New Jersey Blacksmiths Association

N.J.B.A. Newsletter

NJBA Volume 24, Issue 3 February, 2021

Editorial

Having received no contributions for publication, I've spent a good deal of time perusing newsletters from other ABANA Affiliates for articles to include in this Newsletter. That comes with the territory, but the difference this time is the number of obituaries I have encountered during my perusals. The odd obituary does crop up in these newsletters from time to time -- and in ours as well -- but there's been a quantum shift in the past few months. Perhaps most notable was the death of Frank Turley, a long-time teacher to many, including myself.

You all know where this is going. You all know how this happened. A world-wide pandemic overtook us and we were not prepared. Some folks were in denial about this pandemic, and some still are.

Your NJBA Directors agreed fairly early on not to risk unnecessarily the lives of our members. Accordingly, we cancelled all NJBA in-person events for 2020, including Board meetings. Since NJBA could then not serve its members, the Board gave the current membership a dues vacation. We wanted herd immunity to be established before we again assembled in person.

At the (virtual) January Board meeting, we yet again tabled the questions of when again to hold in-person meetings and to reimpose dues. Perhaps by the next Board meeting, in April, the vaccination program will have achieved some significant impact. We hope we'll then be able to announce meetings for later this year.

Upcoming NJBA Meets

No NJBA meets are scheduled as of the issuing of this Newletter. Please check our Facebook page or our subreddit for meeting announcements. NJBA will be using these social media sites for any meetings scheduled after this newsletter is issued.

All NJBA-sponsored open forge meets have been suspended until further notice due to the pandemic. In normal times we would be holding open forge meets in Howell, NJ, every Monday evening, in Lambertville, NJ, every Sunday from May through October, and in Smithtown, LI, NY, Sundays on request from November through April.

Let's hope things get back to normal soon….

Report on the January 11 Virtual Board Meeting

In attendance were Bruce Freeman, Marshall Bienstock, Ryan Amos, Tom Santomauro and Dan Yale

EJOT picnic. East Jersey Old Town wanted us to reserve a date for 2021 but due to the uncertainty of the vaccination program, we declined to do so as yet and will put off the decision until the April Board meeting. Further discussion was tabled for lack of a volunteer to coordinate the event. Bruce will ask a member who was previously involved in the Red Mill meet whether he'd care to be the coordinator. Bruce will ask the demonstrator we'd planned to bring in last year of his availability this year.

Crane Rail Anvils. NJBA Director Larry Brown had previously dropped off four rough-cut anvils off at Marshall's Farm, and the Board must set a price for these. Marshall noted that Fazzio's is selling lighter-weight rail for use as anvils, and the Board decided to await news on those weights and prices before pricing ours for sale to members.

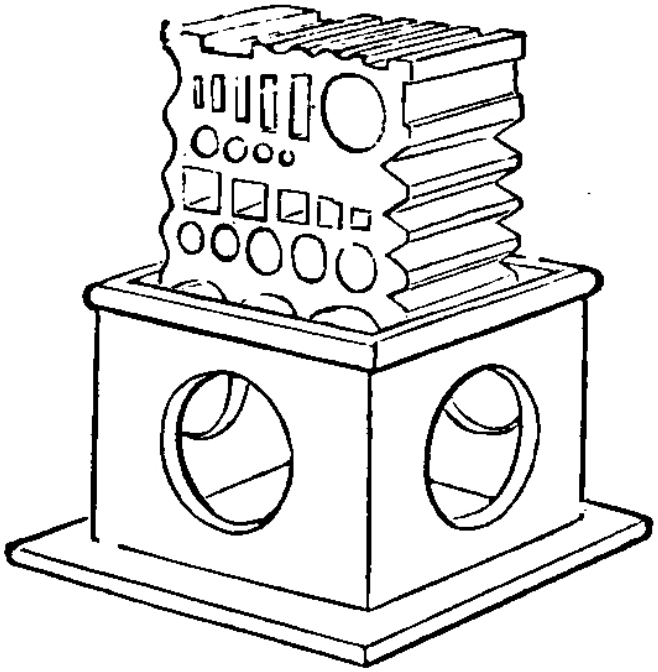
Reopening of NJBA. Vaccine rollout looks like it may be complete by summer this year It was suggested that smaller classes with fewer students with proper PPE could be held outside (using our lightweight forging stations) later in the year, weather permitting. The scheduling of events was tabled until the April Board meeting.

(Continued on p. 3)

New Jersey Blacksmiths Newsletter

NJBA Board of Directors

Ryan Amos
William Barrett
Marshall Bienstock
Larry Brown
Eric Cuper
David Ennis
Bruce Freeman
Mark Morrow
Bruce Ringier
Thomas Santomauro
Ben Suhaka
Dan Yale



We like to thank those who joined NJBA as Business Members:
Marshall Bienstock

Blacksmith Coal and Coke Available to NJBA Members

NJBA purchased ten tons of "nut" coal of good analysis. In addition to our using it for our demonstrations, this coal will be available for purchase by NJBA members at 20¢ per pound, on a bring-your-own-bag and bag-it-yourself, honor-system basis. The coal is located across the drive from the larger door to Marshall's pole barn, formerly the site of the coke pile. We still have some coke available at the same price, *behind* this same bin. (Walk around by the path to the left of the bin, but watch for poison ivy.) Plastic bags of at least 3-mil thickness are recommended. (A spring balance, *not legal for trade,* has been mounted beside the bin for your convenience in *estimating only*.) Please inquire of Marshall Bienstock for more information and to make payment.

NJBA's Official Address
NJBA, P.O. Box 224
Farmingdale, NJ 07727-9998

NJBA's Website:
http://www.njblacksmiths.org

NJBA Newsletter:
Will be found on our website (above). Look for "Current Newsletter" and/or "Newsletter Archive."

NJBA's Facebook Page:
https://www.facebook.com/njblacksmiths/

NJBA's IForgeIron subforum:
Scroll down at https://www.iforgeiron.com/.

NJBA's subreddit:
Reddit.com/r/NJBA
You can get a free Reddit account and post questions, links, pictures or whatever here.

January Board Meeting (continued from p.1)

meeting.

Web presence. Suggestions have received on our Facebook account suggesting possibilities for online engagement:

- Some sort of Skype online meeting. Ryan will investigate these possibilities.
- Podcasts for training.
  Bruce mentioned that a local facility has a room dedicated to recording such videos.
- A Q/A section on the website or Facebook available for members from members.
  In this regard, Bruce has been answering questions on Reddit, and has compiled some of them onto his own webpage: https://sites.google.com/view/grasshopperhammer-spinoff/reddit-answers-blacksmithing
- An online forum for members to sell things, chat, meet other members, exchange ideas and tips.
  Our subreddit (www.reddit.com/r/NJBA) serves some of these purposes.

Dues. All current members (2019-2020) were given a dues holiday for 2020-2021. That suspension of dues ends in June, 2021. Discussion of this matter was tabled until the April Board meeting.

News from ABANA:

Call for Art: 'Iron to Art' Festival

In October of 2021 (recently rescheduled from the original date in April), ABANA will host 'Iron to Art' Festival at our new headquarters in Johnstown, Pennsylvania. ABANA would like to invite the Affiliates, clubs and associated organizations to consider a project to be displayed at the Festival. There are a few areas in the new headquarters that will be a perfect place to show off your work as well as being a part of the historical mystique of our new building, which is the old train station.

Check out the new Trailer https://www.youtube.com/watch?v=xGce0bnMN-Y For 48 years, ABANA has not had a place to call its home. In 2020, the Board of Directors voted to give ABANA a permanent home in Johnstown, PA. Johnstown has a rich historical presence in the Steel and Iron industry. It only made sense that ABANA's first permanent home be in the historical steel town known as Johnstown. In 2021, ABANA will host an inaugural event welcoming the ABANA Membership to Johnstown. We have lots in store for the event.

