New Jersey Blacksmiths Association
"EAGLE"

N.J.B.A. Newsletter

NJBA Volume 8, Issue 4 **02/01/04**

Editors Soapbox

Brrr, we're in another cold one. A mild Winter would be a nice change as it would give me a chance to do what I was trying to do last Fall and didn't find the time to. In February we have a treat, Rob Hudson will demonstrate Knife making at Dan Cruzan's shop in Southern , NJ. I am sure this will be a very informative meet. This is followed by anvil repair and gas forge workshops. So come out learn something new.

I would like to thank all who submitted reports and scrap corner items. Get involved and I hope to see you soon
L Brown

Upcoming events for 2004

Get you calendars out and mark these events down. For those on the web bookmark our web site and check for meet information. Remember most of our meets have an "Iron in the Hat" drawing, so be sure to bring something.

February 8, 9:00 — A meet at Dan Cruzan's shop featuring Rob Hudson as the demonstrator. *Blizzard date is the following Sunday Feb. 15*

March 6-7, 9:00 — 2004 Anvil repair workshop at Marshall's shop in Howell, NJ. Details on page 3.

March 26– 28, Furnace Town Joint Meet in Snow Hill, MD. Details on page 3.

April 3rd, 9:00 — Gas forge workshop at Marshall's shop in Howell, NJ. Details on page 3.

February Meet at Dan Cruzan's Shop

This Februarys meet will be on **Sunday, February 8th** at 9 am with a snow/blizzard date of **Sunday, February 15**. The featured demonstrator will be Rob Hudson. Rob is an ABS Master Bladesmith. Rob is planning to demonstrate making a knife from start to finish, I am sure it will be exciting and informative to watch him at work.

If you bring young children with you to the meet NJBA and the host ask that they be supervised at all times. John Chobrda is the contact for this event, see directors list page 2.

Directions to Dan Cruzan's shop:

Dans forge is near Bridgeton (Cumberland Co. NJ). Southbound on NJ turnpike get off at exit 2. Take Rt. 322 east to Mulllica hill. Take Rte. 77 south about six miles to Deerfield, which is at the intersection of Rts. 77 and 540. from Deerfield proceed west on route 540. Go past the 20 mile marker and at the next intersection turn left onto Harmony Rd. Go to the stop sign turn left onto Walters Rd. Go 200 yards turn right onto Harmony Rd. Dans is the first farm on the right. There is a sign that says Dan Cruzan's-Nursery (146 Harmony Rd.. Bridgeton. NJ. 08302. 609-451-0904).

If coming into NJ across Delaware Memorial Bridge take Rt. 49 east. (pick up 49 at the foot of the bridge). Go past the 19 mile marker on Rte. 49, turn left onto Jericho road. At the next slop sign go straight across onto Moore's Corner Road. At the next stop sign turn left onto Harmony Road. Dan's is the first farm on the left.

NEW!!!
Official NJBA Address

NJBA
P.O. Box 761
Mt. Laurel NJ 08054

The old address was:
NJBA, P.O. Box 195
Howell, NJ 07731
This will still be active for a while but please note the change and start using the new address.

The NJBA Web Site!

The NJBA Web Site is up and running at:
`http://njba.abana-chapter.com/`
The Newsletter is at:
http://members.bellatlantic.net/~vze25jcc/index.htm
or the site may be linked to from the NJBA web site.

Rather than use room in the newsletter, All correspondence between ABANA and NJBA is now being posted on the NJBA web site. If you cannot access it there, contact me and I will send you copies

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March Anvil Repair Workshop

On March 6 and 7 will be holding an anvil repair workshop. This is an anvil repair workshop as opposed to an anvil restoration workshop. Repair of an anvil includes hard face of edges, minor cracks, pits and dings with a flat grind for $75. Estimates for other repairs requiring multiple welding passes such as a full resurface, broken or rework of horns may be obtained by bringing the anvil by Marshall's for an estimate. If you are interested please let us know by February 25th, so we can get a head count of the anvils and prepare to have enough materials and personnel.

The contact person for this event is;

Nate Pettengill, 856-764-5639
nate.pettengill@lmco.com

This event will be held at Marshall's Farm.
Directions:

Marshalls Farm is at 663 Casino Drive, Howell (Monmouth Co.). NJ. which is about 1/4 mile east of Route 9. Casino Dr. is a few miles north of 1-195. and a few miles south of Rte. 33. Either of these routes can be easily reached from the major north-south highways. including the Garden State Parkway. the NJ Turnpike. 1-195. Rt. 18 or Rt. 34. Marshall can be reached at his shop at (732) 780-0871.

Furnace Town Meet

Furnace Town Living Heritage Museum. Snow Hill, MD 26, 27, & 28 March 2004, at the Gichner Memorial Forge

Marine Hardware with Walter Scadden

Walter was the primary blacksmith during the three-year construction of the of the replica of the historic schooner Amistad at Mystic Seaport. He has done extensive research on many types of marine hardware and their use in ships of the past.

Born to Irish immigrant parents in Hartford, Walter was a early product of the Art Development Program for Youth at the city's Wadsworth Athenaeum, where he trained as a stone cutter. After serving in the Marines as a welder he returned home with an interest in early American ironwork. He opened a blacksmith shop in Manchester and worked as a city firefighter.

Walter developed his own style while studying with masters Francis Whitaker, Manfred Bredhol, and Ivan Bailey. He participated in certificate programs in Architectural Technology at Hartford State Tech and Architectural Design at Rhode Island School of Design. After winning the US Steel Design Competition in 1985 and exhibiting at the Smithsonian in Washington, D.C., his base of clients grew to enable him to concentrate on ironwork full time. Walter studied at the John C. Campbell Folk School, and later taught there for 8 years. He demonstrated at the second World Architectural Ironwork Congress in Aachen, Germany and the ABANA conferences in Birmingham, Alabama and St. Louis, Missouri.

Walter worked on the restoration of several Samuel Yellin pieces at Yale University, as well as the restoration of the Guggenhiem Museum carousel at Sand Point, NY. Presently, Walter teaches at the Rhode Island School of Design and is working on several research and design projects.

To register for the workshop, please call Mark to reserve a place: limited to 12. Send registration for the Joint Meeting and Workshop with Name, address, Phone #, E-mail, which dates and events and payment to:
Mark Williams,
114 West Federal Street, Snow Hill, MD 21863, (H)410-632-0914, <williamsiron@comcast.net> Make checks out to: Furnace Town Blacksmiths Guild

Saturday demonstration after 1st March/	$25.00
Saturday demonstration/	$20.00
Saturday dinner/	$17.00
Sunday workshop /	$25.00

End of March Gas Forge Workshop

We are arranging the gas forge workshop for April 3rd. We will be making twenty forges. Sign up for this workshop is first to call, first on the list. The list stops at twenty. Some pre fabrication is needed and assembly will be on the day of the workshop. The design and price are still being finalized the exact price has not been set. We are trying to provide new regulators, valves and hose with the forges for safety and this may drive the price up a little. The price should be about $160 and we hope to hold it close to this. If possible the cost will be less. Jeff Morelli is the contact for this. Call him to sign up, remember if you want one call to reserve a spot as this might fill up quickly.

Jeff Morelli, 234 Rahilly Road,
Wrightstown, NJ 08562
609-723-5990, 732-494-9061x1162

This event will be held at Marshall's Farm.
Directions under Anvil Repair on this page.

