Mach # 654

MANUAL 45

MACH 654

TABLE TYPE "D" SERIES

#1155 + 1843

NEWMAN ~~1844~~

MODEL 250T S/N 9300

HORIZONTAL BORING, DRILLING AND MILLING MACHINES

INSTRUCTION AND PARTS MANUAL

Giddings and Lewis Machine Tool Co.

Fond du Lac, Wisconsin, U.S.A. 54935

PH. 414-921-9400

GIDDINGS & LEWIS MACHINE TOOL COMPANY

PARTS AND INSTRUCTION MANUAL
FOR
MODEL "D"
and (340-T) (350-T)

HORIZONTAL BORING, DRILLING AND MILLING MACHINES

INSTRUCTIONS FOR ORDERING REPAIR PARTS

Your repair parts orders will receive the best service if, when ordering, the following information is clearly stated:

1. The quantity of each part required
2. The part name and the part number
3. The serial number of the machine. The serial number is stamped on a name plate which is found on the lower left hand corner of the spindle feed case. Orders cannot be accepted without this serial number.

GIDDINGS & LEWIS MACHINE TOOL COMPANY
Fond du Lac, Wisconsin, U.S.A.

PRICE $25.00

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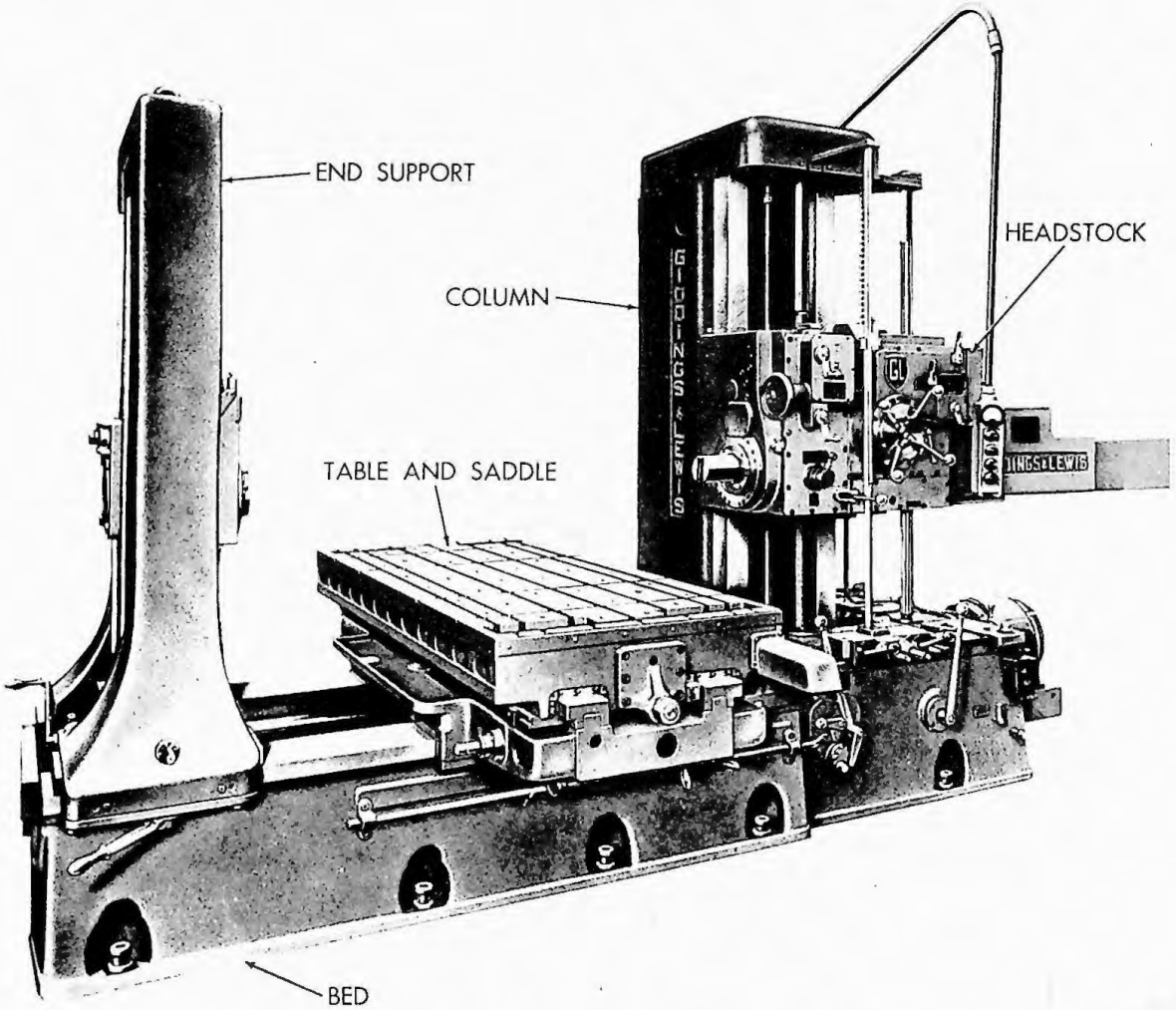


APPROXIMATE LIFTING WEIGHTS OF MAJOR UNITS
FOR 340-T AND 350-T MACHINES

	340-T	350-T
Headstock	4,000	5,000
48" Column	4,300	7,000
60" Column	4,800	7,700
72" Column	5,300	8,400
36" x 72" Table and Saddle	6,000	-
48" x 72" Table and Saddle	7,500	10,500
	340-T and 350-T	
48" x 96" Table and Saddle	11,500	
48" x 120" Table and Saddle	15,000	
60" x 96" Table and Saddle	14,800	
60" x 120" Table and Saddle	16,200	
60" x 144" Table and Saddle	17,500	
72" Bed	10,000	
96" Bed	12,000	
120" Bed	14,000	
End Support	3,000	

Section I

INSTALLATION

SHIPMENT AND TRANSIT

All Giddings and Lewis machines are completely assembled, run off, and inspected at the factory. Their size prohibits the shipping of them completely assembled and they have been carefully dismantled for this reason.

For domestic shipment, the machine units are placed on skids. All machined surfaces are coated with slushing compound and the entire machine is covered with waterproof paper and tarpaulins for shipment on flat cars. You will be billed for the tarpaulins, which are to remain the property of the Giddings and Lewis Machine Tool Company. You will receive full credit for them when they are returned.

For export shipments, all machines are disassembled into their various units and are shipped completely boxed and protected for ocean shipment.

When removing the machine components from flat cars or when lifting during assembly, heavy pads or wood blocks should be placed at all points where lifting cables or chains contact the machine. Be sure no chain or rope exerts strain on any projecting parts. A CRANE OF SUFFICIENT CAPACITY SHOULD BE USED FOR LIFTING ALL MAJOR UNITS. (See weight chart on opposite page.)

Carefully check all parts of the machine against the packing list included with each shipment. Report immediately any damage or shortages to the carrier and to the representative of our agent from whom the machine was purchased.

PREPARATION FOR INSTALLATION

Use gasoline, kerosene, or any non-inflammable cleaner to remove the slushing compound from each unit as it is needed during assembly. A Giddings and Lewis service representative is available on request to supervise the assembly of all domestic machines. If you require a service representative, clean all units thoroughly, and move them to a location near the machine's foundation prior to his arrival.

FOUNDATION

The G&L table type horizontal boring, drilling, and milling machines described in this manual are provided with a one piece bed of heavy box type, internally ribbed construction. Regardless of the rigidity obtained from this type of construction, however, these machines will perform most satisfactorily when placed on a solid foundation free from vibration. They should not be mounted on any individual anti-vibration devices of either spring or rubber pad construction.

The foundation should be a one piece solidly constructed reinforced concrete slab, insulated from the surrounding floor. The minimum recommended depth is shown on our foundation plans. The actual depth required will vary depending on the local soil conditions.

Hollow leveling screws, threaded into the bed flange, are used for leveling the machine. Separate hold-down bolts which extend through the leveling screw are used to maintain position and alignment. (See figure 1.)

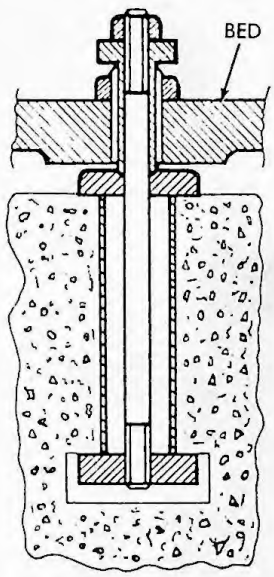


Figure 1. Leveling Screw Arrangement

Small round leveling plates are furnished with the machine which are finished with a spherical seat to fit a mating radius on the leveling screws. These plates will be found in a box of auxiliary equipment and are to be placed over the hold-down bolts before setting the machine bed in place. The hold-down bolts, which are not furnished with the machine, should be set in the foundation as illustrated in figure 1. This method will allow the foundation to be completely finished before the machine arrives. A smooth surface on the concrete slab is desirable so the leveling screw plates will lie flat and level.

NOTE

When setting the machine on the foundation, it is recommended that you do not grout it in place. Periodic re-leveling and re-alignment will be necessary to insure continued accuracy of machine.

Before leaving the factory, each machine is tested under power for precision alignments and tolerances. These indicator tests are positive and can be re-established by proper leveling when the machine is set up on its own foundation. The G&L service representative who assists in the erection of your machine will make these alignment checks before turning the machine over to your operator.

BED

The initial step in the assembly of your horizontal boring machine is to place the bed over the hold-down bolts on your foundation. The bed and the leveling screws should be thoroughly cleaned of all slushing compound. The leveling screws should be extended approximately 1/2" below the machined pads on the bottom of the bed.

When lifting the bed casting, heavy steel bars should be placed through the holes at either end of the bed for ease of handling with chains or cable. Use mats or lumber to protect all machined and painted surfaces during the handling of the major castings, (figure 2).

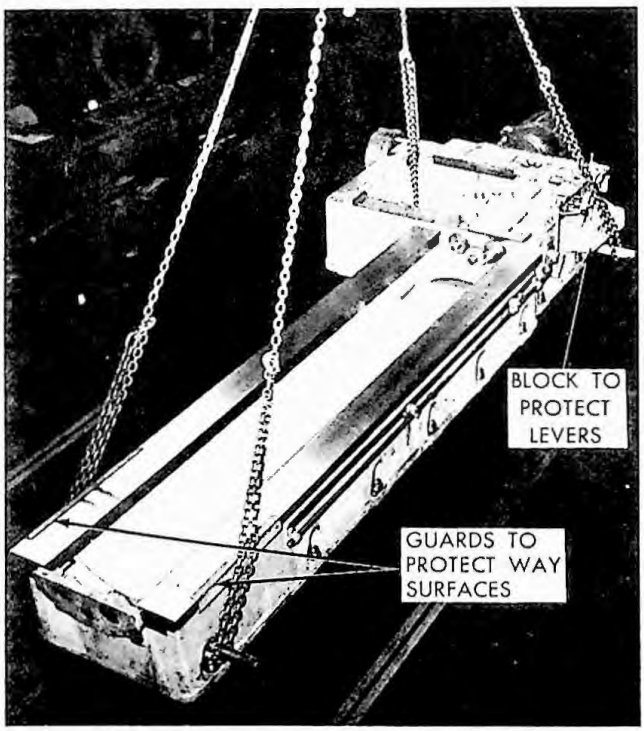


Figure 2. Crane Hookup for Bed

After the bed is resting on the leveling screw plates, it should be completely leveled and retained with the hold-down bolts. This is accomplished with one or two precision levels graduated .0005" per foot per line. A ground or scraped parallel should be used to span the bed ways for leveling at right angles to the bed length. At the rear of the bed, the levels may be placed directly on the scraped surface forming the seat for the machine column.

When the bed is leveled the auxiliary saddle support runways, if furnished, may be set in place in their respective troughs and leveled up individually. In doing this, the distance from the center of the runway to the edge of the bed way and the vertical distance between the two way surfaces should be held within 1/16" of the dimensions shown on the foundation drawings. These runways may be leveled by setting a precision level in both directions on the ground top surface.

On machines furnished with over-the-floor type saddle support runways, the runway castings should be bolted to the sides of the machine bed before the bed has been lowered in position over the hold-down bolts. The runway surface may then be leveled with the leveling screws and hold-down bolts along the edge of the casting.

COLUMN

Before placing the column on the bed, extreme care should be taken to make sure that both mating surfaces are perfectly clean and free from nicks. A fine file should be used to go over the surfaces lightly to remove any bumps or nicks which may have occured in handling. The column should then be carefully set over the integral key on the bed and the two ground steel spacer shims (packed in a separate box) inserted immediately in front of the keys according to the numbers stamped thereon.

The set screws at the rear of the column should be partially tightened to draw the column back against the ground shims. The column may then be moved slightly to the right or left with a bumping bar or heavy timber to align the two tapered dowel pin holes. Care should be taken that these holes are in exact alignment before seating the dowel pins. The set screws which pull the column against the ground shims may now be fully tightened and all cap screws inserted and secured.

NOTE

Column may be lifted as shown in figure 3.

HEADSTOCK

The headstock should be thoroughly cleaned and the head and column ways carefully checked for nicks or bumps. Remove vertical pivot pins and the two headstock inner clamps for cleaning. The clamps should be installed and set in position toward the center of the headstock. The pivot pins may be inserted after the head is in place on the column.

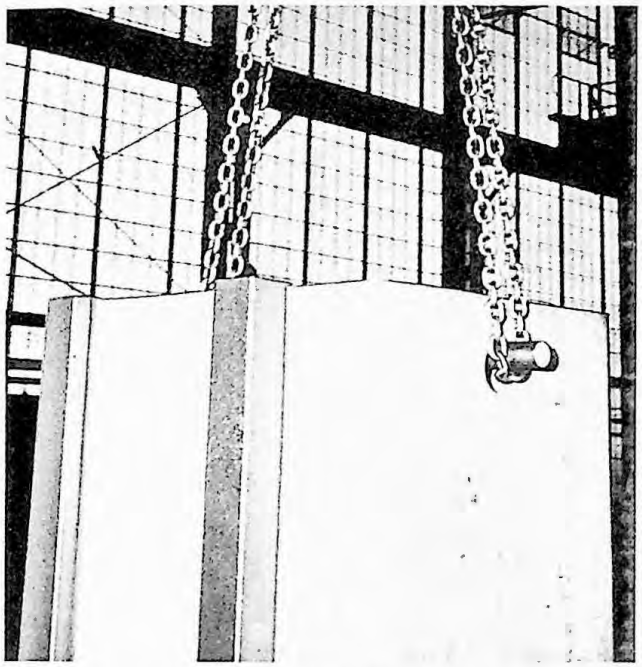


Figure 3. Lifting Column

The headstock may now be lifted with two chains or cables as shown in figure 4. Chains should be adjusted to hold the head in an exact horizontal position. Adjustment of the spindle position in or out, to aid in balancing the head, can be accomplished with the hand wheel. Care should also be taken to protect the head from damage resulting from chains or cables.

The headstock may be moved into position on the column ways making sure they are adequately oiled in the process. The outer clamp strips may then be bolted tightly to the head and the four gibs inserted and held loosely in place by retaining screws. The head should be lowered on the column and set to rest on a 4" x 4" wood block about 18" high. Place block on bed directly adjacent to the rear column way. The headstock gibs may now be loosely adjusted and the hoisting chains removed.

Immediately following the hanging of the headstock, the felt and brass wiper parts should be assembled to the top and bottom of the head to prevent accumulation of any foreign matter in the wiper recesses. These parts will be found in small shipping bags in the box of auxiliary equipment.

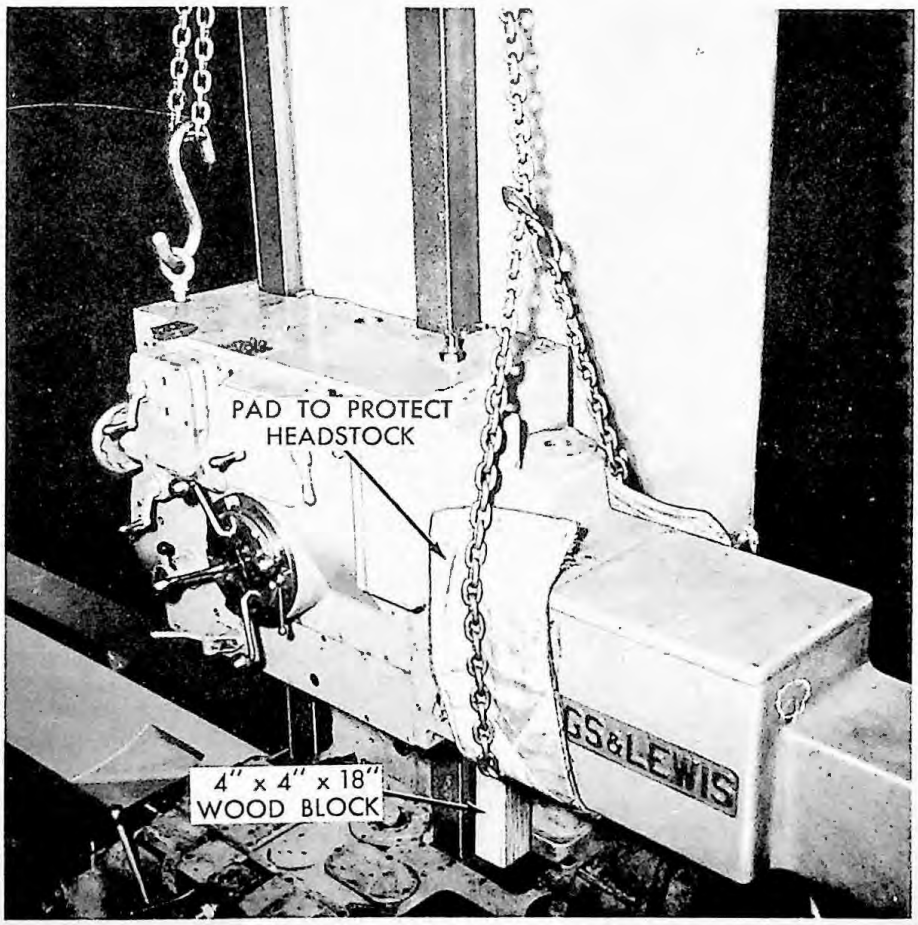


Figure 4. Mounting Headstock on Column

For installations where there is sufficient room overhead, the headstock may be lowered over the top of the column ways. This will make it possible to install the outer clamp strips before the head is mounted on the column. The inner clamps may also be left in position with the pivot pin in place.

When mounting the head in this manner, an assembler should sit on top of the column to assist in guiding the head over the column ways.

COUNTERWEIGHT

After the column is bolted in place, the counterweight chain should be fastened to the main counterweight and the weight lowered into the column cavity, (figure 5). A heavy timber should be inserted through the opening at the rear of the column to support the weight until it is hooked up to the headstock. If any auxiliary weights are supplied, they should now be placed on top of the main counterweight.

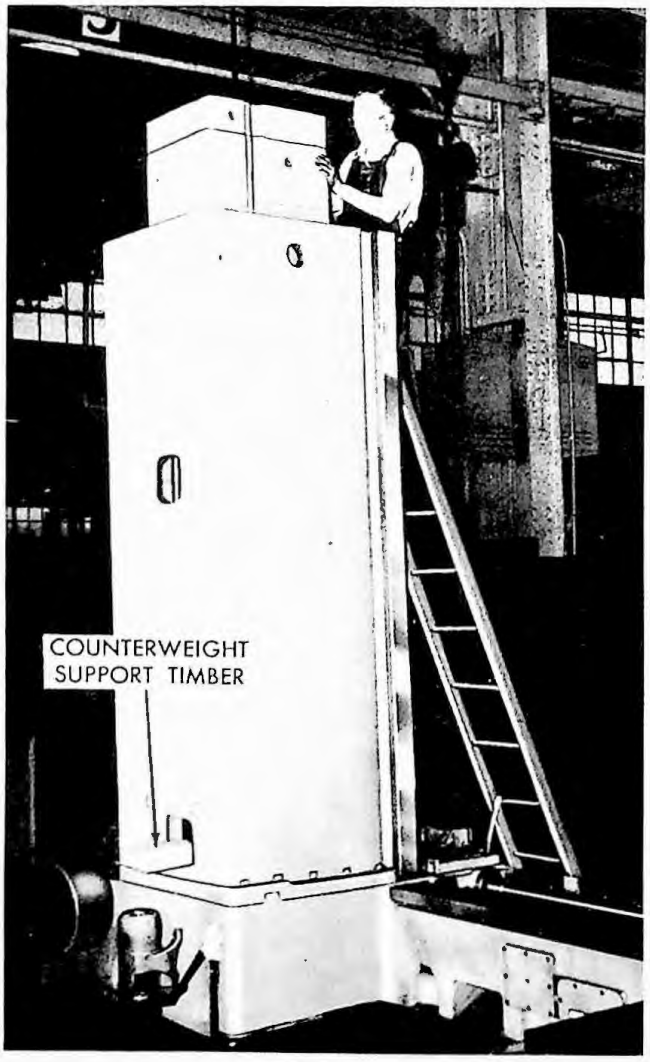


Figure 5. Lowering Counterweight into Column

SHEAVE BRACKET

The counterweight sheave bracket may now be placed in position on top of the column taking care to thread the counterweight chain over the two sheaves, (figure 6). The two taper dowel pins and all bolts should be inserted in place and secured.

Figure 6. Mounting Sheave Bracket on Column

The two bearing caps on the sheave bracket should be removed and the elevating screw and vertical drive shaft lowered in place, (figure 7). The bearings on these shafts should not have to be removed for assembly unless the shafts must be inserted from the bottom. If this is necessary, make sure that the bearings are seated firmly against the shoulder on the shafts at reassembly.

It will be necessary to thread the elevating screw through the nut on the headstock and down into the splined socket in the bed. After initial engagement in the splined socket is made, the screw can be turned down the rest of the way by using the safety hand crank on the bed. The headstock may then be cranked upwards on the column so the counterweight chain can be attached and the wood block beneath the head removed.

The elevating screw bearing retainer cap may now be bolted in place. The vertical drive shaft has a

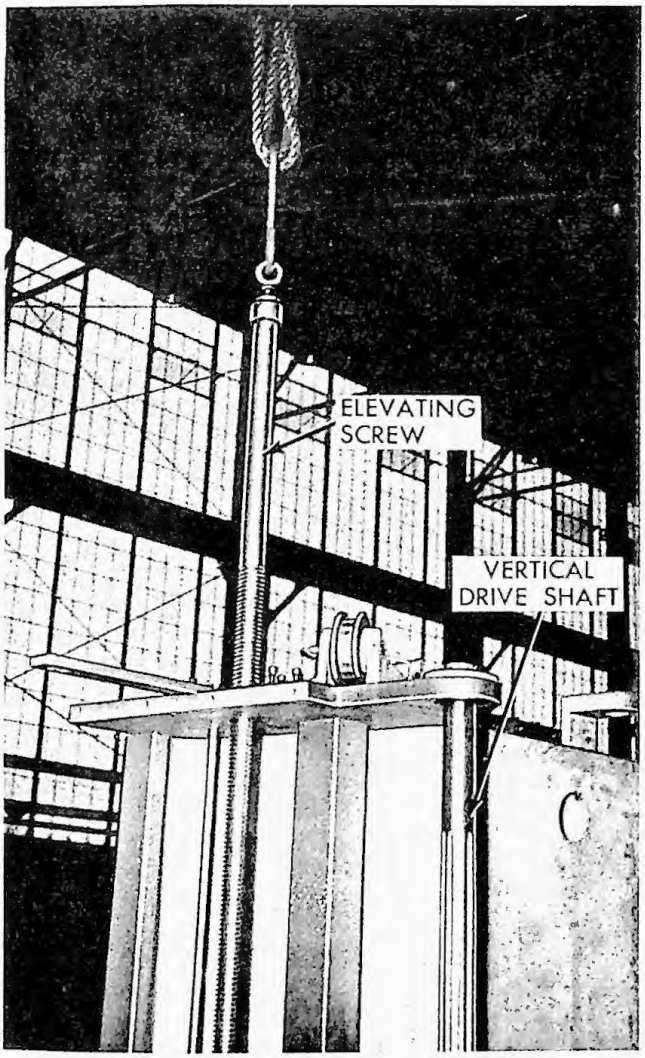


Figure 7. Installing Elevating Screw

self aligning bearing at its upper end and the proper alignment of it can be assured by tightening the bearing retainer cap only after the headstock is moved to a position near the top of the column. This can be accomplished after power is applied to the machine.

When the elevating screw bearing retainer cap is in place, the headstock may be lowered on the column with the safety hand crank to elevate the counterweight. This will permit the wood blocking beneath the counterweight to be removed from the column.

The headstock gibs should now be given a final adjustment. This is done by drawing up the gib retaining bolts until they are snug making sure the smaller set screws are completely free. The retaining bolt should then be backed off one-quarter turn and the set screw tightened down to back out the gib slightly.

CONTROLS

The control panel may be bolted in place on the column. The swinging pendant arm should be mounted on top of the sheave bracket and all the wiring to the panel properly connected. The wiring diagrams for the machine will be found in an envelope inside the control panel.

TABLE AND SADDLE

The table and saddle assembly should be thoroughly cleaned and the saddle way surfaces carefully inspected for nicks or bumps. The bed ways should also be cleaned and covered with a generous film of oil. The table and saddle may now be lifted using a double sling arrangement, (figure 8), and set on the bed ways about midway between the column and end of the bed. The table clamp lever and table feed engagement lever should be on the side facing the machine column. When lowering the saddle, it should be held tightly against the guiding edge of the bed ways (i.e. edge nearest operator's position) so the long brass gib may be inserted on the opposite side. The long clamps on each side of the saddle and the saddle clamp mechanism may be installed after the saddle is set on the bed ways. The felt and brass wipers should also be attached to all surfaces as soon as possible.

The bearing bracket on the end of the bed should now be removed and cleaned. The saddle feed screw, the table drive spline shaft and the end support drive shaft should be placed in position and supported at the end of the bed by tying or wiring them to a brace

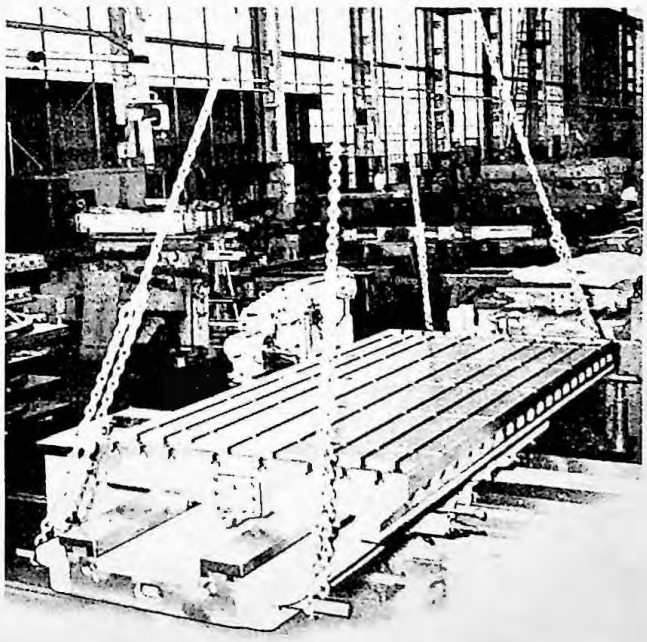


Figure 8. Crane Hookup for Table and Saddle

laid across the bed ways. The bearing bracket can now be replaced over the bearings on the ends of the three shafts. The saddle feed nut should be bolted loosely in place and should be tightened only after power has been applied and the saddle moved to the end of the bed where the nut can assume the proper alignment.

NOTE

Do not attempt to move the table on the saddle by hand or power until the four shims placed at each corner beneath the table clamp strips are removed.

SADDLE SUPPORTS

If the machine is supplied with auxiliary saddle supports, these units may now be bolted to the bottom side of the saddle. To do this, the saddle supports should be set on the auxiliary runways in the proper position to roll them into place. Each support is stamped with a number corresponding to an identical number on the mounting pad beneath the saddle for proper location. The rollers under the saddle supports should be adjusted so the units will roll underneath the saddle. After bolting the units in place, the rollers should not be lowered to rest on the rails until the rest of the machine has been completely leveled.

END SUPPORT

The end support unit can now be assembled to the machine. An I-bolt is attached to the top of the end support column for lifting, (figure 9). There are two clamp plates on the underside of the column for holding it to the bed. The plates have elongated holes which permit them to be pulled back to clear the edges of the bed ways. The two bolts and clamp lever on each side must be loosened to allow them to be moved. There is a flat gib on the front way aligning the end support to the bed laterally. The two socket head adjusting set screws should be loosened so the gib will lie flat against the end support column casting. After the ways are cleaned and oiled, the end support may be lowered onto the bed and the clamps positioned and tightened under the bed ways.

NOTE

When lowering the end support the pinion used for moving the end support on the bed must be meshed into the rack. This can be accomplished by turning the pinion with the safety hand crank.

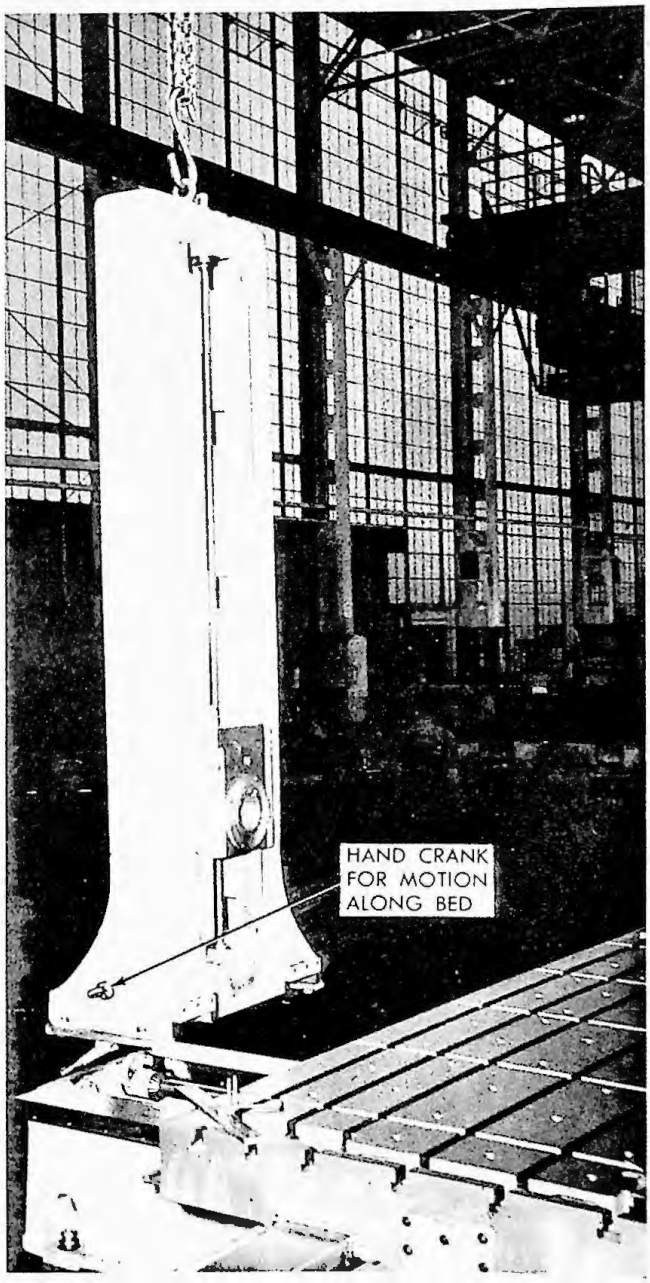


Figure 9. Lowering End Support on Bed

The machine headstock should now be positioned to the same elevation as the end support bearing block. This can be checked by reading the respective vernier scales. After this is done, the bevel gear attached to the end support drive shaft can be bolted to the column, (figure 10). This provides the power for moving the bearing block simultaneously with the headstock.

After moving the two units up and down several times, their respective heights should be checked again. If they are out of alignment by more than .030", the bevel gear bracket should be loosened

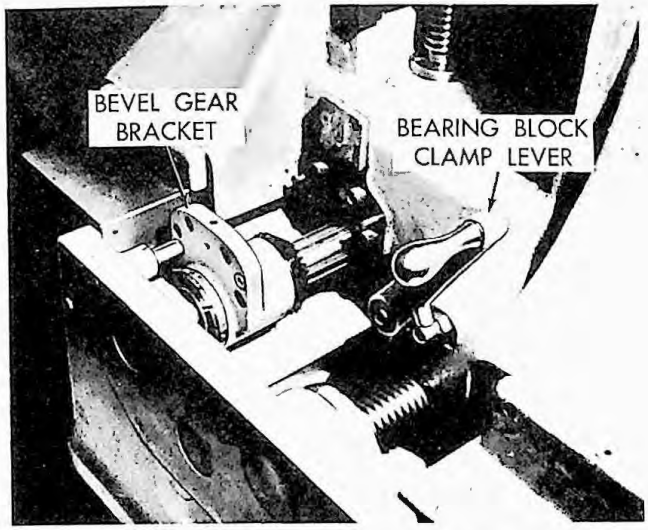


Figure 10. End Support Lower Works

and disengaged while the headstock is positioned to the correct position. The bracket can then be bolted in place. A final precision alignment is described under "Adjustments", page 31.

COOLANT SYSTEM

If a coolant system is supplied, the pump and piping and the coolant trough can now be mounted on the machine and wired into the control panel, (figure 11).

LEVELING

After completion of the machine installation, it is necessary to check and adjust the machine for its level condition and take all machine alignments to assure the maximum accuracy in machining operations. This should be accomplished after the machine is completely wired and lubricated (see instructions in lubrication section, page 10).

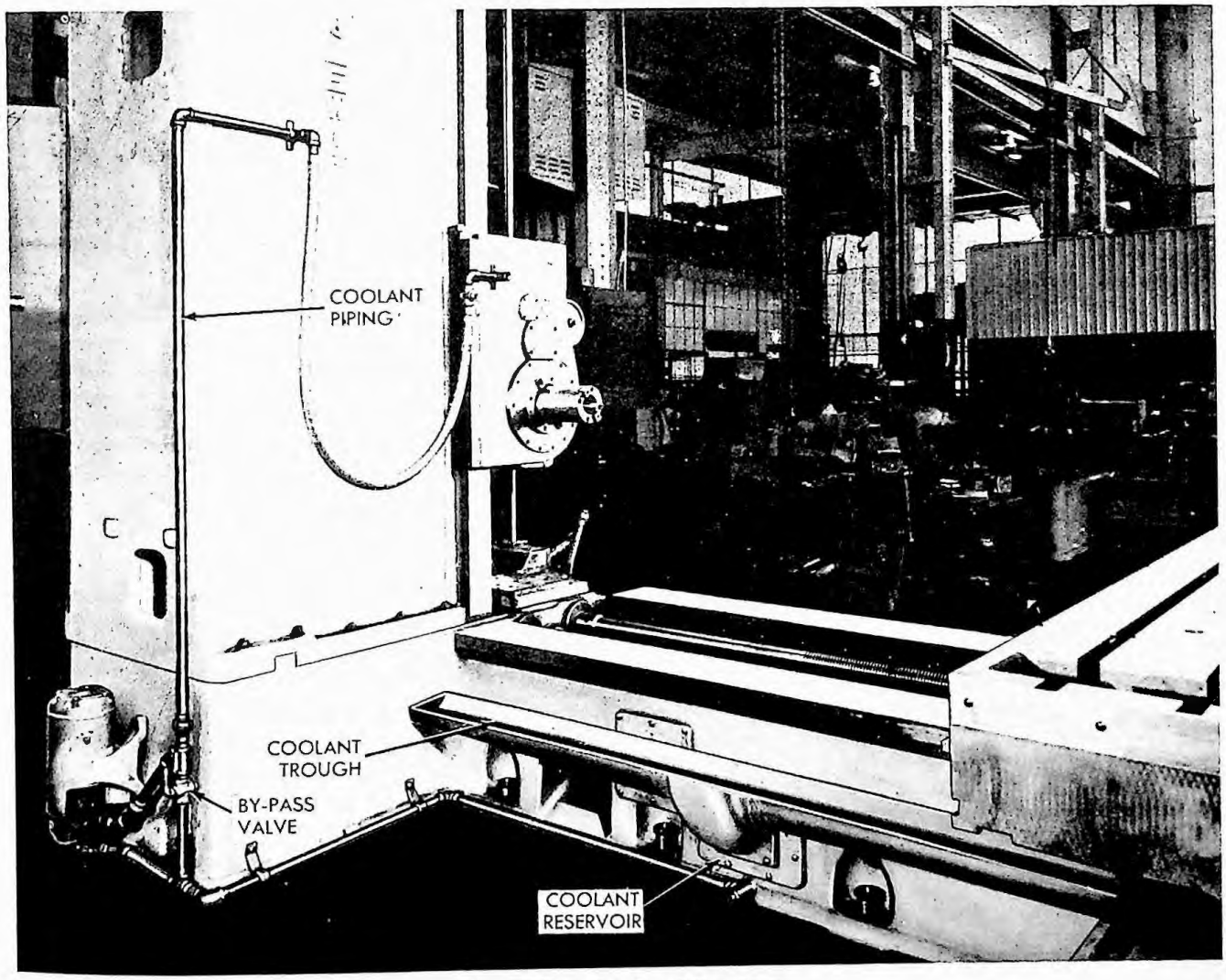


Figure 11. Coolant System

All of the hold down bolts should be loosened and the saddle moved to a position toward the end support end of the bed. For proper leveling, it will be necessary to obtain a precision machine level having a vial accuracy of 10 seconds with one division equalling one-half thousandth of an inch per foot. Two levels of this type are actually more desirable so one may be used in each direction though it is possible to interchange a single level if that is all that is available. In addition to this, it is necessary to obtain an accurate parallel 1" or more wide and long enough to bridge across the bed ways.

The levels should first be placed on the leveling pads on the two rear sides of the column, (figure 12). The leveling screws around the operator's end of the bed should be adjusted to bring the reading on these two level positions to within one line on the level. Care should be taken to be sure all leveling screws are carrying an equal amount of load in this operation. The anchor or hold down bolts should be tightened as the leveling screws are adjusted. The lock nut on the leveling screw itself should not be tightened until the entire leveling job is completed.

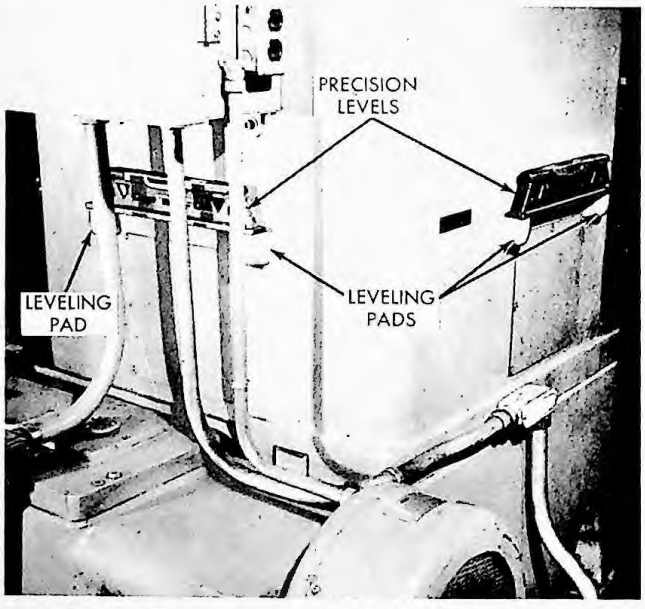


Figure 12. Leveling Column End of Bed

The parallel should now be placed across the bed ways as close to the column end of the bed as possible making sure that both the ways and the parallel are free from burrs or nicks. Its position on the bed ways should be indicated on the parallel with a pencil or crayon so it can always be set in the same relative location. One precision level may now be placed on the parallel and the other on and parallel to the bed way on the operator's side of the machine, (figure 13). These readings should be checked and compared and leveling adjustments made with the screws on either side of the bed.

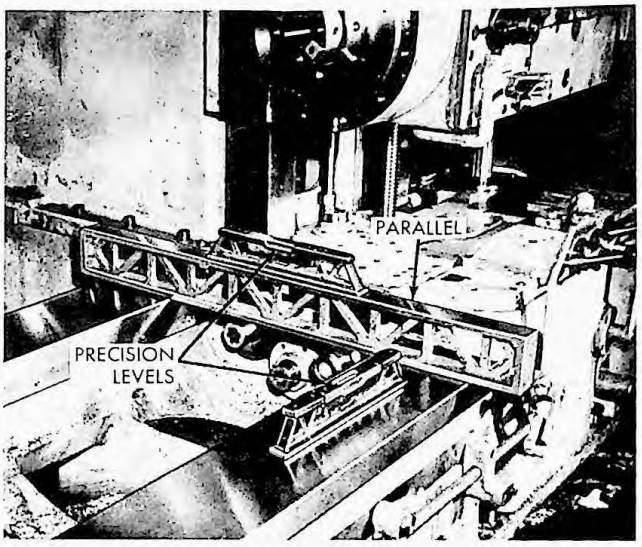


Figure 13. Level Arrangement on Bed

The bed should be raised or lowered gradually by using the screws nearest the level and the next several sets of leveling screws. Do not try to accomplish all the necessary adjustments on one leveling screw as this will tend to leave that particular section extremely high or low compared with the rest of the bed.

The parallel should then be moved to a position over the next pair of leveling screws and the level be placed on it in the same location. The other level should be moved further down the bed way between the next pair of leveling screws and appropriate adjustments made in each direction. This procedure should be repeated along the entire length of the bed. It will be necessary to move the table and saddle back and forth on the bed to keep clear of the desired leveling area. It will probably also be necessary to repeat this procedure two or three times to correct errors which were created in the continuous leveling operation.

After the bed ways are completely leveled, the level should again be placed on the leveling pads at the rear sides of the column and the leveling screws adjusted to obtain a proper reading. Care should be taken that all of the adjustment is not made on any one leveling screw in order not to affect the level condition established for the rest of the bed. When using the leveling pads on the column, extreme caution must be exercised to make sure that they are not nicked and that the level is setting on them properly. These pads are scraped at the time of final machine assembly to a level reading after the machine alignments have been taken with an indicator and cylindrical post. These pads are quite vulnerable to damage in shipment and in handling and it will occasionally be necessary to recheck the machine alignments by indicating the travel of the headstock. This will be explained later in this section.

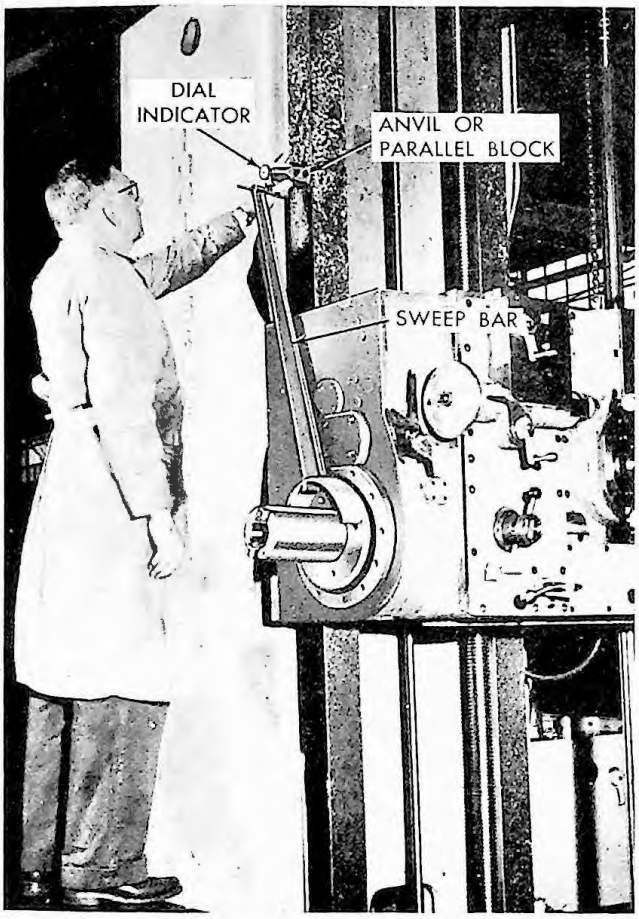


Figure 14. Spindle Sleeve Sweep to Column

When the machine is perfectly level, the locking nuts on the leveling screws should all be tightened. It is not necessary to make these nuts extremely tight as too much pressure might actually affect the level condition of the machine.

The saddle support rails should be leveled in a similar manner using two levels set parallel and at right angles respectively to the length of the rail. When leveling these rails for the first time, it is necessary to gauge the vertical distance from the top of the bed ways and hold it to within 1/16" of the dimension shown on the machine foundation plan. After these rails are completely leveled, the saddle supports should be adjusted so they will carry part of the weight of the table and table load. To do this, the table should be run out flush with the end of the saddle and a level set on the end of it parallel to the saddle ways. The saddle support should then be adjusted until this level reads 1/2 line high on the end of the table. This will allow for slight amount of settling when the table is extended beyond this position or when an extremely heavy load is moved out over the saddle support. The supports should then be firmly locked in this position with the clamp bolts on the inside of the unit.

ALIGNMENTS

The final alignment checks should now be made on the machine to assure that it has been erected and leveled properly and that the ultimate in machining accuracy can be accomplished. The first check which should be made is a sweep of the spindle sleeve to the column ways below and above the headstock casting. This is done with a special sweep bar bolted to the sleeve as shown in figure 14. An indicator is mounted to the sweep bar and a zero setting is established on the front face of the column way below the headstock. When doing this, it is best to indicate over a small ground parallel block to assure a more uniform reading in all positions. After the zero setting has been established at the bottom, the sweep is rotated to a position above the headstock and an identical reading taken on the column way using the same parallel block. This reading should be from 0 to plus .001" on top to indicate that the spindle is tilted up a very slight bit. This alignment has proven to be the best for the overall accuracy of the machine and will allow for a slight sag in the spindle at extended positions.

If this check does not fall within this tolerance, first be sure that the sweep bar is completely rigid as this can have a very great effect on the final reading. If this is all right, then the headstock wiper should be removed and the guiding way checked with a feeler gauge as there may have been some dirt or foreign matter underneath the ways during assembly which will require the removal of the headstock.

The other alignment checks to make are the vertical travel of the headstock as indicated against a square or cylindrical post set on the center of the machine table. This square should be indicated both in a direction parallel to the bed ways and perpendicular to the bed ways to assure that the column is standing completely vertical, (figure 15). The toler-

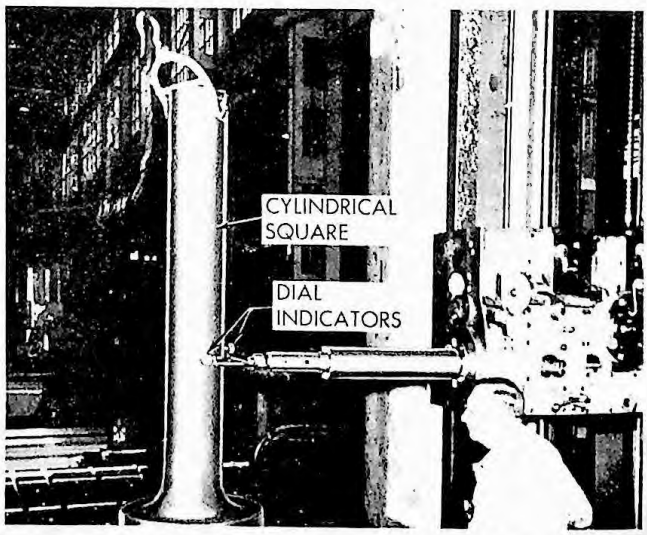


Figure 15. Indicating Headstock Travel

ance on this reading is .001" in 48" and correction of this reading can be made by adjusting the leveling screws underneath the column end of the bed.

The final alignment check to make is the parallelism of the spindle travel with the bed ways. Before this can be accomplished, it is necessary to run the machine headstock approximately 15 minutes until it warms up to operating temperature. To make this check it is necessary to extend the spindle approximately 18" and clamp an indicator to a magnetic base set on the front edge of the machine table, (figure 16). This indicator should be positioned against the side of the spindle. Next, rotate the spindle and pick up the high point of the spindle runout. Then adjust the headstock up and down slightly to make sure the highest point of the spindle is contacting the indicator button. The headstock should be clamped in this position. The saddle should now be traversed over a length of 12" and the indicator reading taken at extreme limits of this travel. The reading on this measurement should be within .0002" over 12" of travel. This will actually govern the straightness of a boring operation when using the spindle or saddle travel. If this check does not fall within the required tolerance, it will be necessary to loosen the column bolts holding it to the bed and grind a small amount of stock off of one or the other of the two ground shims which locate it against the integral key on the bed.

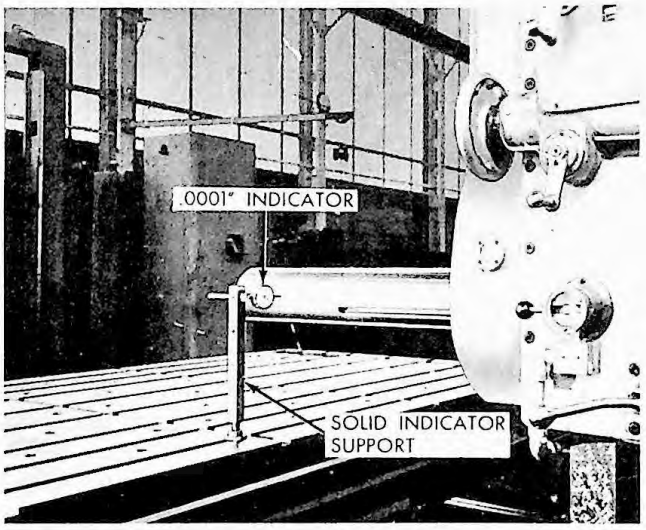


Figure 16. Checking Spindle Alignment to Bed Ways

Section 2
LUBRICATION

The life and service of a precision machine tool depends greatly upon the care and maintenance it receives. The best way to care for a machine is to see that it is frequently, thoroughly and properly lubricated.

To simplify this problem, all Giddings & Lewis machines are equipped with various automatic oiling systems. These systems require attention only at infrequent intervals though there are some daily hand oiling operations required. Complete information on the proper lubrication of your machine is given below.

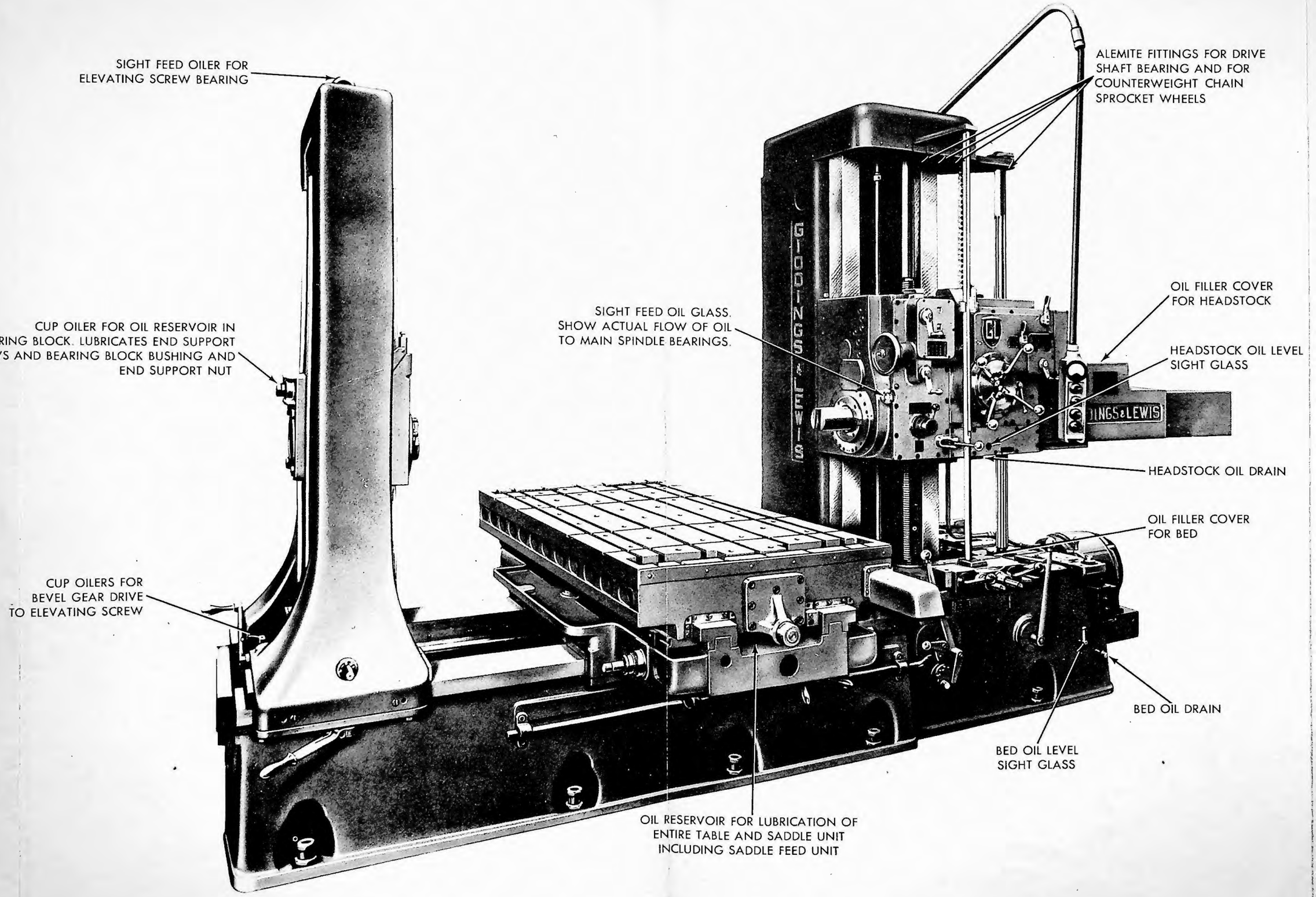
A chart listing the lubrication recommendations for your machine is shown in figure 17, and also on a metal plate attached to the machine.

LUBRICATION

ELEMENT	METHOD	Gargoyle LUBRICANT RECOMMENDED
Headstock	Circ. System	Gg. D. T. E. Oil Light
Bed Base	Splash System	Gg. D. T. E. Oil Light
Table Drive Unit	Grease Packed	Gargoyle Grease Sovarex No. 1
	Oil Packed	Gargoyle Cylinder Oil 600W
Table & Saddle Ways	Bijur System	Gargoyle Vactra Oil No. 2
End Support Block	Oil Reservoirs	Gg. D. T. E. Oil Heavy Medium
Coolant Pump	Grease Packed	Gargoyle Grease Sovarex No. 1
Miscellaneous Bearings	Grease Cup	Gargoyle Grease Sovarex No. 1
Electric Motors	Grease Packed	Gargoyle Grease Sovarex No. 1
Table Hand Feed Gear Box	On Model 350 Only	Gargoyle Cylinder Oil 600W
Misc. Oil Cups & Oilers on Saddle	Hand Oiled	Gg. D. T. E. Oil Heavy Medium

The above are Socony-Vacuum products.
They or their equivalent are suggested.

Figure 17. Lubrication Chart


SIGHT FEED OILER FOR ELEVATING SCREW BEARING
CUP OILER FOR OIL RESERVOIR IN BEARING BLOCK. LUBRICATES END SUPPORT WAYS AND BEARING BLOCK BUSHING AND END SUPPORT NUT
CUP OILERS FOR BEVEL GEAR DRIVE TO ELEVATING SCREW
SIGHT FEED OIL GLASS. SHOW ACTUAL FLOW OF OIL TO MAIN SPINDLE BEARINGS.
ALEMITE FITTINGS FOR DRIVE SHAFT BEARING AND FOR COUNTERWEIGHT CHAIN SPROCKET WHEELS
OIL FILLER COVER FOR HEADSTOCK
HEADSTOCK OIL LEVEL SIGHT GLASS
HEADSTOCK OIL DRAIN
OIL FILLER COVER FOR BED
BED OIL DRAIN
BED OIL LEVEL SIGHT GLASS
OIL RESERVOIR FOR LUBRICATION OF ENTIRE TABLE AND SADDLE UNIT INCLUDING SADDLE FEED UNIT
GIDDINGS & LEWIS
GL
INGS & LEWIS

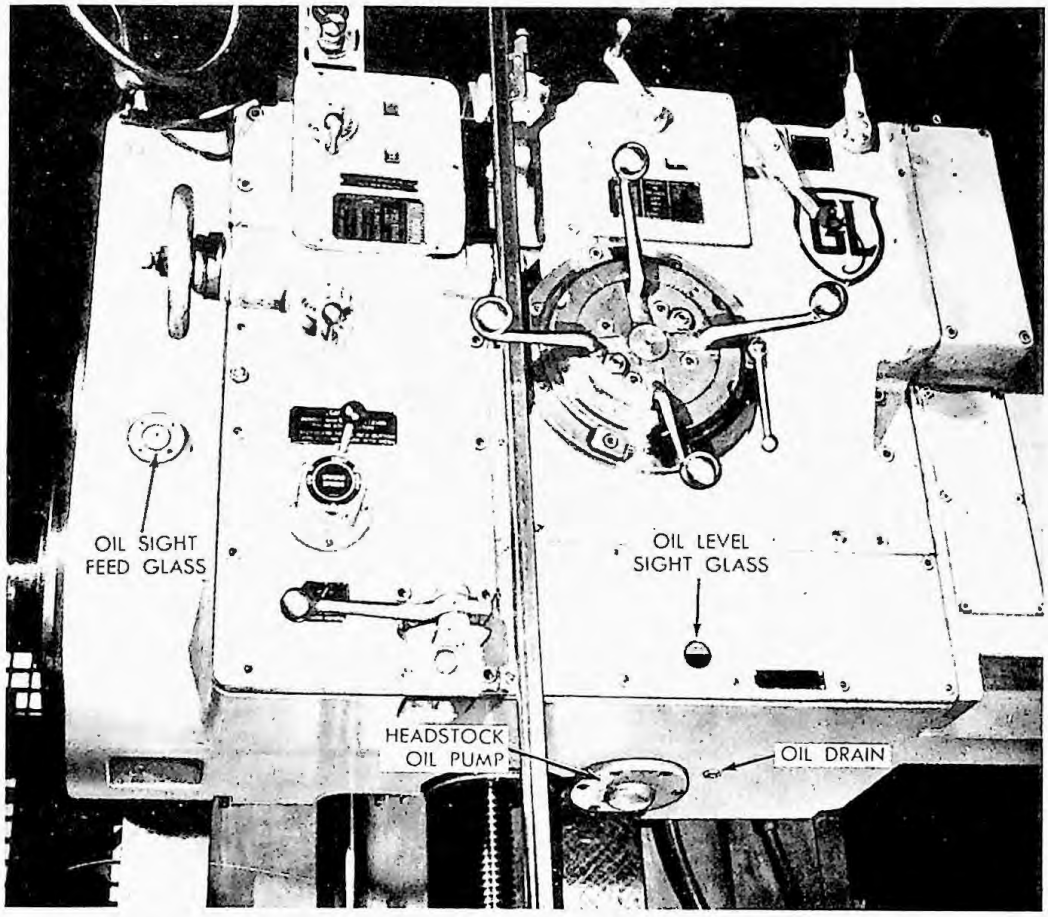


Figure 18. Headstock Lubrication

HEADSTOCK

The headstock on the 30 Series table type horizontal boring machines contains its own oil reservoir. The gears and bearings as well as the headstock ways are lubricated from an automatic distribution system within the head leading from a gear driven pump located in a sump at the bottom of the casting. One line from this pump directs oil to the sight feed pocket at the front of the head where it runs down into the front spindle sleeve bearings, (figure 18). The sight feed glass is used to indicate that the pump is working properly. The flow of oil in the glass can be regulated by removing the glass and adjusting the set screw. This flow should be limited to 40 to 60 drops per minute to prevent it from running out the front bearing cover.

Before running the head, it should be filled with oil through a pipe plug hole in the top of the ram guide immediately to the right of the vertical drive shaft, (figure 19). Oil should be poured into the head until it reaches the half way mark on the oil sight gauge near the bottom of the headstock. The head should then be started up and allowed to run while more oil is added until the running level reaches the gauge line. For draining the headstock when changing oil, a plug is provided in the underside of the casting near the oil pump.

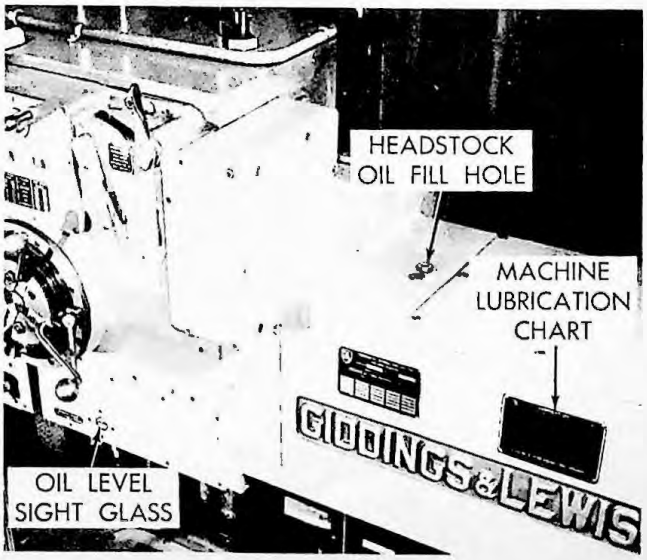


Figure 19. Headstock Lubrication

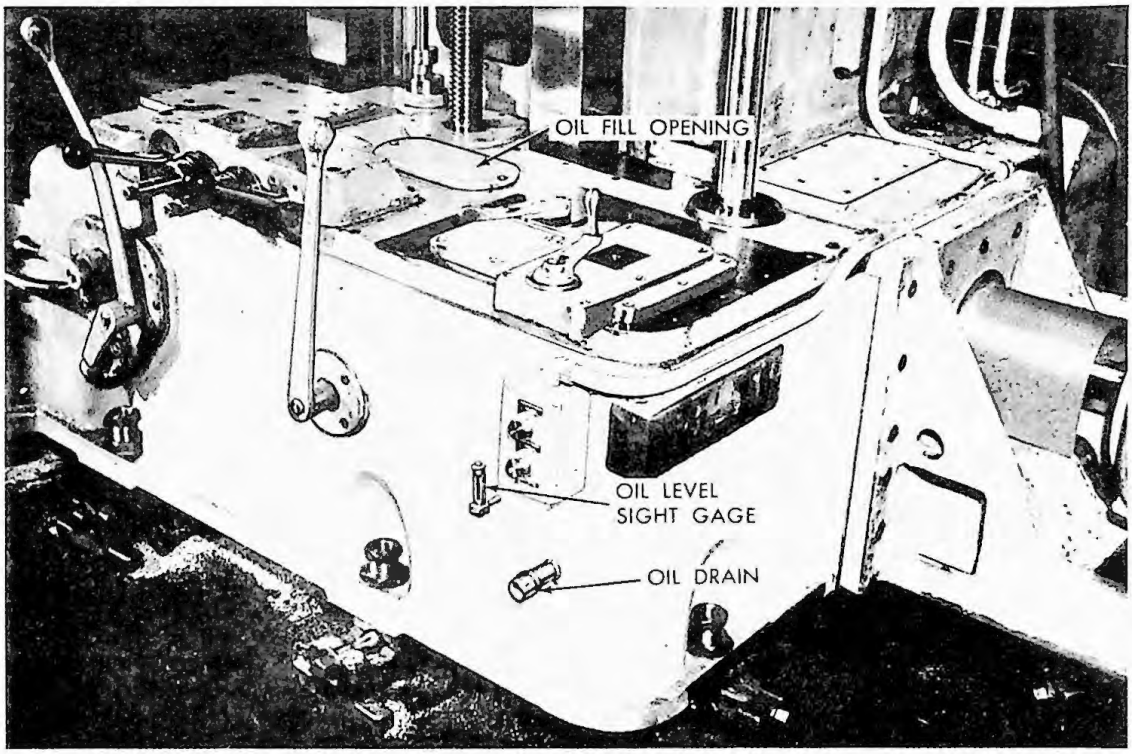


Figure 20. Bed Lubrication

BED

All of the mechanism in the bed of this machine is oiled through a splash lubrication system. The oil may be poured into the bed through the opening over the feed and rapid traverse clutch, (figure 20). This compartment should be filled until the level reaches the half way mark on the oil sight gauge. The amount and recommended type of lubricant is noted on the lubrication chart.

TABLE AND SADDLE

All the bearings, ways and moving parts of the table and saddle unit are automatically lubricated. A pressure pump submerged in an oil pocket in the saddle is operated by a cam whenever the feed and rapid traverse lever is engaged. The oil is piped to the various bearings and the proper amount of oil supplied to each bearing is controlled by drip type filter fittings. By moving the table to the extreme position away from the operator, the filter cap is exposed so that the pocket can be filled with oil, (figure 21). About three quarts of oil are required to fill the pocket. It should be inspected occasionally and refilled with oil when the oil does not appear above the bottom of the strainer screen.

On the No. 340-T machine, the hand feed shaft bearings for the table hand feed are readily lubricated by running the table back a short distance and oiling through the four small oilers immediately above the hand feed shaft. The four oilers are located--two outside and two between the saddle ways.

