Sharpen your own backsaw

IT'S EASIER THAN YOU THINK

BY MARK HARRELL

INEXPENSIVE TOOL KIT

You'll need a flat, bastard-cut mill file, a tapered triangular saw-sharpening file, and two small Arkansas honing stones, sold for knife sharpening.

If you can sharpen a plane iron, you can sharpen a sawtooth. There's a lot of information online about tooth geometry, and it can be valuable for folks like me who sharpen saws every day, some of which are heavily damaged. But that level of detail is overkill for most woodworkers, who simply need to sharpen a Western-style backsaw that is in good shape but dull.

Maybe you have a nice vintage saw, or you purchased a great new model a few years ago and it's time to freshen up the teeth. In these situations, you can simply replicate the original sharpening angles and make things easy on yourself. But you can use my methods to resharpen almost any backsaw—be it a tenoning or dovetail saw sharpened for rip cutting, a dedicated crosscut saw such as a carcase or miter saw, or an all-purpose saw with a hybrid pattern.

Wondering if your saw is dull? If you have to apply downward pressure to get the saw to cut—in other words, if the weight of the saw is not enough on its own—your saw needs sharpening.

Tools of the trade

You don't need many specialized tools to sharpen a saw. You can turn any vise into a saw vise with two pieces of angle iron and two strips of leather (shown at right). You need to see the small teeth very clearly, and it is easiest to keep your body position (and your filing angle) consistent if you are standing. Therefore, the closer the vise is to your chest height, the easier things will be. This is why I use a machinist's vise, which stands taller than a woodworking vise (and can be raised with blocks underneath).

You need two files to sharpen a saw: a flat bastard, or single-cut, mill file and a triangular tapered saw file. Choose the smallest saw file that will do the job. Too much file sticking up above the tooth line will make it harder to settle into the gullets and match the angle already there. For safety and control, put handles on your files. Last, you need a couple of Arkansas whetstones, one soft and one hard, used for sharpening knives and sold at hardware stores. Waterstones are too soft for the job.

Mark and joint the teeth

You'll be sharpening alternating teeth, working first from one side of the blade and then the other, so before you start you'll need to mark them as a visual aid, dotting the ones leaning away from you (see photo, above right). After

Photos: Asa Christiana

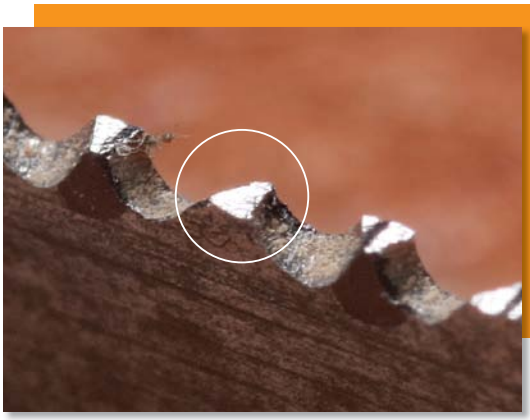
JOINT THE TEETH FIRST

Lose the handle. *To clamp the entire saw plate in the vise and keep the tooth line rigid, you'll need to take off the saw's handle. Use a large, flat screwdriver tip so you don't damage the screw slots.*

Mark the teeth now. *Use a marker to dot the teeth that are leaning away from you. Then flip over the saw and do the same on the other side, coloring the remaining teeth.*

Clamp the blade. *Most people don't have a traditional saw vise, but you can convert any vise by adding temporary jaws, made from angle-iron lined with leather.*

Joint the teeth. *Filing creates a level reference surface for the rest of the sharpening process. Use a flat, bastard-cut mill file, keeping it level as you push it from heel to toe.*



WHAT TO LOOK FOR

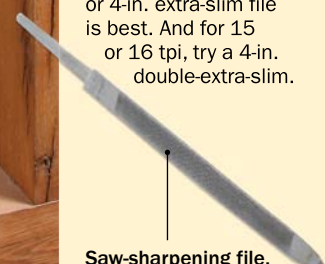
Stop when most or all of the teeth have at least a tiny flat on the tip.

FILE EVERY OTHER GULLET

Mount the vise chest-high if you can. Keep your elbows tucked in, and take baby steps every 6 or 8 teeth, so you don't stretch out your arms and lose your visual and muscle memory. An adjustable light is very helpful.

