CELTIC KNOT SLICING JIG

VERSION 2 BUILD

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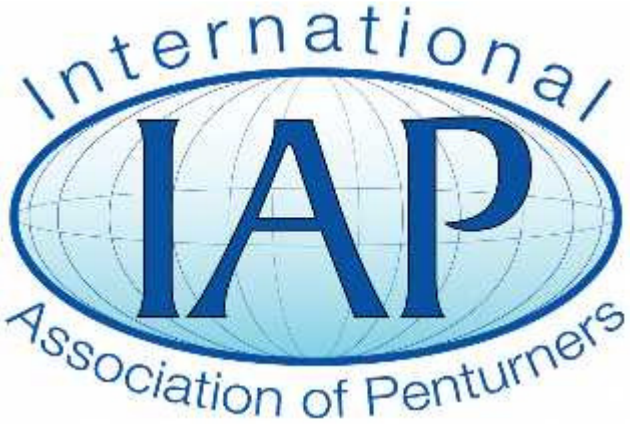
MAY 2020



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I wanted to improve the design of the original Celtic Knot Jig (CKJ) in several areas.

- Improve alignment of hold down to make it easier to remove and replace.
- Cut knots at different angles with a single jig.
- Improve clamp and leadscrew adjustment.
  - Lock down quickly at any position of the lead screw location.
  - Move / Slide the Lead screw without having to turn it.
  - The CKJ can be made with metric measurements. Use a 6mm or 8mm rod with a 1mm pitch.

Materials:

1@ 36" x 1" hardwood square dowel.
1@ Miter Runner. I suggest Incra - 18" GlideLOCK Steel Miter Slider
1 1/2"(12mm) x 24" x 30" Baltic Birch Plywood
2@ 1/4" x 20 TPI coupler nut. Get at least 4 or 5 extras.
4@ 1/4" x 20 TPI hex nuts. You will need several of these.
1@ 1/4" x 20 TPI threaded insert intended for wood. Get some extras.
36" 1/4" x 20 TPI threaded rod. Get a good threaded rod, not the BORG store.
2@ 1/4" x 20 TPI Female Knobs. Woodcraft #142230
Knob diameter not more than 1-1/2" to clear the saw table.
1@ 1/4" x 20TPI Quick Release Knob. Rockler #63391 or others have these.
1@ 1/4" x 20 TPI Carriage bolt. 4" long and fully threaded
Drill bit the same size as the outside (point to point) diameter of the coupler nut. Mine was 27/64". Yours may be different.

You can make the CKJ from whatever scraps you have lying around.
In all component measurements "L" is parallel to blank; "W" is at 90° to blank. Your setup may be different and need different sizes.
Suggested Component Sizes:

16" L x 19" W Base Plate
16" L x 3" W Fence
9" L x 4-3/4" W Hold-down
9" L x 3/4" W Hold-down strips
1" square dowel ~3-5/8" long Alignment Block
1/4" x 20 TPI threaded rod 13" length. Your length may vary.

Practice Safety at all times!! The small parts used in this process are hard to hold. Use clamp, vise, or other means to keep your fingers clear of spinning parts.

1. Work Piece – (Black) Work piece is clamped here for cutting.
2. Positioning Mount – (Red) Threaded rod to position the inlays for cutting.
3. Position Mount Clamp – (Purple) Clamp down on threaded rod???
4. Fence – (Blue) Put the blank in the same position for all the cuts.
5. Hold-down – (Green) Keep pieces in place and fingers away from the saw blade.
6. Quick Release Knob – (Blue) Holds everything in place while you make the cuts.
7. Alignment Guide – (Yellow) Position the hold-down in the same location for all cuts.

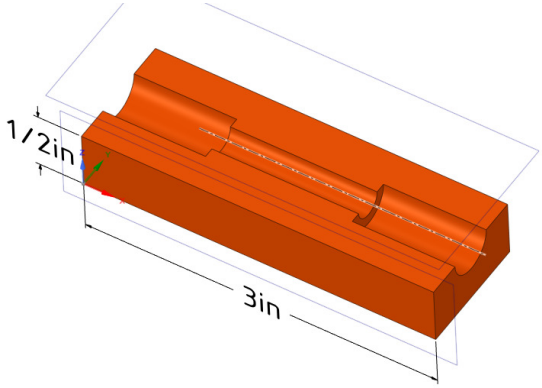
The CKJ MUST be used with the same blade in your table saw every time. If you have more than one saw blade, make more than one jig! Bottle Stoppers or Pepper Mills look better with a thicker kerf. For pens use a 7 1/2" circular saw blade.

