TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST FOR

LATHE, ENGINE TOOLROOM MODEL 1530 (3416-00-517-1051)

HEADQUARTERS, DEPARTMENT OF THE ARMY

MARCH 1983

WARNING

DO NOT OPERATE THE SPEED SELECTORS WHEN THE MOTOR IS RUNNING.

TECHNICAL MANUAL

No. 9-3416-230-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *14 March 1983*

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS LIST FOR LATHE, ENGINE TOOLROOM MODEL 1530 (NSN 3416-00-517-1051)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2, located in back of this manual direct to: Commander, US Army Armament Materiel Readiness Command, ATTN: DRSAR-MAS, Rock Island, IL 61299. A reply will be furnished directly to you.

NOTE

This manual is published for the purpose of identifying an authorized commercial manual for the use of the personnel to whom this equipment is issued.

Manufactured by: Standard-Modern Tool Co. Ltd.
69 Montcalm, Ave.
Toronto, Ontario M6E4N9
Procured under Contract No. DAAA-75-C-7017

This technical manual is an authentication of the manufacturers' commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.

INSTRUCTIONS FOR REQUISITIONING PARTS

NOT IDENTIFIED BY NSN

When requisitioning parts not identified by National Stock Number, it is mandatory that the following information be furnished the supply officer.

1 - Manufacturer's Federal Supply Code Number. 36195

2 - Manufacturer's Part Number exactly as listed herein.

3 - Nomenclature exactly as listed herein, including dimensions, if necessary.

4 - Manufacturer's Model Number. 1530

5 - Manufacturer's Serial Number (End Item).

6 - Any other information such as Type, Frame Number, and Electrical Characteristics, if applicable.

7 - If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50.

Complete Form as Follows:

(a) In blocks 4, 5, 6, list manufacturer's Federal Supply Code Number - 36195 followed by a colon and manufacturer's Part Number for the repair part.

(b) Complete Remarks field as follows:

Noun: (nomenclature or repair part)
For: NSN: 3416-00-517-1051
Manufacturer: Standard-Modern Tool Co. Ltd.
69 Montcalm, Ave.
Model: 1530 Toronto, Ontario M6E4N9
Serial: (of end item)

Any other pertinent information such as Frame Number, Type, Dimensions, etc.

OPERATOR'S HANDBOOK

Index Page No.

LIST OF ILLUSTRATIONS

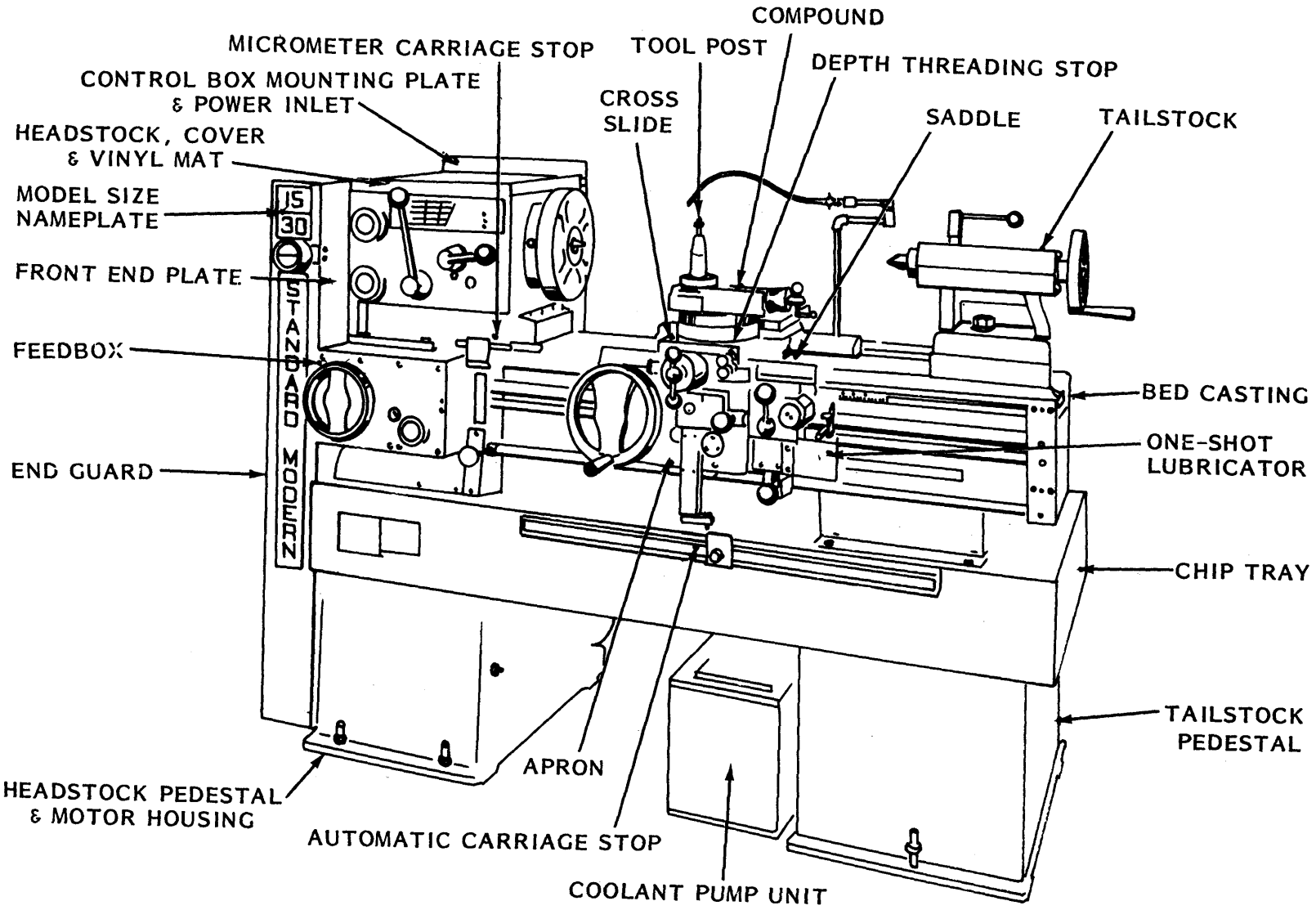


Figure 1 General View

1. LIFTING AND INSTALLATION INSTRUCTIONS

1.1 Lifting the Machine

To lift the machine by the use of chain slings, run the carriage down to the tailstock and place the slings around the center bed cross ribs.

Protect painted surfaces with thick pads.

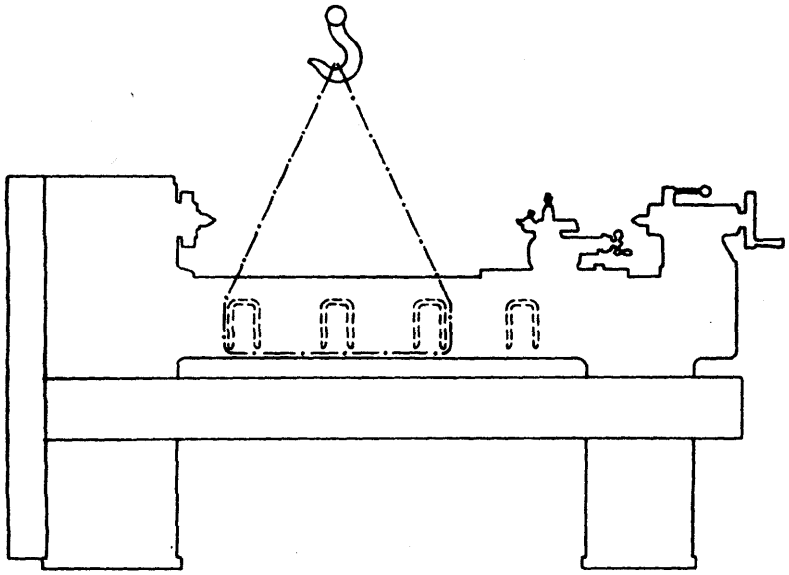


Figure 2 Lifting the Machine

Lifting equipment should have a capacity of approximately 4000 lbs.

Do not remove skids from the machine until it is brought to its final position.

1.2 Inspection

Check your delivery slip against the accessories that were ordered with the machine. If there is a shortage or error, report it.

The serial number of the machine is stamped on the recessed face, on top of the bed, at the tailstock end.

LIFTING AND INSTALLATION

1.3 Cleaning

All unpainted parts of the machine have been coated with an anti-rust compound. This should be thoroughly removed after the machine is installed and before moving the carriage, compound rest or tailstock on their respective slides.

To remove the anti-rust compound use a wiper dipped in kerosene.

All unpainted surfaces should immediately be coated with a film of light machine oil to prevent rust. If the finished surfaces are kept clean and well coated with oil, the lathe will retain its new appearance indefinitely.

1.4 Installation

For proper operation, the machine should be set on a substantial floor capable of supporting the weight safely. To secure the machine on its foundation use anchor bolts or lag screws. For the size of the lathe and the location of the bolt holes see the floor plan.

After the machine is in position, it must be leveled by the use of the square head set screws provided before tightening the lag screws. It will be necessary to use 4 inch square steel plates, about 3/8" thick, under the leveling screws to prevent the ends of the screws from sinking into the floor.

It is important that the lathe be level in order to produce accurate work.

Use a precision level placed lengthwise, and crosswise on the bed. To take a reading off the level for the crosswise leveling of the bed, use parallel bars placed on the flats of the bed.

After all the strain and twist has been removed from the lathe bed, and it checks perfectly level, the pedestals should be lagged to the floor, and the leveling re-checked. Re-check the level of the machine at regular intervals.

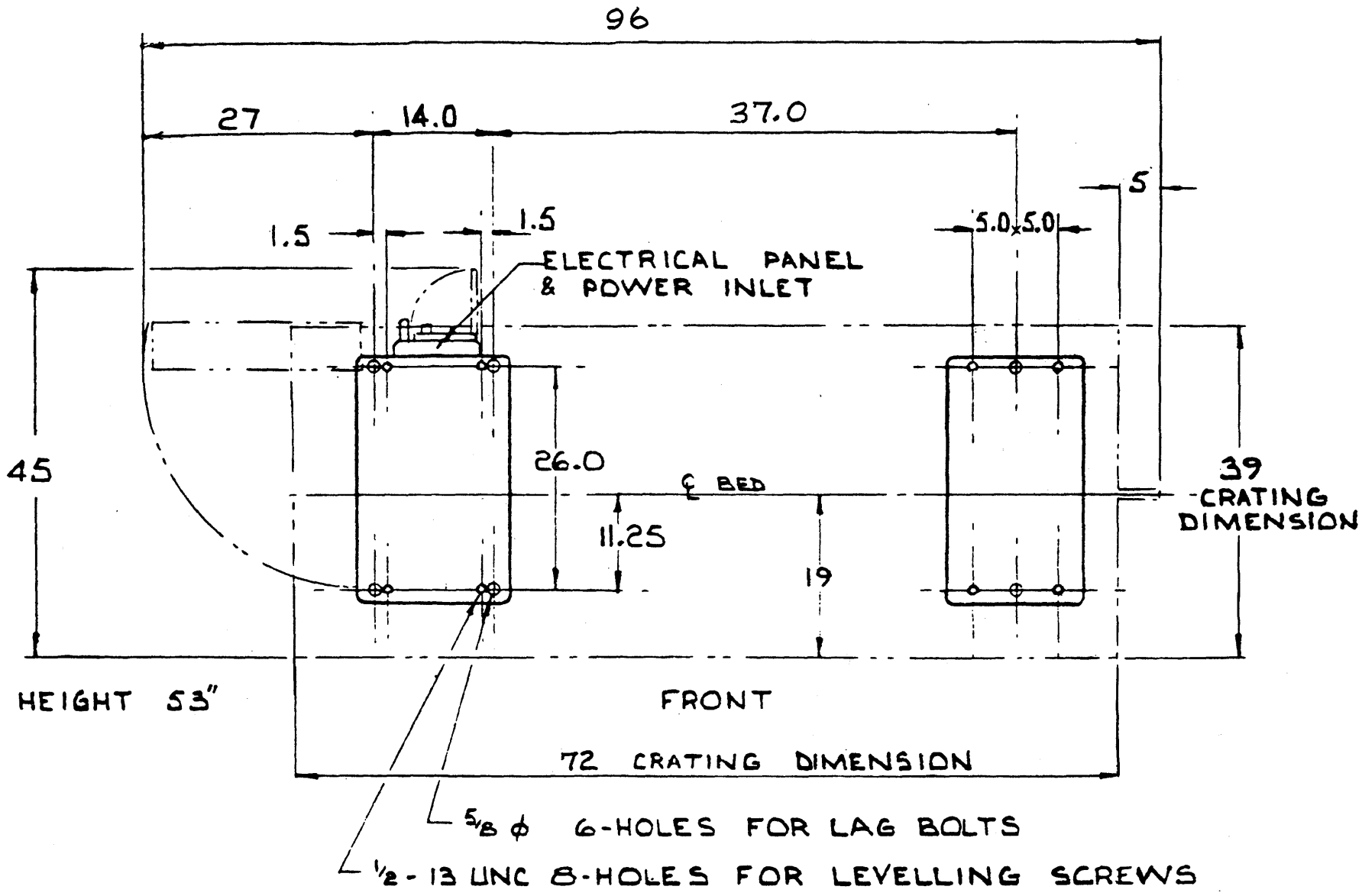
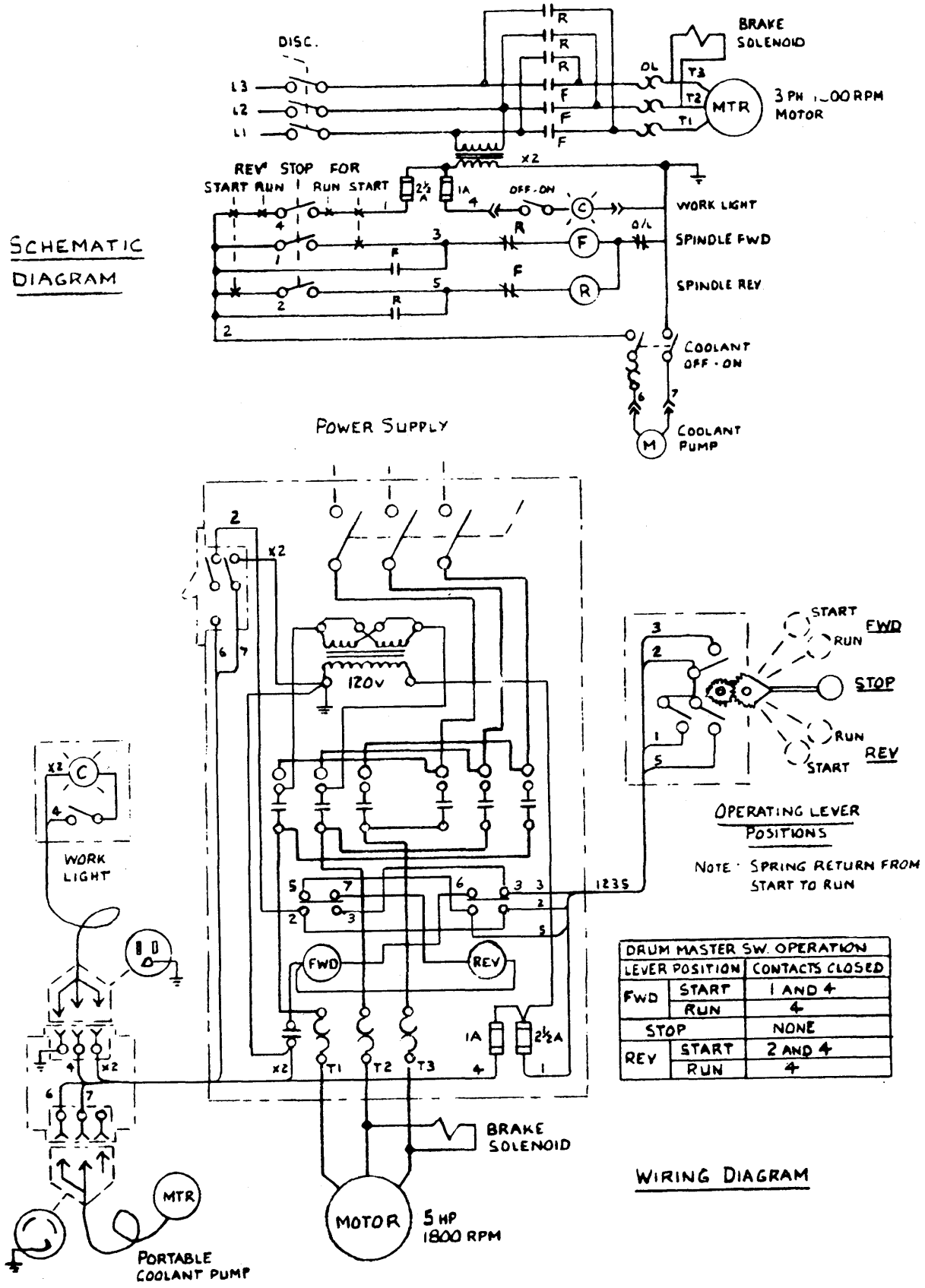


Figure 3 Floor Plan



DRUM MASTER SW. OPERATION		
LEVER POSITION		CONTACTS CLOSED
FWD	START	1 AND 4
	RUN	4
STOP		NONE
REV	START	2 AND 4
	RUN	4

Figure 4 Electrical Schematic Diagram

2. LUBRICATION

All machines are shipped with the lubricant oil drained from the oil sumps in the headstock, feedbox, and apron, and must be serviced before being put into use.

A high grade S.A.E. No. 30, Mineral Oil should be used. (Viscosity 500-530 SUS at 100 Deg. F.)

CAUTION:

Do not mix detergent type, automotive oil or multipurpose oils with the type of oil specified.

Before filling reservoirs or oil cups, always wipe off any accumulation of old oil, grease or dirt that might get into a part being lubricated.