On the No. 350-T machine only, a separate compartment, which holds approximately one quart of oil, is provided for oiling the gears and bearings for hand feeding the table. The table must be run back to expose the pipe plug for filling, (figure 21).

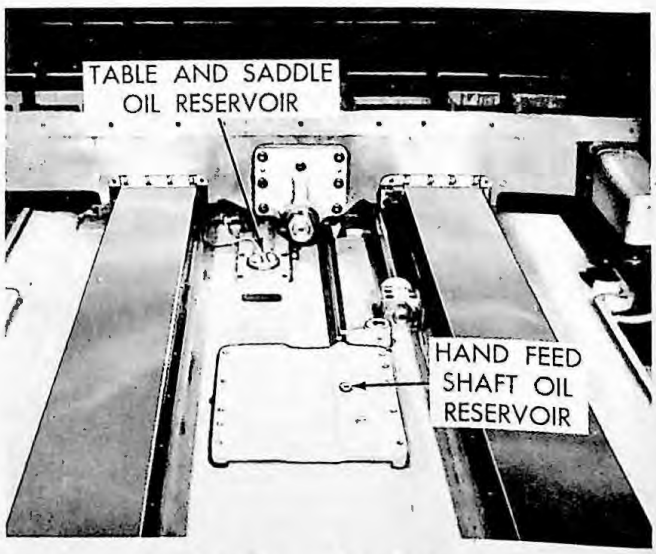


Figure 21. Table and Saddle Lubrication

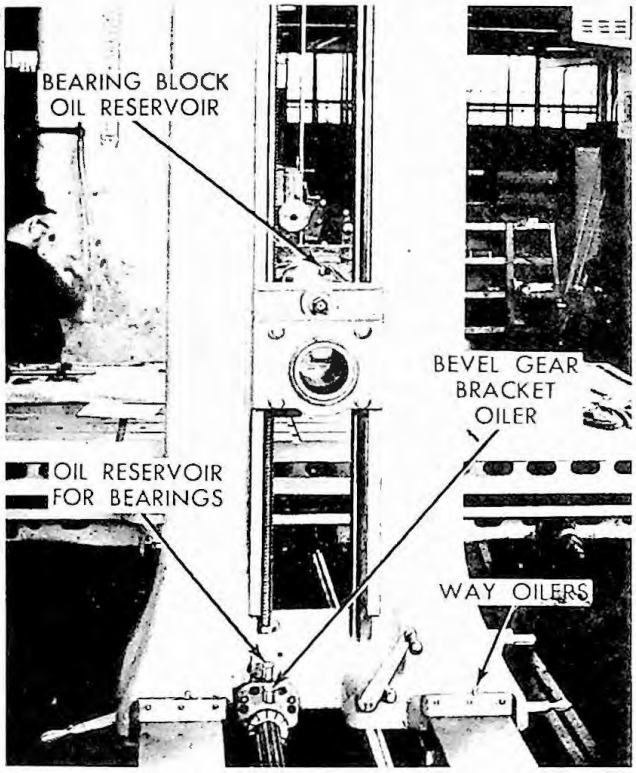


Figure 22. End Support Lubrication

END SUPPORT

The end support block is lubricated from a small chamber in the top, (figure 22). This chamber should be filled with oil to the top of the oiler. This oil level should be maintained and frequent inspection is advised to make sure of this requirement. The compartment holds approximately one pint of oil. There is another compartment at the base of the end support which holds approximately one-quarter pint and takes care of lubricating two bearings on the shafts. This compartment is filled with oil to the top of oiler. This level should also be frequently inspected so that the compartment is kept constantly filled with oil. Bowen oilers on the bed way wipers should be filled at least once a day. A wick-fed oiler, (figure 23), on top of the end support is used for lubricating the bearing on top of the elevating screw. This oiler should be frequently inspected and filled.

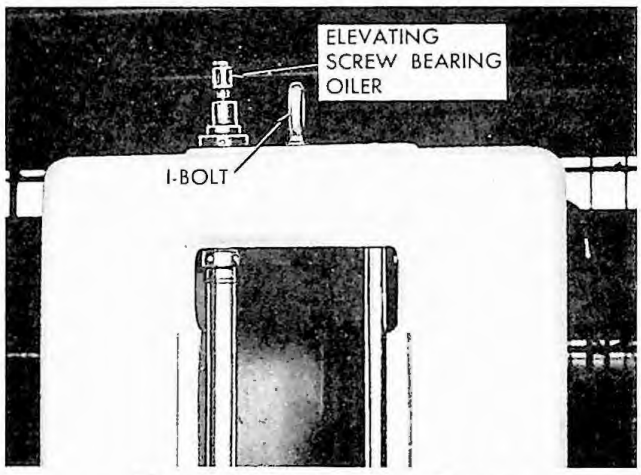


Figure 23. Elevating Screw Bearing Lubrication

GENERAL

In addition to the major units there are a number of small oilers on the hand feed shafts and other isolated moving parts which must be lubricated daily. The motors should be lubricated according to the chart on the machine.

CHANGING OIL

The oil in the headstock reservoir and compartment of the bed of the machine should be removed after the first two or three weeks. These reservoirs should then be filled with flushing oil and the machine operated for 3 to 5 minutes. Disassemble the oil pump by removing the flange screws underneath the headstock next to the drain plug and thoroughly clean any sediment from the headstock reservoir. The flushing oil can then be withdrawn and the reservoirs filled with a supply of fresh, clean oil as previously mentioned. After this first change, it is advisable to repeat this cleaning every four to six months, depending upon the amount of use given the machine. It is very necessary to periodically flush out the machine as described above. The oil in the machine is subject to heat and wear the same as that in an automobile. If the practice of carefully lubricating and periodically cleaning is observed, no lubrication difficulties should ever develop in your Giddings & Lewis Horizontal Boring, Drilling, and Milling Machine.

Section 3
OPERATION

The following instructions should be carefully studied and thoroughly understood before any attempt is made to start the machine. Do not place any tools or any other articles on top of the bed immediately under the headstock because these two units come very close together when the headstock is all the way down.

MOTOR AND CONTROL

There is one motor that drives the spindle, table, headstock, saddle, and end support bearing block. The drive motor is rated at 20 horsepower on the 340-T machine and 25 horsepower on the 350-T machine.

Overload protection is provided for the motor on the machine. The circuits are arranged so that in the event of an overload, all motion of the machine is stopped.

The control of the drive consists of a reversing type across-the-line starter and an electric brake for stopping. It should be noted that inching the motor at frequent intervals will trip the main motor overloads. Therefore, discretion should be used in the number of times the main motor is started and stopped repeatedly.

The pendant control houses a number of push buttons and selector switches, (figure 24). These are used to accomplish the following functions:

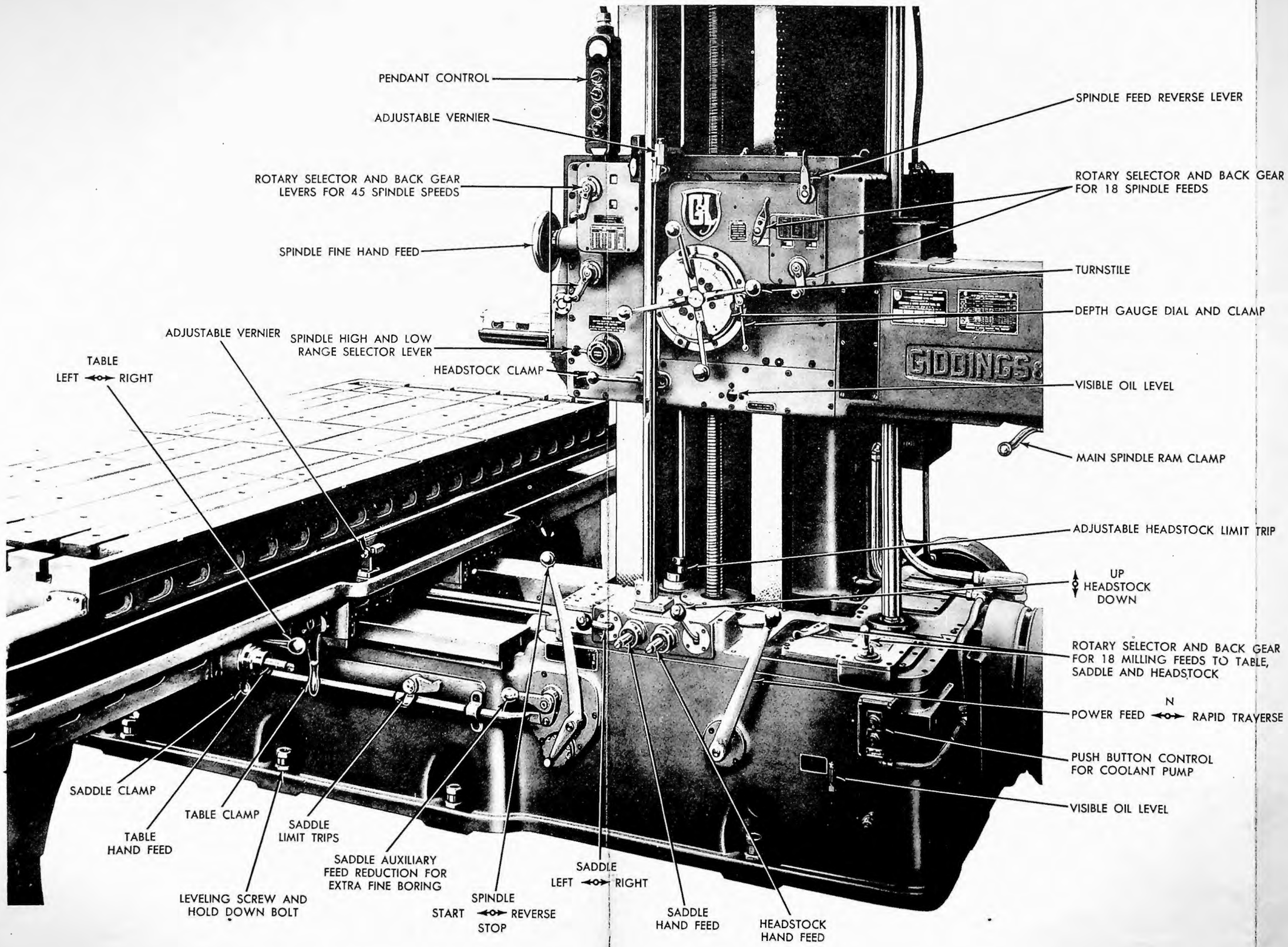
1. Stop and start the main drive motor.
2. Change rotative direction of the motor.
3. Jog the motor manually.

All machines have a built-in ammeter mounted in the pendant control. This ammeter enables the operator to determine the amount of power being consumed so he can safely stay within the capacity of the machine. As a protection against overloading, it will be necessary to limit the horsepower consumed to 1 horsepower per revolution of the spindle between the speeds of 10 and 20 rpm on the 340-T machine and 7.5 and 25 rpm on the 350-T machine. This limitation is indicated on the face of the ammeter.

WARNING

Care should be exercised so that continuous feed facing heads, star feed facing heads and other off balance rotating accessories and attachments are not operated at spindle speeds in excess of those called for on attachment noteplate.

Figure 24. Pendant Control Station
(350-T Illustrated)


PENDANT CONTROL
ADJUSTABLE VERNIER
ROTARY SELECTOR AND BACK GEAR LEVERS FOR 45 SPINDLE SPEEDS
SPINDLE FINE HAND FEED
ADJUSTABLE VERNIER
SPINDLE HIGH AND LOW RANGE SELECTOR LEVER
HEADSTOCK CLAMP
TABLE
LEFT ◄► RIGHT
SADDLE CLAMP
TABLE HAND FEED
TABLE CLAMP
LEVELING SCREW AND HOLD DOWN BOLT
SADDLE LIMIT TRIPS
SADDLE AUXILIARY FEED REDUCTION FOR EXTRA FINE BORING
SPINDLE START ◄► REVERSE STOP
SADDLE LEFT ◄► RIGHT
SADDLE HAND FEED
HEADSTOCK HAND FEED
SPINDLE FEED REVERSE LEVER
ROTARY SELECTOR AND BACK GEAR FOR 18 SPINDLE FEEDS
TURNSTILE
DEPTH GAUGE DIAL AND CLAMP
VISIBLE OIL LEVEL
MAIN SPINDLE RAM CLAMP
ADJUSTABLE HEADSTOCK LIMIT TRIP
UP
HEADSTOCK
DOWN
ROTARY SELECTOR AND BACK GEAR FOR 18 MILLING FEEDS TO TABLE, SADDLE AND HEADSTOCK
N
POWER FEED ◄► RAPID TRAVERSE
PUSH BUTTON CONTROL FOR COOLANT PUMP
VISIBLE OIL LEVEL

LEVER FUNCTIONS

FEATURES

DIRECTIONAL CONTROL

Eliminates operator fatigue and saves time - no need to concentrate on which way to move the levers - just move them the way you want the machine unit to go.

CENTRALIZED CONTROL

No climbing around the machine to get at the controls - everything within convenient reach of the operator.

SCALES AND ADJUSTABLE VERNIERS

Accurate measurement to .001" on table and headstock units. Adjustable vernier eliminates decimal figuring.

MICROMETER HAND ADJUSTMENT

Adjustable dials, graduated to .001" allow accurate setting of all units by hand.

VISIBLE OIL LEVELS

Positive assurance of proper lubrication.

ROTARY DIALS AND SELECTORS

Simply turn the crank to select proper speeds and feeds for all units - quickly and precisely.

Figure 25. Control Functions Chart

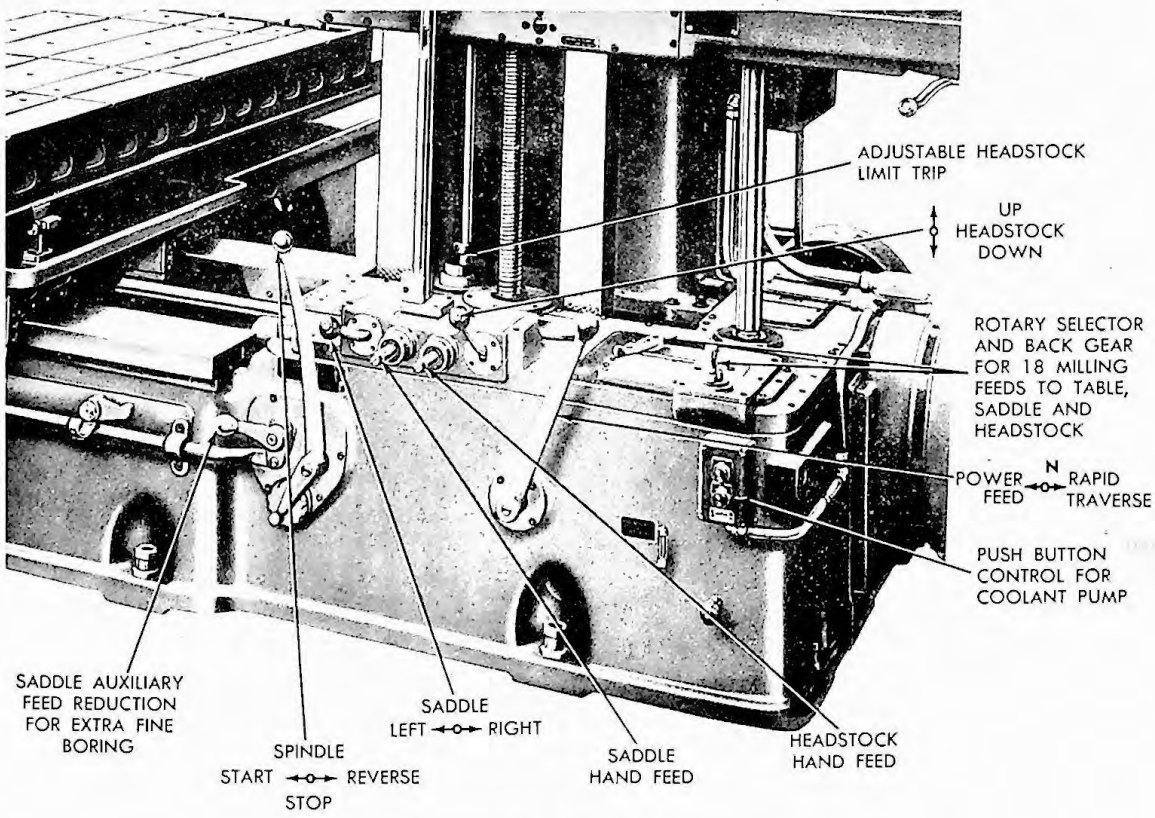


Figure 26. Bed Controls

STARTING, STOPPING, REVERSING

When the machine is idle, the start, stop and reverse lever is approximately 10 degrees to the left of vertical. This lever controls the two multiple disc clutches for the main drive. Throwing this lever to the left causes the spindle to rotate right hand, i.e., the direction for drilling, (figure 26).

Throwing it to the right of the neutral position causes the spindle to rotate in the opposite direction.

The stop, start, reverse lever can be used for inching the spindle in either direction but avoid running the spindle when this lever is not in either of its extreme positions. A partially engaged clutch will slip and slipping causes wear.

At the low end of the start, stop, reverse lever a projection is provided and directly below the lever an adjustable safety knob is arranged so that it may be turned in three different positions. When the machine is used for tapping, which requires that the spindle must be quickly reversed, the safety knob is turned to the middle or lowest position to allow the projection on the end of the lever to pass from the forward to the reverse position without any interference. For safety purposes, when the machine is normally used with the spindle rotating to the right, such as using right hand milling cutters, it is advisable that the knob be turned to the left. In the event the machine must be quickly stopped, the lever can then be jerked to the neutral position without going into reverse.

MILLING FEED AND RAPID TRAVERSE

A complete feed mechanism for milling is located in the bed of the machine at the column end. Incorporated in this feed unit is a rapid traverse to all units. This feed and rapid traverse unit controls the movement of the headstock and end support block up and down, the table forward and backward on the saddle and the saddle movement to the left and right along the bed of the machine. The feed and rapid traverse is selected through the feed and rapid traverse lever. When this lever is pushed to the left, the feed train of the gears is engaged. When it is pushed to the right, the rapid traverse is engaged. The engaging of this lever into the feed or rapid traverse does not of itself apply the feed or rapid traverse to any of the units. This is controlled independently for each unit. The feed and rapid traverse are always in the same direction.

The eighteen milling feeds are obtainable through two levers. One of them is a rotary lever geared to a dial having all the milling feeds in inches per

minute. The other is a back gear lever to which is attached a slide having an opening which exposes to view the actually engaged feed corresponding to the position of the levers. A milling feed note plate shows all the feeds in the order that they are obtained by turning the rotary lever.

There is no feed reverse in this unit as the direction of the feed and rapid traverse is taken care of independently for each of the units. With this directional control of the feed and rapid traverse on each unit, it is not necessary to bring any unit back by hand after it has gone on to the safety limit trips. All that is necessary is to pull the directional engagement lever in the opposite position.

FINE SADDLE FEEDS FOR BORING

When extremely fine feeds are needed for boring large holes, using the slower spindle speeds, the saddle reduction lever is shifted to the right, applying a forty to one reduction to the regular saddle feeds. A spring loaded clutch permits the rapid shifting of the lever without waiting for the clutch teeth to engage. A note plate is attached near the lever showing the fine feeds available. As the saddle rapid traverse is also reduced forty to one, the lever should be shifted to the left to obtain 120" per minute rapid traverse to the saddle.

IMPORTANT

> Machine must be running, feed lever must be engaged for either direction and feed and rapid traverse lever must be engaged to the left before shifting saddle reduction lever.

HEAD TRAVERSE

The application of the feed or rapid traverse in either direction to any of the units is controlled independently. The headstock power traverse lever is for moving the head up and down on the column. This lever moves in a vertical plane. When lever is moved up, the head travels up for either feed or rapid traverse. When the lever is moved down, the head travels down. This lever can be engaged into either position without slowing down the feed or speed or otherwise interfering with the progress of the cut being taken. Do not engage this lever into either position with the rapid traverse running. Headstock hand traverse shaft is for the hand movement of the headstock up and down on the column. This, of course, will be used only for final adjustment of the head for an accurate boring operation. This is operated by a safety hand crank referred to later in these instructions.

SADDLE TRAVERSE

A saddle power traverse lever applies feed or rapid traverse in either direction for the movement of the saddle back and forth on the bed ways. This lever moves in a horizontal plane and the same directional control of this unit is obtained as mentioned for the headstock movement on the column. This unit will move in the direction the lever is pushed for either feed or rapid traverse. This lever can be engaged into either position without slowing down the feeds or speeds or otherwise interfering with the progress of the cut being taken. Do not engage this lever into either position with the rapid traverse running. The saddle hand traverse shaft is for moving this unit back and forth by hand. This saddle hand feed will be used only for the final adjustment of the table along the bed for some accurate position. It, too, is operated by a safety hand crank handle referred to later in these instructions.

SPEED CHANGING

All the speed changes on these machines are located in the head and are obtainable through three levers, (figure 27). Of these three levers, one is the spindle high and standard or low range selector. This lever has three positive shifts; high range to the right, neutral in a vertical position and standard range to the left. After selecting the desired speed range, the exact speed can be obtained through one of two rotary back gear levers. A spindle speed plate shows all the spindle speeds obtainable. The rotation of the rotary levers obtains the speeds in the order in which they are shown on the speed plate.

If it is desired to operate the spindle feed without rotating the spindle, the high and standard range lever can be shifted to the neutral position.

CAUTION

> While these speed change levers shift very easily and the gears controlled by them will mesh at lower speeds, it is advisable not to shift them under power. It is suggested that the start, stop and reverse lever be engaged and pulled out again, and while the machine is still coasting, the speed change levers can be shifted to the desired positions.

POWER FEED TO SPINDLE

The entire feed mechanism for the spindle is contained in the head and all spindle feed changes are obtainable through two levers. One of these is a rotary lever geared to a dial having all the spindle feeds. The other is a back gear lever to which is attached a slide having openings which expose to view the actually engaged high and standard range spindle feeds, corresponding to the positions of the high and standard range lever. A spindle feed plate shows all the feeds in the order in which they are obtained by operating the rotary lever. Feed is

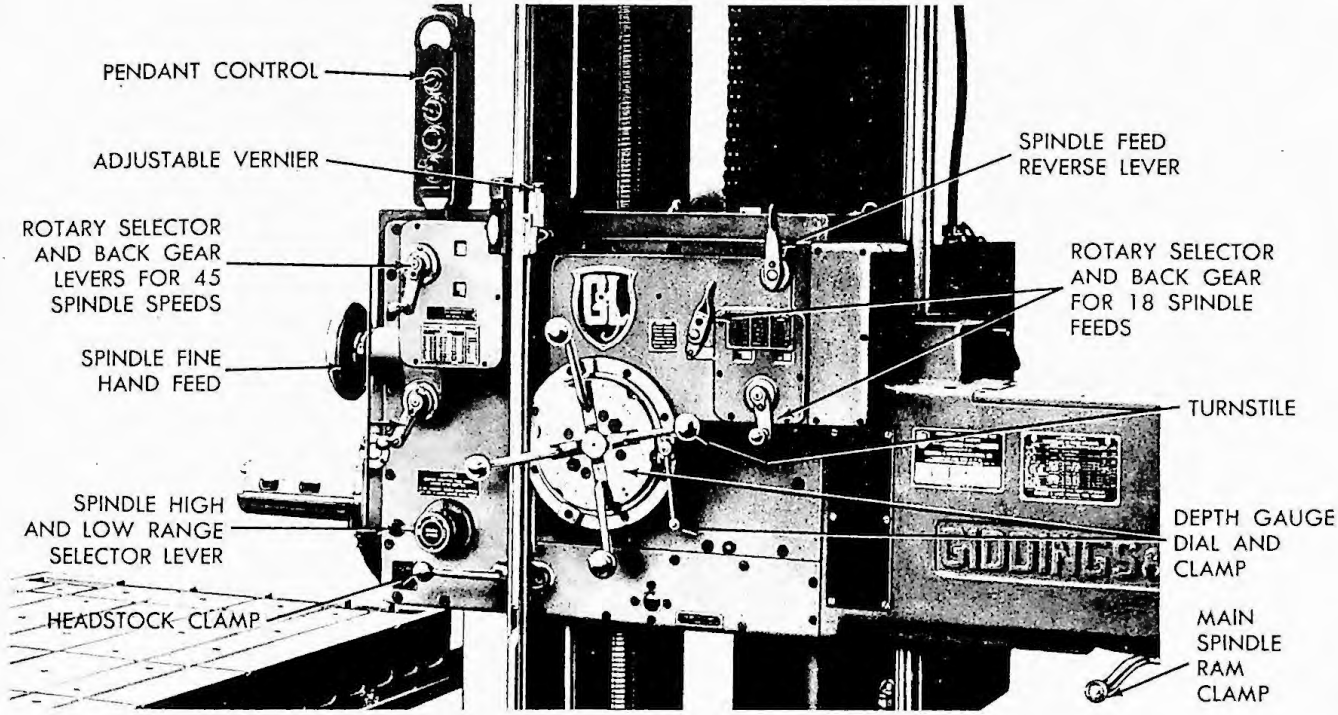


Figure 27. Headstock Controls

applied to the spindle by pulling the quick motion turnstile handles toward the operator.

CAUTION

Do not apply power feed to spindle when in extreme in or out position. Spindle should be started from extreme position by means of turnstile handles before applying power feed.

SPINDLE FEED REVERSE

The spindle feed reverse lever controls the direction of the spindle feed and when it is straight up and down, it is in the neutral position. When pushed to the right, the power feed moves the spindle out when it is rotating right-hand as for drilling.

When pushed to the left, the power feed moves the spindle in. When the spindle is reversed as in the backing out of a tap, the direction of feed is also reversed.

HAND FEED TO SPINDLE

If it is desired to feed the spindle feed hand wheel, it is necessary that the spindle feed reverse lever be in the neutral position. Spindle hand wheel rotates so that the top of it comes toward the operator and moves the spindle out, irrespective of spindle rotation.

For hand feed as well as for power feed to the spindle, the quick motion turnstile handles should be pulled toward the operator.

SPINDLE CLAMP

The spindle can be clamped at any position of its travel. A lever clamps the spindle by pulling it toward the operator.

CAUTION

Do not apply feeds to spindle while clamped.

HEADSTOCK CLAMP

Before attempting to move any unit by hand or power, care should be taken that the clamp for that unit has been released. The headstock clamp lever, by means of a cam and multiplying levers, securely clamps the head to the column on the back inside edge of the column ways. The head is clamped to the column by pulling lever toward the operator.

DEPTH GAUGE FOR SPINDLE FEEDS

In connection with the spindle feed unit, an arrangement is provided so that the feed to the spindle may be automatically disengaged at any predetermined point within six inches of travel. Any tools attached to the spindle should first be set to the starting position of the feed. This is done by means

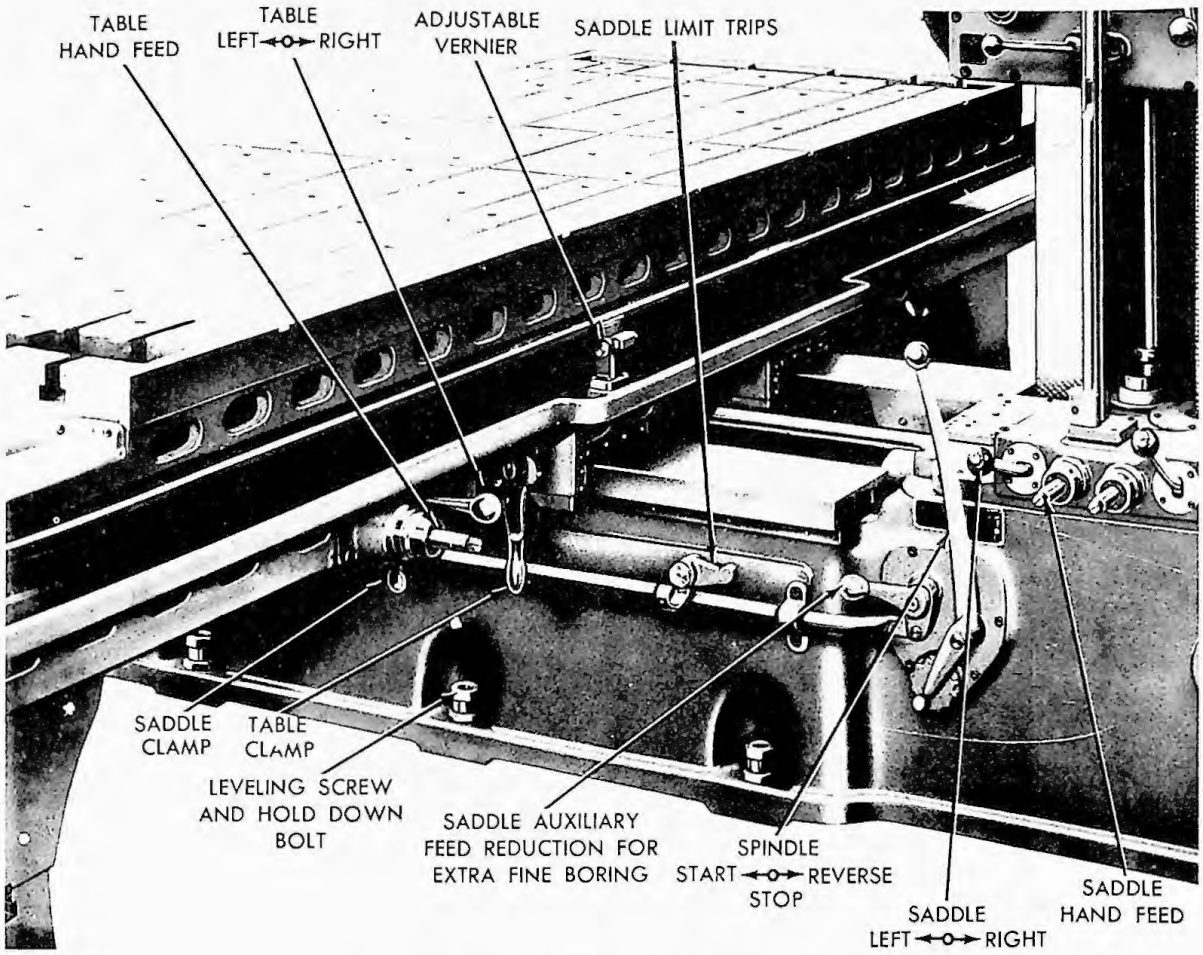


Figure 28. Table and Saddle Controls

of the turnstile handles. The adjustable dial which is graduated in sixteenths of an inch up to six inches, is turned so that the distance the spindle is to be fed lines up with the zero stamped on the turnstile hand hub. The dial is then clamped with the clamp lever and the feed is engaged by pulling turnstile handles toward the operator. When the dial is clamped, the spindle feed will always be automatically disengaged when the zero on the hub lines up with the zero on the adjustable dial.

TABLE TRAVERSE

Table power traverse lever, (figure 28), applies feed or rapid traverse in either direction to the movement of the table back and forth on the saddle. This lever moves in a horizontal plane and the same directional control of this unit is obtained as mentioned for the above movement of the headstock up and down on the column. The unit will move in the direction the lever is moved for either feed or rapid traverse. This lever can be engaged into either position without slowing down the speed or feed or otherwise interfering with the progress of the cut being taken. Do not engage this lever into either position with the rapid traverse running. The table hand traverse shaft is for moving the table back and forth on the saddle by hand. The table hand feed will be used only for final adjustment of the table on the saddle for some accurate position. It is also operated by the safety hand crank referred to later in these instructions.

TABLE CLAMP

The table is clamped to the saddle by pulling lever upward into a horizontal position. An interlock is provided in connection with this clamp so that the table feeds cannot be operated when the table is clamped.

SADDLE CLAMP

By actuating two toggles the saddle clamp lever securely clamps the saddle to the ways of the bed of the machine on both the front and rear ways. When the saddle clamp lever is at right angles to the bed, it is in the unclamped position. The clamp is applied by pulling the lever toward the operator.

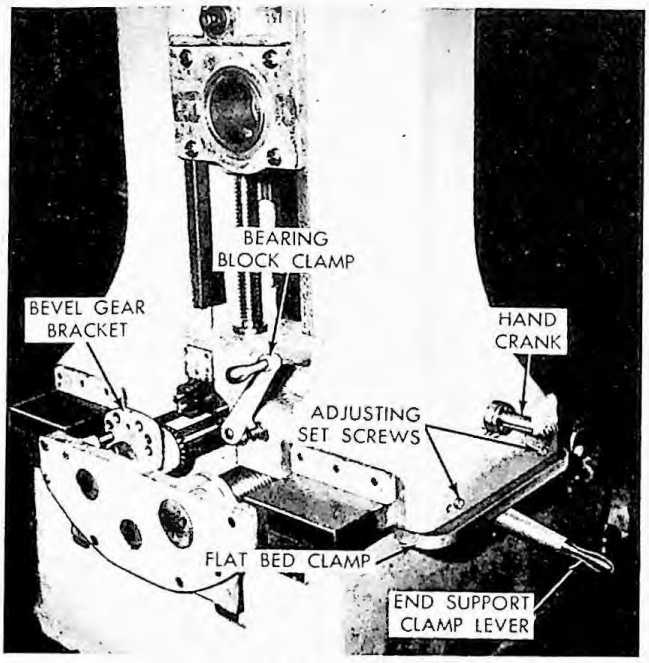


Figure 29. End Support Controls

END SUPPORT TRAVERSE

The end support is moved back and forth on the bed of the machine by the end support traverse, (figure 29). This is operated by the safety crank handle referred to later in these instructions.

END SUPPORT REMOVAL

When long work requires the removal of the end support, this unit can be taken off the machine. To facilitate removal and replacement of this unit, the following instructions should be closely observed:

The head and end support block should be moved up until the edge of the way scraper lines up with the zero mark on the outside of the left way of the column. This mark is approximately one-third the distance from the top of the column. In this position, the end support block should be clamped, using the clamp lever. The Allen socket head set screws for adjusting the flat gib on the front of the bed should be loosened about two turns. The flat clamp plates at the bottom are provided with slotted holes so that they may be pulled back to clear the bed by merely loosening the cap screws and the clamp levers but without removing them entirely from the end support column. The bevel gear bracket at the bottom should then be removed from the end support column and attached to the pin on the bracket at the end of the bed. The complete end support can then be lifted from the bed and the machine is ready for operation.

To replace the end support, the head should be brought up to the zero mark again and the above sequence of operations reversed.

END SUPPORT BLOCK CLAMP

The end support block clamp is operated by pulling lever toward the operator.

END SUPPORT CLAMPS

There are two end support clamp levers, one on the front way and one on the rear way of the machine. The end support should be clamped to the bed of the machine whenever it is in use.

SAFETY TRIPS

The movements by power feed or rapid traverse of the headstock on the column, the saddle on the bed, and the table on the saddle are protected by means of safety trips to insure that the respective feed or rapid traverse is thrown out of engagement when the limit of travel is reached. Adjustable trip collars attached to a vertical trip rod are provided for the headstock movement on the column in order that the feed or rapid traverse can be disengaged at any point in the travel either up or down. Similar trip dogs for the table movement provide settings to disengage the feed or rapid traverse at any point within the range of the table movement. These dogs are attached to a flat table gib on the left side of the table. Adjustable disengagement features are intended as a convenience in production milling.

HAND FEED DIALS AND SAFETY CRANK

All the hand feed dials are graduated in thousandths of an inch. These graduated dials ride free on their respective shafts and can be clamped in any position by the knurled screw on the end of the shaft. All hand adjustments of the machine are made by a safety crank handle. To move any of the units with this safety crank handle, it is necessary to keep it pressed into the jaw clutch against a spring load. With this arrangement, as soon as the hand is removed from the crank handle, it is disengaged and swings free on the shaft. This prevents possible injury to the operator and damage to the machine if through oversight the crank handle should not be removed before applying feed or rapid traverse. Nevertheless, it is advisable to remove the crank handle when not in use.

Section 4
OPTIONAL ARRANGEMENTS

THREAD LEAD DEVICE

With a built-in thread lead device, any thread leads can be applied to the spindle through a change gear quadrant compartment and an accurately cut feed screw, (figure 30). A separate chart, attached to the compartment cover, is provided showing the proper gearing on the quadrant for each thread lead. The direction of the spindle movement should be determined and set by means of the screw feed reverse lever. This setting should not be changed during the thread cutting operation. The thread cutting feed is applied by pushing in the spindle feed selector lever and shifting it to the left. This engages half nuts to the screw which are always running when the lever is in engagement and the spindle is running. After a cut is taken in a thread, the tool is first backed out of the thread, then the lever is pulled out and shifted to the left and the spindle can be quickly backed out of the cut by means of turnstile handles. To facilitate picking up the thread for the next cut, a dial is provided having sixteen divisions, the alternate divisions being numbered one to eight. This dial rotates continuously when the half nuts are disengaged and the feed screw running, and stops as soon as the half nuts are engaged by means of the spindle feed selector lever.

For even threads, or those divisible by 2, such as 2, 4, 6, 8, engagement can be made on any of the sixteen divisions, each division representing 1/2" of the spindle travel. For odd threads, such as 3, 5, 7, engagement can be made on alternate divisions representing 1" of spindle travel. For threads such as 2-1/2 and 11-1/2 engagement can only be made on divisions quartering the dial, representing 2" of spindle travel. Safety trips are provided so that the half nuts are thrown out of engagement when the limit of travel is reached in either direction.

BUILT-IN ROTATING TABLE

On machines having a built-in rotating table, (figure 31), the table feed lever controls the direction of the cross travel of the rotating table on the saddle. To apply power cross feed, first shift feed and rapid traverse lever to the left and then table feed lever in the desired direction of feed. Rapid traverse is applied by shifting feed and rapid traverse lever to the right. When table feed lever is in a neutral position, hand cross feed may be applied by using the safety hand crank.

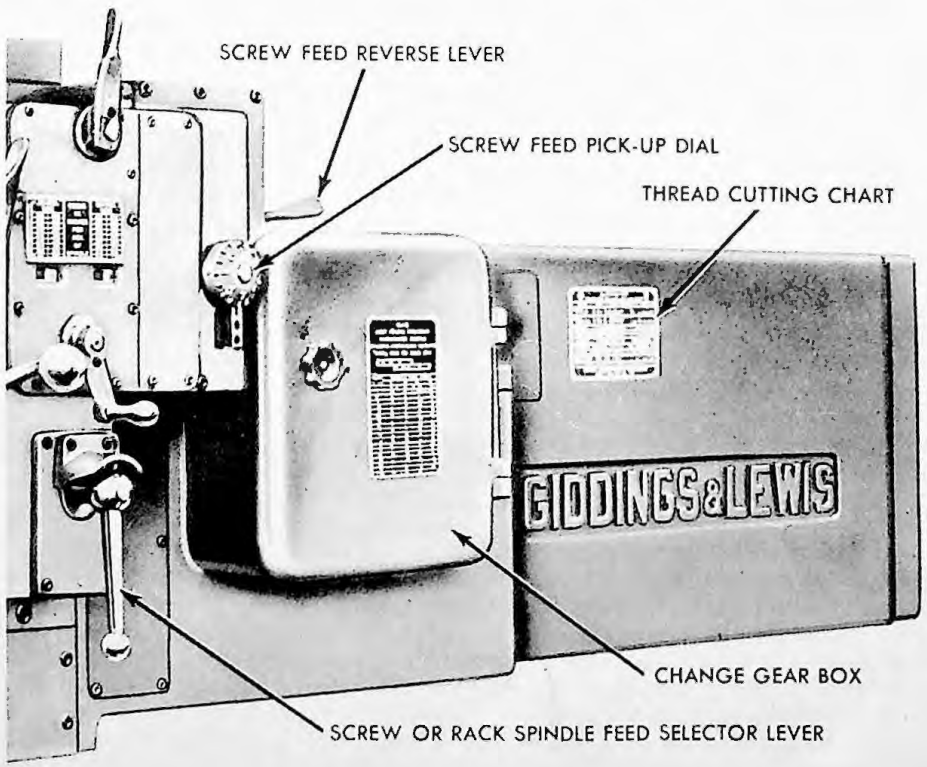


Figure 30. Precision Thread Lead Attachment

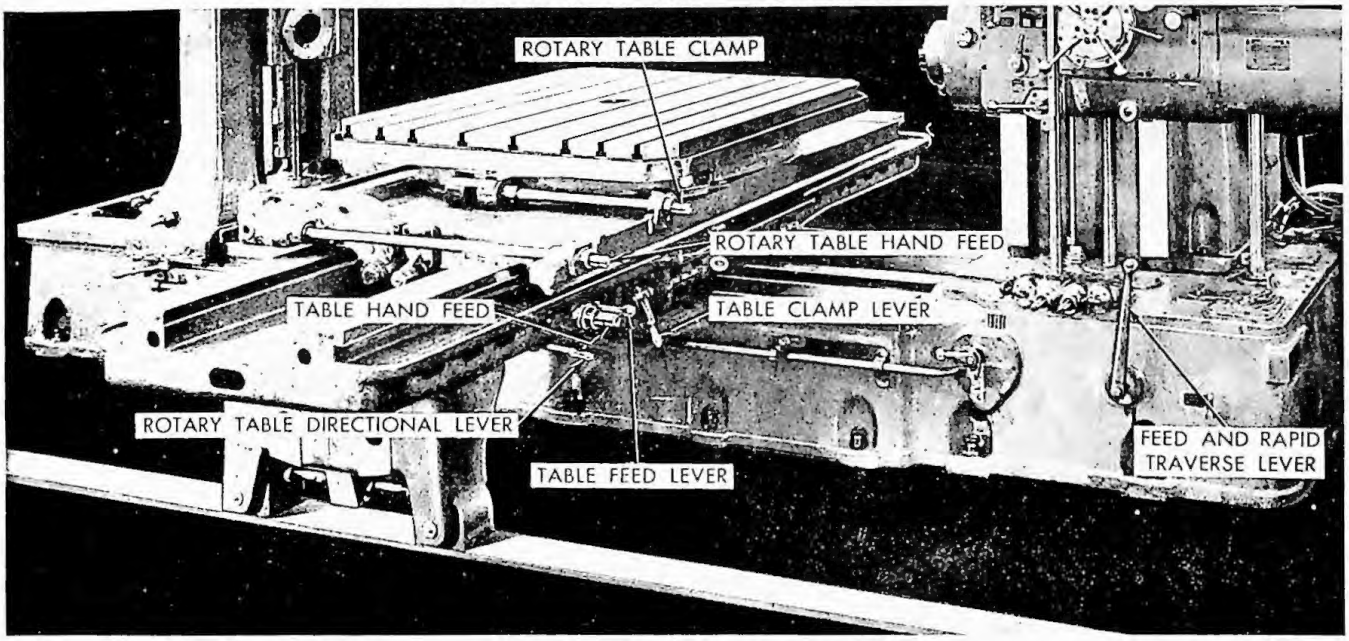


Figure 31. Built-in Rotary Table Controls

The table may be clamped against cross movement by pulling table clamp lever upward.

To apply power rotary feed to the table, first shift feed and rapid traverse lever to the left and then rotary table directional lever in the direction the table is to be turned. Rapid traverse rotary movement is applied by shifting feed and rapid traverse lever to the right.

When rotary table directional lever is in a neutral position, rotary hand feed may be applied by using the safety hand crank.

The table may be clamped against rotary movement by using the safety hand crank.

WARNING

Do not apply power rotary movement while table is clamped.

The table is graduated in 1/2° for the complete 360°. Micrometer dial stops, however, are provided for accurate adjustment of the table to four positions 90° apart. The micrometer dial is located immediately to the right of the clamp. A small lever with a spring is used to throw the micrometer stop into the path of the four index stops. The table is then rotated by hand until the pointer on the micrometer dial reads zero and then the table may be clamped.

NOTE

A special safety arrangement is incorporated in dial indicator housing to safeguard indicator against damage.

For example, if table is rotated too far against dial indicator, indicator arm is cammed out of position until it clears indicator stop. Indicator then returns to its normal position against a cushioned stop. Table should then be reset by means of safety hand crank. Turn table to the left far enough to pick up indicator arm and then reverse movement to bring indicator to zero reading. Lock table clamp.

The entire table and saddle unit is automatically lubricated and instruction plates giving full instructions for filling oil reservoirs are attached.

AUTOMATIC POSITIONING DEVICE

The positioning device consists essentially of a master switch for the table and a second one for the headstock, (figure 32), a motor driven reduction gear box for each unit, and a solenoid declutching device for the directional clutch of each unit. In principle, the table and headstock units are essentially alike.

Positioning of the table and headstock is individually controlled, and it is, therefore, possible to operate the units separately or simultaneously. A selector switch is provided in the pendant station

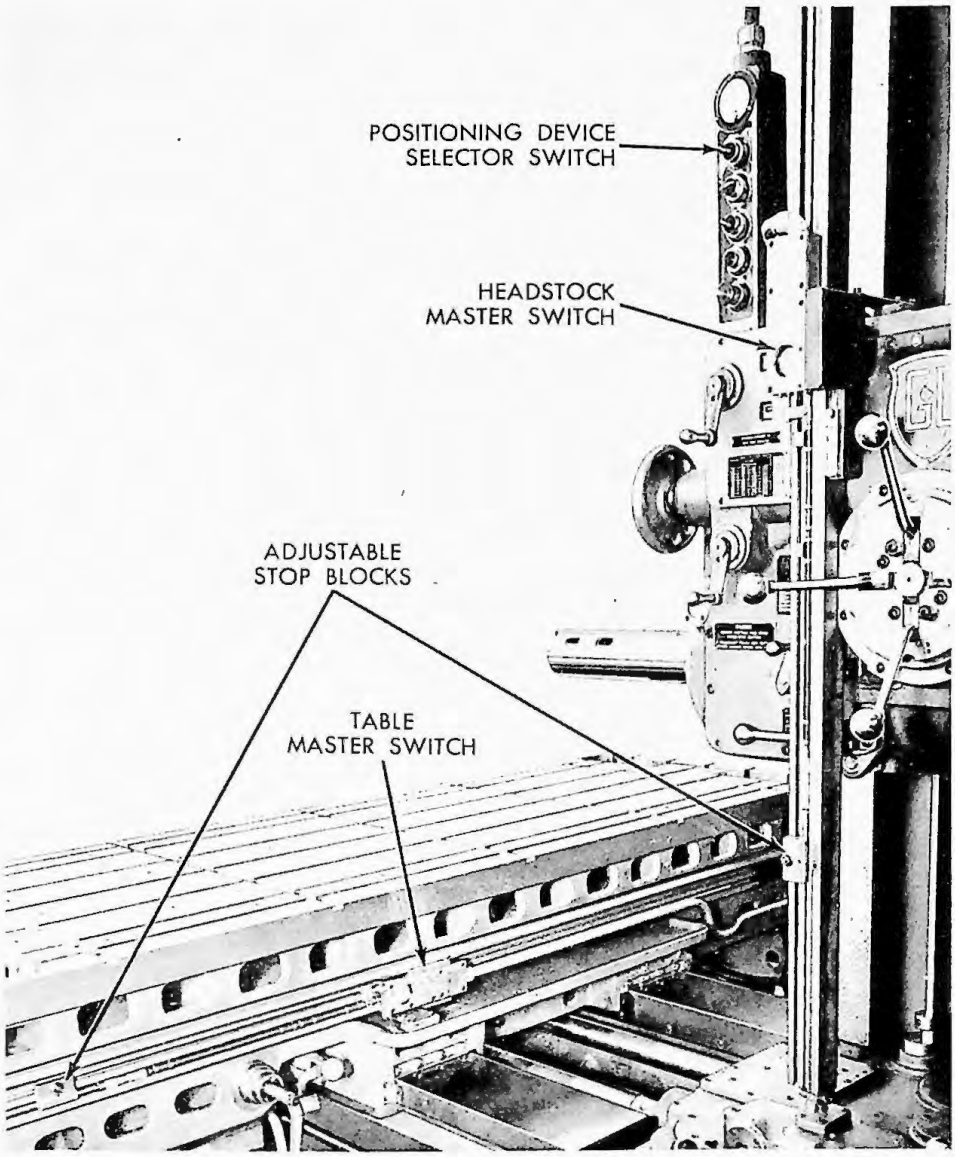


Figure 32. Automatic Positioning Device

to set up the machine for automatic positioning or for operation of the machine without the positioning device being used. See figure 32.

The measuring mediums are standard precision end measuring rods and an inside micrometer such as used on our standard measuring devices, or special job rods bored for stop pins for repetitive production.

The procedure for setting up a positioning device equipped boring machine to bore a number of holes in a workpiece is as follows:

With a workpiece fastened in position on the machine table, the machine units are moved to locate the spindle at some suitable starting point on the workpiece, such as the point from which the holes to be bored are dimensioned. Next, place a micrometer, which should be set to read zero, in the rod trough. Loosen the lock nut of the adjustable stop block, (figure 32) and move along the trough toward the master switch box so that it pushes the micrometer into the master switch actuator until the dial indicator reads zero. Lock the stop block in this position. With the selector switch set for automatic positioning, the machine should now reposition to this starting point when desired. To move to the next desired position which, for example, might be 6.300" away, rapid traverse the machine unit to move the stop block and the micrometer away from the master switch. If standard end measures and micrometer heads are to be used, place a 6.000" long end measure in the rod trough. Set the micrometer to read .300" and place it back into the rod trough. With the machine set for its highest feed rate, engage the feed

to move the machine unit towards the master switch box. The machine unit will automatically stop at the desired new position.

Briefly, an explanation of a positioning cycle is this: After the desired end measures and micrometer are in the trough, the operator engages the feed which causes the machine unit to move toward the master switch unit, carrying with it the stop block, the measuring rod, and the micrometer. The micrometer contacts the operating plunger of the master switch unit, which operates a micro switch that energizes a solenoid to disengage the directional control clutch. The machine unit then goes past the point at which the operating plunger closes the master switch. The closing of the master switch starts the motor driven, fine feed unit and energizes the magnetic clutch, which then connects the fine feed unit to the feed screw of the machine unit. The machine unit moves back to the point where the master switch opens, de-energizing the magnetic clutch which disconnects the fine feed unit from the feed screw. The machine unit will come to an instantaneous stop, due to the low feed rate of the fine feed unit. The precision dial indicator in the master switch box will indicate that the correct position has been attained.

For traversing a long distance, it is sometimes desirable to move most of the way in rapid traverse, shifting to feed shortly before contacting the master switch. The machine can be set up to operate using rapid traverse entirely, but experience has shown this to be a savings of time only on certain jobs. Due to inherent variations in the amount of coast, after disengaging the directional control clutches, the positioning device must be set up so that the distance which it moves the machine back in fine feed is always more than the greatest variation in the amount of coast. Naturally the variations in coast will be greater when using rapid traverse than when using a high feed rate. When using a high feed rate, a positioning device can be adjusted for a much shorter length of travel in fine feed, resulting in considerable savings of time. When it is desired to operate on rapid traverse only, the positioning device must be adjusted for the greater over-travel or coast.

POWER DRAW BOLT

This arrangement is operated by a small torque motor in the rear end of the ram guide and is controlled by a switch from the pendant station, (figure 33). The procedure for assembling an arbor or boring bar is as follows:

First, make sure shank of the arbor and the taper in the spindle are clean. Next, position the arbor in the spindle, lining it up on the spindle nose keys. There is approximately 3/32" engagement by the spindle nose keys to prevent the tool from turning in the operator's hand. Turn switch to the in position and arbor will be drawn into the spindle.

NOTE

The spindle drive is interlocked to prevent the spindle from being driven by the draw bolt motor.

Removal of the arbor is accomplished by turning the out switch. Positive ejection will leave the arbor partially engaged on the spindle nose keys. Then remove the arbor.

An added feature is the removable and spring-loaded hand crank, for operating the draw bolt in case of power failure.

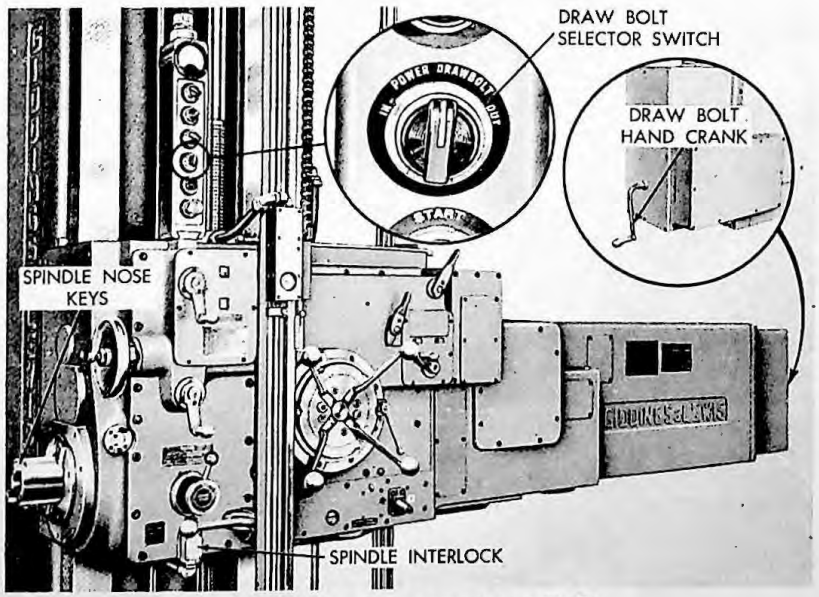


Figure 33. Power Draw Bolt

Section 5
ADJUSTMENTS

The number of adjustments on the different units of this machine has purposely been kept to a minimum. Whenever adjustments are necessary during the life of the machine, every effort has been made to allow them to be made easily and quickly.

DRIVING CLUTCHES

There are two multiple-disc friction clutches in the main drive that are controlled by the start, stop and reverse lever (figure 34). They are accessible through the opening on top of the bed to the right of the column. The clutches should be adjusted to trip evenly when the start, stop and reverse lever is in either of its extreme positions. The clutches should not drag when the lever is in its neutral position. The rapid traverse clutch is of the same design and is accessible through the opening, (figure 34), on top of the bed behind the feed and rapid traverse lever.

The adjustment of the multiple disc friction clutches requires no wrench, screw driver or any other tool. A sectional drawing with adjustment instructions for the clutches are shown on a plate attached to each of the openings.

SPINDLE BEARINGS

The main spindle sleeve is mounted in a precision Timken bearing supporting the rear end and one or two precision Timken bearings supporting the front end. The bearings of the main spindle sleeve are properly adjusted before the machine is shipped and no readjustment should be required for a long period of time.

SPINDLE SLEEVE BEARING ADJUSTMENT

To adjust the spindle sleeve bearings, the following procedure should be followed:

1. Remove ram guide end cover and loosen nuts that secure Timken bearings on rear end of spindle.

2. Remove vernier from headstock.

3. Loosen cone point set screw at lower end of scale shaft and remove scale shaft from machine.

4. Remove jam nut on spindle hand feed wheel shaft. Remove hand feed wheel. Adjust dial lock screw to neutral position and remove dial from shaft. Now, turn lock screw in to force out lock pin in shaft sufficiently to allow it to be pulled out of the dial sleeve with the fingers. Remove dial sleeve.

5. Remove the four socket head screws from cast iron bearing retainer plate and remove plate.

6. Spindle hand feed shaft may now be withdrawn from the headstock.

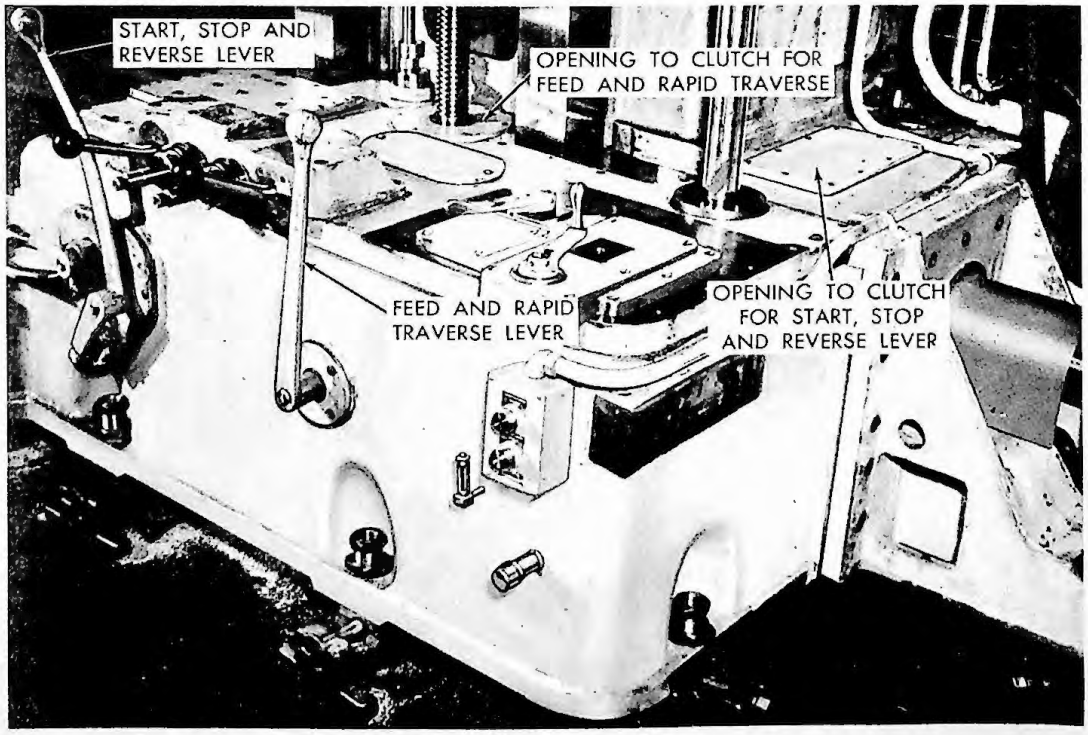


Figure 34. Clutch Locations in Bed

7. Remove all socket head screws from the spindle feed unit. Withdraw taper dowel pins and remove unit from headstock.

8. Remove the dog point set screw from the bearing adjusting nut located on the rear end of the spindle sleeve.

9. Turn bearing adjustment nut clockwise to tighten bearings. Care should be taken to make sure that the bearings are not set up too tightly. To determine setting of bearings, the following test in step No. 10 should be made.

10. Attach a piece of round bar stock 40" long directly to the machine spindle. Insert bar through draw key slot or front slot of spindle. The center of the bar should be in line with the center of spindle and locked in place with wooden wedge. File a notch in bar exactly 19" from center. Hang a weight on bar at this notch. Spindle sleeve bearings should be adjusted just tight enough so that the weight just barely turns the spindle.

To determine the amount of weight to hang on bar, consult the following table:

For No. 340-T Machine - 4 to 5 lbs. at 19" radius

For No. 350-T Machine - 5 to 6 lbs. at 19" radius

After bearings have been properly adjusted, redrill sleeve for dog point screw. Lock bearing adjusting nut.

After spindle sleeve bearings have been adjusted, the bearings on rear end of spindle in spindle ram should be preloaded. Turn nuts just tight enough to support the following added weight on bar across face of spindle sleeve. For No. 340-T Machine the added weight should be - 1 lb. For No. 350-T Machine the added weight should be - 1-1/2 lbs.

11. Reassemble machine in the reverse order in which it was taken apart.

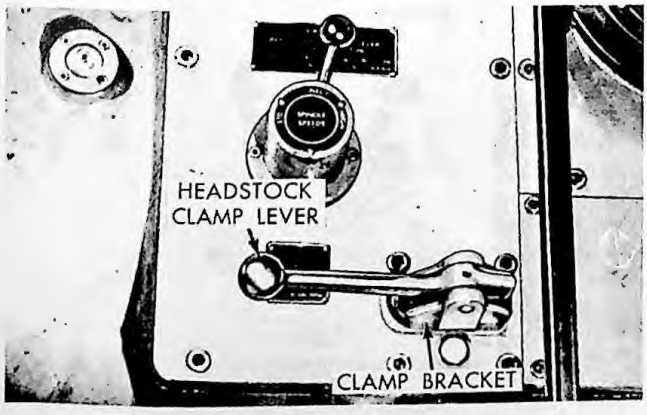


Figure 35. Headstock Clamp

HEAD CLAMP

The adjustment of this clamp is rather sensitive and should be made accordingly. Loosen the Allen socket head screws in bracket, (figure 35), about two turns. Insert a pin into one of the holes of the nut behind the bracket. To tighten the clamp, turn the adjusting sleeve slightly to the left and tighten the Allen socket head screw. This adjustment should be continued until the head is securely clamped to the column by pulling the head clamp lever toward the operator but should not be so tight that the clamp is not free in the released position.

NOTE

An adjusting screw will be found at the top of the vertical clamp lever behind the headstock to take up all lost motion.

SPINDLE FEED CLUTCH

There is an adjustment provided for the internal gear segments of the spindle feed clutch that is controlled by moving the quick motion turnstile handles in and out, (figure 36). Two lock nuts placed over two Allen socket head screws are provided on the hub disc of the turnstile handles. To adjust this unit, the two lock nuts must be loosened and the Allen socket screws tightened so that when the internal gear clutch of the spindle feed mechanism is engaged, the expanding internal gear segments fit snugly into the internal gear on the worm wheel.

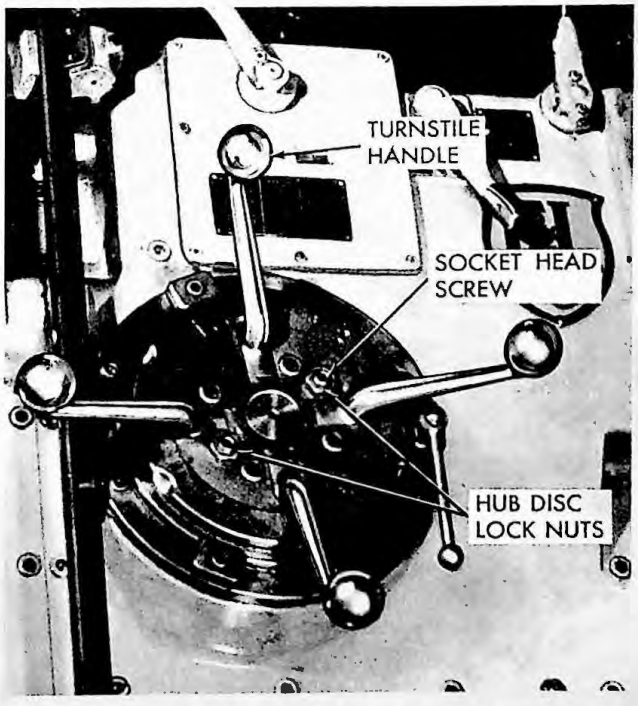


Figure 36. Spindle Feed Trip Adjustment

NOTE

The above two adjustments are extremely sensitive and independent. They are provided mainly for G&L assembling convenience and it is suggested that they be left strictly alone unless adjustment is absolutely necessary. This adjustment most likely will not have to be made during the life of the machine, except in such cases where parts are broken by accident and have to be replaced.

SPINDLE TRIP FEED

The two Allen socket head screws in the graduated dial ring are for adjusting the dog that trips the feed when the automatic depth gauge is used, (figure 37). The two set screws have cone points which fit into vee slots in the dog that are a little further apart than the set screws. Adjust the dog to take care of any wear that might be caused by the dog riding over the contact point on the inside of one of the quick motion turnstile handles. To move this dog in toward the center, the inside screw nearest the hub should be loosened only very little and the outside one tightened. This adjustment is very sensitive and should be made accordingly. The adjustment is provided for G&L assembling convenience and it is possible that further adjustment will not be required during the life of the machine. Unless adjustment becomes absolutely necessary, it is suggested that it not be tampered with.

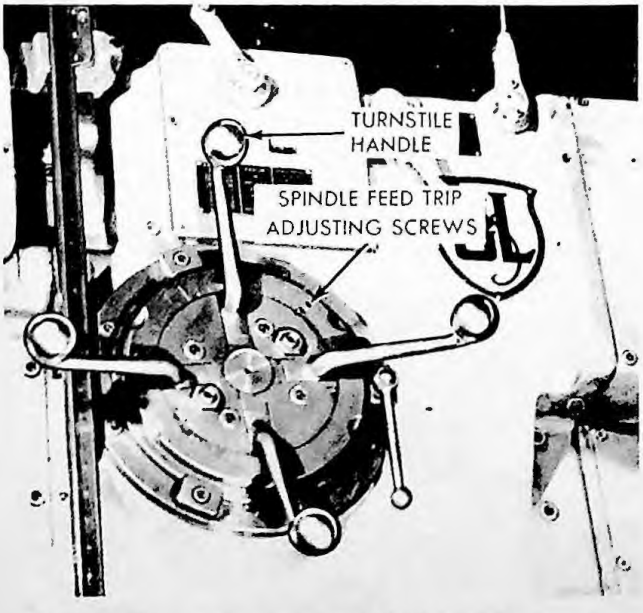


Figure 37. Spindle Feed Clutch Adjustment

SPINDLE TRAVEL

The spindle is arranged so that when the spindle reaches the limits of travel either way, the movement of the spindle will stop. A ram attached to the spindle, has rack teeth which mesh with a gear driven by the feed mechanism. When the limits of travel are reached, the gear runs off the rack. A loose or floating tooth arrangement, however, is provided at each end of the rack, making it unnecessary to push the rack back into engagement.

