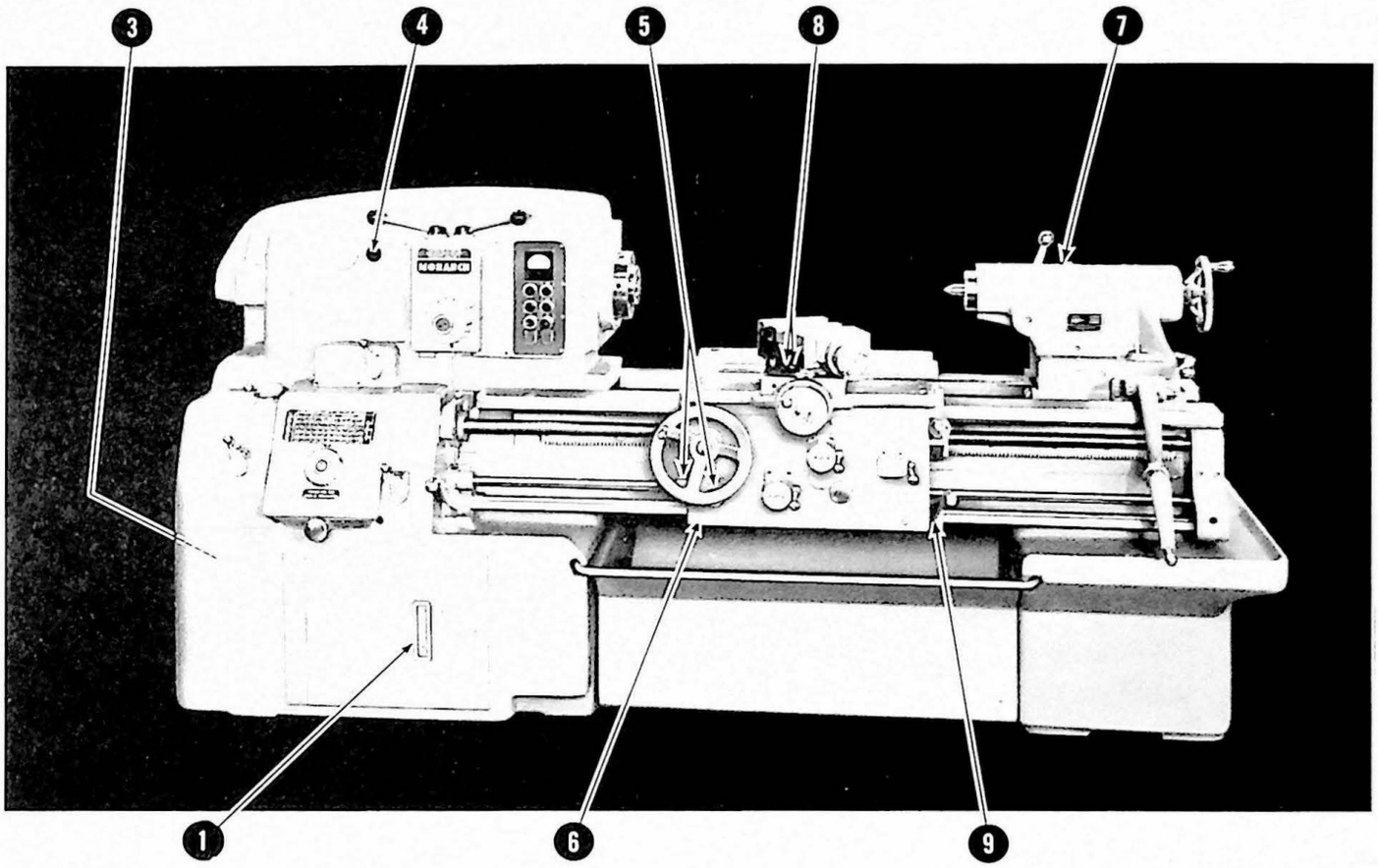


FIGURE 19 MONARCH 610 & 612 LATHE

Reference Number	Part	Capacity	Monarch Lubricant Spec.	Schedule
1	Hydraulic Power Unit Reservoir Filling Point and Oil Level Gauge (Unit Also Furnishes Oil for Lubrication of Headstock and Gear Box)	4 Gals.	MO-12	Check oil level at least twice a week. Drain every 6 months and clean. Also replace filter.
3	Main Drive Motor (Not visible)		MG-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	1 Qt.	MO-14	Drain (point 6) and flush twice a year. Check level each shift.
7	Tailstock		MO-12	Oil weekly.
8	Compound Rest		MO-14	Oil weekly.
9	Apron Control Rod Bearings		MG-2	Grease monthly.
	Taper Attachment		MO-14	Oil weekly when in use.
	Traveling Rod Supports (Where Used)		MO-14	Oil weekly.
Rear of lathe, at headstock end.	Rapid traverse gear motor drive.	1 Pt.	MO-12	Drain every 6 months, flush and refill with fresh oil. Grease rear motor bearing yearly with MG-2.

Monarch

ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES

THE MONARCH MACHINE TOOL CO

SIDNEY, OHIO

3619-1 (2M) H8

Litho in U.S.

Sidney, Ohio 45365

SAFETY

Metal cutting equipment is designed to change the shape of parts by removing metal. Accomplishing the metal cutting function requires high speeds, high horsepower, sharp tools, and moving elements. This in turn requires that an operator of this equipment be safety conscious to avoid an accident which could be crippling or fatal to the operator or persons standing nearby.

We cannot hope to anticipate all possible factors that could cause an accident to occur with this equipment, but are listing general safety considerations as an aid to the operator becoming safety oriented.

An operator should become completely familiar with all machine controls and corresponding movements before operating the machine. He should maintain a clear area surrounding the machine to be sure there are no obstacles to his movement and no slippery spots on the floor.

We suggest that snug fitting clothing and safety glasses be worn, and no attempt made to operate the machine while fatigued or ill. Do not operate the machine if it is malfunctioning in any way.

Persons other than the operator should stay at least 6 feet away from the machine while it is running so as not to distract the operator or accidentally move a control lever.

Do not stand on machine elements. Do not store wrenches or other items on machine surfaces.

Be sure that all guards and covers are properly in place and doors are closed and fastened while operating the machine.

The work holding device must be securely fastened to the spindle nose, workpiece properly held by work holding device (be sure to remove knock-out bar and all wrenches from spindle before running), tailstock (if needed) and tailstock spindle must be securely clamped before running part. The tailstock conveyor crank, if it is a removeable type, must be removed immediately after use. If a cylinder is used for power chucking, be sure pressure is adequate and speed is not excessive for the type chuck jaws being used.

Chucks must not be opened and tailstock members must not be unclamped while the workpiece is rotating.

Tools and holders must be securely fastened before attempting a cut.

A lathe is not designed for two-man operation. We recommend that the machine be turned off when another person is giving assistance in changing tooling, loading work, cleaning machine, or during maintenance work, as an accidental control actuation can cause an unexpected machine movement which could cause an accident.

Use a work loading assist to load heavy parts, but be sure the assist is clear of machine elements and will not obstruct operator movement before starting the machine.

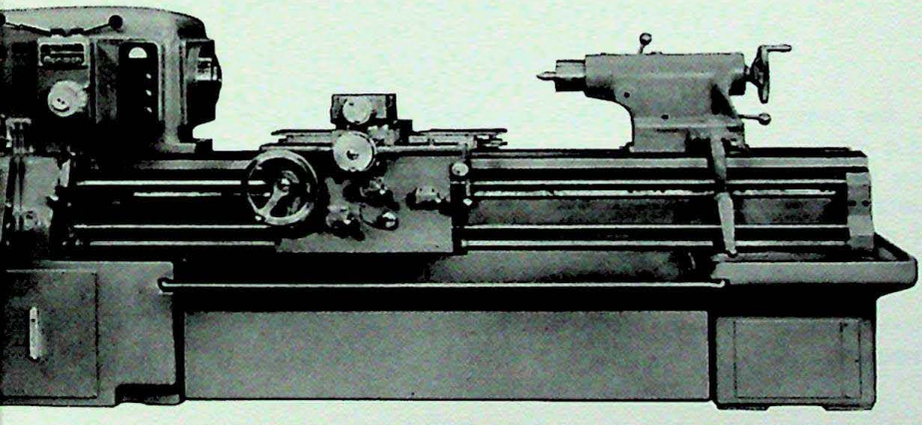
The actual cutting operation can produce sharp edges and considerable heat. The operator should never touch the workpiece, and should keep all objects away from the tool and workpiece, while rotating. Also, never reach past the spindle or workpiece while it is rotating.

The movement of the carriage and bottom slide will create pinch points and the operator must avoid these points.

High voltage is used to power this machine. Authorized electricians only should correct an electrical component failure. Other maintenance must be performed by authorized personnel.

In conclusion, the operator must treat the machine with the utmost respect and observe all safety precautions.

Monarch



SERIES 610 and 612 LATHES

PARTS CATALOG

THE MONARCH MACHINE TOOL COMPANY SIDNEY, OHIO

Monarch SERIES 610 AND 612 Lathe

MODELS 1610, 2013, 2516

PARTS CATALOG

Inherent in the purchase of this Monarch 610 or 612 Lathe is the guarantee of precise equipment construction. It has been designed, manufactured, and produced under the most rigid and exacting quality control conditions possible to insure accurate and long-life service. However, natural wear, general maintenance, or damage to the equipment may necessitate the ordering of replacement parts. To assure prompt service in ordering replacement parts, we have prepared this parts catalog, specifically designed to give you every possible assistance in quickly identifying and ordering required parts. It is a tangible result of Monarch's ever-continuing effort to provide users with the finest type of service possible and to make parts replacement ordering simple yet efficient.

Monarch

HOW TO IDENTIFY AND ORDER REPLACEMENT PART

CATALOG PLAN

For simplicity and clarity of presentation, the complete lathe has been separated into specific groups or units as indicated by the Visual Index on page 3. In the pages that follow, each unit is illustrated in exploded view form to show every detail part that forms the complete unit.

Certain units required more than one exploded view to clearly show all parts and these are grouped together as indicated in the Visual Index.

Each illustration is designated by a letter (Figure D, E, F, etc.) and the sequence of illustrations through the catalog is in alphabetical order beginning with the letter D. Each illustration has an adjoining parts list for part name identification.

LOCATING AND IDENTIFYING PARTS

Turn to the Visual Index on page 3 and determine the name of the unit where the part required can be found.

Note the figure letter and page number on which the unit is illustrated in exploded form.

Turn to the proper page, locate the illustrated pa and match the index number of the part with corresponding index number of the parts list part name identification.

HOW TO ORDER REPLACEMENT PAR

To assure prompt and accurate service when orde ing replacement parts, be sure to include the f lowing information.

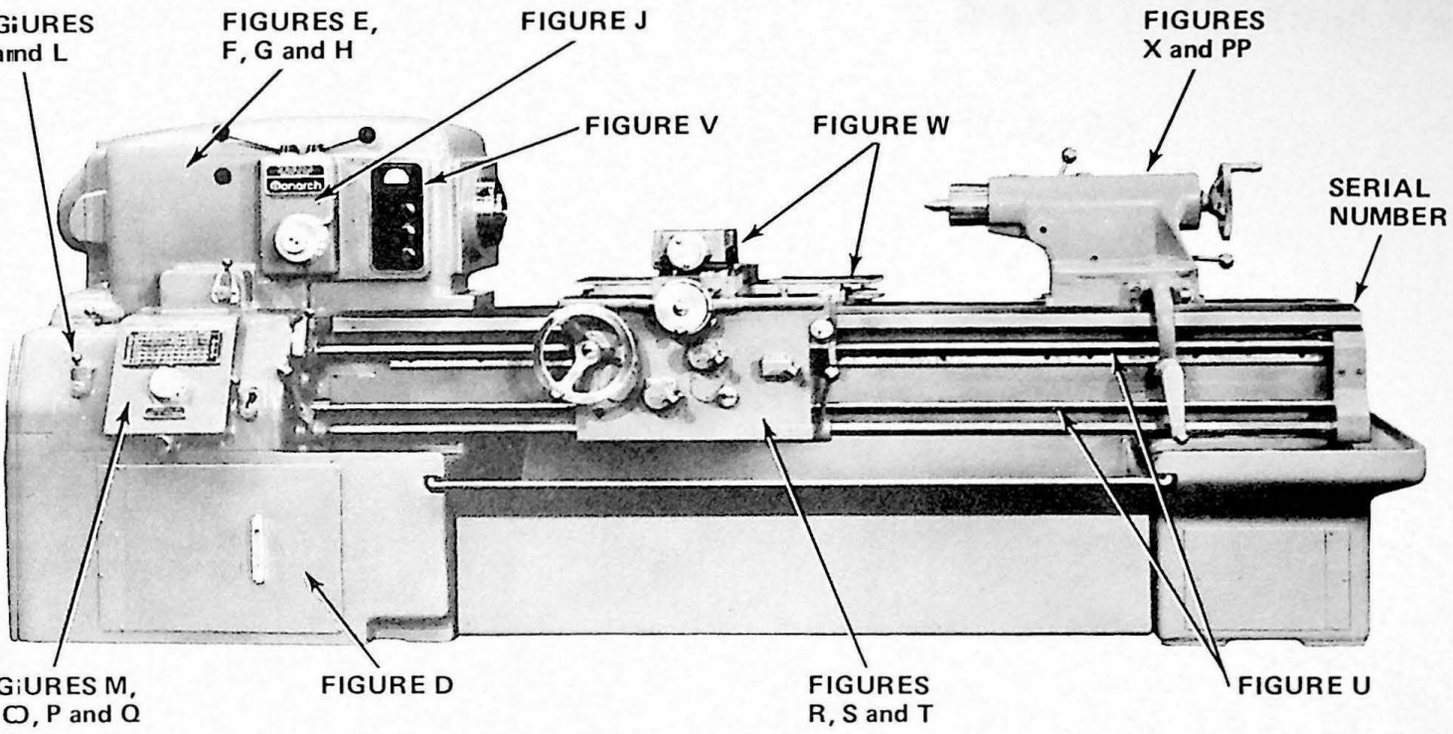
(1) Quantity required.
(2) Index number and name of part.
(3) Serial number of lathe requiring replacem part.

A sample order, properly worded, would read follows: 1 - Part number E21, Collar, for Monar 610 Lathe, Serial No. 12345.

NOTE

Always make certain the serial number of the lathe concerned is included in the order. The serial number of your lathe is stamped on the bed way as indicated in the Visual Index (page 3).

UAL INDEX



GURE UMBER	TABLE OF CONTENTS	PAGE
D	Hydraulic Tank	4-5
E	Headstock	6-7
F	Headstock	8-9
G	Headstock	10-11
H	Headstock Shifter Plate and Manifold Assembly	12-13
J	Headstock Mechanical Gear Shift Control	14-15
K	Reg. End Gearing and Metric Transposing Gears, Models 1610-2013	16-17
L	Reg. End Gearing and Metric Transposing Gears, Model 2516-2013	16-17
M	Gear Box for Model 1610, 2013 with and without Rapid Traverse	18-19
N	Gear Box for Model 1610, 2013 with and without Rapid Traverse	20-21
O	Gear Box for Models 2013 and 2516	22-23
P	Gear Box for Models 2013 and 2516	24-25
Q	Gear Box for Models 2013 and 2516	26-27
R	Plain Apron for Model 1610 and 2013	28-29
S	Plain Apron for Model 2013 and 2516	30-31
T	Apron Lead Screw Reverse for Models 1610, 2013 and 2516	32-33
U	Bed, Bed Parts, Control Rods, Leadscrew, Rod Carriers and Power Rapid Traverse	34-35
V	Electrical Parts and Panel Cabinet	36-37
W	Carriage Cross Slide, Compound Rest and Connected Compound with Plain Block Rear Rest	38-39
X	Tailstock-Screw Operated, Dead Spindle (612 Only)	40-41
PP	Tailstock-Screw Operated, Dead Spindle (610 Only)	42-43
	OPTIONAL AND ACCESSORY EQUIPMENT (On the following pages commonly used items of options and accessory equipment are listed)	
Y	Tailstock-Two Speed Range, Angular, Dead Spindle (612 Only)	44-45
Z	Tailstock-Anti-Friction and Angular Control Parts (612 Only)	46-47
QQ	Tailstock-Anti-Friction Spindle and Two Speed Screw	48-49
AA	Tailstock-Air Operated	50-51
BB	Apron with Power Rapid Traverse for Models 1610 and 2013	52-53
CC	Apron with Power Rapid Traverse for Models 1610 and 2013	54-55
DD	Apron with Power Rapid Traverse for Models 2013 and 2516	56-57
EE	Apron with Power Rapid Traverse for Models 2013 and 2516	58-59
FF	Apron with Power Rapid Traverse for Models 2013 and 2516	60-61
GG	Taper Attachment (612 Only)	62-63
RR	Taper Attachment (610 Only)	64-65
HH	Steady Rests and Follow Rests	66-67
SS	Cross Feed Screw with & w/o Micro-Gaging Dials	68-69
KK	Dog Plate, Face Plate and Multiple Indexing Face Plate	70-71
LL	Carriage Stops	72-73
MM	Multiple Automatic Length Feed Stop	74-75
NN	Single Automatic Length Feed Stop and Coolant System	76-77

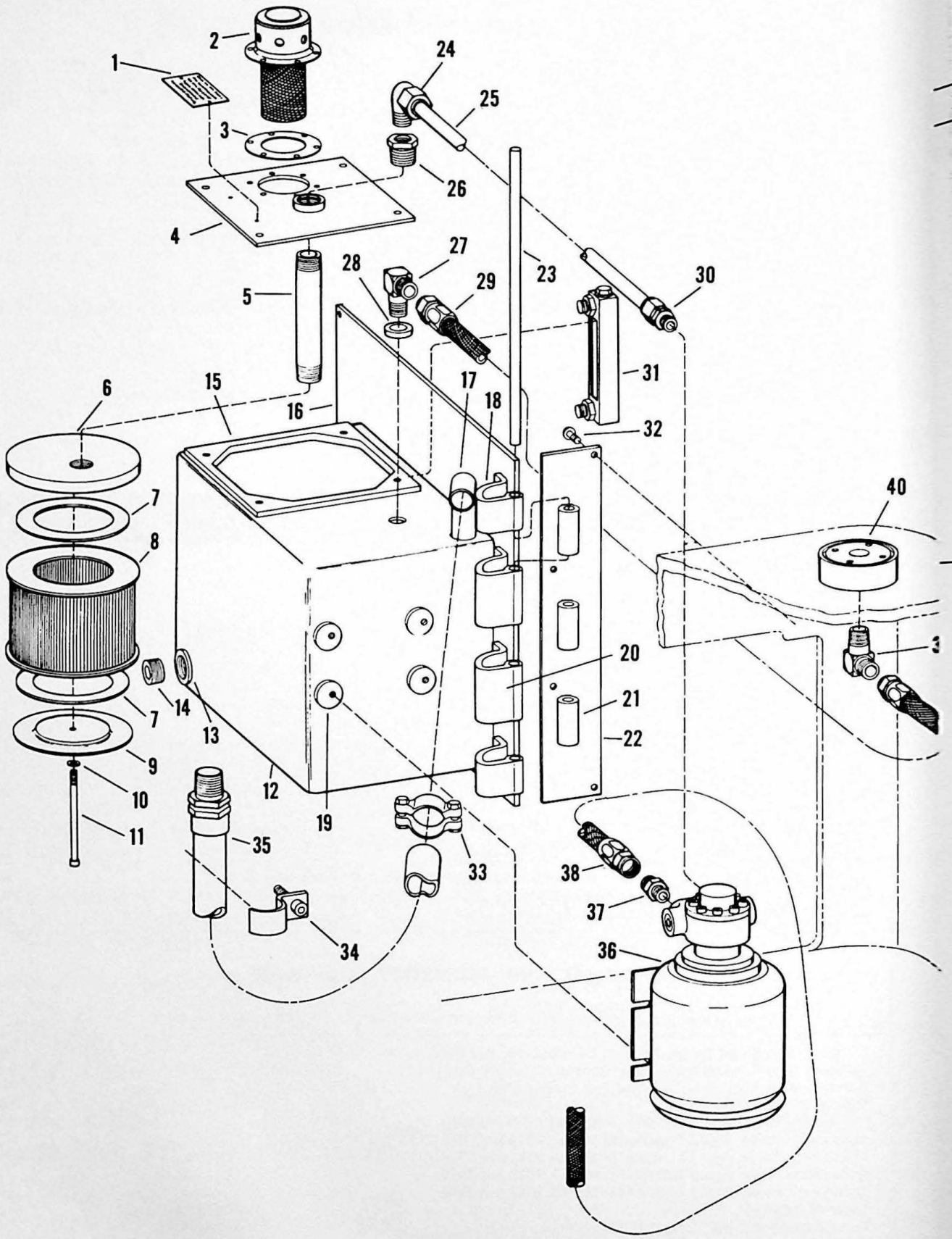


Figure D, Hydraulic Tank

Parts List for Figure D, Hydraulic Tank

INDEX NO.	PART NAME
D1	Instruction Plate
D2	Oil Filler
D3	Oil Filler Gasket
D4	Filter Plate
D5	Pipe
D6	Plate
D7	Neoprene Gasket
D8	Filter Element
D9	Bottom Plate
D10	Washer
D11	Screw
D12	Hydraulic Tank (Welded Assembly)
D13	Pipe Coupling
D14	Pipe Plug
D15	Plate
D16	Door
D17	Elbow
D18	Hinge Leaf
D19	Motor Mounting Lug
D20	Hinge Leaf

INDEX NO.	PART NAME
D21	Hinge Plate
D22	Hinge Lug
D23	Hinge Pin
D24	90° Elbow
D25	5/8" O. D. Steel Tubing
D26	Reducing Bushing
D27	Elbow Hose Adaptor
D28	Spacer
D29	Double Female Swivel Hose
D30	Straight Fitting
D31	Oil Level Sight Gage
D32	Screw
D33	Hose Clamp
D34	Pipe Clamp
D35	Drain Hose
D36	Hydraulic Pump and Motor
D37	Straight Hose Adaptor
D38	Double Female Swivel Hose
D39	Elbow Hose Adaptor
D40	Drain Adaptor

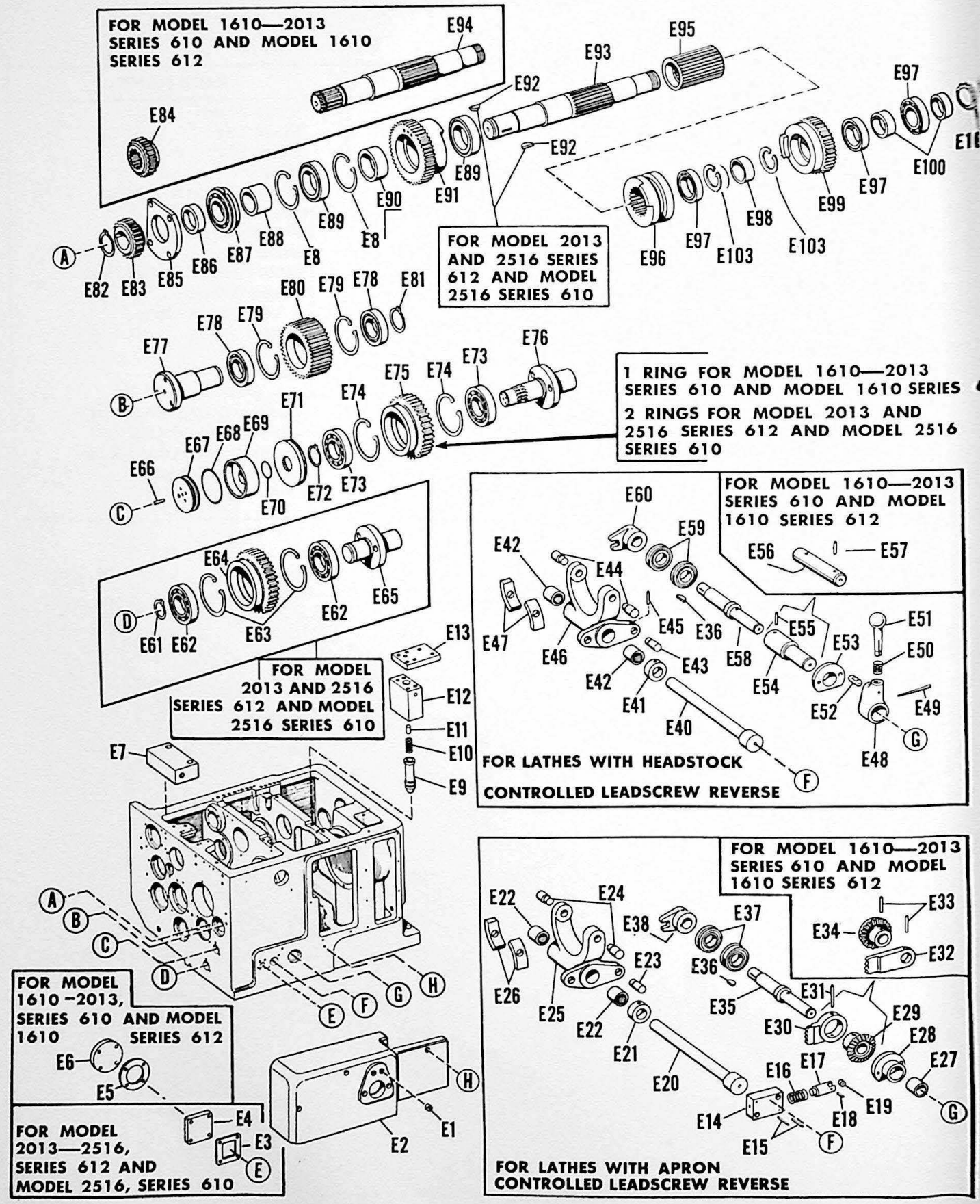


Figure E, Headstock

Parts List for Figure E, Headstock

INDEX NO.	PART NAME
E1	Insert
E2	Front Cover (Lower)
E3	Gasket
E4	Cover
E5	Gasket
E6	Cover
E7	Junction Block
E8	Retaining Ring
E9	Valve Stem
E10	Spring
E11	Spacer
E12	Valve Body
E13	Bracket
E14	Detent Case
E15	Dowel Pin
E16	Spring
E17	Plunger
E18	Roller Shaft
E19	Roller
E20	Shaft
E21	Collar
E22	Needle Bearing
E23	Pin
E24	Clutch Shoe Pin
E25	Clutch Fork
E26	Clutch Shoe
E27	Oilite Bushing
E28	Bushing
E29	Bevel Gear
E30	Index Sector
E31	Roll Pin
E32	Index
E33	Roll Pin
E34	Bevel Gear
E35	Shaft
E36	Woodruff Key
E37	Ball Bearing
E38	Shifter Arm
E40	Shaft
E41	Collar
E42	Needle Bearing
E43	Pin
E44	Clutch Shoe Pin
E45	Roll Pin (For Models 1610 - 2013)
E46	Clutch Fork
E47	Clutch Shoe
E48	Shifter Lever Hub
E49	Taper Pin
E50	Shifter Lever Spring
E51	Shifter Lever
E52	Plunger Pin
E53	Bushing
E54	Stub Shaft
E55	Roll Pin

INDEX NO.	PART NAME
E56	Straight Shaft
E57	Roll Pin
E58	Shaft
E59	Ball Bearing
E60	Shifter Arm
E61	Retaining Ring
E62	Ball Bearing
E63	Retaining Ring
E64	Gear (44T)
E65	Idler Stud
E66	Dowel Pin
E67	Piston
E68	"O" Ring
E69	Cylinder
E70	"O" Ring
E71	Brake Disc Assembly
E72	Retaining Ring
E73	Ball Bearing
E74	Retaining Ring 1 for Model 1610 - 2013 2 for Model 2516
E75	Gear
E76	Idler Stud
E77	Stud
E78	Ball Bearing
E79	Retaining Ring
E80	Gear
E81	Retaining Ring
E82	Retaining Ring
E83	Gear
E84	Gear (For Model 1610 - 2013)
E85	Cover
E86	Spacer
E87	Ball Bearing
E88	Spacer
E89	Ball Bearing
E90	Spacer
E91	Clutch Gear
E92	Woodruff Key (For Model 2516)
E93	Reverse Shaft
E94	Reverse Shaft (For Models 1610 - 2013)
E95	Splined Drive Sleeve
E96	Reverse Clutch
E97	Ball Bearing
E98	Spacer
E99	Clutch Gear
E100	Spacer
E101	Lockwasher
E102	Locknut
E103	Retaining Ring

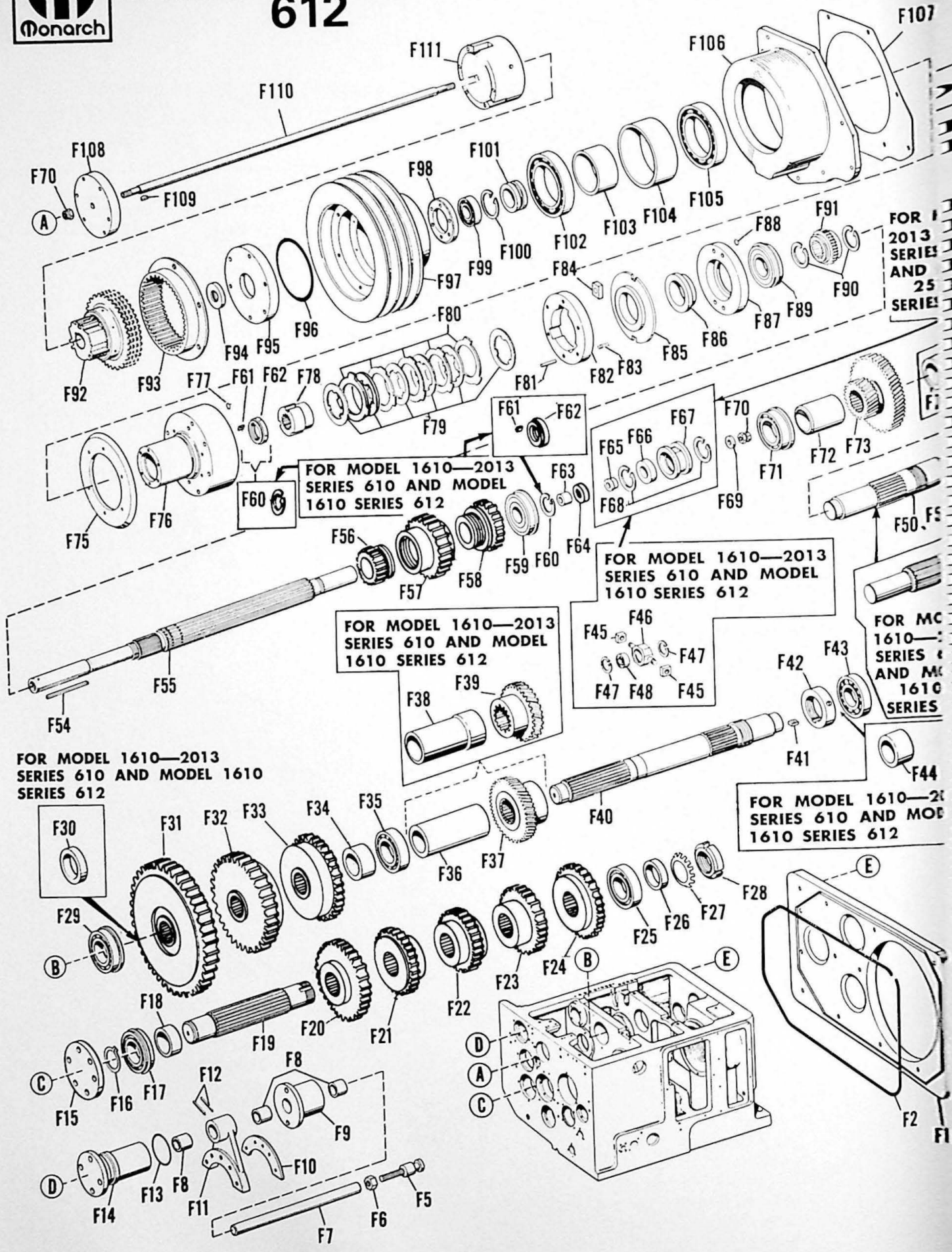


Figure F, Headstock

Parts List for Figure F, Headstock

EX NO.	PART NAME
'1	Cover Plate
'2	Sealing Element
'5	Adjusting Stud
'6	Hex Half Nut
'7	Shaft
'8	Bushing
'9	Bushing - R. H.
'1.0	Shifter Shoe
'1.1	Shifter Fork
'1.2	Roll Pin
'1.3	"O" Ring
'1.4	Bushing - L. H.
'1.5	Bearing Cap
'1.6	Retaining Ring
'1.7	Ball Bearing
'1.8	Spacer
'1.9	Shaft
'2:0	71 T. Gear
'2:1	59 T. Gear
'2:2	51 T. Gear
'2:3	55 T. Gear
'2:4	61 T. Gear
'2:5	Ball Bearing
'2:6	Spacer
'2:7	Bearing Lockwasher
'2:8	Bearing Locknut
'2:9	Ball Bearing
'3:0	Spacer (For Model 1610-2013 Series 610 & Model 1610 Series 612 Only)
'3:1	93 T. Gear
'3:2	67 T. Gear
'3:3	60 T. Gear
'3:4	Spacer
'3:5	Ball Bearing
'3:6	Spacer
'3:7	Gear
'3:8	Spacer (For Model 1610-2013 Series 610 & Model 1610 Series 612)
'3:9	Gear (For Model 1610-2013 Series 610 & Model 1610 Series 612)
'4:0	Shaft
'4:1	Locknut Insert
'4:2	Locknut
'4:3	Ball Bearing
'4:4	Spacer (For Model 1610-2013 Series 610 & Model 1610 Series 612)
'4:5	Shoe
'4:6	Shifter Ring
'4:7	Retaining Ring
'4:8	Ball Bearing
'4:9	Shaft (For Model 1610-2013 Series 610 & Model 1610 Series 612)
'5:0	Shaft (For Model 2013-2516 Series 612 & Model 2516 Series 610)
'5:1	Locknut Insert
'5:2	Locknut
'5:3	Ball Bearing

