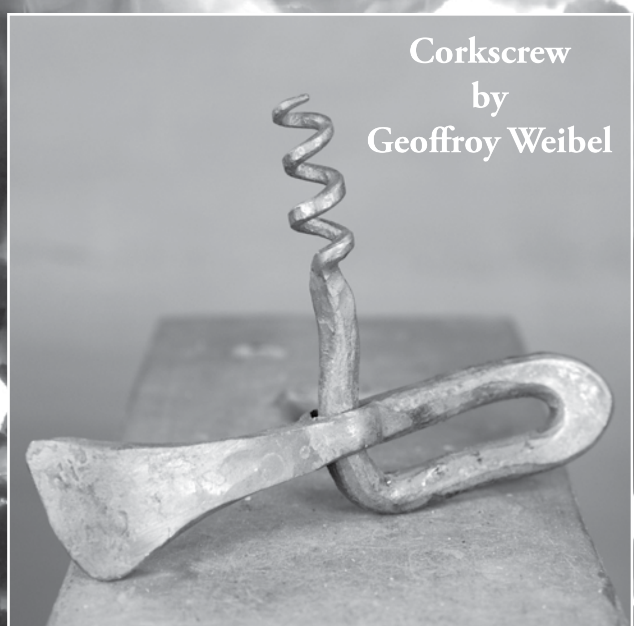
Vol. 22, # 3
Summer 2014

Hammer's Blow

Journal of the Artist-Blacksmith's Association of North America

The Hand Forged Wood Axe
By
Gerald Boggs



Corkscrew
by
Geoffroy Weibel

Editor: Mark Aspery
Proofreading: Gerald Franklin
Publisher: ABANA
Printing: Sundance Press, AZ.

Permit to mail at periodical postage rates is registered at Jonesborough, TN, and additional mailing offices.

POSTMASTER: Send address changes to:
The Hammer's Blow
259 Muddy Fork Road
Jonesborough, TN 37659

Next Deadline: September 1st, 2014
All materials for publication should be e-mailed to:
hbeditor@abana.org or contact Mark Aspery @
P.O. Box 523, Springville, CA. 93265-0523

ON THE COVER:
Wood Axe by Gerald Boggs, page 4
Corkscrew by Geoffroy Weibel, page 18

Hammer's Blow, USPS 018-972, ISSN#1531-0302 is a journal of the Artist-Blacksmith's Association of North America, Inc. (ABANA), a non-profit corporation, and is published and mailed to members on a quarterly basis by ABANA, 259 Muddy Fork Road, Jonesborough, TN 37659 423/913-1022.

Membership is available to anyone interested in the art of blacksmithing at the regular membership rate of $55 per year. Matters relating only to membership, magazine or journal subscription should be addressed to ABANA Central Office, 259 Muddy Fork Road, Jonesborough, TN 37659.
Phone: 423/913-1022 Fax: 423/913-1023.

AFFILIATE EDITORS: Most articles may be reprinted; contact the editor for more information

DISCLAIMER NOTICE: The Artist-Blacksmith's Association of North America (ABANA), its staff, directors, officers, editors and members, specifically disclaim any responsibility or liability for damages or injuries as a result of any construction, design, use or application of information contained in this publication.

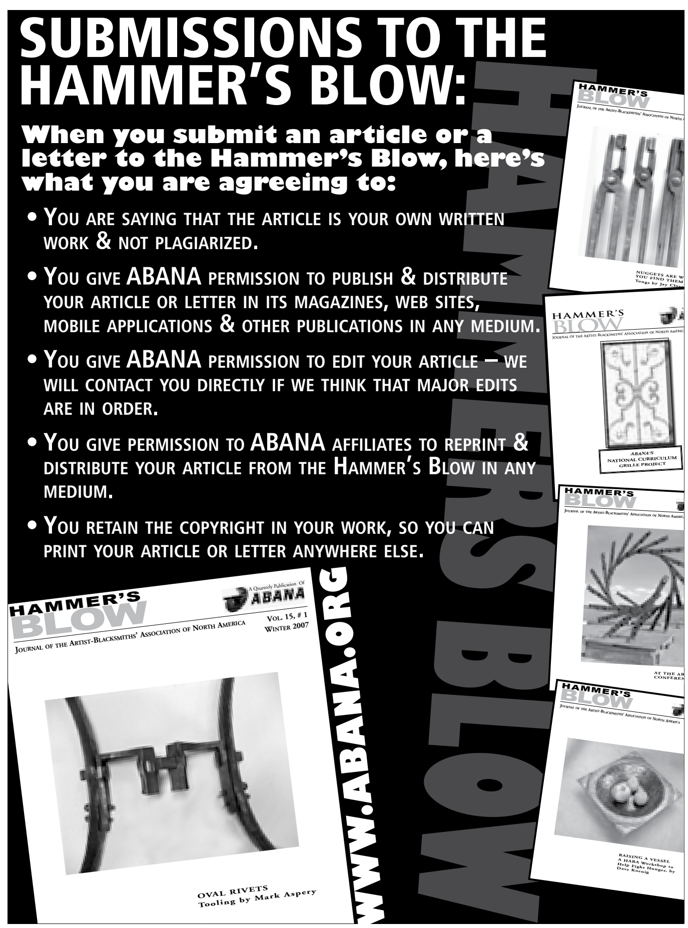
ABANA Contacts
Send dues and address changes to:

ABANA Central Office
259 Muddy Fork Road
Jonesborough, TN 37659
Ph: 423/913-1022
Fax: 423/913-1023
e-mail: centraloffice@abana.org
web site: www.abana.org

The Anvil's Ring
e-mail: areditor@abana.org
in the subject line please type:
Valerie Ostenak

The Hammer's Blow
c/o Mark Aspery
P.O. Box 523
Springville, CA. 93265-0523
e-mail: hbeditor@abana.org

WWW.ABANA.ORG



Hope to see you all at the conference. If you haven't registered, there is still time:

www.abana.org/2014Register

Still haven't decided? Review the Demonstrators list and I'm sure that you'll want to find a way to see them:

www.abana.org/2014Demonstrators

...and if the slate of demonstrators isn't enough to convince you, don't forget that there will be:

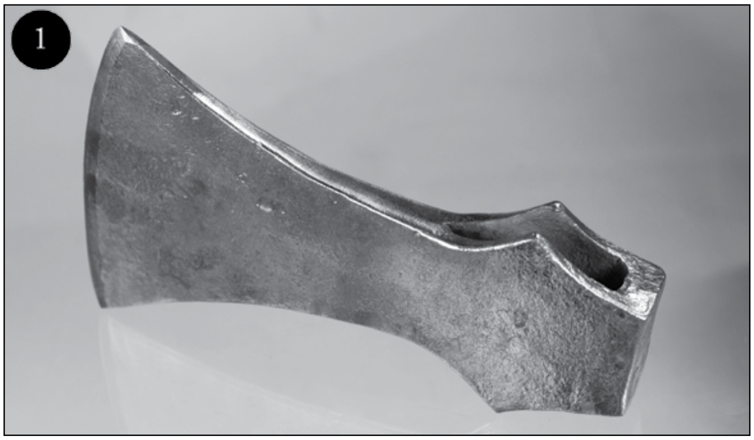
- a gallery full of forged Ironwork
- a teaching tent with 4 instructors and 20 workstations to allow you to get hands-on and improve your skills
- vendors and tail-gaters with tools, books and supplies
- seminars
- family activities
- Iron-In-The-Hat (including 3 "big ticket" items- Anvil, Tire-Hammer, & BAM Box)
- an auction of ironwork by demonstrators and attendees
- and hundreds of fellow blacksmiths from across the country and around the world

The Folded and Forge Welded Wood Axe

By: Gerald Boggs of Afton, Virginia

I'm using 1½-inch wide by ½-inch thick stock for the body of this axe and a length of ¾-inch wide by ⅜-inch tool steel (1090) for the bit of the axe.

You will also need to make a drift to dress the eye after forge welding the two halves together.



The finished axe

I would like the sides of the axe eye to show some lugs or langets. I think that the British Museum might even call these areas spurs. I'm going to call them lugs for the remainder of this article. Fig. 1

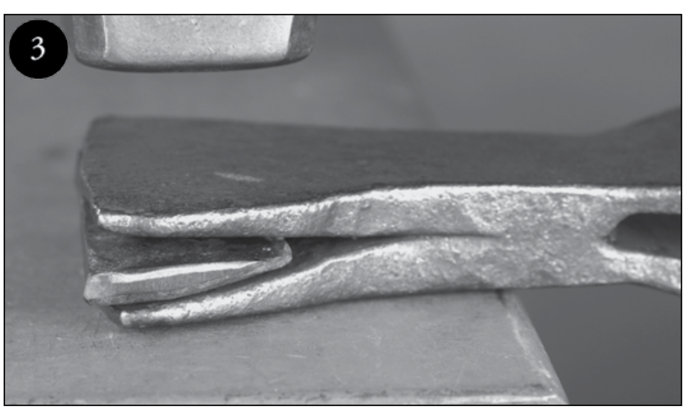
This axe will be folded in half around the eye (Fig. 2) and forge welded shut. . A tool steel bit will also be added at the blade (known as the bit) of the axe. Fig. 3

My local hardware store sells a 'Boy Scout' axe handle. The portion of the handle that fits into the axe eye measures about 1⅞-inch wide and tapers from ⅝-inch to ⅛-inch thick to form a teardrop shape. Fig. 4

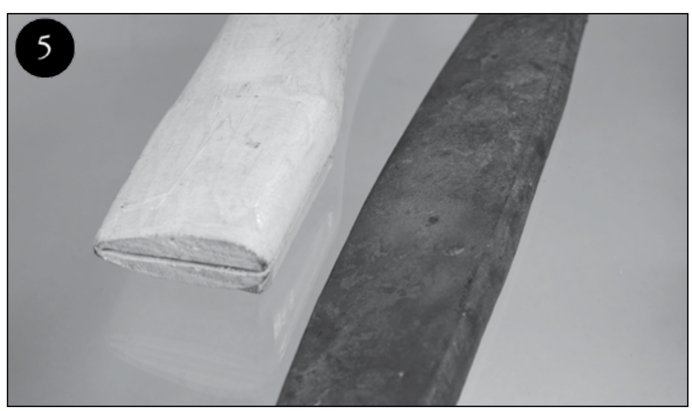
The sides of the axe eye are going to be approximately 3⁄16-inch to ¼-inch thick. I will use the ¼-inch measurement for layout. I can compensate for any later loss in thickness by dressing the poll of the axe.

