

Doc Blake's Keel Clamping Tool



**August 2020
David Blake**

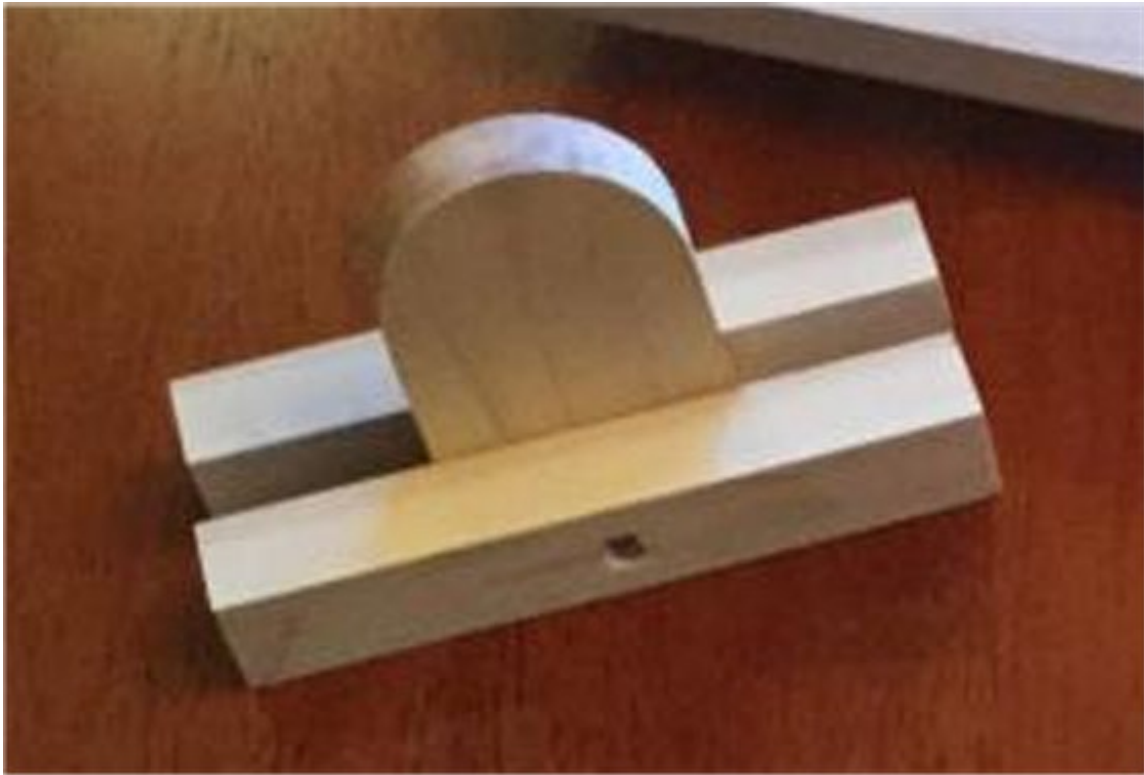
Keel Clamp

1) About materials: The base is best made of $\frac{3}{4}$ " plywood. All the other wood should be hardwood. I used maple, but other hardwoods like poplar would work fine. The lower pivot gussets are $\frac{3}{4}$ " thick, but all the other hardwood in the clamp is $\frac{1}{2}$ " thick. Detailed drawings of parts are included below, as is a cut list and inventory of needed hardware.

2). The first step is to select a base. Bigger is better than smaller, because once the clamp is finished, and a model is clamped in it, it may be a bit top heavy. You wouldn't want it to topple over. I used a 7" X 14" piece of $\frac{3}{4}$ " plywood for my base. Draw a centerline across the short dimension. Measure out $\frac{1}{4}$ " on either side of the centerline and draw lines parallel to it. This will establish where the lower pivot and it's gussets are located. The two lines parallel to the centerline are $\frac{1}{2}$ " apart.

3) Cut out the lower pivot and the two lower pivot gussets according to the plan and the cut list.

4) Center the lower pivot on one of the gussets and glue the two parts together. Make sure the bottom of the gusset and the bottom of the pivot are flush with each other so the assembly will sit flat. When dry, glue the other gusset in place. You should have a piece that looks like this.



When the assembly is dry, I added a 1-1/4" #6 wood screw as reinforcement. You can drill the hole now for the 5/16" carriage bolt shown on the plans.

5) Glue the lower pivot assembly to the base, centering it over the lines you drew previously. Once dried, I added four 1-1/4" long #6 screws through the bottom of the base into the gussets to reinforce the structure.





