

The Anvil's Horn

A Publication of: The Arizona Artist Blacksmith Association

Issue No. 148

January 2011

*"Branches with Leaves"
staircase railing. Forged
from 1 1/2" material
and smaller.*

By Brian Hughes

*More of Brian's work
on page 6*



President's Message:

It's getting a bit chilly outside, huh, I actually started wearing long pants in the past couple weeks! Great time to fire up the forge and get some hot work done. That's why we have winters, isn't it?

I was not able to attend the last Hammer-in at Falcon Forge since Hidden in the Hills Art show was the same weekend, but I hear it was a roaring success. Over 60 registrations, iron in the hat had a great deal of donations and I did not hear but I'm sure we had a number of students from the metalworking classes! Congratulations to all who made this a success. Oh and of coarse Ron is the most fabulous host as well as a great demonstrator and teacher!

The auction is upon us as of the writing of this message and the elves are hard at work to make it an exciting event as always.

In January, Pep Gomez from Las Cruces is going to be at my shop (Grizzly Iron) to do a pattern welding demo. This is going to be a demo that you don't want to miss. Pep is an excellent instructor and he is always fun to watch. There is room for folks to camp at the shop (no hookups) but you are welcome! On Friday evening, Pep will be doing a thermite pour, so don't miss that either!

And don't forget Grizzly Iron hosts an open forge on the first Saturday of the month, except in January we are moving it to January 8. Peter Jonnason will be showing how he forges a hand from one piece of iron! Don't be shy to bring stuff to show and tell too!

Keep the forges roaring so you can keep the shop warm!

Grizz

In Memoriam

We'll miss our friends Jim Marson and Jim Lewallen who passed last month.

Jim, Marson is the fellow who had the blacksmithing pavilion at the Renaissance Festival. His wife, Irene is going to keep the business going and would like to find a smith or two to do the re-enactments at the festival. See page 10 for more info. Jim and Irene have resided in Apache Junction for the past several years.

Many of us know Jim Lewallen from the many workshops and classes he attended with us. Jim lived in Wickenburg.

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Demo: January 14, 15, 16 at Grizzly Iron

Pep Gomez - Pattern Forging

Friday January 14: 6:00 pm Thermite pour

Saturday January 15: Gates open 8:00 am. Demo starts at 9:00 am.

Sunday January 16: Demo starts at 9:00 am

Registration: \$15 total for one day or 2. (\$20 for non-members) Friday evening is free

Many of us first met Pep at Fred Bordcherdt's Buckskin Ranch demo. Pep brought several very impressive pattern welded items. Those who saw Pep demo at the SW regional conference in Las Cruces said we had to get him here!. You won't want to miss this demo.

José "Pep" Gómez was born in El Paso, Texas in 1975. He first became interested in metal-working 20 years ago, when he observed an artist casting aluminum at a street festival in El Paso. After that he began gravitating towards general metalworking, including blacksmithing, fabrication, welding, and metal sculpture. Following numerous gallery openings over several years in El Paso, Pep migrated to Las Cruces, New Mexico in 1997 in order to attend welding classes at Doña Ana Community College where he won two back-to-back silver medals in the national welding competition. Following graduation, he worked 4 years for Lockheed-Martin as an advanced prototype fabricator, and has spent six years as a Welding Technology Instructor at the Doña Ana Community College. Gómez has been a member of the *Southwest Artists Blacksmiths* and *Arizona Artist Blacksmith Association* for several years. He owns and operates "Lost Arts Forge and Metal Works" where he specializes in rebuilding heavy equipment, forging one-off parts and tooling, forging of pattern welded items, and welding fabrication and repair of all things metal.

- Lunch is on your own.
- Tailgaters welcome –bring your money
- Remember to bring Iron-In-the-Hat and Show and Tell items
- Camping at Grizzly Iron (no hook-ups)

Remember Iron In the Hat

Thanks to all of you who have participated in Iron In The Hat. By purchasing tickets and donating items, you help support AABA events and projects. Items for donation can be a tool, piece of art, something you don't utilize in your shop, a great book, t-shirt, hat... something an AABA member would enjoy.

Thanks for your continued support.

Look forward to seeing you at demo!

Lucy Schwab

Directions to Grizzly Iron:

Take I-10 to 7th Ave, by the tunnel

Exit on 7th Ave.

Go South on 7th Ave to Grant

Turn right on Grant

Turn right on I3th Ave

Turn left on Lincoln

It's on the left.

The address is: 1329 W. Lincoln St., Phoenix

As always, safety glasses are required.

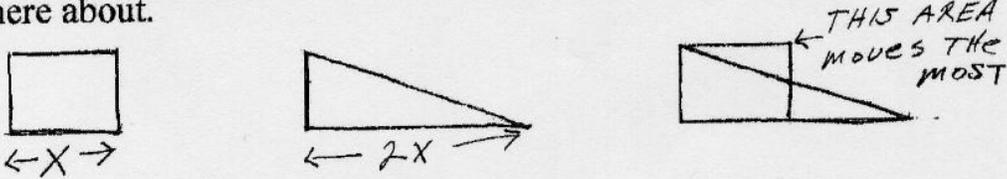
November Demo Report: Falcon Forge

What a great day at Ron Kinyon's. The weather was perfect and the crowd was one of the largest we have had in quite a while. Ron Kinyon had a Chinese Striker self-contained hammer, the Kinyon Mark II hammer, a Big Blu and a Little Giant lined up and running for everyone to compare the attributes of each. He explained and demonstrated differences between each hammer. He covered a lot of ground on tooling and techniques. It was an excellent demonstration. Then Ron's neighbor, Jerry Fuller, showed and explained his hydraulic cold bending and twisting machine.

