October 2017

THE FORGE FIRE

The Newsletter of the Indiana Blacksmithing Association, Inc.

An Affiliate Of The Artists-Blacksmiths' Association of North America, Inc.

IBA is a Not For Profit Indiana Corporation recognized by the IRS under section 501(c)(3)

9:30 AM is the regular meeting time for IBA Hammer-Ins
with beginner training available at 9:00 AM.
PLEASE MAKE SURE TO ASK FOR HELP!

If you would like an IBA membership application form, please contact Farrel Wells, Membership Secretary (765) 768-6235.

BULK LOTS ARE AVAILABLE TO DEMONSTRATORS,
SHOPS, SHOWS AND OTHERS WILLING TO MAKE THEM AVAILABLE.
WE APPRECIATE YOUR HELP.

More nearby resources and organizations for blacksmiths:

Rural Smiths of Mid-America:
Meetings are on the first Saturday of each month
Call Ron Gill
317-374-8323 for details

IBA MEETING SCHEDULE

Check the latest *Forge Fire* for monthly **IBA** revisions.

Oct 21 2017	**TBD**
Nov 18 2017	**TBD**
Dec 9 2017	**TBD (2ND SATURDAY)**
Jan 20 2018	**TBD**

Editors Message

The September hammer in was hosted by the One-Armed Blacksmiths at the Bartholomew County 4-H fairground blacksmith shop. All four forges were going as the 4-H members demonstrated their skills. They were very impressive as they forged various items.

As I am writing this SOFA has just ended and UMRBC (Pontiac) is about to begin. Due to prior commitments I am not able to attend UMRBC. I am hoping to hear from attendees. The weather is suppose to be great for outdoor activities. The change from the typical heat of July along with the impressive list of demonstrators should get more people motivated to participate.

The folks at SOFA are thinking about holding a **tire hammer building class** next spring. Currently they are trying to determine the level of interest.

> I am looking to see if there is enough interest in having a Clay Spencer Tire Hammer Build at the SOFA facility in Troy, Ohio. The anticipated time for the build would be mid April, 2018.
>
> The ballpark cost estimate is $1500. Pricing is by no means complete as costs depend on rentals (forklift), how much cheap steel is available, etc.
>
> The estimated time needed to complete the project will probably exceed 40 hours over 4 or 5 work days as well as some pre-work sessions to build the sub assemblies.
>
> For more information, go to YouTube on line, type in Clay Spencer Tire Hammer and watch his videos.
>
> There will be 12-15 spaces available in this workshop. There are large , heavy pieces of material to handle, lead to melt and pour, machining, much welding (12 linear feet per hammer), and wiring of electrical parts. Safety is our first concern.
>
> If you are interested and are able to commit to several pre-work sessions and 4-5 days for final assembly and a 50% down payment (pricing still unfinished but likely $750 or more), please contact me by November 30, 2017.
>
> Interested persons should contact:
>
> Jacob Lutz
> Ph: 765-760-0923
> Email: lutz.jake@gmail.com

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Dates to Remember

Oct 13-14
UMRBC

IBA website: www.indianablacksmithing.org IBA Facebook page: www.facebook.com/groups/IndianaBlacksmithingAssociation/

IBA Satellite Groups and News

1) Sutton-Terock Memorial Blacksmith Shop
Meet: 2nd Saturday at 9 AM
Contacts: Fred Oden (574) 223-3508
Dennis Todd (574) 542-4886

3) Wabash Valley Blacksmith Shop
Meet: 2nd Saturday at 9 AM
Contacts: Doug Moreland (217) 284-3457
Max Hoopengarner (812) 249-8303

5) Maumee Valley Blacksmiths
Meet: 2nd Saturday
Contacts: Clint Casey (260) 627-6270
Mark Thomas (260) 758 2332

7) Rocky Forge Blacksmith Guild
Meet: 2nd Saturday at 9 AM
Contacts: Ted Stout (765) 572-2467

9) Whitewater Valley Blacksmiths
Meet: 2nd Saturday
Contact: Keith Hicks (765) 914-6584

