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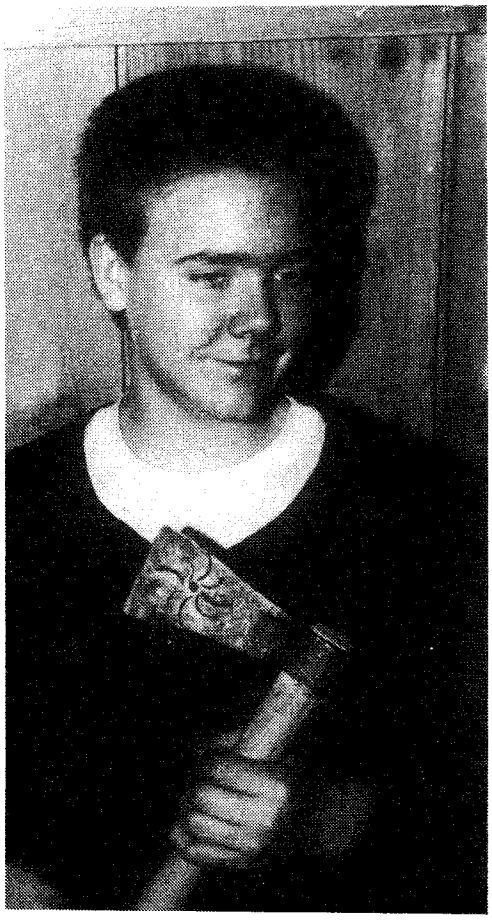
NWBA

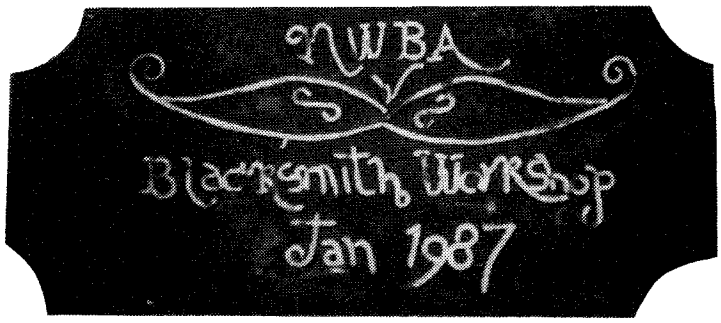
Hot Iron News

CHAPTER OF ABANA

March, 1987 -- Voice of the Northwest Blacksmiths Association

ANOTHER SUCCESSFUL NOVICE WORKSHOP





Photos - Lloyd Hedglin

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

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Please excuse misspellings and any other mistakes as most of this was typed after midnight the day it went to Howard for publication.

My apologies to Ray Coomes for not giving him credit for the excellent article on gas forges in the last issue.

ABANA Board

Darryl Nelson our NWBA President has recently been elected to the ABANA board. Congratulations Darryl. With Jim Garret and Dorthy Stiegler already being board members this gives the Northwest an excellent representation at the national level.

For Shame

Its disappointing to have to write this but it needs to be done. Someone in our group has no respect for property and sticky fingers, this throws suspicion on a large group of very honest and above board people. Items that have disappered include apair of Phil Baldwin's tongs, Gary Brumfeild's engraving tools, a camera from Fire Mountain Forge, and $11.00 worth of unauthorized phone calls from Jerry Culberson"s shop. Come on whoever you are this is not acceptable behavior from adults and blacksmiths.

ENGRAVING WORKSHOP

March 13,14 & 15 Dan Obrien a retired 2nd generation engraver from Seattle will be leading an engraving workshop at Old Cedar Forge in Allyn, WA. Call Darryl at 832-6280 for info.

KNIFE WORKSHOP

There will be a knife making workshop held at Dave Thompsons shop in Eugene, Oregon May 16 & 17. Instructors will be Gene Chapman, Wayne Goddard, and Dave Thompson. The emphasis will be on forge welding, metalurgy of the forge welded blade, heat treatment and blade testing, and gas forge operation. Contact Gene at 206-297- 2495.

SPRING GATHERING

The spring gathering will be held at Ike Bays near Hillsboro, Oregon May 9th & 10th. Our demonstrator is Ivan Bailey who studied with Professor Fritz Ulrich of Germany in 1971-72. He demonstrates steel carving, inlaying, glass fusing with steel, and methods of sheet forming-repousse/chasing. He lectures on blacksmithing in Germany, shop layout, publicity, client relations, pricing and designing for iron.

CASTING

Mike Falk, a sculpture and art instructor, will be giving a casting workshop June 19th, 20th and 21st. Projects will include each participent doin a small bronze done using the lost wax method and an aluminum pour.
Sign up before May 22nd by contacting Gene Chapman 297-2495.

OKCA SHOW

The Oregon Knife Collectors Association has kindly donated a display table for a blacksmithing and bladesmithing display during their show at the Lane County Fairgrounds in Eugene, Oregon on April 11th & 12th. OKCAs show has over two hundred exibitors and attracts makers and collectors from all over the United States.
Small forged pieces and photos are needed for the display. Contact Gene at the above number.

