

Treadle Hammer Materials

1/27/94

PN	Name	Qty	Size	Lgth	Material	Comments
1	Anvil (solid)	1	5" or 6" round	36	HRS -HC	Or square or weld from 1" or 2" slabs
2	Base	1	1/2" x 16"	32	Hot rolled Stl	Cut 9 from 4' x 8' sheet (or 3/8")
3	Column	1	4" x 11 gage	60	Square tubing	Cut 4 from 20' length
4	Support	2	1 1/4" round	4	Hot rolled Stl	
5	Tool Holder	2	3/4" x 4"	4	Hot rolled Stl	
6	Foot Bar	1	1 1/2" x 11 gage	14	Square tubing	
7	Side	2	1 1/2" x 11 gage	28	Square tubing	
8	Crossbar	1	1 1/2" x 11 gage	7	Square tubing	
9	Tube	1	3/4" pipe	6.9	Sch 40 Black	
10	Pivot	1	3/4" round	10	Hot rolled Stl	
11	Spacer	2	1/2" x 1 1/2"	3	Hot rolled Stl	For 6" anvil, 4 required
12	Brace	2	1 1/2" x 11 gage	28	Square tubing	
13	Tube, Hammer	1	4" x 1/4" wall	12	Square tubing	
14	Handle	1	9/16" round		Car Coil Spring	Cut 1/2 Coil, heat and flatten
15	Lead Stop	1	18 gage x 3 1/2"	5.8	Sheet Stl	
16	Hammer Cheek	2	3/8" x 3"	12	Hot rolled Stl	
17	Lead	40	Pounds		Lead	Pour melted Lead around chunks
18	Screw	2	1/2" NC	2.5	1/2" All Thread	
19	Clamp Bar	2	1/2" round	5	Hot rolled Stl	Round ends
20	Guide	2	3/4" pipe	0.75	Sch 40 Black	
21	Plate	1	1/4" x 1 1/2"	12	Hot rolled Stl	
22	Clamp Plate	1	Assy			PN 20+21
23	Slider Cheek	2	3/8" x 4"	12	Hot rolled Stl	
24	Rack	1	12 pitch x 3/4" sq	12	Steel	14.5° pressure angle, mates with 36 *
25	Slider Plate	1	3/8" x 4"	27	Hot rolled Stl	
26	Nut, 1/2" NC	6			Steel	
27	Clamp Back	2	1/4" x 1 1/2"	12	Hot rolled Stl	Drill hole, bend on jig, weld nut
28	Clamp, Slider	2	Assy			PN 18+19+26+27
29	Spring Link	2	5/16" x 3"	18	Spring	One inch ID rolled eyes, each end
30	Bushing	8	1/2" ID x 1" OD	1	Bronze	Oilite type
31	Clamp Plate	2	1/4" x 3"	4.5	Hot rolled Stl	
32	Connector	2	1/2" x 1 1/2"	2	Hot rolled Stl	
33	Link Connector	1	Assy			PN 31+32
34	Crank	1	1/2" round	21	Cold Rolled Stl	20" long for 5" anvil
35	Crank Bearing	2	1/2" x 1"	4	Hot rolled Stl	
36	Pinion	1	Pitch 1.0, 12 teeth	0.75	Steel	12 pitch, 1/2" ID, 14.5° press. angle *
37	Lockwasher	4	1/2" ID		Steel	
38	Stop	1	1/4" x 1"	4	Hot rolled Stl	
39	Turnbuckle	1	3/4" thread		Steel	12" takeup, Cut off eyes
40	Extension	1	3/4" pipe	14.8	Sch 40 Black	
41	Handwheel	1	1/2" round	15.8	Hot rolled Stl	Bend in circle and weld
42	Spokes	2	1/2" round		Hot rolled Stl	Cut to fit Turnbuckle, estimate 1.5"
43	Spring Bar	1	1/4" x 3"		Hot rolled Stl	Length = Anvil width + 3"
44	Spring	3	Half of 150 lb.		GarageDoorSp	Cut garage door spring in half
45	Bar	1	1/2" x 1 1/2"	10	Hot rolled Stl	
46	Spring Tube	1	3/4" pipe	10	Sch 40 Black	Forge grooves for spring loops.

PN	Name	Qty	Size	Lgth	Material	Comments
47	Link Bar	1	Assy			32+45
48	Eyebolt	3	3/8" NC	6	Steel	
49	Bolt	2	1/2" NC	4.5	Steel	3 3/4" grip
50	Bolt	2	1/2" NC	5.5	Steel	4 3/4" grip
51	Nut	14	3/8" NC		Steel	
52	Lockwasher	11	3/8"		Steel	
53	Bolt	4	3/8" NC		Grade 5 Steel	1 1/2" Grip, 2" or longer
54	Bolt	2	3/8" NC		Grade 5 Steel	2" Grip, 2 1/2" or longer
55	Bolt	2	3/8" NC		Grade 5 Steel	2 1/2" Grip, 3" or longer
56	Bolt	4	5/16" NC		Grade 5 Steel	3/4" Grip, 1 1/2" or longer
57	Nut	4	5/16" NC		Steel	
58	Lockwasher	4	5/16"		Steel	
59	Wedge	1	1/4" x 1 1/2"	6	Hot rolled Stl	Forge taper
60	Washers	18	1/2" ID x 1/8"		Steel	
61	Cable/Clamp	1	1/8" dia	18	Steel	Cable with Garage Door Springs
62	U	1	1/4" x 1"	4.25	Hot Rolled Stl	Forge to U shape
63	Tang	1	1" square	1.5	Hot Rolled Stl	
64	Plate	2	3/4" x 4"	4	Hi Carbon Stl	Spring or any high strength steel
65	Hard Plate, Btm	1	Assy			63+64
66	Hard Plate, Top	1	Assy			62+64
67	Connector Sides	4	1/2" x 1 1/2"	3	Hot Rolled Stl	

Sources:

©ClaySpencer1994

Spring Link, PN 29—Local spring company or Champ Spring Co., 2107 Chouteau Ave., St. Louis, MO 63103, 314/231-7570. The upper Spring Link may be mild or hot rolled steel instead of spring steel. The Spring Links may be constructed by welding. Use two lengths of precision tubing, 0.5" ID x 1" OD x 4" long and weld to flat spring (HRS for upper link). Preheat and post heat spring steel and use 7018 rod. Rack and Pinon, PNs 24 & 36 may be bought from gear and bearing supply houses. Browning part numbers are NSR12 x 3/4 and NSS1212.

Spring, PN 44 - Garage door company or Home Depot. Buy 2 springs, cut in half and use 3 halves. PN 61, Cable/Clamp comes with Home Depot springs. May use 12" long bungee cord with hooks instead of cable.

Notes:

Weld symbols are not shown for all welds. All high carbon steel should be preheated/postheated and welded with special rods such as 7018.

Dimensions are not shown where holes are located on centerlines.

Small variations in dimensions are usually OK except where it affects fit or assembly with mating parts.

Sizes and materials may be changed/substituted as long as they are strong enough and fit with mating parts.

The Anvil should be solid, either square or round. It may be welded up of slabs of material. If welded of slabs, leave a 1" slab in center two inches shorter than other slabs and delete PN 4. This leaves space for the bottom tool tang to come through PN 5. The center slab may be several inches shorter or cut off at an angle so that a drift may slide out.