6) We can start to work on the clamp jaws and the upper pivot now. The upper pivot, like the lower, is made of $\frac{1}{2}$ " thick by 2" wide hardwood. There is a 1" radius round over cut into the top and a hole for a $\frac{5}{16}$ " carriage bolt. Once that's cut out and drilled, we can make the two clamp jaws. Again, these are $\frac{1}{2}$ " thick stock, 16" long, 1- $\frac{3}{8}$ " wide and identical. There are 4 holes drilled into both of the jaws, $\frac{1}{2}$ from the bottom edge . These are for the four $\frac{1}{4}$ " carriage bolts that tighten the jaws. It's important that these line up, or else the jaws will be difficult to adjust. I suggest clamping the two jaws together before drilling, and using a drill press if you have access to one. Here are two photos of the completed clamp jaw assembly:



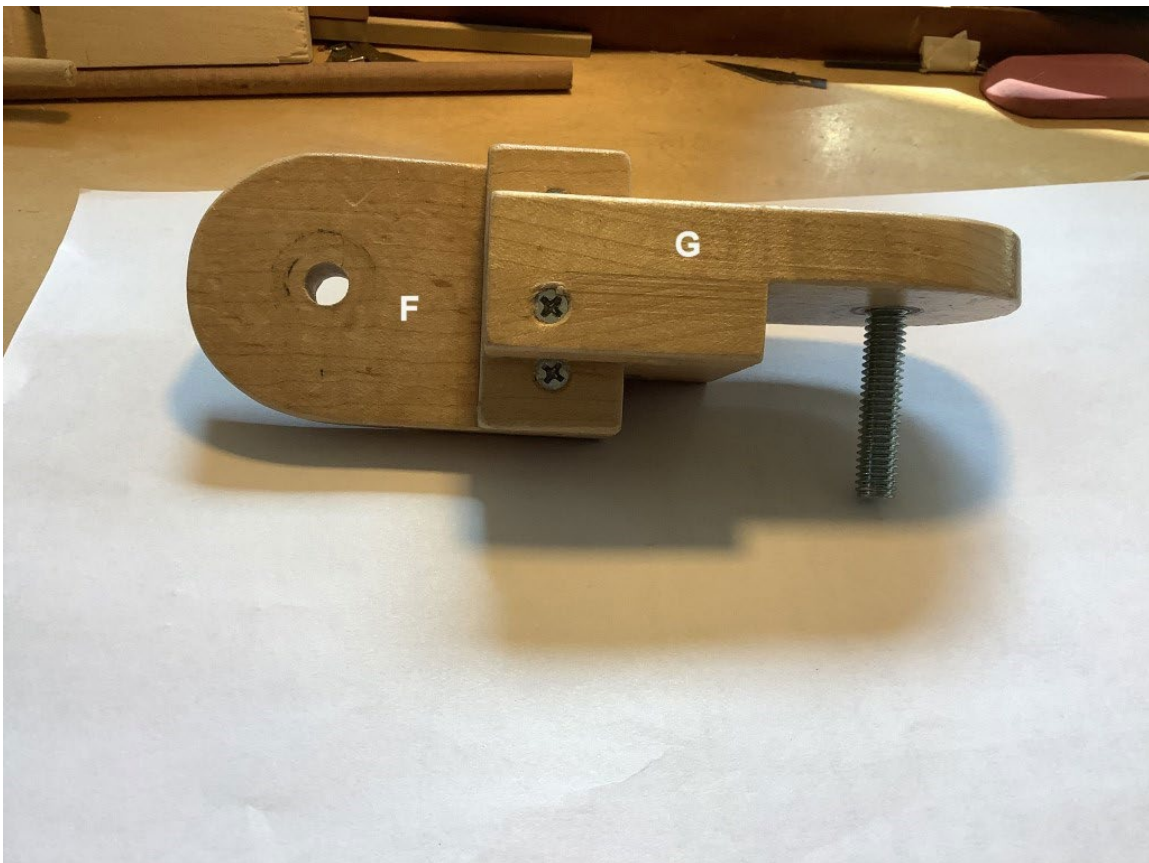
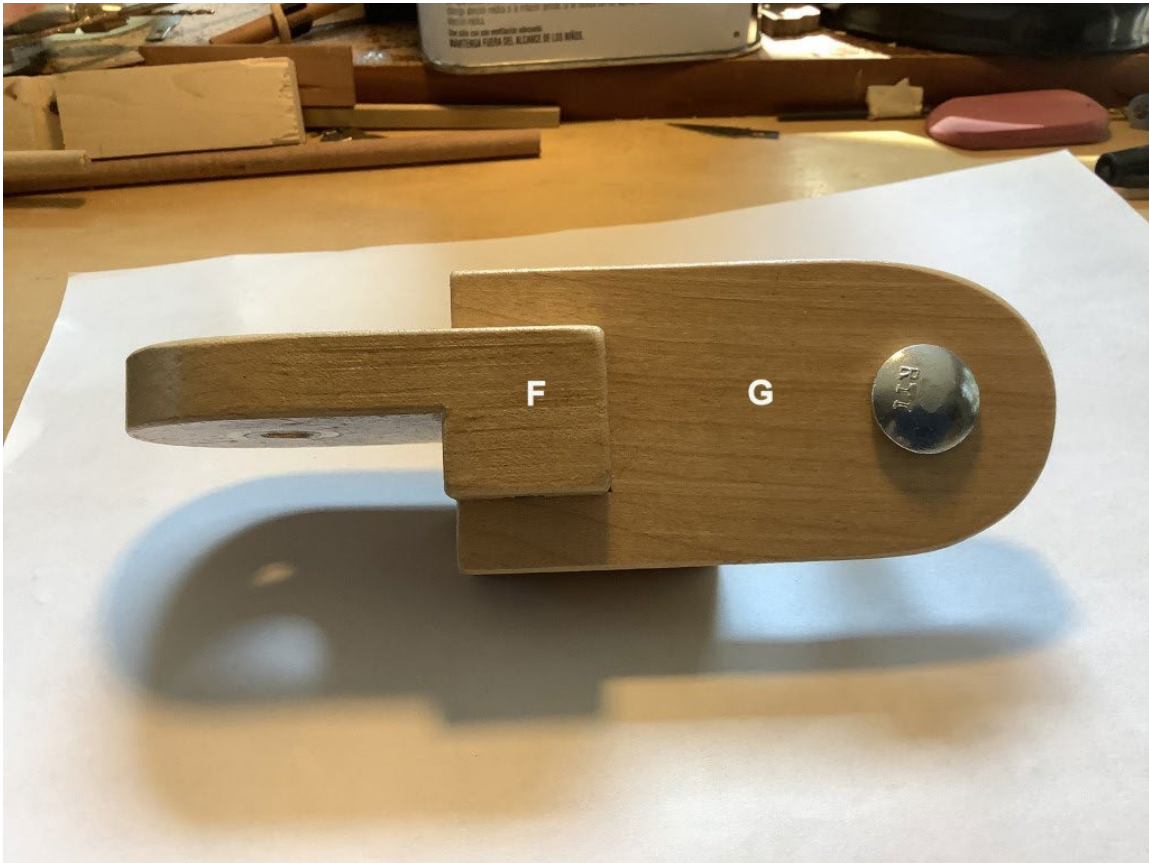