Cold Spring Village Meet

The weekend of June 19th and 20th is entitled "Men and Machines" and we would like to invite you or a member of your organization to join us for the event. Small engine demonstrations, antique tools and visiting blacksmiths will be part of our program. It is demonstrators who share their skills with our visitors who help to teach the importance of machinery through the ages and make this an interesting weekend. We look forward to having members of the *New Jersey Blacksmiths Association* once again being an integral part of this successful event.

Yours truly,
Karen Hollywood
Special Events Coordinator, Historic Cold Spring Village

She is asking that all who plan to attend fill out the Registration form in the next newsletter. Our members do not have to pay registration but Karen is looking to improve their contact information and records.

Help out Blacksmithing!

Peters Valley

Peters Valley is looking for donations to help out their shop and program. Contact Meagan Crowley at Peters Valley or Bruce Ringier (directors list) about their needs or where to send funds.

The Garris Center Blacksmith Shop

The Garris Center Blacksmith Shop is being restored to working condition as a living museum. Once completed, the blacksmith shop will be open to the public with live demonstrations by local and invited blacksmith artists. Your donation will be instrumental in the restoration of this important part of Branchville, NJ, history. Please send tax deductible donation to CBRF Blacksmith Ship, P.O. Box 447, Branchville, NJ 07826. For donation of tools or to volunteer your services, please contact Bob Leach at 973.948.2897.

Meet Double Aught Iron (00Fe) sent in by Bruce Freeman

Roger Duncan (410.357.4444; dunkybones@verizon.net) is selling 00Fe at events in our area. He was at the Red-Mill tool swap last September, and at Gichner's Hammer-In in January. I bought $50 worth of this iron (at roughly $1.85 per lb.) to start with, albeit without a specific need in mind, and I encourage everybody to do likewise to support Roger's endeavor and to ensure a continuing supply of this material . Although expensive when compared to steel, it is worth the expense for projects involving considerable forging.

Here is some of what Roger has to say about this new iron product: "About four years ago, Art & Metal in Hanson, MA, began importing 'Pure Iron' from France. This was a very pure form of iron, and very expensive to produce. While it was well received and was developing and expanding market, the initial cost plus shipping, etc., did not make it a marketing success. Importation stopped about two years ago…. "Trying to compete and possibly improve on 'Pure Iron,' I started, several years ago, to seek a source, domestically, for a good forging iron. Late last year I found a source for iron with less than one point of carbon and only eight points of manganese…. It is almost identical to Pure Iron in chemistry, except that it is slightly higher in some of the trace elements which will add to its strength and toughness, but not of a sufficient amount to reduce or limit its superior forging characteristics, i.e., metal movement, welding, etc.

"Advantages of 00Fe: …broadest forging range of any ferrous metal, from white heat down to black and then a little more. No silicate to cause cracking. Uniformity of material gives no significant variation within heats, or from heat to heat. Material response rapidly to what direction your hammer gives it…. This improves productivity and profitability for the professional smith. For the student, it is a perfect medium for learning hammer control and technique…. 00Fe is the only material that is suitable for ornate detail or sculpting.

Comparison of Chemistries

	C	Mn	P	S	Cu	N	Sn	Al	Cr	Mo	Si	slag
00Fe	.003	.08	.01	.008	.02	.004	.002	.025	.04	.004	.009	-
Pure Iron	.007	.06	.004	.004	.009	.003	.02	.02	.02	.002	.01	-
Wrought Iron	.02	-	.12	.02	-	-	-	-	-	-	.12	2.50
A-36	.26	.80	.04	.05	-	-	.01	-	-	-	-	-

Report on Tom Ryan's Meet At Koenig Iron L.I.C.

Report on the November 9th meeting at Koenig Iron Works in Long Island City, by **Bruce Freeman**

The meeting got underway at about 9:30 or 10:00. attendance was large, drawing from Long Island, other areas of New York State, and northern and central New Jersey. About thirty people attended, including a considerable number of professional smiths. Bill Gichner and a friend came the furthest, having left Maryland at 5 AM to attend.

Tom Ryan runs the architectural ironworks at Koenig Iron works, a very impressive workspace with equipment including a 100-ton hydraulic press, a Chambersburg self-contained air hammer, coal and natural gas forges, and crucible furnaces. Tom gave an introduction to the sort of work they produce. In the background was an impressive set of railings, including railings for a circular staircase.

Tom then gave a demonstration of blacksmithing, including forge welding and other operations and producing an elegant element that could be incorporated into architectural ironworking, a piece of furniture, or smaller projects.

From there he moved on to the making of a spring swage. He uses only mild steel for these swages. The pair of blocks were roughly 1.5" thick and 5" square, and were welded to a "spring" of half-inch round that was folded and rounded for the spring action. Having heated this to red, he inserted a master form of steel into this blank and hammered the blocks together under the air hammer, finishing off under the press. He then case-hardened the surfaces using the commercial material "Kasenit", quenching it quickly in cold water to harden the surfaces. Using a different such swage, he demonstrated its use to for putting an ornament on the center of a baluster, picket, or other element.

Tom also demonstrated pouring (casting) of aluminum, using molds that had been prepared ahead of time. He described how the master pattern had been made. When he broke open the flask, a nearly perfect reproduction of the original was revealed. He described the use of such elements in architectural metalwork, as a cost-effective method of reproducing existing hardware.

The demonstrations were excellent. Any of the three parts of the demonstration could have easily filled an entire meeting.

The demonstrations were well planned and executed. Tom was a gracious host and he put a lot of effort into making it a successful meet. Many thanks to him for opening a commercial shop up to the NJBA and giving our members a feel for the scale work that is done there. We spent a lot on food and coffee that day but with the generous donations in the iron in the hat we covered the expenses for the day—L.B. Editor

December Holiday Party

The Holiday Party was again hosted by Jan and Marshall. This year, the attendance was up, with a number of regulars from the Monday evening open forge meeting joining in the festivities. More wives and significant others than usual were in attendance - a positive note. The weather was decent locally, but in the north there was snow, so we would have had at least one more (our editor) had the weather been better. Food and libations were excellent and plentiful. Blacksmithing videos were running on the upstairs VCR. I move we make this a monthly event. Bruce Freeman

The Yellin Show at The Rosenbach Museum & Library

The Rosenbach Museum & Library (www.rosenbach.org) has a show of "Yellin's Fantastical Ironwork Creations" from now to 29th of February 2004. They are located at; 2008 Delancey Place, Philadelphia, PA, 215 732-1600.

I was there on 1/23 and I must say I enjoyed the show there is one room of Yellin work and a set of gates if you take the house tour. Some of the items in the room say "Do not touch" but, many say "Please touch me". Some of the items are from his office such as the door his hat rack and fireplace screen. I had seen pictures of these but seeing them in person and up close made it worth the trip as did many of the other pieces.
L Brown– Editor

Scrap Corner

These are from the Forge List:

Replacing Babbit Bearings

The Question:

From: John Newman

I bought a 12" woodworking jointer the other day and I think I am going to have to re-pour the bearings in it. I had a few questions for those of you that have done it. What is the best way to get the old babbit out? melting with a torch, or chipping? I am going to get a mandrel turned to pour around, should I have collars machined in to act as a dam? And lastly what type of babbit would be good for this the local supplier has about 20 grades of babbit.

