

OPERATOR'S MANUAL

WORK SAFELY AT ALL TIMES

WITH QUALIFIED OPERATORS ONLY.

MODEL _____ **SERIAL#** _____

We, the undersigned, have read and understand the OPERATOR'S MANUAL.

QUALIFIED OPERATORS

NAME

SHIFT

DATE

NAME	SHIFT	DATE

Safety glasses are required when operating or observing this machine. Modification or alteration of this machine may be hazardous. Do not modify or alter this machine without Scotchman's written permission. Lesser quality parts may lead to injury.

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MODEL 207

**SCOTCHMAN
INDUSTRIES, INC.**

MODEL

207

OPERATOR'S

MANUAL

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1.0 INTRODUCTION

The Scotchman Ironworker is a versatile, multi-purpose, shearing, punching and forming machine engineered for trouble free operation. The design of the machine combines simplicity of operation with smooth, full stroke control. The ability of the operator to control the machine's direction of movement at any point in the stroke (stop, jog or reverse) gives the Scotchman Ironworker a tremendous advantage over mechanical machines. There is no chance of the Scotchman Ironworker being "accidentally tripped". The hydraulic system operates at a maximum pressure of 1,500 PSI and is protected from overload by a pilot operated relief valve.

2.0 WARRANTY

Scotchman Industries, Inc. will, within one (1) year of date of purchase, replace F.O.B. the factory or refund the purchase price for any goods which are defective in materials and workmanship, provided that the buyer returns the warranty registration card within thirty (30) days of purchase date and, at the seller's option, returns the defective goods freight and delivery prepaid to the seller, which shall be the buyer's sole and exclusive remedy for defective goods. Hydraulic and electrical components are subject to their respective manufacturer's warranties. This warranty does not apply to machines and/or components which have been altered, changed or modified in any way or subjected to abusive and abnormal use, inadequate maintenance and lubrication or subjected to use beyond seller's recommended capacities and specifications. In no event shall seller be liable for labor costs expended on such goods or consequential damages. Seller shall not be liable to purchaser or any other person for loss or damage, directly or indirectly arising from the use of the goods or from any other cause. No officer, employee or agent of seller is authorized to make any oral representations or warranty of fitness or to waive any of the foregoing terms of sale and none shall be binding on the seller .

3.0 INSTALLATION

⊠ CAUTION: THIS SECTION DISCUSSES INSTALLATION AND SET-UP PROCEDURES. PLEASE READ THOROUGHLY BEFORE OPERATING THIS IRONWORKER.

3.1 PHYSICAL DIMENSIONS

HEIGHT 48 INCHES

LENGTH 33 INCHES

WIDTH 24 INCHES

WEIGHT 550 POUNDS

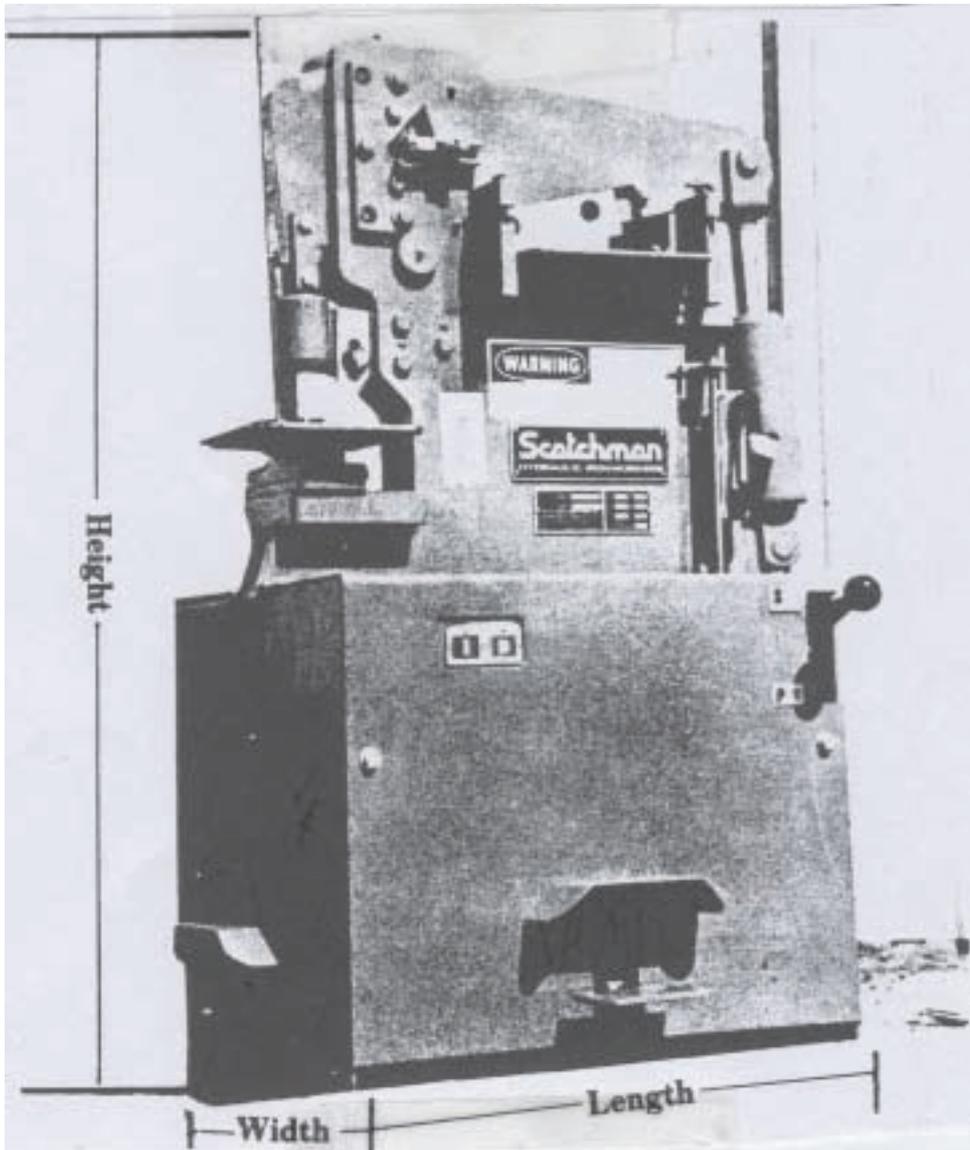


FIGURE 1

3.2 MACHINE MOVING PROCEDURES

There are two recommended methods of moving the Model 207.

⊗ CAUTION: MAKE SURE THAT ANY LIFTING DEVICE HAS ADEQUATE CAPACITY BEFORE ATTEMPTING TO PICK UP THE MACHINE.

The 207 does not have to be level or stationary to operate. FIGURE 2 demonstrates the use of a forklift.

For safety purposes, the forks should be spread so as to fit just inside the legs of the machine. Lift only on the square tubing side rails or under the 2 x 4 skids. Do not back away from the machine with the forks tilted up, as this could cause interior damage to the machine.

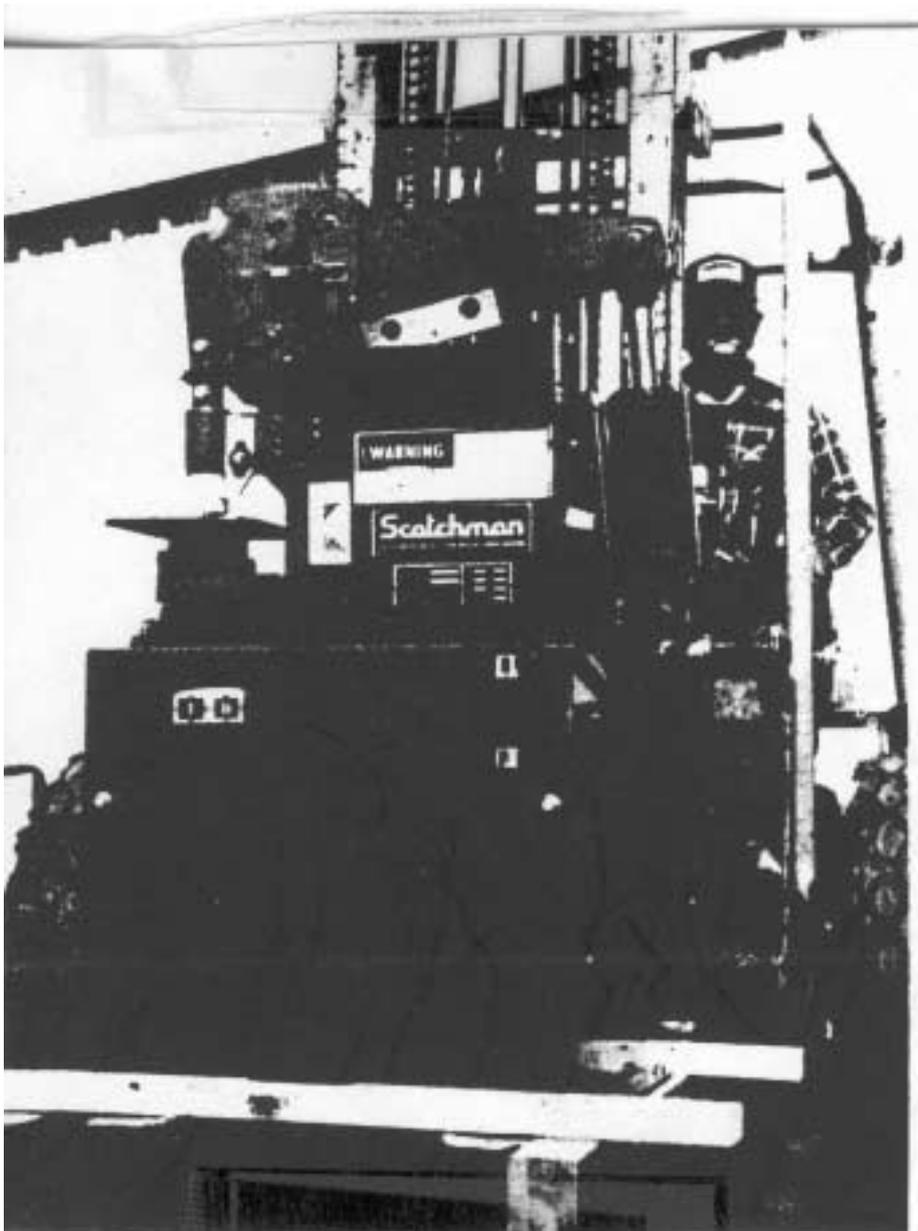


FIGURE 2

FIGURE 3 demonstrates an overhead lift for the Model 207.

⊠ **NOTE:** The lift must not be made on the beam by wrapping the chain or strap between the pivot pin and the top angle blade holder area of the beam, as that may damage the control linkage or .move it out of adjustment.

To lift the 207, hook one end of a chain in the vertical plate welded on top of the beam support ears. Remove the hold down roller and run the other end of the chain through the right hand hold down bracket, Place the right hand allen wrench back in its place, passing through one of the chain links, to hold it in place. The chain may now be used to lift the 207.

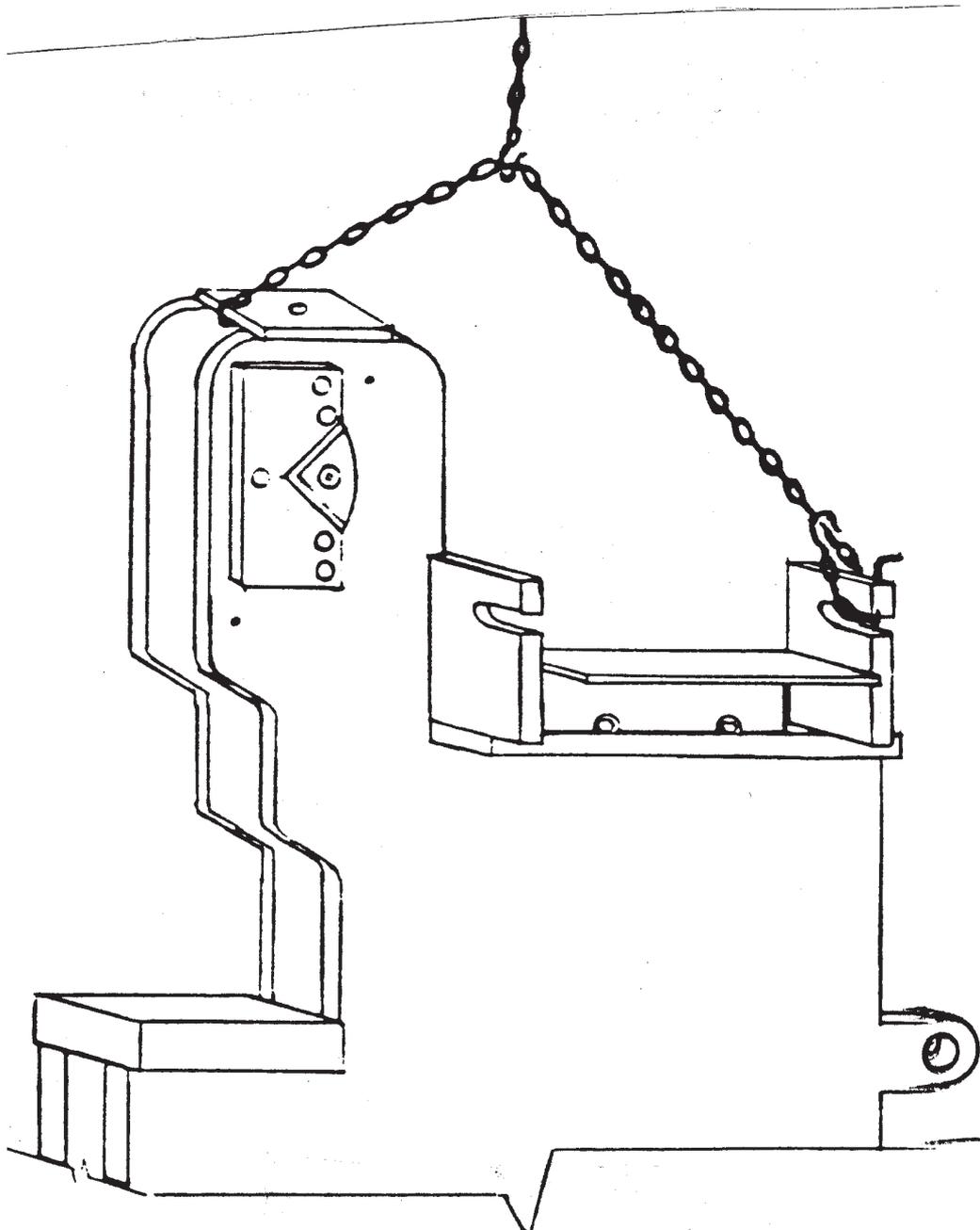


FIGURE 3

3.3 PHYSICAL INSPECTION

Any damage to the machine during shipment should be reported to the delivery carrier immediately and a damage report made out so that a claim can be placed. The carrier is responsible for shipping damage, but it is the customer's responsibility to report damages, external or internal, immediately.