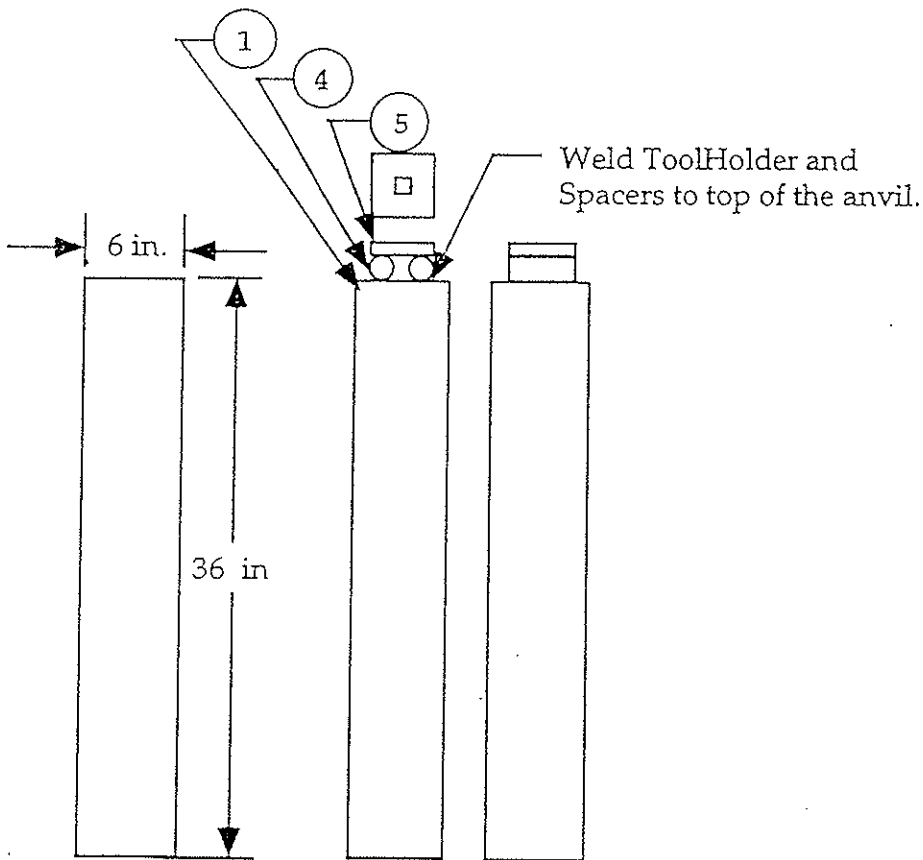
Spring Bar, PN43, - Length is equal to width of the Anvil, PN 1, plus 3". Adjust mounting holes to fit PN 12 holes. Length of Crank, PN 34 and number of spacers, PN 11 should be adjusted to suit Anvil width.

All the lead does not have to be melted. Cut lead in chunks with a hack under a power hammer or use torch. Put chunks in hammer tube and pour melted lead around chunks. Melt lead outside and don't breathe fumes. A solid hammer may be used if you don't like melting lead.

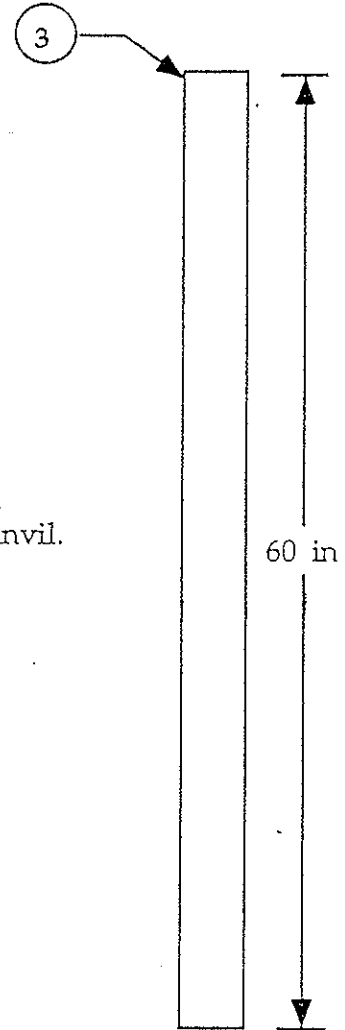
Base, Anvil and Column



Base, 1/2" plate
Drill 1/2", holes 2" from
each edge at each corner

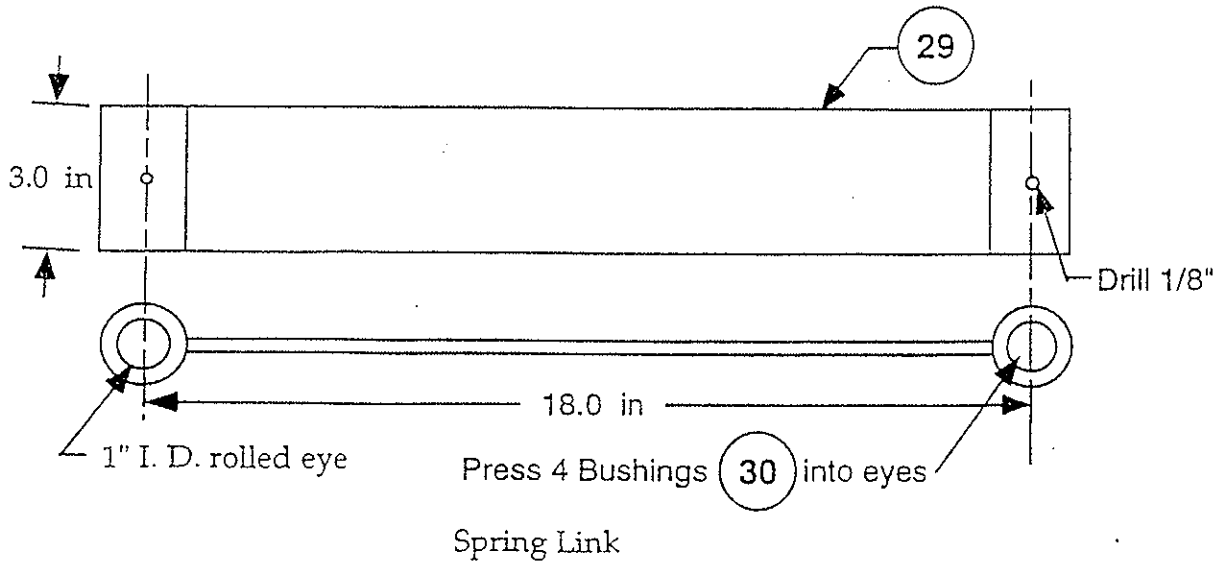
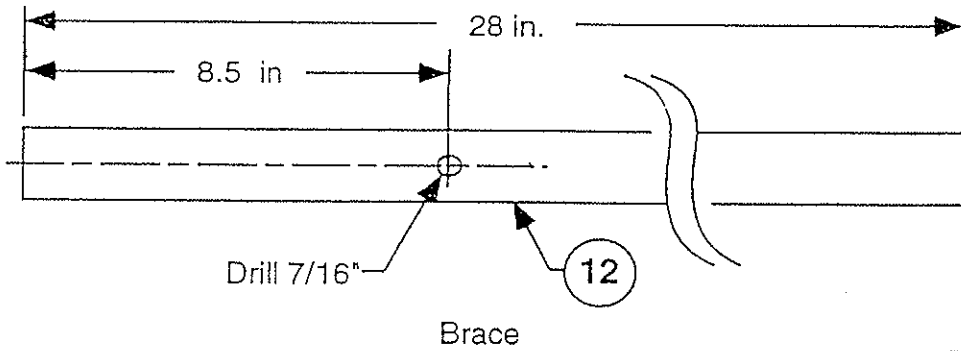
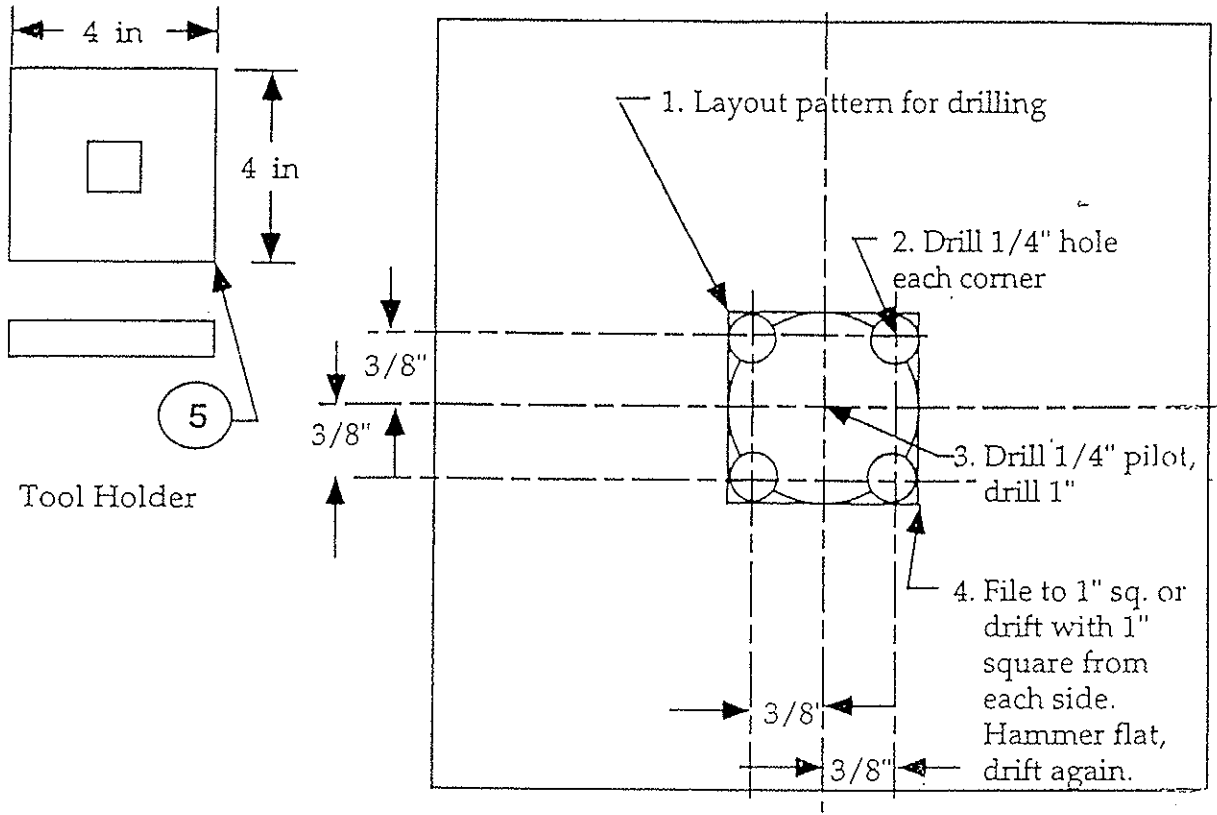


