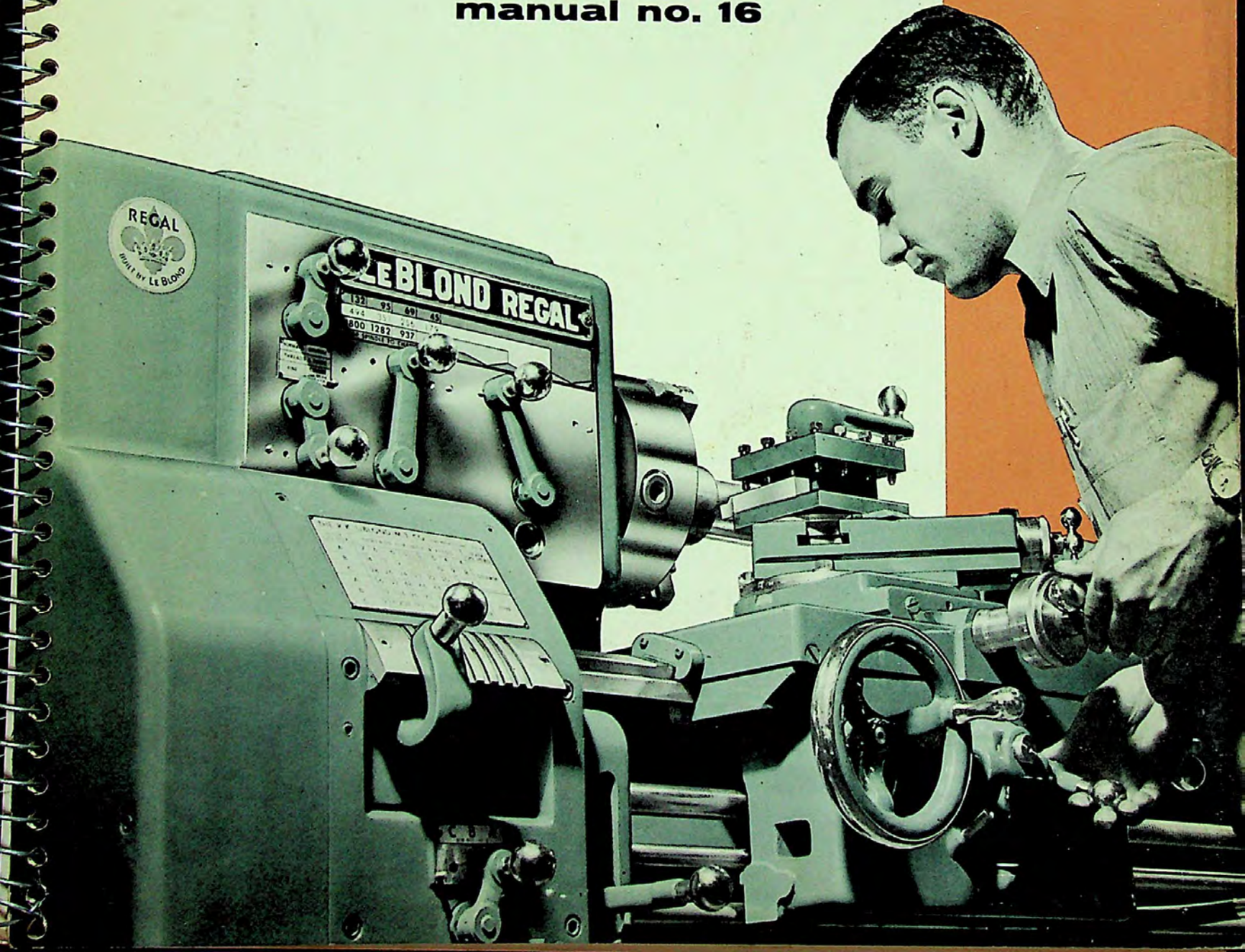
LeBLOND *of Cincinnati*

13"
15"
17"
19"

RUNNING A REGAL

manual no. 16



RUNNING A REGAL

An instruction manual describing the construction, operation and maintenance of the modern gear — timing belt drive engine lathe — the LeBlond Regal.

with sectional and exploded parts section for greater ease and speed in ordering repair parts.

16th Edition

The R. K. LeBlond Machine Tool Company

Cincinnati 8, Ohio, U. S. A.

Largest Manufacturer of a Complete Line of Lathes

Price $2.00

Printed in U. S. A.

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.

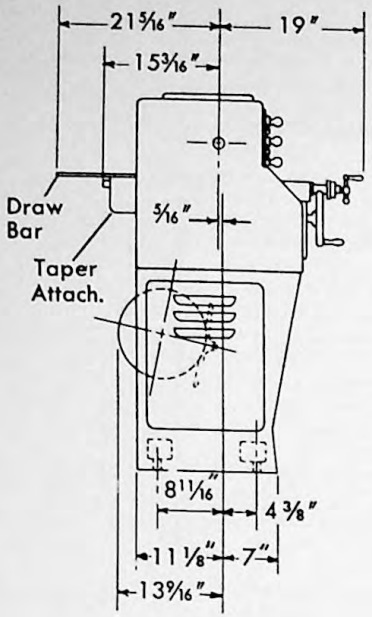
The parts section makes it easy for you to order necessary parts by showing the parts in both sectional and exploded view. There is a parts illustration for each of the units which make up the Regal, and each part is listed by name, number, and quantity. Your repair parts order will be facilitated if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

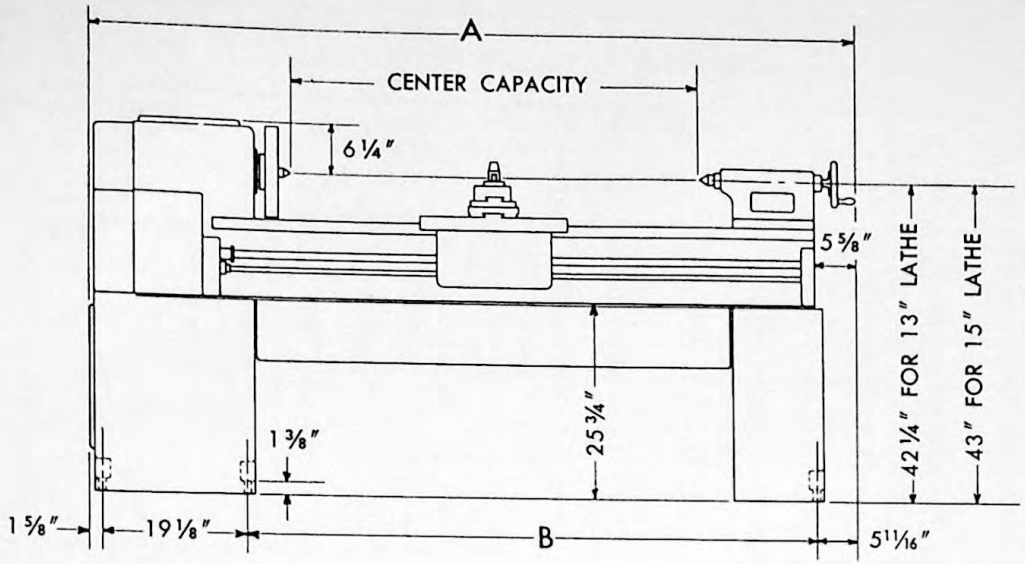
Engineering changes are made constantly which improved your Regal lathe. Thus, your lathe may differ slightly from the ones illustrated here. This means that we are continually striving to give you the best and most modern equipment for your turning requirements.

INDEX

SPECIFICATIONS FOR LeBLOND REGALS

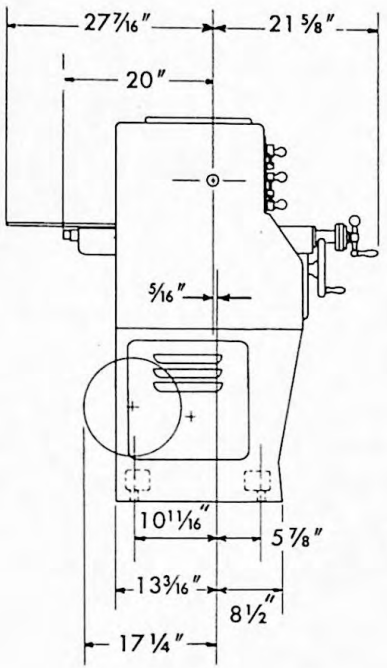
SIZE	13" Floor and Bench Type	15"	17"	19"
Capacity				
Swing over bed and carriage wings	14"	15-1/2"	17-3/4"	19-1/4"
Swing over compound rest	8"	9-1/2"	10-3/4"	12-1/4"
Distance between centers, base length	18"	18"	30"	30"
Center distance increases in increments of	12"	12"	12"	12"
Size of tool-forged	1/2" x 3/4"	1/2" x 1"	1-1/4" x 5/8"	1-1/4" x 5/8"
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	7-1/2"	7-1/2"	8"	8"
Face plate, large, diameter	12"	14"	16"	18"
Headstock				
Spindle speeds, number	12	12	12	12
Spindle speed ranges, low range, rpm	30 to 1200	30 to 1200	25 to 1000	25 to 1000
Spindle speed ranges, high range, rpm	45 to 1800	45 to 1800	38 to 1500	38 to 1500
Front spindle bearing, Timken precision, o.d.	4-1/4"	4-1/4"	5-3/8"	5-3/8"
Radial load at 100 rpm, pounds	5112	5112	7080	7080
Thrust load at 100 rpm, pounds	4600	4600	6176	6176
Center spindle, Roller bearing, o.d.	3-15/16"	3-15/16"	4-5/8"	4-5/8"
Radial load at 100 rpm, pounds	4840	4840	6400	6400
Rear spindle, Ball bearing, o.d.	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	1-13/32"	1-13/32"	1-17/32"	1-17/32"
Spindle, size of hole, taper No.	11 - B & S	11 - B & S	5 - Morse	5 - Morse
Spindle, size of center, Morse taper No.	3	3	4	4
Spindle nose, taper key drive, size	LOO	LOO	LO	LO
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 on 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 attachment	8-7/8"	8-7/8"	11-1/4"	11-1/4"
Cross slide travel with taper attachment	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, in. per rev.	.0018-.106	.0018-.106	.002-.116	.002-.116
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	1-5/16"	1-5/16"	2-7/16"	2-7/16"
Center, Morse No.	3	3	4	4
Spindle travel and set over right or left	5", 1"	5", 1"	7", 1"	7", 1"
Taper Attachment				
Maximum taper per foot	3-1/2"	3-1/2"	3-1/2"	3-1/2"
Turns at one setting	10"	10"	15"	15"

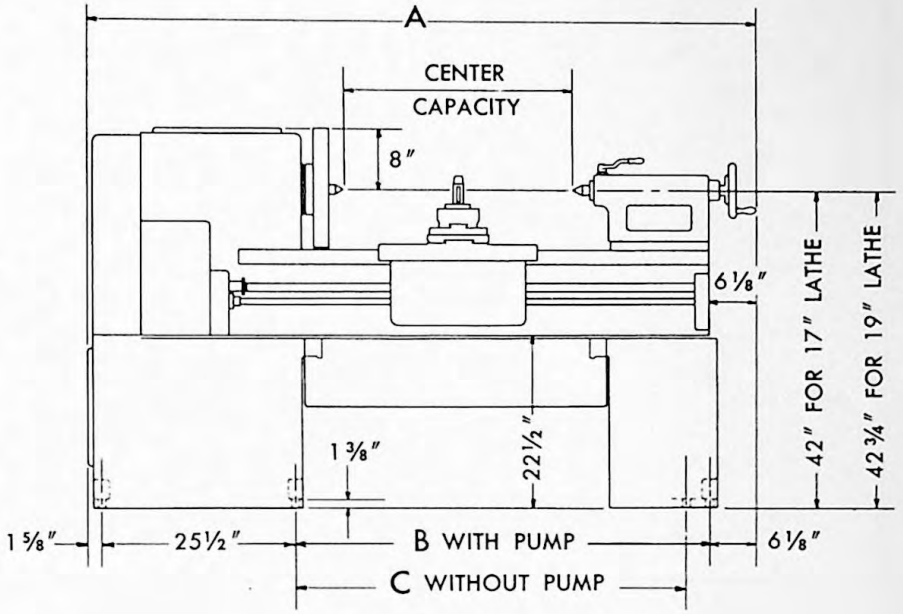




13" - 15" REGAL STANDARD

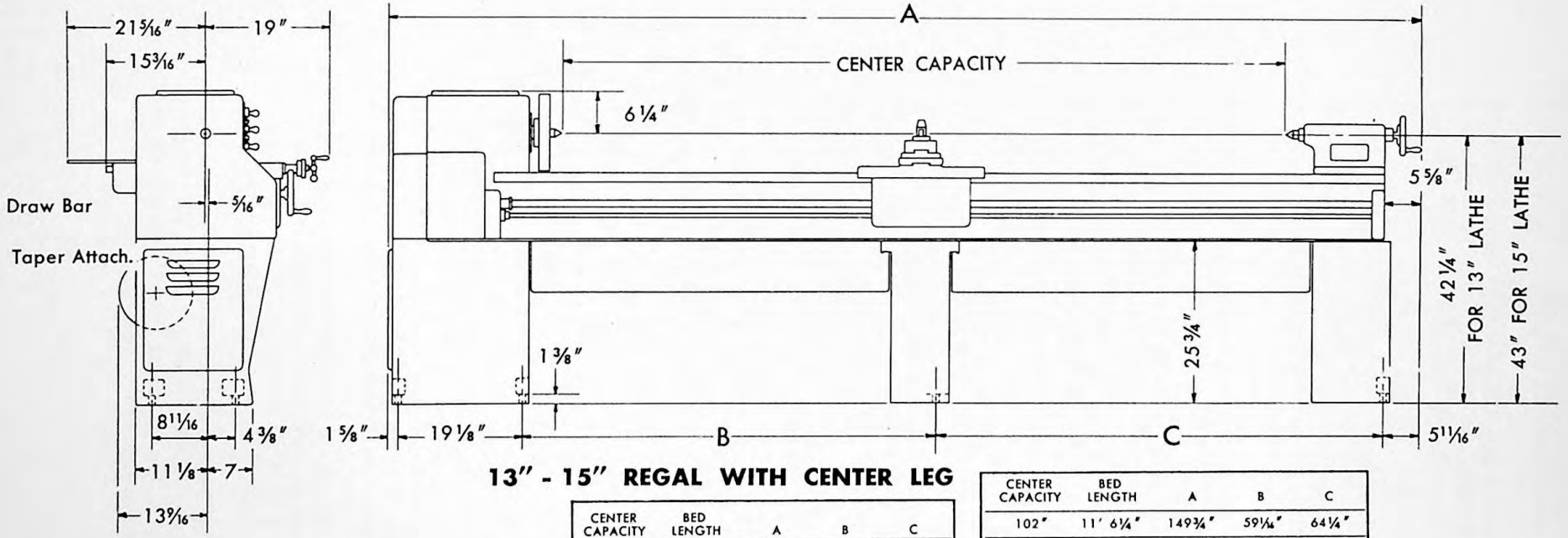
CENTER CAPACITY	BED LENGTH	A	B
18"	4' 6 1/4"	65 3/4"	39 3/4"
30"	5' 6 1/4"	77 3/4"	51 3/4"
42"	6' 6 1/4"	89 3/4"	63 3/4"
54"	7' 6 1/4"	101 3/4"	75 3/4"
66"	8' 6 1/4"	113 3/4"	87 3/4"





17" - 19" REGAL STANDARD

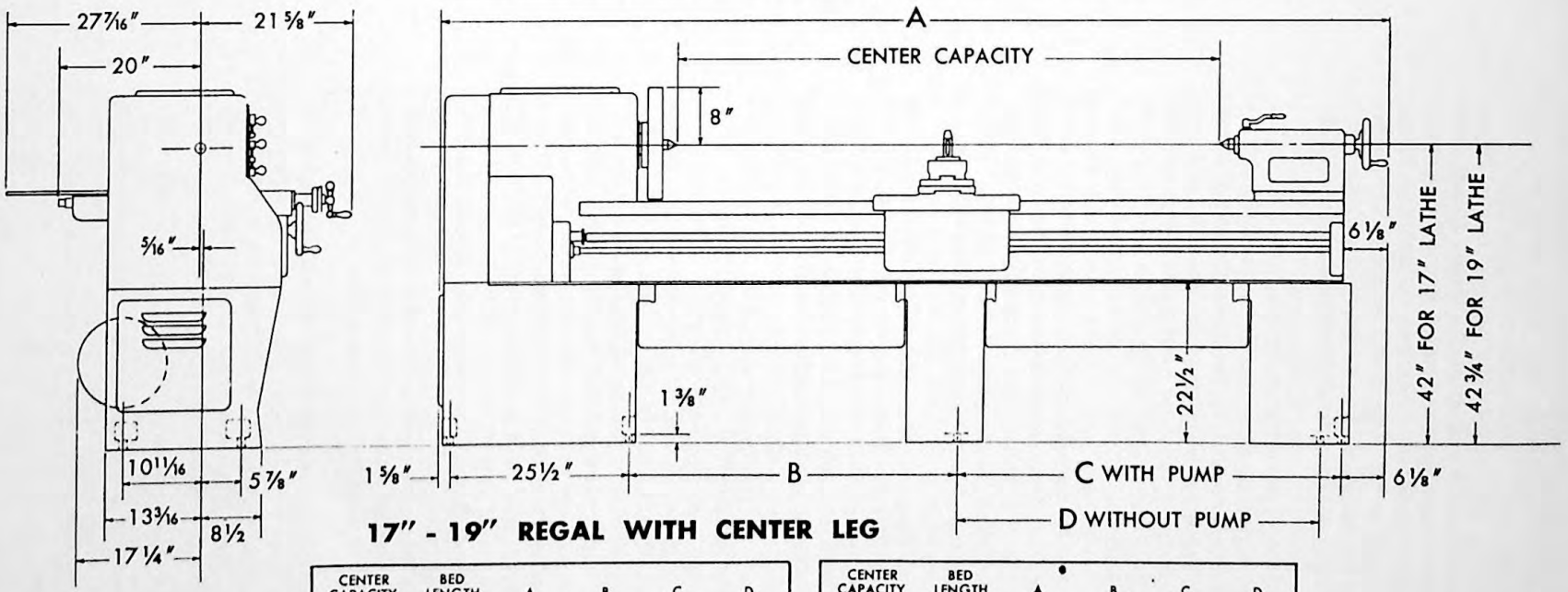
CENTER CAPACITY	BED LENGTH	A	B	C
30"	6' 3"	88 1/8"	54 1/8"	51 1/8"
42"	7' 3"	100 1/8"	66 1/8"	63 1/8"
54"	8' 3"	112 1/8"	78 1/8"	75 1/8"
66"	9' 3"	124 1/8"	90 1/8"	87 1/8"



13" - 15" REGAL WITH CENTER LEG

CENTER CAPACITY	BED LENGTH	A	B	C
78"	9' 6¼"	125¾"	47¹⁄₁₆"	52¼"
90"	10' 6¼"	137¾"	53¹⁄₁₆"	58¼"

CENTER CAPACITY	BED LENGTH	A	B	C
102"	11' 6¼"	149¾"	59¹⁄₁₆"	64¼"
114"	12' 6¼"	161¾"	65¹⁄₁₆"	70¼"
126"	13' 6¼"	173¾"	71¹⁄₁₆"	76¼"



17" - 19" REGAL WITH CENTER LEG

CENTER CAPACITY	BED LENGTH	A	B	C	D
78"	10' 3"	136⅛"	47⅞"	55⅞"	52⅞"
90"	11' 3"	148⅛"	53⅞"	61⅞"	58⅞"
102"	12' 3"	160⅛"	59⅞"	67⅞"	64⅞"

CENTER CAPACITY	BED LENGTH	A	B	C	D
114"	13' 3"	172⅛"	65⅞"	73⅞"	70⅞"
126"	14' 3"	184⅛"	71⅞"	79⅞"	76⅞"
138"	15' 3"	196⅛"	77⅞"	85⅞"	82⅞"

INSTALLATION

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.

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

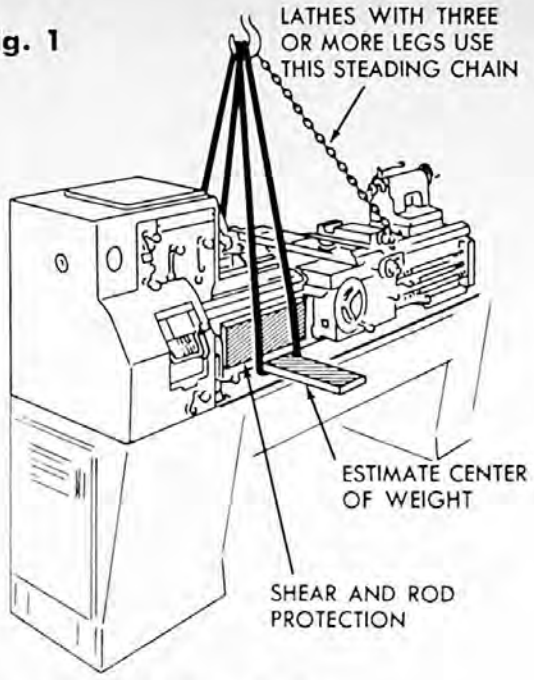
It is usually convenient to leave the machine on the skids when removing the crating. Thus the machine can be moved on the skids to its final location. This is particularly true where crane facilities are not available.

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

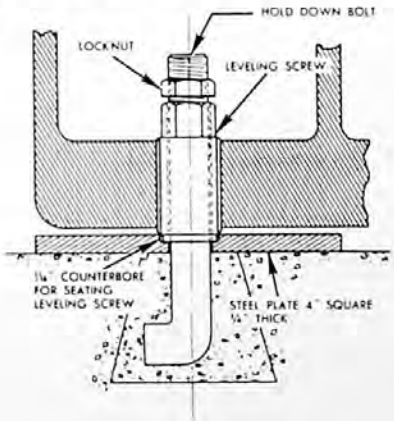
It is important that the voltage and other specifications of the motor are the same as those of your service lines. The name plate on the motor specifies the operating voltage and whether the current should be direct (D. C.) or alternating (A. C.). If alternating current is specified, the voltage, frequently (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, a smooth steel plate, approximately 4" square, 1/4" thick, and countersunk 1/16" of an inch deep for seating the leveling screws, should be surfaced against the concrete. If necessary, chip the concrete before placing these 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.

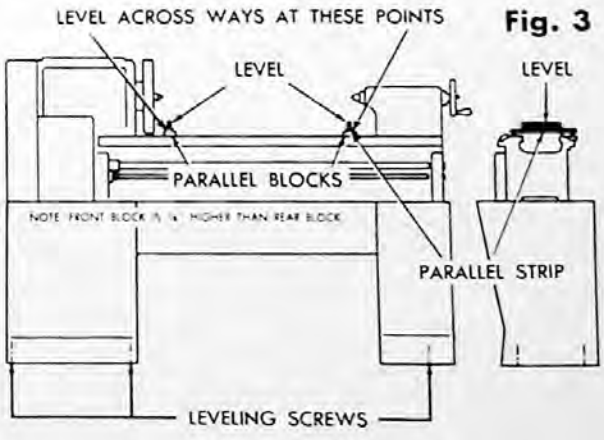
Next, level the lathe by means of leveling screws provided using a precision level. An ordinary carpenter's level or combination square level is not sensitive enough. See Figure 3.

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.

