#19

MODEL MM-61A, B or C

SERIAL NUMBER _____

OPERATOR'S MANUAL

&

PARTS LIST

FOR

METAL MUNCHER

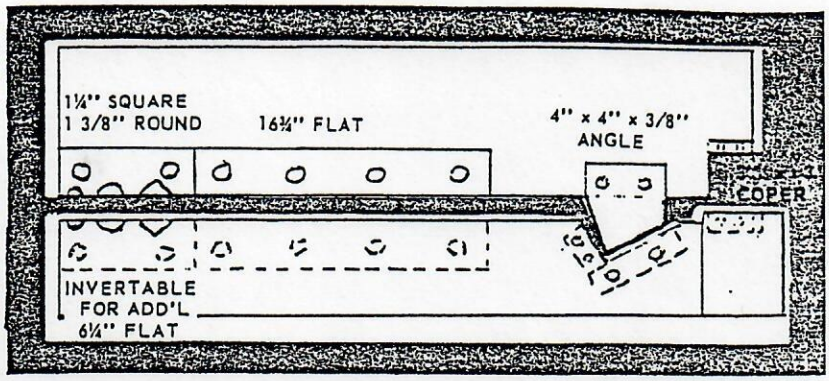
WHEN ORDERING PARTS, CONTACT AREA DEALER, OR:

Kalamazoo
METAL MUNCHER

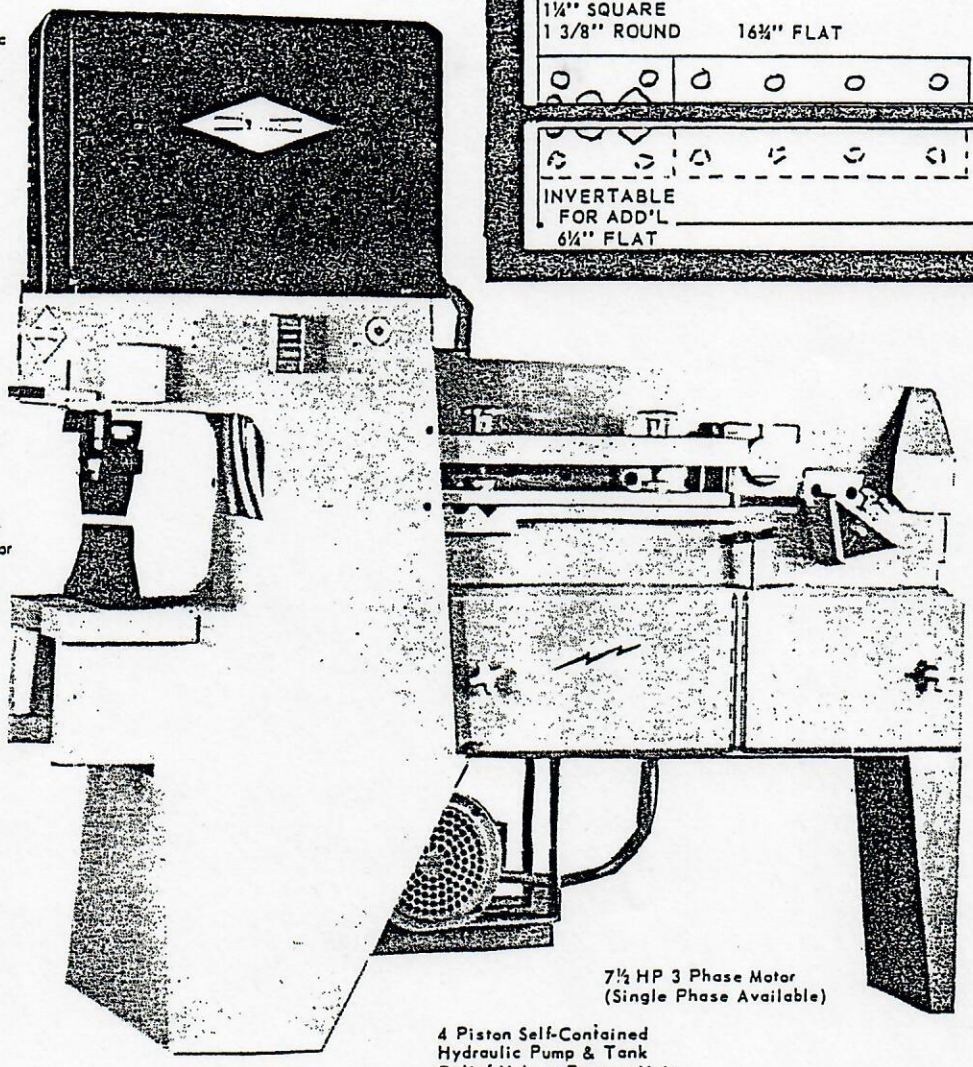
3428 East B Avenue Plainwell, MI 49080

#19

32 Ton Hydraulic Cylinder
Operates Shear



49 Ton Hydraulic
Cylinder
Operates Press



10" Throat
With 9" x 18"
Press Bed

Hand Tightened
Coupling Nut For
Quick Punch
Change

Operating
Pressure
3500 P.S.I.

Built Ruggedly
of 2" & 3"
Steel Plates

MM 61 B
Basic Unit

Coper-Notcher on End
For Easy Access

Storage
Compartment
For Punches,
Dies, etc.

Highest Quality, Hardened
Tool Steel Shear Blades

7½ HP 3 Phase Motor
(Single Phase Available)

4 Piston Self-Contained
Hydraulic Pump & Tank
Relief Valves Protect Unit

About Half the Price of Mechanical Iron Workers

METAL MUNCHER FIRST IN VERSATILITY

THE COMPLETE METAL FABRICATING CENTER – IT WILL . . .

Model MM 61 B. Metal Muncher, a multiple purpose metal working machine, brings new ease, convenience, speed and cost cutting ability to metal fabricators, and at an original cost of almost 50% below most iron workers of similar capacities. No other single piece of metal working equipment will do so many operations with equal ease or so little set-up time. Its use is only limited by the ingenuity of the user.

The C.E.C. Metal Muncher is a hydraulically operated shear, punch press, shop press, notcher or coper, and press brake in one unit. Dual hydraulic valves allow independent operation of press & shear. Two operators can work at the same time. While one is punching and forming, etc., the other can be shearing or notching. One pump, one motor operates the entire unit. Relief valves protect the unit against overloads. With the press and coper at each end it allows any size work to be brought to them.

SHEAR
1" x 6" Flat Bars
to ¼" and Lighter x 20"
1 3/8" Round- -1¼" Squares
4" x 4" x 3/8" Angle

NOTCH
Flats, Angles or
Cope 3" x 3" x 3/8"

PUNCH
1-1/16" Hole Through
½" Stock

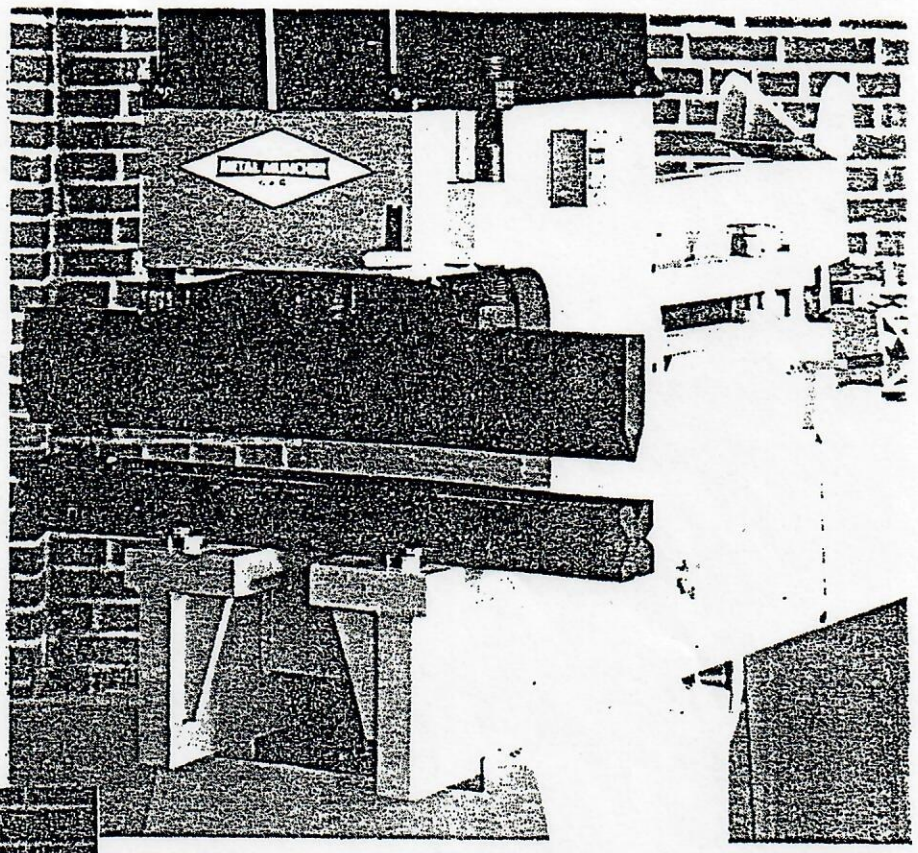
FORM
Z-Bars, Channels, Angles
or Other Shapes
18" Brake Bends up to 5/16" Plate

49 TON PRESS

HAS POWER FOR MANY JOBS

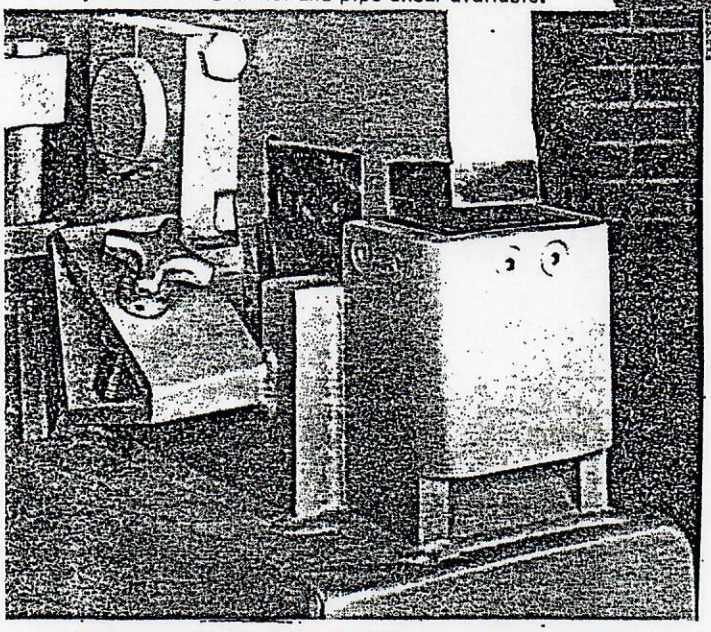
PUNCH–FORM–PRESS

The press end of the Metal Muncher has the power, a big throat and long stroke that permits use of a wide range of punches, forming and bending dies. Loosening a set screw and hand tightened coupling nut allows operator to change punch and die sets quickly. A sleeve type arrangement clamps the punch stem, special tools, brake sets, etc. to the hydraulic cylinder shaft. The press piston shaft has a built-in self aligner. This keeps the shaft from turning when other than round dies are used. An adjustable stripper bar holds the work down as punch is being withdrawn. It is mounted in a slotted hole so it can be removed easily or swung to the side when changing punches and dies. The press cylinder as well as the shear cylinder can be brought to any point before punching or shearing. This means accurate punching, shearing, or forming on hand marked work. When the die holder plate is removed it exposes a press bed throat that will take up to a 4" shaft

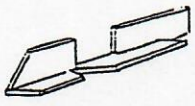


SPECIAL TOOLING

The big throat and long stroke on the Metal Muncher frame offers unlimited ways to use special tooling for multiple punching, forming, shaping and cut-off tooling. If you do not have facilities for making special tooling, advise us of your needs. Channel and pipe shear available.



