AB-732

manual 18

RUNNING A REGAL

13"-15"-17"-19"

LeBLOND of Cincinnati

RUNNING A REGAL

YOUR NEW LeBLOND LATHE

The new LeBlond Regal Lathe will give you a long life of precision production and minimum maintenance if the fundamentals of good operation are observed. This book is intended to aid the operator by giving him specific instructions on how to operate, lubricate and maintain the Regal. Basic machining charts and information are included for aid in the simple calculations the operator makes in everyday production.

The parts section makes it easy for you to order necessary parts by showing the parts in both sectional and exploded view. There is a parts illustration for each of the units which make up the Regal, and each part is listed by name, number, and quantity. Your repair parts order will be facilitated if you will give the part number, the part name and the quantity required. Along with this information, the serial number of the Regal must be included.

Engineering changes are made constantly to improve your Regal lathe. Thus, your lathe may differ slightly from the ones illustrated here. This means that we are continually striving to give you the best and most modern equipment for your turning requirements.

When you ordered your LeBlond Regal, you received an acknowledgment of the order specifying a date of shipment. When the Regal leaves our factory, the transporting agency issues a bill of lading; a receipt indicating that the lathe is accepted in good order for shipping.

Before accepting the shipment, check the lathe carefully to be sure that it has not been damaged in transit. If it has been damaged in any way, the shipment should be conditionally accepted from the transportation company with the provision that it is subject to thorough inspection.

In case of damage, after you have estimated the extent of damage and have placed your claim with the transportation company, we ask that you forward us complete details and our Traffic Department will help you expedite the claim.

The packing list itemizes all parts included in the shipment. Your Receiving Clerk should check and account for every item on the packing list. The packing list should be kept as a part of your permanent record of this machine.

The R. K. LeBlond Machine Tool Company

Cincinnati 8, Ohio, U. S. A.

Largest Manufacturer of a Complete Line of Lathes

Price $3.00

Litho in U.S.A.
3903 (3M - 6/62)

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SPECIFICATIONS FOR LEBLOND REGALS

SIZE	13"	15"	17"	19"
Capacity				
Swing over bed & carriage wings	14-1/2"	15-1/2"	17-3/4"	19-1/4"
Swing over cross slide	8-1/2"	9-1/2"	10-3/4"	12-1/4"
Distance between centers, base length	18"	18"	30"	30"
Center distance increases in increments of	12"	12"	12"	12"
Size of tool-forged	1/2" x 1"	1/2" x 1"	1-1/4" x 5/8"	1-1/4" x 5/8"
Size of tool holder	1/2" x 1-1/8"	1/2" x 1-1/8"	5/8" x 1-3/8"	5/8" x 1-3/8"
Steady rest capacity	1/2" to 4"	1/2" to 4"	1/2" to 6"	1/2" to 6"
Follow rest capacity	3/8" to 2-3/4"	3/8" to 2-3/4"	3/8" to 3-1/4"	3/8" to 3-3/4"
Face plate, small diameter	8"	8"	9"	9"
Face plate, large diameter	13"	15"	15-1/2"	17-1/2"
Headstock				
Spindle speeds, number	12	12	12	12
Spindle speed ranges:				
Low range, rpm	30 - 1200	30 - 1200	25 - 1000	25 - 1000
High range, rpm	45 - 1800	45 - 1800	38 - 1500	38 - 1500
Spindle bearings number of	3	3	3	3
Spindle bearing diameters:				
Front	2-1/2"	2-1/2"	3-5/16"	3-5/16"
Center	2-3/8"	2-3/8"	2-7/8"	2-7/8"
Rear	2-5/32"	2-5/32"	2-9/16"	2-9/16"
Front spindle bearing, Timken precision				
Outside diameter	4-1/4"	4-1/4"	5-3/8"	5-3/8"
Radial load at 100 rpm, pounds	6043	6043	8667	8667
Thrust load at 100 rpm, pounds	5443	5443	7533	7533
Center spindle, roller bearing				
Outside diameter	3-15/16"	3-15/16"	4-5/8"	4-5/8"
Radial load at 100 rpm, pounds	5702	5702	7857	7857
Rear spindle, ball bearing				
Outside diameter	3-9/16"	3-9/16"	3-15/16"	3-15/16"
Radial load at 100 rpm, pounds	3400	3400	4070	4070
Spindle size of hole, straight	1-17/32"	1-17/32"	1-49/64"	1-49/64"
Spindle size of hole taper	Morse #5	Morse #5	Amer.Std.200	Amer.Std.200
Spindle size of center, Morse	#3	#3	#4	#4
Spindle nose, taper key drive, size	L-O	L-O	L-1	L-1
Spindle nose, diameter large end of taper	3-1/4"	3-1/4"	4-1/8"	4-1/8"
Bed				
Length, standard	4' 6-1/4"	4' 6-1/4"	6' 3"	6' 3"
Length increases in increments of	12"	12"	12"	12"
Width	12-3/16"	12-3/16"	14-3/8"	14-3/8"
Depth	10-1/4"	10-1/4"	11-1/2"	11-1/2"
Carriage				
Length of bed	18-3/8"	18-3/8"	21"	21"
Bearing surface, square inches	62	62	79	79
Bridge width	6-1/4"	6-1/4"	7-7/8"	7-7/8"
Cross slide travel without taper att.	8-7/8"	8-7/8"	11-1/4"	11-1/4"
Cross slide travel with taper att.	7-7/8"	7-7/8"	9-5/8"	9-5/8"
Compound rest travel	3-7/8"	3-7/8"	4-3/8"	4-3/8"
Feeds-Threads				
Feed changes, gear or belt drive	48	48	48	48
Feed range, inches per revolution	.002-.120	.002-.120	.0023-.132	.0023-.132
Thread changes gear drive only	48	48	48	48
Threads per inch, range	4 to 224	4 to 224	2 to 112	2 to 112
Leadscrew diameter and threads per inch	1", 6	1", 6	1-3/16", 4	1-3/16", 4
Tailstock				
Spindle diameter	1-15/16"	1-15/16"	2-7/16"	2-7/16"
Center, Morse	#3	#3	#4	#4
Spindle travel & set over right or left	5", 1"	5", 1"	7", 1"	7", 1"

SPECIFICATIONS FOR LEBLOND REGALS (CONT.)

SIZE	13"	15"	17"	19"
Taper Attachment				
Minimum taper per foot	3-1/2"	3-1/2"	3-1/2"	3-1/2"
Turns at one setting	10"	10"	15"	15"
Motor Recommendations				
Maximum hp and rpm				
Without brake and with standard speed range	2, 1800	2, 1800	3, 1800	3, 1800
With brake and with standard speed range	2 or 3, 1800	2 or 3, 1800	3 or 5, 1800	3 or 5, 1800
With brake and with high speed range	3, 1800	3, 1800	5, 1800	5, 1800
Weight & Dimensions (Base Length)				
Net weight, pounds	2220	2300	3300	3390
Domestic shipping weight, pounds	2520	2600	3700	3790
Export shipping weight, pounds	2550	2630	3790	3875
Net weight, each additional 12" of bed, pounds	125	125	220	220
Floor space required	66" x 40"	66" x 40"	89" x 50"	89" x 50"
Distance, spindle center to floor	42-1/2"	43"	42"	42-3/4"

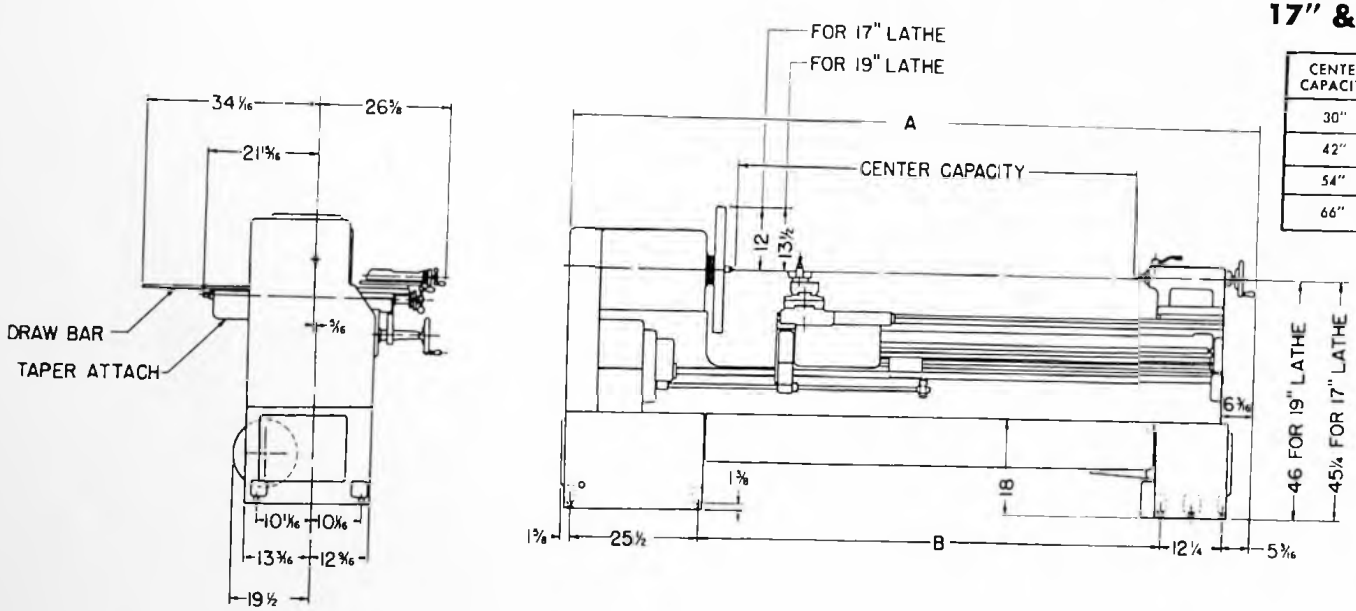
SPECIFICATIONS FOR LEBLOND REGAL PBG AND SBG LATHES

Specifications of the 17" and 19" Regal Engine Lathes apply to Gap Models except for those noted here.

SIZE	17"PBG	19"PBG	17/28" SBG	19/28" SBG
Capacity				
Swing through gap	26"	27-1/2"	35"	36-1/2"
Center Distance, bed closed			30"	30"
Center Distance, bed extended			50"	50"
Center distance increases in increments of			12"	12"
Gap face plate diameter	24"	27"	24"	27"
Distance face plate to end of gap	10-1/16"	10-1/16"		
Distance spindle nose to end of gap	10-3/16"	10-3/16"		
Bed				
Base length, 30/50 centers closed			6' 3-1/4"	6' 3-1/4"
Top bed length base machine			50-3/8"	50-3/8"
Width			14-3/8"	14-3/8"
Depth, top			9-1/2"	9-1/2"
Depth, lower			9-3/4"	9-3/4"
Carriage				
Length on bed	22"	22"	22"	22"
Bearing surface, square inches	82-1/4"	82-1/4"	82-1/4"	82-1/4"
Cross slide travel, with or without taper attachment	15-1/2"	15-1/2"	15-1/2"	15-1/2"
Bridge width	7-7/8"	7-7/8"	7-7/8"	7-7/8"
Weight and Dimensions (30" center distance)				
Net weight, pounds	3900	4000	4250	4335
Domestic shipping weight, pounds	4300	4400	4650	4735
Distance spindle center to floor			42"	42-3/4"
Overall length, bed closed			7' 6"	7' 6"
Overall length, bed extended			9' 2"	9' 2"

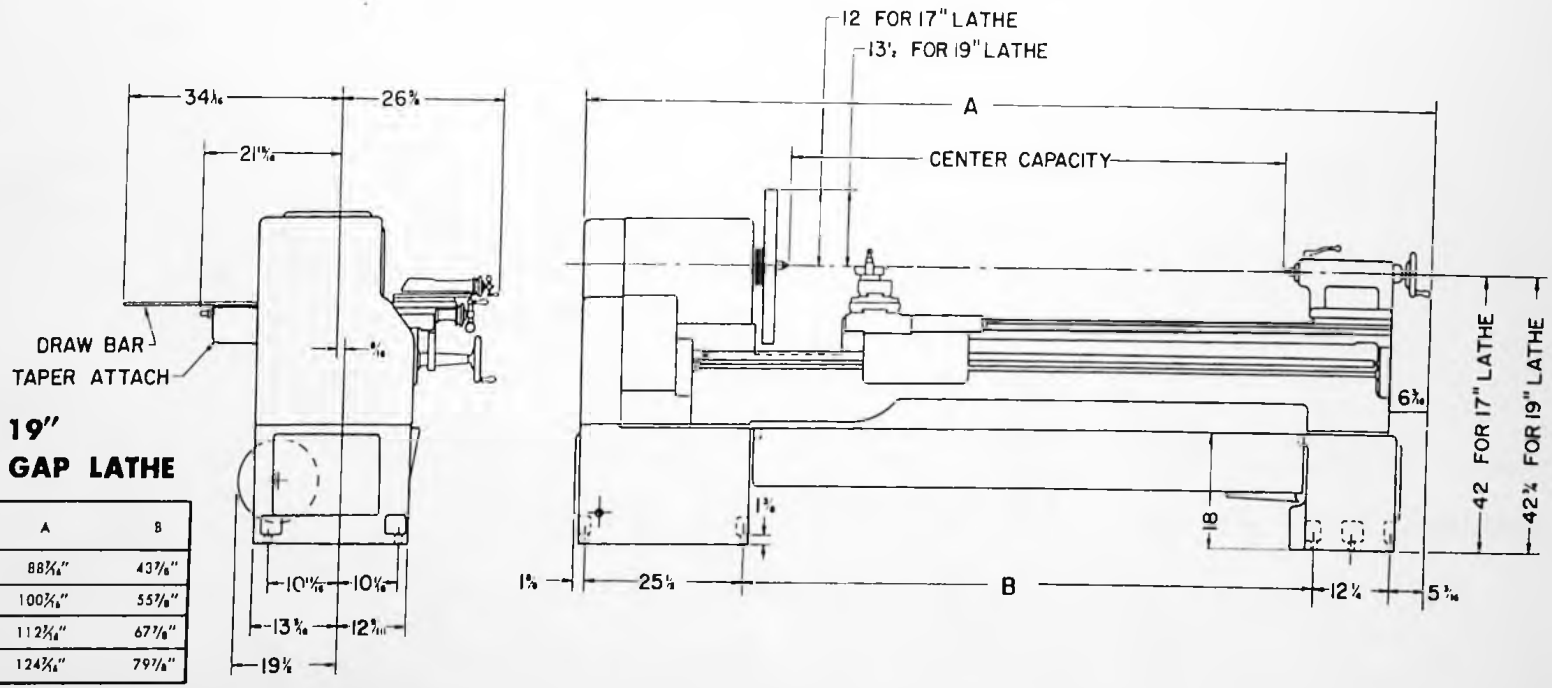
17" & 19" SLIDING BED GAP REGAL

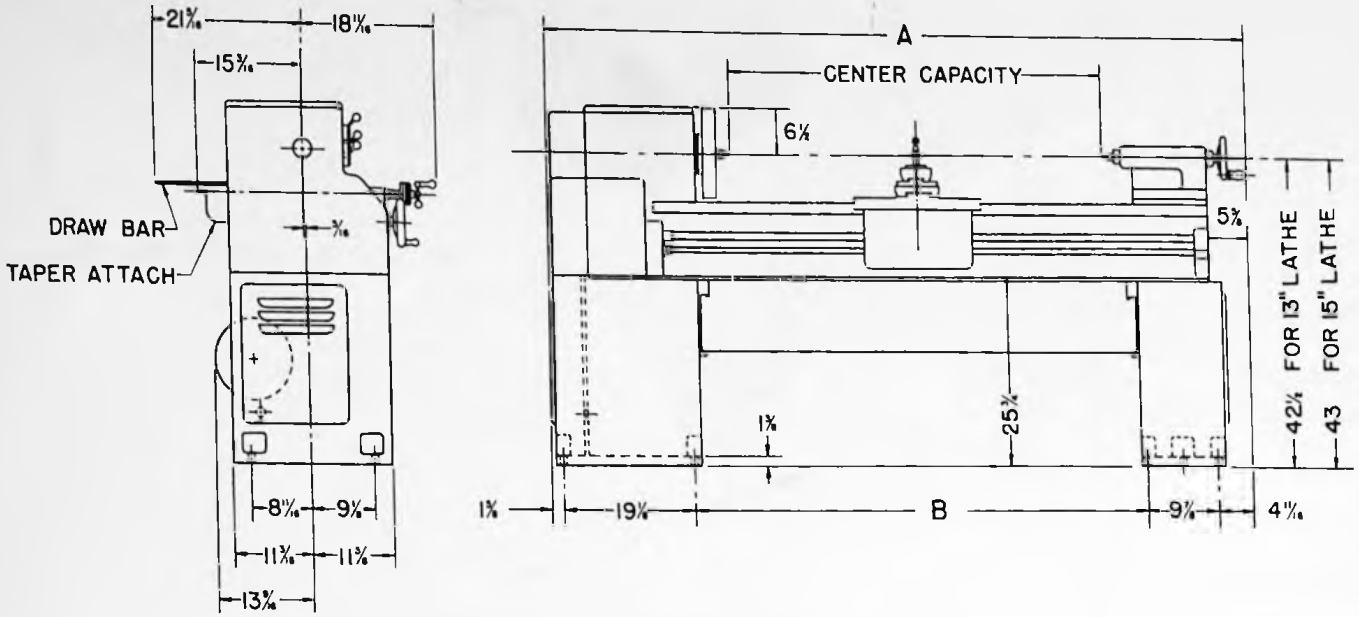
CENTER CAPACITY	BED LENGTH	A CLOSED	A EXTENDED	B
30"	6' - 3¼"	7' - 3¹³⁄₁₆"	8' - 11¹³⁄₁₆"	43⅞"
42"	7' - 3¼"	8' - 3¹³⁄₁₆"	10' - 5¹³⁄₁₆"	55⅞"
54"	8' - 3¼"	9' - 3¹³⁄₁₆"	11' - 11¹³⁄₁₆"	67⅞"
66"	9' - 3¼"	10' - 3¹³⁄₁₆"	13' - 5¹³⁄₁₆"	79⅞"



17" & 19" REGAL PLAIN GAP LATHE

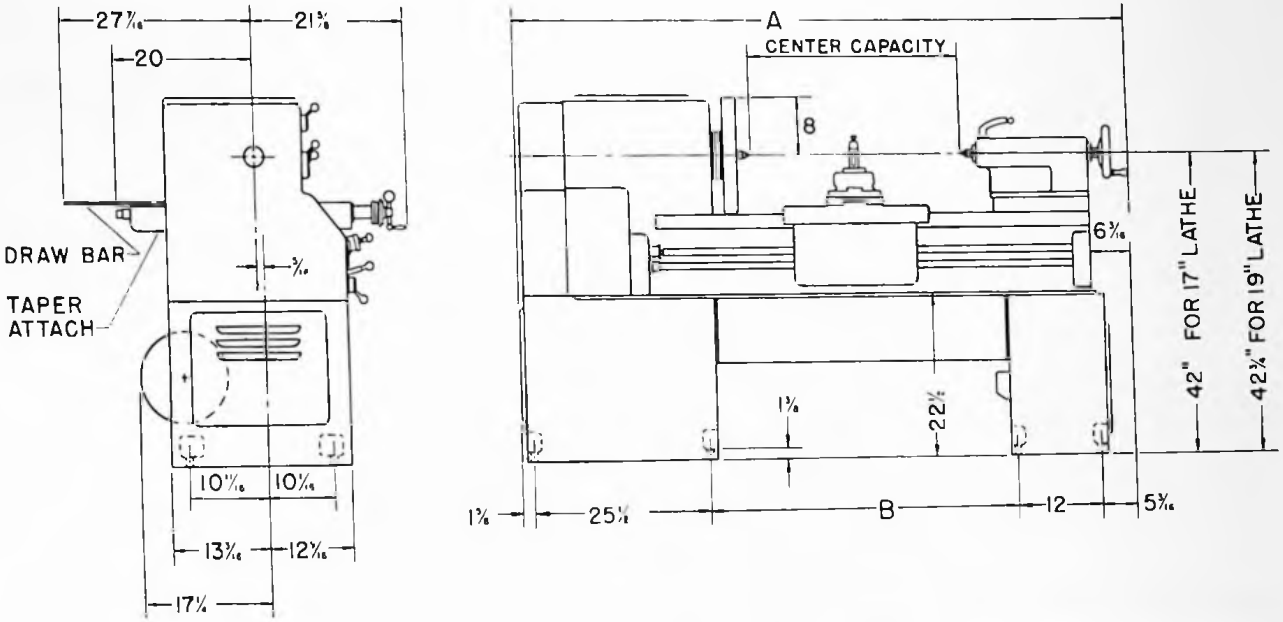
CENTER CAPACITY	BED LENGTH	A	B
30"	6' - 3¼"	88¾₁₆"	43⅞"
42"	7' - 3¼"	100¾₁₆"	55⅞"
54"	8' - 3¼"	112¾₁₆"	67⅞"
66"	9' - 3¼"	124¾₁₆"	79⅞"





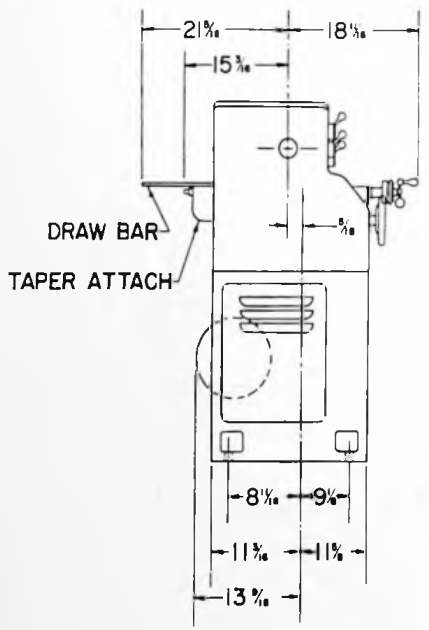
13" - 15" REGAL STANDARD

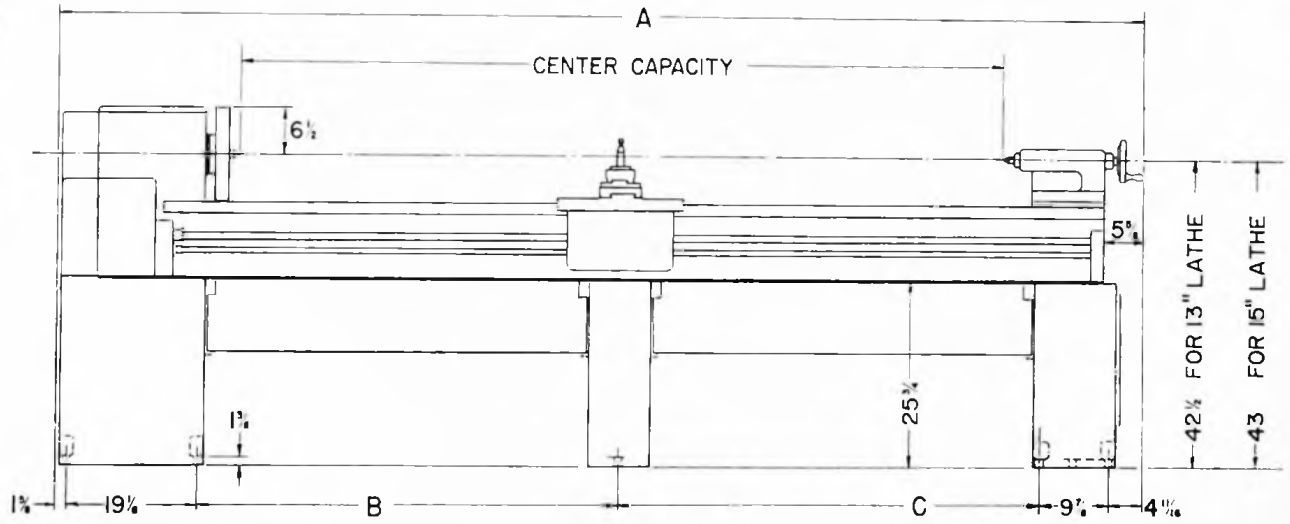
CENTER CAPACITY	BED LENGTH	A	B
18"	4' - 6¼"	65¾"	30⅞"
30"	5' - 6¼"	77¾"	42⅞"
42"	6' - 6¼"	89¾"	54⅞"
54"	7' - 6¼"	101¾"	66⅞"
66"	8' - 6¼"	113¾"	78⅞"



17" - 19" REGAL STANDARD

CENTER CAPACITY	BED LENGTH	A	B
30"	6' - 3"	88⅜"	43⅞"
42"	7' - 3"	100⅜"	55⅞"
54"	8' - 3"	112⅜"	67⅞"
66"	9' - 3"	124⅜"	79⅞"

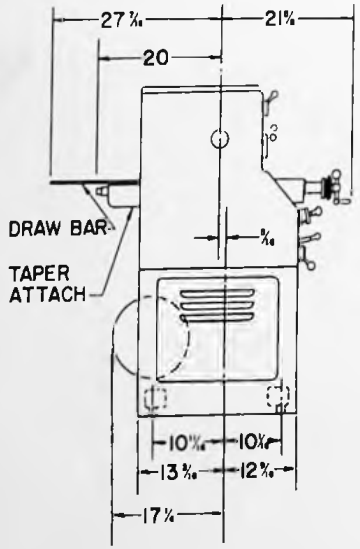


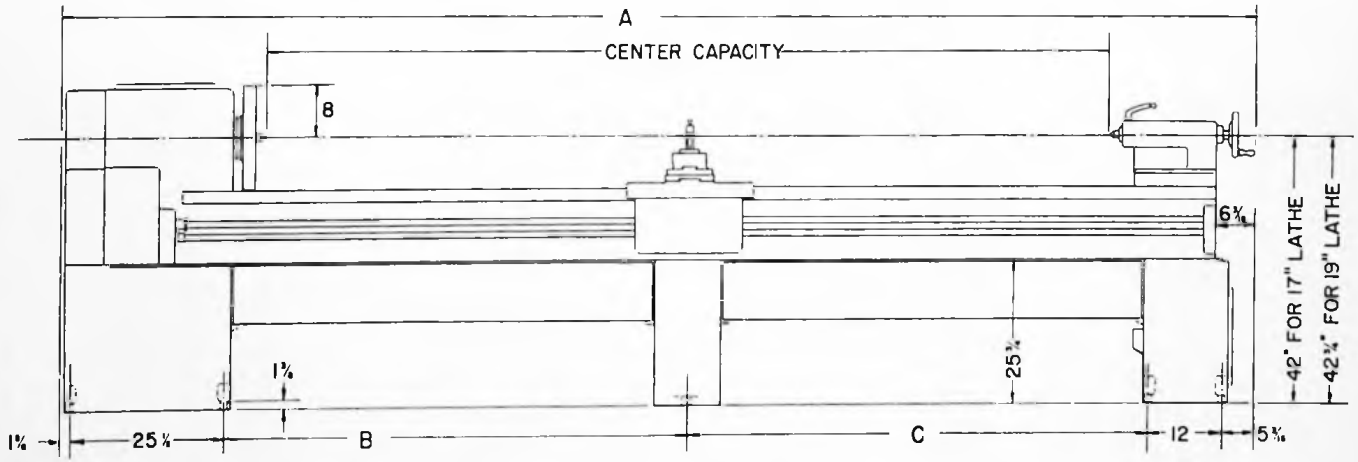


13" - 15" REGAL WITH CENTER LEG

CENTER CAPACITY	BED LENGTH	A	B	C
78"	9' - 6¼"	125¾"	45⅜"	45¼"
90"	10' - 6¼"	137¾"	57⅜"	57¼"

CENTER CAPACITY	BED LENGTH	A	B	C
102"	11' - 6¼"	149¾"	69⅜"	69¼"
114"	12' - 6¼"	161¾"	81⅜"	81¼"
126"	13' - 6¼"	173¾"	93⅜"	93¼"





17" - 19" REGAL WITH CENTER LEG

CENTER CAPACITY	BED LENGTH	A	B	C
78"	10' - 3"	136⅜"	45⅜"	45⅜"
90"	11' - 3"	148⅜"	51⅜"	51⅜"
102"	12' - 3"	160⅜"	57⅜"	57⅜"

CENTER CAPACITY	BED LENGTH	A	B	C
114"	13' - 3"	172⅜"	63⅜"	63⅜"
126"	14' - 3"	184⅜"	69⅜"	69⅜"
138"	15' - 3"	196⅜"	75⅜"	75⅜"

INSTALLATION

Foundation

The floor upon which your lathe is to be set should be flat and heavy enough to support the weight of the machine without noticeable deflection. If such a floor is not available, it may be necessary to construct a special foundation in order to eliminate frequent need for re-leveling and re-alignment.

Concrete Floors. In order to minimize machine vibration and deflection, a reinforced concrete floor serves as the best foundation. All Regal lathes require a minimum of 6" reinforced concrete.

Wood Floors. Many shop floors are made of wood block or some other type of vibration dampening material which covers a concrete sub-floor. This material should be taken up and the area filled in with concrete to the floor level.

In case the floor is of timber construction, the usual practice is to cut a hole in the floor and build up with reinforced concrete from the ground.

Second Floor. Your Regal should always be located over a pillar or supporting beams. If no such support is available, one or more pillars should be installed, if your Regal is to remain accurate and level.

Cleaning

For shipment, all oil was drawn from the reservoirs, and all polished and unpainted surfaces were well covered with a slushing compound.

The slushing compound is best removed by washing with kerosene or benzene. Do not use an air hose. Air pressure will drive in between the bearing surfaces any grit and dirt picked up in transit. Raise the cross slide guards, clean the screw and slides, remove the bedway wipers and clean thoroughly. When all the unpainted and polished surfaces are wiped clean, put a light coat of machine oil on them to protect them from rust. Frequent cleaning and oiling of these parts will increase the useful life of your Regal.

Before starting the machine, consult the section on "Lubrication" for the proper lubrication points and the fillers for the reservoirs. Make sure the machine is properly lubricated before starting in order to avoid damaging any bearing surfaces.

Moving and Lifting

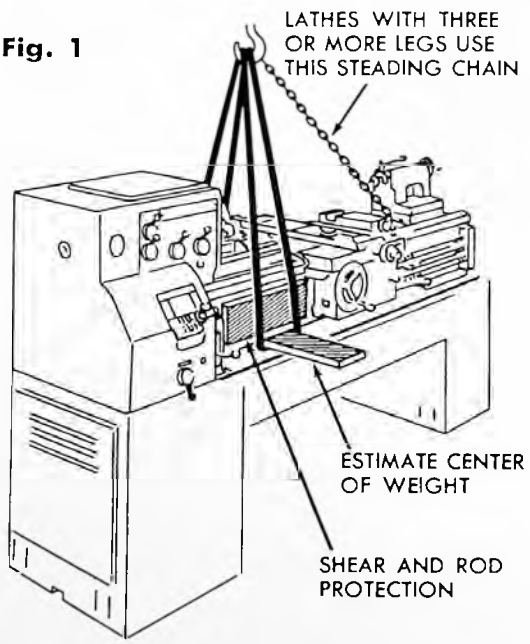
It is usually convenient to leave the machine on the skids when removing the crating. Thus the machine can be moved on the skids to its final location. This is particularly true where crane facilities are not available.

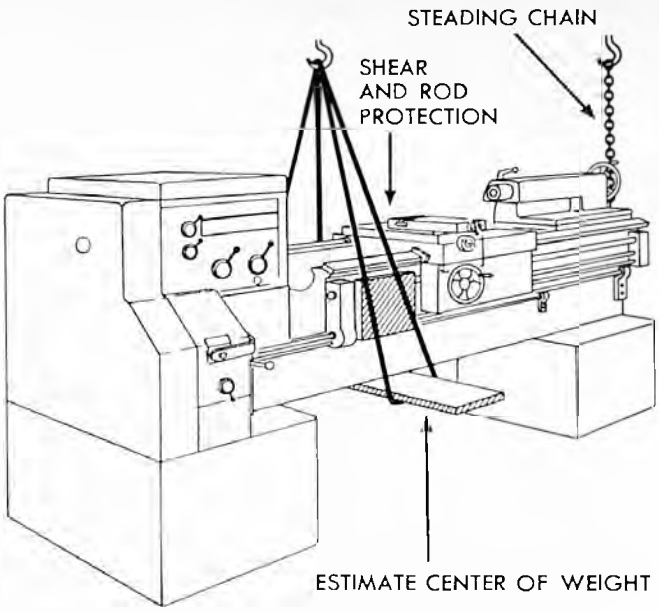
However, if cranes are available, the following instructions should be followed. For Regals with two legs, insert a heavy board or flat steel bar under the bed at the estimated center of weight. Sling on each end of the board or bar using another board to protect the control rods. Raise the machine slightly to assure proper balance before continuing. (See Figure 1).

For Regals with three or more legs, follow the same procedure but add a chain from the crane hook to a cross girth at the tail end of the lathe. This will help steady the set-up.

NOTE: Make sure the carriage clamp screw is loosened before moving the carriage. The carriage and tailstock may be moved to help balance the lathe for moving by crane.

Fig. 1





Electrical Connections

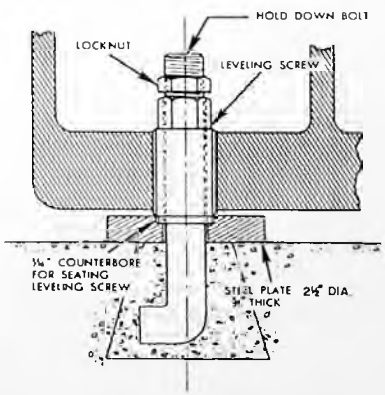
It is important that the voltage and other specifications of the motor are the same as those of your service lines. The name plate on the motor specifies the operating voltage and whether the current should be direct (D. C.) or alternating (A. C.). If alternating current is specified, the voltage, frequently (cycles and number of phases) are shown. If there is any doubt about the current and voltage, call your local power and light company and verify the supply. If there is a difference, advise us before connecting, and avoid burning out or otherwise damaging the motor.

Leveling

Your LeBlond Regal Lathe was lined and accurately checked with the lathe in perfect level. In order to reproduce this accuracy in your shop, it is essential that your lathe be leveled properly. Too much emphasis cannot be placed on the importance of properly leveling your lathe.

In order to hold the level and prevent the leveling screws from digging into a concrete floor, smooth steel plates are furnished with each machine. Measuring approximately 2-1/2" in diameter, 3/8" thick, and countersunk 1/16" deep for seating the leveling screws, these plates should be surfaced against the concrete. If necessary, chip the concrete before placing the plates under the leveling screws. See Figure 2. Never use a resilient type of vibration dampening device, such as rubber under the leveling screws. These devices make it difficult, if not impossible to maintain accurate level.

