Balcones Forge Dispatch

President's Corner

June 2016

Greetings!

Our May meeting, which was to be held on June 4th, will now happen on June 25th. It will hosted by Patrick Watson just outside of Hye, TX on the 4B Ranch. Patrick is putting on a founders day celebration and has asked Balcones Forge to be a part of it. He has lined up some top notch entertainment for the afternoon which includes some antique cars, wagon rides by Dennis Moore of the Buggy Barn in Blanco, some wine tasting and added a dance pavilion. We are hoping this will be the first of many more years to celebrate his heritage. https://www.facebook.com/hyefestival/

The trade item will be a item that has been demonstrated by Bill Epps. Bill has lots of videos and books out there with many easy to make pieces that are explained in detail. He has also posted many times on "I Forge Iron".

We are also going to need a few forges and anvils for this event. Please bring your equipment if you can.

The folks at the Texas Folklife Festival in San Antonio at the Institute of Texan Cultures have also invited us back to participate the 45th annual festival. This event will run from June 10th to the 12th. We will have a special memorial tribute to Willie Calhoun on Saturday evening at 7pm. Please email or give me a call if you would like to demo. www.texasfolklifefestival.org

Meeting Date(s) are June 18 & June 25

President's message continued on page 2.

President's message continued.

And if all that isn't enough, Mary Jo has volunteered to host the June meeting at her shop on the 18th of June to continue her welding demo. She said we have the talking part done and you are now welcome to bring you welders and hoods for some hands on instruction. This is your chance to learn to use your machine from a master. Don't miss it.

Start times for all meetings is 9:30am unless otherwise posted.

Hope to see you all in Hye.

Jerry Achterberg,
President Balcones Forge

The Balcones Forge Board of Directors

Jerry Achterberg, President
Jerry Whitley, Vice President
Daniel Harrington, Treasurer
Tim Tellander, Secretary

Laura Armstrong
Rick Dawdy
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Web Page Update

Hello Balcones Forge members. The website now has many new aspects to it. As some of you know you can now fill out membership applications online under the membership page. Also the member gallery needs an update so please send some pictures of your work along with a short biography as to how you became a blacksmith. Please email this to Shane Tilton at:

flex201214@gmail.com

On another note many of our members offer teaching or other blacksmithing related services. If you are one of these individuals please email Shane the title of your service, prices or a price range and method of contact for the service. I look forward to your submissions and emails.

Strike while the irons hot.

Thank you,
Shane Tilton

NEWSLETTER CHANGES COMING

by Daniel Harrington

Balcones Forge has offered members a printed and mailed copy of the Balcones Forge Dispatch at a very low cost ($5/year) for a number of years... Probably forever. We have also known for some time that the actual cost of producing and mailing these letters is higher than the additional membership fee.

After looking into the actual costs to produce these letters, which about 33% of our members receive, we got a big surprise! The cost to print and mail twelve newsletters to a single member is **over $26.00**. Since we're only charging $5, that mean's were loosing... Well, y'all can do the math.

The Board chewed on this one for a while and looked for ways to fix the problem. We considered increasing the fee for membership with hard copy newsletter to $30/year (from $25,) but that still leaves us $16 short for every member receiving a newsletter in the mail. We agreed that increasing the cost to our members any further than that was not an option. This essentially left us with two choices: continue to provide the newsletters at a loss, or move away from the printed newsletter altogether.

After much wailing and gnashing of teeth, we decide to stop mailing the newsletters. The last issue to be mailed out to members will be December 2016.

Our hope is that members understand that this was a difficult decision, but one we felt necessary to make. Our goal is to continue to produce a dozen or so hard copies to be made available at meetings for those who would like to take a hardcopy home with them. Otherwise, the newsletters will be available on our website, and all members who have provided an email address will receive a link each month.

