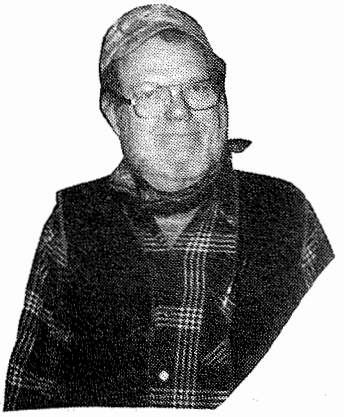
$2.00

NWBA

Hot Iron News

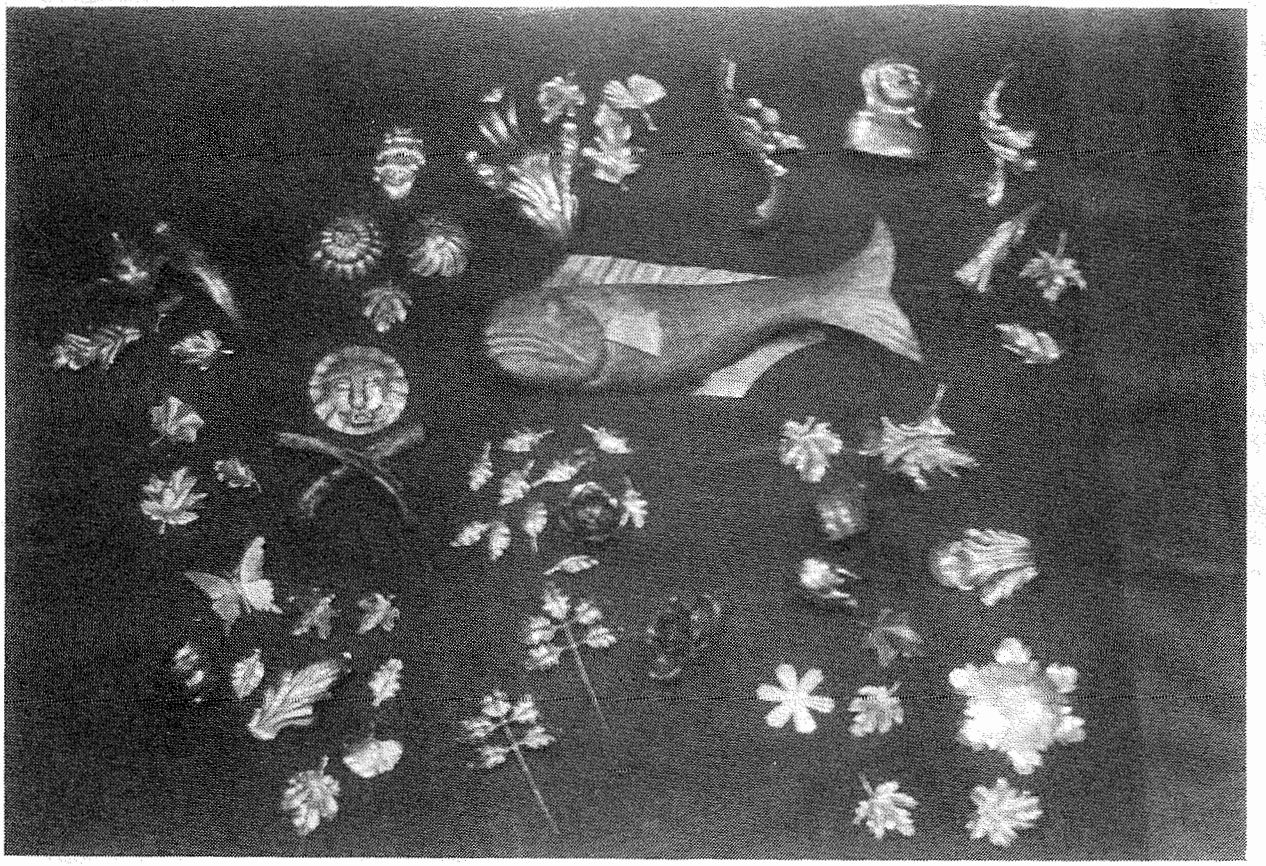
CHAPTER OF ABANA

JANUARY 1987 -- Voice of the Northwest Blacksmiths Association



HERSOM WORKSHOP

DRAWS HOORAYS! *See page 11*



N. W. B. A.
Box 81041, Seattle, WA

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President receives "Wally" Award

This picture is of our NWBA president proudly accepting the "Wally" award at the Flagstaff ABANA conference. This award is made and given by Richard Quinell of Rouhurst Forge in Surrey England To the maker of the most whimsical item in the show. This year it was two Saquaro cacti made by the lost pickle method of casting, mounted on a cut out of the state of Arizona. Darryl won with a "perfectly useless "" damascus giraffe.

