New Jersey Blacksmiths Association
"EAGLE"

N.J.B.A. Newsletter

Volume 5, Issue Number 1

Spring is here!

Well, Spring has "sprung"! We've had a couple of meets since the last newsletter. In February we were making chains and t-shirts at Marshalls and in April we visited the Mercer Museum in Doylestown, Pa, for a tour accompanied by the curator. We then finished the day with the hospitality of Doug Learn at his home nearby home. We now have T-shirts for sale at $15 apiece, with Josh Kavett being the contact person (Buy one for everyone in the family). So for those who have been idle this last winter, dust off the anvils and heat things up!

Upcoming events for 2000;

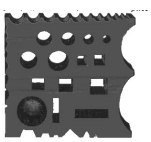
May; Meeting at **Alex Parubchenko's Shop** in Trenton on Sunday May 21, from 10 am-1 pm. See details on this page for directions. **Elections** will also be held, so come to vote or get involved

June; The meeting will be held at **Cold Spring Village**, Cape May, NJ on June 17 from 10 am—4 pm, see pages 1 and 2 for details and directions.

July; We will be meeting on Friday night, July 28th starting 7PM at the **Monmouth County Fair.** The fair runs July 26th through July 30. We will have demonstration space available to members and a display area for members work throughout the week of the fair.

August; A **Smithing Magician Workshop** will be held at **Marshalls** shop on Sunday, August 27 . See details and directions on page

November; Possible meet in Peters Valley.



May Meet at

Alex Parubchenko's Shop

In Trenton

The meet will be on Sunday May 21st from 10 am - 1 pm. We will try to meet for lunch at a local establishment after the meet. Alex Parubchenko will demonstrate the forging of hammers and (ornamental) crosses at his shop, "The Blacksmith of Trenton." A #2 Nazel power hammer will be used for some of the demonstration. Alex also has anvils and leg vises for sale.

Elections for our Board of Directors will also be held this day, so come out and vote or put your hat into the ring and get involved

Directions: You can get to Olden Ave., Trenton, from US Route 1 (Trenton Freeway) or from Interstate Route 295 or via Arena Drive from Interstate Route 195. From US 1, go SE about 1/2 mile to the shop. From I 295, go NW about 2 miles to the shop. From I 295 go NW about 2 miles, where Arena joins Olden, and then about 2 miles NW on Olden to the shop. The shop is at 334 N. Olden Ave. There is a vacant lot next door where you can park. (Phone: 609-396-9583)

June Meet in Cold Spring Village In Cape May

The New Jersey Blacksmith Association will hold a general meeting and demonstration at Historic Cold Spring Village in Cape May New Jersey. The meeting will take place on Saturday June 17th

June Meet cont inued;

There will be demonstrations on both Saturday And Sunday so if you can't make Saturday come out Sunday. The meeting will coincide with HCSV's Tractors, Tools and Tackle event. HCSV is a 19th century village so period costumes are encouraged. NJBA members not wearing costumes are encouraged to wear NJBA t-shirts. Demonstrators should be in costume or be wearing a NJBA T-shirt. All members in costume will receive free admission and may bring one guest. Lunch on both days will be provided to NJBA members in costume.

We need members to bring portable forges and anvils for the demonstrations. Members bringing forges and other equipment should be there an hour earlier at 9 am. If you are interested in being a period demonstrator or have any other questions contact Steve Rhoades at (856) 697-4144 or hotiron1@juno.com.

Directions: Take exit 4A south from the Garden State Parkway and follow the signs to Historic Cold Spring Village 720 Rt. 9 Cape May NJ 08204 (609) 898-2300.

Directions to East Freehold Park ,NJ

- From Garden State Parkway:
  Garden State Parkway to Exit 100, Hwy. 33 west. Follow Hwy. 33 to Kozloski Rd., turn right. Follow signs to Park.
- • State Hwy. 9 to Hwy. 33 east, south of Freehold. Follow Hwy. 33 to Halls Mill Rd. North exit. Follow Halls Mill Rd. north to intersection. Road name will change to Kozloski Rd. Follow Kozloski Rd. to Park on left.
- From Rt. 18
  Rt. 18 to Exit 22, Rt. 537 west. Take Rt. 537 west to Kozloski Rd., turn left. Follow to Park on right
- It has also been recommended that to avoid traffic approach from Rt. 537

For more information contact David Macauley 732-206-1568 or drmacauley@att.com.

Free passes will be available for demonstrators, but we need to know who wishes to demonstrate by June 30th, 2000. For general information on the fair call: (732) 842-4000.

July Meet at Monmouth County Fair

East Freehold Park NJ

General Meeting Friday 7 PM July 28th

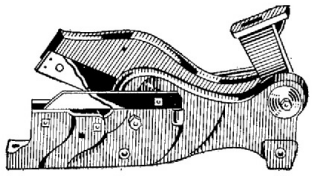
NJBA members will be providing a blacksmithing demonstration in conjunction with the Longstreet Farm Exhibit during the County Fair running July 26th – 30th. The general meeting will be held Friday Night starting 7 PM at the NJBA demonstration booth. Look for the Longstreet Farm Exhibit. Blacksmiths are encouraged to submit some of their work for a display at this venue on Friday night. All work will be displayed at the exhibit. This is a great opportunity for us to advertise NJBA and individual members. We can distribute business cards, brochures and talk to the public regarding our work

A forge, several anvils, some tools, stock and coal will be kept at the fair site for demonstrators.

August meet; Smithing Magician Workshop

Preparation for Workshop at Marshall's Open Forge Meetings.

Bruce Freeman and Marshall Bienstock are requesting assistance in preparing for the Smithing Magician Workshop to be held on Sunday, August 27. Help is needed mostly in cutting stock, and perhaps with grinding and drilling operations as well. We will be doing this work Monday evenings, simultaneous to the open forge meetings at Marshall's Forge. (See announcement elsewhere.) Contact Marshall at 732-780-0871 or Bruce at 609-716-2827 for more details.



February Meet At Marshall's

This was a two part meet, the front of the shop was making chain for the ABANA conference chain project. Links were made by experienced smiths and first time chain makers. The back of the shop held the T-shirt production line.

Report on the T-shirt project by Josh Kavett;

The board of NJBA decided to go ahead and make our own T-shirts this year. After much discussion of color, style and logo design, a consensus was reached. I took the lead in coordinating the job, which was made possible by our own member, David Potts. Dave is the graphics and internet expert at my school, Northern Burlington Regional. Dave did the final development of the logo, and created the screens. He also laid out the money and ordered the shirts.

We set the printing and heat lamp equipment in Marshall's back room, and did a home-brewed screen printing operation. The morning was devoted to printing the front pockets, and after a break for lunch and IITH, the back logos were printed. Thanks to all of the members that participated during the day.

