DEPARTMENT
OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT

AND GENERAL SUPPORT MAINTENANCE

MANUAL INCLUDING REPAIR PARTS LIST

FOR

ENGINE LATHE

MODEL NUMBER 2516-20

(3416-00-242-8824)

HEADQUARTERS,
DEPARTMENT OF THE ARMY

JANUARY 1984

TECHNICAL MANUAL

No. 9-3416-245-14&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *20 January 1984*

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, Munitions and Chemical Command, ATTN: DRSMC-MAS-SE, Rock Island, IL, 61299. A reply will be furnished to you.

Operator, Organizational, Direct Support and General Support Maintenance Manual Including Repair Parts List for:

Engine Lathe
Model No. 2516-20
3416-00-242-8824

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: American Tool Company
720 East Second Street
Cincinnati, OH 45202

Procured under Contract No. DAAA09-78-C-5371

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. 03078

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

3 - Manufacturer’s Part Number exactly as listed herein.

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

4 - Manufacturer's Model Number. 2516-20

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 03078 followed by a colon and manufacturer's Part Number for the repair part.

(b) Complete Remarks field as follows:

Noun:	(nomenclature of repair part)
For:	NSN: 3416-00-242-8824
Manufacturer:	American Tool Company
	720 East Second Street Cincinnati, OH 45202
Model:	2516-20
Serial: (of end item)	

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

Table of Contents

ERECTING

UNLOADING. Hoisting weights are as follows:

14" x 30" between centers style "B"	7900 lbs.
For each additional 24" between centers, add	525 lbs.
16" x 30" between centers style "C"	8200 lbs.
For each additional 24" between centers, add	525 lbs.
20" x 30" between centers style "D"	8500 lbs.
For each additional 24" between centers, add	525 lbs.
20" x 48" between centers style "E"	14000 lbs.
For each additional 24" between centers, add	775 lbs.
25" x 48" between centers style "F"	14600 lbs.
For each additional 24" between centers, add	775 lbs.

CAUTION -When Hoisting.

For safety and convenience, two holes extend from front to rear of bed to allow use of hoisting bars. These bars should be of heat-treated alloy steel, 13/8" in diameter and 33" long for the 14" Style "B" through the 20" Style "D" Lathes and 2" in diameter and 36" long for the 20" Style "E" and 25" Style "F" Lathes. The two hoisting slings should be of 3w" chain of 11,400 lbs. capacity per sling for the 14" Style "B" through the 20" Style "E" Lathe, and of 1L2" chain of 19,000 lbs. capacity per sling for the 25" Style "F" Lathe. Use wood blocks at the four points between chain and

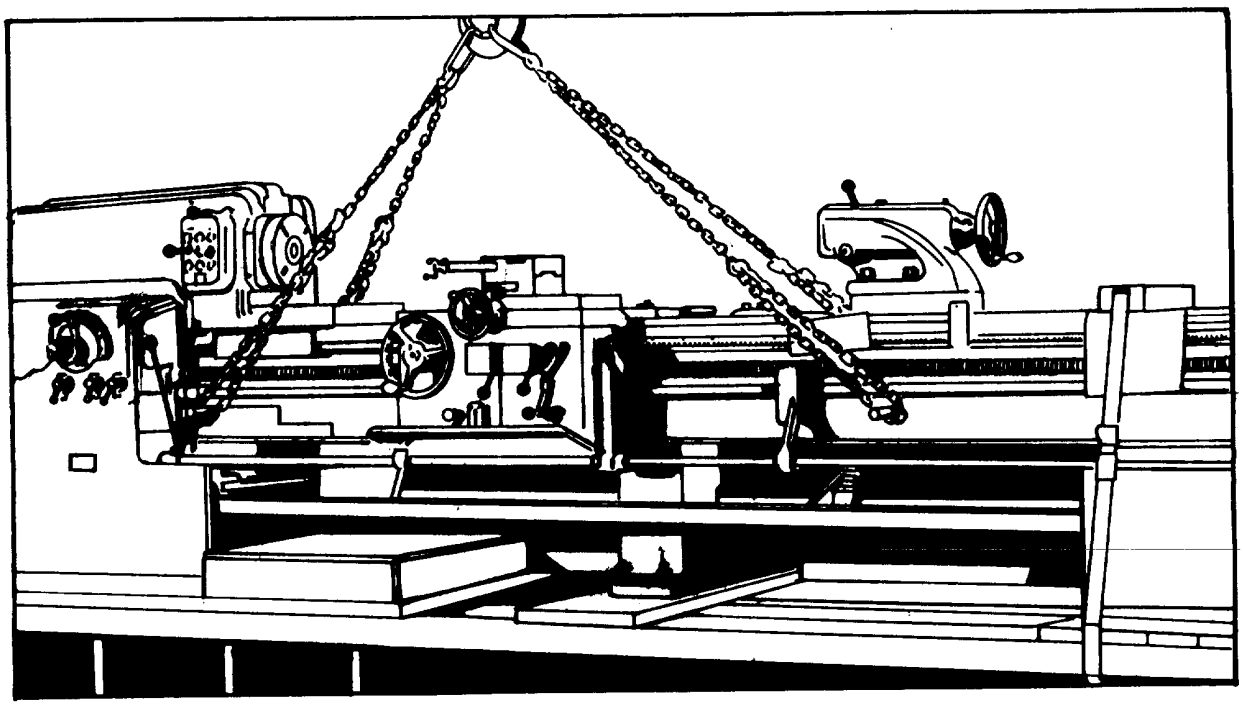


Figure No. 1-Hoisting 16” x 102”

bedway. Figure No. 1 illustrates this hoisting technique. Take a slight strain with the crane before hoisting to make sure all is secure and in balance.

"NOTE"

When moving lathe do not use SLING or PINCH BAR under the covers at the head end.

SETTING UP. Study foundation sent with machine.

FOUNDATION. A concrete foundation or floor is preferred, but a solid wood floor is satisfactory. When preparing footing for setting up lathe, allow one inch (l") in either direction around the hold-down bolts to allow for variations or slight errors in locating these bolts. Hold-down bolts pass through the center of the leveling screw bushings. A steel plate should be placed between the leg and the foundation for supporting the leveling screw bushings.

Figure No 2 shows two different methods of using hold-down bolts in concrete. The right-hand diagram illustrates the method by which bell bottom holes are drilled in the concrete floor, then the lathe, with hold-down bolts already fastened loosely through legs, is positioned correctly on its foundation and finally molten lead is poured into the holes around hold-down bolts. Channels should be chipped into concrete to guide lead into holes.

The left-hand diagram shows method wherein new concrete foundation has been prepared for lathe and hold-down bolts are permanently sealed into foundation.

Hold-down bolts, washer plates and vertical pipes are all in place when concrete is poured.

Note:

Be sure that screw bracket for adjustably mounted motor is anchored to the foundation with hold-down bolts.

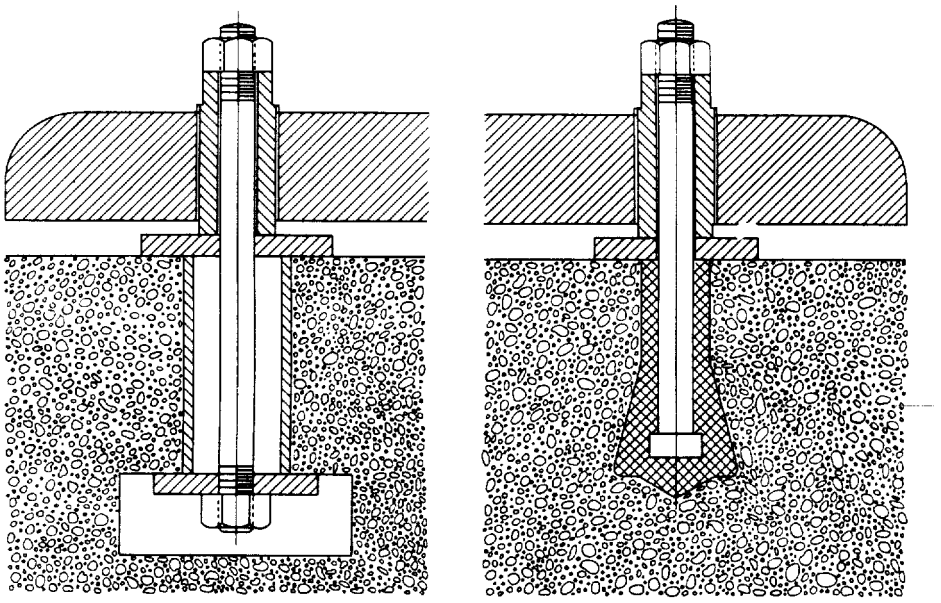


Figure No. 2-Two different applications of hold-down bolts in concrete

LEVELING. Use a good PRECISION level about 18" long and graduated to no more than .001" per foot. (A common carpenter's or machinist's level is not accurate enough.) Place level longitudinally on front carriage wings, figure No. 3, and adjust leveling screws in headstock and tailstock legs until bed is level lengthwise at head-end, center and tail-end positions, as shown. Then, with carriage close to headstock, place the level across the carriage wings with level squared against the side of the compound rest. Adjust head-end leg leveling screws until level reading is obtained. With carriage close to tailstock, place level across the carriage wings with level parallel to the side of the compound rest. Adjust tail-end leg leveling screws until level reading is obtained. When moving level from one position to another, do not turn it end for end. Retest at head-end position and then again at tail-end until readings differ by less than a full graduation.

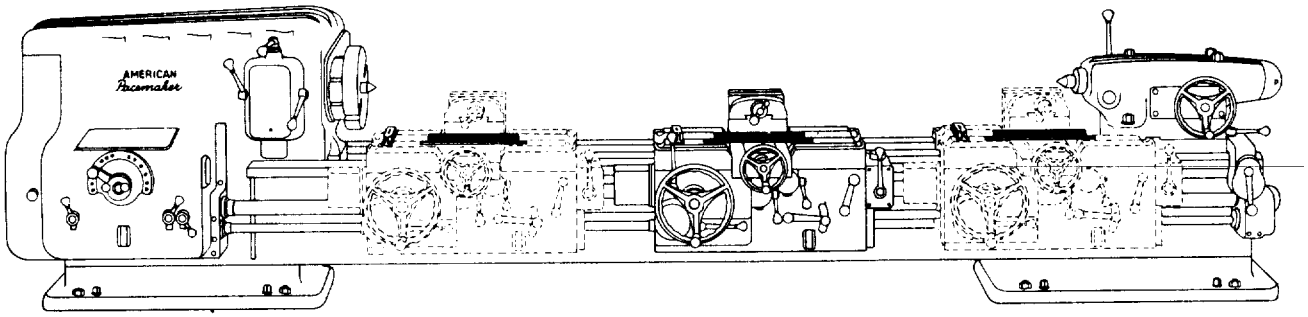


Figure No. 3-Leveling Diagram

When lathe has a center leg, follow the same operations, and when the headstock end and the tail end are level, place the carriage over the center leg and adjust screw bushings until the reading of the level differs less than a full graduation from that of the first two positions.

After machine is leveled tighten nuts on hold-down bolts until slight tension is secured. Again recheck level. Too much tension will spring bed out of level. It is important to check level of lathe at least every six months to insure accurate work.

CLEANING. Do not move carriage until bed has been thoroughly cleaned and oiled by the manual pump on the apron. For cleaning the machine, kerosene is preferable to gasoline, as it does not evaporate and leave dried slushing compound on finished surfaces. The kerosene must be absolutely clean. It is very important to clean the ways of the bed carefully and thoroughly. Lubricate freely all bearing surfaces before operating machine. See that no oil holes are clogged.

OILING INSTRUCTIONS. The machine when shipped (unless dismantled) is lubricated according to directions appearing on the oiling instruction plate attached to the outside of the electrical control panel at the rear of the headstock.

TO LUBRICATE OBSERVE THE FOLLOWING:

Head, Gear Box and Change Gearing-The head, gear box and change gearing are provided with automatic pump lubrication. This pump located in the bottom of the head unit provides the lubrication for all three of these units. Oil passing through the flow gauge in front of the head shows that the pump is working. Fill reservoir through plug in gear box with a high grade machine oil, viscosity 275-290 seconds Saybolt at 100 degrees F. Drain and refill every six months thereafter. Keep oil at such a level so that it will be between the high and low limits on the gauge in the gear box while the head is at rest.

Follow instructions on the oil filter at rear of head. Caution-If oil filter handle becomes too tight to turn by hand, remove filter and cleanse with kerosene and compressed air. DO NOT FORCE HANDLE.

Carriage and Apron--The carriage, apron, cross slide, cross feed nut and half nuts are provided with automatic pump lubrication for longitudinal feeding, cross feeding, and chasing. Before starting each day, operate the auxiliary pump at the bottom of the apron freely. Keep apron oil reservoir filled between the high and low limits on the gauge with Gear Oil, S.A.E. 80 (MII,-L-2105, NSN 9150-00-240-2246).

Tailend Bushing-Leadscrew bearing is an bushing which requires oiling about twice a year. The feed rod and power rapid traverse rod anti-friction bearings are grease packed and should be checked once a year.

Taper Attachment-The anti-friction taper attachment is provided with permanent, oil-sealed ball bearings. When attachment is in use the dove-tail slide bearing should be oiled daily. The dove-tail slide bearing of the plain taper attachment should also be oiled daily when in use.

Hand Operated Mechanism-Lubricate once every week with a Machine Oil (MIL-L-2104, NSN 9150-00-231-9040).

Important-After lathe has been set up. ready for operation, or has been idle for two or three weeks, the auxiliary pump at bottom of apron should be operated freely to thoroughly lubricate the carriage vees. Also, the spindle should be run at slow speed at first to give the oil a chance to circulate.

Note

The lubricating periods mentioned apply to normal working service. In extreme conditions lubricate more often.

OPERATING AND ADJUSTING

STARTING-Observe the following instructions carefully: Before starting make sure that control levers are in their off position, close to the lathe bed: that the two feed "drop" levers on the apron are in their lowered, or disengaged, positions: and that the top speed change lever is in its blue, or slow, position. Press starting button on the gear box to secure current thru the main line.

MOTOR DRIVE-All lathes are motor driven, with motor adjustably mounted at rear of head-end leg. The motor is mounted on a hinged plate that is provided with a screw for adjusting the belt tension.

STARTING CLUTCH AND BRAKE UNIT-The starting clutch and brake unit is a self-contained trouble-free unit bolted and doweled to the headstock and under the swinging cover. It is automatically oiled by the circulating system of the head and mounted 100% on anti-friction bearings, thus requiring absolutely no attention from the operator.

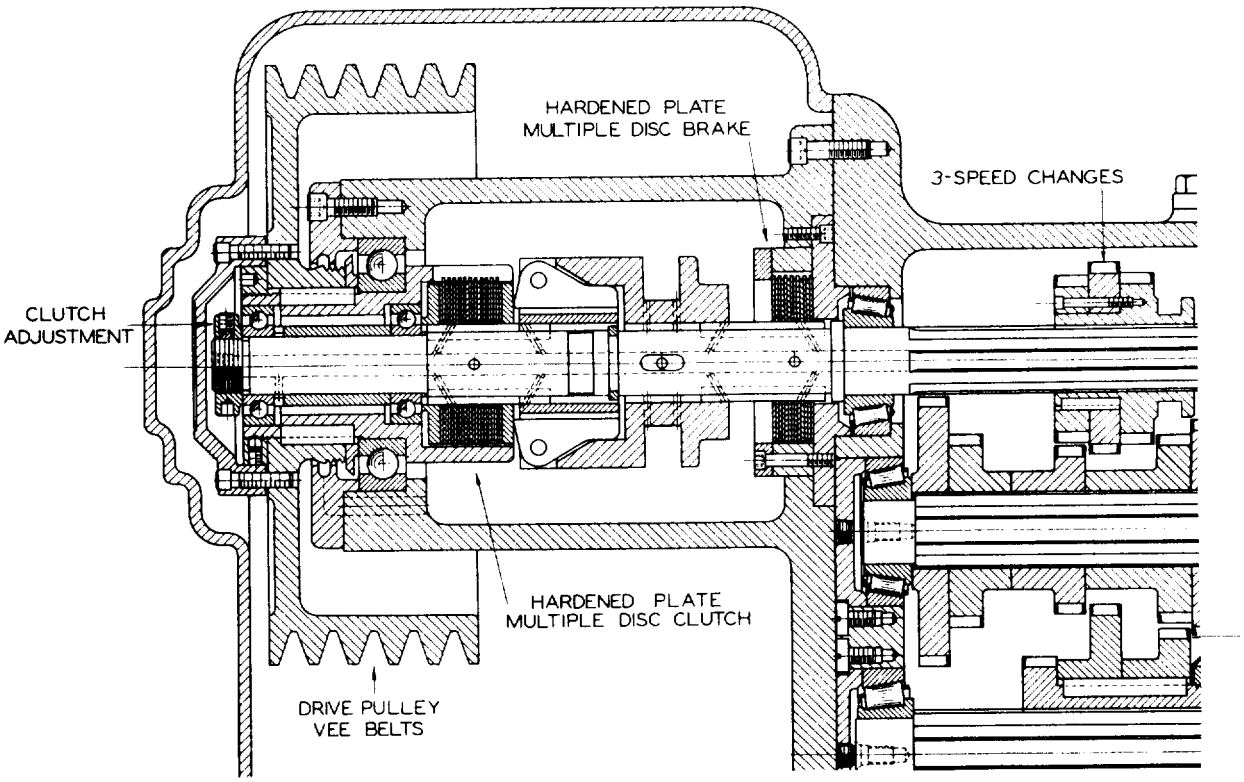


Figure No. 4-Diagram of Clutch and Brake Unit

To adjust multiple disc clutch, swing open cover at head-end of Lathe, remove six bolts from pulley hub cover and remove cover, loosen set-screw in nut designated by clutch adjustment in Figure No. 4 and turn nut until the toggle fingers can be felt to have ridden over the taper onto the flat, into engagement. Do not adjust clutch so tightly that snap cannot be felt. When adjustment has been completed, make sure that the set-screw has been tightened.

The multiple disc brake is self-adjusting for wear.

HEADSTOCK-The headstock is automatically oiled by a pump circulating system and all bearings are 100% anti-friction: therefore, no attention is necessary except following the previously outlined oiling instructions.

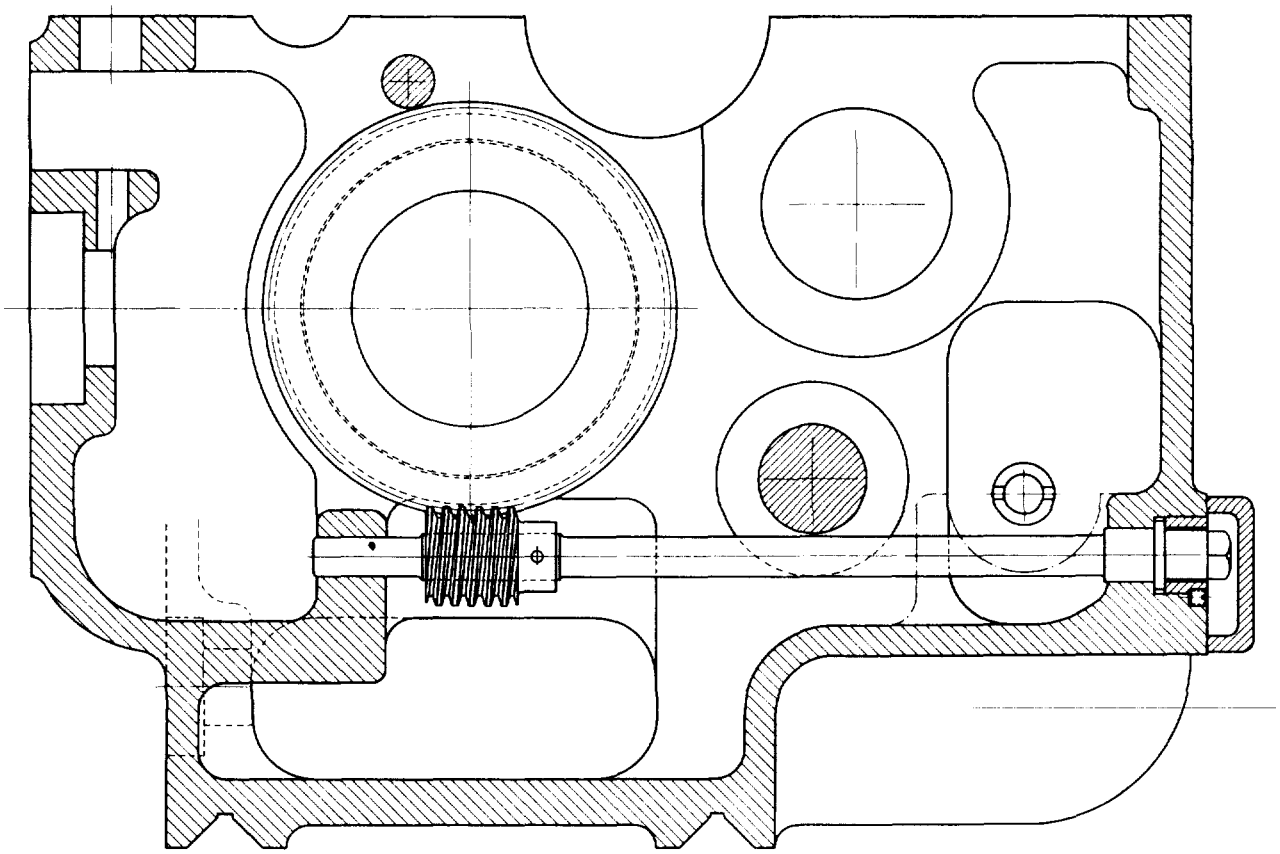


Figure No. 5-Diagram showing means for adjusting Spindle Bearings

To adjust spindle bearings remove small cover marked "A" on rear of headstock and follow instructions on instruction plate located above oil filter. This unit is self-locking because of the worm and worm wheel used to actuate the adjusting nut.

Attach the small face plate to nose of spindle. Put spindle in neutral by means of lever on top of speed selector housing. While making the adjustment hit end of spindle solidly with babbitt hammer. Rock spindle by means of the face plate while making the adjustment. Tighten the bearings until a slight drag is felt on the face plate.

SPINDLE SPEED SELECTOR-All speeds are procured through the action of two levers whose positions clearly and directly indicate on the speed plate the R.P.M. of spindle at any setting, Figure No. 6. The top lever has three positions, one for the slow range, indicated in blue, one for the intermediate range, indicated in red, and one for the fast range, indicated in black. The bottom lever has nine positions, each of which is designated on the speed plate by a circle which in turn contains three speed rates, indicated in corresponding colors. To select a desired speed, place the lower lever at the circle containing that rate, then place the upper lever in the blue, red or black position to correspond to the color indicated in the circle.

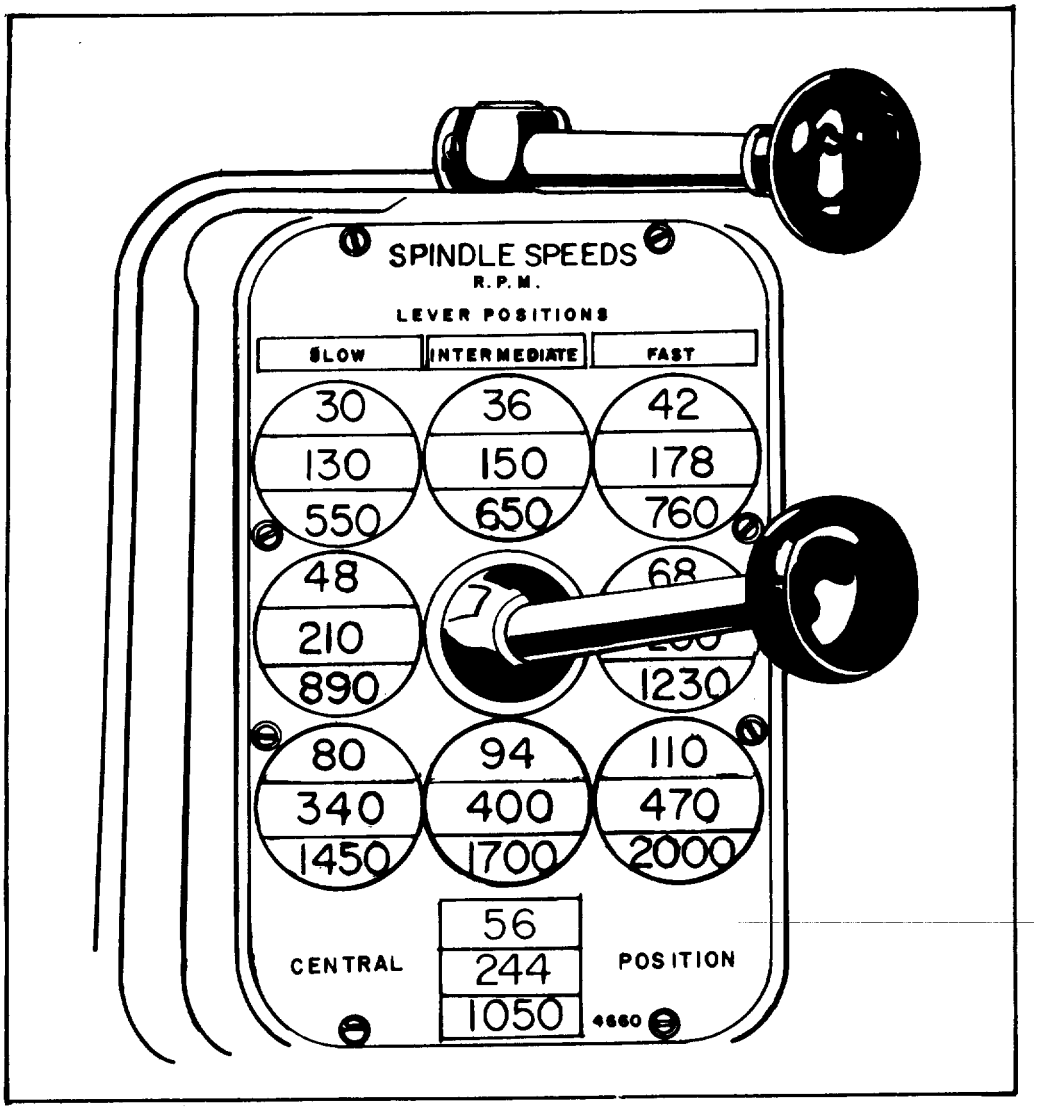


Figure No. 6-Direct Reading Speed Control, 27-Speed Head

THE NEUTRAL POINT for the spindle to be completely disengaged from the headstock gears is the top lever position between the red and the black. At this point the notch on the lever hub coincides with the neutral line on the small plate attached to the top of the speed change unit.

SPINDLE SPEED CHANGE-Speed changes should be made only after the clutch has been disengaged, and preferably just before the spindle stops. Sometimes when shifting gears after spindle has come to a complete stop it is necessary to jog the spindle a bit with the head end control lever to allow gears to mesh.

