WYSONG PRESS BRAKE SERVICE INSTRUCTIONS

UNLOADING and HANDLING

Examine your new WYSONG PRESS BRAKE shipment carefully. In the event you find shipping damage, notify the carrier and file damage notices promptly.

WYSONG PRESS BRAKES have lifting holes at the top of each housing. If handled by crane, be sure a spreader bar is in the sling so the housing plates are not subject to a heavy sideward strain.

If your WYSONG PRESS BRAKE is rigges or rolled to the foundation site, attach towing cables to the skid. DO NOT ATTACH TOW LINES to the machine. WYSONG PRESS BRAKES have jack toe clearance under the housing for easier removal of skids. DO NOT REMOVE SKID UNTIL MACHINE IS AT INSTALLATION POINT!

125 SERIES and LARGER

WITH BED INSTALLED

Secure machine against tipping using block and tackle from top of machine in both the front and back. Remove skids by lifting with a crane when available. If space does not permit the use of a crane of if one is not available, use jacks of sufficient capacity and blocks, near or in front of the bed as possible, raising the machine in 2" steps each side alternately, until clearance is obtained to remove the skids. Lower in similar manner.

As soon as the skids are removed, temporily bolt the machine on its foundation before cleaning and leveling. The block and tackle should not be removed until the machine has been secured to its foundation.

WITH BED REMOVED

When a machine has a large bed it will be removed and bolted to the back if possible. After the machine has been secured to its foundation, as described above, carefully wipe off all mating surfaces. Place the bed pillows in position, wipe off the pillow tops and side plate vertical surfaces. Check the vertical surfaces of the side plates to be sure they are plumb. This may be accomplished using a vertical level or machinist combination square. Remove the bed from rear of side plates, if attached and carefully wipe off mating surfaces. Position bed in front and tighten bolts with 6 ft. length of pipe. Check to be sure there is no clearance between the bed and side plate vertical faces, using feeler gauges, check and insure the bed has properly seated on the bed pillows.

FOUNDATION

Refer to Dimensional and Foundation Drawing 50-1700 or 75-1700. Foundation bolt hole locations on this drawing are approximate. Anchor bolts should be set in pipe to allow bolt hole variations.

CLEANING

Exposed surfaces on WYSONG PRESS BRAKES are coated with a protective sludge when shipped. This protection is easily removed with ordinary solvents. CLEAN RAM WAYS AND GIBS THOROUGHLY.

LEVELING

Leveling the WYSONG PRESS BRAKE is of vital importance in the functional operation of the machine. Four steel pads and a variety of steel shims are required for the leveling. One-half inch pads and 1/8 inch to 1/4 inch shims are suggested. The pads and shims must be large enough to support both the Foot Angles (part #0112) and the Foot-the bottom corners-of the Side Plates (part #0109 and #0110). This fact should be considered when drilling the required holes in the pads and shims which are to be placed over the anchor bolts.

The first step is to level the steel pads that are placed over the anchor bolts. It's best to level only two pads at the same time. An effective method is to bridge a flat piece of metal across the pads.

Starting with the front pads, place a precision Level along the bridge. Using the shims suggested, raise and lower the bridge until level. The same method is used on both ends to level the pads from front to back. Leveling the pads will make the actual leveling of the PRESS BRAKE much easier.

Lower the PRESS BRAKE onto the pads, making sure to align the holes in the Foot Angles with the Anchor bolts. Caution should be taken not to bend the Foot Angles or Anchor bolts while lowering the machine. Jack toes are recommended to lower and raise the machine while leveling.

To level the PRESS BRAKE end to end, start by placing the precision Level along the top of the Bed Plate (part #0101-#0105). The Level should be centered on the Bed between the side plates.

Before taking a reading on the Level, allow the bubble to come to a complete rest. Raise the lower end of the PRESS BRAKE by placing extra steel shims under the Foot Angles.

To level the machine front to back, only one end of the PRESS BRAKE is leveled at a time. Place the Level across the top of the Bed Plate and parallel to the Foot Angles. Raise the lower foot of the Side Plate by placing steel shims under that Foot Angle. The same procedure is repeated on the other end.

Recheck the PRESS BRAKE end to end. Usually raising one end of the machine causes a change in the leveling. If so, repeat the previous procedures.

CAUTION!!!!!

The clearance between the Ram Guideways (part #0135 and #0116) and the Ram Brackets (part #0401 and #0402) is the single most important factor in the leveling of the PRESS BRAKE and must be checked carefully. The following procedures should be performed:

1. Starting at one end of the PRESS BRAKE, check the clearance between the front of the Ram Guideway and the Ram Bracket ty inserting a feeler gauge in the gap between the two adjacent parts.

   A reading is taken at the top of the Ram Bracket and at the bottom . (See Figure No. 1) The results have to be nearly identical. If there is a difference (more than .005"), then remove or add shims at the rear Foot Angle on that end until the clearance at the top and bottom are within the tolerance indicated.

2. Inspect the Ram Guideway clearance on the other end using the same procedure.

3. The Sides of the Ram Guideways and the Ram Brackets must be parallel within .015" on both ends of the PRESS BRAKE. This can be checked easily by removing the inside Gibs (part #0406). Readings are taken at the top and at the bottom of the Ram Brackets. A gap of 1/8 inch to 3/16 inch is normal. (See Figure No. 2)

   A. If the difference is more than the recommended tolerance between top and bottom, then the PRESS BRAKE may have been distorted during shipping. It may be necessary to loosen the Bed bolts on the end that is not within tolerance, and square the Guideway until the reading taken is nearly identical.

   B. Squaring the Ram Guideway can be accomplished by prying on the Side Plate. This is done at the front of the PRESS BRAKE through the slot of the Bed Plate. After the Ram Guide is parallel to the Ram Bracket, retighten the Bed bolts securely.

   C. Under no circumstances loosen Bed bolts untill it is necessary.

4. Before operating the PRESS BRAKE, tighten the Anchor bolts solidly against the shims and pads.

5. After a few weeks of operation, recheck and relevel PRESS BRAKE if necessary. For best operation, check leveling periodically.

LUBRICATION

WYSONG PRESS BRAKES have vital gears and bearings, and improper lubrication will greatly impede the PRESS BRAKE'S performance. Therefore, it should be understood that proper lubrication is the best insurance against breakdowns and costly repairs.

WYSONG PRESS BRAKES are equipped with either a manually operated Bijur Lubrication system (type JIA) or an automatically operated Bijur Lubrication system (type RJA). Both systems supply lubrication to the Flange Bearing segments, Pitman Bearing segments, and the Ram Guideways.

The manually operated Bijur system -- situated on the R. H. Side Plate (part #0110)--should be actuated twice daily by pushing the pump handle forward.

The Ball Seats are lubricated weekly through the grease fittings located on the Ram Brackets (part #0401 and #0402). A grease gun, which is required to oil the Ball Seats, should be activated until the oil seeps through the top of the Ball Retainer (part #0404).

Once monthly the Screws (elevation) and the Nuts (Pitman) should be lubricated by removing the Pitman Plugs (part #0306) that are placed between the Yokes of the Pitman Connections (part #0301 and #0302) and adding 1/2 pint of oil.

The R. H. and the L. H. Transmissions must be checked periodically by looking through the View Gages fitted on both Transmission Covers (part #0204 and #0205). The oil level should cover 1/2 the view gages. A 3/8 inch pipe plug, located on top of the Transmission Housings, can be removed to add oil as required.

Periodically inspect the Clutch Master Cylinder by removing the plug on top of the cylinder. The cylinder should be filled until the fluid level reaches the bottom of the hole. This should be done as required.

The Elevation Mechanism should be checked periodically by removing the 1/4 inch plug on the side of the Elevation Housing. Fill the Housing as required until the oil runs out the hole.

A few drops of lubricating oil should be placed on the Clutch Yoke Pins and the Treadle Arm Pin periodically to reduce wear.

Annually: Flush and refill the Transmission and Elevation Housings.

Blow out the lubrication lines to remove any foreigh matter that may have collected there.

CAUTION!!!!!

Before WYSONG PRESS BRAKES leave the factory, they are carefully checked and run under simulated operating conditions for several hours. However, the Pitman Bearing segments and the Flange Bearing segments are set a little tight so they will properly seat themselves during the break-in period (under normal operating conditions, about two weeks).

Activate the Bijur manually operated lubrication system more often during the break-in period. Frequently check the Pitman Bearing segments and Flange Bearing segments to see if they are heating excessively. If so, stop the machine long enough to allow them to cool. While in the break-in period, continue activation of the lubrication system frequently, and stop the PRESS BRAKE if the bearings are over-heating. If, after two weeks of normal operation, the bearing segments continue to heat, please contact the factory.

The information given in the manual on Lubrication is for a PRESS BRAKE operating under normal conditions. During excessive operation the PRESS BRAKE will require more frequent lubrication.

The table below contains the necessary information required to service WYSONG PRESS BRAKES:

TABLE 1

Part Name	Part Number	Service Period	Lubricant
Flange Bearing Segments	0114	Daily	SAE 50 wt. oil
Pitman Bearing segments	0305	Daily	SAE 50 wt. oil
Ram Guideways	0135 & 0116	Daily	SAE 50 wt. oil
Ball Seats	0405	Weekly	SAE 50 wt. oil
Screws	0307 elevation	Monthly	SAE 50 wt. oil
Nuts	0308 pitman	Monthly	SAE 50 wt. oil
R.H. Transmission	0204 housing	As Required	SAE 50 wt. oil
L.H. Transmission	0206 housing	As Required	SAE 50 wt. oil
Clutch Master cylinder	0814	As Required	H.D. brake fld.
Elevation Mechanism	0723 housing	As Required	SAE 50 wt. oil
Clutch Yoke Pins	0818	Periodically	*
Treadle Arm Pins	0824	Periodically	*

* Any type of lubrication oil is adequate.

CLUTCH and BRAKE

WYSONG PRESS BRAKES are equipped with Flex-Disc Clutch and Brake. Adjustment has been made at the factory, however, as the clutch and brake facings glaze during the first days of operation, it will be necessary to make an adjustment.

On either the clutch or brake, unlock the spider hub by depressing the lock lever. Rotating the spider slockwise will take up the clutch or brake and counter-clockwise will loosen them. Usually one or two notches of adjustment are sufficient.

The Flex-Discs and facings can be removed with very little effort. Back off the clutch or brake spider several full turns. Remove the disc mounting bolts. Turn the disc so a lining section joint is vertical. Pull down on the L. H. half and push up on the R. H. half. The disc will separate in two halves and slide out from between the pressure plates. To install a Flex-Disc, reverse the procedure.

When installing a brake or clutch Flex-Disc, adjust the spacer nuts at the mounting bolts to give .010 to .012 feeler gauge clearance between the disc lining face and the inside plate, when in the released position. Adjust the spider plate to give .010" to .012" feeler gauge clearance from the outside face of the Flex-Disc when the spider stops will clear the spider ring by 1/8" to 3/16" in the engaged position.

Tension on the brake can be increased or eased by adjusting the brake spring stud No. .0808.

An overlap of clutch and brake action or a complete separation of brake and clutch engagement can be obtained. Remove the acorn nut from the clutch end of Clutch Draw Bar No. 0820. Rotating the draw bar clockwise will separate the clutch and brake action. Counterclockwise adjustment will do the oposite. Always replace the acorn lock nut before operating.

If after adjusting or replacing the clutch or brake it is necessary to reposition the clutch treadle, do so by adjusting the turnbuckle in the linkage at the master cylinder.

RAM OR DIE SPACE ADJUSTMENT

Die space indicators and adjustment motor control buttons are located in at the right front of the ram. The adjustment mechanism is self locking, therefore, pressing the "UP" or "DOWN" buttons is all that is necessary. Safety limit switches prevent overtravel. The die space indicators or counters read directly in die space, distance bed to ram, stroke down and show this distance in thousandths. Should it ever be necessary to reset the indicators, loosen the set screws in the drive shaft sprocket. You may then rotate the sprocket on the shaft to adjust the indicator reading.

The clutch lever on the indicator panel disengages one end of the ram adjustment and one indicator. This allows tilting the ram to compensate for taper in dies or for fade-out work.

No adjustment of the gibs is necessary when tilting the ram as swivel or rocker type gib shoes are used.

STALLING ON DEAD CENTER

If greatly overloaded, it is possible to exhaust all the flywheel energy and stall the press on "DEAD CENTER". Should this occur, reverse flywheel rotation by switching power leads in the starter. Run the flywheel up to full speed in the reverse direction and engage the clutch firmly. If the flywheel tends to stall, release the clutch to allow it to gain full speed. Jam the clutch into full engagement repeatedly, until the ram releases and backs off.

DIES

Most press brake operations involve single 90° Vee bends. The customary die design for this work involves a female Vee with a width eight times material thickness. The male Vee is usually the same width but this is not mandatory. The radii preferably are not smaller than the thickness of the material.

Dies for 90° bends generally are made 88° or less to compensate for spring back material. Dies such as this do not require buttoming on or coining the work piece as they air bend and thus require less power. Bottoming dies, reduced radii and using narrower female dies can double or triple power requirements.

When airbending, regardless of material thickness being formed, the radius of the inside of the bend will be approximately 5/32 of the die opening. If the radius on the punch is equal to or smaller than stock thickness being formed (standard commercial practice), and the die opening is eight times the stock thickness, the inside bend radius will be approximately equal to the stock thickness.

Increasing or decreasing the die opening will increase or decrease the bend radius.

CAUTION!!!!!

The larger the radius and the lighter the material, the more the springback. Overbend allowance must be made in the dies to compensate. 90° dies with 90° included angle do not allow for springback.

REMOVING AND REPLACING PARTS

Removing and Replacing Bed Plate (Part #0101 - #0104)

REMOVING

Before the Bed Plate is removed from the Press Brake, the Back Gage should be taken off. The standard Back Gage is removed simply by

unscrewing the four bolts that hold the Back Gage Brackets (part #1201) to the Bed Plate. If your WYSONG PRESS BRAKE has a front operated Back Gage, information is given on replacing or installing front operated Back Gage under Optional Equipment.

Loosen the four 1" Socket Head Cap Screws (part #0159) that secure the Bed Plate to the Side Plates (part #0109 and #0110). Caution should be taken not to "strip" the socket head when loosening the Cap Screws(Bed Bolts).

Attach to the Bed Plate whenever mechanism you are going to use in lifting it from its position. The mechanism must be securely attached and able to handle the task of removing the Bed Plate or it may result in injury to some personnel. A fork lift works very well and can handle almost any job on WYSONG PRESS BRAKES that require lifting and positioning of parts.

Remove the 1" Bed Bolts. Lift the Bed Plate up slightly until it no longer sets on the Bed Pillow (part #0113). Pull the Bed Plate slowly away from the Side Plates.

REPLACING

Prior to installing the Bed Plate, clean and remove any burrs from it, the Bed Pillows, and the Side Plates. The smallest burr could prevent the Bed Plate from being bolted flush against the Side Plates or cause the Bed Plate to be out of parallel with the Ram Plate (part #0105 - #0108).

Replace the Bed Pillows on the Side Plates if they have been removed. Position the Bed Plate onto the Side Plates carefully. Insert the Bed bolts and "snug" (not tightly) the Bed Plate against the Side Plates.

Indicate the Ram Plate to see if it is parallel to the Bed Plate. If the Ram Plate has not been disturbed, and the parts do not indicate parallel, check the Bed Pillows and the slots in the Bed Plate to see if they are properly seated. If the Bed Plate is properly seated, one end of the Ram Plate must be raised or lowered until the parts are parallel.

The Guideways (part #0116 and #0135) must be checked to see if they are parallel to the Ram Brackets (part #401 and #402). The Ram Brackets and the Sides of the Ram Guideways must be parallel within .015"

Remove the inside Gibs (part #406) and with a feeler gage take a reading at the top and at the bottom of the two parts. The thickness of the gap may vary from .125" to .187, but whatever the thickness the parts must be parallel. (See Figure No. 2). If the parts are parallel to each other, tighten the Bed Bolts securely.

If the sides of the Ram Guideways and the Ram Brackets are not parallel on one end or both, the Guideway will have to be squared. Squaring the Ram Guideway can be accomplished by prying on the Side Plates through the slot in the Bed Plate. After the Ram Guideway is parallel to the Ram Bracket, tighten the Bed Bolts securely.

After the installation is complete, recheck the machine for level; and carefully check the Ram Guideway clearances as outlined in the leveling procedure. Be sure all parts are thoroughly lubricated before operating the machine.

Removing and Replacing Ram Plate

(Part #0105 - #0108)

REMOVING

Caution: Electrical equipment will have to be disconnected from the Ram Plate before it can be detached from the Press Brake. Therefore, make sure the electrical power leading to the machine has been totally shut off. All electrical equipment should be taken directly off the Ram Plate, not disconnected at some other place on the Press Brake.

Remove the front of the Ram Plate the pushbutton Face Plate (part #1005) which is held in place by round head cap screws. Disconnect the electrical wires from the pushbutton switches. Be sure to mark the wires plainly so they can be re-connected to their correct terminal screws.

The pushbutton Back-up Plate (part #1003) and the Limit Switch (part #1018) must be removed from the back of the Ram Plate. They are detached by unscrewing the cap screws which hold them in place.

Detach the Limit Switch Bar (part #1001) that is mounted on top of the Counter Housing (part #0717). Do not move the Limit Switch Collars (part #1004).