3" x 3" COPER-NOTCHER



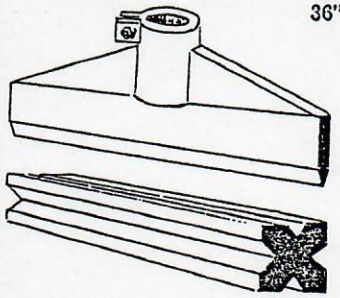
You will find many uses for this coper-notcher. Its on the end of the shear section where any length material can be handled. Handles up to 3/8" stock.

SOLD BY:

18" or 36" BRAKE SET

36" Shown Above

(OPTIONAL EQUIPMENT)



You can not beat it for making small parts. Upper bending die mounts on press cylinder shaft. Lower die on the press bed. Brake 5/16" plate up to 18" wide. Stabilizing rods and sleeves provided with 36" brake sets. Bend ¼" plate up to 36" wide. Why operate a big brake to make the 101 small formed parts you use?

MODEL MM 61 B SPECIFICATIONS

Ram Tonnage (Press)	49 Tons	
Ram Bore (Press)	6"	CAPACITIES
Ram Bore (Shear)	4½"	(based on 50,000# P.S.I. Steel)
Punch Stroke	9:00"	Punch - 13/16 thru 3/4
Press Bed Area	9" x 18"	Bar Cutter - 1¼ square, 1 3/8 round
Bed Slot Width	4"	Flat Stock - 3/16 and lighter - 23", ¼" - 20", 5/16" - 16" 3/8" - 15", ½" - 12", ¾" - 9", 1" - 6"
Motor	7½ HP 3-Ph. 220-440 (single phase available)	
Pump	4 piston type	Angles - 4 x 4 x 3/8
Length	71.0"	Coper - 3" wide by 3" deep - cut 3/8" stock
Height	73.0"	Bending (optional) On 2" V Die 6" of ½" plate to 90° 18" of 5/16" plate to 90° 36" of ¼" plate to 90°
Width	32.0"	
Weight	Approx. 3000#	

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

You have purchased one of the most versatile and safe hydraulic iron working machines on the market today. With proper maintenance and care the METAL MUNCHER is so designed to be a long life productive machine in your plant or shop.

As with any tool, satisfactory use can best be had by a good start. With this in mind, the following check list should be gone through after receiving and installing your METAL MUNCHER.

1. Tighten all bolts, including knife and trunion bolts.
2. Tighten motor and pump mount bolts. Also check belt alignment.
3. Check pulley keys and set screws.
4. Check electrical connections.
5. Check cylinder tie bolts and hydraulic connections.
6. Check pins in valve control handles.
7. Check proper knife clearance (round & square, flat bar, angle and coper). Check knife section for proper clearance.
8. Make sure upper shear bar pivot pin nuts are "set".
9. Check set screw on shear bar clevis pin.
10. A standard machine is wired 220 three phase. Make certain unit complies with your power source. Wire in compliance with your local electric code.
11. Properly lubricate machine (see section on lubrication).

After ten hours of operation, diligently repeat the above check list. Then for continued satisfaction repeat the above every thirty days.

Always refer to your serial number when ordering parts or seeking information.

Always wear safety glasses.

KEEP HANDS OUT OF KNIFE AREAS

DISCONNECT POWER BEFORE WORKING ON UNIT

PUNCH PRESS

Being hydraulic and having a long stroke, the METAL MUNCHER press offers much more versatility than any other iron worker on the market. Tooling to be adapted to it is only limited by the imagination of the user.

As standard, your METAL MUNCHER is furnished with the following:

Punch Coupler
Punch Coupling Nut
Die Holder Block
Stripper
Shaft Guide

The shaft guide can be installed by sliding the clamp bar over the press shaft and with the guide shaft to the rear, raising it up to engage with a slot in the back of the press cylinder mounting plate. The shaft guide is used to prevent rotation of the press shaft when using other than round punches and dies.

The punch coupling is clamped to the press shaft and the die holder block is clamped to the press platen. Select a mating punch and die. Affix punch to coupler with coupling nut, insert die in die holder block. Check coupling nut repeatly. Carefully bring punch into die and center die with punch and tighten die block to press platen. Continued good alignment of punches and dies is very essential to long life of punches and dies. Check die for cutting edges. Keep punches and dies in good condition. Worn punches will increase stripping pressure and can warp material. A lubricant applied to punch will lengthened life of punch and ease stripping.

The stripper should be adjusted so that material will just slide under it. Washers provided with the stripper mounting bolts are used to vary the stripper height.

The METAL MUNCHER press can be used as a shop press. Shafts can be pushed from gears, pulley, etc. or can be used to push bearings into housings, press fitting parts. When pushing shafts from pulleys, etc., support should be given to the parts to prevent damage. Careful not to damage end of shaft. Special coupler is recommended. A "V" block is available on the METAL MUNCHER accessory list to aid in this type of work. Always keep work centered and properly aligned with press shaft.

Tubular lugs on the side of the press frame are for the bending depth control bolts used with certain bending dies. See accessory list.

In the press platen are four bolt holes tapped 1/2"-13 thd. These are primarily for retaining guides for lower bending dies, but can be used for holding tooling. Because of the long cylinder stroke and gap, the METAL MUNCHER adapts well to special tooling, die sets, etc.

FLAT SHEAR BAR

In addition to square shearing flat bars, mitre cuts can be made. For mitre cuts, mark stock to angle desired, slide through hold down, align mark with blade and shear. A production plate and squaring arm can be adapted for production work.

When shearing, ALWAYS keep hold down against material to atleast a slip fit. A loose hold down will allow material to be drawn or wedged between the knives, forcing them apart, putting an undue strain on the upper bar, and causing premature wear on the METAL MUNCHER. Squarer cuts are made with the hold down against the stock.

The METAL MUNCHER will cut approximately 17" of flat stock with the round and square knives in position to cut round and square bars. Up to 22" of flat stock can be cut by inverting

these two knives. Simply remove the two cap screws holding each round and square knife, invert knives, replace bolts.

Flat bar knives have four cutting edges and should be turned to a new edge when the used one becomes dull. The round and square knives have only one usable cutting edge for the round and square. Both flat edges can be used. Knives can be surface ground.

Maintain .005 to .010 clearance between flat bar knives. After sharpening shim knives to obtain clearance at pivot point. Adjust clearance at round and square with adjustable gib block and/or shims. Knives should be checked frequently for clearance. Dull knives increase burring and tend to give you a poor cut.

ANGLE SHEAR

The angle shear is basically for making 90° cuts in angles. Equal or unequal leg angles can be cut. To obtain a good 90° cut, it is important than the angle hold down be kept to a slip fit or tighter against the material. Make sure drop off end of angle is not higher than lower angle knives.

Where it is desirable to have a mitre cut on the end of an angle, this cut may be made in the coper.

The angle knives have only one cutting edge. After SN-2134, lower angle knives have four cutting edges. When dull, these knives can be resharpened. After sharpening, should the cut not be as good as original a correction can be made. Observe where the upper knife is first engaging the angle. Remove knife and with grinder remove metal on knife edge in this area. Remove only a small amount of material. Replace knife and check results. Continue to do this until cut is satisfactory. Grind slowly. DO NOT OVER HEAT knife. Maintain .005 to .010 clearance between upper and lower knives.

COPER-NOTCHER

The coper-notcher can be one of the most used factilities of your METAL MUNCHER. For longevity it is important that it be used properly. The right hand side of the blade is thicker than the left. This is to give shear or rake to the knife to reduce shearing pressure. The right side is to be favored in shearing as this throws the side pressure into the gib.

The lower coper knives have four cutting edges and should be turned to a new edge when dull. After sharpening, the knives are shimmed out for proper clearance. The sides should have .005 to .010 and the end should not have more than .062. Maintain a wide clearance on the end if consistently shearing thicker materials--up to 3/8". Otherwise use a closer tolerance for satisfactory coping of thinner materials. DO NOT EXCEED 3/8" THICK MILD STEEL.

HYDRAULIC SYSTEM

The METAL MUNCHER hydraulic system is a very basic and simple system and can be expected to give much satisfactory service with a minimum of attention.

As standard your METAL MUNCHER is equipped with a four piston pump with a reservoir capacity of seven quarts. To add oil to the system use a non-foaming, rust preventative, hydraulic oil or a non-detergent 10W oil. To check oil level have cylinder piston shafts retracted. The filler cap can be located under the press.

The system contains a relief valve which has been factory pre-set to operate your METAL MUNCHER to factory specifications. Breaking the seal and resetting the relief valve will void the warranty.

The pump may be rotated in either direction. Changing rotation will not affect controls. Pump does not have to be bled to remove air from lines or to prime it. Air will be forced from lines after several cycles.

At such time as pump may need rebuilding, it can be rebuilt in the field or returned to the factory for rebuilding and a new pump warranty.

LUBRICATION

Since your METAL MUNCHER is hydraulic, it has very few moving parts and requiring little lubrication. What it does need is important and should not be neglected. Greasing is as follows:

Bar Shear Cylinder Clevis	Every 10 Hours
Bar Shear Pivot Pin	Every 10 Hours
Bar Shear Trunion	Every 10 Hours
Bar Shear Gib	Every 5 Hours
Electric Motor	Every 2 Years

TROUBLE-SHOOTING----------HYDRAULICS

Loss of power check following:

* Motor and pump mount belts
* Pulleys, keys, set screws
* Belt alignment, tension, condition
* Oil Level
*
* Malfunctioning valve
* Oil by passing piston

ELECTRICAL---------Motor fails to start

* Check starter reset button
* Check main disconnect for "on" position
* Check line voltage below fuses. A fuse can be bad, but sufficient feed back to light a neon type circuit tester
* Check all connections
* Check circuitry through start-stop switch

SERVICE BULLETIN SECTION

Metal Muncher Service and Repair Bulletin No. S-55

Metal Muncher Hydraulic Pressure Problems

Models MM-60, MM-61B, MM-61C

CYLINDER CONTROL VALVES

Power for punching and shearing to capacity is derived from a hydraulic system delivering approximately 3750 PSI to the hydraulic control valves for the cylinders. One valve regulates the pressure to the press cylinder, the other to the shear cylinder. These valves are factory preset to deliver approximately 3500 PSI to the cylinder.

HYDRAULIC PUMP AND RELIEF VALVE

Pressure is derived from a four (4) piston hydraulic pump located inside the oil reservoir. There is also a hydraulic relief valve that is factory preset at approximately 3750 PSI. This valve is located here for a good reason. It should not be adjusted by an inexperienced person. If improperly adjusted to higher pressures you invite all kinds of machine damage. Its purpose is to protect the machine and the hydraulic pump. This pump is warranted by Williams Machine and Tool Co., Omaha, Nebraska. If you locate your problem in the pump or relief valve, read Williams pump warranty and service information bulletin. It was delivered to you with the METAL MUNCHER.