REVERSE FOR LEADSCREW AND FEED ROD-Except when the leadscrew reverse from apron is supplied, the leadscrew and feed rod are reversed by operating the pull-rod at the end of the headstock inside the swinging cover. The direction plate on the pull-rod states that for left-hand threads the pull-rod should be pushed in, and for right-hand threads. pulled out: there is a center neutral position which completely disengages the change gears and the gear box from the spindle.

CHANGE GEARS AND GEAR BOX-On all English lathes a standard English range is furnished and every change on the index plate on the front of the box is obtained without changing any of the head end gears. The two outside gears, "A" and "B", Figure No. 7, should never be removed on English lathes. In addition to the standard range, other ranges may be secured by the addition of suitable gearing, namely:

Coarse leads.	Transposed metric leads, coarse.
Diametral pitch leads.	Transposed module leads, standard.
Transposed metric leads, standard.	Transposed module leads, coarse.

To obtain these additional ranges, the change gears must be arranged to correspond to the stud, quadrant, and box gears shown on the plate which is furnished for that particular range and which is attached to the inside of the swinging cover.

On all metric lathes a standard metric range is furnished, but to obtain the feeds and leads shown on the index plate on the front of the box, the change gears must be arranged to correspond to the stud, quadrant, and box gears shown on the plate.

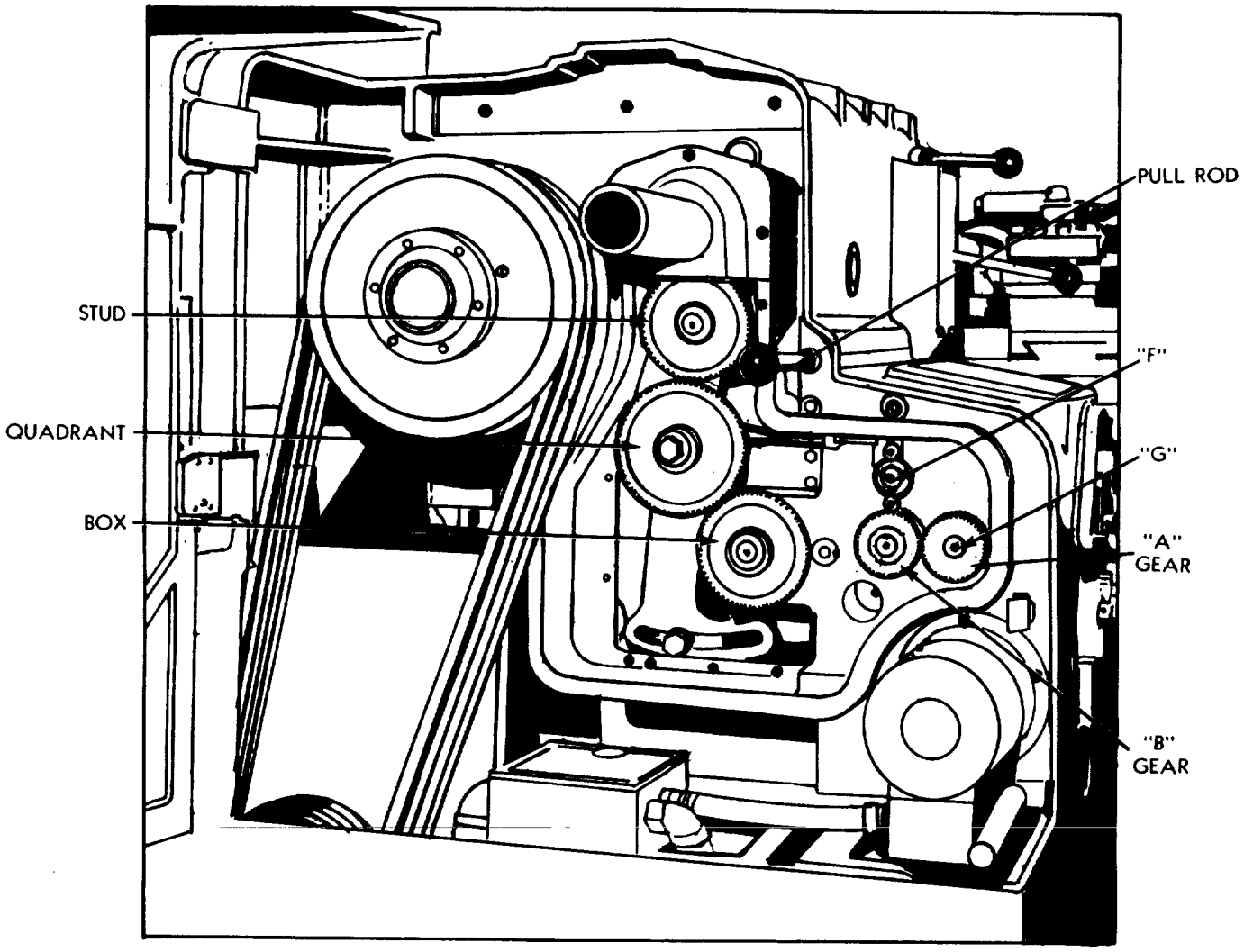


Figure No. 7-Head-End, showing Swinging Cover open and oil tight aluminum cover removed.

In addition to the standard metric range, other ranges may be secured by the use of special gearing, namely:

Coarse leads.	Transposed diametral pitch leads.
Module leads, standard.	Transposed English leads, standard.
Module leads, coarse	Transposed English leads, coarse.

To obtain these additional ranges, first arrange the change gears to correspond to the stud, quadrant, and box gears shown on the plate which is furnished for that particular range and which is attached to the inside of the swinging cover. Second, make sure that for all metric leads and feeds the "A" gear, Figure No. 7, is on the cone shaft "F" and the small conversion lever on the opposite side of the box, is at position No. 1: and make sure that for transposed English leads and feeds the "A" gear is on the tumbler shaft "G" and the small conversion lever on the opposite side of the box is at position No. 2.

All special threads and leads for any of the fore-mentioned ranges are obtained through the use of special gears on the stud, quadrant, and box. When a special thread is furnished, an additional plate is attached to the inside of the cover to show the change gears used and the correct lever positions.

To change any of the change gears, simply remove snap-ring with proper tool, slip gear off, fit the desired gear onto sleeve, and replace snap-ring.

To adjust quadrant gear along the slot, loosen the hex-head screw, slip gear along into place, and tighten screw.

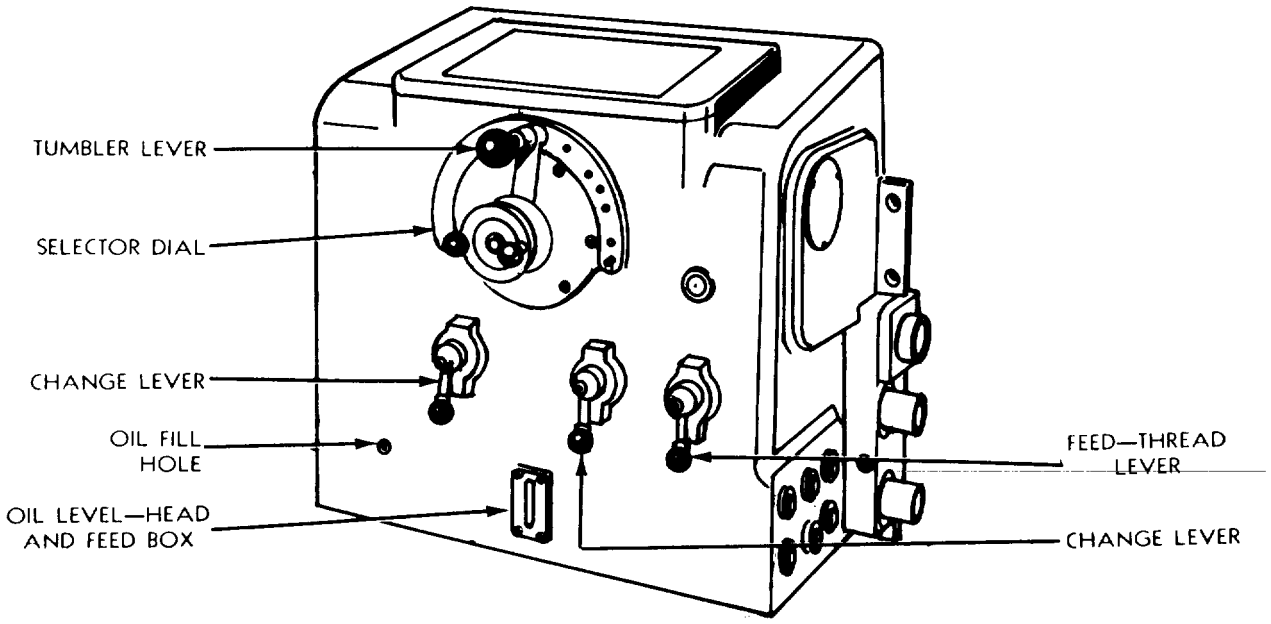


Figure No. 8-English Quick Change totally enclosed gear box

Thread, lead and feed selections of any range are made through the gear box by manipulating the tumbler lever and selector dial in combination with the two shifter levers. The tumbler lever and the selector dial working together select any one of eleven different changes representing the eleven columns on index plate. The two shifter levers give six different two letter combinations representing the six rows on the index plate. Any desired thread, lead or feed can be quickly selected by setting tumbler lever to the number corresponding to the column number in which the desired thread, lead or feed is found and by setting both shifter levers to give the two letter combination indicated by the row in which the desired thread, lead or feed is located. The tumbler lever and selector dial shifting is accomplished by shifting the tumbler lever into the "OUT" position, by rotating the selector dial until desired tumbler position number is opposite top center line and finally by shifting the tumbler lever from "OUT" position to the same number position as that indicated by selector dial.

Thread, lead and feed changes may best be made when spindle is running at moderate speed as this permits the gears to engage more readily. Make certain that tumbler lever is already shifted into its "OUT" position before selector dial is rotated; tumbler lever has plunger latch for self locking in each position necessitating an outward pull on this handle before shifting.

FEED ROD AND LEADSCREW--The feed rod and leadscrew are independent of one another and when one is running the other is stationary. To change the drive from one to the other merely position the small lever, Figure No. 8 on the right side of the gear box, to read "FEED" or "THREAD".

The feed rod is provided with a ball spring safety clutch immediately inside the feed box. This clutch will not need adjustment. The condition of overload must be removed before it will automatically reset.

On the feed rod there are two adjustable collars for automatically stopping the longitudinal feeding of the carriage in either direction.

CLUTCH AND BRAKE CONTROL LEVERS-There are two levers for starting and stopping the spindle. One is positioned close to the headstock for use when changing speeds, and the other is on the right-hand side of the apron. To engage clutch the lever is moved toward operator, and to disengage clutch and engage brake the lever is moved away.

APRON-The apron, Figure No. 9, is driven by either the feed rod or the leadscrew, depending upon whether the double-bevel pinion or the half-nuts are engaged. The double-bevel pinion is actuated by the forward-reverse lever on the front of the apron and controls the direction of feeding, both longitudinal and cross. The half-nuts are engaged by the half-nut lever, but the direction of travel is controlled by the direction of rotation of the leadscrew. These two levers are interlocking and one must be in its

neutral or disengaged position before the other can be moved. The neutral position for the forward-reverse lever is the center hole, and the disengaged position for the half-nut lever is at the top of its arc.

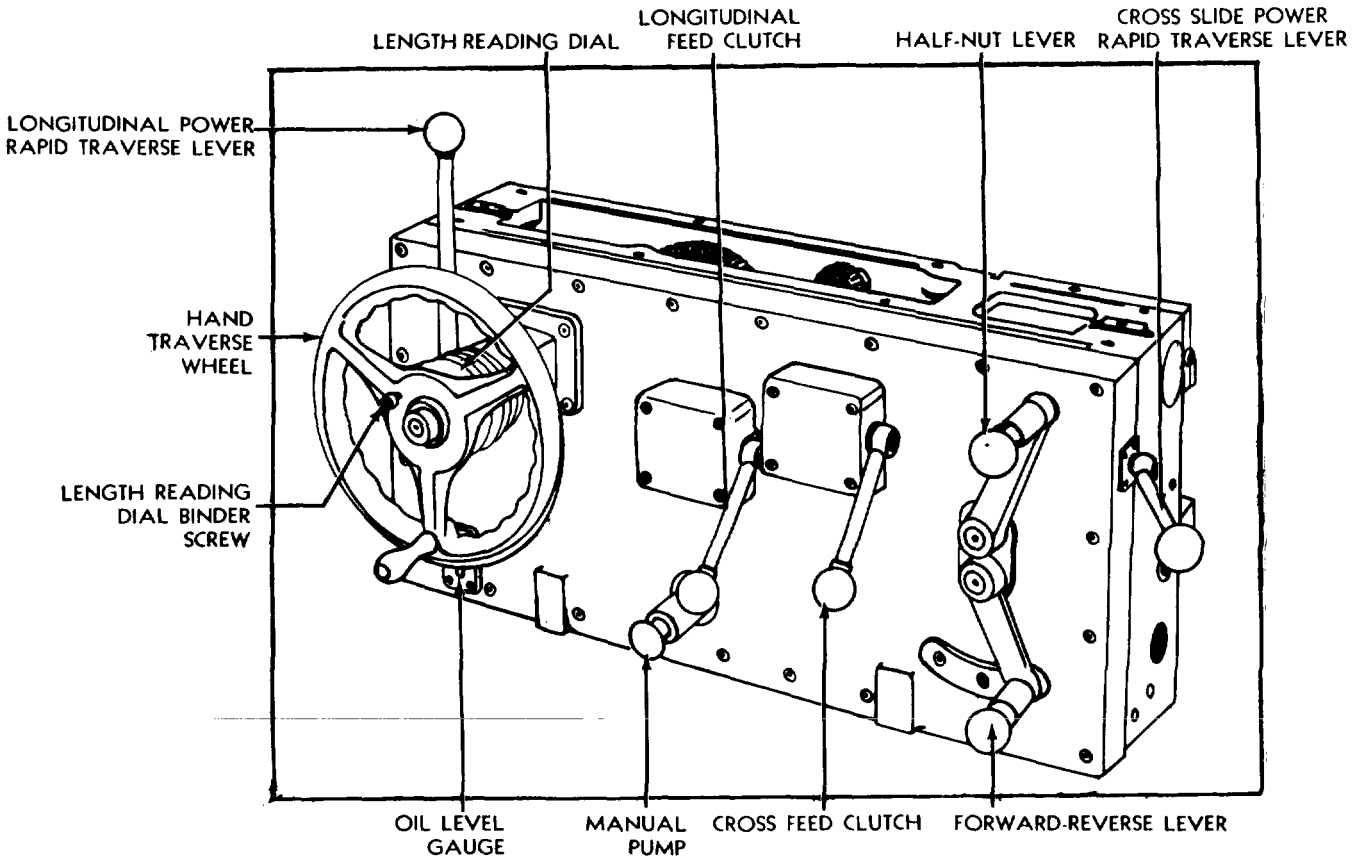


Figure No. 9-Front View of Apron

The instruction plate over the chasing dial on the extreme right of the apron clearly states the correct procedure for engaging the half-nuts. (There is no chasing dial furnished on metric lathes. Half-nuts remain engaged and carriage is returned by either leadscrew reverse or reversing motor).

FEED CLUTCH LEVERS-The two drop levers on the front of the apron actuate clutches which control the longitudinal feed of the carriage and the cross feed of the tool slide. The left-hand lever controls the longitudinal and the right the cross feeding. When the control levers are in the raised position the clutches are engaged, and in the dropped position, disengaged.

Both the longitudinal feed and cross feed are provided with safeties so that no damage will occur should the carriage or cross slide be fed into an obstruction

or allowed to feed to its limit of travel.

To adjust clutch stop spindle, raise lever to engaged position, remove four screws holding housing and remove housing completely.

Make sure that the anti-friction thrust washer inside adjusting nut "A", Figure No. 10 has not fallen off shaft. Adjust nut "A" for desired tension and then replace housing.

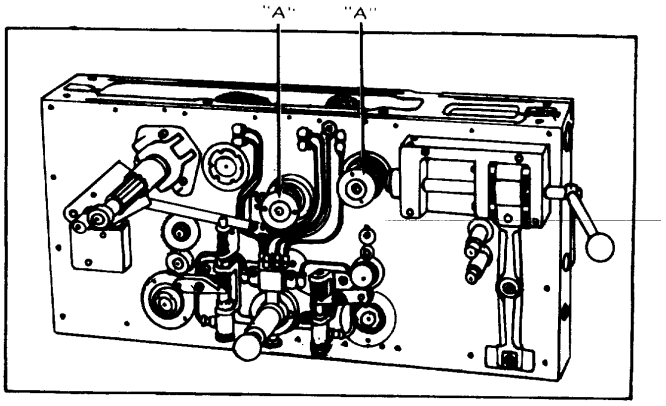


Figure No. 10-Front View of Apron with front cover plate removed exposing all adjusting members

LEADSCREW REVERSE FROM APRON-When the direction of the leadscrew is reversed from the apron, a small lever is employed at the top right-hand side of the apron. This lever has three positions: up, when cutting left-hand threads; center, or neutral: and down when cutting right-hand threads. With this attachment adjustable stops are provided for chasing in both directions.

Use this reverse only for the leadscrew when chasing threads. The forward-reverse lever on the apron should always be used for reversing the direction of feeding.

Do not attempt to reverse leadscrew when spindle speed is over 200 R.P.M. When over this speed, disengage clutch then brake spindle to a moderate speed before reversing.

4-WAY POWER RAPID TRAVERSE-When the 4-way power rapid traverse is furnished two independently operated directional levers are used. The carriage longitudinal traverse is actuated by a convenient control lever at the left side of the apron, while the control lever for the tool rest cross travel is located at the right side of the apron, figure No. 9. These levers are separated to eliminate the possibility of engaging the wrong traverse and also to permit both traverses being operated simultaneously. A further safety feature is provided by spring actuated safety clutches which control the traverses. These disc clutches are engaged and disengaged by spring action applied by the actuation of the control levers, as a result the traverses operate only while the operator holds the levers in operating positions. Should the carriage or tool rest be accidentally run into an obstruction the clutches will simply slip. See Figure No. 11.

If either the longitudinal or the cross slide power rapid traverse is furnished alone, the principle of operation is the same as described above.

CARRIAGE-The carriage is rigidly secured to the bed by taper gibs under the front and rear outer vees. The taper gibs are adjusted by means of their adjusting screws. Turning screws to the right tightens the gibs, and to the left loosens them.

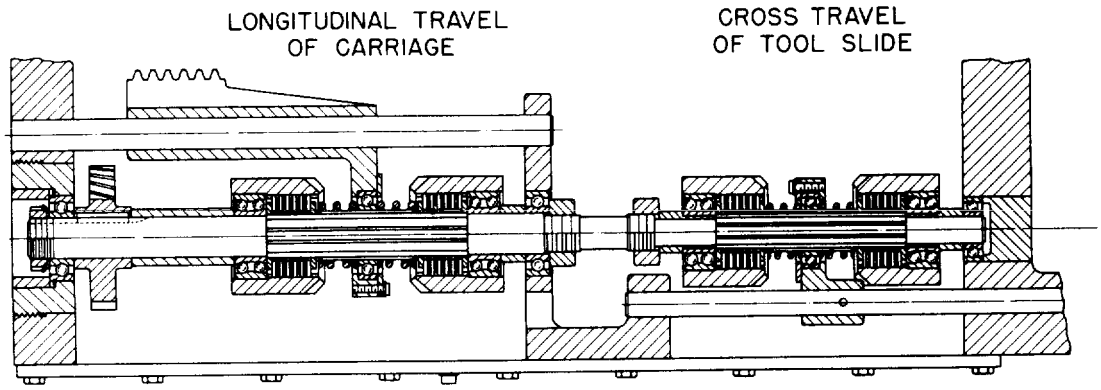


Figure No. 11-Diagram of Power Traverse Safety Clutch Unit

The bottom slide is secured to the carriage bridge and the top slide to the swivel also by means of adjustable taper gibs, located on the left-hand sides. In the slot on each side of the swivel are four clamp nuts for tightening the swivel to the bottom slide. The swivel can be swung in a 360° arc.

The carriage is clamped to the bed by means of the square-head screw located on the front, right-hand carriage wing. Directly behind both micrometer dials is found a knurled nut for binding the graduated dials to the screws. The knurled collar on the dial is merely for convenience in setting.

MICROMETER BALL THREADING STOP-A micrometer ball threading stop is provided on standard engine lathes to facilitate threading operations. This stop permits the withdrawal of the tool from the cut up to 3 revolutions of the cross feed screw without disturbing the tool setting. This permits withdrawal of tool at the end of each cut and the return of the tool to the original depth of cut. Additional depth may be secured by further adjustment of the compound rest top slide screw. If this is not convenient the stop may be loosely set and used as a "slip stop" whereby the handwheel is turned past the stopping point by the amount required for the next depth of cut.

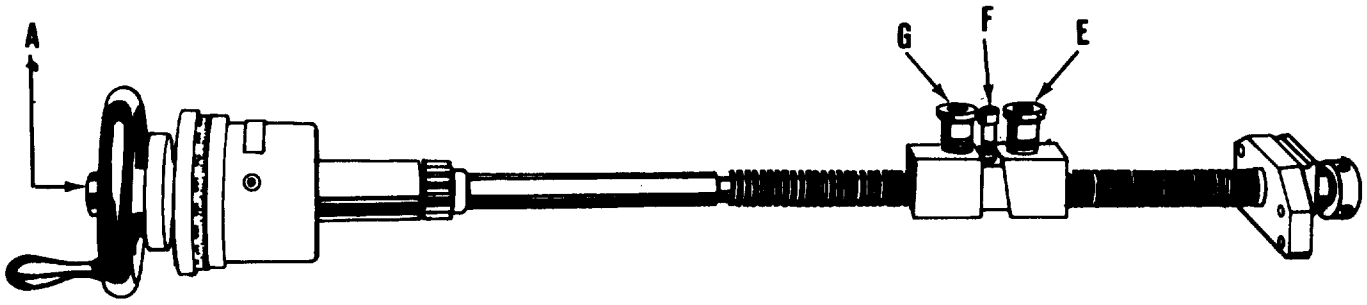


Figure No. 12-Hardened cross feed screw with large direct reading micrometer dial, automatically oiled, bronze compensating nut and Micrometer Ball Threading Stop

To adjust the cross feed nut for wear and accompanying backlash, loosen the hex-head screw "E" in the center of the carriage bridge just behind the swivel about a quarter turn and turn small hollow-head screw "F" to the right to draw up the adjusting wedge, figure No. 12. The correct procedure is to adjust the small screw a quarter turn and then to tap the hex-head screw with a babbitt or wood block, at the same time turning the cross feed hand wheel to the right and left to feel for the correct adjustment. When the wedge has been drawn up a sufficient amount tighten the hex-head screw. Do not loosen the large hollow-head screw "G" at any time. The hardened cross feed screw confines all the wear to the nut, and for this reason the nut may be adjusted at any point along the screw.

On carriages without taper attachment, when backlash develops because of end play in the anti-friction thrust bearings on the screw, tighten the round nut "A" at the front end of the screw. On carriages with the taper attachment, unscrew the square plate "M", figure No. 13, directly over the back end of the screw, loosen two small set-screws in round nut, and adjust nut until end play is removed.

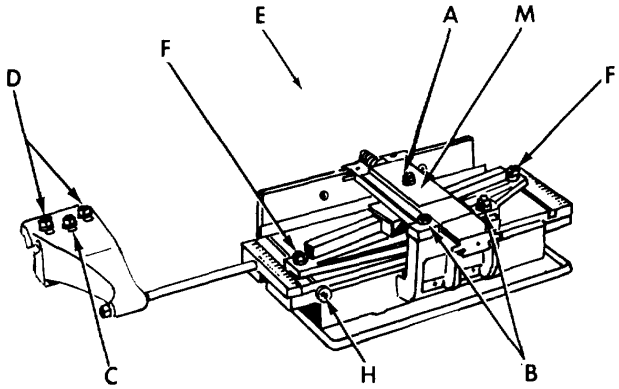


Figure No. 13-View of Plain Bearing Taper Attachments with guards removed.

TAPER ATTACHMENT--Either the plain bearing or the ball bearing taper attachment, Figure No. 13 is easily and quickly set up for action. For chasing tapered threads set up for adjustable cross feed control (telescopic type).

Loosen draw bar binder nut "C", the two swivel nuts "'F" and screw "A", and nuts "B". By means of the knurled knob "H" set swivel to desired taper, either inches per foot at one end or degrees of angle at the opposite end of swivel base, then tighten nuts "F" and screw "A". Also tighten dog clamp nuts "D". To change from taper to straight turning loosen screw "A" and nuts "F", then set swivel straight. Next, tighten screw "A", the two nuts "B" and the two nuts "F". Now tighten nut "C" and loosen the two nuts "D". Make sure that nut "C" is tight and the two nuts "D" are loose when turning straight work.

For turning taper, set up for locked cross feed control (rigid type). Loosen screw "A" and nuts "B". Set swivel to required angle. Tighten screw "A", loosen nut "C", tighten nuts "D" and screw plug in center of hex screw "E". See Figures No. 12 and 13.

TAILSTOCK-The tailstock, figure No. 14, is provided with four clamping bolts for binding it securely to the bed. The spindle is clamped and unclamped in the barrel by raising or lowering the clamping lever at the front of the tailstock.

Both the stationary and combination stationary/live center spindles are provided with tang slots for easy removal of the center and ordinary drilling operations. To remove either spindle, run it all of the way out until the pinion is disengaged from the rack and then carefully pull remainder of distance by hand. A key at the front end of the combination spindle locks the center for stationary operation. Be sure key is always locked tightly in place.

The tailstock has its own plunger pump lubrication and the reservoir should be kept filled between the high and low limits on the gauge with Gear Oil, S.A.E. 80 (MIL-L2105, NTSTI 9150-00-240-2246).

The tailstock micrometer dial reads spindle advance in 1/32" increments and is adjustable to zero at any position of the spindle.