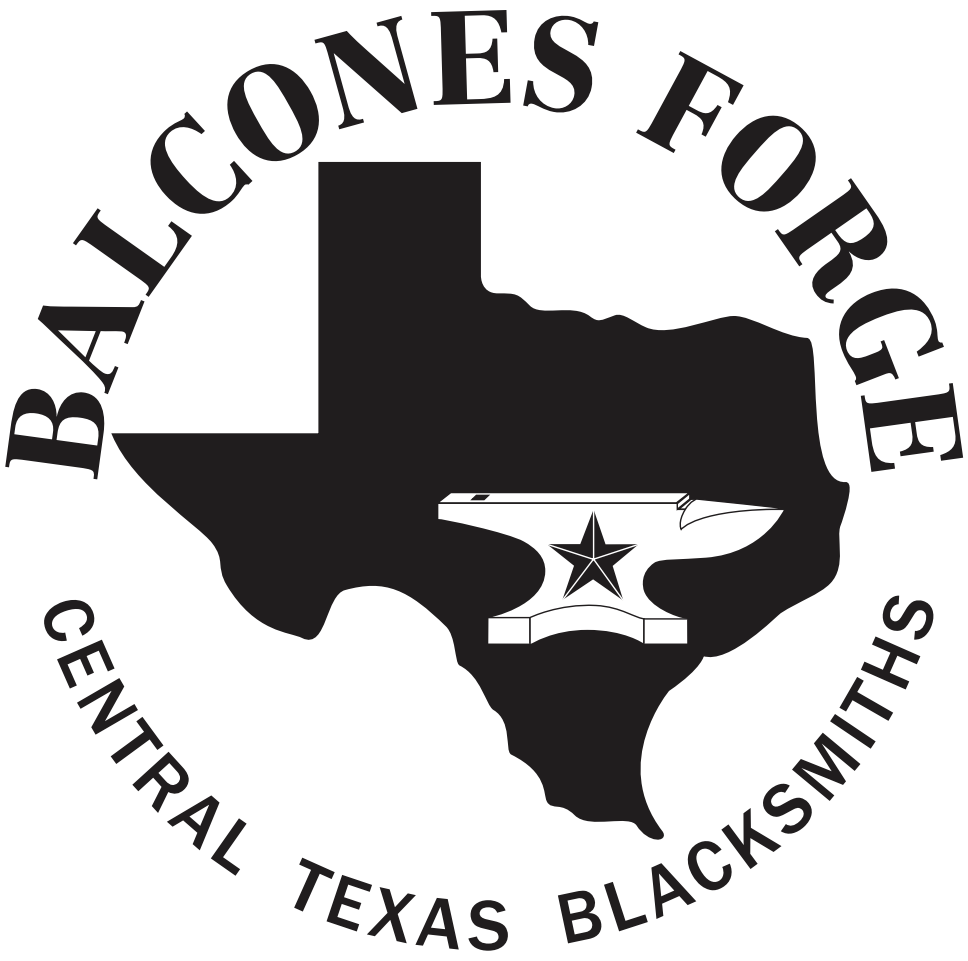
Happy Forging,
DH

Balcones Forge 2016

June18 (June meeting) Mary Jo Emrick – Welding techniques – Georgetown, Texas
This part 2 of the welding info sessions hosted by Mary Jo.

June 25 (May meeting) Hye, TX See Presidents corner for details. www.hyefestival.com
"Trade Item" – Something demoed by Bill Epps

July & August-These two months are usually too hot to forge in Central and South Texas. We are again looking into a "Field Trip" type of meeting. This time we are hoping to get a guided tour of the Institute of Texas Cultures. Remember, it is air conditioned (YEAH!)



Proud supporters of the 2016 ABANA Conference

Mark your calendars for the

17th annual
Balcones Forge Bluebonnet Demo
April 1, 2017

featuring Lyle Wynn, Dorothy Stiegler, and Dana Flanders

Marble Falls, TEXAS (Austin-area)

Hands-on classes/instruction: March 29 - 31
All-day demo, dinner, and live auction: April 1

www.BalconesForge.org

Note: I was recently asked about techniques for polishing the face of a 100 pound anvil for the purpose of forging jewelry. I have never taken such a large anvil to a high polish, so I emailed Valerie Ostenak, the only person I know who routinely forges jewelry to a high polish state. Here is what I learned:

Anvil Polishing

Polishing large anvil faces for jewelry forging

The faces of small anvils and jewelers anvils are easy to polish. They can be lightly ground with a Scotch Brite (3M) flap disc in fine or medium grit (not Extra fine) on a standard 4 1/2 inch angle grinder and then taken to a high polish at the jewelry buffer using a muslin buff with a polishing compound like Fabulustre or Ryobi Stainless Steel compound. Take care to keep all grinding and polishing even and smooth to prevent causing a wavy anvil face. Work from different sides and ends of the anvil, swapping back and forth from time to time. Keep continually sighting over the anvil face to see what you have accomplished. Do not overdo.

To polish anvil faces too large to bring to the buffer, begin with a flap disc on a 4 1/2 inch angle grinder, working just as you would a smaller anvil. Once it is evenly ground, move on to a 4 inch spiral stitched muslin buff on your angle grinder, using Ryobi Stainless Steel compound. Working carefully, this should allow you to achieve a bright, flat finish. If you plan to dress the anvil, complete that operation using a standard 120 grit flap disc before beginning grinding and polishing.

This polishing technique is courtesy of my generous friend, Valerie Ostenak. You may see her unique forged jewelry work at www.valerieostenak.com.

John Crouchet

Stumped by Anvils

Bob Dixon Gumm

At a recent BGOP shop meeting, Dave Murphy brought in an anvil that he had recently purchased (above). Dave had some questions about it — its manufacturer and purpose — and so he did some research. Dave is retired from the National Park Service, and is well-acquainted with historical research. Also, being an historian, Dave knows that one clue can lead to many possibilities. In this case, he discovered that his stump anvil could have been used for tinning, making nails, or other tasks where a small portable anvil would be needed. He also consulted the written work of Henry Mercer, which led to some interesting discoveries.

