

The New, Improved Bevel Jig

I recently had some requests regarding how we shape our signature tip bevels. Actually the request was for how we made the tip bevel jig shown in our knife-making video. Since the video, I designed a newer and better bevel cutting jig. So I sent our instructions for using the new jig, instead of how to make it.

We always provide detailed instructions for our local group members who want to make their own Darts using our shop. This makes it easier on us and forces them to do most of the actual work. We still enjoy lending a hand when required, but the hand comes with a bit of harassment. There's always a price!

When I designed and built our original bevel jig, we had not planned on making lots of knives. We figured we'd make a half-dozen for each of us. As we came up with design variations and responded to requests for purchases, I decided that a better jig was in order. I was never happy with the original jig!

The original jig mounted the piece in a mostly vertical plane (shown below). This meant that we had to use a milling bit for side cutting. We also had to make several passes to remove the required amount of metal for the bevel. Since we cut against the side, there was some minor flex, which meant more stress on the tip and a rougher cut. It also meant that we had to rotate the vise table to get the right amount of offset—originally 5° then to 3°. Afterwards we would have to realign the table to 0° for other work. We could also be off by as much as 0.5° when rotating the table.

Other problems with the original jig, such as having to change the cutting tool and cutting speed when going from the milling bit to the slitting saw for the rest of the cuts, made me search for an alternative approach.

So, what I wanted was a platform that could use the same tool and speed for all of the mill work done on the Darts, no requirement for rotating the table, single pass cutting with clean cuts with less stress on the side of the Dart tip and no requirement for alignment after setup.

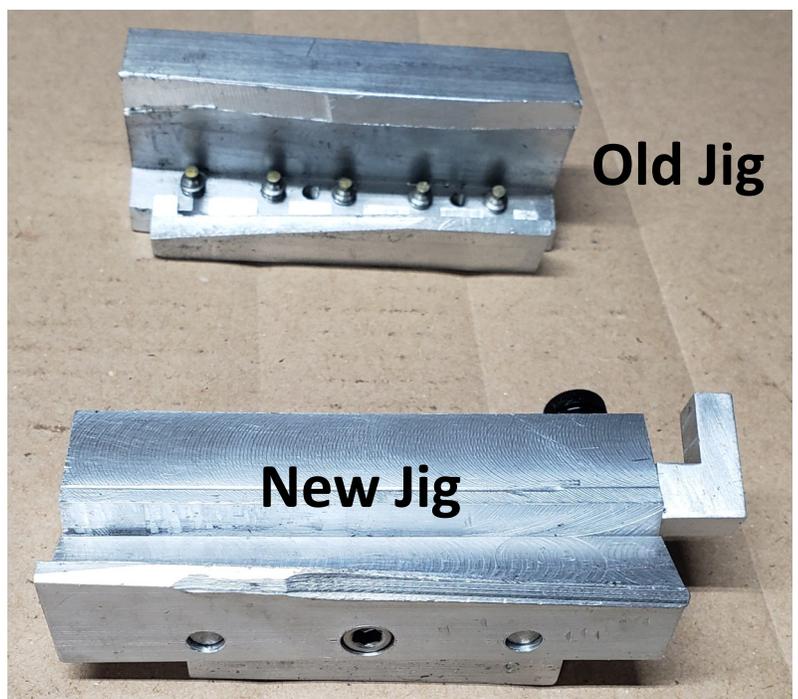
The new jig allows for a mostly horizontal positioning (shown below), removable 3° angle piece to maintain a consistent bevel angle, an alignment stop for quick setup and a strong clamping system for holding the Dart at a 20° angle for slitting. This makes the bevel cuts faster, cleaner, repeatable and easier.

My only planned mod for the future is to shorten and taper the alignment pins for easier separation and reassembly, but otherwise, it works great.

To the right is a comparison of the old and new jigs in their positions for cutting.

The old jig had one benefit over the new one: If you wanted to cut four bevels, two on each side, you just rotated the table the same number of degrees in the opposite direction, turned the jig around in the vise and cut. The new jig only allows for our signature cut! Of course, we consider that to be a benefit.

