

Saltfork Craftsmen Artist-Blacksmith Association

July 2008



Happy 4th of July

**Saltfork Craftsmen
Artist-Blacksmith Association
Officers and Directors**

President: Jim Carothers 580-336-9213
9501 Frontier, Perry Ok. 73077
frontiershop@wildblue.net

Vice-President: Gerald Franklin 580-467-8667
Rt. 3 Box 239J, Duncan, Ok 73533
franklin@gci-wireless.net

Sec-Treas. Mike George 580-327-5235
1227 4th St. Alva, Ok. 73717
mike-marideth@sbcglobal.net

Director: JC Banks 580-482-3209
16007 S. CR 206 Altus, Ok. 73521
jc.banks@okstate.edu

Director: Byron Doner 405-650-7520
6520 Alameda, Norman Okla.
byrondoner@earthlink.net

Director: Bill Kendall 918-742-7836
1756 E. 59th St Tulsa Ok. 74105
wwkendall@aol.com

Director: Richard Dyer 918-582-5065
1119 S Birmingham Pl. Tulsa, Ok. 74104
irondyer@aol.com

Assignments:

Editor: Diana Davis 580-549-6824
23966 NE Wolf Rd Fletcher, Ok 73541
Lazyassforge@tds.net

Librarian/Education:
Gerald Franklin 580-252-6002
Rt 3 Box 239J Duncan, Ok 73533
franklin@gci-wireless.net
cell phone 580-467-8667

Events coordinator: Bill Davis 580-549-6824
Lazyassforge@tds.net

The Saltfork Craftsmen Artist-Blacksmith Association, a non-profit organization of amateur and professional artist and craftsmen, publishes this newsletter monthly. Our purposes are the sharing of knowledge, education and to promote a more general appreciation of the fine craftsmanship everywhere. We are a chapter of the Artist-Blacksmith Association of North America.

Material from this newsletter may be freely copied without permission for non-profit purposes. Please credit the author and this publication.

Visit our Saltfork Craftsmen Website:
www.saltforkcraftsmen.org

Trading Post

For Sale:

3/4" round bar of 5160 (\$3.30 per foot plus shipping)
3/4" and 1" round bar of 52100 (\$6.00 and \$9.45 per foot plus shipping) Contact Ray Kirk, ray@rakerknives.com or 1-918-456-1519



Army surplus round nosed pliers that make good scroll pliers for small items. They are 6" long \$5.00 each plus shipping. I also tie brooms on your handle or mine. \$20.00 plus shipping. Diana Davis 580-549-6824 or lazyassforge@tds.net



Due to health problems, I have decided not to rebuild any more Little Giant hammers. I have for sale :One decent used 100# hammer (\$3,500), one completely rebuilt 50# hammer (\$4,500), one good condition used #50 hammer (\$3,500), two rebuildable 50# hammers (one at \$1750 and one at \$2,000), I have some miscellaneous parts, dies, babbit mandrels, and etc. for sale. Contact Mike George at 580-327-5235 (home), 580-829-1968 (cell) or Mike-marideth@sbcglobal.net

Wanted:

Advertising Coal Hammers, Contact Mike George at 1-580-327-5235 or o Mike-Marideth@sbcglobal.net



Auction: Aug 2nd in El Reno Ok. Large selection of Blacksmithing tools, forges and other equip. Ron Buxton, owner 405-802-7245
Redingsauctionservice.com for info.



Complete blacksmith line-shaft. Good Running Condition with post drill, pedestal grinder/wire wheel and 40 lb Perfect Power Hammer, Lots of extras, Call for info. 817-329-5299 Jim White

Club Coal

Saltfork Craftsmen has Arkansas coal for sale. The coal is \$95/ton to members and \$145/33non-members.

Bring your own containers. Contact Tom Nelson at 1-580-862-7691 to make arrangements to pick up a load.

DO NOT CALL AFTER 9 P.M. If you make arrangement well in advance, Tom can load your truck or trailer with his skid steer loader. Otherwise you will need to bring a shovel. The coal can be weighed out at the Douglas Coop Elevator scales. The coal is in large chunks; bring something to break up the coal into manageable pieces.

S/C Region coal location: Coal is in 1-2" size pieces.

Bring your own container. The coal is at Max Scrudder's place in Mountain View. Contact Max for load out instructions.

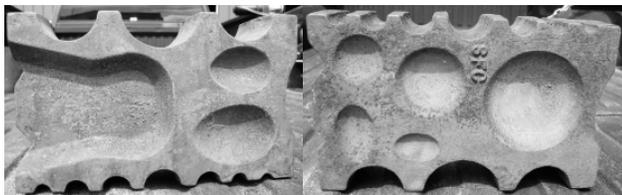
Cost for this coal is .06/pound or \$120.00/ton. NO SALES to non-members.

Max Scrudder can be contacted at (405) 226-9951

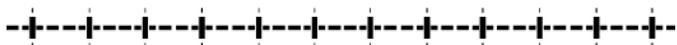
NE Region coal location: Dan Cowart also has coal to sell. He can be contacted at dacowart@dishmail.net or CowartPat@gmail.com

Saltfork Craftsmen Swage Blocks \$105.00 each plus shipping. SCABA members can purchase one block for a special members price of \$85.00

Contact Mike George at 1-580-327-5235 or mike-marideth@sbcglobal.net or Bill Kendall at 1-918-742-7836 or wwkendall@aol.com



Mail your ads to the editor or email them to lazyassforge@tds.net



MEETING SCHEDULE

July

South/Central region—July 19th. Hosted by Max Scrudder at his shop in Mountain View, Okla. Lunch is provided but bring a side dish. The trade item is a wall hanging. Max's shop is located just south of the auction barn.

Northeast regional meeting. July 12th hosted by Dwayne Moss at his shop in Mannford. Lunch will be a fish fry with all the trimmings. Trade item is anything with a leaf. Find your way to Mannford.

From the stoplight in Mannford. (Sonic will be on the NW corner) continue from the stoplight for 2 miles (West) to the intersection of Hwy 51/48. At the intersection, turn right (North) and another very quick right will be 361st West Ave. Our house is the 3rd house on right, the shop is behind house— red metal building.

Bonus: Charlie Groom is co-hosting and is planning to make Root Beer for everyone to enjoy.

If Coming from OKC. At the intersection Hwy 51/48 continue through the intersection north to 361st West Ave. house is the 3rd on right.

Southeast regional meeting. July 5th. Open

Northwest regional July 26th hosted by Ron Lehenbauer . Ron Lehenbauer will be the main host for this event but there will be a lot of other members helping him put on this event. It will be held at the **Pavilion at Salt Plains Reservoir** just off River Road below the Dam. (Same location as last years SaltPlains Picnic) There will be plenty of burgers to partake of but bring a side dish and a lawn chair. Everything gets started at 10:00 A.M. Bring your forges and come enjoy the day. It will also be a day to remember long time member Ruth Burns. Ruth passed away last month. Ruth, along with husband John were among the founding members of this club. It is only right for us to spend a day sharing memories of her and all the influence she had on all of us during her life.