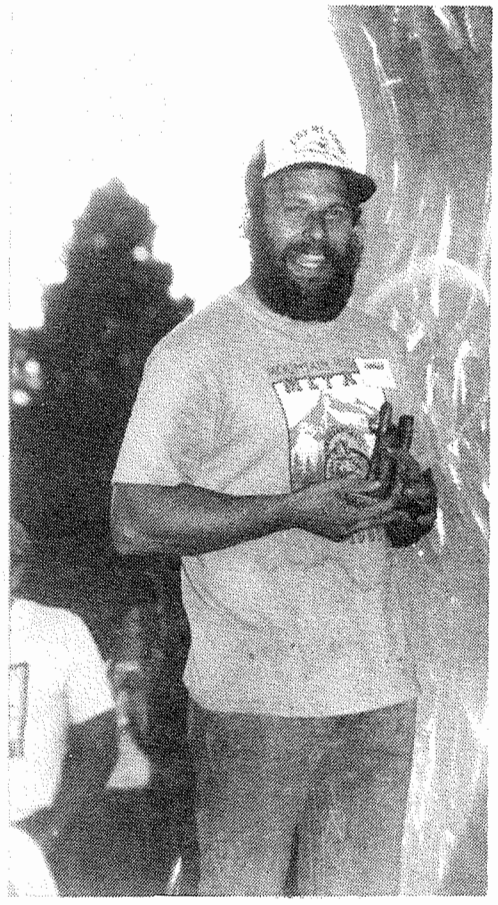


Photo - Corky Storer

Novice Workshop

January 16th, 17th,& 18th there will be a novice workshop at Old Cedar Forge in Allyn, Washington. Instructors will include most of the NWBA board. There is parking space and a place to pitch tents as well as motels available in Shelton. Call Darryl at F.M.F. (206-832-6280) for more information.

Fall Gathering

Oct. 25th& 26th F.M.F. hosted our fall get-together. There were demos by the Cal-Gas and Harris torch representitive on the use of propane torches as well as an excellent safty lecture. Darryl Nelson & Gene Chapman showed how to construct a loose brick gas forge as shown in the last newsletter. Sixty pounds of beef loin roast, three pony kegs of beer and other goodies to numerous to mention were consumed to the last scrap and drop.

NWBA Events Past & Future

Frank Turley will be here April 9th & 10th to give us some insights into the Zen of blacksmithing. If you know Frank you'll want to attend. If you don't know him take this opprotunity to meet one of America's top instructors in the field of ironwork. Space is limited so sign up now. 206-832-6280

The demonstrator for our spring meet the first weekend in May will be Ivan Bailey from Savanah, Georgia. Location and details in the next newsletter.

A note from Nahum

Dear Darryl and NWBA,

All week I have been trying to get a time when I could sit down and write you, and the NWBA to thank you again for having me teach at the work shop on repousse.

I am still elated at the interest, concentration and enthusiasm that all those attending displayed during the three days we were together.

What stamina some of them showed by working ? till 5 a.m. Sunday morning.

I understand that this kind of stamina is not at all unusual when blacksmiths get together, a flash back to my past, reveals remembrances of times Idid the same thing myself. Ha!

I do hope those who hadn't finished some particular piece, were able to do so when they returned to their own shop. (Amazing how much work and the number of pieces made during the work shop.)

Thank you again NWBA for a most enjoyable and memorable Oct 17- 18- 19.

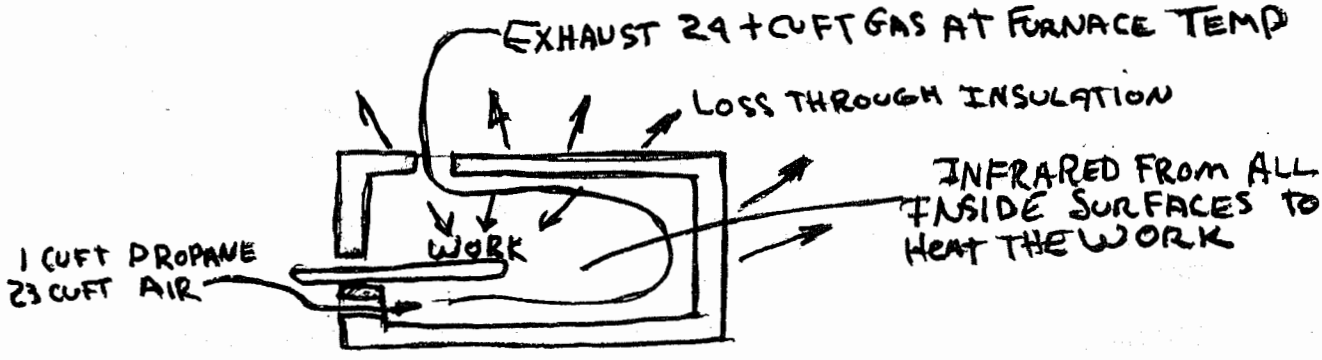
Sincerely,
Nahum Hersom
"Grandpa"

DESIGNING A GAS FORGE

In furnace and torch design, one very common misconception is that a big noisy flame is needed to have HOT temperatures. On the contrary, a Bunsen Burner or a cutting torch could have the same temperature, up to 3,600°F. The noise heard from the torch is the excess oxygen through the torch tip and is used for 'cutting', actually; preheat, then burning, and finally blowing the slag clear of the slot.

Some manufacturers of torches or furnaces are motivated in design by one factor; they must compete in pricing their product. A burner designed with high pressure can save the price of a regulator and some smaller piping. This can mean the difference between getting the sale or not.

A furnace designer that wants the BEST, will invariably use a low pressure system at the furnace. The low pressure system is safer, it uses fuel more efficiently, the temperature can be set and maintained better without drifting, the flame is 'softer' too. Hot air currents through the furnace are easier to control, and scaling is much less. As mixing is more thorough, combustion is complete in the furnace, without blowing excess air on the part. In the furnace, infrared from the bricks do the real heating, not the flame. The flame is used to heat up the bricks, the bricks provide a constant source for a non-oxidizing heat - excessive air flow or the flame impinging on the metal will cause scaling. Only enough fuel/air should be used to replace the heat required to heat the metal and make up the losses through the vents, openings, and insulation.



A SIMPLE UP FLOW FURNACE

fig. 1

For the average shop furnace using standard, off the shelf parts, the total costs should be, $6 to $10 per burner + $50 for bricks, metal, etc. For more heat, burners should be increased in number not size.

