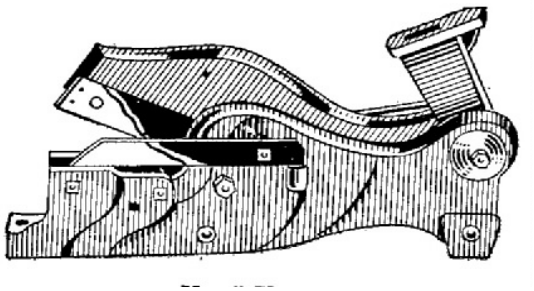
some of the stresses from the forging. It is an important and often overlooked step in heat-treating. Normalizing is similar to "annealing"; the difference is that normalizing is aircooled. When annealing the steel is brought up to the same red (1550F AVERAGE) and cooled as slowly as possible in insulation such as vermiculite, mica, or ceramic fiber. This renders the steel as soft as it gets. When it is cool, grind or file to shape as needed, do not get it real hot.

The next step is "hardening". The steel is brought up to the same red heat as before and quenched in something, more on that shortly. This red heat I keep harping on is something called "critical temp." It is the point at which the steel shifts its crystalline structure from one "phase" to the other. To find the critical temp one can use a small magnet on a wire. SLOWLY heat a sample of the steel checking it for "stick" with the magnet as you go. When it loses its stick (non-magnetic) you have reached critical temp for that alloy of steel. Memorize that color. This must be done on a "rising heat' because the steel remains nonmagnetic for a while as it falls below critical temp. This temp is (slightly) different for each alloy of steel.

Back to the 'quench". Common quench media are: air, (for air hardening steel), water (for water hardening steel), oil, (for oil hardening...). There are also a variety of brine solutions and formulas such as "superquench" for hardening low carbon (mild) steels. Superquench is the fastest cooling, followed by brine, cold water, warm water, cold oil, warm oil, and air. BOTTOM LINE, the faster steel cools, the harder it gets.

For most small tools, oil (such as transmission oil) is a best choice though caution should be used to avoid fires. Back to the chisel. Heat an inch or two of it to just above critical temp and quench completely in oil. It should be hard (and also brittle). Now it MUST be tempered immediately or it may crack.

The word tempering is often misused. Tempering is heating the steel to between 250F and 750F (This is a generalization). What this operation does is greatly relieve the stresses caused by hardening as well as slightly reducing the hardness from the quenching. For a chisel, removing the oil may do this, then sanding the tool (so the



colors can be seen) and using a torch to heat

SLOWLY above the hardened area and letting the "temper colors' (blue, purple, brown, straw, ltght yellow) conduct down towards the business end. For a chisel I like to stop the color (by quenching) so that the cutting edge is brown to purple (500F-550F). This step may (should) be repeated to insure a good average temper. This is called "double or triple drawing". If you overheat the tool now, thus making it too soft, you must start over with the normalizing step.

For more on this I recommend Jack Andrews "New Edge of the Anvil", Alexander Weyger's books, or Alex Bealers Book.

FOUR things affect how hard steel gets: ONE, The alloy mix, especially the amount of carbon. TWO, Temperature at quenching. THREE, Speed of quenching, (medium) FOUR, tempering heat.

SUMMARY.

1. FORGE TO SHAPE.
2. HEAT TO CRITICAL TEMP. (MED. RED), AND NORMALIZE (LET AIR COOL).
3. GRIND OR FILE.
4. HEAT TO JUST ABOVE CRITICAL TEMP (MAGNET?) AND QUENCH (IN OIL USUALLY FOR MOST SMALL TOOLS) FIRE DANGER, DO NOT INHALE SMOKE!
5. LIGHTLY SAND AND HEAT TO DRAW TEMPER. REPEAT SAND AND TEMPER IF YOU WISH.
6. TEST IT. MODIFY AS NEEDED.
7. LEARN BY DOING.
8. ATTEND YOUR LOCAL CHAPTER MEETINGS AND THE BI-YEARLY ABANA CONFERENCE

Remember, some smiths learn by reading, some by watching, and many of us just have to pee on the electric fence for ourselves. Be careful out there. With Hammer and Tongs, Scott Lankton

The Role of Blacksmiths Through The Ages

The blacksmith has played an important role in society down through the ages, according to research compiled by Dr. James M. Jeep Sabo,

In ancient Wales, for example, the blacksmith held a place of honor in the Prince's court with the priest and the poet, and according to Greek mythology, there was even a blacksmith on Olympus.