The axe is made from a length of bar that is folded in half at the poll and forge welded together

My handle measures 1⅞-inch wide and ⅝-inch thick



A high carbon or alloyed steel bit is forge welded into the cleft of the blade



I have made a drift from 1⅛-inch round bar to match the axe handle

Adding the thickness of the axe handle to twice the thickness of the axe eye material will give you a measurement of 1⅛-inches. This will be the width of the axe at the poll. The eye will taper down to ⅛-inch wide. Fig. 6

The lugs will be diamond shaped when viewed from the sides of the axe. This will mean drawing some material out at the top and bottom of the eye before welding. Figs. 14 - 16

As I draw or spread material to form the lugs, there will be some collateral lengthening of the eye material along the centerline on the bar.

To compensate for the lengthening of the eye material, I must start with an eye that is slightly smaller than my intended outcome and allow it to stretch.

As a result of my own test pieces, I am going to start with 1½-inches of material that will lengthen to 1⅞-inch as I form the lugs and weld the axe blade together. Fig. 6

The overall length of the axe is personal choice. This axe will be used as a hatchet rather than a weapon replica so, as such, it will be quite short in length.

I use an 8½-inch to 10-inch length of bar depending upon the style of axe. I'll lose 1⅛-inch of material length to form the poll, leaving me with the remainder of the material to form the blade and the bit of the axe.

I like to center punch the bar to mark the poll and the extent of the axe eye material. Typically, I center punch inside the edges of the bar to allow for easy cleanup of the marks. If you are having difficulty seeing your center punch marks when you start to forge, consider two options:

- Scrape the area with your rake. This will leave scale in the bottom of the center punched hole. This scale will present as a black dot as you look at the hot bar.

- Center punch the edges of the bar leaving a slight protrusion in the bar's profile. The protrusion is easier to see when hot but may require some clean up later.

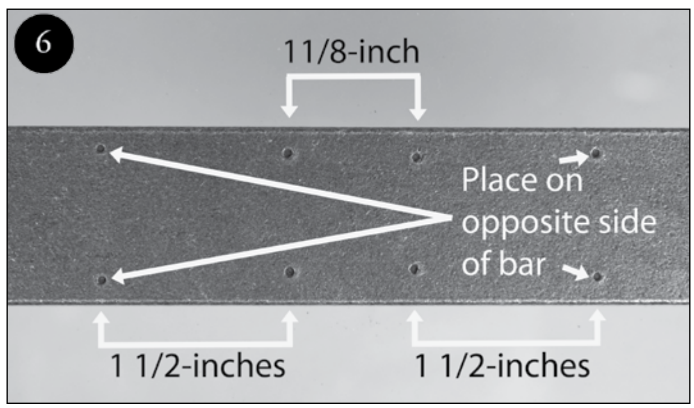
The first step in making the axe is to isolate the material for the eye. This material is defined by creating two shoulders, one on each side of the bar, about 1½-inches apart.

Find the center of the bar and measure out 9⁄16-inch on either side to define the poll of 1⅛-inches in total width. Mark each line with two punch marks set far enough apart so that they can help you keep the bar square to the anvil as you shoulder in to start the eye of the axe.

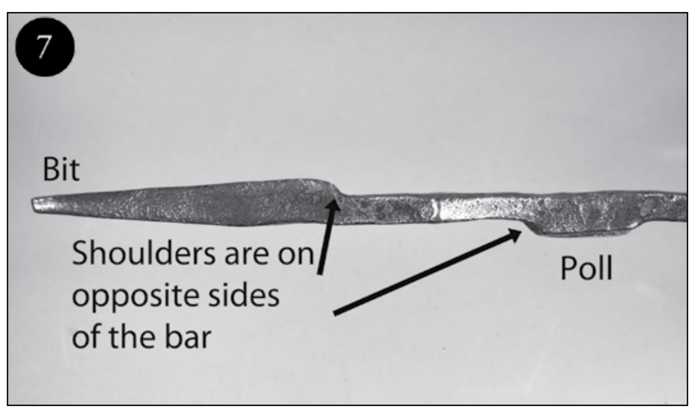
Turn the bar over and find the center of the bar. Measure out 21⁄16-inch either side of the center line. This marks the other end of the axe eye. Again, use two punch marks to help square the bar to the anvil during the forging process.

The two sets of center punch marks defining the eye shoulders should be about 1½-inches apart but on opposite sides of the bar. The shoulders are shown in Fig. 7.

Take a heat around the center of the bar and while holding the poll of the axe off the anvil, align one set of poll punch marks to a round nearside edge of your anvil. Keep the punch marks up and visible as you work. Fig. 8



I have shown the center punch marks on one side of the bar, but in practice they are placed on opposite sides to each other



The center punch marks correspond with shoulders forged into opposite sides of the bar

Hold the bar at a slight angle to the face of the anvil. Using half-faced hammer blows, shoulder the stock to define the poll and the start of the axe eye. Fig. 9

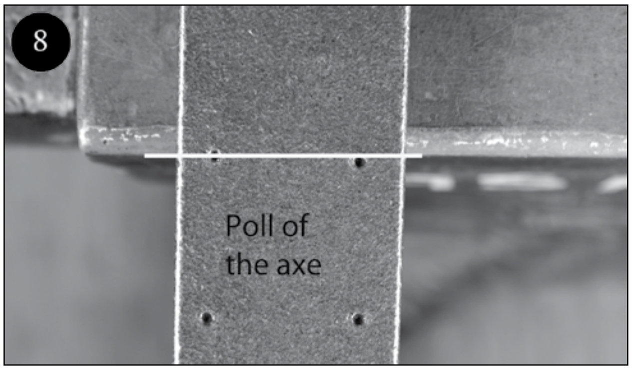
Shoulder in just slightly less than half way, leaving a little leeway when you draw the lugs and spread the side of the axe eye. Fig. 10 - 11

If you have enough heat, turn the bar over and align the punch marks for the front of the eye to a round portion of the offside edge of your anvil. Again hold the stock at a slight angle as you shoulder in. Fig. 12

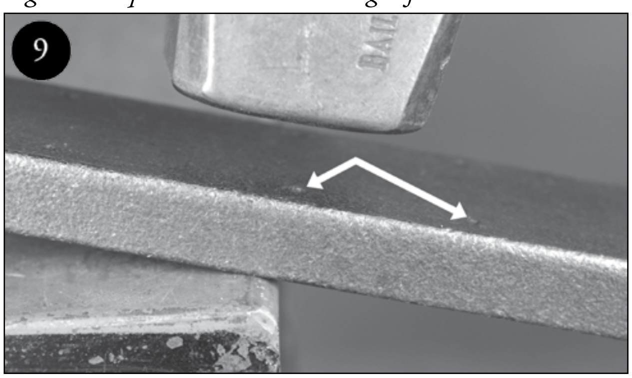
Dress the mass at the center of the eye so that it creates a diamond or triangular shape in cross section when viewed from the edge of the bar. Fig. 13

A setup in blacksmithing is a step that will yield a predictable result at a later stage in the forging process. The mass at the center of the axe eye will make it easier to produce the sharp lugs that I desire later on in the forging process.

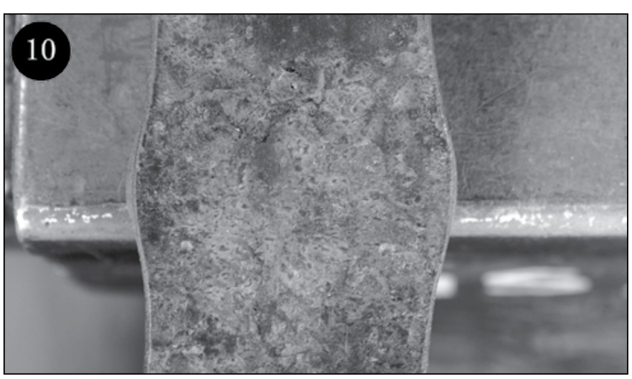
As I have the heat in the area of one side of the eye, I like to spread that side. If I were working in a gas forge, with a general heat on the whole bar, I might want to define the eye on the other side of the poll as my next step.



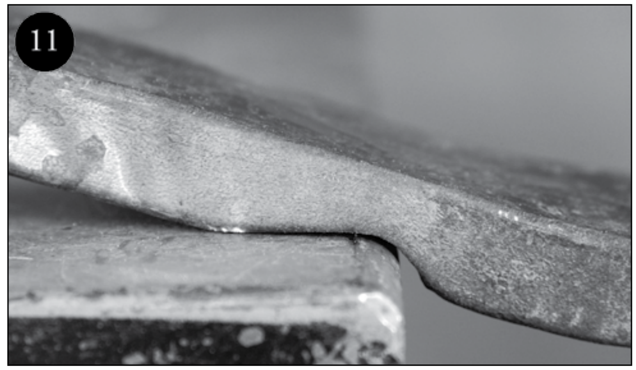
The center punch marks help keep you honest when trying to bar square the bar to the edge of the anvil



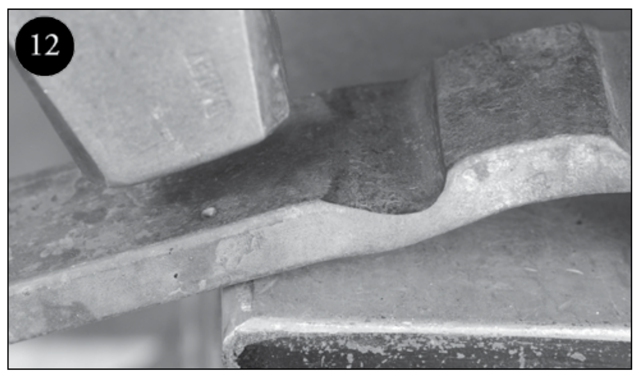
Hold the bar at a slight angle to the anvil face



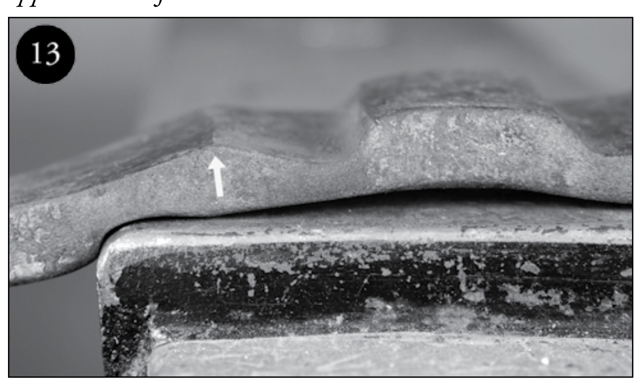
Use half-faced blows to create a shoulder



Take the shoulder down to half the bar's thickness



Shoulder in to define the other end of the axe eye on the opposite side of the bar



The resultant apex is a setup, placing material in the right place to form the lugs to the eye

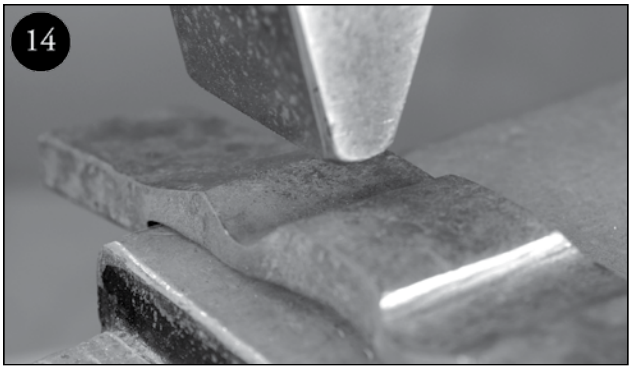
To spread the eye, I divide the material with my cross peen and then move each section away from the fullered groove. Figs. 14 & 15

I find it more difficult to move the material away from me, so that is the side that I move first, knowing that I can usually equal that forging when working towards me.