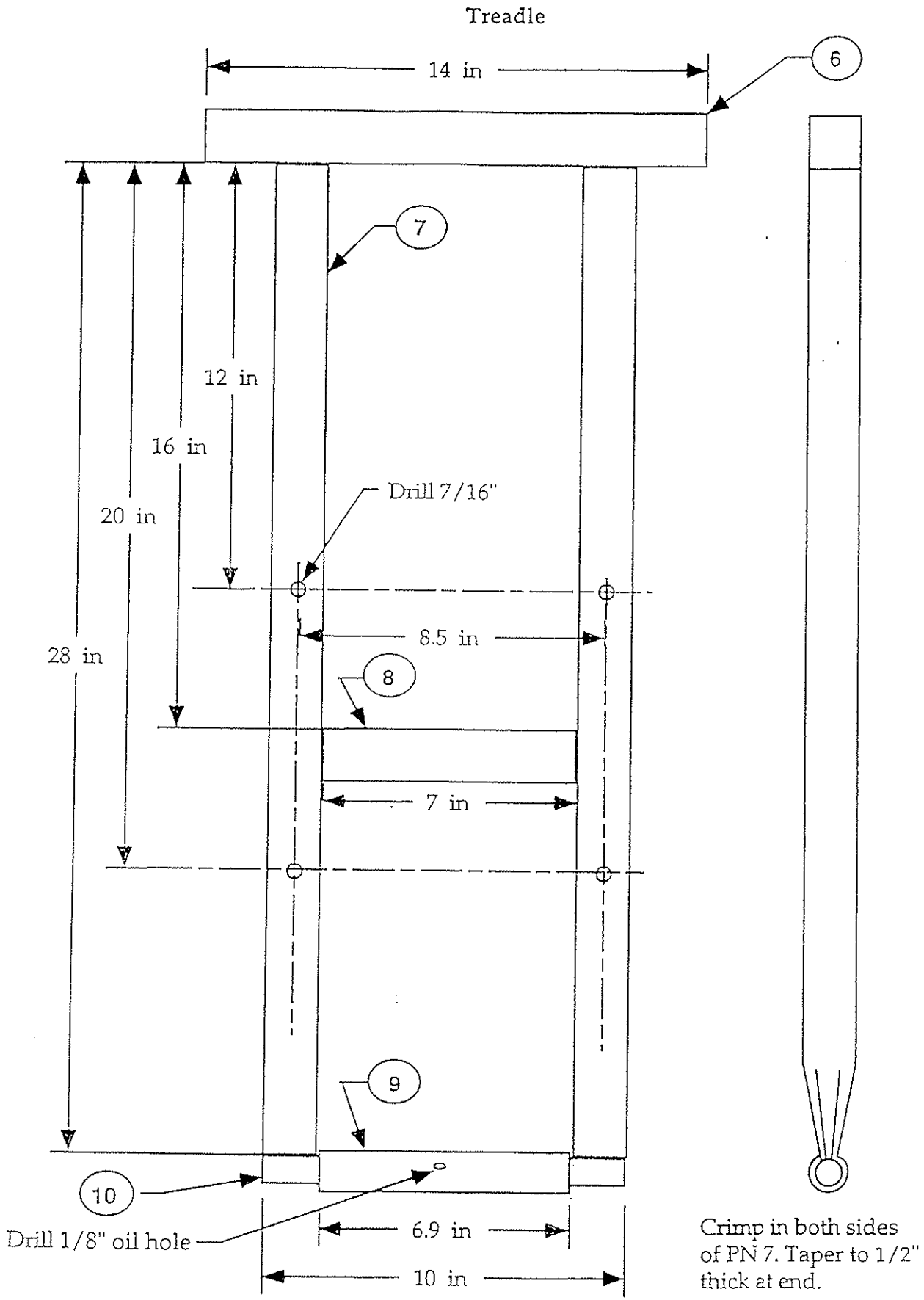
Anvil 6" or 5" solid
square or round



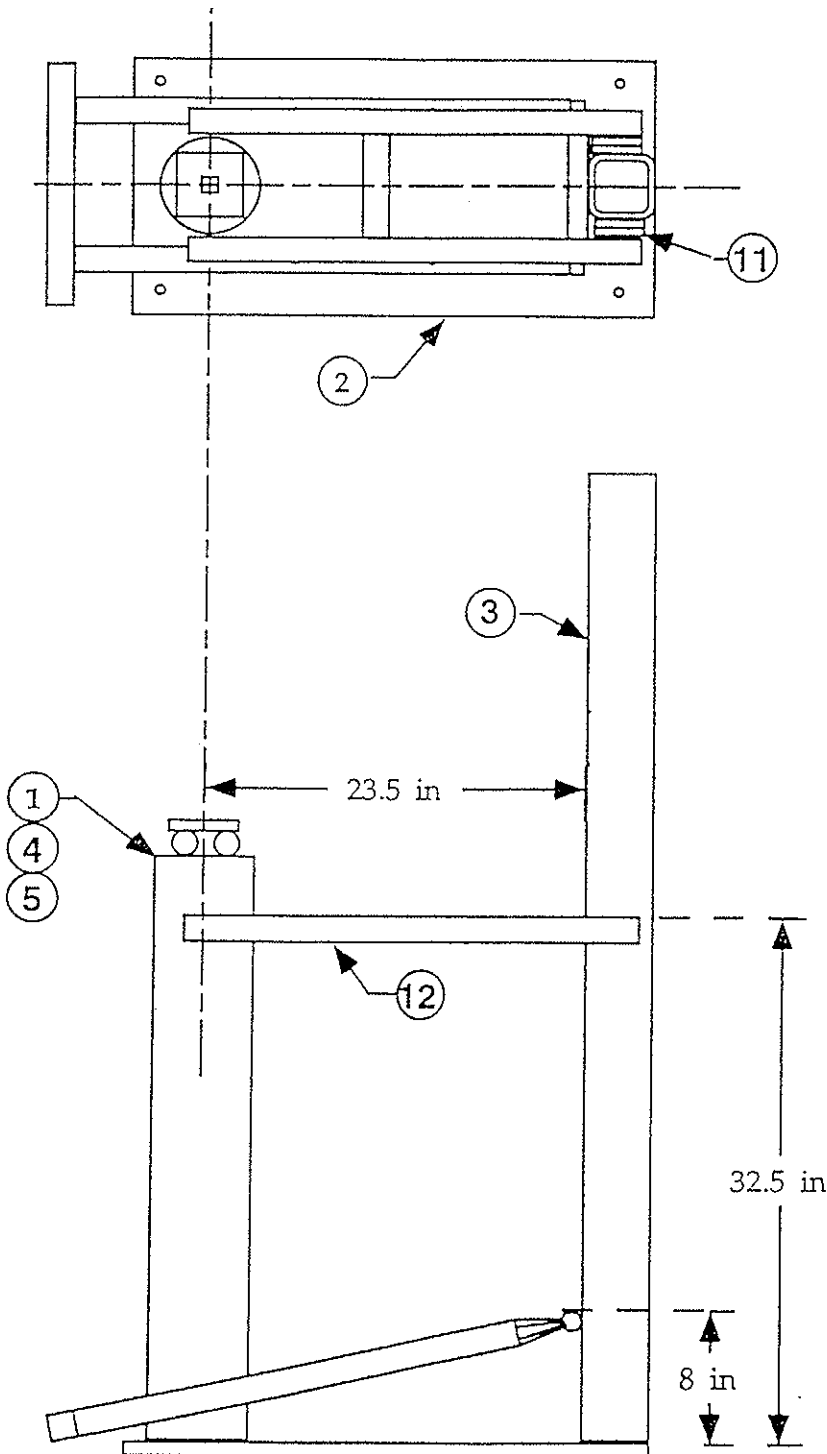
Column
4" sq. tubing
11 gage

Tool Holder, Brace and Spring Link





Assembly of Base, Anvil and Column



Mark off centerline on Base.