ABANA's New Executive Director

The Artist-Blacksmith's Association of North America, Inc. has named Janie Grela as its first Executive Director. This year, ABANA established its headquarters in the train station in Johnstown, Pennsylvania. As Executive Director, Janie will develop a museum space, library and archive at the historic train station. Janie will be responsible for leading the non-profit organization in adherence to the strategic plan set forth by the Executive Board. Her experience in non-profit management and strategic planning will help further the vision of the organization through initiatives that support the development of ABANA and the community.

Rules for Participation in NJBA Hands-On Events

These rules apply to workshops, open forge meets, demonstrations with hands-on components, etc.

1. Participation in NJBA-sponsored hands-on events is limited to adults (i.e., 18 years or older). This rule was effected as of December 4, 2016.
   (Note: This policy ***does not apply*** to open forge meets and similar events *that are sponsored or co-sponsored* by youth-oriented organizations such as scouts, 4H groups, schools or other venues, including the Holcombe-Jimison Blacksmith Shop.)
2. Workshops are open only to NJBA members, but nonmembers may join by paying dues when they register.
3. All workshop fees are due upon registering. Any materials fee is not refundable. A workshop fee is refundable only if your place in the workshop is filled by another person.
4. If you only want to watch the workshop, the fee is half the listed workshop fee.
5. Workshops are intended for the purpose of teaching certain skills and/or completing certain projects, and are subject to the authority of the workshop leader or instructor. Accordingly (as per a vote of the NJBA Board on Jan. 28, 2018.):
   - The participant shall work *only* on the project at hand and not on any other projects, *without exception*.
     (Note: Any NJBA member may attend an NJBA open forge meeting to work on his own project.)
   - Every participant will be required to follow the instructions of the workshop leader, especially any instructions pertaining to safety, or he may be ejected.
   - A person who has a history of failure to follow instructions may be refused admission to any workshop, at the sole discretion of the workshop leader.

February 15—George Washington Day

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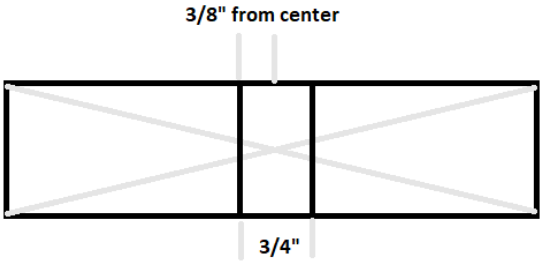
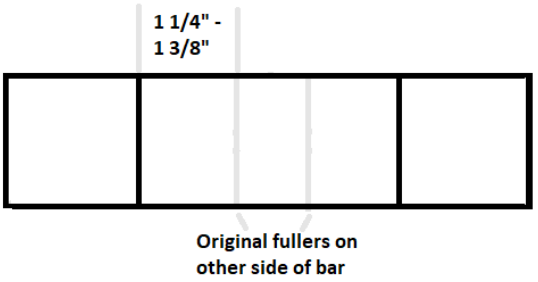
Forging a Colonial Hatchet

You've probably heard the story about George Washington chopping down a cherry tree when he was a kid, then owning up to it when his father called him on it. This testimony to the Father of our Country's honesty is almost certainly a myth, but if it had actually happened, he likely would have used a hatchet similar to this one.

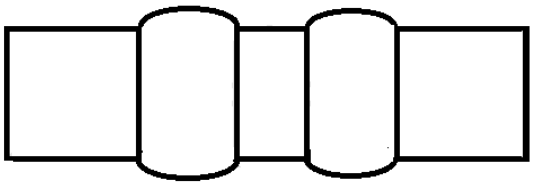
Forging a hatchet is similar to forging an axe, only smaller. Start with a section of mild steel* 3/8" X 1 1/2" stock about 8" long. Find the center of the bar, then fuller a groove crossways about 3/8" on either side of the center mark. This will leave you a 3/4" poll. Make your fullers about 3/16" deep.



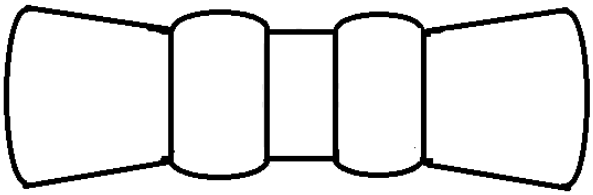
Flip the bar over, then make 2 more fullers, about 1 1/4" - 1 3/8" from the first fullers. Again, make your fullers about 3/16" deep.



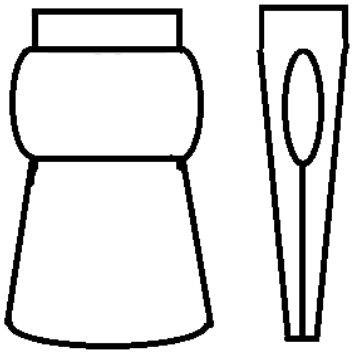
Draw out the sections between the fullers to make the "lugs" of the axe. These will form the eye of the axe. Forge the lugs down to 3/16" thick.



Draw out the ends of the bar to begin the taper for the blade. You'll get some spread, as well—that's OK.

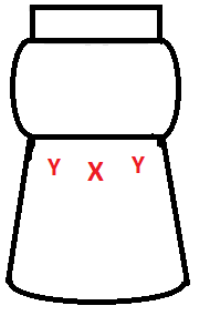


Fold the bar at the original fullers, so the lugs meet up to form the eye and the blades match up. Don't worry if it isn't perfect, just get it close.



*Yes, wrought iron would be more "correct" than mild steel for this project, and if you have some in the proper size and want to use it, by all means, go for it!

Place the axe in the fire and allow it to soak. Bring it up to a dull red heat, then flux the blades. Bring the piece to a welding heat. Strike first in the center of the blade ("X" in the drawing), then move out to the edges ("Y"). Repeat as many times as necessary to weld the piece up.

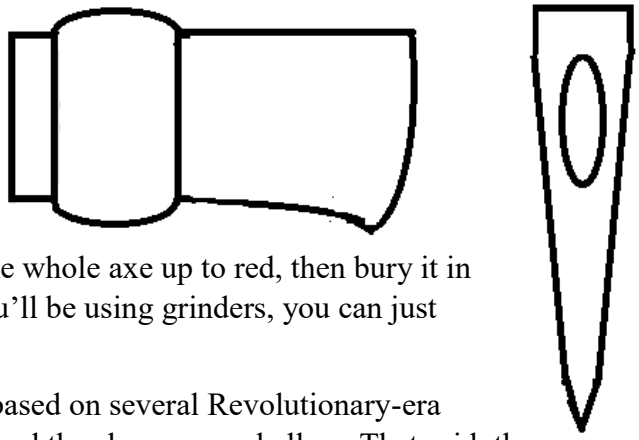


IMPORTANT—DON'T weld all the way to the end of the axe at this point. Leave 1/2" or so open so you can add the steel bit.

For the steel bit, I usually use a scrap of old file. Any high carbon steel will do, though. Cut a piece as long as the axe is wide. Hammer a taper along one long edge, making the bit wedge shaped. Heat the bit to a dull red, and flux.

Heat the axe to orange, and open the edge of the axe that you didn't weld up. Flux. Bring the axe back to orange, insert the steel bit (tap it in to seat it), heat the whole thing to welding heat, and forge weld it. Take as many welding heats as you need to get this sealed up.

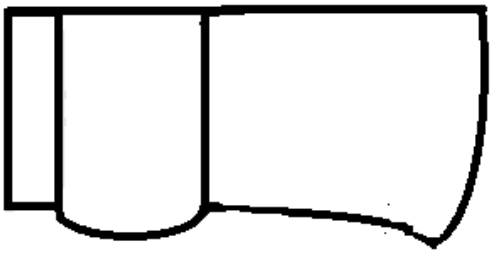
From here on, do all hammering at close to welding heat.



