

**Several Knife Grinding Jigs
I have Found Useful**
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Have you ever ground and sanded your hand forged knife to near perfection on your belt sander by hand, only to discover some of your angles and planes were off a bit? I certainly suffer from this. It is true with a lot of practice you can get very good with hand work on a 2 x 72 belt sander but..... I am finding as I get older I am a bit more twitchy and my concentration does not last as long as it use to.

Several years ago I started looking for simple ways to improve my knife making skills. Particularly my rough grinding. I found a couple of jigs that make my life a whole lot easier. They are pretty easy to make and allow much more precision.

First I needed a flat reference point. Ideally 90 degrees to the belt.



This is a piece of 3/8th by 3.5 inch by 18 inch flat bar that is welded to a support that is in turn bolted to my belt sander. This gives the perfect table for the jig to slide on for the grinding. It is important that this is secure and can't move or pivot relative to the belt.

The Grinding Jig

This is required to hold the knife stable and change angle relative to the belt in very small increments and be locked in place. The goal is to be able to slide the jig along the

table and have a smooth plane be ground into what ever surface of the knife I am working on. Multiple passes bring the flat plane further into the knife until I reach the desired depth. I found this jig online and unfortunately do not recall who originally made it.



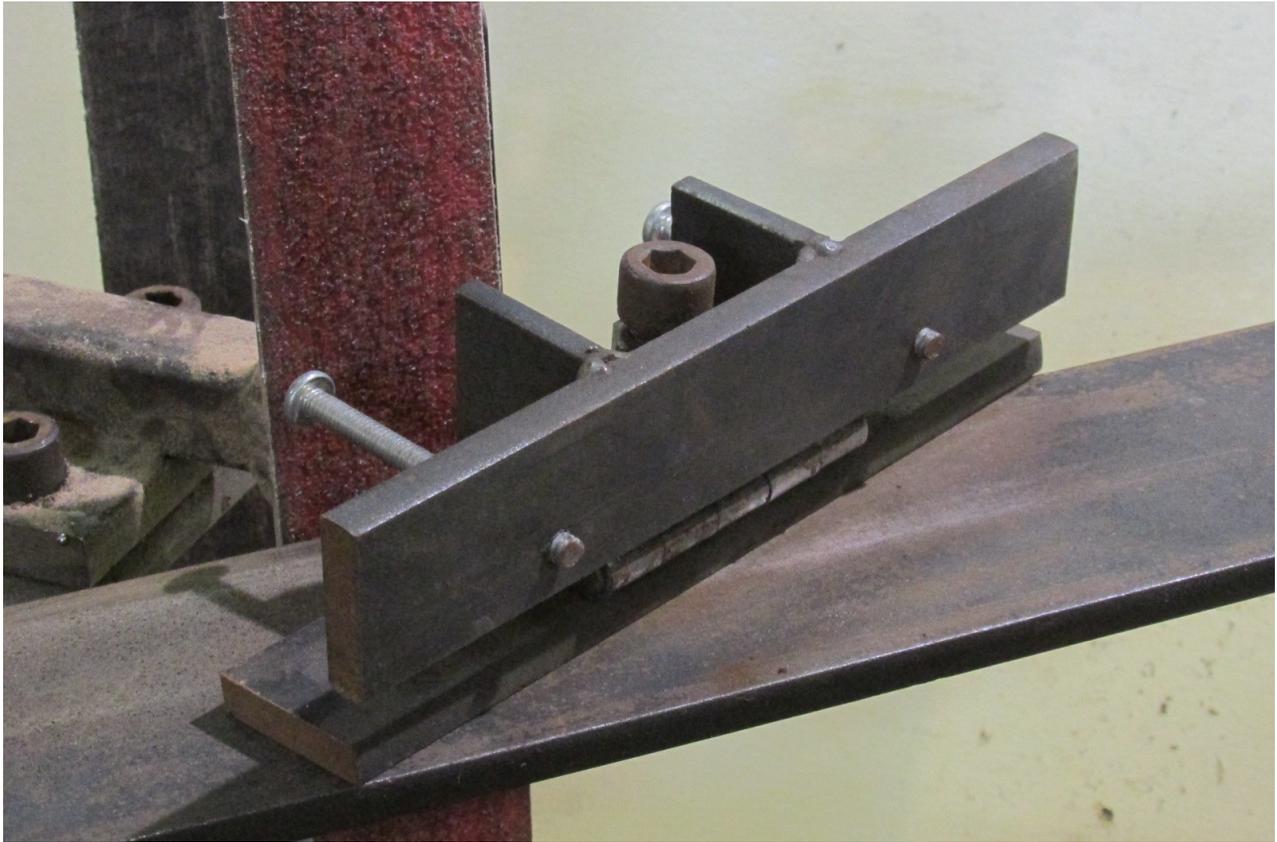
This is the grinding/sanding jig. It is constructed of 2 pieces of $\frac{3}{8}$ th by 1.5 inch by 8 inch flat bar. These are hinged together with a welded 3 inch hinge (this is in the middle of the bar). There is a central $\frac{1}{2}$ inch fine thread bolt with two nuts that protrudes through the top part of the hinge. The bottom nut is welded to the hinge. The top nut is a jam nut that locks the bolt in place once you find your angle.