To illustrate, we will go through a basic piping and furnace design, using the following criteria: (Since piping is critical to safety and efficient operation, we will start at the tank) The furnace will be for a Blacksmith doing medium sized work and the system will use a tank some distance from the shop, only to show how to size piping. A double stage regulation system will be shown, (2 or more burners could be used with or without a blower). The burner will be about 60,000 BTU/HR with an adjustable valve. The furnace is set near the center of the shop. The piping for the furnace will go up 8', across 12', down 10', bury 24" deep, and 35' to the tank, for a total of 70'. (It is required that the tank be at least 10' from the building, unless it is a portable cylinder)

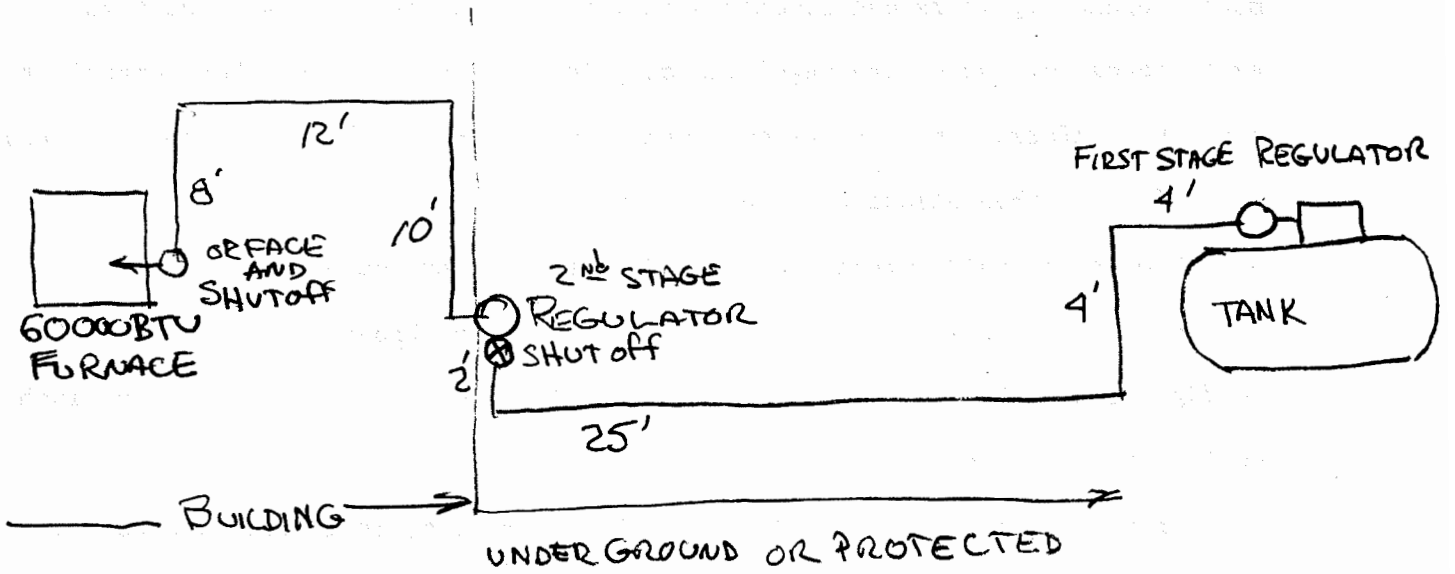


fig. 2

Items needed for shop, shown in fig. 2:

Valve - ½" Ballvalve - main shutoff at the building
Furnace - 60,000 BTU/HR
Furnace piping - inside building
Buried piping - outside building
Regulator - low pressure - (11" w/c)
Regulator - high pressure - (10#)
Cylinder - 24 gallons or larger

Distance from the tank to the building is 35' and Table 1, shows that 3/8" copper tubing will flow 210,000 BTU/HR at 40', or ½" pipe will flow 1,382,000 BTU/HR, so either could be used. From the second stage regulator to the furnace, 30' of pipe will be needed, and from Table 2, it shows 5/8" copper tubing will handle 107,000 BTU, or ½" pipe can be used for 152,000 BTU, (big enough for 2 furnaces). As 'hard' piping is recommended inside buildings then ½" iron pipe is the recommended pipe. Using Table 2 for piping a low pressure, single stage system, it can be seen that, for 60,000 BTU low pressure and a 75' run, 3/4" pipe will be needed all the way from the regulator to the furnace. This is a basic system and most propane suppliers can recommend piping size and regulators to suit your exact needs, or one of the regulator suppliers (Rego or Fisher) have manuals to give this information. At Vashon Propane, we use Rego's "LP Serviceman's manual" for reference when planning piping systems.

Now, to a basic furnace design: One of the most common mistakes made in amateur built furnaces is not enough clear air flow <u>through</u> the furnace, refer to fig. 1, usually at least one square inch inlet opening, for one square inch of outlet opening is standard.

If any flame exists outside of the fire box area, it indicates unburned gases and this unburned gas <u>cools</u> the chamber and indicates <u>excessive</u> oxygen or fuel, which causes an oxidizing or reducing atmosphere. If the air/gas mixture is correct, and the velocity is correct (slow), the gas/air mixture will combust at about 1,000°F and could not go through a 2,000°F furnace without igniting.

If too much gas and air is forced through the furnace, it will cool the furnace and gas will be forced out through openings in the bricks and burn outside the furnace. This wastes fuel (its sure not heating the furnace) and can cause pockets of unburned fuel to collect in the SHOP. (VERY DANGEROUS!)

To recap, the burner must mix gas and air at approximately a 23 to 1 ratio for good combustion.