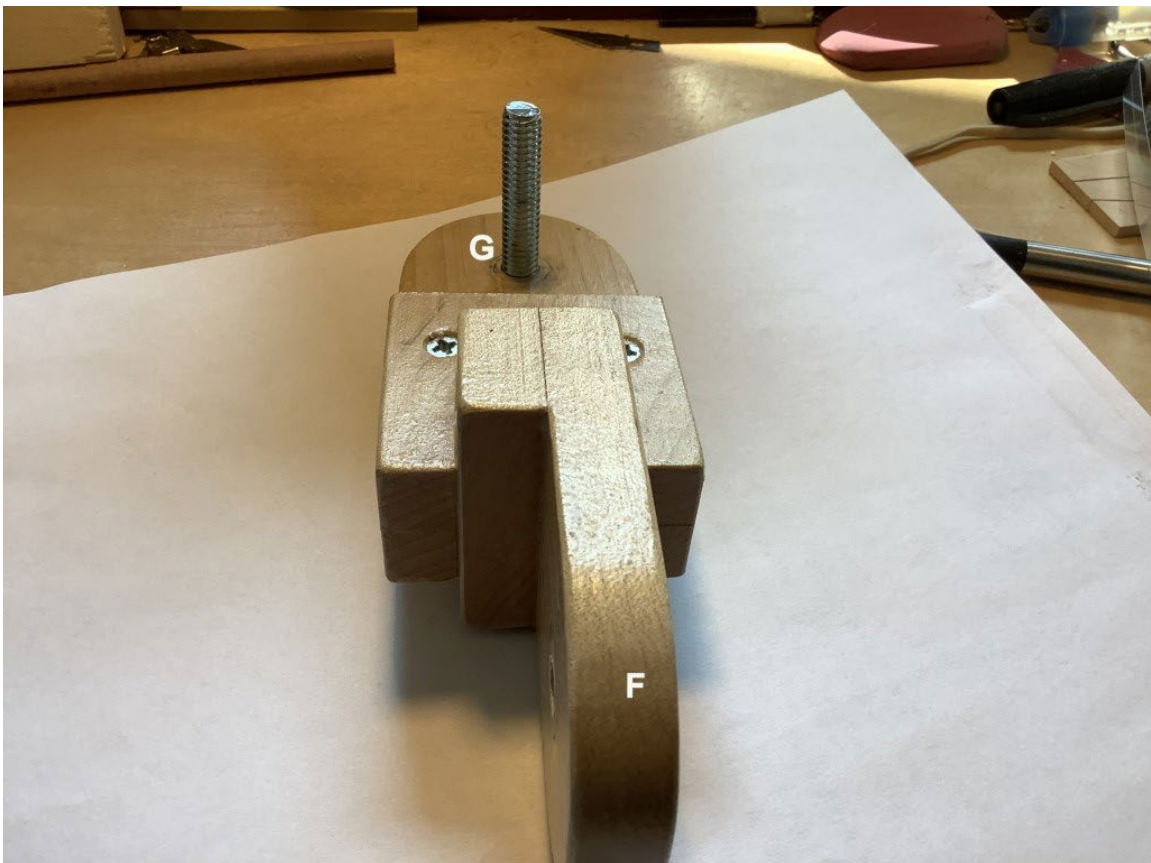
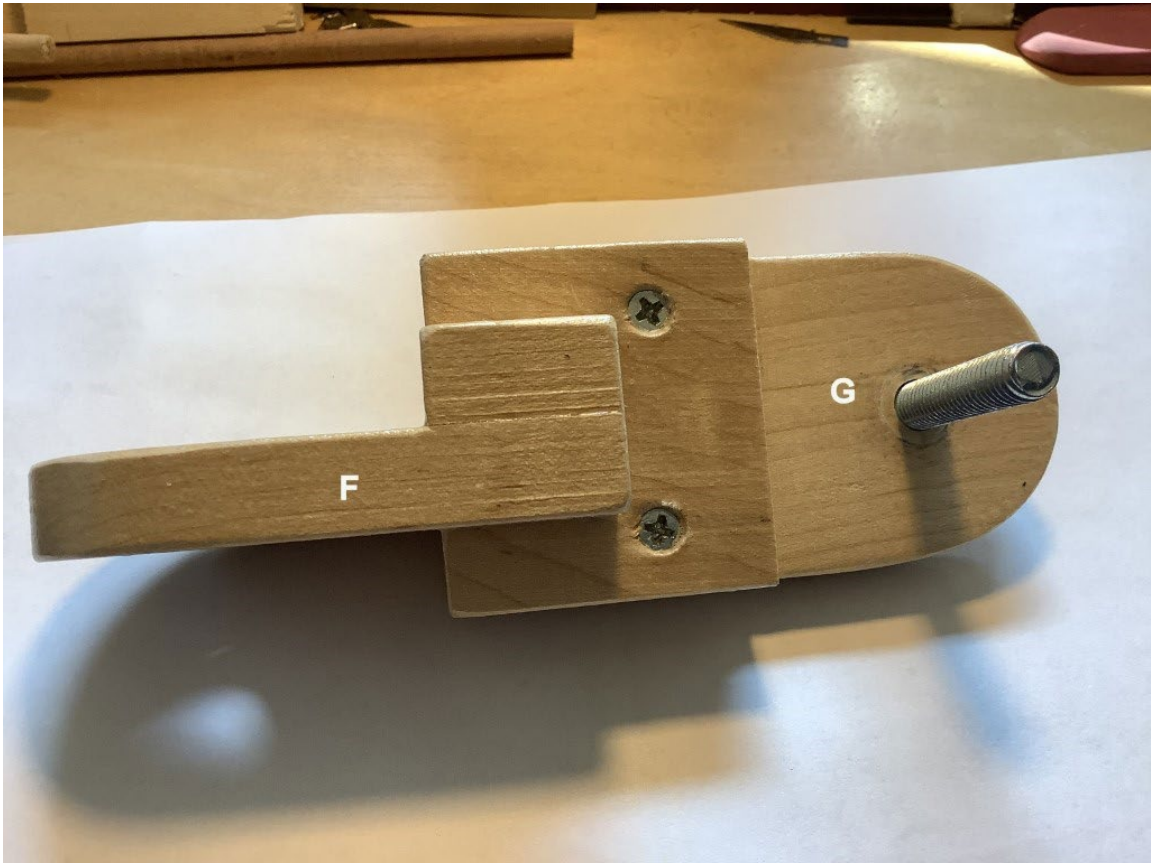
6) The knuckle is the key to how this clamp works. It allows the clamp to pivot in two planes. Moving the base creates adjustment in the third plane. Although the knuckle looks complicated, it is actually made out of two simple pieces. I glued and screwed the knuckle together. It does require a cutout after assembly, so I would suggest gluing the components together first, laying out the cutout, and then adding reinforcing screws that won't interfere with the knuckle assembly. The photos below show the knuckle assembly: Part F is the lower knuckle pivot, part G is the upper knuckle pivot. Both are made of the pivot proper and a filler piece. Cut out the parts and glue the filler piece in place.

