

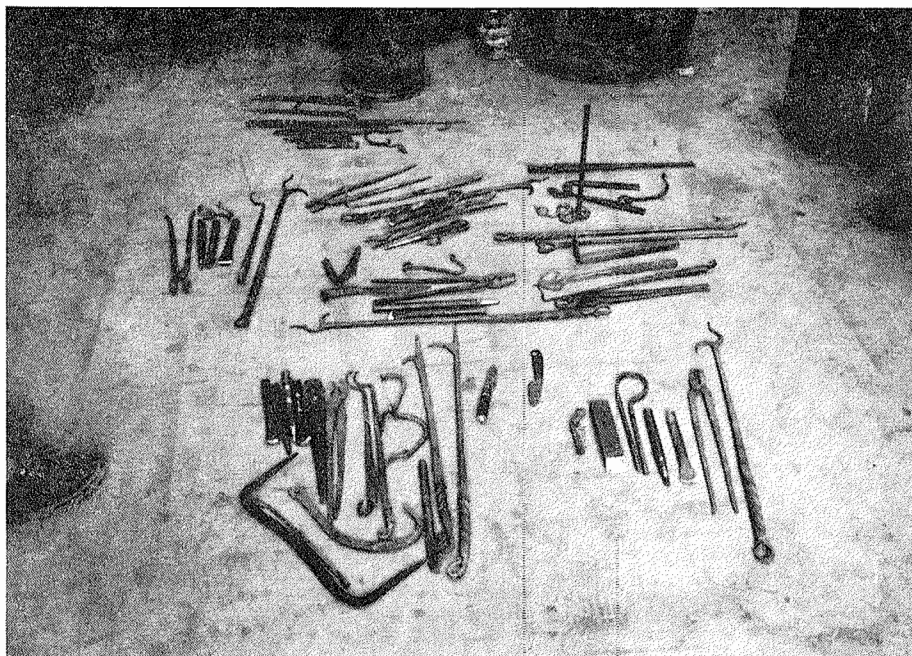
CHAPTER OF ABANA

Hot Iron News

VOICE OF THE NORTHWEST BLACKSMITHS ASSOCIATION

SPRING 1992

\$ 4.00 U.S.



1991 NWBA OFFICERS AND BOARD MEMBERS

NWBA
P.O. BOX 81041
SEATTLE, WA 98108

President:

Grant Sarver
2311 Ross Way
Tacoma, WA 98421
(206) 572-7460

Vice-President:

Joe Elliott
1926 SW 25th
Redmond, OR 97756
(503) 548-2564

Treasurer:

Tom Graham
7545 - 45th NE
Seattle, WA 98115
(206) 523-5334

Secretary:

Ike Bay
13085 NW Ridgetop Drive
Portland, OR 97229
(503) 645-2790

Editor:

Margaret Byers
2311 Ross Way
Tacoma, WA 98421
(206) 572-7460

Director:

Jeff Holtby
22929 Union Hill Road
Redmond, WA 98053
(206) 868-9531

Director:

Smokey Adams
PO Box 311
McKenna, WA 98558
(206) 458-2777

Director:

Kent Rudisill
2520 SW 45th Street
Corvallis, OR 97333
(503) 753-2543

Hot Iron News is the official quarterly publication of the Northwest Blacksmith's Association. Submission of materials for the magazine is eagerly encouraged. Editor is Margaret Byers. Dead-line for submissions are February 15th, May 15th, August 15th, and November 1st. Other ABANA Chapters, blacksmith's associations, and non-profit educational metals oriented groups have permission to reprint non-copyrighted material found within the covers of Hot Iron News as long as credit is given to the authors, the magazine and NWBA. The Northwest Blacksmith's Association, and the Hot Iron News disclaim any responsibility or liability for damages or injuries as a result of any construction, design, use, manufacture or other activity undertaken as a result of the use or application of information contained in any article in the Hot Iron News. The Hot Iron News makes every effort to insure the accuracy of the information contained in the articles published herein, but the use of any material or information is solely at the user's own risk. The Hot Iron News assumes no responsibility or liability for the accuracy, fitness, proper design, safety or safe use of any information, technique, material, tool design, use, etc., contained herein.

IN THIS ISSUE

NWBA Officers	Inside Front Cover
President's Message	4
Calendar of Events	5
Friends	6
Activities:	
Hossfeld Bender Workshop	8
The Quilting Corner.	8
Lovelace Tools	9
Forging Mathematics 101	10
Can I Have Your (A)Tenon, Please	12
Hints	13
Glen Gilmore Demonstration	16
Answer Man	17
Photos	Centerfold
Notes From Gas Forge Workshop	20
Propane Gas Forges	22
Thoughts While the Forge Cools	26
Forge Furnace - Combustion Facts	27
ABANA Presidential Message	29
ABANA Liaison	30
ABANA Conference	31
Applications: NWBA & ABANA	32
Francis Whitaker Foundation	33
New Arrivals	34
Classifieds	Inside Back Cover

Front Cover:

"THE WILD BUNCH" From Novice Workshop

PREZ SEZ

Well, here we are again! Spring, and the N.W.B.A. is cookin'. The spring conference at Dave Thompson's was great! Dimitri showed some great slides, talked about things many people are interested in and gave some wonderful demonstrations. Interest in plasma cutting, galvanizing and plate work has certainly been heightened. Great job Dimitri!

Berkley Tack showed more of the practical side of blacksmithing than most of us have ever seen. Tool making, heat treating, railing, thoughts on production, and practical general smithing earned him the respect of all who attended. Thanks Berk!

Play time produced the usual assortment of mangled iron, great conversation and hangovers. All us old farts tried to remember the old days when we really knew how to make with the midnight madness. Well, nostalgia just ain't what it used to be, I guess.

Our semi-potluck was, shall we say, interesting. Just think of it as the cheesiest spinach soup you ever had! (for those of you who weren't there, the caterer forgot to put the pasta in the lasagne.)

The auction produced about \$1,600.00 with Jerry Culberson working his magic on the crowd. Jerry, how **do** you do it? Been a shortage of good things for the auction lately. Thought we might try some incentives. For the fall conference we will give a \$5.00 dicount off your ticket if you bring an auction item! We will also be awarding prizes for your auction items in the following catagories;

BEST FORGED PIECE

BEST OTHER CRAFT PIECE

BEST FOOD ITEM

BEST TOOL

CHINTZIEST PIECE

The best part is the judging - price. We'll let the folks vote with their wallets. That last prize won't be awarded unless there's a real deserving entry. Sound like it might be interesting? Now, let's see, trip to Hawaii, \$50,000.00, two nights in Tacoma? Have to think about them prizes.

Dave's shop impressed everyone with it's equipment, order, and especially Dave's "sketches" hanging on the walls. By the way, Dave, great scrap pile you got out back! Thank you Dave and Rebecca! Fantastic event!

The novice workshop at Old Cedar Forge was a roaring success. Larry, Moe, and Curly Joe [scratch that Margaret] Jerry, Gene and Curly Joe sure make a great team. Punches, poz tongs, even flowers sprang forth. The food alone was worth the price of admission! Nice surroundings, good friends, and hot iron - - can it get any better than this? All seriousness aside, this was a memorable time for all. Gee, do I have Presidential commendations in my kit? Have to look into that, hmmm.

Looks like the Clifton Ralph workshop is right on track. One opening left - probably be gone by the time you read this. Suggestions for hot workshops like this are welcome. Jeff Holtby has done a great job organizing this event. Jeff may seem like a real nice guy, but, deep down I'll bet he's just as tough as pudding.

The N.W.B.A. is expanding it's book purchasing program. We'll have 50 more copies of "Edge of the Anvil" and 20 copies of "The Power Hammer", both at a discount and no shipping charge. Call Tom Graham or Joe Elliott - or Ike or Margaret, anybody but me! Sorry! No lending copies.

Anyone interested in another group purchase of Yater blocks or double bick (German style) anvils please contact me at (206) 572-7460. Will try for fall delivery depending on when we get an order together.

Speaking of fall, mark your calendars for our conference October 2,3,4 at Bernie & Linda Coski's in Tacoma, WA. **Date & location are FIRM.** Stand back! Jerry Culberson will be demonstrating his hand hammering fire breathing hot air hammering whisker singeing whip cracking smoke belching forging techniques. I'm sure Bernie will have a few tricks up his sleeve to show. And of course we'll bring in a hired gun from out of town just to round things out. See next issue of H.I.N. for complete details

God! I love this job! And I thought my other job was fun! Well, that's all for now, so, time to beat it!

The biggest "Wannabe" in the Northwest,

Grant "You can call me Prez" Sarver

Calendar of Events

- June 18-20, 1992 **ABANA Conference**, San Luis Obispo, CA (Registration June 17, 1992)
- June 26-28, 1992 **Clifton Ralph Workshop**, Power Hammer Technique, 15 people class limit, \$200.00 each, Jeff Holtby event chair. (206) 868-9531
- Oct 2-4, 1992 **NWBA Fall Conference**, Bernie Coski's, Tacoma, WA Contact Jerry Culberson, (206) 275-6769
- Summer 1992 **Gas Forge Building Workshop**. Date, location, and cost not fixed. For a flat fee, participants are provided all materials and leave with a finished gas forge. Event will be video taped. Plans and drawings done so nonparticipants can benefit.
- May 1993 **Spring Conference 1993**, Timberline, OR. Exact date is to be determined. Darryl Nelson event chair.

PLEASE NOTE: **Novice Workshops** will be held at Jerry Culberson's Old Cedar Forge in Allyn, WA as soon as he has 12 people registered for a class. Contact Gene Chapman (206) 297-2495.

Jerry Henderson is interested in putting together another repousse workshop to be held at Nahum Hersom's in Boise ID. Interested parties please contact Jerry at 503-397-6131.

OPEN FORGE AT GRANT SARVERS SHOP (APEX FORGE, 2311 Ross Way, IN BEAUTIFUL TACOMA!)

EVERY FRIDAY from 5:00 P.M. til the cows come home! Come mangle iron on an industrial scale! Time for talk, chalk, and fun. There will be things for all skill levels. don't be bashful. The best part is the price - FREE! Please call in advance in case it's called because of, like, rain or something - (206)572-7460. Got any more six inch square, Jerry?

FRIENDS

EULOGY TO MIKE FALK

One of our more eclectic members, Mike Falk, passed away recently and his flamboyant presence will be greatly missed by all who knew him.

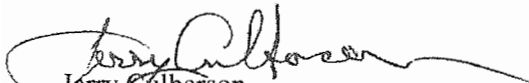
Mike was part philosopher, guru, seminarian, sailor, theologian, politician, educator and sometimes self-appointed expert at/on practically any subject. He was able to state opinions on every topic under the sun and, quite possibly, was an authority on a wide range of subjects--some of which only he could have been the true authority on. He was interesting, entertaining and always full of quality bullshit--something we blacksmiths truly appreciated.

His shop was something out of every craft person's hallucinations, a junk yard gone mad, a tumultuous upheaval of earthquake rubble--cardboard, tin, brick, plywood and plastic--a multi-layered midden of artifacts which even now would provide a life's work for some tortured soul of an archaeologist. The shop was a labyrinth of shops--photography, pottery, casting, woodcarving, blacksmithing, basket weaving, wine making, welding, audio/visual, sculpture, painting, cartography, jewelry, cinema, music and more. There was a nook, a cranny, a balcony, a basement, a loft, a haven, a porch, a smithy, a closet--something for every possible craft or hobbyist, collections of invaluable stuff, junk, tool and paraphernalia. It was, at best, organized chaos on a grand enough scale to cause any woman to file for divorce. In other words, it was a man's version of heaven on earth.

Mike was a great contributor to our organization. He always had something in the auction--a piece of pottery "raku," a basket, a sterling silver fuschia blossom carefully and artfully cast, or a bottle of wine he had made (quite good, I might add). He contributed time, talent and energy with equal fervor and made us all the richer for having known him.

Mike, if you are up in heaven now, given 'em hell, and take time out to piss on a "be back" for us. If you ever meet a blacksmith up there who knows how to bid a job, send us a signal, would you? We'll all be waiting for that!

Thanks, Mike.


Jerry Culberson

As a young man, Mike Falk taught art in Portland, OR. He moved to Anacortes in 1950 and worked as a newspaper man, photographer, sign painter, water-colorist and boat captain.

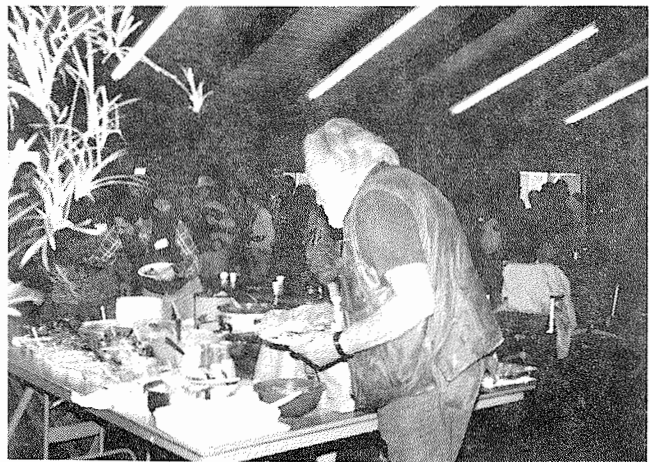
He also worked as a policeman, later becoming police chief of Houghton. Mike took early retirement in the late 1960s to attend the University of Washington.

He spent seven years earning a master's of fine arts in sculpture, later teaching art and was chairman of the art department of Lakeside School for 17 years. He "retired"

in 1988.