John

The Answer:

Dear John. The torch is the fast way to get the lead out (so to speak) if you can do it safely, watch for popping and splattering when hot babbit meets trapped oil, you may have to chip some too. If some is stuck in the bottom, don't worry too much. If there are anchor holes, drill them out, so the new babbit will get in there.

The rule of thumb for babbit is: for heavy load, slow rpm use harder (less lead) babbit, for lighter loads, high rpm use softer babbit (more lead). Jointers and planers would fall into the medium to high rpm category. Hard babbit is for steam engines, big slow pumps, hit and miss engines, etc., and the like.

Even if you machine collars, you will still need damming material for a proper seal. Nothing more irritating than to have everything all set up and then watch all your fresh babbit dribble into the dirt. Use whatever you can rig up to hold the damming material in place, the clay stuff will melt and fall right off if you don't back it up, trust me on this. Don't try to fill a gap more than 1/8" with the clay, use leather or rope or wood or something, and use the clay as a final seal.

In some applications with a lot of vibration, or if there is no good way to anchor the pour, I will clean and degrease the box thoroughly, and TIN the interior of the casting with paste soldering flux, solder, and a torch. Once the interior is tinned, you KNOW the babbit will stick when you pour it in.

Also, do not overheat the babbit. When a pine stick inserted into the ladle starts to char, it is hot enough. heat as quickly as you can because the molten babbit oxidizes quickly in air, and a skin forms. If you get a crust floating on top you are probably too hot and waiting too long. Skim quickly, and pour fast. The molten babbit should look clean and shiny, just like mercury. Always melt more than you think you need, so you don't come up short, or you have to start over. Much easier to file off a little extra than to start at page 1again. Wear long sleeves.

It helps a lot if you warm up the mandrel and bearing box a little, while the babbit is melting, otherwise they will chill the babbit so fast it won't make it into everywhere it needs to go. Heat at least until the dew is gone. If you overheat the mandrel, the babbit will take forever to set up, and you may melt out the damming stuff. I suppose that this might be obvious, but I must remind you that the machine needs to be sitting dead level when you pour the babbit, um, for obvious reasons.

If the bearing is two pieces, pour the bottom first, then file it level with the box. Round the edges of the fresh bearing a little at the "seam". If you cut oil grooves, stop short of the ends of the babbit. I personally think babbit bearings run longer without the grooves, but that is another story.

Add a 1/16 or more shim on both sides before pouring the top half, so you have room to scrape if necessary, and so you will be able to take up for wear later just by thinning the shims and scraping a little, rather than repouring.

Check the fit with bluing, and scrape if necessary before pouring the top half. It is nightmarish to try to scrape the top and bottom simultaneously. If the shaft has two or more bearings, pour and scrape all the bottoms first until the shaft is perfectly fitted, then pour and fit the tops.

If you soot up the mandrel with acetylene before installing, it helps keep the babbit from sticking. A microthing coat (just a smear) of high-temp neverseez can work too. Never use grease of any kind. On large dia. bearings, I have used a thin sheet of paper, rolled around the shaft and pasted. The paper chars away, and leaves a little clearance to get the shaft back out. You won't need this.

If the bearing is one piece, or vertical, all the above still applies, you just dam, preheat and pour. Wait until the mandrel and babbit are COOL and spray some penetrating solvent into the ends, and gently twist the mandrel to get it out. The mandrel will often stay hot longer than the pour, and be good-n-stuck if you try to wrench it loose before it cools. Completely. Cold.

Hope this is helpful. There are lots of ways that will work, these are just suggestions.

Tom Troszak , Reprinted with permission

Safety For Blown Gas Forges

From: Keporter@aol.com
Subject: Re: [TheForge] Gas forge safety?

Date: Tue, 2 Dec 2003 18:22:55 EST
Fan blown gas safety:

(1) Write to the manufacturer, or go online, to obtain their own instruction manual. If there is a flame-guard safety system installed, check to see that it is working.

(2) With the system pressurized, employ first your sense of smell, and then soapy water, to check the whole incoming gas system for leaks before operating.

(3) Always turn the blower fan on before opening the gas cock.

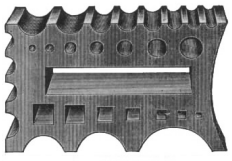
(4) Use a good ignition source (i.e., plumbing torch) to supply continuous flame until the furnace is lit; keep your hand and arm along with anything else combustible, out of the exhaust path.

(5) Never leave the area while the equipment is running. Never leave the area until a proper shutdown and complete cooling has been accomplished. Use a drop of water--not your hand--to establish temperatures. Never let your attention wander completely from the furnace while it is running--especially while you are familiarizing yourself with the equipment.

(6) Consider what you would wish you had available in case of an accident and make sure it is on hand right now. The local fire department will give you good advice here.

(7) Proper shutdown begins with the gas valve closest to the supply source, and then each valve downstream from it (regulators, needle valves, final valve) in that order, so that positive pressure is eliminated, while a pure fuel gas atmosphere is maintained.

Whatever else is needed depends on the particular system (see step 1). Safety depends on complete, calm, understanding. It is never established by fear. Mikey
Mike has written a book on gas forges that will be available through SkipJack Press.



Acme Threads and Nuts

Somewhere I heard that Acme threads seize up to make breaking loose a vise difficult. i.e. vise was not a good application. Anyone have experience with that?
dan

Dan,
Looking at the bench vices in my shop (quite a few of them), they all seem to have ACME threaded shafts.
Dave

Any machinist in the crowd? When thread taps are made they are offered in range from H1 - H7.....H1 being a very tight fit, and H7 being the most loose. When you buy taps and dies for general maintenance they are usually sold as H4's. Are Acme threads for machine tools cut to tighter tolerances than t! hose for a vice that would allow it not to bind? Maybe some info on that could offer better results in your trial and error projects for clamping accessories.
Ralph

Ralph makes a really good point -- and may bring us to understand the jamming problem Dan talked about.

There are two classes of ACME treads -- General Purpose and Centralizing. Each class having a series of tolerance divisions that set the fit of nut to thread. For General Purpose common use includes 2G, 3G and 4G -- with 2G being the preferred choice (it has the most clearance) while 3G and 4G have less backlash in each case.

Likewise the Centralizing class has a series of tolerance that are in common use 2C, 3C and 4C. What is centralizing? In the centralizing form the flat crest of the tread is design such that it will hit the flat root of the thread before both tapered sides of the thread will mate and prevent wedging of the taper sides of the thread -- which could result in jamming. In other words the major diameter of the tread insure that only one taper face of the tread can be in contact. All of the power treads I work with in jacks, mills etc where of the centralizing type.

You can find detailed information on this in Machinery's Handbook, just look under ACME threads.

I have no idea if Dave's ACME thread are General Purpose or Centralizing -- might make a difference in how they would work in a vise, clamps etc.