After the machine has been located, the shroud on the operator's side of the machine should be removed and an inspection made of the interior of the machine for missing or damaged parts.

CHECK SPECIFICALLY:

- A. The foot pedal linkage should operate freely, all pins and keys in place.
- B. The spool should work freely in the valve.
- C. Check all nuts, especially on the base of the motor and pump, to be sure that they are tight.
- D. Check the hydraulic oil level in the tank. It should be 1-1/2 to 2-1/2 inches below the top of the tank.
- E. The machine should be received with the punch in the down position, the punch being inserted in the die. This insures that the punch and die have not been knocked out of alignment in shipment. If the punch is in the up position when you receive your machine, align your punch and die before operating your 207. For instructions, SEE SECTION B ON PAGE 13.

3.4 ELECTRICAL REQUIREMENTS

All machines are wired 230V -3 Phase-60 Hz unless order is specified otherwise. (Motors are dual voltage 230-460 and may be rewired for higher voltage per instructions on the motor. Switch boxes are NOT dual voltage and a new box must be supplied with a voltage changeover.)

⊠ CAUTION: TO PREVENT DAMAGE TO THE MOTOR AND DANGER TO THE OPERATOR, ALL ELECTRICAL CONNECTIONS SHOULD BE MADE BY A LICENSED ELECTRICIAN.

For supply cords ten foot or shorter, we recommend at least 12 gauge and preferably, 10 gauge. For longer cords, use at least 10 gauge and preferably, 8 gauge. After connecting the electrical power and making physical inspection, remove all objects (tools, wrenches etc.) away from the work area on the machine. Turn the machine on momentarily and note the rotation of the motor and pump. Rotation is indicated on the pump. If the rotation is not correct, the electrician will have to switch two of the three input wires.

MOTOR VOLTAGE (V AC)	FULL LOAD CURRENT (AMPS)
208/3 ph	9.7
230/3 ph	8.8
460/3 ph	4.4
220/1 ph	19.5

Full voltage Magnetic Starter 600 V AC

LE1-D

• CHANGING COIL



- Visible coil voltage
 - Quick, simple coil change.
 - ① Unscrew 2 cover screws.
 - ② Remove the contact housing.
 - ③ Pull out the coil.
- Replacement should be done in the reverse order.

• SPARE COILS (1) Max. supply variation — 15 to + 10%

Coil voltage 60Hz (1)	24	120	200	240	480	600
LE1-D12 LX1-D	09020	09110	09200	09220	09415	09550
LE1-D25 LX1-D	16021	16110	16200	16220	16415	16550
LE1-D40 LX6-D	40020	40100	40175	40200	40415	40500
Coil voltage 50Hz (1)	24	110	220	380	440	500
LE1-D12 LX1-D	09024	09110	09220	09380	09415	09500
LE1-D25 LX1-D	16024	16110	16220	16380	16415	16500
LE1-D40 LX6-D	40024	40110	40220	40380	40440	40500

• MOUNTING THE OVERLOAD RELAY



- ① Unscrew the terminal screws.
 - ② Put the overload in to the proper position.
 - ③ Tighten the screws.
- Note : The relay can be mounted up to an angle of $\pm 30^\circ$ maximum from the vertical position forwards or backwards, but never sideways.

• WIRING

A CONTROL CIRCUIT : Connect the 2 wires coming from terminals ③ and ① to the terminals ②5 and ②6 of the overload relay.

A1 COVER PUSHBUTTON OPERATION : Ready for use.

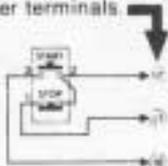
A2 REMOTE PUSHBUTTON STATION OPERATION : See below.

A3 FLOAT SWITCH LIMIT SWITCH... OPERATION : See below.

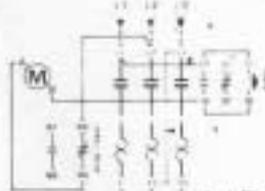
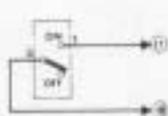
REMOTE CONTROL :

- Remove jumper (X)
- Connect control wires to starter terminals.

A2



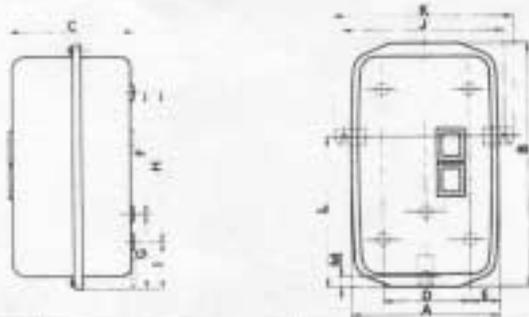
A3



LE1-D40 only.

• MOUNTING CENTERS AND DIMENSIONS.

RECOMMENDED FIXING SCREWS : 1/4-20.



NEMA	LE1-D12.../LE1-D25...		LE1-D40...		
Y	12	Inches	m/m	Inches	m/m
A	6	5/16	160	7 1/8	181
B	9	29/32	251.5	12 1/2	317
C	5	1/16	128.5	6 1/16	154
D	3	11/32	85	4 1/8	105
E	1	15/32	37.5	1 1/2	38
F	5	23/32	145	-	-
G	1	13/16	46.2	-	-
H	-	-	-	7 11/16	195
I	-	-	-	2 1/2	64
- J	6	5/8	168	7 9/16	192
- K	7	13/16	198	8 3/4	222
- L	5	15/32	138.7	7 3/32	180
- M	-	-	-	5/16	B

B MOTOR CIRCUIT :

B1 THREE PHASE MOTOR :

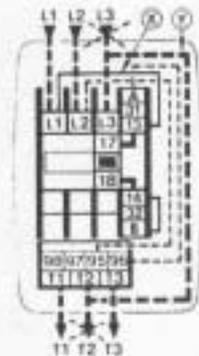
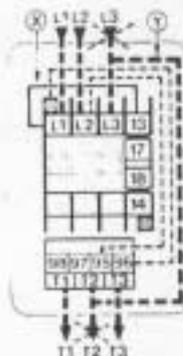
Connect ① ② ③ to the motor and ① ② ③ to the supply.

B2 SINGLE PHASE MOTOR (X) :

Connect an additional jumper (Y) rated in accordance with the motor F.L.C. between ② and ③. Connect ① and ③ to the motor, ① and ② to the supply.

LE1-D12 /LE1-D25.

LE1-D40.



• CONNECTIONS

- Captive riding saddle clamp or connector terminal.
- Maximum capacity : 1 or 2 solid or stranded copper wires.
- Basic aux. contacts or contact attachments : AWG.12.



Power Circuit

LE1-D12
AWG.12

LE1-D25
AWG.10

AWG.14 extra control connexions



Power Circuit :

LE1-D40
AWG.6

FIGURE 4

3.5 MACHINE STROKE INSPECTION

The **OVERALL STROKE** on the 207 has been pre-set correctly at the factory, but should be checked to see that the linkage has not worked loose or damage occurred during shipment. Set the stroke adjustment handles as far apart as possible. (For parts identification, SEE FIGURE 5.) With the machine running,, set the select lever to **PUNCH** mode. Be sure that 2 x 2 x 1/4 angle iron will fit into the angle shear. If not, loosen the bolt on the stroke adjustment block and raise the block until adequate clearance, to just let the 2 x 2 x 1/4 angle pass through freely, is obtained. Now, set the select lever to **SHEAR** mode. The blades should be open about 1/8" at the closest point. If there is not at least 1/8" opening, the clearance on the 2 x 2 x 1/4 angle has been set too great and the stroke adjustment block will have to be lowered.

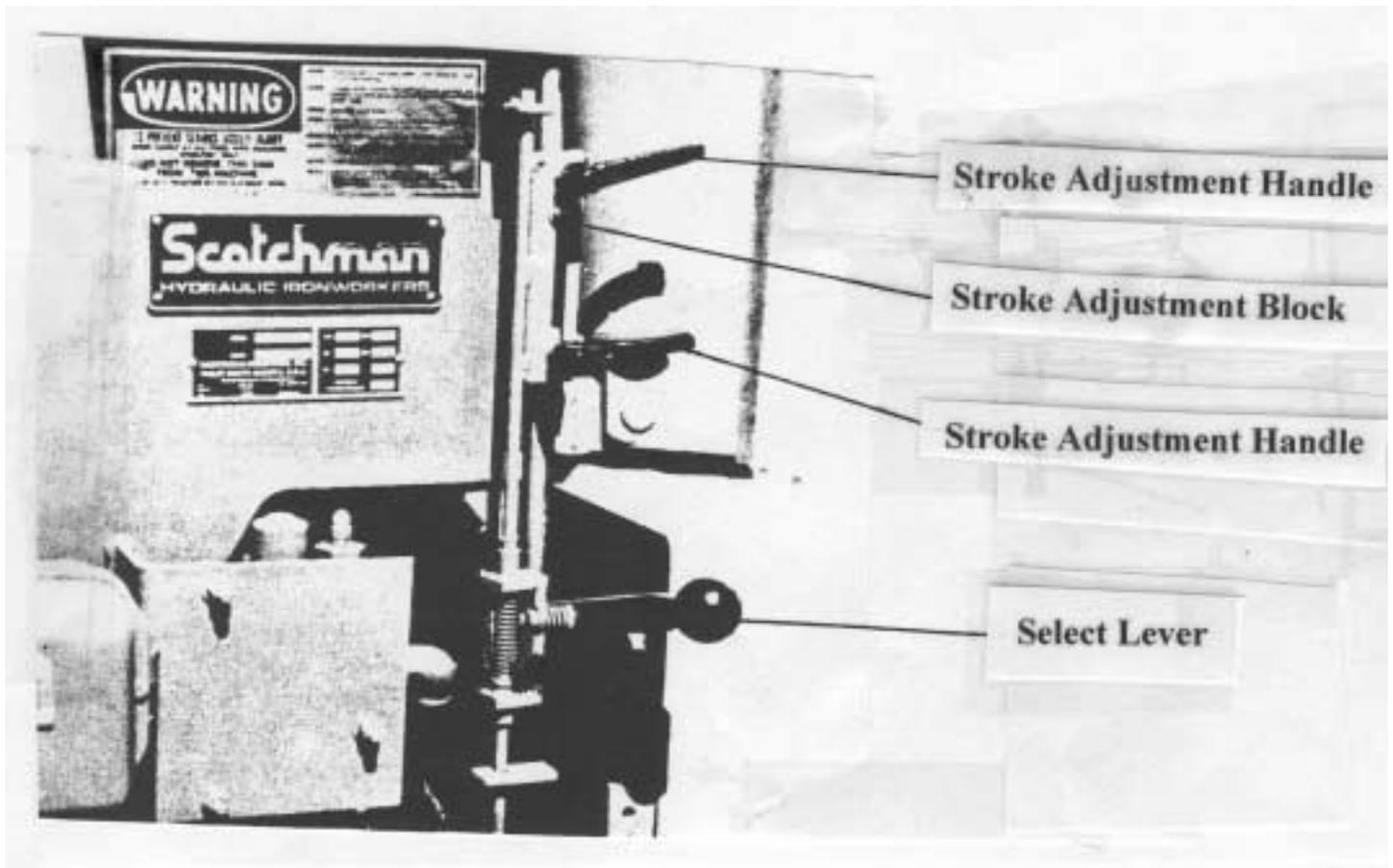


FIGURE 5

4.0 MAINTENANCE

The Scotchman Ironworker is an exceptionally “rugged” machine designed for long life with a minimum amount of maintenance. A regular program of servicing will extend the machine’s life and prevent costly downtime.

4.1 LUBRICATION

- **IMPORTANT:** Before operating the 207, apply oil to the bar shear blades, the angle shear blades and the punch and die.

Re-oil punches and dies every five to ten cuts and blades every 10 to 15 cuts. The oil will allow the machine to shear, punch and strip more easily and increase tool life considerably. We recommend cutting oil or motor oil swabbed on with a small brush or applied with a squirt can or a spray applicator. Apply oil to the clevis pin.

LUBRICATION CHART

ONCE PER DAY:

1. Grease the zerk on the beam pivot pin.
2. Grease the four zerks, located around the angle shear on the operator’s side of the machine.
3. Grease the two zerks on the pressure plate (one in each end).

ONCE PER WEEK:

1. Grease the zerk in the pressure block on top of the punch ram.
2. Grease the zerk on the side of the punch barrel guide.
3. Apply grease to the surface of the beam guide wear plates on the outer end of the main beam (parts 3 and 4 on page 24).

ONCE PER YEAR:

Change the hydraulic oil. Disconnect the hydraulic hose that runs from the tank to the pump at the bottom of the tank and allow it to drain. Refill with approximately ten quarts of medium weight, non-foaming hydraulic oil. The oil level needs to be 1-1/2" to 2" from the top of the tank.

5.0 MACHINE OPERATION

Each operator should familiarize himself with the following practices and safety precautions.

