

# Tambour Cabinet Doors

## *Canvas and glue make flexible, flowing doors*

by Richard Wedler

**T**he first time I used tambour doors in a furniture project, my client had commissioned a dining buffet to fit into an extremely small dining room. Hinged doors stuck out too far when opened, and regular sliding doors limited access to the inside of the cabinet. Tambours provided an elegant solution.

Tambour doors are made by gluing a gang of individual wooden slats to a canvas backing. The slat ends have tongues that ride in a track groove routed into the cabinet carcass. The canvas backing gives a tambour plenty of flexibility to follow gentle curves in a track, so the doors can run back into the cabinet and disappear. Their flexibility makes tambours an attractive solution for doors in a wide variety of cabinet and furniture pieces. Although tambours can be made to operate vertically, the most accessible projects involve one or two horizontally sliding doors, such as the ones in the buffet I built shown below.

In this article, I'll tell you how I make a typical tambour door, from milling the slats to gluing on the canvas, to routing the track, to adding handles and installing the finished doors. Because smooth-running doors depend on careful planning as much as precise construction, I suggest you read the story on tambour de-

sign on p. 78 before you proceed. Once you've determined track layout and slat size, you can make a full-scale plan-view drawing of the cabinet and use it to generate templates for the track and various cabinet parts.

### **Milling the slats**

Door construction begins with milling the slats. I perform this task in several separate stages, allowing the blanks to season in between. Though this may seem time-consuming, it ensures that all wood distortion and dimensional changes take place *before* the slats are glued to their canvas backing. The straightness and precision of each slat is crucial to a smooth-running tambour.

I begin by estimating how many slats the door will require. Experience has taught me to be conservative and to make 25% to 30% more than the total number needed; even more if the wood is fussy and seems prone to warping. In the first milling stage, I joint, then thickness plane or rip saw the slats until they're at least one-and-a-half times thicker and wider than the finished size and slightly longer. Once the first pass is done, I stack the slats into a neat pile, placing stickers between the courses to allow air circu-

*Canvas-backed tambour doors are elegant and smooth-operating alternatives to standard hinged or sliding doors. They excel in providing a large amount of access to a cabinet interior, such as this pair of doors does in the dining room credenza built by the author.*



lation. The length of time it takes the wood to season will vary depending on the species, the climate in your shop and how wet or dry the wood was to begin with. Most distortion probably will occur within a few days. But don't worry; you've left enough stock on each slat to allow corrections in subsequent milling.

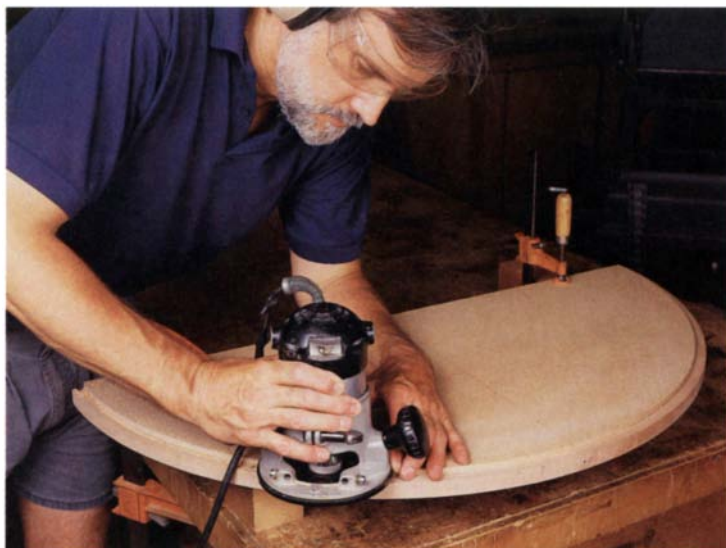
The next milling stage removes another 15% or so from each slat. To keep things orderly, I've developed my own procedure: First I joint one edge of each slat, and place those edges face down on the worktable. Next I thickness plane the unjointed edges (to keep them parallel). I rotate each slat 90°, so it's face up, before setting it on the worktable. Then I repeat the same jointing/thicknessing process. This minimizes confusion about what's been done and what hasn't. After all the milling is completed, the slats go back to the stickers for another day or two of seasoning.