Vulcan, the son of Zeus and Hera, made tools and weapons and built the houses in which the gods lived. Four beautiful handmaidens, who he made with his own hands and endowed with life assisted him in his forge.

Thor, of the Norsemen, hurled his blacksmiths hammer as a weapon and a tool. It was this fabled blacksmith who some believed caused the thunder to roll.

In old Russia, the blacksmith even participated in weddings. It was his presence that supposedly helped weld men and women together.

Through the years, the blacksmith was essential to transportation. making shoes for horses and oxen and welding and fitting wagon tires and hub rings. Other craftsmen were dependent upon the blacksmith to make their tools.

The blacksmith was the only one of the ancient craftsmen to work with the four elements: fire, air, earth and water. Fire was used to heat the iron, which he took from the earth along with the coal for the fire, and the bellows controlled the air for his purposes. Water was essential to cool and temper the heated metal.

The blacksmith filled a number of rotes in society, from making the tools of war, such as swords and spears, to providing ice skates for children.

Some of the names in history books were involved in blacksmithing:

• Louis XVI had his own blacksmith shop at Versailles, where he designed and made locks for guns and doors.

• Richard the Lion-Hearted is said to have spent much time working in his army's blacksmith shop.

• Maximillian the Great was responsible for the armor of his period.

• Charles V, emperor of the Holy Roman Empire, worked on the guns used by his soldiers.

• George Washington took a great interest in the blacksmith shop at Mount Vernon.

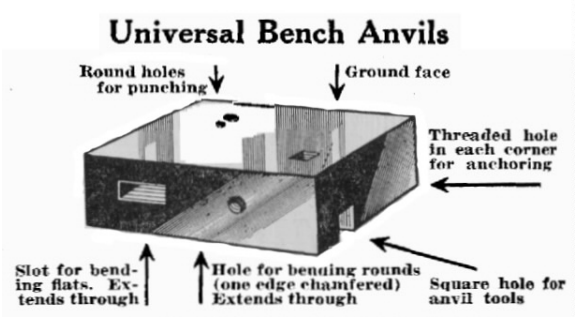
• Thomas Jefferson had a nail factory at Monticello.

• John C Calhoun knew as much about the techniques of blacksmithing us most masters in the trade.

• Sir Winston Churchill was descended from blacksmiths on the American and British sides of his family.

• Richard Sears, founder of Sears, Roebuck and Company, was the son of a blacksmith. His father made the first surgical scalpels for the Mayo Clinic.

(The source of this article was lost– editor.)



More Tips from the Forge List

To: "Darrell"
Subject: Propane Safety

The little hand tightening valve on the side of the valve is called a 10% valve. It is used when filling the tank. The way it works is it is opened while filling the tank. When the liquid propane starts spitting out of the 10% valve, the tank is 80 + % full of liquid propane and the maximum fill should be 85%. If you continue filling the tank until there is a continuous stream of white liquid after the fill valve is shut off, you have exceeded 90% full tank. If you have a tank that releases a "shot of gas every now and again" you have either over filled the tank (VERY dangerous) or you have a bad valve (also very dangerous). If you think your tank is over filled, take the tank outside and open the 10% valve. If white liquid propane comes out, you can either leave the 10% valve open until just gas comes out or you can connect to a high use item such as a forge and use the gas (which will also cool the tank.) If clear gas comes out and you are having "shot of gas every now and again" have the valve changed before you blow something up.

