

Chapter 7—Files and Filing Basics

Before shaping and sharpening your ax, you must understand the importance of files and learn proper filing techniques. Early files date back as far as 1200 to 1000 B.C. People hand-cut early files by striking a chisel into a strip of metal at a specified angle and interval. Around A.D. 1490, Leonardo da Vinci drew plans for a machine to cut the teeth for making files. However, no one before the mid-1700s successfully invented machines to cut files. Many people continued to hand-cut files until the Industrial Revolution, and some continue to hand-cut them today.

File Types

Choosing the correct file can be a daunting task. For a good introduction to files and filing, refer to:

- “[Nicholson: The Guide to Files and Filing](https://images-na.ssl-images-amazon.com/images/I/81h0ZOHI0XL.pdf)” <<https://images-na.ssl-images-amazon.com/images/I/81h0ZOHI0XL.pdf>>
- “[Simonds: Facts on Files](http://www.simonds-saw.com/handfiles/HAND%20FILES%20PUBLICATIONS/File%20Facts.pdf)” <<http://www.simonds-saw.com/handfiles/HAND%20FILES%20PUBLICATIONS/File%20Facts.pdf>>

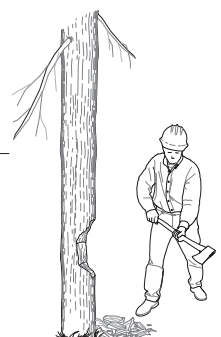
This manual focuses on the flat file; the best choice for filing an ax.

File Characteristics

As with high-quality axes, high-quality files are increasingly difficult to find. Manufacturers make files in a wide variety of shapes, sizes, tooth configurations, and cuts. Files can be flat, round, half round, triangular, or any number of other specialized shapes. The filer must be aware of the cut—how rough or fine the teeth are—and the number of teeth per inch of file length. The fewer teeth per inch a file has, the rougher the cut. The more teeth per inch, the smoother the cut. Regardless of the file cut, the larger a file, the fewer teeth per inch and the shorter a file, the more teeth per inch. Consequently, a 12-inch flat bastard file is coarser than a 6-inch flat bastard file (figure 7-1). Additionally, the fewer teeth per inch, the more aggressive the cut. For filing an ax head, the author prefers a 12-inch, flat, single-cut bastard file, although a 10-inch file is adequate. A file smaller than 10 inches does not allow for a long enough stroke to remove metal efficiently. After roughing in the shape, use an 8-inch (or sometimes a 6-inch) file for finer work and to remove the marks left by the coarser file.



Figure 7-1—A 12-inch flat bastard file and a 6-inch flat bastard file. Note the difference in coarseness between the two files (inset).



File Patterns

Manufacturers cut files in either American or Swiss patterns. The standard American pattern files have three primary grades (from coarsest to finest): bastard cut, second cut, and smooth cut. Swiss pattern files have seven cuts (from coarsest to finest): 00, 0, 1, 2, 3, 4, and 6. The coarser the grade, the longer the file tooth and the greater the space between teeth. American patterns are limited and are better for coarser work. The finer-grade Swiss patterns are better for fine, detailed work. This is not to imply that you cannot achieve a smooth finish with American patterns.

American and Swiss file patterns are also measured differently. American files are measured from the point to the end of the tang, whereas Swiss files are measured from the point to the heel (figure 7-2).

File Tooth Cuts

The basic file cuts are single cut and double cut, but there are numerous other patterns (figure 7-3). The rows of teeth on single-cut files run parallel to each other at about a 65-degree angle from the centerline of the file. Single-cut files are excellent for sharpening tools and should be the main file you use on an ax. Use the single-cut bastard file for push and draw filing strokes. Use finer cuts for finish work. Double-cut files are excellent for rough work (i.e., for removing a lot of material). The rows of teeth on double-cut files crisscross each other, forming a diamond shape.

The first cut is called the overcut and the second cut is called the upcut. The upcut is finer than the overcut. Do not confuse a double-cut file with a second-cut file. A second-cut file is a less coarse version of the bastard file and it produces a finer finish.