11) Bunkum Valley Metalsmiths
Meet: 1st Saturday
Contacts: Jim Malone (812) 725-3311
Terry Byers (812) 275-7150
Carol Baker (317) 809-0314

13) Satellite 13
Meet: 4th Saturday
Contact: Bill Newman (317) 690-2455

2) Jennings County Historical Society Blacksmith shop
Meet: 2nd Saturday at 9 AM
Contact: Ray Sease (812) 522-7722

4) Fall Creek Blacksmith Shop
Meet: 4th Saturday at 9 AM
Contacts: Gary Phillips (260) 251-4670
Dave Kline (765) 620-9351

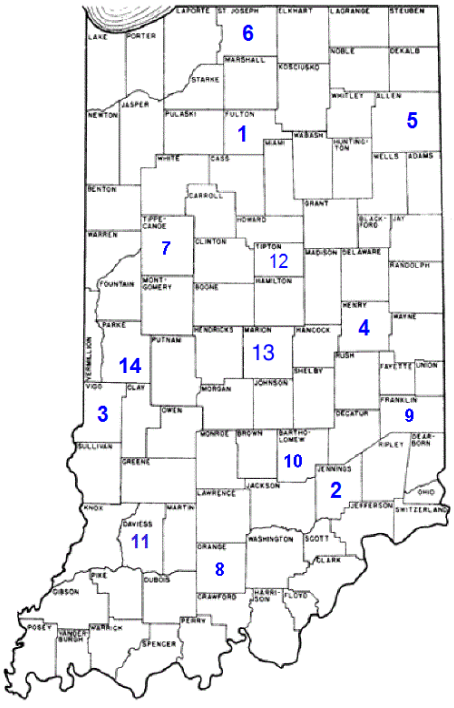
6) St. Joe Valley Forgers
Meet: 4th Saturday at 9 AM
Contacts: Bill Conyers (574) 277-8729
John Latowski (574) 344-1730

8) Meteorite Mashers
Contacts: Mike Mills (812) 633-4273
Steve King (812) 797-0059
Jeff Reinhardt 812-949-7163

10) One-Armed Blacksmith Shop
Meet: 1st Saturday
Contact: Tim Metz (812) 447-2606

12) "Doc" Ramseyer Blacksmith Shop
Location: 6032W 550N, Sharpsville, IN 46060
Meet: 3rd Sunday at 2 PM
Contact: Charles Gruell (765) 513-5390

14) Covered Bridge Blacksmith Guild
Meet: 1st Saturday
Contact: John Bennett (812) 877-7274



Jennings County Historical Society Blacksmith shop

The Vernon Blacksmiths had a very prosperous day at the Vernon shop. Charlie Helton, Bill Kendrick, Ray Sease, Kenny Dettmer, and others spent most of the time working on the power hammer. Things finally came together and made one heck of a hammer! Meanwhile, Nathan Pevlor crafted a wheat head with a leaf attached . This took three forge welds, which were perfectly done. Great job! Ray Sease quickly cabbaged on to it and clamed it for himself. As usual, we had a very good iron-in-the-hat and a pair of tongs for door prize, made by Kevin Welsh. Paul Bray

Meteorite Mashers

This month's meeting was held under the horn of an Anvilstream camper at Troy Ohio during the Quad State Roundup. Meeting attendance was the best yet with about 1200+ attendees. Iron in the hat was a bust cause all the cheapskate blacksmiths were saving all their money for plunder at the tailgate sales. The October meeting will be October 28th at Beck's Mill, on Beck's Mill road near Salem.

This 6 page article reprinted from the Third Quarter 2017 edition of the Hot Iron News published by the Northwest Blacksmith Association

Matt Moore: Bronze Pour

Matt Moore, who casts metal as a hobby, treated the conference crowd to a bronze pouring demonstration on Sunday morning. Though many people had gone home, there were quite a number who stayed around to take it in. This is a sketchy overview of the process, as with all technical skills, the details (which may be missing here) are vital... i.e. this is not a how to article!!

Sand casting, also known as sand molded casting, uses sand as the mold material. Over 70% of all metal castings are produced via sand casting process.