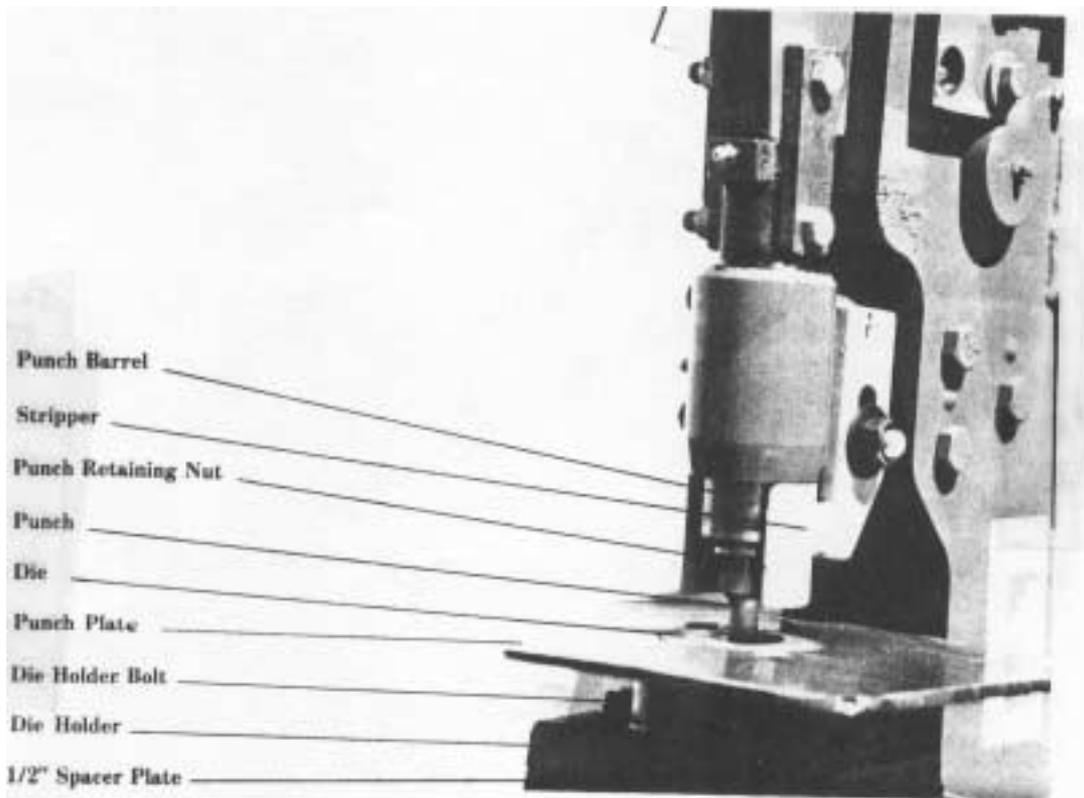


FIGURE 6 (PUNCH PART IDENTIFICATION)

5.1 PUNCH OPERATION

A. SELECT THE PROPER PUNCH AND DIE.

The 207 Ironworker uses the #20 punches and dies that have a built-in clearance of 1/32 of an inch.

Under normal punching conditions, a punch will use a corresponding die stamped the same size.

(A 3/8" punch will be used with a die stamped 3/8".) In some cases, when punching 1/2" thick steel or material harder than mild steel, it may be desirable to use a 1/16" larger die, which will reduce the tonnage requirements and provide less shock.

B. INSTALLING PUNCHES AND DIES.

- 1. Turn the machine on and put the changeover lever in SHEAR position. This will run the punch down into the die, which is necessary for the proper alignment of the new punch and die.**
- 2. Remove the stripper guard and the stripper.**
- 3. Completely loosen the two bolts that hold the die holder in place. Raise the die holder and remove the 1/2" spacer plate from under it. Now the die holder can be removed from the machine.**
- 4. Loosen the set screw in the front side of the die holder and remove the die. Insert the new die so that the ground flat area aligns with the set screw. Then, tighten the screw.**
- 5. Remove the punch retaining nut and punch. Install the new punch and tighten it firmly in place. (If a square or slot punch is being used, do not tighten the retaining nut until after the die holder is put back into place. This is necessary to obtain proper alignment.)**
- 6. Place the die holder so that the punch enters the die, then lift it up to allow the 1/2" spacer plate to be put back under the die holder. Adjust the die holder so that there is equal clearance between the punch and die on all sides. Tighten the two die holder bolts firmly. (Tighten the punch retaining nut at this time, if a square or slot punch is being used.)**
- 7. Install the stripper, stripper washers and guard. The washers are used to reduce the clearance between the stripper and the material being punched. The stripper should be lowered so that the material will just pass under it freely. This will reduce stripping time. If a variety of material thicknesses will be punched, no washers should be installed.**
- 8. Adjust the stroke control handles to provide the minimum stroke required for each job. This will decrease cycle time.**

C. LUBRICATE THE PUNCH AND DIE.

Oil should be applied before the first hole is punched and every 5 to 10 cuts, thereafter. This will increase punch life considerably and allow the machine to punch and strip more easily.

D. CHECK PUNCHING TOOLS FOR TIGHTNESS.

Tools should be checked at the start of each operation and intermittently during the day. Check the punch securing nut, stripper, die and die holder. Tools tend to loosen under punching shock. Keep them tight to prevent punch to die contact.

E. CONTACT BOTH SIDES OF THE STRIPPER. Material to be punched must contact or straddle both sides of the stripper. An unbalanced stripping load will occur, causing punch breakage, if this practice is not observed.

F. SPECIAL STRIPPERS MAY BE NEEDED FOR CERTAIN JOBS.

The standard stripper has been designed to work in as many applications as possible, but you may have to fabricate your own strippers for some materials, small channel for example. The important consideration is to keep material level through the stripping action. When punching thin strap iron, the material will tend to draw up into the stripper. To prevent this, a large washer can be welded across the bottom of the stripper to force materials to strip off level. This type of stripper will also allow you to punch in the corner of metal pieces.

G. SMALL ANGLE IRON MAY DAMAGE THE PUNCH RETAINING NUT.

⊗ **CAUTION: WHEN PUNCHING ANGLE WITH AN UPRIGHT LEG OF 1 TO 2-1/2", AS THE PUNCH COMES DOWN, THE RETAINING NUT MAY STRIKE THE UPRIGHT LEG, DAMAGING THE NUT.**

H. STAY WITHIN RATED PUNCHING CAPACITIES.

⊗ **NOTE: 1/2" material is the maximum thickness for punching.**

MAXIMUM PUNCH SIZES IN MILD STEEL

Thickness of Steel	Diameter of Punch
1/2"	1/2"
3/8"	21/32"
1/4"	1"
3/16"	1-1/4"

FIGURE 7

Your Scotchman Ironworker is designed to operate in mild steel. Within conservative limits, it can also operate in medium carbon annealed steel and some forms of abrasion resistant steels.

Conditions of high shock can be encountered in the punching of alloyed steels and accordingly, the machine rating must be reduced.

I. DO NOT PUNCH MATERIAL THICKER THAN THE DIAMETER OF THE PUNCH.

This "rule of thumb" is a safety factor. If the material is thicker than the punch size, breakage is very likely.

I. PUNCH FULL, COMPLETE HOLES. DO NOT PUNCH PARTIAL HOLES OR PAST THE EDGE OF THE MATERIAL.

The side thrust encountered in punching a partial hole can force the punch over and strike the die, causing punch or die breakage. (If long slots need to be punched requiring three or more strokes, punch both ends out first, leaving the center section for the last stroke.) Special nibbling punch and die sets are available for punching into the edge of material. Call Scotchman Industries for quotations.

J. MAINTAIN SUFFICIENT MATERIAL BETWEEN THE PUNCHED HOLE AND THE EDGE OF THE WORKPIECE.

If a hole is punched very near the edge of the material, it will deform the workpiece. A rule of thumb is "Do not punch closer to the edge of the material than a distance equal to the material thickness".

K. DO NOT WORK WITH DULL OR DAMAGED TOOLING.

Working with damaged punches or dies will increase the tonnage requirements and tend to overwork the machine. It will also produce less desirable holes.

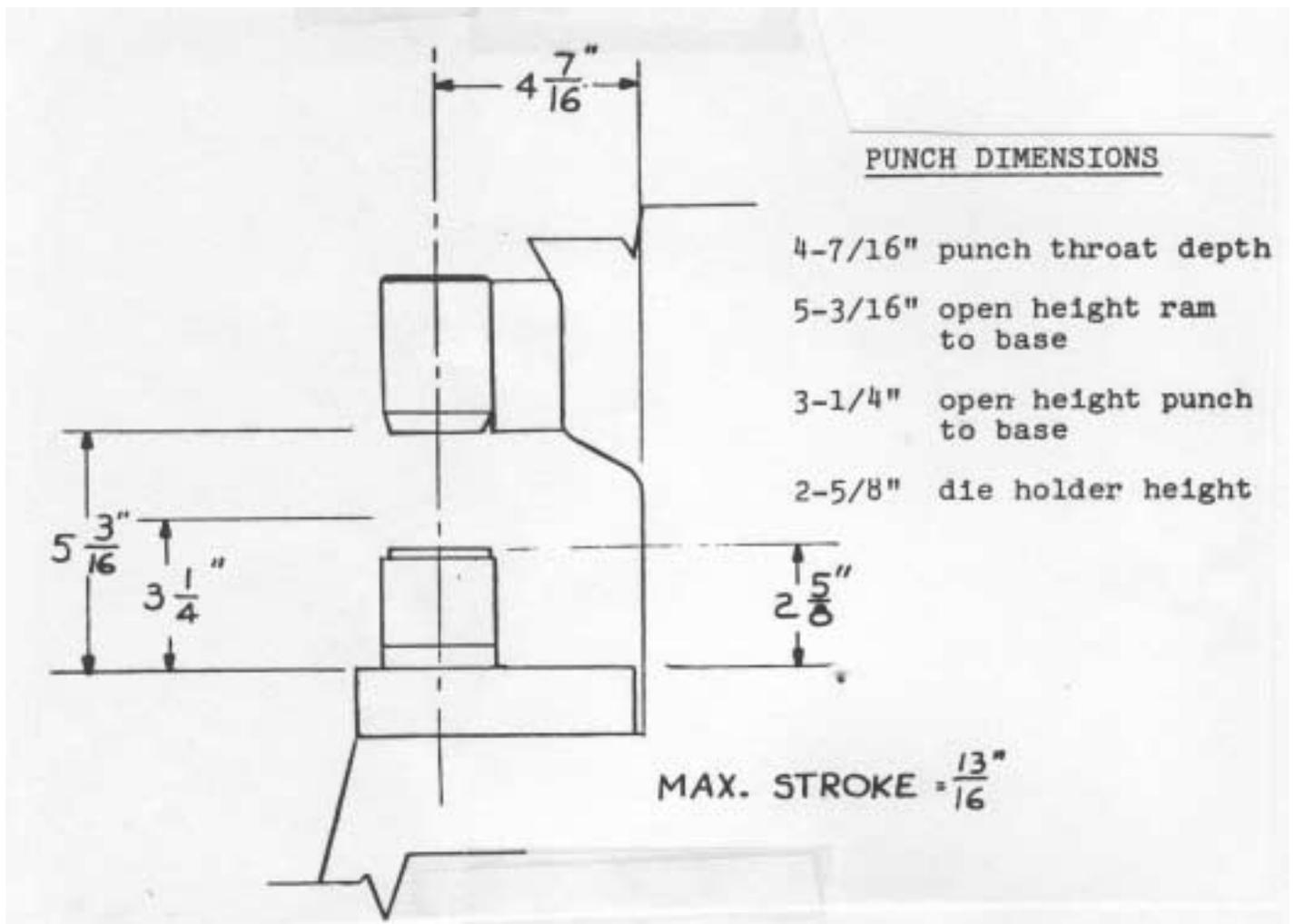


FIGURE 8

5.2 ANGLE SHEAR OPERATION

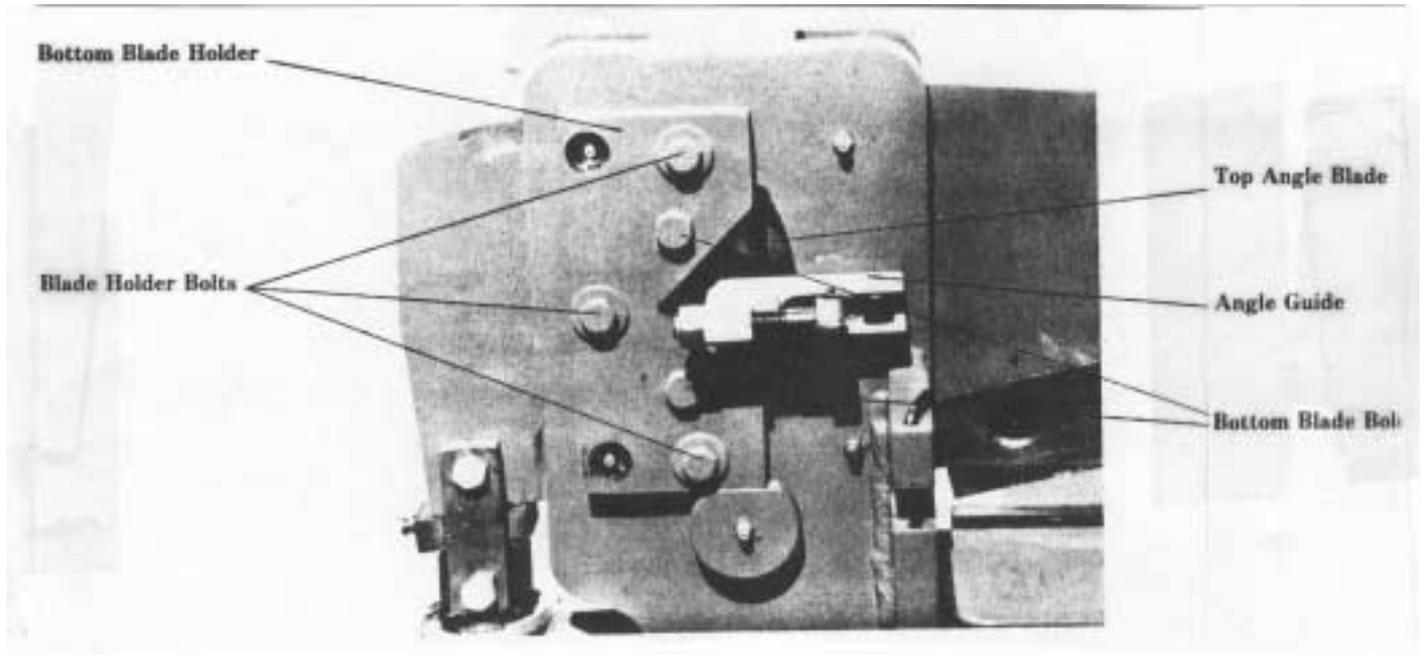


FIGURE 9 (ANGLE SHEAR PARTS IDENTIFICATION)

A. LUBRICATE THE BLADES.

Oil should be applied to the upper and lower blades before the first cut is made and every 10 to 15 cuts, thereafter. This will reduce cutting pressures and increase blade life.