INDEX NO.	PART NAME
F54	Clutch Key
F55	Clutch & Brake Shaft
F56	31 T. Gear
F57	51 T. Gear
F58	41 T. Gear
F59	Ball Bearing
F60	Retaining Ring
F61	Locknut Insert
F62	Locknut
F63	Bushing
F64	Oil Seal
F65	Adaptor Ring
F66	Ball Bearing
F67	Shifter Ring
F68	Retaining Ring
F69	Washer
F70	Flexloc Nut
F71	Ball Bearing
F72	Spacer
F73	Compound Gear
F74	Spacer (For Model 2013-2516 Series 612 & Model 2516 Series 610)
F75	Oil Deflector
F76	Outboard Bearing Support
F77	"O" Ring
F78	Brake Hub
F79	Inner Disc
F80	Outer Disc
F81	Roll Pin
F82	Brake Ring
F83	Compression Spring
F84	Brake Disc Retainer
F85	Pressure Plate
F86	Piston
F87	Cylinder
F88	"O" Ring
F89	Ball Bearing
F90	Retaining Ring
F91	Gear
F92	Clutch
F93	Gear Ring
F94	Oil Seal
F95	Bearing Retainer
F96	"O" Ring
F97	Sheave
F98	Bearing Retainer
F99	Ball Bearing
F100	Retaining Ring
F101	Oil Ring
F102	Ball Bearing
F103	Bearing Spacer (Inner)
F104	Bearing Spacer (Outer)
F105	Ball Bearing
F106	Clutch Brake Cover
F107	Gasket
F108	Cap
F109	Woodruff Key
F110	Clutch Rod
F111	Engaging Cone

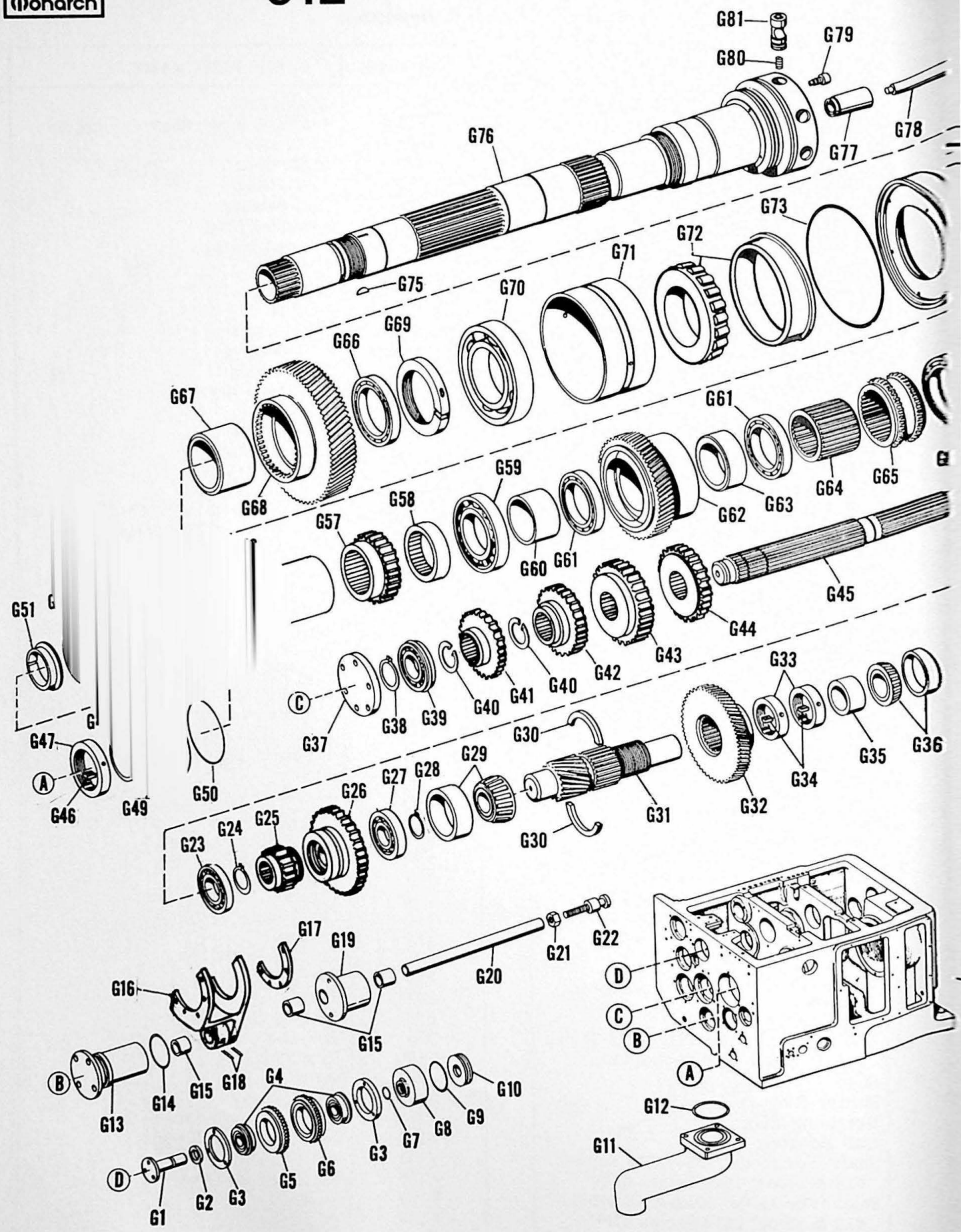


Figure G, Headstock

Parts List for Figure G, Headstock

INDEX NO.	PART NAME
G1	Shaft
G2	Spacer
G3	Gear Clamp
G4	Ball Bearing
G5	54 T. Gear
G6	Gear Disc Assembly
G7	"O" Ring
G8	Cylinder
G9	"O" Ring
G10	Piston
G11	Drain Hose Adaptor
G12	"O" Ring
G13	Offset Bushing, L. H.
G14	"O" Ring
G15	Bushing
G16	"H" Shifter Fork
G17	Shifter Shoe
G18	Roll Pin
G19	Offset Bushing, R. H.
G20	Shaft
G21	Hex Half Nut
G22	Adjusting Stud
G23	Ball Bearing
G24	Retaining Ring
G25	27 T. Gear
G26	60 T. Gear
G27	Ball Bearing
G28	Retaining Ring
G29	Single Row Bearing
G30	Retaining Spacer
G31	Pinion Shaft
G32	Gear
G33	Locknut
G34	Locknut Insert
G35	Spacer
G36	Single Row Bearing
G37	Bearing Cap
G38	Retaining Ring
G39	Ball Bearing
G40	Retaining Ring
G41	76 T. Gear

INDEX NO.	PART NAME
G42	59 T. Gear
G43	67 T. Gear
G44	63 T. Gear
G45	Shaft
G46	Locknut Insert
G47	Locknut
G48	Spacer
G49	Oil Slinger Cover
G50	"O" Ring
G51	Oil Slinger
G52	Ball Bearing
G53	Spacer
G54	Spacer
G55	45 T. Gear
G56	Spacer
G57	45 T. Gear
G58	Spacer
G59	Ball Bearing
G60	Spacer
G61	Bearing Assembly
G62	Gear
G63	Spacer
G64	Splined Spacer
G65	Clutch
G66	Bearing Assembly
G67	Spacer
G68	Bull Gear
G69	Locknut
G70	Ball Bearing
G71	Spacer
G72	Bearing Assembly
G73	"O" Ring
G74	Spindle Cup
G75	Woodruff Key
G76	Cam Lock Spindle
G77	Center Bushing
G78	Center
G79	Cam Screw
G80	Cam Spring
G81	Cam

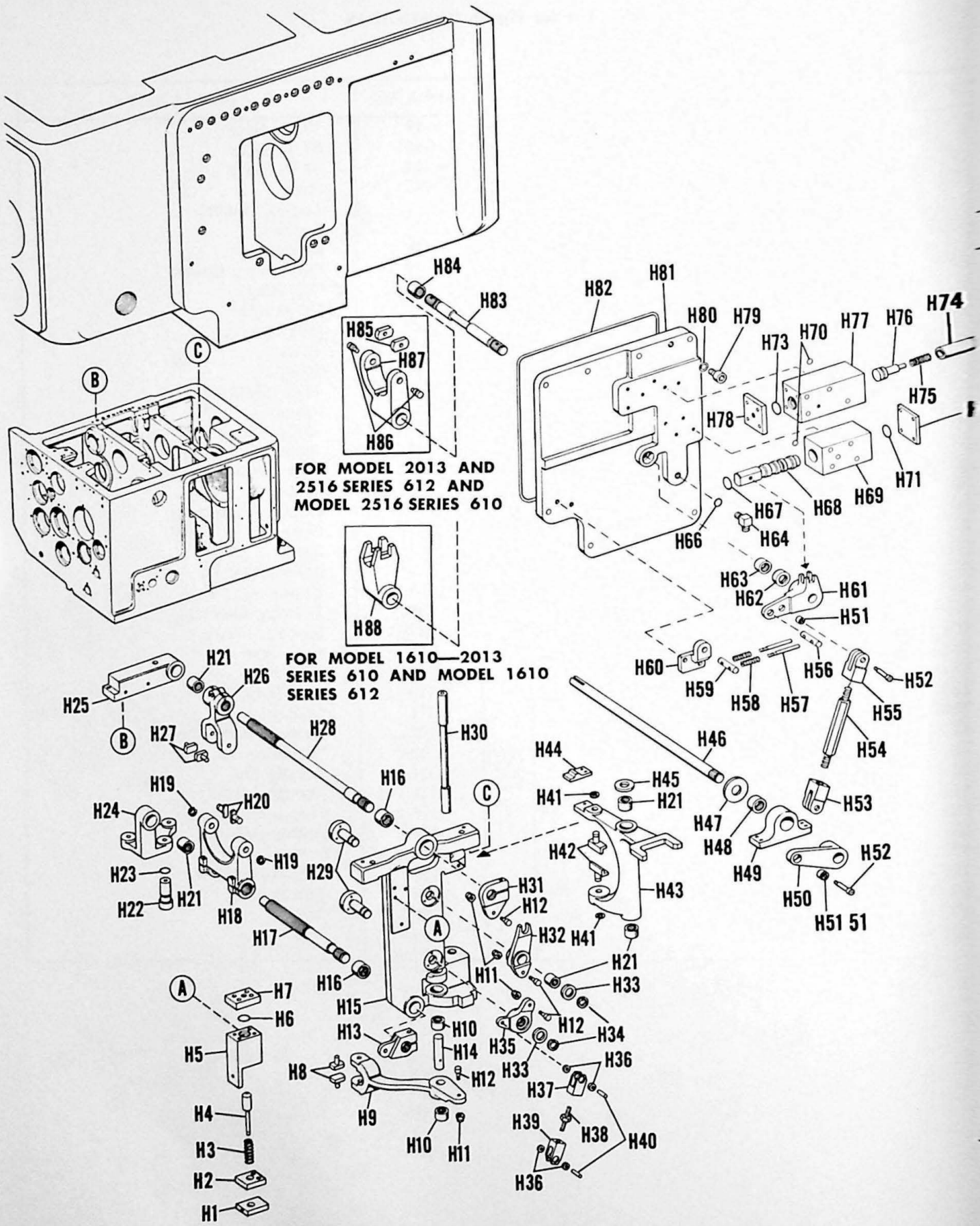


Figure H. Headstock Shifter Plate and Manifold Assembly

Parts List for Figure H, Headstock Shifter Plate and Manifold Assembly

INDEX NO.	PART NAME
H1	Stop Block
H2	Cap
H3	Compression Spring
H4	Stem
H5	Valve Body
H6	"O" Ring
H7	Cap
H8	Shifter Shoe
H9	Shifter Lever
H10	Needle Bearing
H11	Flexloc Nut
H12	Cam Follower Bearing
H13	Shifter Arm
H14	Shaft
H15	Shifter Plate
H16	Needle Bearing
H17	Shifter Shaft
H18	Shifter Fork
H19	Retaining Ring
H20	Shifter Shoe
H21	Needle Bearing
H22	Post
H23	"O" Ring
H24	Bracket
H25	Shaft Support
H26	Shifter Link
H27	Shifter Shoe
H28	Shaft
H29	Stud
H30	Shaft
H31	Shifter Lever
H32	Lever
H33	Spacer
H34	Retaining Ring
H35	Shifter Arm
H36	Bushing
H37	Yoke End
H38	Link
H39	Yoke End
H40	Pin
H41	Retaining Ring
H42	Shoe
H43	Fork
H44	Cam

INDEX NO.	PART NAME
H45	Spacer
H46	Cross Shaft
H47	Collar
H48	Needle Bearing
H49	Bracket
H50	Lever
H51	Needle Bearing
H52	Shoulder Screw
H53	Yoke R. H. Thread
H54	Adjusting Screw
H55	Yoke L. H. Thread
H56	Pin
H57	Stud
H58	Spring
H59	Pin
H60	Bracket
H61	Lever
H62	Oil Seal
H63	Needle Bearing
H64	Elbow
H66	"O" Ring
H67	"O" Ring
H68	Valve Stem
H69	Brake Valve Block
H70	"O" Ring
H71	"O" Ring
H72	Cap
H73	"O" Ring
H74	Valve Stem
H75	Compression Spring
H76	Plunger
H77	Relief Valve Block
H78	Cap
H79	Plug
H80	"O" Ring
H81	Rear Manifold
H82	Sealing Element
H83	Clutch Fork Shaft
H84	Needle Bearing
H85	Shifter Shoe
H86	Shoe Pin
H87	Shifter Yoke
H88	Shifter Yoke

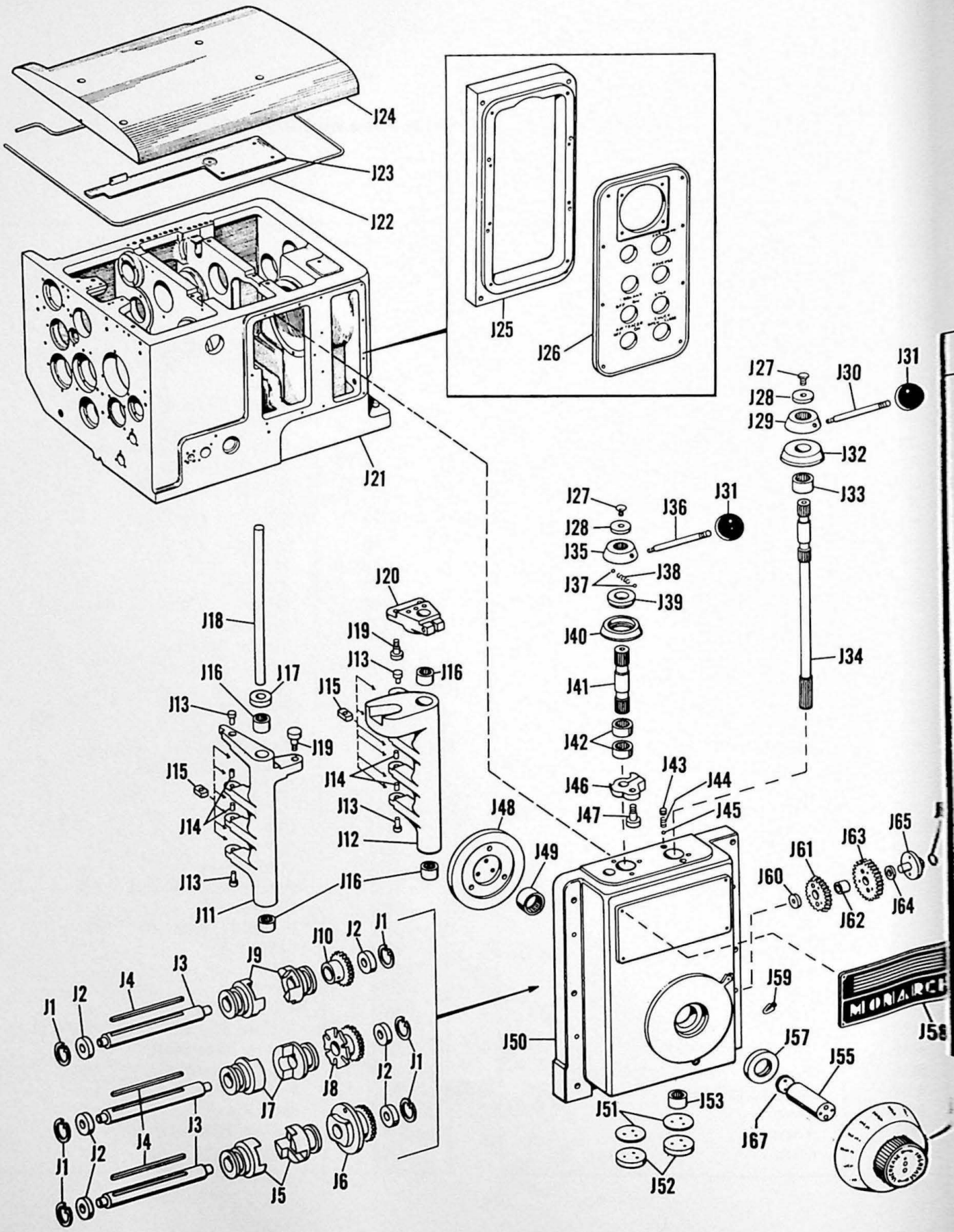
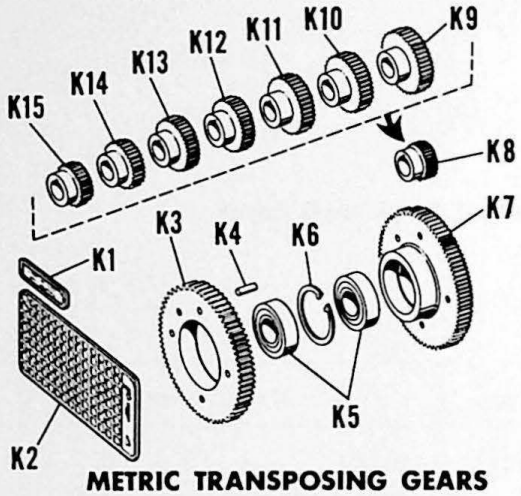


Figure J. Headstock Mechanical Gear Shift Control

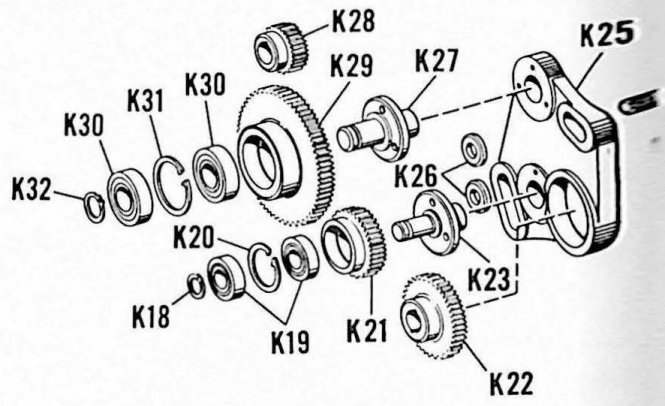
Parts List for Figure J, Headstock Mechanical Gear Shift Control

INDEX NO.	PART NAME
J1	Retaining Ring
J2	Ball Bearing
J3	Cam Shaft
J4	Cam Shaft Key
J5	Cam
J6	Driver
J7	Cam
J8	Geneva Stop
J9	Cam
J10	Gear
J11	Shifter Lever - L.H.
J12	Shifter Fork - R.H.
J13	Shoe Pin
J14	Shoe Pin
J15	Shoe
J16	Needle Bearing
J17	Collar
J18	Shaft
J19	Cam Follower Bearing
J20	Shifter Lever - R.H.
J21	Headstock
J22	Sealing Element
J23	Lubricator Pan
J24	Headstock Cover
J25	Mounting Plate
J26	Switch Plate
J27	Screw
J28	Washer
J29	Shifter Hub - R.H.
J30	Handle - R.H.
J31	Knob
J32	Shifter Index Plate - R.H.
J33	Needle Bearing

INDEX NO.	PART NAME
J34	Shaft
J35	Shifter Hub - L.H.
J36	Handle - L.H.
J37	Steel Ball
J38	Compression Spring
J39	Detent Plate
J40	Shifter Index Plate - L.H.
J41	Shaft
J42	Needle Bearing
J43	Lock Screw
J44	Spring
J45	Steel Ball
J46	Lever
J47	Cam Follower Bearing
J48	Bevel Gear
J49	Needle Bearing
J50	Housing
J51	Gasket
J52	Cover
J53	Needle Bearing
J55	Shaft
J56	R.P.M. Dial
J57	Oil Seal
J58	Instruction Plate
J59	Pointer
J60	Washer
J61	Bevel Pinion
J62	Needle Bearing
J63	Gear
J64	Washer
J65	Stud
J66	"O" Ring
J67	Shim

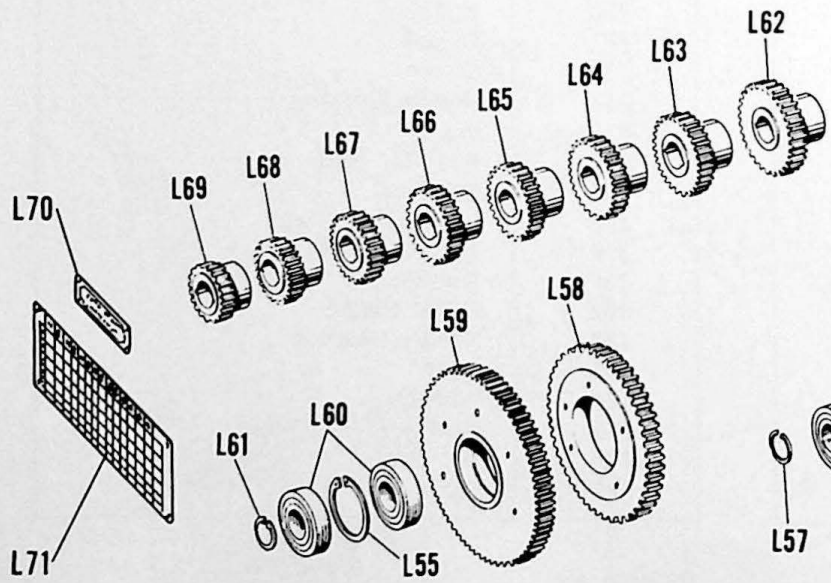


METRIC TRANSPOSING GEARS

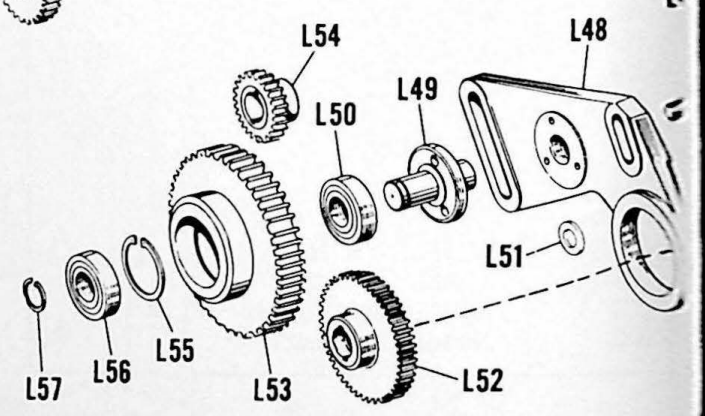


REGULAR
END GEARING

Figure K, Model 1610 and 2013 Series 610, Model 1610
Series 612 Regular End Gearing and Metric Transposing Gears



2013-2516 SERIES 612 AND 2516 SERIES
610 METRIC TRANSPOSING GEARS



2013-2516 SERIES 612 AND 2516 SERIES
610 REGULAR END GEARING

Figure L, Model 2013-2516 Series 612 and Model 2516, Series 610
Regular End Gearing, Metric Transposing Gears

Parts List for Figure K, Model 1610 and 2013 Series 610, Model 1610 Series 612 Regular End Gearing and Metric Transposing Gears

INDEX NO.	PART NAME
	METRIC TRANSPOSING GEARS
K1	Index Key Plate
K2	Index Plate
K3	Gear, 75T
K4	Dowel Pin
K5	Ball Bearing
K6	Retainer Ring
K7	Gear, 127T
K8	Gear, 35T
K9	Gear, 65T
K10	Gear, 56T
K11	Gear, 55T
K12	Gear, 52T
K13	Gear, 50T
K14	Gear, 45T
K15	Gear, 40T

INDEX NO.	PART NAME
	REGULAR END GEARING
K18	Retainer Ring
K19	Ball Bearing
K20	Retainer Ring
K21	Gear, 36T
K22	Gear, 50T
K23	Stud
K24	Tee Bolt
K25	Quadrant
K26	Washer
K27	Stud
K28	Gear, 25T
K29	Gear, 75T
K30	Ball Bearing
K31	Retainer Ring
K32	Retainer Ring

Parts List for Figure L, Model 2013-2516 Series 612 and Model 2516 Series 610, Regular End Gearing and Metric Transposing Gears

INDEX NO.	PART NAME
	2013-2516 REGULAR END GEARING
L47	T-Bolt
L48	Quadrant
L49	Stud
L50	Ball Bearing
L51	Washer
L52	Gear (50T, 10P)
L53	Gear (75T, 10P)
L54	Gear (25T, 10P)
L55	Retaining Ring
L56	Ball Bearing
L57	Retaining Ring

INDEX NO.	PART NAME
	2013-2516 METRIC TRANSPOSING GEARS
L58	Metric Trans. Gear (75T, 16P)
L59	Metric Trans. Gear (127T, 16P)
L60	Ball Bearing
L61	Retaining Ring
L62	Metric Trans. Gear (65T, 16P)
L63	Metric Trans. Gear (56T, 16P)
L64	Metric Trans. Gear (55T, 16P)
L65	Metric Trans. Gear (52T, 16P)
L66	Metric Trans. Gear (50T, 16P)
L67	Metric Trans. Gear (45T, 16P)
L68	Metric Trans. Gear (40T, 16P)
L69	Metric Trans. Gear (35T, 16P)
L70	Index Key Plate
L71	Index Plate

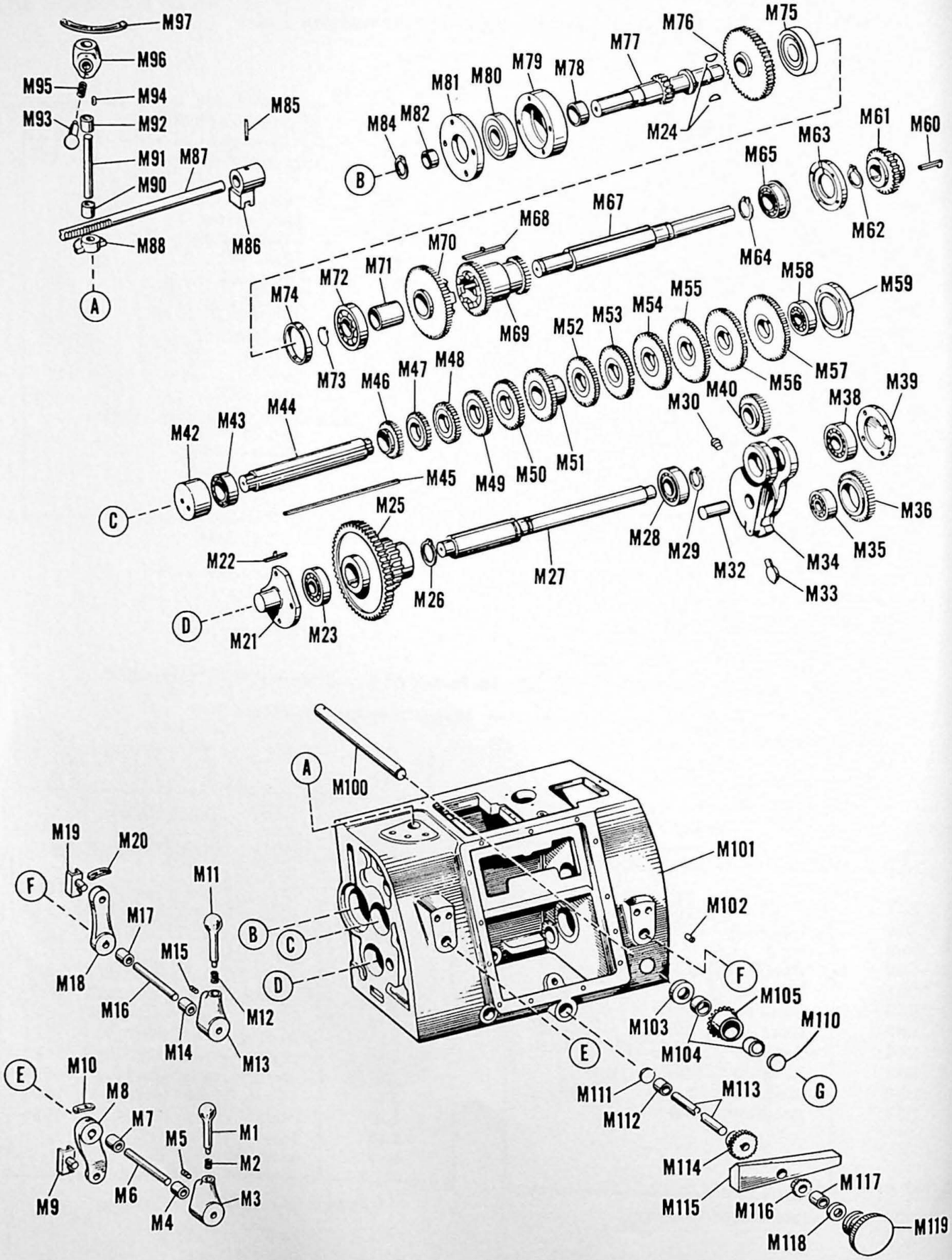


Figure M, Gear Box for Models 1610 and 2013, Series 610 and Model 1610, Series 612. (With or Without Rapid Traverse)

Parts List for Figure M, Gear Box for Models 1610 and 2013, Series 610 and Model 1610, Series 612

(With or Without Rapid Traverse)

INDEX NO.	PART NAME
M1	Shifter Lever
M2	Shifter Lever Spring
M3	Shifter Lever Hub
M4	Bushing
M5	Plunger Pin
M6	Shaft
M7	Bushing
M8	Lever
M9	Shoe
M10	A-B Index Plate
M11	Shifter Lever
M12	Shifter Lever Spring
M13	Shifter Lever Hub
M14	Bushing
M15	Plunger Pin
M16	Shaft
M17	Bushing
M18	Lever
M19	Shoe
M20	Index Plate (Threads-Feeds)
M21	Plate
M22	Tit Key
M23	Bearing
M24	Key
M25	Gear (52T, 26T)
M26	Retaining Ring
M27	Tumbler Shaft
M28	Bearing
M29	Retaining Ring
M30	Button
M32	Tumbler Idler Stud
M33	Tumbler Stud
M34	Tumbler
M35	Bearing
M36	Tumbler Idler Gear (40T)
M38	Bearing
M39	Bearing Cap
M40	Gear (32T)
M42	Plug
M43	Bearing
M44	Cone Shaft
M45	Key
M46	Gear (32T)
M47	Gear (36T)
M48	Gear (38T)
M49	Gear (40T)
M50	Gear (44T)
M51	Gear (48T)
M52	Gear (46T)
M53	Gear (52T)
M54	Gear (54T)
M55	Gear (56T)
M56	Gear (60T)
M57	Gear (64T)
M58	Bearing

INDEX NO.	PART NAME
M59	Bearing Cap
M60	Key
M61	Slip Gear (30T)
M62	Retaining Ring
M63	Bearing Cap
M64	Retaining Ring
M65	Bearing
M67	Clutch Shaft
M68	Tit Key
M69	Sliding Clutch Gear (44T, 32T)
M70	Clutch Gear (64T)
M71	Oilite Bushing
M72	Bearing
M73	Retaining Ring
M74	Spacer
M75	Bearing
M76	Gear (52T)
M77	Compound Shaft (13T)
M78	Spacer
M79	Bearing Retainer
M80	Bearing
M81	Bearing Cap
M82	Bushing
M84	Retaining Ring
M85	Worm Lock Screw
M86	Shifter Fork
M87	Shifter Rack (16T)
M88	Gear Segment (32T)
M90	Bushing
M91	Shaft
M92	Bushing
M93	Shifter Lever
M94	Plunger Pin
M95	Shifter Lever Spring
M96	Shifter Lever Hub
M97	C-D-E Index Plate
M100	Shaft
M101	Gear Box
M102	Insert
M103	Oil Seal
M104	Needle Bearing
M105	Sleeve Miter Gear (17T)
M110	Plug
M111	Plug
M112	Oilite Bushing
M113	Shaft
M114	Gear (26T)
M115	Cam Plate
M116	Bevel Gear (32T)
M117	Oilite Bushing
M118	Oil Seal
M119	Shifter Knob