Molds made of sand are relatively cheap, and sufficiently refractory even for steel foundry use. In addition to the sand, a suitable bonding agent (usually clay) is mixed or occurs with the sand. The mixture is moistened, typically with water, but sometimes with other substances, to develop the strength and plasticity of the clay and to make the aggregate suitable for molding. The sand is typically contained in a system of frames or mold boxes known as a flask. The mold cavities and gate system are created by compacting the sand around models, or patterns, or carved directly into the sand.

Mixing up the sand with oil.

Casting Sand

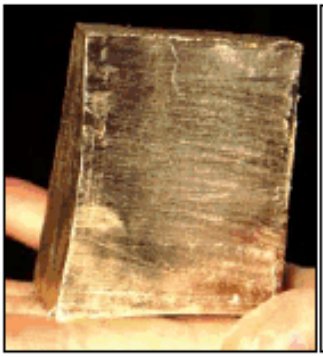
To create the mold for casting, a very fine sand with approximately 10% clay is used. Clay makes the sand stick together, but too much clay does not allow for air flow around the particles, trapped air can cause defects in the cast metals. Water is added to the sand to make it stick together and have the right consistency. Oil may be used as well, as Matt did for this pour. Water may cause steam that can blister the surface of the cast piece. Oil does not cause a steam problem, but too much oil makes it so the air cannot get out and results in blistered casting. Two types of sand blends were mentioned K-Bond, an oil bonded casting sand, an almost smokeless oil bonded foundry sand for casting zinc, aluminum, brass, bronze and iron, and Petrobond. Both can be bought at a foundry supply, on ebay or on other websites, and both give good results in creating castings with great detailing and a fine finish. Matt used Petrobond retempered with 30 weight non-detergent oil. Brand new Petrobond is nice and red, not dirty. The Petrobond turns black where hot metal touches it in casting. Try to separate out the black sand if reusing casting sand.

Another way to get the right consistency of sand for casting is to use 30w non-detergent motor oil. The goal is to get it to coat the sand grains until the sand has the consistency of brown sugar.

Preheat the crucible by placing it in the furnace, homemade from a 5 gallon metal bucket.

Crucibles are made of silicone carbide or graphite. Only one type of metal should be used in each crucible.

Everdur Silicone Bronze ingots were purchased from the foundry supply La Grande Industrial Supply, Portland. Everdur has silicone and copper but no zinc, and it does not degrade. Beware: Zinc bronze gasses off at melting temperature, exposure to the gas can cause illness.



About Everdur: With its pleasant color (and ability to accept a range of patinas) combined with good fluidity, low drossing, and a reasonable solidification range, Everdur Silicon Bronze is widely used in both industrial and creative applications. Everdur's balance of mechanical properties and corrosion resistance has led to its use in valve and pump parts, impellers, bells and a variety of other engineering applications. More recently, Everdur's excellent casting characteristics have resulted in it being the preferred Bronze for sculpture casting in its wide acceptance for the jewelry caster as well.

Making the Pattern

The mold is formed by laying a pattern onto the prepared casting sand and packing sand over it. Pressing the pattern into the sand makes the sand bulges and gets fluffy. Patterns can be carved from wood, shaped from putty that hardens (Durham's Rock Hard Putty, Fix-It-All patching compound, Plaster of Paris), or an original part that you want to duplicate. Fine tune the pattern with a pattern making friend - glazing putty (air dries in 5-10 minutes) or bondo. Castings shrink 3-5%. If you need a piece the exact size of an original you will need to make it slightly larger, take the original and coat it with wax or heavy paint. Shrinkage is slightly different for every metal, there are specifications for each alloy, but you may need to experiment with the casting to achieve exact dimensions.

Hammer head pattern piece.

Matt used carved wood coated with plastic for the hammer pattern. Indexing holes were drilled in the piece before it was cut in half for casting the hammer head. The other piece to be cast was a rifle butt plate, and the pattern was an original rifle butt plate sliced in half as the pattern for pouring a duplicate.

Preparing the Mold

A multi-part molding box (known as a casting flask, the top and bottom halves of which are known respectively as the cope and drag) is prepared to receive the pattern.