All electrical equipment and wires taken off the PRESS BRAKE should be wired or tied where they will not be damaged while the Ram Plate is being removed.

Attach to the Ram Plate whatever mechanism you are going to use in lifting it from its position. The mechanism must be securely attached and able to handle the task of removing the Ram Plate or it may result in injury to some personnel. A fork lift works very well and can handle almost any job on MERCURY PRESS BRAKES that requires lifting and positioning of parts.

Remove the Gibs (part #0406) from the Ram Brackets (part #0401 and #0402). The Gibs should be marked so they can be placed back on the same Ram Brackets.. Loosen the Way Bearing (part #0408) on the right hand Ram Bracket and remove the Guideway Bearing (part #0407).

Take out the cap screws that hold the Ball Retainers (part #0404) to the Ram Brackets. These parts hold the Ram Plate up; therefore, use all possible safety precautions. There will be Ball Retainer shims behind the Ball Retainer. One side may have more or different size shims so they must be marked to indicate which Ball Retainer they go with.

Lower the Ram Plate with the lifting mechanism until the screws (part #0307) are completely free from the Ram Brackets. Pull the Ram Plate straight out from the Guideways (part #0116 and #0135) slowly to prevent damage to them or the Ram Brackets.

REPLACING

Clean and remove any burrs on the Guideways, Ram Brackets, and the Gibs. Make sure that no dirt or other foreign matter is in the oil holes or rings in the Guideways.

With the lifting mechanism push the Ram Plate close (not touching) to the PRESS BRAKE. The Ram Plate must be centered so the Guideways will slip into the Ram Brackets.

Slowly raise the Ram Plate with the lifting mechanism until the screws slip into the Ram Brackets. Caution must be taken not to force the Screws up by lifting too high on the Ram Plate.

Replace the Ball Retainer shims. Insert the cap screws in the Ball Retainers and tighten them. You may now remove the lifting mechanism since the Ball Retainers will hold the Ram Plate up.

Push the Ram Plate back until the Ram Brackets are flush against the Guideways. Insert the Guideway bearings in the right Ram Bracket.

Replace the electrical equipment, making sure to connect all wires to their respective terminal screws. Connect the PRESS BRAKE to its source of power supply. Do not at this time attempt to operate the PRESS BRAKE. CAUTION: Be sure that the Limit Switch Collars are tight.

The Guideways must be checked to see if they are parallel to the Ram Brackets. The Ram Brackets and the Sides of the Ram Guideways must be parallel within .015". With a feeler gage take a reading at the top and at the bottom of the two parts. The thickness of the gap may vary from .125" to .187", but whatever the thickness the parts must be parallel. (See Figure No. 2)

If one end or both ends are not parallel it will be necessary to loosen the Bed Bolts and square the Guideway. Squaring the Guideway can be accomplished by prying on the Side Plates (part #0109 and #0110) through the slot on the Bed Plate (part #0101 - #0104). After the Guideways are parallel to the Ram Brackets, tighten the Bed Bolts securely.

Indicate the Ram Plate to see if it is parallel to the Bed Plate. If they are not parallel to each other, one end of the Ram Plate must be raised or lowered until they are. This will complete the installation of the Ram Plate but before operating the PRESS BRAKE:

a. Activate the Bijur lubrication system

b. Check to see if the machine is level (See Leveling)

c. Especially check the Ram Guideway clearances

PRESS BRAKE SETUP PROCEDURE

The initial setup of a mechanical press brake should begin with the ram at the bottom of the stroke. Each eccentric of the WYSONG PRESS BRAKE is marked with a center line which, when it is in a vertical position, will indicate the extremes of the stroke.

Most WYSONG PRESS BRAKES have a shut height, or die space, of 12". That is when the stroke is down and the adjustment is up there will be a 12" distance between the faces of the bed and ram. A filler block or lower die holder is usually placed on the bed to fill up part of the space. For ordinary dies the ram will be adjusted almost all the way up. This is the most desirable condition especially for heavy loads, as the unsupported section of the adjusting screws is reduced to a small amount.

With the filler block in place, but not bolted tight, the lower die is placed on the filler block in such a way that the work piece is centered between the side frames as much as possible. Tighten the die clamping set screws. The die should sit firmly on its supporting shoulders. Locate the filler block so that the die vee is centered above the slot in the bed and tighten the clamp bolts temporarily.

Adjust the ram downward so that just enough space remains for the upper die. Slide the upper die into place. Tighten the die clamp bolts securely so that the upper die will not drop out. Adjust the ram upward to free it from the lower die, and re-center the lower die by sight. Then adjust the ram downward tightly, with the ram adjusting motor and complete the final tightening of the upper die clamp bolts.

Again, adjust the ram upward to metal thickness clearance at the slopes of the die. Adjust the alignment of the filler block until the clearances are alike when the filler block is bolted securely to the bed. Check at both ends of the dies with feeler gages or strips of metal of proper thickness. This completes the alignment setup.

The ram must now be adjusted to produce an acceptable part. This may require a different setting on one end from the other, to compensate

for total errors in dies, and differences that may occur in wear on machine parts and dies. It will often be necessary to shim the dies to correct for machine deflections. When loads are heavy enough to deflect the bed, it will result in the ends of the work piece not bending at as much of an angle as the center. To correct this condition the dies will need thicker shims at the center, tapering to thinner shims near the ends. This is usually done by using multiple strips of very thin metal (or paper) starting with a long strip, then centering successively shorter ones on top of the long one.

A definite change in angle will be noted if the ram adjustment is changed only a few thousandths of an inch. In like manner shims must be only a few thousandths of an inch in thickness. Secondly, the "tapering" procedure is also important in obtaining a satisfactory result.

When a satisfactory set up has been made, all information, such as dies used, filler block used, ram indicator readings (at both ends if they are not alike), gage setting dimensions, shims (if any), and other notes which would help repeat the job with a minimum of setup time should be recorded.

REMEMBER, WHEN SETTING UP DIES:

Bring the ram to the bottom of the stroke.

Remove foot pedal so clutch will not be operated accidentally.

Change die height only with a motorized ram adjustment.

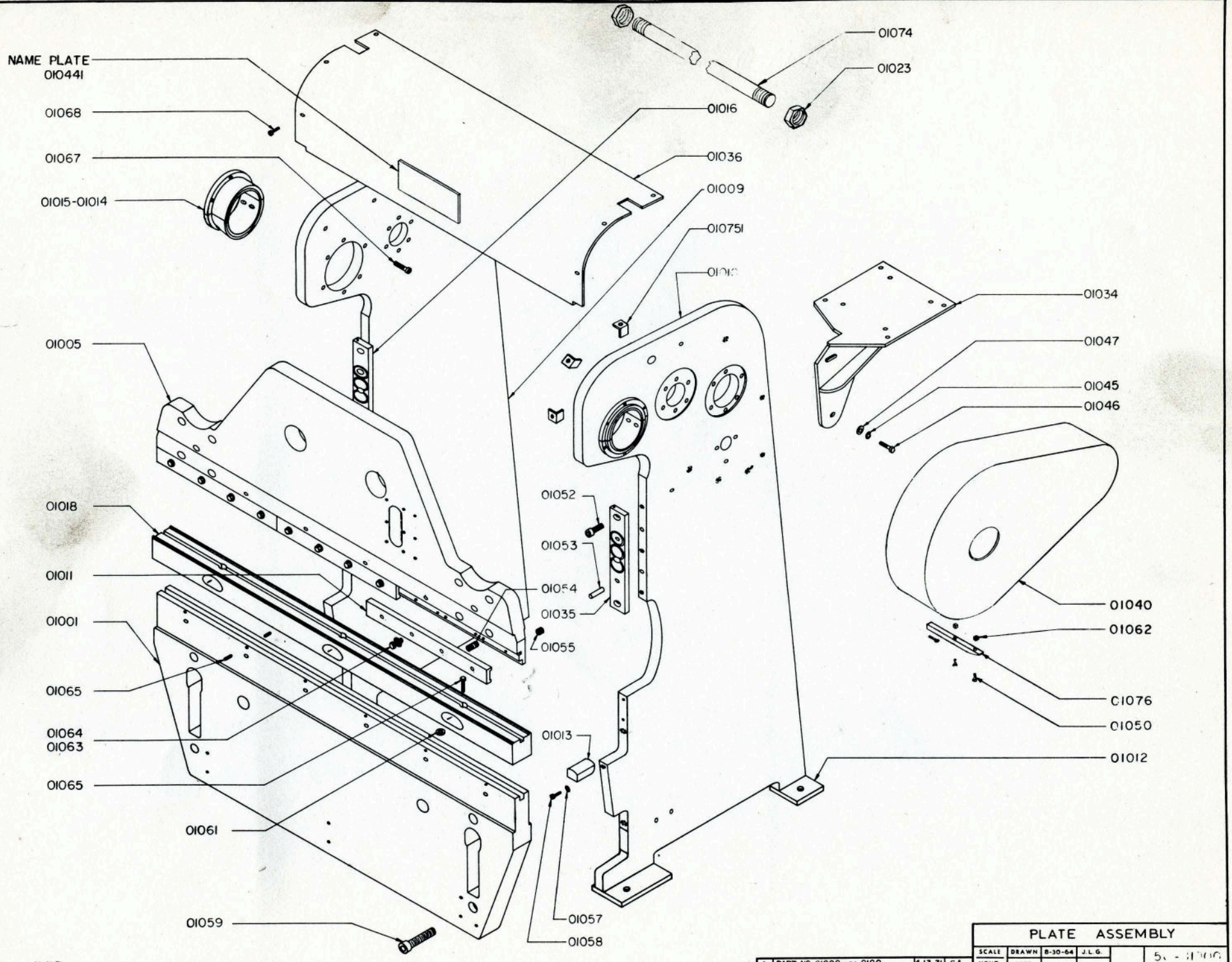

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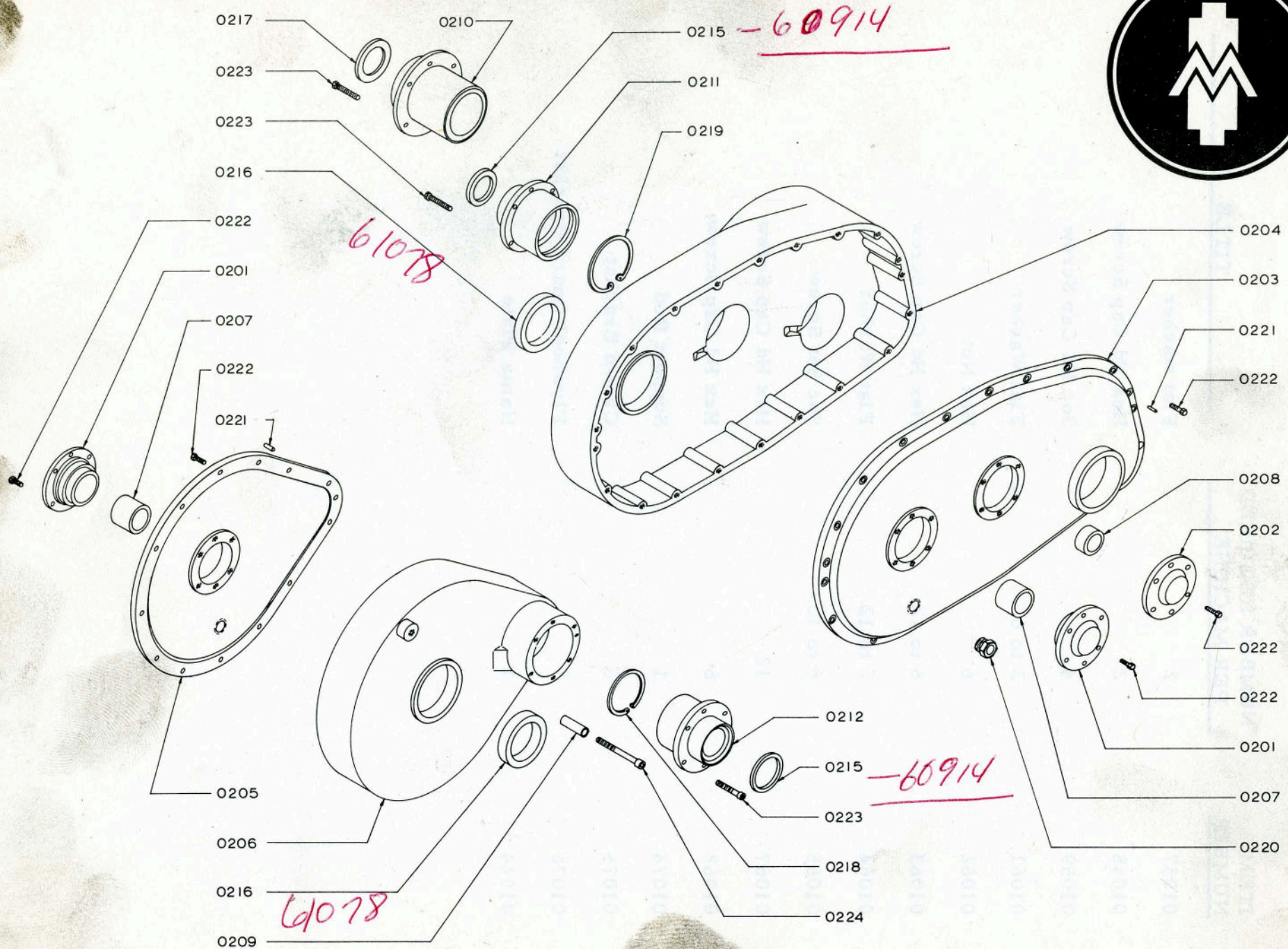
PLATE ASSEMBLY

SCALE	DRAWN	8-30-64	J.L.G.	5 - 31006
NONE	APPR.			

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
01057	2	Flat washer
01058	2	Hex Hd Cap Screw
01059	4	Soc Hd Cap Screw
01061	3 to 6	Flat Washer
01062	6	Hex Nut
01063	6 to 12	Hex Hd Cap Screw
01064	6 to 12	Flat Washer
01065	6 to 12	Soc Set Screw
01067	12	Hex Hd Cap Screw
01068	6	Hex Hd Cap Screw
01074	1	Support Rod
01075	6	Crown Bracket
01076	3	Flywheel Guard Bracket
01044	1	Name Plate



TRANSMISSION HOUSING ASSEMBLIES

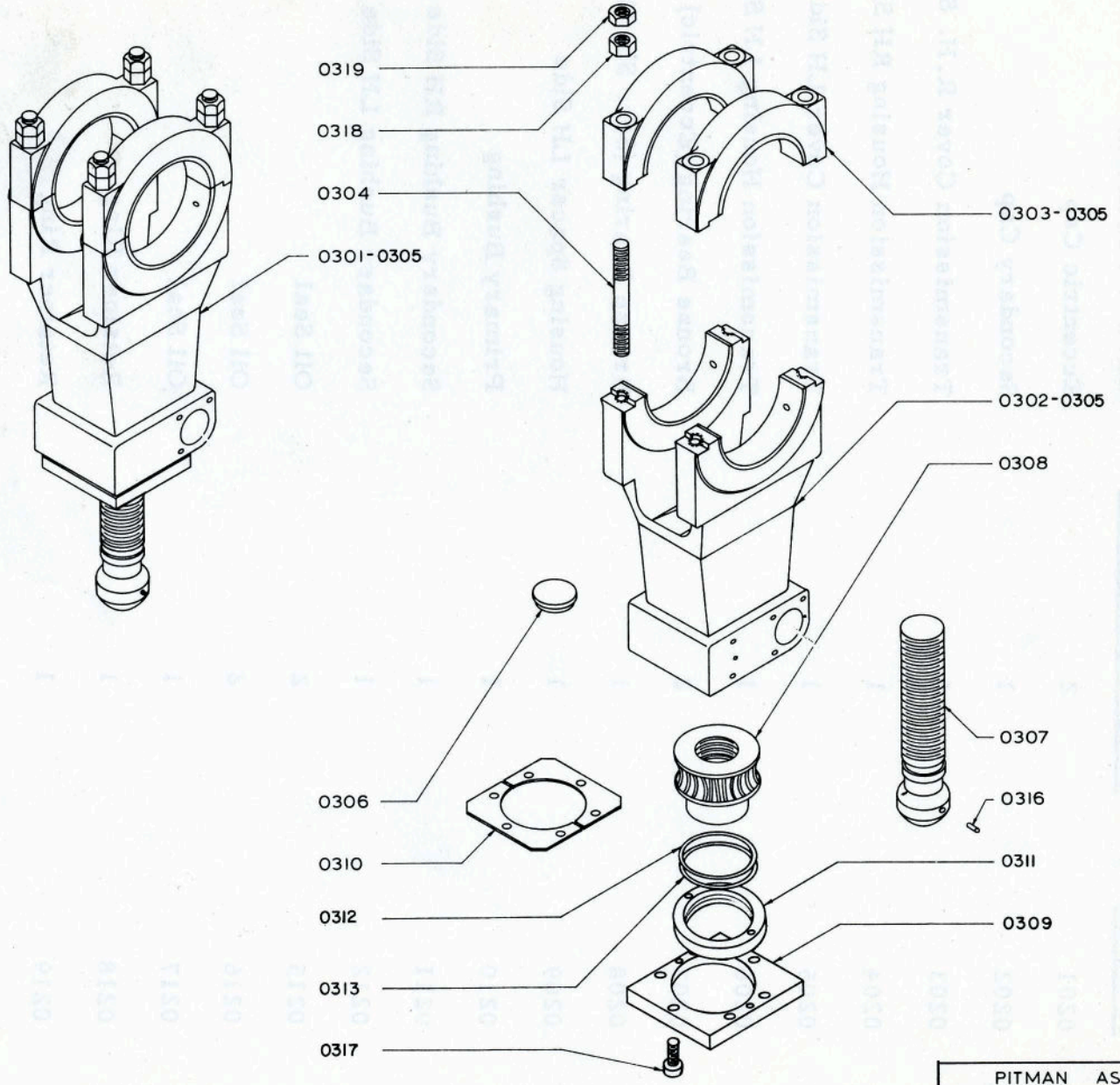
SCALE	DRAWN	4-7-64	J. L. G.	50-0200
NONE	APPR.			