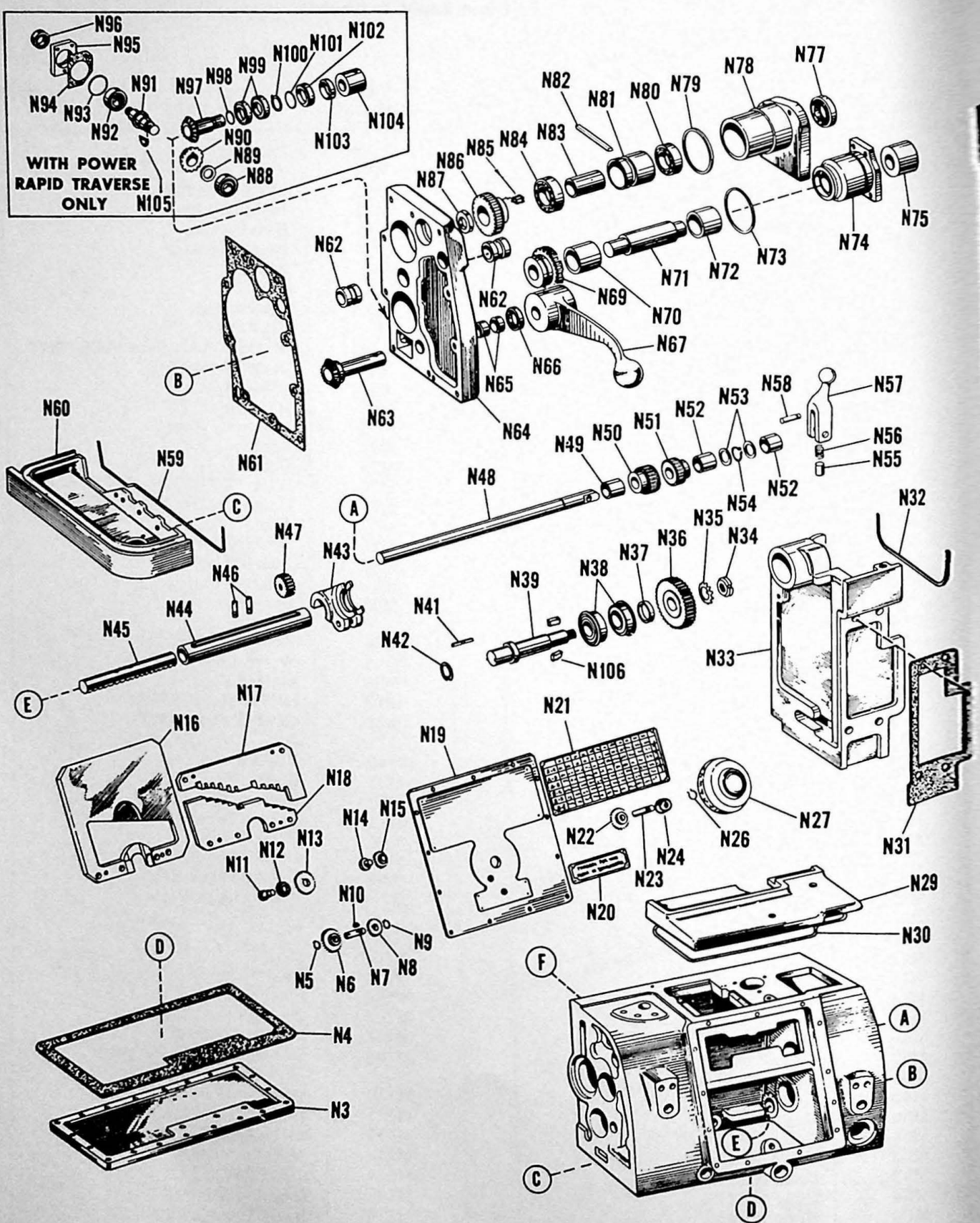


Figure N, Gear Box for Models 1610 and 2013, Series 610 and Model 1610 Series 612 (With and Without Rapid Traverse)

Parts List for Figure N, Gear Box for Models 1610 and 2013, Series 610 and Model 1610, Series 612

(With or Without Rapid Traverse)

INDEX NO.	PART NAME
N3	Cover
N4	Gasket
N5	Retaining Ring
N6	Bevel Pinion (46T)
N7	Shaft
N8	Gear (32T)
N9	Retaining Ring
N10	Key
N11	Gear Stud
N12	Gear (32T)
N13	Gear (53T)
N14	Stud
N15	Gear (32T)
N16	Rack Plate
N17	Tumbler Plate
N18	Tumbler Plate
N19	Cover
N20	Instruction Plate
N21	Index Plate
N22	Gear (45T)
N23	Shaft
N24	Bushing
N26	Retaining Ring
N27	Dial
N29	Cover
N30	Sealing Element
N31	Gasket
N32	Sealing Element
N33	End Gear Housing
N34	Locknut
N35	Lockwasher
N36	Gear
N37	Spacer
N38	Bearing
N39	Shaft
N41	Key
N42	Retaining Ring
N43	Shifter
N44	Sleeve
N45	Rack
N46	Dowel Screw
N47	Gear (22T)
N48	Shaft
N49	Oilite Bushing
N50	Gear (24T)
N51	Gear (24T)
N52	Oilite Bushing
N53	Spacer
N54	Retaining Ring

INDEX NO.	PART NAME
N55	Pin
N56	Spring
N57	Shifter Lever
N58	Stud
N59	Seal
N60	Sump
N61	Gasket
N62	Bushing
N63	Miter Gear (17T)
N64	Leadscrew Feed Rod Support
N65	Needle Bearings
N66	Oil Seal
N67	Control Lever
N69	Gear
N70	Oilite Bushing
N71	Stud Shaft
N72	Oilite Bushing
N73	"O" Ring
N74	Feed Rod Bearing Housing
N75	Collar
N77	Oil Seal
N78	Leadscrew Bearing Housing
N79	"O" Ring
N80	Bearing
N81	Outer Bearing Spacer
N82	Felt Oil Retainer
N83	Inner Bearing Spacer
N84	Bearing
N85	Straight Key
N86	Gear
N87	Nut
N106	Square Key
	WITH POWER RAPID TRAVERSE ONLY
N88	Bearing
N89	Washer
N90	Miter Gear
N91	Gear Shaft
N92	Bearing
N93	"O" Ring
N94	Gasket
N95	Retaining Plate
N96	Oil Seal
N97	Miter Gear
N98	Washer
N99	Bearing
N100	Retaining Ring
N101	"O" Ring
N102	Retaining Ring
N103	Oil Seal
N104	Coupling
N105	Woodruff Key

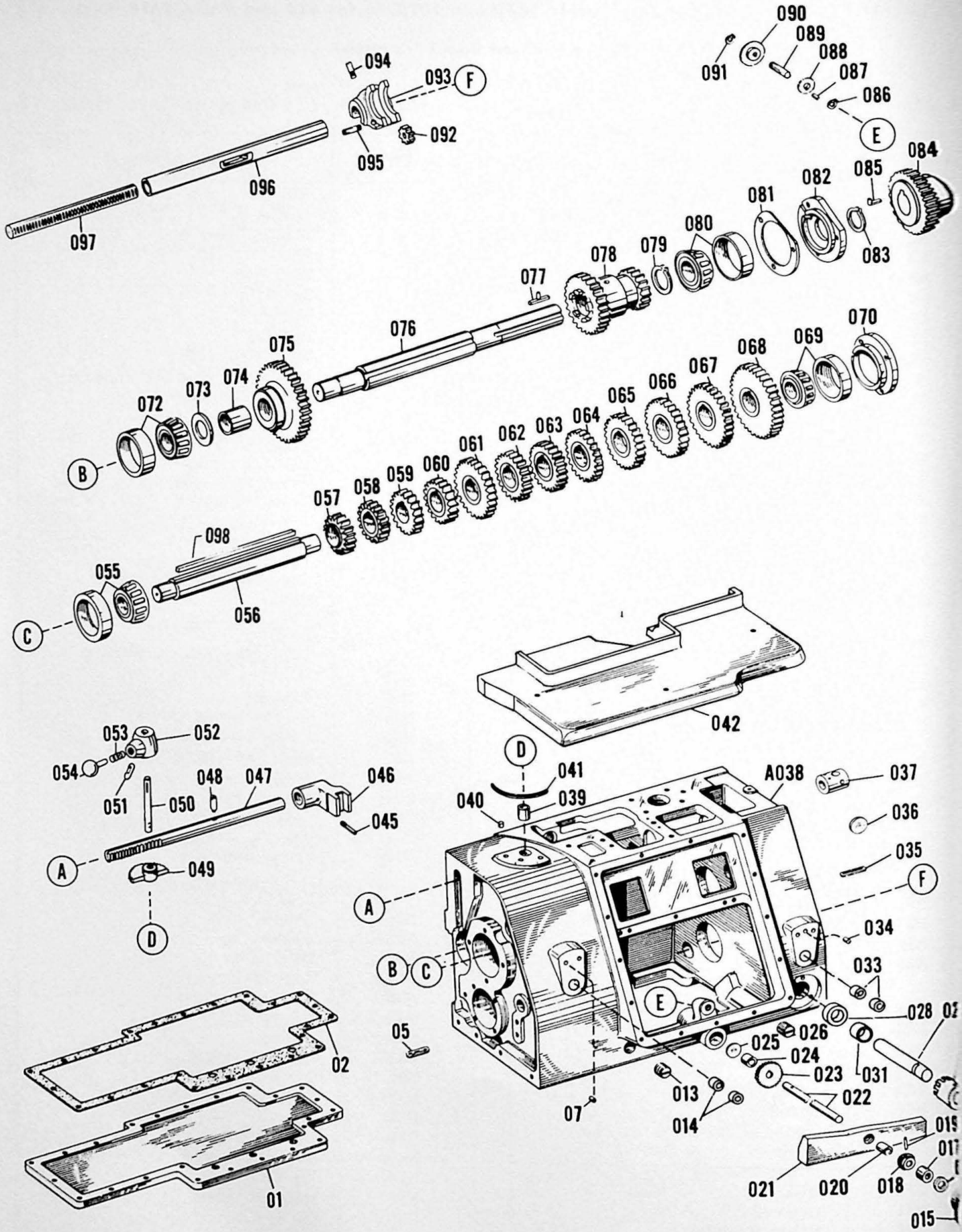


Figure O, Gear Box for Models 2013 and 2516, Series 612 and Model 2516, Series 610

Parts List for Figure O, Gear Box for Models 2013 and 2516 Series 612 and Model 2516, Series 610

INDEX NO.	PART NAME
O1	Cover
O2	Gasket
O5	A-B Index Plate
O13	Plug
O14	Oilite Bushing
O15	Shifter Knob
O16	Garlock Oil Seal
O17	Oilite Bushing
O18	Bevel Gear (32T)
O19	Threaded Dowel
O20	Oilite Bushing
O21	Cam Plate
O22	Shaft
O23	Bevel Gear
O24	Oilite Bushing
O25	Expansion Plug
O26	Plug
O27	Shaft
O28	Oil Seal
O30	Plug
O31	Needle Bearing
O32	Bevel Gear
O33	Oilite Bushing
O34	Insert
O35	Leadscrew and Feed Rod Plate
O36	Expansion Plug
O37	Oilite Fitting
O38	Gear Box
O39	Oilite Bushing
O40	Plug
O41	C-D-E Index Plate
O42	Cover
O45	Worm Lock Screw
O46	Shifter Fork
O47	Shaft Rack
O48	Key
O49	Gear (40T)
O50	Shaft
O51	Plunger Pin
O52	Shifter Lever Hub

INDEX NO.	PART NAME
O53	Shifter Lever Spring
O54	Shifter Lever
O55	Single Row Bearing
O56	Cone Shaft
O57	Cone Gear #1
O58	Cone Gear #2
O59	Cone Gear #3
O60	Cone Gear #4
O61	Cone Gear #5
O62	Cone Gear #6
O63	Cone Gear #7
O64	Cone Gear #8
O65	Cone Gear #9
O66	Cone Gear #10
O67	Cone Gear #11
O68	Cone Gear
O69	Single Row Bearing
O70	Bearing Cap
O72	Single Row Bearing
O73	Collar
O74	Oilite Bushing
O75	Gear (36T)
O76	Clutch Shaft
O77	Key
O78	Gear (27T, 18T)
O79	Retaining Ring
O80	Single Row Bearing
O81	Shim
O82	Bearing Cap
O83	Retaining Ring
O84	Slip Gear
O85	Slip Gear Key
O86	Retaining Ring
O87	Key
O88	Bevel Gear (32T)
O89	Shaft
O90	Bevel Gear (47T)
O91	Retaining Ring
O92	Gear (8T)
O93	Shifter
O94	Dowel Screw
O95	Dowel Screw
O96	Sleeve
O97	Rack
O98	Square Key

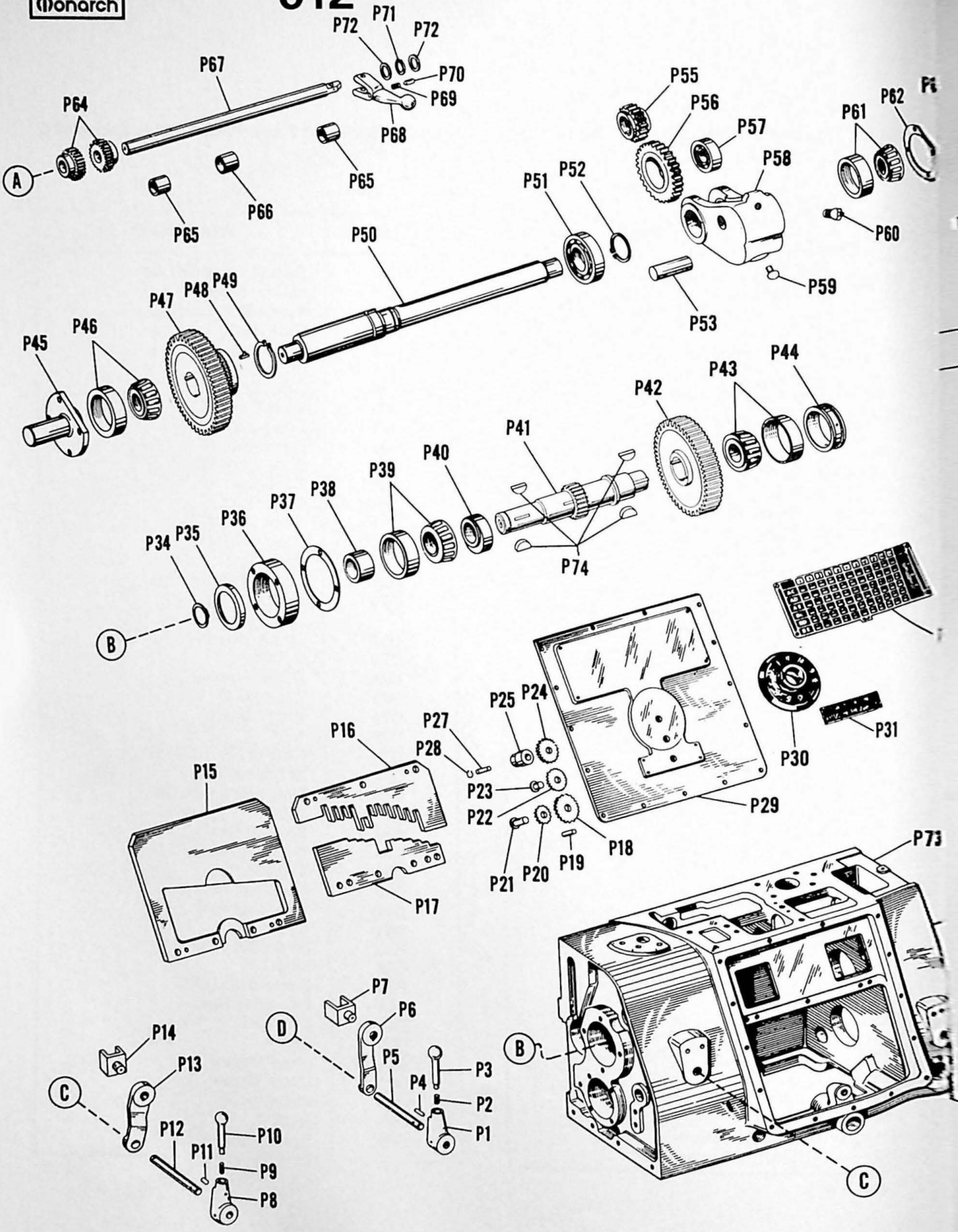


Figure P, Gear Box for Models 2013 and 2516, Series 612 and Model 2516, Series 610

Parts List for Figure P, Gear Box for Models 2013 and 2516, Series 612 and Model 2516 Series 610

INDEX NO.	PART NAME
P1	Shifter Lever Hub
P2	Shifter Lever Spring
P3	Shifter Lever
P4	Plunger Pin
P5	Shaft
P6	Lever
P7	Slip Gear Shoe
P8	Shifter Lever Hub
P9	Shifter Lever Spring
P10	Shifter Lever
P11	Plunger Pin
P12	Shaft
P13	Lever
P14	Compound Shoe
P15	Rack Plate
P16	Tumbler Plate
P17	Tumbler Plate
P18	Gear (48T)
P19	Pin
P20	Gear (32T)
P21	Gear Stud
P22	Gear (42T)
P23	Stud
P24	Gear (44T)
P25	Bushing
P27	Shaft
P28	Retaining Ring
P29	Cover
P30	Dial
P31	Instruction Plate
P33	Index Plate
P34	Retaining Ring
P35	Cup Deflector
P36	Bearing Retainer
P37	Shim

INDEX NO.	PART NAME
P38	Spacer
P39	Single Row Bearing
P40	Cam
P41	Compound Shaft
P42	Gear
P43	Single Row Bearing
P44	Bearing Spacer
P45	Cover Plate
P46	Single Row Bearing
P47	Gear
P48	Key
P49	Retaining Ring
P50	Tumbler Shaft
P51	Ball Bearing
P52	Retaining Ring
P53	Shaft
P55	Tumbler Gear
P56	Tumbler Idler Gear
P57	Ball Bearing
P58	Tumbler
P59	Button
P60	Tumbler Stud
P61	Single Row Bearing
P62	Shim
P63	Bearing Cap
P64	Gear (32T)
P65	Bushing
P66	Bushing
P67	Shaft
P68	Shifter Lever
P69	Spring
P70	Pin
P71	Retaining Ring
P72	Collar
P73	Gear Box
P74	Woodruff Key

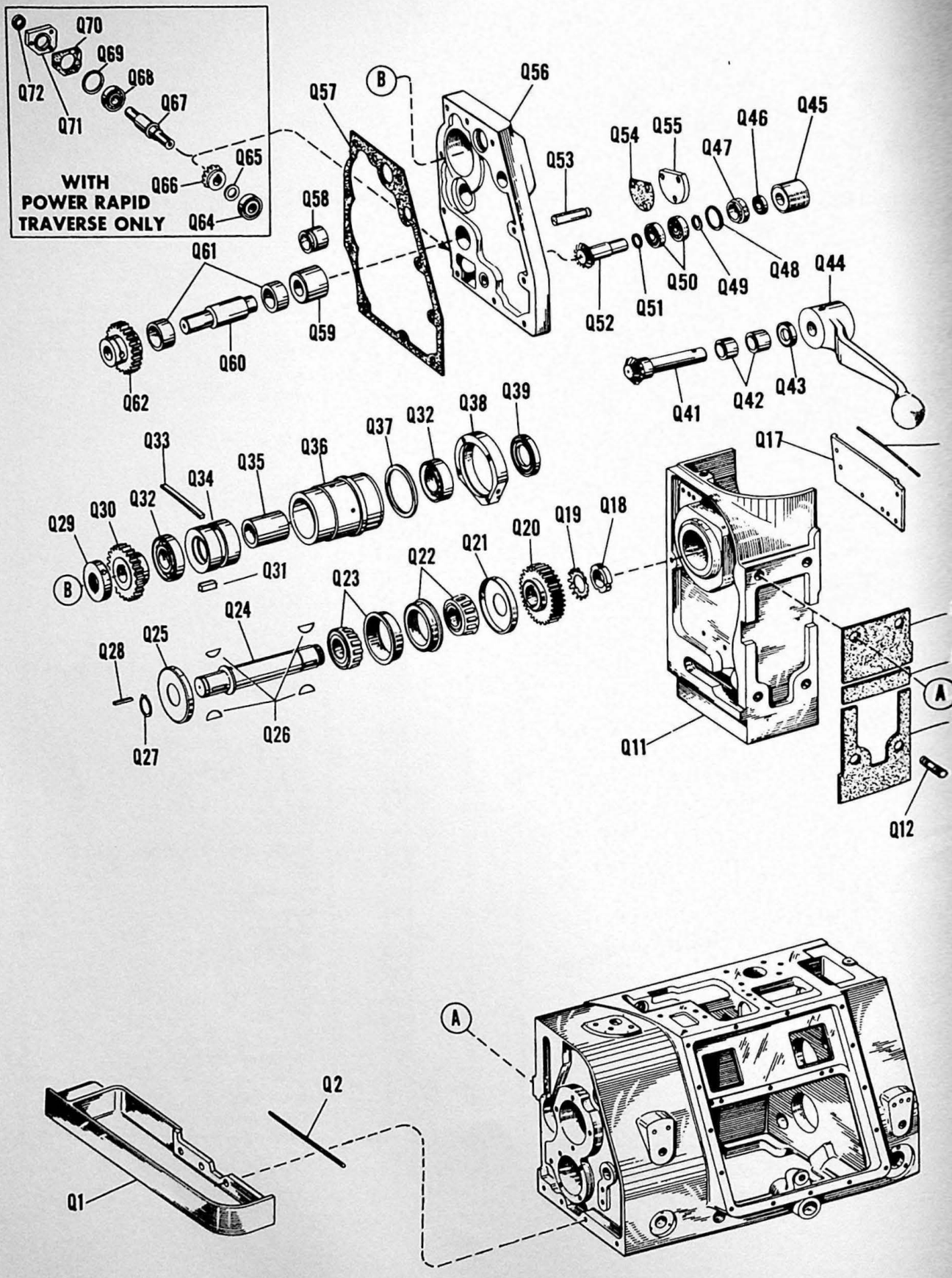


Figure Q, Gear Box for Models 2013 and 2516, Series 612 and Model 2516, Series 610

Parts List for Figure Q, Gear Box for Models 2013 and 2516, Series 612 and Model 2516, Series 610

INDEX NO.	PART NAME
Q1	Sump
Q2	Sealing Element
Q11	End Gear Housing
Q12	Stud
Q13	Gasket
Q14	Gasket
Q15	Gasket
Q16	Sealing Element
Q17	Guard
Q18	Locknut
Q19	Lock Washer
Q20	Gear
Q21	Oil Deflector
Q22	Single Row Bearing
Q23	Single Row Bearing
Q24	Shaft
Q25	Oil Deflector
Q26	Key
Q27	Retaining Ring
Q28	Key
Q29	Nut
Q30	Gear
Q31	Key
Q32	Bearing Assembly (Leadscrew)
Q33	Oil Retainer (Felt)
Q34	Outer Spacer
Q35	Inner Spacer
Q36	Bearing Housing
Q37	Linear "O" Ring
Q38	Cap
Q39	Garlock Closure
Q41	Miter Gear

INDEX NO.	PART NAME
Q42	Needle Bearing
Q43	Oil Seal
Q44	Lever
Q45	Coupling
Q46	Garlock Oil Seal
Q47	Retaining Ring
Q48	Linear "O" Ring
Q49	Retaining Ring
Q50	Bearing
Q51	Washer
Q52	Miter Gear
Q53	Lever Locating Stud
Q54	Gasket
Q55	Cover
Q56	Leadscrew and Feed Rod Support
Q57	Gasket
Q58	Bushing
Q59	Collar
Q60	Stub Shaft
Q61	Oilite Bushing
Q62	Gear
	WITH POWER RAPID TRAVERSE ONLY
Q64	Bearing
Q65	Washer
Q66	Miter Gear
Q67	Gear Shaft
Q68	Bearing
Q69	Linear "O" Ring
Q70	Shim
Q71	Retaining Plate
Q72	Garlock Oil Seal

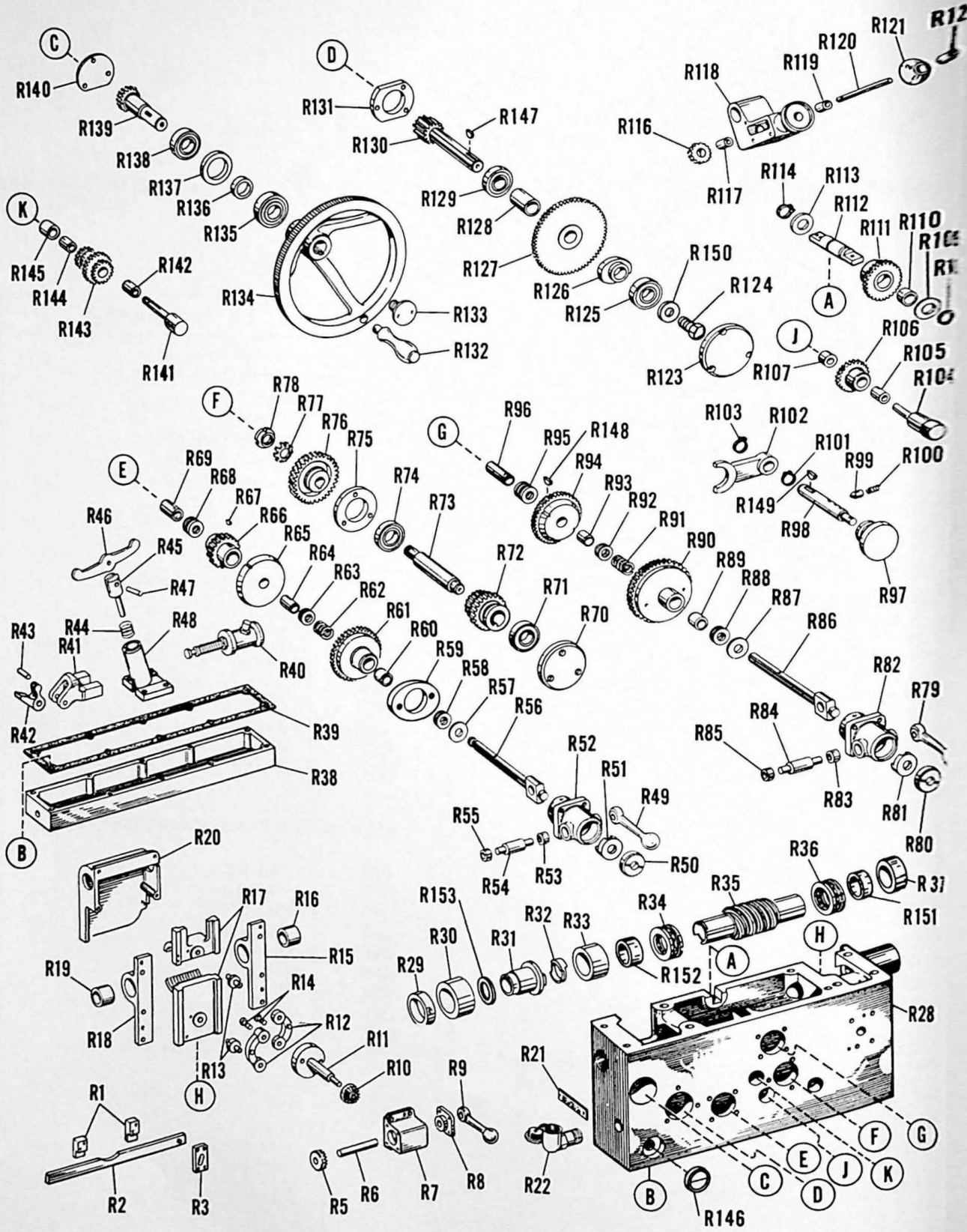


Figure R, Plain Apron for Models 1610 and 2013, Series 610 and Model 1610, Series 612

Parts List for Figure R, Plain Apron for Models 1610 and 2013, Series 610 and Model 1610, Series 612

INDEX NO.	PART NAME
R1	Bar Guide
R2	Lock Bar
R3	Interlock Guide
R5	Miter Gear
R6	Half Nut Lever Shaft
R7	Half Nut Lever Housing
R8	Housing Cap
R9	Shifter Lever
R10	Miter Gear
R11	Shaft
R12	Half Nut Link
R13	Stud
R14	Stud
R15	Half Nut Gib - R. H.
R16	Bushing
R17	Half Nut
R18	Half Nut Gib - L. H.
R19	Bushing
R20	Guard
R21	Oil Instruction Plate
R22	Oil Filler
R28	Apron
R29	Collar
R30	Bushing
R31	Driver
R32	Driver Plate
R33	Bushing
R34	Thrust Bearing
R35	Worm
R36	Thrust Bearing
R37	Bushing
R38	Pump Housing
R39	Gasket
R40	Lubrication Pump
R41	Pump Bracket
R42	Pump Lever
R43	Pump Lever Pin
R44	Plunger Spring
R45	Cam Follower Plunger
R46	Pump Cam Follower
R47	Cam Follower Pin
R48	Cam Follower Bracket
R49	Friction Handle
R50	Friction Stem Nut
R51	Cam Washer
R52	Front Friction Cap
R53	Cam Bushing
R54	Cam
R55	Cam Bushing
R56	Longitudinal Friction Shaft
R57	Bearing Retainer
R58	Thrust Bearing
R59	Pump Cam
R60	Friction Stem Bushing
R61	Friction Disc Gear
R62	Friction Spring
R63	Thrust Bearing
R64	Oilite Bushing
R65	Friction Disc Assembly (Gear, Disc and Bushing)
R66	Gear
R67	Woodruff Key
R68	Thrust Bearing
R69	Bushing
R70	Cover
R71	Bearing
R72	Gear
R73	Worm Wheel Shaft
R74	Bearing
R75	Cover
R76	Wormwheel
R77	Lockwasher
R78	Lock Nut
R79	Friction Handle

INDEX NO.	PART NAME
R80	Friction Stem Nut
R81	Cam Washer
R82	Front Friction Cap
R83	Cam Bushing
R84	Cam
R85	Cam Bushing
R86	Cross Feed Friction Shaft
R87	Bearing Retainer
R88	Thrust Bearing
R89	Friction Stem Bushing
R90	Friction Disc Gear
R91	Friction Spring
R92	Thrust Bearing
R93	Oilite Bushing
R94	Friction Disc Assembly (Gear, Disc and Bushing)
R95	Thrust Bearing
R96	Bushing
R97	Knob
R98	Feed Reverse Shifter Shaft
R99	Plunger
R100	Cam Spring
R101	Retaining Ring
R102	Shifter Yoke
R103	Retaining Ring
R104	Idler Gear Shaft
R105	Oilite Bushing
R106	Gear
R107	Bushing
R108	Retaining Ring
R109	Spacer
R110	Bushing
R111	Gear
R112	Shaft
R113	Spacer
R114	Retaining Ring
R116	Chasing Dial Worm Gear
R117	Bushing
R118	Chasing Dial Housing
R119	Bushing
R120	Shaft
R121	Chasing Dial
R122	Bushing
R123	Cap
R124	Bearing Retaining Screw
R125	Bearing
R126	Cam
R127	Gear
R128	Spacer
R129	Bearing
R130	Rack Pinion
R131	Cap
R132	Handle (Revolving)
R133	Shoulder Screw
R134	Handwheel
R135	Bearing
R136	Spacer
R137	Spacer
R138	Bearing
R139	Gear
R140	Cover
R141	Gear Shaft
R142	Oilite Bushing
R143	Gear
R144	Bushing
R145	Bushing
R146	Bijur Oil Window
R147	Woodruff Key
R148	Woodruff Key
R149	Woodruff Key
R150	Washer
R151	Bushing
R152	Bushing
R153	Thrust Bushing