Remember, the built-in relief valve is preset at factory to the O.E.M. specifications. This relief valve should never be tampered with, but instead sent to Williams where proper testing equipment is available. Tampering with this relief valve will void the warranty.

REBUILT HYDRAULIC PUMPS

Williams can furnish rebuilt pumps, less reservoir, on an exchange basis. Rebuilt and guaranteed, the price is very reasonable. If you wish immediate service, a $15.00 charge will be added for the return of your pump, which will be refunded if main casting is useable when received. See Williams information sheet for instructions on how to remove the pump and relief valve from the reservoir.

LOCATING PRESSURE PROBLEMS

The two cylinders operate independently off the same hydraulic pump. Each cylinder has its own control valve. It is possible for one cylinder to be operating at capacity while the other does not.

If this is the problem then its fair to assume that the hydraulic pump is delivering the necessary oil pressure to one cylinder and that the other weak cylinder's control valve is mal-functioning or has gotten out of adjustment. The problem may also be located in the hydraulic cylinder.

WHAT TO DO IF CONTROL VALVE MAL–FUNCTIONS

If the pressure problem is traced to one of the cylinder control valves, call your dealer or Center Engineering Corp. No valve on the METAL MUNCHER is to be tampered with without approval. Breaking the seal on any valve will void the warranty on the machine. The pressure going into the cylinder part must be checked with a gauge.

IF NEITHER CYLINDER PERFORMS TO CAPACITY

In this case the problem may be in the hydraulic pump and relief valve area. To check this out follow this procedure.

1. Check motor belts. They may be loose and slipping.
2. Check pulley, keys, and set screws on drive. Make sure they are OK.
3. Check voltage at electric motor. It may be low.
4. Check oil in the reservoir. Have cylinder piston shafts retracted. The filler cap is on the top of the reservoir. The standard reservoir capacity is 7 quarts. The high volume pump reservoir capacity is 15 quarts. The oil level should be 2" from the top of the reservoir. If oil is low, add a non-foaming, rust preventative hydraulic or a non-detergent 10 W oil. Then test the machine at its rated capacity.

CHECK PUMP PRESSURE WITH GUAGE

If the above steps do not solve the problem, it is time to check the hydraulic pressure as it enters the cylinder.

Raise the piston to the top of = the cylinder. Remove hose (4) or (1) at the upper part of the cylinder. Attach an oil pressure guage to this hose (at least 5000 PSI guage). Screw a 3/8" plug in the port to prevent oil from leaking out.

Start the hydraulic pump. Move control lever downward. The guage should read approximately 3500 PSI. If pressure is low at the cylinder port another check with the guage should be made at the end of the hose coming from the pressure side of the pump. If the pressure at this point is approximately 3750 PSI the problems should be located in the control valve of the cylinder.

If the pressure at this point is low, it is fair to assume that the hydraulic relief valve in the reservoir is out of adjustment or something has gone wrong with the pump.

REMOVING PUMP FROM RESERVOIR

To determine this, remove the reservoir assembly from the METAL MUNCHER. Then remove pump from reservoir to inspect for mechanical failure. If the pump is in good mechanical condition the problem is probably in the relief valve. See Williams instructions for removing pump from reservoir.

The built-in relief valve is preset at factory to the O.E.M. specifications. DO NOT TAMPER WITH IT. Call your dealer, or Center Engineering.

CHECK CYLINDER FOR LEAKY RINGS

If the pressure at the cylinder is approximately 3500 PSI and the cylinder still does not reach its rated capacity a check should be made for possible by-pass leak in the piston area such as worn out O-rings.

With the piston located as far to the top as possible remove the plug and screw a cap on open end of hose. Start the hydraulic pump. Move the control lever upward. A little oil will always come out, but if a flow of oil does, it is a good sign that oil is by-passing the piston, reducing the effective pressure.

In this case the cylinder will have to be removed and repaired. Check for scored cylinder walls and shafts. O-rings may need replacing. A kit of O-rings is available. Refer to "Hydraulic Cylinder Service and Repair" bulletin.

CYLINDER SHAFT WILL NOT RAISE

If the cylinder shaft remains in a down position and will not raise upward when the control valve is engaged in the up position, the shaft has probably become disconnected from the piston.

The cylinder shaft is threaded at the top. The threads extend through the top of the piston far enough for a large nut to secure the shaft and piston together. This nut may have unscrewed resulting in the shaft dropping out of the piston. When this occurs the oil pressure from the bottom part simply circulates through the shaft hole in the piston with no lifting effect.

To correct this problem, remove the hex nuts from the top of the cylinder tie bolts. The tie down plate can then be removed. Then the cylinder and lower cylinder head. Remove the piston and loose nut from the cylinder barrel. Replace and secure the piston to the shaft. Then reassemble. Read Hydraulic Cylinder Repair and Maintenance bulletin for more detailed instructions.

Ref. No.	Part No.	Description	Qty. Req'd.
52	M249	Die Holder Block--2 3/8" Dies	1
53	M251	Die Locking Screw	1
54	M252	Clamping Bar	1
55	M253	Clamp Bolts--1/2-13 x 4 1/2 Gr.5 Hex Hd.	2
56	M107	Skirt	1
57	M164	Directional Control Plate	1
58	M164A	METAL MUNCHER Decal (diamond shape)	3
59	M164B	Mach. Serial No. & Capacity Chart (shear--punch)	1
59A	M164C	1/8" rivets	6
60	M147A	Bar Shear Pivot Pin (threaded type)	1
61	M147B	Bar Shear Pin Pivot Spacer 1 1/2"	1
62	M147C	1 1/2" Jam Nut	2
63	M147D	4044-32 Bronze Bushing	1

WHEN ORDERING PARTS ALWAYS GIVE SERIAL NUMBER.

SERIES MM-61 and MM-90 METAL MUNCHER

Parts Schematic Bulletin S-60A

Ref. No.	Part No.	Description	Qty. Req'd.
1	M223-B	Upper Coper Blade (keyed top)	1
2	M224-B	Lower Coper Blade (3"x3" coper,4-way)	2
3	M225-B	Lower Center Coper Blade (3"x3",4-way)	1
4	M146	1/2" Flat Socket Head Cap Screw	28
5	M226	Upper Angle Blade	1
6	M227-A	Vertical Lower Angle Blade (4-way)	1
7	M228-A	Horizontal Lower Angle Blade (4-way)	1
8	M142	Hold Down Hand Knobs	3
9	M144	Roll Pins 3/16 x 1 1/4	5
10	M147-E	7/8 x 7 Hex Cap Screw	2
11	M147-F	7/8 Lock Nut	2
12	M172	Door Latch	2
13	M231	Hand Knob--Cabinet Door	2
14	M149	1/4-20 x 1 Hex Head Cap Screw	4
15	M150	1/4-20 Hex Nuts	4
16	M232	Control Link	1
17	M152	Control Handle--Bar Shear (incl.17A)	1
18	M233	Flat Bar Hold Down Screws	2
19	M153	Control Linkage Assembly	1
20	M159-A	Plastic Hood	1
21	M234	Spacer--Flat Bar Hold Down	2
22	M132	Grease Fitting--1/4" Drive Straight	5
23	M235	3/4-10 x 6 Hex Cap Screw	2
24	M236	Flat Bar Knife (4-way)	2
25	M206-A	5/8 Jam Nut	4
26	M238	Round and Square Knife	2
27	M171	1/8 x 1/4 Type "U" Screw	8
28	M152-A	Control Handle, Press (incl.17A)	1
29	M239	Upper Bar--Flat Bar Hold Down	1
30	M240	Lower Bar--Flat Bar Hold Down	1
31	M154	1/2"-13 Hex Nut	8
32	M241	1/2" Flat Washer	24
33	M156	1/2"-13 x 1 1/2 Hex Bolt	4
34	M158	Stripper Bar	1
35	M167	1/2"-13 x 2 1/2 Hex Cap Screw	2
36	M126	Main Frame	1
37	M165	Start-Stop Station	1
38	M242-A	5/8 Set Screw	4
39	M243	2 1/4 O.D. x 2" I.D. x 1 3/4 L. Bronze Bushing	2
40	M133	Clevis Pin, Bar Shear	1
41		See Hydraulic Cylinder Schematics	
42	M244	Wear Gib	2
43	M245	5/8-11 x 4 1/4 Bolt w/Nut	4
44	M246	Mounting Block, Brass Gib	2
45	M247	Upper Shear Bar	1
46	M153	Control Rod and Arm	1
47	M162	Control Link	1
48	M163	5/16-18 x 1 Hex Bolt	5
49	M126-90	Series 90 Main Frame with 48" Press Bed	1
50	M248	Screw, Angle Hold Down	1
51	M108-A	Adjusting Stop for Brake	4

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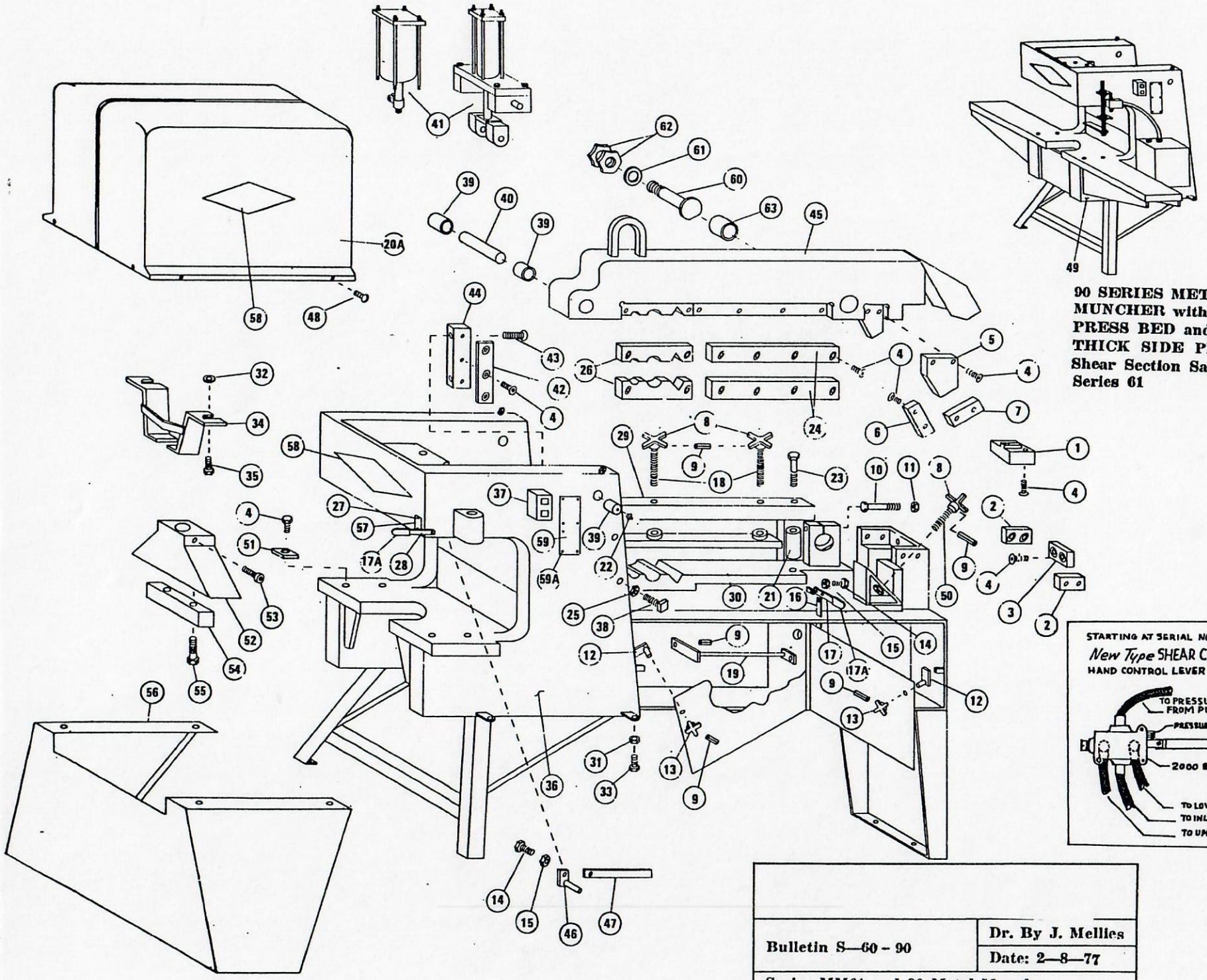