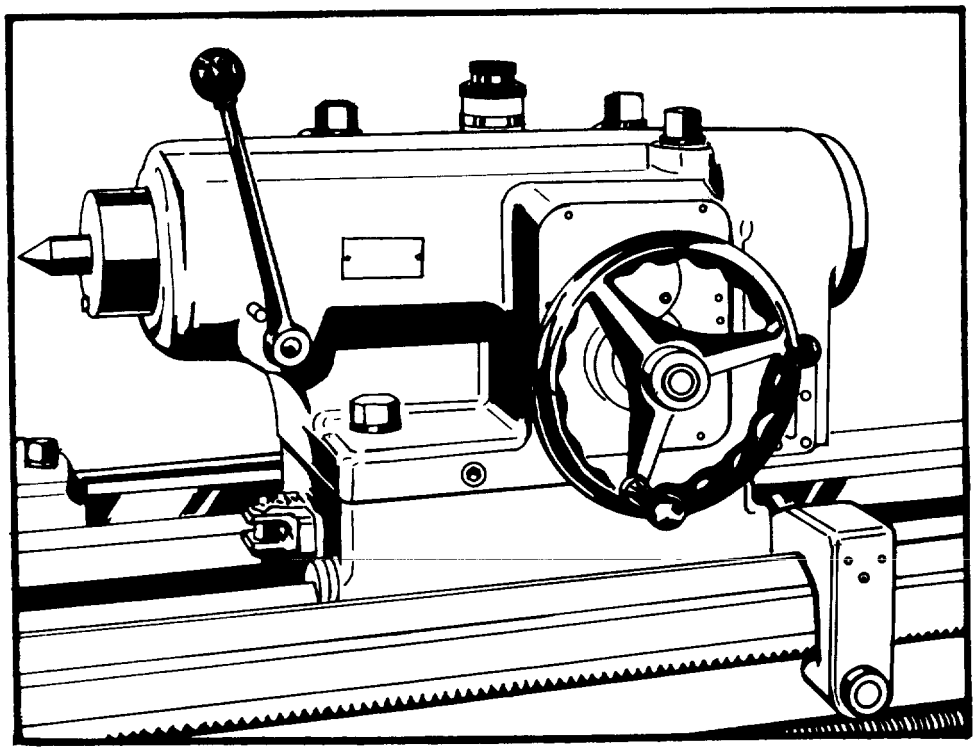


Figure No. 14-Tailstock

There is a 1/8” set-over adjustment possible. To adjust the center alignment from the front to the rear, loosen the hollow hex screw on the rear side two or three turns, adjust the hollow hex screw on the front side to the right until the desired position is obtained, and then tighten the screw on the rear side.

To adjust the center alignment from the rear to the front, loosen the hollow hex screw on the front side two or three turns, adjust the hollow hex screw on the rear

side to the right until the desired position is obtained and then tighten the screw at the front.

These same operations hold true for the built-in anti-friction center tailstock except that of removing the center. The anti-friction mounted center, by itself, is non-removable, and must be removed along with its complete anti-friction unit. To do this, remove the plate on the front end of the spindle and draw out the complete anti-friction unit by the center. If the unit is too tight to draw out, remove the spindle and then tap it out. However, it will be rare, if ever, that this center unit must be removed. Even when regrinding the center is left in position and rotated by means of a thin belt placed around the cylindrical portion.

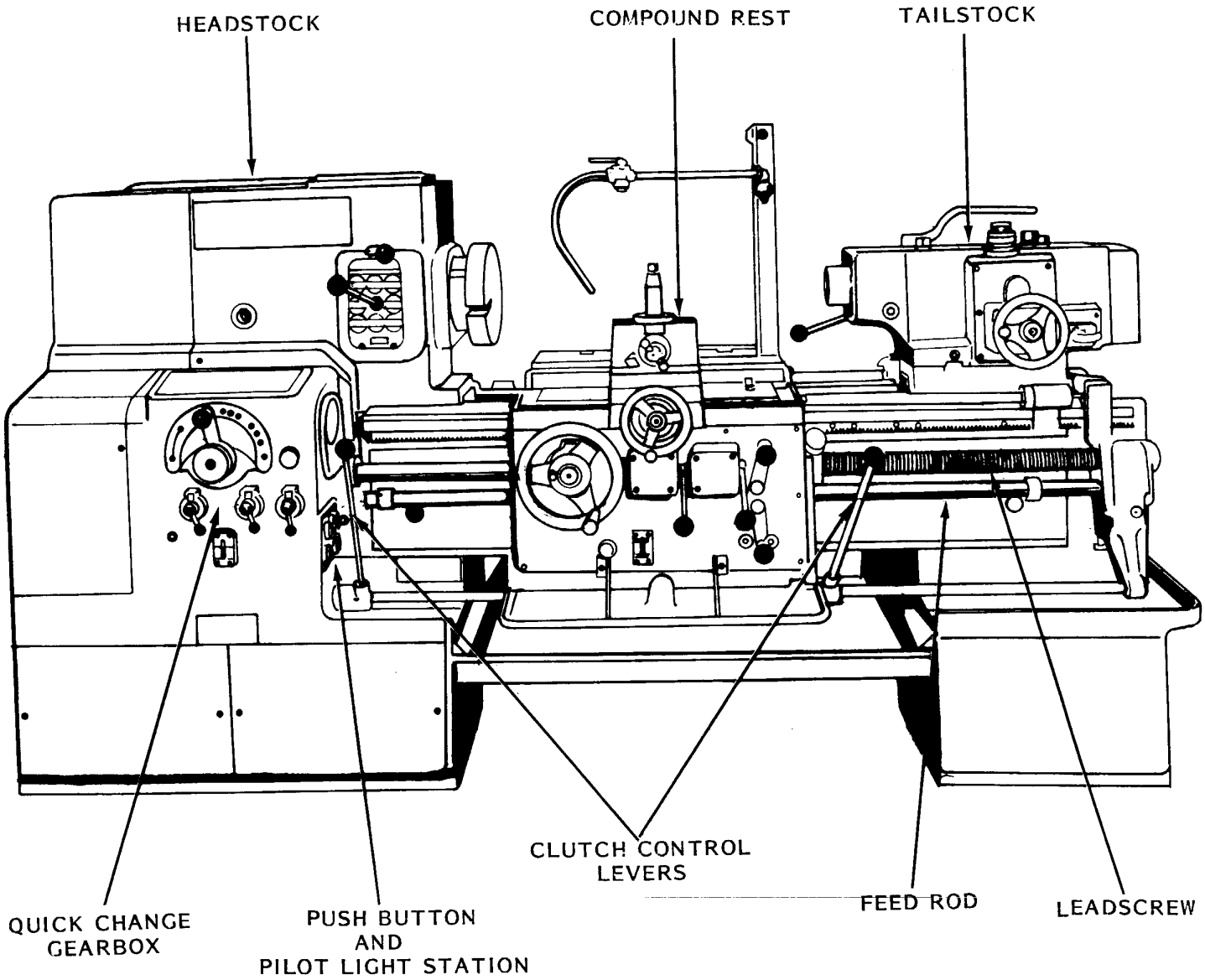


Figure No. 15 - Engine Lathe

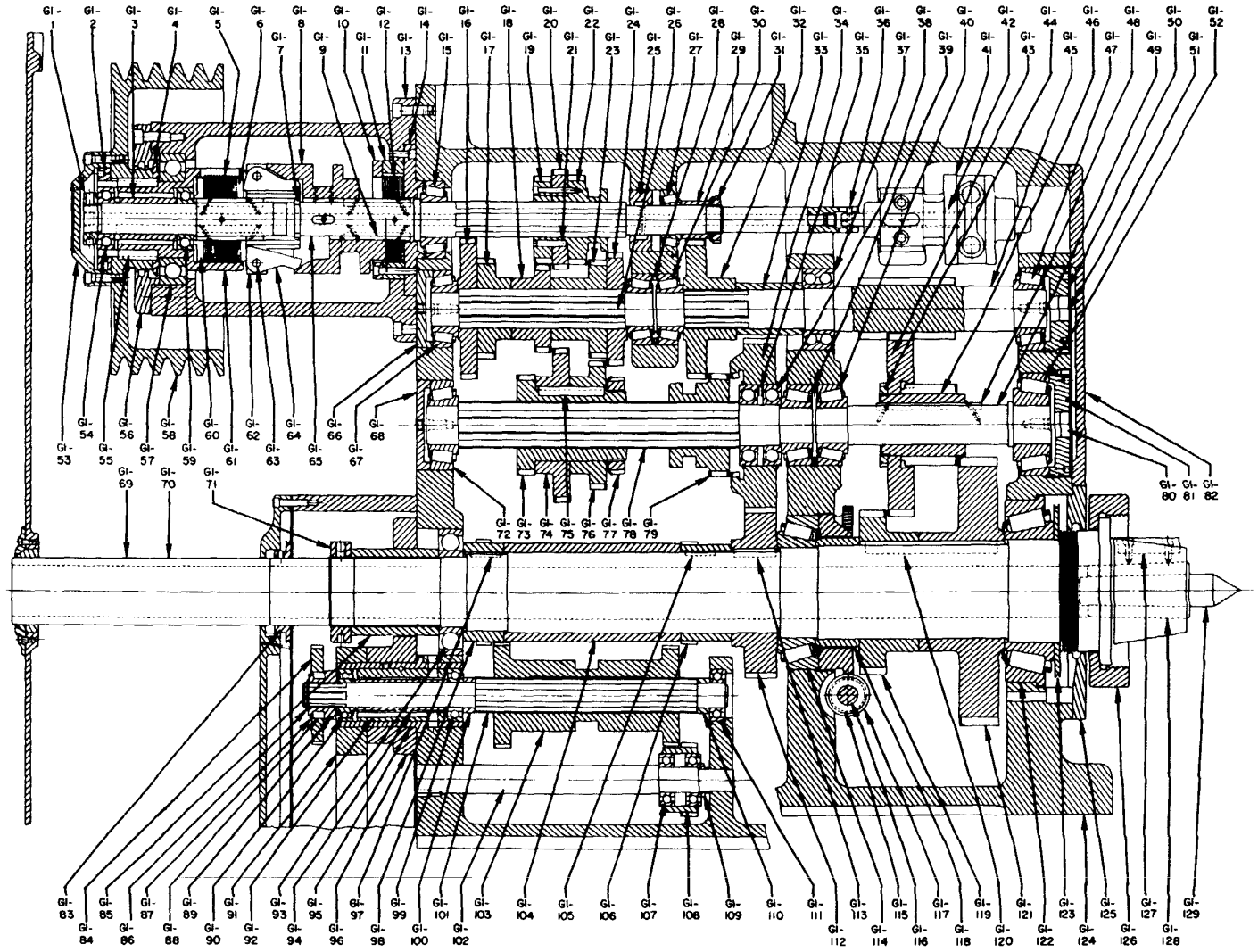


Fig. G1 Headstock Gearing-27 Speeds

HEADSTOCK GEARING-27 SPEEDS

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G1-1	Nut	G1-44	Nut	G1-87	Ring
G1-2	Nut	G1-45	Shaft	G1-88	Key
G1-3	Sleeve	G1-46	Gear-16T	G1-89	Hub
G1-4	Sling	G1-47	Bearing	G1-90	Bearing
G1-5	Plates	G1-48	Key	G1-91	Quadrant
G1-6	Plates	G1-49	Shaft	G1-92	Spacer
G1-7	Retainer	G1-50	Nut	G1-93	Bearing
G1-8	Spool	G1-51	Plug	G1-94	Spacer
G1-9	Key	G1-52	Bearing	G1-95	Sleeve
G1-10	Retainer	G1-53	Cover	G1-96	Plate
G1-11	Collar	G1-54	Bearing	G1-97	Key
G1-12	Plates	G1-55	Key	G1-98	Gear-64T
G1-13	Housing	G1-56	Retainer	G1-99	Bearing
G1-14	Ring	G1-57	Bearing	G1-100	Spacer
G1-15	Bearing	G1-58	Sheave	G1-101	Shaft
G1-16	Gear-53T	G1-59	Bearing	G1-102	Shaft
G1-17	Gear-37T	G1-60	Plate	G1-103	Gear-64T
G1-18	Gear-32T	G1-61	Hub	G1-104	Spacer
G1-19	Gear-31T	G1-62	Hub	G1-105	Key
G1-20	Gear-37T	G1-63	Pin	G1-106	Gear-61T
G1-21	Key	G1-64	Finger	G1-107	Bearing
G1-22	Gear-34T	G1-65	Shaft	G1-108	Gear-44T
G1-23	Gear-35T	G1-66	Plug	G1-109	Spacer
G1-24	Gear-42T	G1-67	Bearing	G1-110	Spacer
G1-25	Ring	G1-68	Plug	G1-11	Bearing
G1-26	Shaft	G1-69	Spindle	G1-112	Gear-60T
G1-27	Bearing	G1-70	Spindle	G1-113	Key
G1-28	Spacer	G1-71	Nut	G1-114	Bearing
G1-29	Spacer	G1-72	Bearing	G1-115	Worm
G1-30	Bearing	G1-73	Gear-37T	G1-116	Shaft
G1-31	Nut & Lockwasher	G1-74	Gear-59T	G1-117	Wheel
G1-32	Gear-52T	G1-75	Key	G1-118	Spacer
G1-33	Spacer	G1-76	Gear-48T	G1-119	Gear-49T
G1-34	Gear-61T	G1-77	Nut & Lockwasher	G1-120	Key
G1-35	Spacer	G1-78	Shaft	G1-121	Gear-61T
G1-36	Pin	G1-79	Gear-38T	G1-122	Bearing
G1-37	Bearing	G1-80	Plug	G1-123	Sling
G1-38	Bearing	G1-81	Nut	G1-124	Headstock
G1-39	Spacer	G1-82	Cover	G1-125	Cover
G1-40	Bearing	G1-83	Sling	G1-126	Lock Nut
G1-41	Bracket	G1-84	Gear-60T	G1-127	Key
G1-42	Bearing	G1-85	Spacer	G1-128	Bushing
G1-43	Gear-55T	G1-86	Ring	G1-129	Center

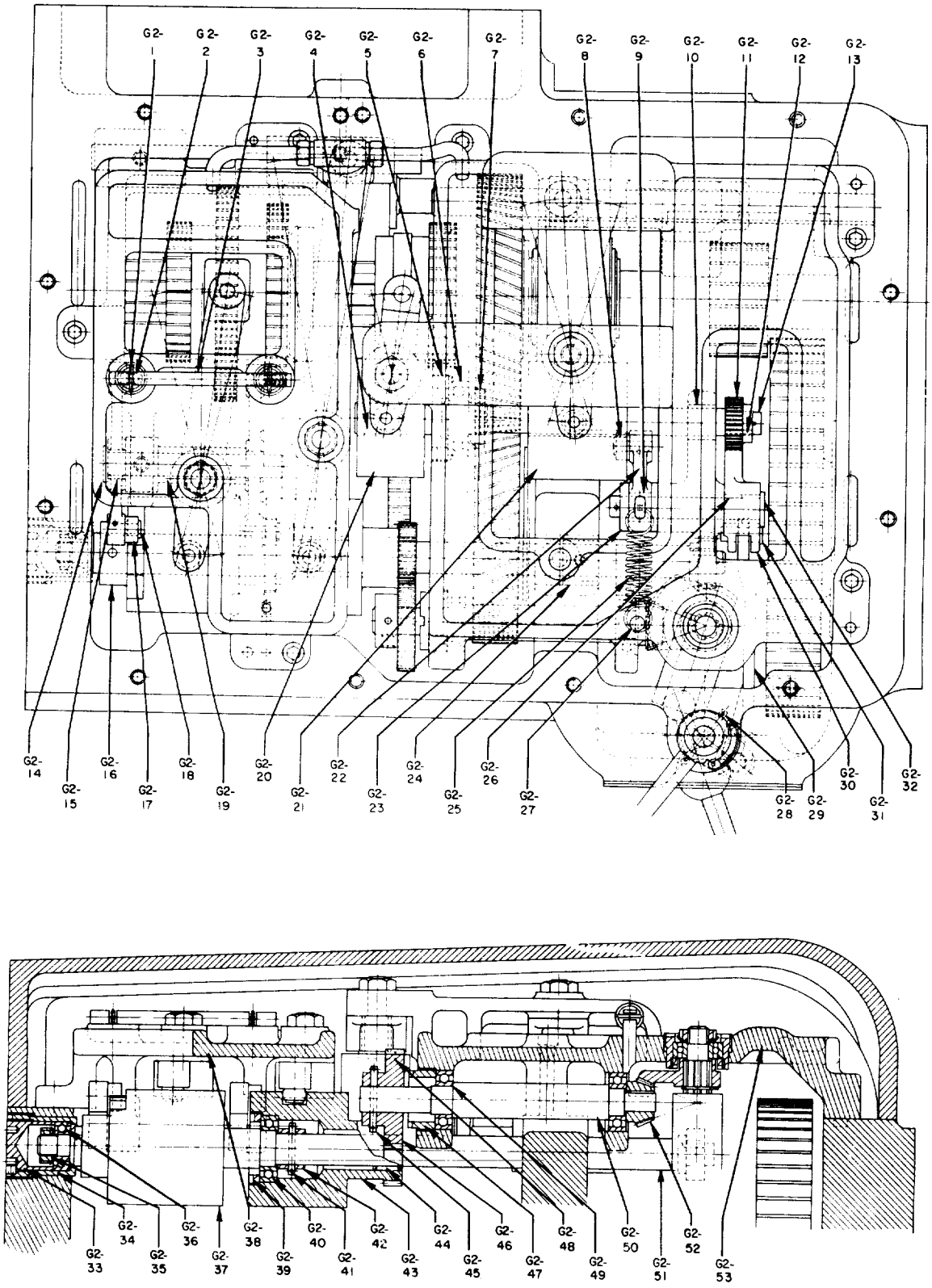
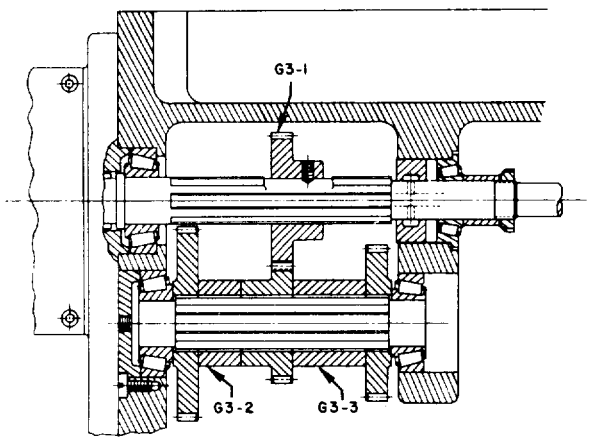
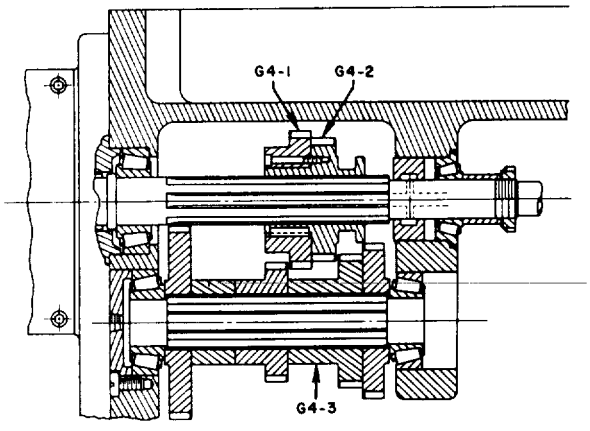


Fig. G2 Headstock Gear Shifting-27 Speeds

HEADSTOCK GEAR SHIFTING-18 & 27 SPEEDS

Part No.	Part Name	Part No.	Part Name
G2-1	Spring	G2-28	Pin
G2-2	Post	G2-29	Link
G2-3	Bar	G2-30	Sector
G2-4	Key	G2-31	Stud
G2-5	Nut	G2-32	Shaft
G2-6	Bearing	G2-33	Nut
G2-7	Nut & Lockwasher	G2-34	Retainer
G2-8	Pin	G2-35	Nut & Washer
G2-9	Bearing	G2-36	Bearing
G2-10	Bearing	G2-37	Cam
G2-11	Gear	G2-38	Bracket
G2-12	Key	G2-39	Nut
G2-13	Shaft	G2-40	Bearing
G2-14	Shaft	G2-41	Pin
G2-15	Bearing	G2-42	Spacer
G2-16	Detent	G2-43	Cam
G2-17	Roller	G2-44	Bearing
G2-18	Pin	G2-45	Pin
G2-19	Spacer	G2-46	Gear
G2-20	Cam	G2-47	Nut
G2-21	Cam	G2-48	Stud
G2-22	Lever	G2-49	Bearing
G2-23	Washer	G2-50	Shaft
G2-24	Bearing	G2-51	Shaft
G2-25	Spring	G2-52	Pinion
G2-26	Bearing	G2-53	Bracket
G2-27	Post		





HEADSTOCK GEARING -9 SPEEDS

Part No.	Part Name
G3-1	Gear-37T
G3-2	Spacer
G3-3	Spacer

HEADSTOCK GEARING -18 SPEEDS

Part No.	Part Name
G4-1	Gear-37T
G4-2	Gear-33T
G4-3	Gear-36T

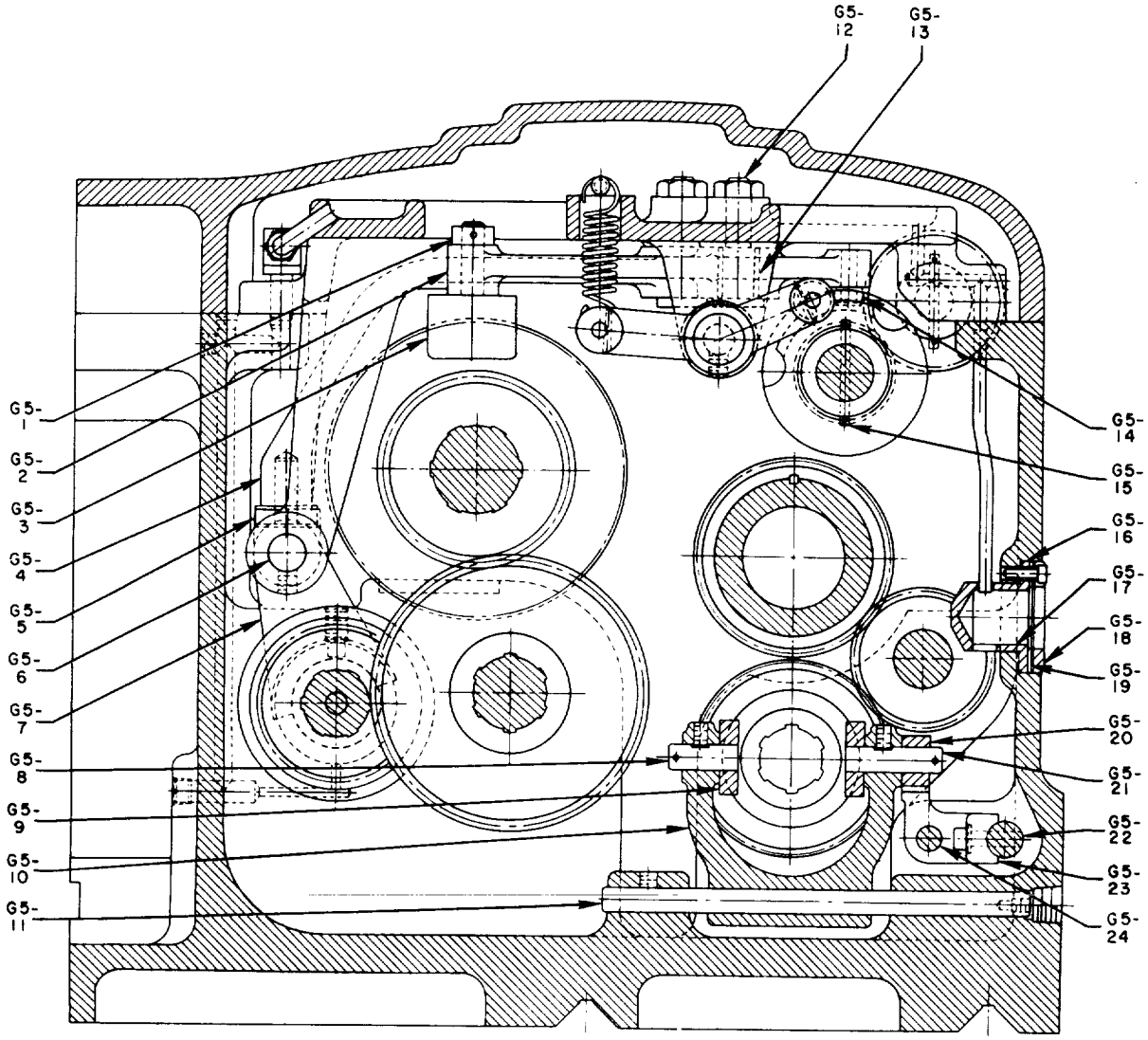


Fig. G5 Headstock Gear Shifting-18-27 Speeds

HEADSTOCK GEAR SHIFTING-18 & 27 SPEEDS

Part No.	Part Name	Part No.	Part Name
G5-1	Collar	G5-13	Pin
G5-2	Lever	G5-14	Roller
G5-3	Shoe	G5-15	Pin
G5-4	Lever	G5-16	Washer
G5-5	Shoe	G5-17	Plug
G5-6	Shaft	G5-18	Plate
G5-7	Fork	G5-19	Gasket
G5-8	Pin	G5-20	Block
G5-9	Shoe	G5-21	Pin
G5-10	Yoke	G5-22	Shaft
G5-11	Pin	G5-23	Bracket
G 5-12	Stud	G5-24	Shaft

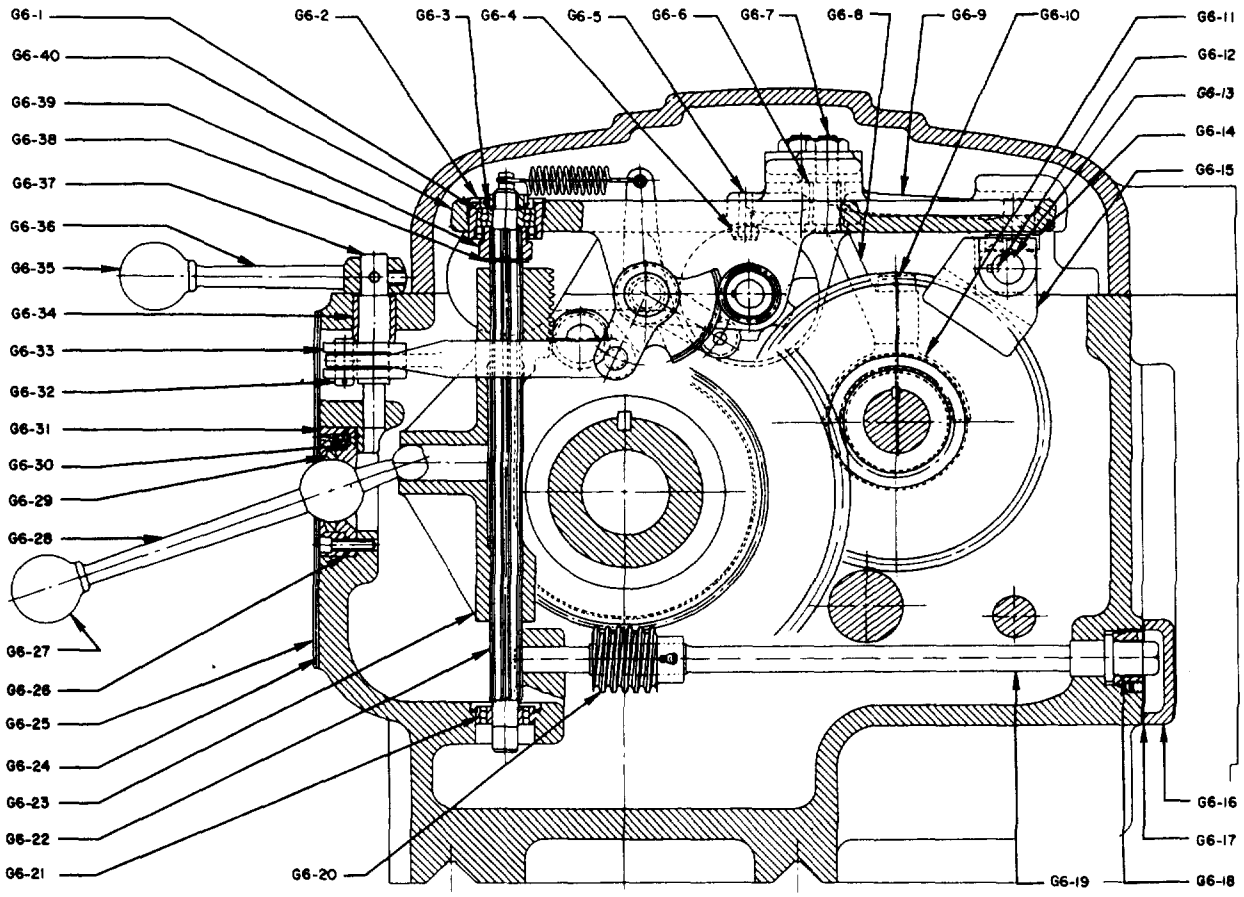


Fig. G6 Headstock Gear Shifting-18-27 Speeds

HEADSTOCK GEAR SHIFTING-18 & 27 SPEEDS

Part No.	Part Name	Part No.	Part Name
G6-1	Bearing	G6-21	Bearing
G6-2	Sleeve	G6-22	Shaft
G6-3	Washer	G6-23	Rack
G6-4	Roller	G6-24	Gasket
G6-5	Pin	G6-25	Plate
G6-6	Bracket	G6-26	Spacer
G6-7	Stud	G6-27	Knob
G6-8	Lever	G6- 28	Lever
G6-9	Lever	G6-29	Ring
G6-10	Collar	G6-30	Seat
G6-11	Fork	G6-31	Seat
G6-12	Key	G6-32	Stud
G06-13	Shaft	G6-33	Crank
G6-14	Shoe	G6-34	Bearing
G6-15	Fork	G6-35	Knob
G6-16	Cover	G6-36	Lever
G8-17	Gasket	G6-37	Shaft
G6-18	Nut	G6-38	Ring
G6-19	Shaft	G6-39	Gear
06-20	Worm	G6-40	Nut

