On the Anvil NEWSLETTER
PHILIP SIMMONS ARTIST BLACKSMITH GUILD
http://philipsimmonsartistblacksmithguild.com

From the President's Anvil: July 2014

Sorry I was unable to attend the meeting at Roger & Gail Marcengill's, they are always gracious to have the meeting at their shop in June every year. My thanks to them and Bessie & Jerry Fowler for hosting! We had about 35 smiths and smith lovers!

It was reported by Barry, Ray and others that I talked to that Ryan Calloway did an excellent demonstration and added useful information for those that want to build a business and sell their work.

Ryan began his demo of a corner of what might be a gate or frame containing a calla lilly, talking about texturing the metal. Texturing is necessary due to the perception by customers that the material must have hammer marks to look "wrought". He explained that in his classes, he touched on miss hits showing up in the finished pieces to represent inconsistency. He further talked about layout and design of the pieces and the tooling to make it happen. He continued with pricing and marketing to the architects who hire him. He demonstrated Prayer bowls - dishing flat material into raised bowls using a cylinder bottom modified swage. He makes these as gifts to the friends, clients, and architects as hopeful reminders of custom metal work. To wrap the demonstration up, Ryan spoke on the work he enjoyed doing.. Shop work is great; installations can be challenging and require assistance , so charge appropriately. Also, perceptions of shop/studio visitors are important. Keep nice work on display so that it represents the fine ironwork that you do as an artist blacksmith

The Iron in the Hat produced $700. With lots of nice forged items made by members, this helps us pay the bills, buy materials, and provides money for scholarships and instructors.

Our new members include: Gordon Baker, Jason Brachman, Will Kallberg, Brad Malone, Mr. Simmons' grandson, Ade Ofunniyin, and Jason Anderson Ryan's striker.

We had a good hammer in at Magnolia Gardens the weekend of the 4th with lots of exposure to the public and local media coverage. Some of the members were able to sell some of their work. There were 6 forges going most of the weekend with numerous questions from small children and adults. Four of the adults were overcome with curiosity and talked of joining the Guild, I don't have their names yet. Make all of our newbies feel welcome and help them any way that you can on their journey learning blacksmithing craft.

Thanks,Jesse

Iron in the Hat

Item	Donated By	Won By
Forged Cross Sculpture	Charles Meyer	Duke Baxter
You-Finish-Punches	Jody Durham	Barry Myers
Palmetto Deco Oyster Knife	Josh Weston	Trent Baldwin
Can'O Metal Stuff	Jerry Greene	Barry Myers
Ginko Leaf Bottle Opener	Ray Pearre	Steve Alverson
Candle Holder	John Tanner	Roger Marcengill
Large Scrolly Candle Holders	Roger and Gail Marcengill	Donna Keaton
Large Scrolly Candle Holders	Roger and Gail Marcengill	Rame Campbell
Right Handed Gloves	Roger and Gail Marcengill	Rame Campbell
Wire	Ryan Calloway	Charles Meyer
Napkin Holder that could be used a bookends	Jason Alexander	Meck Hartfield
Howard McCall's Heritage in Iron book	Howard McCall	Perry Thomasson
Mouse Key Ring	Cary Epps	Ryan Callaway
Bike Chain Bottle Opener	Jason Alexander	Perry Thomasson
Bike Chain Bottle Opener	Jason Alexander	Charles Meyer
Horse shoe rasp Knife	Jerry Fowler	Chuck Baldwin
Copper Striped Bass	Mike Bell	Ryan Callaway
Bearing Races and bearings	Perry Thomasson	Pam Etheridge
Perry's First Signed Piece Oyster Knife	Perry Thomasson	Barry Myers
Center Scribe	Perry Thomasson	Cary Epps
Copper Leaf Bracelet	Tony Etheridge	John Tanner
Fine Damascus Knife	Meck Hartfield	Donna Keaton
Forged Cooking Set with Dutch Crown	Meck Hartfield	Chuck Baldwin
Anvil Devil	Chuck Baldwin	Trent Baldwin
Whitesmithed Fork	Barry Myers	Bob Kaltenbach
Coil Spring	Robert Campbell	Rame Campbell
Leather Mallet	Curly Lawson	Jody Durham
Copper Sun/Cloud Sculpture	Gail Marcengill	Donna Keaton

The Iron-in-the-Hat garnered $700 from the eager crowd that sweated through the June Meeting. That was awfully good. Thank you one and all for your generosity in both the giving and the donating of you iron.