The following pages provide instructions for using, not building, the new jig, but it does give you an idea as to how it works.



Instructions for Using the Improved Tip Bevel Jig

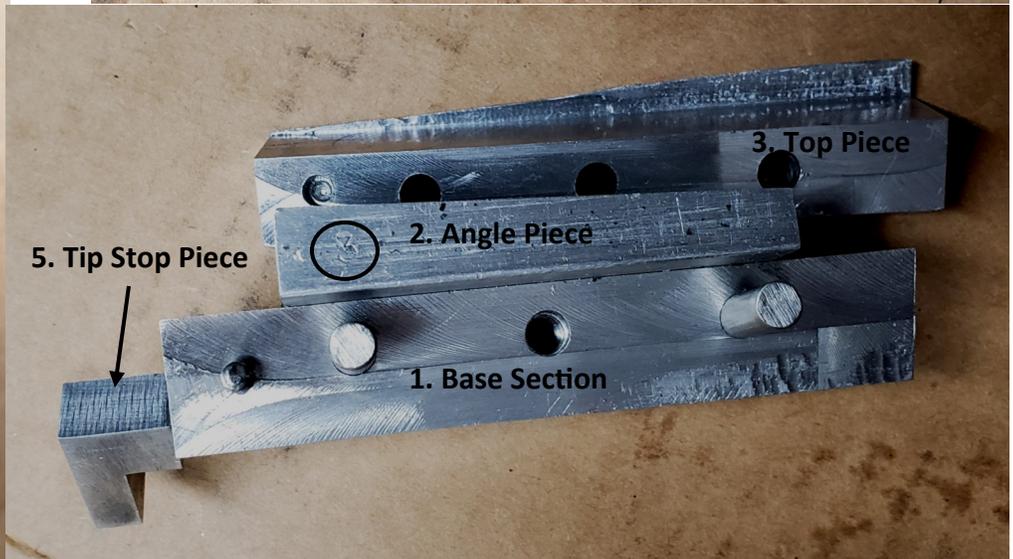
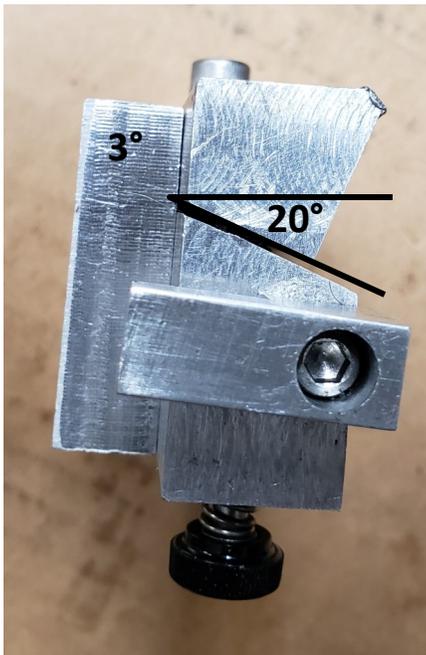
Terminology

The jig is comprised of several pieces:

1. Base section, which has two guide rods for stability. Other pieces are attached to this section.
2. Angle piece, currently a 3° angle block (notice the circled "3" stamp). This is screwed into the base section to provide a consistent bevel angle. It can be detached if another angle is preferred.
3. Top piece, which attaches to the base section via the two guide rods. A bolt provides proper holding tension between the two sections.
4. Top piece adjustment screw, which attaches to the base section to allow for maintaining even pressure on a knife with a long tip angle.
5. Tip stop piece, which is used when placing a knife into the jig for proper overhang. This allows for consistent cuts without having to measure for each cut. It is swung out of the way when making the cuts.

The top piece and base section are clamped together by a bolt (not shown) located between the two guide rods. This provides the tension required to hold the blade in place during the cutting operation.

When assembled, the bevel angle and the asymmetrical bevel taper create the Bellablades Signature Cut.