CAUTION

Do not apply a reverse power feed to the spindle when the spindle ram is in extreme in or out position. Use the turnstile to make sure rack teeth are properly engaged before using power feed.

SADDLE CLAMPS

The only other adjustment that may be required on the machine from time to time is for the saddle clamps. The saddle clamp lever clamps the saddle on the front way and also on the rear way through toggle joints. Referring to figure 38, the saddle clamp lever, through the toggle joints, draws the clamp screws up against the flat gib that runs along the way of the bed the full length of the saddle. This flat gib is provided with eight small holes around the hole through which the clamp screw works. The clamp screws are provided with three screw holes so positioned that only one of them at any time is in line with one of the holes. By turning the clamp screws clockwise, the clamp is tightened. With eight holes and three holes, twenty-four fixed positions are possible with each revolution of the clamp screws.

When adjustment is required, the Allen socket head set screw, which is in one of the holes, should be removed and the clamp screws turned far enough to securely clamp the saddle when the saddle clamp lever is at 45° to the bed. The Allen socket head screw can be placed in one of the holes that line up with the holes in the clamp strip.

TABLE CLAMP ADJUSTMENT

The table clamp lever clamps the table to the saddle by means of a toggle operated wedge block. When in the clamped position, the wedge block is forced against the tapered edge of the front table clamp plate that runs the full length on the underside of the table. The adjustment of the table clamp consists of the adjustment of this wedge block to compensate for wear. On the #340-T machine this adjustment is provided by means of a 5/8" set screw located on the front side of the saddle midway between the bed ways. On the #350-T machine the adjustment is provided by means of a 1" set screw located on the front underside of the saddle midway between

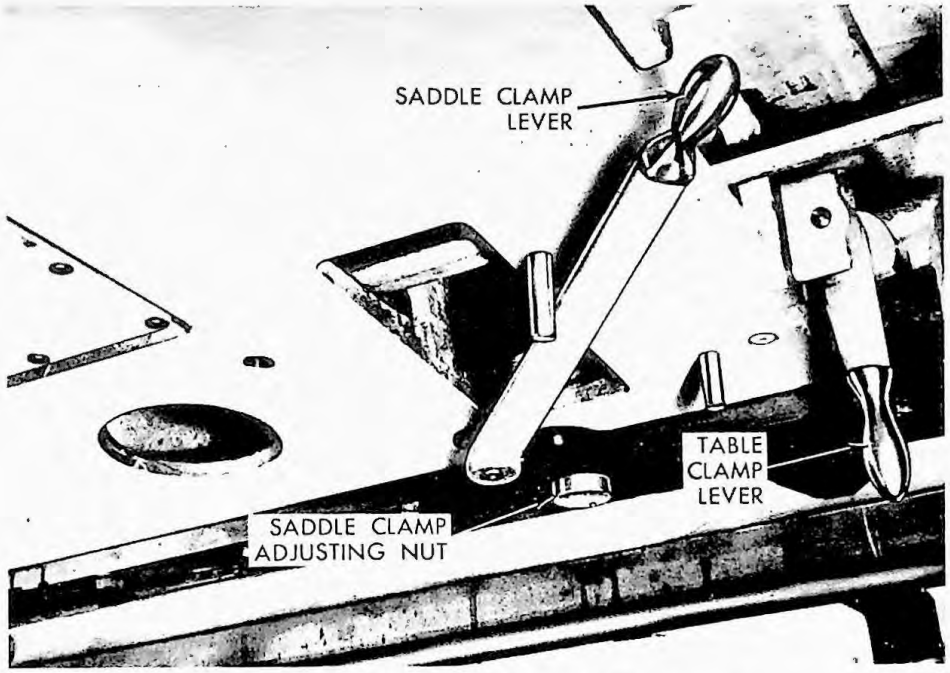


Figure 38. Saddle Clamp Adjustment

the bed ways. In each case the set screw is locked in place with a hex jam nut. To adjust the clamp it is necessary to first loosen the hex jam nut on the set screw and then turn the set screw clockwise until effective clamping action is obtained. After the adjustment is made the set screw should be locked firmly in place by tightening the hex jam nut.

END SUPPORT BLOCK

Due to the uneven wear on the headstock and end support elevating nuts, it is occasionally necessary to adjust the vertical position of the block to maintain proper alignment of the end support bearing or bushing with the main spindle. For this purpose, the end of the screw is supported in an adjustable sleeve at the top of the end support column, (figure 39). The block may be raised or lowered by means of the adjusting nuts at each end of this sleeve until proper alignment is obtained.

Final precision alignment of the block with the headstock can be made by adjusting the two set screws located on the underside of the block, (figure 40).

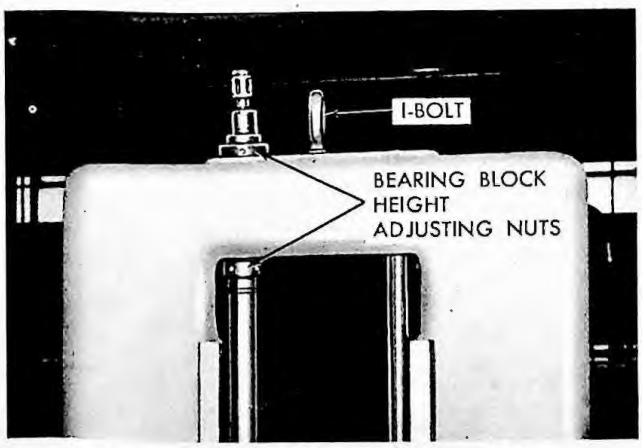


Figure 39. End Support Bearing Block Adjustment

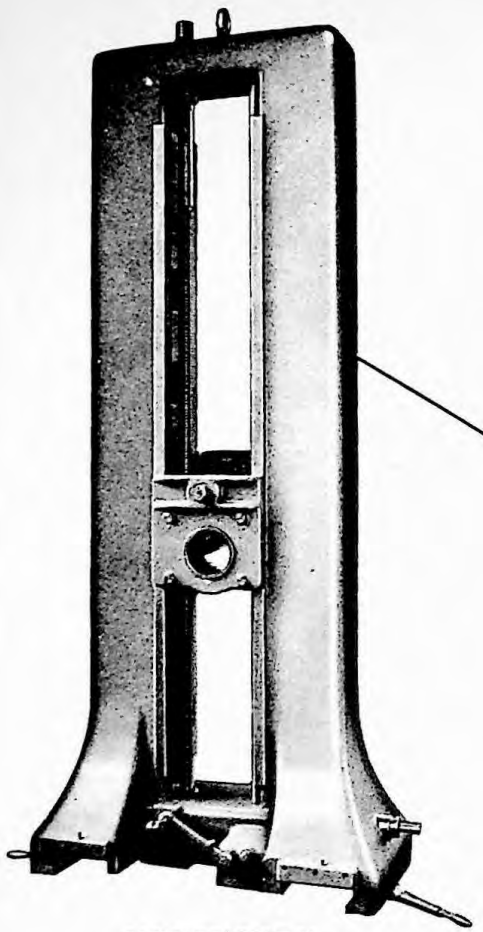
Figure 40. End Support Bearing Block Adjustment

Section 6
REPAIR PARTS

INSTRUCTIONS FOR ORDERING REPAIR PARTS

Your repair parts orders will receive the best service if, when ordering, the following information is clearly stated:

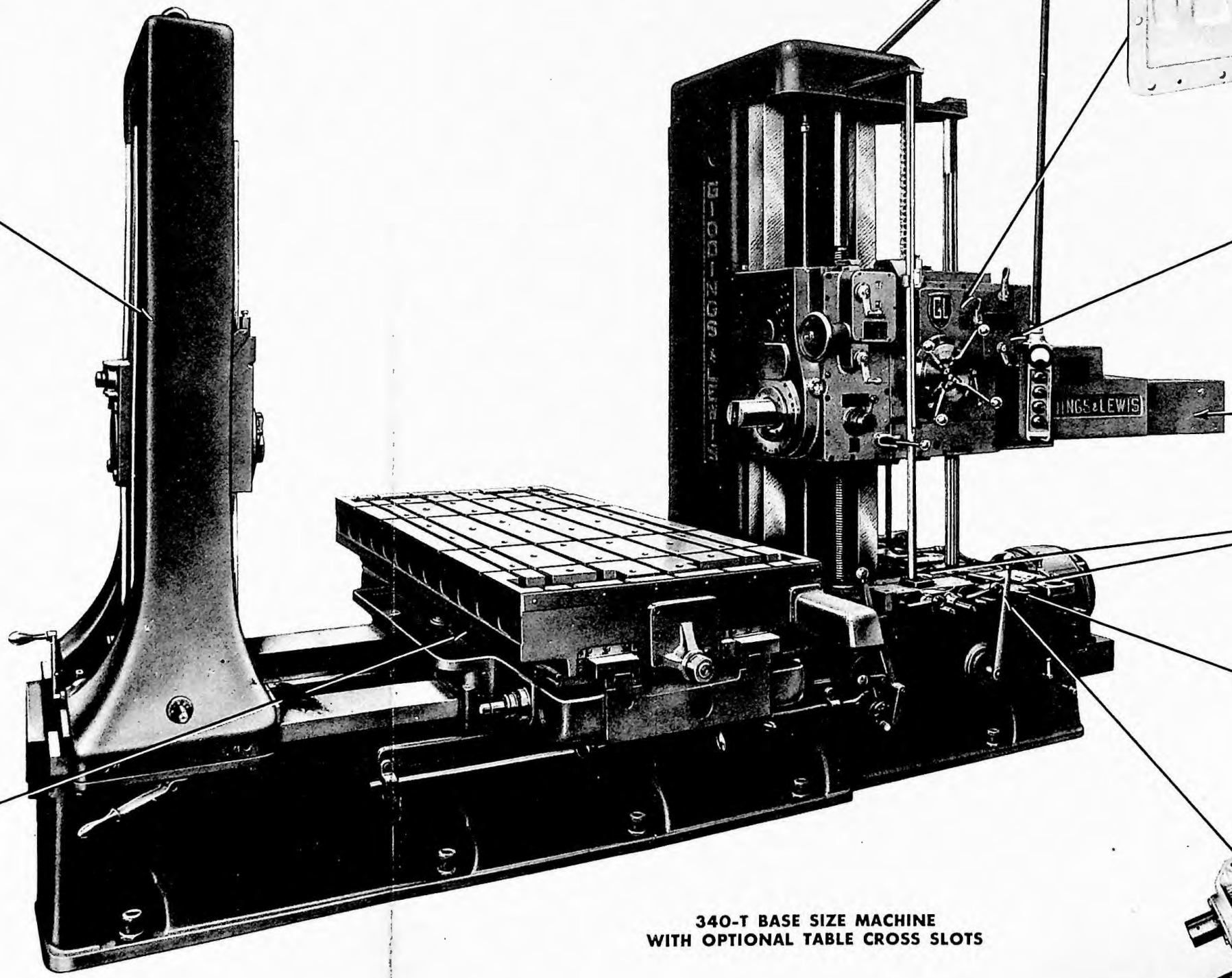
1. The quantity of each part required
2. The part name and the part number
3. The serial number of the machine. The serial number is stamped on a name plate which is found on the lower left hand corner of the spindle feed case. Orders cannot be accepted without this serial number.



ANTI-FRICTION
END SUPPORT

TABLE DRIVE
UNIT

PICK-OFF GEARS



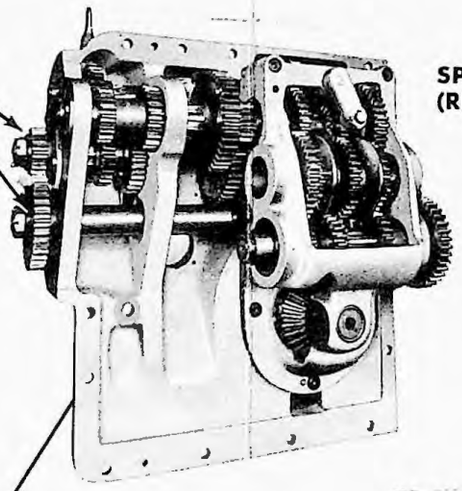
340-T BASE SIZE MACHINE
WITH OPTIONAL TABLE CROSS SLOTS

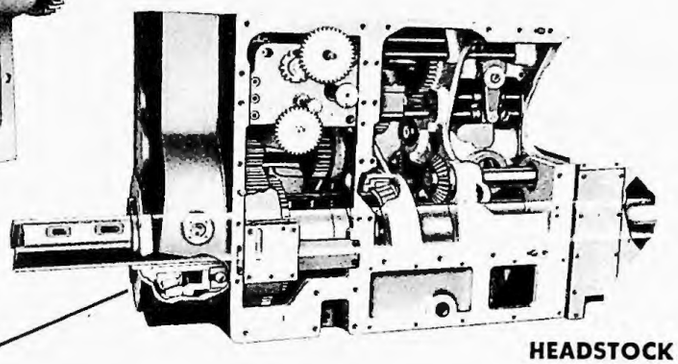
Figure 41. Location of Assembled Units

LOCATION OF ASSEMBLED UNITS

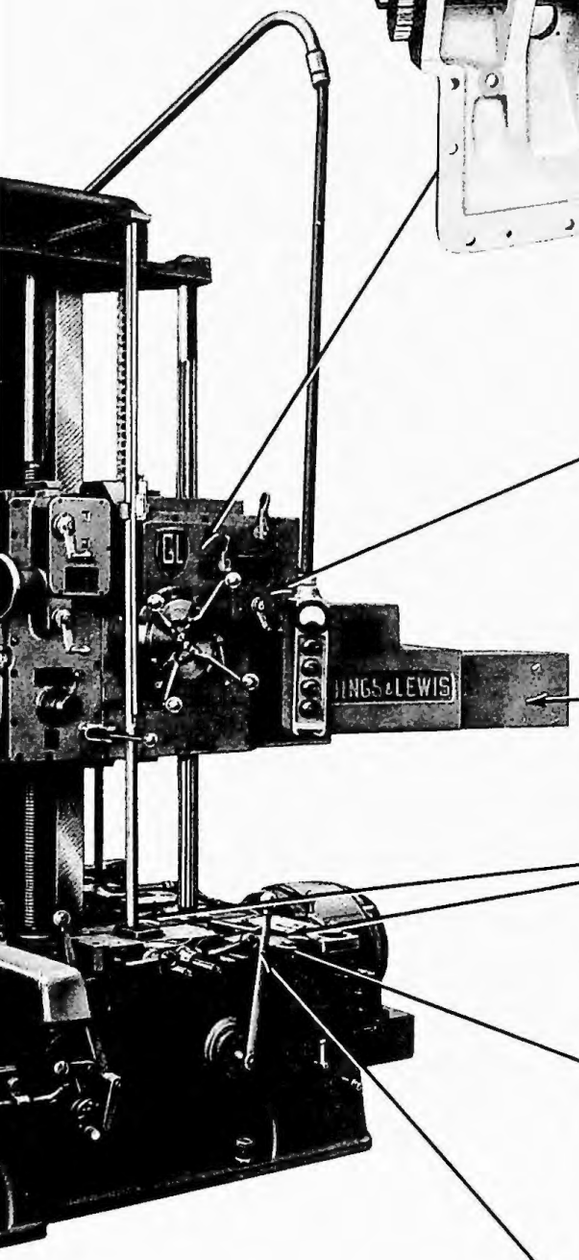
PICK-OFF GEARS

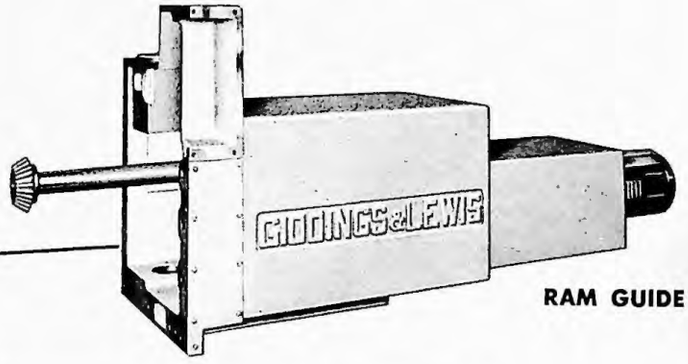
SPINDLE FEED UNIT
(REAR VIEW)



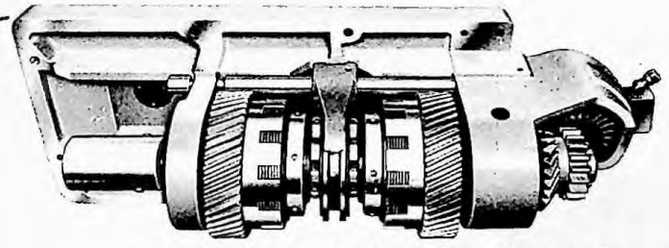


HEADSTOCK

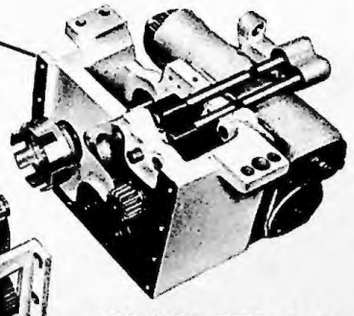


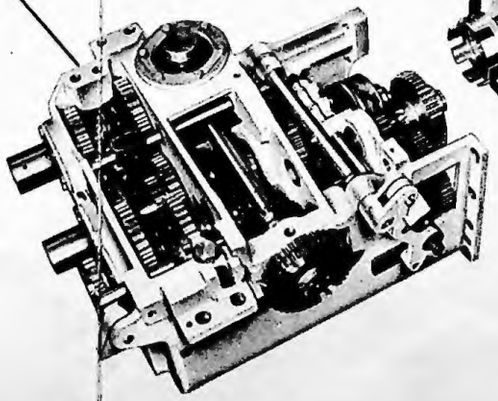


RAM GUIDE



MOTOR DRIVE UNIT
AND SPINDLE REVERSING CLUTCH

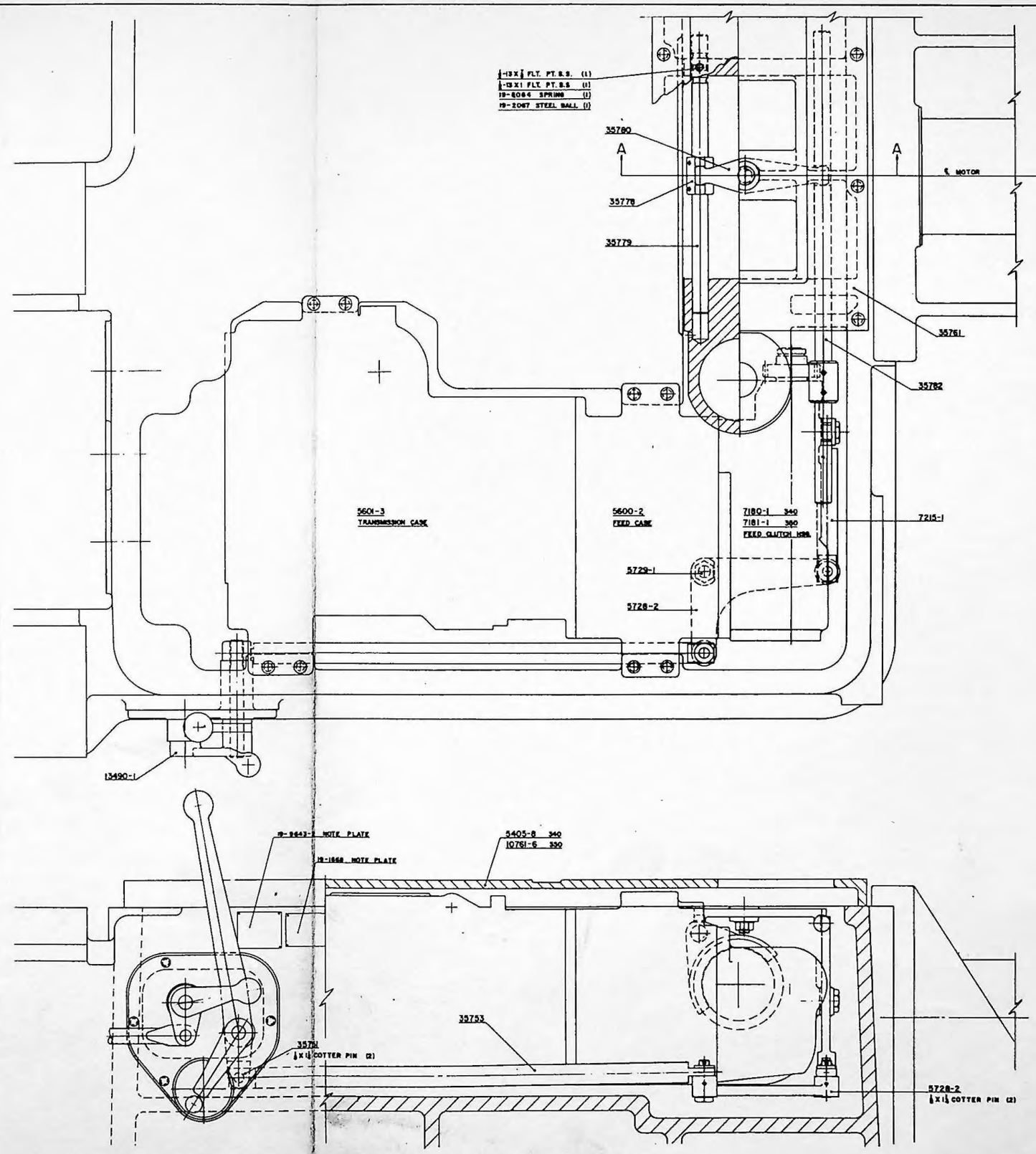




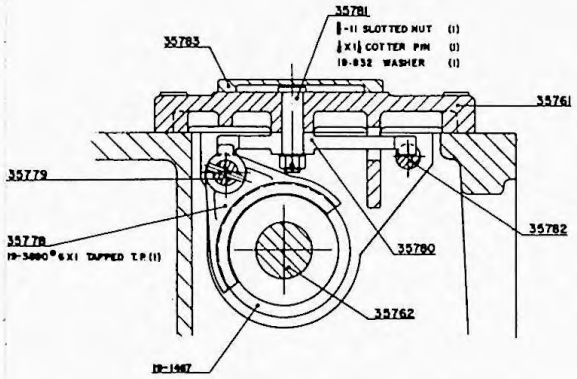
MILLING FEED AND
TRANSMISSION UNIT

IZE MACHINE
ABLE CROSS SLOTS

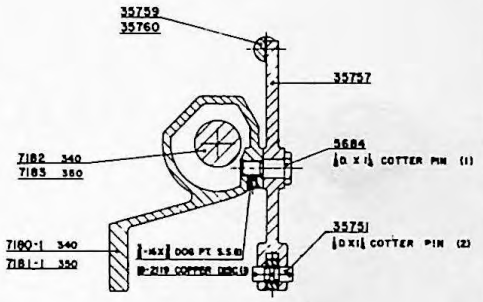
Part Number	Part Name	Part Number	Part Name
5405-8	Cover (340)	35759	Shifter Shaft (340)
5412-2	Cover	35760	Shifter Shaft (350)
5421-1	Shifter Lever	35761	Clutch Housing
5600-2	Feed Case	35762	Clutch Shaft
5601-3	Transmission Case	35778	Shifter Shoe
5684	Stud	35779	Shifter Shaft
5728-2	Shifter Lever	35780	Shifter Lever
5729-1	Shoulder Screw	35781	Shoulder Screw
5769	Coupling	35782	Shifter Shaft
7180-1	Feed Clutch Housing (340)	35783	Cover
7181-1	Feed Clutch Housing	19-668	Drilled Hex. Hd. Cap Screw
7182	Shaft (340)	19-832	Washer
7183	Shaft (350)	19-833	Washer
7184	Bracket	19-1467	Twin Disc Clutch
7215-1	Link	19-1668	Note Plate
10761-6	Cover (350)	19-2067	Ball
13490-1	Lever	19-2119	Copper Disc
13493-2	Lever	19-2701	Straight Pin
35751	Pin	19-2704	Straight Pin
35752	Shaft	19-3890	Taper Pin
35753	Shafter Rod	19-8064	Spring
35754	Pin	19-8518	Taper Pin
35757	Shifter Fork	19-9643-2	Note Plate



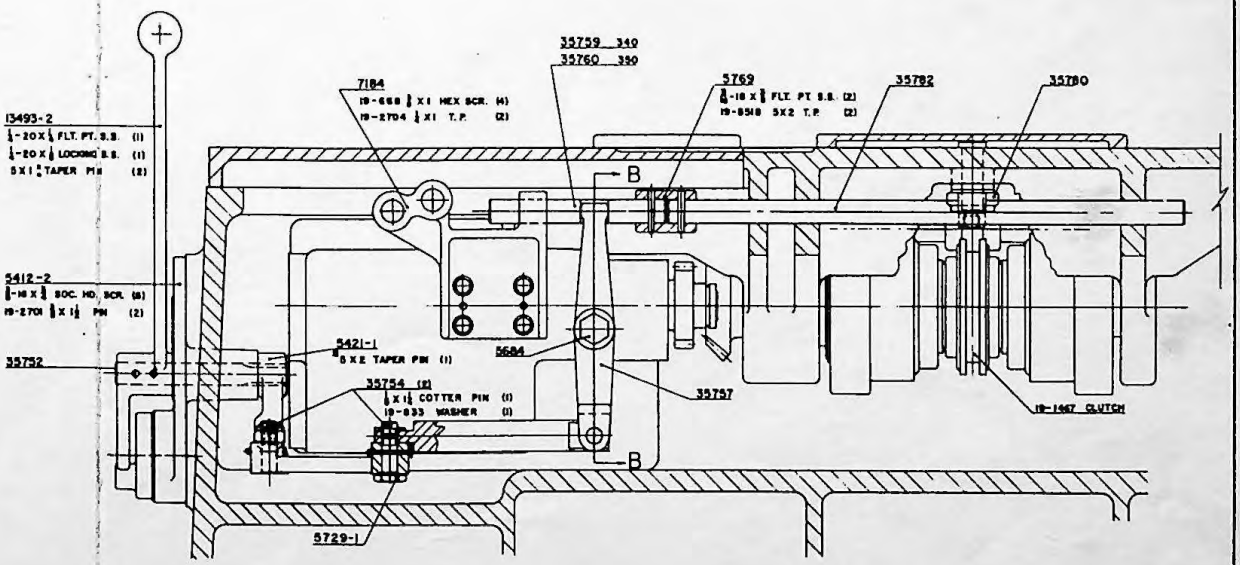
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



SECTION A-A

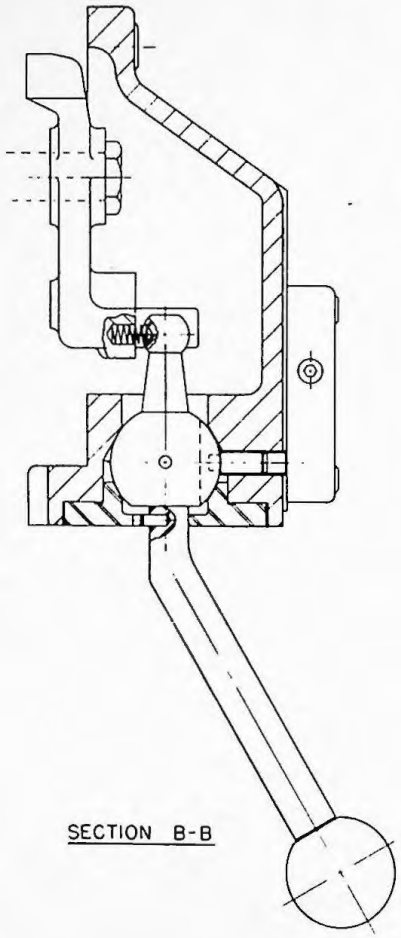


SECTION B-B

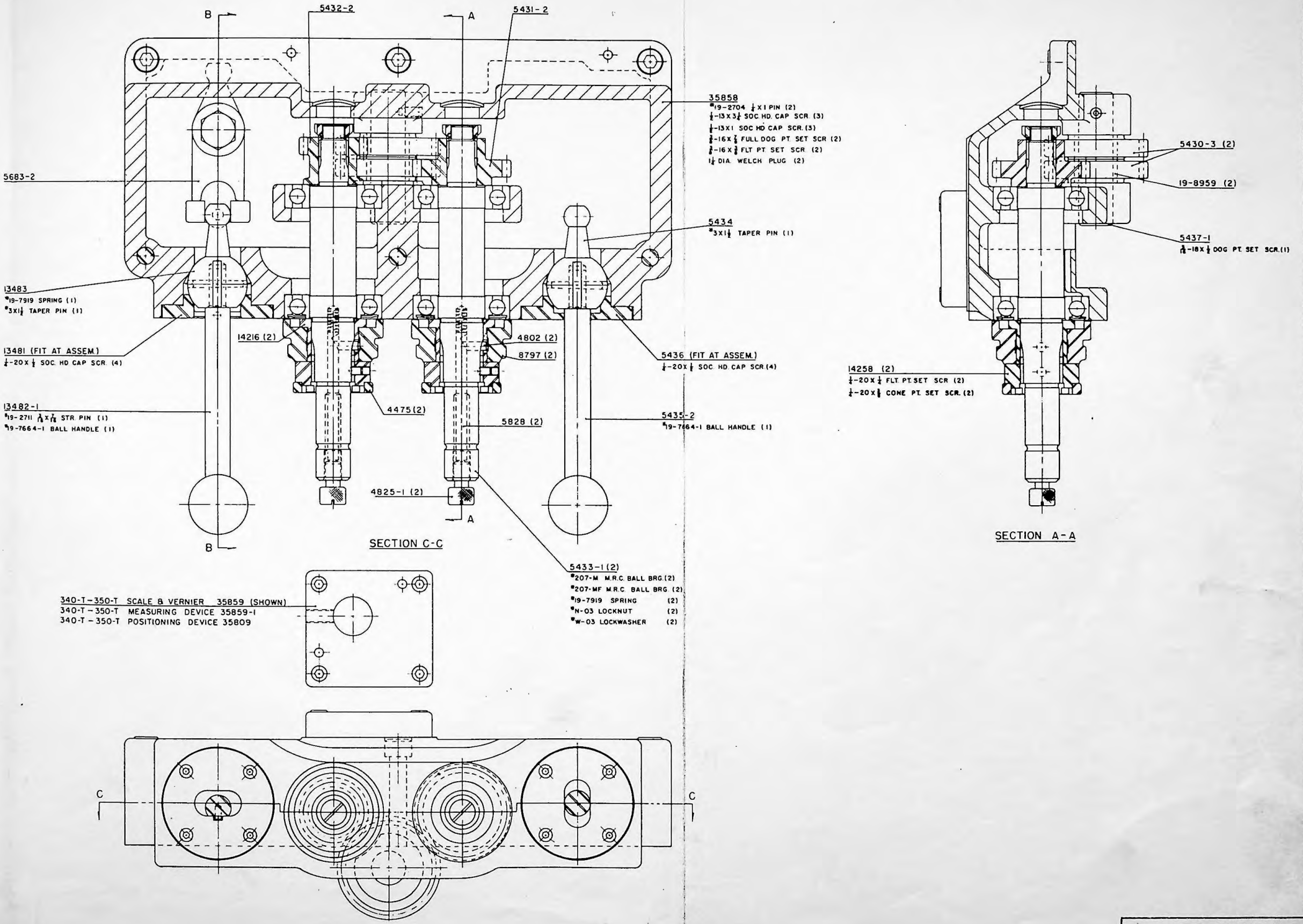


DWG. #A-150-30-1
Manual Spindle Reversing
G & L and Hypro Division

Part Number	Part Name
4475	Clutch Ring
4802	Dial Clamp
4825-1	Dial Clamp Screw
5430-3	Idler Gear
5431-2	Gear
5432-2	Gear
5433-1	Shaft
5434	Ball Shifter
5435-2	Shifter Lever
5436	Shifter Lever Cap
5437-1	Idler Shaft
5683-2	Shifter Arm
5828	Dial Clamp Pin
8797	Micro Dial
13481	Shifter Lever Cap
13482-1	Shifter Lever
13483	Ball Shifter
14216	Bushing
14258	Clutch
35809	Bracket
35858	Transmission Control Box
35859	Scale Strip Base
35859-1	Scale Strip Base
19-2704	Straight Pin
19-2711	Straight Pin
19-7664-1	Ball Handle
19-7919	Spring
19-8959	Bushing

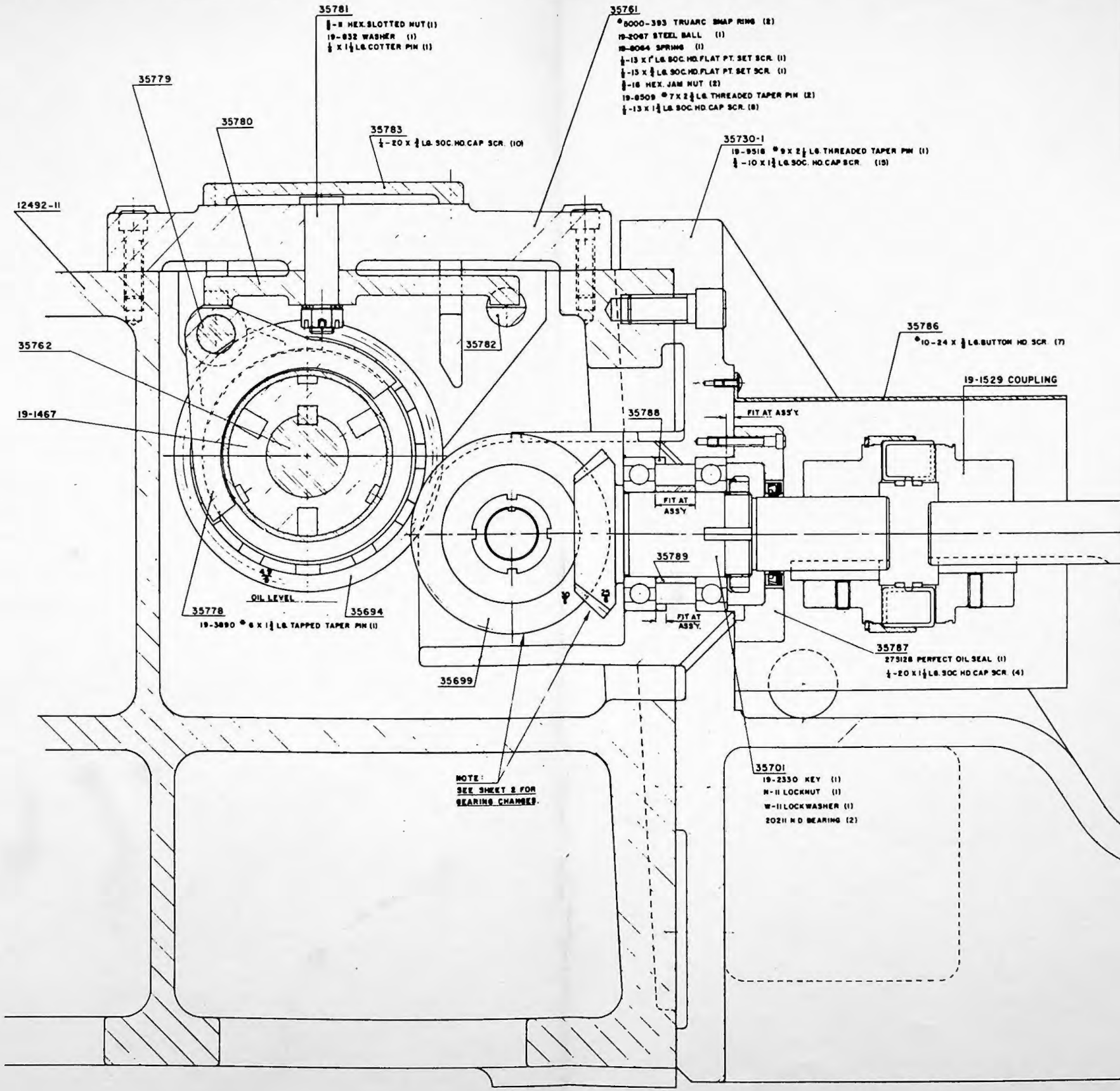


ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

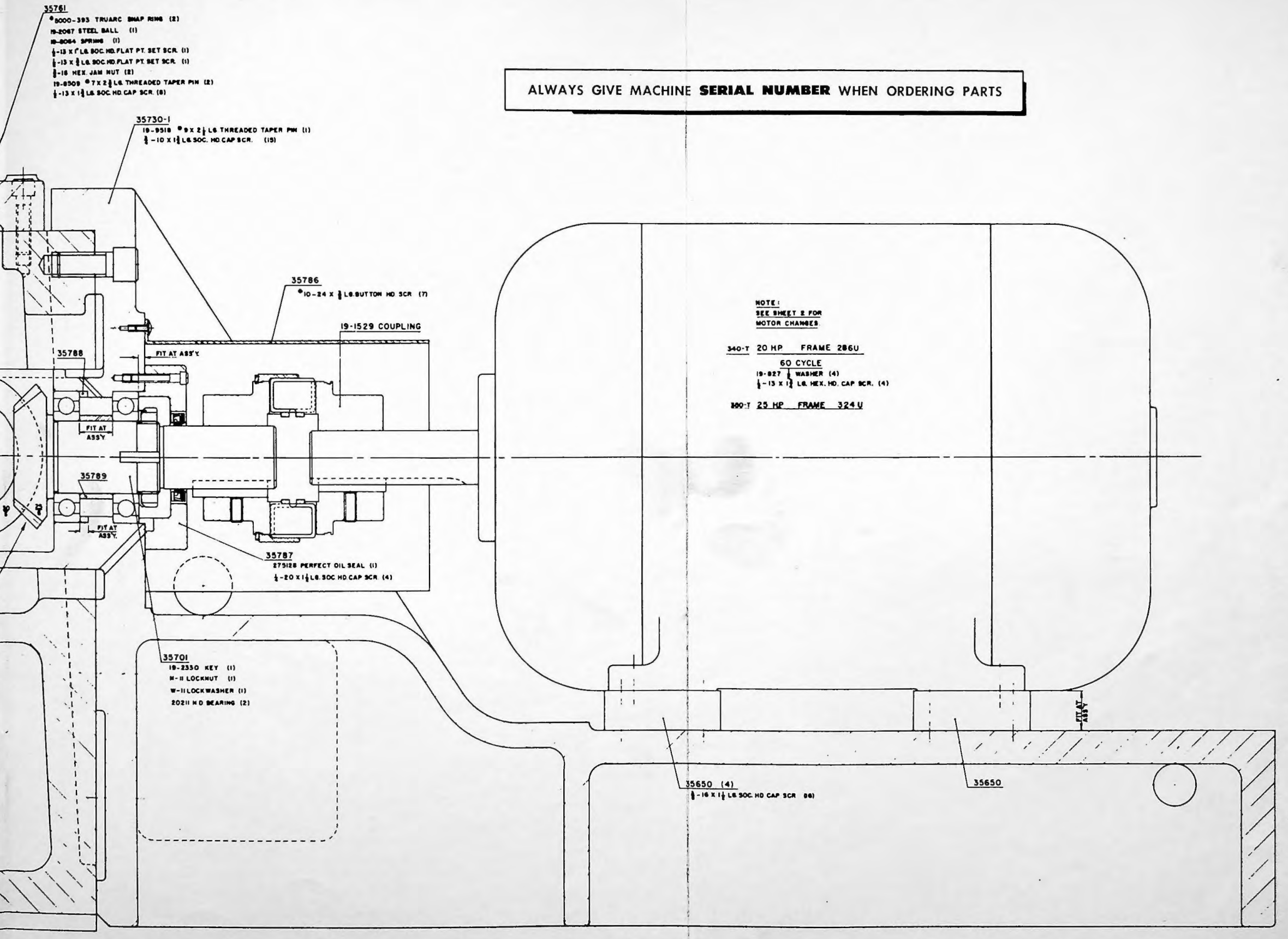


DWG. #A-150-31-1
Transmission Control
G & L and Hypro Division

Part Number	Part Name
12492-11	Bed
35650	Motor Shim
35694	Clutch Driver - 49T
35699	Bevel Gear - 30T
35701	Bevel Gear Shaft
35730-1	Drive Housing
35761	Clutch Housing
35762	Clutch Shaft
35778	Shifter Shoe
35779	Shifter Shaft
35780	Shifter Lever
35781	Shoulder Screw
35782	Shifter Shaft
35783	Cover
35786	Guard (Motor Drive)
35787	Oil Seal Retainer
35788	Spacer
35789	Spacer
19-827	Washer
19-832	Washer
19-1467	Clutch
19-1529	Lovejoy Coupling
19-2067	Steel Ball
19-2330	Round End Key
19-3890	Tapped Taper Pin
19-8064	Spring
19-8509	Threaded Taper Pin
19-9518	Threaded Taper Pin



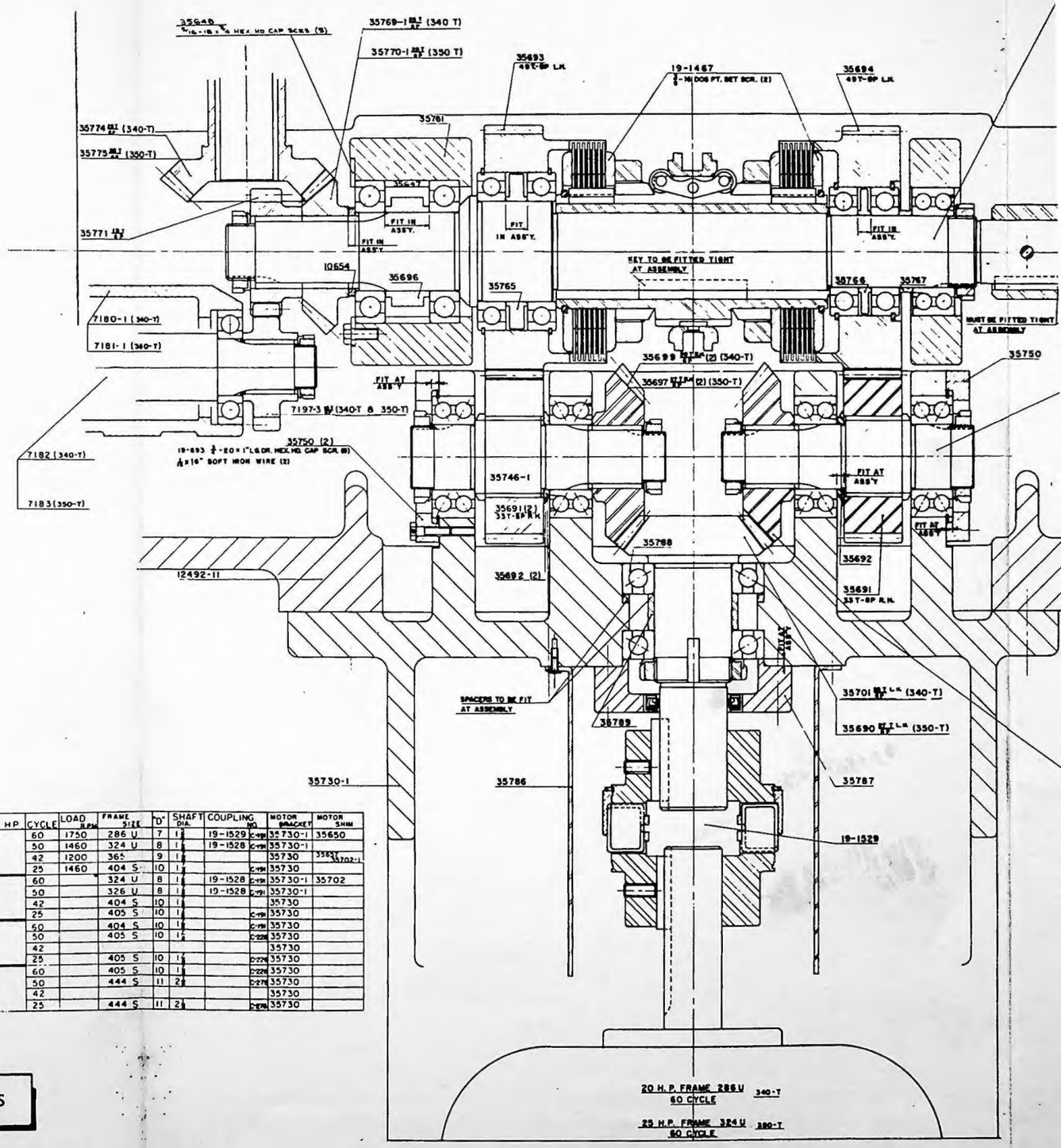
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



DWG. #A-150-32-1
Motor Drive and Reversing Clutch
with Foot Mounted Motor - Sheet #1
G & L and Hypro Division

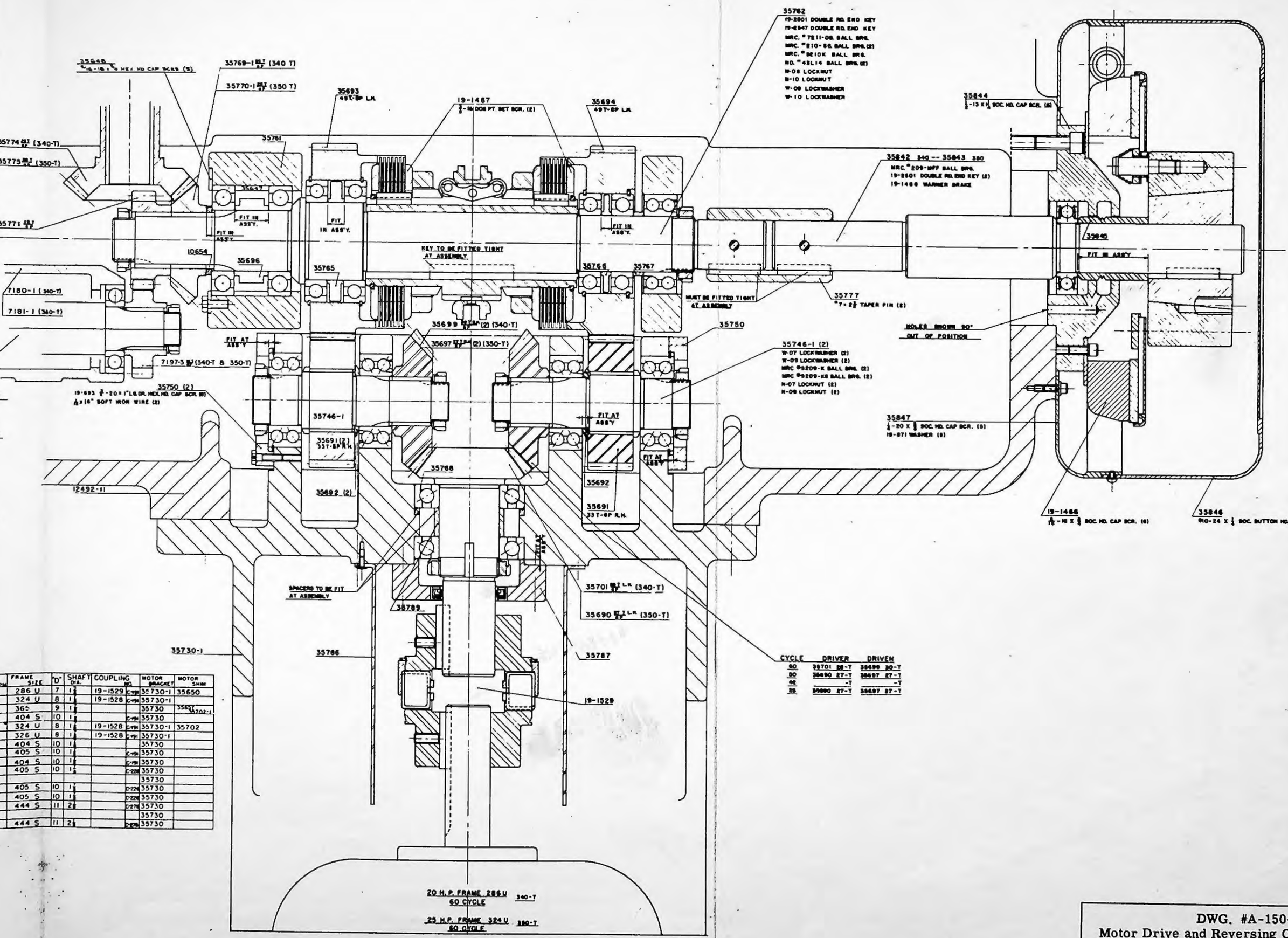
Part Number	Part Name
7180-1	Feed Clutch Housing (340)
7181-1	Feed Clutch Housing (350)
7182	Shaft (340)
7183	Shaft (350)
7197-3	Gear - 19T
10654	Spacer
12492-11	Bed
35690	Bevel Gear - 27T (350)
35691	Gear - 33T
35692	Spacer
35693	Clutch Driver - 49T
35694	Clutch Driver - 49T
35696	Spacer
35697	Bevel Gear - 27T (350)
35699	Bevel Gear - 30T (340)
35701	Bevel Gear Shaft - 25T (340)
35730-1	Drive Housing
35746-1	Shaft
35750	Bearing Retainer
35761	Clutch Housing
35762	Clutch Shaft
35765	Spacer
35766	Spacer

Part Number	Part Name
35767	Spacer
35769-1	Bevel Gear - 26T
35770-1	Bevel Gear - 25T (350)
35771	Spur Gear - 19T
35774	Bevel Gear - 28T (340)
35775	Bevel Gear - 28T (350)
35777	Coupling
35786	Guard (Motor Drive)
35787	Oil Seal Retainer
35788	Spacer
35789	Spacer
35842	Shaft (340)
35843	Shaft (350)
35844	Cover
35845	Spacer
35846	Brake Guard
35847	Brake Cover
19-693	Drilled Hex. Hd. Cap Screw
19-871	Washer
19-1466	Electric Brake
19-1467	Twin Disc Clutch
19-1529	Lovejoy Coupling
19-2501	Round End Key
19-2547	Round End Key



MOTOR H.P.	CYCLE	LOAD R.P.M.	FRAME SIZE	D	SHAFT DIA.	COUPLING NO.		MOTOR BRACKET	MOTOR SHIM
20	60	1750	286 U	7	1	19-1529	C-191	35730-1	35650
	50	1460	324 U	8	1	19-1528	C-191	35730-1	
	42	1200	365	9	1			35730	35651 35702-1
	25	1460	404 S	10	1		C-191	35730	
25	60		324 U	8	1	19-1528	C-191	35730-1	35702
	50		326 U	8	1	19-1528	C-191	35730-1	
	42		404 S	10	1			35730	
	25		405 S	10	1		C-191	35730	
30	60		404 S	10	1		C-191	35730	
	50		405 S	10	1		C-224	35730	
	42							35730	
	25		405 S	10	1		C-224	35730	
40	60		405 S	10	1		C-224	35730	
	50		444 S	11	2		C-276	35730	
	42							35730	
	25		444 S	11	2		C-276	35730	

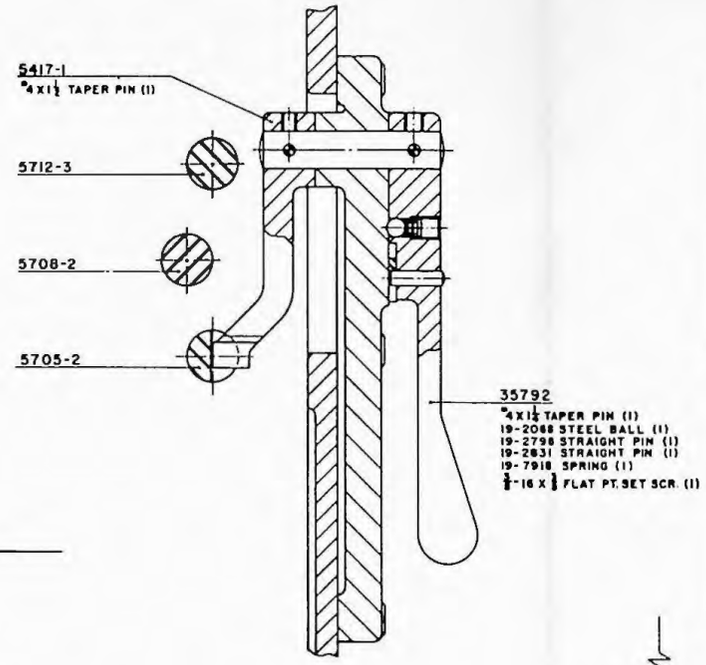
ALWAYS GIVE MACHINE SERIAL NUMBER WHEN ORDERING PARTS



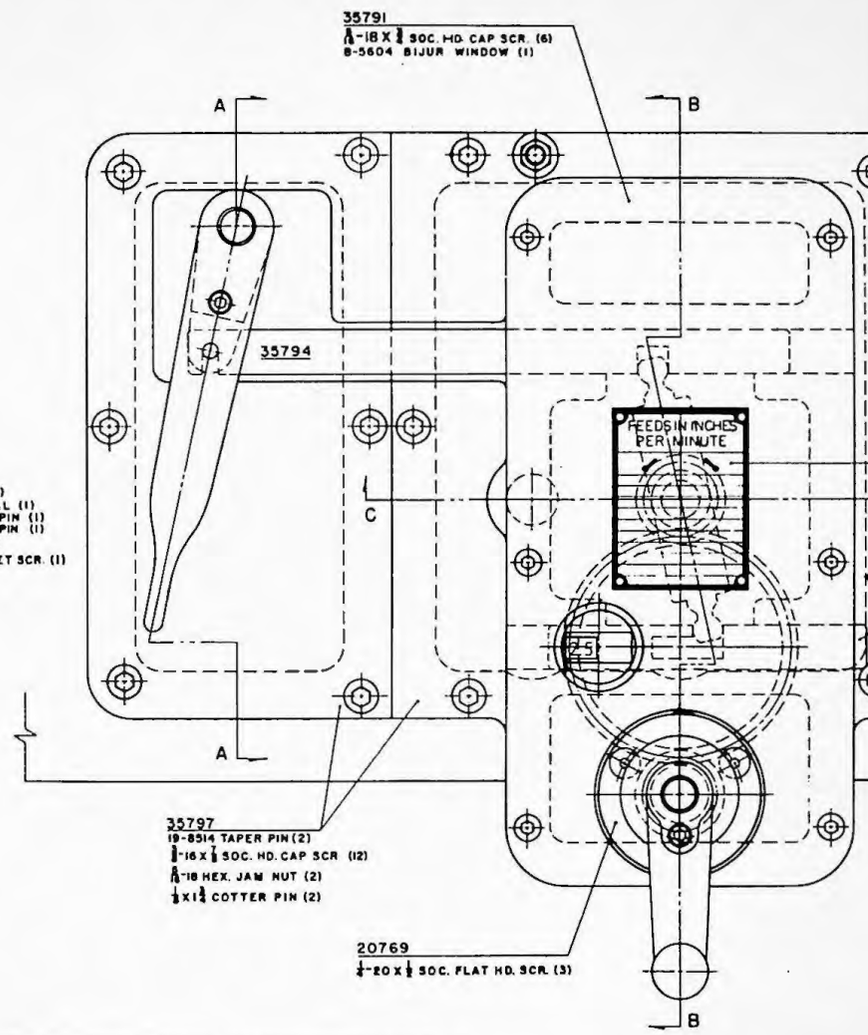
CYCLE	DRIVER	DRIVEN
60	35701 28-T	35699 30-T
50	35690 27-T	35697 27-T
40	-T	-T
25	35690 27-T	35697 27-T

FRAME SIZE	"D"	SHAFT DIA.	COUPLING NO.		MOTOR BRACKET	MOTOR SHIM
286 U	7	1	19-1529	C-11H	35730-1	35650
324 U	8	1	19-1528	C-11H	35730-1	
365	9	1			35730	35697 35702-1
404 S	10	1		C-11H	35730	
324 U	8	1	19-1528	C-11H	35730-1	35702
326 U	8	1	19-1528	C-11H	35730-1	
404 S	10	1			35730	
405 S	10	1		C-11H	35730	
404 S	10	1		C-11H	35730	
405 S	10	1		C-22H	35730	
					35730	
405 S	10	1		C-22H	35730	
405 S	10	1		C-22H	35730	
444 S	11	2		C-27H	35730	
					35730	
444 S	11	2		C-27H	35730	

DWG. #A-150-32-1
Motor Drive and Reversing Clutch with Foot Mounted Motor - Sheet #2
G & L and Hypro Division

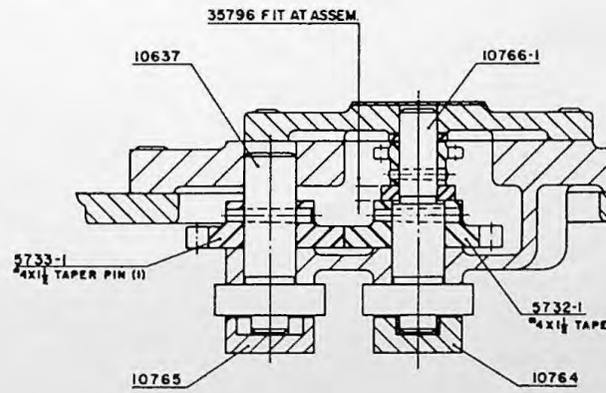


SECTION A-A

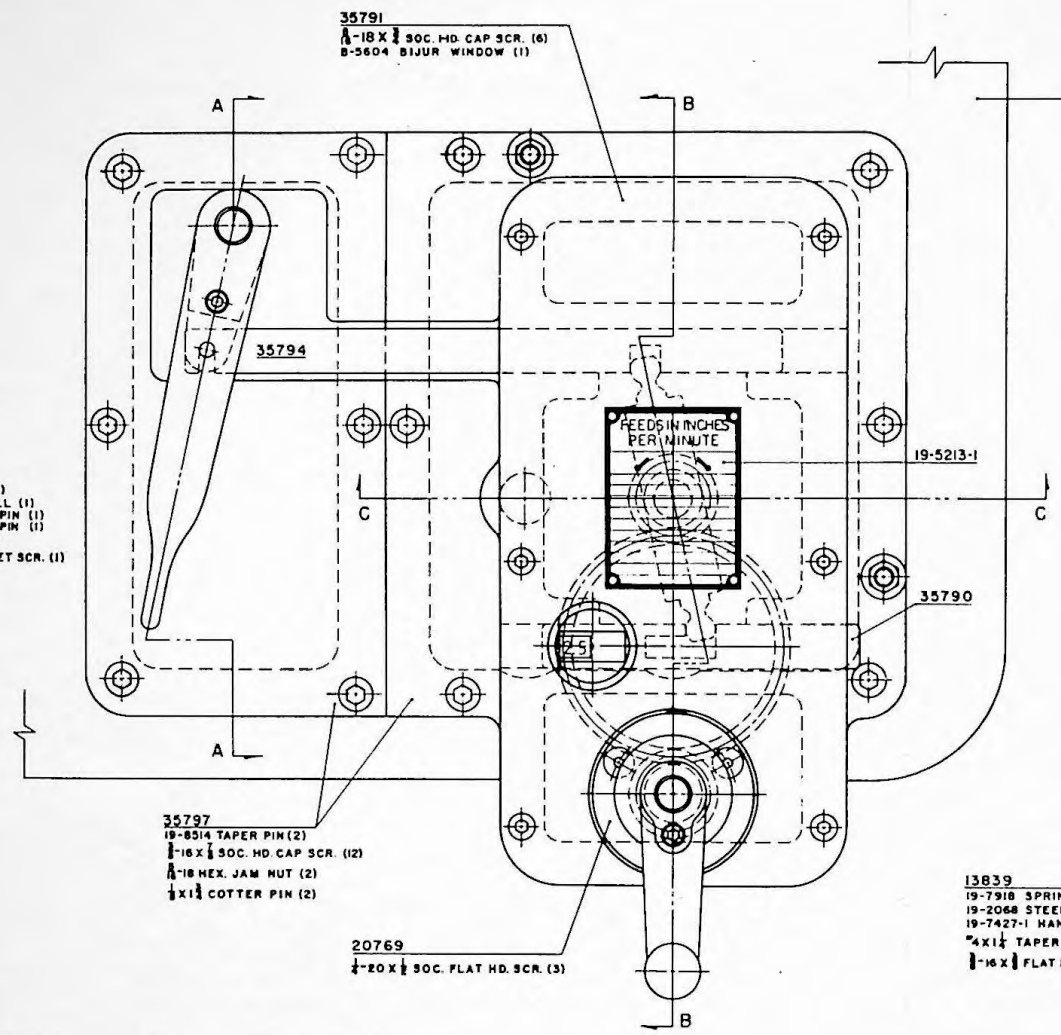


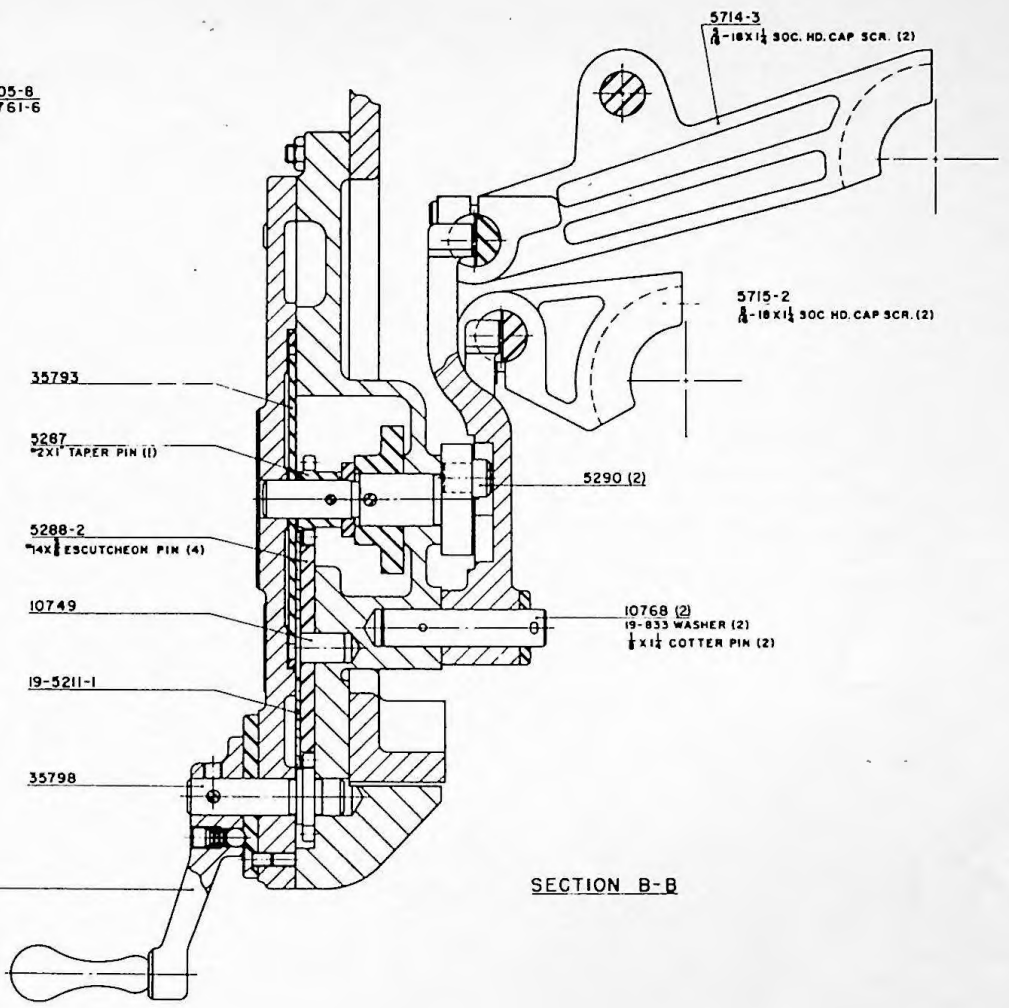
Part Number	Part Name	Part Number	Part Name
5287	Pinion	13839	Lever
5288-2	Feed Dial Gear	20769	Detent Plate
5290	Pin	35790	Feed Indicator
5405-8	Cover	35791	Cover
5417-1	Shifter Lever	35792	Shifter Lever
5705-2	Shifter Shaft	35793	Shifter
5708-2	Shifter Shaft	35794	Shifter Rod
5712-3	Shifter Shaft	35796	Spacer
5714-3	Gear Shifter	35797	Feed Control Box
5715-2	Gear Shifter	35798	Pinion
5732-1	Gear	19-833	Washer
5733-1	Gear	19-2068	Ball
10637	Crank	19-2798	Straight Pin
10749	Pin	19-2831	Straight Pin
10761-6	Cover	19-5211-1	Dial
10764	Shifter Lever	19-5213-1	Note Plate
10765	Shifter Lever	19-7427-1	Rockwood Sprinkler Handle - Plain
10766-1	Crank	19-7918	Spring
10768	Pin	19-8514	Thread Taper Pin