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0201	2	Eccentric Cap
0202	1	Secondary Cap
0203	1	Transmission Cover R.H. Side
0204	1	Transmission Housing RH Side
0205	1	Transmission Cover LH Side
0206	1	Transmission Housing LH Side
0207	2	Bronze Bearing (Eccentric)
0208	1	Bronze Bearing (Sec. Shaft)
0209	1	Housing Spacer LH Side
0210	1	Primary Bushing
0211	1	Secondary Bushing RH Side
0212	1	Secondary Bushing LH Side
0215	2	Oil Seal
0216	2	Oil Seal
0217	1	Oil Seal
0218	1	Retainer Ring
0219	1	Retainer Ring
0220	2	View Gage
0221	4	Dowel Pin
0222	50	Hex Hd. Cap Screw
0223	18	Soc. Hd. Cap Screw
0224	1	Soc. Hd. Cap Screw

COMPLETE PITMAN CASTING
ASSEMBLY CONSISTS OF:

(1) 0302-0305 R.H OR 0301-0305 L.H
(2) 0303-0305
(4) 0304
(4) 0318
(4) 0319

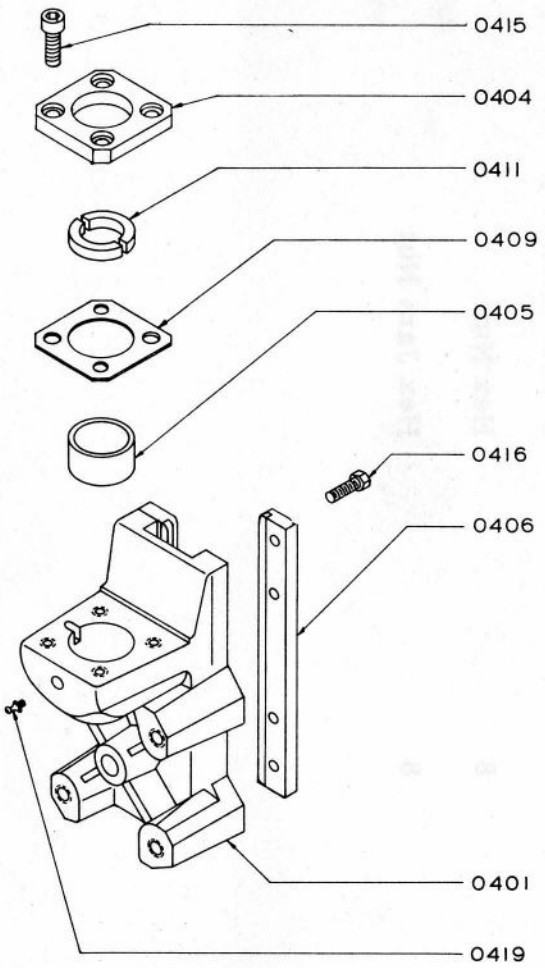


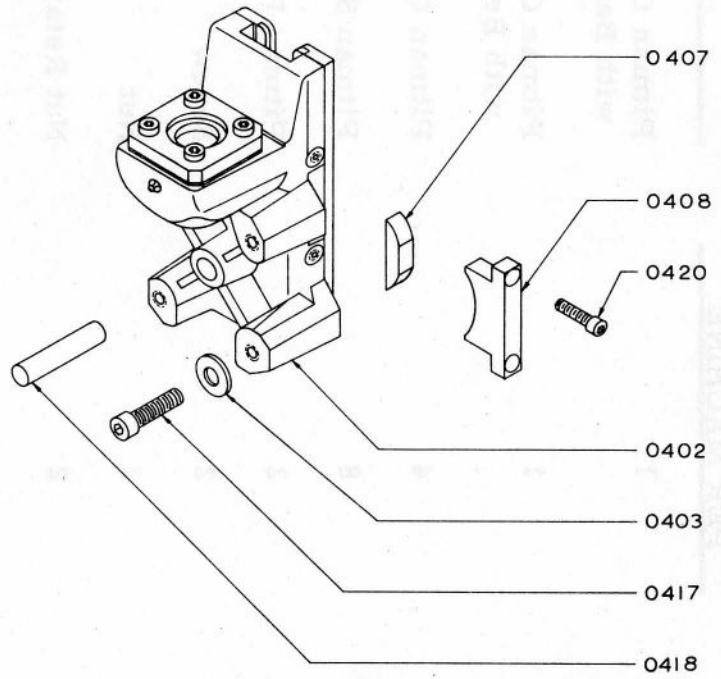
PITMAN ASSEMBLIES

SCALE	DRAWN	9-14-67	P.L.H.	50-0300
NONE	APPR.			

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0301-0305	1	Pitman Connection LH Side with Bearing Segment
0302-0305	1	Pitman Connection RH Side with Bearing Segment
0303-0305	4	Pitman Cap with Bearing Segment
0304	8	Pitman Stud
0306	2	Pitman Plug
0307	2	Screw
0308	2	Nut
0309	2	Nut Retainer
0310	2	Nut Retainer Shim
0312	2	O-Ring
0313	2	O-Ring
0316	2	Dowel Pin
0317	10	Socket Head Cap Screw
0318	8	Hex Nut
0319	8	Hex Jam Nut





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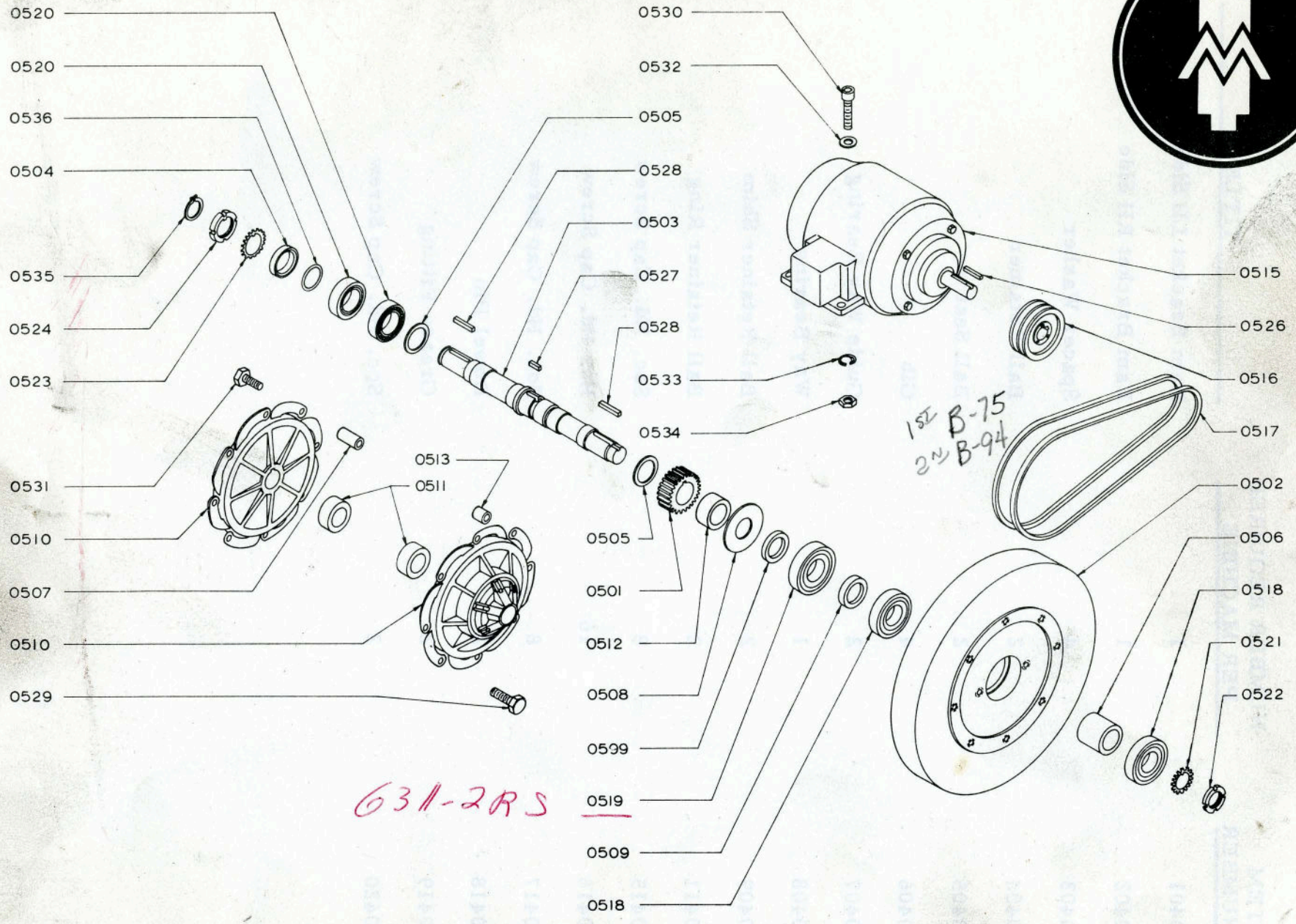
RAM BRACKET ASSEMBLIES

SCALE	DRAWN	8-8-64	J.L.G.		50-0400
NONE	APPR				

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0401	1	Ram Bracket LH Side
0402	1	Ram Bracket RH Side
0403	4	Spacer Washer
0404	2	Ball Retainer
0405	2	Ball Seat
0406	4	Gib
0407	2	Guide Way Bearing
0408	1	Way Bearing
0409	2	Ball Retainer Shim
0411	2	Ball Retainer Ring
0415	8	Soc. Hd. Cap Screw
0416	16	Hex Hd. Cap Screw
0417	8	Soc. Hd. Cap Screw
0418	2	Dowel Pin
0419	2	Grease Fitting
0420	2	Soc. Hd. Cap Screw



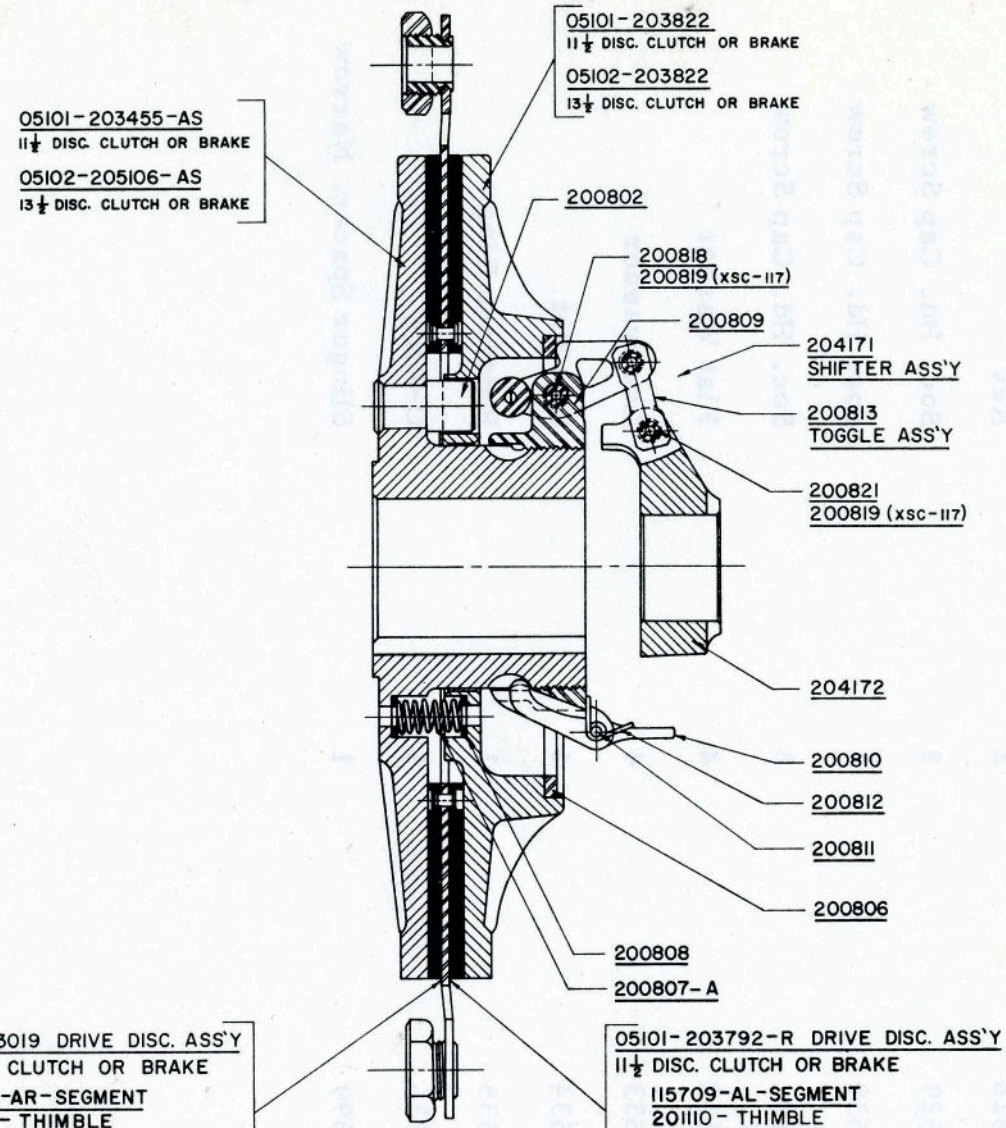
PRIMARY SHAFT ASSEMBLY

SCALE	DRAWN	4-14-64	J.L.G.	50-0500
NONE	APPR.			

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0501	1	Primary Pinion
0502	1	Flywheel
0503	1	Primary Shaft
0504	1	Primary Spacer
0505	3	Central Spacer
0506	1	Flywheel Spacer
0507	8	Brake Spacer
0508	1	Slinger Disc
0509	1	Slinger Spacer
0510	2	Disc Clutch and/or Brake 5000 or 6500 Series (2) 05101 8000 Series (1) 05102 (Clutch) (1) 05101 (Brake) 10,000 Series (2) 05102 (see separate drawing for parts)
0511	2	Primary Clutch Spacer
0512	1	Primary Pinion Spacer
0513	8	Clutch Spacer
0515	1	Drive Motor
0516	1	Taper - Lock Sheave
0517	2 or 3	V-Belt
0518	2	Single Row Ball Bearing
0519	1	Single Row Ball Bearing
0520	2	Tapered Roller Bearing
0521	1	Lock Washer
0522	1	Locknut

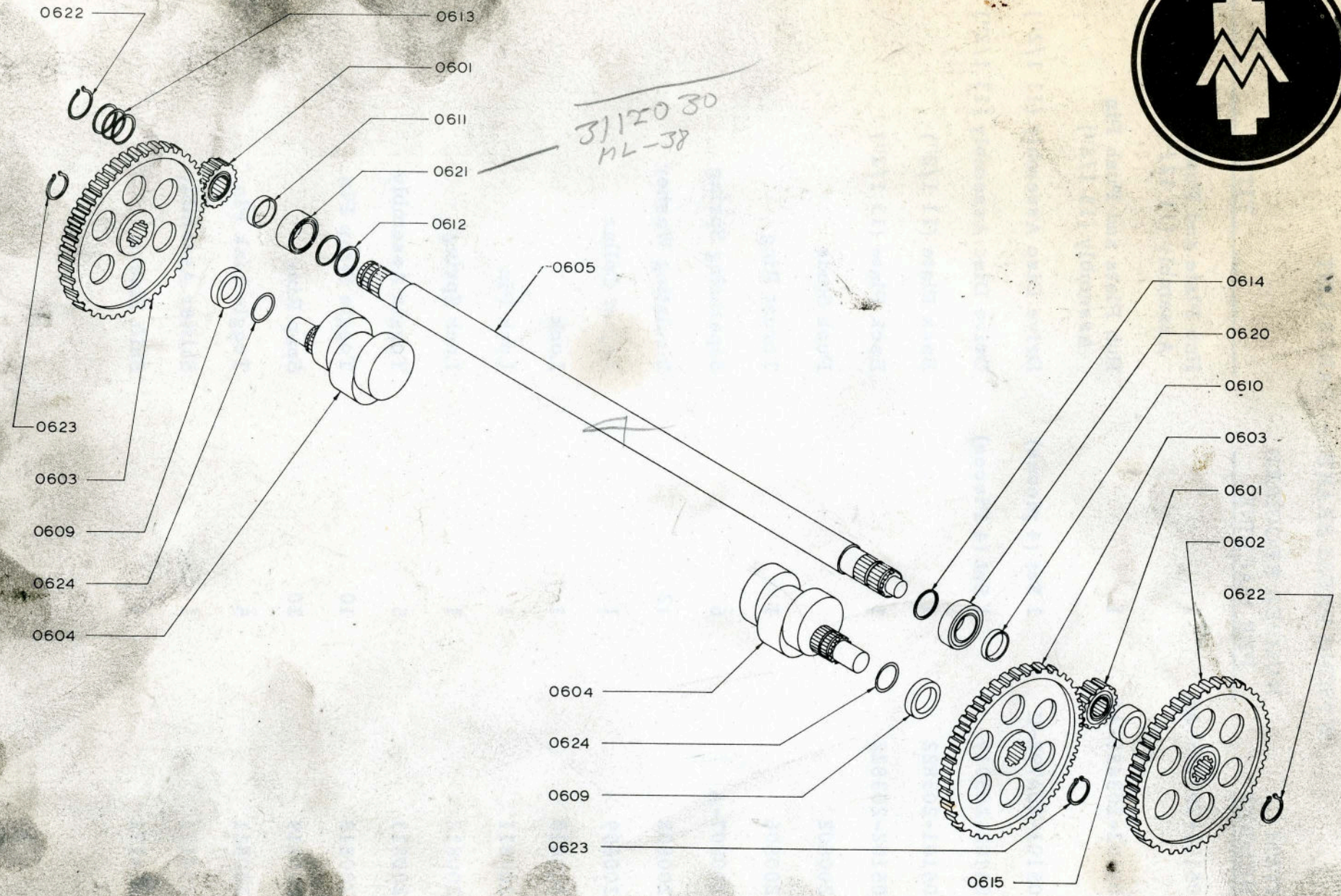
ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0523	1	Lock Washer
0524	1	Locknut
0526	1	Key
0527	1	Key
0528	2	Key
0529	8	Soc. Hd. Cap Screw
0530	4	Soc. Hd. Cap Screw
0531	8	Soc. Hd. Cap Screw
0532	4	Flat Washer
0533	4	Lockwasher
0534	4	Hex Nut
0535	1	Retainer Ring
0536	1	O-Ring
0599	1	Slinger Spacer, Narrow