Project for the Madison Conference!!!!!

Something to think about: For the Madison project next year, the committee has decided on the theme, Blacksmith Phrases in our Language. For example, "strike while the iron is hot" or "it is a poor smith who can't stand the smoke." Okay, they are not all winners…Anyway, these saying – and we have found 140 so far, will be put on metal and hung like Christmas tree ornaments on a wind chime frame. Each participating group will be assigned an equal number for their Guild to produce.

Now, the part about thinking: how will all these sayings be imparted to the metal – chased, stamped, other (?), and what will they look like. What will the wind chime frame look like?

We, PSABG, are tasked with managing the Project. Mike DuBois thought it cute to volunteer me to head it up as I volunteered him to be our Madison rep. So, think about it and give me your ideas – even bad ones. Barry

For Sale:

- **Fire Bricks – Brand New, Industrial Grade. $1 ea. Ed Sylvester 803.414.2487.** These same bricks were as much as $8 at Madison!
- **Hosfield.Bender**, with extension bender and 20 attachments on a nice stand $900.00. **Sewell coal** for sale. 135# for $45, Layne Law 843-333-9964
- **Blacksmith Classes:** John Boyd Smith is offering an instructional blacksmithing program at his smithy near Spartanburg. John is internationally known for his realism in forged steel. Call 912-655-9448, email flemingsmith@aol.com, or website JohnBoydSmith.com.
- **Tire Hammer Plans**: Send check/money order for $30 to Clay Spencer, 73 Penniston Pvt. Drive, Somerville, AL 35670-7013. Includes postage to US and Canadian addresses. Other countries e-mail clay@tirehammer.com for price. 256-558-3658. Tire Hammers for sale contact me for current price. Also, **Beverly Shear Blades Sharpened**, $41 includes return shipping in US. Remove blades and ship to address above. Extra cost for deep nicks or blades sharpened at wrong angles.
- **Big Chuck o' Iron.** 8"x8"x56" 900+ lbs. mass for anvil, treadle hammer, or tire hammer. $300 Jeff Hatfield 864-216-3707
- **120 lb Peter Wright Anvil** made in 1911, $200. **Post Drill**, $100. **Two wheeled grinder** powered by power takeoff, $75. Stan Yates, Norris, SC 864-843-9807

The following is from Ted Banning, a smith on Facebook group Blacksmith Enthusiasts who gives free advice called "Blacksmith Wisdom." Man, think of that! Free advice from a blacksmith! Whodathunkit? On Giving interviews:

1)Remember what you are promoting...stay focused.
2) Have nice displays for the photographers to capture.
3) Don't let the article be about just you...you're promoting the Craft in general and your group in particular.
4) Stick to three points: a) Blacksmiths have a great community. b) Look at all the cool blacksmithed products you can buy. c) You too can try blacksmithing !
5) Make your answer brief and concise...don't ramble.
6) Avoid using jargon only smiths understand.
7) Be positive ! Don't badmouth anything or anyone!
8) Try to get the reporter beating hot metal. The more fun they have, the more it will come across in the article.

Here is a tool Ryan Calloway made to put step bends in flat bar. It is used in the vise. The hooks keep it in place in the vise. Stick the hot metal into the jig and tighten the vise! Voila (not the stringed instrument)! Here it is, along with some other tools and jigs he brought:



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SOME THOUGHTS ON PATTERN WELDING from Al Pendray

(from his 1990 FABA Conference demonstration notes)

In selecting material to pattern weld keep in mind what you want to create - cutting edge or macro pattern. Preferably both.