We made 72 pocket-t shirts. To date, we have sold about 30. They are $15/each, and will be available at all NJBA events. If anyone wants to order by mail, send $15 plus $3 shipping to J. Kavett, 471 Casino Drive, Farmingdale, NJ 07727, and I will send one out. Available in M / L / XL / XXL. All sizes are available as of this writing, but are going quickly. All profits benefit NJBA programs.

NJBA Board of Directors

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osan@netlabs.net
Greg Phillips, Director untill 2002
(914) 457-5671, Acorn Forge, 937 Route 17k,

Open Forges

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)

Monday Night Open Forge In Orange County

Greg Phillips will be hosting an open forge in his shop in Orange Co. NY. For more information Contact: Greg Phillips, Acorn Forge, 937 Route 17k, Montgomery, NY 12549, (914) 457-5672, Suresign@frontiernet.net

Tuesday Night Open Forge on L.I.

On Tuesdays, an open forge will be available at Jon Folk's shop in Central Islip. The forge is open to all N.J.B.A. members only every Tuesday from 3:00 pm to 8:00 pm. For information and directions, call (516) 625-5667

Blacksmithing Workshops and Classes:

Peters Valley Craft Education Center
19 Kuhn Rd., Layton, NJ 07851 (973)948-5200
pv@warwick.net Http://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

Unclassified ad:

Wanted for my collection, eventually to be displayed with the Fisher & Norris archives:
Any Fisher & Norris anvils or vises.
Will buy outright or trade for post vises.
Over 20 post vises to choose from.
Contact Joshua Kavett
732-431-2152 E-mail: jakavett@aol.com

Report on Bob Bergmans Demonstrations At The Furnacetown Blacksmith Guild / NJBA Meet and the NJBA April 2nd Meet At Dan Cruzans

Bob Bergman demonstrated his power hammer the Kickass 75. He demonstrated tooling and techniques that he has developed for this hammer. Bob can be contacted for more information at;
Postville Power Hammers
N 8126 Postville Road
Blanchardville, Wi 53516
1 888 535 6320 Fax 1 608 527 2494

This report has been provided by **Anton Holdstrom**;

Bob Bergman's KA 75 Air Striking Hammer
Designed for low air consumption, Low weight, and low cost
Flat dye style forging
Designed to duplicate man with sledgehammer.
If a lot of long tapers are needed, this is not the machine.
Designed like old time steam hammer. Cylinder moves and ram is stationary. Most cylinders are stationary and the ram moves. One cylinder the air comes in above the ram to move case up, the other the air enters from below and the cylinder moves down.
For cold work, drop pressure down.
ATF fluid lubricate every 4-5 hours / wash WD-40
Cylinders are 2.5" id x 2 = 5 @ 100 psi = 500 LB?
Mass times velocity squared
Longer the tools, less speed of head so less power.
Punching hammer has tendency to roll so keep tools short.

Continued on next page

Bob Bergman Demo cont'd;

Safety

1) When hammer is up, it is on
2) Don't lean against hammer.

Seven (7) Basic Processes

1) Tapering - drawing
Any taper - establish the point first, so you can control the length.
A bird's mouth will always happen is start tapering too close to end.
Start back 1/2 the thickness of material. If going to perform and blunt taper, taker a few Hits back to pop the center out, than start taper. Don't go round and round when tapering, only work square, octagonal or edges.
Power hammer - tapering in steps then use flatter to remove steps.
Solid sound indicates bottom so move in or out.
Taper - towards you - back edge of dye
-- away from you - front edge of dye

2) Upsetting - making thicker
Don't use too heavy of a hammer
1:3 Rule— Diameter : maximum distance that may be upset without problems (1/2" : 1 1/2")
3:1 Max force from top to bottom to meet in center, 4:1 starts to fold
Upsetting - 3:1 width to length ratio, if greater the object will bow or fold
The fold or shut never goes away. If keep hitting, the shut will go deeper.
Corollary to 3:1 rule; if working longer stock must control heated area to prevent bow.Steels
1) H 13 - cutter
1750 - 1800 air harden, heavier material use fan
High chrome - hot working
2) 4140 - dyes Not very high in carbon but is tough.
3) 5160 - snapper, cutter,
Also truck springs
No heat treat, air cool enough
4) A 36 & super quench
5) 8260 track pin
6) S-7 some jack hammer bits
Jackhammer bit - 20 degree taper with 80-degree bevel on very end.

3) Punching
Hit and wiggle, can use graphite grease or coal dust for deeper holes. 20 degree taper prevents sticking. Final drift can be made from mild steel and Gunther quench. Faster than drilling and nice swelling around hole.
Slitting - circumference = 3.14 and 1/2 = 1.57" and slit 75%.

4) Fullering or Grooving
The groove sets off the twist. Rounding corners, grooving and twisting looks like rope.
Chamfer corners cold, example railing.

5) Twisting
Go past stopping point and come back.
6) Cutting
Marks cold and cuts hot.
Cut on alternate sides for a full cut, if rotate 90 degrees only cutting half material.

7) Welding
Does not use flux, very little scale is generated if welding heat is reached fast.
Too long and clinker sticks to metal and scale is generated to prevents weld.

Important Notes

1) Volume - Area - Resistance - Force
2) Cut stock 120" / handles 16" / spring handles 30" and make 10 or 15 at a time.
3) Offset tenon - very easy to do Blacksmithing. Hard if machined.
4) 30 degree taper Max - or shoots out.
5) Walter - blue plastic backing for grinding wheels
6) Handles - 1/4" x 1" nice
7) Ball peen hammer - point the peen and use for punch
8) There seems to be a size like when I was doing the springs that the thickness about 1/8"
Seems to be the thinnest. Maybe due to cooling effect.

Bob Bergman Demo cont'd;

Dies

Cutting - back bevel the cutter 2 degrees to keep cutting straight. No bevel - cutter will tend to roll.
Hard stop to prevent edges from touching.
Turn dyes over to omit the chilling effect.
Dye must be chamfered to allow metal to flow out.

Snub End Scroll

If too tight a bend - crack can start from shut. Roll away clockwise.

Leaf

1/4" x 1" flat and cut end on 45 degree
heat and than center the point.
Veining chisels very steep angles and can do cold.

Rusted Texture

Hard surfacing rod and dye grinder. Go back over again but stop before all flat is gone.

Wood Grain

Take flat stock and bend in the shape of "S". Fuller with cold cutter. Straighten flat stock.