Fig. 2



If hold-down bolts are used, set the lathe in position, mark and then drill. It is impracticable to lay off holes in advance from the dimensional drawings.

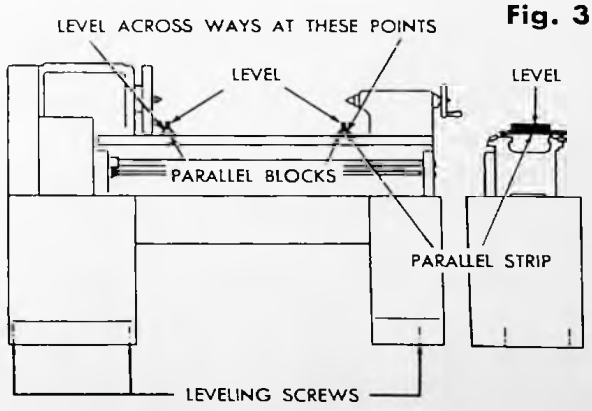
Next, level the lathe by means of leveling screws provided using a precision level. An ordinary carpenter's level or combination square level is not sensitive enough. See Figure 3.

Proceed as follows: Level across the bedways at both the head and the tailend, using parallel blocks on the front flat and the rear hardened way. NOTE: The rear way of your Regal is .0625" higher than the front flat. Use gauge blocks to make up the difference. Leveling is accomplished by adjusting the leveling screws until the bubble is in the center of the glass bowl. If the bed of your machine has one or more center legs, level across them also. The reading must be exactly the same in all positions.

Then, level lengthwise on the rearway at the head and tail ends and at each center leg.

If hold-down bolts are used, draw them to light contact after leveling. Do not tighten bolts excessively as this may twist the bed of the lathe out of level. CAUTION: You should always recheck your level after tightening the hold-down bolts. Never bed the legs of your Regal in concrete as this will preclude any re-leveling of the machine.

Fig. 3



IF LATHE HAS MIDDLE LEG, LEVEL ACROSS WAYS DIRECTLY ABOVE LEGS.

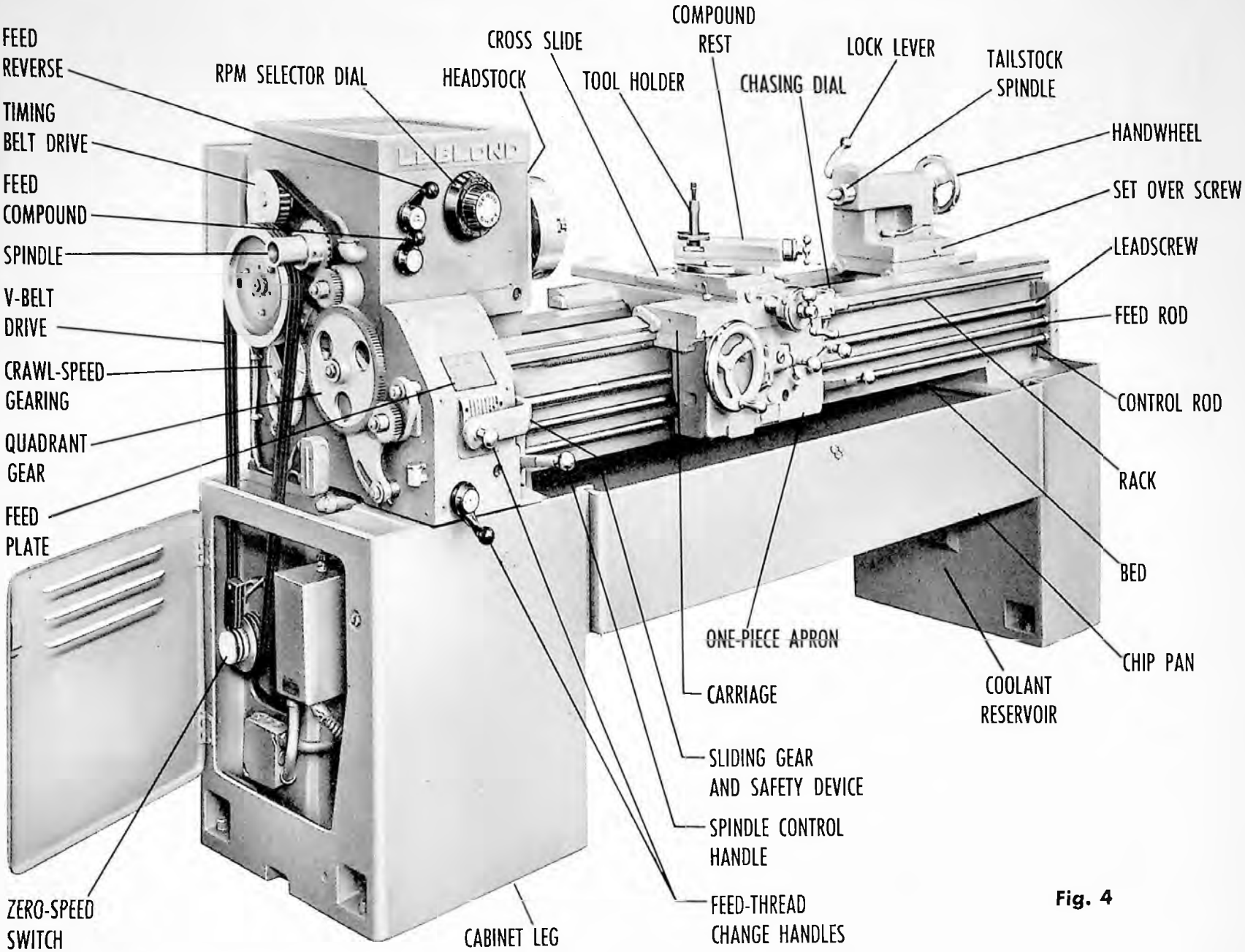

FEED REVERSE
TIMING BELT DRIVE
FEED COMPOUND
SPINDLE
V-BELT DRIVE
CRAWL-SPEED GEARING
QUADRANT GEAR
FEED PLATE
ZERO-SPEED SWITCH
RPM SELECTOR DIAL
HEADSTOCK
CROSS SLIDE
TOOL HOLDER
COMPOUND REST
CHASING DIAL
LOCK LEVER
TAILSTOCK SPINDLE
HANDWHEEL
SET OVER SCREW
LEADSCREW
FEED ROD
CONTROL ROD
RACK
BED
CHIP PAN
COOLANT RESERVOIR
ONE-PIECE APRON
CARRIAGE
SLIDING GEAR AND SAFETY DEVICE
SPINDLE CONTROL HANDLE
FEED-THREAD CHANGE HANDLES
CABINET LEG

Fig. 4

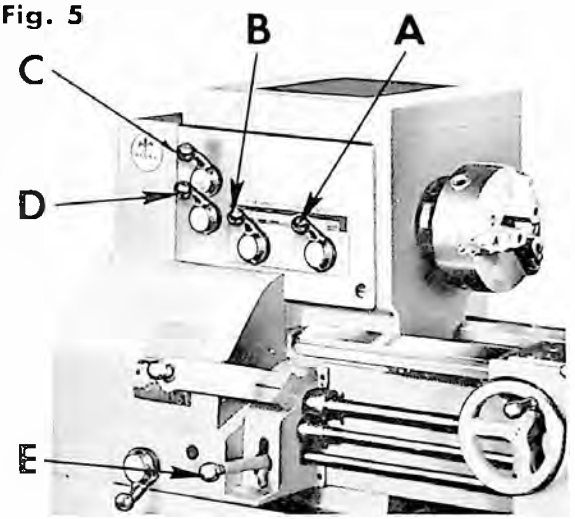
OPERATING INSTRUCTIONS AND NOMENCLATURE

To help you understand your Regal, you will find the following a general description, and operational procedure for each of the major units that make up your lathe.

Headstock

Your new Regal Headstock, Figure 5, provides eight (8) gear-driven spindle speeds and four (4) belt driven spindle speeds for smooth, quiet operation. No gears, other than the feed gears, are in mesh on the spindle when in the belt range. The speeds are easily selected by two levers (A) and (B), and a direct reading color-plate. The spindle is supported by three bearings, two Timkens and one Ball (rear) bearing.

Fig. 5



Optional Equipment

Electric Brake

If your machine is equipped with electric brake, you will find the power pack mounted on the rear of the bed by the headstock leg. This unit contains a rheostat, providing the operator a convenient means for adjusting the braking power.

Along with the electric brake, a five position drum-switch is included. The center position of the spindle control handle applies the brake. A neutral position on either side of the center allows the spindle to coast for jogging, shifting gears or revolving the spindle by hand. The extreme up position of the handle will revolve the spindle forward. The extreme down position of the handle will revolve the spindle in reverse.

The spindle nose is an American Standard Type L taper key drive. The spindle speeds are always increased when moving the shifter levers to the left. The small shifter (C) at the upper left of the Headstock, is the reverse to the feed and leadscrew. The lower shifter (D), on the left of the head, is the feed drive compound, providing coarse and fine feeds and threads. Regal Headstocks have hardened steel gears for long life and trouble-free operation, and all shafts are supported on anti-friction bearings. A three position spindle control handle (E) is provided for electric control if machine is not equipped with an electric brake.

Servo-Shift (Fig. 6)

If your Regal is equipped with Servo-Shift, spindle speeds can be changed simply by turning dial (A) to the desired speed, and moving spindle control handle (B) to engage the brake. The headstock gears will be automatically shifted without further attention from the operator. Spindle speeds can be preselected at any time during the cutting operation, the shifting will not take place until the brake is engaged.

During the shifting cycle, always permit the crawl speed mechanism to oscillate the spindle several times before moving the spindle control handle to disengage the brake. This will insure complete gear engagement and prevent the possibility of clashing.

To "free wheel" the spindle, when inspecting and measuring workpieces, turn Servo-Shift dial (A) to the neutral position marked "N".

Note: The amount of spindle oscillation during the shifting cycle will vary according to the speed selected.

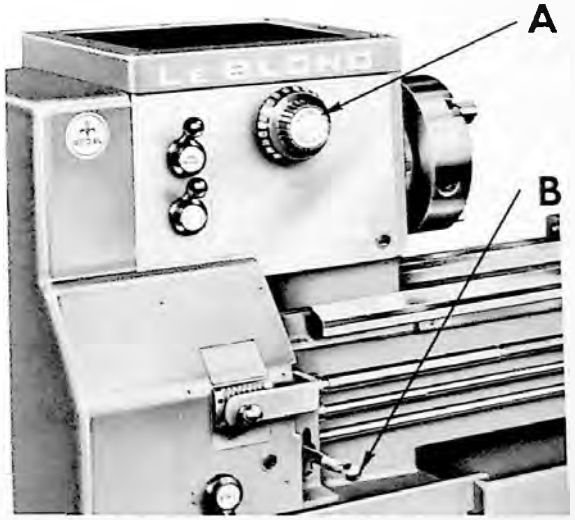
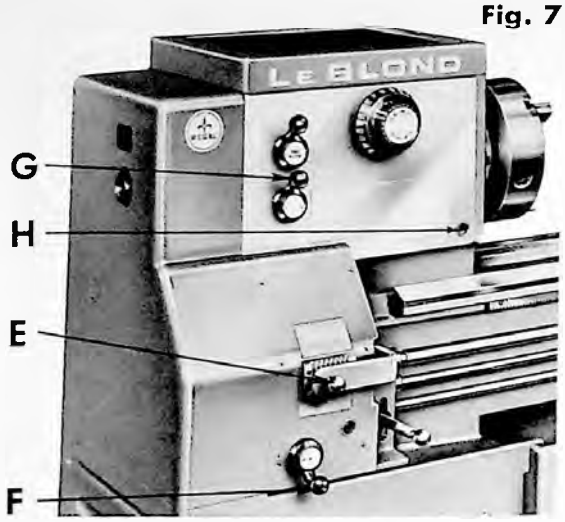


Fig. 6

Field Installation of Servo-Shift

If your Regal has a serial number starting with 4 or higher, and is equipped with electric brake, Servo-Shift can be easily installed at any time. Your dealer will be glad to furnish you with complete details.

Fig. 7



Totally Enclosed Quick Change Box (Fig. 7)

The feed reverse and compounding gears are entirely within the head. A single gear train on the end of the lathe eliminates overhang of the bearings and gives a powerful, quiet drive. The totally enclosed quick-change box is automatically lubricated from a reservoir. Oil level is indicated by visual sight gauge (H).

Forty-eight feed and thread changes are obtained by an eight position tumbler (E), a three position compound (F) in the feed box and a two position compound (G) on the headstock. Fine changes of feeds or threads are obtained as indicated on the index plate by pulling out the tumbler handle and depressing to disengage the tumbler gear, then sliding the tumbler along the sleeve to the proper location and lifting the handle to bring the gears into engagement. When the gears are in engagement, the plunger in the handle locks the tumbler in place. A series of slots milled in the shifter lock-plate mounted on the Quick Change Box above the handle and a pin engaging the slots, prevent the tumbler gear from engaging two gears at any one time.

The Direct Reading Index Plate is mounted on the Quick Change Box directly over the tumbler handle. The numbers on the plate refer to threads or feeds that the leadscrew and the gear combination will cut when the tumbler is engaged directly under the number on the index plate. "Coarse" and "Fine" refer to the location of the compound feed handle on the head and the letters refer to the position of the compound change lever on the feed box.

The feed drive from the head to the Quick Change Box consists of pick-off gears readily accessible by removing the end cover. This arrangement permits the use of metric translating gears and other gears to obtain special feeds and threads.

Feed Rod and Leadscrew (Fig. 8)

The Feed Rod (H) transmits the power from the Quick Change Box to the apron through a safety overload device (I) located at the Quick Change Box end of the Feed Rod. Should the carriage meet with any obstruction on the bed, the safety device will release and prevent damage to the feed mechanism of the lathe. As soon as the obstruction is removed, the feed safety device engages automatically.

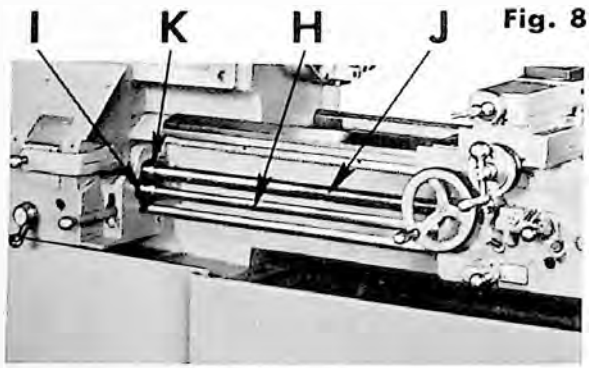
The Leadscrew

The Leadscrew (J) is used only for thread cutting and may be disengaged when not in use through a sliding gear (K). This gear is located on the feed box end of the screw and can be engaged with, or disengaged from the feed rod gear by a short sliding movement on the leadscrew. When not chasing threads, disengage the sliding gear so the leadscrew does not revolve.

The headstock end of the leadscrew runs in the leadscrew bush which is held in the quick change box by two screws. The leadscrew is held endwise between a shoulder and an adjusting nut with hardened thrustwashers on each side of the bush. End-play is eliminated with the adjusting nut.

On some lathes of this type, where splined leadscrews are used to drive the feed, the leadscrew is subject to torsional strains at all times and soon becomes inaccurate. The key engaging the spline in the leadscrew also burrs the edges of the threads which cause the leadscrew to act as a tap constantly wearing the half nuts. The leadscrew on a Regal remains accurate for the life of the machine as it is not subject to these conditions.

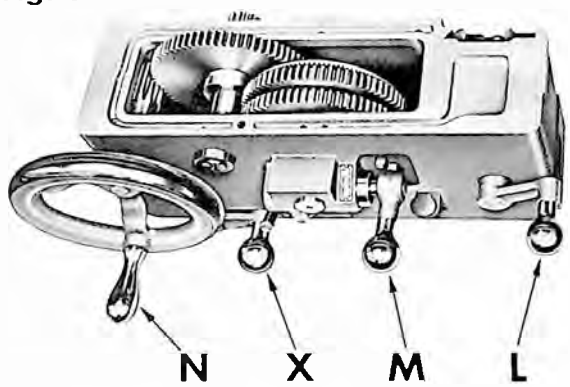
Fig. 8



Apron

The Regal Apron (Figure 9) is a double-walled one piece casting in which all shafts and gears are supported on both ends. This unit is bolted securely to the carriage and contains the controls, gears, and other mechanisms for feeding the carriage and cross slide by hand or power. It also contains the half nuts controlled by lever (L) which engages the leadscrew for thread chasing.

Fig. 9



Power is supplied to the apron through the bevel pinion which is keyed to the feed rod. Positive jaw clutches are employed to direct the power to the rack pinion for length feed and the cross feed screw for crossfeed.

A single lever (M) is employed to engage both length and cross feeds. An instruction plate mounted to the left of the feed control lever indicates the position for cross and length feed. An interference device prevents the engagement of the half nuts and the feed at the same time. Do not attempt to force the feed control lever or the half nut lever when the other is engaged.

Feed Reverse Lever (X) gives feed reverse control at the apron in addition to normal feed reverse on the headstock. This feature is available on 17" and 19" Regals only.

The large hand wheel (N), through a gear reduction, revolves a rack pinion thus providing hand feed to the carriage.

The apron spindle control lever will be found on the right side of the apron.

The Carriage and Compound Rest

The carriage, an H-shaped casting, is fitted to and slides on the bedway; thus providing for longitudinal movement of the tool by hand or power.

The cross-slide often referred to as the bottom-slide, (O), provides for cross motion of the tool by hand or power.

The swivel, (P), and the topslide, (Q), provide angular hand feed. To adjust the angle of the top slide, loosen nuts (1) and (2), swivel the unit to the desired angle as indicated by the graduation (R), and retighten nuts (1) and (2).

Both the crossfeed dial, (S), and the topslide dial, (T), read in diameter reduction. .010 on the crossfeed dial advances or retracts the slide .005, thus reducing or increasing a given diameter by .010. The topslide dial is calibrated in the same manner. However, the angle at which the topslide is set must be taken into consideration when computing tool advances. For this reason it is generally considered good practice to use a cross slide adjustment for sizing when turning.

Very often the topslide is used for controlling the depths of a facing cut by setting the top slide at 90 degrees, see Figure 11. Under these conditions, the advance of the tool will be one half that shown on the dial.

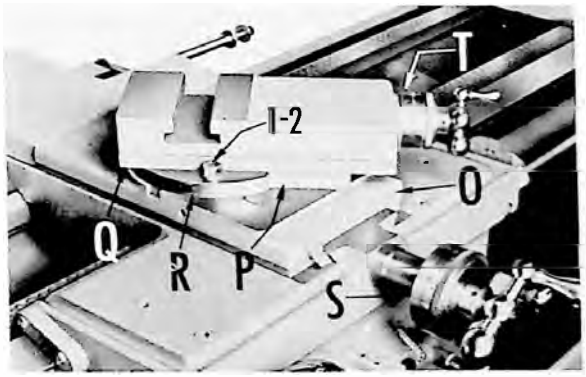
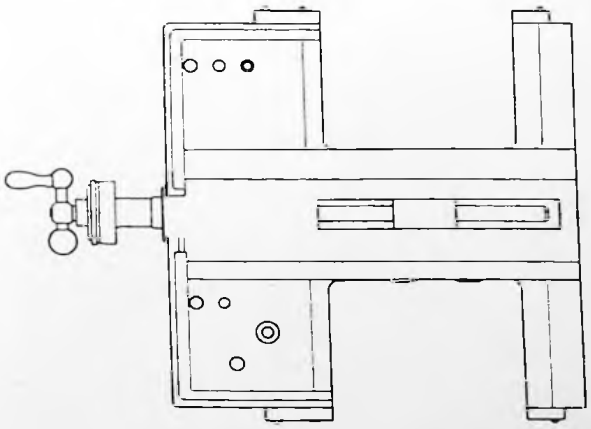


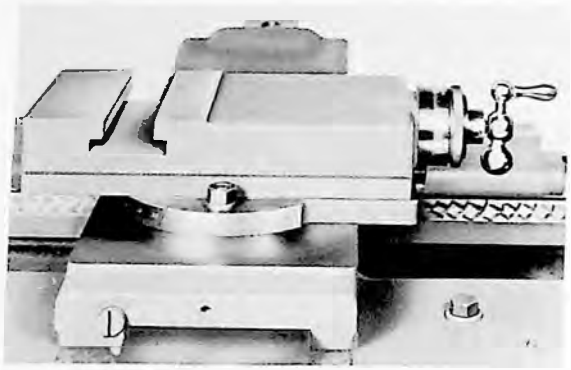
Fig. 10



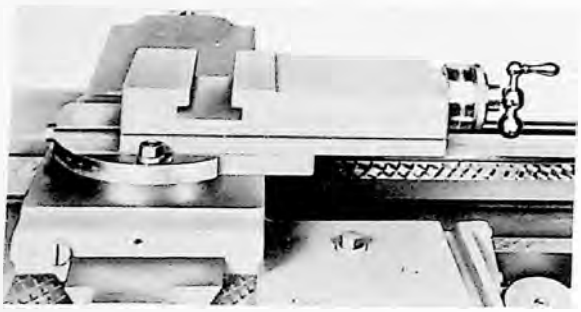
It should be pointed out that the topslide dial is graduated in diameter reduction for use in sizing when the taper attachment is in use. The taper attachment bottomslide draw bar, Figure 19, in its locked position prevents the bottomslide from being moved.

CAUTION: The lathe operator should adjust the topslide flush with the cross-slide for maximum tool support whenever possible - see figure 11. Needless overhang of the topslide will very often result in chatter.

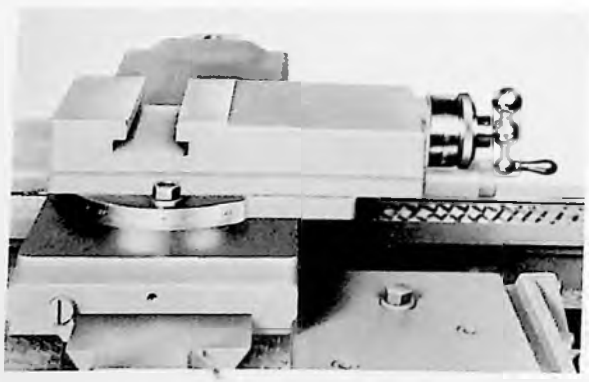
Fig. 11



This is wrong. Slide overhang too far forward. Puts unnecessary strain on middle of T-slot.



This is wrong. Slide is back too far and requires excessive tool overhang.



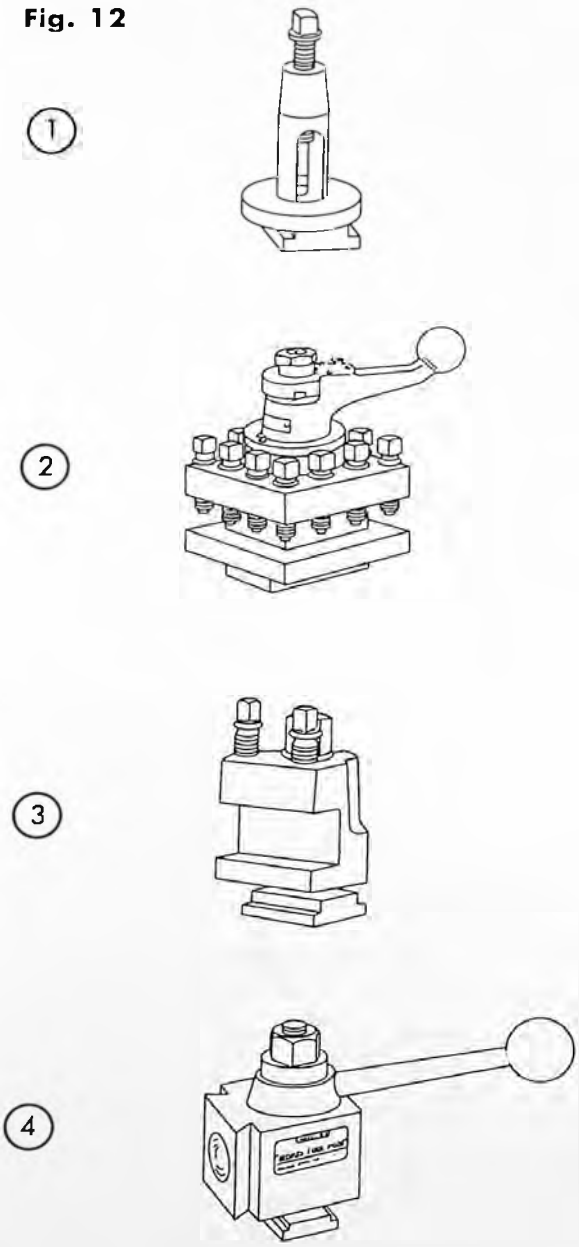
This is right. Top slide should be flush with bottom slide to give greatest tool support.

Tool Holders

The function of the tool holder is to hold the tool rigidly in position for cutting operations. For the correct tool position, locate the cutting edge of the tool on the lathe center line. Because tool shanks vary in size, shims are often used to locate the tool cutting edge on the center line. Proper tool position is necessary to avoid chatter, excessive tool wear and tool breakage.

Be sure the tool does not extend out of the tool holder more than is necessary. Otherwise, chatter may result. Do not use a long wrench to clamp the tool in the tool holder; use the wrench provided.

Fig. 12



Four types of tool holders (Figure 12) are in general use on lathes: 1. the tool posts; 2. the turret type tool block; 3. the European type block (often referred to as "open side" block); and 4. the quick change type block. In the past, tool posts have been used more than other types of holders. The advent of quantity production and carbide tools brought about the need and development of quicker, more efficient and more rigid tool holders.

1. The Tool Post is comprised of the post, screw, washer, collar and rocker. The washer fits the top slide T-slot; the collar and rocker elevate or lower the point of the tool; and the screw clamps the whole assembly to the top slide. Make sure the T-slot is clear of chips in order to secure a firm foundation for the tool.

2. Turret Tool Blocks are comprised of a swiveling block in which the tools are clamped; a clamping lever which clamps or releases the block for swiveling; and a screw arrangement for clamping the unit to the top slide T-slot. Turret blocks hold more than one tool. Within the capacity of the block, all tools for one set-up (for example, sizing, radius, cut-off, knurling tools) are available when needed. All that is necessary to swivel tools is to release the clamp lever, swivel the correct tool into position, and clamp. The tool is then set for the next operation.

3. European or Open Side Type Tool Blocks hold only one tool at a time and are comprised of a T-slot clamp; a "C" shaped block; and two tool clamping screws. Because this unit is very rigid, it is especially useful for heavy cuts.

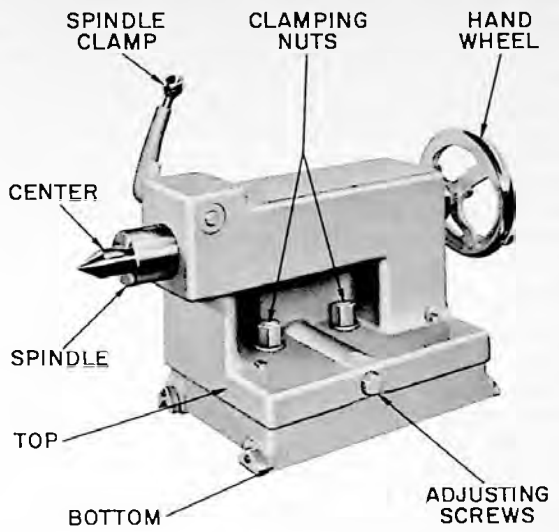
4. Quick Change Type Tool Holders hold only one tool at a time and are comprised of a top slide T-slot clamp; block; and a tool clamping lever to lock each tool in place.

Tailstock

The tailstock unit (Figure 13) is used to support one end of the workpiece and to hold drills, reamers, taps, etc. This unit can be moved on the bedways to accommodate workpieces of different length within the capacity of the lathe. The tailstock consists of a top, bottom, clamp, spindle and handwheel.

The tailstock top is fitted to the bottom and held in position with a cross tongue. A side adjustment is provided to keep the center in line with the head, and for turning shallow tapers by offsetting the spindle in relation to the head.

Fig. 13



Alignment of Centers

When zero marks are in line on the tailstocks top and bottom, centers are approximately in line. But due to the fact that an error of a .001" misalignment cannot be seen, a more sensitive test must be used for perfect straight turning.

A test bar (Figure 14) should be made with centered barstock; 2" diameter, 24" long and with a 1/4" undercut in the center. By taking a light cut at both ends and measuring with a micrometer, you can determine if the cut is straight or tapered.

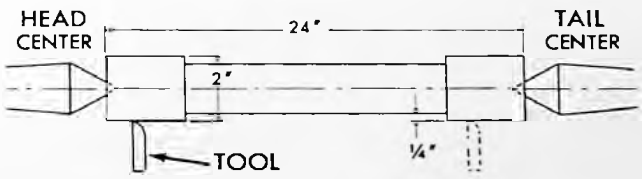


Fig. 14

If your lathe is cutting shallow tapers, the alignment of the tailstock center with the headstock is out of position. If the diameter is larger at the headstock, the tailstock top must be moved to the back of the lathe. If the diameter is larger at the tailstock, the tailstock top must be moved toward the front of the lathe.

NOTE: Do not attempt to adjust side movement with the bed clamp locked in position. Be sure the clamp is only in snug position; this allows the top to move on the bottom. Always loosen the adjusting screw on the side of the tailstock in the direction you wish to move before turning the other screw to move the tailstock top. When you have moved it to the desired position, retighten the original screw. These adjusting screws only locate the top on the bottom and should only be tightened to a snug fit.

Bed

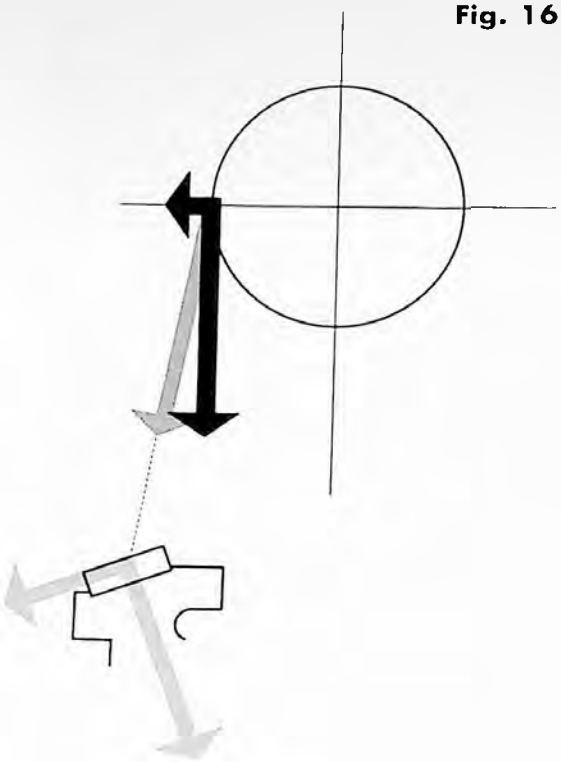
The bed (Figure 15) is the foundation of the lathe. It supports the functioning units and provides an accurate guideway for these units which move on it. Rigid in construction, it has been scientifically designed with heavy girths to minimize deflection.

Fig. 15

The ways are constructed of hardened and ground graphite steel. Wear is kept to a minimum with the graphite acting as a lubricant, and a hardness of 62-64 Rockwell C (600 Brinell). These ways are replaceable in event of accidental damage but with ordinary care will outlast the lathe.

LeBlond bedways are built to the Compensating V-way principle to provide longer wearing qualities by taking the tool thrust properly. The forces, Figure 16, generated by cutting action are a downward thrust and an outward thrust. The downward thrust is greater than that of the outward thrust. To compensate for these factors, the front way is at a 20° angle to the carriage and has a greater width than thickness. This construction gives ample bearing surface to the carriage where it is needed most.

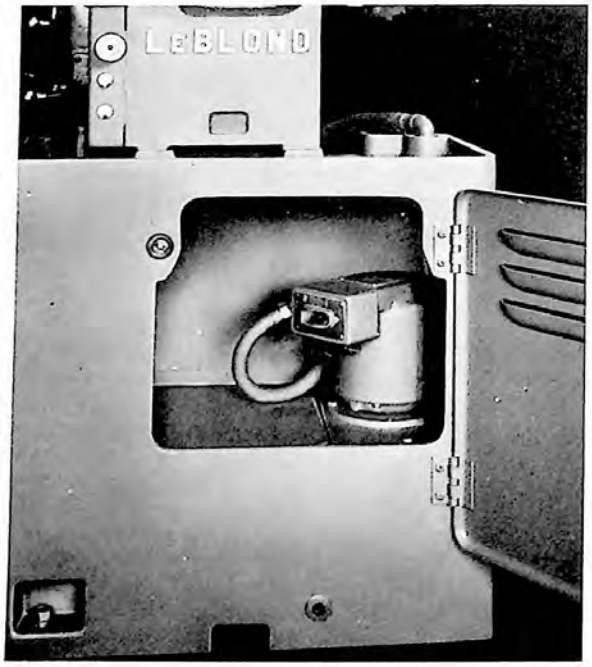
Fig. 16



Coolant System

The Regal lathe tail leg is of the completely enclosed type and houses the coolant system, (optional equipment). See Figure 17.