You need 0.5% carbon or more to create enough martensite for a good cutting edge. A simple way to get a close guess on this is to add available carbon in the material that you weld. For instance, O1 is 0.90% carbon and 1018 runs 0.18% carbon. A three layer billet with one bar of O1, two layers of 1018 would have 1.31% carbon. This divided by 3 will give a good estimate of available carbon in the welded piece. This would provide 0.42% carbon. Then you lose some more in decarb so you end up with a very minimum carbon to provide a cutting edge. It would be tough but not a good cutting edge. The chemistry of the material will provide a good macro if it is different in the pieces such as one having a little chrome or nickel, moly, etc. You will have a macro if you weld layers of some material but not as much contrast as with different material. Welding temperature as well as time at temperature will also affect the macro. These are things that only experience will give you. Don't be afraid to experiment to determine what will work best for you.

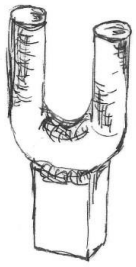
The number of layers that you use also will have to be figured in to produce the macro and also micro structure. There is no magic number of layers that will give the perfect blade. The first weld on good carbon steel will cut but will not have a nice macro. For example, 5160 welded to O1. This is also a good reason to be sure of the material that you use. Then it becomes easier to reproduce the results that you want. After you get the bar welded to the structure you want the heat treatment will generally be figured from the material used. If you use water, oil or air hardening material, you can generally depend on hardening to follow the parent material. The 3rd element chemistry that applies to the hardening ability diffuses very slowly, if at all, where carbons move very rapidly in comparison. Water hardening steel can be hardened in oil, if the sections are thin, such as knife blades, but you don't always create the maximum amount of martensite. Oil hardening will work with water or oil where air hardening works in all 3, water, oil or air. After hardening you need to temper to get the performance that you want, which is hard but tough. Too hard you will chip or break the edge, or too tough or soft then you have a spring or less. Here again you can use the parent material as a starting point but will need experimentation to determine what suits you best.

With pattern welding you have the ability to create your own personal steel so don't be afraid to experiment. This is what really makes it great to work this material.

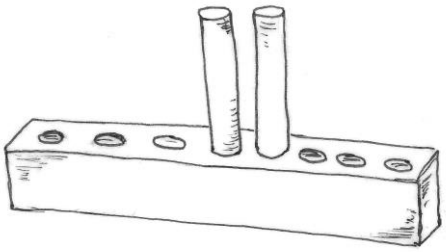
For those of you who may not who Pendray is, he worked with a Univ. of Iowa metallurgist John Verhoeven developed the original process of Damascus steel production. Here is the link: http://www.tms.org/pubs/journals/jom/9809/verhoeven-9809.html This is a really involved read, but your understanding of real Damascus will increase. Barry

Another Bending Jig

By Carl Davison Northeast Blacksmiths Association



A basic bending jig, like the one on the left, that fits in the anvil hardy hole or in a vise is common to us all and extremely useful. Variations like the one pictured are many



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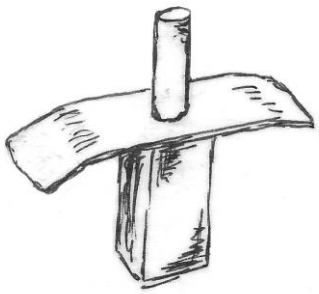
For years I have used a simple bar with holes spaced at different intervals like the one above. I liked that it provided some adjustability in the pin spacing unlike the basic jig. There are circular jigs that use pins and have a hole pattern that also gives a number of spacing options. I've seen one of these sold commercially and also someone is making them for sale on eBay.

Recently I wanted to be able to easily adjust the pins to accommodate different sized cylinders. By making a pair of movable vise pin holders as pictured you are able to easily adjust the pins to meet your needs



Materials

2 pcs. 2" x 1" square stock

2 pcs. 3 1/2" x 1" x 1/8" flat stock

2 pcs. 2 3/4" x 3/8" pin

Braze or weld the square stock to the middle of the 1" flat stock. Mark & drill a 3/8" hole so when it passes through the flat stock it will be centered in the 1" square stock. Drill 3/4" deep. Place the vise pin holder in your vise and hammer the flat tabs to conform to the jaws. In a vise the pair of pin holders can be easily moved and secured in the position you need.