B. SHEAR WITHIN RATED CAPACITIES.

The 207 angle shear is designed to shear a maximum of 1/4" material.

C. TO INSURE A SQUARE CUT: Adjust the angle cutting guide for each change in angle thickness.

D. UNEQUAL LEG ANGLE CAN BE SHEARED WITHOUT SPECIAL BLADES.

E. WHEN LARGE QUANTITIES OF LIGHT ANGLE ARE BEING CUT:

The stroke control handles should be set to provide minimum stroke, which will save time.

F. DO NOT WORK WITH DULL OR DAMAGED BLADES OR ALLOW EXCESSIVE GAP BETWEEN THE BLADES.

If blades become chipped or dull, they should be replaced. Lower angle blades may be turned once to expose a new cutting edge. For best results, about .005 inch clearance per side should be maintained between the upper and lower blades. Shim behind the lower blades to reduce clearance.

G . KE EP THE CUTOFF AREA CLEAR.

Shortcuts and slivers will tend to build up on the cutoff side. These pieces must be cleared off to prevent buildup. To prevent unnecessary wear, the clevis pin may be removed from the beam when the angle shear is not in use.

H. CHANGING BOTTOM ANGLE BLADES:

- 1. Loosen, but. do not remove, the two flathead screws holding the blades to the angle blade holder.**
- 2. Remove the blade holder from the frame by unscrewing the three flathead screws holding it.**
- 3. Remove both blades from the angle blade holder and reverse them, moving the top blade to the bottom position and vice versa, so that the new cutting edges are exposed. If the blades have already been turned once, replace them with new blades. Tighten the screws finger tight, to hold the blades in place.**
- 4. Put the plate, with the blades attached, back on the machine and re-tighten the three flathead screws by hand.**
- 5. Make sure that the bottom of the blades are seated flat in the frame and that no gap exists between the two blades.**
- 6. Tighten all five screws with a wrench.**

I. CHANGING THE TOP ANGLE SHEAR BLADE:

- 1. Remove the angle guide.**
- 2. Turn the machine on, switch the select lever to PUNCH and run the machine forward until the top blade is completely visible. Shut the machine off in this position.**
- 3. Remove the flathead allen screw.**
- 4. Remove the blade from the beam.**
- 5. With a clean grease rag and an air nozzle, blow away and clean all dirt and foreign matter that could keep the blade from lying flat in the beam cavity.**
- 6. Insert the new blade and tighten it securely.**
- 7. Remove all foreign objects from the shear and punch area. Start the machine and jog it slowly forward, making sure that the blade does not overlap with the bottom blades.**
- 8. Turn off the machine and attach the angle guide.**

☒ **NOTE: The cutting edge of the top blade and the cutting edge of the bottom blade should be parallel when the top and bottom are 1/8" apart. If not, the blades should be loosened and adjusted to provide the best cuts.**

5.3 BAR SHEAR OPERATION

- A. **LUBRICATE THE BLADES.** Apply oil to the blades before making the first cut and every 10 to 15 cuts, thereafter. This will reduce cutting tonnage and increase blade life.
- B. **LESS DISTORTION AT OUTER END OF BLADES.** Bar blades on the 207 do not have a fixed rake and, therefore, have less distortion toward the outer end. For minimum distortion, it may be desirable to shear thinner metal as far to the right hand side as capacity will allow. Thicker pieces will have to be sheared closer to the pivot area, to provide required tonnage.
- C. **ROUNDS AND SQUARES MAY BE CUT ON THE BAR SHEAR.** Round rods, square bars and other shapes may be sheared on the standard bar blades, but a slight amount of distortion will occur, a flattening on one side of the rod. This type of cut is satisfactory for most welding purposes, but cannot be threaded or fed through a tight clearance without first grinding. To cut many shapes with minimum distortion, notched bar blades that will fit in the bar shear area are available. For diagrams, SEE FIGURE 10 ON THE FOLLOWING PAGE.
- D. **MAINTAIN PROPER BLADE CLEARANCE.** A clearance of .005 inch should be maintained between the bar blades, the full length of the blades. Clearance is reduced by placing shims behind the lower blade. If the beam moves away from the lower blade on each stroke, it is necessary to adjust or shim the beam guide located on the back side, outer end of the beam, to guide the beam down in a straight line.
- E. **HARD MATERIALS MAY DAMAGE BLADES.** The 207 is designed for shearing mild steel, SAE-1020. Within conservative limits, it can also operate in medium carbon annealed steel, some stainless and some forms of abrasion resistant steels. Shearing capacities will be reduced as these materials shear harder. Some materials, such as hardened tool steel, will damage or break blades and should not be sheared. Concrete reinforcement bar can be sheared, but has hard spots and will cause the blades to wear more rapidly.
- F. **KEEP THE CUT -OFF AREA CLEAR.** Short cuts and slivers will tend to build up when sheared on the bar shear. These pieces should be cleared off before buildup develops.
- G. **BAR SHEAR CAPACITIES.**

Maximum Shearing Capacity in Mild Steel:

Thickness of Steel	Length of Cut
1/2"	3"
3/8"	5"
1/4"	7"

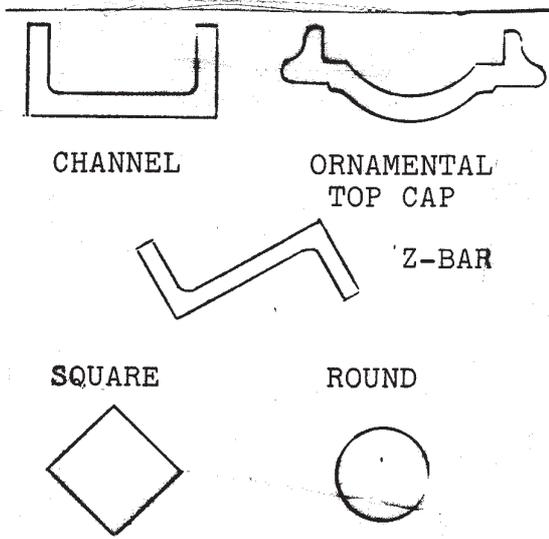


FIGURE 10

Figure 10 features SPECIAL NOTCHED BAR BLADES FOR CUTTING WITH MINIMUM DISTORTION. These are some of the more common notches we provide in blades, to produce minimum distortion cuts. We will also build blades for other shapes. If you have some material that you need to cut without distortion, send us a sample or call us for feasibility and price.

Figure 11 below features examples of various shapes that we can provide for hole punching. We also custom build other shapes upon request. Send us samples or drawings of what you need and we will quote price and delivery, if your operation is feasible.

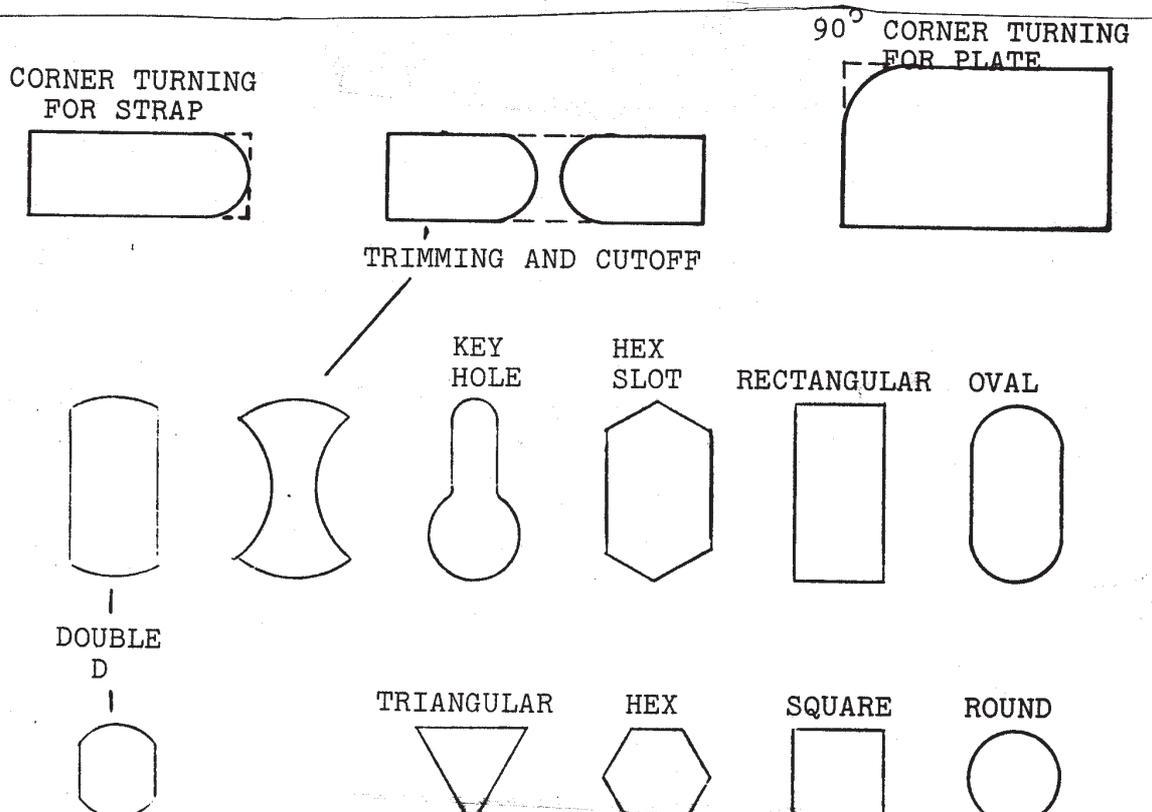


FIGURE 11

5.4 PIPE NOTCHER

The Pipe Notcher is a component tool designed to saddle cut pipe or tubing for applications such as railings. There are dies available to notch angles in tubes and pipe, also. For prices and availability, contact your local dealer or the factory.

5.4A PIPE NOTCHER INSTALLATION

SEE FIGURE 11A ON THE FOLLOWING PAGE. The Pipe Notcher installs in the punch station on this model. When installed in the punch station, the selector arm must be in the PUNCH position.

TO MOUNT THE PIPE NOTCHER IN THE PUNCH STATION:

1. Remove the die holder, die holder plate, stripper, punch and punch retaining nut.
2. Install the punch pusher (A) in the punch barrel.
3. Install the return springs, the upper die and the lower die in the pipe notcher housing.
4. Mount the pipe notcher so that the cutting dies face to the left, or right side of the machine. Use one of the die holder bolts to anchor the tool in place. To assure proper slug removal, align the tool over the slug hole in the bolster.

☒ **NOTE: THE PUNCH PUSHER WILL NOT ALIGN DIRECTLY OVER THE PIPE NOTCHER. THIS IS OKAY.**

☒ **CAUTION: WITH THE TOOL MOUNTED, IT IS NECESSARY TO SET THE DOWNSTROKE OF THE MACHINE TO PREVENT DAMAGE TO THE TOOL. THE UPPER DIE SHOULD NOT PASS THE LOWER DIE BY MORE THAN 1/32 OF AN INCH (.7MM).**

5.4B PIPE NOTCHER OPERATION

The Pipe Notcher is a vendor item for Scotchman Industries. The following are the manufacturer's recommendations for maintenance and alignment of this tool.

➡ **PLEASE READ CAREFULLY BEFORE USE OF TOOLING.**

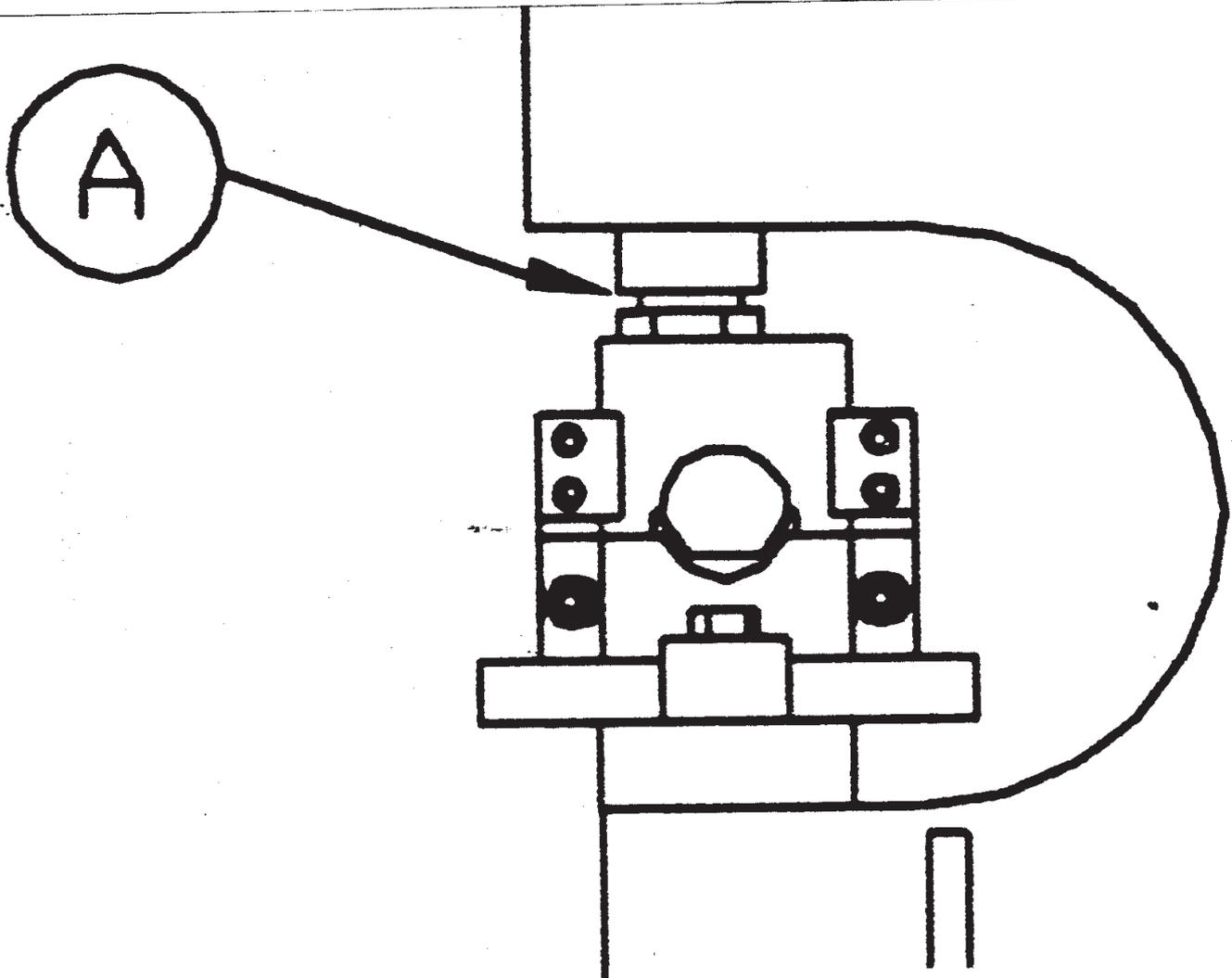
To achieve the best results from your unit, please observe these simple rules:

- A. Keep the unit clean. Whenever dirt or metal chips accumulate, remove the 8mm limit screw located in the center, at the rear of the punch. Lift out the punch holder and the two springs. Clean the unit with solvent.
- B. Never remove the M-10 dowel pin from the upper die.
- C. Check the alignment of the unit. After cleaning the unit, always check the alignment of the punch and die. To check the alignment, insert the punch and die holder, without the springs, into the housing and check the gap. SEE FIGURE 11B ON THE FOLLOWING PAGE. If proven correct, tighten the two M-10 socket head screws holding the lower die section in place. Apply some high pressure lube all around the inside of the housing. Reassemble the unit, reversing the above procedures. Before operating, lubricate the back and sides of the upper die with way oil. Repeat this lubrication once daily. Apply cutting oil or motor oil to the cutting dies before the first cut and every ten to fifteen cuts, thereafter.