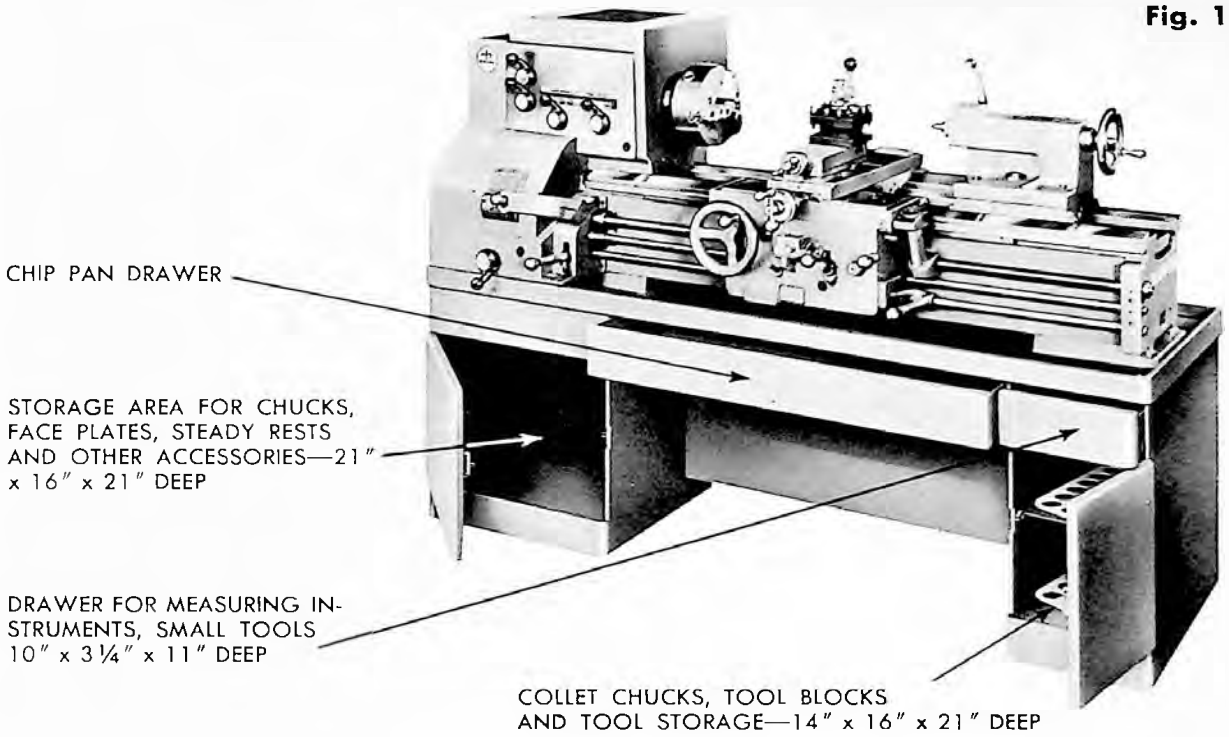
Fig. 17

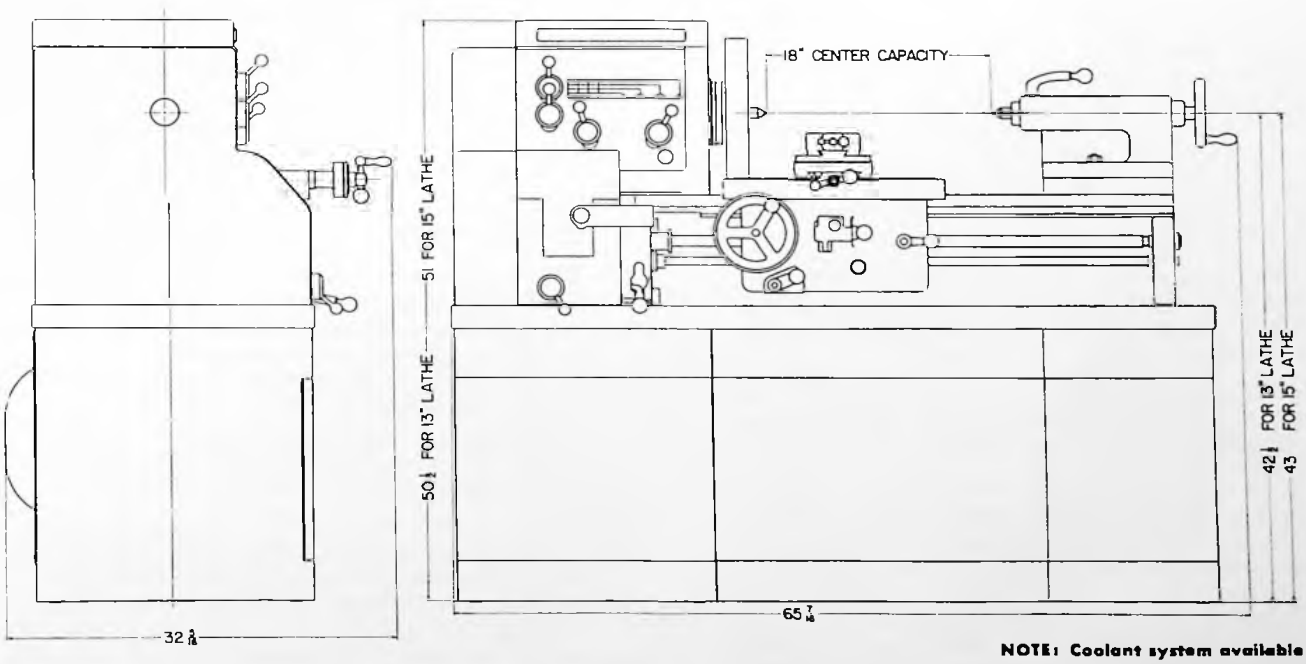


BENCH REGALS

13" and 15" Bench Regals are mounted on a heavy fabricated welded steel cabinet to give maximum rigidity for all operating conditions. See Figure 18 for dimensions and storage area.

Fig. 18

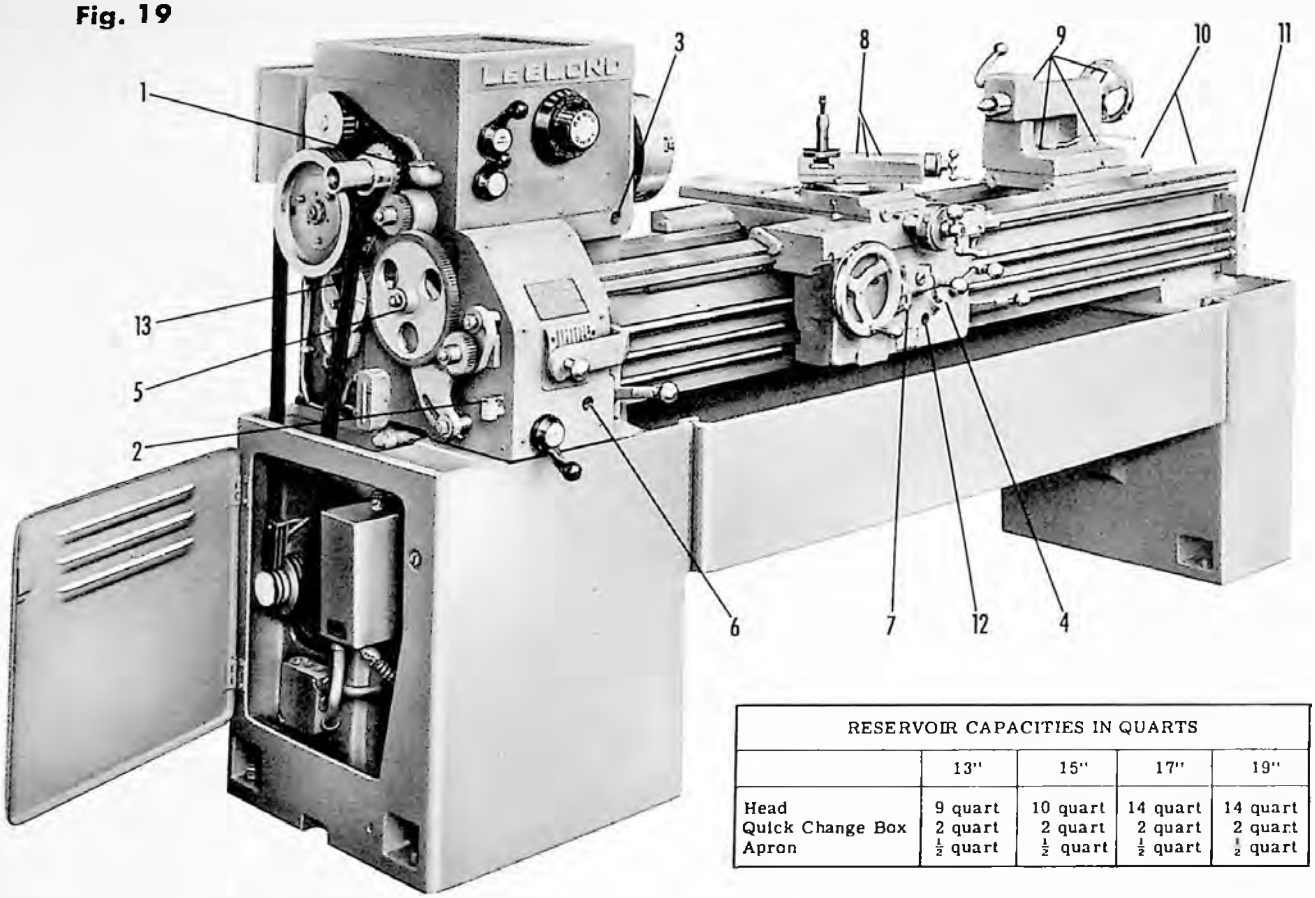




NOTE: Coolant system available

MACHINE SPECIFICATIONS

Fig. 19



RESERVOIR CAPACITIES IN QUARTS				
	13"	15"	17"	19"
Head	9 quart	10 quart	14 quart	14 quart
Quick Change Box	2 quart	2 quart	2 quart	2 quart
Apron	½ quart	½ quart	½ quart	½ quart

LUBRICATION

After installation has been completed, the lathe must be thoroughly lubricated and all reservoirs filled before it is put in operation. Oil levels must be checked regularly and oil cups kept well lubricated in order to get the longest life and smoothest operation from your lathe. Lubrication points and reservoir fillers are indicated on Figure 19.

Use a high grade industrial oil, of 300 S.U.S. @ 100° F., for all lubrication points and reservoirs. (see chart above) For grease fittings use a No. 2 lithium base grease.

If the lathe is equipped with Regal-Trace, the unit should be filled with turbine quality, rust, oxidation, and foam inhibited oil of 150 S.U.S. @ 100° F.

On machines that are equipped with Servo-Shift, the headstock and hydraulic shifting mechanism use the same oil.

The head end cover must be removed to fill head (1) and quick change box (2) reservoirs. Weekly checks should be made at the following points to insure proper oil level: (3) Headstock oil sight gauge; (6) Quick change box oil sight gauge; (12) apron filler oil sight gauge; (5) quadrant gear oiler; (13) crawl-speed linkage (applies only to machines equipped with Servo-Shift.)

Daily lubrication should be performed at the following points:

(7) Apron pump plunger. This will oil the carriage cross slide, bedways and apron. Before starting machine or moving carriage, pump oil until it appears in the tell hole located on the front right hand shear wiper of the carriage.

(8) Compound rest oilers (three).

(9) Tailstock oilers (four).

(10) Front flat and rear V-way should always be wiped free from dirt and grit then lightly oiled when moving tailstock along bed. This protects the tailstock bottom from excessive wear thereby keeping the accuracy built into the tailstock.

(11) Back box oiler.

ADDITIONAL INSTRUCTIONS

(Fig. 20)
On sliding bed gap Regal lathes additional daily lubrication should be performed at the following points.

(12) Bottom bed feed box
(13) Top bed feed box

Before moving top bed under power, wipe drive screw (B) clean from dirt and lightly oil. Always wipe bottom ways clean and oil before closing gap.

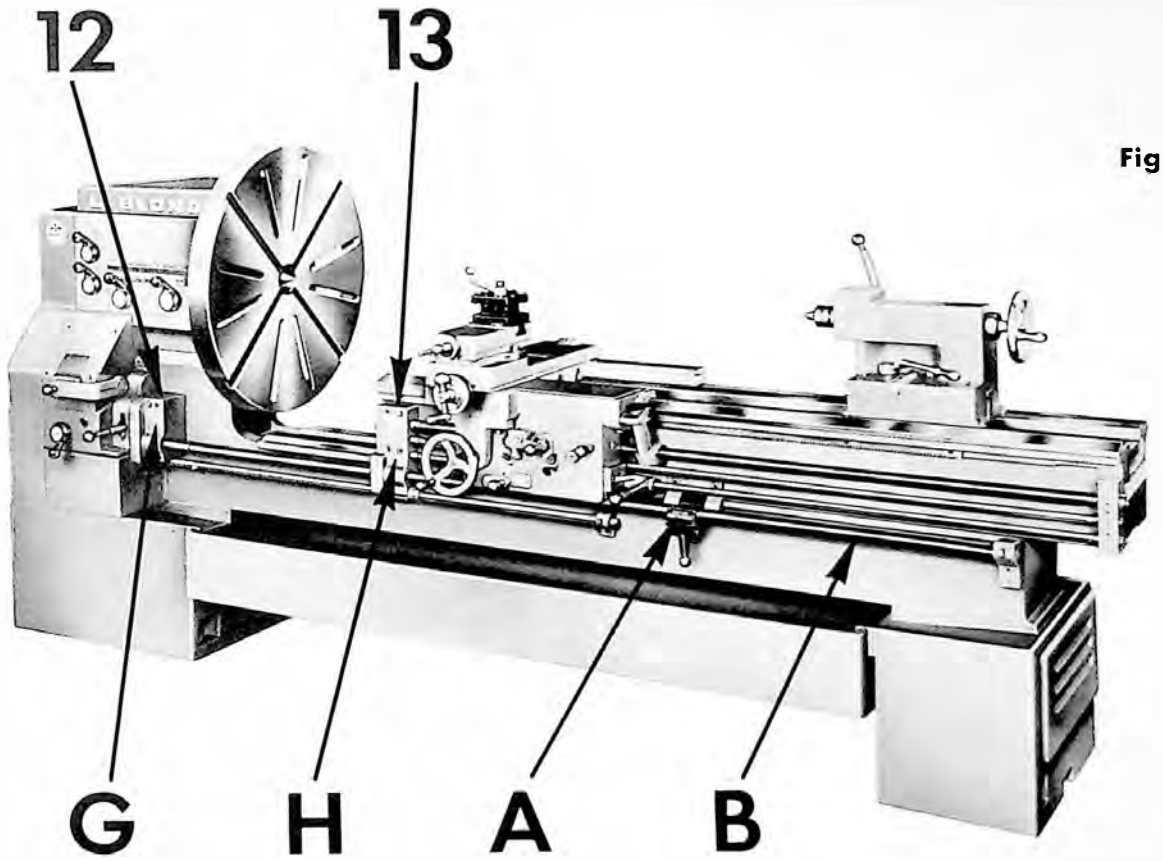


Fig. 20

Regal Sliding Bed Gap Lathe
(Fig. 20)

A sliding bed, a special carriage, apron arrangement and part of the feed mechanism differentiates this lathe from the regular Regal lathe. On the base length of the machine the gap may be opened to a maximum working distance of 20". For every bed increase increment of 12" the center distance will be increased by 18" with the bed fully extended.

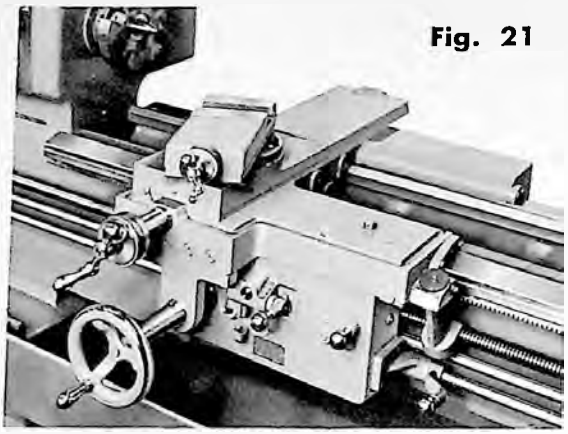
Feed is transmitted from the quick change box through transfer box (G) to the gap bed box (H) by means of an extension rod. The extension rod lies along the lower bed in order to keep the gap working area open. This rod is also used to traverse the top bed under power.

Lever (A), Fig. 20 engages the traverse nut to the drive shaft. The top bed slides along a vee-way on the bottom bed which keeps it in position.

CAUTION: Before moving the top bed be sure to loosen the clamp nuts found on the bed girths. Do not traverse the top bed in the spindle belt drive and do not exceed the fine feed range when in spindle gear drive.

On sliding bed gap lathes of 66" center distance and longer, one support jack is furnished to support the bed overhang. Raise the jack just enough to relieve the strain resulting from bed overhang but not enough to raise the top bed off the lower bed. Retighten the bed clamps by tightening the bolts next to the vee-way to insure proper alignment.

Fig. 21



A special carriage, Figure 21, is provided with the cross slide located at the left of the carriage wing. This allows the operator to place his tools to take full advantage of the gap. An extension rest (optional equipment) facilitates even fuller use of the gap.

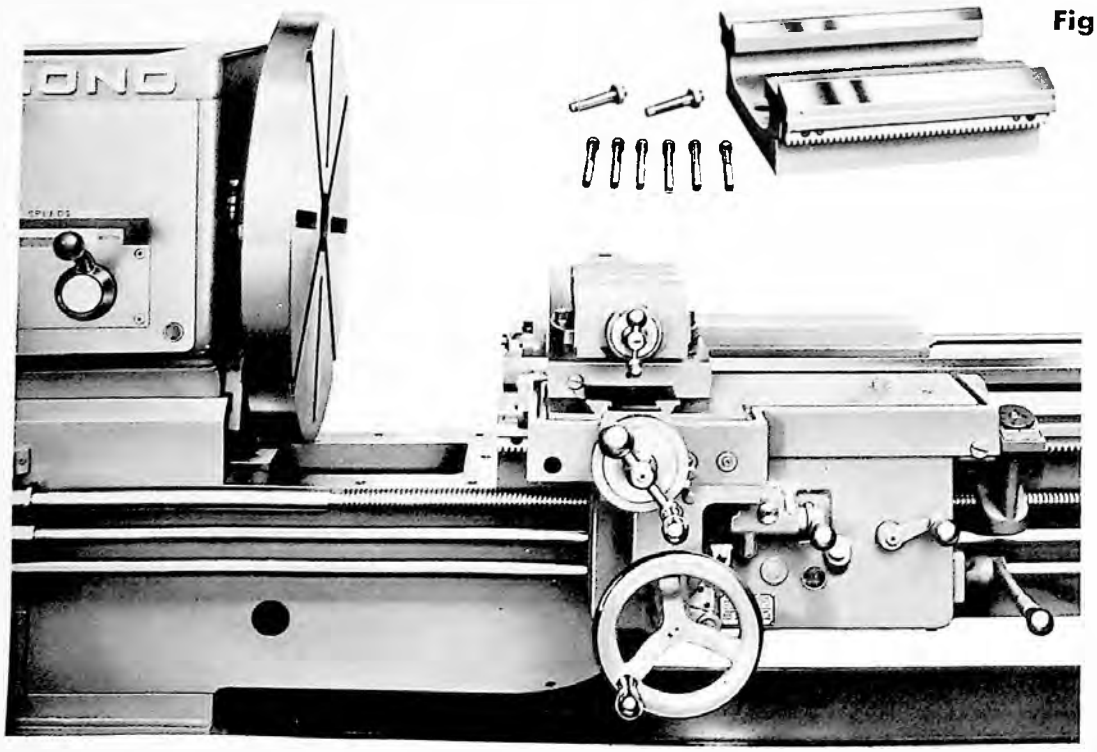
Regal Plain Bed Gap Lathe

Plain bed gap lathes differ only in their bed, apron and carriage construction. The carriage and apron are the same type as employed on the sliding bed gap lathe. The difference from a regular lathe lies in the cutout section of the bed called a gap.

The gap opening is fitted with an accurately machined block to match the bed. This block is held in place with six screws and is located with taper pins. Since this block is precision machined, care must be taken when removing it. Removal by an overhead crane is recommended in order to avoid jamming or wedging the block in the bed.

To remove the block, first take out the screws which hold the block in the bed. The taper pins which locate the block are threaded on top and the nuts must be turned down to pull these pins. When replacing the block make sure the nuts are backed off so the pins seat properly. Also carefully clean the bed opening and gap block before placing it back on the bed.

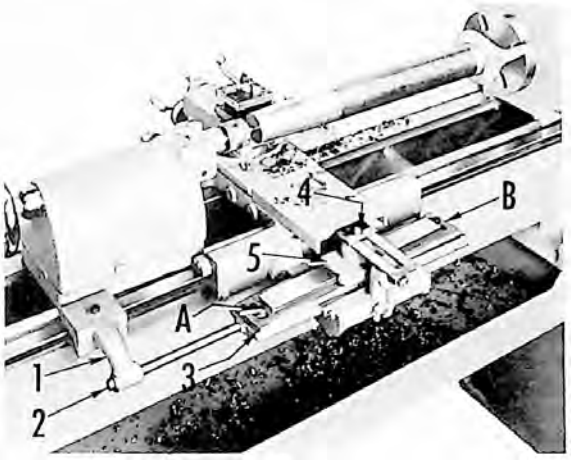
Fig. 22



Taper Attachment

The Regal telescopic taper attachment, Figure 23, is ruggedly constructed, accurately machined and simple to operate. Capacity on the 13" and 15" Regals is 3-1/2" maximum taper per foot and will turn 10" at one setting. Capacity on the 17" and 19" Regals is 3-1/2" maximum taper per foot and will turn 15" at one setting.

Fig. 23



When the carriage is brought into position for taper turning, the bed bracket (1) is locked on the bed ways. The slide rod draw bar is then locked by nut (2). The swivel guide bar (3) is adjusted to the desired taper by loosening nuts (A) and (B), adjusting to the proper taper and retightening nuts (A) and (B). This guide is graduated in inches on one end and degrees on the other.

With the taper bar clamp nut (4) loosened, the tool is moved into position and nut (4) relocked. When the carriage feed is engaged, the bed bracket and connecting rod hold the lower taper bar in a fixed position in relation to the bed and work. Movement of the carriage, slides gibbed block (5) along the taper bar.

The taper attachment bottom slide draw bar, in its locked position, prevents the cross slide from being moved. The compound rest dial is used in sizing for taper turning. For this reason the compound rest should be at the zero setting and square with the carriage. Avoid unnecessary overhang of this slide to prevent chatter.

Chasing Dial

The chasing dial, Figure 24, permits the operator to take a cut, back the tool out and return the carriage to the starting point, set the tool for the next cut, and re-engage the half nut to pick up the same lead without stopping or reversing the spindle.

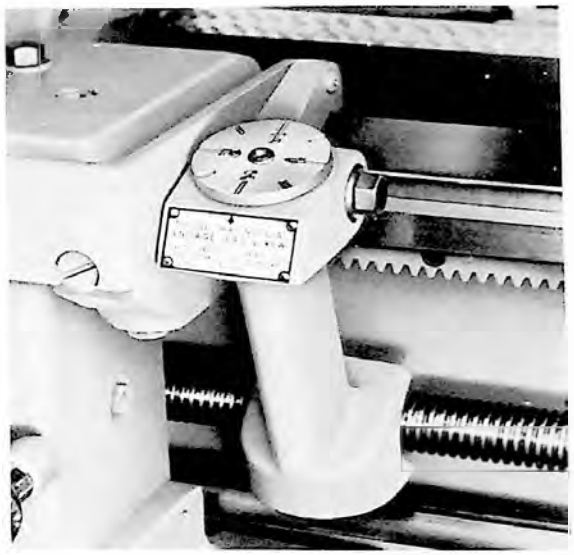


Fig. 24

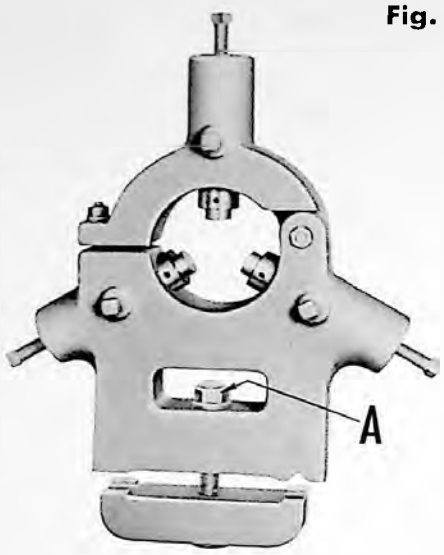
The chasing or thread indicating dial consists of a worm wheel, which runs in the leadscrew, and a shaft connected to an indicating dial. When chasing even numbered threads, the half-nuts may be engaged at any line on the dial, odd numbered threads at any numbered line and half-threads at any odd numbered line.

Steady Rest

The steady rest, Figure 25, provides a fixed support between the head and tailstock for long round work while it is being turned. The rest is also used to support one end of the workpiece when operations such as boring are used.

Steady rests are clamped in position on the bed by clamp nut (A). Proper position is generally in the center of long work-pieces for turning, and on one end for boring. Two types of jaws are generally used on steady rests, plain or bronze type and roller jaws -- adjustment of these jaws should be made in the following manner. Always adjust the bottom jaws first.

Fig. 25



These jaws should be positioned to keep the workpiece running true. The top jaw is then brought into light contact with the workpiece to support the upward thrusting action that occurs when the work is revolving. Be sure to keep oil on the contact area between the jaw tips and the work. Scoring is usually caused by the top jaw being too tightly clamped and lack of oil. Chatter is generally caused by the top jaw being too loose.

Follow Rests

The follow rest, Figure 26, is used to support

Fig. 26

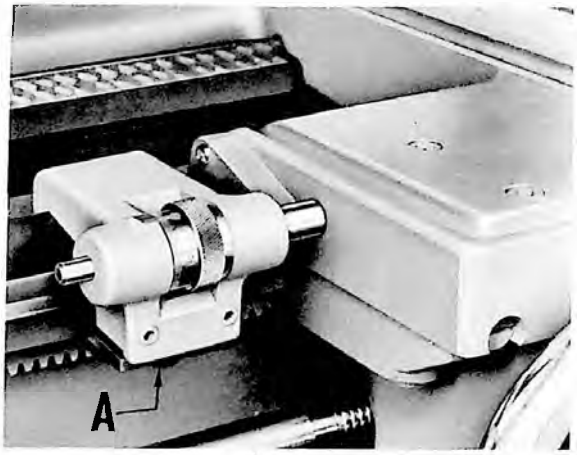
between-center work against the forces of the cut being taken. It is bolted to the carriage and moves with it. This rest is very useful in turning long small diameter work and is a necessity when chasing threads on long screws. Without a follow rest the screw would be inaccurate, due to its springing away from the tool.

The follow rest is adjusted to the workpiece in the following manner. First, the cut is started and turned approximately 3". The jaws are then set to the turned diameter after which the cut can be taken across the entire length of the work. When adjusting the jaws to the work, make sure they support but do not bind or twist the workpiece. Practice will give you the proper tension for jaw adjustment.

Micrometer Carriage Stop

The micrometer carriage stop, Figure 27, permits the operator to bring the carriage to the same position accurately on the bed. It is very useful where a series of cuts are desired at accurate decimal dimensions.

Fig. 27



The stop is clamped on the front bed way with nut (A). The design of the clamp prevents marring the hardened way while in use. A micrometer screw with hardened ends is turned by a large knurled collar which has been graduated for direct reading in thousandths of an inch. The carriage is brought up against the end of the stop by hand. Never run the carriage against the stop with power feed.

MAINTENANCE AND ADJUSTMENTS

The following general rules will keep your machine in best running condition and prevent down time for maintenance and repair.

1. Keep general work area clean.
2. Do not remove guards, - they are put on for safety and to keep dirt out of your lathe.
3. Make sure the tailstock has been clamped before turning between centers.
4. Don't use your lathe for a work bench, Lathes have been wrecked by a wrench lying on the ways between the carriage and head.
5. Always keep the spindle nose, face plate, chucks and centers clean and dry. Dirt and grit between a face plate and the spindle nose may cause run out.
6. Headstock and tailstock spindle holes as well as centers must be free from dirt before inserting centers.
7. Tighten spindle lock nut securely before starting lathe.
8. Use lubricant on dead tailstock centers.
9. Keep tool tight in tool holder.
10. Before chasing threads, wipe leadscrew free from dirt and lightly oil.
11. Check direction of feed before engaging the tool to the workpiece.
12. Always disconnect the power before leaving lathe.

Be sure your lathe is properly lubricated at all times and oil reservoirs are filled. See section on "Lubrication".

From time to time your lathe may need minor adjustments. Read the proper section for making these adjustments before performing adjusting operations. Never tear a machine down leaving a box of parts for a service man. He is experienced in trouble shooting and chances are he will save you time and money by doing this work himself. Often corrections can be made without tearing machine down.

TROUBLE SHOOTING CHART

TROUBLE	PROBABLE CAUSE	CORRECTION
Vibration	Loose leveling screws	Set all screws so they bear evenly on leveling plates.
	Torn or mismatched vee belts	Replace vee belts with matched set.
	Work or chuck out of balance operating at high spindle speeds	Balance chuck or reduce spindle speed.
	Motor out of balance	Contact local representative of motor manufacturer.
Chatter	Tool bit improperly ground or not on center	Regrind tool bit or adjust tool holder so that area of contact between tool bit and work is decreased.
	Tool overhang too great	Keep point of tool bit as close as possible to tool holder.
	Using improper surface feet	Reduce or increase spindle speed.
	Feed rate too high or too low	Reduce or increase feed.
	Gibs of cross slide or compound rest loose	Adjust gibs.
	Spindle bearings worn	Adjust spindle bearings

continued on next page

TROUBLE SHOOTING CHART (Continued)

TROUBLE	PROBABLE CAUSE	CORRECTION
Chatter (cont'd)	Work improperly supported	Adjust tailstock center. Use steady rest or follow rest on long slender shafts.
	Vibration	See "Vibration" trouble above.
	Spindle bearing loose	Adjust spindle bearings.
Work not turned straight	Headstock and tailstock centers not aligned	Align tailstock center.
	Work improperly supported	Use steady rest or follow rest. Reduce overhang from chuck.
	Bed not level	Relevel bed, using precision level.
	Tool not on center when using taper attachment	Put tool on center.
Work out of round	Work loose between centers or centers are excessively worn -- work centers out of round	Adjust tailstock center. Regrind centers. Lap work centers.
	Loose headstock spindle bearings	Adjust headstock spindle bearings
Cross slide or compound rest movement does not coincide with dial movement of respective adjusting screw.	Gib setting too tight or too loose	Adjust gibs.
	Work is too long and slender	Use steady rest or follow rest.

Headstock Spindle Bearing Adjustment (Fig. 28)

When adjusting the spindle bearing, use small face plate on spindle nose. Remember that a slight drag should be felt when the bearing is adjusted correctly.

1. Remove the head cover.
2. Locate the two hex head set screws (1) on the center bearing nut. Loosen.
3. Tighten (or loosen) the center bearing nut (2). This is the adjusting nut.
4. Tighten the two hex head set screws (1) on the adjusting nut.
5. Replace the head cover and bolt firmly to prevent oil leakage.

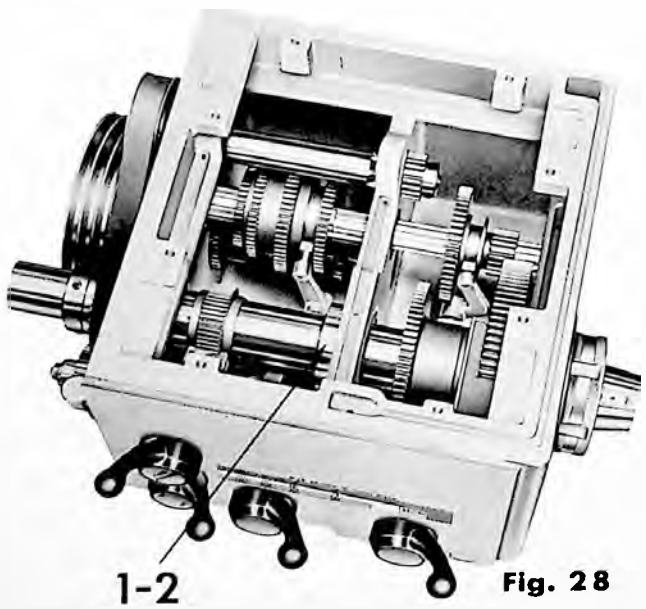


Fig. 28

Servo-Shift Pressure Adjustment

To adjust the Servo-Shift hydraulic pressure, remove the headslock cover. Remove the small pipe plug in the front hydraulic cylinder, opposite the pressure line. Insert a pressure gauge as shown on page 70. The gauge should read to about 500 P.S.I.

Start the hydraulic pump. Loosen the lock nut on the pressure adjusting valve (page 70) and turn the set screw clockwise to decrease pressure, counter-clockwise to increase pressure. The operating pressure is approximately 200 P.S.I. Retighten the locknut.

Belt Tension Adjustment (Fig. 29)

The motor is mounted on a hinged plate in the back of the headstock leg. The hinged plate is adjusted by means of turnbuckle (A) in the leg to regulate the tension on the V-belts. Belts should have approximately 1/2" spring to provide enough tension to take the cuts without slipping. Too much tension on the belts will cause a strain on the motor and drive shaft bearings, causing excessing wear. Oil on the belt will cause slippage.

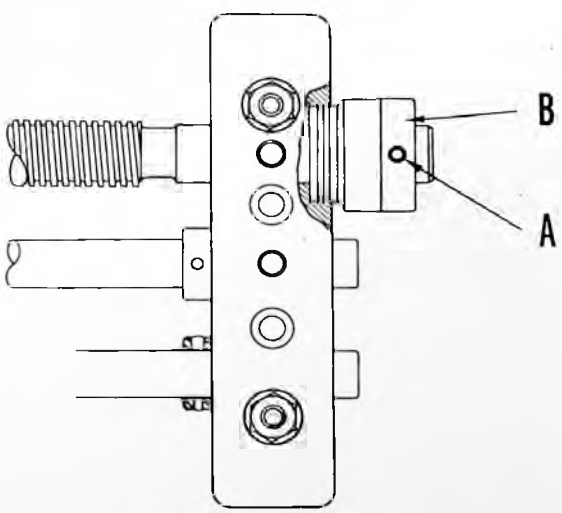
Fig. 29

Leadscrew Adjustment (Fig. 30)

The leadscrew has been properly adjusted before the machine has been shipped. With normal care, no adjustment will be necessary for many years.

NOTE: The leadscrew is used only for chasing on Regal lathes. Under all other operations, it does not revolve. Excessive wear to the leadscrew and half nut take place when the leadscrew is not cleaned before chasing when it has not been used for some time. Always wipe leadscrew with an oily rag to remove dirt and grit under these conditions.

Fig. 30



For correct adjustment:

1. Loosen set screw (A).
2. Tighten the adjusting nut (B) until there is no end play in the leadscrew.
3. Retighten set screw (A).

Cross Slide and Top Slide Gib adjustment

If the gibs on the cross slide and top slide are loose, the compound rest will wobble slightly causing inaccurate work. To adjust these gibs follow this procedure:

1. Loosen the gib screw(E)at the small end of the gib.
2. Tighten adjusting screw (F)at the large end of the gib, until a slight drag is felt when the slide is moved. Retighten screw (E).