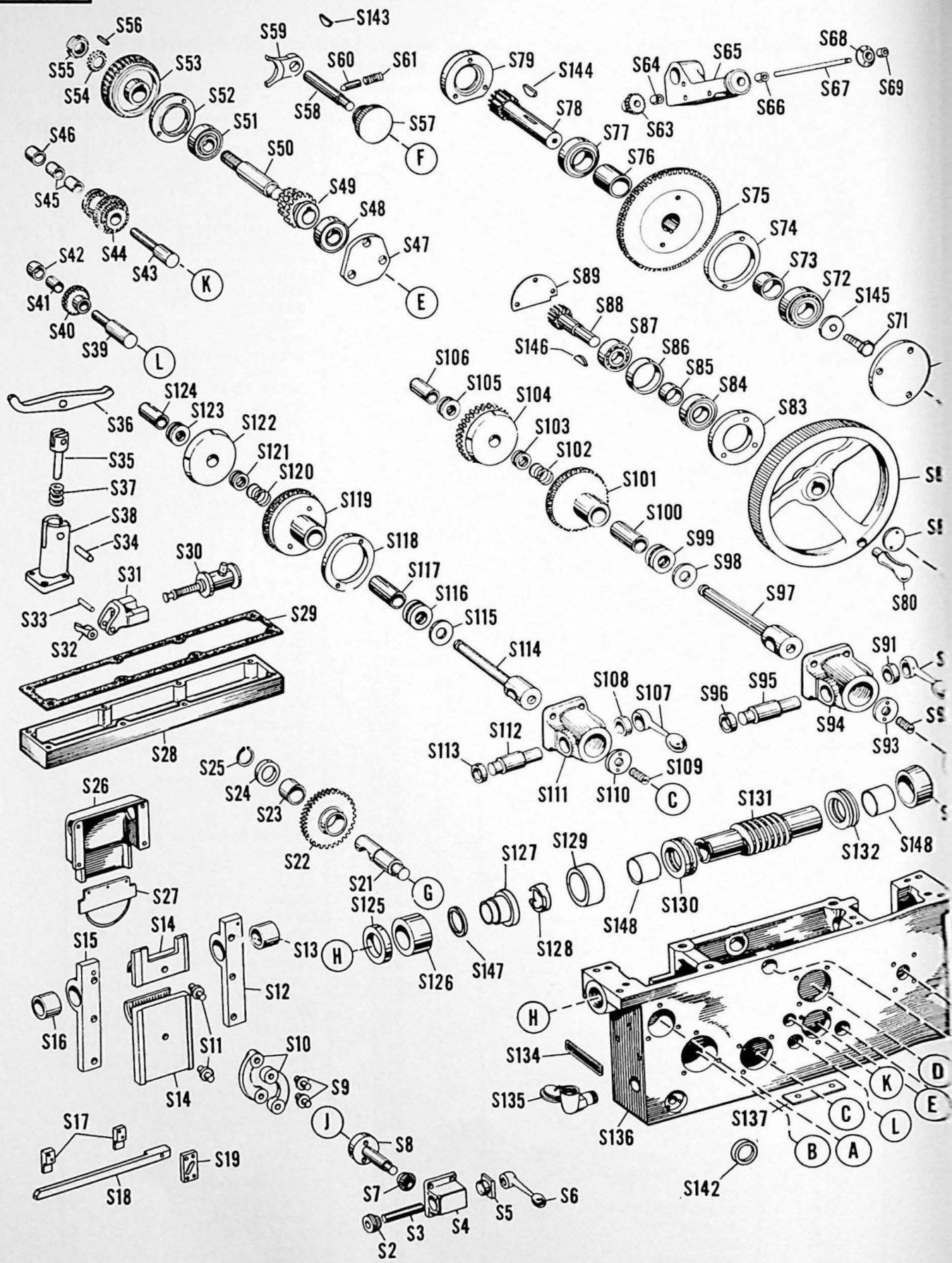
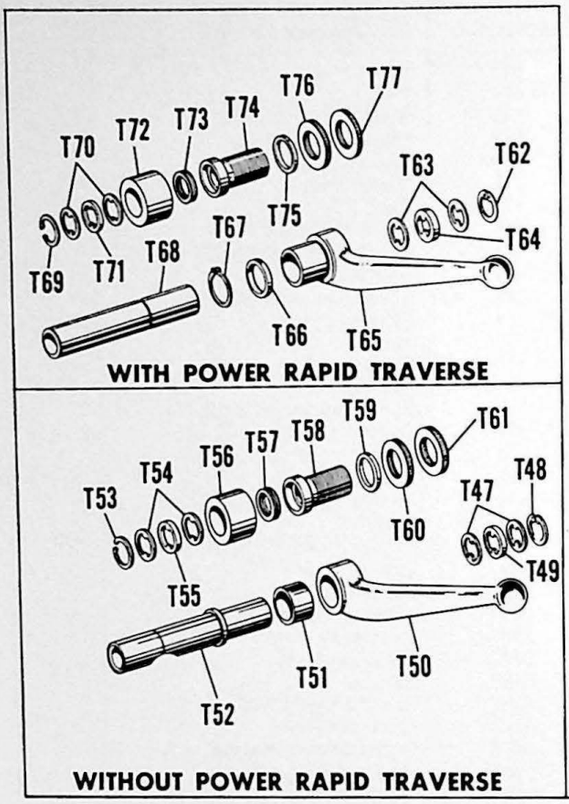


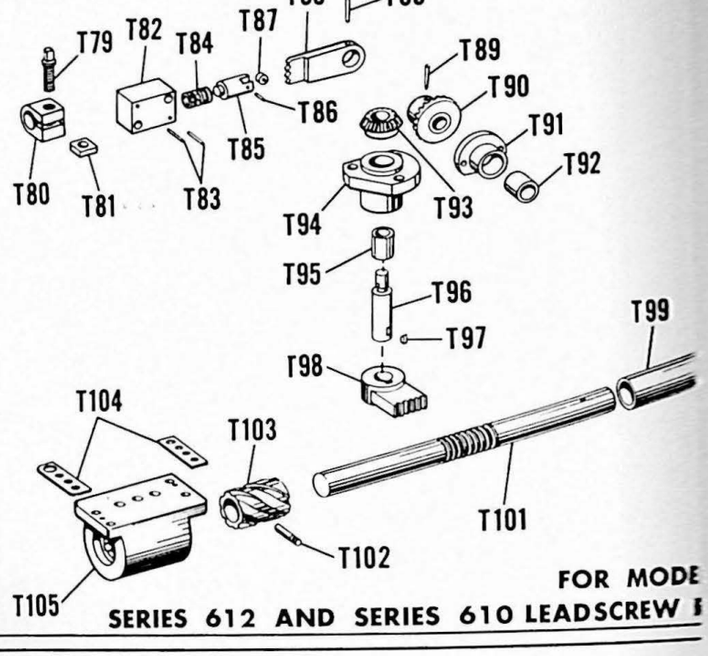
Figure S, Plain Apron Models 2013 and 2516, Series 612 and Model 2516, Series 610

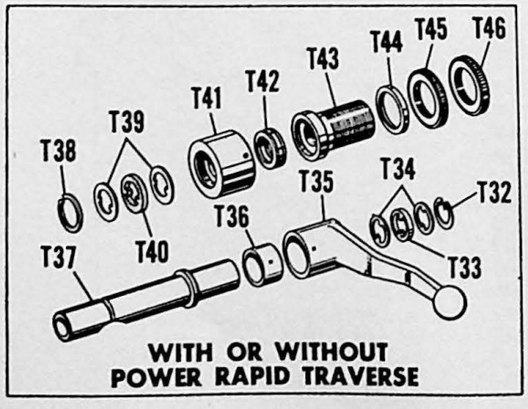
Parts List for Figure S, Plain Apron Models 2013 and 2516, Series 612 and Model 2516, Series 610

INDEX NO.	PART NAME
S2	Miter Gear
S3	Half Nut Lever Shaft
S4	Half Nut Lever Housing
S5	Housing Cap - R. H.
S6	Lever
S7	Miter Gear
S8	Shaft
S9	Stud
S10	Half Nut Link
S11	Stud
S12	Half Nut Gib - L. H.
S13	Bushing
S14	Half Nut
S15	Half Nut Gib - R. H.
S16	Bushing
S17	Bar Guide
S18	Lock Bar
S19	Interlock Guide
S21	Shaft
S22	Gear
S23	Oilite Bushing
S24	Washer
S25	Retaining Ring
S26	Guard
S27	Guard
S28	Pump Housing
S29	Gasket
S30	Oil Pump
S31	Oil Pump Bracket
S32	Pump Lever
S33	Pump Lever Pin
S34	Cam Follower Pin
S35	Cam Follower Plunger
S36	Pump Cam Follower
S37	Plunger Spring
S38	Cam Follower Bracket
S39	Gear Shaft
S40	Gear
S41	Bushing
S42	Bushing
S43	Gear Shaft
S44	Gear
S45	Bushing
S46	Bushing
S47	Cover
S48	Bearing
S49	Gear
S50	Wormwheel Shaft
S51	Bearing
S52	Cap
S53	Wormwheel
S54	Lockwasher
S55	Locknut
S56	Key
S57	Shifter Knob
S58	Feed Reverse Shifter Shaft
S59	Shifter Yoke
S60	Plunger
S61	Spring
S63	Gear
S64	Oilite Bushing
S65	Chasing Dial Housing
S66	Oilite Bushing
S67	Shaft
S68	Chasing Dial Head
S69	Bushing
S70	Cap
S71	Hex Head Cap Screw
S72	Bearing

INDEX NO.	PART NAME
S73	Spacer
S74	Cam
S75	Gear
S76	Spacer
S77	Bearing
S78	Rack Pinion
S79	Cap
S80	Handwheel Handle
S81	Cross Feed Shoulder Screw
S82	Handwheel
S83	Cover
S84	Bearing
S85	Spacer
S86	Spacer
S87	Bearing
S88	Handwheel Pinion Shaft
S89	Cover
S90	Lever
S91	Bushing
S92	Cam Stud
S93	Lock Nut
S94	Front Friction Cap
S95	Cam
S96	Bushing
S97	Cross Feed Friction Shaft
S98	Bearing Retainer
S99	Thrust Bearing
S100	Bushing
S101	Friction Disc Gear
S102	Friction Spring
S103	Spring Thrust Bearing
S104	Gear and Disc Assembly
S105	Thrust Bearing
S106	Bushing
S107	Lever
S108	Bushing
S109	Cam Stud
S110	Lock Nut
S111	Front Friction Cap
S112	Cam
S113	Bushing
S114	Longitudinal Friction Stem
S115	Bearing Retainer
S116	Thrust Bearing
S117	Bushing
S118	Cam
S119	Friction Disc Gear
S120	Friction Spring
S121	Spring Thrust Bearing
S122	Friction Disc and Gear Assembly
S123	Thrust Bearing
S124	Bushing
S125	Collar
S126	Bushing
S127	Driver
S128	Drive Plate
S129	Bushing
S130	Thrust Bearing
S131	Worm
S132	Thrust Bearing
S133	Bushing
S134	Instruction Plate
S135	Oil Filler
S136	Apron
S137	Spacer Block
S142	Oil Level Gage
S143	Woodruff Key
S144	Woodruff Key
S145	Washer
S146	Woodruff Key
S147	Bushing
S148	Bushing







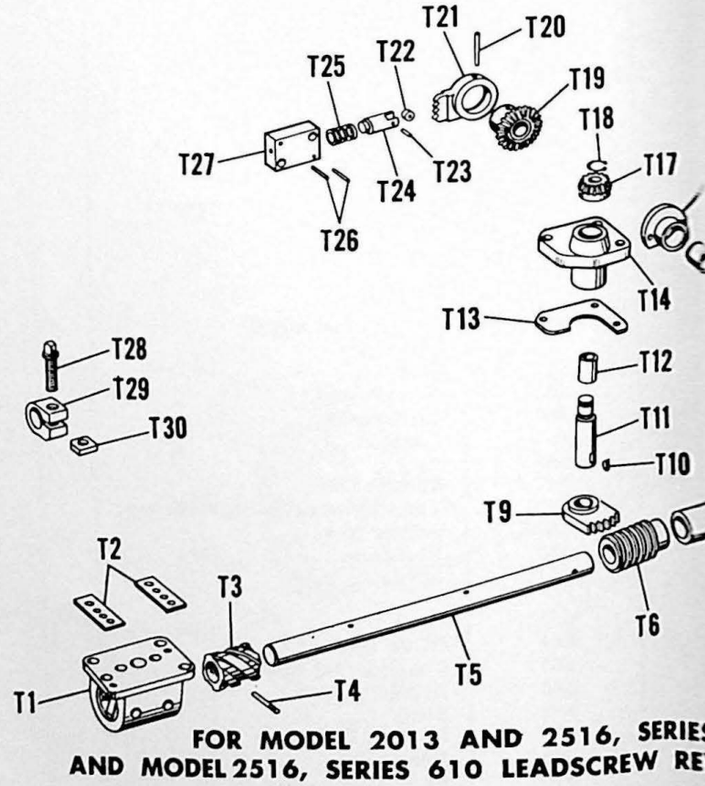


Figure T, Apron Leadscrew Reverse for Models 2013 and 2516, Series 612—Model 2516, Series 610—Model 1610 Series 612 and Series 610

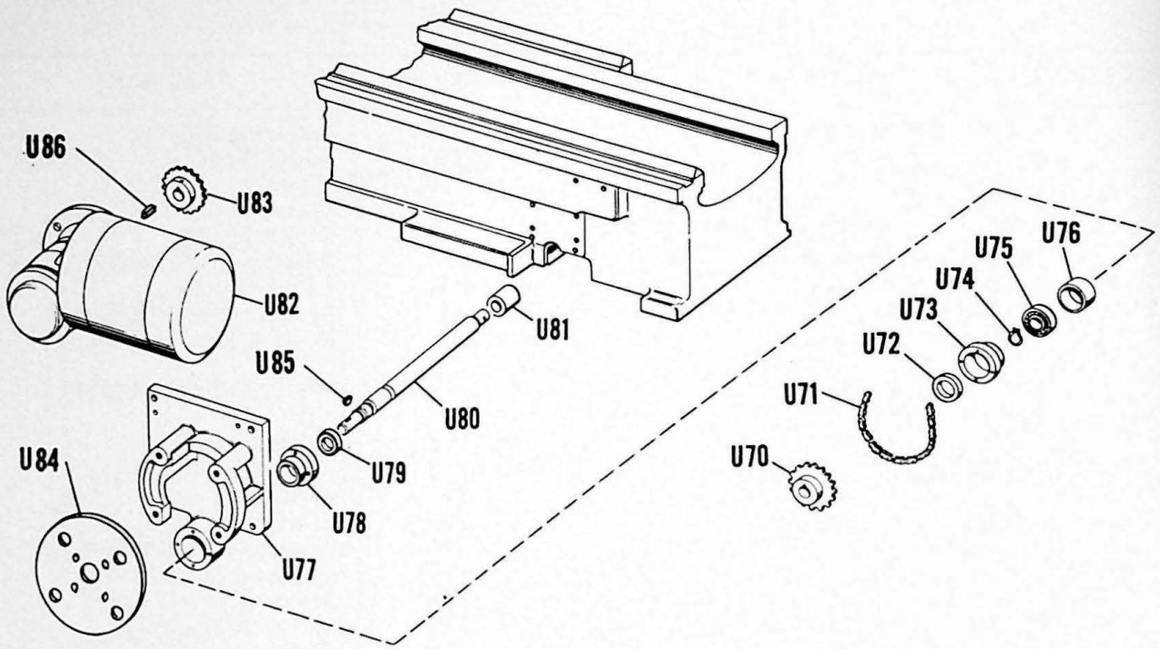
Parts List for Figure T, Apron Leadscrew Reverse for Models 2013 and 2516, Series 612
Model 2516, Series 610 — Model 1610, Series 612 and Series 610

INDEX NO.	PART NAME
	LEADSCREW REVERSE
T1	Nut
T2	Shim
T3	Worm
T4	Worm Lock Screw
T5	Reverse Rod
T6	Reverse Rod Rack
T7	Reverse Rod Coupling
T9	Reverse Segment
T10	Woodruff Key
T11	Segment Shaft
T12	Bushing
T13	Shim
T14	Bevel Gear Bracket
T15	Oilite Bushing
T16	Bushing
T17	Bevel Gear
T18	Retaining Ring
T19	Large Bevel Gear
T20	Roll Pin
T21	Index Sector
T22	Roller
T23	Roller Shaft
T24	Plunger
T25	Spring
T26	Dowel Pin
T27	Detent Case
T28	Clamp Bolt
T29	Safety Collar
T30	Safety Key
	WITH POWER RAPID TRAVERSE
T32	Retaining Ring
T33	Wiper
T34	Wiper Plate
T35	Lever
T36	Reverse Control Sleeve Bushing
T37	Reverse Control Sleeve
T38	Retaining Ring
T39	Wiper Plate
T40	Wiper
T41	Thrust Collar
T42	Thrust Bearing
T43	Reverse Rod Adjusting Sleeve
T44	Retaining Ring
T45	Reverse Rod Adjusting Nut
T46	Reverse Rod Lock Nut
	WITH OR WITHOUT POWER RAPID TRAVERSE
T47	Wiper Plate
T48	Retaining Ring
T49	Wiper
T50	Lever
T51	Reverse Control Sleeve Bushing
T52	Reverse Control Sleeve

INDEX NO.	PART NAME
T53	Retaining Ring
T54	Wiper Plate
T55	Wiper
T56	Thrust Collar
T57	Thrust Bearing
T58	Reverse Rod Adjusting Sleeve
T59	Retaining Ring
T60	Reverse Rod Adjusting Nut
T61	Reverse Rod Lock Nut
	WITH POWER RAPID TRAVERSE
T62	Retaining Ring
T63	Wiper Plate
T64	Wiper
T65	Lever
T66	Reverse Control Sleeve Bushing
T67	Retaining Ring
T68	Reverse Control Sleeve
T69	Retaining Ring
T70	Wiper Plate
T71	Wiper
T72	Thrust Collar
T73	Thrust Bearing
T74	Reverse Rod Adjusting Sleeve
T75	Retaining Ring
T76	Reverse Rod Adjusting Nut
T77	Reverse Rod Lock Nut
	LEADSCREW REVERSE
T79	Clamp Bolt
T80	Safety Collar
T81	Safety Key
T82	Detent Case
T83	Dowel Pin
T84	Spring
T85	Plunger
T86	Roller Shaft
T87	Roller
T88	Index Sector
T89	Roll Pin
T90	Bevel Gear
T91	Bushing
T92	Oilite Bushing
T93	Bevel Gear
T94	Reverse Segment Bracket
T95	Oilite Bushing
T96	Bevel Pinion Shaft
T97	Woodruff Key
T98	Reverse Segment
T99	Reverse Rod Sleeve
T100	Oil Seal
T101	Reverse Rod Rack
T102	Worm Lock Screw
T103	Worm
T104	Shim
T105	Nut

RAPID TRAVERSE DRIVE

BED REAR VIEW



BED, BED PARTS, CONTROL RODS, LEADSCREW, AND ROD CARRIERS

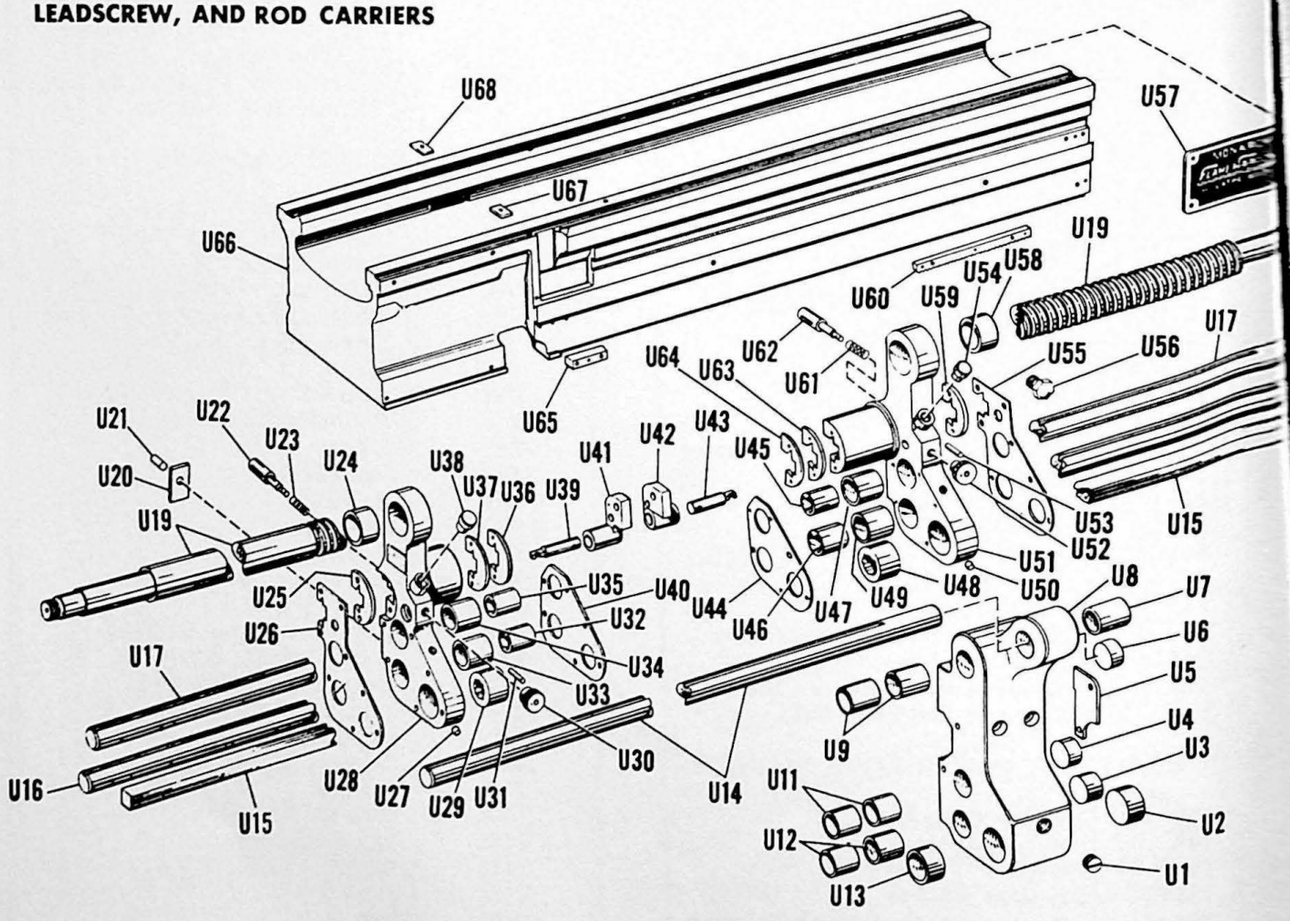


Figure U, Bed, Bed Parts, Control Rods, Leadscrew, Rod Carriers and Power Rapid Traverse

Parts List for Figure U, Bed, Bed Parts, Control Rods, Leadscrew, Rod Carriers and Power Rapid Traverse

INDEX NO.	PART NAME
	BED, BED PARTS, CONTROL RODS, LEADSCREW AND ROD CARRIERS
U1	Threaded Plug
U2	Plug
U3	Plug
U4	Plug
U5	Cover Plate
U6	Plug
U7	Bushing
U8	Rear Leadscrew Box
U9	Bushing
U11	Bushing
U12	Bushing
U13	Control Rod Bushing
U14	Leadscrew Reverse Rod
U15	Control Rod
U16	Traverse Rod
U17	Feed Rod
U19	Leadscrew
U20	Wear Block
U21	Dowel Pin
U22	Plunger
U23	Spring
U24	Bushing
U25	Wiper
U26	Plate
U27	Hydraulic Plug
U28	Rod Support (Headstock - L. H.)
U29	Bushing
U30	Knob
U31	Pin
U32	Sleeve
U33	Bushing
U34	Bushing
U35	Sleeve
U36	Wiper Plate
U37	Wiper
U38	Oil Hole Cover
U39	Latch - L. H.
U40	Plate
U41	Bracket - L. H.
U42	Bracket - R. H.

INDEX NO.	PART NAME
U43	Latch - R. H.
U44	Plate
U45	Sleeve
U46	Sleeve
U47	Bushing
U48	Bushing
U49	Bushing
U50	Hydraulic Plug
U51	Rod Support (Tailstock - R. H.)
U52	Knob
U53	Pin
U54	Oil Hole Cover
U55	Plate
U56	Button
U57	Name Plate
U58	Bushing
U59	Wiper
U60	Rack
U61	Spring
U62	Plunger
U63	Wiper
U64	Wiper Plate
U65	Block
U66	Bed
U67	Filler Plate (Front)
U68	Filler Plate (Rear)
	RAPID TRAVERSE DRIVE
U70	Sprocket (For Models 1610-2013)
U71	Diamond Roller Chain #82
U72	Oil Seal
U73	Bearing Cap
U74	Snap Ring
U75	Ball Bearing
U76	Spacer
U77	Bracket
U78	Bearing Cap
U79	Oil Seal
U80	Shaft
U81	Coupling
U82	Traverse Motor
U83	Sprocket
U84	Adaptor Plate
U85	Woodruff Key
U86	Key

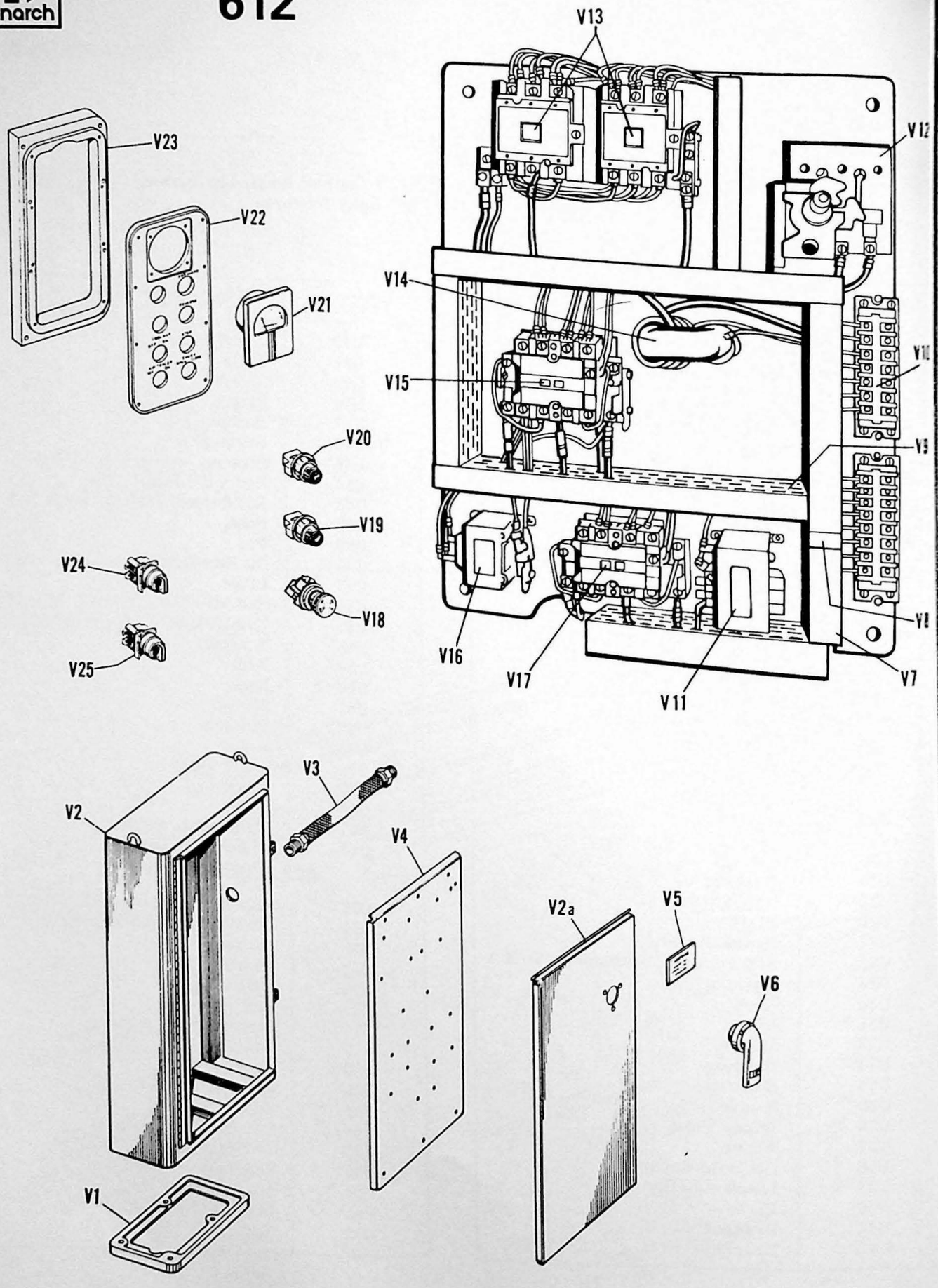


Figure V, Electrical Parts and Panel Cabinet

Parts List for Figure V, Electrical Parts and Panel Cabinet

INDEX NO.	PART NAME
V1	Spacing Block
V2-2a	Panel Cabinet and Door
V3	Titeflex Assembly
V4	Panel
V5	Warning Plate
V6	Enclosure Handle and Mechanism
V7	Panel Channel
V8	Panel Channel Clip
V9	Panel Channel Cover
V10	Terminal Block
V11	Control Transformer
V12	Circuit Breaker
V13	Magnetic Reversing Starter

INDEX NO.	PART NAME
V14	Transformer, Ring Type
V15	Magnetic Starter (Hyd. Pump)
V16	Transformer (Work Light)
V17	Magnetic Starter (Coolant Pump)
V18	Pushbutton
V19	Red Illuminated Pushbutton
V20	Green Illuminated Pushbutton
V21	Meter
V22	Switch Plate
V23	Mounting Plate
V24	Selector Switch, Coolant Pump
V25	Selector Switch, Work Light

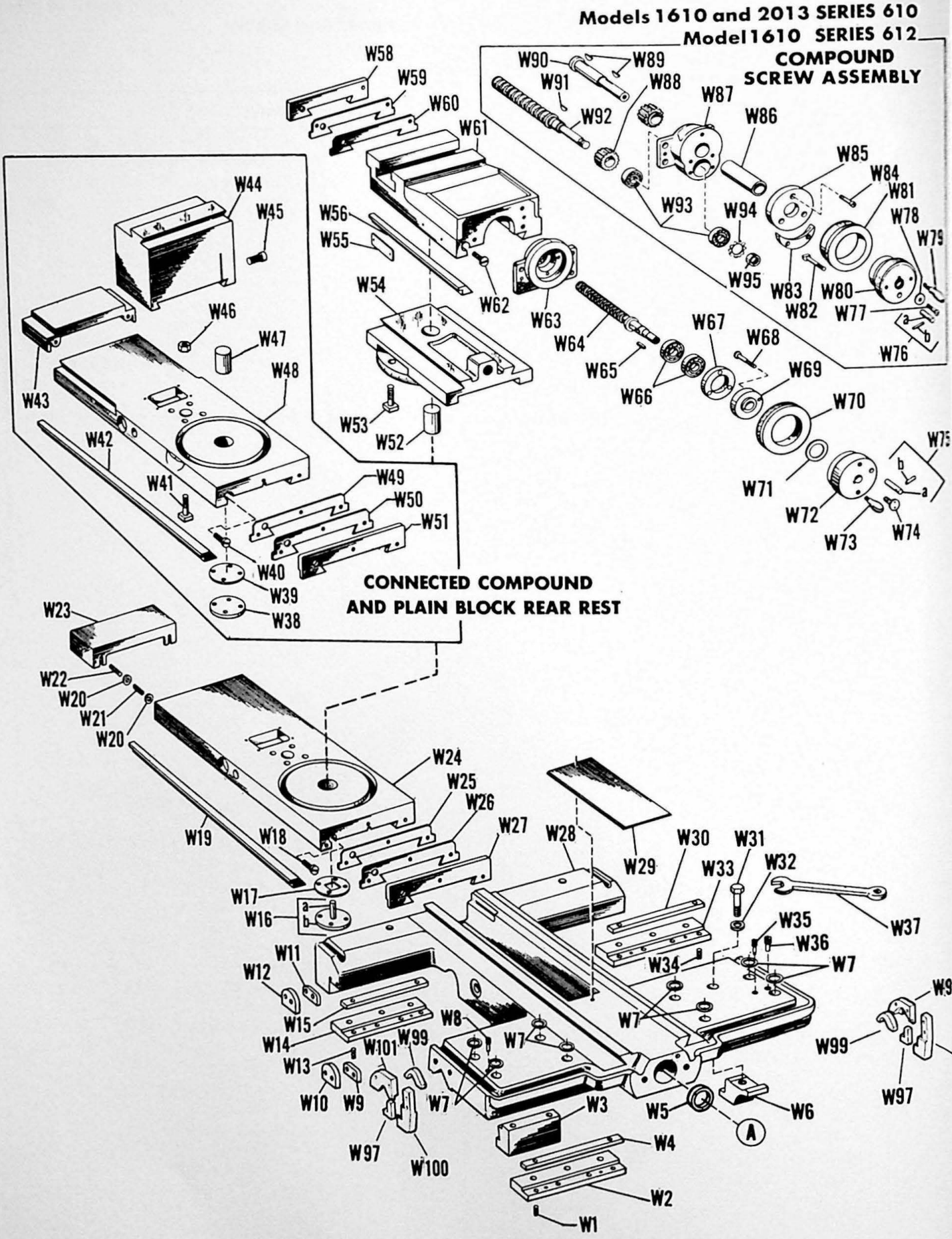


Figure W, Carriage, Cross Slide, Compound Rest and Connected Compound with Plain Block Rear Rest.