Put on level floor.

Put Column on back of the Base.

Shim Column so it is vertical, on centerline, square with Base and even with back of Base.

Tack weld Column to Base.

Weld the Treadle to the front of the Column at 8" above the Base.

Put Anvil on Base centerline inside the Treadle so that the center of the 1" square hole is 23.5" from the front of the Column.

Shim Anvil so it is vertical and parallel with Column.

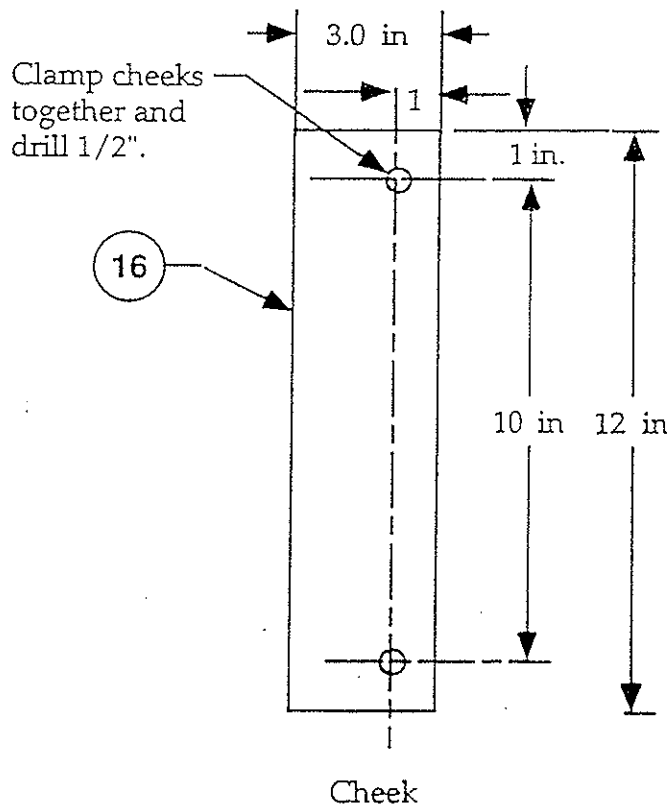
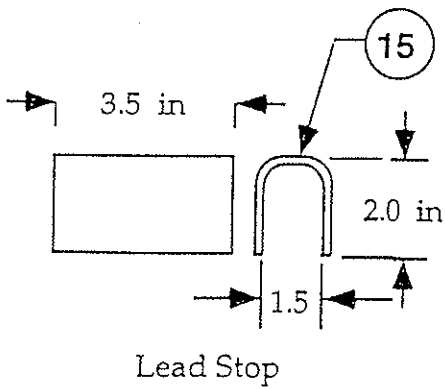
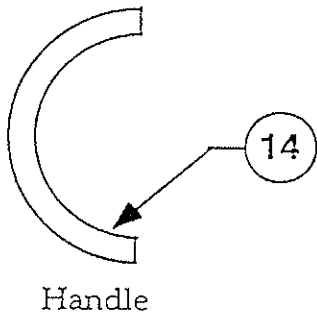
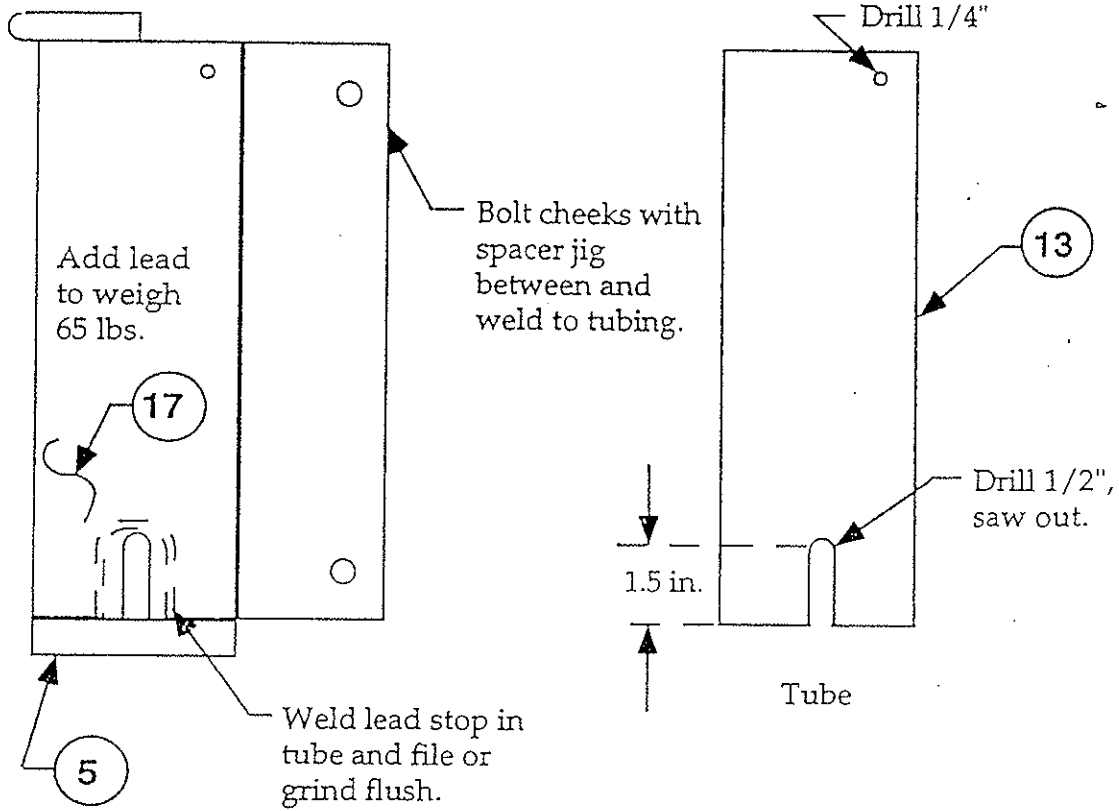
Tack weld Anvil to Base. Recheck the 23.5" and that the square hole is square with Column.

Weld the Braces to Anvil and Column at 32.5" above the Base. Use Spacers to make Column plus Spacers width equal to the Anvil width.

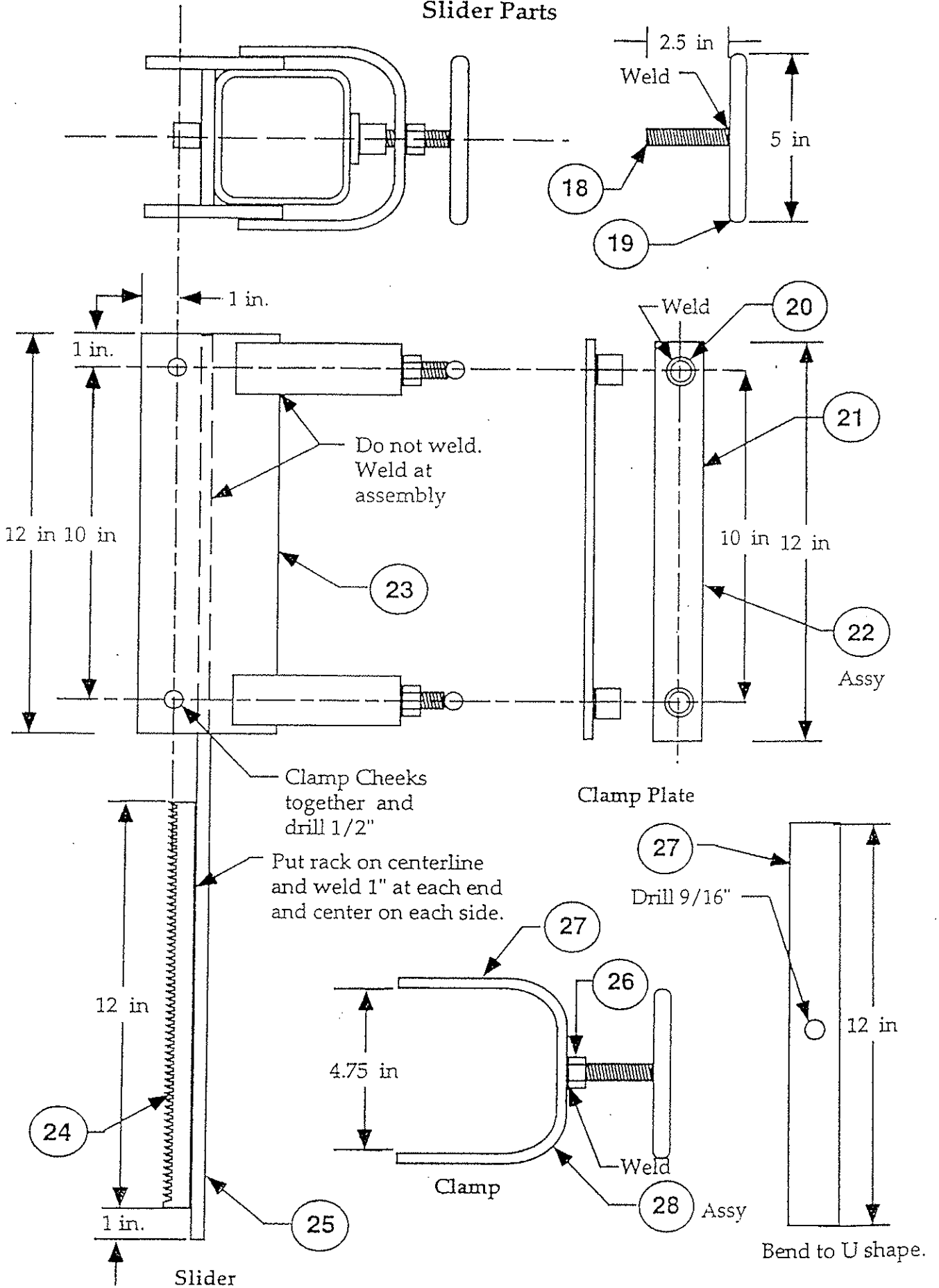
Do not weld sides until Treadle is in place.