This mixture must be moving SLOW enough to completely burn IN the furnace. An UNRESTRICTED exhaust opening must be sized to allow the products of combustion to escape. (Don't choke the fire) One inch of inlet opening and one inch of exhaust opening.

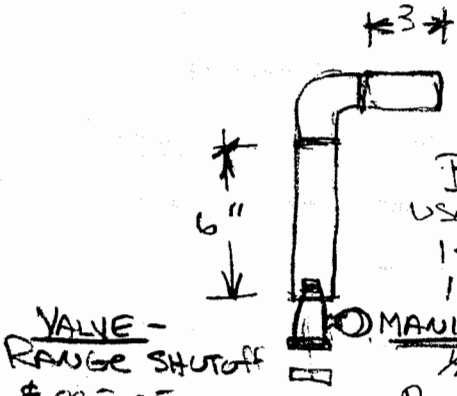
Check the exhaust, and if it will burn then you are forcing the furnace by flowing too much gas. ie. If you pull the choke on a car it will pull in more gas than the engine can burn. The car cannot run at maximum power and the exhaust contains unburned gasoline.

All unburned gases are acting as a coolant in the furnace.

A noisy furnace is an inefficient, cool, uncontrollable furnace.

SAFETY FIRST! It can be dangerous, to allow unburned gas to collect in the shop area!

THE BURNER

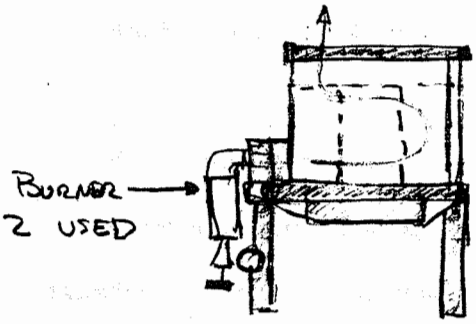


A

A SIMPLE BURNER MADE FROM STANDARD PLUMBING Parts + 2-#52 RANGE VALVES HOOKED TOGATHER WITH A 16" Pipe OF ½" WATER PIPE, DRILL & TAP TO TAKE THE VALVES. THE VALVES ARE Not HOOKED TO THE BURNER TUBE

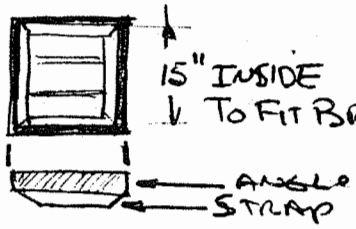
DRILL OUT THE ORFACE IN THE VALVES WITH A #52 DRILL (30,000 BTU EACH.)

THE FURNACE



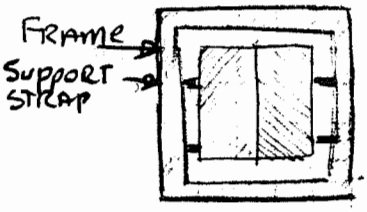
FIRST MAKE 1-15"x15" SQUARE FROM 1" ANGLE THESE WILL BE THE BASE (ADD LEGS TO SUITE)

(A)



ADD 2-½" STRAPS TO ONE OF THE SQUARES THIS WILL ALOW THE BOTTOM BRICKS TO SET 1" LOWER THEN SIDES

(B)

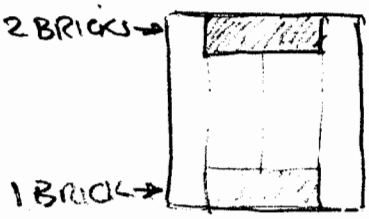


START BY LAYING 2 BOTTOM BRICKS

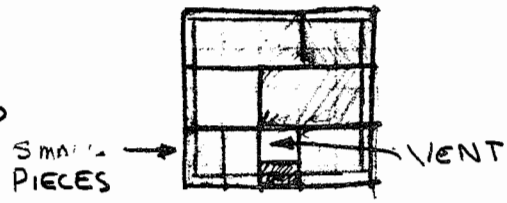
(E)

CUT 3 BRICKS 6" LONG & WITH 3 FULL BRICK LAY DOWN IN TOP FRAME (15 X 13½ INSIDE)

(C)

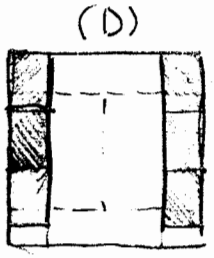


NEXT ADD 2 BRICKS AT 1 END & 1 BRICK AT OTHER - THESE SHOULD BE ON THEIR SIDE



DRILL OR CUT 3" VENT PUT ON TOP OF FURNACE WITH FRAME UP

(D)