PUBLIC DEMO'S AND REQUEST

Aug 28th. Poor Boys Antique Tractor Show in Fletcher, Okla. School Day is Thursday from 9-2:30. Gerald Franklin is doing the demo's for this event but if you want to come help, I sure he won't run you off.

Sept 26-27 18th National Two Cylinder Show and Threshing Show, at Fairview, Ok. This is what they call a working show with games, plowing, baling, threshing, etc. Contact James @ 580-227-4985

October 18-19 SCABA conference at Perry Ok.

You need to be making your plans for the SCABA Conference in October. Don't forget that hotel rooms are sometimes in short supply. Book your room early, you can always cancel it (according to hotel regulations) if something comes up and you can't attend.

Also start working on a nice item for the auction and collect items for the Iron-n-hat.

You can also make a tool to be donated to the tool box. Adam is putting final touches on the box and David Seigris has tickets printed and for sale now.

SCABA TOOL BOX

Raffle tickets are now available for the tool box. If you would like to purchase tickets or get some to sell for the club please contact David Seigrist, tool box chairman. The tickets are \$2.00 each and come in booklets of 5 tickets or \$10.00 each booklet. The drawing for the box will be done during the conference in October. Check out the list of tools and pick out something to make and donate to the box. All the boxes in the past have been really nice because of the box and tools made by the members.

Forging request

I am looking for someone to make some steer roper horseshoes like the ones Bill Epps used to make. We got some from him last year, but I guess he has retired. I would appreciate if you guys could let me know if any body still makes these. We have a friend wanting some for Christmas presents. I am hoping Bill taught ya'll how to make them. Thanks..Lyndon Wagner. bearcave@amaonline.com

Knife show

The annual Knife show held at the Holiday Inn at 2101 S. Meridian will be held on Sept 20, 21st. You can contact Ray Kirk for more information. ray@rakerknives.com

Texas Annual Chuck Wagon Cook Off

I got a call asking me to demo only 5 days prior and like a crazy man I said yes!. Lesson here is have items made up just for these surprise demos. I did have an assortment of some things and even took 2 of my copper roses not expecting to sell them, mainly for display...they sold! It was fun, had a good



amount of interest and the usual statements you hear at demos. "This is a dying art." "I didn't know people still did this." and of course the "My Grand Daddy was a blacksmith". I had handouts of how to join "Saltfork" and how to get started in blacksmithing. (Thanks Jim C.) I also was asked by one of the wagon cooks if I could/would make a lantern hanger for his wagon, made 3 to his specs and he was happy. I was asked to come back next year and you can bet I will be better prepared...I hope!

Although it was very HOT the crowds were there. Many enjoyed the great cooking at Glade-water's Chuck Wagon cook Off on march 31. There were 15 chuck wagons entered in the cook off, one coming all the way from South Carolina.

Tommy Dean

Mangum Oklahoma Frontier Days Art Show

Recently I was invited to come to an Art Show at Mangum on the 21st of June, during their Frontier Days celebration. It was held on the Court House Lawn, which provided several nice shade trees. I forged all day and had a good time. Going with some suggestions of other smiths I made a display board in addition to my sales table so people could see items from afar. Also, my dad went with me and took care of sales, which turned out to be a big help. I could spend my time forging and talking with onlookers and he could visit with folks coming by. Several came by and couldn't believe there were blacksmiths still around, and had no idea you could custom order pieces for various applications.

I guess there must have been about 1,000 people pass thru and most stopped by for a few minutes and a few camped out all day watching hot metal come out of the fire. The local radio station 1450 AM out of Altus came up and asked for an on-air interview which I gladly did and put in a plug for SCABA. One of the best items to demo was a Fredericks Cross that Diana Davis has in her sketchbook. It works very well if you have kids who are good guessers at what you are making. That one keeps them guessing right up to the end.

It was a very nice day and folks really enjoyed themselves. I look forward to going back next year.

David Seigrist

Tool/Item	Maker/Buyer	Cost/Value
Box	Adam Hall	\$300
Hardware for toolbox	Mike George	
Cross peen hammer		
Straight peen hammer		
Rounding hammer		
Tongs:		
¼ v-bit		
3/8 v-bit		
½ v-bit		
¾ v-bit		
¼ flat		
3/8 flat		
½ flat		
¾ flat		
Scrolling		
Side grip		
Pick up tongs	Maurice Hamburger	\$25
Fire tools (Shovel, rake, poker)	Mark Carter	\$75
Hot cut hardie		
Cold cut hardie	Tommy Dean	\$25
Twisting wrench		
Treadle/Hand Hammer Tooling	JC Banks	\$200
Set of punches and holder		
Center punch		
Chisel, large		
Chisel, small		
Chisel, hot slit	JC Banks	\$25
Slitting chisel		
Hold Down		
Flat wire brush w/handle	Tommy Dean	\$30
File, flat bastard cut w/handle		
File, half round w/handle		
Set of monkey tools		
Rivet backing tool		
Rivet setting tool		
Hacksaw	Maurice Hamburger	\$25
Bolster plate		
Square	Maurice Hamburger	\$30
Scribe	Bill Kendall	\$30
Bending forks	JC Banks	\$50
Spring swage (necking down)		
Flux spoon		
Metal folding ruler 24" or 72"		
Soapstone		
Ball tool (round blunt nose punch)		
Hook Ruler	Gerald Franklin	\$30
Iron Mountain Flux	Diana Davis	\$22
Finishing Wax		
Nail Header		
Dual Caliper	David Seigrist	\$35
Total value to date:		\$ 902

Remembering Patrick Sain

Patrick Sain passed on after a physical battle with cancer. Greatly to my sorrow, Patrick is gone and I long for one more moment, one more chance, to know Patrick a bit better. Those opportunities are gone.

Most have been gripped with the same sense of having missed important moments in life and not recognizing it until it's too late to act. Sayings have been coined that express that realization. Sayings like; 'each day is a gift', and 'Love like there's no tomorrow' ...think about it.

As much as we'd like to, we can't buy those moments back.

A faithful friend once told me that I owe every person one thing...love. That love comes by way of a listening ear, a word of encouragement, or a friendly phone call. Like the hammer striking the anvil the thing that rings true, the memory of Patrick that drives me to change, is that I must savor every moment we have together. To share in your triumphs and to share in your sorrows.

It is a faithful saying, don't say anything that would hurt [another person]. Instead, speak only what is good so that you can give help wherever it is needed. That way, what you say will help those who hear you.

Let's remember Patrick and value this thought, each day is a gift with each other. Let's not make waste of so precious a gift but highly value the passing moments we have together.

Kent Hadick

Whats it.....