Mike was an active artist all of his life. He was past treasurer of the NWBA and served on the board of the Northwest Basketry Assoc. His talents

ranged throughout the metal and fine arts of bronze casting and blacksmithing. He also was a master jeweler, master potter and was among the best basket weavers in the Pacific Northwest. He was accomplished in the arts



At the table as well, Mike was *nolo secundus* (second to none)

of video, poetry, writing, gardening and tree farming. He was a practitioner of Ninjitsu and enjoyed playing the organ.

Mike, you will truly be missed.

FRIENDS

Don Hawley, of California, was a well known old timer, owner of Western Forge & Flange. Sorry to hear that Don has passed away. He will be missed by all that knew him.

I just received word that Don Hawley(CBA) passed away in February. Don was an industrial blacksmith most all of his life. His father started Hawley Forge in Oakland CA, and Don retired and sold the shop after more than 25 years of smithing. His work was industrial smithing of many types and even forged out alloy material that was used for the skin of NASA's first space re-entry vehicle.

Don sent many articles and letters to NWBA, ABANA, CBA, and other associations. If you can get a hold of "The Anvil's Ring" - Winter Issue 84/85 Vol 12 #4, it has a great article on setting up two hammers at Hawley Forge. One was a "little" 10,000# double arch steamer and a 20,000# drop hammer. The photos were great.

Those of us who knew Don, are really going to miss him. He was a "typical blacksmith". Kind of crusty on the outside and no time for fools, but inside was a heart of gold. If you had a question or a problem for him, be sure to take lots of writing materials, 'cause you couldn't remember all the information that he would give you. Don was always willing to help out.

In the same issue of the "Anvil's Ring", page 41, there is a letter written to NASA some years back which I thought you might enjoy.

From "The Anvil's Ring", Winter Issue 84/85 Vol 12 #4, p. 41 (ed. - The following letter was sent to the space program in regards to the openings for civilian passengers on the space shuttle. A copy was forwarded to the Anvil's Ring by its author. Somehow it reminds one of the story of Solomon's temple and the great feast after its building where all the artisans and craftsmen were invited but the blacksmith. But for his work, nothing would have been built. It is the editor's opinion that NASA could not make a better choice.)

"This is to be considered as my application to be the first outer space blacksmith.

I feel I am deserving and well qualified. I do not shoe horses or make window grills. However, I did lots of small and large forgings for several metallurgists working on the development of the space age metals.

I forged the material used as the skin on our first re-entry vehicle. That was before the days of tiles. Besides common materials such as stainless steel, aluminum, copper, brass, or tool steels, I have forged the pure elements of Titanium, Molybdenum, Zirconium, Hafnium, Tantalum, Tungsten, Columbium, Yttrium, and more.

I forged many of these materials alloyed with others. I forged a single crystal of Molybdenum to determine if it, by itself, would "want" to forge to a diamond shape rather than a desired square configuration. The metallurgists thought it was due to the normal interstitial condition of several crystals, or grains, together. Strange, but in forging the single crystal I still had to contend with the problem of it wanting to go diamond.

With the metallurgists, I went through the heartache and joys of "this will forge like butter at 2400' F.", and have it fail on the first blow. Or, "we will try this, but we know it won't forge", and have it forge beautifully.

This is not a forging lesson, just a request to forge in orbit. I will appreciate your early reply. I'm not getting any younger (still in great shape) and I would like to shake hands with Vulcan.

Don Hawley
Oroville, California"

Enjoy your forging time with Vulcan, my friend.

We will miss you,
Smokey

ACTIVITIES

HOSSFELD BENDER WORKSHOP

By Gene Chapman

The Hossfeld Bender Workshop had 17 in attendance. Some folks came from as far as Montana and Canada.

Grant Sarver demo'd the Hossfeld, explaining the numerous possibilities of this versatile tool. Cold iron, hot iron took shape as clips, hooks, springs, clamps and eyes. 1" hex alloy steel was easily bent at a red heat.

It was on the chilly side Saturday morning but plenty of blacksmith hot talk and two propane heaters kept it warm. Saturday afternoon Grant gave us a special treat in making a pair of poz type tongs in his 500# Nazel power hammer. He used several ingenious dies in the process. The remainder of the day was spent with hands on bending.

Early evening found most watching or forging on Grant's incredible toy - the 500# Nazel. Nelson & Elliott were at their best - forging some unusual looking whatchamacallits. Fun time lasted till 8:30 PM - not like the old days, 5 AM red eye stuff. (Back in my day . . . ed)

Sunday was spent with more hands on bending and some played with the Nazel. The workshop broke up around 2:30 PM. The remaining crew ate gourmet at a bar & grill on the Tacoma Tide Flats.

Thanks Grant & Margaret for hosting and demo'ing the Hossfeld Bender Workshop.

FROM THE QUILTING CORNER

By Ina Rattenbury

The NWBA ladies completed their first quilt and it was auctioned at the Spring Conference to the highest bidder, Babe Brandon. Called a charm quilt, it was queen size, very colorful and comprised of many blocks (charms) made from fabric salvaged from the ladies' "scrap bags". It is hand stitched and hand quilted. Save your dollars for the next one, which the ladies have already started.

"Some folks came from as far as Montana and Canada."

The next quilting project will be a queen-size friendship quilt. Anyone may contribute to the making of this quilt whether you sew or not. Done in 12 1/2" blocks, the block can be any design you like -- patterned, appliqued, embroidered, or whatever you choose. The only requirement is that it measure 12 1/2" by 12 1/2" when completed.

"The next quilting project will be a queen-size friendship quilt."

If you don't sew, but would like to be part of this project, pick up a block at a garage sale, flea market, or maybe you have one your grandmother or aunt made that you'd like to see put to good use. If you have pieces for making a block but don't know where to start, bring them along to the next NWBA gathering and we'll help you. We need 30 blocks to construct the quilt. Once we have all the blocks, we will piece the quilt together, hand quilt it, and then auction it.

As conferences are only held twice a year, mail completed blocks to either Ina Rattenbury, Old Cedar Forge, East 220 Cronquist Road, Allyn, WA 98524 or Vernell Henderson, 36050

Pittsburg Road #2, St. Helens, OR 97051. If you have any questions or want more details, please call Ina (206-275-6769) or Vernell (503-397-6131).

NOTICE

At the Spring Conference, it was voted to increase membership dues to \$20.00 per year, effective immediately.

Check your expiration on your mailing label.

Thanks,
Margaret

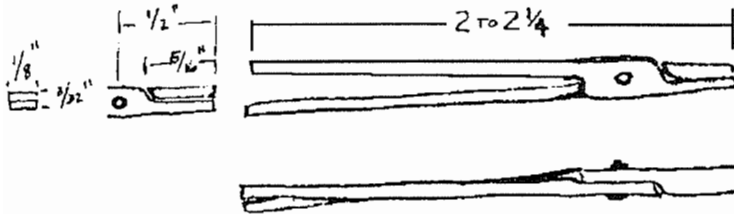
LOVELACE TOOLS

By Jim Lovelace

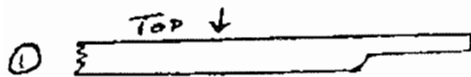
MINI-TONGS

While taking a workshop with Darryl Nelson in the Summer of '90, he showed me how to make these mini-tongs. Here's my interpretation of them. NOTE: These are only recommended for miniture left handed smiths.

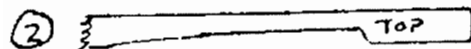
Tongs 1/8" Square Stock



Step 1 Forge jaw over edge of anvil about 3/8" long, will grind back later.

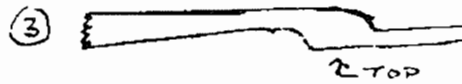


Step 2 Rotate 90° to right and forge joint over far edge of anvil about 3/8" long and a slight taper.



Step 3 Rotate 90° to right and forge in offset for reins

Step 4 Cut handle, from end of jaw to cut, about 1 1/2"



Step 5 Draw reins out to nice square taper & break edges.

Step 6 Make a second half

Step 7 Fit at joint and drill rivet hole with 1 1/6" bit and pin with copper coat welding rod rivet. (Use a little heat.)

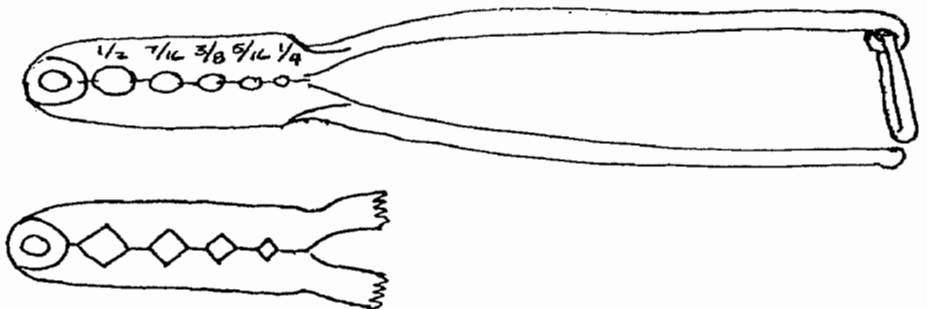
HEADING TOOL

As a collector of tools I often look for a relic of the past that

is no longer useful in its present state. One such tool is a terminal crimper from the phone company. Older versions are drop forged steel and lend themselves well to modification.

To start you need to find an old terminal crimper, and grind the crimping sections to tapered round. Check for hardness, most of these tools are good steel but not hardened. Next you need to drill the holes out, (if it has the locking ring, as illustrated, lock closed to keep diameters accurate) it is best to go undersize on the first pass and then drill to the finished size. To finish up the tool you want to break the edges with a file and countersink on one side.

Some other possibilities for the tool is to file or forge the holes on a diamond and use as a twisting wrench or maybe drill holes on the center and spaced to suit for use as a welding jig.



By JIM LOVELACE
REDMOND, OR.

FORGING MATHEMATICS 101

By Louie Raffloer, Inquisition Forge, Seattle, WA

OR: HOW THAT ONE CLASS YOU CUT IN HIGH SCHOOL WILL COME BACK TO HAUNT YOU!

This article is presented to y'all as a refresher course in one aspect of basic mathematics. I forget which branch of math it is; algebra; proportions?. In any case, my boss, Mike Linn, answered my question of "How much stock should I start with to get a taper this long?" with this lesson.

The particular application of this knowledge is in the case where you need to draw a continuous taper between two defined points. The most common situation where I use this technique is in the production of fire tools. I'll use a poker as the example in this article.

Materials Required for calculating: Steel weight chart, Ruler, Calculator (I recommend one that does decimal to foot/inch conversions), Decimal Conversion Chart.

The first step would naturally be the decision making one: Let's say we've decided to make a 30" poker using 5/8" square stock. Supposing that your decorative handle is 8" and the working end is to be 4", leaving 18" of taper from the bottom of the handle to the beginning of the working end. Let's also say that taper will begin with the original stock size and end at 3/8".

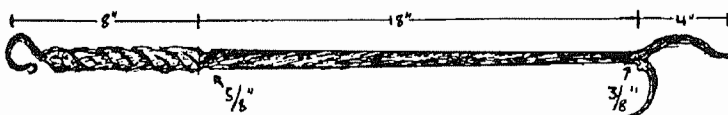


Figure 1

A popular way of drawing down a poker shaft is to put a fuller on the material to separate the mass of what will be the working end and the yet to be tapered, shaft. This fullering should leave the thickness of the steel slightly larger in dimension than the decided finished thickness

of that end of the taper. (The placement of that fuller is what the focus of this writing is about.)

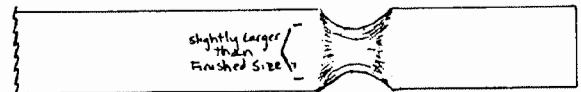


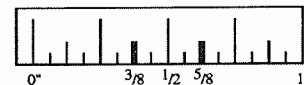
Figure 2

The first step is to find the average of the two dimensions at either end of the taper. This can be done with a ruler or on paper.

On Paper

$$\frac{5/8" + 3/8"}{2} = \text{Average}$$

On Ruler:



Adding the 2 dimensions, then dividing by 2 = Average

Locate both dimensions on ruler scale, the midpoint = Average

The next step is to dust off your calculator (careful with that air hose) and get out your steel weight chart.

Let us proceed with this thought in mind: We will be seeking to match the weight of the finished taper with the weight of the unworked stock.

Now, take your average, 1/2" sq in this case, and find its weight on the chart. As most charts from steel suppliers give you these weights in terms of feet, and we need to know in inches, you'll have to do a simple conversion. Simple: divide weight per foot figure by 12:

$$1/2" \text{ sq} = .8500 \text{ lbs/ft} \frac{.8500}{12} = .0708 \text{ lb per inch.}$$

Multiply the inch weight by the length of the finished taper:
 18" X .0708 = 1.2744 = weight of finished taper.

Next we need to calculate the weight per inch of the unworked stock (in this case 5/8"):

$$5/8" \text{ sq} = 1.328 \text{ lbs/ft} \frac{1.328}{12} = .1107 \text{ lbs/inch.}$$

The final step is to determine how many inches of 5/8" sq are needed to make the 18" taper: divid the total taper weight by the raw stock weight.: $\frac{1.2744}{.1107} = 11.51$

This product is your measurement in inches. In this example (11.51") it is easy to see that 11 1/2" is the length of 5/8" we need to isolate for the taper. In the case where your decimal value is much more

FORGING MATHEMATICS 101

obscure, and if difficult to convert in your head, a decimal/fraction conversion chart or dimensional calculator can be very helpful. Either can be eventually discarded as your recognition, and ability to round off to nearest 1/8" or 1/4" increments becomes better.