Darrell

Engraving Tools from Concrete Nails

My name is William L. Howard, Bill for short, and I have made my living as a metalsmith for the last 30 years. I am considered a master goldsmith by those who care about such things and I also engrave, sculpt, mint, cast, forge, make prototypes, teach, consult, appraise, drink scotch and whatever else might be available, weld, do seminars and most anything else which is legal, fun, informative and earns fair wages. I live with my wife, Kathy and our kids, Aaron & Missy, in Stoughton, Wisconsin where we operate our business and do all the usual stuff.

I've had to do some pretty weird things with metal in the course of making custom orders and one of the most useful skills I ever learned was how to make those special tools you couldn't buy if you wanted to but really make the job happen faster. The following constitutes the lecture part of a demo I did for the blacksmiths at the '95 QUAD STATE ROUNDUP in Ohio. It was received well and I wish to thank my hosts who treated me very well. Not everyone has vast resources of cash or tools so I have presented this information based on a low tech, low cost approach. You will need some concrete nails, a belt sander or grinder, a heat source, hammer, striking surface, a can of water, a vise and about 20 minutes.

==========

SAFETY TIPS: For those of you who have lawyers please observe the following advice. You are responsible for your own safety and work habits. Use safety glasses when using grinders, torches, hammers and all potentially dangerous (especially rotary) power equipment and tools. Avoid burns, if it gets hot let go! Remember that black heat (not glowing red) can burn you. You can hold work with your hands while forging but if you're not a quick worker be prepared to let go quick. Enough said about the obvious.

==========

NAIL TOOLS: Making an engraving chisel…

Heat the heads of several concrete nails (bigger is better) and let them air cool to anneal (or soften) the striking surface to avoid chips etc. Heat only about 1/4" to red/orange or until it's non magnetic. If you over heat, the steel will emit sparks which means you are losing carbon content which you don't want to do.

Heat the pointed end to red/orange and forge flat as shown in figure 1. If you're quick you can hold this with your fingers. During the same heat, hammer a slight bend near the tip as shown in figure 3. This will save you some grinding later.

There are three basic parts to an engraving tool - FACE, HEEL & SHAFT

a. You sharpen the face
b. You shape the heel for the cut shape you want
c. You hold or mount the shaft

The cutting edge is where the face and the bottom of the heel meet. The profile of the face is a cross section which has been ground off the tip, above the heel, at an angle. This will cut different shaped grooves into your work. The best one to start with is the 1/2 round.

Grind the heel slowly with the point up to make the bottom edge 1/2 round. If you rotate it back and forth too fast, you will get a pointed shape instead of rounded. When you're happy, smooth it off with a little wet or dry sandpaper as this will make a smoother cut.

Next grind the angle you want for your face. Eyeballing is good enough. Grind with the heel up if you can as this will reduce burrs and try to get the plane of the face ground perpendicular to the shaft. If its off to the right or left it won't cut straight. See large figure.

So far you have been working with annealed or softened tool steel which you will now harden by heating the business end to red/orange or non-magnetic and quenching vertically in water. Don't stir, swirl or move it. Your tool is now hardened and ready to sharpen. Use a light touch and avoid over heating by quenching frequently in a can of water. If you can, keep the face flat and true to the original angle. If it cuts your finger nail, it will cut mild steel or annealed tool steel.

To cut steel, hold at a steep angle and enter the metal with one tap. Continue tapping with a light hammer while lowering the other end until the face starts to cut through the metal.

To cut continuous lines hold your tool at a constant angle. Too high and it dives into the metal and too low causes it to surface. With a little practice you can cut a straight line at even depth.

To cut curved lines you must either rotate your vise or move around the work piece as you tap the tool through the metal

IS IT RIGHT?: If your tool has developed a mushroomed tip and won't cut it is too soft. If the tip has chipped or fractured it is too hard. Anneal & re-harden. The nail will stand this a good number of times as long as you don't overheat and burn out the carbon (emitting sparks during a heat).

SPARK TESTING TOOL STEEL: Take the suspect stock and grind it hard enough to create a shower of sparks. If the sparks are straight and not too bright you have non-tool steel or iron. If the sparks fork and fan out in a bright pattern you have tool steel. Use a wood nail and an old drill bit for comparison. Compare a wood nail (bends) and a concrete nail (breaks) for spark patterns. This is a scroungers' test and will not provide an alloy number or hardening information but can lead to results with a little trial and error experimentation. Junk is cheap, high tech tool steel ain't.