2.1 Headstock

The lubrication of the headstock is automatic, so that an even distribution throughout the headstock is assured.

To service the headstock, fill the reservoir to the center of the oil sight gauge through the oil pipe at the left end of the headstock inside the end guard.
The reservoir capacity of the headstock is approximately 9 British Imperial Quarts or 11 U.S. Quarts.

Depending on operating conditions, usually about every six months, the headstock should be drained and thoroughly flushed out, before adding new oil. The drain pipe is located at rear bottom of headstock.

Because most solvents tend to soften paints, they are not recommended as flushing mediums. A light blending oil, to which a small percentage of kerosene has been added, may be used to flush out any dirt or sediment. Run the machine for several minutes without load so that the flushing oil can circulate through the reservoir. The flushing oil should then be drained and new oil added.

LUBRICATION

2.2 2-Speed Headstock Drive.

Four grease fittings, located inside the end guard, lubricate the shaft bearings of the 2-Speed Drive.

On the 2-Speed Drive, between the large "Slow Range" Pulley and the smaller "Fast Range" Pulley, a CLUTCH BOBBIN slides on a multi-tooth sleeve which requires the application of grease at regular intervals, to assure free shifting.

In order to apply grease to the sleeve, move the bobbin first to the "Fast" position and then to the "Slow" position. (The "SLOW RANGE-FAST RANGE" SELECTOR KNOB actuates the Clutch Bobbin).

Use a small rod to insert the grease on either side of the bobbin.

Also apply grease to the groove in the clutch bobbin to prevent noise from the actuating pin.

2.3 Feedbox

The lubrication of the Totally Enclosed Feedbox is automatic so that an even distribution throughout is assured. To service the feedbox, fill reservoir to the center of the oil sight gauge through filler elbow at left end of feedbox. The reservoir capacity of the Feedbox is approximately 2 British Imperial Quarts or 2 1/2 U.S. Quarts.

Feedbox should be drained and flushed, using same procedure as outlined for headstock, approximately every 6 months. The drain hole is located on front face of Feedbox at left hand end.

2.4 Compound

On the compound rest, one oil hole lubricates both the ways and the screw,

2.5 Cross Slide

Of the three ball type oilers on top of the cross slide the two outer ones lubricate the cross slide dovetails and bearing surfaces on the saddle.

These two oilers are not used when the One-Shot Lubricator provides lubrication to the bearing surfaces through internal passages in the saddle. This lubricating system with One-Shot Lubricator, located on the apron, is optional equipment.

One oiler, at the center on top of the cross slide lubricates the Cross Feed Nut and the threaded portion of the Cross Feed Screw.

The cross feed screw bearing is lubricated by an oiler behind the cross feed dial.

LUBRICATION

2.6 Saddle

On the right top side of the saddle wings two oilers lubricate the bearing surfaces of the saddle on bedways.

These two oilers are not used when the oil is supplied by the One-Shot Lubricator.

The oil flows down through the oilers, or flows through the inside oil passages when using One-Shot Lubricating System, out onto the ways and along the length of the saddle through oil grooves.

The oil is retained at the bearing surfaces by felt seals located at either end of the saddle wings which also provides an even distribution of the lubricant over the ways.

2.7 Apron

The box construction of the apron completely encloses all moving parts. The lower half forms a large oil reservoir in which all the gears run, providing an even distribution of lubricant.

Service the apron reservoir through the oil cup at the back of the apron handwheel. Fill with oil to the center of the oil sight gauge. The reservoir capacity of the apron is approximately 1 British Imperial Quart or 1 1/4 U.S. Quarts.

The apron oil reservoir should be drained, flushed and re-filled with fresh, clean oil at least once every 6 months.

Two oil cups, located on the right hand front of the apron, lubricate individually the half-nuts control shaft and the thread chasing dial shaft.

2.8 Tailstock

The spindle and screw are lubricated by an oiler located on top of the spindle housing.

The bedways on which the tailstock slides should be cleaned and oiled frequently.

Dry red lead mixed with machine oil to a creamy consistency, is an excellent lubricant for the tailstock center when a revolving center is not available.

LUBRICATION

2.9 Bed End Bracket and Leadscrew

Three grease fittings, located on the front face of the Bed End Bracket, lubricate individually the ends of the Leadscrew, Feed Shaft and Control Shaft.

Grease every '8 working hours the end of the Leadscrew and the end of the Feedshaft. The end of the Control Shaft requires grease once a month, as indicated on Lubrication Plate.

Before cutting a thread, clean and oil the Leadscrew thoroughly.

2.10 Taper Attachment

Clean and oil the pivoted Slide Bar before use.

Three oilers lubricate the cross guide bar and two oilers provide lubrication to the slide plate dovetails.

2.11 Control Shaft for Leadscrew Reverse

NOTE: This lathe has two extra grease fittings on the Control Shaft for Leadscrew Reverse - one on the Bed End Bracket (3rd down) and one on the Support Block at R.H. end of Apron. Grease once a week.

Apply a few drops of oil to the Coupling and Pivot Roller at left end of Control Shaft.

LEADSCREW REVERSE

This lathe is equipped with an apron-mounted control lever (MAROON KNOB) for selecting both leadscrew and feed reverse.

Push "DOWN" for R.H. threads & L.H. Feed.
Pull "UP"' for L.H. Threads & R.H. Feed.
Horizontal position is neutral.

Avoid engagement at spindle speeds above 100 R.P.M. when cutting very coarse threads - OR - 800 R.P.M. when cutting fine threads and when using normal feed rates.

A good general rule for determining the approximate safe spindle speed when cutting a specific T.P.I. is to multiply the T.P.I. by 25.

Example	2	T.P.I.	x 25 =	50	R.P.M.
	8	T.P.I.	x 25 =	200	R.P.M.
	16	T.P.I.	x 25 =	400	R.P.M.
	32	T.P.I.	x 25 =	800	R.P.M.

There should be little difficulty in engaging the half nuts when following this rule and undue strain on the feed gear train is avoided.

The main feature of the Leadscrew Reversing Mechanism is the ability to disengage, reverse and re-engage the drive to the leadscrew without losing the relationship between the spindle and the leadscrew.

A further asset is the precise stopping of the carriage movement in either direction (via the trip dogs) when cutting threads or doing normal turning operations.

This is invaluable when:

1. Cutting a thread up to a shoulder.

2. Cutting an internal thread in a blind hole.

NOTE:
The threading tool will cut its own internal undercut, prior to retraction.

3. Cutting threads which cannot be handled with the threading dial such as metric leads and other odd pitches where the half nuts must be kept in engagement until the thread is completed.

CAUTION
Do not use "Reverse Spindle Rotation" in conjunction with the Trip Dogs for Leadscrew Reverse.
A stop block has been fitted below the L.H. Motor Control Handle to guard against this.

If "Reverse Spindle Rotation" is ever required for a special job, simply loosen the screw in the stop block and swing it out of the way. Be sure to re-position it after the job is done.

3. OPERATING INSTRUCTIONS

3.1 Motor Drive and Belt Tension Control

The Electrical Motor, located in the pedestal below the headstock, drives the machine through a 2-speed Drive Arrangement with Super H.C. V-Belts.

All belts are the same length and are interchangeable with one another.

When replacing belts, loosen the motor plate clamps and lift the motor plate.

The belts on the Slow Range Pulley can be readily removed, simply by rolling them off the pulley. However, replacement of the Fast Range Belts, requires the removal of the Shifting Arm which drops down between the two pulleys.

When replacing the shifting arm, place the Clutch Bobbin in its central position between the pulleys and clamp the shifting arm by tightening the 3/8 Soc. Hd. Cap Screw.

Be sure the clutch actuating pin does not touch the bottom of the Bobbin groove. Leave 1/32" clearance to prevent rubbing.

With the shifting arm in position adjust the new belts for proper tension (see below) and tighten motor plate clamps.

For the correct belt tension, use the following simple method:

At the center of the span apply a force of 5 lbs. using a spring scale (at right angles to the span) to deflect the belt 1/2 inch.

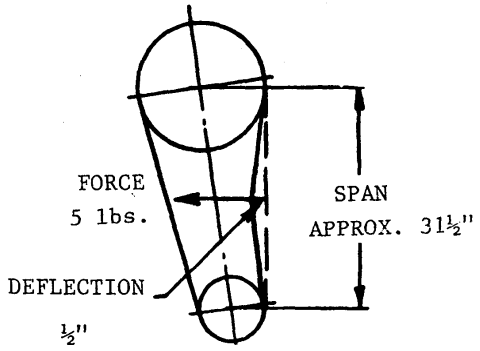


Figure 5 Belt Tension

Check the tension frequently during the first day of operation, and periodically thereafter.

Keep the pulleys and belts clean and free of any foreign material to ensure long life and better traction.

3.2 Motor and Spindle Rotation Control

Spindle rotation is controlled by means of the dual Control Levers mounted on a common Control Shaft. This control shaft in turn actuates a 3-position Rotary Pilot Switch which selects FORWARD, STOP and REVERSE rotation of the motor and spindle.

OPERATING INSTRUCTIONS

Motor and Spindle Rotation Control

The switch box and the L.H. CONTROL LEVER are located just below the headstock at the right lower side of the feedbox.

The R.H. CONTROL LEVER is mounted at the right lower side of the apron and moves with the apron along the bed.

Lifting the levers up gives FORWARD rotation of spindle in the normal direction for turning, drilling, boring, etc.

Pushing the levers down gives REVERSE spindle rotation.

The central or STOP position stops the spindle.

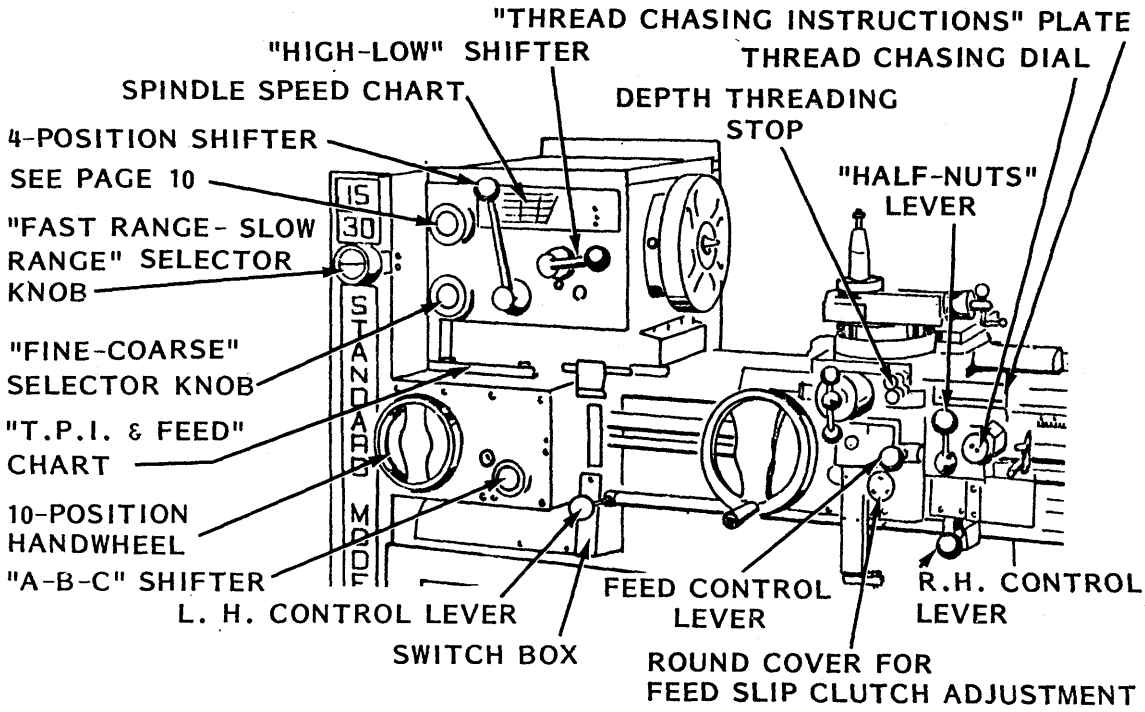


Figure 6. Motor & Spindle Rotation Control

3.3 Spindle Speed Selection

The direct reading SPINDLE SPEED CHART is located on the upper front face of the Headstock.

Immediately below are two speed selectors:
THE 4-POSITION SHIFTER and the "HIGH-LOW" SHIFTER.

The third speed selector: The "FAST RANGE - SLOW RANGE." SELECTOR KNOB is located at the left hand end of headstock.

The desired spindle speed is obtained by placing the three Speed Selectors in positions corresponding to the selected spindle R.P.M. number noted directly on the SPINDLE SPEED CHART.

For free hand rotation of the spindle move the "HIGH-LOW" SHIFTER to its NEUTRAL position.

WARNING
DO NOT OPERATE THE SPEED SELECTORS WHEN THE MOTOR IS RUNNING.

OPERATING INSTRUCTIONS

3.4 Power Feeds

To select the power longitudinal feed or the power cross feed arrange the "R.H. - L.H." and "FINE-COARSE" SELECTOR KNOBS on the headstock and also the "A-B-C" SHIFTER and the 10-POSITION HANDWHEEL on the feedbox, to correspond to the desired feed rate indicated on the "T.P.I. and FEED" CHART.

As an added feature all feed rates are exactly as shown on the chart. This makes it possible to cut scrolls on faceplate work when using the power cross feed.

CAUTION

AVOID THE COARSE RANGE OF FEEDS WHEN SPINDLE SPEEDS ARE ABOVE 500 R.P.M.

For longitudinal power feed move the FEED CONTROL LEVER up to the "LONG FEED" POSITION and the tool will move along the bed parallel to the spindle.

For cross power feed move the FEED CONTROL LEVER down to the "CROSS FEED" position, and the tool will move across the bed, at right angle to the spindle.

NOTE:

A short side shift is required before shifting from LONG FEED to CROSS FEED or vice-versa. This prevents accidental through-shifting.

A safety interlock is also fitted so that it is impossible to engage the FEED CONTROL LEVER and the HALFNUTS at the same time.

3.5 Automatic Carriage Stop.

As an additional feature, lathes can be equipped with automatic feed trip to provide accurate carriage stopping at any point on the bed and in either direction of longitudinal feed.

Simply clamp the moveable TRIP DOG to the rail at the desired stopping position.

3.6 Thread Cutting and Thread Chasing Dial

When cutting screw threads select the desired T.P.I. setting, and proceed in the normal manner.

To engage Apron for threading, the HALF-NUTS are brought into mesh with the Leadscrew by pushing the "HALF-NUTS" LEVER down.

To disengage, lift the same lever up.

The THREAD CHASING DIAL is conveniently located in relation to the lever and the "THREAD CHASING INSTRUCTIONS" PLATE is attached to the saddle wing just above it.

OPERATING INSTRUCTIONS

Thread Cutting

For cutting metric or special threads an ADJUSTABLE BRACKET with CHANGE GEARS for desired pitches is available as optional equipment together with a nameplate with TABLES of THREADS and PARTICULARS of CHANGE GEARS and FEEDBOX SETTINGS (as shown below).

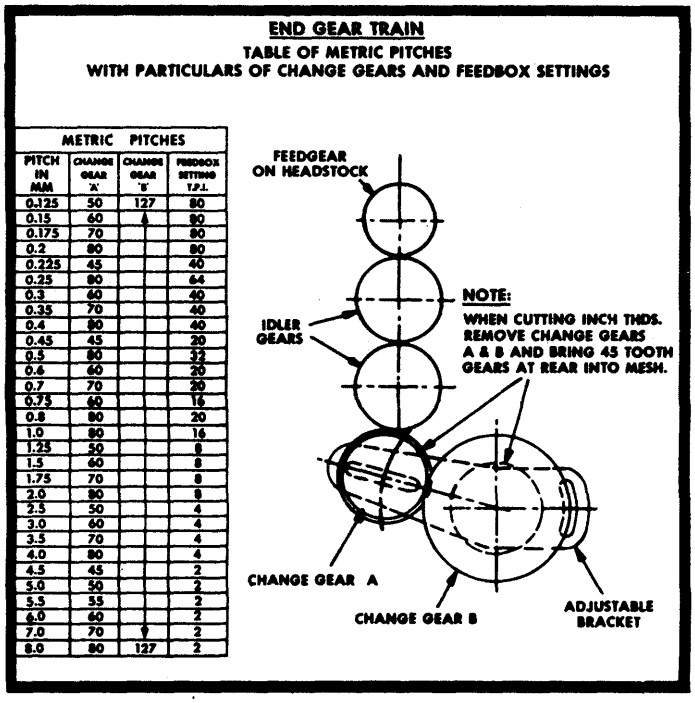


Figure 7 Thread Cutting (Pitches)

- For cutting the METRIC PITCHES as per chart a set of seven change gears is required.

- Virtually ANY DESIRED PITCH can be cut via the use of special change gears.

The Thread Chasing Dial cannot be used when cutting metric threads. The half nuts must be closed during the entire threading operation. Use the reversing motor to return carriage at the end of each cut - after retracting the cutting tool.

NOTE

It is not necessary to remove the ADJUSTABLE BRACKET when cutting Standard Inch Pitches. Simply remove the outer change gears and bring the 45T gears at rear into mesh.

OPERATING INSTRUCTIONS

3.7 Taper Turning Attachment:

Telescopic Type - Saddle Mounted

Taper: 4" per foot on dia. or 20 deg. included angle

Stroke: 12" - Standard, or 15" stroke - special

For Taper Turning:

(1) Loosen HEX HEAD LOCK SCREW on the bracket;
(2) Locate saddle on bed in relation to work piece;
(3) Tighten the two - HEAVY HEX NUTS on the bed clamp;
(4) Adjust the PIVOTED SLIDE BAR to desired taper and lock securely.

For Straight Turning:

(1) Loosen HEAVY HEX NUTS on the bed clamp;
(2) Tighten the HEX HEAD LOCK SCREW on the bracket;
(3) Leave the PIVOTED SLIDE BAR locked at its angular setting, so that taper attachment will move with the saddle.