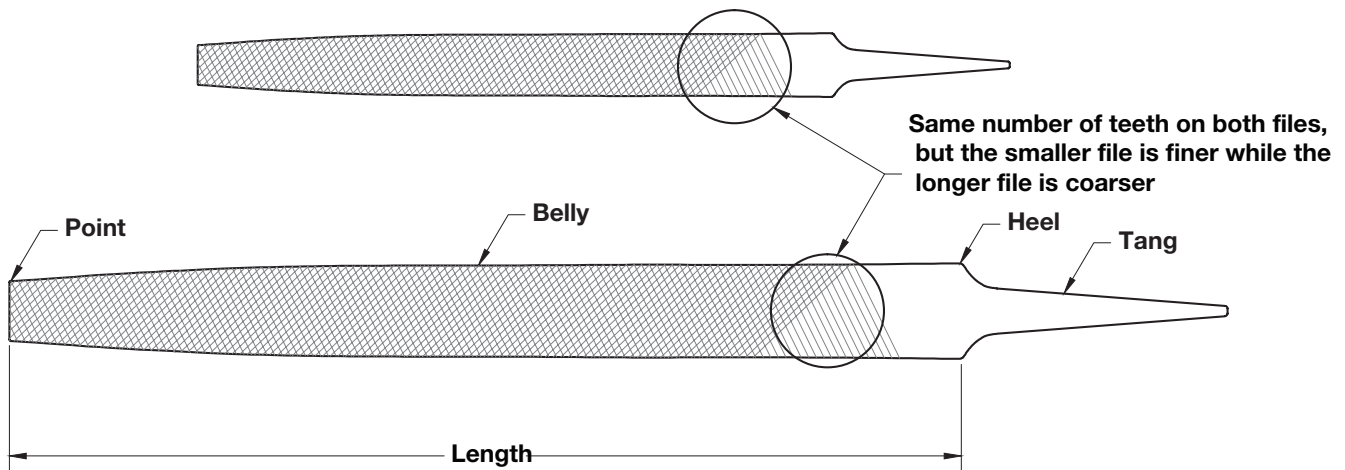


Figure 7-2—Swiss files are measured from the point to the heel.