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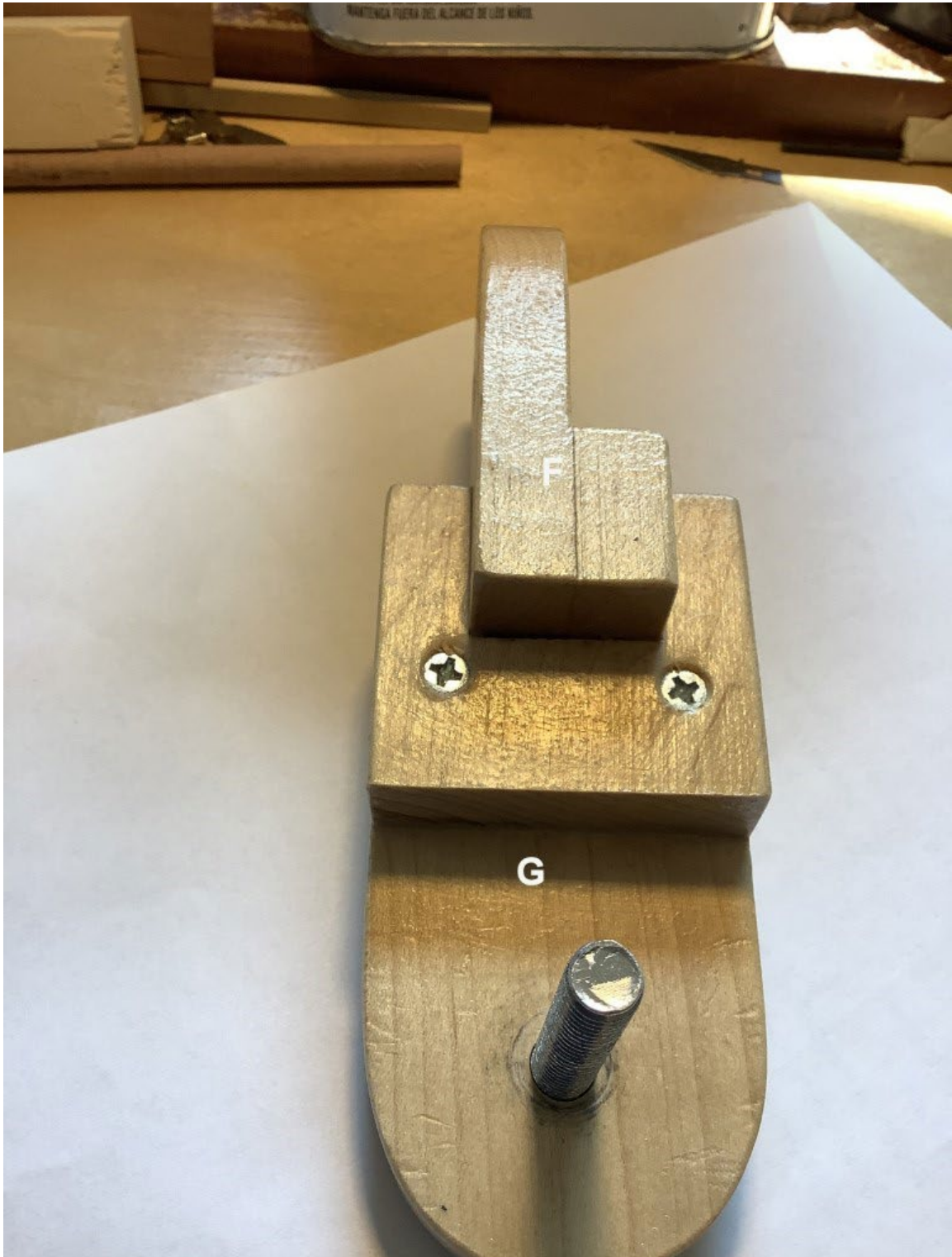