IF YOU CAN DRAW IT YOU CAN ENGRAVE IT:

Can't draw? Use this Xerox trick!
Draw, trace etc. your pattern on paper.
Xerox it bigger or smaller as you wish.
Clean your metal with Acetone or Lacquer thinner.
Tape your Xerox face down on the work surface.

Rub the back of the Xerox design with a rag which is damp with Acetone so the paper looks translucent and you can see the pattern through it.

Before it dries or gets moved, press down with the dry end of your rag on the design until it is dry (60 seconds max).

Peel the paper, which will stick a little where the toner transferred, away from your work piece and see if the design is all there.

This produces a durable pattern which you can spray clear lacquer over for longevity of complicated designs. It will not rub off easily and can be transferred to anything the solvent won't eat!

NOTE: Your pattern is a mirror image of the original! You may want to trace the back of your design and Xerox that to allow the lettering to transfer as readable, etcetera. It works great for making stamp or die patterns which must be reversed anyway.

If you want to do it over, just clean the metal with acetone and repeat.

HELPFUL TIPS: If your Xerox transfer smears, you either got it too wet or your copy moved during the rubbing procedure. This transfer will not resist heat like soapstone lines will for cutting purposes.

Once you have a good pattern, you only have to follow the lines until you have cut them all to your satisfaction. Beware brushing off your work surface with your hand as the burrs you have raised at the end of your cuts will cut lines in your hand until they are removed with an exit cut. (SEE ILLUS.) This is designed to get rid of them and save your hide from damage. While cutting, your graver acts like a plow or a wing according to the angle of attack. Steep angles cut deep and vice versa. The more taps per inch of line cut the smoother your cut will appear. Numerous light taps will work better than heavy blows for delicate line work.

If you find that the shank of your graver is bending it is because it got too hot during forging or some other part of the process and didn't get hardened later. Heat the center and quench to try and remedy this. Take care to keep the ends cold or you will have to fix them next.

Engraving and penmanship have much in common. Everyone has a different style so experiment with face shapes and angles as well as heel angles. Use the bottom and sides to create compound or beveled cuts and tapered lines etc.

These tools can be hammered, which is the usual method for cutting steel or they can be mounted in handles for cutting softer metals and fine work in steel by hand. The plates for printing our money are hand cut in steel for example. This is highly advanced work not recommended for beginners or amateur counterfeiters. A clever combination can be had by mounting your shaft in a handle you can use and including a short steel striker of smaller diameter which contacts the shaft through the other end of the handle. This allows you to cut by hand or hammer cut with the same tool. Handle shapes are usually shaped like a mushroom cut in 1/2 from cap to stem. The shaft is mounted in the stem end with the heel and the flat part of the handle on the down side.

Stamps, dies and trademarks can be made with your new skills. Coining dies, embossing dies for shaping thin metal and a multitude of other techniques are now available to you. You can also do decorative gun engraving, inlay work and a variety of other things which I highly

recommend you practice first before you cobble up a valuable shotgun etc.!

Steel is hard and mistakes you make are hard to erase! Try planning your cuts, working some from two directions. This works well with curves. Most cuts work well if you cut from right to left (southpaws may ignore) and you don't have to make a cut all at once. It can be segmented and cut from different angles and directions as with lettering.

Last but not least, use finesse. Most novice engravers try to make a deep cut all at once when a better and more controllable approach is to shave it down in stages. A power slip can spoil hours of work or require the removal of a sharp tool from some part of your body. I know, I've done both. Try and plan your mistakes with the "what if game".