Weld Anvil and Column to Base.

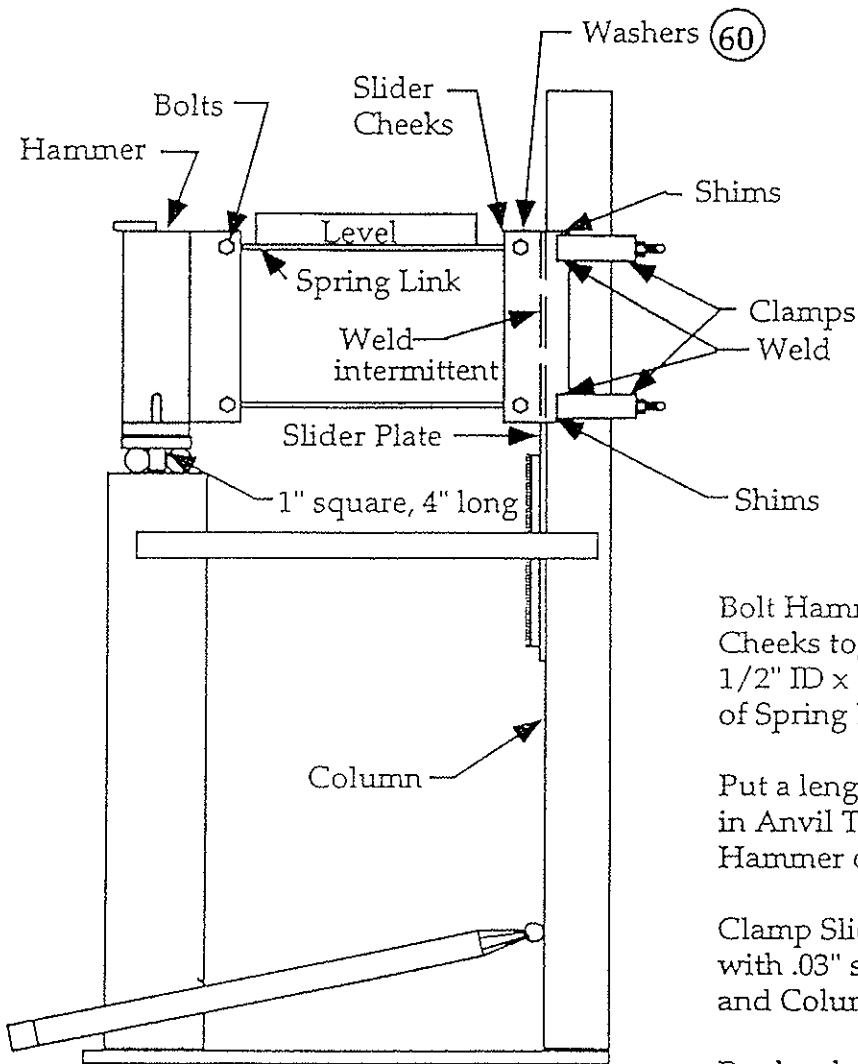
Hammer



Slider Parts



Slider and Clamp Assembly



Bolt Hammer, Springs, and Slider Cheeks together. Put 4 Washers, 1/2" ID x 1/8" thick on each side of Spring Link at Slider bolts.

Put a length of 1" square, 4" long in Anvil Tool Holder and set Hammer on it.

Clamp Slider Cheeks to Column with .03" shims between Cheek and Column on one side.

Put level on Spring Link to make sure they are level.

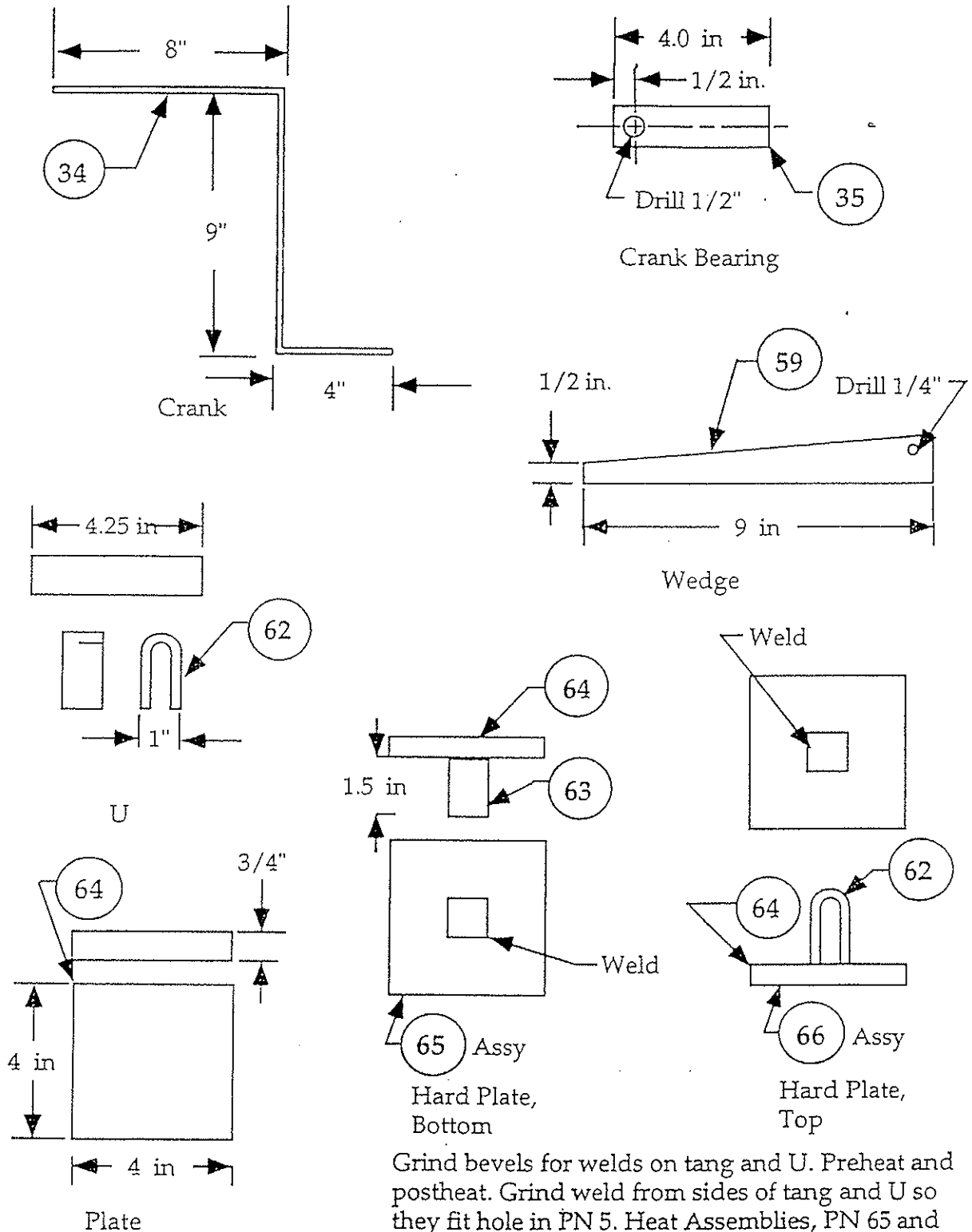
Clamp Slider Plate to Column.