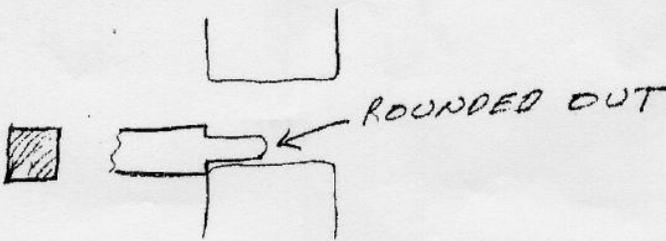


Ron provided us with a lot of Kinyon's Power Hammer Tips. Here's a few. See the rest at www.AZ-Blacksmiths.org

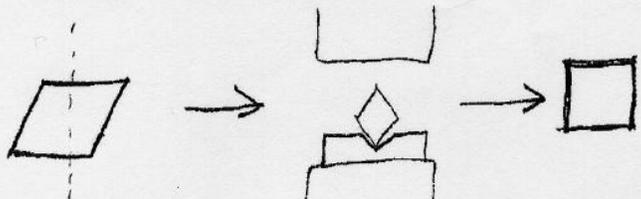
To forge a taper you should double the length of the original stock or there about.



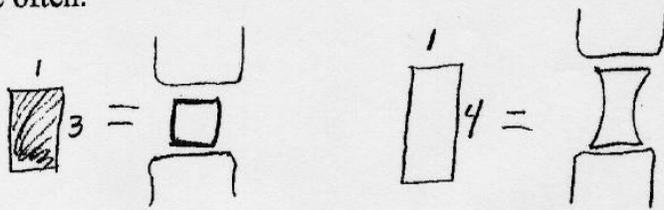
Generally forging Square is the fastest and easiest way to move material



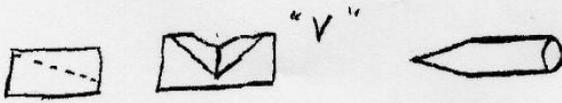
If the stock gets out of square use a "V" block to straighten



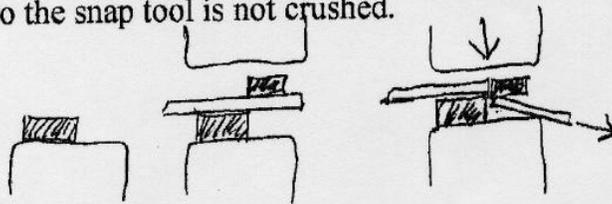
3 to 1 Ratio. This is the limit when forging. 4 to 1 or more will fold or dog bone and twist out of control, if you work over 4 to 1, hit the wide side often.



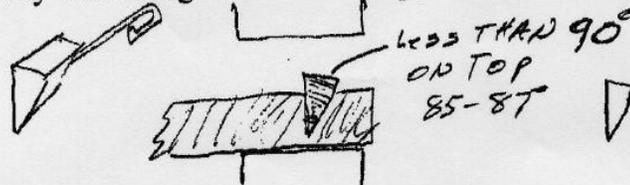
When forging pipe use a "Tapered V block" this works 3 sides and keeps it round, work it round.



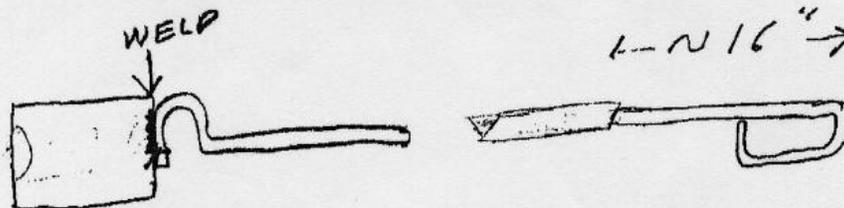
When snapping off stock always use thicker material on the bottom so the snap tool is not crushed.



Cutter tool requires less than 90° on the top to have it cut straight. Only cut through 90% then snap, or use cutter Plate



Most tool handles should be 5/16 or 3/8 round with an "S" at the tool end to slow down breaking welds.



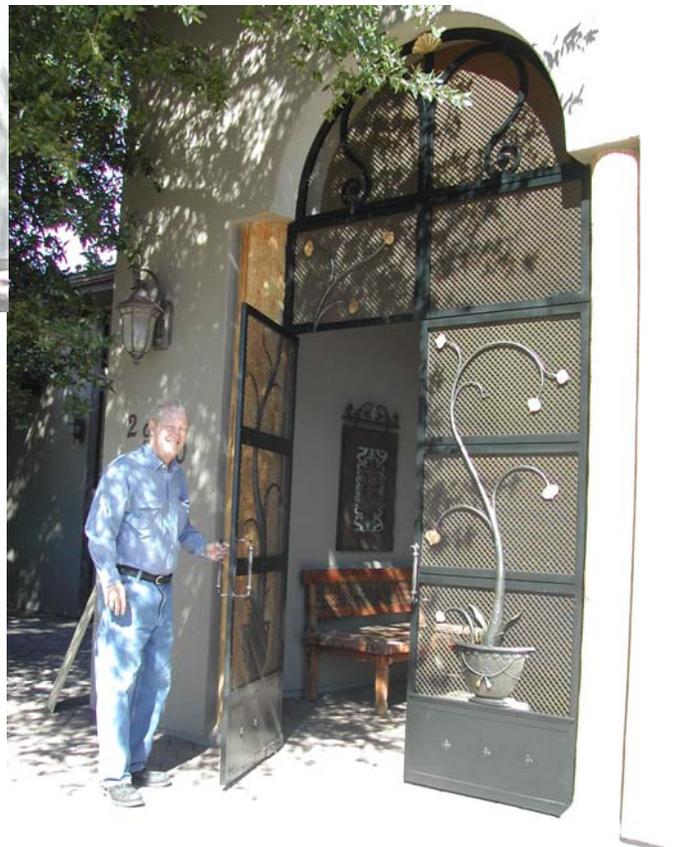
Member's Gallery: Brian Hughes



"Vine of Life" screen doors, 12'6" tall and 6" wide, are mounted on 2-speed, in-ground automatic closers with hold open feature.



Close up of "Vine of Life" screen doors. Main stalk forged from 3' material, handles forged from 1" round bar.