3RD - NOW ADD 6 BRICKS, 3 EACH SIDE OF THE BOTTOM BRICKS, FOR THE SIDES. THEY STAND ON END

ADD 1 BRICK OR USE CUT BRICKS FOR DOOR

VENT CAN BE USED TO HEAT SMALL PIECES

Tubeing	3.75
VALVES	9.00
½" Pipe & Cap	1.80
ANGLE ect.	5.60
BRICKS -	38.50

TOTAL Cost

Rat - '80

FLOW OF LP-GAS THROUGH FIXED ORIFICES*

TABLE 4

BTU Per Hour at 11" W.C. at Sea Level

Orifice or Drill Size	Propane	Butane	Orifice or Drill Size	Propane	Butane
.008	519	589	51	36,531	41,414
.009	656	744	50	39,842	45,168
.010	812	921	49	43,361	49,157
.011	981	1,112	48	46,983	53,263
.012	1,169	1,326	47	50,088	56,783
80	1,480	1,675	46	53,296	60,420
79	1,708	1,936	45	54,641	61,944
78	2,080	2,358	44	60,229	68,280
77	2,629	2,980	43	64,369	72,973
76	3,249	3,684	42	71,095	80,599
75	3,581	4,059	41	74,924	84,940
74	4,119	4,669	40	78,029	88,459
73	4,678	5,303	39	80,513	91,215
72	5,081	5,760	38	83,721	94,912
71	5,495	6,230	37	87,860	99,605
70	6,375	7,227	36	92,207	104,532
69	6,934	7,860	35	98,312	111,454
68	7,813	8,858	34	100,175	113,566
67	8,320	9,433	33	103,797	117,672
66	8,848	10,031	32	109,385	124,007
65	9,955	11,286	31	117,043	132,689
64	10,535	11,943	30	134,119	152,046
63	11,125	12,612	29	150,366	170,466
62	11,735	13,304	28	160,301	181,728
61	12,367	14,020	27	168,580	191,114
60	13,008	14,747	26	175,617	199,092
59	13,660	15,486	25	181,619	205,896
58	14,333	16,249	24	187,828	212,935
57	15,026	17,035	23	192,796	218,567
56	17,572	19,921	22	200,350	227,131
55	21,939	24,872	21	205,525	232,997
54	24,630	27,922	20	210,699	238,863
53	28,769	32,615	19	223,945	253,880
52	32,805	37,190	18	233,466	264,673

Courtesy of National Fire Protective Association – NFPA No. 54
National Fuel Gas Code – 1984.

TABLE 1 – FIRST STAGE PIPE SIZING

Maximum capacity of pipe or tubing, in thousands of BTU/hr of LP-Gas.
(Based on 10 PSIG inlet pressure at a pressure drop of 1 PSIG.)

Size of Pipe or Copper Tubing, inches		Length of Pipe or tubing, feet*											
		10	20	30	40	50	60	70	80	90	100	125	150
Copper Tubing (O.D.)	3/8	448	307	246	210	186	168	155	144	135	127	113	103
	1/2	1156	786	628	535	472	427	392	364	341	321	284	256
	5/8	2274	1540	1236	1054	931	841	772	717	672	634	560	506
Pipe Size	1/2	2442	1895	1580	1382	1240	1133	1048	979	921	872	775	703
	3/4	4631	3812	3230	2842	2561	2348	2175	2035	1917	1816	1618	1470
	1	8531	6916	5939	5270	4776	4392	4083	3829	3614	3429	3063	2789
	1-1/4	16626	13771	11963	10691	9736	8987	8378	7872	7443	7074	6336	5779
	1-1/2	23670	19957	17510	15749	14407	13341	12470	11740	11119	10581	9501	8682
	2	42531	38514	32398	28359	27001	25104	23538	22216	21082	20097	18104	16580

*Total length of piping from outlet of first stage regulator to inlet of second stage regulator (or to inlet of second stage regulator furthest away).

TABLE 2 – SINGLE OR SECOND STAGE PIPE SIZING

Maximum capacity of pipe or tubing, in thousands of BTU/hr of LP-Gas.
(Based on 11 inches water column inlet pressure at a pressure drop of 1/2 inch water column.)

Size of Pipe or Copper Tubing, inches		Length of Pipe or tubing, feet*											
		10	20	30	40	50	60	70	80	90	100	125	150
Copper Tubing (O.D.)	3/8	39	26	21	19	–	–	–	–	–	–	–	–
	1/2	92	62	50	41	37	35	31	29	27	26	–	–
	5/8	199	131	107	90	79	72	67	62	59	55	–	–
	3/4	329	216	181	145	131	121	112	104	95	90	–	–
	7/8	501	346	277	233	198	187	164	155	146	138	–	–
Pipe Size	1/2	275	189	152	129	114	103	96	89	83	78	69	63
	3/4	567	393	315	267	237	217	196	185	173	162	146	132
	1	1071	732	590	504	448	409	378	346	322	307	275	252
	1-1/4	2205	1496	1212	1039	913	834	771	724	677	630	567	511
	1-1/2	3307	2299	1858	1559	1417	1275	1181	1086	1023	976	866	787
	2	6221	4331	3465	2992	2646	2394	2205	2047	1921	1811	1606	1496

*Total length of piping from outlet of regulator to appliance furthest away.

Note:
Data from ANSI Z223.1, 1974, National Fuel Gas Code, Tables 1-B7 & 8.