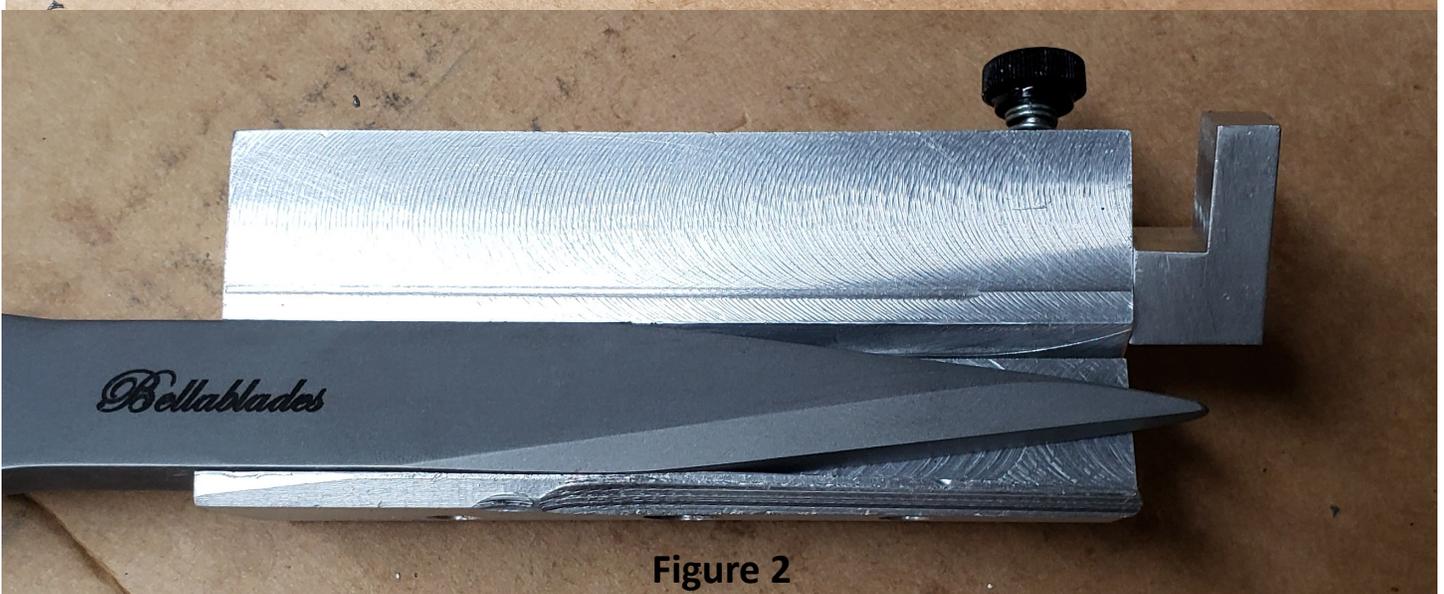
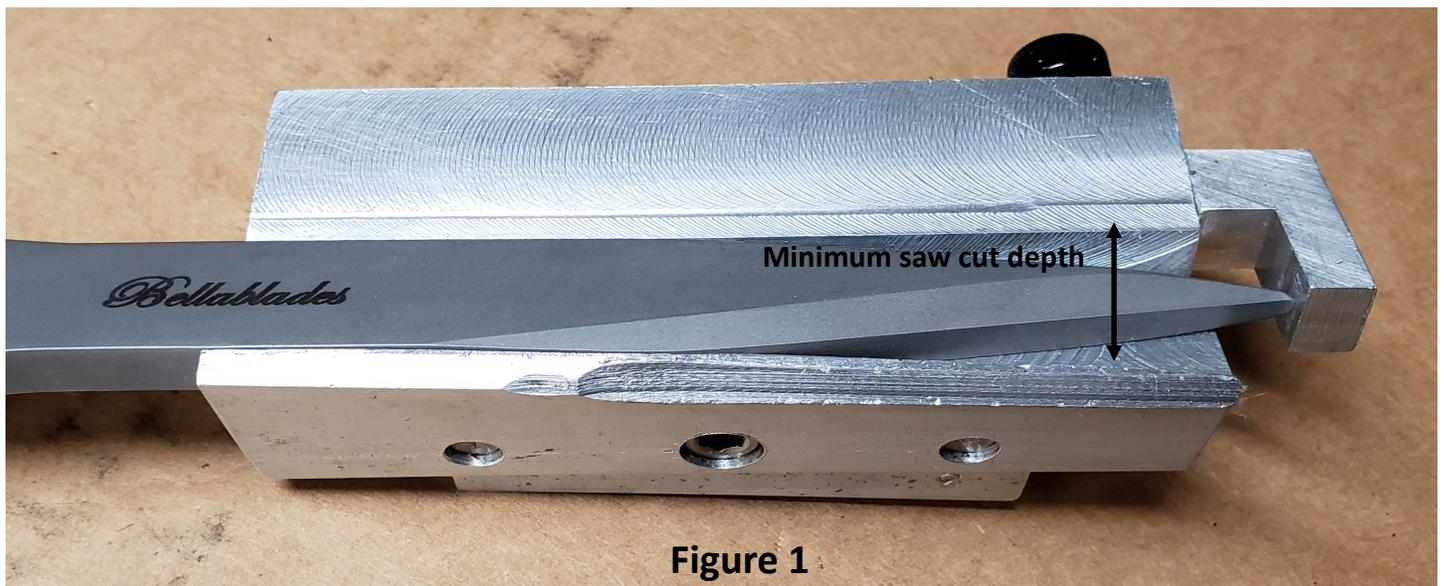