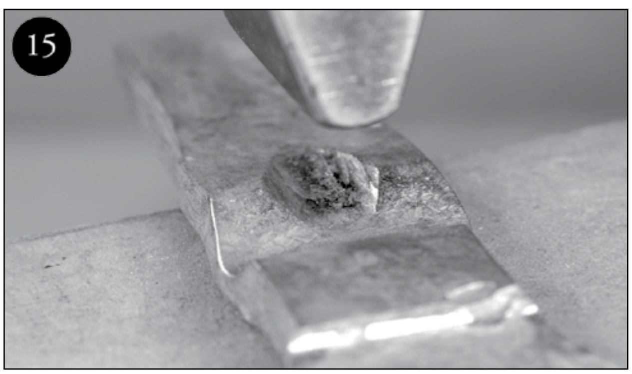
Working in an opposite manner doesn't always yield balanced results for me.

I'm going to spread the eye on both sides of the poll before I dress the lugs. I seem to get more consistent results when working both lugs at the same time. I check the distance between the two shoulders on a regular basis to be sure that I do not exceed 1⅞-inch between the two.

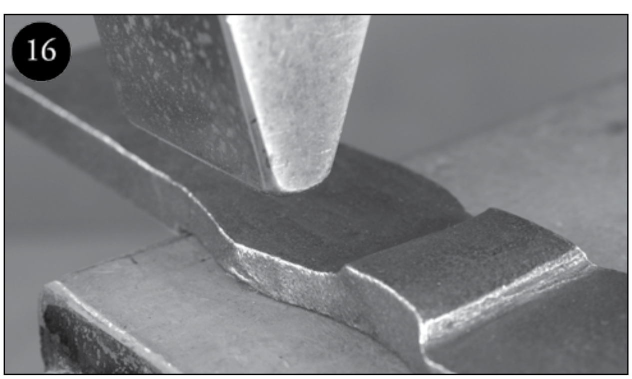
You can dress and shape the lugs over the bick (horn) using a farrier's rounding hammer, or you can dress them on the face of the anvil using the flat face of your cross peen. I'm going to show dressing the lugs over the bick as I like the curved shape that the bick gives the lugs. Figs. 17 - 19



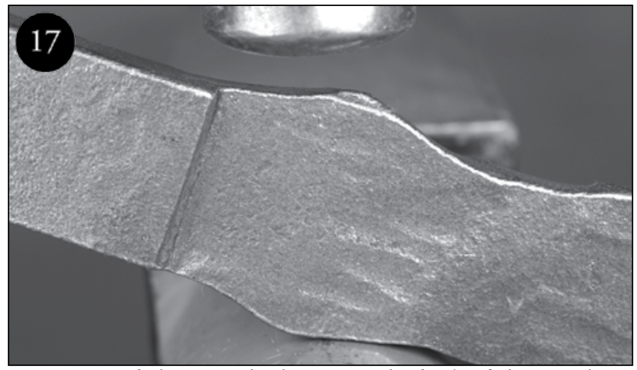
Use the peen to spread the material for the lugs



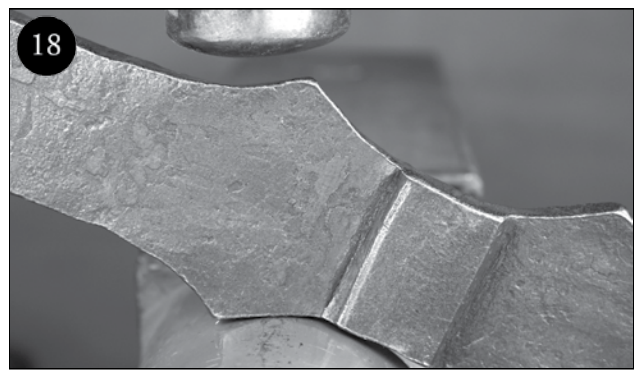
Fuller in the center of the material and work outwards



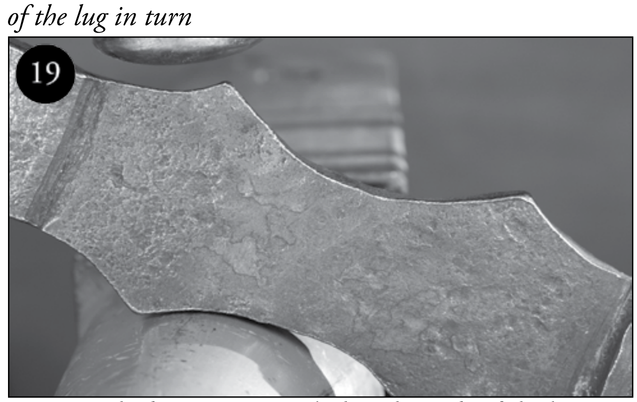
You can see the lugs starting to develop as a result of creating a setup



Dress and sharpen the lugs over the bick of the anvil



I use a farrier's rounding hammer and work each side of the lug in turn



I turn the bar over to work the other side of the lug

I am stronger working one way over the bick than the other. This can displace the lugs from the center of the eye if I am not careful. I check my work often for uniformity.

You might consider spreading the lugs out a little more once you have dressed them. This will thin the apex of the lug and means that they will have to be re-dressed, but you will have very distinct lugs as a result.

Check that the eye measures 1⅞-inch on each side of the axe poll.

The next step is to draw down and spread the bit of the axe. The outside of the axe is kept straight while the inside surface is tapered. Fig 24. By tapering the inside surfaces, you will be creating a cleft at the bit once you start forge welding the axe together.

Start in the middle of the material and create a valley about 1½-inches long. Move the material away from you before you bring the material towards you. Figs. 20 & 21

The area of material near the eye is not spread. It is left flat for ¾-inch and serves as an initial weld site. As this area is not being spread it serves as a pivot for the material being drawn down and spread for the bit. This will cause the material at the bit to curve around the pivot as you work.

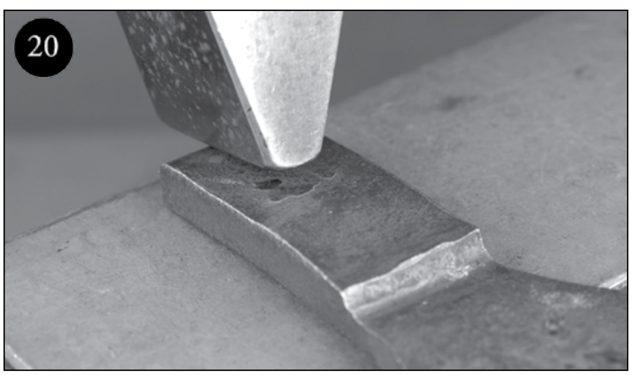
Keep the bit edges straight at this point in the forging. There will be enough material once the bit insert is welded in to create a curve to the edge of the finished bit.

A curve now would only serve to complicate the welding in of the high carbon or alloyed steel bit insert.

To keep the bit straight as I draw it down and spread the material, I change the angle of my cross peen to the material. Initially, as I divided the material, my peen was perpendicular to the edge of the material. Figs. 21 & 22

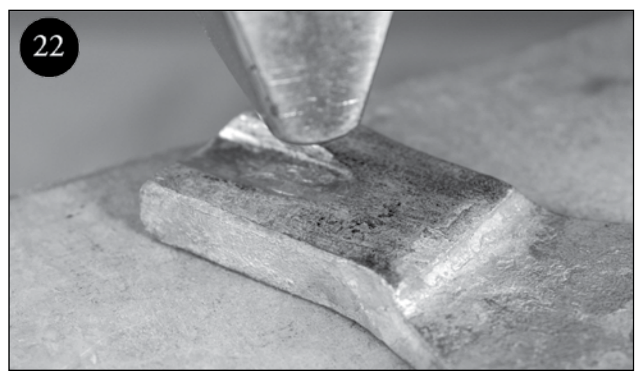
Once I start moving material away and towards me, I change the angle of the peen so that it is perpendicular to the corner that I am working towards. In that way, I am moving material into the corner area and helping keep the edge of the bit straight.

I like to spread the bit to about 2½-inches in width.

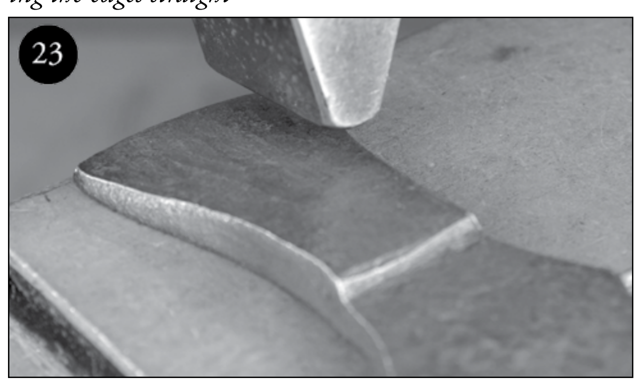


The bit of the axe will need to be drawn down and spread to accept the steel bit insert

Again start in the center of the bar and work outwards



Angle the peen to move material into the corners keeping the edges straight



Hold the axe flat on the anvil and angle your hammer as you work

Once the lugs are to your liking and the bit is spread, fold the axe in half over the horn. Work back and forth between the two sides to get things even. Fig. 25

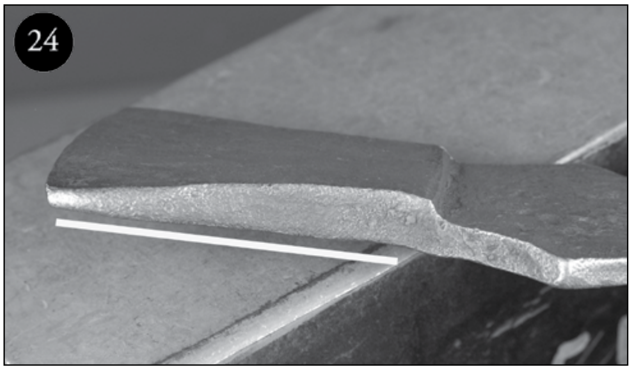
If the sides are skewed, quench the bit area and true up the axe by tapping the higher side of the blade down until both sides are even.

