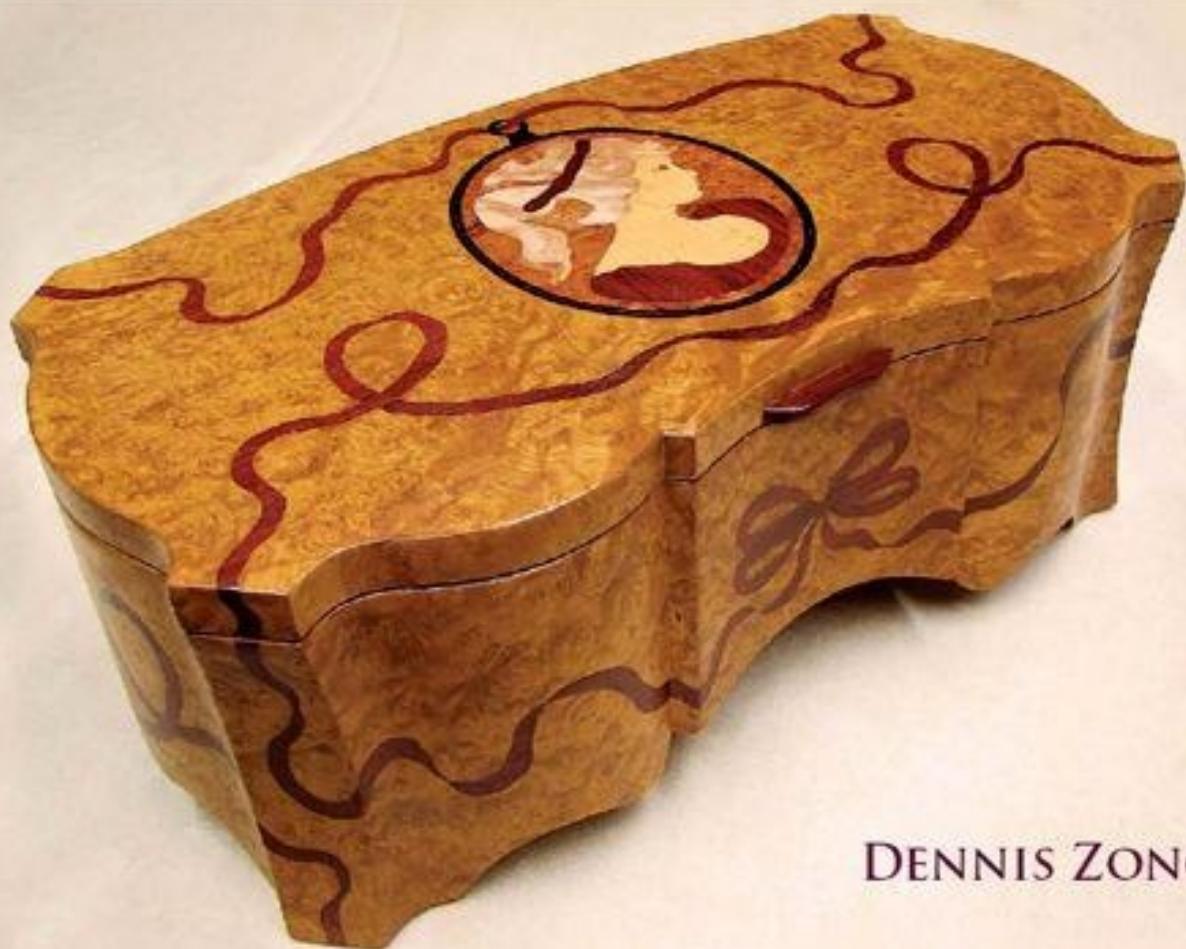




WOODEN BOXES

SKILL-BUILDING TECHNIQUES FOR SEVEN UNIQUE PROJECTS
CARVING ♦ JOINERY ♦ MARQUETRY ♦ RADIUS INLAYS ♦ SEGMENTED TURNING



DENNIS ZONGKER



D E N N I S Z O N G K E R

Wooden Boxes



The Dunton Press

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To the loving memory of my mother, Shirley, who never had a chance to see me complete this book. No matter what I made, whether it turned out good or not so good, she would always love it just the same. I will truly miss all her encouragement, love, and support.

And also in loving memory of my sister Debbie, whose life was cut short. Thank you for always being there with a smile on your face.

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And a special mention to my son, Eric: May this book take your woodworking to a new level and give you the inspiration to always strive to be your best and to never stop wanting to improve.

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INTRODUCTION

BOX MAKING HAS BEEN AROUND SINCE THE time of the ancient Egyptians, and it's still one of the most popular pastimes for modern-day woodworkers. Boxes can be made for all kinds of reasons: keeping playing cards, coins, and art supplies in order; protecting jewelry; storing wine; and playing music, to name but a few. They can also be made just for decoration.

Today, boxes are handcrafted by professional woodworkers and hobbyists alike. They range from simple unadorned boxes to the most elaborate designs imaginable by any craftsman. Each custom-built wooden box is unique and slightly different from any other. Box making has grown in popularity due to creativity and the joy of producing something that has never been done before.

Over the past few years I have developed a strong passion for box making, and seeing all the ways a box can be designed has opened my mind to being more creative. When designing boxes I want them to be a pleasure to look at, with carvings and colorful marquetry, but also to be pleasurable to listen to with music. My boxes often have unique features, such as segmented turnings, decorative trim, and even serpentine radius fronts that make them stand out from basic boxes.

When designing each one of the seven boxes shown in this book, I did a lot of research and used plenty of trial and error to ensure the best outcome for each one. I wanted to be able to add as many different techniques to build the reader's skill from the beginning techniques to the more difficult levels of box making. Taking a mixture of the different styles can help in the design and building of a box of your own design.

This book is for all woodworkers who are looking for a new challenge. It's about teaching different woodworking techniques in joinery, different styles of cutting marquetry, perfecting radius inlays, and making your own diamond-pattern banding, to name just a few skills. It's also filled with information that will surely come in handy when working on your next box.

I'll walk you through from the simplest box to some more-complex designs. Working on each one of these boxes and coming up with new designs has been a rewarding challenge for me. Being innovative can change the basic square box into a creative design. As when learning anything new, you start simple and once you have mastered that you move on to more complex boxes with more detailed designs. That's what I show throughout this book with each box, starting easy and working to the more difficult. The techniques you'll learn can be applied to many types of projects, not just for making these unique boxes. Use them for almost any type of woodworking project.

I have thoroughly enjoyed sharing my woodworking style and techniques with others, and I hope I can help you explore new and many more possibilities. We all have to start somewhere, and with a little determination and enthusiasm, these newfound skills can open the world to creating anything your mind can imagine.



Serpentine Coin Box

I WANTED THIS BOX to be as beautiful on the inside as it is on the outside, so I combined quilted bubinga hardwood with chestnut burl veneer for a strikingly elegant look. As a complementary touch, and also to provide protection, I added solid ebony to all outside edges. The serpentine front has a convex curve in the center flanked by slightly concave ends. The box interior has three removable coin trays made from quilted bubinga, a hardwood with rich, reddish tones that will highlight your prized coin collection.

In this chapter, you'll learn how to make the three-radius serpentine box front using a bandsaw. There are also techniques on making dovetail splines that join the mitered corners on both the box and the coin trays. Splined-dovetail joints are highly decorative but are also very strong and durable. I show how to install small brass knobs for lifting and stacking the coin trays, which fit snugly within the box. And there are also detailed instructions for installing a full-mortise lock for keeping your coin collection secure.



Finished size of box: 6½ in. tall × 9¾ in. deep × 14 in. wide

MATERIALS

QUANTITY	PART	SIZE	CONSTRUCTION NOTES
1	Front	1 $\frac{7}{8}$ in. $\times$ 5 $\frac{1}{8}$ in. $\times$ 14 in.	quilted bubinga
1	Back	$\frac{5}{8}$ in. $\times$ 5 $\frac{1}{8}$ in. $\times$ 14 in.	quilted bubinga
2	Ends	$\frac{5}{8}$ in. $\times$ 5 $\frac{1}{8}$ in. $\times$ 8 $\frac{1}{2}$ in.	quilted bubinga
1	Top	$\frac{1}{2}$ in. $\times$ 8 $\frac{1}{2}$ in. $\times$ 14 in.	maple plywood
1	Bottom	$\frac{1}{2}$ in. $\times$ 7 $\frac{3}{4}$ in. $\times$ 13 $\frac{1}{4}$ in.	maple plywood
1	Inside top veneer	$\frac{1}{42}$ in. $\times$ 8 $\frac{3}{4}$ in. $\times$ 14 $\frac{1}{4}$ in.	bubinga burl veneer
2	Bottom veneer	$\frac{1}{42}$ in. $\times$ 8 in. $\times$ 13 $\frac{1}{2}$ in.	bubinga burl veneer
1	Dovetail spline material	$\frac{5}{16}$ in. $\times$ $\frac{3}{8}$ in. $\times$ 36 in.	black ebony
1	Top veneer	$\frac{1}{42}$ in. $\times$ 11 in. $\times$ 14 $\frac{1}{2}$ in.	maple veneer
1	Top veneer (exterior)	$\frac{1}{42}$ in. $\times$ 10 in. $\times$ 14 $\frac{1}{4}$ in.	chestnut burl veneer
1	Back veneer (exterior)	$\frac{1}{42}$ in. $\times$ 5 $\frac{3}{8}$ in. $\times$ 14 $\frac{1}{4}$ in.	chestnut burl veneer
1	Front veneer (exterior)	$\frac{1}{42}$ in. $\times$ 5 $\frac{3}{8}$ in. $\times$ 14 $\frac{3}{4}$ in.	chestnut burl veneer
2	End veneer (exterior)	$\frac{1}{42}$ in. $\times$ 5 $\frac{3}{8}$ in. $\times$ 8 $\frac{3}{4}$ in.	chestnut burl veneer
22	Banding	$\frac{3}{16}$ in. $\times$ $\frac{3}{16}$ in. $\times$ 18 in.	black ebony
1	Bottom base front	$\frac{1}{2}$ in. $\times$ 3 $\frac{1}{2}$ in. $\times$ 17 in.	quilted bubinga
1	Bottom base back	$\frac{1}{2}$ in. $\times$ 1 $\frac{1}{4}$ in. $\times$ 15 in.	quilted bubinga
2	Bottom base ends	$\frac{1}{2}$ in. $\times$ 1 $\frac{5}{8}$ in. $\times$ 10 in.	quilted bubinga
4	Splines	$\frac{1}{4}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 1 $\frac{1}{8}$ in.	any hardwood
4	Bun feet	1 $\frac{7}{16}$ in. $\times$ 1 $\frac{7}{16}$ in. $\times$ 1 in.	black ebony
1	Full-mortise box lock		brass
1	Escutcheon	$\frac{1}{8}$ in. $\times$ 1 in. $\times$ 3 in.	quilted bubinga
1 pair	95° stop hinges	1 $\frac{1}{16}$ in. $\times$ 1 $\frac{1}{4}$ in.	brass-plated
6	Small knobs	$\frac{1}{4}$ in. tall $\times$ $\frac{5}{16}$ in. dia.	brass



2	Tray ends (3 from each; 6 total)	$\frac{5}{8}$ in. $\times$ $3\frac{5}{8}$ in. (1 in.) $\times$ $7\frac{1}{8}$ in.	quilted bubinga
2	Tray fronts and backs (3 from each; 6 total)	$\frac{5}{8}$ in. $\times$ $3\frac{5}{8}$ in. (1 in.) $\times$ $12\frac{5}{8}$ in.	quilted bubinga
3	Tray bottoms	$\frac{1}{4}$ in. $\times$ $6\frac{5}{16}$ in. $\times$ $11\frac{13}{16}$ in.	maple plywood
6	Horizontal tray dividers	$\frac{3}{16}$ in. $\times$ $\frac{3}{8}$ in. $\times$ $11\frac{3}{8}$ in.	bubinga
15	Vertical tray dividers	$\frac{3}{16}$ in. $\times$ $\frac{3}{8}$ in. $\times$ $5\frac{7}{8}$ in.	bubinga
3	Self-adhesive black velvet	$5\frac{7}{8}$ in. $\times$ $11\frac{3}{8}$ in.	

Cut the hardwood parts

1. Start by using a tablesaw to rip a $1\frac{7}{8}$ -in.-thick blank of quilted bubinga to $5\frac{1}{8}$ in. wide by 38 in. long. From that piece, you'll be able to cut both ends and the front and back of the box.
2. Switch to a power miter saw to cut the box front from the blank at 16 in. long, which is 2 in. longer than its finished size. The extra length allows you to accurately cut the dados and mitered rabbets on the tablesaw before trimming the parts to their finished lengths.
3. To create the box back and ends, resaw the remainder of the blank on the tablesaw. Adjust the rip fence to align the blade center with the center of the $1\frac{7}{8}$ -in.-thick blank. Also, raise the blade to $2\frac{5}{8}$ in. so it'll cut slightly more than halfway through the $5\frac{1}{8}$ -in.-wide blank. Set the blank on edge and make the first pass over the blade. Then flip the blank end for end, keeping the same face against the fence, and make another pass over the blade to complete the cut (**PHOTO A**).



RESAW THE BUBINGA BLANK to cut the parts for the box back and ends. Make the first pass with the blade raised to $2\frac{5}{8}$ in. and then flip the blank end for end to make the second pass.

4. Use a thickness planer to mill the two resawn parts down to $\frac{5}{8}$ in. thick and then cut the back to 16 in. long and both ends to $10\frac{1}{2}$ in.

Cut and veneer the box top and bottom

BEFORE CUTTING THE DADOES AND RABBETS into the hardwood box parts, cut the plywood box top and bottom and then veneer them. The veneer I chose for the inside of the box is bubinga burl, which is similar to the hardwood but adds the richness of burl. You'll need one piece of veneer for the inside of the box top and two pieces for the box bottom.

1. Use the tablesaw to cut the box top and bottom from ½-in.-thick maple plywood (**PHOTO A**).



CUT THE BOX TOP and bottom from ½-in.-thick maple plywood.

2. You also need to make three clamping cauls out of ¼-in.-thick maple or birch plywood. Cut one caul for the box top at 8¾ in. wide by 14¼ in. long and two for the box bottom at 8 in. wide by 13½ in. long. You need two cauls for the bottom so you can veneer both faces for balance and appearance. At this point, you need to veneer only the inside face of the box top; the outside surface will be veneered later with chestnut burl.

3. Using a cutting mat and scalpel, place the bottom and top clamping cauls on top of the veneer. Press down firmly on the caul with one hand, and then cut the veneer using the edges of the caul as a guide (**PHOTO B**, [p. 8](#)).



CUT THE VENEER with a scalpel using the edges of the caul as a guide. Make two or three passes to avoid chipping the

veneer.

4. Apply yellow glue to the veneer and plywood substrate and spread it evenly with a 3-in.-wide roller (**PHOTO C**, [p. 8](#)).



GLUE THE VENEER to the plywood substrate.

WORK

When pressing down burl veneer to a glued substrate, glue will sometimes seep through voids in the surface of the veneer. To prevent the veneer from sticking to the clamping caul, wipe off the excess glue, and then place blue painter's tape over the voids.

5. Set the caul on top of the veneered substrate and secure with strips of Gorilla Tape[®]. Place the assembly into a vacuum-press bag and let dry for one hour to two hours.

WORK

Use a sanding block and 150-grit sandpaper to round over the sharp edges of the clamping caul that sits on top of the veneered assembly. This will protect the vacuum press bag from punctures.

6. Once the glue is dry, set the box top and bottom onto a self-healing mat and use a scalpel to trim the veneer flush with the plywood substrates. Sand the trimmed edges smooth with a sanding block with 150-grit sandpaper.

WORK

It's important to trim the veneer flush two hours to three hours after placing the assemblies into the vacuum press bag. If you wait any longer, the excess yellow glue will be too hard to cut through.

Cut the miters and rabbets

FOR THE TOP OF THIS BOX, I CHOSE TO miter and rabbet the top edges of the front, back, and ends along with the plywood top. The bottom surface of the top fits down into the rabbet, and the upper surface of the top is mitered, leaving a flat clean surface for veneering the box top.

1. Tilt the tablesaw blade to 45° and raise the blade to $\frac{3}{8}$ in. Set the rip fence to $5\frac{1}{8}$ in. Now cut into the top edge of the box ends and back (**PHOTO A**).



CUT A MITER $\frac{3}{8}$ in. deep into the top edge of the box ends and back.

2. Cut a miter into the box top by placing the maple plywood face down on the saw table. Set the rip fence to 14 in. Push the box top past the blade to cut the miter. Adjust the rip fence to $8\frac{1}{2}$ in. and repeat to cut miters into the box front and back.

To cut the miter into the box front, I had to set the tablesaw fence to the opposite side of the blade because my sawblade tilts in one direction only. Keeping the blade height the same, set the fence $1\frac{1}{4}$ in. from the blade.

3. Cut a miter on the inside edge of the box front with a slow and steady push past the blade.

4. Cut rabbets into the front, back, and ends. Set the tablesaw blade height to $\frac{5}{16}$ in. to split the $\frac{5}{8}$ -in. thickness in half. Then adjust the fence to $4\frac{5}{8}$ in. to create a $\frac{3}{16}$ -in.-deep by $\frac{5}{16}$ -in.-wide rabbet. Run all four pieces—front, back, and both ends—through the blade. Then readjust the fence to $4\frac{3}{4}$ in. to cut the last pass (**PHOTO B**).



CUT $\frac{3}{16}$ -IN.-DEEP by $\frac{5}{16}$ -in.-wide rabbets into the front, back, and ends.

5. Place the box top on the tablesaw with its inside burl-veneered surface facing down on the saw table. Run all four edges through the blade, then adjust the fence to remove the remaining waste wood from the rabbet.

WORK

The rabbet height depends on the thickness of the plywood, which may vary slightly. To cut the opposing rabbet into the box top, set the fence so that the outside edge of the blade cuts at $\frac{5}{16}$ in., which is the width of the opposing miter on the box front, back, and ends.

Cut the bottom groove and rabbet

I MADE THE BOX BOTTOM FROM ½-IN.-THICK plywood for the extra strength needed to support the base trim and the weight of the coin trays. A ¼-in.-wide groove is cut into the inside surfaces of the box front, back, and ends to receive the box bottom, which has a ¼-in.-thick rabbet cut into its four edges.

1. Start by cutting a ¼-in. by ¼-in. groove into the four hardwood box parts. Set the tablesaw blade to ¼ in. high and the fence to ¾ in. Make the first pass into all four inside faces of the front, back, and ends. Then reset the fence to ¼ in. and repeat to create ¼-in. by ¼-in. grooves (**PHOTO A**). If your tablesaw blade is narrower than ⅛ in., you'll need to make three passes to form the ¼-in.-wide grooves. The maple plywood I used was slightly less than ½ in. thick, so after veneering both surfaces it measured ½ in. thick.



CUT A ¼-IN. by ¼-in. groove for the plywood bottom into the four hardwood box parts.

2. Set the rip fence to ⅛ in. (to equal ¼ in. to the outside of the blade) and cut all four edges of the bottom. Then position the fence flush against the blade and cut the last pass. Dry-fit the box-bottom rabbet into the grooves, making sure it fits snugly, but not too tight.

Cut the box to size

Measure and mark the top edge of each hardwood box part to its finished length (see “Materials” on [p. 5](#)). Use a miter saw to cut 45° angles in each end of the front, back, and ends. To ensure accurate miters, hold each part tight against the saw’s table and fence.

Lay out the serpentine front

DRY-FIT THE BOX PARTS AND TAPE THE corners. Next, cut two scrap-wood blocks for use as center points for your trammel or large compass. Cut the outside block $5\frac{1}{8}$ in. tall by $9\frac{1}{4}$ in. long or longer; make the inside block 3 in. long by $4\frac{5}{8}$ in. tall. These temporary blocks are needed only to strike the curved serpentine arcs.

1. Set the blocks in place, as shown in **PHOTO A**, and then measure and mark the center point on the box front. Using a combination square, draw a straight line across the box front and inside block. Then adjust the trammel or compass to a 9-in. radius and strike the center, convex arc.



USE A TEMPORARY BLOCK and a trammel to strike the curved serpentine arc on the box front.

2. To strike the two concave arcs onto the box front, start by drawing a centerline along the edge of the outside wood block. Then, from the center of the box front, measure over $6\frac{11}{16}$ in. to the left and right and make a mark onto the top edge of the box front. Now align the centerline on the outside wood block with one of the $6\frac{11}{16}$ -in. marks on the box front.
3. Use a framing square or try square to make sure the wood block and box front are square to each other. Set the trammel or compass to 9 in., locate the center point, and then strike an arc along the top edge of the box front (**PHOTO B**). Repeat to strike a matching arc onto the opposite end of the box front.



TO MARK THE OUTSIDE concave arcs on the box front, draw a 9-in. radius from a temporary block lined up with each end.

Cut the serpentine front

1. Install a $\frac{3}{8}$ -in.-wide 6-tpi (teeth per inch) blade onto your bandsaw. Use a try square to square the bandsaw table to the blade and set the cutting height by adjusting the blade guides to slightly above the serpentine front.
2. Cut into the bubinga box front, following the center of the pencil line (**PHOTO A**).



PUSH THE BOX FRONT through the blade at a steady pace with even pressure to avoid an uneven sawkerf.

3. Clamp the serpentine front into a bench vise and sand and file smooth the bandsaw blade marks. To help speed up the process, use a random-orbit sander fitted with 150-grit sandpaper.

M

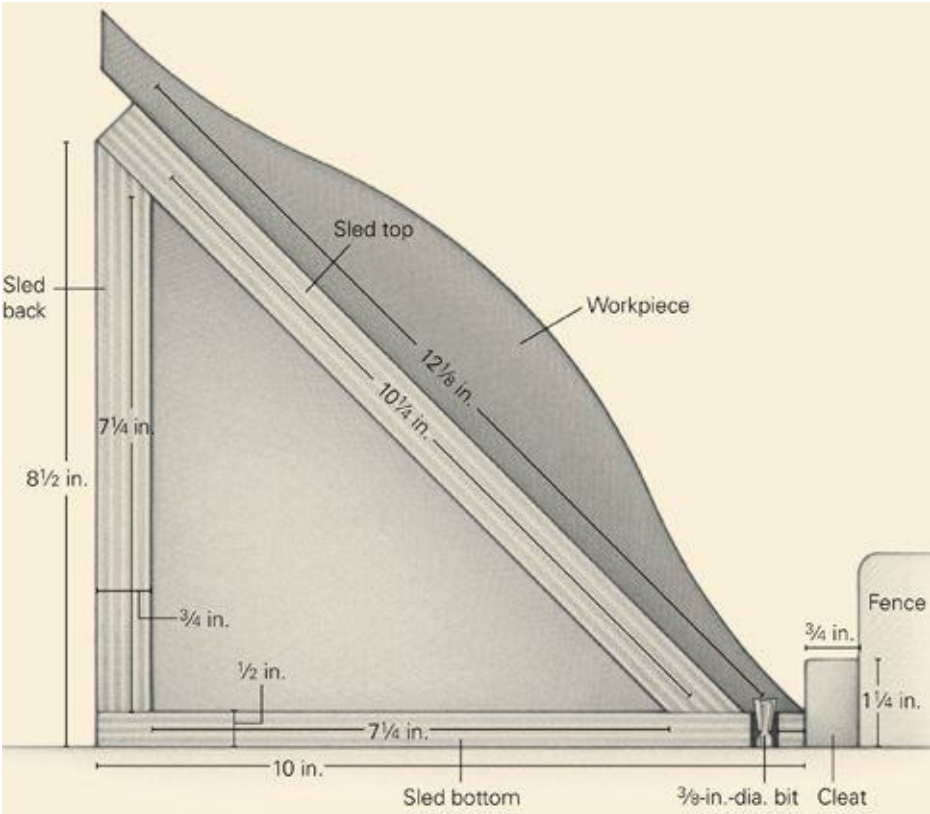
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S

To rout the corner dovetail joints (see [p. 14](#)), I made a router-table sled, which provides an easy, accurate way to rout into the 45° ends of the box parts.

1. To make the dovetail sled, start by cutting a piece of $\frac{1}{2}$ -in. plywood for the sled bottom to 10 in. wide by 16 in. long.
2. Use $\frac{3}{4}$ -in.-thick plywood for the sled top, back, and two sides. Cut the top to $12\frac{1}{8}$ in. wide by 16 in. long; make the back 8 in. wide by 16 in. long. Cut each side of the sled to $7\frac{1}{4}$ in. square. Now cut a $\frac{3}{4}$ -in.-thick by $1\frac{1}{4}$ -in.-wide by 16-in.-long hardwood cleat to support the front edge of the sled.
3. Angle the tablesaw blade to 45° and cut miters into one long edge of both the sled top and back. Then glue and clamp the support cleat to the front edge of the sled bottom.
4. Set up the router table with a $\frac{3}{8}$ -in.-dia. straight-cutting bit. Adjust the fence to cut a through slot $1\frac{1}{8}$ in. from the edge of the front support cleat. Lower the sled bottom down onto the spinning bit and cut an 8-in.-long through slot (**PHOTO A**).

Dovetail Sled (Vertical Section)



Rout the corner dovetails

1. Leave the router-table fence at the same 1½-in. setting used to cut the through slot in the dovetail sled (see “Making a Dovetail Sled” on [p. 12](#)). Install a 5⁄16-in.-wide dovetail bit with an 8° angle and 1¾-in. cutting length. Adjust the height of the bit to 3⁄16 in. above the plywood sled bottom.
2. Place the box front onto the sled, making sure its 45° corner is tight to the bottom platform and vertical cleat. Lock down both toggle clamps to secure the box front to the sled.
3. Position the sled so that the router bit is clearly showing through the slot. Turn on the router and, when it reaches full speed, slowly push the sled across the dovetail bit (**PHOTO A**).



WITH THE SLED TIGHT against the router-table fence, push the sled across the dovetail bit to rout the corner dovetails.

4. Once the bit exits the vertical cleat, stop the sled when you can see the router bit in the through slot. Then turn off the router. Use these same steps to rout dovetails into both ends of all four hardwood box parts.

WORK

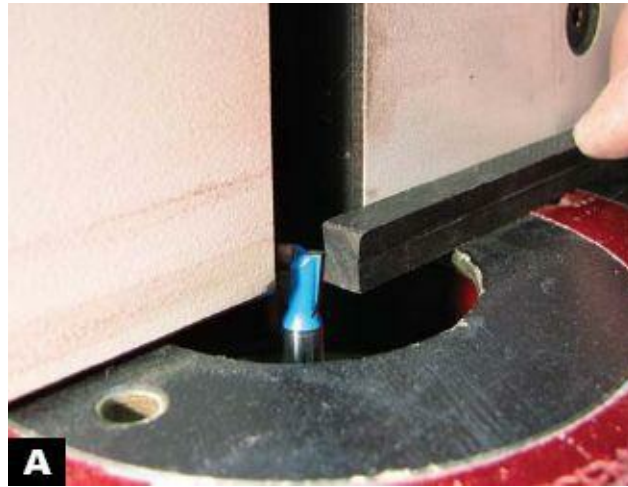
To save an extra step when making the coin trays for this box, rout the corner dovetails into the trays at the same time as the main box parts (see “Materials” on [p. 6](#) for the dimensions). Cut a 45° angle on both ends of each board, and then rout the dovetails. Note that these tray parts are cut wider than needed to make it easier to rout the dovetails. You’ll be trimming them down to their finished sizes later on.

Make the dovetail splines

I USED BLACK EBONY HARDWOOD FOR THE dovetail splines because of its dramatic color contrast to the quilted bubinga and also for its strength and durability.

1. On the tablesaw, cut one piece of $\frac{5}{16}$ -in.-thick ebony to $\frac{3}{8}$ in. wide by 36 in. long. This one piece will yield four $4\frac{1}{2}$ -in.-long splines for the box corners, and twelve $1\frac{1}{16}$ -in.-long splines for the tray corners.

2. Using the same $\frac{5}{16}$ -in.-wide by 8° dovetail router bit, adjust the cutting height to $\frac{3}{16}$ in., which is half of the $\frac{3}{8}$ -in.-wide spline. Set the router-table fence so the bit cuts just $\frac{1}{64}$ in. into the spline to create the 8° angle. Slowly push all four edges of the ebony piece past the router bit to mill the dovetail splines (**PHOTO A**, facing page).



MILL THE DOVETAIL SPLINES using a $\frac{5}{16}$ -in.-wide by 8° dovetail router bit.

3. Before dry-fitting the box together, cut $\frac{1}{8}$ in. off the four corners of the box bottom, so it won't hit the dovetail splines.

4. Use the miter saw to cut four $4\frac{1}{2}$ -in.-long splines for the box corners. Slide the splines into the corner joints (**PHOTO B**).



FIT THE SPLINES into the corner joints, locking the box parts together. Note that the splines must sit below the top, which fits into the mitered rabbet.

Glue the box together

1. Start by placing blue painter's tape along the inside corners of the box sides to prevent any glue from drying onto the hardwood. Then brush yellow glue into the dovetail slots and splines, being careful not to get any glue in the bottom groove.
2. Use short bar clamps to hold the box together. Check all four corners with a try square to ensure the box is square. Make any necessary adjustments before the glue sets up.
3. Let the glue dry about two hours before removing the clamps. Then scrape off any excess glue and remove the tape.
4. Brush yellow glue onto the upper edges of the box and on the box-top mitered rabbet. To avoid excessive glue squeeze-out, apply glue sparingly along the inside edge of the box (**PHOTO A**).



AFTER GLUING UP THE SIDES, brush glue onto the upper edges and onto the box-top mitered rabbet. Set the box onto a temporary block to raise the box up enough to create space for the bar clamps.

5. Use several short bar clamps to hold the box top to the box. Lightly clamp the four corners first, then clamp all around the box every 2 in. to 4 in. Evenly tighten the clamps with medium pressure. Let the glue dry for three hours before removing the clamps.

Veneer the box top

BEFORE COVERING THE OUTSIDE OF THE box with chestnut burl veneer, veneer the box top with maple veneer. Maple veneer is a good choice because it has a tight grain pattern with fine texture, which will prevent the seam between the plywood and bubinga from telegraphing through the finished chestnut burl top.

1. Start by making two clamping cauls out of $\frac{3}{4}$ -in.-thick medium-density fiberboard (MDF), each one 11 in. wide by $14\frac{1}{4}$ in. long. Place the box on top of one caul, leaving a $\frac{1}{8}$ -in. space at the back and each end. Use a pencil and steel washer to draw a pencil line $\frac{1}{8}$ in. from the front edge of the serpentine box front (**PHOTO A**).



TO DRAW THE PROFILE on the MDF clamping caul, place the box on top of the caul and use a pencil and steel washer to draw a line $\frac{1}{8}$ in. from the front edge of the box front.

2. Then, on the bandsaw, follow the pencil line to cut out the serpentine front. Use this caul as a template to trace the serpentine shape onto the second caul, then cut it out on the bandsaw.
3. Place one of the clamping cauls on top of an 11-in.-wide by $14\frac{1}{2}$ -in.-long piece of maple veneer. Use a cutting mat and scalpel to cut around the perimeter of the caul and through the veneer. For best results, use medium pressure and cut through the veneer in two or three passes.
4. Use a random-orbit sander with 150-grit sandpaper to smooth and flatten the box top. Blow off the sanding dust with compressed air, then wipe the top clean with a dry rag.
5. Apply yellow glue to the box top and maple veneer, then spread the glue evenly with a 3-in.-wide paint roller.
6. Place one clamping caul under the box and one on top of the maple veneer. Clamp the box, applying medium to heavy pressure. Let the glue dry for two hours before removing the clamps (**PHOTO B**).



ADHERE THE VENEER to the top with one clamping caul under the box and one on top of the veneer. Start clamping in the center of the box to push the glue outward and then clamp the outer edges approximately 1½ in. from the perimeter edges of the cauls.

7. Trim the veneer flush to the box by placing the box upside down onto the cutting mat. Use the scalpel to cut the veneer flush with the box. Then smooth the edge with a sanding block and 150-grit sandpaper.

Make a serpentine caul

- 1.** To veneer the serpentine shape of the box front, you'll need to make a matching serpentine-shaped clamping caul. On a tablesaw, cut two pieces of $\frac{3}{8}$ -in.-thick bending plywood to $5\frac{1}{2}$ in. wide by 16 in. long. Apply yellow glue to one face of each piece of bending plywood. Clamp both pieces to the box front using spring (pinch) clamps on the ends and bar clamps across the middle. Let the glue dry overnight.
- 2.** Remove the serpentine-shaped clamping caul and spray adhesive onto the inside face of the caul. Then press a piece of $\frac{1}{8}$ -in.-thick foam onto the adhesive. This thin, cushiony layer will eliminate any voids when using the caul to glue the veneer to the box front.

Cut the box veneer

THE FOLLOWING STEPS DESCRIBE HOW TO apply chestnut burl veneer to the surfaces of the box parts.

- 1.** Cut the top, back, and end clamping cauls from $\frac{3}{4}$ -in.-thick MDF or plywood. Cut the back caul to $5\frac{3}{8}$ in. wide by $14\frac{1}{4}$ in. long. Cut each end clamping caul to $5\frac{3}{8}$ in. wide by $8\frac{3}{4}$ in. long.
- 2.** Use the top, back, and end clamping cauls as cutting templates to cut the chestnut burl veneer (see “Materials” on [p. 5](#) for the veneer sizes needed).
- 3.** Set each piece of veneer face down on a self-healing mat and cover it with the appropriate clamping caul. Press down firmly with one hand, then use the scalpel to cut along the perimeter edges of the caul (**PHOTO A**).



CUT THE VENEER by pressing down firmly with one hand and using a scalpel to cut along the caul.

Veneer the outside surfaces

1. Begin by veneering the serpentine surface of the box front. Wipe off any dust, then roll a light, even coating of yellow glue onto both surfaces (**PHOTO B**).



APPLY A BEAD OF YELLOW GLUE onto both surfaces; spread evenly with a small paint roller.

2. Press the veneer to the serpentine front and then cover it with the foam-lined serpentine clamping caul. Clamp the caul and veneer to the box front, starting in the middle and working out toward the ends (**PHOTO C**). Let the glue dry for two hours before removing the clamps and caul.



CLAMP THE VENEER to the serpentine front with the foam-lined serpentine clamping caul, starting in the middle and working out toward the ends. I suggest using 10 small bar clamps, 5 along each of the lower and upper edges of the box front.

3. Trim the veneer flush to the box using a scalpel (**PHOTO D**). Sand off excess glue or veneer with a sanding block and 150-grit sandpaper. Follow the same steps to veneer the box back and two ends. When clamping the back veneer, be sure to cover the box front with the foam-lined caul to protect it from the clamp pads. When veneering the box ends, glue and clamp both ends to the box at the same time.



TRIM THE VENEER flush to the box using a scalpel. Keep the blade flat to the box and cut slightly inward toward the box to avoid any chipping.

4. To veneer the chestnut burl veneer to the box top, apply yellow glue to the box top and chestnut burl veneer, then spread the glue evenly with a paint roller. Press the veneer to the box top. Place one clamping caul under the box and another on top. Using large bar clamps, start clamping near the center of the box top to push glue out to the edges. Then tighten more clamps around the perimeter, positioning them about 1½ in. from the outer edges. Let the glue dry for two hours.

5. After removing the clamps, trim the veneer flush to the box using a scalpel. Smooth any excess glue and veneer with a sanding block and 150-grit sandpaper.