Weld Slider Cheeks to Slider Plate. Remove Shims.

Put Clamps and Clamp Plate over Cheeks and hold in place with C-clamps.

Weld Clamps to Cheeks.

Crank, Wedge and Hard Plates



Grind bevels for welds on tang and U. Preheat and postheat. Grind weld from sides of tang and U so they fit hole in PN 5. Heat Assemblies, PN 65 and PN 66 to red and put in hammer anvil and hit several blows to be sure tang and U are aligned.

Crank, Pinion, Stop Assembly

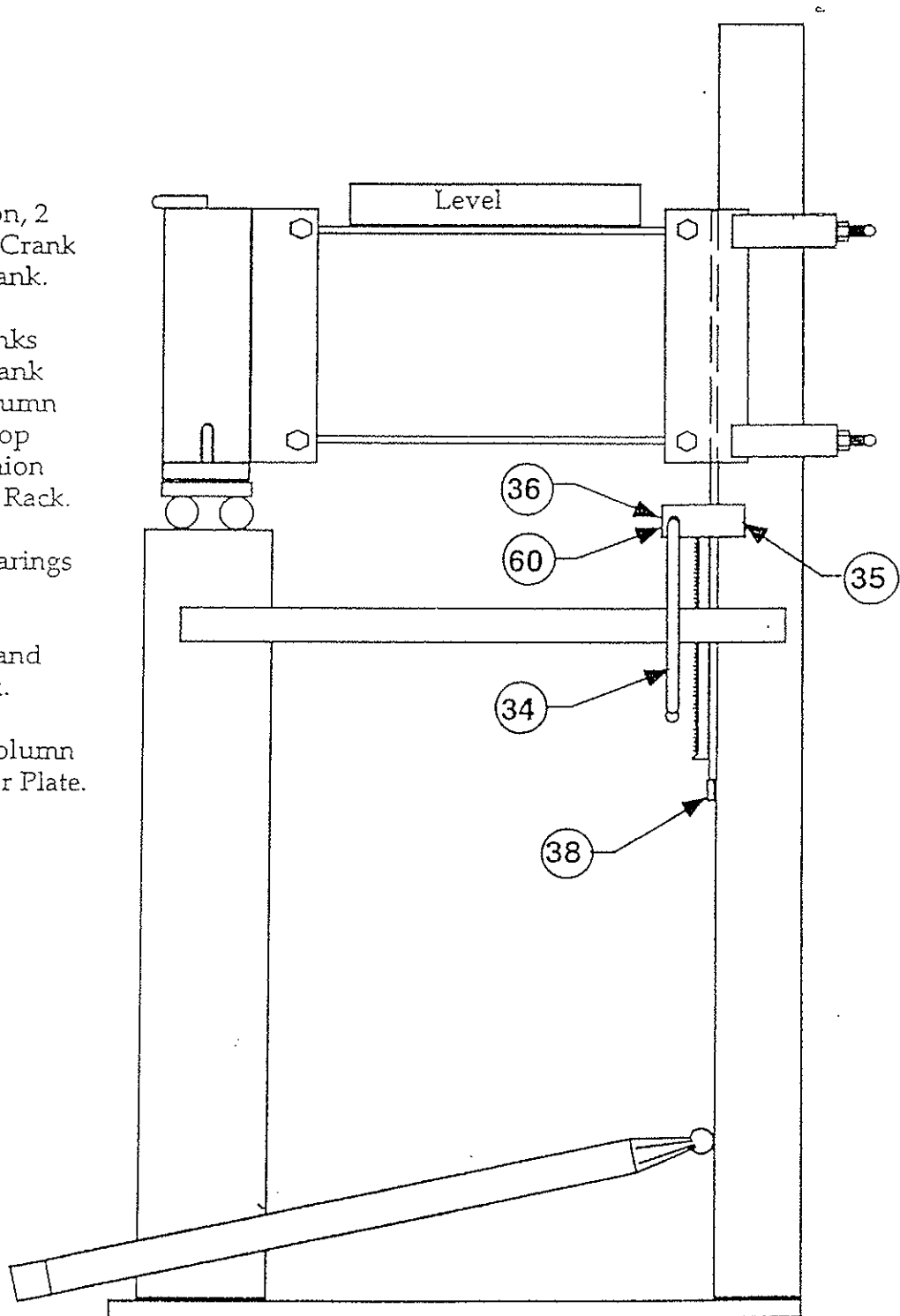
Assemble Pinion, 2 Washers and 2 Crank Bearings on Crank.

With Spring Links level, clamp Crank Bearings to Column so Pinion is at top of Rack and Pinion is meshed with Rack.

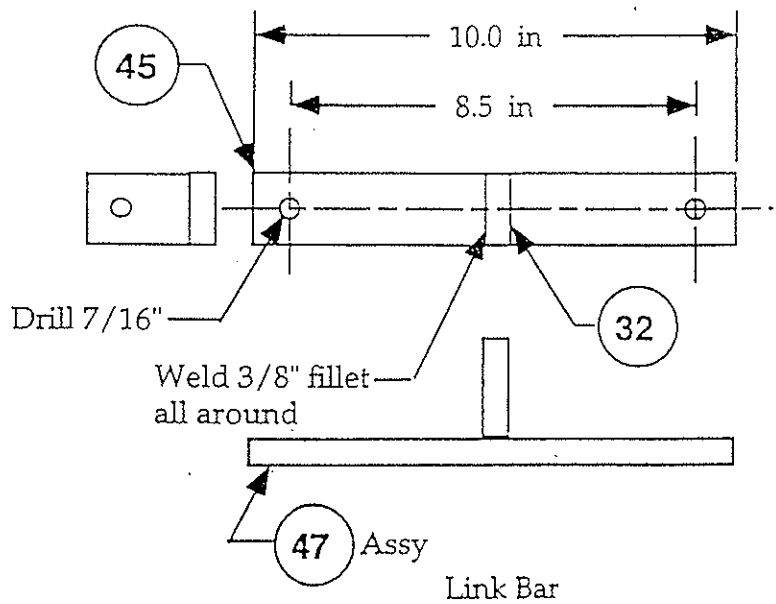
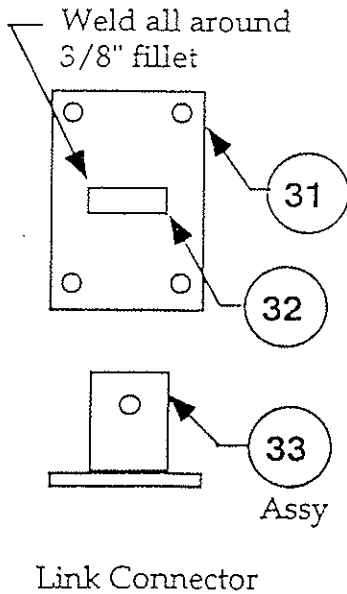
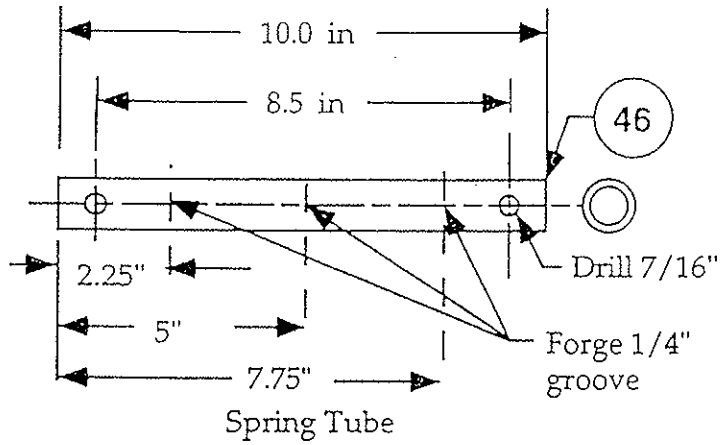
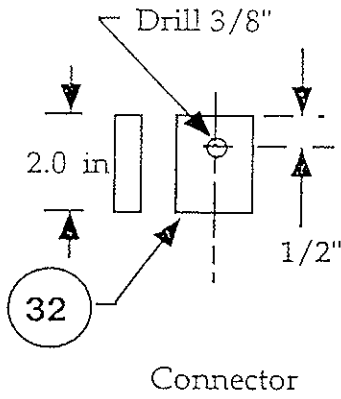
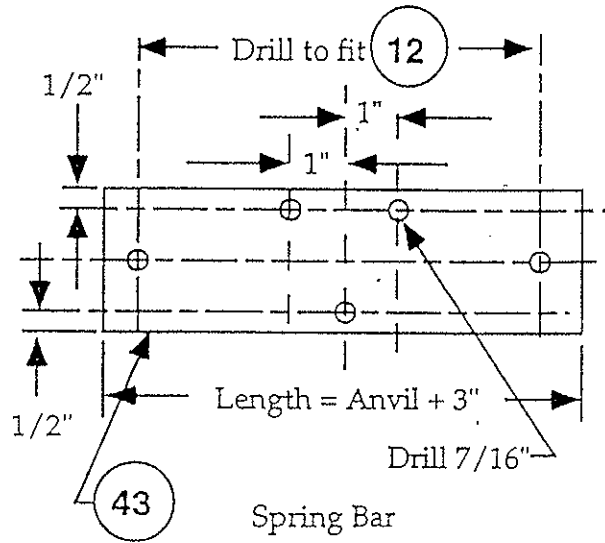
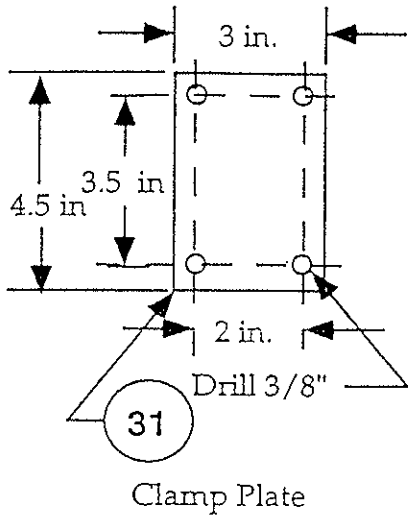
Weld Crank Bearings to Column.