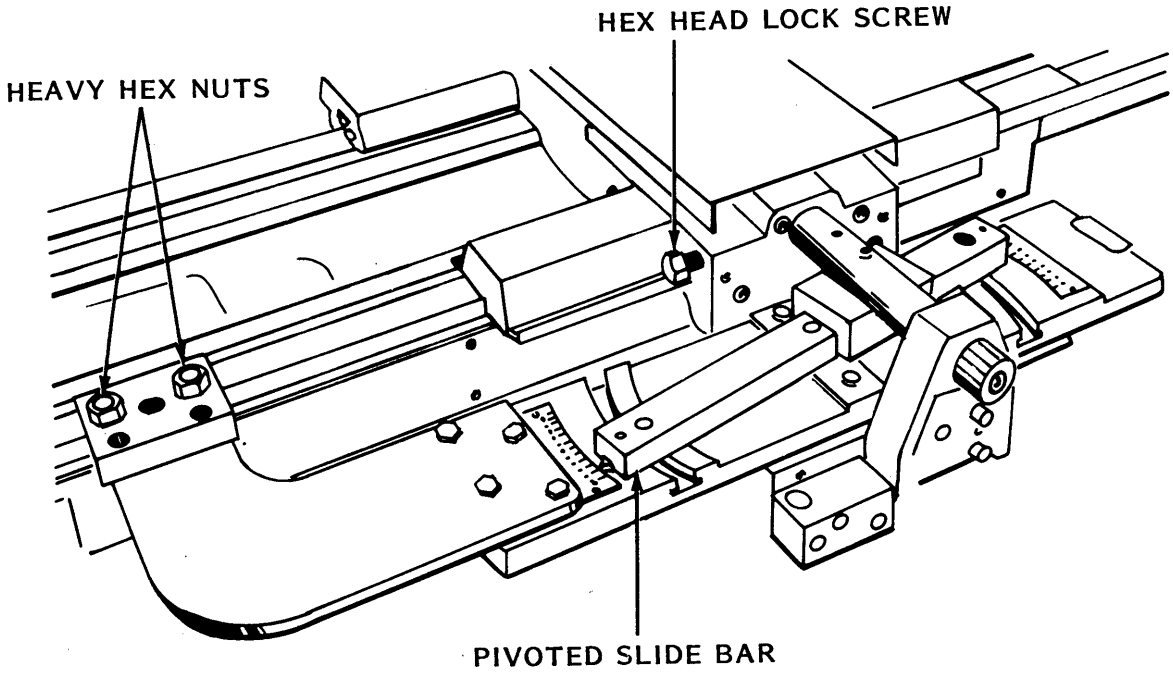


Figure 8 Taper Turning

OPERATING INSTRUCTIONS

3.8 Lead Screw Shear Pin

This brass shear pin is located at the left-hand end of the leadscrew (see below) and is provided to prevent damage to the leadscrew should the carriage be allowed to come in contact with the headstock or some other obstruction which acts as a positive stop. When the stoppage takes place the leadscrew continues to turn in the half nuts and will begin to move endwise thus shearing the pin longitudinally.

The shear pin can be readily replaced by first withdrawing the leadscrew from the coupling to remove the three portions of broken pin. It is then returned to the coupling and rotated by hand until the zero line on the screw coincides with that on the coupling. A new shear pin (4 spare are provided with the machine) is then driven into place.

3.9 Gear Train Shear Key

This brass shear key, is located in the feed compound shaft and drives the top gear of the end gear train (see below). It is provided to prevent damage to the feed compound gears in the headstock due to a possible seizure in the feed box.

A Spare Shear Key, which is provided with the machine, can be readily fitted by first removing the gear and knocking the broken portions of key out of the shaft with a small square nosed chisel. The new key is then fitted to the shaft and the gear assembled. It is important of course, to locate
and remedy the cause of the seizure.

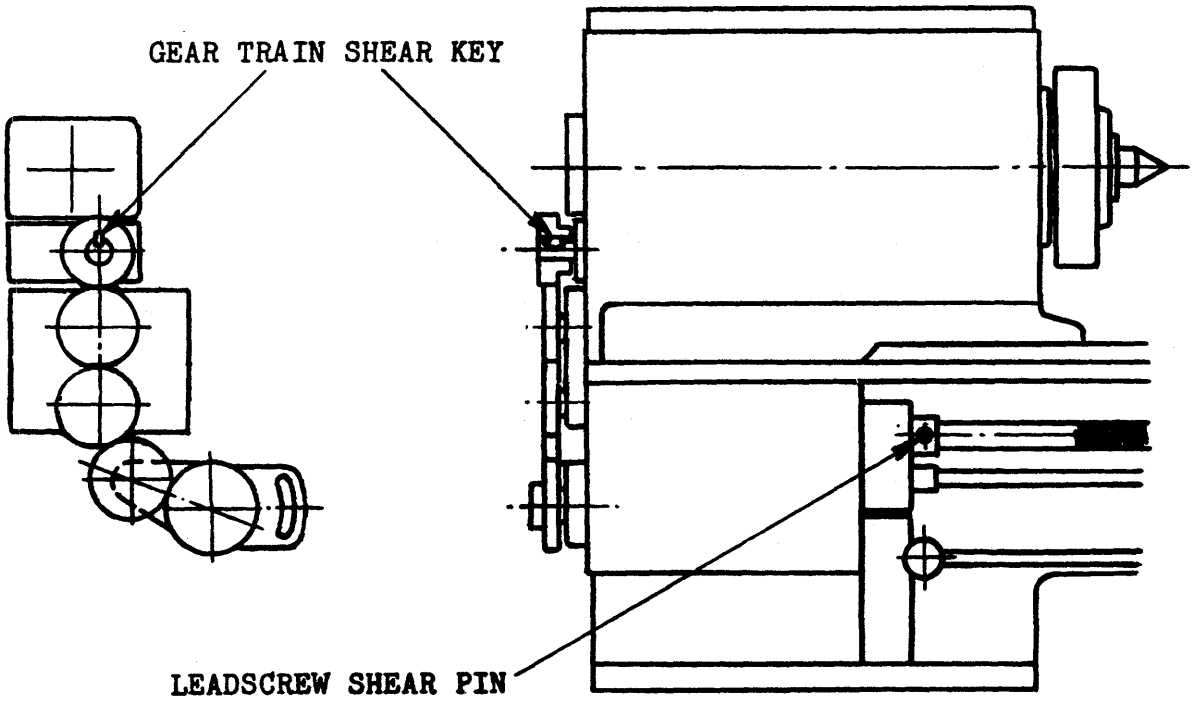


Figure 9 Location of Shear Pin & Shear Key

OPERATING INSTRUCTIONS

3.10 Feed Slip Clutch Adjustment

A feed slip clutch is provided in the apron to prevent damage to the feed mechanism in case of accidental overload. The clutch is pre-adjusted at the factory for all normal cutting loads.

If further adjustment is required, proceed as follows:-

(1) Remove the round cover from the front of the apron just below and to the left of the feed control lever

NOTE

Oil will drain out through the screw holes and should be retained in a clean container for refilling the apron oil sump.

(2) To adjust the feed slip clutch, simply tighten the socket set screw in the exposed end of the clutch shaft until the desired drive is obtained.

CAUTION

Do not lock the screw up solid as this will make the slip clutch inoperative.

(3) Test the drive via a very heavy cut or by grasping the apron handwheel with two hands while the carriage is in motion. You should be able to make the clutch "click" otherwise it is too tight and could shear the brass key in the end gear train.

(4) Replace the round cover and the oil.

3.11 Coolant Attachment

Available with centrifugal pump unit which delivers a copious volume of liquid at relatively low pressure.
The flow may be throttled or shut off completely without overloading the motor.
The motor has permanently lubricated oilite bearings and no lubrication is required for either pump or motor.

This unit has a 10 gal. tank supplied with removable chip and sludge collecting tray with a baffle and deflector for settling out sediment. Easily removed for cleaning.

Coolant tank should be cleaned and re-filled every 6 months or more frequently depending on usage.

The pump motor as standard is supplied with a 6 feet cord complete with "U" ground plug for use with a 115 volt wall outlet.

On special applications the coolant pump is supplied with a twist-lock plug, and the lathe-mounted receptacle is connected to the Control Panel 115 Volt Supply via a coolant On-Off switch.

HEADSTOCK PARTS

ITEM	NAME	PART NO.
1	SOC. HD. CAP SCREW 1/2-13 X 1 1/4	
2	SPECIAL WASHER	A-33264
3	SPECIAL WASHER	A-33265
4	REAR COVER	B-33159
5	GASKET	A-33218
6	OIL SEAL (1 3/8 I.D. X 2 O.D. X 21/64) CHICAGO RAWHIDE #13560	
7	INNER RACE-TORRINGTON #IR-1812	
8	DOUBLE ROW BALL BEARING-S.K.F. #3206/C4	
9	KEY 1/4 X 1/4 X 2 3/4 SQUARE ENDS	
10	PULLEY SHAFT	C-33161
11	TRIPLE SHIFTING GEAR	C-33089
12	38 TOOTH SPLINED GEAR	B-33090
13	BALL BEARING-S.K.F. #6205	

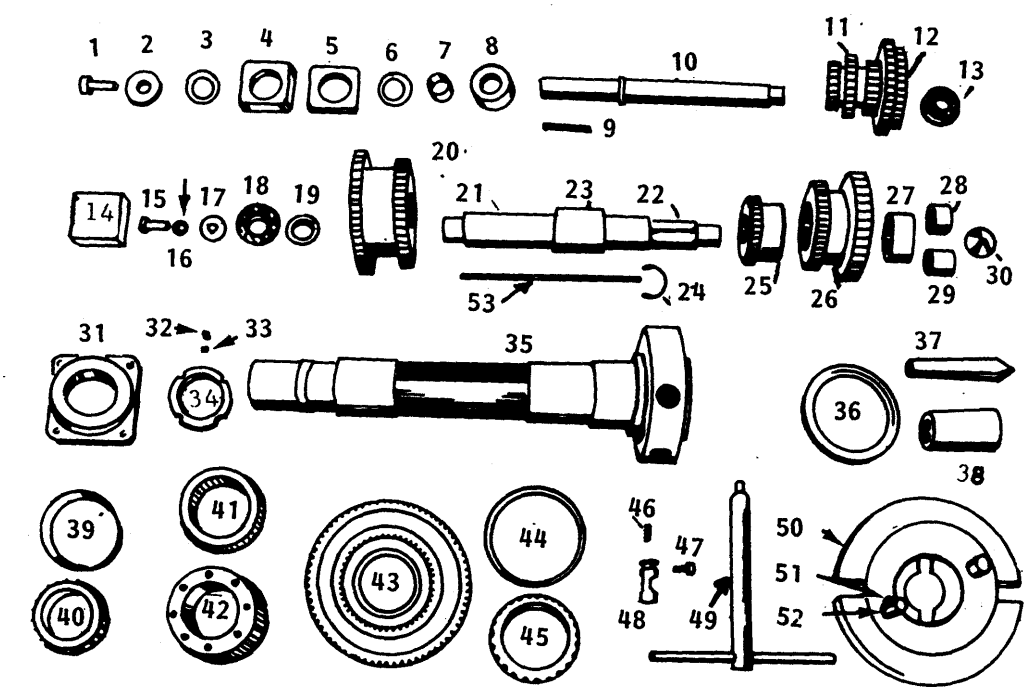


Figure 10 Headstock Parts

HEADSTOCK PARTS LIST (continued)

ITEM	NAME	PART NO.
14	REAR COVER	B-33157
15	HEX. HD. CAP SCREW 1/2-13 X 1 1/4	
16	SPLIT LOCKWASHER #1/2	
17	WASHER	A-33175
18	BALL BEARING-S.K.F. #6206	
19	SPACER	B-33167
20	60T. & 52T. GEAR	B-33163
21	INTERMEDIATE SHAFT	C-33169
22	ROLL PIN 3/16 DIA. X 1/2 LG.	
23	SPACER	B-33156
24	CRESCENT RETAINING RING-TRUARC #5103-175	
25	33T. GEAR	B-33166
26	42T. & 53T. GEAR	B-33160
27	RETAINER	B-33168
28	NEEDLE BEARING-TORRINGTON #JH-2016	
29	INNER RACE-TORRINGTON #IR-1616	
30	FROST PLUG 2" DIA.	
31	REAR COVER	B-32673
32	SOC. SET SCREW 1/4-28 X 1/4 LG.	
33	BRASS PAD	A-30564
34	LOCKNUT #N13	B-33155
35	D1-6" CAMLOCK SPINDLE	C-32671
36	BEARING SHIELD	B-32891
37	LATHE CENTER No. 4 MORSE:	
	-FOR ENGINE LATHE	A-22639
	-FOR TOOLROOM LATHE	A-41591
38	SLEEVE	
	-FOR ENGINE LATHE	A-41064
	-FOR TOOLROOM LATHE	A-41590
39	CUP #29520 TIMKEN	
40	CONE #29588 ROLLER BEARING (No. 3 PRECISION FOR ENGINE LATHE) (No. 0 PRECISION FOR TOOLROOM LATHE)	
41	54T. FEED TAKE OFF GEAR	C-33173
42	HIGH-LOW SHIFTER GEAR	C-33188
43	69T. BULL GEAR	C-33172
44	CUP #492A TIMKEN	
45	CONE #497 ROLLER BEARING (No. 3 PERCISION FOR ENGINE LATHE) (No. 0 PRECISION FOR TOOLROOM LATHE)	
46	CAM SPRING (6 REQ'D.)	A-41131
47	CAM SCREW (6 REQ'D.)	A-41123
48	CAM FOR D1-6" CAMLOCK (6 REQ'D.)	
49	CAM WRENCH	B-41210
50	10" DIA. DOG PLATE #D-41216	
51	SOC. HD. CAP SCREW 5/16-18 X 5/8 (4 REQ'D.)	SUB-ASS'Y. #51634
52	D1-6" CAMLOCK STUD "MAC-IT" (4 REQ'D.)	
53	Key 1/4 x 1/4 x 2 3/4 Square Ends	

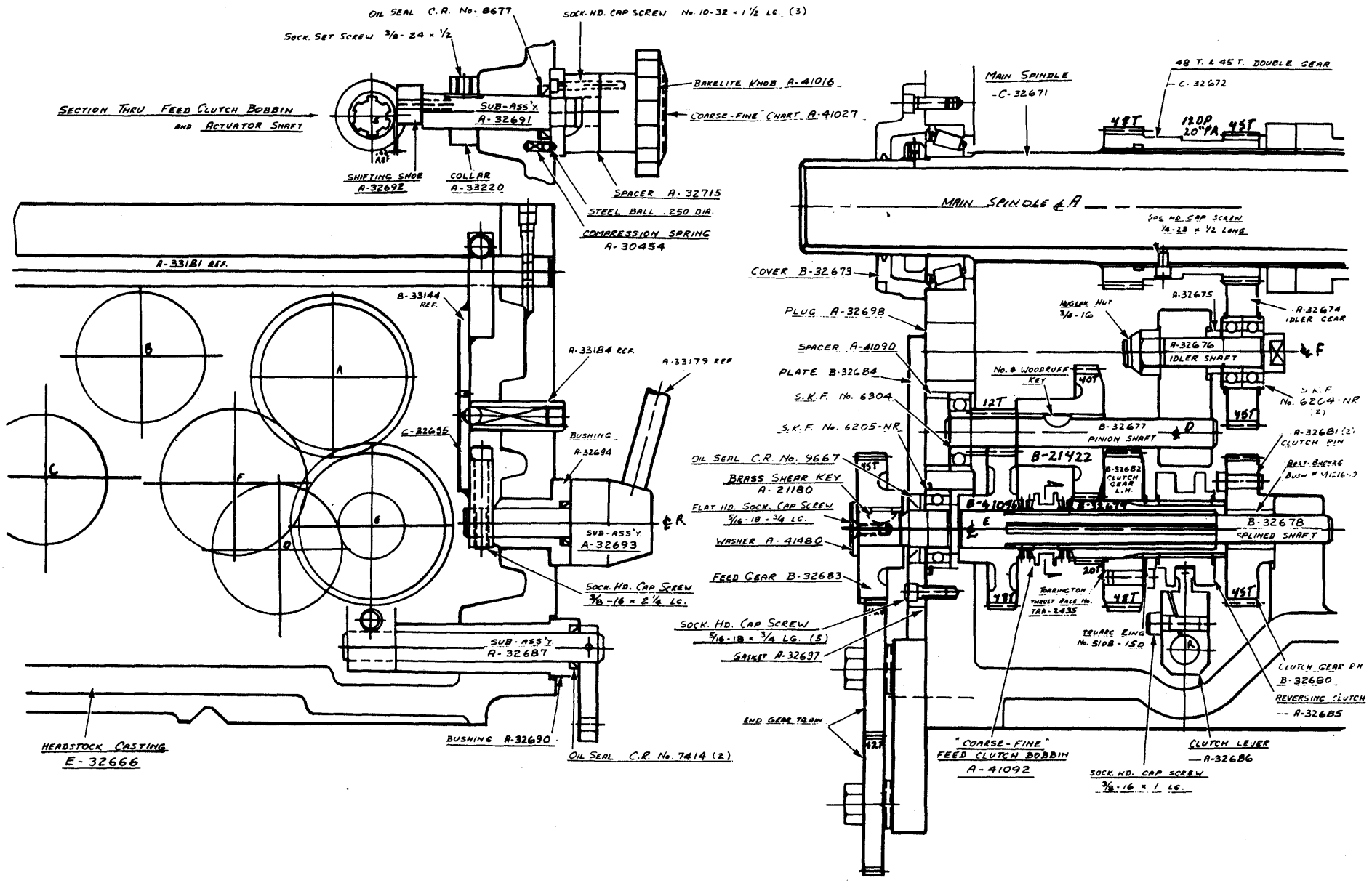


Figure 11 Headstock Feedtrain for Leadscrew Reverse

HEADSTOCK PARTS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
90	CROSS SHAFT	A-33181	112	GALVANIZED PIPE COUPLING 1/2 NPTF	
91	4-POSITION GEAR SHIFT SUB-ASS'Y.	B-33182	113	STANDARD GALVANIED LONG NIPPLE	
92	ROLL PIN 1/4 DIA. x 1 1/2 LG.			1/2 NPTF x 35" LG.	
			114	GALVANIZED 90" ELBOW 1/2 NPTF	
			115	OIL WINDOUW-BIJUR #B.5093	
95	RETAINING SCREW	A-33291	116	STANDARD GALVANIZED LONG NIPPLE	
96	SOC. SET SCREW /2-13 x 3/8 LG.			1/2 NPTF x 12" LG. or	
97	INDENT POSITIONER	A-33184		OIL DRAIN PIPE -13 1/2 LG.	B-32987
98	SPRING- #1			(FOR LATHE WITH COMBINATION STARTER)	
99	STEEL BALL .4375 DIA.		117	STYANIDAPD GALVANIZED LONG NIPPLE	
100	SOC. HD. CAP SCREW 3/8 16 x 1 1/4 LG			1/2 NPTF x 8" LG.	
101	GEAR SHIFTER SECTOR	B-33144	118	GAIVANIZED 45" ELBOW 1/2 NPTF	
			119	SQUARE HD PIPE PLUG 1/2 NPTF	
			120	HEX HD. CAP SCPEW 1/2 13 x 1" LG.	
			121	HEX JAM NUT 1/2 13	
			122	HEX HD CAP SCREW 5/8 11 x 2 1/4 LG.	
			123	HEADSTOCK CLAMP (REAR)	A-33203
106	BLACK PLASTIC BALL KNOB-		124	HEADSTOCK CLAMP	A-21447
	DIMCO #230 (3/8-24 x 1/2 INSERT)		125	SOC. HD. CAP SCREW 5/8 11 x 4 LG	
107	HAND LEVER	A-33179	NOT SHOWN		
108	HAND LEVER	A-33180			
109	SOC. HD. CAP SCREW 3/8-16 x 2 1/2 LG				
110	HI-LO GEAR SHIFTER SUB-ASS'Y	B-33143		HEADSIOCK COVER	C-33134
111	FILLER BREATHER PLUG	A-41712		MAT FOR HEADSTOCK COVER	B-33133

