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Federal Secretary Desk

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As you open the door on the desk, door supports slide smoothly out into position to support it.

Specialty brass hardware combines with classic inlay and dovetail details on this Federal-style Secretary Desk.

Federal Secretary Desk

Federal styling, an American response to various European influences, relies on a combination of simple elements to create an elegant complete design. With that goal in mind, our secretary features oval inlays and book-matched burl veneer, together with tapered legs and slender, light-colored inlay strips.

On a project like this, with so many details and complicated steps, you'll need to be organized. Two good pieces of advice before you start: First, work from the floor up. Second, have all your materials, including the burl veneer and specialty hardware, on hand before you make your first cut.

Take your time when choosing stock for the four legs (pieces 1). They'll look best if there are no cathedral spikes in the grain, especially after the inlay is applied. To keep a uniform appearance, use stock with growth rings running at a 45° angle across the bottom face.

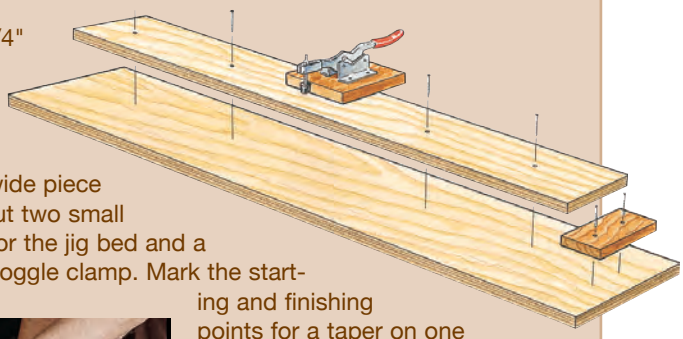
After cutting the legs to the dimensions shown in the Material List on page 97, orient them so the best color and figure face forward. Then follow the Technical Drawings on page 102 and the sidebar, at right, to lay out and cut the tapers. Note all eight tapers stop shy of the top of the legs where the desk aprons (pieces 2 and 3) will be attached.

Rip the aprons to size from walnut veneered plywood. The bottom of the aprons are accented with a solid piece of 3/8" molding (piece 4). Glue it in place and shape the bead profile on your router table, as shown in the Bead Molding Detail on page 97.

Making Floating Tenon Joinery

The aprons are secured to the legs with mortise-and-tenon joinery, but in this case

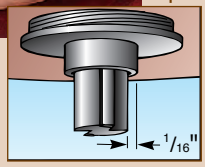
QUICK AND EASY LEG TAPERING



Make a bed from 3/4" plywood, 10" longer than your workpiece and wide enough to accommodate a toggle clamp. Rip another 4"-wide piece for the jig's fence and cut two small pieces to make a stop for the jig bed and a mounting block for the toggle clamp. Mark the starting and finishing points for a taper on one leg (see Technical Drawings), and place it on the bed with the stock you wish to remove hanging over the edge. Mount the fence and stop block against the edge of the leg (the fence will be positioned at an angle, relative to the jig bed). Toggle-clamp the leg in place and raise the blade up high. Set the jig against your saw's rip fence, and align the fence as necessary. Slide the jig along the fence to cut the tapers.

The nicely tapered legs on this classic design were produced using this simple jig.

FORMING THE OVAL ACCENTS



To allow for the offset of the router bit and rub collar, use a small machine nut as a guide when tracing around the oval inlay.

Federal styling relies on simple elements combined to create an elegant, complete design. To that end, our secretary uses oval inlays together with tapered legs and slender, light-colored inlay strips. The key to getting the ovals and strips to fit well is to use a template to guide your router. However, the space between the outside edge of the rub collar and the router bit must be accommodated (see inset). One trick is to use a machine nut to offset your pencil as you trace a line around the outside of the oval. Cut the template opening on your scroll saw and rout a few oval shapes with your new template and rub collar to test the fit. Expect to make a few adjustments — and possibly even a few templates — before your oval inlay fits perfectly. It's worth the effort to be precise.

After a few adjustments to the template, the ovals should fit perfectly in the scrap wood test piece. A precisely-made template is imperative here.

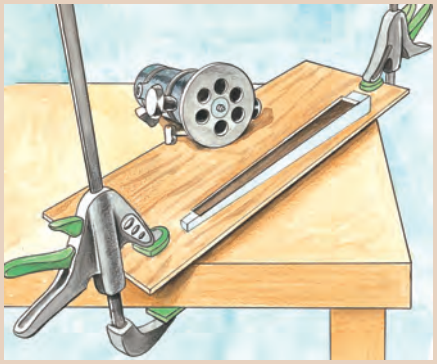
the tenons (pieces 5) float — that is, they aren't an integral part of either piece. As such, it is necessary to form matching mortises in both the legs and aprons.

Follow the Technical Drawings to lay out the mortises. Now, install a 3/8" straight bit in your router table and set the fence to the dimensions shown on the drawings. Use a stop block and a piece of masking tape to give you the proper size mortise (as shown in Figure 1), then test your setup on some scrap before milling the leg and apron mortises in several passes. Make the floating tenons to snugly fit the mortises. Next, use a pocket hole jig and bit to drill pocket holes in the top edges of the aprons (see Technical Drawings for locations). These holes will eventually hold face frame screws (pieces 6) to attach the legset to the rest of the desk. With this done, complete the inlay and stringing (pieces 7 and 8) in the legs, following the sidebars shown here.