Brian Hughes continued



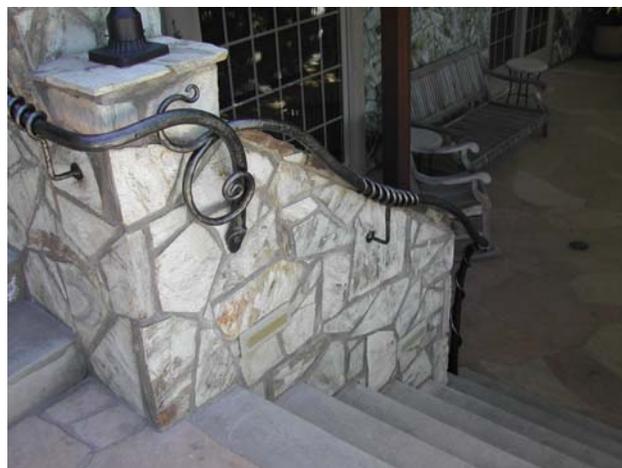
*Andirons, 46" tall.
Forged from 1 1/2 x 3 Steel*



*Vision of Alhambra steel and glass doors.
8 feet tall x 9 feet wide*



*Snake and egg fireplace enclosure with steel drapery.
Forged in steel and copper.*



Forged steel exterior stair railing

Dumb Things Not To Do !

By Harold Hilborn

If you are ever attending a Hammer In and you all pile in someone's truck to go out for lunch with several other blacksmiths in their own trucks PLEASE remember this:

After everyone has finished eating and you're sitting around shooting the bull; then someone yells "WE GOTTA GO, WE ARE GOING TO MISS IRON IN THE HAT." Everyone leaves the restaurant like someone said "There are free blacksmith tools in the parking lot, first come first serve." Don't go to the rest room without telling someone, no matter how bad you have to go. You might just get left behind.

If you are driving one of these said vehicles and someone says "Where is so and so" then someone else replies "I think he got in to someone else's truck." Then you drive away and are out in traffic and see the poor soul who got left behind running around the parking lot like his parents left him behind at a rest area.

Now everyone in your vehicle is laughing uncontrollably and you're crossing 3 lanes of traffic illegally. You are obligated to go back and offer him a ride even if you are going to miss Iron In The Hat.

I must now offer a sincere apology to you Bill (*Ganoe*), but I still think it was all Ira's fault. By the way, Bill wanted to drive his own truck, but we shamed him into getting in ours.

Maybe it would be safe to say, "don't go to lunch with Harold, he just might leave you behind."

A Better Way To Cool Tools

By Randy Stoltz

Both paraffin wax and beeswax have an excellent ability to absorb and store heat. Additionally both of these substances do not have a melting point, they have a melting range (i.e. they slowly liquefy over a range of temperatures not a single point like water). This makes wax a great medium for cooling punches, chisels, drifts, and other tools used to work hot steel as it will cool and lubricate the tool without the risk of hardening it.

I have used a mixture of paraffin wax, beeswax, and powdered graphite to cool my punches and other tools for some time now and have had very good results. You can use all paraffin or all beeswax but I used a 50 – 50 mix since the paraffin is harder than the beeswax (and I had I several pounds of it sitting around). I added the powdered graphite to improve the lubricating properties of the mixture. Graphite is a high pressure high temperature lubricant often used on dies or presses. It works very well on drifts to keep them from sticking. You can also use molybdenum disulfide powder for extreme lubricating applications but it usually costs a lot more.

To make the mixture, I add one tube of the powdered graphite (.21 oz / 6 grams) to 2 cups of melted wax and pour it into a metal cup. Note that wax expands 5 -10 percent when heated so leave some room in the cup.

Here is some additional technical information. Paraffin wax is part of a family of hydrocarbon compounds known as alkanes with the general formula of nH_{2n+2} that are solid at room temperature. Paraffin that is liquid at room temperature is known as mineral oil. Beeswax is not a single compound but is a mixture of several compounds with the base compound very similar to paraffin. Both paraffin and beeswax are solid at room temperature and have a flashpoint of 400° F. The melting range of paraffin wax varies with the exact compound but can be classified as low (125° F - 135° F), Medium (135° F - 145° F), and high (150° F - 165° F). Beeswax has a melting range of 144° F - 147° F.

SW Regional Annual Blacksmith's Conference

February 19 & 20, 2011 Las Cruces New Mexico, Mikey's Place

Pre-registration – through 1 February \$50 (at the door \$65 or \$35 per day)

Set-up & practice - Friday Feb 18

Conference - Saturday Feb 19

Registration 8 – 8:45 (Includes Continental Breakfast)

Demonstration 9 – 12

Lunch 12 – 1:30

Demonstration 1:30 – 5

Open Forge 6 – 9 pm

Conference – Sunday Feb 20

Registration 8 – 8:45 (includes Continental Breakfast)

Demonstration 9 – 12

IRON IN THE HAT DRAWING – 12:30

Afternoon Demonstration 1:30–5

For more info Visit the SWABA website: www.swaba-abana-chapter.org

Or contact Ben Lobue 575-649-9339 blobue@q.com

To Pre-register send the completed registration or included information postmarked by February 1 with check or MO to:

Ben LoBue 5086 Minniec Rd. Las Cruces, NM 88011

Name _____ Email _____

Postal address _____ Phone _____

Enclosed \$ _____ ck / MO

Liability release signature required at door

Featured Demonstrator:

Brent Bailey Forge & Tool Company

Brent Bailey, international blacksmith demonstrator, is known for his 'Damascus Steel' tools.