THE RIGHT SAW FILE

For faster cutting saws with 10 to 12 teeth per inch (tpi), buy a 6-in.-long "double-extra-slim" file. For 13 or 14 tpi, a 5-in. double-extra-slim or 4-in. extra-slim file is best. And for 15 or 16 tpi, try a 4-in. double-extra-slim.



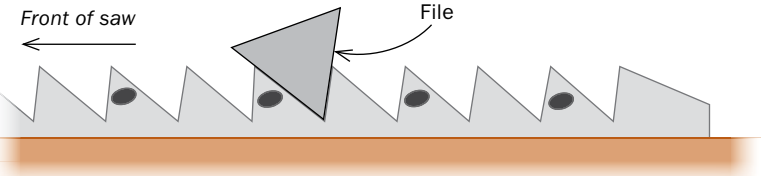
Saw-sharpening file, 4 in., double-extra-slim

$9; leevalley.com

Wiggle the file into place. *When using the saw file, the goal is to match the sharpening angle that's already there.*

FILE BEHIND THE DOTS

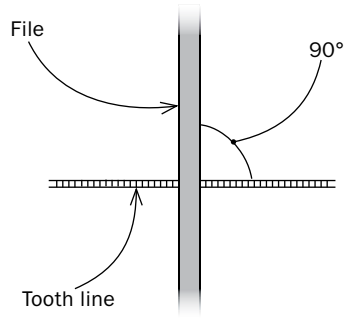
With the teeth facing left, you want the file to the right of the dots as you go. The natural filing action will equally sharpen the back of the tooth that's bent away from you and the front of the other tooth.



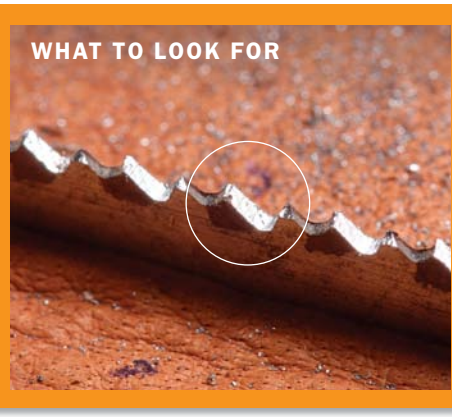
Light, heavy, light. *Keep the file level as you take two or three light strokes. Then take a look. You should see a nice even facet on the back of the dotted tooth. Then take a more firm stroke, and one last light stroke if needed.*

90° FOR A RIPCUT

For dovetail and tenoning saws, a standard ripcut is great. Keep the file 90° to the tooth line.



WHAT TO LOOK FOR



The back of the teeth are easiest to see, so look there for one shiny facet, which means you nailed the angle. Second, since you are filing every other gullet, you need to remove only about half of the tiny flats on the tips of the teeth at this point.

Drawings: John Tetreault

that, the first sharpening step is to joint the tooth line, creating a line of flats on the tips. This will create a visual reference as you file the gullets, ensuring that the finished height is consistent and each tooth takes a similar bite.

Remove the handle and clamp the saw plate so the tooth line is about ½ in. above the vise jaws. Lay a mill file on top and push it along the tooth line in one fluid, gentle motion. Don't go too far chasing perfection. There is often a low tooth, or two or three, that you can ignore. If you try to bring the whole tooth line down to that level, you'll remove way too much material.

The geometry of saw sharpening

Now lower the saw plate in the vise so that the teeth are only about ⅛ in. above the jaws. The best way to understand saw sharpening is that you're not sharpening teeth, you're filing gullets (the V between the tips). The front of the tooth does the cutting, of course, but the only way to ensure consistency is to file the entire gullet, removing material from each side. However, because the back of a tooth is longer and more horizontal than the cutting edge, it is more visible, so that's where you will focus when checking your work. And that's always the tooth with the dot on it.

There are three basic angles to sharpen at, depending on how the saw will be used. If you think about the numbers on a clock, knowing how to position the file becomes more intuitive. Keeping a consistent angle is far more important than what the exact angle is. In each case the file will be level with the floor; it's only the lateral angle that varies.

The other important angle is the rake, which refers to how aggressively the front of the tooth is pitched forward, and thus how aggressively it will cut. Since you are sharpening a good saw, not rehabbing a damaged one, you simply match the manufacturer's rake. Nestle the tip of the file in the first gullet, and rotate it lightly until you feel it settle into place.