To move along quicker, press glued parts together and use a brad nailer to prevent parts from slipping.

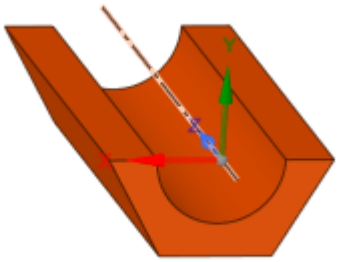
If you want to make Celtic Knot Bottle Stoppers or Pepper Mills, move the fence back from the front edge of the CKJ and make the fence taller. You may need to adjust sizes and the clamping lever. Use a full 10" saw blade for Pepper Mills or Bottle Stoppers to get an adequate depth of cut.

Positioning Mount

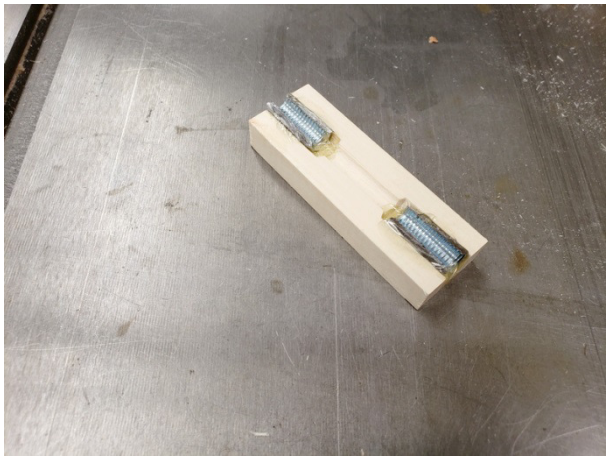
Cut a 3" length of the 1" square dowel. Drill a 1/4" hole thru the center of the blank just like a pen blank. This MUST BE ACCURATE! The threaded rod should be a sliding fit. Leave the blank in position. Measure the coupler nut from point to point (largest size). Mine was 27/64". It is 7/8" in length. Drill a hole in the blank the length of the coupler nut from both ends. The hole must be centered on the 1/4" hole at both ends. Insert the threaded rod in the blank. The rod must be straight and level. In several passes, split the blank in half on the table saw. The holes should be half on the positioning mount. Trim off any wood fibers that stick up.



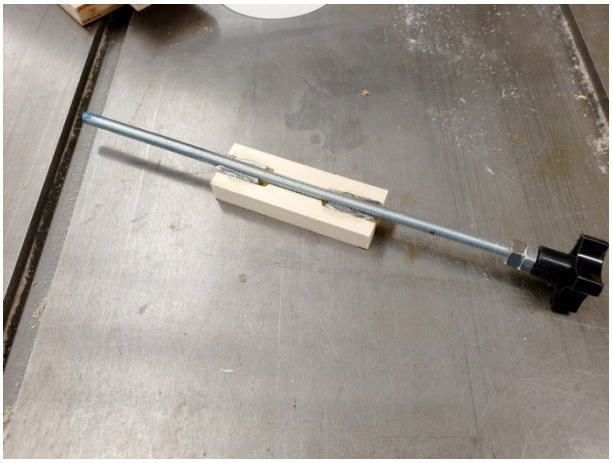
Clamp one of the coupler nuts lengthwise in a vise. Wear face protection! Use a Dremel with a FIBER cut-off wheel to slice the nut in half lengthwise. Don't use the thin cut-off wheel, it will just shatter. Slice one side of the nut so the point is just showing on the ends. Let the nut cool before touching it. DAMHIKT! Flip the nut over and repeat for the other side of the nut. Repeat the whole process for a second coupler nut. You will now have two partial coupler nuts like shown. File any sharp edges. Remove any burrs from the threads.



Now prepare to glue the partial coupler nuts into the **Positioning Mount**. You will need some Saran Wrap and Epoxy Glue. Put epoxy glue into the recesses where the two partial coupler nuts will go. Press the coupler nuts into the larger recesses at the ends of the **Positioning Mount**. Cover the coupler nuts with Saran Wrap and lay the threaded rod into the nuts. Clamp the rod in the center with a squeeze clamp.



