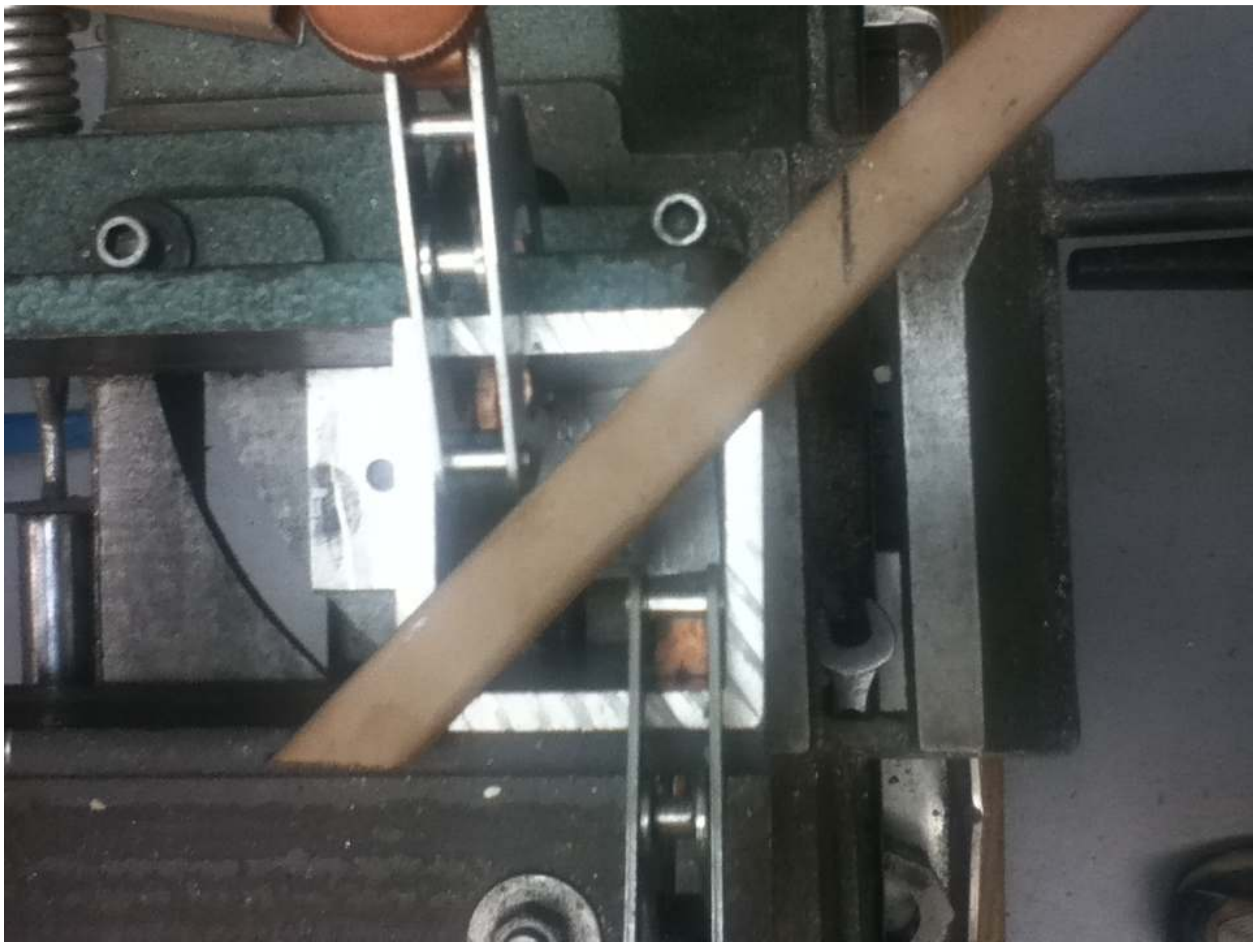
A 45° Jaw Set for a Horizontal/Vertical Bandsaw, version 4

By R.G. Sparber



Sure I can unclamp my horizontal/vertical bandsaw jaws and set them to 45°. It is just a pain to do. And if I am making a series of 90° and 45° cuts, the pain is even greater. So instead I cobbled together a pair of softjaws that hold my square tubing at 45°.