Weld Washers and Pinion to Crank.

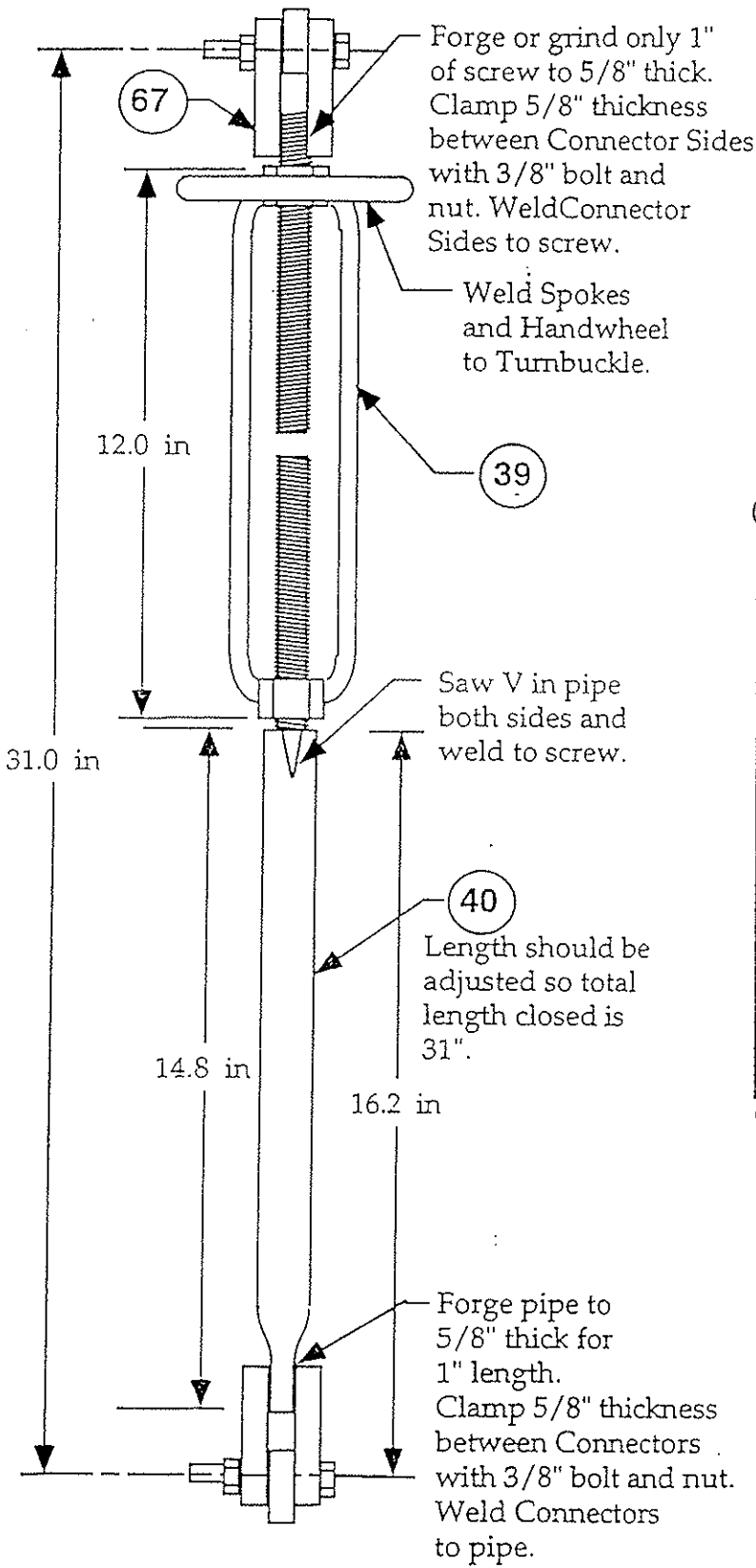
Weld Stop to Column just below Slider Plate.



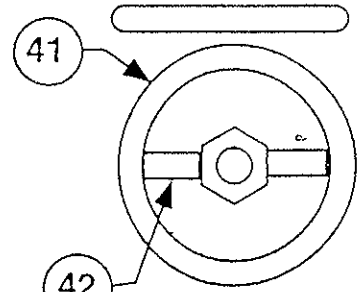
Spring and Link Connectors



Adjustable Link

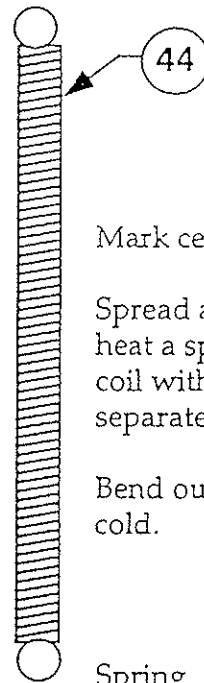


Adjustable Link



Adjust length of spoke to fit turnbuckle.

Handwheel

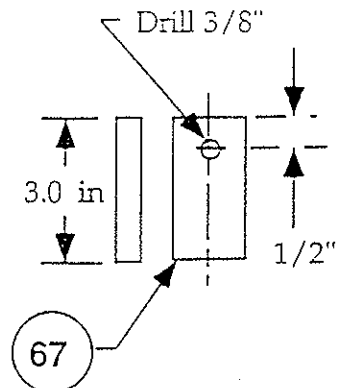


Mark center of Spring.

Spread adjacent coils and heat a spot on the center coil with a torch until it separates.

Bend out a 2 turn loop, cold.

Spring



Connector Sides

Final Assembly

Put hammer on anvil
install spring links with
bolts, spacer washers,
nuts, and lockwashers.

Install Clamp at 4.5"
from back pivot.

Bolt Link Bar under
Treadle.

Put Spring Tube through
3 Springs and bolt
under Treadle.

Bolt Spring Bar on top
of Braces.