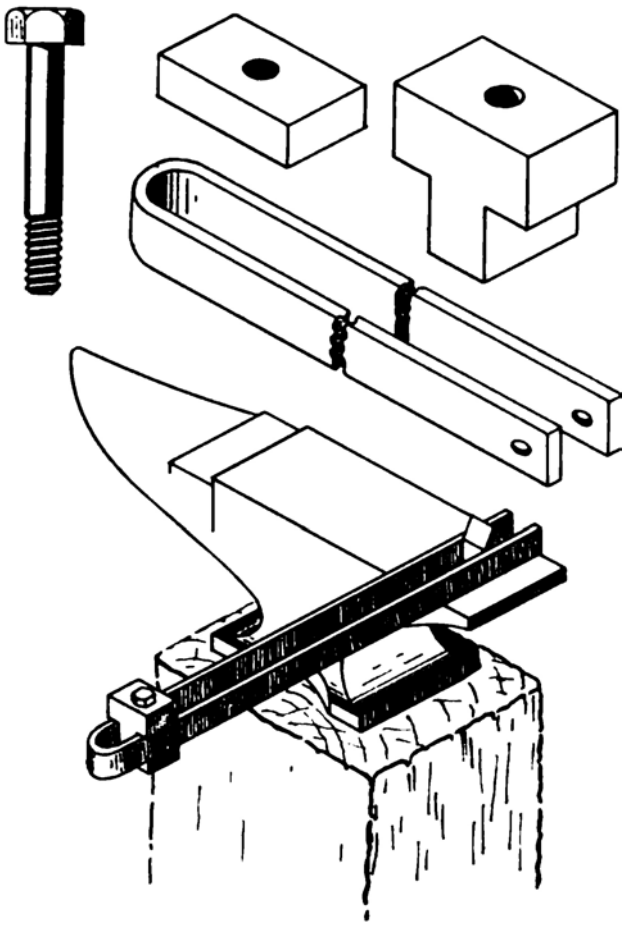
There are numerous occasions when blacksmiths stumble onto a mystery tool. Antique stores and tailgating events are sometimes filled with surprises. When we find a mystery tool, it never helps to make an assumption about what it is. In order to find answers, we must utter those three words that men have difficulty saying: "I don't know." (Kudos to the *Red Green Show* for this quote). Once we become impressed with everything that we don't know, we can begin to find answers. Many books have been written about tools and can be found in libraries, antiquarian book stores, yard sales, and dot-com bookstores. There are also organizations that are devoted to the study and collection of antique tools. Potomac Antique Tools and Industries Association (http://www.patinatools.org/), located in the Washington, DC, area, is a good example. Last, and certainly not least, are shop meetings. Odd and ancient tools are a real hit at a blacksmith "show and tell, " and smiths, being consummate pack-rats, have likely seen that mystery tool before.

Included here are some anvil pictures that I downloaded that may shed light on the subject. And since the topic of making nails has been broached, the next few pages will be devoted to nail making. George Anderton once commented that making nails is a good thing to do at a demonstration. They're quick and relatively easy to make, they involve a lot of motion, and they can be handed out to observers — like candy. So here's your chance to get ready for the next demonstration.

From
THE AMERICAN BLACKSMITH
February 1921

ANVIL GAUGE

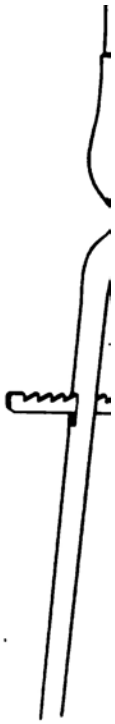
Where a blacksmith has any amount of rods or bars, etc., to cut off on the anvil hot chisel, some sort of an adjustable gauge will make the work easier. I recently



noted such a device and have made a few sketches of it which are shown here.

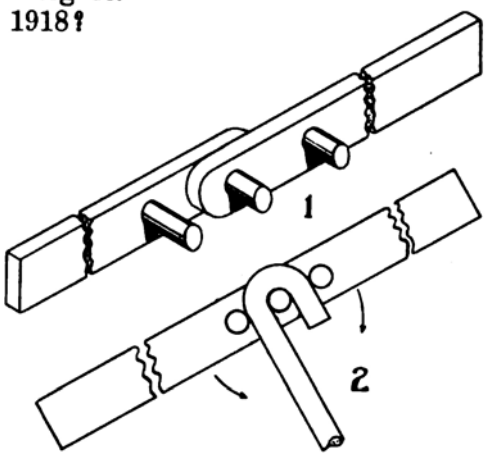
The chisel is of special height and construction and to it is attached the gauge track made of a piece of light band iron as shown. A stop with a bolt and strap complete the device.

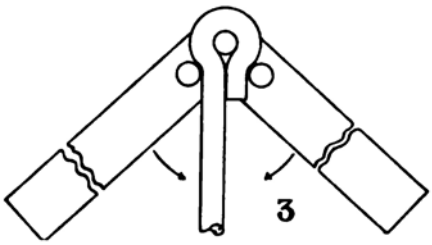
EYE BENDING DEVICE



For making eyes in rods of small size, one can use such a home made tool as that shown in the self explanatory sketches to advantage. The tool is easy to make, being simply two lengths of flat bar stock with three suitable size pins. The size of the center or hinge pin will depend on the size of the eye wanted and if desired there should be different size pins. One can improve the idea when using it.

1918?