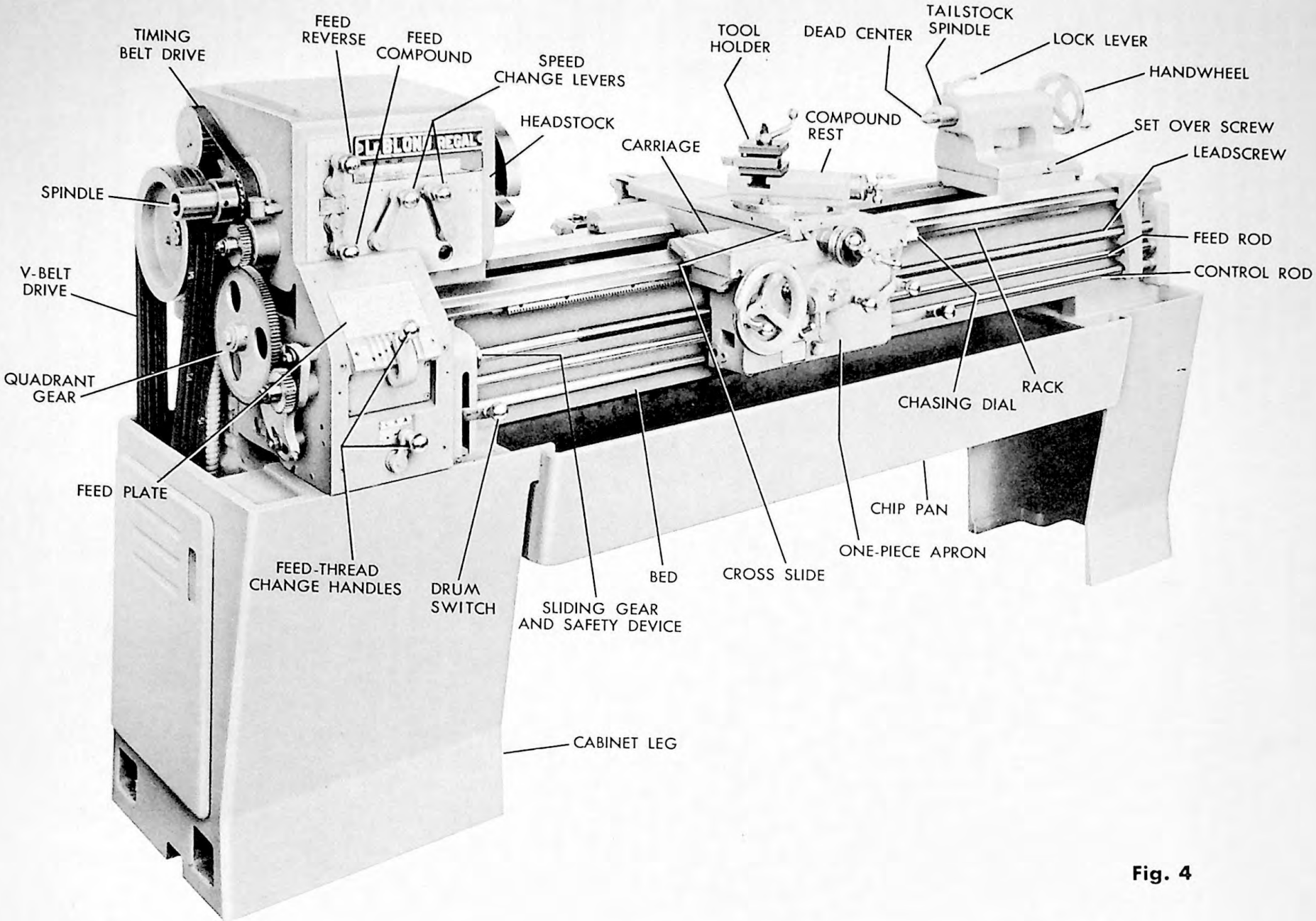

TIMING BELT DRIVE
FEED REVERSE
FEED COMPOUND
SPEED CHANGE LEVERS
HEADSTOCK
TOOL HOLDER
DEAD CENTER
TAILSTOCK SPINDLE
LOCK LEVER
HANDWHEEL
COMPOUND REST
SET OVER SCREW
CARRIAGE
LEADSCREW
SPINDLE
FEED ROD
V-BELT DRIVE
CONTROL ROD
QUADRANT GEAR
RACK
CHASING DIAL
FEED PLATE
CHIP PAN
ONE-PIECE APRON
FEED-THREAD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

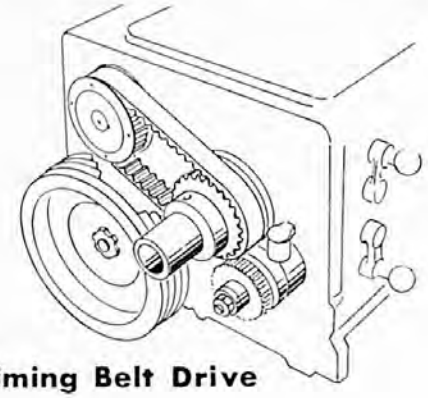
Fig. 4

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. To receive the most benefits from your new Regal, you should be thoroughly acquainted with these units, and with the specifications of your particular lathe. Refer to these operating instructions frequently.

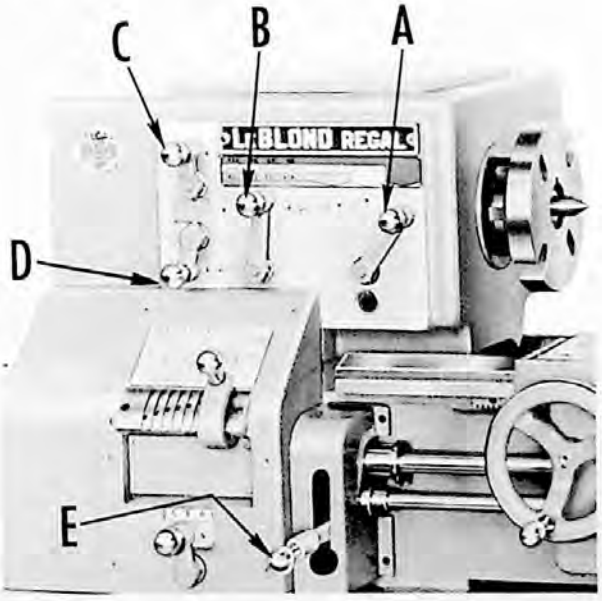
Headstock

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.



Timing Belt Drive

Fig. 5



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 drum-switch (E) is provided for electric control if machine is not equipped with an electric brake.

Fig. 6

Optional Equipment

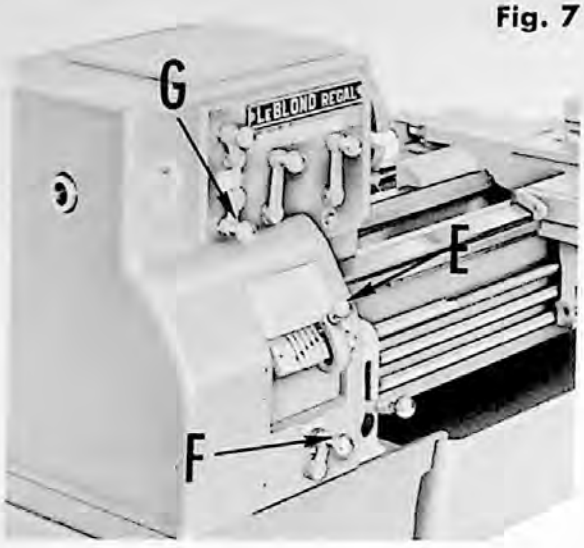
Electric Brake with Motor Drive

If your machine is equipped with electric brake, you will find the power pack (Figure 6), 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 breaking 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 in reverse. The extreme down position of the handle will revolve the spindle forward.

The spindle control handle is located below the headstock to the right of the quick change box. When apron spindle control is furnished, an additional control lever is provided on the apron.

Fig. 7



Quick Change Box (Fig. 7)

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.

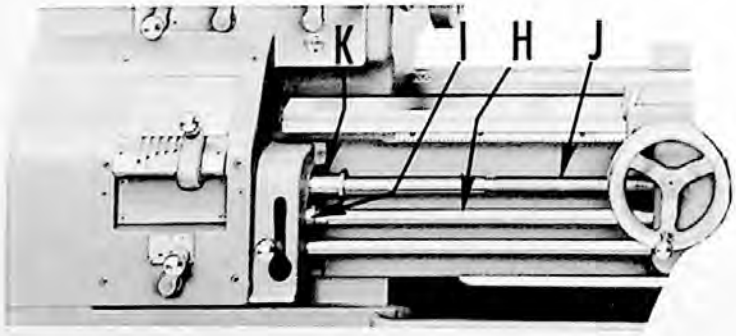
The Leadscrew

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.

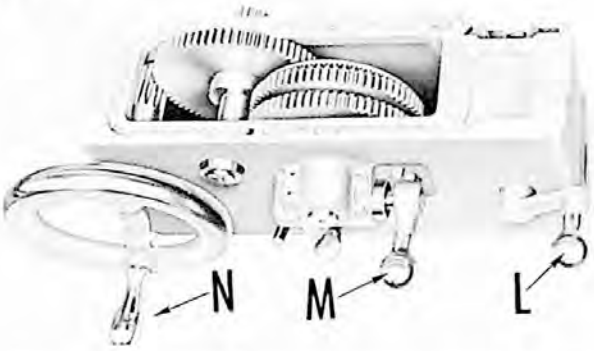
Fig. 8



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. The feed is reversed by a lever on the headstock. An interference device prevents the engagement of the half nuts and the feed at the same time. Do not attmept to force the feed control lever or the half nut lever when the other is engaged.

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

If the machine is equipped with apron spindle control, the 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.

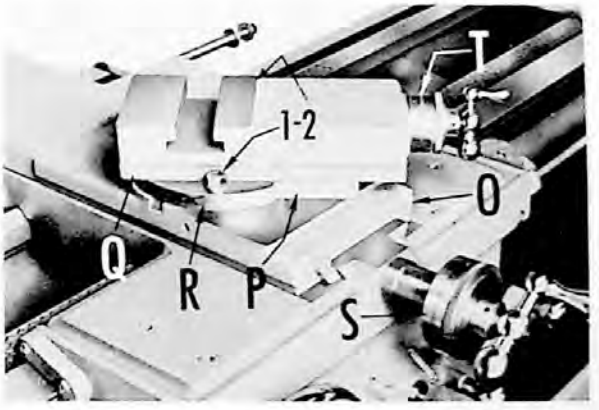
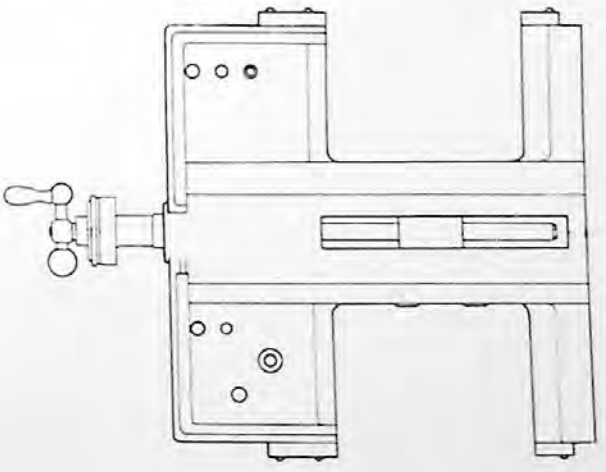


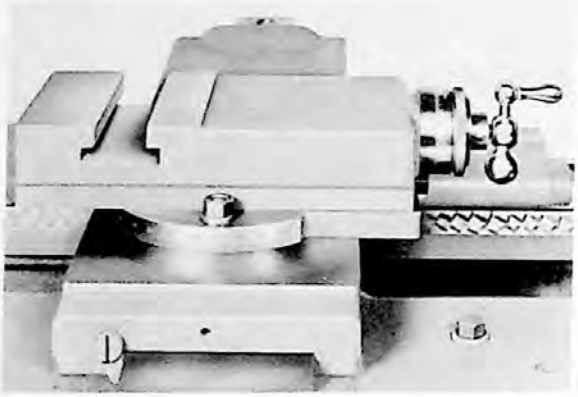
Fig. 10



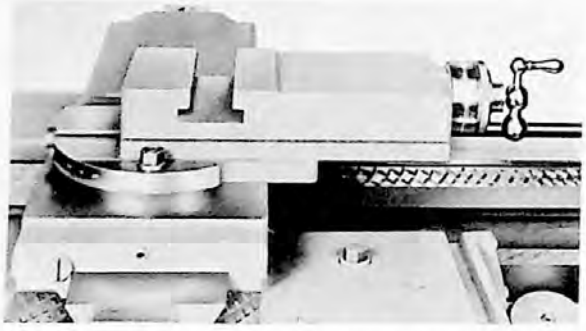
It should be pointed out that the topslide dial is graduated in diameter reduction for use in sizing when the taper attachment is in use. The taper attachment bottomslide draw bar, Figure 19, in its locked position prevents the bottomslide from being moved.

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.

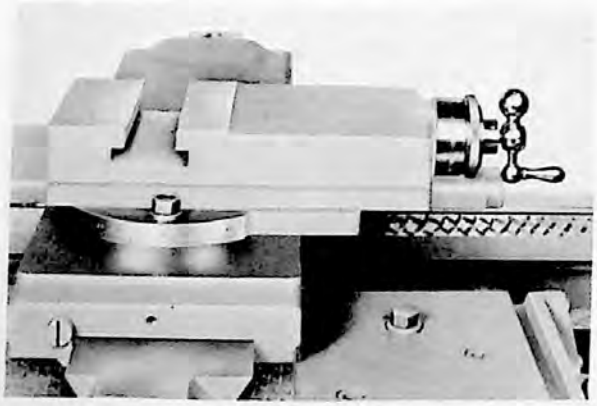
Fig. 11



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.



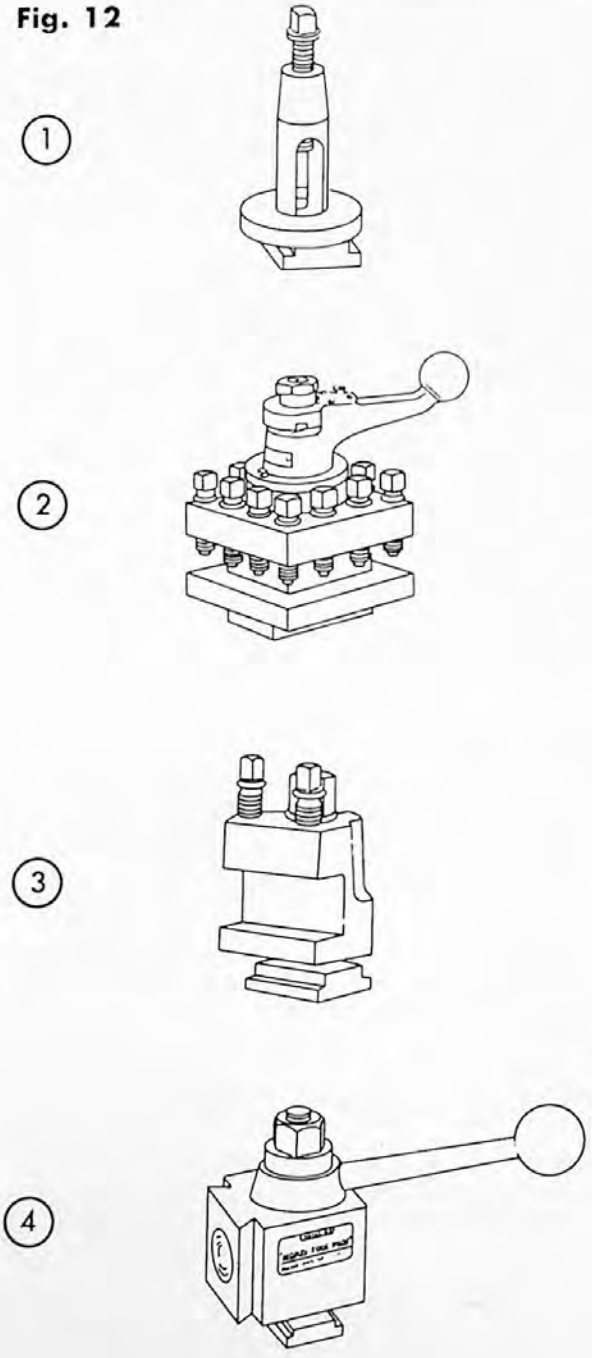
This is right. Top slide should be flush with bottom slide to give greatest tool support.

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. Beacuse 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.

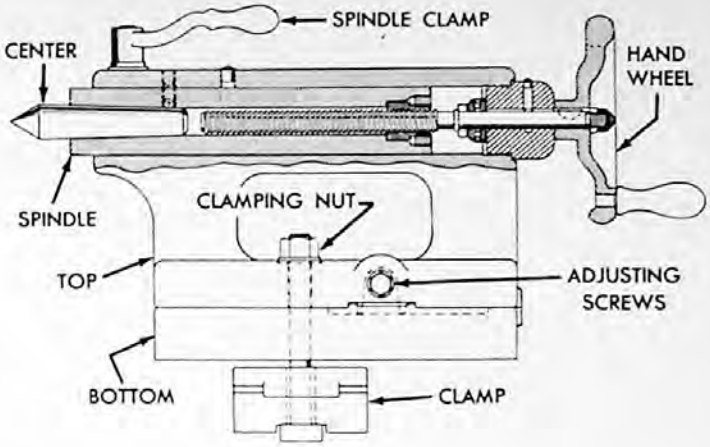
4. Quick Change Type Tool Holders hold only one tool at a time and are comprised of a top slide T-slot clamp; block; and a tool clamping lever to lock each tool in place.

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

Fig. 13



line with the head, and for turning shallow tapers by offsetting the spindle in relation to the head.

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" milalignment 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.

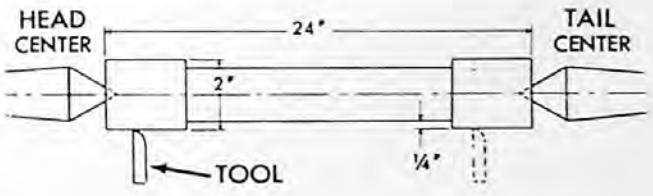


Fig. 14

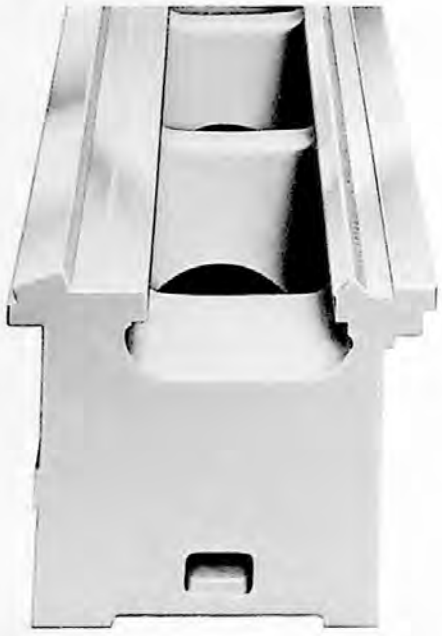
If your lathe is cutting shallow tapers, the alignment of the tailstock center with the headstock is out of position. If the diameter is larger at the headstock, the tailstock top must be moved to the rear of the lathe. If the diameter is larger at the tailstock, the tailstock top must be moved toward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

NOTE: No 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.

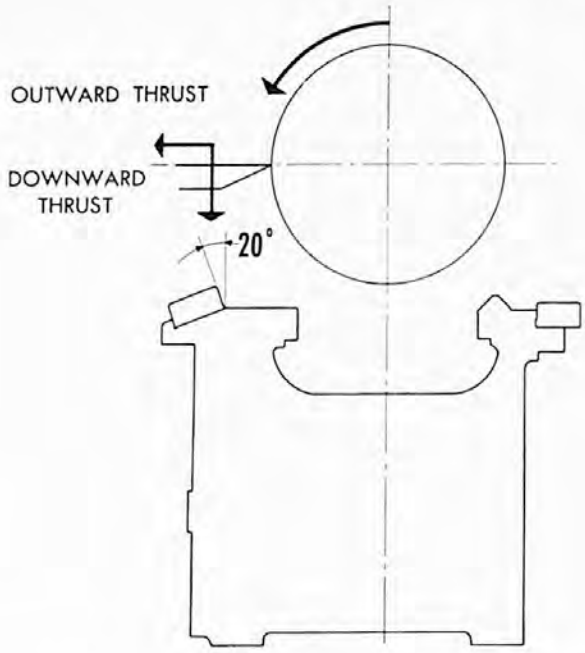
Fig. 15



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 62-54 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



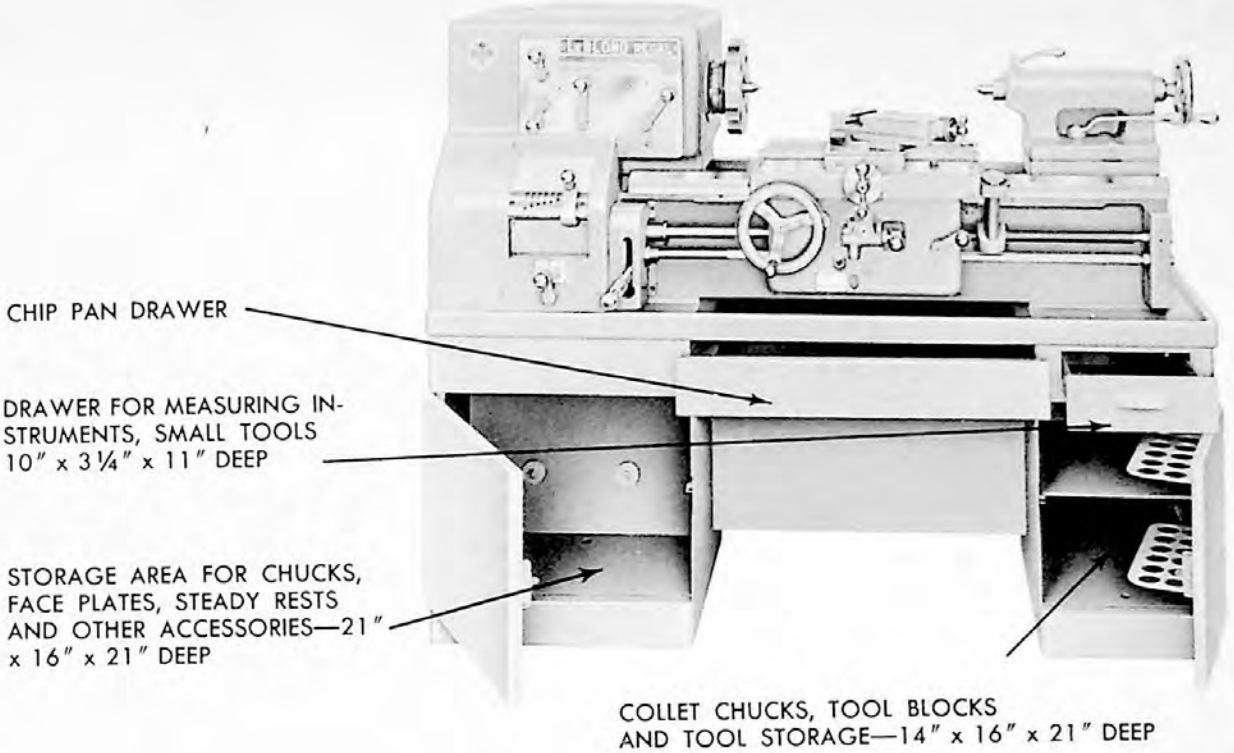
Two types of tail end legs are furnished with the Regal lathe. A standard leg and a completely enclosed leg, (optional equipment), which houses the coolant system. See Figure 17.