With the bit welded in, hammer the whole piece into the familiar axe shape. You want a continuous wedge shape from poll to edge. You can trim off the top "wing" of the eye now with a chisel, though I usually wait and saw it off.

If you're going to be doing your finish work with hand tools (hacksaws and files), you'll want to anneal the head. Heat the whole axe up to red, then bury it in wood ash to cool slowly overnight. If, on the other hand, you'll be using grinders, you can just normalize the axe.

Refine the shape of the axe with file or grinder. This axe is based on several Revolutionary-era hatchets found in archaeological digs. The lugs are rounder and the slope more shallow. That said, there are many styles of colonial hatchets, and more importantly, this is yours. Shape it as you wish.



Grind or file the cutting edge. If you're looking for more of a splitting axe, you'll make the edge blunter, kind of like a cold chisel. If you're looking for a slicer or carving axe, make the angle sharper, kind of like a hot chisel. I tend to make them as general-use camp axes, so grind the bevel somewhere in the middle.

Heat Treating

This is an axe, not a knife. You're swinging it, and colliding with wood or other material. If it's going to fail, you want it to bend, not break. You'll also want it to be easier to sharpen in the filed. So, you'll temper it to be softer than you would a knife.

Heat the piece to cherry. Quench the axe, edge down, in your preferred tempering oil. Keep it moving in the oil until it's cool. Wipe clean, polish the edge, then reintroduce heat into the axe from behind. Draw the temper to a blue color along the edge.

Then put a handle on it, and go find a cherry tree.

Measuring the "Speed" of Quench Oil

In Josh Foran's brut de forge knife forging demonstration he talked about quenching in an "11second oil". I've heard quench oils described that way before, but this time I really wondered what that means?

I found a paper, "Care and Maintenance of Quench Oils" by two engineers at Houghton International, D. Scott MacKenzie and I. Lazarev. Houghton makes quench oils.

Quench oils can be classified as normal, medium, or fast based on the General Motors quenchometer speed (GMQS) test. This test is also known as the nickel ball test or ASTM Method D 3520. This test calls for heating a nickel ball to 1620 degrees and then quenching in 200 mL (about 6.76 ounces) of oil. Nickel is nonmagnetic at 1620 degrees and becomes magnetic when it cools to 670 degrees. A magnet beside the container of oil attracts the ball when it becomes magnetic. Thus the time for the oil to quench the ball from 1620 to 670 degrees can be measured. This test can also show the effect of contaminants, age, and oil temperature on the performance of a quench oil.

Normal speed oil measures 13 to 20 seconds on the GMQS test. Medium speed oil measures 10 to 12 seconds, and fast oils measure 7 to 9 seconds. The well known Park 50 is a 79second oil and Park AAA is a 911second.

From Houghton, HoughtoQuench K is a 79second oil and HoughtoQuench G is a 1012second oil. HoughtoQuench 100 is a slower, 1522second oil. Anecdotally, canola oil is said to be just slightly faster than an 11second oil.

Canola seems to be regarded as the best choice among the readily available cooking oils for use in quenching. Water is faster than any of these oils, but may shock and crack steels that are designed for oil quenching.

Advantages of engineered quench oils include reliability, longer and more stable life as a quenchant, and a cooling rate that varies as the steel cools for even hardening.

Finding engineered quench oils in reasonable quantities for home shops can be a challenge.

Many of the knifemaker supply outfits such as USA Knifemaker or Jantz Supply stock quench oils.

Reprinted from the Bituminous Bits, Newsletter of the Alabama Forge Council

Chisel - Drill - Punch Holder

Steve Bloom, Iron Flower Forge

Hanging onto chisels, dri□s & punches is always a bit problema□cal, especially when your fingers on the non-hammer side are close to ground zero. Here's a simple solu□on. A sec□on of square hollow tubing (8" x 5/8" square), a length of all-thread (1/2x13), some beefy washers (two is a good idea), a washer and a nut. Slot the business end of the tubing as shown and grind in a fish-mouth on the other axis. Weld a washer to the end of the all thread to hold the tool. Tighten as needed.

Reprinted from the Clinker Breaker, from FABA

Correction: I appropriately credited Jered Hampton on the article on the twisted cross in last month's newsletter. His editor, Mike Mumford of the Califonia Blacksmiths worried that Jered might achieve world-wide fame and the fortune that goes with it might ruin him. While Mike was pleased to have the article, Jered let him know that he did see the process on the internet. So, while it was not his design, Jered did figure out how to make it so he could help you and I understand it. Barry

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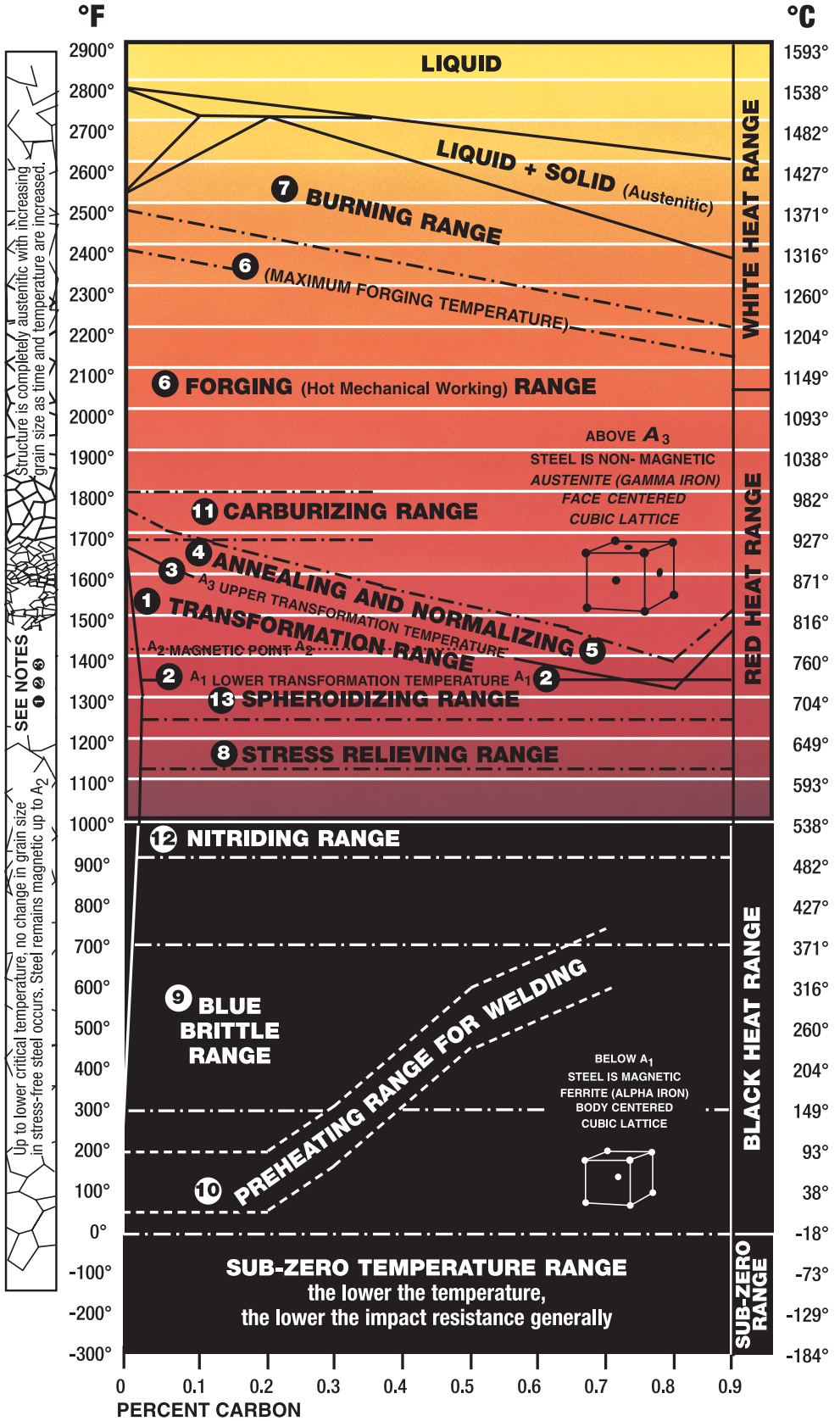
Basic Guide to Ferrous Metallurgy



❶ **TRANSFORMATION RANGE** In this range steels undergo internal atomic changes which radically affect the properties of the material.

