

Do all six pieces, striving to get them even. I make marks on my anvil with a soapstone so I'll know how far to draw out. I also write "master" on one piece and use it as the pattern, matching all the others to it. When you've finished one end on each piece, turn them around and make a square taper to within 1" of the other taper. You will be leaving roughly 1" of the stock square with a flat 2" taper on one end, and a longer square taper on the other.

If you work from the tip back, you can get a nice square taper that remains even throughout. If you turn it a quarter turn every five to six hammer blows, it should remain square. Of course, try to take care not to burn up any of the stock, but if it does happen, it's best to remake that piece; otherwise you will have to cut off all the others to match it.

Now, line them up and see if they are all the same length. Each piece will probably have an overall length of about 7" with about 1" of the parent stock remaining near the wide flat end. Heat the 1" area of parent stock and hot-cut a line down it on two opposite sides. Next, gripping the long end with a tong, heat the area that you just hot-cut. Put that long end in the vise and quench the flat part of it with the quench can, leaving only the scored 1" area hot. Grip the flat part with a wrench and twist to the right one fast turn. Do this to only three of the pieces; then put a complete twist to the left on the remaining three pieces. Reheat each piece and straighten it up.

Now for the fun part. Take one of the pieces and put the end with the square taper into the fire, taking about a 2" heat. Move quickly to the anvil and put the piece flat on the surface with the tip at the very, very edge of the far side of the anvil. With the hammer coming at a 45 deg. angle, move the work away from you as you tap the curl around (see Fig. 2). Reheat if necessary.



Fig. 2

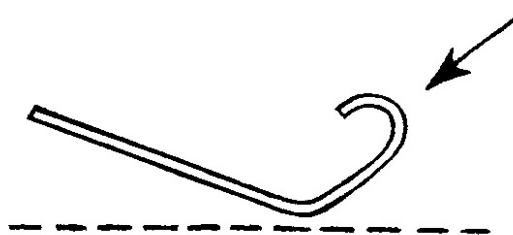


Fig. 3

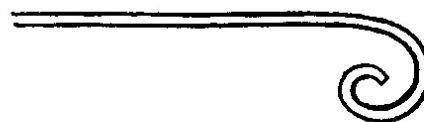


Fig. 4

Turn the piece over and strike lightly with back-up blows toward yourself to form a little "elephant nose" on the end (see Fig. 3 and 4).

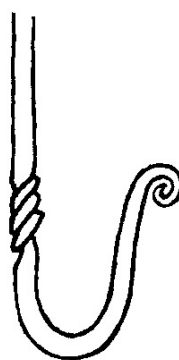


Fig. 5



Fig. 6

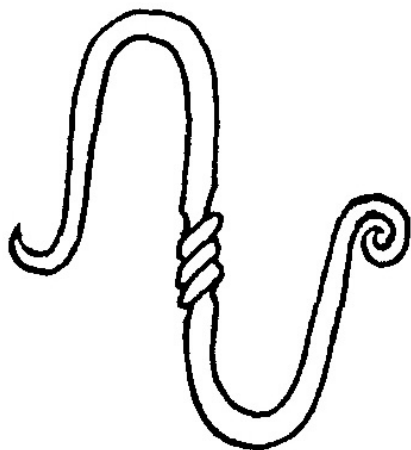
Next reheat a 1" area between the elephant nose and the twist and quickly dip the nose in the bucket of water to avoid misshaping it. Place the piece over the horn about 1 1/2" ahead of the square twist, and with the elephant nose facing up, tap it turning the heated area into a U shape (see Fig. 5). Do these steps on all six pieces.

Now, gripping the U-shaped part with a tong, heat the other (flat) end and curl it up a tiny bit, going towards the other curl (see Fig. 6). It will really be just

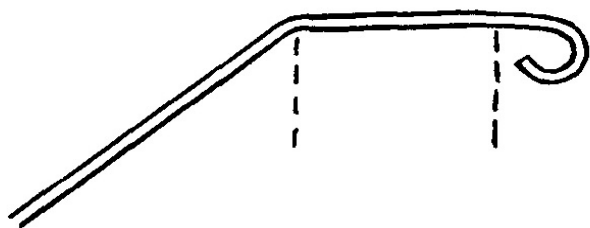
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barely turned on the end, going that direction (I use the same technique as in the first elephant curl).