Cut the box in half

THE NEXT STEP IS TO CUT THE BOX INTO two pieces, effectively separating the box top from the box itself. This step is done on the tablesaw with the help of a shopmade box-cutting sled. The sled provides a stable surface on which to rest the serpentine box front as you push it through the sawblade.

- 1.** Make the sled bottom from 2-in.-thick scrap hardwood. Cut it to $5\frac{1}{8}$ in. wide by 18 in. long. Then cut two holding blocks, each measuring $1\frac{1}{2}$ in. thick by $1\frac{1}{2}$ in. wide by $5\frac{1}{8}$ in. long.
- 2.** Draw the serpentine radius onto the edge of the sled bottom. To bring the box level to the sled bottom, set the box on four $5\frac{1}{8}$ -in.-long scrap-wood blocks. Trace the serpentine box front on to the sled bottom.
- 3.** Next, install a $\frac{3}{8}$ -in.-wide 6-tpi blade into the bandsaw and check the blade for squareness with the table using a try square. Adjust the cutting height approximately $\frac{1}{2}$ in. above the top edge of the $5\frac{1}{8}$ -in.-wide sled bottom.
- 4.** Cut away the waste material from the sled bottom by sawing down the center of the pencil line. Use slow, steady pressure to ensure accuracy and smoothness of cut.
- 5.** Now place the serpentine box face front down into the sled. Set one holding block onto the sled, butted up against the front and rear of the box. Mark the position of each block. These two blocks will hold the sled together after cutting through the box. Remove the box and set it aside.
- 6.** Fasten each holding block to the sled with four 3-in.-long screws. Note that for each block it's important to drive two screws to each side of the sawblade path. Sawing into a misplaced screw will ruin the blade.
- 7.** To cut the box in two, start by setting the tablesaw fence $1\frac{1}{2}$ in. from the blade, and adjust the blade height to $2\frac{5}{8}$ in. Set the box face down onto the sled. Place the sled tight to the fence, turn on the saw, and push the sled through the sawblade to cut through the serpentine front (**PHOTO A**). Remove the box from the sled and set the sled aside. You will not need the sled to cut through the back and ends of the box.



TO CUT THE SERPENTINE box front in half, use a shopmade cutting sled. A block at each end of the sled holds the box securely in place.

8. To cut through the box back and ends, begin by setting the sawblade height to $19/32$ in. That'll leave approximately $1/32$ in. of hardwood uncut, so the two box parts will remain together during the next three cuts. Cut all three sides, starting with one end, and push the box through the sawblade, keeping it as straight as possible throughout the process. Then repeat with the back surface and finish up with the remaining box end.

9. To separate the box top from the box, use a scalpel to slice through the remaining hardwood. Sand the cut edges flat and smooth (**PHOTO B**).



USE A SANDING BLOCK with 150-grit sandpaper to sand the cut edges of the box flat and smooth.

Cut rabbets for the ebony banding

ON THE OUTSIDE EDGES AND CORNERS OF the box, I installed black-ebony banding, which serves as a decorative design element but also as a durable strip that protects the veneer.

1. Set up the table router with a ball-bearing piloted rabbeting bit. Adjust the bit to cut a $\frac{1}{8}$ -in.-deep by $\frac{1}{8}$ -in.-high rabbet. Rout rabbets into the top edges of the box top, the bottom edges of the box bottom, and all four corners of both the box top and box itself (**PHOTO A**).



ROUT THE RABBETS for the ebony banding on the outside edges and corners of the box

2. Now readjust the rabbeting bit for routing the inside edges of the box top and box. Set the bit to cut $\frac{1}{8}$ in. deep by $\frac{1}{16}$ in. high and rout the rabbets.

Cut the ebony banding

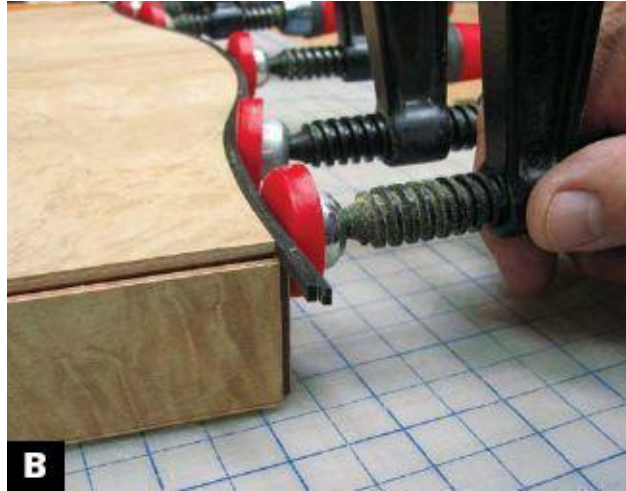
1. Use the tablesaw to cut 22 pieces of ebony banding. Make each piece $\frac{3}{16}$ in. thick by $\frac{3}{16}$ in. wide by 18 in. long, which is slightly thicker and wider than necessary. This will be enough ebony to get all the banding, plus two extra pieces in case of any mishaps.
2. Trim all 22 ebony pieces to $\frac{9}{64}$ in. square. Set the tablesaw fence $\frac{9}{64}$ in. from the sawblade, then lower the blade beneath the saw table.
3. Clamp a $\frac{3}{4}$ -in.-thick particleboard or MDF panel to the saw table. Turn on the tablesaw and raise the blade to cut $\frac{1}{2}$ in. through the panel. Turn off the saw.
4. Screw two featherboards to the panel. Position one in front of the blade, $\frac{3}{16}$ in. from the fence. Screw the second featherboard on the outfeed side of the sawblade, $\frac{9}{64}$ in. from the fence. Push all 22 pieces of ebony across the blade.
5. To make the banding for the radiused serpentine front, you'll need to trim down eight of the $\frac{9}{64}$ -in.-thick ebony pieces to $\frac{5}{64}$ in. by $\frac{9}{64}$ in. Readjust the featherboards, setting one $\frac{9}{64}$ in. from the rip fence in front of the sawblade and the other $\frac{5}{64}$ in. from the fence behind the blade. Push eight ebony pieces through the blade using a push stick (**PHOTO A**).



CUT THE EBONY BANDING on the tablesaw, using two featherboards screwed to an MDF panel to guide the narrow stock.

Bend the ebony banding

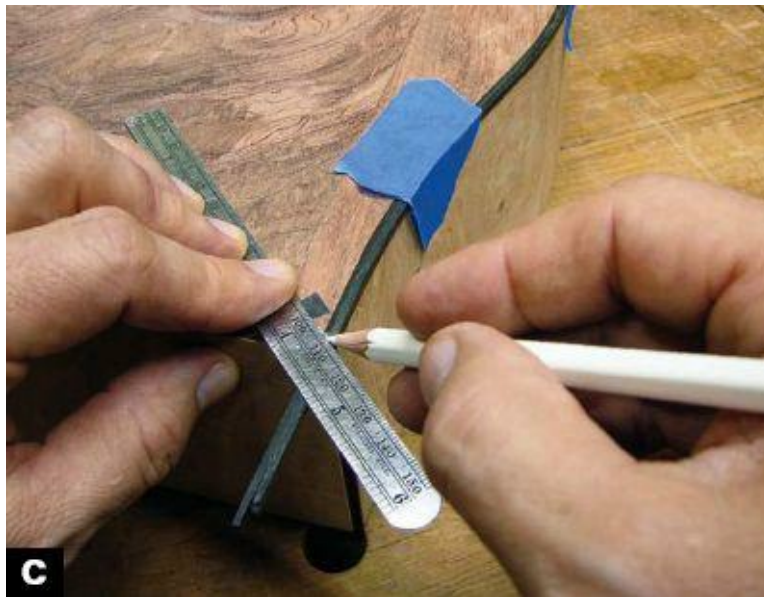
1. To form the serpentine-shape ebony banding, take two pieces of $\frac{5}{64}$ -in.-thick by $\frac{9}{64}$ -in.-wide by 18-in.-long ebony banding and brush yellow glue onto the $\frac{9}{64}$ -in.-wide mating surfaces. Don't glue the banding to the box at this time; this step is only to get the shape of the banding.
2. Use several small bar clamps to clamp the two ebony strips to the rabbet on box top. Let the glue dry for four hours before removing the clamps (**PHOTO B**). Repeat this same step to form the next three pieces of serpentine banding. The radius banding will be formed to the shape of the serpentine; there will be a little spring to it, but it will glue tight to the rabbet after you miter the corners and glue and clamp it into place.



TO FORM THE SERPENTINE ebony banding, clamp two pieces of banding to the rabbet on the box top. Apply glue to the $\frac{9}{64}$ -in.-wide mating surfaces, but not to the box at this point.

Cut and fit the banding

1. Start by fitting the serpentine banding into the rabbet on the bottom edge of the box. Hold it in place with blue painter's tape.
2. Use a small rule to draw a 45° line onto both corners of the serpentine banding (**PHOTO C**).



MARK THE MITER CUTS onto both corners of the serpentine banding.

3. Place the banding into a miter box and line up the 45° mark on the banding with the 45° setting on the miter box. Hold the banding in place and cut the miter with a small backsaw. Flip the banding over and repeat the same steps for cutting the opposite miter.
4. Cut a 45° angle onto a straight piece of banding for lining up the two miters on the serpentine banding.
5. Brush yellow glue onto both the rabbet and the serpentine banding. Then use small bar clamps to clamp the banding in place. Start in the middle and work your way outward on each end. Let the glue dry for three hours to four hours.
6. Remove the clamps. Place the banding into the rabbet of the box and use a small rule to help draw a pencil line onto the banding to represent where to cut the 45° angles on the side and back pieces of the ebony.
7. Once all three pieces have been cut and fitted, apply yellow glue to the back rabbet and banding. Hold the banding in place with blue painter's tape. Clamp it tight with light to medium pressure. Let the glue dry for one hour. Repeat for both ends (**PHOTO D**).



GLUE AND CLAMP the banding into the rabbets, holding it in place with blue painter's tape.

After the glue has dried, remove the bar clamps and tape. Use the same steps to glue and clamp the remaining banding, except for the box corners.

8. Place the corner banding into the rabbet on the box corner. Use a small rule and pencil to draw a cut line onto the banding. Trim the pieces to length using the miter box and handsaw; cut them to 90°. Apply yellow glue to the rabbet and banding and then spread it evenly with a brush.

9. Press the banding tight into the rabbet and wipe off any excess glue with a clean rag. Secure the banding with strips of blue painter's tape. Let the glue dry for one hour before removing the tape. Repeat for all eight corners.

WORK

The rabbets on the inside edges of the box are smaller, but you still use the same size banding. That's because cutting the banding any smaller on the tablesaw would be extremely difficult, if not impossible.

Plane and scrape the banding flush

1. Clamp the box to the workbench. Use a low-angle block plane to remove the excess ebony banding on the inside edges of the box top and bottom. Plane it flush with the bubinga hardwood.
2. To trim the ebony banding along the outside of the box, use a cabinet scraper, as shown in (PHOTO **E**). Repeat these same steps to scrape flush the front serpentine and all corners and edges of the ebony.



TO TRIM THE EBONY banding along the outside of the box, start by clamping the box secure to your workbench. Then use both hands to slightly bend the scraper as you push it across the banding. Shave the banding flush and flat to the veneer.

3. After scraping, sand the veneer and ebony smooth with a sanding block and 150-grit sandpaper.

S S

A properly sharpened scraper should produce paper-thin wood shavings, not sawdust. If your scraper is not working properly, square up both long edges first with a mill file, then with a fine sharpening stone. Once the edge is flat and smooth, use a burnisher to press in a slight angle into the edge. This will leave a small hook for scraping thin wood shavings.

Cut the base parts

THE BOTTOM OF THE BOX IS ACCENTUATED with a base made of ½-in.-thick quilted bubinga hardwood. The base complements the box interior while adding a striking contrast to the jet-black ebony banding.

1. Use the tablesaw to cut four pieces of ½-in.-thick quilted bubinga hardwood, dimensioned slightly oversize, as noted in “Materials” on [p. 5](#).
2. To lay out the front serpentine, place the base front and sides down on the workbench and set the box on top. Use a pencil to mark where the box corners intersect the base front. Remove the front base.
3. Use a combination square to draw 45° lines at each box corner marked on the base front. Place the base front back underneath the box and line up the corners.
4. Use a steel washer with a ⅜-in. space and a pencil to trace the serpentine shape of the box onto the base front (**PHOTO A**).



TO LAY OUT THE BASE FRONT, use a pencil and a washer with a ⅜-in. space to trace the serpentine shape of the box onto the base front. At each corner, hold a small scrap-wood block in place so you can advance the washer up to the mitered line.

5. Cut a 45° angle into both ends of all four base pieces. Trim the base front to 14¾ in. long; cut the base back to 14 in. long.
6. For the sides, the edge of the base at the back of the box will be flush to the box. The sides and front will have a ⅜-in. overhang from the box sides and front. To miter these back corners start the miter on both end pieces at ⅜ in. inward, leaving ⅜ in. by ⅜ in. of end grain showing along the back side. Start the miter cut offset at ⅜ in. inward on both sides to match the 45° miters at the back, which will be flush to the back of the box. Cut the side pieces to 8⅞ in. long.
7. Dry-fit the four base pieces together to be sure they fit the box properly. Check to see that the base is flush to the back and extends out ⅜ in. along both the front and both ends.
8. Cut the serpentine front base on the bandsaw, following the outside edge of the pencil line (**PHOTO B**).



TO CUT THE BASE FRONT, follow the outside edge of the curved pencil line using a slow and steady push through the blade.

9. Clamp the base front into a bench vise and sand the serpentine edge with a 1½-in.-dia. wooden dowel wrapped in 150-grit sandpaper. Be sure to smooth away all sawblade marks.

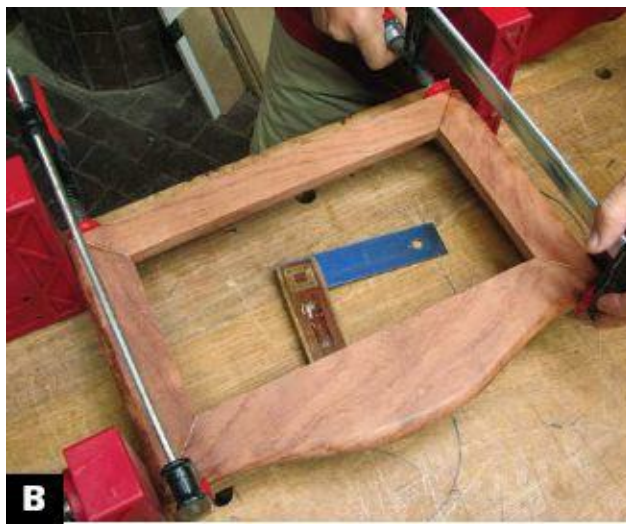
Shape and assemble the base

1. Install a $\frac{3}{8}$ -in.-radius roundover bit in the router table and then rout a $\frac{3}{8}$ -in. radius along the top edge of the base front and each base end. Do not rout the base back piece, which is installed flush and square to the box.
2. The four corners of the base are joined together with wood splines glued into slots cut into each end of all four parts. Cut the slots on the router table with a ball-bearing-piloted rabbeting bit that cuts $\frac{1}{4}$ in. wide by $\frac{3}{8}$ in. deep. Set the height of the bit to cut exactly in the center of the $\frac{1}{2}$ -in.-thick bubinga parts.
3. To prevent kickback, feed the mitered corners into the router bit from left to right. Use the bearing guide at the top of the router bit to control the slot length. Be careful not to cut through the outside edges. Also, using a starter pin will help prevent the router bit from cutting too fast (**PHOTO A**).



AFTER ROUNDING OVER a $\frac{3}{8}$ -in. radius along the top edge of the base front and each base end, rout the slots into each end of all four parts.

4. Make the splines that go in the slots by first milling a piece of hardwood to $\frac{1}{4}$ in. thick by $\frac{3}{4}$ in. wide by 12 in. long. Then cut the piece into four $1\frac{1}{8}$ -in.-long splines. Use a sanding block with 80-grit sandpaper to round off all four corners of each spline so they fit into the slots.
5. Brush yellow glue onto the mitered ends of the base parts, and onto the splines. Press the splines into the slots and join together the four base parts.
6. Clamp the base together with four small bar clamps (**PHOTO B**). Wipe off any excess glue with a clean, dry rag and let the glue dry two hours before removing the clamps. Hand-sand the base smooth with 150-grit sandpaper.



CLAMP THE BASE PARTS TOGETHER, lightly tightening the clamps until each mitered corner is drawn tightly closed.

WORK

Push wood parts into the router bit at a slow and steady pace, holding the pieces firmly with your fingers at a safe distance from the spinning router bit. Remember that when using a router table, the router bit spins counterclockwise.

Turn the bun feet

ADDING BLACK EBONY BUN FEET TO THE base of the box adds a little style and complements the ebony inlaid bandings. To turn the bun feet on the lathe, you'll need an outside caliper and three turning tools: a roughing gouge, $\frac{1}{8}$ -in. parting tool, and skew chisel.

1. Start by cutting one $1\frac{7}{16}$ -in. by $1\frac{7}{16}$ -in. by 6-in.-long ebony blank on the tablesaw. Then cut the blank into four 1-in.-long pieces, using the miter saw.
2. Mount one of the blanks in the lathe and set the speed to 300 rpm. Use the roughing gouge to turn the blank into a $1\frac{3}{8}$ -in.-dia. cylinder. Stop occasionally and check the diameter with the calipers.
3. Turn off the lathe and mark two lines onto the cylinder using a white pencil. These lines show where to cut with the parting chisel. Mark one line $\frac{1}{2}$ in. from the right end of the blank; mark the second line $\frac{1}{4}$ in. to the left of the first mark. Hold the pencil point against each mark and rotate the blank by hand to draw cut lines around the blank (**PHOTO A**).



MARK THE CUT LINES on the bun foot using a white pencil.

4. Start turning the blank by using the $\frac{1}{8}$ -in. parting tool to cut into the outside edge of the second line. This initial cut will form the top end of the tenon. Cut into the ebony until you've reduced the diameter to approximately $\frac{3}{8}$ in.

WORK

When turning the bun feet, position the tool rest no more than $\frac{1}{4}$ in. from the blank. Make sure the turning tools are always in contact with the tool rest.

- 5.** Next, use the parting tool to cut into the outside edge of the first line, making sure you leave $\frac{1}{2}$ in. at the bottom of the foot for shaping the bun. Use the parting tool to cut the tenon, leaving it oversize for now at $\frac{1}{2}$ in. dia (**PHOTO B**).



USE A PARTING TOOL to define the tenon on the bottom of the foot.

- 6.** Use the skew chisel to round over both edges of the bun section. Shape the elliptical radius until it looks balanced on both sides. When blending the two radiuses, try to maintain the original $1\frac{3}{8}$ in. dia. (**PHOTO C**).



SWITCH TO THE SKEW CHISEL to round over both edges of the bun section.

- 7.** Use the $\frac{1}{8}$ -in. parting tool to trim the tenon to $\frac{1}{4}$ in. long by $\frac{3}{8}$ in. dia. Check its diameter with the calipers.

8. Once you've shaped the bun foot and tenon, reverse the direction of the lathe and set the speed to 900 rpm. Grab a handful of ebony wood shavings and hold them against the spinning foot. The shavings will act as ultrafine sandpaper to smooth the turned surface.

WORK

When cutting the final details into the bun feet, turn the lathe up to 500 rpm. This slightly higher speed helps produce a nice clean cut.

9. Switch the lathe to forward direction and lower the speed to 500 rpm. Use the parting tool to cut into the end of the tenon, leaving just $\frac{1}{8}$ in. of wood. Remove the foot from the lathe and use a fine-tooth handsaw to cut the excess wood from the end of the tenon. Repeat the previous steps to turn the remaining three bun feet (**PHOTO D**).



USE THE PARTING TOOL to turn the tenon to its finished diameter of $\frac{3}{8}$ in.

Attach the bun feet and base

1. Use a $\frac{3}{8}$ -in.-dia. Forstner® bit to bore $\frac{1}{4}$ -in.-deep holes (mortises) into the bottom of the base. Position the mortises $\frac{3}{4}$ in. in from all four corners. Brush yellow glue into the mortises and onto the tenons of each bun foot. Press the feet into the mortises and clamp them in place with small bar clamps. Let the glue dry for two hours before removing the clamps.
2. Set the box upside down on the workbench. Place the base on top, making sure its back edge is flush with the rear of the box. Secure the base in place with small bar clamps.
3. Attach the base to the bottom of the box with seven 1-in.-long flat-head screws: three in front, two in back, and one in the center of each end. Position the screws $\frac{3}{4}$ in. from the outer edges. Drill a $\frac{7}{64}$ -in.-dia. pilot hole for each screw and then countersink the holes. Drive in the screws and remove the clamps (**PHOTO E**).



AFTER ATTACHING THE BUN FEET, screw the base to the bottom of the box with 1-in.-long flat-head screws.

Install a full-mortise lockset

TO LOCK THE COIN BOX, I INSTALLED A FULL-mortise brass lockset, which is strong, discreet, and easy to install. The escutcheon surrounding the lock is made from solid quilted bubinga. Begin the installation by routing a shallow $\frac{3}{64}$ -in.-deep by $\frac{3}{8}$ -in.-wide by $2\frac{1}{4}$ -in.-long mortise into the underside of the box front. This mortise will receive the selvedge (outer flange) of the lockset.

1. Measure $9\frac{1}{16}$ in. from the back edge of the box and 7 in. from one end of the box to find the center point for the mortise. Use a try square to draw the centerline.
2. Then, from the centerline, measure out to the left and right $1\frac{1}{8}$ in. Draw square lines at each mark to represent the $2\frac{1}{4}$ -in.-long mortise.
3. Install a $\frac{3}{8}$ -in.-dia. straight bit in the router table. Position the fence $9\frac{1}{16}$ in. from the center of the bit and clamp two wood stop blocks to the router fence. Position one stop block on the infeed side of the bit, the other on the outfeed side. Secure each block $8\frac{1}{8}$ in. from the center of the router bit.
4. Lower the router bit flush with the table. Set the box upside down with its back tight to the fence and its end up against the infeed stop block. Turn on the router, hold the box with one hand, and raise the bit $\frac{3}{64}$ in. Slowly push the box across the bit until it butts against the outfeed stop block. Lower the bit and turn off the router. Repeat these steps to rout an identical mortise into the inside front edge of the box top.
5. Drill a shorter, but deeper mortise into the first mortise you routed into the top front edge of the box. This second mortise will receive the brass lock mechanism, which measures $\frac{7}{32}$ in. thick by $1\frac{1}{16}$ in. deep by $1\frac{3}{8}$ in. wide. Start by drawing a centerline across the length of the mortise, then measure out from the center $1\frac{1}{16}$ in. toward each end to equal the $1\frac{3}{8}$ -in. width of the lock mechanism.
6. Use a $\frac{7}{32}$ -in.-dia. drill bit to drill a series of closely spaced $1\frac{1}{8}$ -in.-deep holes within the $1\frac{3}{8}$ -in.-wide outline. Continue drilling until the entire mortise is drilled out (**PHOTO A**).



DRILL CLOSELY SPACED $1\frac{1}{8}$ -in.-deep holes for the mortise for the brass lock mechanism. Then chisel the mortise walls flat and smooth.

7. Chisel the walls of the mortise flat and smooth. You can leave the rounded ends of the mortise; don't bother squaring them up (**PHOTO B**). Temporarily install the lock and check to be sure it and the selvedge fit snugly into the mortises.



CHISEL THE WALLS of the mortise flat and smooth.

8. Drill a keyhole into the front of the box. Measure down $\frac{7}{8}$ in. from the front center of the serpentine box front and use a $\frac{5}{16}$ -in.-dia. bit set to $\frac{3}{4}$ in. deep to drill the keyhole (**PHOTO C**). Place the full-mortise lock into the mortise, predrill the screw holes, and attach the lock to the box. At this time, fasten the latch plate to the box top, too.



DRILL A $\frac{5}{16}$ -IN.-DIA. keyhole into the front of the box.

WORK

Before routing the mortise for the lockset, make a test cut into a 9¾-in.-wide by 14-in.-long piece of scrap plywood or MDF. Rout the mortise, then check to make sure it's properly placed and is the correct length and depth.

Make the escutcheon

Most full-mortise locks come with a matching keyhole cover, which is known as an escutcheon. However, rather than use the lock's brass escutcheon, I decided to custom-cut one out of the quilted bubinga hardwood.

1. Set the brass escutcheon on top of a piece of 1/8-in.-thick bubinga and trace around it **(PHOTO D)**.



USE A PENCIL to trace around the outside edge and keyhole of the escutcheon.

2. Drill a 3/16-in.-dia. hole through the middle of the escutcheon outline. Then use the scrollsaw and a #5 reverse skip-tooth blade to cut out the interior key slot. Reposition the blade and carefully cut along the outside pencil line **(PHOTO E)**.



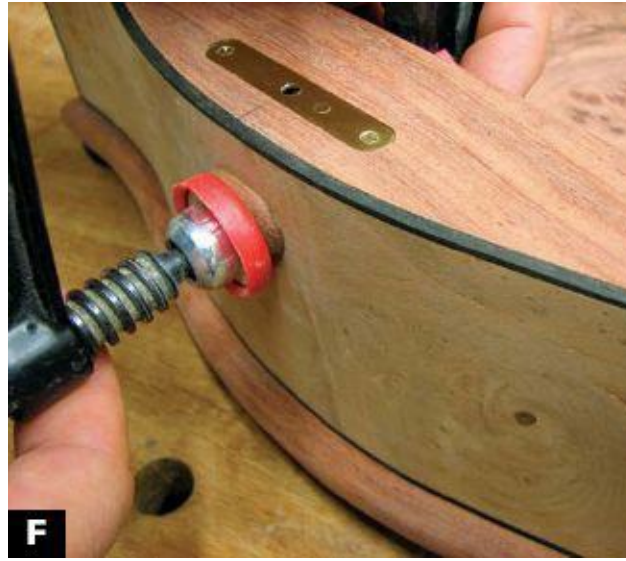
USE A SCROLLSAW to cut out the interior key slot in the escutcheon and then cut along the outside pencil line.

3. To shape the escutcheon to match the 9-in. radius of the serpentine box front, you need to make a rounded sanding template. Cut a piece of hardwood to 1½ in. thick by 3 in. wide by 9 in. long. Then use a bandsaw to cut a 9-in. radius into the hardwood. Clamp the radiused template into a bench vise and stick a 150-grit sandpaper disk onto its center. Hold the escutcheon against the sand-paper and slide it back and forth across the template until you form a 9-in. radius into the back of the escutcheon. Periodically check it against the serpentine front of the box until it fits perfectly around the keyhole. Sand smooth and round over the outer edges of the escutcheon using the same 150-grit sanding template.

WORK

Cut the bubinga for the escutcheon 3 in. long. This is longer than needed, but it provides extra wood to hold down while cutting out the escutcheon.

4. Hold the escutcheon against the box front and align the two keyholes. Draw light pencil lines around the outer edge of the escutcheon. Brush a light coat of yellow glue inside the pencil line on the box and onto the back of the escutcheon. Avoid applying too much glue. Clamp the escutcheon to the box, then wipe away any excess glue. Leave the clamp in place overnight (**PHOTO F**).



CLAMP THE ESCUTCHEON to the box centered to the keyhole. Let the glue dry overnight before removing the clamp.

Install the hinges

THE TOP IS ATTACHED TO THE BOX WITH two $1\frac{1}{16}$ -in. by $1\frac{1}{4}$ -in. brass-plated 95° stop hinges, which hold the top open without the aid of a chain.

- 1.** Prop the top level with the box, then measure $1\frac{1}{4}$ in. in from each end. Set the hinges flat across the seam between the top and the box and position each hinge so that its knuckle—the cylindrical part that houses the pin—extends past the back edge by $\frac{3}{16}$ in. Trace around the hinges with a sharp pencil, marking their outlines onto the back, top edge of the box and the box top.
- 2.** Use a $\frac{3}{4}$ -in.-wide wood chisel and mallet to cut just inside the pencil lines. Hold the chisel vertically at precisely 90° . Cut to a depth of $\frac{3}{32}$ in. Remove the waste wood from within each hinge mortise using a #2/8 carving gouge (**PHOTO A**).



USE A #2/8 CARVING GOUGE to remove the waste wood from within each hinge mortise to a depth of $\frac{3}{32}$ in.

- 3.** Drill screw pilot holes and fasten the hinges with the screws provided.

Make the coin trays

THE THREE COIN TRAYS ARE DESIGNED TO fit into the box sitting one on top of the other. Small brass knobs are used to lift the trays out of the box. Holes drilled into the bottom of the trays fit over the brass knobs and allow the trays to lie flat.

1. Earlier you cut to size and routed the dovetails for the bubinga trays (see [p. 14](#)). Now rip them to their 1-in. finished width on the tablesaw (**PHOTO A**).



SET THE TABLESAW FENCE 1 in. from the blade and rip six tray ends. Then cut the three fronts and three backs. Use a push stick to push the narrow parts past the sawblade.

2. Cut the three tray bottoms from $\frac{1}{4}$ -in.-thick maple plywood (see “Materials” on [p. 6](#)). Check that the tray parts fit together by dry-fitting each tray using the $1\frac{1}{16}$ -in.-long ebony dovetails that you cut earlier.
3. Brush yellow glue onto all eight corners and the four ebony dovetails. Then assemble the tray by sliding the dovetails into the corners joints. Clamp each tray together with four short bar clamps (**PHOTO B**). Use a clean, dry rag to wipe off any excess glue. Let the glue dry for two hours before removing the clamps. Repeat the steps for the remaining two trays.



CLAMP EACH TRAY TOGETHER, checking to be sure the mitered-corner joints fit tightly together. Set a try square into the inside corners to ensure the trays are square.

4. After the glue has completely dried, use a wood file to smooth and flatten the ebony dovetails flush with the bubinga hardwood. Use a sanding block with 150-grit sandpaper to sand all the bubinga surfaces smooth and flush. Then lightly round over all the corners and edges with the sandpaper.

5. Install two small brass knobs, each measuring approximately $\frac{1}{4}$ in. tall by $\frac{5}{16}$ in. dia., to each tray. Position the knobs at opposite corners and $1\frac{1}{4}$ in. from the tray edges (see the bottom photo on [p. 37](#)). This balanced positioning makes it easy to lift the trays from the box.

6. Drill two $\frac{3}{8}$ -in.-dia. by $\frac{3}{8}$ -in.-deep holes into the bottom edge of three trays. Position the holes to align with the brass knobs in the tray below. Use a $\frac{3}{4}$ -in.-dia. countersink bit to create a $\frac{1}{2}$ -in.-wide countersink chamfer around each hole (**PHOTO C**). This slight chamfer will protect the wood from chipping and help guide the knobs into the holes.



DRILL TWO COUNTERSUNK HOLES into the bottom edge of each tray, positioned to align with the brass knobs in the tray below.

Make the tray dividers

For this coin box, I built all three trays to hold silver dollars; each tray holds 18 of the 1½-in.-dia. coins. You can easily alter the dividers in the trays to hold coins of larger or smaller sizes.

1. Start by cutting the dividers from $\frac{3}{16}$ -in.-thick by $\frac{3}{8}$ -in.-wide bubinga hardwood. For each tray, you need two 11 $\frac{3}{8}$ -in.-long horizontal pieces, and five 5 $\frac{7}{8}$ -in.-long vertical ones. Set the tablesaw blade to $\frac{3}{16}$ in. high, which will split the width of the divider in half for cutting the lap joint.
2. Use the miter gauge with an attached wood support block to cut half-lap joints into the horizontal divider pieces. Hold all six 11 $\frac{3}{8}$ -in.-long dividers against the support block and cut them all at the same time. Then adjust the dividers over $\frac{1}{16}$ in. to produce $\frac{3}{16}$ -in.-wide joints (**PHOTO D**). Repeat these same steps for the 5 $\frac{7}{8}$ -in.-long vertical dividers.



CUT THE HALF-LAPS into the tray dividers, using a wood block attached to the miter gauge to support the pieces.

3. Once all the dividers are cut, assemble them and set them into the trays to ensure they fit snugly. Use 150-grit sandpaper to smooth all edges and surfaces of the dividers.

Apply the finish

AS THE FINAL STEP, I APPLIED A CLEAR, precatalyzed lacquer finish to the box with a pneumatic sprayer.

- 1.** Start by lightly hand-sanding all surfaces with 150-grit sandpaper. Blow off the sanding dust and wipe everything down with a clean, dry rag.
- 2.** Spray all surfaces with a very light coat of lacquer, which acts as a sealer. Allow the lacquer to dry one hour longer than is recommended by the manufacturer (**PHOTO A**).



APPLY THREE COATS of precatalyzed lacquer finish to the box with a pneumatic sprayer.

- 3.** Lightly sand all surfaces with ultra-fine 320-grit sandpaper. Wipe off the sanding dust, then spray on another light coat of lacquer. Be careful not to apply the lacquer too thickly; otherwise, it could crack over time. Repeat the previous step by sanding with 320-grit sandpaper and then applying one final coat of lacquer. Let the finish dry overnight.

WORK

Before applying a finish to the coin trays, use painter's tape to mask off the top, interior surface of the plywood bottoms. Once the finish has dried, remove the tape. The unfinished surface gives the adhesive a stronger bond to hold down the velvet lining.

Install the tray liners

THE BOTTOM OF EACH COIN TRAY IS LINED with self-adhesive black velvet, which is soft, durable, and the perfect complement to the jet-black ebony hardwood.

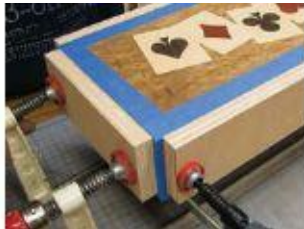
- 1.** To accurately cut the velvet to size, make a template from ¼-in.-thick plywood. Cut the template to 5⅞ in. wide by 11⅜ in. long, the same size as the interior of the trays.
- 2.** Lay the velvet face up onto a cutting mat and set the plywood template on top. Press down on the template and cut around it with a scalpel. Check the fit in the tray. Repeat to cut the final two velvet pieces.
- 3.** Peel off the protective paper from the back of one velvet piece and gently set it into the tray. Check to be sure it's in the proper position, then slowly press down the velvet. Repeat to line the remaining two trays (**PHOTO A**).



LINE THE BOTTOM of each coin tray with self-adhesive black velvet, cut to fit.



THE FINISHED TRAYS nest inside the box.



Playing Card Box

THIS BEAUTIFUL camphor burl card box provides a neat, stylish way to store all your playing cards. Centered on the box top is an attractive marquetry design that represents the four suits of cards. To enhance the edges of the box, I added diamond-pattern banding to further illustrate the playing-card theme.

In this chapter, you'll learn techniques for cutting the playing card marquetry using just a scalpel, a technique known as the *window method*. The playing cards are cut from holly veneer and the card symbols—heart, club, spade, and diamond—are cut from bloodwood and Macassar ebony veneers. And there are step-by-step instructions for fabricating the diamond-pattern banding from Macassar ebony, bloodwood, and holly hardwoods.



Other advanced box-making techniques used in this project are cutting miters with a 90° V-groove router bit and turning a knob out of Macassar ebony. To complement the ebony used throughout the box, you'll learn how to make the box feet from pieces of Macassar ebony.

The playing card box measures 3 $\frac{3}{8}$ in. tall by 8 in. deep by 14 $\frac{5}{8}$ in. long, plenty large enough to store four decks of playing cards, poker chips, and even some dice.



