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Bombé Box

In this plan you will be getting:

- Step by Step construction instruction.
- A complete bill of materials.
- Exploded view and elevation drawings.
- How-to photos with instructive captions.
- Tips to help you complete the project and become a better woodworker.



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\$7.95

WJ051



Published in Woodworker's Journal "Woodworking Classics: Skill-Building Projects for the Home Woodworker"



Bombé Box

Carving shapes with your table saw, building a low-tech slot mortiser and cutting finger joints...from a techniques standpoint, this project will give you a woodworking workout. When you're finished, you'll end up with a shapely accent piece with three inner trays for storing jewelry or other collectibles. It's a great project for building skills without breaking the project budget.

The idea for this little chest grew out of our author's personal fondness for the bombé shape and a pedagogical crisis. About a dozen years ago, he was teaching an advanced cabinet-making class at a community college. Traditionally, his third-year students were required to produce a final project during the last month of class. On the first day of their last month, the shop lost all of its three-phase power, save to three table saws. The maintenance crew at the college was less than hopeful for a speedy repair.

In a moment born of desperation and inspiration, and tempered with a large dose of blindingly good luck, he was able to lay out the requirements for a new final project that the class dubbed "table saw composition." This small jewelry box was the result.

Reviewing the Key Points Before Some "Gee-whiz" Machining

While cutting the curve of the box at the table saw is the "gee-whiz" part of this project, the corner joinery must come first. The choice of finger joints for this box was part aesthetic and part engineering. Aesthetically, the visibility of the joints helps to emphasize the "S" curve of the chest. From an

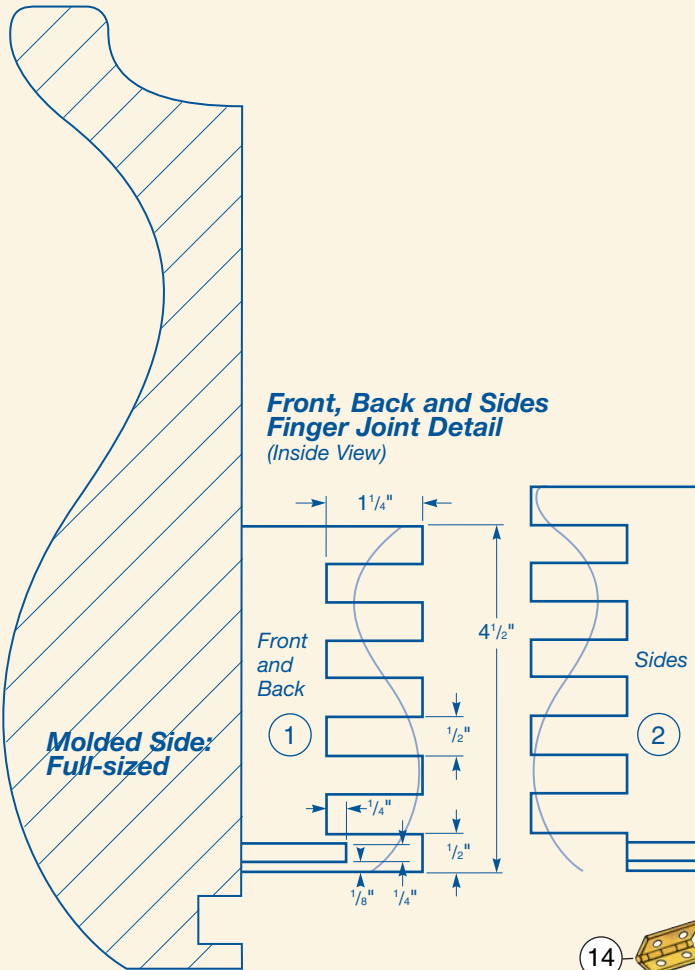
engineering standpoint, the box is stronger than it really needs to be. Because the sides of the box rise above the front and back, the top of the sides need to end in a finger. Our author used 5/4 stock with a dado blade stacked to cut 1/2" joints. Starting with a space at the bottom of the sides on the 5"-wide stock produces a joint layout that ends with a fin-

ger on top. See the *Elevation Drawings* on the next page for more details.