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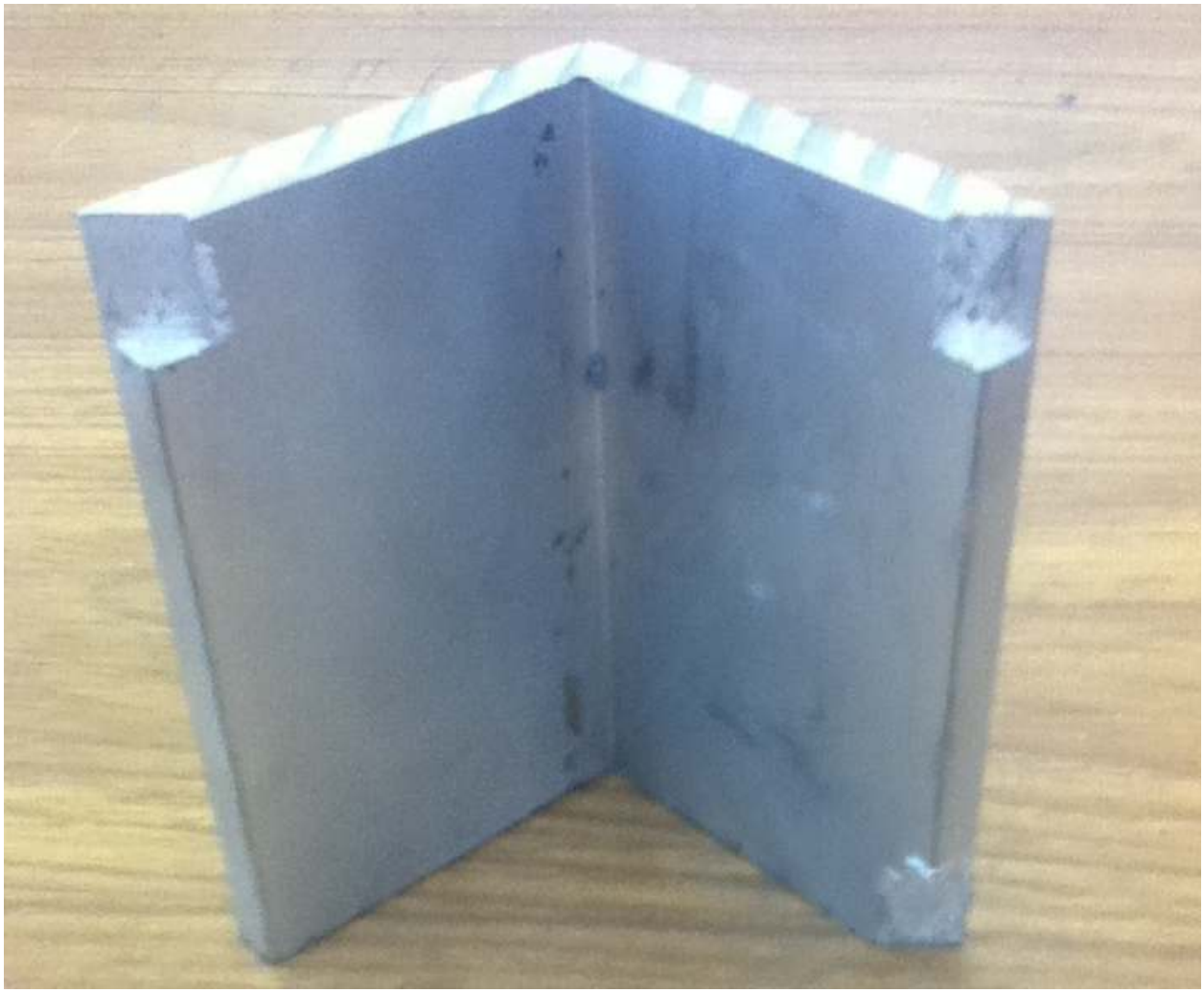
Just in case you are not familiar with my horizontal/vertical bandsaw, here it is. The movable jaw has been replaced to suit my needs. But that is another story.