The final milling step takes the slats to within a final sanding of their finished dimensions. A final pass is taken with jointer and planer set to remove a scant 1/32 in. It's advisable to do any edge-shaping on the slats prior to this last milling, especially if shaping removes considerable stock because this may induce additional warping. My shop is equipped with a small drum sander, so I sand all the slats with it. Now sticker the slats again, and leave them until you're ready to glue up the doors.

## Routing the track

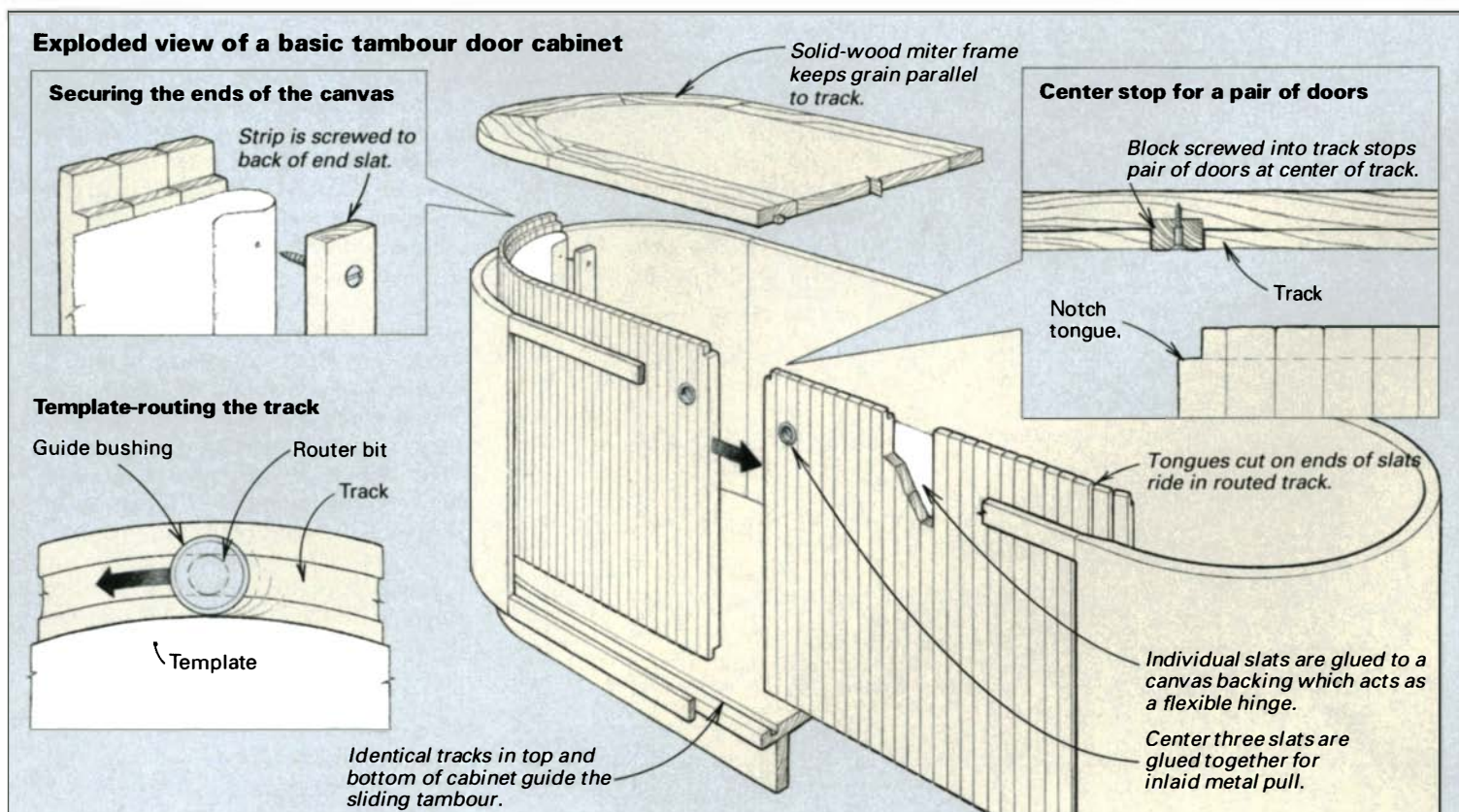
I template-routed the track into the case work before assembling the cabinet. Though I've seen tracks that were routed into particleboard and plywood carcasses, the smoothest-running tambour track is routed into a solid-wood frame mitered together so that the grain runs parallel to the track. This can be a lot of work, so you might want to incorporate a solid frame only on the cabinet bottom because the lower track carries the weight of the tambour and the majority of the resistance during door travel.