Begin by selecting your stock for the front, back and sides (pieces 1 and 2) and cutting them to the dimensions found in the *Material List* on page 62. Then grab your dado set and make those finger joints. If you are new to making them, the *sidebar* on page 64 will get you going in the right direction.

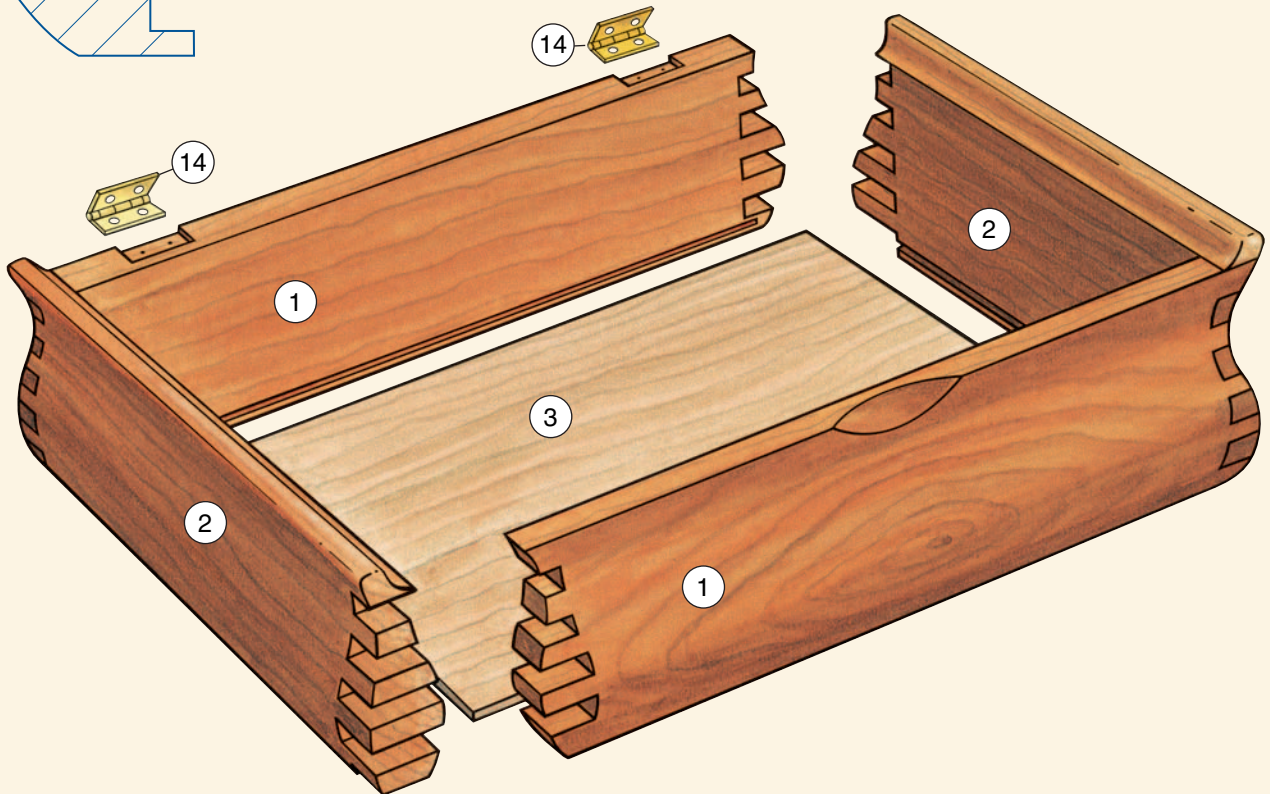


Bombé Box Exploded View

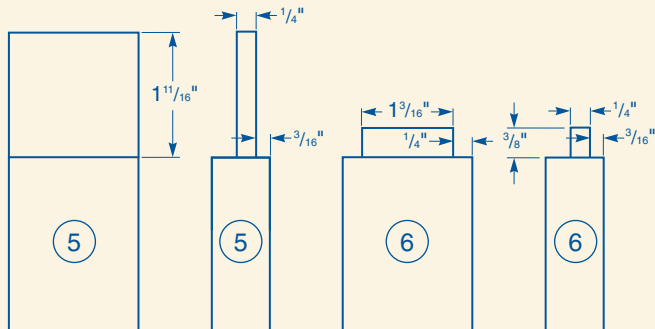


MATERIAL LIST – Bombé Box

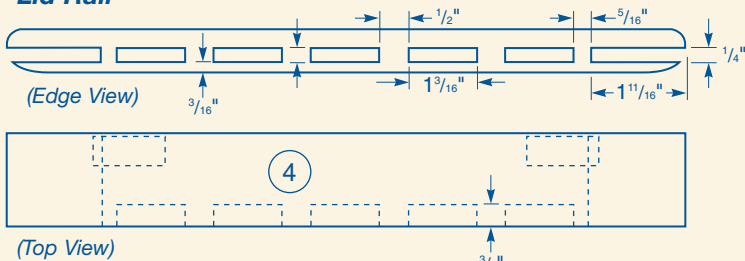
	T x W x L
1 Front and Back (2)	1 1/4" x 5" x 12 7/8"
2 Sides (2)	1 1/4" x 5" x 10 1/8"
3 Bottom (1)	1/4" x 8 1/8" x 10 13/16"
4 Lid Rails (2)	3/4" x 1 5/8" x 11 25/32"
5 Lid Stiles (2)	3/4" x 1 11/16" x 9 7/8"
6 Lid Muntins (5)	3/4" x 1 11/16" x 6 5/8"
7 Tray Fronts and Backs (4)	3/8" x 1 1/4" x 10 1/2"
8 Tray Sides (4)	3/8" x 1 1/4" x 7 1/2"
9 Tray Handle (2)	3/8" x 1" x 10 5/8"
10 Tray Bottoms (2)	1/8" x 7" x 10"
11 Small Tray Front and Back (2)	3/8" x 1 1/4" x 7 1/2"
12 Small Tray Sides (2)	3/8" x 1 1/4" x 5 1/2"
13 Small Tray Bottom (1)	1/8" x 5" x 7"
14 Brusso Hinges (2)	Brass, 90°



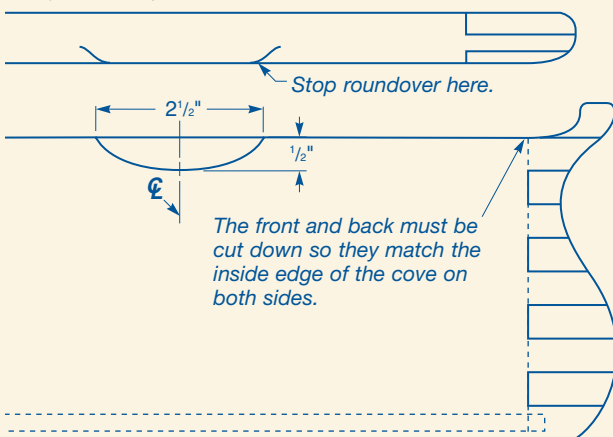
Lid Stile and Muntin Tenon Detail
(Top and Edge View)



Lid Rail



Bombé Jewelry Box Machining Details
(Front View)



Whether novice or pro, testing your setup with scrap wood is more than just being prudent. Once the sides, front and back are correctly machined and fitting well, you can move on to the fun stuff. That said, cut the corner joints.

Shaping the Sides

Shaping wood on the table saw requires a bit of patience and a little imagination. Patience, to make the repeated cuts required to safely mold wood in this fashion...and imagination to forecast the shape of the arc that the blade will cut. With this modified ripping process, instead of feeding the wood directly into the blade, the wood is fed in at an angle controlled by auxiliary fences.

To start, sketch the desired profile onto an end of one of the boards. Use this profile to help align the auxiliary fences to the blade. From the outfeed side of the saw and with the blade raised, sight along the table at the arc of the blade and think of it as a cutting profile (see the *tint box* on page 67 for photos that will help). What you are after is the angle that best matches the profile sketched on the end of the board.

Once the angle is "sighted-in," securely clamp the two auxiliary fences to the saw table. The resulting "chute" should fit snugly against the box sides, but it should not restrict their movement across the saw table.