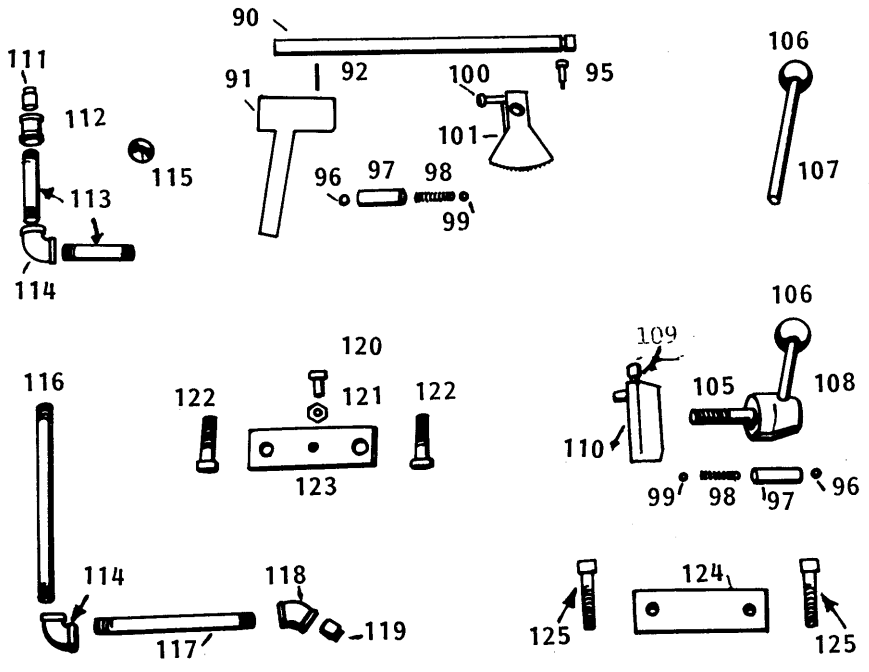


Figure 12 Headstock Parts

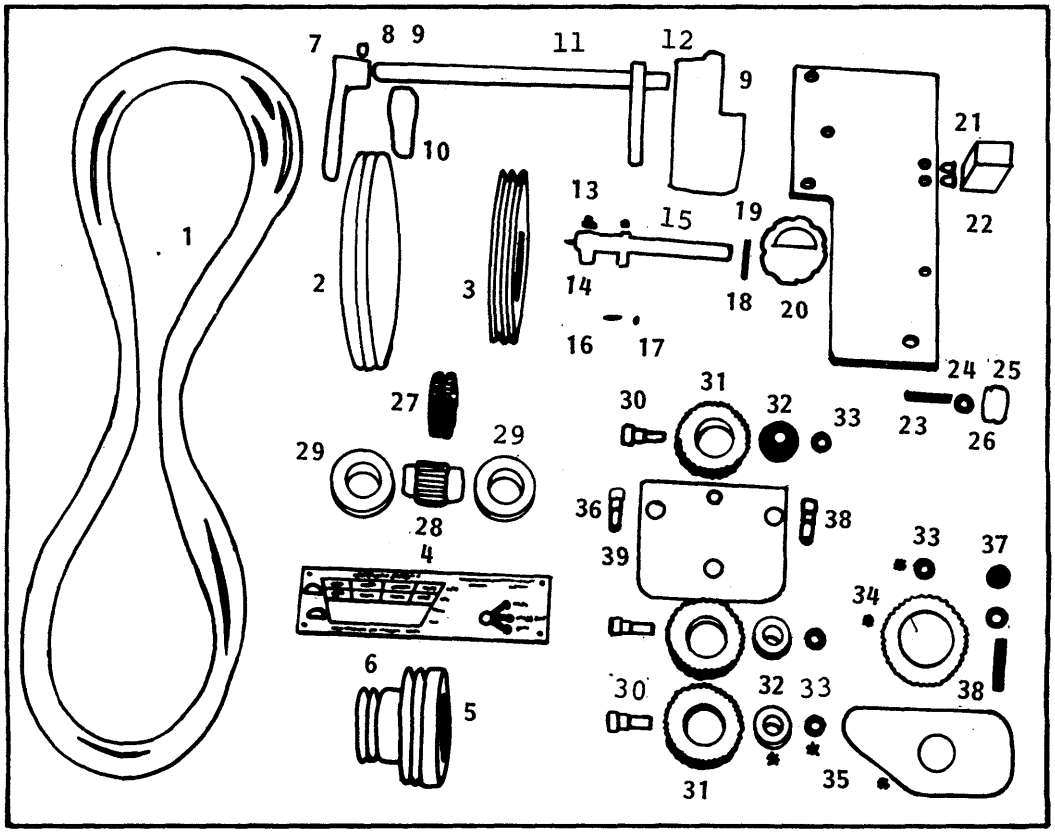


Figure 13

2-SPEED HEADSTOCK DRIVE AND END GEAR TRAIN PARTS

2-SPEED HEADSTOCK DRIVE AND END GEAR TRAIN PARTS

ITEM	NAME	PART NO.
1	V-BELTS 85" LG. GATES SUPER H.C. #3V850	
2	LOW SPEED PULLEY	C-33966
3	HIGH SPEED PULLEY	C-33967
4	SPEED CHART (30-1800 R.P.M.)	B-33986
5	MOTOR PULLEY	C-33245
6	SOC. SET SCREW 3/8-16 X 3/4 LG.	
7	OFFSET LEVER	B-33259
8	SOC. HD. CAP SCREW 3/8-16 X 1 1/4 LG.	
9	GREASE FITTING LINCOLN #5042 STRAIGHT THREAD	
10	PIVOT	B-33255
11	SHAFT & LEVER	B-33256
12	MOUNTING CASTING	C-33084
13	SOC. SET SCREW 3/8-24 X 1/2 LG.	
14	COLLAR	A-41018
15	ECCENTRIC SHAFT SUB-ASS'Y.	B-33974
16	COMPRESSION SPRING	A-30454
17	STEEL BALL .250 DIA.	
18	ROLL PIN 1/4 DIA. X 2" LG.	
19	"SLOW RANGE-FAST RANGE" PLATE	A-33263
20	KNOB	A-33092
21	BUTTON HD. SOC. CAP SCREW 5/16-18 X 5/8 LG.	
22	SHAFT SUPPORT BLOCK	A-33019
23	BELT GUARD LATCH SPINDLE	A-41415
24	WASHER-WESPO #6001	
25	SOC. SET SCREW 1/4-28 X 1/4 LG.	
26	KNOB FOR GUARD	A-21120
27	SPLINED CLUTCH	B-33110
28	SPLINED SLEEVE	B-33266
29	BALL BEARING-S.K.F. #6208-2RS	
30	IDLER BOLT	A-41526
31	42 T. IDLER GEAR	A-41363
32	BALL BEARING-S.K.F. #6303-2RS	
33	WASHER-WESPO #6009	
34	45 T. FEED GEAR	B-41364
35	ADJUSTABLE IDLER BRACKET	B-33038
36	SOC. HD. CAP SCREW 1/2-13 X 1 1/2 LG.	
37	HEAVY HEX. NUT 1/2-13	
38	MILLED STUD 1/2-13 X 2 1/4 LG.	
39	FIXED IDLER BRACKET	B-33368

Note: PARTS MARKED THUS * ARE NOT REQUIRED FOR CUTTING METRIC OR SPECIAL THREADS AND PITCHES - SEE PAGE 28 FOR REPLACEMENT PARTS.

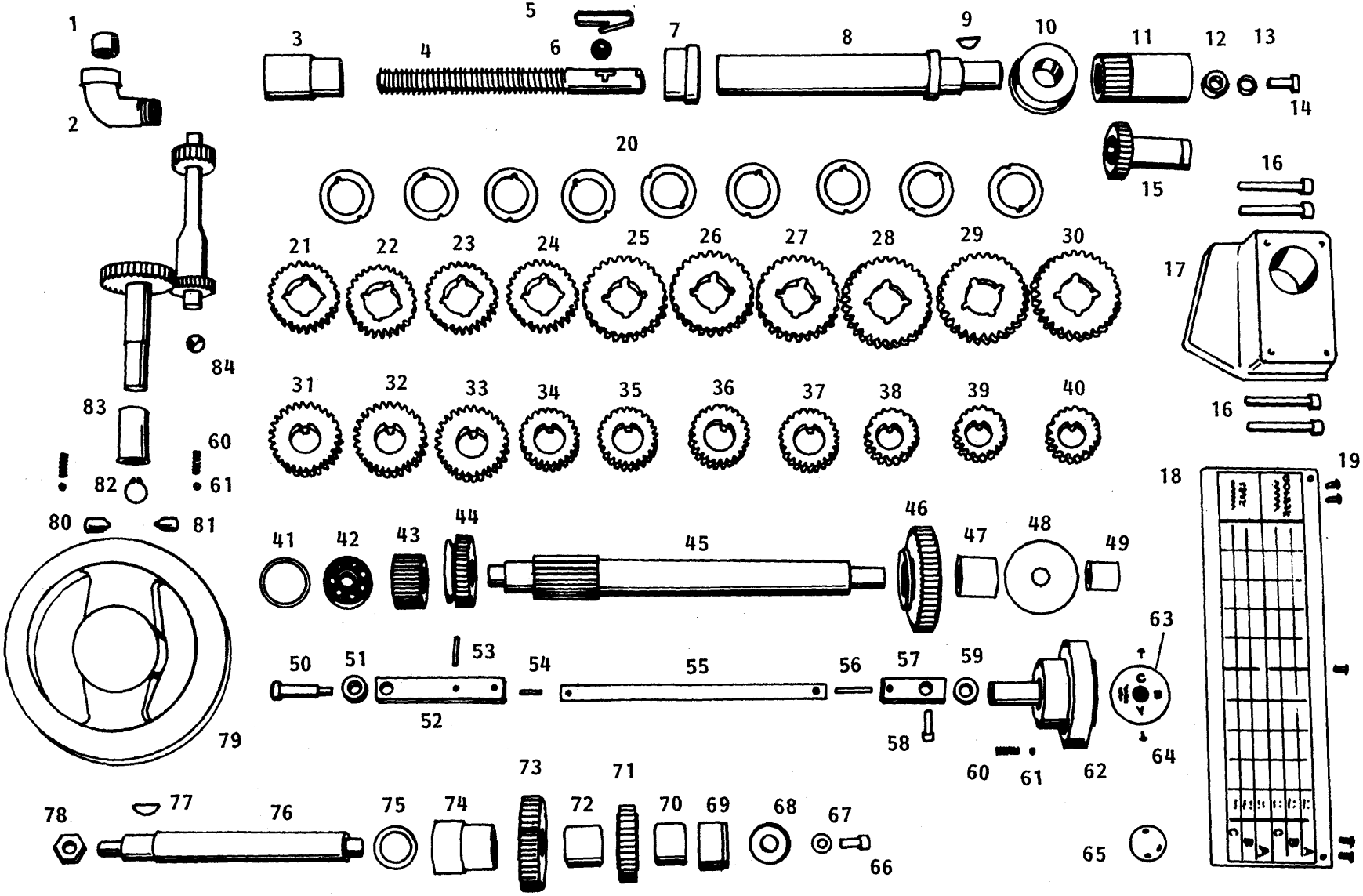


Figure 14 Totally Enclosed Feed Box Parts

TOTALLY ENCLOSED FEED BOX PARTS

ITEM	NAME	PART NO.
1	SQ. HD. PIPE PLUG 1/2, NPTF	
2	STREET ELBOW 1/2,: NPTF x 90°	
3	RACK COVER	A-33467
4	ROTATING RACK	C-33458
5	LEAF SPRING	A-41156
6	ROLLER KEY	A-33469
7	FLANGE BUSHING	A-33468
8	ROLLER KEY SHAFT	B-33472
9	WOODRUFF KEY #9 3/16x 3/4	
10	DOUBLE ROW BALL BEARING-NEW DEPARTURE #45205	
11	LEADSCREW COUPLING GEAR	B-33985
12	WASHER 3/8 I.D.-WESPO #6008	
13	SPLIT LOCKWASHER # 3/8	
14	HEX. HD. CAP SCREW 3/8,-24 x 2 1/4 LG.	
15	FEED SHAFT COUPLING GEAR	B-33071
16	SOC. HD. CAP SCREW 5/16-18 x 2 1/4 LG.	
17	END CASTING	C-3266
18	T.P.I. & FEEDS NAMEPLATE	B-33456
19	BUTTON HD. SOC. CAP SCREW #10-24 x 3/8 LG.	
20	THRUST RACE-TORRINGTON #TRB-2031	
21	27 TOOTH FEED DRIVE GEAR	A-33432
22	27 " " " "	A-33433
23	30 " " " "	A-33434
24	33 " " " "	A-33435
25	23 " " " "	A-33436
26	27 " " " "	A-33437
27	39 " " " "	A-33438
28	27 " " " "	A-33439
29	35 " " " "	A-33440
30	30 " " " "	A-33441
31	27 TOOTH GEAR	A-33442
32	24 " "	A-33443
33	24 " "	A-33444
34	24 " "	A-33445
35	16 " "	A-33446
36	18 " "	A-33447
37	24 " "	A-33448
38	16 " "	A-33449
39	20 TOOTH GEAR	A-33450
40	16 TOOTH GEAR	A-33451
41	BEARING RETAINER	A-33475
42	BALL BEARING - S.K.F. #6302	
43	24 TOOTH CLUTCH GEAR	A-33466
44	36 TOOTH SLIDING GEAR	B-33474
45	INTERMEDIATE SHAFT	B-33471
46	CLUTCH GEAR	B-33473
47	BUSHING (1 x 1 1/4 x 1 1/4) -- OILITE #AA-1212-16	
48	WASHER-INTERMEDIATE SHAFT	A-33476
49	BUSHING (5/8 x 7/8 x 1)-- OILITE #AA-832-1	
50	SHOULDER SCREW 3/8 x 1 1/4 LG.	
51	SPACER	A-33428
52	SHIFTER BLOCK	B-33427
53	H'DN. DOWEL PIN 3/16 DIA. x 1" LG.	
54	H'DN. DOWEL PIN 3/16 DIA. x 3/4 LG.	
55	SHIFTER LINK	B-33426
56	H'DN. DOWEL PIN 3/16 DIA. x 1 1/4 LG.	
57	SHIFTER BLOCK	A-33425
58	SOC. HD. CAP SCREW 1/4-28 x 2/4 LG.	
59	OIL SEAL (7/8 O.D. x 1/2 I.D. x 1/4)-#4938	
60	COMPRESSION SPRING	A-30454
61	STEEL BALL.250 DIA.	
62	A-B-C SHIFTER KNOB SUB-ASS'Y.	B-33429
63	A-B-C NAMEPLATE	A-33457
-64	DRIVE SCREW TYPE "U" #4 x 1/4 LG.	
65	OIL WINDOW-BIJUR B 5093	
66	SOC. HD. CAP SCREW 5/16-24 x 3/8 LG.	
67	FLAT WASHER-S.A.E. # 5/16	
68	BALL BEARING-S.K.F. #6202	A-33463
69	24 TOOTH GEAR	A-33465
70	SPACER	A-33462
71	36 TOOTH GEAR	A-33464
72	SPACER	A-33461
73	48 TOOTH GEAR	A-33460
74	BEARING BUSH	
75	OIL SEAL (1 1/2 O.D. x 1" I.D. x 5/16) #9840	
76	POWER INPUT SHAFT	B-33470
77	WOODRUFF KEY #11 (AMER. STD. #607) 3/16 x 7/8	
78	HEAVY HEX. NUT 1/2-13 NC	
79	HANDWHEEL	C-33459
80	SOC. SET SCREW FLAT POINT 1/2-13 x 3/4 LG.	
81	SOC SET SCREW CONE POINT 1/2-13 x 3/4 LG.	
82	RETAINING RING-TRUARC #5100-75	
83	BEAR-N-BRONZ BEARING-BOSTON CAT. NO. M1216-14	
84	FROST PLUG 5/8 DIA.	
85	HANDWHEEL GEAR & SHAFT SUB-ASS'Y.	A-33452
86	RACK PINION SHAFT	B-33455