I rout the track using a straight bit. The router has a base fitted with a guide bushing to follow a composition board template, as shown in the photo above. The width of the bit will equal the



**Wedler template-routs the track that guides the tambour around the curved end of a kitchen peninsula cabinet. The particleboard template steers the guide bushing of a router fitted with a straight bit.**

width of the track. As far as the type of bit to use, I've had particularly good luck with carbide slotting bits, though standard carbide (one or two flute) and even newly sharpened HSS bits could prove adequate. Before marking and cutting out the template, I must compensate for the guide-bushing offset. I subtract the outside diameter of the bushing from the diameter of the bit and divide that number in half. The resulting number equals the offset. Now, working on the full-scale layout drawing, I draw a parallel line offset from the inside edge of the track by the calculated amount. This new line represents the profile of the template to cut out. I make my templates from either 1/4-in. medium-density fiberboard (MDF) or Masonite. Both are inexpensive, although I've found tempered Masonite to be more durable for repetitive jobs.



# Designing slats and track for a smooth-running door

If you decide to use tambour doors in any piece of furniture or cabinetry, don't expect to just pop them in like you would hang a hinged door on a completed face frame. While they're not particularly complicated to make, tambour doors must be integrated at the same time the case work is designed.

## Laying out the track

Carcases for tambour doors usually have an outer case and an inner case open to the front. The tambour track passes between inner and outer cases on the sides and at the rear (see the drawing below). The inner case provides a means of adding shelves and dividers to the cabinet; otherwise, these could not be attached to the sides of the outer case without interfering with tambour travel. The inner case also hides the canvas backing when the doors are open and prevents items stored in the cabinet from hanging up the doors.

After determining the basic design and dimensions of your carcass, plan the path of the track on a full-sized drawing. The track must maintain adequate clearance from both the inner and outer case works. Tambours with wide slats will require more clearance on the outside of curves than tambours with narrow slats.

For easiest tambour installation and removal, the cabinet should have a removable back with the track running directly out the back. Otherwise, you will have to devise some sort of access panel (this panel is important for adjustments when the cabinet is new, for future repairs and for refinishing).

Most cabinets will require each door to negotiate only one curve as it traverses from front to side. However, wide, shallow cabinets may not have adequate side depth to accommodate a long tambour door that's fully opened. In this case, curve the track around behind the inner case, as shown in the drawing.

While I have seen a tambour travel around a curve with as little as a 1 in. radius, gentler curves with radii of 2 in. to 6 in. usually make smoother-operating doors. Larger-radius turns also handle wider slats, which give you more design latitude. An additional refinement, taught to me by a friend, is to run the track close to the inner edges of the face-frame stiles, as shown in the drawing, to minimize the gap between the closed tambour and the frame. This lends a more sophisticated look to your piece. If there isn't room for the slats to pass, you can bevel the inner edge of the stile for more clearance (see the drawing detail below).

## Sizing the slats

Once you've laid out the track, you will need to size the slats and their tongues. As you can see in the drawing detail below, the ratio of the width of the slat and thickness of the tongue must be adjusted to fit the size and the radius of the track groove. I initially calculate tongue size from a drawing; the size should allow adequate clearance—maybe  $\frac{3}{64}$  in. or so—to prevent binding in the curve. I rout a test track in a wood scrap and then try running a test tongue around the curve. For most tambours I build, I make a  $\frac{1}{4}$ -in.- or  $\frac{5}{16}$ -in.-wide groove for a track that curves no tighter than a 2 in. radius. This track smoothly handles slats that are  $\frac{3}{8}$  in. to  $\frac{3}{4}$  in. wide, with tongues about  $\frac{9}{32}$  in. thick. For bigger cabinets, I've used track grooves as wide as  $\frac{3}{8}$  in. to handle the larger, heavier doors.