Three strokes per gullet: light, firm, light

Regardless of the sharpening angle, the filing action is the same. In one fluid stroke, lightly pass the file through the gullet.

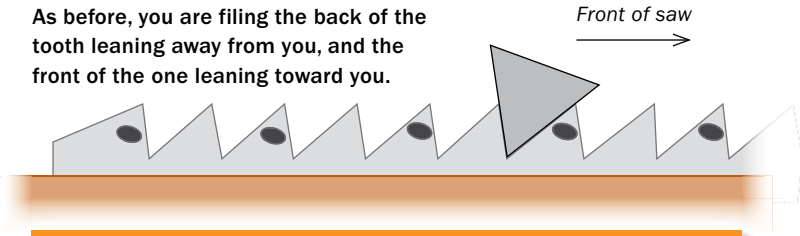
FLIP THE SAW AND REPEAT

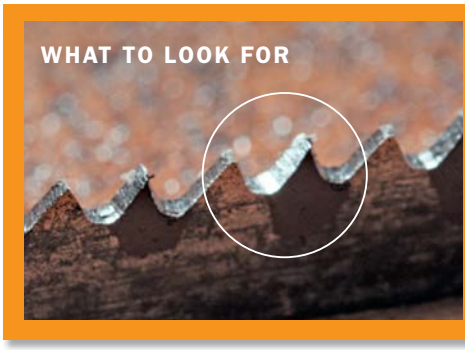
After turning it around, the teeth will be facing right.

Same technique. *Settle the file into place and take a light stroke. If the angle looks right, take a more assertive stroke. If the little flat at the tip isn't gone yet, take another light stroke.*

BEHIND THE DOTS AGAIN

As before, you are filing the back of the tooth leaning away from you, and the front of the one leaning toward you.



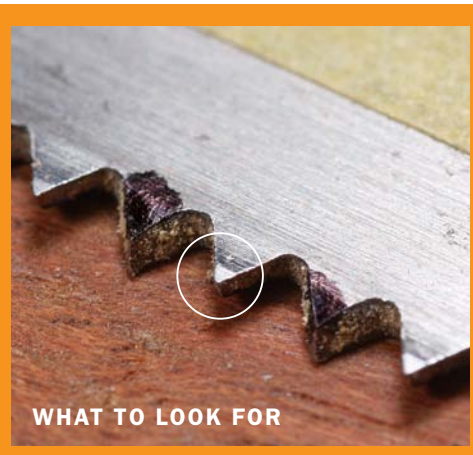


WHAT TO LOOK FOR

The flats at the tips should be almost gone, and all of the teeth and gullets should be symmetrical. Now go down the tooth line one or two more times, fine-tuning it to create the perfect sharpening job.

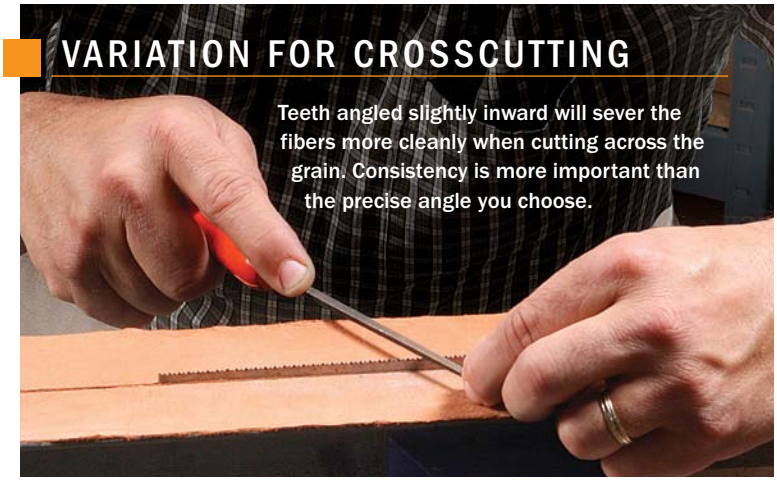
STONE THE SIDES FOR A SMOOTH CUT

With painter's tape protecting the blade, go over both sides of the teeth lightly with a coarse and then a fine Arkansas whetstone. Stoning evens out the set of the teeth and removes the burrs created by filing, dramatically improving the quality of cut.