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



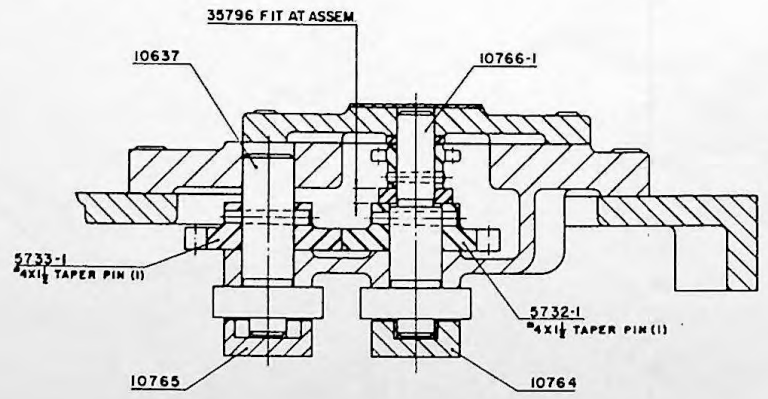
SECTION C-C





SECTION B-B

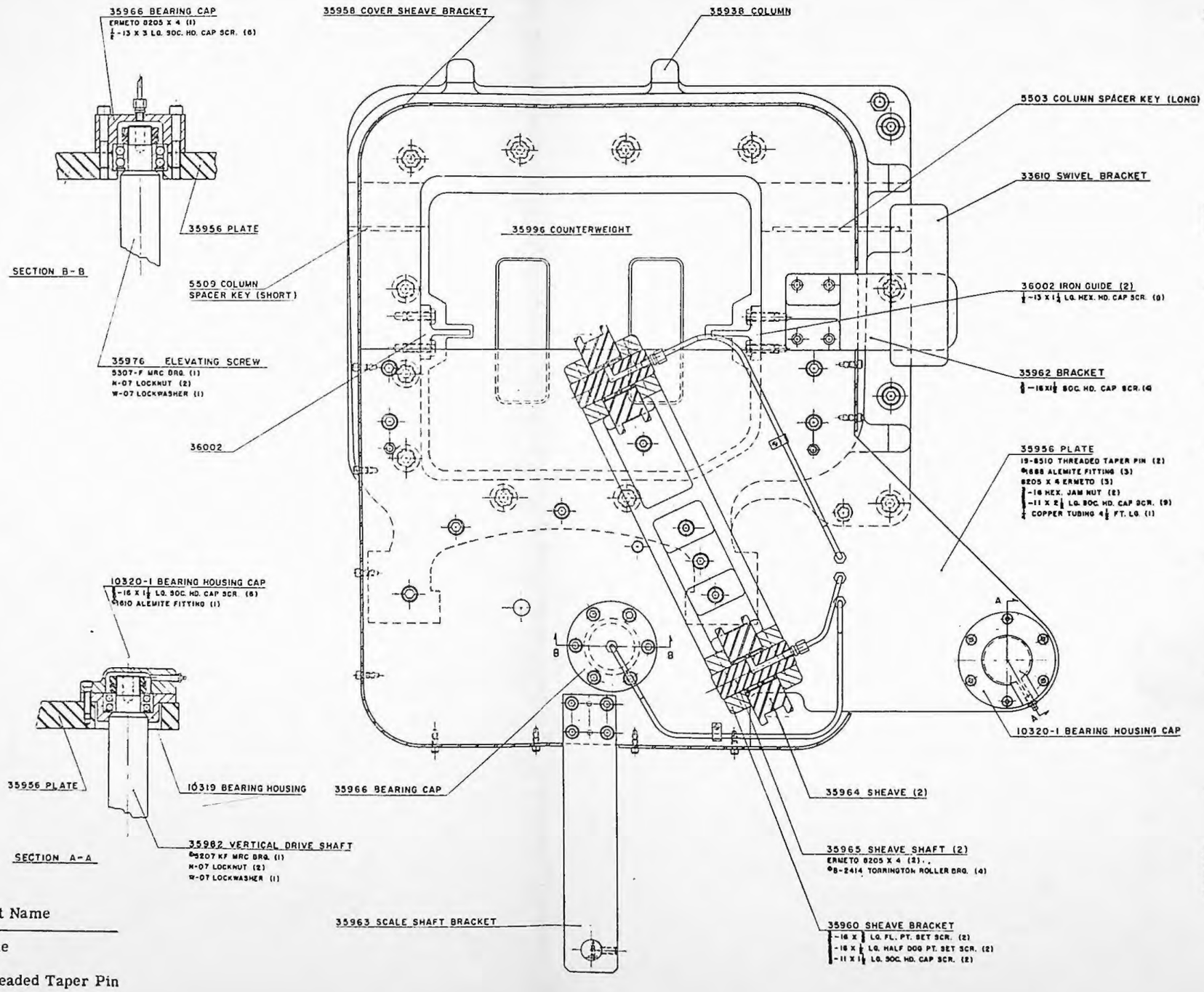
IAL NUMBER WHEN ORDERING PARTS



SECTION C-C

DWG. #A-150-33-1
Milling Feed Control
G & L and Hypro Division

Part Number	Part Name
5422-2	Cover
5503	Column Spacer Key (Long)
5504	Column Spacer Key (Short)
5509	Column Spacer Key (Short)
7222-1	Coupling
10319	Bearing Housing
10320-1	Bearing Housing Cap
10325	Collar
10372	Trip Shaft
13258-9	Scale Shaft
33610	Swivel Bracket
35938	Column
35956	Plate
35958	Cover - Sheave Bracket
35960	Sheave Bracket
35962	Bracket
35963	Scale Shaft Bracket
35964	Sheave
35965	Sheave Shaft
35966	Bearing Cap
35967	Cover
35972	Eye Bolt
35976	Elevating Screw
35982	Vertical Drive Shaft
35996	Counterweight
36002	Guide Iron
37068	Aux. Counterweight
65993	Chain
19-838	Washer
19-2726	Straight Pin
19-2776	Straight Pin



Part Number	Part Name
19-7177	Scale
19-8503	Threaded Taper Pin
19-8510	Threaded Taper Pin
19-8514	Threaded Taper Pin

NG)

37068 AUX. COUNTERWEIGHT AS NEEDED

35996 COUNTERWEIGHT

35938 COLUMN
19-838 WASHER (13)
19-2776 ⅜ X 3¼ STR. PIN (2)
19-8503 THREADED TAPER PIN (2)
⅜-11 HEX. JAM NUT (2)
⅜-10 X 1½ LG. FL. PT. SET SCR. (2)
⅜-10 X 3 LG. SOC. HD. CAP SCR. (4)
⅜-10 X 4¼ LG. SOC. HD. CAP SCR. (9)

35967 COVER (3)
¼-20 X ½ SOC. FLAT HD. SCR. (24)

35967

5504 COLUMN SPACER KEY (SHORT)

35958 COVER SHEAVE BRKT.
⅜-16 X ⅝ LG. SOC. HD. CAP SCR. (10)
⅜-13 EYE BOLT WILLIAMS #28 (1)

35964

35965

35972 EYE BOLT (2)
⅜-8 HEX. JAM NUT (2)

36002 IRON GUIDE

65993 CHAIN

35960 SHEAVE BRACKET

35967

10325

10372 TRIP SHAFT

10325 COLLAR (2)
⅜-16 X ¾ SOC. HD. CAP SCR. (2)

5422-2 COVER
¼-20 X ½ SOC. HD. CAP SCR. (4)

35964 SHEAVE

35956 PLATE

7222-1 COUPLING
⅜ X 2 X ¾ TAPER PIN (1)

TOP OF BED

35965 SHEAVE SHAFT

35972

35963 SCALE SHAFT BRACKET
⅜-16 X 1" LG. CONE PT. SET SCR. (1)
⅜-16 HEX. JAM NUT (2)
⅜-13 X 1½ LG. SOC. HD. CAP SCR. (4)
19-8814 THREADED TAPER PIN (2)

TOP OF HEADSTOCK IN HIGHEST POSITION

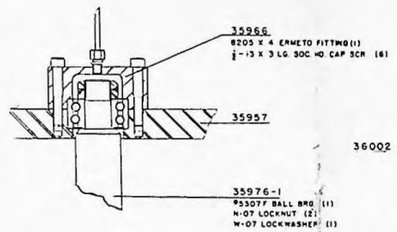
TOP OF HEADSTOCK IN LOWEST POSITION

13256-9 SCALE SHAFT
19-2726 ⅜ DIA. X ¾ LG. STR. PIN (1)
19-7177 SCALE 60" LG. (1)
96-32 X ¾ LG. FL. SOC. HD. CAP SCR. (2)

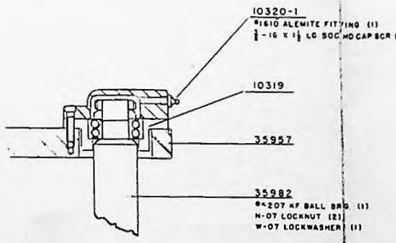
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

DWG. #A-150-35-1
Column (340-T)
G & L and Hypro Division

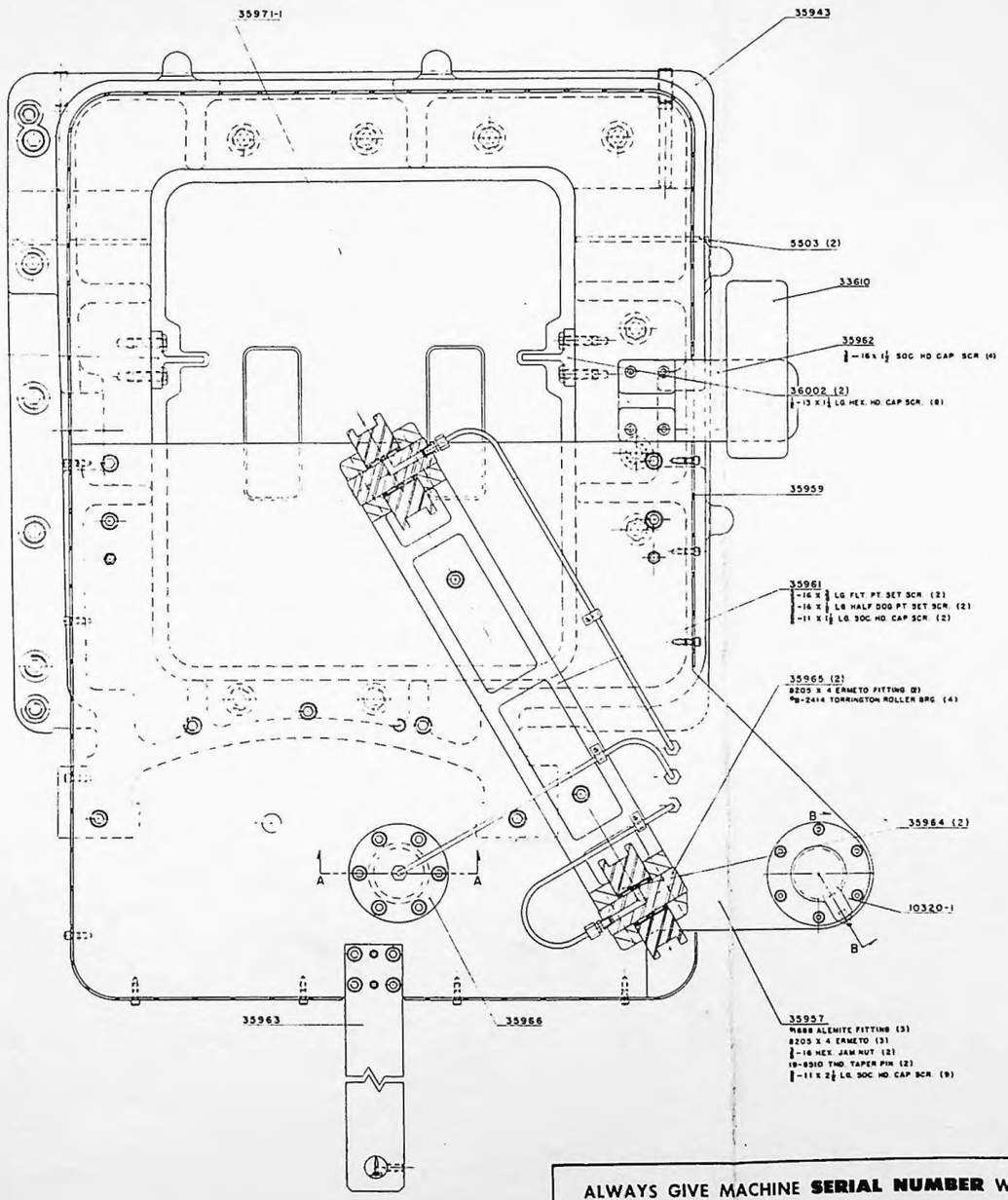
Part Number	Part Name	Part Number	Part Name
5422-2	Cover	35965	Sheave Shaft
5503	Column Space Key - Long	35966	Bearing Cap
		35967	Cover
7222-1	Coupling	35971-1	Counterweight
10319	Bearing Housing - Drive Shaft	35976-1	Elevating Screw
10320-1	Bearing Housing Cap	35982	Vertical Drive Shaft
10325	Collar	35987	Chain
10325-1	Collar	36002	Guide Iron
10372	Trip Shaft	36077	Aux. Counterweight
10375-8	Scale Strip	45146	Eye Bolt
33610	Swivel Bracket	19-839	Washer
35943	Column	19-2726	Straight Pin
35957	Plate	19-2759	Straight Pin
35959	Sheave Bracket Cover	19-8503	Threaded Taper Pin
35961	Sheave Bracket	19-8507	Threaded Taper Pin
35962	Bracket	19-8510	Threaded Taper Pin
35963	Scale Shaft Bracket	19-8514	Threaded Taper Pin
35964	Sheave		



SECTION A-A



SECTION B-B



35943
-9 X 3½ LG SOC HD CAP SCR
-9 X 4½ LG SOC HD CAP SCR
-11 HEX. JAM NUT (2)
-10 X 1½ LG SOC. HD FLT PT SE
19-2759 ¼ X 4½ LG STR. PIN
19-8503 THD. TAPER PIN (1)
19-8507 THD. TAPER PIN (1)
19-839 WASHER (14)

35959
-18 X ½ LG SOC HD CAP SCR
#825 WILLIAMS EYE BOLT (1)

35964

35965

35987

35957

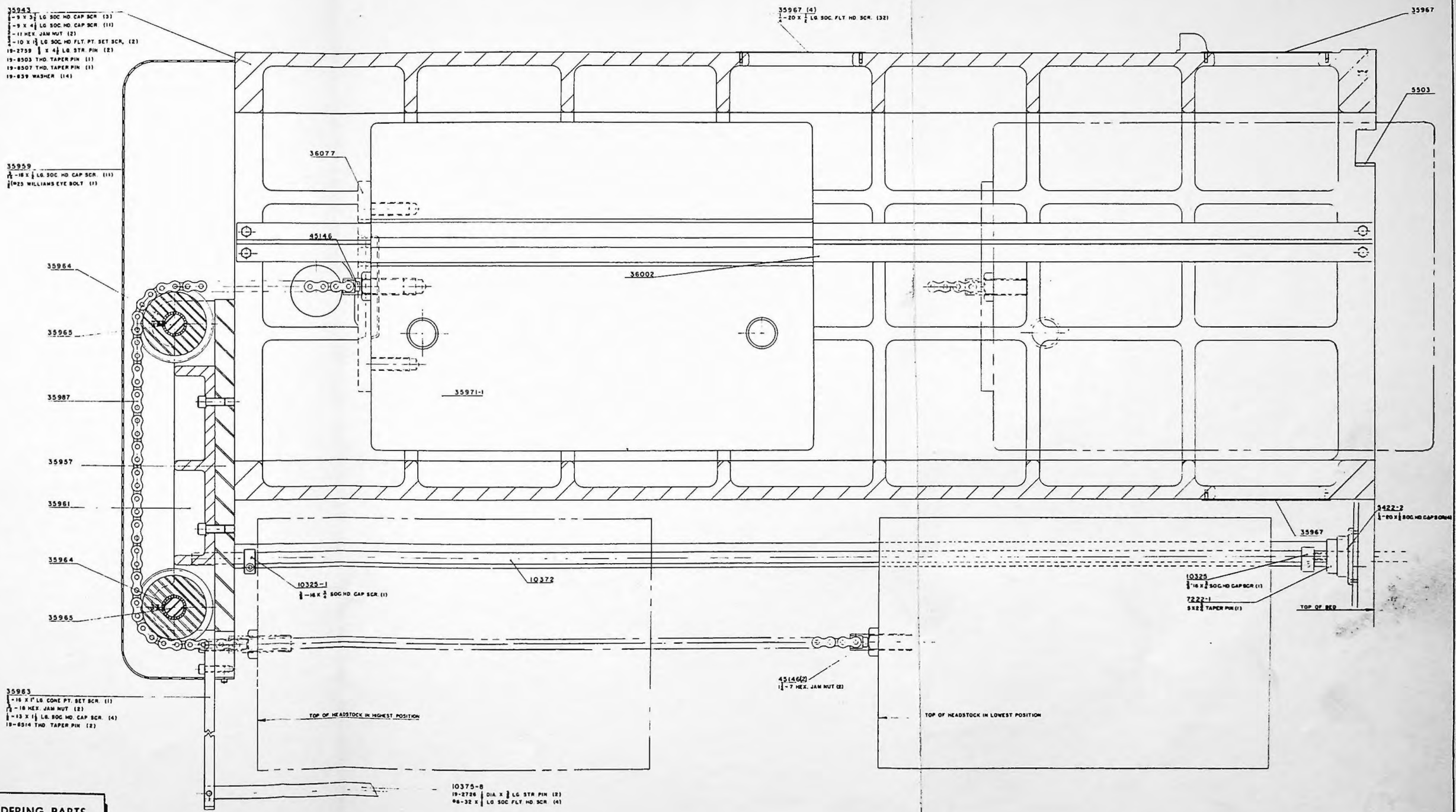
35961

35964

35965

35963
-16 X 1" LG CONE PT SET SCR
-18 HEX. JAM NUT (2)
-13 X 1½ LG SOC HD CAP SCR
19-8514 THD TAPER PIN (2)

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



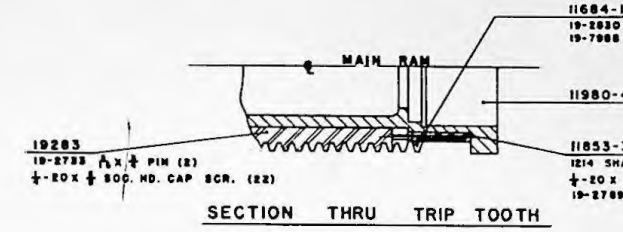
HEN ORDERING PARTS

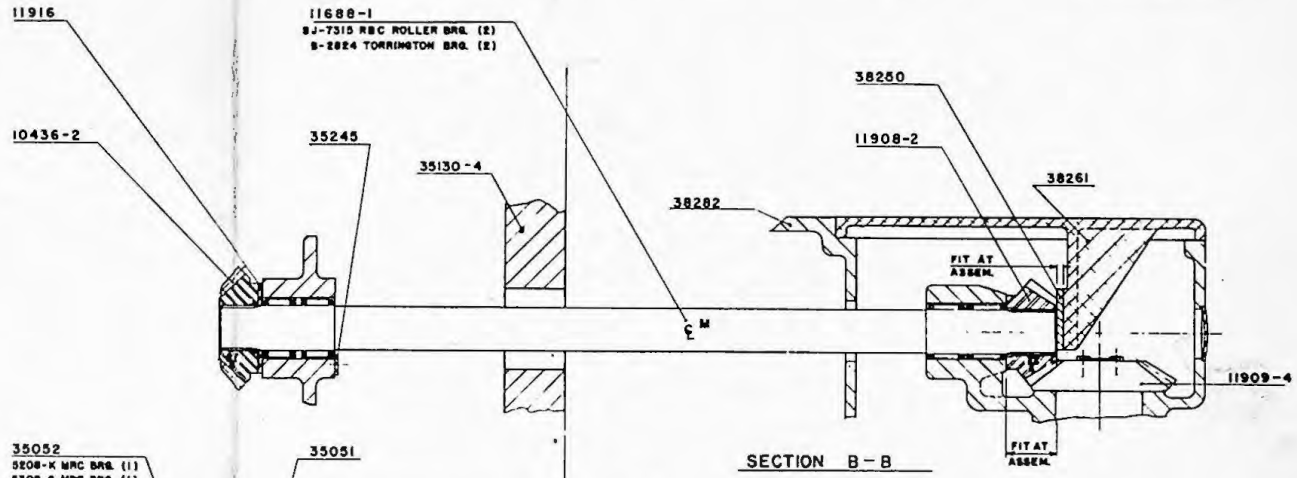
DWG. #A-150-35-2
Column (350-T)
G & L and Hypro Division

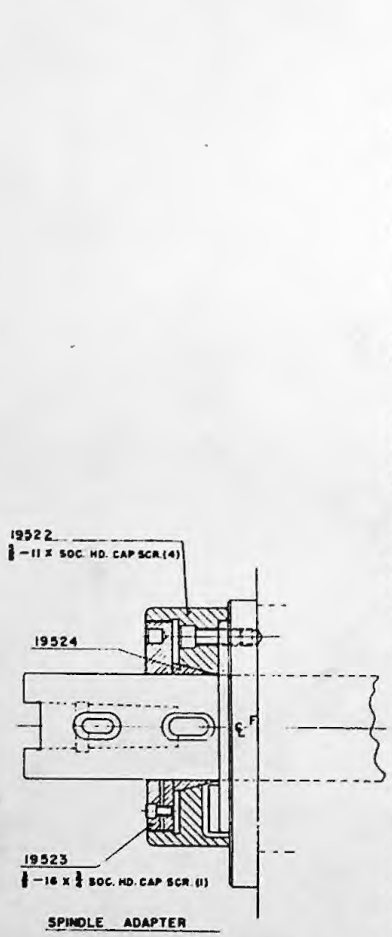
Parts List for DWG. #A-150-40-1

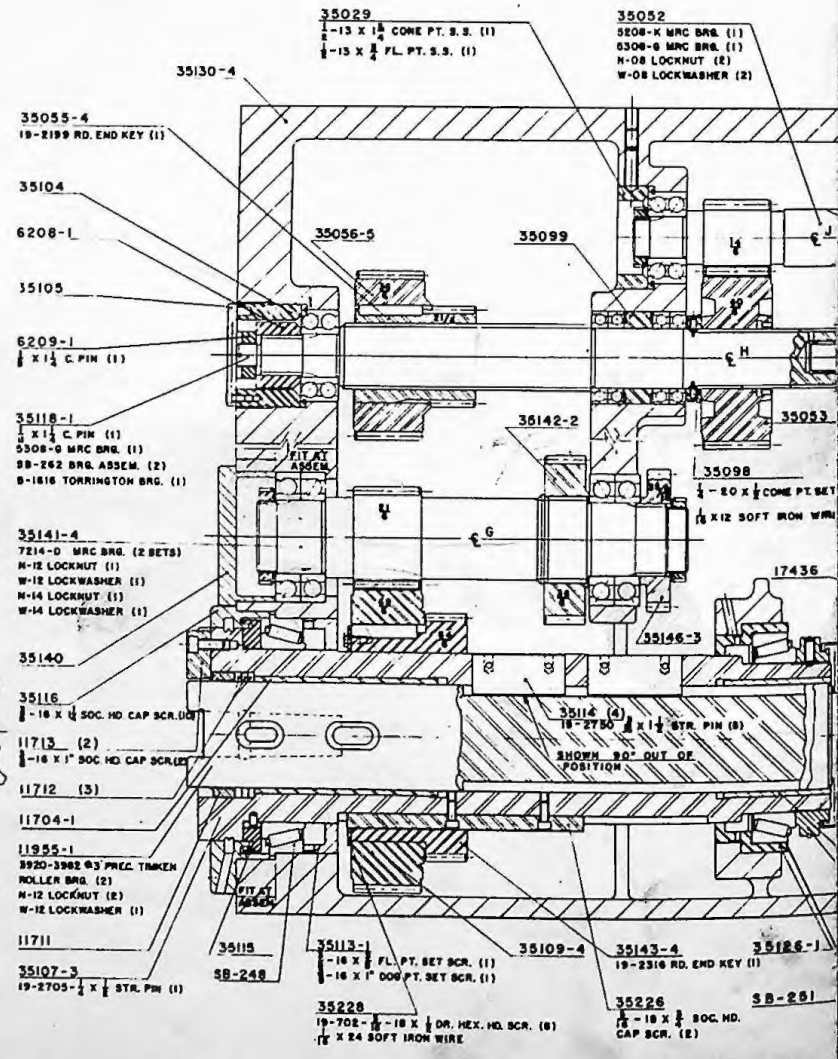
Headstock

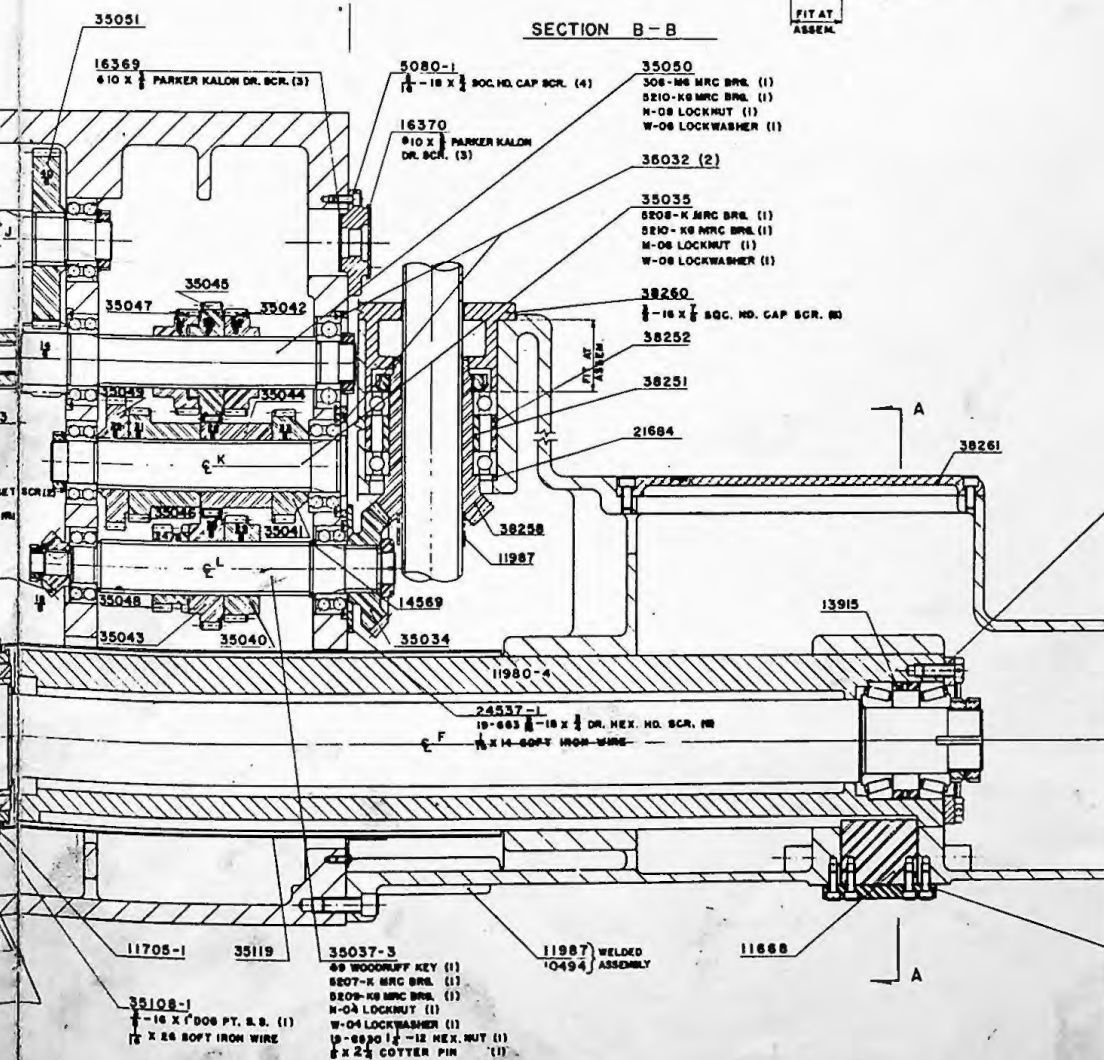
Part Number	Part Name
5080-1	Cover
5169	Clamp Sleeve
5171	Retaining Plate
6208-1	Spacer
6209-1	Nut
7395	Clamp L. H. Adj. Sleeve
7396	Clamp R. H. Adj. Sleeve
10436-2	Bevel Gear
10494	Cover
10537	Clamp Lever
10539	Plate
11668	Key
11684-1	Trip Tooth
11688-1	Shaft
11704-1	Front Spindle Bushing
11705-1	Rear Spindle Bushing
11711	Wiper Ring
11712	Spindle Wiper
11713	Key
11853-3	Trip Tooth Guide
11908-2	Bevel Pinion
11909-4	Bevel Gear
11910-7	Pinion
11916	Thrust Washer
11955-1	Spindle - #5MT - Slot Type
11980-4	Main Ram
11987	Drive Shaft Tube
13915	Spacer
14143	Bearing Retainer Plate
14569	Spacer
16369	Cover
16370	Cover
17436	Miter Gear - 18T
19283	Rack
19522	Adapter
19523	Nut
19524	Clamp Ring
21684	Spacer
24537-1	Bearing Retainer
35029	Retainer
35032	Spacer
35034	Bevel Gear
35035	Shaft
35037-3	Shaft
35040	Gear - 29T
35041	Gear - 33T
35042	Gear - 30T
35043	Gear - 35T
35044	Gear - 28T
35045	Gear - 32T
35046	Gear - 31T
35047	Gear - 31T
35048	Gear - 24T
35049	Gear - 39T
35050	Pinion Shaft - 14T
35051	Gear - 40T
35052	Pinion Shaft - 14T
35053	Gear - 40T
35055-4	Gear - 21T
35056-5	Gear - 36T
35098	Collar
35099	Spacer
35104	Nut
35105	Cover
35107-3	Spindle Sleeve
35108-1	Lock Nut
35109-4	Bull Gear
35113-1	Oil Retainer
35114	Spindle Key
35115	Oil Retainer
35116	Spindle Sleeve Cover
35118-1	Shaft
35119	Main Spindle Guard
35126-1	Bearing Retainer
35130-4	Headstock
35140	Auxiliary Spindle Cover
35141-4	Pinion Shaft - 21T
35142-2	Gear
35143-4	Gear
35146-3	Gear - 28T
35224	Key
35226	Key
35228	Retainer Ring
35245	Bearing Retainer
38250	Spacer
38251	Spacer
38252	Spacer
38255	Bearing Retainer
38256	Clamp Screw
38258	Bevel Pinion
38260	Bearing Retainer
38261	Ram Guide Cover
38262	Spindle Guard
38282	Ram Guide
19-663	Drilled Hex. Hd. Cap Screw
19-670	Cap Screw
19-675	Drilled Hex. Hd. Cap Screw
19-702	Drilled Hex. Hd. Cap Screw
19-2199	Rd. End Key
19-2316	Rd. End Key
19-2705	Straight Pin
19-2733	Straight Pin
19-2750	Straight Pin
19-2789	Straight Pin
19-2830	Straight Pin (Cyonide)
19-7988	Spring
19-8530	Lock Nut


MAIN RAM
19283
SECTION THRU TRIP TOOTH

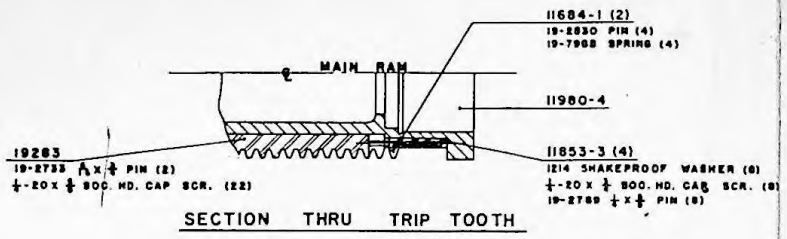

11916
11688-1
SJ-7315 RBC ROLLER BRG. (2)
B-2824 TORRINGTON BRG. (2)
10436-2
35245
35130-4
38250
11908-2
38261
38282
FIT AT ASSEM.
11909-4
SECTION B-B


19522
19524
19523
SPINDLE ADAPTER


35029
35052
35051
16369
35130-4
35055-4
35104
6208-1
35105
6209-1
35118-1
35141-4
35140
35116
11713 (2)
11712 (3)
11704-1
11955-1
35107-3
35115
SB-248
35056-5
35099
35142-2
35098
35146-3
35114 (4)
SHOWN 90° OUT OF POSITION
35109-4
35143-4
35113-
35228
35226
35126-1
SB-281
11705-1
35108-1
35119
35053
17436


5080-1
16370
35050
35032 (2)
35035
38260
38252
38251
21684
38258
11987
14569
35034
35045
35047
35042
35044
35041
35048
35043
35040
13915
11980-4
24537-1
11987 10494 WELDED ASSEMBLY
11668
35037-3
A

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



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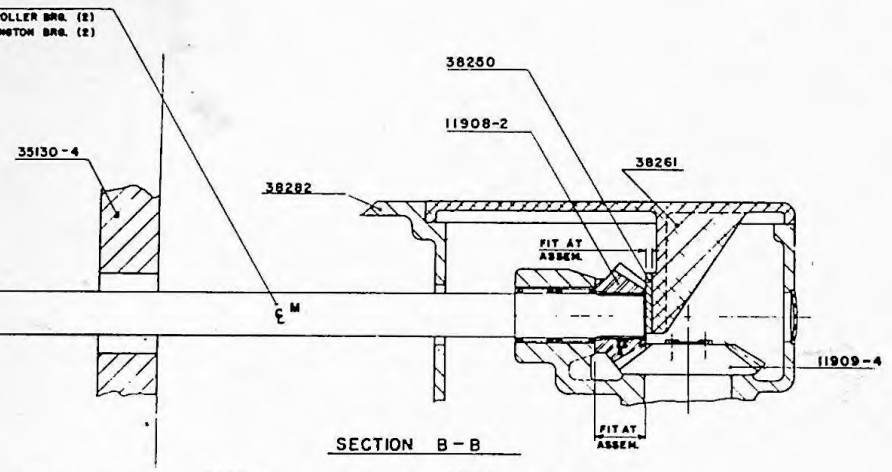

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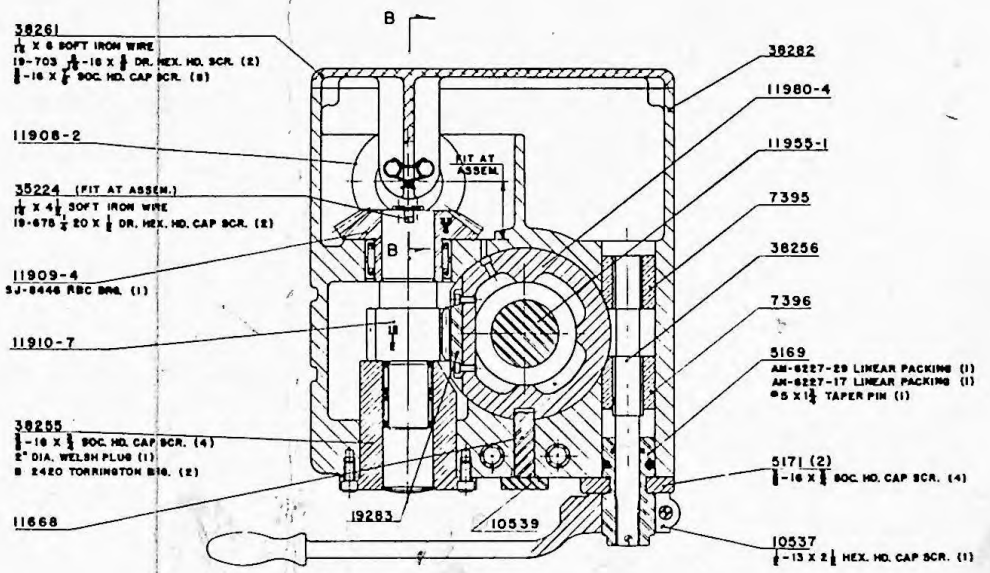
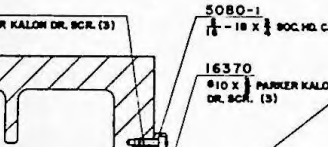
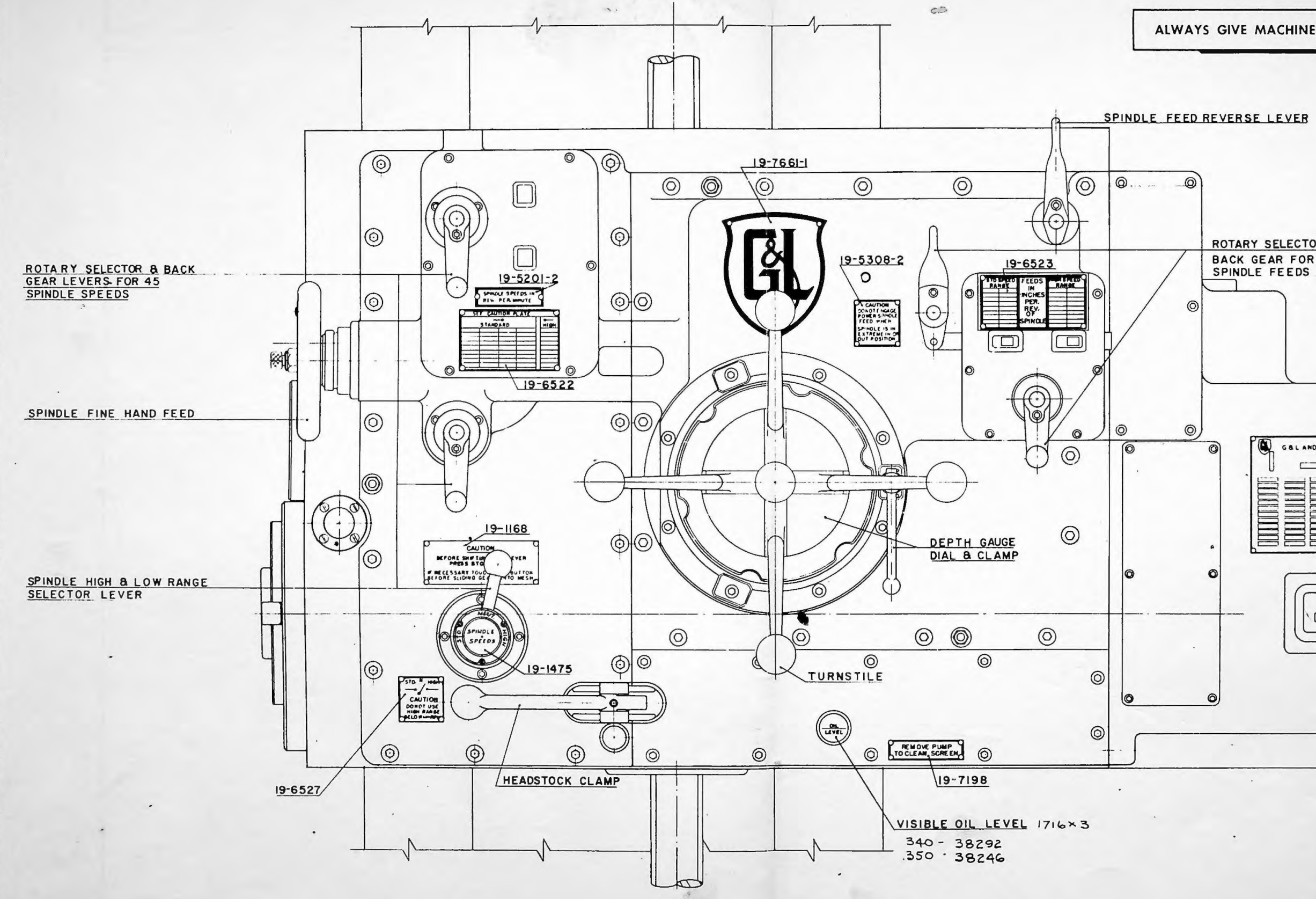


SECTION A – A



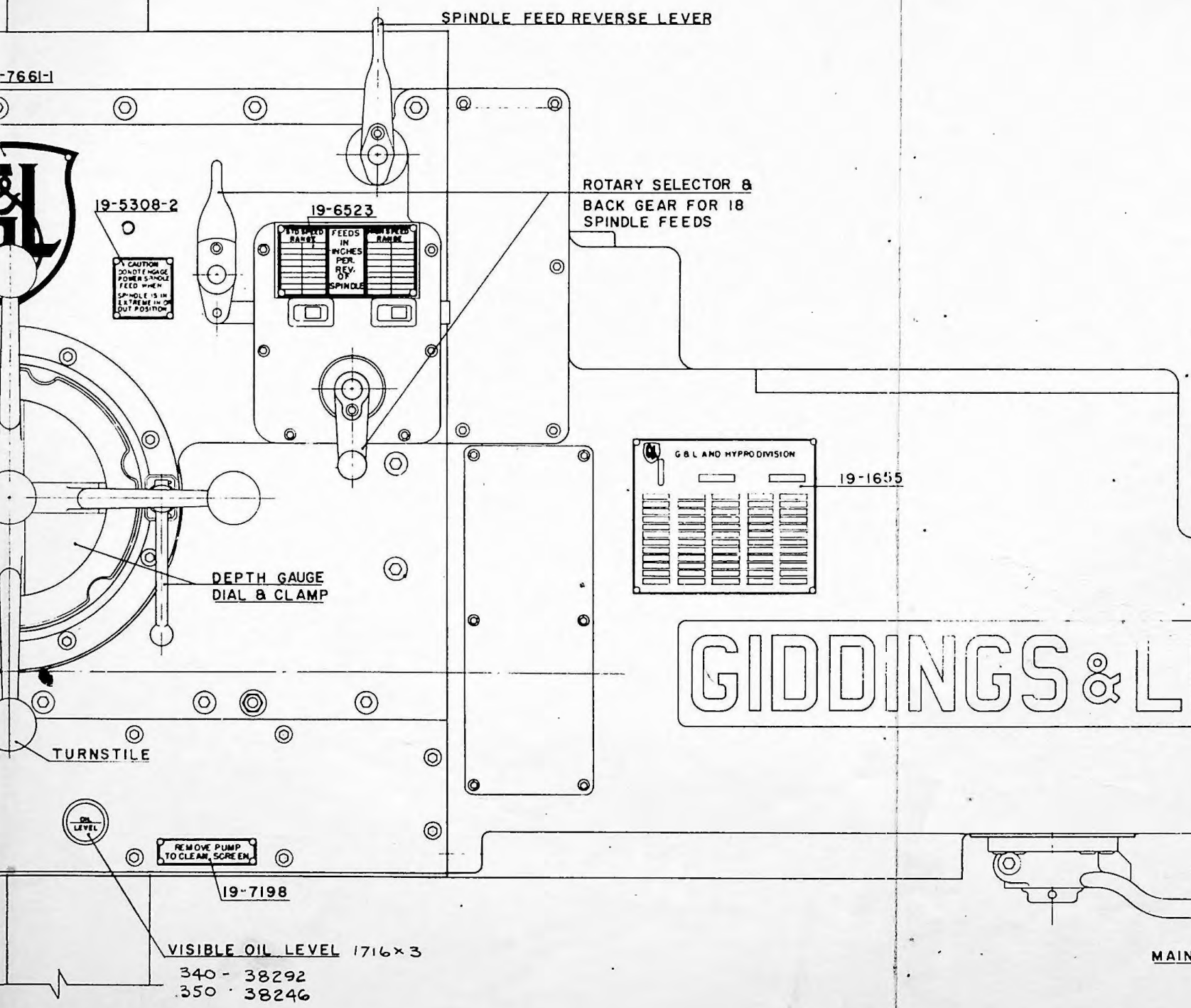
DWG. #A-150-40-1
Headstock (340-T)
G & L and Hypro Division

ALWAYS GIVE MACHINE



OPERATORS VIEW

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



GIDDINGS & LEWIS

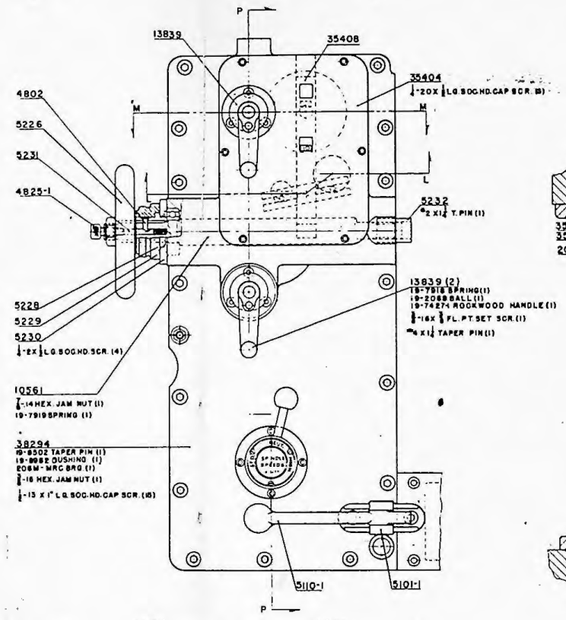
OPERATORS VIEW

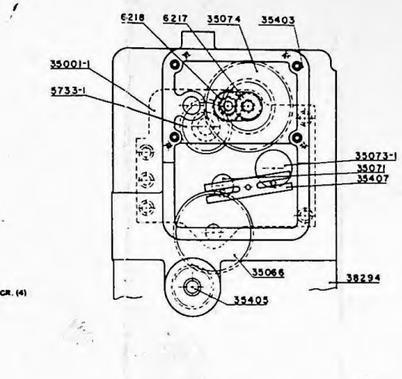
Part Number	Part Name
19-1168	Note Plate
19-1475	Note Plate
19-1655	Note Plate
19-5201-2	Note Plate
19-5308-2	Note Plate
19-6522	Note Plate
19-6523	Note Plate
19-6527	Note Plate
19-7198	Note Plate
19-7661-1	Note Plate

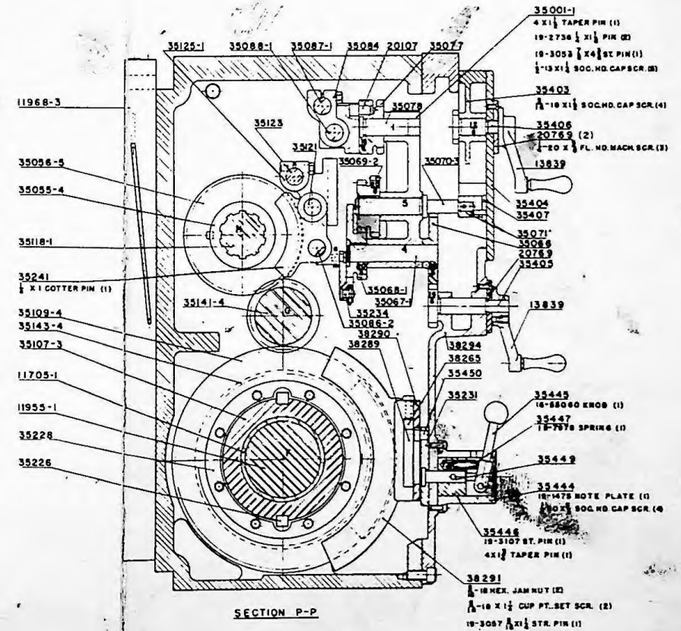
DWG. #A-150-40-2
Headstock (340-T)
G & L and Hypro Division

Part Number	Part Name
4802	Dial Clamp
4825-1	Dial Clamp Screw
5101-1	Clamp Lever Bracket
5110-1	Headstock Clamp Lever
5122-1	Cover
5179	Shaft
5226	Hand Wheel
5228	Bushing
5229	Dial
5230	Plate
5231	Dial Clamp Pin
5232	Coupling
5733-1	Gear
6217	Speed Dial Gear
6218	Gear
10561	Shaft
11688-1	Shaft
11705-1	Rear Spindle Bushing
11955-1	Spindle - #5MT - Slot Type
11968-3	Head Gib - Left
11980-4	Main Ram
13839	Lever
14052	Gear
20107	Shifter Pin
20769	Detent Plate
35001-1	Bracket
35035	Shaft
35037-3	Shaft
35040	Gear - 29T
35041	Gear - 33T
35042	Gear - 30T
35043	Gear - 35T
35044	Gear - 28T
35045	Gear - 32T
35050	Pinion Shaft - 14T
35053	Gear - 40T
35055-4	Gear - 21T
35056-5	Gear - 36T
35066	Gear
35067-1	Pin
35068-1	Shifter Disc
35069-2	Gear
35070-3	Shaft
35071	Shaft End
35072	Gear
35073-1	Shaft
35074	Gear
35075-1	Pinion Shaft
35076	Shifter Disc
35077	Shifter Disc
35078	Pin
35083	Shifter Block
35084	Shifter Block
35086-2	Shifter Rod
35087-1	Shifter Rod
35088-1	Shifter Rod
35089	Shifter Block
35090	Shifter Lever
35091	Shifter Lever
35092	Shifter Lever

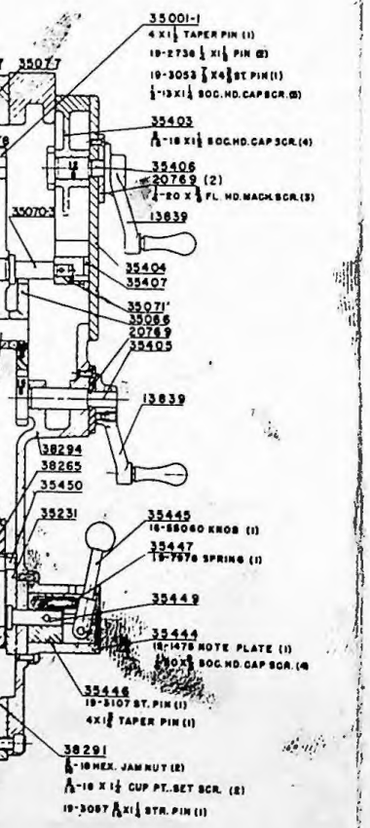
Part Number	Part Name
35093-1	Shaft
35094	Shifter Shoe
35095	Shifter Shoe
35096	Shifter Rod
35107-3	Spindle Sleeve
35109-4	Bull Gear
35118-1	Shaft
35119	Main Spindle Guard
35121	Shaft
35122	Shaft
35123	Shifter Rod
35124	Shifter Shoe
35125-1	Shifter Shoe
35130-4	Headstock
35141-4	Pinion Shaft
35143-4	Gear
35226	Key
35228	Retainer Ring
35231	Shifter Crank Plate
35234	Pin
35235	Link
35241	Shifter
35245	Bearing Retainer
35403	Housing
35404	Cover
35405	Gear
35406	Gear
35407	Link
35408	Slide
35444	Shifter Cam
35445	Shifter Handle
35446	Shifter Hub
36447	Spring Plunger
35449	Shifter Crank
35450	Shifter Stub
38265	Shifter Gib
38289	Shifter Bar
38290	Shifter Plate
38291	Shifter
38294	Headstock Cover
19-675	Drilled Hex. Hd. Cap Screw
19-1475	Note Plate
19-2067	Steel Ball
19-2068	Steel Ball
19-2733	Straight Pin
19-2736	Straight Pin
19-2789	Straight Pin
19-2852	Straight Pin
19-3053	Straight Pin
19-3057	Straight Pin
19-3107	Straight Pin
19-6526	Speed Dial
19-7427-1	Rockwell Sprinkler Handle - Plain
19-7915	Spring
19-7918	Spring
19-7919	Spring
19-7978	Spring
19-8502	Taper Pin
19-8982	Bushing

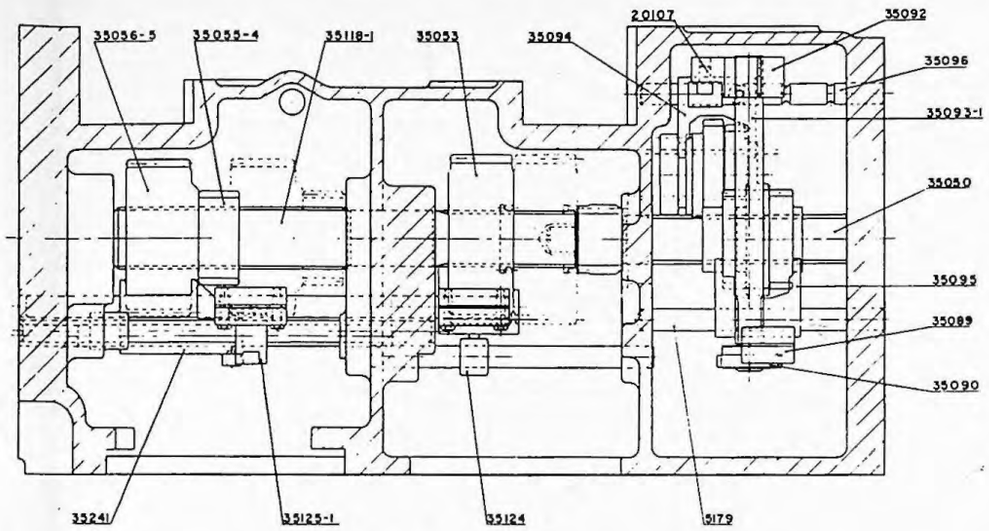




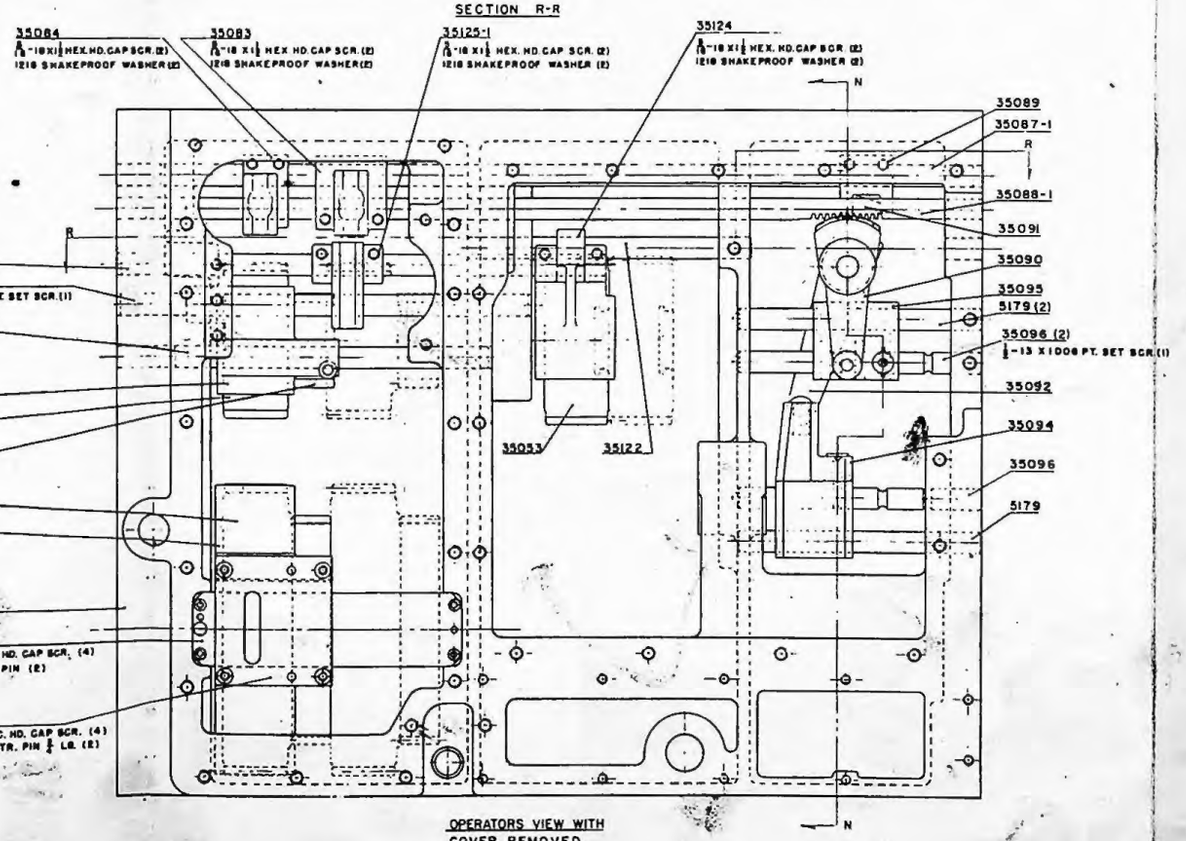


ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

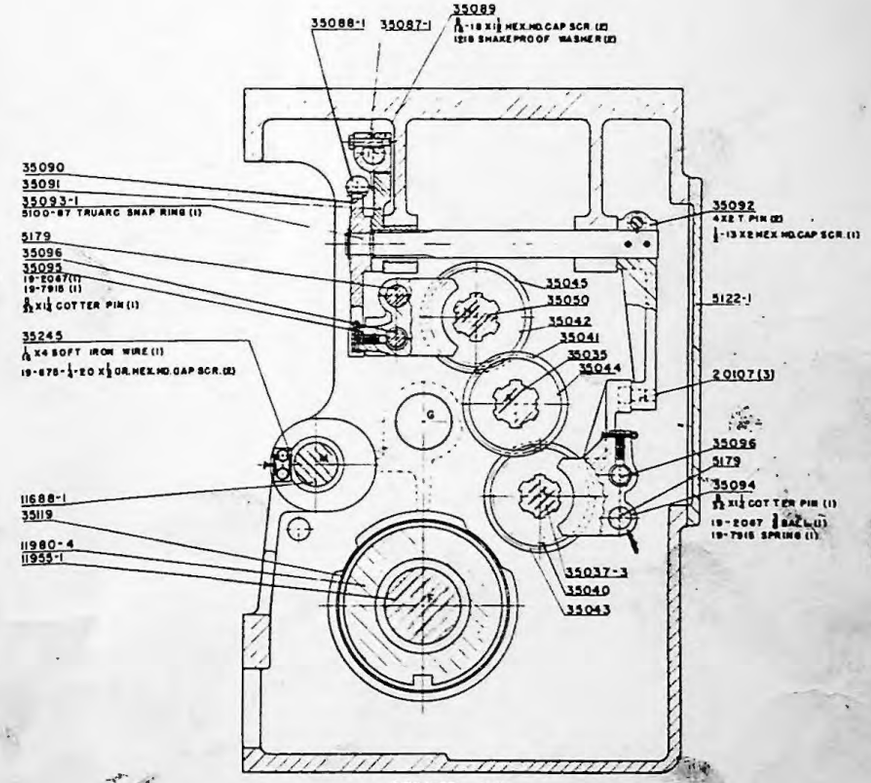




SECTION R-R



OPERATORS VIEW WITH
COVER REMOVED



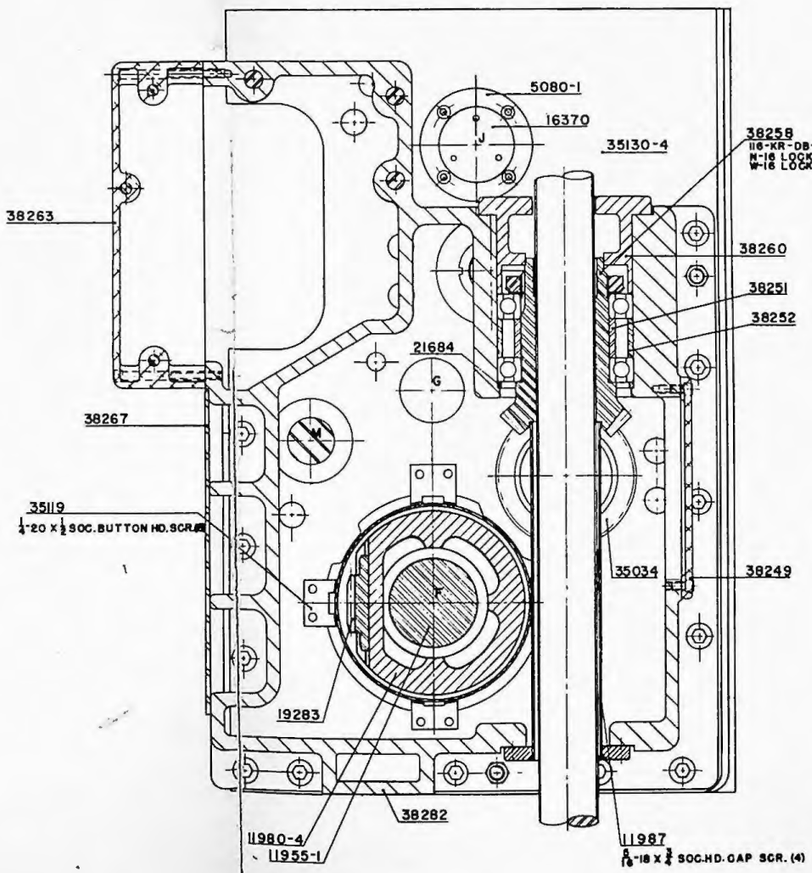
SECTION- N-N

DWG. #A-150-40-3
Headstock (340-T)
G & L and Hypro Division

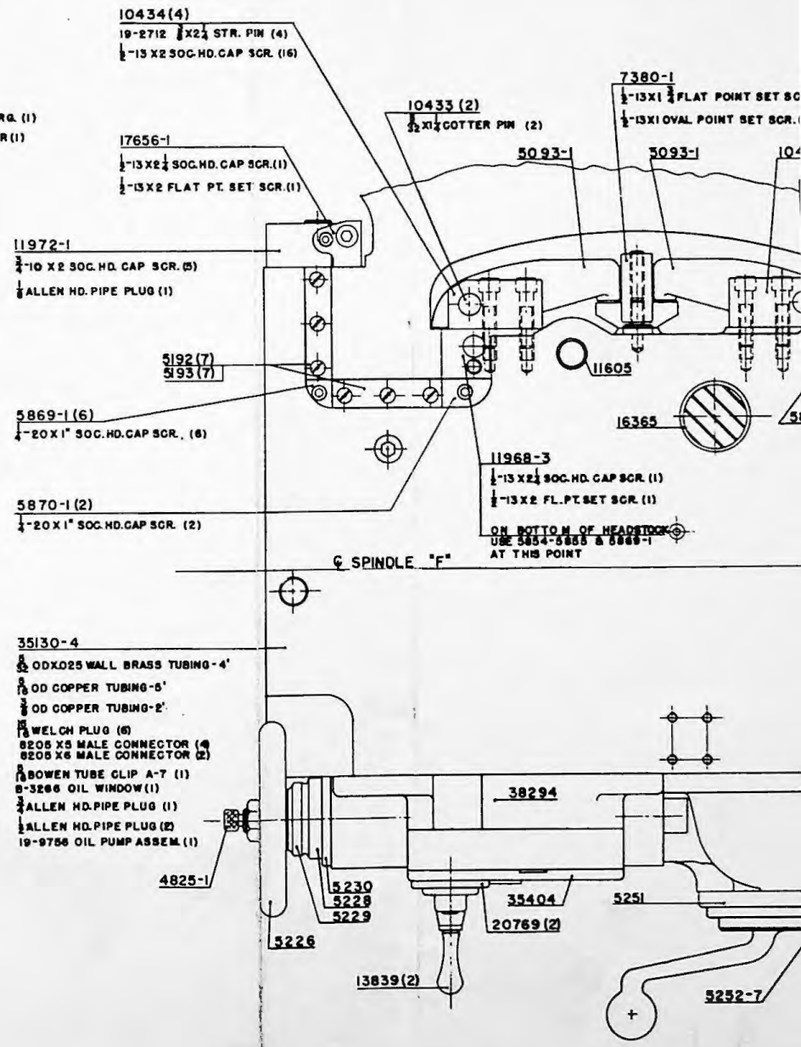
Part Number	Part Name
4825-1	Dial Clamp Screw
5080-1	Cover
5093-1	Headstock Clamp
5122-1	Cover
5192	Wiper Plate
5193	Felt Wiper
5226	Hand Wheel
5228	Bushing
5229	Dial
5230	Plate
5251	Dial Bearing
5252-7	Dial
5256-1	Lever
5293-1	Shifter Lever
5353-1	Lever
5849	Shoulder Screw
5854	Wiper Plate
5855	Wiper Felt
5869-1	Filler Block
5870-1	Filler Block
7380-1	Headstock Clamp Lever
10433	Pin
10434	Pin Support
11605	Trip Shaft Tube
11955-1	Spindle - #5MT - Slot Type
11968-3	Head Gib - Left
11969-3	Head Gib - Right
11971-1	Clamp - Right
11972-1	Clamp - Left
11980-4	Main Ram