DISC. CLUTCH AND/OR BRAKE					
SCALE	DRAWN	12-19-62	P.L.H.		05101
NONE	APPR.				05102

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
05101-203455-AS	1	Hub Plate and Push Pin Assembly (11 12/"
05102-203455-AS	1	Hub Plate and Push Pin Assembly (13 1/2")
05101-203792-R	1 Set (4 pieces)	Drive Disc Assembly (11 1/2")
05102-203019	1 Set (4 Pieces)	Drive Disc Assembly (13 1/2")
05101-203822	1	Back Plate (11 1/2")
05102-203822	1	Back Plate (13 1/2")
200802		Push Studs
200806	1	Thrust Ring
200807-A	6	Separating Spring
200808	12	Insulating Washer
200809	1	Adjust Collar
200810	1	Lock
200811	1	Lock Pin
200812	1	Lock Spring
200813	5	Toggle Assembly
200818	10	Toggle Strap Pin
200819	20	Snap Ring
200821	5	Toggle Link Pin
204171	1	Shifter Assembly
204172	1	Shift Sleeve



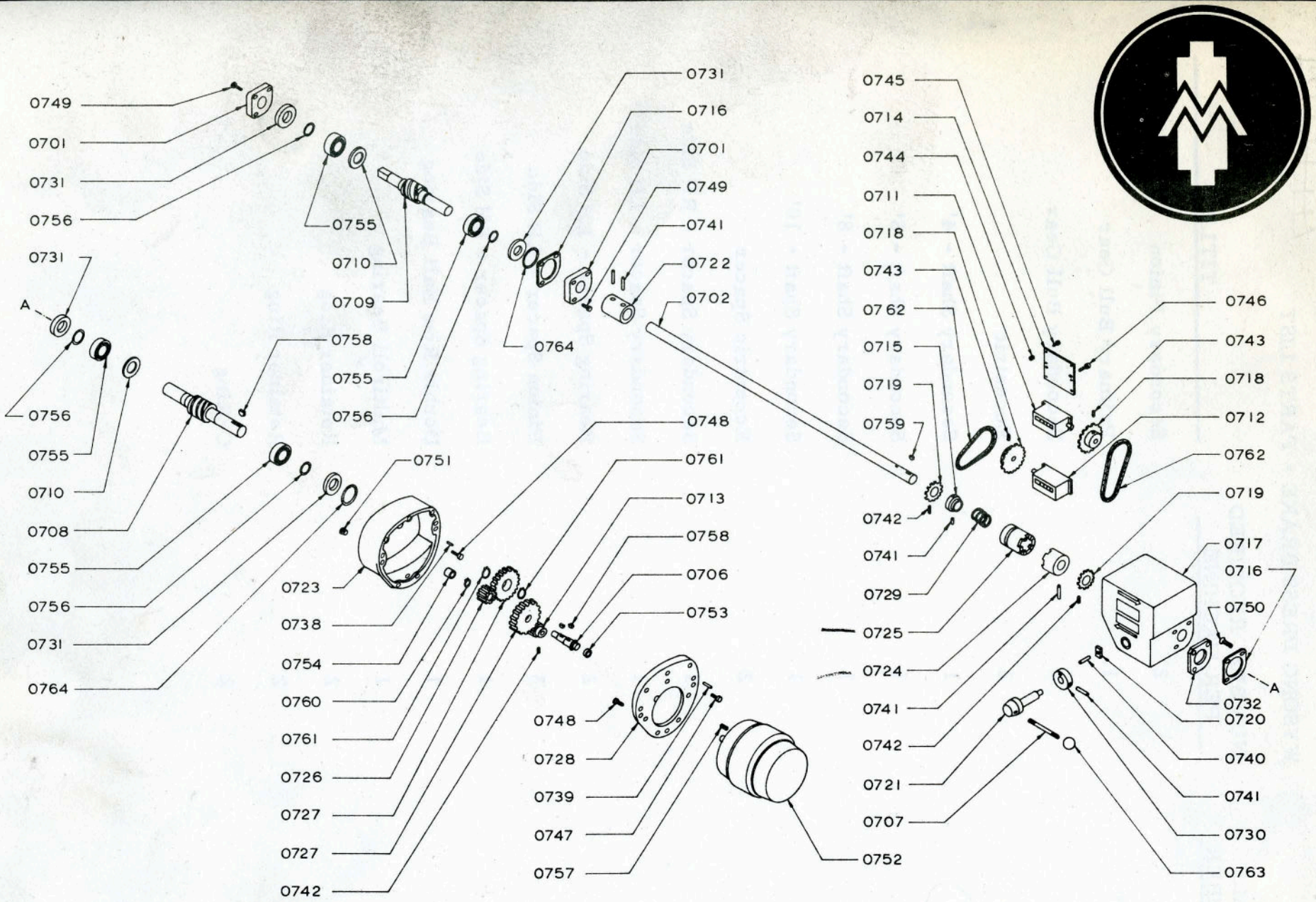
31120 30
ML-38

SECONDARY SHAFT ASSEMBLY

SCALE	DRAWN	4-20-64	J.L.G.	50-0600
NONE	APPR.			

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0601	2	Secondary Pinion
0602	1	Primary Bull Gear
0603	2	Secondary Bull Gear
0604	2	Eccentric
0605	1	Secondary Shaft - 4'
0606	1	Secondary Shaft - 6'
0607	1	Secondary Shaft - 8'
0608	1	Secondary Shaft - 10'
0609	2	Eccentric Spacer
0610	1	Secondary Spacer - RH Side
0611	1	Secondary Spacer - LH Side
0612	2	Bearing Spacer - LH Side
0613	3	Pinion Spacer - LH Side
0614	1	Bearing Spacer - RH Side
0620	1	Double Row Ball Bearing
0621	1	Multiroll Bearing
0622	2	Retainer Ring
0623	2	Retainer Ring
0624	2	O-Ring



RAM ELEVATION MECHANISM

SCALE	DRAWN	4-29-64	J.L.G.
NONE	APPR.		

50-0700

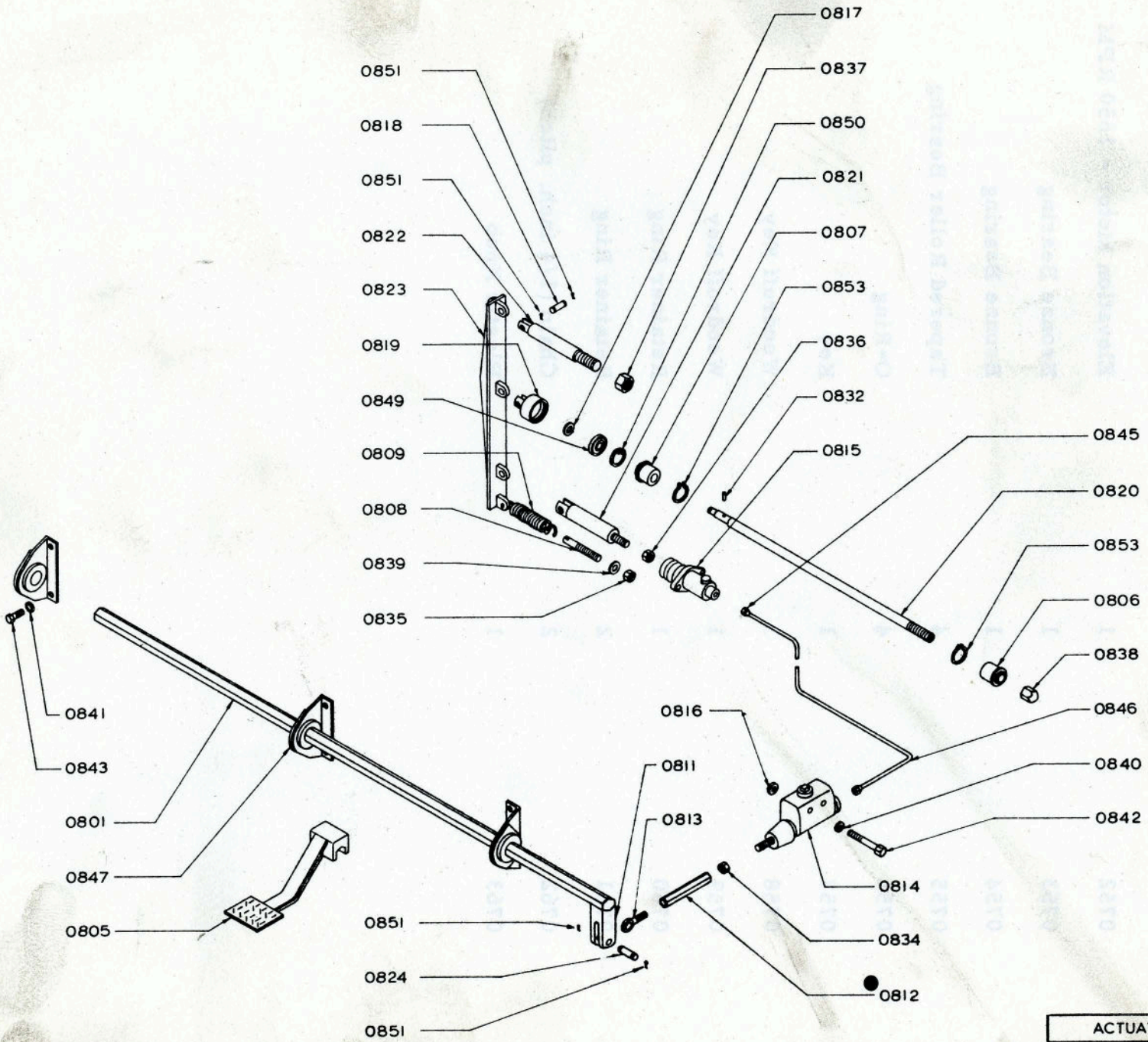
ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0701	2	Worm Retainer
0702	1	Elevation Shaft 4'
0703	1	Elevation Shaft 6'
0704	1	Elevation Shaft 8'
0705	1	Elevation Shaft 10'
0706	1	Stub Shaft
0707	1	Clutch Handle
0708	1	Worm Shaft - RH Side
0709	1	Worm Shaft - LH Side
0710	2	Spacer Washer
0711	1	Counter - RH Side
0712	1	Counter - LH Side
0713	1	Elevation Motor Pinion
0714	1	Counter Mounting Plate
0715	1	Counter Clutch Spacer
0716	2	Worm Retainer Shim
0717	1	Counter Housing
0718	2	Counter Sprocket
0719	2	Shaft Sprocket
0720	1	Clutch Shoe
0721	1	Elevation Actuator Shaft
0722	1	Worm Sleeve - LH Side
0723	1	Elevation Housing

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0724	1	Worm Clutch - Elevation
0725	1	Shaft Clutch - Elevation
0726	1	Elevation Pinion
0727	2	Elevation Gear
0728	1	Elevation Cover
0729	1	Clutch Spring - Elevation
0730	1	Actuator Ring - Elevation
0731	4	Worm Bearing Spacer
0738	2	Dowel Pin
0739	2	Dowel Pin
0740	1	Dowel Pin
0741	5	Roll Pin
0742	3	Soc. Set Screw
0743	2	Soc. Set Screw
0744	6	Hex Nut
0745	6	Soc. HD Cap Screw
0746	2	Soc. HD Cap Screw
0747	7	Soc. HD Cap Screw
0748	11	Soc. HD Cap Screw
0749	6	Soc. HD Cap Screw
0750	3	Fl. HD Cap Screw

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0751	2	Pipe Plug
0752	1	Elevation Motor - 1650 RPM
0753	1	Bronze Bearing
0754	1	Bronze Bearing
0755	4	Tapered Roller Bearing
0756	4	O-Ring
0757	1	Key
0758	3	Woodruff Key
0759	1	Woodruff Key
0760	1	Retainer Ring
0761	2	Retainer Ring
0762	2	Chain (1/4 inch. pitch)
0763	1	Plastic Knob



REV. 11-21-67

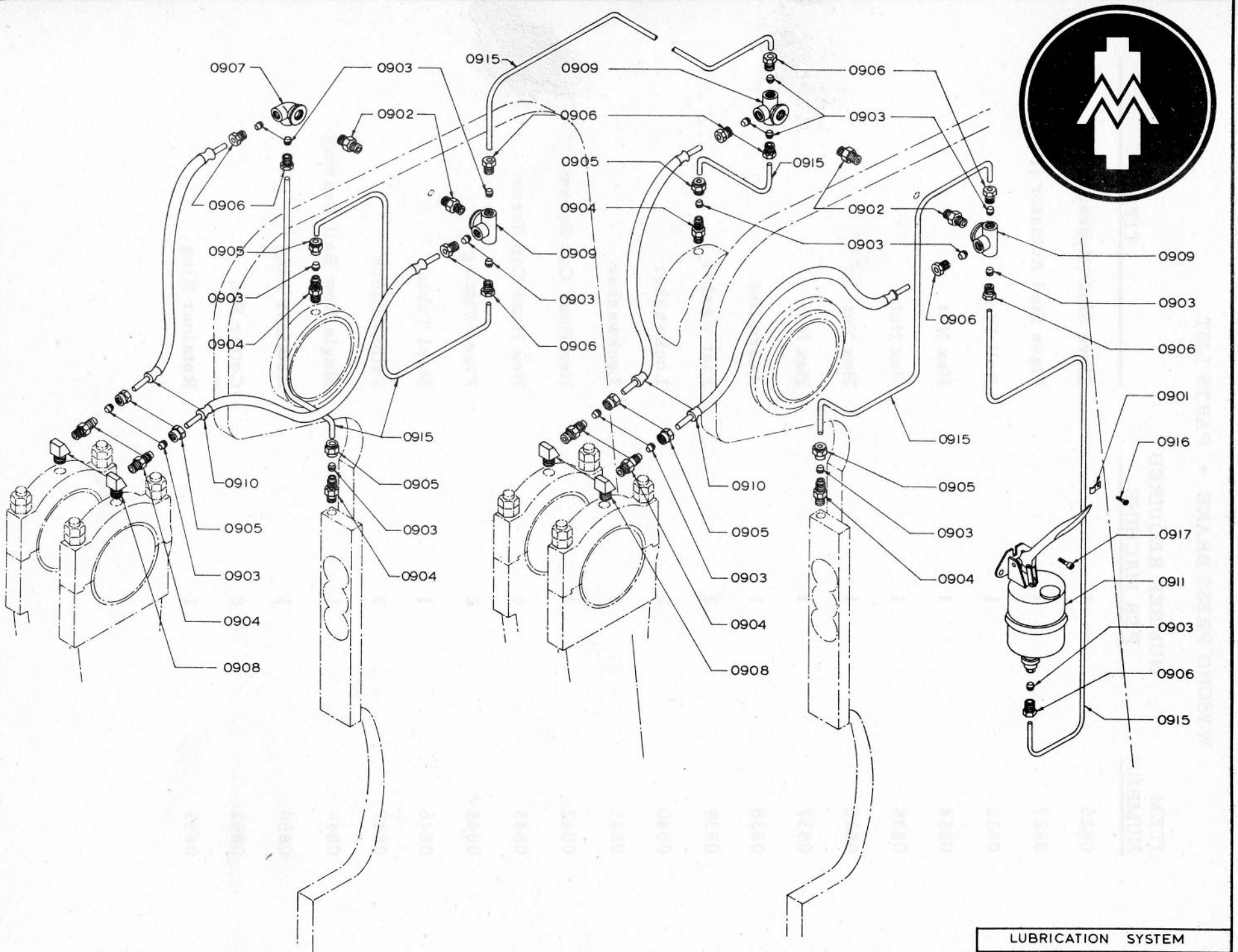
ACTUATING MECHANISM					
SCALE NONE	DRAWN	8-1-64	J.L.G.		50-0800
	APPR.				