Because the ends of the box sides need to be shaped to the same profile, shape the box as a unit. If the box's joinery is tight, you can shape the box without clamping up the parts. If the fingers and slots are a bit loose, however, a clamp or two will secure the joints.

Now set the height of the blade at a little over 1/32" above the table. If you feel uncertain about your angle and how it will look as you mold the sides, use a test piece. When you're satisfied with the test piece, shape the box. Make each pass or cut about 1/16" deep and use a slow feed rate. Don't be too concerned about burning the wood with this slow rate of feed. Continue making passes on all four sides of the box until you have formed the desired profile. To remove the material at the bottom of the profile, use the table saw with the blade

TABLE-SAWN FINGER JOINTS: A QUICK REFRESHER COURSE

Finger joints (also called box joints) are simple to make, nice to look at and very durable. Use a jig (shop-made or manufactured) to form the fingers and slots. The author chose to make a one-time jig using a backer board mounted to his miter gauge. To make your own, cut an opening (using the dado setup prepared for the finger joints) to accept a registration pin in the backer board. In this case, the pin should be 1/2" X 1/2" X 1 1/4". Glue the pin into the opening and reposition the backer board so the pin is moved to the right of the dado head, twice the width of your dado cut (in this case 1"). Now secure the jig to your miter gauge. This may take some tweaking to get exactly right. You are now ready to make your finger joints. Using scrap lumber to make test cuts is the next step in successfully completing the task. A handy trick for making the sides of this box is to clamp one of the completed front or back pieces onto the registration pin and then use it to help register the first cut on the end pieces.



Using a registration pin mounted in a backer board, the author made a "one-time" finger joint jig for his table saw.



tilted. Finish shaping and smoothing the sides with a hand plane and scraper for the convex portions and coarse sandpaper with a shaped sanding block for the convex areas. Final sanding includes more of the same...a lot more!

Next, let in the bottom (piece 3) of the box. Our author used a 3/16" straight bit in a router table and made two cuts per groove just to be sure the groove could properly accommodate undersized plywood. On the box back and front, this is a blind operation (you can't observe the bit cutting the wood directly). Start and stop the cut in exactly the same place by marking the router table or fence with start and stop marks to correspond with marks on the front and back. On the sides, it is a simple through-groove.

Making the Lid

To complement the bombé sides of the box, the lid is a lightly arched frame-and-panel construction. The shape helps to embellish the curve of the sides. Make the lid rails, stiles and muntins (pieces 4, 5 and 6), ripping

them from 6/4 plain-sawn stock. If your stock shows quartersawn grain, orient the wood so the lid parts show this figure on the top and bottom surfaces.

The lid's open mortise and tenon joints are easily made at the table saw with a shop-made tenoning jig. The approach is decidedly "low-tech." First attach a tall, hardwood board to the table saw's rip fence (see left photo, next page). It should be carefully dressed, flat and true, because this auxiliary rip fence facing will define the path of your stock through the blade. Take another scrap of wood and rest it on top of the auxiliary fence; this piece forms a sliding runner. Set the height of the blade to the width of the frame member, allowing 1/32" extra.