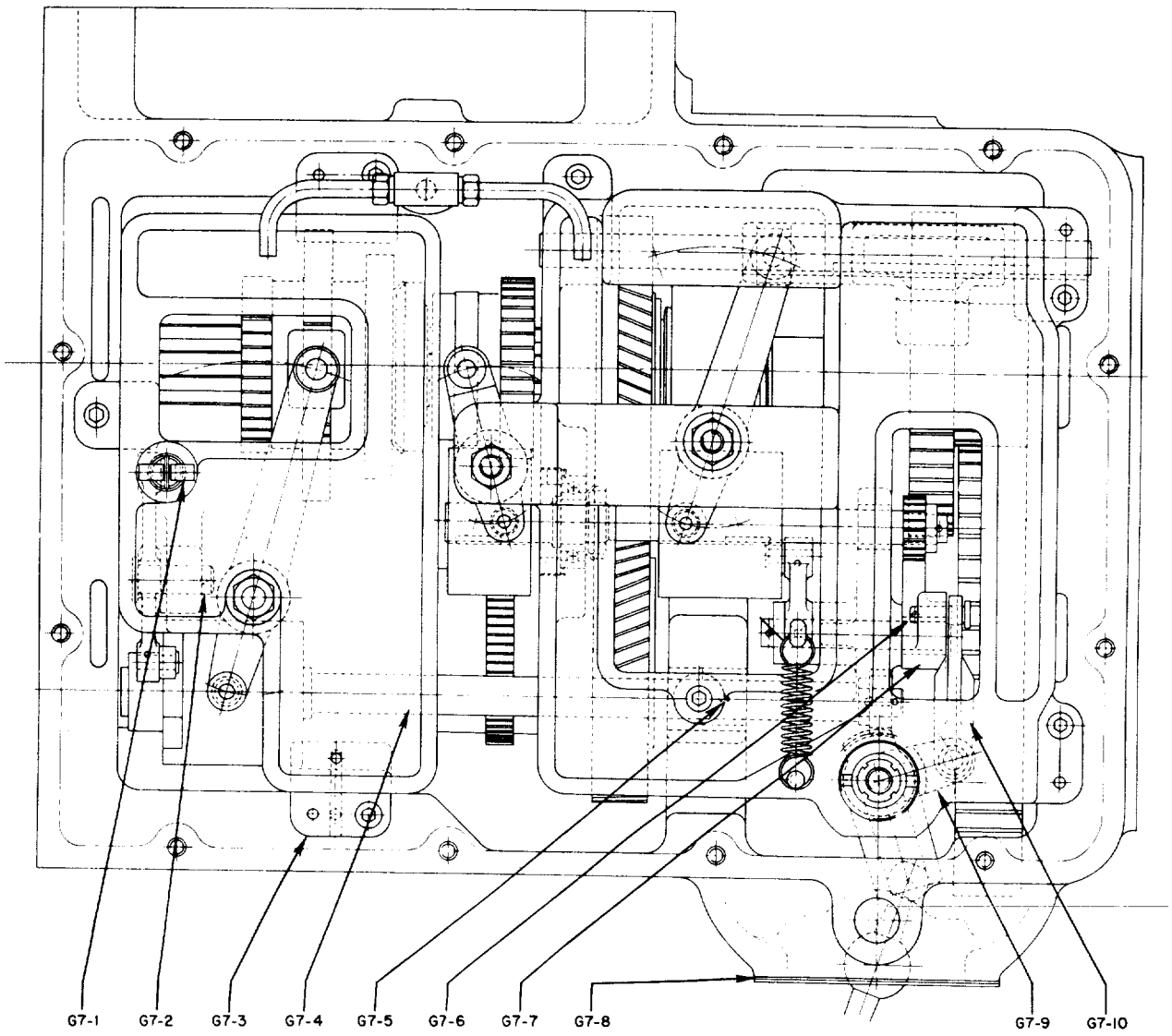


Fig G7 Headstock Gear Shifting-9 Speeds

HEADSTOCK GEAR SHIFTING-9 SPEEDS

Part No.	Part Name	Part No.	Part Name
G7-1	Bar	G7-6	Stud
G7-2	Pin	G7-7	Sector
G7-3	Bracket	G7-8	Plate
G7-4	Shaft	G7-9	Lever
G7-5	Screw	G7-10	Link

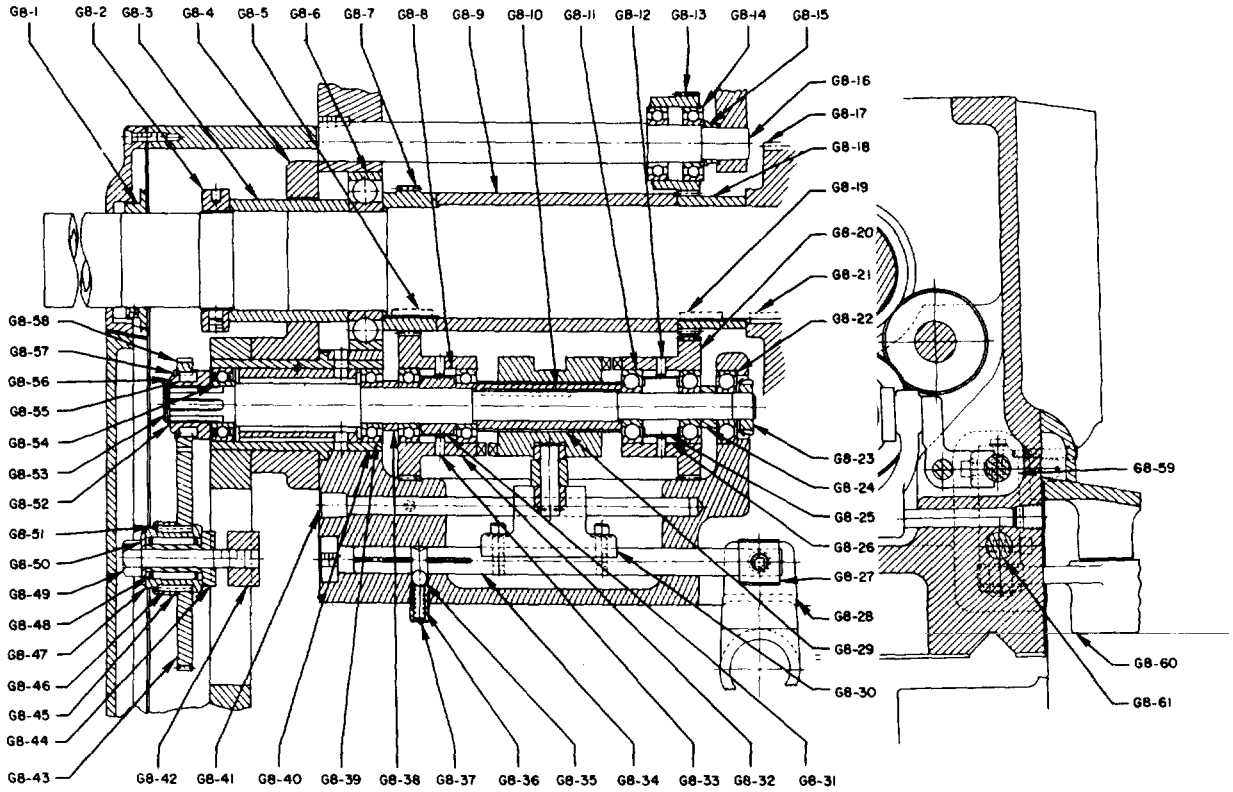


Fig. G8 Headstock with Leadscrew Reverse

HEADSTOCK W/L.S.R.

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G8-1	Sling		G8-22	Bearing	G8-43 Gear
GB-2	Nut		G8-23	Nut	G8-44 Post
G8-3	Spacer		G8-24	Spacer	G8-45 Spacer
G8-4	Plate		G8-25	Spacer	G8-46 Key
G8-5	Key		G8-26	Spacer	G8-47 Hub
G8-6	Bearing		G8-27	Shoe	G8-48 Bearing
G8-7	Gear		G8-28	Lever	G8-49 Screw
G8-8	Spacer		G8-29	Sleeve	G8-50 Washer
G8-9	Spacer		G8-30	Bracket	G8-51 Ring
G8-10	Key		G8-31	Spacer	G8-52 Ring
G8-11	Bearing		G8-32	Gear	GB-53 Shaft
G8-12	Pin		G8-33	Pin	G8-54 Bearing
G8-13	Gear		G8-34	Rod	G8-55 Key
G8-14	Bearing		G8-35	Ball	G8-56 Hub
G8-15	Spacer		G8-36	Spring	G8-57 Ring
G8-16	Shaft		G8-37	Cap	G8-58 Gear
G8-17	Gear		G8-38	Spacer	G8-59 Block
G8-18	Gear		G8-39	Bearing	G8-60 Lever
G8-19	Key		G8-40	Sleeve	G8-61 Rod
G8-20	Gear		G8-41	Plug	
G8-21	Key		G8-42	Nut	

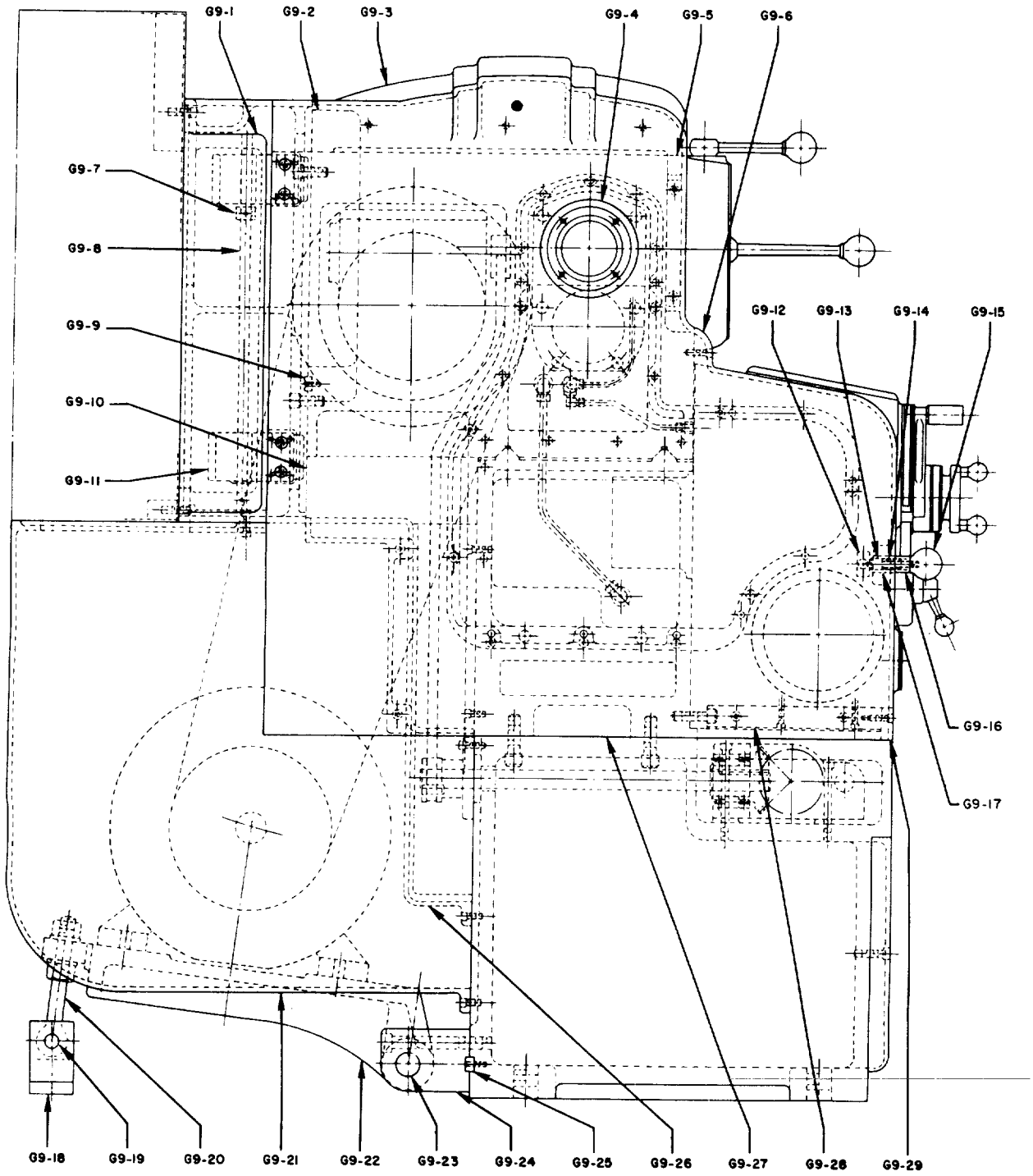


Fig. G9 Head End Covers

LATHE

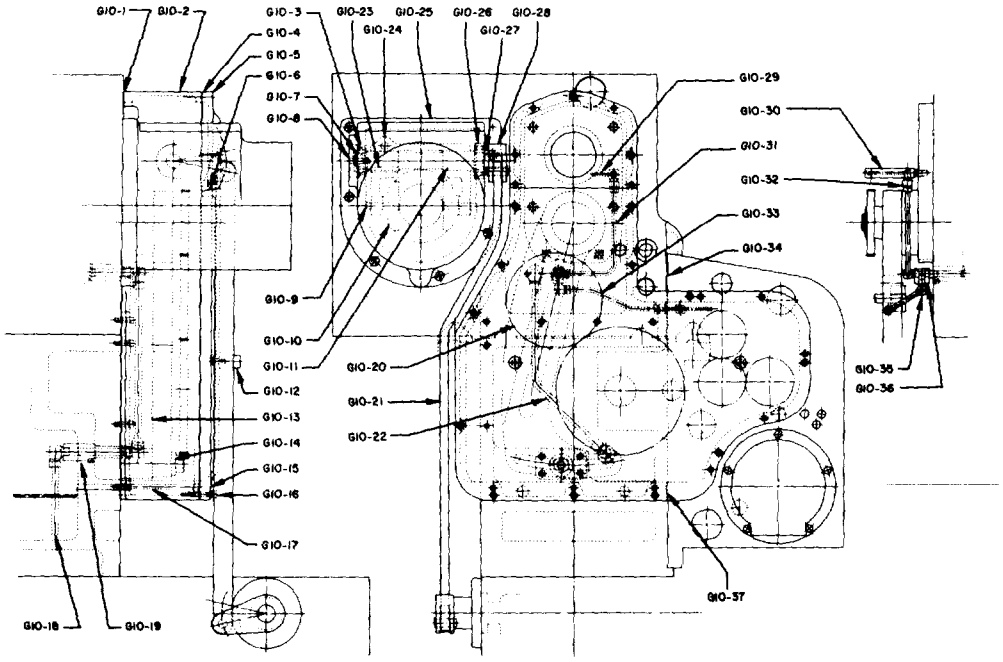


Fig. G10 Change Gear Covers

HEAD END AND CHANGE GEAR COVERS

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G9-1	Adapter	G10-1	Gasket	G10-20	Gear-90T
G9-2	Cover	G10-2	Frame	G10-21	Rod
G9-3	Frame	G10-3	Bearing	G10-22	Tube
G9-4	Plate				
G9-5	Frame	G10-4	Gasket	G10-23	Key
G9-6	Cover	G10-5	Cover	G10-24	Fork
G9-7	Collar	G10-6	Gasket	G10-25	Cover
G9-8	Pin	G10-7	Ring	G10-26	Bearing
G9-9	Key	G10-8	Plug	G10-27	Spacer
G9-10	Cover	G10-9	Pin	G10-28	Crank
G9-11	Hinge	G10-10	Shoe	G10-29	Tube
G9-12	Latch	G10-11	Shaft	G10-30	Block
G9-13	Plunger				
G9-14	Spring	G10-12	Handle	G10-31	Tube
G9-15	Knob	G10-13	Bracket	G10-32	Fitting
G9-16	Bushing	G10-14	Washer	G10-33	Tube
G9-17	Bushing	G10-15	Cover	G10-34	Gasket
G9-18	Support	G10-16	Stud	G10-35	Fitting
G9-19	Pin	G10-17	Plug	G10-36	Block
G9-20	Eyebolt	G10-18	Screw	G10-37	Gasket
G9-21	Guard				
G9-22	Plate	G10-19	Tube		
G9-23	Pin				
G9-24	Hinge				
G9-25	Key				
G9-26	Frame				
G9-27	Cover				
G9-28	Plate				
G9-29	Plate				

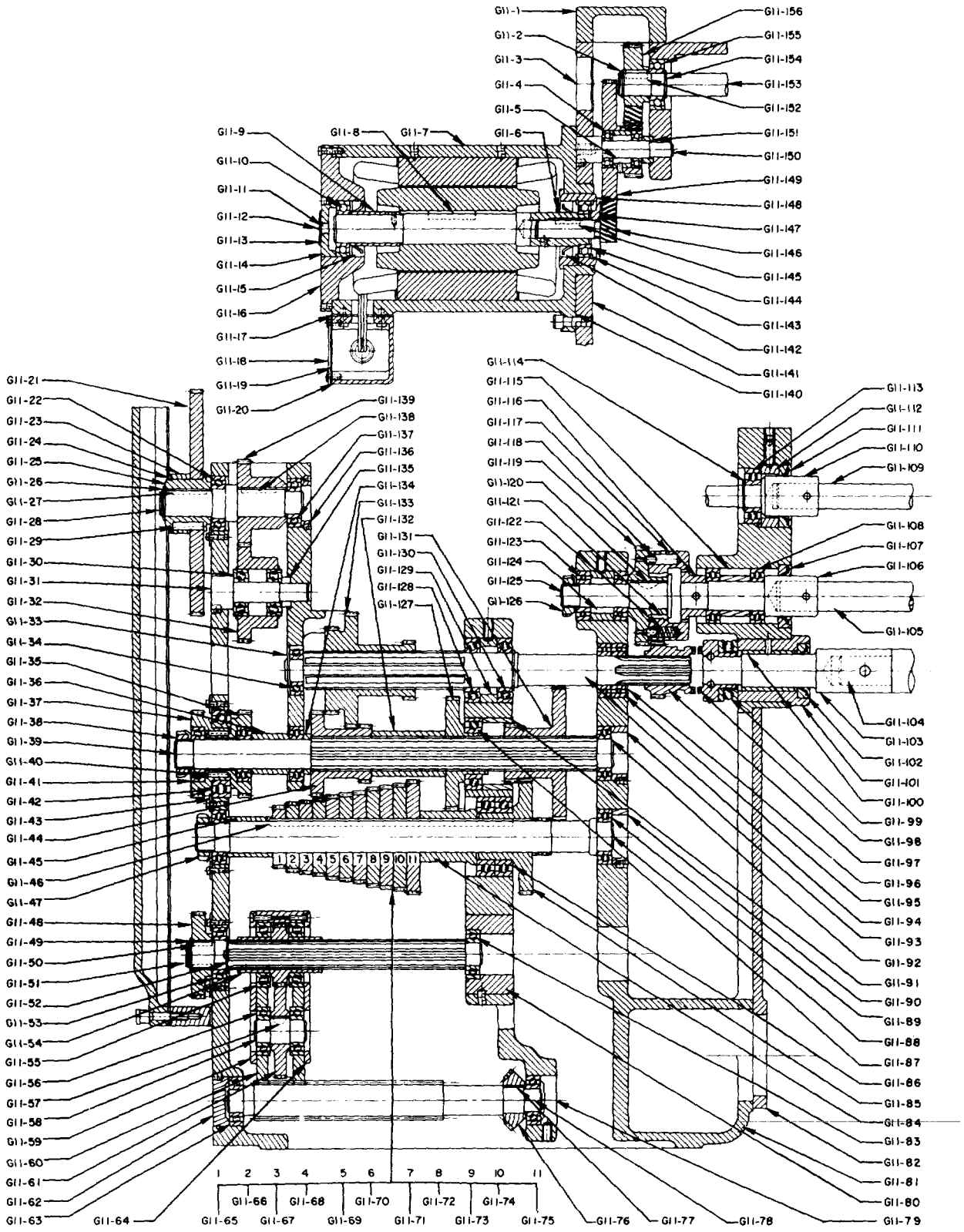


Fig. G11 Feed Box Gearing – English

LATHE
FEED BOX GEARING-ENGLISH

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G11-1	Cover	G11-53	Bearing	G11-105	Rod
G11-2	Ring	G11-54	Pinion-32T	G11-106	Shaft
G11-3	Plug	G11-55	Bearing	G11-107	Seal
G11-4	Bearing	G11-56	Bearing	G11-108	Bearing
G11-5	Spacer	G11-57	Key	G11-109	Shaft
G11-6	Shaft	G11-58	Stud	G11-110	Shaft
G11-7	Frame	G11-59	Plate	G11-111	Seal
G11-8	Key	G11-60	Tumbler	G11-112	Spacer
G11-9	Spacer	G11-61	Gear-50T	G11-113	Bearing
G11-10	Bearing	G11-62	Plug	G11-114	Ring
G11-11	Plug	G11-63	Bearing	G11-115	Spacer
G11-12	Pin	G11-64	Plate	G11-116	Clutch
G11-13	Plate	G11-65	Gear-32T	G11-117	Clutch
G11-14	Plug	G11-66	Gear-36T	G11-118	Ball
G11-15	Seal	G11-67	Gear-38T	G11-119	Gear-45T
G11-16	Plate	G11-68	Gear-40T	G11-120	Key
G11-17	Gasket	G11-69	Gear-44T	G11-121	Bushing
G11-18	Cover	G11-70	Gear-46T	G11-122	Spring
G11-19	Gasket	G11-71	Gear-48T	G11-123	Bearing
G11-20	Box	G11-72	Gear-52T	G11-124	Spacer
G11-21	Gear-120T	G11-73	Gear-54T	G11-125	Shaft
G11-22	Bearing	G11-74	Gear-56T	G11-126	Nut & Lockwasher
G11-23	Spacer	G11-75	Gear-60T	G11-127	Gear-60T
G11-24	Ring	G11-76	Gear-32T	G11-128	Bearing
G11-25	Hub	G11-77	Key	G11-129	Spacer
G11-26	Ring	G11-78	Shaft	G11-130	Bearing
G11-27	Key	G11-79	Plug	G11-131	Gear-30T
G11-28	Shaft	G11-80	Adapter	G11-132	Spacer
G11-29	Key	G11-81	Feed Box	G11-133	Gear-45T -60T -30T
G11-30	Bearing	G11-82	Cover	G11-134	Spacer
G11-31	Shaft	G11-83	Bearing	G111-135	Collar
G11-32	Gear-52T	G11-84	Spacer	G11-136	Spacer
G11-33	Ring	G11-85	Gear-60T	G11-137	Bearing
G11-34	Bearing	G11-86	Bearing	G1I-138	Key
G11-35	Gear-45T	G11-87	Bearing	G11-139	Gear-45T
G11-36	Spacer	G11-88	Shaft	G11-140	Gasket
G11-37	Gear-45T	G11-89	Bearing	G11l-141	Feed Box
G11-38	Nut & Lockwasher	G11-90	Spacer	G11-142	Seal
G11-39	Shaft	G11-91	Retainer	G11-143	Ring
G11-40	Key	G11-92	Bearing	G11-144	Bearing
G11-41	Bearing	G11-93	Spacer	G11-145	Key
G11-42	Bearing	G11-94	Shaft	G11-146	Pinion
G11-43	Washer	G11-95	Bearing	G11-147	Sling
G11-44	Gear-45T -30T	G11-96	Ring	G11-148	Retainer
G11-45	Spacer	G11-97	Gear	G11-149	Gear
G11-46	Key	G11-98	Clutch	G11-150	Shaft
G11-47	Nut & Lockwasher	G11-99	Bearing	G11-151	Spacer
G11-48	Gear-45T	G11-100	Bearing	G11-152	Key
G11-49	Ring	G11-101	Bushing	G11-153	Shaft
G11-50	Key	G11-102	Seal	G11-154	Ring
G11-51	Shaft	G11-103	Shaft	G11-155	Bearing
G11-52	Ring	G11-104	Screw	G11-156	Gear