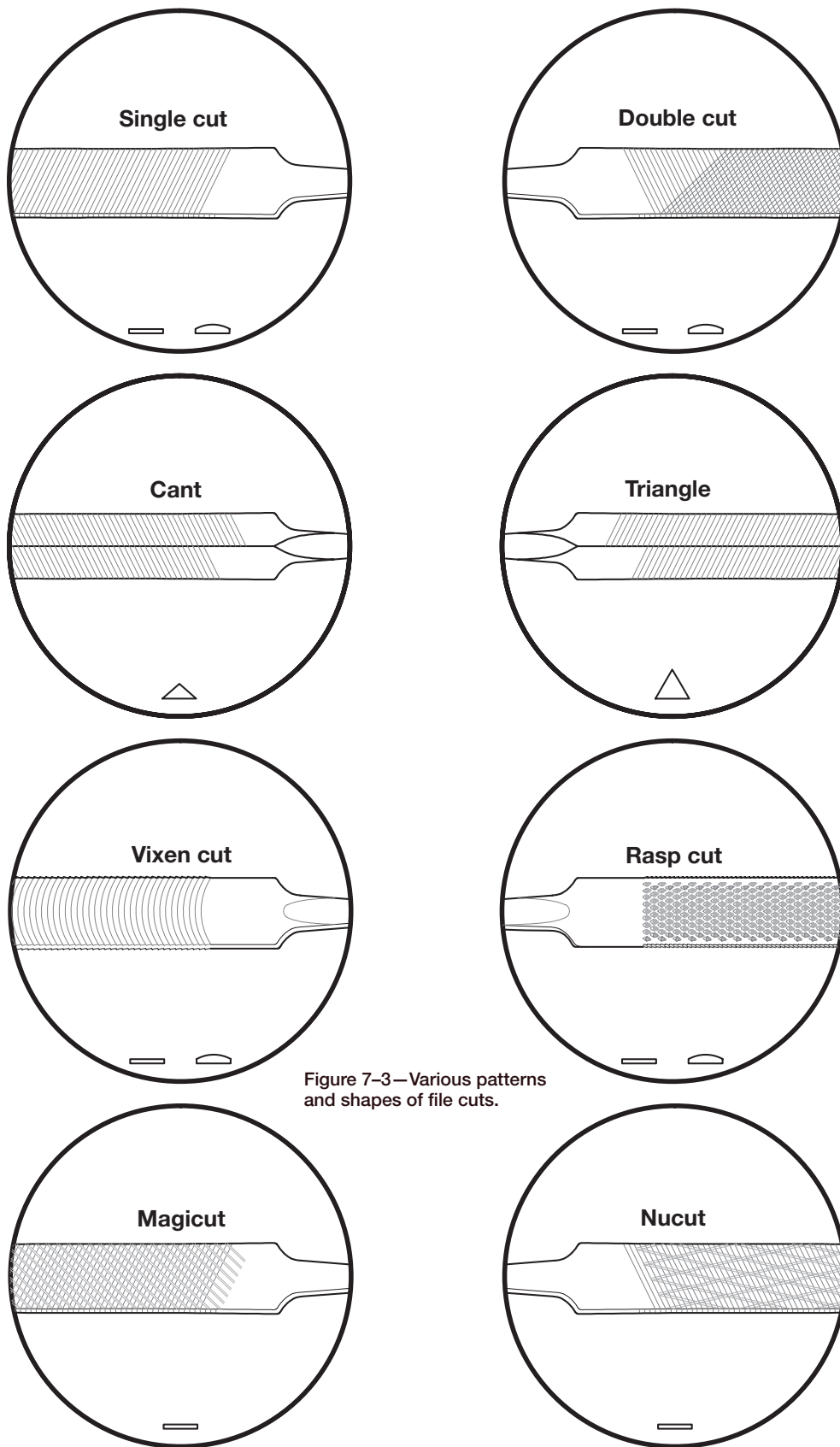


Figure 7-3—Various patterns and shapes of file cuts.



Rasps

Rasps—another type of file—have a series of individual, very coarse teeth (figure 7–4) designed specifically for cutting wood; they are very useful for the initial (rough) shaping of an ax handle.



Figure 7–4—A rasp (the author used a broken ax handle to make a handle for this rasp).

How a File Cuts

Before you begin to file, it is important to understand how a file cuts and proper hand-filing techniques.

The cutting teeth on a file face forward and only cut when you push the file. Using a file in a back-and-forth sawing motion can dull and damage the file. At the end of a stroke, you should lift the file off the ax head and bring it back to the starting point for the next stroke.

There are three main filing motions:

- Draw filing
- Lathe filing
- Push filing (also known as straightforward filing)

Push filing and draw filing are the two file strokes you use to sharpen an ax head.

Choosing the Right File for the Job

If a file is in good condition but does not cut well or skips over the ax head, use a smaller file for a better bite.



Push Filing

Push filing (figure 7–5) requires you to push the file straight ahead (along the longitudinal axis of the file) or at a slight diagonal angle across the work piece. Apply pressure on the front point of the file when beginning the stroke. This helps equalize the force you apply to the work piece. Leverage tends to favor the hand pushing the file at the start of the stroke. Apply pressure on the point and heel of the file as you slide it across the work piece. Apply pressure to the heel of the file when reaching the end of the stroke. Leverage at the end of the stroke favors the file point. Modify strokes as needed to prevent filing a groove. Watch the file to ensure that you are filing flat and not bowing the file under the pressure you apply.

Beginners commonly rock or seesaw the file during the stroke or try to remove too much material too quickly. Either of these actions can cause an uneven and convex surface. Push filing is the primary method for removing metal and shaping an ax head. Keep your body still and allow your arms to pivot about your shoulders. If your body moves while you file, you may create an arc in the work piece.