Making a Fire Basket By Bob Ehrenberger

I had a good customer make a request a couple years ago to make a fire basket. I'm not sure what the real name for them is, but they were used for street lights in some Colonial era towns. You also see them in old European castles. Anyway, she gave me some pictures to work from, but wanted me to scale it down so that it was about waste high. She does Colonial reenacting and wanted to use it in front of her tent.

Like a lot of projects where I had no idea where to start, I procrastinated. About two weeks before it was due I decided that I had to make a decision on the dimensions and jump into it. I decided the basket should be 8" in diameter with 8" high sides, now that wasn't so hard was it. Waist high meant about 3 feet with another foot to make the spike and step to go into the ground. So the materials I needed were:

3- 24"x 1/8"x1" straps for the sides
1 - 8"x 12ga. sheet metal disk for the bottom
1 30" x 1/8"x 1" strap for the ring around the top
1 - 45"x 1/2sq bar for the support
6 - small acorns to be used as rivets.
1 - 7"x 28" heavy fire place screen mesh

The first step was to make the spike on the support, but not the step at this time. Then I made the tenon on the other end which would hold all the pieces together. I went with a 3/8" tenon on the 1/2" bar to make it as strong as possible. Once the tenon was made I put my touch mark on the bar so that I wouldn't forget later.

Next the basket components. I drilled a 1/4" hole in the middle of each of the 3 straps and then drifted them to fit the tenon. I wanted to preserve as much material as possible. I then flared each of the ends with a cross pein hammer like I was getting ready to make a fish tail scroll.

The bottom plate was also drilled with a 1/4" hole and then dished slightly, maybe 1/2" depression over the 8" diameter. The center hole will stretch during the dishing, it wasn't quite big enough to fit the tenon so I drifted it to fit too.

I put the dish on the tenon upside down and the bent each of the straps so they conformed to the curve of the dish.

While I had the forge going I made the acorns. Which would be used later for the rivets. Once forged they were cut to length and the shank ground smooth. They came out between 3/16 and 1/4".

Fire Basket .. Continued

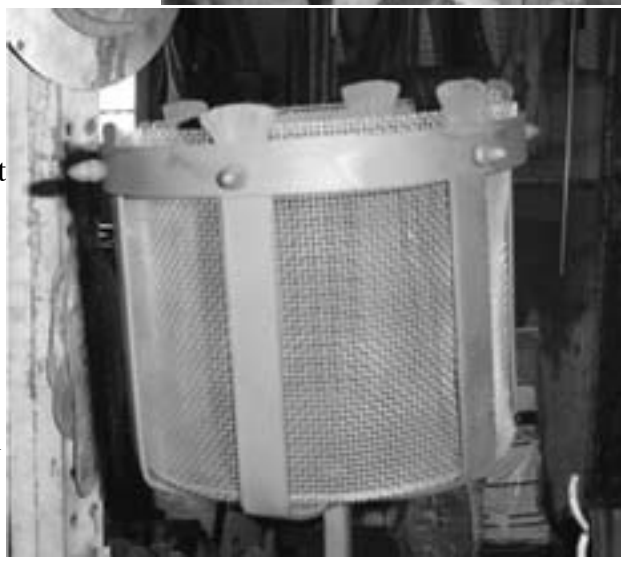
At this stage on the first one I made, I flipped everything over and set the center rivet/tennon. But I thought that maybe it would work better if I bent the sides up using the vice before setting the tenon so I tried it on this one.

As it turned out, having the sides bent up was a real pain when setting the tenon. It was much easier to rivet it before bending the sides up. If I make any more, that is what I will do.

I used an 8" ring form to bend the top ring. Once it was bent, I marked the center of the overlap and drilled through the intersection. I then picked a starting place on the uprights and drilled one to have the lap joint. I held it in place with vice grips and marked where the ring crossed each of the uprights. All the holes were then drilled in the ring. I used a support for drilling that is similar to something I saw in the Blacksmith Journal that was used to drill holes in scrolls. Having good support makes a world of difference when drilling odd shaped stuff.

The ring was then fitted back on the basket and all the uprights were marked and drilled.

For the final assembly I held the acorns in my heading tool and heated them with a torch to rivet them over.



I was going to get a piece of hardware cloth to line the basket and then I remembered that I had some heavy screen left over from making a fire place screen. It worked great. The screen isn't fastened in place, it has enough spring to hold it secure.

The last thing to do was to bend the step where it goes into the ground.

The Lowly File

A Brief History of Files

Among all the tools in a blacksmith's shop, those which are most likely taken for granted are files. To some, they're just another part of the forging process. And to others, they are mostly neglected. Files really are an indispensable tool. With them we can dress up stock that has just been cut, or thin the blade on the knife we are making. If we have visions of work that has a really finished appearance, we have to understand the many kinds of files and their uses.

Files have a long history. The Egyptians used rasps made of bronze more than three thousand years ago. The use of iron rasps by the Assyrians dates back to the Seventh Century B.C.E. Drawings by Leonardo da Vinci include a sketch of a machine used for cutting files. The device used a chisel to make a strike that swaged a tooth, and then advanced into position to create the next tooth, and so on. (Is there anything that he didn't think of?).