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0801	1	Treadle Shaft 4'
0802	1	Treadle Shaft 6'
0803	1	Treadle Shaft 8'
0804	1	Treadle Shaft 10'
0805	1	Treadle Weldment
0806	1	Clutch Adapter Bushing
0807	1	Brake Adapter Bushing
0808	1	Brake Spring Stud
0809	1	Brake Spring
0811	1	Treadle Arm
0812	1	Turn Buckle
0813	1	Eye Bolt
0814	1	Master Cylinder
0815	1	Slave Cylinder
0816	2	Master Spacer
0817	1	Drawbar Washer
0818	3	Clutch Yoke Pin
0819	1	Drawbar Clevis
0820	1	Clutch Drawbar
0821	1	Slave Stud (Air)
0822	1	Clutch Yoke Stud
0823	1	Clutch Yoke
0824	1	Greadle Arm Pin

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0826	1	Slave Stud (Hydraulic)
0827	1	Slave Stud Actuator (Hydraulic)
0832	1	Roll Pin
0834	1	Hex Nut
0835	1	Hex Nut
0836	1	Hex Nut
0837	1	Hex Nut
0838	1	Acorn Nut
0839	1	Flat Washer
0840	2	Lockwasher
0841	6	Lockwasher
0842	2	Hex Head Cap Screw
0843	6	Hex Head Cap Screw
0845	2	Flare Fitting
0846	1	Steel Tubing
0847	3	Pillow Block
0849	1	Single Row Ball Bearing
0850	1	Retainer Ring
0851	8	Cotter Pin
0853	1	Retainer Ring

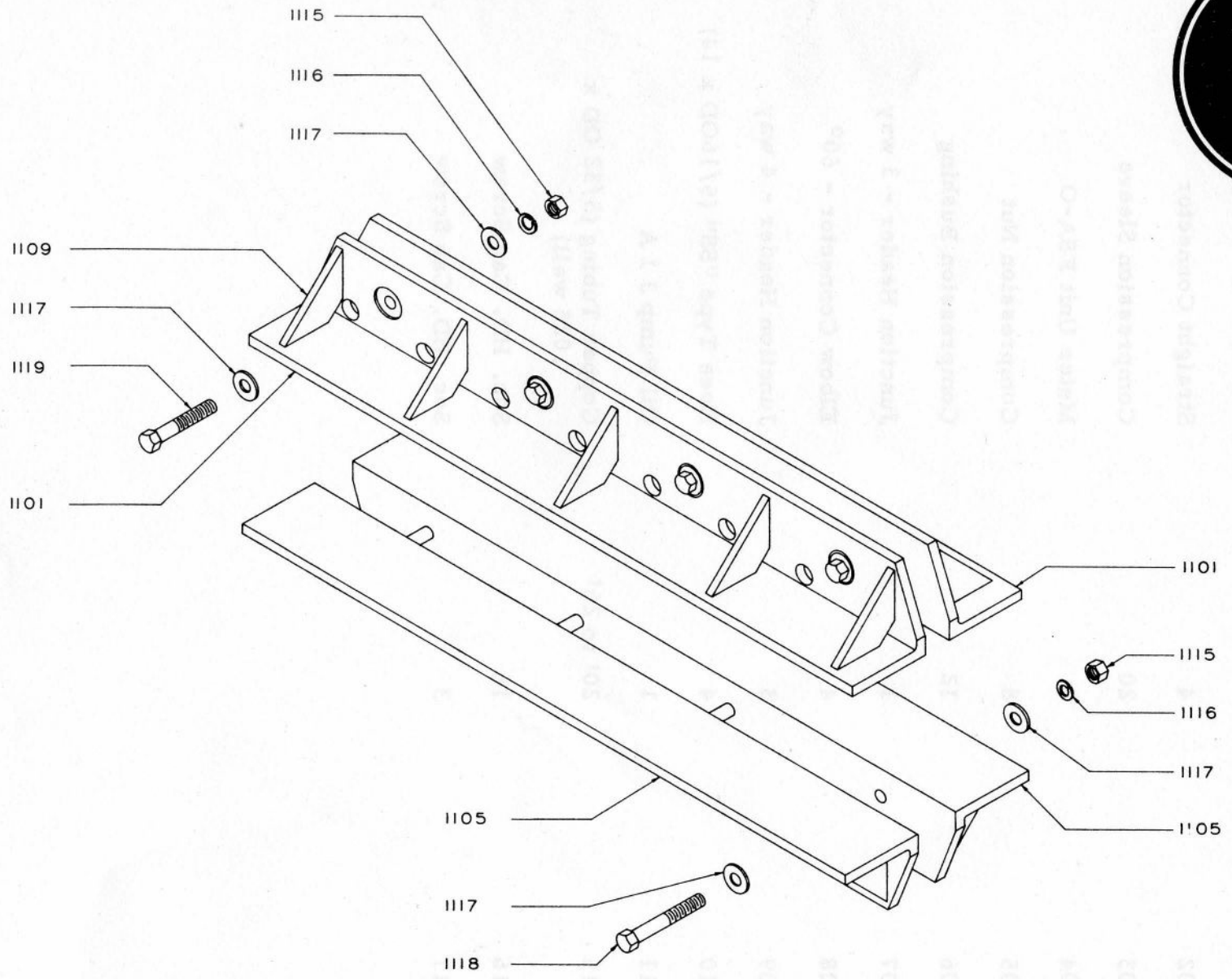


LUBRICATION SYSTEM

SCALE	DRAWN	5-14-64	J.L.G.	50-0900
NONE	APPR.			

WYSONG PRESS BRAKE - PARTS LIST

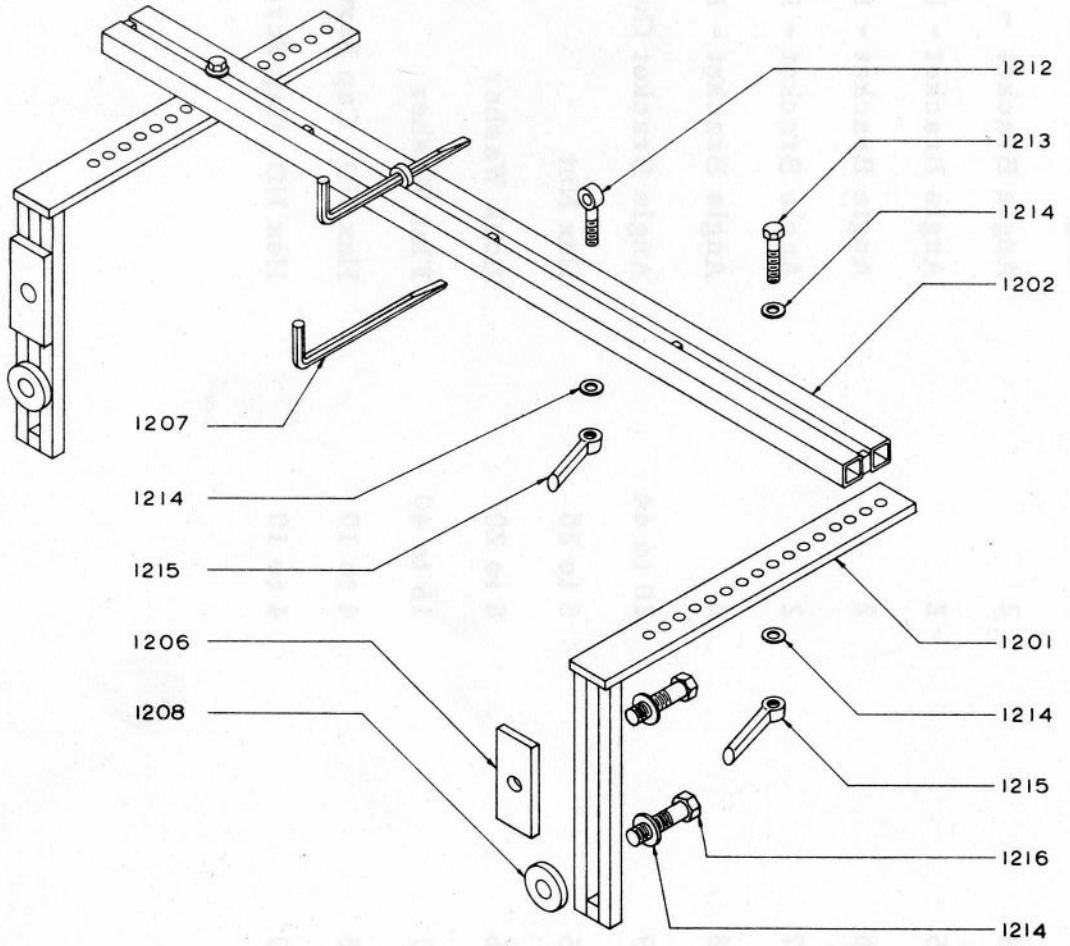
ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
0901	16	Tubing Clip - Single
0902	4	Straight Connector
0903	20	Compression Sleeve
0904	8	Meter Unit FSA-O
0905	8	Compression Nut
0906	12	Compression Bushing
0907	1	Junction Header - 3 way
0908	4	Elbow Connector - 60°
0909	3	Junction Header - 4 way
0910	4	Hose Type "SS" (5/16OD x 14)
0911	1	Oil Pump J I A
0915	20' to 26'	Copper Tubing (5/32 OD x .025 wall)
0916	16	Soc. HD. Cap Screw
0917	3	Soc. HD. Cap Screw



ANGLE BRACKETS						
SCALE	DRAWN	4-9-64	J.L.G.			50-1100
NONE	APPR.					

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
1101	2	Angle Bracket - Bed 4'
1102	2	Angle Bracket - Bed 6'
1103	2	Angle Bracket - Bed 8'
1104	2	Angle Bracket - Bed 10'
1105	2	Angle Bracket - Ram 4'
1106	2	Angle Bracket - Ram 6'
1107	2	Angle Bracket - Ram 8'
1108	2	Angle Bracket - Ram 10'
1109	20 to 44	Angle Bracket Gusset
1115	8 to 20	Hex Nut
1116	8 to 20	Lock Washer
1117	16 to 40	Flat Washer
1118	4 to 10	Hex HD. Cap Screw
1119	4 to 10	Hex HD. Cap Screw

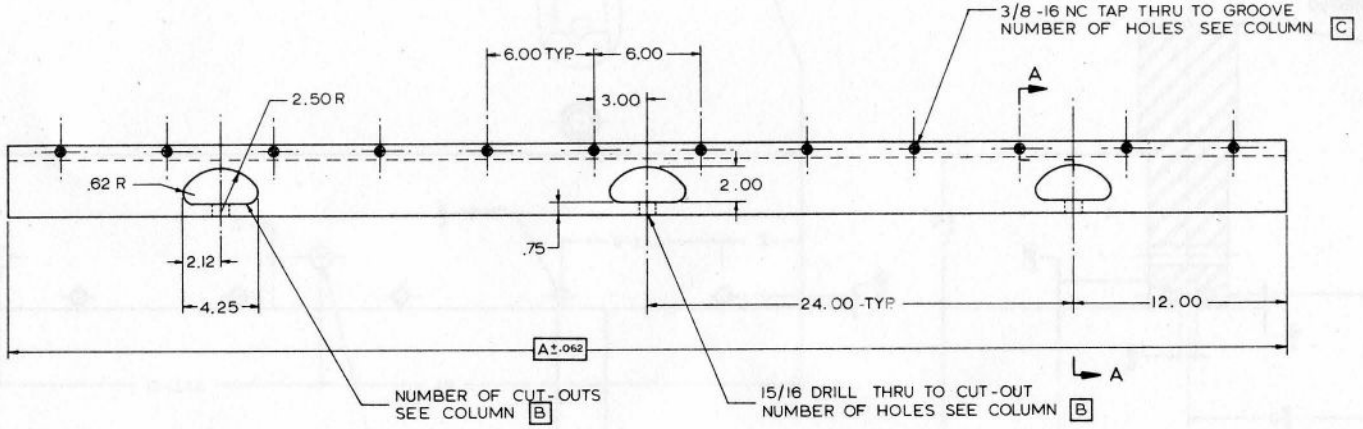


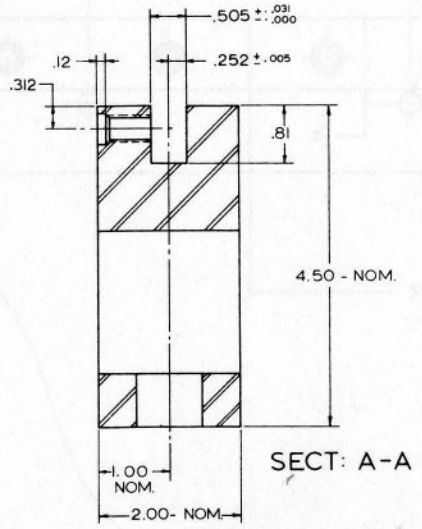
BACK GAGE ASSEMBLIES

SCALE	DRAWN	8-8-64	J.L.G.	50-1200
NONE	APPR.			

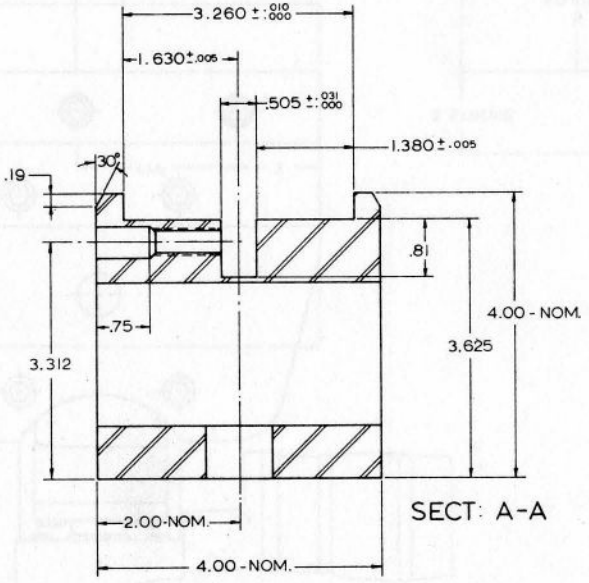
WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
1201	2 to 3	Back Gage Bracket
1202	1	Back Gage Cross Bar 4'
1203	1	Back Gage Cross Bar 6'
1204	1	Back Gage Cross Bar 8'
1205	1	Back Gage Cross Bar 10'
1206	2 to 3	Back Gage Spacer
1207	2 to 3	Back Gage Finger
1212	2 to 3	Eye Bolt
1213	2 to 3	Hex HD. Cap Screw
1214	6 to 9	Flat Washer
1215	4 to 6	Lever Nut
1216	2 to 3	Hex Nut
1217	4 to 6	Flat Washer
1218	2 to 3	Hex HD. Cap Screw