NOT SHOWN

NAME	PART NO.
GASKET	C-33424
FEEDBOX CASTING	E-33421
WITH: (2) PULL DOWEL 5/16 HEX ID CAP SCREW	
(2) HEX. HD. CAP SCREW 1/2-13 x 1 1/4 LG.	
(2) SOC. 3D. CAP SCREW 3/8-16 x 2" LG.	
FRONT COVER	C-33422
WITH: (2) DOWEL PIN 1/4, DIA. x 3/4 LG.	
(10) SOC. HD. CAP SCREW 5/16-18 x 1 1/4 LG.	
DRAIN PLUG-HEX. SOC. PIPE PLUG 1/4 NPTF	

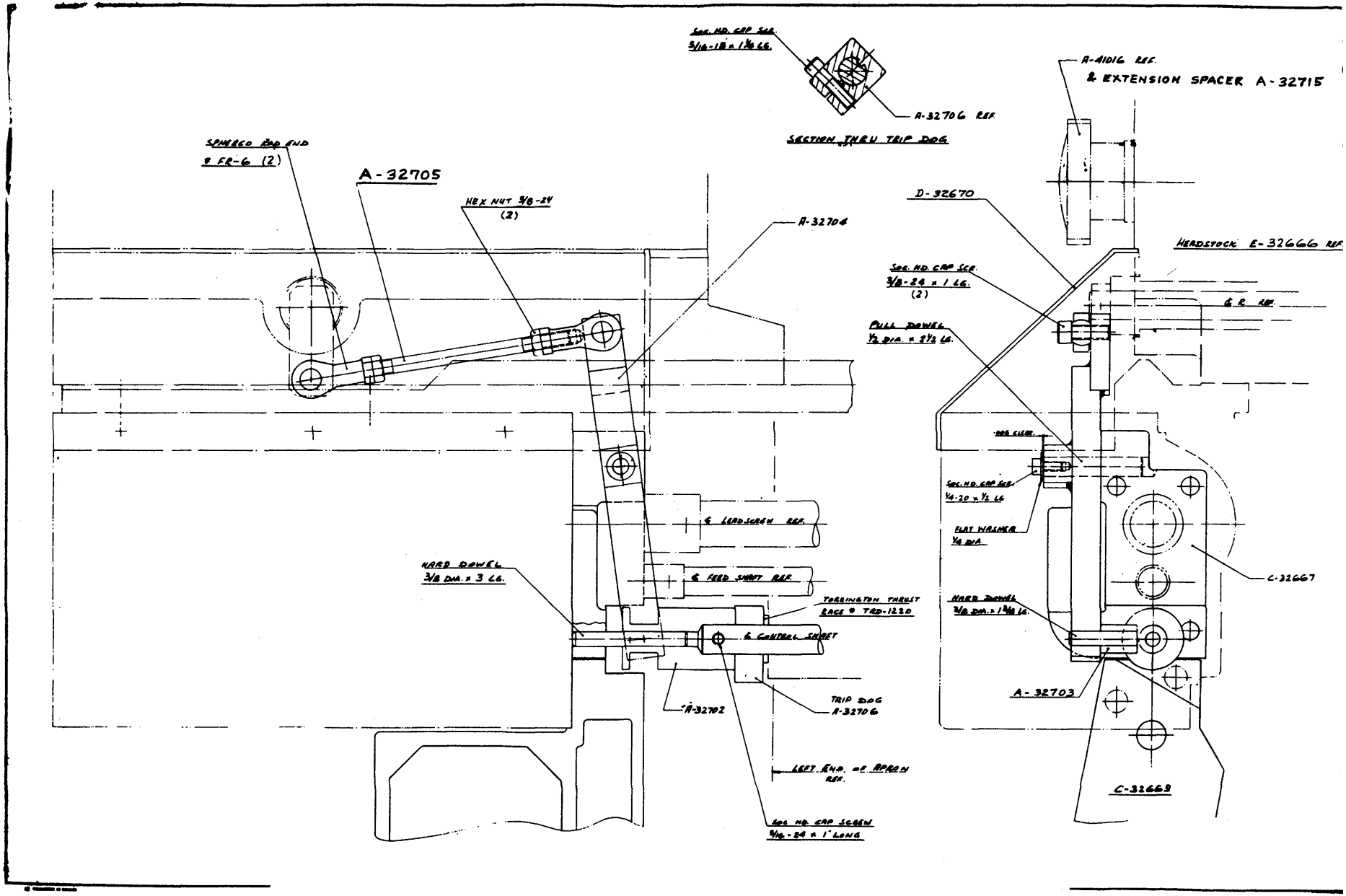
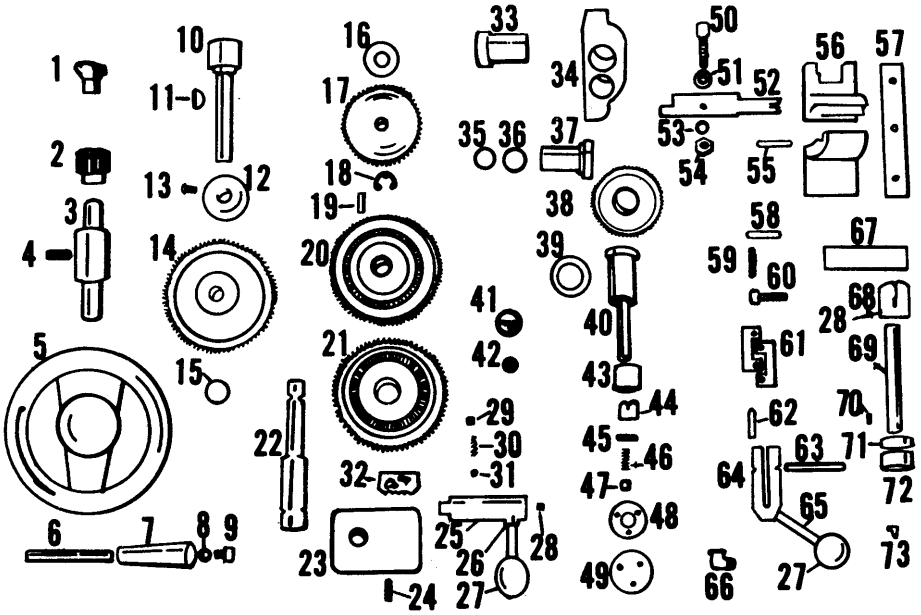


Figure 15 Control Linkage L. H. For Leadscrew Reverse Diagram

APRON PARTS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	0ILER-GITS #307		35	RETAINING RING-TRUARC #5100-100	
2	16 TOOTH GEAR	B-33059	36	THRUST WASHER	A-21250
3	FAN & PUMP BEARING-POLLARD #FPS 137		37	BEVEL PINION	B-21245
			38	66 T. BEVEL GEAR	B-21756
4	SOC. SET SCREW 3/8-16 x 1" LG.		39	OIL SEAL (1 3/8 x 2 x 21/64) #13560	
5	HANDWHEEL	C-33060			
6	SHAFT	A-41245	40	SHAFT FOR BEVEL GEAR	B-21757
7	HANDLE	B-41244	41	OIL WINDOW -- BIJUR #B-5093	
8	WASHER 1/2 O.D. x 17/64 I.D. x.062 STAINLESS STEEL-H. M. HARPER CO.		42	HEX. SOC. PIPE PLUG 3/8-I8 NPTF	
			43	18 T. SLIP CLUTCH PINION	A-21246
9	SOC HD. CP SCPEW 1/4-28 x 1/2		44	FEED SLIP CLUTCH	A-21247
10	RACK PINION SHAFT	B-21238	45	PIN	A-50507
11	WOODRUFF KEY #11 (3/16 x 7/8 DIA.)		46	COMPRESSION SPRING	A-21267
12	BALL BEARING-S.K.F. #6304-2RS-NR		47	SOC. SET SCAREW 1/2-13 x 1/2 '"NYLOK"	
13	BUTTON HD. SOC. CAP SCREW 1/4-20 x 1/2 LG.		48	GASKET	A-20985
			49	COVER	A-21249
14	67 TOOTH GEAR	B-33053	50	SOC. HD. CAP SCREW 3/8-16 x 1 x 3/4	
15	CLOSED END NEEDLE BEARING-TORRINGTON #M.12121		51	WASHER-WESPO #6001	
			52	FEED INTERLOCK BAR	B-33054
16	SPACER	A-41285	53	SPLIT LOCKWASHER #3/8	
17	16 T. CLUTCH GEAR	B-41266	54	HEX. NUT 3/8-16	
18	RETAINING RING-TRUARC #5133-75		55	DOWEL 5/16 DIA. X 1 3/4 LG.	
19	SPACER PIN	A-41263	56	HALF NUTS	C-33056
20	90 T. DOUBLE CLUTCH GEAR	C-33051	57	GIB	B-33057
21	90 T. SINGLE CLUTCH GEAR	B-33052	58	DOWEL 5/16 DIA. x 1 1/2 LG.	
22	CLUTCH SHAFT		59	TENSION SPRING	A-21257
	--STANDARD	B-41262	60	SOC. HD. CAP SCREW 1/4-20 x 1 1/2 LG.	
	--FOR AUTO. CARRIAGE STOP	C-41669	61	HALF NUT LINK	A-33068
23	FEED CONTROL BOX		62	LINK PIN	A-21252
	--STANDARD	C-41259	63	RETAINER PIN	A-21258
	--OR AUTO. CARRIAGE STOP	C-41668	64	CONTROL SHAFT	A-33058
24	SOC. SET SCREW 3/8-16 x 3/4 LG. "NYLOK" FULL DOG POINT		65	HANDLE FOR HALF NUTS	A-21266
			66	ELBOW OILER-GITS #1207	
25	CLUTCH CONTROL SHAFT	B-41260	67	THREAD CHASING INSTRUCTIONS CHART	A-41203
26	FEED CONTROL LEVER	A-33061			
27	SLACK PLASTIC BALL KNOB-DIMCO #230 3/8-24 INSERT)		68	16 T. WORM GEAR	A-33077
			69	DIAL SHAFT	A-21265
28	SOC. SET SCREW 5/16-18 x 3/8 G.		70	DOWEL 1/8 DIA. x 1/2 LG.	
29	SOC. SET SCREW 5/16-18 x 1/4 LG.		71	ZERO WASHER	A-41276
30	COMPRESSION SPRING	A-21268	72	THREAD CHASING DIAL	A-21263
31	STEEL BALL .250 DIA.		73	OILER-GITS #521	
32	FEED INDICATING CHART	A-41202		**NOT SHOWN**	
33	BUSH FOR BEVEL BRACKET	A-33076			
34	BEVEL GEAR BRACKET	A-32701		APRON HOUSING	D-32700

Figure 16 Apron Parts



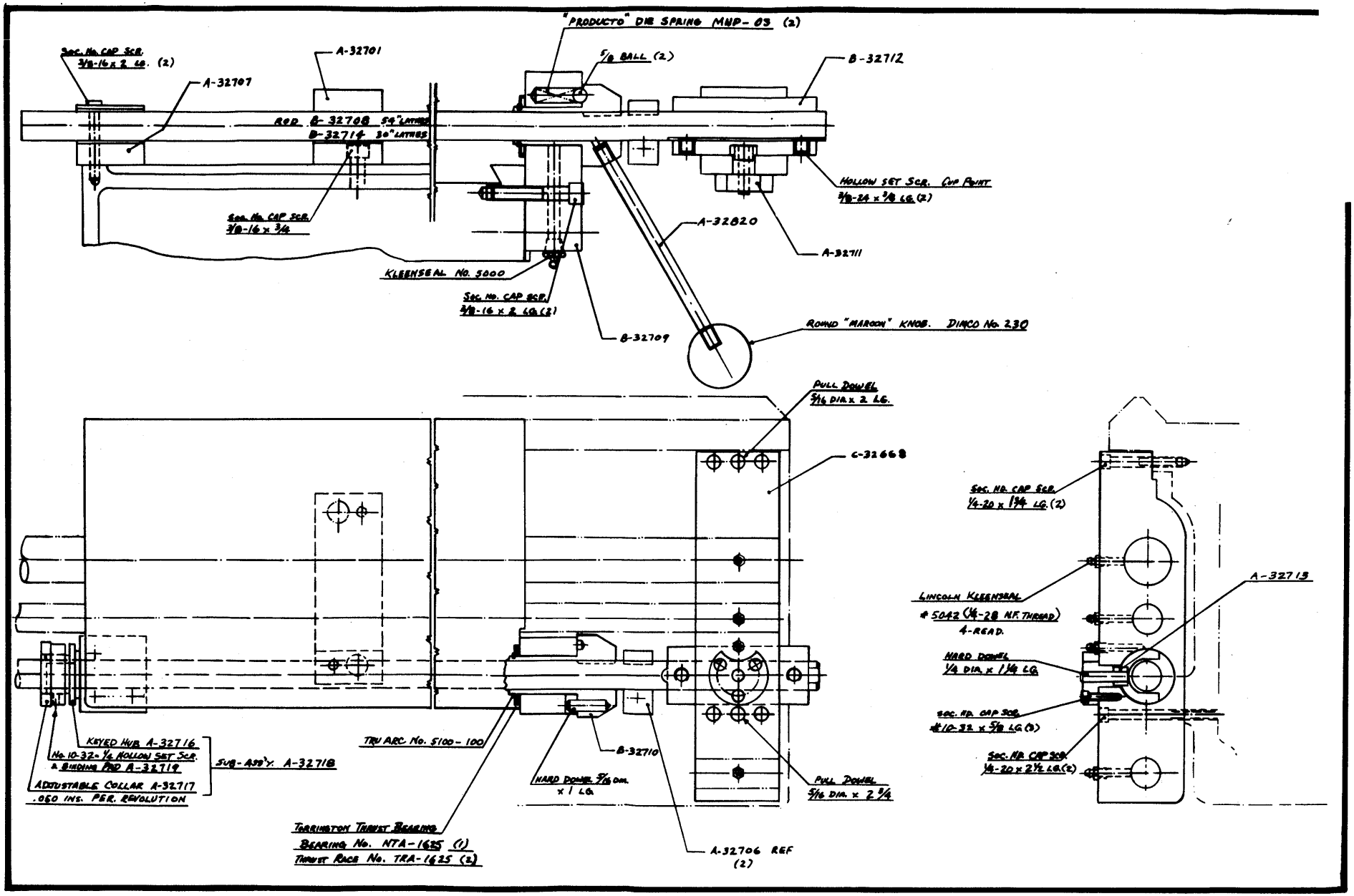
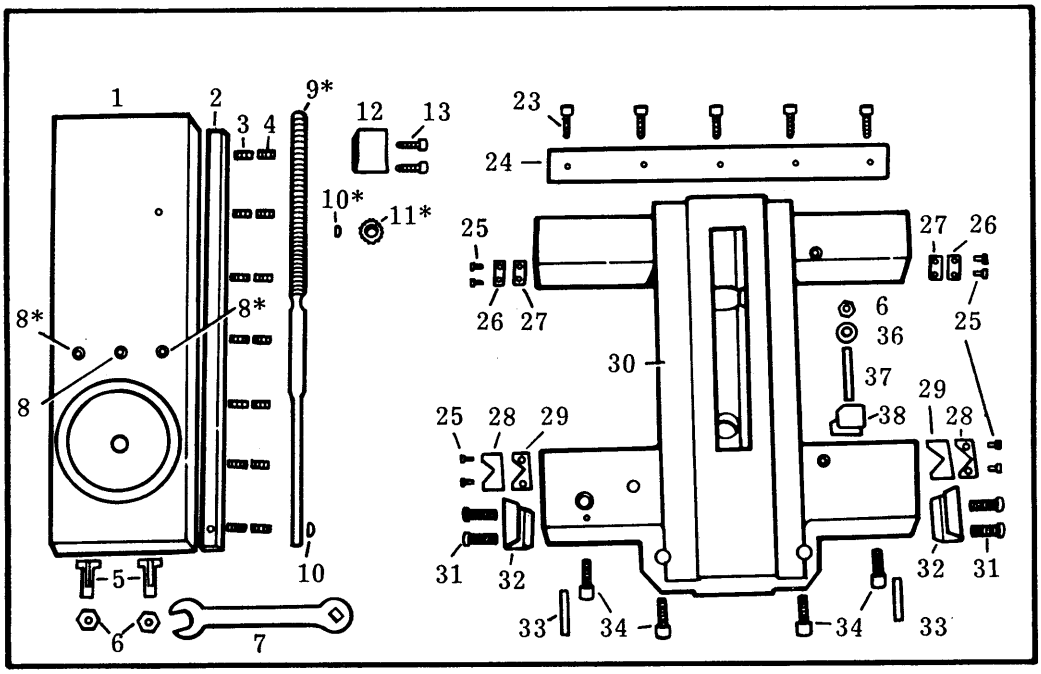