Positioning Mount

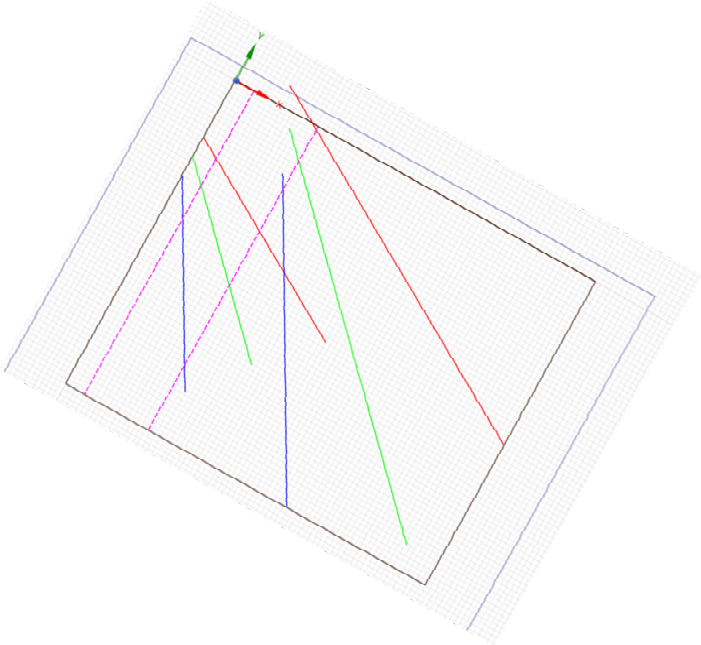


Positioning Mount with Threaded Rod

Plate and Fence

Base Plate Bottom

Base Plate Top



Seen from Top
Red is the 60°
Green is the 45°
Blue is the 30°
Pink is the layout of the fence.
Longer lines are the miter runner positions

This is the same orientation as the Base Plate Top Photo above right.

Measure the distance from the saw blade to the near edge of the miter slot. Mine is 5-5/8". Make a template guide from scrap wood. Cut the base plate to size. Flip the base plate upside-down and mark the angles you want to use on the bottom of the plate.

Layout the angles and positions of the cuts you want to make. I suggest 30°, 45°, and 60° to the angle of the blank. Cut a template guide from scrap about 16" long and the width of the distance from blade to miter slot. Mark the positions of the saw kerf and miter slot runner.

Layout the position and width of the **Fence** on the bottom of the **Base Plate**. Drill holes for the miter slide on the base plate for each of the 30, 45, and 60 degree angles. Be cautious, don't cover the holes with the fence. You will want to drill holes for any adjusting screws. You can trim off the upper left corner of the plate to make it smaller.

Attach the miter runner to one of the positions. Carry the saw cut lines to the top of the fence. Flip the plate upright. Mount the **Fence** back (1" for pens, 2" or 3" for bottle stoppers or peppermills) from the edge of the **Plate** and glue in place. Make sure no glue squeezes out from the front side of the fence. Clamp or brad the fence in place and let dry. Using the threaded rod, place the **Positioning Mount** at the lower end of the **Fence**. The threaded rod should be parallel to the fence. Glue the **Positioning Mount** down and clamp with rod installed. Don't mess up the threads. Let dry.

Hold Down
Mark the saw cut lines on the top side of the plate and fence. Cut the **Hold Down** 1-3/4" wider than the width of the **Fence** and long enough to cover the saw cut lines including the fence.

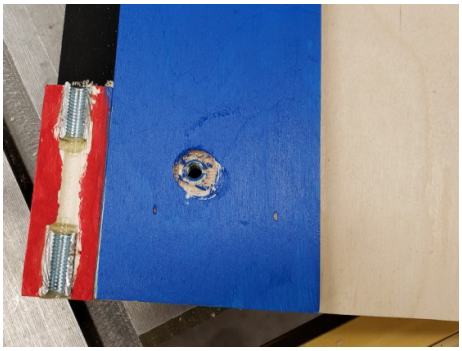
Cut two pieces of stock 1/2" thick x 3/4" wide and the length of the **Hold Down.** These will fit like a saddle over the **Fence**. Glue one piece to the rear of the **Hold Down**. Take the other piece and use double sided tape to attach the front block to the Hold Down. This piece is sacrificial and may need to be replaced as you make use of the jig.