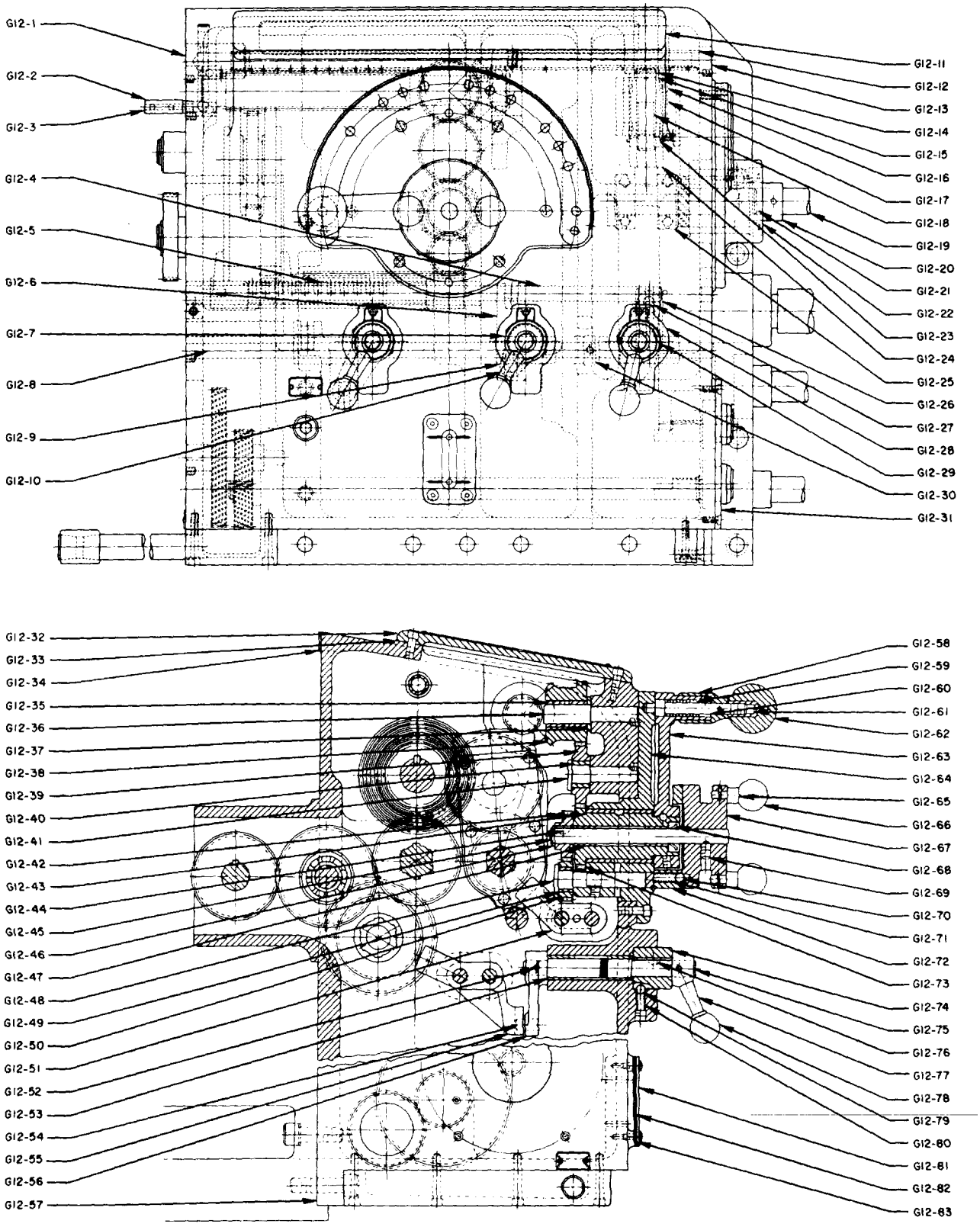


Fig. G12 Feed Box gear Shifting – English

LATHE
FEED BOX GEAR SHIFTING-ENGLISH

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G12-1	Plug	G12-29	Detent	G12-57	Cover
G12-2	Block	G12-30	Collar	G12-58	Handle
G12-3	Tube	G12-31	Control Panel	G12-59	Spring
G12-4	Rod	G12-32	Cover	G12-60	Bushing
G12-5	Rod	G12-33	Gasket	G12-61	Pin
G12-6	Fork	G12-34	Gasket	G12-62	Knob
G12-7	Detent	G12-35	Bearing	G12-63	Lever
G12-8	Rod	G12-36	Stud	G12-64	Bracket
G12-9	Crank	G12-37	Washer	G12-65	Stud
G12-10	Pin	G12-38	Gear-32T -32T	G12-66	Knob
G12-11	Stud	G12-39	Gear-32T	G12-67	Dial
G12-12	Pipe	G12-40	Bearing	G12-68	Seal
G12-13	Plug	G12-41	Stud	G12-69	Screw & Lockscrew
G12-14	Ring	G12-42	Gear	G12-70	Ball
G12-15	Washer	G12-43	Bearing	G12-71	Spring
G12-16	Bearing	G12-44	Key	G12-72	Collar
G12-17	Spacer	G12-45	Shaft	G12-73	Gear
G12-18	Fork	G12-48	Stud	G12-74	Detent
G12-19	Shaft	G12-47	Bearing	G12-75	Shaft
G12-20	Screw	G12-48	Stud	G12-76	Key
G12-21	Stud	G12-49	Bearing	G12-77	Lever
G12-22	Seal	G12-50	Pinion	G12-78	Knob
G12-23	Lockwasher	G12-51	Fork	G12-79	Ball
G12-24	Lever	G12-52	Pin	G12-80	Spring
G12-25	Bearing	G12-53	Bearing	G12-81	Plate
G12-26	Fork	G12-54	Pin	G12-82	Glass
G12-27	Pin	G12-55	Fork	G12-83	Gasket
G12-28	Crank	G12-56	Crank		

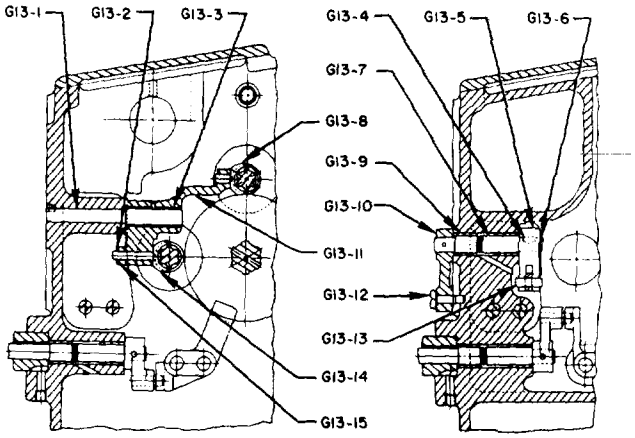


Fig. G13 Feed Box Gear Shifting -- Metric

FEED BOX GEAR SHIFTING-METRIC

Part No.	Part Name
G13-1	Stud
G13-2	Washer
G13-3	Bushing
G13-4	Key
G13-5	Lever
G13-6	Ring
G13-7	Shaft
G13-8	Fork
G13-9	Bushing
G13-10	Lever
G13-11	Lever
G13-12	Screw
G13-13	Pin
G13-14	Fork
G13-15	Link

PARTS LIST

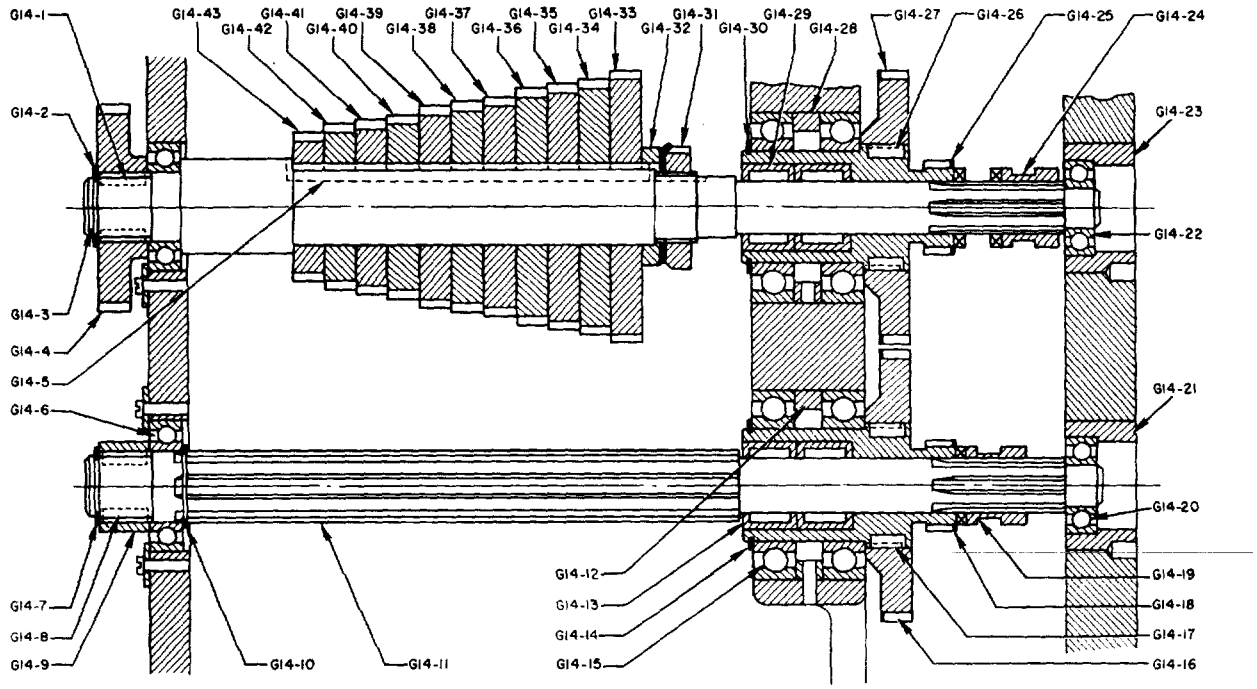


Fig. G14 Feed Box Gearing--Metric

FEED BOX GEARING-METRIC

Part No.	Part Name	Part No.	Part Name
G14-1	Key	G14-23	Retainer
G14-2	Ring	G14-24	Clutch
G14-3	Shaft	G14-25	Hub
G14-4	Gear-45T	G14-26	Key
G14-5	Key	G14-27	Gear-60T
G14-6	Bearing	G14-28	Spacer
G14-7	Ring	G14-29	Bearing
G14-8	Key	G14-30	Ring
G14-9	Spacer	G14-31	Nut & Lockwasher
G14-10	Ring	G14-32	Spacer
G14-11	Shaft	G14-33	Gear-60T
G14-12	Spacer	G14-34	Gear-56T
G14-13	Bearing	G14-35	Gear-54T
G14-14	Ring	G14-36	Gear-52T
G14-15	Bearing	G14-37	Gear-48T
G14-16	Gear-60T	G14-38	Gear-46T
G14-17	Key	G14-39	Gear-44T
G14-18	Hub	G14-40	Gear-40T
G14-19	Clutch	G14-41	Gear-38T
G14-20	Bearing	G14-42	Gear-36T
G14-21	Retainer	G14-43	Gear-32T
G14-22	Bearing		

LATHE

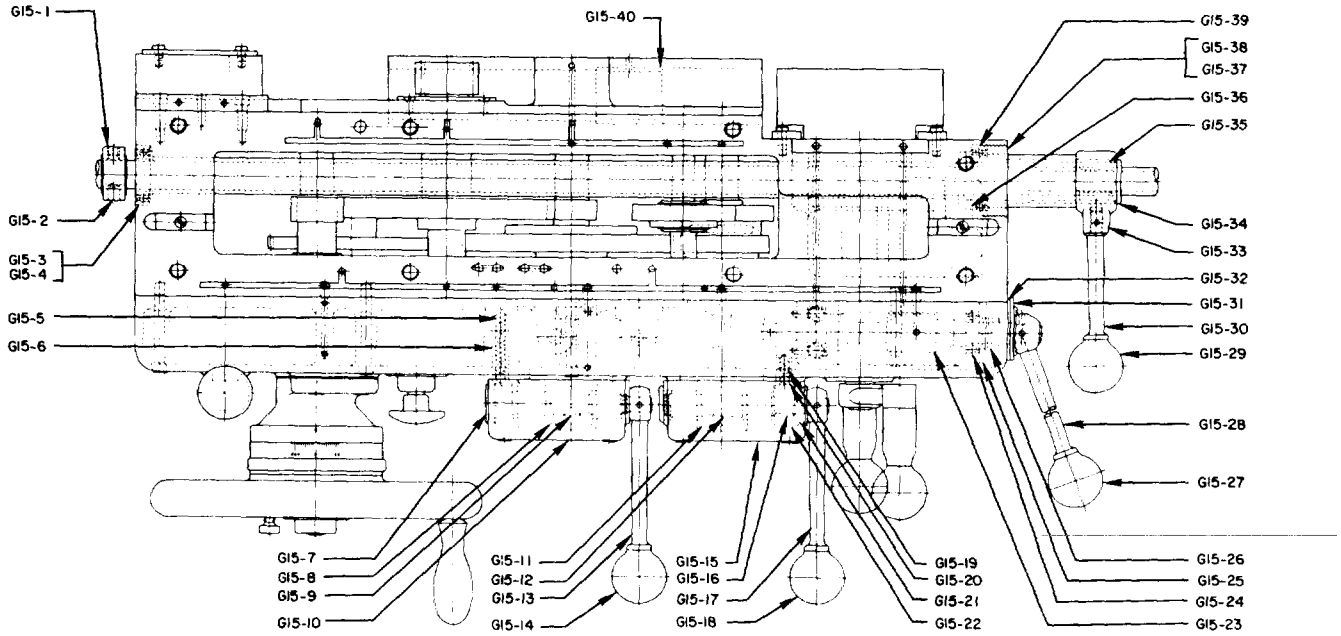


Fig. G15 Apron—Top View

APRON

Part No.	Part Name	Part No.	Part Name
G15-1	Collar*	G15-21	Collar
G15-2	Key*	G15-22	Detent
G15-3	Bearing*	G15-23	Shaft
G15-4	Plug#	G15-24	Bearing
G15-5	Ball	G15-25	Plate
G15-6	Guide	G15-26	Collar
G15-7	Shaft	G15-27	Knob
G15-8	Cam	G15-28	Lever
G15-9	Key	G15-29	Knob*
G15-10	Housing	G15-30	Lever*
G15-11	Cam	G15-31	Plate
G15-12	Key	G15-32	Seal
G15-13	Lever	G15-33	Hub*
G15-14	Knob	G15-34	Sleeve*
G15-15	Housing	G15-35	Key*
G15-16	Key	G15-36	Ring
G15-17	Lever	G15-37	Plug#
G15-18	Knob	G15-38	Nut*
G15-19	Ball	G15-39	Bearing
G15-20	Guide	G15-40	Bushing*

*With Leadscrew Reverse Only
#Without Leadscrew Reverse Only

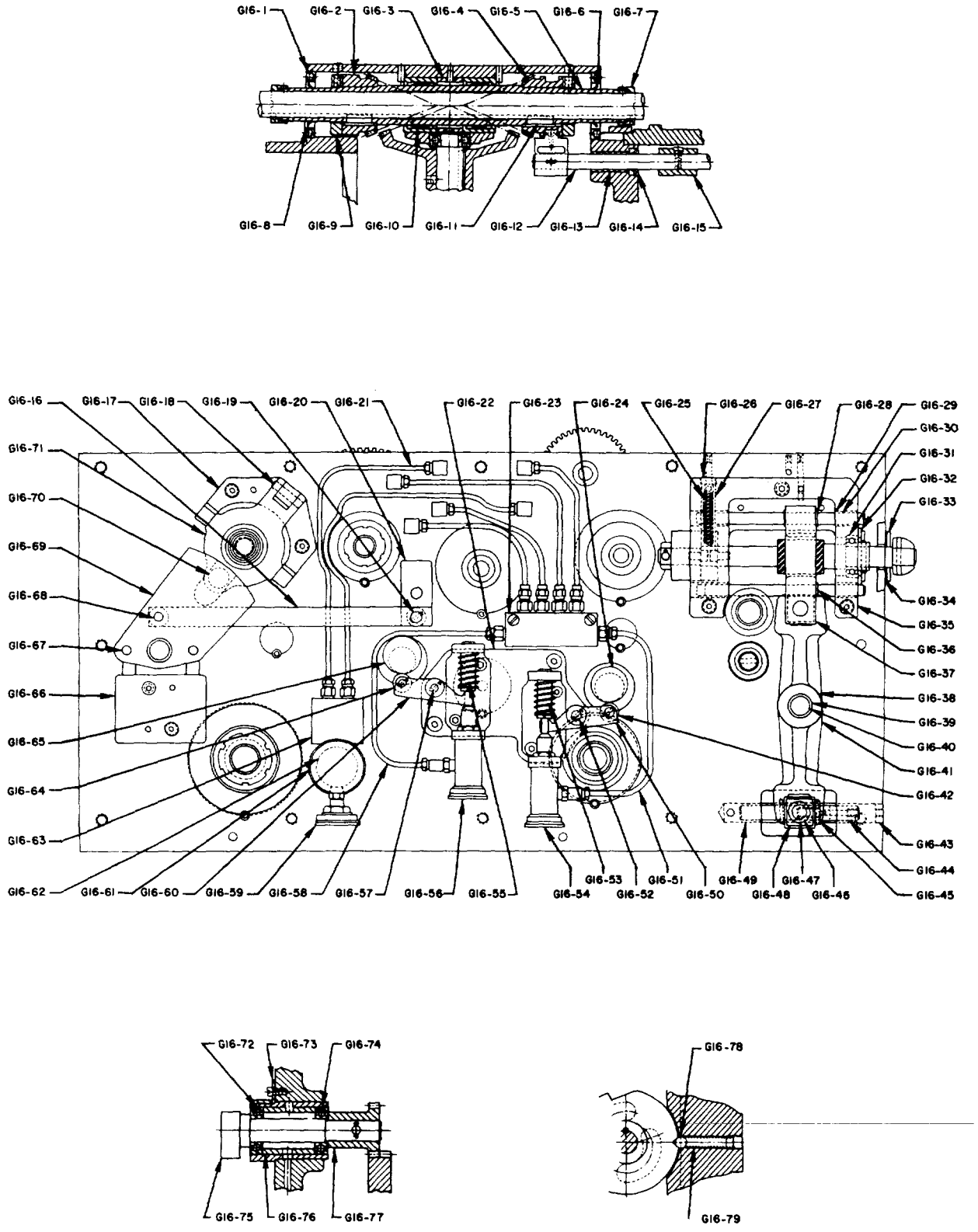


Fig. G16 Apron – Front, Sectional and Plan Views

LATHE

APRON

Part No.	Part Name	Part No.	Part Name
G16-1	Adapter	G16-41	Lever
G16-2	Pinion	G16-42	Bushing
G16-3	Spacer	G16-43	Plug
G16-4	Pinion	G16-44	Rod
G16-5	Sleeve	G16-45	Washer
G16-6	Seal	G16-46	Ring
G16-7	Collar	G16-47	Screw
G16-8	Seal	G16-48	Shoe
G16-9	Nut	G16-49	Bushing
G16-10	Bearing	G16-50	Arm
G16-11	Key	G16-51	Tube
G16-12	Rod	G16-52	Stud
G16-13	Bearing	G16-53	Spring
G16-14	Seal	G16-54	Pump
G16-15	Block	G16-55	Spring
G16-16	Link	G16-56	Pump
G16-17	Bracket	G16-57	Stud
G16-18	Pin	G16-58	Tube
G16-19	Post	G16-59	Valve
G16-20	Lever	G16-60	Arm
G16-21	Tubes	G16-61	Knob
G16-22	Plate	G16-62	Body
G16-23	Manifold	G16-63	Manifold
G16-24	Cam	G16-64	Bushing
G16-25	Spring	G16-65	Cam
G16-26	Screw	G16-66	Block
G16-27	Plunger	G16-67	Pin
G16-28	Ring	G16-68	Post
G16-29	Bushing	G16-69	Cam
G16-30	Rod	G16-70	Ball
G16-31	Bearing	G16-71	Lever
G16-32	Screw	G16-72	Bearing
G16-33	Plate	G16-73	Washer
G16-34	Gasket	G16-74	Bearing
G16-35	Bracket	G16-75	Shaft
G16-36	Ring	G16-76	Spacer
G16-37	Nut	G16-77	Gear
G16-38	Washer	G16-78	Ball
G16-39	Ring	G16-79	Spring
G16-40	Pin		

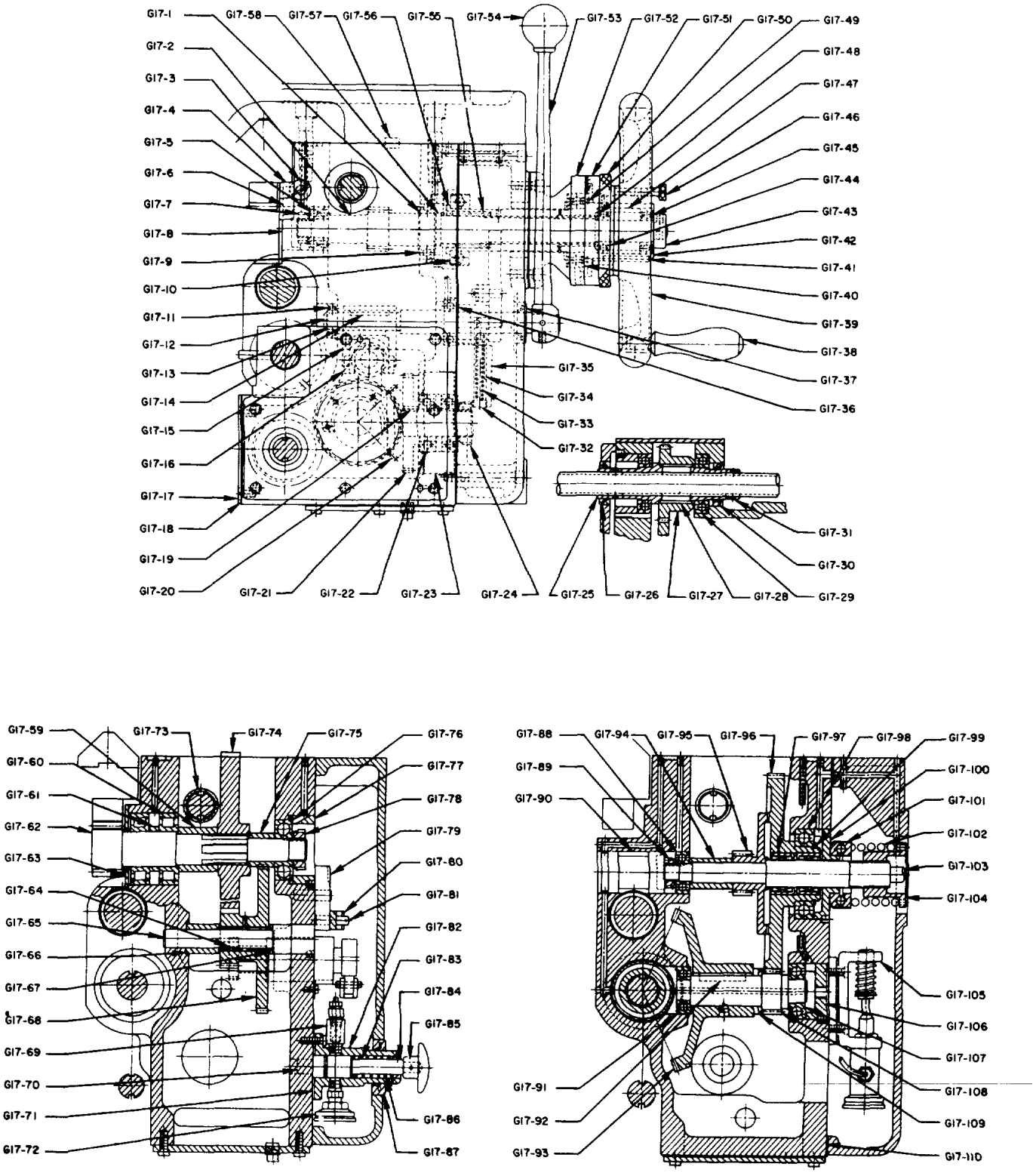


Fig. G17 Apron-End and Sectional Views

LATHE

APRON

Part No.	Part Name	Part No.	Part Name
G17-1	Ring	G17-56	Clutch
G17-2	Shaft	G17-57	Key
G17-3	Screw	G17-58	Shim
G17-4	Gib	G17-59	Spacer
G17-5	Bearing	G17-60	Bearing
G17-6	Block	G17-61	Spacer
G17-7	Locknut	G17-62	Pinion
G17-8	Plug	G17-63	Cover
G17-9	Bearing	G17-64	Bearing
G17-10	Bearing	G17-65	Shaft
G17-11	Bearing	G17-66	Spacer
G17-12	Shaft	G17-67	Washer
G17-13	Ring	G17-68	Gear
G17-14	Key	G17-69	Valve
G17-15	Fork	G17-70	Plug
G17-16	Shoe	G17-71	Gasket
G17-17	Cover	G17-72	Strainer & Intake Valve
G17-18	Gasket	G17-73	Cover
G17-19	Key	G17-74	Gear
G17-20	Gear	G17-75	Spacer
G17-21	Gear	G17-76	Bearing
G17-22	Bearing	G17-77	Retainer
G17-23	Retainer	G17-78	Nut & Washer
G17-24	Locknut	G17-79	Lever
G17-25	Sleeve	G17-80	Washer
G17-26	Seal	G17-81	Post
G17-27	Gear	G17-82	Pump Body
G17-28	Key	G17-83	Plunger
G17-29	Bearing	G17-84	Bushing
G17-30	Seal	G17-85	Knob
G17-31	Sleeve	G17-86	Spring
G17-32	Screw	G17-87	Seal
G17-33	Spring	G17-88	Bearing
G17-34	Plunger	G17-89	Nut & Washer
G17-35	Block	G17-90	Plug
G17-36	Bearing	G17-91	Bearing
G17-37	Seal	G17-92	Key
G17-38	Handle	G17-93	Gear
G17-39	Handwheel	G17-94	Spacer
G17-40	Bearing	G17-95	Pinion
G17-41	Key	G17-96	Gear
G17-42	Clutch	G17-97	Bearing
G17-43	Nut	G17-98	Bearing
G17-44	Bearing	G17-99	Ring
G17-45	Bearing	G17-100	Adapter
G17-46	Screw	G17-101	Bearing
G17-47	Spacer	G17-102	Spring
G17-48	Washer	G17-103	Shaft
G17-49	Ring	G17-104	Nut
G17-50	Dial	G17-105	Pump
G17-51	Bracket	G17-106	Plug
G17-52	Shim	G17-107	Bearing
G17-53	Lever	G17-108	Shaft
G17-54	Knob	G17-109	Collar
G17-55	Spring	G17-110	Gasket