Scholarship Report - Forge Welding

by Jim Guy

Let's face it, forge welding intimidates beginning blacksmiths. Beginners hear all sorts of helpful tips about forge welding that makes it seem to be mysterious and complex. That's why I chose the forge welding weekend class at John C. Campbell as my scholarship class. To clear up the mystery. I took the weekend class on forge welding taught by David Tucciarone. He teaches this class and a beginning blacksmithing class every year at John C Campbell. David began with a discussion of forge welding in general, the different kind of fluxes available (and that you can make), and fire management.

Our first hands-on welding task was making simple lap welds. Working in pairs as smith and striker, we would take a pair of 3/8" square stock, weld them together (. . . well, either burn them, or weld them together). Then cut off the weld and switch roles as smith and striker. This process really helped me. The focus is on the actual welding. (What does it look like and feel like when it's at welding heat. Understanding you only need light taps, not big blows when welding.) No tongs or scarfs are needed in this simple weld, so all time is invested in WELDING, not preparing to weld.

From there we went to scarf welds (also done in pairs). By then we had enough confidence to work alone and tackle "drop-the-tongs" weld, chain welds, and tee welds. David had examples of other type welds for use in different situations that were available if we had the time or had a special need (things like round-to-square scarfs, rings, collar welds, 90° corner, celery welds).

This is a class and an instructor that I highly recommend!

This article will detail key points from this class beginning with a discussion of flux and its uses, fire management for forge welding, the process of forge welding (using the lap weld as an example), and scarfs. Then this article will give an overview of different welding techniques such as the "Drop-the-tongs" weld, and chain weld, concluding with a pictorial overview of other weld types.

What is Forge Welding?

Forge welding is a process of applying sufficient heat and pressure to two pieces of similar material causing the diffusion of the two pieces into each other at a molecular level. But, then we only need to know that it works, not the physics involved.

David Tucciarone

Flux

The primary role of flux is to keep the metal clear of scale while it is being heated by providing a barrier to oxygen. Flux melts at a temperature lower than the point scale forms and will mix with impurities and will carry these away during hammering. To us this means that flux makes it easier to weld. (flux use is more of an American technique. Traditionally British smiths don't use flux, or when they do, they only use clean sand).

Commonly available types of flux are:
Borax: Sodium Borax. Available as "20 Mule Team Borax", or in commercial welding fluxes. Readily available and in-expensive.
EZ Weld: Commercial flux containing borax and iron filings. Iron filings in this compound helps the metal weld lightly under difficult conditions. The iron filings will form little "tack welds" early in the welding process. Down side is a slightly messy weld that requires more cleanup
Crescent Weld: Commercial flux containing a mixture of borax and boric acid. This product flows more cleanly than EZ Weld or borax and is more applicable when welding small or detailed pieces.
Cherry Heat: Commercial product containing a mixture of boric acid and iron oxide. In practice, it works fine but can fall off metal until it is heated to a high temperature.
[*This article was published before the advent of **Iron Mountain Flux**. It is most probably anhydrous borax and iron filings, but that is speculation. It is like magic dust. It welds at lower temperatures than the others mentioned above. Editor Barry Myers]*

EZ Weld, Crescent Weld and Cherry Heat are all produced by Superior Flux and Manufacturing (http://www.superiorflux.com/ welding.html)

You can make your own "Cherry Heat" by mixing boric acid and red ocher in equal parts. Boric acid is also known as ortho boric acid, available as "Roach

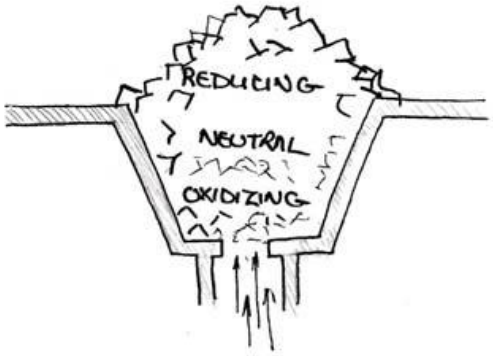
Proof". Red ocher is iron oxide powered for use as a pigment in ceramics and painting and is available through art suppliers.