MATERIALS

QUANTITY	PART	SIZE	CONSTRUCTION NOTES
2	Banding borders	$\frac{1}{16}$ in. $\times$ $1\frac{1}{4}$ in. $\times$ $19\frac{1}{8}$ in.	Macassar ebony
2	Half-diamond bandings	$\frac{3}{16}$ in. $\times$ $1\frac{1}{4}$ in. $\times$ 24 in.	holly
1	Diamond banding	$\frac{9}{32}$ in. $\times$ $1\frac{1}{4}$ in. $\times$ 24 in.	bloodwood
1	Box panel	$\frac{1}{2}$ in. $\times$ $14\frac{1}{4}$ in. $\times$ $20\frac{7}{8}$ in.	$\frac{1}{2}$ -in.-thick maple plywood (for box top and sides)
2	Box substrates	$\frac{1}{42}$ in. $\times$ $21\frac{1}{8}$ in. $\times$ $14\frac{1}{2}$ in.	camphor burl veneer
4	Insert veneer	$\frac{1}{42}$ in. $\times$ $3\frac{1}{2}$ in. $\times$ $4\frac{1}{2}$ in.	holly veneer
2	Heart, diamond	$\frac{1}{42}$ in. $\times$ 2 in. $\times$ 2 in.	bloodwood veneer
2	Spade, club	$\frac{1}{42}$ in. $\times$ 2 in. $\times$ 2 in.	Macassar ebony veneer
1	Box bottom	$\frac{1}{4}$ in. $\times$ $7\frac{1}{2}$ in. $\times$ $14\frac{1}{8}$ in.	$\frac{1}{4}$ -in.-thick maple plywood
2	Box bottom veneer	$\frac{1}{42}$ in. $\times$ $7\frac{3}{4}$ in. $\times$ $14\frac{3}{8}$ in.	camphor burl veneer
6	Edge veneers	$\frac{1}{42}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 8 in.	camphor burl veneer
6	Edge veneers	$\frac{1}{42}$ in. $\times$ $\frac{3}{4}$ in. $\times$ $14\frac{5}{8}$ in.	camphor burl veneer
1 pair	95° stop hinges	$1\frac{1}{16}$ in. $\times$ $1\frac{1}{4}$ in.	brass-plated
4	Top tenon feet	$\frac{1}{4}$ in. $\times$ $\frac{7}{16}$ in. $\times$ $1\frac{1}{16}$ in.	Macassar ebony
4	Middle feet	$\frac{3}{16}$ in. $\times$ 1 in. $\times$ $1\frac{1}{4}$ in.	Macassar ebony
4	Bottom feet	$\frac{3}{16}$ in. $\times$ $\frac{3}{4}$ in. $\times$ $\frac{7}{8}$ in.	Macassar ebony
1	Knob	$1\frac{3}{4}$ in. $\times$ $1\frac{3}{4}$ in.	Macassar ebony
3	Poker-chip dividers	$\frac{7}{8}$ in. $\times$ $1\frac{1}{8}$ in. $\times$ $4\frac{7}{8}$ in.	Macassar ebony
2	Card dividers	$\frac{7}{8}$ in. $\times$ $\frac{5}{16}$ in. $\times$ 7 in.	Macassar ebony
2	Dice trays	$\frac{7}{8}$ in. $\times$ $1\frac{3}{8}$ in. $\times$ $4\frac{1}{16}$ in.	Macassar ebony

Make the banding

THE FIRST STEP TO BUILDING THIS BOX IS to make the eye-catching diamond-pattern banding that runs around the box and the box top. To produce a complementary color and design combination, I made the banding from the same three wood species as I used to make the marquetry veneer: Macassar ebony, holly, and bloodwood.

You'll need five pieces of hardwood to make the banding: two pieces of Macassar ebony to form the outside borders of the banding, two pieces of holly for making the half-diamond pieces, and one piece of bloodwood for the full-shape diamonds.

1. Cut the Macassar ebony, holly, and bloodwood to length using the miter saw (see "Materials" on [p. 39](#)). Switch to the tablesaw, set the fence 1¼ in. from the blade, and cut the pieces to width.
2. Resaw the hardwood pieces to their finished thickness. Make a test-cut in scrap wood first to confirm the accuracy of each setup. Cut two ebony pieces to 1/16 in. thick, two holly pieces to 3/16 in. thick, and one bloodwood piece to 9/32 in. thick (**PHOTO A**).



RESAW THE HARDWOOD PIECES for the banding to their finished thickness, using a featherboard and a push stick for safety.

3. Make two crosscut sleds for your bandsaw table: one for cutting the full-shaped diamonds and the other for cutting the 45° angles for the half-diamond pieces (see the photos on the facing page). Every bandsaw is different, so adjust the dimensions to fit your saw. For my 14-in. Delta® bandsaw, I cut two 13¾-in.-sq. pieces of ¾-in. plywood, and two hardwood runners, each measuring ¾ in. thick by ¾ in. wide by 14 in. long. The runners are screwed to the underside of each plywood sled and slide in the miter-gauge groove in the bandsaw table.

4. Cut two hardwood fences, each 1 in. thick by 2 in. wide by 13¾ in. long, and screw one to the top

surface of each sled. Position the fences $6\frac{7}{8}$ in. from the front edge of the plywood sled. Be sure the fences are square before fastening. Set the crosscut sled onto the bandsaw table with its runner in the miter-gauge groove. Turn on the saw and push the sled forward, cutting through the plywood sled and approximately $\frac{1}{2}$ in. deep into the hardwood fence.

5. Make a hardwood stop block that's about 1 in. thick by 2 in. wide by 5 in. long. The stop block is clamped to the fence for making repetitive cuts of the same exact size.

Cut full- and half-diamonds

1. The first hardwood parts to cut with the crosscut sled are the $\frac{9}{32}$ -in.-thick bloodwood pieces, which will form the full diamonds in the center of the banding. Start by clamping the stop block to the fence at exactly $\frac{9}{32}$ in. from the sawblade kerf. This stop-block position will produce a perfect square part, which when rotated 45° will look like a diamond.

Hold the bloodwood strip in place against the fence and tight to the stop block. Slide the sled into the blade, cutting through the bloodwood strip and into—but not through—the fence. Remove the cut piece of bloodwood and pull the sled back away from the blade. Push the bloodwood tight to the stop block and repeat until you've cut 50 pieces (**PHOTO B**).



USING A SHOPMADE CROSSCUT SLED on the bandsaw, cut the bloodwood pieces that form the full diamonds in the center of the banding. To produce clean, straight cuts with these small pieces, use a $\frac{1}{4}$ -in.-wide by 6-tpi blade.

2. To prepare to cut the holly strips, which form the half-diamonds in the decorative banding, adjust the bandsaw table to 45° , turn on the saw, and slide the second crosscut sled into the blade cutting approximately $\frac{1}{2}$ in. into the fence.

3. Make a hardwood stop block for the angle-cutting sled that's about $\frac{1}{4}$ in. thick by $1\frac{1}{4}$ in. wide by 4 in. long. Hold the stop block flat against the fence, and then slide the sled forward to cut a 45° angle into the end of the stop block. Flip the stop block over and trim off about $\frac{1}{8}$ in. of its pointed tip to create a small, flat surface to which the holly strip can be butted.

WORK

While cutting the pieces of banding, check often to make sure there's no sawdust building up against the stop block. Even a little bit of sawdust will affect the uniformity of the pieces.

4. Measure $\frac{3}{8}$ in. from the bandsaw-blade kerf cut into the sled and clamp the stop block to the fence.
5. Once the stop block is clamped in position, cut one end of the holly strip to 45°, then flip it over, butt it to the stop block, and cut the opposing 45° angle. That will produce one triangular-shaped piece of half-diamond holly. Flip the strip over, butt it to the stop, and repeat until you've cut 100 half-diamond pieces of holly (**PHOTO C**).



SWITCH TO THE ANGLE-CUTTING SLED to cut the half-diamond holly pieces, butting the end of the holly against the stop block clamped to the fence.

6. Use a sanding block and 150-grit sandpaper to very lightly sand off burrs and rough spots from each piece of holly and bloodwood banding.

Glue together the diamonds

1. Make two hardwood clamping cauls, each measuring $\frac{3}{4}$ in. thick by $1\frac{1}{4}$ in. wide by $19\frac{1}{8}$ in. long. The cauls will be used to assemble the pieces into the diamond-pattern banding. Cut a $1\frac{1}{4}$ -in.-wide by $19\frac{1}{8}$ -in.-long piece of double-stick mounting film. Peel off the protective backing and stick the film to one of the clamping cauls. Peel off the upper layer of protective backing to expose the adhesive. Use this sticky surface to assemble the banding pieces.
2. Start by placing one of the holly triangles flush with the end of the clamping caul. Firmly press it down onto the sticky film. Set another holly triangle tight against the first one, and press it down. Continue in this manner with the remaining holly pieces, covering the entire clamping caul (**PHOTO D**).



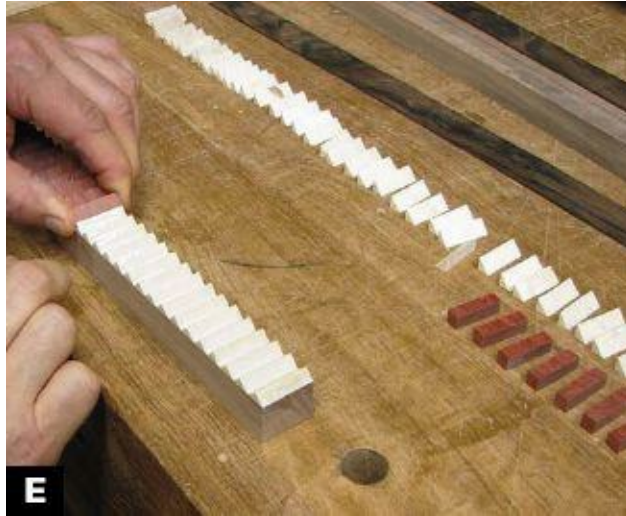
USE ONE OF THE CLAMPING CAULS with double-stick mounting film to assemble the pieces into the diamond banding. Working from the end of the caul, firmly press all the holly triangles down onto the sticky film.

3. Squeeze two thin beads of yellow glue across the holly triangles from one end of the caul to the other. Then use a small artist's brush to spread the glue evenly onto each triangle.

WORK

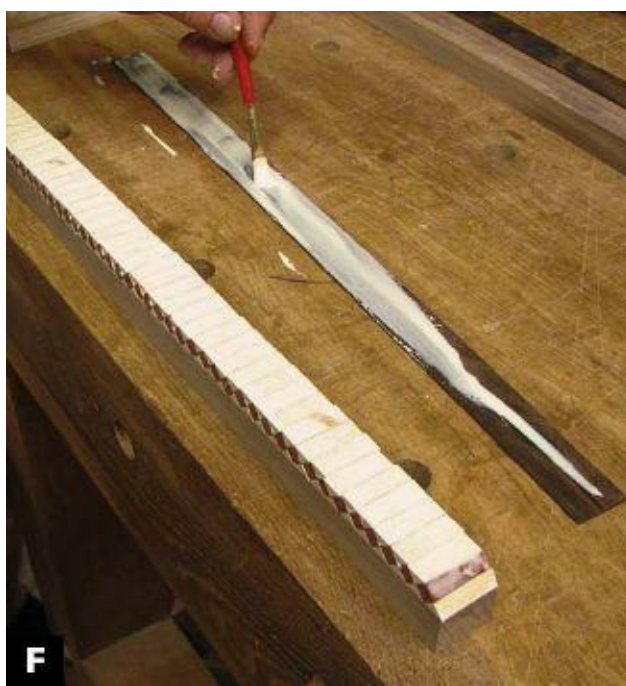
When gluing down the bloodwood pieces, align the end grain of all the pieces in the same direction: all facing to the left or all to the right. This parallel alignment will give the banding a cleaner, more uniform appearance.

4. Set a bloodwood piece into the center of the first two holly triangles. Press down and slide the bloodwood piece back and forth slightly to ensure a strong glue bond. Check to be sure the ends of the pieces are flush. Continue installing bloodwood pieces in this manner until all 50 are glued down (**PHOTO E**).



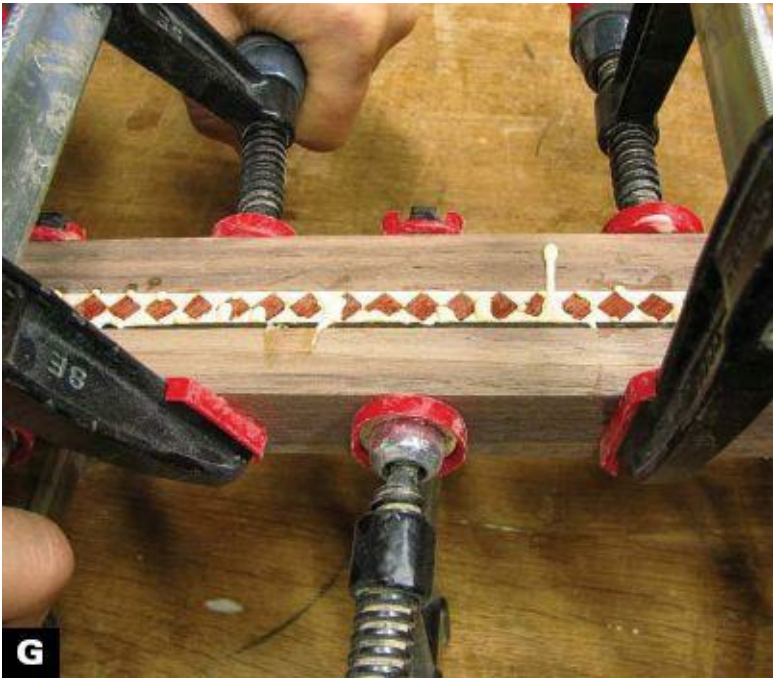
AFTER APPLYING GLUE to the surfaces of the holly triangles, fill in with the bloodwood pieces.

5. Squeeze two beads of glue across the bloodwood pieces. Brush the glue out evenly and then press the remaining holly triangles down onto the bloodwood pieces. Remember to slide each triangle back and forth slightly to create a good glue bond.
6. Once all the holly triangles are glued in place, brush an even layer of glue across the top of the triangles and also onto one surface of one of the Macassar ebony borders (**PHOTO F**).



BRUSH YELLOW GLUE onto the top of the holly triangles and onto one surface of one of the Macassar ebony borders.

7. Use the other clamping caul to sandwich the banding with several short bar clamps (**PHOTO G**). Clean off any excess glue with a clean rag and scraper. Let the glue dry overnight.



ADD THE OTHER CLAMPING CAUL and sandwich everything together. Space the clamps about 2 in. apart and tighten them with a fair amount of pressure.

Apply the second ebony border

- 1.** Remove the clamps and use a slotted screwdriver to carefully pry off the clamping caul that's stuck on with double-stick film. Use a sanding block and 80-grit sandpaper to sand away any dried glue that may have seeped through the holly.
- 2.** Brush glue onto the second Macassar ebony border and across the holly triangles on the opposite side of the banding.
- 3.** Press the Macassar ebony border down onto the holly triangles, then use both cauls and bar clamps spaced about 2 in. apart to firmly clamp the border to the banding. Let the glue dry overnight. Remove the clamps and cauls and sand the 1¼-in.-wide surfaces of the ebony flat and smooth with a sanding block and 150-grit sandpaper.

Slice the banding into thin strips

1. Before slicing the banding into thin strips, flatten one edge with a low-angle block plane. Set the plane iron for a very shallow cut and make long, continuous strokes across the banding (**PHOTO H**).



USE A BENCH VISE to hold the banding while planing the edges flat and even.

2. Set the tablesaw fence $\frac{1}{16}$ in. from the blade and cut the banding into thin strips, using a push stick for safety. By using an ultra-thin-kerf blade, you should be able to get nine slices out of the $1\frac{1}{4}$ -in.-wide glued-up piece of banding. That means you'll have three extra pieces, in case of any mishaps.

3. The last step before starting to build the box is to use the bandsaw to rip three pieces of banding lengthwise down the middle. These half-width banding strips will be installed along the seam between the box and box top. Make a plywood platform with an attached fence to fit the bandsaw table. Clamp the platform in place and check to be sure the blade will rip the banding precisely down the middle. With the blade aligned exactly with the center of the bloodwood diamonds, slowly push the banding strips, one at a time, past the blade (**PHOTO I**).



USE THE BANDSAW to rip three pieces of banding lengthwise down the middle.

M

M

T

C

To produce extremely thin cuts, as is necessary when making the $\frac{1}{16}$ -in.-thick diamond-pattern banding, I recommend using an ultrathin-kerf rip blade in the tablesaw. This blade has teeth that are only $\frac{5}{64}$ in. wide. The results are cleaner thinner cuts with much less waste.

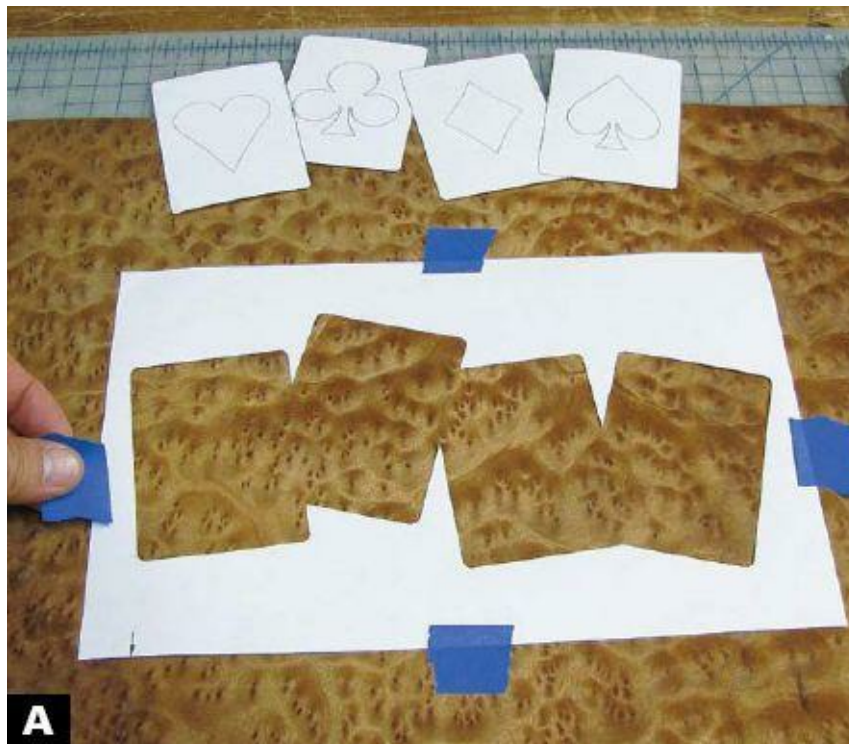


Window method of marquetry

THE WINDOW METHOD OF MARQUETRY IS A technique that uses only a scalpel to cut the veneers. First, a template is used to draw a design onto the background veneer. Then the template design is cut out from background veneer, creating a window. The window in the background veneer is then filled with another veneer, called the *insert*.

Using the window method to cut marquetry takes a bit longer than other marquetry techniques, but there's a lot less preparation time involved. It's also a good marquetry method for cutting straight lines with a high degree of accuracy.

1. Start by making a photocopy of the playing card template shown on [p. 47](#). Then use a cutting mat, scalpel, and straightedge to cut around the outside lines of the template, leaving the four cards attached as one design.
2. Before starting the marquetry, cut a 14¼-in.-wide by 20⅞-in.-long box panel from ½-in. maple plywood (this one panel will be used to form the box sides and top). Next, cut two clamping cauls from ½-in. plywood or medium-density fiberboard (MDF). Make them approximately ¼ in. wider and longer than the plywood panel.
3. Cut two pieces of camphor burl veneer to the same size as the clamping cauls: 14½ in. wide by 21⅞ in. long. Save time by using one of the cauls as a cutting template: Set the caul on top of the veneer and cut around it with a scalpel.
4. Take the paper template from which you earlier cut out the four-card design. Tape the template to the center top surface of one of the camphor burl veneer pieces; this veneer piece will eventually cover the top and all four sides of the box (**PHOTO A**).



TAPE THE TEMPLATE to the center top surface of one of the camphor burl veneer pieces.

Spray a light coat of adhesive to the backside of the four-card template, which you cut from the paper template. Set the four-card template into the cutout opening in the paper template and press it

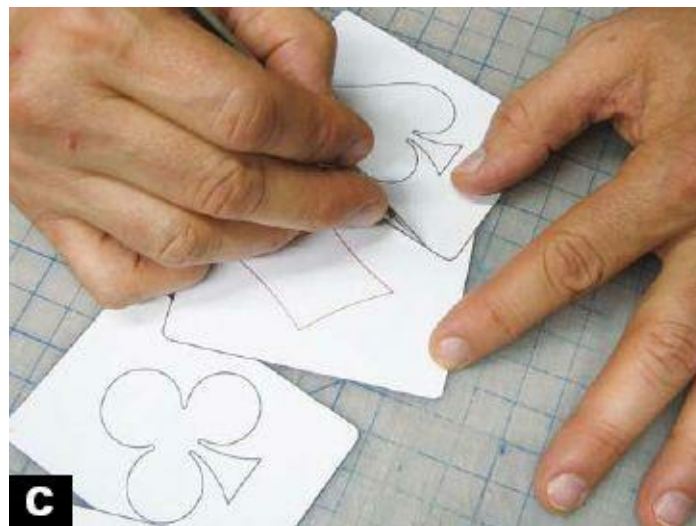
down onto the veneer. Peel off the taped-down paper template.

5. Holding the scalpel at approximately 45°, cut around the outside edges of the four-card template (**PHOTO B**, [p. 46](#)). Don't try to cut all the way through the veneer; instead, make relatively short, light scoring cuts around the template. When you get to the tight-radius corners, make very short scoring cuts. After scoring the veneer all the way around the four-card design, place the scalpel blade in the scoring cuts and cut through the veneer.



HOLD THE SCALPEL at approximately 45° and cut around the outside edges of the four-card template, making relatively short, light scoring cuts.

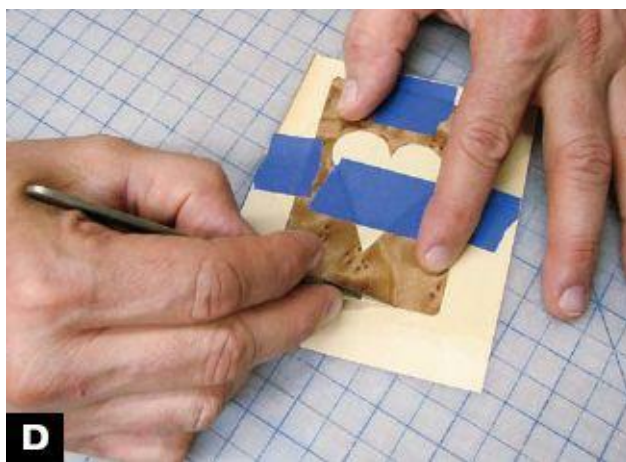
6. Set the four-card template with attached veneer onto the cutting mat. Now cut out each of the four cards, separating them from each other (**PHOTO C**). Cut out the center designs—heart, club, diamond, and spade—from the cards. Use the same cutting steps as the card template: score along the lines first and then cut through the veneer. After cutting out all four shapes, peel the paper template from the camphor burl card template.



CUT AROUND EACH OF THE FOUR CARDS, separating them from each other, and then cut out the center designs.

7. Cut four 3½-in.-wide by 4½-in.-long pieces of holly veneer; these pieces will yield the insert veneer. Tape the camphor burl card templates to the holly pieces. Then use the same score-and-cut method as employed earlier to cut around the outside edges of the card templates. Using the edge of the camphor burl veneer as a cutting guide ensures that the veneer pieces will fit together perfectly

(PHOTO **D**).



TAPE THE CAMPHOR BURL CARD TEMPLATES to the holly veneer pieces and cut around the outside edges of the templates. As you cut, be sure to keep two or three pieces of the tape holding the template to the holly veneer. When necessary, move the tape and install new tape as you cut around the template.

8. Reposition the tape to hold down the perimeter of the template. Then cut out the center design from each card.

9. Cut two 2-in. by 2-in. bloodwood veneer pieces, and two 2-in. by 2-in. Macassar ebony veneer pieces. These four pieces will be used to fill in the cutouts in the center of the holly veneer cards: The bloodwood veneer is used for the heart and diamond suits, the Macassar ebony for the club and spade.

10. Tape the holly veneer heart to the top of a bloodwood veneer square. Align the pieces with the grain of the two pieces running vertically and parallel. Score and cut through the bloodwood, using the heart-shaped holly veneer as a guide. Repeat to cut out the three remaining card suits, using the appropriately colored veneer (**PHOTO **E****).



TAPE THE HOLLY VENEER HEART to the top of a bloodwood veneer square and score and cut through the bloodwood.

11. Press the bloodwood veneer heart insert into the center cutout in the holly veneer heart card. Then set the heart card onto a sheet of camphor burl veneer. If you've cut the pieces correctly, the bloodwood heart should fit into the holly card with a very small, nearly undetectable kerf space (**PHOTO **F****). If the heart is slightly too large to fit into the cutout in the holly veneer card, use 150-grit sandpaper to lightly sand the edges of the bloodwood heart. Repeat to fit the remaining three inserts into the cards.

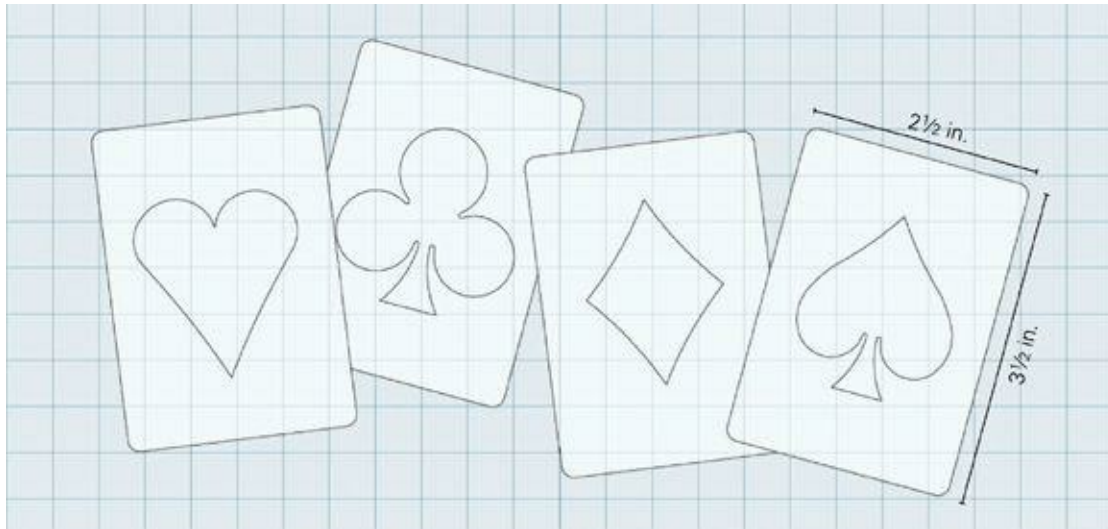


INSERT THE HEART into the holly card, and then set the card into the camphor burl background veneer.

WORK

It's important to use a sharp scalpel when cutting veneer. However, rather than replacing a dull blade, place the blade upside down and use a sharpening stone to sharpen it. A few short strokes back and forth across the stone will maintain a sharp cutting edge.

Playing Card Template



Enlarge by 200% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Glue the veneer to the substrate

Once all four card marquetry pieces have been fitted together, prepare to glue the box top veneer to the plywood substrate.

1. Use blue painter's tape to secure the four cards to the center cutout of the camphor burl veneer piece cut previously (**PHOTO G**). Flip over the veneer, placing it face down on the cutting mat. Then use long strips of tape across the entire back surface of the cards. Be sure the tape covers the whole marquetry pattern. Now flip the marquetry veneer face up and carefully peel off the short pieces of tape from the front surface.



SECURE THE FOUR CARDS to the center cutout of the camphor burl veneer piece.

2. Apply 2-in.-wide strips of water-gum tape to the front surface of the marquetry design. Be sure the tape extends an inch or so onto the camphor burl background veneer. Rub down the tape with a fine-bristle brass brush (**PHOTO H**). If you don't own a water-gum tape dispenser, simply cut the tape to length, dampen it with a wet sponge, and press it down onto the veneer.



APPLY WATER-GUM TAPE to the front surface of the marquetry design and rub down the tape with a fine-bristle brass brush.

W

G

T

D

The advantage of using a tape dispenser, as opposed to a wet sponge, is that the gluing process goes much neater and faster. Water-gum tape is coated with a special water-activated hide glue. As you pull the tape from its roll, a water reservoir at the front of the dispenser dampens the underside of the tape, activating the adhesive. The dispenser also has a row of sharpened teeth that cleanly cuts the tape to length.



3. Once the water-gum tape has dried, set the veneer facedown and peel off the blue painter's tape covering the back surface. The box top's marquetry veneer is now ready to be glued down to the plywood substrate.
4. Prepare to glue veneer to the top and bottom of the plywood substrate. Start by applying yellow glue to each sheet of veneer and to both surfaces of the substrate. Spread the glue evenly with a small roller.
5. Stick the veneer pieces to the plywood substrate. Sandwich the substrate between two clamping cauls and secure the assembly with four pieces of Gorilla Tape (**PHOTO I**). Place the veneered assembly into a vacuum press and let the glue dry for three hours.



GLUE THE VENEER PIECES to the plywood substrate and sandwich the substrate between two clamping cauls.

6. Trim the veneer edges flush to the maple plywood substrate by placing the box top onto the cutting mat and using the scalpel to cut away the excess veneer. Guide the scalpel's blade along the edge of the plywood to ensure a straight cut. Use a sanding block with 150-grit sandpaper to smooth away any rough spots.

7. Wipe the water-gum tape with a wet rag. Then use a cabinet scraper to gently scrape the gum tape from the four-card marquetry design (**PHOTO J**). If the tape is too hard to easily scrape off, simply rewet it and try again. Wait for the veneer to dry completely before proceeding.



WET THE GUM TAPE with a rag and gently scrape the gum tape from the four-card marquetry design.

WORK

It's best to trim the veneer flush to the plywood substrate when the glue has dried for only three hours. If you wait overnight, the glue will be too hard to slice through.

Make the box bottom

- 1.** Start by cutting a $\frac{1}{4}$ -in.-thick by $7\frac{1}{2}$ -in.-wide by $14\frac{1}{8}$ -in.-long piece of maple plywood for the box bottom. Then cut two $\frac{1}{4}$ -in. by $7\frac{3}{4}$ -in. by $14\frac{3}{8}$ -in. MDF pieces for use as clamping cauls. Use one of the MDF cauls as a template to cut two pieces of camphor burl veneer. Set the caul on top of the veneer and cut around its perimeter. Repeat to produce a second $7\frac{3}{4}$ -in. by $14\frac{3}{8}$ -in. veneer piece.
- 2.** Roll yellow glue onto both faces of the maple plywood box bottom, and onto one surface of each camphor burl veneer piece. Press the veneer pieces to the plywood, cover the top and bottom with a clamping caul, and secure with Gorilla Tape. Slip the box bottom into the vacuum press bag and let the glue dry for three hours. Then trim the veneer edges the same as the top.

Cut the bottom groove

1. Use a tablesaw to cut $\frac{1}{4}$ -in.-deep grooves into the box to receive the box bottom. Set the tablesaw fence $\frac{1}{4}$ in. from the blade and adjust the blade height to $\frac{1}{4}$ in. Place the box tight up against the saw fence with its four-card marquetry design facing up. Turn on the saw and push the box top across the blade. Repeat to cut a groove along the remaining three edges.
2. Readjust the tablesaw fence, setting it $\frac{3}{8}$ in. from the blade. Now make four more passes over the blade to widen the grooves to $\frac{1}{4}$ in. However, because the box bottom is veneered on both surfaces, it's slightly thicker than $\frac{1}{4}$ in. Move the fence away from the blade an amount equal to two thicknesses of veneer, slightly less than $\frac{1}{16}$ in., and make four final passes over the blade. Set the box bottom into the grooves to check that it fits snugly (**PHOTO A**).



CUT THE GROOVES for the box bottom and check the fit.

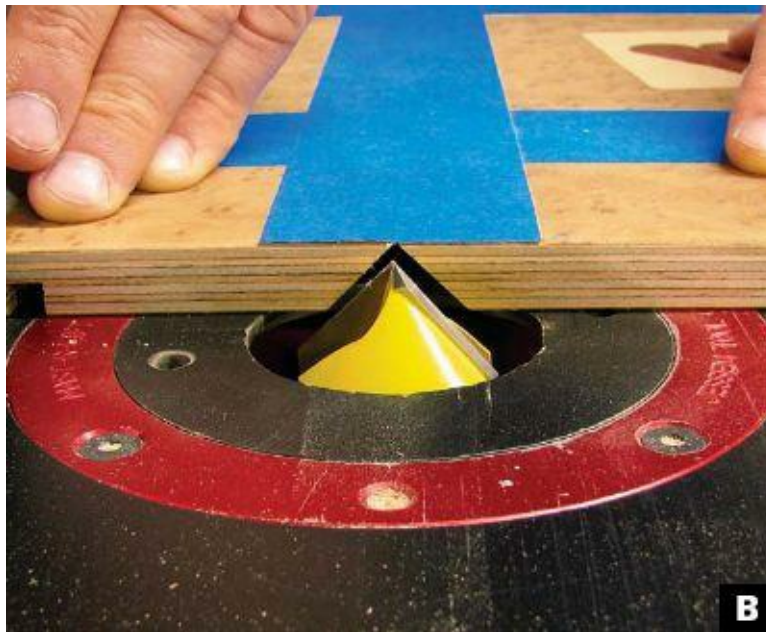
Rout the box miters

CUT MITERED JOINTS INTO THE BOX TOP, ends, and corners with a router table and 90° V-groove bit. The bit should have a 1½-in. cutting width, $\frac{13}{16}$ -in. cutting depth, and overall length of 2 in. This routing method provides a fast, effective way to produce seamless joints while allowing the wood-grain pattern of the veneer to perfectly match up around the box.

1. With the box top face up, measure $3\frac{1}{8}$ in. from all four edges and put down 2-in.-wide strips of blue painter's tape. Be sure to align the center of the tape strips with the $3\frac{1}{8}$ -in. measurement.

Cover the first tape strips with two more layers of tape. Three tape layers will provide plenty of strength to hold the box parts together during the routing process. After firmly pressing down all three tape layers, trim off the excess tape with a scalpel.

2. Set the router table fence $3\frac{1}{8}$ in. from the pointed tip of the V-groove bit. Raise the bit about $\frac{1}{4}$ in. high; it's best to mill the mitered joints in two or three progressively deeper passes. Turn on the router and push the box top over the bit. Repeat to rout a shallow groove into the other three edges of the top. Raise the bit a little more and repeat. On the last pass, raise the bit to within $\frac{1}{64}$ in. of the masking tape. The idea is to cut through the plywood and just barely score the underside of the veneer. When properly cut, the V-grooves allow you to close the miter joints while the tape holds the plywood pieces together (**PHOTO B**).



TO FORM THE BOX MITERS, make three passes over the V-groove bit, raising the bit a little on each pass. On the last pass, raise the bit to within $\frac{1}{64}$ in. of the masking tape.