Before the advance of industrial technology and the use of interchangeable parts, filing was a very important part in the fabrication of mechanisms (clocks, guns, locks, etc.). The parts of a device were forged or cast and roughed out using whatever machining processes available. The components were then carefully filed to a state where final assembly could take place. By today's standards this method seems primitive, and yet there were many high quality pieces manufactured. The only drawback was that the hand finished parts were not interchangeable.

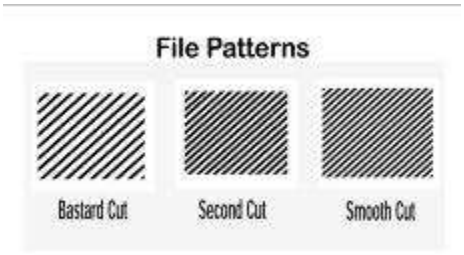
Machining in the mid 19th century was heavily dependent on filing, because milling practice was slowly evolving out of its infancy. As late as the early 20th century, manufacturing often involved filing parts to precise shape and size. In today's manufacturing environment, milling and grinding have generally replaced this type of work, and filing (when it occurs at all) usually tends to be for deburring only. Skillful filing to shape and size is still a part of die-making, mold-making, tool-making, etc., but even in those fields, the goal is usually to avoid handwork when possible.

Terms

Cut of the file refers to how fine its teeth are. From most aggressive cut to least aggressive, they are the "Rough" cut with about 10-20 teeth to the inch, the "Middle" cut with about 25-30 teeth to the inch, "Bastard cut" with around 40-50 teeth to the inch, the "Second cut" with 60-70 teeth per inch, the "Smooth" cut with 80-90 teeth per inch , the "Dead Smooth" cut with 100-110 teeth per inch and finally the "Finish cut" with 120+ teeth per inch. These are not hard and fast tooth counts, as they will vary from manufacturer to manufacturer.

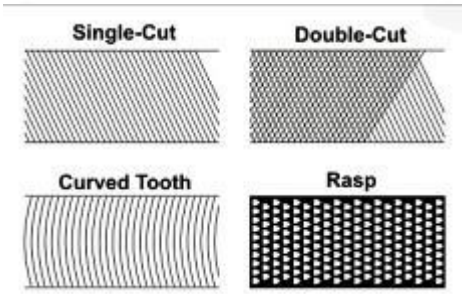
If you look at two files of different sizes, say, a 6 inch file and a 14 inch one, both Bastard cuts, the 14 inch file's teeth will be proportionally farther apart than are those on the 6 inch file. This is the reason for the "range" of teeth per inch on a file. This holds true also for the other cuts. As the file size increases, so does the spacing between the teeth, for the same cut and therefore the number of teeth per inch.

Bastard cut file has the teeth further apart than the other two (second and smooth cuts), and is used to rapidly remove a lot of metal, with little to no regard for the finish.



Second cut. With teeth a bit closer together than a Bastard cut, it is used to remove metal at a slower rate, resulting in less finish work to be done. It is also used to clean up after a Bastard file has removed the bulk of the metal.

Smooth cut has the teeth closer together than the Second cut, and is used to finish off the filing job, sneak up to a tight tolerance, or remove the file marks left by the Second cut file.



S**ingle-cut** files have one set of parallel, diagonal rows of teeth. They are cut at an angle of from 65 to 85 degrees to the center line. Used primarily on very hard metal,, and with light pressure to produce a smooth surface or keen edge..

Double-cut files have two sets of teeth, the Over-cut and the Up-cut. The Up-cut teeth are finer and are set in the opposite direction over the Over-cut teeth

Swiss-Pattern Files have teeth that are cut at a shallower angle, and are graded by number, with a number 1 file being coarser than a number 2. Most files have

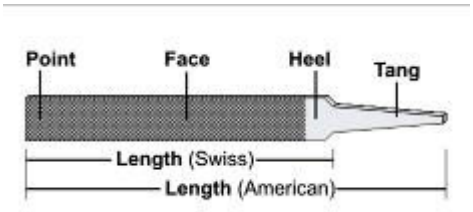
teeth on all faces, but some specialty flat files have teeth only on the face or only on the edge, so that the user can come right up to another edge without damaging the finish on it.

Note: While you may find the Rough and Middle cut files in a really well stocked hardware store, you will likely never see the Finish cut there anymore. Most stores only carry the Bastard, Second and Smooth cuts. Home Depot, Lowes, etc. generally only carry the Second Cut as they are the most all around useful file to the home owner. However, they carry different sizes and shapes. Finish Cut and other files can be purchased online.

Draw filing involves laying the file sideways on the work, and carefully pushing or pulling it across the work. This catches the teeth of the file sideways instead of head on, and a very fine shaving action is produced. There are also varying strokes that produce a combination of the straight ahead stroke and the drawfiling stroke, and very fine work can be attained in this fashion. Using a combination of strokes, and progressively finer files, a skilled operator can attain a surface that is perfectly flat and near mirror finish.

File card, a brush with metal bristles, is used to clean the file. (The name, "card", is the same as used for the "raising cards" (spiked brushes) used in woolmaking.)

File parts -A file has three main parts: the length, which is the cutting surface covered with teeth; the tang, which is where the handle is attached (never use the tang as a handle); and the heel, which is the transition between the length and the tang. Files come in wide variety of types and profiles.