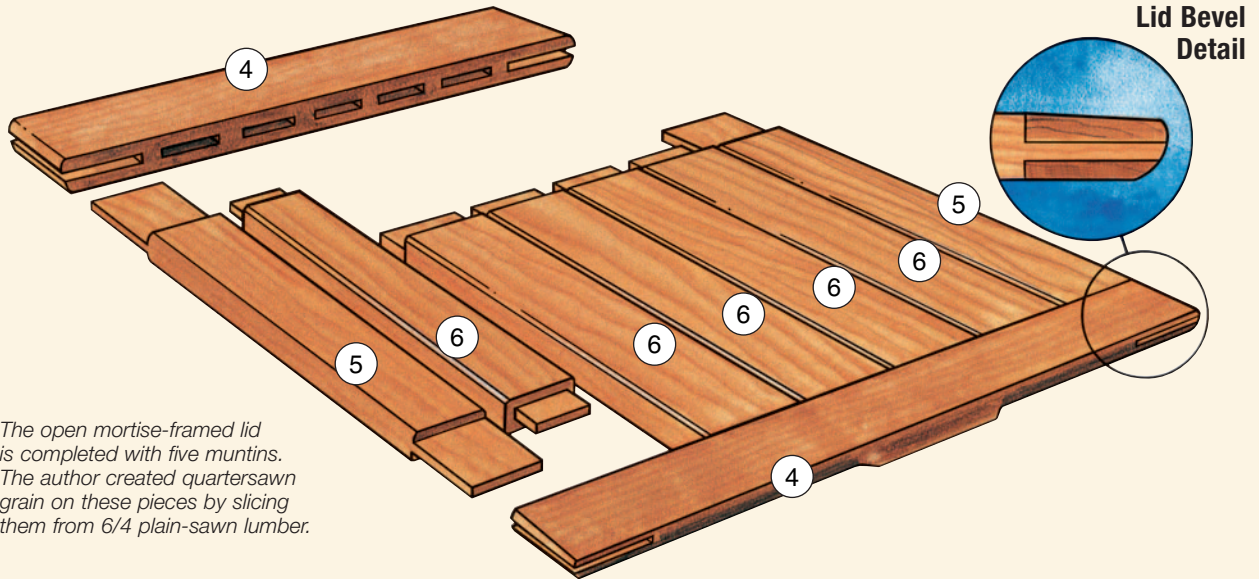
Next, lay out the mortises and tenons as shown in the *Elevation Drawings* on page 63. After adjusting the fence to cut the first pass on the stiles' open mortises, take a piece of scrap wood of the same dimension and rest it on its end against the auxiliary fence and clamp it to the runner. By pushing down on the runner with your

QuickTip

Foam Board Sanding Block

You'll definitely appreciate having a curve-bottomed sanding block to refine the outer faces of this project. A quick and cheap solution is to use a scrap of rigid foam insulation, and mold it to the correct profile with a rasp. First cut the project parts to shape on the table saw, then make the sanding block based on your final part shapes. It takes just a few minutes of filing to create a mirror opposite of the project's curve, and the foam board will stand up well to hand-sanding. Just wrap it with a piece of sandpaper and you're ready to go to work.

Lid Exploded View

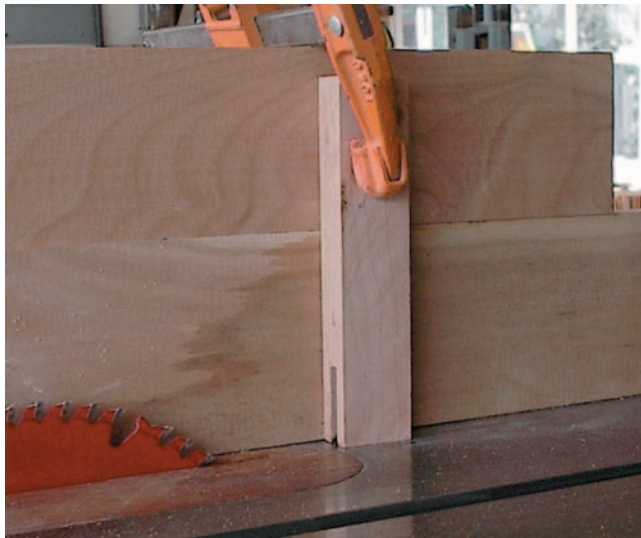


The open mortise-framed lid is completed with five muntins. The author created quartersawn grain on these pieces by slicing them from 6/4 plain-sawn lumber.

right hand and pushing the test piece against the fence with your left, you are ready to guide the test piece through the saw blade. Practice the movement a few times to become comfortable with it. Once the movement is smooth and steady, go ahead and make the

other cuts. When you work with the actual pieces, remember to flip the ends for the cut on the opposite end so the same face is riding against the auxiliary fence. After all four cuts have been made, adjust the fence to make the remaining cuts.

With the open mortises cut to size, you're ready to cut the rails' tenons. Again, a test cut or two saves time and wood. Line up the blade with the edge of one of the mortise pieces—as though you wanted to enlarge the mortise by the width of the saw blade.