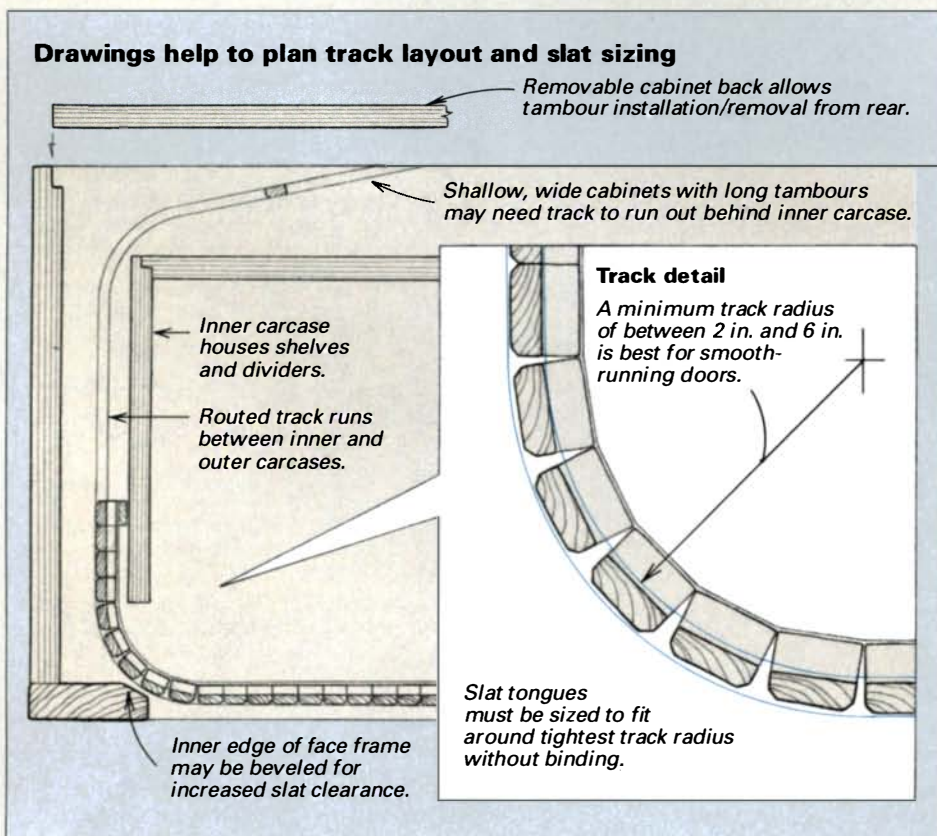
Tongues should be slightly longer than the depth of the track so that the overhanging portion of the slat (which serves to conceal the track) doesn't scrape the carcass. I usually make my track about  $\frac{1}{4}$  in. deep and the tongues about  $\frac{5}{16}$  in. to  $\frac{3}{8}$  in. long. The added tongue length also creates a pleasing reveal (an even gap) where the slats meet the carcass at top and bottom.

Shaped edges on the slats significantly affect the look and the character of any tambour door. The simplest edge treatments include rounding over, small coves and full or stopped chamfers. For a more dramatic effect, you may wish to shape slat faces and/or edges using a bead cutter, Roman ogee, or other profile-router bit. If you leave the slat edges unshaped, your tambour will look more like a solid panel, especially if the wood lacks strong grain contrast.

To further enhance the solid-panel effect, saw slats sequentially from wide boards to preserve the grain patterns in the finished tambour. Marking slats and maintaining their order may require a librarian's patience, but the results are extremely rewarding, particularly when using beautifully figured woods.

The design of the handles or pulls should be incorporated into the design of the slats. If the curve of the track permits, glue together two or three slats at the leading edge of the door, and screw on a handle or rout a recess for a ring pull into the slats. Alternatively, you could add a wider, thicker slat at the end of the tambour that has a finger pull routed into it, or screw a shaped handle strip to the edge of the last slat.