Building the Legset Assembly

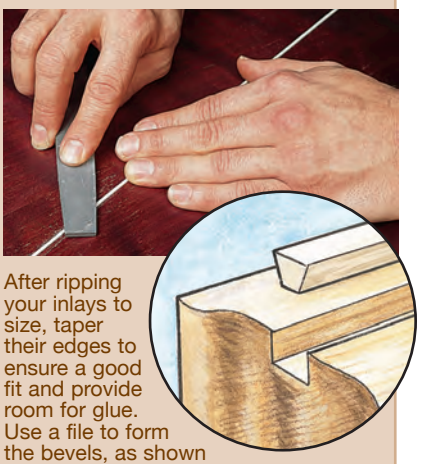
With the inlay and decorative stringing completed, sand the aprons and legs, starting with 100-grit and finishing with 220-grit papers. Dry-fit and temporarily clamp the legs and aprons together. With the assembly square and plumb, cut the corner braces (pieces 9) to size and predrill and countersink for their screws (pieces 10). When everything fits, remove the clamps and glue and screw the legset together.

LEG, DOOR AND DRAWER INLAYS



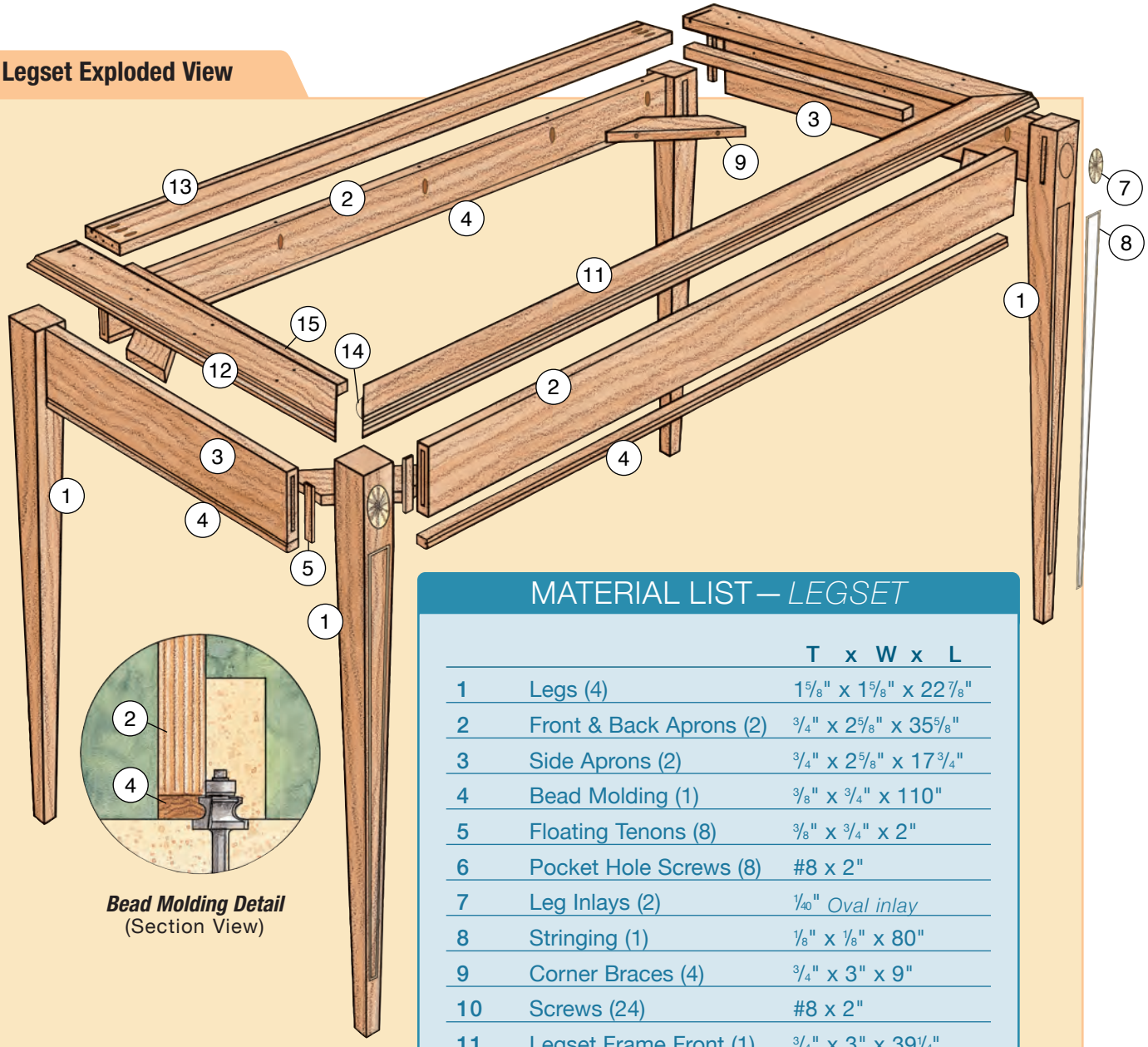
Use a router bit with a rub collar and a template to form the grooves on the tapered legs, drawer and door. Make some test cuts on scrapwood first to verify your setup.

As with the decorative ovals, above, forming the grooves for the slender inlays is easy with a router, rub collar and a jig. Use the Technical Drawings to make jigs for all of the inlays. To form the long thin inlays, start with a piece of 3/4" stock, slicing it on your table saw a hair wider than the groove it will fill. Lower the blade and rip strips to the depth of the groove, test fitting as you go. It is imperative to use a zero-clearance insert in the table saw for this operation. Anytime you fit a strip of inlay into a tiny groove, try slightly tapering the edges of the strips to ensure a better fit. Use a file to remove just a bit of wood.