STOCK FOR MAKING A STAMP or TOUCHMARK:

If you want to avoid the trial and error method of finding junk to make a stamp with and you can spare a few bucks; call your local tool and die or machine shop. Ask for W1 or W2, water hardening tool steel. It is adequate for our needs here and comes in a variety of shapes. I recommend round or square about 1/2" to 3/4" for stamps. It depends on what size your finished mark is to be. Water hardening is simple and easy. For those of you with the right stuff there are other steels with oil and air hardening properties which are useful but more high tech. Size and cut your stock to a length which is appropriate to the use. Don't hit a stamp 3" x 3/16" with a sledge, use a tap hammer. Old chisels and punches are a good source for heavier duty stamps. Drill bits will work fine for light work but tend to be brittle unless tempered for heavy use.

MAKING A STAMP OR PATTERNED PUNCH:

Heat red/orange and forge work end to shape desired. Soften striking end. I recommend forging a short taper towards the work end - approx. 1/3 the total length or as required to shape and size the tip. Heat and air cool to anneal and normalize (even out hardness of forged portion) the working end of your stamp.

Trim off the end of your stock so that the face of your stamp is perpendicular to the shaft and as flat as possible (90 degrees). If it will stand on the face on a flat, level surface you got it right.

Engrave or punch design into the end of the stamp. Letters and numbers must appear backwards like a mirror image if the mark from the stamp is to come out right. Don't cut or punch too deep as 1/32" is usually adequate to produce a legible mark. Keep your cuts neat and to an even depth so the resulting mark will have an even height. Use modeling clay, wax or lead for test strikes and to check your progress.

Grind or file an even bevel all around the edge. This will make a nice "frame" around your maker's mark.

Clean up the face and make sure all burrs are neatly removed. Double check your work. A good stamp will make 1000's of impressions for you and if there is a flaw it will multiply.

Harden by heating to red/orange or non-magnetic heat and quenching vertically in water. Just hold it still until it quits steaming and is cool to the touch. Clean up with a fine steel brush and test strike in lead or soft metal. If you are going to mark iron work, stamp the work while at least cherry red or hotter. Non-ferrous metals such as copper, brass, bronze gold etc. can be stamped cold. If you worked it hot stamp it hot.

QUENCH your stamp after using it on hot iron or you will eventually ruin it through gradually softening the face. Air hardening steel eliminates this problem but water hardening steel is just fine and a bit easier to work for your first stamp. NEED HELP? or DID IT WORK FIRST TRY?: Send me sample of your work and I'll provide a constructive critique of your engraving or maker's mark etc. if you send a SASE. NO charge but donations are gleefully accepted.

