

This is as basic of a skill to woodworking as sharpening a chisel, and not much more difficult. Yet, some still quake with fear at the prospect, as if Odin himself will smite them should they dare put file to saw. Or, they think others can do the job better for them.... I will try hard to explain the processes of sharpening within, with my goal being to demystify the process. After that - practice is what is needed. Practice, practice, practice. You will fail during some of your first attempts, have no doubt... but at the worst, you will learn, and be the better for it.

## Sharpening First, Tuning After?

Before getting into troubleshooting problems with saws, it's best to make sure it's sharp - and to understand all that sharpening a saw entails. However - some of the steps you take when tuning might be undertaken before you sharpen the saw, some after, so keep it in mind when reading both this and the tuning sections of this article.

A great reference site on saw sharpening does already exist on the web and is available at [www.vintagesaws.com](http://www.vintagesaws.com). Most, if not all, of the sharpening procedures are covered on that site, some maybe in more detail than what I do. I will also cover some of the basics of saw sharpening well enough to do a good job, using my experience, from a "what users need to know" sort of perspective. But it certainly never hurts to check out other references for additional perspectives.

*An excellent source for sharpening two-man crosscut saws is available at the United States [Federal Highway Administration's](#) web site (who'dathunk that?). I would also suggest Leonard Lee's book "A Complete Guide to Sharpening", available from [Lee Valley](#).*

An important note - sharpening saws is pretty much impossible to accomplish without some sort of a saw vise, be it iron or wood. If you buy one, avoid the no-name steel versions and go for the classic cast iron ones from companies such as Disston or Wentworth. I have 4 currently, including a Wentworth, and #1, #2, and #3 Disstons. Of those, the Wentworth isn't useable for backsaw, but is excellent for regular saws... The #1 and #2 Disstons are handy, and work well, but are somewhat short at only 9 or so inches. My favorite - the #3 - is over 12" long and is big and heavy - a benefit, because it holds the saws steadier while filing.

Should you decide you would rather make your own - an excellent plan for a wooden saw vise is available on [The Cornish Workshop's](#) web site. I've used both cast iron and wooden saw vises, and each have their respective advantages and disadvantages. I've found that both types work well, and I personally don't prefer one over the other.. One thing to be aware of - the vise I link to above is not suitable for back saws without modification... But - I'm also happy to say that Jasper Homminga has graciously contributed a small article on making a simple wooden saw vise - available on this web site [HERE](#). It looks like a classically simple design, easy to build, and customizable to fit available hardware besides.

Some advice for those who haven't done much sharpening, or have only sharpened larger saws - go slowly, and with a light touch until you get the hang of it. Even then, not all days are good saw sharpening days. There have been many instances for me while sharpening saws where I just about gave up in frustration because I just couldn't get the teeth to come out right - it took a little time away from it to get some perspective. Teeth as small as these are can be difficult to get right without some practice.

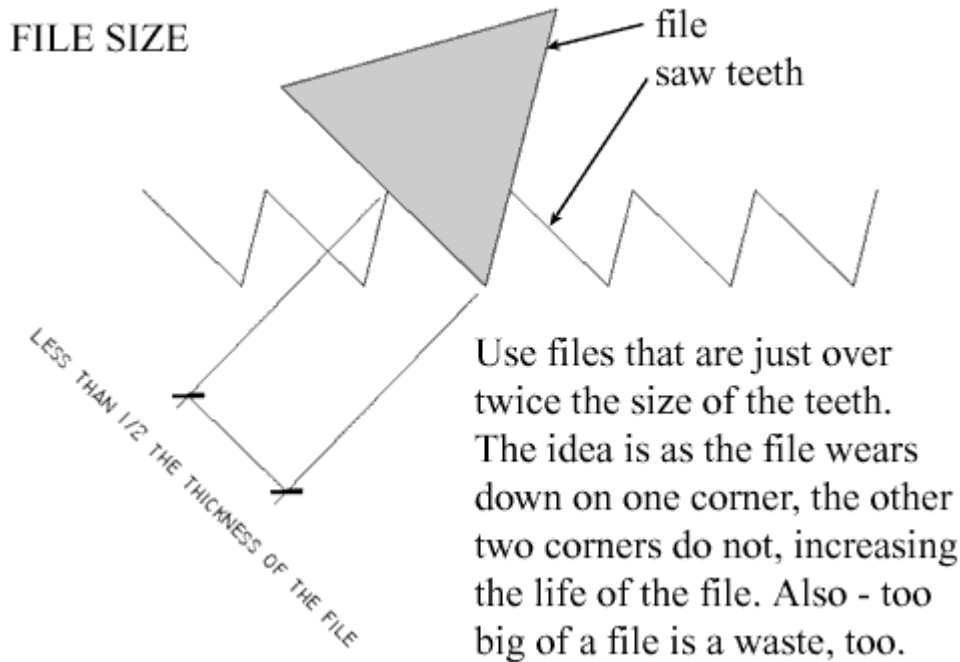
I've also found that a magnifying light is of great help when doing fine teeth.

