

# A Study in Squares

Gridwork side table is a unique take on Arts and Crafts

BY KEVIN RODEL



I came across the original version of this table while doing research for *Arts & Crafts Furniture: From Classic to Contemporary* (The Taunton Press, 2003), the book I co-authored with Jon Binzen. Josef Hoffmann of Vienna designed that table in 1903. For my own version, I made just a few changes: to the size, the construction of the top, and the finish (fumed white oak). The biggest difference between mine

and the original (which had a blackened finish) is the top. The original didn't have a pinwheel top. Instead, it had four mitered pieces that were glued together with a contrasting center piece.

Designed over 100 years ago, this table remains quite avant-gard. It pushes design boundaries with interesting twists on the legs, aprons, and top that all work well together. It is a simple yet very strong de-





**GRIDWORK SIDE TABLE**

Pinw  
13/16

**TOP VIEW**

The diagram shows the top view of a square gridwork side table. The overall dimensions are 20 3/4 in. by 20 3/4 in. The table features a central square inset with a dark, textured surface. The gridwork is composed of blue lines forming a square pattern. Red hatched areas indicate the locations of the table legs and the central inset. Dimensions are provided for the gridwork sections: 11 7/8 in. for the left section, 8 3/8 in. for the right section, and 3 7/8 in. for the bottom section. A dimension of 3 in. is shown for the right side of the table. The diagram also includes a small detail of a wooden leg and a pinwrench.

11 <sup>7</sup>/<sub>8</sub> in.

8 <sup>3</sup>/<sub>8</sub> in.

20 <sup>3</sup>/<sub>4</sub> in.

3 in.

3 <sup>7</sup>/<sub>8</sub> in.

## EDGE DETAIL

Center block,  
approx. ½ in. thick  
by 3½ in. square,  
sits in rabbet on  
underside of top.

Technical drawing of a wooden stool with the following dimensions:

- Top width:  $20\frac{3}{4}$  in.
- Top thickness:  $1\frac{3}{16}$  in.
- Top overhang (left):  $1\frac{3}{16}$  in.
- Top overhang (right):  $1\frac{3}{16}$  in.
- Seat height:  $10\frac{1}{2}$  in.
- Seat thickness:  $1\frac{1}{2}$  in.
- Seat width:  $9\frac{1}{2}$  in.
- Seat depth:  $1\frac{3}{4}$  in.
- Seat thickness (bottom):  $\frac{1}{2}$  in.
- Leg height: 27 in.
- Leg width:  $1\frac{5}{8}$  in.
- Leg thickness:  $\frac{5}{8}$  in.

Legs have a reverse taper on two outer faces, leaving the inside edges straight and square for easy joinery.

The four grid structures that form the apron give this design a lot of punch as well as structural integrity. The grids are light but very rigid and provide a great

## UNIQUE LEG CONSTRUCTION FOR A CUTTING-EDGE DESIGN

Unlike most legs that taper toward the bottom, these legs get narrower at the top. They also have grooves that hold the gridwork aprons, instead of mortises, and inlaid cuffs at the bottom.

### MAKE THE REVERSE-TAPERED LEG

Two outside faces are tapered from  $1\frac{3}{16}$  in. at top to  $1\frac{5}{8}$  in. at bottom (before rabbeting for cuff)

Two inside faces are straight and square for easy joinery.

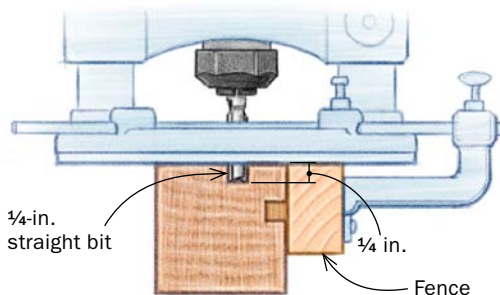
Stopped groove (cut before leg is tapered),  $\frac{1}{4}$  in. wide by  $\frac{1}{4}$  in. deep by 10 in. long,  $\frac{1}{2}$  in. from inside edge

### ADD THE CUFF

Ebony cuffs,  $\frac{3}{32}$  in. thick by  $\frac{5}{8}$  in. wide

Rabbet,  $\frac{1}{16}$  in. deep

**Start by cutting the grooves.** A straight bit and a plunge router with a fence make it easy to cut the stopped grooves in the two inside faces of the legs (right). Rodel uses a chisel to square the end of the groove (far right).