Pack the sand into the top piece of the molding box, the cope, making it as dense and even as possible. The sand needs to be compacted to hold its shape when the pattern is removed. Use a tool to hand pack the sand around the form until it is super dense. Sprinkle pattern piece with some kind of parting compound (bon ami, limestone, feldspar), so it can be removed from the sand without damaging the mold. Putting the pattern piece in a sock or a nylon stocking filled with chalk can work as well. Place the dusted pattern piece onto the mold, then pack the sand around it very firmly. The pattern piece needs to have a very slight taper so that it can be removed from the sand. There are tricks to creating the taper when you don't want the cast piece itself to have a taper.

After the bottom of the flask has been rammed around the pattern, talc (or other releasing powder) is dusted over the surface of the pattern to ensure the releasing agent coats it on all surfaces.

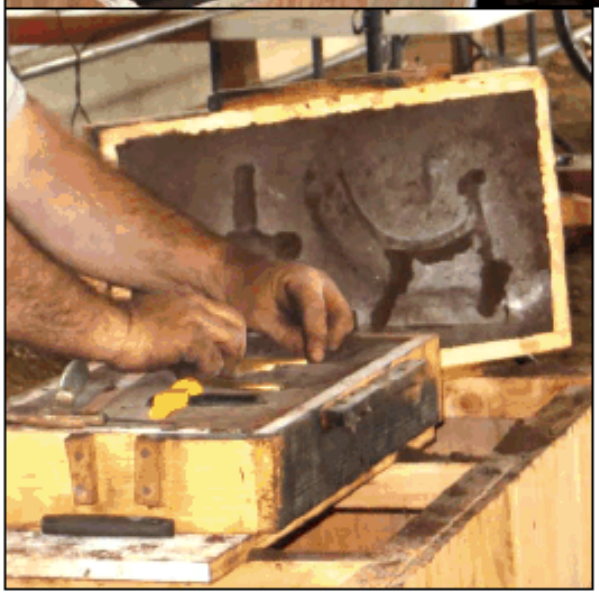
Put the flask together, sift sand over the pattern using a riddle of ¼"hardware cloth. Riddling gets rid of lumps and non-sand bits (old bb's of bronze) that might be left in recycled sand.

Continue to add sand evenly until the flask is full. Tamp it down very firmly, continuing to add sand until it completely fills the flask. If there is an under cut on a pattern piece, you need to push sand packed around

the tapered edge. Use the pointy end of tamper. Ram edges first, don't ram too hard. Too soft the whole thing might fall out, too hard, air can't get out and causes porous casting.

When the flask is full and packed as much as possible, screed the mold - run a straight edge along the top edge of the flask to remove any excess sand.

Separate the mold. If you did a good job, you'll get good detail and shape accuracy. If it falls apart, you have to go back and pack the sand better.



Vents are needed to vent air so the metal flows freely, without compressing air in front of it. They can prevent blowouts with water tempered sand, as too much water can create steam that can cause a mold to blow out. Matt has not used that kind of sand, so has not had that experience. With Petrobond, he typically only vents where there is an area that may trap air. On the subject of venting, sometimes you put in a large vent, called a riser. It vents, it also provides a blob of metal to refill part of the object that may have lots of shrinkage from size. It also lets you know you've completely filled the mold by seeing the metal flow up the riser.

To make the vents, poke a stiff wire or rod repeatedly into the cope's sand, forming the vent channels. The vent channels must not pierce into the mold cavity or they will fill with metal.