Fig. 17

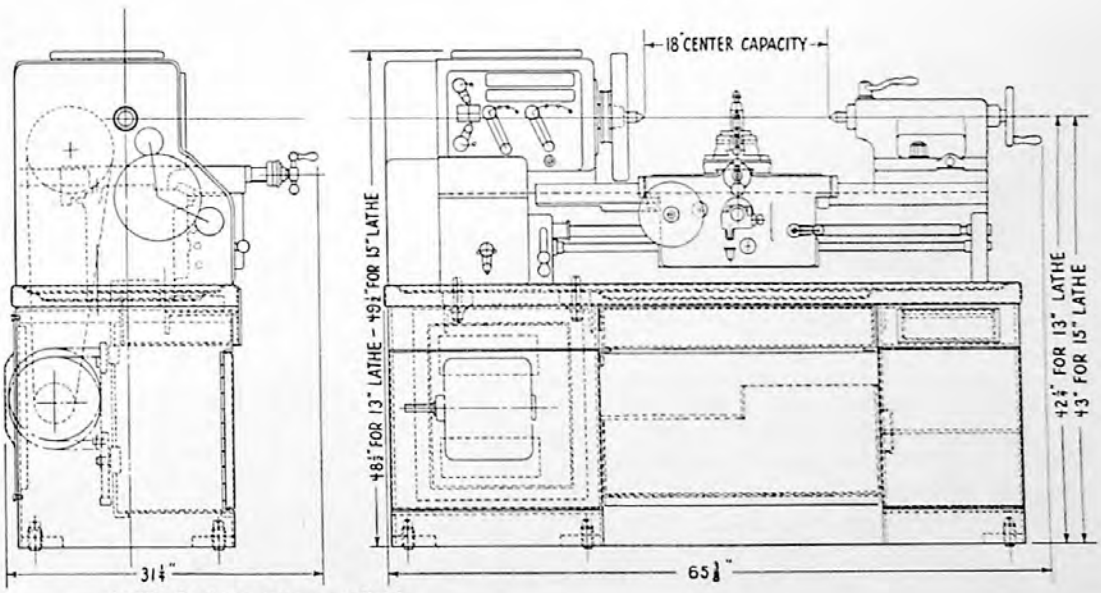
BENCH REGALS

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



MACHINE SPECIFICATIONS

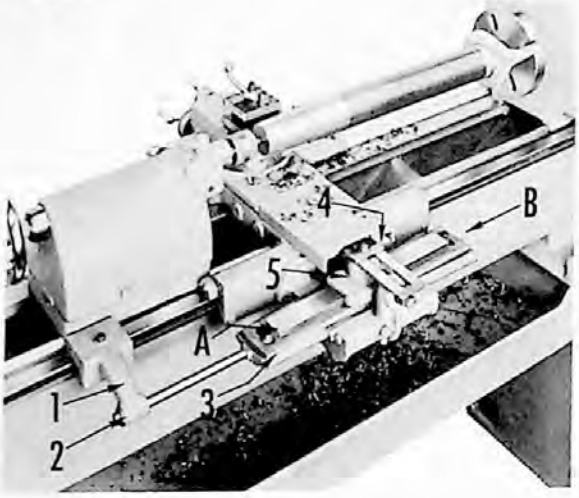


NOTE: Coolant system available

Taper Attachment

The Regal telescopic taper attachment, Figure 19, 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. 19



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 show (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 20, 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.

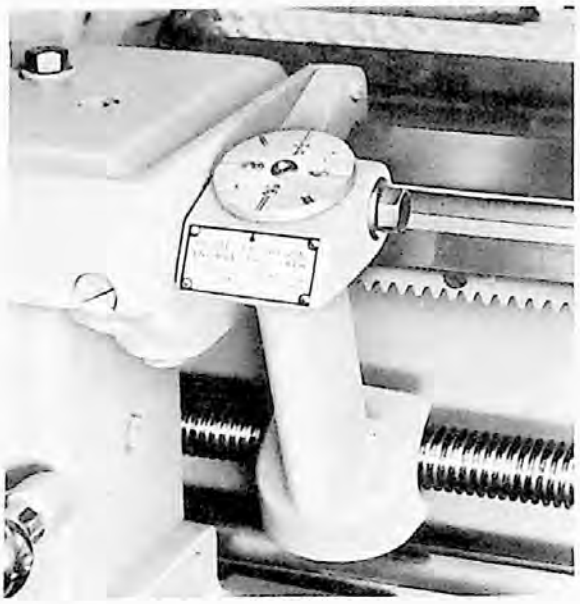


Fig. 20

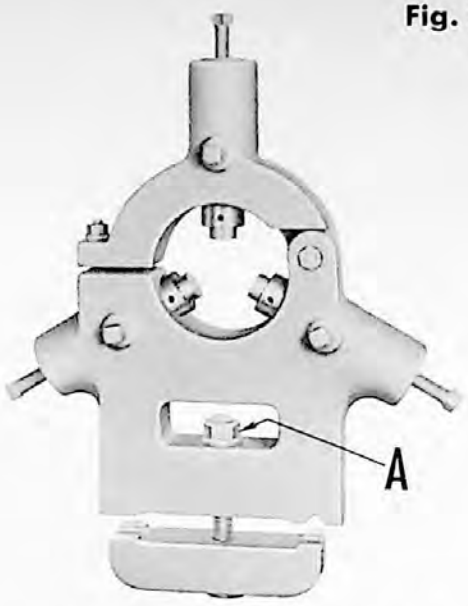
The chasing or thread indicating dial consists of a worm wheel, which runs in the leadscrew, and a shaft connected to an indicating dial. When chasing even numbered threads, the half-nuts may be engaged at any line on the dial, odd numbered threads at any numbered line and half-threads at any odd numbered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

Steady Rest

The steady rest, Figure 21, 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 jaw first.

Fig. 21

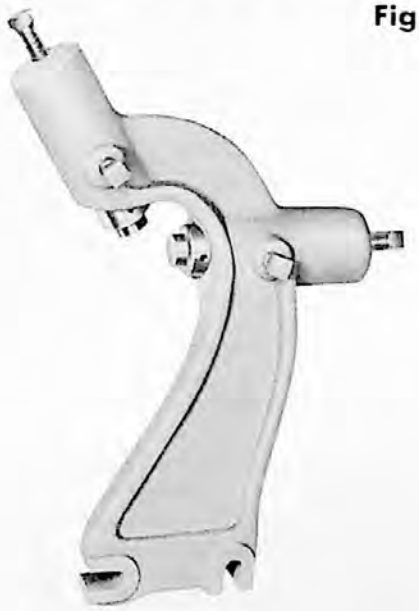


These jaws should be positioned to keep the workpiece running true. The top jaw is then brought into light contact with the workpiece to support the upward thrusting action that occurs when the work is revolving. Be sure to keep oil on the contact area between the jaw tips and the work. Scoring is usually 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 22, is used to support 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 sould be inaccurate, due to its springing away from the tool.

Fig. 22

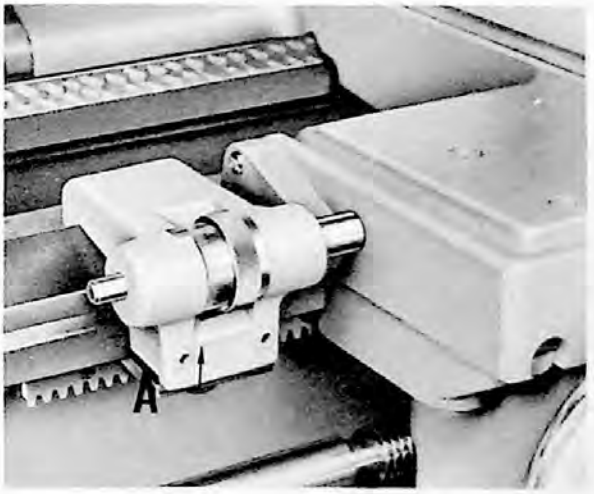


The follow rest is adjusted to the workpiece in the following manner. First, the cut is started and turned approximately 3". The jaws are then set to the turned diameter after which the cut can be taken across the entire length of the work. When adjusting the jaws to the work, make sure they support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

Micrometer Carriage Stop

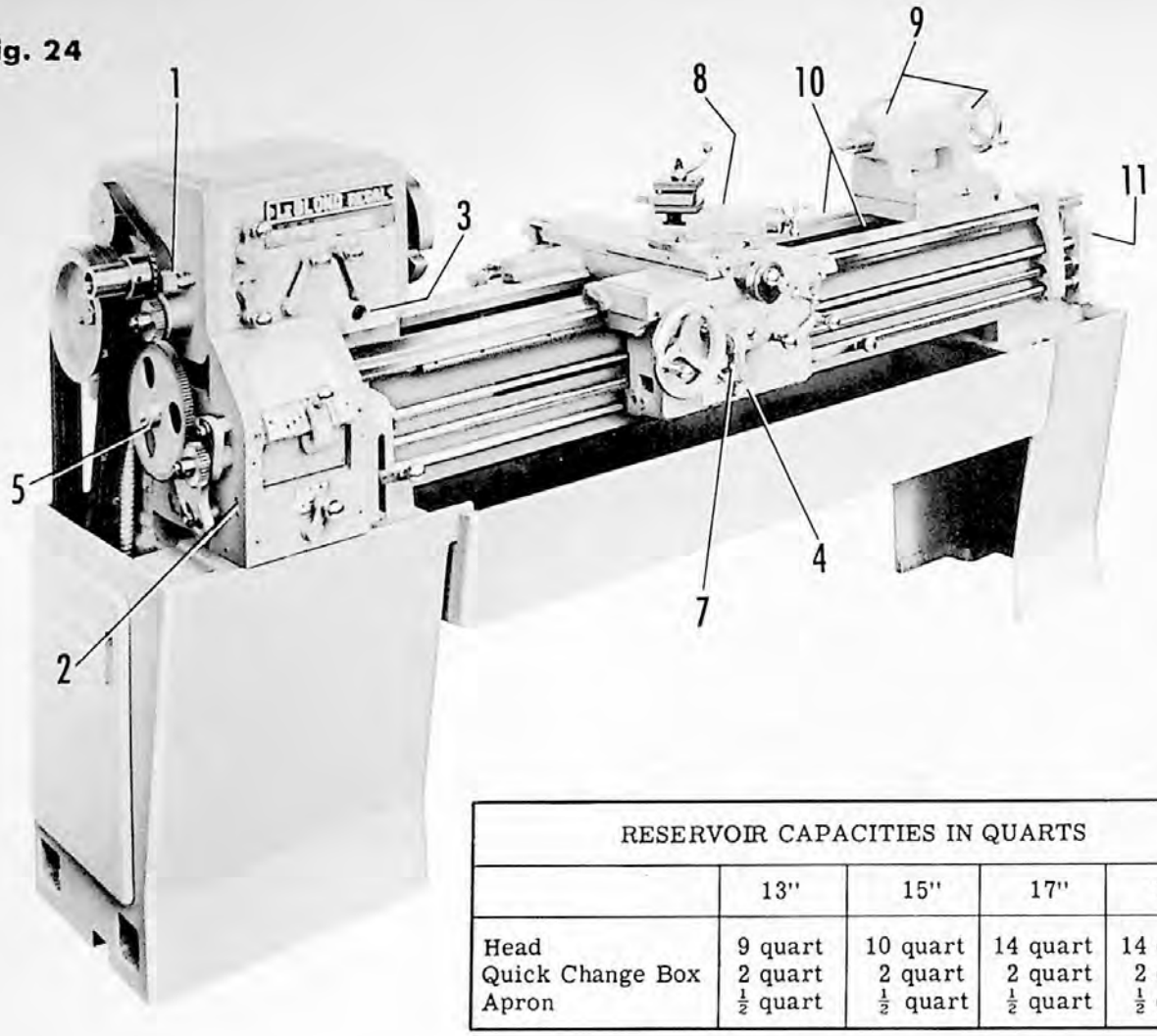
The micrometer carriage stop, Figure 23, permits the operator to bring the carriage to the same position accurately on the bed. It is very useful where a series of cuts are desired at accurate decimal dimensions.

Fig. 23



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.

Fig. 24



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 24.

Use a high grade industrial oil, equal to SAE 30, of 500 sec. 160° F. (See chart above)

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; (2) Quick change box (oil should be within 1/8" of top of filler); (4) apron filler; (5) quadrant gear oiler.

Daily lubrication should be performed at the following points:

(7) Apron pump plunger. This will oil the carriage, 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 (two).

(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.

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 banch. 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 grease 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	Renew 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 (Check by taking off drive belts and running lathe from a motor mounted on floor)	Contact local representative of motor manufacturer.
Chatter	Cutter bit unproperly ground or too wide of area of contact	Regrind cutter bit or adjust tool holder so that area of contact between tool bit and work is decreased.
	Tool overhang too great	Keep point of cutter bit as close as possible to tool holder.
	Using improper surface feet	Reduce or increase spindle speed.
	Feed rate too high	Reduce feed.
	Gibs of cross slide or compound rest loose	Adjust gibs.

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 precisison 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.
Cross slide or compound rest movement does not coincide with dial movement or 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

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.

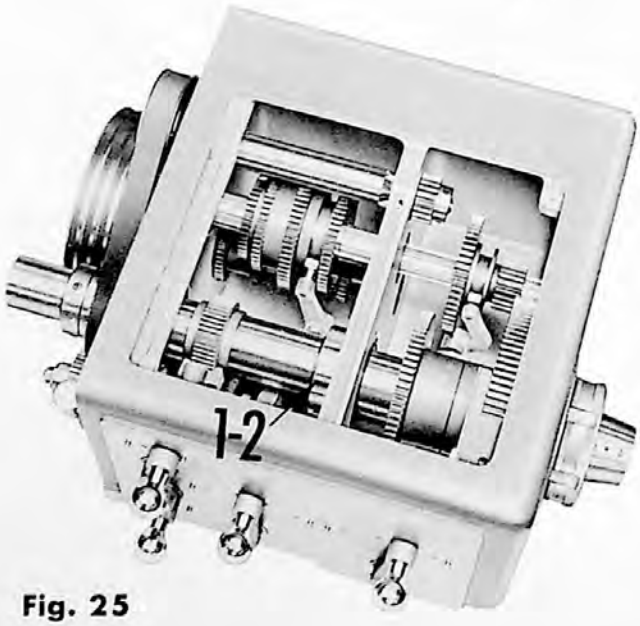


Fig. 25

Belt Tension Adjustment

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 three 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.

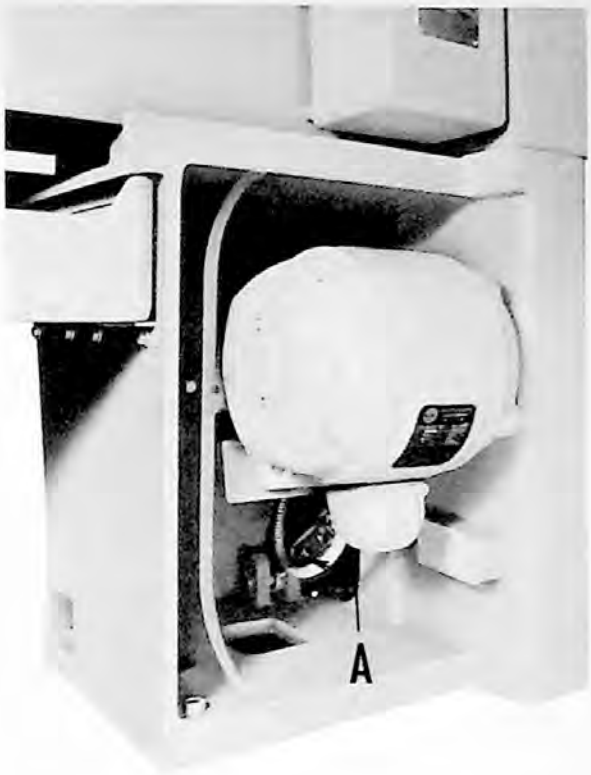


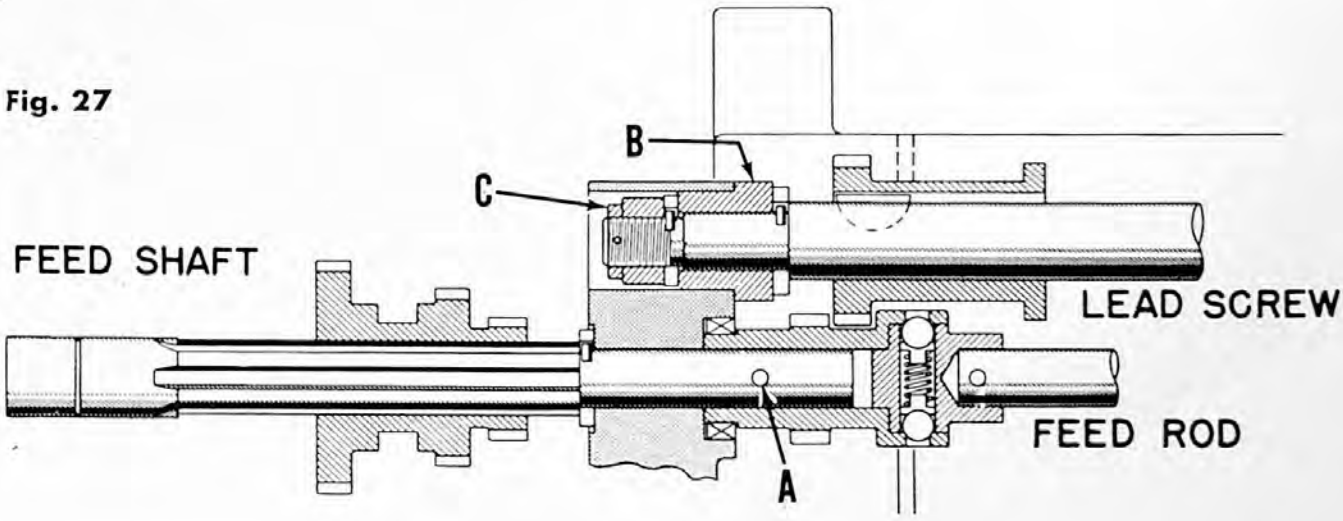
Fig. 26

Leadscrew Adjustment

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. 27



For correct adjustment, follow this procedure:

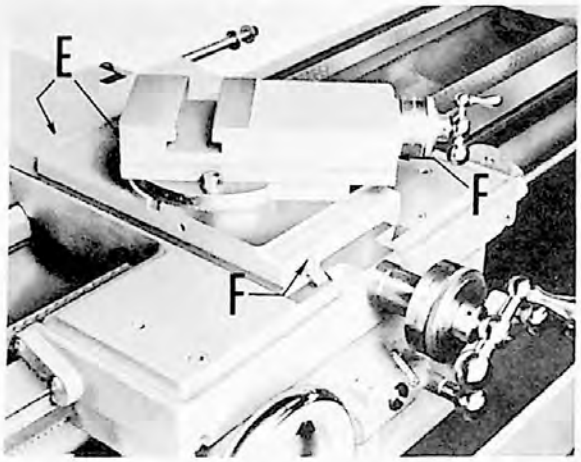
1. Remove fillister head screw securing slip gear cover to the lathe bed, remove the cover.
2. Remove the back box.
3. Remove pin (A) from safety clutch on feed rod.
4. Take out the two fillister head screws securing the leadscrew bushing to the side of the quick change box. Engage the half-nuts on the leadscrew.
5. Move the carriage toward the tailstock end sufficiently to allow the withdrawal of the bushing (B).
6. Draw up the adjusting nut (C) on the end of the leadscrew that extends through the bushing until there is no end play in the leadscrew.

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).

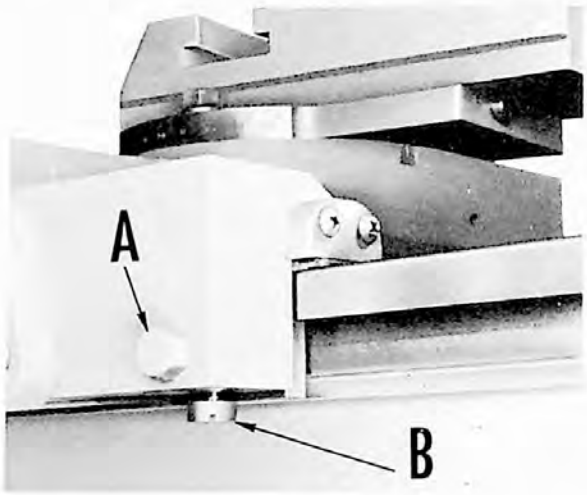
Fig. 28



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. 29

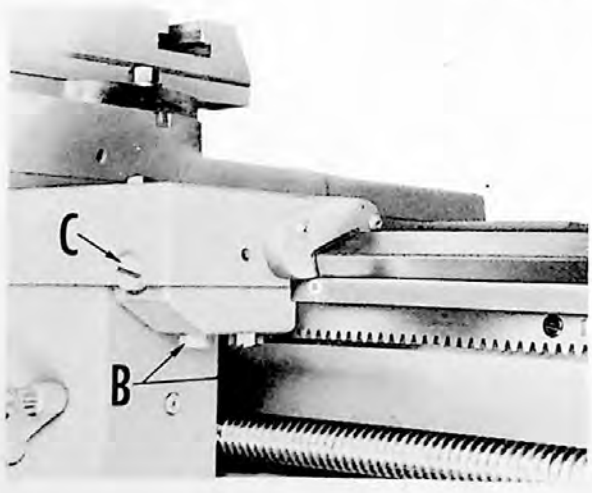


Carriage Front Gib adjustment

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.

Fig. 30



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
10 Centimeters	1 Decimeter
10 Decimeters	1 Meter

1 Kilometer	.6214 mile
1 Meter	39.37 inches
	3.2808 feet
	1.0936 yard
1 Centimeter	.3937 inch
1 Millimeter	.03937 inch

1 Centimeter	.3937 inch
1 Decimeter	3.937 inches
1 Meter	39.37 inches

1 Mile	1.609 kilometers
1 Yard	.9144 meter
1 Foot	.3048 meter
1 Foot	304.8 millimeters
1 Inch	2.54 centimeters
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	Diameter, Inches	Limits, Inches
Running Fits -- Ordinary Speed		Driving Fits -- Ordinary	
Up to 1/2	− 0.00025 to −0.00075	Up to 1/2	+ 0.00075 to + 0.0015
1/2 to 1	− 0.00075 to −0.0015	1/2 to 1	+ 0.001 to + 0.002
1 to 2	− 0.0015 to −0.0025	1 to 2	+ 0.002 to + 0.003
2 to 3-1/2	− 0.0025 to −0.0035	2 to 3-1/2	+ 0.003 to + 0.004
3-1/2 to 6	− 0.0035 to −0.005	3-1/2 to 6	+ 0.004 to + 0.005
Running Fits -- High-Speed, Heavy Pressure and Rocker Shafts		Forced Fits	
Up to 1/2	− 0.0005 to −0.001	Up to 1/2	+ 0.00025 to + 0.0005
1/2 to 1	− 0.001 to −0.002	1/2 to 1	+ 0.0015 to + 0.0025
1 to 2	− 0.002 to −0.003	1 to 2	+ 0.0025 to + 0.004
2 to 3-1/2	− 0.003 to −0.0045	2 to 3-1/2	+ 0.004 to + 0.006
3-1/2 to 6	− 0.0045 to −0.0065	3-1/2 to 6	+ 0.006 to + 0.009
Sliding Fits		Driving Fits -- For such Pieces as are Required to be Readily Taken Apart	
Up to 1/2	− 0.00025 to −0.0005	Up to 1/2	+ 0 to + 0.00025
1/2 to 1	− 0.0005 to −0.001	1/2 to 1	+ 0.00025 to + 0.0005
1 to 2	− 0.001 to −0.002	1-1/2 to 2	+ 0.0005 to + 0.00075
2 to 3-1/2	− 0.002 to −0.0035	2 to 3-1/2	+ 0.00075 to + 0.001
3-1/2 to 6	− 0.003 to −0.005	3-1/2 to 6	+ 0.001 to + 0.0015

INSTRUCTIONS FOR ORDERING PARTS

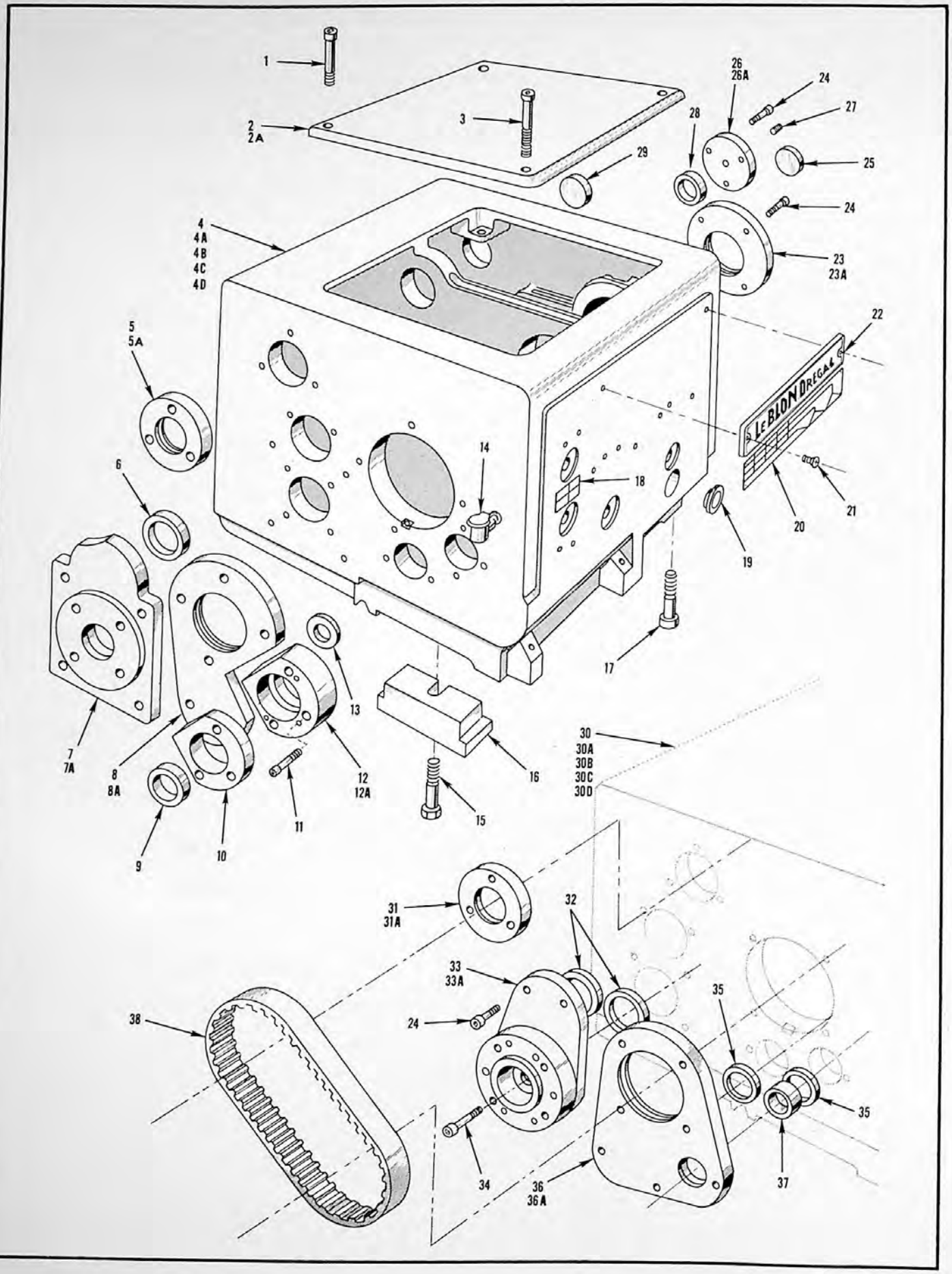
When ordering repair parts, the following information must be given for best service:

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 key 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.