By turning the bolt in, the angle moves from 90 degrees inward to something suitable for grinding the edge taper on the knife. The two small square pieces of flat bar either end of the top hinge are welded to the long plate and the hinge just for support.

There are also two $\frac{1}{4}$ inch by 3 inch machine bolts. Spaced about 4 or 5 inches apart. The spacing should be suitable for the majority of knives that you make. That is one bolt the handle rests on, and the other one the back of the blade rest on. I will explain this in more detail a bit further along.

Where the spacing is not critical the height from the table is. The two bolts must be as close to the same height from the table as you can get. I made up the hinge portion of the jig then used a scribe and a straight edge off the table to make a sharp line equal height

along the face of the jig. Then centre punched on the line. I drilled for tapping 1/4 inch holes. Tapped and all set. There are also jam nuts on the back of the bolts.



The bolts only stick out about the thickness of your knife. They will get ground down as you work on sanding the planes. That is why they are 3 inches long.

How to Use the Jig

In general clamping a knife to the jig allows you to grind a flat plane. But how to find the angles.

When forging a blade that will be ground using a jig like this it is **always best to leave extra material** so there is plenty to grind into clean metal below pits etc. Also the blade needs to be straight and if you have forged the edge taper on the blade it should be even on both sides. This is one time stock removal is easier than forging as stock removal you start with parallel planes.

First I find which side of the tang is closer to the vertical axis of the knife. I sand by hand on the belt sander, to bring it in as close to vertical as I can get but leave it thick. I then align the face of the jig to be flat with the belt. This may not be 90 degrees to the table. You can loosen the 1/2 inch bolt off and clamp the face of the jig to the flat work surface of the belt. Then slowly dial in the 1/2 bolt for solid contact. This should give