REPRESENTATIVE EQUIVALENT LENGTHS OF VARIOUS VALVES AND FITTINGS

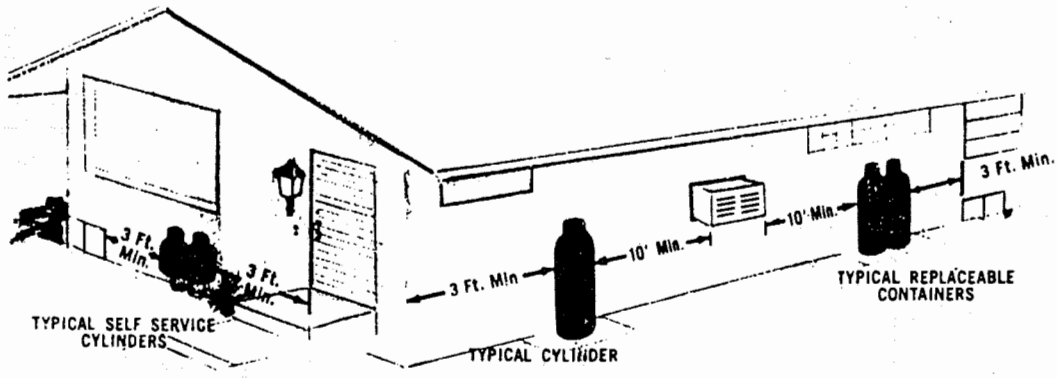
TABLE 3

FITTING	EQUIVALENT LENGTH OF STEEL PIPE (FEET)													
	Nominal Pipe Size (NPT)													
	¾" Schedule		1" Schedule		1¼" Schedule		1½" Schedule		2" Schedule		2½" Schedule		3" Schedule	
	40	80	40	80	40	80	40	80	40	80	40	80	40	80
45° Screwed Elbow	1.2	0.9	1.3	1.2	1.7	1.5	2.0	1.8	2.6	2.4	3.0	2.8	3.8	3.7
90° Screwed Elbow	1.8	1.6	2.3	2.1	3.1	2.9	3.7	3.4	4.6	4.4	5.3	5.1	6.9	6.5
Screwed Tee Thru Run	1.4	1.3	1.7	1.6	2.4	2.3	2.8	2.6	3.6	3.3	4.2	4.0	5.4	5.0
Screwed Tee Thru Branch	4.6	4.0	5.6	5.3	7.9	7.3	9.3	8.6	12.0	11.0	15.0	14.0	17.0	16.0
Screwed Globe Valve*	14.0	10.0	21.0	16.0	24.0	19.0	39.0	27.0	42.0	34.5	24.0	20.0	46.0	39.0
Screwed Angle Valve*	11.0	8.0	13.0	10.0	10.5	8.5	20.0	16.0	32.0	26.5	7.5	6.0	19.0	16.0
Flanged Globe Valve*	—	—	—	—	—	—	30.0	24.0	41.0	34.0	—	—	46.0	39.0
Flanged Angle Valve*	—	—	—	—	—	—	12.0	10.0	14.5	12.0	—	—	19.0	16.0

* Regd A7500 Series Valves

NOTE: 5 foot minimum between relief valve discharge and external source of ignition (air conditioner), direct vent, or mechanical ventilation system (attic fan).

NOTE: If the DOT cylinder is filled on-site from a bulk truck, the filling connection and vent valve must be at least 10 feet from any external source of ignition, direct vent, or mechanical ventilation system.

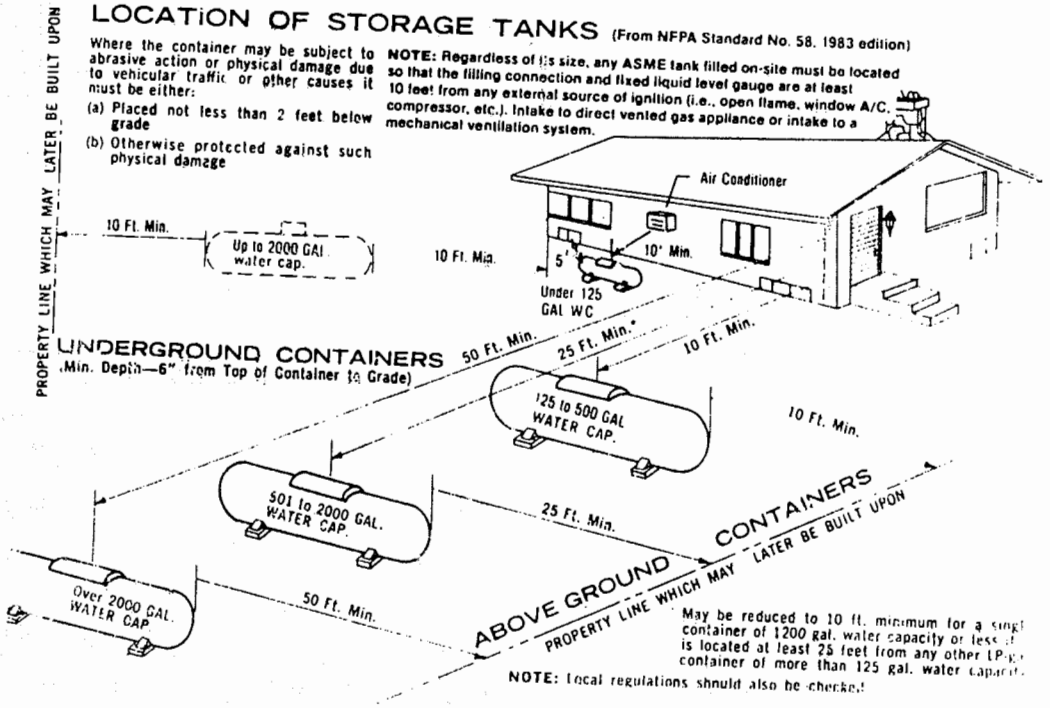


LOCATION OF DOT CYLINDERS

(From NFPA No. 58 Standard 1983)

Distances shown represent those between the safety device discharge on the containers and any building opening located below the level of this discharge.

NOTE: Local regulations should also be check



To The Editor:

Some reflections on the Nahum Hersom Workshop held at my forge October 17-19, 1986....

Not only is Nahum a very skilled craftsman, blacksmith, tool-maker, and instructor, but he is also a very respectable philos-opher, psychologist, and bull-shipper.

Those of us who were lucky enough to attend were treated to a very intense and entirely satisfying experience. My shop walls still echo with dinky little hammer blows by the millions, the rattle and shuffle of countless searches for just the right hammer, stake or punch, and the clank of vise handles closing home thousands of times.

Each one of us came away with a lasting real sense of accomplishment in the completed work pieces clutched in our hot, tired little hands.

Above all, we have once again discovered another facet of this craft and opened the closet door a bit wider. And, believe me, there is a burning light bulb in there! There is no doubt in my mind that the Northwest Blacksmiths Association is leading the way in the discovery of even more light bulbs in even more closets!