REPAIR PARTS INDEX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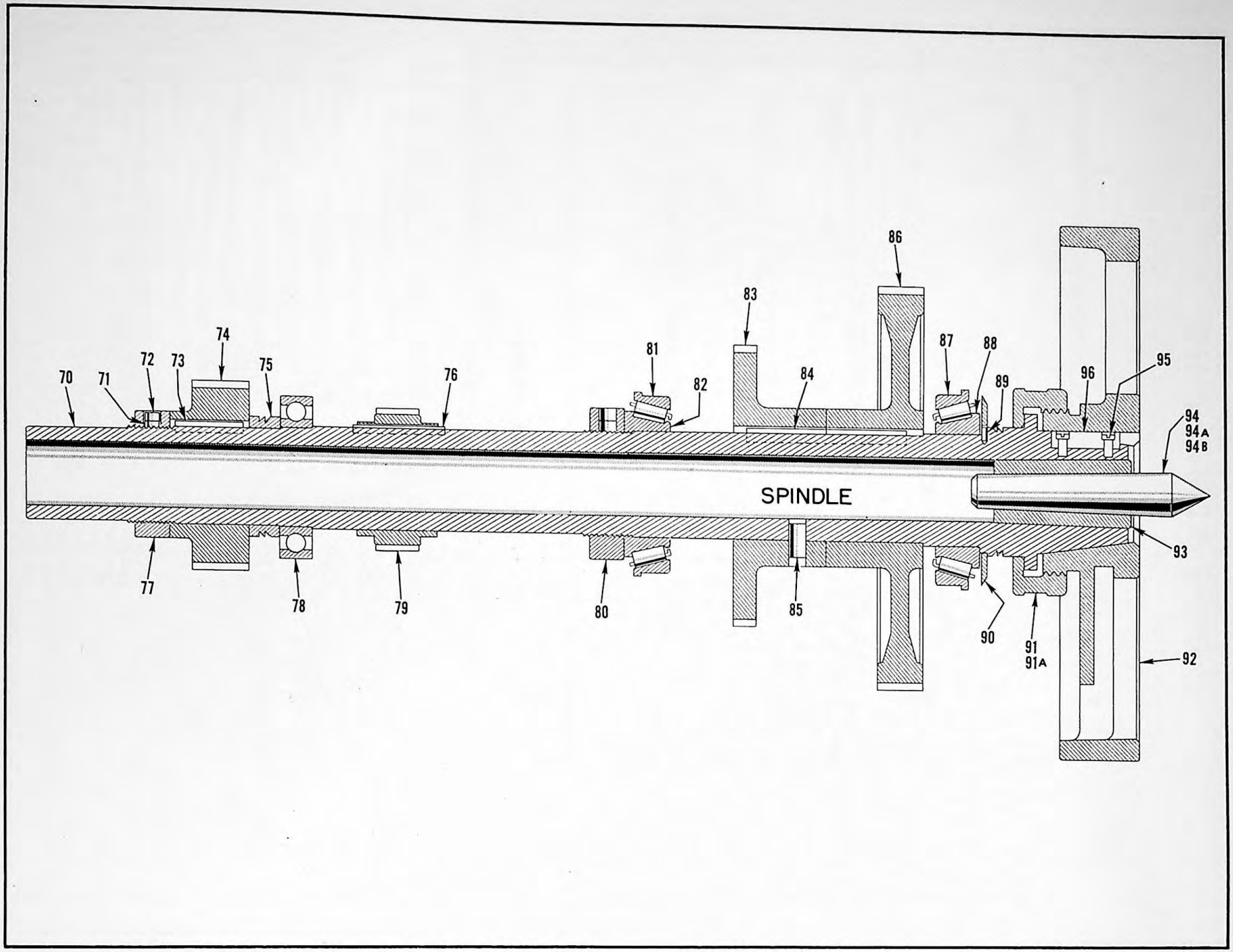
LE BLOND REGAL

HEADSTOCK CASTING

KEY NO.	PART NAME	MODEL	QTY.
1.	Screw, Sock. Hd.	13"-15"	2
		17"-19"	2
2.	Cover, Head Top	13"-15"	1
		17"-19"	1
2A.	Seal, Top Cover (cut to suit)	All	1
3.	Screw, Sock. Hd.	13"-15"	2
		17"-19"	2
4.	Head	13"	1
		15"	1
4A.	Scoop, Face Gear Oil	13"-15"	1
4B.	Screw, Machine	13"-15"	2
4C.	Plug, Pipe	13"-15"	1
4D.	Plug, Oil Hole (oil line restrictors)	13"-15"	3
5.	Flange, High Speed Shaft Rear	13"-15"	1
5A.	Gasket, High Shaft Flange	13"-15"	1
6.	Collar, Drive Shaft Matching	13"-15"	2
7.	Flange, Drive Shaft	13"-15"	1
7A.	Gasket, Drive Shaft Flange	13"-15"	1
8.	Flange, Spindle Rear	13"-15"	1
8A.	Gasket, Spindle Rear Flange	13"-15"	1
9.	Seal, Victroprene Oil	13"-15"	1
10.	Cap, Feed Shaft Bearing Sleeve	13"-15"	1
11.	Screw, Sock. Hd.	13"-15"	3
12.	Sleeve, Feed Shaft Bearing	13"-15"	1
12A.	Gasket, Feed Shaft Bearing Sleeve	13"-15"	1
13.	Collar, Inter, Fe. Shaft Matching	13"-15"	1
14.	Oiler	13"-15"	1
		17"-19"	1
15.	Screw, Hex Head Cap	13"-15"	1
16.	Clamp, Head to Bed	13"-15"	1
17.	Screw, Sock. Hd. Cap	13"-15"	2
		17"-19"	4
18.	Plate Feed Indicator	13"-15"	1
		17"-19"	1
19.	Window Unit, BIJUR Oil Level Type	All	1
20.	Plate, Spindle Speed		
	(30 to 1200 RPM)	13"-15"	1
	(45 to 1800 RPM)	13"-15"	1
	(25 to 1000 RPM)	17"-19"	1
	(37 to 1500 RPM)	17"-19"	1

KEY NO.	PART NAME	MODEL	QTY.
21.	Screw, Mach. Oval Hd.	All	2
22.	Name Plate, "LEBLOND"	13"-15"	1
		17"-19"	1
23.	Flange, Spindle Front	13"-15"	1
		17"-19"	1
23A.	Gasket, Spindle Front Flange	13"-15"	1
		17"-19"	1
24.	Screw, Sock. Hd. (for various end flanges)	13"-15"	25
		17"-19"	19
25.	Plug, Steel	13"-15"	1
		17"-19"	1
26.	Plug, Inter. Shaft Front	13"-15"	1
		17"-19"	1
26A.	Gasket, Inter. Shaft Front	13"-15"	1
		17"-19"	1
27.	Screw, Set	All	1
28.	Collar, Inter. Shaft Marching	13"-15"	1
		17"-19"	1
29.	Plug, Steel	13"-15"	1
		17"-19"	1
30.	Head	17"	1
		19"	1
30A.	Scoop, Face Gear Oil	17"-19"	1
30B.	Screw, Machine	17"-19"	2
30C.	Plug, Pipe	17"-19"	1
30D.	Plug, Oil Hole (oil line restrictors)	17"-19"	3
31.	Flange, High Speed Shaft Rear	17"-19"	1
31A.	Gasket, High Speed Shaft Flange	17"-19"	1
32.	Collar, Drive Shaft Matching	17"-19"	2
33.	Flange, Drive Shaft	17"-19"	1
33A.	Gasket, Drive Shaft Flange	17"-19"	1
34.	Screw, Sock. Hd.	17"-19"	4
35.	Collar, Inter. Feed Shaft Matching	17"-19"	2
36.	Flange, Spindle Rear	17"-19"	1
36A.	Gasket, Spindle Rear Flange	17"-19"	1
37.	Seal, Victoprene Oil	17"-19"	1
38.	Belt Gelmer Timing	13"-15"	1
		17"-19"	1

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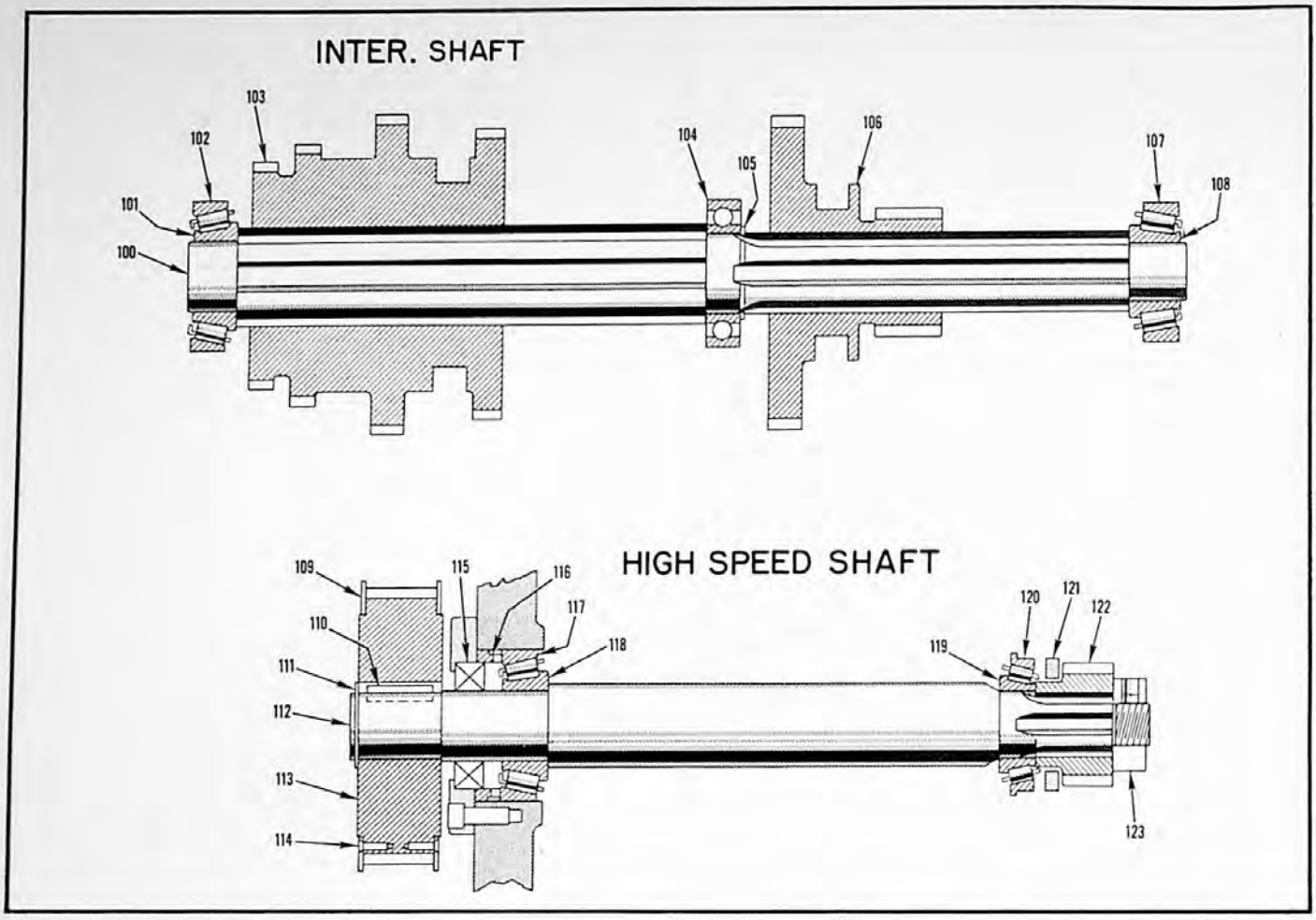
SPINDLE

SPINDLE

KEY NO.	PART NAME	MODEL	QTY.
70.	Spindle	13"-15"	1
		17"-19"	1
71.	Plug	13"-15"	2
72.	Screw, Set	13"-15"	2
		13"-15"	1
73.	Key, Flat	17"-19"	1
		13"-15"	1
74.	Pulley, High Speed Spindle	17"-19"	1
		13"-15"	1
75.	Collar, Spindle Thrust	17"-19"	1
		13"-15"	1
76.	Key, Flat	17"-19"	1
		13"-15	1
77.	Nut, Lock	17"-19"	1
		13"-15"	1
78.	Bearing, MRC Ball	17"-19"	1
		13"-15"	1
79.	Gear, Spindle Feed Reverse	17"-19"	1
		13"-15"	1
80.	Nut, Lock	17"-19"	1
		13"-15"	1
81.	Cup, Timken Bearing #3	17"-19"	1
		13"-15"	1
82.	Cone, Timken Bearing #3	17"-19"	1
		13"-15"	1
83.	Gear, Spindle	17"-19"	1
		13"-15"	1
84.	Key, Flat	17"-19"	1
		13"-15"	1
85.	Pin, Straight	17"-19"	1
		13"-15"	1
86.	Gear, Spindle Face	17"-19"	1
		13"-15"	1
87.	Cup, Timken Bearing #3	17"-19"	1
		13"-15"	1
88.	Cone, Timken Bearing #3	17"-19"	1

KEY NO.	PART NAME	MODEL	QTY.
89.	Pin, Straight (not used on 17"-19")	13"-15"	1
90.	Slinger, Spindle Oil	13"-15"	1
		17"-19"	1
91.	Nut, Draw	13"-15"	1
		17"-19"	1
91A.	Wrench, Spanner (for Draw Nut)	13"-15"	1
		17"-19"	1
92.	Plate, Small Face	13"-15"	1
	Plate, Large Face 12" Diam.	13"	1
	14" Diam.	15"	1
	Plate, Large Chuck 7" Diam.	13"-15"	1
	Plate, Extra Large Chuck 10-1/4" Diam.	13"-15"	1
	Plate, Large Chuck 8" Diam.	13"-15"	1
	Plate, Medium Chuck 6" Diam.	13"-15"	1
	Center, Spindle Half	13"-15"	1
	Plate, Small Face	17"-19"	1
	Plate, Large Face 16" Diam.	17"	1
	18" Diam.	19"	1
	Plate, Small Chuck 6" Diam.	17"-19"	1
	Plate, Medium Chuck 7" Diam.	17"-19"	1
	Plate, Extra Large Chuck 11-1/2" Diam.	17"-19"	1
	13-1/4" Diam.	17"-19"	1
	Plate, Large Chuck 8" Diam.	17"-19"	1
	9" Diam.	17"-19"	1
93.	Bush, Spindle Center	13"-15"	1
		17"-19"	1
94.	Center, Spindle	13"-15"	1
		17"-19"	1
94A.	Center, Spindle Half	17"-19"	1
94B.	Rod, Center Knockout	17"-19"	1
95.	Screw, Filister Head	All	2
96.	Key Spindle Nose	13"-15"	1
		17"-19"	1

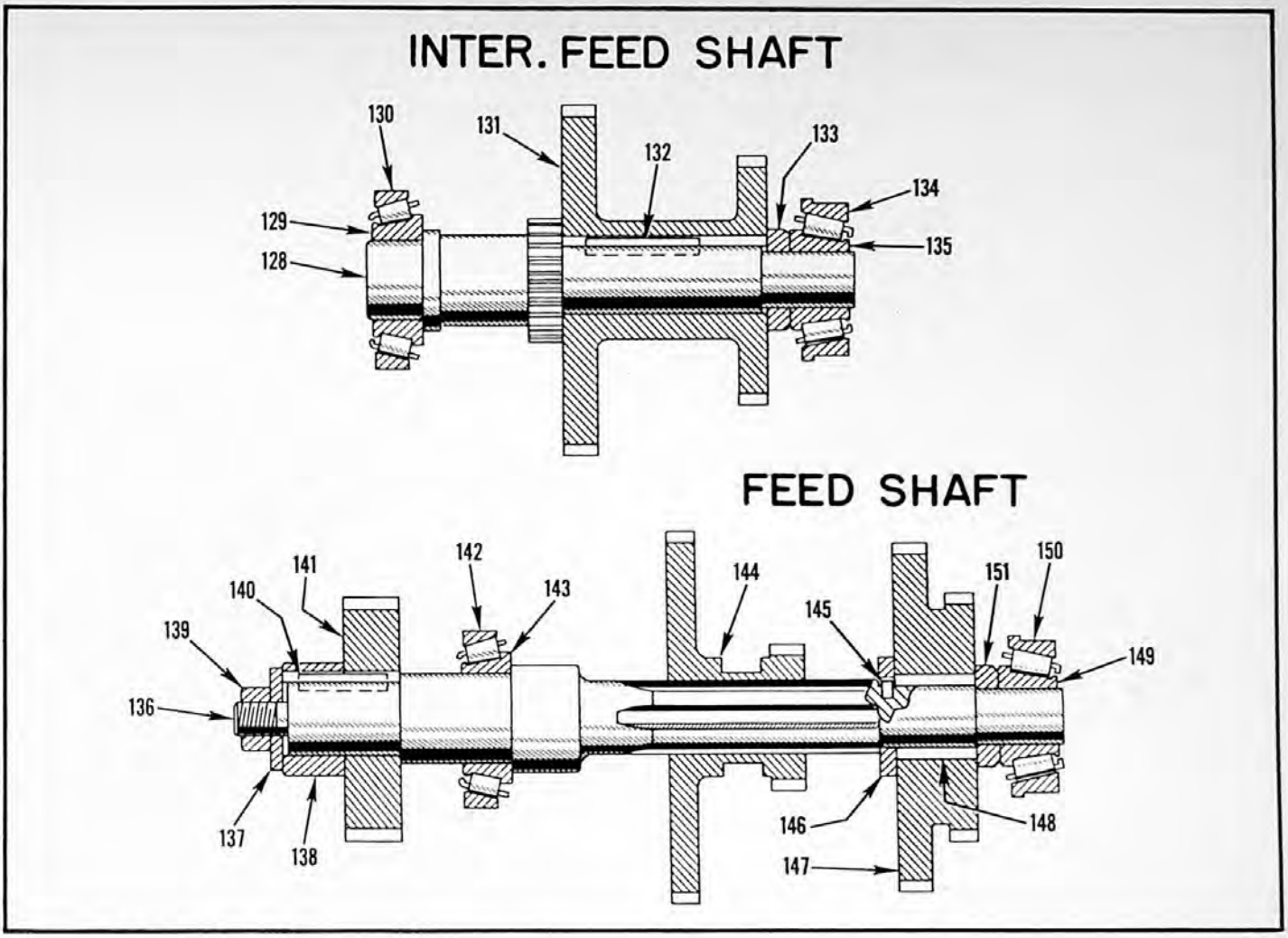
IMPORTANT—Include serial number of your lathe when ordering repair parts.



INTERMEDIATE SHAFT - HIGH SPEED SHAFT

KEY NO.	PART NAME	MODEL	QTY.	KEY NO.	PART NAME	MODEL	QTY.
100.	Shaft, Intermediate	13"-15"	1	112.	Shaft, High Speed	13"-15"	1
		17"-19"	1			17"-19"	1
101.	Cone, Timken Bearing #2. . .	13"-15"	1	113.	Pulley, High Speed Shaft . . .	13"-15"	1
		17"-19"	1			17"-19"	1
102.	Cup, Timken Bearing #2 . . .	13"-15"	1	114.	Screw, Flat Head Sock. . . .	All	8
		17"-19"	1	115.	Seal, Victoprene Oil	13"-15"	1
103.	Gear, Intermediate Shaft Cluster	13"-15"	1			17"-19"	1
		17"-19"	1	116.	Collar, High Speed		
104.	Bearing, MRC Ball	13"-15"	1		Shaft Matching	13"-15"	1
		17"-19"	1			17"-19"	1
105.	Ring, Truarc	13"-15"	1	117.	Cup, Timken Bearing #2 . . .	13"-15"	1
		17"-19"	1			17"-19"	1
106.	Gear, Intermediate	13"-15"	1	118.	Cone, Timken Bearing #2 . .	13"-15"	1
		17"-19"	1			17"-19"	1
107.	Cup, Timken Bearing #2 . . .	13"-15"	1	119.	Cone, Timken Bearing #2 . .	13"-15"	1
		17"-19"	1			17"-19"	1
108.	Cone, Timken Bearing #2 . .	13"-15"	1	120.	Cup, Timken Bearing #2 . . .	13"-15"	1
		17"-19"	1			17"-19"	1
109.	Flange, High Speed Shaft Pulley	13"-15"	2	121.	Retainer, High Speed Shaft Oil .	13"-15"	1
		17"-19"	2			17"-19"	1
110.	Key, Flat	13"-15"	1	122.	Pinion, High Speed Shaft . . .	13"-15"	1
		17"-19"	1			17"-19"	1
111.	Ring, Truarc	13"-15"	1	123.	Nut, Lock.	13"-15"	1
		17"-19"	1			17"-19"	1

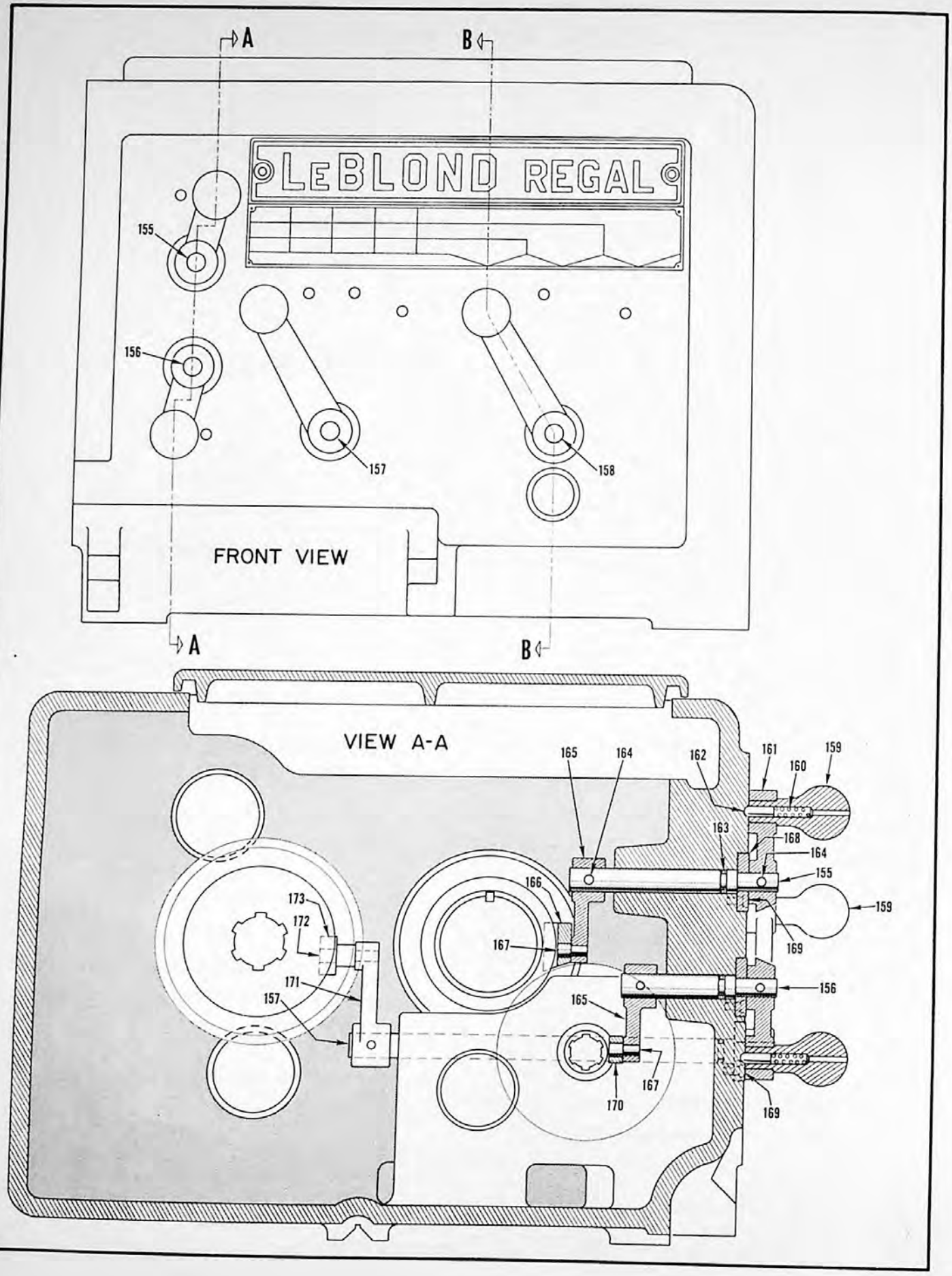
IMPORTANT—Include serial number of your lathe when ordering repair parts.