Setting up a Knife in the Jig for a Cut

The Steps:

1. Rotate and lock the tip stop piece, as shown in Fig. 1, and tighten in place.
2. If it is the first bevel cut, loosen the top piece adjustment screw to make sure it does not interfere with the top piece when top and base are together. Place a knife into the jig, as shown in Fig. 1, with the knife tip against the tip stop.
3. Squeeze the top and base together behind where the tightening bolt is located and rotate the top piece adjustment screw until it touches the top section. This step is typically done only on the first cut of the first knife if they are all the same width.
4. While holding the top and base sections together tighten the center bolt until snug.
5. When knife is secured in the jig, loosen the tip stop, swing it out of the way, as shown in Fig. 2, and lock it down. The bevel is now ready to be cut.

Below: Knife with pre-cut bevel is clamped in jig to illustrate the setup and cutting process. Notice the clean cuts made by the slitting saw.



Cutting the Bevel with a Slitting Saw

The Steps:

1. Place the jig in the vise, supported by two parallels high enough to allow for clearance of the top and base sections while holding the angle piece in place.
2. Lower the slitting saw until it just touches the tip of the knife. Since we finish the cut with $\sim 0.100''$ of width on the tip, allow for $0.050''$ on each side of center when cutting. Assuming a $0.250''$ knife width, divide by two: $0.125''$ and subtract $0.050''$: $0.075''$.
3. Zero the vertical movement gauge while the slitting saw rests on the knife tip.
4. Move the saw away from the knife to allow for vertical motion and lower by $0.075''$ (for $0.250''$ width).
5. Making sure that the slitting saw hub will not interfere with the edge of the jig, start your cut on the back side of the tip.
6. Once the cut is finished, remove the jig from the vise, loosen the tightening bolt and remove the knife from the jig.
7. Clean any debris in the jig, swing the tip stop back into position, place the blade (or another blade if both sides are complete) in the jig, against the tip stop, tighten the bolt, swing the tip stop out of the way and lock it down.
8. Return to the mill for another cut, making sure that any debris left on the mill will not interfere with the precision of the next cut.
9. Return to Step 1 of this section and continue.

Note: Speed of the slitting saw is based on its diameter and tooth count. Since our saw is $2.5''$ diameter, set it to 280 RPM—Max!