Bulletin S—60 - 90	Dr. By J. Mellies
	Date: 2—8—77
Series MM61 and 90 Metal Muncher	
Parts Schematic	

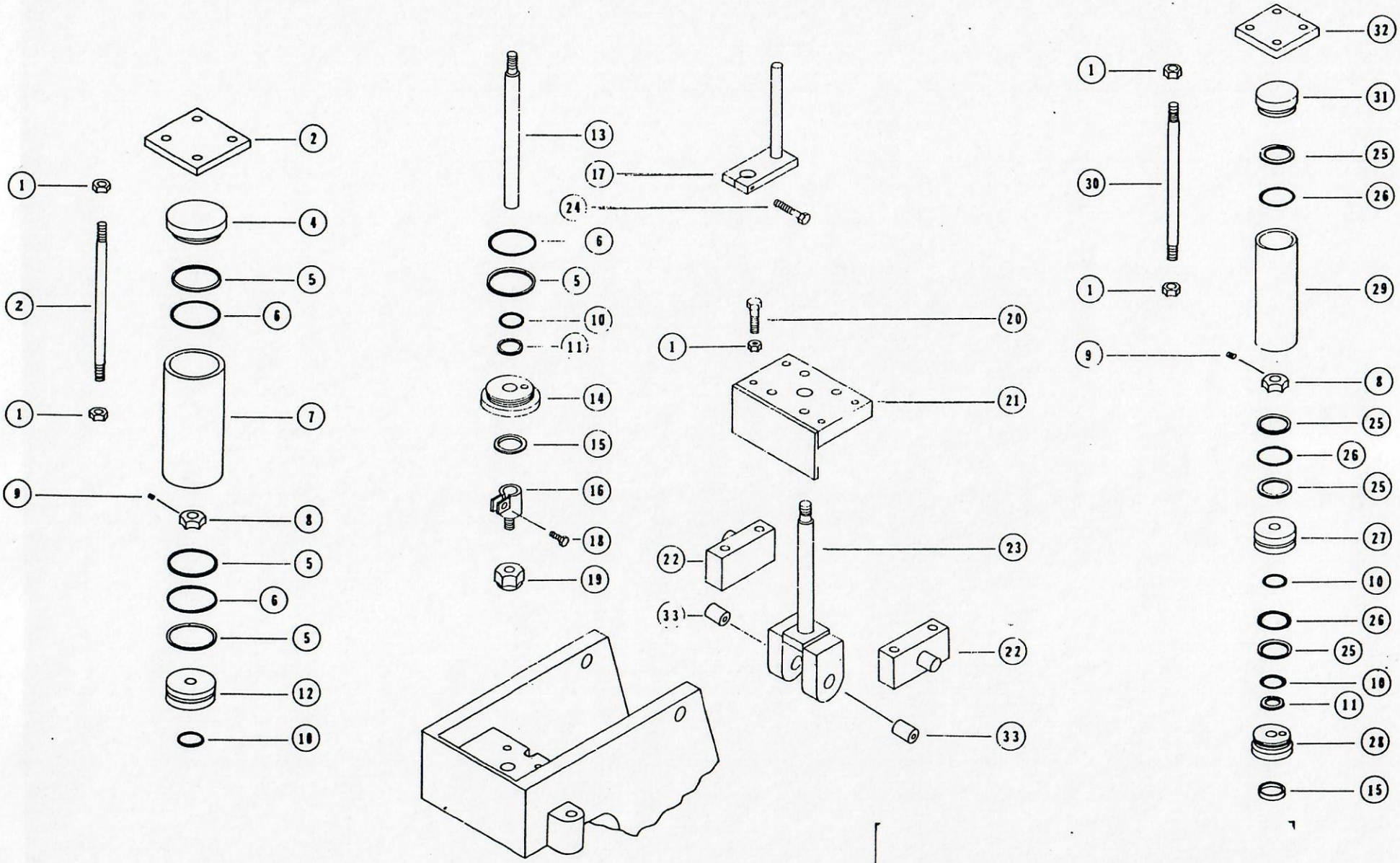
SERIES 90 CYLINDER PARTS

Service Bulletin S-59

Ref. No.	Part No.	Description	Qty. Req'd.
61	M-254	7/8" - 9 Hex Nut	16
62	M-255-8	Tie Down Plate - 8" cyl.	1
63	M-256	7/8" Tie Bolt	8
64	M11-A-8	Press Cyl. Plug - 8"	1
65	M-257-8	8" Back-up Ring	4
66	M-258-8	8" "O" Ring	3
67	M-259-8	8" Cylinder Barrel	1
68	M-291-8	Piston Stop Spacer	1
69	M-260-A	5/16 Socket Set Screw	1
70	M-260-8	2" Hex Nut	1
71	M-261-8	Piston - 8" Cylinder	1
72	M-120-8	"O" Ring Shaft Seal for 3" shaft	2
73	M-262-8	Press Cylinder Shaft 3" Dia.	1
74	M-263-8	Head - 8" Cylinder	1
75	M-123-8	Wiper Seal for 3" shaft	2
76	M-266-90	Coupler Nut Adapter - for #45 Nut	1
77	M-266-90A	5/8 x 2 Hex Head Cap Screw	1
*78	M-271	Punch Coupling Nut - #45 (std.)	1
79	M-292-8	Shaft Guide for 3" Shaft	1
80	M-293	1/2 x 3 Hex Cap Screw	1
1	M-254	7/8" - 9 Hex Nut	12
8	M-260	1 1/2" - 6 Hex Nut	1
9	M-260-A	5/16 Socket Set Screw	1
10	M-120	"O" Ring Seal - Shaft Seal 2"	2
11	M-114	Back-up Ring - Shaft Seal 2"	1
15	M-123	Wiper Seal 2"	1
20	M-272	7/8" - 9 Gr. 5 x 4 Cap Screw	4
21	M-273	Mounting Plate, Bar Shear Cyl.	1
22	M-274	Pivot Block	2
23	M-275	Piston Shaft - Clevis	1
25	M-112	4 1/2" Back-up Ring	4
26	M-113	4 1/2" "O" Ring	3
27	M-118	4 1/2" Piston	1
28	M-122	4 1/2" Head	1
29	M-276	4 1/2" Cylinder Barrel - Bar Shear	1
30	M-277	Tie Bolts - Bar Shear Cylinder	4
31	M-129	Head - Bar Shear Cylinder	1
32	M-110	Tie Down Plate - 4 1/2" Cylinder	1
33	M-243-A	.3236-16 Bronze Bushing - Clevis	2
	M-294	8" Cylinder Repair Kit (Press)	1
	M-295	4 1/2" Cylinder Repair Kit (Shear) (Kits includes all "O" rings, back-up rings, and wiper seal)	1
	M-297	8" Cylinder Complete & assembled less tie bolts	1
	M-298	4 1/2" Cylinder Complete & assembled less tie bolts	1

* If other than standard #45 Coupling Adapter specify type punch used.

WHEN ORDERING PARTS ALWAYS GIVE SERIAL NUMBER.



Bulletin S—58	Dr. By J. Mellies
	Date: 12—20—76
Series MM61 Metal Muncher	
Cylinder Parts Schematic	

NEW SERIES MM-61C STARTING WITH SERIAL NO. 2391

Hydraulic and Electric Parts

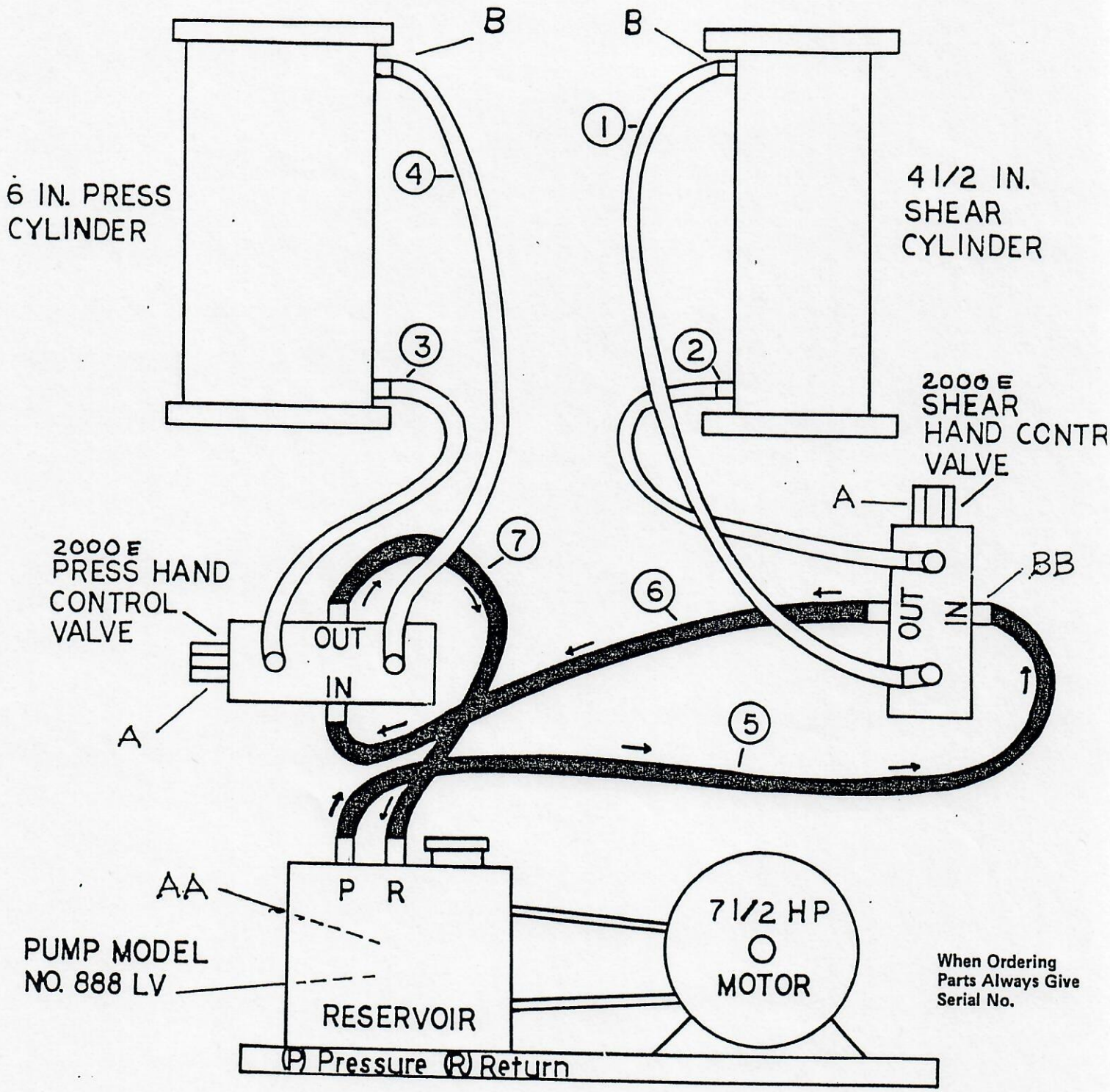
REF. NO.	PART NO.	DESCRIPTION	QTY. REQ,D.
1.	1-61C	Oil Hose Upper Port Shear Cyl. to Valve	1
2.	2-61C	Oil Hose Lower Port Shear Cyl. to Valve	1
3.	3-61C	Oil Hose Lower Port Press Cyl. to Valve	1
4.	4-61C	Oil Hose Upper Port Press Cyl. to Valve	1
5.	5-61C	Oil Hose Pump Pressure Line to Shear Cyl. Valve	1
6.	6-61C	Oil Hose Pressure Line from Shear Valve to Press Valve	1
7.	7-61C	Oil Hose Return Line from Press Valve to Pump	1
	M-282H	90° Hydraulic Elbows 3/8"	
	M-181	Hydraulic Control and Pressure Valve	1
	M-286	Signal Cable-Start-Stop to Starter 16/3 std.	1
	M-197	Pump Sheave	1
	M-203	Drive Belt	2
	M-202	Sheave Bushing, Motor Pulley 1 3/8" Bore	1
	M-201	Motor Sheave	1
	M-204	Oil Cap Pump Reservoir	1
	M-209	Hydraulic Pump Model 888-LV (less reservoir)	1
	M-210	7½ H.P. 1800 R.P.M. 3-Phase Motor	1
	M-290	Starter	1
	M-165	Start-Stop Station	1
	M-290A	Reducing Transformer (dual voltage)	1