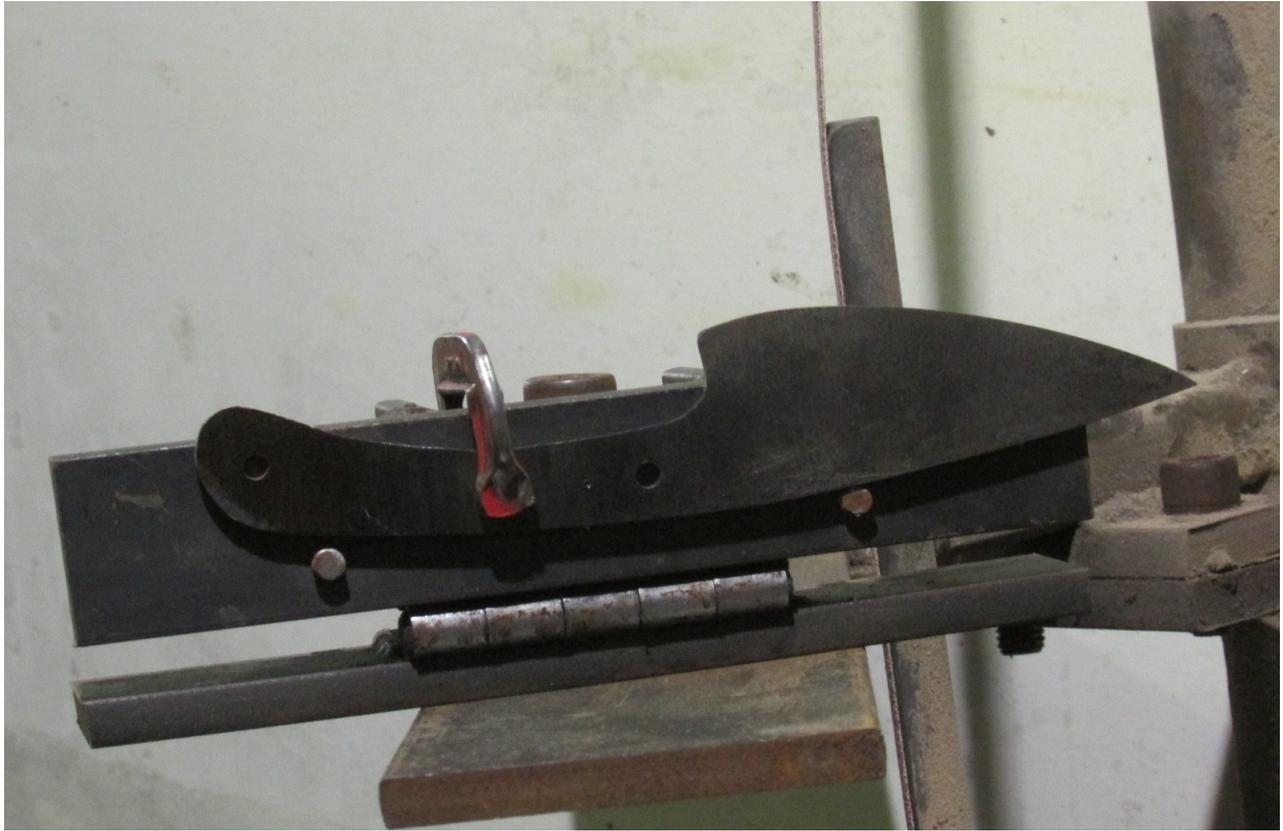
you a parallel face to the belt.



Here you can see parallel to the work surface in the gap to the belt.

Next is clamping the cleaned side of the tang to the face of the jig. Then sand the other side of the tang until it is flat and the desired depth. This will make the two surfaces of the tang parallel, but we have to go back to the first surface to get our desired thickness.

Switch so that the freshly ground surface is in contact with the face of the jig and rework the first tang surface until it is the desired thickness. Now you have your two reference planes to develop the bevels on the knife.



The knife should rest on at least one of the bolts for this process. The clamp will have to be moved a couple of times to smooth the whole tang.

If you have not forged out a strong edge taper, you can continue the flat parallel grind on to the blade to even everything up. Be careful at the tip.

Adjustment to taper to the edge.

The adjustment is simple but the alignment is important. Look carefully at you knife. Which side tapers more to the edge? How much of your edge do you loose if you match the shallow taper side to the strong taper side. Do you have enough material to grind this away? This is why I said in the beginning leave everything thick.

Decide what angle you are going to use. I do this simply by eye and aligning for best fit. Thread the bolt down and lock the jam nut so it can not move. Do a final check. This angle should be something that works for both sides of the knife. It does not change.

Once again clamp the tang of the knife to the face of the jig. Determine where you want the taper to start. Typically at the start of the edge or possibly a bit further onto the edge of the blade. Obvious, but do not grind toward the handle past your chosen start point of the taper. You will taper the handle and not have parallel surfaces if you do.

Make sure both the tang and the back of the blade rest on the 1/4 inch bolts. Take a

couple of passes to see what it looks like. Now is the time to adjust if you need to. Minor corrections now are easy but soon you will be locked into the angle you have chosen.



On this knife I chose to start the taper at the start of the edge. Patience is important to gradually work the plane that you are generating into position. The goal is not to sharpen the knife here. Just generate your geometry. Once you get the plane developed where you want, change up your belt until you get the grit and finish you desire. Easier to change belts now instead of changing the jig and have something slip out of place and have a different angle when you come back to a new belt. If the knife is in the annealed state you can take it up to your normal quenching finish. If you have already hardened the blade make sure you keep it cold. Cooling in water after a few passes is a good idea. I dip the whole jig and knife without un-clamping.

Once you are satisfied with the finish, before un-clamping, take a sharpie marker and mark where the blade rests on the two 1/4 inch bolts. Un-clamp and continue the black line over the back and on to the other side of the blade. Turn the knife so that the other side of the tang is clamped to the face of the jig. (Edge is still up) Position so that your rest points match up. Clamp well. Start with coarse grit on this side starting at the required spot.