Now, reheat down to the twist, quench the tiny partial curl on the end, and make a fairly tight flat bend at the center of the heated area (see Fig. 7). Do this to all six pieces making sure to wire brush as you go.



You should now have six nice looking hooks. These will work together with the three twisted bars you made in the first part of this project. Take one of those bars and heat about 2" of one end. Flatten the flat side so that it widens, keeping everything even and taking care not to hit those nice twists you've made.



Now reheat the same end of the work and, using the scroll technique, make a small curl on the end. Do all six ends. Now take the shortest of the three pieces and measure 2" back from each end (including the curl). Hold the piece at an angle on the front edge of the anvil (curl down) and bend the tip over about 45°

(see Fig. 8). Do this to the other end also.

Now heat the bar from the center to the beginning of the 45° angle bend; with the curl up, carefully make a gentle curve over the horn. It won't be very curved now, more like an arc. Turn it around, heat the other side, and repeat the process. This will form one gentle arc that has two flat "wings" one on each end. The wings will be drilled or punched so the piece can be attached to the wall at those points. The inside center of the arc will probably not exceed 3" and the wings should sit flat against the wall.

Use the technique in the last project we made in the Anvil's Ring, to punch the holes. The medium length piece can be bent the same way as the shortest one. The longest one should have its wings at about 30 deg. angles on each end and will probably be 3 1/2" to 4" at the center. Remember to punch or drill the wings on all three pieces.

Now slide the six hooks evenly over the medium length bar. Place the three that twist to the left, on the right side of the bar; place the three that twist to the right, on the left side of the bar. After they are evenly spaced, remove them one at a time, heat the end with the flat bend, and replace it over the bar in its original position; then crimp carefully with the tongs to seat it. With a little skillful measuring ahead of time, they will correspond with the flat areas in the reverse twists on the bars. Even everything up, wire brush, heat, and give them an oil finish; or you can varathane the work.

You now have a guest towel rack (the shortest piece), a bathroom towel rack (the longest piece), and a robe crown for inside the bathroom door. I hope you have fun with this project. I think you will be pleased with the beautiful shape of the steel and the graceful hooks.

The Anvils Ring Vol.#15 Issues #2 and #3 1987/88

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Foundations!

A Resource for Beginners.

by Bud Oggier

the Anvil's Ring/ Fall 1986 Part 6

"Jean, today we're going to harden the chisels we made yesterday. Before we start on them, we'd better talk about heat treating a little bit. I'm not going to try and make a metallurgist of you, but you should have some understanding of what's going on inside the piece.

Heat treating steel the way we do it in the blacksmith shop is a two stage process: hardening and tempering. Many people confuse this and use the terms interchangeably. Hardening is just what the name says, 'making the piece harder.' In the hardened state, it will be very hard, but also very brittle. Tempering means to reduce the hardness, or temper it, to remove the brittleness and increase the toughness. This is accomplished by changing the shape of the molecules in the steel.

When a piece is heated, all the tiny particles get excited and move around in the steel. At one point, the critical heat, a transformation in the form of the molecules takes place, and if it's cooled rapidly, the piece will be hard. If the critical heat is not reached, no appreciable hardening will take place. The critical heat occurs somewhere above 1325°F, and varies depending on the composition of the alloy.

If the piece is not cooled rapidly, or quenched, but allowed to cool in air, it will return to its original state. Some steels are quenched in water; for others this rate of cooling is too rapid and they must be quenched in a slower cooling medium, like oil. A very few special alloys will cool rapidly enough in air to harden. These are called 'air hardening. Without some rather expensive equipment, like a pyrometer, we can only approximate the temperature for hardening.

While the piece is heating, another phenomenon is taking place in the steel. The size of the grains in the crystalline structure is growing.