Fish from Horseshoe;

1) Use ball to start mouth, round hot cutter to open mouth.
2) Eye - ball peen punch
3) Gills - same round hot cutter.
4) Heels - flair out and use flatter

Hand Wheel

Make a ball and flatten
Hold in jaws and drive down to offset with hammer
Punch hole for mounting

Preparing the scarf for welding

Bend about 1/2" back onto itself. Work to taper and than point.
This makes a large upside down thumb profile.
If bring to welding heat very fast, than don't need flux because very little scale is generated.

Tongs - Quick & Regular

1) 90 degree with 1/2 face blows to start jaws.
Turn towards the hand, which is going to hold it.
2) 45 degree with 1/2 face blows to start eye
3) 90 degree to set eye size and start reins
Bob made a block with recess to prevent eye from getting too thin.
Quick tongs are made using 5/16" or 3/8" rod to set eye area.
Heat and twist for jaws. The twist does stress the area

Auction tid bits from Josh

Article 1: Auction news

I follow and attend many auctions and recently saw reports of three items that may be on interest to the blacksmithing community. Last week on Ebay, a hammerhead that was provided by Bill Gitchner to Francis Whitaker for reworking, then stamped with his touchmark, and given back to Gitchner was sold. It brought about $135. No handle included.
A recent sale of Arts & Crafts items in Lambertville, NJ saw a Yellin piece sold. It is described as a "wrought-iron floor lamp" and it sold for $25,000.
Also in Ebay news, a one pound sample anvil marked "Hay-Budden Manufacturing", Brooklyn, NY on one side and marked with a name of a company in New Zealand on the other side sold for about $565. Not a bad price per pound. One can see another of these mini's in Postman's anvil book.
More on auctions next newsletter.

Josh Kavett's Fisher&Norris Project

Just a brief update on my FN project. I have applied for a grant from the NJ Historical Commission to help finance expenses in writing the book on the history of Fisher&Norris Anvil Works. I will hear about the grant around June 1, I will begin actual manuscript work after my Flagstaff trip. I am also planning to finish a room off in my shed for my museum of Fisher&Norris anvils and patterns. This work will start this summer and hopefully will be done before winter. This work will involve insulating, wiring, sheet rocking and painting. I have not decided what to do about the floor yet. Any volunteers will be welcome and appreciated. Give a call any evening for information. I eventually hope to put up a large building dedicated as my museum of great stuff.

April Meet at the Mercer Museum and the Home of Doug Learn

On 15 April, under intermittent rain and in competition with the first day of PA trout season and Spring Fling, a total of 27 members of both NJBA and PABA met at the Mercer Museum, Doylestown, PA. Curator Corey Amsler led off the tour with a brief history of Henry Mercer, his museum, and his works. Corey then guided us through selected areas of the Museum, explaining the reasons for the arrangements of the artifacts and his perceived mission of those artifacts. We were then allowed into a storage area for woodworking tools and allowed to look and inspect the collection of tools there. After a close inspection of the tools, Corey then left us to roam the Musuem at will. Henry's collection of artifacts is truly amazing, a snapshot of obsolete technology, preserved by one man with a vision.

A majority of the visitors then repaired to my house for lunch, a tour of some of my tools and artifacts, and most interestingly, a discussion by Josh Kavett on his attempts to preserve the history of the Norris and Fisher anvil company in Trenton. Josh brought the foundry pattern for one anvil and explained the process of casting the anvils. He also gave a brief history of the Company and his contacts with the heirs of the family, the last years of the company, his efforts to salvage as much of the company's information as possible, and his efforts to start a Museum to chronicle this part of Trenton's industrial heritage and itscontribution to blacksmithing. After a short IITH, the visitors dispersed. I would like to continue this joint meeting at my house as a yearly event.

International Preservation Trades Workshop

The 4th annual International Preservation Trades Workshop (IPTW 2000) will be held November 13-15, 2000 at the Pennsylvania Farm Show Complex in Harrisburg, Pennsylvania.

IPTW 2000 will explore the theme "Convergence: Architecture and Craft" through demonstrations, presentations and round-table discussions. Preservation trades people will demonstrate a variety of skills and traditional crafts as well as the application of new techniques and technologies in the preservation of historic structures. Other presentations will focus on training for the preservation trades and how those engaged in the preservation trades can work more as a partner with those in the design professions. What makes IPTW unique and different from other preservation conferences is the opportunity to see, and participate in, actual hands-on demonstrations of preservation crafts and trades.

The Pennsylvania Historical and Museum Commission is hosting IPTW 2000 in conjunction with the Preservation Trades Network of the Association for Preservation Technology International. A local organizing committee has been working since September to make IPTW 2000 the best such event ever. The Pennsylvania Historical and Museum Commission will be holding its annual maintenance conference in conjunction with IPTW 2000.

The Pennsylvania Farm Show Complex offers an exciting new venue for the IPTW. With 16 acres under roof and 60 acres of parking, it is one of the largest exhibition facilities in the east. The 28,000 square foot Large Arena will be the home of IPTW 2000 that will provide ample room for the dozens of demonstrations and presentations as well as many exhibitors of products and tools of interest to those in the preservation industry.

Contact Barry Loveland at 717-783-5407 (bloveland@phmc.state.pa.us) or Preservation Trades Network, P.O. Box 257, Mastic, NY 11950, info@ptn.org for additional information.

This letter of appreciation was received from Allaire Village:

WM. H. KER
P. O. BOX 114
2246 RAMSHORN DR.
ALLENWOOD, N. J. 08720

Larry Brown - Editor
NJBA Newsletter
90 William Ave.
Staten Island, NY 10308

Dear NJBA,

As I sat at the recent NJBA directors meeting listening to the plans for upcoming events I was embarrassed to remember that it has been several months since the last anvil repair workshop. I was embarrassed because as chairman for the Historic Allaire Village Blacksmith Guild I had neglected to recognize the generous efforts of the membership of the NJBA.

As a gesture of good will the NJBA was kind enough to include one of our very abused donation anvils as a part of the anvil repair workshop. The anvil had been donated to the Village by a local resident and had been part of the family farm in Kentucky. It migrated north and remained a sentimental lawn ornament for years until its donation. The ravages of time and severe abuse would normally have qualified its only viable use as that of a boat mooring.

The anvil was resurrected and transformed by the skilled crafts persons of the NJBA. With its new crisp corners, filled in sections, and beautifully finished face and horn, it has become a functioning addition to the tooling in the Allaire Village blacksmith shop.

We at Allaire Village offer a belated but sincere thanks for your donation of time, materials, craftsmanship, and spirit of good will.