After ripping your inlays to size, taper their edges to ensure a good fit and provide room for glue. Use a file to form the bevels, as shown in the inset.

Legset Exploded View



Bead Molding Detail
(Section View)

MATERIAL LIST—*LEGSET*

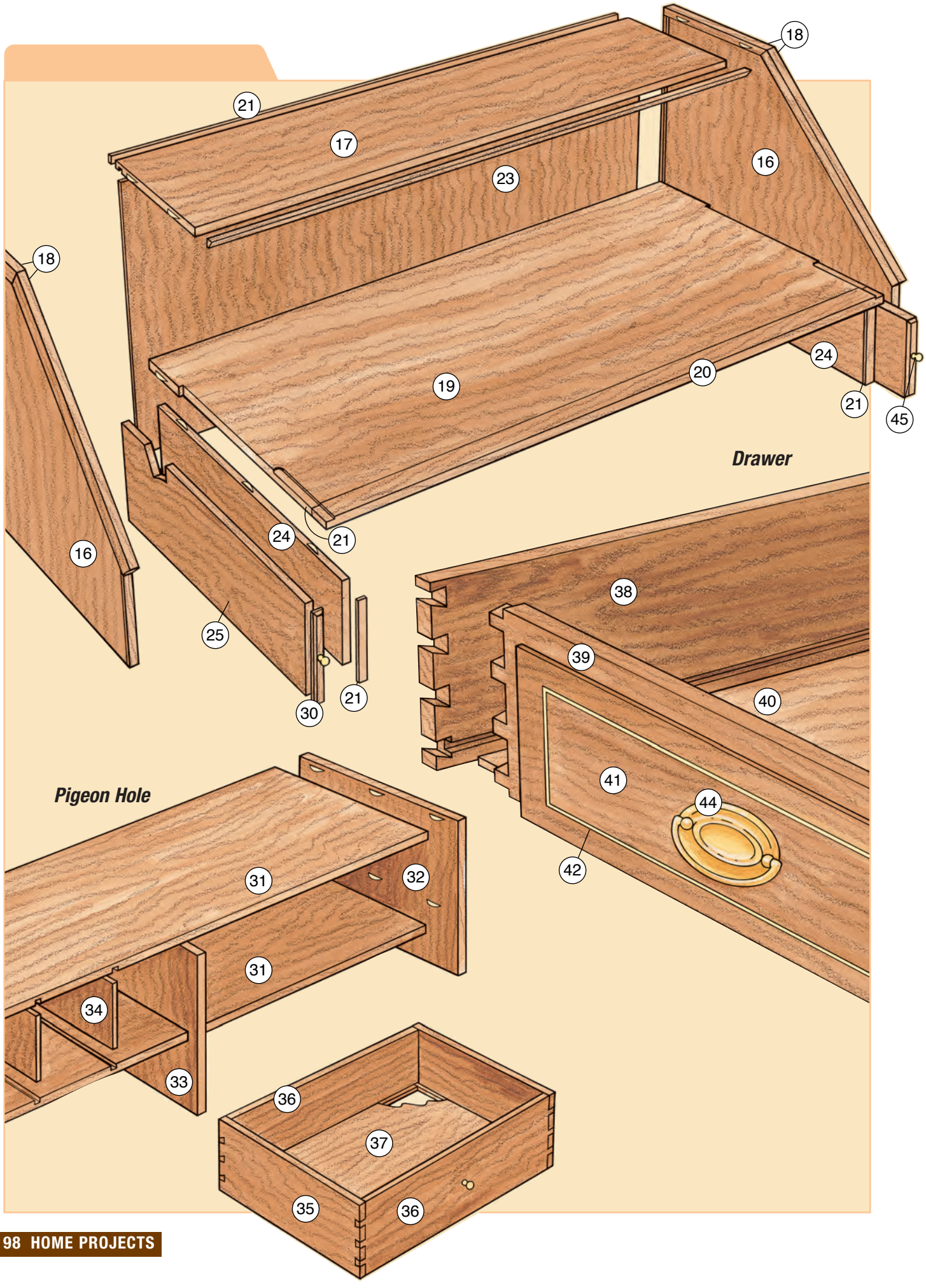
		T x W x L
1	Legs (4)	1⅝" x 1⅝" x 22⅞"
2	Front & Back Aprons (2)	¾" x 2⅝" x 35⅝"
3	Side Aprons (2)	¾" x 2⅝" x 17¾"
4	Bead Molding (1)	⅜" x ¾" x 110"
5	Floating Tenons (8)	⅜" x ¾" x 2"
6	Pocket Hole Screws (8)	#8 x 2"
7	Leg Inlays (2)	1/40" *Oval inlay*
8	Stringing (1)	⅛" x ⅛" x 80"
9	Corner Braces (4)	¾" x 3" x 9"
10	Screws (24)	#8 x 2"
11	Legset Frame Front (1)	¾" x 3" x 39¼"
12	Legset Frame Sides (2)	¾" x 3" x 21¼"
13	Legset Frame Back (1)	¾" x 3" x 33¼"
14	Biscuits (100)	#20
15	Drawer Supports (2)	¾" x ¾" x 15¼"

Figure 1: Floating tenons are a unique feature in this design. Use a stop block and masking tape to start and stop your mortises.