Clyde Caldwell may have expressed it best when he told me that when he signed up for this workshop, he asked Darryl Nelson if he tho't it too advanced for him. Darryl told him..it was a no-sweat workshop.

When Clyde arrived and saw Nahum's work, and that which we were to do, he was about to cuss out Darryl for sand-bagging him. Even so, at the end of the workshop, Clyde's smile was ear to ear, and he had some very nice work clutched in his fist.

To those of you out there who tho't one hundred bucks too much money for a mere workshop, let me say that $100 is a small price to pay for all that we received from Nahum. When he returns for next year's workshop, those who want to attend had better be quick to sign up. The number one slot is already filled and the rest are filling fast.

To all those who attended, thank you for adding to the echoes in my shop! To Nahum, once again, with feeling..Hip, Hip, Hooray!

To a great workshop event!

Sincerely,
Jerry Culberson

Chili Feed

Vic's chili feed & Welcome Home party for Jack was a sucess and well atended. We ran out of chili and beer long before we stopped having a good time.

BUILD YOURSELF A LOW BUCKS POWER HAMMER

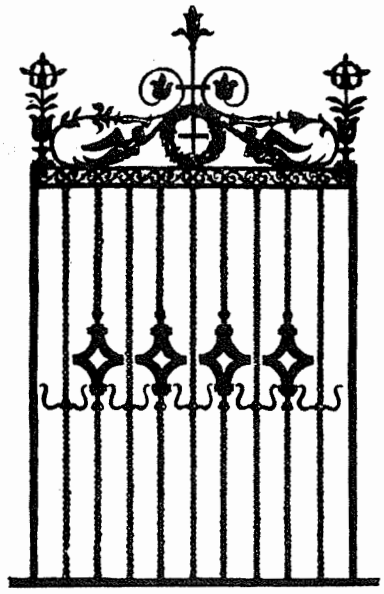
I think this little machine might be of interest to the amateur or hobbyist like me who does not want to lay down big bucks for a manufactured power hammer. I just happened to stumble on to this one in a 1982 estate sale. The credit for building this machine belongs to some blacksmith that has gone to Pearly Gates Forge and could not take it with him. I could not find his name, the only history I could turn up was that it was made during the thirties by a blacksmith who reworked a lot of plow shares.

The beauty of this hammer is its simplicity. It was built using salvaged parts and materials right down to the flywheel eccentric shaft bearings which were the top 4 inches of 2 connecting rods cut off and welded to a plate, the shaft running in the wrist pin bushings. I have replaced them with pillow block bearings but they were still serviceable. The center pivot which is only a 3/4 inch bolt in a drilled hole shows war but not bad for a 50 year old machine.

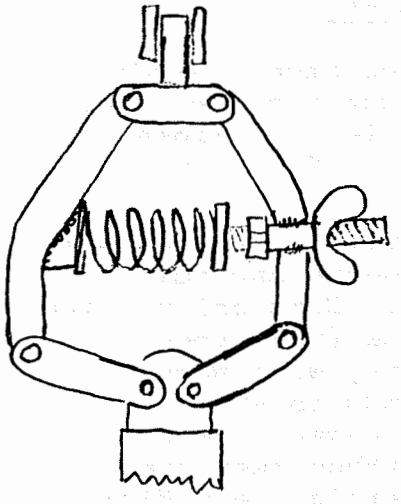
This hammer could be scaled up to a more powerful hammer. It can be made from most any shape of steel. The column could be square tube or I-beam. The hammer could be square stock inside square tubing. The flywheel could be a steel wheelbarrow or farm implement wheel with concrete cast into the spokes for weight. Maybe a gearbox from a lawnmower could be added to allow for different strokes per minute.

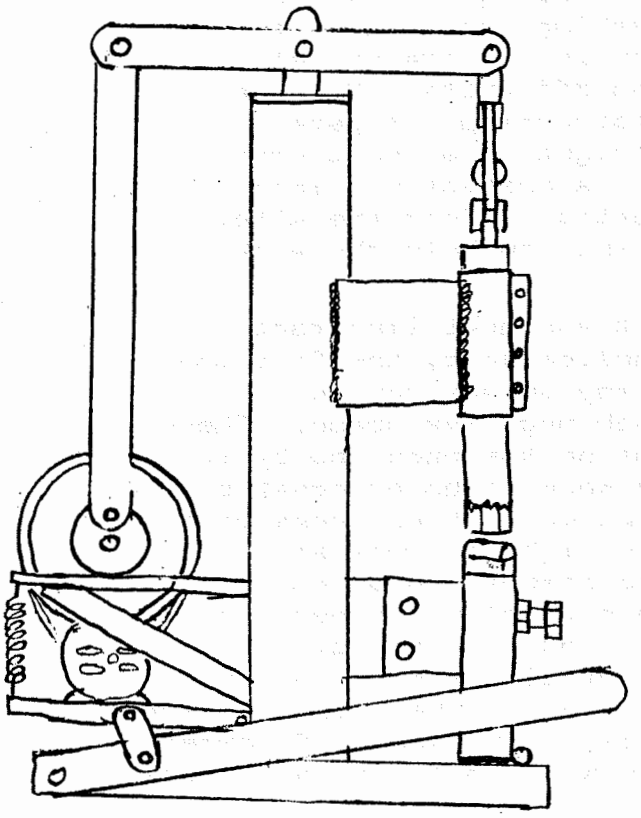
Anyhow I have passed on the idea. Take it and see what you can do with it.