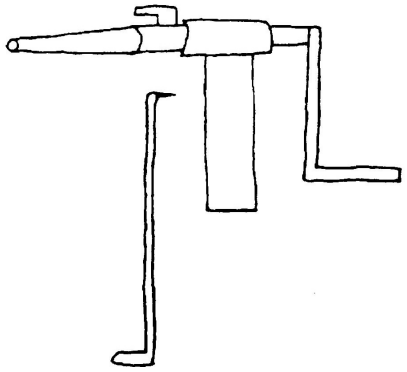
With sincere appreciation,

Wm. H. Ker

Wm. H. Ker - Chairman
Historic Allaire Village
Blacksmiths Guild

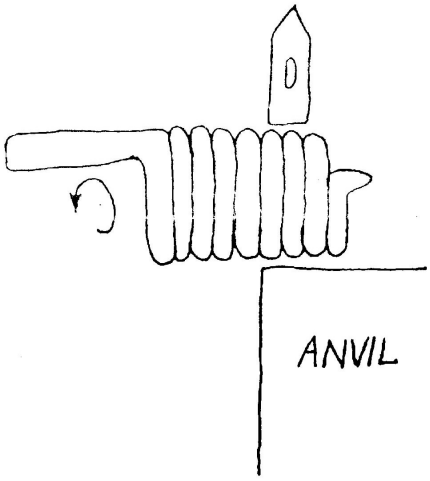
TAL'S TENDRIL TOOL:

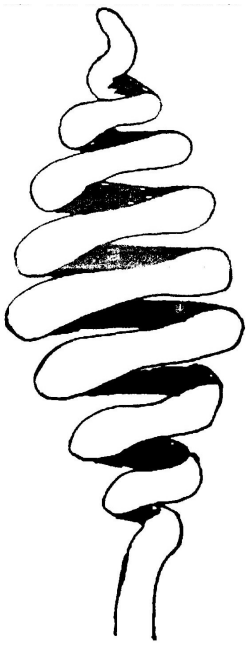
During the class at the Folk School, my project required four tendrils to be made. After making a couple the hard way, I came up with this gadget.



The stock was 1/4" round x 16 1/2" long. Forge a short taper on one end. Bend the ends as shown. Take a long heat, stick the end with the short taper under the hold-down finger and crank the handle until you run out of' hot stock. Two heats should get you to the end. If you crank the handle backwards the stock will release from the jig and slide off the tapered end.

After this step take a heat and close up the ends of the tendril using the step of the anvil. If you turn the piece as if you were 'unscrewing" it off the anvil and keep hitting with the edge of the hammer in fine with the edge of the anvil, the ends will make themselves. All of this is much easier done than I can describe it.





Reprinted from the Hot Iron Sparkle

MAKING THE MOST OF TIME IN YOUR SHOP

Time is our most important resource. There seldom seems to be enough of it to accomplish all that we set for ourselves to do. I've put together the following article both from my own thoughts and experience and from many other sources. Some of these sources are conversations with other smiths, exchange newsletters from ABANA chapters, conferences, demonstrations, classes and lectures, books, and THEFORGE e-mail forum. I have tried to give appropriate credit, but admit that in many cases I do not remember the source. Sincere thanks to all who have developed and communicated ideas on this matter, and my profound regrets to those who are not given proper credit. **KDZ**

Optimizing time in the shop is a perpetual struggle, and this article will come at the issue from four directions: health and safety; layout and storage; processes and procedures; and tools and equipment.

Foremost is **Health and Safety.** Nothing will delay a project as quickly as a trip to the emergency room and the subsequent recovery and healing time. Loss of hearing may not show up immediately, but will have a significant impact on your ability to communicate with customers suppliers and demonstrators. A case of 'tennis elbow' can restrict your hammering for a couple of months. (More on pg. 14.) There are ways to reduce the chances of these things happening:

- Get appropriate training in the possible hazards associated with what you want to do, whether that is arc welding, oxyacetylene cutting and welding, using a gas or a coal forge, or using potentially hazardous chemicals and solvents.

- Read the directions before you start to use equipment. Look for hazard statements on the labels of paints, solvents and other chemicals. If you have any doubts, get a copy of the Material Safety Data Sheet (MSDS) or consult with someone who is an expert in the use of the material.

- Don't over stress yourself. Stay in good physical condition. Learn and use exercises to minimize repetitive stress injury to wrists and arms. The same goes for abdominal and back strengthening exercises to lessen the risk of injury from heavy lifting. Most of all, know your limits. Know what you can safely lift; get help or use mechanical assistance for heavy moving.

- Take a break or quit for the day when you are getting tired or inattentive to details. Be aware when you at risk of accident because of alcohol or drugs, or because you are preoccupied with anger at someone or something. Even anger with your own mistakes can ruin a day.

- Wear ear protection, especially when doing heavy hammering or working with a ringing anvil.

- **ALWAYS** wear appropriate safety glasses to protect against flying scale, chips off hammers or other hardened tools, and fragments thrown off by grinders and wire. Use appropriate lenses to protect against ultraviolet and infra-red radiation from arc welding, gas welding, and even forge welding.

- Start your forging sessions with a light hammer and light work until your arm is warmed up. Alternate between heavy and lighter hammers to rest your arm. If you can switch between left and right, all the better. Set your anvil at an appropriate height, to avoid over-extending your elbows and to allow standing straight while you work.

Many people find wrist high to be a good choice, but make sure your anvil and other work surfaces are at the optimum height for *you.*

- Keep your shop in good order, plan a layout for your workplace that allows for convenient storage of tools and materials. Avoid having clutter underfoot, and keep your shop clean. This is a safety measure, and also helps reduce wasted motions and time spent looking for the next tool or piece of stock.

Layout and Storage

- Put your anvil next to your forge, where you can turn to it with one or two steps. This minimizes loss of heat, making forging easier. If you do much work with very small stock, put a small anvil block on the forge table so you won't have to step away from the fire at all. Have a set of loops on the anvil stand to hold the frequently used anvil tools, and a nearby stand to hold hammers and tongs.

I have a portable tool stand made from an old spoked wheelbarrow wheel with an extra ring to divide up the spaces, an idea copied from Bill Wojcik. It is also good to have a small tool tray attached to the anvil stand or the post vise to hold chisels, punches, etc. for use. Your collection of chisels and punches may be set into holes drilled in a wooden block, or compactly held in one-pound vegetable or pet food cans.

Lengths of bar stock can be stored vertically, but segregated by size and length. Shorter cutoffs can be stored on shelves or in cans. The key element in storage is to have one place for each tool and size of stock or other supplies, so you have only one place to look when you need something.

It can't be emphasized too strongly that your work place should be kept clean and neat. You will waste too much valuable time when starting to work if you have to put things away from the last time, or clear the work area of clutter.