William L. Howard
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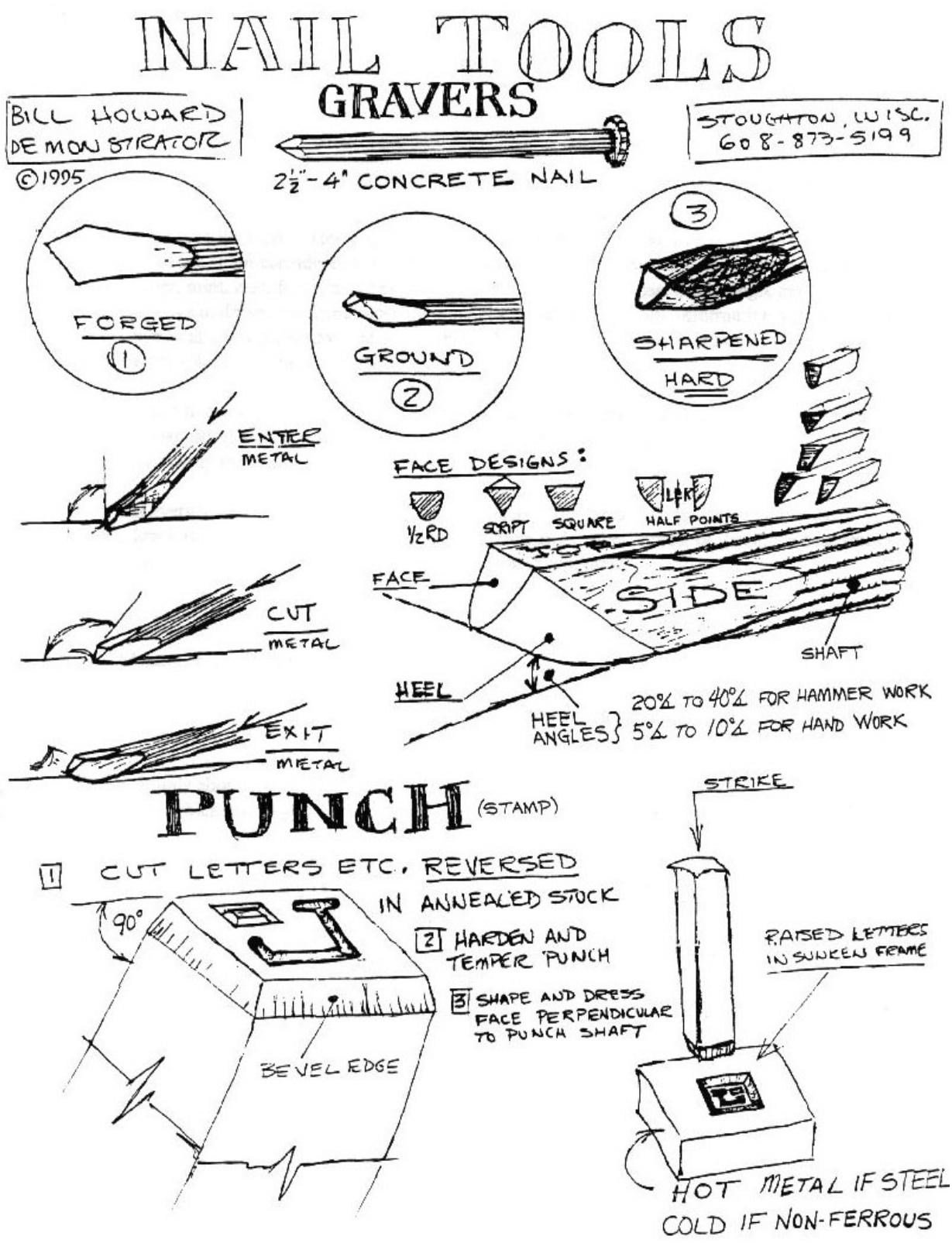
www.howard-academy.com

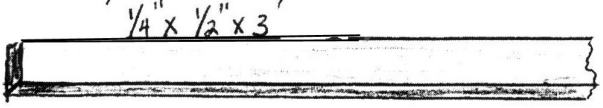

NAIL TOOLS
GRAVERS
BILL HOWARD
DEMONSTRATOR
©1995
STOUGHTON, WISC.
608-873-5199
2½"-4" CONCRETE NAIL
FORGED
1
GROUND
2
3
SHARPENED
HARD
ENTER
METAL
CUT
METAL
EXIT
METAL
FACE DESIGNS:
½RD
SCRIPT
SQUARE
HALF POINTS
FACE
SIDE
SHAFT
HEEL
HEEL ANGLES
20° TO 40° FOR HAMMER WORK
5° TO 10° FOR HAND WORK
PUNCH (STAMP)
1 CUT LETTERS ETC. REVERSED IN ANNEALED STOCK
2 HARDEN AND TEMPER PUNCH
3 SHAPE AND DRESS FACE PERPENDICULAR TO PUNCH SHAFT
90°
BEVEL EDGE
STRIKE
RAISED LETTERS IN SUNKEN FRAME
HOT METAL IF STEEL
COLD IF NON-FERROUS

I have several of these picture demo's from this newsletter featuring this artist, which I will feature in the next few newsletters—Larry Brown NJBA Editor