Gerald Franklin recently received a email from a fellow smith. He had bought a item at a auction that he didn't know what it was. You know how it is, a item looks interesting and the price is right. Well here is a picture of the item. If you have any idea what this items is let Gerald know and he will forward the info to the other smith.



What is your favorite time in History?

Everyone has a time in history that they feel was a time when they wish they had been able to live. For some of us it is within the last 100 years or so but for a small group of smiths it is a little farther back in history than that.

With a club our size you will run into all types. You have the smith that are into modern art. There are also members that practice the ironwork style and techniques found in early colonial times. But then you have the group that are looking for the dragon to slay or the damsel to rescue. These are the ones that you will find working on chain mail, swords, or other kinds of ironwork that would have been found in the Kings castle or a medieval village.

I recently caught up with our own medieval smiths as they set up for their second weekend of a medieval faire down by Lawton. I found Dawnavan Crawford setting on the ground working to add grommets to the edges of a tarp because the winds had knocked it down earlier in the week. The others were putting the final touches to their forge setups and getting the fires going. They have built three or four bellows and forges that they have received many compliments on. I didn't get to try to bellows but



would like to sometime.



Along with Dawnavan, the others that make up this group are Steven Knisely, Terry Jenkins, Cory Charlton and Michal and Alyssa Lusk. They



also have a couple (soon to be new members) that are getting started in both blacksmithing and demonstrating. This group has just done a full month at the Muskogee Castle and are ready for a rest. You can also see these guys demonstrate during the Norman Fair each Spring.



South/Central Meeting

Larry and Linda Morefield hosted the June meeting for the S/C region at Medicine Park. The Fire dept was have a fund raiser to help with equipment purchases that are always needed before fire season gets into full swing. They had asked if the blacksmith would set up down by the fire station to help draw visitors. We were set up under some large shade trees that backed up to the creek. We had the perfect view of both the stream and the swimming area. It was a really nice day with both light breezes and pleasant temp. Not TOO hot and windy. We only had a few members show up for this meeting but those that did had a good time either forging or watching those that were forging. At noon ,as part of their fundraiser ,the fire department had prepared brisket with all the trimmings. If you didn't want that there was always the River Side Café or the Old Plantation Restaurant.

Jerry Cathy set up next to the Fire Station and Larry Morefield had his wagon and forge set up when we arrived.



Gerald watched as Bill made a Tomahawk from a rasp. All in all we had a good day ending with An ice cream from a local vendor on our way Home.

NORTH EAST REGIONAL MEETING DATES

January 12, 2008
Host: Bill Kendall 918-691-2173

February 9, 2008
Host: Gary Gloden Letter opener 918-321-5015

March 8, 2008
Host: Dan Cowart 918-534-0299
Trade item something for the grill
Lunch:

April 12, 2008
Host: Mark Coatney
Phone #: 918-476-6755

May 10, 2008
Host: *State meeting*
Phone #:

June 14, 2008
Host: Charlie McGee
Phone #:918-643-3299
Trade item: hat rack (wall or floor)

July 12, 2008
Host: Dwayne Moss
Phone #:918-260-3267

August 9, 2008
Host: Omar Reed
Phone# (918)478-4088

Sept. 13, 2008
Host: Dan Cowart
Phone #:918-534-0299
Trade item is a tool to be added to the tool box

October 11, 2008
Host:
Phone #:

November 8, 2008
Host: Mike Sweany
Phone #: 918-245-8460

December 13, 2008
Host:
Phone #:

NORTH WEST REGIONAL MEETING DATES

January 26, 2008
Host: Ron Lehenbauer :(580)758-1126
Trade item: spoon

February 23, 2008
Host: Ron Lehenbauer (580)758-1126
Trade item: fork

March 22, 2008
Host: Bob Kennemer (tool for cooking on a grill)
Phone #: 580-225-3361

April 26, 2008
Host: Mike George (pair of small Shelf brackets)
Phone #: 580-327-5235

May 2008
Host: State meeting –No regional meetings
Phone #:

June 28, 2008
Host: Charlie Todd
Phone #:580-242-0105

July 26, 2008
Host: Ron Lehenbauer
Phone #: 580-758-1126

August 23, 2008
Host:
Phone #:

Sept. 27, 2008
Host:
Phone #:

October 25, 2008
Host:
Phone#

November 22, 2008
Host: Tom Nelson
Phone #: 580-862-7691

December 27, 2008
Host:
Phone #:

SOUTH CENTRAL REGIONAL MEETING DATES

January 19, 2008

Host: JC Banks

Phone #(580)482-3209

Scroll jig workshop

February 16, 2008

Host: Gerald Franklin

Phone #: 580-467-8667

Scroll ends workshop

March 15, 2008

Host: Byron Donor

Phone #(405)650-7520

April 19, 2008

Host: Terry Jenkins

Phone #(580)485-2394

May 2008

Host: State meeting no regional meetings

Phone #:

June 21, 2008

Host: Larry Morefield

Phone #: 580-529-3081

Trade item: Punch or Chisel

July 19, 2008

Host: Max Scudder

Phone #: 580-654-2229

Trade items is a wall hanging

August 16, 2008

Host: Richard Simpson

Phone #:

Sept. 20, 2008

Host: Terry Jenkins (Sulphur Tractor Show)

Phone #: 405-485-2394

October 18, 2008

Host: : SCABA Conference Perry, Okla.

November 15, 2008

Host: Bill and Diana Davis

Phone #: 580-549-6824

December 20, 2008

Host: Aniela Hadick

Phone #:405-869-2043

Trade item: some kind of vessel

SOUTH EAST REGIONAL MEETING DATES

January 5, 2008

Host: Bois D'Arc Forge

Phone #:

February 2, 2008

Host:

Phone #:

March 1, 2008

Host: Gerald Franklin Durant Stockyards

Phone #: 580-467-8667

April 5, 2008

Host:

Phone #:

May 2008

Host: State meeting in Norman Ok

Phone #:May 10 ..Info in newsletter

June 7, 2008

Host:

Phone #:

July 5, 2008

Host:

Phone #:

August 2, 2008

Host:

Phone #:

Sept. 6, 2008 (Being Planned)

Host: Omar Reed to be held at Ft. Washita)

Phone #: (918) 478-4088

October 4, 2008

Host:

Phone #:

November 1, 2008

Host:

Phone #:

December 6, 2008

Host:

Phone #:

Splitting



A coffee table by Doug Wilson using the techniques described

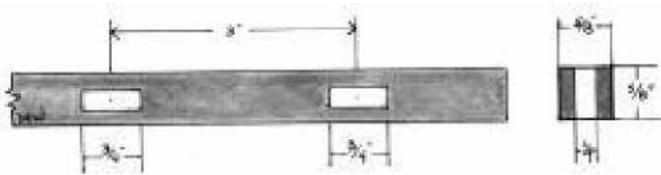
By Jay Close

Illustrations by Doug Wilson, photos by Jay Close

Lesson Number Eight—

Splitting Definition:

Cutting a bar by driving a sharp-edged chisel usually parallel to the length of the bar.