## Sizes of Files Used in Sharpening Saws

This is taken from a couple web sites - you can see not even the experts always agree on which files should be used for which saws:

<b>First site File Types</b>	<b>PPI of Saw</b>	<b>Other File Types/TPI</b>	<b>TPI of Saw</b>
7" Regular Taper	4-5.5	7" Regular File	(5-5 1/2 tpi)
7" Slim Taper	6,7	7" X Slim File	(8 tpi)
6" Slim Taper	8	n/a	n/a
6" X Slim Taper	9,10	6" X Slim File	(10 tpi)
6" 2X Slim Taper	11	6" XX Slim File	(12 tpi)
5" 2X Slim Taper	12-14	4" X Slim File	(15 tpi)
4" 2X Slim Taper	15-20	4" 2X Slim File	(22 tpi)

You can see that not everyone agrees across the board on the proper size files. What I read from that is that absolute adherence to the above table - either side of it - is not necessary, just recommended. Remember that too large of a file for too small of a tooth can lead to problems with the file being too rounded at the corner to be effective. The opposite can waste a file by using too much of its side up, dulling it when you try to use another corner of the file. A good rule of thumb is that 1/2 the depth of the file should be just greater than the depth of the tooth being filed.



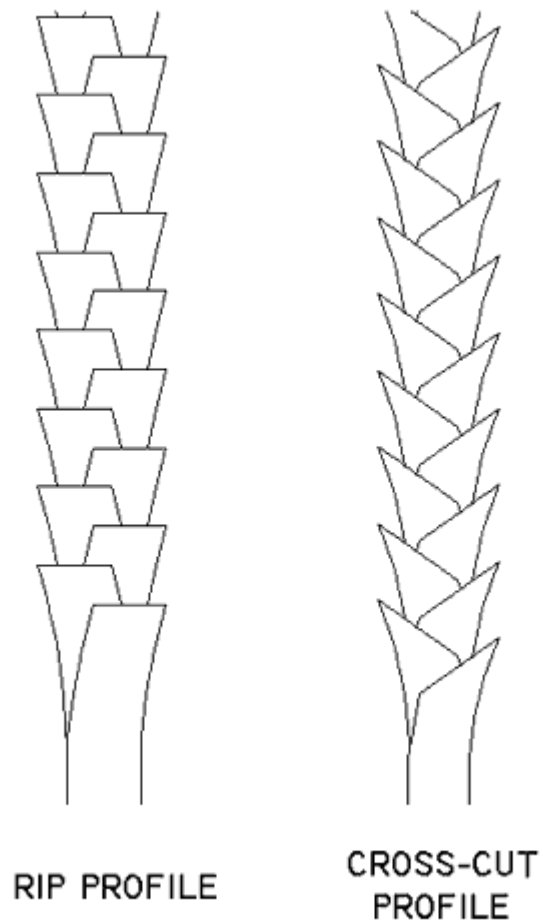
I find I can use a file for shaping teeth for quite a while, but for final sharpening it really pays to use a nice sharp one. For teeth finer than 16 PPI, you can also look into using a needle file. I've not done this, but others have reported success to me using them. Files less than 6" long can be difficult to find in your local hardware store - I've had good luck getting them from Lee Valley and McMaster-Carr.