Incidentally, I know there will be some question as to scale loss. The material lost in a competent forging will register somewhere in the 3rd or 4th decimal position and no attempt to calculate this loss will be time well spent.

In conclusion, I'd like to acknowledge that most production items we make do not require this accuracy. These tips may be helpful in research and development before going to work on larger quantities. One inch of steel saved on the initial cut length of a 100 piece production run saves 100" of steel. This is very simple math and it adds up to saving some dough at the steel yard.

Also, when using the calculation you get closer to drawing a more perfect taper. If all the numbers match up in the end and the taper looks continuous then you can be reasonably sure that the geometric perfection has been more closely achieved.

Common Fraction/Decimal Conversions

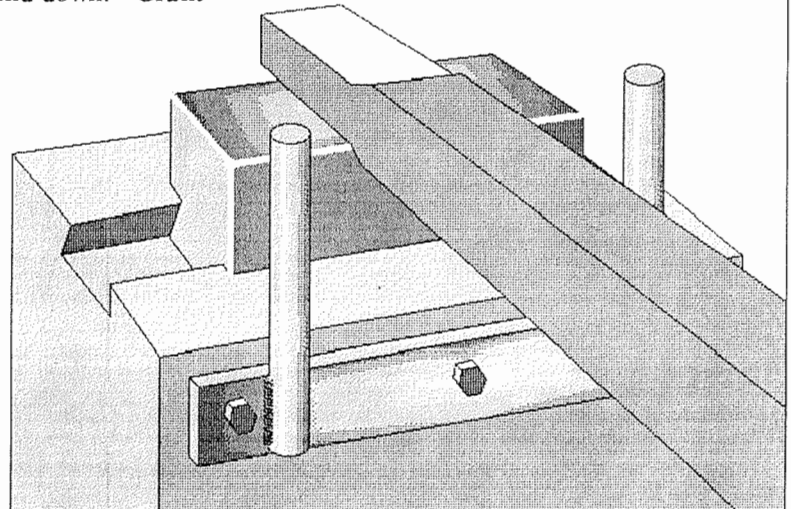
1/16"	.0625
1/8"	.125
3/16"	.1875
1/4"	.25
5/16"	.3125
3/8"	.375
7/16"	.4375
1/2"	.5
9/16"	.5625
5/8"	.625
11/16"	.6875
3/4"	.75
13/16"	.8125
7/8"	.875
15/16"	.9375

Commonly Used Steel Weights

	Round Stock		Square Stock	
	inch	foot	inch	foot
1/8"	.0035	.0417	.0044	.0531
3/16"	.0078	.0939	.0100	.1195
1/4"	.0139	.1669	.0177	.2125
3/8"	.0313	.3755	.0398	.4781
1/2"	.0556	.6676	.0708	.8500
5/8"	.0869	1.043	.1107	1.328
3/4"	.1252	1.502	.1594	1.913
7/8"	.1704	2.044	.2169	2.603
1"	.2225	2.670	.2833	3.400

SISSY RAILS for your hammer

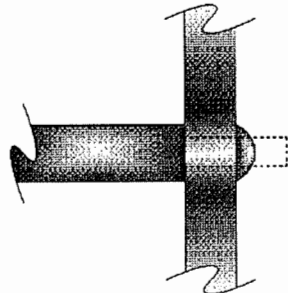
I find these useful on large, long or awkward work. Just one less thing to pay attention to. Now if I can just keep it from bouncing up and down! - Grant



Can I have your (a)tenon please?

By Joe Elliott

By tenon I mean a smaller shape forged, welded, or machined to the end of a larger shape. If the tenon is to be used in joinery it is typically passed through a corresponding "hole", and excess is riveted over.



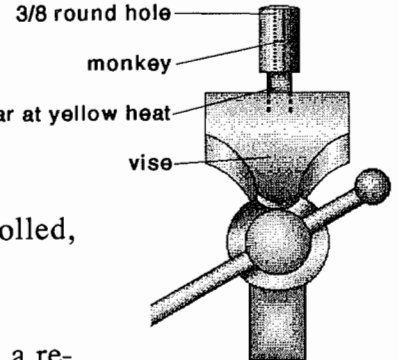
tenon joint

If, for example, the adjoining pieces were 5/8" square, I would make a 3/8" round tenon 1 3/8" long, (5/8", pass through material + 3/4", twice the thickness of tenon). If rotating is a concern, I could countersink the far side (heading side) of the hole then take a cold chisel and mark the inside. The other options would be to make a square or rectangular tenon.

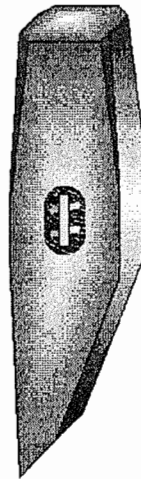


non-rotating tenon

centered in the end of 5/8" square. I would then countersink the hole, insert 3/8" round cold rolled, weld into place, and grind/file weld flush. I recently used this in a repair job where I didn't have enough material to "pull" a new tenon.



- 2.) I could cut them on a lathe.
- 3.) Forge tenons by "hand".
 - a. Butcher all four sides, leaving more than the 3/8"
 - b. Draw material out.
 - c. Swage or file to 3/8" round
 - d. Monkey to square up shoulders.

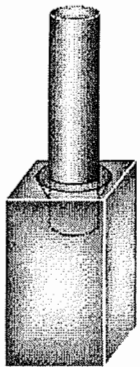


butcher top tool

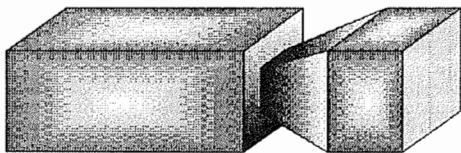
- 4.) Forge tenons under power-hammer. For this I made a spring swage.

To get a 3/8" round tenon on the end of 5/8" square I basically have four options.

- 1.) I could drill a 3/8" hole 1/2 deep

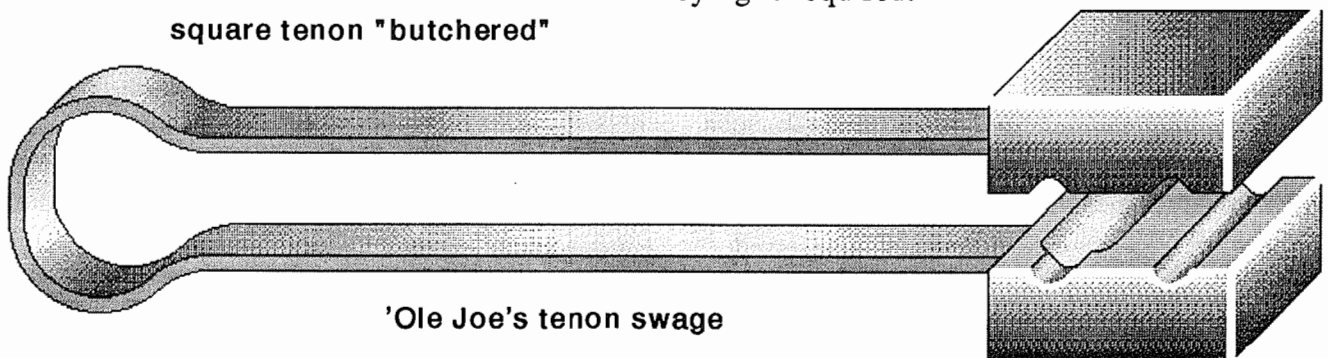


repair tenon



square tenon "butchered"

To minimize cold shuts, all edges are radically chamfered leaving only the bottom 1/3 of pattern. By tapering the first pattern the forging material is held tight to the edge and little monkeying is required.



'Ole Joe's tenon swage

Reprinted from The Blacksmith's Guild of the Potomac, Inc., May/June 1991. Written by Brad Silberberg, Bradley Metal Design, Inc.

WHEN RE-SURFACING AN ANVIL, resist the temptation to polish it like a mirror. A polished anvil is a must for cold planishing nonferrous metals, but can cause trouble when forging hot steel. A bar at yellow heat will slip and slide on a polished anvil face, making it very hard to set a shoulder on the near anvil edge, or draw a point on the far one. My anvil sometimes gets a little too polished just from use (usually during the winter when the humidity is low, not during the rust season in August) and I give it a quick rub with coarse aluminum oxide cloth to give it some tooth. Do this by hand only, as a sander or grinder will remove more metal than necessary.

THIS MAY SOUND STRANGE, but Crazy Glue is great for fastening metal to metal or other hard materials to metal. Although it should never be used on parts that will be soaked or heated, it's great for attaching light weight ornaments to larger projects. Use some common sense, and don't use it where a lot of leverage can be applied to break the bond or places where parts only barely touch.

I used Crazy Glue on a pair of newel posts that I made recently.

The design called for 9" long strips of 1/8" x 1/2" steel to be attached long wise to the side of a pipe to produce a ribbed effect. I thought about all of the other fastening methods that were available to me and it seemed that all of them would either warp the thin strips, or in the case of welding or soldering, would leave excess material to be ground or scraped off, leaving marks, or at least knocking off the black oxide finish. I remembered watching a furniture company use Crazy Glue to attach electric wires to the struts of chandeliers. I tried an experiment gluing a scrap of the ribbing to a scrap of pipe. I had to smack it with a hammer to knock it loose! It wasn't even the glue that gave way. The glue pulled the black oxide off one of the bars.

To make the bond even better, I sanded the black oxide off both the back of the rib strip and the mating area on the pipe. I then wiped both parts with acetone to remove any grease or oil that might interfere with the chemical bond. I applied the glue to the rib strip in a thin line (if you use too much glue, it weakens the bond) and pressed the parts together for two full minutes. The strips are now in place to stay. I prefer the Crazy Glue pen container as it is easier to control the flow of glue. Be careful with this stuff, **IT CAN GLUE YOUR SKIN TOGETHER!**

A RECENT PROJECT required

acorns to be forged with a swage die. To make the swage, first a master pattern of an acorn on a stem was turned from tool steel and hardened. I have always read to then take two blocks of steel, heat them, and forge them into the pattern, turning it around on its stem until the blocks met. This acorn was quite large and it seemed like an awful lot of metal would have to be displaced to get the blocks to meet. Instead, I took two blocks of steel about 2" x 2" x 1" and used a carbide burr in my die grinder to cut away enough of the mating faces of the blocks so that the master pattern would almost fit in the spaces. I checked them frequently with the pattern, making sure that when I heated the blocks and forged them into the pattern, no voids would develop around it.

I then made a set of hinged connecting arms and welded them to the blocks. I use hinged arms rather than the traditional hairpin-type spring arms because they allow me to fully open the dies so that both ends are flat on a bench. I can then check or grind them comfortably. When using mated top and bottom swages, it is necessary to keep the swages tightly clamped against the hot workpiece, and my hand gets tired of working against the spring-type arms that want to open after every blow. The hinged joint also makes it easier to open the dies to insert the

Hints

work. With the hinge, I can swing the top die of the pair out of the way so that I can forge steel into the bottom swage only making a one sided forging (more important with pass-through type swages, like to forge half round stock).

Next I welded the arms to the carved out die blanks, heated them, inserted the cold master pattern, and forged the dies shut under my air hammer while turning the pattern to smooth and shape the impressions. When cool the edges of each impression were then relieved with the die grinder to minimize flashing. Remember that you only need to maintain the true profile of the master pattern in a small area along the axis of the pattern to get the right profile on the turning forging because the dies will squeeze the hot blank to the smallest cross section of the impression.

I then hardened the swages and welded two plates to the lower hinged arm to create a guide fork to keep the halves of the swage aligned. I tested the dies to find the right size material to use for the forging. Finally, I used a stone in the die grinder to relieve and tune the hardened dies.

I SPENT SOME TIME at the Southeast Regional Blacksmithing Conference talking with Robb Gunter (the blacksmith at Scandia Nation Labs who helped develop the ABANA propane forge) and

picked up these tips:

Some of you may have read in the Anvil's Ring about a 10% lye quench to harden mild steel. This is **very** dangerous stuff to have around the shop. Robb has come up with a safe, bio-degradable alternative that will turn 1018 steel to 43 Rockwell hardness, and seems to do the same to the A-36 steel commonly sold as mild steel in our area. This is hard enough to use for power hammer dies, but still can be cut with a file. Somehow this quench (as well as the lye) turns the cubic steel crystals into flattened rhomboid crystals, all the way through to the center of even large pieces. This imparts incredible toughness along with the greater hardness. The metallurgists that Robb has spoken with cannot explain what happens.

Robb and his co-workers at Scandia have done 150 test samples, complete with photomicrographs that show the change. The extreme whetting characteristics of the ingredients of this mix make it a super fast quench. Robb says that it will elevate the hardness of all carbon steels to the point where steels of 1% carbon and over will literally explode from the stress induced by the rapid cooling. Mix the following:

- 5 pounds table salt
- 32 ounces "Dawn" dish washing liquid

- 8 ounces Shaklee "Basic" cleaning concentrate (\$8-9 for 32 oz. Look under "Shaklee Products" in your business white pages.)

- Enough water to make 5 gallons of mix

Stir mixture every time before using. Quench steel at 1550° F (bright red). Mixture is good for about a year until its components begin to break down. I told Robb about a consumer report that a local TV station did about the effectiveness of various dish soap brands and its finding that "Sunlight" worked best. I used it for my mix and it seems to work fine.