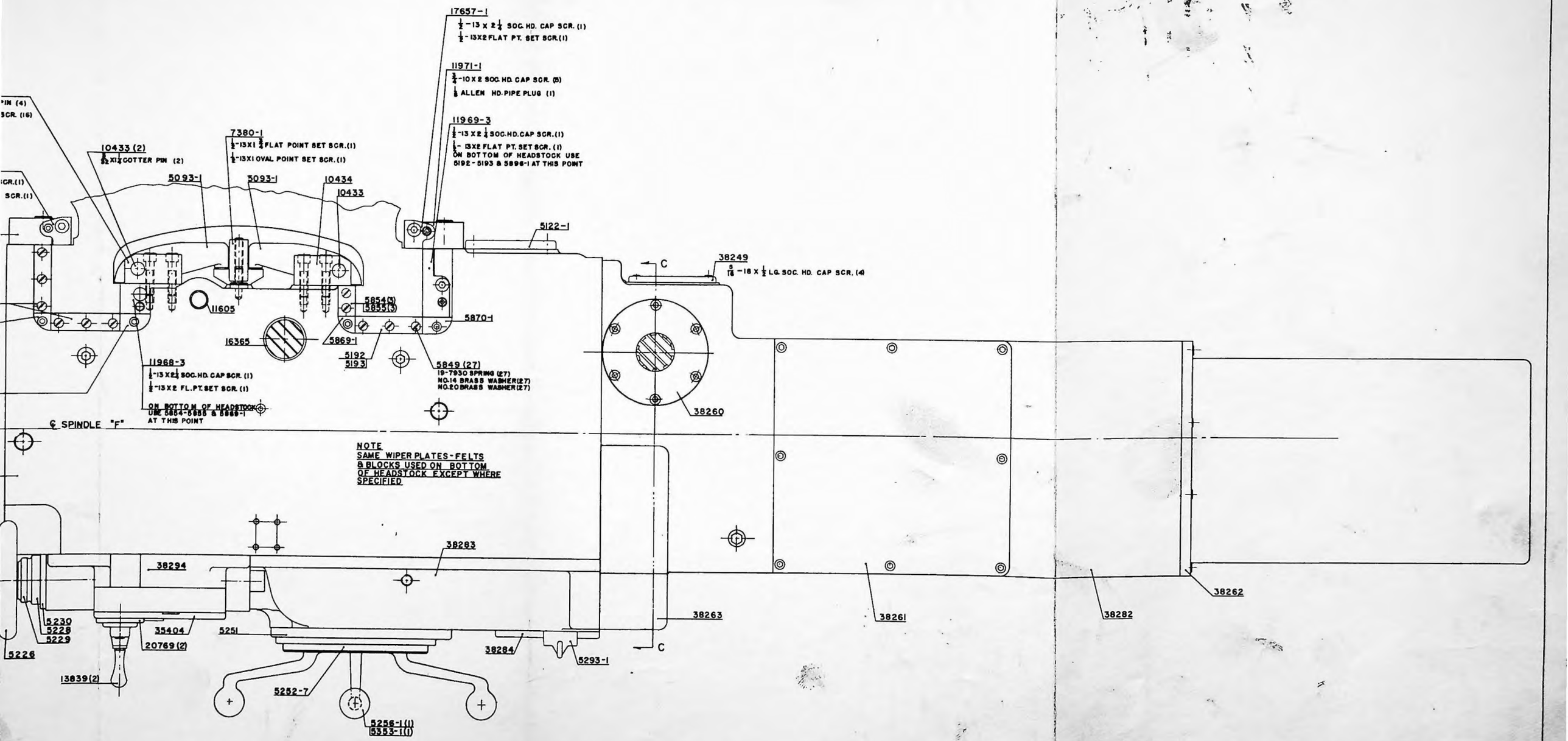
Part Number	Part Name
11987	Drive Shaft Tube
13839	Lever
16365	Screw Tube
16370	Cover
17656-1	Taper Gib - Left Clamp
17657-1	Taper Gib - Right Clamp
19283	Rack
20769	Detent Plate
21684	Spacer
35034	Bevel Gear
35119	Main Spindle Guard
35130-4	Head Stock
35404	Cover
38249	Cover
38251	Spacer
38252	Spacer
38258	Bevel Pinion
38260	Bearing Retainer
38261	Ram Guide Cover
38262	Spindle Guard
38263	Cover
38267	Cover
38282	Ram Guide
38283	Spindle Feed Case
38284	Cover
38294	Headstock Cover
19-2712	Straight Pin
19-7930	Spring
19-9756	Oil Pump Assembly

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



SECTION C-C





DWG. #A-150-40-4
Headstock (340-T)
G & L and Hypro Division

45

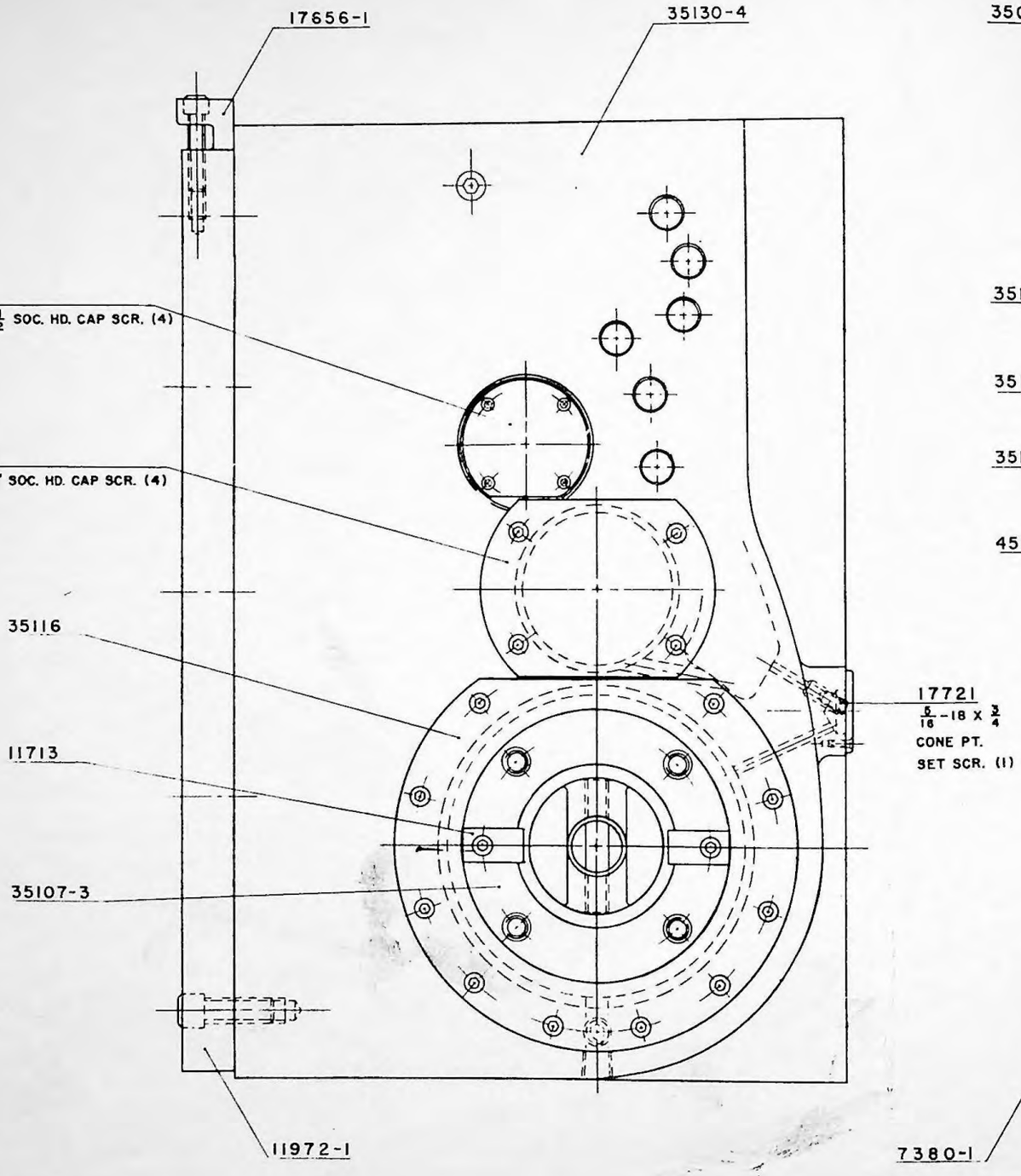
Parts List for DWG. #A-150-40-5

Headstock

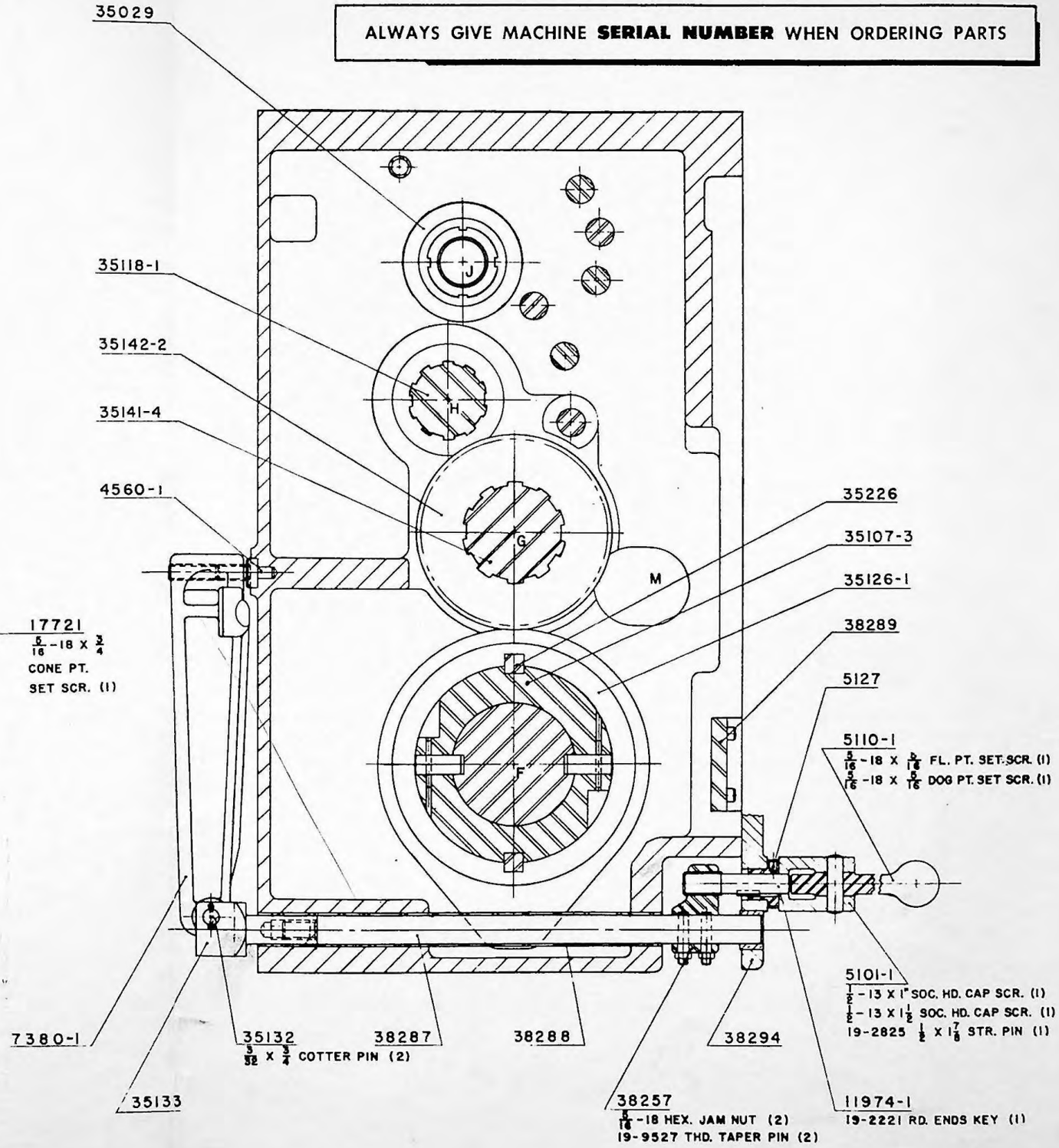
Part Number	Part Name
4560-1	Headstock Button
5101-1	Clamp Lever Bracket
5110-1	Headstock Clamp Lever
5127	Adjusting Bushing
7380-1	Headstock Clamp Lever
10436-2	Bevel Gear
11688-1	Shaft
11713	Key
11955-1	Spindle - #5MT - Slot Type
11972-1	Clamp - Left
11974-1	Clamp Rod - Short
11980-4	Main Ram
11981-1	Oil Pipe
17432-1	Cover
17433-2	Shaft
17435	Screen
17436	Miter Gear - 18T
17437	Miter Gear - 18T
17440	Spacer
17656-1	Taper Gib - Left Clamp
17721	Oil Feed Sleeve
35029	Retainer
35035	Shaft
35050	Pinion Shaft - 14T
35051	Gear - 40T
35052	Pinion Shaft - 14T

Part Number	Part Name
35087-1	Shifter Rod
35088-1	Shifter Rod
35105	Cover
35107-3	Spindle Sleeve
35116	Spindle Sleeve Cover
35118-1	Shaft
35119	Main Spindle Guard
35126-1	Bearing Retainer
35122	Shaft
35130-4	Headstock
35132	Pin
35133	Yoke
35140	Aux. Spindle Cover
35141-4	Pinion Shaft - 21T
35142-2	Gear
35226	Key
38257	Coupling
38287	Long Clamp Rod
38288	Clamp Rod Tubing
38289	Shifter Bar
38292	Cover
38294	Headstock Cover
19-2221	Round End Key
19-2825	Straight Pin
19-9105	Bushing
19-9527	Threaded Taper Pin

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

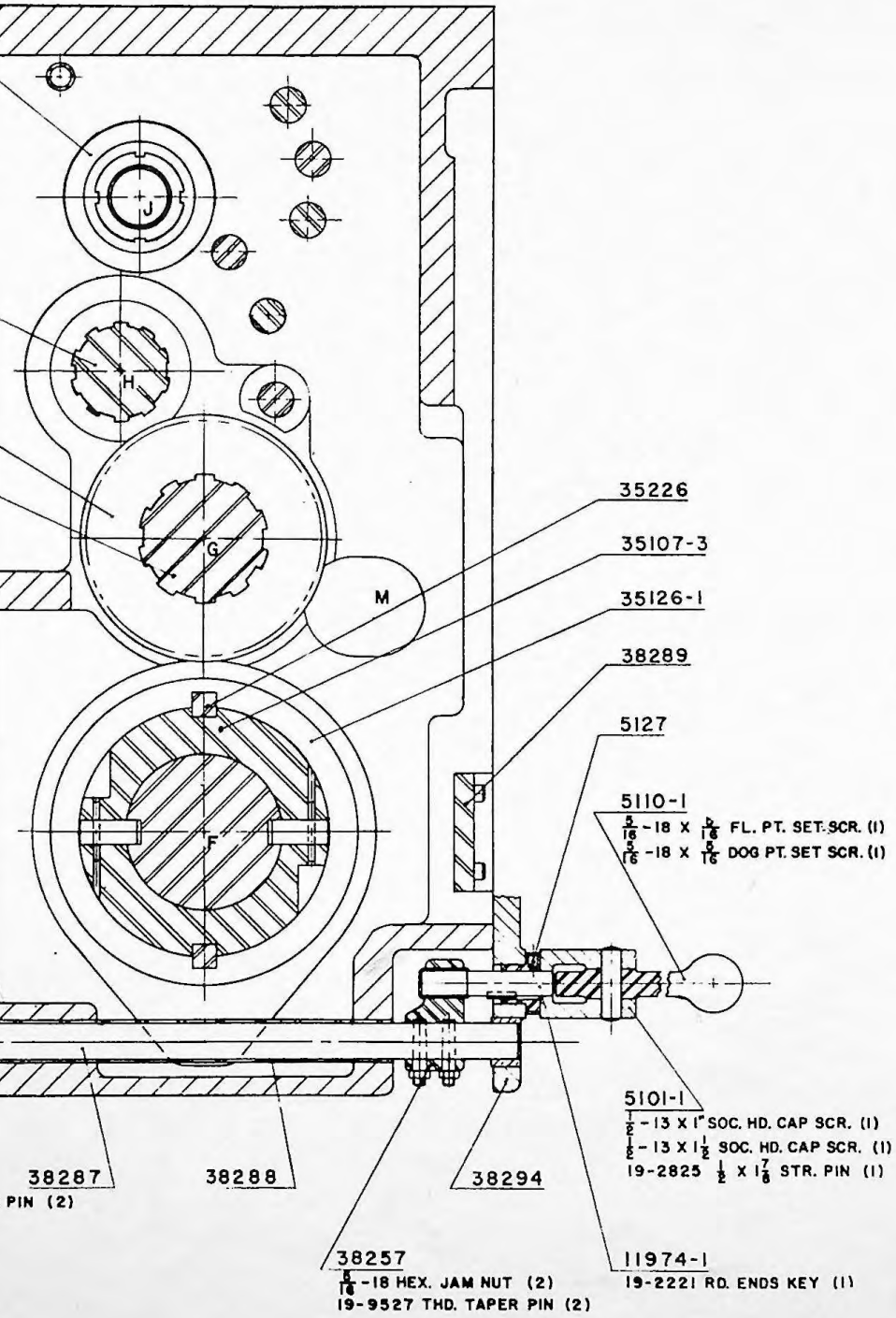


SPINDLE END VIEW

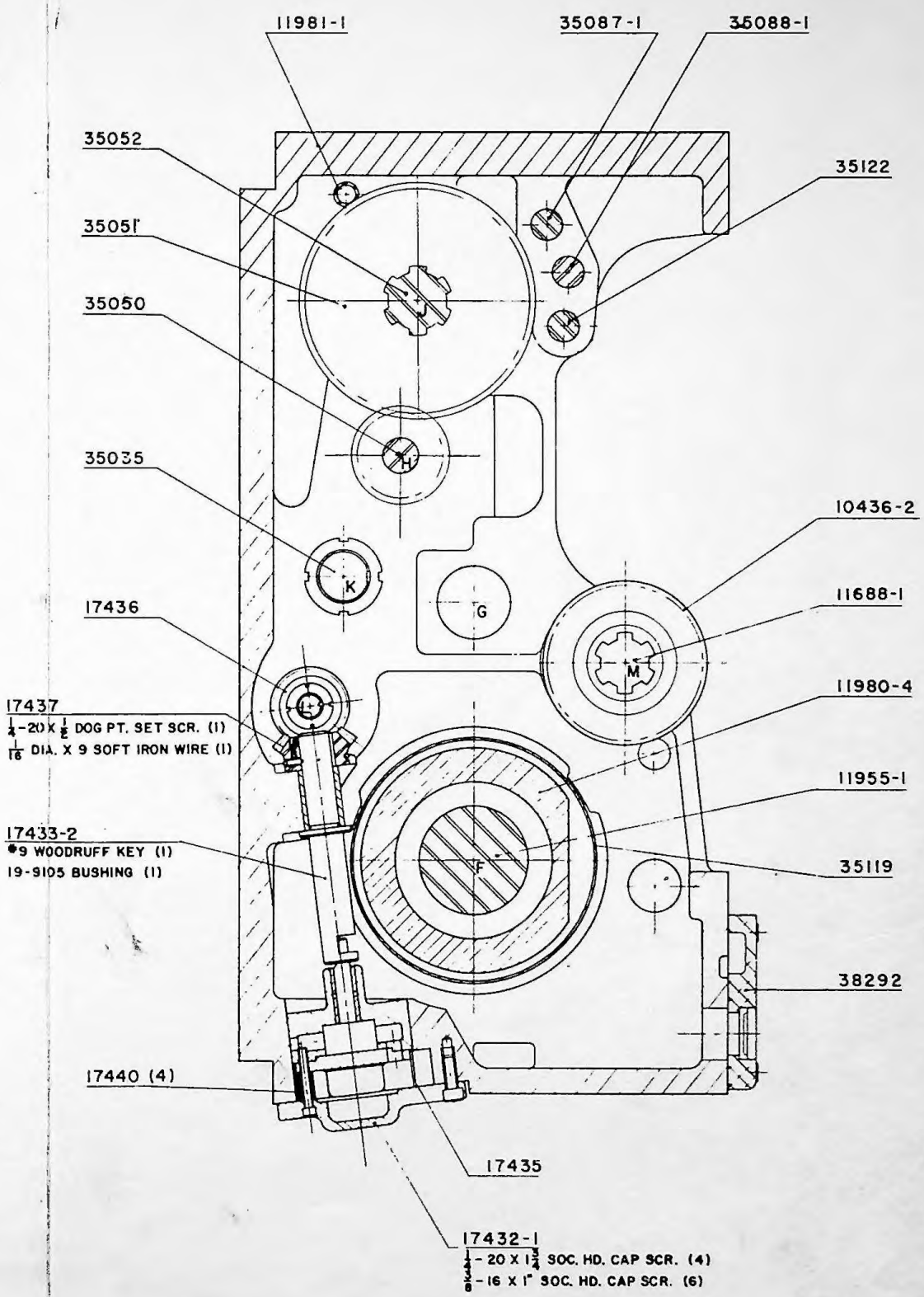


SECTION THRU CLAMPING

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



SECTION THRU CLAMPING



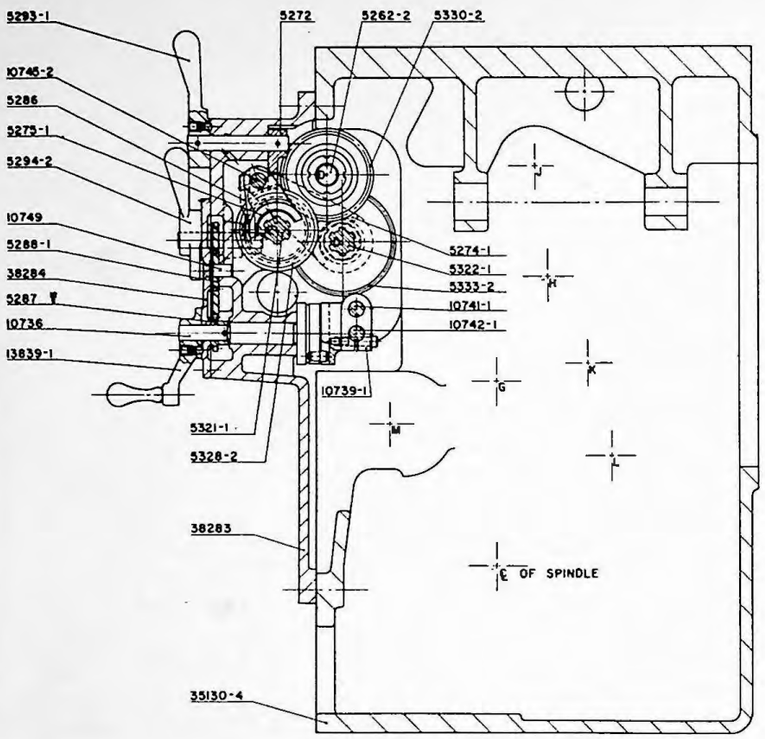
SECTION THRU OIL PUMP

DWG. #A-150-40-5
Headstock (340-T)
G & L and Hypro Division

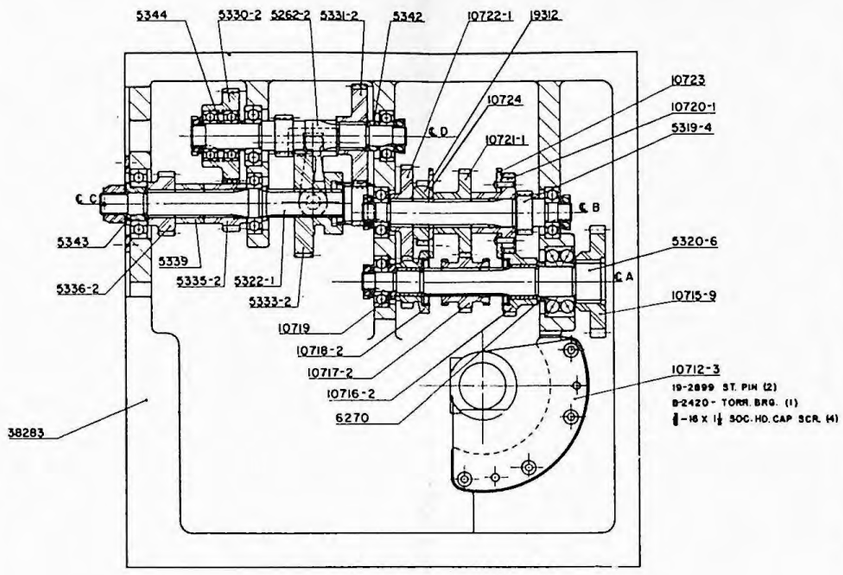
Parts List for DWG. #A-150-40-6

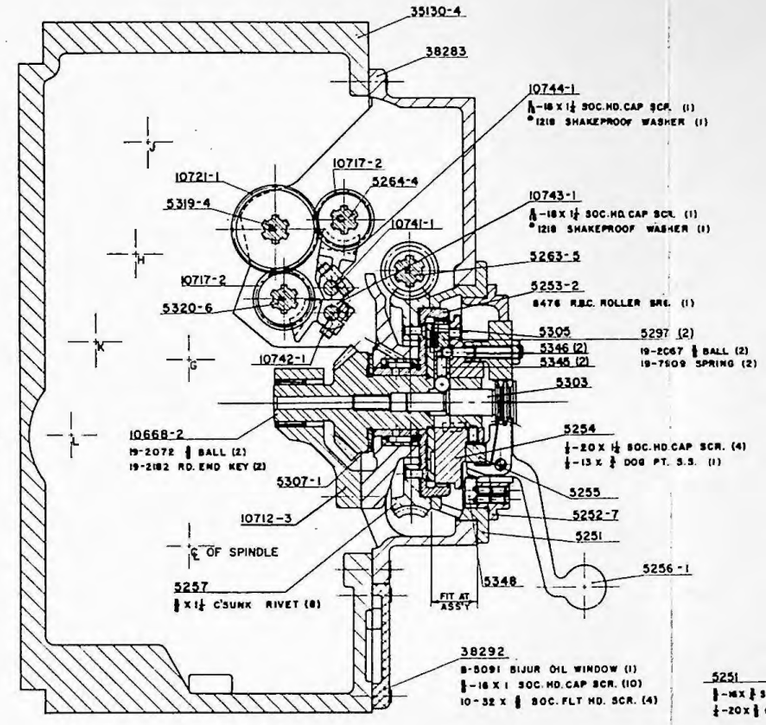
Headstock

Part Number	Part Name
5251	Dial Bearing
5252-7	Dial - English
5253-2	Clutch
5254	Clutch Plate
5255	Lever Plate
5256-1	Lever
5257	Worm Gear
5262-2	Pinion Shaft
5263-5	Worm Shaft
5264-4	Pinion Shaft
5272	Shifter Lever
5274-1	Shifter Shoe
5275-1	Shifter Shoe
5286	Shifter Lever
5287	Pinion
5288-1	Feed Dial Gear
5293-1	Shifter Lever
5294-2	Shifter Lever
5295-1	Feed Indicator
5297	Clutch
5298	Stud
5299	Clamp
5300	Dial Guide
5301	Clamp Nut
5302	Clamp Lever
5303	Clutch Plunger
5305	Retaining Plate
5306	Worm
5307-1	Thrust Washer
5315	Bearing Retainer
5317	Bearing Retainer
5318	Pin
5319-4	Pinion Shaft
5320-6	Shaft
5321-1	Shaft
5322-1	Shaft
5328-2	Cluster Gear
5330-2	Gear
5331-2	Gear
5333-2	Gear
5335-2	Gear
5336-2	Gear
5337	Spacer
5339	Spacer
5342	Spacer
5343	Collar
5344	Spacer
5345	Clutch Adj. Pin
5346	Clutch Adj. Pin
5348	Feed Knockout Pin
5353-1	Lever
6270	Spacer
10668-2	Bevel Gear
10712-3	Bracket
10715-9	Gear - 23T
10716-2	Feed Gear
10717-2	Gear
10718-2	Gear
10719	Spacer
10720-1	Gear
10721-1	Gear
10722-1	Gear
10723	Retainer
10724	Retainer
10725-2	Gear
10726-2	Gear
10736	Gear
10737	Gear
10738	Pin
10739-1	Shifter Block
10740-1	Shifter Block
10741-1	Shifter Shaft
10742-1	Shifter Shaft
10743-1	Shifter
10744-1	Shifter
10745-2	Shaft
10749	Pin
10964	Spacer
13839-1	Lever
16518-1	Gear - 16T
16519-1	Gear - 32T
19312	Gear - 24T
35130-4	Headstock
38263	Cover
38283	Spindle Feed Case
38284	Cover
38292	Cover
19-666	Drilled Hex. Hd. Cap Screw
19-811	Washer
19-838	Washer
19-2067	Ball
19-2068	Ball
19-2072	Ball
19-2182	Round End Key
19-2708	Straight Pin
19-2774	Straight Pin
19-2792	Straight Pin
19-2899	Straight Pin
19-7427-1	#1 Rockwood Quick Action Handle
19-7909	Spring
19-7918	Spring
19-8502	Threaded Taper Pin
19-8523	Lock Nut
19-8524	Lock Nut
19-8860	Bushing
19-8985	Bushing
19-8990	Bushing

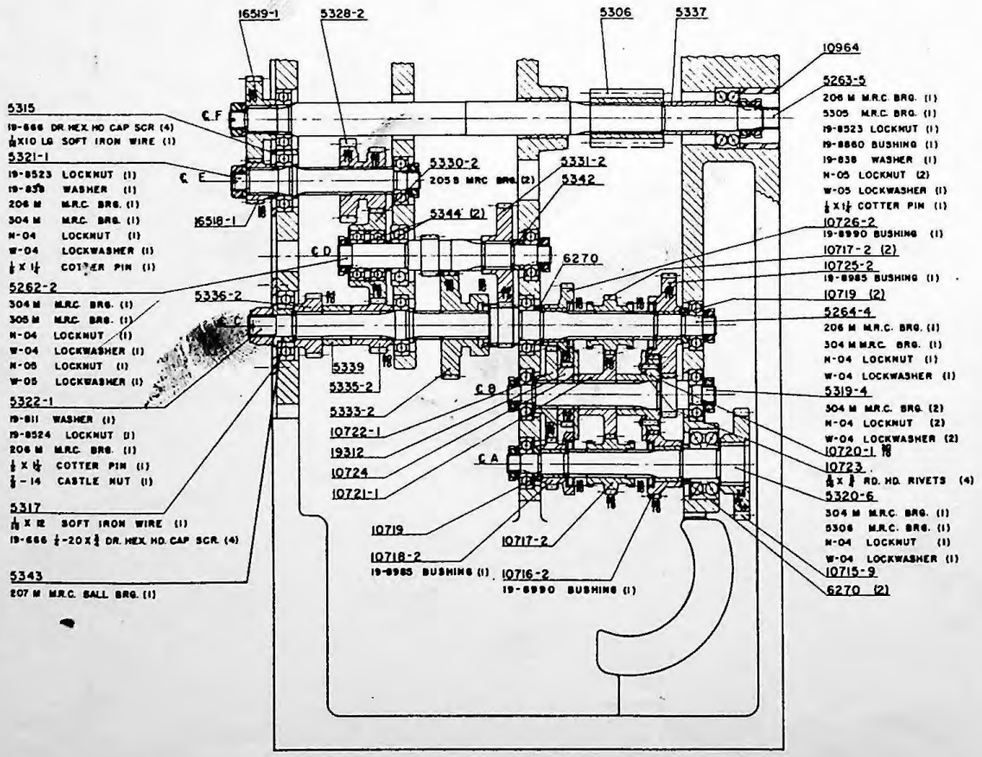


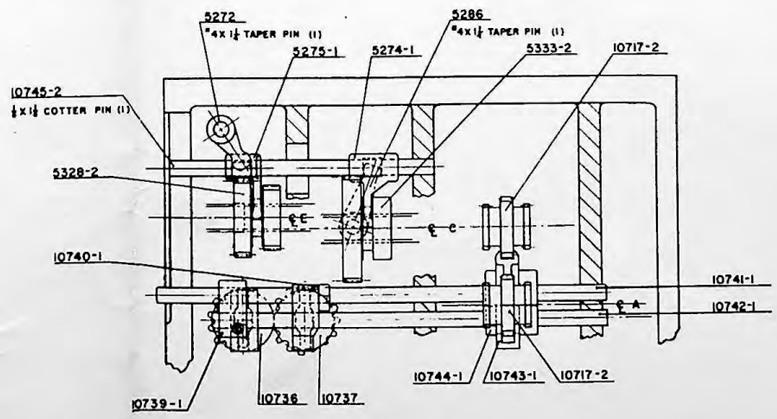
SECTION S-S



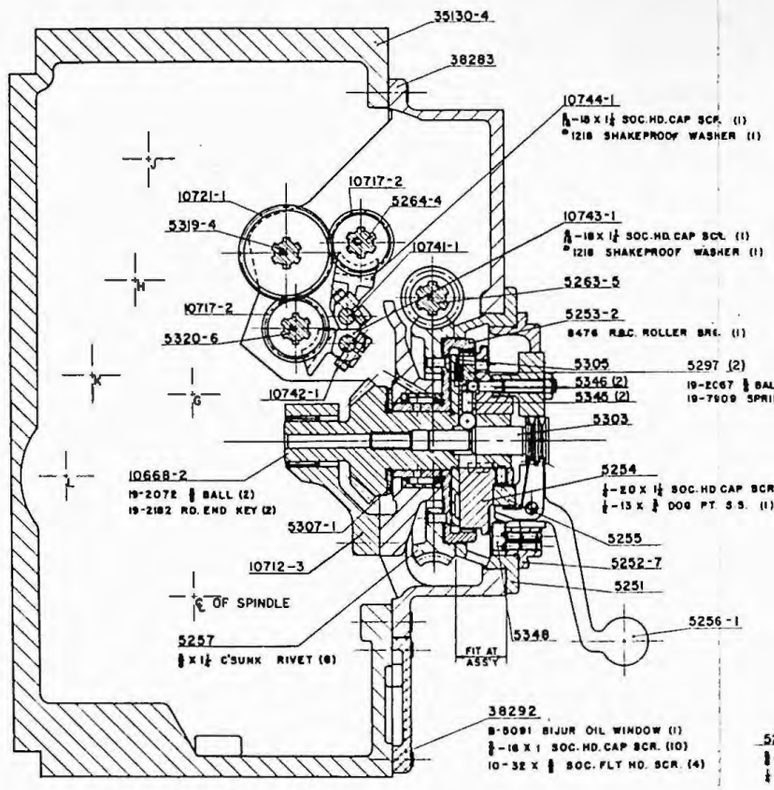


SECTION U-U

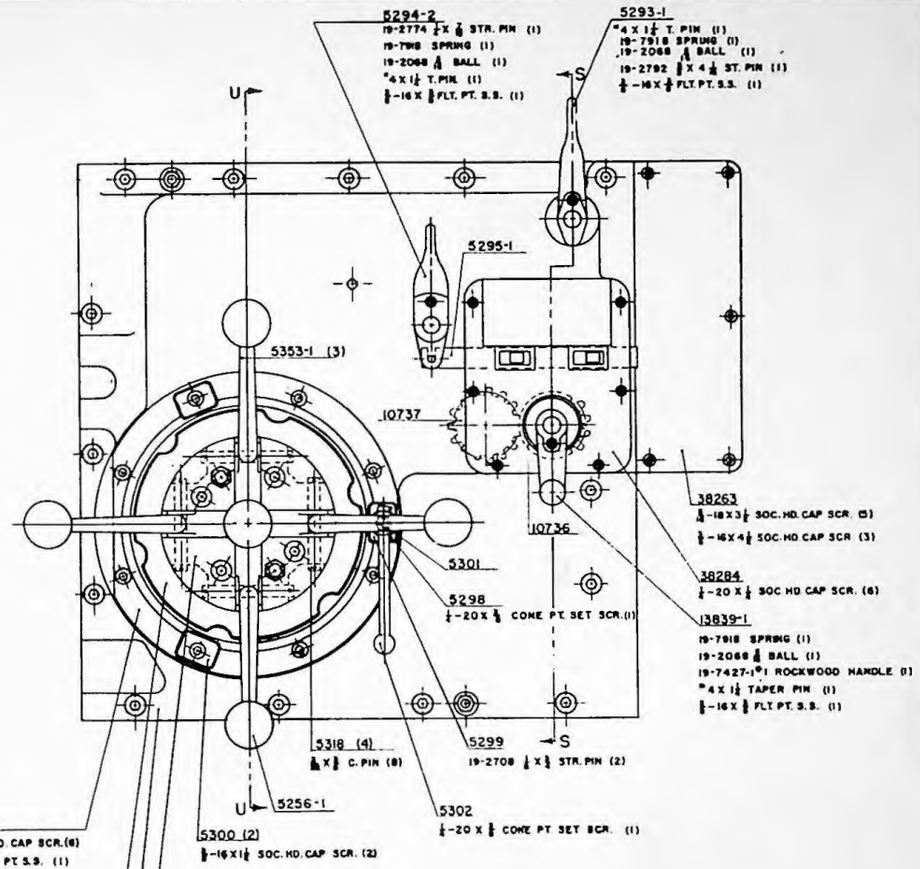




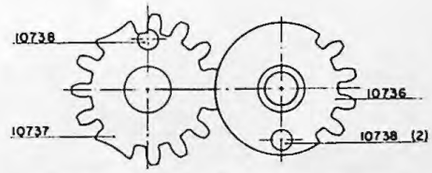
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



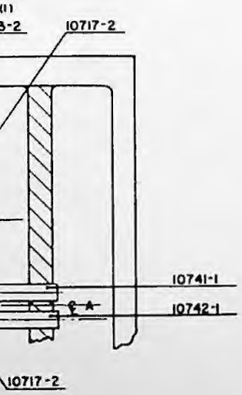
SECTION U-U

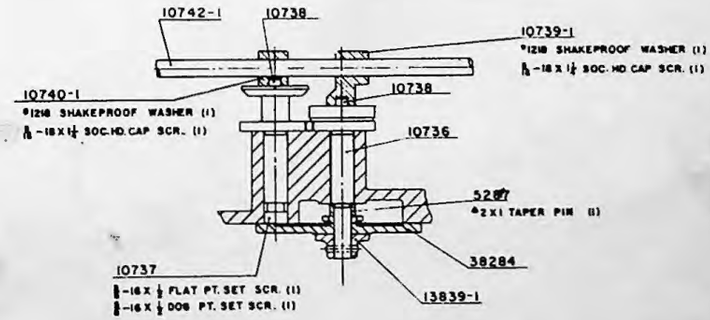


RIAL NUMBER WHEN ORDERING PARTS



POSITION GEARS AND CRANK AS SHOWN





DWG. #A-150-40-6
Headstock (340-T) (Spindle Feed)
G & L and Hypro Division

Parts List for DWG. #A-150-40-7

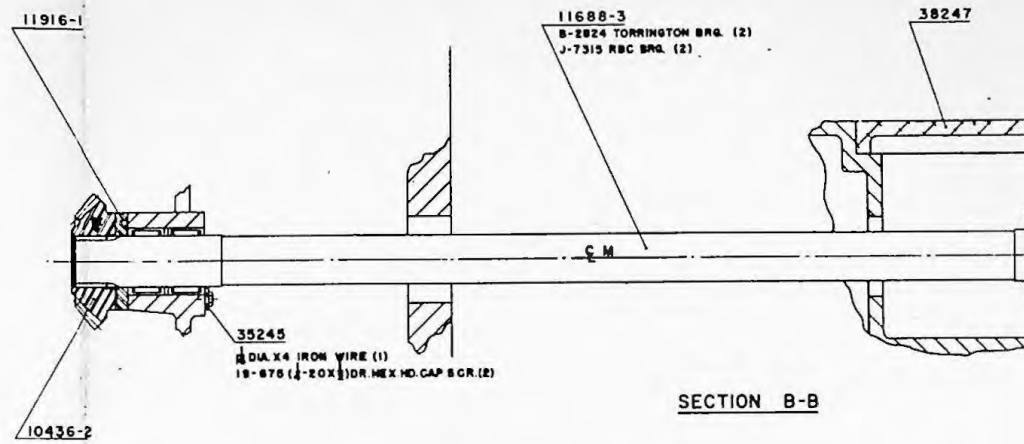
Headstock

Part Number	Part Name
4037	Key
5080-1	Cover
5169	Clamp Sleeve
5171	Retaining Plate
6208-1	Spacer
6209-1	Nut
7395	Clamp L. H. Adj. Sleeve
7396	Clamp R. H. Adj. Sleeve
9251	Wiper Ring
9517	Spacer
9518	Bearing Retainer
10415-3	Spindle Key
10417-2	Spindle Bushing
10418-1	Spindle Bushing
10429	Spindle Wiper
10436-2	Bevel Gear
10496-1	Bevel Pinion - 24T
10497-4	Bevel Gear - 40T
10505	Trip Tooth - Main
10537	Clamp Lever
10539	Plate
10576	Main Spindle Guard
10580-9	Main Ram
10580-10	Main Ram (Metric)
10581-1	Spindle - #6MT - Slot Type
11668	Key
11688-3	Shaft
11853-2	Trip Tooth Guide
11916-1	Thrust Washer
13911-5	Pinion
14569	Spacer
16369	Cover
16370	Cover
17436	Miter Gear - 18T
19281	Clamp Ring
19282	Rack
19520	Adapter
19521	Nut
21684	Spacer
24537-1	Bearing Retainer
35000-7	Headstock
35025	Nut
35027-1	Nut
35028	Bearing Retainer
35029	Retainer
35031	Spindle Sleeve Cover
35032	Spacer
35034	Bevel Gear
35035	Shaft
35036	Oil Retainer
35037-3	Shaft
35038-5	Spindle Sleeve
35040	Gear - 29T
350[illegible]	Gear - 33T
350[illegible]	Gear - 30T
35043	Gear - 35T
35044	Gear - 28T

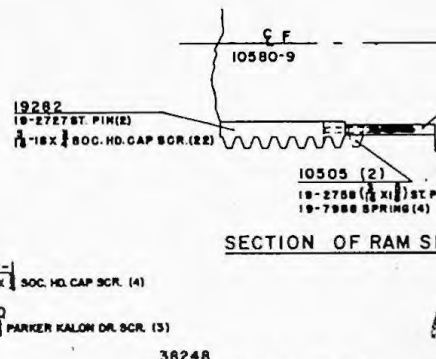
Part Number	Part Name
35045	Gear - 32T
35046	Gear - 31T
35047	Gear - 31T
35048	Gear - 24T
35049	Gear - 39T
35050	Pinion Shaft - 14T
35051	Gear - 40T
35052	Pinion Shaft - 14T
35053	Gear - 40T
35055-4	Gear - 21T
35056-5	Gear - 36T
35058-5	Bull Gear
35098	Collar
35099	Spacer
35101-2	Shaft
35103	Spacer
35104	Nut
35105	Cover
35140	Aux. Spindle Cover
35141-5	Pinion Shaft
35142-2	Gear
35143-5	Hi-Speed Gear
35146-2	Gear
35157-1	Spacer
35222-1	Bearing Retainer
35225	Key
35226-1	Key
35228-1	Retainer Ring
35245	Bearing Retainer
38241	Ram Guide
38244	End Housing
38245	Cover
38247	Cover - Ram Pinion
38248	Bearing Retainer
38250	Spacer
38251	Spacer
38252	Spacer
38255	Bearing Retainer
38256	Clamp Screw
38258	Bevel Pinion
19-663	Drilled Hex. Hd. Cap Screw
19-675	Drilled Hex. Hd. Cap Screw
19-680	Drilled Hex. Hd. Cap Screw
19-702	Drilled Hex. Hd. Cap Screw
19-703	Drilled Hex. Hd. Cap Screw
19-2199	Key
19-2316	Round End Key
19-2705	Straight Pin
19-2727	Straight Pin
19-2750	Straight Pin
19-2758	Straight Pin (Cyonide)
19-2789	Pin
19-7988	Spring
19-8504	Taper Pin
19-8530	Hex Lock Nut
19-9756	Oil Pump Assembly

Type 350
9300

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

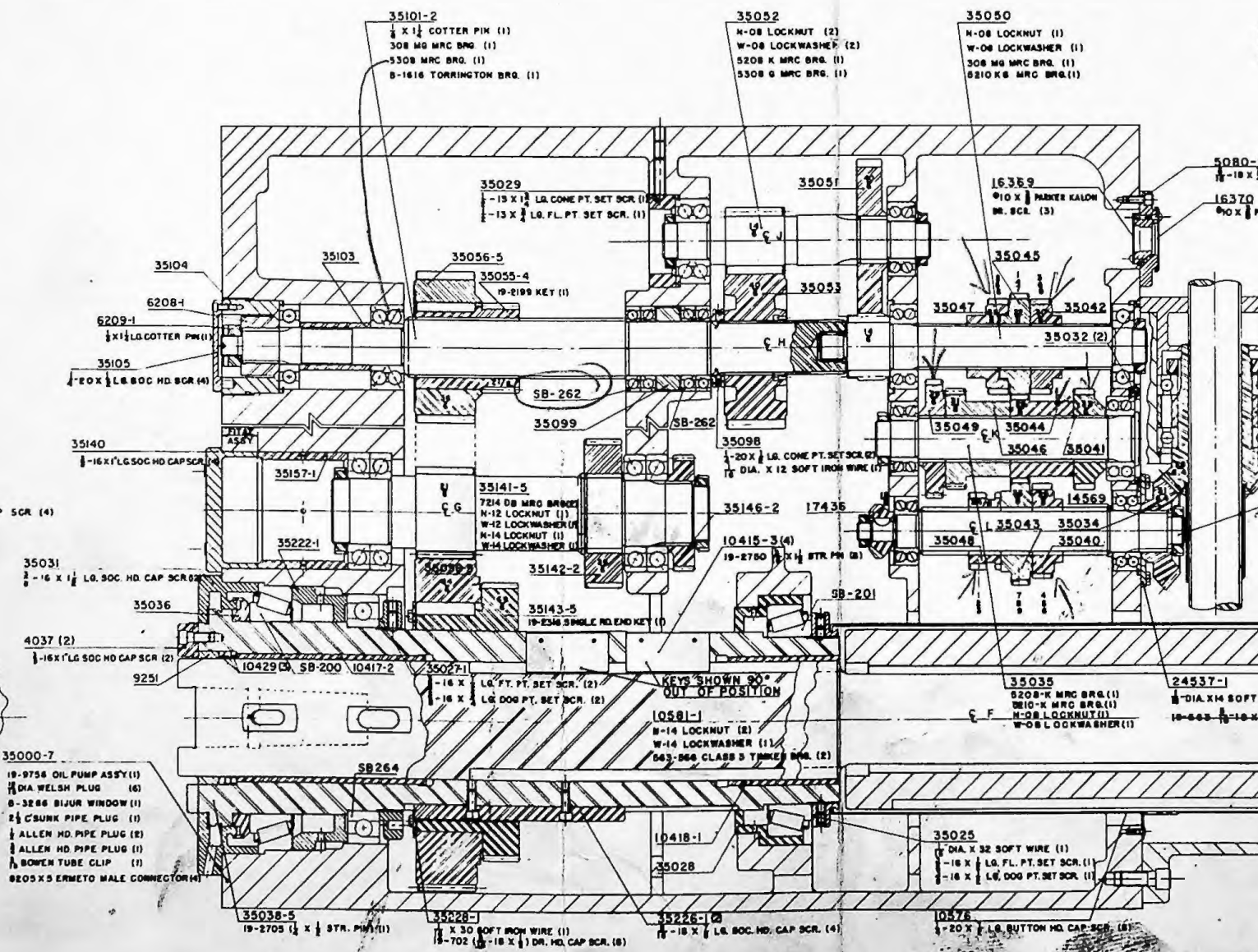


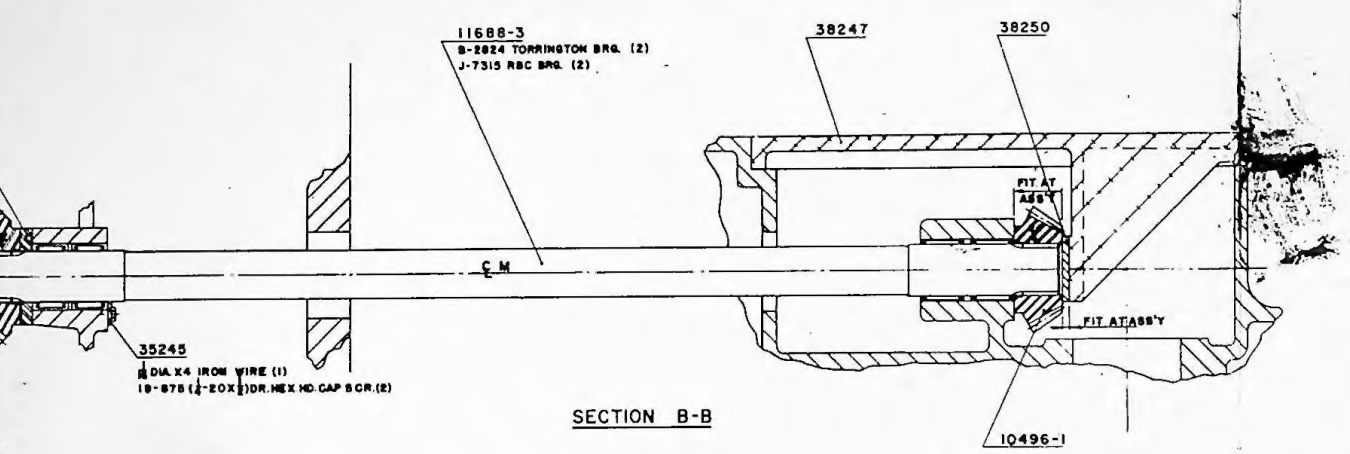
SECTION B-B



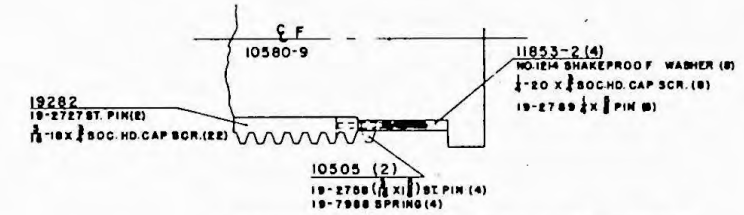
SECTION OF RAM S

SPINDLE ADAPTER

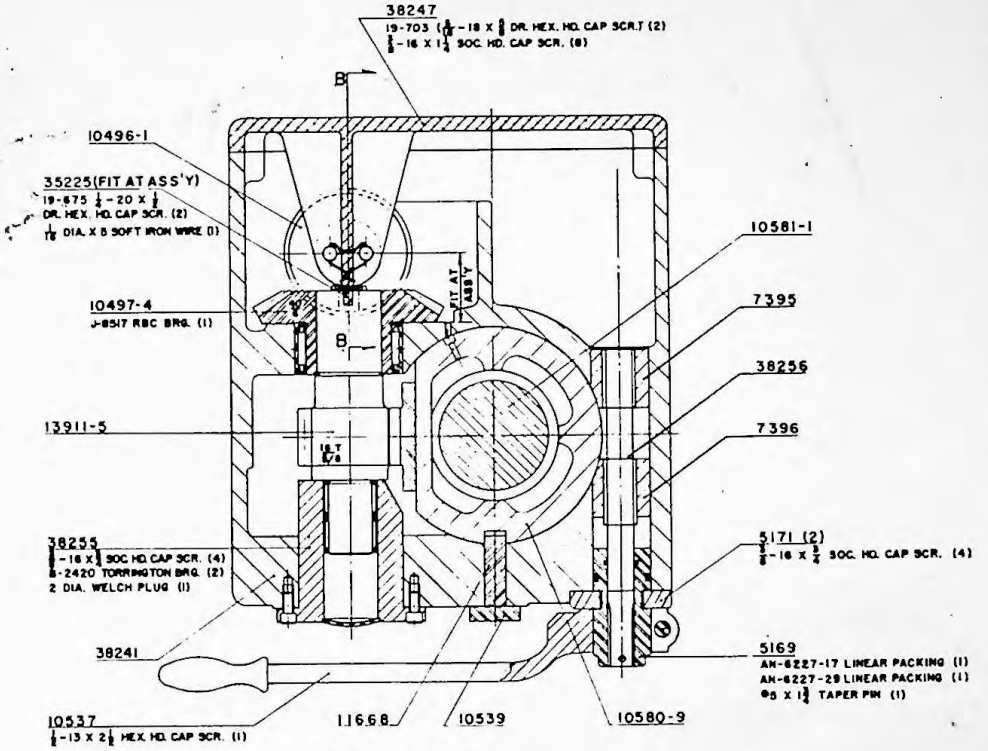




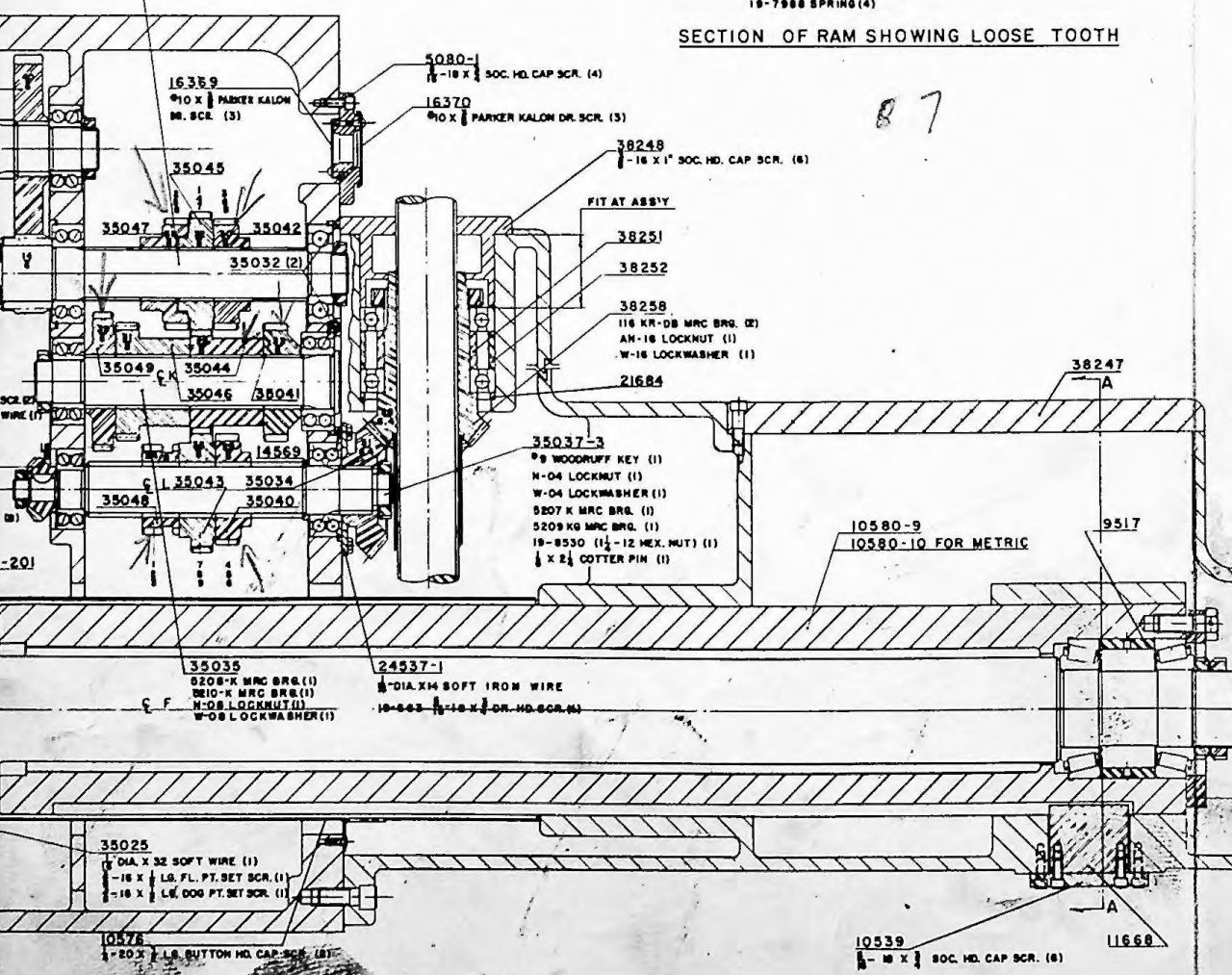
SECTION B-B



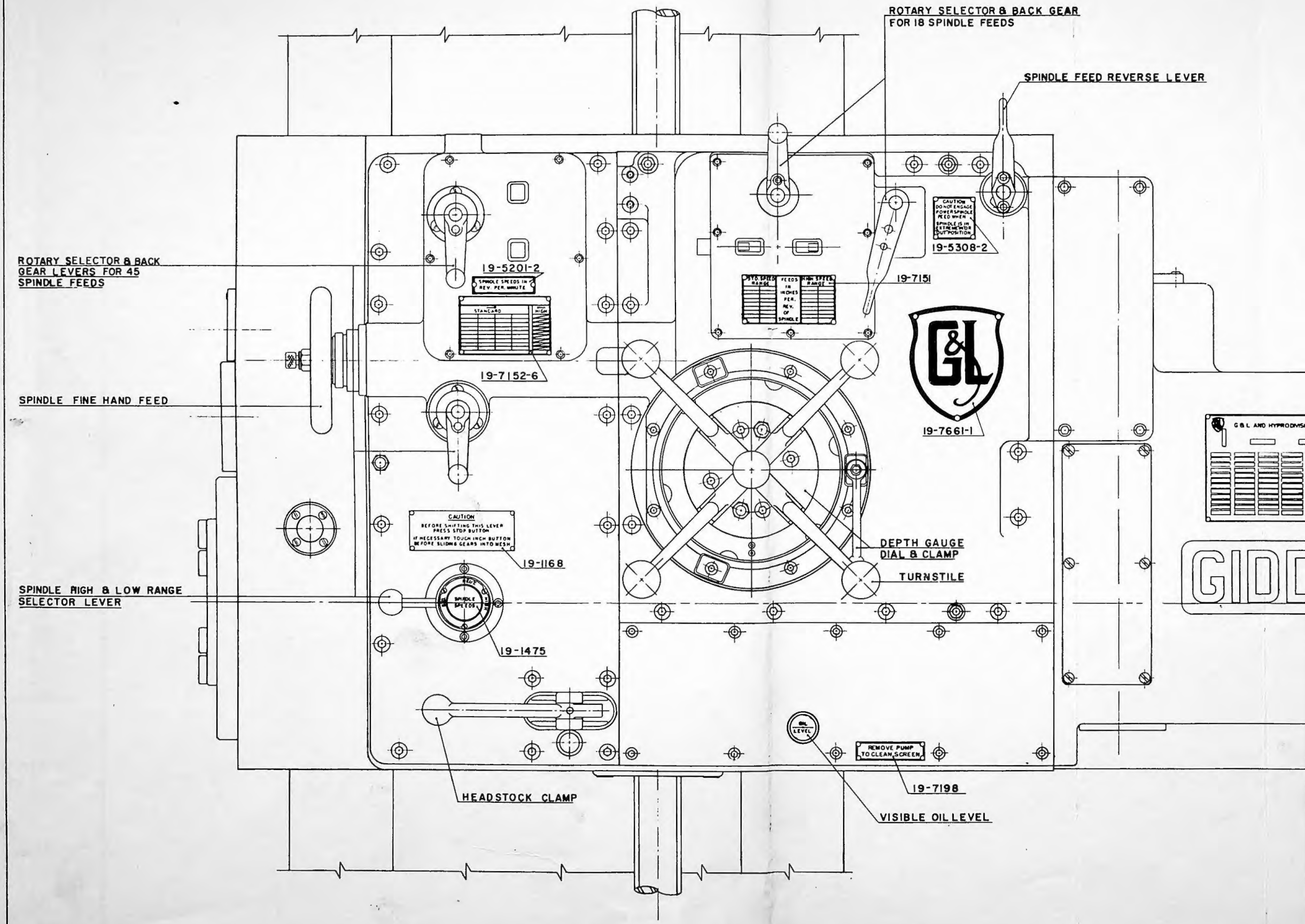
SECTION OF RAM SHOWING LOOSE TOOTH

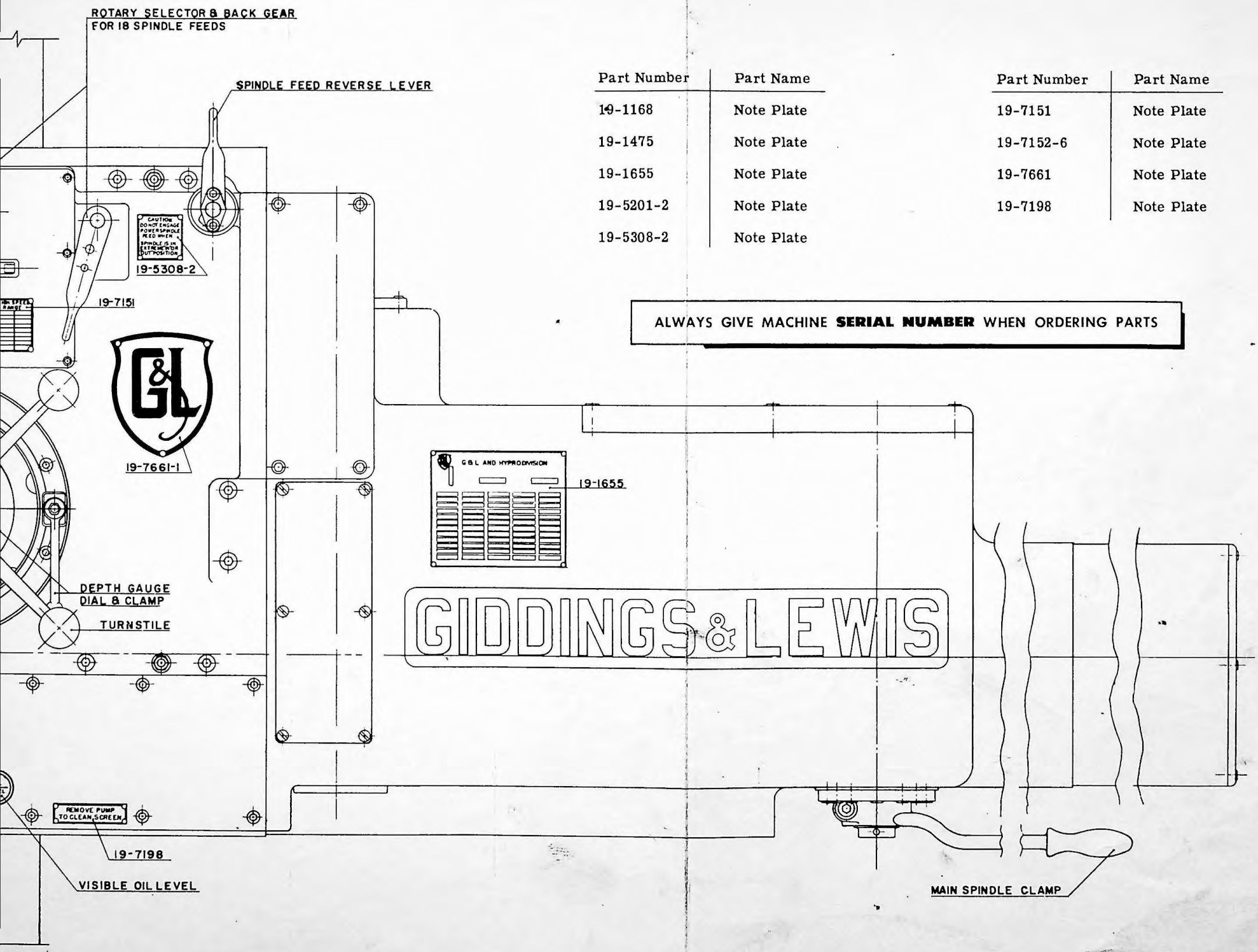


SECTION A-A



DWG. #A-150-40-7
Headstock (350-T)
G & L and Hypro Division


ROTARY SELECTOR & BACK GEAR FOR 18 SPINDLE FEEDS
SPINDLE FEED REVERSE LEVER
ROTARY SELECTOR & BACK GEAR LEVERS FOR 45 SPINDLE FEEDS
19-5201-2
SPINDLE SPEEDS IN REV. PER. MINUTE
STANDARD
HIGH
19-7152-6
19-7151
FEEDS IN INCHES PER REV. OF SPINDLE
19-5308-2
CAUTION DO NOT ENGAGE POWER SPINDLE FEED WHEN SPINDLE IS IN EXTREME OUT POSITION
19-7661-1
SPINDLE FINE HAND FEED
CAUTION
BEFORE SHIFTING THIS LEVER PRESS STOP BUTTON
IF NECESSARY TOUCH INCH BUTTON BEFORE SLIDING GEARS INTO MESH
19-1168
DEPTH GAUGE DIAL & CLAMP
TURNSTILE
SPINDLE HIGH & LOW RANGE SELECTOR LEVER
19-1475
HEADSTOCK CLAMP
OIL LEVEL
REMOVE PUMP TO CLEAN SCREEN
19-7198
VISIBLE OIL LEVEL
G & L AND HYPRODRIVE



Part Number	Part Name
19-1168	Note Plate
19-1475	Note Plate
19-1655	Note Plate
19-5201-2	Note Plate
19-5308-2	Note Plate

Part Number	Part Name
19-7151	Note Plate
19-7152-6	Note Plate
19-7661	Note Plate
19-7198	Note Plate

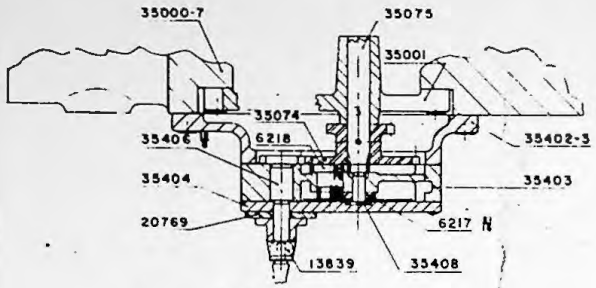
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