5.4C PIPE NOTCHER CAPACITIES

One and one half inch (1-1/2") schedule 80 pipe is the maximum thickness that can be cut. Lighter weight tubing may be cut, but will probably require different dies for best cutting results. Separate dies are required for each size of pipe or tubing being notched.

⊠ CAUTION: ALWAYS REMOVE THIS TOOL WHEN IT IS NOT IN USE.



5.5 BRAKE OPERATION

A. INSTALLATION:

- 1. The brake is installed in the punch station. Remove the die holder and spacer, the stripper, punch and retaining nut.**
- 2. Install the upper die in place of the punch, but do not tighten the retaining nut at this time.**
- 3. Bolt the brake base in place of the die holder, using the two bolts from the die holder. Do not tighten at this time.**
- 4. Put the lower brake die in the base and jog the beam down carefully, until the dies come together. Rotate the upper die and move the base until the dies are aligned, then shut the machine off and tighten the retaining nut on the upper die and bolts in the base.**
- 5. Set the upper stroke control handle to prevent constant bottoming out of the dies. The stroke control handle can be reset later, to provide the desired degree of bend on your material. The lower die may be rotated to accommodate various thicknesses of material.**

B. CAPACITIES:

1/4 x 6" is the maximum capacity. Narrower materials up to 3/8" thick may be bent by using a wider, lower die and a larger radius or upper die.

- C. CENTER MATERIAL: It is necessary to always center-load the material in the brake; otherwise, damage will occur to the upper die.**

TONS REQUIRED PER HOLE TO PUNCH MILD STEEL HAVING 60,000 PSI TENSILE STRENGTH

HOLE DIAMETER		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"
		.125	.1875	.250	.3125	.375	.4375	.500	.5625	.625	.6875	.750	.8125	.875	.9375	1.000
METAL GAUGE	THICKNESS INCHES	PRESSURE IN TONS														
28	.015	.2	.2	.3	.4	.4	.5	.6	.7	.7	.8	.9	1.0	1.1	1.2	1.3
26	.018	.2	.3	.4	.4	.5	.6	.7	.8	.9	1.0	1.1	1.1	1.2	1.3	1.4
24	.024	.2	.4	.5	.6	.7	.8	.9	1.1	1.2	1.3	1.4	1.5	1.6	1.8	1.9
22	.030	.3	.4	.6	.7	.9	1.0	1.2	1.3	1.5	1.6	1.8	1.9	2.1	2.2	2.4
20	.036	.4	.5	.7	.9	1.1	1.2	1.4	1.6	1.8	1.9	2.1	2.3	2.5	2.6	2.8
18	.048	.5	.7	.9	1.2	1.4	1.6	1.9	2.1	2.4	2.6	2.8	3.1	3.3	3.5	3.8
16	.060	.6	.9	1.2	1.5	1.8	2.1	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	4.7
14	.075	.7	1.1	1.5	1.8	2.2	2.6	2.9	3.3	3.7	4.0	4.4	4.8	5.1	5.5	5.9
12	.105	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6	5.1	5.7	6.2	6.7	7.2	7.7	8.2
10	.135	1.3	2.0	2.6	3.3	4.0	4.6	5.3	5.9	6.6	7.3	7.9	8.6	9.2	9.9	10.6
5/32"	.157	---	2.3	3.1	3.8	4.6	5.4	6.1	6.9	7.7	8.4	9.2	10.0	10.7	11.5	12.3
3/16"	.188	---	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	14.8
1/4"	.250	---	---	4.9	6.1	7.4	8.6	9.8	11.1	12.3	13.5	14.7	16.0	17.2	18.4	19.7
3/8"	.375	---	---	---	---	11.1	12.8	14.8	16.5	18.5	20.2	22.1	23.8	25.8	27.5	29.5
1/2"	.500	---	---	---	---	---	---	19.7	22.0	24.6	26.9	29.5	31.8	34.4	36.8	39.4
5/8"	.625	---	---	---	---	---	---	---	---	30.8	33.7	36.9	39.9	43.0	46.0	49.2
3/4"	.750	---	---	---	---	---	---	---	---	---	---	44.3	47.7	51.7	55.2	59.0
1"	1.000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	80.0

FIGURE 12 (PUNCH TONNAGE CHART)

5.6 RECTANGLE NOTCHER

The Rectangle Notcher is a component tool designed to make rectangle and vee notches in angle iron and flat stock. The maximum capacity of this tool is 2 by 1-3/4 inches (50 x 45mm) rectangle notch in 1/4 inch (6mm) material or a 1-1/2 inch (38mm) vee notch.

5.6A RECTANGLE NOTCHER INSTALLATION

SEE FIGURE 13 ON THE FOLLOWING PAGE.

1. Place the selector arm in the PUNCH position and allow the cylinder to completely retract.
2. Remove the die holder, die holder plate, stripper, punch and punch retaining nut.
3. Insert the notcher ram (A) into the die (B) and place the tool on the punch bolster.
4. Start the punch retaining nut in the punch bolster.
5. Raise the die (B) and install the riser (C) under the die.
6. Start the mounting bolts (D) in the die and tighten the punch retaining nut.
7. Align the upper and lower dies and tighten the mounting bolts (D).

5.6B RECTANGLE NOTCHER OPERATION

⊗ CAUTION: BEFORE OPERATING, THIS TOOL, SET THE DOWNSTROKE OF THE MACHINE SO THAT THE FRONT OF THE TOP BLADE JUST PASSES THE LOWER BLADES, APPROXIMATELY 1/8 INCH (.3MM). FAILURE TO SET THE STROKE WILL RESULT IN DAMAGE TO THE TOOL AND POSSIBLE INJURY TO THE OPERATOR.

1. Lubricate the upper and lower dies before the first cut and every ten to fifteen cuts, thereafter.
2. Place the material to be notched between the upper and lower dies and make the cut.
3. After the cut is made, remove the material before releasing the foot pedal.

⊗ CAUTION: ALWAYS REMOVE THIS TOOL WHEN IT IS NOT IN USE.

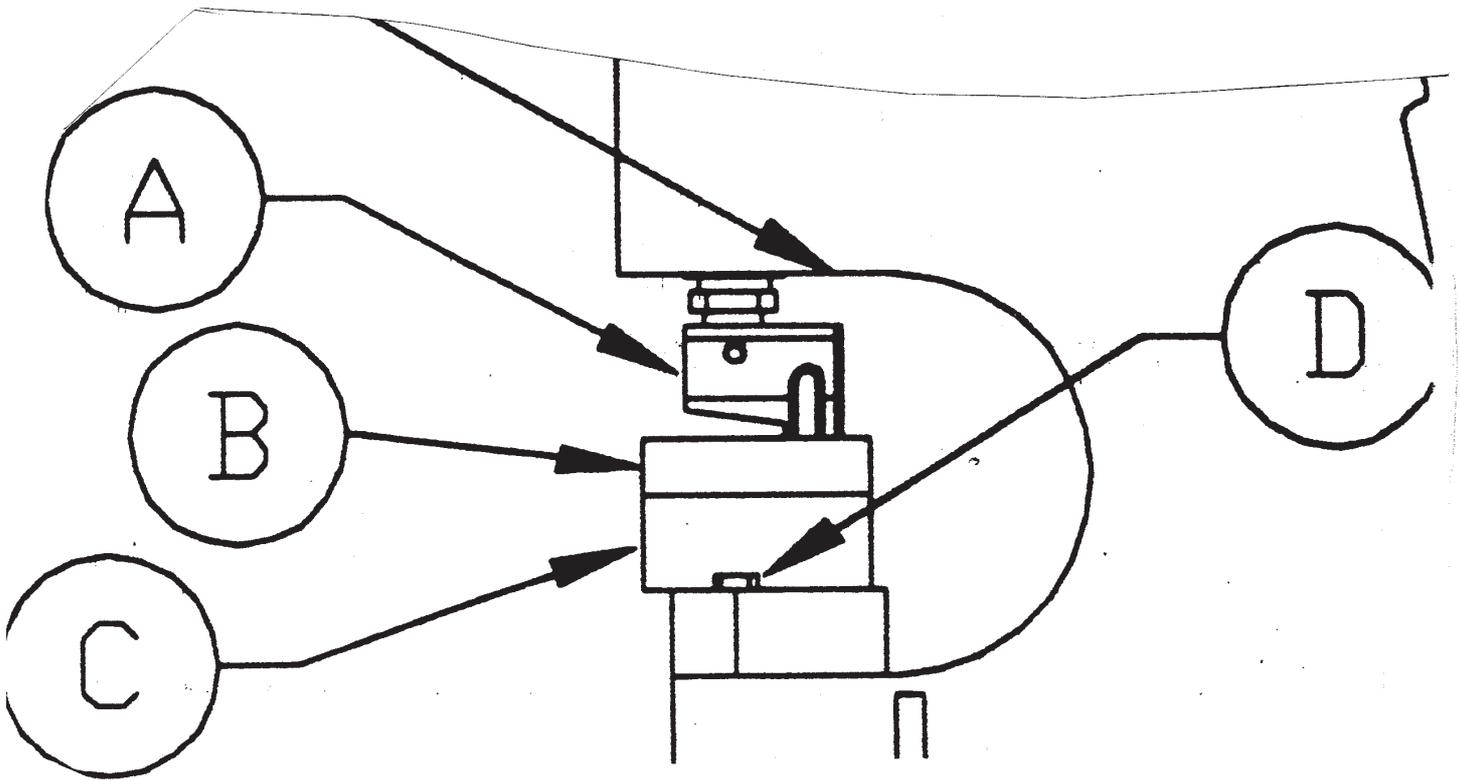
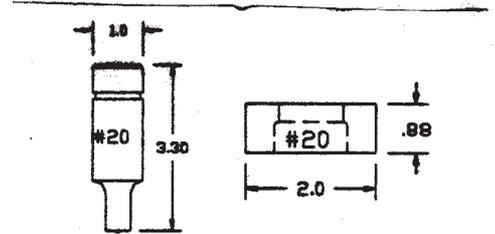


FIGURE 13

8.0 PUNCHES & DIES

#20 ROUND PUNCHES & DIES

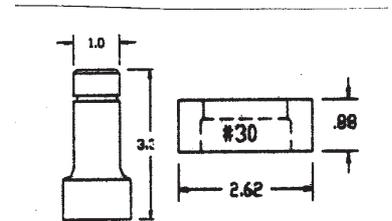
1/8, 5/32, 3/16, 7/32, 1/4, 9/32,
5/16, 11/32, 3/8, 13/32, 7/16, 15/32, 1/2,
17/32, 9/16, 19/32, 5/8, 21/32, 11/16,
23/32, 3/4, 25/32, 13/16, 27/32,
7/8, 29/32, 15/16, 31/32,
1, 1-1/32, 1-1/16, 1-1/8, 1-3/16, 1-1/4
5mm, 6mm, 7mm, 8mm, 9mm, 10mm, 11mm, 12mm
13mm, 14mm, 15mm, 16mm, 17mm, 18mm, 19mm
20mm, 21mm, 22mm, 23mm, 24mm, 25mm
26mm, 27mm, 28mm, 29mm, 30mm, 31mm, 32mm



#20 ROUND OVERSIZED PUNCHES & DIES

(USE 2-5/8" DIE HOLDER)

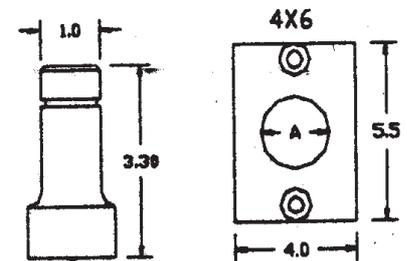
1-9/32 " UP TO 2 "



#20 ROUND OVERSIZED PUNCHES & DIES

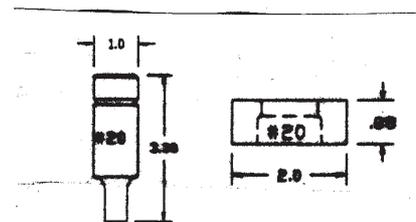
(USE 4 x 6 DIE)

2-1/32" UP TO 2-1/4"