The hotter it gets, the larger the grains grow. Large grains contribute to easy fracture and conse-

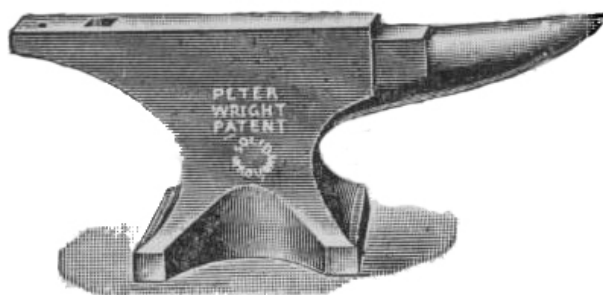
quently, less strength. We therefore need to get the piece hot enough to cause the transformation to hardness, but with a minimum of grain growth.

One temperature indicator we can use is that as a piece of steel approaches its critical heat, it loses its attraction for a magnet. If we go a little beyond that point, we should be okay. A full bright red with a tinge of orange is usually quite close.

Well, Jean, let's see if all this good theory works in practice. I know that the steel in these chisels is a water hardening steel, so we can quench them in the slack tub. I want about 3" of the cutting end of the piece to get hot. When quench it, I'll only put about 1" in the water and move it gently back and forth—raising it a little at each stroke—until the end is cold. I then quickly shine the cooled end with this piece of broken grinding wheel, and let the residual heat in the unquenched part, reheat the part I just quenched, in order to temper it.

As a piece of steel is heated, iron oxide forms on the surface. If the surface is shiny you can see it form, first as a pale yellow (lowest temperature) deepening to brown, then purple, then blue, and finally gray. These colors are indications of temperature. The lighter the color, the lower the heat. The more heat, the softer the piece gets. Since this tool is going to be subjected to some pretty severe use, and we don't want it to chip, I'm going to let the color come up to a full blue.

Let's try a magnet on this piece. See, it still wants to stick and the color is dull red. We'll apply a little more heat but we don't want to heat the piece too rapidly; the heat has to have time to soak all the way through.



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There, that looks about right. Into the water about an inch deep, move back and forth, raise it a little, keep moving—there, it's cold on the end. Now we'll shine it up with the grinding stone. See the color begin to show closest to the heat? As the heat travels, you can see the color march down the piece. I want the end of this chisel to be a full blue. I'll cool the tip again so it doesn't get any softer, but not the part that wasn't quenched. I'm going to let this cool down to room temperature and make sure the tip doesn't heat up again, re-dipping it if necessary.

Remember the cut we put in the chisel? Now is when we use it to find out how good a job we did. I'll put the tip in the vise with the cut just above the jaw and break it off. The cut makes the piece want to break there first. Now look at the steel in the break. See how smooth it is and looks like satin? That's great. If we had let it get it too hot, it would have gotten hard all right, but the grains would have been large and the broken surface would look more like rock salt than satin, and that's no good. If I try to file the end, the file just slides over it. That means it's real hard and should do a good job.

Now we'll treat the other end the same way. This time we'll have to be careful that the end we just treated doesn't get hot enough to temper it any further. If it starts to get hot, we can cool off the tip in the slack tub. The section on this end is larger than the one we just treated, so when the piece gets almost hot enough, I'll shut off the blower and let it soak a minute to be sure the heat is all through the piece before I quench it.

I can still touch the end with my fingers, so it's not too hot, yet. Looks like the piece is just about at the right temperature now, so I'll shut off the blower, wait a minute, and quench. Remember, into the water about an inch deep, move it back and forth, raise it up a little, and back and forth again, until it's cool. Shine it up and watch the colors run to blue, now cool again.

The reason for moving the piece back and forth is to keep cold water always against the piece and to keep any bubbles from forming on the piece. Raising it up a little, steadily prevents a sharp line of demarcation from forming at the quench line. There is a gradual change from soft to hard because, as we raise up the

piece, it doesn't get severe tempering at the quench line, and that's good.

Go ahead with your piece and I'll grind this chisel to find out how it did.