### Angles Used in Saw Teeth - Rake and Fleam

Before getting too deep into shaping the teeth - I think a bit of discussion of rip and crosscut profiles is in order, to help understand some of the reasons behind them.

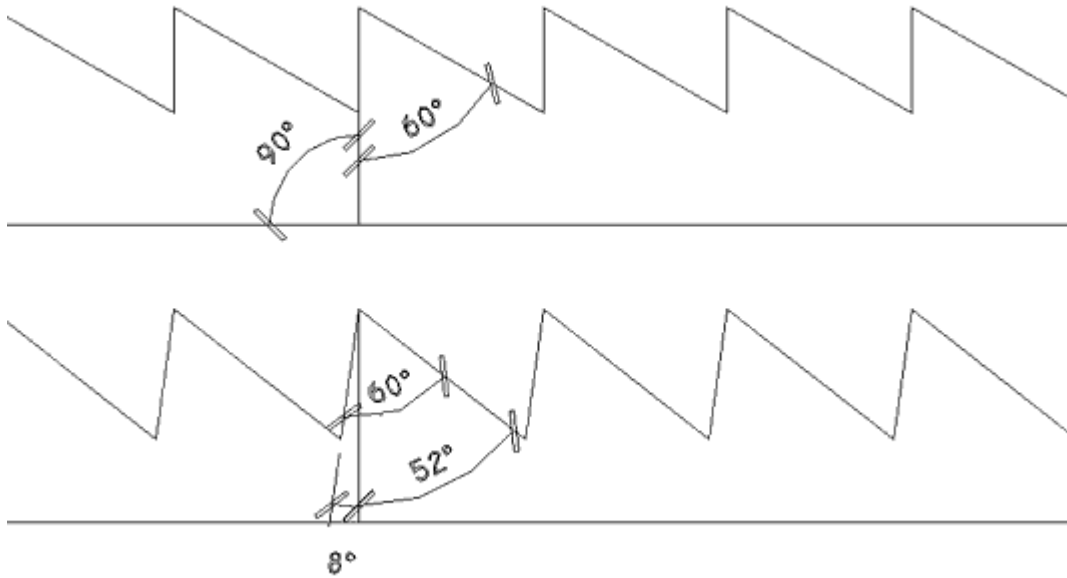
A fairly recent "innovation" is that dovetail saws should be filed rip, since that is the direction in which they were cut, and recently more and more dovetail saws are being sold in this configuration. This was not the case when I was learning - a crosscut profile was considered to be more useful than a rip, because while you can use a crosscut saw for short ripping functions (albeit slower), the opposite is decidedly not the case.

This is because a rip saw leaves a rougher edge than a crosscut saw - you can get away with this when sawing with the grain, but not going across it (it's for much the same reason you need knickers in a dado plane, but not in a rabbet or grooving plane). Using a rip saw invariably means you must use a marking knife of some sort to cut the edges of your dovetails - or use a backer - before you saw them, else you will get a ragged edge on the back side of the cut. The chance is less so with a crosscut saw, because the teeth act more like knives than the chiseling cut of the rip saw. Here's that profile shot again, where you can see what the differences are in the two types if you were to sight down a saw from the end:



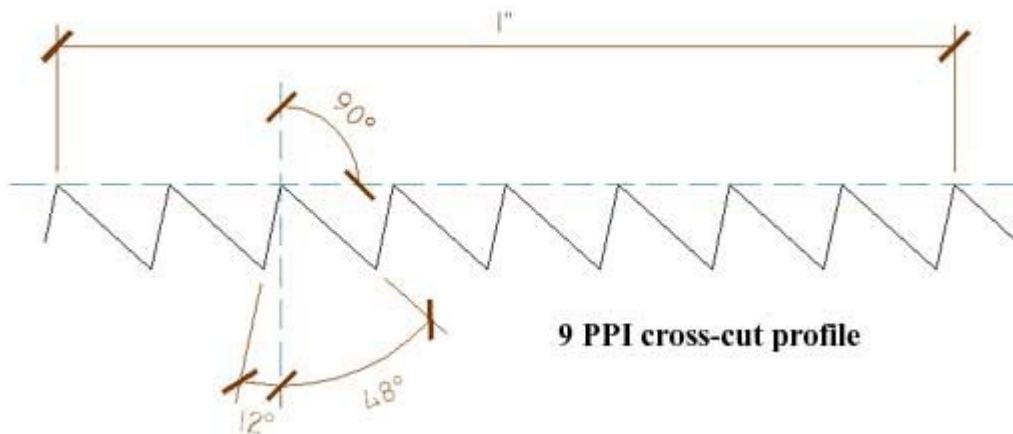
Dad always told me that you could slide a needle down the valley that forms between the teeth of a well-sharpened crosscut saw. I say this just to point out the slicing cut that it makes. Personally, I have used each for cutting dovetails - and I can't say I prefer either way. Regardless, a cross-cut saw is needed for making some shoulder cuts for tenons, so having one of each seems like a good idea.

For rip teeth, you can use the following as a guide for setting the rake angle (note, the heel - or handle - of the saw would be to the right, and the toe - end - of the saw to the left)::



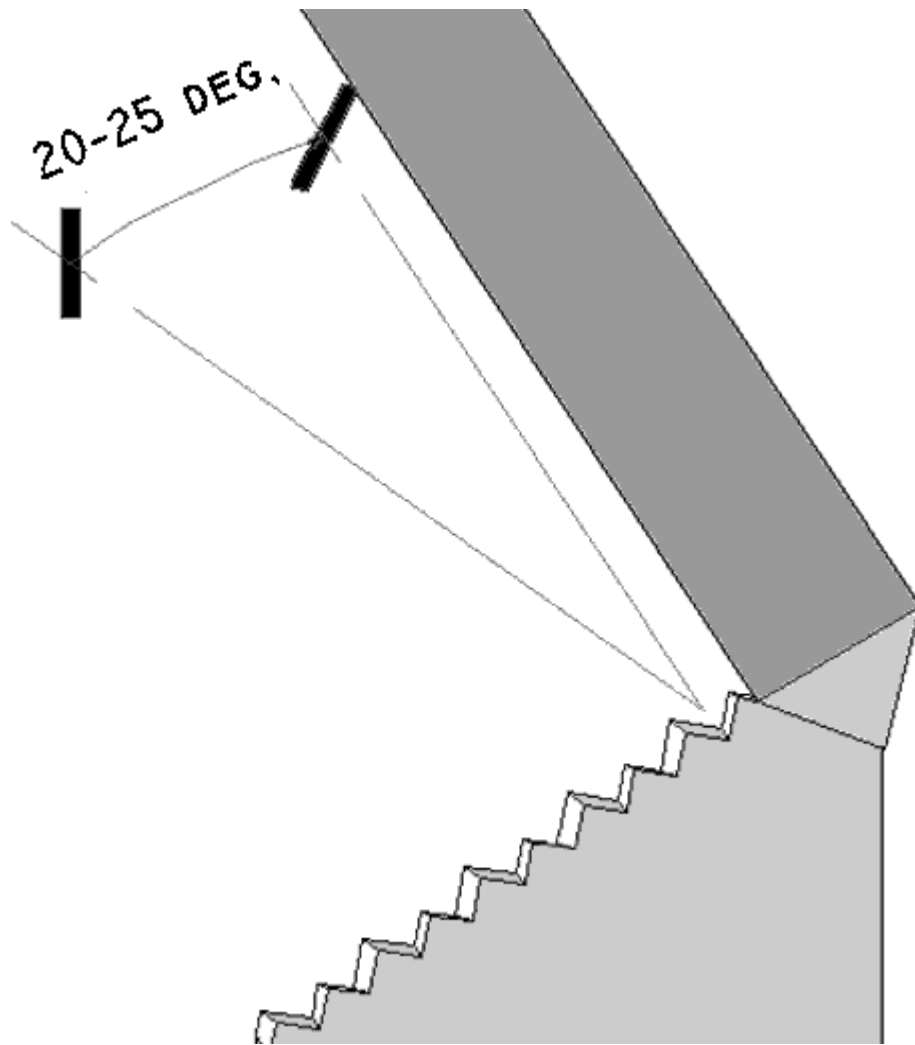
The top one is the more aggressive pattern, which can be more difficult to use if you're not as experienced with hand saws as you'd like to be. If starting cuts is an issue with you, you might consider the lower diagram (or something between the two) which relieves the angle of attack slightly to make for a less aggressive cut. It'll be slower, but easier to use. Disston started using the lower profile at some point after the turn of the century for some of their saws, so there's no need to feel like you're cheating if you do decide to use the less aggressive cut. I know users who sharpen their dovetail rip saws up to a full 15 degrees to make them easier starting. I would suggest you experiment with your own to find out where you are most satisfied.