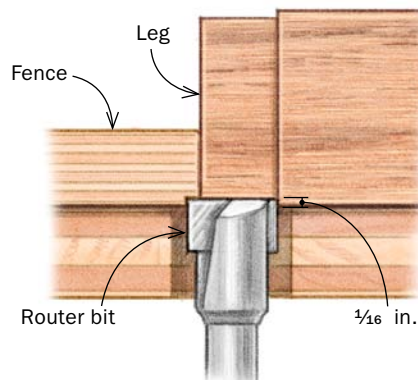


deal of gluing surface with the legs. The grid structure is simply a series of carefully placed half-lap joints, and there is more than one way to make them. I have found that the quickest and cleanest approach is to cut a series of dados across a wide piece of stock first and then rip this stock into the strips. This quickly gives you grid sticks with the half-laps in exactly the same location. What makes the joinery layout a bit trickier is the thicker piece at the top

of the grid. That is designed to drop the grid down a bit below the overhang of the top, so it looks uniform to the viewer. It also provides a wider place to attach the corner blocks that reinforce the base and provide a place to attach the top.

**Start with wide stock**—For each of the grids, you should have two pieces of stock that you can cut into at least five narrow-

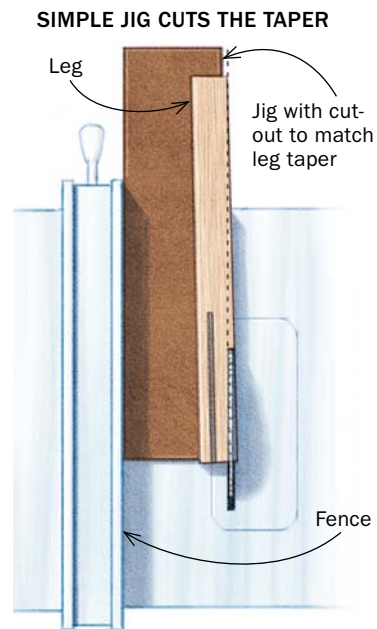
**A shallow rabbet for the cuffs.** Rodel uses a router table to rabbet the bottom of the legs. The rabbet should be slightly shallower than the thickness of the cuff stock. The slight taper on the legs will affect the rabbets where the inlays join, but Rodel compensates for that when gluing in the first two cuffs and fitting the second two between them.







**Backward taper is next.** Rodel uses a simple L-shaped jig to cut the taper on the leg. Make sure your saw has its splitter in place (left).



er strips each, plus the thick piece at the top, and a test piece of the same thickness for setting the depth of the cuts. With a dado set in your tablesaw, use the test piece to set the depth of cut a hair

less than halfway through the stock. Doing this allows the pieces to protrude from one another slightly and helps with clamp pressure. Also, I start with stock that is  $\frac{1}{16}$  in. too long. This way, the intersecting pieces end up a bit proud, and then I trim all four grids to the same size.

It's important to keep track of the five pieces of vertical grid stock and the five pieces of horizontal grid stock and keep them separated, because the layouts are slightly different and executed on the opposite faces. Lay out the dado locations on one set of the grid stock. You'll set up everything to those lines and cut all the pieces at the same time, so you don't need to mark dados on everything. You do need to mark whether they are verticals or horizontals and add a triangle to reorient them once they are cut into strips. Keep in mind that the dados on the horizontal stock are on the inner faces and the dados on the vertical stock are on the outer faces.

Also note that along the top and bottom of the vertical pieces and sides of the horizontal ones there are rabbets (they are open on one side), not dados. Cut those first, starting with the sides of the horizontals and the bottoms of the verticals because they are all the same dimension. Then cut the thicker rabbet at the top of the verticals before moving on to the dados.

When cutting the rabbets, move the rip fence right up to the dado blade but leave a small space so as not to nick the fence. That will leave a sliver of waste at the end of the rabbet, but you can knock that off



**Glue the cuff stock in place.** Rodel clamps two opposite sides at a time, leaving the first pair long and cutting the second pair to fit between those. Once the glue is dry, he trims the ends and sands the cuffs flush to the legs.