Dave Smucker

Passivation of Stainless Steels

Rich Waugh -- Sun Oct 26 16:54:16 PST 2003
Used with the authors permission. Posted on the Blacksmiths Virtual Junkyard; http://www.keenjunk.com

Passivation of Stainless

These days, what I do with my forged stainless is to passivate by electropolishing. I use a solution of 1 part Ospho to 3 parts water in a stainless steel stock pot. I use a 6/12 volt battery charger that can deliver about 6 amps and connect the positive to the work piece and the negative to the stock pot. Suspend the work in the solution. If you see bubbles rising from the work, you've got it hooked up correctly. If the bubbles are forming on the sides of the stock pot, you need to reverse the connections. You should use a piece of stainless wire to hook to the work, so that the copper clip on the battery charger doesn't get in the solution. I find that sometimes the circuit breaker that is built into my cheap charger tends to trip after a few minutes, but then resets itself. I leave the piece in the solution until all the firescale is either removed or softened up enough to rub right off with a Scotchbrite pad. The resulting finish is a satin smooth that can be easily buffed up with stainless compound or a stainless wire wheel. The Ospho is a phosphoric acid solution with some glycol esters in it that is used to prepare steel for painting. I buy it at the hardware store here. There are a couple of other brands of the same sort of thing, read the ingredients. Muriatic acid (hydrochloric acid) won't do the same thing. If you can't find the Ospho, then I would suggest you get some citric acid. You should be able to find that at either the grocery in the canning section or someplace that sells supplies for making candy. A restaurant supply might have it also, since it is used to sprinkle on fruit to prevent browning. It is a crystalline powder. Mix a solution that is about 20% by weight in water. Heat it to about 120ºF and immerse the work piece in it for a half an hour or so. This is the solution that commercial passivators are using when they don't electropolish. Sandblasting may work to remove firescale, but it may not truly passivate the surface, i.e. remove all free iron and encourage the formation of chromium oxides. A rinse in the citric acid solution after sandblasting should do the job, though. Use a rag soaked in the solution and keep the piece wet for at least fifteen minutes. If you want to do the electropolishing thing, but don't have a big enough stainless pot, you can use a plastic garbage can and make a ring of scrap stainless sheet to go around the inside of it. Same concept, that is your cathode. The work piece is the anode, and you are "plating" off of the work piece (anode) onto the container (cathode). Experiment with different strength solutions and different voltages/current levels. I'm sure you'll be able to find some combination that will work for you. I haven't had the opportunity to play around with the process enough to fine tune it yet, so I'm giving you the information I've learned so far. When I have the time to really do some controlled tests, I'll work it out exactly and then write something up to be posted. In the meantime, if you learn anything new, let me know what you discover. I hope this helps you.
Rich Waugh is located in the Virgin Islands.

From The NEB List

A **Question about Stainless Steel started this informative dialog on the NEBList:**

I'm curious if anyone here has worked stainless steel through their forge and shaped it upon their anvil? Is this possible? Steve LaBonte

Yes, to stainless steel being able to be worked hot. There are lots of considerations when working SS hot, but the main rule of thumb is it's 3 times as difficult to work compared to mild steel (4 times compared to pure iron) and 6 times as expensive to the customer.
David A. Court

yes ... I've forged a few pieces.... ornamental hooks and brackets from type 304 stainless ... under the hammer the stainless behaves somewhat like the high carbon steels in that it is tougher and harder than low carbon steel and needs to be worked with plenty of heat, I use a gas forge and so I don't know if the carbon present in a coal forge would have any effect on working with stainless so forge and hammer work in stainless is not much different than hard steel, a large difference will be found with stainless when you turn to other operations such as drilling and sawing, when cold, stainless has the tendency to work harden and as a result you'll find that drill bits and band saw blades wear quite quickly,...I've heard of using other alloy type material as well ...monel and silicon-bronze.... but I haven't had a chance to try them myself yet.
Charles Sedell

When stainless steel is forged, it may lose all of its

corrosion resistant properties. You need to seek out a grade of stainless that can retain these properties when forged and look for the relationship with professional heat treating. Peter Cassidy

Stainless falls into three categories, the 300 series (18-8 types) nonmagnetic, non-hardenable and the most forgeable, the 400 series, magnetic, hardenable, and very narrow forging temperature range, and the Ferritic grades; 430, 434, and 430F are non hardenable, magnetic and very difficult to forge because of their low hot working temperature and fast grain growth when heated. Stay away from the sulfurized grades; 303, 416, 420F as they crack easily as does 440A, B & C (for bearings and knives). Stainless needs a lot of force to move as you will see, and if you do forge the 400 series, don't let it cool as it will harden in air. Best to start by trying some 301, 302, or 304 stainless, then 316. If you don't have a power hammer you will wish you did. Also, stay clear of the 600 grades (630, 631) as they are PH types, with
extremely narrow forging ranges and even annealed are about Rockwell C 30-35.

Michael Schemmerhorn

I've said it before, and I'll say it again: for a beginning smith like myself, this forum sure is a great way to learn by listening! I appreciate the tid-bits of info I pick up from you more experienced guys all the time. Thanks! Roy Kosonen

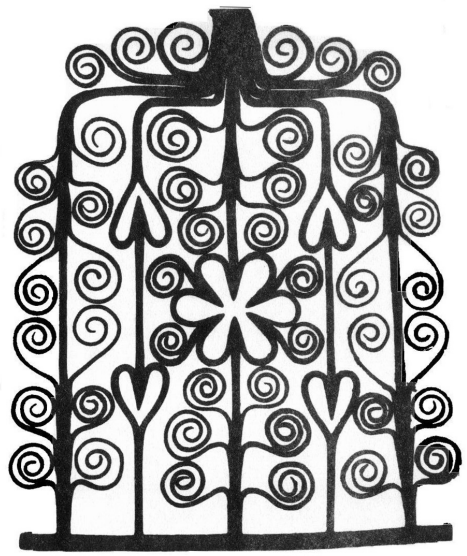
A big THANKS to Mike. The best technical answer I've ever seen concerning SS! I use it for some foundry tongs (304) and forging hammer swages (440; because I got a good deal on quite a bit). I've made several larger pieces for customers and it can be beautiful. That's where the 3 times as difficult and 6 times as expensive comes from. It's really only 3 and 3; until you try and bring out the SS qualities!

David A. Court

In order to get the stainless qualities, you need to passivate the piece after it has been forged. This gets rid of the free iron in the surface that causes the rust. This can be done crudely in your electrolytic rust removal system by simply reversing the electrodes. Put the hot (red) on your piece and the black (negative) on a piece of scrap. The free iron is eaten out of the surface and what is left is alloyed to the other stuff in stainless that makes it stainless. Not a nasty process at all.

Frederick Fatter

You're welcome. I guess from the comments on "returning SS to being corrosion resistant," I should have added; Stainless gets its corrosion resistance from the chromium that it contains. When the Cr meets with the oxygen in the air it forms a chromium oxide film on the surface of the metal that is very resistant to general type corrosion. The chrome oxide film forms by itself over time on the 300 stainless grades, but the 400 grades, especially the high carbon 440C, A, &B require that the material be heat treated, similar to a tool steel, to produce the required cr oxide film. All stainless grades, regardless of chemistry, can be "passivated" to instantly produce the desired film by use of a nitric acid bath. Most commercial plating companies can do this for you if you don't want the problem of what to do with the acid when you're done. To do it yourself; First wash the parts by a 30 minute bath in hot (150-200F) 5% sodium hydroxide, or any alkaline cleaner - FREE OF CHLORINE. Clear water rinse. The 300 series and lower carbon 400 series (403, 410, 420) grades are then soaked in 20% nitric/water solution heated
Spring 2002 New England Blacksmiths



Blacksmithing Workshops and Classes:

Peters Valley Craft Education Center
19 Kuhn Rd., Layton, NJ 07851 (973)948-5200
pv@warwick.net www.pvcrafts.org

Academy of Traditional Arts
Carrol County Farm Museum
500 South Center St. Westminster, MD 21157
(410)848-7775 (410)876-2667

Touchstone Center for Crafts
R.D.#1, Box 60, Farmington, PA 15437
(724)329-1370 Fax: (724)329-1371

John C Campbell Folk School
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Brasstown, NC 28902
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Red Mill Forge
Contact Adam Howard about workshops and per diem use of the shop (908)735-4573

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Has a large selection of tools for sale.
Anvils – Forges - Leg Vices—Blowers
Tongs – Hammers
Will also repair and/or resurface Anvils
Call John for prices and availability
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Wanted: Donations for the NJBA Trailer
We need hand tools, files,
Tongs (Old, new and repairable),
Safety Glasses and assorted rivets.
Look around and see what you have to donate.
Contact; Dave Macauley, Directors list, Page 2

Business Members

We would like to thank those who joined with our new Business Membership category
Please show them our support

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John Chobrda, Pine Barrens Forge
231 Morrison Ave., Hightstown, NJ 08520
609-443-3106

Open Forges

We are looking for members who are interested in opening their forges up to members as a open forge. This does not have to be a weekly forge as is Marshall's the others can meet once or twice a month. Please contact, Larry Brown, Editor.

We want to encourage all to join us at:

Monday Night Open Forge in N.J.

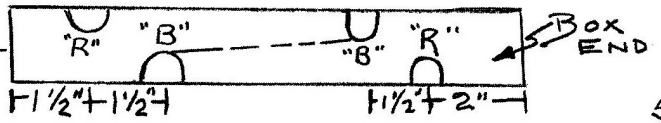
Marshall Bienstock is hosting an open forge in his shop at 7 pm almost every Monday night (Please call ahead on holidays to make sure , (732)780-0871)

Open Forge in Long Island

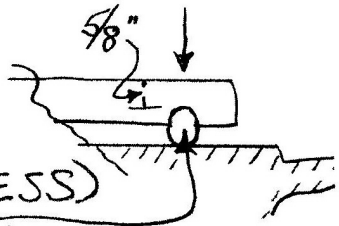
Sunday from 10:00 am to 6pm.
Starting the 1st Sunday in November (closed Nov. 9 NJBA Meet) until the end of April. Please call ahead to confirm and get directions. Ron Grabowski, 110 Burlington Blvd. Smithtown, NY (631) 265-1564 Rons-

Darryl Nelson's Box Jaw Tongs by Don Kemper

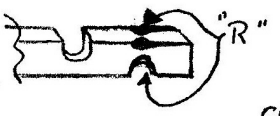
"BASIC" --- 5/16" X 1" X 16" STOCK - B

SETUP --- 

1) FORGE INDENTS @ "R" & "B"
(MAINTAIN 5/8" WIDTH & 5/16" THICKNESS)

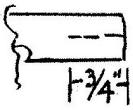


2) ROUND OVER EDGES OF INDENTS "R" ---



3) CHISEL CUT FROM "B" TO "B" - (DRAW INTO REINS & CHAMFER)

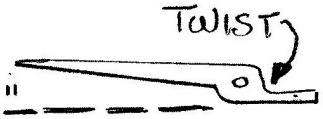
4) SPLIT 3/4" @ BOX END -



5) BEND SPLIT END, FORGE TO 90° ---

6) PUNCH FOR 5/16" RIVET (BOTH PIECES)

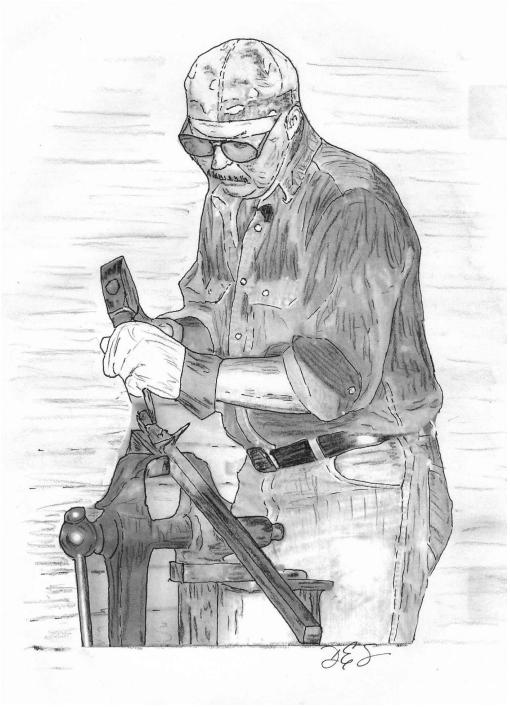
7) TWIST 90° @ ROUNDED "R" ---



8) BEND BOX END @ 90° OVER DESIRED STOCK -

9) RIVET (5/16") & TUNE TO FINISH -

NORTH WEST BLACKSMITH ASSOCIATION



Part 2

Forging Dragons

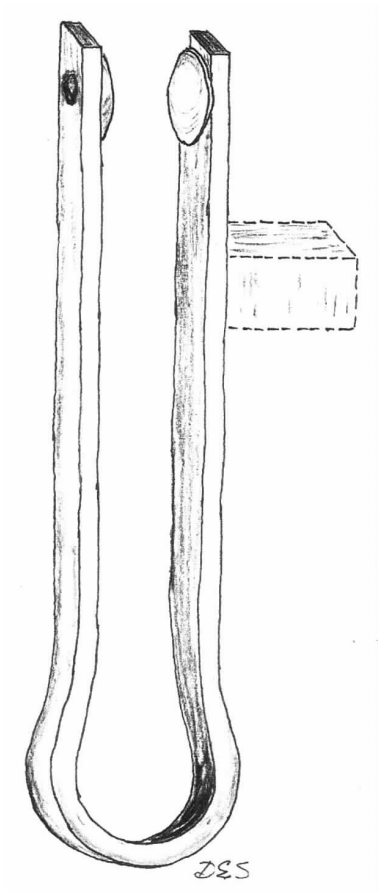
An article on Steve Williamson's methods of forging dragons.

by Dave Smucker

In the last issue of the newsletter, we completed forging the dragon's head except for the mouth and "beak" area. Now to continue, the next operations is to forge the neck area and complete 2 to 3 back ribs, (scales or vertebra – "whatever you want to call them"). They are the pulled out ridges that define the back of the dragon and extend from the base of the head to the end of the tail – except where the wings attach to the body of the dragon. While we didn't make much use of the treadle hammer in Part I – if you have one you will make a lot of use of it for the vertebra. If you don't have a treadle hammer you can still do this work at the anvil with the correct tooling – it will just take more heats and effort.

To forge the vertebra you will need a special tool, a type of spring fuller that will allow you to forge both sides of the vertebra at one time. Steve makes up two forms of this tool based on a design from Clay Spencer. Clay's original design is one that he came up with to form the "pulled out" nose on his rail spike wizards. Clay made these original spring fullers by welding two large steel balls (3/4 to 1 inch diameter) to the "U" of the spring fuller. For Clay's spring fuller you can get these balls from a large ball bearing or they can purchased from someone like MSC. Steve's tools uses large carriage bolt heads in place of the ball bearings. This, in effect, gives you a spherical surface that has about double the radius of the 3/4 to 1 inch ball bearings. Carriage bolts are officially know as American National Standard Round Head Square Neck Bolts – but don't try that name at your local hardware store unless you enjoy a good laugh. The 1/2inch size has a head diameter of about 1.050. The 5/8 inch size has a head diameter of about 1.250. They have a spherical "size" of about 1 3/4 and 2 inch respectively. (from Machinery's Handbook Industrial Press Inc.)