Figure 17 Apron Control R. H. for Leadscrew Reverse Diagram

CROSS SLIDE AND SADDLE PARTS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	EXTENDED CROSS SLIDE:				
	--STANDARD	D-32925			
	--FOR DEPTH THREADING STOP AND ONE-SHOT LUBRICATION	D-32936			
	--FOR DEPTH THREADING STOP ONLY	D-32965			
	--FOR ONE-SHIOT LUBRICATION ONLY	D-32966			
2	GIB FOR EXTENDED CROSS SLIDE	B-33480			
3	HARDENED DOWEL 1/4 DIA. x 1 LG.				
4	"NYLOK" SOC. SET SCREW 5/16-24 x 1/2 LG.		23	"LOC WELL" SOC HD. CAP SCRE[W 3/8-16x 1 1/4 LG	
5	TEE-HEAD BOLT	A-21462	24	REAR SADDLE GIB	B-33126
6	HEAVY HEX. NUT 1/2-13 UNC		25	ROUND HD MACHINE SCREW #10 32 x 1/2 LG	
7	TOOL POST WRENCH · ARMSTRONG #5630 OR WILLIAMS #5630		26	REAR SADDLE WIPER PLATE	A-21186
8	OILER GILS #523		27	REAR SADDLE WIPER	A-21188
	(4 OILERS MARKED THUS *·IN PICTURE		28	FRONT SADDLE WIPER PLATE	A-21185
	ARE NOT REQUIRED FOR ONE SHOT		29	FRONT SADDLE WIPER	A-21187
	LUBRICATION)		30	SADDLE CASTING	
*9	CROSS FEED SCREW	B-21202		- STANDARD	E-33086
*10	WOODRUFF KEY #6 (5/32 x 5/8 DIA			- FOR ONE SHOT LUBRICATION	E-33087
*11	GEAR FOR CROSS FEED SCREW	A-21203	31	HEX. HD CAP SCREW 3/8-16 x 1 1/2 LG.	
12	NUT FOR CROSS FEED SCREW	A-32926	32	FRONT SADDLE GIB	A-21219
13	SOC HD. CAP SCREW 5/16-24 x 1 1/4 LG		33	PULL DOWEL 5/16 DIA x 2" LG.	
			34	SOC. HD. CAP SCREW 1/2-13 1 1/2 LG.	
			36	WASHER - WESPO #6002	
			37	MILLED STUD 1/2-13 x 2 3/4 LG.	
			38	SADDLE CLAMP BLOCK	A-21218
				Note: - ITEM 8 WHERE MARKED THUS * IN PICTURE BELOW IS NOT REQ'D. WITH ONE-SHOT LUBRICATION.	
				- ITEMS 9. 10 AND 11 MARKED THUS * ARE NOT REQ'D WITH TELESCOPIC TAPER ATTACHMENT,4 FOR REPLACEMENT PARTS SEE PAGE 29	

Figure 18 Cross Slide & Saddle Parts



SEE PAGE 30
FOR DETAILS OF CROSS FEED DIAL WITH BALL TYPE THREADING STOP

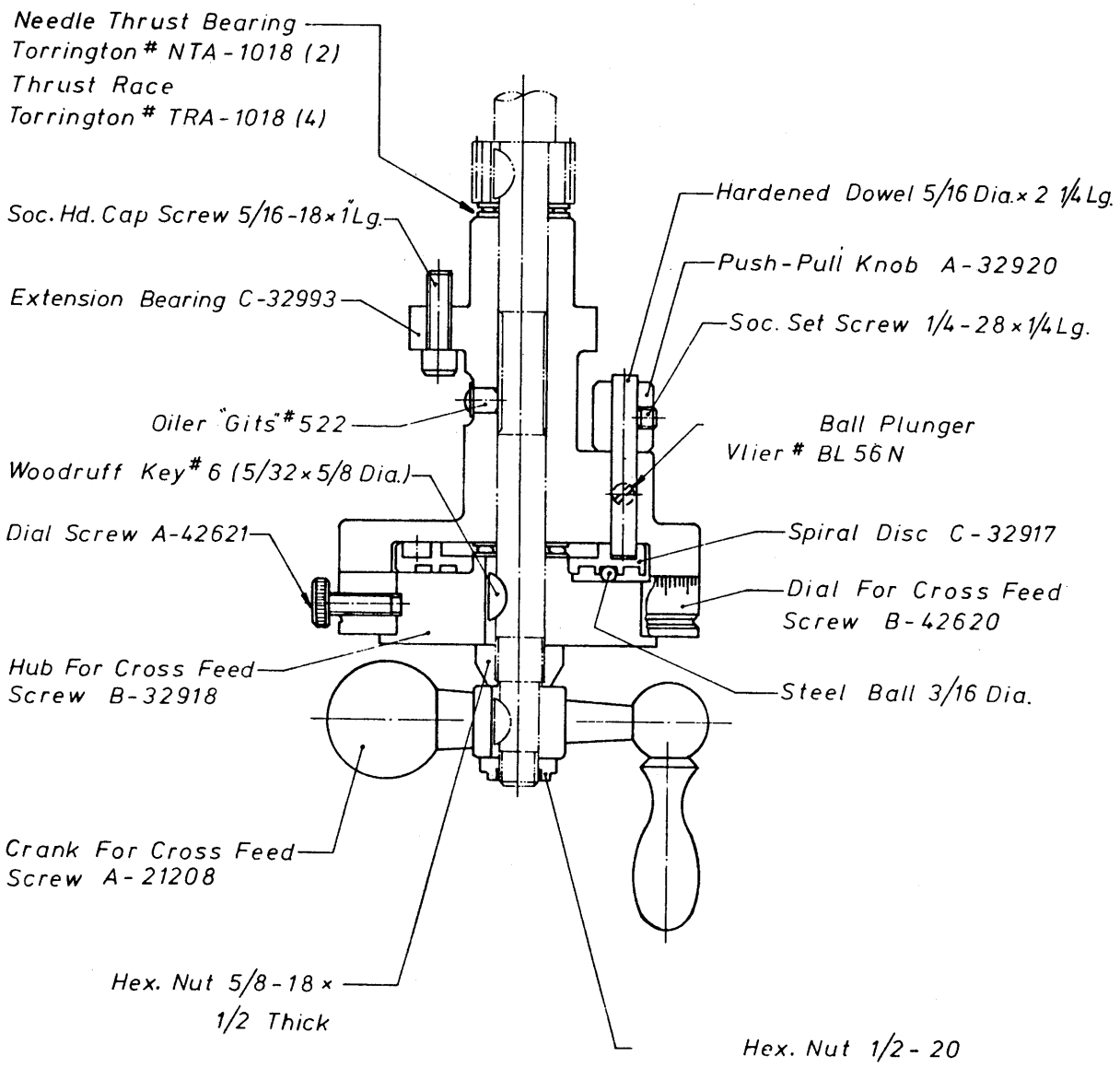


Figure 19

DETAILS OF CROSS FEED DIAL
WITH BALL TYPE THREADING STOP

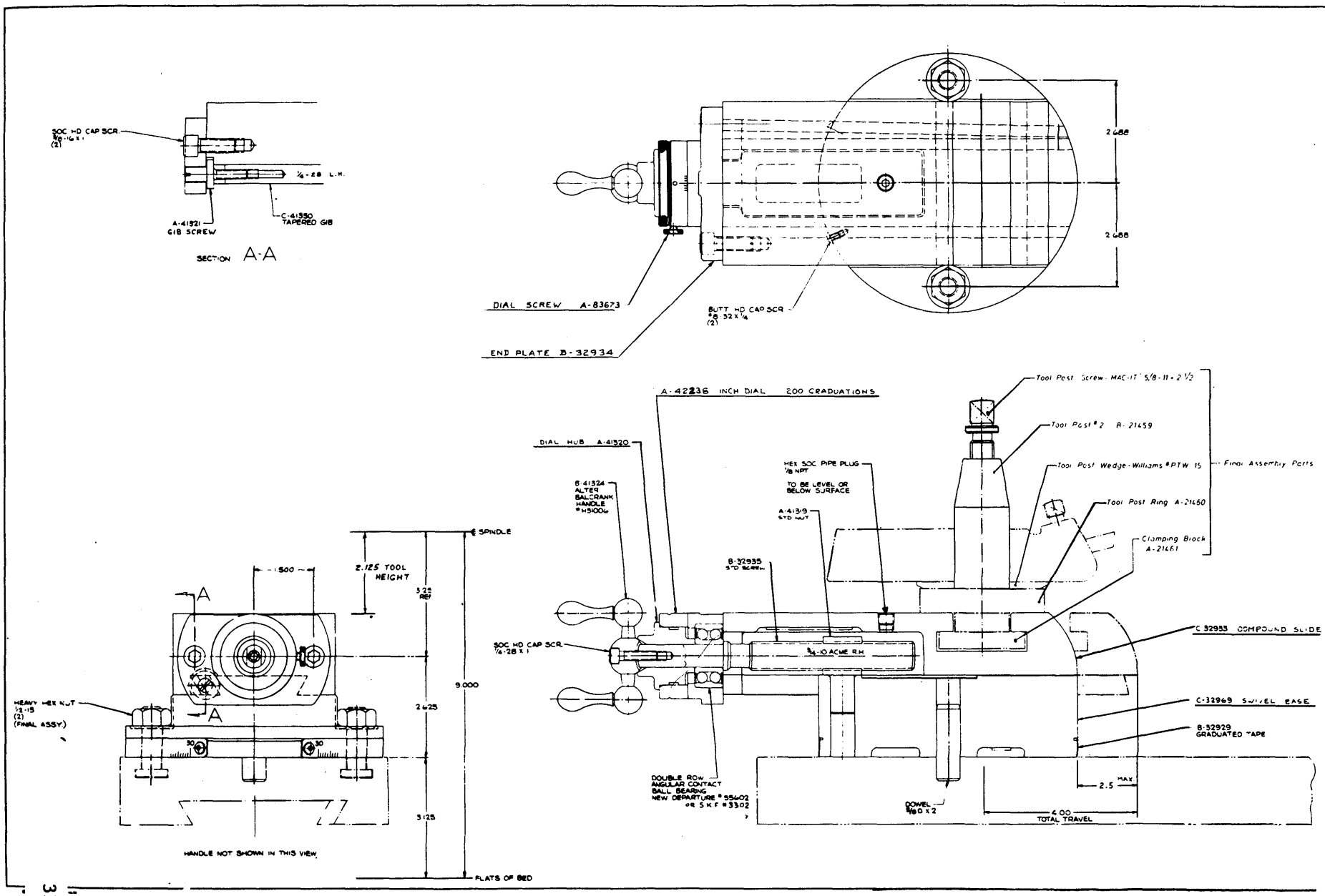
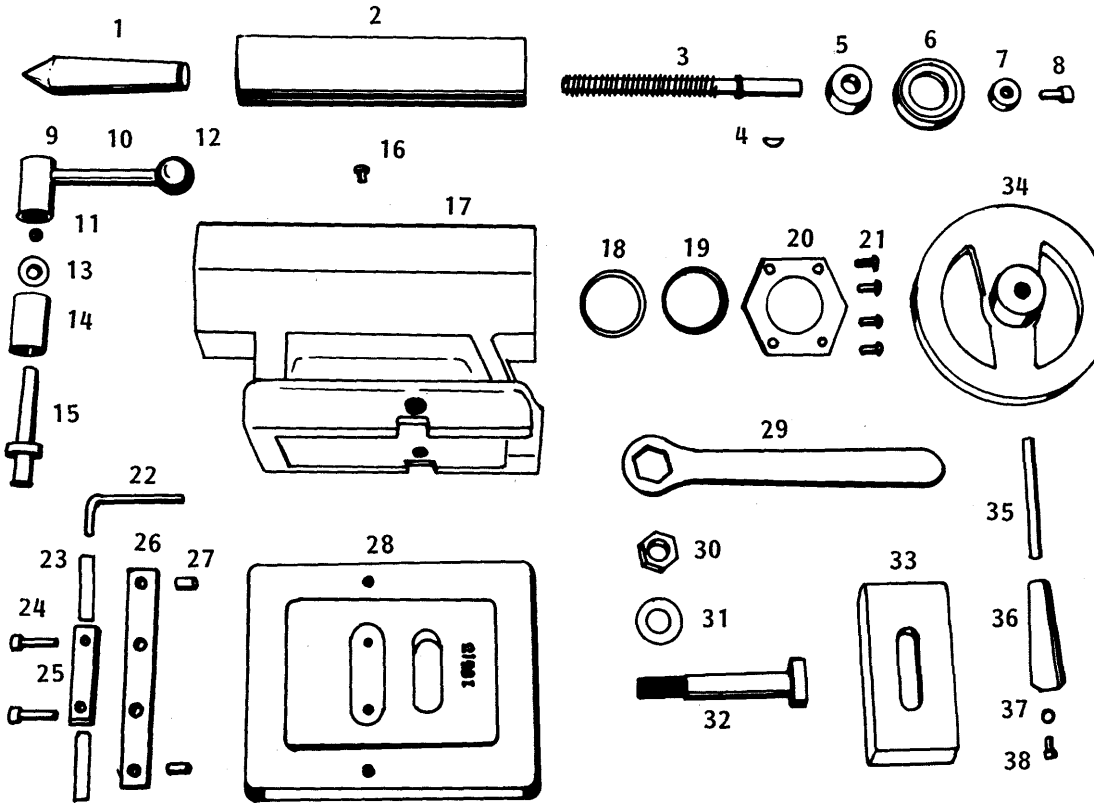


Figure 20 Compound Slide Assembly Diagram

TAILSTOCK PARTS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	LATHE CENTER NO. 4 MORSE:		21	BUTTON HD. SOC. CAP SCREW	
	-FOR ENGINE LATHE	A-22639		5/16-18 x 3/4 LG. (4 REQ'D.)	
	-FOR TOOLROOM LATHE	A-41591	22	ALLEN KEY #1/4	
2	SPINDLE	C-33016	23	SOC. SET SCREW, FLAT POINT	
	WITH SPINDLE NUT	A-33018		1/2-13 x 2 1/4 LG. (2 REQ'D.)	
	AND SOC. HD. CAP SCREWS #10-32 x 3/4		24	SOC. HD. CAP SCREW	
3	SPINDLE SCREW	B-33017		5/16-18 x 1 1/4 LG. (2 REQ'D.)	
4	WOODRUFF KEY #8(5/32 x 3/4 DIA.)		25	THRUST BLOCK	A-33033
5	BEARING SEAT COLLAR	A-33026	26	TENON STRIP	A-33025
6	BALL BEARING-.K,F. #6008.2RS		27	DOWEL 3/8 DIA. x 3/4 LG.	
7	HANDWHEEL RETAINER	A-41232		(2 REQ'D.)	
8	SOC. HD. CAP SCREW 3/8-24 x 3/4		28	BASE CASTING	C-33366
9	BOSS FOR HANDLE	A-33027	29	BOX WRENCH WILLIAMS #808	
10	SHAFT FOR HANDLE	A-33028		(1 1/4 ACROSS FLATS)	
11	SOC. SET. SCREW 1/2-13 x 3/8 LG.		30	HARDENED HEAVY HEX NUT	
12	BLACK PLASTIC BALL KNOB			3/4-10 (1 1/4 ACROSS FLATS)	
	DIMCO #95 (3/8-24 INSERT)		31	WASHER-WESPO #6011	
13	WASHER-WESPO #6009		32	CLAMP STUD	A-33363
14	CLAMP BUSHING	B-21466	33	CLAMP PLATE	B-21098
IS	SPINDLE CLAMPING STUD	A-22813	34	HANDWHEEL	C-33023
16	OILER-GITS #533		35	SHAFT	A-41245
17	SPINDLE HOUSING	D-33012	36	HANDLE	B-41244
18	O-RING #330 (2 1/8 x 2 1/2 x 3/16)		37	WASHER 1/2 O.D. x 17/64 I.D. x .062	
19	SPACER	A-33031		STAINLESS STEEL-H.M. HARPER CO.	
20	RETAINING PLATE ·	A-33030	38	SOC. HD. CAP SCREW 1/4-28 x 1/2	

Figure 21 Tailstock Parts



GENERAL ASSEMBLY PARTS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	MODEL SIZE NAMEPLATE	A-33994	24	HUB	A-33202
2	SERIAL NAMEPLATE	B-60275	25	CONTROL BRACKET	B-33067
3	LUBRICATION NAMEPLATE:		26	HUB	A-21092
	-STANDARD LATHE	A-32923	27	STEM FOR CONTROL LEVER	A-21093
	-WITH ONE.SHOT LUBRICATOR	A-32906	28	BLACK OVAL	
4	"HARDENED BEDWAYS" NAMEPLATE	B-41519		KNOB OA-5	
5	VERTICAL NAMEPLATE	D-41413	29	HEX HD. CAP SCREW 3/4-10 x 1 1/2" LG	
6	RACK	B-21278	30	WASHER	B-33252
7	BED END BRACKET	C-32668	31	MOTOR PLATE	D-33124
8	GREASE FITTING-KLEENSEAL #5042		32	HEX NUT 3/8-11	
9	LEADSCREW SHEARPIN	A-21142	33 .	PIVOT SCREW	A-31231
10	TAPER PIN #1 x 1" LG.		34	HEX JAM-NUT 1/2-13	
11	LEADSCREW 1 3/16 DIA.	B-33980	35	PLAIN WASHER # 1/2	
12	FEEDSHAFT	B-33483	36	HEX NUT 1/2-13	
13	CONTROL SHAFT	B-33485	37	SPLIT LOCKWASHER # 1/2	
14	FROST PLUG 2" DIA.		38	ANCHOR FOR MOTOR PLATE	A-33221
15	"FWD-STOP-REV" NAMEPLATE	B-33196	39	HEX HD BOLT 1/2-13 x 2 LG	
16	SWITCH BOX	D-32669			
17	GASKET FOR SWITCH BOX	B-33195		**NOT SHOWN**	
18	COVER PLATE FOR SWITCI1 BOX	B-33487		BED CASTING	E-33118
19	ROTARY PILOT SWITCH -			CHIP TRAY	D-33995
	ALLEN-BRADLEY #804-A3			HEADSTOCK PEDESTAL	D-33116
	(WITHOUT ENCLOSURE. HAND LEVER			TAILSTOCK PEDESTAL	D-32892
	AND LEGEND PLATE)			END GUARD	E-33083
20	CONTROL SHAFT SECTOR	B-33197		HINGE END PLATE	D-33996
21	PINION	B-33199		CONTROL BOX MOUNTING PLATE:	D-33132
22	SOC. SET SCREW 5/16-24 x 5/16 LG.				
23	SOC. SET SCREW 3/8-24 x 3/8 LG.				