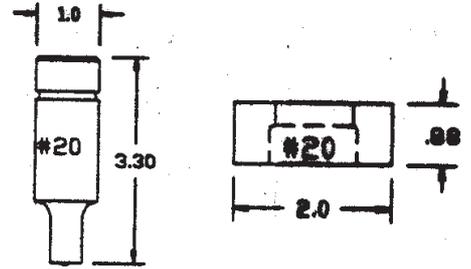
#20 SQUARE PUNCHES & DIES

9/32, 3/8, 13/32, 7/16, 15/32, 1/2,
17/32, 9/16, 5/8, 21/32, 11/16, 3/4,
25/32, 13/16, 7/8, 1



#20 OVAL SLOT PUNCHES & DIES

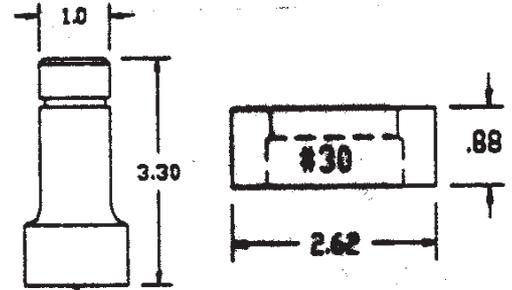
1/4 x 1/2, 9/32 x 1/2, 1/4 x 3/4, 9/32 x 3/4, 5/16 x 3/4,
11/32 x 3/4, 3/8 x 3/4, 13/32 x 3/4, 7/16 x 3/4, 15/32 x 3/4,
1/2 x 3/4, 17/32 x 3/4, 9/16 x 3/4, 1/4 x 1, 9/32 x 1, 5/16 x 1,
11/32 x 1, 3/8 x 1, 13/32 x 1, 7/16 x 1, 15/32 x 1, 1/2 x 1,
17/32 x 1, 9/16 x 1, 5/8 x 1, 21/32 x 1, 11/16 x 1, 3/4 x 1,
25/32 x 1, 13/16 x 1, 1/4 x 1-1/4, 5/16 x 1-1/4, 3/8 x 1-1/4,
13/32 x 1-1/4, 7/16 x 1-1/4, 15/32 x 1-1/4, 1/2 x 1-1/4,
9/16 x 1-1/4, 5/8 x 1-1/4, 21/32 x 1-1/4, 11/16 x 1-1/4,
3/4 x 1-1/4, 25/32 x 1-1/4, 13/16 x 1-1/4



#20 OVAL SLOT OVERSIZED PUNCHES & DIES

(USE 2-5/8" DIE HOLDER)

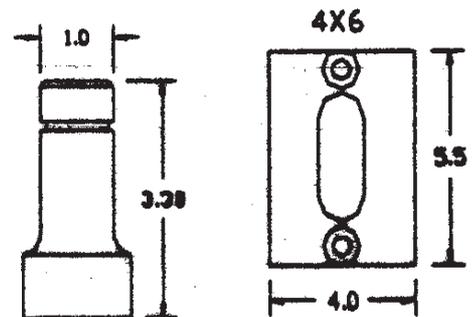
1-9/32" UP TO 2"



#20 OVAL SLOT OVERSIZED PUNCHES & DIES

(USE 4 x 6 DIE)

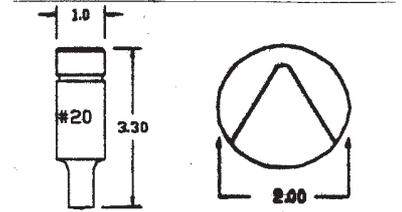
2-1/32" UP TO 2-1/4"



#20 PICKET PUNCHES & DIES

5/8 SQUARE TUBING MAX. ON 314-C6 & 4014-TM

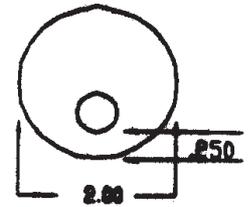
3/4 SQUARE TUBING MAX. ON 4014-CM



#82 ECCENTRIC DIES FOR PUNCHING NEXT TO WEB OF ANGLE IRON

NOTE: ALL #82 ECCENTRIC DIES ARE 1/32" LARGER THAN PUNCH SIZE. WHEN ORDERING, MUST SPECIFY PUNCH SIZE. EXAMPLE:

#20 1/2" PUNCH WILL NEED #82 17/32" ECCENTRIC DIE.

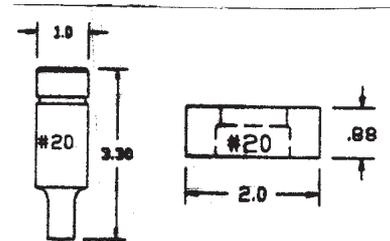


**9/32, 5/16, 11/32, 3/8, 13/32, 7/16, 15/32, 1/2, 17/32, 9/16, 19/32,
5/8, 21/32, 11/16, 23/32, 25/32, 13/16, 27/32, 7/8, 29/32**

**#20 HEXAGON PUNCHES & DIES
(USE STANDARD 2" DIE HOLDER)**

1/4" UP TO 1-1/16"

ALL SIZES ARE SPECIALS

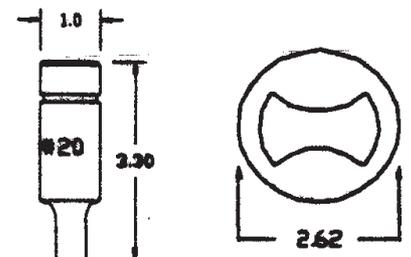


#20 TRIMMING & CUTOFF PUNCHES & DIES

1" SIZE IN STOCK ONLY

DIE IS 2-5/8" O.D.

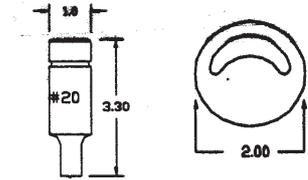
(OVERSIZED DIE HOLDER IS REQUIRED)



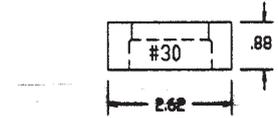
#20 CORNER TURNING PUNCHES & DIES

AVAILABLE IN THE FOLLOWING SIZES ONLY:

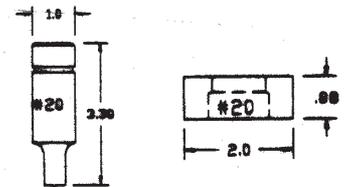
1/2"



3/4" (MUST USE 2-5/8" DIE HOLDER)



**#20 RECTANGLE PUNCHES & DIES AVAILABLE
CALL FOR PRICES AND DELIVERY**



INFORMATION ON ORDERING PUNCHES & DIES

**THE PUNCH & DIE SIZES LISTED ARE STANDARD SIZES KEPT IN STOCK
FOR YOUR CONVENIENCE.**

**FOR SPECIAL SIZES, INCLUDING METRIC, PLEASE CALL OR FAX
FOR QUOTATIONS AND DELIVERY.**

**#20 PUNCH & DIE SETS HAVE A 1/32" DIE CLEARANCE. WHEN ORDERING DIES, PLEASE
SPECIFY PUNCH SIZE BEING USED. ALSO, PLEASE SPECIFY THICKNESS AND TYPE OF
MATERIAL, TO ASSURE PROPER DIE CLEARANCE.**

**IN ADDITION TO THE SHAPES LISTED, WE MANUFACTURE TEARDROP, KEYHOLE,
KNOCK-OUT AND OTHER SPECIALTY PUNCHES & DIES.
PLEASE WRITE, CALL OR FAX FOR PRICES AND DELIVERY.**

6.0 PARTS LISTS

6.1 MAIN BEAM

ITEM	PART #	DESCRIPTION	QTY. REQ.
1	002240	Pressure Plate	1
2	002160	207 Beam	1
3	000139	Wear Plate-Beam Guide	1
4	000133	Wear Plate-Beam	1
5	N/A	Cylinder Clevis Pin	1
6	001030	7" Bar Shear Guard	1
7	001033	7" Hold-down Roller	1
8	002490	Shear Table	1
9	000097	7" Bar Shear Blades	2
	000100	8" Bar Shear Blades	
10	002280	Angle Guide	1
11	002120	Main Pin & Nut	1
12	002270	Lower Angle Blade Holder	1
13	002250	Top Blade-Angle Shear	1
14	002260	Lower Blade-Angle Shear	2
15	000672	Stripper Washers (Set of 3)	1
16	000654	Stripper-Standard	1
17	400738	Stripper Guard	1
18 4	00726	Punch Plate	1
19		Die	
20	401470	Die Holder (2")	1
21	001572	Die Holder Plate	1
22	000624	Punch Retaining Nut	1
23	000627	Snap Ring (#20)	1
24		Punch	
25	000633	Punch Barrel Guide	1
26	001559	Punch Barrel	1
27	002290	Drag Link	1
28	402284	Pressure Block	1
29	104225 & 116012	3/8 x 24 HHCS & Nut	
30	130315	7/16 x 14 FSHCS	
31	130330	7/16 x 14 FSHCS	

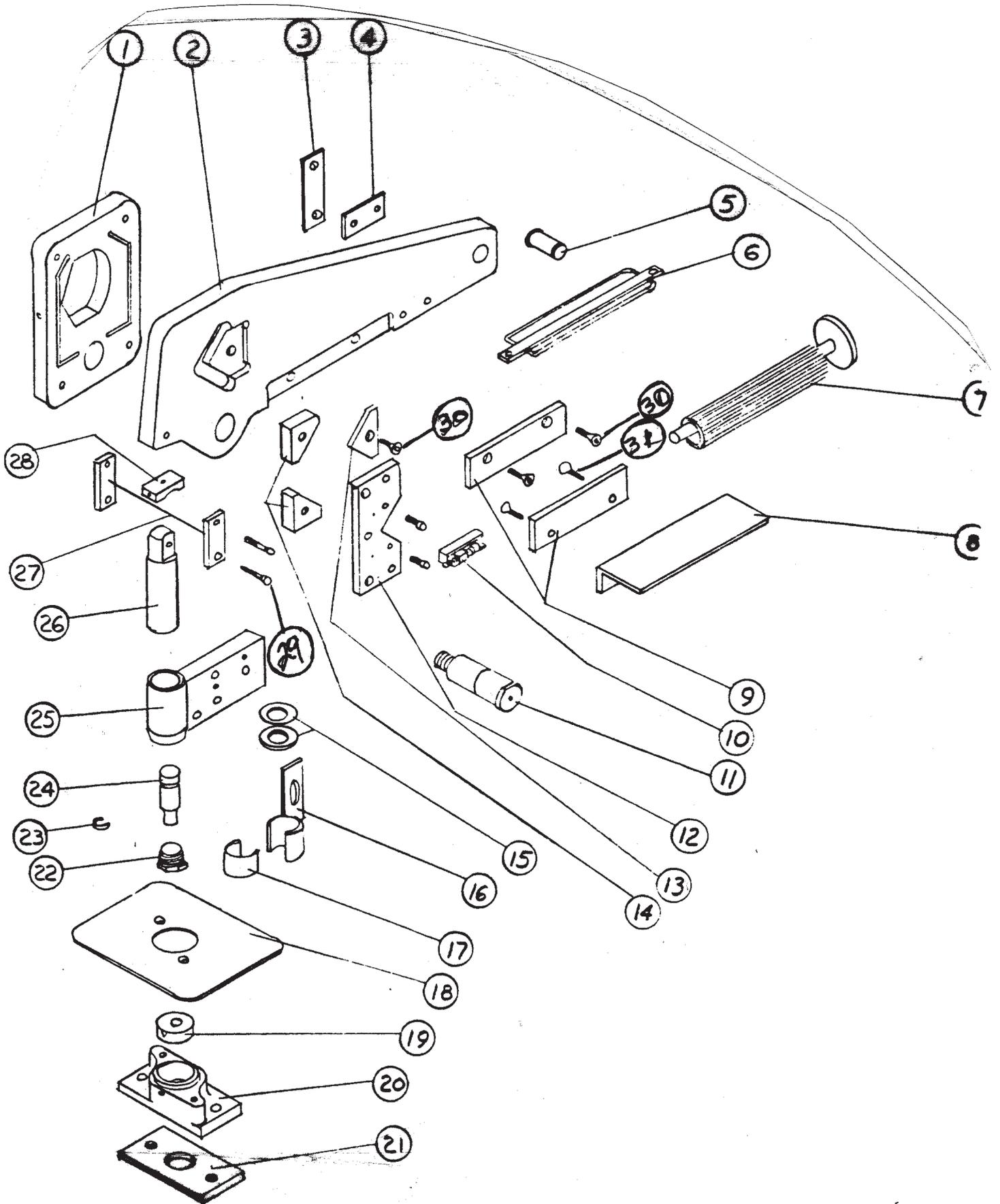


FIGURE 14

6.2 LINKAGE

ITEM	PART #	DESCRIPTION	QTY. REQ.
1	N/A	Stroke Adjustment Block	1
2	N/A	Slider Block Assembly	2
3	010061	Stroke Adjustment Handle	2
4	402455	Select Lever	1
5	010204	Select Lever Knob	1
6	002485	Select Lever Spring	1
7	002400	Switch-over Clevis Assembly	1
8	002410	Spring Spool	2
9	N/A	Roll Pin	2
10	002430	Stroke Adjustment Clevis	1
11	002475	Shear Pedal Assembly	1
12	402445	Pedal Bearing	2
13	002465	Punch Pedal Assembly	1
14	N/A	Pedal Weldment	1
15	140415	Valve Link Clevis Pin	1
16	010202	Valve Link Clevis	1
17	N/A	Valve Link	1
18	140215	Stroke Adjustment Clevis Pin	1
19	N/A	Stroke Adjustment	1
20	002415	Clevis Spring	1
21	N/A	Stroke Control Assembly	1