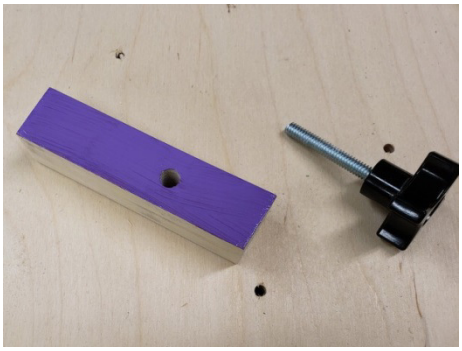
Alignment Block
Now make an **Alignment Block**. See photo for details of what it looks like. The block is composed of 2 1" square dowels stacked on top of each other and the same length as the width of the **Fence**. Glue the two pieces together to make a single **Alignment Block** of 2" high. Cut a keyway kerf in the **Alignment Block** and the **Hold Down.** You will need a bit of wood or aluminum the same thickness as the kerf. Glue the keyway to the **Alignment Block**. Now cut a matching slot in the Hold Down. Drill some guide holes for finish nails in the bottom of the plate and into the **Alignment Block**. Size the nails so they don't come thru the top of the block. Apply glue to the Alignment Block and ensure the **Hold Down** is aligned with the fence and drive home the finish nails.

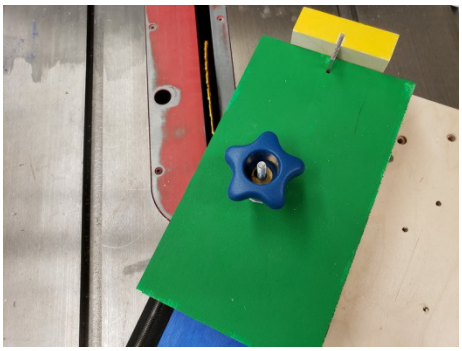
Hold Down Bolt
The **Hold Down Bolt** must be located so it is NOT in line with the saw blade! It MUST be vertical to the plate and fence. Mount the saw blade you intend to use with the CKJ in the table saw. Let the saw blade extend only about 1/8" or so above the table. Mount the miter runner into position on the bottom of the base. There must be no play in the jig. Make a practice cut about 4" long. Now shift the miter runner to each position and cut a similar groove. Turn the base over and look at where the grooves are cut into the bottom of the jig. Use strong clamps to secure the **Hold Down** and **Plate.** Drill a relief hole 3/4" in diameter and 1/4" deep with a forstner drill bit. Drill a 1/4" vertical hole thru the **Plate** and **Fence**. Remove the clamps and **Hold Down**. Enlarge the hole in the **Hold Down** to 3/8". Insert the carriage bolt thru the hole and tighten until it seats in the hole and doesn't rub on the table top of the saw. Epoxy the bolt into the hole

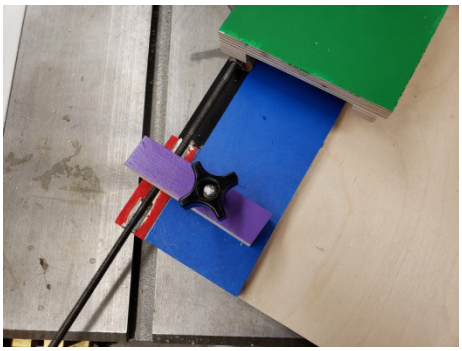
Positioning Mount Clamp

Cut a 4" piece of 1" square dowel. Drill a 3/8" hole 1-1/2" from the end thru the dowel. Lay the **Clamp** on top of the **Positioning Mount**. Mark the position on the **Fence**. Drill a relief hole about 1/8" deep in the top of the fence. Now drill and mount a 1/4" threaded insert into the fence at that position. Create a studded knob from a piece of threaded rod and one of the female knobs. Measure the length of threaded rod needed to clamp down on the threaded rod.









Assemble Threaded Rod

Measure the required length of the threaded rod. It must reach from the Positioning Mount to the far saw cut line. Allow a bit of length for the knob and the pusher nut. Use CA glue to attach a hex nut to the end of the threaded rod. Put two hex nuts on the other end of the rod. Screw the Knob onto the threaded rod and use the two hex nuts to lock the knob is position.