❷ **LOWER TRANSFORMATION TEMPERATURE (A_1).** Termed Ac_1 on heating, Ar_1 on cooling. Below Ac_1 structure ordinarily consists of FERRITE and PEARLITE (see below). On heating through Ac_1 these constituents begin to dissolve in each other to form AUSTENITE (see below) which is non-magnetic. This dissolving action continues on heating through the TRANSFORMATION RANGE until the solid solution is complete at the upper transformation temperature.

❸ **UPPER TRANSFORMATION TEMPERATURE (A_3).** Termed Ac_3 on heating, Ar_3 on cooling. Above this temperature the structure consists wholly of AUSTENITE which coarsens with increasing time and temperature. Upper transformation temperature is lowered as carbon increases to 0.85% (eutectoid point).

- **FERRITE** is practically pure iron (in plain carbon steels) existing below the lower transformation temperature. It is magnetic and has very slight solid solubility for carbon.
- **PEARLITE** is a mechanical mixture of FERRITE and CEMENTITE.
- **CEMENTITE** or IRON CARBIDE is a compound of iron and carbide, Fe_3C.
- **AUSTENITE** is the non-magnetic form of iron and has the power to dissolve carbon and alloying elements.

❹ **ANNEALING,** frequently referred to as FULL ANNEALING, consists of heating steels to slightly above Ac_3, holding for AUSTENITE to form, then slowly cooling in order to produce small grain size, softness, good ductility and other desirable properties. On cooling slowly the AUSTENITE transforms to FERRITE and PEARLITE.

❺ **NORMALIZING** consists of heating steels to slightly above Ac_3, holding for AUSTENITE to form, then followed by cooling (in still air). On cooling, AUSTENITE transforms giving somewhat higher strength and hardness and slightly less ductility than in annealing.

❻ **FORGING RANGE** extends to several hundred degrees above the UPPER TRANSFORMATION TEMPERATURE.

❼ **BURNING RANGE** is above the FORGING RANGE. Burned steel is ruined and *cannot be cured* except by remelting.

❽ **STRESS RELIEVING** consists of heating to a point below the LOWER TRANSFORMATION TEMPERATURE, A_1, holding for a sufficiently long period to relieve locked-up stresses, then slowly cooling. This process is sometimes called PROCESS ANNEALING.

❾ **BLUE BRITTLE RANGE** occurs approximately from 300° to 700°F. Peening or working of steels should not be done between these temperatures, since they are more brittle in this range than above or below it.

❿ **PREHEATING FOR WELDING** is carried out to prevent crack formation. See TEMPIL® PREHEATING CHART for recommended temperature for various steels and non-ferrous metals.

⓫ **CARBURIZING** consists of dissolving carbon into surface of steel by heating to above transformation range in presence of carburizing compounds.

⓬ **NITRIDING** consists of heating certain *special steels* to about 1000°F for long periods in the presence of ammonia gas. Nitrogen is absorbed into the surface to produce extremely hard "skins".

⓭ **SPHEROIDIZING** consists of heating to just below the lower transformation temperature, A_1, for a sufficient length of time to put the CEMENTITE constituent of PEARLITE into popular form. This produces softness and in many cases good machinability.

- **MARTENSITE** is the hardest of the transformation products of AUSTENITE and is formed only on cooling below a certain temperature known as the M_S temperature (about 400° to 600°F for carbon steels). Cooling to this temperature must be sufficiently rapid to prevent AUSTENITE from transforming to softer constituents at higher temperatures.
- **EUTECTOID STEEL** contains approximately 0.85% carbon.
- **FLAKING** occurs in many alloy steels and is a defect characterized by localized micro-cracking and "flake-like" fracturing. It is usually attributed to hydrogen bursts. Cure consists of cooling to at least 600°F before air-cooling.
- **OPEN OR RIMMING STEEL** has not been completely deoxidized and the ingot solidifies with a sound surface ("rim") and a core portion containing blowholes which are welded in subsequent hot rolling.
- **KILLED STEEL** has been deoxidized at least sufficiently to solidify without appreciable gas evolution.
- **SEMI-KILLED STEEL** has been partially deoxidized to reduce solidification shrinkage in the ingot.
- **A SIMPLE RULE:** Brinell Hardness divided by two, times 1000, equals approximate Tensile Strength in pounds per square inch. (200 Brinell ÷ 2 x 1000 = approx. 100,000 Tensile Strength, p.s.i.).

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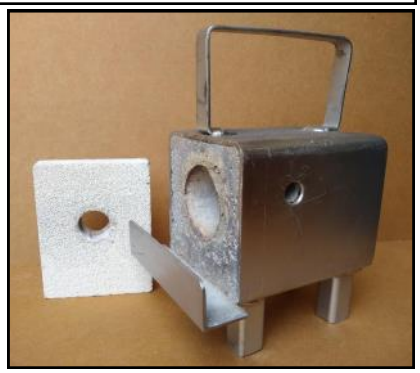
Small but Mighty by Randy Palluch

Randy came up with an idea to design a compact forge because he was making small items and wanted a faster and more efficient way to heat parts. He was originally using just a propane torch which worked, but it took longer and there was a lot of heat loss. Randy used this forge to heat the rivets for the Greene County Poor House cemetery cross project and it worked perfectly! Randy uses a Bernzomatic 8000 torch with this forge, which fits perfectly.



General Fabrication:
To start with, he used a 5 1/2" by 3/16" walled steel tubing about 6" long. The back plate on the forge was made out of 1/8" plate welded to the back. He added four 1" X 1/8" X 2" long legs. To secure the forge to a surface, he placed two 1/2" square nuts press fitted into the front tubing feet which is more than adequate. The burner hole is a round 5/8" hole, 13/16" above center, 1 7/8" back from front of the tubing. This is to create a turbulent swirl flow pattern. These are **critical** measurements. The door holder is 1 1/4" X 1 1/4" X 1/8" angle for the door support. (Make sure you attach this door angle **AFTER** you pour the refractory!) Handle is 3/4" X 1/8" bent to shape.

Photo Right: Note angle and placement of 5/8" pin, important location.

Contact Randy for information call or text 412-200-0952 dograndy@comcast.net

Preparation for casting refractory material:
Take a piece of 2" plastic PVC pipe which is 2 3/8" OD, about 12" long so you can handle it comfortably. Close one end with a 2 1/4" ball bearing or a rubber ball of similar size secured to pipe with epoxy. Place forge on its back and put a 1" shim on the bottom. Take a 1 1/8" shim and place on the side where the feet are (true bottom of forge). Set pipe with ball in forge vertically and push to wall. Clamp pipe to side with the burner hole making sure it is against the 1 1/8" bottom shim. Drill the 5/8" hole using the burner hole as a guide halfway through the pipe. Remove shims, clean inside of forge box thoroughly and place a 5/8" pin through burner pole to secure pipe. Randy recommends using Vaseline on the pipe and pin to keep refractory material for sticking to facilitate removal.

Above photo shows how the PVC pipe, attached ball and 5/8" pin sit inside forge for casting step.

How to cast:
Randy used a powdered high temperature refractory material and mixed it according to directions. Amazon is a good supply source. After mixing, add the refractory, pour slowly and tap on the sides of the forge to prevent voids such as bubbles. Let set, remove pin and pipe, then allow to cure according to directions. The process may take several days.