See Bulletin S-58 for Hydraulic Cylinder Parts.

WHEN ORDERING PARTS ALWAYS GIVE SERIAL NUMBER.

New Series MM61C Hydraulic System

Starting With Serial No. 2391



When Ordering Parts Always Give Serial No.

A. Pressure Adjustment Valve For Cylinder. See Hydraulic System Service Bulletin No. S-55 For Instructions

A.A. Pressure Adjustment Valve in Reservoir. DO NOT TAMPER with this valve. See Hydraulic Service Bulletin No. S-55 for Instructions.

B. Check Hydraulic pressure at Cylinder with guage, Approx. 3500 P.S.I.

B.B. Check Pump Pressure to Cylinder Pressure Control Valve direct from pump. Appro. 3750 P.S.I.

SERIES 60 and 61 UP TO SERIAL NO. 2391

Hydraulic and Electric Parts

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ,D.
1.	1-60	Oil Hose Upper Port Shear Cyl. to Valve	1
2.	2-60	Oil Hose Lower Port Shear Cyl. to Valve	1
3.	3-60	Oil Hose Lower Port Press Cyl. to Valve	1
4.	4-60	Oil Hose Upper Port Press Cyl. to Valve	1
5.	5-60	Oil Hose Valve to Valve	1
6.	6-60	Oil Hose Ret. Line from Shear Valve to Pump	1
7.	7-60	Oil Hose Pump Pressure Line to Press Valve	1
	M-282H	90° Hydraulic Elbow 3/8"	
	M-181	Hydraulic Control and Pressure Valve	2
	M-286	Signal Cable—Start-Stop to Starter 16/3 std.	1
	M-197	Pump Sheave	1
	M-203	Drive Belt	2
	M-202	Sheave Bushing, Motor Pulley 1 3/8" Bore	1
	M-201	Motor Sheave	1
	M-204	Oil Cap Pump Reservoir	1
	M-209	Hydraulic Pump Model 888-LV (less reservoir)	1
	M-210	7½ H.P. 1800 R.P.M. 3-Phase Motor	1
	M-290	Starter	1
	M-165	Start-Stop Station	1
	M-290A	Reducing Transformer (dual voltage)	1

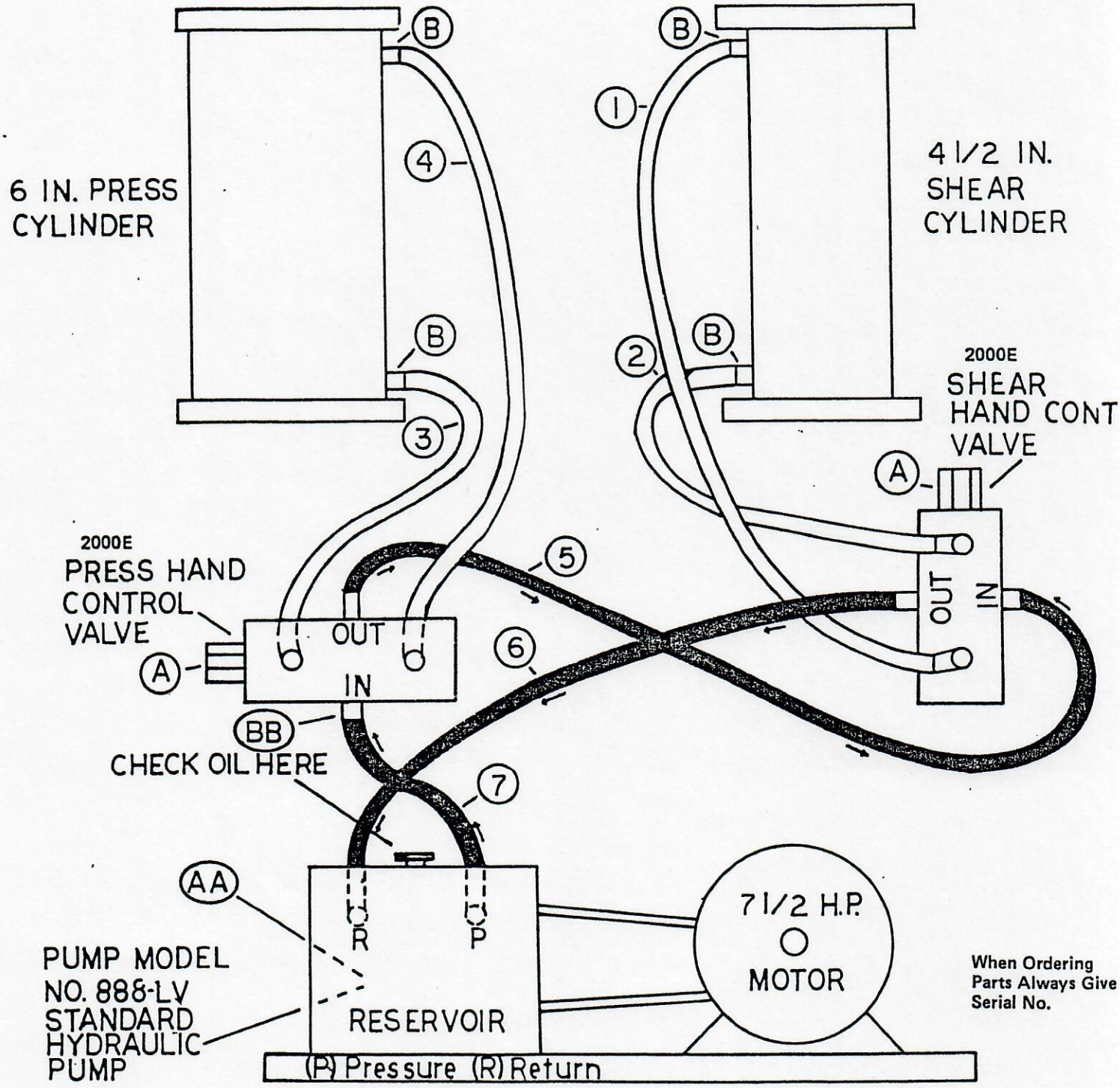
See Bulletin S-58 for Hydraulic Cylinder Parts.

WHEN ORDERING PARTS ALWAYS GIVE SERIAL NUMBER.

Series 60, 61B and 61C up to Serial No. 2391

Metal Muncher Hydraulic System

SERVICE BULLETIN S-50



When Ordering Parts Always Give Serial No.

A. Pressure Adjustment Valve For Cylinder. See Hydraulic System Service Bulletin No. S-55 For Instructions

A.A. Pressure Adjustment Valve in Reservoir. DO NOT TAMPER with this valve. See Hydraulic Service Bulletin No. S-55 for Instructions.

B. Check Hydraulic pressure at Cylinder with guage, Approx. 3500 P.S.I.

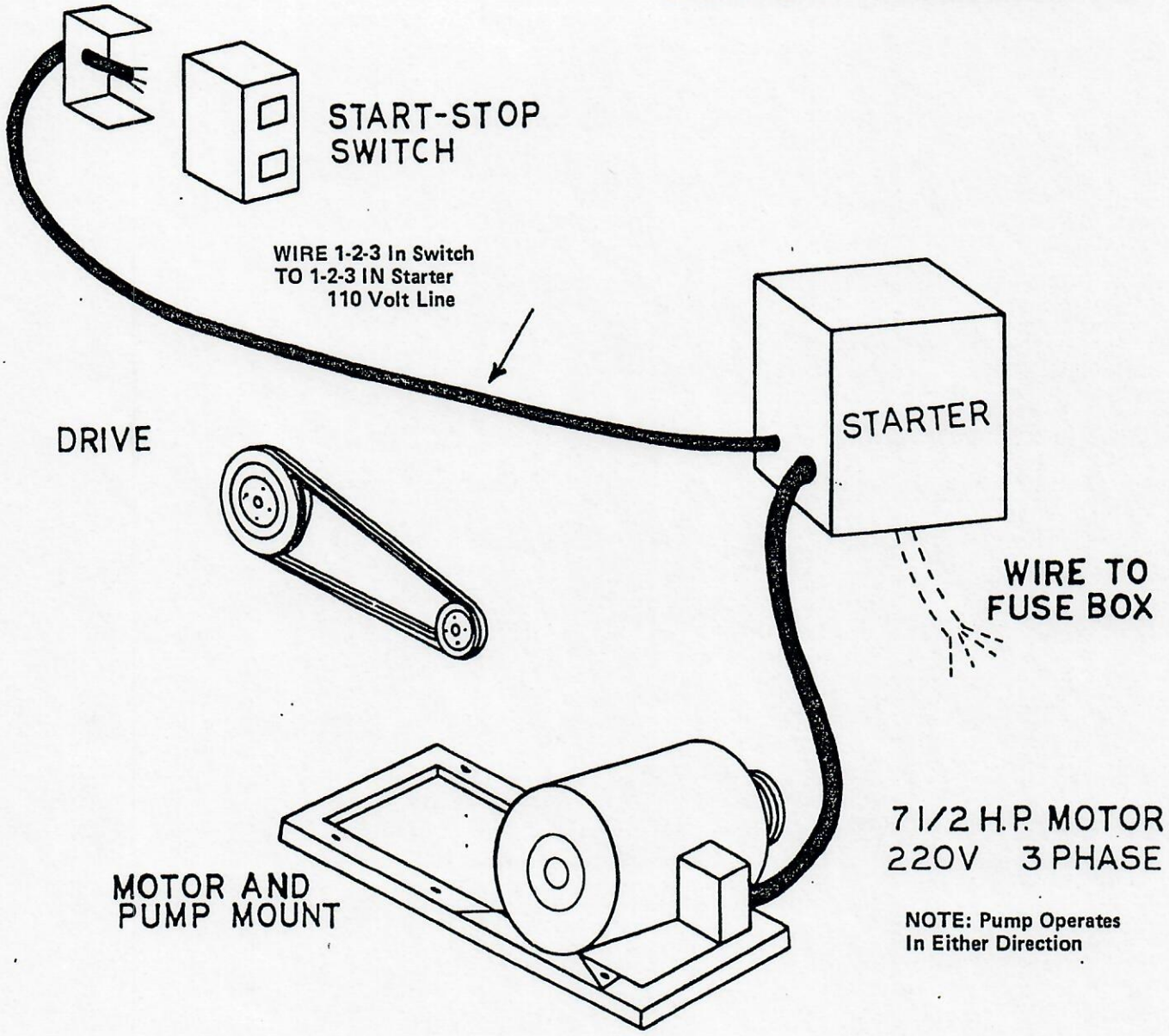
B.B. Check Pump Pressure to Cylinder Pressure Control Valve direct from pump. Appro. 3750 P.S.I.