—R.W.





*A shopmade fixture secures the slats for gluing on the canvas backing. Pipe clamps and a wide batten board cinch the slats tightly together; a few blows from a mallet ensure that all slats are flat.*

After sawing and smoothly sanding the template, I mark a set of reference lines to aid in precisely repositioning the template when routing top and bottom tracks. A centerline marked on both template and carcass parts may be all that's needed. Also, I mark the top surface of the template and orient this side up when routing the bottom track and down for the top track. This ensures identical tracks that run exactly parallel in the top and bottom of the case works, even if the template isn't perfectly symmetrical.

With the bit and guide bushing set up in my router, I take a test pass in a scrap of track material to ensure the cut will be clean and chatter-free. Now I clamp or tack the template to the panel, and I'm ready to rout. I make the top track slightly deeper than the bottom one to allow the top slat tongues plenty of clearance, so they'll run with minimum resistance. Once the routing is done, I thoroughly sand the tracks until they're smooth and consistent.

### **Gluing the canvas to the back of the slats**

The simplest way to successfully join many individual slats into a tambour door is to build an assembly fixture that positions and secures the slats while the canvas backing is glued on. This fixture consists of a plywood or MDF baseboard with strips tacked on in a U-shape, surrounding the slats on three sides. Each of these strips should be thinner than the slats, allowing them to protrude a sixteenth or so above the strips. This keeps the canvas from accidentally adhering to the assembly fixture during glue-up.

A good choice of backing materials traditionally used for tambours is a good-quality, lightweight #12 (or 12 oz.) cotton canvas. However, I've recently been experimenting with contact-cementing acrylic canvas to tambours. Sunbrella acrylic canvas (available from The Canvas Shop, 7410 Valjean Ave., Van Nuys, Calif. 91406; 818-989-4356) doesn't seem to stretch or unravel as much as cot-



*A laminate roller works bubbles or wrinkles from canvas that's been glued to the back of slats. This canvas forms a fabric hinge that allows the tambour to run flexibly.*

*Rabbet the ends of the tambour with a dado blade on the tablesaw to form tongues on the ends of the slats. These tongues, which run in the track to guide the tambour door, are cut from the canvas side of the door.*



ton, and it doesn't get as easily saturated with contact cement.

Which adhesive is best for canvas-tambour construction? In my experience, yellow glue (aliphatic resin) or a good-quality solvent-based contact cement (I use Touch Down, made by W.F. Taylor Co., or Weldwood) is the best choice. It's easy to control canvas saturation when applying contact cement with a roller. It is simple to spread evenly on both slats and canvas, and it's very flexible. But contact cement is flammable, so work in a room with good ventilation. Critics of this approach have said the canvas may come unglued because of solvents in the finish applied to the face of the slats, but I've never experienced this difficulty myself.

When I'm all ready for glue-up, I go through my stack of slats and select the straightest, most perfect ones and trim them to final length, touch sanding the ends as necessary. I load the slats into the assembly fixture face down and edge to edge. I then clamp them tightly together using a wide board the same length as the slats as a caul. To ensure the slats are all perfectly flat, I tap them down using a Dead-Blow mallet (see the photo at left above).

I size the canvas about 1½ in. (total) narrower than the length of the slats and several inches longer. I use a razor knife guided by a metal straightedge to do the cutting and handle the canvas carefully to keep the edges from unraveling (don't worry if a row or two of thread comes off). Next I draw pencil lines around the perimeter of both the assembled slats and canvas, staying about ¾ in. shy of the edges, which keeps me from spreading glue too closely to the edges. I also mark the extra inches at each end of the canvas to be left adhesive-free. This lets me hold the canvas flat while I'm applying the glue, and it gives me a clean edge to grab when laying down the canvas. The excess is trimmed and secured later.