Pinning refers to the clogging of the file teeth with *pins*, which are material shavings. These pins cause the file to lose its cutting ability and can scratch the workpiece.

Safe edge - Flat files may have one or more edges ground smooth (no teeth) called the safe edge so as to allow filling up close to another surface at some angle to the one actually being filed, without changing the second surface.

Steel files: BGOP member Jan Kochansky notes that, "...current Nicholson files are 1095, while the old (extinct) Black Diamond files were 10300 or equivalent. Rasps are frequently made of lower carbon steel and then case hardened."

Types of Files

Files come in a wide variety of materials, sizes, shapes, cuts, and tooth configurations. The cross-section of a file can be flat, round, half-round, triangular, square, knife edge or of a more specialized shape. There is no unitary international standard for file nomenclature; however, there are many generally accepted names for certain kinds of files.

Barrette files are tapered in width and thickness, coming to a rounded point at the end. Only the flat side is cut, and the other sides are all safe. For doing flat work.

Checkering files are parallel in width and gently tapered in thickness. They have teeth cut in a precise grid pattern, and are used for making serrations and doing checkering work, as on gunstocks.

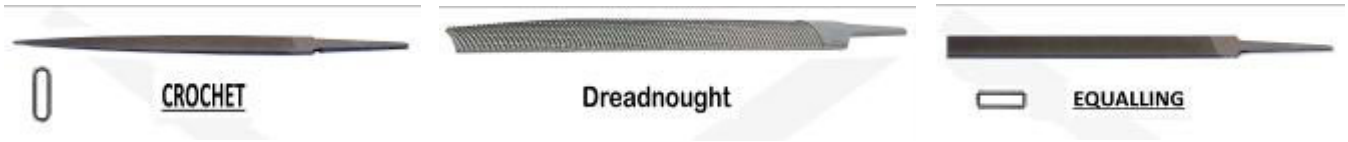
Crossing files are half round on two sides with one side having a larger radius than the other. Tapered in width and thickness. For filing interior curved surfaces. The double radius makes possible filing at the junction of two curved surfaces or a straight and curved surface.

Crochet files are tapered in width and gradually tapered in thickness, with two flats and radiused edges, cut all around. Used in filing junctions between flat and curved surface, and slots with rounded

edges.

Diamond files Instead of having teeth cut into the file's working surface, diamond files have small particles of industrial diamonds embedded in their surface (or into a softer material that is bonded to the underlying surface of the file). The use of diamonds in this manner allows the file to be used effectively against extremely hard materials, such as stone, glass or very hard metals such as hardened steel or carbide against which a standard steel file is ineffective. Diamond files are also the only type that may be used with a back-and-forth motion without damaging the file.

Draw files are generally single cut and of the Second or Smooth cut variety. They don't have tangs on them, but instead have longer smooth ground "Safe" areas at each end for the hands to grasp.



Dreadnought (curved teeth) and **millenicut** (straight teeth) files both have heavily undercut, sharp but coarse teeth. Both can be used for rapidly removing large quantities of material from thick aluminum alloy, copper or brass. Today, the millenicut and dreadnought have found a new use in removing plastic filler materials such as two-part epoxies or styrenes such as those used in automobile body repairs.

Equaling files are parallel in width and thickness. Used for filing slots and corners.

Farrier Rasp files are tanged horse rasps used mainly by horseshoers and blacksmiths. They are flat with rasp cut on one side (upstanding teeth arranged in rows with curved cutting edges of generally pyramidal shape and have a cutting face with a positive rake or slope) and a double cut file on the reverse side.

Half round ring files taper in width and thickness, coming to a point, and are narrower than a standard half round. Used for filing inside of rings.

Hand files are parallel in width and tapered in thickness; they are used for general work.

Joint round edge files are parallel in width and thickness, with rounded edges. The flats are safe (no teeth) and cut on the rounded edges only. Used for making joints and hinges.

Knife files are tapered in width and thickness, but the knife edge has the same thickness the whole length, with the knife edge having an arc to it. Used for slotting or wedging operations.

Lozenge File : a die-sinker's small file with a lozenge-shaped cross section and teeth on all four faces. (See also Slitting File).

Long Angle Lathe files have the teeth set across the length of the file at a much greater angle, close to 85-87 degrees, and are used to put a finish on a rough turned cylindrical object mounted in a lathe. They can be either single or double cuts, generally they are single cut Second cut files.

Machine files are, most simply, files that can be clamped in the chuck of a power-driven machine. A filing machine is similar in appearance to a scroll saw or bandsaw in that the file is mounted vertically in the middle of a table. When in operation the file reciprocates vertically while the workpiece is presented to the file's face and manipulated around the table/file as the shape requires. Filing machines are useful tools as they reduce fatigue and improve product accuracy, and although not usually seen in modern production environments, they may be found in older toolrooms or diemaking shops as an aid in the manufacture of specialist tooling.

Mill files are the most common shape; they are rectangular in cross section and taper slightly in both width and thickness from tang to end. They are all single-cut.