Electricals

SERVICE BULLETIN S-50

Series 60 and 61

Metal Muncher



SERVICE SUGGESTIONS

MOTOR FAILS TO START

* Check Starter reset buttion.

* Check main disconnect for "on" position.

* Check line voltage below fuses. A fuse can be bad, but sufficient feed back to light a neon type circuit tester. Make sure there is sufficient power at machine.

* Check all connections and wire for loose connection or breakage.

* Check circuiting through Start-Stop switch.

MOTOR KICKS OFF FROM JAR

* Remove cover on start-stop switch. Tighten screws. In shipment and use, they can vibrate loose.

CAUTION: DON'T OVER TIGHTEN---- these small screws are easy to strip.

* Put extra rubber padding back of start-stop switch if above does not correct problem.

* Oil Motor every two years.

WHEN ORDERING PARTS
ALWAYS GIVE SERIAL NUMBER

See Parts List on 60-Page 10

SERVICE BULLETIN S—57

Metal Muncher Shear Blade Service and Repair Instructions

Maintenance is the key to better shearing and long blade life. A few minutes spent each week making sure that blades are tight, the clearance correct, and shear edges are good pays big dividends. The following suggestions will help you keep the METAL MUNCHER shear section in top working condition.

CAPACITIES. . . . Your METAL MUNCHER is engineered to do a wide range of shearing jobs. Its rated capacity is based on mild steel 50,000 lbs. P.S.I. The blades are made for shearing this type steel with some overload tolerance. Shearing harder materials can result in broken and chipped knives. The rated capacity for shearing is listed on the machine as well as in the specifications. Do not overload even though hydraulic relief valves protect the METAL MUNCHER.

WHEN ORDERING PARTS ALWAYS GIVE SERIAL NUMBER

BLADE CLEARANCE . . . . Proper shear blade clearance is essential to good cuts and blade wear. Maintain maximum of .005 clearance between upper and lower knives. Thin materials require close fitting blades and heavier materials a wider clearance. Too much clearance results in the material being drawn between the blades which not only puts too much stress on the machine but also results in a poor cut.

ADJUSTING BLADES. . . . Your METAL MUNCHER shear blades were factory set for shearing up to 3/8" mild steel at the coper and angle shear. Up to 1" plate at the flat shear. If clearance increases after use, or if you are shearing thinner materials, shims should be placed back of the blades to reduce the clearance if metal is drawing between blades.

TURNING BLADES. . . . With use, the sharp shear edges will wear and get dull. Most of the flat blades can be turned to a new edge. If the blade needs to be sharpened, replace the amount of metal removed with an equal thickness of back-up shim stock to obtain desired clearance.

SHARPENING BLADES. . . . When all useable edges of the shear blades are dull, the blade can be sharpened with a surface grinder. Grind only the flat sides--not the edges except on the upper angle blade which may need to be ground on the edge to fit the angle shape. If five or ten thousandth is removed from the width of the blade, back it up with an equal amount of shim stock to retain proper clearance between the blades.

KEEP BLADES TIGHT . . . . The biggest cause of blade damage is failure to keep the flat socket head cap screw tight. Most cap screws are easily accessible. Least accessible is the upper coper blade. Tighten ALL of the blade screws regularly.

GIB ADJUSTMENT. . . . Current model METAL MUNCHERS have two adjustable gibs at the front end of the shear bar. Earlier models have one. By shimming to proper blade clearance at the pivot area the gib adjustment can give you proper clearance and hold it at other points.

FITTING ANGLE BLADES. . . . If the upper angle blade is replaced or removed, it may be necessary to make a correction by additional grinding. Observe where the upper blade is first engaging the angle and deforming it. This area should be ground, a small amount at a time, until the upper angle blade contacts each side of the angle simultaneously. The point of the upper blade should strike the center of the angle. Grind slowly. DO NOT OVERHEAT blade. By proper grinding and fitting any one thickness of angle can be sheared with no deformity.

USING THE COPER-NOTCHER . . . . The upper coper blade is thicker on one side than the other. This is to give shear or rake to the blade to reduce shearing pressure. The thickest side of the blade should be favored when coping or notching. The lower blades have four cutting edges and should be turned to a new edge when dull. Remember too, proper clearance is most important. Maintain approximately .010 clearance on side blades and approximately 12% of material thickness on front blade. Keep the blade screws tight. Shim out when necessary.

INCREASE FLAT SHEAR LENGTH. . . . By inverting the round and square blades. Shear up to 22 inch wide plate this way.

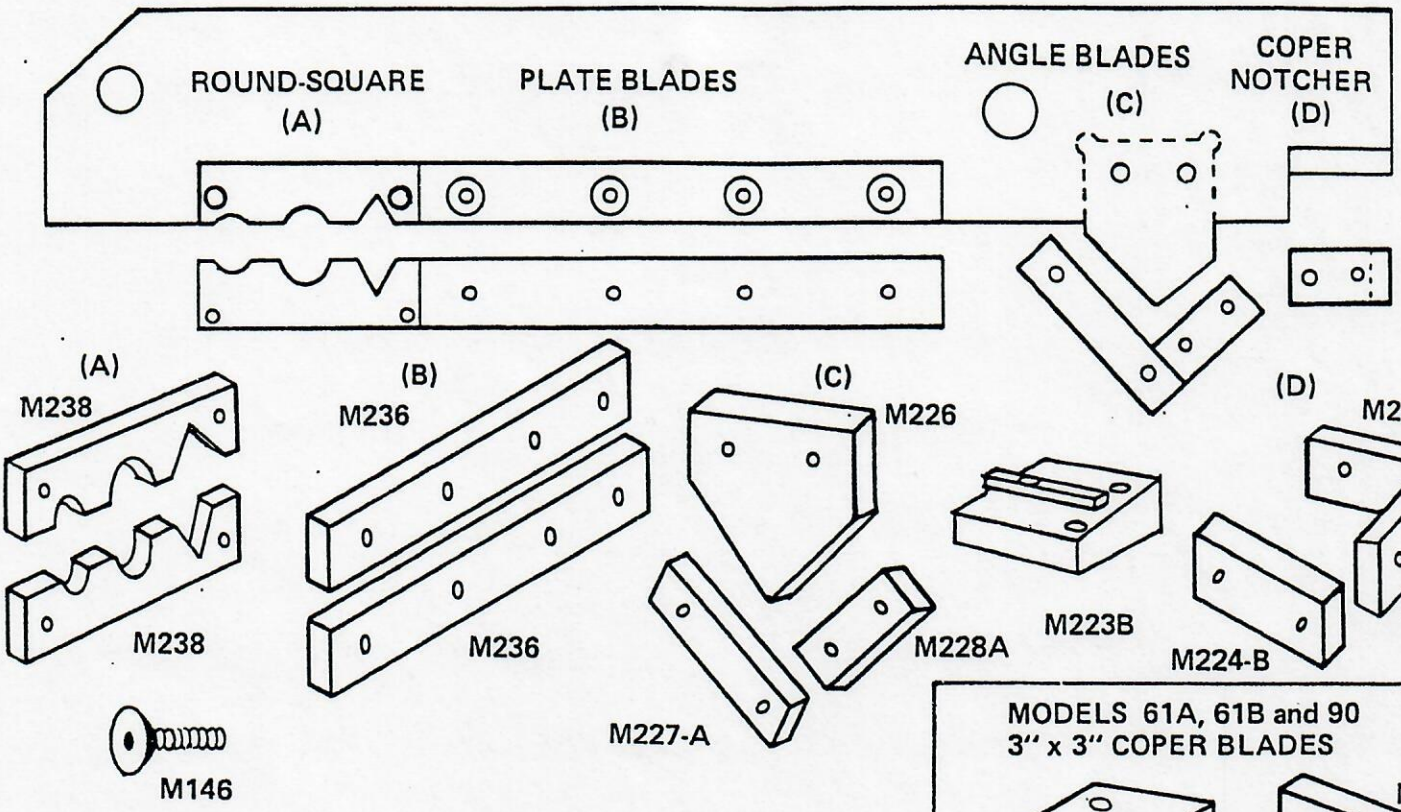
DEFORMING PLATE. . . . The heavier the plate, the closer to the shear bar pivot point, it will have to be positioned for cut off. Plate steel should be placed as far forward on the shear as possible to eliminate or reduce plate deforming.

HOLD DOWNS. . . . The more secure the material is held down, the squarer the blades will cut off the material. The hold downs also prevent material from tilting up and wedging between the blades and putting unnecessary strain on the shear bar.

FROZEN BLADE SCREWS. . . . If blade screws become frozen to a point that the allen wrench will not remove, weld a nut on the face of the screw and remove screw with wrench. Sometime liquid wrench will get the job done.

LUBRICATION. . . Grease bar shear pivot points every 10 hrs. Grease bar shear gibs every 5 hrs.

Treat Your Metal Muncher Right — It Will Treat You Right



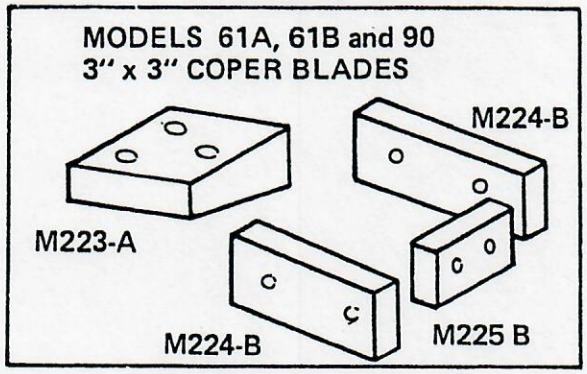
METAL MUNCHER SHEAR BLADES

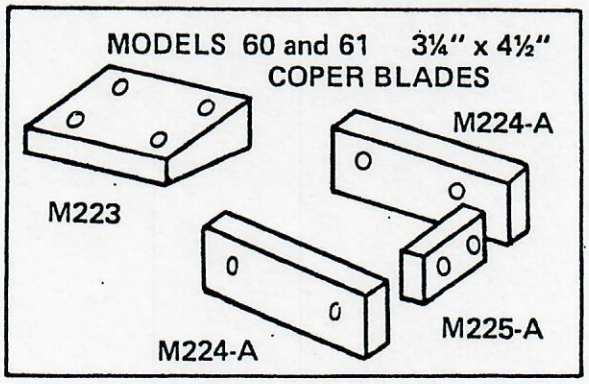
Models 61A, 61B, 61C, 90 and 90C

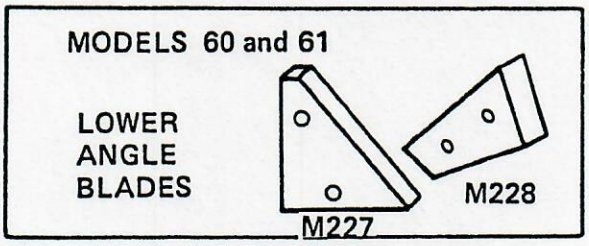
METAL MUNCHER shear blades are precision made of the finest grade tool steel and scientifically heat treated for toughness and long hard service. The blades above are for current model no. 61C. Differences in older models are shown in the boxes at the right.