Brent specializes in a variety of forged products: tools, blades, home accessories, sculpture, jewelry and architectural ironwork. **Brent** will demonstrate tool making basics and present information on basic metallurgy, equipment & the design process. **TOPICS:**

Hammer, Axe, Tongs, Dies, Power hammer tooling, Heat treating different steels & alloys, Power hammer techniques (punching, dies, spring swages), Grinding, Abrasives, Making Handles, Tool repair (chisels, punches, hammers, wood tools), Ornamental techniques (with samples) and a portfolio slide show of favorite ironwork

CALENDAR 2011

January 8	Open Forge	Grizzly Iron	Phoenix
January 14,15,16	Demo Pep Gomez	Grizzly Iron	Phoenix
February 5	Open Forge	Holy Hammer Ironworks	Tucson
February 5	Open Forge	Grizzly Iron	Phoenix
February 19-20	SW Regional Conference	Mickey's	Las Cruces, NM
February 26	BOD Meeting	John Silvestre's	Apache Junction
March 5	Open Forge	Holy Hammer Ironworks	Tucson
March 5	Open Forge	Grizzly Iron	Phoenix
March 19-20	Demo	Holy Hammer Ironworks	Tucson
March 26	Iron In The Desert II (Doves)	Stagecoach Village	Cave Creek
April 2	Open Forge	Holy Hammer Ironworks	Tucson
April 5	Open Forge	Grizzly Iron	Phoenix
May 21-22	Demo	Bar-U-Bar	Skull Valley

Welcome New Members

Kurt D. Perry	John A. Crandall
Gwenyth Larsen	Ernie Gunderson
Dan Mahan	Richard A. Homberg
Robert Holmes	Chris Jones
Hanne S. Garrett	Tedd McDonah
Max McHugh	Kevin Potter
Debra Montgomery	

AABA BOD Meeting

February 26 we will have a board meeting at John Silvestre home. 3:00 for the BOD meeting. John will host a BBQ after the meeting. John is supplying Steak or Chicken. Bring a Side dish to share. Families are welcome.

Address; 4879 N Monterey Dr.

Apache Junction 85120

Nearest Cross roads are Idaho and Canyon

Please RSVP with choice of meat and # of people to grizz@grizzlyiron.com cell-602-717-1458

CALL FOR IRON

Interested in demonstrating and or selling your blacksmith products at the Arizona Renaissance Fair, in February and March? Show your work to 10,000 people a day.

Products will be juried.

For more info Contact Irene Marson at

Election Results

See page 2 for the complete list of officers and directors.

Sarah Harms, Kristin Loving, Clark Martinek and Jim Sheehan all volunteered to serve on the board of Directors and were elected.

The officers all volunteered to sign up for another term, with Paul and Mary Ann switching positions. Current board members whose terms were up were re-elected. There is another group whose 2 year term will expire next year.

These are the folks that make our association work. Remember to let them know you appreciate their service. If there is anything you'd like to see done differently or would like to help, let them know that, also.

Deadline: February 4 for the March issue of the Anvil's Horn. Earlier would be greatly appreciated. Articles, photos, notices, and ads can be emailed to: Danshammer@cox.net or mailed to AABA 2522 W. Loughlin Dr. Chandler, AZ 85224

Education Committee Needs Your Input

Peter Sevin, your new education coordinator would like suggestions from the membership for classes you would like to attend or teach.

Whatever your interest let Peter know. 602-320-2384 or email: psevin7@cox.net

AABA Website: AZ-blacksmiths.org

2011 Dues are Due January 1
Don't forget to send yours in. Thanks!

Open Forge: Phoenix

Grizzly Iron is hosting their monthly open forge on January 8. Peter Jonasson will demonstrate hand forging or rather forging a hand. 8:00 am until it's done.

Grizzly Iron, Inc
1329 W Lincoln St., Phoenix, AZ 85007

Open Forge: Tucson

Harold Hilborn of Holy Hammer Ironworks will host open forges in Tucson on the first Saturday of each month through April. Hours: 9:00 am—1:00 or so.

If you have a project you want to work on, a welding repair, or just want to stop by and have coffee with some friends, please attend. Some dates could be canceled due to scheduling conflicts, so please call to verify. Address: 5870 E.14th St. Tucson. The shop is located on the Tuller School Campus.

For directions or questions give Harold a call at (520) 603-6723. Hope to see you there!

Pieh Tool Educational Opportunities

Beginner/Intermediate Blacksmithing Classes with Gordon Williams

Class Dates:

Jan. 21-23

Feb. 18-20

Mar. 11-13

Apr. 8-10

May 6-8

\$455 per 30 hour class. All materials and equipment are provided.

Bill Pieh Resource for Metalwork at Pieh Tool in Camp Verde, Arizona. Contact: 928-554-0700 or www.piehtoolco.com

MCC Has Welding & Blacksmithing

TIG, MIG, Arc, Gas, and Art classes are all available, as is certification in any of those welding methods at Mesa Community College, Southern and Dobson in Mesa.

The MCC blacksmithing program is one of the best deals around - over 60 hours of instruction for just under \$450 and that includes material and propane! Saturday (Jaimie Escobedo instructor) and evening classes (Dan Jennings instructor) are available. Blacksmithing is WLDI03.

Classes fill early so it's not too early to be thinking about fall 2011.
For more info go to: www.mesacc.edu

AABA New Member and Membership Renewal Form

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____ Email _____

Professional blacksmith _____ Hobbyist _____ Farrier _____ Blades smith _____

Your main blacksmithing interest _____

Occupation or skill _____

Please check one:

Regular membership (\$30) _____

Family membership (\$35) _____

Mail to: Terry Porter
2310 E. Melrose St.
Gilbert, AZ 85297

Make Check Payable to AABA

CHASING & REPOUSSE New Eyes - New Look

by James McLaughlin

As a Blacksmith I got trapped in a steel box called fabrication, thinking that all I could work was steel and iron using other materials like copper or brass as a splash of color to break up the black (iron). Thanks to a recent workshop taught by Rodger "Grizz" LaBrash, I learned to use the ancient art of Chasing & Repousse (Chasing - working from the finished side of a project. Repousse - working from the back side of a project). The ability to use the contrasting parts as a focal point is a whole new world of possibilities for anyone willing to try and it's almost as easy as tracing a picture. The great thing about this is these techniques can be adapted for working with steel too. The only difference is the tooling needs to be heavier and stronger.

Here's how to get started. The tools - you can make them yourself out of 1/4" tool steel, S-7 is what we used in the class, or you can order them. The hammer and punches can be found on EBay or in Jewelry supply shops or, for the punches, if you ask real nice you might get Grizz to make you a set.

The Backing - there are commercial pitch bowls available or you can make your own out of cast iron cookware. We learned there are three kinds of pitch - red, green and black. Black being petroleum based is probably not something you would want to use if you want to work in or near your house. The red and green are resin based. From first hand experience the red gives off the smell of pine when heated. You can even use sand or carpet pieces, although you might lose some of the finer details.