Processes and Procedures

First comes the Francis Whitaker dictum: "Get it hot and hit it hard!" Steel moves much more easily at an orange-yellow heat than low orange. Forging below red is only useful for final surface finishing and minor straightening. Add to the set "Hit it accurately." Good hammer control is an important skill to practice.

For drawing out tapers or other thinning, use the edge of the anvil or a bottom fuller, like Bill Wojcik's 'wonder bar' to speed up the process. You can also use a narrow peen or the corner of a square faced hammer to get a similar effect.

When forging an upset square corner, start by using bending forks and a narrow heat to get near the desired shape before you start hammering. You should be able to bend to an inside radius equal to the stock thickness.

For larger projects, Whitaker's guidance is sound: Make a full-scale drawing of the project on your layout table or on a piece of sheet metal (gypsum dry wall works o.k. too) so you can compare each work-piece to the design as you go. Saves a lot of mistakes and rework when you can get an early look at deviations from the intended shape or size.

If you are making more than two or three of a given piece to the same shape and size it is usually worthwhile to set up a fixture to set each piece to the right location and curvature.

The quickest finish that is also reasonably durable is wax melted onto hot iron oxide (fire scale). Bees' wax is o.k., although

it does feel a bit sticky. Peanut oil baked on at high temperature is another good choice, but not as simple as wax. You have to take care not to get the work so hot that the oil burns off. Both beeswax and peanut oil are acceptable finishes for kitchen utensils.

Work two pieces at once. Let one heat while you are forging the other. From Ed Grove: Make extra pieces of commonly used components whenever you have odd moments.

Make all the component parts of your item before you start to assemble the piece. It will go faster if you assemble all like parts before you go on the to next.

Tools and Equipment

Even if you are skilled at managing the fire, use of a gas forge is a timesaver. Temperature control is easier, and you can more easily heat two or more pieces at once without fear of burning. The typical gas forge has its limitations if you are working with large shapes. I solve this problem by having a forge which is a burner plus stacked insulating firebricks. This way I can fit the fire to the work.

The 4" or **41/2"** angle grinder is a very hand shop tool. Many smiths have three or more to eliminate changing wheels from one operation to the next.

A chop saw (abrasive cutoff wheel) or a horizontal bandsaw are handy for cutting stock to length. I prefer the horizontal bandsaw, because it allows you to set up the cut and then do something else until the cut is done. On the other hand, the abrasive cutoff wheel allows you to cut hardened tool steel almost as easily as mild steel.

If you do a lot of heavy work, a power hammer, either mechanical or air operated, is a major labor and time saver. The treadle hammer can be used for occasional heavy forging, but it is most useful for decorative
chasing and chiseling with appropriately sized tools.

For polished work, a belt sander with a variety of grits, together with a polishing wheel is the way to go.

Another from Ed Grove: Make tongs to fit each size of stock you work. This is especially valuable for larger sizes, to avoid dropping your work in the middle of a forging heat.

These are some rather elementary, but important steps to take in insuring your time at the forge is optimized by simple steps that any blacksmith can and must do. As Dan Boone pointed out during one of his demos, you are only one person and when you can't work any faster you have to work smarter in order to make the most of your possibilities and your time at the forge. And that may be the difference between making a living or not.

Your comments and any additional ideas are welcome and will be published in the next newsletter.

- Ken Zastrow

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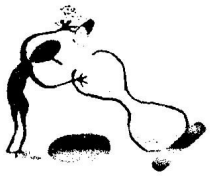
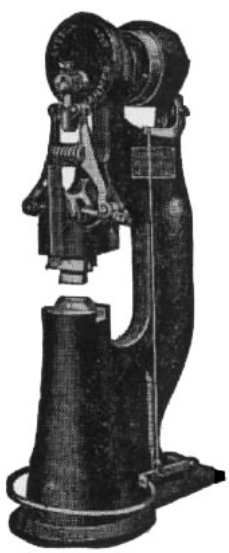
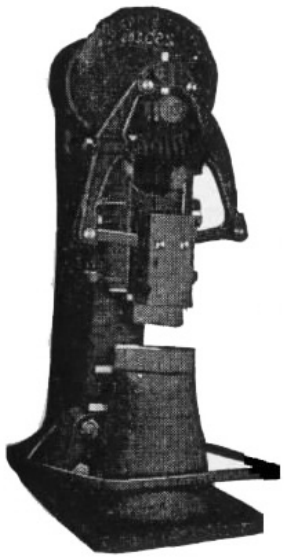
The Blacksmiths' Guild of the Potomac
January/February 1999







The Heat Treatment of Chisels;

from the forge list,
With the author Glen Davis' permission

Jeff,
I have been waiting for someone to ask these questions so I may add my practical interpretation of heat treating. I worked in a forge shop in the late 60's and retired as a teacher of manufacturing technology after 30 years last May. I am not an engineer, but consider myself to be a practical craftsman. Carbon steel with a carbon content of above 0.3% will respond to heat treating if it is heated above the upper critical temperature and quenched faster than the critical cooling rate. The upper critical temperature, is the temperature minimum required to produce a phase change to austenite or a face-centered-cubic (fcc) microstructure.

With plain carbon steel, steel which does not have any appreciable alloying elements added, the steel will loose magnetic properties as it reaches the Currie temperature or the upper critical temperature. At this point the carbon will go into solution with iron. This is often referred to as putting the carbon in solution. The austenite phase or the fcc microstructure can hold approximately 2.0% carbon in solution. As steel is heated to the upper critical temperature or the point at which carbon goes into solution with iron a fine grain structure is formed. As steel is heated to a higher temperature or is held at the upper critical temperature for a long period of time, grain size will continue to increase. Overheating steel during forging will increase grain size and produce a weaker forging than desired. Under heating or forging when the steel changes from red to black, as in the forging of a chisel, will create stresses which often produce the thumb nail crack as can be seen down from the cutting edge of the chisel. This thumb nail crack is easily visable when heating the chisel to the quenching temperature after grinding.