Needle files Needle files are small files that are used in applications where the surface finish takes priority over metal removal rates but they are most suited for smaller work pieces. They are often sold in sets, including different shapes. (See also Swiss Pattern Files).

Nut files are fine, precise files in sets of graduated thickness, used by luthiers for dressing the slots at the end of the neck which support the strings of guitars, violins etc., in the correct position.

Pillar files are parallel in width and tapered in thickness for perfectly flat filing. Double cut top and bottom with both sides safe, these are long, narrow files for precision work.

Pippin files are tapered in width and thickness, generally of a teardrop cross section and having the edge of a knife file. Used for filing the junction of two curved surfaces and making V-shaped slots.

Riffler files are small to medium sized files in an assortment of cross sectional shapes and profiles. The varying profiles and shapes enable them to be used in hard to reach, or unusually shaped areas. They are often used as an intermediate step in die making where the surface finish of a cavity die may need to be improved. - e.g.; plastic injection moulding or die casting

Round files, also called **rat-tail files**, are gradually tapered and are used for many tasks that require a round tool, such as enlarging round holes or cutting a scalloped edge.

Round parallel files are similar to round files, except that they do not taper. Shaped like a toothed cylinder.

Screwhead Files are used for filing slots in small screws.

Slitting files are parallel in width with a diamond shaped cross section. Thinner than knife files and use for filing slots. (See also Lozenge File).

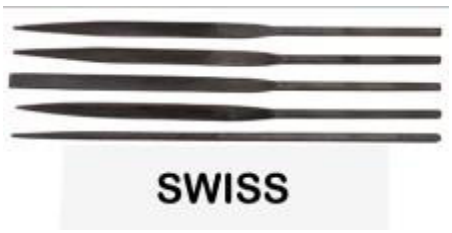
Square files are gradually tapered and cut on all four sides. Used for a wide variety of things.

Swiss pattern files are a type of fine file used for precision filing of jewelry, instrument parts, and dies.(see also **Needle Files**)

Three square files, also called **triangular files**, have a triangular cross-section, which usually gradually tapers. Some files taper all the way to a point (especially small ones). Three square files are used for many cuts, such as cutting angles less than 90 degrees. They are often employed for sharpening the teeth of wood saws. Triangular files have 60 degree angles, whereas "square" is 90 degrees. All this is true, but triangular files are nevertheless commonly called "three square".

Vul-crylic files are used for filing plastics, waxes, and soft materials.

Warding files are parallel in thickness, tapered in width, and thin. Like a hand or flat file that that comes to a point on the end. Used for flat work and slotting.comes to a point on the end. Used for flat work and slotting..



Handles

A file used without a handle is an accident waiting to happen! Always use a handle of the proper size, and make sure it's on tight before you start filing.

There are several types of handles, and each has its own proper method of installation.

Some handles use a threaded section in the ferrule (neck) area to let you "screw" the tang of the file into them. Just screw the handle onto the tapered tang and you are ready to go. Some handles just use a hole drilled into the handle for you to tap the tang into. There is a right way and a wrong way to install this type of handle. The wrong way is to put the tang into the handle and then grasp the file itself, and drive it down onto a solid surface, handle first, to drive the file into the handle. The handle hits the solid surface, the tang and file keep going (inertia) and the hole is made too big, or the handle splits. And even if it doesn't split it, the handle is generally never as tight on the tang as it will be if you do it right.

The right way to install a drive on handle is to put it on the tang as far as it will go with moderate pressure, then grasp the file itself, and tap the end of the file down onto a block of wood. This uses inertia to seat the handle just the right amount, so that the square shoulders of the tang will have a good grip on the wood inside the hole.

The third type of handle uses a screw type collet: you insert the handle into the collet end of the handle, then twist the ferule to close the collet down tightly on the tang.

Using Your File

Select a file that is best for the job. There are many types of files, coming in various sizes, shapes, degrees of coarseness, and tooth geometries. Files remove metal in the same manner that hacksaws do metal, or that wood saws and wood chisels do wood. They shear off chips of it, the size of the chip being related to the cut of the file, the number of teeth on the saw, etc.

It is important to make sure that the material to be filed is softer than the file - so do *not* try to file hardened steel with a (hardened steel) file; you will quickly ruin it. In a similar way, diamond-embedded files should not be used on soft materials, including many softer steels, as this will cause the diamonds to be torn out.

Clean the file. There should not be any pins (bits of filed metal) stuck in the teeth; if there are, clean them out with a stiff wire brush or, if necessary, a piece of skinny wire or sheet metal. Also, chalk or oil can be used to lubricate the file and make cutting easier because of the loss of friction from metal rubbing against metal and to remove the chance of having pins form and stick in the teeth. The chalk/oil will also keep the metal dust down making cleanup and breathing in the given area where a lot of filework is done much easier. Another benefit to using oil is the rust protection on the piece and the file itself. Just remember that there is oil or lard on the piece if you need to do work that requires the surface to be clean of it. **Note:** Never leave chalk on your file when storing it. The chalk will absorb moisture and lead to rusting.

Clamp the work in the vice. It should protrude far enough that you are not likely to rub the file on the hardened steel jaws of the vice, but not any more than this - if the work extends too far from the jaws of the file, it will vibrate ("chatter") during the filing, making the work take longer and the finish of the work poor.