You should see an axe at this stage. The portion of the blade nearest the eye should be almost touching with the bit end forming a cleft. The high carbon or alloyed steel bit will be welded into the cleft.

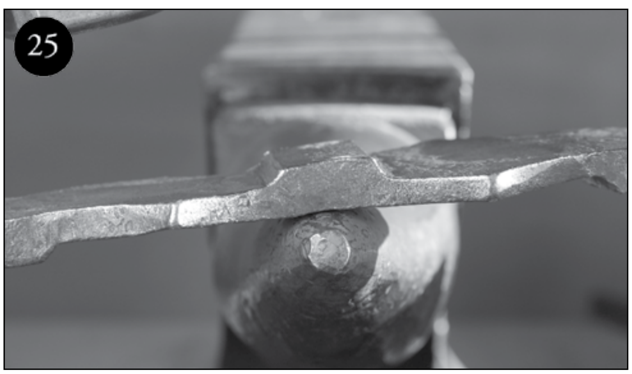
As you fold the axe, keep the two sides open and at a slight diverging angle to each other. We know that when forming a square corner bend, the last thing that we do is close the corner to 90˚.

Keeping a square corner open prevents cracking on the inside of the bend as you work up the corner.

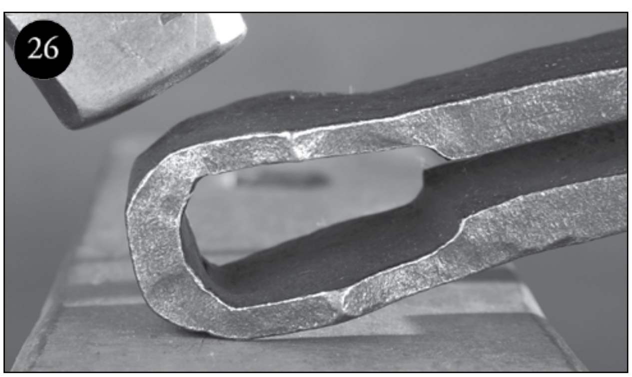
Dress the poll of the axe. This move is very similar to creating a square corner bend. Hold the axe at a slight angle to the face of the anvil to help preserve the open angle of the two sides of the axe. Figs. 26 & 27



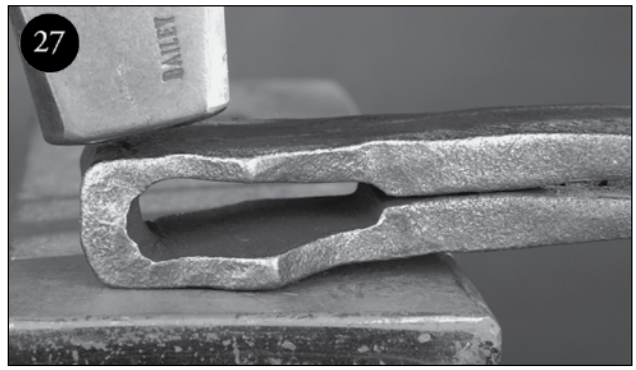
Note that the slope is to the inside of the axe blade



Fold the axe in half around the poll of the axe

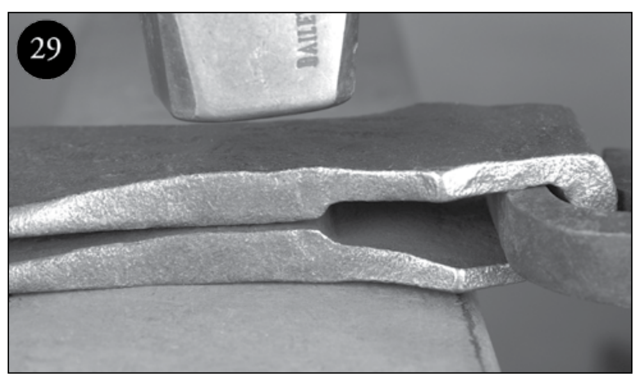


Dress the poll keeping the hammer angle open at the moment to prevent cracks



Dress any cupping around the poll as you lower your hammer angle

Hoop tongs grasp the axe eye quite well and are easy to make



True up both sides of the blade so that they lie on top of each other

In order to keep the heat in the axe when you start welding the blade together, you might want to forge the high carbon steel bit to shape first. I'm using 1090 steel, but I suspect that other alloy or high carbon steels will work just as well.

I need to thin one edge of the bit so it fits into the cleft of the axe blade. Fig. 30

Thinning one side of a bar tends to make the bar curve away from the thinned edge. Correcting this bend later can damage the thin edge. Consider pre-bending the bar towards the proposed thin edge with the idea that, once the edge is thinned, the bar will finish straight.

I thin the edge down to about 1⁄16-inch, making the bar about one-inch wide. Fig. 32

At this stage, I cut one end of the steel bit off at the same angle as the current edge of the axle blade. I measure along the steel bit the width of the axe blade and cut mostly through the steel, again at an angle.

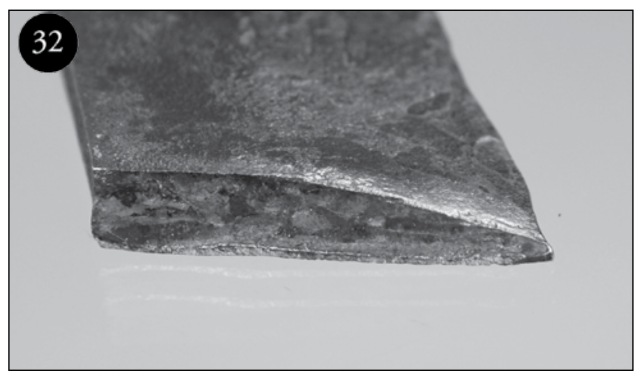
Having the steel loosely attached to the parent bar allows me to heat it in the forge without having to hold it with tongs or risk losing the piece in the fire. I use this same technique for welded collars. Fig. 31

To help keep the steel bit in place during the welding process, I cut some teeth on the thinned edge. There are a number of ways to create the teeth on the edge of the steel bit. I find that a hot chisel used directly on the edge works well. I alternate holding the chisel at two different angles to get a saw tooth arrangement on the edge. Fig. 33

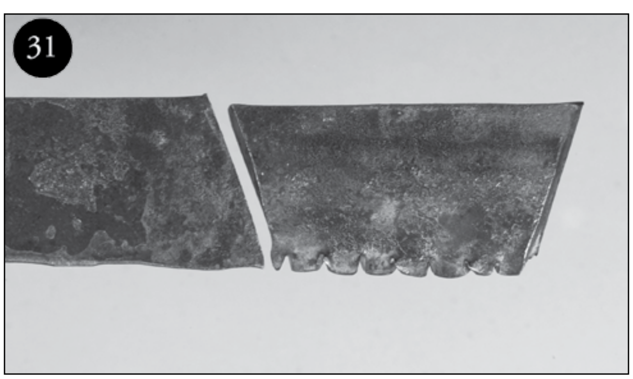
You will note that your 1⁄16-inch edge is now more like a 1⁄8-inch edge. This is why, when you drew down and spread the edge of the axe, you came back further than one-inch with the slope.

Keep the steel bit warm as you complete the initial weld on the blade of the axe. Fig. 34

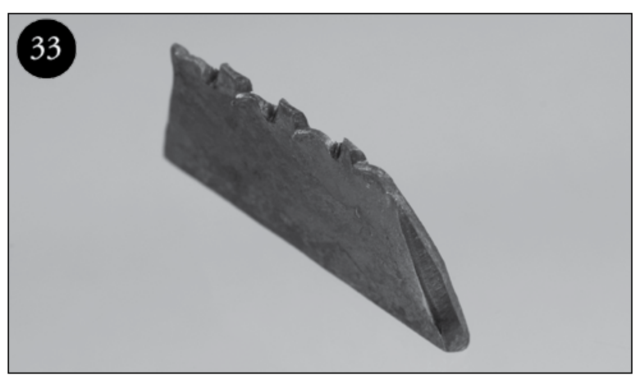
The high carbon or alloy steel bit is drawn down on one edge



Here is a view of the cross section of the steel bit



The bit is shown severed from the bar. In practice wait I until the bar is hot and ready to be welded in place



Here is the bit after the edge has been given a saw tooth edge that will hold it in place during welding

You need to stabilize the sides of the axe in preparation for welding in the steel bit. You will weld the area of the blade that is flat and touching. This is a rather large weld, with the weld site being inside of the material.

A slow heat will be required to bring the inside of the material up to a welding heat without burning the outside surfaces.

You have a slight issue with the welding in that you will be welding right up to the eye of the axe. In order to thin both sides of the axe blade evenly, turn the axe over regularly and work on both sides of the axe.

If you refer to Mark's welding article in the Winter 2012 Hammer's Blow magazine (HB Vol 20 #1), you will note that he states that a bar can act as its own anvil even though it is all hot. Working from one side only will thin the top side, and will affect the look of your axe eye. Fig. 36

The added benefit of working from both sides of the axe blade is that you tend not to distort the eye too much with the heel of your hammer and the inertia of the poll and tongs.