The finished practice piece with dimensions

Lesson: slitting and drifting two mortises or slots in a square sectioned bar.

Intent:

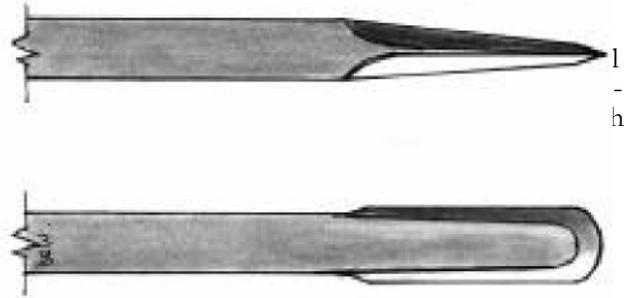
The smith will learn the technique of slitting and drifting a narrow mortise to specified dimensions and how to anticipate the stretching of the bar to position mortises accurately.



Jay's tooling for this lesson

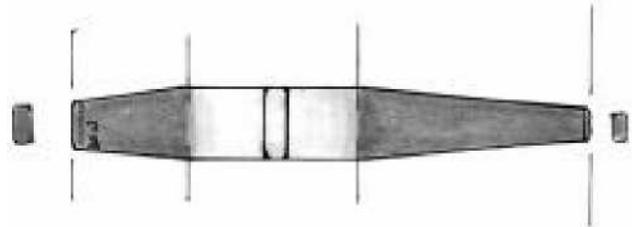
A slitting chisel

Materials:



A pair of pick up tongs will be useful dealing with the drift.

Make the cutting edge of the chisel to approximate the drawing above. The edge is curved and thin. Keep it symmetrical—an off-center edge will be hard to drive straight. The length of the chisel edge should be about 75% of the length of the finished opening—in this case about 5/8-inch for an opening 3/4-inch long.



A drift

Make the drift to resemble the drawing. Provide a long, lead taper, a parallel section and a driving taper a bit longer than the bar thickness. To avoid sharp inside corners in the material, file or grind a slight chamfer on the edges of the drift. Round the top where the hammer hits to minimize mushrooming.

Method:

Overview of the Process: When a narrow slot or mortise is needed it is often slit and drifted rather than punched. This is particularly true when it is desirable to retain the full thickness of the bar stock around the opening.

In the process taught here, a slit is cut then a drift inserted into the slit. This drift works like an internal anvil as the sides of the bar are progressively forged thinner on either side of the slit and the ends of the slit squared as the drift is driven in further.

Step One:

Measure the overall length of the bar you are starting with and record that measurement.

One inch from one end of the bar place a center punch mark deep enough that it will be readily observed on the heated bar. Center the punch mark in the middle of the bar.

Roll the bar 180 degrees and place a corresponding center punch mark on the opposite side. These two marks will guide the placement of your chisel as you cut from both sides.

Step Two:

With tools ready at the anvil, heat the end of the bar to a full yellow. Make sure that the area around the center punch marks is hottest.

Place the heated end of the bar in the middle of the anvil with a center punch mark facing up.

Put the chisel edge centered over the punch mark aligned with the length of the bar.

Tip: If you have difficulty seeing the punch mark, rub the side of your hammer across the bar surface. This will scrape the surface free of scale, but scale will collect in the center punch mark and make it visible.

Steady the end of the bar you have been holding against your thigh. Pick up the hammer.

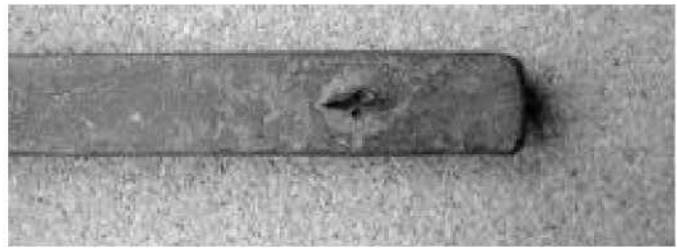
Hit the end of the chisel to leave a distinct but light witness mark to your chisel placement.

If necessary, correct the placement of the chisel and drive it hard into the bar a little more than half way.

Hold the chisel vertically. Hit the chisel vertically, and you will cut vertically.

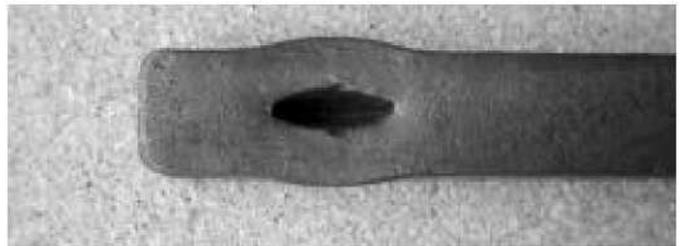


Jay Close steadies the bar against his thigh.



A "witness mark" centered on the center punch mark

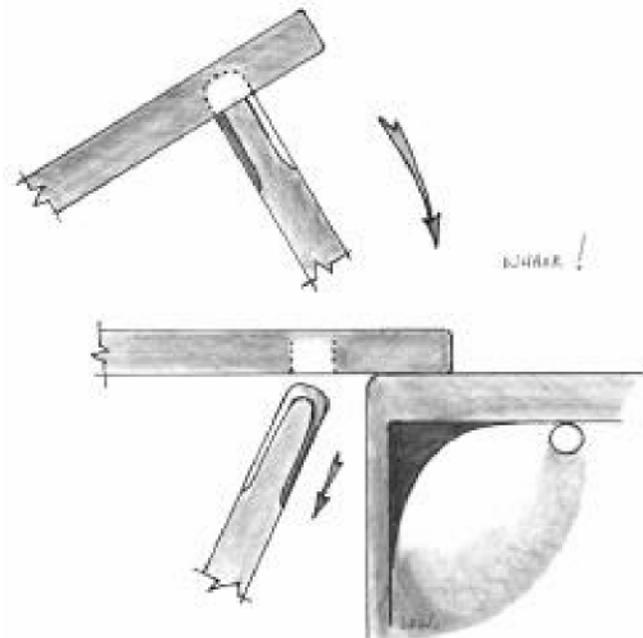
Do not allow the chisel to stay in the cut! If it softens in use, it stops cutting and begins to deform. As a starting point, three quick hammer blows to the chisel and then get it out of the cut.



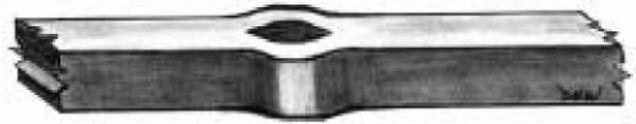
The cut halfway through

Especially for a W-1 chisel, as soon as you notice it turning red, quench the edge. Residual heat in the rest of the tool will slightly draw the hardness, keeping the tool from becoming brittle.