A steel with 0.4% carbon, like AISI1040 steel, will make a decent chisel and cut mild steel. Maximum hardness is possible with a steel containing around 0.86% carbon and is referred to as the eutectoid composition. The eutectoid composition of carbon steel is that percentage of carbon which requires the lowest upper critical temperature to produce the phase change to austenite (fcc) when heated. Hardness increases as carbon content increases up to around .86% carbon where a maximum hardness on the Rockwell C-Scale of around 68 is reached if the steel is quenched faster than the critical cooling rate after being heated to the austenite temperature. Additional carbon will not increase hardness but will increase wear resistance by forming additional carbides. On plain carbon steel, the higher the carbon content the more star bursts will be present with a spark test on a grinding wheel.
A water hardening steel can be quenched and tempered in a single operation. Heat to the austenitizing temperature, the point where it loses its magnetism, and quench in water for a few seconds and remove from the water and polish with emory cloth to obtain a bright surface while the steel is black but hot. Observe the color as the surface changes color from the remaining heat in the chisel. The temper colors will run to the cutting edge and when the correct color is obtained, plunge the chisel into the water quench and cool to room temperature.
The temper colors are transient oxide films indicating the temper of the steel. A good temper for a chisel is a bronze color. When the bronze color reaches the cutting edge of the chisel, the chisel should be cooled rapidly by plunging back into the water to avoid a higher tempering temperature and the temper colors continuing to run. Oil hardening tool steel requires a two step process. First heat the steel to the austenite temperature and quench in oil faster than the critical cooling rate to produce as much untempered martensite as possible. Swirl the chisel in a circular motion to break down the insulating layer of gas formed and prevent flame-up from occuring. The critical cooling rate is the rate of rapid cooling that will produce the maximum amount of martensite without picking up soft pearlite from too slow a cooling rate. After cooling to room temperature, (leave a little heat in the steel to avoid excessive stress), polish the chisel with emory cloth to obtain a bright finish.
Reheat the chisel with a torch gradually beginning about 1 inch back from thecutting edge. When the temper color progresses from light straw to dark straw to bronze, plunge the chisel in a container of cold water to stop the tempering process. (Continued page)

The heat treatment of chisels; continued

For a steel to respond to heat treatment two factors must be present. One is the steel must be capable of undergoing a phase change and the other is there must be sufficient carbon to produce martensite. Martensite is a supersaturated solid solution of carbon trapped in a body-centered-tetragonal form of iron. If steel is allowed to cool slowly, the microconstituents formed are depending on the carbon content of the steel a combination of ferrite, pearlite, and cementite and will not produce hardness.

Hardness in steel is produced when steel with carbon in excess of 0.3% carbon is cooled fast enough to cause carbon in the fcc crystal lattice structure of iron to try to transform to the lower temperature microconstituent of bcc iron. Since the bcc form of iron can hold only 0.035% carbon, the additional amount of carbon beyond 0.3% causes the body-centered-cubic iron to be distorted to a highly stressed body-centered-tetragonal form of iron (untempered martensite) as the steel is cooled faster than the crital cooling rate. When the carbon content is increased from 0.3 % to 0.86% the amount of stress is increased and the corresponding hardness increases. The higher the tempering temperature the more hardness is given up to provide toughness.

Hardness must be sold to buy toughness.
The phase change temperature of alloy steels does not always respond to a loss of magnetism and are difficult to predict. Phil Baldwin, bladesmith, stated the forged O1 tool steel or AISI1095 maintains a superior cutting edge when compared to high alloy tool steels because the high alloy steels are suceptable to micro-flaking on the cutting cause the high alloy steels are suceptable to micro-flaking on the cutting edge.
Hope this information is helpful.
Glen Davis

Grain Size Demonstration

The grain size change in carbon steel can be demonstrated by forging two cold chisels, one forged at recommended forging range temperatures and the other at elevated temperatures. Using carbon steel with at least 0.4% carbon, forge a wedge or chisel point on chisel number 1 maintaining the temperature in the red heat range while forging. After the chisel point is obtained, reheat the chisel to "cherry red" around 1650 degrees F and allow it to cool in still air.

This reheating and cooling process is referred to as normalizing. It allows the steel to return to a normal condition eliminating forging stresses Using the same steel or the other end of the bar from which chisel number 1 was forged, forge a chisel point on chisel number 2 allowing the temperature to reach the yellow heat range while forging. After the chisel point is obtained, reheat the chisel to "yellow hot" around 2000 degrees F and allow it to cool in still air. This reheating and cooling process would normally relieve stresses and refine the grain structure; however, by overheating prior to cooling in still air, larger grain size is produced.

The grain size of the two chisels can not be observed without metallurgical analysis in the normalized condition. When an attempt is made to break the end of the chisels to observe the grain size, they will bend and not break. Both chisels should be reheated and quenched. Chisel number 1 forged at the lower temperature should be reheated to "cherry red" about one inch from the edge and quenched in water and chisel number 2 reheated to "yellow heat" and quenched in water.

By heating at different temperatures and quenching both chisels in water, the thin forged ends of the chisels can be tapped with a hammer or placed in a vice and broken off allowing the grain size to be observed with the naked eye. Be sure everyone in the shop is wearing safety glasses before breaking the ends off.

The untempered martensitic structure of steel breaks like glass. The grain size of the lower temperature forged and quenched chisel number 1 will be fine with grain boundaries nearly impossible to observe. The higher temperature forged and quenched chisel number 2 will exhibit pronounced grain boundaries with grains easily seen. The grain of overheated steel can be

refined and made smaller by allowing the steel to cool slowly from the high temperature and reheating to the lower correct temperature and allowing it to cool in still air. Normalizing prior to heating and quenching at the recommended temperature will help refine the grain (make grains more homogeneous or disperse carbon evenly in the grain
rather than allow it remain concentrated at the grain boundary where it migrated during overheating) and reduce the grain size. Overheating carbon steel will decarburize the surface and increase scale formation.
Hope this will demonstrate how fine and coarse grain size is produced.
Glen Davis

Tong making by Mike Boone

From: "mike boone" <boonewi@frontier.net>
To: <theforge@qth.net>
Subject: RE: [TheForge] how do you make tongs?

One way that I make my tongs, that is different than any formula I have seen, is to start with rectangular stock. I use 3/8" x 1" for most of my general tongs. If you start with a rectangular cross-section and make your off-sets on the thin edge of the bar then the eye (boss) has a very consistent and good chance of coming out correctly and not sloppy.
I usually mark the bar 2" from the front edge, for the jaws, on one side and then make another mark on the underside at 3" from the front. The 1" in the middle of the two marks becomes the eye (boss). Now forge the first offset without changing the shape of the boss area (use half-faced blows to create the offset). Now that you have the first offset turn the bar on its' side and hang the front off of the far side of the anvil and put your 45 degree offset blow to end up with centered jaws. Now take a heat, turn your bar opposite of the first offset and offset the beginning of the reigns with respect to not fouling the boss again. Now is when I would round up the boss. Now draw out the reigns and viola!
Hopefully this helps.
Mike Boone
Boone Wrought Iron
Dolores, Colorado
http://www.BooneWroughtIron.com

Thoughts on teaching and sharing knowledge with beginners;