I spread glue on both canvas and slat backs, keeping the adhesive layer thin and evenly distributed. A little practice on a piece of

## Hidden tambour doors

When Maine woodworker William Turner set about making tambour doors for his walnut chest for storing audio equipment, shown in the photo below, he didn't like the gap between the outer edge of each door and the frame of the cabinet. After some head scratching, Turner came up with a plan: He sawed the tongues off the two outermost slats on each door, so they weren't trapped by the track groove. He then screwed a short length of bandsaw blade (with the teeth ground off) to the back of each door near the end, as shown in the drawing below. When the doors are in the closed position, these blade strips act like springs to keep the outer slats flush with the door front. When the door is pulled open, there's a slight resistance as the spring-loaded slats bend slightly to follow the tongued slats around while the door smoothly recedes into the cabinet.

### Hidden tambour doors

Spring-loaded slats hide gap where closed tambour meets cabinet stile.

Springs are made from short lengths of bandsaw blade, notched and screwed to tambour back.

Cabinet frame

Tongues cut off last two slats.

Photo: William Thuss



scrap canvas will help to determine the best technique to achieve a perfectly even spread. The objective is to bond fibers in the fabric to fibers in the wood without allowing the glue to soak through the canvas. If you're using contact cement, allow both surfaces to dry for the length of time specified on the can before sticking the canvas down. If it's your first attempt, you might want to ask for help positioning the canvas and laying it down flat.

I use a laminate roller (available from a building supply store) to work out wrinkles and bumps in the canvas, as shown in the top right photo on p. 79. A straight stick with a rounded edge also works. Firm, even pressure gives an adequate bond if you're using contact cement. If you've applied yellow glue, clamp a flat batten board on top of the canvas. Covering the batten with clear plastic wrap or waxed paper will prevent the board from sticking to the back of the canvas. After the glue sets for a few hours, I remove the tambour from the jig and check each joint to make sure it bends freely. If it doesn't, I snap the edges apart to free the slat because the little bit of glue that seeped in hasn't set yet. (If you use yellow glue, don't wait overnight to try this.)

### Fitting the doors

With the canvas glued and dried on each tambour door, it's time to shape a tongue at the top and bottom of each door to fit the track in the carcass. Size the tongues to allow the tambour to smoothly negotiate curves in the track (see the box on p. 78). I cut the tongues by rabbeting the tambour on the tablesaw fitted with a sharp dado set. First I clamp a plywood auxiliary face to the saw's regular rip fence. Next I assemble my dado set to make the width of cut at least  $\frac{1}{8}$  in. more than the width of the desired rabbet.

Next I lock the rip fence with the dado set's right edge slightly over the auxiliary fence and raise the running blade until it's just shy of the estimated rabbet depth (tongue thickness). I run one edge of the tambour through the saw, as shown in the bottom right photo on p. 79, and check the tongue's fit in the carcass. If it's too tight, I raise the blade a minuscule amount and take another very light pass. When the tambour glides freely in the track, I ease the edges of the tongues and sand them with fine sandpaper. The tambour should slide with just the pressure of a pinky finger. The loose canvas at each end of the door is now trimmed and secured. I cut the canvas back until there's just about  $\frac{3}{4}$  in. left. Then I fold the end under and screw a backing strip over the fold, into the end tambour (see the drawing on p. 77).

When clear finishing my cabinets, I try to avoid getting finish into the track itself. This is easier if I'm wiping or brushing on the finish; if I'm spraying, I mask off the track. It's best to finish the tambour before installing it. Bend the surface back slightly to ensure that both edges of each slat receive finish.

After the finish is dry, I slip the tambour doors into place. Before installing the cabinet back, I screw a small block of wood as a stop at the back end of each track. This prevents the doors from accidentally opening too far and slipping inside their case, out of grasp. If the cabinet has a pair of doors, I install a concealed stop in the upper track to ensure the tambours and handles are centered when closed. The block engages a notch in the top tongue of the first slat in each door (see the drawing on p. 77). Finally, I lubricate the tracks by rubbing in a tiny bit of paraffin wax—not too much or the wax will cake and collect dust. If sections of the track are inaccessible, you might want to lubricate them before carcass assembly. In this case, take care not to contaminate surrounding areas of the carcass that will be finished later. □

*Richard Wedler is a professional woodworker, musician and filmmaker in North Hollywood, Calif.*