Fabricate the door using light weight insulation brick approximately 1 1/8" thick, cut from a bigger block. Randy made his door 4 1/2" X 5 1/2" with the 1 1/8" hole 3 1/8" from the bottom of the 5 1/2" side and centered on the 4 1/2" side. That puts the hole at the very top of the opening. You can cut the brick on a band saw. This configuration site of the hole allows for placement of the opening to use various areas of the forge.

Add an Interior Ceramic Coating:
Cera Materials is one supplier Randy used. The purpose of the coating is it reflects infrared heat, forge performs efficiently, and it is good to 2300^0. Apply to forge and door according to directions. After curing the recommended allotted time, make sure you break in the furnace gradually by placing a 150 watt incandescent bulb in the forge for several hours.

Ringing In the New Year

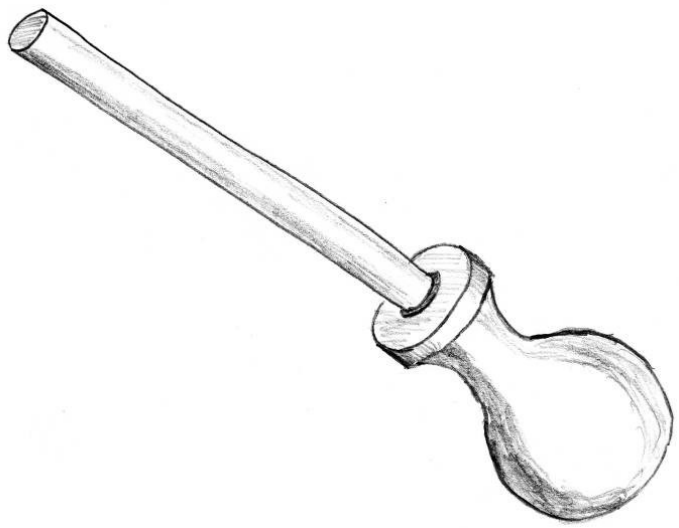
Two Bells made by Bill Clemens – large bell is approximately 2 1/2 " and smaller one is approximately 1 3/4"

Article by Bill Clemens

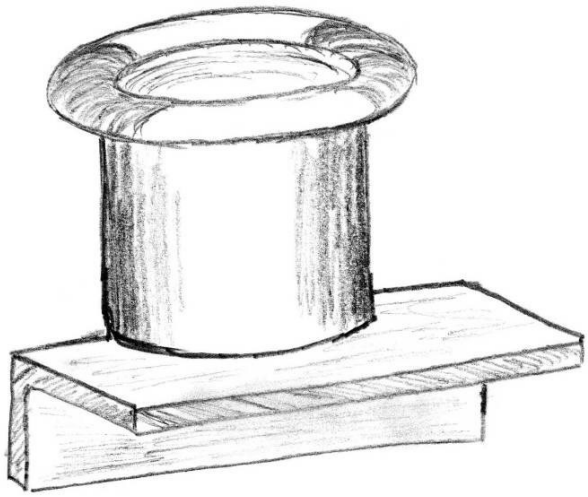
I began experimenting with making these bells over a year ago when a how to article appeared in an affiliate newsletter.[1] I quickly discovered that cutting out the bell blank was a stumbling block in making them. I first tried making them from thinner material than called for and found out that they don't form well from thin material. I then cut, **ground**, and **filed** one from the right material and was able to complete a bell but wasn't happy with the top half which seemed to be flat bent petals on a round hemispherical base. I next got a dozen blanks plasma cut at a local metal supply shop that only required some grinding on one side to remove the flash. I subsequently have had blanks laser cut and now after having made several dozen bells think I have the "how to" down well enough to offer this article to all.

Tools

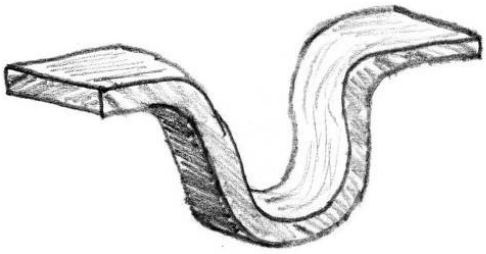
Top Swedge –Tailer hitch ball or ball bearing(2" for large bell 1 1/2 " for small bell) with 10-12 inch 1/2 - 3/4 stem welded on.



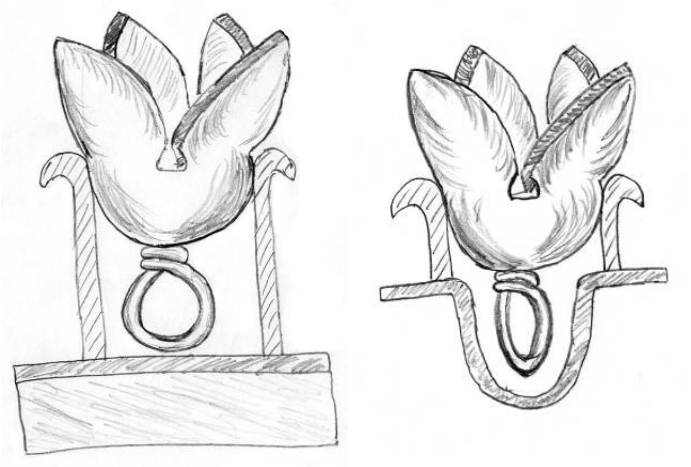
Bottom Swedge – Pipe with top end flared using horn of anvil
Large – ID ~ 2 3/8 " (3 inch thick walled pipe)
Small – ID ~ 1 3/4" (2 inch pipe)
Add angle iron for use in vise or hardy stem for use on anvil.



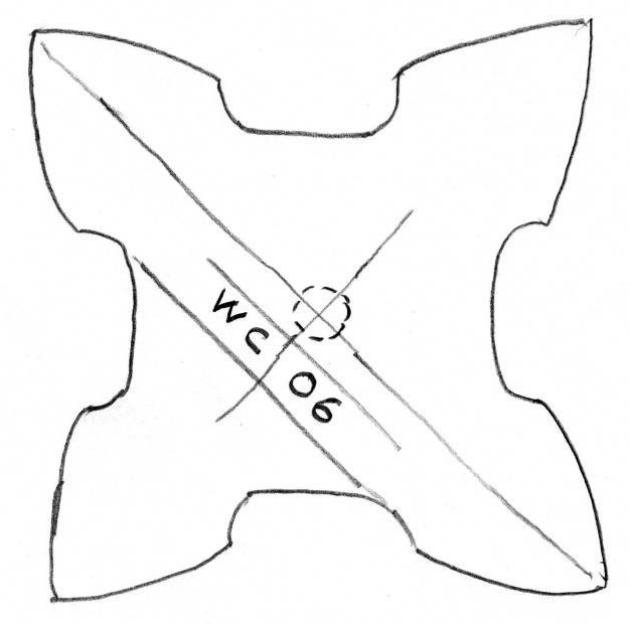
Shown below is a quick hardy stem made from flat stock 1/8-1/4" thick and the width of the hardy hole.



The space from the top of the flared pipe to the bottom of the tool needs to allow the bottom of the bell and ring to be inserted. This is a minimum of 2 3/4 " for the large bell and 2 1/4" for the small bell

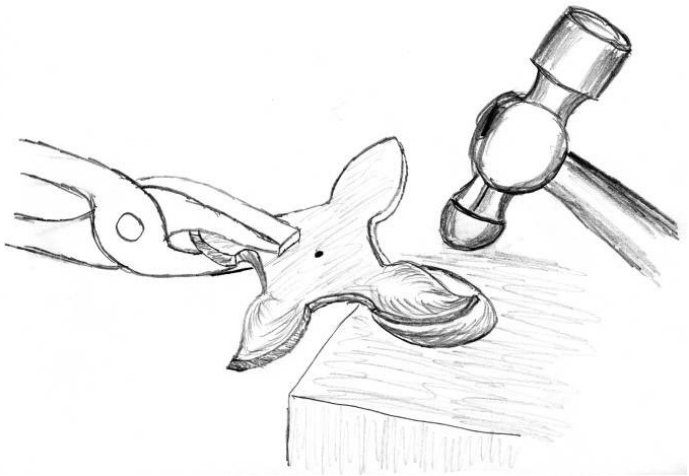


Bell Blanks – Cut (or have cut) bell blanks using the templates at the end of this article. Use 3/16" (or 7 Gage) for the large bell and 1/8" (or 11 Gage) for the small bell. Make a center punch hole on the inside of the blank for drilling the stem hole and touch mark the blank on the outside.