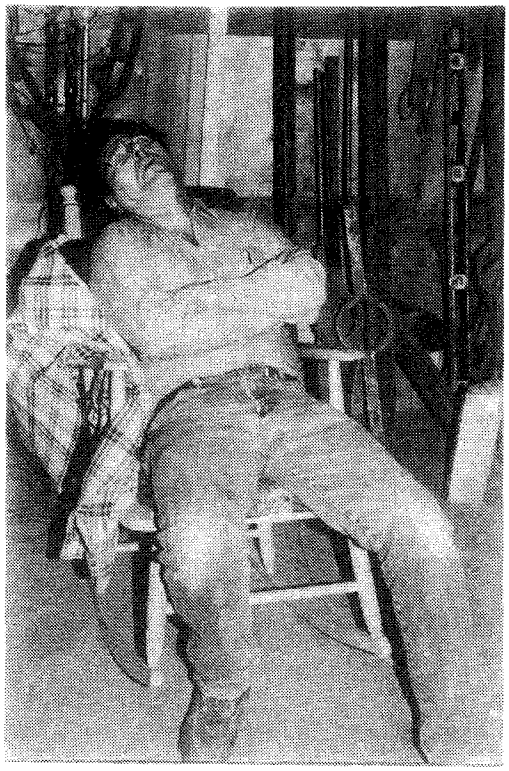


Photo by Lloyd Hedglin

TURLEY WORKSHOP

The Turley workshop is full. SORRY GUYS IF YOU SNOOZE YOU LOSE.

Dear Smiths:

I have had a 100 lb. Murray hammer for 20 years. When I got it, it had cast steel toggle arms, one was broke, one toggle bolt and toggle bolt sleeve was missing. The spring was 5/8" stock, 1 5/8" inside diameter, 8 1/2 rings-8 1/2" long. It had an air operated brake on the crank wheel. I forged two new toggle bolts and toggle bolt sleeves and brazed the toggle arm, I put this all together with a new 4"x 8" bottom die and used it once in a great while for a number of years. I thought it worked very good.

After I joined the Appalachian chapter of ABANA and got an early retirement from a steel mill, I started using the hammer more. I kept trying to make it work better and hit harder. I changed the brake to a spring loaded one. It's better and cheaper to operate. A brake makes these hammers 10 times better. You can place a fuller, cutter, punch, etc., where you want it without breaking your arm or nose.

I forged two new (4140) toggle arms, with a 2" boss for the coil spring, which I believe had been worn down on the old arms. After step by step progress I now have a 10" long, 10 1/2 ring-13/16" diameter, 2"inside diameter coil spring. The hammer hits harder, has better control, and I can hit an easy blow more consistantly. I went from 3 1/4" between the edge of the ram and the inside edge of the toggle bolt sleeve to 4 3/8 inches.

I used car and truck springs from a junk yard. These springs were 5/8" to 13/16" round stock and had 3 1/2" to 4 1/4" inside diameter. The tapered end of the spring was too long for what I needed. I cut almost all of the taper off one end. I figured the circumference of both springs (the one I had and the one I wanted) and cut off some excess weight on the other end. I heated one end and pulled about 6 inches straight out 90 degrees from the coil. I forged a 4 1/2" long taper on this which is a little more than half the length of one ring on the 13/16" stock, 2" inside diameter spring. I used a 14" long, 2" round stake to fit the handle hole and a forged pin in the pritchel hole to shape the spring. I left about 3" of the tapered end straight to hold the spring in position against the pin. I used a pair of short-jawed chain link tongs with rounded edges on the jaws, to pull the larger coil tight around the 2" pin. Remove the coil before it shrinks tight on the pin. When I had about 9 1/2 rings, I cut the end off 2 1/4" shorter than I wanted it when finished. Next, I tapered this 4 1/2" back from the end. I hammered both of these tapered ends ends around the pin and made sure all the rings were together tight. I heated the the whole spring and

placed it in a 3" channel. I drove a hot cut lightly between each ring, turned the spring over and repeated it until the spring was 10 inches long. The channel (or V block) hits the 2 sides only, with the chisel on top you are hitting 3 places approximately 120 degrees apart. The channel helps to keep the spring straight and holds it in place while opening the spring to proper length.

I heated the whole spring to about 1500 degrees Farenheit and buried it in the lime box to normalize it. The next day I heated the spring as evenly as I could all over, to approximately 1500 degrees again and dumped in in oil. I let the furnace cool down while the spring was cooling. I heated it as slowly, and evenly as I could to approximately 1000 degrees Farenheit. It is about right when it will make a hickory handle smoke as soon as you touch it to the spring. When it reached this point I quenched it in oil for a few seconds and let it cool in the atmosphere. I drawed one until it was a very dull red, in the dark. It did not spring back or break, it bent together and stayed that way until tempered it again. I have read where smiths quench something like this at 1450 degrees Farenheit. I am not a metallurgist or chemist, I didn't have an ideal atmosphere or equipment but I believe that 50 to 150 degrees above the non-magnetic point won't hurt that much and below it, won't get the job done. The steel will cool some, going from the fire to the oil tank, I believe you will have a better chance of being above the non-magnetic point from end to end all over the object, with a little higher heat, even if you are using educated eyeballs as a guage. I have forged 100 1x2x8 3/4" (1020 steel) wedges in 8 hours with this hammer and that spring.

I did all of this in a 2 burner Mankel furnace. I bought the furnace at the ABANA auction at Depere. I think this a a very effective, effecient and practical little furnace for a small shop. It has a door on both ends, and is almost portable when cold. It is not a heat treating furnace but by using baffle plates to deflect the heat from the burners, you can make it work as one.