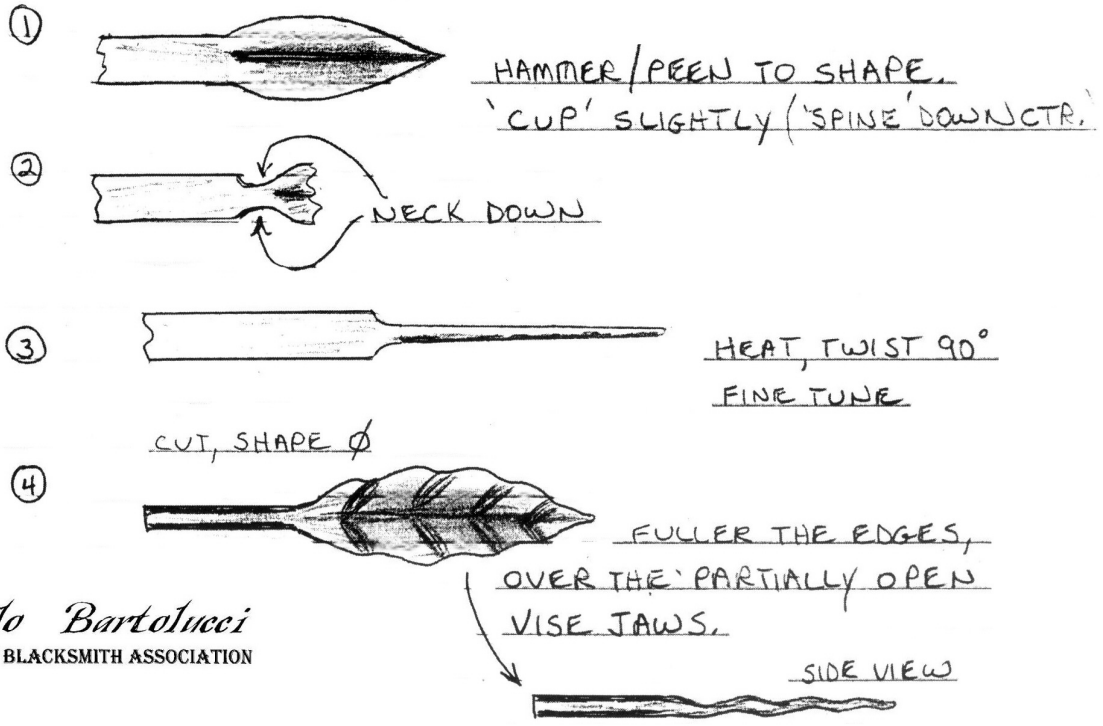
NWBA SPRING CONF. 5/26/02

ANGELO BARTOLUCCI

LEAVES, ETC. FROM WROUGHT IRON

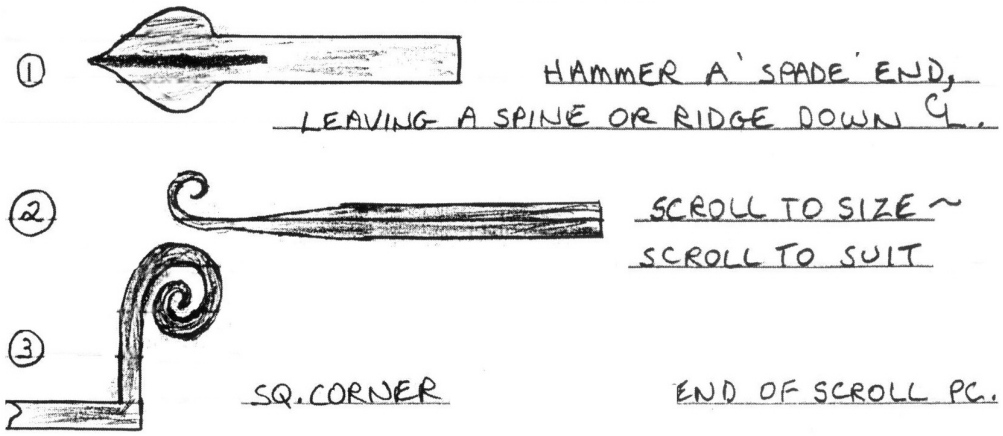


LEAF



Angelo Bartolucci
NORTH WEST BLACKSMITH ASSOCIATION

SPADE END SCROLL END OF LEAF PC.