Tip: If the chisel sticks, twist it to slightly widen the slot and it should pull free. Sometimes tapping the sides of the slot will knock out a reluctant chisel. Or turn the work upside down and swat the end of the bar on the edge of the anvil to use momentum to pull the chisel free.



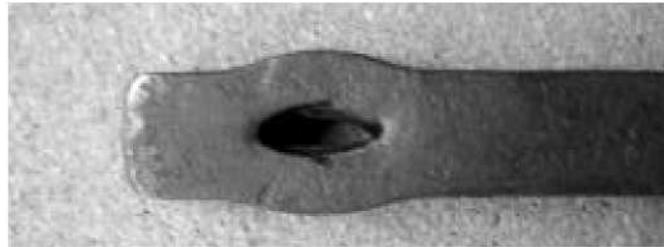
Removing a sticky chisel



With the cut a little more than half way through, put the bar back in the fire.

Tip: Inspect the chisel. If it has deformed on the edge, correct and resharpen before continuing.

Unless you need to resharpen the chisel, resist the temptation to thoroughly cool the chisel. It will cool in the air as you reheat the bar and will have enough remaining heat to not overly cool the bar as you continue cutting.



The completed slit

Step Three:

Repeat step two chiseling through from the opposite side until the two cuts meet halfway through the bar. You should see a clean opening all the way through with the sides of the slit bulged out.

Step Four

Prepare your tools so that the drift and pick-up tongs are handy. Take a good yellow heat on the bar around the slit. Tap the drift into the slit until solid resistance is met, i.e., until you are beginning to reshape the ends of the opening just by driving in the drift.

The lead taper of the drift should extend through to the opposite side of the bar. Make sure you are hitting it in over the hardie hole, the pritchel hole, a bolster block or open vise jaws.

The trick is to support the work as closely around the slit as possible.

Tip: An unsupported bar can collapse into a wide pritchel or hardie hole, so hold the bar along the side of the hole where one edge at least will receive support. If you are hitting the drift a number of successive blows, move the bar left, right, front, back around the square hardie hole or around the circumference of a large pritchel hole.

Supporting the bar with the edges of the pritchel hole

Once you meet resistance, forge the bulge of the sides against the drift working both sides evenly. Knock the drift in further to continue squaring the ends and bulge the sides again.

Remember, you are shaping the sides of the slot with the hammer working against the drift, but the ends of the slot can only be cleaned up by driving the drift in against them.

The exact balance between forging the sides with the drift in place and driving the drift deeper to clean the ends of the slot is a matter of experiment. The variables include the width of your chisel, the taper of your drift and how aggressively you pursue each shaping option.

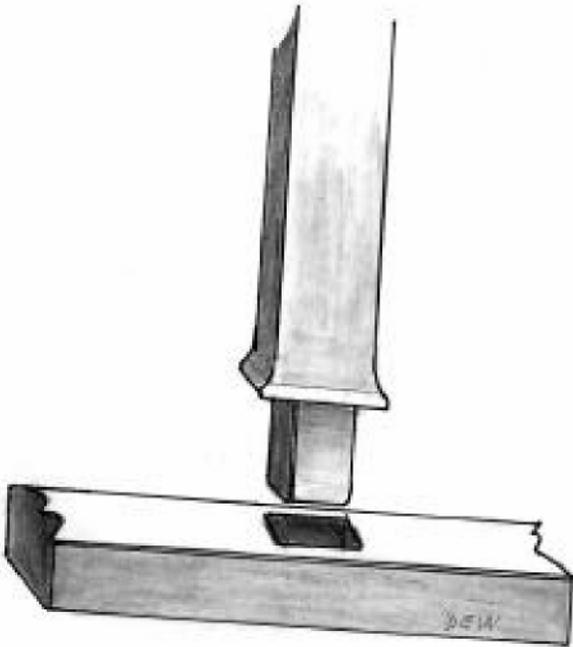
Repeat the forging of the sides and then remove the drift by tapping on the end of the lead taper or tapping the lead taper on the anvil surface.

The sides will stretch longer and thinner. This is good. But the wall around the slot will also stretch wider. This is bad. The undesirable stretch must be forged out with the drift knocked free of the slot.

Do this now. A couple of hammer blows on each side should suffice.

WARNING: the drift is now VERY HOT and can only be handled with tongs!

Mortise and Tenon Joinery



Text and Illustrations by Doug Wilson

#1. Example of technique

Lesson Number Nine–Mortise and tenon joinery *Definition:*

Making a mechanical joint with two or more pieces *Intent:*

The smith will learn to forge a tenon and assemble a mortise and tenon joint.

Tools

Side set – top and bottom (drawing #2) Note that the cutting edges aren't sharp. The cutting edges are slightly radiused.

Set hammer

Monkey tool or bolster plate with 1/4" x 3/4" hole (drawing #3) (This is a tool block with a 1/4" x 3/4" hole in center.) *Materials:*

1/2" x 1" x 18" mild steel bar.

Method:

Step One:

Upset end of bar and forge to 1 1/8" x 5/8", 3/4" from end. End tapers down to 3/8" x 3/4". (drawing #4) Mark bar on hot cut 3/4" from end.

Step Two:

Take a full yellow heat. Place the bar over the bottom side set. Hit a light blow. The bottom surface of the bar will be cut. Turn

If the drift has taken on a red color, quench it quickly to black but not down to hand -holding temperature. If the bar is still at least orange, put the drift in from the oppo site side of the slot and repeat the forging in of the bulge and resetting the drift. Do not work below a clear orange to bright red heat. Do not allow the drift to get red and soften while in the slit. Get it out and keep it relatively cool. A soft internal anvil is of little use.

Resist the temptation to cool the drift to hand -holding temperature. This will rob heat from the work piece and slow down the pace of the work. Handle the drift with tongs.

When the bar is red, remove the drift, forge in the unwanted stretch in width and get it back in the fire.

Step Five

Complete the drifting of the hole using the same procedure out lined in Step Four:

Tap in the drift until the drift squares the ends of the slot. Forge in the bulge on both sides evenly. Remove the drift and dress the top and bottom of the slot. Re -set the drift from the opposite direction and work the sides evenly again.

As a final sizing step, as the bar cools to red, drive the drift through all the way from one direction. The sides should not bulge.

The drifted slit

Then, drive the drift through from the opposite direction as the bar loses forging heat. If necessary, do some low heat dressing of the bar surfaces and tap the drift through one final time.

Step Six

Now that you have slit and drifted a mortise, measure its overall length with the bar at room temperature. Compare that to the overall length of the bar before the mortise. The difference will tell you how much the bar stretched to create a mortise of that size.

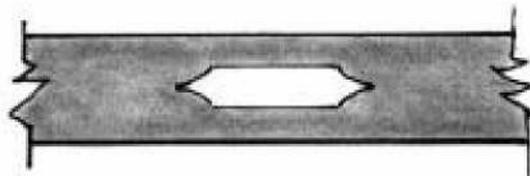
Knowing this stretch factor, mark the center point for another mortise that will end up 3 inches from the center of the first one.