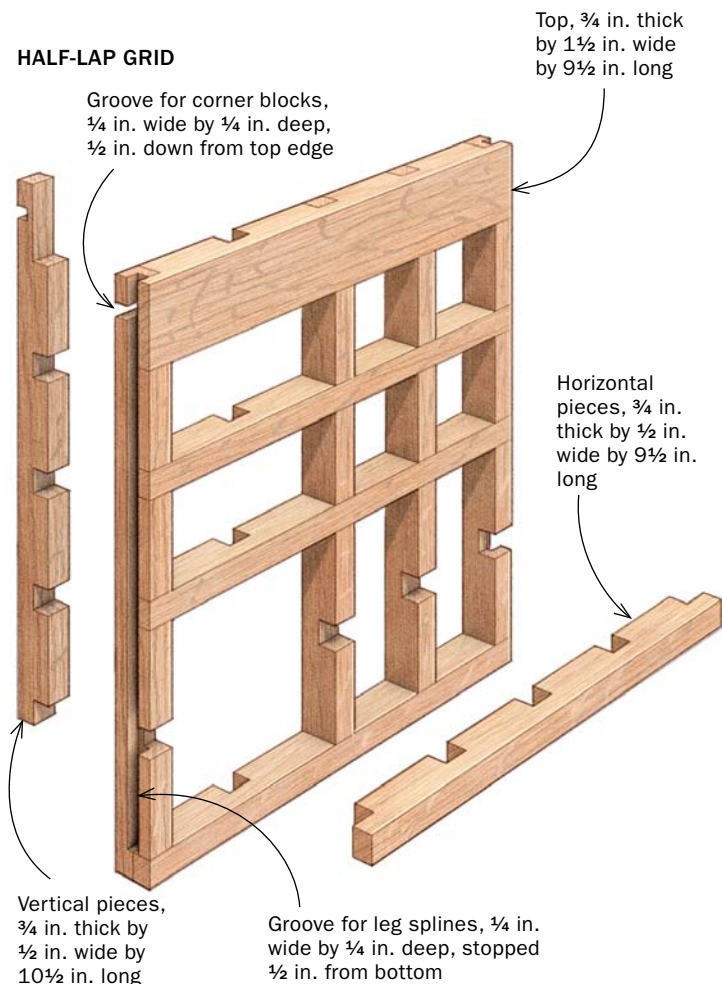




## PERFECT GRIDS, STEP BY STEP

The hard part is making sure all the half-laps are right on. By cutting the dadoes in wider stock and then ripping those into thinner strips, Rodel ensures all the half-laps on the grids meet up perfectly. Keeping track of all the parts is the key to success.

### HALF-LAP GRID



easily with another pass. When cutting the dadoes, work on all the horizontals and then all the verticals. With the fence as a stop, work to the layout lines on the first piece, and then cut all those dadoes before moving the fence to cut the next dado.

**Rip and joint your way to precise fitting grid strips**—When you have cut all of the dadoes, it's time to rip the wide stock into strips. To rip the strips to the perfect width, I use the tablesaw in conjunction with the jointer. Set the jointer to make a light cleanup cut and do not change it. With a good rip blade, set the saw's rip fence for a heavy 1/2-in. cut. Now, using a test piece, rip off a strip, joint the ripped edge, and test the fit in a dado. If the fit is too tight or loose, make the necessary adjustments to the rip fence. When your test piece fits snugly with hand pressure, rip all of

the grid stock into strips. Remember, after each ripcut, joint the edge of the grid stock before ripping another strip. When all of the grid stock has been ripped, joint the ripped face of all the strips, and you're ready to assemble the grids.

**Assemble and groove the grids**—Because each intersection needs a clamp, this glue-up can be fussy. But it's not difficult. I always dry-fit beforehand and try not to use too much glue so I don't have a lot of squeeze-out to clean up.

Once the grids are glued together, I pass them through a thickness sander and level



**Cut rabbets and dadoes in wide stock.** Use a test piece for setups, setting the blade height just shy of halfway. Rodel cuts the outside rabbets on each end of the horizontal stock pieces and the bottom of the vertical stock and then moves the fence to cut the rabbet at the top of the vertical stock, which is wider than the others. Then he repositions the rip fence twice more to cut the remaining dadoes in the grid stock.



**Rip the dadoed stock into narrow strips.** Rodel rips all the strips (left), jointing the wide stock between each ripcut (below left), and then jointing the opposite face after it has been ripped. He keeps all the stock marked with triangles and letters so he can keep track of them through this process.



the surfaces while bringing them to final thickness. I rent time on a local wide-belt sander, but a belt sander followed by a random-orbit sander could get the job done as well. Just take care to keep everything flat and on the same plane.

To clean up the edges of the grids, I joint two adjoining edges and rip the opposite sides to the final dimension.





**Putting the grids together.** Glue and clamp the entire grid at the same time, joining the center pieces first and then moving outward (above). To avoid crashing clamps, use a vise to hold the grid and apply clamping pressure to part of it, and add clamps to the rest of the intersections (right).