To make the spring fuller you will need carriage bolts and 1/4 x 1 inch flat stock for the "spring". I suggest that you make two of these tools, one with and one without a hardie tang. Cut your flat stock to a length of 26 to 28 inches, then find and mark the center of your stock. I use a square point center punch for this because it is easier to see when hot. Now heat the center of your bar and then bend it around a cylindrical form or the horn of you anvil. I like a piece of 1 – 1/2 inch pipe clamped vertical in my vise to make this bend around. What you are bending here is a large "U". Don't worry if the ends are not exactly the same length, you can trim them off later. Let your "spring" air cool. Now select the location on the shorter leg and center punch where you will bolt will go. Cut a piece of scrap wood that will just fit between the two legs of the "U". (All blacksmith shops should have some wood around – it is useful for other things than just starting fires.) Clamp your wood scrap between the legs of the "U" and drill through both legs and the scrap. If you are doing this in a drill press use a C-clamp or if using a hand drill just clamp the "U" in a vertical position in your vise. For this type of operation, I suggest first drilling with a 3/16 or 1/4 pilot drill and then opening up the hole to 1/2 inch for the carriage bolt. By drilling through both legs of the "U" and the wood scrap at the same time, you assure that the two bolt heads will be in alignment.



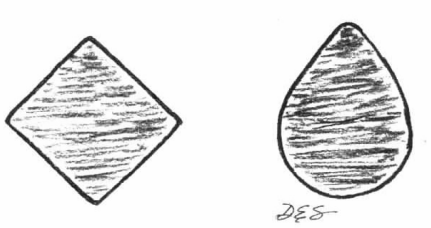
Spring Fuller – from 1/4 x 1 inch stock with 1/2 carriage bolts heads used for "tool surfaces". A tang can be welded on one side for your hardie hole.

Now you can install the carriage bolts from the inside of the "U". Most likely, the carriage bolts are galvanized. It is hard to buy black steel ones anymore so I suggest that you heat them in your forge to burn off the zinc plating. Be very careful to avoid the fumes from the zinc. Let them cool and then file or grind the corners off of the square shank so that they are not too hard to install in the "U". Press into place from the inside of the "U". You can tap it into place or drop several washers on the bolt and run a nut up and pull the carriage bolt into place. Cut the treads off.

Now plug weld them from the outside of the "U". Do a good job here and build up some weld material on the surface because this will be the striking surface for the tool. Clean up with that grinder or disk sander. Now, as I said before, I recommend that you make two of these tools. One to use free hand and the other to use with a hardie hole tang in either the anvil or treadle hammer. If you are going to do this work without a treadle or power hammer than you will need one with the hardie tang unless you have a striker.

Now that you have the tools, let's get on with more work on the dragon.

As we left the dragon in the last issue the horns where laid back against the body so that we could work on the details of the head. Now you need to heat them and gently bend them forward so that you can work on the neck and body area. They do not have to come too far forward – vertical to the body is fine. We now want to forge and draw out the neck area but retain most of the mass in the body area where the wings and talons will attach. Steve draws and forges this area to what I would call a "fat tear drop" cross section with the top of the tear where we will form the neck fins or vertebra. You want this length to be long enough for two to three fins but not more. Another way to think about this cross section is to think about it as a diamond with the bottom of the diamond rounded. This is also the best way to obtain the desired shape – first forge the area into a square set on the diamond to the head and then round up the bottom. You can do this by keeping the bottom against the anvil and working the top two side of the "tear". Forge a smooth transition back into the body section.



Square section on diamond – Fat Teardrop

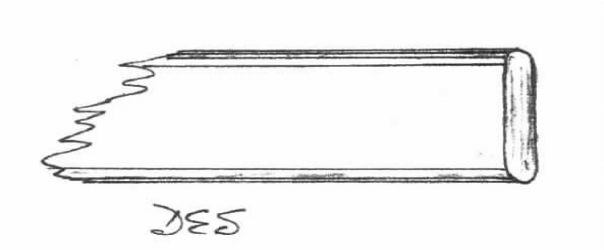
Now you can put your tooling for forming the fins to work. Steve does the neck fins with the tool fastened via the hardie hole tang in his treadle hammer. This allows very close control on the placement of the fins. With this arrangement in a treadle hammer, you can hold the dragon by the "tail" and also use tongs in the other hand to give two-handed control of placement.

If you are working on the anvil – you will also need the tool with a hardie tang but will only have one free hand to hold the dragon (the other one has your hammer) unless, of course, you are blessed with a striker.

With these, two (or three) fins in place it is time to set the curve of the head and neck to the body section. Also, while you have everything in the area warm, heat up the horns and get them into the final location over the neck area. Take some care here, take a good look at the metal at the base of the horns, and look for cracks – if you have any, dress them out before making your final bends. A small rat-tail file or small chainsaw file works well for this.

The dragonhead and neck are now complete, except for the "beak" and tongue, but we are going to move on towards the tail before finishing the head. Round up the body section – the mass in this area stays the closest to the original stock section but is rounded up and drawn out a little. Then start the drawing process for the rest of the long tail of the dragon. Like the short section of the neck, that we have already done, this will be a "fat teardrop". As before first draw this out as a square section but set on the diamond to the body. Then form the tear by working the bottom area against the anvil, rounding it by working the top sides of the teardrop with the hammer. This will round the bottom with the anvil and sharpen the top of the tear. When we have 4 to 6 inches of the tail shaped, we are ready to put a slot in the back for installation of the wings. Don't put the fins on this section yet.

Steve now punches a slot in the back (top) of the body by using a 1 inch slotting punch – **but doesn't punch through.** Make you punch about 1 inch wide by 1/4 inch with rounded corners.

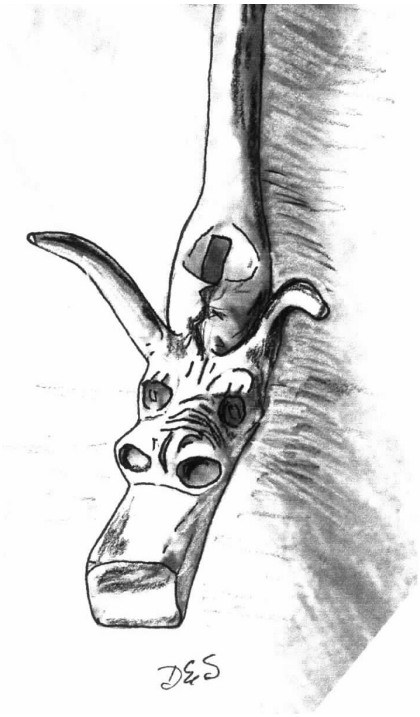


Working end of punch, grind end flat with sharp edges to body

You can make your punch from 5160 (coil spring) or W1 tool steel and it will work fine – but this is one application where I prefer H13 or S7 tool steel. The reason is that this type of tool will remain in contact with hot metal for longer periods – and the hot work tool steel in H13 or S7 just plain holds up better than others when it has to work at higher temperatures. While this is a punch required for this application, you will find many other uses for this punch in other work too.

