



ARCHED AURORA NIGHTSTAND

BY DARRELL PEART

If my furniture making business were a corporation, the shareholders would have thrown me out a long time ago. My approach is impractical, because I'd rather tinker with a design than repeat it. That means I spend a lot of time remaking jigs and templates, which is not an efficient way to maximize profits. I think any design is fresh fodder for further exploration. This nightstand is a refinement of an earlier design, just one in a long series of tables that I've designed (see "Furniture DNA, page 40). It has obvious Greene and

Greene elements as well as a nod to James Krenov, through the use of his block-and-dowel pull. I used Kiah (African mahogany) as the primary wood, because good quality Honduras mahogany is difficult to get here in Seattle. I used Gaboon ebony to make the decorative plugs and splines.

Start by milling all the parts about 1/8" oversize in thickness and cutting them 1/4" oversize in length and width. Cut extra pieces for testing set-ups and to replace any parts that move excessively. Sticker these parts and set them aside.

LEGS

Build the jig for routing the waterfall leg details (Fig. A). Mill the legs (A, Fig. B), making sure they're flat and 1-9/16" square. Mark the waterfall profile on two adjacent sides of each leg and remove the waste by sawing to within 1/16" of the lines. Install a 3/4" x 1-3/4" flush-trim bit in your router table. Clamp each leg in the jig and rout the waterfall profiles (1).

Bunch the legs together, using the profiles to orient them correctly. Label each leg at the top and mark an arrow that points to

the center (Fig. C). Next, carefully mark all of the mortises and plug locations. From experience, I know it is very easy to get disoriented at this point, because the mortise sizes and locations vary, and there are three sizes of plugs. So, reassemble the legs using their top marks, and double check to make sure that all the mortises are located on the inside faces—the same as the waterfall profiles. All the plugs should be located on the outside faces. Chop or rout the 9/16" deep mortises, using whatever method you prefer.

Drill all the plug holes 1/64" undersize, and then square them. Use a hollow chisel from your mortiser to square the 1/4" holes. For the 3/16" holes, lay out the shape with a square drafting template and then square the hole with a chisel. For the 1/8" holes, use the square end of a tap from a tap and die set. (Taps work okay on these small holes, but not on anything larger.)

APRONS, RAILS AND STRETCHERS

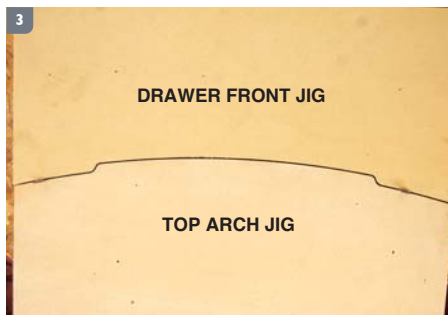
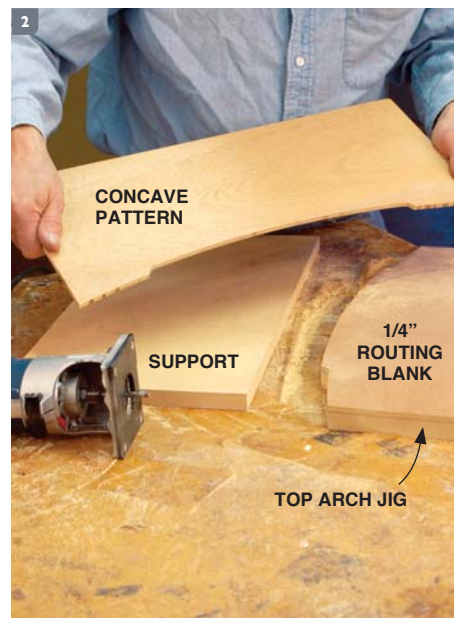
Mill the aprons (B), drawer rails (C and D), and stretchers (E). Leave the aprons and bottom drawer rail as rectangles for now, so you will have a reference for machining the tenons—their arches and cloud lift details will be routed later. Mill the top rails (F) and the faux rails (G) now, too, but leave them a little long.

Now, cut all the tenons (Fig. D), using your preferred method. It's critical that the distance between the tenon shoulders (16-1/8") is the same on every piece. Once all of the shoulders are established, cut the top rails and faux rails to length, matching them exactly to the shoulder lengths. Miter the ends of the top rails and the top drawer rail. Saw or rout the rabbet in the bottom inside corner of each stretcher.