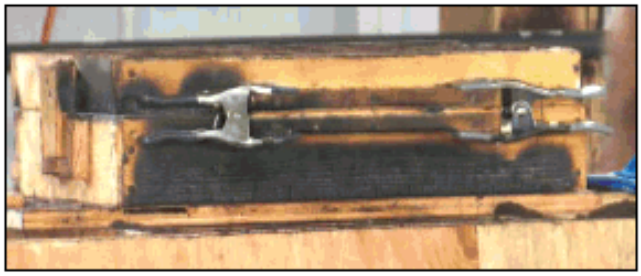
Next, channels, or "gates" need to be carved into the sand to give the bronze a way enter and fill the mold. Cut in the gate and smooth it with your finger, working on top side. Now you have to pull the pattern out, which may be hard to do. To help get it out, push down sand around the piece causing the bottom sand to be bowled and top to be proud. If it is still difficult to remove, you can rattle it slightly. Matt used a helpful little tool, looking a little

like a tuning fork, to gently rattle the piece and loosen it. Drywall screws, with coarse cut threads will also work, touching only the pattern itself to loosen it so you don't disturb the mold.

After the vent and gate channels have been made, the pattern is removed, a cavity will remain that forms the external shape of the casting. It is possible to smooth small defects at this stage, using a smoothing tool or finger to clean up the surfaces.

Some internal cavities of the casting may be formed by cores. Cores are additional pieces that form the internal holes and passages of the casting. Cores are typically made out of sand so that they can be shaken out of the casting, rather than require the necessary geometry to slide out. As a result, sand cores allow for the fabrication of many complex internal features. There are many recipes for making core material, Matt's recipe for making a core includes used mold sand, whole wheat flour, salt, molasses and water. Cores were not part of the demonstration because the pieces to be cast did not have any internal cavities.

A mold for a core that would be used to create the eye in the hammer head. Matt said if he found a workable sand to make cores, he would have poured it with the core. .



After the gates are cut into the sand and the pattern pieces removed, put the flask back together and clamp the top and bottom of the box together. Now, you're ready to pour.

The Pour

Matt made the furnace with a metal five gallon can, coated on the inside with refractory cement. The cement is given structural support with castable refractory tie wire woven around the inside, keeping the wire within the cement walls of the furnace.

Pipe gas in at an angle so gas doesn't go straight in. When the gas is piped straight in it does not flow well. At an angle the gas flows around the crucible. In Matt's furnace, the bottom of crucible is the last to heat. He mentioned that if he had a brick at the bottom it would help a lot.

Don't put cold metal in a hot crucible. Preheat it by setting it on top of the furnace. Any moisture on it will steam blast out.

Put one block of bronze in at a time, it will expand before it melts, and you don't want to blow out the sides of the crucible. Wait for the first chunk to melt before adding more. When melted he added flux (just a sprinkle of borax) and stirred it with a steel stick, then continued heating for a minute. Molten metal can rapidly absorb hydrogen gas from

the atmosphere causing surface defects and porosity. Using a flux will result in a better surface finish and improved material strength in your part. (It also helps to recover metal that would otherwise be stuck in the dross).

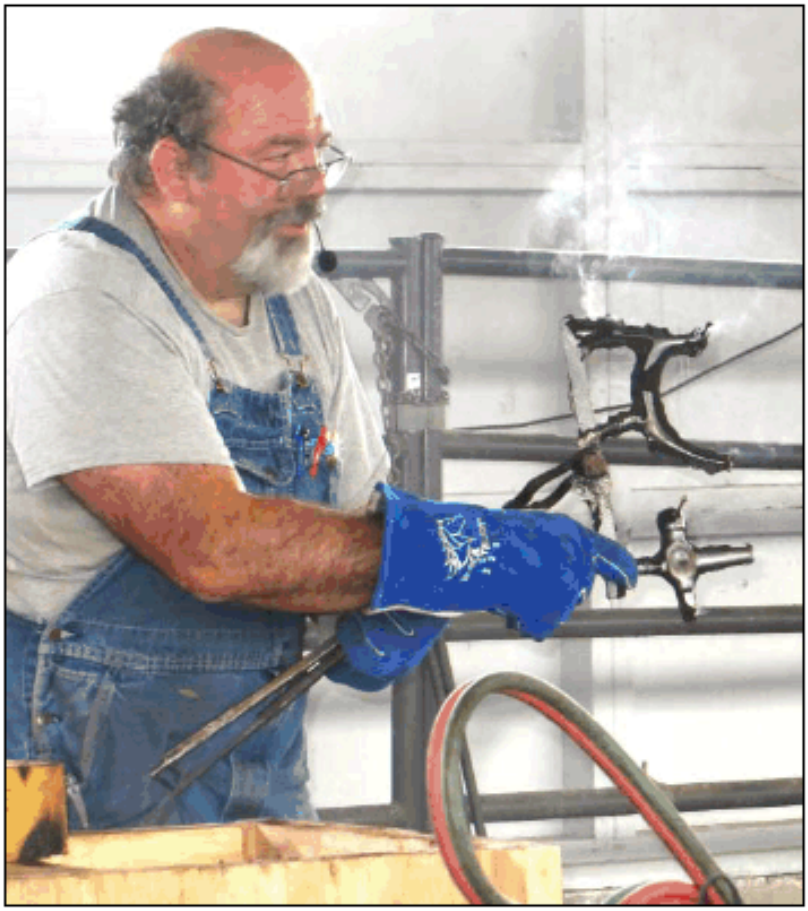
Matt wears a heavy duty mask when working with molten metal. He plans his steps so when the hot metal comes out of the furnace he can swiftly go directly to pouring in the fewest possible steps. First, he set the flask, clamped all around, next to the fire. He removed the lid from the furnace and set it off to the side, lifted the crucible and set it on the hot lid. Then, he adjusted his grip on the crucible and began to pour right away. Don't stop pouring once you start, stopping would probably cause a blockage.