3. Turn over the substrate and use a scalpel to cut away the four outside corners (**PHOTO C**). Now the miters can be folded together to form the box.

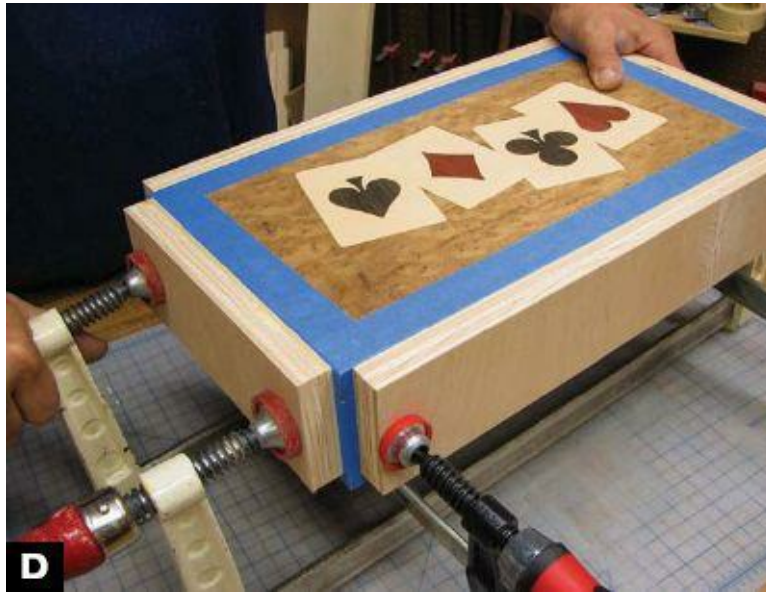


CUT AWAY THE FOUR outside corners so that the miters can be folded together to form the box.

Glue the box together

Dry-fit the box together with the bottom placed into its grooves. Check to confirm that all the mitered joints fit tightly together.

1. Make four plywood clamping cauls: two at $\frac{3}{4}$ in. thick by 3 in. wide by 14 in. long, and two at $\frac{3}{4}$ in. thick by 3 in. wide by $7\frac{1}{2}$ in. long. These will be used to apply equal clamping pressure to all four sides of the box.
2. Brush yellow glue onto both faces of each miter; try to keep glue $\frac{1}{16}$ in. away from the inside face veneer. Too much glue will squeeze out all over the inside of the box. Don't apply any glue to the box-bottom grooves.
3. Set the box bottom into the grooves and then fold the mitered joints closed, forming the box. Tape strips at each corner to hold the box together. Place a plywood clamping caul against each side of the box, then apply medium pressure with four bar clamps. Let the glue dry overnight before removing the clamps (**PHOTO D**).

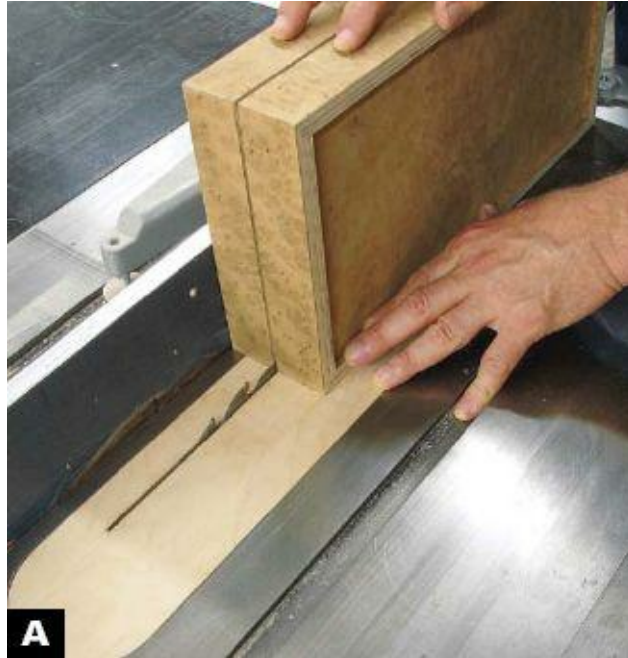


WITH THE BOX BOTTOM SET into the grooves and a plywood clamping caul against each side of the box, use four bar clamps to clamp the box.

Cut the box in half

YOU NEED TO CUT THE BOX IN TWO TO separate the top from the box itself; the best tool for this job is the tablesaw.

1. Adjust the height of the sawblade to $1\frac{5}{32}$ in., which is about $\frac{1}{32}$ in. shy of cutting completely through the box. Cut along all four sides of the box, keeping it as straight as possible while pushing it past the blade (**PHOTO A**). Separate the box top from its bottom by using a scalpel to slice through the remaining plywood and veneer.



SEPARATE THE BOX TOP from the box itself by cutting along all four sides on the tablesaw, leaving $\frac{1}{32}$ in. shy of cutting all the way through the box.

2. Now use the tablesaw to remove the remaining lip from the just-cut edge of the box top and box. Raise the sawblade approximately $\frac{1}{16}$ in. and pass all four edges of both the top and box past the blade. This final trimming cut will leave a flat, clean edge for veneering.

Veneer the edges

HERE'S A QUICK, EASY WAY TO CUT VENEER strips for the box edges: First, make clamping cauls that are about $\frac{1}{4}$ in. wider than the edge but exactly the same length. Then use the cauls as templates to cut the veneer strips to size. This method eliminates having to measure each veneer strip, and, because the strips will be $\frac{1}{4}$ in. wider than necessary, you can adjust them to fit perfectly at the mitered corners.

1. Cut two clamping cauls out of hardwood: one at $\frac{3}{4}$ in. by $\frac{3}{4}$ in. by 8 in. long, and another at $\frac{3}{4}$ in. by $\frac{3}{4}$ in. by $14\frac{5}{8}$ in. long. Miter-cut both ends of each caul to 45° .
2. Cut 12 strips of camphor burl veneer: six at $\frac{3}{4}$ in. wide by 8 in. long and six at $\frac{3}{4}$ in. wide by $14\frac{5}{8}$ in. long. That's enough veneer to cover the four edges at the very bottom of the box, four edges around the top of the box, and four edges on the underside of the box top.
3. Place the veneer on the cutting mat and set a clamping caul on top. Firmly press down on the caul, then cut around all four edges with a scalpel. Repeat to cut a total of six 8-in.-long veneer strips, and six $14\frac{5}{8}$ -in.-long strips.
4. Brush yellow glue onto both the veneer and box edge. Lightly press the veneer to the edge, then check to confirm that its mitered ends line up with the box corners.
5. Place the caul on top of the veneer strip and clamp down the veneer with four bar clamps (**PHOTO A facing page**). Immediately wipe away any excess glue with a rag. Then, use a steel rule, or similar tool with square corners, to scrape away any remaining glue. Allow the glue to dry for three hours and then repeat to veneer the remaining edges.



PLACE THE CAUL ON TOP of the veneer strip and clamp down the veneer with four bar clamps.

6. Trim the outer edges of the veneer flush to the box with a scalpel. Hold the box down on the cutting mat and guide the scalpel's blade along the perimeter of the box (**PHOTO B**).



TRIM THE EXCESS VENEER flush to the box with a scalpel.

- 7.** Trim the inner veneer edges by setting the box on its side, with the veneered edge facing up. Hold the scalpel on its side and guide its blade along the flat surface of the box.
- 8.** Smooth the trimmed veneer edges inside and outside the box with a small, flat needle file. Smooth away all rough spots and burrs left behind by the scalpel.

Route rabbets for the banding

THE NEXT STEP IS TO ROUT SHALLOW RABBETS into the box top and around the middle of the box to receive the diamond-pattern banding. The banding measures $\frac{1}{16}$ in. thick by $\frac{1}{2}$ in. wide.

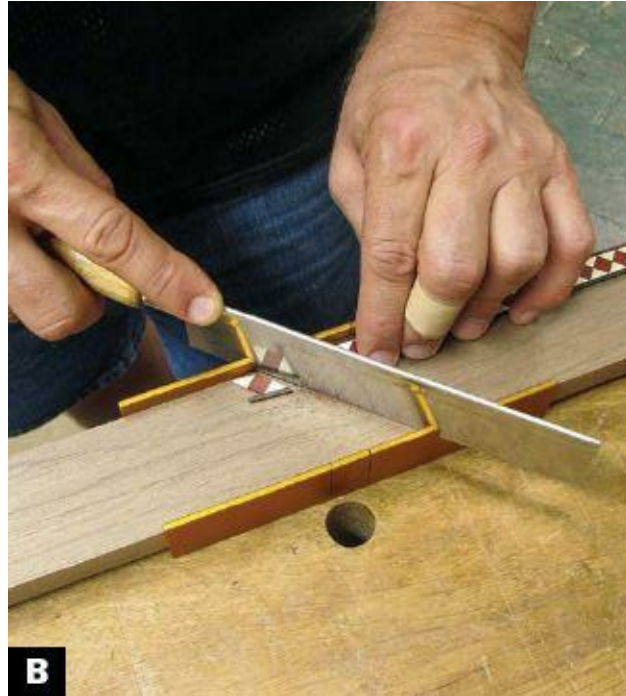
- 1.** To improve cutting accuracy, cut a piece of $\frac{3}{4}$ -in.-thick plywood and clamp it to the router table with half of the $\frac{3}{4}$ -in.-dia. circle drilled out of its center edge. This half-round cutout will fit around the router bit.
- 2.** Install a $\frac{5}{8}$ -in.-dia. straight-cutting bit and adjust the fence so the bit cuts slightly less than $\frac{1}{2}$ in. wide. This will allow the banding to overhang the box veneer slightly. Adjust the height of the router bit to cut slightly less than $\frac{1}{16}$ in., which will ensure that the banding doesn't sit lower than the camphor burl veneer.
- 3.** To rout the top rabbet on the top surface, place the box top facedown and tight to the fence, turn on the router, and push all four sides through the bit.
- 4.** To rabbet in the half banding, set the fence to rout a $\frac{7}{32}$ -in.-wide rabbet. The cut depth should stay the same as the top, $\frac{1}{16}$ in. or slightly under. Then rout the side edges of the top and bottom inside edges of the box (**PHOTO A**).



ROUT THE RABBIT for the banding, keeping a slow and steady speed to prevent any chipping.

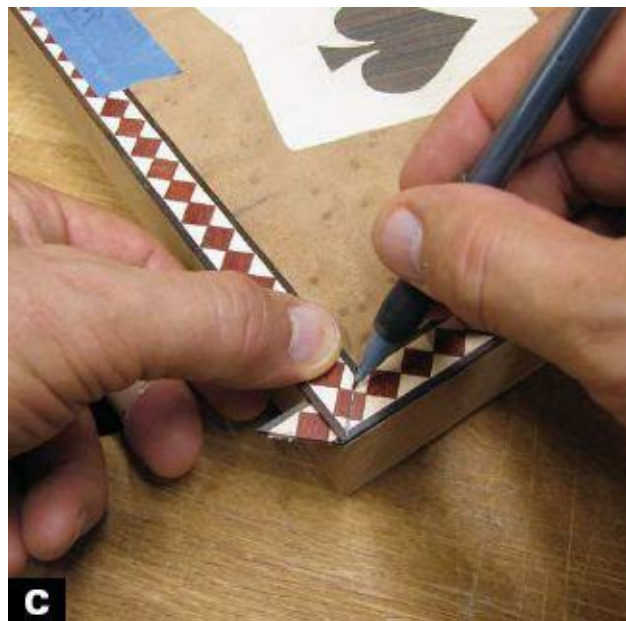
Cut and fit the banding

1. Place a length of banding in the rabbet along the top, front edge of the box top. Use a pencil and protractor combination square to draw lines onto the banding to represent where to cut the end miters.
2. Cut the mitered ends of the banding to 45° with a miter box and small, fine-tooth handsaw. If necessary, place a piece of hardwood into the bottom of the miter box to protect the sawteeth (PHOTO **B**).



CUT THE MITERED ENDS of the banding with a miter box and small fine-tooth handsaw.

3. Press the front banding into its rabbet and hold it in place with a strip of tape. Set the adjacent length of banding into the rabbet along the end of the box top, running it under the mitered end of the front banding. Line up the diamond pattern, then use the mitered end of the front banding to draw the 45° cut line onto the banding below (PHOTO **C**). Hand-cut the banding on the miter box. Repeat these steps to complete the top banding.



USE THE MITERED END of the front banding to draw the 45° cut line onto the banding below.

4. To line up the diamond pattern along the sides of the box, place the banding strips into the rabbets and mark the cut lines with a pencil. Remember the ends of these banding strips are mitered where they wrap around the corners of the box. To cut these end miters in the miter box, you must hold the bandings on edge.

WORK

You can make your own miter box by simply gluing and screwing together three pieces of hardwood to form a square-bottomed trough. Then use any small Japanese-style handsaw that has 20 tpi (teeth per inch) to 26 tpi to cut the desired angles into the miter box.

Glue and clamp the banding

1. To hold the miters tight to each other while gluing and clamping the banding to the box, cut blue painter's tape with a miter on each end about $\frac{1}{4}$ in. shorter than the actual banding to the top.
2. To glue the banding in place, lift up the outside edge of one banding piece with the tape still attached to both the top and banding. Brush yellow glue onto both surfaces, and then set the banding back in place (**PHOTO D**). Clamp down one piece of banding at a time, using the same clamping cauls you used to cut the veneer edges. After the banding has been glued down, wipe off any excess glue with a clean cloth. Repeat this step for the remaining top banding pieces.



HOLD THE BANDING IN PLACE with blue painter's tape while you glue down each piece. Clamp down the banding using the same clamping cauls you used to cut the veneer edges.

3. To glue on the side banding, use the same method described in the previous steps. Then clamp on all eight bandings into the top and bottom of the box. After the glue is dry, use a block plane to very lightly plane the banding flush to the surface of the veneer.

Install the hinges

THE BOX TOP IS ATTACHED WITH TWO $1\frac{1}{16}$ -in. by $1\frac{1}{4}$ -in. brass-plated 95° stop hinges, which hold the box top open without the aid of a chain. To mount the hinges, you'll need to cut four mortises through both the banding and plywood. The banding is relatively hard and chips easily, so be sure your chisel is extra sharp.

1. Measure in $1\frac{1}{4}$ in. from each end of the box and box top and mark square cut lines. Set a hinge on the line and trace around its hinge leaf with a sharp pencil. Repeat to trace the remaining three hinge positions on the box and box top.
2. Clamp a 1-in.-sq. by 8-in.-long wood block to the rear inside surface of the box; the block will prevent the plywood from splitting while you chisel out the hinge mortise (**PHOTO A**).



CUT JUST INSIDE THE PENCIL LINES for the hinge mortise using a $\frac{3}{4}$ -in.-wide wood chisel and mallet. Hold the chisel at precisely 90° and cut to a depth of $\frac{3}{32}$ in.

3. Remove the waste wood from within each hinge mortise with a #2/8 carving gouge. Again, remove just $\frac{3}{32}$ in. of wood from each mortise. Set the two hinges into the mortises and attach with the brass screws provided.

Make the box feet

THE SMALL FEET ATTACHED TO THE BOTTOM of this box are made from Macassar ebony, which accentuates the ebony inlay in the banding. Each foot is glued together from three pieces of ebony: two pieces form the foot's middle and bottom sections, and one piece serves as the tenon at the top of the foot. So to make the four feet, you'll need 12 pieces of ebony: 4 for the top tenon, 4 for the middle section, and 4 for the bottom section (see "Materials" on [p. 39](#)).

1. Start by cutting all 12 ebony pieces to size using the tablesaw and miter saw. To make repetitive, accurate crosscuts, employ a stop block. Use a sanding block and 150-grit sandpaper to lightly sand all the edges and surfaces.
2. Glue and clamp the $\frac{3}{4}$ -in. by $\frac{7}{8}$ -in. bottom pieces to the 1-in. by $1\frac{1}{4}$ -in. middle pieces. Be sure to position the smaller bottom pieces with a $\frac{1}{8}$ -in. offset along three sides. The remaining $\frac{1}{4}$ -in. offset represents the inside edge of the foot. Use a small spring clamp to hold the two pieces together until the glue dries. Repeat for the other three feet.
3. Turn the box upside down and glue the $\frac{7}{16}$ -in. by $\frac{11}{16}$ -in. tenon pieces to the four corners of the box. Secure each tenon with a small bar clamp. Allow the glue to dry for three hours. Then glue and clamp the feet to the tenons. Line up the back edges of the pieces, which allows the feet to extend out $\frac{1}{16}$ in. (**PHOTO A**).



GLUE THE THREE-PIECE FEET to the bottom of the box.

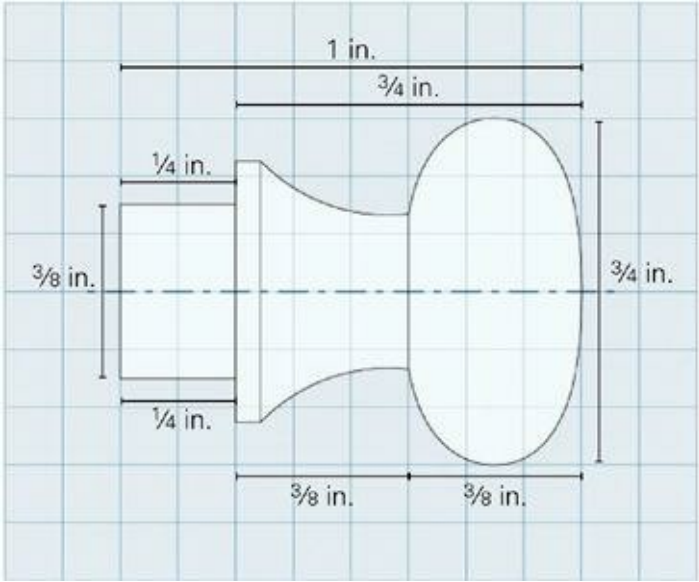
Turn the knob

TO TURN THE SMALL ROUNDED KNOB USED to lift the box top, you'll need a pair of outside calipers and four turning tools: a roughing gouge, $\frac{1}{8}$ -in. parting tool, skew chisel, and $\frac{3}{8}$ -in. round-edge skew. I used a NOVA[™] midi chuck to hold the stock in the lathe.

The knob is made from a $1\frac{3}{4}$ -in. by $1\frac{3}{4}$ -in. block of Macassar ebony, the same hardwood as the feet. Set the lathe's speed to 500 rpm and turn the knob to its finished size of $\frac{3}{4}$ in. dia. by $\frac{3}{4}$ in. long with a $\frac{1}{4}$ -in.-long by $\frac{3}{8}$ -in.-dia. tenon.

1. Start by using the roughing gouge to cut the square blank into a $1\frac{3}{16}$ -in.-dia. by $1\frac{1}{4}$ -in.-long cylinder, which is slightly larger than the knob's finished dimension. Then turn off the lathe and readjust the tool rest, locking it $\frac{1}{8}$ in. away from the blank.

Knob Template



Reduce by 50% for full-size template. When reduced, grid is 1/8 in. $\times$ 1/8 in.

2. Make a photocopy of the template shown above. Use the template and white pencil to mark cut lines onto the ebony cylinder. Hold the pencil point against each mark and rotate the cylinder by hand to draw lines all the way around.
3. Use the 1/8-in. parting tool to make an initial depth cut into the knob. For now, make only one cut; this will keep the cylinder more stable when rounding the knob.
4. Use the skew chisel to round both the outside and inside edges of the cylinder, forming an elliptical shape. As you round the edges, you'll also be reducing the diameter of the cylinder. Be careful not to cut too deeply. The knob's finished diameter is 3/4 in. **(PHOTO A)**.



USE THE SKEW CHISEL to form the elliptical shape of the knob.

5. Switch to the $\frac{3}{8}$ -in. round-edge skew to cut into the ebony, forming a cove that extends from the second pencil line to the back edge of the knob.
6. Use the $\frac{1}{8}$ -in. parting tool to cut into the outside edge of the second pencil line. Cut straight into the ebony, leaving a $\frac{5}{8}$ -in.-dia. flat ring at the base of the cove (**PHOTO B**). Turn the tenon with the parting tool by cutting two kerfs to establish the $\frac{1}{4}$ -in.-long by $\frac{3}{8}$ -in.-dia. tenon.



TURN THE TENON with the parting tool.

7. Run the lathe in reverse at 900 rpm and sand the knob smooth with a handful of wood shavings. Hold the shavings against the spinning knob and they'll act as ultrafine sandpaper. Then use the 1/8-in. parting tool to cut through the end of the tenon, severing the knob from the blank.

Attach the knob

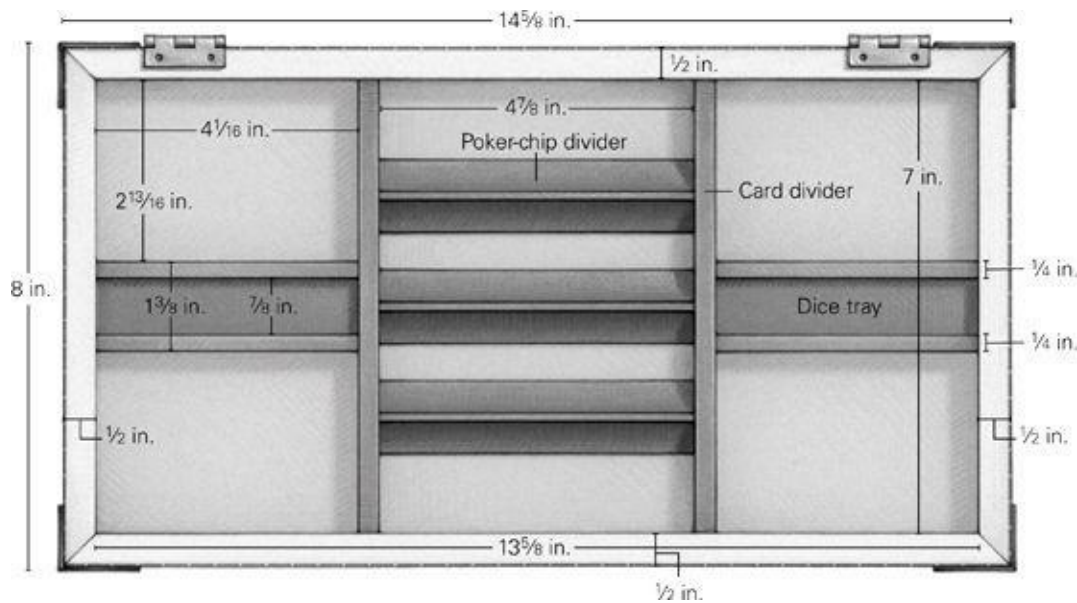
- 1.** Set up the drill press with a $\frac{3}{8}$ -in.-dia. Forstner bit and then drill a $\frac{1}{4}$ -in.-deep hole (mortise) into the center of the box lid, slightly above the banding. Dry-fit the knob to make sure it fits.
- 2.** Brush yellow glue into the mortise and onto the knob's tenon. Press the knob into the mortise and secure it with a bar clamp and pad protectors. Let the glue dry for two hours to three hours.

Cut the interior dividers

THE INTERIOR OF THE BOX is divided into sections by strips of Macassar ebony. The dividers create compartments for storing four decks of cards and four rows of poker chips. There are also two narrow trays, which each hold five dice.

For the poker-chip dividers, you'll need three ebony pieces each $\frac{7}{8}$ in. thick by $1\frac{1}{8}$ in. wide by $4\frac{7}{8}$ in. long. To make the card dividers, cut two pieces each $\frac{7}{8}$ in. thick by $\frac{5}{16}$ in. wide by 7 in. long. For the dice trays, you'll need two ebony pieces each $\frac{7}{8}$ in. thick by $1\frac{3}{8}$ in. wide by $4\frac{1}{16}$ in. long.

Interior Layout



1. To cut the edge-lap joints, start by raising the tablesaw blade to $\frac{7}{16}$ in., which is half the $\frac{7}{8}$ -in. thickness of the ebony pieces. Then use the miter gauge to saw a $\frac{7}{16}$ -in.-high by $1\frac{3}{8}$ -in.-wide cutout into the center of each card divider. These cutouts will straddle the ends of the dice trays (**PHOTO A**).



MAKE THE $1\frac{5}{8}$ -IN.-WIDE CUTOUTS into the center of each card divider. These cutouts will straddle the ends of the dice trays.

2. Use the miter gauge to cut a shallow $\frac{5}{16}$ -in.-wide by $\frac{7}{16}$ -in.-high rabbet into both ends of each dice tray.

3. Raise the tablesaw blade to $\frac{3}{16}$ in. and set the fence $\frac{1}{4}$ in. from the blade. This setup will produce a $\frac{1}{4}$ -in.-wide raised lip along both edges of the dice trays. Use a push stick to push the dice tray past the blade. Then rotate the tray, placing the opposite edge against the fence, and make another pass over the blade. Reset the fence to $\frac{3}{8}$ in. and make two more cuts, rotating the tray in between. Repeat moving the fence and making cuts until a groove is formed along the length of the tray. Repeat the previous steps to cut the groove into the second dice tray (**PHOTO B**).



CUT A 7/8-IN.-WIDE GROOVE along the length of each dice tray.

- 4.** Sand all the edges and surfaces of the trays and dividers with a sanding block and 150-grit sandpaper.
- 5.** Brush glue onto the edge-lap joints cut in the card dividers and onto the rabbeted ends of the dice trays. Slide the parts together and clamp. Let the glue dry for two hours before removing the clamps.
- 6.** To make the three poker-chip dividers, install a 3/4-in.-radius cove bit in the router table to rout a radius into both sides of each divider. Cut the profiles in three or four progressively deeper cuts **(PHOTO C)**. Trying to cut the 3/4-in.-radius cove in a single pass can cause chipping. Sand the poker-chip dividers smooth with 150-grit sandpaper. Then use the miter saw to trim the three dividers to their finished length of 4 3/4 in.



ROUT A RADIUS into both sides of each of the three poker-chip dividers. (It's safer to rout one piece 16 in. long and then cut to the finished size.)

- 7.** Install all the dividers and trays, and fill the box with the poker chips, cards, and dice. Check to be sure all components fit. Then empty the box and remove hinges before applying the finish.
- 8.** Lightly sand the entire box with 150-grit sandpaper. Blow off the sanding dust with compressed air and wipe down all surfaces with a clean, dry rag. Then, following the instructions on [p. 36](#), apply a clear topcoat finish to the box.



Artist Sketch Box

BEAUTY AND FUNCTION come together perfectly in this artist sketch box, which features an intricate banding composed of solid walnut and curly maple hardwood. The box top is cut at an angle, so when it's opened, there's a sloped surface for placing a sketchpad. A removable interior panel provides space for storing pads and paper, and the upper tray holds pencils, erasers, and other supplies. A handle and two latches make it easy to lock the box and carry it from place to place.



Accented with two contrasting woods—curly maple and walnut—the center panels of the box are made of richly figured Karelian burl veneer. The burl panels are bordered by quartered cherry and solid walnut trim on all corners. The walnut trim adds style and visual interest, but it also protects the cherry veneer from any bumps and knocks.



Finished size of box: 5 in. tall × 11 in. deep × 14 in. long

MATERIALS

QUANTITY	PART	SIZE	CONSTRUCTION NOTES
2	Box parts	$\frac{3}{4}$ in. × $5\frac{1}{2}$ in. × 32 in.	curly maple
1	Top	$\frac{5}{8}$ in. × 11 in. × 14 in.	maple plywood
1	Bottom	$\frac{1}{2}$ in. × $10\frac{1}{4}$ in. × $13\frac{1}{4}$ in.	maple plywood
1	Splines	$\frac{5}{16}$ in. × $\frac{1}{2}$ in. × 24 in.	walnut
1	Pencil-tray front	$\frac{3}{4}$ in. × $19\frac{1}{16}$ in. × $12\frac{3}{4}$ in.	curly maple
1	Pencil-tray bottom	$\frac{5}{16}$ in. × $2\frac{3}{8}$ in. × $13\frac{1}{4}$ in.	curly maple
1	Decorative banding	$\frac{1}{4}$ in. × 2 in. × 30 in.	curly maple
2	Decorative banding	$\frac{1}{16}$ in. × 2 in. × 30 in.	walnut
1	Flitch	$\frac{1}{42}$ in. × 14 in. × 84 in.	Karelian burl veneer (for decorative panels)
1	Flitch	$\frac{1}{42}$ in. × 6 in. × 84 in.	quartered cherry veneer (for decorative borders)
7	Corner banding (pieces)	$\frac{5}{32}$ in. × $\frac{5}{32}$ in. × 30 in.	walnut
1	Fixed interior panel	$\frac{1}{2}$ in. × $10\frac{1}{8}$ in. × $12\frac{1}{2}$ in.	maple plywood
1	Removable interior panel	$\frac{1}{2}$ in. × $7\frac{5}{8}$ in. × $12\frac{1}{2}$ in.	maple plywood
4	Panel edge trim	$\frac{1}{8}$ in. × $\frac{5}{8}$ in. × 30 in.	walnut
1	Cleat	$\frac{3}{8}$ in. × $19\frac{1}{16}$ in. × $12\frac{3}{4}$ in.	curly maple
1	Support block	$\frac{3}{4}$ in. × $1\frac{1}{4}$ in. × $12\frac{3}{4}$ in.	any hardwood
1	Support block	$\frac{3}{4}$ in. × $\frac{1}{4}$ in. × $12\frac{3}{4}$ in.	any hardwood
1 pair	Hinges	$\frac{3}{4}$ in. × 1 in.	nickel finish
1 pair	Swing catches	$1\frac{1}{8}$ in. × $1\frac{1}{4}$ in.	nickel finish
1	Handle	$4\frac{1}{4}$ in.	nickel finish

Cut the hardwood and plywood box parts

1. Start by cutting two pieces of curly maple hardwood to $\frac{3}{4}$ in. thick by $5\frac{1}{2}$ in. wide by 32 in. long. Plane both pieces to $\frac{5}{8}$ in. thick, and then rip them on the tablesaw to $5\frac{1}{8}$ in. wide (**PHOTO A**).



RIP THE $\frac{5}{8}$ -IN.-THICK CURLY MAPLE to $5\frac{1}{8}$ in. wide for the box sides.

2. Crosscut each board to produce one 13-in.-long piece and one 16-in.-long piece. These four pieces are slightly longer than needed but will eventually form the front, back, and ends of the box. Making these box parts longer at this stage makes it easier to mill them to their finished dimensions later.
3. Cut the box top from $\frac{5}{8}$ -in.-thick maple plywood, making it 11 in. wide by 14 in. long. The top must be $\frac{5}{8}$ in. thick to equal the thickness of the curly maple box parts. Now cut the box bottom from $\frac{1}{2}$ -in.-thick maple plywood; make it $10\frac{1}{4}$ in. wide by $13\frac{1}{4}$ in. long.

WORK

To confirm that your tablesaw is cutting precisely at 45°, cut a scrap piece first and then check the angle of the cut with a combination square.

Cut miters and rabbets

For this box, I chose to join the top to the box with mitered rabbet joints. The joints are cut into the top edges of the box front, back, and ends and into the plywood box top. When attached, the bottom surface of the box top fits down into the rabbet and its top surface is mitered, leaving a flat, clean surface for veneering.

1. Tilt the tablesaw blade to 45° and raise it to cut $\frac{3}{8}$ in. deep. Set the saw fence $5\frac{1}{8}$ in. from the blade. Pass each of the four hardwood box parts—front, back, and ends—over the blade, cutting a shallow mitered kerf (**PHOTO B**).



CUT A SHALLOW MITERED KERF into the top edge of the front, back, and ends.

2. Move the saw fence to 14 in. from the blade and cut a 45° miter into each end of the plywood box top. Readjust the fence to 11 in. and cut a miter into the front and back edge of the box top.
3. Prepare to cut rabbets into the box front, back, and ends by tilting the tablesaw blade to 90° and then lowering the blade to $\frac{5}{16}$ in.; this height represents half the thickness of the $\frac{5}{8}$ -in.-thick box parts. Move the saw fence to $4\frac{5}{8}$ in. from the blade. This setup will produce a $\frac{3}{16}$ -in.-deep by $\frac{5}{16}$ -in.-wide rabbet. Run all four maple-hardwood box parts through the blade. Then move the fence $\frac{1}{8}$ in. farther from the blade to $4\frac{3}{4}$ in. and push each part pass the blade, effectively widening the rabbets (**PHOTO C**).



CUT $\frac{3}{16}$ -IN.-DEEP by $\frac{5}{16}$ -in.-wide rabbets on the top edge of the four maple box parts.

4. With the sawblade height already at $\frac{5}{16}$ in., prepare to cut the rabbet into the box top. Move the saw fence $\frac{5}{16}$ in. from the outside edge of the blade, which is the width of the opposing miters cut into the box front, back, and ends. Place the box top face up on the tablesaw and run all four edges through the blade, creating the mitered rabbet joints.

Cut the bottom groove and rabbet

The next step is to cut grooves into the inside surfaces of the four box parts to receive the ½-in.-thick plywood box bottom. Then cut rabbets into all four edges of the box bottom to fit into the ¼-in. by ¼-in. grooves.

1. Adjust the tablesaw blade to ¼ in. high and position the fence ⅜ in. from the blade. Pass each of the four box parts over the blade, making sure each one is face down with its bottom edge against the fence. Reset the fence to ¼ in. and make a second pass over the blade to create the ¼-in. by ¼-in. grooves (**PHOTO D**).



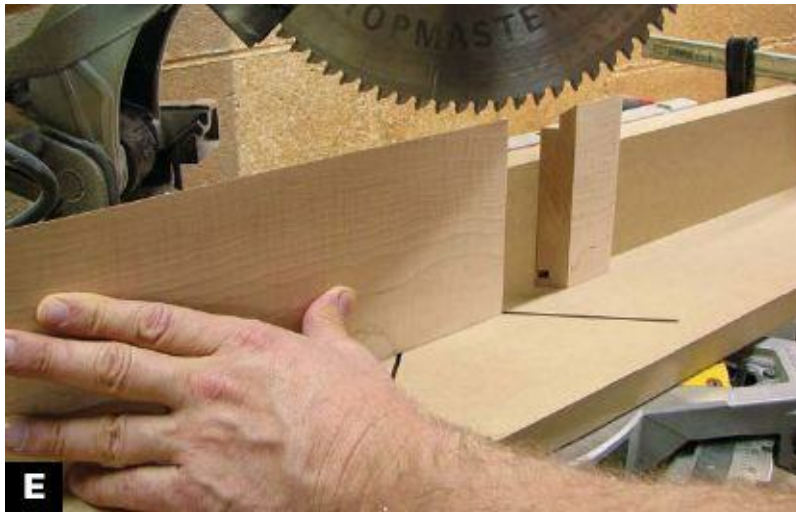
CUT THE ¼-IN. GROOVES for the box bottom in each of the four box parts, making sure each one is face down with its bottom edge against the fence. If the teeth on your tablesaw blade are less than ⅛ in. thick, you'll need to make three passes to cut ¼-in.-wide grooves.

2. Set the tablesaw fence ¼ in. from the outside edge of the sawblade. Place the box bottom face down and make four passes over the blade, one along each edge of the plywood bottom. Reset the fence flush with the blade and make four more passes to complete the ¼-in. by ¼-in. rabbets. Confirm that the box-bottom rabbets fit into the grooves cut in the box parts. If necessary, fine-tune the cuts to achieve a snug, but not too tight joint.

Miter-cut the hardwood box parts to size

To cut the four hardwood box parts to their finished length, first fabricate an L-shaped auxiliary fence to ensure smooth, accurate cuts.