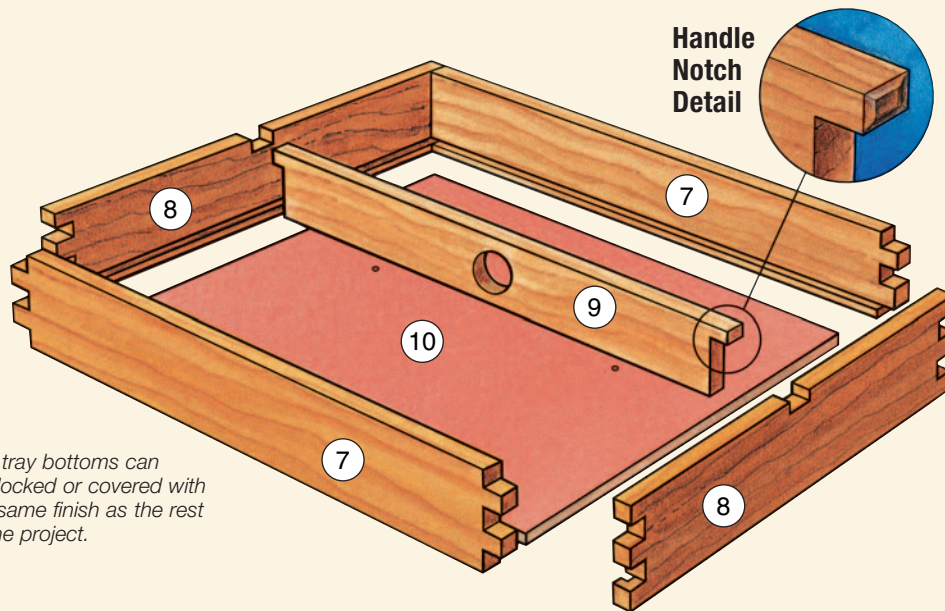


Here's a low-tech jig for making the open mortises on your box lid. It employs a runner board that slides on top of the rip fence facing.

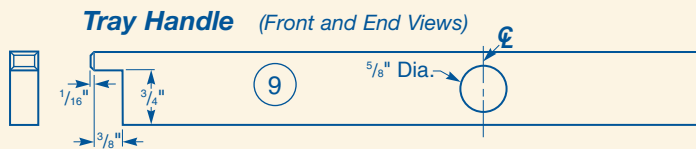
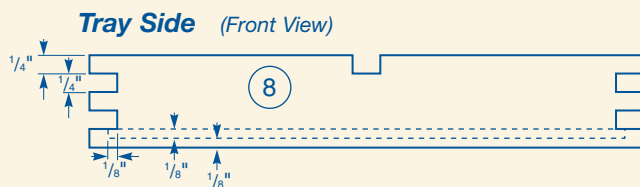
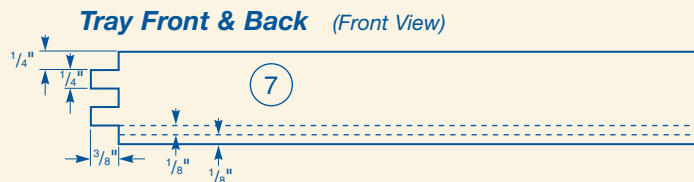


Using a stand-off block to register the cut and a miter gauge for safety, machine tenons onto the ends of the muntins.

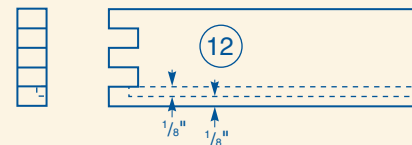
Tray Exploded View



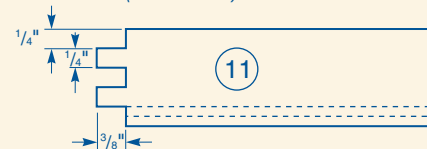
The tray bottoms can be flocked or covered with the same finish as the rest of the project.



Small Tray Side
(Front and End Views)



Small Tray Front & Back
(Front View)



Using the clamp and runner, make a test cut on scrap lumber. If the cut is satisfactory, make the four cuts necessary to establish the first side of all four tenons. Repeat the procedure for the second cut on the opposite side of the tenon. To establish the clean straight line at the tenon shoulder, use your miter gauge and a standoff block clamped to the rip fence to register the shoulder location. Remember that the

depth of cut necessary to remove a tab from one side is less than the other.