Is your piece ready yet? Not quite, the magnet still sticks. Now it's ready. Keep it moving in the water, raise it a little, that's good, keep moving, now shine it and watch the colors. If there isn't enough heat left in the piece to make the colors run, you can heat the area behind the quench line a little with a torch, but just enough to show the colors. You could also heat a piece of steel in the forge and lay this piece on it and transfer the heat. If this were an oil quenching steel, it wouldn't be safe to do what we just did. The portion of the piece not in the oil is hot enough to set it on fire, and I don't need that in my shop. Jean, break off the end of your piece and let's look at the grain size. Hey, that looks good, a nice smooth satiny gray. Okay, do the other end. Be sure the first end doesn't get hot. You could shine it up again and as long as no color shows, you know it didn't get hot again.

I'm going to try out my chisel by cutting on a soft piece of material. There, I've hit it hard enough to put a good nick in the soft steel, but my chisel still looks fine. Must have gotten lucky and done a good job. Let's try yours—hit it a good lick. Now, let's look.

Great, the edge isn't hurt; looks like you've made your first tool. Jean, I always mark my tools and any work I do. I won't put my stamp on a piece that I don't feel is right, and no piece goes out the door without my stamp. You can do as you like, but my policy about this has stood me in good stead.

Jean, hardening a piece of steel is a severe process and any nicks, cuts or sharp corners are places that will want to start a crack, so when you make a piece to be hardened, try to keep this in mind, and keep these things to a minimum.

Well, you've had quite a dose for today. Come back again and we'll do some more, and start on more tools."

This article was reprinted courtesy of the author Bird Ogier, The Anvil Ring and ABANA. It was originally published in the Summer Issue of the Anvil Ring 1986, Volume 15 Issue 1. Reprinting of this article must be cleared through the ABANA publishing committee.

Tom Moore



Mark Smith's notes from Tom Moore's demo. at the October 6, 2001, meeting hosted by Steve Mengel and Eric Green

★ Pennsylvania Striker • November 2001

I fire without a match
using Pure Iron[®], charred cotton and
fibre from rope. Tom using rapid hammer blows
on nail size sliver of Pure Iron[®] got it red. Then he
quickly moves the iron to the cotton, with a breath, the
to the rope - fire!

II FLUX SPOON

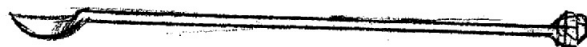
$\frac{5}{16}$ 18" long

OLD NUT WELDED
on end. Then
forged into faceted ball

Tapers end
then folds rod
back on itself for
weld. FLUX IS BORAX
WELD THEN FORGE the mass
into "spoon". TROUBLE getting scarf down?.



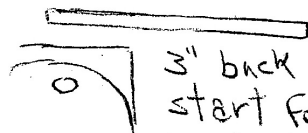
use flux & COPPER electric wire
(Just like the Ol' timers) add heat
file clean. Red spot? Heat again.



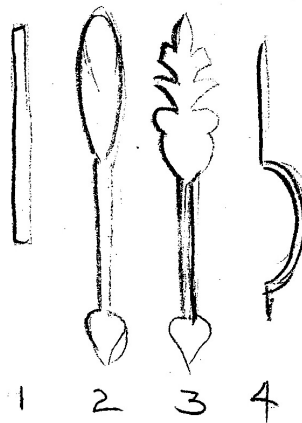
III Suffolk Thumb latch

8" x $\frac{5}{8}$ " #

Using Pure IRON



3" back
start forging the top
part of latch



The handle, forge to 6" care taken
not to make it too long.

THE design was chisled out, an
easy task with Pure IRON® then
filed.