That spring broke after a couple of months of hard work. What did I do wrong?

Keep Hammerin'
Clifton Ralph

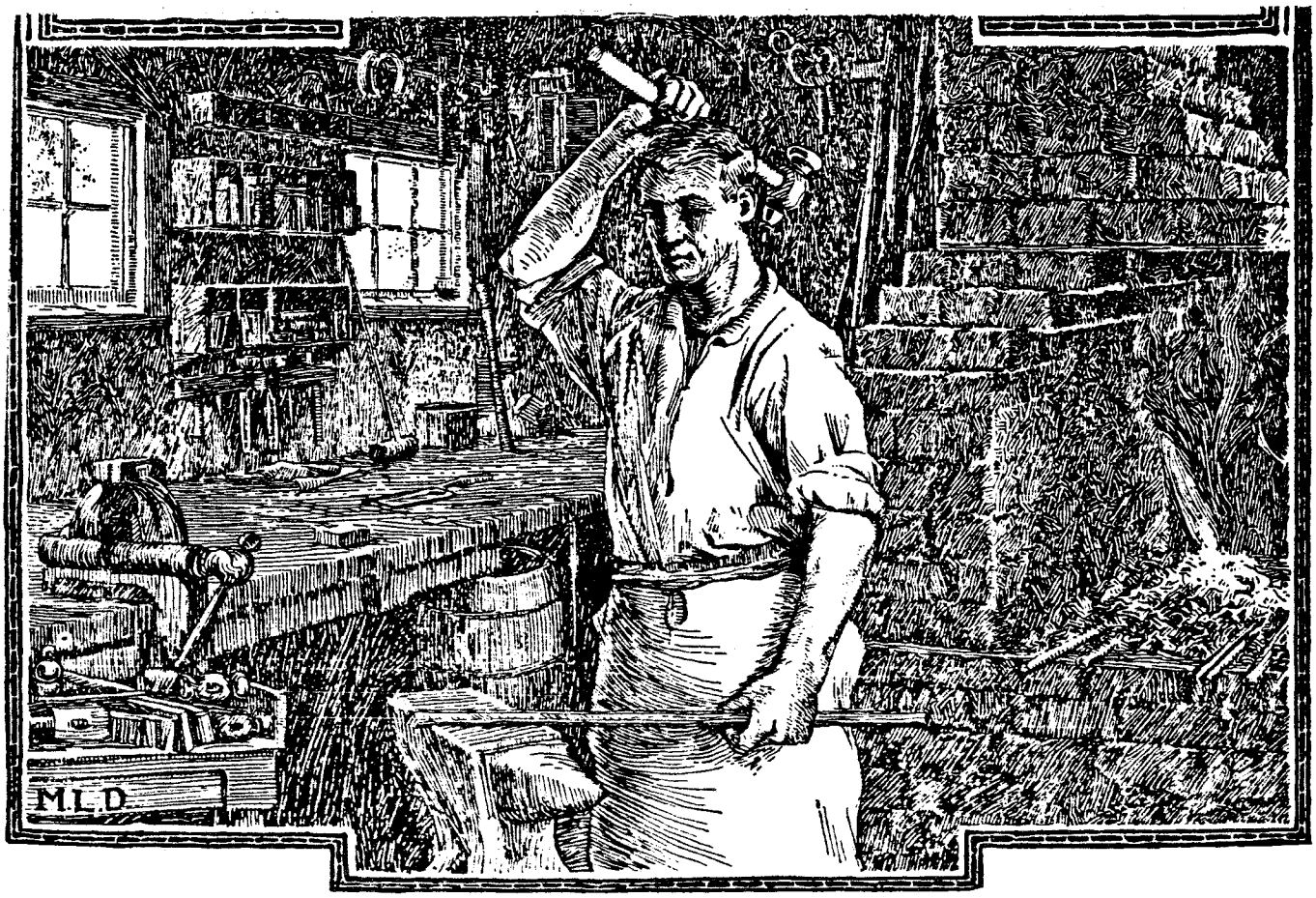
TERRY

about hammer dies, the 50' hammer set up for the demonstration at Madison had a beautiful set of half-round and half-flat dies. This type of dies is, in my opinion, a whole lot better than the dies in most 25 and 50 Lb. Little Giants which were made for plow shears. (wide bottom dies and smaller top die good for shears but for nothing else I can think of.)

I believe in most cases a smith is better off to use matching flat dies with the edges rounded off about 1/8 to a 1/4 inch radius. When you learn to pinch with the front or back edge of the die you can forge or draw out a piece of steel about as fast on flat dies as you can on drawing dies. The big difference as I see it, is the best part of the die which is dead center with the die and the weight of the ram cannot be used because of the changeover from round to flat on the half and half dies. All hammer guides have to be loose enough for the hammer to move freely. In older hammers which most of us have, the bottom end of the guides are worn more than the top. While some of this cannot be helped. This wear is made worse by hitting objects off center on the die. In other words, try to forge off center on a 6" wide die you can feel it pull towards the side you are forging on. It is a whole lot harder to forge a good square when you are working off center on the die. This difference shows up more on large hammers with longer dies. On a flat die you have more table or working surface for cutting, fullering, punching, offsetting or whatever you want to do with a piece of steel. It is at the point where the most solid blow is delivered, dead center of the die and ram. On these 25 and 50 Lbs Little Giants that have a small top die, if the smith would make a top die flat and the same width and height as the larger bottom die, than make a longer or stronger coil spring to compensate for the added weight of the larger top die. He would have a much better forging hammer that will hit harder and easier, more consistantly than they do now. On most of these hammers that I have seen the spring does not have enough tension to make the hammer as effective as it can be. With a stronger spring or more tension you get less slopping, popping, and cracking and solid blows on the metal. With a larger die the spring may need to be 1/32 to 1/16 larger diameter material and or one more ring in the coil. One half of the ring more might make the difference. With all the varieties of cars today you can find a coil spring in a junk yard almost any diameter you want. It is not too difficult to reshape it to the size, number of coils and length to fit one of these hammer. After shaping, normalize it in lime or