Making the Walnut Frame

A flat frame (pieces 11, 12 and 13) serves as a transition between the base and desktop. The front joints are mitered, while the back ones are simple butts held with screws. The miter joints are reinforced with #20 biscuits (pieces 14). Dry-fit the frame, then glue and clamp it together. Now add the drawer supports (pieces 15) with glue and clamps (see Exploded View).

With a belt sander, smooth the frame to 220 grit before routing the ogee profile on the front and side edges. Set the frame upside down on the workbench and center the legset (side-to-side) on it. Align the back edges so they're flush with each other, then extend the pocket screw holes into the frame and set this assembly aside for now.


18
21
17
16
23
18
19
20
24
21
45
Drawer
24
21
16
38
25
39
40
30
21
41
Pigeon Hole
44
42
31
32
31
34
33
36
37
35
36

MATERIAL LIST — *CARCASS*

		T x W x L
16	Carcass Sides (2)	¾" x 20⅜" x 13½"
17	Carcass Top (1)	¾" x 11⅜" x 36¾"
18	Carcass Edge Banding (1)	¾" x ¾" x 96"
19	Carcass Writing Top (1)	¾" x 18" x 36¾"
20	Brace (1)	¾" x 2" x 36¼"
21	Banding (1)	⅛" x ¾" x 60"
22	Specialty Door Hardware (1 Set)	Brass
23	Carcass Back (1)	¼" x 14½" x 37¼"
24	Drawer Cavity Dividers (2)	¾" x 4" x 19⅞"
25	Door Supports (2)	¾" x 3 15/16" x 20"
26	Door Edge (1)	¾" x ¾" x 124"
27	Door (1)	¾" x 11⅛" x 34¾"
28	Burl Door Veneer (2)	1/32" x 13" x 19"
29	Plain Door Veneer (1)	1/32" x 13" x 37"
30	Door Support Endcaps (2)	¼" x ¾" x 31 5/16"

MATERIAL LIST — *PIGEON HOLE UNIT*

		T x W x L
31	Pigeon Hole Top & Shelf (2)	½" x 10" x 35⅛"
32	Pigeon Hole Sides (2)	½" x 10" x 8 13/16"
33	Pigeon Hole Large Dividers (2)	½" x 10" x 8 5/16"
34	Pigeon Hole Small Dividers (3)	¼" x 10" x 4⅜"
35	Pigeon Hole Drawer Sides (4)	½" x 3⅞" x 10"
36	Pigeon Hole Drawer Frt & Bk (4)	½" x 3⅞" x 11 5/16"
37	Pigeon Hole Drawer Bottoms (2)	¼" x 9⅝" x 11"
38	Large Drawer Sides (2)	½" x 3⅞" x 19⅞"
39	Large Drawer Front & Back (2)	½" x 3⅞" x 33 11/16"
40	Large Drawer Bottom (1)	¼" x 33 3/16" x 19⅜"
41	Large Drawer Face (1)	3/32" x 4" x 33⅞"
42	Large Stringing (1)	⅛" x ¼" x 168"
43	Key Pull (1)	Brass
44	Drawer Pulls (2)	Brass, ⅝" Dia.
45	Drawer Support Pulls (2)	Brass, ⅜" Dia.

Building the Carcass Sides

Cut the carcass sides (pieces 16) and top (piece 17) from a single sheet of veneered plywood, to preserve their grain pattern. Use a plywood-cutting blade in your table saw to cut these parts to shape (see Technical Drawings), following the dimensions provided in the Material List, above.

Use double-sided tape to temporarily hold the sides together, taping them in the same orientation they will appear on the desk. Now make the angled front edge cuts on the sides (see Technical Drawings).

Adding Solid-Hardwood Edges

The exposed edges of the top and angled edges of the sides are covered with hardwood banding (piece 18) that is mitered to length (see Technical Drawings) and applied with glue and clamps. Stretchable plastic packing tape makes a great clamp here. After spreading glue on the parts, wrap one edge of the tape around the opposite edge of each panel and press the first few inches firmly so it gets a good grip on the plywood. Stretch the tape tightly as you apply it across the face, over the banding and down the other face of each piece. When the glue dries, trim the banding flush with the plywood. Use a sharp cabinet scraper to shave the banding edges flush. Then cut the proper angle on the front edge of the top.

Time for Some Minor Milling

The sides are attached to the legset frame with screws. The writing top (piece 19) and the carcass top are joined to the sides with biscuits. Refer to the Technical Drawings before laying out and machining these biscuit slots, then apply a hardwood brace (piece 20) to the front edge of the writing top with glue and biscuits. Then apply hardwood banding (piece 21) to all the exposed edges of the walnut plywood.

You'll find dimensions on the Technical Drawings for making a notch in each side of the writing top: these notches are for the door hardware (pieces 22), and they can be cut on the band saw. Apply hardwood banding to the sides of these slots too, then machine biscuit slots in the ends of the writing top. The last bit of machining for the writing top is to rout mortises for the door hinges. You will also need to pare a chamfer into the leading edge directly in front of the hinge mortise. Check the Technical Drawings for more details.

We recommend walnut plywood for the carcass back (piece 23). It may be undersize in thickness, so select an undersized straight router bit to match. Refer to the Technical Drawings to find the groove locations and dimensions, then mill them in the carcass sides and top, and also in the frame for the back panel. Make sure to end the stopped grooves at the correct locations.