Parts No.	Description	No.Req'd.
M-238	Round and Square Blade	2
M-236	Flat Bar Blade	2
M-226	Upper Angle Blade	1
M-227	Left Lower Angle Blade Models 60 & 61	1
M-228	Right Lower Angle Blade Model 60 & 61	1
M-227-A	Verti.Lower Angle Blade (4-way)	1
M-228-A	Horiz. Lower Angle Blade (4-way)	1
M-223	Upper Coper Blade Models 60 & 61 3¼" x 4¼"	1
M-224	Lower Coper Blade (flat type Model 60)	2
M-225	Lower Center Coper Blade (flat type Model 60)	1
M-224-A	Lower Coper Blade Models 60 & 61	2
M-225-A	Lower Center Coper Blade Models 60 & 61	1
M-223-A	Upper Coper Blade (no key) 3" x 3" 61A, 61B	1
M-223-B	Upper Coper Blade (keyed top) 3" x 3" 61C	1
M-224-B	Lower Coper Blade (3" x 3" coper) 61 A, B, C	2
M-225-B	Lower Center Coper Blade (3" x 3" coper) 61 A, B, C	1
M-146	½" Flat Socket Head Cap Screw	28

When Ordering Blades Always Specify Serial Number







BLADES FOR OLDER MODELS

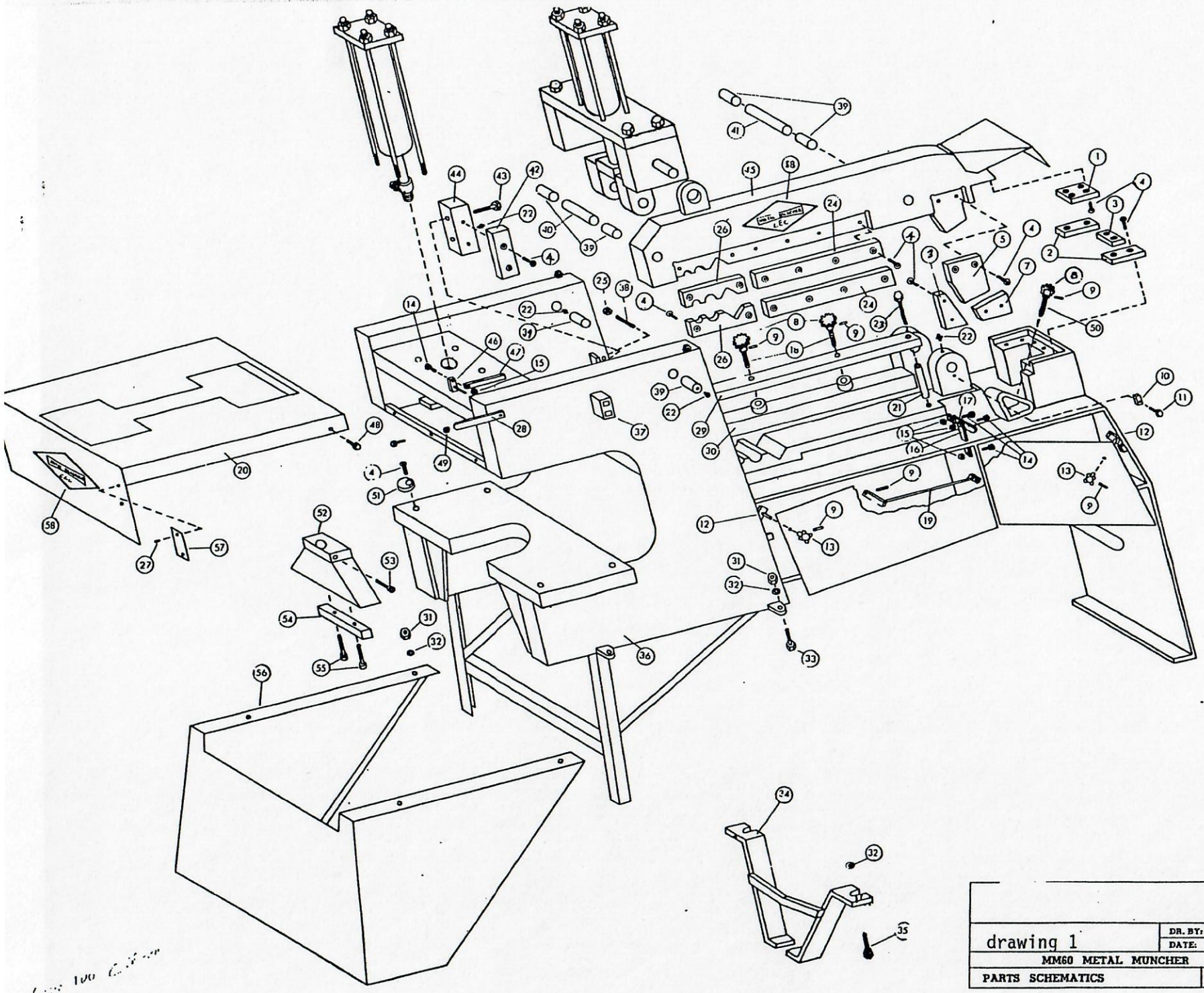
When ordering blades for Model 50 and other older models be sure to give serial number of unit and dimensions of blades.

DRAWING 1 PARTS SCHEMATIC

REF #	PARTS NO.	DESCRIPTION	REQ'D
1	M223	UPPER COPER KNIFE	1
2	M224	LOWER OUTER COPER KNIVES	2
3	M225	LOWER CENTER COPER KNIFE	1
4	M146	½-13x1½ FLAT SOCKET HEAD CAP SCREW	28
5	M226	UPPER ANGLE KNIFE	1
6	M227	LEFT LOWER ANGLE KNIFE	1
7	M228	RIGHT LOWER ANGLE KNIFE	1
8	M142	HOLD DOWN HAND KNOBS	3
9	M144	ROLL PINS, 3/16 x 1¼	6
10	M229	RETAINING LUG, BAR PIVOT PIN	2
11	M230	3/8-16 x 1 HEX CAP SCREW	2
12	M172	DOOR LATCH	2
13	M231	HAND KNOB, CABINET DOOR	2
14	M149	¼-20 x 1 HEX HEAD CAP SCREW	4
15	M150	¼-20 HEX NUTS	4
16	M232	CONTROL LINK	1
17	M152	CONTROL HANDLE, BAR SHEAR	1
18	M233	FLAT BAR HOLDOWN SCREWS	2
19	M153	CONTROL LINKAGE ASSEMBLY	1
20	M159	HOOD	1
21	M234	SPACER, FLAT BAR HOLDOWN	2
22	M132	GREASE FITTING, ¼" DRIVE STRAIGHT	7
23	M235	3/4-10 x 6 HEX CAP SCREW	2
24	M236	FLAT BAR KNIFE	2
25	M237	5/8-11 JAM NUT	2
26	M238	ROUND AND SQUARE KNIFE	2
27	M171	1/8 x ¼ TYPE "U" DRIVE SCREW	6
28	M131	BRONZE BUSHING, 2¼ O.D.x 2 I.D.x 2 L.	4
29	M239	UPPER BAR, FLAT BAR HOLDOWN	1
30	M240	LOWER BAR, FLAT BAR HOLDOWN	1
31	M154	½"-13 HEX NUT	8
32	M241	½" FLAT WASHER	24
33	M156	½" - 13 x 1½ HEX BOLT	4
34	M158	STRIPPER BAR	1
35	M167	½-13x2½ HEX CAP SCREW	2
36	M126	MAIN FRAME	1
37	M165	START/STOP STATION	1
38	M242	5/8-11x3 SOCKET SET SCREW	2
39	M243	2¼O.D.x2I.D.x13/4L. BRONZE BUSHING	2
40	M133	CLEVIS PIN, BAR SHEAR	1

Continued on next Page

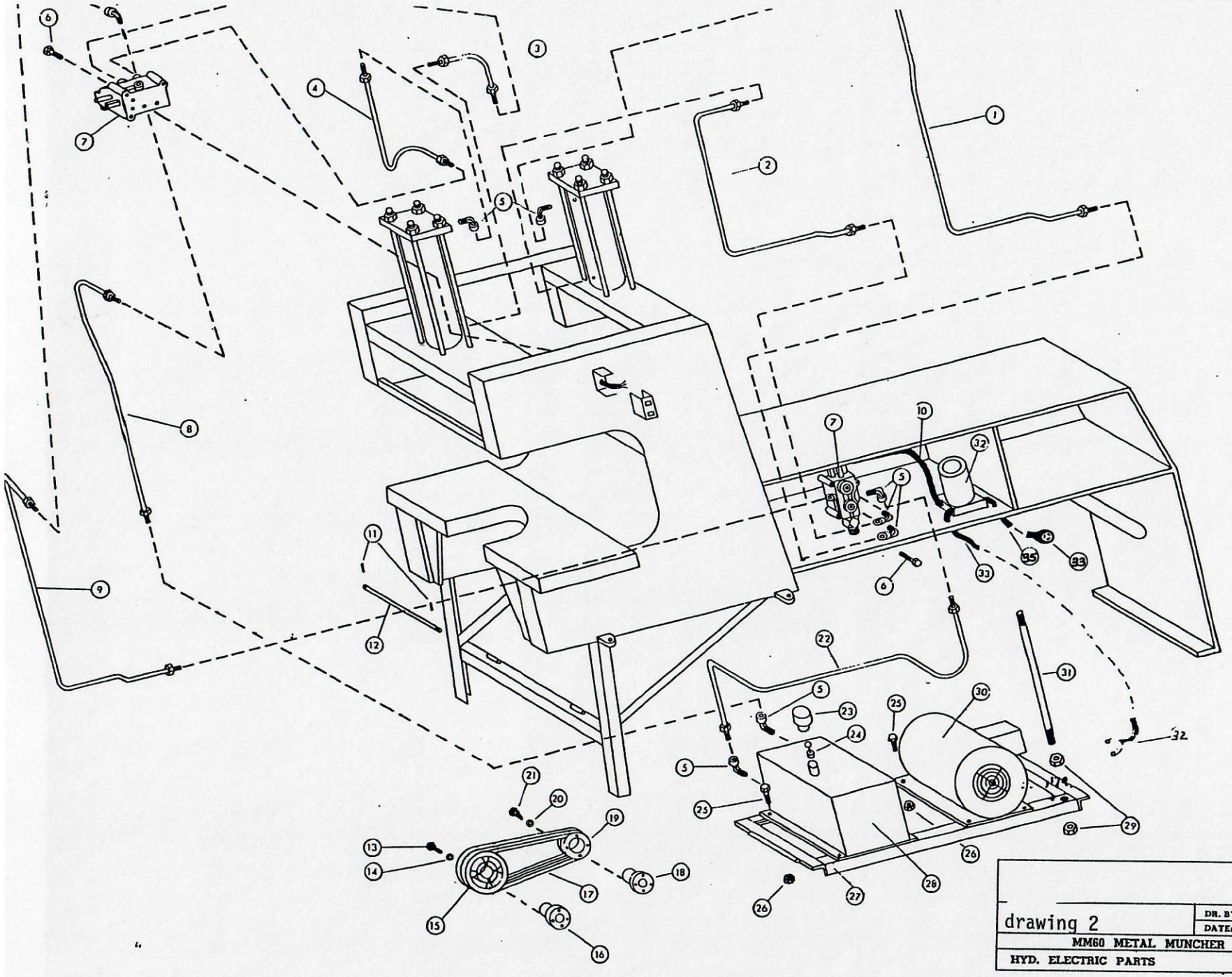
41	M147	BAR SHEAR PIVOT PIN	1
42	M244	BRASS GIB	1
43	M245	5/8-11x4¼ BOLT W/ NUT	2
44	M246	MOUNTING BLOCK, BRASS GIB	1
45	M247	UPPER SHEAR BAR	1
46	M153	CONTROL ROD AND ARM	1
47	M162	CONTROL LINK	1
48	M163	5/16 - 18 x 1 HEX BOLT	5
49	M170	5/16 - 18 HEX NUT	3
50	M248	SCREW, ANGLE HOLD DOWN	1
51	M108	ADJUSTING ECENTRIC (Optional)	4
52	M249	DIE HOLDER BLOCK - 2" DIES	1
	M250	DIE HOLDER BLOCK - 2 3/8" DIES	1
53	M251	DIE LOCKING SCREW	1
54	M252	CLAMPING BAR	1
55	M253	CLAMP BOLTS-½ - 13 x 4½ GR.5 HEX HEAD	2
56	M107	SKIRT	1
57	M164	DIRECTIONAL CONTROL PLATE	1
58		DECAL	3