Once you have welded the initial part of the axe blade, it is time to insert the high carbon steel bit. Fig. 35

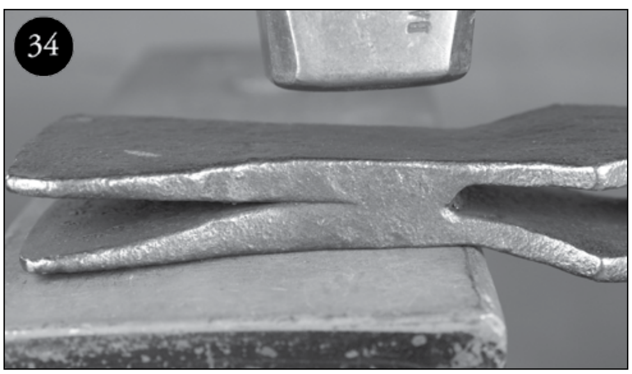
Again, your welded surfaces are on the inside of the bar making it difficult to achieve a welding heat without burning the outside surfaces.

Keeping the high carbon steel bit hot (red heat or above) will help it achieve a welding temperature sooner. The premise is rather like a welded collar in that the center bar has to be hot before you wrap the collar around it or they will not weld together.

Place the steel bit into the cleft and close the cleft onto the serrated edge of the steel bit. The thick edge of the bit and the edge of the axe blade should be even. Fig. 37

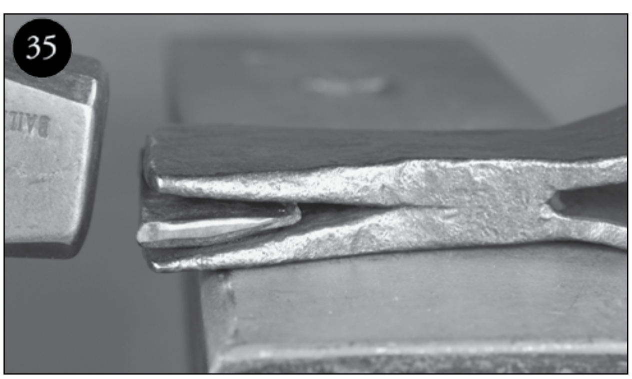
Take a slow welding heat to fully penetrate the steel and weld the bit in place. Fig. 38

You can choose to spread the blade and edge any number of ways from wide and curved to narrow, long and straight. I will show two variations in this article. Figs. 42 & 43

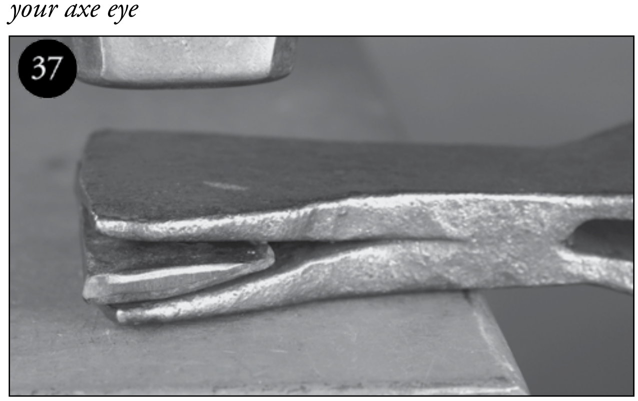


The flat surfaces of the axe are welded together to stabilize the two sides

Working from one side only when welding can damage your axe eye



The hot steel bit is driven into the cleft at the bit of the axe



The weld is completed with the steel bit in place

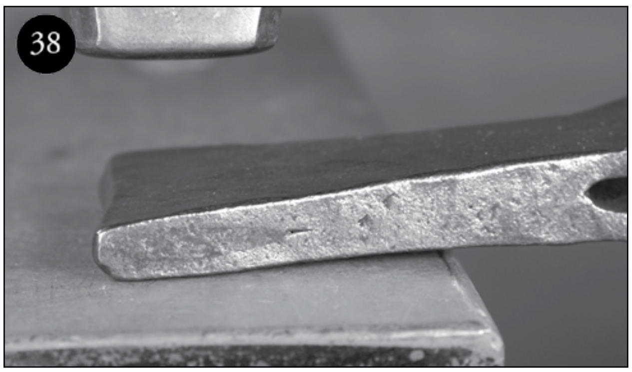
You may have to trim or rasp the edges if you have any overlap or misaligned pieces of steel.

Once the blade is to your liking, drift the eye with your drift. I support the poll on the nearside edge of the anvil as I place and work the drift. Fig. 41

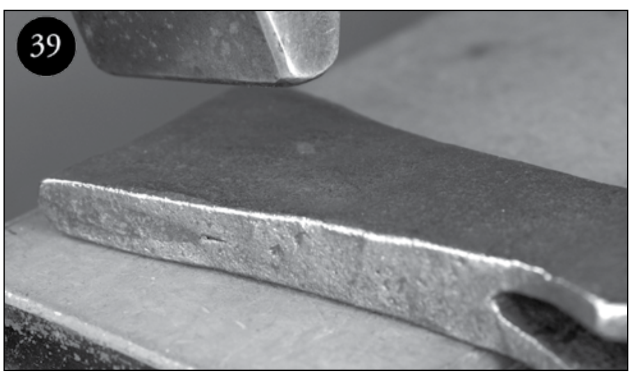
Note that as you bent the sides of the axe over, the top and bottom edges of the poll were displaced. Fig. 40

You can choose to dress the edges now, with the drift in place, or leave them as they produce an hourglass effect within the axe eye. The hourglass shape, together with your wedge and steel, helps secure the handle.

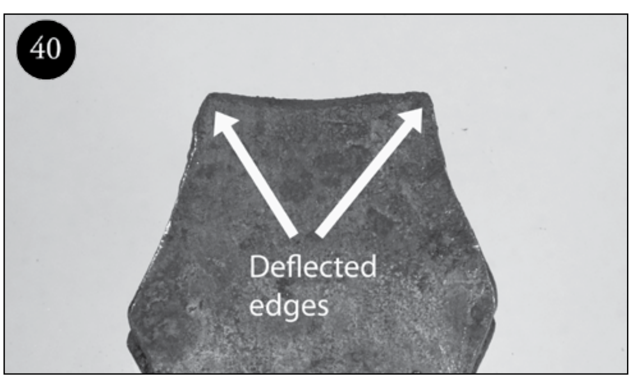
After the axe has been filed or rasped, the edge will need to be heat treated appropriate to the type of steel used for the bit insert.



Here is the completed weld

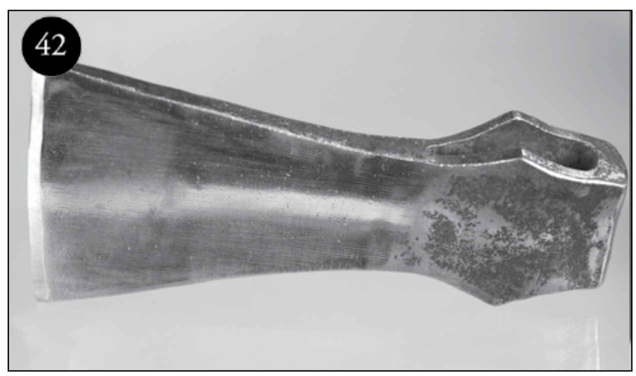


Spread the bit to suit your intended purpose

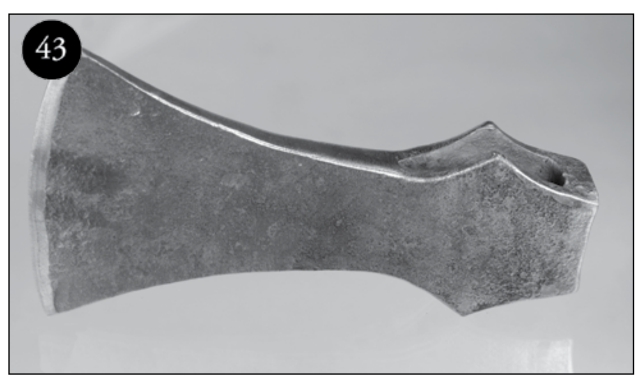


The edges of the poll have been deflected in the bending process

The eye is drifted and dressed by resting the poll on the edge of the anvil face



A straight edged axe



A curved edged axe

Once the bit is securely welded in place, you will need to draw down and spread the edge or your blade will be too blunt for its intended purpose. Figs. 39 & 40

Do not to take the edge to its final dimensions, there will be some decarbonizing of the steel during heat treatment.

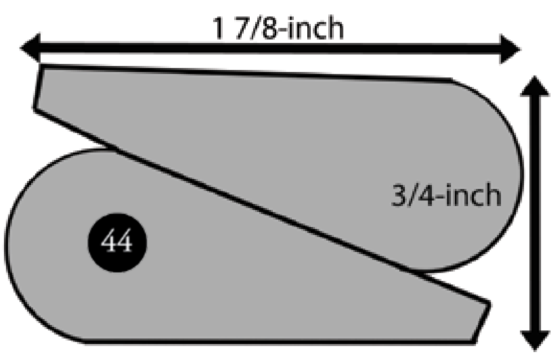
The Axe Eye Drift

For the drift, use a 4½-inch long piece of 1⅛-inch diameter round bar. The length of the drift is reasonably easy to understand, but how did I come up with 1⅛-inch round?

I did a rough area calculation of the drift and compared it to stock that I had available on my rack. I knew that I wanted round bar to begin with because round bar when flattened, will leave me with a half-round sides.

Working out the area of the handle looked like an issue so I decided to stack one handle on top of the other and treat it as a rectangle. I then divide the resultant area by two and compare it to the area of my round bar on hand. Fig. 44

Stack two handles with the ⅝-inch width on top of the ⅛-inch width to get a height of ¾-inch. The handles are 1⅞-inch wide. So I have a ¾-inch by 1⅞-inch rectangle.



Area = .75-inch x 1.875-inch = 1.406 square inches

Divide this by two to get the area of one drift.

Area of one drift = 1.406 ÷ 2 = 0.703 square inches.

A one-inch round bar has an area of:

$$\text{Area} = \pi r^2$$

Area = 3.142 x .5 x .5 = 0.7855 square inches.

In theory, the one-inch diameter bar should work, but in practice...

I know that in producing the drift the stock will take some heavy forging with the peen. I've already seen in the axe eye that there is collateral movement of the material along the centerline of a bar when using the peen.

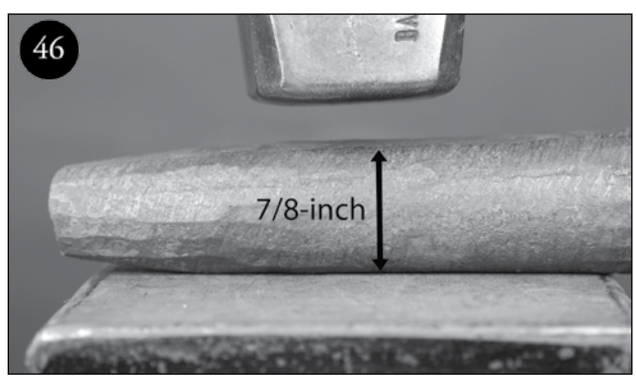
There will also be loss to scale and I might want some extra material for clean up of the drift surfaces after the forging is complete.