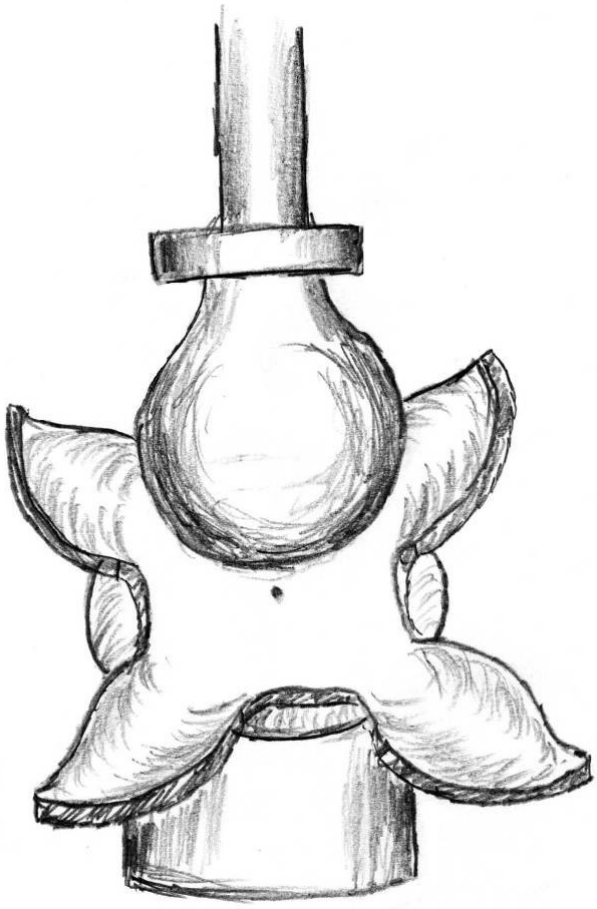


You may also decorate the outside of the bell at this point such as adding leaf veining to each of the 4 petals of the bell as shown here:

Dish each of the petals of the bell blank using a spoon swedge and ball pein hammer.

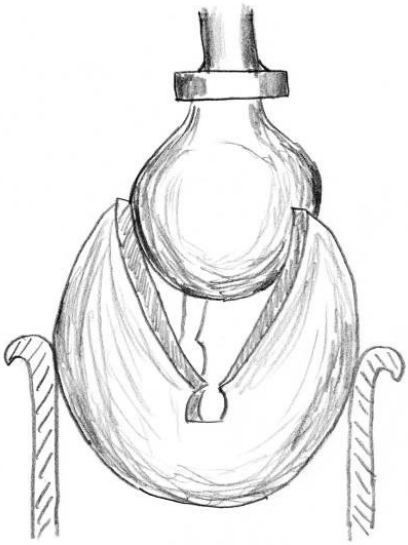


Form Bell – Heat the blank uniformly to a yellow heat and begin sinking it into bottom pipe swedge with the top ball swedge. This will take several heats as you are upsetting the material between the bell's petals.

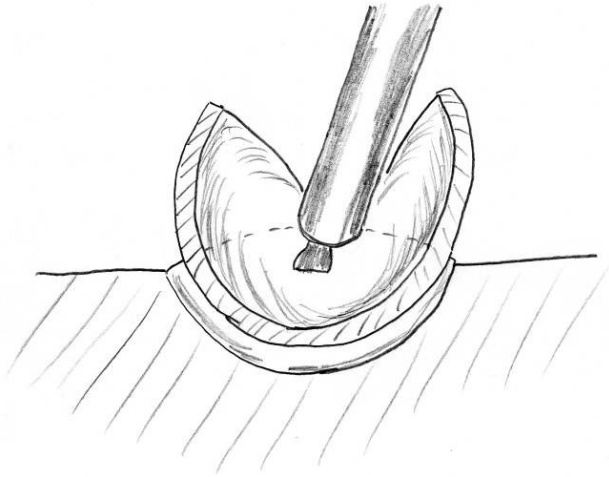


To help shape the bell use the top ball swedge on the anvil to smooth out and round the portion of the bell being upset between the petals.

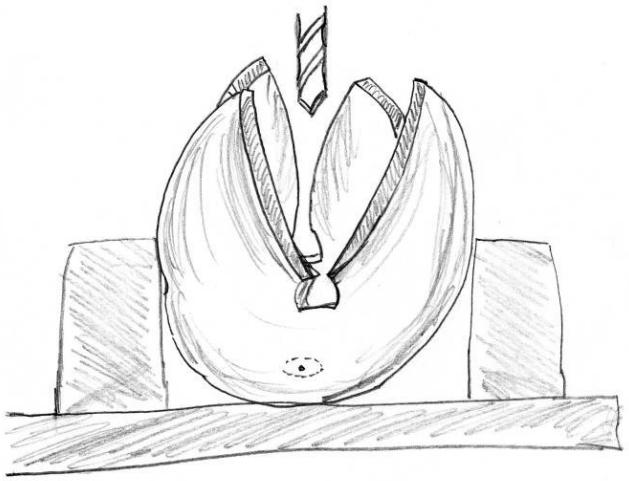
Continue sinking the bell until the ball swedge can just be removed from the bell.



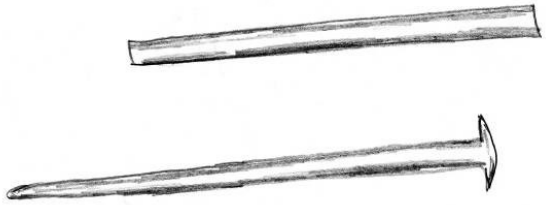
Use the smaller ball swedge on the large bell or a 3/4 inch rounded end rod on the small bell to round out the area between the petals into a ladle swedge block.



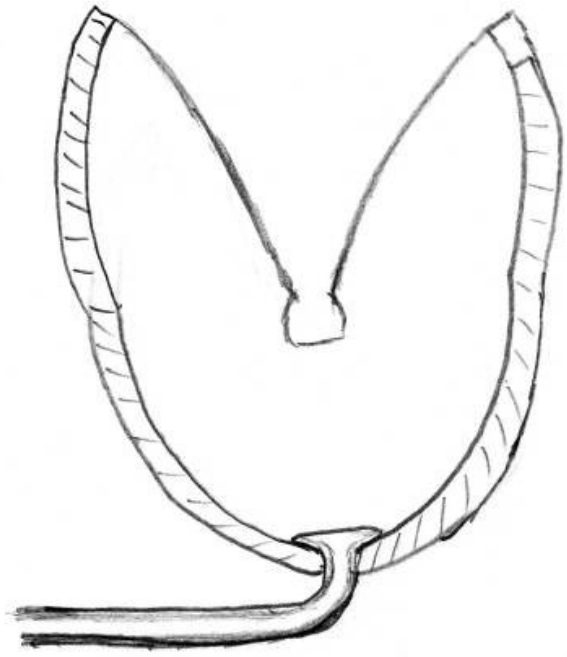
Stem – Drill 1/4" hole in bottom of bell to accept stem



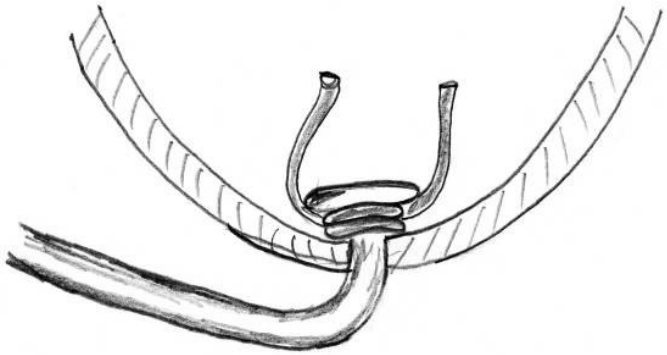
Forge stem from 6 inches of 1/4 inch round. Head one end and taper 1 1/2 inches of other end to a blunt taper.



