

Coffee Table for M.C. Escher!

Featured Piece of the Month – October 2022

Jim Allen

I had been looking for a coffee table idea for some time. When doing research on Period Furniture I came across information and designs of Charles Renee Mackintosh from the Scottish Arts and Crafts period. While many of the Arts and Crafts period pieces are heavy looking, the style is after all medieval revival, his *Hill House Drawing Room table* was appealing. After gathering more information on his designs, one author suggested the design would make a great coffee table. Get out the sketch pad, and drafting board; how do I do this?

Let's start with the finished product, and I'll detail from there.



23 $\frac{1}{8}$ x 37 $\frac{1}{8}$ x 16 $\frac{1}{8}$ Oak with Glass Top Coffee Table

Starting with each square measuring 6 $\frac{5}{16}$ " horizontally by 6 $\frac{3}{4}$ " vertically, the component pieces were drawn with five main parts: legs, stiles, and 3 sizes of rails for a total of 78 pieces. Next the detail was added to make all the connections. Unfortunately the detail got confusing, i.e.; mortises intersecting half laps, some on one side and on all interior pieces mortises

intersecting on both sides. To simplify I worked up a process sheet, so that the drawings only detailed the tenons and half laps.

Pictured on the right are the 78 pieces that make up the grids in the coffee table, including 4 legs, 20 stiles, 6 short rails, 10 long rails, and 36 interior connector rails. The legs only needed 3 mortises each on the inside corners. The main stiles and rails all needed $3/8'' \times 3/8''$ tenons on each end, and $3/8'' \times 3/16''$ on the ends of each connector rail. I needed to set up a production method to cut 148 tenons accurately.

First goal was to make sure each of the stiles and rails were the same length. This was done using a table saw sled with an 'L' stop. The same set up was used to cut the tenon shoulders. After the 'L' stop was dialed in to the correct depth, the four shoulders of each end could be cut all to the same length. This part of the project was very repetitive and I was glad that I made a few extra pieces. One misstep or attention lapse sent another piece to the scrap bin! I learned to use a lot of patience and take breaks to refocus on the job at hand. I cannot imagine having to do something like this on a daily basis; piece work production is a quality killer!



Last step for the tenons was cutting the cheeks, again accuracy and repeatability were important. Time to breakdown and purchase that tenon jig I've always wanted.

With the tenons cut the next step was to lay out the mortises and half laps. I did the half laps first. With the $3/4''$ dado half lap completed at each intersection the top and bottom rail, mortises could be lined up, detailed, and cut. This way if there were the slightest dimensional error it would be carried perpendicularly from top to bottom.

The two end assemblies were half lapped and mortised first. These only required one set up on the table saw with a dado stack. Using a miter gauge and spacer block clamped to the table saw fence, the first cut was followed by reversing the piece to cut the second half lap. The same was true for cutting the mortises. Using a stop block on the mortising fence cutting the first mortise on the 4 top and bottom rails, the pieces were reversed to mortise the other end. The alignment and square of each assembly was checked by dry fitting the stiles and rails.



The next part was to set up and cut half laps and mortises for the long end rails. With 5 sections there were 2 set ups required, the 2 ends, and the 2 inside. Again this was done the same as the 2 end assemblies, but now there were 4 stiles to cut. Like the end assemblies it was all lay out, check and recheck dimensions, and patience!

Now to make this all work, the half lap dados had to be cut on all 20 stiles in the exact same place. These cuts were key to a good fit because the top, bottom and middle rails needed to fit into mortises cut into the legs at the same locations. While I had detailed and milled the leg mortises, a double check of the layout was done by dry assembly of the legs and rails and the stiles aligned with the middle rail. Once satisfied that the stile dado was dimensioned correctly, a sample piece was cut and checked. Remember the old woodworkers mantra; *Measure Twice, Cut Once!* Now with all the work of milling, sizing, tenoning and mortising of 78 pieces, a couple more measure and checks were wise. Satisfied, cutting the 20 stile dados were next.