Parts List for Figure W, Carriage,Cross Slide, Compound Rest and Connected Compound with Plain Block Rear Rest

INDEX NO.	PART NAME
W1	Carriage Clamp Gib Screw
W2	Carriage Clamp
W3	Carriage Clamp - L. H.
W4	Clamp Gib
W5	Garlock Closure
W6	Binder Clamp
W7	Washer
W8	Dowel
W9	Flat Wiper
W10	Flat Wiper Case
W11	Flat Wiper
W12	Flat Wiper Case
W13	Carriage Clamp Gib Screw
W14	Carriage Clamp
W15	Clamp Gib
W16	Drain Cover and Post Assembly
W16-a	Drain Cover Post
W16-b	Drain Cover
W17	Gasket (Drain Cover)
W18	Gib Screw
W19	Bottom Slide Gib
W20	Clamping Washer
W21	Spring
W22	Dust Guard Stud
W23	Dust Guard
W24	Bottom Slide
W25	Wiper Back-up Plate
W26	Bottom Slide Wiper
W27	Wiper Case
W28	Carriage
W29	Carriage Dust Plate
W30	Clamp Gib
W31	Hex Head Cap Screw
W32	Washer
W33	Carriage Clamp
W34	Carriage Clamp Gib Screw
W35	Threaded Dowel
W36	Dowel
W37	Wrench
W96	"L" Wiper Case R. H.
W97	"L" Wiper
W98	Vee Wiper Case R. H.
W99	Vee Wiper
W100	"L" Wiper Case L. H.
W101	Vee Wiper Case L. H.
	CONNECTED COMPOUND AND PLAIN BLOCK REAR REST
W38	Drain Cover
W39	Gasket (Drain Cover)
W40	Gib Screw
W41	Swivel Bolt
W42	Bottom Slide Gib
W43	Guard
W44	Tool Rest
W45	Clamp Screw
W46	Hex Full Nut
W47	Swivel Pin
W48	Bottom Slide

INDEX NO.	PART NAME
W49	Wiper Back-up Plate
W50	Bottom Slide Wiper
W51	Wiper Case
	STANDARD MACHINE
W52	Swivel Pin
W53	Swivel Bolt
W54	Swivel
W55	Lubricating Instruction Plate
W56	Top Slide Gib
W58	Wiper Case
W59	Wiper
W60	Wiper Back-up Plate
W61	Top Slide
W62	Gib Screw
W63	Compound Bushing
W64	Compound Screw
W65	Key
W66	Ball Bearing
W67	Bearing Retainer
W68	Dial Lock Screw
W69	Compound Dial Bushing
W70	Compound Dial
W71	Shim
W72	Compound Knob
W73	Handle
W74	Compound Shoulder Screw
W75	Dial Lockscrew Nut and Pin Assembly
W75-a	Dial Lockscrew Nut
W75-b	Dial Lockscrew Pin
	MODEL 1610 - SERIES 612 1610 & 2013 - SERIES 610 COMPOUND SCREW ASSEMBLY
W76	Dial Lockscrew Nut and Pin Assembly
W76-a	Dial Lockscrew Nut
W76-b	Dial Lockscrew Pin
W77	Retaining Screw
W78	Retaining Screw Washer
W79	Handle
W80	Compound Knob
W81	Compound Dial
W82	Dial Lock Screw
W83	Cover
W84	Retaining Screw
W85	Compound Dial Plate
W86	Oilite Bushing
W87	Compound Bushing
W88	18 T. Gear
W89	Key
W90	Compound Gear Stud
W91	Key
W92	Compound Screw
W93	Ball Bearing
W94	Lockwasher
W95	Locknut

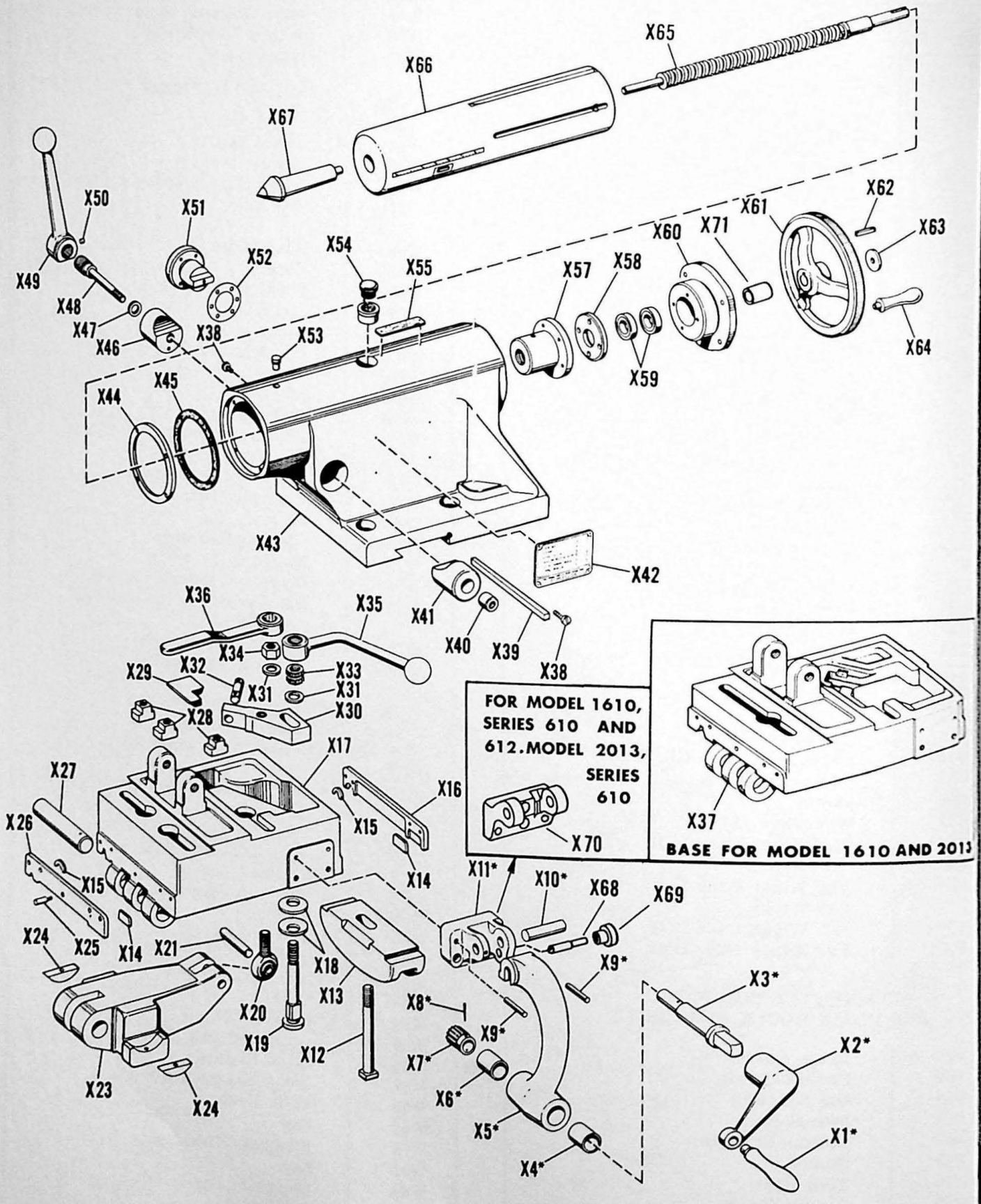


Figure X, Tailstock—Screw Operated, Dead Spindle (612 only)

Parts List for Figure X, Tailstock—Screw Operated, Dead Spindle (612 only)

INDEX NO.	PART NAME
FOR ALL MODELS (X1 to X11)	
X1	Crank Handle
X2	Crank
X3	Rack Pinion Stem
X4	Bushing
X5	Rack Pinion Hinge
X6	Bushing
X7	Pinion Gear
X8	Roll Pin
X9	Dowel Pin
X10	Conveyor Bracket Pin
X11	Conveyor Bracket
X12	Clamp Bolt
X13	Clamp
X14	Flat Wiper
X15	Vee Wiper
X16	Wiper Case - R. H.
X17	Tailstock Base
X18	Swivel Washers
X19	Quick Clamp Shaft
X20	"Monoball" Rod End
X21	Pin
X23	Clamp
X24	Rocker
X25	Stop Pin
X26	Wiper Case - L. H.
X27	Pin
X28	Tee Nut
X29	Pad
X30	Arm
X31	Washer
X32	Pin
X33	Nut
X34	Special Hex Nut
X35	Quick Clamp Lever
X36	Wrench

INDEX NO.	PART NAME
X37	Tailstock Base (For Models 1610-2013)
X38	Gib Screw
X39	Gib
X40	Allen Nut
X41	Binder Plug (Front)
X42	Serial No. Plate
X43	Tailstock Top
X44	Spindle Wiper Case
X45	Spindle Wiper
X46	Binder Plug (Rear)
X47	Thrust Washer
X48	Clamp Lever Shaft
X49	Clamp Lever
X50	Binder Plug
X51	Key
X52	Shim
X53	Oiler
X54	Oiler Assembly
X55	Lub. Instruction Plate
X57	Nut - L. H.
X58	Bearing Retainer
X59	Bearing Set
X60	Bearing Housing
X61	Handwheel
X62	Key
X63	Washer
X64	Handle
X65	Screw - L. H.
X66	Spindle
X67	Center
X68	Pin
X69	Knob
X70	Conveyor Bracket
X71	Sleeve

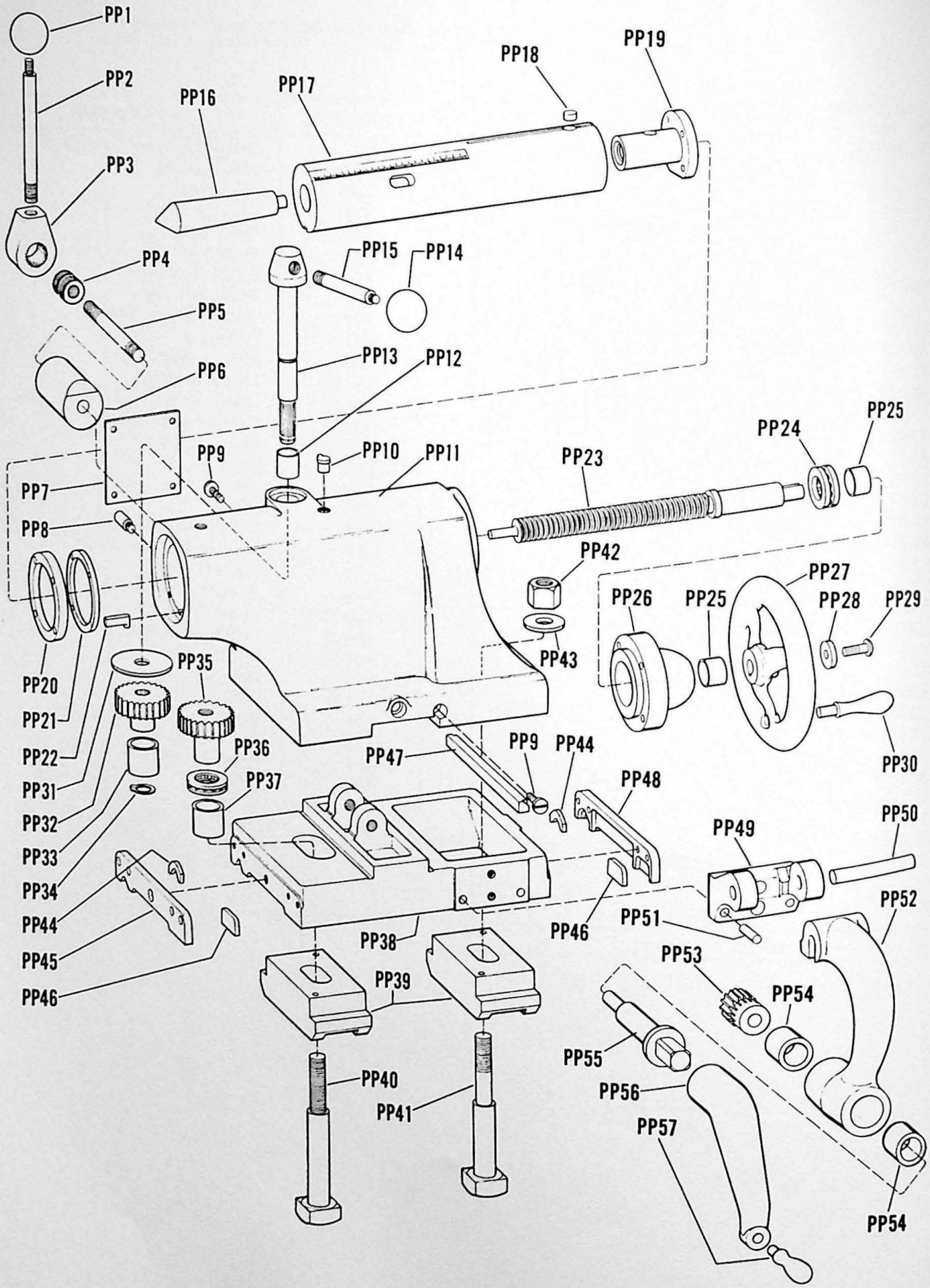


Figure PP, Tailstock—Screw Operated, Dead Spindle—(610 only)

Parts List for Figure PP, Tailstock— Screw Operated, Dead Spindle (610 only)

INDEX NO.	PART NAME
PP1	Knob
PP2	Clamp Lever
PP3	Binder Lever Hub
PP4	Serrated Nut
PP5	Binder Lever Stud
PP6	Binder Plug
PP7	Cover
PP8	Stop Pin
PP9	Gib Screw
PP10	Oiler
PP11	Tailstock
PP12	Oilite Bushing
PP13	Clamp Lever Shaft
PP14	Knob
PP15	Clamp Lever
PP16	Center
PP17	Tang Slot Spindle
PP18	Oil Wick
PP19	Nut
PP20	Wiper Case
PP21	Wiper
PP22	Key
PP23	Screw
PP24	Thrust Bearing
PP25	Bushing
PP26	Bearing Housing
PP27	Handwheel
PP28	Washer
PP29	Screw

INDEX NO.	PART NAME
PP30	Balcrank Machine Handle
PP31	Retaining Washer
PP32	Serrated Gear
PP33	Bushing
PP34	Retaining Ring
PP35	Nut Gear
PP36	Thrust Bearing
PP37	Bushing
PP38	Tailstock Base
PP39	Clamp
PP40	Clamp Bolt
PP41	Clamp Bolt
PP42	Nut, Clamp Bolt
PP43	Washer, Clamp Bolt
PP44	Vee Wiper
PP45	Wiper Case, L. H.
PP46	Flat Wiper
PP47	Gib
PP48	Wiper Case, R. H.
PP49	Conveyor Bracket
PP50	Hinge Pin
PP51	Dowel Pin
PP52	Rack Pinion Hinge
PP53	Rack Pinion
PP54	Bushing
PP55	Rack Pinion Stem
PP56	Crank
PP57	Balcrank Machine Handle

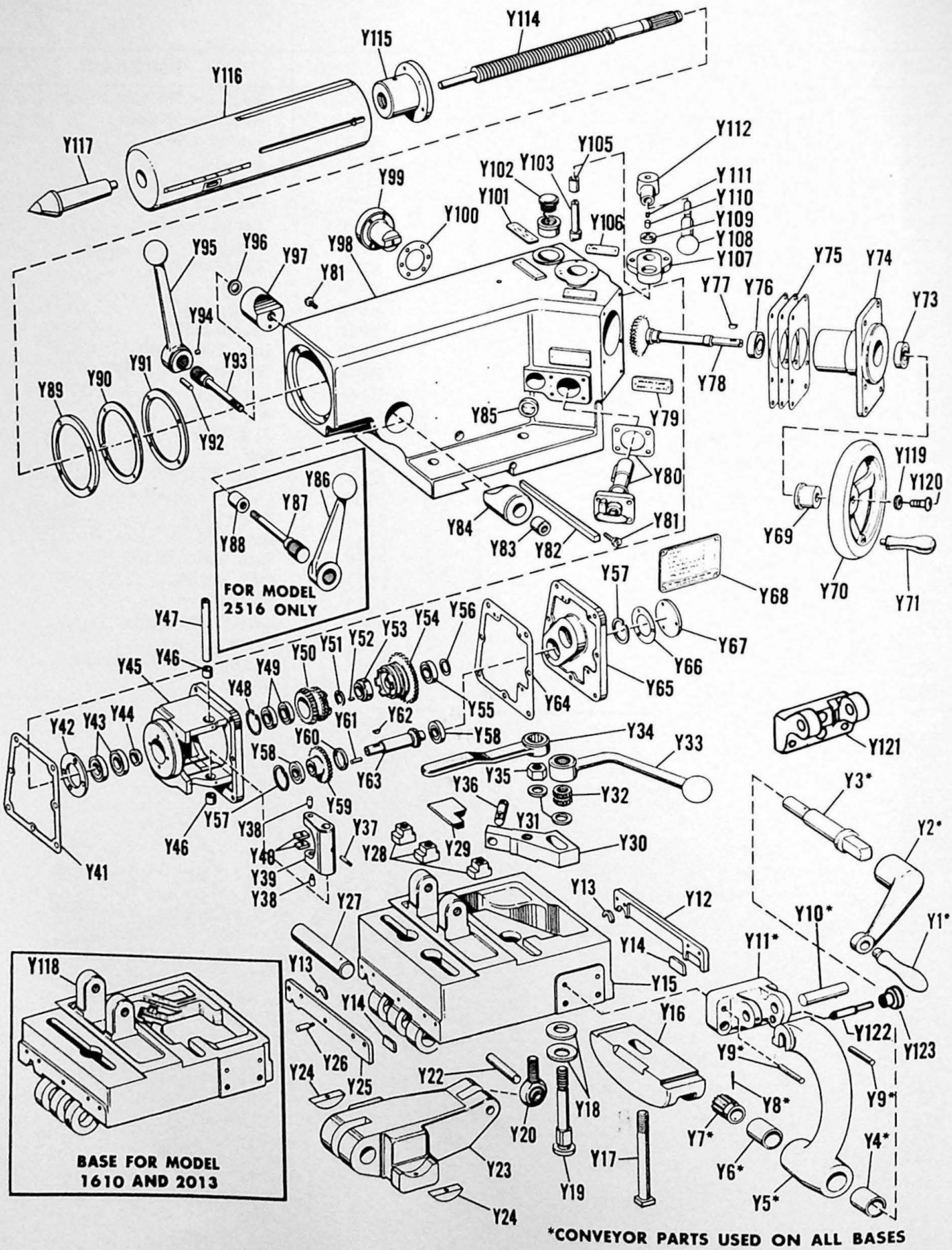
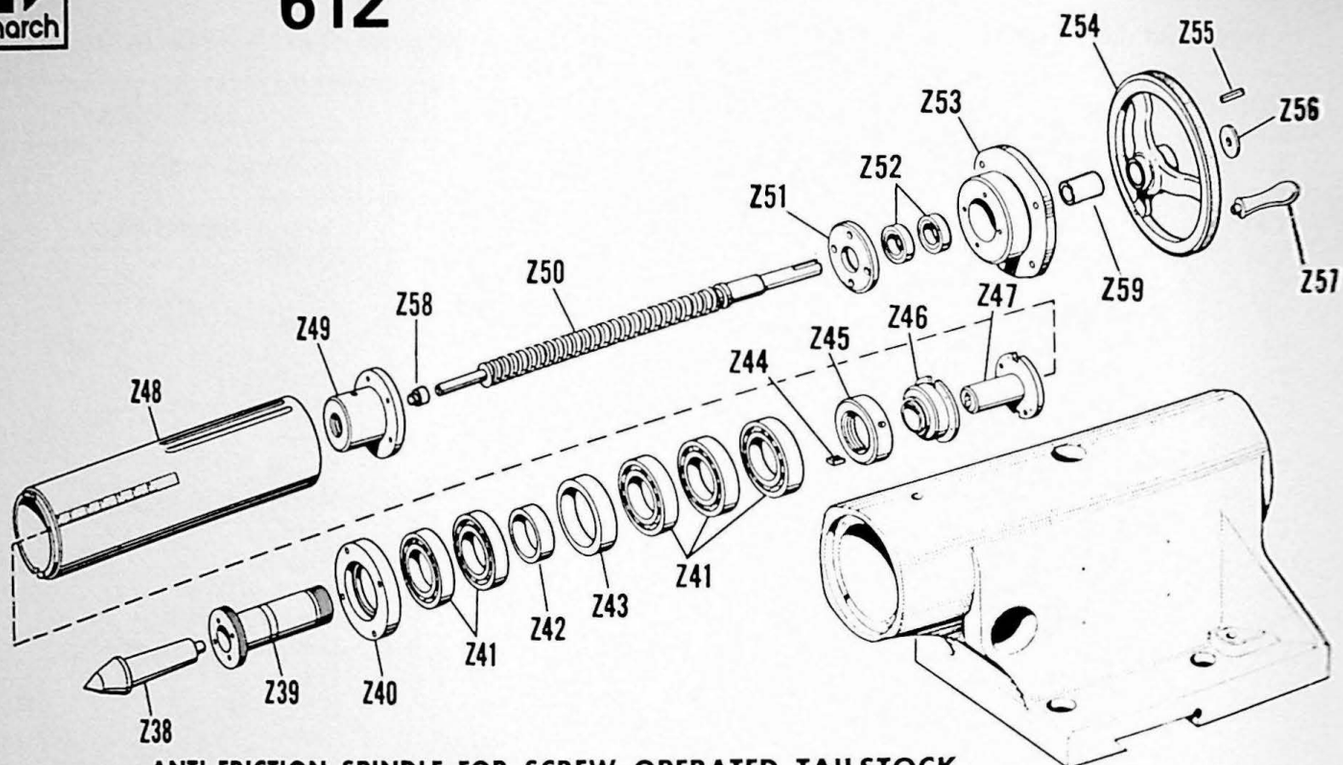


Figure Y, Tailstock—Two Speed Range, Angular, Dead Spindle. (612 only)

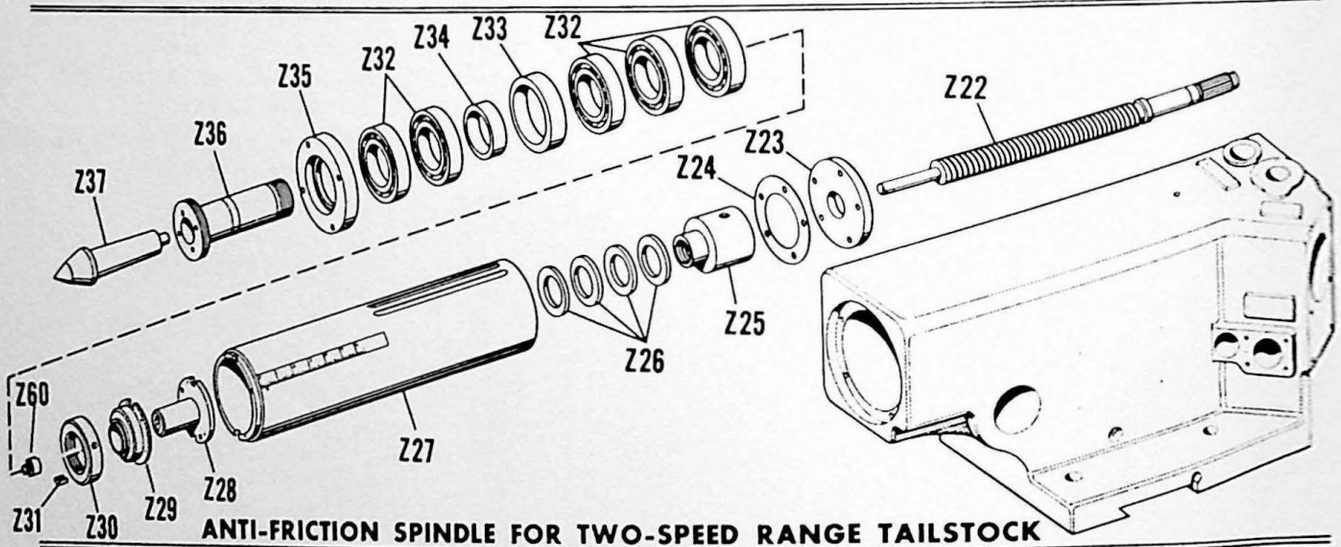
Parts List for Figure Y, Tailstock—Two Speed Range, Angular, Dead Spindle (612 only)

INDEX NO.	PART NAME
Y1	Crank Handle
Y2	Crank
Y3	Rack Pinion Stem
Y4	Bushing
Y5	Rack Pinion Hinge
Y6	Bushing
Y7	Pinion Gear
Y8	Roll Pin
Y9	Dowel Pin
Y10	Conveyor Bracket Pin
Y11	Conveyor Bracket
Y12	Wiper Case - R. H.
Y13	Vee Wiper
Y14	Flat Wiper
Y15	Tailstock Base
Y16	Clamp
Y17	Clamp Bolt
Y18	Swivel Washer
Y19	Quick Clamp Shaft
Y20	"Monoball" Rod End Bearing
Y22	Pin
Y23	Clamp
Y24	Rocker
Y25	Wiper Case - L. H.
Y26	Stop Pin
Y27	Pin
Y28	Tee Nut
Y29	Pad
Y30	Arm
Y31	Washer
Y32	Nut
Y33	Quick Clamp Lever
Y34	Wrench
Y35	Special Hex. Nut
Y36	Pin
Y37	Dowel
Y38	Shifter Pin
Y39	Shifter Fork
Y40	Shifter Shoe
Y41	Gasket
Y42	Bearing Retainer
Y43	Bearing Set
Y44	Spacer
Y45	Housing
Y46	Bushing
Y47	Shifter Shaft
Y48	Retaining Ring
Y49	Bearing Set
Y50	Compound Gear
Y51	Retaining Ring
Y52	Locknut Insert
Y53	Locknut
Y54	Sliding Gear
Y55	Bearing
Y56	Retaining Ring
Y57	Retaining Ring
Y58	Bearing
Y59	Gear
Y60	Oiler Ring
Y61	Dowel Pin
Y62	Woodruff Key

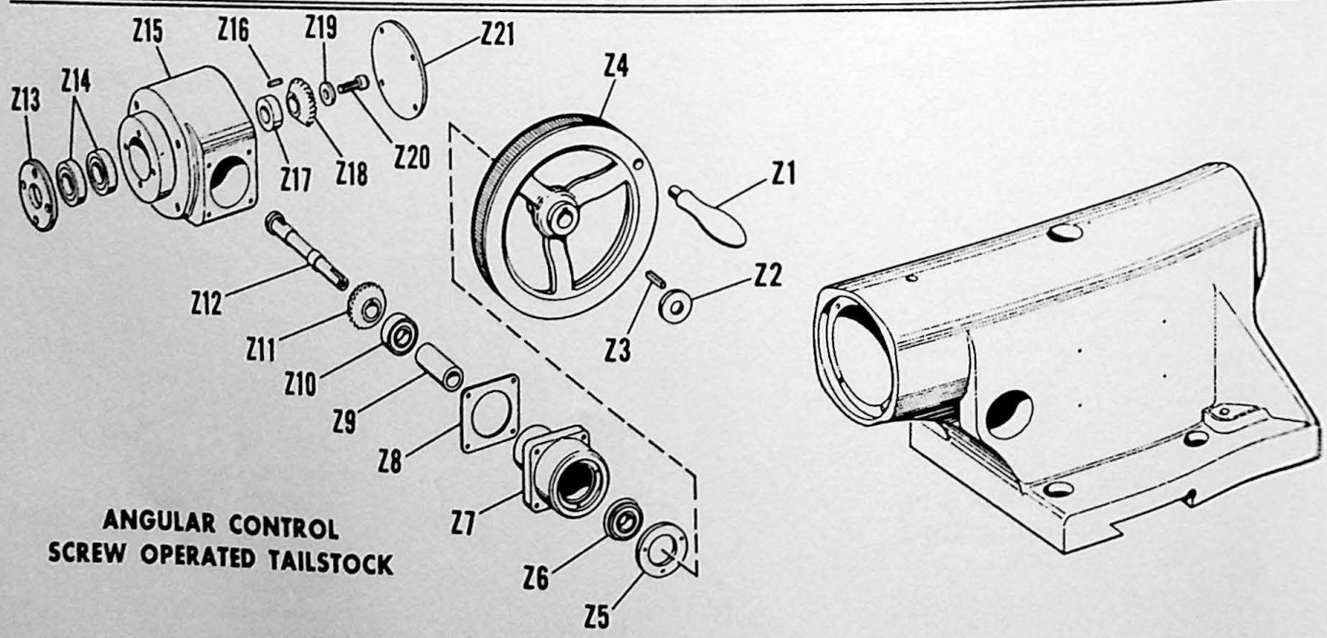
INDEX NO.	PART NAME
Y63	Intermediate Shaft
Y64	Gasket
Y65	Bearing Support Plate
Y66	Gasket
Y67	Cap
Y68	Serial No. Plate
Y69	Spacer
Y70	Handwheel
Y71	Handle
Y72	Screw
Y73	Bearing
Y74	Handwheel Housing
Y75	Shim
Y76	Bearing
Y77	Woodruff Key
Y78	Handwheel Shaft
Y79	Lub. Instruction Plate
Y80	Lubricator
Y81	Gib Screw
Y82	Gib
Y83	Allen Nut
Y84	Binder Plug (Front)
Y85	Bijur Oil Window
Y86	Clamp Lever (Model 2516 Series 612 Only)
Y87	Clamp Lever Shaft (Model 2516 Series 612 Only)
Y88	Allen Nut (Model 2516 Series 612 Only)
Y89	Spindle Wiper Case
Y90	Felt Wiper
Y91	Gasket
Y92	Dowel Pin
Y93	Clamp Lever Shaft
Y94	Plug
Y95	Clamp Lever
Y96	Thrust Washer
Y97	Binder Plug (Rear)
Y98	Tailstock Top
Y99	Key
Y100	Shim
Y101	Lub. Instruction Plate
Y102	Oiler Assembly
Y103	Shifter Shaft Extension
Y105	Bushing
Y106	High Low Plate
Y107	Shifter Plate
Y108	Shifter Lever
Y109	Insert
Y110	Detent
Y111	Spring
Y112	Shifter Lever Hub
Y114	Screw - R. H.
Y115	Nut - R. H.
Y116	Spindle
Y117	Center
Y118	Tailstock Base (Model 1610-2013 Series 610 & 612)
Y119	Washer
Y120	Button Head Screw
Y121	Conveyor Bracket
Y122	Pin
Y123	Knob



ANTI-FRICTION SPINDLE FOR SCREW OPERATED TAILSTOCK



ANTI-FRICTION SPINDLE FOR TWO-SPEED RANGE TAILSTOCK



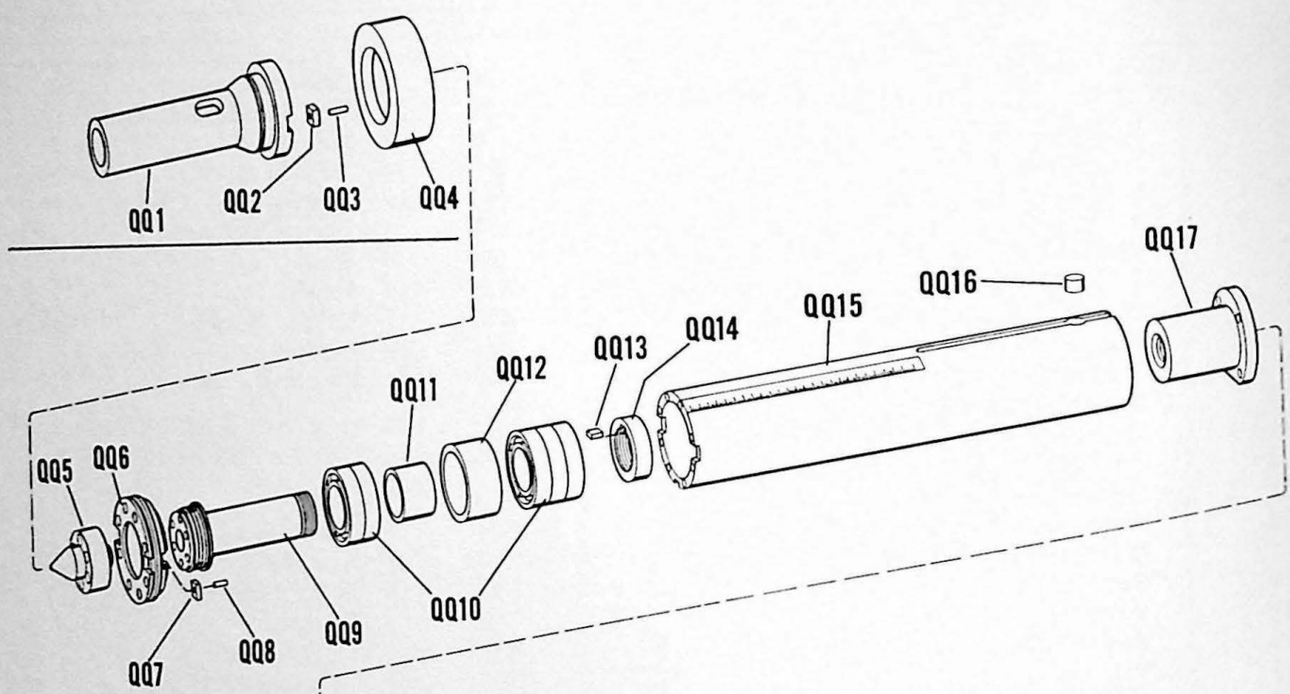
ANGULAR CONTROL
SCREW OPERATED TAILSTOCK

Figure Z, Tailstock—Anti-Friction and Angular Control Parts. (612 only)

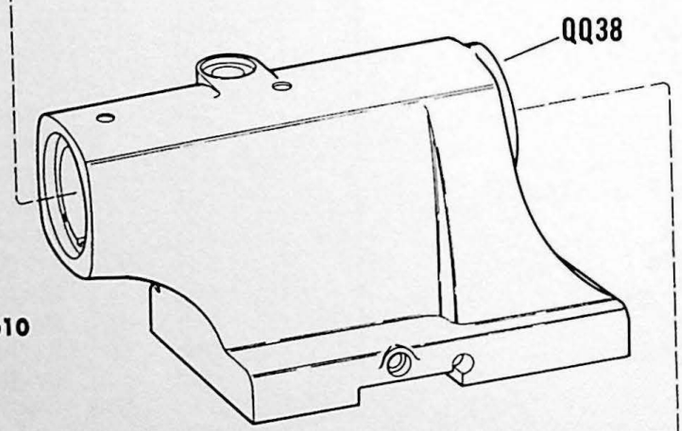
Parts List for Figure Z, Tailstock—Anti-Friction and Angular Control Parts (612 only)