When assembled, cut the 1" X 1" X 1" "saddle in place on part G. Glue the two knuckle parts together as shown. When dry, add reinforcing screws to the knuckle where appropriate.



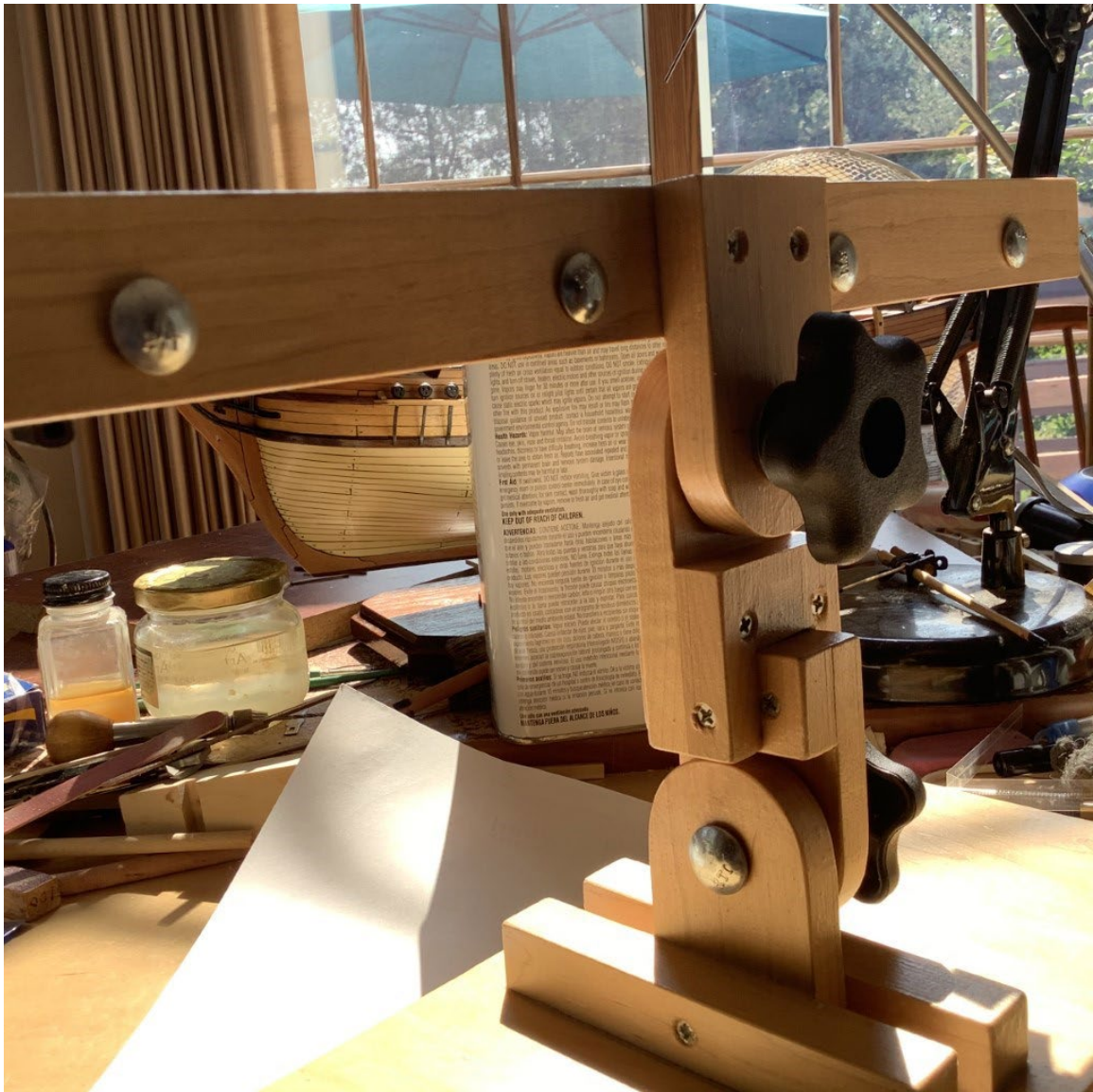






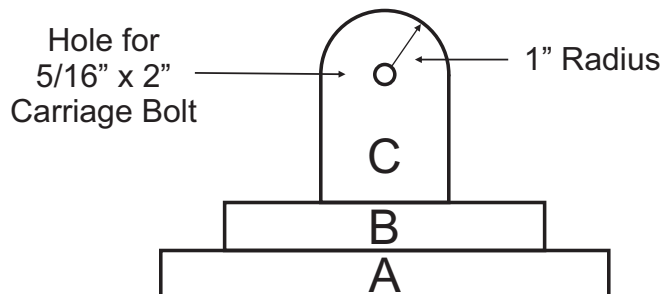
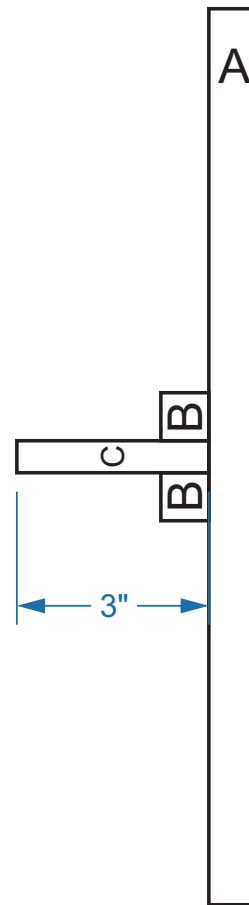
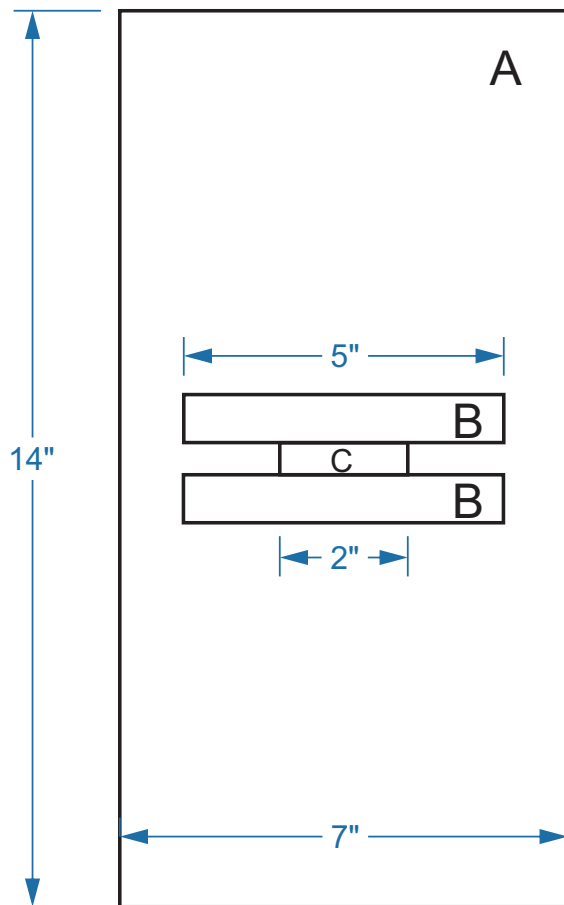
7) Finish the parts as you choose. I used Minwax Polycrylic. It dries fast and cleans up with water. Assemble the clamp using the carriage bolts, washers and star knobs or thumbscrews as desired. You're done!!