Borax was used on most of the class projects. But flux is just another tool in our tool box. That was demonstrated by switching to EZ Weld when someone was having difficulty with a weld, and at times putting a little EZ Weld in the middle of the scarf, and borax around that. In essence using different fluxes to solve different problems.

The Fire

There is a lot blacksmithing lore concerning a proper fire for forge welding. Some are absolutely true, some only impact forge welding under special conditions (yes, clinkers can be a problem, but only by blocking air flow, creating cold spots. They don't necessarily kill any chance of welding). Key aspects of a proper fire we do care about are: ensuring there are no "voids" in the fire, working in the reducing zone of the fire, and taking advantage of the "oven effect".

A coal fire has three major regions: an oxidizing zone, neutral zone and reducing zone. The oxidizing region has more oxygen than needed to support the fire in that area. Heating metal in this region will create a lot of scale so we should avoid placing our metal here. Oxygen is balanced with that needed to support the fire in the neutral region, minimizing scale formation. The reducing zone does not have enough oxygen to support the fire. This is the area we need to use when forge welding. Scale is minimized, resulting in cleaner metal for welding.



The "Oven effect" is achieved by making sure your pieces are covered in the fire. And it really doesn't take much for the oven effect to impact the welding process.

Tip: If your metal comes out of the fire white and crusty, the fire is an oxidizing fire. Remove surface and start over. If you burn the metal, cut it off. That will not forge weld.

Lap Weld

The lap weld is formed by overlapping two bars about one inch, and welding them. This is a very weak weld, which is not used often. This does give us an opportunity to practice welding with the minimum investment of our time, allowing us to focus on the process of forge welding, learn the feel of the fire, and the look of the metal at forge welding temperatures.

The welding process is:

1. Heat both pieces to orange
2. Brush off scale
3. Add flux
4. Put back in fire
5. Heat to welding heat on one side
6. Rotate 180°
7. Heat the other side to welding heat
8. Pull out and hammer

The first three steps leaves the welding surfaces clean and covered in flux. The next four steps ensures more than just the surface is at welding heat.

"Pull out and hammer" consists of positioning the two pieces together, and lightly tapping them together. Getting the pieces in good alignment is easier to do if you use the edge of the anvil to steady them. Once there, you can pivot the ends into alignment before bringing them together to hammer.

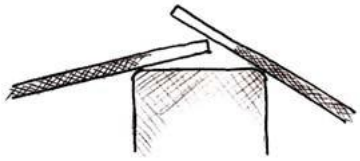


Figure 3: Positioning bars for welding

When hammering the weld together, you want to tap lightly, but hard enough to force molten flux and slag out of the joint. Bring the pieces together, then tap at the ends of the overlapping pieces (1 and 2 in the illustration). Turn the piece over and tap at points 3 and 4, then turn to the side and tap the sides. Once welded, it's always good to bring the joint back up to welding temperature, and perform a second weld . . . Just to make sure you have a good weld.

Scarf Weld

The scarf weld is the basis of most welds made. It overcomes the shortfalls of a lap weld in a number of ways. Looking at the cut-through lap weld in figure 2, you can see that the joint is not completely welded. The weld is strongest underneath the initial hammer hits. A scarf is formed at an angle to maximize the amount of

contact surface impacted by each blow. With this shortened contact area, each hammer blow puts pressure across the entire joint.

Figure 5: Two scarfed bars ready for welding

Other features of the scarf that makes for a better join are its extra mass and the small tip at the end. The extra mass comes from upsetting the scarf so it is thicker than the original bar. This offsets the thinning that occurs when hammering the two pieces together ensuring there is enough mass to match the size of the two parent bars.

Figure 6: Scarfs in position for welding

The small tip at the end of the scarf acts as a quick tack weld on initial contact, securing the two pieces just that little bit that makes a difference when you start hammering.