Much the same is true for a crosscut profile, but it starts out with a less aggressive angle. Here is about the most aggressive angle I would use on one:



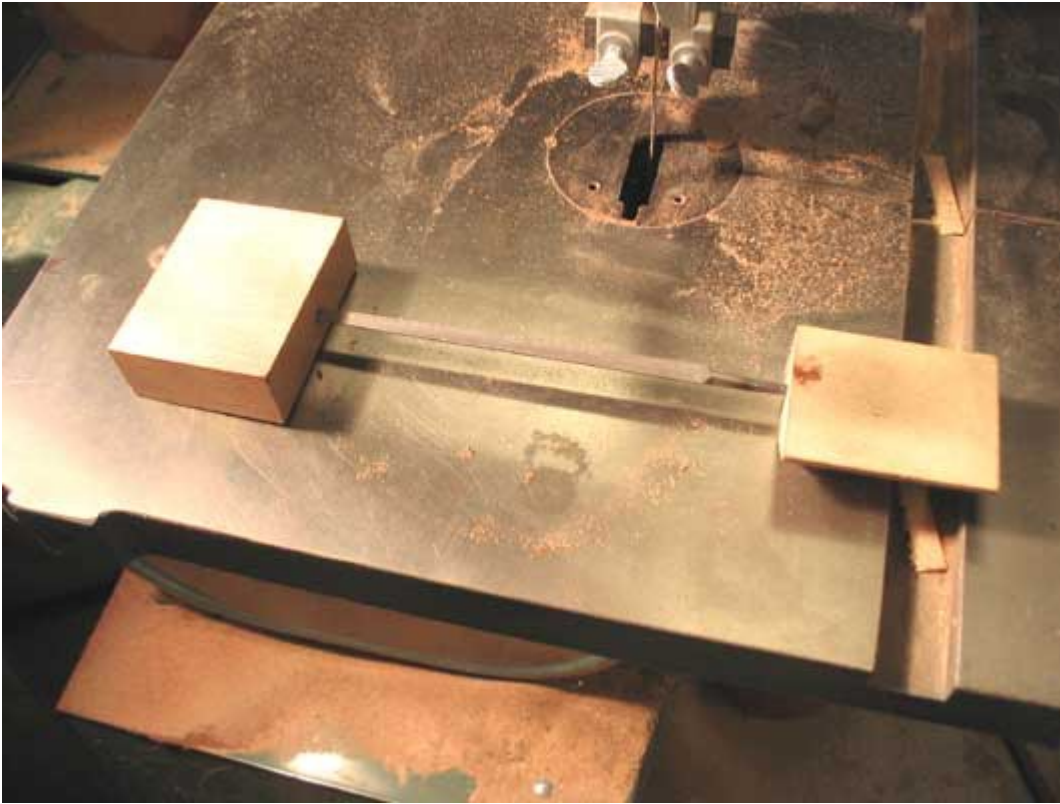
You can increase the 12 degree angle for a less aggressive cut, if you prefer. There is more discussion of these angles on the [Vintage Saws](#) site, if you are interested.

Fleam only really applies to crosscut saws, for our purposes here. Fleam is the angle off of 90 degrees that a crosscut saw is sharpened to, like this:



This diagram shows a fleam angle of 20 to 25 degrees. Every other tooth gets filed to the prescribed angle, then the saw is flipped and the remaining teeth are filed to a mirrored angle. It's this angle that forms the slicing points shown in the diagram above - you can sort of make it out in the teeth shown in this diagram. There will be more on this angle in the next page, where you will also see this same diagram again.