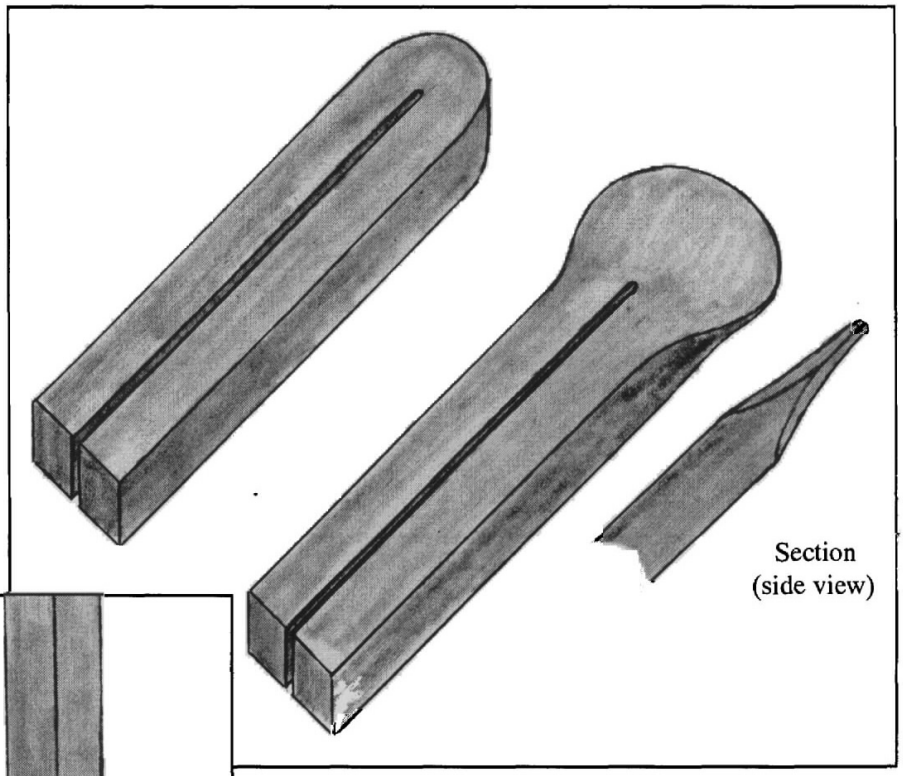
From: JoeToolie@aol.com
Subject: Re: [TheForge] First coal fire
To: theforge@qth.net

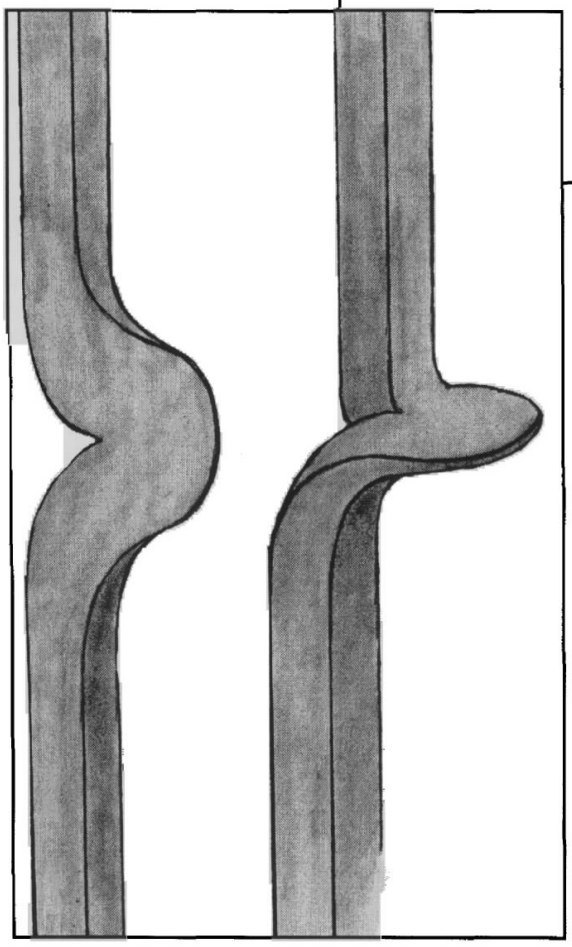
I'm one of those "sponges" that has been on The Forge list for some time but rarely contributes any input. I felt compelled to add a some comments in regard to the "First Coal Fire" question recently asked by a novice smith. The responses made by list members reminded me of why I so enjoy blacksmithing so much. I, like most of you other guys, enjoy making things with my hands. But it goes a step further, I also enjoy the process of doing it as much as I enjoy the end product. There aren't many of other crafts that let you reap this double enjoyment as well as smithing does. You see a picture or acquire an old forged tool and immediately, the wheels start churning, thinking about how the smith went about making it. You ponder the order of forging steps that have to be followed to duplicate it. You may spend the better part of a session beating to death a hot piece of iron only to find that that's not the way he accomplished a tough section, but you don't take your failure to heart. Those failures are what make you a better smith.

The down side of taking up blacksmithing is it's learning curve. There aren't many of us so gifted that we are able to master all the necessary skills involved in short order. Something as basic to the craft as making and tending a fire, is an essential skill that must be mastered in order to forge the simplest of things. I guess it's the knowledge of this, that makes accomplished smiths so willing to help those who are just starting out. You just don't find this sharing of information and skills/ methods, in many other crafts. My hat's off to you that know, are willing to show. My advise to those new comers to smithing is to give it some time. The way to master the skills is by practicing, reading about and asking other's who know about them.
If it were easy....it wouldn't be as much fun.
Joe Grasso

Contemporary Picket Decoration
George Dixon, Metalsmith

Heat,
fold,
forge,
then open!





The two variants of this motif are shown at left. They both come from the same preparatory form, which is illustrated above. The bar stock is heated and folded over tightly. Another heat is taken and the folded end is drawn out. As the section above shows, the piece is drawn out evenly. Use the anvil horn for the last adjustments.

Once the center is drawn out, and the forged area is blended back into the picket bar, take a localized heat (yellow) and open the effect. If it is opened along the axis of the bar, you get the far left effect. Open the forged area across the axis of the bar and you get the near left effect.