Heat sources, you need two. #1, heating the pitch. The red and green can be heated in the oven though it will take longer for the pitch to set because the cast iron holds the heat a long time. Or you can get a heat gun, the kind used for stripping paint works great. #2, Annealing the copper. We used a propane weed burner. It's quick and it fits your work no matter the size.

Next, after annealing the copper it turns black. The black scale is nasty stuff and needs to be cleaned off. We used Sodium Bisulfate for the pickle, (you



can find it anywhere pool maintenance supplies are sold - look for "ph -"), about 1/2 cup to 5 gallons of water. Also the warmer the pickle the faster it works. It doesn't have to be heated, however, it does need to be kept in a sealable container. Grizz said an ice chest will last about 5 years or so.

Here are a few other things you will need: a water bucket, Scotch Brite pads and or fine steel wool, rubber gloves, Chapstick (it's a great releasing agent for the pitch), brass wire brush, putty knife, dish soap, liver of sulfur, a well lit work area, and a spray adhesive for sticking a pattern to the piece and a wax or sealing agent (we used Renaissance wax in the class).

A good thickness for the copper is 18 oz., it works fairly easily and doesn't tear as easily as thinner material does. Start with a smaller project like a 4" x 4" square, this size allows you to see results quickly without being overwhelming.

Starting the Project.

After annealing and pickling the work piece, attach your pattern to the copper with adhesive. Turning the corners of the copper down about a 1/4" will help hold in place while it's being worked. Heat the pitch to about a 1/4" depth is soft; smear a thin layer of Chapstick on the back of the copper so the pitch won't stick to it. Now set it in the pitch and allow the pitch to cool and set up before you start to work it. "Hint" - placing it in the freezer will speed up cooling dramatically.

Now that the pitch has set it's time to Chase the lines of the pattern. To make sure your lines are deep enough you should be able to catch your finger nail in the line you just hammered in. Once you have completed Chasing your pattern it's time to flip your work over.

Use the heat gun to heat the work piece and a putty knife to pop it out. After the piece is free from the resin it needs to be annealed and cleaned. While the piece is in the pickle use the heat gun to heat the pitch until it flows, then shake to level, filling in the area where you were working.

Now you're ready to begin the Repousse work (pushing out from the back). Start by turning the piece face down into the pitch (remember to cover the pitch side with Chapstick), you should be looking at the raised lines from the Chasing. Use the flat side of the Butcher tool on the raised lines and start pushing the copper to the finished side of the piece. Depending on the depth and amount of detail you may need to repeat this step several times.

Once you've completed pushing from the back (Repousse), you will need to flip the piece over again and refine the details by Chasing from the front. Once again, use the heat gun to heat the work piece and a putty knife to pop it out. After the piece is free from the resin it needs to be annealed and cleaned. While the piece is in the pickle use the heat gun to heat the pitch until it flows and shake to level, filling in the area where you were working. Don't forget the Chapstick on the back to keep the pitch from sticking, then use the putty knife to scoop out some pitch and smooth it on the back of the piece to fill in the voids from the Repousse work. Allow it to set up before placing back in the pitch bowl.

Now, use a Texturing tool to remove any left-over tool marks. Remove from the pitch and clean using soapy water and brass brush and rinse. While piece is drying, mix up the Liver of Sulfur, brush this on the piece when completely dry to patina the copper and rinse with water to stop the reaction and rub on the wax to seal.

You Are Done.

Raising Workshop

When:

April 15-17, 2010

Where:

The Studio of Grizzly Iron, Inc.
1329 W Lincoln St
Phoenix, AZ 85007

How much:

Registration \$395.00

(\$100.00 Down payment required when registering, to reserve your spot in the class)

What you take home:

Raising Hammer
One Raising Stake
Copper for your projects

Why:

To learn how to raise copper into vessels and other such objects. This workshop will enhance your metal working skills as well as create new ones. We will also go over the basics of making a raising stake.

How to Register:

Register online at www.grizzlyiron.com or contact Rodger or Jason at 602-716-9660



Building 18th Century Double Bellows

by Bill Ganoe

I am fascinated by all facets of blacksmithing, but I've gotten hooked hard on the historical aspects of the craft. One day a couple of years ago, I was wandering through the recently opened Presidio San Augustin del Tucson (a partial reconstruction of the original, late 18th Century Spanish colonial fort.) and I noticed several demonstrations of colonial-era activities: cooking, baking, weaving, spinning, etc. I had to open my mouth and ask about the lack of a blacksmith shop. One of the officials said, "Funny, you should ask. We're looking for someone to volunteer for that." I asked around to see if there were any experienced blacksmiths in the area who were interested, but I came up empty-handed, so, in spite of my novice skills, I became the resident demonstrator.

I had a small rivet forge with an electric blower and an 85-pound London pattern anvil. My costume was blue jeans and a denim shirt. None of these things could represent an authentic Spanish colonial smithy typical of the 1790s, but they got me through the first several living history demos. To provide a more authentic image, I dug into "Southwestern Colonial Ironwork: The Spanish Blacksmithing Tradition" by Marc Simmons and Frank Turley. There are few sources of detailed information about colonial-era blacksmithing in the southwest, but people associated with the Presidio agreed that creating a smithy similar to the drawing on the cover of the Simmons and Turley would be a reasonably authentic addition to the Presidio grounds. (Fig. 1) That meant building a side blast forge with adobe bricks and mortar along with concertina, or double, bellows as shown in the drawing. Both the bellows and the forge have been built in the last year, and they are in use during living history

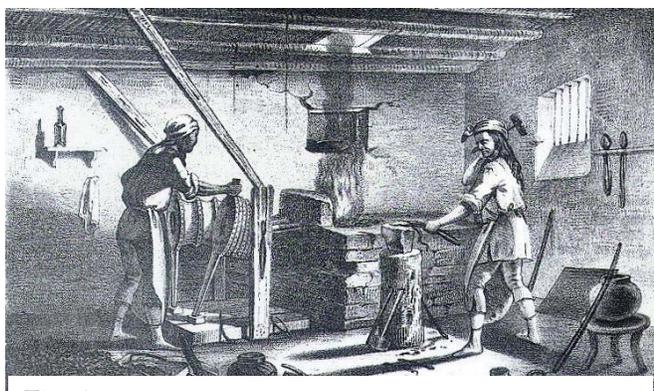


Fig. 1: *Indian Blacksmith Shop (Pueblo of Zuni)* by lithographer James Ackerman based on a sketch by Richard H. Kern that appeared in "Report of an Expedition Down the Zuni and Colorado Rivers (1853)" by aptain L. Sitgreaves.