Here is one of my softjaws. I used an endmill to cut the steps on top outer corners. They are about 0.1” wide maximum and 0.4” from the top. This was a quick “proof of concept” job so admittedly it looks a bit ratty.

You may notice something odd on the lower right corner of the softjaw. That is… ah… a screw up that I will explain next.

Here you see one of the softjaws being machined. On my first try I used just the force of the vise to hold it in place. The part lifted up slowly from the pull of the endmill and spoiled the cut. Oh well, turn it over and try again, with an added hold down clamp.

I did have to place a piece of scrap 1/8” aluminum plate under the softjaws to get the bottom of the steps above the top of the vise jaws. Other than that, the arrangement worked well and I quickly cut the 6 diagonal braces needed for my latest project.

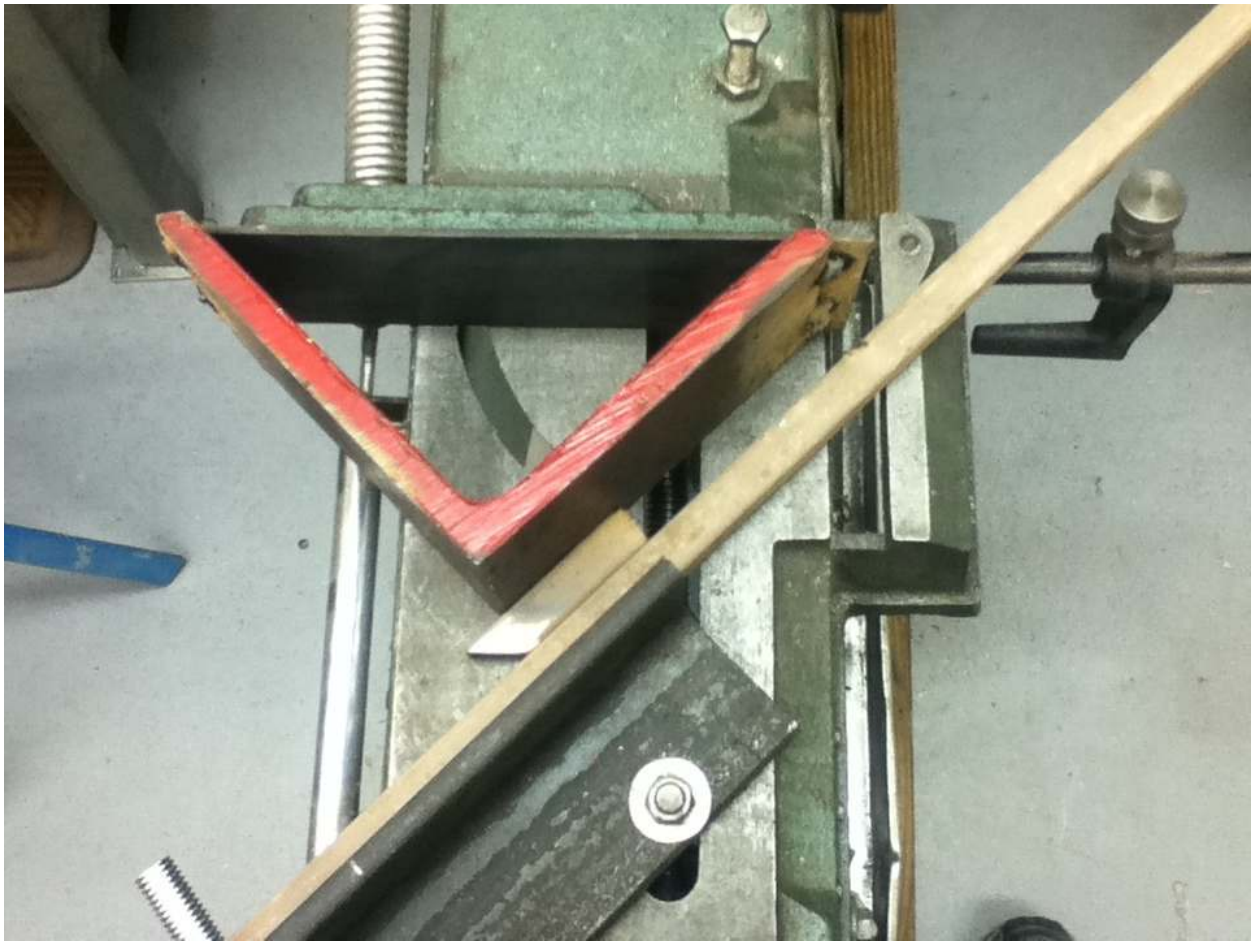
If needed, a stop can be added to the movable jaw to set the overall length of each bar being cut.