FILLER BLOCK - NARROW
50-74
STANDARD EQUIPMENT



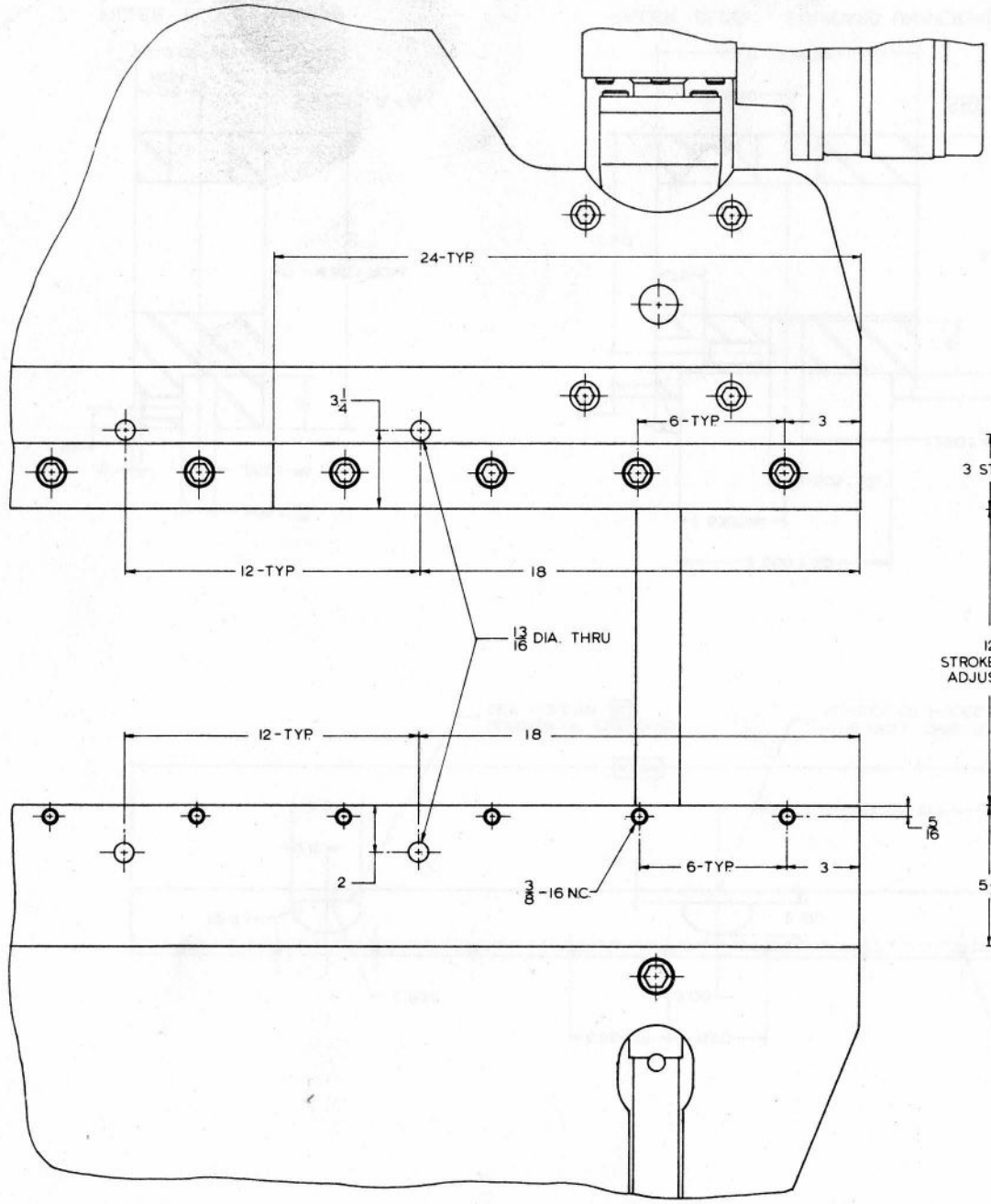
FILLER BLOCK - STANDARD UNIVERSAL
50-75
SPECIAL EQUIPMENT

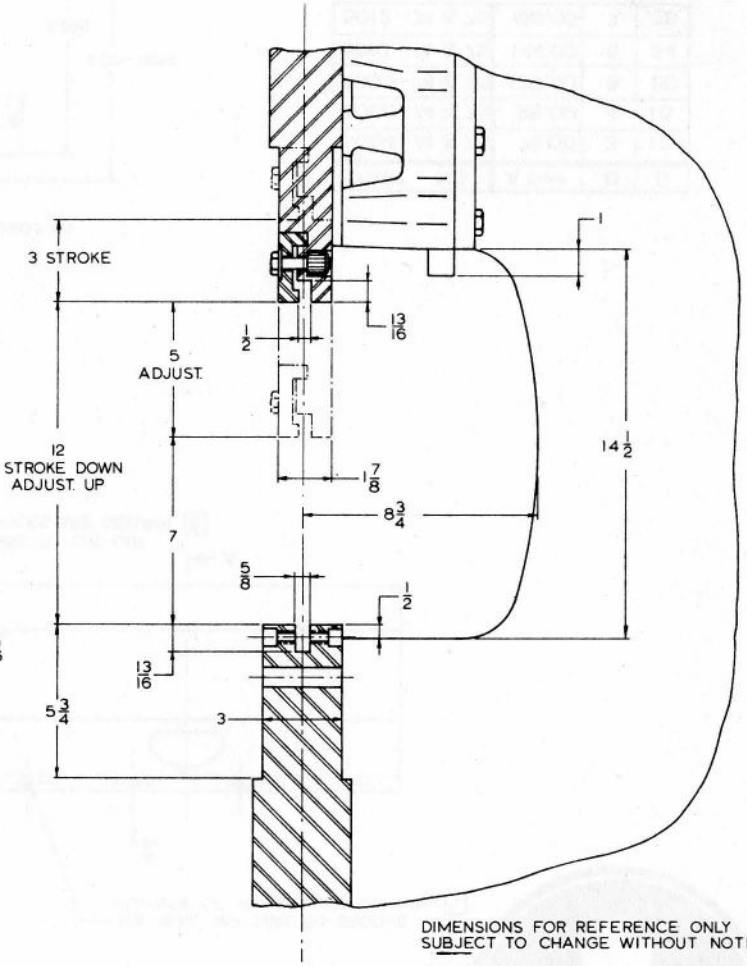
PART NO.	A ±.062	B	C
5004-74 & 75	72.00	3	12
5006-74 & 75	96.00	4	16
5008-74 & 75	120.00	5	20
5010 -74 & 75	144.00	6	24
5012 -74 & 75	168.00	7	28

DIMENSIONS FOR REFERENCE ONLY,
SUBJECT TO CHANGE WITHOUT NOTICE.

FILLER BLOCK CHART

SCALE	DRAWN	4-27-65	J.L.G.	50-1400
NONE	APPR.			

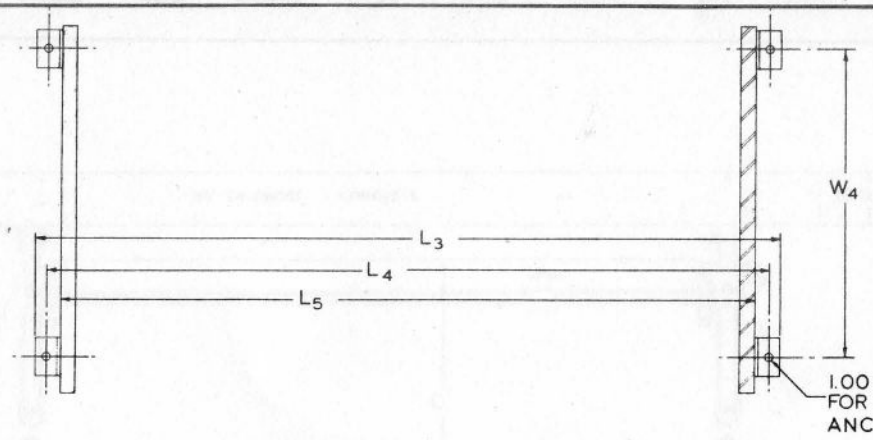




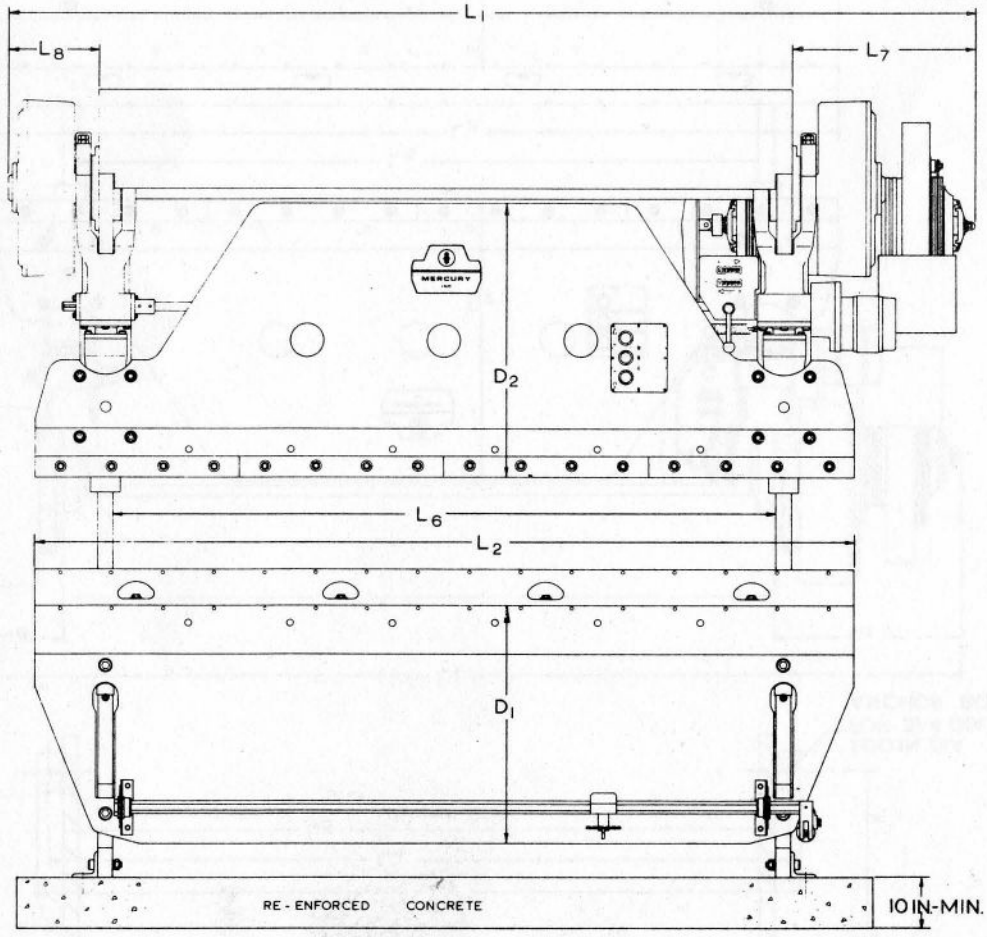
DIMENSIONS FOR REFERENCE ONLY
SUBJECT TO CHANGE WITHOUT NOTICE

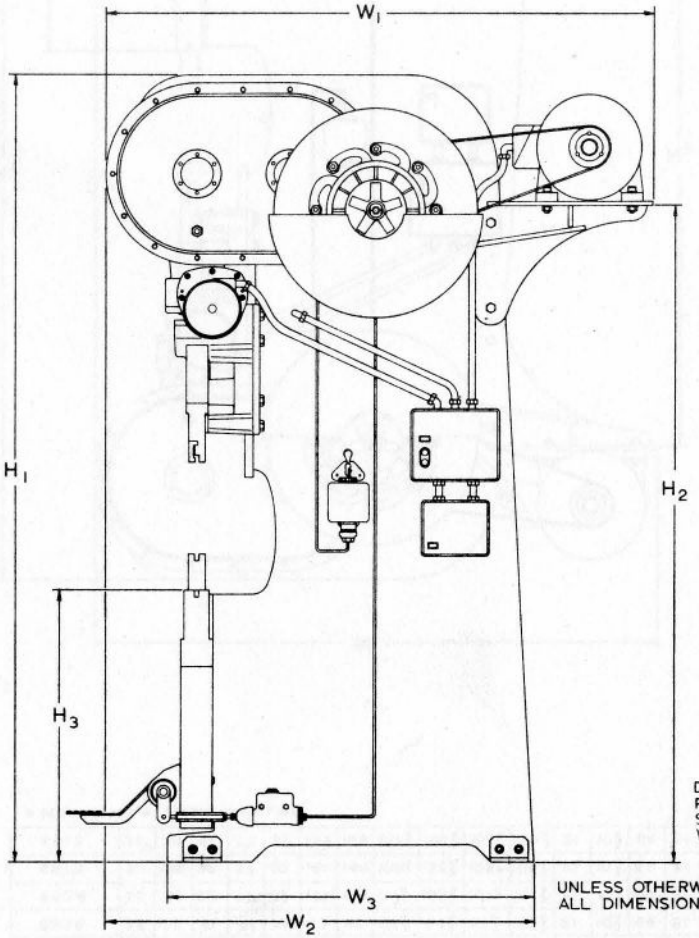
DIE SPACE LAYOUT

SCALE	DRAWN	4-28-65	G.T.S.	50-1600
NONE	APPR.			



PRESS BRAKE NUMBER	D_1	D_2	H_1	H_2	H_3	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	W_1	W_2	W_3	W_4	APPROX. SHIPPING WEIGHT IN LBS.
5004	28	32	92	77	32	89	72	63 1/4	60 3/4	57 1/4	53 3/4	21	10 3/4	64	51	43	36	
5006	28	32	92	77	32	113	96	87 1/4	84 3/4	81 1/4	77 3/4	21	10 3/4	64	51	43	36	
5008	30	36	92	77	32	137	120	111 1/4	108 3/4	105 1/4	101 3/4	21	10 3/4	64	51	43	36	
5010	30	36	92	77	32	161	144	135 1/4	132 3/4	129 1/4	125 3/4	21	10 3/4	64	51	43	36	
5012																		



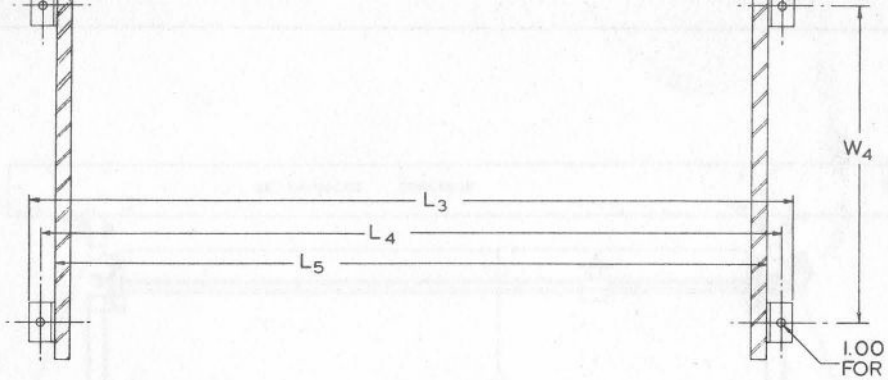


DIMENSIONS ARE FOR REFERENCE ONLY AND SUBJECT TO CHANGE WITHOUT NOTICE.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES.

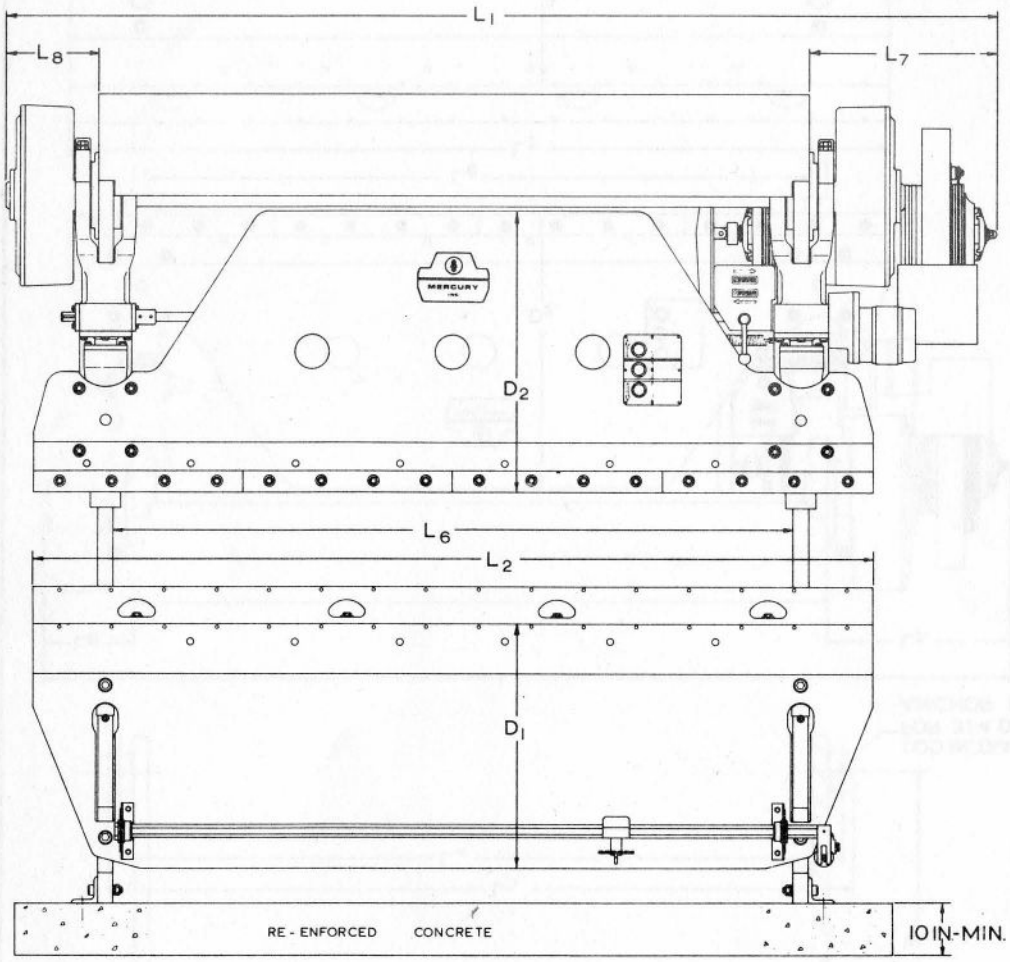
MACHINE ASSEMBLY & FOUNDATION

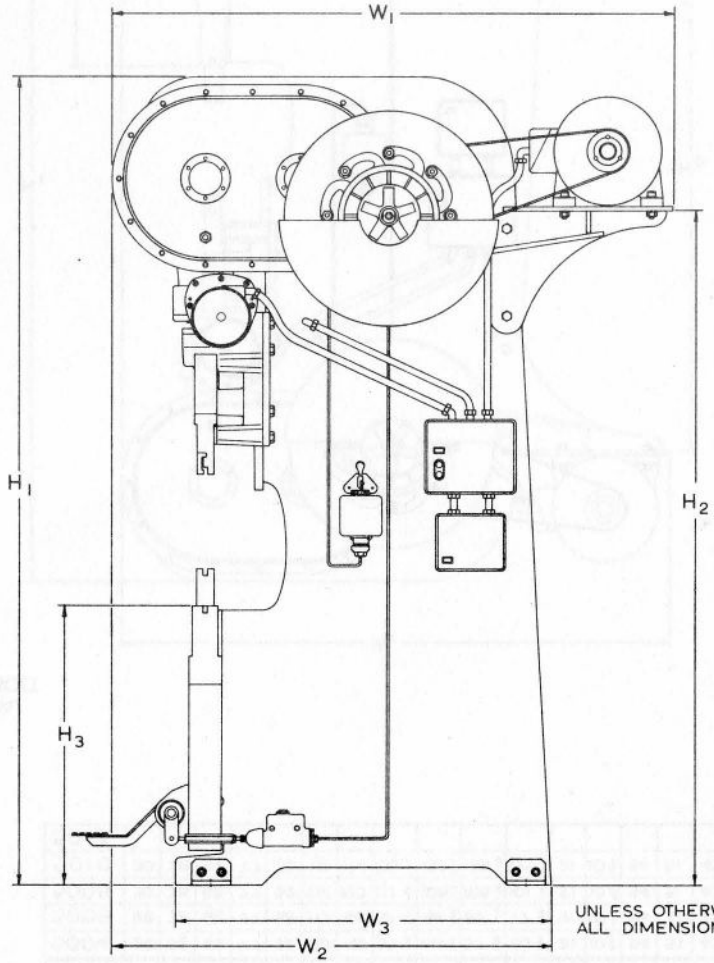
SCALE	DRAWN	11-8-64	J.L.G.	50-1700
NONE	APPR.			