Carrying Out the Dry Assembly

Cut the drawer cavity dividers (pieces 24) and door supports (pieces 25) to size. In order to mount the door hinge hardware to the door supports, you need to drill a shallow mortise into the sides of the supports with a large Forstner bit (this will create right and left pieces) and finish by cutting the shaped notch onto each support (see the Technical Drawings). Now you're almost ready to start dry-assembling the carcass.

The drawer cavity dividers are joined to the writing top by biscuits. Use the Technical Drawings to locate and cut the biscuit slots in the drawer cavity dividers, writing top and the carcass sides and top.

Final-sand all the inside surfaces, then dry-fit and clamp the carcass together. It's a good idea to apply finish to the inside surfaces before gluing up the carcass. Be sure not to get stain or finish on any area you will need to glue up later. After a dry-fit, glue and clamp the carcass together, checking for squareness. When the glue cures, secure the carcass to the frame by extending the frame's pilot holes into the sides and drawer cavity dividers.

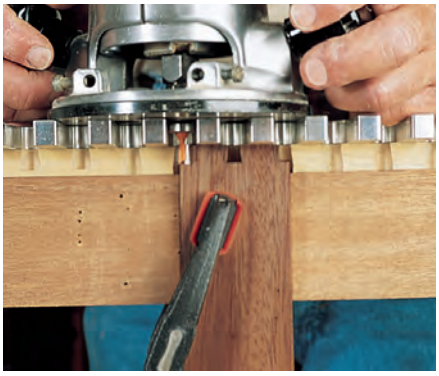
Making the Door

The door is the most difficult and time-consuming part of this project, especially when you consider the veneer work involved. You don't want to make any mistakes here, so make a 6"-wide template the same dimension as the door from the writing top to the carcass top. This piece will help you test the fit of the hinge leaf and the lid support linkage before you get started on your burl-veneered masterpiece.

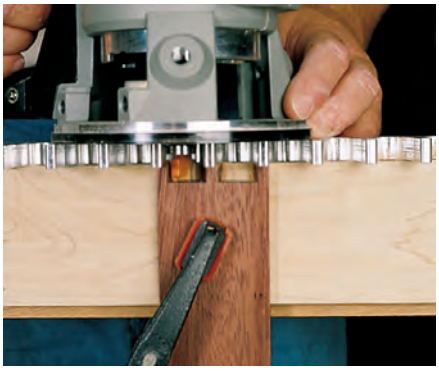
Apply solid-hardwood door edging (piece 26) to the edges of the door blank (piece 27), securing it with glue and clamps. Miter the corners of this banding so no end grain shows. Flush up the banding with the plywood after the glue dries, using scrapers and a sanding block to avoid rounding over the edges. The veneer will telegraph any errors, so take your time. Leave the lid oversized by 1/16" all around (that's the way it's listed in the Material List), for final trimming after the veneer work is completed. Your final trim will leave a 1/16" gap on each side.

Balance the door construction by gluing veneer (pieces 28 and 29) to both sides of the plywood. It's best to do this clamping with a veneer press (see sidebar, page 101), or you can use bricks or sand bags on top of scrap plywood to apply even pressure to the panel and veneer. Cover the door with a sheet of wax paper to keep the veneering glue from sticking to things it shouldn't.

If you use a veneer press for this operation and glue both veneer faces at once, be sure to apply equal pressure to all areas of the panel. As you tighten your clamps, work from the center out to the edges to eliminate any air pockets or pooled glue. Scrap-wood crossbearers with curved bottom edges will help you keep the pressure evenly applied.



Use a Keller Dovetail jig or similar jig to create the dovetails on the drawers. Be sure to use different size dovetail bits on the large and small drawers.



Both drawers have through dovetails and plywood drawer bottoms. Test your setup on scrap lumber of the same dimensions.

Prepping for the Hardware

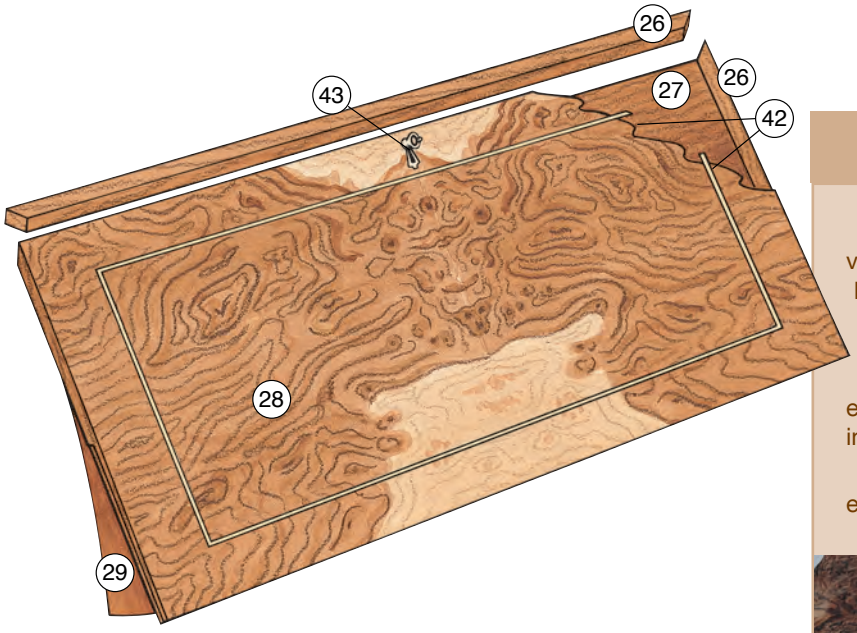
After the veneering glue is dry, flush-trim the veneer with an ultra sharp knife. Set your table saw to 22½° to trim the top edge and 90° to trim the sides. Then sand the edges smooth with just a hint of a roll back where the veneer meets the edge.