More mortise fun to do! Remember the 36 connector rails, those 3/8" x 3/16" tenons need a place to go. There are another 72 mortises to cut. The outside rails only needed 4 3/8" x 3/16" deep mortises on the inside face. The middle 2 assemblies need the same mortises cut on the top and bottom rails on both sides; the middle rail has a mortise on one side and in the stiles on the other side. I left all my alignment markings in place for this step, again using stop blocks on the mortising fence for repeatability.



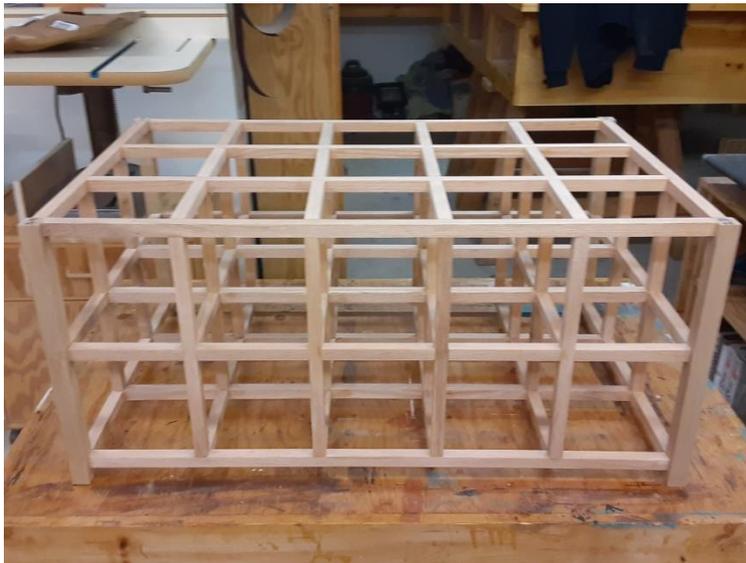
I was now ready to experience the rapture of assembling my creation, after several attempts going alone I took a deep breath and waited for help. My grandson visiting from Houston was very happy to help.



Roan Allen from Houston

Starting with the 2 end grids dry assembled, we then added one outside grid, followed by the inside grids; working towards us, lightly clamping the end grids to the side grids as we proceeded. As each grid assembly was placed, the 12 connector rails were added, then on to the next long grid assembly. After all the pieces were dry assembled, it was time to check for square, proper spacing, and level. With everything measured as planned, it was time for glue up! This worked out to be easier than dry assembly.

Each grid pattern, 3 rails, and 2 or 4 stiles were glued and clamped using plastic squares on the corners. I did these one at a time, using liquid hide glue and waiting overnight for a good glue set. As with the process for the dry assembly the end grids were glued to the legs, with the glue set on the ends, the first outside grid was glued in place. I found it easier to take this slowly, letting each glue up to set before proceeding. The assembly had just enough flexibility that the last 2 long grid assemblies could be glued in place at the same time.



An important finishing note here, every piece was hand sanded prior to glue up to 320 grit paper with a hand held sanding block. Don't even think about doing it after gluing!

We, as in my wife and myself, determined at this point that the only top that would work here was tempered glass. I did want to carry over the Mackintosh detail of the 9 Mother of Pearl inlays at the center of the top of the original table. I'm going to give a shout out here to the people at Country Glass in Hudson, MA for their input. They had nine 1" squares etched to the underside of the glass. With the glass top in hand, it was back to the drawing board for edging to contain the glass. The weight of the glass (more than the wood base) is enough to hold it down. To contain the glass I wanted a thin, simple contour mitered frame. With the glass frame glued in place it was time to finish.



Don't even think about sanding, steel wool burnish or buff after gluing. While I did sand every piece prior to assembly, I didn't steel wool and buff. Big mistake, I didn't keep track of the

hours, could you blame me! But it was worth it. First coat was wiped on Boiled Linseed Oil, followed by wiped on water based polyurethane semi-gloss varnish. To do all surfaces took a little over one hour, and why only do a couple, when you can agonize over the minutest flaw, buff and do again! After seven coats, enough, no one will ever get their eyes within 6 inches to see that spec in the surface!

At long last we have the coffee table with a lot of interest and detail that I always wanted, and my wife is looking forward to playing Tic-Tac-Toe with the grandchildren!