Use your files properly. Whenever you use a metal file, make sure you use the whole length of the file. If you get into the habit of using just the spot in the center, a groove will form there, throwing the entire file out of sync. When you try to use a file that is worn in only one spot on something bigger, where you need more of the surface to work for you, it will hang up and be just about useless.

Files have forward-facing cutting teeth, and cut most effectively when pushed over the workpiece. Pulling a file directly backwards on a workpiece will cause the teeth to bend, permanently damaging the file (especially when an inexperienced user adopts a back-and-forth "sawing" motion).

Be careful never to strike the file against a hard object, nor to drop it on a hard floor, like one made of concrete. The file will most likely shatter, and if it does, it frequently will throw razor sharp shards in a number of directions. If this happens, be careful picking the pieces up.The height of the work piece in the vise should be about level with your arm when your arm is bent at the elbow, with the upper part of your arm parallel to your side, and the forearm parallel to the floor.

Hold the file with the point between the thumb and index finger of your "Off "hand, with the fingers curled under the file and the thumb lying on top of it at nearly a right angle across the file. Hold the handle in your "On" hand (the right hand if you are right handed in other words) with a light grip. Don't put a death grip on it, that will cause you to tip the file and you won't get an even draw stroke from it. And your fingers and arms will cramp up easily if you are holding it too tight.

Set the belly (center) of the file on the nearest edge of the work piece, and with a light pressure, not much more than the weight of the file itself plus the weight of your hands, push it across the work piece.

Press down lightly with the left hand, if you are right handed, as you start the file forward. As the stroke progresses, apply pressure from both hands simultaneously. As you reach the end of the stroke, back off on the pressure on the left hand, so only the right hand is applying pressure. By doing it this way, you will make it much easier on yourself as far as keeping the surface level goes. Change it up much, and you will end up with a curved or sloped surface on the work piece. In other words, keep the file as horizontal as possible, don't let it rock or seesaw on you. When the Heel of the file gets close to the near edge of the work piece, lift the file clear of it and go back to the starting position for the next stroke.

For heavy cross filing, to remove material, grab the handle of the file with the dominant hand and place the palm of the other hand on the end of the file. Orienting the file so that it points away from you, press down firmly (so that the file digs in and cuts the metal) and make long, slow strokes away from your body, removing downward pressure on the return stroke to prevent dulling the file.

For light cross filing, to remove material with a small file (as for detail work), grab the handle of the file with the dominant hand and place the fingers of the other hand on the end of the file. Orienting the file so that it points away from you, press down firmly (so that the file digs in and cuts the metal) and make long, slow strokes away from your body, removing downward pressure on the return stroke to prevent dulling the file.

For draw filing, to make a highly finished surface, grab each side of the file with your hands only somewhat further apart than your workpiece. Orienting the file so that it points to your side, press down firmly (so that the file digs in and cuts the metal) and make long, slow strokes away from your body, removing downward pressure on the return stroke to prevent dulling the file.

Maintain Your Files

Keep your files clean. If the file gets filled up with little metal shavings, it will not work properly. If you try to use it when it is clogged up, you will ruin the tiny teeth of the file. There is a special brush made for cleaning the shavings out of your file. You can usually buy it wherever files are sold, but try a hardware store--most of them will have this nifty little item on hand. Remember that it is best to clean steel with copper or brass, as the softer metal will remove debris without causing damage.

When a file is new by the way, its really too sharp to use effectively on steel. So for the first bit of a files life, use it for filing brass. When it dulls a bit and starts to drag on the brass, use if for filing aluminum. When it dulls a bit more now its ready to have a long and useful life on steel.

Files often get ruined just by being in the toolbox. Their sharp, fine little teeth are battered by the constant contact with other tools, causing them to flatten or chip and break. Never put them anywhere where they'll get banged around. Keep your files in a drawer that's lined with an old piece of carpet remnant. The carpeting will give the teeth a soft foundation, and will insure that they don't rub together, even when you open and close the drawer. This will protect the teeth of the files from damage.

If you want to carry your files to a job outside the home, use your toolbox--but take special care of them. Select a length of felt or heavy flannel. Wrap the first file in one end, so that the entire file is covered. Then lay the next file and roll them up together, covering the entire second file. Do this with each file, until all of them are rolled up together (but not touching each other) with cloth between them.

When you are done using them, clean the pinnings out with the piece of brass as mentioned before. But don't recoat them with chalk! When put away for any extended period of time, the chalk would draw moisture from the air and accelerate the rusting of the file. So just remove the pinnings, give the file a good brushing with a stiff nylon brush, and then hang it up.

Filing Tip: To check for square corners when filing toward that goal, use a square, preferably a good, accurate machinist's square.

Filing Tip: If filing cast iron or forged steel, be sure to knock the scale off first! It is very hard and will quickly ruin a file.

Filing Tip: Never leave a file on your bench or near anyplace where you are MIG-FC or SMAW welding. Spatter from the arc will stick to your file, and your file will be ruined.

— Sources: Wikipedia, various paper and cyber sources, and personal observation

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