JIGS FOR ROUTING ARCHES

Make jigs to rout the faux rails, aprons, bottom drawer rail and drawer (Fig. E). Start by making patterns to lay out the arcs for each jig. Using 1/4" MDF and a router equipped with a straight bit and a trammel, rout 38"-radius and 38-3/8"-radius arcs for the bottom arch jig, and 39"-radius and 39-3/8"-radius arcs for the top arch jig.

To make the jigs, plot the arc end points as centerlines onto pieces of 3/4" MDF that are exactly 9" x 20" (Fig. E). Accuracy to



1/64" is a must here (Incra layout tools provide the necessary precision). Use the large-radius patterns you've just made to connect the end points of the center arcs. Then use your small-radius patterns to draw the two outside arcs. Connect the center and outside arcs with cloud lifts. First, plot the transition point for each S-shaped lift. Then use a Berol RapiDesign R-75 radius guide to draw the curves.

Saw each profile to within 1/16" of the layout lines. Align each arc pattern with its respective layout line and fasten it to the jig. Install a flush-trim bit in your router (3/4" dia. or smaller) and rout each arc onto the

jig. Shape the connecting cloud-lift radii using a spindle sander equipped with a 3/8" dia. spindle. The registration blocks that complete the jigs will be added later.

DRAWER FRONT JIG

I think the visual effect is delightful when two design elements create a symmetrical series of arcs. Moreover, I enjoy the challenges this precise work presents.

The goal is for the drawer front to precisely mirror the arched profile of the drawer rail, with a consistent 1/16" gap. To rout that profile, you need a concave copy of the top arch jig that is offset by 1/16" (Fig. E). The

AURORA NIGHTSTAND

Overall Dimensions: 28-1/8" H x 26" W x 21-5/16" D

| Part | Number | Name | Material | Dimensions (Th x W x L) |
|----------|----------|-----------------------|----------|---------------------------------|
| A | 4 | Leg | kiah | 1-9/16" x 1-9/16" x 27-1/8" (a) |
| B | 3 | Apron | kiah | 7/8" x 5-3/16" x 17-1/8" (b) |
| C | 1 | Top drawer rail | kiah | 1/2" x 2-3/4" x 17-1/8" |
| D | 1 | Bottom drawer rail | kiah | 7/8" x 2-3/8" x 17-1/8" |
| E | 4 | Stretcher | kiah | 1" x 1-1/4" x 17-1/8" |
| F | 3 | Top rail | kiah | 1/2" x 2-3/4" x 16-1/8" (c) |
| G | 3 | Faux rail | kiah | 1/4" x 2-3/8" x 16-1/8" (d) |
| H | 6 | Apron trim | kiah | 1/8" x 7/16" x about 30" |
| J | 1 | Shelf | kiah | 7/8" x 16-1/2" x 16-1/2" |
| K | 10 | Large Plug | ebony | 17/64" x 17/64" x 6" (e) |
| L | 8 | Small plug | ebony | 9/64" x 9/64" x 6" (e) |
| M | 8 | Medium plug | ebony | 13/64" x 13/64" x 6" (e) |
| N | 1 | Drawer front | kiah | 11/16" x 4" x 16" |
| P | 2 | Drawer side | kiah | 5/8" x 4" x 17-1/8" |
| Q | 1 | Drawer back | kiah | 5/8" x 2-1/4" x 15-1/4" |
| R | 1 | Drawer bottom | ply | 1/4" x 16-1/4" x 15-3/16" (f) |
| S | 2 | Drawer pull block | ebony | 9/16" x 13/16" x 1-1/2" |
| T | 1 | Drawer pull dowel | mahog | 3/8" dia. x 7-3/4" |
| U | 1 | Top core | kiah | 7/8" x 21" x 21-1/2" |
| V | 2 | Breadboard end | kiah | 1" x 2-1/4" x 21-5/16" |
| W | Multiple | Internal spline | kiah | 1/4" x 15/16" x 44" |
| X | 4 | Decorative spline | ebony | 5/16" x 3/4" x 5" |
| Y | 1 | Breadboard plug stock | ebony | 1/4" x 25/64" x 10" (g) |
| Z | 2 | Drawer runner | hardwood | 1/2" x 5/8" x 16" (h) |
| | 1 | Dowel | birch | 3/16" dia. x 15" |