Fig. 31

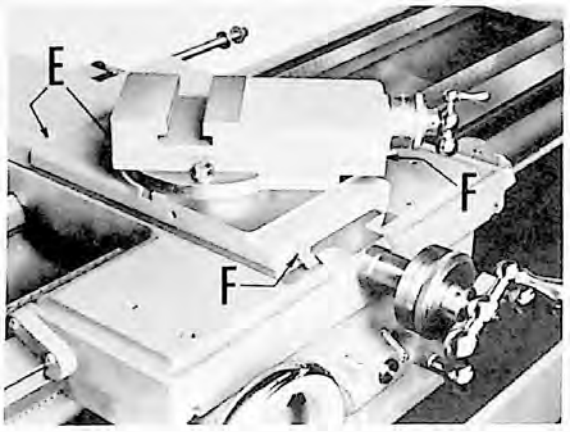


Fig. 32

Carriage Rear Gib adjustment

The carriage rear gib is adjusted by moving it vertically upward. To adjust the gib, loosen two head screws (A) which hold the gib against the rear wall of the carriage. Tighten the two screws (B) that move the gib vertically upwards until a slight drag is felt as the carriage is moved along the bed. Tighten the hex screws.

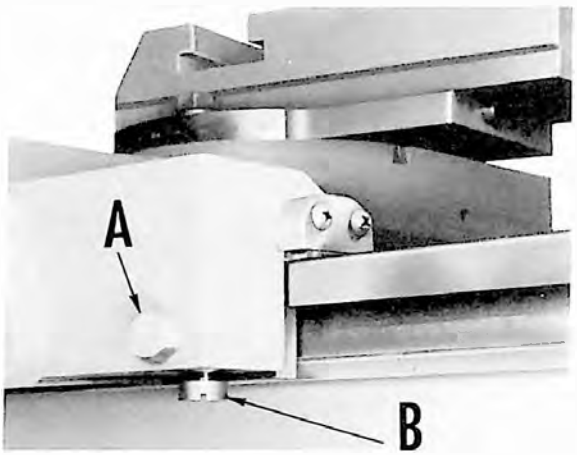
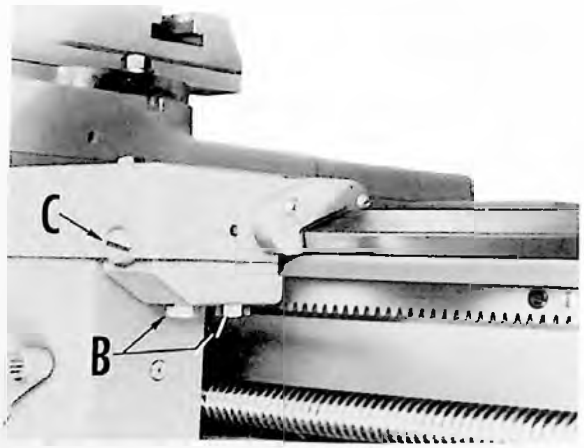


Fig. 33

Carriage Front Gib adjustment

There are two gibs located at both sides of the carriage front. Nuts(B) hold the gib bracket to the carriage from underneath. The gib adjusting screws (C) are found at the front edge of the carriage. When adjusting the front carriage gibs:

1. Loosen two gib bracket nuts (B).
2. Adjust gib adjusting screws until there is a slight drag when the carriage is moved along the bed.
3. Repeat with the other front gib.



TABLES SECTION

TABLE OF DECIMAL EQUIVALENTS

1/64" to 1" in 64ths

Fraction	Decimal Equivalent	Fraction	Decimal Equivalent	Fraction	Decimal Equivalent
1/64	0.015 625	11/32	0.343 75	43/64	0.671 875
1/32	0.031 25	23/64	0.359 375	11/16	0.687 5
3/64	0.046 875	3/8	0.375	45/64	0.703 125
1/16	0.062 5	25/64	0.390 625	23/32	0.718 75
5/64	0.078 125	13/32	0.406 25	47/64	0.734 375
3/32	0.093 75	27/64	0.421 875	3/4	0.750
7/64	0.109 375	7/16	0.437 5	49/64	0.765 625
1/8	0.125	29/64	0.453 125	25/32	0.781 25
9/64	0.140 625	15/32	0.468 75	51/64	0.796 875
5/32	0.156 25	31/64	0.484 375	13/16	0.812 5
11/64	0.171 875	1/2	0.500	53/64	0.828 125
3/16	0.187 5	33/64	0.515 625	27/32	0.843 75
13/64	0.203 125	17/32	0.531 25	55/64	0.859 375
7/32	0.218 75	35/64	0.546 875	7/8	0.875
15/64	0.234 375	9/16	0.562 5	57/64	0.890 625
1/4	0.250	37/64	0.578 125	29/32	0.906 25
17/64	0.265 625	19/32	0.593 75	59/64	0.921 875
9/32	0.281 25	39/64	0.609 375	15/16	0.937 5
19/64	0.296 875	5/8	0.625	61/64	0.953 125
5/16	0.312 5	41/64	0.640 625	31/32	0.968 75
21/64	0.328 125	21/32	0.656 25	63/64	0.984 375

MILLIMETERS INTO INCHES

Millimeters	Inches	Millimeters	Inches	Millimeters	Inches
1/10 mm	.00394	8 mm	.31496	17 mm	.66929
1/5 mm	.00787	9 mm	.35433	18 mm	.70866
1/2 mm	.01969	10 mm	.39370	19 mm	.74803
1 mm	.03937	11 mm	.43307	20 mm	.78740
2 mm	.07874	12 mm	.47244	21 mm	.82677
3 mm	.11811	13 mm	.51181	22 mm	.86614
4 mm	.15748	14 mm	.55118	23 mm	.90551
5 mm	.19685	15 mm	.59055	24 mm	.94488
6 mm	.23622	16 mm	.62992	25 mm	.98425

10 Millimeters	1 Centimeter	1 Centimeter	.3937 inch
10 Centimeters	1 Decimeter	1 Decimeter	3.937 inches
10 Decimeters	1 Meter	1 Meter	39.37 inches
1 Kilometer	.6214 mile	1 Mile	1.609 kilometers
1 Meter	39.37 inches	1 Yard	.9144 meter
	3.2808 feet	1 Foot	.3048 meter
	1.0936 yard	1 Foot	304.8 millimeters
1 Centimeter	.3937 inch	1 Inch	2.54 centimeters
1 Millimeter	.03937 inch	1 Inch	25.4 millimeters

Limits for Turning and Grinding -- The limits given in the table below are recommended for use in the manufacture of machine parts, to produce satisfactory commercial work. These limits should only be followed under ordinary conditions. For special cases, it may be necessary to increase or decrease the limits given in the table. The allowance to be used when rough turning parts to be ground varies from 0.010 to 0.030 inch; that is, a part to be ground to a diameter of 1 inch would be rough turned in the lathe to a diameter of from 1.010 to 1.015 inch, while a 3-inch shaft may have an allowance of from 0.015 to 0.025 inch. The allowance depends largely on the class of work.

Allowances for Fits

Grinding Limits for Cylindrical Parts

(+ Designates larger than nominal size; − Smaller than nominal size.)

Diameter, Inches	Limits, Inches
Running Fits -- Ordinary Speed	
Up to 1/2	− 0.00025 to − 0.00075
1/2 to 1	− 0.00075 to − 0.0015
1 to 2	− 0.0015 to − 0.0025
2 to 3-1/2	− 0.0025 to − 0.0035
3-1/2 to 6	− 0.0035 to − 0.005
Running Fits -- High-Speed, Heavy Pressure and Rocker Shafts	
Up to 1/2	− 0.0005 to − 0.001
1/2 to 1	− 0.001 to − 0.002
1 to 2	− 0.002 to − 0.003
2 to 3-1/2	− 0.003 to − 0.0045
3-1/2 to 6	− 0.0045 to − 0.0065
Sliding Fits	
Up to 1/2	− 0.00025 to − 0.0005
1/2 to 1	− 0.0005 to − 0.001
1 to 2	− 0.001 to − 0.002
2 to 3-1/2	− 0.002 to − 0.0035
3-1/2 to 6	− 0.003 to − 0.005

Diameter, Inches	Limits, Inches
Driving Fits -- Ordinary	
Up to 1/2	+ 0.00075 to + 0.0015
1/2 to 1	+ 0.001 to + 0.002
1 to 2	+ 0.002 to + 0.003
2 to 3-1/2	+ 0.003 to + 0.004
3-1/2 to 6	+ 0.004 to + 0.005
Forced Fits	
Up to 1/2	+ 0.00025 to + 0.0005
1/2 to 1	+ 0.0015 to + 0.0025
1 to 2	+ 0.0025 to + 0.004
2 to 3-1/2	+ 0.004 to + 0.006
3-1/2 to 6	+ 0.006 to + 0.009
Driving Fits -- For such Pieces as are Required to be Readily Taken Apart	
Up to 1/2	+ 0 to + 0.00025
1/2 to 1	+ 0.00025 to + 0.0005
1-1/2 to 2	+ 0.0005 to + 0.00075
2 to 3-1/2	+ 0.00075 to + 0.001
3-1/2 to 6	+ 0.001 to + 0.0015

INSTRUCTIONS FOR ORDERING PARTS

When ordering repair parts, the following information must be given for best service:

1. Serial number of the lathe. This can be found on the front flat at the tailstock end of the bed.

2. The name of the part, the number of the part, and the page number on which the part appears in the book.

In the Repair Parts Section the 13" Regal is taken as the basic machine in working up the lists. Therefore, some parts on Regals of other sizes will not be identical with the illustrations. This is the reason why we require the Serial No. of your lathes before the proper part can be sent.

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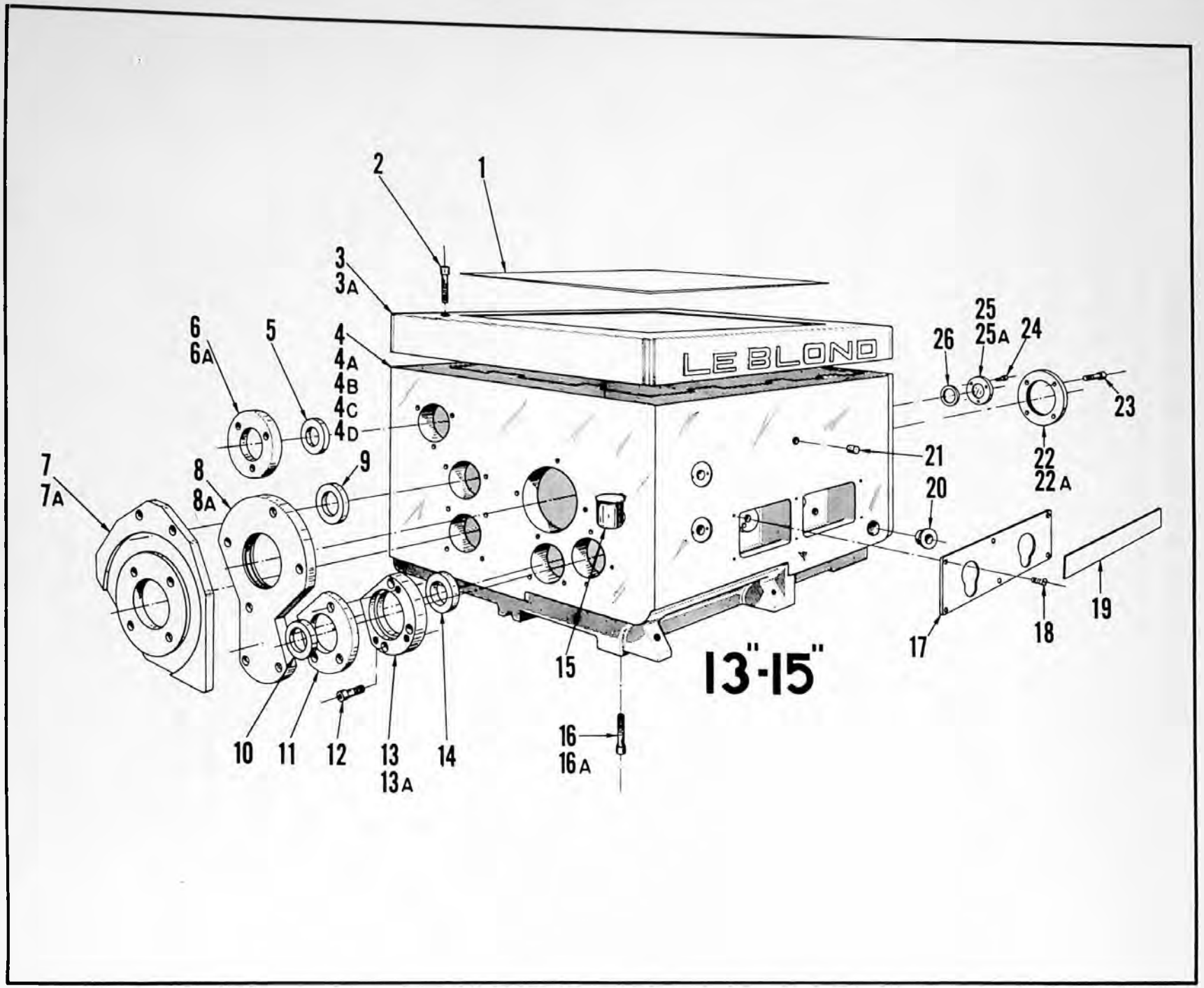
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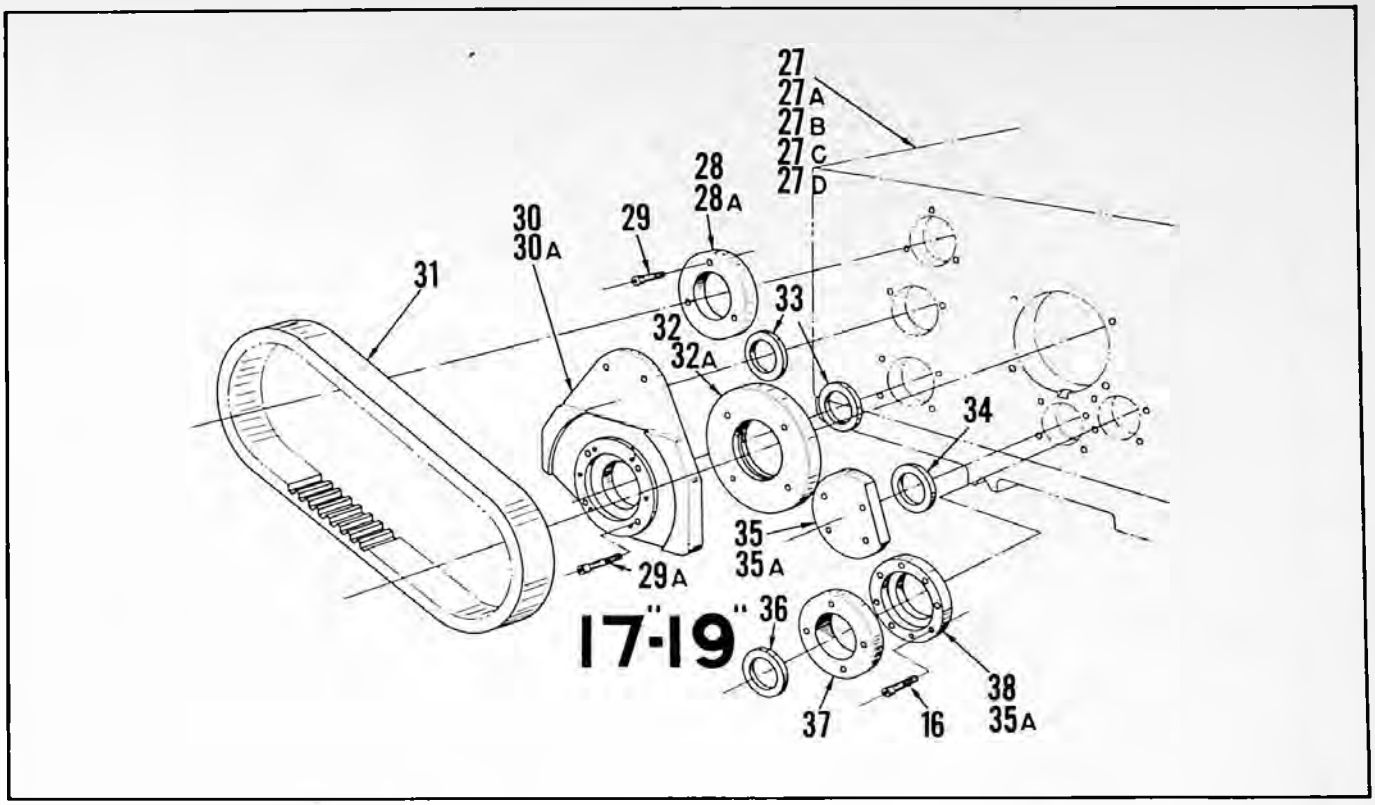
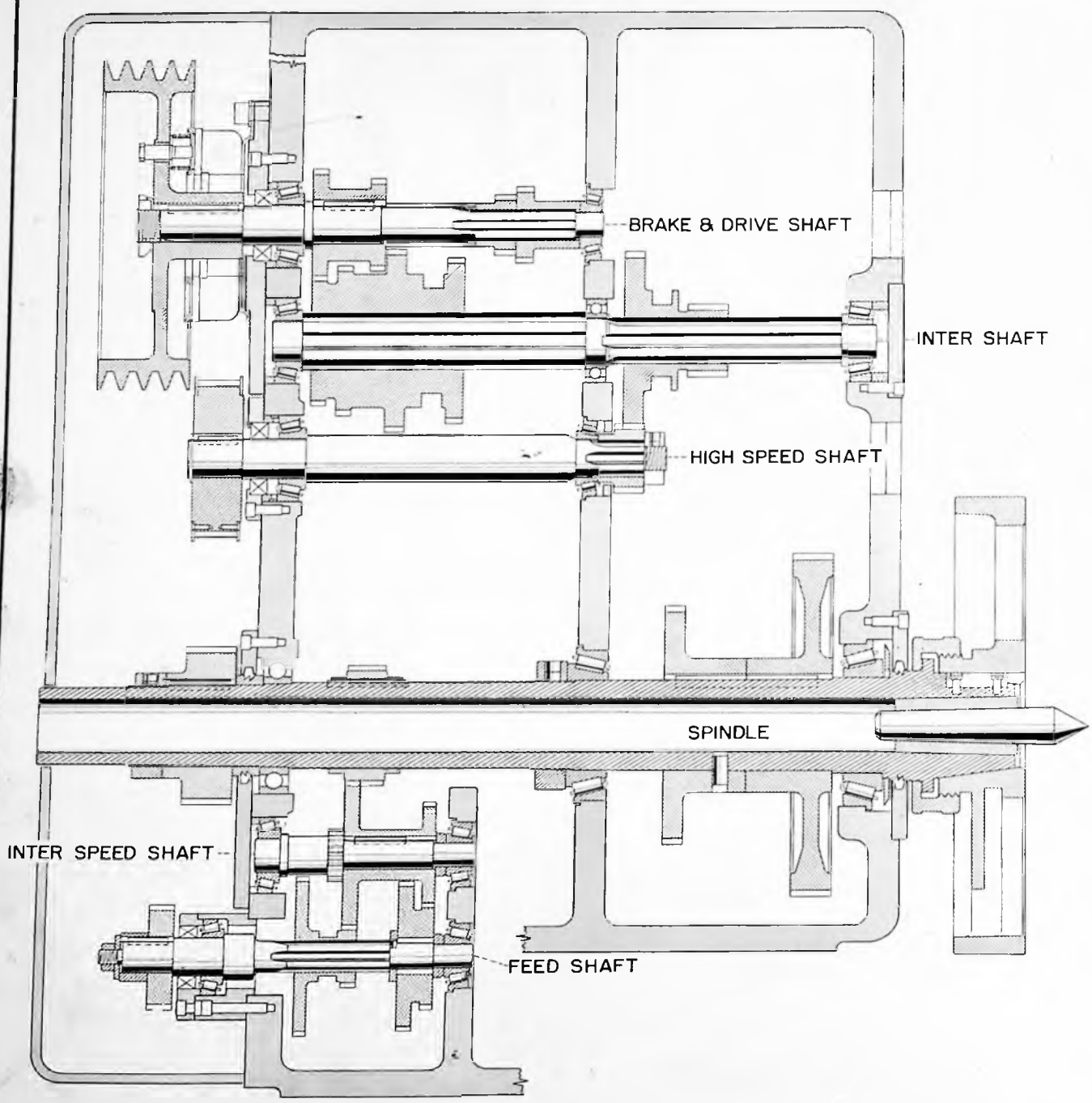


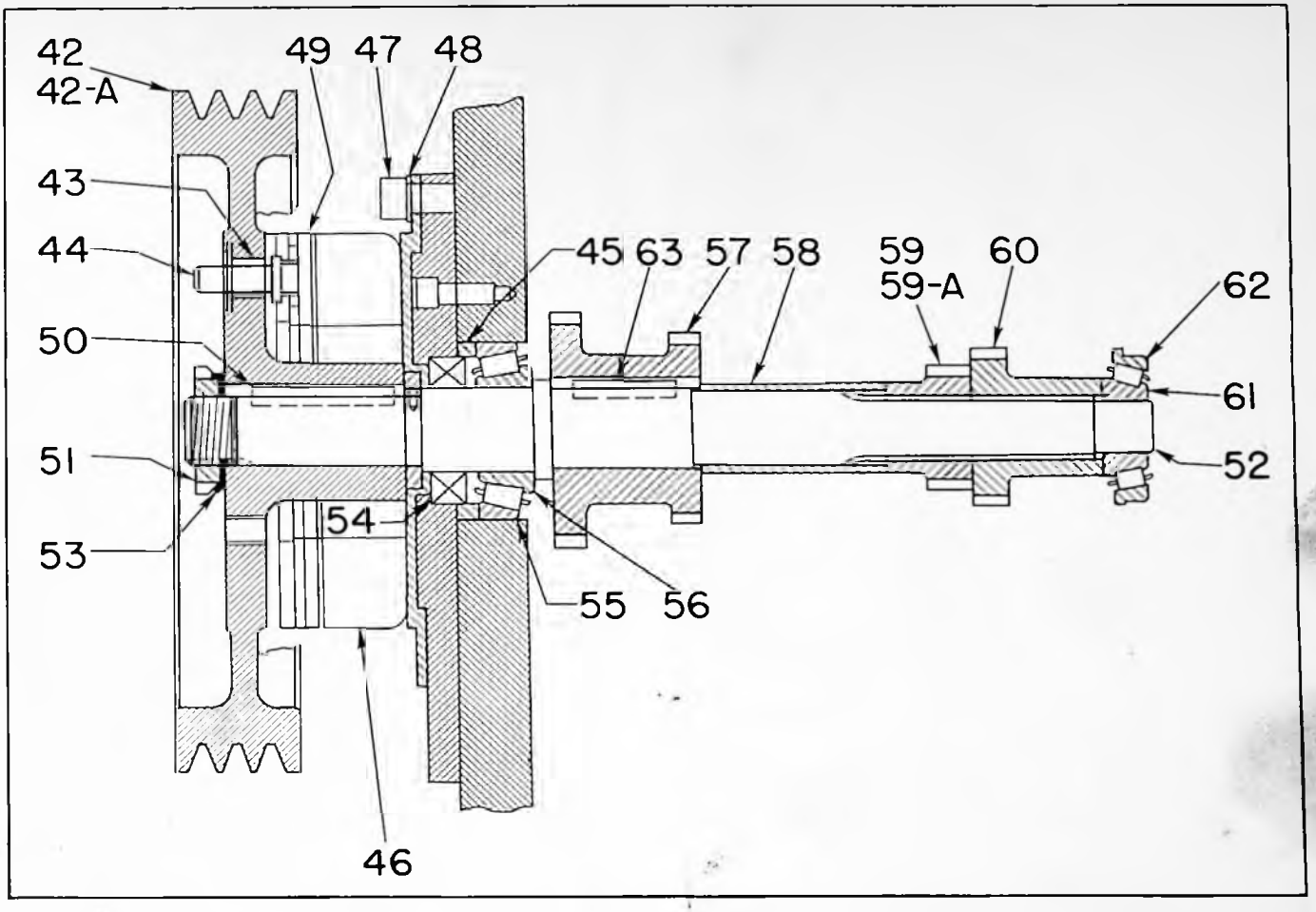
HEADSTOCK CASTING

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
1.	Mat, Head Cover	1	20.	Window Unit, Bijur Oil Level Type	1
2.	Screw, Socket Head	8	21.	Plug, C. I.	1
3.	Cover, Head Top	1	22.	Flange, Spindle Front	1
3A.	Gasket, Head Cover	1	22A.	Gasket, Spindle Front Flange	1
4.	Head (Specify 13" or 15")	1	23.	Screw, Socket Head	4
4A.	Scoop, Face Gear Oil	1	24.	Screw, Socket Head	3
4B.	Screw, Socket Head	2	25.	Plug, Inter, Shaft Front	1
4C.	Plug, Pipe	1	25A.	Gasket, Inter. Shaft Front	1
4D.	Plug, Oil Hole	3	26.	Spacer, Inter. Shaft	1
5.	Collar, High Speed Shaft Matching	1	27.	Head (Specify 17" or 19")	1
6.	Flange, High Speed Shaft Rear	1	27A.	Scoop, Face Gear Oil	1
6A.	Gasket, High Speed Shaft Flange	1	27B.	Screw, Machine	2
7.	Flange, Drive Shaft	1	27C.	Plug, Pipe	1
7A.	Gasket, Drive Shaft Flange	1	27D.	Plug, Oil Hole	3
8.	Flange, Spindle Rear	1	28.	Flange, High Speed Shaft Rear	1
8A.	Gasket, Spindle Rear Flange	1	28A.	Gasket, High Speed Shaft Flange	1
9.	Collar, Drive Shaft Matching	2	29.	Screw, Socket Head	2
10.	Seal, Victoprene Oil	1	30.	Flange, Drive Shaft	1
11.	Cap, Fd. Shaft Brg. Sleeve	1	30A.	Gasket, Drive Shift Flange	1
12.	Screw, Socket Head	3	31.	Belt, Timing (Specify 13", 15", 17", or 19")	1
13.	Sleeve, Fd. Shaft Brg.	1	32.	Flange, Rear Spindle	1
13A.	Gasket, Fd. Shaft Brg. Sleeve	1	32A.	Gasket, Spindle Rear Flange	1
14.	Collar, Interfd. Shaft Matching	1	33.	Collar, Drife Shaft Matching	2
15.	Oiler	1	34.	Collar, Inter. Feed Shaft Match	1
16.	Screw	2	35.	Cover, Inter. Feed Shaft Brg.	1
16A.	Screw	2	35A.	Gasket, Feed Shaft Sleeve	3
17.	Cover, Head Front	1	36.	Seal, Victoprene Oil	1
18.	Screw, Button Hd. Soc. Type	6	37.	Cap, Feed Shaft Brg. Sleeve	1
19.	Plate, Spindle Speed (Specify Speed Range)	1	38.	Sleeve, Feed Shaft Bearing	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.



HEADSTOCK ROLLOUT

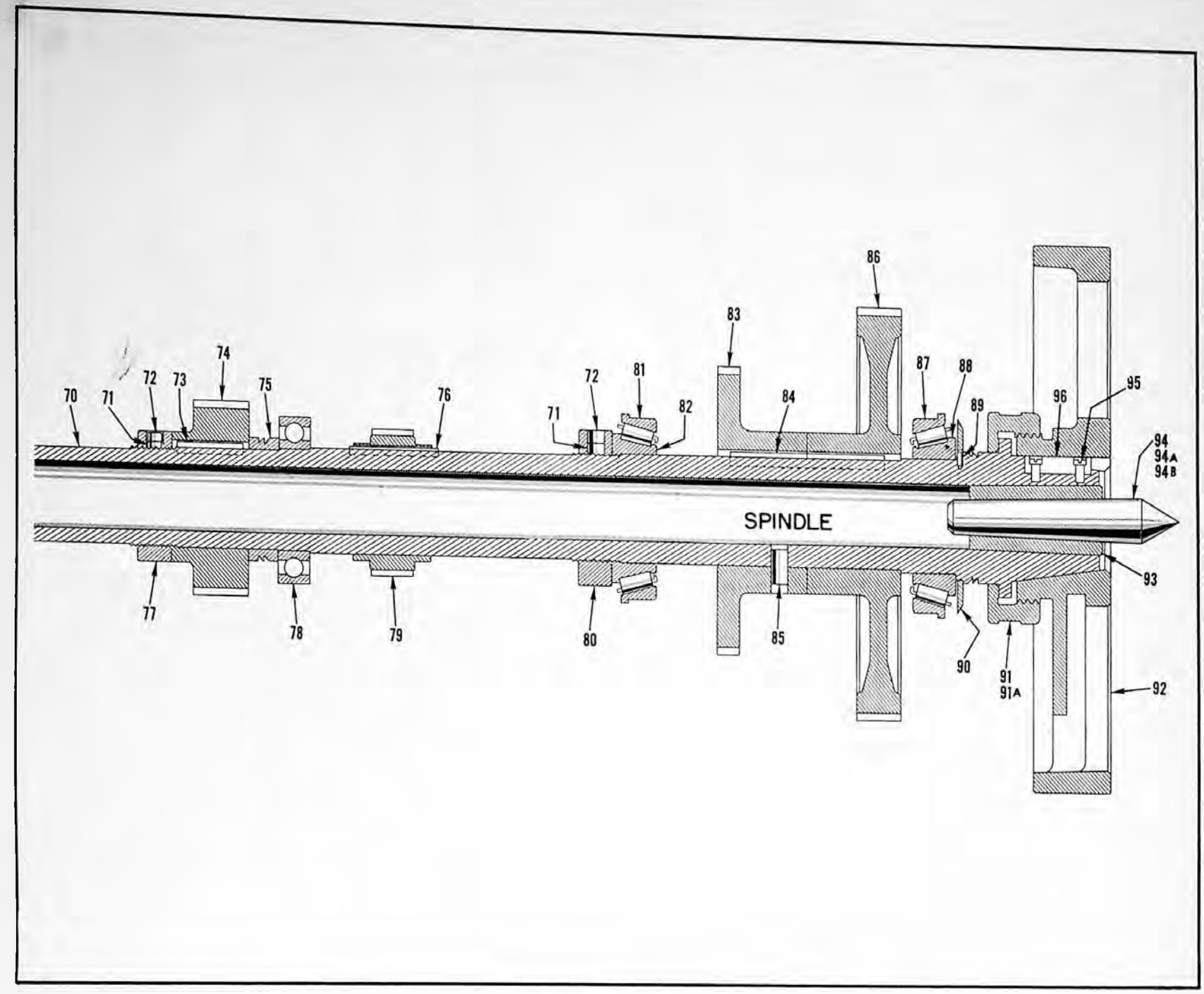


IMPORTANT—Include serial number of your lathe when ordering repair parts.