The next step on the grids is to cut a groove on the vertical edges, which corresponds to the groove in the legs. I do this on the tablesaw with a dado blade, stopping the groove before it runs out the bottom edge of the grid.

For added strength and a place to secure the top, I add corner blocks to the inside of the base. The corner blocks have a tongue that sits in a notch in the top of the grid. Although I don't add the blocks yet, I groove the top of the grid now.

### Attach grids to legs

Now you can assemble the base. The legs attach to the grids with splines in the grooves. There is plenty of strength with the 10½ in. of long-grain to long-grain glue surface at these joints, but the splines make the glue-up easier, keeping the grids from sliding around and guaranteeing that all alignments are the same. Glue two sub-assemblies: one grid to two legs for each assembly. When they dry, glue them together with the remaining two grids.

While you're waiting for the first parts of the base assembly to dry, make up the corner blocks. First, drill the four top hold-down holes on the drill press. Next, cut the blocks from the stock and use the tablesaw to rabbet the two just-cut edges to make a tongue that fits snugly into the groove in the top edge of the grids. When the base is fully assembled, glue in the corner blocks.

### A pinwheel top

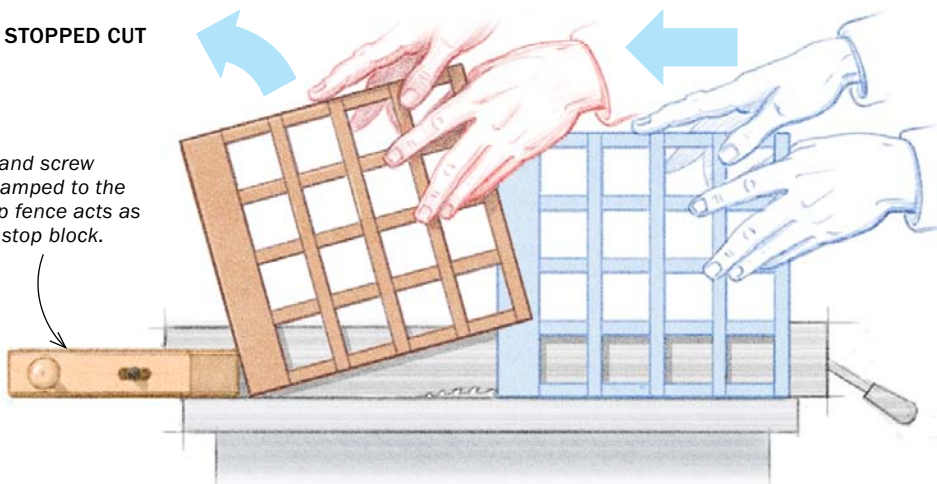
The top construction is unconventional but that's what I like about it, and it works very



**Grooves for splines and corner blocks.** Use the same setup, a dado blade on the tablesaw, to cut the grooves for the spline and the corner blocks. The corner-block groove can go through, but the spline groove is stopped, so set a stop block on the rip fence and pivot the work up when you hit it. Square up the end with a chisel.

### A STOPPED CUT

Hand screw clamped to the rip fence acts as a stop block.





## THE BASE IS EASY TO ASSEMBLE

Glue-ups don't get any easier. Splines align the grid aprons with the legs, and the grids provide a perfect place for clamps to rest.