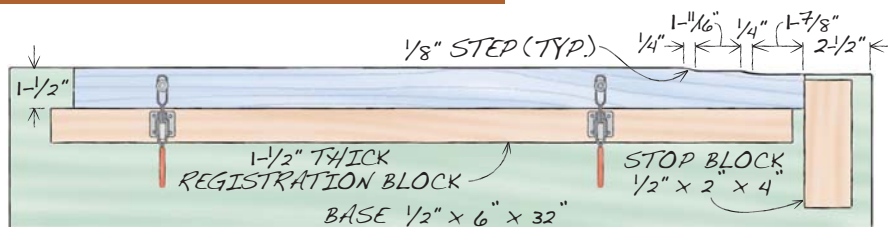
Notes

- (a) Trim to 1-1/2" x 1-1/2" when routing waterfall profiles.
 (b) Cut to final length with faux rail attached.
 (c) Cut long and trim to exact length of tenon shoulders.
 (d) Attach to apron before cutting to final length.
 (e) Cut to about 1/4" lengths.
 (f) Adjust to fit.
 (g) Cut to length to fit breadboard mortises.
 (h) Adjust width and thickness to fit.

Hardware

2 1/4-20 threaded inserts; 2 1" x 1/4-20 flat head brass screws; 11 #8 X 1" flat head wood screws (top rails to aprons; assembled top to top rails); 4 table top fasteners; 8 #8 x 2 1/2" pan head wood screws (breadboard ends to core); 4 pcs. 1/8" thick L-angle aluminum 3/4" x 3/4" x 16"; 12 #8 x 3/4" flat head wood screw (L-angle aluminum to stretchers) 2 #6 x 3/4" pan head wood screws (shelf to L-angle aluminum); sticky felt pads.

FIG. A: ROUTING JIG FOR LEGS



key, of course, is to use the jig's profile to make a pattern for the drawer front.

To start, fasten a 1/4" x 20" x 16" piece of MDF on top of the top arch jig. The two pieces should be flush on three sides—the cantilevered portion of the 1/4" MDF will become the pattern for creating the drawer front jig. Slide a support under the cantilevered portion and clamp both sides of the setup. Then, using a 1/4" flush-trim bit, carefully rout the 1/4" MDF flush to the jig's profile (2). The bearing **MUST** remain in tight contact with the profile all the way through the cut, or the new concave pattern will not be accurate. It may take a more than one try to get useable results.

Attach the concave pattern to a 3/4" x 9" x 20" piece of MDF, flush on three sides. Outfit your router with a 1/4" straight bit and a 5/8" guide bushing. Then rout the profile onto the 3/4" MDF. To check the results, align the drawer front jig you've just created with the top arch jig, using 1/16" spacers in between (3).