BRAKE & DRIVE SHAFT

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
42.	Pulley, Drive	1	52.	Shaft, Drive	1
42A.	Brake, Dyna-Torque Electric, Outside Mounting	1	53.	Washer, Lock	1
43.	Oilite Bushing	3	54.	Seal, Victoprene Oil	1
44.	Dyna-Torque Accessory Group Including Drive Pins	1	55.	Cup, Timken Bearing #2	1
45.	Spacer, Bearing	1	56.	Cone, Timken Bearing #2	1
46.	Magnet, 90 Volt	1	57.	Gear, Drive Shaft Large	1
47.	Screw	4	58.	Collar, Drive Shaft Spacing	1
48.	Washer	4	59.	Gear, Drive Shaft Small	1
49.	Armature	1	59A.	Key, Flat (not used on 13-15)	1
50.	Key, Flat	1	60.	Gear, Drive Shaft Inter.	1
51.	Nut, Lock	1	61.	Cone, Timken Bearing #2	1
			62.	Cup, Timken Bearing #2	1
			63.	Key, Flat	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.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94B
SPINDLE
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91A
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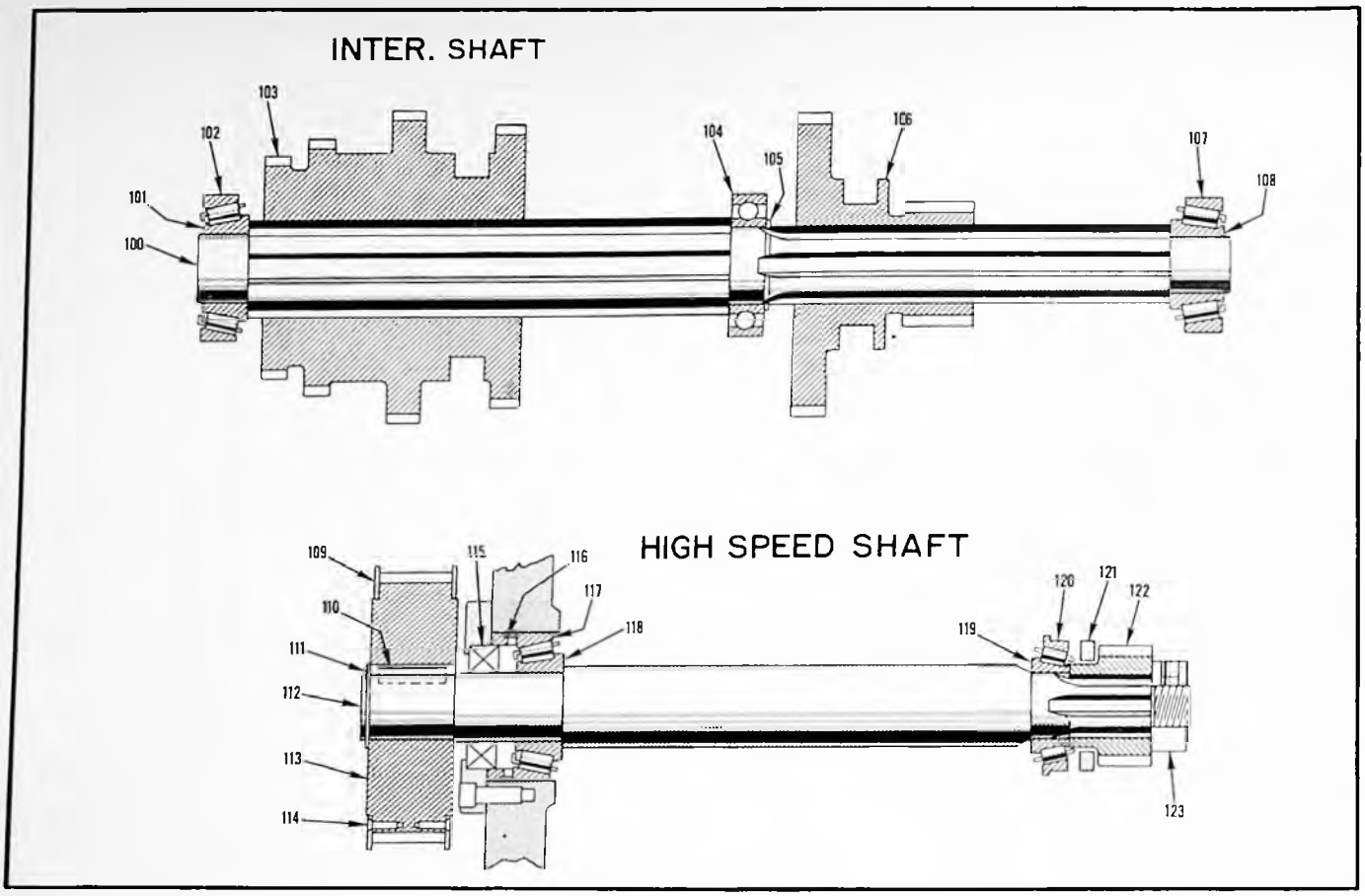
77

SPINDLE

PART NO.	PART NAME	QTY.
70.	Spindle	1
		1
71.	Plug	2
72.	Screw, Set	2
73.	Key, Flat	1
		1
		1
74.	Pulley, High Speed Spindle	1
75.	Collar, Spindle Thrust	1
		1
76.	Key, Flat	1
		1
77.	Nut, Lock	1
		1
78.	Bearing, MRC Ball	1
79.	Gear, Spindle Feed Reverse	1
		1
80.	Nut, Lock	1
81.	Cup, Timken Bearing #3	1
		1
82.	Cone, Timken Bearing #3	1
		1
83.	Gear, Spindle	1
		1
84.	Key, Flat	1
		1
85.	Pin, Straight	1
86.	Gear, Spindle Face	1
87.	Cup, Timken Bearing #3	1
		1
88.	Cone, Timken Bearing #3	1
		1

PART NO.	PART NAME	QTY.
89.	Pin, Straight (not used on 17"-19")	1
		1
90.	Slinger, Spindle Oil	1
		1
91.	Nut, Draw	1
		1
91A.	Wrench, Spanner (for Draw Nut)	1
		1
92.	Plate, Small Face	1
	Plate, Large Face 12" Diam.	1
	14" Diam.	1
	Plate, Large Chuck 7" Diam.	1
	Plate, Extra Large Chuck 10-1/4" Diam.	1
	Plate, Large Chuck 8" Diam.	1
	Plate, Medium Chuck 6" Diam.	1
	Center, Spindle Half	1
	Plate, Small Face	1
	Plate, Large Face 16" Diam.	1
	18" Diam.	1
	Plate, Small Chuck 6" Diam.	1
	Plate, Medium Chuck 7" Diam.	1
	Plate, Extra Large Chuck 11-1/2" Diam.	1
	13-1/4" Diam.	1
	Plate,. Large Chuck 8" Diam.	1
	9" Diam.	1
93.	Bush, Spindle Center	1
		1
94.	Center, Spindle	1
		1
94A.	Center, Spindle Half	1
94B.	Rod, Center Knockout	1
95.	Screw, Filister Head	2
96.	Key Spindle Nose	1
		1

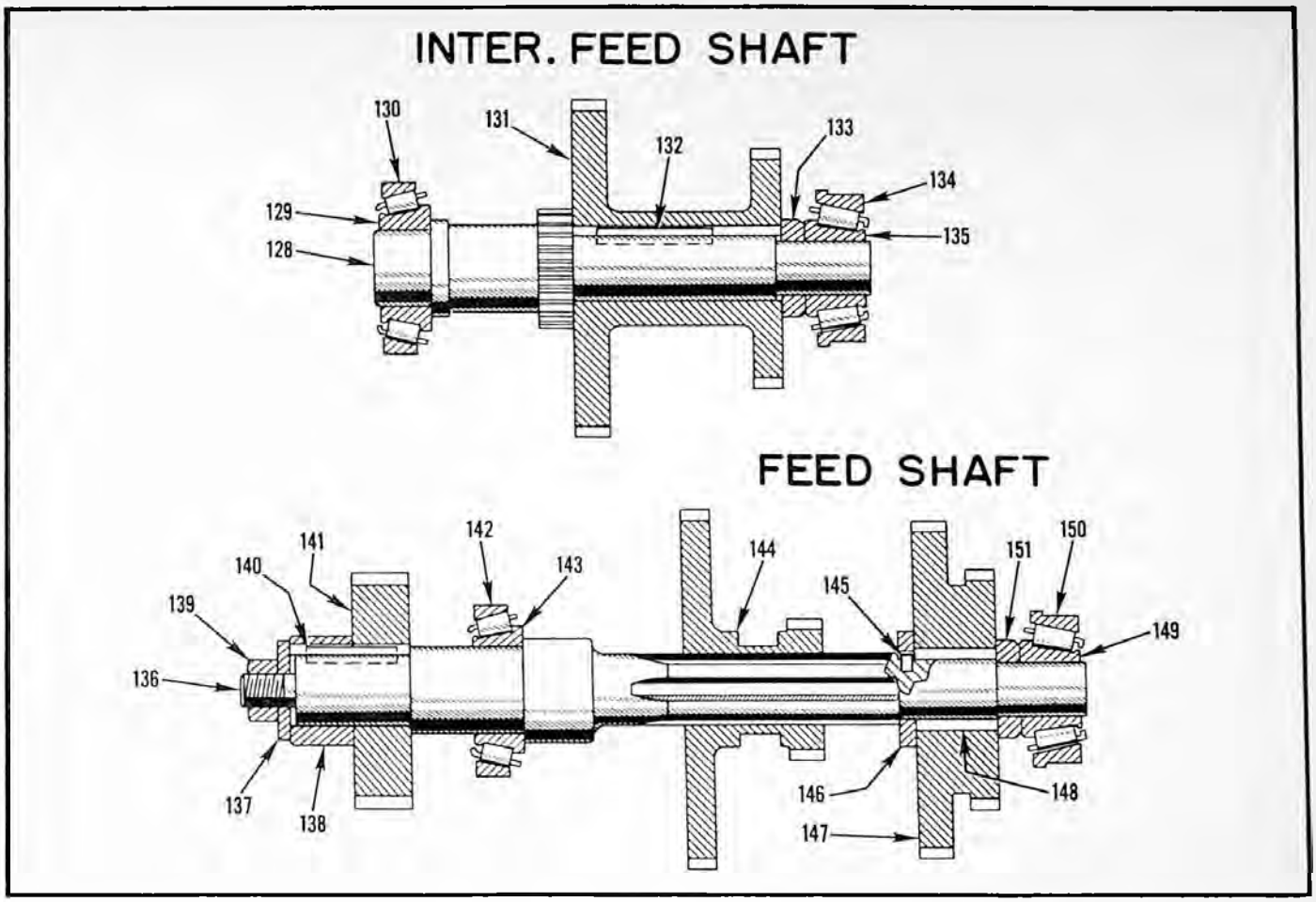
IMPORTANT—Include serial number of your lathe when ordering repair parts.



INTERMEDIATE SHAFT - HIGH SPEED SHAFT

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
100.	Shaft, Intermediate	1	112.	Shaft, High Speed	1
101.	Cone, Timken Bearing #2	1	113.	Pulley, High Speed Shaft	1
102.	Cup, Timken Bearing #2	1	114.	Screw, Flat Head Sock.	8
103.	Gear, Intermediate Shaft Cluster	1	115.	Seal, Victoprene Oil	1
104.	Bearing, MRC Ball	1	116.	Collar, High Speed Shaft Matching	1
105.	Ring, Truarc	1	117.	Cup, Timken Bearing #2	1
106.	Gear, Intermediate	1	118.	Cone, Timken Bearing #2	1
107.	Cup, Timken Bearing #2	1	119.	Cone, Timken Bearing #2	1
108.	Cone, Timken Bearing #2	1	120.	Cup, Timken Bearing #2	1
109.	Flange, High Speed Shaft Pulley	2	121.	Retainer, High Speed Shaft Oil	1
110.	Key, Flat	1	122.	Pinion, High Speed Shaft	1
111.	Ring, Truarc	1	123.	Nut, Lock	1

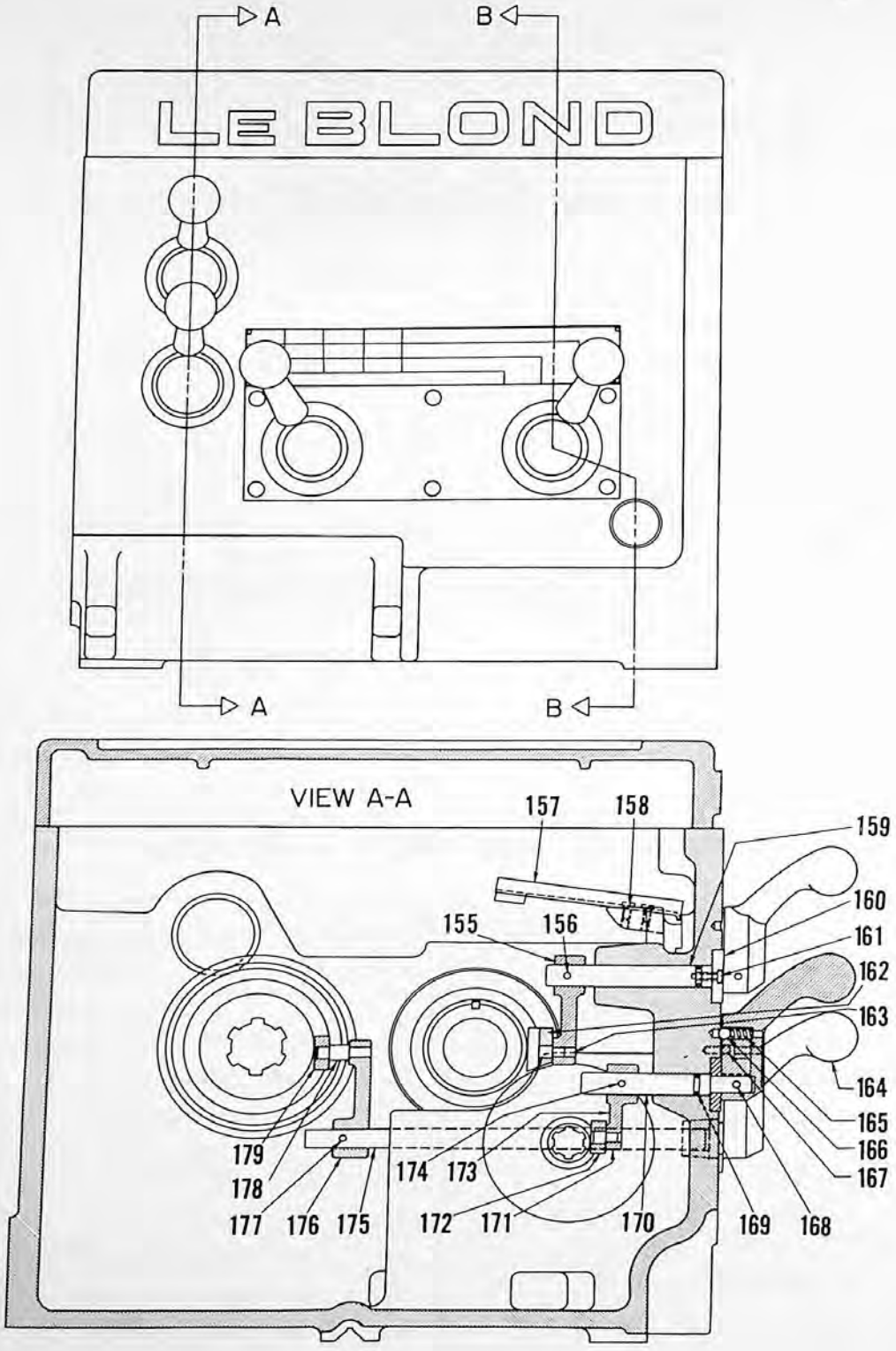
IMPORTANT—Include serial number of your lathe when ordering repair parts.



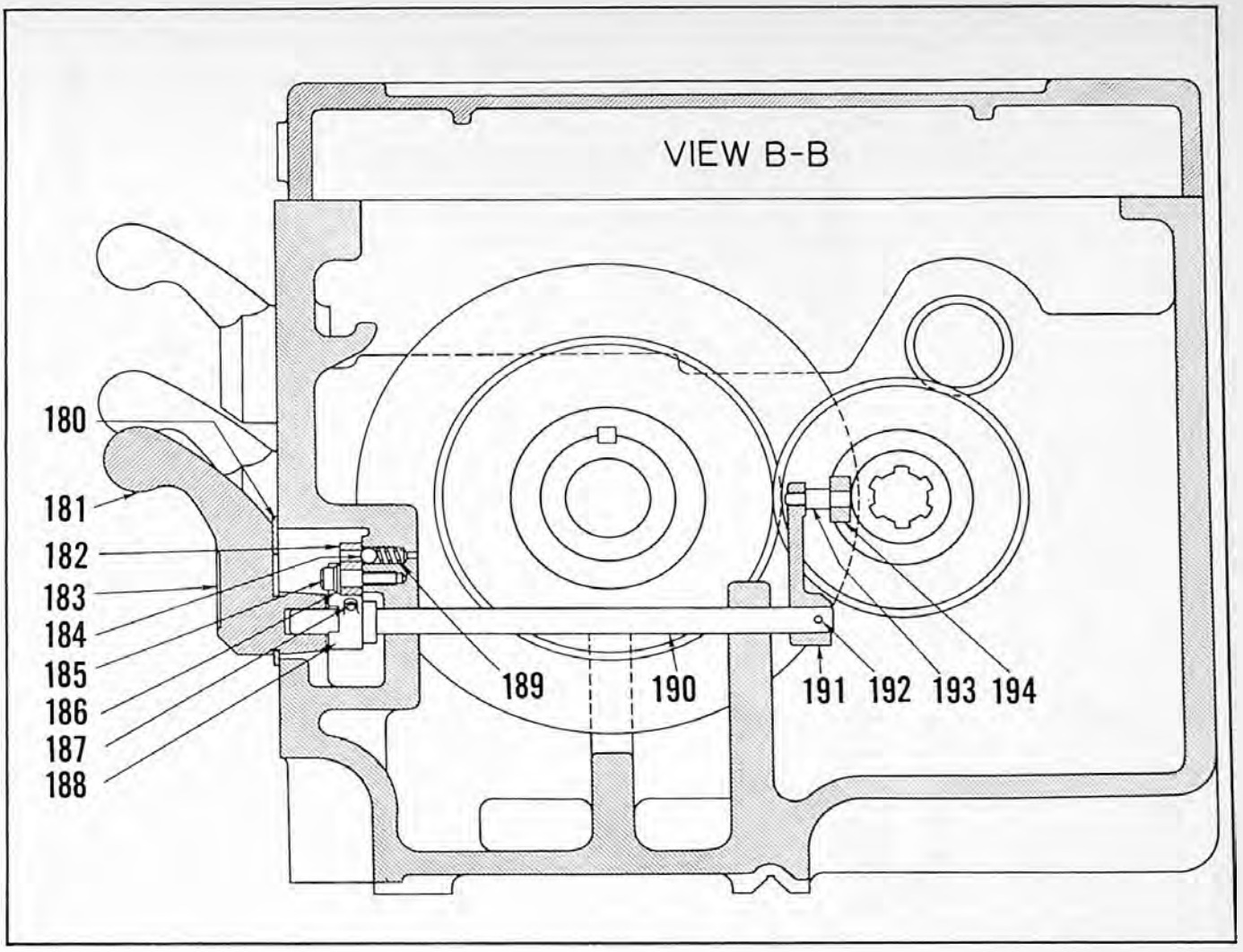
INTERMEDIATE FEED SHAFT - - FEED SHAFT

PART NO.	PART NAME	QTY.
128.	Shaft, Intermediate Feed	1
129.	Cone, Timken Bearing #2	1
130.	Cup, Timken Bearing #2	1
131.	Gear, Intermediate Feed Shaft	1
132.	Key, Flat	1
133.	Collar, Spacing	1
	Collar, Thrust	1
134.	Cup, Timken Bearing #2	1
135.	Cone, Timken Bearing #2	1
136.	Shaft, Feed	1
137.	Washer, Spec	1
138.	Collar, Feed Shaft Change Gear	1
139.	Nut, Hex	1
140.	Key, Flat	1
141.	Gear, Feed Change	1
142.	Cup, Timken Bearing #2	1
143.	Cone, Timken Bearing #2	1
144.	Gear, Feed Shaft Sliding	1
145.	Pin, Straight	1
146.	Collar, Feed Reverse Idler Gear	1
	Collar, Thrust	1
147.	Gear, Feed Reverse Idler	1
148.	Bush, Feed Reverse Idler Gear	1
149.	Cone, Timken Bearing #2	1
150.	Cup, Timken Bearing #2	1
151.	Collar, Spacing	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.



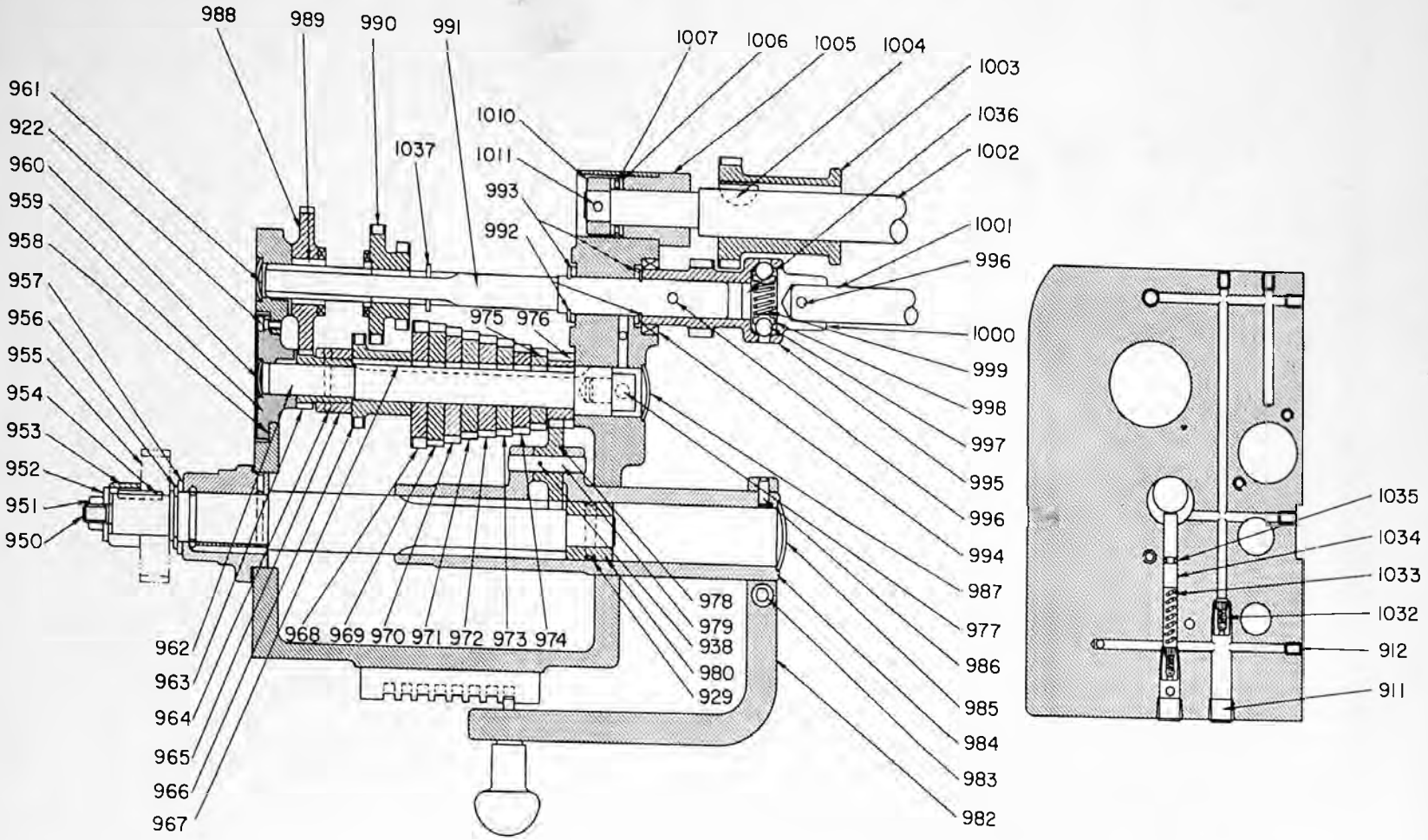
IMPORTANT—Include serial number of your lathe when ordering repair parts.



REGAL SHIFTER SECTIONS

KEY NO.	PART NAME	QTY.	KEY NO.	PART NAME	QTY.
155	Lever, Shifter	1	175	Shaft, Inter. Shaft Slid. Cluster Gear Shifter	1
156	Pin, Taper	1	176	Lever, Shifter	1
157	Scoop, Face Gear Oil	1	177	Pin, Taper Draw	1
158	Screw, Machine	2	178	Pin, Shifter	1
159	Shaft, Fd. Rev. Gear Shifter	1	179	Shoe, Shifter Lever	1
160	Collar, Shifter Retainer	1	180	Cover, Head Front	1
161	Screw, Phillips Head	4	181	Handle, Shifter	2
162	Shoe, Shifter	1	182	Screw, Set	4
163	Pin, Shoulder	1	183	Plate, Shift Handle	2
164	Handle, Shifter	2	184	Ball	2
165	Spring, Detent	2	185	Screw, Hex. Soc. Shoulder	2
166	Ball	2	186	Washer, Shoulder Scr.	2
167	Pin	4	187	Pin, Taper	2
168	Pin, Taper	2	188	Yoke, Shift Retainer	2
169	Ring, "O"	2	189	Spring, Detent	2
170	Shaft, Feed Comp. Shifter	1	190	Shaft, Inter. Shaft Slid. Back Gear Shift	1
171	Pin, Shoulder	1	191	Lever, Shifter	1
172	Shoe, Shifter Lever	1	192	Pin, Taper Draw	1
173	Lever, Shifter	1	193	Pin, Shifter	1
174	Pin, Taper	1	194	Shoe, Shifter Lever	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.



QUICK CHANGE BOX ROLLOUT

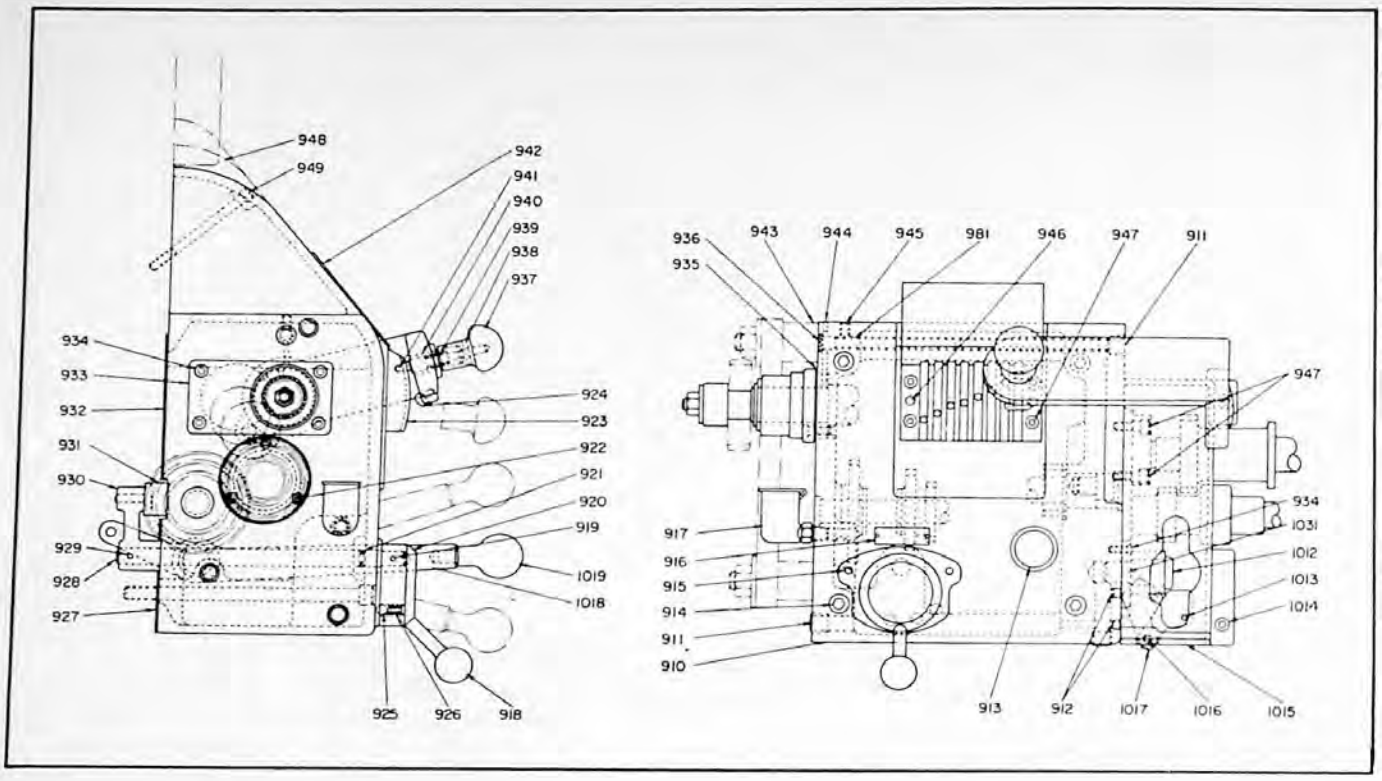
QUICK CHANGE BOX

Feed Shaft -- Feed Rod -- Leadscrew Intermediate Shaft -- Cone Shaft

KEY NO.	PART NAME	QTY.
911	Pipe Plug	4
912	Pipe Plug	6
922	Screw	3
929	Taper Pin	1
938	Taper Pin	2
944	Pin	2
950	Drive Gear Shaft	1
951	Hex Nut	1
952	Washer	1
953	Feed Gear Collar	1
954	Key	1
955	Feed Gear	1
956	Snap Ring	1
957	Drive Shaft Collar	1
958	Gasket	1
959	Cone Shaft Bushing	1
960	Expansion Plug	1
961	Plug	1
962	Cone Shaft	1
963	15T. - 14P. Gear	1
964	Pin	1
965	Cone Shaft Collar	1
966	15T. - 9P. Gear	1
967	Cone Gear Key	1
968	21T. - 9P. Gear	1
969	28T. Cone Gear	1
970	26T. Cone Gear	1
971	24T. Cone Gear	1
972	23T. Cone Gear	1
973	22T. Cone Gear	1
974	20T. Cone Gear	1
975	18T. Cone Gear	1
976	16T. Cone Gear	1
977	Cone Shaft Stud	1
978	Tumbler Gear	1
979	Tumbler Gear Shaft	1

KEY NO.	PART NAME	QTY.
980	Drive Gear Bushing	1
982	Yoke Shifter Arm	1
983	Screw	1
984	Cylinder Yoke	1
985	Expansion Plug	1
986	Pin	1
987	Expansion Plug	1
988	Clutch Gear	1
989	Clutch Gear Bushing	1
990	Sliding Gear	1
991	Feed Shaft	1
992	Snap Ring	2
993	Collar	2
994	Victoprene Oil Seal	1
995	Feed Rod Gear	1
996	Taper Pin	2
997	Ball	2
998	Feed Rod Plunger	2
999	Feed Rod Spring	1
1000	Feed Drive Collar	1
1001	Feed Rod	1
1002	Lead Screw	1
1003	Lead Screw Pinion	1
1004	Woodruff Key	1
1005	Lead Screw Bushing	1
1006	Bearing Race	2
1007	Bearing	1
1010	Nut	1
1011	Cotter Pin	1
1032	Check Valve	2
1033	Spring	2
1034	Pump Piston	1
1035	"O" Ring	1
1036	Plug	1
1037	Snap Ring	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.



QUICK CHANGE BOX CASTING

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
910	Quick Change Box	1	935	Gasket	1
911	Pipe Plug	4	936	Expansion Plug	1
912	Pipe Plug	6	937	Yoke Shifter Knob	1
913	Oilsight Window	1	938	Taper Pin	2
914	Screw	4	939	Spring	1
915	Pin	2	940	Knob Sleeve	1
916	Indicator Plate	1	941	Knob Plunger	1
917	Gits Oiler	1	942	Index Plate	1
918	Knob	1	943	Quadrant Spacer	2
919	Pin	1	944	Pin	2
920	Hub	1	945	Set Screw	1
921	"O" Ring	1	946	Pin	2
922	Screw	3	947	Screw	6
923	Shifter Lock Plate	1	948	Quick Change Box Top Cover	1
924	Button	1	949	Screw	2
925	Steel Ball	1	981	Oil Dist. Pipe	1
926	Spring	1	1012	Shifter Stud	1
927	Gasket	1	1013	Pin	1
928	Shifter Shaft	1	1014	Screw	2
929	Taper Pin	1	1015	Slip Gear Cover	1
930	Shifter Lever	1	1016	Binding Head Screw	1
931	Shifter Shoe	1	1017	Safety Latch	1
932	Gasket	1	1018	Spindle Control Handle	1
933	Quick Change Box Bushing	1	1019	Ball Handle	1
934	Screw	6	1031	Handle Detent Plate	1

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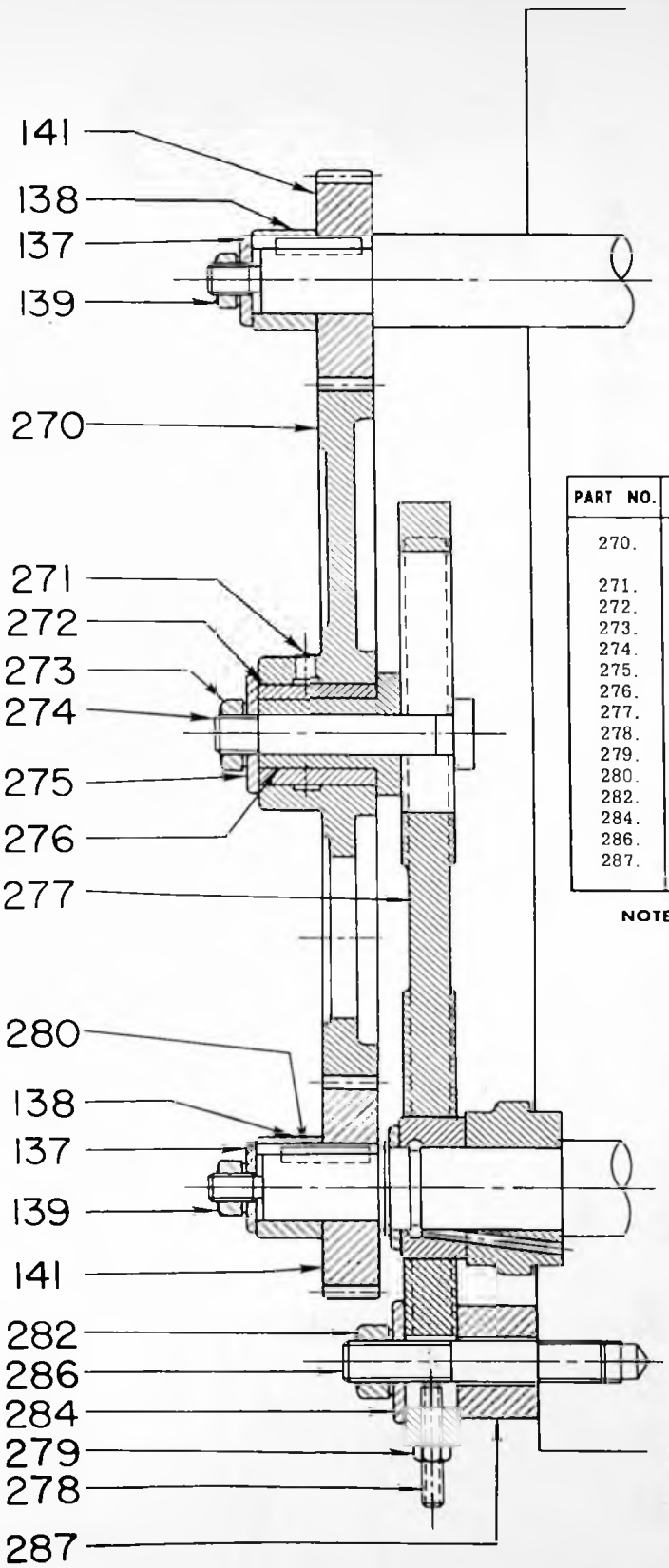

QUADRANT

PART NO.	PART NAME	QTY.
270.	Gear, Quadrant 120 Teeth (Specify 12 or 14 Pitch)	1
271.	Oiler	1
272.	Bush, Oilite	1
273.	Nut	1
274.	Bolt, Quadrant T-Slot	1
275.	Washer	1
276.	Bush, Quadrant Gear	1
277.	Quadrant	1
278.	Screw, Set	1
279.	Nut	1
280.	Key	1
282.	Nut	3
284.	Washer	3
286.	Stud	2
287.	Spacer, Quadrant	2

NOTE: See page 37 for part numbers not listed here.