# Keel Clamp Tool



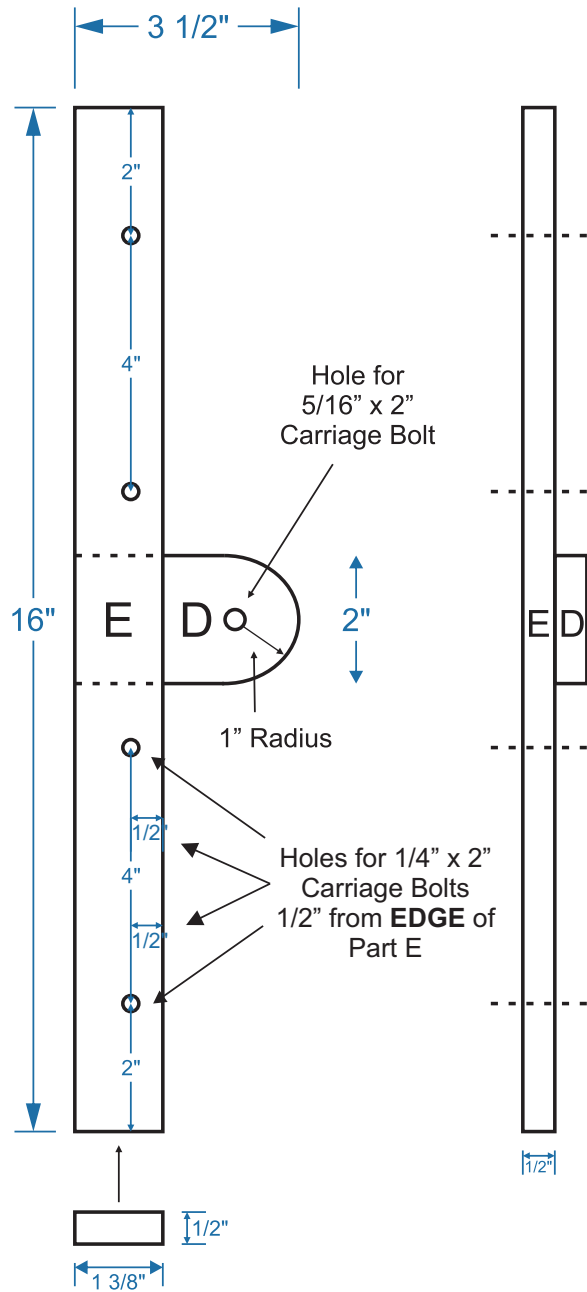
Ⓐ - 14" x 7" x 3/4" plywood base

Ⓑ - 3/4" x 3/4" x 5"  
lower pivot gussets (x2)

Ⓒ - 3" x 2" x 1/2" lower pivot

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Scale: 1" = 3"  
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# Keel Clamp Tool



(D) - Upper Pivot  
 $3\frac{1}{2}" \times 2" \times \frac{1}{2}"$   
 $1"$  radius round over top.  
 Hole for  $\frac{5}{16}" \times 2"$  carriage bolt.