ashes. Heat it evenly all over to 1500 or 1600 degrees. Quench in oil and leave till cool. (You have to be above the non-magnetic point, 100 degrees above, won't hurt it and 50 degrees below the magnetic point, won't work.) When you are quenching somthing like this in oil do it quick with a long pair of tongs and watch your eyebrows because they may burn from the flash fire. Draw the whole spring evenly all over to 1100 degrees or robin egg blue (it's about right when it will make a hickory handle smoke. When you reach this point, at a slow even heat, dip it in oil for a few seconds and let it cool in the atmosphere. With a coal fire it is hard to get a even heat on a coil spring, one way might be to take a piece of three inch or larger pipe, longer than the spring, plug the end of the pipe. Build a large deep fire, heat the pipe all over, put the spring inside the pipe and by turning the pipe and the spring, you should be able to get a fairly even, indirect heat on the spring. A steel baffle plate placed across the center of the fire and under the pipe can help spread the heat more evenly. Try it you might like it.

THE BLACKSMITH



Mr. Francis Whitaker
1265 West Bunny Court
Aspen, Colorado 81611
303-925-3844 303-920-1265

January 7, 1986.

Dear Friends,

I would like to run an ad in your news letter about my book. Please advise me as to the cost and I will be glad to send a check.

THE BLACKSMITH'S COOKBOOK, Recipes in Iron, by Francis Whitaker is now available. Published by Jim Fleming, illustrated by Robert L. Hale, the book is an advanced textbook, with a wealth of techniques and procedures in architectural ironwork. It is available from the following distributors:

Centaur Forge, Ltd., 117 North Spring Street, Burlington, Wisconsin, 53105.

Jim Fleming, Box 1212, Breckenridge, Colorado, 80424.

Bill Gichner, Iron Age Antiques, Ocean View, Delaware, 19970.

Norman A. Larson, 5426 Highway 246, Lompoc, California, 93439.

Price is $31.50 postpaid.

Autographed copies may be obtained from the author:

Francis Whitaker, 1265 West Bunny Court, Aspen, Colorado, 81611.

ALL PROFITS go to The Francis Whitaker Blacksmith's Educational Fund, now established under the auspices of ABANA.

Cheers,

Francis Whitaker

Francis Whitaker

Special thanks for any way you can help

F

BASIC METALLURGY

CHEMICAL TESTS

Many smiths do not use chemical tests thinking they are too complex. Actually many are simple and exceedingly accurate and require only keeping some small bottles of test chemicals on hand for use when needed. Every maintenance department should have a "test kit" on hand ready for use.

1. **TO DISTINGUISH MONEL FROM INCONEL.**

One drop of nitric acid applied will turn blue-green in one minute on monel, but will show no reaction on inconel.

2. **TO DISTINGUISH STAINLESS STEEL FROM OTHER STEELS.**

Mix a solution of 94 per cent wood alcohol and 6 per cent nitric acid. Apply a drop and in one minute time unalloyed steels will discolour, but stainless steels will show no discolouration. A 10 per cent nitric acid solution will also etch carbon and mild steels almost immediately but not stainless steels.

3. **TO DISTINGUISH MAGNESIUM FROM ALUMINIUM.**

A zinc chloride and water solution (such as most acid type soldering fluxes) or muriatic acid and water will immediately blacken magnesium and will show no reaction in contact with aluminium. A drop of silver nitrate will turn magnesium dark but not aluminium.

4. **TEST FOR SILVER**

Sulphuric acid (or egg yolk) will turn high silver bearing materials green.

5. **TO DISTINGUISH BETWEEN NICKEL-CHROMIUM STAINLESS STEEL AND STRAIGHT LOW CHROMIUM STAINLESS STEEL.**

A few drops of 45 per cent phosphoric acid will bubble on low chromium stainless steel.

6. **TESTS FOR MOLYBDENUM IN STEEL**

One drop of concentrated hydrochloric acid is left on the polished surface for three to five minutes and then absorbed on filter paper. One drop of 10 per cent stannous chloride is placed on the paper. A few drops of 10 per cent potassium thiocyanate solution are placed on a second paper and the 2 **PAPERS HELD TOGETHER.** If Molybdenum is present a pink or light red occurs with a 0.2 to 0.5 per cent and brownish red with higher content.

7. **To distinguish high molybdenum stainless steel (such as types A1S1 316 or A1S1 317) from non-molybdenum bearing stainless steels.**

Immerse the stainless steel in a 10 per cent solution of nitric acid which has been heated to approximately 160 deg.F. If bubbles occur, the stainless steel does not contain molybdenum.