COMPLETE THE RAILS

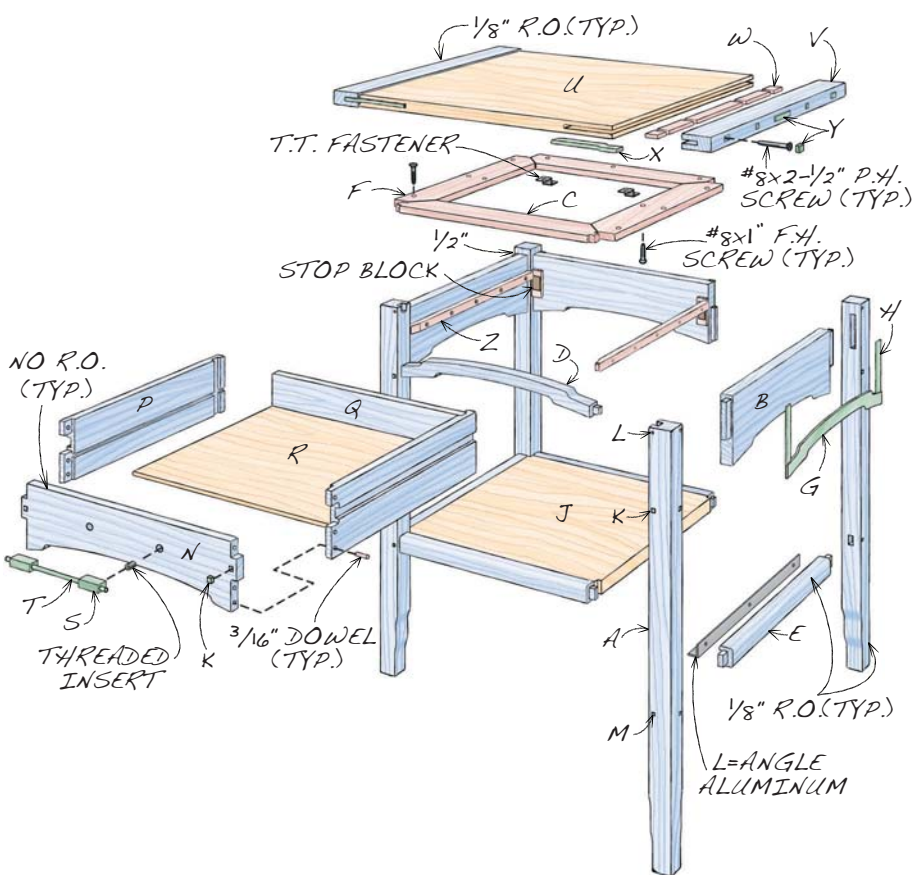
Center and attach the registration block to the top arch jig (Fig. E). Rout the arched profiles on the tops of the faux rails and on the bottom drawer rail (4). Accuracy is extremely important here. To make sure the block is correctly located, make test cuts on scrap pieces identical in size to the actual stock. The flush-trim bit you use cannot be larger than 7/8". Before routing, trace the arched profile on each piece and then cut or sand as close to the line as possible, to minimize the chances of blowout.

Rout 1/8" roundovers on the arched profile of each faux rail. Sand the faux rails and aprons to 220 grit. Then glue and clamp each faux rail on an apron, flush with both shoulders and the bottom edge.

Center and attach the registration block to the bottom arch jig. Then rout the bottom profile on all three apron/faux rails (5). Use nails or screws to correctly register the bottom drawer rail on the same jig (6). Fasten the rail to the jig with screws through the bottom. Then rout the profile.

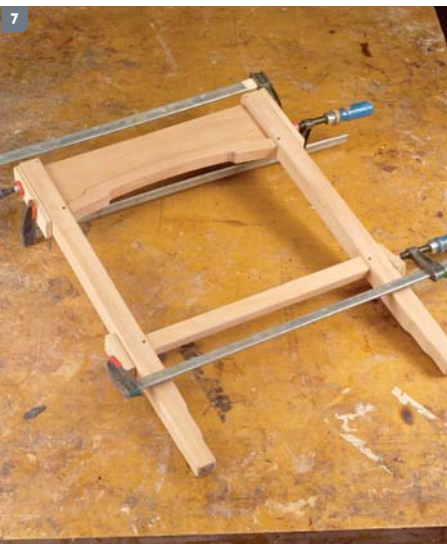
Sand all the parts you've completed so far to 220 grit, and round over all the exposed edges (including both faces of edges seen after final assembly). When rounding over the legs, beware of the holes for pegs—your bit's bearing may run into them.

FIG. B: EXPLODED VIEW



ASSEMBLE THE BASE

Glue up the right and left sides separately. Dry-fit each assembly before gluing, to ensure that the apron sits 1/2" (the top rails' thickness) below the top of the legs (7). Next, add the front and back rails and stretchers and glue the two sides together. I use a shop-made fixture to ensure a square



glue-up (8). Make the apron trim pieces (H). Rout a 1/8"roundover on one edge of a length of 7/16" thick stock. Then rip a 1/8" thick strip off the routed edge. Fit and glue on each trim piece (9).