One essential element of this design that I failed to mention before is the left side stop. It is a piece of threaded rod that keeps the movable and fixed jaws at a given distance. This lets me clamp the tool on the right and not have the movable jaw pivot. You can see it disengaged in the next picture.

Although I did think this up myself, I am positive it is an old idea.

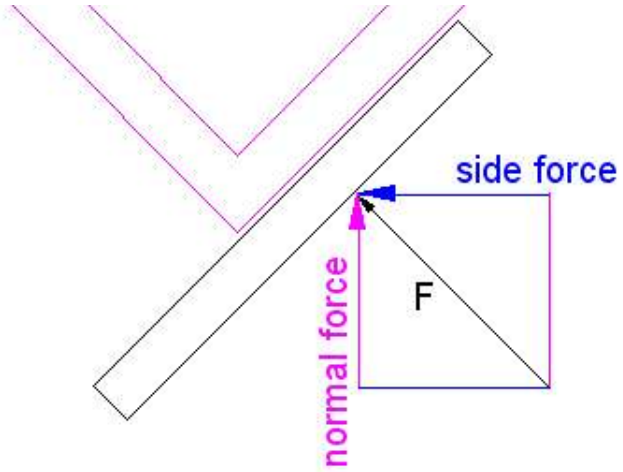
Reader's Comments and Suggestions

Malcolm Parker-Lisberg made a suggestion which I misinterpreted. The result is shown below. I used a single piece of angle on the fixed jaw and tilt the movable jaw.

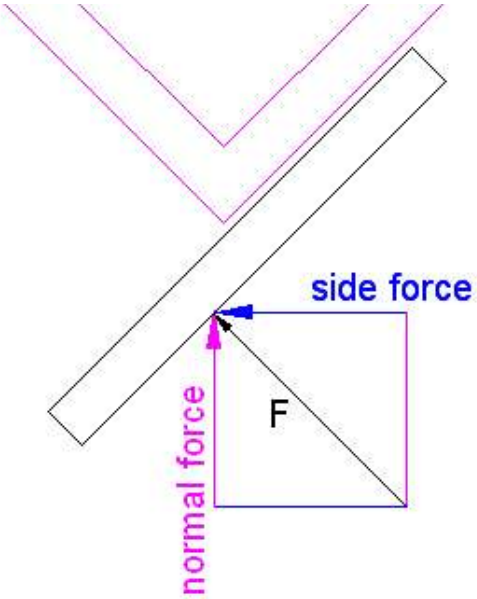


In the lower left corner of the picture you can see some of the threaded rod mentioned on the last page.

After some playing around, I found that I had to use a rather large piece of angle in order to get the movable jaw's clamping force to work right while still enabling the end of the bar being cut to clear the right end of the fixed jaw. A smaller piece of angle caused the bar to pivot clockwise around the angle rather than clamp to it.