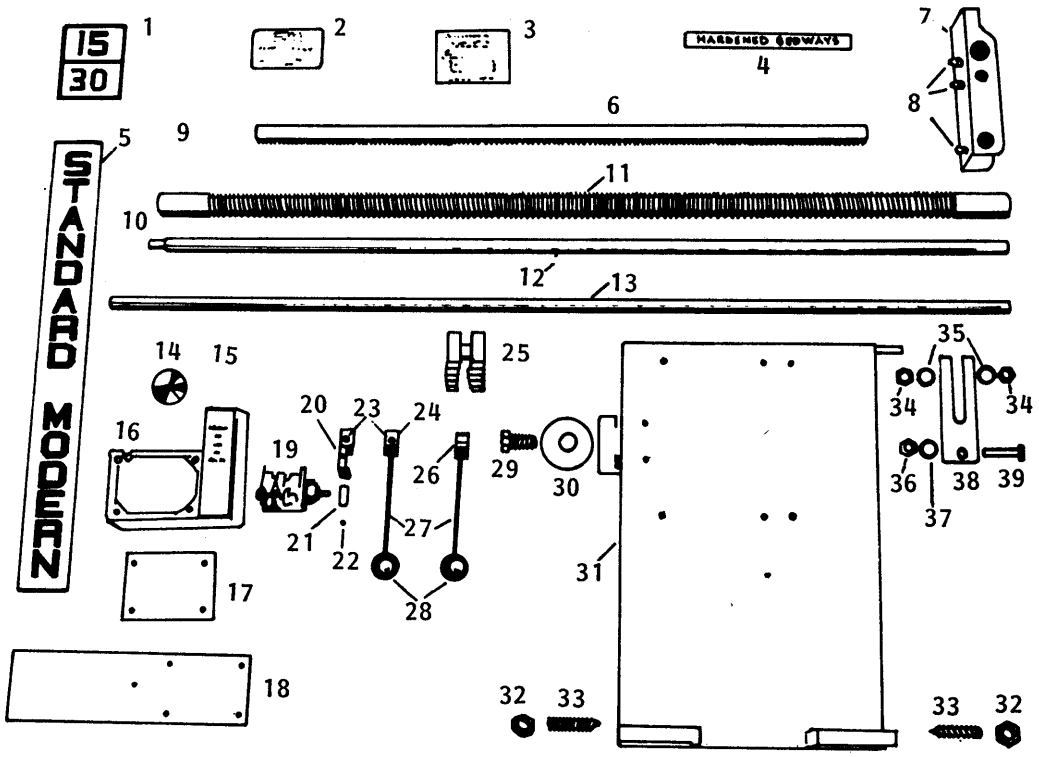


Figure 22 General Assembly Parts

END GEAR TRAIN PARTS
FOR CUTTING METRIC AND SPECIAL THREADS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	ADJUSTABLE BRACKET	C-21353	12	70 T. CHANGE GEAR	22656
2	FIXED GEAR HUB	A-21361		74 T. " "	22657
3	KEY 1/4 x 1/4 x 1 3/8 LG.			75 T. " "	22658
4	45 TOOTH SPUR GEAR	B-41407		79 T. " "	22659
5	SPECIAL WASHER	A-21359		80 T. " "	22660
6	SPECIAL BOLT	A-21360		84 T. " "	22661
7	HARDENED SLEEVE	A-21358		85 T. " "	22662
8	BUSHING (.751 x .878 x 3/8 LG) --			86 T. " "	22663
	OILITE #AA-838-25			88 T. " "	22664
9	IDLER GEAR HUB	A-21357		89 T. " "	22665
10	HEAVY HEX NUT 1/2-13			91 T. " "	22666
11	NAMEPLATE:			92 T. " "	22667
	- METRIC THREADS ONLY	B-33990		93 T. " "	22668
	- METRIC DIAMETRAL, MODULE AND			95 T. " "	22681
	SPECIAL THREADS	B-33039		97 T. " "	22669
12	CHANGE GEARS	C-21362		98 T. " "	22670
	(TWO ONLY SHOWN FOR ILLUSTRATION)			100 T. " "	22682
	45 T. CHANGE GEAR	22650			
	50 T. " "	22651		107 T. " "	22671
	55 T. " "	22652		108 T. " "	22672
	60 T. " "	22653		110 T. " "	22673
	64 T. " "	22677		117 T. " "	22674
	65 T. " "	22654		124 T. " "	22675
	67 T. " "	22265		127 T. " "	22676

NOTE: CHANGE GEARS ARE SUPPLIED WHEN REQUIRED.

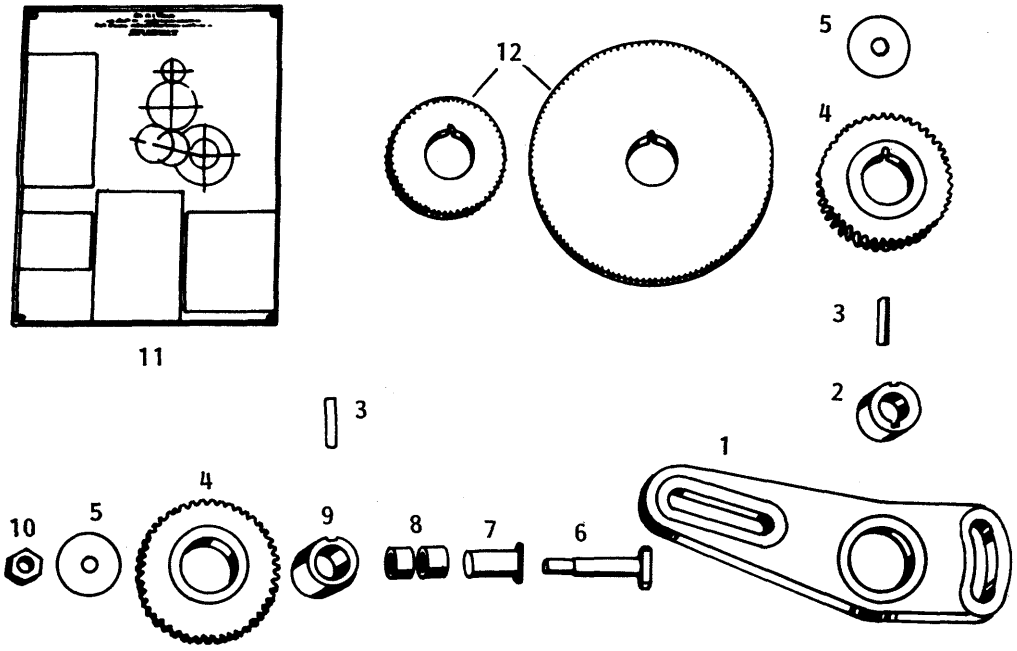
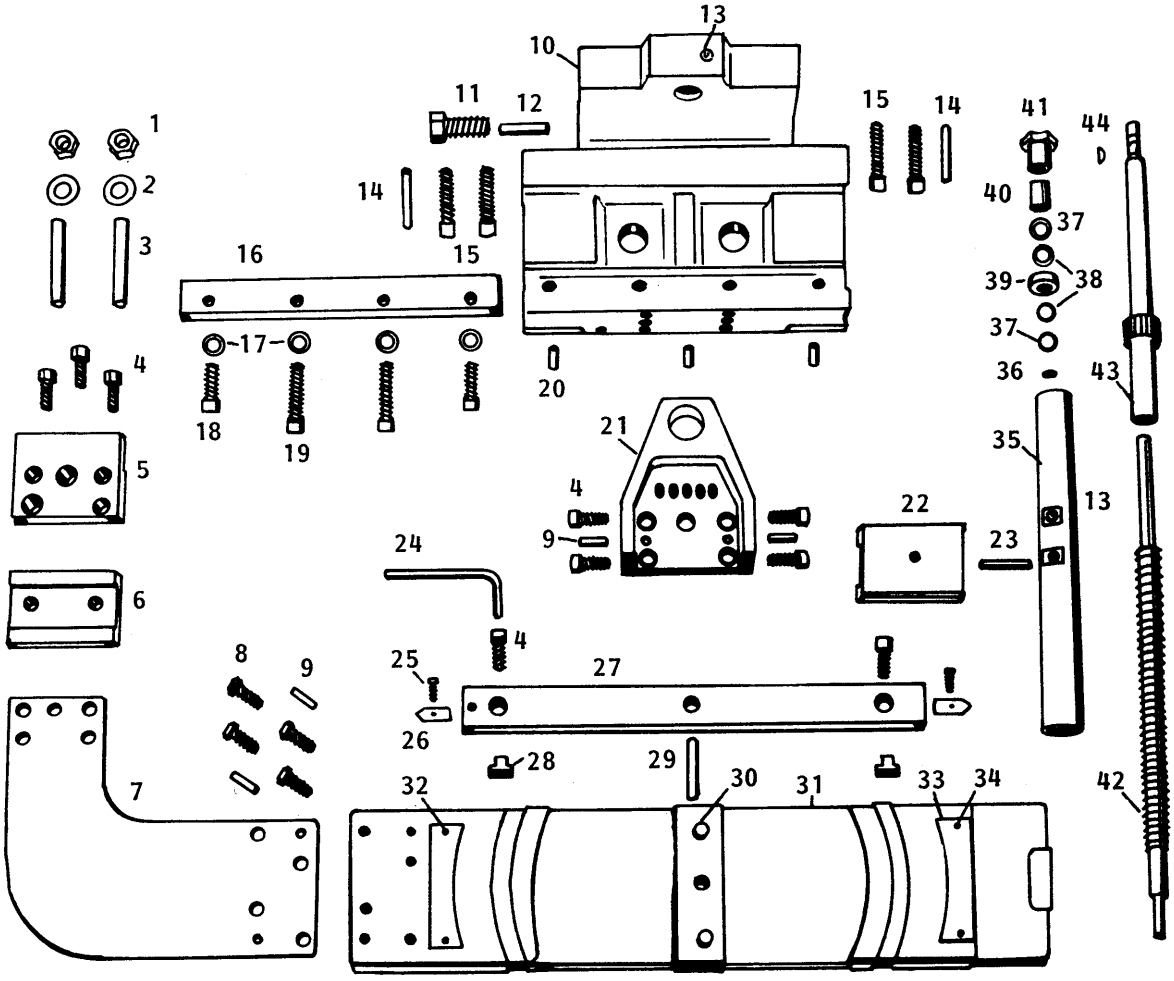


Figure 23 End Gear Train Parts

TELESCOPIC TAPER ATTACHMENT PARTS PAGE 33

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	HEAVY HEX NUT 1/2-13		27	SLIDE BAR:	
2	WASHER - WESPO #6002			- FOR 12" STROKE	C-33306
3	MILLED STUD 1/2-13 x 3" LG.			- FOR 15" STROKE	C-32911
4	SOC. HD. CAP SCREW 3/8-16 x 1" LG.		28	T-SLOT NUT	A-41353
5	BED CLAMP - UPPER	A-33308	29	DOWEL 1/2 DIA. x 2" LG.	
6	BED CLAMP - LOWER	A-33309	30	OILER-GITS #533	
7	BED ANCHOR ARM,	C-33307	31	SLIDE PLATE:	
8	HEX HD. CAP SCREW 3/8 - 16 x 1" LG.			- FOR 12" STROKE	D-33302
9	DOWEL 5/16 DIA. x 1" LG.			- FOR 15" STROKE	D-32912
10	MAIN BRACKET	D-33301	32	GRADUATED PLATE-DEGREES	
11	HEX. HEAD LOCK SCREW	A-33320		- FOR 12" STROKE	B-33318
12	LOCKING PIN	A-33321		- FOR 15" STROKE	B-32910
13	OILER - GITS #521		33	GRADUATED PLATE-TAPER/FOOT:	
14	PULL DOWEL 3/8 DIA. x 2" LG.			- FOR 12" STROKE	B-33317
15	SOC. HD. CAP SCREW 3/8 - 16 x 2" LG.			- FOR 15" STROKE	B-32909
16	GIB	B-33305	34	DRIVE SCREW "U" TYPE #4 x 1/4 LG.	
17	PLAIN WASHER - S.A.E. # 3/8		35	CROSS GUIDE BAR	C-33310
18	SOC HD. CAP SCREW 3/8 - 24 x 1 1/4 LG.		36	HEAVY HUGLOCK NUT 3/8 - 24	
19	SOC. HD. CAP SCREW 3/8 - 24 x 2" LG.		37	THRUST RACE-	
20	SOC SET SCREW "NYLOK"			TORRINGTON #TRC - 613	
	3/8 - 16 x 3/4 LG.		38	! NEEDLE THRUST BEARINC	
21	OUTER SUPPORT	C-33303		TORRINGTON #NTA - 613	
22	SHOE	C-33304	39	BEARING RING	A-33312
23	PULL DOWEL 3/8 DIA. 1 x 3/4 LG.		40	BOST-BRONZ BEARING #B911-6	
24	ALLEN KEY #5/16			(.565 I.D. x .691 O.D.x 3/4)	
25	SOC. HD. CAP SCREW #10 - 32 x 3/8 LG.		41	BEARING LOCKNUT	B-33311
26	POINTER	A-33319	42	CROSS FEED SCREW	B-33313
			43	CROSS FEED SHAFT	B-33314
			44	WOODRUFF KEY #6 (5/32 x 3/8)	

Figure 24 Telescopic Taper Attachment Parts



COOLANT PARTS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	PUMP UNIT-GRAY MILLS #X11 - HR35 · A		9	ELBOW # 3/8 x 90°	
2	NOZZLE WITH SHUT-OFF COCK & REDUCING BUSHING # 3/8 x 1/4 (SUPPLIED WITH PUMP UNIT)		10	PIPE NIPPLE 3/8 x 18" LG.	
3	FLEXIBLE HOSE (SUPPLIED WITH PUMP UNIT)		11	SOC. SET SCREW 1/2 - 13 x 3/4 LG.	
4	STREET ELBOW # 1/2 x 90°		12	PIPE SUPPORT BRACKET	C-33360
5	PIPE COUPLING # 3/8		13	SOC. HD. CAP SCREW 3/8 - 16 x 1 1/4LG.	
6	PIPE NIPPLE 3/8 x 3" LG.		14	SEALTITE RUBBER COVER-HUBBELL #7574 (WITH "TWIST-LOCK" PLUG ONLY)	
7	SWING JOINT # 3/8 - CRANE #300		15	"TWIST-LOCK" ARMORED CAP-HUBBELL #4726 WITH CORD GRIP FOR CORD DIA. .296 - 562 (SPECIAL APPLICATION ONLY)	
8	PIPE NIPPLE 3/8 x 4" LG.				

NOTE: ITEM 12 - PIPE SUPPORT BRACKET PART #C - 33360 NOT USED ON LATHE WITH TELESCOPIC TAPER ATTACHMENT.
- USE PIPE SUPPORT BLOCK PART #B - 41475 INSTEAD.

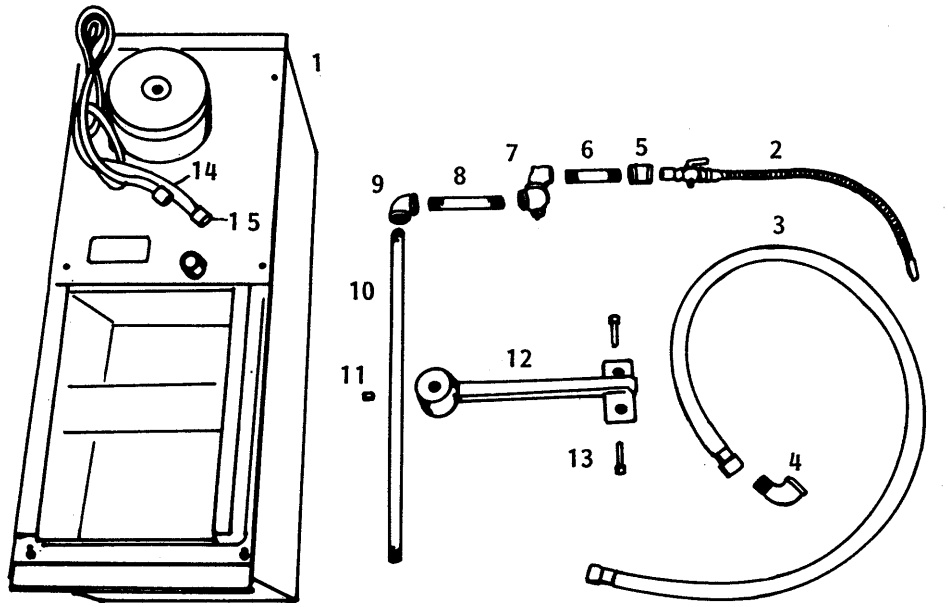


Figure 25 Coolant Parts

STEADY REST, FOLLOW REST AND MICROMETER CARRIAGE STOP PARTS

STEADY REST - 33125			FOLLOW REST 33325		
ITEM	**NAME**	**PART NO.**	**ITEM**	**NAME**	**PART NO.**
1	UPPER CASTING	D-41482	15	SOC. SET SCREW 3/8 - 16 x 3/8, LG.	
2	LOWER CASTING	E-33097		CONE POINT (6 REQ'D.)	
3	HARDENED HEAVY HEX. NUT 1/2 - 13,		16	SOC. SET SCREW 1/4 - 28 x 1/4 (3 REQ'D.)	
	3/8 ACROSS FLATS (2 REQD.)		17	BUSHING (3 REQ'D.)	A-33095
	% ACROSS FLATS (2 REQ'D.)		18	KNOB (3 REQ'D.)	A-21120
4	WASHER WESPO #6009 (2 REQ'D).		19	BUTTON FOR SLEEVE (3 REQ'D.)	A-33096
5	EYE BOLT	A-41488	20	CLAMP SCREW (3 REQ'D.)	A-21292
6	PIVOT PIN	A-21392	21	FOLLOW REST CASTING	D-33326
7	SOC. SET SCREW 3/8 - 20 x 3/4 LG.		22	SOC. HD. CAP SCREW 1/2 - 13 x 3 1/4 LG.	
8	HINGE PIN	A-41489	23	SLEEVE (3 REQ'D.)	A-21301
			24	ADJUSTING SCREW-LONG	A-33098
9	HEX. HD. CAP SCREW 3/8 - 16 x 3/4 LG.		25	ADJUSTING SCREW (2 REQ'D.)	A-21302
10	WASHER-WESPO #6001				
11	MILLED STUD 1/2 - 13 x 4 LG.			**MICROMETER CARRIAGE STOP-22187**	
12	CLAMP BAR	A-21288	3	HARDENED HEAVY HEX. NUT 1/2 , 13	
13	SLEEVE (3 REQ'D.)	A-41487	29	WASHER-WESPO #6002	
14	ADJUSTING SCREW	A-41483	30	COLLAR	A-22819
			31	MILLED STUD 1/2 - 13 x 3 1/2 LG.	
15	SOC. SET SCREW 3/8 - 16 x 3/8 LG.		32	KNOB	A-21396
	CONE POINT (3 REQ'D.)		33	GRADUATED SLEEVE	B-41373
16	SOC. SET SCREW 1/4 - 28 x 1/4 (3 REQ'D.)		34	SCREWED STEM	A-21397
17	BUSHING (3 REQ'D.)	A-41486	35	BODY	B-22818
18	KNOB (3 REQ'D.)	A-41485	36	DOWEL 1/4 DIA. x 3/4 LG.	
19	BUTTON FOR SLEEVE (3 REQ'D.)	A-41484	37	CLAMP SCREW	A-30586
20	CLAMP SCREW (3 REQ'D.	A-21292	38	TAPER PIN #4 x 1 1/2 LG.	
			39	CLAMP	A-41372