drawing 1	DR. BY: L. E. L.
	DATE: 9-3-72
MM60 METAL MUNCHER	
PARTS SCHEMATICS	1 of 3

DRAWING 2 HYDRAULIC-ELECTRIC PARTS
SCHEMATIC

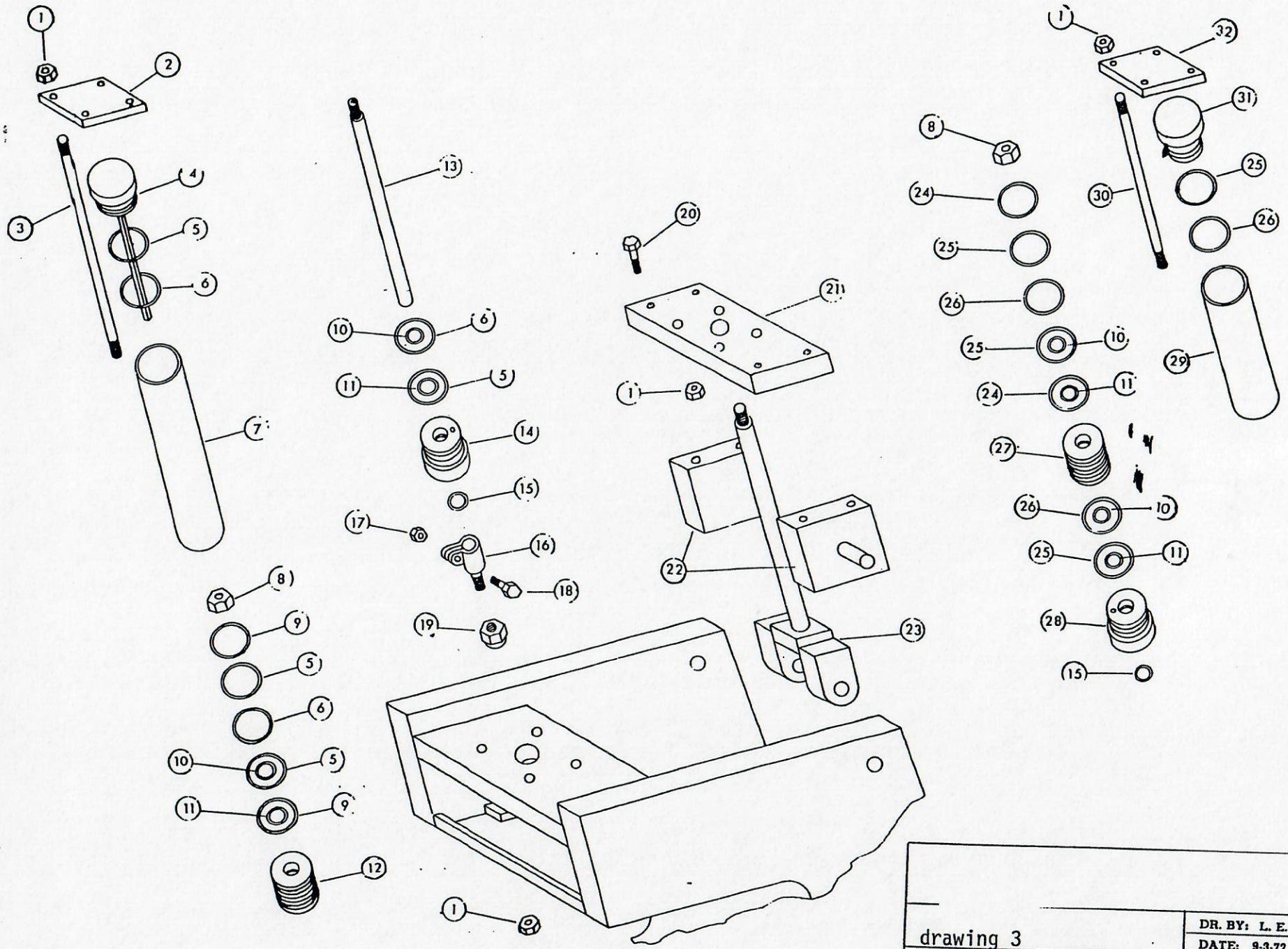
REF. #	PARTS NO.	DESCRIPTION	QTY REQ'D
1	M278	OIL LINE, UPPER PORT to VALUE	1
2	M279	OIL LINE, LOWER PORT to VALUE	1
3	M280	OIL LINE, LOWER PORT to VALUE	1
4	M281	OIL LINE, UPPER PORT to VALUE	1
5	M282	90° STEEL STREET ELL, 3/8" N.P.T.	8
6	M283	5/16" x 2¼" CAP SCREW	6
7	M181	HYDRAULIC CONTROL VALUE	2
8	M284	OIL LINE, PUMP PRESSURE LINE TO VALUE	1
9	M285	OIL LINE, VALUE to VALUE	1
10	M286	SIGNAL CABLE, START/STOP to STARTER 16/3 STO	1
11	M221	1/8 x 1 COTTER KEYS	2
12	M222	MOTOR-PUMP MOUNT PIN	1
13	M195	5/16"-24NF x 2 HEX CAP SCREW	3
14	M196	5/16 LOCK WASHER	3
15	M197	2B9.0 SHEAVE	1
16	M198	SHEAVE BUSHING, PUMP PULLEY	1
17	M203	47" B BELT	2
18	M202	SHEAVE BUSHING, MOTOR PULLEY- 1 3/8 BORE	1
	M202-A	OPTIONAL WITH SINGLE PHASE MOTOR 1 1/8 BORE	1
19	M201	2B4.8 MOTOR SHEAVE	1
20	M200	¼" LOCK WASHER	3
21	M199	¼-28NF x 2 HEX CAP SCREW	3
22	M287	OIL LINE, RETURN LINE VALUE TO PUMP	1
23	M204	OIL CAP PUMP	1
24	M205	OIL STRAINER	1
25	M206	5/16-18 NL x 1¼ HEX CAP SCREW	8
26	M208	PUMP AND MOTOR BASE	1
27	M209	HYDRAULIC PUMP	1
28	M213	3/4-10NC HEX NUTS	4
29	M210	7½ HP 1800 RPM 3PH MOTOR	1
	M211	OPTIONAL - 7½ HP 1PH MOTOR	1
30	M213	3/4" STUB BOLT, MOTOR HANGER	2
31	M288	10 ga. TONGUE TERMINAL CONNECTOR	4
32	M219	4 WIRE RANGE CAP- OPTIONAL	1
33	M289	4 WIRE 10ga. POWER CORD STO X 48"	1
34	M217	4-10 STO POWER CORD-OPTIONAL X 240"	1
35	M290	1 NEMA STARTER	1



drawing 2	DR. BY: L. E. L.
	DATE: 8-3-72
MM60 METAL MUNCHER	
HYD. ELECTRIC PARTS	2 of 3

DRAWING 3

REF NO.	PARTS NO.	DESCRIPYION	QTY REQ'D
1	M254	7/8"-9 HEX NUT	16
2	M255	TIE DOWN PLATE-6"CYL.	1
3	M256	7/8" TIE BOLT	4
4	M111	PRESS CYL. PLUG-4½"	1
	M11-A	PRESS CYL. PLUG-6"	1
5	M257	6" BACK UP RING	4
6	M258	6" "O" RING	3
7	M259	6" CYLINDER BARREL	1
8	M260	1½"-6 HEX NUT	1
9	M117	4½" CAST RING-NA 6" CYLINDER	2
10	M120	"O" RING SEAL, SHAFT SEAL	4
11	M114	BACK UP RING, SHAFT SEAL	4
12	M261	PISTON-6" CYLINDER	1
13	M262	PRESS CYLINDER SHAFT	1
14	M263	HEAD-6" CYLINDER	1
15	M123	WIPER SEAL	2
16	M264	PUNCH COUPLING ADAPTOR-37A NUT	1
	M265	PUNCH COUPLING ADAPTOR-37. NUT-OPT	
	M266	PUNCH COUPLING ADAPTOR-45 NUT-OPT	
17	M267	½-20 HEX NUT GR.5	1
18	M268	½-20 CAP SCREW GR.5	1
19	M269	PUNCH COUPLING NUT-37A	1
	M270	PUNCH COUPLING NUT-37	OPT
	M271	PUNCH COUPLING NUT-45	OPT
20	M272	7/8-9 GR.5x4 CAP SCREW	4
21	M273	MOUNTING PLATE, BAR SHEAR CYLINDER	1
22	M274	PIVOT BLOCK	2
23	M275	PISTON SHAFT-CLEVIS	1
24	M117	4½" CAST PISTON RING	2
25	M112	4½" BACK UP RING	4
26	M113	4½" "O" RING	3
27	M118	4½" PISTON	1
28	M122	4½" HEAD	1
29	M276	4½" CYLINDER BARREL BAR SHEAR	1
30	M277	TIE BOLT, BAR SHEAR CYLINDER	4
31	M129	HEAD, BAR SHEAR CYLINDER	1
32	M110	TIE DOWN PLATE-4½"CYLINDER	1



drawing 3	DR. BY: L. E. L. DATE: 9-3-72
MM60 METAL MUNCHER	
CYLINDER SCHEMATICS	3 of 3