Work through the grits like you did before. Since you are working off the parallel face of

the tang and have not adjusted any angles your taper should end up the same as the first one.



You can leave part of the back flat to the tang as in this image. Slightly more aggressive taper a bit further down to edge.



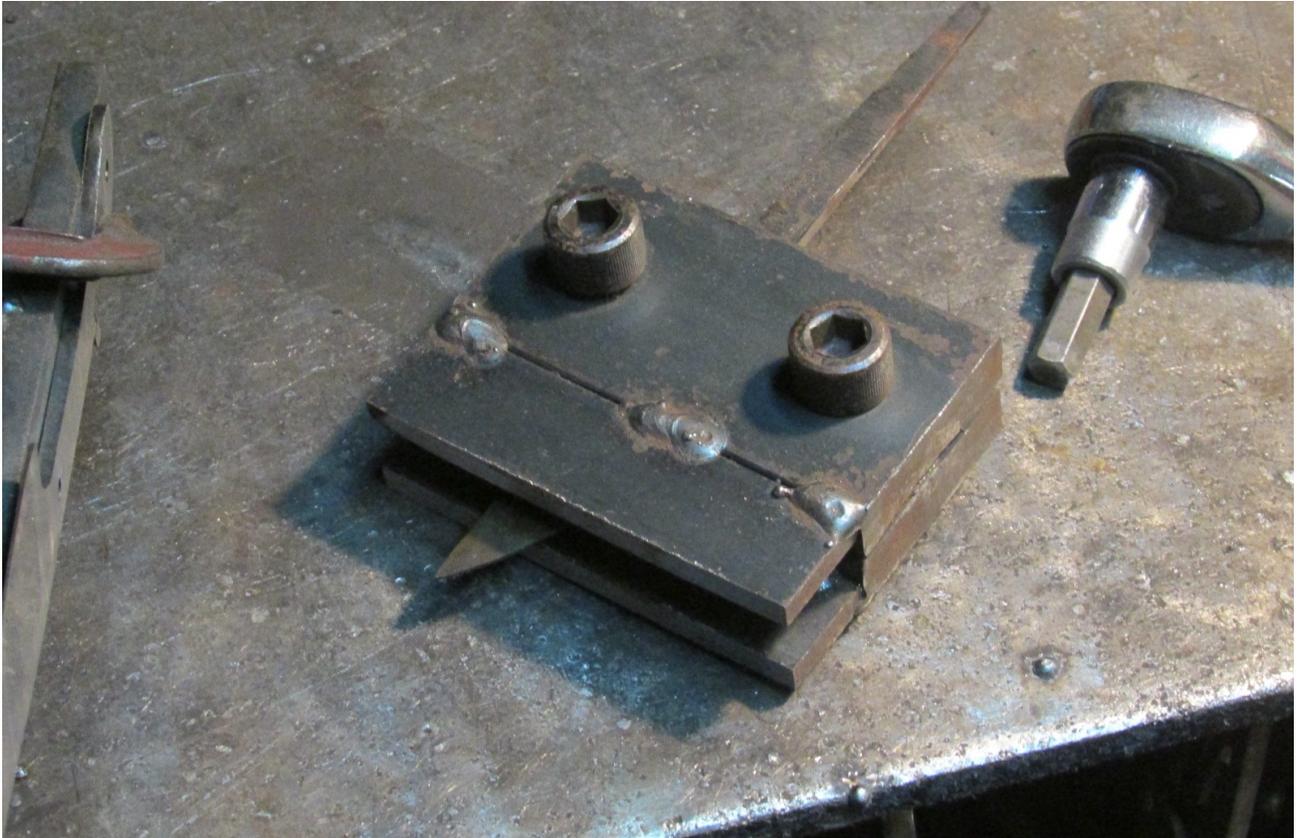
Or you can do a flat grind all the way to the back as in this photo. I have just a bit further

to go to get to the back.

With care with your angles you can develop nice clean straight lines and planes. It is true it is more of a machined look and it does depend on what look you are trying to achieve.

The File Jig

The other jig that I use often is the file jig to get the shoulder to the tang square and flat and if I am adding a bolster it can create the tenon for fitting in the bolster.