INTERMEDIATE FEED SHAFT - - FEED SHAFT

KEY. NO.	PART NAME	MODEL	QTY.	KEY NO.	PART NAME	MODEL	QTY.
128.	Shaft, Intermediate Feed	13"-15"	1	141.	Gear, Feed Change	13"-15"	1
		17"-19"	1			17"-19"	1
129.	Cone, Timken Bearing #2	13"-15"	1	142.	Cup, Timken Bearing #2	13"-15"	1
		17"-19"	1			17"-19"	1
130.	Cup, Timken Bearing #2	13"-15"	1	143.	Cone, Timken Bearing #2	13"-15"	1
		17"-19"	1			17"-19"	1
131.	Gear, Intermediate Feed Shaft	13"-15"	1	144.	Gear, Feed Shaft Sliding	13"-15"	1
		17"-19"	1			17"-19"	1
132.	Key, Flat	13"-15"	1	145.	Pin, Straight	All	1
		17"-19"	1	146.	Collar, Feed Reverse Idler Gear	13"-15"	1
133.	Collar, Spacing	13"-15"	1		Collar, Thrust	17"-19"	1
	Collar, Thrust	17"-19"	1	147.	Gear, Feed Reverse Idler	13"-15"	1
134.	Cup, Timken Bearing #2	13"-15"	1			17"-19"	1
		17"-19"	1	148.	Bush, Feed Reverse Idler Gear	13"-15"	1
135.	Cone, Timken Bearing #2	13"-15"	1			17"-19"	1
		17"-19"	1	149.	Cone, Timken Bearing #2	13"-15"	1
136.	Shaft, Feed	13"-15"	1			17"-19"	1
		17"-19"	1	150.	Cup, Timken Bearing #2	13"-15"	1
137.	Washer, Spec	All	1			17"-19"	1
138.	Collar, Feed Shaft Change Gear	All	1	151.	Collar, Spacing	13"-15"	1
139.	Nut, Hex	All	1			17"-19"	1
140.	Key, Flat	All	1				

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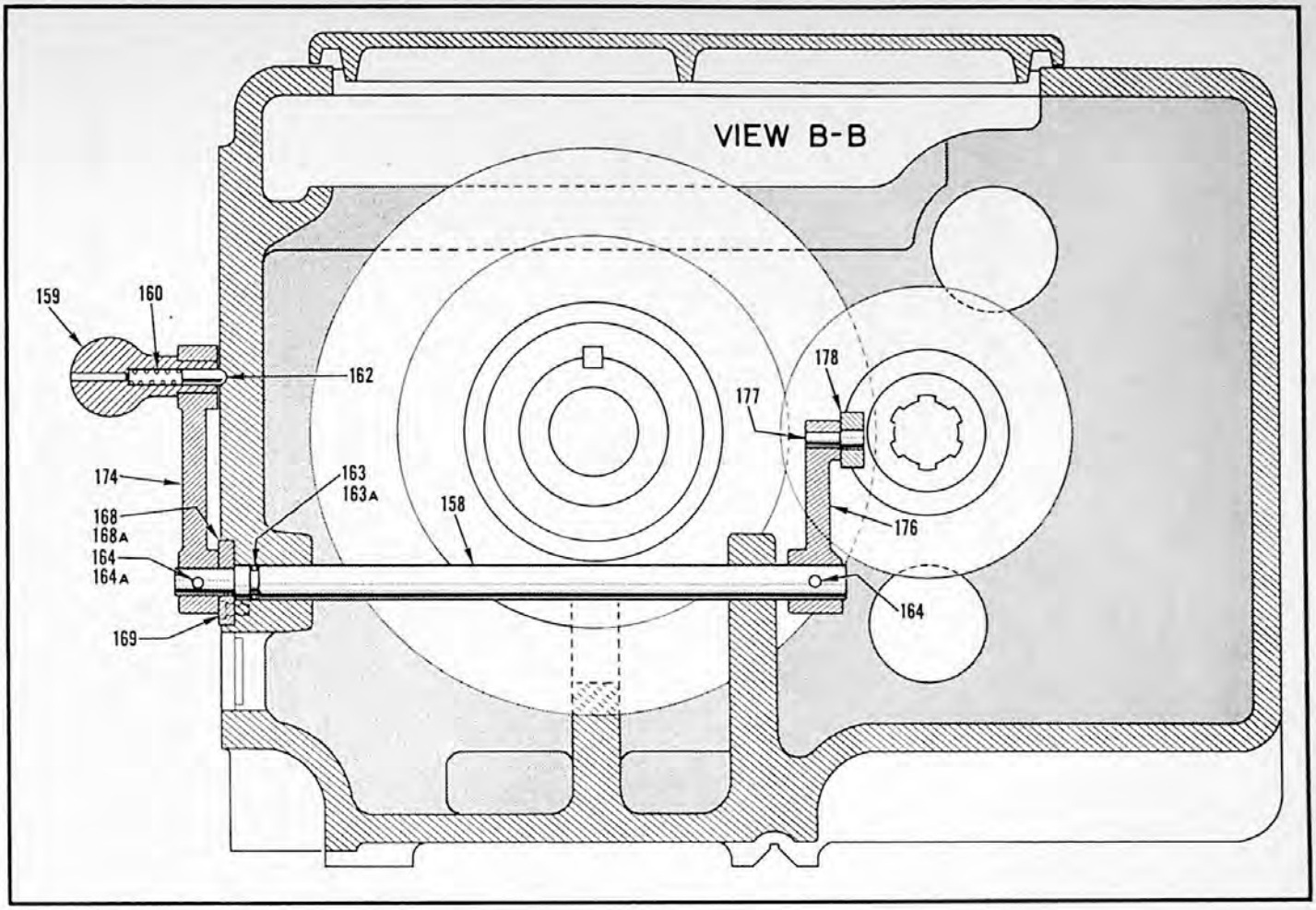
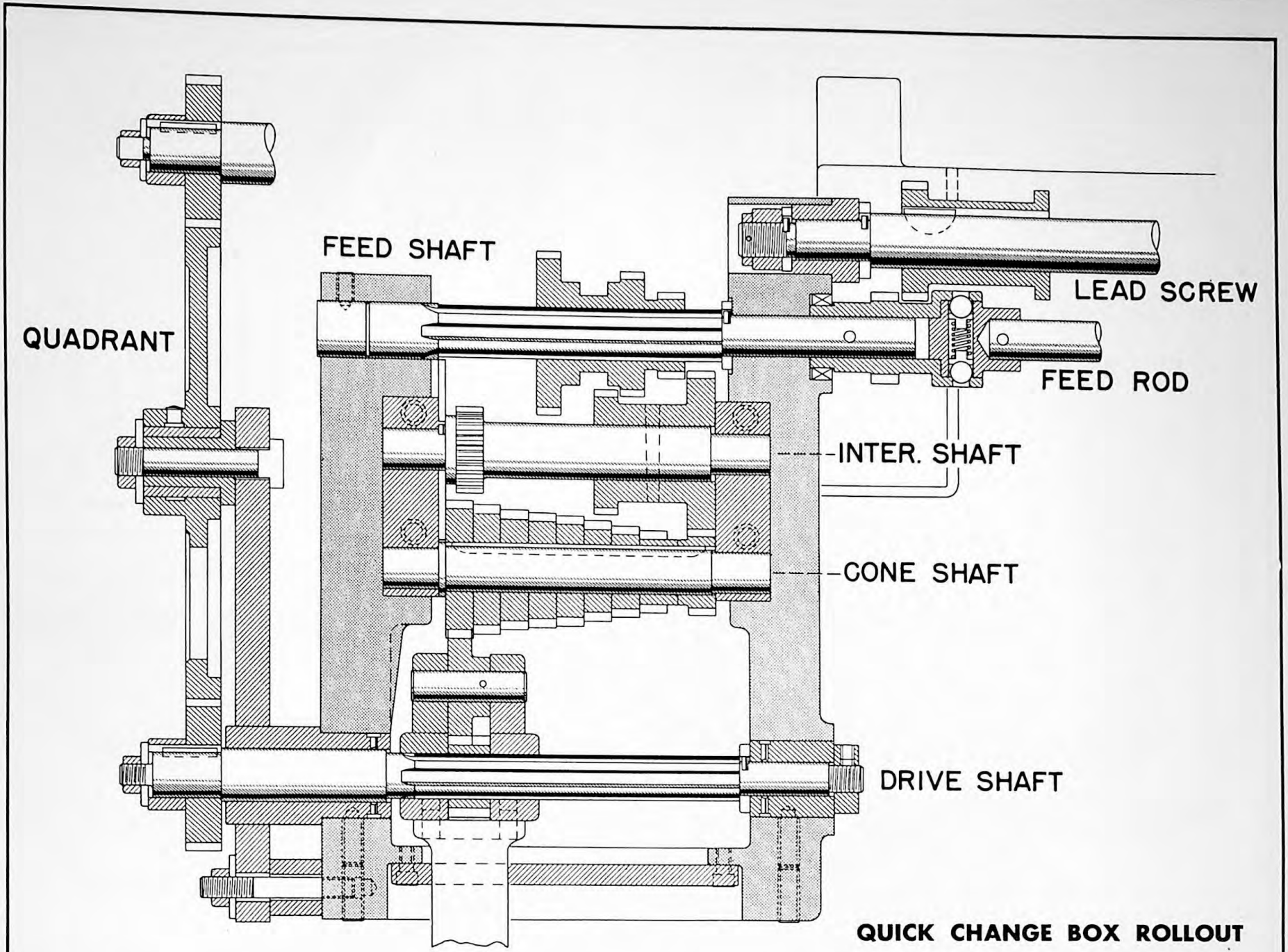


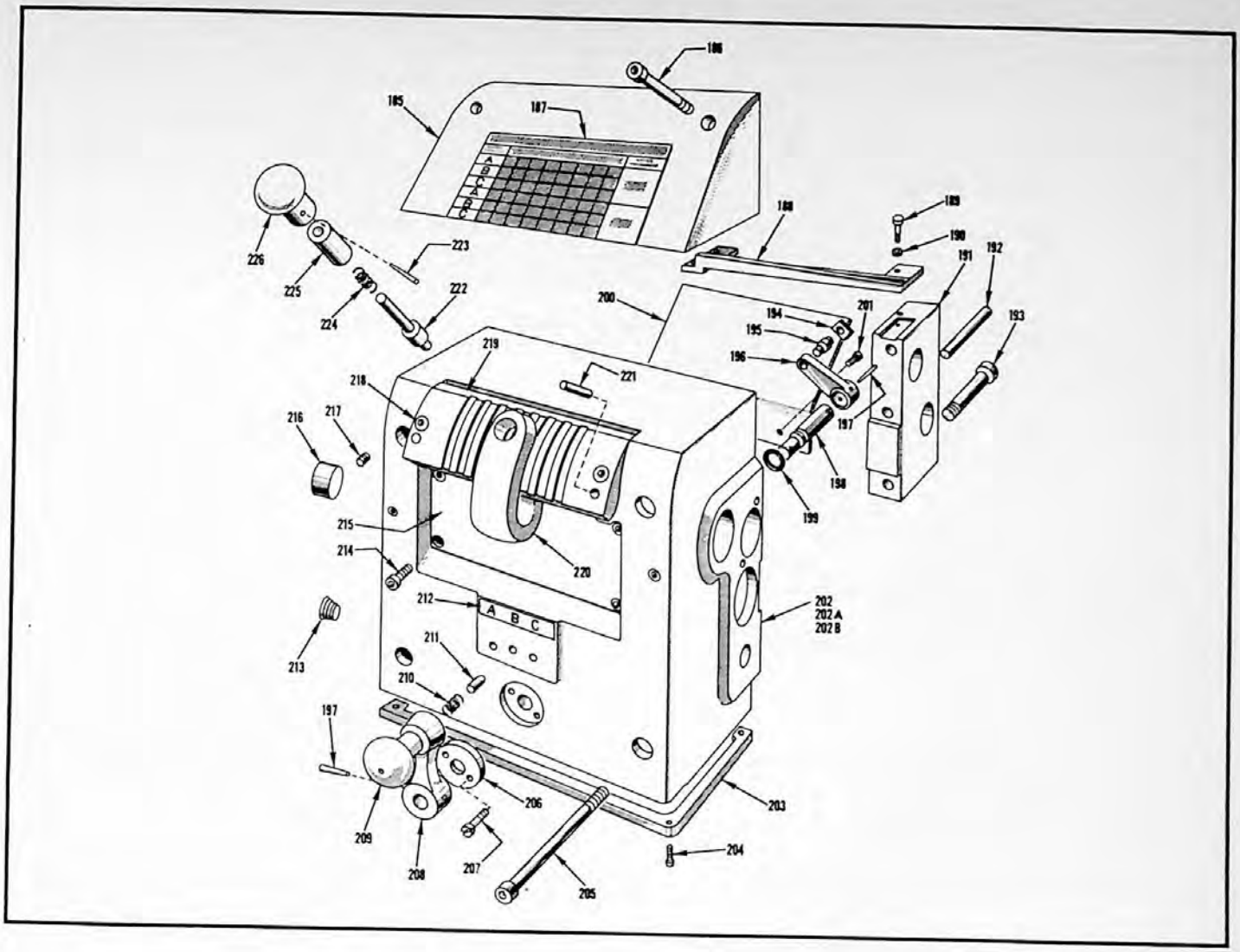
HEAD SHIFTERS

KEY NO.	PART NAME	MODEL	QTY.
155.	Shaft, Feed Reverse Gear Shifter	13"-15"	1
		17"-19"	1
156.	Shaft, Feed Compound Shifter	13"-15"	1
		17"-19"	1
157.	Shaft, Inter. Shaft Sliding Cluster Gear Shifter	13"-15"	1
		17"-19"	1
158.	Shaft, Inter. Shaft Sliding Back Gear Shifter	13"-15"	1
		17"-19"	1
159.	Handle, Ball	All	4
160.	Spring	All	4
161.	Handle, Shifter Shaft	13"-15"	2
		17"-19"	2
162.	Plunger, Shifter Handle	All	4
163.	Ring "O"	13"-15"	4
		17"-19"	2
163A.	Ring "O"	17"-19"	2
164.	Pin, Taper	13"-15"	8
		17"-19"	4
164A.	Pin, Taper	17"-19"	4
165.	Lever, Shifter	13"-15"	2
		17"-19"	2
166.	Shoe, Shifter	13"-15"	1
		17"-19"	1
167.	Pin, Shoulder	All	2
168.	Collar, Shifter Retainer	13"-15"	4
		17"-19"	2
168A.	Collar, Shifter Retainer	17"-19"	2
169.	Screw, Phillips Head	All	8
170.	Shoe, Shifter Lever	13"-15"	1
		17"-19"	1
171.	Lever, Shifter	13"-15"	1
		17"-19"	1
172.	Pin, Shifter	13"-15"	1
		17"-19"	1
173.	Shoe, Shifter Lever	13"-15"	1
		17"-19"	1
174.	Handle, Shifter	13"-15"	2
		17"-19"	2
175.	Lever, Shifter	13"-15"	1
		17"-19"	1
176.	Pin, Shoulder	13"-15"	1
		17"-19"	1
177.	Shoe, Shifter Lever	13"-15"	1
		17"-19"	1

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

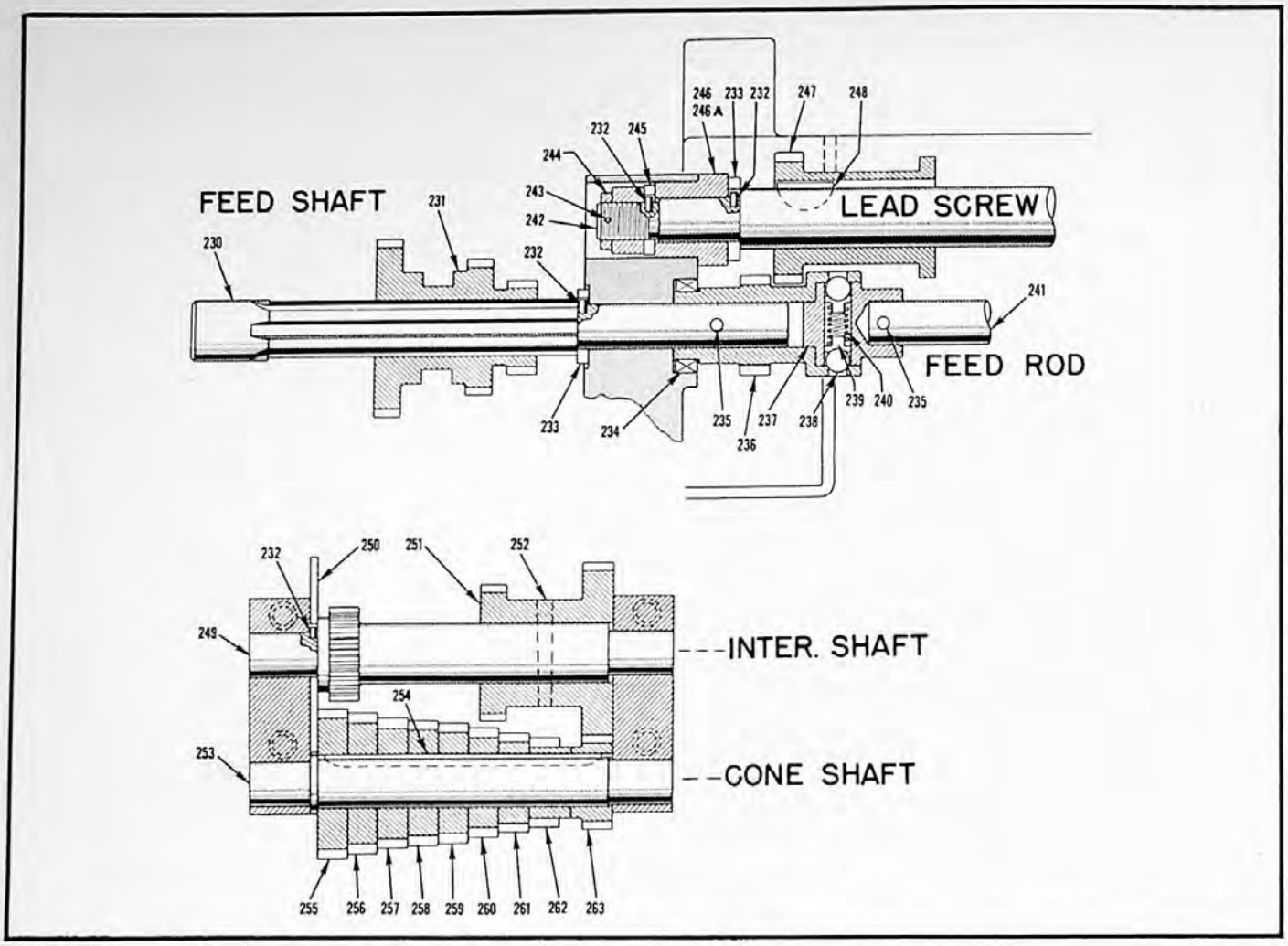


QUICK CHANGE BOX ROLLOUT



QUICK CHANGE BOX CASTING

KEY NO.	PART NAME	MODEL	QTY.	KEY NO.	PART NAME	MODEL	QTY.
185.	Cover, Quick Change Box Top	13"	1	203.	Extension, Quick Change Box	17"-19"	1
		15"-17"	1	204.	Screw	17"-19"	3
		19"	1	205.	Screw	All	4
186.	Screws	13"-15"	2	206.	Collar, Shifter Retainer	All	1
		17"-19"	2	207.	Screw	All	2
187.	Plate, Index	13"-15"	1	208.	Handle, Shifter	All	1
		17"-19"	1	209.	Handle, Ball	All	1
188.	Trough, Oil	All	1	210.	Spring	All	1
189.	Screw	All	2	211.	Plunger Shifter Handle	All	1
190.	Washer	All	2	212.	Plate, Indicator	All	1
191.	Cap	All	2	213.	Plug, Pipe	All	2
192.	Pin	All	2	214.	Screw	All	4
193.	Screw	All	4	215.	Cover, Front	All	1
194.	Shoe, Shifter	All	1	216.	Plug	All	1
195.	Pin, Shifter	All	1	217.	Screw, Set	All	1
196.	Link, Shifter	All	1	218.	Screw	All	2
197.	Pin, Taper	All	2	219.	Plate, Shifter Lock	All	1
198.	Shaft, Shifter	All	1	220.	Yoke, Cylinder	All	1
199.	"O" Ring	All	1	221.	Pin, Straight	All	2
200.	Plate, Oil Baffle	All	1	222.	Plunger, Index Handle	All	1
201.	Screw	All	2	223.	Pin, Taper	All	1
202.	Box, Quick Change	All	1	224.	Spring	All	1
202A.	Gasket, Box to Bed Top	All	1	225.	Sleeve, Index Handle	All	1
202B.	Gasket, Box to Bed Bottom	All	1	226.	Handle, Plunger	All	1



QUICK CHANGE BOX

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

KEY NO.	PART NAME	MODEL	QTY.	KEY NO.	PART NAME	MODEL	QTY.
230.	Shaft, Feed	All	1	245.	Collar	All	1
231.	Gear, Sliding	All	1	246.	Bush, Lead Screw	All	1
232.	Pin, Straight	All	4	246A.	Screw	All	2
233.	Collar	All	2	247.	Pinion, Lead Screw	13"-15"	1
234.	Seal, Victoprene Oil	All	1			17"-19"	1
235.	Pin, Taper	All	2	248.	Key, Woodruff	All	1
236.	Gear, Feed Rod	13"-15"	1	249.	Shaft, Inter	All	1
		17"-19"	1	250.	Plate, Oiling	All	1
237.	Collar, Feed Drive	13"-15"	1	251.	Gear, Inter. Shaft Large	All	1
		17"-19"	1	252.	Pin, Taper	All	1
238.	Ball	13"-15"	2	253.	Shaft, Cone	All	1
		17"-19"	2	254.	Key, Cone Shaft	All	1
239.	Plunger, Feed Rod Drive Collar	13"-15"	2	255.	Gear, Cone Shaft 28 Teeth	All	1
		17"-19"	2	256.	Gear, Cone Shaft 26 Teeth	All	1
240.	Spring, Feed Rod Drive Collar	13"-15"	1	257.	Gear, Cone Shaft 24 Teeth	All	1
		17"-19"	1	258.	Gear, Cone Shaft 23 Teeth	All	1
241.	Rod, Feed (Specify Center Cap)	13"-15"	1	259.	Gear, Cone Shaft 22 Teeth	All	1
		17"-19"	1	260.	Gear, Cone Shaft 20 Teeth	All	1
242.	Screw, Lead (Specify Center Cap)	13"-15"	1	261.	Gear, Cone Shaft 18 Teeth	All	1
		17"-19"	1	262.	Gear, Cone Shaft 16 Teeth	All	1
243.	Pin, Cotter	All	1	263.	Gear, Cone Shaft		
244.	Nut, Spec.	All	1		14 Pitch - 20 Teeth	All	1