Photo 1. Proof-of-concept bellows and adobe forge ready for a living history demonstration at the Presidio San Augustin del Tucson in Tucson, Arizona.

days at the Tucson Presidio this fall. (Photo 1) (Designing and building the forge is the subject of an article published elsewhere by Eric Thing of Tucson.)

Here's how I built the bellows.

The Simmons and Turley book provided many details of colonial-era bellows, but no detailed plans. I was able to obtain some sketches, with a few dimensions, of the bellows built for the La Purisima mission in California. The Simmons and Turley book noted that rawhide as well as "sheepskin, goatskin, cowhide, and buffalo hide were known to have been used in" colonial era bellows. None of those materials are cheap today, so I decided to build an air bag using a discarded shower curtain instead of leather to test my initial ideas for construction. (Photo 2)

The shower curtain from my junk pile provided enough material for an air bag about 12" in diameter and 24" long. The actual dimensions of the sheet I cut was 40" x 26". That would allow 1" of material to fold



Photo 2. Bellows air bag made from a shower curtain and plywood ribs.

ver the ends of the tubes and 1" of material to sew a seam along the length of the tube. (The actual circumference of the tube would be $12" \times \pi$ or 37.7".)

I guessed that I would need four ribs to support the tube plus two ends. I cut six disks 12" in diameter from 3/8" plywood. I cut 3" holes in the center of the end pieces, for intake and exhaust, and holes 10" in diameter in the four ribs. I "sewed" the shower curtain "hide" with many small staples, and I attached the tube to the end pieces and ribs with furniture tacks. The number of tacks that stuck out the side of the disks indicated that (1) I needed to improve my hammering accuracy, and (2) 1/2" plywood might be a much better choice for the disks. The intake and exhaust valves (flap valves) were 4" squares of heavy (1/16") vinyl scraps tacked over the holes in the end pieces with stick pins. Crude as it was, the performance of the air bag motivated me to move on to a model built with leather.

About the only detailed information I had about the leather to use when I started was the little booklet, "How to Make a Blacksmith's Bellows" by Robert M. Heath. The advice in there was to use 4 oz to 5 oz. meaning a thickness of about 4/64 - 5/64 of an inch) chrome tanned leather. I went to a Tandy Leather Factory store in Tucson and explained what I was trying to do, I came away with a side of 4 oz suede.

Leather usually doesn't come in nice, regular shapes that meet whatever dimensional requirements you might have. The best I could lay out on this hide was a piece about 25" x 35 3/4", That meant I could make a tube about 11" in diameter with enough overlapping material to sew the leather together to produce a tube. I took the sheet to a shoe repair shop to be sewn.

I cut six disks 11" in diameter from 1/2" plywood. The ribs had holes 9" in diameter, and the end pieces had 3" holes. I nailed the tube to the disks with 3/4" furniture tacks, and I made the flap valves from 4" square patches of suede backed with a 4" x 3 1/2" piece of heavy pasteboard. The 3 1/2" side of the pasteboard allowed a 1/2" strip of leather to be nailed to the end piece and act as the hinge for the valve.

The operation of this air bag was impressive enough for me to start work on a second air bag. I got another side of



Photo 3. Frame for the double bellows under construction..

4 oz. suede. Note to self: Get enough leather at the same time, probably two sides, to complete two air bags.. Different shipments of leather don't necessarily have consistent coloring. In my case I wound up with two lungs of obviously different shades of tan. They still move air, but the appearance is a little sloppy.

When I started this project it wasn't clear that there would be a place to store the bellows at the Presidio -- and I had no place at my home to store a fully assembled bellows -- so I worked up a portable design with a vertical frame to which the air bags would be attached and a base to which the vertical frame could be bolted. I had no completely dimensioned drawings to work with, so I

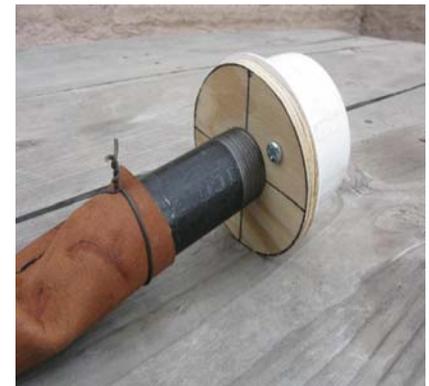
made some educated guesses. Since I was guessing I designated this incarnation of bellows to be just a proof-of-concept model. That was justification for building the framework out of 2 x 4's using fairly modern hardware. (Photo 3). I assured the people at the Presidio that the second generation model would be built using techniques and hardware more appropriate to the 18th Century.

The vertical staves attached to the ends of the air bags act as handles, or paddles, for operating the bellows as well as providing support for the air bags. Given that this was a proof-of-concept model using modern construction, I could have worked out a fairly modern arrangement for hinging the paddles, but I decided to go with a more period-authentic scheme where the paddles were loosely tenoned in part of the base. (Photos 1 and 3)

The design of the vertical frame was determined by my intention to make an airtight plenum to combine the output of the



Photo 4 & 5: Exhaust adaptor/connector with leather air tube. Opposing views



Bellows continued on next page

two air bags and direct it into a single tube that would be attached to the tuyere. Making an air-tight box using lumber from a local DIY store presented a problem. Kiln-dried or not, such lumber seems to warp if you breathe on it these days. A generous dose of roof patching cement didn't completely remedy the situation. Given that the smiths of 200 years ago probably weren't very concerned with air-tight plenums, I could probably get away with some (or maybe a LOT of) leakage.