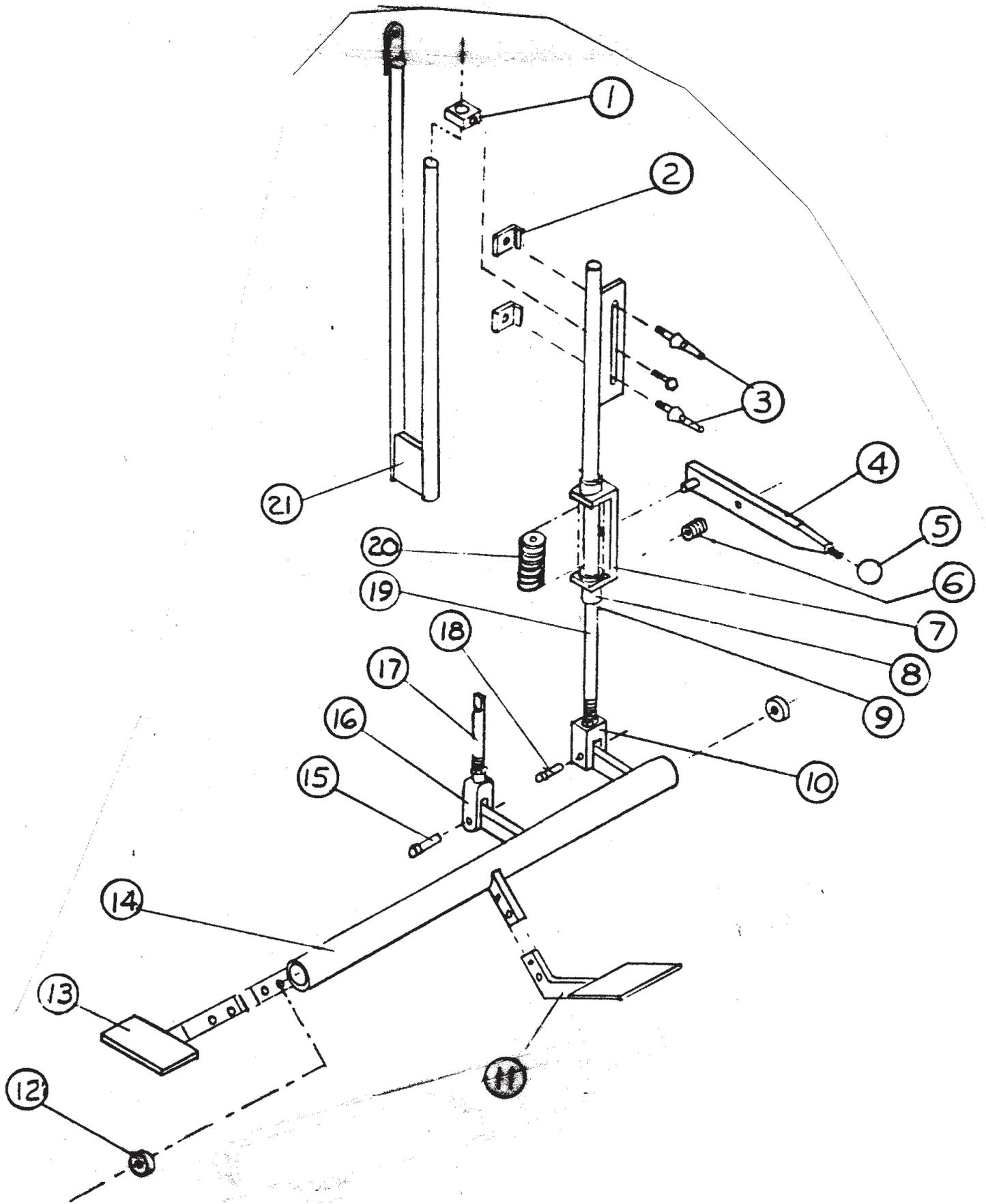


FIGURE 15

6.3 CYLINDER

ITEM	PART #	DESCRIPTION	QTY. REQ.
1			
2			
3			
4			
5			
6	003081	Cylinder Seal Kit	1
7	N/A	Cylinder (Complete)	1

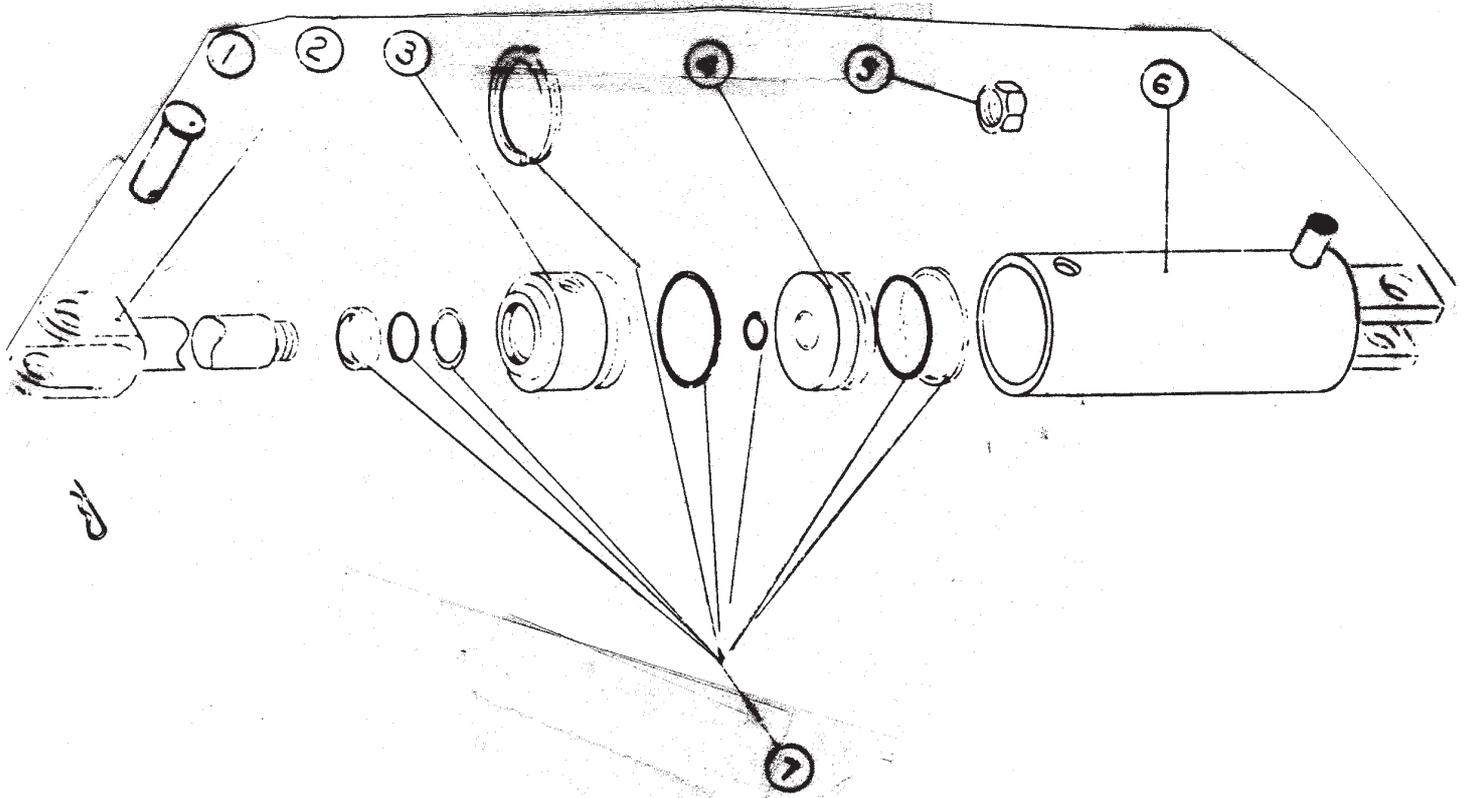


FIGURE 16

6.4 PIPE NOTCHER

ITEM	PART #	DESCRIPTION
A	001194	Solid Retaining Nut
C & F	001220	3/4" Upper & Lower Die
	001222	1" Upper & Lower Die
	001224	1-1/4" Upper & Lower Die
	001226	1-1/2" Upper & Lower Die
D	001208	Die Spring
E	001195	Pipe Notcher Housing
G	001209	Guide Plates
H	212012	M-10 Washer
I	203225	M-10 HHCS
K	073420	M-8 Set Screw

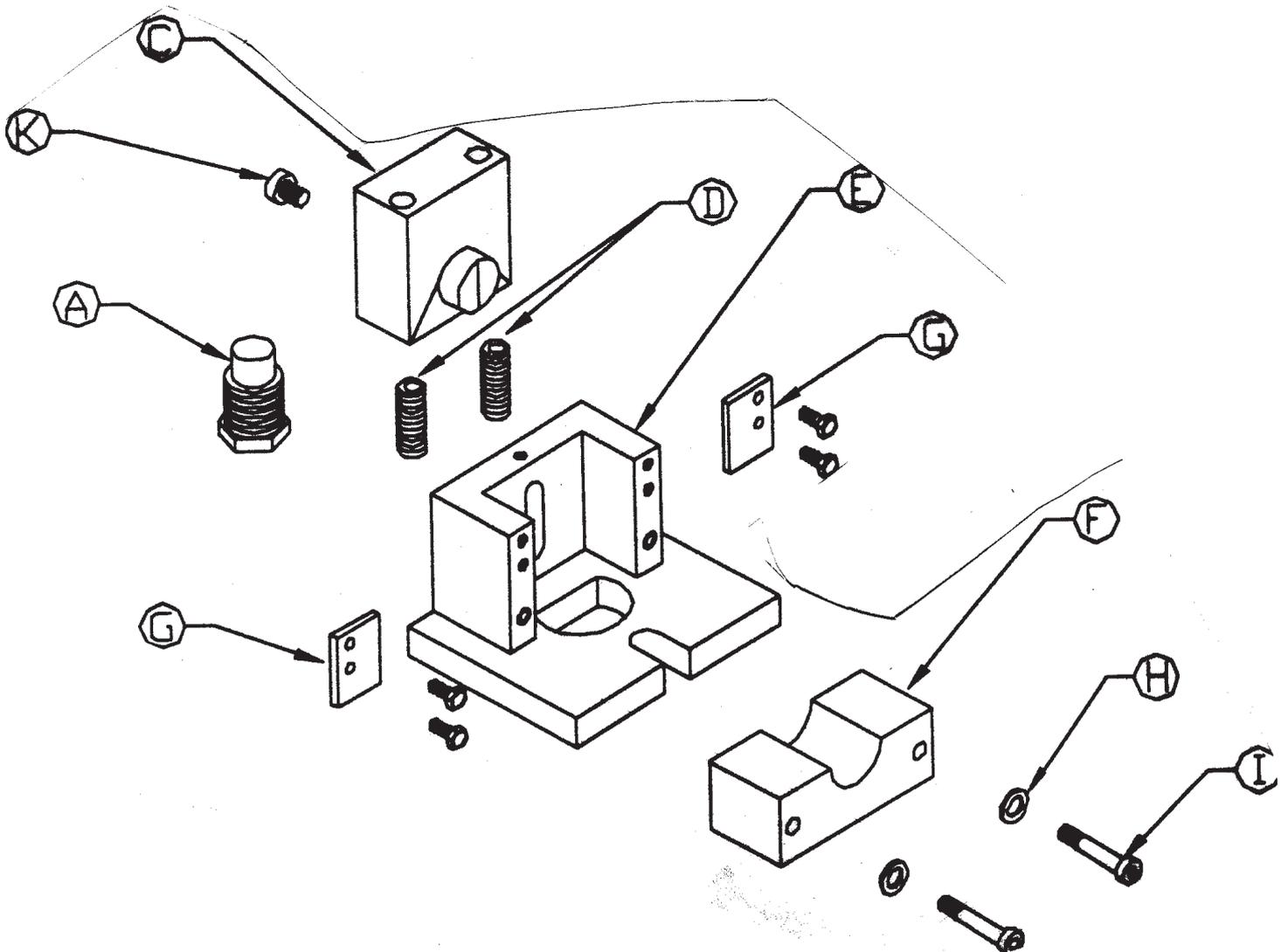


FIGURE 17

6.5 NINETY DEGREE BRAKE

ITEM	PART #	DESCRIPTION
A	001185	Upper Brake Die Stem
B	000624	Punch Retaining Nut
C	00 1179	Upper Brake Die (Includes A & B)
D	001188	Lower Die
E	001191	Base
F	001176	Complete Brake