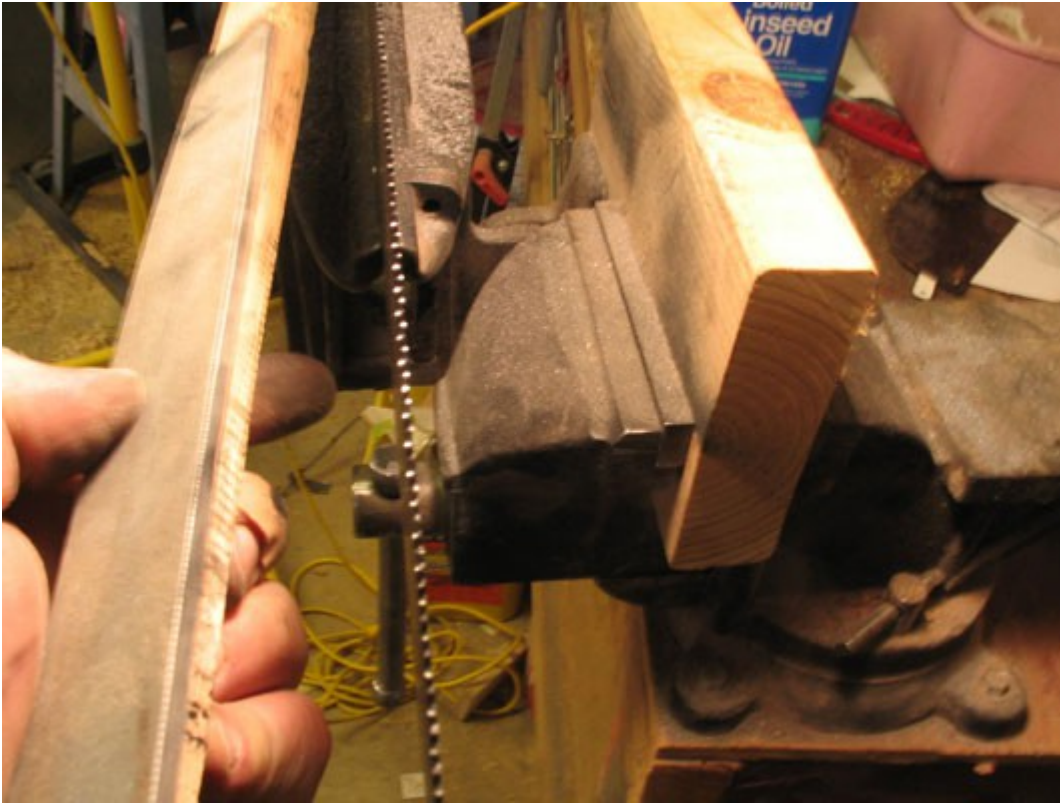
Truth be told - I never sit there with an angle gauge to determine what exact angle I'm filing. I stick the end of the file into a block of wood at what "looks" to be about right, and go with it. I often jam the other end of the file into another block of wood to help me maintain a consistent angle, however, and use a bevel gauge so I can repeat the angle when I turn it around for the other side.