Using the scrap template you made earlier as a guide, trim the sides of the door for the door hinge support hardware (piece 22), as indicated on the Technical Drawings. Cut the rabbets for the support linkages on your router table, using an extra-tall fence for good support. Use a sharp chisel to pare out the recess to 30° from vertical (providing clearance for the hinge knuckle when the door closes). Connect the hardware to the door support pieces you prepared earlier. There is a bit of hand work involved when final-fitting the hinge support hardware, so dry-fit the hinges as you go.

Cut the door support endcaps (pieces 30) to size and sand them. Use two-sided tape to temporarily attach each endcap to a large piece of scrap while you mill the cove profile (see the Pinup Shop Drawings) on their front faces. Do this on the router table with a bearing-guided bit. When they're completed, epoxy the two endcaps in place.

Making the Pigeon Hole Unit

Most of the pigeon hole assembly elements (pieces 31 through 34) are joined with lap joints in the center and simple butt joints and biscuits at the ends and top. The three small dividers are contained in small dadoes. Use your table saw to nibble out the six dadoes that hold the small dividers in place and your router table to mill the interlocking slots. Before moving on, cut the biscuit slots. All these dimensions are shown on the Technical Drawings. Again, it is a good idea to pre-finish this unit before you glue it up (mask off the joints). When the finish is dry, glue the assembly together, checking for squareness as you tighten the clamps. Give the outside a final sanding, then apply finish.



Building the Drawers

Cut stock for the drawers (pieces 35 through 40) and join the sides to the fronts and backs with through dovetails. We used a Keller Dovetail jig with two different sizes of bits (see the Technical Drawings for the dimensions and the photos on the previous page for milling details), but any similar dovetailing jig will work just as well. If you don't own a dovetail jig, you can cut them by hand. Use a 1/4" bit in your router table to cut stopped grooves for the bottoms (see the Technical Drawings), then glue up and clamp all three drawers.

For aesthetic reasons, we decided to cover the dovetails on the front face of the large drawer. After planing some walnut (piece 41) to 3/32" thickness, center it on the drawer front before gluing and clamping it in place. When the glue dries, use a flush-trim bit to clean the edges.

Adding Final Touches and Finish

To continue the striping theme established on the front faces of the legs, follow the same technique used there to apply stringing (piece 42) to the door face and the face of the large drawer. All the locations and dimensions are shown on the Technical Drawings.

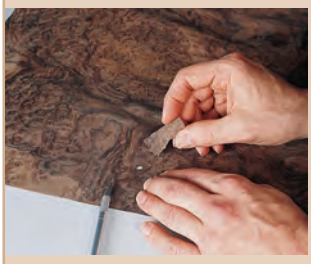
Now you're ready to finish the rest of the bare surfaces. Remove all the hardware and thoroughly sand the project. Apply three coats of finish, sanding between coats with 400-grit wet/dry paper. Either lacquer or satin varnish would make a durable and attractive topcoat for this desk.

When the finish is dry, locate the key pull according to the Technical Drawings and follow the manufacturer's instructions to install it. Drill pilot holes for the key pull, the drawer support pulls and the drawer pulls (pieces 43, 44 and 45), and screw them in place at the locations shown on the Technical Drawings. Finally, apply a little wax to the door supports so they slide easily. Then breathe a big sigh of relief at completing such an ambitious project! This one is sure to become a family heirloom.

BURL VENEER

If this is the first time you've ever ordered burl veneer, you'll be surprised when you receive it. Burl veneer is definitely not ready to use right out of the box. Because of the many different grain directions, there's a tremendous amount of stress in the veneer. Never fear — waves, and even holes, are quite acceptable. But the first step in readying the veneer for use is to get it flat.

Do this by soaking your wavy panels in glycerine-based veneer treatment. Once it's saturated, start forming a big sandwich. This begins with a piece of flat 3/4" melamine-covered MDF, cut at least 1/8" bigger all around than the sheet of veneer. On top of this, place a sheet of Fiberglas™ window screen and six sheets of newspaper to prevent bonding between the paper and burl. Place the wet veneer on the screen, then complete the sandwich with more screen, newspaper and plywood. Clamp everything tight with a set of curved cauls to form a press.