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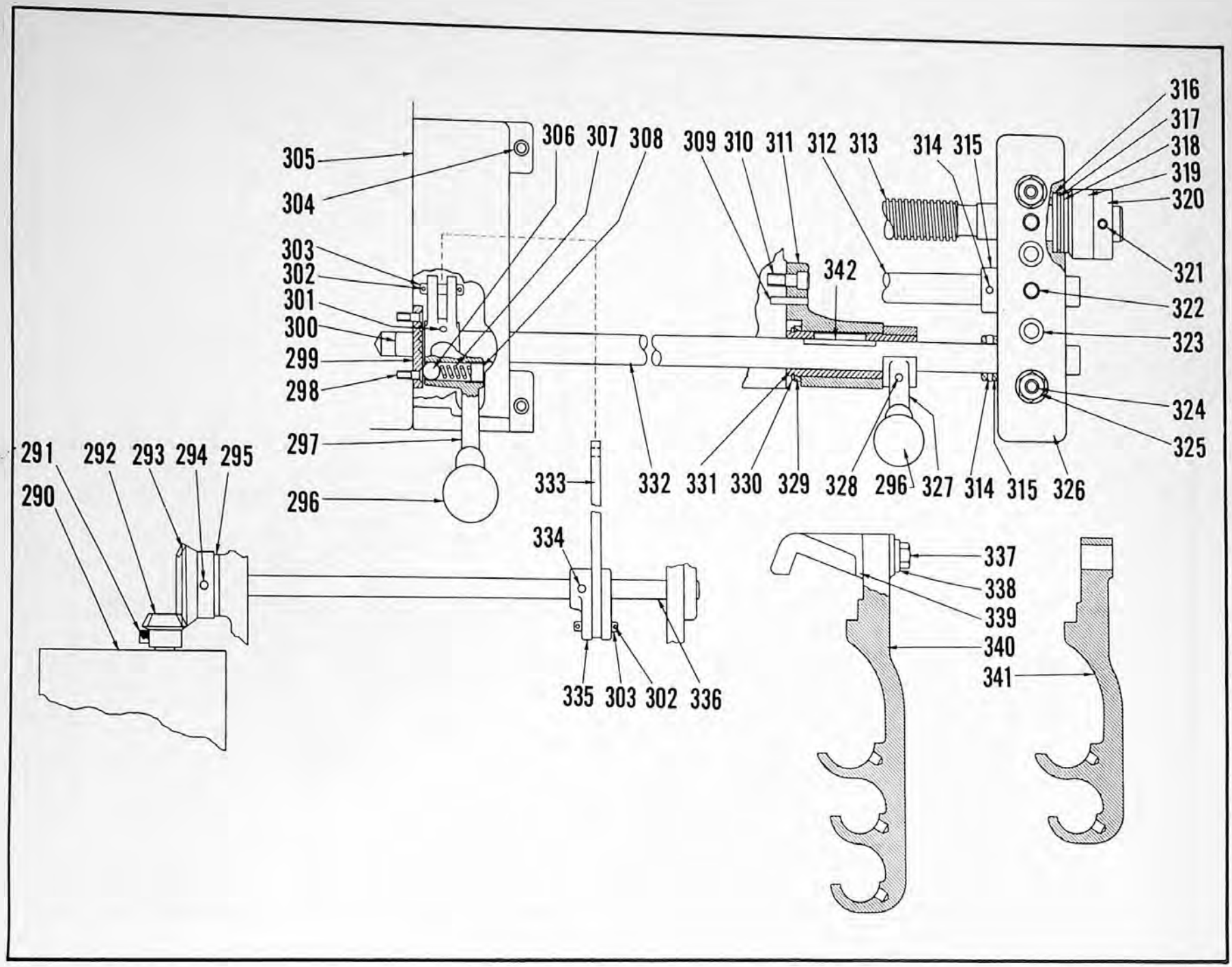
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SPINDLE CONTROL

KEY NO.	PART NAME	QTY.	KEY NO.	PART NAME	QTY.
290	Switch	1	317	Bearing	1
291	Set Screw	1	318	Bearing Race	1
292	Bevel Gear	1	319	Collar	1
293	Bevel Gear	1	320	Nut	1
294	Taper Pin	1	321	Set Screw	1
295	Washer	1	322	Plug	2
296	Knob	2	323	Screw	2
297	Spindle Control Handle	1	324	Draw Pin	2
298	Screw	2	325	Nut	2
299	Detent Plate	1	326	Back Box	1
300	Shifter Stud	1	327	Lever	1
301	Taper Pin	1	328	Taper Pin	1
302	Cotter Pin	4	329	Collar	1
303	Pin	2	330	Snap Ring	1
304	Screws	2	331	Sleeve	1
305	Slip-Gear Cover	1	332	Control Rod	1
306	Ball	1	333	Link	1
307	Spring	1	334	Raper Pin	1
308	Set Screw	1	335	Shifter	1
309	Pin	2	336	Control Rod	1
310	Screws	4	337	Screw	1
311	Apron Bracket	1	338	Washer	1
312	Feed Rod	1	339	Block	1
313	Lead Screw	1	340	Support	1
314	Taper Pin	2	341	Support	1
315	Collar	2	342	Feather Key	1
316	Bearing Race	1			

IMPORTANT—Include serial number of your lathe when ordering repair parts.

APRON 13" - 15" - 17" - 19"

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
345.	Apron, 1st Stud	1	382.	Handle, Half Nut	1
346.	Ring, Truarc	1	383.	Apron	1
347.	Bearing, N.D. Ball	1	384.	Ball, Steel	1
348.	Screw, Headless	2	385.	Plunger, Clutch Shifter	1
349.	Key, Woodruff	1	386.	Spring	1
350.	Handwheel (3 spoke)	1	387.	Screw, Headless	1
351.	Handle	1	388.	Screw, Headless	1
352.	Stud, Rack Wheel	1	389.	Plate, Instruction	1
353.	Bearing, N.D. Ball	1	390.	Plug, Pipe	1
354.	Wheel, Rack	1	391.	Oiler, Gits	1
355.	Key	1	392.	Screw, Headless	1
356.	Screw, Headless	1	393.	Washer	1
357.	Pin	1	394.	Screw, Hex Head	1
358.	Collar, Rack Wheel Stud	1	395.	Nut	1
359.	Shaft, Rack Wheel Gear	1	396.	Screw, Headless	1
360.	Bush, Long Fd. Cl. Gr.	1	397.	Screw Sock. Hd.	4
361.	Gear, Long Cross Fd.	1	398.	Plate, Feed Direction	1
362.	Pin, Shifter Interference	1	399.	Screw, Set	2
363.	Pin, Taper	1	400.	Screw, Set	2
364.	Pin, Gear Spacing	4	401.	Pinion, Bevel	1
365.	Gear, Sliding Inter.	1	402.	Collar, Bevel Pinion Thrust	1
366.	Gear, Cross Feed Clutch	1	403.	Key, Feather	1
367.	Bush, Cross Feed Gear	1	404.	Collar, Bevel Pinion	1
368.	Pin, Clutch Shifter Handle Stop	1	405.	Ring, Truarc	1
369.	Shaft, Clutch Shifter	1	406.	Screw, Headless	1
370.	Pin, Taper	1	407.	Key, Woodruff	1
371.	Handle, Clutch Shifter	1	408.	Gear, Bevel	1
372.	Handle, Ball	2	409.	Pin, Straight	2
373.	Bush, Clutch Shifter Shaft	1	410.	Bush, Bevel Gear Shaft Rear	1
374.	Shoe, Clutch Shifter	1	411.	Shaft, Bevel Gear	1
375.	Rug, Welch	1	412.	Bush, Bevel Gear Shaft Front	1
376.	Box, Nut (English)	1	413.	Plug, Welch	1
	Box, Nut (Metric)	1	414.	Plunger, Oil	1
377.	Pin	2	415.	Spring, Oil Plunger	1
378.	Pin, Straight	1	416.	Rod, Oil Cylinder Spring Guide	1
379.	Cam, Nut Box	1	417.	Plug, Oil Cylinder Pipe	1
380.	Spring (cut to suit)	1	418.	Gib	1
381.	Pin, Taper	1			

IMPORTANT—Include serial number of your lathe when ordering repair parts.

APRON FEED REVERSE (17"-19") SECTION AA

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
1040.	Pinion, Bevel	1	1052.	Collar, Shift Retainer	1
1041.	Pinion, Shifter	1	1053.	Screw, Slotted Head	2
1042.	Sleeve, Bevel Pinion	1	1054.	Pin, Taper	1
1043.	Key, Feather	1	1055.	Shaft, Fd. Rev. Handle	1
1044.	Pin, Straight	4	1056.	Handle, Feed Rev.	1
1045.	Shoe, Shifter	1	1057.	Pin, Taper	1
1046.	Fork, Reverse	1	1058.	Spring (cut to suit)	1
1047.	Lever, Feed Rev.	1	1059.	Sleeve	1
1048.	Pin, Taper	1	1060.	Pin, Taper	1
1049.	Screw, Set	1	1061.	Plunger	1
1050.	Plug	1	1062.	Knob	1
1051.	Screw, Set	1			

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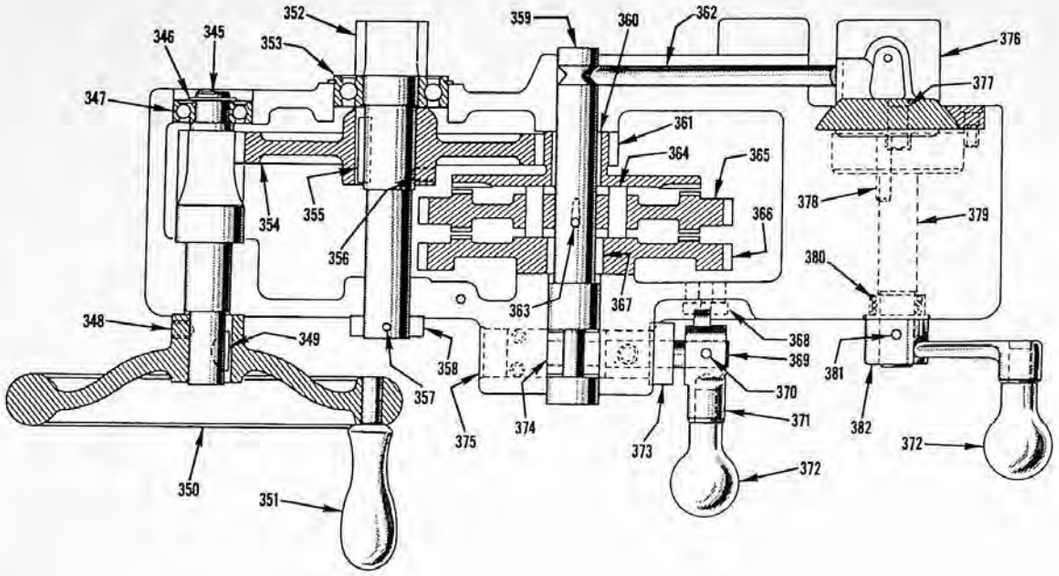
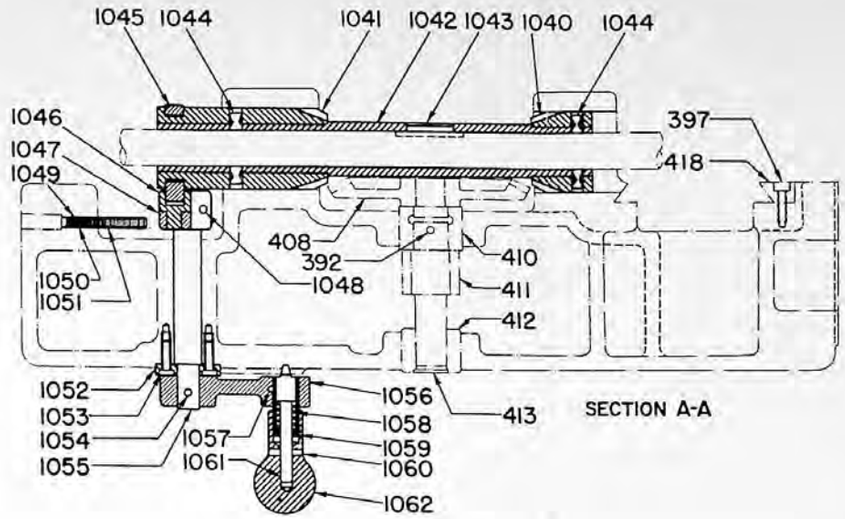
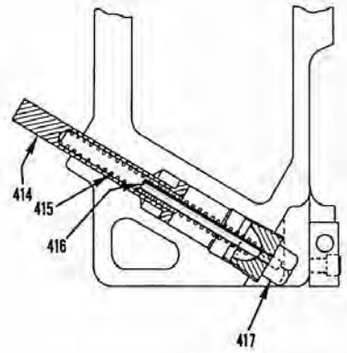
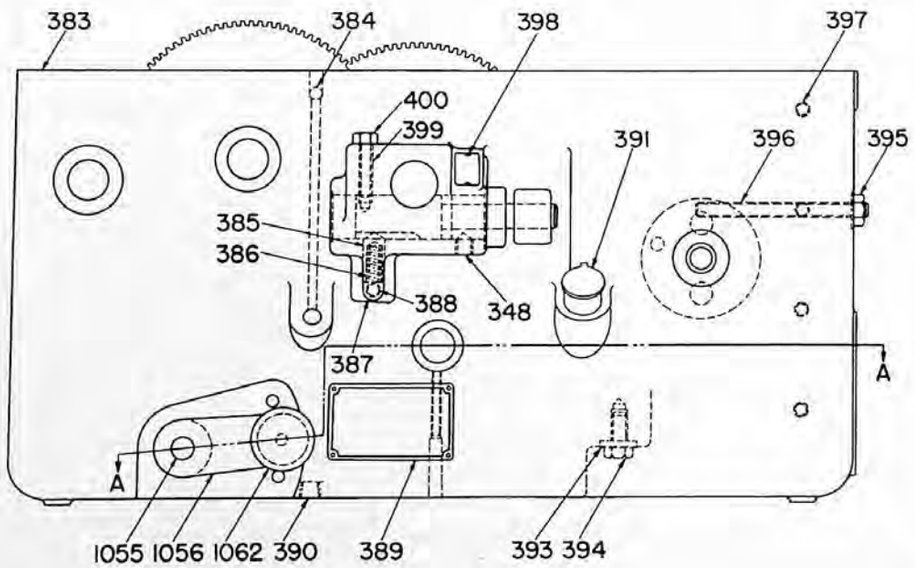
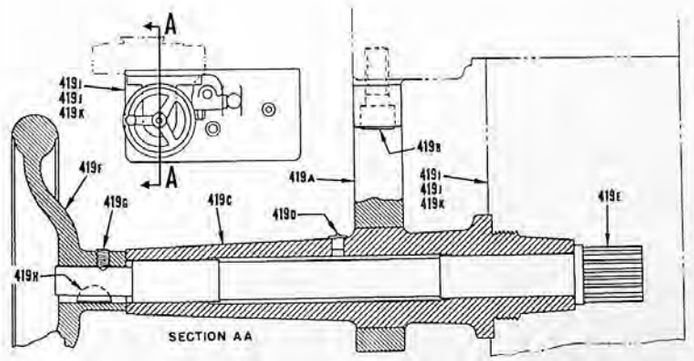






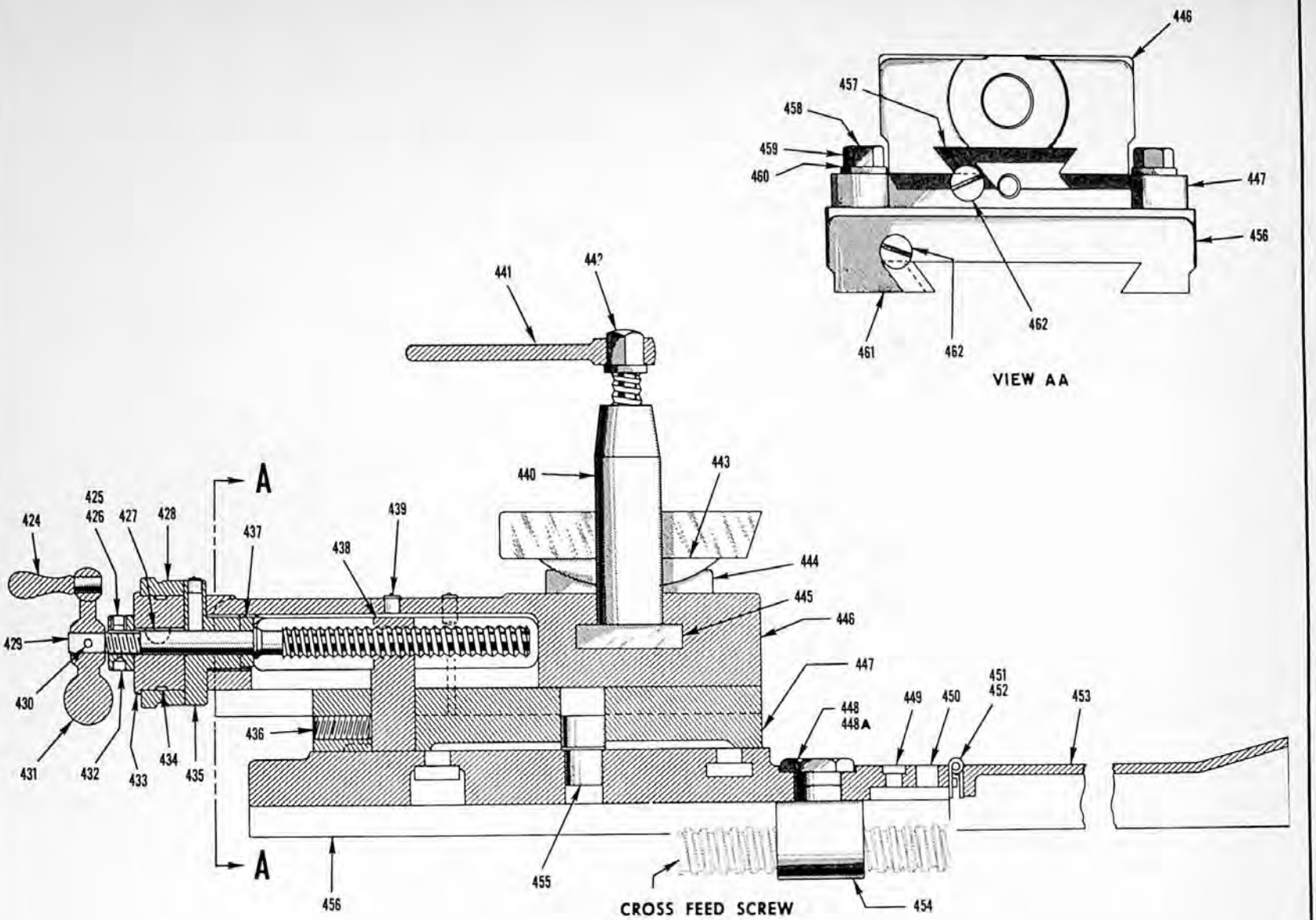
OIL PLUNGER





APRON FIRST STUD BRACKET ASSEMBLY
17" - 19" PLAIN AND SLIDING BED GAP LATHE REGAL

PART NO.	PART NAME	QTY.
419A.	Bracket, First Stud	1
419B.	Screw, Socket, Head	2
419C.	Bush, First Stud	1
419D.	Oiler	1
419E.	Stud, Apron	1
419F.	Handwheel	1
419G.	Screw, Headless	1
419H.	Key, Woodruff	1
419I.	Apron, (Use Fin. Det. D-96A-1)	1
419J.	Plug, Front	1
419K.	Plug, Rear	1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CROSS FEED SCREW

SEE PAGE 50

COMPOUND REST WITH TOOL POST

PART NO.	PART NAME	QTY.
424.	Handle, Ball	1 1
425.	Screw, Set	2
426.	Plug	2
427.	Key, Woodruff	1 1
428.	Collar, Graduated (English)	1 1
	(Metric)	1 1
429.	Screw, Top Slide (English & Metric)	1
	(English)	1
	(Metric)	1
430.	Pin, Taper	1 1
431.	Handle, Single Ball Crank	1 1
432.	Nut, Top Slide Screw	1 1
433.	Bush, Graduated Collar	1 1
434.	Spring	1 1
435.	Bush, Top Slide Screw	1
436.	Screw, Set	1 1
437.	Collar, Top Slide Screw	1
438.	Nut, Top Slide (English & Metric)	1 1
	(English)	
	(Metric)	1
439.	Oiler	4
440.	Post, Tool	1 1
441.	Wrench, Tool Post	1 1
442.	Screw, Square Head Tool Post	1 1
443.	Wedge, Tool Post	1 1
444.	Collar, Tool Post	1 1

PART NO.	PART NAME	QTY.
445.	Washer, Tool Post Square	1 1
446.	Slide, Top	1 1
447.	Slide, Swivel	1 1
448.	Screw, Cross Feed Nut	1 1
448A.	Washer	1 1
449.	Plug, (Not used when Taper Att. is furnished)	1 1
450.	Plug, (Not used when Taper Att. is furnished)	1 1
451.	Hinge, Dirt Guard	1 1
452.	Screw, Spec. Sock. Hd.	4
453.	Guard, Dirt	1 1
454.	Nut, Cross Feed (English)	1 1
	(Metric)	1 1
455.	Pin, Shoulder	1 1
456.	Slide, Bottom	1 1 1 1
457.	Gib, Top Slide	1 1
458.	Bolt, T-Slot	2 2 2 2
459.	Nut, Hex	2 2
460.	Washer	2 2
461.	Gib, Bottom Slide	1 1
462.	Screw, Gib	4 4

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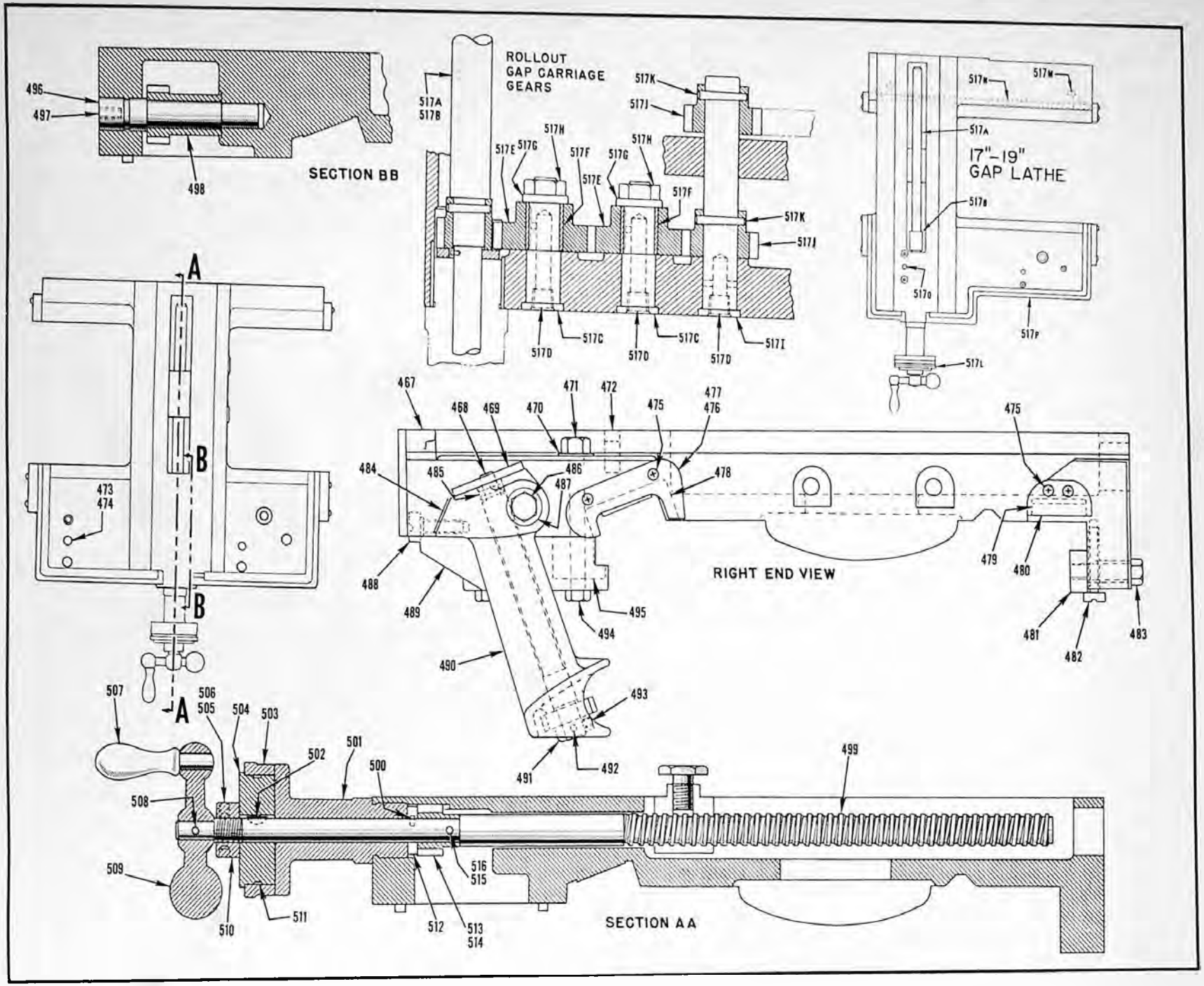
SECTION BB
ROLLOUT GAP CARRIAGE GEARS
17"-19" GAP LATHE
RIGHT END VIEW
SECTION AA
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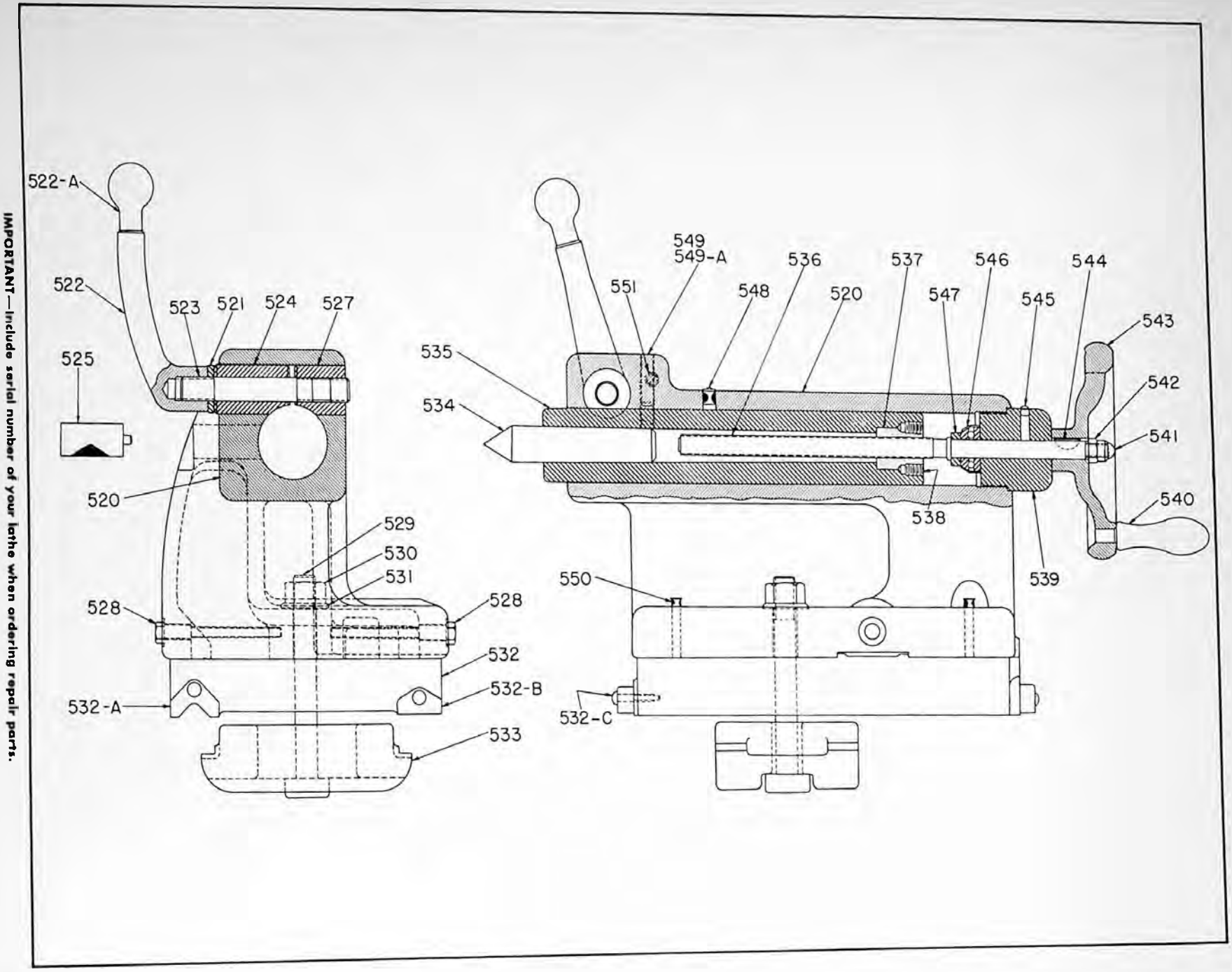
CARRIAGE AND CHASING DIAL

PART NO.	PART NAME	QTY.
467.	Carriage	1
468.	Shaft, Bracket	1
469.	Dial	1
470.	Washer	1
471.	Screw, Hex Cap	1
472.	Plug	
473.	Pin	2
474.	Plug	2
475.	Screw, Rd. Hd. Machine	8
476.	Wiper, Shear Front Right Hand	1
477.	Wiper, Shear Front Left Hand	1
478.	Neoprene Strip	2
479.	Neoprene Strip	2
480.	Wiper, Shear Rear	2
481.	Gib, Carriage Rear	1
482.	Screw, Gib	2
483.	Screw, Hex Cap	2
484.	Plate, Chasing Dial Instruction	1
485.	Pin, Taper	1
486.	Cap, Screw	1
487.	Washer	1
488.	Screw, Gib	2
489.	Gib, Carriage Front	2
490.	Bracket, Dial	1
491.	Wheel, Chasing Dial Worm	1
492.	Pin, Taper	1
493.	Screw, Set	1
494.	Screw, Hex Cap	4
495.	Clamp, Carriage	1
496.	Stud, Indler Pinion	1
497.	Screw, Set	1
498.	Pinion, Idler	1
499.	Screw, Cross Feed	
	(Without Taper Att. Without Hydra Trace)	
	English	1
	Metric	1
	(With Taper Att. Without Hydra Trace)	
	English	1
	Metric	1
499A.	Ring, "O" (Not shown)	1
499B.	Sleeve, Cross Feed Screw (Not shown)	1
500.	Pin Straight	1
501.	Bush, Cross Feed	
	(Without Taper Att. Without Hydra Trace)	
	English	1
	Metric	1
	(With Taper Att. Without Hydra Trace)	
	English	1
	Metric	1
502.	Key	1
503.	Collar, Grad	
	(With or Without Taper Att.)	
	English	1
	Metric	1
504.	Hub, Graduated Collar	1
505.	Screw	2
506.	Plug	2
507.	Handle, Ball	1
508.	Pin, Taper	1
509.	Handle, Ball	1
510.	Nut	1
	Lock, Nut	1
511.	Spring	1
512.	Collar, Thrust (Without Taper Att.)	1
513.	Pinion, Cross Feed Screw (Without Taper Att.)	1
514.	Sleeve, Cross Feed Pinion	
	(With Taper Att. Without Hydra Trace)	1
515.	Pin, Taper (Without Taper Att.)	1
516.	Key, Feather (With Taper Att.)	1

17" - 19" PLAIN & SLIDING BED GAP LATHES
ROLL-OUT OF GAP LATHE CARRIAGE & CROSS FEED SCREW

PART NO.	PART NAME	QTY.
517A.	Screw, Cross Feed	
	(Without Taper Attachment - English)	1
	(Without Taper Attachment - Metric)	1
	(With Taper Attachment - English)	1
	(With Taper Attachment - Metric)	1
517B.	Nut, Cross Feed	
	(With or Without Taper Attachment - English)	1
	(With or Without Taper Attachment - Metric)	1
517C.	Stud, Cross Feed Intermediate Gear	2
517D.	Plug, Pipe	3
517E.	Gear, Cross Feed Intermediate	2
517F.	Bush, Cross Feed Intermediate Gear	2
517G.	Washer	2
517H.	Nut, Hex	2
517I.	Shaft, Cross Feed Driving	1
517J.	Gear, Cross Feed Driving	2
517K.	Pin, Taper	2
517L.	Collar, Graduated	
	(With or Without Taper Attachment - English)	1
	(With or Without Taper Attachment - Metric)	1
517M.	Screw, Hex Cap	2
517N.	Gib, Rear	1
517O.	Pin, Taper	1
517P.	Carriage	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.



IMPORTANT—Include serial number of your lathe when ordering repair parts.