To do this punching, set the heated body section of your dragon in a 1-inch or 1 – 1/4 inch bottom swage set on your anvil. If you have a large swage block with this size, usually on an edge, that can be used too.

To make the slot, heat your dragon to a good orange, place it in the swage block and punch down from the top or back of the dragon. You want to make a deep slot for the wings but do not want to punch through as you would in most applications. Position your punch and take the first blow or two to start the process. Cool you punch and drop a little fine coal dust in the started slot and continue punching. You may have to do this several times but you should be able to deepen the slot with only one heat.



A View of the Dragonhead after the slot has been punched for the wings, but before the tail has been completed or the saw cut made for the mouth.

We are not going to install the wings yet, but we are ready to draw out the rest of the body / tail of the dragon. We produce a long gradual taper over the total length of the body /tail until we reach the very end of the tail. Use the same procedure as before, first drawing it

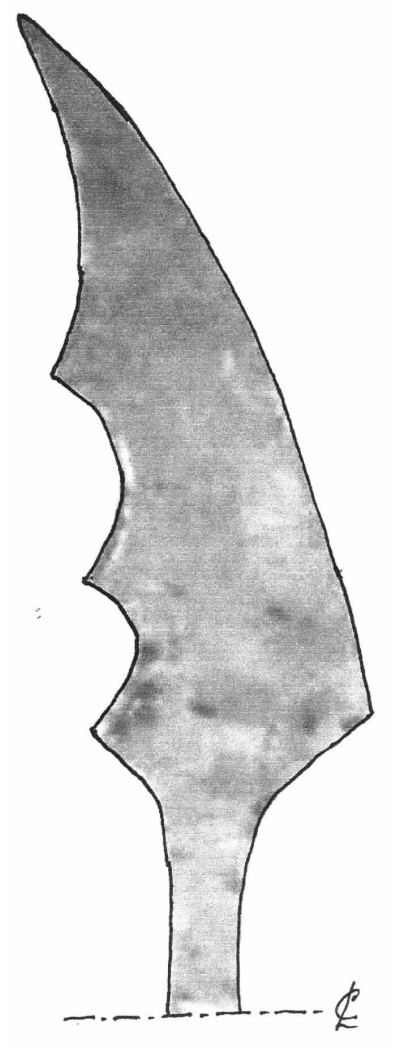
out a square section then rounding into the fat teardrop. Here is where if you don't have a treadle hammer or power hammer you will wish you did. Never the less, all of this drawing can be done on the anvil, as it was done for centuries by many blacksmiths. About half-way through you will want to turn your work around and hold it by the dragonhead. Steve works to have his 1-inch stock dragon reach a length that measures from his waist to the floor.

Most likely, you will have some stock left as you reach the end of the tail. Cut this off, leaving enough material to form the "rattle" or "spear" on the end of the tail. You form this rattle / spear just as you would a leaf. Set off some material on the edge of the anvil or using a spring fuller and then form into the leaf shape.

You are now ready to put all of the fins or vertebra on the back of the dragon over the total length of the body / tail. For this part of the dragon, Steve Williamson uses the same spring fullering tool but uses the free hand one and does the work in the treadle hammer. He finds that this is the fastest way for him to work. He heats a section of the dragon and then draws out each one of the fins – being able to do three fins with each heat. As you draw out the fins, it will cause the body / tail of the dragon to curve because it becomes longer on the fin side. You need to adjust for this at least every other heat. Steve recommends using a wood mallet to do this so that you don't damage your dragon. Another important recommendation of Steve's is to heat you dragon with the fins up in your fire or your will have real danger of burning them. Working from the head to the tail makes the fins small towards the tail with closer spacing.

If you are doing this for the first time, you may find that it is easier to use the fuller with the hardie tang attached. If you are working under a treadle hammer this allows you to use two hands to position the work piece. For me, I would hold the dragon itself with my left hand, using a Kevlar glove if necessary and using tongs in my right hand. Without a treadle hammer, working on the anvil I would for sure want to use the fullering tool with the hardie tang. Again, being right handed, I would hold the dragon with my left and use the top of my hammer to help position the work piece into the spring fullering tool – then strike it with my hammer when correctly positioned. While not as easy to use as tongs to help position the work piece I find that I can both push and pull with my hammer when using a spring fuller. You may have to "adjust" the spring of your fullering tool so that it has a light spring effect on the work piece. This is easier for me to work with than when the fuller halves (top and bottom) have a gap to the work piece.

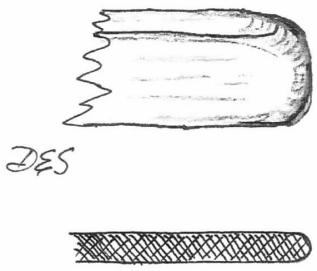
You have now finished much of the dragon and it is now time to move on to the wings, talons, forked tongue and beak. Let's start with the wings. Steve makes the wings – both wings at the same time from a single piece of 16 or 18 gauge mild steel. (Steve used to make two separate wings and join them in the body slot – but one day he decided that he could make as one piece and fold them.)



I have included one half of a general pattern (about 3/4 size) for the wings based on a photo I took of one of Steve's blanks – it is not an exact copy but should be good enough to give you an idea to work with.

Base you own pattern on your ideas and a little experimentation. The long section in the middle of the two wings may seem longer than necessary but as you will see, much of it is captured inside of the dragon's body.

Start by tracing your wing pattern on your sheet steel and the cut it out. In my shop, I would do this on the vertical band saw, but you can do it other ways too. You could use a Beverly shear, a plasma-cutting torch; you could burn it out with an oxy-acetylene torch, cut it with a hand fret saw or with a cold chisel. I think Steve uses a Beverly shear to cut his. The plasma torch does a nice job but unless you have one you're not going to buy one for just dragon wings. The oxy-acetylene gives a somewhat rough job unless you have a very small tip. The fret saw does a beautiful job and is a low cost tool but is too slow for some of you. Last, but not least, is using a small cold chisel to do this. If you have never tried this is goes much faster than you would think. Your chisel needs to be **sharp**. I like to do this kind of thing seated at a solid bench working on a heavy piece of steel plate as my cutting anvil. If your wings have rough edges, clean them up using a file. If you hold the wings vertical in the vise with the working edge close to the vise jaws, you can quickly move all the way around the piece.



Working end of typical repoussé tool for forming wings. Round polish the working surfaces.

For the next operation we are going to form the wings, giving them both shape and depth. Steve does this under the treadle hammer using a repoussé technique. First it is important to anneal (normalize) the sheet steel. To do this heat it above the non-magnetic point and let air cool. This is technically a normalizing or partial anneal but is effective for what you are doing here. Steve uses two very simple rounded end tools to form the major wing "veins" from the backside of the wing. This gives the wings a structured detail and produces a natural wing curvature at the same time. After you have the veining, you can further refine this curvature or add more dishing by using a ball bean hammer or rounding hammer.