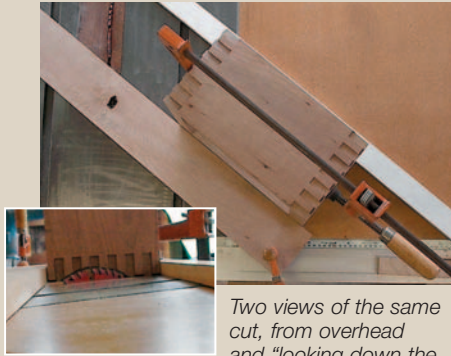
Cutting the tenons on the individual muntins requires the same process. The mortises for the muntins are cut at the drill press with a Forstner bit and cleaned up with a mortising chisel. Dry-fit the pieces, and use your table saw to establish the slope on the front and back of the lid. This means running the lid on edge through the blade.

Routing for the Lid

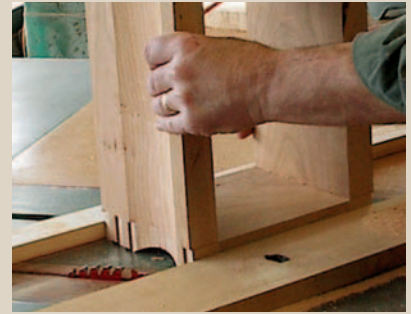
Since the lid of the box is oversized, both the lid and the box will require routing. For the lid, which should be routed as a unit, use a roundover bit. The top of the box sides require a cove, which is done with the box disassembled. Next, cut down the front and back so they meet the cove cut perfectly (see the *Elevation Drawings*). This creates a recessed area that the lid will

SHAPING THE BOX SIDES

Creating the classic bombé curve on this box begins on the table saw. The author used auxiliary fences placed at an angle to the saw blade to guide this process. The box is machined while dry-fitted together so the corners of the box are shaped along with the faces of the sides, front and back. The key to this process is to remove only a small amount of material with each pass over the blade.



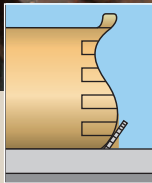
Two views of the same cut, from overhead and "looking down the chute" (inset). Determine the fence angle using the "line of sight" method.



Once you've established your blade angle relative to the clamped fences, raise the blade 1/16" with each pass. Continue until you have the desired curve on all faces.



The lower bout of the S curve is started by slicing an angled cut at the bottom edge of the box, as shown in the inset.



Finish the box's elegant shape by planing, scraping and sanding.



The author used a wide collection of hand tools and sanding blocks to bring the bombé box to its final shape.

fit into, adding subtly to the box's overall curvy shape.

Letting in the small access cove, shaping the front edge of the box and easing the edges comes next. The access cove is done with a cove bit and the lid with a roundover. Note that the bottom edge radius stops at the edge of the access cove, starts again at the other edge and continues. It's a small feature, but it lends a sense of organization.

Now you can assemble the box with glue and clamps, taking plenty of care to be sure it's square.

Building Three Trays

If your project will be used as a jewelry box, there are three trays to construct to organize various jewels,

gems and trinkets. Since you're now a pro at making box joints, use them to connect the tray frames. The trays are mostly made out of 1/4"-thick hardwood and can be produced in short order. Cut the parts (pieces 7 through 13) to size. Set up another finger joint jig and test-fit the corners on some scrap. Use this setup to form the handle notches, too. See the *drawings* on the preceding page for all your machining details. Rout in the groove for the bottoms and you are almost done. Drill a hole in the handles of the large trays to make them easier to grip.

Mounting the lid requires some sturdy hardware. Brusso makes a sturdy but discreet 90° stop hinge (pieces 14) that is easy to install and perfect for this project.

Finishing Up

With all the construction behind you, it's time for finishing. Sand everything to 220 or finer grit. Use a quality oil- or sprayed lacquer finish, carefully rubbing it down with steel wool between coats. We were more interested in producing a grain-enhancing sheen than a shine. Then top off the finish with a coat of paste wax and a good buffing.

There are a couple options for finishing the trays. You can apply the same finish here as you're using for the rest of the project. Or, skip the finish on the tray compartments and spray them with colored flocking instead for a classic jewelry box detail.