Round over the bottom outside edges of the top rails and rout a shallow rabbet on their bottom inside edges, for the table-



FIG. C: LEG MORTISES AND PLUGS

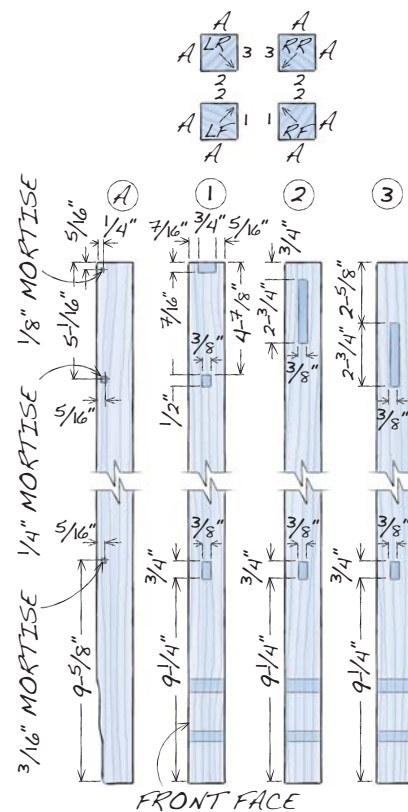


FIG. D: TENONS

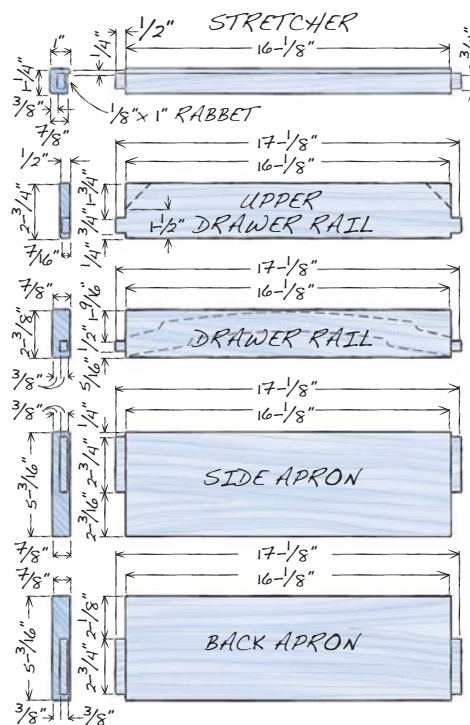


FIG. E: ROUTING JIGS FOR ARCHES

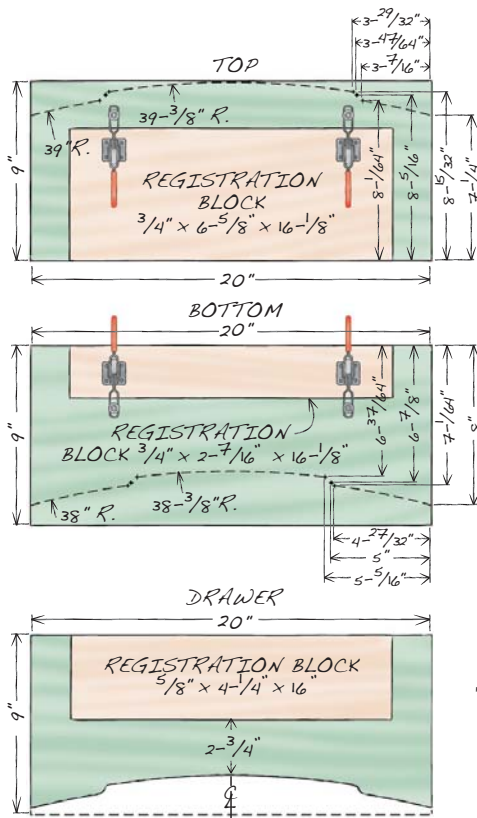


FIG. G: BREADBOARD END DIMENSIONS

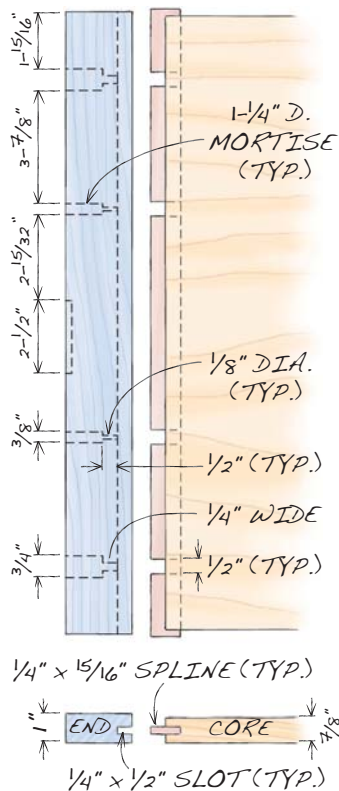
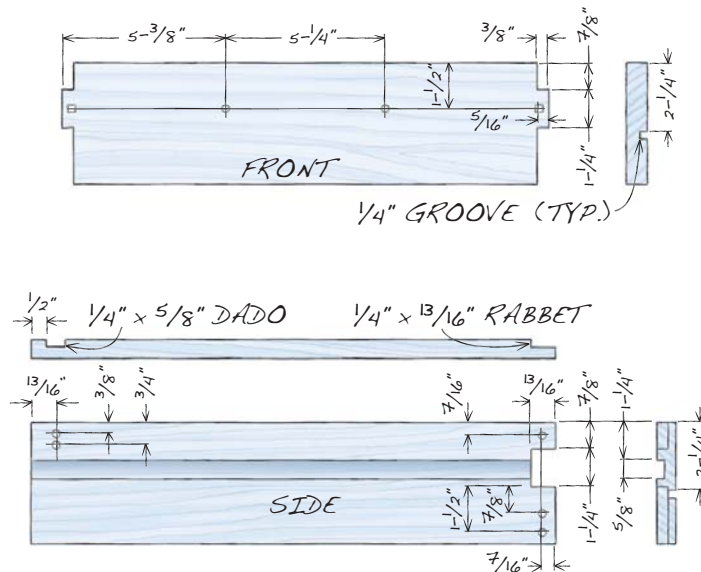


FIG. F: DRAWER PART DIMENSIONS



top fasteners that are used to attach the top. Then glue and screw the top rails to the aprons, making sure their outside edges are coplanar with the faux rails. Glue up the shelf (J) and cut it to final size. It should fit inside the stretchers with a 1/8" gap all around. Round over the shelf's top face.

EBONY PLUGS

Machine square rods for the ebony plugs (K, L and M), 1/64" oversize. Sand the rod ends on a soft surface to form a pillow shape (10). Work up to 600 grit and then polish on a buffing wheel, using white rouge. Cut each pillowed end to 1/4" length and slightly bevel the sides to ease insertion (11). Squeeze a dot of glue in the hole and tap the plugs into their respective holes with a plastic-headed mallet.

THE DRAWER

Mill the drawer front (N) and sides (P) to final size and the drawer back (Q)

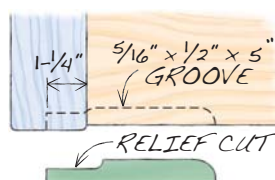
to final thickness. Lay out the finger joint notches on the front end of each drawer side (Fig. F). Use a dado set, a sled with a tall fence, and a stop to cut the notches (12). Make test cuts first, using scrap stock. Use two settings to establish the width.