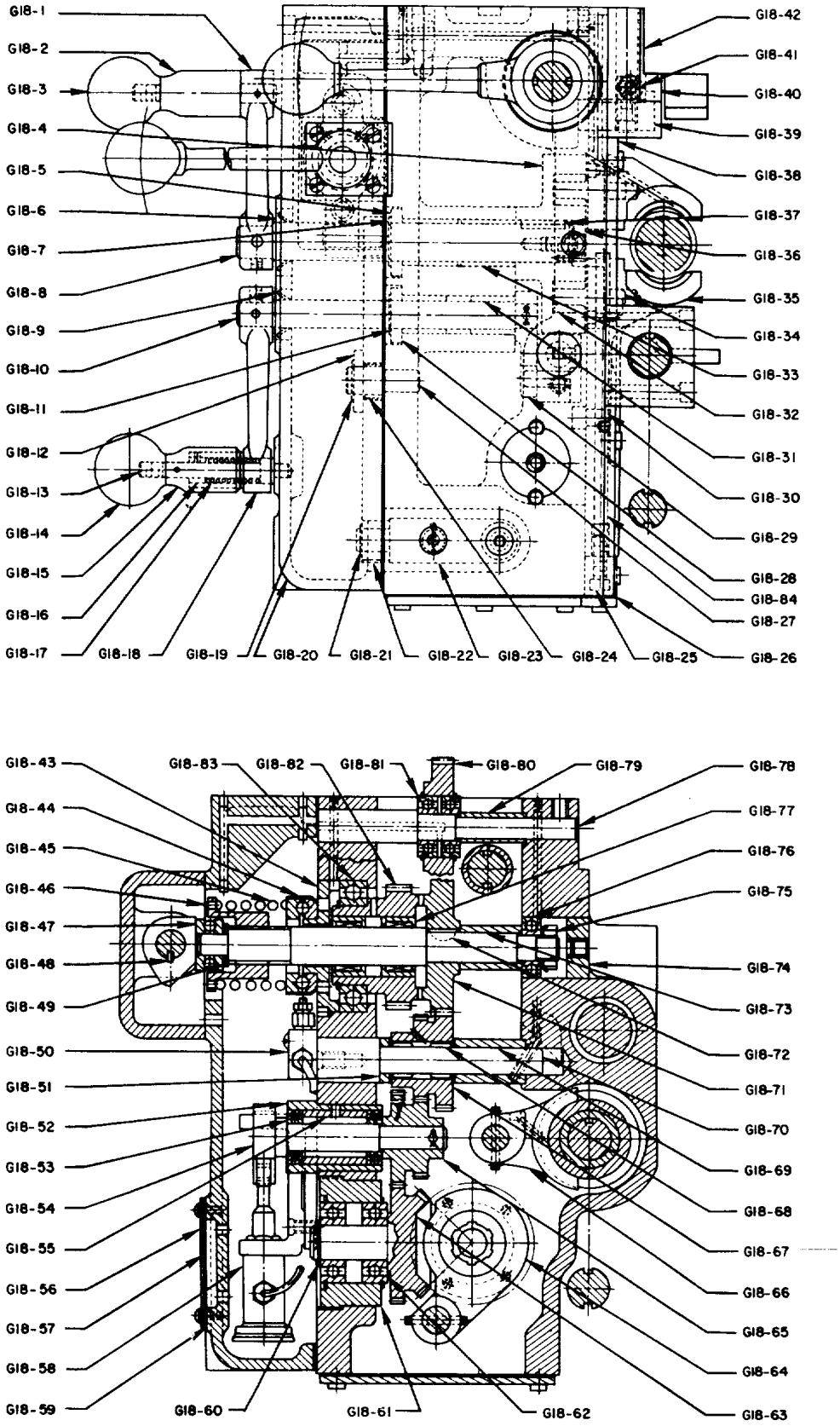


Fig. G18 Apron-End and Sectional Views

LATHE

APRON

Part No.	Part Name	Part No.	Part Name
G18-1	Lever	G18-43	Adapter
G18-2	Handle	G18-44	Bearing
G18-3	Knob	G18-45	Spring
G18-4	Cam	G18-46	Nut
G18-5	Washer	G18-47	Bearing
G18-6	Seal	G18-48	Key
G18-7	Ring	G18-49	Collar
G18-8	Shaft	G18-50	Manifold
G18-9	Seal	G18-51	Washer
G18-10	Shaft	G18-52	Sleeve
G18-11	Ring	G18-53	Bearing
G18-12	Washer	G18-54	Shaft
G18-13	Pin	G18-55	Spacer
G18-14	Knob	G18-56	Plate
G18-15	Handle	G18-57	Glass
G18-16	Bushing	G18-58	Pump
G18-17	Spring	G18-59	Gasket
G18-18	Lever	G18-60	Ring
G18-19	Ring	G18-61	Retainer
G18-20	Cover	G18-62	Bearing
G18-21	Ring	G18-63	Gear
G18-22	Shoe	G18-64	Fork
G18-23	Block	G18-65	Gear
G18-24	Bearing	G18-66	Fork
G18-25	Screw	G18-67	Gear
G18-26	Gasket	G18-68	Bearing
G18-27	Pin	G18-69	Spacer
G18-28	Washer	G18-70	Shaft
G18-29	Lever	G18-71	Gear
G18-30	Pin	G18-72	Key
G18-31	Bearing	G18-73	Spacer
G18-32	Roller	G18-74	Plug
G18-33	Bearing	G18-75	Nut & Washer
G18-34	Stud	G18-76	Bearing
G18-35	Nut	G18-77	Bearing
G18-36	Washer	G18-78	Stud
G18-37	Key	G18-79	Spacer
G18-38	Clamp	G18-80	Gear
G18-39	Clamp	G18-81	Bearing
G18-40	Gib	G18-82	Gear
G18-41	Screw	G18-83	Bearing
G18-42	Block		

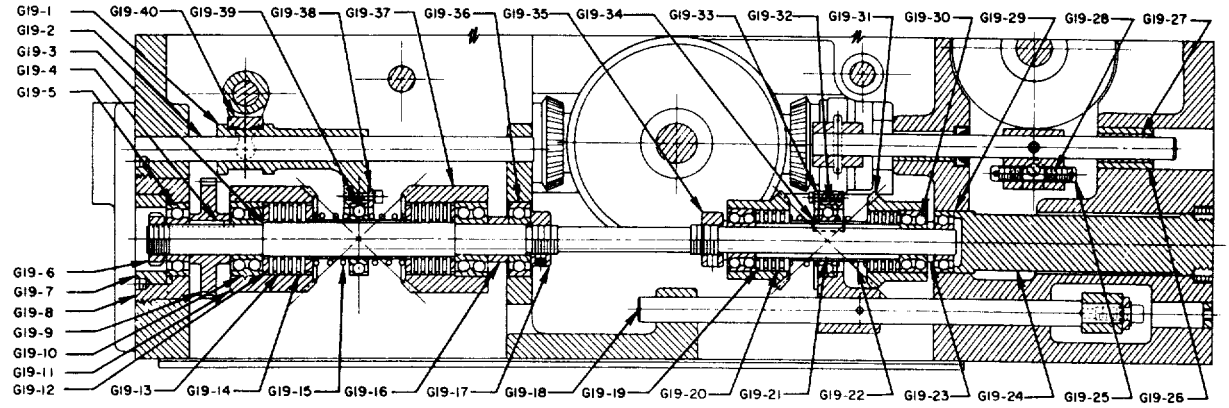


Fig. G19 Apron with Longitudinal and Cross Traverse

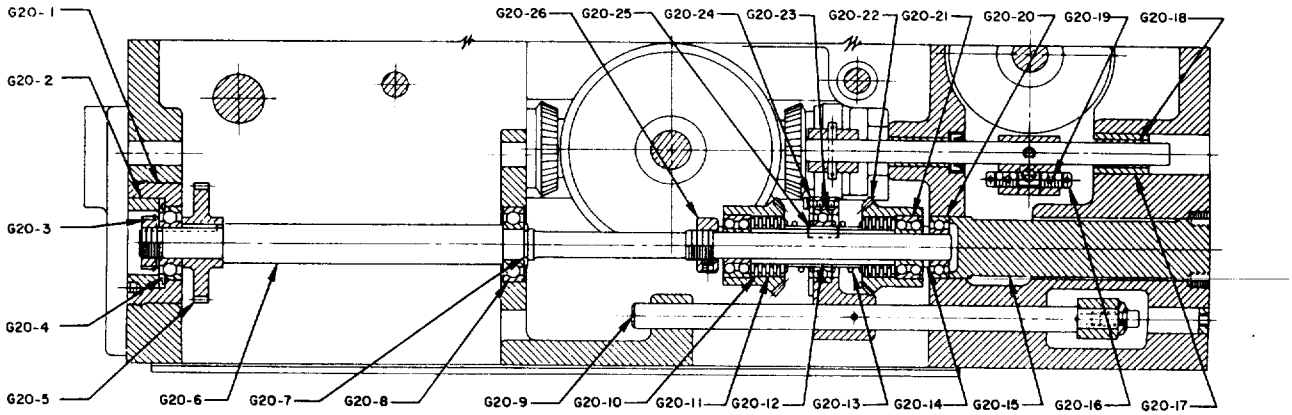


Fig. G20 Apron with Cross Traverse Only

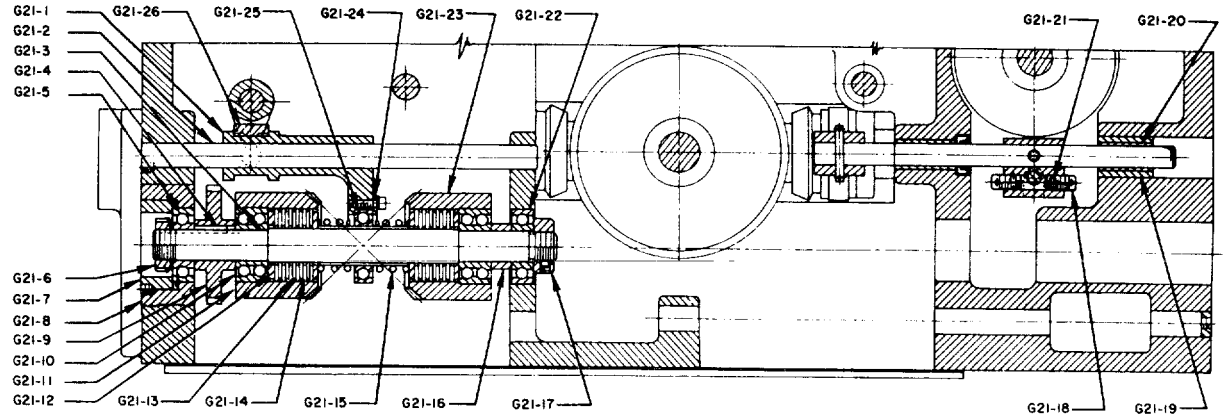


Fig. G21 Apron with Longitudinal Traverse Only

LATHE
APRON W/LONG. AND CROSS TRAVERSE

Part No.	Part Name	Part No.	Part Name
G19-1	Fork	G19-21	Sleeve
G19-2	Rod	G19-22	Spring
G19-3	Shaft	G19-23	Spacer
G19-4	Key	G19-24	Rod
G19-5	Bearing	G19-25	Stop Screw
G19-6	Nut	G19-26	Bushing
G19-7	Retainer	G19-27	Bearing
G19-8	Retainer	G19-28	Plug
G19-9	Gear-32T	G19-29	Bearing
G19-10	Bearing	G19-30	Bearing
G19-11	Gear	G19-31	Gear
G19-12	Plate	G19-32	Bearing
G19-13	Plates	G19-33	Plate
G19-14	Plates	G19-34	Key
G19-15	Spring	G19-35	Nut
G19-16	Spacer	G19-36	Bearing
G19-17	Nut	G19-37	Gear
G19-18	Rod	G19-38	Plate
G19-19	Plates	G19-39	Bearing
G19-20	Plates	G19-40	Shoe

APRON W/CROSS TRAVERSE ONLY

Part No.	Part Name	Part No.	Part Name
G20-1	Retainer	G20-14	Spacer
G20-2	Retainer	G20-15	Rod
G20-3	Nut	G20-16	Stop Screw
G20-4	Bearing	G20-17	Bushing
G20-5	Gear	G20-18	Bearing
G20-6	Shaft	G20-19	Plug
G20-7	Ring	G20-20	Bearing
G20-8	Bearing	G20-21	Bearing
G20-9	Rod	G20-22	Gear
G20-10	Plates	G20-23	Bearing
G20-11	Plates	G20-24	Plate
G20-12	Sleeve	G20-25	Key
G20-13	Spring	G20-26	Nut

APRON W/LONG TRAVERSE ONLY

Part No.	Part Name	Part No.	Part Name
G21-1	Fork	G21-14	Plates
G21-2	Rod	G21-15	Spring
G21-3	Shaft	G21-16	Spacer
G21-4	Key	G21-17	Nut
G21-5	Bearing	G21-18	Stop Screw
G21-6	Nut	G21-19	Bushing
G21-7	Retainer	G21-20	Bearing
G21-8	Retainer	G21-21	Plug
G21-9	Gear	G21-22	Bearing
G21-10	Bearing	G21-23	Gear
G21-11	Gear	G21-24	Plate
G21-12	Plate	G21-25	Bearing
G21-13	Plates	G21-26	Shoe

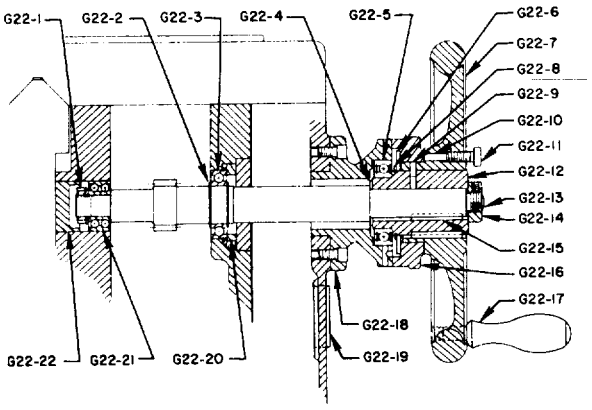


Fig. G22 Apron – First Pinion Assembly without Power Rapid Traverse

APRON - 1st PINION ASSEMBLY - WITHOUT P.R.T.

Part No.	Part Name	Part No.	Part Name
G22-1	Nut & Washer	G22-12	Bushing
G22-2	Ring & Shim	G22-13	Shaft
G22-3	Bearing	G22-14	Nut
G22-4	Washer	G22-15	Key
G22-5	Bearing	G22-16	Dial
G22-6	Washer	G22-17	Handle
G22-7	Handwheel	G22-18	Bracket
G22-8	Ring	G22-19	Plug
G22-9	Pin	G22-20	Ring
G22-10	Plug	G22-21	Bearing
G22-11	Screw	G22-22	Plug

PARTS LIST

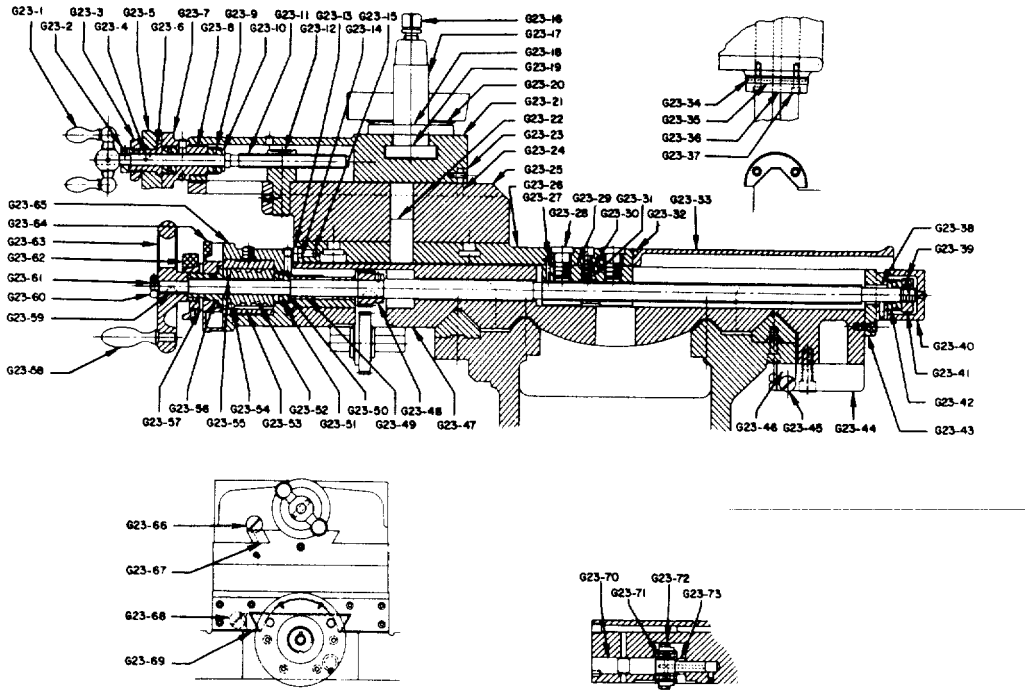


Fig. G23 Compound Rest and Carriage

COMPOUND REST AND CARRIAGE

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G23-1	Crank	G23-26	Slide	G23-51	Bearing
G23-2	Nut	G23-27	Plug	G23-52	Bushing
G23-3	Nut	G23-28	Screw	G23-53	Bushing
G23-4	Key	G23-29	Nut	G23-54	Ball
G23-5	Dial	G23-30	Nut	G23-55	Key
G23-6	Bushing	G23-31	Wedge	G23-56	Bushing
G23-7	Bushing	G23-32	Strip	G23-57	Washer
G23-8	Bushing	G23-33	Guard	G23-58	Handle
G23-9	Bearing	G23-34	Wiper	G23-59	Key
G23-10	Washer	G23-35	Wiper	G23-60	Nut
G23-11	Screw	G23-36	Wiper	G23-61	Screw
G23-12	Nut	G23-37	Screw	G23-62	Nut
G23-13	Plate	G23-38	Bushing	G23-63	Wheel
G23-14	Wiper	G23-39	Shoe	G23-64	Dial
G23-15	Pin	G23-40	Cover	G23-65	Bushing
G23-16	Screw	G23-41	Nut	G23-66	Screw
G23-17	Post	G23-42	Bearing	G23-67	Gib
G23-18	Collar	G23-43	Bracket	G23-68	Screw
G23-19	Collar	G23-44	Bracket	G23-69	Gib
G23-20	Wedge	G23-45	Screw	G23-70	Stud
G23-21	Slide	G23-46	Gib	G23-71	Bearing
G23-22	Plug	G23-47	Carriage	G23-72	Gear-23T
G23-23	Plate	G23-48	Pinion	G23-73	Spacer
G23-24	Wiper	G23-49	Bearing		
G23-25	Swivel	G23-50	Shim		

PARTS LIST

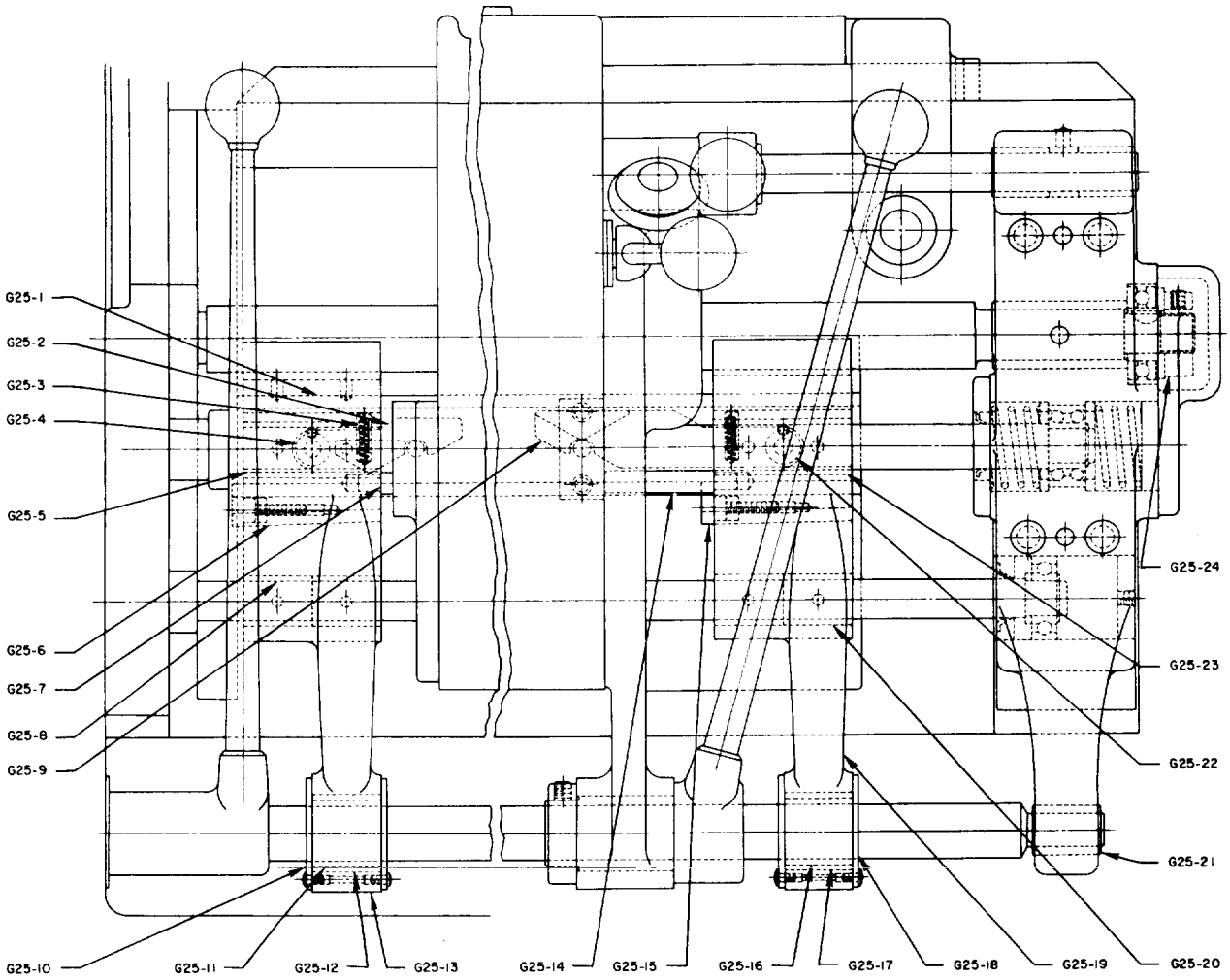


Fig. G25 Leadscrew Supports
LEADSCREW SUPPORTS

Part No.	Part Name	Part No.	Part Name
G25-1	Bushing	G25-13	Support
G25-2	Latch Head End	G25-14	Pin
G25-3	Spring	G25-15	Gib
G25-4	Pin	G25-16	Sleeve
G25-5	Bushing	G25-17	Bushing
G25-6	Gib	G25-18	Plate
G25-7	Pin	G25-19	Support
G25-8	Bushing	G25-20	Bushing
G25-9	Latch Tail End	G25-21	Bushing
G25-10	Plate	G25-22	Pin
G25-11	Sleeve	G25-23	Bushing
G25-12	Bushing	G25-24	Bushing

LATHE

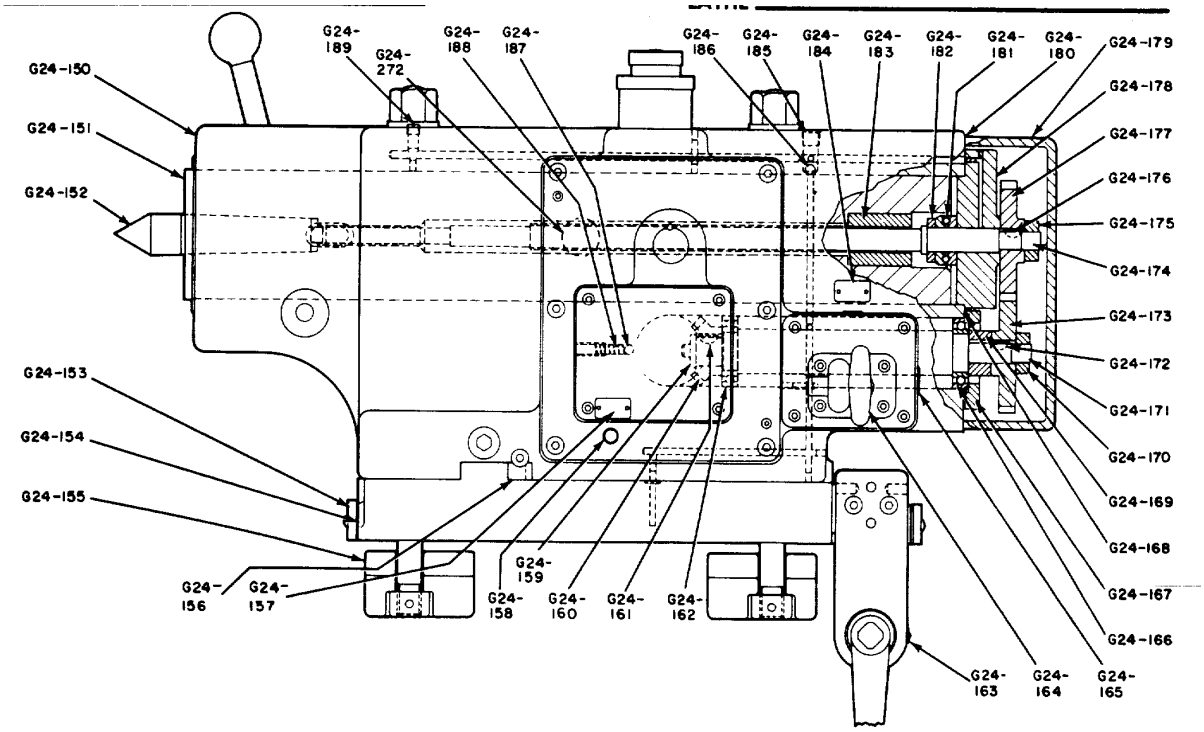


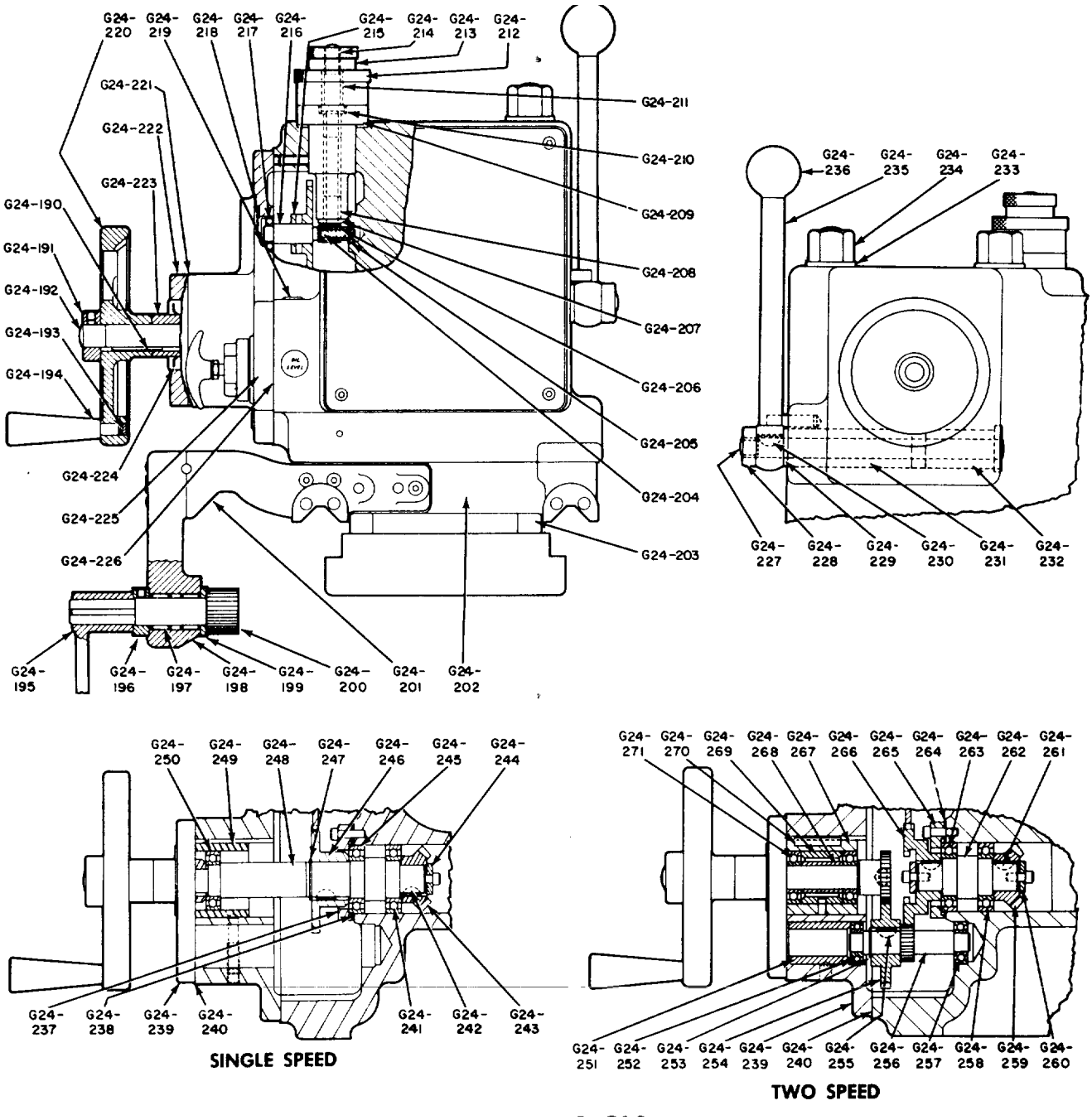
Fig. G24 Tailstock

TAILSTOCK

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G24-150	Tailstock Top	G24-182	Washer	G24-214	Shaft
G24-151	Spindle	G24-183	Spindle Nut	G24-215	Gear
G24-152	Center	G24-184	Plate	G24-216	Shaft
G24-153	Retainer	G24-185	Plug	G24-217	Bearing
G24-154	Wiper	G24-186	Ball	G24-218	Retainer
G24-155	Clamp	G24-187	Ball*	G24-219	Plug
G24-156	Gib	G24-188	Spring*	G24-220	Handwheel
G24-157	Plate	G24-189	Control Unit	G24-221	Gasket
G24-158	Plug	G24-190	Key	G24-222	Retainer
G24-159	Washer	G24-191	Nut	G24-223	Sleeve
G24-160	Gear	G24-192	Shaft*	G24-224	Seal
G24-161	Key	G24-193	Plug	G24-225	Mounting Plate
G24-162	Bearing	G24-194	Handle	G24-226	Gasket
G24-163	Oiler	G24-195	Handle	G24-227	Clamp Screw
G24-164	Pump	G24-196	Collar	G24-228	Nut
G24-165	Window	G24-197	Bearing	G24-229	Washer
G24-166	Bearing	G24-198	Mover Bracket	G24-230	Key
G24-167	Retainer	G24-199	Washer	G24-231	Rear Bushing
G24-168	Shim	G24-200	Mover Pinion	G24-232	Front Bushing
G24-169	Spacer	G24-201	Support	G24-233	Washer
G24-170	Nut	G24-202	Tailstock Base	G24-234	Nut
G24-171	Shaft	G24-203	Stud	G24-235	Lever
G24-172	Key	G24-204	Worm Gear	G24-236	Knob
G24-173	Gear	G24-205	Bearing	G24-237	Retainer
G24-174	Spindle Screw	G24-206	Worm	G24-238	Shim
G24-175	Nut	G24-207	Washer	G24-239	Front Plate
G24-176	Key	G24-208	Bushing	G24-240	Gasket
G24-177	Gear	G24-209	Bushing	G24-241	Bearing
G24-178	Cap	G24-210	Bushing	G24-242	Key
G24-179	Cover	G24-211	Bushing	G24-243	Gear
G24-180	Gasket	G24-212	Dial	G24-244	Washer
G24-181	Bearing	G24-213	Nut	G24-245	Bearing