I tested the quench with several things. I found that a piece of 1/2" square A-36 mild steel got somewhat harder when quenched in plain water, but I could easily flatten the end with a 3 lb. hammer. The other end of the same bar, quenched in Robb's mix, got only a little harder but my hammer just bounced off of it. A 1 1/2" round piece of cold rolled steel quenched in the mix didn't seem to get any harder. A 1/2" octagon piece of 1075 tool steel hardened in the mix (but not tempered) broke in half when laid across the hardie hole and tapped with the cross pein of a hammer. I can see where this quench will allow the use of mild steel for blunt forging tools, but it can't make mild steel suitable for tools like cold chisels. I still need to experiment with different steels

Hints

and different quenching temperatures.

Robb buys big hex (Allen) keys cheaply at flea markets to use for chisel stock. He straightens them out, forges what he needs and hardens them in oil.

ABANA FORGE UPDATED

Robb has also made some additions to his latest version of the ABANA forge. At the suggestion of a combustion engineer who we talked with at length at the last ABANA conference at Alfred, NY., Robb has added a top to the forge's chimney. Actually, it is a piece of sheet metal that holds pieces of the ceramic insulation board at the front and above the chimney opening so that heat reflects back down the chimney onto the air intake pre-heaters while still allowing the exhaust gases to escape from the open sides and back of the added assembly. Tests at Scandia have shown this reflector to raise the efficiency of this forge by a whopping 30% at the high end of its working temperatures. The other additions are a pivoting support arm on the front of the forge to hold up long stock, a wider base frame, and stock supports on the sides of the chimney to take advantage of the waste heat from the chimney for twisting heats. Robb let me use his forge for my demos at the Southeast Conference. It was just like home. Thanks again, Robb!

If you use what Chris and I call "the Goo" (boiled linseed oil, beeswax & turpentine mix) to finish ironwork, you can darken the finish of your work by adding a little lamp black tinting color to it. (available at paint stores). We just made some drapery rods for an interior designer and had to use the rusty, scarred up steel rods we got from our supplier because there was no time to send the stuff back. (Like they would have sent us anything different the next time?)

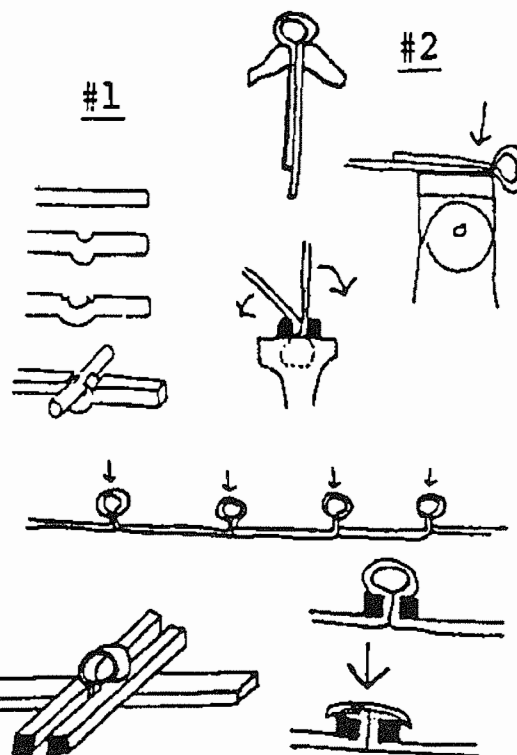
We cleaned the rods with Scotchbrite cleaning pads, heated them and applied a coat of "goo". Chris then put a little of the lamp black on the same rag and went back over the rods. The marks in the scale were make much less noticeable and the finish looked an even, dark black. I suppose you could mix the lamp black tint right into the "goo" itself. Other tinting colors could also be used to achieve different effects.

MORE HINTS

TWO METHODS USED BY TOM JOYCE TO JOIN

BARS: #1) Forge a depression with fuller over anvil hole or swage block. Hot chisel a notch on each side of the fullering. Tap down the notches to hold round bar in place for railing, grill, etc. #2) Mark with center punch equal distance for making loops in bottom rail. Make ring in vise jaws, using

a mandrel for uniform size. Mark 1/2" from ring on both sides with hot chisel, 1/3rd through flat stock. Put two 1/2" square bars at sides of ring and bend. Make rings all across bottom rail - all are even because of center punching in the first step. Clamp down bar with rings, clamp 1/2" square bars in place, heat ring with a torch and hammer ring down and around square bars, holding them in place with flattened ring.



From a demonstration by Tom Joyce as reported in the newsletter of the Upper Midwest Blacksmith Assoc. - ABANA. Tom is considered to be one of the foremost artist smiths in the country and operates a five man shop in Santa Fe, NM.

GLEN GILMORE DEMONSTRATION

© 1991 By Brian Browning

Glen demonstrated a series of small, sometimes deceptively simple individual details he uses when creating his larger works, which include large tables, outdoor gates, fireplaces and other architectural ironwork. He began by showing how he rivets joints.

Making a decorative rivet:

Glen uses a simple tenon tool to make uniformly shaped tenons on his rivets, and to clean up the shoulders of the tenon. (See figure A.)

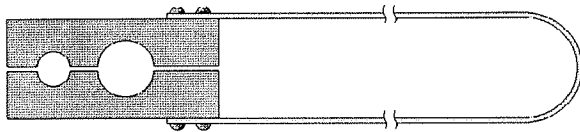


Figure A

Make sure that the hole through tool is slightly radiused on both sides (vertically) and ends (horizontally) to eliminate cut marks on the tenon.

Lay out the stock for a tenon of the desired length: the thickness of the pieces to be joined, plus the thickness of the decorative washer (if one is to be used), plus enough extra stock to



Figure B

upset the end of the rivet. Glen uses 5/8" sq. stock. Begin by drawing out the tenon on the end of the bar. Using the tenon

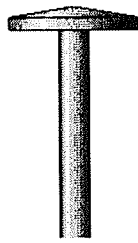


Figure C

Do not cut completely through the bar, leaving the remainder as a handle. Holding this handle, place the tenon in the anvil's pritchel hold and finish cutting through the bar. Upset the head of the rivet, and bevel the corners. The basic rivet is completed, and the head ready to finish. (See figure C.)

tool, refine the tenon. Leaving enough metal for the rivet head, begin to cut the bar. (See figure B.)

The rivets which Glen creates are unique elements which personalize his work, in a very real sense, they are his signature, very unlike the standard round or flat head rivets available commercially. He suggests that each smith develop his own style of rivet heads and incorporate them whenever his work requires riveting.

Glen has a 1" thick steel plate drilled with holes in a variety of sizes, which he uses to hold the rivet when embellishing his rivet heads.

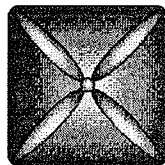


Figure D

The rivet head:
First Heat: use a round nose

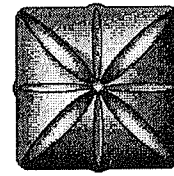


Figure E

Second Heat: use a round nose punch to make the short teardrop shapes. (See figure E.)

Glen often uses a decorative washer opposite the head. (See figure F.) Alternatively, a commercial rivet could be used with the rivet head placed on the inside of the forging, and a decorative washer used on the visible side. Glen commented that this might be very effective using a brass rivet.

When punching a hole for the rivet to go through, run the drift through from both sides of the piece. Heat the end of the tenon, and put it in place. Glen uses a lead block to protect the decorative faces when finishing and installing rivets. He recommends John Deere for commercial rivets; they sell a wide variety of rivets with different heads, faces, and lengths.

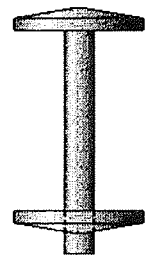


Figure F

Re-printed from The Prairie Blacksmith

THE ANSWER MAN

The Answer Man
14 1/4 Half Vast Ave.
Pavement Narrows
Montana. no zip

Dear Answer Man,
When I use my propane torch
around my vise or anvil - water
comes out of the iron. How do I
stop this?
(signed) Puzzled in Poulsbo

Dear P in P,

In my many years of experience I have found that water comes out of the darndest things, sometimes unexpectedly. Approximately 97 1/2% of the time it has to do with heat or pressure. My present theory is leaning towards the conclusion that the water is in the heat, I just can't quite see pressure having water in it. I have observed that some water has pressure in it, but speed is involved too. Just today I was noticing the steam coming out of my tea kettle, heat was driving the fine particles of water out of the heavier water in the kettle, or was it pressure.....? I might have to modify my theory to allow for water to be either in the iron or in the gas. Why don't you contact the people who made your propane torch and see what they have to say. One thing that I am sure of is that hot iron will not hold any water. If you can't get gas that doesn't have water in the heat then you could build little heaters for you anvil and vise to

keep the water from getting in it from the start, or you could move to Arizona. I saw an advertisement for a "heat exchanger" and I am thinking about calling the number and see if they can tell me anything about the water that is in heat. I have another theory - about hard and soft particles and how they work with cold and hot particles.....(hot iron is softer than cold iron, ice melts, steel can be made up of either hard or soft particles depending on how it is cooled from a hot heat, etc., etc.). Since all of this is connected with heat, there is probably water involved. Matter probably consists of a fine balance between the wet and dry particles which in turn are controlled by or else control the hard and soft particles which have something to do with the cold and hot particles.

Thank you for the good question and I certainly hope my theory is not as complicated for you as it is for me.

The Answer Man

(Contributed by Gene Chapman)
His question & Wayne Goddards
answer.

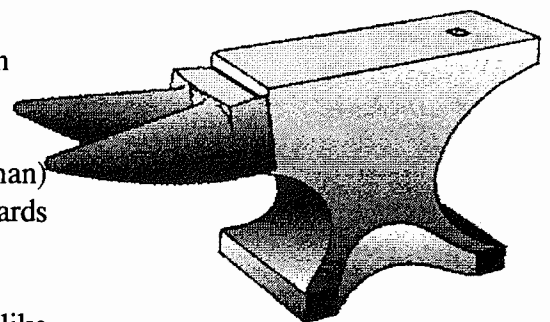
If I might add a little here, I'd like to mention my own experience in this regard. Many years ago I had the opportunity to do some work for a diver who supplied his own steel for the job. Before starting he

told me to be careful as this steel had been salvaged and had soaked up a lot during it's years under water!

As proof of this fact he said to just try heating it with a torch and it would start oozing water right away. Deciding that the customer is always right, I agreed to do it his way, but would be obliged to charge extra for having to heat the steel to drive out all the water before doing any welding .

What's this talk about "heat exchangers"? What would you exchange heat for? And why? I've heard of people trading tit for tat. Now here's what I want to know: Just what is tat anyway? Where do I get it? And how do I trade it in for the other thing?

Grant in a coma
(dammit Margaret, thats TA-coma)



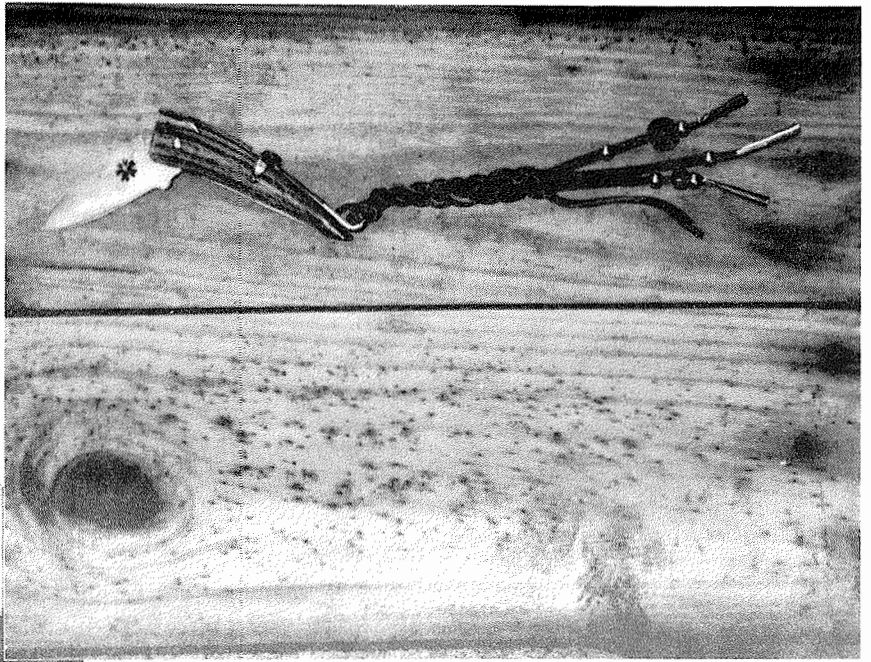
JOE ELLIOTT'S IDEA OF A
DOUBLE BICK ANVIL!