TAILSTOCK

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
520.	Top, Tailstock	1	534.	Center, Spindle	1
521.	Washer	1	535.	Spindle, Tailstock	1
522.	Handle, Binder	1	536.	Screw, Spindle	1
522A.	Handle, Ball	1	537.	Nut, Tailstock	1
523.	Stud, Tailstock	1	538.	Screw, Set	2
524.	Bush, Upper Binder	1	539.	Cap, Tailstock.	1
525.	Key, Plug	1	540.	Handle, Ball	1
526.	Screw, Set	1	541.	Nut, Acorn	1
527.	Bush, Lower Binder	1	542.	Nut, Hex	1
528.	Screw, Hex Cap	1	543.	Handwheel	1
529.	Bolt, Rough	1	544.	Key, Woodruff	1
530.	Nut, Hex	1	545.	Oiler	1
531.	Washer	1	546.	Bearing, Ball	1
532.	Bottom, Tailstock	1	547.	Collar, Spindle Screw	1
532A.	Wiper, Rear Shear	2	548.	Oiler	1
532B.	Wiper, Front Shear	2	549.	Screw, Set	2
532C.	Screw	4	549A.	Plug, Brass	2
533.	Clamp, Tailstock.	1	550.	Oiler	2

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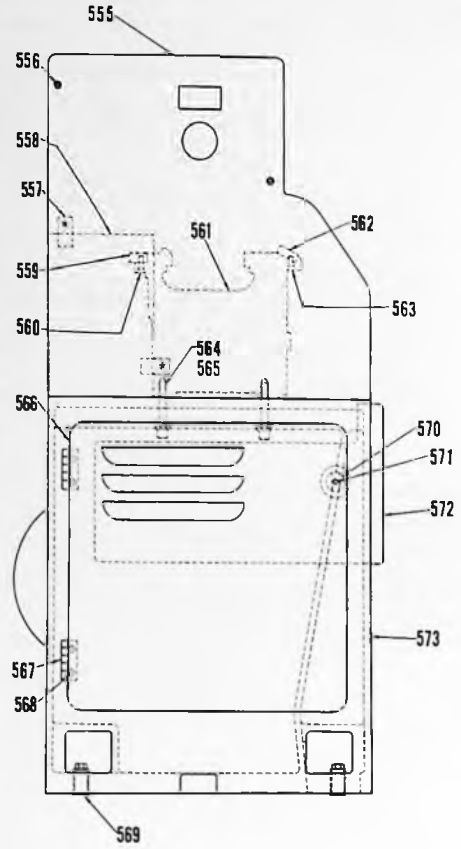
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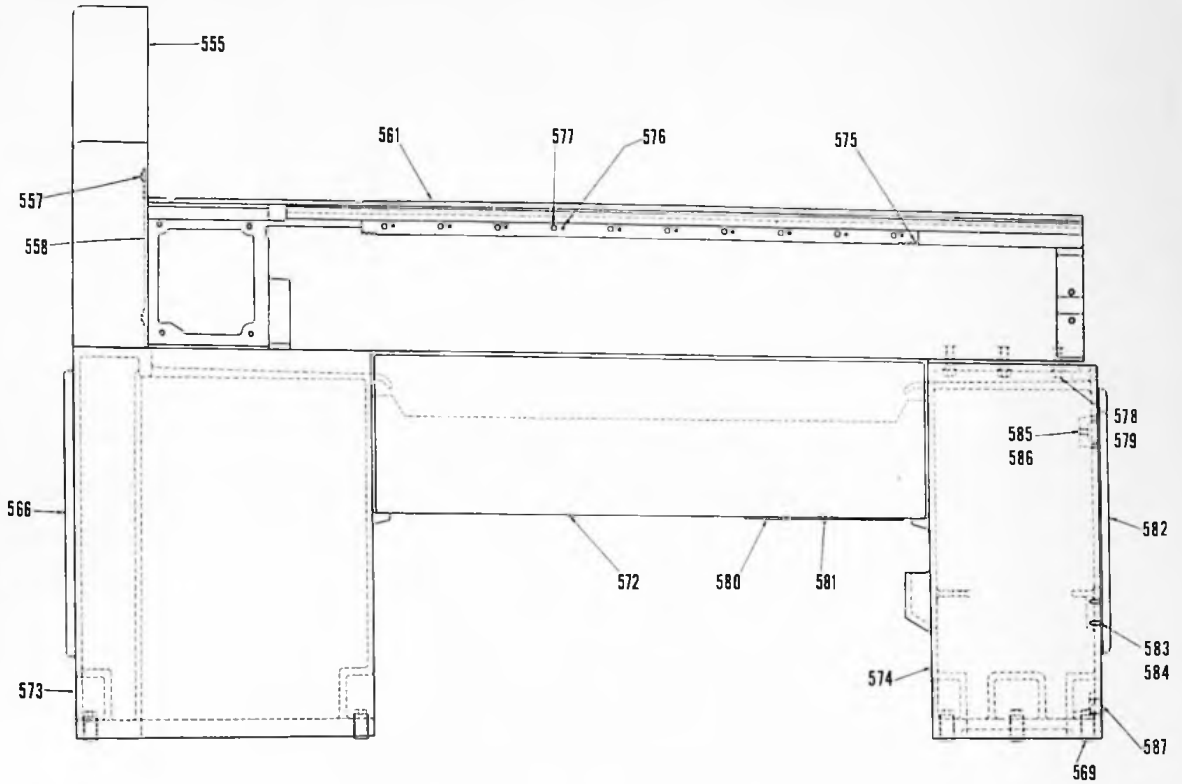
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BED, PAN, LEGS & HEAD END COVER

PART NO.	PART NAME	QTY.
555.	Cover, Feed Gear	1
556.	Screw, Socket Head Cap	3
557.	Screw, Hex Head Cap	3
558.	Plate, Head Feed Cover Back	1
559.	Shear, Rear (Specify Center Capacity)	1
560.	Screw	Var.No.
561.	Bed, (Specify Length)	1
562.	Shear, Front (Specify Center Capacity)	1
563.	Screw	Var.No.
564.	Screw, (Head End Leg To Bed)	4
565.	Washer	4
566.	Door, Head End Leg	1
567.	Hinge, Door	2
568.	Screw	4
569.	Screw, Leveling (Head and Tail Legs)	7
570.	Magnet, Alnico Carboloy	1
571.	Screw, Brass Machine Flat Head	1
572.	Pan (Specify Center Capacity)	1
573.	Leg, Head End Cabinet	1
574.	Leg, Tail End Cabinet	1
575.	Rack, (Specify Center Capacity)	Var.No.
576.	Pin, Taper	Var.No.
577.	Screw	Var.No.
578.	Screw, (Tail End Leg To Bed)	6
579.	Washer	6
580.	Plate, (1 - For Each Dry Pan)	1
581.	Screw, (2 - For Each Dry Pan)	2
582.	Door, Tail End Leg	1
583.	Hinge, Door	2
584.	Screw	4
585.	Magnet, Alnico Carboloy	1
586.	Screw, Machine Flat Head	1
587.	Plug, Pipe	1

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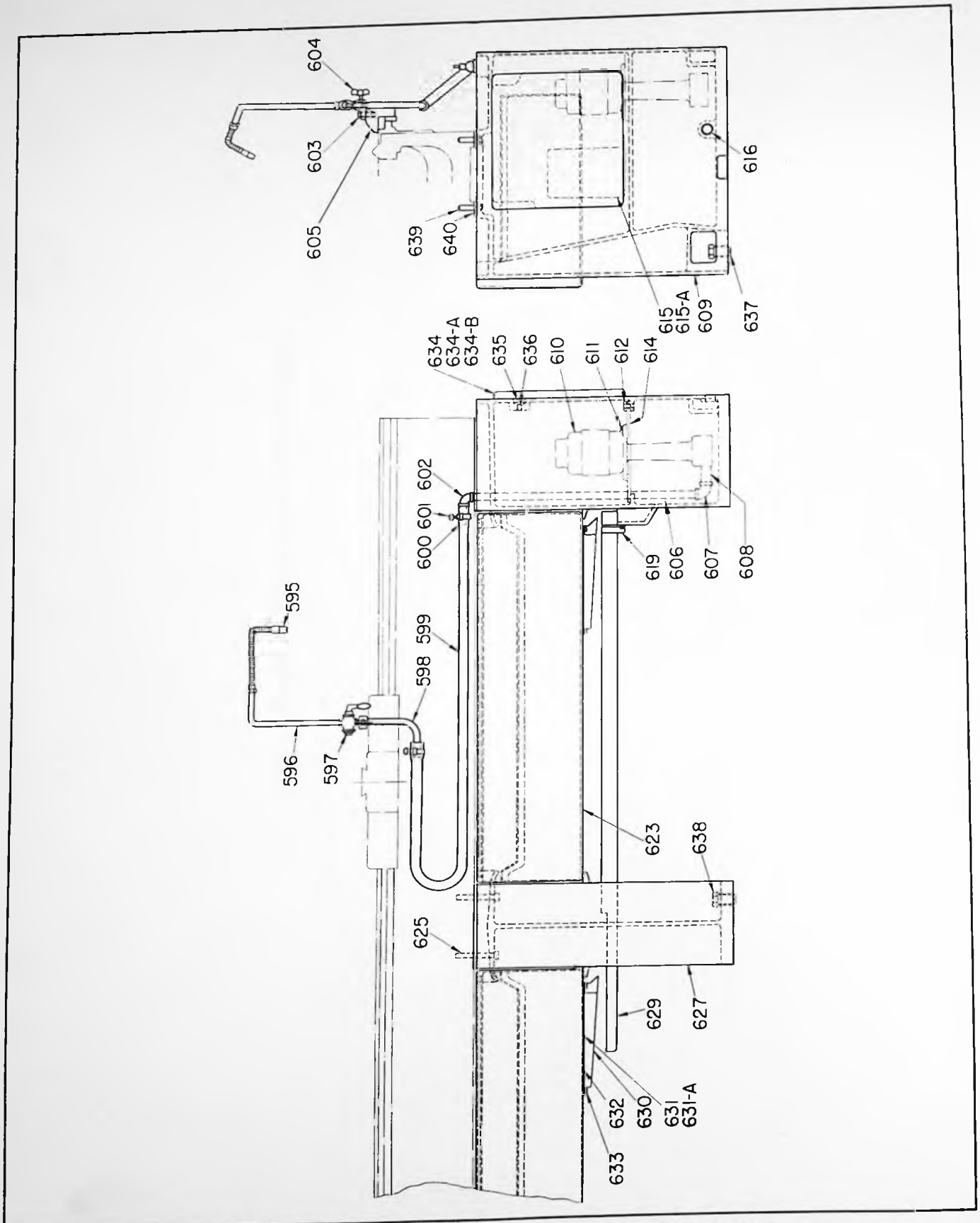

IMPORTANT—Include serial number of your lathe when ordering repair parts.

TAIL CABINET LEG, CENTER LEG TROUGH, COOLANT PUMP WITH PIPING

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
595.	Spout, "Stayput" Flexible Coolant	1	615.	Cover, Reservoir Hole (With Pump)	1
596.	Pipe, Distributor	1	615-A.	Cover, Reservoir Hole (Without Pump)	1
597.	Cock, Stop	1	616.	Plug, Pipe	1
598.	Pipe, Distributor	1	619.	Screw, Binding Head Machine	4
599.	Hose, Rubber (Cut to Suit)	1	623.	Pan, (Specify Center Capacity)	1-3
600.	Nipple	1	625.	Screw, Socket Hd. Cap (Middle Leg to Bed)	4
601.	Clamp, Hose	2	627.	Leg, Middle	1-2
602.	Elbow, 90°	1	629.	Trough, Coolant (Specify Length)	1
603.	Screw, Hex Cap	1	630.	Spout, Drain	1
604.	Screw, Thumb	1	631-A.	Screw, (Each Strainer)	2
605.	Bracket	1	632.	Gasket, Drain Spout	1
606.	Pipe, (Cut to Suit)	1	633.	Screw	9
607.	Elbow, Reducing, 90°	1	634.	Door	1
608.	Nipple	1	634-A.	Hinge, Door	2
609.	Leg, Tail End Cabinet	1	634-B.	Screw	4
610.	Pump, Ruthman (Specify H.P., Voltage & Cycles)	1	635.	Magnet, Alnico	1
611.	Screw, (Pump to Plate)	4	636.	Screw, Brass Machine Flat Head	1
612.	Screw, Hex Cap	2	637 & 638	Screw, Leveling (Specify Middle or Tail Leg)	Var.No.
614.	Plate, Pump Support	1			

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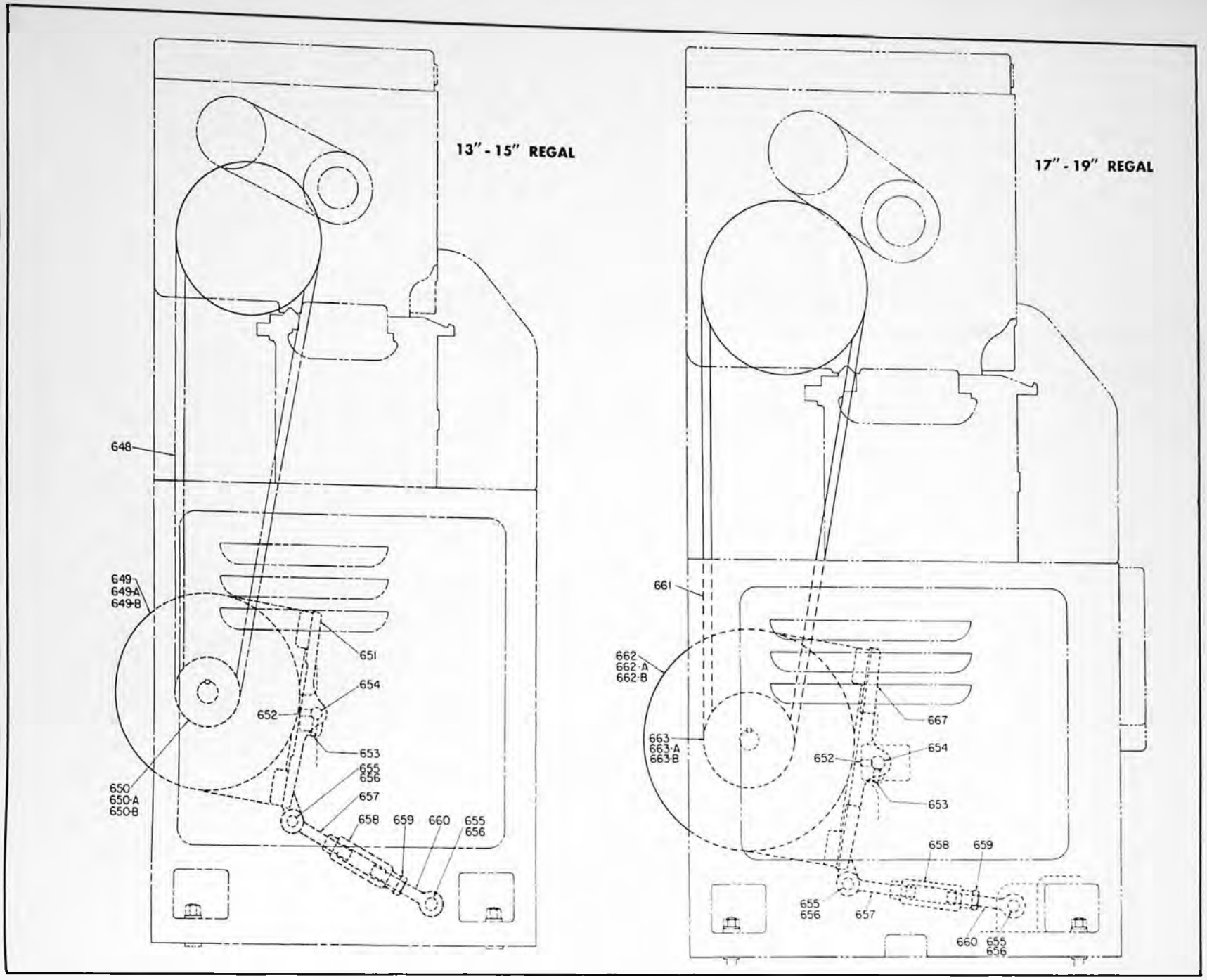

IMPORTANT—Include serial number of your lathe when ordering repair parts.

MOTOR DRIVE & MOUNTING ASSEMBLY

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
648.	V-Belt, Gates	3	657.	Bolt Eye, Left Hand Thread	1
649.	Motor, A-C, New Nema Frame Number Specify Current, Voltage, Horsepower, Phase & Cycle	1	658.	Turnbuckle	1
649-A.	Screw	4	659.	Nut, Hex	1
649-B.	Washer	4	660.	Bolt, Eye, Right Hand Thread	1
650.	Pulley, Motor Specify Cycle, Horsepower & Speed Range Desired	1	661.	V-Belt, Gates	4
650-A.	Key	1	662.	Motor, A-C, New Nema Frame Number Specify Current, Voltage, Horsepower, Phase & Cycle	1
650-B.	Screw, Set	1	662-A.	Screw	4
651.	Plate, Motor	1	662-B.	Washer	4
652.	Screw, Set	1	663.	Pulley, Motor Specify Cycle, Horsepower & Speed Range Desired	1
653.	Screw, Set	1	663-A.	Key	1
654.	Stud, Motor Plate	1	663-B.	Screw, Set	1
655.	Pin, Link	2	667.	Plate, Motor	1
656.	Pin, Cotter	4			

IMPORTANT—Include serial number of your lathe when ordering repair parts.

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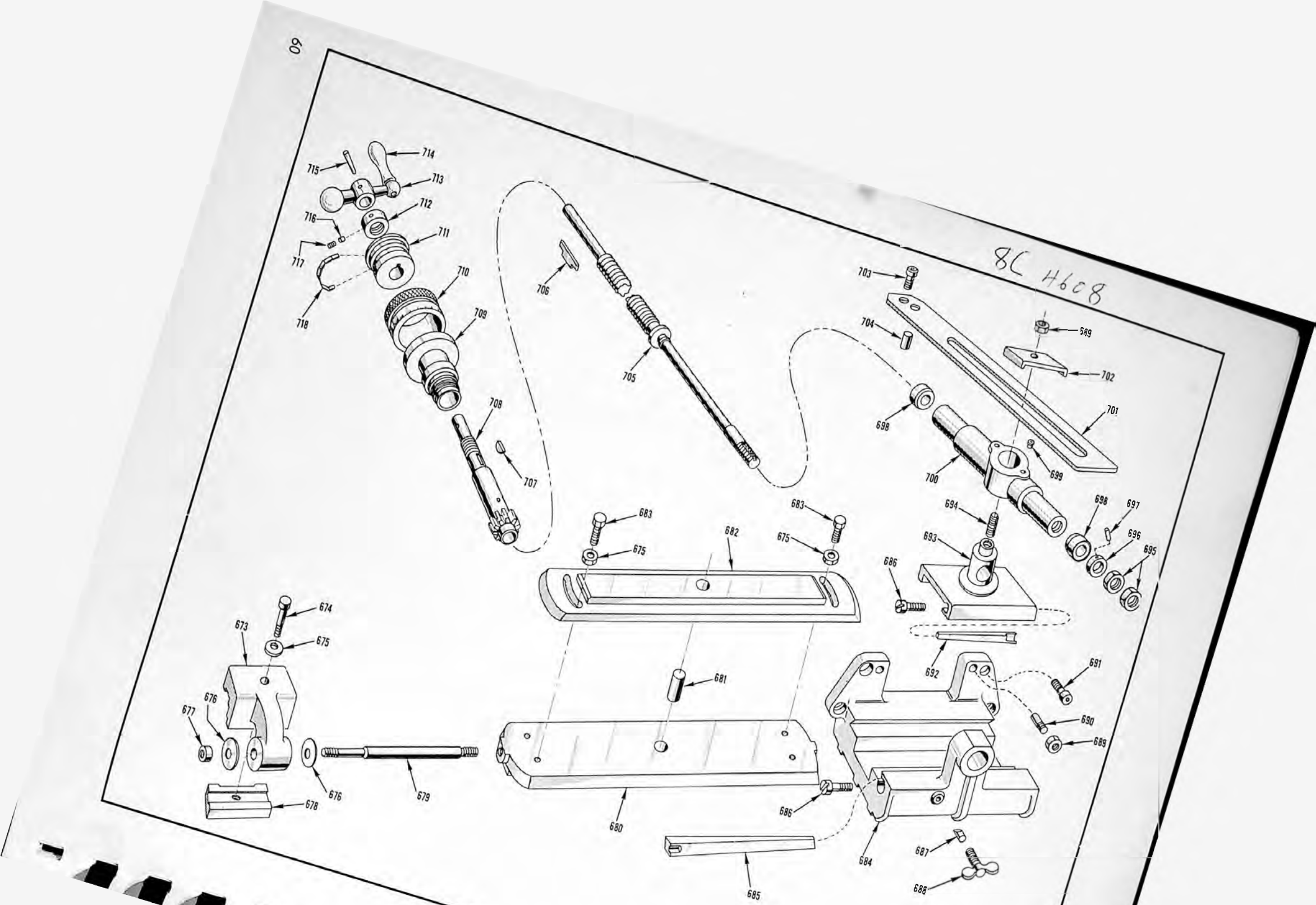
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TAPER ATTACHMENT

PART NO.	PART NAME	QTY.
673.	Bracket, Bed	1
		1
674.	Screw, Hex Hd. Cap	1
		1
675.	Washer	3
		3
676.	Washer	2
		2
677.	Nut, Hex	1
		1
678.	Clamp, Bed Bracket	1
		1
679.	Rod, Bed Bracket Clamp	1
		1
680.	Slide, Taper Attachment	1
		1
681.	Plug, Guide Bar Swivel	1
		1
682.	Bar, Guide (English)	1
	Bar, Guide (English)	1
	Bar, Guide (Metric)	1
	Bar, Guide (Metric)	1
683.	Screw, Hex Cap	2
		2
684.	Bracket, Taper Attachment Slide	1
		1
685.	Gib, Slide (Cut to Suit)	1
686.	Screw, Gib	4
687.	Plug, Slide Gib 1-2	1
		1
688.	Screw, Thumb	1
		3
689.	Nut, Hex	3
		2
690.	Pin, Draw	2
		4
691.	Screw, Sock. Hd. Cap	4
		1
692.	Gib, Guide Bar Shoe	1
		1
693.	Shoe, Guide Bar	1
		1
694.	Stud, Carriage Shoe	1
695.	Nut, Hex Lock	2
696.	Collar, Cross Feed Screw	1
697.	Pin, Straight	1
		2
698.	Bearing, Thrust	2

PART NO.	PART NAME	QTY.
699.	Oiler	2
700.	Shoe, Carriage	1
		1
701.	Bar, Taper Attachment Draw	1
		1
702.	Plate, Guide Bar Clamp	1
		1
703.	Screw, Sock. Hd. Cap	1
		1
704.	Pin	1
		1
705.	Screw, Cross Feed (English)	1
	(English)	1
	(Metric)	1
	(Metric)	1
706.	Key, Feather	1
		1
707.	Key	1
		1
708.	Sleeve, Cross Feed Pinion (English)	1
	Sleeve, Cross Feed Pinion (English)	1
	Sleeve, Cross Feed Pinion (Metric)	1
	Sleeve, Cross Feed Pinion (Metric)	1
709.	Bush, Cross Feed Screw (English)	1
	Bush, Cross Feed Screw (English)	1
	Bush, Cross Feed Screw (Metric)	1
	Bush, Cross Feed Screw (Metric)	1
710.	Collar, Graduated (English)	1
	Collar, Graduated (English)	1
	Collar, Graduated (Metric)	1
	Collar, Graduated (Metric)	1
711.	Hub, Graduated Collar (English)	1
	Hub, Graduated Collar (English)	1
	Hub, Graduated Collar (Metric)	1
	Hub, Graduated Collar (Metric)	1
712.	Nut, Lock	1
		1
713.	Handle, Ball	1
		1
714.	Handle, Ball	1
		1
715.	Pin, Taper	1
		1
716.	Plug	2
717.	Screw	2
718.	Spring	1
		1

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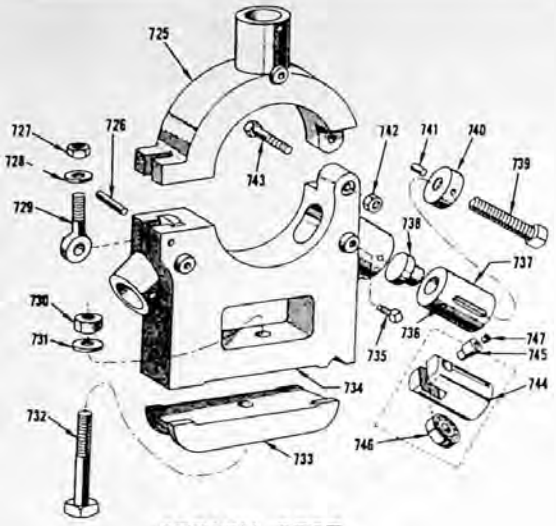
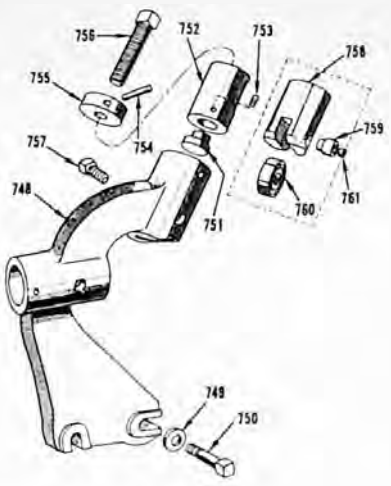


STEADY REST



FOLLOW REST

STEADY REST CAPACITY

13 - 15 1/2" to 4"
17 - 19 3/8" to 6"

FOLLOW REST CAPACITY

13 - 15 3/8" to 2 3/4"
17 1/2" to 3 1/4"
19 1/2" to 3 3/4"

PART NO.	PART NAME	QTY.			
725.	Top, Steady Rest	1	1	1	1
726.	Pin, Straight	1	1	1	1
727.	Nut	1	1	1	1
728.	Washer	1	1	1	1
729.	Bolt, Eye	1	1	1	1
730.	Nut	1	1	1	1
731.	Washer	1	1	1	1
732.	Bolt, Rough	1	1	1	1
733.	Clamp, Steady Rest	1	1	1	1
734.	Bottom, Steady Rest	1	1	1	1
735.	Screw, Sq. Hd. Set	3	3	3	3
736.	Screw, Set	3	3	3	3
737.	Jaw, Steady Rest	3	3	3	3
738.	Tip, Bronze	3	3	3	3
739.	Screw, Sq. Hd. Set	3	3	3	3
740.	Collar, Jaw Adj. Screw	3	3	3	3
741.	Pin, Straight	6	6	6	6
742.	Nut	1	1	1	1
743.	Screw, Hex Cap	1	1	1	1

PART NO.	PART NAME	QTY.			
744.	Jaw, Roller	3	3	3	3
745.	Stud	3	3	3	3
746.	Roller	3	3	3	3
747.	Oiler	3	3	3	3
748.	Rest, Follow	1	1	1	1
749.	Washer	2	3	2	3
750.	Screw, Hex Cap	2	3	2	2
751.	Tip, Bronze	2	2	2	2
752.	Jaw, Follow Rest	2	2	2	2
753.	Screw, Set	2	2	2	4
754.	Pin, Straight	4	4	2	2
755.	Collar, Jaw Adj. Screw	2	2	2	2
756.	Screw, Sq. Hd. Set	2	2	2	2
757.	Screw, Sq. Hd. Set	2	2	2	2
758.	Jaw, Roller	2	2	2	2
759.	Stud	2	2	2	2
760.	Roller	2	2	2	2
761.	Oiler	2	2	2	2

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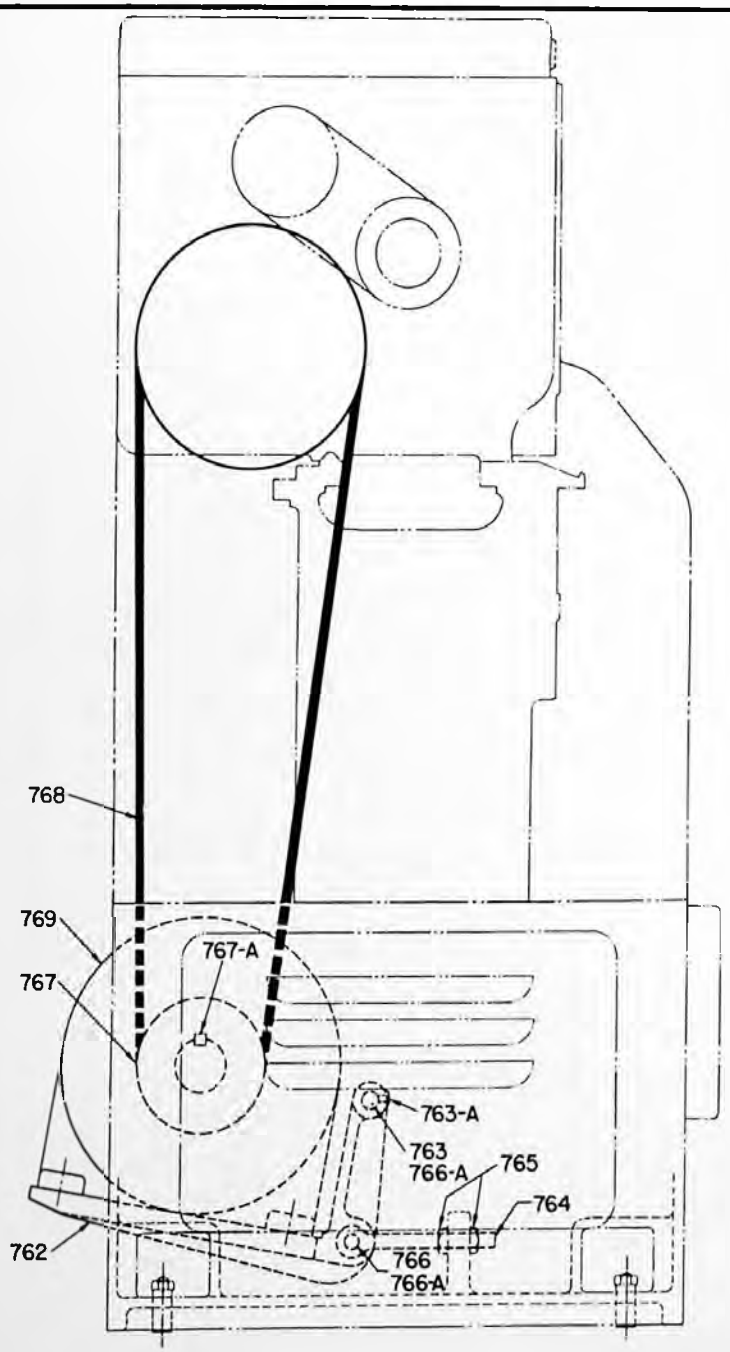


PART NO.	PART NAME	QTY.
762.	Plate, Motor	1
763.	Shaft, Motor Plate	1
763A.	Screw, Set	2
764.	Bolt, Eye	1
765.	Nut, Hex	2
766.	Pin, Link	1
766A.	Cotter Pin (3/4" Long) . . .	2
767.	Pulley, Motor 3" P. D. 1-1/8" Hole(New nema frame) for 50 Cy. 3 & 5 HP & 25 Cy. 3 HP	1
767.	Pulley, Motor 3" P. D. 1-1/8" Hole (New nema frame) for 50 Cy. 3 & 5 HP & 25 Cy. 3 HP	1
	Pulley, Motor 3" P. D. 1-1/8" Hole (New nema frame) fro 60 Cy. 3 & 5 HP . . .	1
	Pulley, Motor 3. 6" P. S. 1-3/8" Hole (New nema frmae) for 25 Cy. 5 HP	1
767A.	Screw	1
768.	V-Belt, Gates	4
769.	Motor, A-C New Nema Frame Number (Specify current voltage, horsepower & cycle to suit order)	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.

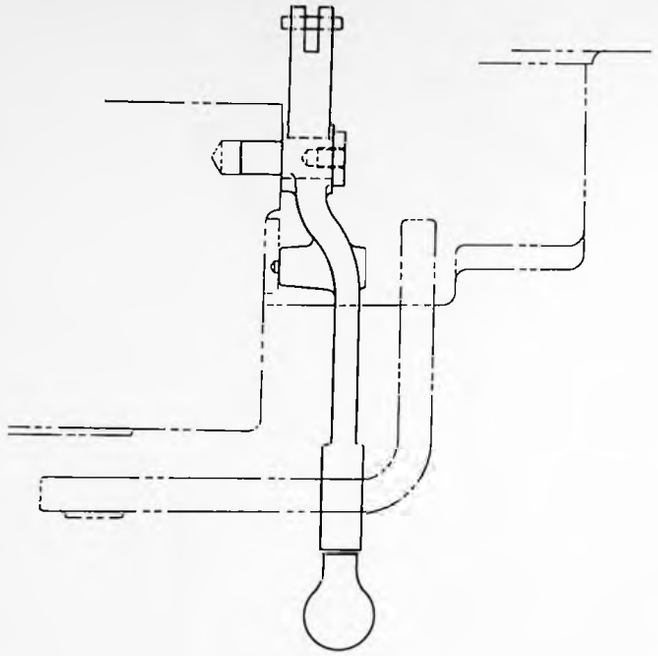
MOTOR DRIVE

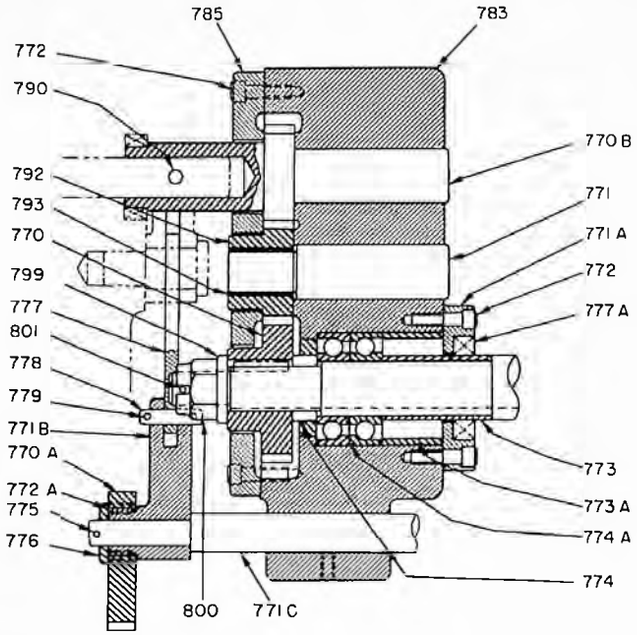
(SLIDING BED & PLAIN BED) GAP LATHES 17" - 19"

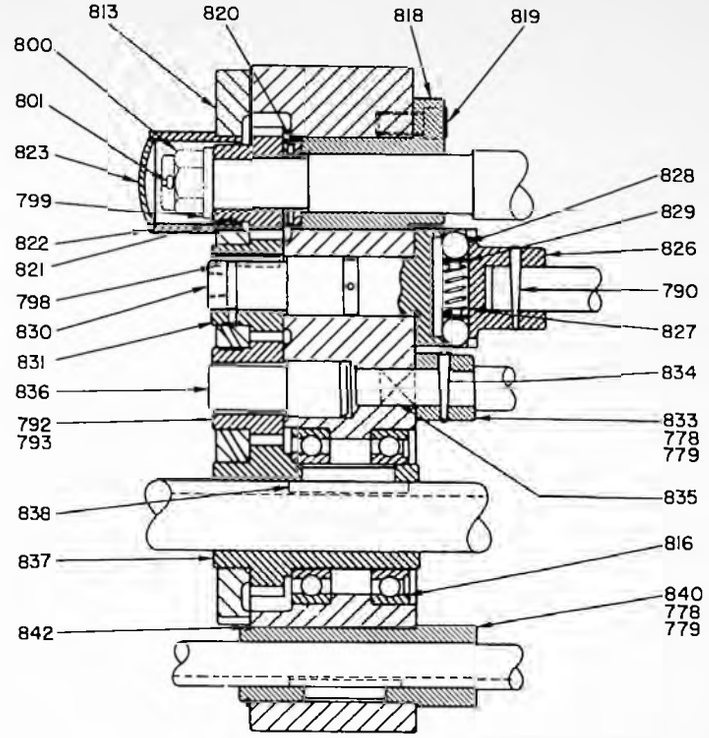
GEARED FEED, TRAVERSE DRIVE AND SWITCH CONTROL ASSEMBLIES
17" - 19" SLIDING BED GAP AND PLAIN GAP LATHES

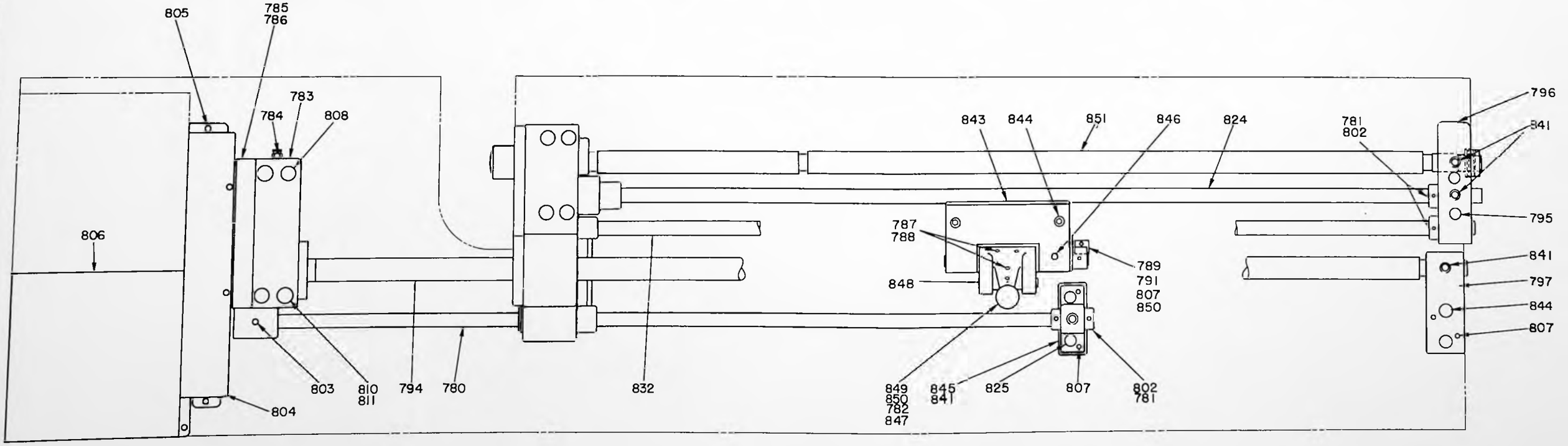
PART NO.	PART NAME	QTY.
770.	Gear, Drive Shaft Feed	1
770A.	Gear, Switch Control	1
770B.	Pinion, Feed Drive	1
771.	Stud, Idler	1
771A.	Cover, Bearing	1
771B.	Lever, Switch Control	1
771C.	Shaft, Switch Control	1
772	Screw	10
772A.	Screw, Set	2
773.	Sleeve	1
773A.	Collar, Bearing	1
774.	Spacer	1
774A.	Bearing, Duplex Ball	1
775.	Pin, Cotter	1
776.	Washer	
777.	Link	1
777A.	Oil Seal (Victor)	1
778.	Pin	2
779.	Pin, Cotter	8
780.	Rod, Lower Control	1
781.	Pin, Taper	1
782.	Handle, Knob	1
783.	Bracket, Bottom Bed Feed	1
784.	Oiler	1
785.	Plate, Bottom Bed Bracket Plate	1
786.	Screw	6
787.	Screw, Set	2
788.	Screw, Set	2
789.	Collar, Stop	1
790.	Pin, Taper	2
791.	Lug, Stop Collar	1
792.	Gear, Idler	2
793.	Bearing, Oilite	2
794.	Shaft, Feed Drive	1
795.	Screw	2
796.	Back Box	1
797.	Bracket, Drive Shaft End	1
798.	Key	1
799.	Washer	2
800.	Nut	1
801.	Pin, Cotter	1
802.	Collar, Soft	1
803.	Screw, Set	
804.	Cover, Slip Gear	1
805.	Screw, Binding	6
806.	Cover, Switch	1
807.	Pin, Taper	2
808.	Screw, Socket Head Cap	3
809.	Plug	3
810.	Pin, Draw	3
811.	Nut	2
812.	Bracket, Top Bed Feed	1
813.	Plate, Top Bed Bracket	1
814.	Pin	2
815.	Stud, Feed Rod Drive	1
816.	Ball Bearing	1
817.	Screw	2
818.	Bushing, Lead Screw	1
819.	Screw	2
820.	Bearing	3
821.	Pinion, Lead Screw	1
822.	Guard, Dirt	1
823.	Plug, Expansion	1
824.	Rod, Feed	1
825.	Screw, Socket Head Cap	2
826.	Collar, Feed Drive	1
827.	Spring, Feed Rod Driving Collar	1
828.	Ball	2
829.	Plunger, Feed Rod Driving Collar	2
830.	Plug, Pipe	1
831.	Gear, Feed Rod Drive	
832.	Upper Control Rod	1
833.	Lever, Upper	1
834.	Taper Pin	1
835.	Plug	
836.	Stud, Idler	1
837.	Gear, Drive Shaft	1
838.	Key	1
839.	Link	1
840.	Lever, Lower	1
841.	Pipe, Plug	4
842.	Screw, Set-Ring, Snap Truarc	1
843.	Bracket, Tray Unit	1
844.	Screw, Socket Head Cap	4
845.	Bracket, Lower	1
846.	Screw, Set	1
847.	Nut, Lower Half	1
848.	Stud, Nut Swivel	1
849.	Nut, Upper Half	1
850.	Screw, Set	1
851.	Screw, Lead	1
852.	Shaft, Gear	1
853.	Bracket, Switch	1
854.	Crank, Shifter	1
855.	Gear, 32T-16P	1
856.	Gear, 16T-16P	1
857.	Screw, Set	1
857A.	Screw, Set	2
857B.	Screw	2
857C.	Screw	4
857D.	Screw, Low Head	1
857E.	Screw	2
857F.	Screw, Set	1
858.	Pin	1
858A.	Pin, Cotter	3
858B.	Washer	1
859.	Switch	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.