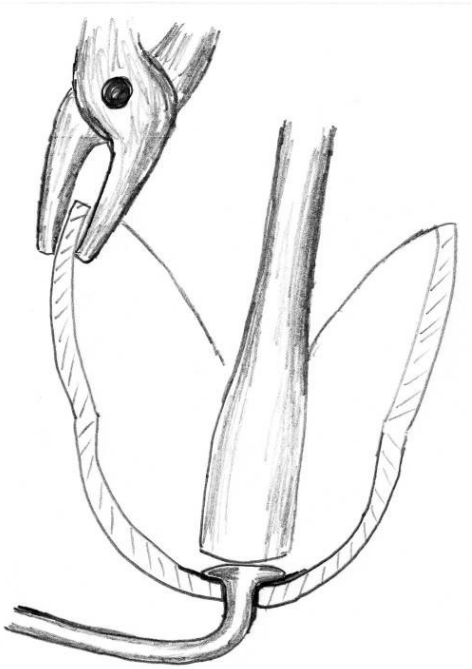
Heat the headed end of the stem and insert in the bell bending the stem at approx 90 degrees close to the bell.



Heat and flux the stem head and then wrap with copper wire. Preheat the bell and then reinsert the stem. Heat slowly to near welding heat watching until the copper wire melts.

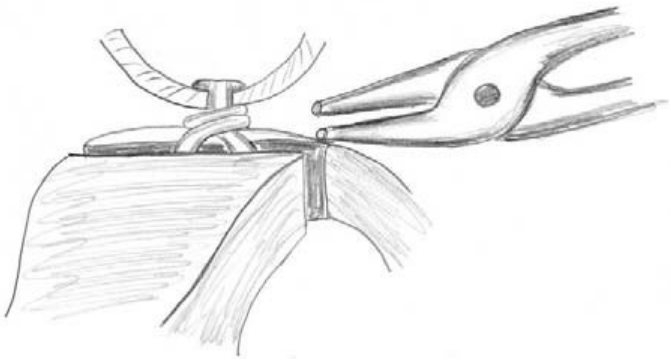


Remove from forge and hold head in place until bell cools and copper hardens.

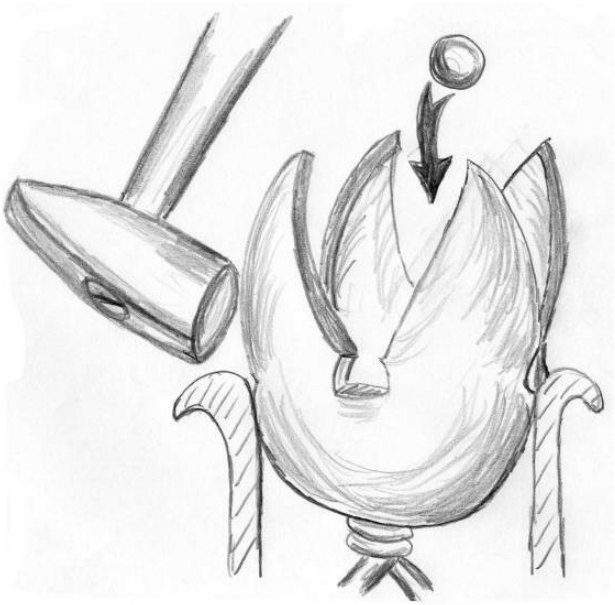


Heat stem and form ring with scrolling tongs. Take care not to overheat the bell and break the copper braze.

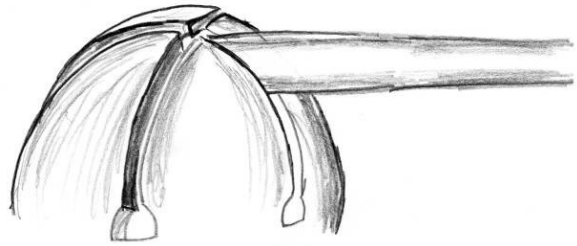
Heat tapered end and wrap around stem with scrolling tongs to finish ring.



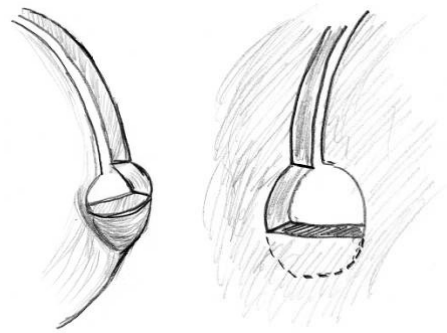
Place bell in forge with petals down and heat to bright orange. Set bell in pipe swedge, insert ball bearing (3/8 to 7/16" for small bell 1/2 to 5/8" for large bell) Hammer petals closed with gentle blows near their base.



Space petals with thin tapered chisel/fuller while using a hammer to close them.



Completed bell has a bulge where the metal has been upset between the petals and the hole at the end of the slots is not round but flat on the bottom. You may choose to leave the bell like this or remove it. It does not seem to have much affect on the sound of the bell. First file or grind the bulge flush following the contours of the bell. Next. with a round file or die grinder, round the bottom of the hole.



The bell should be heated again to critical temperature (nonmagnetic) and quenched to improve its ring.

Options for the bells include using a nut and bolt in place of the ring to fasten the bell(s) to a leather strap. You could also drill and tap the base of the bell to accept a bolt for this same purpose.

Materials List for Bells

Tools

Top Swedge

Trailer Ball or Ball Bearing

Large Bell – 2"

Small Bell – 1 1/2"

10-12" 3/4 round for stem

Bottom Swedge

Pipe with top edge rolled

Large Bell - 2 3/8" ID

Small Bell - 1 3/4" ID

Angle Iron for base in vise

Hardy Stem for use on Anvil

3/4" round end Fuller

1/2 -3/4" wide thin tapered Fuller

Bells

Blanks cut using template on following page

6" 1/4 inch round for stem/ring

Ball bearing for Ringer

3/8 to 7/16" for small bell

1/2 to 5/8 " for large bell

Copper Wire to forge braze Stem to bell

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This article is based on a article by Steve Alling that appeared in the Nov-Dec 2005 issue of The Upsetter, the newsletter of the Michigan Artist Blacksmith's Association.