1. Cut two pieces of 1-in.-thick MDF to 4 in. wide by 36 in. long. Screw the two pieces together, making sure that no screw is in the cutting path of the sawblade. Clamp the L-shaped fence to the miter-saw fence.
2. Rotate the miter-saw blade to 45° and cut one end of each hardwood box part. Be sure to hold the parts tight against the MDF fence.
3. Next, mark the finished length of 14 in. onto the box front and back, and 11 in. onto each of the two box ends. Miter-cut each part to length (**PHOTO E**).



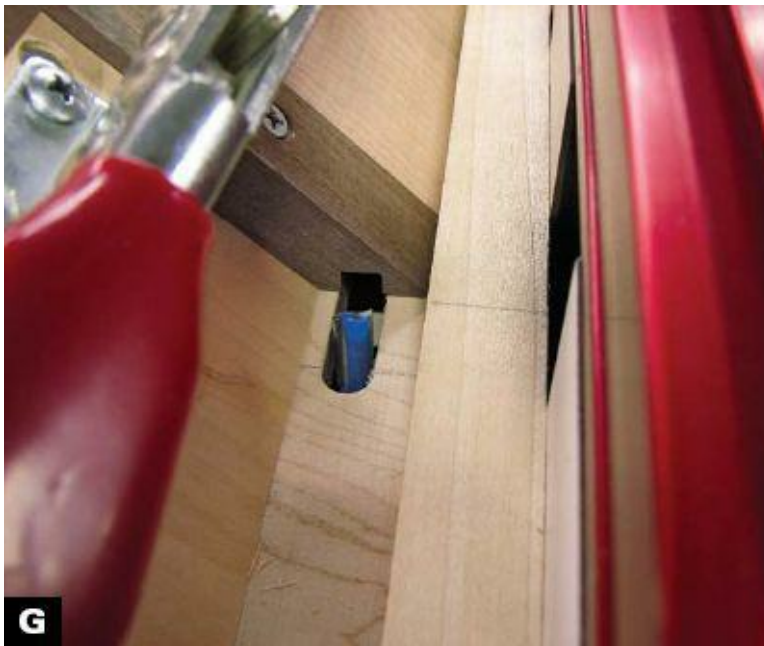
MITER-CUT THE FOUR hardwood box parts to their finished length on the miter saw.

Rout the corner splines

The shopmade dovetail sled that was used to build the Serpentine Coin Box is also used here to cut narrow grooves for splines that reinforce the corners of this box (see [p. 12](#)).

1. Rout the grooves into the mitered corners using a router table and $\frac{5}{16}$ -in.-dia. straight-cutting bit. Position the router-table fence so that the bit is centered within the $\frac{3}{8}$ -in.-wide slot cut in the bottom of the sled.
2. Adjust the router bit so that it's $\frac{1}{4}$ in. above the plywood sled bottom. Place the box front face down onto the sled. Hold it tight against the bottom platform and tight against the vertical cleat. Then lock down both toggle clamps to secure the box front to the sled.
3. Position the sled so that the router bit is clearly visible through the slot cut in the sled bottom. Hold the sled tight against the router-table fence, and then turn on the router. When the router reaches full speed, slowly push the sled past the router bit, cutting a $\frac{1}{4}$ -in.-deep by $\frac{5}{16}$ -in.-wide groove in the mitered end of the box front (**PHOTO F**). Repeat these steps to rout grooves in both ends of all four box parts (**PHOTO G**).





USE A DOVETAIL SLED to rout grooves for the corner splines in both ends of all four box parts (top, and detail above).

4. Cut six solid-walnut splines to fit into the grooves you just routed. (Walnut is a good choice because it is relatively hard and is a nice contrast to the light-colored curly maple box parts.) Start by using the tablesaw to cut a piece of walnut to $\frac{5}{16}$ in. thick by $\frac{1}{2}$ in. wide by 24 in. long. Then move to the miter saw and crosscut the 24-in.-long walnut piece into six splines: four at $4\frac{1}{2}$ in. long for reinforcing the corners of the box, and two at $1\frac{1}{4}$ in. long for assembling the inside pencil tray.

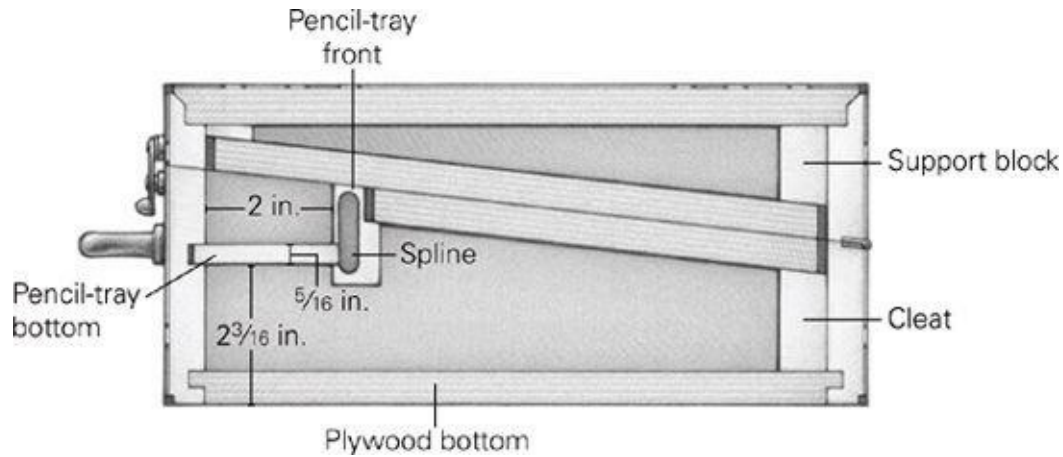
Rout the inside tray grooves

Inside the box there's a pencil tray that's held in place with splines that fit into grooves (see "Vertical Section through Side of Box" below). Rout these grooves with the same $\frac{5}{16}$ -in.-dia. straight-cutting bit used to cut the spline grooves earlier. Note that you must rout grooves into the front and bottom edges of the pencil tray and into the interior surfaces of the box front and ends.

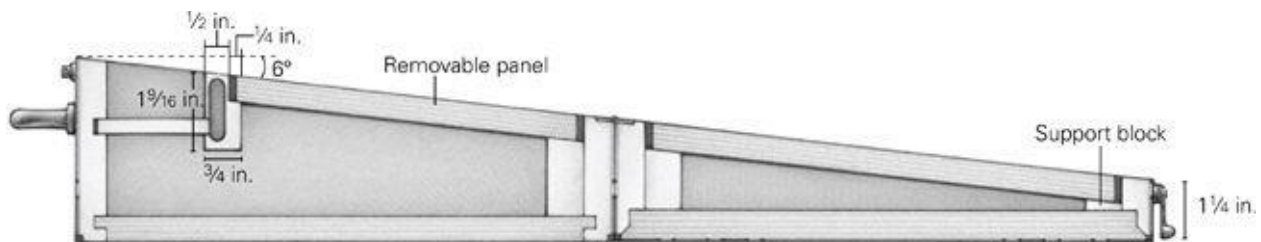
1. Start by using a steel rule and pencil to draw the groove positions onto the inside surface of the box parts. Measure $2\frac{3}{16}$ in. up from the bottom edge of the box front and ends and draw lines to represent the bottom edge of the pencil tray. Then draw straight lines across the length of the front and both ends that measure $2\frac{1}{8}$ in. in from the inside edge of the miters. Measure up $\frac{5}{16}$ in. from the pencil lines and draw parallel lines, indicating where to rout the $\frac{5}{16}$ -in.-wide grooves.

Vertical Section through Side of Box

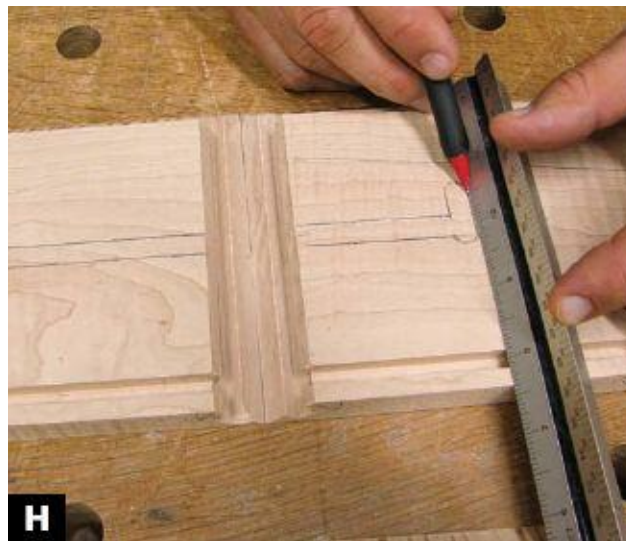
Box closed



Box open



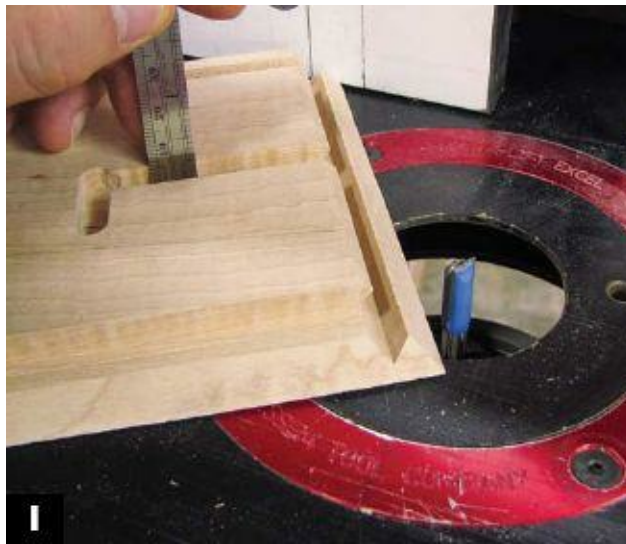
2. Measure $2\frac{1}{8}$ in. from the inside edge of the miter on each box end and draw the groove lines to show the position of the pencil tray's front edge. Measure $2\frac{1}{16}$ in. up from the bottom edge of the box ends and draw two $1\frac{1}{4}$ -in.-long parallel lines, spaced $\frac{5}{16}$ in. apart. Now draw four $\frac{5}{32}$ -in. radii to connect the lines and represent the radius of the router bit. Drawing the outline of all the grooves helps you accurately position the stops on the router table (**PHOTO H**).



DRAW THE OUTLINE of the grooves for the pencil tray on the box ends and front.

3. Set the router bit to cut $\frac{1}{8}$ in. above the router table. Then adjust the fence $2\frac{3}{16}$ in. from the front edge of the router bit to the fence. This will align the bit with the pencil lines.

- 4.** Measure 3 in. from the center of the bit to the left and right, and mark lines onto the router-table fence. These marks will be used to rout the correct length stopped grooves in the box ends.
- 5.** Place the box front face down on the router table, with its bottom edge against the fence. Turn on the router and slowly push the box front into and past the router bit, cutting a groove along its entire length. For the right end of the box, push it into the router bit and up to the stop line on the fence. For the left end of the box, you'll have to feed it into the router bit from the opposite direction. Push the piece up to the stop line. After making the first passes, raise the bit to $\frac{1}{4}$ in. and repeat the same steps.
- 6.** Now prepare to rout grooves into the box ends to receive the front of the pencil tray. Set the fence 3 in. from the center of the router bit, then measure $2\frac{1}{16}$ in. from the left and right of the bit's center and mark the fence for this stopped groove. Then, from both the $2\frac{1}{16}$ -in. lines, draw a line $1\frac{1}{4}$ in. out from the router bit. These four lines represent the $1\frac{1}{4}$ -in.-long stopped grooves for both the left- and right-hand ends of the box.
- 7.** Lower the router bit flush to the table and place the right end of the box tight to the fence. Align its bottom edge with the $1\frac{1}{4}$ -in. line. Turn on the router and raise the bit $\frac{1}{8}$ in. and push the part up to the $2\frac{1}{16}$ -in. line. Raise the bit $\frac{1}{8}$ in. more, to equal the $\frac{1}{4}$ -in.-deep groove. Push the part into the bit from the opposite direction up to the $1\frac{1}{4}$ -in. line. Lower the bit before turning off the router.
- 8.** Repeat these steps for the opposite box end. Once done, use a steel rule to check the depth of all the grooves, confirming that each one is $\frac{1}{4}$ in. deep. **(PHOTO I)**



USE A STEEL RULE to check the depth of all the grooves for the pencil tray; they should each be $\frac{1}{4}$ in. deep.

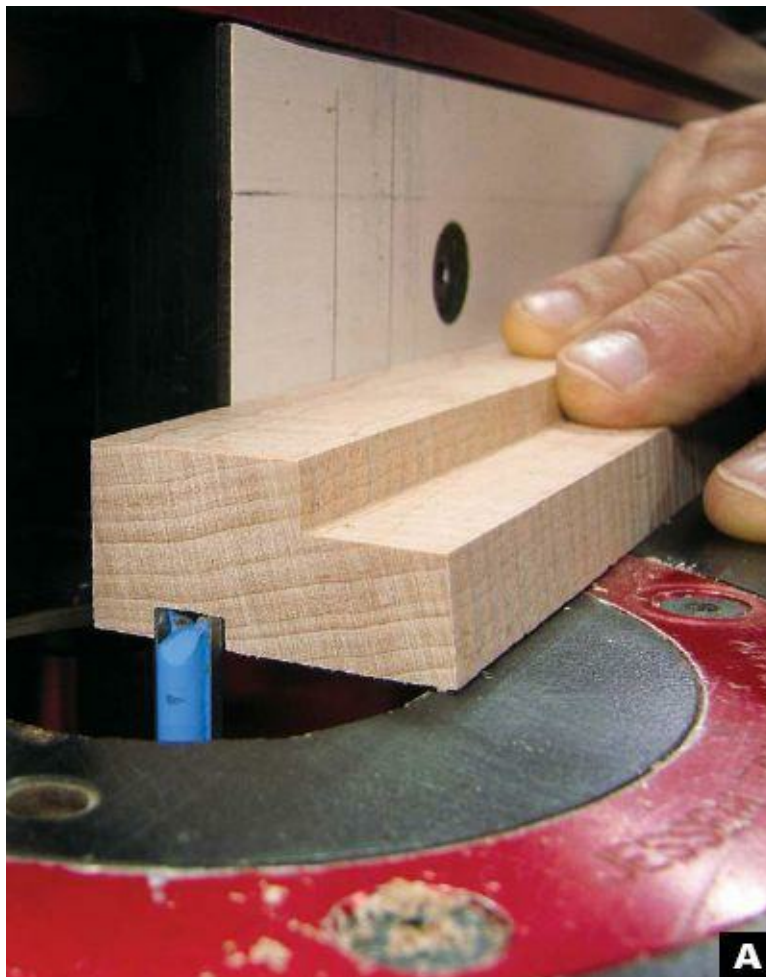
WORK

When routing grooves, always make a test-cut in scrap before routing the box parts. This will help ensure that each groove is correctly positioned and routed to the correct length. And always keep your hands well away from the path of the router bit.

Cut the pencil-tray parts

CUT THE FRONT AND BOTTOM OF THE pencil tray from curly maple hardwood to match the rest of the box interior.

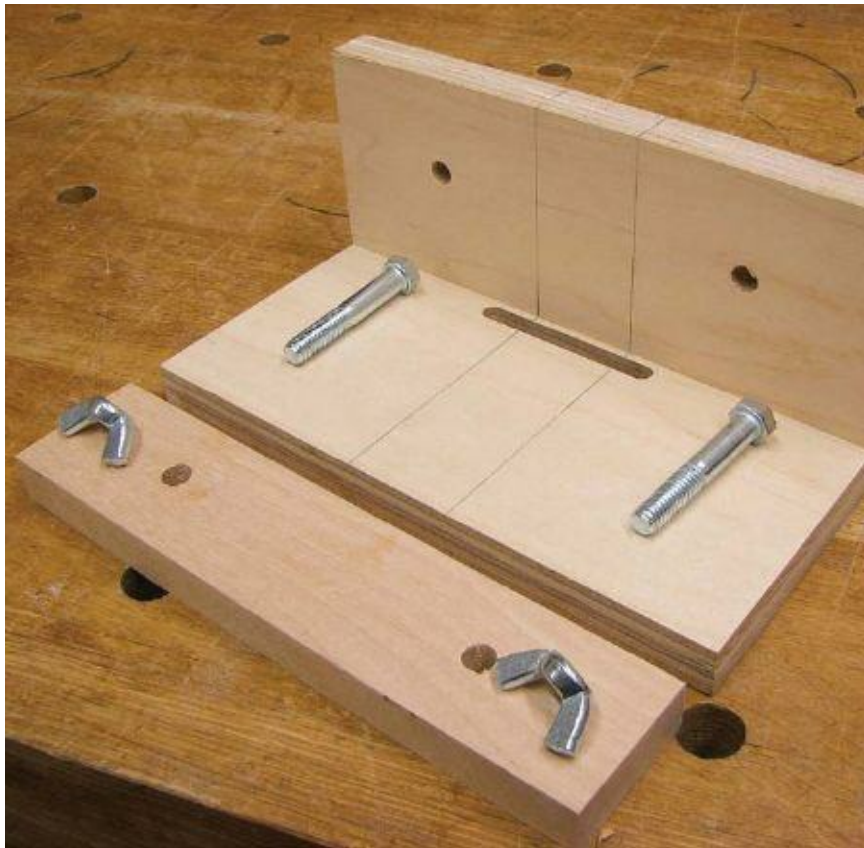
- 1.** Cut the tray front to $\frac{3}{4}$ in. thick by $1\frac{9}{16}$ in. wide by $12\frac{3}{4}$ in. long. Tilt the tablesaw blade to 6° , but leave the rip fence $1\frac{9}{16}$ in. from the blade. Push the tray front through the blade to bevel-cut a 6° angle along its top edge.
- 2.** Now cut a rabbet into the pencil-tray front, which will receive the removable sketchpad panel. Adjust the tablesaw blade to $\frac{1}{4}$ in. and set the fence $\frac{9}{16}$ in. from the blade. Make the first pass over the blade and then readjust the fence three more times at $\frac{1}{8}$ -in. intervals to remove enough wood to form the $\frac{1}{4}$ -in.-deep by $\frac{1}{2}$ -in.-wide rabbet.
- 3.** Make the bottom of the pencil tray by first tilting the tablesaw blade back to 90° . Then cut a piece of curly maple to $\frac{3}{4}$ in. thick by $2\frac{3}{8}$ in. wide by $13\frac{1}{4}$ in. long. Mill the tray bottom to $\frac{5}{16}$ in. thick by either resawing it on the tablesaw or feeding it through a thickness planer. Also, cut a small chamfer into both outside corners of the tray bottom to avoid the walnut corner-box splines.
- 4.** Rout a groove along the inside surface of the tray front using the same $\frac{5}{16}$ -in.-dia. straight-cutting router bit you used earlier. Set the router-table fence $\frac{5}{16}$ in. away from the bit and adjust the bit to $\frac{1}{8}$ in. high. Turn on the router and slowly push the part past the spinning bit. Raise the bit another $\frac{1}{8}$ in. and repeat to cut the $\frac{1}{4}$ -in.-deep by $\frac{5}{16}$ -in.-wide groove. **(PHOTO A)**



ROUT A GROOVE along the inside surface of the pencil-tray front to receive the tray bottom.

The safest, most accurate way to rout the short, shallow grooves into the ends of the pencil-tray front is to use a shopmade router-table jig.

1. Cut two pieces of $\frac{3}{4}$ -in.-thick plywood to 4 in. by 9 in. for the rear and bottom of the jig. Then cut one piece of $\frac{3}{4}$ -in.-thick hardwood to 2 in. by 9 in., which will serve as the jig's clamping block.
2. Using a $\frac{7}{8}$ -in.-dia. Forstner bit, bore two $\frac{5}{16}$ -in.-deep counterbore holes into one of the plywood pieces. Position the holes $1\frac{1}{2}$ in. down from the long edge and 2 in. from each end. Switch to a $\frac{3}{8}$ -in.-dia. bit and drill into the center of both counterbores. This piece will be the rear of the jig.
3. Drill two $\frac{3}{8}$ -in.-dia. holes into the hardwood clamping block. Position the holes 2 in. from each end and 1 in. from the edge.
4. Draw a pair of parallel lines onto the inside surface of both plywood pieces. Position the lines $3\frac{23}{32}$ in. from each end of the plywood pieces; the lines should be $1\frac{9}{16}$ in. apart, which equals the width of the front tray.



5. Fasten together the two plywood pieces with 2-in. screws to create the L-shaped jig, using the plywood piece with the counterbored holes as the rear, vertical part of the jig. Make sure the screw heads are set below the surface.
6. Prepare to rout a $\frac{5}{16}$ -in.-wide by 3-in.-long slot through the bottom of the jig. Set the router-table fence $\frac{7}{8}$ in. away from the $\frac{5}{16}$ -in.-dia. straight-cutting bit. Lower the bit flush with the router table. Set the jig down on the router table and mark onto the fence where to start and stop the jig in order to cut the through slot.
7. Set the jig on the starting mark, turn on the router, and slowly raise the bit approximately $\frac{1}{8}$ in. Push the jig 3 in. up to the stopping mark on the fence. Repeat, raising the bit $\frac{1}{8}$ in. until you've

cut all the way through the bottom of the jig.

8. Complete the jig by using two $\frac{3}{8}$ -in.-dia. by $2\frac{1}{2}$ -in.-long hex-head machine bolts and two wing nuts to secure the hardwood clamping block to the jig.

Rout end grooves in the tray front

1. To rout stopped grooves into the ends of the pencil-tray front, start by standing the tray front in the router-table jig with its right-hand end down against the jig bottom. Place the tray front's inside surface against the rear of the jig. Tighten the wing nuts to lock the tray front in place.
2. Hold the jig tight against the router-table fence and slide it forward until the bit is visible at the left end of the through slot cut in the jig bottom. Take a pencil and mark the router-table fence $1\frac{1}{4}$ in. from the leading edge of the jig. This mark represents the distance you must push the jig to cut the stopped groove.
3. Raise the bit $\frac{1}{8}$ in. above the bottom of the jig. Turn on the router and then slowly push the jig up to the pencil mark. Pull the jig back to its starting position and raise the bit $\frac{1}{8}$ in. more. Push the jig up to the line once again to complete the $\frac{1}{4}$ -in.-deep by $\frac{5}{16}$ -in.-dia. stopped groove (**PHOTO B**).



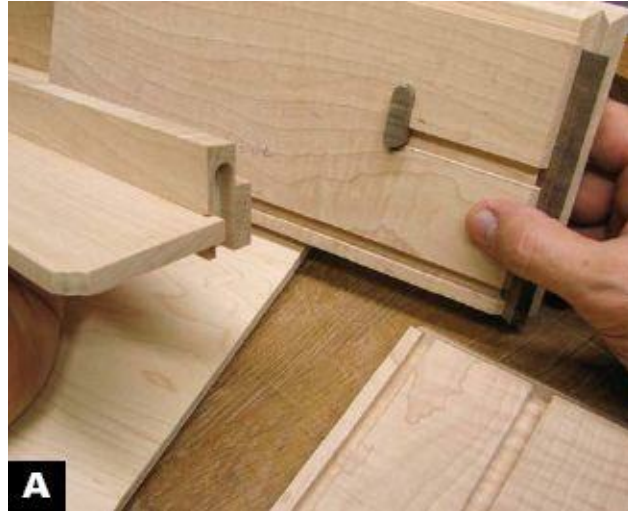
SUPPORT THE PENCIL-TRAY front in a shopmade router-table jig to cut the shallow stopped grooves in the end of the workpiece.

4. To rout a stopped groove into the left-hand end of the pencil-tray front, rotate the piece end for end and repeat the steps (only this time, push the jig into the router bit from the opposite direction).

Glue the box together

IT'S IMPORTANT TO DRY-FIT THE BOX PARTS together using splines before applying any glue. Make sure each spline fits snugly into its groove and that the box itself is square.

1. Use a sanding block and 80-grit sandpaper to round over both ends of each 1¼-in.-long walnut spline. Press the splines into the grooves routed into the box end (**PHOTO A**).



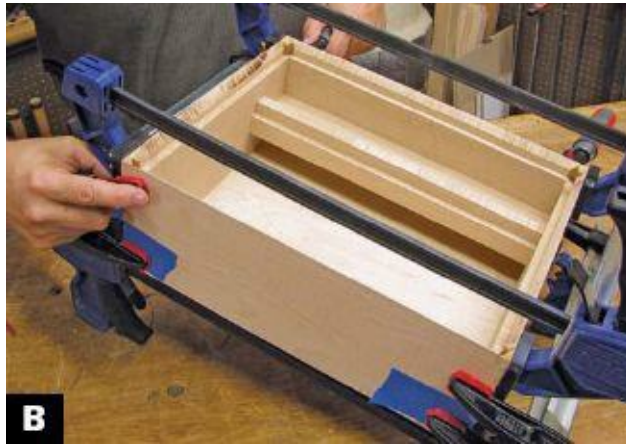
BEFORE APPLYING ANY GLUE, dry-fit the radiused walnut splines into the grooves routed into the box ends.

2. Use the bandsaw to cut ⅛ in. off each corner of the box bottom. Trimming the corners allows the bottom to fit into place without hitting the box-corner splines. Dry-assemble the box, using splines to hold the parts together.
3. Once you're satisfied with the way the parts fit together, disassemble the box. Brush yellow glue onto the mitered box corners. Apply glue to the ends of the pencil-tray front and onto its splines and grooves too. Don't brush glue onto the pencil-tray bottom or box bottom. These parts must be allowed to expand and contract freely in their grooves.
4. Assemble the box, making sure you glue the pencil tray to the box interior using walnut splines. Temporarily hold the parts together with strips of tape at each corner. Then apply glue to the 4½-in.-long splines and slide one into each box corner joint. Make sure each spline sits flush with, or slightly below, the bottom of the rabbet cut into the top edge of the box.

WORK

It's very important to strike a small chisel mark—or other indelible mark—into the underside of the box bottom to indicate on which side the pencil tray is located. Once the box is assembled, there's no way of knowing which side is the front. The chisel mark will prevent you from cutting into the tray when you slice the box top from the box.

- 5.** Hold the box together with several short bar clamps (**PHOTO B**). Use a try square to confirm that all four corners of the box are square, and make any necessary adjustments to square up the box. Let the glue dry for two hours, and then remove the clamps. Peel away the tape and use a cabinet scraper to scrape off any dried glue.



GLUE UP THE BOX SIDES, bottom, and pencil tray.

- 6.** Apply yellow glue sparingly to the mitered rabbets cut into the top edges of the box and into the underside of the box top (**PHOTO C**). Set the box top down onto the box and secure it with one bar clamp at each corner. Then add more clamps along each side, spacing them 3 in. to 4 in. apart. Evenly tighten the clamps with medium pressure. Allow the glue to dry for three hours and then remove the clamps.



APPLY GLUE SPARINGLY to the mitered rabbets along the inside edge of the box and top to prevent glue seepage.

- 7.** Sand all six surfaces of the box with a random-orbit sander fitted with a 150-grit disk. When you're done, use compressed air to blow off the sanding dust, then wipe down the box with a clean, dry cloth. The box is now ready for veneering.

WORK

Even though you won't be veneering the bottom of the box, be sure to sand it smooth to remove any dried glue or rough spots.

Make the decorative banding

THE DECORATIVE BANDING THAT RUNS around the top and sides of the box features a ¼-in.-wide strip of curly maple that's bordered along both edges by narrow pinstripes of walnut. Make the banding by first laminating together curly maple and walnut hardwood and then ripping the blank into thin strips to form the banding.

1. Start by crosscutting on a miter saw two pieces of ¾-in.-thick walnut and one piece of ¾-in.-thick curly maple to 30 in. long. Then use the tablesaw to rip both pieces to 2 in. wide.
2. Raise the tablesaw blade to 2¼ in. high and lock the rip fence ¼ in. from the blade. Resaw the curly maple piece, using a push stick for safety, to produce a ¼-in.-thick by 2-in.-wide by 30-in.-long strip. **(PHOTO A)**



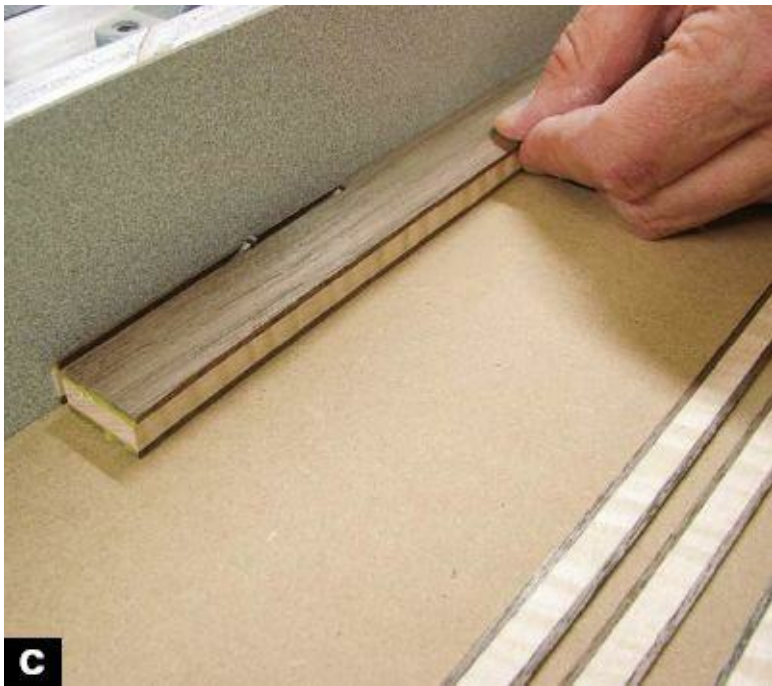
RESAW THE CURLY MAPLE for the decorative banding to ¼ in. thick, using a push stick for safety.

3. Set the fence 1/16 in. from the blade and resaw each walnut piece to create two 1/16-in.-thick by 2-in.-wide by 30-in.-long strips.
4. Make two 2-in.-wide by 30-in.-long clamping cauls out of 1-in.-thick MDF. You're now ready to laminate together the maple and walnut pieces to form the banding blank.
5. Wipe all dust from the three banding pieces and from the two clamping cauls. Use a 3-in.-wide roller to spread an even coat of yellow glue onto both surfaces of the curly maple and one surface of each walnut piece **(PHOTO B)**.



LAMINATE TOGETHER the maple and walnut pieces to form the banding blank. Sandwich the blank between two MDF clamping cauls.

- 6.** Assemble the banding blank by gluing one walnut piece to each side of the curly maple piece. Then sandwich the blank between the two MDF clamping cauls. Wrap Gorilla Tape around each end of the assembly to prevent the parts from shifting out of position during clamping.
- 7.** Tighten one short bar clamp over each piece of tape, then start in the center of the assembly and add more clamps, spacing them about 3 in. apart. Tighten each clamp with heavy pressure to squeeze out all air and excess glue.
- 8.** Immediately wipe away any excess glue with a clean rag and then let the glue dry overnight. After removing the clamps and cauls, sand the broad 2-in.-wide surfaces of the walnut smooth and flat with a sanding block and 150-grit sandpaper.
- 9.** Clamp the blank into a bench vise and smooth and flatten one long edge with a block plane.
- 10.** Set the tablesaw fence $\frac{1}{32}$ in. from the blade and use a push stick to cut the laminated blank into thin, narrow strips of banding. Note that by using an ultra-thin-kerf rip blade, I was able to get 20 pieces of banding from the 2-in.-wide blank, which is more than you'll need to complete the box (**PHOTO C**).



RIP THE LAMINATED BLANK into narrow $\frac{1}{32}$ -in.-thick strips of banding.

Veneer the decorative side panels

THE BOX TOP AND ALL FOUR SIDES FEATURE a center panel of Karelian burl veneer, which is outlined by the decorative maple-and-walnut banding made in the previous step. The banding is used as a decorative element but also to separate the Karelian burl veneer center panel from the quartered cherry veneer that borders the box top and sides.

To veneer this box, I purchased one 14-in.-wide by 84-in.-long piece of Karelian burl veneer. That's more veneer than needed, but it allows you to select the best grain pattern, avoid using any veneer section that's chipped or cracked, and recut a piece should you make a mistake.

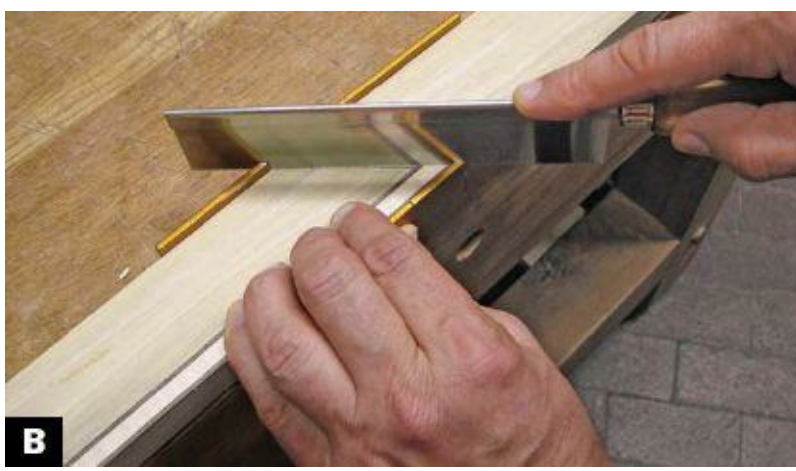
It's worth mentioning that veneering over hardwood can be problematic, especially on large projects, because solid wood and veneer expand and contract at different rates. However, for smaller projects, such as wooden boxes, expansion isn't a concern because the amount of wood movement is insignificant.

- 1.** Cut two clamping cauls out of $\frac{3}{4}$ -in. or 1-in.-thick MDF or plywood. These cauls will be used to clamp the Karelian burl veneer to the four sides of the box. Cut one caul $2\frac{5}{8}$ in. wide by $8\frac{1}{2}$ in. long for the box ends and a second caul $2\frac{5}{8}$ in. wide by $11\frac{1}{2}$ in. long for the box front and back.
- 2.** Place the veneer on a cutting mat, set a clamping caul on top, and use it as a template to cut the veneer. Press down on the caul, and then use the scalpel to cut around the perimeter of the caul. Make two or three passes to cut through the veneer (**PHOTO A**). Repeat this step until you've cut four pieces of Karelian burl veneer; that's one each for the box front, box back, and box ends.



USE A CLAMPING CAUL as a template to cut the Karelian burl veneer for the decorative side panels, making two or three passes to cut through the veneer.

- 3.** Miter-cut the decorative banding to length using a miter box and fine-tooth handsaw. Place one piece of banding into the miter box and cut its end to 45° . Then hold the banding tight against the Karelian burl veneer center panel, with its mitered end aligned with the edge of the center panel. Mark the miter on the opposite end of the banding and miter-cut it to length (**PHOTO B**).



MITER-CUT THE DECORATIVE BANDING to length using a miter box and fine-tooth handsaw.

- 4.** Set the mitered length of banding tight to the edge of the Karelian burl veneer center panel. Align the mitered ends of the banding with the corners on the center panel. Tape the two pieces together with blue painter's tape.

When cutting veneer with a scalpel, let the razor-sharp blade do most of the work by applying light pressure, which will produce nice, clean, crisp cuts.