For example, say you started with 10 inches of bar. After you made the first mortise the bar grew to 10 and 1/2 inches. From the mortise center, the mortise pushed the bar 1/4 inch forward and another 1/4 inch back. If you want a second mortise a specified distance from the first, you must anticipate this 1/4 inch stretch center to center.

Mark the center of the second slot half the overall stretch of the material closer to the first slot than the needed final dimension.

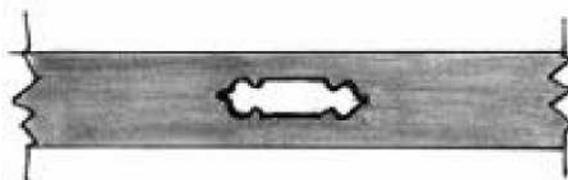
Slit and drift the second mortise just as the first. **Troubleshooting:**

Your mortise should look like a rectangle reflecting the cross -section of your drift. If it looks like the drawing below, the drift never had a chance to square the ends of the slit. This came about because either (1) the length of the chisel cutting edge was too long compared to the width of the drift, or (2) you did not drive the drift in far enough before stretching the sides of the slot.



Results of a chisel too long for the drift

If your mortise looks like this, you have over -stretched the sides of the slot so that on the final forging the drift was not completely filling the mortise.



Results of overstretched sides



#2. *A top and bottom side set the bar up on its corner. Strike another light blow.*

Turn bar onto uncut next surface. Strike again. This marks the second side of the bar. (drawing #5)

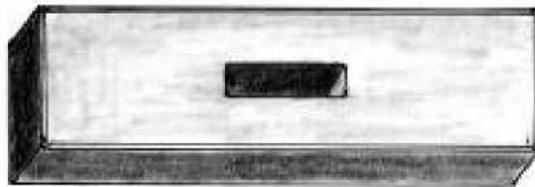
Repeat and cut the remaining two corners and sides with light blows.

Notes: The light blows on the corners help to insure proper tool alignment.

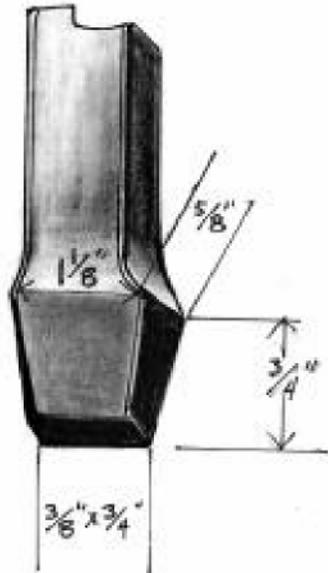
Misaligned cuts or double cuts cause hot shuts, then cracks. Proper tool alignment is critical here. Any mis-cuts should be filed out immediately.

Once marked, the bar can be supported on a stand or your hip. Use top tool to continue. (See previous lesson for bar support.)

Reheat bar if necessary. Continue cutting until the core of the bar is just a bit oversize, in this case about $5/16$ " x $13/16$ ".



#3. *A bolster plate*



4. *Upsetting and forging dimensions*

Notes: If the tenon is a bit too fat that's ok. Too thin won't do. A striker's assistance helps with drawing down the tenon.

Step Three:

Reheat bar to full yellow. Place bar over sharp edge of anvil face. Place set hammer directly over it. (drawing #6) Strike a heavy blow. Turn the bar 1/4 turn. Strike again. Turn again in the same rotation. Strike again. You are drawing out the tenon.



5. *Marking the second side of the bar* Continue until you have drawn down the tenon to 1/4" x 3/4"; length as far as it goes.

Finally, lightly forge down the corners.

Note: As you forge down the tenon, the set hammer and the anvil must be parallel. Check size of tenon by inserting end of tenon into bolster.

Step Four:

Upset square shoulders. Reheat to full yellow. Heat should extend about an inch up from tenon shoulder.

Note: Quench the tenon to prevent burning if necessary.

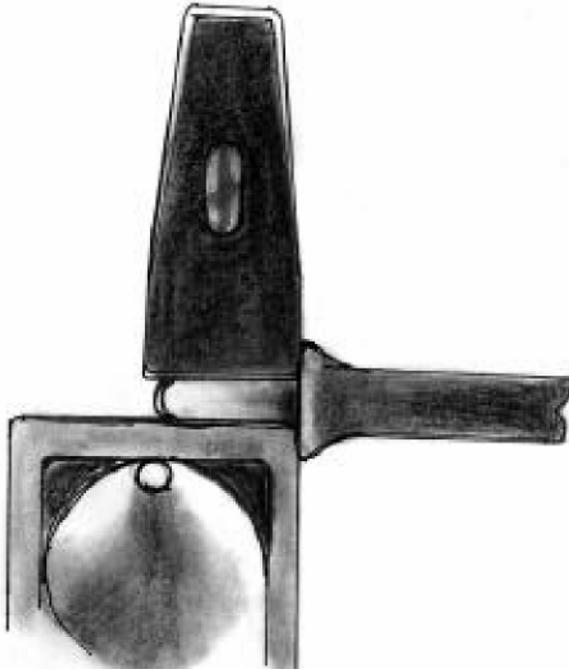
Pull the bar from the fire. Set bolster over the hardie hole. Insert tenon. Upset and square by hitting hard on top end of bar. (drawing #7)

Straighten bar as necessary. Square shoulders to bar with light hits on anvil face.

Note: Tenon should be centered on the bar. Centerlines of bar should be straight. Shoulders should be straight and square.

Step Five:

Cut tenon to length on cutoff hardy. In this case, length should be 1 1/4" from shoulder.



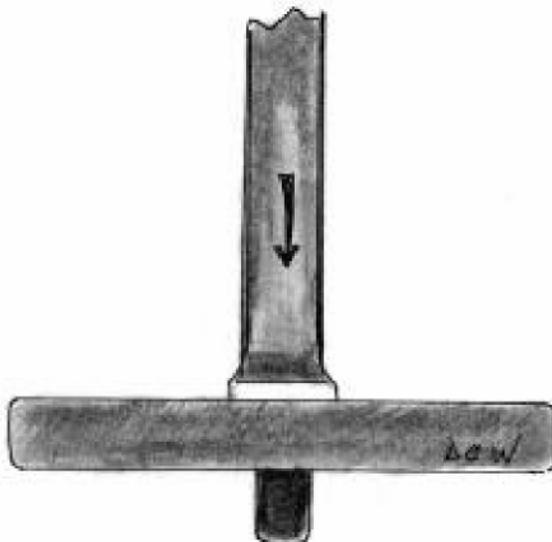
6. *Using the set hammer*

Note: Beveled edges on the end of the tenon help prevent thin, sharp or cracked edges on the finished tenon head.