* Two Speed

LATHE



TAILSTOCK

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G24-246	Gear	G24-255	Key*	G24-264	Shim*
G24-247	Snap Ring	G24-256	Shaft*	G24-265	Retainer*
G24-248	Shaft	G24-257	Bearing*	G24-266	Gear*
G24-249	Sleeve	G24-258	Bearing*	G24-267	Bushing*
G24-250	Bearing	G24-259	Gear*	G24-268	Spacer *
G24-251	Spacer*	G24-260	Washer*	G24-269	Spacer*
G24-252	Bearing*	G24-261	Key*	G24-270	Key*
G24-253	Snap Ring*	G24-262	Shaft*	G24-271	Bearing*
G24-254	Gear*	G24-263	Bearing*		

* Two Speed

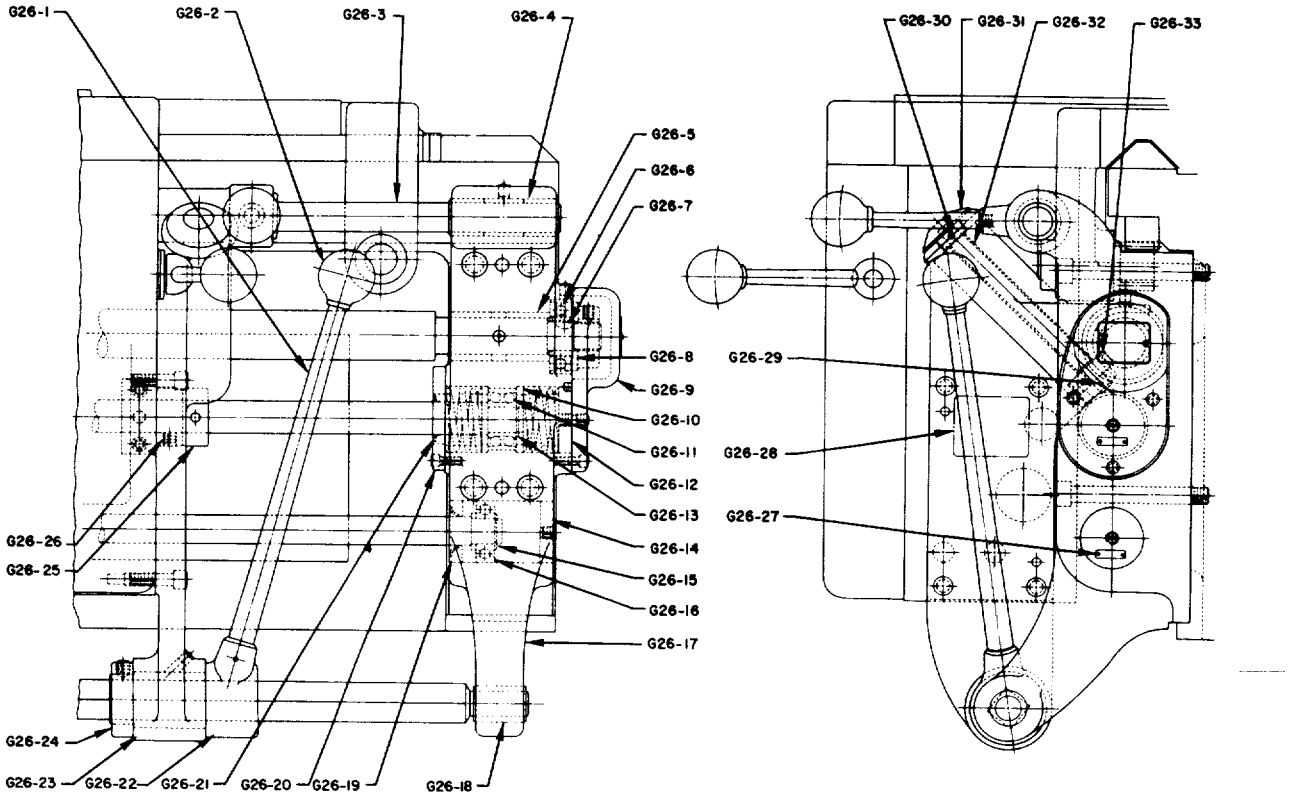


Fig. G26 Tail End Bracket

TAIL END BRACKET W/LEADSCREW REVERSE

Part No.	Part Name	Part No.	Part Name
G26-1	Lever	G26-18	Bearing
G26-2	Knob	G26-19	Seal
G26-3	Shaft	G26-20	Plate
G26-4	Bearing	G26-21	Seal
G26-5	Bearing	G26-22	Hub
G26-6	Bearing	G26-23	Bracket
G26-7	Key	G26-24	Collar
G26-8	Sleeve	G26-25	Collar
G26-9	Cover	G26-26	Collar
G26-10	Spacer	G26-27	Plate
G26-11	Bearing	G26-28	Plate
G26-12	Plug	G26-29	Pin
G26-13	Ring	G26-30	Pin
G26-14	Plug	G26-31	Dial
G26-15	Ring	G26-32	Bushing
G26-16	Bearing	G26-33	Wheel
G26-17	Bracket		

PARTS LIST

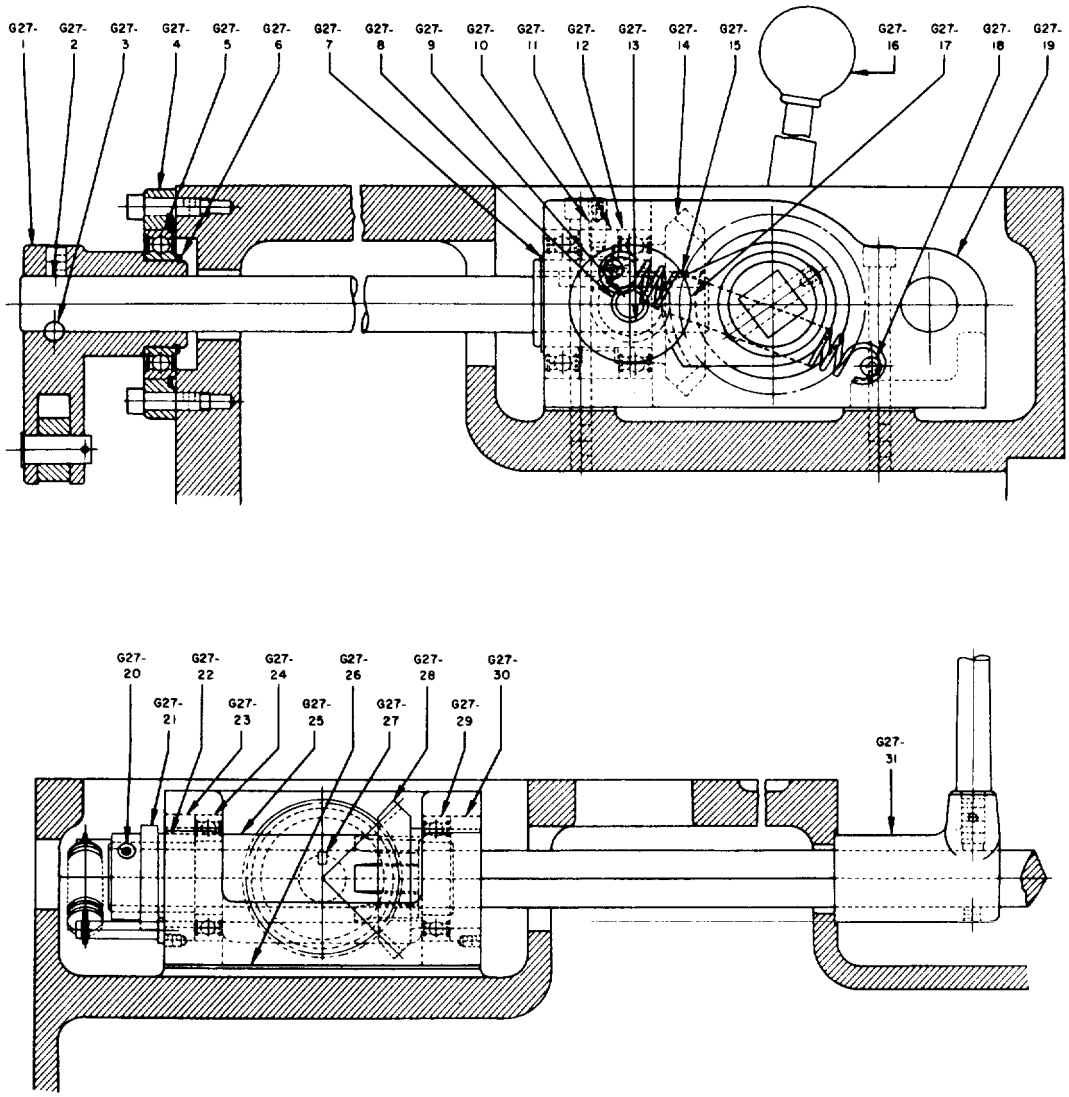


Fig. G27 Head End Mechanical Control Bracket

HEAD END MECHANICAL CONTROL BRACKET

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G27-1	Crank	G27-12	Bearing	G27-23	Spacer
G27-2	Shaft	G27-13	Ring	G27-24	Bearing
G27-3	Pin	G27-14	Gear	G27-25	Sleeve
G27-4	Retainer	G27-15	Key	G27-26	Shim
G27-5	Bearing	G27-16	Knob	G27-27	Key
G27-6	Ring	G27-17	Gear	G27-28	Gear
G27-7	Ring	G27-18	Post	G27-29	Bearing
G27-8	Bushing	G27-19	Bracket	G27-30	Spacer
G27-9	Stud	G27-20	Pin	G27-31	Hub
G27-10	Pin	G27-21	Segment		
G27-11	Spacer	G27-22	Spacer		

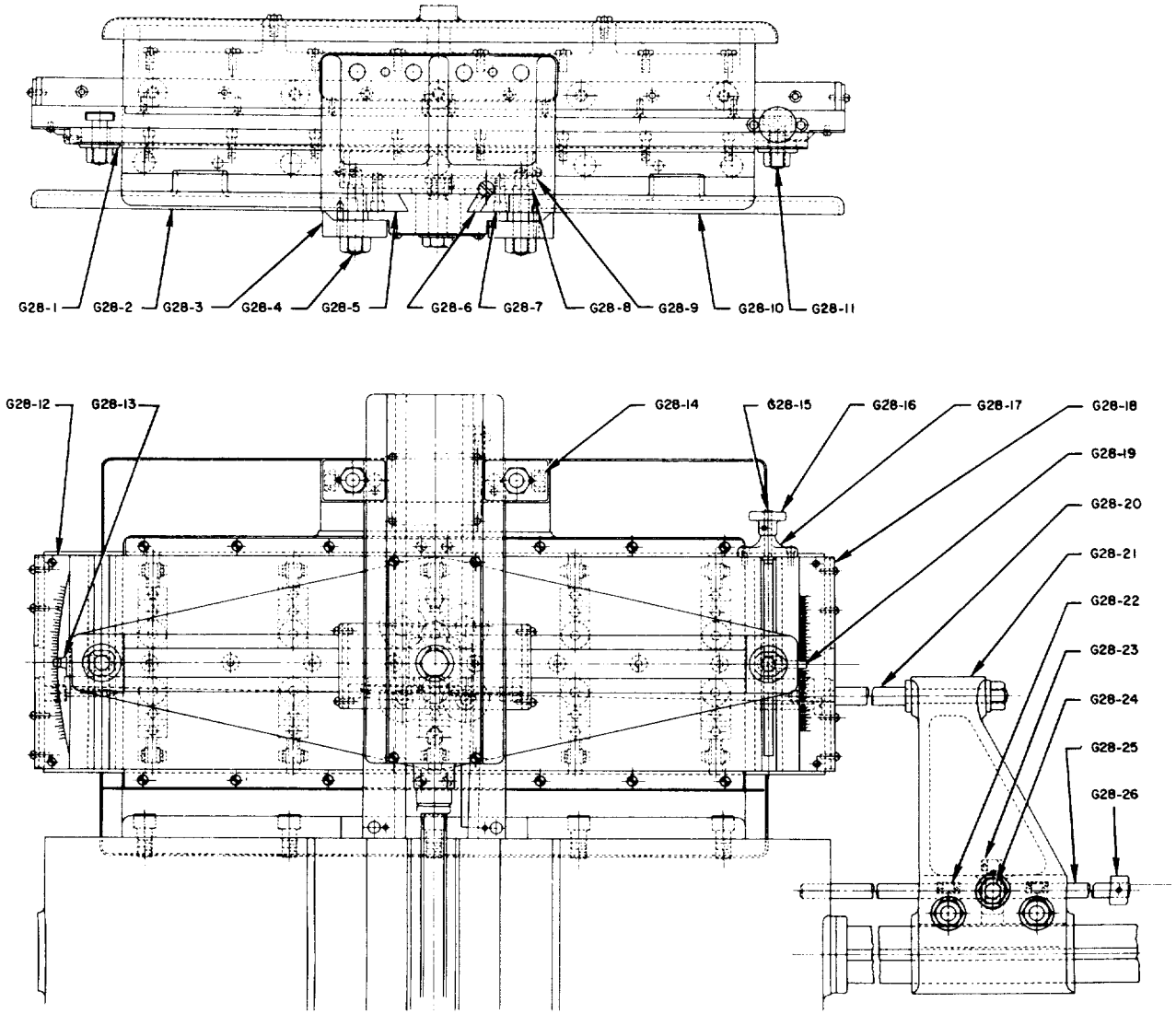


Fig. G28 Taper Attachment -- General

TAPER ATTACHMENT -GENERAL

Part No.	Part Name	Part No.	Part Name
G28-1	Washer	G28-14	Plate
G28-2	Guard	G28-15	Screw
G28-3	Clamp	G28-16	Knob
G28-4	Stud	G28-17	Bracket
G28-5	Guide	G28-18	Scale
G28-6	Gib	G28-19	Pointer
G28-7	Guide	G28-20	Bar
G28-8	Wiper	G28-21	Bracket
G28-9	Plate	G28-22	Plate
G28-10	Guard	G28-23	Plate
G28-11	Screw	G28-24	Bolt
G28-12	Scale	G28-25	Bar
G28-13	Pointer	G28-26	Collar

PARTS LIST

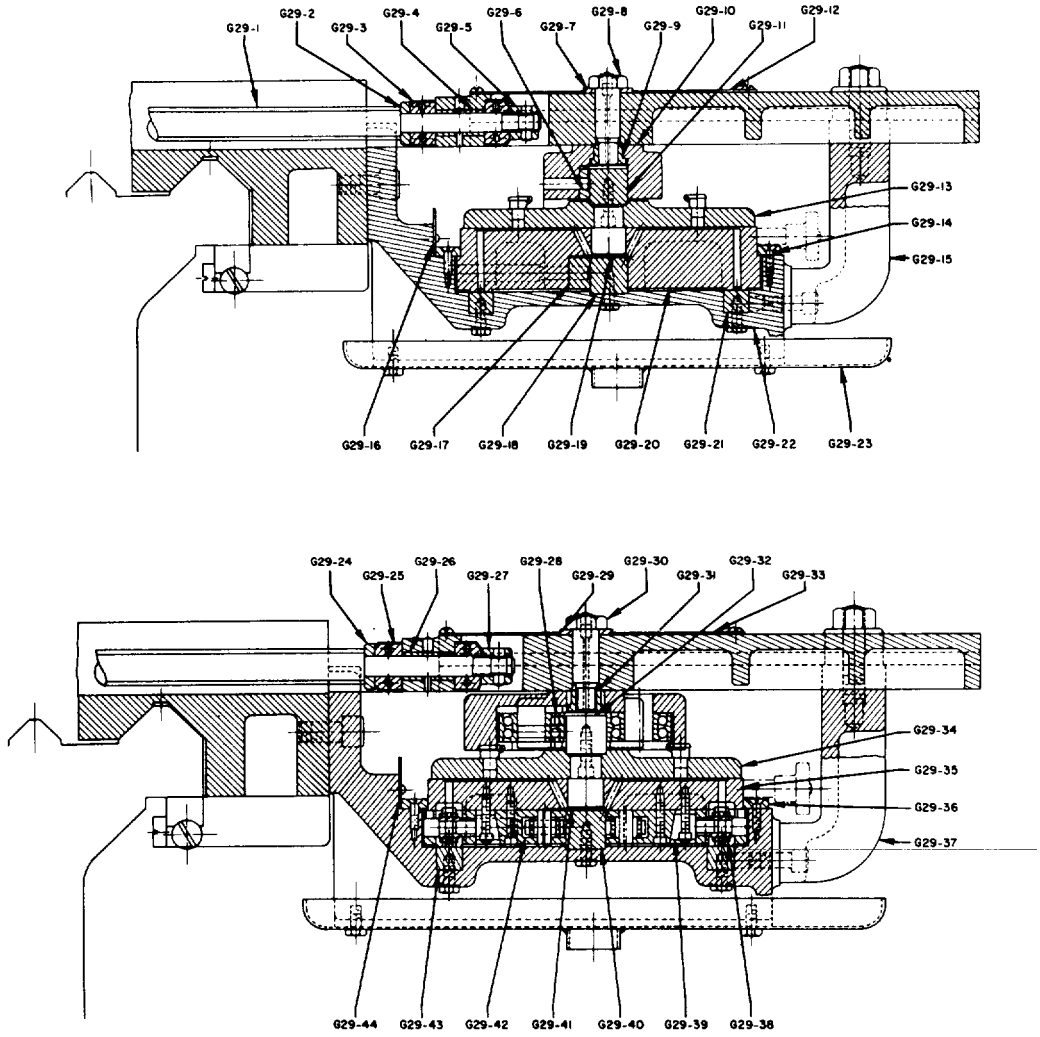


Fig. G29 Taper Attachments – Plain and Ball Bearing Sectionals

TAPER ATTACHMENTS-PLAIN AND BALL BEARING

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G29-1	Screw	G29-16	Trough	G29-31	Nut
G29-2	Collar	G29-17	Gib	G29-32	Guide
G29-3	Bearing	G29-18	Guide	G29-33	Plate
G29-4	Bushing	G29-19	Swivel	G29-34	Swivel
G29-5	Nut	G29-20	Base	G29-35	Base
G29-6	Gib	G29-21	Way	G29-36	Plate
G29-7	Washer	G29-22	Bracket	G29-37	Bracket
G29-8	Screw	G29-23	Pan	G29-38	Bearing
G29-9	Nut	G29-24	Collar	G29-39	Wedge
G29-10	Shoe	G29-25	Bearing	G29-40	Guide
G29-11	Guide	G29-26	Bushing	G29-41	Swivel
G29-12	Plate	G29-27	Nut	G29-42	Bearing
G29-13	Swivel	G29-28	Bearing	G29-43	Way
G29-14	Plate	G29-29	Washer	G29-44	Trough
G29-15	Bracket	G29-30	Screw		

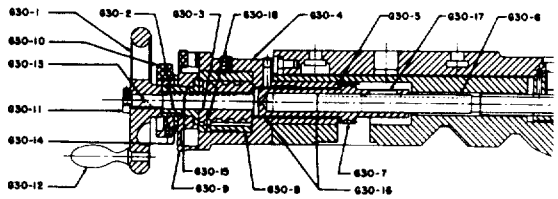


Fig. G30 Taper Attachment – Crossfeed Screw

TAPER ATTACHMENT - CROSSFEED SCREW

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G30-1	Hand Wheel	G30-7	Pinion	G30-13	Key
G30-2	Bushing	G30-8	Bushing	G30-14	Washer
G30-3	Spiral Bushing	G30-9	Dial	G30-15	Key
G30-4	Bushing	G30-10	Nut	G30-16	Bushing
G30-5	Collar	G30-11	Nut	G30-17	Key
G30-6	Screw	G30-12	Handle	G30-18	Ball

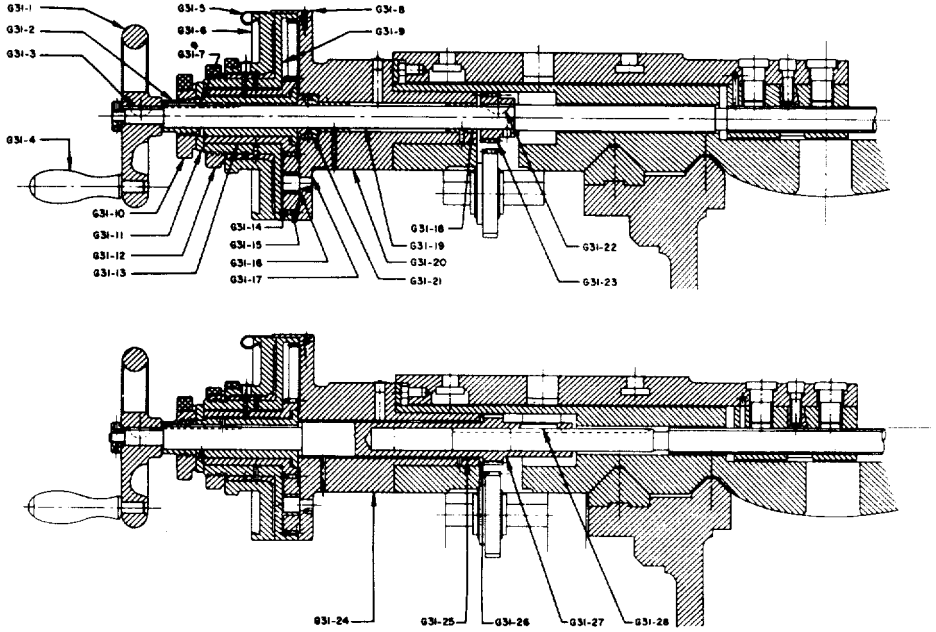


Fig. G31 Dual Dials with and without Taper Attachment

DUAL DIALS

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G31-1	Handwheel	G31-11	Washer	G31-21	Bearing*
G31-2	Sleeve	G31-12	Lock Nut	G31-22	Key*
G31-3	Key	G31-13	Gear	G31-23	Pinion*
G31-4	Handle	G31-14	Dial	G31-24	Bushing#
G31-5	Clip	G31-15	Gear	G31-25	Bushing#
G31-6	Dial	G31-16	Bushing	G31-26	Collar#
G31-7	Key	G31-17	Stud	G31-27	Pinion#
G31-8	Pointer	G31-18	Bushing*	G31-28	Key#
G31-9	Gear	G31-19	Screw*		
G31-10	Nut	G31-20	Bushing*		