5. Cut a 45° miter into the next piece of banding. Hold it against the edge of the center panel and slide its mitered end tight against the miter cut in the first banding piece. Check to make sure the mitered ends of the banding fit tight together. Then mark where to miter-cut the opposite end of the banding. Cut the banding and tape it to the center panel. Repeat these steps to miter-cut banding to fit around the remaining three Karelian burl veneer center panels.

6. The decorative banding separates the Karelian burl veneer center panels from the quartered cherry borders that frame the box top and four sides. For this box, I bought one 6-in.-wide by 84-in.-long flitch of quartered cherry veneer, which was more than enough. To cut the cherry veneer pieces to size, use the same technique employed to cut the Karelian burl veneer, starting with making clamping cauls.

To make three clamping cauls, start by cutting a ¾-in.-thick by 15/16-in.-wide by 36-in.-long piece of MDF or plywood. Now, from this 36-in.-long piece, cut three cauls at 14½ in., 11½ in., and 5¼ in. Be sure to miter-cut each end of all three pieces.

7. Place the quartered cherry veneer on the cutting mat and set the 5¼-in.-long caul on top. Press down firmly and cut around the caul with the scalpel. Again, cut through the veneer in two or three passes. Cut a total of eight 5¼-in.-long cherry veneer pieces. (Note that the cauls will produce cherry veneer borders that are ⅛ in. wider than necessary; the little bit of extra width makes it easier to glue the veneered panel to the box.)

8. Set the cherry border tight against the banding. Line up the miters at the corners and secure with blue painter's tape. Repeat to attach the cherry border to the opposite end.

9. Use the 14½-in.- and 11½-in.-long cauls as templates to cut the longer (horizontal) cherry veneer borders. Press down firmly on the caul and cut around its perimeter, making two or three passes to cut through the veneer. Cut a total of four 14½-in.- and four 11½-in.-long cherry veneer pieces.

Alternatively, to ensure a perfect fit, cut a miter on one end of the horizontal border, but leave the other end square. Place the straight end underneath the opposing miter and lightly cut the miter by following the edge of the end miter, taking two or three passes (**PHOTO C**).



FOR A PERFECT FIT, run the horizontal border long and use the adjoining border as a template to cut the miter.

Once all the cherry borders are cut and fitted to the veneer panel, secure the borders with blue painter's tape. Repeat these steps to assemble the remaining three veneer panels.

A S

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Installing the decorative banding on this box requires cutting lots of 45° miters. But precise cutting alone doesn't always produce perfect, tight-fitting miter joints. When necessary, I touch up the mitered ends of banding using a simple, but highly effective, sanding jig.

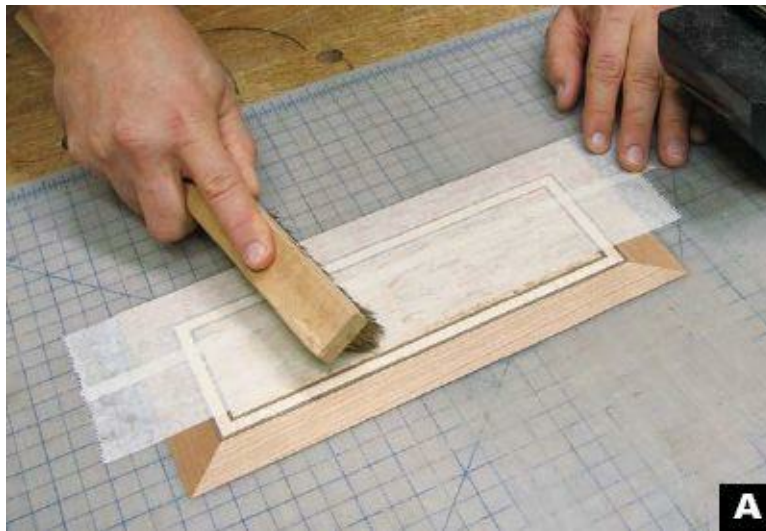


The jig consists of a ¾-in.-thick by 5-in.-wide by 12-in.-long MDF bottom platform, and a ¾-in.-thick by 1½-in.-wide by 10-in.-long hardwood fence, which is miter-cut to 45° on one end. The fence is screwed to the bottom platform at a 45° angle with its mitered end flush to the end of the platform.

To use the jig, simply clamp it to the workbench and hold a piece of banding against the fence with its mitered end overhanging slightly. Then use a sanding block with 150-grit sandpaper to sand the end of the banding to length.

Glue on the veneered end panels

1. Place one of the veneered panels for the end of the box onto the cutting mat with the blue painter's tape facing down. Apply water-gum tape to the bare surface of the veneer panel, effectively gluing together all the veneer pieces into a single sheet. If you don't have a water-gum tape dispenser (see [p. 48](#)), simply cut the tape to length and wet it with a sponge. Apply the wet tape to the veneer and press it down with a fine-bristle brass brush (**PHOTO A**). Use a scalpel to trim the gum tape flush with the four edges of the veneer panel.



APPLY WATER-GUM TAPE to the veneered panel and press it down with a fine-bristle brass brush.

- 2.** The decorative banding is slightly thicker than the surrounding burl and cherry veneers, so it's necessary to cut a $\frac{3}{4}$ -in.-thick by 1-in.-wide by 3-in.-long piece of MDF or plywood for use as a pressing block.
- 3.** Remove the blue tape on the back, and then flip over the veneer panel with the gum tape facing up. Use the pressing block to rub down the gum tape and veneer edges next to the banding. This will ensure that all veneer surfaces will bond tightly to the box.
- 4.** Before gluing the veneer panels to the box, cut four clamping cauls out of 1-in.-thick MDF. For the box front and back, cut two cauls, each $5\frac{1}{4}$ in. wide by $14\frac{1}{8}$ in. long. For the box ends, make two cauls, each $5\frac{1}{4}$ in. wide by $11\frac{1}{8}$ in. long. Then use spray adhesive to affix two layers of $\frac{1}{8}$ -in.-thick poly foam to one surface of each clamping caul. The cushiony-foam surfaces will eliminate any voids when gluing and clamping the veneer panels to the box.
- 5.** With a 3-in. paint roller, apply a light, even coating of yellow glue to the veneer panel and to one end of the box (**PHOTO B**).



APPLY A LIGHT, EVEN COATING of yellow glue to the veneer panel and to one end of the box.

6. Place the clamping caul on top of two runners on the workbench with the foam-covered surface facing up. Lay the veneer panel on top of the foam with the gum-tape surface facing down. Place the box on top. To protect the opposite end of the box, set the other caul on top. Tighten one bar clamp in the middle of the box, and then place one at each end. Apply just light pressure to the three clamps at this time (**PHOTO C**).



GLUE THE VENEER PANEL (at bottom) to the box with the clamping caul underneath; set the other caul on top to protect the opposite end of the box. Tighten the clamps a little at a time, checking occasionally to make sure the veneer is still in position.

7. As you tighten the clamps, the veneer may slide out of position. Check to make sure it stays aligned with the corners of the box. Once the veneer is clamped in the correct position, add three more clamps to the opposite side. Tighten all the clamps a little at a time, checking occasionally to make sure the veneer is still in position. Let the glue dry for two hours, then remove the clamps. Repeat these steps to veneer the opposite box end, and then the box front and back.

WORK

Before clamping the veneer panels to the box, make two $\frac{3}{4}$ -in.-thick by 2-in.-wide by 10-in.-long hardwood runners. These narrow runners will create space beneath the box for positioning the bar clamps.

Remove the excess veneer and gum tape

1. Place the box on end on top of the cutting mat and use a scalpel to cut around the perimeter of the box, trimming away the excess veneer. Remove any dry glue or excess veneer with a sanding block and 150-grit sandpaper.
2. To remove the water-gum tape, take a wet rag and wipe down the tape. Allow the wet tape to set for a couple of minutes and then peel off the tape (**PHOTO D**). If the tape doesn't come off, simply wet it again. If it still doesn't come off, use a cabinet scraper to lightly scrape the gum tape from the surface. After the tape is gone, let the veneer dry completely before proceeding.



WIPE DOWN THE WATER-GUM TAPE with a wet rag, allow to set for a couple of minutes, and then peel off the tape.

Scrape the banding flush

As mentioned earlier, the decorative banding is slightly thicker than the surrounding veneer surfaces, so it's necessary to scrape it flush with a cabinet scraper. Keep the scraper sharp by flattening its edge with a burnisher and forming the desired burr.

Clamp the box in a bench vice to secure it while scraping. Then use both hands to slightly bend the scraper (**PHOTO E**). Be careful not to scrape the cherry borders or you might cut right down to the hardwood substrate. Repeat these steps to scrape the banding flush on the remaining sides of the box.



USE A CABINET SCRAPER to shave the banding flat and flush, bending the scraper slightly with both hands as you push it away from you.

Cut the top veneer panel

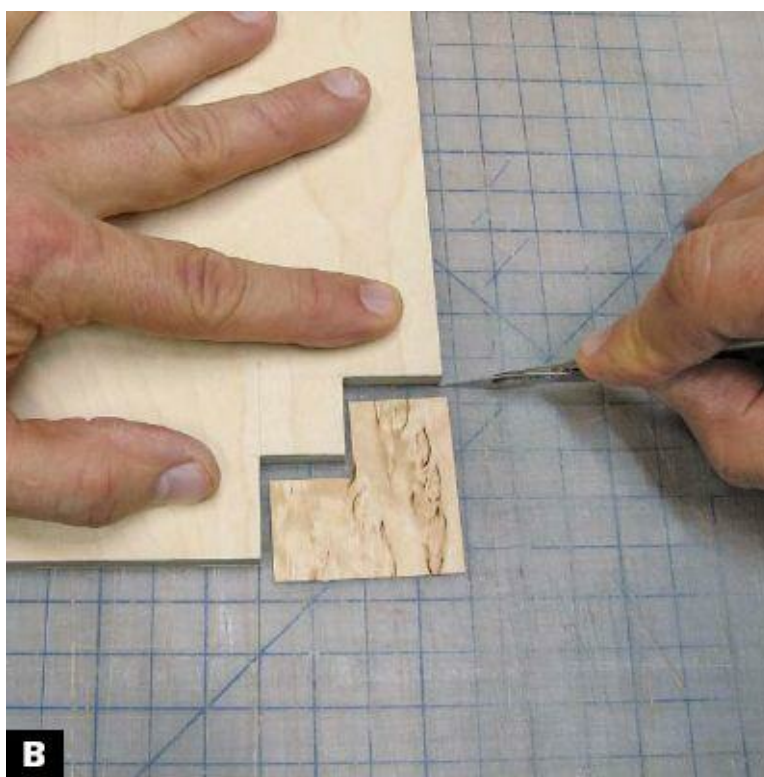
THE TOP OF THE BOX IS VENEERED SIMILARLY to the box sides: A center panel of Karelian burl veneer is outlined with decorative banding, which in turn, is bordered by quartered cherry veneer. The two main differences are that the box top is much larger and the decorative banding forms an eye-catching geometric inlay at each corner, something that I call a modified Greek key pattern. Before dealing with the decorative banding, you must cut the Karelian burl veneer center panel.

1. Start by cutting an 8½-in.-wide by 11½-in.-long clamping caul from ¼-in.-thick MDF or plywood. Place a sheet of Karelian burl veneer on top of the cutting mat, and then set the clamping caul on top. Press down on the caul and cut around its perimeter with a scalpel. Make two to three passes to cut through the veneer.
2. Mark the outline of the Greek key pattern onto one corner of the cutting caul. Use a try square and sharp pencil to draw two lines from each edge of the caul, one at ¾ in. and another at 1 in. Then draw the four lines to represent the Greek key (**PHOTO A**). Erase the two inside lines, leaving just the L-shaped key (this will make it less confusing when cutting out the key).



USE A SMALL TRY SQUARE and a pencil to mark the outline of the Greek key pattern onto one corner of the cutting caul.

3. Use a ¼-in.-wide by 10-tpi bandsaw blade to cut the Greek key from the clamping caul. Cut down the center of the pencil lines, making sure that you cut perfectly straight. Then use a sanding block and 150-grit sandpaper to smooth edges of the caul.
4. Place the caul on top of the Karelian burl veneer, aligning the edges at the veneer's corner. Press down on the caul and use a scalpel to cut along the notched cutout to remove one L-shaped Greek key corner. Again, make two or three passes to cut through the veneer (**PHOTO B**). Repeat to cut one Greek key from each of the remaining three veneer corners. Note that you'll have to flip over the caul to cut the corners on the opposite end of the veneer.



WITH THE CAUL ON TOP of the Karelilian burl veneer for the top, cut along the notched cutout in the caul to remove one L-shaped Greek key corner.

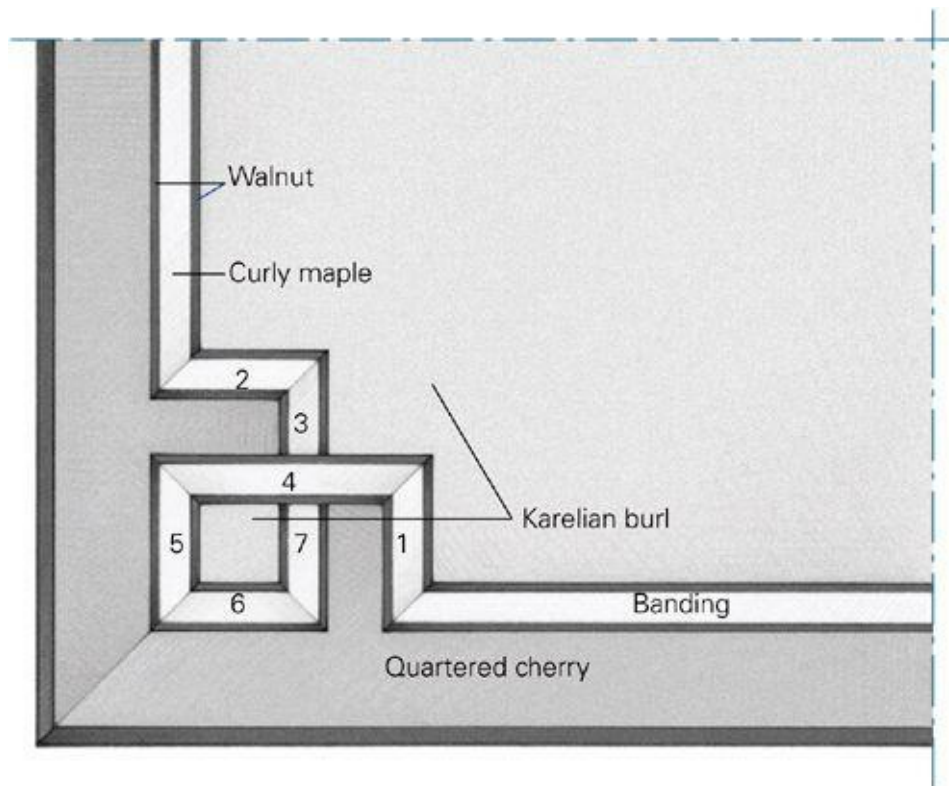
Make the Greek key banding

1. Cut to length the four long pieces of banding that go around the perimeter of the Karelian burl veneer center panel. Use the miter box to cut both ends of each piece to 45°. Hold the pieces of mitered banding tight to the center panel and secure with blue painter's tape.

Now refer to "Greek Key Corner Layout" on [p. 82](#) for cutting the seven short pieces of banding that are needed to create each Greek key corner. It's important to cut and fit the banding pieces according to the numerical sequence shown in drawing. Note too that in order to complete the Greek key pattern, you'll also need to cut one small square of the Karelian burl veneer and two small rectangular pieces of quartered cherry veneer for each corner.

2. Use the miter box and fine-tooth handsaw to cut to length banding piece no. 1. Start by cutting a 45° angle on one end, then dry-fit it against the end of the long piece of banding taped to the center panel. Check to be sure the mitered joint fits tightly together. Now mark the opposite end of piece no. 1 and miter-cut it to length. Check to be sure banding piece no. 1 fits properly, then flip over the center panel and tape piece no. 1 in place with blue painter's tape. Repeat to cut and attach banding piece no. 2.

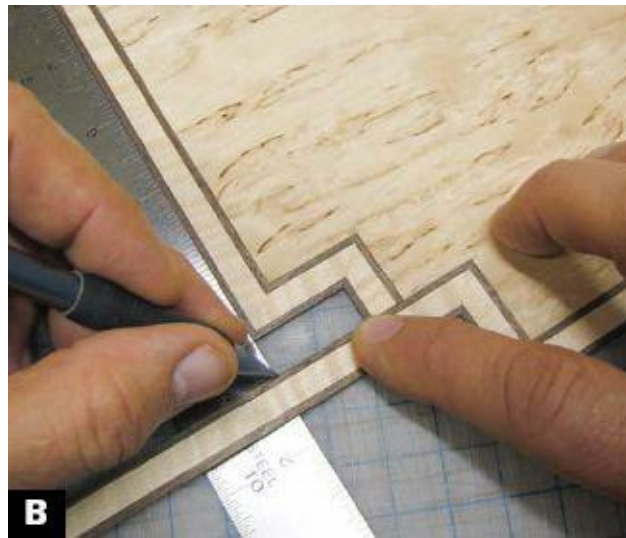
3. Miter-cut the end of banding piece no. 3 and fit it against the mitered end of piece no. 2. Draw a line where you must square-cut the end of banding no. 3 (**PHOTO A**). This squared end will butt up against the edge of banding piece no. 4, giving the appearance that banding pieces are crossing over one another. Once banding piece no. 3 has been cut and fitted, flip over the veneer panel and tape no. 3 in place.



CUT AND FIT BANDING PIECE no. 3, drawing a line where the square-cut end butts up against the edge of banding no. 4.

4. Cut banding piece no. 4, which is the longest piece in the Greek key corner. Start by cutting a 45° angle in one end and then butt it against the mitered end of piece no. 1. Take a steel rule, slip it underneath banding no. 4 and press the rule against the outside edge of the center panel. Make a pencil

mark where the steel rule intersects banding no. 4 (**PHOTO B**). Miter-cut banding piece no. 4 on the pencil mark to 45°. Tape banding piece no. 4 to the center panel.



MARK THE OUTSIDE MITER for banding piece no. 4, which is the longest piece in the Greek key corner.

5. Place a piece of Karelian burl veneer onto the cutting mat and use a steel rule and scalpel to cut out a $\frac{5}{8}$ -in. square. Tape this small square of veneer into the center of the Greek key.

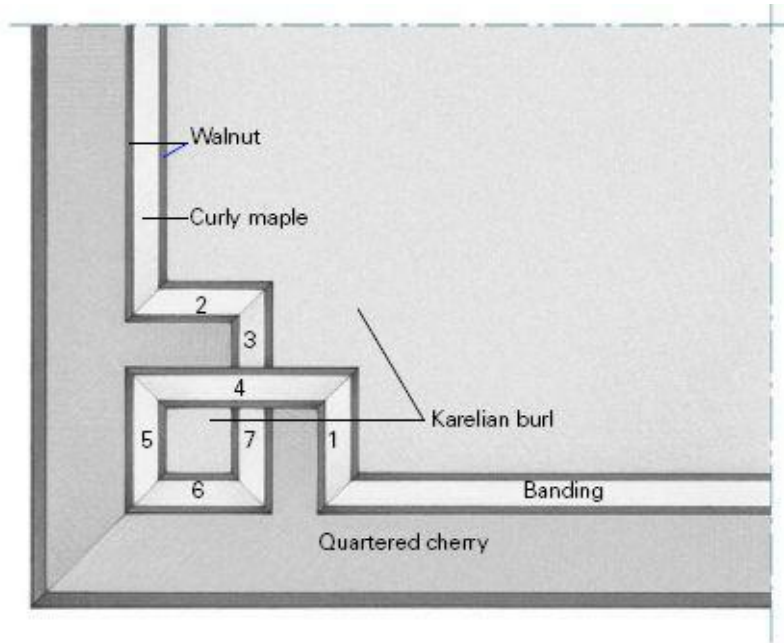
6. Cut and tape in place banding pieces no. 5 and no. 6 and then tape them to the center panel. Be sure to use a steel rule to keep all the pieces straight and square.

7. Miter-cut the end of banding piece no. 7 and set it tight to the mitered end of piece no. 6 and against the edge of the Karelian burl square. Make a pencil mark where piece no. 7 overlaps banding piece no. 4 (**PHOTO C**). Square-cut banding no. 7 on the pencil mark, set it in place, and tape it to the backside of the center panel. Repeat these steps to complete the remaining three Greek key corners.



MARK THE SQUARE CUT on the end of banding piece no. 7 where it abuts banding no. 4.

Greek Key Corner Layout

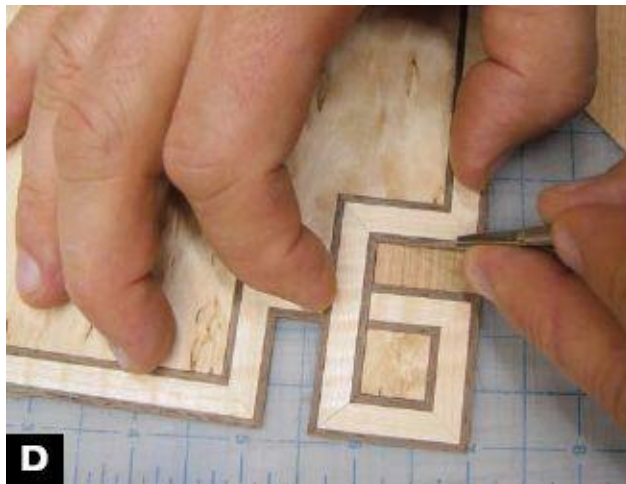


To make sure the Greek key corners are square and straight, use a straightedge guide or steel rule to align the banding pieces before marking and cutting them to length.

8. To complete each Greek key corner you must cut and install the rectangular pieces of quartered cherry veneer that fill the open spaces to either side of each Greek key. However, before cutting these small rectangular pieces, you must cut the outside cherry borders first. That'll make it much easier to match up the wood grain on the borders with the wood grain on the rectangles.

Use the same 11 $\frac{1}{8}$ -in.-long and 14 $\frac{1}{8}$ -in.-long clamping cauls used earlier to cut the cherry borders for the sides of the box. Follow the steps shown on [pp. 76–77](#) for cutting the quartered cherry veneer borders to fit around the center panel of the box top.

9. The next step is to cut the small rectangular pieces of cherry veneer to fit into the open notches beside each Greek key corner. Start by setting one cherry border on top of a flitch of cherry veneer. Shift the border around until you find a matching wood-grain pattern on the veneer. Now slip the veneer under the Greek key corner, aligning the matching wood-grain pattern under the open notch. Firmly press down on the banding and cherry veneer, and then cut out the cherry rectangle with a scalpel (**PHOTO D**).

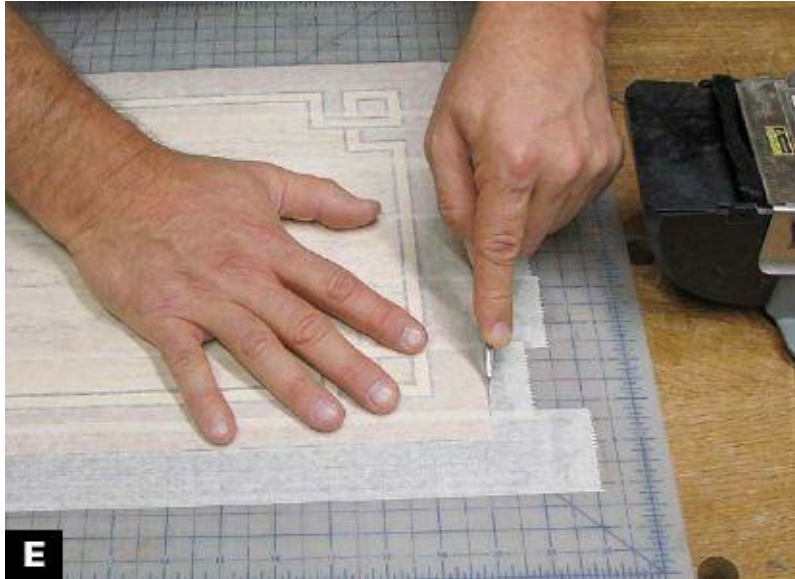


CUT THE SMALL RECTANGLES of cherry veneer to fit into the open notches beside each Greek key corner. The wood grain on the rectangle should match the wood grain on the border.

The wood grain on the rectangle will now match the wood grain on the border. Repeat these steps to cut two cherry rectangles for each Greek key corner. Once done, tape the rectangles to the back of the center panel. Then tape the four quartered cherry borders to the panel as well.

Glue on the top veneer panel

1. Set the center veneer panel onto the cutting mat with the blue painter's tape facing down. Apply water-gum tape to the top surface of the veneer panel, covering the entire surface to create a single sheet of veneer for gluing to the box top.
2. Press down the water-gum tape with a fine-bristle brass brush. Then use a scalpel to trim off the excess tape from around the edges of the veneer panel (**PHOTO E**).



COVER THE TOP SURFACE of the center veneer panel with water-gum tape, and then trim off the excess tape from around the edges of the panel.

3. Peel off the blue tape and then flip the veneer panel over so that the water-gum tape faces up. Use a small wood block to press down the tape and the veneer edges next to the banding. This hand rubbing will eliminate any air pockets and ensure a tight glue bond to the box top.
4. Make two clamping cauls out of 1-in.-thick MDF. Cut both cauls to 11½-in.-wide by 14½-in.-long pieces, one for the box top and the other for the box bottom. Use spray adhesive to adhere two layers of ½-in.-thick foam to one of the clamping cauls. Roll a light, even coating of yellow glue onto the top veneer panel and onto the top of the box (**PHOTO F**).



ROLL A LIGHT, EVEN COATING of yellow glue onto the top veneer panel and onto the top of the box and then clamp the panel to the box.

- 5.** Take the two hardwood runners used earlier to veneer the box ends (see [p. 79](#)) and set them on edge on the workbench. Place the foam-covered clamping caul on top of the runners. Then lay the veneer panel on top of the foam with its glued surface facing up. Set the box upside down on top of the veneer. Now place the second clamping caul on top to protect the bottom of the box.
- 6.** Start by lightly clamping the center of the box and then the edges. The veneer will move slightly as you apply pressure, so reposition the veneer when necessary to ensure that the corners of the quartered cherry veneer borders line up with the corners of the box. Little by little tighten all the clamps, making sure the veneer doesn't shift out of position. Let the glue dry for two hours before unclamping the box.
- 7.** Place the box upside down on the cutting mat and use a scalpel to trim off the excess veneer from around the perimeter. Remove any dry glue or veneer remnants with a sanding block and 150-grit sandpaper.
- 8.** To remove the water-gum tape, start by wiping down the tape with a wet rag. Wait a minute or two, then peel off the tape. If the tape is too difficult to peel off, rewet it or simply scrape it off with a cabinet scraper. Once the tape has been removed, let the veneer dry before proceeding.
- 9.** Clamp the box into a bench vice and use a cabinet scraper to scrape the banding flush with the Karelian burl veneer center panel and the quartered cherry borders. Use both hands to slightly bend the scraper as you push it away from you. Shave off only enough wood to level the banding with the surrounding surfaces.

Cut the rabbet and the corner banding

ALL OUTSIDE EDGES AND CORNERS OF THE box are fitted with solid-walnut banding, which is not only attractive but also helps protect the veneer. The narrow pieces of walnut fit into shallow $\frac{1}{8}$ -in. by $\frac{1}{8}$ -in. rabbets, which are cut on the router table.

1. Start by mounting a rabbeting bit in the router table. Install a ball-bearing pilot onto the bit to produce a $\frac{1}{8}$ -in.-deep cut and then adjust the height of the router bit to $\frac{1}{8}$ in. Rout a $\frac{1}{8}$ -in. by $\frac{1}{8}$ -in. rabbet around the edges of the box top and bottom, and along each of the four box corners (**PHOTO A**).



ROUT $\frac{1}{8}$ -IN. by $\frac{1}{8}$ -in. rabbets around the edges of the box top and bottom and along each of the four box corners, pushing the box past the bit at a slow and steady pace.

2. Cut the solid-walnut banding on the tablesaw. Start with a 2-in.-thick by 30-in.-long piece of walnut that's at least 2 in. or 3 in. wide. Lock the rip fence $\frac{5}{32}$ in. from the sawblade and then cut one $\frac{5}{32}$ -in.-thick by 2-in.-wide by 30-in.-long strip of walnut. Place the strip flat down against the saw table and cut seven $\frac{5}{32}$ -in. by $\frac{5}{32}$ -in. by 30-in.-long pieces of banding. This will be enough banding for the entire box, plus one extra piece. Note that the banding is about $\frac{1}{32}$ in. larger than the rabbets. Once they're glued in place, you'll be able to scrape the banding perfectly flush with the veneered box.

Attach the walnut banding

1. Start installing the walnut banding into the rabbet at the top, front edge of the box. Use the miter box and fine-tooth handsaw to miter-cut one end of the banding to 45°. Hold the banding into the rabbet with its mitered end flush with the end of the box. Now use a pencil to mark the opposite end of the banding even with the box (**PHOTO B**). Miter-cut the banding to 45° on the pencil mark.



FIT THE WALNUT BANDING into the rabbet at the top front edge of the box, marking for miter cuts at both ends.

2. After cutting the banding to length, set it into the rabbet and secure with strips of blue painter's tape. Continue cutting and taping banding pieces around the top and then around the bottom of the box.

3. Prepare to cut the four short, vertical pieces of walnut banding that fit into the rabbets routed into the corners of the box. (Note that these banding pieces are square cut, not mitered.) Use the miter box and fine-tooth handsaw to make a square 90° cut on the end of a length of banding. Hold the banding into the corner rabbet with its square-cut end sitting on top of the horizontal banding at the bottom of the box. Make a pencil mark where the vertical corner banding meets the horizontal banding at the top of the box. Square-cut the banding to length, then tape it into the rabbet. Repeat to cut and fit the remaining three pieces of corner banding.

4. Once you've cut and taped into place all 12 banding pieces, remove them, and brush yellow glue into a rabbet and onto the appropriate piece of banding. Press the banding into its rabbet and secure with tape. Check to be sure the banding is perfectly aligned within the rabbet. Repeat for the remaining pieces of banding. Wipe away any excess glue with a clean cloth. Let the glue dry for at least one hour before peeling off the tape.

5. Clamp the box to the workbench and use a cabinet scraper to carefully scrape the walnut banding flush with the veneer. Bend the scraper slightly and slowly shave away the excess walnut (**PHOTO C**). Repeat to scrape flush the vertical pieces of banding at each box corner. Then use a sanding block and 150-grit sandpaper to lightly sand the entire box.



USE A CABINET SCRAPER to scrape the walnut banding flush with the veneer.

Cut the box in half

TO CUT THE BOX TOP SAFELY AND ACCURATELY from the box itself you must make two cutting sleds for the tablesaw (see the sidebar on [p. 88](#)). You need two sleds because the top is cut from the box at a 6° angle, requiring one sled for each end of the box.

1. After building both cutting sleds, set up the tablesaw for cutting the box top from the box. Start by setting the rip fence so that the edge of the sled is 5 in. from the center of the sawblade. Then adjust the height of the sawblade to exactly $2\frac{3}{32}$ in. At this height, the blade won't cut completely through the box but instead will leave about $\frac{1}{32}$ in. of hardwood uncut. That way, the box halves remain intact throughout the cutting process.
2. Before cutting the box, turn on the saw and run both sleds through the blade. This will split the sled bottoms in half, but the screws in the front and rear support blocks will hold the sled together. The sawkerf at the rear of the sled will clearly show where the blade exits the sled.
3. Set the box into the left-hand sled with the box end resting against the rear support block and the veneered box top tight against the angled fence. (The left-hand sled is the one with the plywood fence angling to the left, away from the saw's rip fence.) Check the bottom of the box for the chisel mark or stamp you made earlier. Turn on the saw and push the sled through the sawblade (**PHOTO A**).



TO CUT THE BOX IN HALF, set the box on the sled and push the sled through the sawblade with one hand holding the front corner of the box, and the other pushing the rear of the sled.

M

C

S

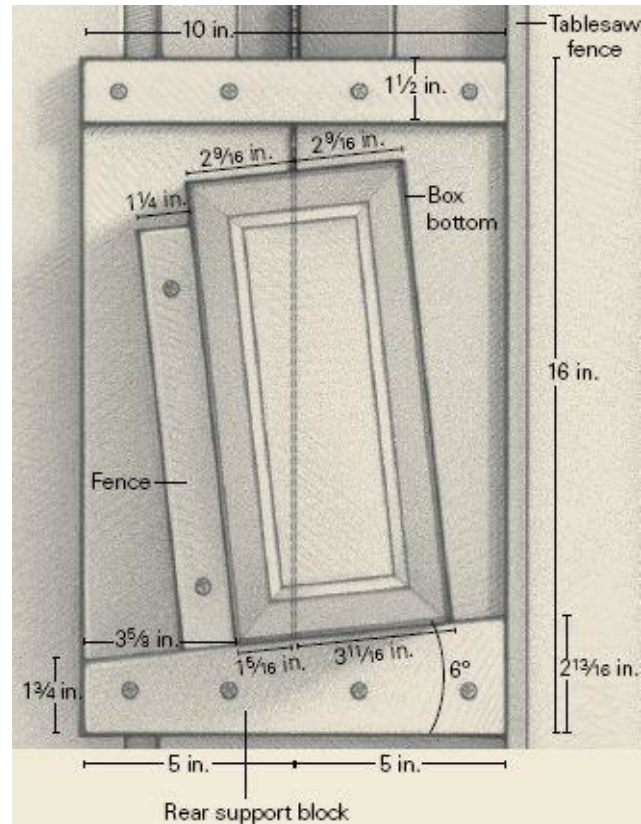
1. Cut two pieces of $\frac{3}{4}$ -in.-thick plywood 21 in. wide by 23 in. long. Glue the pieces together and then secure them with one $1\frac{1}{4}$ -in. screw driven into opposite corners. Place the plywood assembly into a vacuum press bag and let the glue dry for about two hours. Once the glue dries, remove both screws and scrape off any excess dry glue from the four edges. You can now cut the eight parts needed to build both sleds from this one $1\frac{1}{2}$ -in.-thick plywood panel.
2. Cut two 10-in.-wide by 16-in.-long plywood pieces to serve as the bottom of the sleds. Then cut the two $1\frac{1}{2}$ -in.-wide by 10-in.-long strips for the front support block. Next, cut two $2\frac{13}{16}$ -in.-wide by 10-in.-long pieces for the rear support blocks. Finally cut two $1\frac{1}{4}$ -in.-wide by 10-in.-long pieces for the angled fence.
3. To establish the 6° angle on the rear support blocks, make a mark at one end of each block $1\frac{3}{4}$ in. up from the bottom edge (see “Box-Cutting Sleds” below). Draw a line from this mark to the

corner at the opposite end of the 10-in.-long plywood block. Use a bandsaw to cut along the outside edge of the pencil line on each rear support block. Smooth the diagonal edges with a sanding block and 80-grit sandpaper.