PRESS BRAKE NUMBER	D_1	D_2	H_1	H_2	H_3	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	W_1	W_2	W_3	W_4	APPROX. SHIPPING WEIGHT IN LBS.
6504	28	32	92	77	32	89	72	63 1/4	60 3/4	57 1/4	53 3/4	21	10 3/4	64	51	43	36	
6506	28	32	92	77	32	113	96	87 1/4	84 3/4	81 1/4	77 3/4	21	10 3/4	64	51	43	36	
6508	30	36	92	77	32	137	120	111 1/4	108 3/4	105 1/4	101 3/4	21	10 3/4	64	51	43	36	
6510	30	36	92	77	32	161	144	135 1/4	132 3/4	129 1/4	125 3/4	21	10 3/4	64	51	43	36	
6512	36*	44	92	77	32	185	168	159 1/4	156 3/4	153 1/4	149 3/4	21	10 3/4	64	51	43	36	

* BED EXTENDS 4" BELOW FLOOR LINE.





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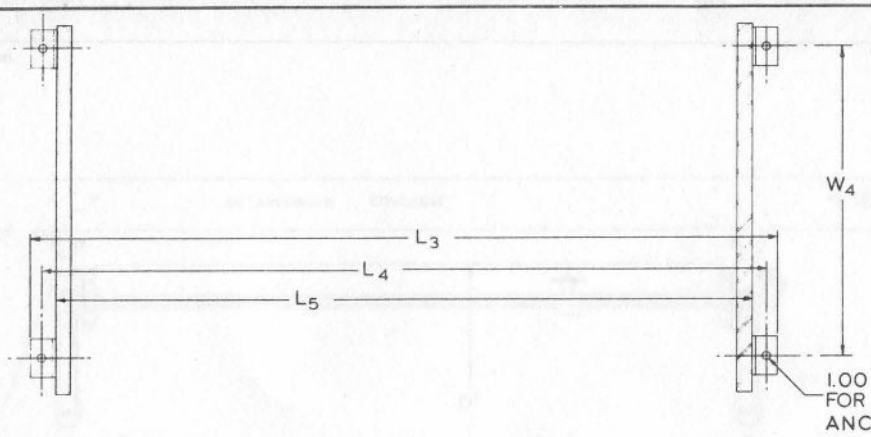
UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES.

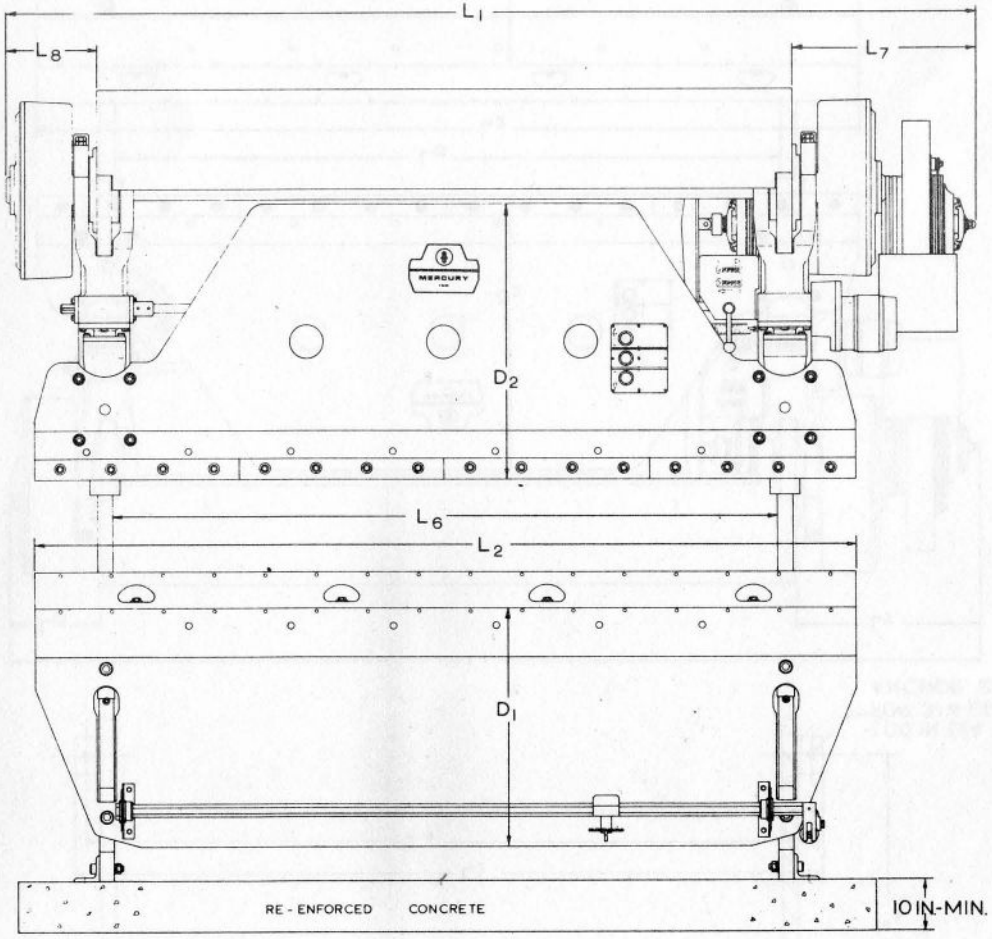
MACHINE ASSEMBLY & FOUNDATION

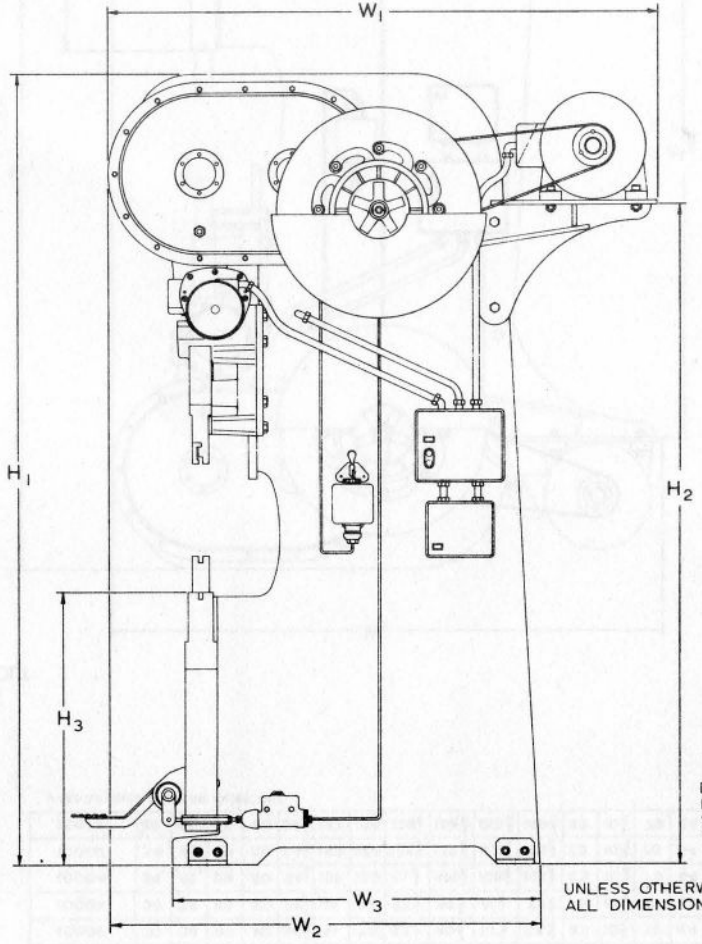
SCALE	DRAWN	9-15-65	J.L.G.	65-1800
NONE				

4-4-67



PRESS BRAKE NUMBER	D_1	D_2	H_1	H_2	H_3	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	W_1	W_2	W_3	W_4	APPROX. SHIPPING WEIGHT IN LBS.
8004	30	38	99	80	34½	91	72	63¼	60²⁄₁₆	57¼	53¹⁵⁄₁₆	23	10¹⁄₁₆	72	59	51	44	
8006	30	38	99	80	34½	115	96	87¼	84²⁄₁₆	81¼	77¹⁵⁄₁₆	23	10²⁄₁₆	72	59	51	44	
8008	34	42	99	80	34½	139	120	111¼	108³⁄₁₆	105¼	101³⁄₁₆	23	10³⁄₁₆	72	59	51	44	
8010	34	42	99	80	34½	163	144	135¼	132³⁄₁₆	129¼	125³⁄₁₆	23	10⁴⁄₁₆	72	59	51	44	
8012	36	46	99	80	34½	187	168	159¼	156³⁄₁₆	153¼	149³⁄₁₆	23	10⁵⁄₁₆	72	59	51	44	



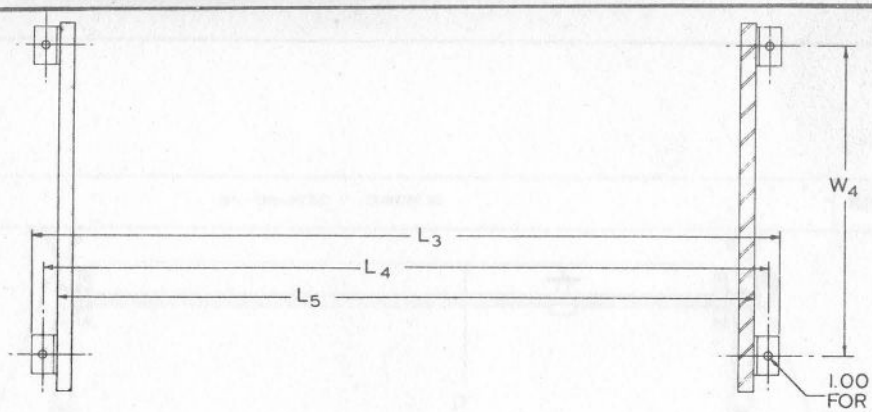


DIMENSIONS ARE FOR REFERENCE ONLY AND SUBJECT TO CHANGE WITHOUT NOTICE.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES.

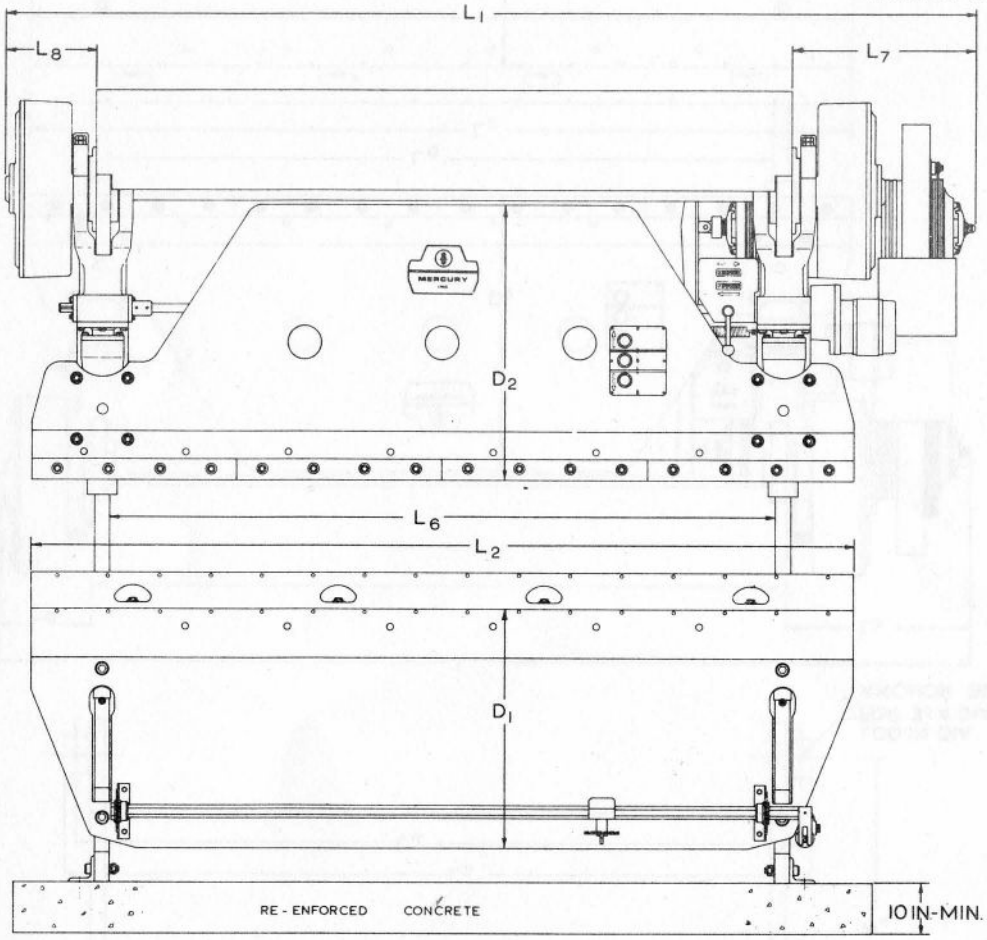
MACHINE ASSEMBLY & FOUNDATION

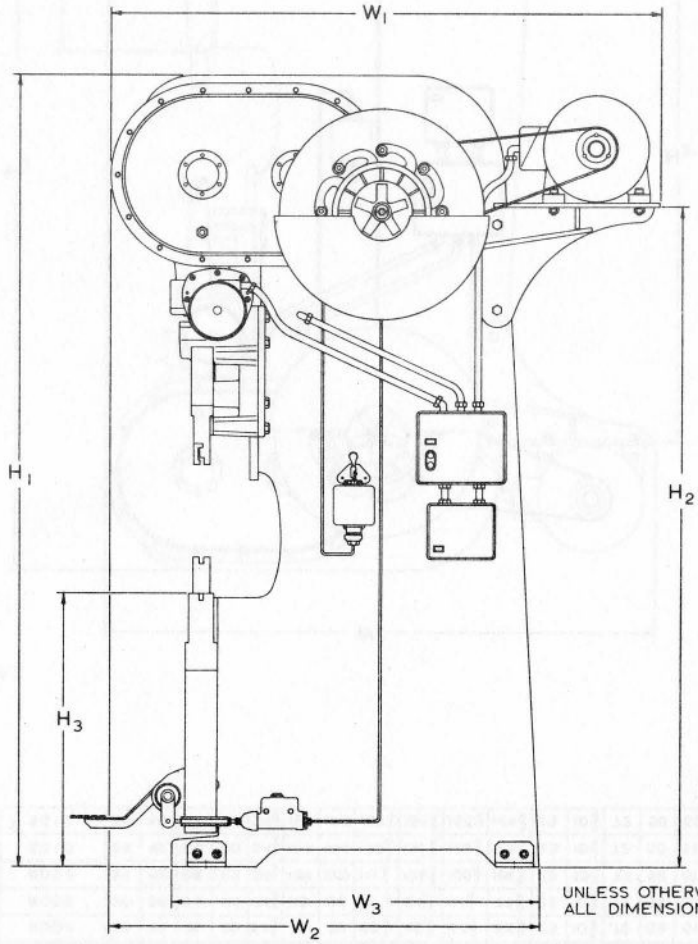
SCALE	DRAWN	9-15-65	J.L.G.	80-1800
NONE	APPR.			