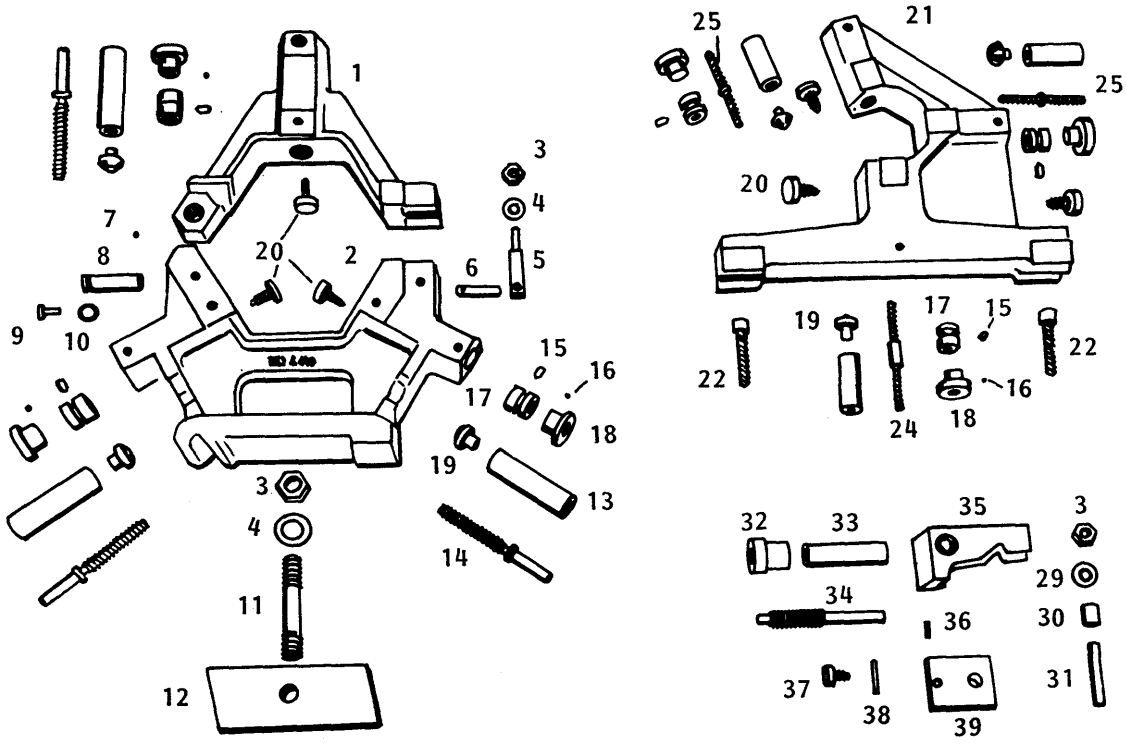


Figure 26 Steady Rest, Follow Rest & Micrometer Carriage Stop Parts

DIAL INDICATOR CARRIAGE STOP AND DEPTH THREADING STOP PARTS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	FILLISTER HD. MACH. SCREW #10 - 32 x 1/2 LG.		8	CLAMPING STUD	A-23256
			9	CLAMPING NUT	A-23254
2	CHIP GUARD	A-21347	10	HARDENED HEAVY HEX NUT 3/8- 16	
3	CLAMPING BRACKET	B-21348	11	WASHER-WESPO #6001	
4	LONG RANGE DIAL INDICATOR AMES #282 WITH SCREW TYPE BACK, SHOCK-LESS. HUNDRED SERIES-GRADUATED .001		12	CLAMP BOLT	A-41547
			13	STOP ROD	A-22708
			14	MILLED STUD 3/8- 16 x 1 1/2 LG.	
5	HARD STD. DOWEL 3/16 DIA. x 3/4 LG.		15	LATCH PLATE	A-22710
6	SOC. HD. CAP SCREW 1/4-20 x 3/4 LG.		16	GRADUATED NUT	A-22711
7	CLAMPING PLATE	A-21346	17	KNURLED LOCKNUT	A-22712

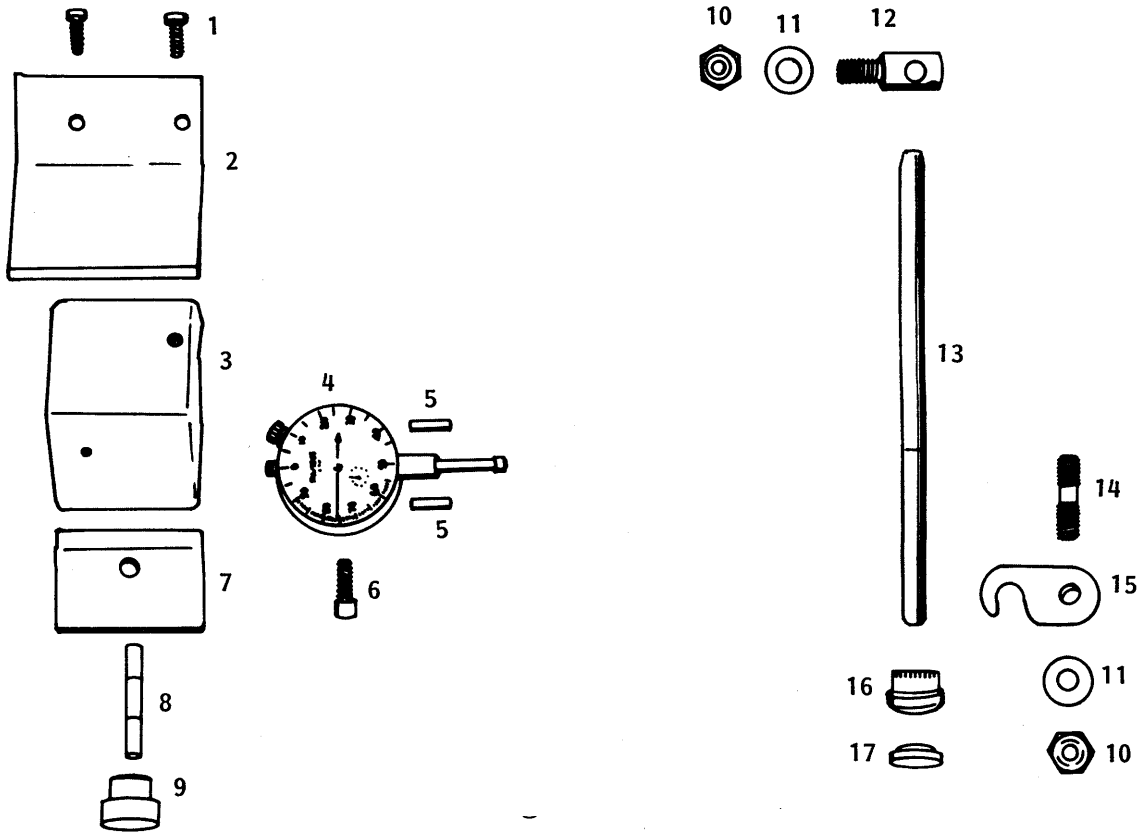


Figure 27

Dial Indicator Carriage Stop and Dept Threading Stop Parts

AUTOMATIC CARRIAGE STOP PARTS

ITEM	NAME	PART NO.	ITEM	NAME	PART NO.
1	SOC. HD. CAP SCREW 1/4 - 20 x 1 3/4 LG. (4 REQ'D.)		11	CAM FOLLOWER-TORRINGTON #CRS- 12	
			12	CLAMP NUT	A-33356
2	STOP CONTROL BLOCK	B-33351	13	TRIP DOG	B-33354
3	HARDENED DOWEL 3/16 DIA. x 3/4 LG. (2 REQ'D.)		14	HEAVY HEX BOLT	A-21217
			15	END CAP-CANTRUSS #RR2E	
4	ROLLER BEARING -- TORRINGTON #HJ - 101812 12 REQ'D.)			(2 REQ'D.)	
			16	HEX. NUT 3/8 - 16 (5 REQ'D. FOR 30" BED - 8 FOR 54")	
5	OIL SEAL (3/8 I.D. x 1 1/4 x O.D. x 1/4) CHICAGO RAWHIDE STOCK NO. 6225			RAIL FOR 30" BED	C-33353
				RAIL FOR 54" BED	C-33347
6	ECCENTRIC SHAFT	B-33352	18	SPLIT LOCK WASHER # 3/8 (5 REQ'D. FOR 30" BED-8 FOR 54")	
7	WOODRUFF KEY #3 (1/8 x 1/2 DIA.)				
8	SOC. HD. CAP SCREW 1/4 - 20 x 3/4		19	SOC. HD. CAP SCREW 3/8 - 16 x 3/4 LG. (5 REQ'D. FOR 30" BED 8 FOR 54")	
9	TRIM ARM	B-41672			
10	HUGLOCK NUT 3/8 - 24 (5/16 THICK)		20	SLEEVE FOR CAM FOLLOWER	A-32949

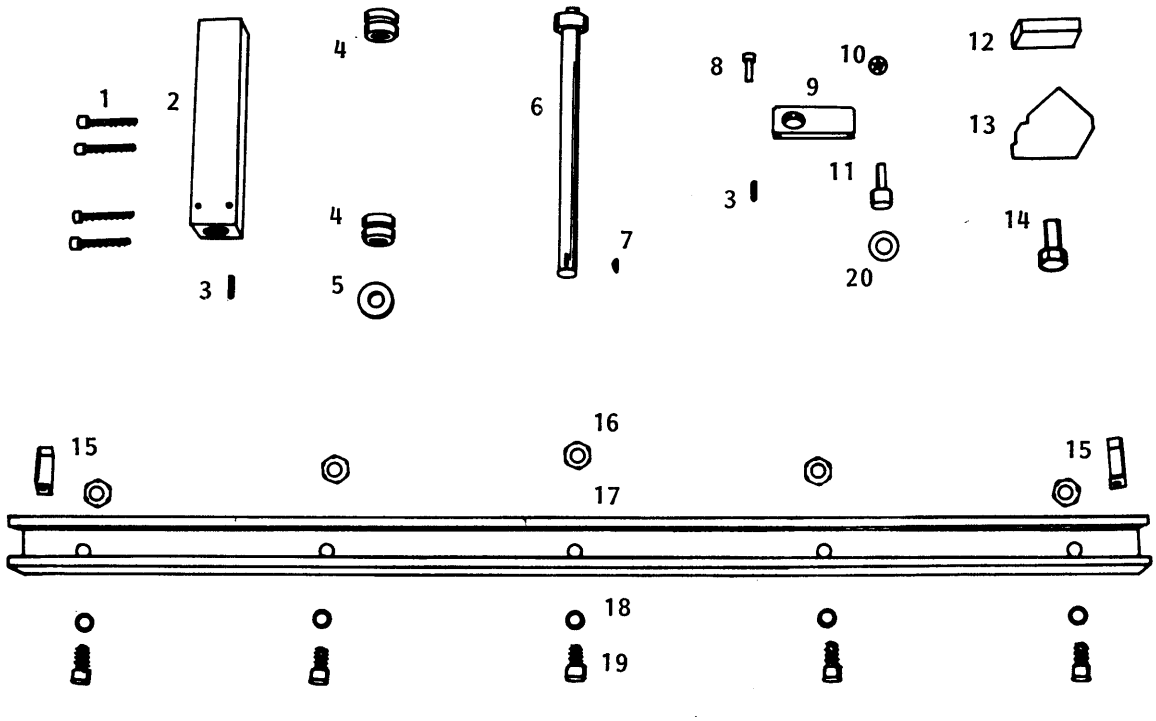


Figure 28 Automatic Carriage Stop Parts

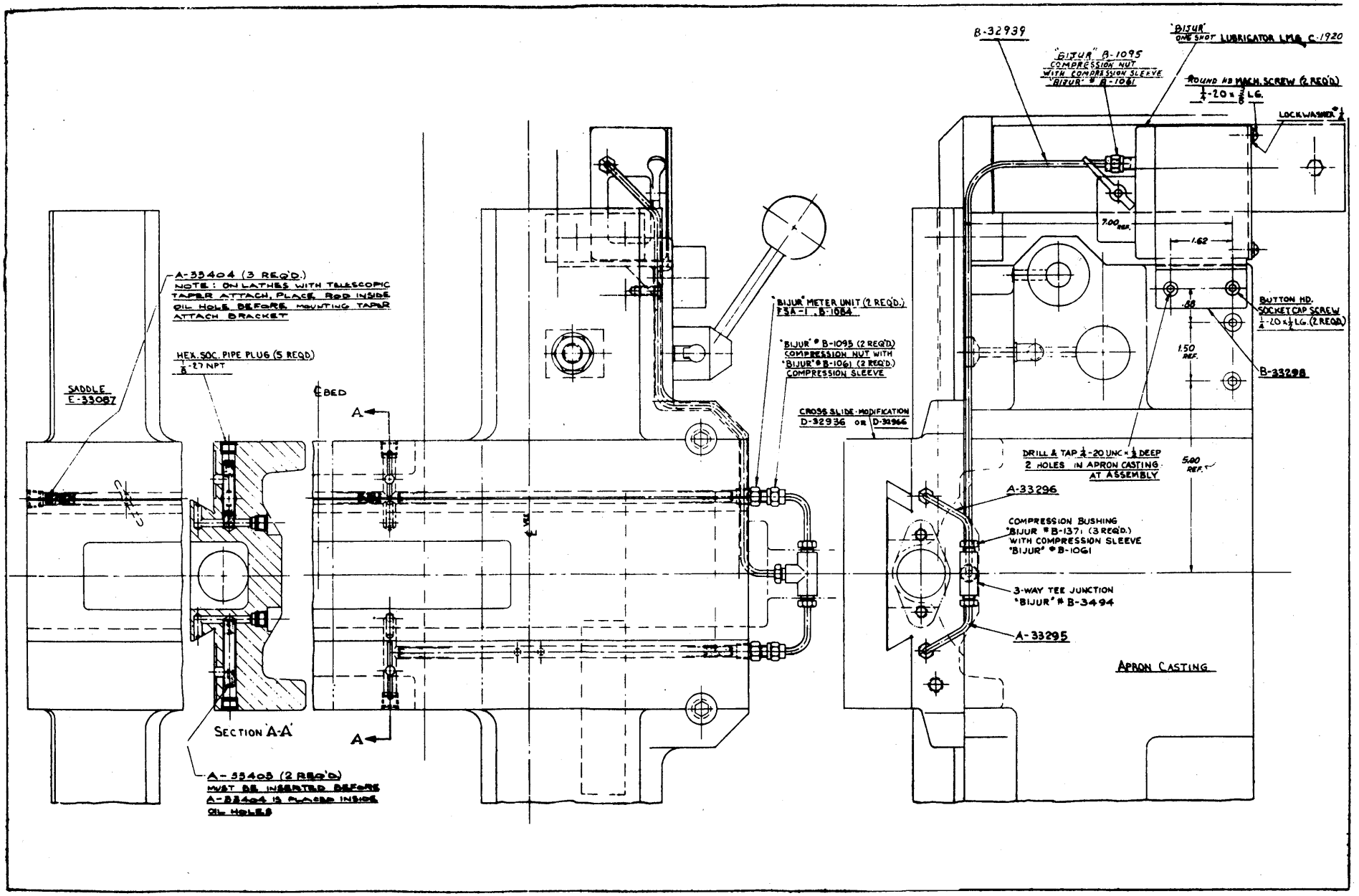


Figure 29 One Shot Lubricator Assembly Diagram

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E. C. MEYER
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

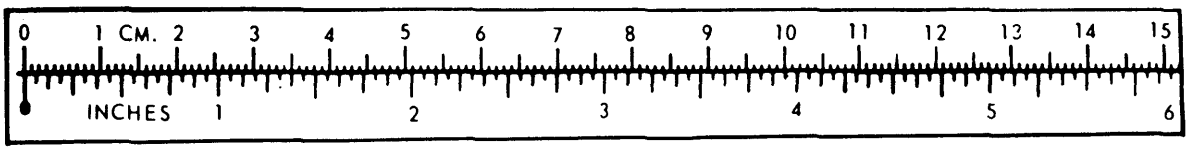
1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



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