Step Six:

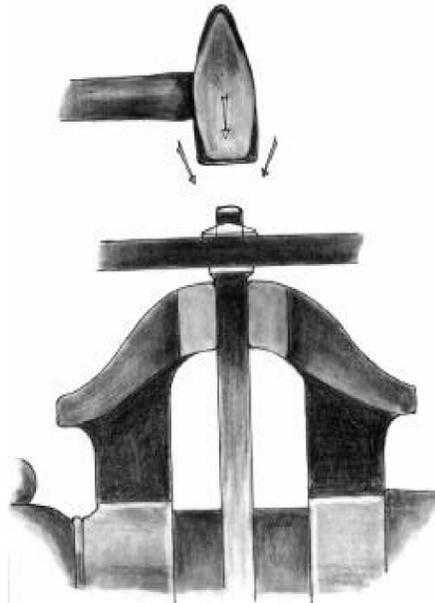
Finishing the joint. Heat tenon and about 1" above shoulder to full yellow.

Quickly set bar in vise. Set mortise onto it. Tap it down so it sits firmly on tenon shoulders. With rapid hammer blows, upset the tenon. (drawing #8) First hammer blows are straight down. Finish with angled blows.



Note: The entire tenon and a bit of the shoulder must be at a bright heat to insure a tight joint.

Forge the head of the tenon into a symmetrical shape with smooth edges. It should be centered on the face of the bar it has joined.



#8. *Upsetting the tenon*

Note: If you run out of heat, you can use a torch to reheat the tenon head. It is best to finish this operation in one heat. A second heat should only heat the tenon, not the bar with the mortise. (drawing #9)

Troubleshooting:

If the tenon has cracks at the shoulder, this was caused by (1) cutting too deep in step two, (2) misaligned or double cuts, or (3) forging tenon at black heat.

Note: File out hot shuts before and during forging of the tenon.

If the tenon head is not centered on the bar it joins, your upsetting blows may not have been straight down or the mortise was not centered in the bar the tenon joins.

Targets, Time:

Upsetting bar, one heat.

Cutting shoulder and drawing out tenon, two to three heats. Trimming end of tenon, one heat.

Assembling pieces and heading tenon, one heat.

Targets, Dimensional:

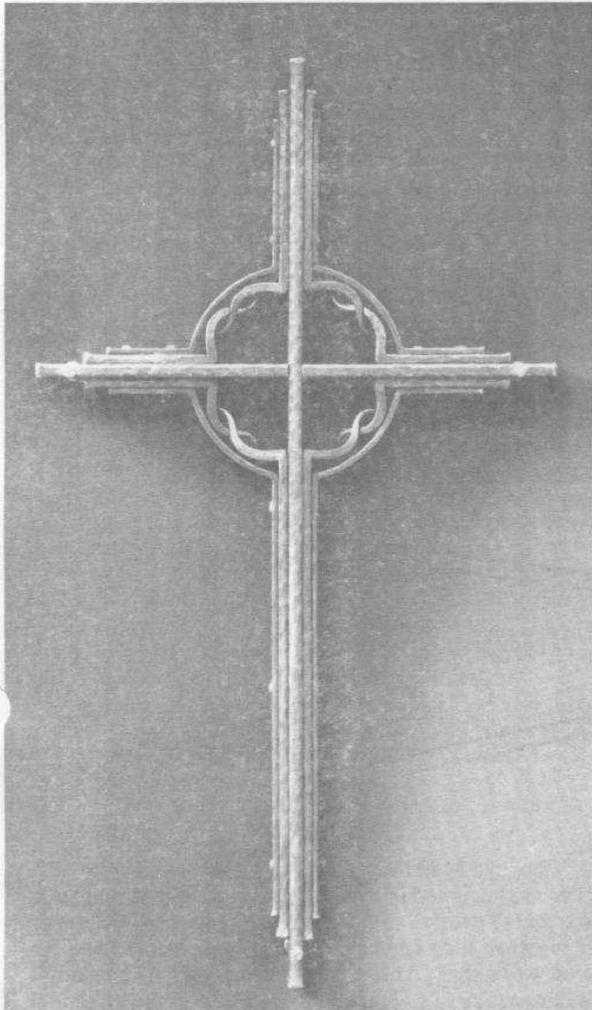
Tenon head should be symmetrical, without sharp edges and centered on the bar it joins.

Tenon shoulder should be the same dimension or slightly smaller than the bar it passes through and joins.



#9. *The lesson completed*

A Memorial Cross by Joe Babb, Coerico Forge, Knoxville, TN



This project began because a friend blacksmith referred the client to me. The client was building an outdoor memorial chapel at the corner of a church and wanted a decorative cross that could provide a meditational focal point. We met at the chapel location and discussed the project and I tried to get a sense of what sort of design he wanted. This is sometimes difficult because clients do not necessarily think in terms of design. Sometimes I will offer some simple example sketches on the spot. Sometimes it is better just to talk and get to know the person. In this particular case the client wanted to please several family members as well as church members so there were many unknowns. I offered to draw up a couple of designs and let him get responses. After some consideration, the family chose one design but felt some changes were needed. My client was also concerned about how the final design would look on the wall of the church so I redrew the

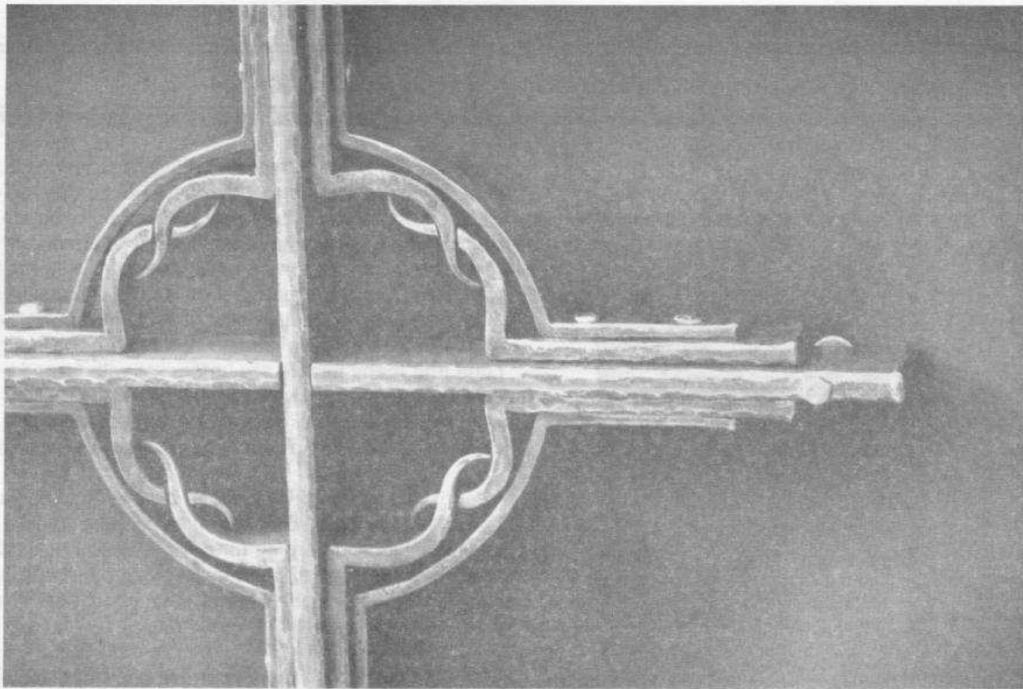
design at full scale with the modifications requested. The final design was 36" high and 20" wide. The completed cross weighed 38 pounds. This design was approved along with my cost estimate. However, since I was proposing turning a rectangular bar section on edge, the client still had trouble visualizing the end product. I offered to show him the cross after completing one quadrant of the ornamental elements. After this was accomplished, I had proven the design concept. I find that many people are unfamiliar with forged iron elements and also have difficulty visualizing from a 2D working drawing or sketch. If you can show even a sample of what you are talking about, it helps them visualize the rest.