Figure 7 shows the process of forming the body of a scarf .
These steps are:

1. Upsetting the end
2. Forging a blunt taper on two sides
3. Forging a flat taper on a third side

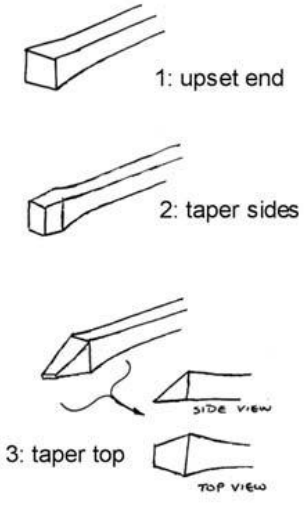


Figure 7: Upset and taper end

The tip is formed by hammering the end of the scarf down on a rounded edge of the anvil with half-faced blows. Lower the handle as the piece is hammered to form the distinctive curve of the tip. See figure 8.

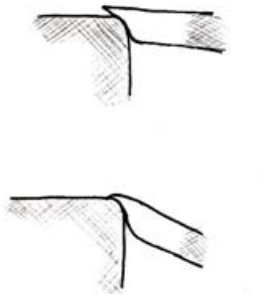


Figure 8: Form tip on scarf

The welding process is the same as with a lap weld, except the point of contact is the two scarfs. Forge scarfs in both bars to be welded, proceed with the lap weld process. In step 8, align the ends as shown in figure 6. Once a good weld is formed, shape the joint to the same size as the rest of the bar.

"Drop-the-Tongs" Weld

If you are making a scarf weld and working alone, how are you going to hold two hot pieces of metal and hammer the weld? That's where the "drop-the-tongs" weld comes in. The process for this weld is the same as the scarf weld with the following difference: once you position the two pieces together, you release the tongs to one piece and use that hand to hammer the joint. This depends upon the pieces "sticking" on contact to keep them positioned through the hammering step. This works best if one of the pieces being welded is much lighter than the other.

Chain Weld

Forging chain is a good welding exercise. It's repetitive, the pieces to be welded stay in position for you, but it could be clumsy at times. We used 8" lengths of 3/8" round bar stock in class for this project. The process is:

1. Bend bar into a "U" shape, ensuring the ends are even

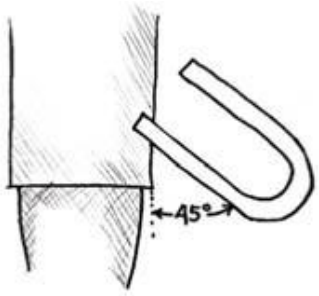


Figure 9: Starting the scarf of a chain link

2. Scarf one end by:
a. Half-face blows while holding the link at a 45° angle to the anvil edge as shown in figure 9.
b. Flip the link up and draw out the longer side of the scarf into a taper as seen in the bottom of figure 10.
c. With this scarf up, repeat on the other end of the link, ensuring one scarf is up and the other is down.

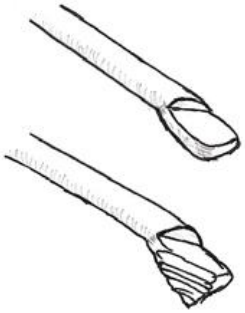


Figure 10: Drawing out the scarf

3. Bend the two ends towards each other and line up the scarfs for welding (figure 11). (the bend doesn't need to be fancy, just a simple angle is needed)

Figure 11: Final position before welding

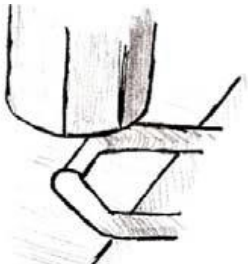


Figure 12: Hammering top and bottom

4. Heat, flux then bring to welding heat.
5. Hammer shut:
    - Tap top (figure 12), flip
    - Tap bottom (figure 12)
    - Tap side (figure 13), flip
    - Tap other side (figure 13)
4. Complete a second link
5. Forge a third link, but before welding, slide the first two links into the third one.