INDEX NO.	PART NAME
	ANGULAR CONTROL FOR SCREW OPERATED TAILSTOCK
Z1	Handle
Z2	Washer
Z3	Key
Z4	Handwheel
Z5	Bearing Retainer
Z6	Bearing
Z7	Handwheel Housing
Z8	Shim
Z9	Spacer
Z10	Bearing
Z11	Bevel Gear
Z12	Handwheel Shaft
Z13	Bearing Retainer
Z14	Bearing Set
Z15	Bevel Gear Housing
Z16	Key
Z17	Spacer
Z18	Bevel Gear
Z19	Washer
Z20	Nylok Cap Screw
Z21	Cover
Z58	Knockout Plug
Z59	Sleeve
	ANTI-FRICTION SPINDLE FOR TWO SPEED RANGE TAILSTOCK
Z22	Screw - R. H.
Z23	Retainer Plate
Z24	Shim
Z25	Nut
Z26	Belleville Spring
Z27	Spindle
Z28	Drill Adaptor
Z29	High Speed Oil Seal
Z30	Locknut
Z31	Locknut Insert
Z32	Bearing Set
Z33	Spacer
Z34	Spacer
Z35	Spindle Cap
Z36	Center Shank
Z37	Center
Z60	Knockout Plug
	ANTI-FRICTION SPINDLE FOR SCREW OPERATED TAILSTOCK
Z38	Center
Z39	Center Shank
Z40	Spindle Cap
Z41	Bearing Set
Z42	Spacer
Z43	Spacer
Z44	Locknut Insert
Z45	Locknut
Z46	High Speed Oil Seal
Z47	Drill Adaptor
Z48	Spindle
Z49	Nut - L. H.
Z50	Screw - L. H.
Z51	Bearing Retainer
Z52	Bearing Set
Z53	Bearing Housing
Z54	Handwheel
Z55	Key
Z56	Washer
Z57	Handle

EXTERNAL DRILL ADAPTOR
(USED WITH ANTI-FRICTION CENTER ONLY)



ANTI-FRICTION SPINDLE
FOR MODEL 1610—2013
SERIES 610 AND MODEL 1610
SERIES 612



TWO-SPEED SCREW
FOR MODEL 1610—2013
SERIES 610 AND MODEL 1610
SERIES 612

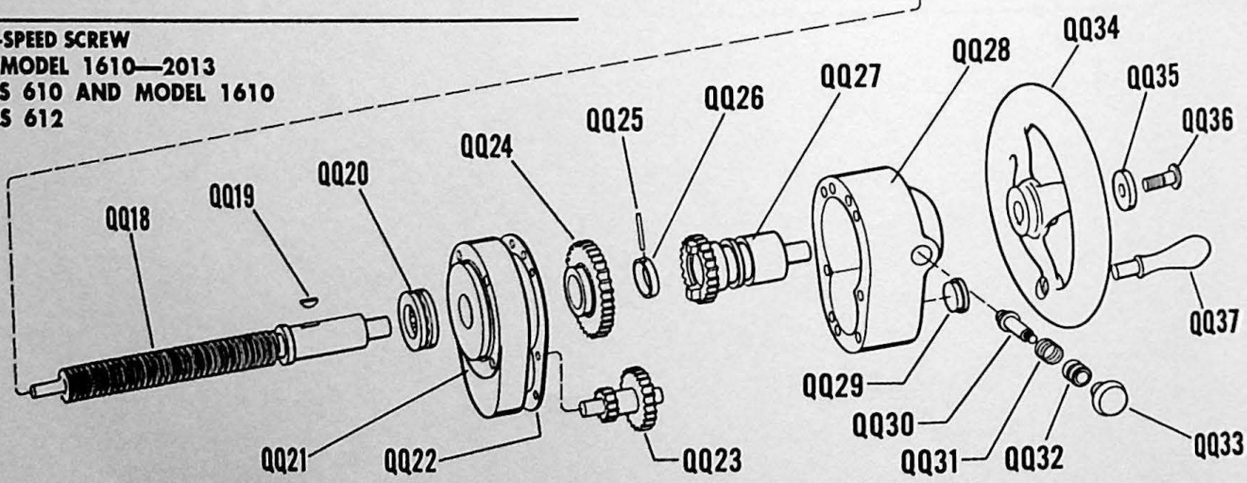


Figure QQ, Tailstock—Anti-Friction Spindle and Two-Speed Screw

Parts List for Figure QQ, Tailstock—Anti-Friction Spindle and Two Speed Screw

INDEX NO.	PART NAME
QQ1	Drill Adaptor
QQ2	Key
QQ3	Pin
QQ4	Nut
QQ5	Center
QQ6	Bearing Retainer
QQ7	Key
QQ8	Pin
QQ9	Center Shank
QQ10	Bearing Set
QQ11	Spacer
QQ12	Spacer
QQ13	Locknut Insert
QQ14	Adjusting Locknut
QQ15	Spindle
QQ16	Oil Wick
QQ17	Nut
QQ18	Screw
QQ19	Woodruff Key

INDEX NO.	PART NAME
QQ20	Thrust Bearing
QQ21	Housing Base
QQ22	Gasket
QQ23	Cluster Gear
QQ24	45 T. Clutch Gear
QQ25	Pin
QQ26	Collar
QQ27	Shifter
QQ28	Housing
QQ29	Oil Window
QQ30	Plunger
QQ31	Spring
QQ32	Sleeve
QQ33	Knob
QQ34	Handwheel
QQ35	Washer
QQ36	Screw
QQ37	Balcrank Machine Handle
QQ38	Tailstock Top

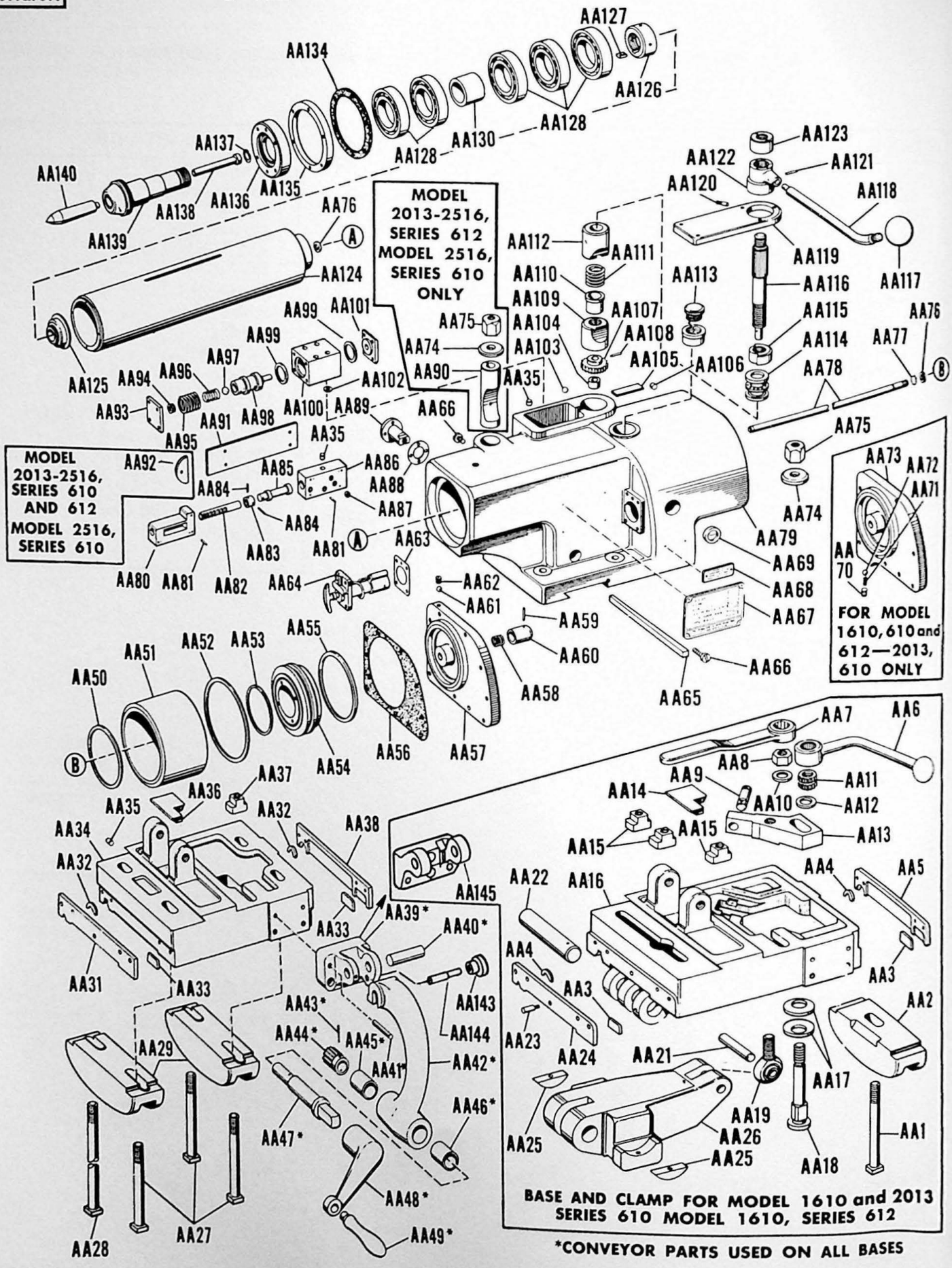


Figure AA, Tailstock — Air Operated

Parts List for Figure AA, Tailstock — Air Operated

INDEX NO.	PART NAME
FOR MODELS 1610-2013 SERIES 610 MODEL 1610 SERIES 612	
AA1	Clamp Bolt
AA2	Clamp (Rear)
AA3	Flat Wiper
AA4	Vee Wiper
AA5	Wiper Case - R. H.
AA6	Quick Clamp Lever
AA7	Wrench
AA8	Special Hex Nut
AA9	Pin
AA10	Washer
AA11	Nut
AA12	Washer
AA13	Arm
AA14	Pad
AA15	Tee Nut
AA16	Tailstock Base
AA17	Swivel Washers
AA18	Quick Clamp Shaft
AA19	"Monoball" Rod End
AA21	Pin
AA22	Pin
AA23	Stop Pin
AA24	Wiper Case - L. H.
AA25	Rocker
AA26	Clamp
AA27	Clamp Bolt
AA28	Clamp Bolt
AA29	Clamp
AA31	Wiper Case - L. H.
AA32	Vee Wiper
AA33	Flat Wiper
AA34	Tailstock Base
AA35	Hydraulic Plug
AA36	Pad
AA37	Tee Nut
AA38	Wiper Case - R. H.
FOR ALL MODELS	
AA39	Conveyor Bracket
AA40	Conveyor Bracket Pin
AA41	Dowel Pin
AA42	Rack Pinion Hinge
AA43	Roll Pin
AA44	Pinion Gear
AA45	Bushing
AA46	Bushing
AA47	Rack Pinion Stem
AA48	Crank
AA49	Crank Handle
AA50	"O" Ring
AA51	Cylinder Liner
AA52	"O" Ring
AA53	"O" Ring
AA54	Piston
AA55	"O" Ring
AA56	Gasket
AA57	Cylinder Cap
AA58	Compression Spring
AA59	Roll Pin
AA60	Knock-Out Nut
AA61	Ball
AA62	Pipe Plug
AA63	Gasket
AA64	Lubricator
AA65	Gib
AA66	Gib Screw
AA67	Serial No. Plate
AA68	Lub. Instruction Plate
AA69	Bijur Oil Window

INDEX NO.	PART NAME
FOR MODELS 1610-2013 SERIES 610 MODEL 1610 SERIES 612	
AA70	Pipe Plug
AA71	Spring
AA72	Ball
AA73	Cylinder Cap
AA74	Washer
AA75	Special Hex Nut
AA76	"O" Ring
AA77	Retaining Ring
AA78	Center Knock-Out
AA79	Tailstock Top
AA80	Valve Rack Guide
AA81	Dowel Pin
AA82	Valve Rack
AA83	Coupling
AA84	Roll Pin
AA85	Valve Stem
AA86	Valve Block
AA87	"O" Ring
AA88	Shim
AA89	Key
AA90	Sleeve
AA91	Cover
AA92	Cover
AA93	Valve Cap
AA94	Lock Screw
AA95	Spring
AA96	Spring
AA97	Nylon Ball
AA98	Valve Stem
AA99	"O" Ring
AA100	Valve Block
AA101	Valve Pilot Cap
AA102	"O" Ring
AA103	Nylon Ball
AA104	Bushing
AA105	Lub. Instruction Plate
AA106	Hydraulic Plug
AA107	Gear
AA108	Roll Pin
AA109	Binder Plug (Lower)
AA110	Sleeve
AA111	Spring
AA112	Binder Plug (Upper)
AA113	Oiler Assembly
AA114	Thrust Bearing
AA115	Cam
AA116	Cam Shaft
AA117	Knob
AA118	Lever
AA119	Cover
AA120	Threaded Dowel
AA121	Roll Pin
AA122	Handle Hub
AA123	Nut
AA124	Spindle
AA125	High Speed Oil Seal
AA126	Locknut
AA127	Locknut Insert
AA128	Bearing Set
AA130	Spacer
AA134	Wiper
AA135	Spindle Wiper Case
AA137	Retaining Ring
AA138	Center Knock-Out
AA139	Center Shank
AA140	Center
AA143	Knob
AA144	Pin
AA145	Conveyor Bracket

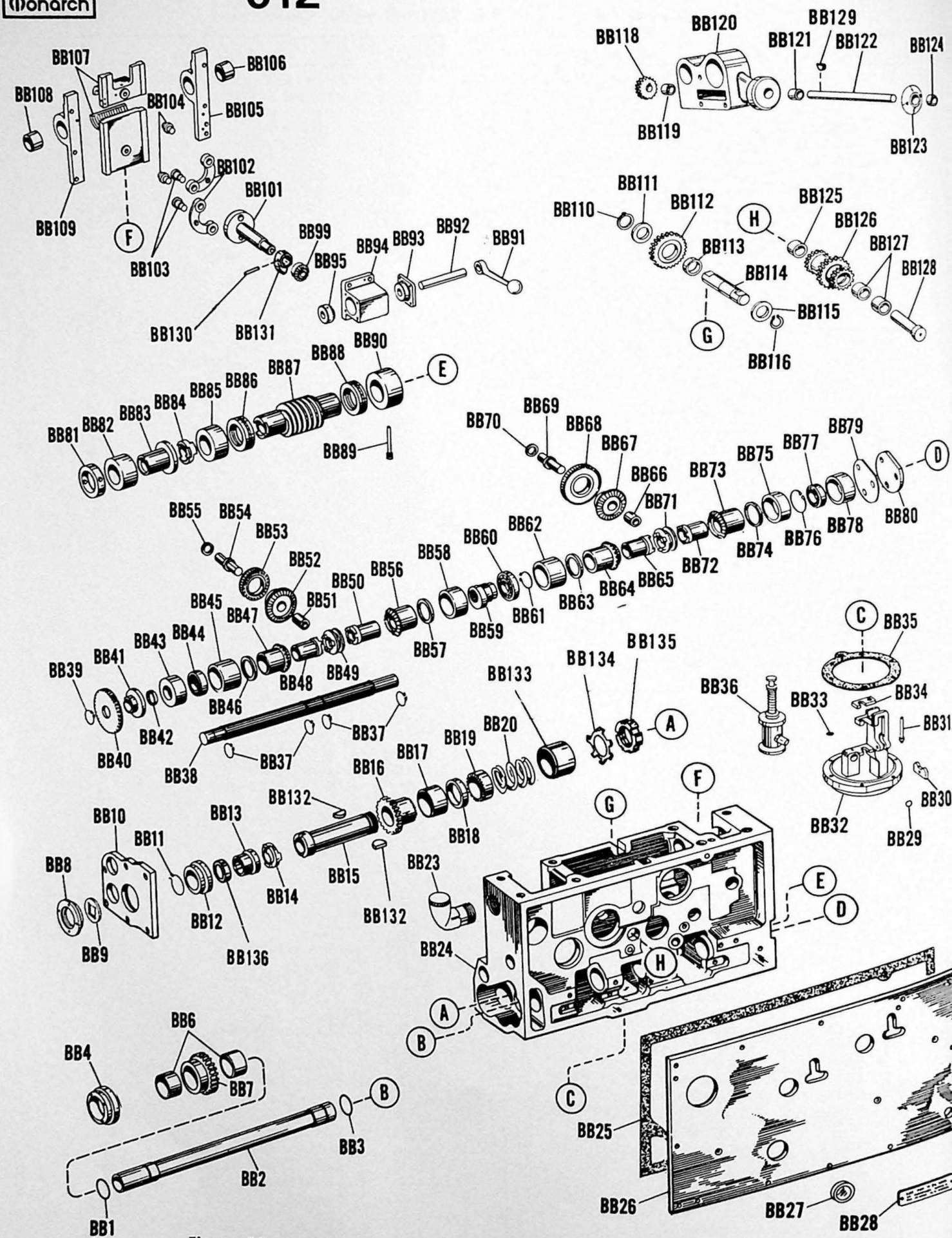


Figure BB, Model 1610 AND 2013 Series 610, Model 1610 Series 612
Apron with Power Rapid Traverse

Parts List for Figure BB, Model 1610 and 2013 Series 610
Model 1610, Series 612 Apron with Power Rapid Traverse

INDEX NO.	PART NAME
BB1	"O" Ring
BB2	Control Rod Tube
BB3	"O" Ring
BB4	Rapid Traverse Bearing
BB6	Oilite Bushing
BB7	Gear
BB8	Retaining Plate
BB9	Cover
BB10	Cover
BB11	Retaining Ring
BB12	Rapid Traverse Bearing
BB13	Rapid Traverse Drive Coupling
BB14	Rapid Traverse Drive Coupling Disc
BB15	Drive Sleeve
BB16	Gear
BB17	Bushing
BB18	Drive Gear Collar
BB19	Safety Clutch
BB20	Spring
BB23	Oil Filler
BB24	Apron
BB25	Gasket
BB26	Front Cover
BB27	Oil Window
BB28	Instruction Plate
BB29	"O" Ring
BB30	Pump Actuator
BB31	Pump Actuator Pin
BB32	Pump Bracket
BB33	"O" Ring
BB34	Pump Actuator Block
BB35	Gasket
BB36	Lubricator Pump
BB37	Retaining Ring
BB38	Clutch Shaft
BB39	Retaining Ring
BB40	Gear
BB41	Gear Hub
BB42	Oil Seal
BB43	Bearing Block
BB44	Radial Bearing
BB45	Miter Gear Bushing
BB46	Washer
BB47	Bevel Gear
BB48	Clutch
BB49	Rapid Traverse Clutch
BB50	Clutch
BB51	Oilite Bushing
BB52	Bevel Gear
BB53	Gear
BB54	Shaft
BB55	Washer
BB56	Bevel Gear
BB57	Washer
BB58	Miter Gear Bushing
BB59	Cam
BB60	Radial Bearing
BB61	Retaining Ring
BB62	Miter Gear Bushing
BB63	Washer
BB64	Bevel Gear
BB65	Clutch
BB66	Oilite Bushing
BB67	Bevel Gear

INDEX NO.	PART NAME
BB68	Gear
BB69	Shaft
BB70	Washer
BB71	Rapid Traverse Clutch
BB72	Clutch
BB73	Bevel Gear
BB74	Washer
BB75	Miter Gear Bushing
BB76	Retaining Ring
BB77	Radial Bearing
BB78	Bearing Cap
BB79	Gasket
BB80	Cover Plate
BB81	Collar
BB82	Bushing
BB83	Driver
BB84	Drive Plate
BB85	Bushing
BB86	Thrust Bearing
BB87	Worm
BB88	Thrust Bearing
BB89	Dowel Screw
BB90	Bushing
BB91	Shifter Lever
BB92	Half Nut Lever Shaft
BB93	Housing Cap - R. H.
BB94	Half Nut Lever Housing
BB95	Miter Gear
BB99	Miter Gear
BB101	Eccentric Shaft
BB102	Half Nut Link
BB103	Stud
BB104	Stud
BB105	Half Nut Gib - L. H.
BB106	Bushing
BB107	Half Nut
BB108	Bushing
BB109	Half Nut Gib - R. H.
BB110	Retaining Ring
BB111	Spacer
BB112	Gear
BB113	Bushing
BB114	Shaft
BB115	Spacer
BB116	Retaining Ring
BB118	Gear
BB119	Bushing
BB120	Chasing Dial Housing
BB121	Bushing
BB122	Shaft
BB123	Chasing Dial
BB124	Bushing
BB125	Oilite Bushing
BB126	Gear
BB127	Oilite Bushing
BB128	Gear Shaft
BB129	Woodruff Key
BB130	Dowel Pin
BB131	Cam
BB132	Woodruff Key
BB133	Spring Cover
BB134	Lock Washer
BB135	Locknut
BB136	Bushing

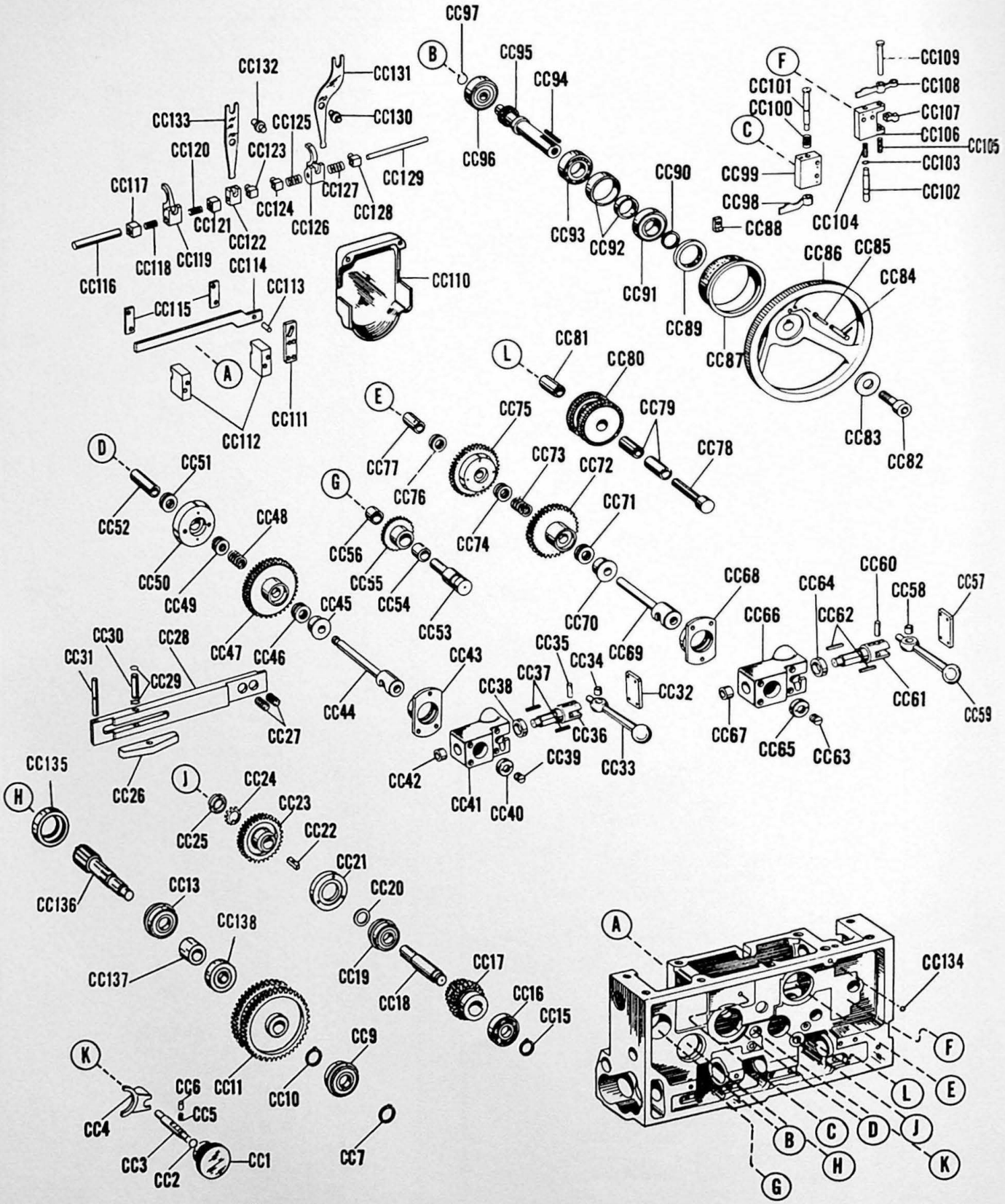


Figure CC, Model 1610 and 2013 Series 610, Model 1610 Series 612
Apron with Power Rapid Traverse

Parts List for Figure CC, Model 1610 and 2013 Series 610
Model 1610, Series 612 Apron with Power Rapid Traverse

INDEX NO.	PART NAME
CC1	Knob
CC2	"O" Ring
CC3	Feed Reverse Shifter Shaft
CC4	Shifter Yoke
CC5	Spring
CC6	Detent Pin
CC7	Retaining Ring
CC9	Radial Bearing
CC10	Retaining Ring
CC11	Cluster Gear
CC13	Radial Bearing
CC15	Retaining Ring
CC16	Radial Bearing
CC17	Feed Reverse Gear
CC18	Worm Wheel Shaft
CC19	Radial Bearing
CC20	Worm Wheel Shim
CC21	Bearing Retainer
CC22	Key
CC23	Worm Wheel
CC24	Lock Washer
CC25	Lock Nut
CC26	Shoe
CC27	Spring
CC28	Support Arm
CC29	Retaining Ring
CC30	Pin
CC31	Arm Hinge Pin
CC32	Cover Plate
CC33	Friction Lever
CC34	Oilite Bushing
CC35	Friction Lever Pin
CC36	Friction Cam
CC37	Friction Cam Wiper
CC38	Oilite Bushing
CC39	Cam Screw
CC40	Lock Nut
CC41	Friction Cam Housing
CC42	Oilite Bushing
CC43	Bearing Cap
CC44	Longitudinal Friction Stem
CC45	Retaining Bushing
CC46	Thrust Bearing
CC47	Friction Disc Gear
CC48	Friction Spring
CC49	Thrust Bearing
CC50	Friction Disc Assembly (Gear and Disc)
CC51	Thrust Bearing
CC52	Bushing
CC53	Gear Shaft
CC54	Oilite Bushing
CC55	Gear
CC56	Bushing
CC57	Cover Plate
CC58	Oilite Bushing
CC59	Friction Lever
CC60	Friction Lever Pin
CC61	Friction Cam
CC62	Friction Cam Wiper
CC63	Cam Screw
CC64	Oilite Bushing
CC65	Lock Nut
CC66	Friction Cam Housing
CC67	Oilite Bushing
CC68	Bearing Cap
CC69	Cross Feed Friction Stem
CC70	Retaining Bushing

INDEX NO.	PART NAME
CC71	Thrust Bearing
CC72	Friction Disc Gear
CC73	Friction Spring
CC74	Thrust Bearing
CC75	Friction Disc Assembly (Disc and Gear)
CC76	Thrust Bearing
CC77	Bushing
CC78	Gear Shaft
CC79	Bushing
CC80	Cluster Gear
CC81	Bushing
CC82	Cap Screw
CC83	Retaining Washer
CC84	Dial Locknut and Pin Assembly
CC85	Dial Lock Screw
CC86	Handwheel
CC87	Dial
CC88	Pointer
CC89	Oil Seal
CC90	Spacer
CC91	Radial Bearing
CC92	Spacer Assembly
CC93	Radial Bearing
CC94	Key
CC95	Handwheel Pinion Shaft
CC96	Radial Bearing
CC97	Retaining Ring
CC98	Valve Finger
CC99	Valve Body
CC100	Compression Spring
CC101	Valve Stem
CC102	Valve Stem
CC103	Spring Retainer
CC104	Compression Spring
CC105	Compression Spring
CC106	Valve Block
CC107	Half Nut Valve Finger
CC108	Valve Finger
CC109	Stem
CC110	Guard
CC111	Lock Bar Cam
CC112	Lock Bar Guide
CC113	Pin
CC114	Lock Bar
CC115	Lock Bar Guide Cover
CC116	Shifter Shaft
CC117	Spring Stop Block
CC118	Spring
CC119	Shifter
CC120	Spring
CC121	Spring Stop Block
CC122	Shifter Collar
CC123	Spring Stop Block
CC124	Spring Stop Block
CC125	Spring
CC126	Shifter
CC127	Spring
CC128	Spring Stop Block
CC129	Shifter Shaft
CC130	Stud
CC131	Fork
CC132	Stud
CC133	Fork
CC134	"O" Ring
CC135	Retaining Cap
CC136	Rack Pinion
CC137	Spacer
CC138	Ball Bearing

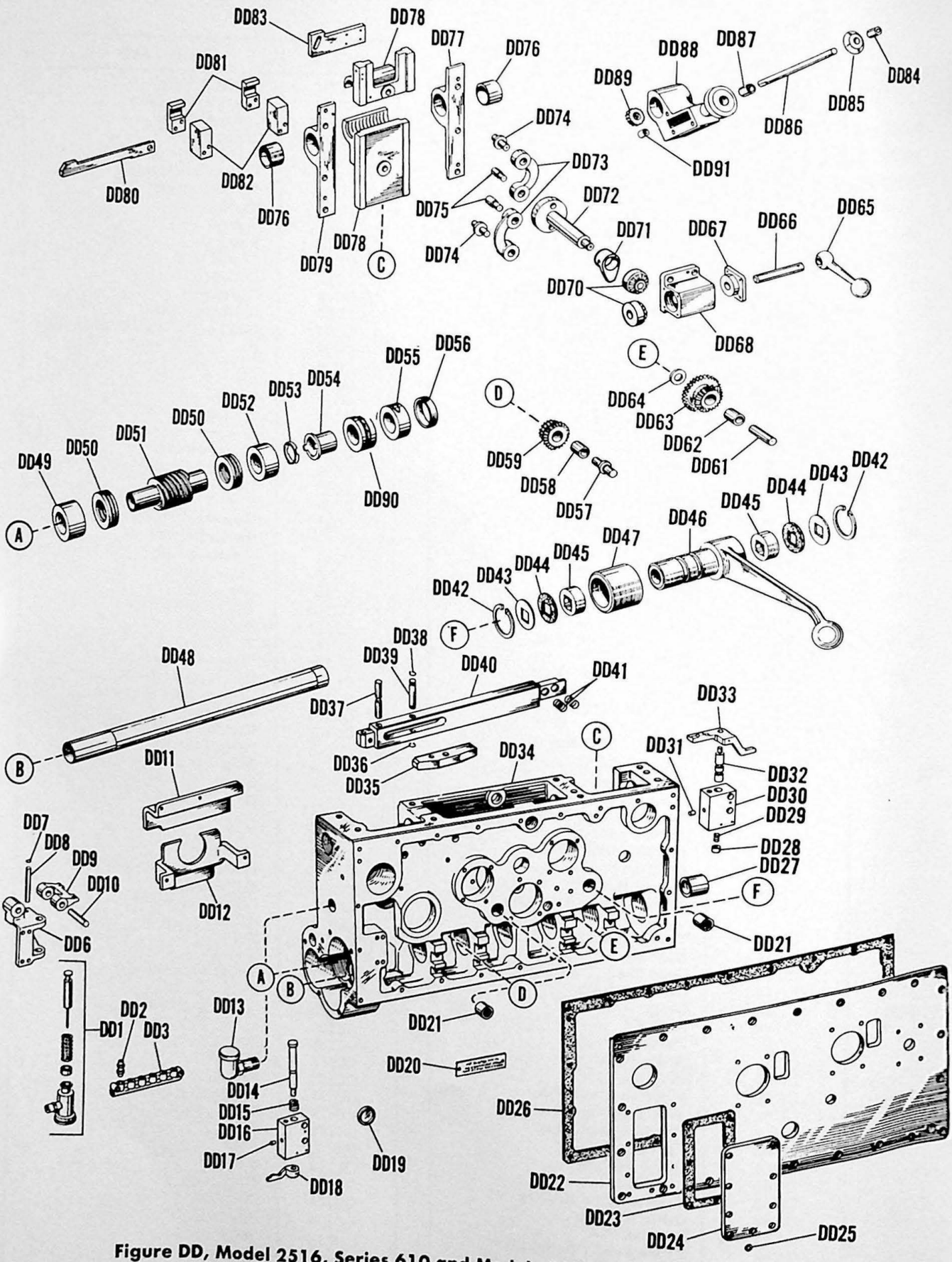


Figure DD, Model 2516, Series 610 and Models 2013 and 2516, Series 612 Apron with Power Rapid Traverse

Parts List for Figure DD, Model 2516, Series 610 and Models 2013 and 2516, Series 612 Apron with Power Rapid Traverse

IINDEX NO.	PART NAME
DD1	Lubricator Pump
DD2	Meter Unit
DD3	Junction (6 Way)
DD6	Pump Bracket
DD7	Retaining Ring
DD8	Shaft
DD9	Lever
DD10	Shaft
DD11	Upper Guard
DD12	Lower Guard
DD13	Oil Filler
DD14	Valve Stem
DD15	Compression Spring
DD16	Valve Body
DD17	Hydraulic Plug
DD18	Valve Finger
DD19	Oil Window
DD20	Instruction Plate (Lubrication)
DD21	Oilite Bushing
DD22	Front Cover Plate
DD23	Gasket
DD24	Cover Plate
DD25	Washer
DD26	Gasket
DD27	Bushing
DD28	Spring Retainer
DD29	Compression Spring
DD30	Valve Body
DD31	Hydraulic Plug
DD32	Valve Stem
DD33	Valve Finger
DD34	Apron
DD35	Shoe
DD36	Retaining Ring
DD37	Hinge Pin
DD38	Retaining Ring
DD39	Pin
DD40	Support Arm
DD41	Springs
DD42	Retaining Ring
DD43	Wiper Plate
DD44	Wiper
DD45	Bushing
DD46	Control Lever