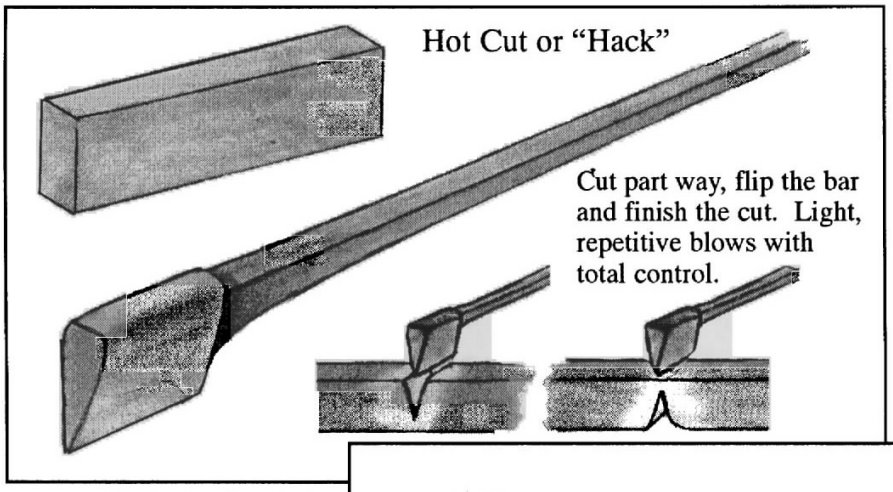
Try putting several of these effects on a single bar, switching sides as you go.

And.....

Wear Safety Glasses!

Three Easy To Make Power Hammer Tools.

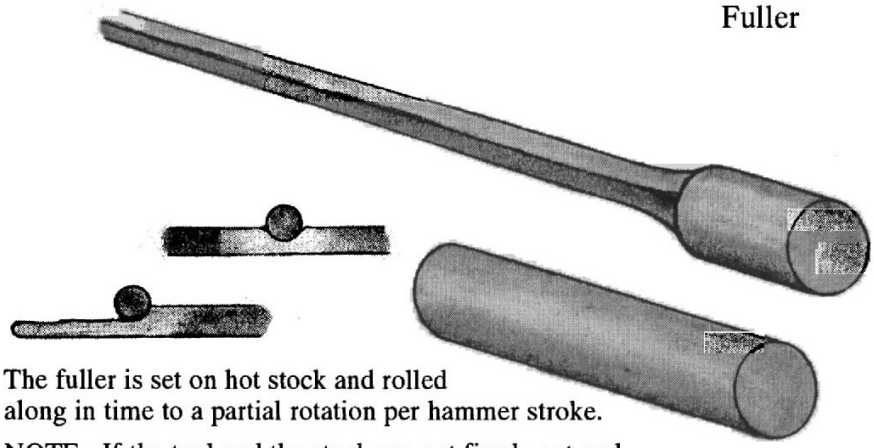
George Dixon, Metalsmith



Here are three very useful and happily, very easy to make power hammer tools. These tool styles are centuries old. They are built to cut stock hot, fuller metal and to set shoulders and smooth-out surfaces.

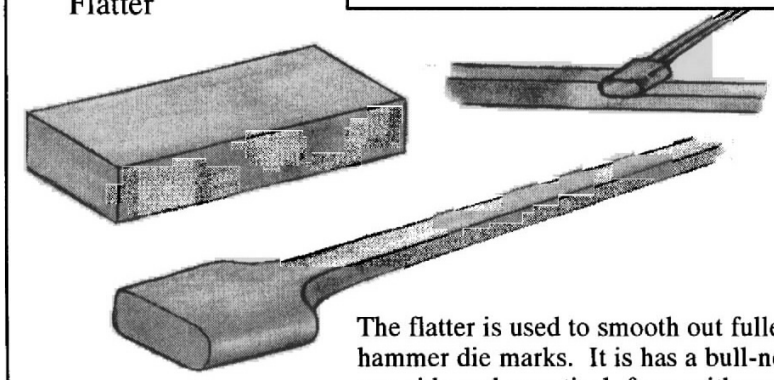
They can be made of almost any tool steel you are familiar with. The process used to make them is basically the drawing process.

Their size is relative to the size of the power hammer they are used with. One rule of thumb that seems to be a constant in well made historic examples, is that the handle is somewhat flexible (to help minimize shock to the hands holding it) and there is a pronounced fillet at the shoulder between tool 'head' and handle. The fillet prevents cracks between head and handle.



The fuller is set on hot stock and rolled along in time to a partial rotation per hammer stroke.

NOTE: If the tool and the stock are not firmly set and held on the bottom die before the first stroke, they will be after it.....at the expense of your safety.



The flatter is used to smooth out fuller and hammer die marks. It is has a bull-nose on one side and a vertical face, with very rounded shoulders, on the other. This allows it to be moved easily across stock (when the bull-nose leads) or clean up a shoulder (when the vertical face leads).

Making these tools is one issue, using them safely is entirely another story. Realize that a power hammer can severely injure the operator.

So, before you go off alone, get instruction.

Learn a safe approach to power hammer use, either with tooling or without.

And.....

Wear Safety Glasses!

Gas Forge Supplier Tip;

From: "forgeman" <forgeman@home.com>
To: "Larry Brown" <lnbrown@con2.com>
Subject: kaowool supplier

I am in the process of building a gas forge and needed to buy some kaowool. I looked in the phone book under refractories and found this company

Kraemer Gunite Inc 227-8097

I called and expected to be told I had to buy a whole roll, but to my surprise they said they could help me out.
I only needed 18 in. wide by about 31 in. long. We looked around the garage and couldn't find any small pieces so the guy opened a new box and cut what I needed.
I asked for extra and ended up with a 24 in. wide by 6 ft. strip for a price of $20.
Mcmaster Carr wants $82 for 1 in. 8 lb. density 24 in. wide X 25 ft, so I think I did ok.
The guy was really nice and tried to help and made suggestions on how to assemble the forge.
Bill Futer
Glassboro NJ

Noisy Anvil Tips from The Forge List;

Subject: RE: [TheForge] JHM anvils
Author: rackersr@one.net at GATEWAY
Date: 1/30/00 12:56 PM
I don't have a JHM anvil, but as far as quieting the ring from my anvils I can offer a comment. I placed two roofing shingles under my anvil for the sole purpose of absorbing the slight unevenness on the base of the anvil. The first time I used the anvil I was shocked. Instead of a ring, it sounds like a thud. Almost like I was hitting wood instead of metal. If it had any affect on the rebound, it only increased it. Cut the shingles to the shape of the anvil base and you don't even notice they're there. It's got to be one of the simplest and most inconspicuous ways to quiet a ringing anvil I've found.
Bob

To: theforge@qth.net
Subject: Re: [TheForge] JHM anvils
Take a leather strap that you no longer use and a large coffee can. Fill the coffee can with premixed concrete that you can get at the building supply store, place belt in can hang this over the horn when it dries it will help with the ringing (But it will not do anything for the voices, you do hear the voices don't you)
(GRIN) Bowie

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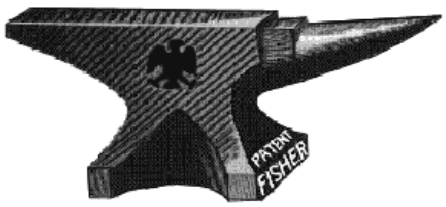

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