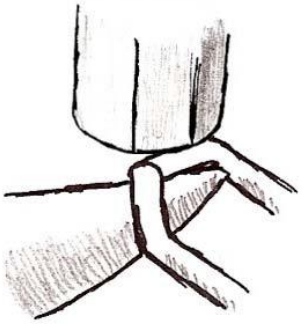


Figure 13: Hammering Sides

6. Hold the assembled links using a simple hook to hold the two completed links out of the fire and out of the way while welding the third link. You can easily grasp the hook and tongs together in one hand, making this so much easier! (see figure 14)

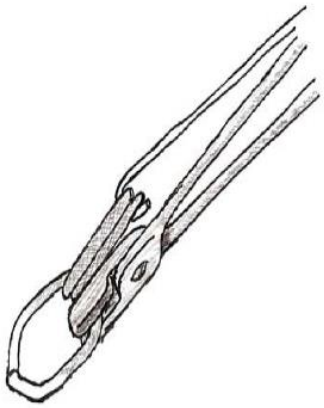


Figure 14: Holding the three links together for welding

Other Types of Welds

This article only introduces the basics of forge welding, but if you think it through, you can apply these same basic techniques when faced with different situations. Here's a few pictures to give you an idea of the possibilities.

Tee Weld

Round to Round scarf weld

Collar Weld


Circle Weld


Loop Weld
Commercial fluxes:
http://www.superiorflux.com/welding.html
manufacturer of EZWeld, Crescent Weld, and others.


Celery weld

Internet References:
The following Internet links are good sources of additional information:
Welding in general:
http://www.1911encyclopedia.org/Welding Full text of the 1911 edition of the Encyclopedia Britannica available online.

http://www.countryside.gov.uk/LAR/archive/publications/ manual.asp Blacksmith's Manual Illustrated (1930). See pages 86, 87 for different welds.

http://www.countryside.gov.uk/LAR/archive/publications/ craftpublications.asp The Blacksmith's Craft (1952). Welding rings: pages 50-76, various weld types: pages 86—98 including two types of "T" welds and forming a square corner using a diagonal weld.

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Jesse Barfield, our President, took a course from David Tucciarone. He is a much better welder after taking the class

In Ryan Callaway's demo, he showed a good pattern transfer method. Just take the pattern to be copied and place it on the metal and spray it with a cheap spray paint. The blank can then be easily cut from the sheet steel!

Philip Simmons Artist Blacksmith Guild

http://philipsimmonsartistblacksmithguild.com/

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Mike DuBois
2017 Cripple Creek Dr.,
Ladsen, SC, 29456
843-819-4539/ forged_art@yahoo.com
Bill Creek
708 Sonny Boy Ln.,
Johns Island, SC29455
843-559-5248/whcreek10@gmail.com
Jason Jaco
29 Woodbine Ct
Columbia, SC 29212
803-799-1865/texasstreet@hotmail
Jody Durham
767 Lynnhaven Dr., Seneca, SC29678
864-985-3919 ironsmith@gmail.com

Membership Application

___ New Member___ Renewal
Name: _____Address: _____

City: _____ State: _____ Zip: _____Phone: _____

email: _____ Sponsor_____
Dues are $15.00 per person/family, per year. Please remit to: C. Ray Pearre, Jr.
4605 Durant Ave.
North Charleston, SC 29405

ACKNOWLEDGEMENT AND ASSMPUMPTION OF RISK

I acknowledge that blacksmithing and related activities are inherently dangerous and involve risks and dangers to participants and spectators that may result in serious injury or death. I have considered these risks and I knowingly assume them. I agree that I am responsible for my own safety during Guild events, including wearing appropriate clothing and protective gear and remaining a safe distance from all dangerous activities. I agree to hold Philip Simmons Artist Blacksmith Guild and guest demonstrators of our craft harmless from liability and expenses arising from of my actions and/or omissions.

When was the last time you paid dues?

There is a note below your address on the last page of our newsletters.
It will say something like…
"Dues Last Paid – 2013"or"Dues for 2014 are due"
This note is updated for each newsletter. We appreciate your prompt payments.

August 16, 10 AM (Really!)

The August Meeting will be at Historic Camden.

Walt Beard will show us what he learned from Bob Alexander on his scholarship. He will demonstrate flower sculpture.

We'll have chicken for lunch. Bring a side or dessert and maybe something nicely forged for Iron-in-the-Hat. Don't forget, Ray gives you 5 free tickets if you bring something you have forged for iron in the hat!

Take I-20 to Exit 98, then North on 521 about 2-3 miles on Right

The October meeting is at Jeff Hatfield's in Woodruff on October 25th.