Rabbet the inside face of each drawer side, to house the drawer front and lighten the appearance of the end-grain fingers. Cut a dado for the drawer back and a groove for the drawer bottom on each inside face. Match the groove to the bottom's thickness. Cut a 3/16" x 5/8" groove for the drawer runner on each outside face.

Transfer the drawer sides' notch locations to the ends of the drawer front and use the dado set, sled, fence and stop to create the fingers. (As before, use scrap material first, to test the fit.) Dry assemble the drawer and square it, to determine the drawer back's exact length. Cut and fit the drawer bottoms (R).

The drawer front may need to be adjusted to evenly fit in the opening. To check the fit, measure the opening and transfer those measurements to the drawer front jig. Attach temporary registration blocks, cut a test piece, and fit it into the opening. Ideally, there will be a 1/16" gap all the way around. If necessary, adjust the blocks and try again. When the fit is acceptable, rout the actual drawer front. Tilt your tablesaw's blade to about 11-1/2° and rip

FIG. H: DECORATIVE SPLINE DETAILS



the drawer sides' bottom edges to match the drawer front's arched shape.

Assemble the drawer and mark a line around the fingers to indicate how far they protrude beyond the drawer front (13). Then round (or "pillow") the fingers, using 120-grit sandpaper and both hands in a see-saw motion to remove most of the waste (14). Don't sand past the lines. Finish the pillowing effect by hand as needed, progressing through the grits to 320.