Word of Warning! When pouring, don't put hand over the top of the vent holes, even with a glove on.

As flames come up sprinkle sand on top.

When pour is complete, allow to cool down slightly.

Remove clamps, remove cope. Scrape sand into bin. Pat sprue overflow into crucible.



When cool, your bronze will easily separate from the sand but you'll need to clean it up a bit and maybe fix some imperfections in the casting. Sand blasting and wire brushing works great for making it pretty.

Many thanks to Matt Moore for a great demonstration!

Matt's dedication and commitment is amazing. Even though he was not feeling well on the day of the demo, he brought all his equipment and spent many hours to show us how it is done. These notes are not really enough to send you on your way to making your own furnace and bronze castings, but they will point you in the right direction. There is plenty of detailed information out on the internet, just do a search for bronze sand casting and you will be inundated. The possibilities are endless... stay inspired, and put your inspiration into action!

This 1 page article reprinted from BAM March/April 2017

Shop Tips

By Jon McCarty

One of the greatest things about our organization is the number of skilled smiths willing to share their knowledge. I am lucky enough to be related to one such smith. Pat McCarty has taught me any things over the years. One lesson I use often is a method of hot cutting or splitting. Below are some tips I picked up from Pat as well as classes I have taken to help make your hot cuts quick, clean and straight.

To start with, you need a properly ground hot cut chisel. You want a gentle curve to the cutting edge and good sharp corners. You want your cutting edge to have a thin cross section as well.

Next you need to have your work piece held firmly on your anvil. You don't want to waste time or energy chasing a part around or having it jump off onto the floor or onto you.

Stand where you can cut towards you, this keeps the chisel from blocking your view. You want to see both sides of your work piece. This will help keep your cut straight. For longer pieces I stand at the heel of the anvil and keep the piece along the center of my anvil.

When splitting, cut almost completely thru your piece before using your cut plate. This will help keep your cut cleaner and it will take less time to cut your slit.

Check the edge of your chisel and keep it cool. Quench it often, keep a can of water close to quench in.

A 1/4" mild steel cut plate can make a cleaner cut than aluminum but is harder on the chisel edge, particularly if the chisel is not properly heat treated.

Center punch to mark the start of your cut.

1: Set the corner of your chisel into your punch mark.

2: Drive your chisel in 1/8" and rock it towards you. Driving it in as you go.