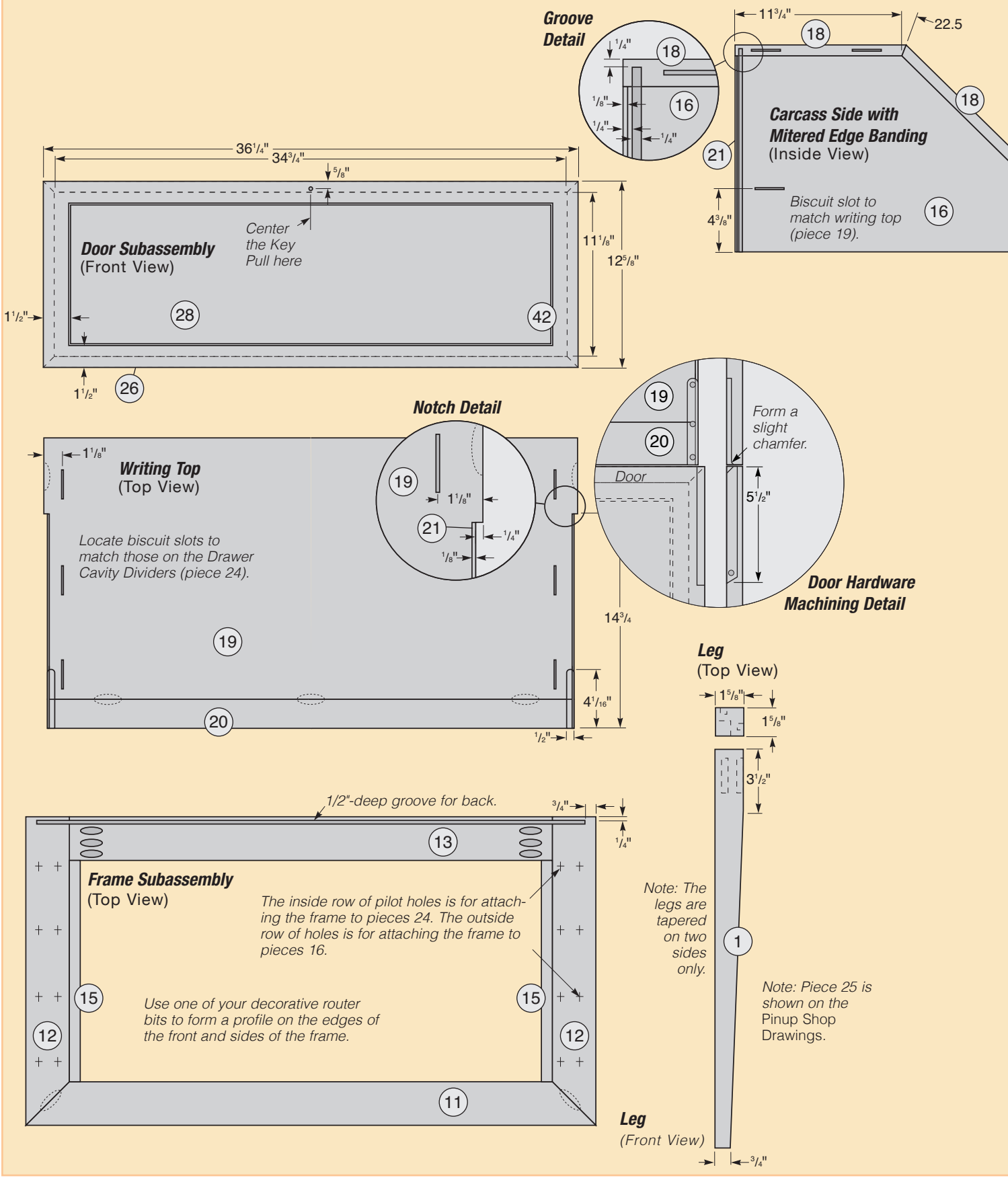
Fill larger holes in the burl veneer with cut-outs of similarly colored veneer. Place a piece of masking tape behind the hole and glue the new piece in place.

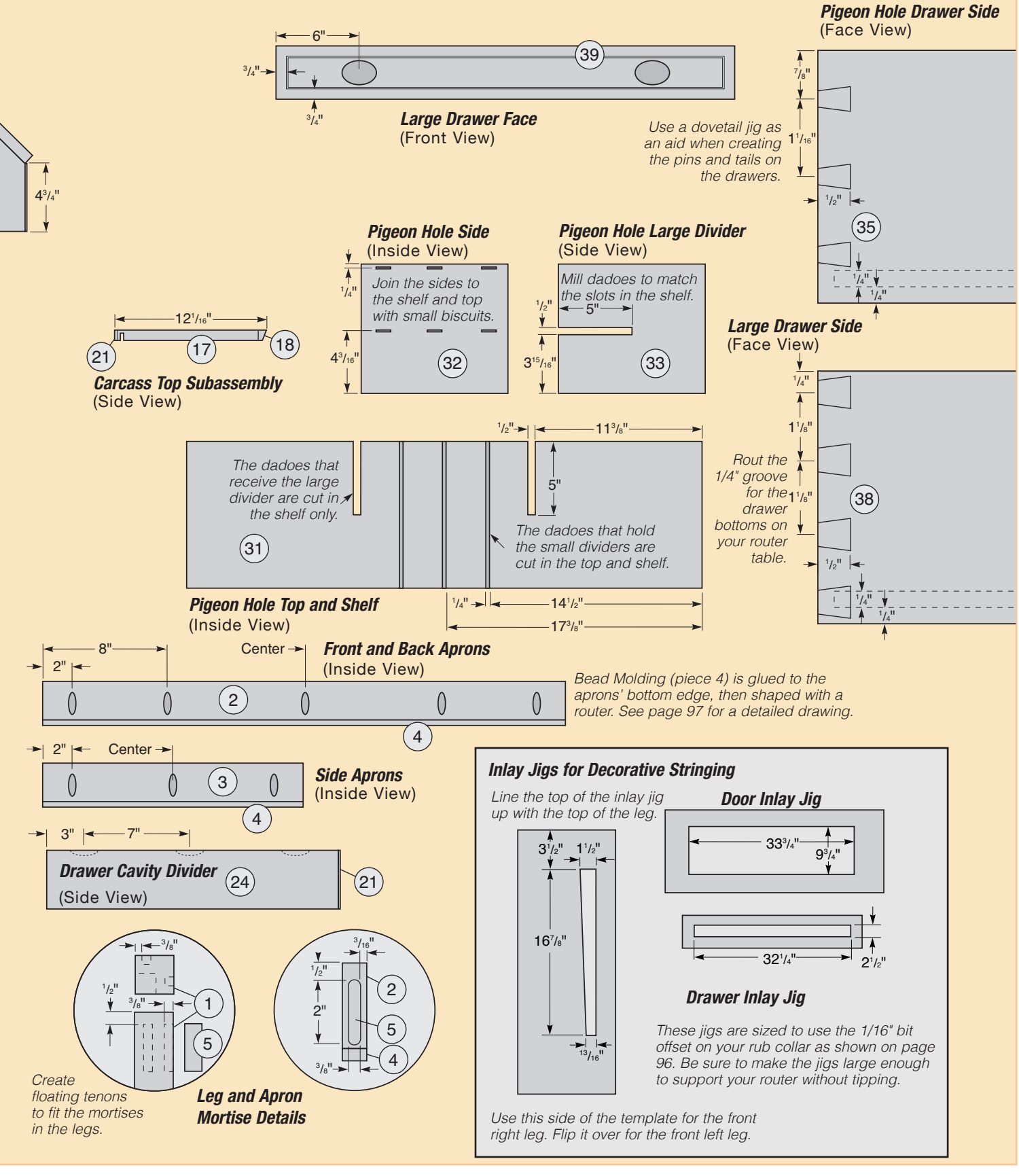
Replace the newspaper after four hours and again after another eight. Do this twice a day for about a week. In extreme cases, you may have to go through this entire process twice, but it's well worth the effort as it makes the rest of the veneering work much easier.