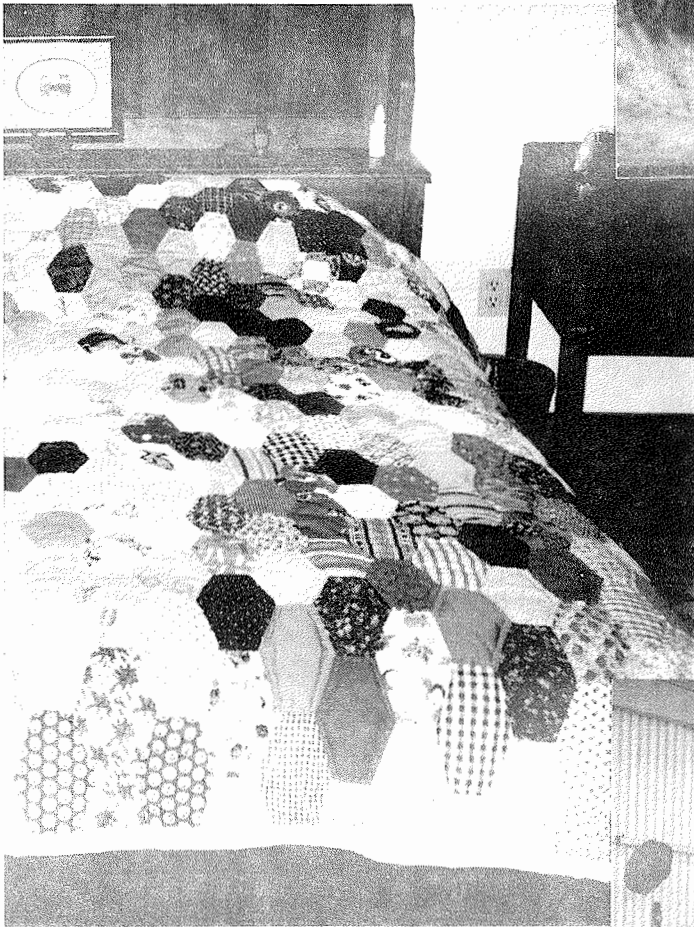
Horse Head from Novice Workshop
Photo by Grant Sarver



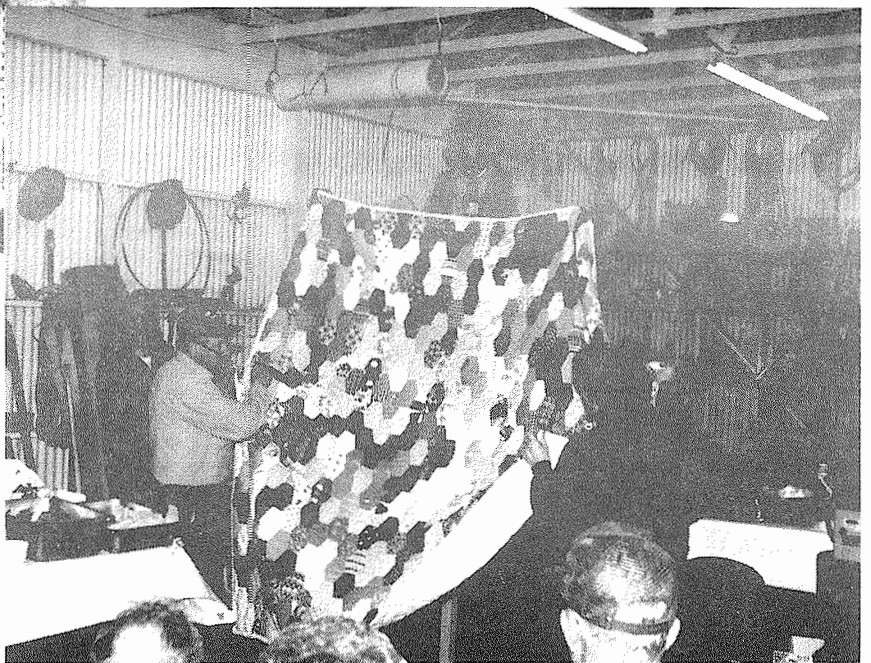
Jerry Henderson & the Octopus
Photo by "Grandpa" Hersom



Knife
by Gene Chapman



"THE" Quilt
Photo by Ina Ratenbury



Jerry Culberson at Spring Conference Auction
Photo Lloyd Hedglin

NOTES FROM GAS FORGE WORKSHOP

© Steve Bloom

The following are notes from Rob Gunter's lecture on the care and feeding of the atmospheric gas forge. Any discrepancies or inaccuracies are due to my note taking, so don't blame Rob!

I. Thermocouple Installation:

Insert the probe into the ceramic tube as far as it will go. Thoroughly pack the tube with kaolwool to prevent oxygen from entering the tube (if it does, the probe will burn out). Drill a snug hole positioned 0.5" from the rear insulated surface and mid-way between the floor and ceiling of the forge. Be sure to position the meter away from the forge since the exterior will reach 400° F on a weld heat.

I have installed my thermocouple as shown in Fig. 1. The use of the angle-iron supports the electrode lead, aids in locating the probe in the forge (clamp the lead between the pieces of angle-iron when the probe is

correctly positioned), and allows the use of excess kaolwool to insulate the probe and lead. Go VERY slow when drilling the access hole - the insulation is very brittle. Try to drill a small hole and then sand the hole to the correct diameter with a wooden dowel & a wrap of sandpaper. DON'T INHALE THE DUST.

"Care and feeding of the atmospheric gas forge."

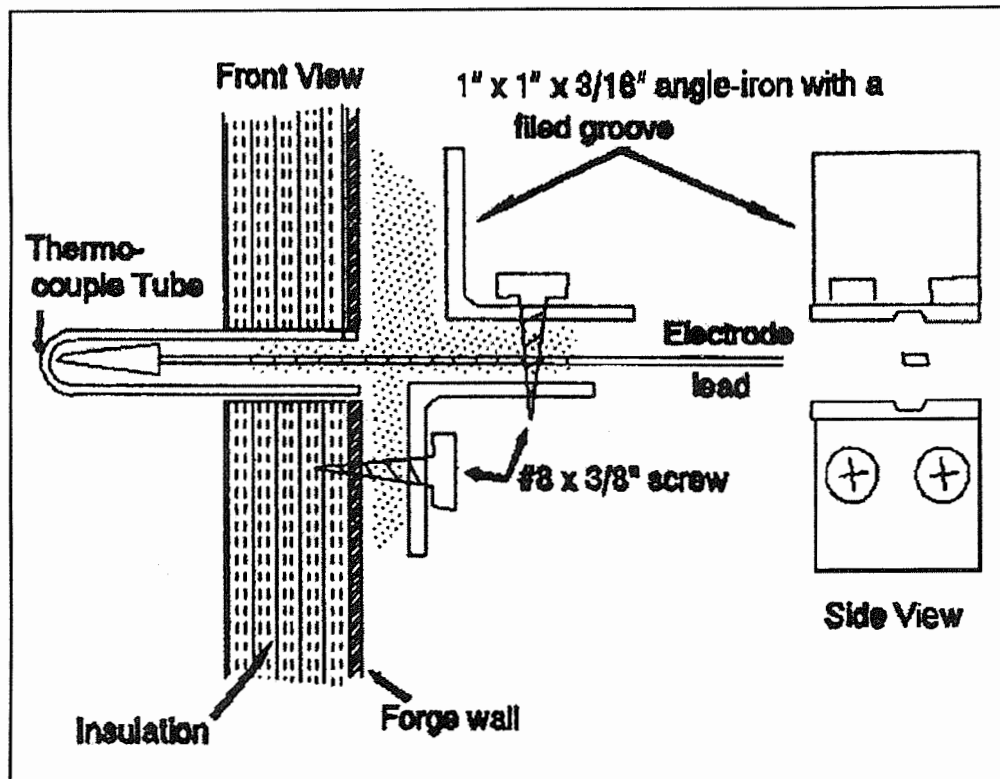
II. Hinge Features:

The hinge is designed to swing the door away from the forge as the door opens (to preserve the insulation). The hinge should be lubricated with a high temperature grease (1200°F lithium should do).

III. Flux Problems:

Flux, especially borax, will quickly destroy the insulation.

Therefore, minimize flux use. If a lot of flux is used, try to protect the left side by inserting a ceramic barrier. Kiln shelves may do (I've acquired a 2400°F shelf fragment from a local pot-



NOTES FROM GAS FORGE WORKSHOP

ter - the shelves are approximately 3/4" thick and can be cut with a masonry-abrasive saw). To even out wear on the floor tile, rotate the tile 180°.

IV. Modifications:

It is possible to add a door or plug in the rear of the forge to allow the heating of long objects. If you do, be aware that wear & tear will increase dramatically. It is possible to scale the forge up and down but maintain the proportions of burners:volume of the standard forge. Use Prep-Sol (a Du Pont product) or wipe down the acetone before painting. Any high temperature manifold paint should be adequate. The paint should not harm the insulation.

V. Starter:

A spark ignitor can be installed in the up-stream pipe (nearest the valve). Get an ignitor with a round sleeve (I've found one at Wal-Mart for under \$9.00 and it has a short ignitor section extending from the ceramic sleeve). Drill an access hole just above the bend in the pipe as it connects to the top of the forge. Use a radiator clamp and a bracket to support the ignitor. Use a mirror in the forge to look up into the pipe. Adjust the ignitor to 3/16" to 1/4" off the read wall of the pipe. Adjust the gap until the spark is consistent. Rig a mount to one side to avoid melting the hand unit.

VI. Fine Tuning:

To drive out water (which will be absorbed into the insulation), light off the forge, let it briefly heat, then cool down. Then bring it up to normal temperatures. If you omit the 'curing' phase, the

insulation may have to do this repeatedly. Once the forge is up to 1500°F, slide the gas tube back and forth until the flame is even on both sides. Rotate the tube until the roar is smooth and at a maximum level. The temperature will rise rapidly when you get it right. Light the forge at 15-18 PSI and maintain until the auto-ignite point is reached. It can coast at 2 PSI (1100-1200°F) and 4 PSI will produce 1800°F. Use the ball valve as a coarse adjustment and regulator as a fine adjustment.

VII. My comments:

I've mounted my forge at just under eye level so as to minimize the chance of banging up the interior. I've also created a long 'L' shaped tool to allow me to push and pull objects around in the forge. I've found that even when my hand is several inches from the opening and I move fast, the welding glove still smokes. Thus it helps to drag out and position objects so I can grab them with tongs without being forced to put my hand directly in line with the forge opening. The only problem that I have encountered so far is getting the forge down below 2150°F (even at 4PSI). To echo Brad Silverberg's comments in the Anvil's Ring (Vol. 19(1), 1992), it's possible to get hooked on using a Gunter gas forge!

Reprinted from The Florida Clinker Breaker, December 1991/January 1992

"The only problem that I have encountered so far is getting the forge down below 2150°F"

PROPANE GAS FORGES

by John Smith

Last year I built a propane forge the same as Jeffrey Funk (see the March 1988 issue of The Rivet), with a steel arched top lined with Kao-wool, firebrick base and sides, and two burners coming in through the top. I built this forge for one purpose --taking 36 inch long heats -- for making the bases of my fireplace toolsets in one heat. It does a wonderful job and has already paid for itself several times over. It has two drawbacks; it takes quite a while to heat up, and it uses a lot of propane.

For 95% of the forge work we do, a 9 inch or 10 inch heat is enough. So I build a small forge of firebricks, with a single burner coming in the side, and this was quick and fairly efficient, but did not give an even heat.

A lot of efficiency is lost when the flame hits a brick wall a few inches away; in fact the brick area opposite the burner was black, even when the rest of the inside of the forge was bright orange.

I attended Northwest Blacksmith Association meeting in the fall where Darryl Nelson of Fire Mountain Forge had a new type of propane forge, which reached welding heat in about 5 minutes from light up, and ran on hardly any propane.

It was cylindrical - a piece of 10 inch pipe - lined with 1 inch thick Kao-wool. The burner came in horizontally near the top, creating a circular, swirling flame, giving a very efficient and even heat. I knew I had to have one!

There was, however, one thing that really bothered me about Darryl's forge, and that was the exposed Kao-wool, with the burner aimed right at it. (In Jeff Funk's forge the burners are aimed away from the Kao-wool.)

Kao-wool is extremely irritating to the throat, and when I have handled it without a mask I have experienced a very irritated throat and tight breathing similar to breathing galvanizing fumes, for several hours.

The brand name that is easily available here is "Inswool," from A P Green Refractories, and on the box it says to avoid breathing without a mask when handling as it gives "Temporary" lung irritation.

When Kao-wool is exposed inside a forge, with the burner flame blowing on it and the steel that is heating up is bound to touch it at times, it seems to me that this must cause particles to become airborne.

One of the reasons for giving up coal is to avoid the harmful airborne coal dust and ash - and I see no point in trading one health hazard for another if it possible to avoid both. So I built a round forge using a castable refractory material instead of Kao-wool.

It doesn't heat up as quickly, but once hot runs at a nice forging temperature at about 1/2 to 1 psi of propane pressure. At increased pressure it reaches forge welding temperature easily.

The castable refractory material I used is from A P Green and is called CA2004. There are several different mixes available, ranging from \$25 to \$70 per 25 Kg bag. CA2004 is about \$35, and so far is working fine. You must add water and mix it up like concrete. After it has cured for 24 hours it is important to dry it out thoroughly before lighting it as trapped moisture can turn to steam and explode.

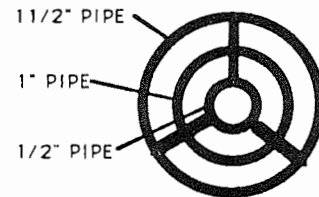
I set mine on top of our wood stove for a week. The stove was alight continuously and it dried the forge nicely, although there was steam created during the initial firing. It was heated slowly and we took several hours before we got the inside to glow. I did this outside, partly in case it did explode, but also because the steam coming off did not smell very nice.

Every thing went fine, and the next day we brought it inside and started using it. Initially I had a piece of 1 1/2 inch pipe with no concentric pipe added..... And it really roared very unpleasantly. When I added the two extra pieces of pipe "See plans" it quieted right down.

Thanks, Jeff, for this important detail. Also, without the extra pipes in the burner, it was a bit temperamental, and until it warmed up it

would occasionally blow itself out. Now the flame pattern is much better and it is not as touchy with the air/gas ratio. A big improvement. The heat throughout the forge is really even.