*Without Taper Attachment Only
#With Taper Attachment Only

PARTS LIST

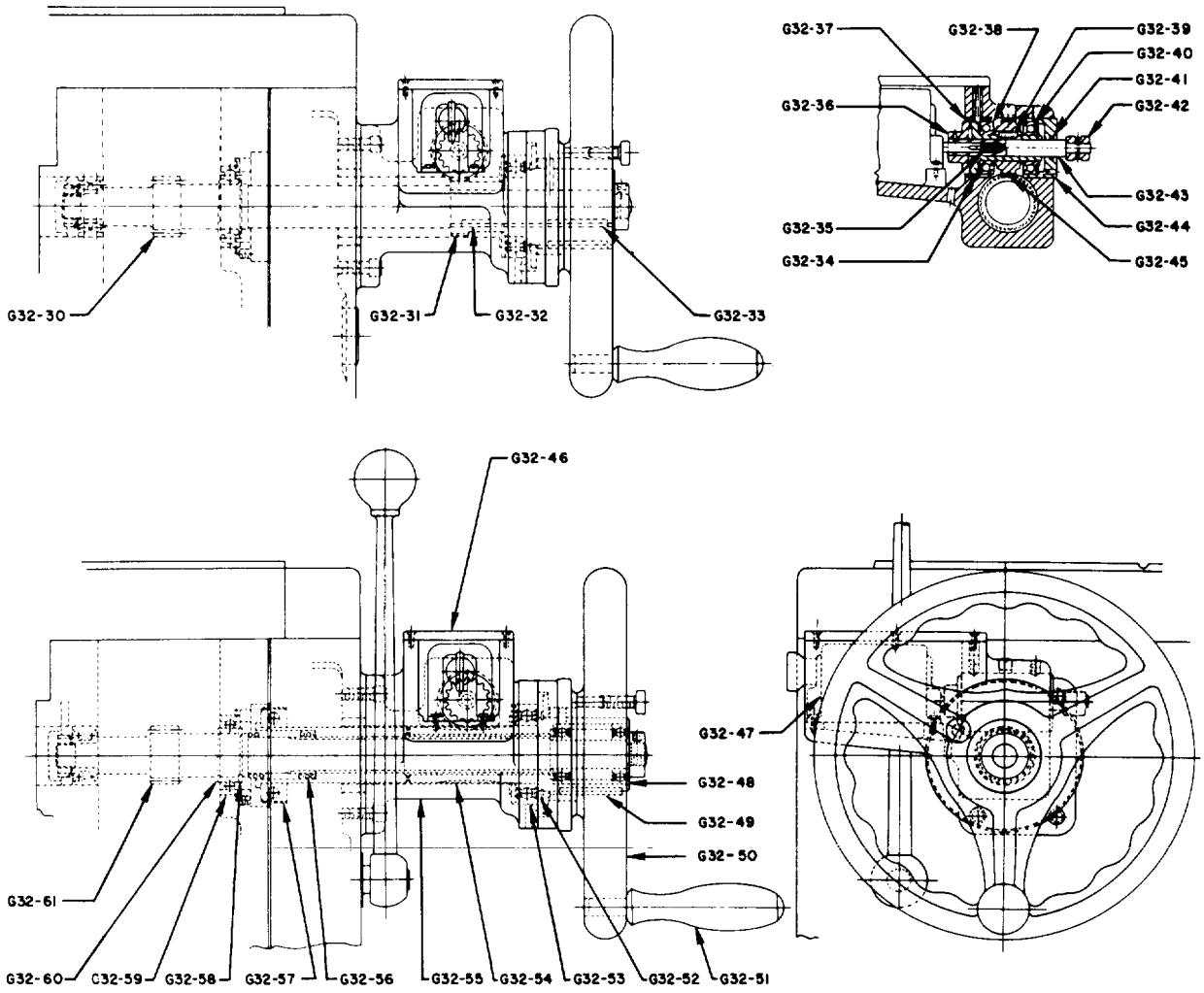


Fig. G32 Length Travel Accumulator – W/ and W/O PRT
LENGTH TRAVEL ACCUMULATOR- W/AND W/O PRT

Part No.	Part Name	Part No.	Part Name	Part No.	Part Name
G32-30	Shaft	G32-41	Seal	G32-52	Ring
G32-31	Gear	G32-42	Knob	G32-53	Bearing
G32-32	Key	G32-43	Shaft	G32-54	Clutch
G32-33	Key	G32-44	Adapter	G32-55	Bracket
G32-34	Clutch	G32-45	Gear	G32-56	Spring
G32-35	Spring	G32-46	Cover	G32-57	Bearing
G32-36	Clutch	G32-47	Accumulator	G32-58	Shim
G32-37	Adapter	G32-48	Bearing	G32-59	Bearing
G32-38	Bearing	G32-49	Key	G32-60	Ring
G32-39	Key	G32-50	Handwheel	G32-61	Shaft
G32-40	Bearing	G32-51	Handle		

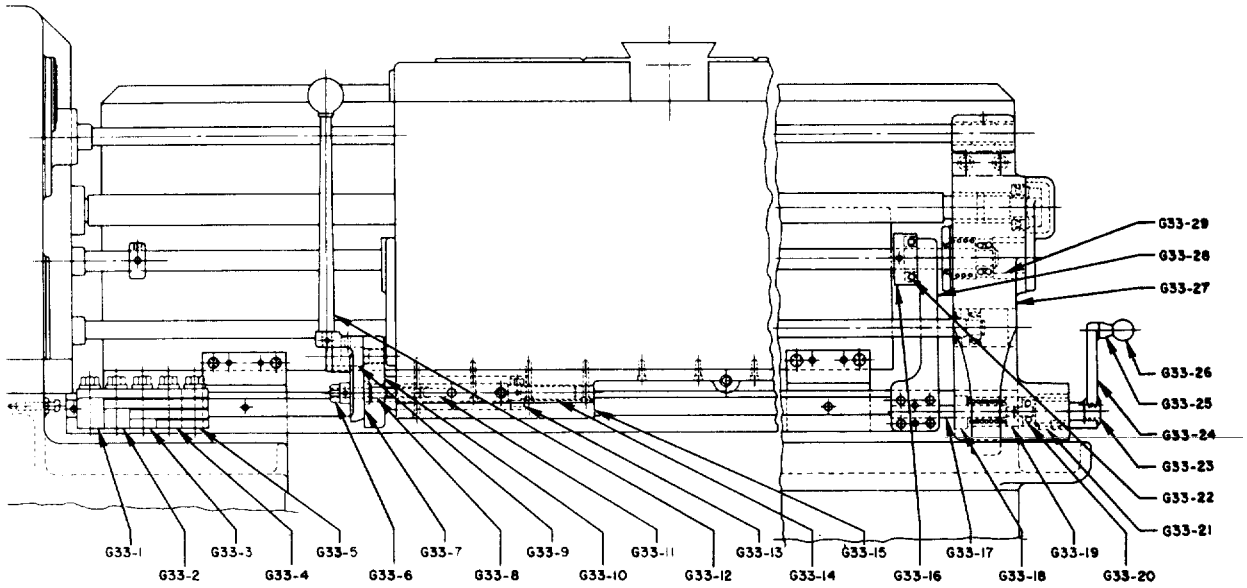
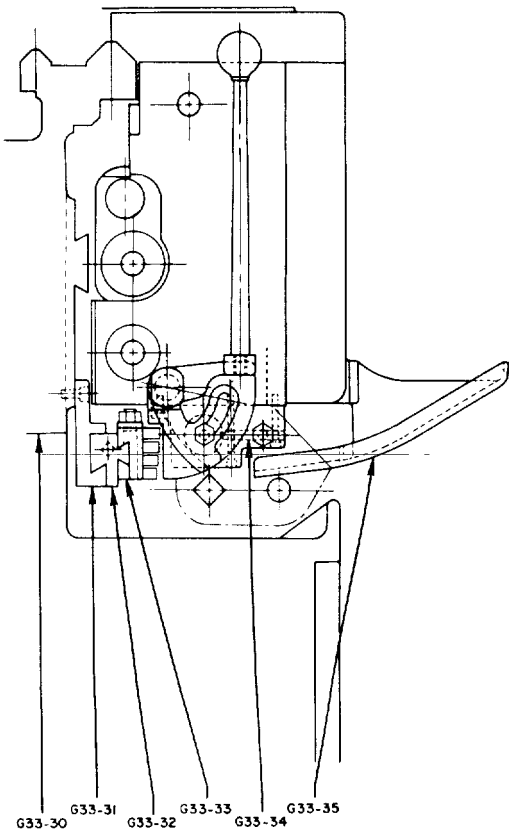


Fig. G33 Automatic Longitudinal Stops



AUTOMATIC LONGITUDINAL STOPS

Part No.	Part Name	Part No.	Part Name
G33-1	Dog	G33-19	Collar
G33-2	Dog	G33-20	Bearing
G33-3	Dog	G33-21	Nut
G33-4	Dog	G33-22	Bearing
G33-5	Dog	G33-23	Screw
G33-6	Nut	G33-24	Lever
G33-7	Plate	G33-25	Stud
G33-8	Screw	G33-26	Knob
G33-9	Stud	G33-27	Spacer
G33-10	Slide	G33-28	Bracket
G33-11	Pin	G33-29	Bracket
G33-12	Lever	G33-30	Bed
G33-13	Collar	G33-31	Hanger
G33-14	Screw	G33-32	Bar
G33-15	Bracket	G33-33	Clamp
G33-16	Collar	G33-34	Pin
G33-17	Shaft	G33-35	Guard
G33-18	Nut		

PARTS LI ST

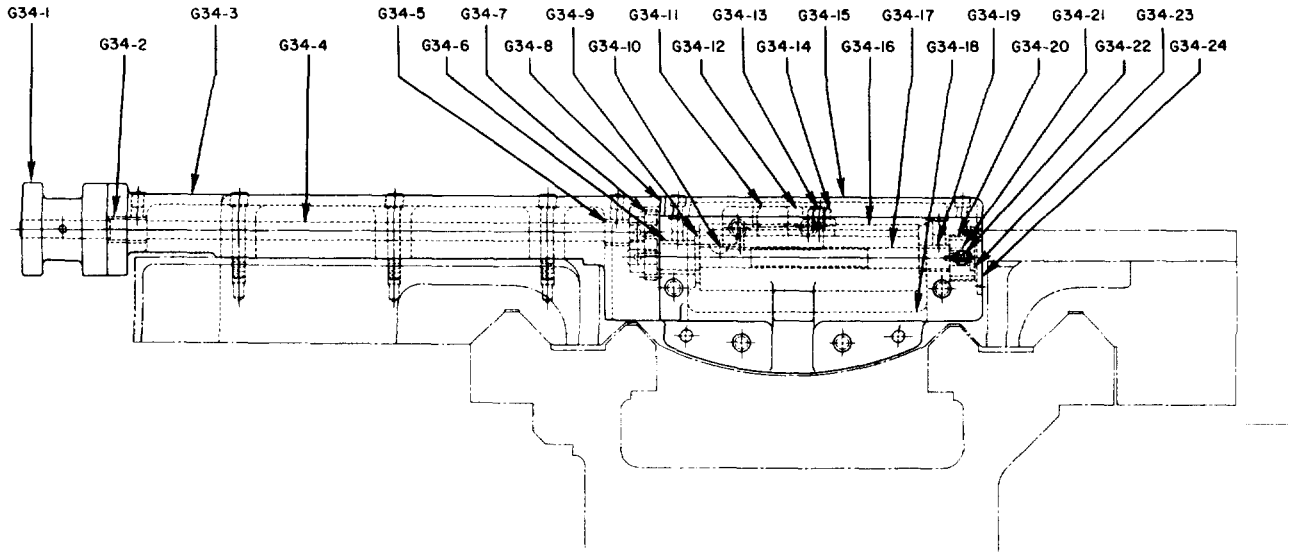


Fig. G34 Multiple Cross Stops

MULTIPLE CROSS STOPS

Part No.	Part Name
G34-1	Dial
G34-2	Bushing
G34-3	Bracket
G34-4	Shaft
G34-5	Bushing
G34-6	Bushing
G34-7	Gear
G34-8	Cover
G34-9	Spacer
G34-10	Key
G34-11	Finger
G34-12	Dog

Part No.	Part Name
G34-13	Screw
G34-14	Wrench
G34-15	Cover
G34-16	Bar
G34-17	Shaft
G34-18	Bracket
G34-19	Bushing
G34-20	Detent
G34-21	Key
G34-22	Ball
G34-23	Washer
G34-24	Cover

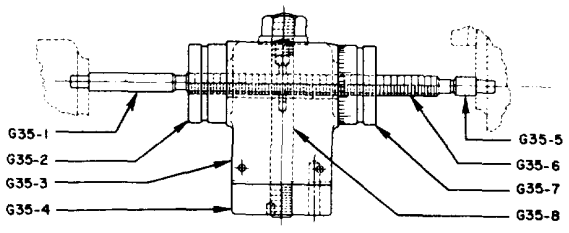


Fig. G35 Carriage Micrometer Stop

CARRIAGE MICROMETER STOP

Part No.	Part Name
G35-1	Pin
G35-2	Nut
G35-3	Bracket
G35-4	Clamp
G35-5	Pin
G35-6	Screw
G35-7	Dial
G35-8	Stud

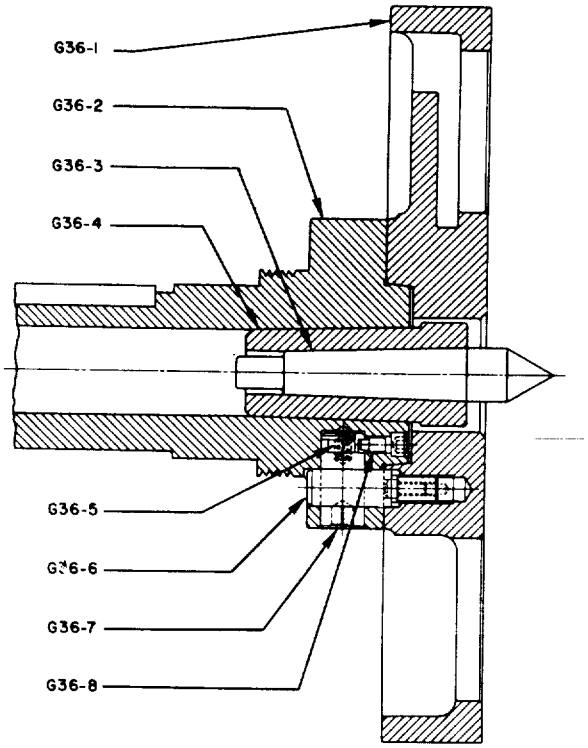


Fig. G36 Camlock Spindle Nose

CAMLOCK
SPINDLE NOSE

Part No.	Part Name
G36-1	Plate
G36-2	Spindle
G36-3	Center
G36-4	Bushing
G36-5	Spring
G36-6	Stud
G36-7	Cam
G36-8	Screw

TAILSTOCK
ANTI-FRICTION CENTER

Part No.	Part Name
G37-1	Plate
G37-2	Spacer
G37-3	Bearings
G37-4	Shim
G37-5	Cap
G37-6	Seal
G37-7	Plate
G37-8	Spacer
G37-9	Spacer
G37-10	Spindle
G37-11	Center

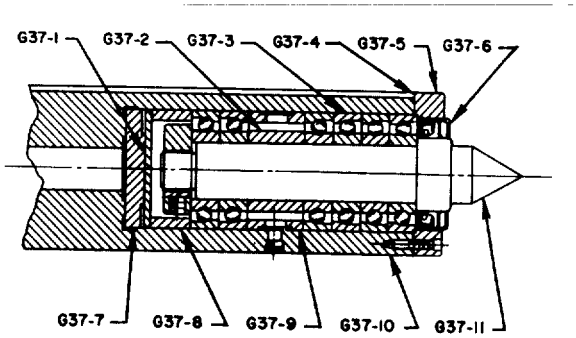


Fig. G37 Tailstock Anti-friction Center

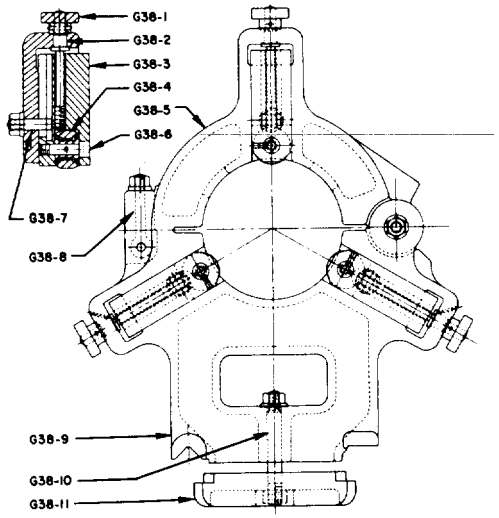


Fig. G38 Roller Jaw Steady Rest

PLAIN JAW
STEADY REST ½"-6"

Part No.	Part Name
G39-1	Top
G39-2	Rod
G39-3	Plug
G39-4	Knob
G39-5	Screw
G39-6	Screw
G39-7	Jaw
G39-8	Bottom
G39-9	Stud
G39-10	Clamp

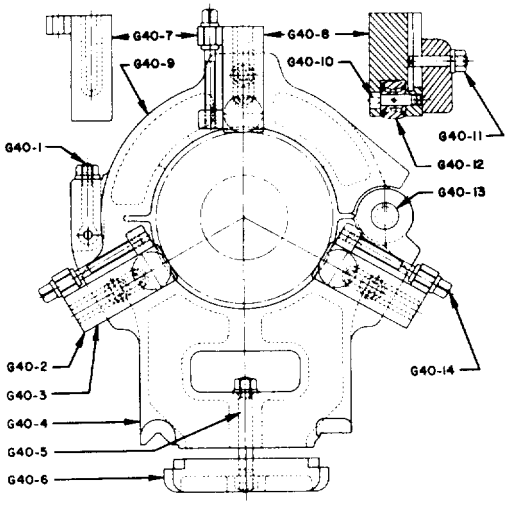


Fig. G40 Plain and Roller Jaw Steady Rests

ROLLER JAW
STEADY REST ½"6"

Part No.	Part Name
G38-1	Knob
G38-2	Screw
G38-3	Jaw
G38-4	Bearing
G38-5	Top
G38-6	Stud
G38-7	Bolt
G38-8	Rod
G38-9	Bottom
G38-10	Stud
G38-11	Clamp

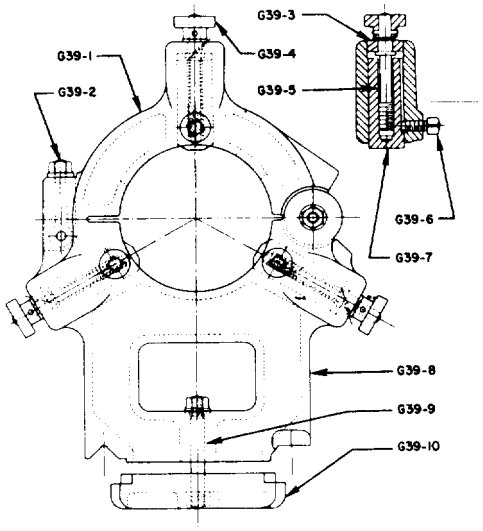


Fig. G39 Plain Jaw Steady Rest

PLAIN AND ROLLER JAW
STEADY REST

Part No.	Part Name
G40-1	Rod
G40-2	Jaw
G40-3	Jaw
G40-4	Bottom
G40-5	Stud
G40-6	Clamp
G40-7	Jaw
G40-8	Jaw
G40-9	Top
G40-10	Stud
G40-11	Bolt
G40-12	Bearing
G40-13	Stud
G40-14	Screw

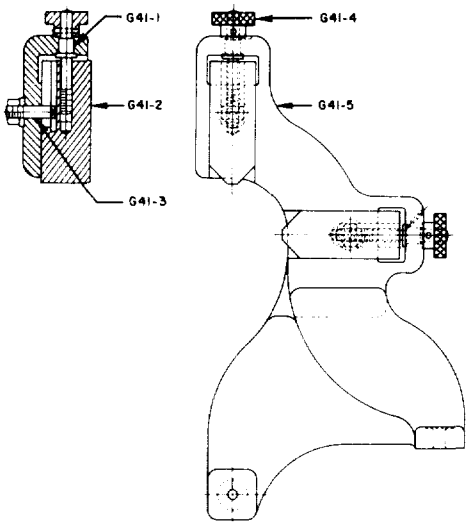


Fig. G41 Plain Jaw Follow Rest

PLAIN JAW
FOLLOW REST

Part No.	Part Name
G41-1	Screw
G41-2	Jaw
G41-3	Bolt
G41-4	Knob
G41-5	Body

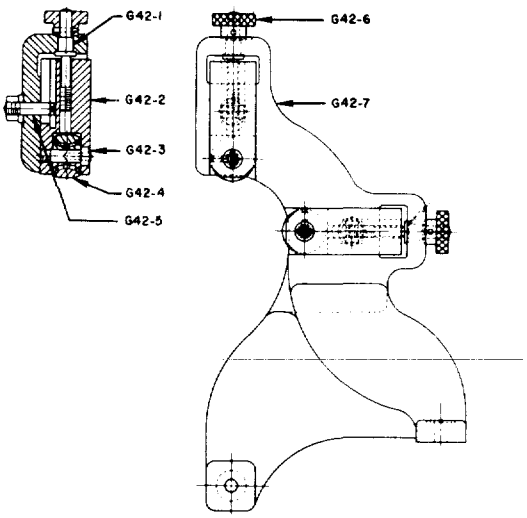


Fig. G42 Roller Jaw Follow Rest

ROLLER JAW
FOLLOW REST

Part No.	Part Name
G42-1	Screw
G42-2	Jaw
G42-3	Stud
G42-4	Bearing
G42-5	Bolt
G42-6	Knob
G42-7	Body

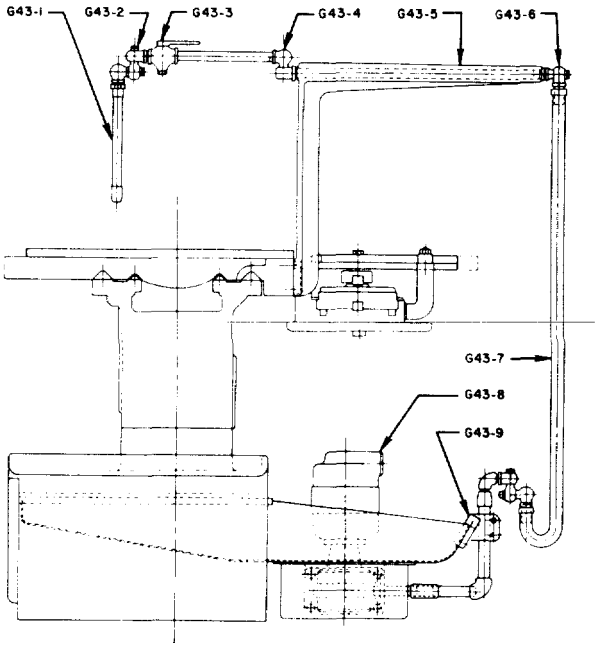
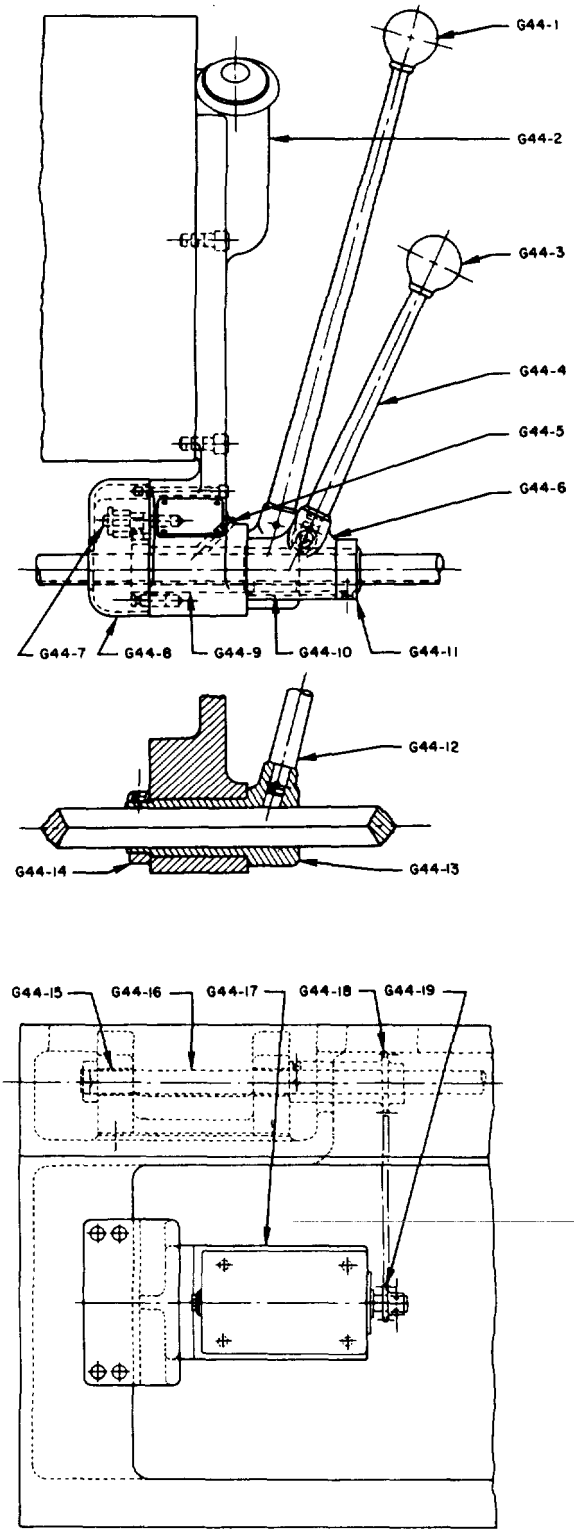


Fig. G43 Coolant Pump and Piping

COOLANT
PUMP AND PIPING

Part No.	Part Name
G43-1	Nozzle
G43-2	Joint
G43-3	Stopcock
G43-4	Joint
G43-5	Bracket
G43-6	Pendant
G43-7	Hose
G43-8	Pump
G43-9	Support

PARTS LIST



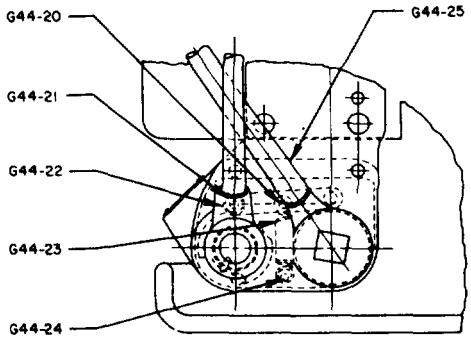


Fig. G44 Constant Speed Electrical Controls

CONSTANT SPEED ELECTRICAL CONTROLS

Part No.	Part Name
G44-1	Knob
G44-2	Bracket
G44-3	Knob
G44-4	Lever
G44-5	Oiler
G44-6	Hub
G44-7	Stud
G44-8	Cover
G44-9	Bushing
G44-10	Key
G44-11	Collar
G44-12	Lever
G44-13	Hub
G44-14	Collar
G44-15	Bushing
G44-16	Rod
G44-17	Box
G44-18	Sprocket
G44-19	Sprocket
G44-20	Post
G44-21	Bushing
G44-22	Roller
G44-23	Spring
G44-24	Post
G44-25	Lever

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

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

Distribution:
To be distributed in accordance with DA Form 12-21 requirements for FSC/FSG 3400-IL.

☆U.S. GOVERNMENT PRINTING OFFICE: 1984-754-045:4013

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

THEN...JOT DOWN THE DOPE ABOUT IT ON THIS FORM. CAREFULLY TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL.

SOMETHING WRONG WITH PUBLICATION

FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

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

PIN: 054740-000