This is simple to construct. It is 2 pieces of 3/8 by 1.5 inch by 4 inch flat bar that one side is drilled for 1/2 inch bolts and the other side is tapped for the matching bolts. A tip for alignment. Tack weld the two plates together. Then drill your holes the size for the tap. Then drill only the top plate the 1/2 inch diameter. This will self centre the tap as well as keep your alignment. Once the tapping is complete grind off the tack weld, separate the pieces and thread your bolts in.

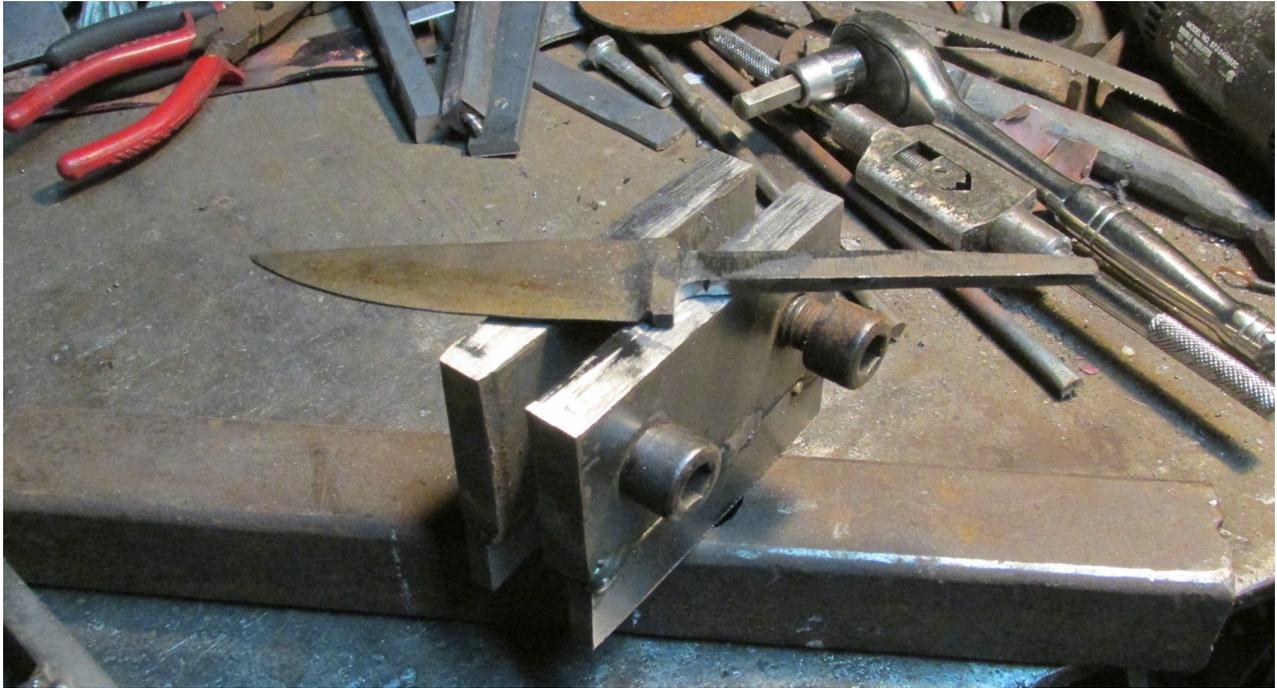
In this case I spaced the hole 2 1/4 inches on centres. The spacing should be wide enough that your knife blades fit between the bolts.

Once bolted back together sand both edges even. I use mild steel and a file will bite into the steel once it reaches its plane, but I see it right away. Some people use heat treated tool steel and the file will skate when it hits the steel.

The other edge I have welded on 1/4 by 1 flat bar. This gives spacing if I am working on integral bolster knives. Same thing these edges are periodically trued up on the belts sander.



A hidden tang knife clamped ready for filing. The file jig is clamped in the leg vise or bench vise to do the filing.



The knife after filing the shoulder of the tang. The same technique can be used to precisely align the taper line on the edge itself. I have not done that yet on the blade in the above photo. Many people underestimate a file. It is slow but can be very precise creating an excellent fit.



Another view of the shoulder filed in.

With a few innovative jigs you can take your knife making to the next level even if you

have very simple equipment. It would not hurt to make a complete stock removal knife to see how the grinding and sanding work with the first jig. That way your angles are more easily understood.

Each jig is open to modification on sizes and construction depending on what type of work you are doing. They are also simple enough to make that you can try them and then make changes as your work changes.