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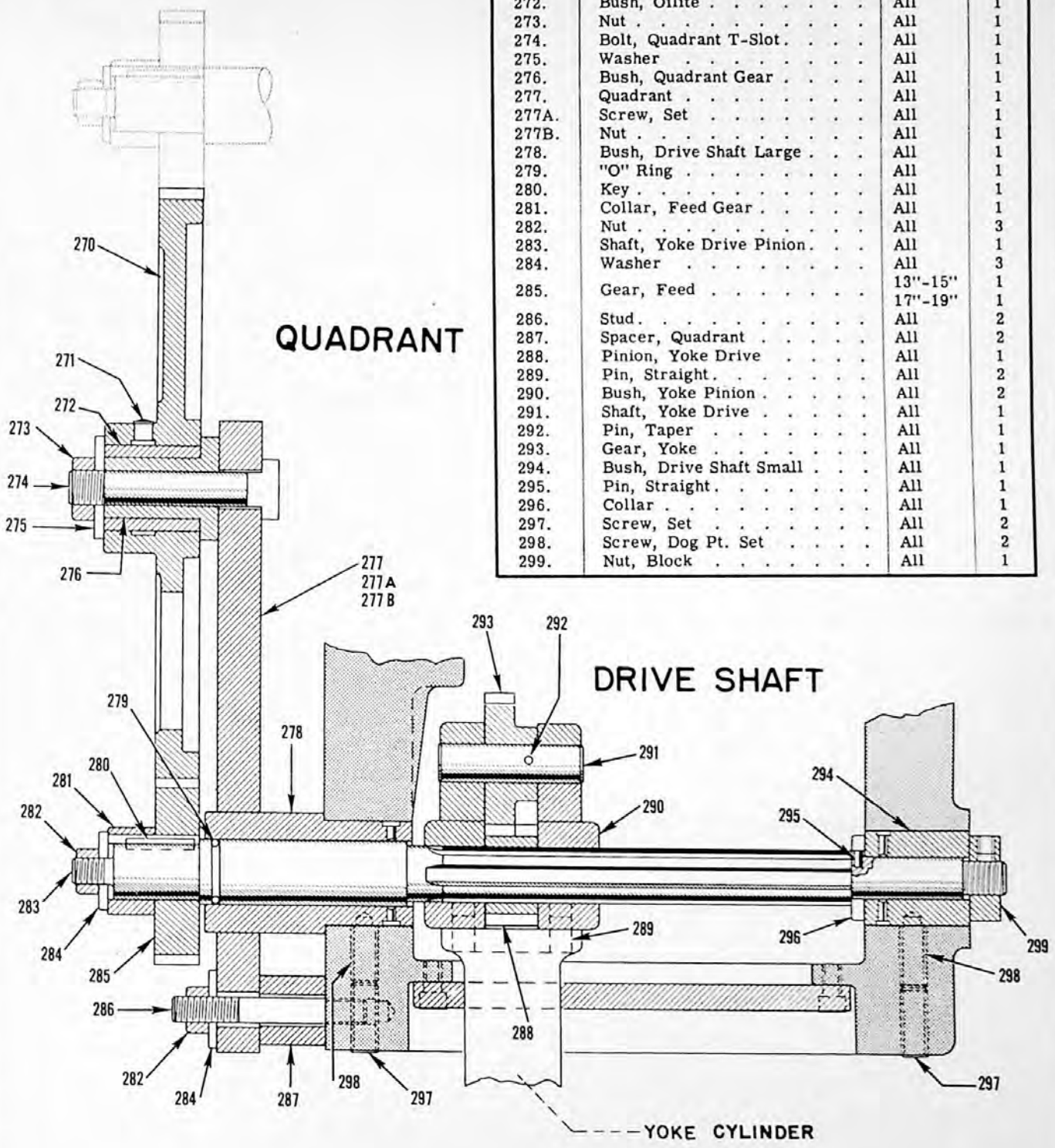
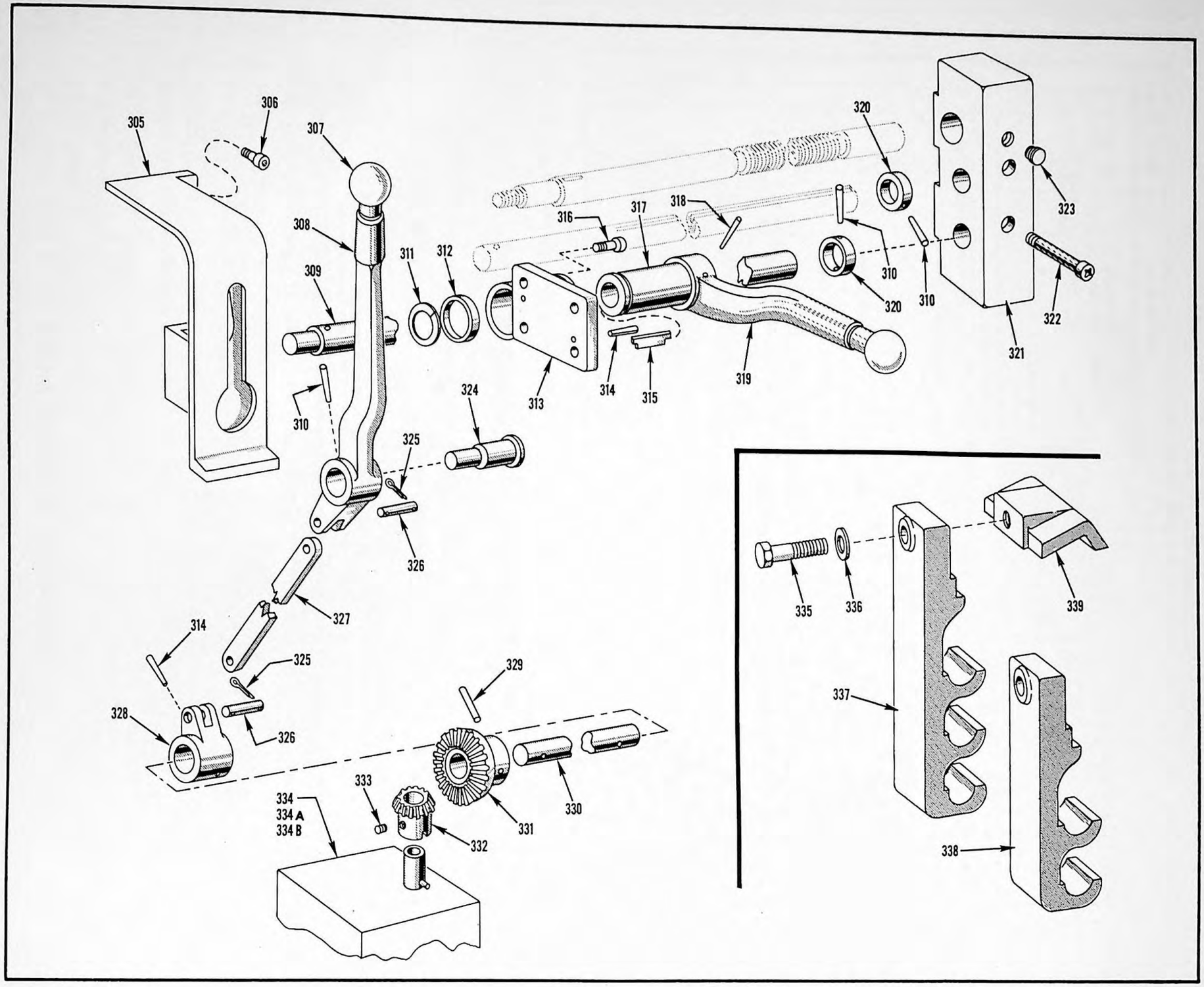


KEY NO.	PART NAME	MODEL	QTY.
270.	Gear, Quadrant		
	14 Pitch - 120 Teeth	13"-15"	1
	12 Pitch - 120 Teeth	17"-19"	1
271.	Oiler	All	1
272.	Bush, Oilite	All	1
273.	Nut	All	1
274.	Bolt, Quadrant T-Slot	All	1
275.	Washer	All	1
276.	Bush, Quadrant Gear	All	1
277.	Quadrant	All	1
277A.	Screw, Set	All	1
277B.	Nut	All	1
278.	Bush, Drive Shaft Large	All	1
279.	"O" Ring	All	1
280.	Key	All	1
281.	Collar, Feed Gear	All	1
282.	Nut	All	3
283.	Shaft, Yoke Drive Pinion	All	1
284.	Washer	All	3
285.	Gear, Feed	13"-15"	1
		17"-19"	1
286.	Stud	All	2
287.	Spacer, Quadrant	All	2
288.	Pinion, Yoke Drive	All	1
289.	Pin, Straight	All	2
290.	Bush, Yoke Pinion	All	2
291.	Shaft, Yoke Drive	All	1
292.	Pin, Taper	All	1
293.	Gear, Yoke	All	1
294.	Bush, Drive Shaft Small	All	1
295.	Pin, Straight	All	1
296.	Collar	All	1
297.	Screw, Set	All	2
298.	Screw, Dog Pt. Set	All	2
299.	Nut, Block	All	1

QUADRANT & DRIVE SHAFT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BACK BOX & APRON ELECTRICAL CONTROL

KEY NO.	PART NAME	MODEL	QTY.
305.	Cover, Slip Gear	13"-15"	1
		17"-19"	1
306.	Screw	All	2
307.	Handle, Ball	All	2
308.	Handle, Spindle Control	All	1
309.	Rod, Control (specify Bed Length)	13"-15"	1
		17"-19"	1
310.	Pin, Taper (one not used when apron spindle control is furnished)	All	3
311.	Ring, Snap Truarc	All	1
312.	Collar	All	1
313.	Bracket, Apron	All	1
314.	Pin, Taper	All	3
315.	Key, Feather	All	1
316.	Screw, Sock. Hd. Cap	All	4
317.	Sleeve	All	1
318.	Pin	All	1
319.	Lever, Apron Control	All	1
320.	Collar, Soft	All	2
321.	Box, Back	All	1
322.	Screw	All	2
323.	Plug, Pipe	All	1
324.	Stud, Shifter (not used when Apron Spindle control is furnished)	All	1
325.	Pin, Cotter	All	4
326.	Pin	All	2
327.	Link	13"-15"	1
		17"-19"	1
328.	Shifter	All	1
329.	Pin, Taper	All	1
330.	Rod, Control	13"-15"	1
		17"-19"	1
331.	Gear, Boston Bevel (#L-1508 14 Pitch-28 Teeth)	All	1
332.	Pinion, Bevel 14 Pitch-14 Teeth	All	1
333.	Screw, Set	All	1
334.	Cutler-Hammer Switch Size No. 1 - 5 Position (9441-H252)	All	1
	Size No. 1 - 3 Position (9441-H258)	All	1
334A.	Screw, Machine with Switch 9441-H252	All	3
	Switch 9441-H258	All	3
334B.	Spacer with Switch 9441-H252	All	3
	Switch 9441-H258	All	3
335.	Screw	13"-15"	1
		17"-19"	1
336.	Washer	13"-15"	1
		17"-19"	1
337.	Support, Lead Screw (with Apron Control)	13"-15"	1
		17"-19"	1
338.	Support, Lead Screw (without Apron Control)	13"-15"	1
		17"-19"	1
339.	Block, Lead Screw Support	13"-15"	1
		17"-19"	1

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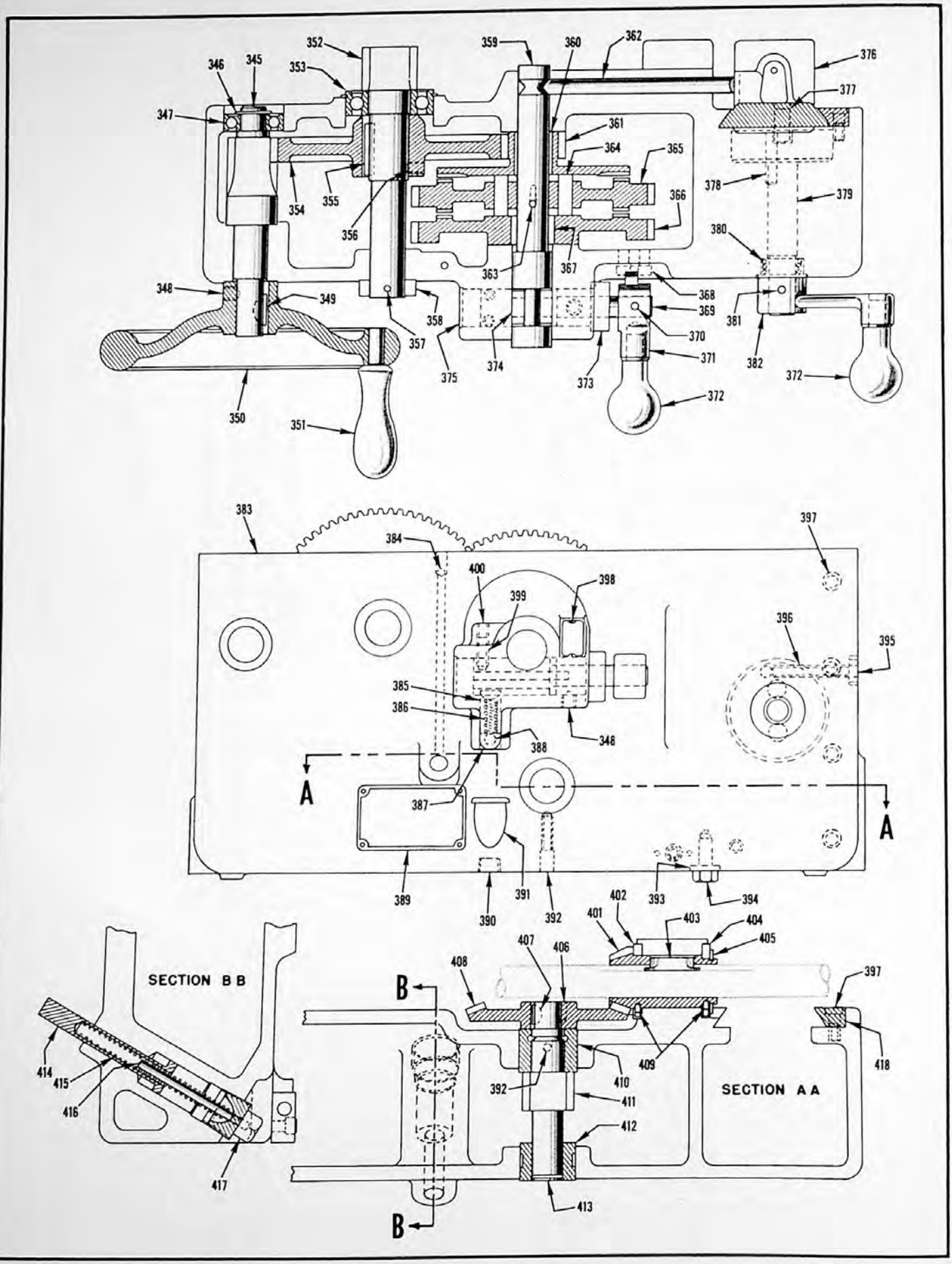
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APRON 13" - 15" - 17" - 19"

KEY NO.	PART NAME	MODEL	QTY.
345.	Apron, 1st Stud	All	1
346.	Ring, Truarc	All	1
347.	Bearing, N.D. Ball	All	1
348.	Screw, Headless	All	2
349.	Key, Woodruff	All	1
350.	Handwheel (3 spoke)	All	1
351.	Handle	All	1
352.	Stud, Rack Wheel	13"-15"	1
		17"-19"	1
353.	Bearing, N.D. Ball	All	1
354.	Wheel, Rack	All	1
355.	Key	All	1
356.	Screw, Headless	All	1
357.	Pin	All	1
358.	Collar, Rack Wheel Stud	All	1
359.	Shaft, Rack Wheel Gear	All	1
360.	Bush, Long Fd. Cl. Gr.	All	1
361.	Gear, Long Cross Fd.	All	1
362.	Pin, Shifter Interference	All	1
363.	Pin, Taper	All	1
364.	Pin, Gear Spacing	All	4
365.	Gear, Sliding Inter.	All	1
366.	Gear, Cross Feed Clutch	All	1
367.	Bush, Cross Fd. Gear	All	1
368.	Pin, Clutch Shifter Handle Stop.	All	1
369.	Shaft, Clutch Shifter	All	1
370.	Pin, Taper	All	1
371.	Handle, Clutch Shifter	All	1
372.	Handle, Ball	All	2
373.	Bush, Clutch Shifter Shaft	All	1
374.	Shoe, Clutch Shifter	All	1
375.	Plug, Welch	All	1
376.	Box, Nut (English)	13"-15"	1
		17"-19"	1
	Box, Nut (Metric)	13"-15"	1
		17"-19"	1
377.	Pin	All	2
378.	Pin, Straight	All	1
379.	Cam, Nut Box	All	1
380.	Spring (Cut to Suit)	All	1
381.	Pin, Taper	All	1
382.	Handle, Half Nut	All	1
383.	Apron	13"-15"	1
		17"-19"	1
384.	Ball, Steel	All	1
385.	Plunger, Clutch Shifter	All	1
386.	Spring	All	1
387.	Screw, Headless	All	1
388.	Screw, Headless	All	1
389.	Plate, Instruction	All	1
390.	Plug, Pipe	13"-15"	1
		17"-19"	3
391.	Oiler, Gits	All	1
392.	Screw, Headless	All	1
393.	Washer	All	1
394.	Screw, Hex Head	All	1
395.	Nut	All	1
396.	Screw, Headless	13"-15"	1
		17"-19"	1
397.	Screw, Sock. Hd.	All	4
398.	Plate, Feed Direction	All	1
399.	Screw, Set	All	2
400.	Screw, Set	All	2
401.	Pinion, Bevel	All	1
402.	Collar, Bevel Pinion Thrust	All	1
403.	Key, Feather	All	1
404.	Collar, Bevel Pinion	All	1
405.	Ring, Truarc	All	1
406.	Screw, Headless	All	1
407.	Key, Woodruff	All	1
408.	Gear, Bevel	All	1
409.	Pin, Straight	All	2
410.	Bush, Bevel Gear Shaft Rear	All	1
411.	Shaft, Bevel Gear	All	1
412.	Bush, Bevel Gear Shaft Front	All	1
413.	Plug, Welch	All	1
414.	Plunger, Oil	All	1
415.	Spring, Oil Plunger	All	1
416.	Rod, Oil Cylinder Spring Guide	All	1
417.	Plug, Oil Cylinder Pipe	All	1
418.	Gib	All	1

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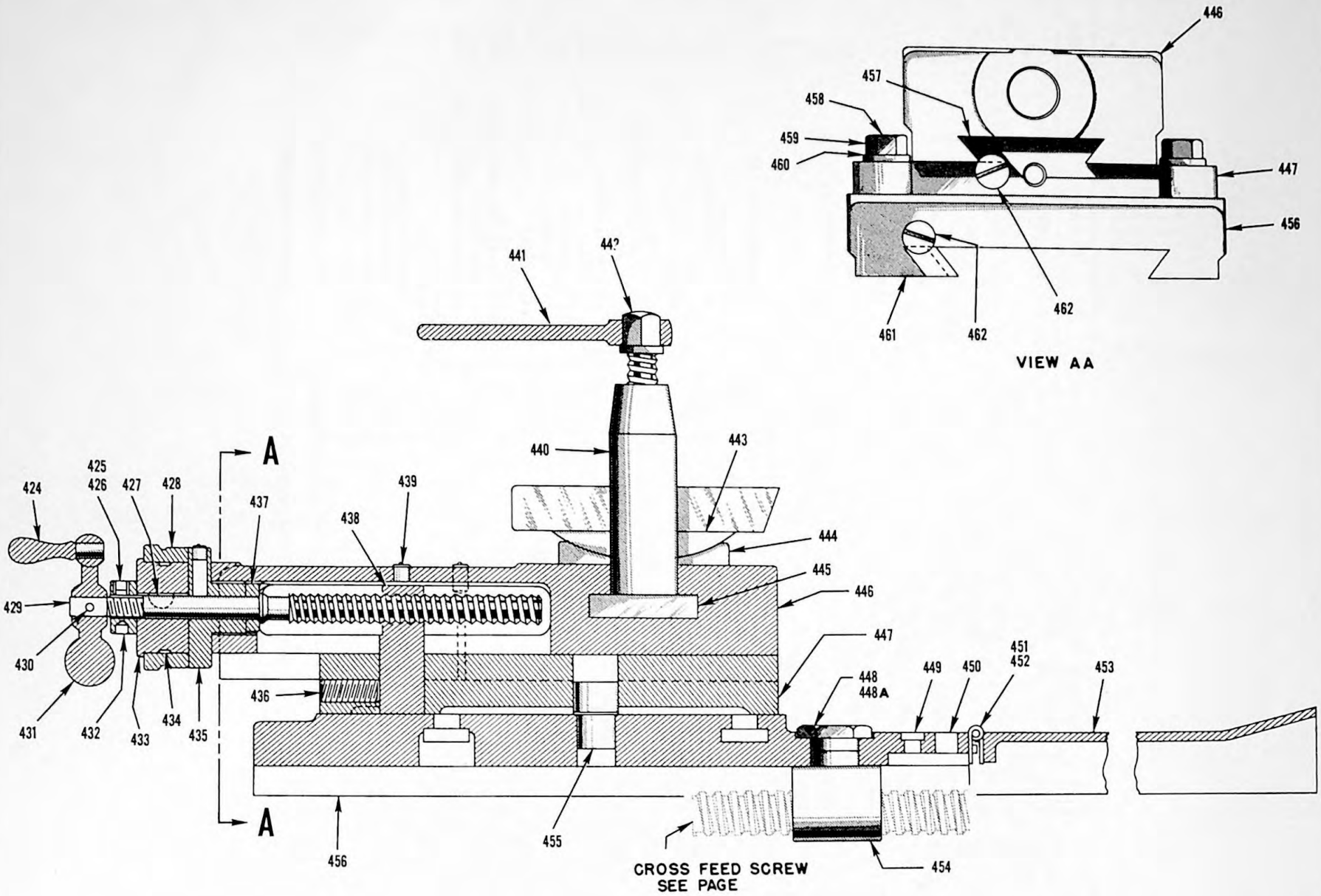
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CROSS FEED SCREW
SEE PAGE