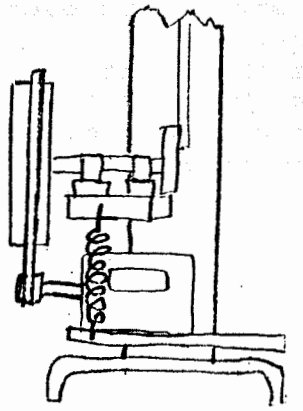
Don Grammond
Blaine, Wa.



BUILD IT YOURSELF LOW BUCKS POWER HAMMER







Anvil - 3" round stock with part of a large radius fuller welded on at a 45 degree angle to center line of column. Other end has a flat surface. Base is hinged to tilt out, anvil piece is removed, flipped over and slid back into 3" pipe housing.

Hammer - 3" round stock 14" long with part of a sledge hammer head welded on.

Hammer Slide - 3" pipe split on one side with 1 piece of 1/4" x 1" flat bar welded on either side of split, clearance adjustment is by 4 clamp bolts.

Column - 6" pipe (well casing)

Base - 12" channel

Bearings - 2 1" pillow block

Rocker Arm - 2 pieces 1/4" x 2" flat bar 22" long.

Rocker arm ratio - 1 to 1

Lift of Hammer - 4" slow - 6" at speed.

Strokes Per Min. - Approx. 250, intensity is adjustable by stiff compression spring on yoke.

Motor - 1/2 h.p. 1750 rpm motor, sheave 2", fly wheel 14" approx. 30 lbs (from an old coffee grinder)

Drive - V-belt ran on outside of flywheel as if it were a flat belt, also serves as a slip-o-matic clutch to hold hammer up.

Eccentric Wheel - 6" for 4" stroke.

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EXHIBITIONS

Slides or stuffing that messy third dimension

Most competitions for show entry, grants and other awards are juried by 35mm color slides. Good slides are essential if one wants to pursue this aspect of the field. Slides are also helpfull in looking at your own work for critical analysis.

The whole point of taking slides for competitions is to make the work as attractive as possible. This means carefull selection of film, background and lighting. 35mm color slide film comes in either Kodakrome or ectachrome (E6) types. The Kodakrome can be developed only by Kodak, with sometimes indifferent results. This type of film tends to shift color to warmer tints. E6 tends to shift colors toward the cool side and can be developed by anyone. In either case one wants to use as fine grained a film as possible, ie a film with a low ASA number like 50. When choosing a background to shoot your work against, find something that allows the work to stand out. For example, black iron tends to get lost in a dark grey background, try an off white. Be sure not to choose a background that is distracting. A gate shot against a fourth of July parade might be a great photo, but poor advertisement for ones work. Architectural iron is difficult to shoot because of competition from the site. Erecting a backdrop or dramatic lighting can help the work stand out.

Lighting is perhaps the most difficult and most important aspect of taking slides. This is complicated by the fact that most ironwork has very little color, may or may not be textural, and is often linear with much negative space. There are a few guides. Strong shadows cast on the backdrop by the work should be avoided. Shooting the work on an overcast day is a solution. Work that is highly textured often looks best when sidelighted. Frequently multiple light sources are used. If the work is on site, set the camera F stop on a low number to give short depth of field to blur the background. Perhaps the most important thing to remember is to pay very close attention to what you are actually seeing thru the viewfinder, not what you know the work looks like. Try different angles to find the most attractive view of the work. Remember it is the slide that gets you what you want, not the work itself.

The mechanics of photography can be gotten from various manuals available at photo stores. They are helpfull on setting exposures, F stops and other things. If you buy a camera, get one with a manual exposure setting, not the type that sets the shutter speed for you. If you have the money and/or lack the time or inclination to do your own photography, there are people who specialize in photographing artists and craftspeoples work.

SELL - BUY - SWAP

FOR SALE

Champion No. 2 100lb. Power Hammer with 3"x5" flat dies, in excellent shape. Gibs, guides, bearings, springs and pins, all in perfect condition. $700.00

Contact Jerry Culberson at OLD CEDAR FORGE, E. 220 Cronquist Rd., Allyn, WA. 98524. Phone 206-275-6769

FOR SALE
2 Coal Forges, Smith Regulators
Hoses,Welding and Cutting Tips
2 Hand Crank Blowers
1 Three Phase Electric Blower
Other Misc. Related Items
Call Corky Storer
(206) 432-1468

FOR SALE
2 Forges and an Anvil
Gary R. Strausbaugh
1777 Sonya Dr SE
Salem, OR 97301
503-378-0926

After you get your slides back from the developer they should be labled with title, dimensions, materials and date. Keep at least one slide of each piece in a master file that you only send out to duplicate. It is amazing how quickly one forgets the details of what and when over a ten year period. After the work is gone, the only thing you have to show is the photo.

Remember, if its worth putting the effort into making it, it is worth keeping a record of what you've done. One good slide or B&W can change your life.

By Phil Baldwin

NORTHWEST BLACKSMITHS ASSOCIATION
PO BOX 81041 SEATTLE WA 98109

MEMBERSHIP APPLICATION: New ! ! Renewal ! ! Correction ! !

Name_____ Date_____

Address_____

City_____ State_____ Zip_____

Phone (____) ____ - _____ Firm(optional)_____

Please enclose your remittance for $12.00, payable to: NWBA

Northwest Blacksmith's Association

P.O. Box 81041 • Seattle, WA 98108

CALENDAR OF EVENTS

February 16-18:	Novice Workshop at Jerry Culbersons shop.
February 20-22:	Engraving Workshop at Jerry Culbersons shop.
April 11-12:	Frank Turley Workshop at Fire Mountain Forge.
May ?	Knife Workshop -Oregon Date & place to be announced later.
Spring Meet:	May 2-3 -- Hillsboro, Oregon at Washington Fairgrounds