Doing custom work can be very time consuming. The initial design process can take a while. Where you draw the line between charging for design time or not, I don't know. I take each new job as a different situation. I'm still working on a system for organizing and estimating jobs. If anyone out there has THE answer, let me know.

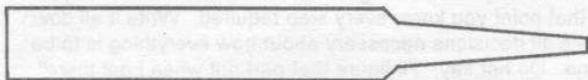
Discovering the processes and tools and material you need is probably easier than estimating time required. Start with your drawn design, mentally take it apart, and make a list of every part needed right down to the rivets. Francis Whitaker used to talk about backward thinking. This meant mentally taking the finished piece and working backwards till you had the pieces of original stock material in front of you. At that point you knew every step required. Write it all down. Make all decisions necessary about how everything is to be done. Do not say, "I'll figure that part out when I get there". Try to guess the time required. If you are disciplined enough, write down times as you work and compare actual times to your estimates and record the differences for next time. By this method, you will become educated and sometimes learn better ways to improve your estimates and/or your processes. We are always holding classes on how to forge. Very rarely do we get together to talk about project management.

I made a cut list of all the iron pieces and also a list of tools necessary that I needed to make. Unfortunately, when we try something new we don't always know the best method and in this case I had to figure out a way to drift a 1/4" hole edgeways through a 1/2" x 2" bar. The intermediate sections required an acute upset corner with tapered ends, and half lap joints. The outside elements required upset corners at specific, accurate angles with a circular section between. I made two drifts for the 1/4" hole, an angle template for the intermediate pieces, and an angle template and a bending form for the circular part of the outside elements.

To make the 1/4" hole edgeways in the 1/2" x 2" pieces, I first drilled a 5/32" guide hole using a drill press and vice. I set up a tripod next to the anvil and laid a 2"x2" piece of square tubing on the anvil and tripod to act as a support for the 1/2" x 2" bar. After heating the bar in the forge, I set it on edge on the anvil and clamped it to the 2x2 tube with C-clamp visegrip pliers. Then I proceeded with my two drifts to enlarge the hole from each direction, one way on one heat, the other on the next.

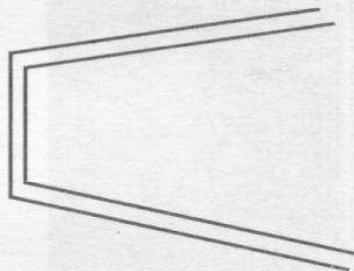


The first drift I used had a heavy 3/4" body that was tapered as shown in the figure below.

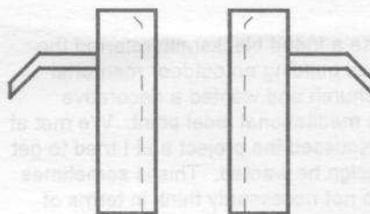


The smallest end was small enough to fit into the 5/32" hole. The tapered end was about 2" long. This tool allowed me to hit pretty hard with the hammer without bending the business end of the tool. I was also able to clamp visegrip pliers on the 3/4" section and twist the tool out of the hole after several hits of the hammer. The second drift was used after I was close to the center of the bar and was driven most of the way through until I could pass a 1/4" rod through easily. The drift was about 3/8" round with a long taper.

The intermediate sections required acute upset corners. If you have ever tried this, you know that one of the most difficult things to do is get upset corners without cracks. This is one place where welding of some sort, either forge or gas, might be a better solution. All of the upset corners in this project were done in the post vice with two hammers. It is an elegant way to do upset corners, but also a good way to get "blacksmith's elbow". The outside elements each required two accurately spaced upset corners with rather accurate angles. The pieces looked as shown below before bending to the circle. Once the section between the corners was bent to a circle on the form, the two arms would be at right angles. Note that most parts of the elements had to be done fairly accurately or else they would not sandwich together well.



To hold everything together, I made rivets from 1/4" rod. I wanted countersunk rivets with an oval head and so made a tool to get one end of the rivet made. The cross was bolted together, then one bolt at a time was removed and replaced with a rivet. The tool for making the rivet heads is shown below.



Two blocks of 1/2"x2" were sandwiched together with a business card between them. A 1/4" hole was drilled through edgeways using a drill press and vice. Then a countersink was used in one end. These pieces were then clamped together in a post vice with a 1/4" rod in the hole. Two flat pieces of scrap 1/4" thick stock were arc welded on and then heated with a torch and hammered down to fit the post vice

Saltfork Craftsmen

Artist-Blacksmith Association
Membership Application
April 2008 thru March 2009

Please accept my application

Date: _____

First Name _____ Last Name _____

Married? Yes No Spouses Name _____

Address _____

City _____ State _____ ZIP _____

Home Phone (____) _____ Work Phone (____) _____

E-Mail _____ ABANA Member? Yes No

I have enclosed \$20.00 for dues to March 30, 2009

Signed _____

Return to: Saltfork Craftsmen, 1227 Fourth St. Alva, Ok 73717



Name: _____

Email: _____

Address: _____

www url: _____

City: _____

Phone: _____

State: _____ Zip: _____

Fax: _____

Country: _____

TYPE OF MEMBERSHIP:

CREDIT CARD INFORMATION:

NEW MEMBER RENEWAL

VISA Mastercard Expiration Date: _____

Regular - \$55.00 Contributing-\$100.00

Card Number: _____
Submit check, money order -U.S. Banks only, or by credit card:

Student- \$45.00 Library-\$45.00

Senior (65+) \$50.00 Foreign-\$65.00

ABANA Chapter Affiliation: _____

PO Box 3425
Knoxville, TN 37927-3425
Phone: 865.546.7733 Fax: 865.215.9964



Saltfork Craftsmen Artist Blacksmith Assoc.Inc.
Fourth Street
Alva, Okla. 737171227

U.S. POSTAGE PAID
STERLING, OKLA
NONPROFIT
ORGANIZATION
73567