## Shaping the Teeth

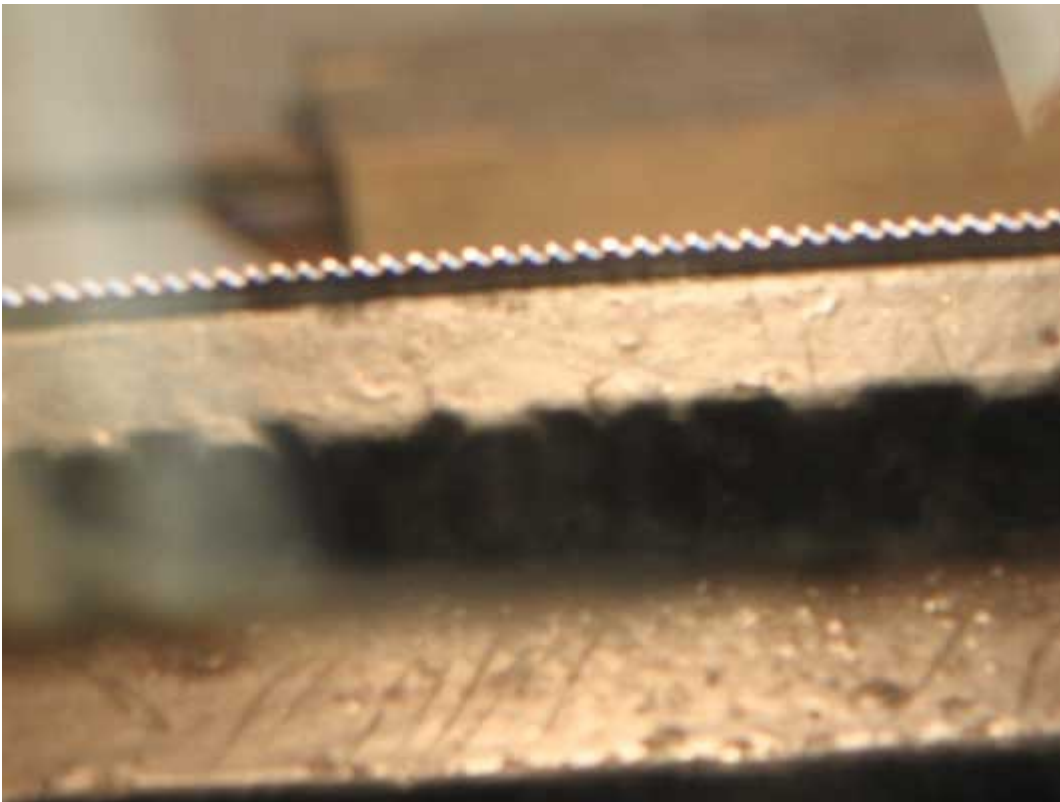
If the teeth aren't very uniform, the first step is to shape the teeth so that they are. When shaping, I usually work from one side only. Trying to skip every other tooth is difficult at best, and unnecessary at this point - as I'll finish sharpening them later by doing every other tooth. One note if you are shaping from one side only - you need to make sure you are holding the file perpendicular to the blade, and not angling the file up or down - if so, the final sharpening process will be much more difficult.

First, I 'joint' the saw - that means filing the top of the saw so each of the teeth are just slightly flattened. I just use a file with a square scrap of wood to help hold it perpendicular to the saw, but name brand jointers are available as well. Here you can see the reflection of the freshly flattened parts of the teeth by their reflection:



File just enough so that you can see a flat spot forming on all of the teeth - if there are one or two that aren't, it's not a big deal - subsequent sharpenings will bring them out. But only a couple...

You can see (maybe - kind of blurry) some of the flat spots on the top of the teeth in this photo after I've jointed them:





If the result of jointing shows evenly sized 'flat spots' on top of the teeth, you can skip the shaping section and go directly to sharpening. However, you can see in this instance that some of those flat spots are larger than others - and some are hardly there at all. We'll need to fix this while the teeth are being sharpened because ideally, they would all be the same. This points to a problem with the size of the existing teeth - that some are more deeply filed than others, and consequently that the points of the teeth are not all the same height - so the saw will not work as well.

What brought this about? Not paying enough attention to details. Many sharpeners simply count the number of strokes they make with the file, but sometime they might be putting more pressure in one direction than in the other, and this is the result... Not to worry - it's easily taken care of. In either case below, when you are sharpening, you are sharpening to the point where the flat spot you created in this step \*just\* disappears... You will notice, as you go, how much pressure it takes to do just that. Plus, guided by the flats on top of the saw, you can apply a slight amount of pressure to the side that has more flat than it should.

This can be a little bit tricky for your first pass, as you only do every other tooth. Just file more conservatively on the first side you do, then return to it to finish the job. One thing I often do on badly out of joint saws is to do a shaping round first, concentrating on getting the teeth uniformly shaped - all from one side. I then set the saw, as shown after the sharpening instructions below, lightly joint the teeth one more time, then go on to sharpen the saw as described below.