I think that the one-inch round bar will be too small. My next option on the rack is 1⅛-inch diameter round bar. As it turned out, this size of bar hit the target.

Draw a short, round taper on both ends of the bar. Flatten the bar down to ⅞-inch thick. Figs. 45 & 46

I leave the extra thickness in the bar for clean up purposes later in the forging.

Draw both ends of the bar down to a short taper



Flatten the bar down to ⅞" thick

Using the peen, draw down one side of the bar. I can only reach one end at a time and when I turn the bar around to work on the other end I found that I was working on the opposite side of the bar. Figs. 47 & 48

This is not an issue, so long as I give myself a little material to equalize the two sides when I near completion of the drift.

Draw one edge down to as close to ⅛-inch as you can go with the peen.

To dress the faces of the drift, match your hammer angle to the taper of the drift and deliver blows with the face of your hammer. This will draw down your ⅞-inch thick bar to ⅝-inch and may correct some curvature of the spine of the drift caused by thinning one edge. Figs. 49 & 50

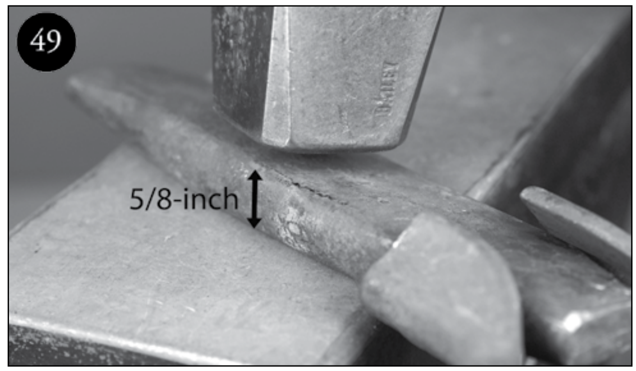
If the drift still has a curved spine, place the spine in a suitable half-round bottom swage and straighten it by tapping the thinned edge. A wooden or hide mallet works well here. Fig. 51

You can draw the working end of the drift down over the bick if you feel that it needs to be thinned to fit your axe eye.

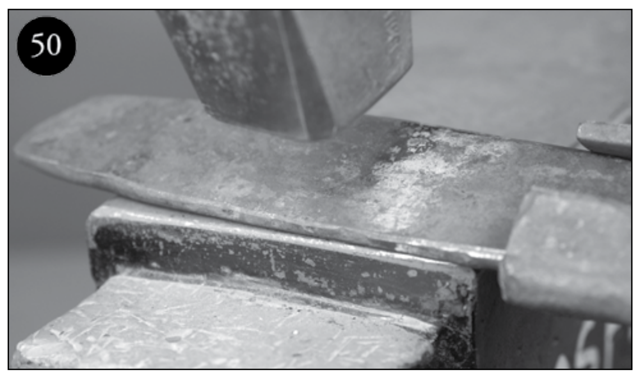
Gerald Boggs owns and operates his own blacksmithing business and school at his home in Afton, Virginia.

Gerald will be instructing in the teaching station at ABANA's Delaware conference in August.

You will need to work on opposite sides of the bar as you swap ends. Draw the edge down to ⅛" thick

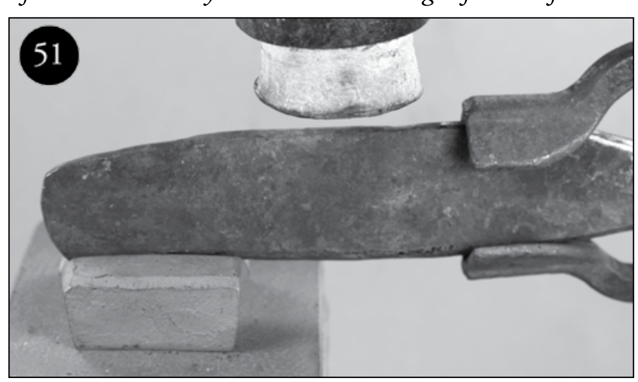


Dress the face of the drift and reduce its thickness



Protect your hammer and anvil by working at the edge of the anvil when you dress the thin edge of the drift

Use your peen to draw down and thin one side of the bar



Use a half-round bottom swage and a hide mallet to straighten the drift if needed

CLASSIFIED ADS

Classes and Workshops

Blacksmithing classes at Arrowhead Forge by David W. Osmundsen. Curriculums include beginning blacksmithing, toolmaking and journeyman levels. For information packet contact David in Buffalo, WY or @ 307-684-2338. See web site: www.arrowhead-forge.com.

Books and Videos

Published back issues of the Blacksmith's Journal are still available in hard copy. Fill in your collection while they last! Buy them online at www.blacksmithsjournal.com where you can find all available issues in the Store.

Pieh Tool Co. offers over 600 metalworking books/videos. Distributor of JET/PowerMax & Milwaukee power tools & equipment. Huge selection of anvils, tongs, hammers, rivets, patinas, fly presses, forges & more. www.piehtoolco.com. Call 928-554-0700 or 888-743-4866.

Books and Videos

How to rebuild a Nazel Powerhammer, 1 1/2-hour CD, 2 Nazel brochures, setup diagram, Mark Krause book with diagrams of how these hammers work. $125.00 delivered. 608/527-2494, www.oldworldanvils.com.

Wanted

SOMEONE to cast bronze or nickel silver parts no larger than 4" x 2 ½" x ½". Small runs, our metal. Contact: dennisb532@gmail.com.

For Sale

FORGED LEAFY ROMANTIC JEWELRY and home décor gifts at https://www.etsy.com/shop/KSkiles-Jewelry . Commissions accepted and wholesale available to qualified retailers. http://kaskiles.com or 618-384-9127

ERNST REFFLINGHAUS ANVILS Highest quality. Made in Germany since 1886. RC 59 hardness guaranteed. Double horn, with or without side shelf. USA Dealer is SHADY GROVE BLACKSMITH SHOP LLC www.blksmth.com Call 308-384-1088

For Sale

RENAISSANCE Microcrystalline Wax Polish. AMAZING! Protects armor, copper, fine wood and much more. Buffs easily to a hard, transparent finish. 65ml tin ($12.95), 200ml tin ($22.95) plus S&H. Blue Moon Forge. Toll free: 1/866-627-6922. E-mail: books@bluemoonpress.org.

CLASSIFIED POLICY

Ads are $20 each and are limited to 35 words (six lines). Longer ads are $5 per line. Please submit your classified ad, in writing, either by e-mail to: centraloffice@abana.org; by regular mail to: ABANA Central Office, Attn: JoAnn, 259 Muddy Fork Road, Jonesborough, TN 37659; or by fax: 423/913-1023. Do not send a check; you will be billed. Designate whether the classified ad is for the *Hammer's Blow* or *The Anvil's Ring* or both.

GEOFFREY WEIBEL'S

The Corkscrew

By: Geoffroy Weibel of Strasbourg, France with Mark Aspery

Geoffroy's native language is French. He has writen this article in English and as such, his turn of phrase may not be the same as ours. I have edited the text only so much as to enhance understanding, leaving the French accent intact. HB editor.

Why a corkscrew? Because it's very useful and that many people love wine, of course! This is one way to make a corkscrew, there are many others. The only limit is your imagination.

I first made the screw from scrap metal. Why scrap metal? Hmmm… I'm volunteering in a (collaborative) bicycle workshop (www.bretzselle.org) and I have access to many used bicycle parts.

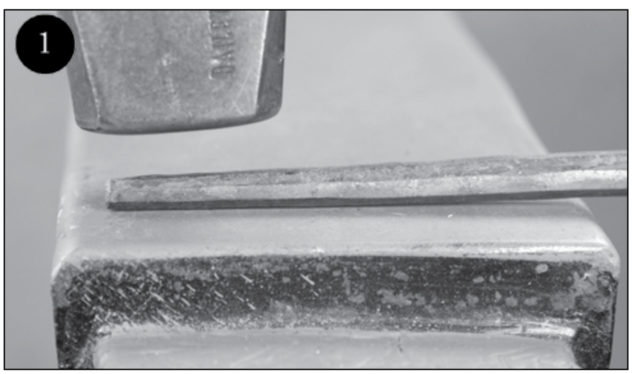
The idea of forging the bottom bracket axle, which is the most massive steel piece that you can find on a bicycle, appealed to me. I first used those axles to forge corkscrews and came later to car suspension springs.

What was nice with the axle is that you can leave a part of it un-forged and come up with a forged object that tells a little bit of its past life. The car spring allows faster work because it is thinner.

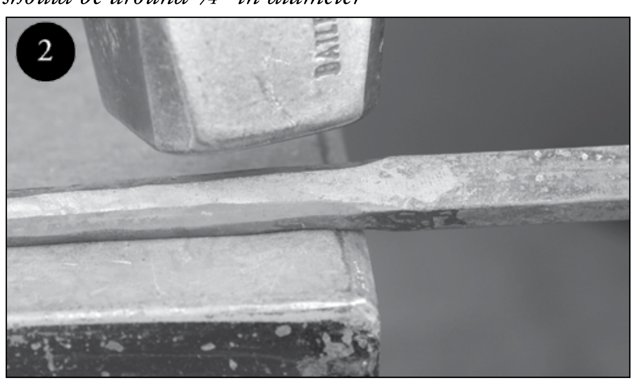
What I want to share here is a very simple "how to" about corkscrew forging. It's not a very difficult exercise but it requires different forging techniques and at the end you'll get a very useful tool. I think it's something worth sharing.