Blacksmithing Workshops and Classes:

Peters Valley Craft Education Center
19 Kuhn Rd., Layton, NJ 07851 (973)948-5200
pv@warwick.net www.pvcrafts.org

Academy of Traditional Arts
Carrol County Farm Museum
500 South Center St. Westminster, MD 21157
(410)848-7775 (410)876-2667

Touchstone Center for Crafts
R.D.#1, Box 60, Farmington, PA 15437
(724)329-1370 Fax: (724)329-1371

John C Campbell Folk School
One Folk School Rd.
Brasstown, NC 28902
1-800-365-5724 www.folkschool.com

Red Mill Forge
Contact Adam Howard about workshops and per diem use of the shop (908)735-4573

BLACKSMITH TOOLS FOR SALE!

John Chobrda

Has a large selection of tools for sale.
Anvils – Forges - Leg Vices—Blowers
Tongs – Hammers
Will also repair and/or resurface Anvils
Call John for prices and availability
Evening (609) 443-3106

Wanted: Donations for the NJBA Trailer
We need hand tools, files,
Tongs (Old, new and repairable),
Safety Glasses and assorted rivets.
Look around and see what you have to donate.
Contact; Dave Macauley, Directors list, Page 2

Business Members

We would like to thank those who joined with our new Business Membership category
Please show them our support

Marshall Bienstock
663 Casino Dr., Howell, NJ 07731
(732) 938– 6577, (732) 780-0871
John Chobrda, Pine Barrens Forge
231 Morrison Ave., Hightstown, NJ 08520
609-443-3106 JChob@earthlink.net
Eric Cuper Artist Blacksmith
109 Lehman Lane, Neshanic Station, NJ 08853
908 642-6420 ericuper@msn.com
Bruce Hay, Jr.
50 Pine St., Lincroft, NJ 07738
Jayesh Shah Architectural Iron Design
950 S. 2nd St., Plainfield, NJ 07063
jay@archirondesign.com

Open Forges

We are looking for members who are interested in opening their forges up to members as a open forge. This does not have to be a weekly forge as is Marshall's the others can meet once or twice a month. Please contact, Larry Brown, Editor.
We want to encourage all to join us at:

Monday Night Open Forge in N.J.

Marshall Bienstock is hosting an open forge in his shop at 7 pm almost every Monday night (Please call ahead on holidays to make sure , (732)780-0871)

Open Forge in Long Island

Sunday from 10:00 am to 6pm.
Starting the 1st Sunday in November until the end of April. Please call ahead to confirm and get directions.
Ron Grabowski, 110 Burlington Blvd. Smithtown, NY
(631) 265-1564
Ronsforge@aol.com

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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/>

Join The Pennsylvania Blacksmiths Association!

Name _____

Address _____

City, State, Zip code _____

Home / work Phone # **E-mail (optional)**

ABANA Member? O **Yes** O **No**
Can you host a PABA meeting? O **Yes** O **No**
Are you willing to demonstrate at a PABA meeting? O **Yes** O **No**

Suggestions for PABA demonstrations _____

What is your skill level?
O Beginner O Intermediate O Advanced O Professional

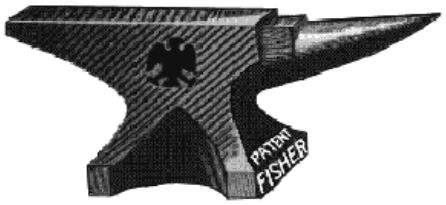
Send your completed application with $ 10 (one year dues) to;
Treasurer Gene Degenhardt
271 Stoney Lane
Lancaster, PA 17603

PABA Membership Application
Membership is from
Jan. 1 — Dec. 31

PENNSYLVANIA Artist BLACKSMITHS' ASSOCIATION

New Jersey
Blacksmiths Association
90 William Avenue
Staten Island, New York 10308
Attn: Larry Brown, Editor

New Jersey Blacksmiths Association



"EAGLE"
FISHER & NORRIS, Trenton, N. J.

How to Join or Renew your Membership in NJBA:

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 761, Mt. Laurel, NJ 08054

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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Address _____ Day Phone _____
City _____
State _____ Zip _____
E-Mail _____ Skill Level (optional)_____
Comments _____