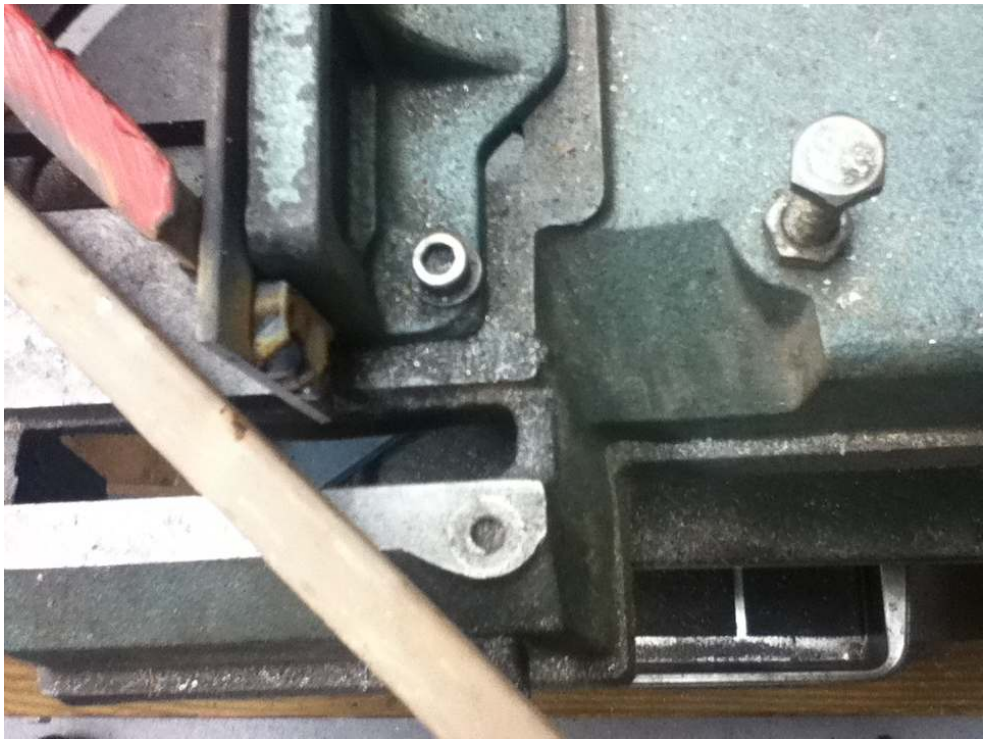
I think this is why. As I tighten the vise, the movable jaw moves closer to the right side face of the angle support shown in the last picture. But when there is contact, the applied force, F, is perpendicular to the bar being clamped. This force can be resolved into a side force and a normal force. I say "normal" because it is perpendicular, or normal, to the fixed jaw. That side force tries to move the angle support to the left. The normal force does the clamping.



If the corner of the angle support is to the right of this force contact point, the side and normal forces cause the bar to pivot clockwise and not clamp.

A smaller angle support puts the corner to the right of the forces so causes this pivoting.

In the prototype shown above, the angle is tack welded to a plate. This plate prevents the angle from spreading open due to the clamping force plus supports a chock on the right side.



This chock prevents the angle support from sliding to the left as force is applied by the movable jaw. One problem here is that I must add packing between bar and angle in order to clear this chock. Moving the angle to the right and welding from the inside would avoid this problem.

My main problem with this design is that I must crank the movable jaw open a lot and am limited to a bar about 2” wide. However, the tool is easy to drop onto the fixed jaw and use. I am hoping that further discussion will help me see how to refine this design and eliminate this problem.

Another improvement to the design came from Nelson Collar who suggested adding a second set of steps at the bottom of the aluminum jaws. Then put a scrap of the bar stock at the bottom to prevent the jaws from tilting. I've tried the idea and it works well.

Your questions and comments are welcome. All of us are smarter than any one of us.

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