DWG. #A-150-40-8
Headstock (350-T)
G & L and Hypro Division

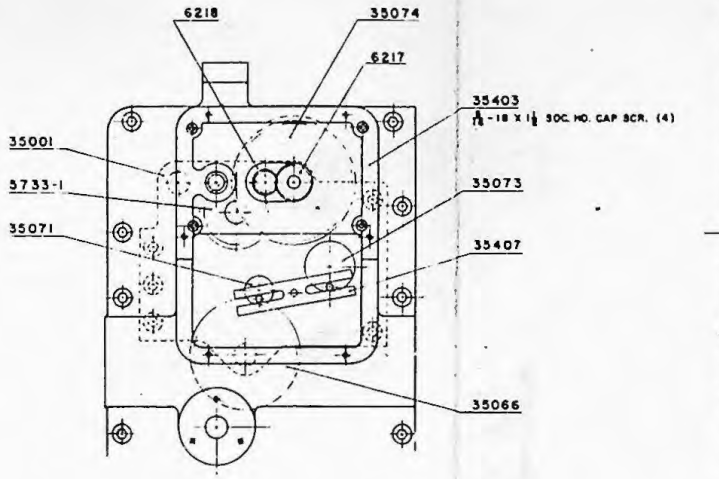
Parts List for DWG. #A-150-40-9

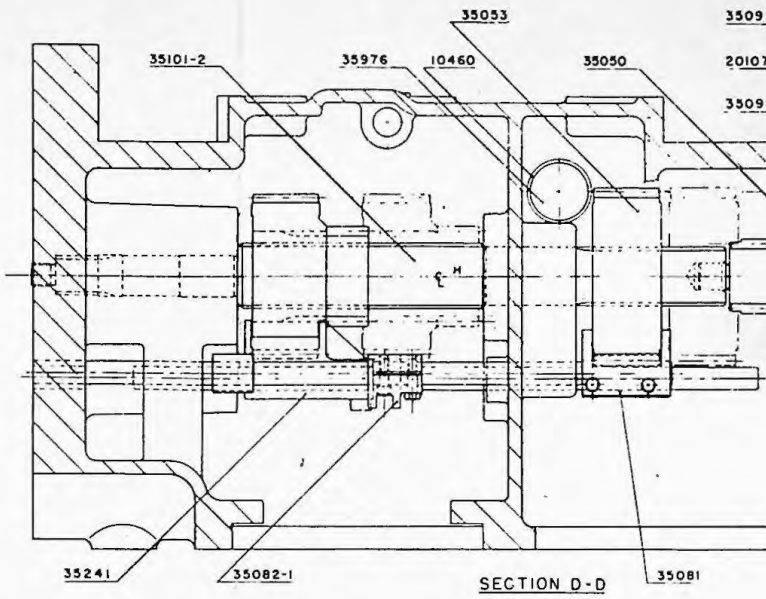
Headstock

Part Number	Part Name
4802	Dial Clamp
4825-1	Dial Clamp Screw
5101-1	Clamp Lever Bracket
5110-1	Headstock Clamp Lever
5179	Shaft
5226	Hand Wheel
5228	Bushing
5229	Dial
5230	Plate
5231	Dial Clamp Pin
5232	Coupling
5733-1	Gear
6217	Speed Dial Gear
6218	Gear
10460	Screw Tube
10561	Shaft
10576	Main Spindle Guard
10580-9	Main Ram
10581-1	Spindle - #6MT - Slot Type
11688-3	Shaft
13839	Lever
14052	Gear
20107	Shifter Pin
20769	Detent Plate
35000-7	Headstock
35001	Bracket
35035	Shaft
35037-3	Shaft
35038-5	Spindle Sleeve
35040	Gear - 29T
35042	Gear - 32T
35043	Gear - 35T
35044	Gear - 28T
35045	Gear - 32T
35046	Gear - 31T
35050	Pinion Shaft - 14T
35053	Gear - 40T
35055-4	Gear - 21T
35056-5	Gear - 36T
35058-5	Bull Gear
35066	Gear
35067-2	Pin
35068-1	Shifter Disc
35069-2	Gear
35070-4	Shaft
35071	Shaft End
35072	Gear
35073	Pinion Shaft
35074	Gear
35075	Pinion Shaft
35076	Shifter Disc
35077	Shifter Disc
35078	Shifter Disc
35081	Shifter Shoe
35082-1	Shifter Shoe
35083	Shifter Block
35084	Shifter Block
35085-1	Shifter Rod
35086-3	Shifter Rod
35087	Shifter Rod
35088	Shifter Rod
35089	Shifter Block
35090	Shifter Lever
35091	Shifter Lever
35092	Shifter Lever
35093	Shaft
35094	Shifter Shoe
35095	Shifter Shoe
35096	Shifter Rod
35101-2	Shaft
35143-5	Gear
35231	Shifter Crank Plate
35234	Pin
35235	Link
35241	Shifter
35245	Bearing Retainer
35402-3	Headstock Cover
35403	Housing
35404	Cover
35405	Gear
35406	Gear
35407	Link
35408	Slide
35444	Shifter Cam
35445	Shifter Handle
35446	Shifter Hub
35447	Spring Plunger
35448	Spacer
35449	Shifter Crank
35450	Shifter Stud
35976	Elevating Screw
38242	Shifter
38264	Shifter Plate
38265	Shifter Gib
38266	Shifter Bar
19-675	Drilled Hex. Hd. Screw
19-1475	Note Plate
19-2067	Ball
19-2068	Ball
19-2733	Straight Pin
19-2736	Straight Pin
19-2789	Straight Pin
19-2852	Straight Pin
19-3022	Straight Pin
19-3057	Straight Pin
19-3107	Straight Pin
19-7915	Spring
19-7918	Spring
19-7919	Spring
19-7978	Spring
19-8502	Threaded Taper Pin
19-8982	Bushing

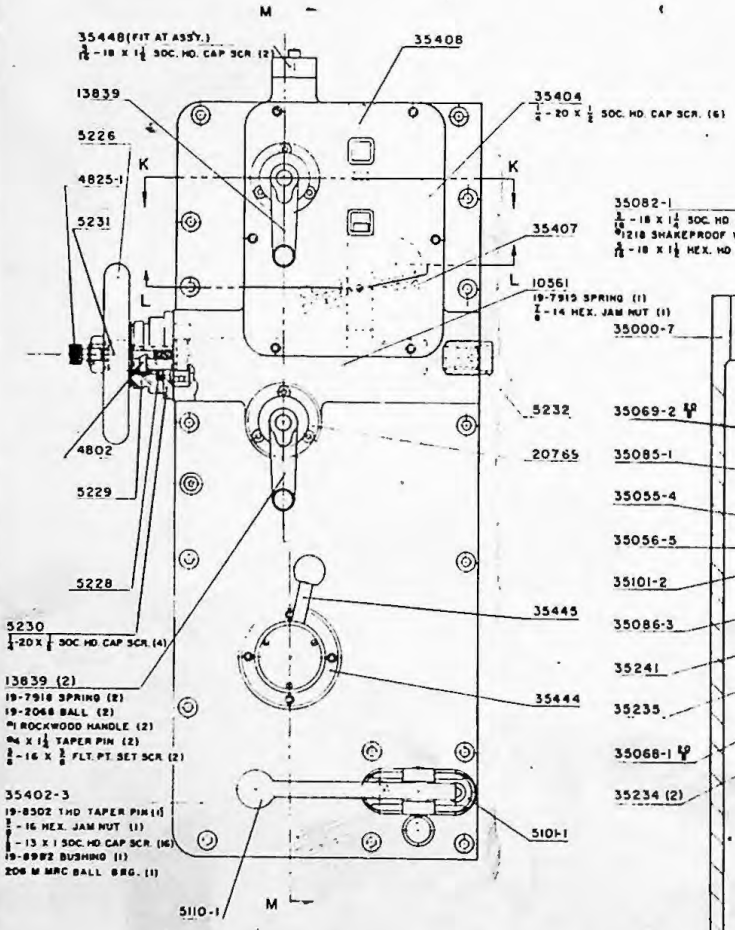


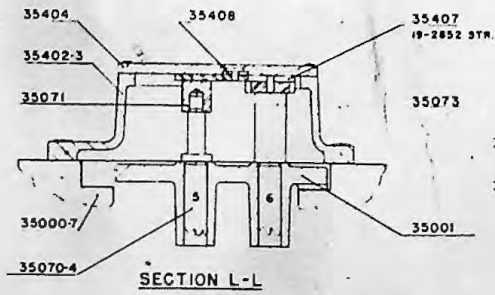
SECTION K-K



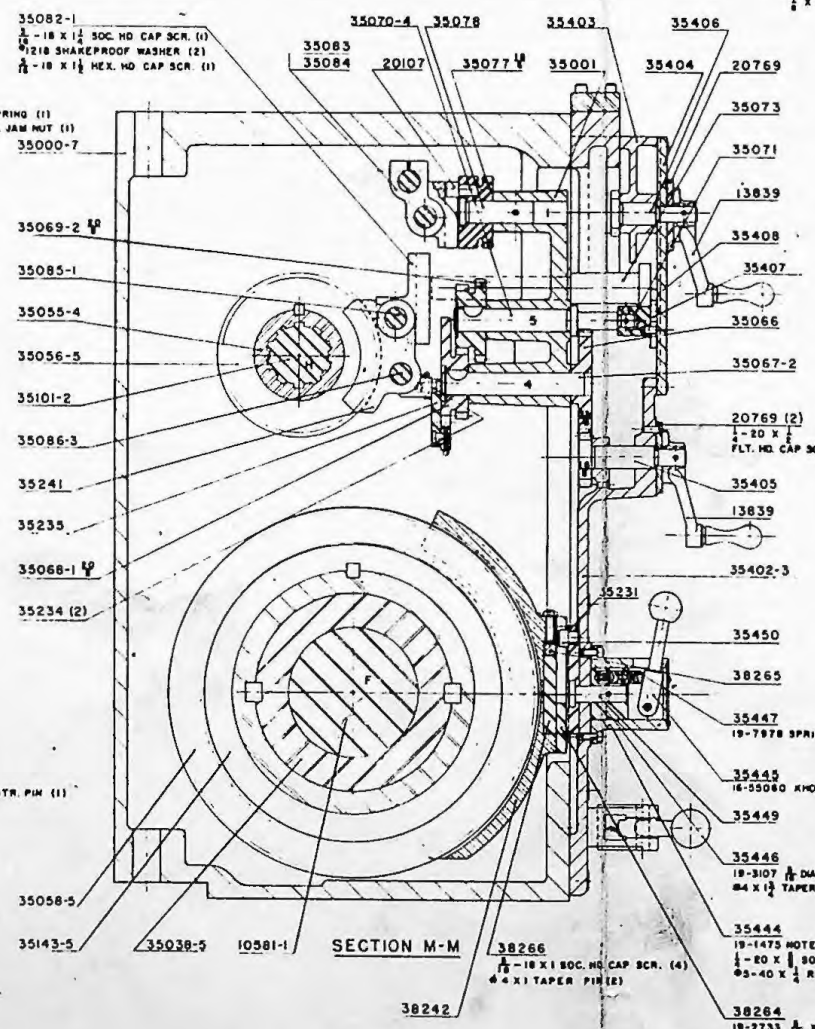


SECTION D-D

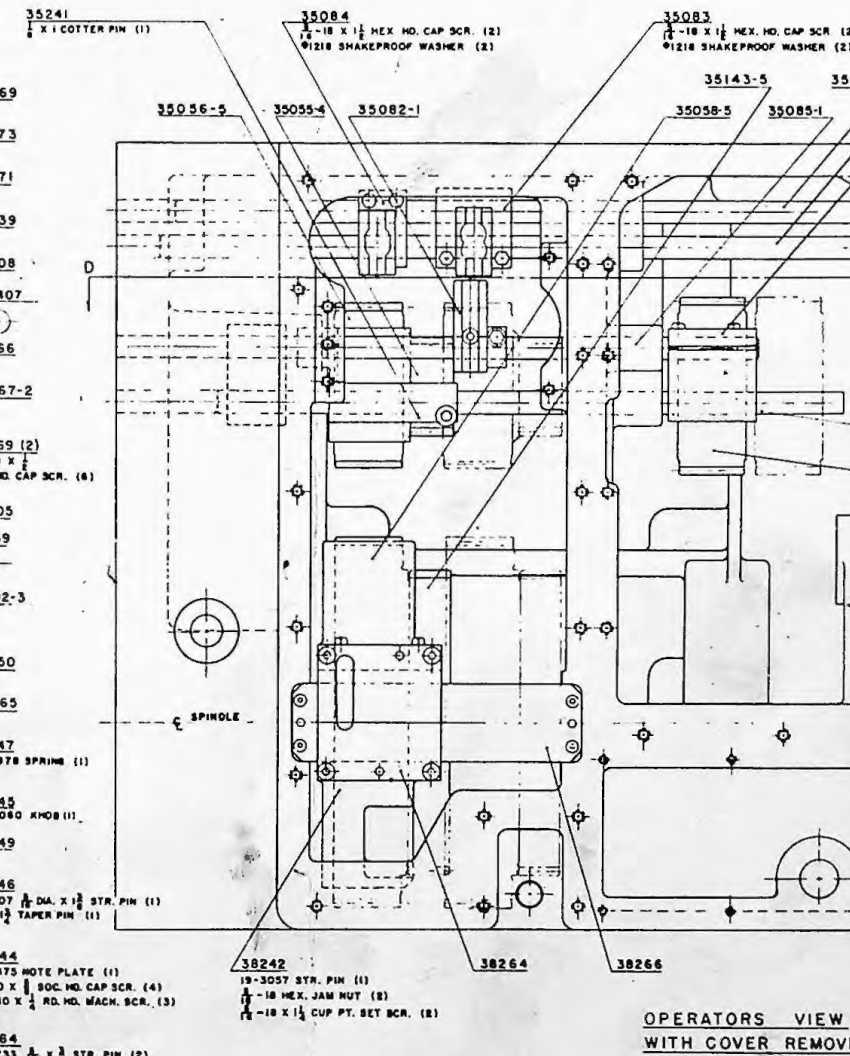




SECTION L-L

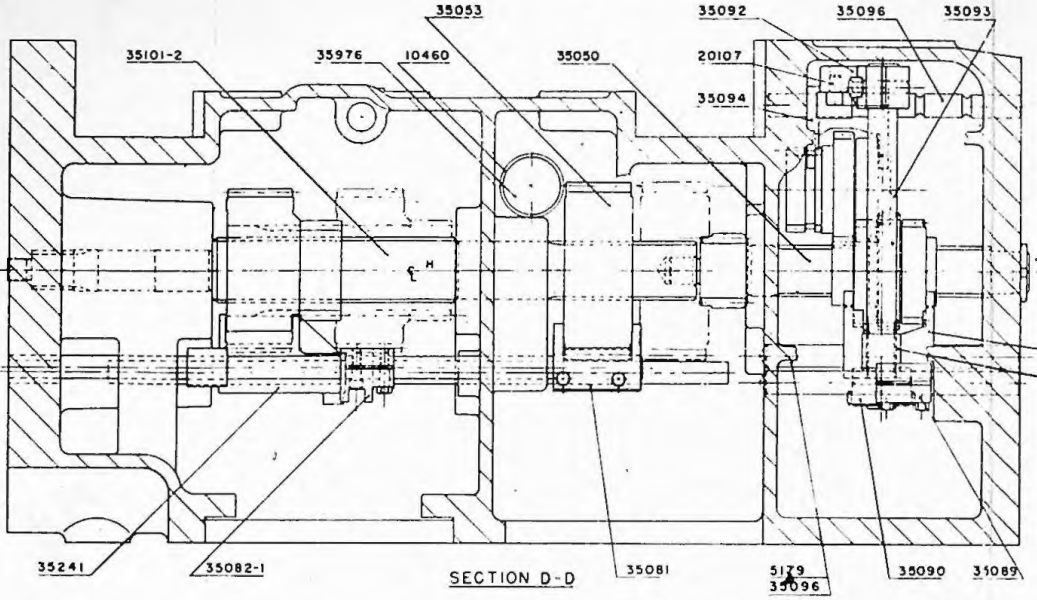


SECTION M-M

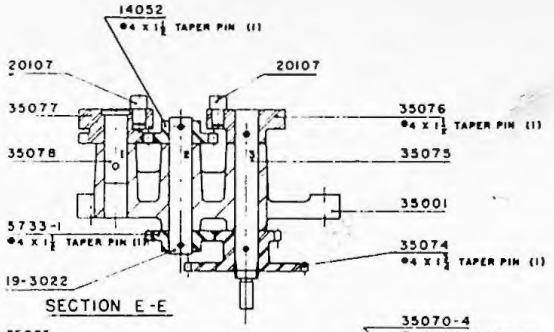


OPERATORS VIEW
WITH COVER REMOV

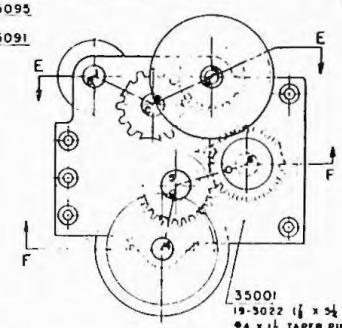
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

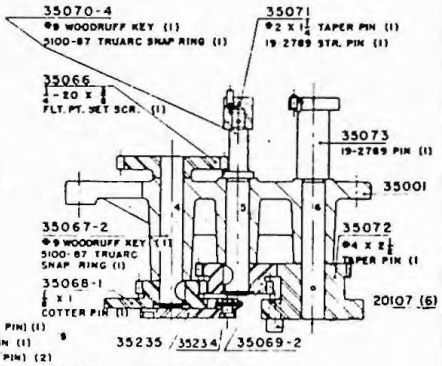


SECTION D-D

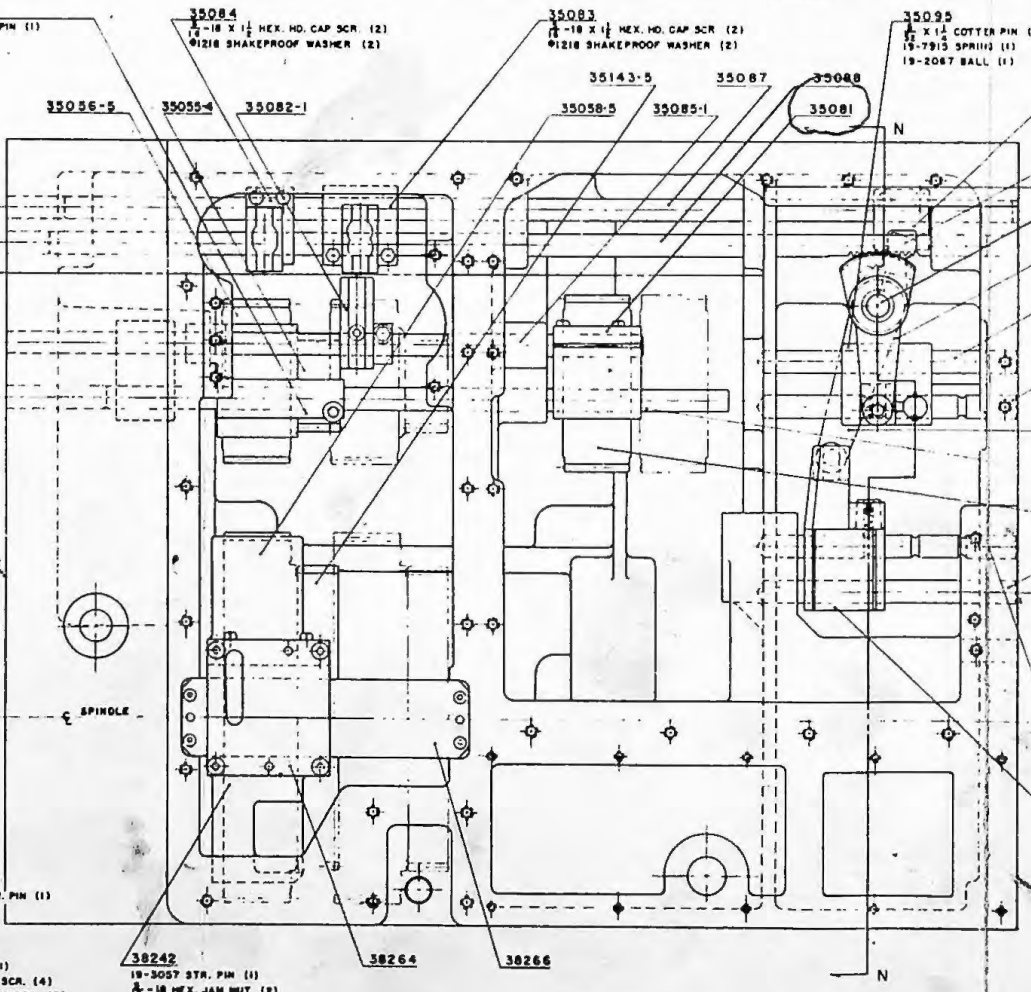


SECTION E-E

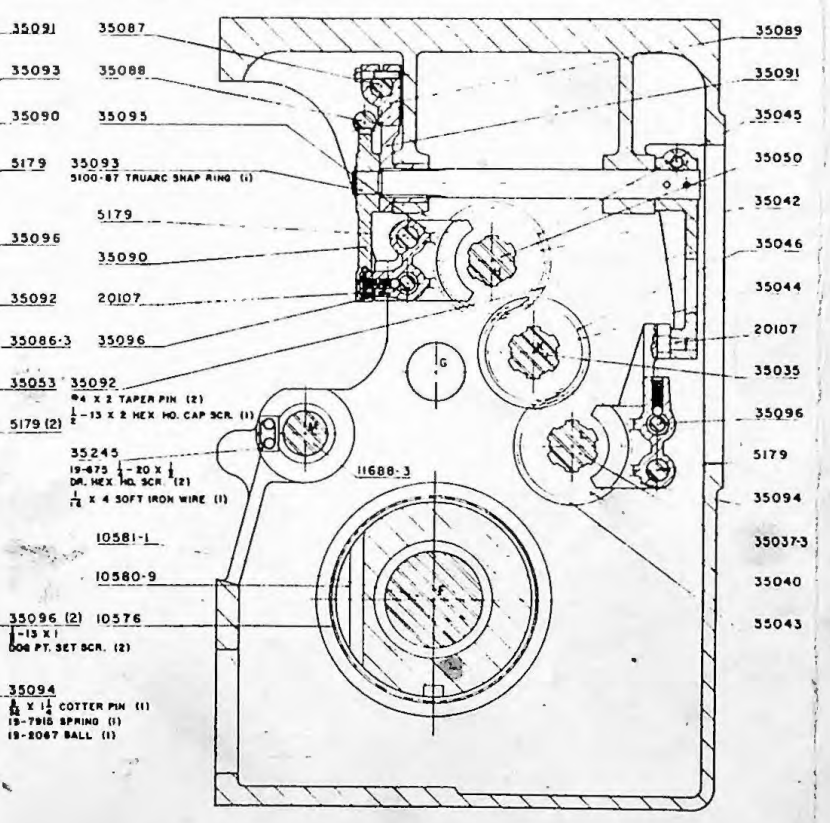




SECTION F-F



OPERATORS VIEW
WITH COVER REMOVED

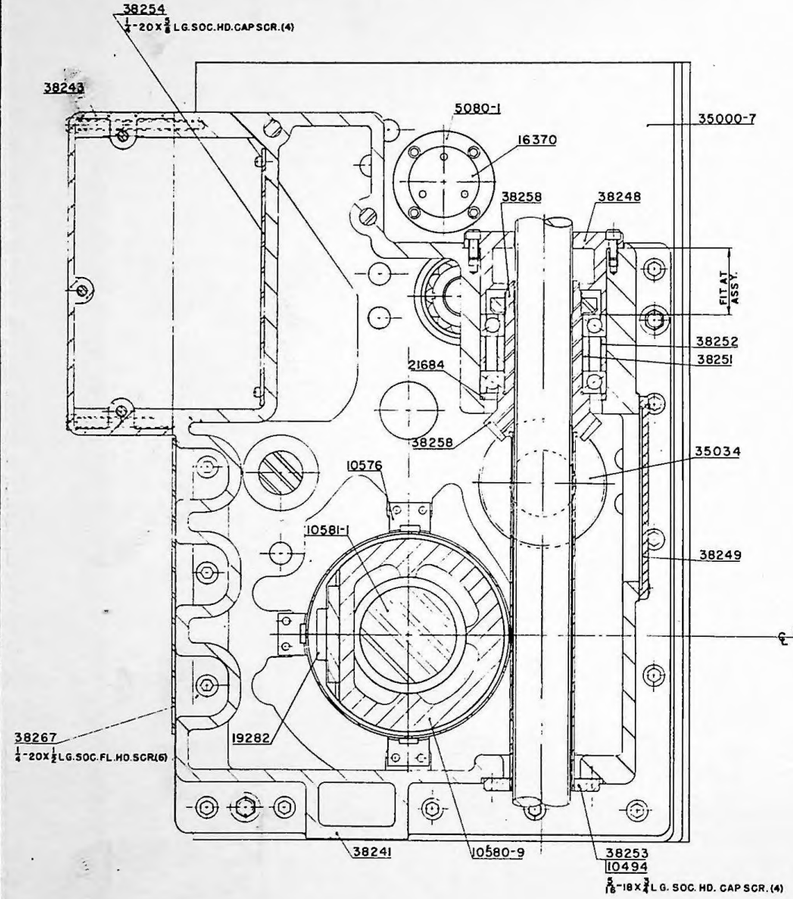


SECTION N-N

VE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

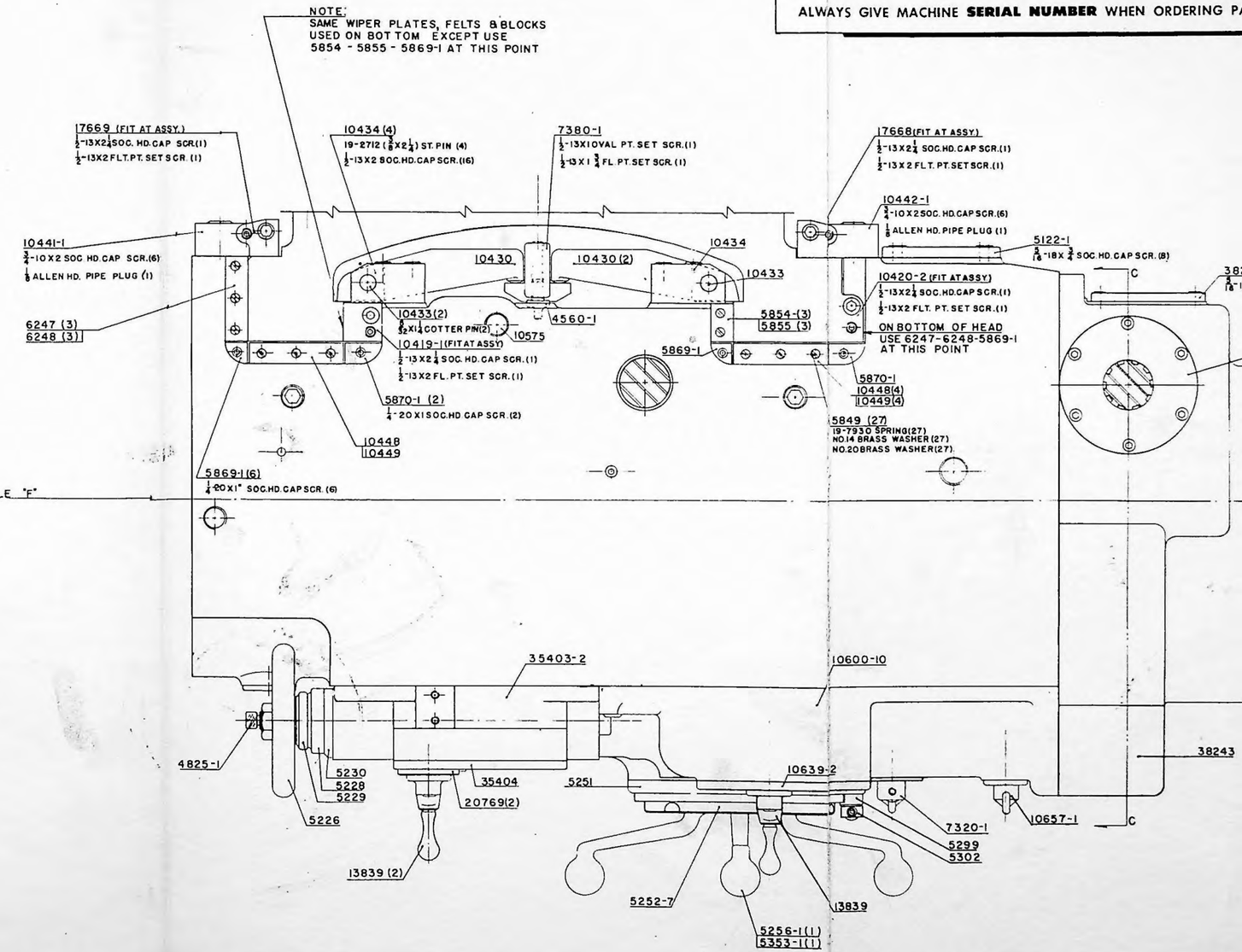
DWG. #A-150-40-9
Headstock (350-T)
G & L and Hypro Division

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



SECTION C - C

℄ SPINDLE "F"



Part Nu
4560-1
4825-1
5080-1
5122-1
5226
5228
5229
5230
5251
5252-7
5256-1
5299

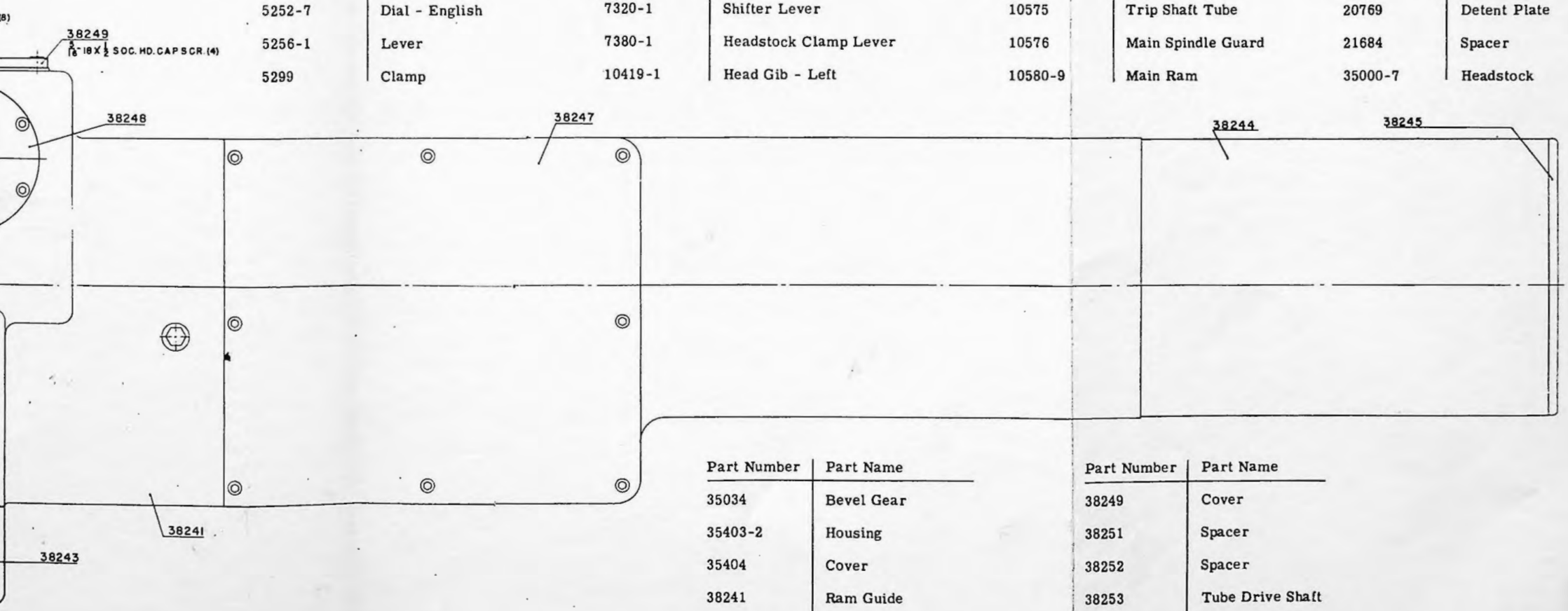
ORDERING PARTS

Part Number	Part Name
4560-1	Headstock Button
4825-1	Dial Clamp Screw
5080-1	Cover
5122-1	Cover
5226	Hand Wheel
5228	Bushing
5229	Dial
5230	Plate
5251	Dial Bearing
5252-7	Dial - English
5256-1	Lever
5299	Clamp

Part Number	Part Name
5302	Clamp Lever
5353-1	Lever
5849	Shoulder Screw
5854	Wiper Plate - 1-3/4" Long
5855	Wiper Felt - 1-3/4" Long
5869-1	Filler Block
5870-1	Filler Block
6247	Wiper Plate
6248	Felt Wiper
7320-1	Shifter Lever
7380-1	Headstock Clamp Lever
10419-1	Head Gib - Left

Part Number	Part Name
10420-2	Head Gib - Right
10430	Headstock Clamp
10433	Pin
10434	Pin Support
10441-1	Clamp - Left
10442-1	Clamp - Right
10448	Wiper Plate
10449	Wiper Felt
10494	Cover
10575	Trip Shaft Tube
10576	Main Spindle Guard
10580-9	Main Ram

Part Number	Part Name
10581-1	Spindle - #6MT - Slot Drive
10600-10	Spindle Feed Case
10639-2	Cover
10657-1	Shifter Lever
13839	Lever
16370	Cover
17668	Taper Gib
17669	Taper Gib
19282	Rack
20769	Detent Plate
21684	Spacer
35000-7	Headstock



Part Number	Part Name
35034	Bevel Gear
35403-2	Housing
35404	Cover
38241	Ram Guide
38243	Cover
38244	End Housing
38245	Cover
38247	Cover - Ram Pinion
38248	Bearing Retainer

Part Number	Part Name
38249	Cover
38251	Spacer
38252	Spacer
38253	Tube Drive Shaft
38254	Cover
38258	Bevel Pinion
38267	Cover
19-2712	Straight Pin
19-7930	Spring

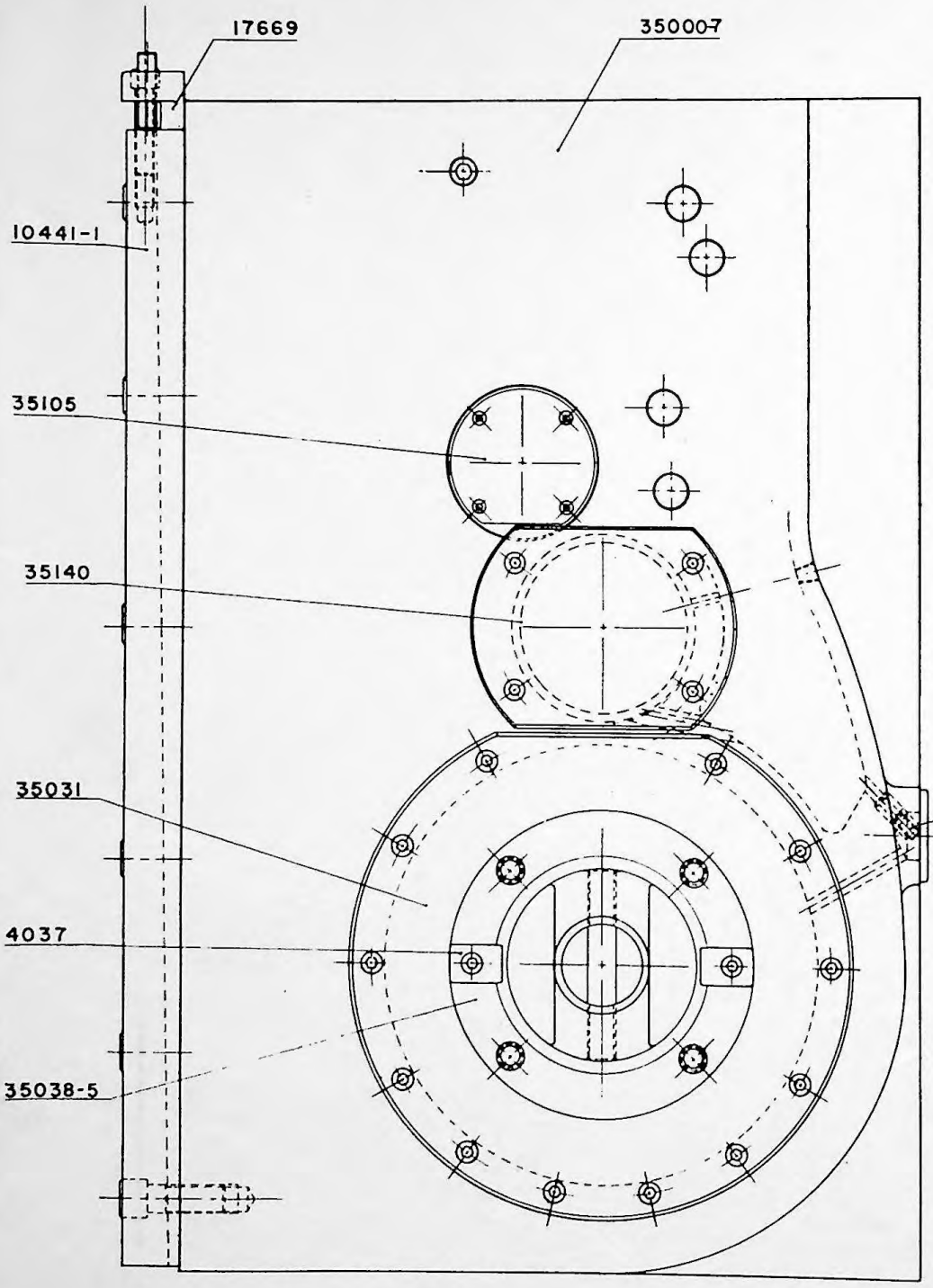
DWG. #A-150-40-10
Headstock (350-T)
G & L and Hypro Division

Parts List for DWG. #A-150-40-11

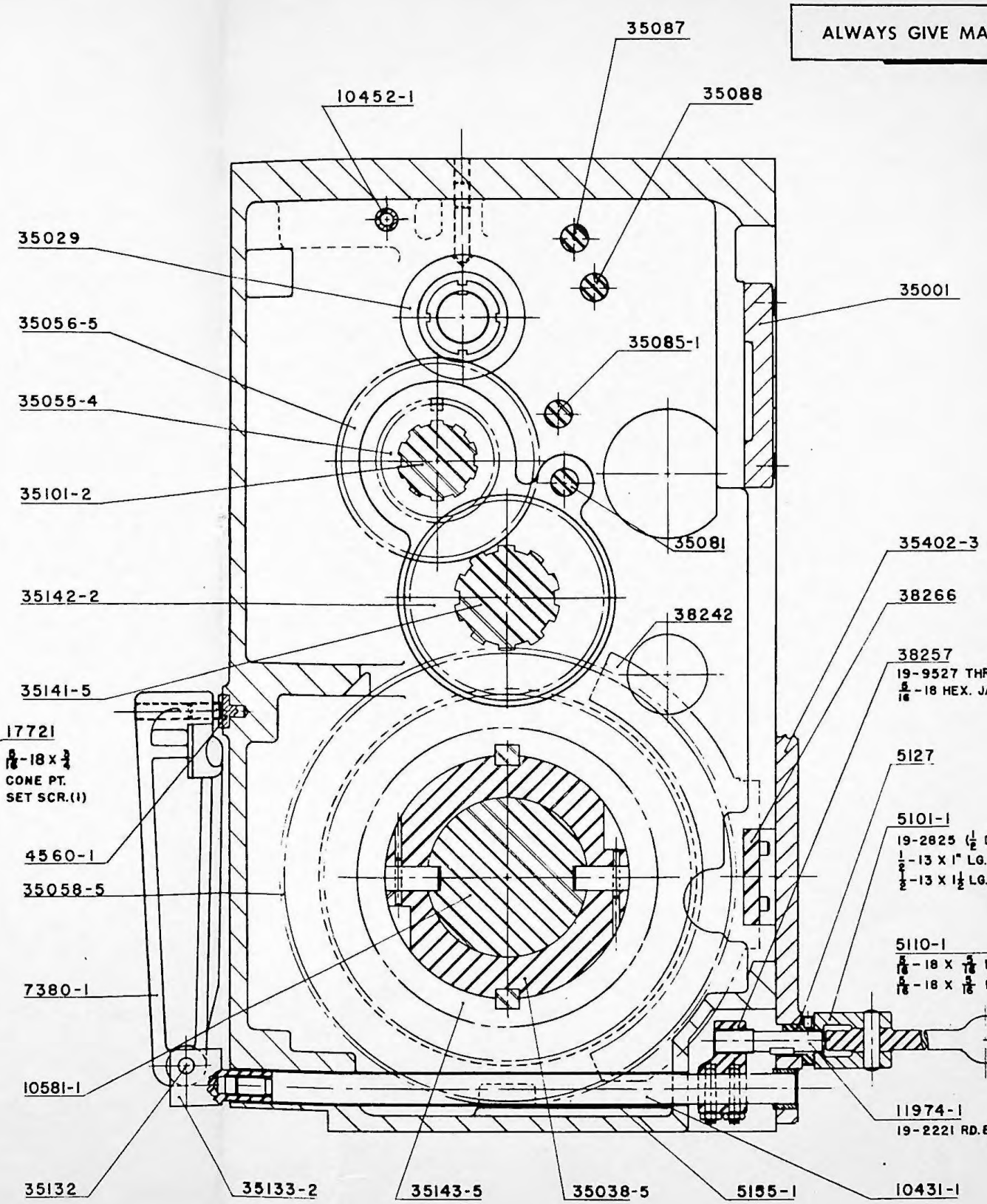
Headstock

Part Number	Part Name
4037	Key
4560-1	Headstock Button
5101-1	Clamp Lever Bracket
5110-1	Headstock Clamp Lever
5127	Adjusting Bushing
5155-1	Tubing - Clamp Rod
7380-1	Headstock Clamp Lever
10431-1	Clamp Rod - Long
10436-2	Bevel Gear
10441-1	Clamp - Left
10452-1	Oil Pipe
10576	Main Spindle Guard
10580-9	Main Ram
10581-1	Spindle - #6MT - Slot Type
11688-3	Shaft
11974-1	Clamp Rod - Short
17432-1	Cover
17433-1	Shaft
17435	Screen
17436	Miter Gear - 18T
17437	Miter Gear - 18T
17440	Spacer
17669	Taper Gib
17721	Oil Feed Sleeve
35000-7	Headstock
35001	Bracket
35029	Retainer
35031	Spindle Sleeve Cover
35035	Shaft
35038-5	Spindle Sleeve
35050	Pinion Shaft - 14T
35051	Gear - 40T
35052	Pinion Shaft - 14T
35055-4	Gear - 21T
35056-5	Gear - 36T
35058-5	Bull Gear
35081	Shifter Shoe
35085-1	Shifter Rod
35086-3	Shifter Rod
35087	Shifter Rod
35088	Shifter Rod
35101-2	Shaft
35105	Cover
35132	Pin
35133-2	Yoke
35140	Auxiliary Spindle Cover
35141-5	Pinion Shaft
35142-2	Gear
35143-5	Gear
35402-3	Headstock Cover
38242	Shifter
38246	Cover
38257	Coupling
38266	Shifter Bar
19-2221	Rd. End Key
19-2825	Straight Pin
10-9104	Bushing
19-9527	Taper Pin

ALWAYS GIVE MA

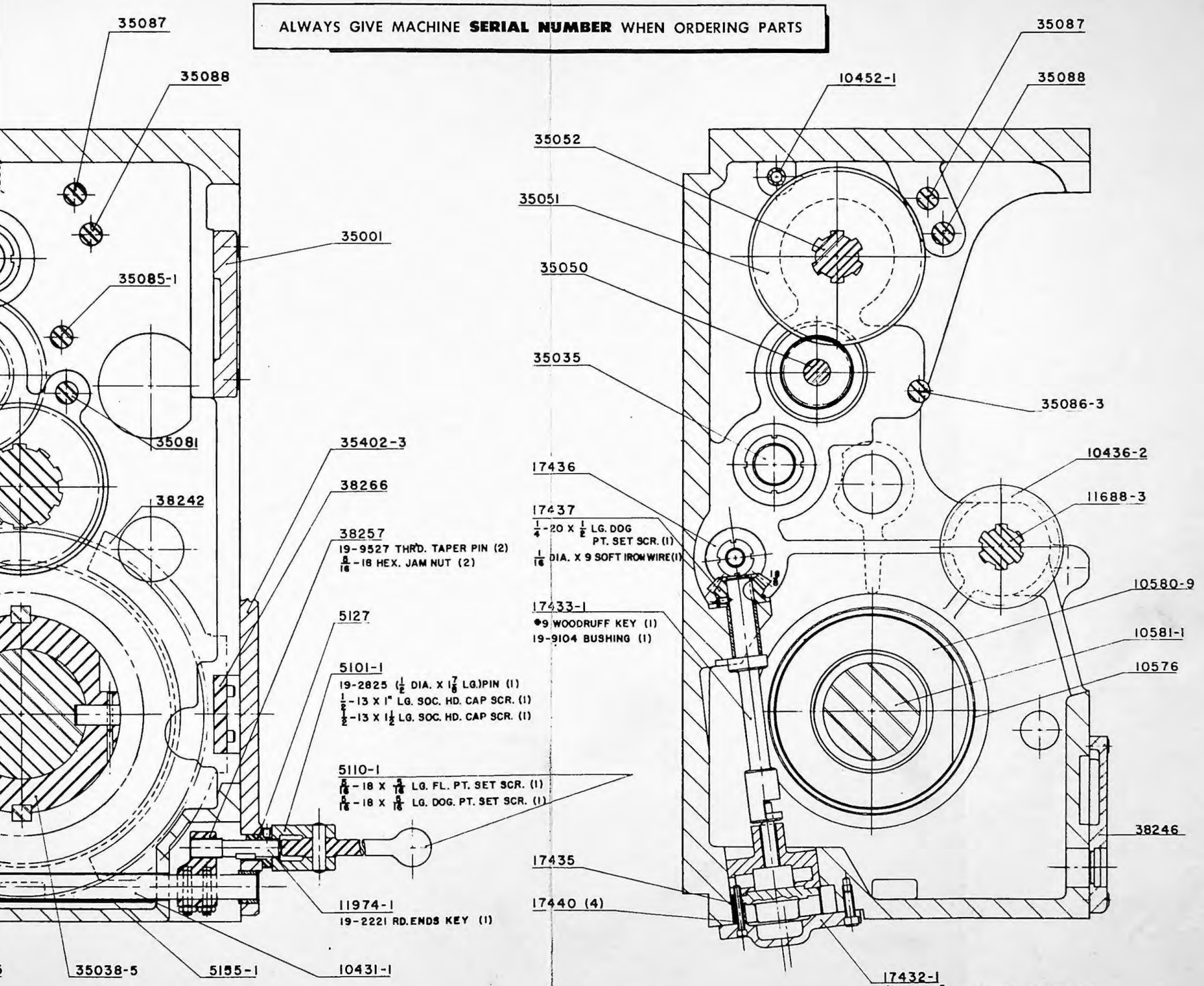


SPINDLE END VIEW



SECTION THRU CLAMPING

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



RU CLAMPING

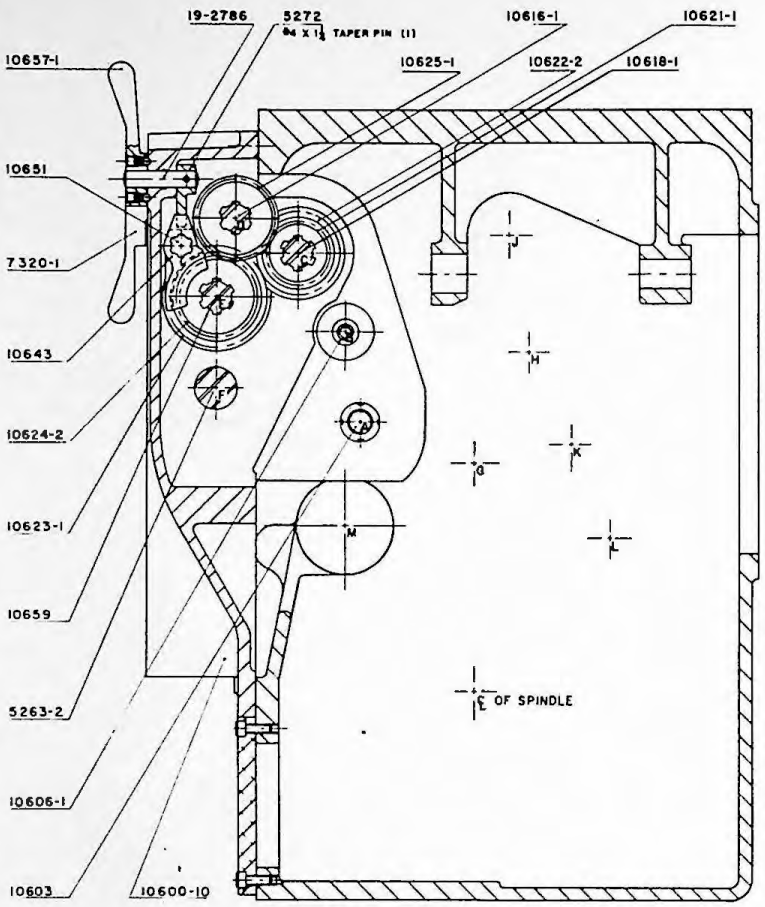
SECTION THRU PUMP

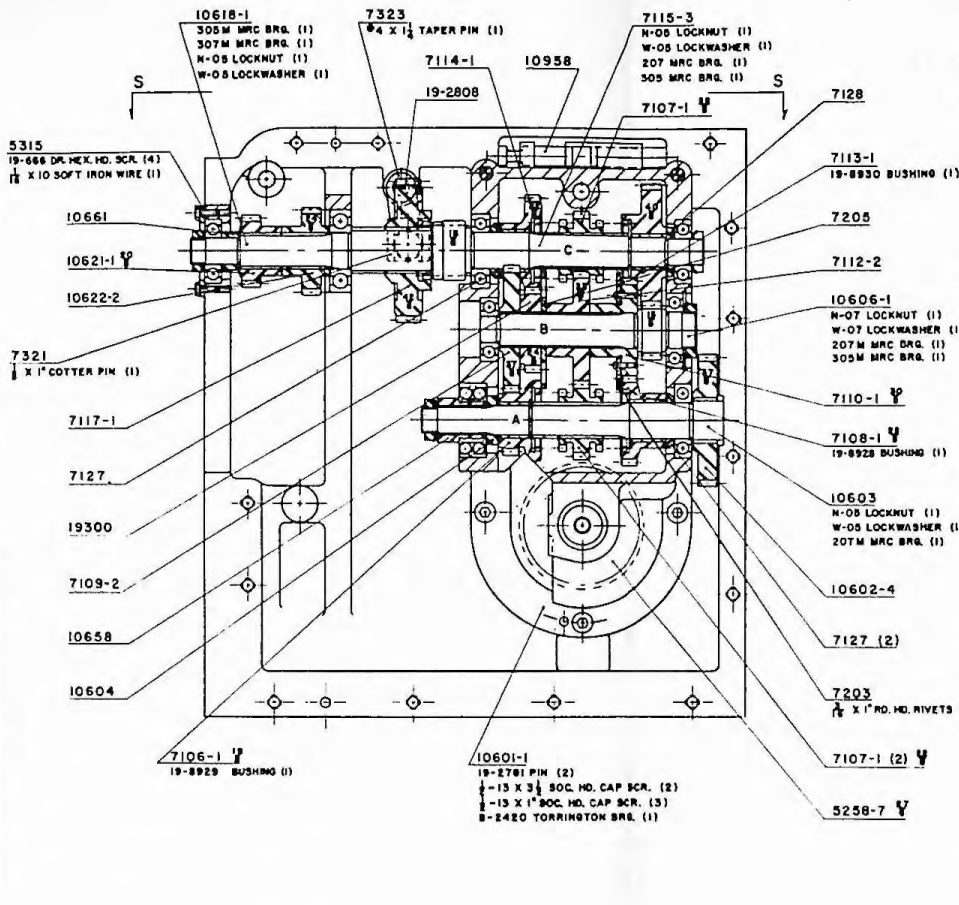
DWG. #A-150-40-11
Headstock (350-T)
G & L and Hypro Division

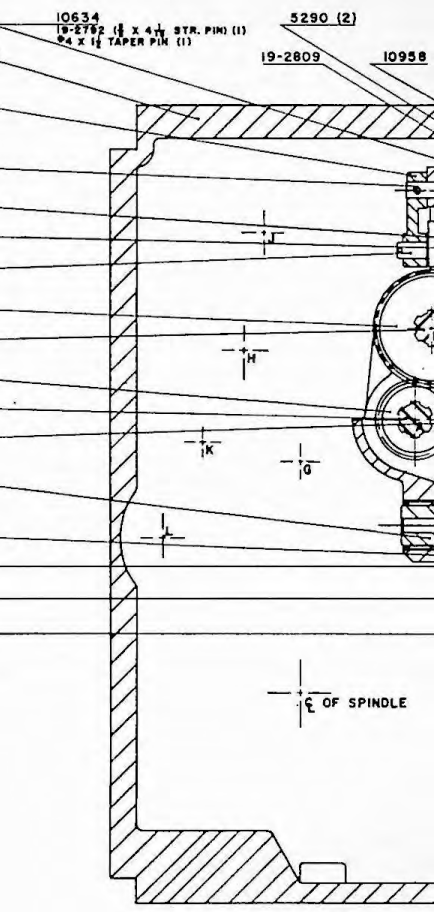
Parts List for DWG. #A-150-40-12

Headstock

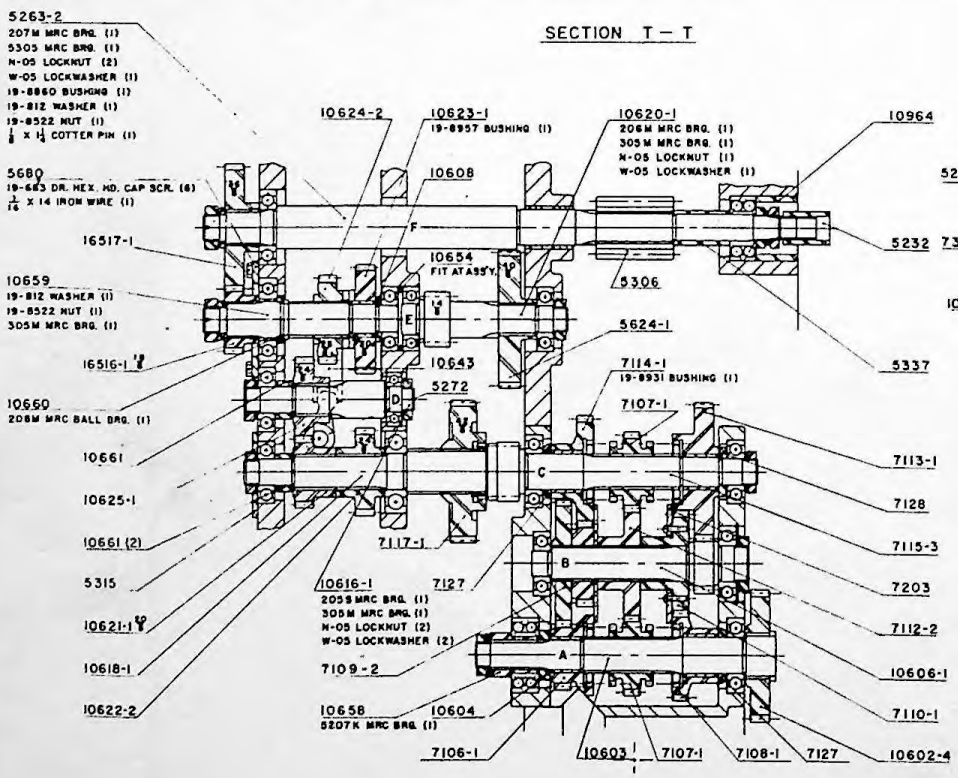
Part Number	Part Name
5232	Coupling
5251	Dial Bearing
5252-7	Dial - English
5253-2	Clutch
5254	Clutch Plate
5255	Lever Plate
5256-1	Lever
5257	Worm Gear
5258-7	Bevel Gear
5263-2	Worm Shaft
5272	Shifter Lever
5287	Pinion
5288-1	Feed Dial Gear
5290	Pin
5297	Clutch
5298	Stud
5299	Clamp
5300	Dial Guide
5301	Clamp Nut
5302	Clamp Lever
5303	Clutch Plunger
5305	Retaining Plate
5306	Worm
5307-1	Thrust Washer
5315	Bearing Retainer
5318	Pin
5337	Spacer
5345	Clutch Adj. Pin
5346	Clutch Adj. Pin
5348	Feed Knockout Pin
5353-1	Lever
5624-1	Gear
5680	Cover
5732-1	Gear
5733-1	Gear
7106-1	Feed Gear - 19T
7107-1	Feed Gear - 22T
7108-1	Feed Gear - 25T
7109-2	Feed Gear - 37T
7110-1	Feed Gear - 30T
7112-2	Feed Gear - 33T
7113-1	Feed Gear - 40T
7114-1	Feed Gear - 32T
7115-3	Shaft
7117-1	Feed Gear - 42T
7127	Thrust Washer
7128	Thrust Washer
7203	Retainer
7205	Retainer
7320-1	Shifter Lever
7321	Shifter Shoe
7323	Shifter Lever
10600-10	Spindle Feed Case
10601-1	Spindle Feed Bracket
10602-4	Gear - 37T
10603	Shaft
10604	Spacer
10606-1	Shaft
10608	Spacer
10616-1	Shaft
10618-1	Shaft
10620-1	Back Shaft
10621-1	Gear - 20T
10622-2	Gear - 24T
10623-1	Gear - 30T
10624-2	Gear - 25T
10625-1	Gear - 24T
10629	Shifter Lever
10630-1	Pin
10632	Shifter Block
10633	Shifter Block
10634	Lever
10635	Lever
10636	Shifter
10637	Crank
10638	Crank
10639-2	Cover
10643	Shifter
10646	Feed Indicator
10651	Shifter Shaft
10654	Spacer
10657-1	Shifter Lever
10658	Sleeve
10659	Shaft
10660	Sleeve
10661	Spacer
10749	Pin
10958	Shaft
10964	Spacer
13839	Lever
16516-1	Gear - 18T
16517-1	Gear - 36T
19300	Feed Gear
35000-7	Headstock
38246	Cover
19-663	Drilled Hex. Hd. Cap Screw
19-666	Drilled Hex. Hd. Cap Screw
19-812	Washer
19-2067	Ball
19-2068	Ball
19-2072	Ball
19-2182	Key
19-2708	Pin
19-2781	St. Pin
19-2786	St. Pin
19-2792	St. Pin
19-2808	St. Pin
19-2809	St. Pin
19-2831	Pin
19-7909	Spring
19-7918	Spring
19-8502	Taper Pin
19-8522	Lock Nut
19-8860	Bushing
19-8928	Bushing
19-8929	Bushing
19-8930	Bushing
19-8931	Bushing
19-8957	Bushing