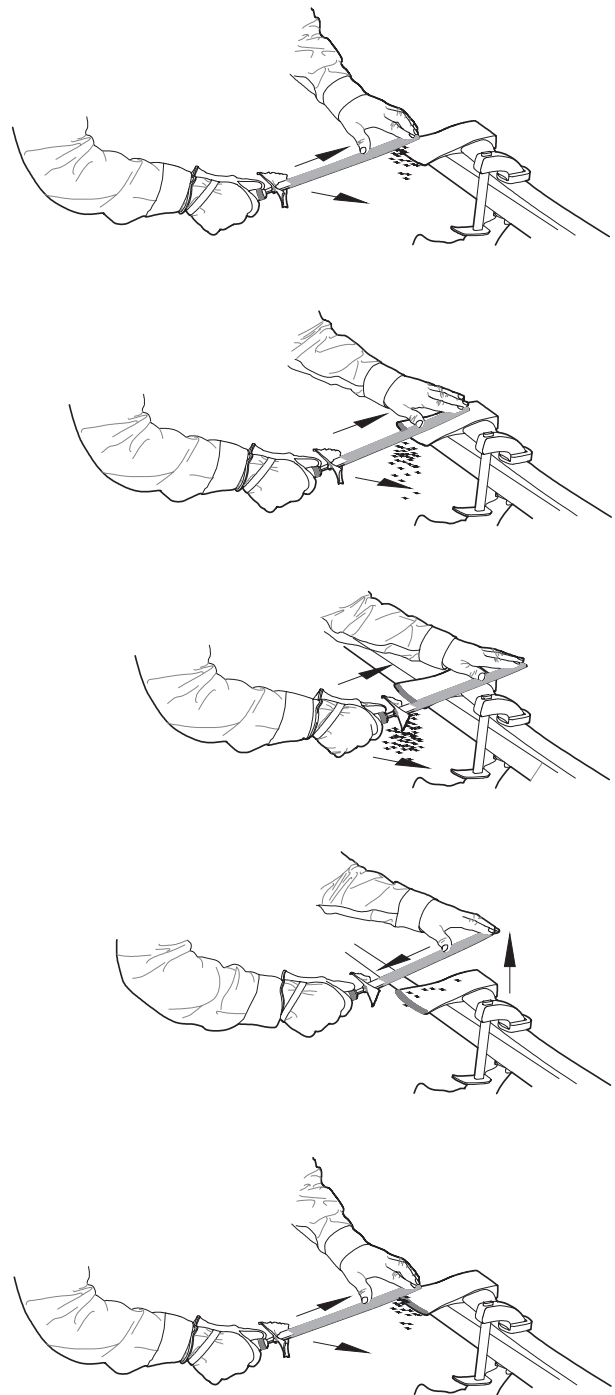
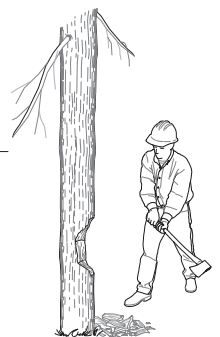


Figure 7–5—Push filing, showing the forward motion.



Draw Filing

Draw filing (figure 7-6) consists of a lateral (rather than forward) motion across the work piece and focuses on the edge and not the sides. When draw filing, hold the file at an angle so that the back edge of the file cuts and removes the steel. Depending on the file, you will need to experiment to find the right angle to remove curls or steel shavings rather than small filings. Start at about a 45-degree angle and adjust up or down to achieve the curls. Use a fanning motion and follow the direction of the cutting edge.

Filing is an art in itself. It involves patience, positioning your body properly, and an understanding of how a file works. Similar to using an ax, filing seems like a simple task that you can pick up with a few minutes of instruction. However, filing takes time to master. Learning proper filing technique helps make your ax an efficient cutting tool.