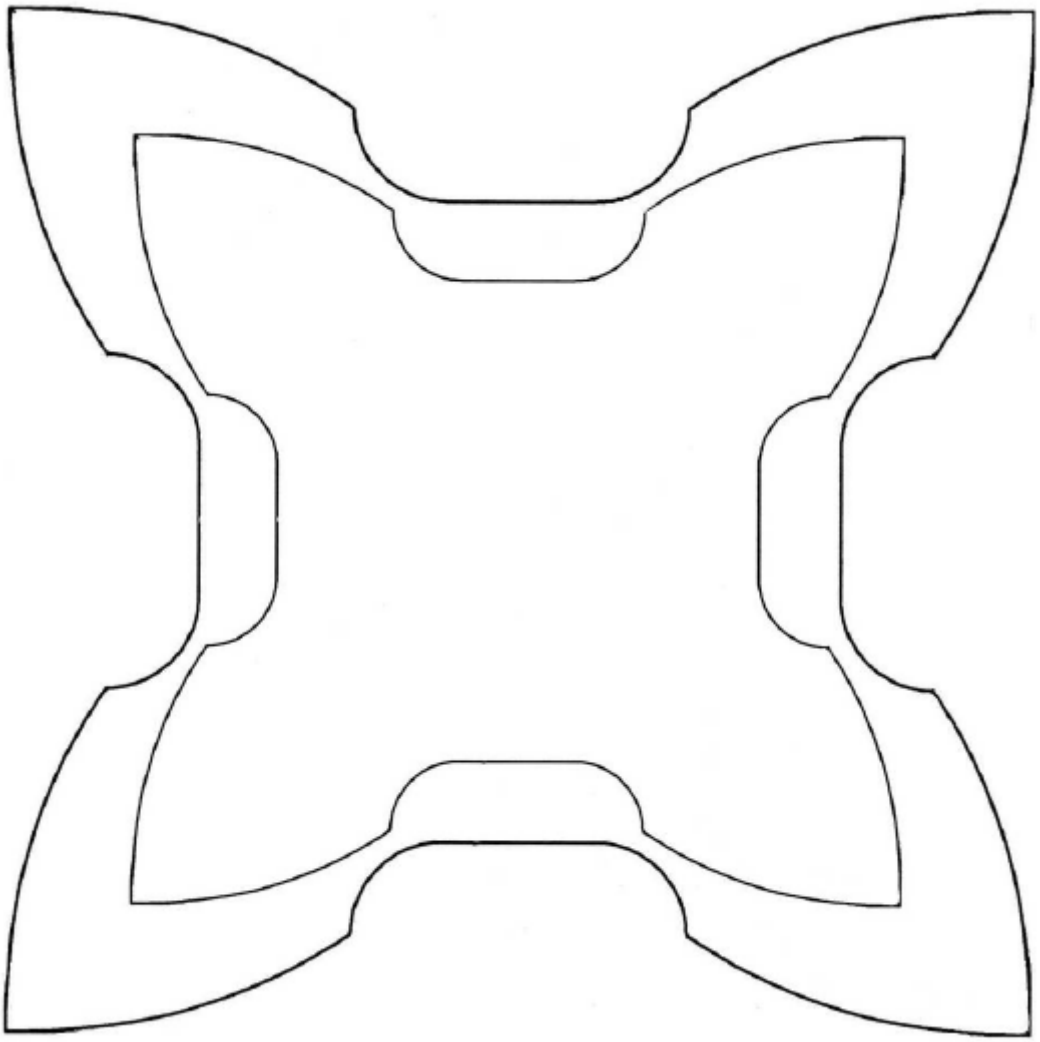
Reprinted from the January/February 2007 Newsletter of the Blacksmiths Guild of the Potomac.

Bill Clemens, January 18, 1953—July 31, 2017

Scale Drawings for Bell Blanks

Large –measures 6 1/2 “diagonally corner to corner – use 3/16” (7 Ga) Stock

Small –measures 4 7/8 “ diagonally corner to corner – use 1/8” (11 Ga) Stock



Seeing Red

By Chris Holt

One of our newer PAABA members has been putting into practice some of the things he dreams up while at work. Ross Kareha a.k.a. “Red” works at Channellock Inc. in Meadville and has some thinking time while doing his finishing work during the day. George B. DeArment was the founder of the company and was a blacksmith from Evansburg, PA so it seems fitting that Red thinks about blacksmithing projects at his work site. One of the projects he has devised is a simple bell made from an aged piece of pipe. This project has a “ring” of creativity to it once you develop some basic skills such as using a fuller. It may be a project you have seen before, but may not have given it a try. This is a particularly good project if you take part in craft shows or in need of a gift item. There is little expense to the materials and the older the pipe….well the more character it will have, and the ringing you hear may be a jingle in your pocket from lots of sales!

Materials:

Approximately 6” of old l 1/2” sch. 40
12” or more of 1/4” round
Piano wire or light wire for ringer
Nut or object as a ringer

Fuller down a piece of pipe approximately 6” long, almost to the point of closing but not quite. Take a piece of 1/4” round, taper one end and make a loop on the other. Insert the 1/4”round through the pipe and close at top. The bell shape can be done before or after using the horn of the anvil or a round steel ball to shape the end. The shape of the bell will change the tone. Shape the handle by gracefully wrapping the handle. Add the ringer, you can use a nut or experiment with items for a pleasant tone.

**Editor’s note*—If you are making a much larger bell, try painting a golf ball black and using it as the ringer, it has a wonderful tone, make sure it is a golf ball with anelastic center and not a liquid center.

Reprinted from the January—February 2017 Michigan Artist Blacksmith Assn. *The Upsetter.* Originally published in the December 2013 Pittsburgh Area Artist Blacksmiths newsletter

Ask the Old Fart

Photos by Paul Diefenderfer

Hey Old Fart: Why?

Why indeed! That is perhaps the best question you should be asking. Every day. Why? All the time. Why? Little kids ask it all the time (it has been known to drive some parents insane). Most adults rarely ask "Why?" They go about their lives "knowing" things are the way they are "because". Here's a quick example. Quick - draw a bell. Did you draw the basic shape of an upside down "U"? Why? "Because" that is how bells are supposed to be right?

I've made quite a few bells from air cylinders. Cut the bottom off. Make a hook to be inserted through the valve opening and the bell is done.

Recently I was going for a different look and cut the top of the tank off so part of the curved area was left. I grabbed the plasma cutter to punch a quick hole in the bottom so I could turn the tank over and hang it - upside down with the opening of the bell still facing down. The steel was so thick my plasma cutter wasn't punching through the steel. After 5 minutes of what should have been a 5 second task I gave up. All of a sudden I asked myself, "Why?" Why does the bell have to hang with the opening down? What if I just set the tank on the ground with the opening up? Then I wouldn't have to make a big stand for the bell. I tried it and the bell rang just fine. Drilled a couple of small holes in the bottom for water drainage and the bell was done except for finishing. I had several of these bells on display during a recent studio tour. As folks were wondering around I would say "Feel free to ring the bells." The most common response was "What bells?" Once discovered, the bells were a big hit.

At the recent demo at my shop I asked every one to sketch a design for a screen door roughly 3ft wide by 8ft tall. The wall around the door was 15 ft tall. There were a wide variety of wonderful designs. They all had one thing in common. All the designs stayed inside the 3ft by 8ft "box" of the door. Why? "Because" that is how we adults think about doors. With 15ft of wall space why not extend the design up and outside the box? I did a mountain scene on the bottom portion of the door and then had an ocotillo with branches extending a couple of feet outside the frame. The client was very happy. They have a work of art with a door in it instead of a door that is a work of art.

So, as you ponder the design of your next project ask yourself, "Why?" Don't settle for the easy answer of, "Because."

An air cylinder bell.

An air cylinder bell that is also a candle holder.

Reprinted from the January—February 201 Michigan Artist Blacksmith Assn. *The Upsetter.* Originally published in the March 2014 Arizona Artist Blacksmith Assn. *The Anvil's Horn*

Dick Smith brought[1] a pick axe head that he modified into a bick for backing up a pipe bell on the inside when forging it. He wedged a piece of 1" square into the head, and used 1" angle welded to the sides of the 1" square as a spacer between the pick axe head and the face of the anvil around the hardy hole.

Editor's Note: Dick brought this bick to the January 19,2007 BGOP meeting

Reprinted from the January/February 2007 Newsletter of the Blacksmiths' Guild of the Potomac

Swedish blacksmith Torbjörn Åhman has a great video on forging this Uri Hofi-inspired bell at https://www.youtube.com/watch?v=lyGksPUhdLc

http://www.torbjornahman.se/

Swiss smith Peter Preisig is one of the few remaining bell makers. This video shows him forging a bell used in New Year's celebrations. Video is in Swiss.

https://www.youtube.com/watch?v=u-t-y2bkgWI

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