PRESS BRAKE NUMBER	D_1	D_2	H_1	H_2	H_3	L_1	L_2	L_3	L_4	L_5	L_6	L_7	L_8	W_1	W_2	W_3	W_4	APPROX. SHIPPING WEIGHT IN LBS.
10004	30	38	99	80	34½	91	72	63¼	60¾	57¼	53¾	23	10¾	78	64	56	49	
10006	30	38	99	80	34½	115	96	87¼	84¾	81¼	77¾	23	10¾	78	64	56	49	
10008	34	42	99	80	34½	139	120	111¼	108¾	105¼	101¾	23	10¾	78	64	56	49	
10010	34	42	99	80	34½	163	144	135¼	132¾	129¼	125¾	23	10¾	78	64	56	49	
10012	*36	46	99	80	34½	187	168	159¼	156¾	153¼	149¾	23	10¾	78	64	56	49	

*BED EXTENDS 1½ BELOW FLOOR LINE



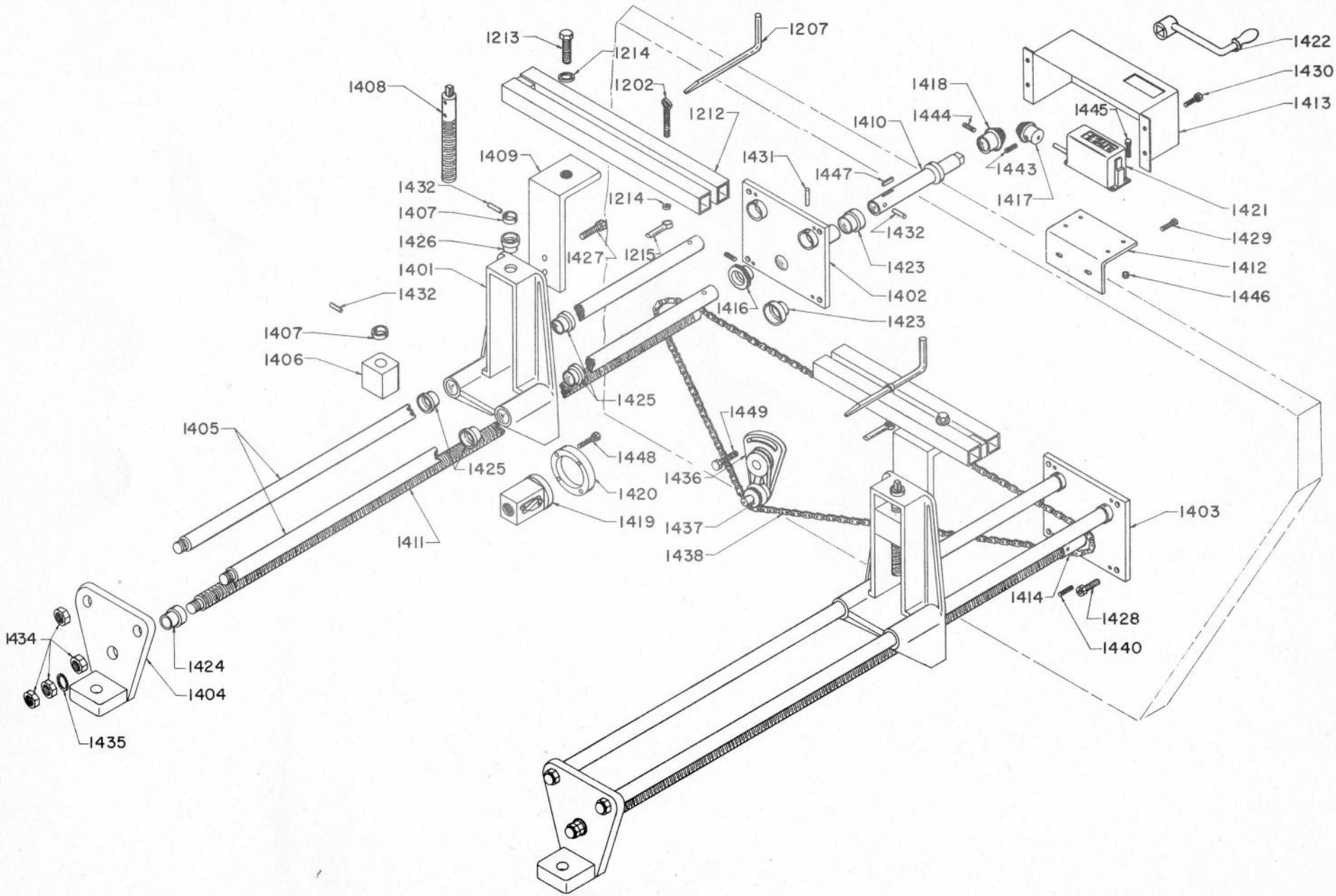


DIMENSIONS ARE FOR REFERENCE ONLY AND SUBJECT TO CHANGE WITHOUT NOTICE.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS IN INCHES.

11-16-67

MACHINE ASSEMBLY & FOUNDATION					
SCALE NONE	DRAWN APPR.	9-15-65	J.L.G.		100-1800



FRONT OPERATED BACK GAGE						
SCALE	DRAWN	12-27-67	P.L.H.			50-2000
NONE	APPR.					

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
1202	1	Eye Bolt
1207	2 to 3	Back Gage Finger
1212	2 to 3	Back Gage Cross Bar
1213	2 to 3	Hex Head Cap Screw
1214	6 to 9	Flat Washer
1215	4 to 6	Lever Nut
1401	2	Stop Carrier
1402	1	Mounting Plate - Right
1403	1	Mounting Plate - Left
1404	2	Bearing Plate
1405	4	Guide Rod
1406	2	Slide Block
1407	4	Collar
1408	2	Elevation Screw
1409	2	Bracket
1410	1	Stub Shaft - Long
1411	2	Screw
1412	1	Counter Mounting Bracket
1413	1	Counter Cover
1414	1	Stub Shaft - Short
1416	2	Counter Sprocket
1417	1	Counter Gear
1418	1	Counter Gear
1419	1	Saginaw Ball Nut

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
1420	1	Saginaw Standard Flange
1421	1	Counter
1422	1	Crank Handle
1423	3	Bronze Bushing
1424	2	Bronze Bushing
1425	8	Bronze Bushing
1426	2	Bronze Bushing
1427	4	Hex Head Cap Screw
1428	8	Hex Head Cap Screw
1429	2	Hex Head Cap Screw
1430	4	Machine Screw
1431	4	Roll Pin
1432	6	Roll Pin
1434	8	Hex Nut
1435	2	Thrust Bearing
1436	1	Drive Tensioner
1437	1	Needle Bearing
1438	1	No. 35, 3/8 pitch Chain
1440	8	Socket Head Set Screw
1443	1	Socket Head Set Screw
1444	1	Socket Head Set Screw
1445	4	Socket Head Cap Screw

WYSONG PRESS BRAKE - PARTS LIST

ITEM NUMBER	NUMBER REQUIRED PER MACHINE	TITLE
1446	4	Nut
1447	2	Key
1448	3	Socket Head Cap Screw
1449	2	Hex Head Cap Screw

TONS PRESSURE REQURED TO BEND MILD STEEL PLATE

THICKNESS OF METAL		WIDTH OF VEE DIE OPENING																
GAUGE	DEC.	1/4	5/16	3/8	1/16	1/2	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
20	.036	3.1	2.3	1.7														
18	.048	4.0	4.0	3.0	2.5													
16	.060				4.5	3.8	2.8											
14	.075					6.3	4.7	3.5										
12	.105							8.0	6.5	5.6								
11	.120								9.0	7.5	6.3							
10	.135									9.9	8.5	7.3						
3/16	.188											14.3	11.2	7.5				
1/4	.250												22.7	15.4	11.4			
5/16	.313													27.0	19.7	15.3		
3/8	.375														30.9	24.0	19.6	
7/16	.438															35.4	28.6	24.4
1/2	.500																39.7	33.3

Underlined figures represent ideal conditions for right angle bending; punch with radius to metal thickness and die opening approximately 8 x metal thickness. Bending pressures required for other metals as compared to 60,000 P.S.I. tensible mild steel on chart.

Above chart is for mild steel of 55,000 to 65,000 pounds per square inch. Bending pressure is proportional to the ultimate strength of the material.

The inside radius of a bend is approximately 5/32" of the die opening and is about the same for varying thicknesses of material bent on the same die set. Heavier thicknesses of plate contain higher carbon content which maintains full ultimate strength. This results in more bending fractures which be reduced by 10 or 12 times die opening or the use of special flanging steel. High tensile steel plates are usually formed over 10 to 12 times die opening.

If dies are set to hit bottom, there is no limit to the pressure that can be applied.

Bends across grain will show less breakage tha when bent in line with the grain of the plate, especially in the thicker plates. It helps avoid cracks by rounding the edges of thick plates at each end of the bend.

Soft Brass . . . . . .50% of pressure listed
Soft Aluminum . . . . . .50% of pressure listed
Aluminum Alloy (Heattreated) . . . . . Same as steel
Stainless Steel . . . . . .50% more than steel
Chrome Molybdenum . . . . . .50% more than steel

TONS PRESSURE REQUIRED TO PUNCH MILD STEEL PLATE

Thickness of Metal	Hole Diameter															
Gauge	Inches	1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1
20	.036	.35	.53	.72	.9	1.1	1.25	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0
18	.048	.48	.72	1.0	1.2	1.4	1.7	1.9	2.1	2.4	2.6	2.8	3.1	3.3	3.5	3.8
16	.060	.60	.90	1.2	1.5	1.8	2.1	2.4	2.7	2.9	3.2	3.5	3.8	4.1	4.4	4.8
14	.075	.8	1.2	1.5	1.9	2.2	2.6	2.9	3.3	3.7	4.1	4.4	4.8	5.2	5.5	6.0
12	.105	1.0	1.6	2.1	2.6	3.1	3.6	4.1	4.7	5.2	5.7	6.2	6.7	7.2	7.7	8.5
10	.135		2.0	2.7	3.3	4.0	4.6	5.3	6.0	6.6	7.3	8.0	8.6	9.3	10	11
3/16	.187		2.8	3.7	4.6	5.5	6.5	7.4	8.3	9.2	10.2	11.1	12.0	13	14	15
1/4	.250			5	6.2	7.5	9	10	11	12.5	14	15	16	17	18.5	20
3/8	.375					11	13	15	17	19	21	23	25	27	29	31
1/2	.500							20	22	25	27	30	32	35	37	40
5/8	.625									31	34	37	40	43	47	50
3/4	.750											45	48	52	56	60

The above chart is for mild steel with a shear strength of 50,000 pounds per square inch.

The shear pressure is proportional to the shear strength of the material.

The punching load should not exceed approximately 85 percent of the rated capacity of the press brake for smooth operation.

Punches may be stepped on two or three levels. Fewer punches on the last level will reduce breakthrough shock.

If punches are stepped half the material thickness, the pressure will be reduced to that of the maximum for all punches on each level.

For irregular hole punching, the pressure will be 25 x length of the outline of the hole x thickness of the plate. The answer will be in tons.

Excessive punch breakage will occur if hole diameter is less than the thickness of the material.

It is better to set up for all punching in one step within capacity of the press brake because of possible forgetfulness in stepping, and commercial spring stripping, punching sets do not have sufficient clearance for stepping.

When punching with spring strippers, the stripping pressure need not be considered as part of the 85% capacity limitation. The total of the punching load and the stripping pressure should not exceed the rated capacity.

A press intended for production punching work, with or without wide bed and ram, should have the following features:

Extra long gibs* Air ram counterbalances* Integral air clutch and brake* Push button control with limit stop* Standard or higher speed* Minimum stroke.

STANDARD STEEL SHEET GAGES

	Carbon Steel		Galv. Steel		Stainless Steel		
						Chrome Alloys	Cr.-Ni. Alloys
Gage No.	Thick. Inches	Wt./Sq.Ft. Lbs.	Thick. Inches	Wt./Sq.Ft. Lbs.	Thick. Inches	Wt./Sq.Ft. Lbs.	Wt./Sq.Ft. Lbs.
7	.1793	7.500	----	----	----	----	----
8	.1644	6.875	.1728	7.031	----	----	----
9	.1494	6.250	.1578	6.406	----	----	----
10	.1345	5.625	.1422	5.781	.1406	5.794	5.906
11	.1196	5.000	.1269	5.162	.1250	5.150	5.250
12	.1046	4.375	.1115	4.531	.1094	4.506	4.594
13	.0897	3.750	.0962	3.906	.0937	3.863	3.938
14	.0747	3.125	.0809	3.281	.0781	3.219	3.281
15	.0673	2.812	.0732	2.969	.0703	2.897	2.953
16	.0598	2.500	.0656	2.656	.0625	2.575	2.625
17	.0538	2.250	.0595	2.406	.0563	2.317	2.362
18	.0478	2.000	.0533	2.156	.0500	2.060	2.100
19	.0418	1.750	.0472	1.906	.0437	1.802	1.837
20	.0359	1.500	.0411	1.656	.0375	1.545	1.575
21	.0329	1.375	.0380	1.531	.0344	1.416	1.444
22	.0299	1.250	.0349	1.406	.0312	1.287	1.312
23	.0269	1.125	.0319	1.281	.0281	1.159	1.181
24	.0239	1.000	.0288	1.156	.0250	1.030	1.050
25	.0209	.875	.0257	1.031	.0219	.901	.919
26	.0179	.750	.0227	.906	.0187	.772	.787
27	.0164	.687	.0212	.844	.0172	.708	.722
28	.0149	.625	.0196	.781	.0156	.644	.656
29	.0135	.562	.0181	.719	.0141	.579	.591
30	.0120	.500	.0166	.656	.0125	.515	.525

STANDARD WIRE GAGES

Amer. Wire Gage Elec. Wire & Rod Cu., Brass, Al., Brz.		Birmingham W. G. Galvanized Iron & Steel		U.S. Steel W.G. Ungalv. Iron & Steel (Ex.Mu.Wr.)		Amer. Steel & Wire Co.-M.W.G. Music Wire	
Gage No.	Diam. Inches	Gage No.	Diam. Inches	Gage No.	Diam. Inches	Gage No.	Diam. Inches
2	.2576	3	.259	2	.2625	—	—
3	.2294	4	.238	3	.2437	—	—
—	—	5	.220	4	.2253	—	—
4	.2043	6	.203	5	.2070	—	—
5	.1819	7	.180	7	.1770	—	—
6	.1620	8	.165	8	.1620	—	—
7	.1443	9	.148	9	.1483	41	.146
8	.1285	10	.134	10	.1350	39	.130
9	.1144	11	.120	11	.1205	37	.118
10	.1019	12	.109	12	.1055	35	.106
11	.0907	13	.095	13	.0915	33	.095
12	.0808	14	.083	14	.0800	31	.085
13	.0720	15	.072	15	.0720	28	.071
14	.0641	16	.065	16	.0625	26	.063
15	.0571	17	.058	17	.0540	25	.059
16	.0508	18	.049	18	.0475	22	.049
18	.0403	19	.042	19	.0410	18	.041
19	.0359	20	.035	20	.0348	15	.035
20	.0320	21	.032	21	.0317	13	.031
21	.0285	22	.028	22	.0286	12	.029
22	.0253	23	.025	23	.0258	10	.024
23	.0226	24	.022	24	.0230	9	.022
24	.0201	25	.020	25	.0204	8	.020
25	.0179	26	.018	26	.0181	7	.018
26	.0159	27	.016	28	.0162	6	.016
27	.0142	28	.014	30	.0140	5	.014
28	.0126	29	.013	31	.0132	4	.013
29	.0113	30	.012	33	.0118	3	.012
30	.0100	31	.010	34	.0104	1	.010
31	.0089	32	.009	36	.0090	0	.009
32	.0080	33	.008	38	.0080	2/0	.008
33	.0071	34	.007	40	.0070	3/0	.009
36	.0050	35	.005	47	.0050	5/0	.005

STD. NON-FERROUS SHEET GAGES

Brass & Aluminum				Copper			Zinc		
		Brass	Alum.						
Gage No.	Thick. Inches	Wt./Sq.Ft Lbs.	Wt./Sq.Ft Lbs.	Gage No.	Thick. Inches	Wt./Sq.Ft Lbs.	Gage No.	Thick. Inches	Wt/Sq.Ft Lbs.
5	.1819	8.015	----	7	.180	8.360	---	----	----
6	.1620	7.138	----	8	.165	7.660	---	----	----
7	.1443	6.358	----	9	.148	6.875	---	----	----
8	.1285	5.662	1.826	10	.134	6.225	24	.125	4.70
9	.1144	5.041	1.626	11	.120	5.575	---	----	----
10	.1019	4.490	1.448	12	.109	5.065	23	.100	3.75
11	.0907	3.997	1.284	13	.095	4.410	22	.090	3.37
12	.0808	3.560	1.148	14	.083	3.860	21	.080	3.00
13	.0720	3.173	1.023	15	.072	3.338	20	.070	2.62
14	.0641	2.825	.911	16	.065	3.020	---	----	----
15	.0571	2.516	.812	17	.058	2.695	19	.060	2.25
16	.0508	2.238	.722	18	.049	2.280	17	.050	1.87
17	.0453	1.996	.644	---	----	----	16	.045	1.68
18	.0403	1.776	.573	19	.042	1.952	15	.040	1.50
19	.0359	1.582	.510	20	.035	1.627	14	.036	1.35
20	.0320	1.410	.456	21	.032	1.484	13	.032	1.20
21	.0285	1.256	.405	22	.028	1.302	12	.028	1.05
22	.0254	1.119	.360	23	.025	1.162	11	.024	.90
23	.0226	.9958	.321	24	.022	1.022	---	----	----
24	.0201	.8857	.286	25	.020	.928	10	.020	.75
25	.0179	.7887	.254	---	----	----	9	.018	.67
26	.0159	.7006	.226	---	----	----	8	.016	.60
27	.0142	.6257	.220	---	----	----	7	.014	.52
28	.0126	.5552	.179	---	----	----	6	.012	.45
29	.0113	.4979	.161	---	----	----	---	----	----
30	.0100	.4406	.142	---	----	----	5	.010	.37
---	----	----	----	---	----	----	4	.008	.30
---	----	----	----	---	----	----	3	.006	.22