COMPOUND REST WITH TOOL POST

KEY NO.	PART NAME	MODEL	QTY.
424.	Handle, Ball	13"-15"	1
		17"-19"	1
425.	Screw, Set	All	2
426.	Plug	All	2
427.	Key, Woodruff	13"-15"	1
		17"-19"	1
428.	Collar, Graduated (English)	13"-15"	1
		17"-19"	1
	(Metric)	13"-15"	1
		17"-19"	1
429.	Screw, Top Slide (English & Metric)	13"-15"	1
	(English)	17"-19"	1
	(Metric)	17"-19"	1
430.	Pin, Taper	13"-15"	1
		17"-19"	1
431.	Handle, Single Ball Crank	13"-15"	1
		17"-19"	1
432.	Nut, Top Slide Screw	13"-15"	1
		17"-19"	1
433.	Bush, Graduated Collar	13"-15"	1
		17"-19"	1
434.	Spring	13"-15"	1
		17"-19"	1
435.	Bush, Top Slide Screw	13"-15"	1
		17"-19"	1
436.	Screw, Set	All	1
437.	Collar, Top Slide Screw	13"-15"	1
		17"-19"	1
438.	Nut, Top Slide (English & Metric)	13"-15"	1
	(English)	17"-19"	1
	(Metric)	17"-19"	1
439.	Oiler	All	4
440.	Post, Tool	13"-15"	1
		17"-19"	1
441.	Wrench, Tool Post	13"-15"	1
		17"-19"	1
442.	Screw, Square Head Tool Post	13"-15"	1
		17"-19"	1
443.	Wedge, Tool Post	13"-15"	1
		17"-19"	1
444.	Collar, Tool Post	13"-15"	1
		17"-19"	1
445.	Washer, Tool Post Square	13"-15"	1
		17"-19"	1
446.	Slide, Top	13"-15"	1
		17"-19"	1
447.	Slide, Swivel	13"-15"	1
		17"-19"	1
448.	Screw, Cross Feed Nut	13"-15"	1
		17"-19"	1
448A.	Washer	17"-19"	1
449.	Plug, (Not used when Taper Att. is furnished)	13"-15"	1
		17"-19"	1
450.	Plug, (Not used when Taper Att. is furnished)	13"-15"	1
		17"-19"	1
451.	Hinge, Dirt Guard	13"-15"	1
		17"-19"	1
452.	Screw, Spec. Sock. Hd.	All	4
453.	Guard, Dirt	13"-15"	1
		17"-19"	1
454.	Nut, Cross Feed (English)	13"-15"	1
		17"-19"	1
	(Metric)	13"-15"	1
		17"-19"	1
455.	Pin, Shoulder	13"-15"	1
		17"-19"	1
456.	Slide, Bottom	13"	1
		15"	1
		17"	1
		19"	1
457.	Gib, Top Slide	13"-15"	1
		17"-19"	1
458.	Bolt, T-Slot	13"	2
		15"	2
		17"	2
		19"	2
459.	Nut, Hex	13"-15"	2
		17"-19"	2
460.	Washer	13"-15"	2
		17"-19"	2
461.	Gib, Bottom Slide	13"-15"	1
		17"-19"	1
462.	Screw, Gib	13"-15"	4
		17"-19"	4

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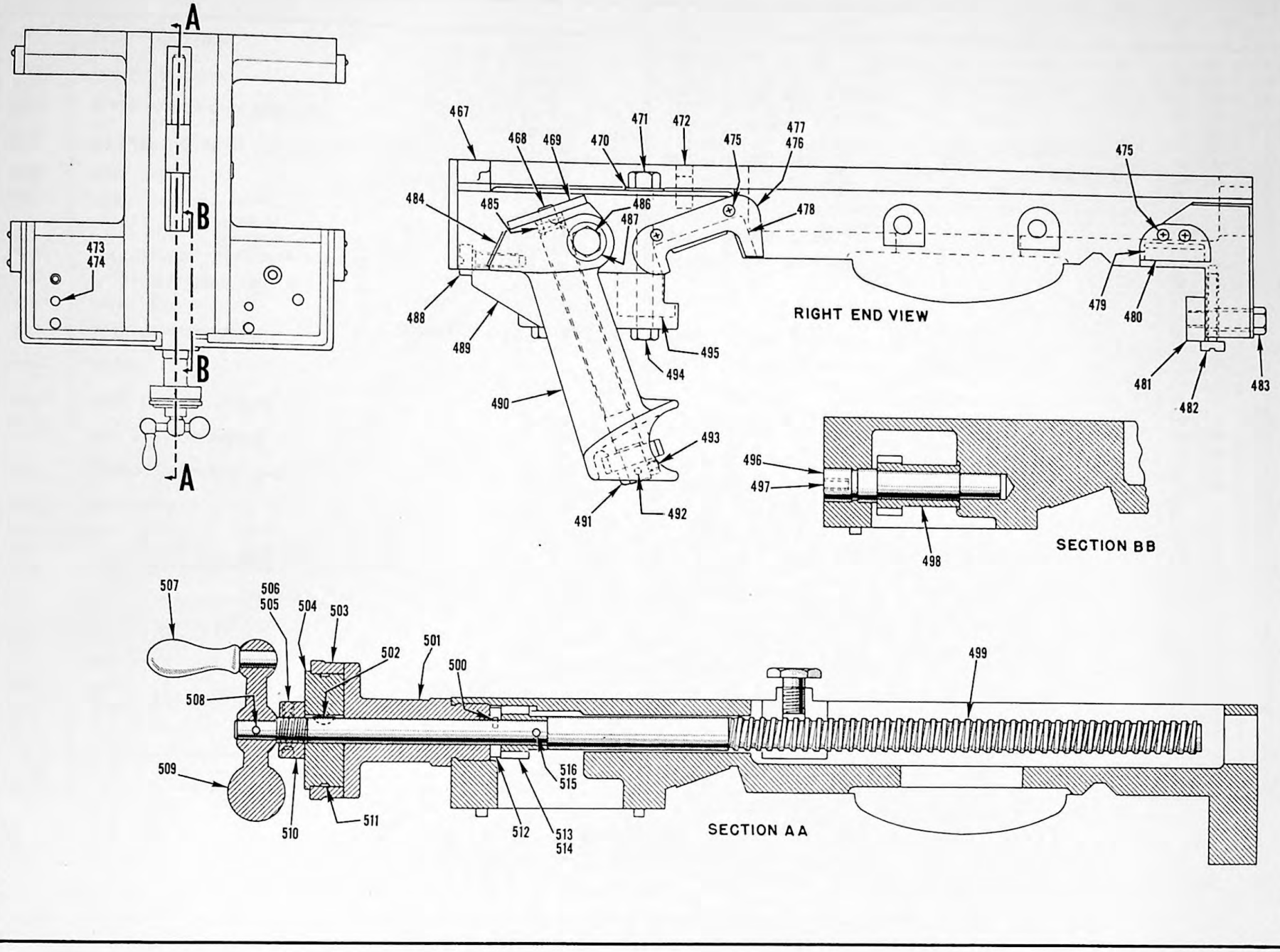
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SECTION AA

CARRIAGE AND CHASING DIAL

KEY NO.	PART NAME	MODEL	QTY.
467.	Carriage	13"-15"	1
		17"-19"	1
468.	Shaft, Bracket	All	1
469.	Dial	All	1
470.	Washer	13"-15"	1
		17"-19"	1
471.	Screw, Hex Cap	13"-15"	1
		17"-19"	1
472.	Plug	All	1
473.	Pin	13"-15"	2
		17"-19"	2
474.	Plug	All	2
475.	Screw, Rd. Hd. Mach.	13"-15"	8
		17"-19"	8
476.	Wiper, Shear Front Right Hand	13"-15"	1
		17"-19"	1
477.	Wiper, Shear Front Left Hand	13"-15"	1
		17"-19"	1
478.	Neoprene Strip	13"-15"	2
		17"-19"	2
479.	Neoprene Strip 1-20 (Cut to Suit)	13"-15"	2
	1-11 (Cut to Suit)	17"-19"	2
480.	Wiper, Shear Rear	13"-15"	2
		17"-19"	2
481.	Gib, Carriage Rear	13"-15"	1
		17"-19"	1
482.	Screw, Gib	13"-15"	2
		17"-19"	2
483.	Screw, Hex Cap	13"-15"	2
		17"-19"	2
484.	Plate, Chasing Dial Instruction	All	1
485.	Pin, Taper	All	1
486.	Cap, Screw	13"-15"	1
		17"-19"	1
487.	Washer	All	1
488.	Screw, Gib	13"-15"	2
		17"-19"	2
489.	Gib, Carriage Front	13"-15"	2
		17"-19"	2
490.	Bracket, Dial	All	1
491.	Wheel, Chasing Dial Worm	13"-15"	1
		17"-19"	1
492.	Pin, Taper	All	1
493.	Screw, Set	All	1
494.	Screw, Hex Cap	All	4
495.	Clamp, Carriage	13"-15"	1
		17"-19"	1
496.	Stud, Indler Pinion	All	1
497.	Screw, Set	All	1
498.	Pinion, Idler	13"-15"	1
		17"-19"	1

KEY NO.	PART NAME	MODEL	QTY.
499.	Screw, Cross Fed		
	(Without Taper Att. Without Hydra Trace)		
	English	13"-15"	1
	Metric	13"-15"	1
	(With Taper Att. Without Hydra Trace)		
	English	13"-15"	1
	Metric	13"-15"	1
	(Without Taper Att. Without Hydra Trace)		
	English	17"-19"	1
	Metric	17"-19"	1
	(With Taper Att. Without Hydra Trace)		
	English	17"-19"	1
	Metric	17"-19"	1
500.	Pin, Straight	All	1
501.	Bush, Cross Feed		
	(Without Taper Att. Without Hydra Trace)		
	English & Metric	13"-15"	1
	(With Taper Attachment Without Hydra Trace)		
	English & Metric	13"-15"	1
	(Without Taper Att. Without Hydra Trace)		
	English & Metric	17"-19"	1
	(With Taper Attachment Without Hydra Trace)		
	English & Metric	17"-19"	1
502.	Key	13"-15"	1
		17"-19"	1
503.	Collar, Grad.		
	(With or Without Taper Att.) English	13"-15"	1
	Metric	13"-15"	1
	English	17"-19"	1
	Metric	17"-19"	1
504.	Hub, Graduated Collar	13"-15"	1
		17"-19"	1
505.	Screw	All	2
506.	Plug	All	2
507.	Handle, Ball	13"-15"	1
		17"-19"	1
508.	Pin, Taper	13"-15"	1
		17"-19"	1
509.	Handle, Ball	13"-15"	1
		17"-19"	1
510.	Nut	13"-15"	1
	Lock, Nut	17"-19"	1
511.	Spring	13"-15"	1
		17"-19"	1
512.	Collar, Thrust (Without Taper Att.)	13"-15"	1
		17"-19"	1
513.	Pinion, Cross Feed Screw (Without Taper Att.)	13"-15"	1
		17"-19"	1
514.	Sleeve, Cross Feed Pinion		
	(With Taper Att. Without Hydra Trace)	13"-15"	1
		17"-19"	1
515.	Pin, Taper (Without Taper Att.)	13"-15"	1
		17"-19"	1
516.	Key, Feather (With Taper Att.)	13"-15"	1
		17"-19"	1

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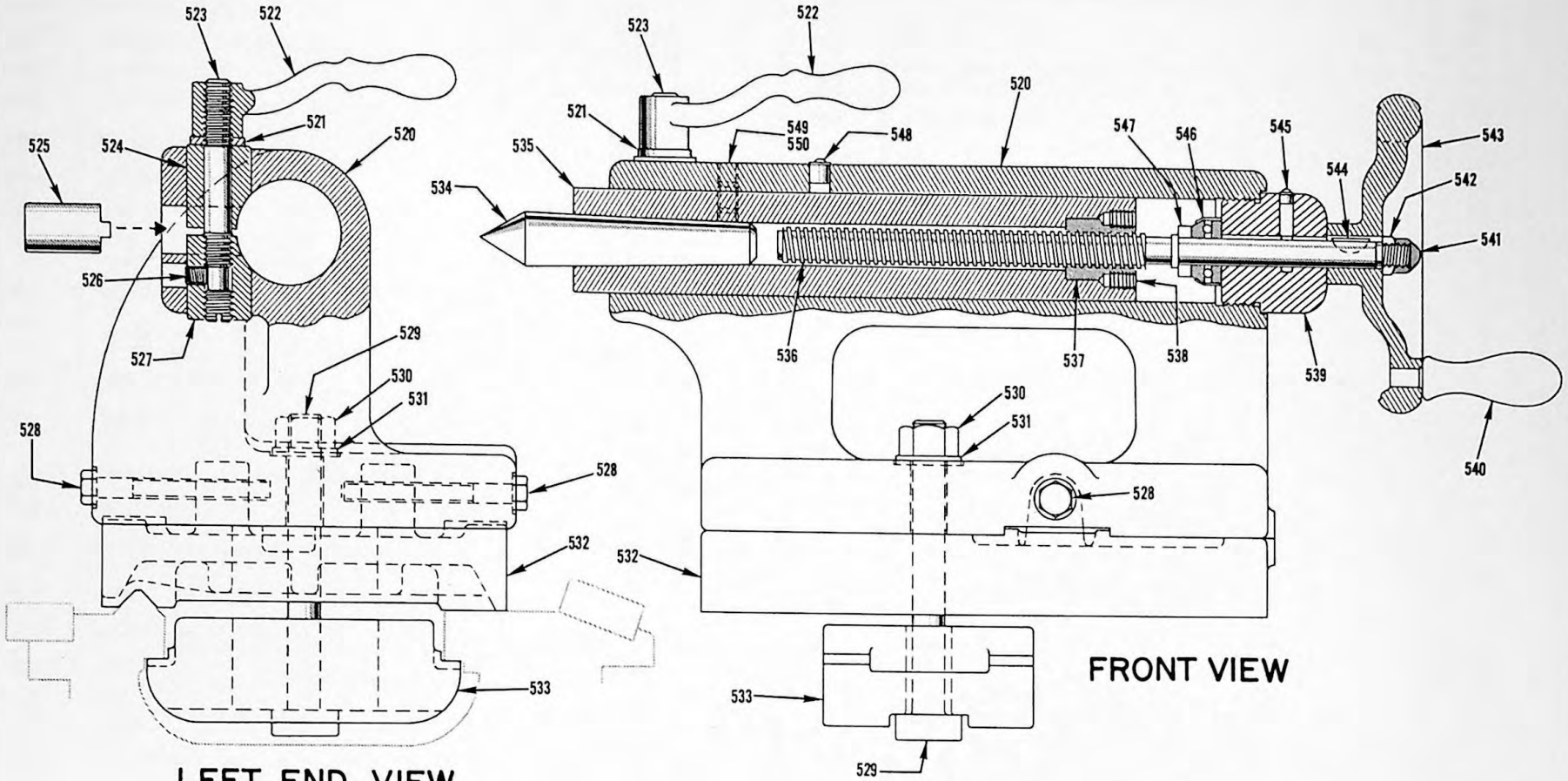
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TAILSTOCK

KEY NO.	PART NAME	MODEL	QTY.
520.	Top, Tailstock	13"	1
		15"	1
		17"-19"	1
521.	Washer	13"-15"	1
		17"-19"	1
522.	Handle, Binder	13"-15"	1
		17"-19"	1
523.	Stud, Tailstock	13"-15"	1
		17"-19"	1
524.	Bush, Upper Binder	13"-15"	1
		17"-19"	1
525.	Key, Plug	13"-15"	1
		17"-19"	1
526.	Screw, Set	13"-15"	1
		17"-19"	1
527.	Bush, Lower Binder	13"-15"	1
		17"-19"	1
528.	Screw, Hex Cap	13"-15"	1
		17"-19"	1
529.	Bolt, Rough	13"	1
		15"	1
		17"	2
		19"	2
530.	Nut, Hex	13"-15"	1
		17"-19"	2
531.	Washer	13"-15"	1
		17"-19"	2
532.	Bottom, Tailstock	13"-15"	1
		17"	1
		19"	1
533.	Clamp, Tailstock	13"-15"	1
		17"-19"	1

KEY NO.	PART NAME	MODEL	QTY.
534.	Center, Spindle	13"-15"	1
		17"-19"	1
535.	Spindle, Tailstock	13"-15"	1
		17"-19"	1
536.	Screw, Spindle	13"-15"	1
		17"-19"	1
537.	Nut, Tailstock	13"-15"	1
		17"-19"	1
538.	Screw, Set	All	2
539.	Cap, Tailstock	13"-15"	1
		17"-19"	1
540.	Handle, Ball	All	1
541.	Nut, Acorn	13"-15"	1
		17"-19"	1
542.	Nut, Hex	13"-15"	1
		17"-19"	1
543.	Handwheel	13"-15"	1
		17"-19"	1
544.	Key, Woodruff	13"-15"	1
		17"-19"	1
545.	Oiler	All	1
546.	Bearing, Ball	13"-15"	1
		17"-19"	1
547.	Collar, Spindle Screw	13"-15"	1
		17"-19"	1
548.	Oiler	All	1
549.	Screw, Set	13"-15"	2
		17"-19"	2
550.	Plug, Brass	All	1

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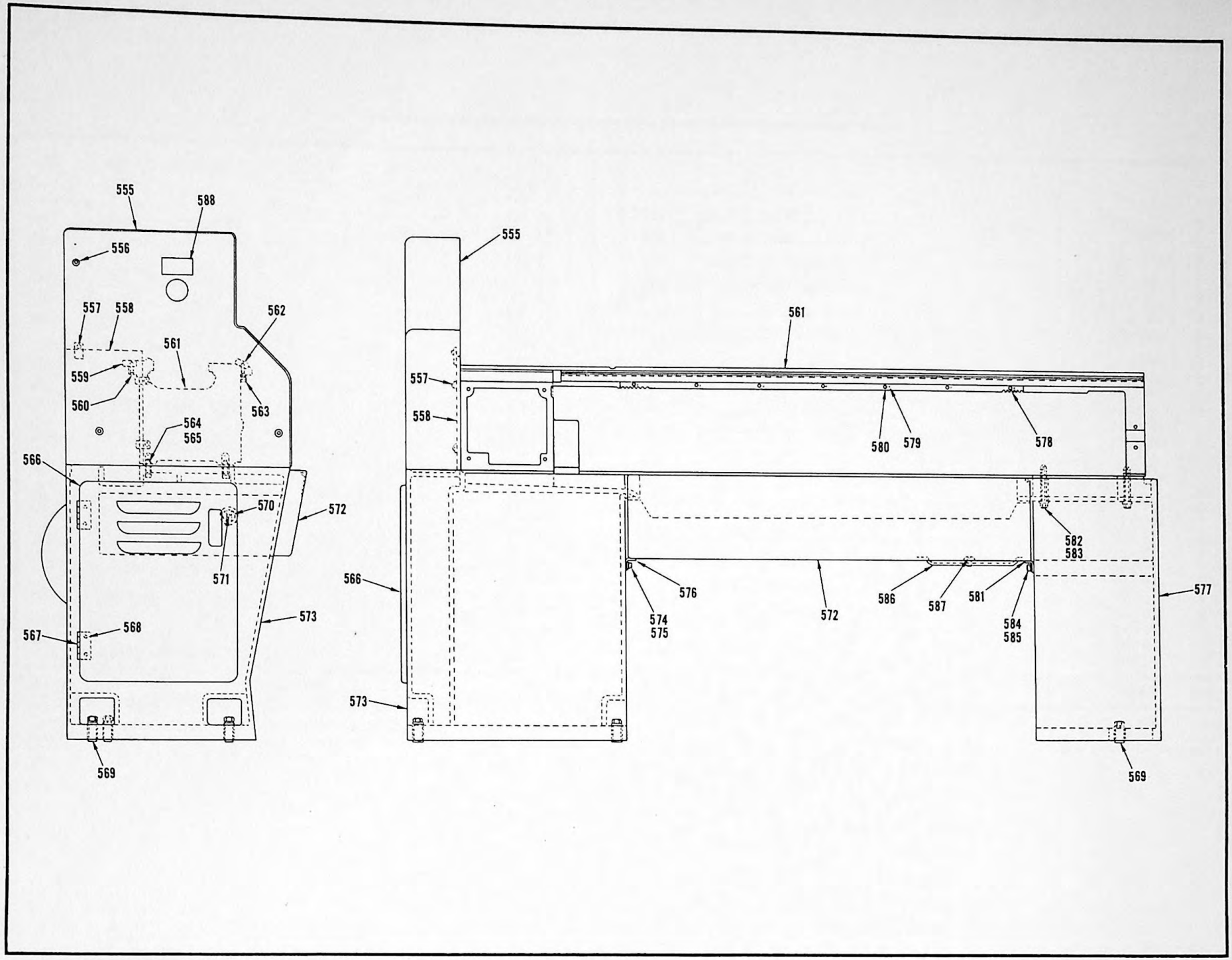
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BED, PAN, LEGS & HEAD END COVER

KEY NO.	PART NAME	MODEL	QTY.
555.	Head Feed Gear	13"	1
		15"	1
		17"	1
		19"	1
556.	Screw, Socket Hd. Cap	13"-15"	3
		17"-19"	3
557.	Screw, Hex Head Cap	All	3
558.	Plate, Head Feed Cover Back	13"-15"	1
		17"-19"	1
559.	Shear, Rear (specify center cap,)	13"-15"	1
		17"-19"	1
560.	Screw (8 for 18" centers - add 2 for each additional ft. of bed)	13"-15"	8
	(11 for 30" centers - add 2 for each additional ft. of bed)	17"-19"	11
561.	Bed (specify length)	13"-15"	1
		17"-19"	1
562.	Shear, Front (specify center cap.)	13"-15"	1
		17"-19"	1
563.	Screw (8 for 18" centers add 2 each for additional ft. of bed)	13"-15"	8
	(11 for 30" centers add 2 each for additional ft. of bed)	17"-19"	11
564.	Screw - (Head end leg to bed)	All	4
565.	Washer	All	4
566.	Door, Hd. End Leg	13"-15"	1
		17"-19"	1
567.	Hinge, Door (Head end leg)	All	2
568.	Screw - (Head end door)	All	4
569.	Screw, Leveling	All	6
570.	Magnet, Alnico Carboloy	All	1
571.	Screw, Brass Machine Flat Head (3/4" long)	All	1
572.	Pan (Specify Center Capacity)	13"-15"	1-3
		17"-19"	1-3
573.	Leg, Head End Cabinet	13"-15"	1
		17"-19"	1
574.	Screw	All	4
575.	Washer	All	4
576.	Support, Pan (Head End)	13"-15"	1
		17"-19"	1
577.	Leg, Plain Tail End	13"-15"	1
		17"-19"	1
578.	Rack (Specify Center Capacity of Lathe)	13"-15"	Var. No.
		17"-19"	
579.	Pin Taper	13"-15"	Var. No.
		17"-19"	
580.	Screw	13"-15"	Var. No.
		17"-19"	
581.	Support, Pan Tail End	13"-15"	1
		17"-19"	1
582.	Screw (Plain Tail End Leg)	All	4
583.	Washer (Plain Tail End Leg)	All	4
584.	Screw (Plain Tail End Leg)	All	2
585.	Washer (Plain Tail End Leg)	All	2
586.	Plate (1 - for each Dry Pan)	All	1
587.	Screw (2 - for each Dry Pan)	All	2
588.	Plate, Oiling Instruction	All	1

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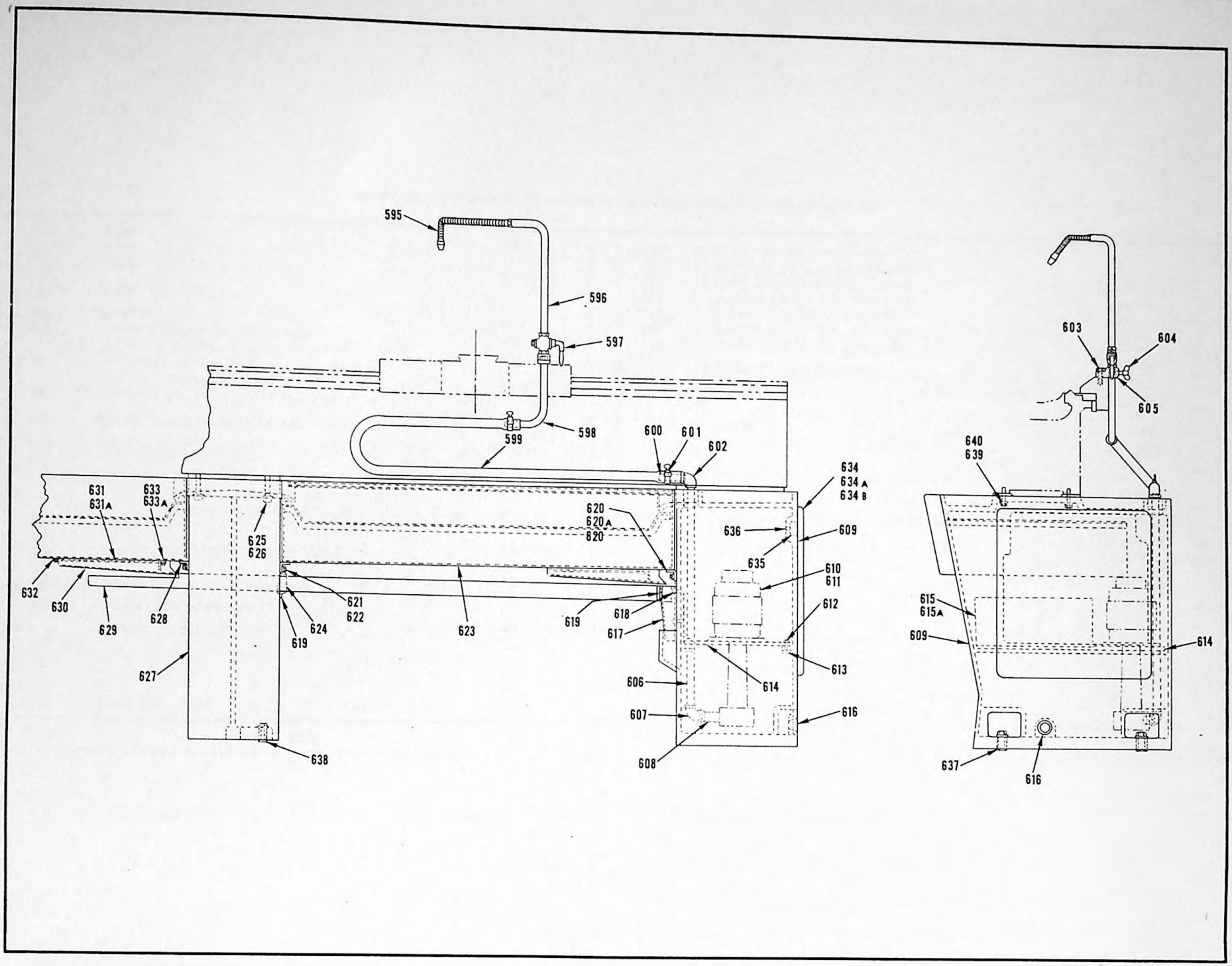
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TAIL CABINET LEG, CENTER LEG TROUGH, COOLANT PUMP WITH PIPING