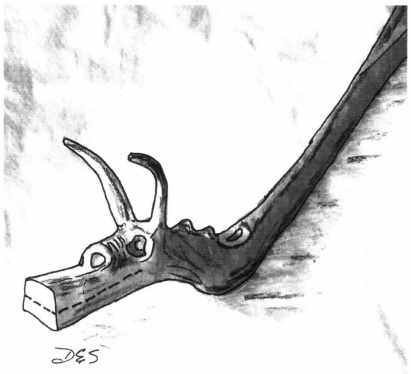
Steve does the veining working on a lead surface as the anvil. He made this by welding a bottom onto a short section of 3-inch pipe, forming a cup in which he melted the lead. Caution – about lead, breathing the fumes from lead or ingesting lead or lead oxide is bad news and can cause serious lead poisoning. Lead fumes are not an issue at room temperature but melting lead without good ventilation is a hazard. Lead or lead oxide dust can also be a problem as can transferring lead from your hands to your mouth, i.e. wash your hands before eating. Other surfaces will also work for this. One good surface is wood end grain in the form of a wood block or stump. Another is pitch (which I have not tried) or a very hard urethane rubber.

The completed and folded wings – ready for welding into the body.

The advantage of working under the treadle hammer for this is that it allows holding the tool with one hand and the wing with the other. Use very light blows. It can also be done with just the tool and a hammer to provide the blows. With a little practice, you can learn to hold the work (wing) with the tool and slide it to the next position for the next blow. Light blows, small steps, this is bench work. Don't over work an area or you will go through the material. You may find you want to anneal a

second time. If this is your first use of these methods, do a little practice on some scrap. You should now have a set of wings – that just lacks the centerfold. To make this fold start by gapping you vise and then gently driving the center of the wing into the gap using a rounded tool. Now heat your wings and you can the bend the wings together. Then clamp about 1 to 1 1/2 inches in the vise or tongs and bend the wings down to a natural position. Set the wings aside, we will install them after we finish the beak.

To make the beak Steve first makes a deep sawed slit for the month. Sawing is the way to go here since so much of the dragon is already done. Steve uses a Milwaukee Portable Band Saw for this operation. It makes quick work of this and lets him see both sides of the mouth while cutting. You can do this on a vertical band saw too – but watch that you make an even cut since the bottom side is hidden from you. Before Steve got his band saw, he made many of these cuts using a hand hacksaw. The hacksaw does a good job – have a sharp (new) blade and take your time. Make the cut deep, to almost under the eyes.



Another view of the dragonhead before completing the tail – the dotted line shows the location of the saw cut for the mouth.

Now take a good deep heat on the mouth area and then set your dragon vertical in the vise holding it in the body / wing area. Take a chisel and open up the mouth. Now **- this is very important -** take a punch and establish the location in the center for a drilling to install the tongue. After the metal is cool you can then drill a 3/16 hole for the tongue. If you don't use a punch to establish this opening for the drill, it will grab and most likely break the drill as well as damaging the dragonhead. Do the punching now, don't put off for later. You can then drill for the tongue when all of the rest of the mouth is done.

With the mouth cut, opened and the punching done for the tongue, take another heat and the draw out the top beak much like you would the tine on a roasting fork. Steve now cleans up this upper beak with his sanding disk. He then heats the beak and makes the "S" bend in the upper beak. This both finishes the upper beak and gets it out of the way for drawing out the lower beak. Repeat the steps on the lower beak of drawing out, cleaning up and making its S bend.

Make the forked tongue out of 1/4 diameter round stock. On one end draw it out to 3/16 dia. For installing in the mouth and on the other end flatten and then split into the two halves – to form the forked tongue. Steve installs the tongue by peening on each side of the tongue using a small diameter punch.

Now let's make the talons. In Part I of this article I told you that more than 15 years ago Steve set out to learn two things, make dragons and forge weld. He has learned both well and uses a forge weld to assemble the talons. He uses 1/4 dia stock for the "leg" portion and 3 pieces of about 1/8 to 5/32 dia stock for the three "claws". Most likely the 1/4 dia material will be cold rolled mild steel, this will work well. For the small diameter, a good material is common 16-penny nails (with the heads cut off). This is 1006 steel and very low carbon and that makes for good welding. If you can find them, 40-penny pole barn spikes are about the right diameter for the 1/4 inch and 1006 too.

Tack weld the three pieces of 1/8 inch material together. Upset the end of the 1/4 inch material and then form your scarf. Now heat your pieces, flux and then bring up to a welding heat. Make a drop tong weld. Reflux and finish the weld if necessary. With small welds like this, it helps to preheat your anvil and some folks place a small anvil (piece of railroad rail) right on their forge. This saves heat in moving from the forge to anvil. Use a small hammer and light blows – remember it is largely the temperature and not the force of the blows that make the weld.

You can then draw out the talons and form them into the shape you want. The leg end needs to be thread using a 1/4 / 20 die. You will then drill (# 7 drill) and tap the dragon body for installing the legs.

It is now time for the other welding operation – in-

stalling the wings. Steve does this using an anvil swage block held in the hardie hole. This allows clearance for one wing to hang over the side of the anvil while closing the weld. Before starting the welding operation, make sure your wings fit into the slot in the back and adjust if necessary.

Take some time to plan the set up for your weld. When coming out of the fire you will have the dragon in one hand and the wings held by tongs in the other. For a right-hander make your arrangement so that the wings are held with the left hand and the dragon with the right. Then have something at the correct height for dragon tail to set on when the body is in the swage. This will allow you to insert the wings, and "drop" the dragon (really set it down) and quickly pick up your hammer with you right hand to make the weld. The wings remain held in the tongs by the left hand. It is kind of drop tong weld. To make the weld heat, flux, and then bring to welding heat both the body and the wing tang. Keeping in mind that it will take a lot longer to heat the body than the wings. You will want to heat with the horns up and it is good to cool the head portion of the dragon once or twice as you bring the body up to temperature to prevent damage to the head. You make the weld by forging the wing slot closed, striking the body on the side.

With the wings in place you can drill and tap for the talons and then install. You can also install the tongue if you haven't done that yet.

All that remains is to shape the dragon body and tail into its final coiled shape, and then clean up and finish your dragon. Steve uses a scrolling jig to help form part of the coiled shape to his dragons.

I have discussed other methods of attaching the wings, tongue and talons with Steve. First, Steve is not 100 percent sure that he gets a true forge weld with the wings – but he is sure that they in fact are very tightly held and will not come loose. It may be possible to hold the wings with a small amount of brazing rod and flux placed in the bottom of the body slot. When I last talked to Steve he had not tried this on the wings. One caution here is to not use too much brazing material or it will show on the finished dragon. Steve has used a small amount of brazing rod to install the tongue. With this technique, you can make your assembly and then heat to brazing temperature with a torch. This could also possibly be used as the attachment method for the talons. I suggest experimenting first on some scrap pieces to get a feel for how much brazing material to use and how well it might work.

I want to close with a special thank you to Steve Williamson for freely sharing his methods with other blacksmiths and demonstrating at Tannehill last fall. As I noted in Part I of these articles, I hope that you will use this information to make your own version of a dragon and not just a copy of Steve's work. Remember that Steve and Clay Spencer will be teaching a class on Wizards and Dragons this coming fall at John C. Campbell Folk School.

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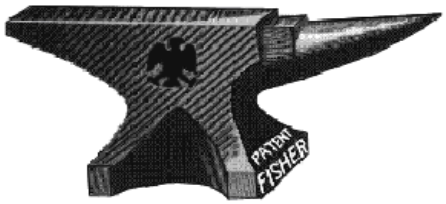

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