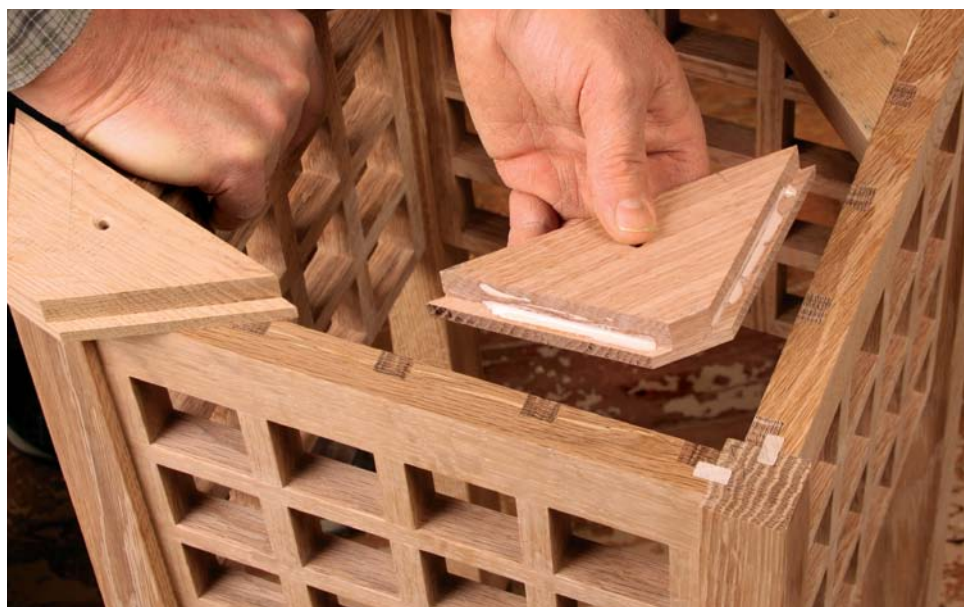


**Two legs and an apron.** Start by creating two sub-assemblies of two legs and a grid (above). Let those dry, and then add those two assemblies to the two remaining grids (right). The splines keep the grids aligned on the legs. You just have to flush everything up at the top.

well with this design. The four identical parts that make up the top should come from the same long, wide board, but if you don't have a long board that wide you could glue up two boards. When the four parts are cut out, lay them out in a spiral pattern and mark the edges that get a mortise and the ends that get tenoned. Lay out and cut the mortises. I use a mortising machine, but you could use a plunge router with a fence and straight bit. I cut the tenons on the tablesaw with two cuts and test-fit the joints. Then cut the 30° under-bevel on the ends opposite the tenons.

There will be some seasonal expansion and contraction across the 8 $\frac{3}{8}$  in. width of each top piece, so only apply glue to the half of the mortise closest to the center of the top. This will allow each piece of the top to move as needed around the outer edge and maintain a constant tight fit in the center. Rather than gluing up all four pieces at once, it is best to do two at a time and then join them.

The last item on the top is the center block. I chose a black Motawi tile (motawi.com) to relate to the ebony cuffs, but your options are unlimited. Whether it is a tile on an insert, a leather pad, or whatever



**Corner blocks for attaching the top.** Once the base is dry, glue the corner blocks in place, and you are ready to screw on the top.



## TACKLE THE TOP LAST

A spiral top with a tile insert adds to the drama of this table.

**Two pieces at a time.** To leave the right-size hole in the center of the table, leave the mortises a little long, leaving some wiggle room for aligning the edge of the tenoned piece with a pencil mark on the mortised piece (3 in. from the shoulder). When each of these sub-assemblies has dried, glue them together, again aligning the edges with the pencil marks. You should have an exact 3-in.-square opening.



**Slight bevel is a subtle detail.** After the top is assembled and sanded, Rodel uses a straightedge and a small V-cutter in a router to carefully cut a shallow groove between the pieces, which extends into the center square. This accentuates the pinwheel arrangement.



**Screw the center block into the rabbet.** The center block, a tile silicone-glued to a wood insert, goes in from the underside of the top and sits just below the surface. Rodel uses TEC, a flexible grout, on the top side in the space between the wood top and the tile.

you may imagine, the center block goes in from the underside of the top and sits in a rabbet that stops it just below the surface. To cut the rabbet, I use a plunge router and bearing-guided rabbeting bit. This leaves the corners rounded, but I square them with a chisel. The depth of the rabbet is determined by the thickness of the mate-

rial that you wish to display. For example, if you choose to insert a  $\frac{3}{8}$ -in.-thick tile, be sure to leave a lip around the center opening that is about  $\frac{1}{32}$  in. more than  $\frac{3}{8}$  in. Again, the insert should sit just below the surface of the wood top.

Attaching the top to the corner blocks is a breeze. With the completed top upside down, center the base over it. With an awl, mark through the corner blocks for the four screw locations, remove the base, and drill these pilot holes. To complete the center insert, make up a baseplate from any stock and cut it to fit the opening in the underside of the top. Drill two small screw holes in two opposite edges. Now fix the insert to the baseplate with an appropriate adhesive.

### Fuming and finishing

I recommend disassembling the top from the base and taking out the insert for finishing. Before I applied three or four coats of Tried

& True Varnish Oil, I fumed the parts. See my article, "Fuming with Ammonia" in *FWW* #126, for detailed instructions on how to darken white oak with this very simple, traditional technique. □

Kevin Rodel makes furniture in Brunswick, Maine.

### Design options

Rodel played with contrast on this set by using a two-part wood bleach on one and an ebonizing process on the other, with a checkerboard inlay in both.