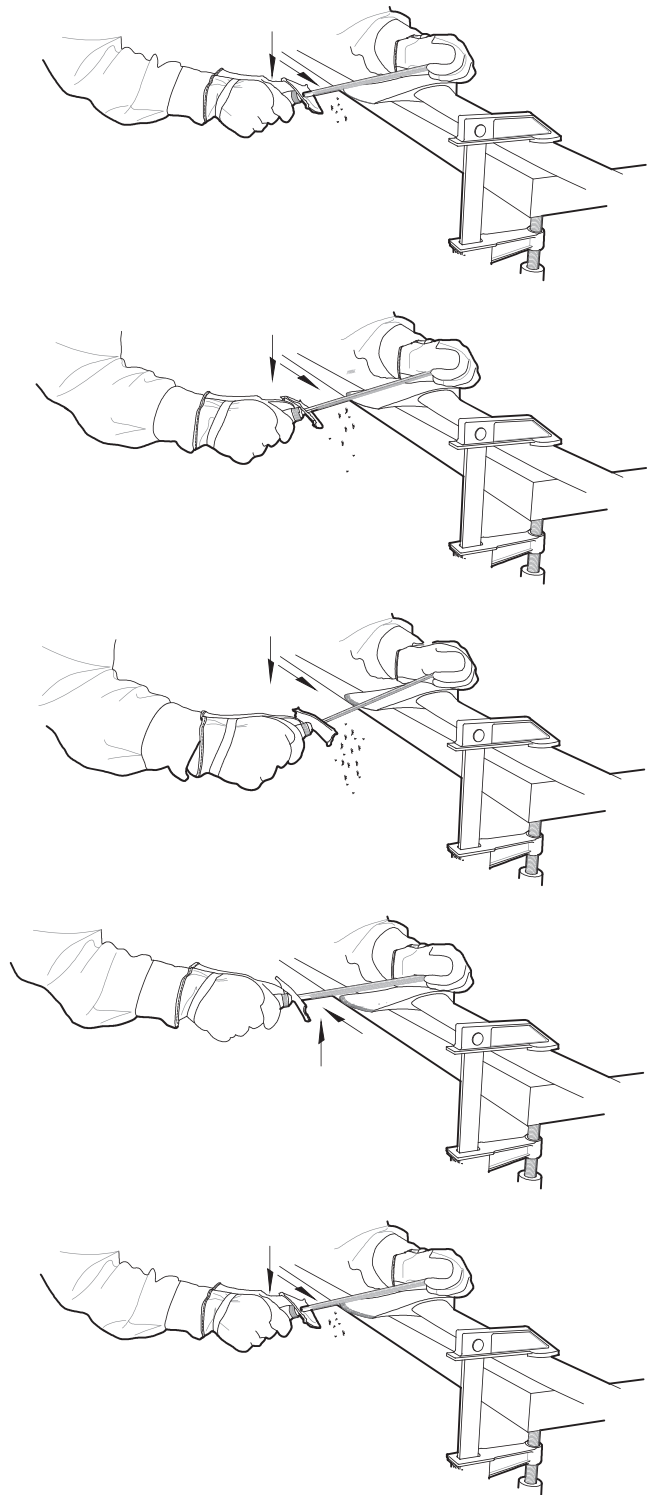


Figure 7-6—Draw filing, showing the lateral motion.



Filing Height, Stance, and Grip

Secure the work piece you are filing in a vise or clamp at about the same height as your elbow when your arm is bent (figure 7-7). If you do not secure the work piece firmly in a vise, chattering (when the file skips or bounces and loses contact with the work piece) or vibration could occur. In order to file efficiently and consistently, you must position your body properly and grip the file correctly. Begin with the filer's stance; place your feet far enough apart (slightly more than shoulder width) to provide stability. For right-handed people, the left foot is in front of the right foot. For left-handed people, the right foot is in front of the left foot. This puts the dominant hand in the proper position to supply power to the stroke while also providing a stable body position. It also gives your arms and shoulders full range of motion.

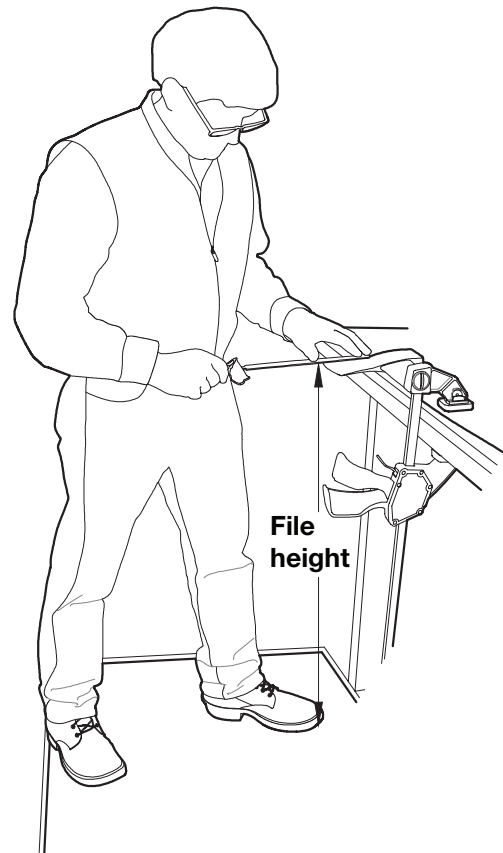


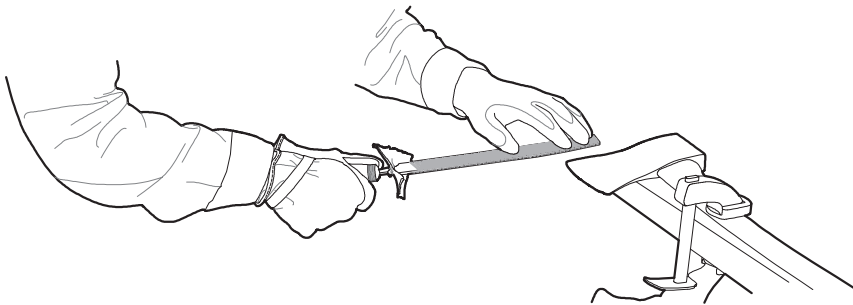
Figure 7-7—Filing at the proper height with the elbow bent.



The following directions are for a right-handed filer. Simply reverse the directions if you are left handed.