(E) - Clamp Jaws (2)  
 $1\frac{3}{8}" \times 16" \times \frac{1}{2}"$   
 Holes as noted for  $\frac{1}{4}" \times 2"$  carriage bolts.

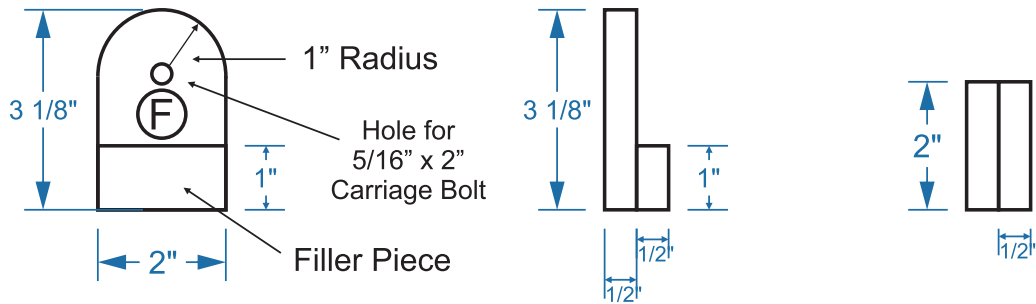
- Screw & Glue Part D to one Part E as noted.

# Keel Clamp Tool

(F)

Knuckle  
Lower Pivot

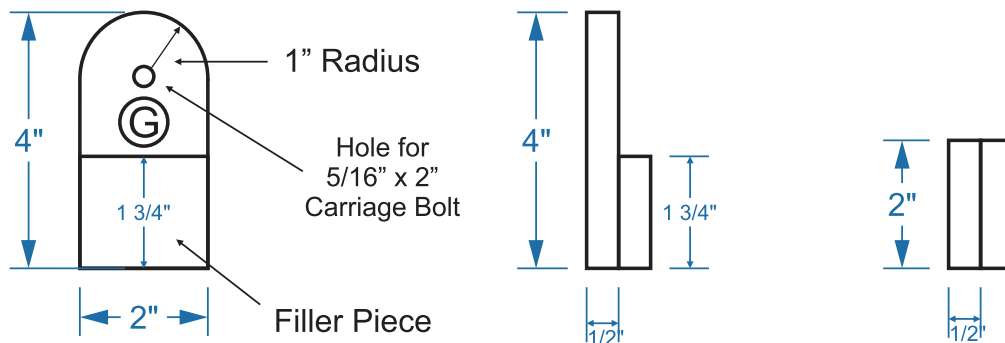
- 3 1/8"x2"x1/2"  
- 1"x2"x1/2" Filler Piece



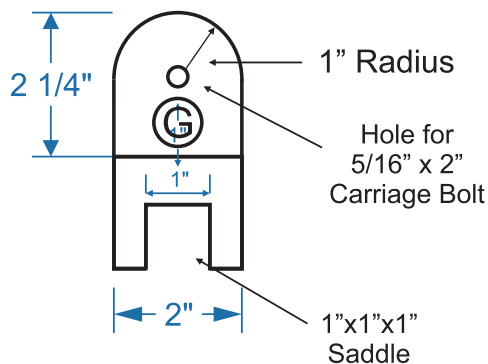
(G)

Knuckle  
Upper Pivot

- 4"x2"x1/2"  
- 1 3/4"x2"x1/2" Filler Piece  
- Cut Saddle



Once Upper Pivot assembled, cut "saddle" into it.



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# Keel Clamp Tool

## Cut List

A - Base: 7" X 14" X 3/4" plywood

B - Lower Pivot Gussets (2): 3/4" X 3/4" X 5" hardwood

C - Lower Pivot: 3" X 2" X 1/2" hardwood

D) - Upper Pivot: 3-1/2" X 2" X 1/2" hardwood

E) - Clamp Jaws (2): 1-3/8" X 16" X 1/2" hardwood

F) - Knuckle Lower Pivot: 3-1/8" X 2" X 1/2" hardwood

1" X 2" X 1/2" hardwood filler piece

G) - Knuckle Upper Pivot: 4" X 2" X 1/2" hardwood

1-3/4" x 2" X 1/2" hardwood filler piece

## Hardware List

- 2 - 5/16" X 2" carriage bolts
- 4 - 5/16" washers
- 2 - 5/16" star knobs or wingnuts
- 4 - 1/4" X 2" carriage bolts
- 4 - 1/4" washers
- 4 - 1/4" star knobs or wingnuts
- #6 woodscrews : 1-1/4" - 6 needed

3/4" - 8 needed

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