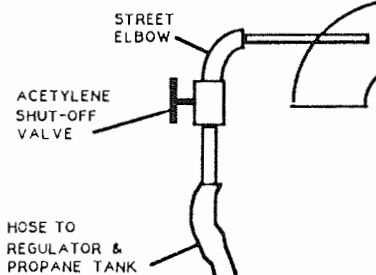
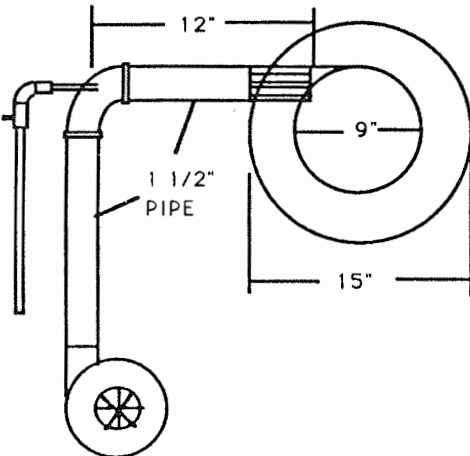
I built my forge specifically for it to be used by two people at once - one working at each end - so I just have loose firebricks stacked up to close off the ends, with an



PROPANE GAS FORGES

adjustable opening to put the steel in. It is **important to use high-temperature firebricks**. I used "Prairie" from A P Green. (Regular fireplace firebricks fall apart when they get hot, as they do on the side facing the inside of the forge.)

My forge is fourteen inches long and the burner is in the center. It could be scaled up or down to suit individual requirements, and one end or both could be made from the castable mix, with a slot for work to go in,



and another slot in the back for heating the middle of a long bar.

I used what I had, but did follow A P Green's recommendation of making the lining 3 inches thick.

A CAUTIONARY

NOTE: Propane gives off carbon monoxide which can be deadly. Do not operate a propane forge in a closed shop unless it is properly vented, and even then a supply of fresh replacement air is necessary. Medical books say carbon monoxide is harmful at a concentration of 100 ppm, which isn't very much.

I haven't used my coal forge since the blower burned out in November, and you know, I don't miss it. Using propane is so darned simple.

Editors note: John says that a 100 pound bottle of propane lasts him about 36 hours and that the cost of running the forge is about 70 cents per hour

Reprinted from *THE RIVET*, Western Canadian Blacksmiths Guild, Feb 1989. By John Smith

A gas forge presents possible hazards when compared with a coal forge. Gas and air in the right mixture with a spark will go bang. The gas forge will eat up all the oxygen in a closed room and leave carbon monoxide which ain't too healthy.

You must be safety conscious when using gas. Do not store or place the bottles near a heat source or on a platform which will turn over. **Be on the look-out for leaks. Check all the connections with soapy water. Do not use a flame.** Do not leave the forge on unattended. Do not look inside the forge when lighting. Be aware of flame-outs.

A gas forge can be safe, fast, and quiet, is inexpensive to build, is clean, will work you to death, will warm your shop on cold days, is addictive and is expensive to operate when compared with coal or coke.

After having seen the gas forges of the Fire Mountain Forge, Gene Chapman, Hans Peot, and the one auctioned off at Tipp City, I had to have one. So Clay Spencer and I each built a circular gas forge.

All of these gas forges were a spin-off of Darryl Nelson's basic design which is shown on the preceding page and on the left.

The smallest forge was Gene's. He had slipped a 3 Lb coffee can over another 3 Lb can. He used an exhaust pipe attached to a hair dryer for his air supply. He used a light dimmer switch to vary the air flow.

The gas line was regulated at a low pressure, had a cutoff valve and went into the elbow. I believe it was nothing but 1/4" copper tubing. There was no orifice or concentric flame holder.

PROPANE GAS FORGES

The coffee cans were lined with 1" thick Kao-wool. The ends were closed with firebricks. A broken firebrick was on the bottom of the forge. Gene forged and heat treated knife blades in this forge.

I believe that most gas forges are too big and therefore expensive to operate.

Clay made his forge, a small one, out of a Freon bottle. He cut one end out and a hole in the other, and lined it with Kao-wool. He followed the drawings on the previous page. Clay made a pivot hinge on the front and attached a Kao-wool lined door.

A needle valve had to be put into the gas line to obtain a reduced gas flow and a finer gas adjustment. At a low pressure and with the door closed, the gas mixture will burn at the gas inlet behind the flame holder. This presents a problem, now the inlet pipe which is uninsulated is being heated.

I made my forge out of a 11 1/2" ID heavy wall pipe which was 14" long. I welded a short piece of pipe larger than the air inlet pipe to the large pipe. This way I can detach the burner from the forge. I also welded two pieces of angle iron to the large pipe for a base. I cast a 2500 degree refractory called Plicast Tuff Mix into the pipe using a 6" stove pipe as a center core. A piece of plywood with spacers nailed to it were used to position the stove-pipe and pipe body. The two pipes were stood on end and the Plicast was rammed in from the other end. Paper was stuffed in front of the burner to fill the void.

The refractory was left to cure for about a day and a half. Then the forge was heated by burning the gas without air for short dura-

tions during a day. The next day it was run full bore for four hours. I was able to weld a large Damascus billet in this home-made gas forge.

I used about 50 Lb of refractory at a cost of \$12 and 50 Lb of scrap metal @ 17 cents a pound. I had a used blower and the gas hose, regulator, fittings, cutoff valve and gage. You can build the same type gas forge for less than \$100.

Clay and I bought the refractory products from:

Frank W Schaefer, Inc, P O Box 1508, Dayton, Ohio 45401, 513/253-2306

The Products were: Plibrico DuraBlanket- 8 Lb, 1"x 24" @ \$3/sqft (Kao-Wool)

&
Plibrico Pli-cast Tuff-Mix @ \$24 per 100Lb

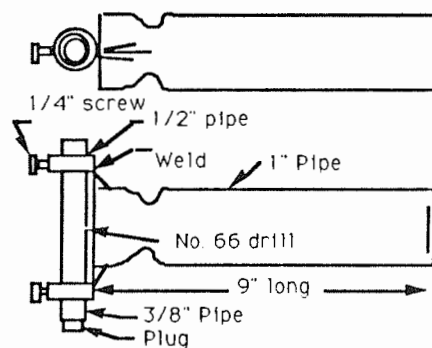
Look in the yellow pages under refractories or ceramics.

by Jim Batson

Reprinted from Bits Vol. 5, No. 5 Sep-Oct 89,

GAS FORGE BURNER UPDATE

In the Sept-Oct 1989, Bituminous Bits, Jim wrote of our experiments with gas forges that Jim had seen on the west coast and I had seen at the Western Regional Conference and that we both had seen at the(continued on page 2)



PROPANE GAS FORGES

Quad State Roundup.

Since then we have made different nozzles and burners and used in the two forges described in the referenced Bituminous Bits.

Jim was invited to demonstrate at a conference at Alpine, TX and saw a forge there used by farriers. It had two burners made out of 1" pipe, with a gas jet pointing down into a venturi fullered near the end of the pipe.

The 9 inch long pipe was fullered or necked down to a 3/4 inch ID about 1 1/4" from the end. A tiny hole was drilled in the side of a 4" length of 3/8" pipe. We used a No. 66 drill. The hole was pointed down the center of the nozzle and held there by clamp screws.

No blower is required. The end of the burner inside the furnace **must be tangential to the round inside** of the furnace and at the center of the length of the furnace for the most efficient operation. This gives a circular flow to the flame burning in the furnace and apparently makes it more efficient than square or rectangular cross section furnaces.

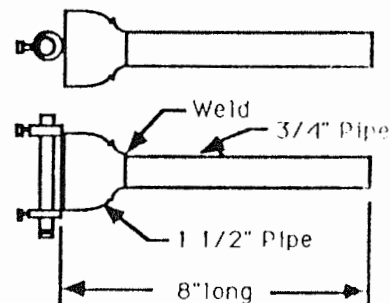
The ABANA plans for Recuperative Gas Fired Forge Furnace, by Robb Gunter, et al, from Sandia National Laboratories was the basis for the burner I have used in my Freon Bottle/Kao-wool furnace.

Neck down a piece of 1 1/2" Sch 40 black pipe to 3/4" inside diameter at 1 1/2" from the end with a spring fuller. Cut at center of the fuller and you have two pieces. Arc weld this to a piece of 3/4" Sch 40 black pipe 8" long.

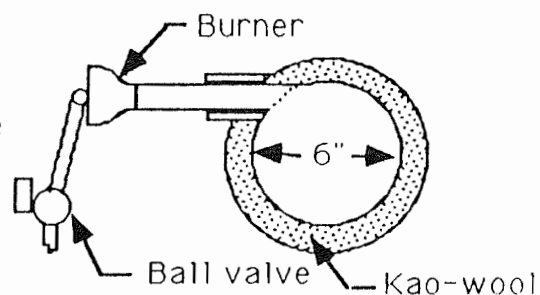
The jet in the 3/8" pipe should be aimed straight down the center of this burner and the jet pipe can be right at the end of the 1 1/2" pipe or back about 1/4" without any noticeable

change in performance.

In my furnace, which is about 1/2 the volume of the ABANA forge, one burner will operate from 5 to 15 psi pressure. The higher pressure is needed to forge weld, but it normally operates at 5 psi for most other forging with the jet drilled with the No. 66 drill.



This Kao-wool furnace heats up very fast since it



has low thermal lag and mass (this characteristic is similar to the ABANA forge). The insulation is not very durable and requires renewing the Kao-wool every 3 months unless you are careful to never snag the sides as you move work in and out of the furnace.

From our trials, it seems that the single burner, of either design, with the No. 66 drill jet is optimum for the 6" diameter by 11" long furnace. The castable refractory is slower to reach forging temperature, 15 minutes or more, but the refractory is very durable and much heavier and retains its heat when a large, cold work piece is put in the furnace.

Clay Spencer Reprinted from Bituminous Bits, Vol. 6, No.1, Jan-Feb 1990 See Kao-wool warning on page 21.

Thoughts While the Anvil Cools

By Bob Corneck

Odd thoughts pop into my mind now and again and I thought that some of them may be of interest to other blacksmiths. I've appreciated what I've read from others. Here are some in no particular order.

On Hardening: Does this caustic soda stuff work? While I was making that nifty little centering tool from Whitaker's book, I needed a small center pop to set into the 1/4" sq steel I was using. The only stuff I had at hand without pounding and grinding was some 1/8" diameter banding wire of low carbon. I cut a 1/2" piece, ground the point, heated the piece in my fluxing spoon to bright yellow and dropped it into about 1/2 pint of a saturated solution of caustic soda. I fished it out, bopped it into a scaly piece of steel. It left a mark and held its point. I really didn't believe the results, so I tried another piece, same size, quenched in water and it mushroomed first blow. I'm still using the centering tool, and it hasn't needed regrinding.

"Odd thoughts pop into my mind now and again"

Try it, but watch that caustic. It burns eyes and skin fast. (See the safer solution devised by Robb Gunter in another part of this issue.)

Just had stitches in my nose. Why? Because I got casual with my tools. In this case a wire wheel grabbed a piece of steel I was polishing. It would have been OK if I hadn't taken the guard off. Guard is back on, nose is doing fine. Look around your shop. Don't get complacent.

It would have been OK if I hadn't taken the guard off.

Scale and gas forges: My job takes me into many industrial forge shops to help with burner problems. A Buffalo drop forge shop was having scale problems, scale sticking, not only hard to clean off, but also leaving a poor surface quality. With

an oxygen analyzer, I found that the medium carbon steel was really sensitive, giving the best results between 0 and 1 percent oxygen. I was quite surprised that the oxygen needed to be so closely controlled, but had similar results from my own forge. It's not well known that scale will form in a reducing (gas rich) atmosphere. When it does it is usually hard tight scale which can fly when pounded. You are all probably aware that the soft scale is a result of an oxidizing flame. By watching your scale, as well as the flame color, you can set your air-to-fuel ratio well without an analyzer. A blue hard flame that is often noisy has an excess of air (oxygen), whereas a yellow flame, often lazy, is fuel rich. The best flame is blue at the center with touches of yellow at the edges. This is also the hottest flame possible.

Forge is cool-so long.

Bob Corneck

Re-printed from the Newsletter of the New York State Designer Blacksmiths, Jan. '92.

Forge Furnaces - Combustion Facts; Answers to Some Questions on Gas Forges

During the ABANA conference I found myself discussing some aspects of the new SANDIA furnace. Many questions were raised as to whether you can forge weld with a gas furnace and why is it necessary to preheat the air. In addition there were questions about fuels; can you use natural gas as well as propane? I prepared a fact sheet at the conference for a few of the attendees and the following is a more detailed explanation of that data, which comes from the Combustion Handbook, put out by North American Manufacturing Company.

Question 1: Can steel be forge welded in a gas furnace?

Answer: Yes. It was demonstrated with the Scandia furnace at the conference with Robb Gunter. Also, which may be of more interest, Mitch Fitzgibbon does it regularly with his propane furnace without air preheat. To forge weld you need that metal to be about 2500°. A rule of thumb is that the furnace gasses need to be 100-200 degrees hotter than the work, so 2700° gasses will be hot enough.

Question 2: How high a flame temperature can we get?

Answer: Flame temperature measurement is notoriously inaccurate so use the following values for comparison only.

Observed flame temperatures:
Cold Air-Natural Gas — 2895-3562°
1400° Air-Natural Gas — 3800-4100°

These figures show that even with cold air the flame can get hot enough to weld. Remember that temperature is only a distant relative of heat input. In other words, if the burner is big enough to overcome the furnace losses, the piece to be forged will approach the flame temperature.

Question 3: Why pre-heat the air?