A slick way to book-match the veneer with a straight, clean joint is to sandwich the two pieces between MDF panels. Hold them tightly together and slice them off on the table saw.

When the veneer is dry, fill any holes, holding your piece up to the light to spot them. Filling them now prevents them from trapping gobs of glue later. On larger holes, take trimmings from the edge of the sheet where it will be cut off, and place them on your bench. Align the hole over them, match the colors and trim to fit. Use masking tape on the top side to hold these trimmings in place.

Now clamp the veneer back in its press and keep it there until you're ready to glue the veneer to the plywood panel.


Groove Detail
1/4"
18
1/8"
16
1/4"
1/4"
11 3/4"
22.5
18
18
Carcass Side with Mitered Edge Banding
(Inside View)
21
4 3/8"
Biscuit slot to match writing top (piece 19).
16
36 1/4"
34 3/4"
5/8"
Center the Key Pull here
Door Subassembly
(Front View)
11 1/8"
12 5/8"
1 1/2"
28
42
1 1/2"
26
Notch Detail
19
20
Form a slight chamfer.
Door
5 1/2"
1 1/8"
Writing Top
(Top View)
19
1 1/8"
21
1/4"
1/8"
Locate biscuit slots to match those on the Drawer Cavity Dividers (piece 24).
Door Hardware Machining Detail
14 3/4
19
Leg
(Top View)
1 5/8"
1 5/8"
3 1/2"
4 1/16"
20
1/2"
1/2"-deep groove for back.
3/4"
1/4"
13
Frame Subassembly
(Top View)
The inside row of pilot holes is for attaching the frame to pieces 24. The outside row of holes is for attaching the frame to pieces 16.
Note: The legs are tapered on two sides only.
1
15
15
Use one of your decorative router bits to form a profile on the edges of the front and sides of the frame.
12
12
11
Note: Piece 25 is shown on the Pinup Shop Drawings.
Leg
(Front View)
3/4"


Large Drawer Face
(Front View)
6"
3/4"
3/4"
39
Use a dovetail jig as an aid when creating the pins and tails on the drawers.
Pigeon Hole Drawer Side
(Face View)
7/8"
1 1/16"
1/2"
35
1/4"
1/4"
4 3/4"
Pigeon Hole Side
(Inside View)
Join the sides to the shelf and top with small biscuits.
1/4"
4 3/16"
32
Pigeon Hole Large Divider
(Side View)
Mill dadoes to match the slots in the shelf.
1/2"
5"
3 15/16"
33
12 1/16"
21
17
18
Carcass Top Subassembly
(Side View)
Large Drawer Side
(Face View)
1/4"
1 1/8"
1 1/8"
38
1/2"
1/4"
1/4"
Rout the 1/4" groove for the drawer bottoms on your router table.
1/2"
11 3/8"
5"
The dadoes that receive the large divider are cut in the shelf only.
31
The dadoes that hold the small dividers are cut in the top and shelf.
Pigeon Hole Top and Shelf
(Inside View)
1/4"
14 1/2"
17 3/8"
8"
2"
Center
Front and Back Aprons
(Inside View)
2
4
Bead Molding (piece 4) is glued to the aprons' bottom edge, then shaped with a router. See page 97 for a detailed drawing.
2"
Center
3
4
Side Aprons
(Inside View)
3"
7"
Drawer Cavity Divider
(Side View)
24
21
3/8"
1/2"
3/8"
1
5
3/16"
1/2"
2"
3/8"
2
5
4
Create floating tenons to fit the mortises in the legs.
Leg and Apron Mortise Details
Inlay Jigs for Decorative Stringing
Line the top of the inlay jig up with the top of the leg.
3 1/2"
1 1/2"
16 7/8"
13/16"
Door Inlay Jig
33 3/4"
9 3/4"
32 1/4"
2 1/2"
Drawer Inlay Jig
These jigs are sized to use the 1/16" bit offset on your rub collar as shown on page 96. Be sure to make the jigs large enough to support your router without tipping.
Use this side of the template for the front right leg. Flip it over for the front left leg.

Secretary Desk