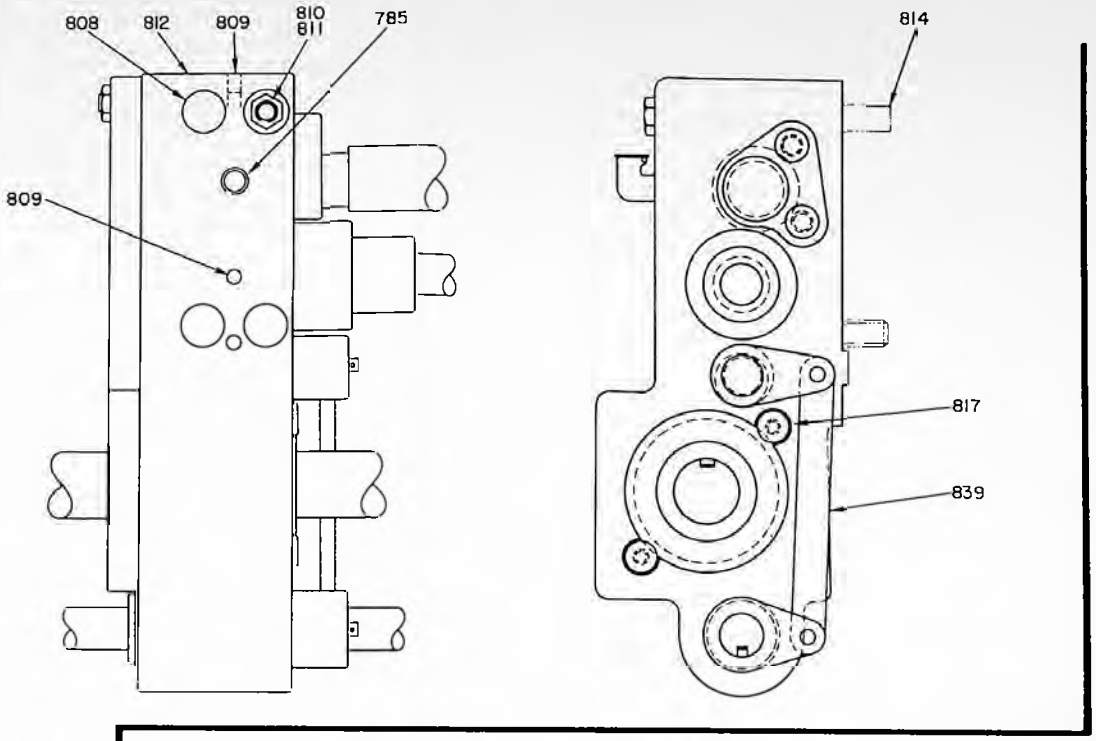


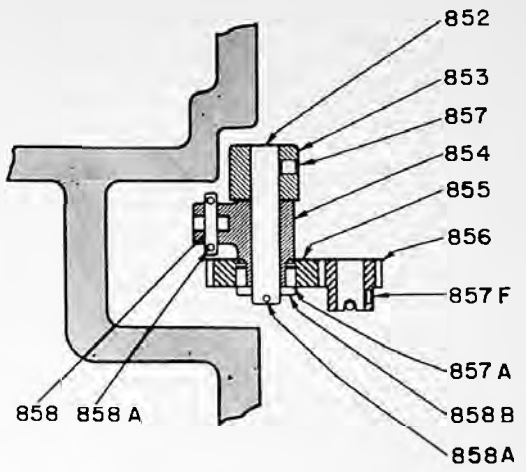




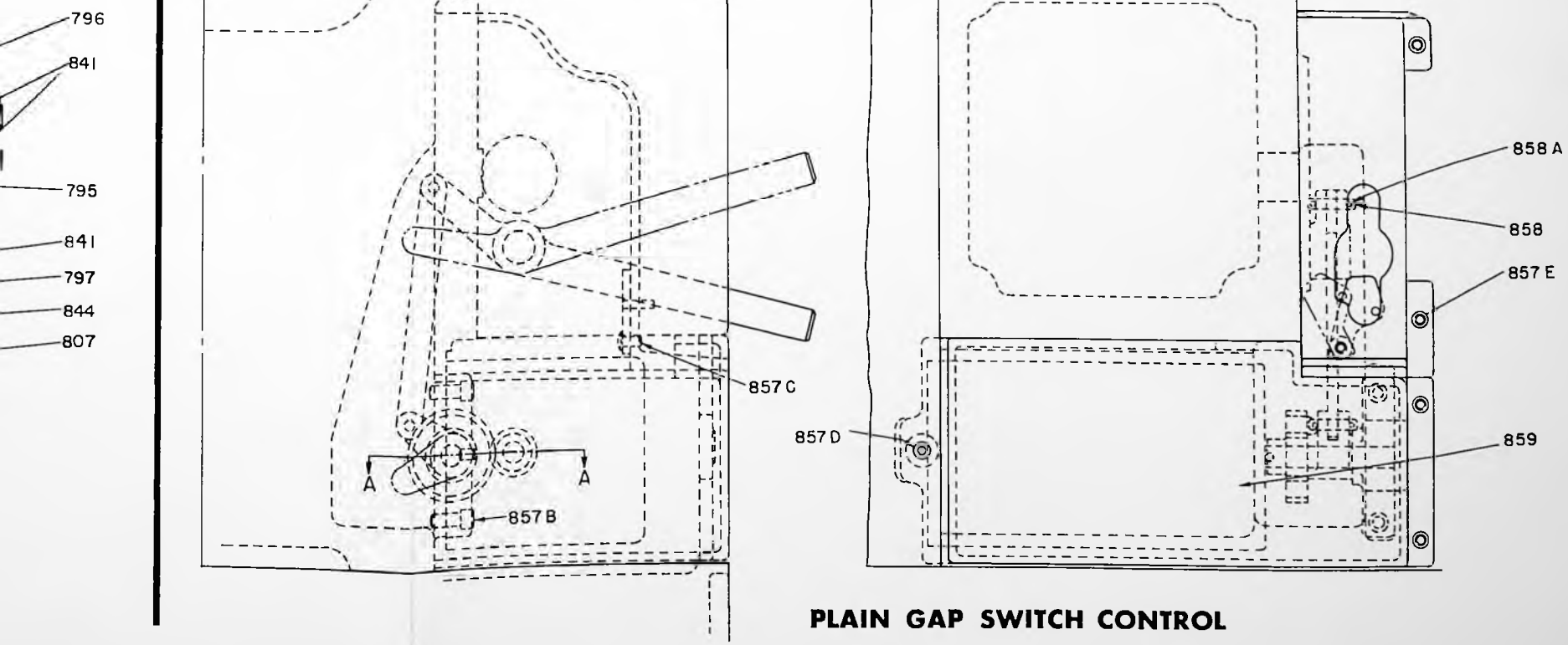


FRONT VIEW OF BED (SLIDING BED GAP LATHE SHOWN)

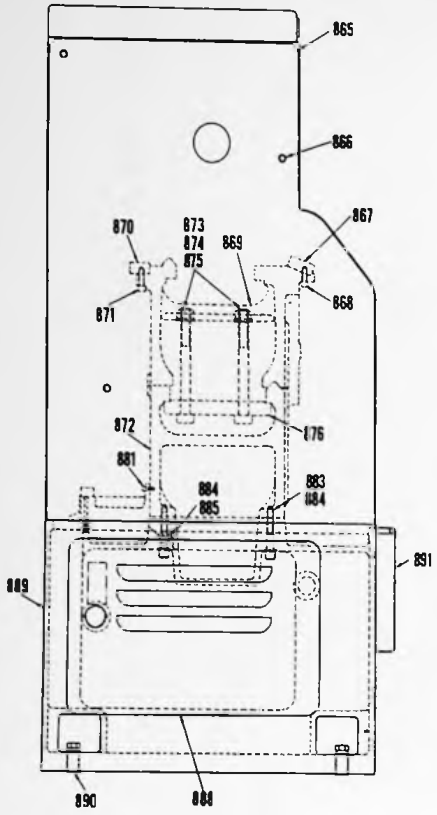




SECTION AA



PLAIN GAP SWITCH CONTROL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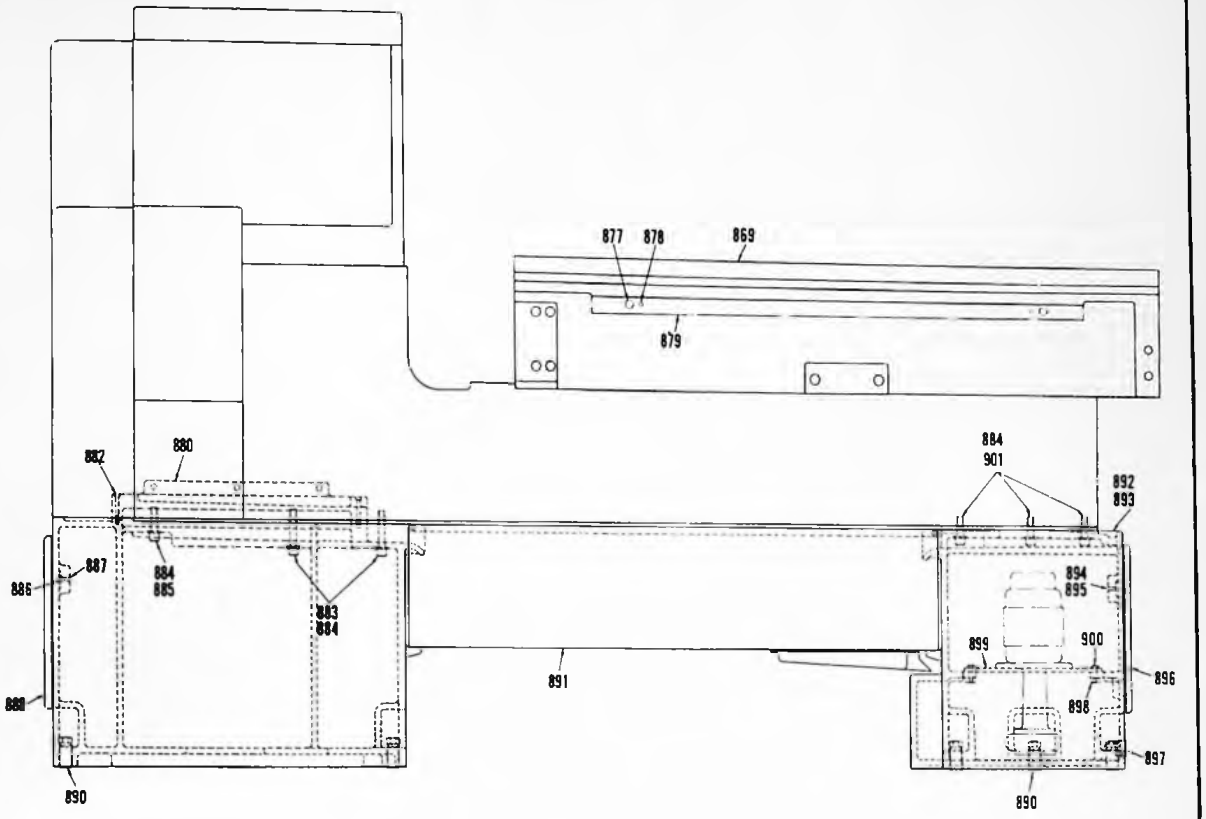
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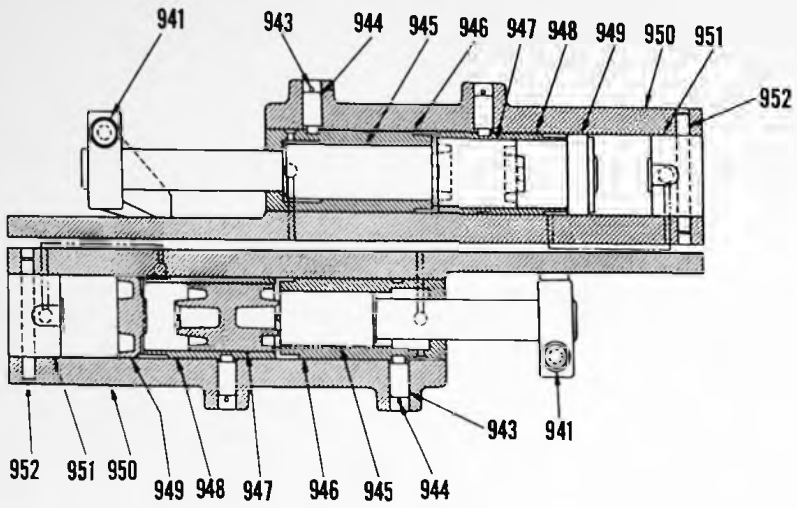
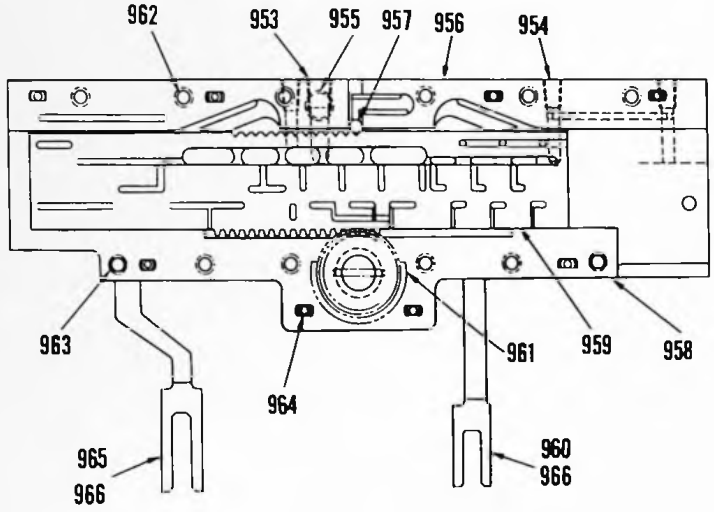
BED, PAN, LEGS & HEAD END COVER
PLAIN & SLIDING BED GAP LATHES

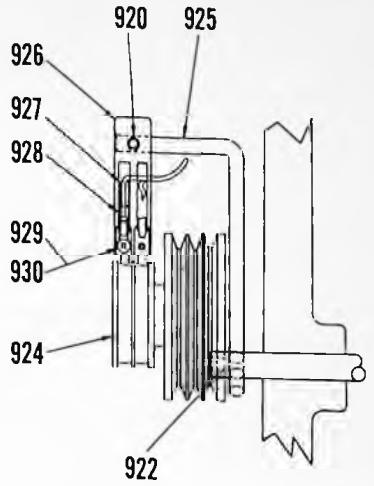
PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
865.	Cover, Feed Gear	1	884.	Washer	7
866.	Screw, Socket Head Cap	3	885.	Screw	1
867.	Shear, Front (Specify Center Capacity)	1	886.	Magnet, Alnico Carboloy	1
868.	Screw, (S.B.G. - Specify Bed Length)	Var.No.	887.	Screw, Brass Machine Flat Head	1
869.	Bed, Top (S.B.G. - Specify Length)	1	888.	Door	1
870.	Shear, Rear (Specify Center Capacity)	1	889.	Leg, Head End Cabinet	1
871.	Screw, (S.B.G. - Specify Bed Length)	Var.No.	890.	Screw, Leveling	4
872.	Bed, Bottom (S.B.G. - Specify Length)	1	891.	Pan, (Specify Center Capacity)	1
872-A.	Bed, (P.B.G. - Specify Length) Not Shown	1	892	Leg, Tail End Cabinet	1
873.	Bolt, S.B.G.	Var.No.	893.	Screw	4
874.	Nut, S.B.G.	Var.No.	894.	Magnet, Alnico	1
875.	Washer, S.B.G.	Var.No.	895.	Screw, Brass Machine Flat Head	1
876.	Clamp, S.B.G.	Var.No.	896.	Door	1
877.	Screw	Var.No.	897.	Plug, Pipe	1
878.	Pin, Taper	Var.No.	898.	Clamp, Pump Plate	2
879.	Rack, Specify Center Capacity	1	899.	Plate, Pump	1
880.	Cover, Head End Leg	1	900	Screw, Hex Head Cap	2
881.	Screw	3	901.	Screw	3
882.	Screw	2	902.	Block, Gap (P.B.G. only) Not Shown	1
883.	Screw	3			

IMPORTANT—Include serial number of your lathe when ordering repair parts.

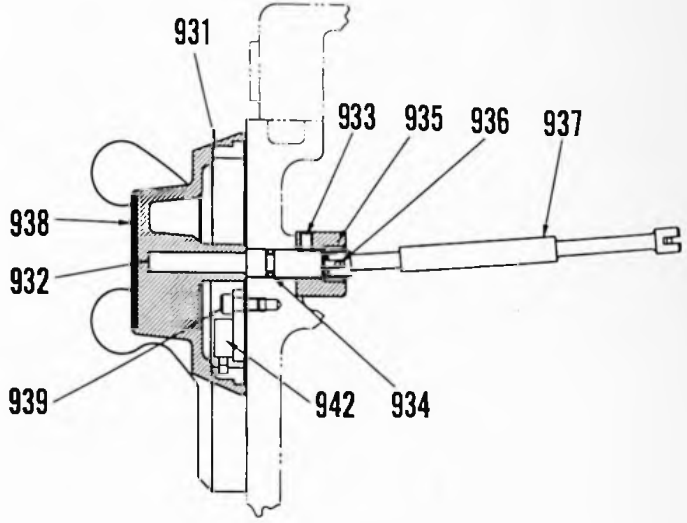


SERVO-SHIFT SHIFTER UNIT



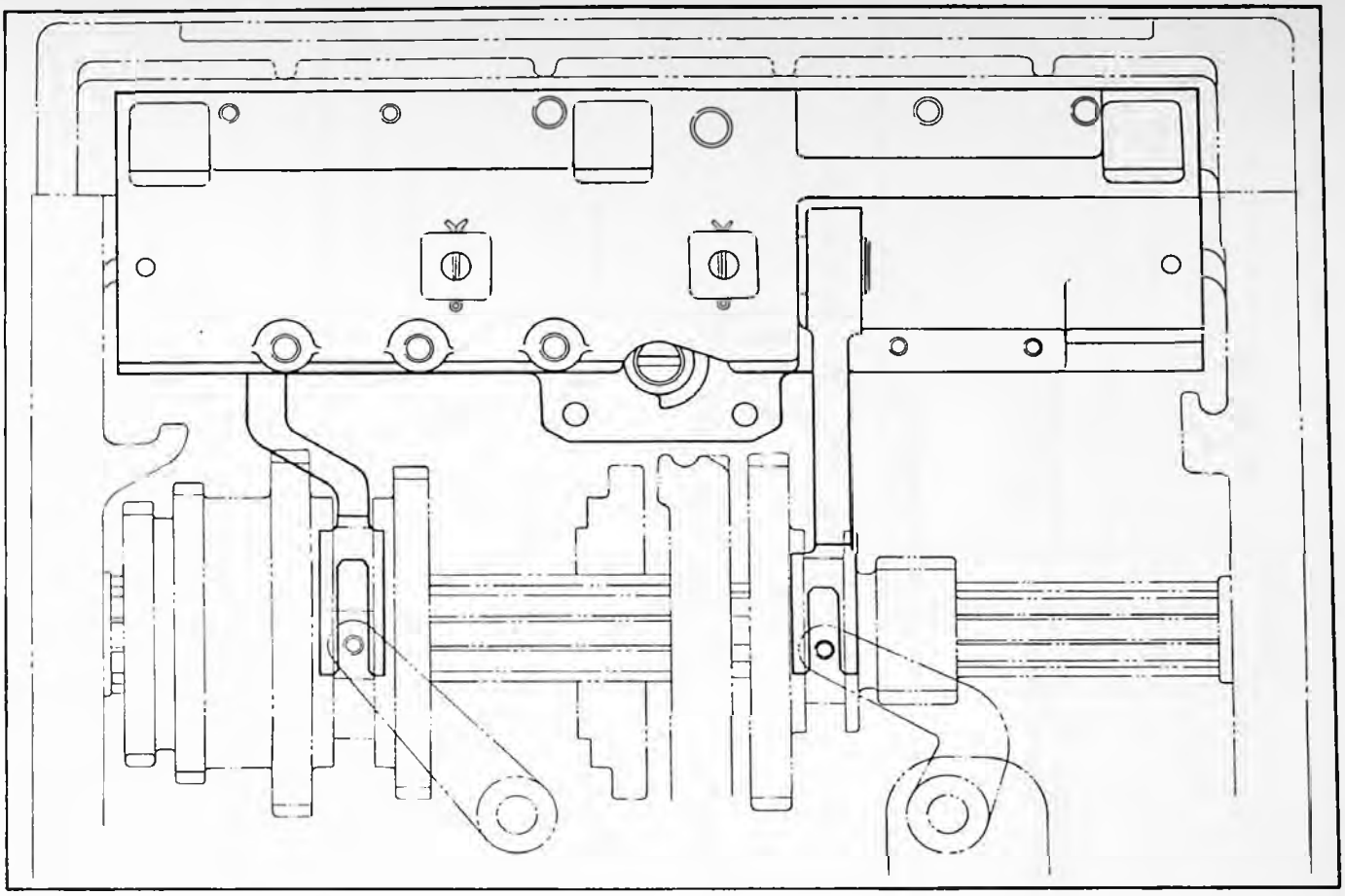


ZERO-SPEED SWITCH
(MAIN DRIVE MOTOR)



SERVO-SHIFT DIAL ASS'Y

IMPORTANT—Include serial number of your lathe when ordering repair parts.

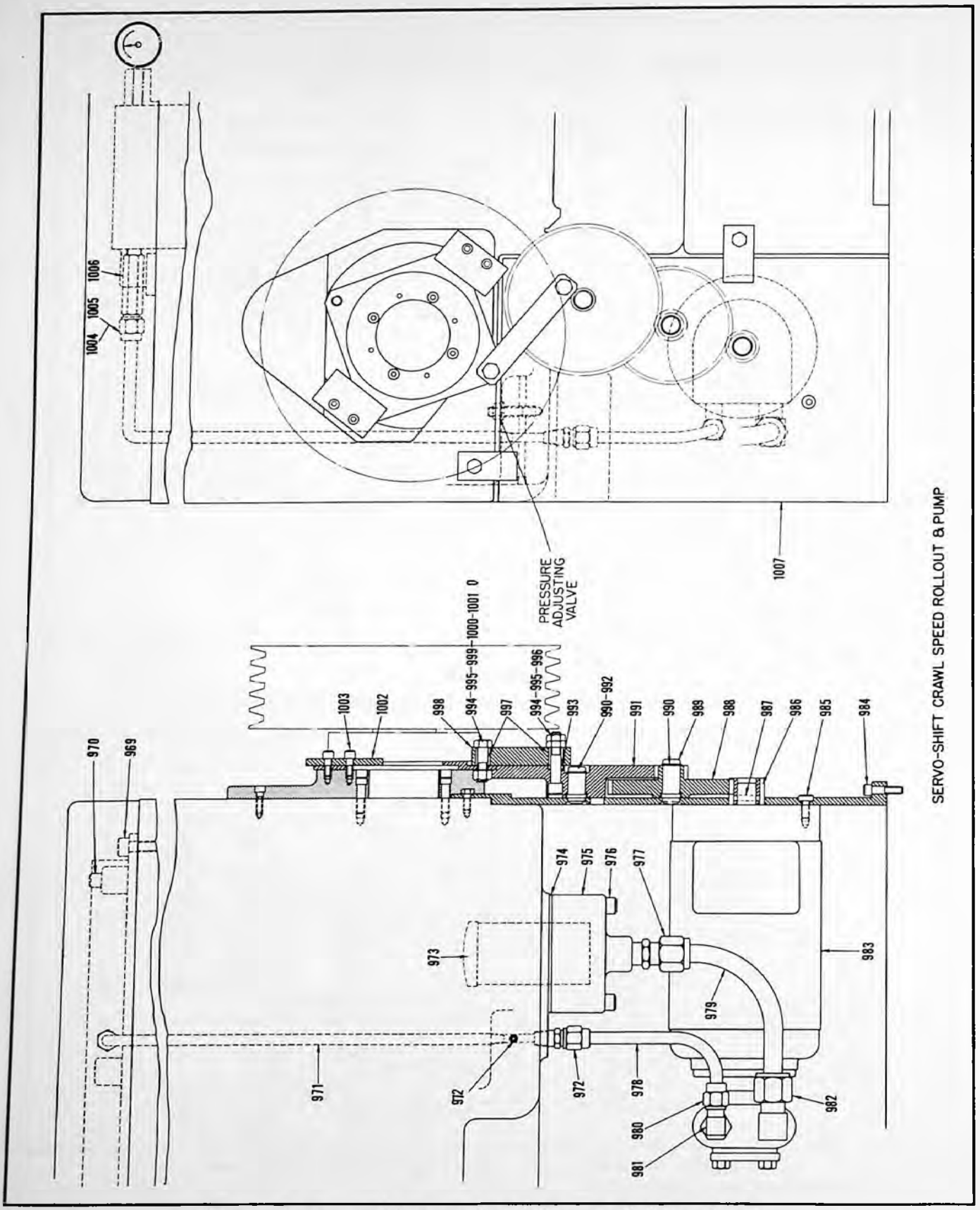


SERVO-SHIFT
ZERO-SPEED SWITCH, SHIFTER UNIT, DIAL ASSEMBLY

KEY NO.	PART NAME	QTY.	KEY NO.	PART NAME	QTY.
946-S	Sleeve	1	920-S	Set Screw	1
947-S	Piston, Long	1	922-S	Set Screw	1
948-S	Liner	1	925-S	Arm, Brush Holder	1
949-S	Piston, Short	1	926-S	Brush Holder	1
950-S	Cylinder	1	927-S	Brush Spring	2
951-S	Retainer	1	928-S	Brush	2
952-S	Pin, Oversize Dowel	1	929-S	Binding Head Screw	2
953-S	Plug, Pipe	1	930-S	Shake Proof Washer	2
954-S	Plug, Pipe	3	931-S	Speed Selector Dial (Specify Speed Range)	1
955-S	Plug, Pipe	1	932-S	Dial Shaft	1
956-S	Spacer, Upper Cylinder	1	933-S	Set Screw	1
957-S	Roller, Detent	1	934-S	"O" Ring	1
958-S	Spacer, Lower Cylinder	1	935-S	Coupling	1
959-S	Slide, Valve	1	936-S	Pin	1
960-S	Fork, "C" Cylinder	1	937-S	Coupling Shaft	1
961-S	Pinion, Valve Slide (With Pin)	1	938-S	Speed Dial	1
962-S	Screw, Socket Cap	6	939-S	Screw	1
963-S	Screw, Socket Cap	6	941-S	Screw	2
964-S	Pin, Straight	2	942-S	Micro-Switch	1
965-S	Fork, "B" Cylinder	1	943-S	Pin, Cotter	2
966-S	Screw, Socket Cap	2	944-S	Pin, Locating	2
			945-S	Piston, Rod	1

IMPORTANT—Include serial number of your lathe when ordering repair parts.

IMPORTANT WHEN ORDERING:
ALL PART NUMBERS THAT PERTAIN TO SERVO-SHIFT MUST HAVE THE SUFFIX LETTER "S" ADDED, EVEN THOUGH IT DOES NOT APPEAR WITH THE CALLOUTS IN THE ILLUSTRATION.



SERVO-SHIFT CRAWL SPEED ROLLOUT & PUMP

IMPORTANT—Include serial number of your lathe when ordering repair parts.

SERVO-SHIFT CRAWL SPEED ROLLOUT

PART NO.	PART NAME	QTY.	PART NO.	PART NAME	QTY.
969-S.	Screw, Socket Cap	4	989-S.	Stud	1
970-S.	Screw, Socket Cap	6	990-S.	Ring, Snap	2
971-S.	Tubing, 3/8" (Cut to Suit)	1	991-S.	Gear, Crank Drive	1
972-S.	Fitting, Hyd.	2	992-S.	Stud	1
973-S.	Filter	1	993-S.	Bushing	1
974-S.	Gasket, Filter Cap	1	994-S.	Screw, Socket Cap (13"-15")	1
975-S.	Cap, Filter	1	995-S.	Nut, Jam	2
976-S.	Screw, Socket Cap	2	996-S.	Screw, Socket Cap (17"-19")	1
977-S.	Fitting, Hyd.	1	997-S.	Bushing	2
978-S.	Tubing, 3/8" (Cut to Suit)	1	998-S.	Arm, Crank	1
979-S.	Tubing, 5/8" (Cut to Suit)	1	999-S.	Screw, Hex Head	1
980-S.	Fitting, Hyd.	1	1000-S.	Nut, Hex.	1
981-S.	Reducer	1	1001-S.	Lockwasher	1
982-S.	Fitting, Hyd.	1	1002-S.	Plate, Brake Retainer	2
983-S.	Motor Driven Pump, Tuthill ILPF Model A	1	1003-S.	Screw, Socket Cap	4
984-S.	Screw, Socket Cap	1	1004-S.	Nut, Hyd.	1
985-S.	Screw, Socket Cap	4	1005-S.	Sleeve, Hyd.	1
986-S.	Pinion, Motor	1	1006-S.	Coupling, Extra Long	1
987-S.	Pin, Roll	1	1007-S.	Plate, Head Feed Cover Plate (Specify Engine, Plain Bed, or Sliding Bed Gap)	1
988-S.	Gear, Cluster	1			

IMPORTANT—Include serial number of your lathe when ordering repair parts.

IMPORTANT WHEN ORDERING:

ALL PART NUMBERS THAT PERTAIN TO SERVO-SHIFT MUST HAVE THE SUFFIX LETTER "S" ADDED, EVEN THOUGH IT DOES NOT APPEAR WITH THE CALLOUTS IN THE ILLUSTRATION.