INDEX NO.	PART NAME
DD47	Collar
DD48	Control Rod Tube
DD49	Bushing
DD50	Thrust Bearing
DD51	Worm
DD52	Collar
DD53	Coupling
DD54	Universal Jaw
DD55	Sleeve
DD56	Set Collar
DD57	Bevel Gear Stud
DD58	Bushing
DD59	Drive Gear
DD61	Bevel Gear Stud
DD62	Bushing
DD63	Drive Gear
DD64	Washer
DD65	Lever
DD66	Half Nut Lever Shaft
DD67	Housing Cap - R. H.
DD68	Half Nut Lever Housing
DD70	Miter Gear
DD71	Eccentric Shaft Cam
DD72	Eccentric Shaft
DD73	Half Nut Link
DD74	Stud
DD75	Stud
DD76	Bushing
DD77	Half Nut Gib - L. H.
DD78	Half Nut
DD79	Half Nut Gib - R. H.
DD80	Interlock Bar
DD81	Guide Plate
DD82	Block
DD83	Interlock Guide
DD84	Bushing
DD85	Chasing Dial Head
DD86	Shaft
DD87	Bushing
DD88	Housing
DD89	Chasing Dial Worm Gear
DD90	Thrust Bearing
DD91	Bushing

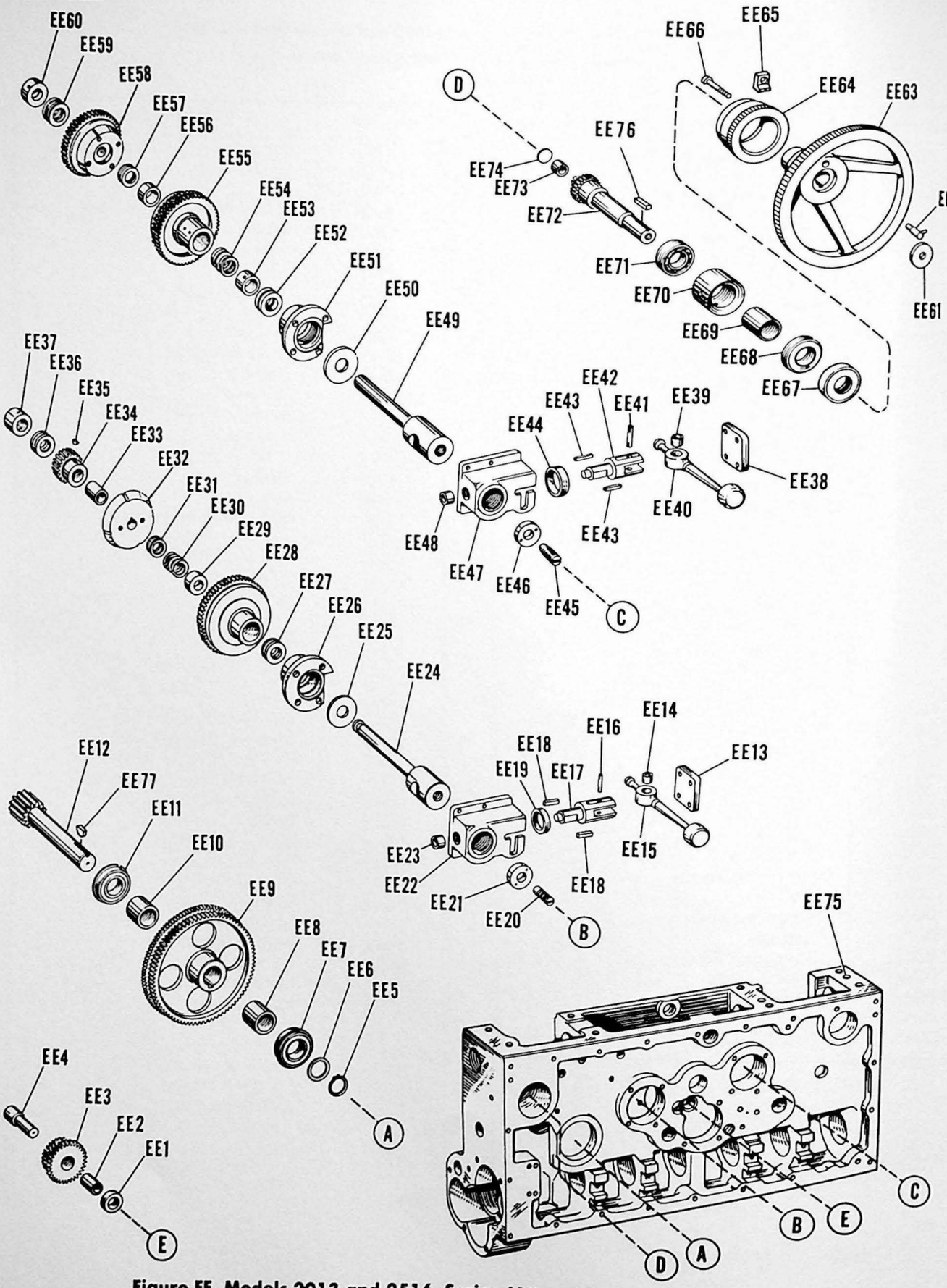


Figure EE, Models 2013 and 2516, Series 612 and Model 2516, Series 610
Apron with Power Rapid Traverse

Parts List for Figure EE, Model 2013 and 2516, Series 612 and Model 2516, Series 610 Apron with Power Rapid Traverse

INDEX NO.	PART NAME
EE1	Collar
EE2	Oilite Bushing
EE3	Gear
EE4	Gear Stud
EE5	Retaining Ring
EE6	Collar
EE7	Bearing
EE8	Spacer
EE9	Cluster Gear
EE10	Spacer
EE11	Bearing
EE12	Rack Pinion (12T)
EE13	Friction Cam Housing Cover
EE14	Oilite Bushing
EE15	Friction Lever
EE16	Friction Lever Pin
EE17	Friction Cam
EE18	Friction Cam Wiper
EE19	Bushing - R. H.
EE20	Friction Stem Adjusting Screw
EE21	Friction Stem Locknut
EE22	Friction Cam Housing
EE23	Bushing - L. H.
EE24	Friction Stem
EE25	Collar
EE26	Friction Gear Bushing
EE27	Thrust Bearing
EE28	Longitudinal Friction Gear
EE29	Bushing
EE30	Compression Spring
EE31	Spring Thrust Bearing
EE32	Friction Disc Assembly
EE33	Bushing
EE34	Gear (23T)
EE35	Woodruff Key
EE36	Thrust Bearing
EE37	Collar
EE38	Friction Cam Housing Cover

INDEX NO.	PART NAME
EE39	Oilite Bushing
EE40	Friction Lever
EE41	Friction Lever Pin
EE42	Friction Cam
EE43	Friction Cam Wiper
EE44	Bushing - R. H.
EE45	Friction Stem Adjusting Screw
EE46	Friction Stem Locknut
EE47	Friction Cam Housing
EE48	Bushing - L. H.
EE49	Friction Stem
EE50	Collar
EE51	Friction Stem Gear Bushing
EE52	Thrust Bearing
EE53	Bushing
EE54	Compression Spring
EE55	Friction Gear
EE56	Bushing
EE57	Spring Thrust Bearing
EE58	Friction Disc Assembly
EE59	Thrust Bearing
EE60	Sleeve
EE61	Handwheel Retaining Washer
EE62	Dial Lock Nut and Pin Assembly
EE63	Handwheel
EE64	Handwheel Dial
EE65	Handwheel Dial Pointer
EE66	Dial Lock Screw
EE67	Oil Seal
EE68	Bearing
EE69	Inner Spacer
EE70	Outer Spacer
EE71	Bearing
EE72	Pinion Shaft
EE73	Needle Bearing
EE74	Expansion Plug
EE75	Apron
EE76	Key
EE77	Woodruff Key

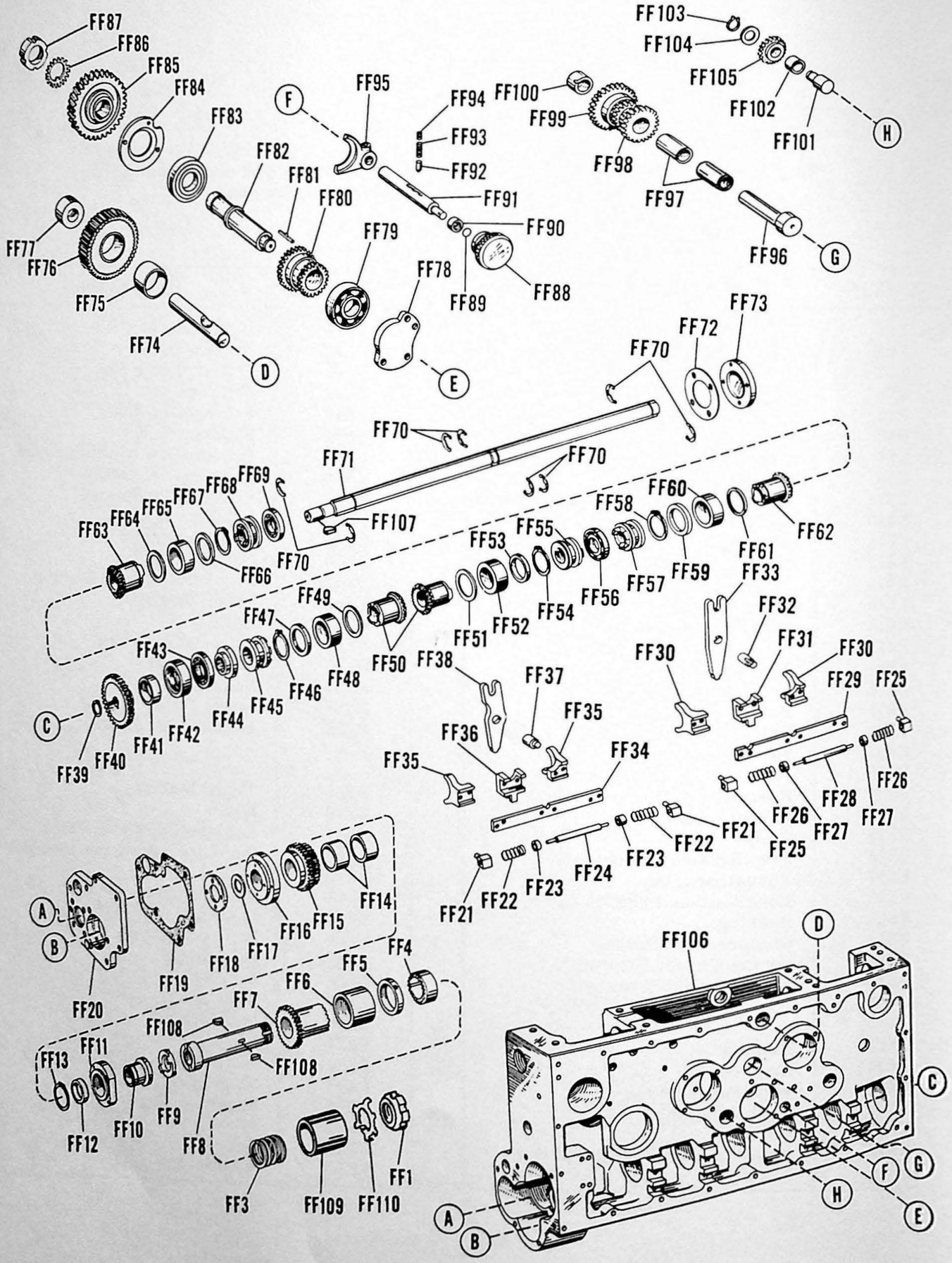


Figure FF, Models 2013 and 2516, Series 612 and Model 2516, Series 610 Apron with Power Rapid Traverse

Parts List for Figure FF, Models 2013 and 2516, Series 612 and Model 2516, Series 610 Apron with Power Rapid Traverse

INDEX NO.	PART NAME
FF1	Adjusting Nut
FF3	Spring
FF4	Safety Clutch
FF5	Drive Gear Collar
FF6	Bushing
FF7	Gear (29T)
FF8	Drive Sleeve
FF9	Rapid Traverse Drive Coupling Disc
FF10	Rapid Traverse Drive Coupling
FF11	Rapid Traverse Bearing
FF12	Bushing
FF13	Retaining Ring
FF14	Oilite Bushing
FF15	Idler Compound Gear
FF16	Bushing
FF17	Cover
FF18	Retaining Plate
FF19	Gasket
FF20	Cover
FF21	Spring Stop Block
FF22	Spring
FF23	Spring Stop Collar
FF24	Traverse Control Spring Stem
FF25	Spring Stop Block
FF26	Spring
FF27	Spring Stop Collar
FF28	Traverse Control Spring Stem
FF29	Fork Rod
FF30	Clutch Shifter Fork
FF31	Shifter Block
FF32	Fork Shaft
FF33	Fork
FF34	Fork Rod
FF35	Clutch Shifter Fork
FF36	Shifter Block
FF37	Fork Shaft
FF38	Fork
FF39	Retaining Ring
FF40	Gear
FF41	Oil Seal
FF42	Seal Retainer
FF43	Bearing
FF44	Pump Cam
FF45	Rapid Traverse Clutch
FF46	Retaining Ring
FF47	Spacer
FF48	Miter Gear Bushing
FF49	Washer
FF50	Miter Gear
FF51	Washer
FF52	Miter Gear Bushing
FF53	Spacer
FF54	Retaining Ring
FF55	Rapid Traverse Clutch

INDEX NO.	PART NAME
FF56	Bearing
FF57	Rapid Traverse Clutch
FF58	Retaining Ring
FF59	Spacer
FF60	Miter Gear Bushing
FF61	Washer
FF62	Miter Gear
FF63	Miter Gear
FF64	Washer
FF65	Miter Gear Bushing
FF66	Spacer
FF67	Retaining Ring
FF68	Rapid Traverse Clutch
FF69	Bearing
FF70	Retaining Ring
FF71	Traverse Clutch Shaft
FF72	Gasket
FF73	Cap
FF74	Gear Stud
FF75	Oilite Bushing
FF76	Gear
FF77	Collar
FF78	Bearing Cap
FF79	Bearing
FF80	Sliding Cluster Gear
FF81	Tit Key
FF82	Wormwheel Shaft
FF83	Bearing
FF84	Bearing Cap
FF85	Wormwheel
FF86	Lockwasher
FF87	Locknut
FF88	Knob
FF89	Linear "O" Ring
FF90	Spacer
FF91	Shifter Shaft
FF92	Detent Pin
FF93	Compression Spring
FF94	Set Screw
FF95	Shifter
FF96	Shoulder Stud
FF97	Oilite Bushing
FF98	Cluster Gear
FF99	Gear (30T)
FF100	Bushing
FF101	Gear Stud
FF102	Oilite Bushing
FF103	Retaining Ring
FF104	Spacer
FF105	Gear
FF106	Apron
FF107	Woodruff Key
FF108	Woodruff Key
FF109	Spring Cover
FF110	Lock Washer

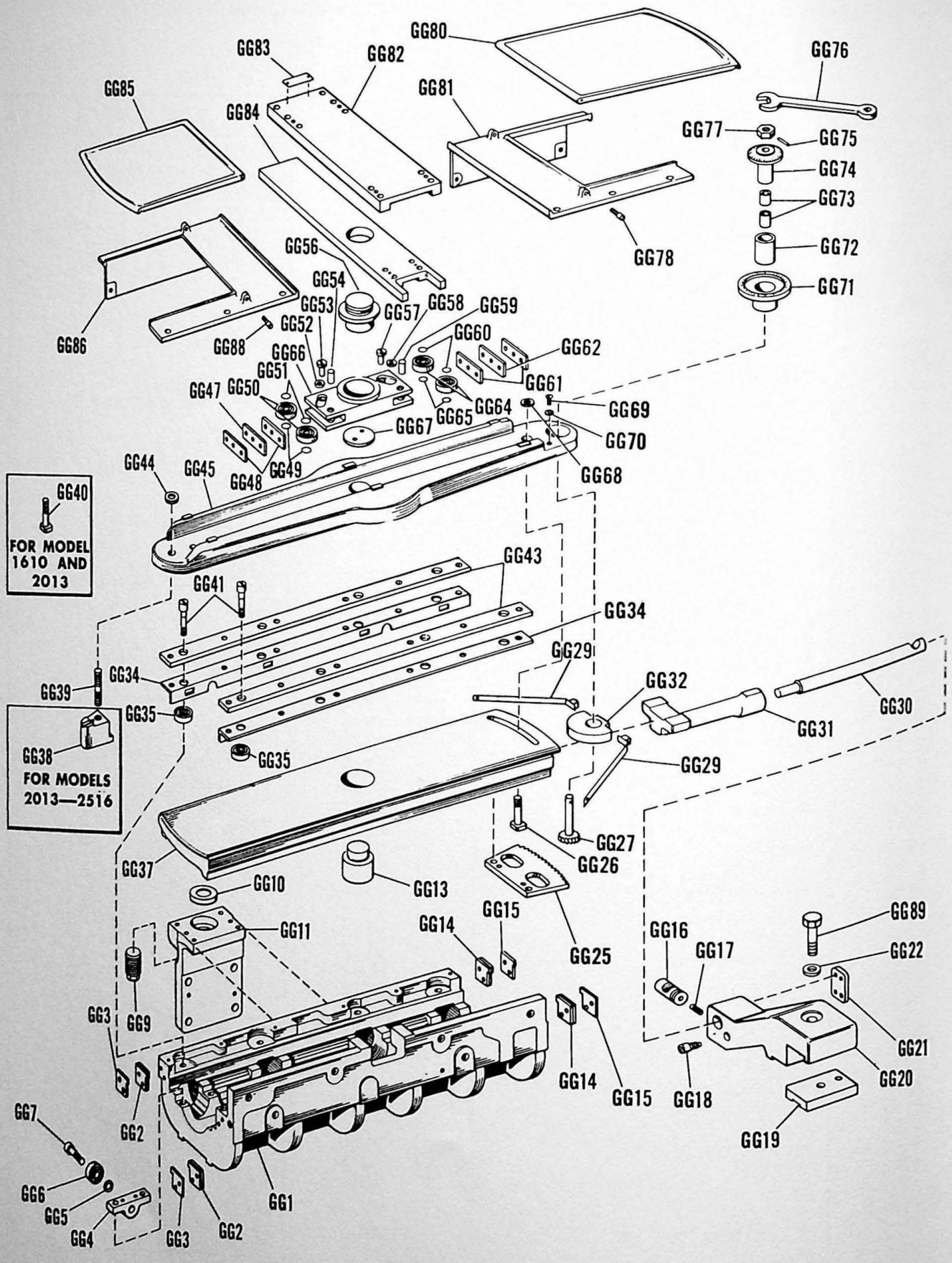


Figure GG Taper Attachment (612 only)

Parts List for Figure GG, Taper Attachment
(612 ONLY)

INDEX NO.	PART NAME
GG1	Carriage Bracket
GG2	Wiper
GG3	Slide Wiper - L. H.
GG4	Lower Bearing Support
GG5	Washer
GG6	Sealed Bearing
GG7	Lower Bearing Eccentric
GG9	Draw Bar Clamp Screw
GG10	Draw Bar Clamp Plug
GG11	Draw Bar Support
GG13	Swivel Stud
GG14	Wiper
GG15	Slide Wiper - R. H.
GG16	Cam
GG17	Cam Spring
GG18	Cam Screw
GG19	Bed Bracket Clamp
GG20	Bed Bracket
GG21	Stop Plate
GG22	Washer
GG25	Gear Segment
GG26	Swivel Clamp Bolt
GG27	Swivel Setting Gear
GG29	Roller Ribbon Assembly
GG30	Draw Rod
GG31	Draw Rod Bracket
GG32	Vernier Dial Roller
GG34	Bearing Guard
GG35	Sealed Bearing
GG37	Slide
GG38	Swivel Clamp - L. H. (For Model 2516 Only)
GG39	Housing Stud
GG40	Swivel Clamp Bolt (For Model 1610 and 2013 Only)
GG41	Side Bearing Eccentric Stud

INDEX NO.	PART NAME
GG43	Slide Gib
GG44	Washer
GG45	Swivel
GG47	Shoe Wiper
GG48	Inside Wiper Case
GG49	Bearing Shim
GG50	Sealed Bearing
GG51	Shoe Bearing Shim
GG52	Shoe Stud Lock Collar
GG53	Shoe Bearing Eccentric Stud
GG54	Shoe Bearing Pin
GG56	Shoe Stud
GG57	Shoe Bearing Eccentric Stud
GG58	Shoe Stud Lock Collar
GG59	Shoe Bearing Pin
GG60	Shoe Bearing Shim
GG61	Inside Wiper Case
GG62	Shoe Wiper
GG64	Sealed Bearing
GG65	Shoe Bearing Shim
GG66	Shoe
GG67	Shoe Stud Cap
GG68	Washer
GG69	Oval Head Screw
GG70	Dial Lock Washer
GG71	Lower Dial
GG72	Bushing
GG73	Bushing
GG74	Vernier Dial
GG75	Pin
GG76	Wrench
GG77	Swivel Setting Gear Nut
GG78	Hinge Pin
GG80	Guard - L. H.
GG81	Guard - L. H.
GG82	Draw Bar Guide
GG83	Lube Instruction Plate
GG84	Draw Bar
GG85	Guard
GG86	Guard - R. H.
GG88	Hinge Pin
GG89	Hex Head Cap Screw

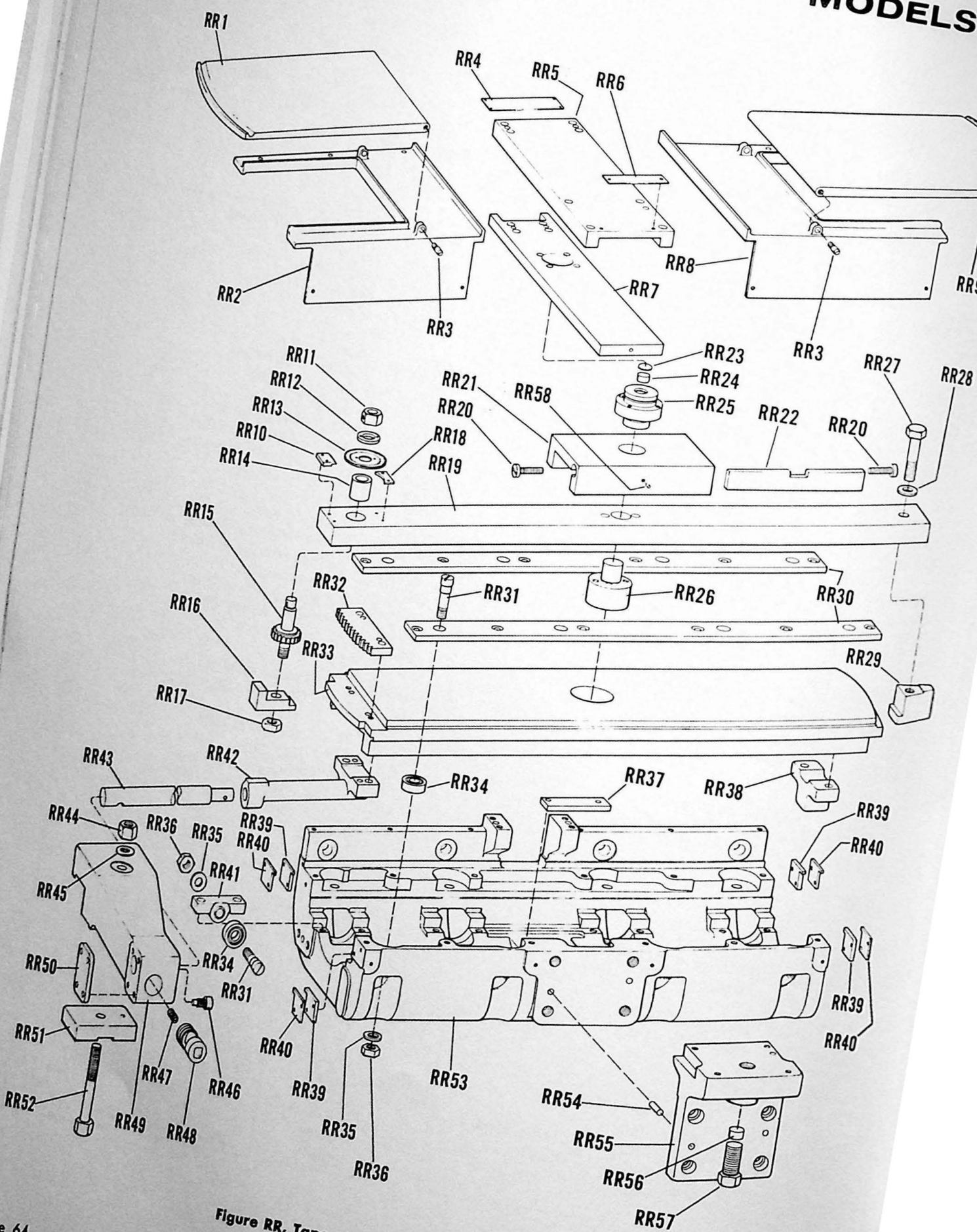


Figure RR, Taper Attachment (Series 610 only)

Parts List for Figure RR, Taper Attachment (Series 610 only)

INDEX NO.	PART NAME
RR1	Guard, Upper L. H.
RR2	Guard, Lower L. H.
RR3	Hinge Pin
RR4	Instruction Plate
RR5	Draw Bar Guide
RR6	Lubrication Instruction Plate
RR7	Draw Bar
RR8	Guard, R. H.
RR9	Guard, L. H.
RR10	Vernier Plate (Degrees)
RR11	Swivel Setting Gear Head
RR12	Washer
RR13	Index Dial
RR14	Bushing
RR15	Swivel Setting Gear
RR16	Swivel Clamp
RR17	Nut
RR18	Vernier Plate (Inches)
RR19	Swivel
RR20	Gib Screw
RR21	Shoe
RR22	Gib
RR23	Cap Plug
RR24	Plug
RR25	Shoe Stud
RR26	Swivel Stud
RR27	Large Head Cap Screw
RR28	Washer
RR29	Swivel Clamp

INDEX NO.	PART NAME
RR30	Slide Gib
RR31	Eccentric Bearing Stud
RR32	Gear Segment
RR33	Slide
RR34	Single Row Ball Bearing
RR35	Washer
RR36	Nut
RR37	Stop Block
RR38	Stop Bracket
RR39	Wiper
RR40	Wiper Bracket
RR41	Lower Bearing Support
RR42	Draw Rod Bracket
RR43	Draw Rod
RR44	Nut
RR45	Washer
RR46	Cam Screw
RR47	Cam Spring
RR48	Cam
RR49	Bed Bracket
RR50	Stop Plate
RR51	Bed Bracket Clamp
RR52	Hex Head Cap Screw
RR53	Carriage Bracket
RR54	Dowel Pin
RR55	Draw Bar Support
RR56	Plug
RR57	Draw Bar Clamp Screw
RR58	Hydraulic Plug

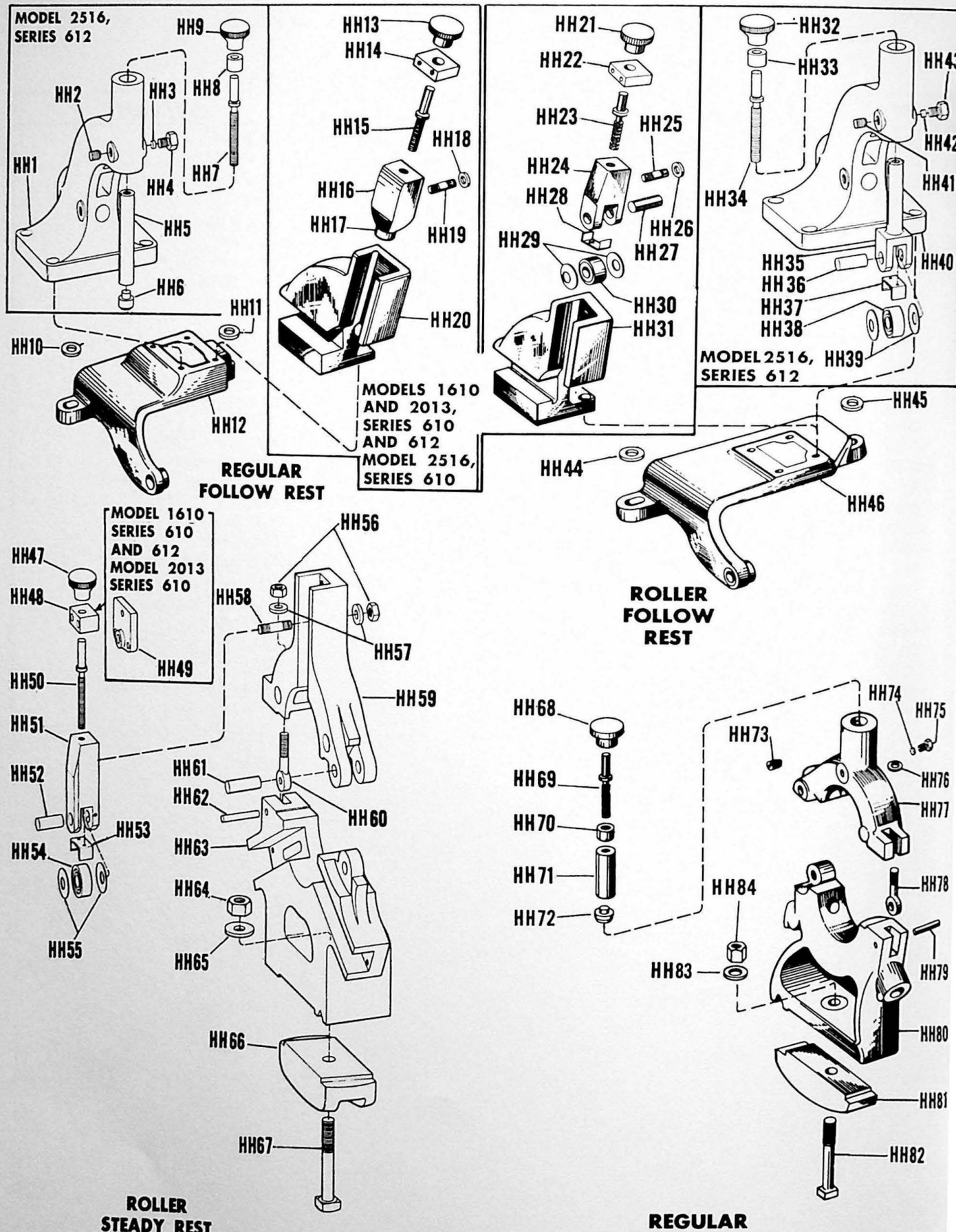


Figure HH, Steady Rests and Follow Rests

Parts List for Figure HH, Steady Rests and Follow Rests

INDEX NO.	PART NAME
	REGULAR FOLLOW REST
HH1	Follow Rest Top
HH2	Jaw Clamp Key
HH3	Plug
HH4	Jaw Clamp Screw
HH5	Jaw
HH6	Jaw Cap
HH7	Jaw Adjusting Screw
HH8	Adjusting Screw Plug
HH9	Adjusting Screw Knob
HH10	Cam Ring
HH11	Cam Ring
HH12	Follow Rest Base
HH13	Adjusting Screw Knob
HH14	Jaw Block
HH15	Jaw Adjusting Screw
HH16	Jaw
HH17	Jaw Cap
HH18	Washer
HH19	Jaw Stud
HH20	Follow Rest Top
	ROLLER FOLLOW REST
HH21	Adjusting Screw Knob
HH22	Jaw Block
HH23	Jaw Adjusting Screw
HH24	Jaw
HH25	Jaw Stud
HH26	Washer
HH27	Jaw Roller Shaft
HH28	Bearing Chip Guard
HH29	Washer
HH30	Bearing
HH31	Follow Rest Top
HH32	Adjusting Screw Knob
HH33	Adjusting Screw Plug
HH34	Jaw Adjusting Screw
HH35	Roller Jaw
HH36	Jaw Roller Shaft
HH37	Roller Bearing Chip Guard
HH38	Ball Bearing
HH39	Washer
HH40	Follow Rest Top
HH41	Jaw Clamp Key
HH42	Plug
HH43	Jaw Clamp Screw

INDEX NO.	PART NAME
HH44	Cam Ring
HH45	Cam Ring
HH46	Follow Rest Base
	ROLLER STEADY REST
HH47	Adjusting Screw Knob
HH48	Jaw Block
HH49	Jaw Screw Support Bracket
HH50	Jaw Adjusting Screw
HH51	Jaw
HH52	Jaw Roller Shaft
HH53	Roller Bearing Chip Guard
HH54	Ball Bearing
HH55	Washer
HH56	Nut
HH57	Washer
HH58	Stud
HH59	Steady Rest Top
HH60	Eye Bolt
HH61	Hinge Pin
HH62	Eye Bolt Pin
HH63	Steady Rest Base
HH64	Nut
HH65	Cam Ring
HH66	Clamp
HH67	Clamp Bolt
	REGULAR STEADY REST
HH68	Adjusting Screw Knob
HH69	Adjusting Screw
HH70	Adjusting Screw Nut
HH71	Jaw
HH72	Jaw Cap
HH73	Jaw Clamp Key
HH74	Plug
HH75	Jaw Clamp Screw
HH76	Washer
HH77	Steady Rest Top
HH78	Eye Bolt
HH79	Eye Bolt Pin
HH80	Steady Rest Base
HH81	Clamp
HH82	Clamp Bolt
HH83	Washer
HH84	Nut