WHAT TO LOOK FOR

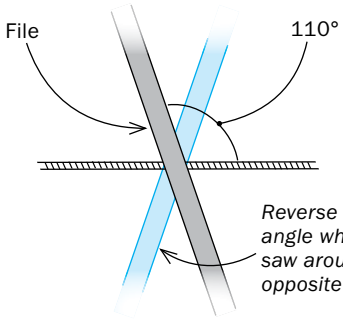
Most of the teeth should have a tiny flat on the sides.



File at a slight angle. *Be sure to reverse the filing angle when you flip the saw over, so the cutting edges of the teeth face inward.*

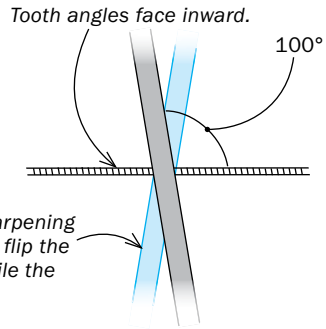
TRUE CROSSCUT

For a dedicated crosscut saw, file the teeth at about 20° off the 90° rip pattern.



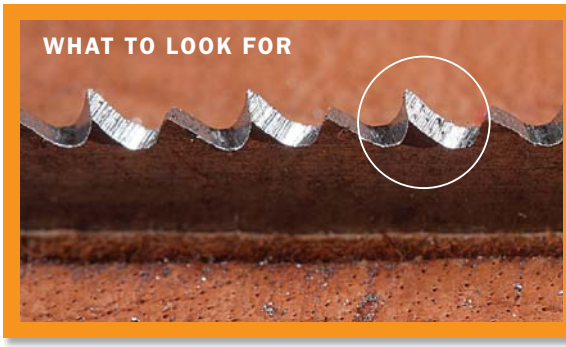
HYBRID TOOTH PATTERN

For an all-purpose saw, file at a less severe angle, just 10° off 90°.



Reverse the sharpening angle when you flip the saw around to file the opposite side.

WHAT TO LOOK FOR



The filing angles are different here, but everything else is the same. Again, you are done sharpening when the little flat disappears on each tooth.

A taper file is narrow at the tip and broadens down the length, so it grinds both sides of the gullet equally.

Take a moment to look at what you've just done, examining the back of the tooth with the dot on it. If you remained true to the manufacturer's rake, you'll see a new, gleaming facet from top to bottom. If you rocked your file too far clockwise, you'll see your work concentrated more toward the tip, or vice versa. If necessary, make a subtle adjustment and take another light pass.

Once you've established a consistent facet, you've also established a few seconds of visual and muscle memory. Now push the file through the gullet in one, smooth, assertive stroke. Don't grind down hard—let the teeth do the work. The goal is to remove about half of the flat you jointed on the tooth with the dot. Don't overdo it; you'll be hitting that tooth's other surface when you sharpen from the other side.

At that point I often take one more very light stroke, for a few reasons. It removes most of the burr left by the more aggressive stroke, it removes a bit more of the flat if needed, and it sets up my muscle memory for the next gullet. You'll develop a nice rhythm in no time.

The back side and beyond

When you have completed the first run down the tooth line, release the vise and flip the saw plate so that the heel is to the left. This time, stay to the left of each tooth with a dot on it (see drawing, p. 84). That will ensure that you once again are sharpening the back of the tooth facing away from you, and the front of the tooth that is bent toward you.

This time, the goal is to remove most of the remaining flats on the tips of the teeth. All of the gullets will be close to the same depth now. But don't try to achieve perfection with only two flips of the plate. When I am done with the first and second passes, on alternating sides, I always flip the saw for a third and fourth pass, just lightly brushing the teeth that need refinement. Only sharpen the teeth with remaining flats, and look for tooth and gullet symmetry. Remember, don't worry about one low tooth, or two or three.

Once you're happy with the tooth line, there is one last important step—stoning the sides of the teeth to even out the set. This creates a microfacet on the cutting edges and removes burrs caused by filing. If you have dial calipers, you can check the amount of set. The goal is a toothline about 0.007 in. wider overall than the blade plate. After this step, when you test-cut a chunk of white oak, you'll find the action easy and the end grain almost glassy.

Have faith in your ability. A timid and hesitant approach can grind teeth out of symmetry. A light, swift, brushing stroke forgives the occasional mistake. □

Mark Harrell makes and sharpens handsaws professionally (BadAxeToolworks.com).

Clean crosscuts. *The crosscut pattern will produce tearout-free cuts across the grain, while the hybrid pattern is a nice compromise between fast rips and clean crosscuts.*