Answer: Air is made up of 20% oxygen by volume, and 80% other gases, mainly nitrogen. Oxygen is needed for burning, but nitrogen is a free loader. But all the air must get to combustion temperature. This uses up some of the heat available in the fuel. Hence pre-heated air is more efficient. Fuel is saved when some of the heat otherwise lost to exhaust gases is taken back in addition to increasing the flame temperature. For a 2300° furnace, fuel savings can be calculated as follows:

60° Air	0% savings
800° Air	30% savings
1000° Air	36% savings
1200° Air	41% savings

Industry gets as much as 2100° preheat on a 2300° furnace, so you can see the savings possible. There are some pros and cons to preheat-

ing air, which will be left to another article.

Question 4: What is the Comparison between Natural Gas and Propane?

Answer: Calculated flame temperatures are as follows:

Cold Air	Natural Gas	3525°
Cold Air	Propane	3573°

Not much difference between the two. The main difference between the two gasses is that propane contains about 2.5 times the heat per cubic foot, which makes for a more compact system.

If you really want to get the temperature up, see what pure oxygen will do for flame temperatures.

Oxygen	Natural Gas	4790°
Oxygen	Propane	5130°

Clearly, welding temperatures can be attained with both gases, if we do not lose too much heat to the atmosphere. Hence, good insulation is needed.

Question 5: How about heat losses?

Answer: The two obvious losses, in addition to the heat lost up the flue, are heat loss through the insulation and losses due to heating air that is not used to supply oxygen to combustion. The problem is similar to keeping homes warm in the North. Since approximately half the heat goes up the flue, electric heat has some

merit. However, electric heat is radiant heat only, and lacks the heat transfer properties of gasses, which both conduct and radiate.

Insulation is a big area, which should be dealt with separately. The rammable refractory biscuit, used in the Scandia furnace, which is durable and can resist fluxes, is good. It does not drain too much heat to get it up to working temperature, which is a problem of most brick hearths.

Question 6: How about excess air?

Answer: If you use just enough cold air to burn all the fuel and have no extra oxygen left over, then 40% of the heat goes to heating the work. If, however, there is a 25% amount of excess air, then only 30% will go to heating the work; a loss of one-third of the heat.

There are many ways to ensure that air and fuel stay in ratio, but the one most commonly used by blacksmiths, and the simplest, is adjusting the flame by eye. A flame tinged with orange that licks out the furnace door, is slightly fuel rich, a good starting point. However, as extra air is added to the flame, the flame turns blue and often the sound from the burner increases.

Question 7: How about secondary air?

Answer: The other less obvious way to introduce too much air is to suck air into the furnace through cracks as well as through the door opening. This we combat with fur-

nace pressure control, or damping off the flue to increase the pressure in the furnace. You cannot suck cold air if you are blowing out hot exhaust gases.

Question 8: Why does the furnace suck in cold air?

Answer: Hot air and gasses rise because they are more buoyant than room temperature air. This makes the lowest point in the furnace where cold air is most likely to first leak in. This is exactly where the hearth is and of course our work. The consequence is chilled work, or even worse, work that is cooler on one side than the other.

One type of industrial forge furnace that does not use a separate flue, is the slot forge, in which the work is pushed in through an open slot and since there is no flue and hot gasses exit around the work. This keeps cold air out and has an added benefit, that the hot gasses blow past the work, which increases heat transfer.

Another common practice with

slot forges in industry is to spread a layer of "grog," crushed refractory, over the hearth. This saves the hearth from mechanical damage, allows gasses to get underneath the work, and keeps old scale from sticking to the work.

In summary, you should definitely think about trying a gas furnace, but remember the following safety tips:

1. Ventilate the room well. You cannot smell carbon-monoxide which is a killer.
2. Do not let unburned gasses accumulate in the furnace. If they do, purge the furnace before trying to relight it.
3. Always have your igniter burning before you turn on the gas.
4. Do not leave a burner unattended, not for one minute.
5. Remember, Propane is a heavier-than-air gas. It can accumulate in low spots such as basements and sump holes waiting for a spark from a switch or motor to ignite it.

**JACK BRUBAKER BLACKSMITHING
BUSINESS FOR SALE**

Due to our pending divorce we are offering for sale our successful blacksmithing business. Copy Righted candle holder designs, custom tooling, maketing contracts, everything from inventory of finished products and raw materials to complete forging equipment, welding, grinding, finishing, sandblasting, painting, and computer system. A 21 year collection of production tools and spares. A proven, profitable business (business appraisal available to serious buyers). Jack Brubaker, RR 2 Box 102A, Nashville, IN 47448 or call (812) 988-8826.



P.O. Box 1181, Nashville, Indiana 47448
Executive Secretary, Janelle Gilbert

Office Hours: 7:30-11:30am & 1:30-4:30pm
Phone: (812) 988-6919

PRESIDENT'S MESSAGE

March 1992

Dear Friends,

It's almost Spring, and just in time too! I've had it with this rain!!

Take a good look at the message from the overall Conference Chairman, Michael Bondi. He has some very important information concerning the upcoming conference in June. Mark your calendars for the event, and I hope to see you there. This should be a very impressive gathering, and you won't want to miss it.

I finally got an interpretation of the letter that I received from Russia, the latter part of January. With the change in government, it has put a major kink in their financial situation, but it hasn't hampered their enthusiasm one bit. They are a tight crew and send their best wishes to all of us, here in the states.

The Russian blacksmiths are hosting the third All-Union Blacksmithing School and Scientific-Practical Conference entitled "Ecology of Blacksmithing Culture" and the Twelfth Readings devoted to the scientific legacy and development of the ideas of Professor A. I. Zimin that will be held at the Museum of Blacksmithing Science and Technology on June 4-5, 1992, in Moscow. The school-conference and readings will examine and discuss basic problems in blacksmithing culture, science, technology, production, art, craft, and history. Topics covered will be: Philosophical problems,; new problems in the theory; research on forge press equipment; theory of plastic deformation; pressure working of materials; terminological problems, and so on. The Blacksmiths, Ecology, Culture, The Fatherland will be held June 6-7, on the grounds of the Museum of Blacksmithing Science and Technology.

If you would like to attend, please contact me ASAP and I will send you all of the information that I have. I will also send you a letter of introduction, and if you agree, a letter about ABANA to be read to their panel.

In any event, it is great that the Russian smiths are positive in their approach to the art of blacksmithing. They finish with the announcement of the All-Union Festival of Blacksmiths to be held August 15-16, same place, and they invite any Americans to participate in the various categories of competitive blacksmithing works.

Hoping to see you in June!

A handwritten signature in cursive script, reading "Dorothy Stiegler". The ink is dark and the signature is fluid and personal.

Dorothy Stiegler
President of ABANA

DES/jrg



ABANA Chapter Liaison Committee
March, 1992

ANVIL'S RING INDEX - the Anvil's Ring contents list put together by ABANA member David A. Court from New Hampshire is in the ABANA office, and is available at no charge to anyone who sends a 5.25 or 3.5 inch preformatted IBM compatible disk to the ABANA office. The list contains information from 1974 Volume #1 Number #2 through 1990 Volume #18 Number #1. Thanks David!

ABANA DEMONSTRATORS LIST - The ABANA Demonstrators and Schools List will be updated sometime around March and sent out to the Chapters. We are looking for both new demonstrators and demonstrators already in the list who may wish to change their information. You are the ones that make this list "tick", we do not solicit smiths to be included. Every single name on the demonstrators list was supplied by you. Do you know someone who should be on it? Please show the form found in this month's Chapter Mailing to the demonstrators in your area.

ARTIST INCUBATOR? - The new Allison's Wells School of Arts & Crafts in Canton, Mississippi will have an "Artist Incubator". This will be a place for new blacksmiths to work until they are well established enough to strike out on their own. It is highly commendable that Allison's Wells has thought to include such a facility in their plans. Hat's off to Allison's Wells, and the members of the Mississippi Forge Council who have been helping to get the program up and running.

UPDATE OF THE SUPPLY DIRECTORY - The Chapter Liaison Committee is again updating the Supply Directory. Here is another service that benefits everyone, where the names for the list are supplied by you! Anyone having information on suppliers, sources for material, or services that would be of interest to the blacksmithing community please forward them to Ron Porter, RR 1 Box 64, Bunker Hill, IN 46914.

FREE TO CHAPTERS - Don't forget that ABANA Chapters are now entitled to two free videos or slide sets per year from the extensive ABANA Library. What a great way to spend some free time during the cold winter months! The regular timetable for return is in effect. Take a look in the back of the Anvil's Ring for a list of titles, and don't forget the popcorn!

ABANA COMMITTEE NEWS - There is the familiar Chapter Liaison Committee, now chaired by Ron Porter. Ron will be responsible for Chapter Resources like the Demonstrators List and Guidelines, Liaison Communications, Support for Chapter Leads, Solicitation and Fund Raising, providing support for regional events, Presentation Materials support, Insurance/Non Profit Status/By-Laws, and Development of new chapters. I will stay on his committee and continue my work for the Chapters.

A new committee, the Member Services committee, is chaired by new Board member Jim Ryan. This committee is responsible for increasing awareness for individual ABANA member benefits, i.e., classifieds, library, tee shirts, scholarships, many of which are really covered under other committees, but not widely known. Jim's committee will also be responsible for Resource Information Development, and spearheading the new Blacksmith Ad Catalogue. Exciting Stuff!

THAT'S WHY THEY CALL HIM CAPT STUMP - A member of the Florida Artist Blacksmith Assoc found an article in a local paper about the makers of Capt. Hook's hook. The Calif. smiths, Alex Collins and Tony Swatton, made several hooks and bases used in the movie, as well as the "attachments" used to replace the hook -- a magnifying glass, claw, hammer, fork, spoon, corkscrew, comb and mirror. They also make Tinkerbell's daggers and scabbards, and the dagger that was stuck through the ransom note at the beginning of the movie. Incredibly, the two smith's names did NOT appear in the closing credits! How rude!

METAL COLORING BOOK - California Blacksmiths Assoc President Richard Schrader told me of a fellow who intends to write a book on coloring metals, and is interested in hearing from anyone who has a recipe or other information on the information, why not drop him a line? Contact Ron Young, 625 W. 10th Ave, Escondido, CA 92025.

THANKS - To all the chapters that have sent their newsletters our way. Clayton Carr, Chapter Liaison Committee, Rt. 2 Box 2911, Kennewick, WA 99337.

ABANA CONFERENCE

ABANA CONFERENCE REGISTRATION FORM

Name _____
 Address _____
 City _____ State/Zip _____
 Day Phone (____) _____ Eve Phone (____) _____
 Names of spouse, guests, or children attending:

	<i>No. of</i>	<i>Rec'd</i>	<i>Rec'd</i>	
	<i>Attendees by 6/1</i>	<i>after 6/1</i>		
Members	_____	\$175 or \$200	\$ _____	
Non-members	_____	\$210 or \$235	\$ _____	
Spouse/Guest	_____	\$ 50 or \$ 60	\$ _____	
Children 6-16	_____	\$ 20 or \$ 20	\$ _____	

FOOD SERVICE* *vegetarian meals*

All meals	_____	\$107 or \$117	\$ _____
Lunches/Dinners only	_____	\$ 77 or \$ 87	\$ _____
Extra BBQ	_____	\$ 20 or \$ 25	\$ _____
Children 3-8 yr	_____	\$ 71 or \$ 81	\$ _____
Children BBQ	_____	\$ 10 or \$ 20	\$ _____

HOUSING*

Single	_____	\$100 or \$110	\$ _____
Double	_____	\$ 68 or \$ 78	\$ _____

Please explain any special or additional housing needs:

Roommate Preference _____

CAMPING* *self-contained vehicles only*

No. of persons _____	\$ 5 or \$ 8 (per night)	\$ _____
----------------------	--------------------------	----------

HEARST CASTLE TOUR

No. of persons _____	\$ 25	\$ _____
TOTAL ENCLOSED		\$ _____

PAYMENT*
 All checks should be made payable to
 CAL POLY FOUNDATION.
 Mail to:
 Housing and Conference Services
 ABANA Conference
 Cal Poly State University
 San Luis Obispo, CA 93407

If using VISA or MasterCard, please complete the following:
 Card# _____ Exp. Date _____
 Drivers License # _____
 State _____ Expires _____
 Signature _____

* See notes opposite

REGISTRATION NOTES

Question regarding registration, meals, accommodations and conference services can be answered at (805) 756-1586. Or check the Special Information Request box below.

FOOD SERVICES

All meals means Wednesday dinner through Sunday breakfast, barbecue included.

Basic meals means lunches and dinners only, starting with dinner on Wednesday and ending with dinner on Saturday. You are strongly urged to purchase a meal plan when registering for the conference, since the nearest restaurants which will be open are located off-campus. There will be a vegetarian selection available (please).

HOUSING

Those registering for on-campus accommodations will be housed in modern dormitories (two single beds, etc. per room) with community bathrooms. Separate bath facilities are provided for men and women. All linens will be furnished. Children under eight stay free in parents room if they provide their own sleeping bags. For roommate preference, please specify on the form.

For those who prefer off-campus lodgings, a list of nearby lodgings, a list of nearby accommodation, in a variety of price ranges, is available. Check box below.

CAMPING

On campus, tenting is not allowed. Self-contained vehicles must be used. For information on the area's other campsites, check the Special Information Request below.

LAUNDRY

Laundry facilities are available both on campus and in the town.

MESSAGE BOARD

During the conference there will be a daily message board available.

PAYMENT

To CAL POLY FOUNDATION. Use separate checks for souvenirs, and note deadlines to avoid late charges. Returned checks are subject to a \$10 charge.

REFUNDS

All requests for refunds must be in writing. Refund requests received after June 10 will be subject to a \$20 administrative fee. No refunds for no-shows or early departures.