Sand all the drawer parts to 220 grit prior to assembly. For better control, glue one finger joint at a time, being careful to keep things square. Drill and install the dowel pins that secure the joints. Then glue in the drawer back. Slide in the drawer bottom and attach it to the drawer back's bottom with hot melt glue.

DRAWER PULL

The pull consists of two ebony blocks (S) with a dowel (T) running through them. To prevent cracking, the blocks need to be supported when they're drilled (15). The hole drilled for the threaded insert will have to be as large as possible, to keep the block from cracking when the insert is installed—practice on scrap ebony first.

THE TOP AND THE SHELF

Glue up the top core (U). Then cut the core and the breadboard ends (V) to final size. Rout slots for the spline sections, centered in the core's thickness (Fig. G). Mill the spline stock (W) so that its grain direction matches that of the core. Chop the stopped mortises along the outside edge of the breadboard ends (16). Leave 1/2" between the mortise bottoms and the spline slot. Drill centered 1/8" dia. holes through the square mortises for the screws; mill 1/8" x 1/2" wide slots through the rectangular mortises, to allow seasonal movement. Round over all the exposed corners and sand the pieces to 220 grit.

Glue the spline sections in the core, leaving 1/2" wide spaces for the screws. Apply glue only to the center 4" of the protruding spline. Then clamp the breadboard ends to the core. Finish securing the ends by running #8 x 2-1/2" pan head screws through the mortises, into the core.

Rout 5/16" x 1/2" slots for the decorative ebony spline (X and Fig. H). Then use a chisel to square the rounded corner





APPLY FINISH

Start the finishing process by sanding out scratches that happened along the way. Next, dampen all the parts with water and let them dry, to raise any bent-over fibers. Sand lightly with 320 grit, to cut the raised fibers.

To stain, mix seven parts General Finishes Orange Dye Stain (water based) with four parts of General Finishes Medium Brown Dye Stain. Apply two or three coats (experiment on scrap to determine how many). Topcoat with General Finishes Arm-R-Seal Satin. Apply five coats on the top and three coats everywhere else.

HANG THE DRAWER

Machine the drawer runners (Z) to size and drill the countersunk screw holes. Sand the runners and their matching drawer-side grooves to 220 grit, followed by a rubbing of paraffin wax. Use a spacer that's exactly 1-5/16" wide to position each slide (18). With the base upside down, place the spacer against the apron rail, followed by the runner. Clamp another piece on top, forcing the runner tight against the spacer. Then drive in the screws. Test fit the drawer. If it binds, look for rub marks on the runners and relieve them with a scraper. If the gap around the drawer front is uneven, you may have to adjust the runners. Position stop blocks of appropriate thickness and padded with felt to create a 1/4" setback between the drawer front and the drawer rail (19).

MOUNT THE TOP AND THE SHELF

Center the top on the base and fasten it at the center, with one screw on each side through the top apron rails. Then install tabletop fasteners on both sides of the screws, to allow seasonal movement.

Cut pieces of 1/8" thick x 3/4" L-angle aluminum to hold the shelf between the stretchers. Paint the aluminum black and then fasten each piece with countersunk #8 x 3/4" flat head wood screws. Install the shelf, using felt dots as cushions, and fasten it to the L-angle with a couple of panhead screws, to allow seasonal movement.

in the breadboard end. Ideally the spline should fit snugly, yet allow pulling out with two fingers. Relieve the spline to allow for seasonal movement, as shown. Install the spline and mark the outline of the top, about 1/16" out. Saw off the waste, leaving the line and a little more (17). Apply glue only to the part of the spline that goes in the core—don't glue the part that goes in the breadboard end. Once the spline is glued in, rout it to shape, 1/16" proud of

the edge, by making two passes with a 1/2" flush-trim bit outfitted with oversize bearings—a 3/4" bearing for the first pass and a 5/8" bearing for the second pass. Pillow the spline's shape by sanding in succession up to 600 grit. To make the square and rectangular ebony plugs for the breadboard mortises (Y), follow a procedure similar to making the plugs for the base. This time, cut each plug to length from a 10" long piece of ebony milled to 1/4" x 25/64".