Tools you'll need

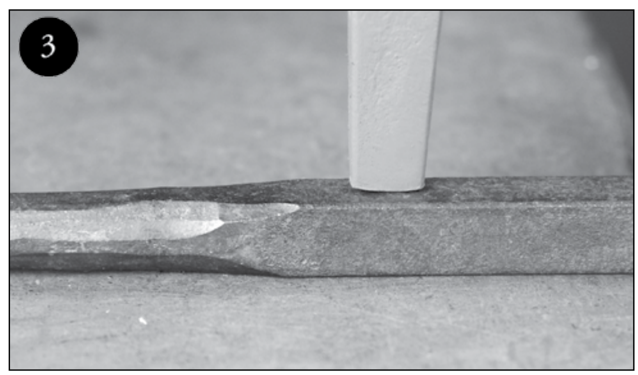
- Anvil's martyr (a sheet of soft steel)
- Round drift (I've marked a ring around mine in order to know when I reach the 10mm diameter – ⅜-inch)
- An "opening knife" (Could be a sharpened screwdriver tip)
- 2 pair of blacksmithing tongs, one to hold the metal during the early steps and another to hold it when the metal will be pushed through the hole, allowing the tongs to be aligned with the future corkscrew end. This is important to get a nice round screw easily.
- Get a bar from the spring steel, around 10-inches long and ⅜-inch square.



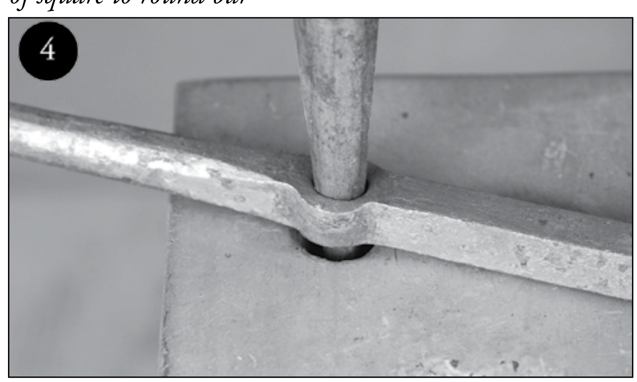
Draw a round taper for the first 3" of the bar. The end should be around ¼" in diameter



Round the bar behind the taper for a further 3", making the total length of round bar 6"



Punch with a ⅜" slot punch just behind the transition of square to round bar



Drift the punched hole to around ⅜" in diameter over the pritchel hole or suitable bolster

"Thinner and thinner it goes…"

Forge your bar into a blunt round taper on one end. The taper should have a length of around 3-inches and go from ⅜-inch square down to ¼ or 5/16-inch round on the end. Next, round the bar from square for another 3-inches, making the total length of round stock (including the taper) around 6-inches in length. Figs. 1 & 2

"The Eye"

The round tapered end will be passed through an eye in the bar. About ¼-inch past the forged round bar, create a slot punched hole in the middle of the bar. Drive the punch through the hot steel until you feel that you are hitting the other side. Fig. 3

Flip the metal piece. You'll see a darker spot on the steel (called a bull's-eye) where you have to back-punch to join the cut.

Once you've managed your cut, re-shape it with a round drift. Always work orange hot at this stage, working too cold can result in cracking the punched hole because you are working a high alloy steel. Fig. 4

"Into the Hole"

Bend the three-inches of taper over the edge of the anvil. Go to 90-degrees. Make the bend in line with the drifted hole, or twist it in line if you make a mistake. Figs. 5 & 6

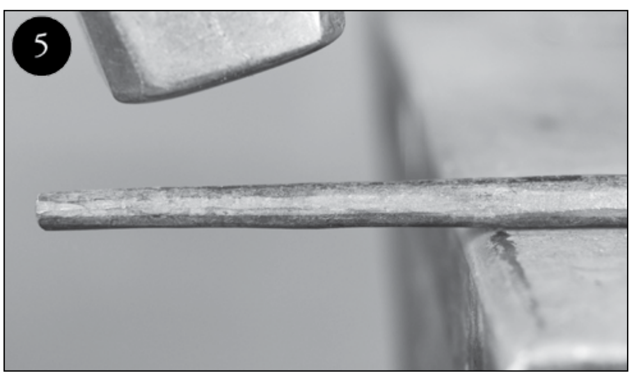
At the bick, gently curve the tapered end. This will allow the metal to penetrate the hole in a straight way. Figs. 7 & 8

Slightly behind the midway point of the hole to the corner of the tapered end bend, bend the metal on the round bick of the anvil. You may have to re-position the taper a little. Once the metal is inside the hole, close the loop allowing more metal to come out of the hole. Fig. 9

Hammering on top of the pritchel hole of the anvil is quite handy, letting the metal come out freely. Fig. 10

Let around 2½-inches protrude between the tapered end of the bar and the hole. This space is needed for the fingers to rest on while pulling on the finished corkscrew.

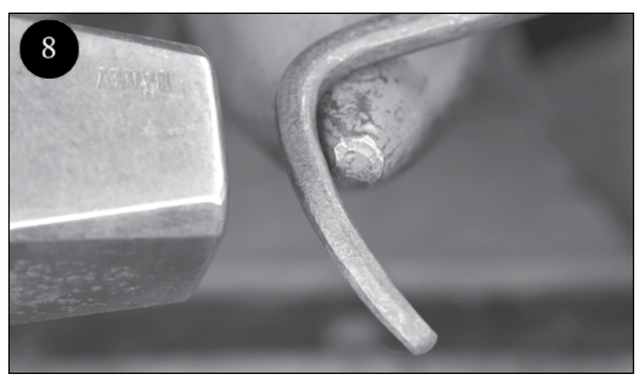
Straighten the tapered end for future forging of the corkscrew. Fig. 11



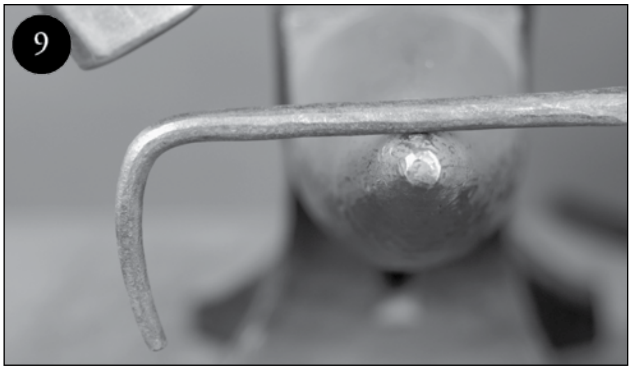
Bend the bar at the start of the taper, 3" from the end of the bar

Bend the bar to 90˚ over a soft edge of the anvil

Use the bick to bend the taper slightly



This bend will help when you pass the taper through the drifted round hole



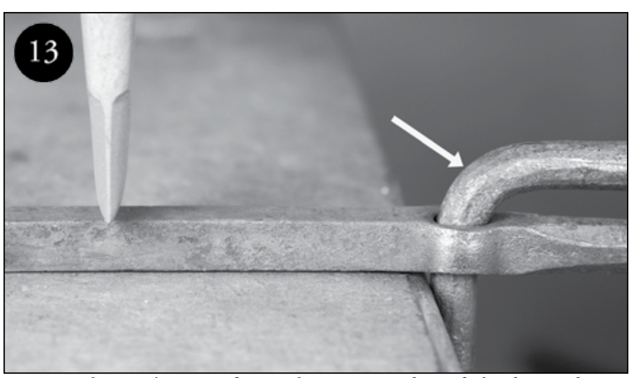
Support the bar just behind the half way point of the hole to the bent over taper and bend the bar

You may have to adjust the position of the bend slightly to thread the hole

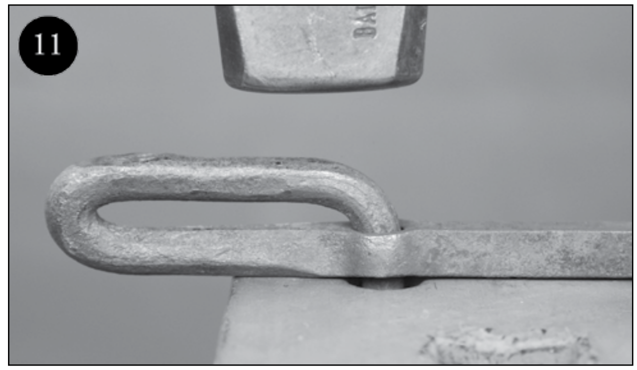
Customize the other end of the corkscrew. I am showing a fan in this case. I cup the fan to fit the thumb. Figs. 15 & 16

The only thing to avoid is creating sharp edges because they will hurt the fingers. Some forged patterns involve sawing, I always prefer hot cut marks to saw marks.

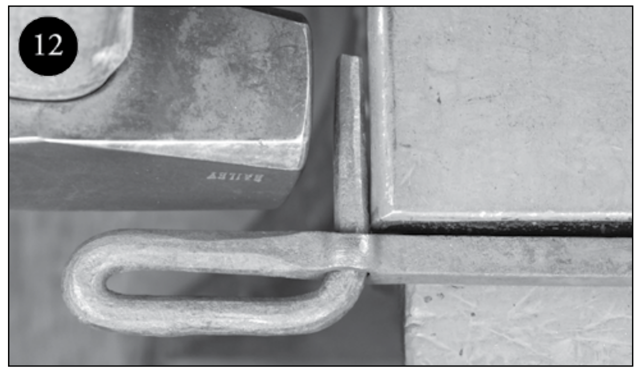
Forging is about sculpting. Forms that we create are calling for the touch. It's nice not to hurt a hand that wants to touch and feel the steel.



Cut the corkscrew from the remainder of the bar, about an equal length from the pass through



Leave a slight gap between the two pieces of bar

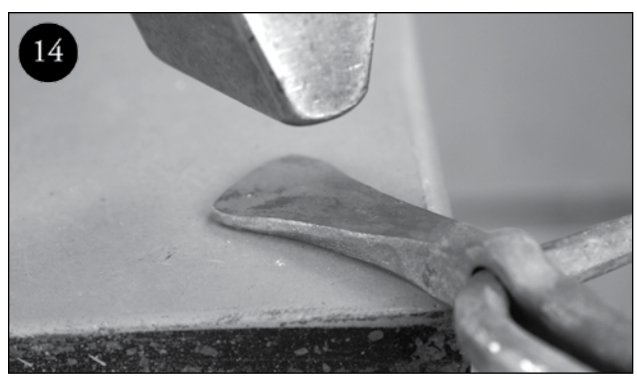


Straighten the tapered end of the bar at the edge of the anvil

Cut the corkscrew from the end of the bar and spread the cut end with your cross peen. Don't make it too thin before you hammer out the marks of the cross peen. Figs. 13 & 14

Make the bottom edge straight with the rest of the bar. This will help later when you are drawing out the taper to form the material needed for the corkscrew.