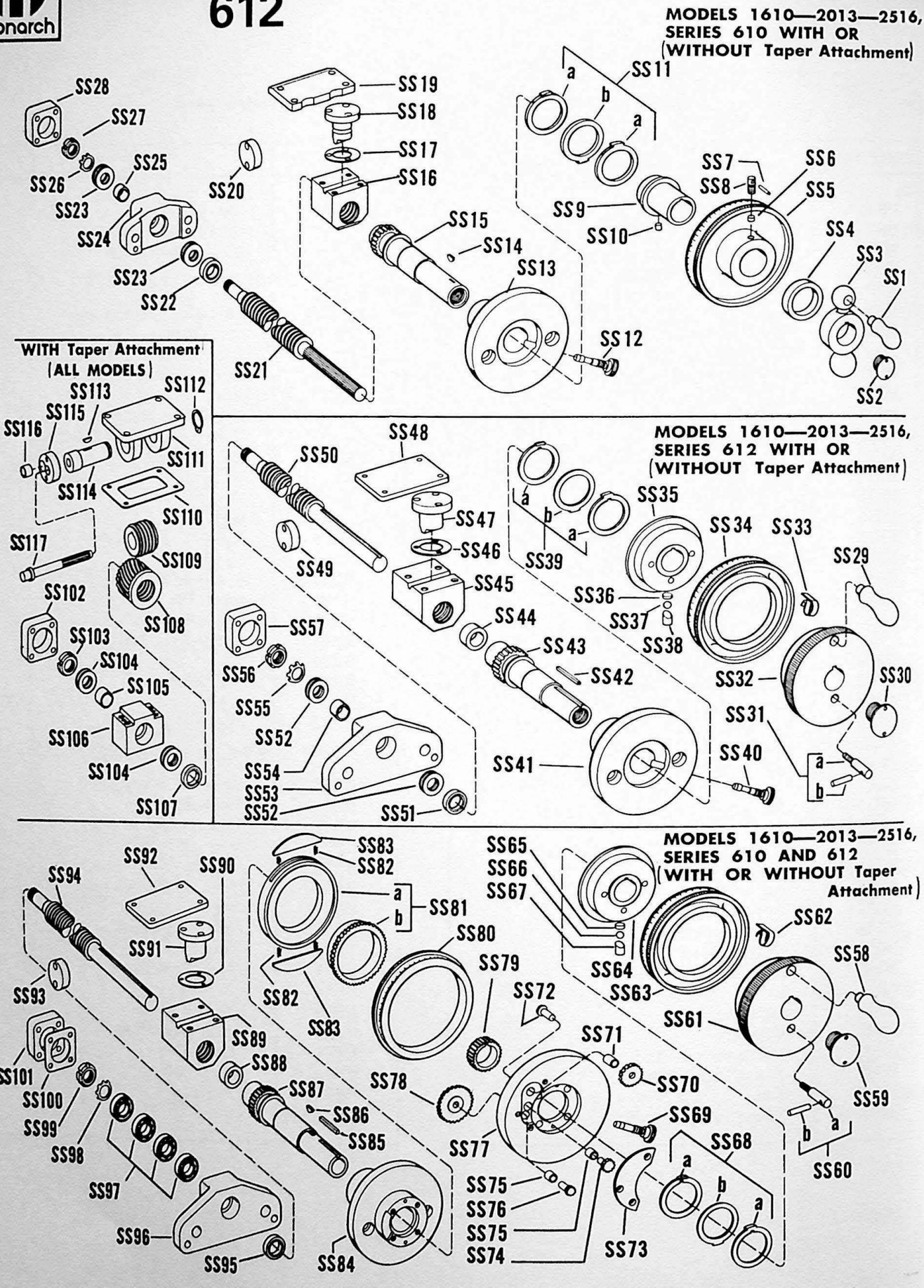
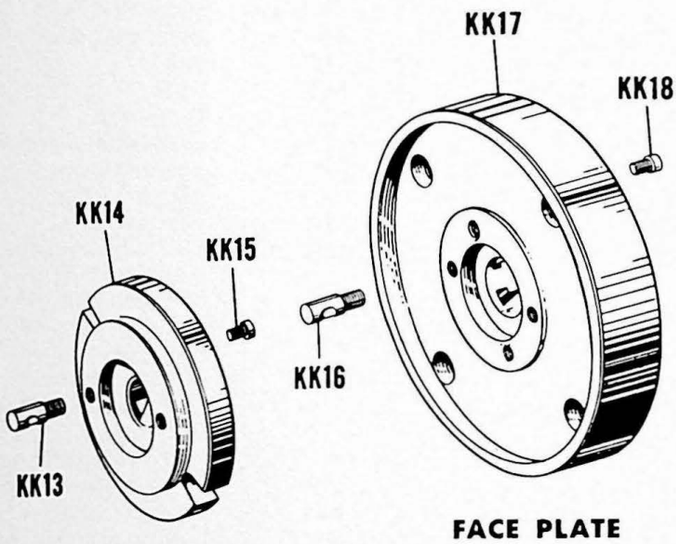


Figure SS, Cross Feed Screw with Micro-Gaging Dials

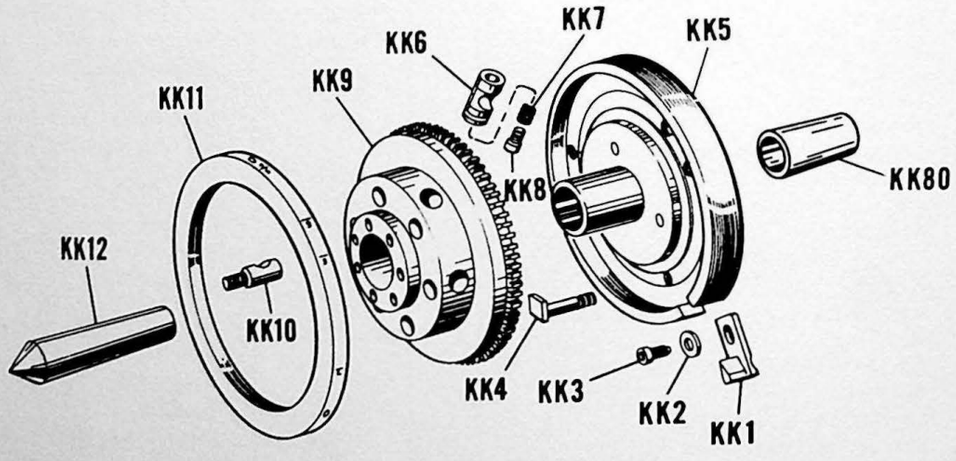
Parts List for Figure SS, Cross Feed Screw with Micro-Gaging Dials,

INDEX NO.	PART NAME
SS1	Balcrank Handle
SS2	Retaining Screw
SS3	Ball Crank
SS4	Spacer
SS5	Micro Dial
SS6	Plug
SS7	Pin
SS8	Dial Lock Screw
SS9	Dial Bushing
SS10	Pin
SS11	Lock Collar Assembly
SS11-a	Lock Collar
SS11-b	Loose Collar
SS12	Stop Screw
SS13	Cross Feed Screw Bushing
SS14	Hi-Pro Key
SS15	Cross Feed Screw Sleeve Gear
SS16	Cross Feed Screw Nut
SS17	Shim
SS18	Cross Feed Nut Key
SS19	Cover Plate (w/out Taper Att.)
SS20	Plug (w/out Taper Att.)
SS21	Cross Feed Screw
SS22	Oil Seal
SS23	Ball Thrust Bearing
SS24	Rear Cross Feed Screw Bearing (w/out Taper Att.)
SS25	Bushing
SS26	Lockwasher
SS27	Locknut
SS28	Bearing Cap
SS29	Balcrank Handle
SS30	Retaining Screw
SS31	Dial Lock Screw and Pin Assembly
SS31-a	Dial Lock Screw
SS31-b	Dial Lock Screw Pin
SS32	Balcrank Cross Feed Hub
SS33	Dial Clip
SS34	Micro Dial
SS35	Micro Dial Bushing
SS36	Plug
SS37	Ball
SS38	Plunger
SS39	Lock Collar Assembly
SS39-a	Lock Collar
SS39-b	Loose Collar
SS40	Stop Screw
SS41	Cross Feed Screw Bushing
SS42	Key
SS43	Cross Feed Screw Sleeve Gear
SS44	Bushing
SS45	Cross Feed Screw Nut
SS46	Shim
SS47	Cross Feed Nut Key
SS48	Cover (w/out Taper Att.)
SS49	Plug (w/out Taper Att.)
SS50	Cross Feed Screw
SS51	Oil Seal
SS52	Ball Thrust Bearing
SS53	Rear Cross Feed Screw Bearing (w/out Taper Att.)
SS54	Bushing
SS55	Lockwasher
SS56	Locknut
SS57	Bearing Cap
SS58	Balcrank Handle
SS59	Retaining Screw
SS60	Dial Lock Screw and Pin Assembly
SS60-a	Dial Lock Screw
SS60-b	Dial Lock Screw Pin
SS61	Balcrank Cross Feed Hub
SS62	Dial Clip
SS63	Micro Dial
SS64	Micro Dial Bushing
SS65	Plug
SS66	Ball
SS67	Plunger
SS68	Lock Collar Assembly
SS68-a	Lock Collar
SS68-b	Loose Collar
SS69	Stop Screw
SS70	30-T Compound Gear
SS71	Dial Spacer Bushing
SS72	12-T Compound Pinion
SS73	Plate
SS74	16-T Idler Pinion
SS75	Dial Spacer Bushing
SS76	12-T Compound Pinion
SS77	Dial Spacer
SS78	55-T Compound Gear
SS79	44-T Compound Gear
SS80	Diameter Dial
SS81	Bushing and Gear Assembly
SS81-a	Diameter Dial Bushing
SS81-b	96-T Compound Gear
SS82	Spring
SS83	Diameter Dial Friction Plate
SS84	Cross Feed Screw Bushing
SS85	Key
SS86	Woodruff Key
SS87	Cross Feed Screw Sleeve Gear
SS88	Bushing
SS89	Cross Feed Screw Nut
SS90	Shim
SS91	Cross Feed Nut Key
SS92	Cover (w/out Taper Att.)
SS93	Plug (w/out Taper Att.)
SS94	Cross Feed Screw
SS95	Oil Seal
SS96	Rear Cross Feed Screw Bearing (w/out Taper Att.)
SS97	Ball Bearings (w/out Taper Att.)
SS98	Lockwasher
SS99	Locknut
SS100	Shim
SS101	Bearing Cap
	USED WITH TAPER ATTACHMENT
SS102	Bearing Cap
SS103	Locknut
SS104	Ball Thrust Bearing
SS105	Bushing
SS106	Rear Cross Feed Screw Bearing
SS107	Oil Seal
SS108	Worm - Wheel Type Nut
SS109	Worm
SS110	Worm Bracket Shim
SS111	Worm Bracket
SS112	Retaining Ring
SS113	Woodruff Key
SS114	Worm Drive Sleeve
SS115	Drive Shaft Collar
SS116	Worm Drive Shaft Clamp
SS117	Worm Drive Shaft



DOG PLATE

FACE PLATE



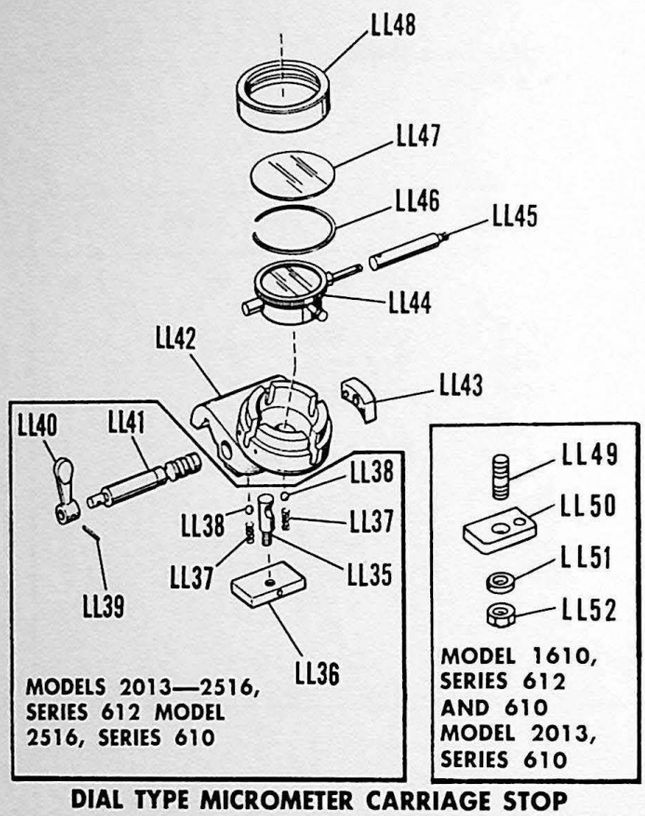
MULTIPLE INDEXING
FACE PLATE

Figure KK, Dog Plate, Face Plate and Multiple Indexing Face Plate

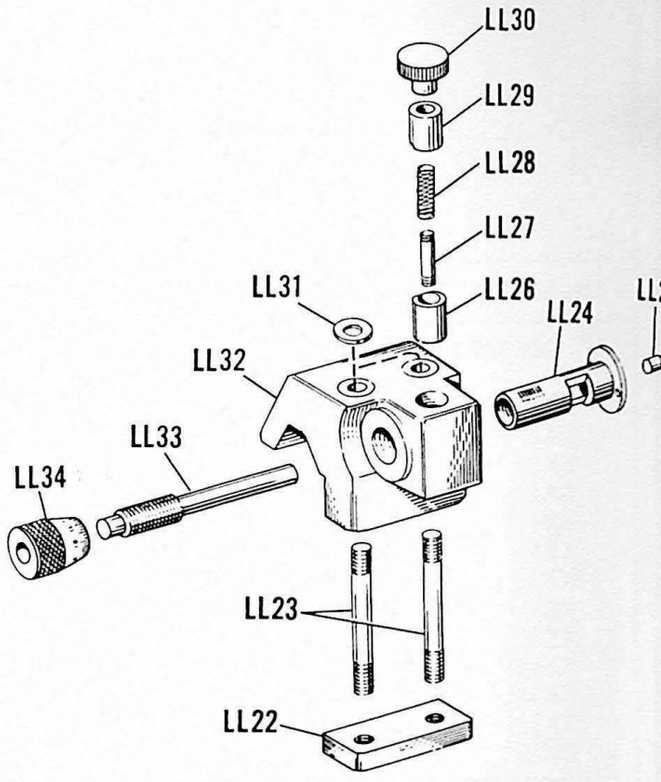
Parts List for Figure KK, Dog Plate, Face Plate and Multiple Indexing Face Plate

INDEX NO.	PART NAME
	MULTIPLE INDEXING FACE PLATE
KK1	Indexing Latch
KK2	Washer
KK3	Cam Screw
KK4	Clamp Bolt
KK5	Hub
KK6	Cam
KK7	Cam Spring
KK8	Locking Screw
KK9	Sub-Nose
KK10	Cam Stud
KK11	Index Ring
KK12	Center
KK80	Center Bushing

INDEX NO.	PART NAME
	DOG PLATE
KK13	Cam Stud
KK14	Dog Plate
KK15	Locking Screw
	FACE PLATE
KK16	Cam Stud
KK17	Tee Slot Face Plate
KK18	Locking Screw



DIAL TYPE MICROMETER CARRIAGE STOP



1610-2013 REGULAR MICROMETER CARRIAGE STOP

2516 MULTIPLE POSITIVE CARRIAGE STOP

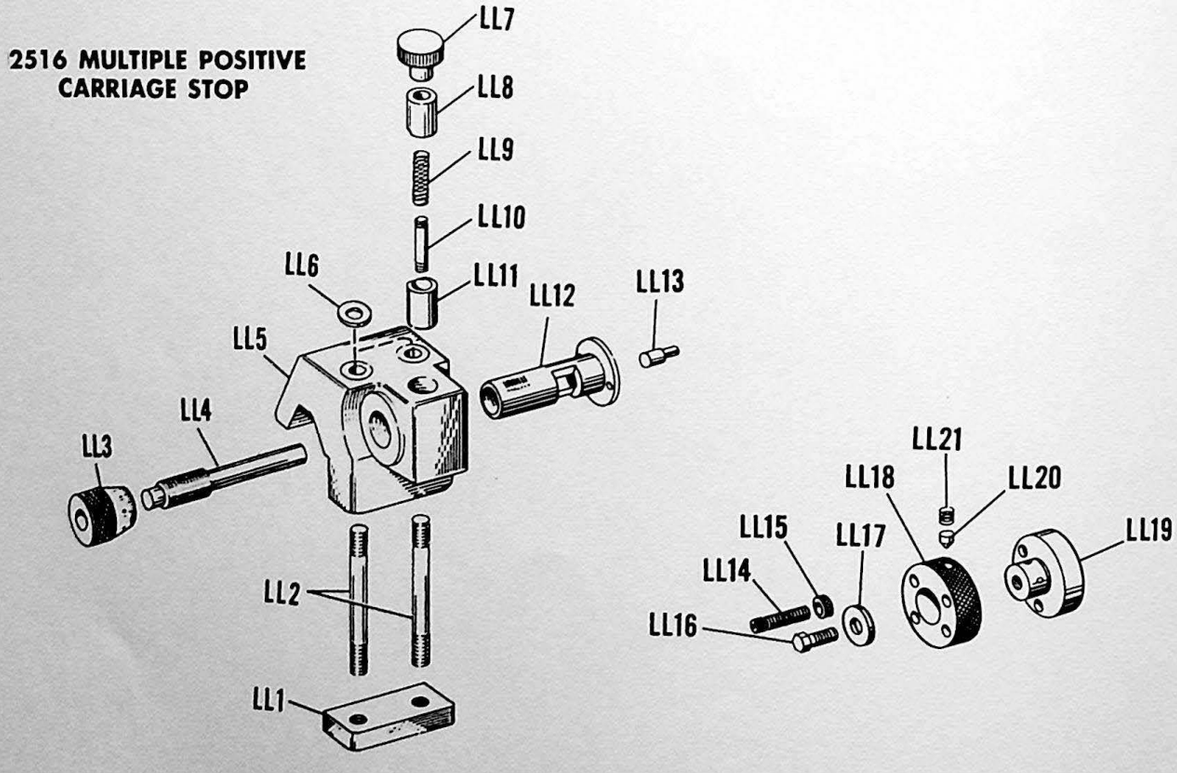


Figure LL, Carriage Stops

Parts List for Figure LL, Carriage Stops

INDEX NO.	PART NAME
	2516 MULTIPLE POSITIVE CARRIAGE STOP
ILL1	Micrometer Bracket Clamp
ILL2	Micrometer Bracket Stud
ILL3	Micrometer Dial
ILL4	Micrometer Bracket
ILL5	Micrometer Bracket
ILL6	Washer
ILL7	Knob
ILL8	Upper Clamp Plug
ILL9	Spring
ILL10	Clamp Plug Stud
ILL11	Lower Clamp Plug
ILL12	Micrometer Body
ILL13	Stop Button
ILL14	Index Screw
ILL15	Index Screw Lock Nut
ILL16	Index Body Screw
ILL17	Index Body Washer
ILL18	Index Body
ILL19	Index Body Post
LL20	Detent Plunger
LL21	Spring
	1610 - 2013 REGULAR MICROMETER CARRIAGE STOP
LL22	Micrometer Bracket Clamp
LL23	Micrometer Bracket Stud
LL24	Micrometer Body
LL25	Stop Button
LL26	Lower Clamp Plug
LL27	Clamp Plug Stud
LL28	Spring
LL29	Upper Clamp Plug
LL30	Knob
LL31	Washer
LL32	Micrometer Bracket
LL33	Micrometer Spindle
LL34	Micrometer Dial
	DIAL TYPE MICROMETER CARRIAGE STOP
LL35	Cam Lock Stud
LL36	Clamp
LL37	Spring
LL38	Steel Ball
LL39	Roll Pin
LL40	Cam Shaft Handle
LL41	Cam Shaft
LL42	Dial Case Bracket
LL43	Indicator Protection Stop
LL44	Dial Indicator
LL45	Stop Button
LL46	Dial Glass Snap Ring
LL47	Dial Glass
LL48	Dial Glass Case Top
LL49	Clamp Stud
LL50	Clamp
LL51	Washer
LL52	Nut

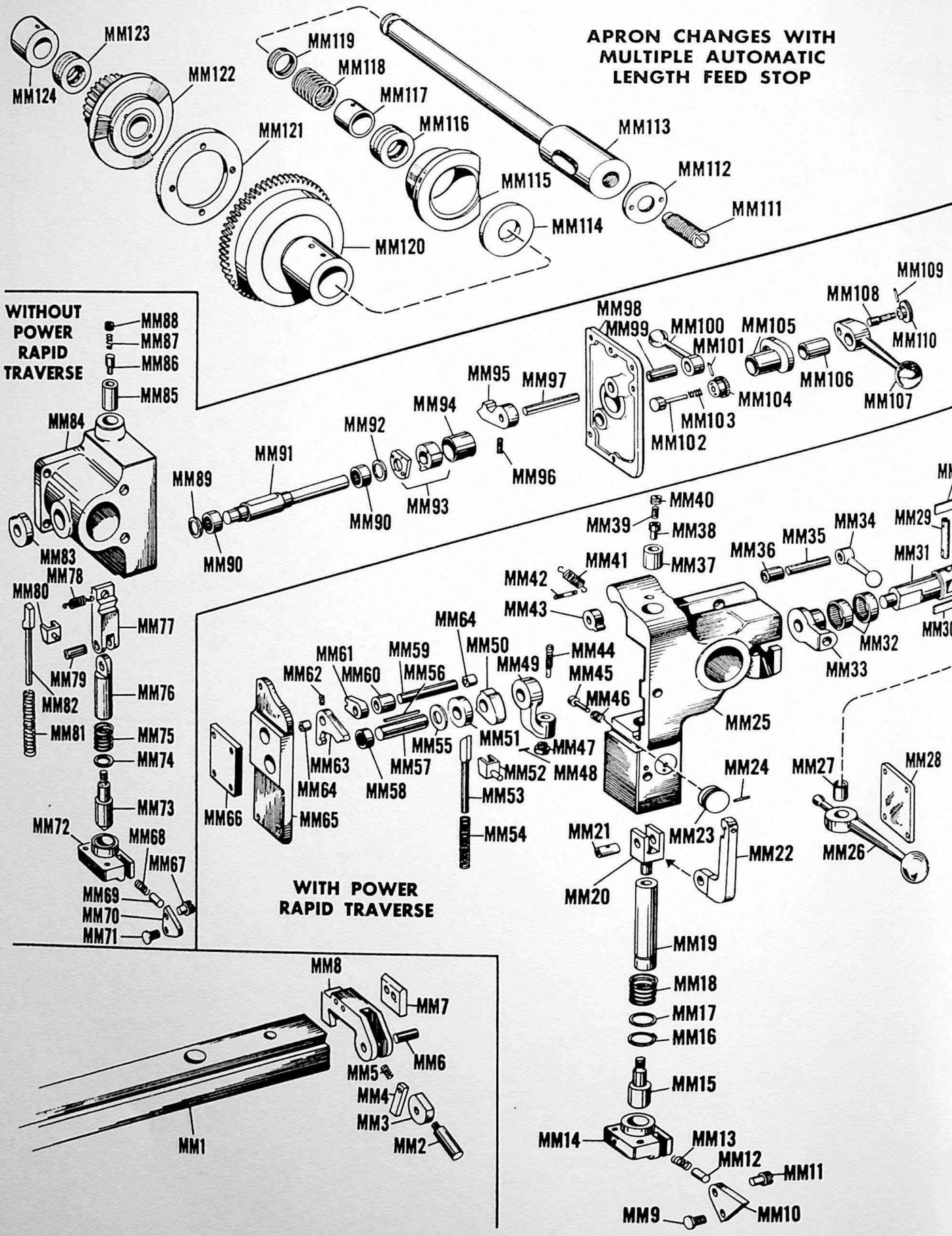


Figure MM, Multiple Automatic Length Feed Stop

Parts List for Figure MM, Multiple Automatic Length Feed Stop

INDEX NO.	PART NAME
MM1	Rail
MM2	Cam Locking Pin
MM3	Cam
MM4	Cam Binder Bar
MM5	Plunger Spring
MM6	Dowel Pin
MM7	Stop Block
MM8	Gauge Block Base
	WITH POWER RAPID TRAVERSE
MM9	Flag Stop Screw
MM10	Flag Stop
MM11	Dowel Screw
MM12	Pin
MM13	Spring
MM14	Cap
MM15	Plunger
MM16	Retaining Ring
MM17	Washer
MM18	Spring
MM19	Plunger Top
MM20	Yoke
MM21	Yoke Pin
MM22	Link
MM23	Knob
MM24	Pin
MM25	Longitudinal Cam Housing
MM26	Friction Lever
MM27	Oilite Bushing
MM28	Friction Cam Housing Cover
MM29	Friction Lever Pin
MM30	Friction Cam Wiper
MM31	Clutch Cam
MM32	Needle Bearing
MM33	Drive Arm
MM34	Handle
MM35	Shaft
MM36	Bushing
MM37	Insert
MM38	Plunger
MM39	Spring
MM40	Screw
MM41	Spring
MM42	Roll Pin
MM43	Knuckle
MM44	Locking Screw
MM45	Uplock Plunger
MM46	Spring
MM47	Knob
MM48	Pin
MM49	Lock Arm
MM50	Locking Cam
MM51	Drive Cam
MM52	Shoe
MM53	Cam Release Plunger
MM54	Spring
MM55	Spacer
MM56	Straight Key
MM57	Lock Cam Shaft
MM58	Needle Bearing (GB-88)
MM59	Pawl Shaft
MM60	Spacer
MM61	Release
MM62	Screw
MM63	Pawl
MM64	Bushing

INDEX NO.	PART NAME
MM65	Cover
MM66	Cover Plate
	WITHOUT POWER RAPID TRAVERSE
MM67	Dowel Screw
MM68	Spring
MM69	Pin
MM70	Flag Stop
MM71	Stop Screw
MM72	Cap
MM73	Plunger
MM74	Washer
MM75	Spring
MM76	Plunger Top
MM77	Link
MM78	Spring
MM79	Plunger Pin
MM80	Shoe
MM81	Spring
MM82	Cam Release Plunger
MM83	Collar
MM84	Longitudinal Friction Housing
MM85	Insert
MM86	Plunger
MM87	Spring
MM88	Screw
MM89	Spacer
MM90	Needle Bearing
MM91	Cam Shaft
MM92	Spacer
MM93	Cam Ratchet Assembly
MM94	Oilite Bushing
MM95	Pawl
MM96	Screw
MM97	Shaft
MM98	Cover
MM99	Bushing
MM100	Handle
MM101	Dowel Pin
MM102	Uplock Plunger
MM103	Spring
MM104	Knob
MM105	Sleeve
MM106	Bushing
MM107	Handle
MM108	Locking Screw
MM109	Pin
MM110	Knob
	APRON CHANGES WITH MULTIPLE AUTOMATIC LENGTH FEED STOP
MM111	Friction Stem Adjusting Screw
MM112	Lock Nut
MM113	Longitudinal Feed Clutch Shaft
MM114	Friction Stem Collar
MM115	Friction Gear Bushing
MM116	Thrust Bearing
MM117	Bushing
MM118	Compression Spring
MM119	Spring Thrust Bearing
MM120	Clutch Gear
MM121	Clutch
MM122	Gear and Clutch Assembly
MM123	Thrust Bearing
MM124	Collar

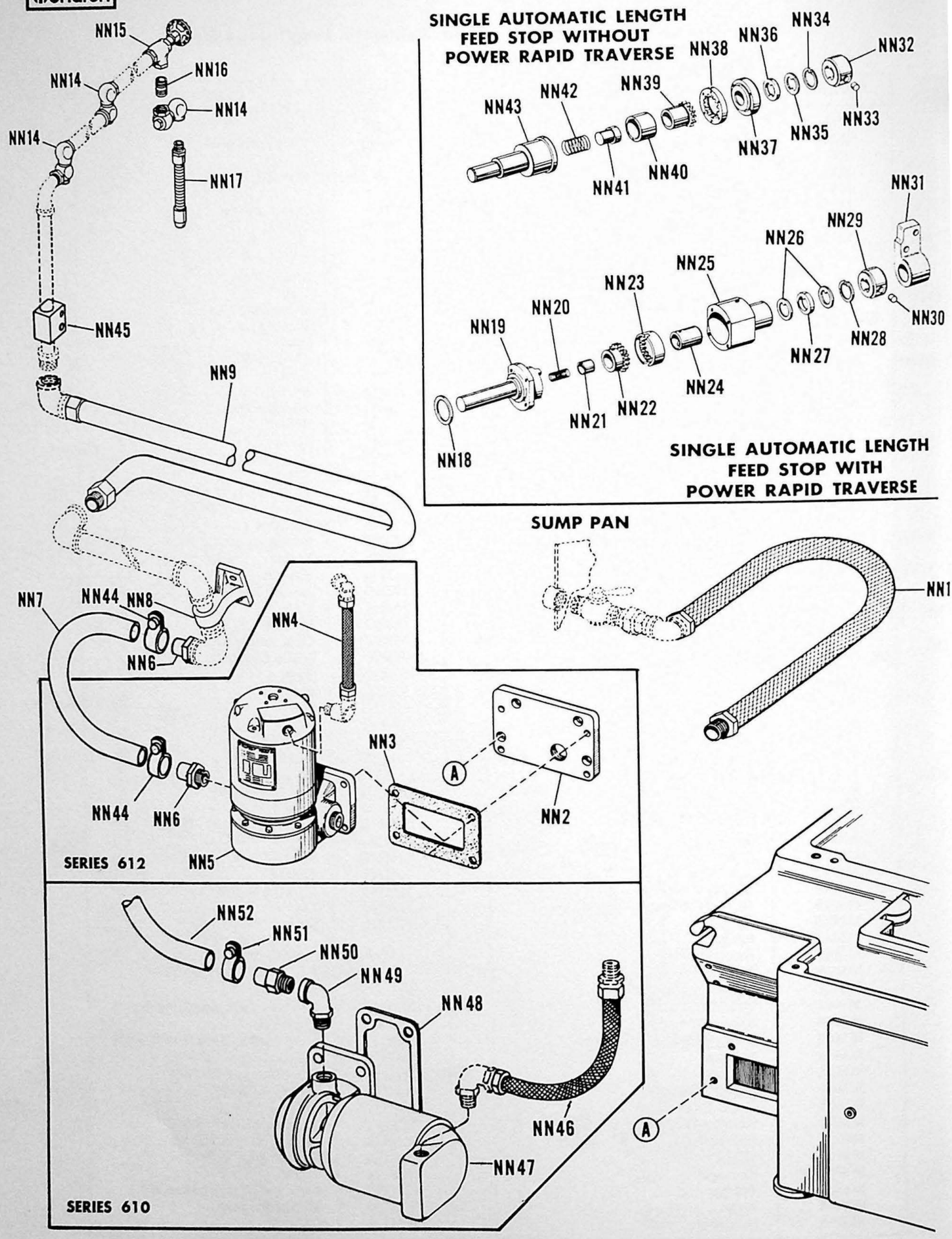


Figure NN, Single Automatic Length Feed Stop and Coolant System

Parts List for Figure NN, Single Automatic Length Feed Stop and Coolant System

DEX NO.	PART NAME
COOLANT PUMP AND PIPING 612 ONLY	
NN1	Hose Assembly
NN2	Pump Plate
NN3	Gasket
NN4	Flexible Conduit
NN5	Coolant Pump
NN6	Hose Coupling
NN7	Hose
NN8	Bracket
NN9	Hose
NN14	Swivel Joint
NN15	Valve
NN16	Close Nipple
NN17	Water Spray
NN44	Hose Clamp
NN45	Support Block
NN46	Conduit
NN47	Coolant Pump
NN48	Pump Gasket
NN49	Elbow Adaptor
NN50	Hose Coupling
NN51	Hose Clamp
NN52	Hose
SINGLE AUTOMATIC LENGTH FEED STOP WITH POWER RAPID TRAVERSE	
NN18	Oilite Thrust Bearing

INDEX NO.	PART NAME
NN19	Clutch Shaft
NN20	Spring
NN21	Thrust Button
NN22	Gear Clutch (27T)
NN23	Internal Gear (27T)
NN24	Bushing
NN25	Clutch Housing
NN26	Wiper Plate
NN27	Wiper
NN28	Retaining Ring
NN29	Feed Rod Stop Collar
NN30	Binder Plug
NN31	Stop Bracket
SINGLE AUTOMATIC LENGTH FEED STOP WITHOUT POWER RAPID TRAVERSE	
NN32	Feed Rod Stop Collar
NN33	Binder Plug
NN34	Retaining Ring
NN35	Wiper Plate
NN36	Wiper
NN37	Clutch Cover
NN38	Internal Gear (24T)
NN39	Gear Clutch (24T)
NN40	Bushing
NN41	Thrust Button
NN42	Spring
NN43	Clutch Shaft



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