8. **TO TEST STEEL TO DETERMINE IF IT CONTAINS NICKEL.**

One drop of nitric acid (concentrated acid plus 50 per cent water) is left on the polished surface for afew seconds and then absorbed on to filter paper. A solution made with 1 gram dimelhylglyoxime, 60 cc 80 per cent acetic acid with 30 cc concentrated ammonia is dropped on to the paper. The acid stain will go to a reddish brown colour.

If the colouration can be removed on washing in running water, the steel is nickel free. A permanent clear red stain indicates the presence of nickel. A faint discolouration could be only a trace element due to the sensitivity of this test so only strong colouration should be considered.

SPARK TESTS

The spark test can be a reliable method of classifying metals since any deviation in composition changes the spark characteristics. When a metal is held against a grinding wheel small fragments are torn away. These are removed with such friction that they become incandescent. The difference in the pattern of the spark stream can identify the metal.

WHITE CAST IRON: Sparks will show a very small amount of red at the wheel turning to a straw colour with an average stream of 18 in. The sprigs are small and repeating.

MALLEABLE IRON: Sparks are straw yellow with shafts about 30 in. in length ending in sprigs.

GREY CAST IRON: Sparks are red turning to straw colour with a stream length of 25 in. The volume is small with many sprigs.

CAST STEEL: White sparks about 70 in. in length with a large volume. The shafts are short with forks and appendages. The higher the carbon content the more numerous the forks.

MILD STEEL: Sparks are in single straigt lines without branching and are yellow.

HIGH SPEED STEEL: Small intermitted linear sparks of red to dark red colour. A little branching near the ends.

High carbon steel.

2 per cent C: simple branching.

75 per cent C: White with much branching and some secondary branching.

1.25 per cent C: Secondary branching throughout entire length — white.

1.5 per cent MN: Manganese content causes branches to shoot out at right angles.

TUNGSTEN CARBIDE: Extremely small stream 10 in. in length. Light orange colour.

NICKEL: Very small orange stream 10 in. in length.

STAINLESS STEEL: Moderate stream 50 in. in length straw colour near wheel and white away from wheel. Forked.

CHIP TESTS

A small piece of metal can be removed with a chisel. The characteristics of the chip can tell much about a metal.

GREY CAST IRON: Chips are smooth, brittle and about 3/8 in. in size.

CAST STEEL: Easily chipped and the chips can be continuous if desired.

ALUMINIUM: Chips are continuous but leave a saw edge where chipped.

WHITE CAST IRON: This metal is so brittle that the chips are small broken fragments.

MALLEABLE IRON: Rough tough chips of about 1/4 in. to 3/8 in. in size.

HIGH CARBON STEEL: Chip has lighter colour at edges than mild steel. Chip can be contiuous.

RING TEST OR SOUND TEST

This test in general is limited to hardness. For example it can aid in distinguishing a hardened or heat treated steel from a soft or annealed steel. Heat treated or hardened steels have a clear ring, while soft steels have a dull sound.

MAGNETIC TEST

One of the best and easiest to use methods for quick determination of metals is by the use of a common magnet. Some of the magnetic qualities of metals follow:

MAGNETIC: Nickel, Steel, Carbon Steel, Cast Iron, Malleable Iron, Straignt Chromium Stainless Steel and Low Alloy Steel.

SLIGHTLY MAGNETIC: Monel, Work hardened Manganese Steel, Work hardened Austenitic Stainless Steel and Stainless Steel with large amounts of Ferrite.

NON MAGNETIC: Manganese Steel, Bronze, Nickel Silver, Austenitic, Stainless Steel, Brass, Aluminium Brass, Pewter, Zinc Alloys, Aluminium Alloys, Magnesium Alloys, Lead, Silver and Tin.

WEIGHT TEST

The weight test is often of great value in distinguishing between metals. For example, zinc die castings and aluminium die castings often look alike.

However, zinc is substantially heavier than aluminium, thus weight will quickly distinguish. Tungsten carbide tools that are used to machine steels will sink in mercury but those used to machine cast iron have a lower specific gravity than mercury and thus will float in mercury.

The following chart shows the pounds per cubic inch of many metals.

Aluminium	0.09751
Brass	0.310
Copper	0.0324
Steel	0.2844
Stainless Steel	0.2829
Cast Iron	0.258
Lead	0.4097
Zinc	0.2577
Nickel	0.3216
Monel	0.319
Tin	0.2637
Magnesium	0.0628
Nickel Silver	0.320
Sintered Carbides	0.5510

CONCLUSION:

The author hopes that the information contained in this paper will assist workshops in identifying metals when necessary. An accurate analysis of metals can often prevent failures and errors.

It is suggested that shop mechanics make some practice runs using these methods since the time spent will be well justified by more accurate metal identification.

Reprinted from the Australasian Manufacturer, November 29, 1969

Repousse Pitch
by Nahum Hersom

For all pitch batches use an iron kettle and a wooden paddle for stirring the mixture.

There are two kinds of pitch, Trinadad or natural oil pitch which originally came from Trinadad, and had a self healing quality. This same type of pitch is now made from oil and is supposed to have the same qualities of self healing. This Trinadad type pitch also called shoemakers pitch when filled with powdered cork was used to fill the space left between the inner sole and the outer sole of a shoe when heavy leather uppers were used such as work shoes.