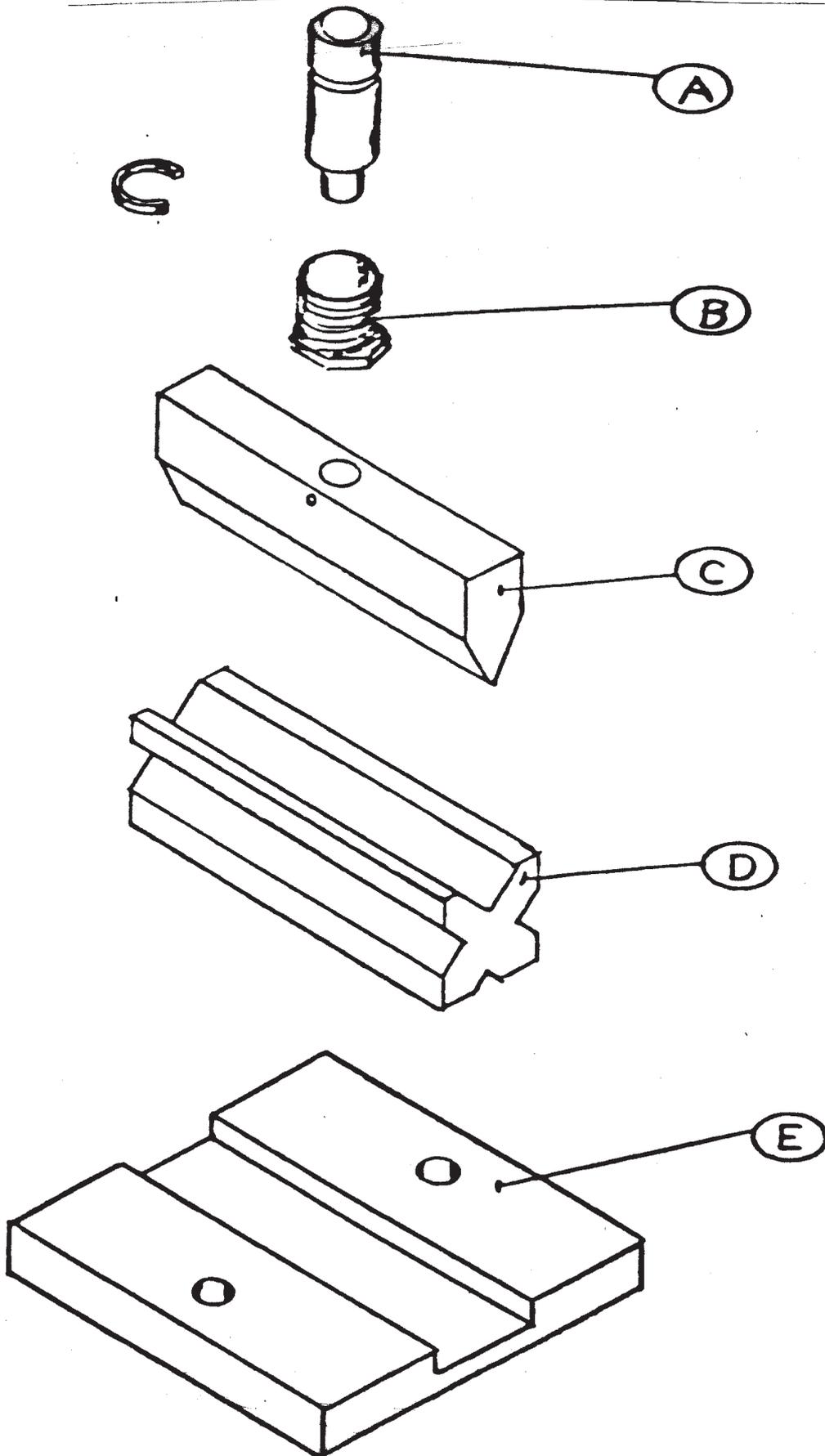
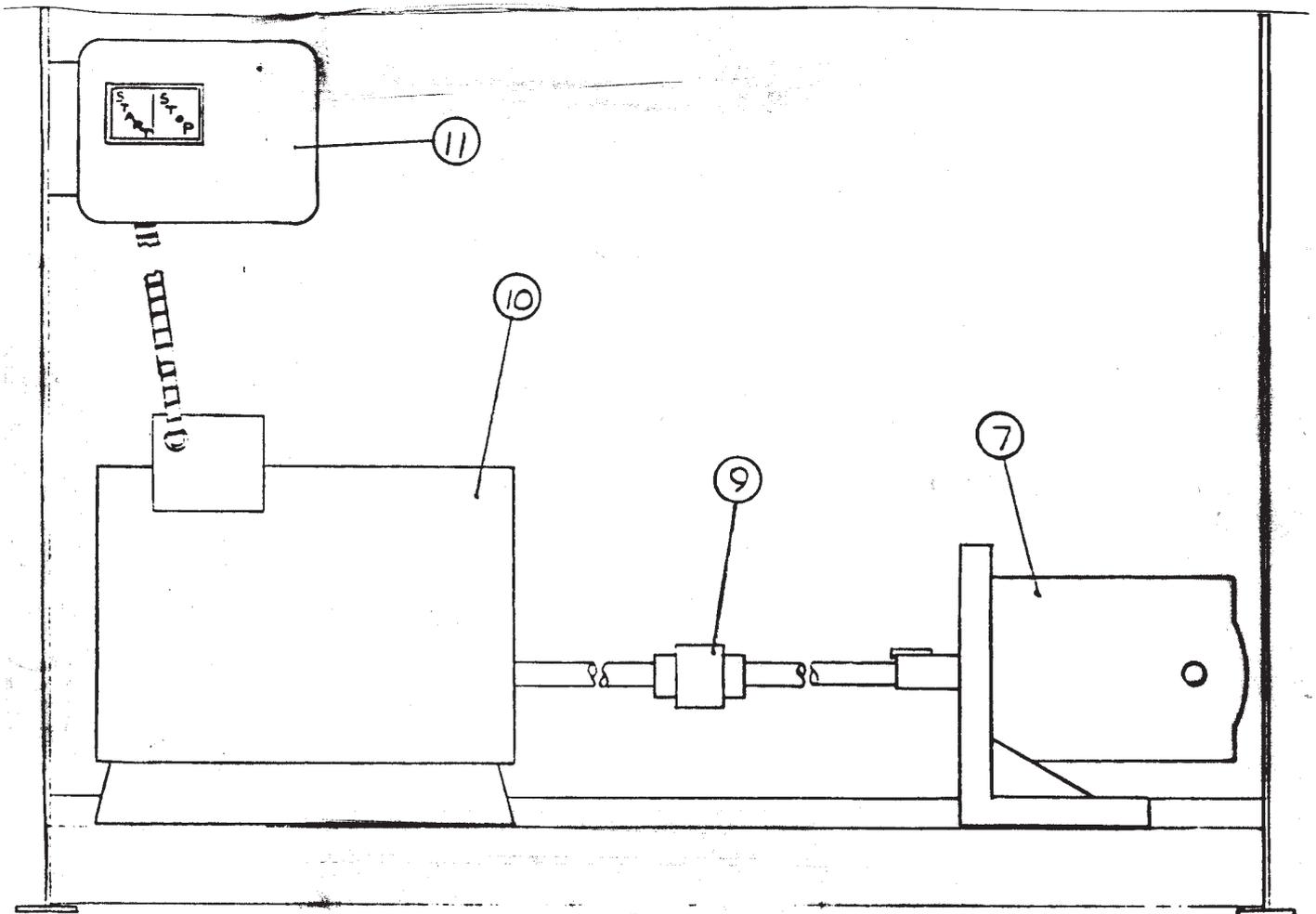


FIGURE 18

6.6 POWER UNIT

ITEM	PART #	SIZE	DESCRIPTION	QTY. REQ.
1	N/A	13-1/2"	Low Pressure Hose	1
2	N/A	5-1/2"	Hydraulic Hose	1
3	N/A	15-1/2"	Hydraulic Hose	2
4	N/A	25-1/2"	Hydraulic Hose	1
5	N/A	3"	Cylinder (2-Way)	1
6	355055		Main Valve	1
7	012135	5 GPM	Pump (2-Way)	1
8	N/A	3.1 U.S. Gal.	Reservoir	1
9	010670 010672 010674		Coupling (3 Pcs.)	1

ALL PRESSURE HOSES ARE 1/2 WITH 1/2 X 14 NPT RIGID CONNECTORS ON EACH END, RATED AT A MINIMUM BURST PRESSURE OF 10,000 PSI.



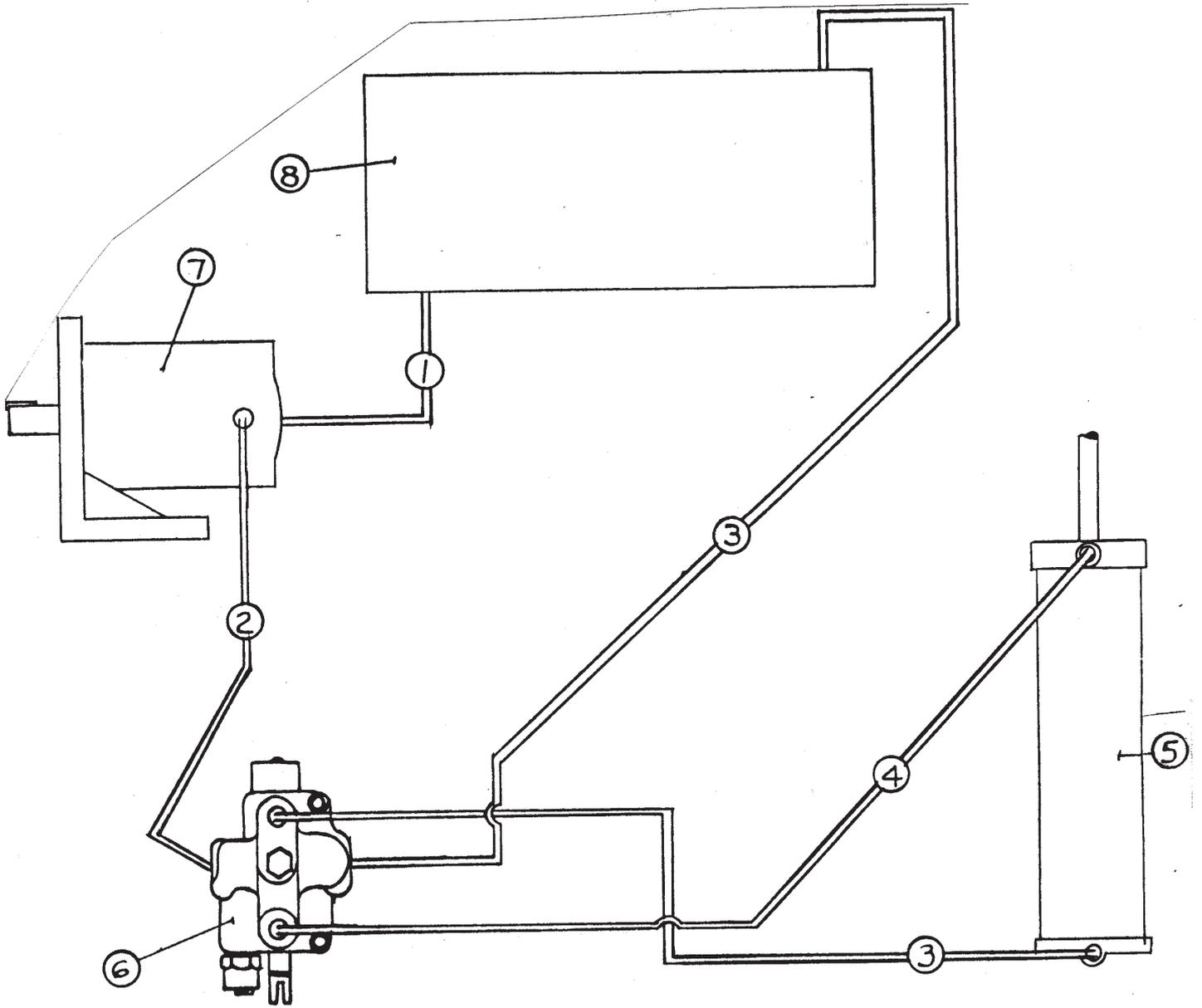


FIGURE 19

6.7 RECTANGLE NOTCHER

ITEM	PART #	DESCRIPTION
A	000627	Snap Ring
B	340031	Stem
C	440013	Ram
D	218048	M-10 Set Screw
E	340003	Die
F	340032	Riser
G	221327	M-12 SHCS
H	440000	Complete Assembly

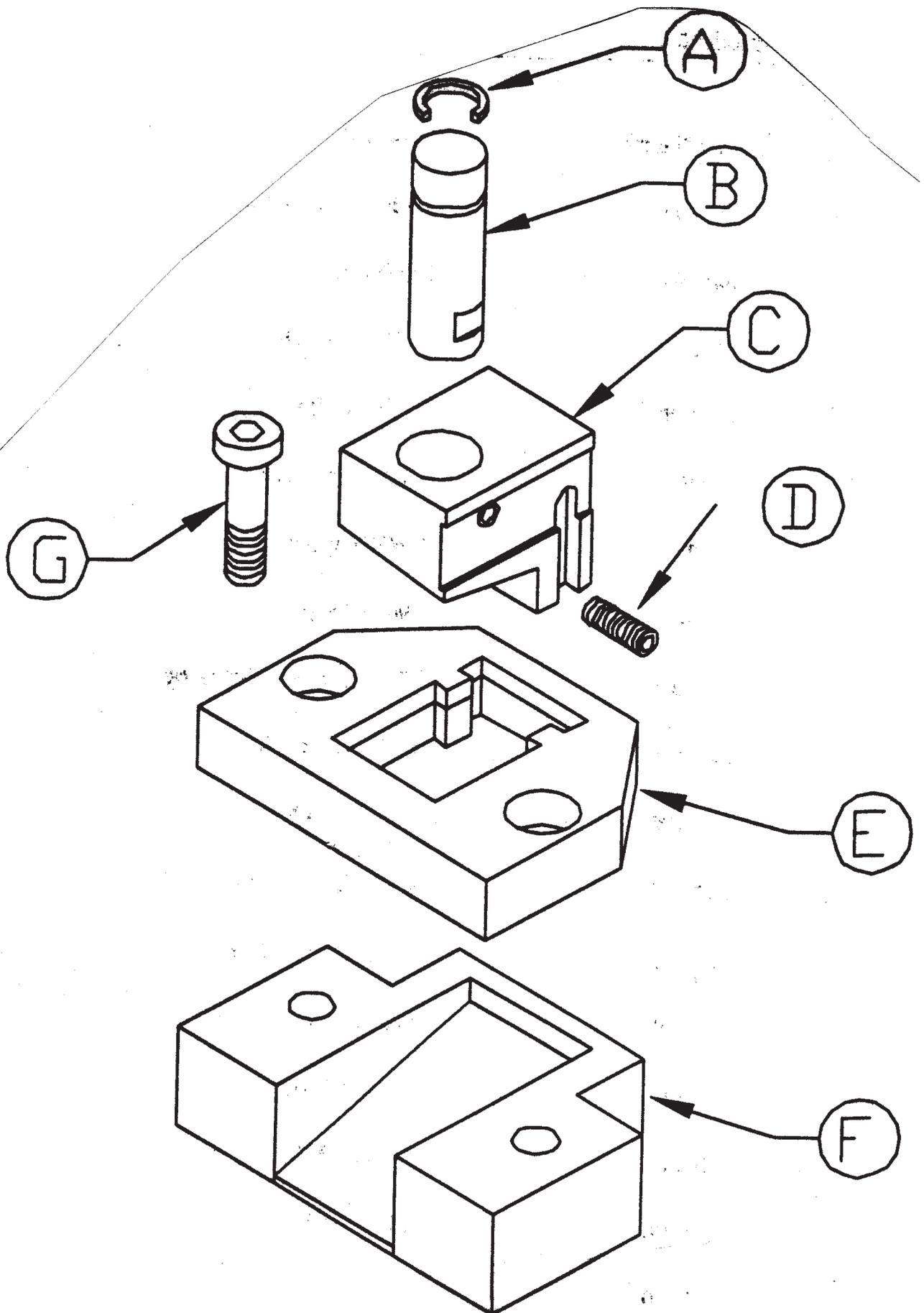


FIGURE 20