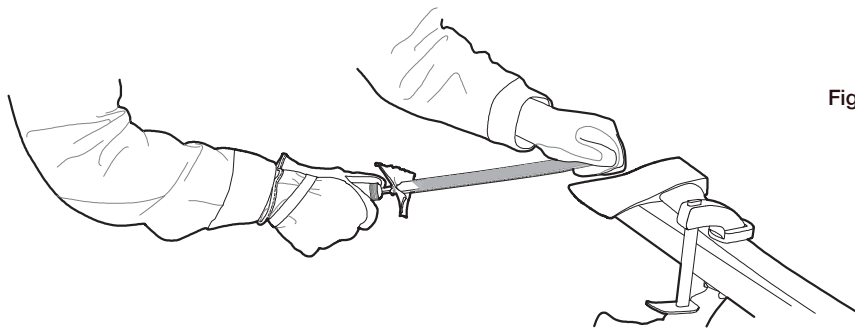
Grip the file with both hands. The file handle should rest in the palm of your right hand with your thumb on top to apply pressure. Secure the opposite end of the file with your left hand. For normal filing, place the thumb and first two fingertips of your left hand on top of the file near the point, as shown in figure 7-8. For hard or heavy stock removal, place the thumb

and ball of the palm of your left hand on top of the point of the file, as shown in figure 7-9. This grip allows both hands to apply hard and consistent downward pressure on the work piece. These two grips are useful for general shaping of the ax head profile. As the ax begins to take shape, you should adjust your grip to hold the point of the file with your thumb on top and index finger below, as shown in figure 7-10. This grip works best for fine, accurate work and curved surfaces, such as the convex surface of an ax head.



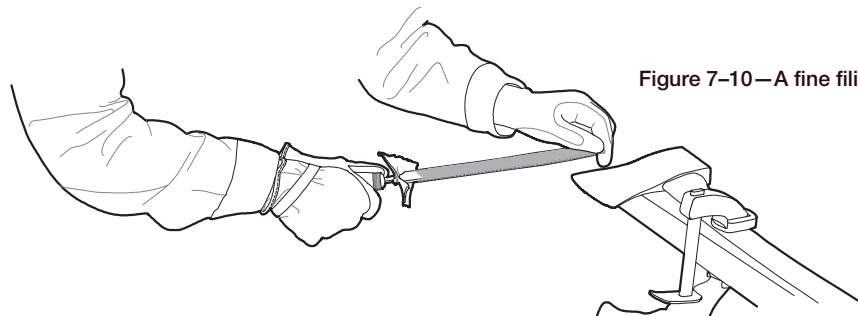
Standard

Figure 7-8—A normal filing grip.



Heavy

Figure 7-9—A heavy filing grip.



Light

Figure 7-10—A fine filing grip.



File Care

To lessen the chance of tooth damage, you should break in a new file by applying light pressure while flat-filing a soft piece of metal, such as brass, bronze, or smooth cast iron.

Always try to keep the file clean. Metal shavings can build up and clog the file's cutting teeth (referred to as "pinning"). A file card (figure 7-11) is a specialized brush with fine metal bristles designed specifically for cleaning files. A fine wire brush also works if you do not have a file card. One trick to help keep a file clean and prevent pinning is to rub blackboard chalk across the teeth to lessen the amount of metal filings that clog the teeth.

Keep files dry. While many tools benefit from a light coat of oil as a protectant, files do not. Oil on a file is difficult to remove and can make the file slide across the work piece rather than cutting into it.

Files stored together and unprotected can dull or damage the teeth. Where possible, store or hang files separately or wrap them individually in paper or cloth (figure 7-12) to ensure that they remain sharp and last longer.

Files wear out, but before you throw out a worn-out file, try soaking it in white vinegar. The acetic acid in vinegar dissolves rust and can give a file a little more life. Be sure to wash and dry the file after soaking it to prevent rusting.

Figure 7-11—A file and file card. The inset shows a closeup of the file card.



Figure 7-12—Files separated and stored in a canvas roll.



File Safety

Always use files with tight-fitting handles. When filing with a loose handle (or no handle), the tang of the file could puncture the palm of your hand if the file slips. A loose-fitting handle is not only dangerous, but it also can produce a rocking or seesawing motion that leads to an uneven or concave surface.

Always use a hand guard when sharpening an edged tool. You can make a hand guard out of a piece of leather, firehose (figure 7-13), felt, or even a piece of cardboard.

Never use a file as a pry bar or lever. The file is hardened steel that can snap and release small bits of steel that can injure you.



Figure 7-13—A file with a firehose handguard.