The other pitch is Burgundy pitch which comes from Norway Spruce.

I used pitch from a Sugar Pine, this tree had been bruised somewhere in its root system and had bled probably for years until a large pitch mass was deposited under ground.

Rosin is hard and does not contain the natural pine oils, as does pitch direct from a tree. It is the by product of the distilling process that removes pine oils and turpentine. A friend of mine from the Southern states told me they used to put small pieces of pitch wood into a container and heat at a low temperature to melt out the pitch to sell to the turpintine distileries.

Filler is any fine material such as plaster of paris, brick dust, coal dust, fly ash from boilers. Plaster is perhaps easiest to obtain.

Tallow is fat from animals. I rendered out beef fat to get my tallow. To clean the tallow boil it in water, two cups tallow to a quart or so of water then strain through filter paper. I put this into the refrigerator and removed cold fat from water and stored for future use. For pitch use hot and be sure there isn't any moisture in it.

Pitch Formulas

Pitch 1 ½ lbs.	Pitch 3 3/4 lbs.	Pitch 6 parts
Plaster 2 lbs.	Plaster 6 lbs.	Plaster 8 parts
Tallow 4 oz.	Tallow 10 oz.	Tallow 1 part

The above formulas are all quite simular..

To melt pitch use low heat 200 to 275 degrees to where pitch is very fluid, do not boil or get to hot to make volitle gases which will ignite. Keep at this temperature to drive out all moisture, especially where one has gathered the pitch from natural sources.

Stir with a wooden paddle often then strain pitch through a fine metal screen to remove forgeign matter, stones sand etc..

Clean iron pot and return pitch to it. Reheat pitch and slowly add plaster or other filler material, stirring constantly until thoroughly mixed. Add only about ¼ of the amount of tallow measured, befor testing the temper of the pitch mixture. It is better to keep adding tallow to get the proper temper than to get it to soft and have to add more pitch and filler.

To test the temper dip a clean stick into pitch and cool in cold water, and indent with thumbnail.
Hard pitch- no indent at all
Medium pitch- indents slowly
Soft pitch- indents easily

The ambient temperature of work area and local determine pitch hardness.

Summer pitch will be harder than winter pitch, as a general rule. Some shops used to keep several tempers of pitch in containers which were used during different heat conditions.

To soften pitch keep adding tallow a little at a time.

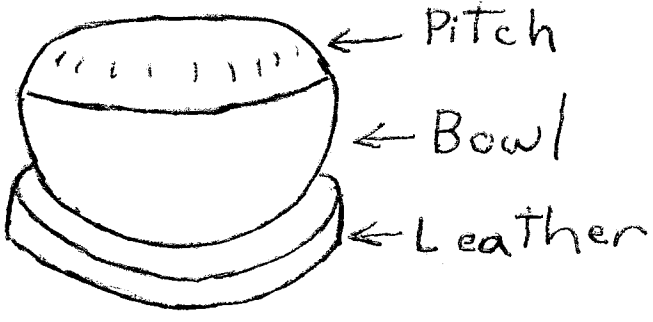
To harden pitch add more pitch and filler according to formula proportions but only a little at a time.

When pitch temper is right pour it into a pitch bowl,or for large flat work a heavy wood form, like a cookie pan, with edges to hold pitch.

My first bowl was a lead weighted Volkswagon hubcap. Cast iron is better, my latest one is made from a bell cover taken from an old irrigation pump motor this can still be weighted with lead in the bottom.

As pitch cools heap it up into a flat topped dome, I have put pitch into 1 inch deep cake pans for large flat work.

Pitch bowls sit into a heavy leather ring which holds bowl upright or at any angle necessary for work.



To attach plate to be engraved to pitch warm both and press together. Sometimes a bit of oil is rubbed on back of the plate, bring pitchup around the plate to hold more securely. To remove plate hit side of plate with flat nose punch with light tap of hammer, should pop loose.

For hand engraving no additional support is necessary but when using hammer and chisel, a few pins may need to be lead solderedon back of the plate and sunk into the warm pitch, even a few nails around edges of the plate are helpful.

Repousse work which is worked from both sides of the metal should after removal be warmed and cleaned with turpintine befor reattaching to pitch.

I understand an old type of glue was made of pitch (tree) and oil to reduce the brittleness and used for jewelery purposes, also the ferrule cement for fishing poles.

Included in my file is this formula which I haven't tried
3 lbs. black shoemakers pitch (Trinadad)
1 lb. rosin
6 lbs. plaster of paris
heat and simmer till shiny black
add rosin to harden
add tallow to soften

Perhaps there are other pitch formulas from other types of substances, all will probably work. Good Luck.