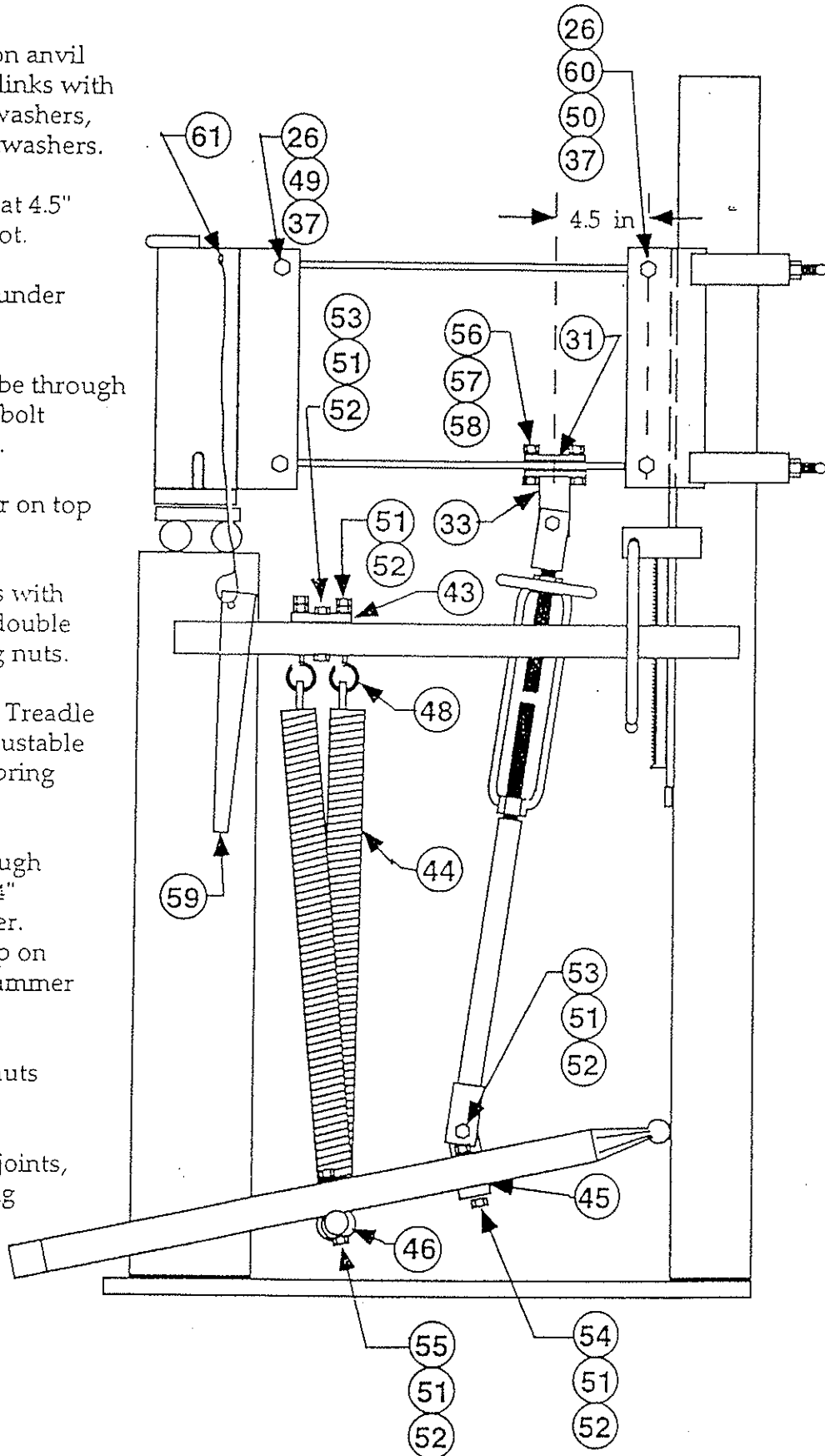
Attach Springs with
Eyebolts; use double
nuts or locking nuts.

Push down on Treadle
and attach Adjustable
Link. Adjust spring
tension.

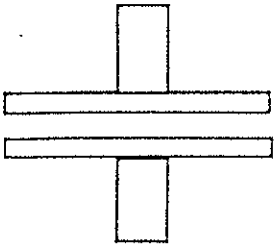
Put Cable through
Wedge and 1/4"
hole in Hammer.
Put cable clamp on
Cable inside hammer
Tube.

Make sure all nuts
are tight.

Oil all moving joints,
including spring
connections.



T H Tools



Hard Plates, 4" square
Grader Blade



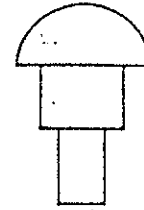
Tool Retainer
1/4" x 1" x 4"



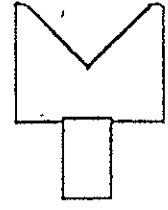
Bottom Tool
Shank, 1" sq



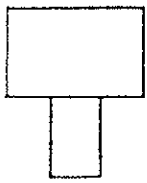
Edge of Anvil Stake
Medium Carbon Steel



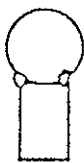
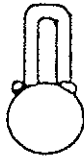
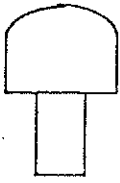
Mushroom Stake
End of Axle



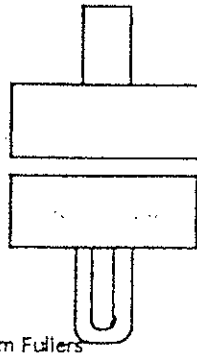
V Block



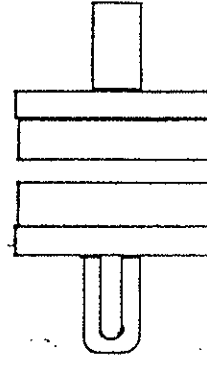
Large Radius Fuller
Medium Carbon



Top and Bottom Fullers
1 1/2" Diameter, Car Axle



Top and Bottom Fullers
3/4" Diameter, Spring



Top and Bottom Fullers
1/2" Diameter, Coil Spring

Clay Spencer
205/837-6996
208 Metaire Lane
Madison, AL 35758

Treadle Hammer Workshop

A few notes about using your new hammers. I never put my fingers under the hammer while forging. I recommend this practice for you. If you use fingers under the hammer it is not a matter of "IF you will mash" them but "WHEN you will mash them". You don't have to keep all your finger out from under the hammer, only the ones you don't want smashed. Use tongs, vise grips to hold punches, etc. Weld a handle on the tools. If you preheat and post heat around 400°F the welded handles do pretty good on many tool steels. Ball peens are made from good steel, have the hole already punched, are cheap and very available at flea markets.

The two hard plates, or other mounted tools, should be in place when the hammer is used to prevent burring or rounding over the hardy holes in the hammer and anvil. You can punch through the bottom hole but be very careful to stay off the edges.

Heat both the hard plates, individually, put in the hammer (with wedge in lightly), or anvil and take a couple of good licks to seat them well. I usually reheat to the critical temperature (red to where a magnet will not pull on it) and normalize by laying on the forge or in ashes to anneal. Mark the front of each and always use in the same orientation.

The flat spring connector plate may be adjusted to back or front to suit your preference. I like it close to the back bolt, about 4 1/2" or 5" out from center of bolt to the center of the plate. The farther back it is, the more the hammer moves in relation to how far the treadle moves. If it is moved farther back the slider cheeks will stop the clamp plate. I take a torch or grinder and notch the cheeks some so the hammer will go up farther. Adjust the spring tension so it pulls the hammer up until it stops.

Before each forging operation, adjust height of hammer if necessary. Open clamps on back while holding crank, and then adjust hammer height. Reclamp.

Put the tool and stock under the hammer and adjust the turnbuckle so that it is down low but does not hit the floor before the hammer hits the tool or stock. Put weight on the treadle by stepping on it to make the adjusting easier. The treadle should be down so you can get more force from your leg but the treadle should be kept from hitting the floor. If it hits the floor before the hammer hits the tool there is a lot of force to be absorbed through the treadle, turnbuckle and spring. Besides, it hurts to slam your foot into the floor a hundred times. Switch legs every once and a while. You will learn to dance on one foot before long.

The U for holding tools in the hammer is made from 1/4" x 1", 4 1/4" long. Bevel the sides before welding and grind off most of the excess weld. Heat as above and fit to the hardy hole, grind off any excess weld metal that doesn't go into the hole. The tang for bottom tools can be made from 1" square. Heat and fit to the hole as above. For matched tools such as top and bottom fullers, put a U on both tools. Put one in line with the tool and the other at 90° to the mating tool so you can use from front or side by switching which tool you put in the hammer. If you like, you can mount the tangs and U's at 45° angle.

You can make many tools from ball peen hammers and you can use many of your regular blacksmithing tools such as spring fullers and swages, tanged fullers and swages. Power hammer tools such as hacks may also be used with the TH.

Since the hammers were put together with the holes aligned while the top link was horizontal, the holes should be aligned when the top link is flat. If the hammer is off to one side or the other, loosen the clamps, move the hammer over and reclamp.

Keep your tools vertical and centered under the hammer or they may kick out. Listen to your hammer. If it sounds strange, check to see what is wrong. A rattling sound generally means that the wedge is loose. Check to see that we tightened the bolts on the spring clamp, turnbuckle and treadle. Retighten the bolts after a few weeks of use. The 1/2" bolts should be loose enough so the hammer moves easily. When you loosen the clamps at the back, have a good hold on the crank handle. When the slider is loose and free it usually moves up, sometimes very fast. Oil the moving parts occasionally.

Let me know if you have problems or questions. Clay Spencer, 205/837-6996, 208 Metaire Lane, Madison, AL 35758