SPECIAL INFORMATION REQUEST

Campgrounds Motels Shuttle service

Membership Application

Mail to:

Northwest Blacksmith's Association
C/O Tom Graham, Treasurer
PO Box 81041, Seattle, WA 98108

Membership Application: New Renewal New Address?

Annual dues are \$20 and include a subscription to Hot Iron News. Please make your check to NWBA and mail to the above address.

Date: _____ Are you a member of A.B.A.N.A.? _____

Name: _____

Firm: _____ Phone: _____

Address: _____

City: _____ State: _____ Zip: _____



Membership Application for:

ARTIST-BLACKSMITH' ASSOCIATION OF NORTH AMERICA
MAIL TO:
ABANA
BOX 1181
Nashville, IN 47448

Membership in ABANA includes a subscription to the Anvil's Ring, member discounts at conferences and on back issues of the magazines.

Full time student -	\$ 25	Regular member -	\$ 35
Family membership -	\$ 40	Seniors over 65 -	\$ 25
Overseas member -	\$ 45	Contributory -	\$100
Public library -	\$ 25		

Name: _____

Street Address: _____

City: _____ State: _____ Zip: _____

FRANCIS WHITAKER BLACKSMITH EDUCATIONAL FOUNDATION

The Francis Whitaker Blacksmith Educational Foundation was conceived in 1988 by Master Blacksmith Francis Whitaker as a way to insure the future advancement of blacksmithing, particularly artistic ironworking.

Sales of The Blacksmith's Cookbook provides most of the funding for the Foundation. Written by Francis Whitaker in 1987, all proceeds beyond printing and distribution cost have been donated by the author to be invested into a Mutual Fund from which only the yearly appreciation of the assets can be used for scholarships and project funding. Thus the Foundation is a perpetual testament to Mr. Whitaker's selfless dedication to the Art of Blacksmithing.

Recognized as a public foundation by the I.R.S., The Francis Whitaker Blacksmith Educational Foundation is eligible for charitable donations from friends of the foundation. These donations are tax deductible and will be acknowledged by letter from the foundation. All donations will be invested directly into the mutual fund to draw interest for foundation grants and scholarships.

Two areas of special interest to the blacksmith community are addressed by the Foundation; the funding of master classes and workshops and the documentation of exhibits of works by blacksmiths.

Individuals seeking monetary help in attending advanced courses, workshops, and seminars held at recognized centers for such events is provided for by direct financial aid to the student. The student is required only to submit a report of his/her endeavors and achievements in the course after completion. This fund is not intended to support novice or beginning students or workshops.

Schools, organizations, and workshops seeking funding to help hold and promote advanced level classes and projects in blacksmithing can apply to the Foundation for assistance. These funds, whenever possible, should be regarded as seed monies to be donated back to the Foundation at the successful completion of the event.

The documentation of gallery exhibits and shows of blacksmith works at conferences and other gatherings of blacksmiths is the second goal of the Foundation. These funds are intended to facilitate the production of high quality photographs, videotapes, drawings, and written descriptions of such exhibits and their subsequent publication. The materials should be gathered with the intention of publication in appropriate form for distribution to blacksmiths and the general public either for profit or not. The Foundation must be acknowledged in any resulting publication, and be allowed to own and distribute the product for the profit of the Foundation.

The Foundation seeks to advance American blacksmiths and to promote American blacksmithing and therefore does not fund travel or events outside the United States and is only available to U.S. citizens. This restriction does not apply to foreign demonstrators teaching in America.

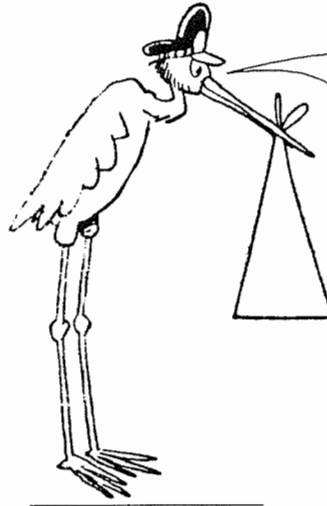
For more information or applications, please contact:

The Francis Whitaker Blacksmith Education Foundation
c/o The Colorado Rocky Mountain School
1493 County Road 106
Carbondale, Colorado 81623

NEW ARRIVALS

Shown below is **Joe Elliott** with his newest addition "*Forby*", Father and baby both doing well, but, father seems to have a nazel condition. Baby is a nazel condition!

As baby weighed about 16,000 lbs. delivery was by tractor-trailer. "Can I keep him, Mom? Please, huh, huh, can I? He won't be any trouble, and I'll take care of him myself"

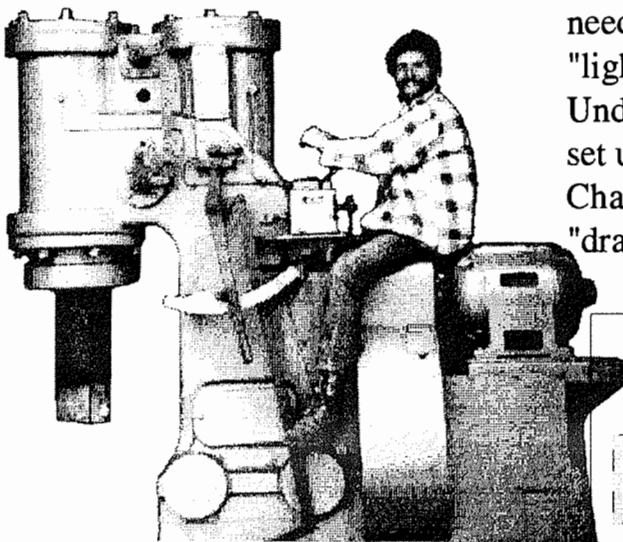


GOT A BABY YOU'RE PROUD OF? Send us a picture and a few notes.

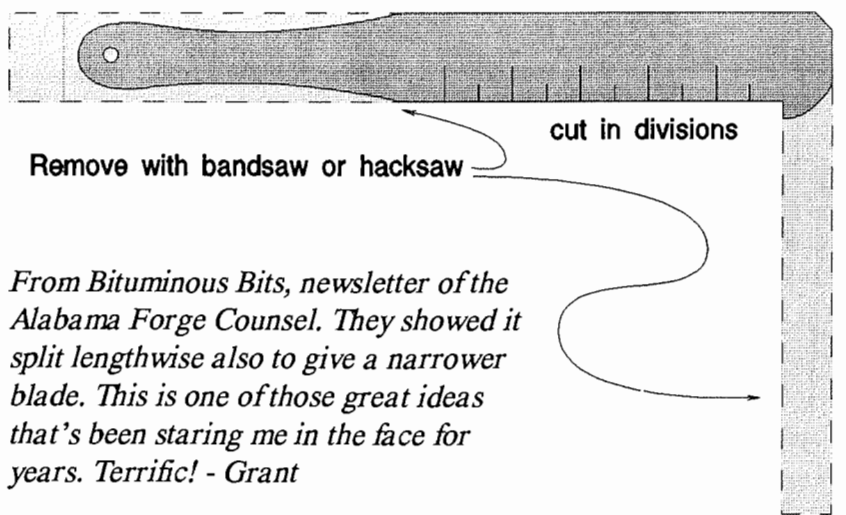
Understand **Grant Sarver** finally has his 700# Bell steam hammer running. Just what he needs, right? Allright for "light work" I guess. Understand he's going to set up his 300# Chambersburg for a "drawing" hammer.

Congratulations **Berkley Tack!** Another new baby? Does'nt that make two this year? A sweet little Beaudry will make a great addition to your operation.

Berkley also has information on an 800# Beament steam hammer, if anyone out there is interested.



HOOK RULE made from old steel square



Jeff Holtby is proud to announce a new addition to his family - Threeby joins Beaudry at the Holtby houshold.

From Bituminous Bits, newsletter of the Alabama Forge Counsel. They showed it split lengthwise also to give a narrower blade. This is one of those great ideas that's been staring me in the face for years. Terrific! - Grant

YE OLD CLASSIFIEDS

FOR SALE: 2) 50# LITTLE GIANT Trip Hammers, \$500, \$750. Anvils, Vises. Call Joe Elliott for information. (503) 548-2564(Shop)

FOR SALE: 3) Leg Vises, \$65.00 to \$85.00. 1) 12" Swage block, \$125.00. 1) Cone Mandrel, \$125.00. Contact Roy Whisenant, 1752 Rounds Avenue, Grants Pass, OR 97527.

JACK BRUBAKER BLACKSMITHING BUSINESS FOR SALE - Due to our pending divorce we are offering for sale our successful blacksmithing business. Copy Righted candle holder designs, custom tooling, marketing contacts, everything from inventory of finished products and raw materials to complete forging equipment, welding, grinding, finishing, sandblasting, painting, and computer system. A 21 year collection of production tools and spares. A proven, profitable, business (business appraisal available to serious buyers). Jack Brubaker, RR 2 Box 102A, Nashville, IN 47448 or call (812) 988-8826.

WANTED TO BUY: Sheet metal drop hammer (English Wheel) for body work. Contact Eric Hayes, 23294 SE 53rd Street, Issaquah, WA, 98027. Phone (206) 972-8978.

PERSONAL -- K. W. in P.T. Plse mt me at flf conf. We stll lv u and the kds mss u. Plse sy all is fgvn. Lv & kss nwba P.S. Plse bmg bk the vwls y tk.

STERLING SILVER PINS. Limited quantities, NWBA Commemorative Pins, \$17.00 each. Contact Tom Graham, P.O. Box 81041, Seattle, WA 98108.

FOR SALE: 12" dia., 3" outlet, cast iron Buffalo Forge Blower with variable speed motor. Includes 6" dia. rheostat with control lever, \$100. 2 1/2' sq Champion #401 Forge, heavy duty cast iron firebox & cinder shaker, all-enclosed with sheet metal hood, \$100.00. 2) 7" leg vises, very good shape. Will trade for 4 1/2"-5" leg vise of same condition as partial payment. Misc. hammers. Contact John Fogelberg, Enumclaw, (206) 825-5285.

FOR SALE: 150# Howe, flat belt drive. Call Jim Hatmaker, (206) 843-1615.

VULCAN 100 lb. anvil for sale. Very clean surfaces. Plate 12" x 3" plus 3" horn. \$100.00. Janet Wartinger, (206) 523-9774.

A LIMITED AMOUNT of New Mexico smithing coal available. \$280.00 per ton. \$16.00 per 100 lbs. Contact Corkey Storer at Heritage Forge, (206) 432-1468 Seattle area.

WANTED TO RENT - Part-time smith seeks space for shop. 400 sq. ft minimum, between Seattle and South Everett. Call or

write: Rob Snyder, 4809 NE 71st Street, Seattle, WA 98115. (206) 523-7209.

INBA ANVIL for sale. Never used. 197 lb. \$400.00. Ed LaCasse (206) 531-1516. 2812 E. 64th Street, Tacoma, WA. 98404-5217.

Have you hugged your anvil today? GC

Corrections

My proofreading could stand improvement. The article about Sam's Hammer gave an incorrect date in the beginning. It should have been 1890. Sorry about that. I guess I've seen the 1990's written so many times that it looked natural, not sinking into my brain the time frame of 100 years ago. The contributor was "Grandpa" Hersom.

LITTLE TREE DESIGNS
115 E. Mendocino Ave. Willits, CA 95490
(800) 227-1934

Now available!

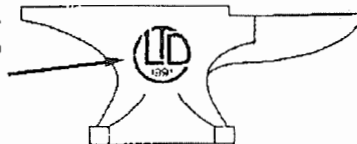
- Tools & tooling for blacksmiths
- Treadle hammer & belt sander kits
 - Hardy tools • Vise tools
 - Custom leather aprons

Send for
free catalog

Coming soon—

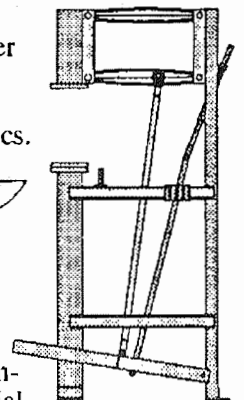
196# anvils produced in the U.S.A. under licensing agreement with I.N.B.A. Little Tree Designs will begin production of anvils based on I.N.B.A. pattern and specs.

Your chapter
name or logo
can be here

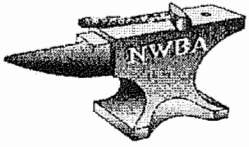


Treadle Hammer Kit

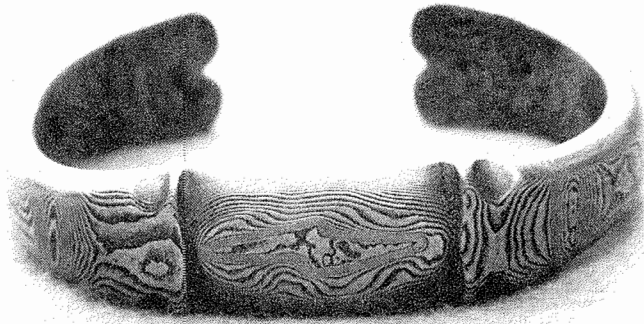
Kit includes all material required for completion (except lead for head). All material is cut and mitered. Hole locations have been center punched. Assembles in 7 to 10 hours. Easy to follow assembly instructions included. Treadle Hammer designed by Jere Kirkpatrick of Valley Forge & Welding. Kit \$475.00



Call or write for more information.



Hot Iron News



**Check your
EXPIRATION!**

Photo by Cal Schultz

JEFF HOLTBY

*Pure nickle/mild steel
Damascus bracelet*

HOT IRON NEWS
MARGARET BYERS, EDITOR
2311 ROSS WAY
TACOMA, WA 98421

ADDRESS CORRECTION REQUESTED