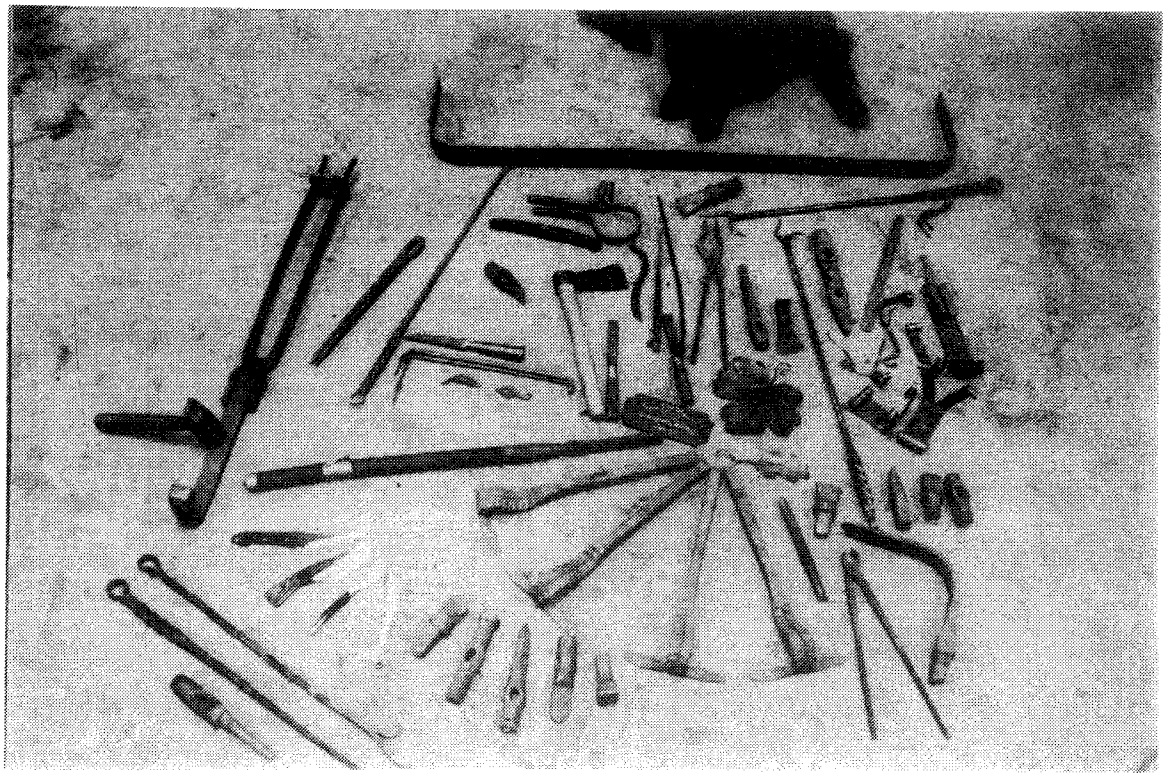


Photo - Lloyd Hedglin

GAS FORGE BUILDING-HOT BURNER CONSTRUCTION — Baldwin

The hot tip burner works well in terms of efficiency and achieving a high heat quickly. They are easy and cheap to build and simple in operation. However, they do not operate well at low temperatures and tend to backburn if rapidly shifted from a high to a low temperature.

Any burner serves two functions. The first is regulate the gas and air and mix it. The second is to deliver the gas/air mixture to the ignition site or burner tip. In practice the the following should be considered.

1. Always use commercial fittings whenever possible. They are cheap and available at a good plumbing supply shop.

2. Air Supply: the blower should be a paddlewheel type. Only this type can supply sufficient air and take the back pressure.

2. Gas supply: Either propane or natural gas may be used. When using naural gas be sure to allow for suffiecient volume, a 3/4 pipe and inlet will do.
When using propane, the volume of gas delevered is dependent on regulator pressure and line size (or the smallest opening in the line). It is best to have a variable pressure regulator and at least a 1/4" gas line.