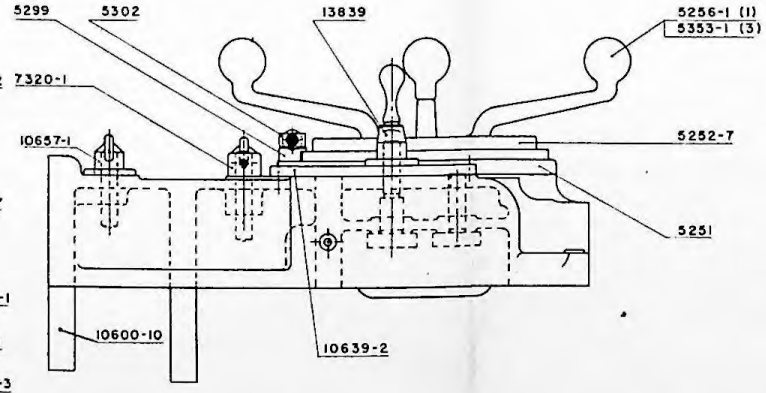






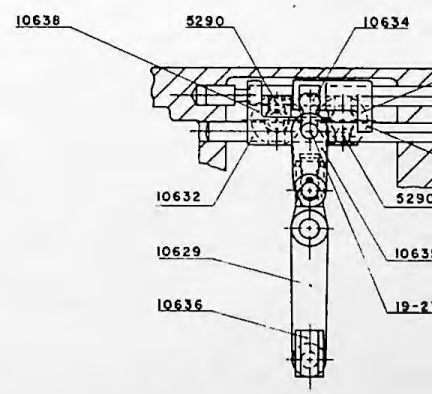
SECTION T – T

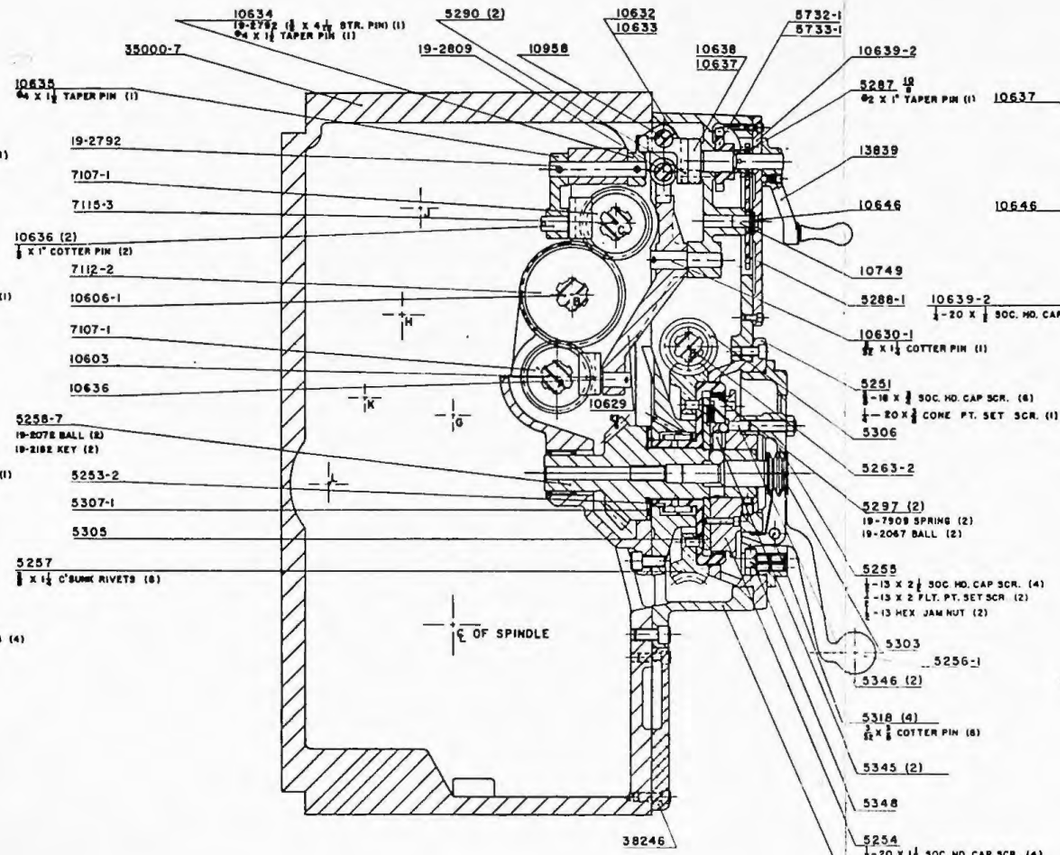




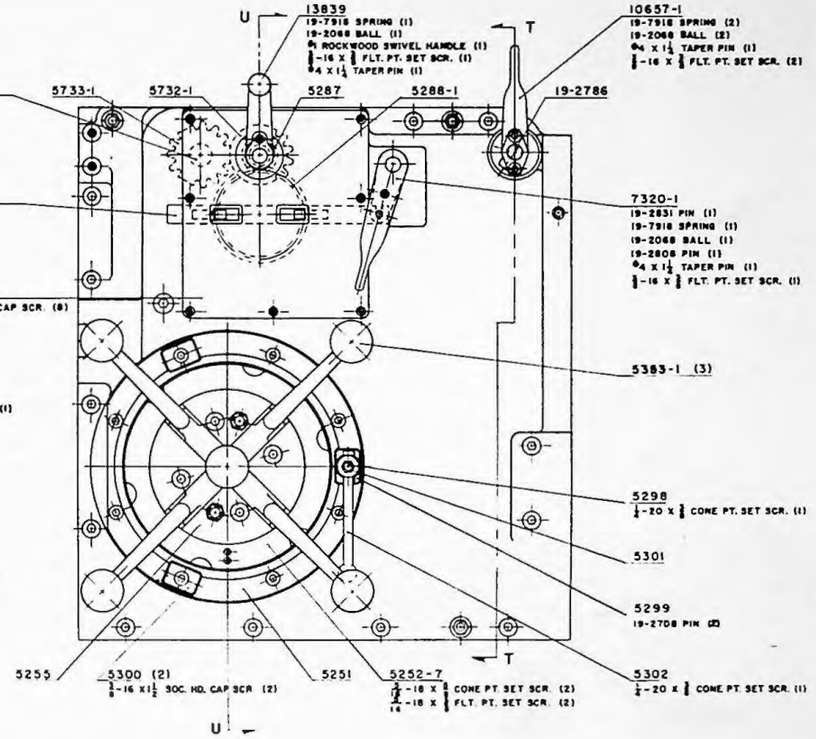
VIEW S – S

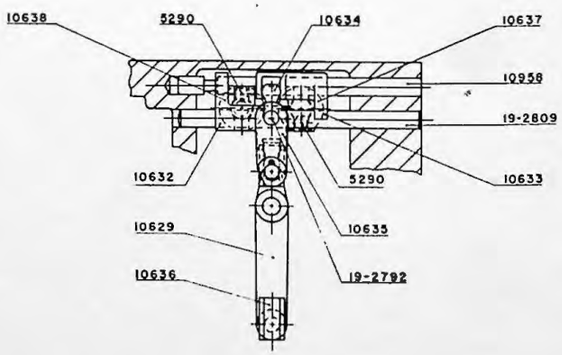
SECTION U-U

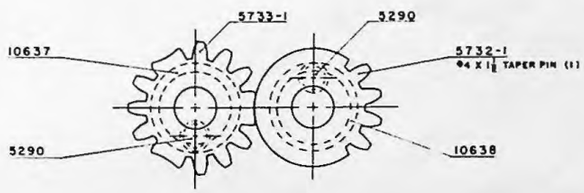




SECTION U-U







POSITION OF GEARS & CRANK AS SHOWN

ALWAYS GIVE MACHINE SERIAL NUMBER WHEN ORDERING PARTS

DWG. #A-150-40-12
Headstock (350-T) (Spindle Feed)
G & L and Hypro Division

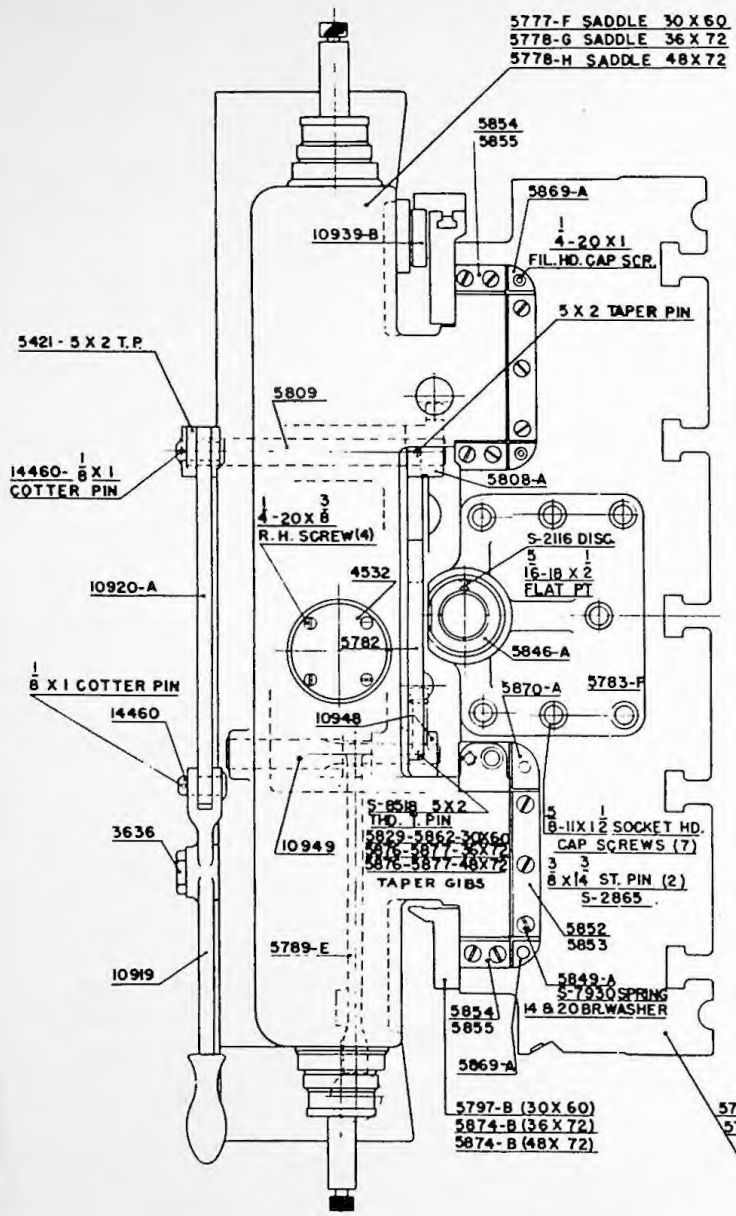
Parts List for DWG. #330-A-5

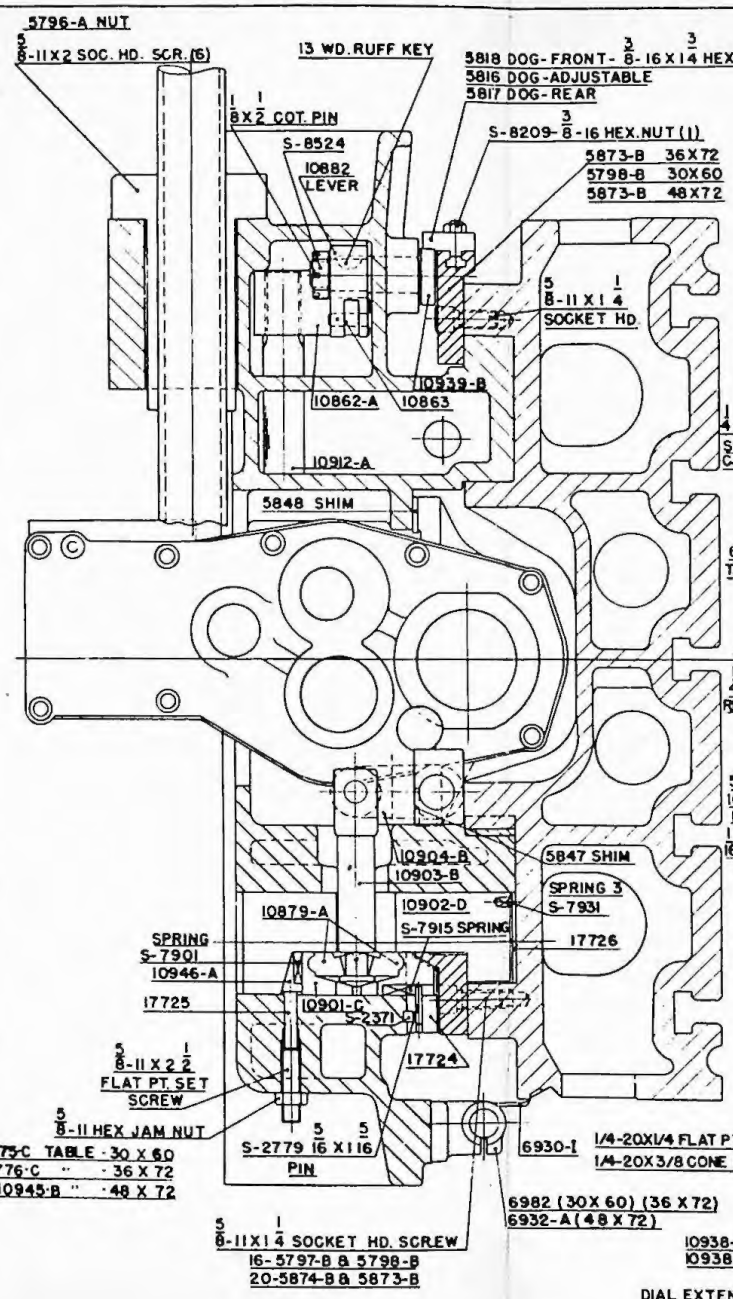
Table and Saddle

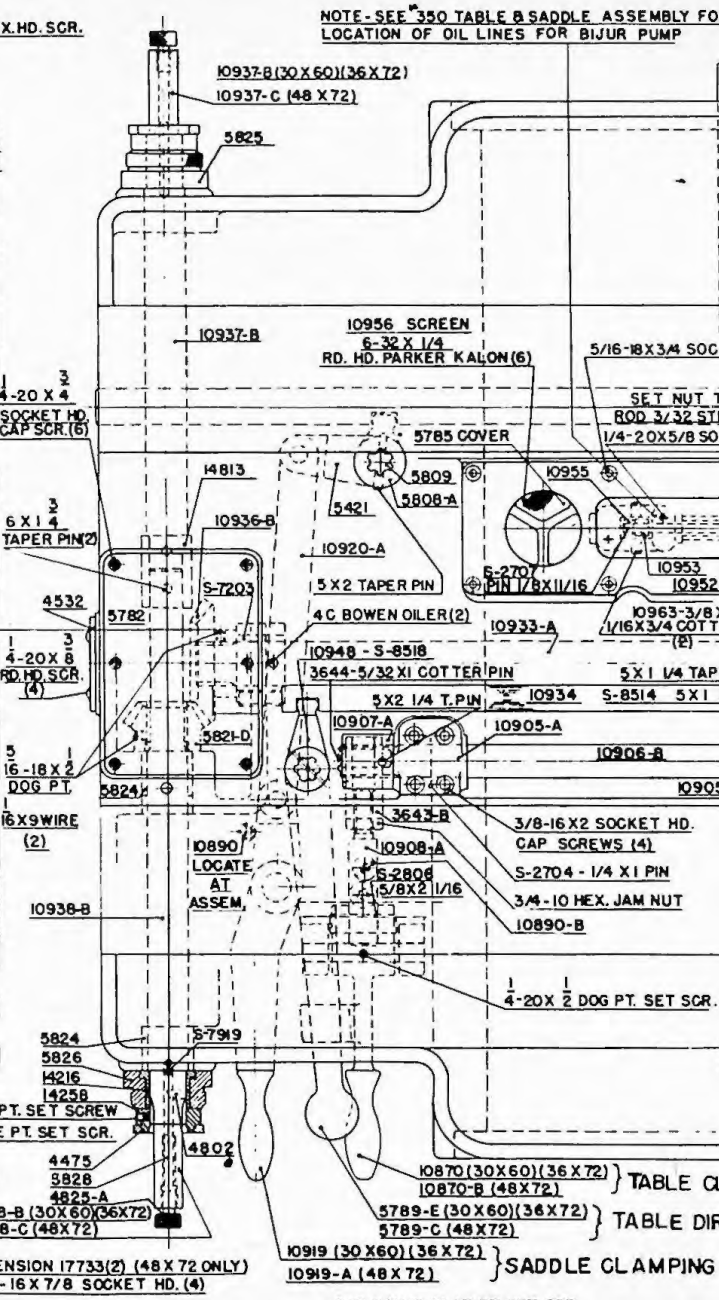
Part Number	Part Name
3636	Trip Cam Stud
3643-B	Horizontal Rod End
3644	Rod End Pin
4475	Clutch Ring
4532	Plate
4802	Dial Clamp Pin
4825-A	Dial Clamp Screw
5421	Shifter Lever
5775-C	Table 30x60
5776-C	Table 36x72
5777-F	Saddle 30x60
5778-G	Saddle 36x72
5778-H	Saddle 48x72
5782	Cover
5783-F	End Bracket
5785	Cover
5786-A	Trip Dog
5789-C	Lever
5789-E	Lever
5792-A	Table Screw (30x60 Table)
5795-C	Lever
5796-A	Nut - Long Feed
5797-B	Table Clamp R. H. 30x60 Table
5798-B	Table Clamp L. H. 30x60 Table
5799-B	Clamp Stud
5802	Pivot Block
5803-C	Clamp Lever - Rear
5804-C	Clamp Lever - Front
5805	Spacer
5806-A	Plate
5807-B	Shaft
5808-A	Lever
5809	Shaft
5813	Trip Lever Link
5816	Dog Adjustment
5817	Dog - Rear
5818	Dog - Front
5821-D	Bevel Pinion
5824	Bushing
5825	Micro Dial
5826	Micro Dial
5828	Dial Clamp Pin
5829	Taper Gib 30x60 Table
5846-A	Nut
5847	Shim
5848	Shim
5849	Shoulder Screw
5849-A	Shoulder Screw
5851	Coupling
5852	Wiper Plate

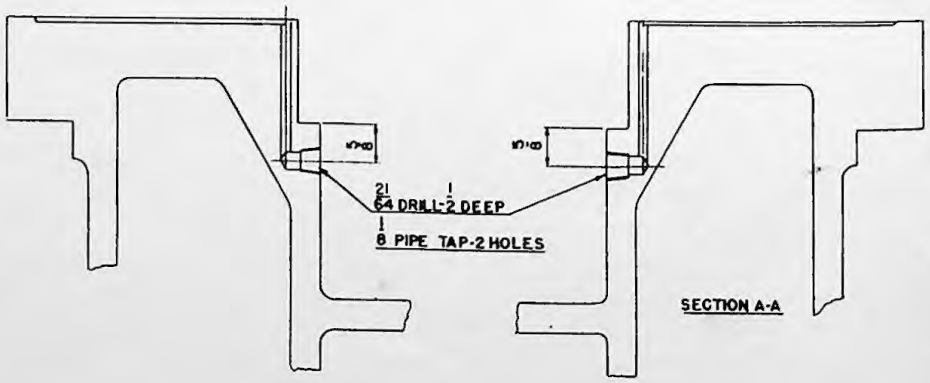
Part Number	Part Name
5853	Felt Wiper
5854	Wiper Plate
5855	Felt Wiper
5856	Wiper Plate
5857	Felt Wiper
5858	Wiper Plate
5859	Felt Wiper
5862	Taper Gib 30x60 Table
5869-A	Filler Block
5870-A	Filler Block
5873-B	Table Clamp L. H. 72" Long Table
5874-B	Table Clamp R. H. 72" Long Table
5876	Taper Gib 72" Long Table or Saddle
5877	Taper Gib 72" Long Table
5900-D	Table Drive Housing
5901-C	Housing Cover
5903-A	Table Cross Feed Nut
5934-A	Pump Rocker Arm
6930-I	Vernier Holder
6932-A	Vernier Bracket
6982	Vernier Bracket
10862-A	Lever
10863	Pin
10870	Lever Table Clamp
10870-B	Lever Table Clamp
10878	Rod End Pin
10879-A	Toggle
10882	Lever
10890	Stud
10890-B	Stud
10901-C	Table Clamp
10902-D	Table Clamp
10903-B	Link
10904-B	Lever
10905-A	Bracket
10906-B	Shaft
10907-A	Lever
10908-A	Link
10912-A	Shaft
10916-B	Clamp - Rear
10917-A	Clamp - Front
10919	Lever
10919-A	Lever
10920-A	Link
10932	Screw Table 36x72, and 48x72
10933-A	Shaft

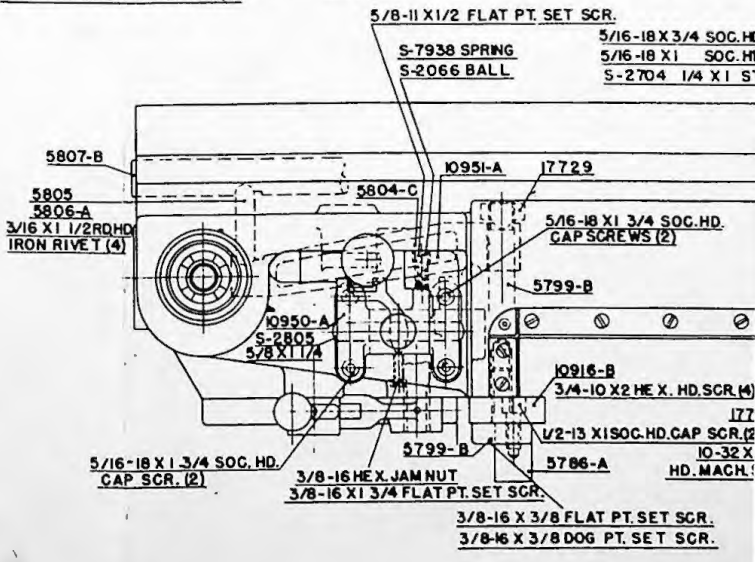
Part Number	Part Name
10934	Shifter Shaft
10936-B	Bevel Gear
10937-B	Shaft
10937-C	Shaft
10938-B	Shaft
10938-C	Shaft
10939-B	Trip Shaft
10945-B	Table 48x72
10946-A	Wedge
10948	Shifter Lever
10949	Shaft
10950-A	Bracket Clamp Lever
10951-A	Bracket Clamp Lever
10952	Pump Bracket
10953	Pump Lever
10954	Pull Rod
10955	Collar
10956	Screen
10963	Pin
14216	Bushing
14258	Clutch
14460	Pin
14813	Coupling
17724	Guard
17725	Pin
17726	Disc
17729	Pivot Nut
17733	Dial Extension
17744	Gib Retainer
S-803	Washer
S-2066	Base
S-2116	Disc
S-2191	Key
S-2371	Key
S-2704	Pin
S-2707	Pin
S-2779	Straight Pin
S-2805	Pin
S-2806	Straight Pin
S-2865	Straight Pin
S-7131	Table, Vernier, Body Assembly
S-7203	Bushing
S-7901	Spring
S-7915	Spring
S-7919	Spring
S-7930	Spring
S-7931	Spring
S-7938	Spring
S-8209	Nut
S-8514	Pin
S-8518	Taper Pin
S-8524	Nut


5777-F SADDLE 30 X 60
5778-G SADDLE 36 X 72
5778-H SADDLE 48X72
5854
5855
5869-A
10939-B
1/4-20 X 1 FIL. HD. CAP SCR.
5 X 2 TAPER PIN
5421 - 5 X 2 T.P.
5809
14460- 1/8 X 1 COTTER PIN
5808-A
1/4-20 X 3/8 R. H. SCREW (4)
S-2116 DISC
5/16-18 X 1/2 FLAT PT.
4532
10920-A
5782
5846-A
1/8 X 1 COTTER PIN
14460
5870-A
5783-F
10948
S-8518 5X2 THD. T. PIN
5829-5862-30X60
5876-5877-36X72
5876-5877-48X72
TAPER GIBS
5/8-11X1 1/2 SOCKET HD. CAP SCREWS (7)
3/8 X 1/4 ST. PIN (2) S-2865
3636
10949
5852
5853
5789-E
10919
5849-A
S-7930 SPRING
14 & 20 BR. WASHER
5854
5855
5869-A
5797-B (30 X 60)
5874-B (36 X 72)
5874-B (48X 72)
5775-C TABLE - 30 X 60
5776-C " - 36 X 72
10945-B " - 48 X 72

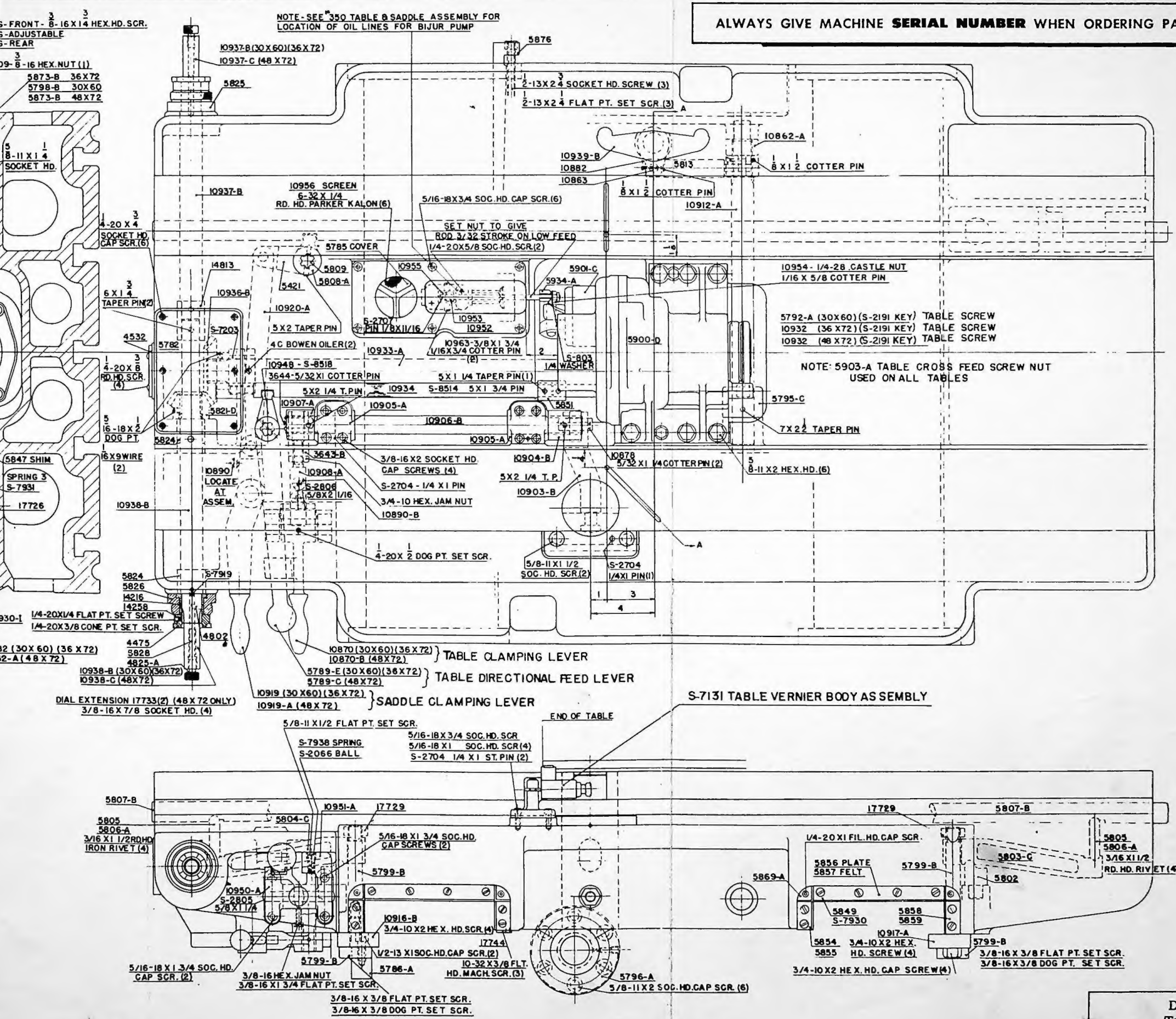

5796-A NUT
5/8-11X2 SOC. HD. SCR. (6)
13 WD. RUFF KEY
1/8X2 1/2 COT. PIN
S-8524
10882 LEVER
5818 DOG-FRONT- 3/8-16 X 1 3/4 HEX. HD. SCR.
5816 DOG-ADJUSTABLE
5817 DOG-REAR
3/8-16 HEX. NUT (1)
5873-B 36X72
5798-B 30X60
5873-B 48X72
5/8-11 X 1 1/4 SOCKET HD.
10939-B
10862-A
10863
10912-A
5848 SHIM
1/4-20 X 3/4 SOCKET HD. CAP SCR. (6)
6 X 1 3/4 TAPER PIN (2)
4532
1/4-20 X 3/8 RD. HD. SCR. (4)
5/16-18 X 1/2 DOG PT.
1/16X9 WIRE (2)
10904-B
10903-B
5847 SHIM
SPRING 3 S-7931
10879-A
10902-D
S-7915 SPRING
17726
SPRING S-7901
10946-A
17725
10901-C
S-2371
17724
5/8-11 X 2 1/2 FLAT PT. SET SCREW
5/8-11 HEX JAM NUT
S-2779 5/16 X 1 1/16 PIN
5/8-11 X 1 1/4 SOCKET HD. SCREW
16- 5797-B & 5798-B
20- 5874-B & 5873-B
6930-I
6982 (30 X 60) (36 X 72)
6932-A (48 X 72)


NOTE - SEE 350 TABLE & SADDLE ASSEMBLY FO
LOCATION OF OIL LINES FOR BIJUR PUMP
10937-B (30X60) (36X72)
10937-C (48 X72)
5825
10937-B
10956 SCREEN 6-32 X 1/4 RD. HD. PARKER KALON (6)
5/16-18X3/4 SOC
SET NUT T
ROD 3/32 ST
1/4-20X5/8 SO
5785 COVER
14813
5809
5808-A
5421
10955
10936-B
10920-A
5 X 2 TAPER PIN
S-7203
4532
5782
4C BOWEN OILER (2)
10933-A
10953
10952
S-2707 PIN 1/8X11/16
10963-3/8
1/16X3/4 COTT
(2)
10948 - S-8518
3644-5/32 X1 COTTER PIN
5X1 1/4 TAP
5X2 1/4 T. PIN
10934
S-8514 5X1
10907-A
10905-A
5821-D
10906-B
10905
5824
3643-B
3/8-16X2 SOCKET HD. CAP SCREWS (4)
10890 LOCATE AT ASSEM.
10908-A
S-2704 - 1/4 X1 PIN
S-2808 5/8X2 1/16
3/4-10 HEX. JAM NUT
10890-B
10938-B
1/4-20 X 1/2 DOG PT. SET SCR.
5824
5826
14216
14258
S-7919
1/4-20X1/4 FLAT PT. SET SCREW
1/4-20X3/8 CONE PT. SET SCR.
4802
4475
5828
4825-A
10938-B (30X60)(36X72)
10938-C (48X72)
10870 (30X60)(36X72)
10870-B (48X72)
TABLE C
5789-E (30X60)(36X72)
5789-C (48X72)
TABLE DR
10919 (30X60)(36X72)
10919-A (48X72)
SADDLE CLAMPING
DIAL EXTENSION 17733(2) (48 X 72 ONLY)
3/8-16 X 7/8 SOCKET HD. (4)


21/64 DRILL-2 DEEP
1/8 PIPE TAP-2 HOLES
SECTION A-A


5/8-11 X1/2 FLAT PT. SET SCR.
S-7938 SPRING
S-2066 BALL
5/16-18 X 3/4 SOC. HD
5/16-18 X 1 SOC. HD
S-2704 1/4 X 1 S
5807-B
10951-A
17729
5805
5806-A
3/16 X 1 1/2 RD HD IRON RIVET (4)
5804-C
5/16-18 X 1 3/4 SOC. HD. CAP SCREWS (2)
5799-B
10950-A
S-2805 5/8 X 1 1/4
10916-B
3/4-10 X 2 HEX. HD. SCR. (4)
1/2-13 X 1 SOC. HD. CAP SCR. (2)
10-32 X
HD. MACH.
5799-B
5786-A
5/16-18 X 1 3/4 SOC. HD. CAP SCR. (2)
3/8-16 HEX. JAM NUT
3/8-16 X 1 3/4 FLAT PT. SET SCR.
3/8-16 X 3/8 FLAT PT. SET SCR.
3/8-16 X 3/8 DOG PT. SET SCR.

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

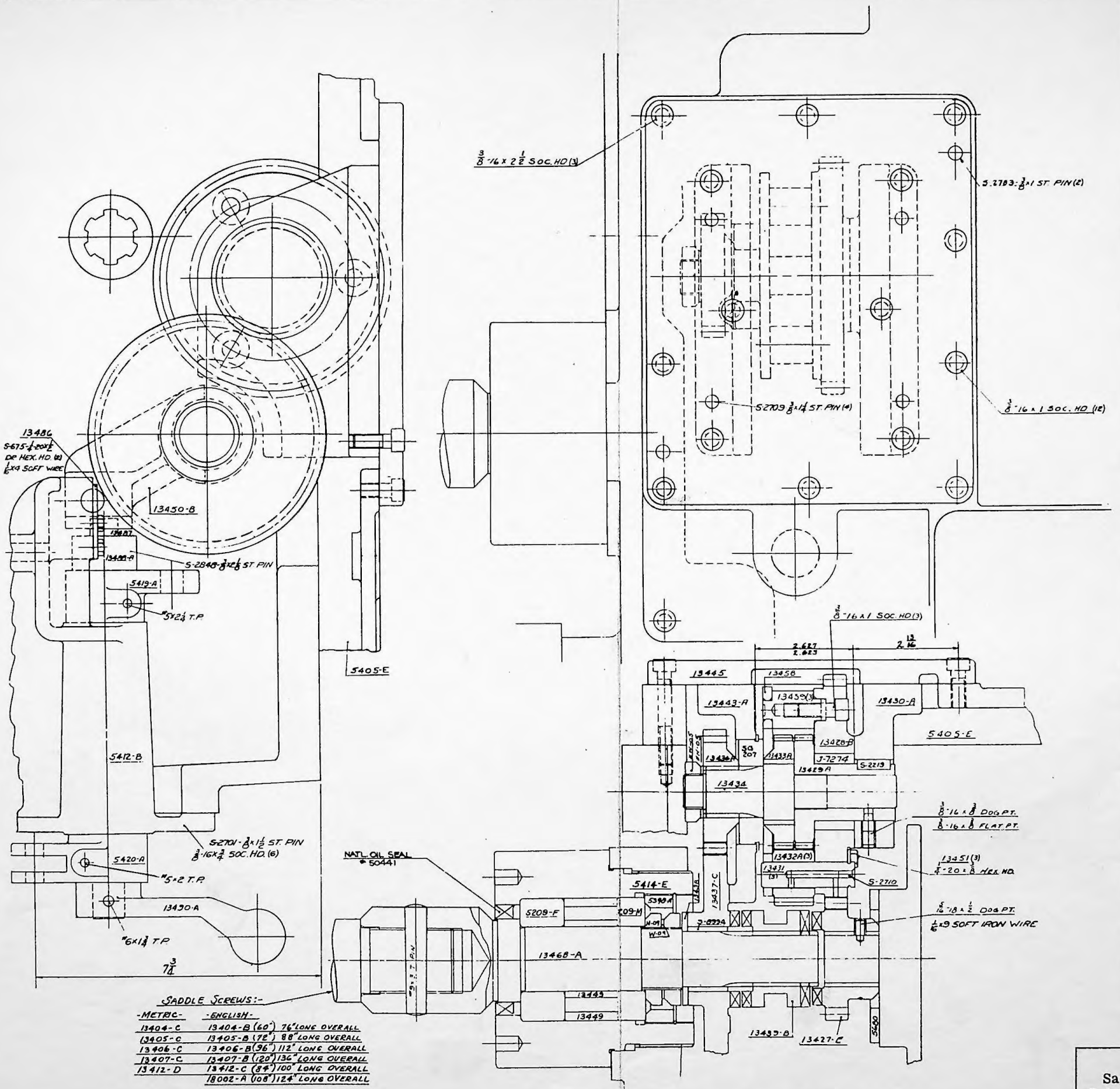


DWG. #330-A-5
Table and Saddle
G & L and Hypro Division

Part Number	Part Name
5398-A	Nut
5405-E	Cover
5412-B	Cover
5414-E	Bearing Bracket
5419-A	Shifter Lever
5420-A	Shifter Lever
5680	Cover
13404-B	Saddle Screw
13404-C	Saddle Screw (Metric)
13405-B	Saddle Screw
13405-C	Saddle Screw (Metric)
13406-B	Saddle Screw
13406-C	Saddle Screw (Metric)
13407-B	Saddle Screw
13407-C	Saddle Screw (Metric)
13412-C	Saddle Screw
13412-D	Saddle Screw (Metric)
13427-E	Gear
13428-B	Gear
13429-A	Gear
13430-A	Bracket
13431	Pin
13432-A	Gear
13433-A	Gear
13434	Shaft

Part Number	Part Name
13436-A	Gear
13437-C	Gear
13438	Spacer
13439-B	Clutch
13443-A	Bracket
13445	Cover
13448	Spacer
13449	Spacer
13450-B	Shifter
13458	Retaining Plate
13459	Spacer
13468-A	Shaft
13486	Plate
13487	Pin
13488-A	Crank
13490-A	Lever
18002-A	Saddle Screw
S-675	Cap Screw
S-2219	Round Ends Key
S-2709	Straight Pin
S-2710	Straight Pin
S-2783	Straight Pin
S-2848	Straight Pin
S-8994	Bushing

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



-METRIC-	-ENGLISH-
13404-C	13404-B (60") 76" LONG OVERALL
13405-C	13405-B (72") 88" LONG OVERALL
13406-C	13406-B (96") 112" LONG OVERALL
13407-C	13407-B (120") 136" LONG OVERALL
13412-D	13412-C (84") 100" LONG OVERALL
	18002-A (108") 124" LONG OVERALL

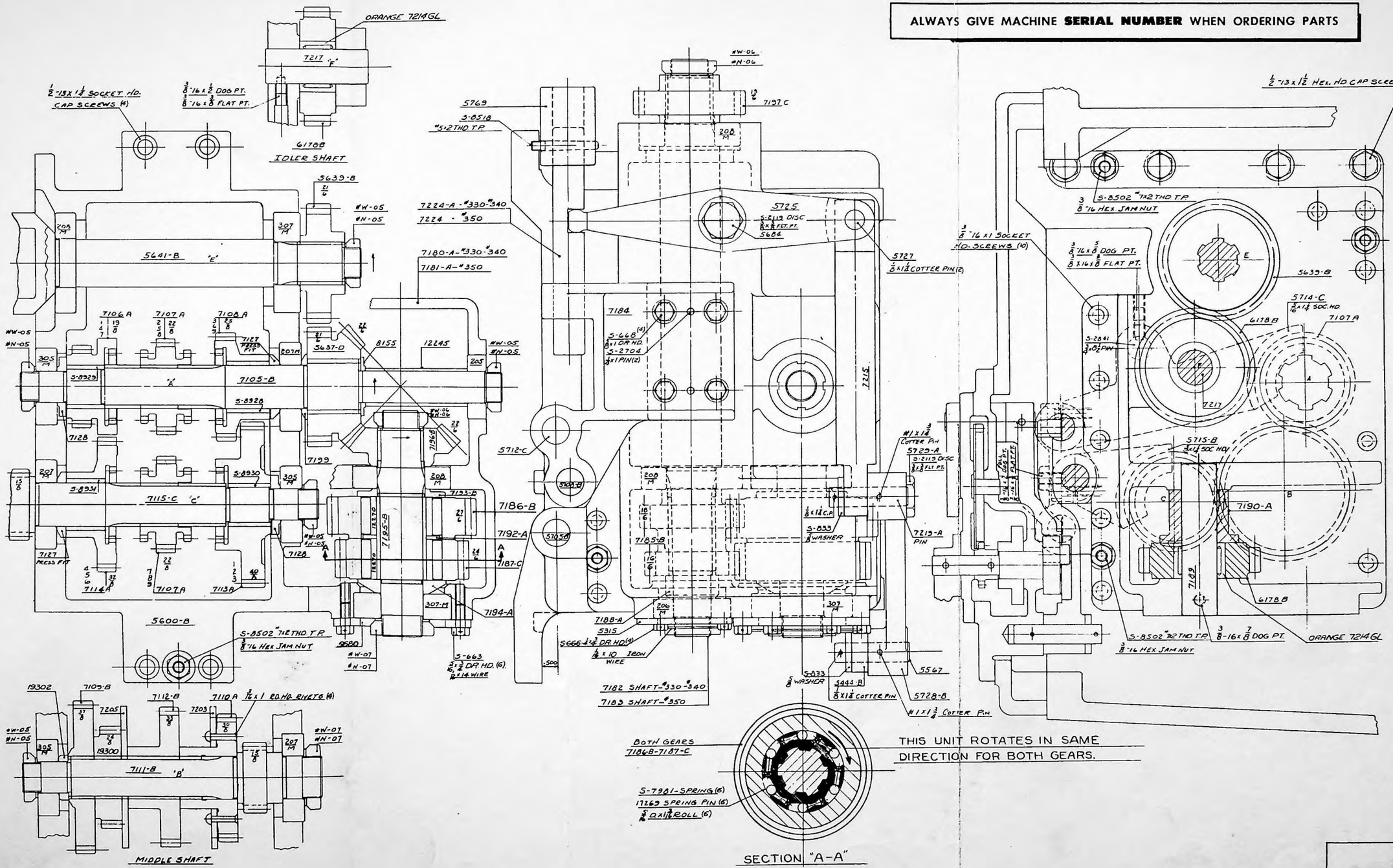
DWG. #330-A-8
Saddle Screw Reduction
G & L and Hypro Division

Parts List for DWG. #330-A-10

Milling Feed

Part Number	Part Name
5315	Bearing Retainer
5444-B	Shifter Rod
5567	Stud
5600-B	Feed Case
5637-D	Gear
5639-B	Gear
5641-B	Rapid Traverse Clutch Drive
5680	Cover
5684	Stud
5705-B	Shaft
5708-B	Shaft
5712-C	Shaft
5714-C	Shifter Shoe
5715-B	Shifter Shoe
5725	Shifter Lever
5727	Pin
5728-B	Shifter Lever
5729-A	Shoulder Screw
5769	Coupling
6178-B	Idler Gear
7105-B	Feed Shaft
7106-A	Feed Gear - 19T
7107-A	Feed Gear
7108-A	Feed Gear - 25T
7109-B	Feed Gear - 37T
7110-A	Feed Gear - 30T
7111-B	Shaft - 15T Gear
7112-B	Feed Gear - 33T
7113-A	Feed Gear - 40T
7114-A	Feed Gear - 32T
7115-C	Feed Shaft
7127	Thrust Washer
7128	Thrust Washer
7180-A	Feed Clutch Housing
7181-A	Feed Clutch Housing
7182	Shaft 335
7183	Shaft
7184	Bracket
7185-B	Cluster Gear
7186-B	Clutch Gear - 27T
7187-C	Clutch Gear - 24T
7188-A	Spacer
7189	Idler Shaft
7190-A	Spacer
7192-A	Spacer
7193-B	Thrust Washer
7194-A	Spacer
7195-B	Shaft
7196-B	Bevel Gear - 22T
7197-C	Gear - 19T
7199	Spacer
7203	Retainer
7205	Retainer
7214	Needle Bearing
7215	Link
7217	Idler Shaft
7219-A	Stud
7224	Shifter Shaft
7224-A	Shifter Shaft
8155	Spacer
12245	Spacer
12270	Clutch Body
17269	Pin
19300	Feed Gear
19302	Spacer
S-663	Cap Screw
S-666	Cap Screw
S-668	Cap Screw
S-833	Washer
S-2119	Copper Disc.
S-2704	Straight Pin
S-2841	Straight Pin
S-7981	Spring
S-8502	Taper Pin
S-8518	Threaded Taper Pin
S-8928	Bushing
S-8929	Bushing
S-8930	Bushing
S-8931	Bushing

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



DWG. #330-A-10
Milling Feed
G & L and Hypro Division

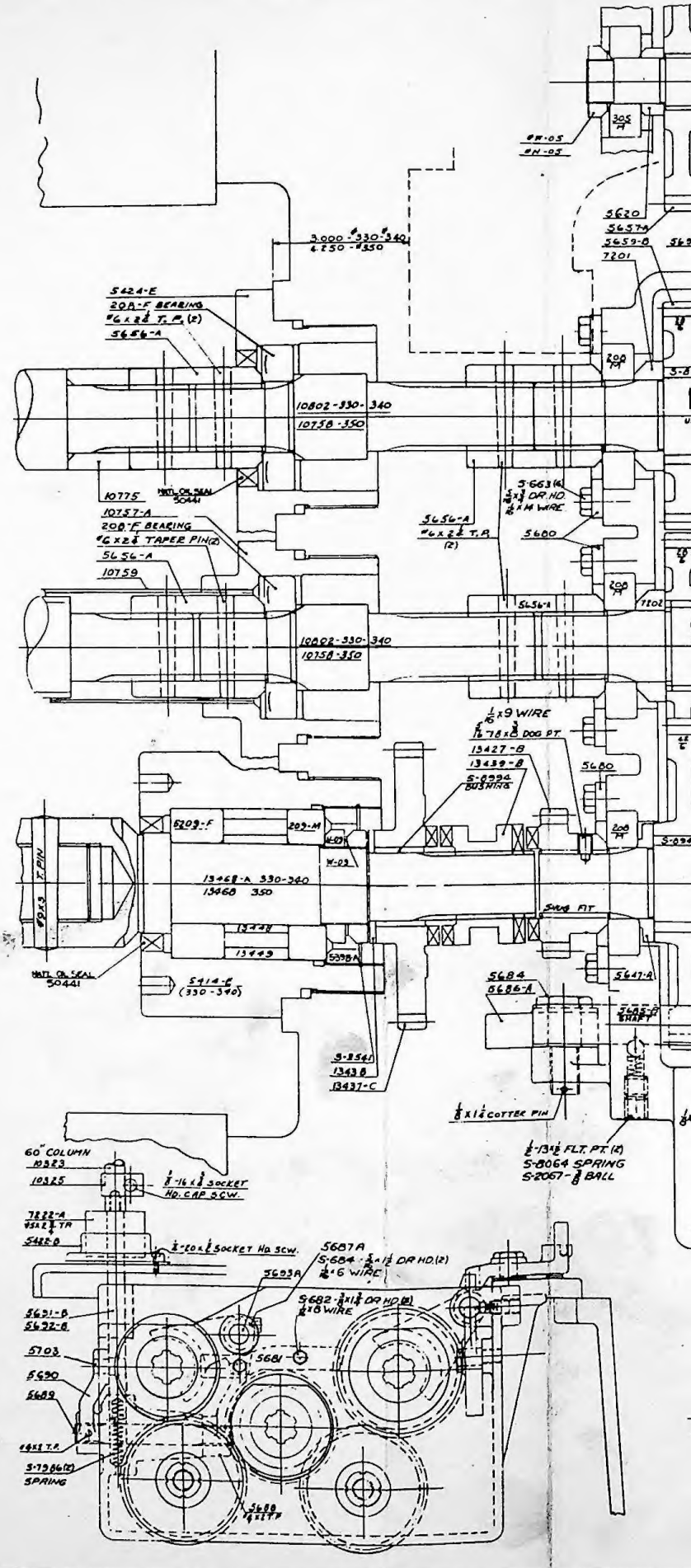
Parts List for DWG. #330-A-11

Transmission

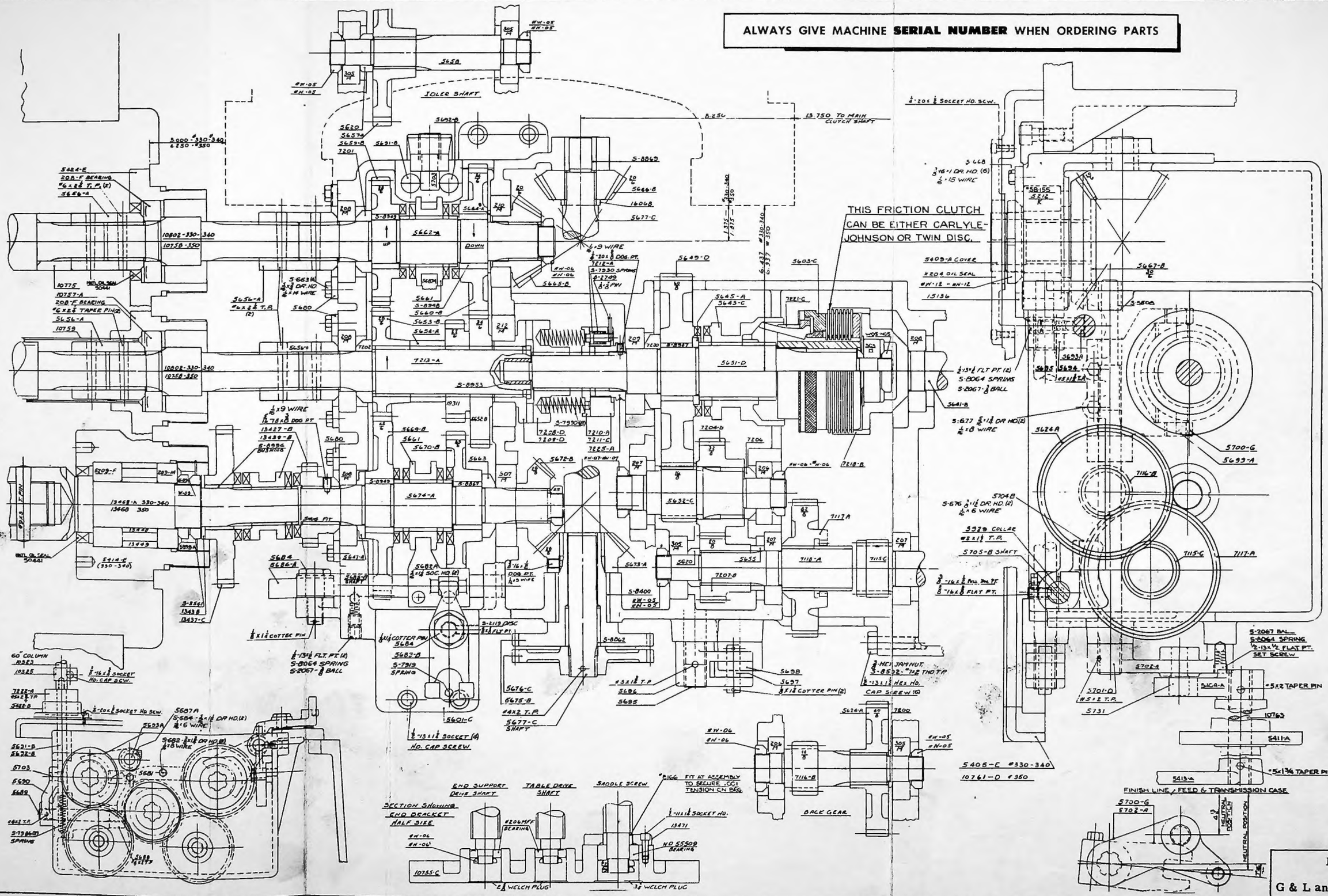
Part Number	Part Name
3929	Collar
5398-A	Nut
5404-A	Shifter Lever
5405-E	Cover
5409-A	Cover
5411-A	Cover
5413-A	Shifter Lever
5414-E	Bearing Bracket
5422-B	Cover
5424-E	Cover
5601-C	Transmission Case
5603-C	Clutch Rapid Traverse
5620	Spacer
5624-A	Gear
5632-C	Pinion Shaft
5641-B	Rapid Traverse Clutch Drive
5643-C	Clutch
5645-A	Thrust Washer
5647-A	Thrust Washer
5649-D	Gear
5651-D	Shaft
5652-B	Cluster Gear
5653-B	Gear
5654-A	Spacer
5655	Spacer
5656-A	Coupling
5657-A	Gear
5658	Shaft
5659-B	Gear
5660-B	Gear
5661	Clutch
5662-A	Shaft
5663	Thrust Washer
5664-A	Thrust Washer
5665-B	Bevel Gear
5666-B	Bevel Gear
5667-B	Bevel Gear
5669-B	Gear
5670-B	Gear
5672	Bevel Gear
5673-A	Bevel Gear
5674-A	Shaft
5675-B	Gear
5676-C	Gear
5677-C	Shaft
5680	Cover
5681	Gear Retainer

Part Number	Part Name
5682-A	Shifter
5683-B	Shifter Arm
5684	Stud
5685-B	Shifter Shaft
5686-A	Shifter Fork
5687-A	Shifter
5688	Shifter Lever
5689	Shaft
5690	Shifter Arm
5691-B	Trip Shaft
5692-B	Trip Shaft
5693-A	Shaft
5694	Shifter Lever
5695	Shaft
5696	Shifter Lever
5697	Pin
5698	Link
5699-A	Shifter
5700-G	Shifter Lever
5701-D	Shaft
5702-A	Shifter Lever
5703	Shifter Lever Pin
5704-B	Shifter
5705-B	Shaft
5731	Shifter Lever Pin
7115-C	Feed Gear - 15T
7116-B	Back Gear - 14T
7117-A	Back Gear - 42T
7118-A	Feed Shaft
7200	Spacer
7201	Thrust Washer
7202	Spacer
7204-B	Gear - 32T
7206	Spacer
7207-B	Gear - 20T
7208-D	Clutch Safety
7209-D	Clutch Safety
7210-A	Spring Plate
7211-C	Clutch Nut
7212-A	Clutch Pin
7213-A	Shaft
7218-B	Clutch Driver Ring
7220	Thrust Washer
7221-C	Clutch Hub
7222-A	Coupling
7225-A	Sleeve
8166	Spacer

Part Number	Part Name
10323	Trip Rod (60" Column)
10325	Collar
10733	Shaft
10755-C	End Bracket
10757-A	Cover
10758	Shaft
10759	Guard
10761-D	Cover
10775	Spacer
10802	Shaft
13427-B	Gear
13437-C	Gear
13438	Spacer
13439-B	Clutch
13448	Spacer
13449	Spacer
13468	Shaft
13468-A	Shaft
13471	Cover
15136	Cover
16068	Spacer
19311	Gear
S-663	Cap Screw
S-667	Cap Screw
S-668	Cap Screw
S-676	Cap Screw
S-682	Cap Screw
S-684	Cap Screw
S-2067	Steel Ball
S-2119	Copper Disc.
S-2749	Straight Pin
S-3541	Lock Wire
S-5508	Bushing
S-7919	Spring
S-7930	Spring
S-7986	Spring
S-7990	Spring
S-8064	Spring
S-8400	Bushing
S-8502	Taper Pin
S-8862	Bushing
S-8867	Bushing
S-8869	Bushing
S-8947	Bushing
S-8948	Bushing
S-8949	Bushing
S-8953	Bushing
S-8994	Bushing

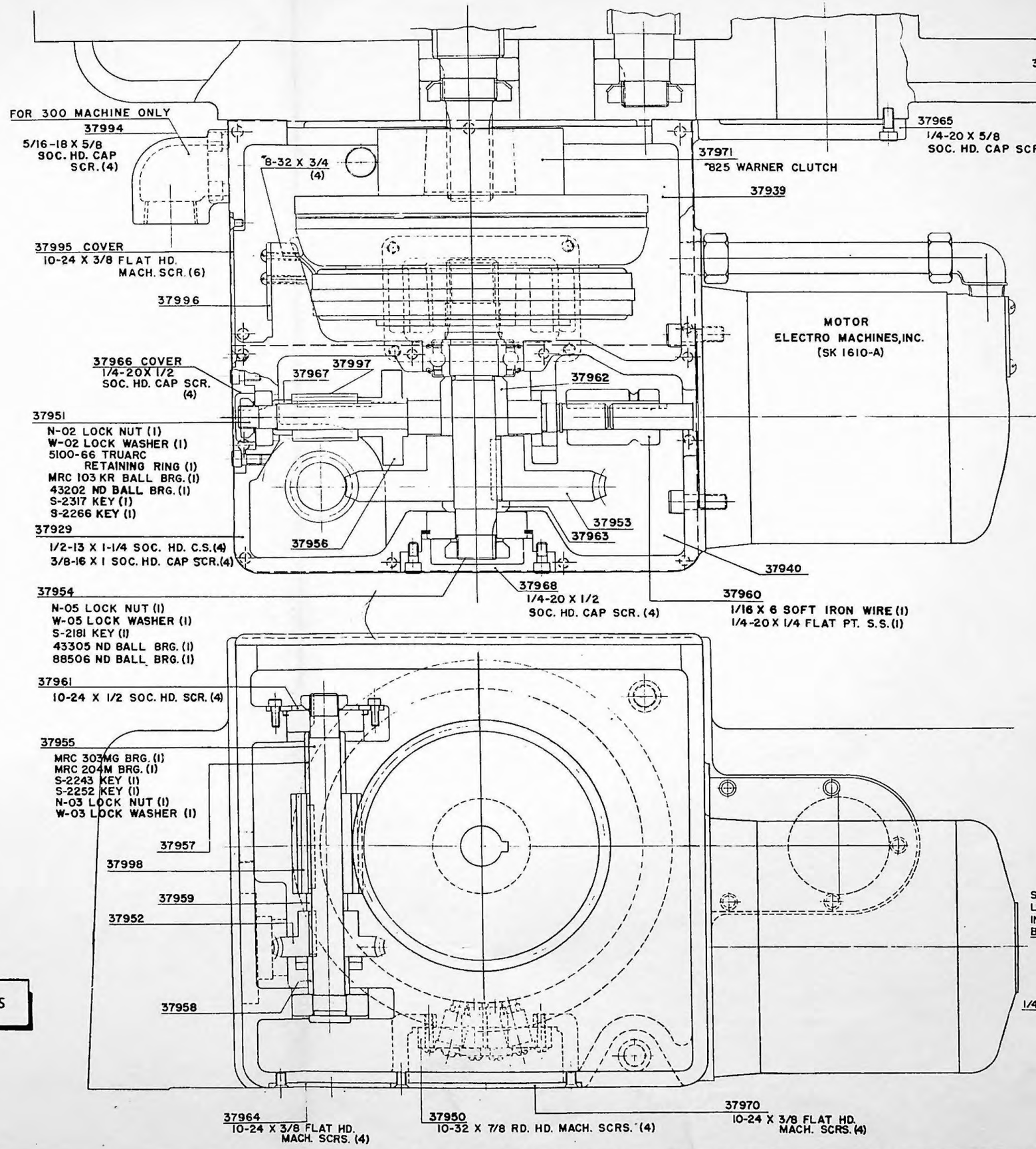


ALWAYS GIVE MACHINE SERIAL NUMBER WHEN ORDERING PARTS

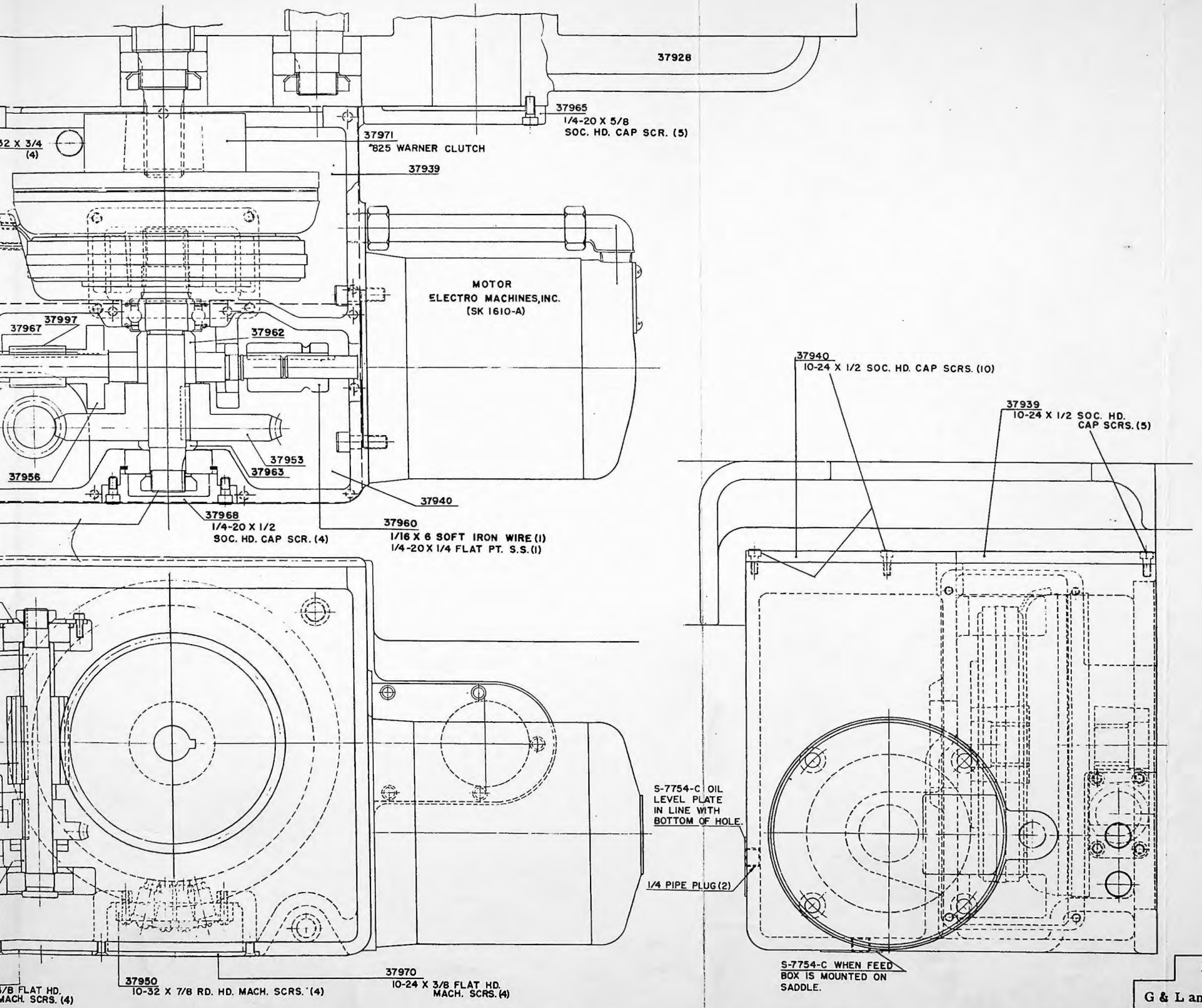


DWG. #330-A-11
Transmission
G & L and Hypro Division

Part Number	Part Name
37928	End Bracket
37929	Main Housing
37939	Cover
37940	Cover
37950	Mounting Block
37951	Shaft
37952	Worm Gear 30T
37953	Worm Gear 48T
37954	Shaft
37955	Shaft
37956	Oil Splasher
37957	Spacer
37958	Spacer
37959	Spacer
37960	Coupling
37961	Bearing Retainer
37962	Spacer
37963	Spacer
37964	Cover
37965	Cover
37966	Cover
37967	Spacer
37968	Cover
37970	Cover
37971	#825 Clutch
37994	Cable Housing
37995	Cover
37996	Terminal Insulator
37997	Boston Worm H L-1407
37998	Boston Worm H L-1076
S-2181	Key
S-2243	Key
S-2252	Key
S-2266	Key
S-2317	Key
S-7754-C	Oil Lever Plate



ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS



DWG. #340-A-46
Feed Box
G & L and Hypro Division

Parts List for DWG. #350-A-6

Table and Saddle

Part Number	Part Name
3643-B	Horizontal Rod End
3644	Rod End Pin
4475	Clutch Ring
4802	Dial Clamp
4825-A	Dial Clamp Screw
5783-F	End Bracket
5785	Cover
5786-A	Trip Dog
5795-C	Lever
5796-A	Nut - Long Feed
5799-B	Clamp Stud
5802	Pivot Block
5803-C	Clamp Lever - Rear
5804-C	Clamp Lever - Front
5805	Spacer
5806-A	Plate
5807-A	Shaft
5808-A	Lever
5809	Shaft
5810-B	Lever
5813	Trip Lever Link
5814-B	Trip Shaft
5816	Dog - Adjusting
5817	Dog - Rear
5818	Dog - Front
5819-A	Shaft
5820-B	Bevel Gear
5821-I	Bevel Pinion
5822-A	Shaft
5828	Dial Clamp Pin
5846-A	Nut
5847	Shim
5848	Shim
5849	Shoulder Screw
5850-A	Shifter Shaft
5851	Coupling
5854	Wiper Plate
5855	Felt Wiper
5856	Wiper Plate
5857	Felt Wiper
5858	Wiper Plate
5859	Felt Wiper
5864-A	Shaft
5869-A	Filler Block
5870-A	Filler Block
5873-A	Table Clamp L. H.
5874-B	Table Clamp R. H.
5876	Taper Gib for 36x72 Table
5877	Taper Gib for 36x72 Table
5922	Shifter Shaft

Part Number	Part Name
6488	Taper Gib
6489	Taper Gib
6930-E	Vernier Holder
6982	Vernier Bracket
8796	Micro Dial
8797	Micro Dial
10850-C	Saddle 146" for 48x96 Table
10851-D	Table
10854	Table Clamp Left 48x96
10855-A	Table Clamp Right 48x96
10856	Lever
10857-A	Lever
10858-C	Shaft
10859	Saddle Clamp - Front
10860	Saddle Clamp - Rear
10861-A	Trip Lever
10862-A	Lever
10863	Pin
10864-C	Saddle 96" for 48x84 Table
10865	Housing - Table Hand Feed
10866	Cover
10867-B	Gear
10868	Shaft
10869-A	Bracket
10870	Lever Table Clamp
10872-A	Link
10873-A	Lever
10874-A	Clamp Shaft
10875-A	Bracket
10876-A	Lever
10877	Link
10878	Rod End Pin
10879-A	Toggle
10880-A	Table Clamp
10881-B	Table Clamp
10882	Lever
10884	Table Screw 48x96 Table
10888-E	Table 48x84
10890	Stud
10890-A	Stud
10891	Shaft
10892	Taper Gib - Front (48x84)
10893	Taper Gib - Rear (48x84)

Part Number	Part Name
10894-C	Table Clamp - Right (48x84)
10895	Table Clamp - Left (48x84)
10896	Table Screw (48x84)
10930-D	Table (48x72)
10932	Screw - Table 36x72 and 48x72
10950-A	Bracket - Clamp Lever
10951-A	Bracket - Clamp Lever
10952	Pump Bracket
10953	Pump Lever
10954	Pull Rod
10955	Collar
10956	Screen
10963	Pin
14085	Wiper Felt
14086	Wiper Plate
14216	Bushing
14258	Clutch
15597	Coupling
17724	Guard
17726	Disc.
17729	Pivot Nut
17744	Gib Retainer
S-803	Washer
S-2066	Steel Ball
S-2116	Copper Disc.
S-2191	Round Ends Key
S-2371	Square End Key
S-2704	Straight Pin
S-2727	Straight Pin
S-2779	Straight Pin
S-2805	Straight Pin
S-2806	Straight Pin
S-2865	Straight Pin
S-7131	Table Vernier Body Assembly
S-7919	Spring
S-7930	Spring
S-7931	Spring
S-7938	Spring
S-8050	Spring
S-8209	Tee Bolt
S-8373	Bushing
S-8501	Special - Dowel , Water Pump
S-8505	Taper Pin
S-8514	Threaded Taper Pin
S-8524	Slotted Hex. Nut
S-8942	Bushing

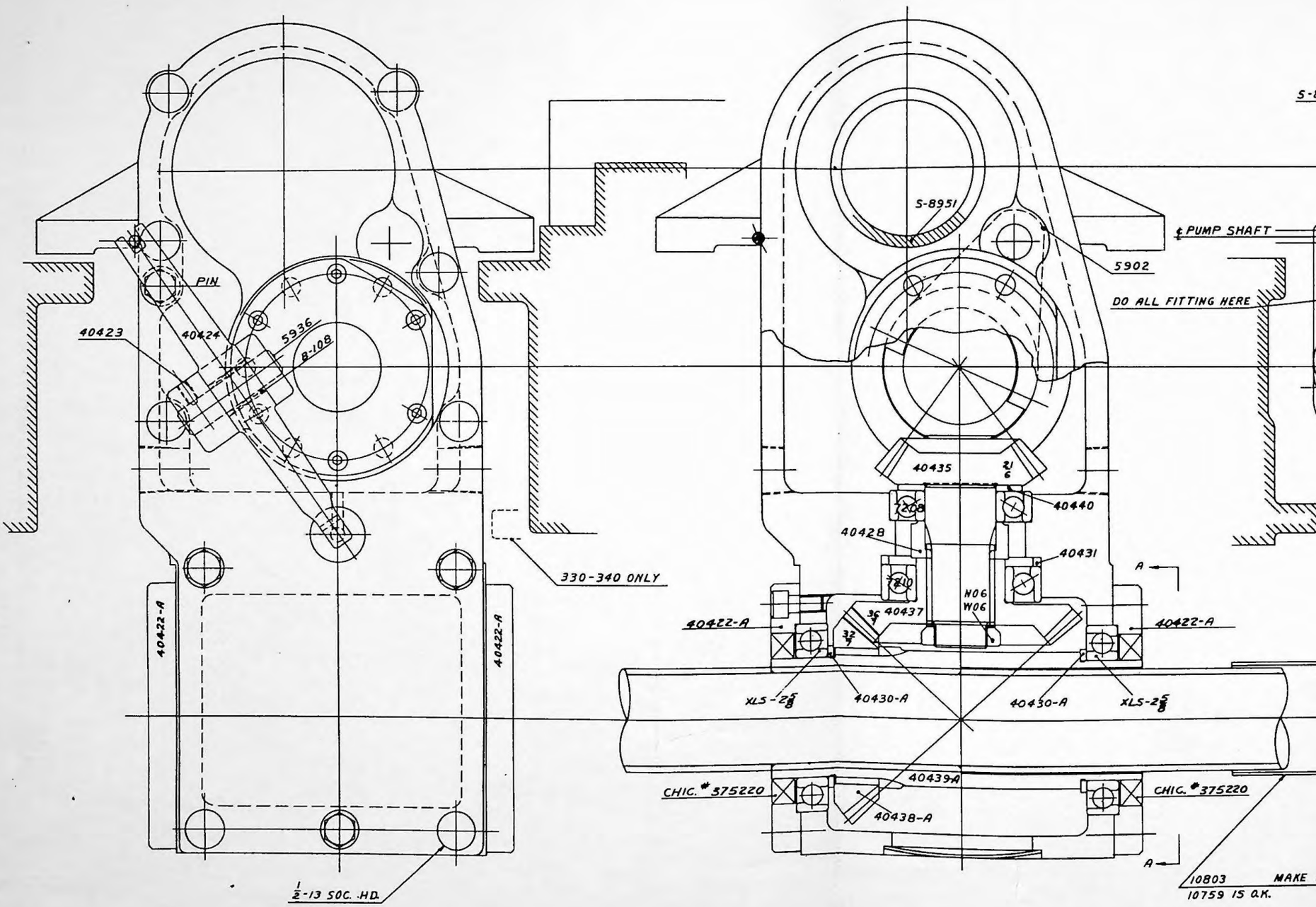
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