3: once the corner closest to you is down 1/8"

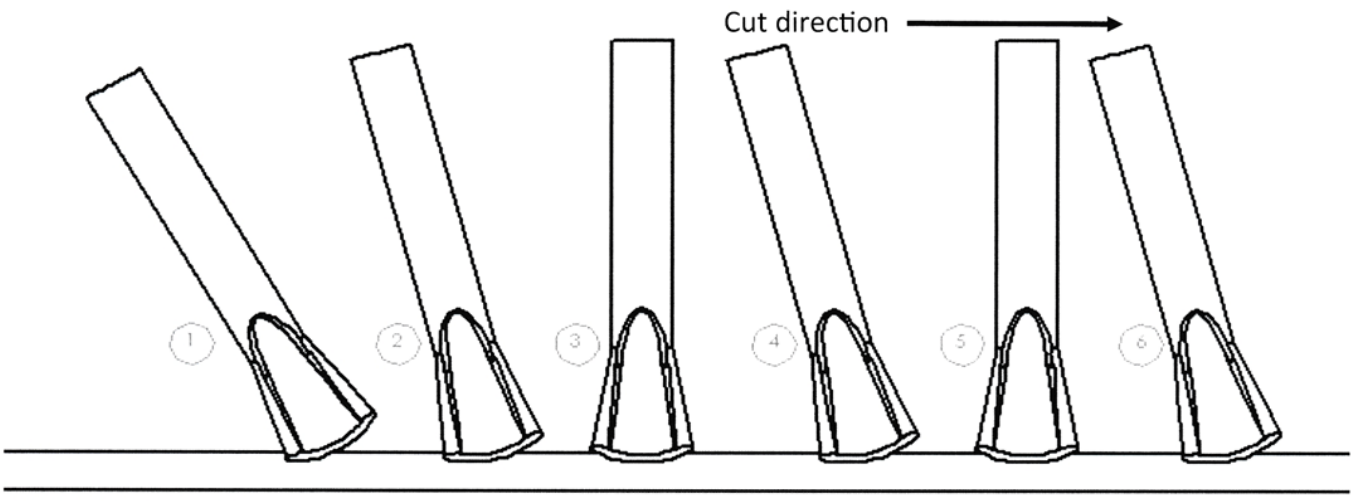
4: Pull the leading 1/4 of your chisel. This is where it gets easy to mess up. If you try to bite more than 1/4 of your chisel then your chisel will wobble. Take small bites and if you started straight you will stay straight.

5,6,7: repeat only using the leading 1/4 of your chisel.

Once you have your first pass made at least 1/8" deep your golden, you have a good line to follow so drive it home. Just remember to take your time on the first pass and take small bites.

I hope some of you find this helpful.

Jon



Introduction to Fold-forming Technique

by Jim Kennady

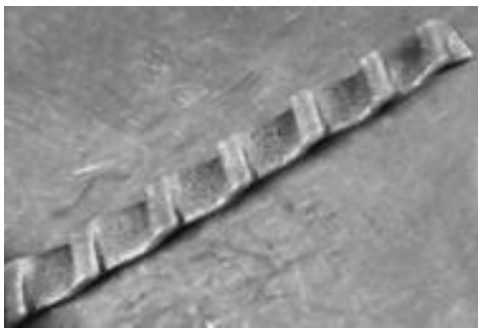
Fold-forming is a metalworking technique where metal is folded, repeatedly forged, annealed, and then finally unfolded. This process creates a dramatic new three-dimensional form. It can best be described as a combination of origami and traditional metalworking. The folded form process is an efficient way to create countless numbers of unique three- dimensional forms. Fold-forming is an innovative and simple hand forging technique that can augment traditional procedures. This example of the technique will craft a bracelet from flat bar stock.

Material 1/2" x 1/8" rectangular bar—24" long (or longer)

Begin rolling the bar over the Anvil's horn.

Continue rolling the bar until the desired amount of material is coiled.

Flatten the coiled bar at or above a red heat.



Unwrap the flattened coil and carefully straighten with a wooden mallet.

Charles Lewton-Brain is credited for "inventing" the technique in the late 1980's. He has published a book, primarily for non-ferrous sheet metal, **Fold-forming, Charles Lewton Brain. Brynmorgen Press 2008**, ISBN 978-1-929565-26-9 His website contains additional information on fold-forming techniques, www.brainpress.com

From NCABANA's Hot Iron Sparkle, through Rocky Mountain Smith's Forge Facts

The *FORGE FIRE*
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