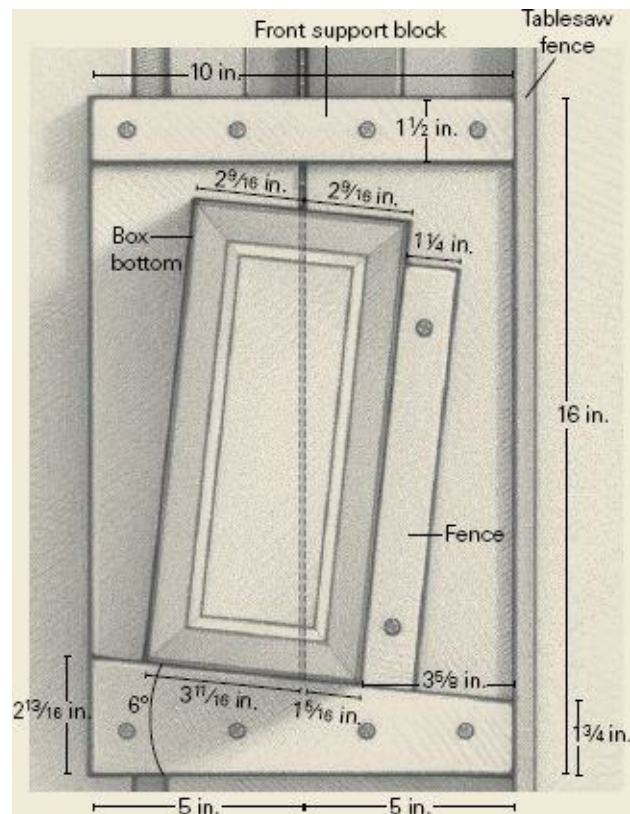
4. To each sled bottom fasten one rear support block, one front support block, and one angled fence. Bore screw-pilot holes first, and then secure each plywood part with 2½-in.-long flathead screws. Refer to the drawing for the exact placement of each part and screw. It's important to keep the screws well away from the blade's cutting path.

Box-Cutting Sleds

Left sled



Right sled



4. After completing the initial cut, put the right-hand sled onto the saw table. Rotate the box end for

end and set its right end down into the sled. (This time, the sled's plywood fence will be angling to the right, toward the saw's rip fence.) Hold the box tight to the rear support block and fence and push it through the blade. Again, be sure to keep both hands well away from the sawblade.

5. Set aside both cutting sleds and prepare to cut through the back surface of the box. Begin by tilting the sawblade to 6° and then lower the blade to precisely $\frac{19}{32}$ in. high. Lock the rip fence $2\frac{9}{16}$ in. from the center of the blade. Turn on the saw and slowly push the box past the blade, making sure you keep the box tight to the fence throughout the cut (**PHOTO B**, [p. 87](#)).



CUT THROUGH THE BACK surface of the box with the sawblade tilted to 6°, keeping the box tight to the fence throughout the cut. Reset the fence and cut the front surface of the box.

WORK

The sawblade will be hidden from view while cutting the box on the sled. Be sure to keep your hands toward the outer edges of the sled and well away from the path of the blade, especially where it exits the rear of the sled.

6. Prepare to cut the front surface of the box. Set the fence $3\frac{11}{16}$ in. to the center of the blade. Don't readjust the blade angle or height. Turn on the saw and make the final pass over the blade. Remember, the box top will remain attached to the box after the final cut.
7. Set the box on the cutting mat or other flat, protected surface and use a scalpel to cut the box top from the box itself. You'll need to cut through only about $\frac{1}{32}$ in. of hardwood, but work slowly and carefully (**PHOTO C**, [p. 87](#)).



USE A SCALPEL to cut through the remaining sliver of hardwood and separate the box top from the box itself.

8. After severing the top, a small ridge of wood will remain along the underside of the box top and upper edges of the box. Remove these ridges with a low-angle block plane. Then sand the edges smooth and flat with a sanding block and 150-grit sandpaper.

Make the interior panels

THERE ARE TWO PANELS INSIDE THE ARTIST Sketch Box, one fixed and the other removable. Both panels are cut from ½-in.-thick maple plywood and then covered with Karelian burl veneer and edge-trimmed with walnut hardwood. For the panels to fit into the box, you must cut a 6° angle into both long edges of each panel. But to start, cut the panels ½ in. wider than needed and then trim them to size after veneering.

1. Use the tablesaw to cut the maple plywood fixed panel to 10⅞ in. wide by 12½ in. long. Then cut the removable panel to 7⅝ in. wide by 12½ in. long.
2. Make four clamping cauls from ¼-in.-thick MDF or plywood: two 10⅜ in. wide by 12¾ in. long for the fixed panel, and two 7⅞ in. wide by 12¾ in. long for the removable panel.
3. Place one of the removable-panel clamping cauls on top of a sheet of Karelian burl veneer, press down, and then use a scalpel to cut around the perimeter edges of the caul. Make two or three passes to cut through the veneer. Repeat to cut a second piece of veneer for the removable panel. Then use the fixed-panel caul to cut one piece of Karelian burl veneer and one piece of scrap veneer. The scrap veneer will be glued to the back of the fixed panel.
4. Apply an even coating of yellow glue to the four veneer pieces and to both surfaces of each plywood panel. Press the veneer onto the panels and then sandwich each between the appropriate pair of clamping cauls. Secure the veneered bundles with strips of Gorilla Tape before placing them into a vacuum-press bag. Allow the glue to dry for about two hours (**PHOTO A**).



PLACE THE FOUR VENEER BUNDLES for the fixed and removable panels into a vacuum-press bag.

5. After the glue has dried remove the tape and cauls. Place the panels onto the cutting mat and use a scalpel to trim off the excess veneer. Then use a sanding block and 150-grit sandpaper to sand away any excess glue or veneer from the edges of the panels.
6. Cut the plywood panels to size. Tilt the tablesaw blade to 6° and set the fence 9⅝ in. from the blade. Push the fixed panel through the blade, beveling one long edge to 6°. Then rotate the fixed panel 180° and flip it over end for end. Set the just-beveled edge against the fence and cut a matching 6° bevel into the opposite edge. This will give the fixed panel two parallel beveled edges, both angling

in the same direction. Reset the rip fence $7\frac{1}{8}$ in. from the blade and repeat to bevel both long edges on the removable plywood panel.

7. Use the tablesaw to mill the walnut trim that goes around the edges of the plywood panels. Cut four pieces of walnut hardwood to $\frac{1}{8}$ in. thick by $\frac{5}{8}$ in. wide by 30 in. long, which will be enough trim for both plywood panels.

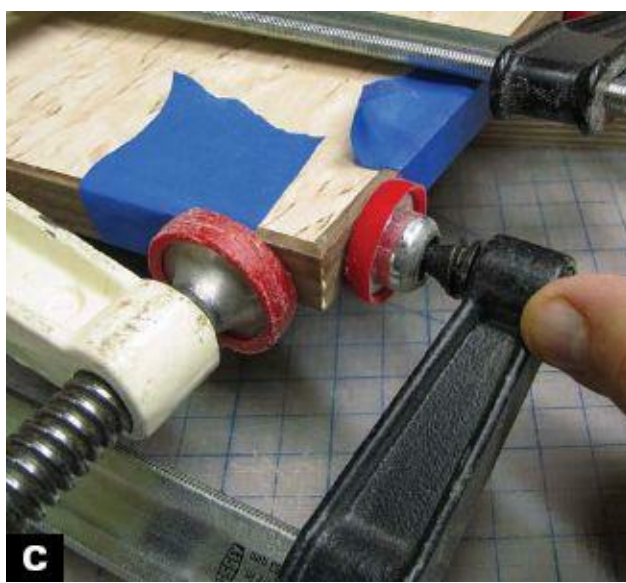
8. Set up the power miter saw for cutting to length the four shorter pieces of walnut trim that cover the square (not beveled) ends of each plywood panel. Rotate the sawblade for a 45° miter, and then tilt the blade for 6° bevel. This will produce the compound-angle cuts necessary to match the 6° bevel angle on the panels. Cut the compound angle into one end of a length of trim, then hold it against the plywood panel and mark where to cut the opposite end. Repeat this step to cut the remaining three pieces of the end trim (**PHOTO B**).



CUT A COMPOUND ANGLE on the ends of each piece of walnut end trim to match the 6° bevel angle on the panels.

9. To cut the longer pieces of walnut trim that cover the beveled edges of the plywood panels, adjust the miter saw bevel to zero but leave the miter angle at 45° . Cut the 45° angle into one end of a length of trim, hold it against the plywood panel, and mark where to cut the opposite end. Repeat to cut the remaining three pieces of the edge trim.

10. After you've cut all eight pieces of walnut trim to length, brush yellow glue onto the square, shorter edges of each panel and onto the four shorter pieces of trim. Press the trim against the panel edges and secure with blue painter's tape. Then use three bar clamps to hold the trim onto each panel; make sure the miters line up to the panel corners before tightening the clamps (**PHOTO C**). Next, glue and clamp the longer pieces of walnut trim to the two long beveled edges of each plywood panel. Let the glue dry two hours to three hours before removing the clamps.



GLUE AND CLAMP the walnut trim against the panel edges, making sure that the miters line up to the panel corners before tightening the clamps.

11. Set one of the plywood panels on the cutting mat and use a low-angle block plane to shave the walnut trim flush with the Karelian burl veneer (**PHOTO D**). Repeat to plane the walnut trim flush on both sides of each panel. Lightly sand all surfaces and edges with a sanding block and 150-grit sandpaper.



SHAVE THE WALNUT TRIM flush with the burl veneer using a low-angle block plane. For the best results, tilt the plane slightly toward the burl and use long, even strokes.

12. Prepare to drill a finger pull into the removable panel. Start by making a drilling platform for the drill press, which will increase accuracy and prevent splintering at the rear of the plywood panel. Cut a 12-in.-wide by 18-in.-long piece of 3/4-in. plywood, which will serve as the base of the platform. Then cut a 2-in.-wide by 18-in.-long piece of 3/4-in. plywood for the fence. Nail or screw the fence to the top surface of the base, flush along one long edge. Clamp the drilling platform to the drill press table with the tip of a 1 1/2-in.-dia. Forstner bit centered over the edge of the fence.

13. Next, draw a centerline onto the edge of the 12 1/2-in.-long removable panel and then set the panel against the fence. Clamp the removable panel to the fence and drill the 1 1/2-in.-dia. half-circle finger pull (**PHOTO E**).



WITH THE REMOVABLE PANEL supported by a plywood drilling platform, use a 1½-in.-dia. Forstner bit to drill a half-circle finger pull centered along the top edge.

Make the inside cleat and support blocks

THE NEXT STEP IS TO MAKE AND INSTALL the one cleat and two blocks that support the two plywood panels (see the drawing on [p. 68](#)). The lower edge of the removable panel rests on a cleat fastened to the inside, rear surface of the box; the removable panel's upper edge sits in the rabbet cut in the pencil-tray front, which is already installed. The fixed panel is supported by two blocks attached to the inside of the box top.

- 1.** Cut a piece of curly maple hardwood for the cleat (see “Materials” on [p. 63](#)). Tilt the tablesaw blade to 6° and set the rip fence 1⁹/₁₆ in. from the blade. Bevel-rip the 6° angle into the top edge of the cleat.
- 2.** Brush yellow glue onto the cleat and onto the inside of the box. Clamp the cleat in place so that it'll hold the removable panel flush with the top, rear edge of the box.
- 3.** Make the two blocks that support the fixed panel. You can cut these blocks from any hardwood species because they'll be hidden from view. Square up the tablesaw blade to 0° and cut the two support blocks (see “Materials” on [p. 63](#)).
- 4.** Tilt the tablesaw blade to 6° and set the blade 1³/₁₆ in. from the blade. Use a push stick to push the first, wider block past the blade. Reset the fence ¼ in. from the blade and bevel-rip the 6° angle into the second, narrower hardwood block.

Install the fixed panel

1. Set the two support blocks into the top box, with the wider block at the rear of the top and the narrower block at the front. Set the fixed panel on top of the blocks to make sure it sits flush with the top edge of the box top. There should be a $\frac{1}{64}$ -in. gap around the edges of the panel to allow for wood movement.
2. Remove the fixed panel and both support blocks. Brush yellow glue onto the inside of the box top and onto the rear and bottom surfaces of each support block. Press the blocks into place and secure with clamps (**PHOTO A**). Let the glue dry for two hours, then remove the clamps.



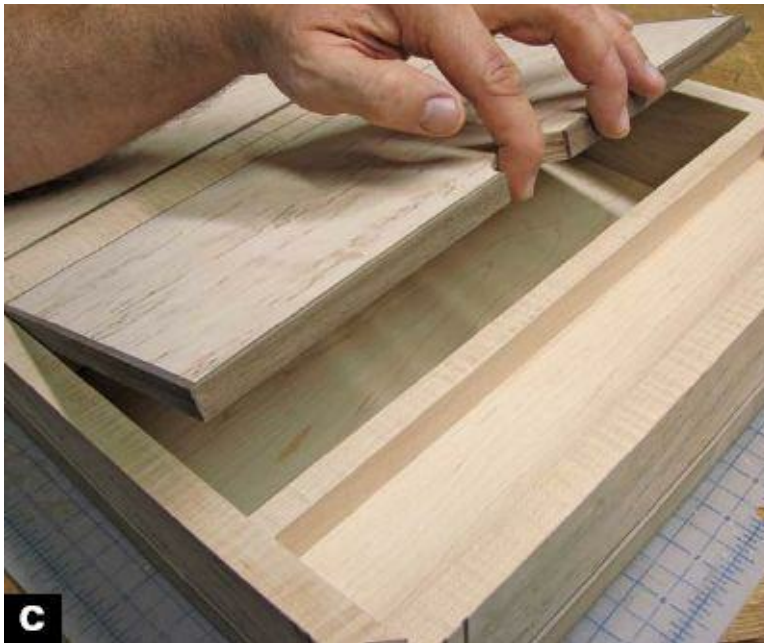
GLUE THE TWO SUPPORT BLOCKS into the top box, with the wider block at the rear of the top and the narrower block at the front.

3. To adhere the fixed panel to the support blocks, I used hot animal-hide glue for its superior strength and because it accommodates wood movement better than other types of glue. Brush three large spots of glue onto each support block, one near each end and one in the center.
4. Press the fixed panel down onto the support blocks and secure with six small bar clamps. Position the clamps directly over the glue spots. Wait two hours before removing the clamps (**PHOTO B**).



GLUE AND CLAMP the fixed panel onto the support blocks.

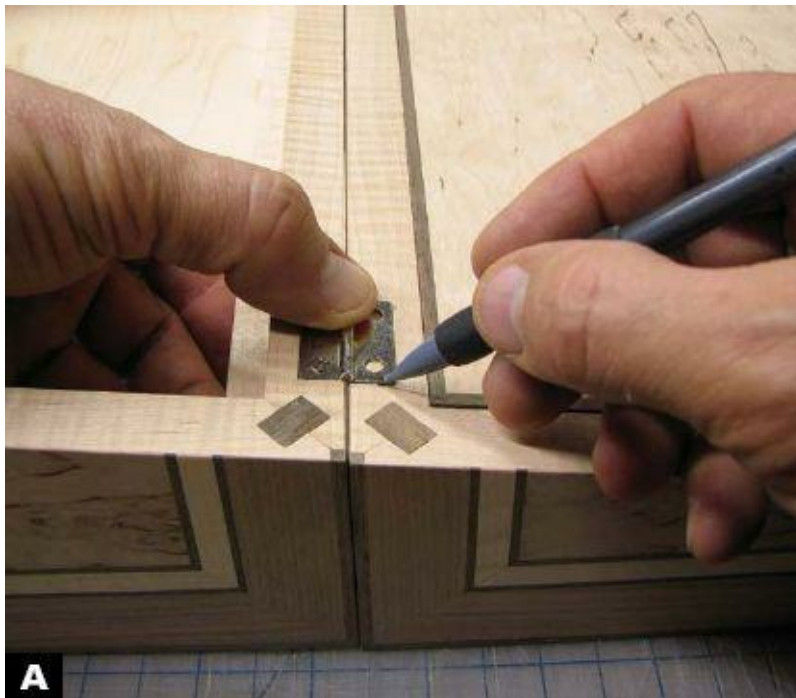
5. Set the removable panel into the box. It should fit loosely with a $\frac{1}{64}$ -in. gap around all four edges. If it fits a little too tightly, sand down the walnut edging with a sanding block and 150-grit sandpaper (**PHOTO C**).



THE REMOVABLE PANEL should fit loosely with a $\frac{1}{64}$ -in. gap around all four edges.

Install the hinges

1. Start by attaching the hinges to the rear edge of the box. Hold one hinge in place, $\frac{7}{8}$ in. in from the end. Position the hinge knuckle (the cylindrical part that holds the pin) to extend just past the rear edge of the box. Trace around the hinge with a sharp pencil. Repeat for the second hinge.
2. Use a $\frac{3}{4}$ -in.-wide wood chisel and mallet to cut just inside the pencil lines. Hold the chisel at precisely 90° and cut to a depth of $\frac{1}{16}$ in. Remove the waste wood from within each hinge mortise with a #2/8 carving gouge. Again, remove just $\frac{1}{16}$ in. of wood from each mortise.
3. Drill pilot holes and then screw the hinges to the rear edge of the box.
4. Place the box top tight against the box in the open position. Line up the top with the box, making sure the sides are perfectly flush with each other. Open the hinges and lay them flat on the edge of the box top. Trace around each hinge with a sharp pencil, then cut the mortises with the chisel and gouge (**PHOTO A**).



THE BOX TOP IS ATTACHED to the box with a pair of $\frac{3}{4}$ -in.-wide by 1-in.-long nickel-finish hinges.

Attach the catches and handle

TO HOLD THE BOX CLOSED, I INSTALLED two swing catches; and to make it easy to carry the box around, I attached a simple handle. The catches and handle are nickel plated to match the hinges.

1. Position each catch 1½ in. from the outside edge of the box to the outside edge of the catch. Hold the upper, swinging part of the catch against the front of the box top. Note that this part aligns precisely with the decorative banding running along the box top. Drill two pilot holes, and then fasten the swinging part to the box top. Repeat to attach the upper part of the second catch (**PHOTO A**).



ATTACH A PAIR OF SWING CATCHES to hold the box closed.

2. Use a ¼-in.-wide steel rule as a spacer for installing the lower, fixed part of the catch. Hold the rule against the swinging part of the catch, and then press the fixed part against the rule. Set a try square on the box top and use it to align the two parts of the catch. Drill pilot holes and attach the fixed part to the front of the box. Repeat to install the fixed part of the second catch.
3. The last piece of hardware to install is the 4¼-in.-long polished nickel handle. Center the handle on the box front and attach with the two screws.

Finish the box

1. Start by removing all the hardware, including the hinges. Lightly hand-sand all surfaces with 150-grit sandpaper. Blow off the sanding dust and wipe everything down with a clean, dry cloth.
2. Spray on a very light coating of clear pre-catalyzed lacquer finish, which will act as a sealer. Allow this initial coat to dry for two hours, which is an hour longer than recommended by the lacquer manufacturer (**PHOTO A**).



APPLY A CLEAR PRECATALYZED lacquer finish using a pneumatic sprayer. (Here, I'm using a DeVilbiss® model J6A-504 C-11 sprayer with a 1-quart cup.)

3. Hand-sand all surfaces again using ultrafine 320-grit sandpaper. Remove the sanding dust, and spray on another light coat of lacquer. Be careful not to apply the lacquer too thickly or it will crack over time.
4. Repeat the previous step by sanding first and then applying one final coat of lacquer. Let the finish dry overnight and then reinstall the hardware.



Music Box

THIS TRADITIONAL-STYLE music box is truly a feast for the senses: Its unique shape, enhanced by inlaid marquetry, is a beauty to behold; the richly figured burl veneer practically demands caressing, and, unlike most wooden boxes, this one can soothe you with the sound of music.

Made primarily of solid maple hardwood covered with maple burl veneer, the box is accented with solid flamed birch trim and midnight-black ebony veneer. The box's musical theme is represented inside and out by detailed marquetry work of violins with musical notes and by a lyre harp applied to the box front. A 72-note musical movement installed inside the box plays three different melodies.

In this chapter you'll learn advanced veneering techniques, including how to select and adhere veneer so the wood grain matches on all sides of the box and flows nicely from the inside of the box to the outside and around the chamfered corners. Specific instructions show how to add inlays to the radius trim that accents the box. There are also step-by-step directions for turning the four segmented feet on a lathe.



Finished size of box: 9 in. tall × 8 in. deep × 15½ in. wide

I briefly discuss the inlaid marquetry of this box, but more detailed marquetry instructions are given for the Traditional Jewelry Box project (see [p. 188](#)). Those techniques can be applied here. The violins on the outside are made of flat-cut African mahogany. On the inside of the box lid, I used bloodwood veneer for the violins, so that when you open the lid, you see the same marquetry design but in a slightly different color of wood. Hot silicon sand was used to create the subtle shading of certain veneer pieces, which lends a three-dimensional look to the marquetry.

MATERIALS

QUANTITY	PART	SIZE	CONSTRUCTION NOTES
1	Flitch (7 sheets) for box	1/42 in. × 21 in. × 31 in.	maple burl veneer
1	Front	9/16 in. × 6 in. × 13 in.	maple
2	Front corners	9/16 in. × 6 in. × 1 1/8 in.	maple
2	Ends	9/16 in. × 6 in. × 6 3/4 in.	maple
1	Back	9/16 in. × 6 in. × 14 1/2 in.	maple
1	Bottom	9/16 in. × 7 1/2 in. × 14 1/2 in.	maple
1	Movement platform	1/4 in. × 6 3/4 in. × 13 3/4 in.	maple
2	Splines	1/8 in. × 1/2 in. × 6 1/4 in.	maple
2	Front and back inner box	9/16 in. × 1 9/16 in. × 9 1/2 in.	maple
2	Ends inner box	9/16 in. × 1 9/16 in. × 5 in.	maple
1	Top inner box	1/8 in. × 5 in. × 9 1/2 in.	glass
1	Radius trim block	5/8 in. × 1 in. × 5 11/16 in.	flamed birch
1	Spline	1/8 in. × 3/4 in. × 4 1/4 in.	maple
5	Part A top cove trim	13/32 in. × 13/32 in. × 12 in.	flamed birch
5	Part B middle trim	5/16 in. × 1 1/16 in. × 12 in.	flamed birch
5	Part C bottom trim	7/32 in. × 1 1/16 in. × 12 in.	flamed birch
10	Part A top cove veneer	1/42 in. × 5/8 in. × 12 1/8 in.	Macassar ebony veneer
5	Parts B and C middle and top veneer	1/42 in. × 7/8 in. × 12 1/8 in.	Macassar ebony veneer
1	Parts B and C radius trim	1 1/16 in. × 4 in. × 12 in.	flamed birch (oversize)
1	Part A radius trim	13/32 in. × 4 in. × 12 in.	flamed birch (oversize)
32	Foot pieces (for 4 feet)	13/16 in. × 5/8 in. × 3 1/2 in.	flamed birch ▶▶

32	Foot pieces (for 4 feet)	$\frac{1}{42}$ in. $\times$ $\frac{7}{8}$ in. $\times$ $3\frac{1}{2}$ in.	Macassar ebony veneer
8	Marquetry veneers	$\frac{1}{42}$ in. $\times$ 8 in. $\times$ 15 in.	see p. 123
1	Top	$\frac{1}{2}$ in. $\times$ 8 in. $\times$ 15 in.	maple veneer plywood
1	Top trim	$\frac{1}{2}$ in. $\times$ $\frac{5}{8}$ in. $\times$ 22 in.	flamed birch
1	Top trim	$\frac{1}{2}$ in. $\times$ $\frac{5}{8}$ in. $\times$ 14 in.	flamed birch
1	Trim inlay veneer	$\frac{1}{42}$ in. $\times$ 8 in. $\times$ 48 in.	black dyed veneer
1	Lyre harp	$\frac{5}{16}$ in. $\times$ $4\frac{1}{2}$ in. $\times$ $5\frac{1}{2}$ in.	flamed birch (oversize)
1	Musical movement		
1 pair	95° stop hinges	$1\frac{1}{16}$ in. $\times$ $1\frac{1}{4}$ in.	

Veneer the hardwood parts

I CHOSE TO GLUE MAPLE BURL VENEER TO maple hardwood rather than build the box from solid maple burl. That's because solid maple burl isn't readily available, nor is it easily routed and machined. And the density of burl isn't good for sound quality; it's too unstable and unpredictable. For this box, you'll need a flitch of seven sheets of maple burl veneer, each measuring $\frac{1}{42}$ in. thick by 21 in. wide by 31 in. long. (A *flitch* is a bundle of veneer sheets that are laid together in sequence exactly as they were cut from the log.) You'll need only five sheets to complete this box, but it's always a good idea to have a couple extra sheets on hand in case of any mistakes or unforeseen problems.

- 1.** Start by cutting the hardwood maple substrate for the box parts. To create the box front, back, both ends, and two chamfered corners, cut two hardwood maple pieces, each measuring $\frac{9}{16}$ in. thick by 6 in. wide by 30 in. long.
- 2.** For the box bottom, you'll need a piece of maple that's $\frac{9}{16}$ in. thick by $7\frac{1}{2}$ in. wide by $14\frac{1}{2}$ in. long. And for the movement platform, cut a maple piece measuring $\frac{1}{4}$ in. thick by $6\frac{3}{4}$ in. wide by $13\frac{3}{4}$ in. long. The movement platform gets installed $3\frac{1}{8}$ in. above the box bottom and provides a place to mount the musical movement (see the drawing on [p. 104](#)).
- 3.** Use a scalpel or artist's mat knife, straightedge, and self-healing mat to slice the veneer down to size. For best results, make each cut in two or three light passes. Trying to force the knife through the veneer on a single pass can chip the veneer or cause the knife to veer away from the straightedge. For each hardwood substrate, cut a piece of veneer that's about $\frac{1}{8}$ in. oversize on all sides.

WORK

My favorite tool for cutting veneer is a medical-grade scalpel. It's extremely sharp and produces the cleanest, most precise cuts. The model I use has replaceable #10A blades, which can be resharpened on an ultra-fine sharpening stone. Scalpels and blades are available from several online sources.



4. Apply yellow glue to the veneer and substrate and spread it evenly with a 3-in. roller. Press the veneer in place, then flip the board and glue veneer to the opposite side (**PHOTO A**). I prefer to use a vacuum press to clamp the veneer in place while the glue dries (see [p. 100](#)). This simple machine provides the easiest and absolute best way to bond veneer to a substrate. If you don't have a vacuum press, use several traditional clamps and/or weights to press down the veneer.



USE A 3-IN. ROLLER to evenly apply yellow glue to the veneer and both sides of the two substrates.

V

H

Look closely at virtually any antique piece of furniture and you'll likely find veneer glued over hardwood, especially on the legs, aprons, and other small surfaces. These veneered surfaces often remain in great shape for generations because there is very little movement between the hardwood and the veneer. Larger surfaces—tabletops, broad sides, and front panels—are usually built out of handmade plywood or lumber-core plywood, and then veneered.

Veneer doesn't hold up very well when glued to large slabs of hardwood because the slabs tend to expand and contract too much. Plus they can crack and warp, which damages the veneer. Keep in mind that the rate of expansion and contraction of wood varies from species to species and

even from board to board. The amount of movement also seems to decline with age. In smaller projects, such as the wooden box shown here, veneering over hardwood works well because the amount of wood movement is insignificant.

5. If using a vacuum press, start by making four clamping cauls, which are simply $\frac{3}{4}$ -in.-thick pieces of MDF cut to the same size as the veneer. Round the corners of the cauls so they won't puncture the vacuum bag. Sandwich one of the veneer substrates between two MDF cauls. Wrap the bundle in four strips of blue painter's tape, just to keep the pieces from shifting out of position. Slide the bundle into the vacuum bag, connect the vacuum hose, and turn on the vacuum press. As air is sucked from the bag, vacuum pressure will squeeze the parts together. Leave the pieces in the vacuum press for three hours. Repeat to adhere the veneer to the second maple substrate **(PHOTO B)**.



THE BEST WAY TO BOND veneer to substrate is to use a vacuum press, with the veneer substrate sandwiched between two MDF clamping cauls.

WORK

A self-healing mat is indispensable when cutting veneers. It'll help you make clean straight cuts, and its surface "heals" itself to like-new condition, even after repetitive cuts. In addition, the knife will stay sharper longer, and the mat's 1-in. grid pattern helps in sizing your cuts.

Lay out and cut the box parts

TAKE BOTH VENEERED SUBSTRATES AND lay them edge to edge. Be sure the grain on the veneers matches. One panel is long enough to cut out the front, two chamfered corners, and both ends with a little extra material left over. The second panel will produce the back of the box; the remainder will be used later for cutting the interior box parts.

1. When matching up the veneer grain, start in the middle of one panel and draw the 13-in.-long box front. Then draw a line at each end of the box front outline to represent the sawkerf. My miter saw blade is $\frac{1}{8}$ in. thick, so I marked the kerf lines $\frac{1}{8}$ in. away from the ends of the box front (**PHOTO A**). Draw lines for the two chamfered corners and box ends, making sure to mark the sawkerfs. Now mark the back of the box onto the second substrate.



LAY OUT THE BOX PARTS on the two veneered substrates, making sure to draw in the lines that represent the sawkerf lines.

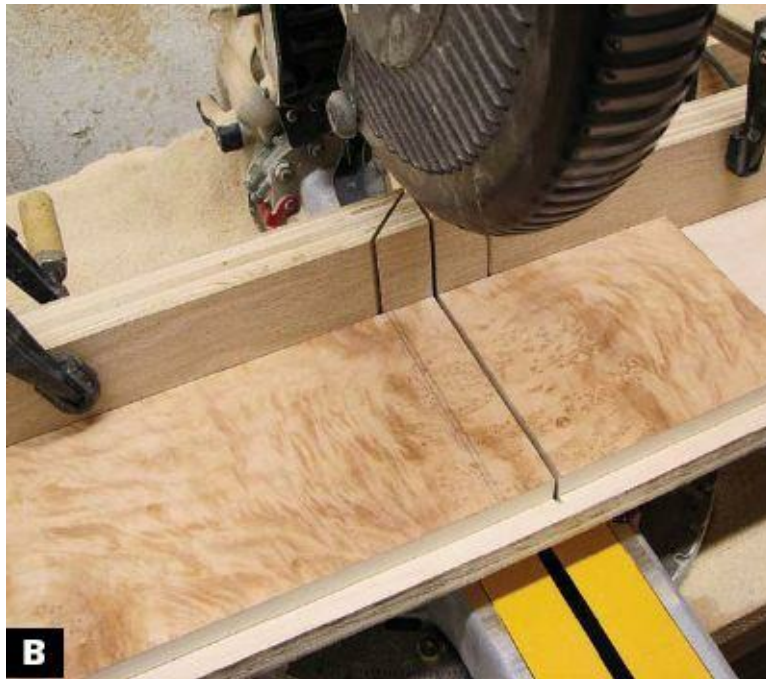
WORK

Make an auxiliary plywood fence and table for your miter saw and clamp it to the saw's fence. Then when you cut through the box parts, the sawblade won't blow out the veneer on the underside.

2. Cut a groove into the inside face of both veneered substrates. The grooves accept the movement platform that supports the musical movement mechanism. The maple platform is $\frac{1}{4}$ in. thick, plus the thickness of the veneer on each side. Adjust the tablesaw blade to cut $\frac{1}{4}$ in. deep and set the rip fence to position the groove 2 in. down from the top edge of the box parts.

To cut the groove to precisely fit the thickness of the platform, you must make two or three passes over the blade, moving the fence slightly after each cut. The finished groove will be slightly less than $\frac{5}{16}$ in. wide.

3. Cut the parts to size, using the layout lines drawn earlier (**PHOTO B**). After cutting all six box parts—front, back, two ends, and two chamfered corners—dry-assemble the box to ensure that the grooves align and that the veneer grain matches all around the box.



AS YOU SAW THROUGH THE PARTS, cut just barely into the plywood table. That way, you'll be able to reuse the auxiliary fence and table for future projects.

Rout the lock-miter joints

The two front chamfered corners are joined to the box ends and front with a specialty joint called a lock miter. These strong, attractive joints are milled on the router table using a $22\frac{1}{2}^{\circ}$ lock-miter router bit set. The set has two bits, one for cutting mortises and one for cutting tenons.

1. Use the mortise-cutting lock-miter bit to mill the joint into both ends of the box front and into the front of each box end (**PHOTO C**).



ROUT THE LOCK-MITER JOINT into both ends of the box front and into the front of each box end. Be sure to use a push stick for safety and accuracy.

2. Switch to the tenon-cutting lock-miter bit and mill the joints into both ends of each chamfered corner. When routing these parts, be sure to protect your hands by using a featherboard clamped to the fence and a push stick to push the wood past the bit.

A two-piece 22½° lock-miter router bit set is a great investment for serious woodworkers. It can be used for many applications, including cabinet corners, and interlocking edge-to-edge joints on eight-sided projects.

Rout the 45° miter joints

Each rear corner of the box, where the back joins the box ends, is connected with a spline-reinforced 45° miter joint. And 45° miter joints are also used to join the box bottom to the box (these joints are not reinforced with wooden splines). Cut each of these miters using the router table and 45° chamfering bit.

1. Set the router-table fence flush with the ball-bearing guide on the router bit. Adjust the height of the bit to cut a 45° angle across the edge of each box part. Rout the 45° cut into both ends of the box back and into the rear of both box ends. Use the same bit to rout 45° miters into the bottom edge of the box front, back, ends, chamfered corners, and into all six edges of the box bottom (**PHOTO D**). (It is very important to use a push block with a 45° angle for routing the small chamfered corners of the bottom. The angled push block will prevent the chamfered corners from sliding into the router bit and ruining the bottom.)



ROUT 45° MITERS into the bottom edges of the box parts and also into both ends of the box back and the rear of both box ends.

2. Move to the tablesaw and bevel-tilt the blade to 45°. Adjust the rip fence to cut into the center of the mitered edge and raise the blade to cut ¼ in. deep. Use the miter gauge to pass each mitered edge past the blade, cutting a shallow spline groove (**PHOTO E**).



SWITCH TO THE TABLESAW and cut a $\frac{1}{4}$ -in. spline groove into the center of each mitered edge.

3. Cut two maple hardwood splines on the tablesaw, each measuring $\frac{1}{8}$ in. thick by $\frac{1}{2}$ in. wide by $6\frac{1}{4}$ in. long. Check to be sure the splines fit snugly into the grooves cut in the miter joints; they should slide in with some resistance.

WORK

Cutting the miters with a 45° chamfer router bit is faster and cleaner than using a tablesaw. With the tablesaw, you'd have to readjust the fence many times and the blade would chip the veneer on the underside.

Cut the sound holes

The box back and the bottom have elongated holes cut in them, which serve as sound holes that let the music out and also provide access to the musical movement's winding mechanism. Cut out both holes with a scrollsaw and #3 reverse skip-tooth sawblade. This style blade produces a smooth, splinter-free cut on both the top and bottom surfaces of the box parts.