3. All burners should have both gas and air on/off valves.

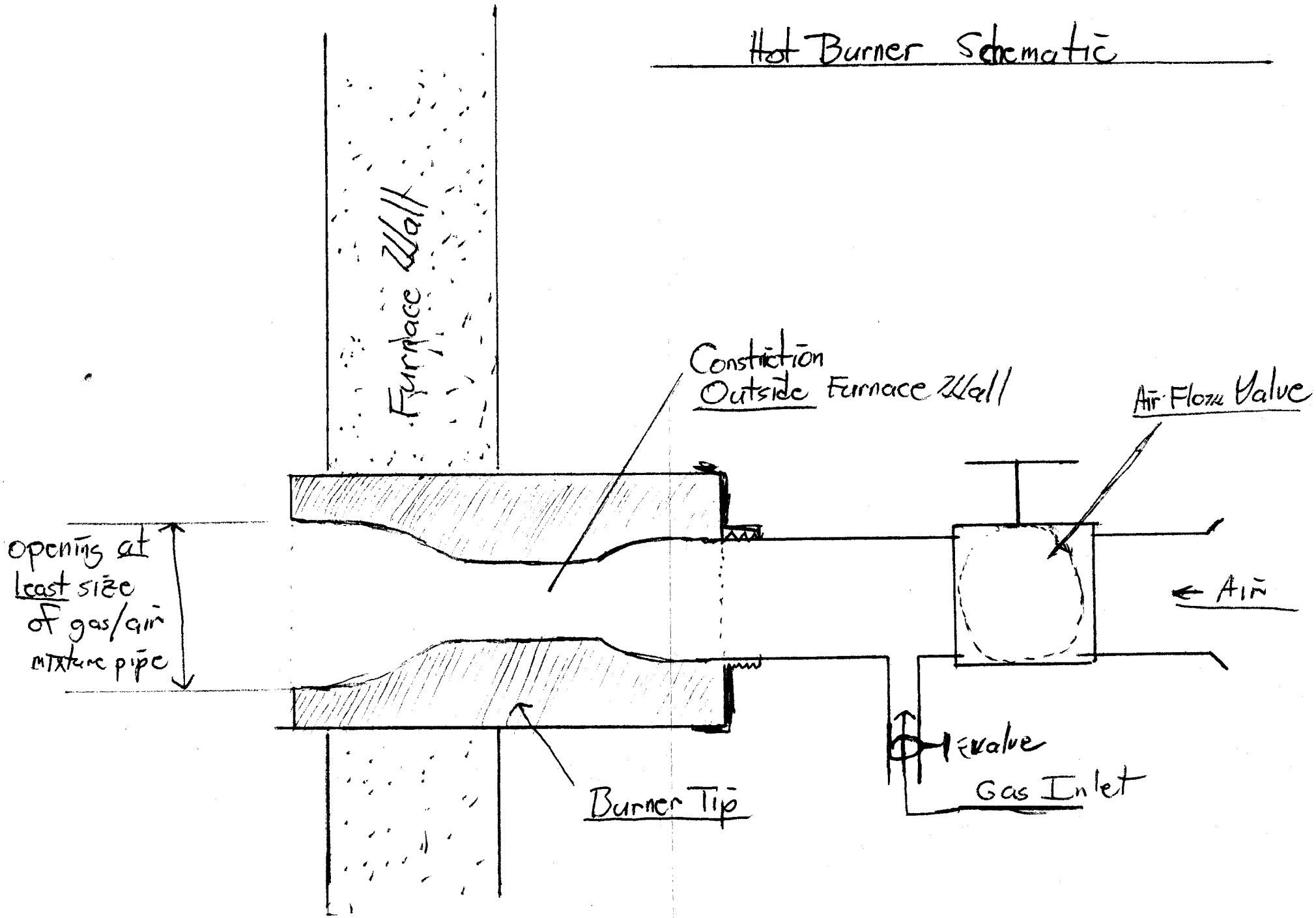
Most gas forges need an air and gas/air pipe 1½" to 2". An imported valve (they are cheaper) is an effective air regulator. The gas inlet may be simply a hole in the side of the burner pipe or may be a nozzel to "spray" the gas into the pipe to achieve a more uniform gas/air mixture. Of prime importance is the mixing of the gas and air between the gas inlet and the burner tip. If no special mixers are used at least a foot of travel should be allowed between the gas inlet and burner tip. Baffles or vanes may be used in the pipe to better mix the gas and air.

4. Burner tip construction is important. The burner tip should be made of a 3000° dense castable. Chicago/Wellsville Ladelcast is excellent. The wall of the burner tip should not be less than ½" thick at any point. There should be a constriction of the gas/air mixture in the burner tip outside the furnace wall to prevent backburn at high temperatures. The size of the constriction should be somewhat less than the gas/air pipe, say 1" to 1¼" for a 1½" pipe. The expansion to the burner after the constriction lowers the velocity of the gas/air mixture and allows for more even burning. It is best to make a metal holder for the burner tip that can screw onto the gas/air pipe, fasten the burner tip to the holder with furnace cement.

Many refinements are possible. If the readers invent something during experimenting and using their gas forges, please take the time to write them down and send them to the Hot Iron News to share with the rest of us.

Next Time: Cold Burner Construction

Hot Burner Schematic



SELL - BUY - SWAP

Wanted: Sheet metal tools, stakes, mechanical planishing hammer, etc. Alan Swedberg 206-736-6548

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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: Refractory materials
Kao-wool, Fire Brick
Reasonably priced
Call - Lester Garrett
(206)935-4035

S-2 Chisel Blanks - 3/4" octagon by 8" long - $ 2.00 each.
Contact Fire Mtn. Forge
1-206-832-6280

The Blacksmith's Heaven

TOM BOWLES

An Angel and a Blacksmith
Started up to Glory's gate,
But when passing close to Hades,
The Angel whispered, "Wait!"
"I've a place I want to show you,
It's the hottest in all Hell,
Where the folks who never paid you
In eternal torment dwell."

And behold! the Blacksmith saw there
His old debtors by the score:
So a chair he grabbed and shouted—
"Let me wish for nothing more;
I'm content to sit and watch them
As they sizzle, singe and burn,
Let me crank the spit a little,
—Give each one another turn."
Said the Angel, "Come on, Blacksmith,
There the Pearly Gates I see."
But the Blacksmith only murmured,
"This is Heaven enough for me!"

NORTHWEST BLACKSMITHS ASSOCIATION
PO BOX 81041 SEATTLE WA 98109

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

Name_____ Date_____

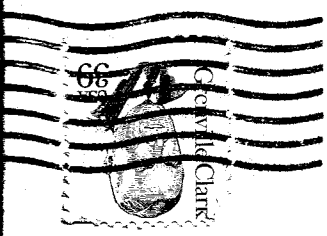
Address_____

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

SPRING MEET - LOCATION AND DATE CHANGED - See page 3
How to get there: Bay View Farm is 16 miles west of Portland. Go out Sunset Highway (#26-West) to Helvetia Road. Travel north on Helvetia to Phillips Road. Turn west on Phillips and Bay View Farm is just past the intersection of Phillips and Valley Vista. Yellow anvil signs will clearly mark the way once you turn off the Sunset Highway (Hwy #26).