About this time I described my problem to an experienced Viking-era re-enactor. He explained that the bellows he used, and probably most bellows up through the 18th Century, didn't even have exhaust valves. They certainly didn't have plenum chambers. He pointed out that the old bellows exhausted through tubes that were loosely coupled a tube that lead to the tuyere. The output of a double bellows would have been feed through a Y-fitting. The output tubes may have been made of clay, metal, wood, or leather. The Y-fitting could well have been molded into the forge rather than being a separate piece connected to the tuyere. The loose coupling might involve the output tubes more or less aligned axially with the tuyere pipe but separated by an inch or so. The tube leading to the tuyere might be merely larger than the output tube or it might involve a funnel-like end to minimize loss of the air stream. The idea behind the loose coupling was to allow hot embers that could be sucked back from the fire to drop out before traveling into the air bags and burning holes in the leather.

So, I gave up the plenum idea. My first attempt to deliver air to the forge involved some 3" flexible clothes drier tubing. The 3" tubing fit the 3" hole in the end of the air bags. The flexible tubes from the two air bags were loosely connected to a funnel that was stuck into a length of 1" black iron pipe that acted as the tuyere. Eric Thing constructed an adaptor, shown in photos 4, 5 and 6. that coupled the 3" hole in the end pieces to short 1" black iron nipples. (Yes, that adaptor is a 3" PVC floor drain.) He also made a couple of tubes out of leather that fit over the nipples and were held open with spiral springs that he wound. He also fabricated a Y-fitting of 1" black pipe that served as the tuyere. It was embedded in the adobe mortar of the forge. (Photo 7) We wound up trying to minimize air leakage rather than trying to emulate the loose couple design. Remember, this is a temporary, proof-of-concept model. If embers sucked back from the fire do present a problem, I will go for loose-coupling in the second generation bellows -- or

I may try to cobble up a means to camouflage an exhaust flap valve.

This bellows provides plenty of air to our adobe forge. We've made many nails and other small trinkets, including some welded chain links, from 1/4" and 3/8" rod. It proved to be an interesting and rewarding challenge -- one of the many that make blacksmithing fascinating.

If any readers are interested in detailed, dimensioned sketches of my bellows, contact me. I'm in the current AABA roster.



Photo 6: Exhaust adaptor/connector with leather air tube fitted into the end of one of the air bags which is mounted, with four 3/8 x 16 bolts, on the vertical frame.



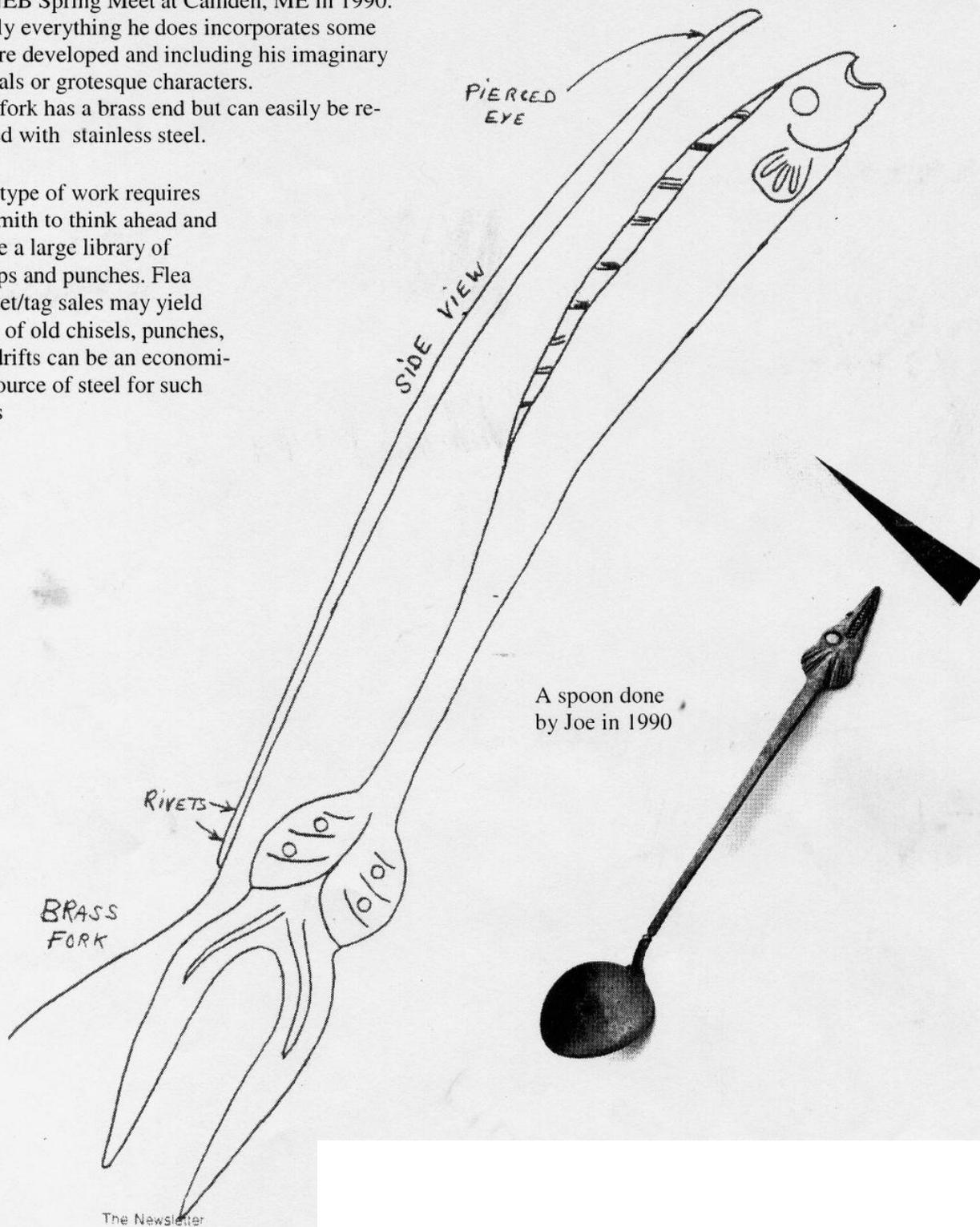
Photo 7. Fabricated black pipe Y-fitting/tuyere embedded in adobe mortar in the forge.