Bend the fan over the bick to support the thumb during use. Fig. 15



Spread the cut end to create a fan with your cross peen and smooth the surface with the flat face of your hammer

Bend the fan over the bick. Make sure that you bend it the right way, towards the thumb

Draw down the other end of the handle and bend that to match the fan end

"Time not to burn"

Draw out a thin wire of steel at least 4-inches long. You want it to be very thin, less than 1/8-inch square. The metal will get hot very fast and cool down very fast, too. Fig. 17

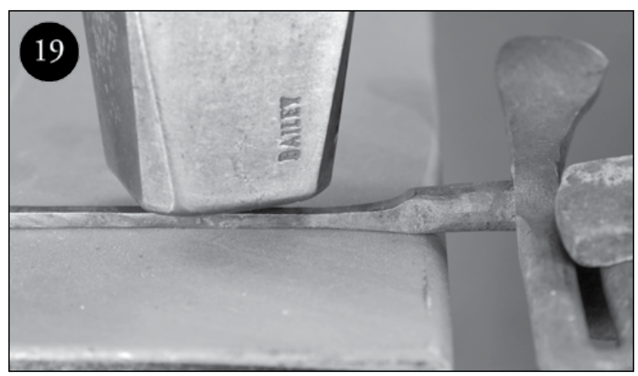
You have to keep your eyes open and to check very often on the temperature if you don't want to be very, very sorry when a sparkling burning iron laughs at you.

Work on two sides of the tapered end. This will create two shoulders in the bar. The corkscrew will be for a right handed person, using the corkscrew in a clockwise motion. Hold the corkscrew with the fan up for one shoulder and then move the fan towards the tip of the bick for the second shoulder. Fig. 18

At first draw it out square, and then when it's really close to the final size of $\frac{3}{32}$-inch square, hammer down the corners and make round. Never mind if it's not very pointy, you'll fix this later. Fig. 19

Leave $\frac{3}{4}$" of stock under the eye, draw down the remainder to $\frac{3}{32}$" square cross section

Work on two sides of the bar only, fan up and then fan to tip of the bick, creating two shoulders



Smooth out the drawn down bar and take to a round cross section

Once round, bend the bar towards the shoulder as shown. The 2^{nd} shoulder should face the tip of the bick

"Tricky part"

It's time to forge the screw. There are several ways to do it but I will show the one I think is the easiest.

The beginning of the screw starts at the transition, so bend the wire around to an angle of 180°. Fig. 20

Make sure that you bend towards a shoulder with the other shoulder facing upwards. Fig. 21

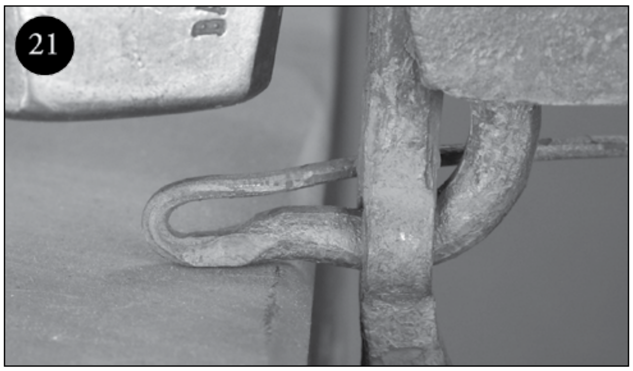
For a right-hand operated screw, the wire should be on the left of the pass through and resting on top of the bar.

Close the bend to the radius of the corkscrew, approximately ¼-inch measured on the outside.

Feed out about ¼-inch of the bend from the offside edge and bend the wire again to 90˚. This will start the first portion of the screw. Fig. 22

You may have to open the bend slightly at the tip of the bick to start the corkscrew angle. Fig. 23

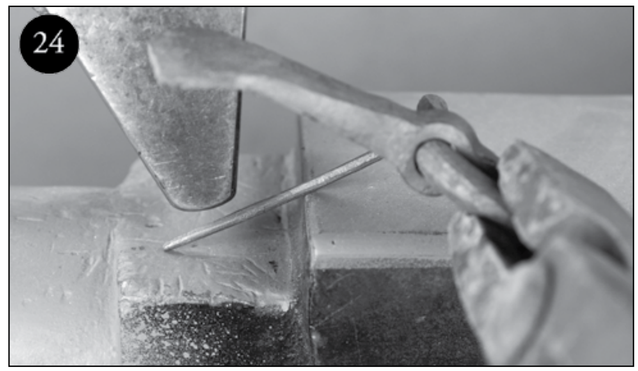
Bend the wire in the step of the anvil or suitable bottom swage. Work on the bick to remove any straight section



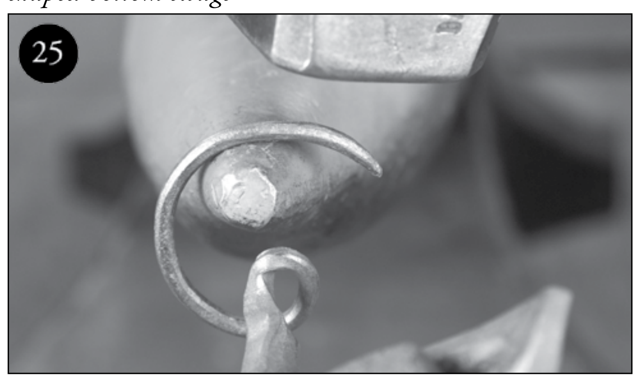
Bend the wire at the transition. Ensure that the wire is on top of the corkscrew and turned towards the shoulder

Feed just about ¼" of the wire over a soft edge and bend the wire to 90˚

Open the leg at the tip of the bick. Open to just past 90˚



Start to turn the corkscrew in the step of the anvil or 'V' shaped bottom swage



Remove any straight sections of the wire on the tip of the bick before returning to the step of the anvil

At the step, rotate the screw counter-clockwise while continuing to hammer the outside surface gently of the bend. When you cannot hammer the inside of this circle anymore, you'll have to hammer it from the outside, allowing you to close the circle. Figs. 24 - 27

The work is then all about keeping this circle round and hammering it while turning the screw. Doing so, the screw will form itself, the circle getting narrower and narrower. I stop when the 4th circle is formed and the screw is about 7⁄16-inch in outside diameter. Fig. 28

"Opening"

For this step you'll need a special tool, you can use an old knife with a strong blade, or forge yourself a very simple screwdriver tip. You want it to be sharp, it must be thin enough to be able to go between the turns of the screw.

Bring the screw to a nice orange heat and progressively open the turns with the knife. Start from the open end. Fig. 29

Heat again, open again and do it until you get a nice balanced corkscrew. You need to open the turns quite a lot or else you'll end up with something like a cork-drill that will destroy the cork and not be able to pull it out of the bottle. Fig. 30

"Make it hard"

You may have to harden and temper the screw, depending upon the steel used, if you want the corkscrew to be tough enough to do its job. Some steels will work just as forged, with no heat treatment necessary.

There's no other way than to test the steel yourself. Well, there's another way but it would be if you know precisely the kind of steel you're using and be able to have a very precise oven. I don't have those things so I "test and try".

"Make it pointy and shiny!"

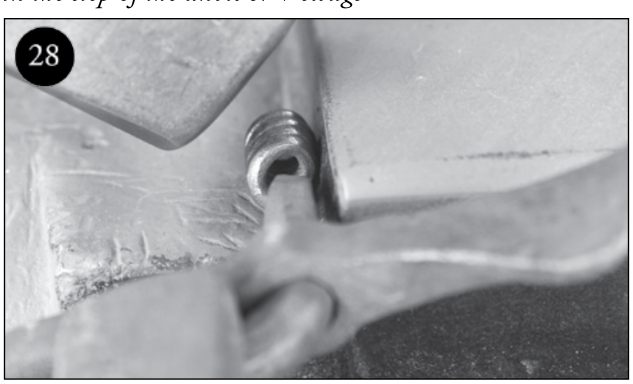
You now want to remove the forging black scale from the outside of the screw to make it shiny to reduce friction. While you are using this tool, take a minute or two to make the end a little bit pointier by grinding it.

Test drive through the cork! Good luck and…Cheers!
Thanks a lot to Thomas Schwartz for his help.

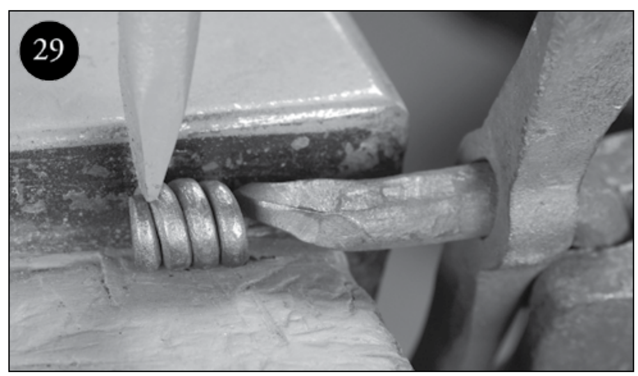
Where is my workshop?
La Semencerie, Strasbourg, France
http://www.lasemencerie.org/

Contact me at: geof.forge@gmail.com

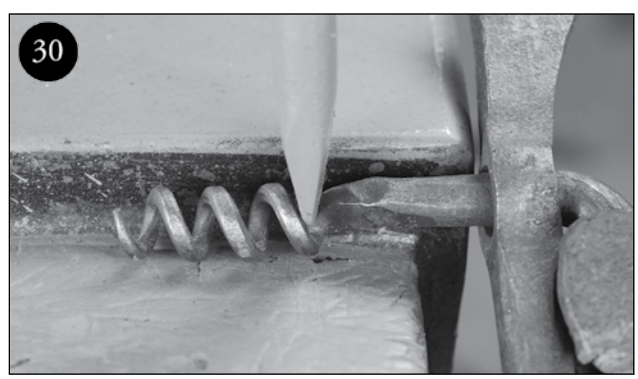
Continue to gently hammer the screw while turning in in the step of the anvil or V swage



Close the screw until it measure 7⁄16" or less on the outside



Start from the open end to shape the screw



Check the screw for uniformity, heat-treat as necessary

Return Address:
ABANA, Central Office.
259 Muddy Fork Road
Jonesborough, TN 37659

MEMBERSHIP RENEWAL REMINDER:
Check your ABANA membership expiration on the mailing label.
If the date there is 6/30/2014, it is urgent that you renew now to continue your ABANA membership.
If the date is 9/30/2014, please look for your renewal notice in the mail in early September.

Next Issue:

Whelk by Darryl Nelson
Filing Vise by Mark Aspery
How Metal Moves, Bending Bar the Easy Way