DWG. #350-A-6
Table and Saddle
G & L and Hypro Division

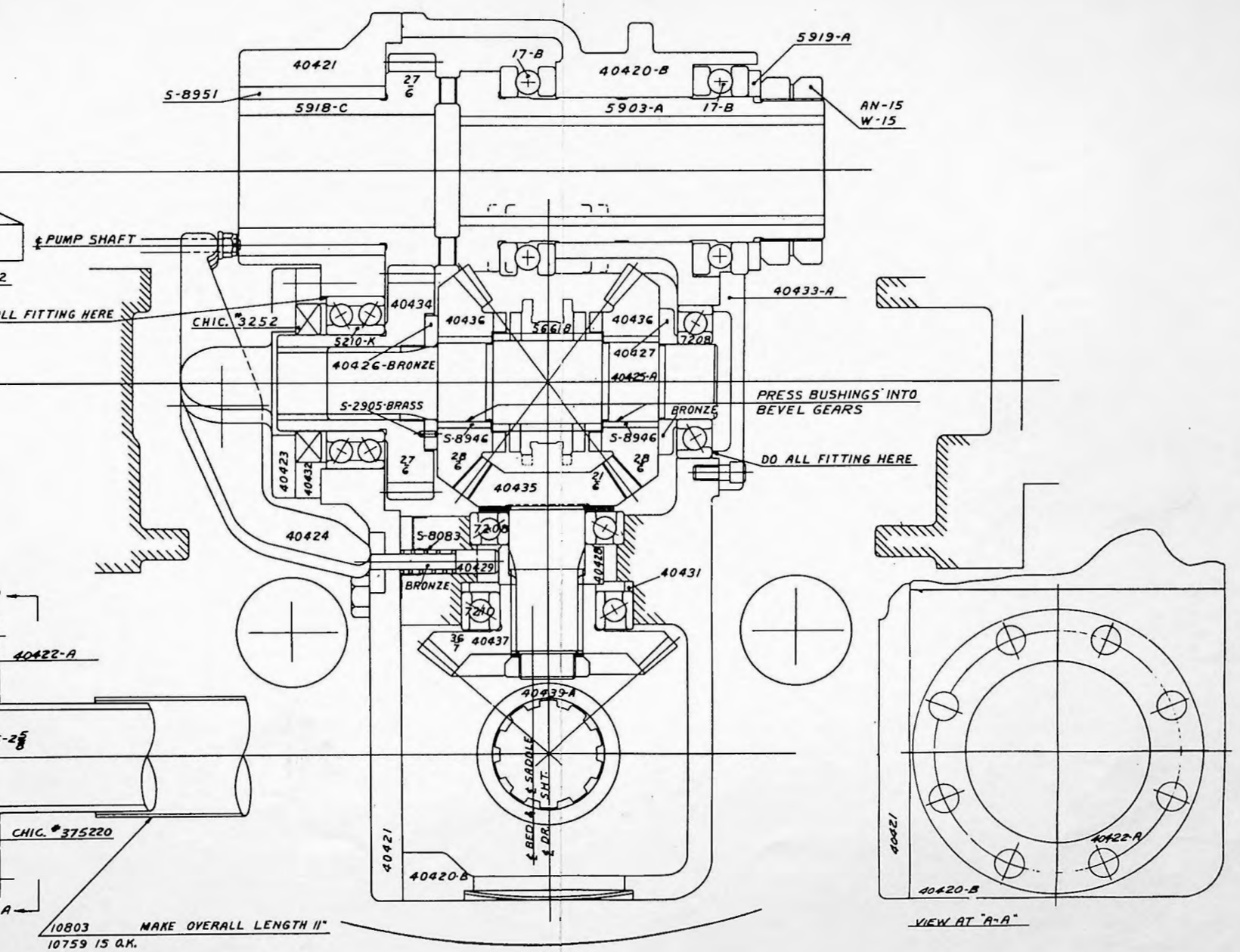
Parts List for DWG. #350-A-25-B

Table Drive

Part Number	Part Name
5661-2	Clutch
5902	Shifter Shoe
5918-3	Gear
5936	Shaft
10803	Guard
40420-2	Table Drive Housing
40421	Housing Cover
40422-1	Bearing Retainer
40423	Pump Bracket
40424	Rocker Arm
40425-1	Shaft
40426	Thrust Washer
40427	Thrust Washer
40428	Cam
40429	Cam Rod
40430-1	Spacer
40431	Spacer
40432	Bearing Retainer
40433-1	Bearing Retainer
40434	Gear
40435	Bevel Gear
40436	Bevel Gear
40437	Bevel Gear
40438-1	Bevel Gear
40439-1	Shaft
40440	Spacer
S-2905	Plug
S-8083	Spring
S-8946	Bushing
S-8951	Bushing



ALWAYS GIVE MACHINE **SERIAL NUMBER** W



SERIAL NUMBER WHEN ORDERING PARTS

DWG. #350-A-25-B
Table Drive
G & L and Hypro Division

Part Number	Part Name
5398-A	Nut
5412-B	Cover
5419-A	Shifter Lever
5420-A	Shifter Lever
5680	Cover
5703	Shifter Lever Pin
10761-D	Cover
13427-B	Gear
13428-B	Gear
13429-A	Gear
13430-A	Bracket
13432-A	Gear
13433-A	Gear
13435	Shaft
13436-A	Gear
13437	Gear
13437-C	Gear
13438	Spacer
13440-B	Clutch
13441-B	Sleeve
13444-A	Bracket

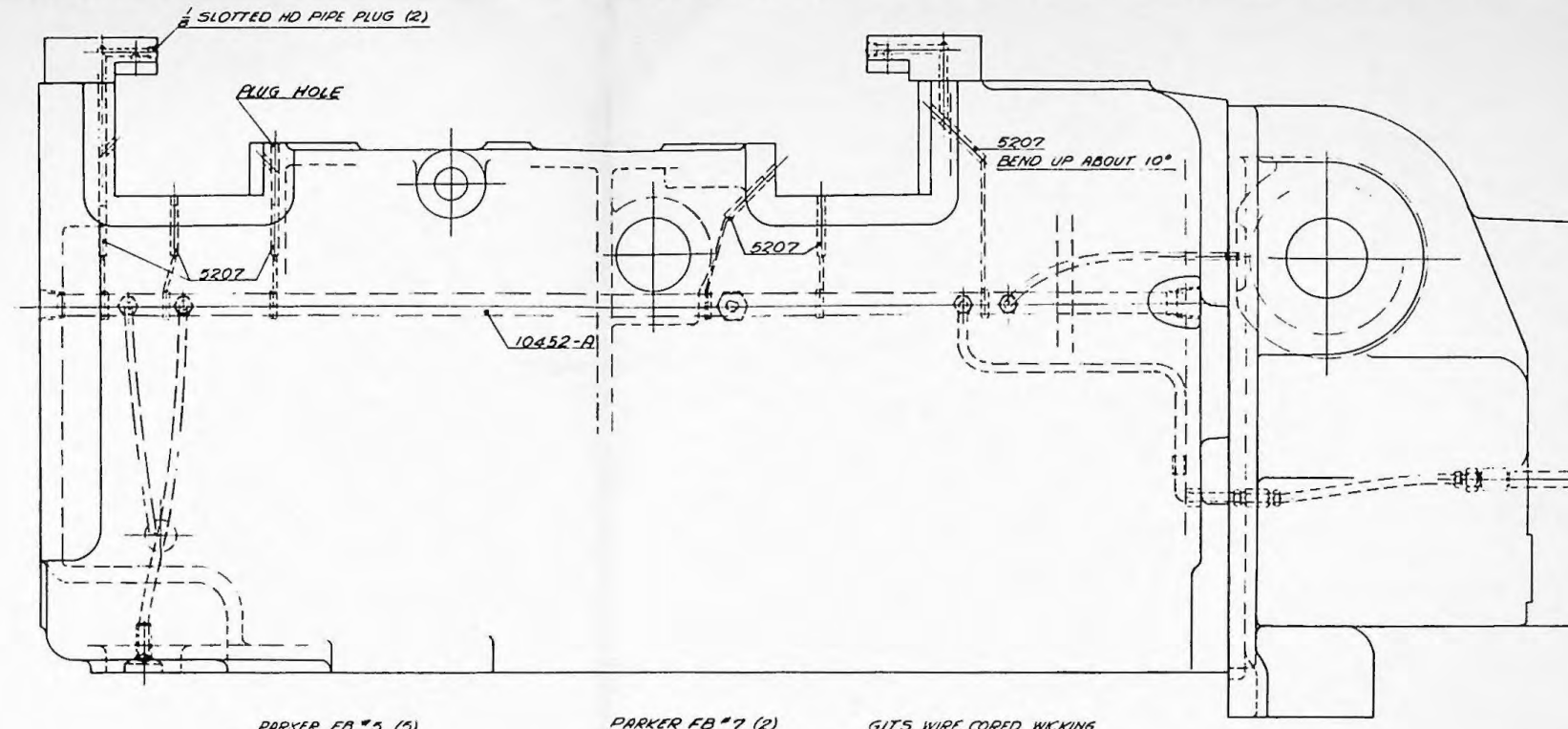
Part Number	Part Name
13446	Cover
13447	Spacer
13448	Spacer
13449	Spacer
13450-B	Shifter
13451	Pin Retainer
13458	Retaining Plate
13459	Spacer
13468	Shaft
13486	Plate
13487	Pin
13488-A	Crank
13490-A	Lever
S-2219	Round Ends Key
S-2701	Straight Pin
S-2709	Straight Pin
S-2710	Straight Pin
S-2783	Straight Pin
S-2848	Straight Pin
S-8994	Bushing

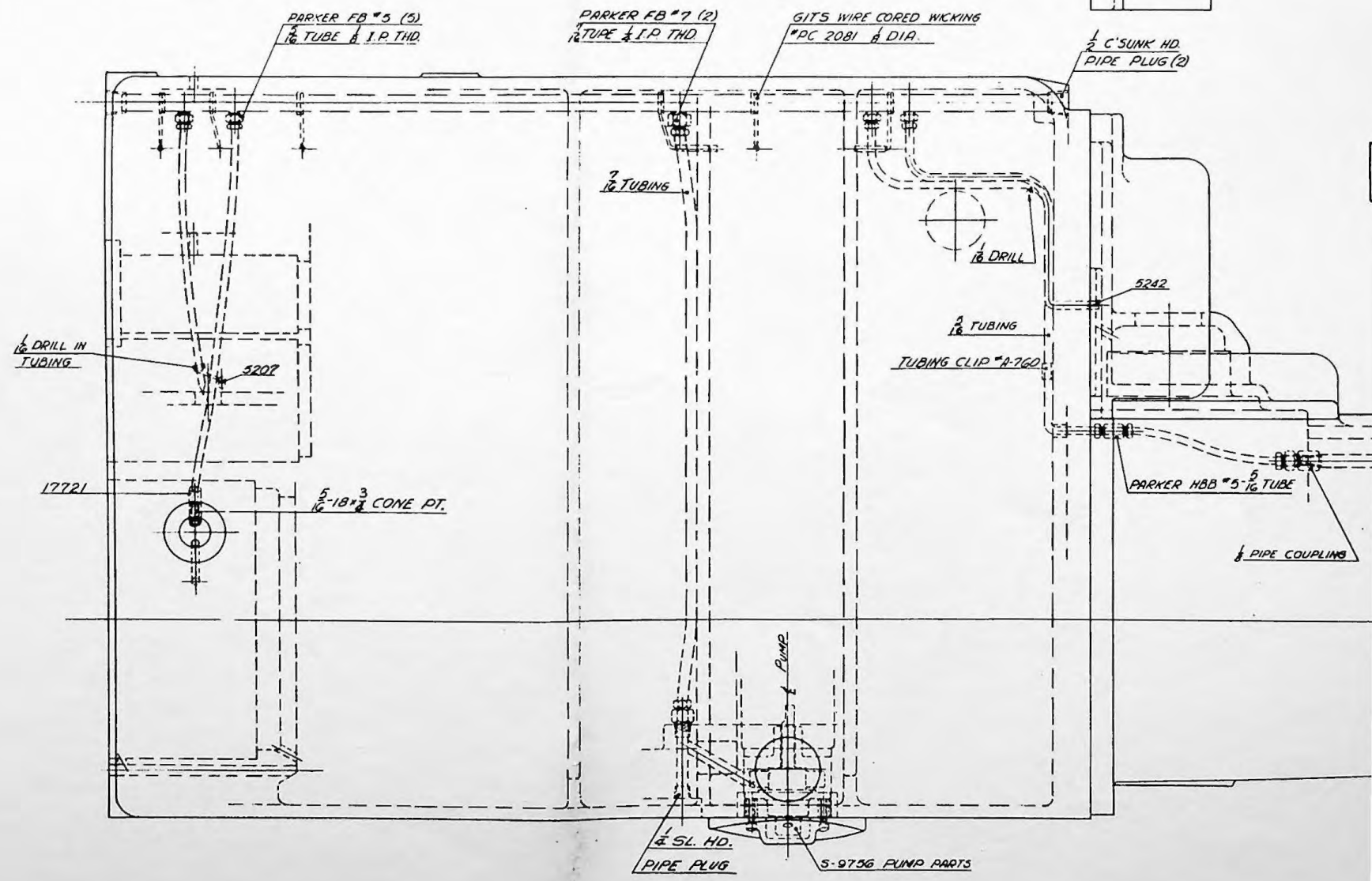
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

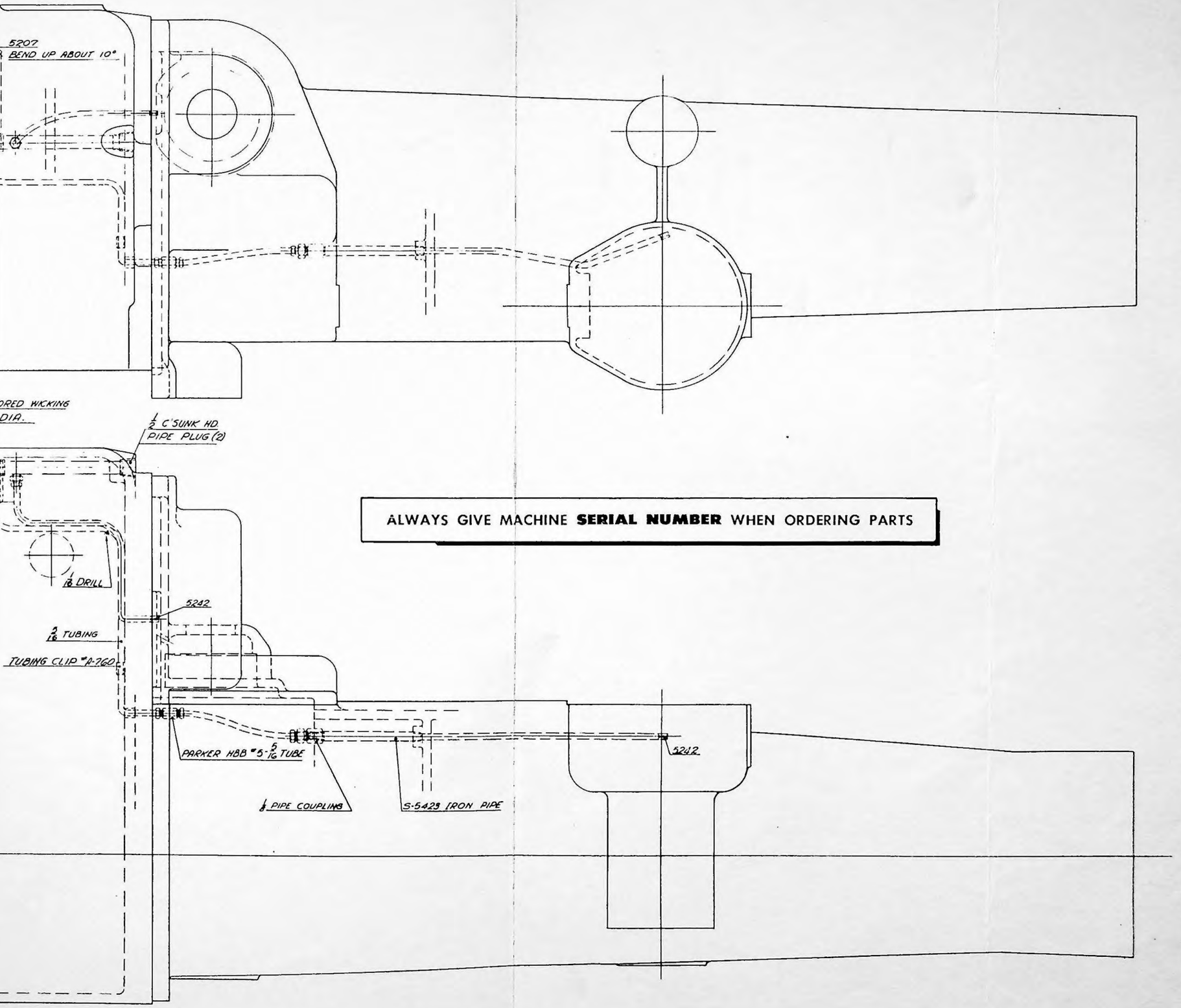
13486
5-675-$\frac{1}{4}$-20 x $\frac{1}{2}$ DR. HEX. HD. (2)
$\frac{1}{16}$ x 9 SOFT WIRE
13450-B
13487
13486-A
5-2848-$\frac{3}{8}$ x $2\frac{1}{8}$ ST. PIN
5419-A
5703
5-2 $\frac{1}{8}$ T.P.
10761-D
5412-B
5420-A
5-2701-$\frac{3}{8}$ x $1\frac{1}{2}$ ST. PIN
$\frac{3}{8}$-16 x $\frac{3}{4}$ SOC. HD. (6)
5-2 T.P.
13490-A
8 x $1\frac{1}{4}$ T.P.
$7\frac{3}{4}$
S-2783
$\frac{3}{8}$ x 1 ST. PIN (2)
$\frac{3}{8}$ x $1\frac{1}{4}$ ST. PIN
S-2709 (4)
$\frac{3}{8}$-16 x $2\frac{1}{2}$ SOC. HD (4)
(17)
$\frac{3}{8}$-16 x 1 SOC. HD.
(3)
$\frac{3}{10}$B
$\frac{3}{104}$
$2\frac{13}{16}$
13446
13458
13444-A
13459(3)
13430-A
13436-A
MRC 207 M
13428-B
10761-D
13447
13429-A
S-2219
13435
#W-05
#N-05
13439-A
J 7274
$\frac{3}{8}$-16 x $\frac{1}{8}$ DOG PT
$\frac{3}{8}$-16 x $\frac{1}{8}$ FLAT PT.
13432-A (3)
13451 (3)
$\frac{1}{2}$-20 x $\frac{3}{8}$ HEX HD
13431 (3)
S 2710
NATL. OIL SEAL # 5041
#9 x 3 T.P.
13441-B
13438
5209-F
13449
13448
209 M
5398-A
S-8994
13440-B
$\frac{5}{16}$-18 x $\frac{1}{2}$ DOG PT
$\frac{1}{16}$ x 9 SOFT IRON WIRE
13468
N09
W09
5540
13437-C
13427-B

DWG. #350-A-27
Saddle Screw Reduction
G & L and Hypro Division

Part Number	Part Name
5207	Oil Tube - Ways
5242	Oil Plug
10452-A	Oil Pipe
17721	Oil Feed Sleeve
S-5423	Oil Pipe
S-9756	Oil Pump







ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS

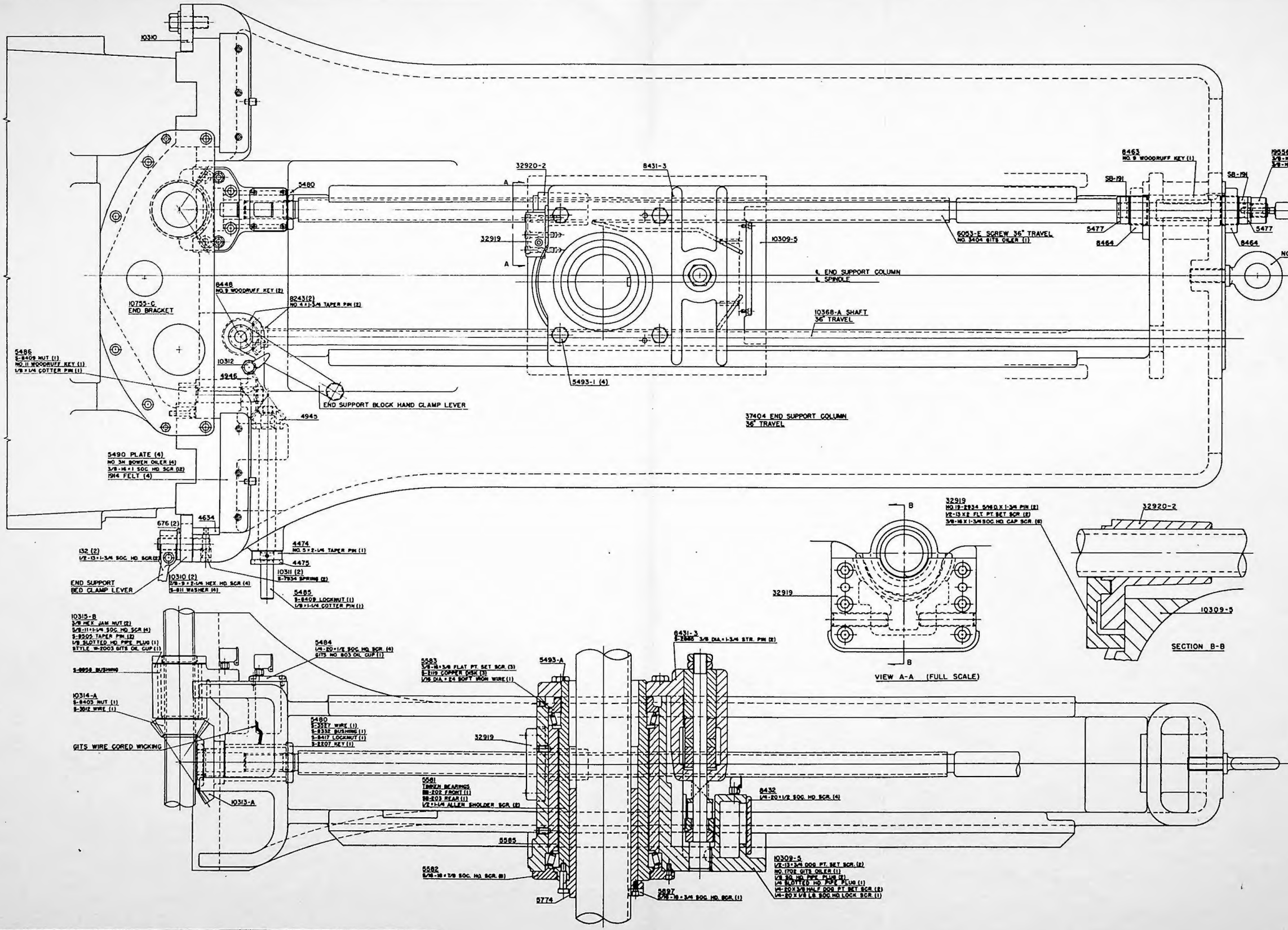
DWG. #350-A-55
Headstock - Oil Piping
G & L and Hypro Division

Parts List for DWG. #350-A-84

Anti-Friction End Support Assembly

Part Number	Part Name
132	Clamp Lever
676	Clamp Nut
1914	Wiper Felt
4474	Clutch
4475	Clutch Ring
4634	Gib
4945	Bevel Pinion
4946	Bevel Gear
5477	Bearing Cover End
5480	Socket
5484	Cover - Oil Chamber
5485	Shaft - Crank
5486	Rack Pinion
5490	Wiper Plate
5493-1	Clamp Screw
5498	Guide Block Clamp
5581	Sleeve
5582	Cover
5583	Nut
5585	Spacer
5774	Bushing
5897	Key
6053-E	End Support Screw
6918	Adj. Vernier Body
6921-1	Spacer
7622	Vernier Adj. Knob
8243	Bevel Gear
8431-3	Clamp Plate
8432	Cover
8433	Cam Bracket - Upper
8434	Cam Bracket - Lower
8435	Cam
8438	Crank
8439	Connecting Link
8440	Clamp - Drawbar
8441	Equalizer Seat
8442	Toggle
8443	Strap
8444	Toggle Sleeve
8445	Toggle Plate
8446	Clamp Pin

Part Number	Part Name
8448	Crank Shaft
8449	Equalizer
8463	Vert. Screw Adj. Sleeve
8464	Adj. Sleeve Nut
10309-5	Guide Block
10310	Base Clamp
10311	Screw - Gib Retainer
10312	Stop Stud
10313-A	Bevel Gear Driver
10314-A	Bevel Pinion Driver
10315-B	Bevel Pinion Bracket
10368-A	Shaft
10755-C	End Bracket
19556	Nut (Elev. Screw)
32919	Housing - Nut
32920-2	End Support Nut
37317	Vernier Holder
37404	End Support Column
19-2753	Pin
19-2931	Pin
19-2934	Pin
19-6003	Vernier
S-811	Washer
S-812	Washer
S-2119	Copper Disc
S-2207	Key
S-2581	Tit Key
S-2769	Pin
S-2865	Straight Pin
S-3512	Lock Wire
S-3527	Lock Wire
S-7425	Machine Handle
S-7934	Spring
S-7973	Spring
S-8332	Bushing
S-8403	Nut
S-8409	Lock Nut
S-8417	Lock Nut
S-8505	Taper Pin
S-8958	Bushing



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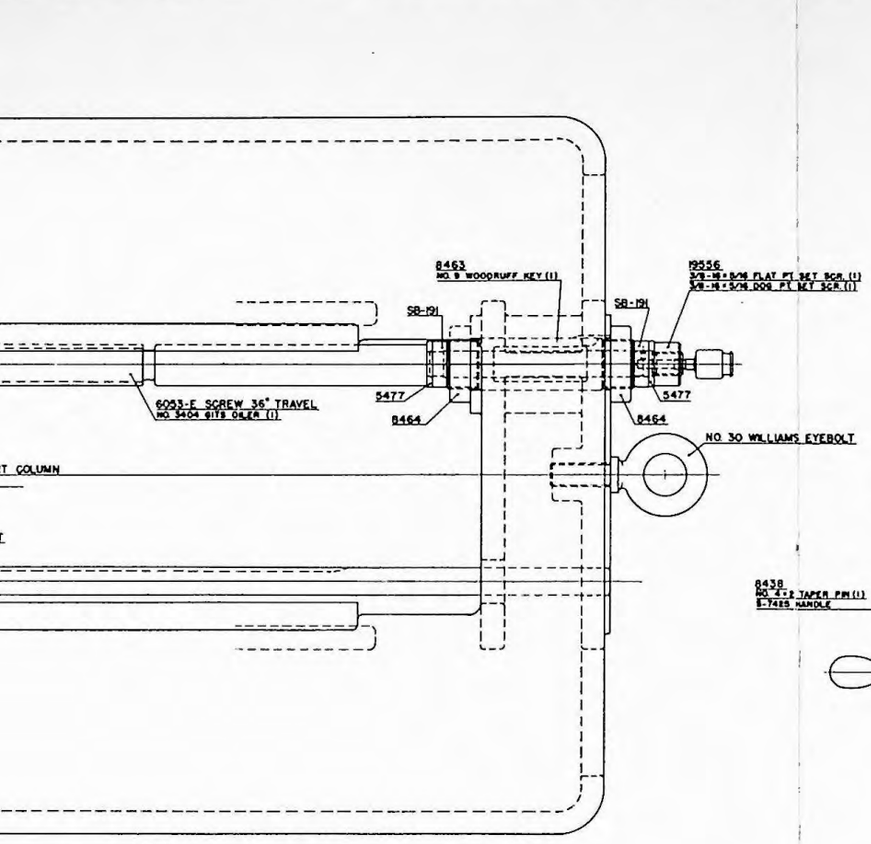
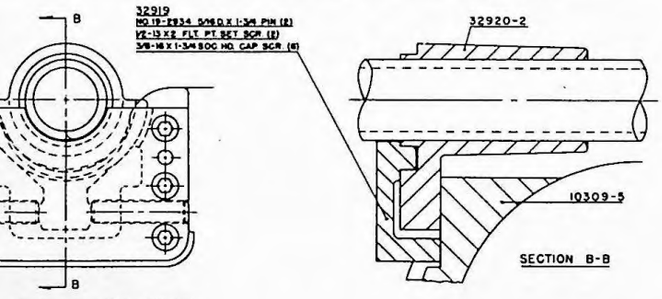
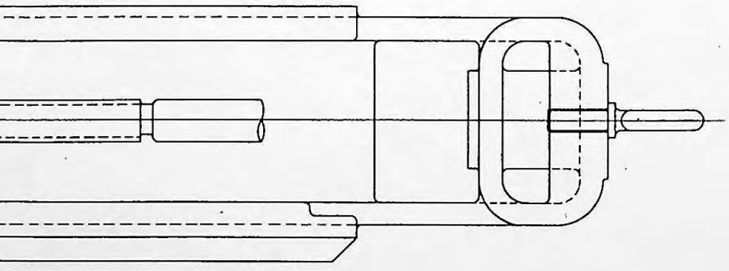
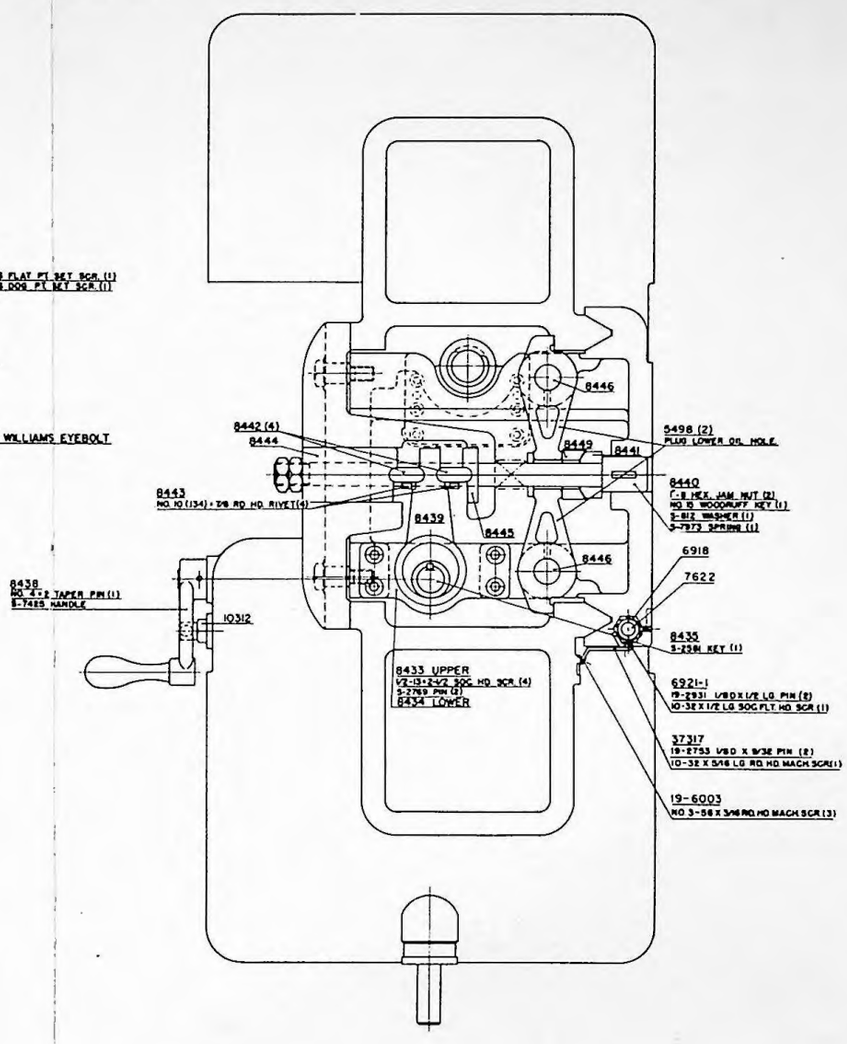
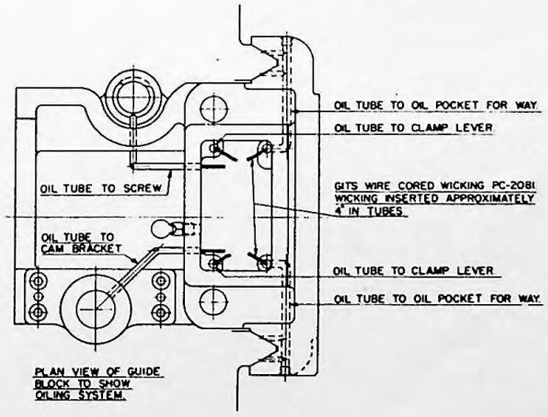






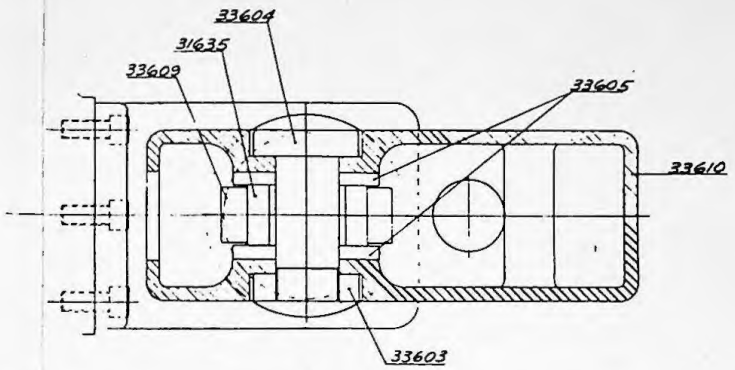


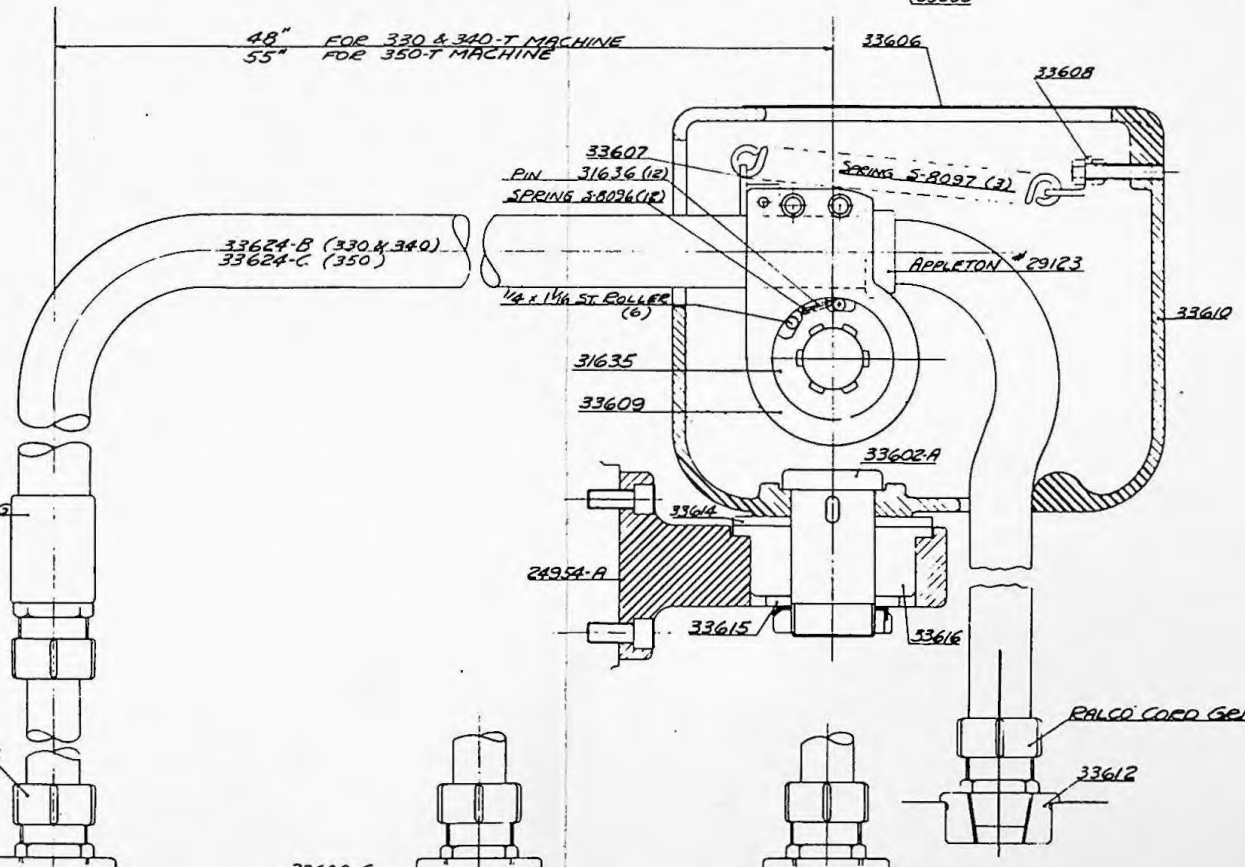


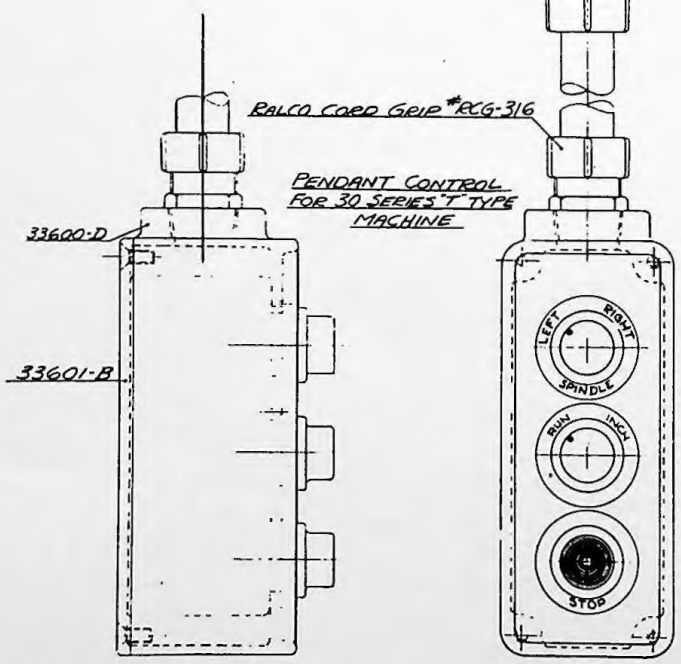
DWG. #350-A-84
Anti-Friction End Support Assembly
G & L and Hypro Division

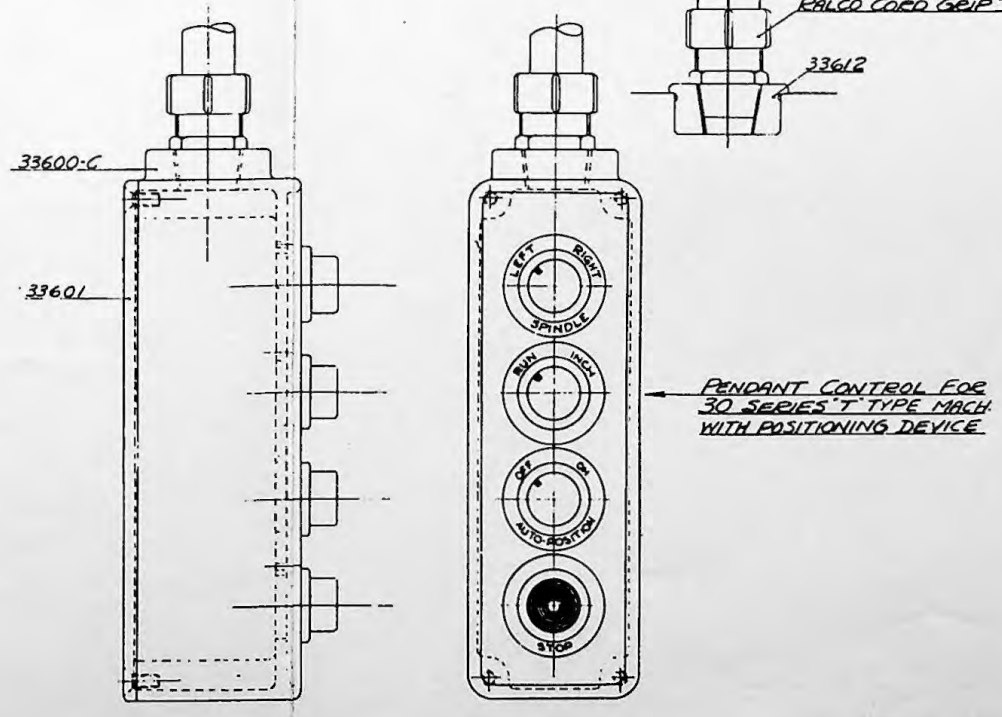
Part Number	Part Name
24954-A	Bracket
31635	Clutch Body
31636	Pin
33600-C	Control Station Panel
33600-D	Control Station Panel
33601	Cover
33601-B	Cover
33602-A	Shaft
33603	Nut
33604	Shaft
33605	Spacer
33606	Cover
33607	Spring Anchor
33608	Spring Anchor
33609	Clutch Housing
33610	Swivel Bracket
33612	Bushing
33614	Washer
33615	Washer
33616	Bushing
33624-B	Conduit
33624-C	Conduit
S-8096	Spring
S-8097	Extension Spring

ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS







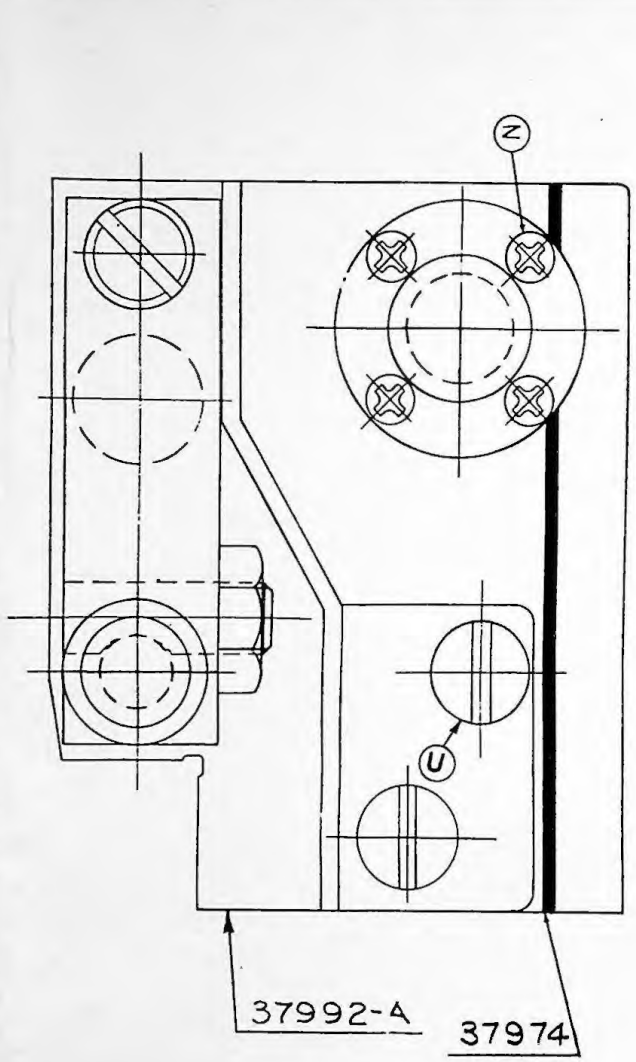


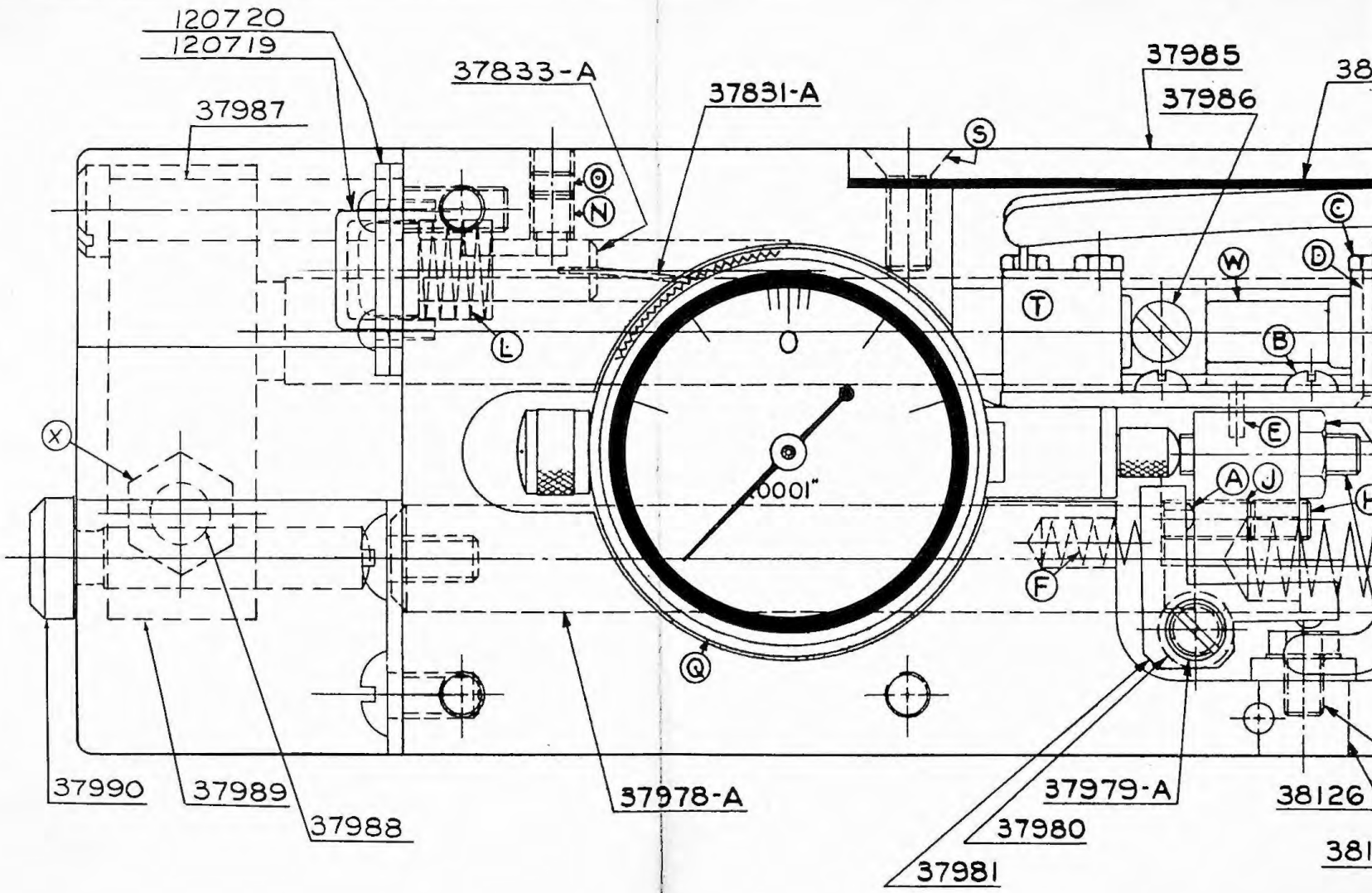
DWG. #SK-1702
Pendant Control
G & L and Hypro Division

Parts List for DWG. #SK-1736-1

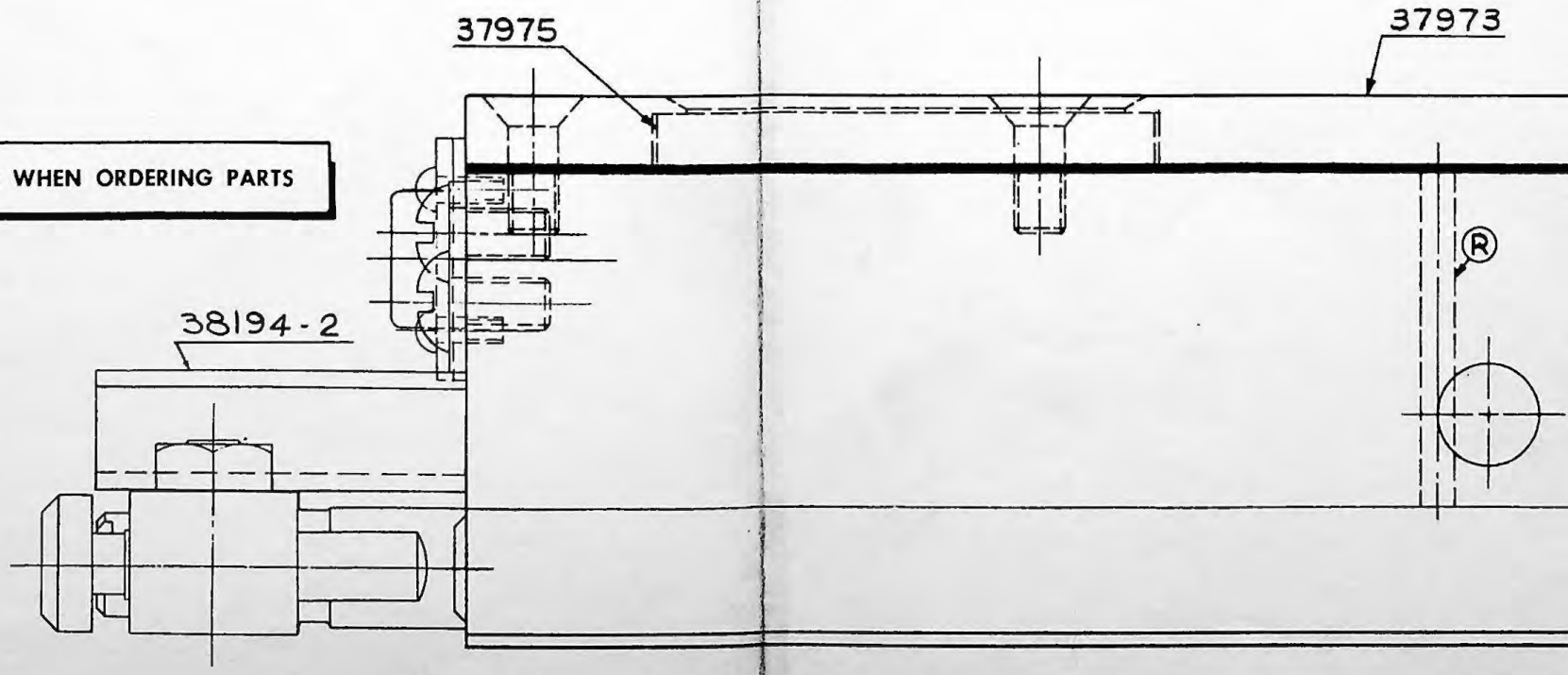
Automatic Positioning Master Switch

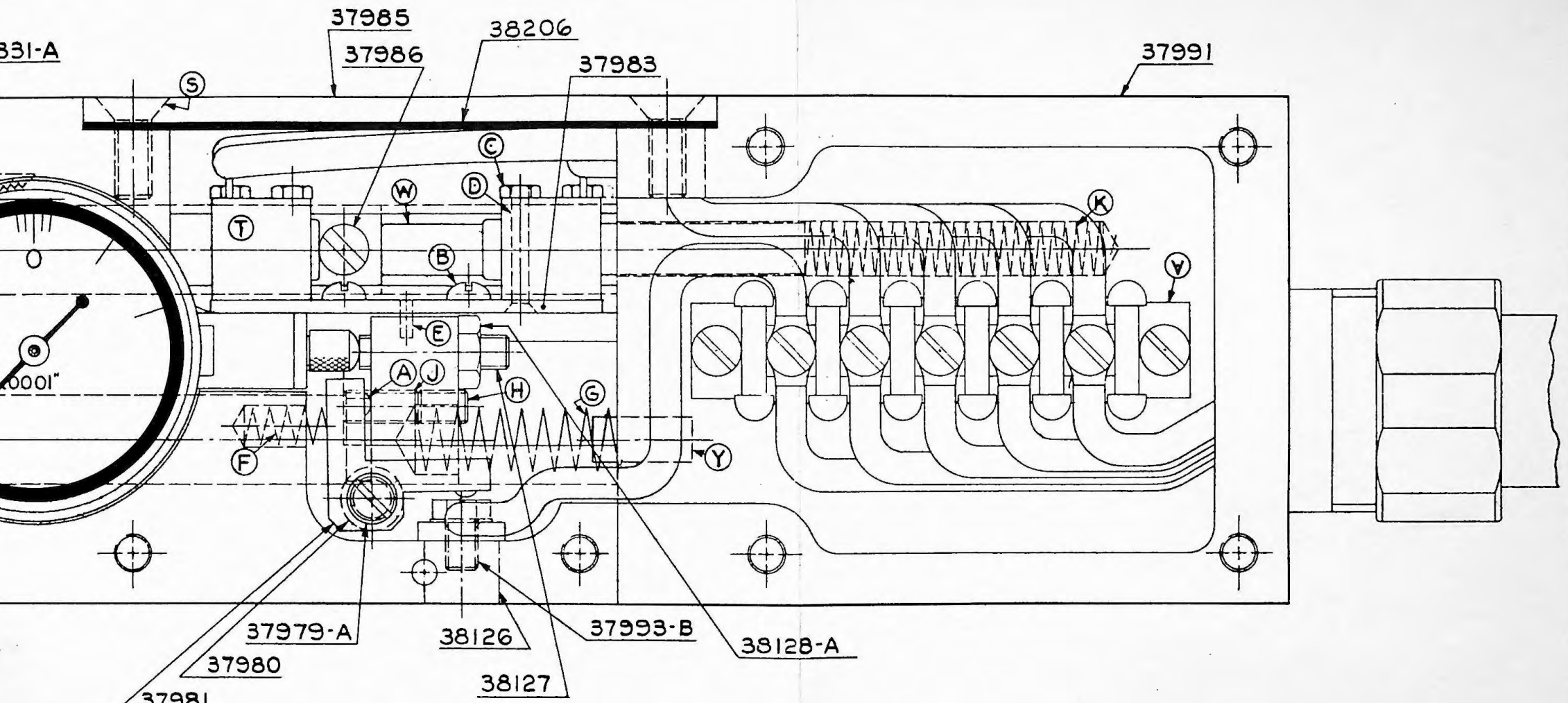
Part Number	Part Name	Part Number	Part Name
37831-A	Spring Blade	37993-B	Contact Point
37833-A	Dial Actuator	38126	Bushing
37973	Cover	38127	Adjusting Screw
37974	Gasket	38128-A	Nut
37975	Indicator Cover	38194-2	Guard
37978-A	Push Rod	38206	Gasket
37979-A	Screw Pivot Shoulder	120719	Seal - Dial Actuator
37980	Pivot Bushing	120720	Retainer - Dial Actuator Seal
37981	Pivot Arm	S-2081	Steel Ball
37983	Mounting Plate	S-2935	Straight Pin
37985	Side Cover	S-3043	Straight Pin
37986	Actuator Pin	S-3054	Straight Pin
37987	Guide Screw	S-3147	Straight Pin
37988	Adjusting Clamp	S-7961	Spring
37989	Switch Actuator	S-7988	Spring
37990	Adjusting Rod	S-7998	Spring
37991	Terminal Block Housing	S-8075	Spring
37992-A	Indicator Housing		

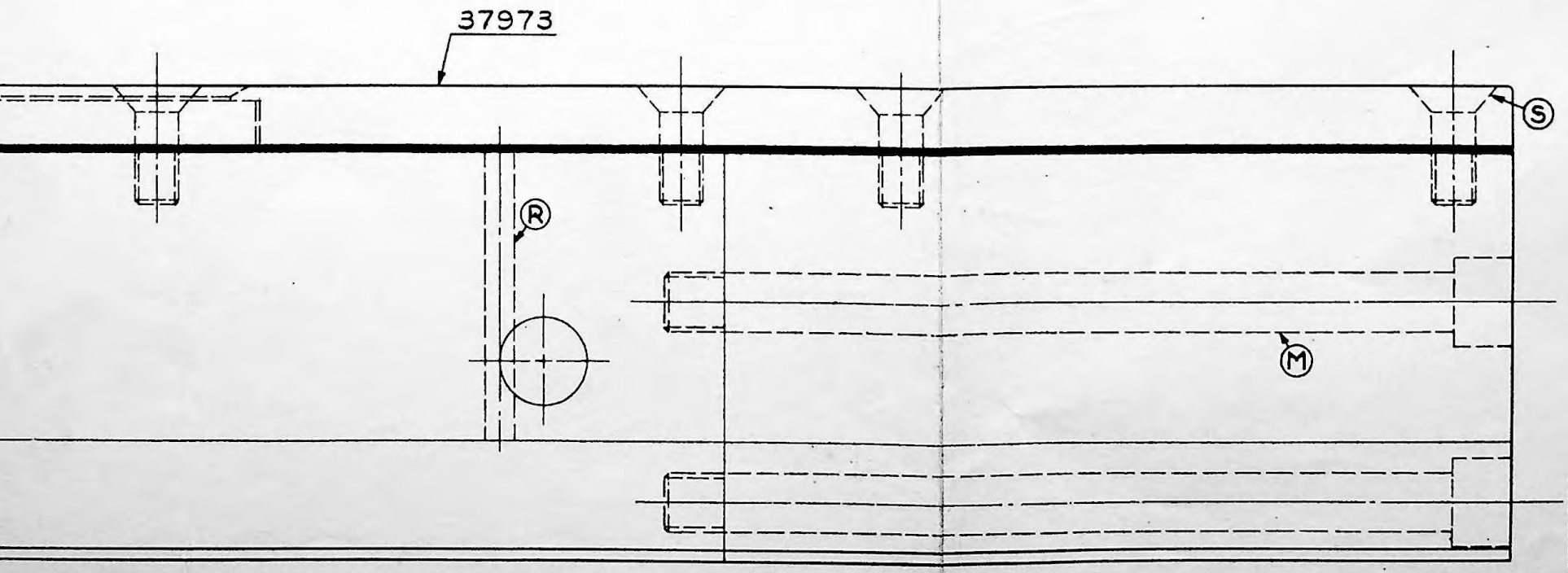




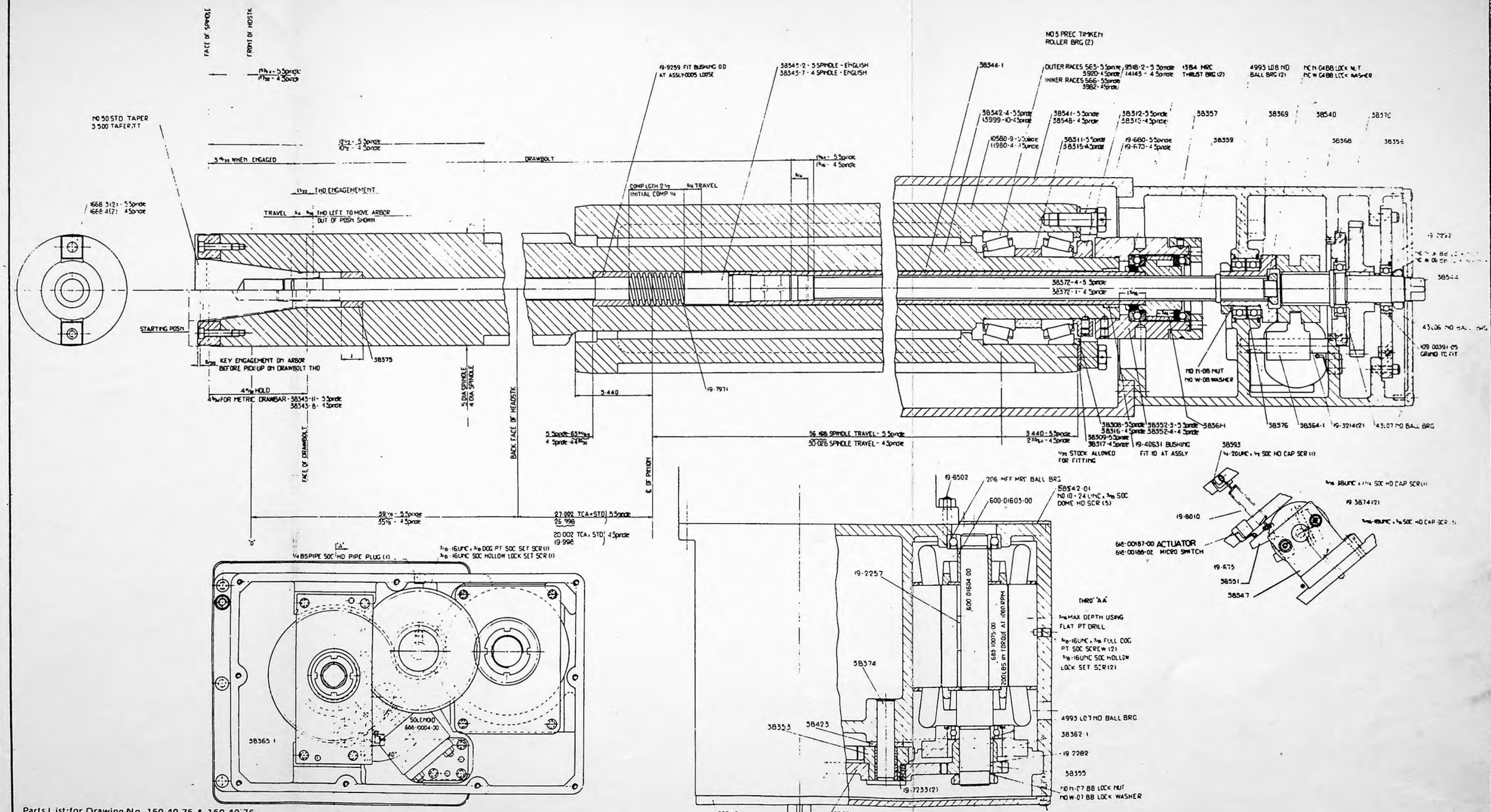
ALWAYS GIVE MACHINE **SERIAL NUMBER** WHEN ORDERING PARTS







DWG. #SK-1736-1
Automatic Positioning
Master Switch
G & L and Hypro Division



Parts List for Drawing No. 150-40-75 & 150-40-76

Power Operated Drawbolt

Part No.	Description	Part No.	Description	Part No.	Description	Part No.	Description	Part No.	Description	Part No.	Description	Part No.	Description
600-01603-00	Spacer – Motor Shaft	38318	Bearing Locknut	019-670	Drilled Hex Screw	38362-1	Cover	38359	Cover	19-8010	Spring	38378	Spacer
600-01604-00	Motor Shaft	38342-4	Spindle	19-680	Drilled Hex Screw	38364-1	Shifter	38368	Clutch Driver	19-40631	Oilite Bushing	38423	Spacer
600-01466-00	Stator – Rotor Unit – 60 c.p.s.	38344-1	Drawbolt Driver	19-850-2	Hardened Washer	38365-1	Bearing Retainer	38369	Clutch Shaft	13999-10	Spindle	38540	Motor Housing
109-00391-05	Spacer	38352-3	Spindle Nut	19-2257	Round End Key	38370	Bearing Retainer	38370	Bearing Retainer	38308	Spacer	38541	End Housing
1668-3	Key	38352-4	Spindle Nut	19-2282	Round End Key	38372-1	Shaft	38372-1	Shaft	38309	Spacer – Pre-Load – 5° Spindle Machine	38542-01	Cover
1668-4	Key	38353	Gear – 18T	19-2292	Round End Key	38372-4	Shaft	38374	Idler Shaft	38311	Spacer – Bearing – 5° Spindle Machine	38543	Cover
9518-2	Bearing Retainer	38354	Gear – 42T	19-3214	Straight Pin	38374	Idler Shaft	38376	Bushing	38312	Bearing Locknut	38544	Clutch Shaft
14143	Bearing Retainer Plate	38355	Gear – 22T	19-3874	Tapped Taper Pin	38376	Bushing	38377	Bushing	38315	Spacer – Pre-Load – 4° Spindle Machine	38547	Solenoid Bracket
10580-9	Main Ram	38356	Gear – 48T	19-7233	Bushing	38377	Bushing	38378	Spacer	38316	Spacer – Bearing – 4° Spindle Machine	38548	End Housing
11980-4	Main Ram	38357	Thrust Collar	19-7971	Compression Spring	38378	Bushing	38423	Spacer	38317	Spacer – 4° Spindle Machine	38551	Shifter Lever
								38540	Motor Housing				
								38541	End Housing				
								38542-01	Cover				
								38543	Cover				
								38544	Clutch Shaft				
								38547	Solenoid Bracket				
								38548	End Housing				
								38551	Shifter Lever				

GIDDINGS & LEWIS MACHINE TOOL COMPANY
A DIVISION OF GIDDINGS & LEWIS INC

TITLE: POWER OPERATED DRAWBOLT ARRANGEMENT

DRAWING NUMBER: 150-40-75
150-40-76