Fish Fork by Joe Anderson

Reprinted from The Blacksmith's Guild of the Potomac, December 1989

Joe Anderson was the featured demonstrator at the NEB Spring Meet at Camden, ME in 1990. Nearly everything he does incorporates some feature developed and including his imaginary animals or grotesque characters. This fork has a brass end but can easily be replaced with stainless steel.

This type of work requires the smith to think ahead and create a large library of stamps and punches. Flea market/tag sales may yield finds of old chisels, punches, and drifts can be an economical source of steel for such items

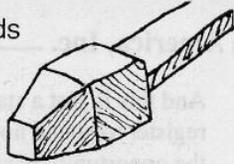


Daryl Nelson's Wolf Head

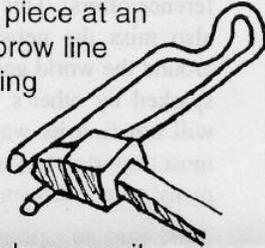
by Jesse Ellingson

Reprinted from Hammer Marks Spring 2004

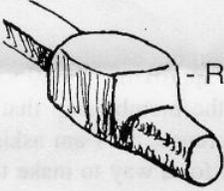
- All Daryl's 3 dimensional heads start with a 3 sided taper (with the bottom flat) on a piece of large square stock



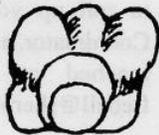
- Starting on the top - hold hot piece at an angle to anvil knocking in the brow line
- then on both sides with a spring fuller to create jowls



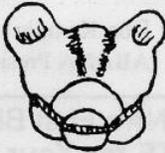
- Round up muzzle on anvil



- In the vise - with 1/4" fuller put in 2 lines on the forehead to separate ears and a line on each side to separate jaw line from cheeks and for placement of eyes

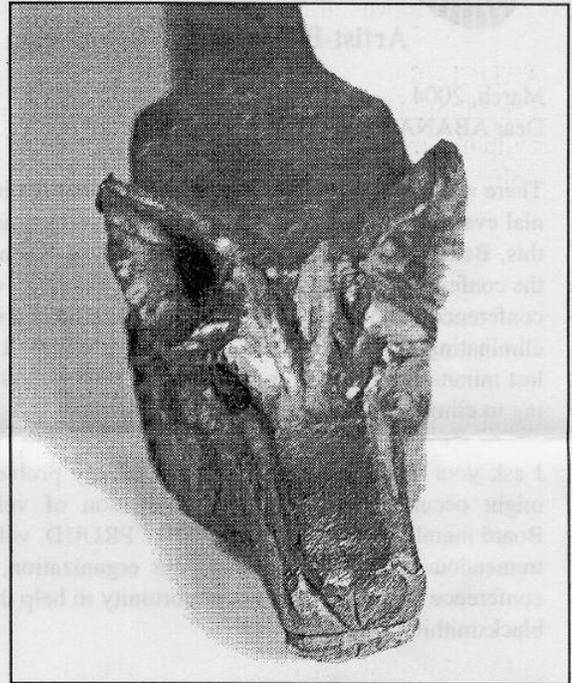
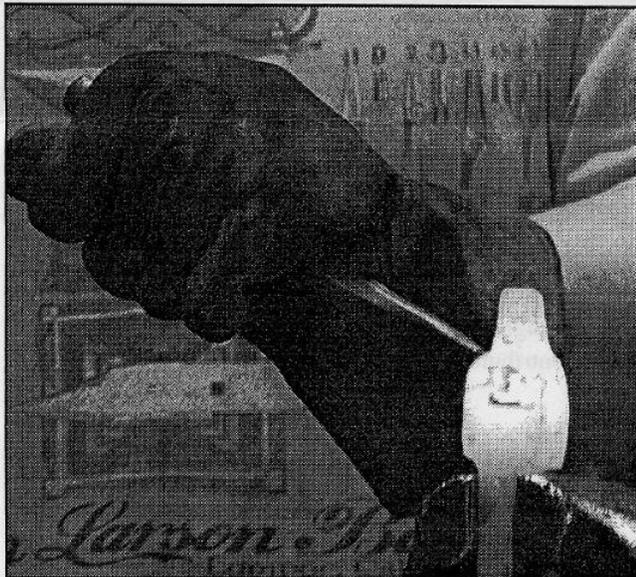


- With same fuller put line in for mouth bringing it around to meet end of line at eyes



- Start at top front corners forcing back material for ears

- On the corner of the anvil - shape and draw out ears to points

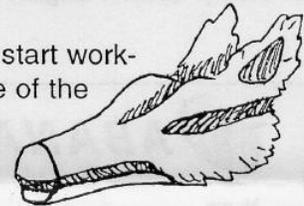


- At this point the difference between the wolf and the bear is the longer snout and pointing the ears

- With a "fuller swage" (concave and convex at the same time) work around the sharp cheek and brow lines to soften the face planes



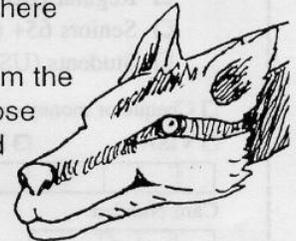
- With a pointed punch start working the ears at the base of the skull adding "fur" lines around edge with a sharp chisel



- Continue refining the brow with the fuller swage

- Open up eyebrows with small punch so you can get the eye punch in there

- Isolate the nose mass from the muzzle - cut in lines for nose and "feather" out fur beard on bottom jaw.



Notes & drawings by Jesse Ellingson

Classifieds

Classified ads are free to members and can be submitted by email to: danshammer@cox.net

Boyles' Tool Service would like to sell several items including a coal forge, tumbler, sand blaster, and plasma cutter. They also have tons of "scrap iron".

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Sources

Rocky Mountain Smiths have videos available of their conference demonstrators. Most of these are high quality edited, multi-camera videos. For more info go to:
www.rockymountainsmiths.org

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MCC student, Tyler Adams, made this sign bracket. The plan is to change the sign to match the season.