WORK CLAMPED ON
THIS angled "T"
held in VISE MAKES
FILING EASY



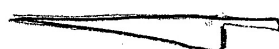
The bends
in the handle

Then the hole for the thumb latch
was punched

the lifter:



ANVIL



Forge to length

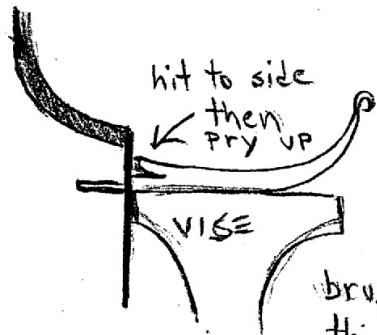
Fold & weld



Forge to length again

Mark Smith's notes from
Tom Moore's demo. at
the October 6, 2001,
meeting hosted by Steve
Mengel and Eric Green

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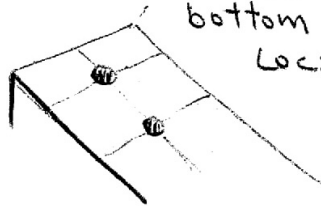


The finish: wire
brushed, boiled linseed oil
thinned with mineral spirits
dry (2 days) coat with post wax.
(on bathroom fixtures a flat polyurethane)
3 coats sprayed.

To brown steel: clorex & water 50/50
heat 15 min

on
Punching nail holes:

cross hairs on
bottom block helps
locate holes



On hammering: keep it loose don't strangle the
hammer.

on pintles: for barn work just point the end
no need to taper



on Pure Iron: cannot say enough good about it

The Beginners Corner

By: Buster Grubbs

Ocmulgee Blacksmith Guild

A Plate Hanger

You will need:

- * 2 pieces of 3/8 to 1/2 square 6' long
- * 2 pieces of 1/4 x 1" flat 6-3/4" long
- * 3 pieces of 5/16 or 3/8 square 13"
- * 10 - 1/8" rivets (or welder)

Step 1-

Forge both ends of the 6' long pieces to a taper or flair or whatever, and roll these into scrolls. (Use your imagination as to design).

Step 2-

Center punch marks at 14", 16", 29", 42" and 44" from the tops of the scrolls as shown (in figure 2).

Step 3-

Heat at the 14" and 44" marks and drive a piece of the 1/4 x 1" flat bar into it so that a notch is formed for the 1/4 x 1" to rest in (so that it is flush with the back of the scroll.)

Step 4-

Weld or drill and rivet the 1/4 x 1 x 6-3/4 to the upright scrolls. (as shown in Figure 4) and then drill 2 holes in each of the 1/4 x 1 cross pieces for mounting.