KEY NO.	PART NAME	MODEL	QTY.
595.	Spout, "Stayput" Flexible Coolant 1/4" I.D. x 12" Long x 1/4 NPT Male Connector	All	1
596.	Pipe, Distributor	13"-15"	1
		17"-19"	1
597.	Cock, Stop	All	1
598.	Pipe, Distributor	13"-15"	1
		17"-19"	1
599.	Hose, Rubber - 37" (18" center cap. For each foot of bed added increase length of hose 1 foot)	13"-15"	1
	(Hose varies) Do you want chart on print E-2664?	17"-19"	1
600.	Nipple - Cut to 2-1/2" long	13"-15"	1
	(Nipple varies) Do you want chart on print E-2664?	17"-19"	1
601.	Clamp, Hose	All	2
602.	Elbow, 90 deg. 3/8 NPT	All	1
603.	Screw, Hex Cap	All	1
604.	Screw, Thumb	All	1
605.	Bracket	All	1
606.	Pipe, 3/8 Nom. 22-3/4" Lg.	13"-15"	1
	3/8 Nom. 19-1/2" Lg.	17"-19"	1
607.	Elbow, 90 deg. reducing	All	1
608.	Nipple, pipe 1/2" Nom. x 3-1/4" Long	13"-15"	1
		17"-19"	1
609.	Leg, Tail End Cabinet	13"-15"	1
		17"-19"	1
610.	Pump, Ruthman 1/10 H.P. (Specify Voltage and Cycle to suit order)	All	1
611.	Screw, (Pump to Plate)	All	4
612.	Screw, Hex Cap	All	2
613.	Clamp, Pump Plate	All	2
614.	Plate, Pump Support	All	1
615.	Cover, Reservoir Hole (with pump)	13"-15"	1
		17"-19"	1
615A.	Cover, Reservoir Hole (without pump)	13"-15"	1
		17"-19"	1
616.	Plug, Pipe	All	1
617.	Funnel	13"-15"	1
618.	Screw	13"-15"	4
619.	Screw, Binding Hd. Machine	All	4
620.	Support, Pan Angle	13"-15"	1
		17"-19"	1
620A.	Screw	All	4
620B.	Washer	All	4
621.	Screw	All	4
622.	Washer	All	4
623.	Pan (Specify Center Cap.)	13"-15"	1-3
		17"-19"	1-3
624.	Clamp, Trough	All	1
625.	Screw, Socket Hd. Cap. (Amt. for 1 middle leg)	All	4
626.	Washer (Amount for 1 middle leg)	All	4
627.	Leg, Middle	13"-15"	1-2
		17"-19"	1-2
628.	Support, Pan (Amt. for 1 middle leg)	13"-15"	2
	(Amt. for 1 middle leg)	17"-19"	2
629.	Trough, Coolant (Specify Length)	All	1
630.	Spout, Drain	All	1
631.	Strainer, (Furnish one with each pan)	All	1
631A.	Screw, (Amt. for each Strainer)	All	2
632.	Gasket, Drain Spout	All	1
633.	Screw	All	9
633A.	Nuts, Hex	All	9
634.	Door	13"-15"	1
		17"-19"	1
634A.	Hinge, Door	All	2
634B.	Screw	All	4
635.	Magnet, Alnico	All	1
636.	Screw, Flat Head Brass	All	1
637.	Screw, Leveling	All	2
638.	Screw, Leveling (Amt. for each Middle Leg)	All	2
639.	Screw, (Cabinet Leg)	All	4
640.	Washer, (Cabinet Leg)	All	4

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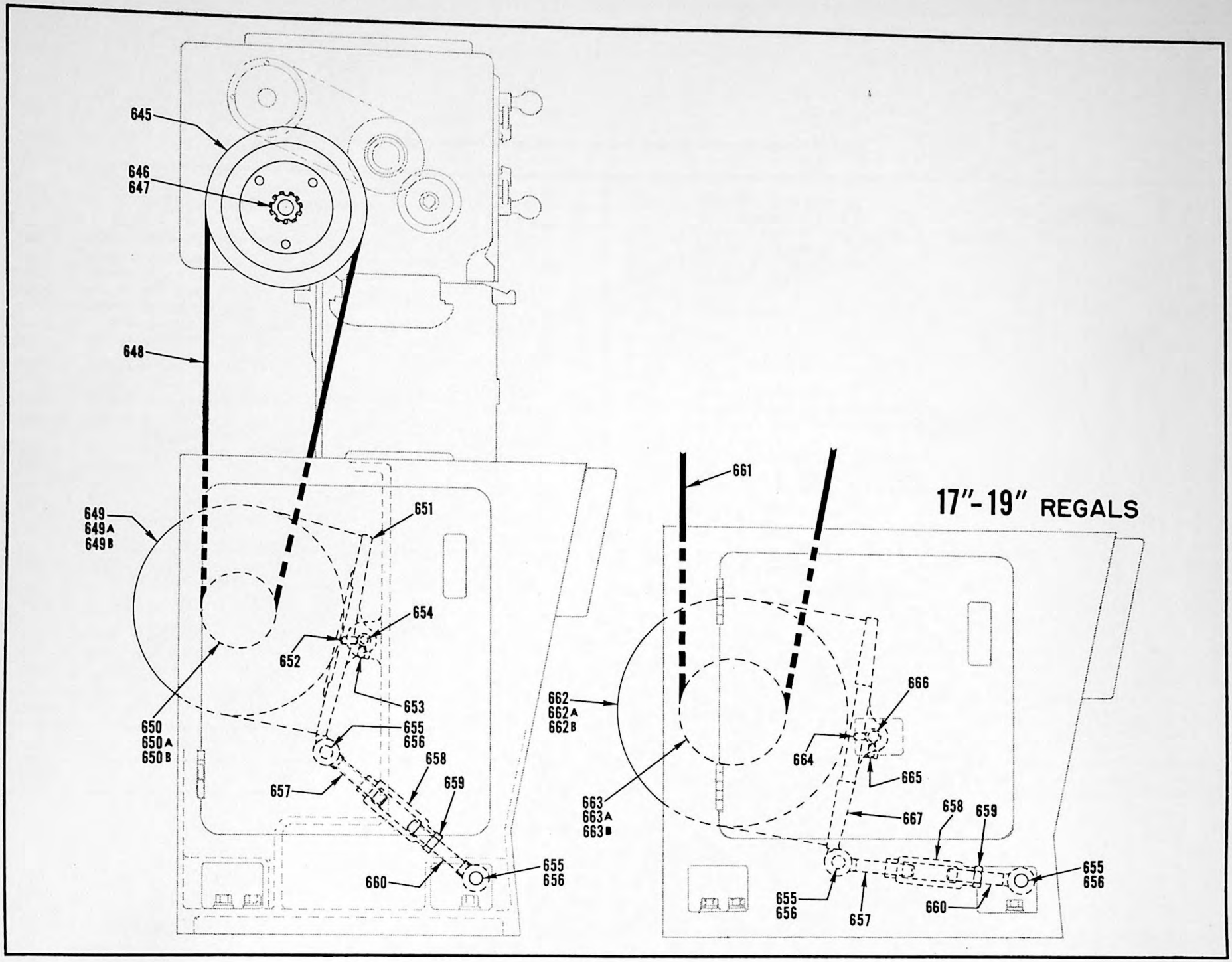
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17"-19" REGALS

MOTOR DRIVE & MOUNTING ASSEMBLY

KEY NO.	PART NAME	MODEL	QTY.
645.	Pulley, Drive	13"-15"	1
		17"-19"	1
646.	Nut, Lock	13"-15"	1
		17"-19"	1
647.	Washer, Lock	13"-15"	1
		17"-19"	1
648.	V-Belt, Gates (low range) 60-50-25 Cycle	13"	4
	(low range) 60 Cycle	15"	4
	(low range) 50-25 Cycle	15"	4
	(high range) 60 Cycle	13"	4
	(high range) 50-25 Cycle	13"	4
	(high range) 60 Cycle	15"	4
	(high range) 50-25 Cycle	15"	4
649.	Motor A-C, New Nema Frame Number Specify Current, Voltage, Horsepower, Phase and Cycle	13"-15"	1
649A.	Screw	13"-15"	4
649B.	Washer	13"-15"	4
650.	Low Range Pulley's 30 to 1200 RPM		
	Pulley Motor - 25 & 50 cycle, 2 HP	13"-15"	1
	60 cycle, 2 HP	13"-15"	1
	25 & 50 cycle, 3 HP	13"-15"	1
	60 cycle, 3 HP	13"-15"	1
	High Range Pulley's 45 to 1800 RPM		
	Pulley, Motor - 25 & 50 cycle, 3 HP (New Nema Std.)	13"-15"	1
	60 cycle, 3 HP (New Nema Std.)	13"-15"	1
650A.	Key	13"-15"	1
650B.	Screw, Set	13"-15"	1
651.	Plate, Motor	13"-15"	1
652.	Screw, Set	13"-15"	1
653.	Screw, Set	13"-15"	1
654.	Stud, Motor Plate	13"-15"	1
655.	Pin, Link	All	2
656.	Pin, Cotter	All	4
657.	Bolt, Eye Left Hand Thd.	All	1
658.	Turnbuckle	All	1
659.	Nut, Hex	All	1
660.	Bolt, Eye Right Hand Thd.	All	1
661.	V-Belt, Gates (low range)	17"	5
		19"	5
	(high range)	17"-19"	5
662.	Motor, A-C New Nema Frame Number Specify Current, Voltage, Horsepower, Phase and Cycle	17"-19"	1
662A.	Screw	17"-19"	4
662B.	Washer	17"-19"	4
663.	Low Range Pulley's 25 to 1000 RPM		
	Pulley, Motor - 25 & 50 cycle	17"-19"	1
	60 cycle	17"-19"	1
	High Range Pulley's 37 to 1500 RPM		
	Pulley, Motor - 25 & 50 cycle	17"-19"	1
	60 cycle	17"-19"	1
663A.	Key	17"-19"	1
663B.	Screw, Set	17"-19"	1
664.	Screw, Set	17"-19"	1
665.	Screw, Set	17"-19"	1
666.	Stud, Motor Plate	17"-19"	1
667.	Plate, Motor	17"-19"	1

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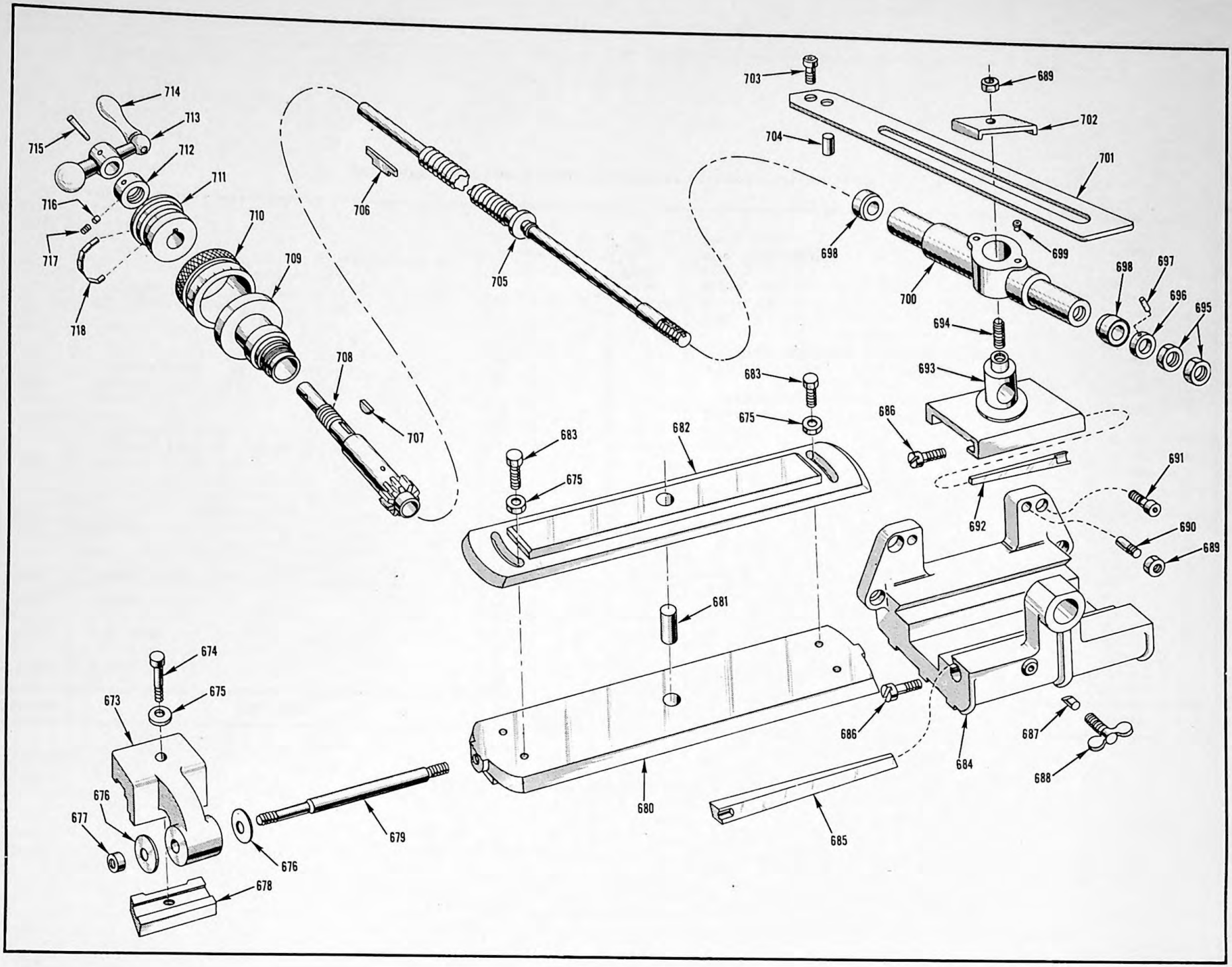
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TAPER ATTACHMENT

KEY NO.	PART NAME	MODEL	QTY.
673.	Bracket, Bed	13"-15"	1
		17"-19"	1
674.	Screw, Hex Hd. Cap	13"-15"	1
		17"-19"	1
675.	Washer.	13"-15"	3
		17"-19"	3
676.	Washer.	13"-15"	2
		17"-19"	2
677.	Nut, Hex	13"-15"	1
		17"-19"	1
678.	Clamp, Bed Bracket	13"-15"	1
		17"-19"	1
679.	Rod, Bed Bracket Clamp	13"-15"	1
		17"-19"	1
680.	Slide, Taper Attachment	13"-15"	1
		17"-19"	1
681.	Plug, Guide Bar Swivel	13"-15"	1
		17"-19"	1
682.	Bar, Guide (English)	13"-15"	1
	Bar, Guide (English)	17"-19"	1
	Bar, Guide (Metric)	13"-15"	1
	Bar, Guide (Metric)	17"-19"	1
683.	Screw, Hex Cap	13"-15"	2
		17"-19"	2
684.	Bracket, Taper Attachment Slide	13"-15"	1
		17"-19"	1
685.	Gib, Slide (Cut to Suit)	13"-15"	1
		17"-19"	1
686.	Screw, Gib	All	4
687.	Plug, Slide Gib 1-2	All	1
688.	Screw, Thumb	13"-15"	1
		17"-19"	1
689.	Nut, Hex	13"-15	3
		17"-19"	3
690.	Pin, Draw	13"-15"	2
		17"-19"	2
691.	Screw, Sock. Hd. Cap.	13"-15"	4
		17"-19"	4
692.	Gib, Guide Bar Shoe	13"-15"	1
		17"-19"	1
693.	Shoe, Guide Bar	13"-15"	1
		17"-19"	1
694.	Stud, Carriage Shoe	13"-15"	1
		17"-19"	1
695.	Nut, Hex Lock	All	2
696.	Collar, Cross Feed Screw	All	1
697.	Pin, Straight	All	1
698.	Bearing, Thrust	13"-15"	2
		17"-19"	2

KEY NO.	PART NAME	MODEL	QTY.
699.	Oiler	All	2
700.	Shoe, Carriage	13"-15"	1
		17"-19"	1
701.	Bar, Taper Attachment Draw	13"-15"	1
		17"-19"	1
702.	Plate, Guide Bar Clamp	13"-15"	1
		17"-19"	1
703.	Screw, Sock. Hd. Cap	13"-15"	1
		17"-19"	1
704.	Pin	13"-15"	1
		17"-19"	1
705.	Screw, Cross Feed (English)	13"-15"	1
	(English)	17"-19"	1
	(Metric)	13"-15"	1
	(Metric)	17"-19"	1
706.	Key, Feather	13"-15"	1
		17"-19"	1
707.	Key	13"-15"	1
		17"-19"	1
708.	Sleeve, Cross Feed Pinion (English)	13"-15"	1
	Sleeve, Cross Feed Pinion (English)	17"-19"	1
	Sleeve, Cross Feed Pinion (Metric)	13"-15"	1
	Sleeve, Cross Feed Pinion (Metric)	17"-19"	1
709.	Bush, Cross Feed Screw (English)	13"-15"	1
	Bush, Cross Feed Screw (English)	17"-19"	1
	Bush, Cross Feed Screw (Metric)	13"-15"	1
	Bush, Cross Feed Screw (Metric)	17"-19"	1
710.	Collar, Graduated (English)	13"-15"	1
	Collar, Graduated (English)	17"-19"	1
	Collar, Graduated (Metric)	13"-15"	1
	Collar, Graduated (Metric)	17"-19"	1
711.	Hub, Graduated Collar (English)	13"-15"	1
	Hub, Graduated Collar (English)	17"-19"	1
	Hub, Graduated Collar (Metric)	13"-15"	1
	Hub, Graduated Collar (Metric)	17"-19"	1
712.	Nut, Lock	13"-15"	1
		17"-19"	1
713.	Handle, Ball	13"-15"	1
		17"-19"	1
714.	Handle, Ball	13"-15"	1
		17"-19"	1
715.	Pin, Taper	13"-15"	1
		17"-19"	1
716.	Plug	All	2
717.	Screw	All	2
718.	Spring	13"-15"	1
		17"-19"	1

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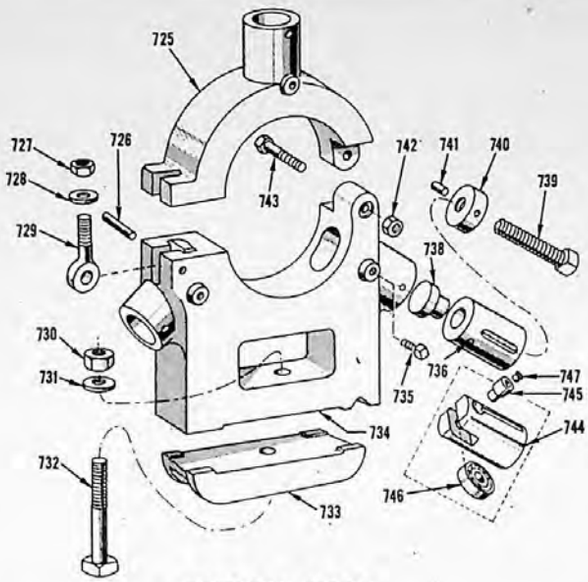
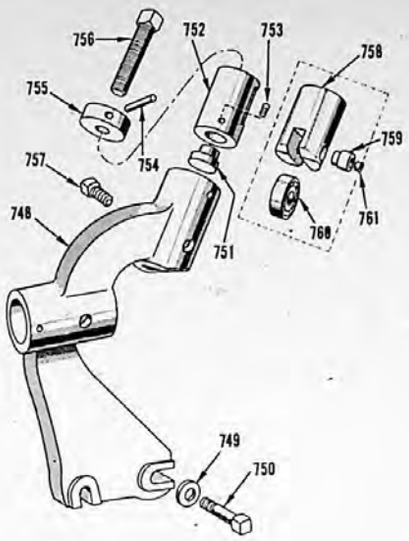


STEADY REST



FOLLOW REST

STEADY REST CAPACITY

13 - 15 3/8" 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"

KEY NO.	PART NAME	MODEL	QTY.
725.	Top, Steady Rest	13"-15"	1
		17"-19"	1
726.	Pin, Straight	13"-15"	1
		17"-19"	1
727.	Nut	13"-15"	1
		17"-19"	1
728.	Washer	13"-15"	1
		17"-19"	1
729.	Bolt, Eye	13"-15"	1
		17"-19"	1
730.	Nut	13"-15"	1
		17"-19"	1
731.	Washer	All	1
732.	Bolt, Rough	13"	1
		15"	1
		17"	1
		19"	1
733.	Clamp, Steady Rest	13"-15"	1
		17"-19"	1
734.	Bottom, Steady Rest	13"	1
		15"	1
		17"	1
		19"	1
735.	Screw, Sq. Hd. Set	13"-15"	3
		17"-19"	3
736.	Screw, Set	13"-15"	3
		17"-19"	3
737.	Jaw, Steady Rest	13"-15"	3
		17"-19"	3
738.	Tip, Bronze	13"-15"	3
		17"-19"	3
739.	Screw, Sq. Hd. Set	13"-15"	3
		17"-19"	3
740.	Collar, Jaw Adj. Screw	13"-15"	3
		17"-19"	3
741.	Pin, Straight	13"-15"	6
		17"-19"	6
742.	Nut	13"-15"	1
		17"-19"	1
743.	Screw, Hex Cap	13"-15"	1
		17"-19"	1

KEY NO.	PART NAME	MODEL	QTY.
744.	Jaw, Roller	13"-15"	3
		17"-19"	3
745.	Stud	13"-15"	3
		17"-19"	3
746.	Roller	13"-15"	3
		17"-19"	3
747.	Oiler	13"-15"	3
		17"-19"	3
748.	Rest, Follow	13"	1
		15"	1
		17"	1
		19"	1
749.	Washer	13"-15"	2
		17"-19"	3
750.	Screw, Hex Cap	13"-15"	2
		17"-19"	3
751.	Tip, Bronze	13"-15"	2
		17"-19"	2
752.	Jaw, Follow Rest	13"-15"	2
		17"-19"	2
753.	Screw, Set	13"-15"	2
		17"-19"	2
754.	Pin, Straight	13"-15"	4
		17"-19"	4
755.	Collar, Jaw Adj. Screw	13"-15"	2
		17"-19"	2
756.	Screw, Sq. Hd. Set	13"-15"	2
		17"	2
		19"	2
757.	Screw, Sq. Hd. Set	13"-15"	2
		17"-19"	2
758.	Jaw, Roller	13"-15"	2
		17"-19"	2
759.	Stud	13"-15"	2
		17"-19"	2
760.	Roller	13"-15"	2
		17"-19"	2
761.	Oiler	13"-15"	2
		17"-19"	2

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