Step 5-

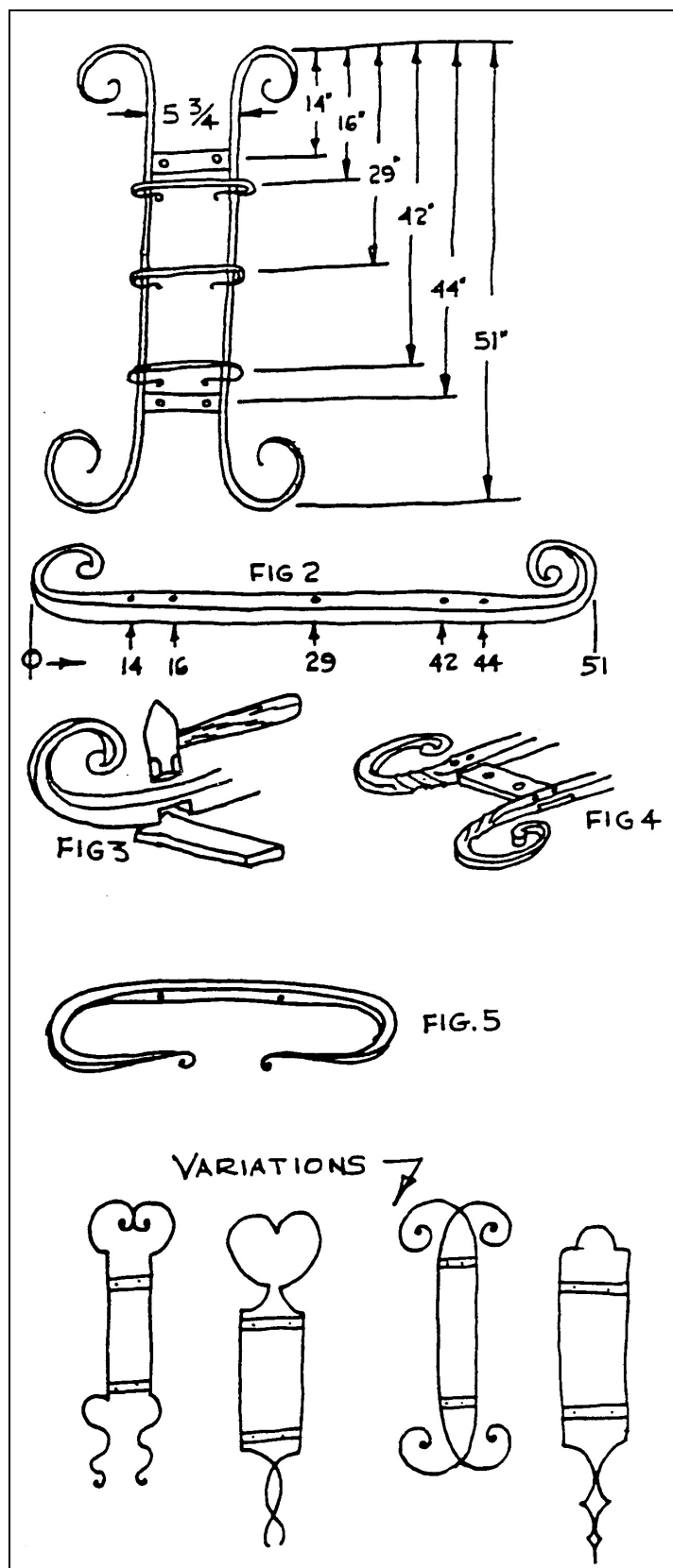
Forge the 3 pieces of 13" long 1/4 or 5/16 out to a taper so that they end up about 15" long. Form tiny pig tail scrolls on each end with needle nose pliers or small scroll tongs. Bend each of these as shown. These are the pieces that will actually hold the plates.

Step 6-

Attach these pieces to the uprights at the 16, 29, and 42" center punched marks made in step 2 above.

Step 7-

Finish by cleaning with a wire brush and applying an edible oil such as vegetable, olive, or whatever you use in your kitchen.



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Join ABANA or Check out other area chapters!

Northeast Blacksmiths Association

Northeast Blacksmiths holds its meets twice a year at the Ashokan Field Campus in New York State.

The Ashokan campus is located in Olivebridge, N.Y., several miles west of Kingston, N.Y. The meets are held the first weekend in May and in the first weekend in October every year. The main demonstration is in the blacksmith shop and there is a "Hands On" workshop for beginners. A main demonstrator is brought in for each meet, food and bunk-house style lodging are provided as part of the cost of the weekend long meet.

Contact : Tim Neu

to register for hammer-ins

or subscribe to the newsletter;

Tim Neu, Ashokan Field Campus,

447 Beaverkill Rd.

Olivebridge, N.Y. 12461 [914]657-8333

For more information check out the web

site; <<http://nba.abana-chapter.com/>>

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ABANA Member? ☐ Yes ☐ No

Can you host a PABA meeting? ☐ Yes ☐ No

Are you willing to demonstrate at a PABA meeting? ☐ Yes ☐ No

Suggestions for PABA demonstrations

What is your skill level?

☐ Beginner ☐ Intermediate ☐ Advanced ☐ Professional

Send your completed application with \$ 10 (one year dues) to;

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271 Stoney Lane

Lancaster, PA 17603

**PABA Membership
Application**

Membership is from

Jan. 1 — Dec. 31



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Staten Island, New York 10308
Attn: Larry Brown, Editor



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NJBA Dues are \$18 per year (as of July 1, 2001).

Please make your check out to: "NJBA"

Please mail checks to:

NJBA, P.O. Box 195, Howell, N.J. 07731

Please include payment with the information listed below. You will receive a postcard confirmation of your membership, and will receive a newsletter within a month.

NJBA's "year" runs from June to June. If you join mid-year, the postcard will offer a prorated dues option which will then allow you to extend your membership till the following June. The following information will be listed in a roster available to other members.

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