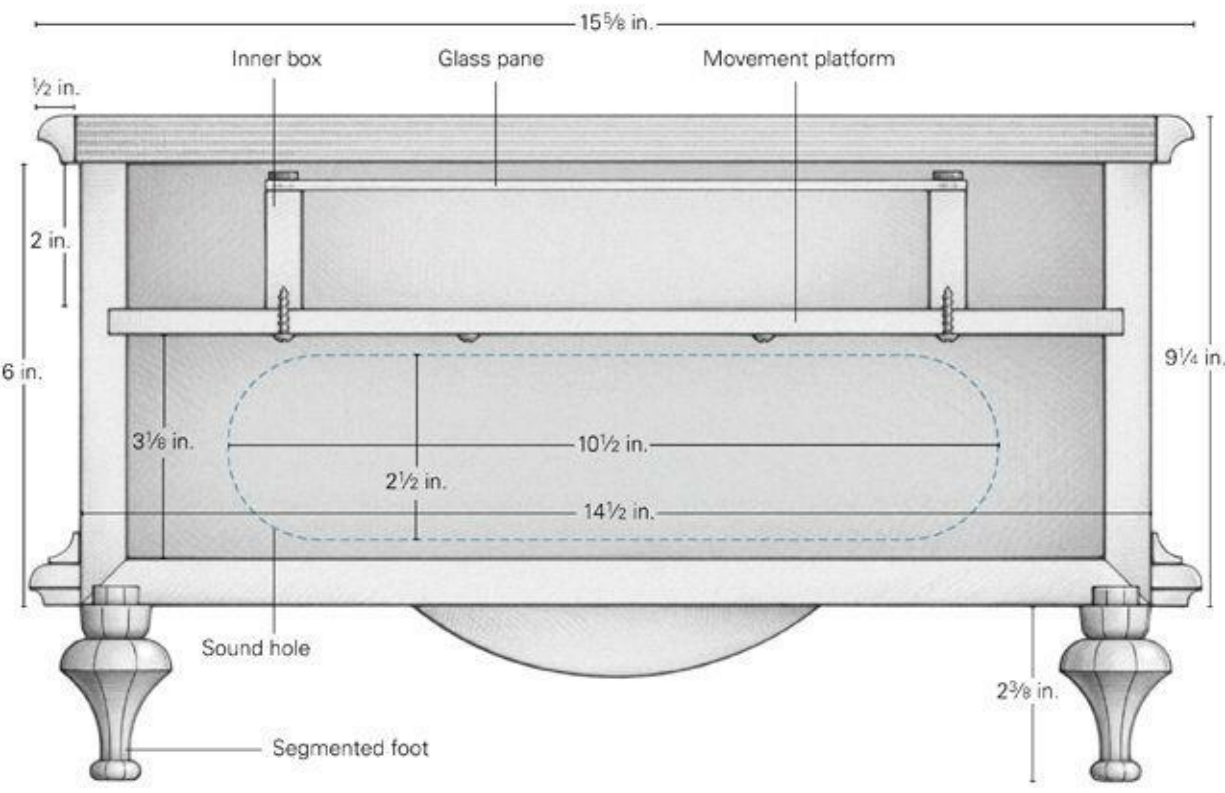
On the box back, draw a 2½-in.-wide by 10½-in.-long cutout with a 1¼ in. radius on each end; refer to “Vertical Section of Back” on [p. 104](#) for the location of the back sound hole. Centering it on the box bottom, draw a 4-in.-wide by 10½-in.-long cutout with a 4-in. radius on each end.

Drill a ½-in.-dia. access hole in the waste area of each part. Feed the scrollsaw blade through the access hole and cut out the sound holes (**PHOTO F**). Use 150-grit sandpaper to smooth the cuts and to ease over the edges on both sides of the holes.



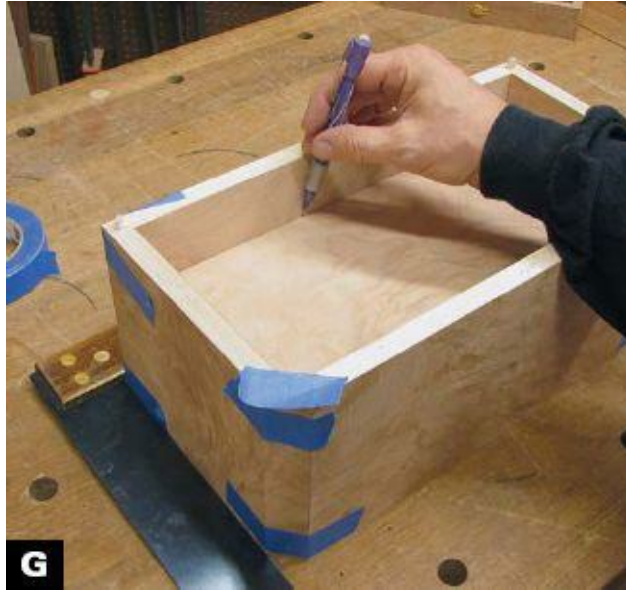
USE A SCROLLSAW to cut out the sound holes on the back and bottom of the box. The sound holes make the 72-note movement sound much better and help bring out the bass and treble.

Vertical Section of Back



Lay out for the musical movement

1. After all the parts are milled, lay them out on a flat surface and lightly sand both sides of each part with a random-orbit sander fitted with 150-grit sandpaper.
2. Dry-assemble the box, using blue painter's tape on the corners. Draw a pencil line around the inside of the box and onto the movement platform. These lines will allow you to accurately mark the positions of the mounting holes for the musical movement (**PHOTO G**). Disassemble the box.



DRY-ASSEMBLE THE BOX and draw a pencil line around the inside of the box and onto the movement platform.

3. For the movement shown here, first draw a 5-in.-wide by 9½-in.-long rectangle, centered on the back edge and then draw a 3-in.-wide by 7½-in.-long rectangle centered inside the first rectangle. Mark mounting-hole locations onto the movement platform. (Each musical movement comes with its own marking template.) Put a piece of scrap plywood under the platform, and drill out the holes.

M

M

There are many different brands and sizes of musical movements, ranging from 18 to 144 notes. The more notes available, the fuller range of sound and harmony. The important thing to understand is that as the note and cylinder size increase, so does the musical performance. So the larger the movement, the more elaborate the musical display and sound it will produce.



Each movement has a different drilling template, and it's imperative to have the movement on

hand before drilling the mounting and winding holes. For this project, I installed a Sankyo 72-note Orpheus musical movement (code No. J02; available at www.bettermusicboxes.com), which plays three melodies: “March of the Toy Soldiers,” “Waltz of the Flowers,” and “Dance of the Sugar Plum Fairy.” This particular movement has an on and off switch that lets you decide whether to play music continuously or to stop after each melody. And it’ll play music with the lid open or closed. When you wind up the music box, be very careful not to overwind the mechanism or it might break.

Glue the box together

1. Before applying any glue, put strips of blue painter's tape along all inside corners where glue will squeeze out. Then use a small brush to spread an even coating of glue onto the mitered corner joints. However, don't put glue in the grooves; the movement platform must be free to expand and contract. Assemble the box, except for the bottom, and hold the parts together with strips of painter's tape. Check the box for square and clamp it with five short bar clamps. Let the glue dry overnight, then remove the clamps (**PHOTO A**, facing page).



GLUE AND CLAMP the box together. Once the glue is dry, remove the clamps and trim the splines flush to the box edges using a small handsaw.

WORK

After the glue dries for about 30 minutes, use a putty knife to scrape off any excess glue from the tape on the inside corners. It's much easier to remove the glue before it has completely hardened.

2. Brush glue onto the mitered edges of the box bottom (**PHOTO B**). Then use three spring clamps and six short bar clamps to hold the bottom to the box (**PHOTO C**).



ASSEMBLE THE BOX SIDES, top, and mounting platform first; allow to dry and then glue on the mitered-edge bottom.



CLAMP THE BOX BOTTOM to the box, using three spring clamps around the sound hole to ensure a tight glue bond.

Veneer the top edges

THE FIRST STEP TO CUTTING VENEER FOR the top edges of the box is to make a cutting/clamping caul from a scrap piece of hardwood. Cut the caul to the same length as the box front and $\frac{1}{8}$ in. wider than the box front's thickness. Be sure to cut each end of the caul to $22\frac{1}{2}^\circ$ to match the angle between the box front and the chamfered corners.

1. Place the cutting caul on top of the veneer and press down tightly. Use a scalpel or artist's mat knife to cut around the edges of the caul, making two or three passes until you've cut through the veneer.



VENEER THE TOP EDGES of the box front, set the caul on top, and clamp. Wait at least an hour before removing the clamps.

2. Use a brush to spread yellow glue onto the back of the veneer and onto the edge of the box front. Press the veneer into place, making sure its ends align with the $22\frac{1}{2}^\circ$ joints at the chamfered corners. Set the caul on top of the veneer and squeeze it down with five short bar clamps (**PHOTO A**).

Repeat this process to cut and adhere veneer to the top edges of the box back and ends. Make new cutting/clamping cauls, as needed.

WORK

Use a putty knife or wood chisel to lightly scrape away any glue that squeezes out from under the ends of the veneer. If this excess glue isn't removed, it'll prevent the next piece of veneer from butting tightly against the first one.

3. Trim the top-edge veneer flush using a very sharp wood chisel. Hold the chisel with its bevel facing up to prevent the chisel from gouging the work (**PHOTO B**, [p. 108](#)).



TRIM THE TOP-EDGE VENEER flush to the sides with a sharp chisel.

4. To veneer the top edges of the two chamfered corners, first make a cutting/clamping caul that's $\frac{1}{16}$ in. longer than the surface to be veneered. That extra length allows the caul to bridge the joint at each end of the small piece of veneer, effectively clamping it down. Set the caul on top of the veneer and cut out two pieces for the chamfered corners. Test-fit the veneer pieces to the chamfered corners. If necessary, use a sanding block with 150-grit sandpaper to lightly sand the veneer until each piece fits perfectly. Brush glue onto the veneer pieces and onto the top edges of the chamfered corners. Press each veneer piece into place and clamp (**PHOTO C**).



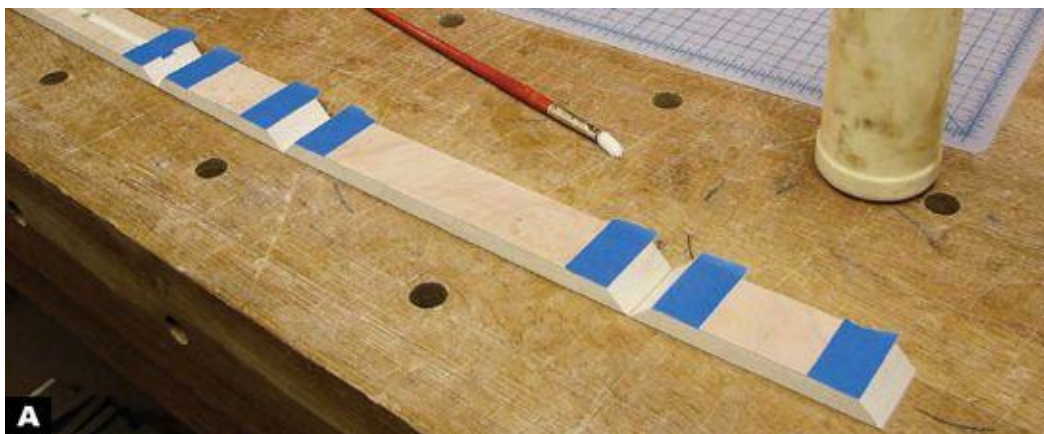
CUT THE VENEER for the top edges of the two chamfered corners; also make a matching clamping caul.

Construct the inner box

THERE ARE MANY REASONS WHY I designed an inner box for this music box, but the most important is improved sound quality. The 72-note musical movement fits snugly inside the inner box, which allows the music to shoot straight up and out. If there were no inner box, the sound would bounce around inside the much larger main box, diminishing the sound quality. I also installed a glass pane over the inner box, which protects the musical movement from fingerprints and dust.

I decided to place the musical movement's on/off switch inside the box, rather than on the outside where it's often located. Putting the switch inside keeps the outside of the box free of any hardware and protects the switch from damaging bumps and knocks.

1. Take the remainder of the veneered-maple substrate, which is approximately 6 in. wide by 15¼ in. long, and cut two 1⁹/₁₆-in.-wide strips on the tablesaw. Those strips will produce the four sides of the inner box. However, before cutting the strips to length, you must glue veneer to one long edge on each piece.
2. Cut two pieces of maple burl veneer about 1¹/₁₆ in. wider and longer than the veneered-maple strips. Brush glue onto the back of the veneer and to one long edge of each strip. Clamp the veneer in place. Once the glue dries, use a chisel to trim the veneer flush, then lightly sand with 150-grit sandpaper.
3. Use the miter saw, with the blade rotated to 45°, to cut the strips into the parts for the inner box. Cut both the front and back to 9½ in. long and cut each of the two ends to 5 in. long.
4. Drill a 5¹/₁₆-in.-dia. center hole through the inner-box front; the hole will accommodate the on/off switch. Then use the tablesaw to cut a 3³/₃₂-in.-deep by 3¹/₈-in.-wide center groove into the inside surface of the inner-box front. The L-lever protruding from the rear of the musical movement will slide into this groove.
5. Place the inner-box parts face down and end to end in the following order: end, back, end, front. Hold the parts together with blue painter's tape.
6. Flip over the taped-together parts and place strips of tape beside the inside joints where glue will squeeze out (**PHOTO A**). Spread glue onto the corner joints and assemble the inner box. Apply tape across the four outside corners to hold the box together. Check to be sure the box is square, then allow the glue to dry overnight.



PREPARE TO GLUE THE PARTS for the inner box (from left to right: front, end, back, end). Note the groove in the front, which accommodates the L-lever that protrudes from the musical movement.

- 7.** Make a full-size template out of $\frac{1}{4}$ -in. plywood for the glass top that covers the inner box. Drill two $\frac{1}{4}$ -in.-dia. holes into the template for the thumbscrews. Bring the template to a glass shop and have them cut and drill a piece of $\frac{1}{8}$ -in.-thick glass to match.
- 8.** Place the inner box inside the music box, centered left to right on the movement platform and tight against the box back. Trace around the inside and outside of the inner box. Remove the inner box and drill four $\frac{1}{8}$ -in.-dia. screw-shank clearance holes through the movement platform, centered on the outlines. Drill one hole centered at each end, and two equally spaced along the front panel (**PHOTO B**).



PLACE THE INNER BOX inside the music box, centered left to right on the movement platform and tight against the box back.

- 9.** Set the inner box back into place and tip the main music box onto its back. Now drill $\frac{1}{8}$ -in.-dia. pilot holes through the holes drilled earlier and into the bottom edge of the inner box. Use a manual screwdriver to fasten the inner box with four $\frac{3}{4}$ -in.-long, #8 pan-head wood screws.

Install the radius trim block

THE BOTTOM EDGE OF THE COMPLETED music box is embellished with decorative trim that runs around the ends, chamfered corners, and front of the box. Along the front, the trim curves downward, forming a gentle radius. Before proceeding, you must install a rounded wooden block to the underside of the box to support that curved section of trim.

1. Cut the $\frac{5}{8}$ -in.-thick by 1-in.-wide by $5\frac{11}{16}$ -in.-long radius trim block from a piece of solid flamed birch. Draw a $4\frac{7}{16}$ -in. radius onto the block, then cut the curve with a bandsaw. Smooth the cut edge with 150-grit sandpaper. The radius trim block attaches to the box bottom with a wooden spline that fits into matching slots. Start by setting up the router table with a rabbet bit that cuts $\frac{1}{8}$ in. wide and $\frac{3}{8}$ in. deep. Cut a $4\frac{3}{16}$ -in.-long slot into the straight edge of the radius trim block. Center the slot so that it starts and stops $\frac{3}{4}$ in. from each end of the block. Use the same setup to cut an identical slot into the box bottom (**PHOTO A**).



ROUT A SLOT FOR THE SPLINE in the straight edge of the radius trim block and a matching slot in the box bottom. Draw vertical lines on the router table fence to indicate where to start and stop routing the spline slots.

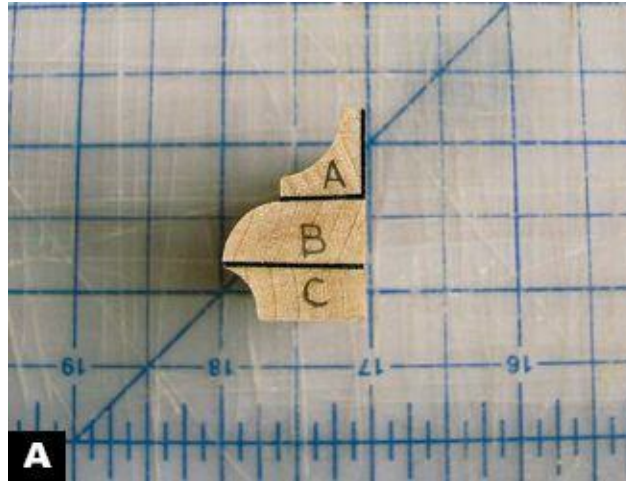
2. Use the tablesaw to cut a $\frac{1}{8}$ -in.-thick by $\frac{3}{4}$ -in.-wide by $4\frac{1}{4}$ -in.-long maple hardwood spline. Round over the four corners of the spline, then dry-fit it into the slots. Trim, as necessary, to achieve a snug, but not too tight, fit. Spread glue onto the spline and into the grooves, then clamp the radius trim block to the box (**PHOTO B**).



CLAMP THE SPLINED RADIUS trim block to the bottom of the box.

Fabricate the decorative trim with inlay

THE DECORATIVE TRIM THAT RUNS AROUND the bottom of the music box is laminated from six pieces. The body of the trim is composed of three pieces of flamed birch, which are separated by two strips of ebony veneer. A third strip of ebony veneer is adhered to the rear of the upper birch piece. The result of this assemblage is a delicately shaped profile that's accented with black pinstripes (**PHOTO A**, below). This trim is similar in design and construction to the segmented-turned feet, which effectively ties together these two design elements.



A THROUGH-SECTION of the completed trim that runs around the bottom of the box. It's composed of three pieces of solid birch and three strips of ebony veneer. The key letters assigned to each birch piece help keep track of how they're glued together.

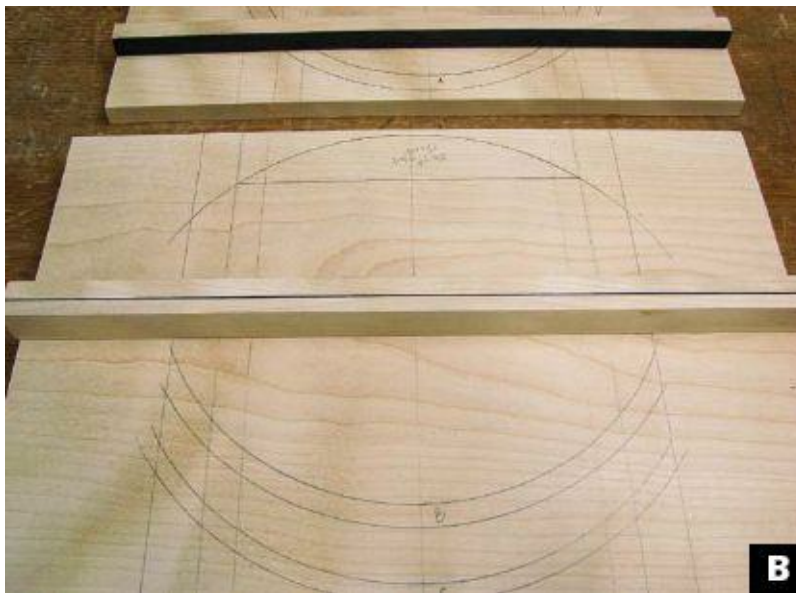
Cut and glue the hardwood and veneer

- 1.** Cut to size the flamed birch and ebony veneer pieces listed in “Materials” on [p. 97](#). (The list includes a little extra, which you can use to make test cuts when setting up the miter saw.) Mill the birch pieces on a tablesaw and cut the veneer using a mat knife and straightedge.
- 2.** Brush glue onto the middle and bottom birch trim pieces (parts B and C in the photo at left). Apply glue to both sides of a strip of ebony veneer too. Lay the veneer between the birch pieces, and squeeze them together. Repeat for the next two trim pieces, then clamp all three together at the same time. Assemble the final two pieces of trim in a similar manner.
- 3.** After the glue has dried, sand the veneer flush to the hardwood with a sanding block and 80-grit sandpaper.
- 4.** Prepare to glue two strips of ebony veneer to each top birch trim piece (part A). Brush glue onto one side of the birch piece and onto one ebony veneer strip; clamp the parts together until the glue dries. Sand the veneer flush, then repeat to adhere the final ebony veneer strips to the adjacent sides of each birch piece. (Note that, at this point, the trim pieces are all straight-sided; we will profile them later, as explained on [p. 115](#).)

Lay out the front radius trim

To form the curved section of trim, you'll need to cut three curved pieces of birch. Start by drawing the three radii onto two pieces of birch hardwood. Cut each birch board approximately 4 in. wide by 12 in., then run them through a thickness planer. Mill the first board to $\frac{11}{16}$ in. thick, which is the same thickness as trim pieces B and C. Plane the second board to $\frac{13}{32}$ in., or as thick as trim piece A.

1. On the first board, which is $\frac{11}{16}$ in. thick, use a compass and draw the largest radius of $4\frac{7}{16}$ in. That represents the outside radius of part C. Then, without moving the compass's pivot point, draw a $4\frac{3}{16}$ -in. radius, which is the inside radius of part C.
2. Move the compass back about 1 in. or so and draw another $4\frac{3}{16}$ -in. radius to represent the outside radius of part B. From the same pivot point, readjust the compass and draw a $3\frac{7}{8}$ -in. radius for the inside curve of part B (**PHOTO B**).



USE A COMPASS to draw parts A, B, and C for the front radius trim.

WORK

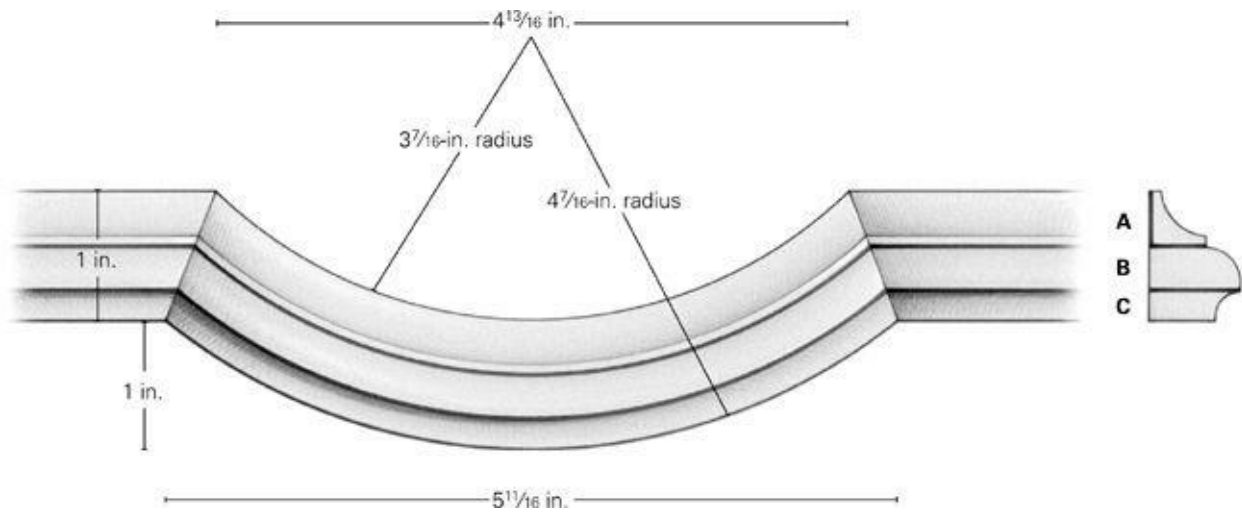
When drawing the radii for the front radius trim note that you must mark them approximately 1 in. longer than the actual pieces of trim, which are about $5\frac{3}{4}$ in. long. Cutting them about $6\frac{3}{4}$ in. long is necessary in order to cut the angled miters onto the ends.

3. On the second board, which is $\frac{3}{8}$ in. thick, draw in the outside radius of part A to $3\frac{7}{8}$ in. and then mark the inside radius to $3\frac{7}{16}$ in. See “Front Radius Trim” below for more details.
4. Use a $\frac{1}{4}$ -in.-wide 6 tpi (tooth per inch) skip-tooth bandsaw blade to cut out the curved pieces of birch trim (**PHOTO C**).



CUT OUT THE CURVED PIECES of birch trim on the bandsaw. Guide the blade as close to the outside edge of the pencil line as possible but be careful not to cut into or past the line.

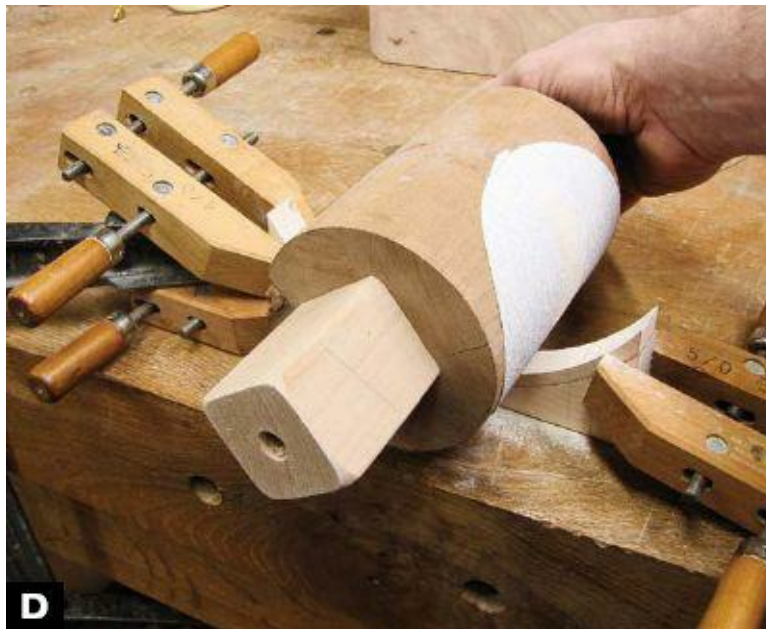
Front Radius Trim



Sand the front radius trim

After cutting the radius trim, you'll need to sand the surfaces smooth and remove all the bandsaw-blade marks. While sanding, support the trim pieces with rounded waste blocks cut from the two birch boards. Clamp the blocks to the workbench, then clamp the radius trim to the blocks.

1. Sand one half of the outside radius using a small block of wood wrapped with 80-grit sandpaper. Use long sanding strokes until the surface is smooth. Then flip around the trim piece and sand the other half. Repeat for the remaining radius trim pieces.
2. Smooth the inside radii with a homemade sanding cylinder. On a lathe, turn a 5-in.-dia. by 6-in.-long wood cylinder. Screw a simple wooden handle to each end of the cylinder. Then stick an 80-grit pressure-sensitive adhesive (PSA) abrasive disk to the cylinder and use it to smooth the inside curves (PHOTO **D**).



USE A SHOPMADE sanding cylinder to smooth the inside curves of the front radius trim.

Cut and clamp the front radius veneer

Prepare to cut three pieces of ebony veneer for the front radius trim. These veneer pieces will be laminated between the radius birch pieces milled and sanded in the previous steps.

1. Set the curved birch top trim (part A) on top of a large piece of ebony veneer. Trace around the part, drawing approximately $\frac{1}{8}$ in. wider on both sides and end. Cut the veneer along the line using a scalpel or artist mat knife. For the veneer strip that goes between the top and middle trim pieces (parts A and B), cut a straight piece of veneer $\frac{5}{8}$ in. wide by $5\frac{3}{4}$ in. long. Then cut another straight strip of veneer to $\frac{7}{8}$ in. wide by $6\frac{1}{4}$ in. long to fit between the middle and bottom trim pieces (parts B and C).

To install the straight veneer strip between parts B and C, brush glue onto both surfaces of the veneer and onto the underside of part B and top edge of part C. Clamp the three pieces together using small spring clamps.

2. Make a rounded clamping form from the boards from which you cut out the curved birch trim. Glue the curved veneer strip to the backside of the curved birch trim part A. Set the veneered surface down against the form and secure with several spring clamps.

3. After the glue dries, trim away the excess veneer. Then sand the veneer flush with the birch using the sanding cylinder.

4. Now prepare to glue a veneer strip to the outside curved surface of top trim part A. Only this time, brush glue onto just one side of the veneer and onto the outside curved surface of part A. Press the veneer into place, then set part A on top of parts B and C, which together create the perfect-size clamping form. Hold the parts together with spring clamps until the glue hardens. Then trim and sand the veneer flush (**PHOTO E**).

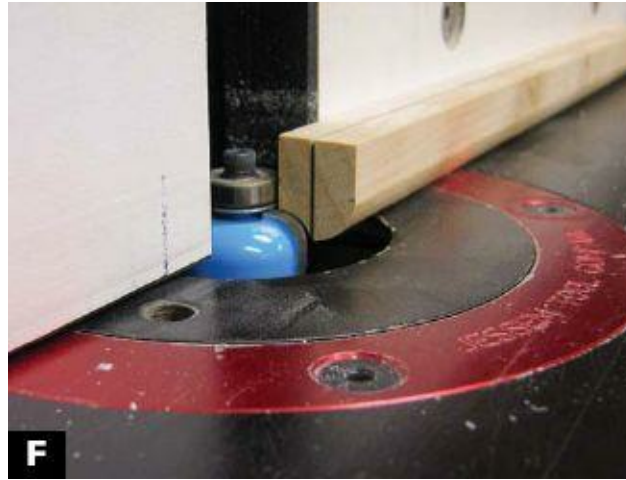


GLUE A VENEER STRIP to the outside curved surface of top trim part A, using parts B and C as a clamping form.

Rout the straight trim pieces

Set up the router table and fence for routing profiles into the straight pieces of trim. Shape each profile in two or three progressively deeper cuts to prevent kickbacks or blowing out an edge. And be sure to use a push stick to protect your fingers.

1. Start by using a $\frac{5}{16}$ -in.-radius roundover bit to round the edge of the middle trim pieces, part B.
2. Switch to a $\frac{3}{16}$ -in.-radius cove bit and rout the bottom trim, part C (**PHOTO F**).



ROUT THE PROFILES into each of the straight trim pieces (shown here is routing the cove in the bottom trim, part C).

3. Install a $\frac{3}{8}$ -in.-radius cove bit and rout a cove profile into the hardwood surface of the top trim, part A.

Rout and cut the radius trim pieces

Next, rout the same profiles into the radius trim pieces. You won't be able to use a push stick for this operation, so install a starter pin in the router table. The round pin has a hard plastic sleeve that spins when the workpiece is pressed against it, helping you control and guide the work into the bit.

1. Begin by using a $\frac{3}{16}$ -in.-radius cove bit to rout the bottom trim, part C.
2. Install a $\frac{5}{16}$ -in.-radius roundover bit and shape the middle trim pieces, part B (**PHOTO G**).



SHAPE THE MIDDLE RADIUS trim pieces, part B, using a starter pin in the router table to help you control and guide the work into the bit.

3. Finally use a $\frac{3}{8}$ -in.-radius cove bit to cut a cove profile into the top trim, part A.
4. With all the individual trim pieces routed, it's time to glue them together. Brush glue onto the underside of the top trim (part A) and onto the upper edge of the middle trim (part B). Squeeze the parts together and secure with several spring clamps. Wipe off any excess glue and allow the glue to cure overnight. The next day, sand the parts lightly with 150-grit sandpaper.
5. Make a radius cutting block to cut the miters on the ends of the front radius trim (see the sidebar below). Set the cutting block onto the miter-saw table, then hold the radius top trim part A against the curved surface of the cutting block. Miter-cut each end of the radius trim to $22\frac{1}{2}^\circ$, making sure the overall length of the curved trim piece is $5\frac{11}{16}$ in.

WORK

Shaping the radius trim requires time and patience. Make several progressively deeper cuts, removing only about $\frac{1}{32}$ in. of wood on each pass. This may seem overly cautious, but it's the surest way to reduce dangerous kickbacks and damaging blowouts that would result in having to fabricate a new laminated part. After executing the final cut on each profile, check it against the straight trim pieces to ensure the two profiles align.

M

R

C

B

To cut the mitered ends onto the front radius trim safely and accurately, you must first make a radius cutting block for the miter saw. Start by cutting a $\frac{3}{4}$ -in.-thick by 3-in.-wide by $4\frac{3}{4}$ -in.-long block of hardwood. Trim each end of the block to $22\frac{1}{2}^\circ$ on the miter saw.

Next, draw a $3\frac{7}{16}$ -in. radius onto the block to match the inside radius of top trim part A. Cut the radius from the block using a bandsaw. Sand the cut edge smooth with 150-grit sandpaper.



Install the trim

1. Lay the music box on its back and set the radius trim piece on top of the radius trim block attached to the box front, but don't glue the trim just yet (**PHOTO A**).



WITH THE MUSIC BOX on its back, test-fit the radius trim piece on top of the radius trim block attached to the box front.

2. Cut the straight pieces of trim that run along the ends, chamfered corners, and front of the box. Note that you must bevel-cut the trim ends to $22\frac{1}{2}^{\circ}$ where the pieces meet at the chamfered corners. But miter-cut the trim to $22\frac{1}{2}^{\circ}$ where it butts against the ends of the radius trim. Dry-fit the trim pieces to the box to ensure all the joints fit tightly together.

3. Heat hot animal hide glue to 140°F in an electric hot pot. Then use the glue to fasten the radius trim piece to the front of the music box. Hold the piece in place by hand for two minutes; there's no need to use clamps. Next, use hide glue to adhere the straight trim pieces to the box. Again, hold each piece in place by hand for approximately two minutes.

4. Put masking tape onto the box, directly above where the trim will be attached (it will make glue cleanup easier). Then use an electric heat gun to warm the back of the trim piece and the surface of the box (this gives you more time to fit the pieces before the glue grabs and provides a stronger bond) (**PHOTO B**).



WARMING THE BACK of the trim piece and the surface of the box gives you more time to fit the pieces before the glue grabs, and it provides a stronger bond.

5. Brush warm hide glue onto both heated surfaces and rub the pieces together to squeeze out excess glue. Press the trim into place and hold it by hand for one minute or two minutes. Let the glue dry for two hours or three hours. Repeat to install the remaining pieces of trim.

Make the segmented feet blank

THE BOX SITS ON FOUR TURNED WOODEN feet, which are designed to match the decorative trim we installed in the previous step. Each foot is made from eight triangular pieces of birch and eight strips of ebony veneer. The birch pieces are separated by veneer strips, and all 16 segments are glued together. The glued-up blank is then turned on a lathe, a technique known as *segmented turning*, to produce birch feet highlighted with vertical black pinstripes (**PHOTO A**).



EACH DELICATE FOOT is composed of eight pieces of solid flamed birch and eight pieces of Macassar ebony veneer, which mirrors the ebony inlays throughout the box.

M

J

C

S

P

To ensure safe, accurate cuts, make a tablesaw jig for milling the segmented pieces. Start by cutting a $\frac{3}{4}$ -in.-thick plywood panel, making it at least 16 in. wide and as long as the saw's table. Rip a $\frac{3}{4}$ -in.-thick by 3-in.-wide plywood fence as long as the plywood panel. Screw the fence to the edge of the plywood panel.

Tilt the bevel angle of the sawblade to $22\frac{1}{2}^{\circ}$ and raise the blade 2 in. above the saw table. Position the saw's rip fence $1\frac{13}{16}$ in. from the top of the blade (the blade tooth closest to the fence), then lower the blade below the table. Clamp the jig to the saw table with its plywood fence against the saw's rip fence.

Turn on the saw and slowly raise the blade until it cuts through and protrudes about $1\frac{1}{4}$ in. above the clamped-down plywood panel. Next, clamp a featherboard to the fence as close as possible to the sawblade. Make a flat push stick about $1\frac{3}{16}$ in. thick by 6 in. wide by 12 in. long with a handle screwed to one end.



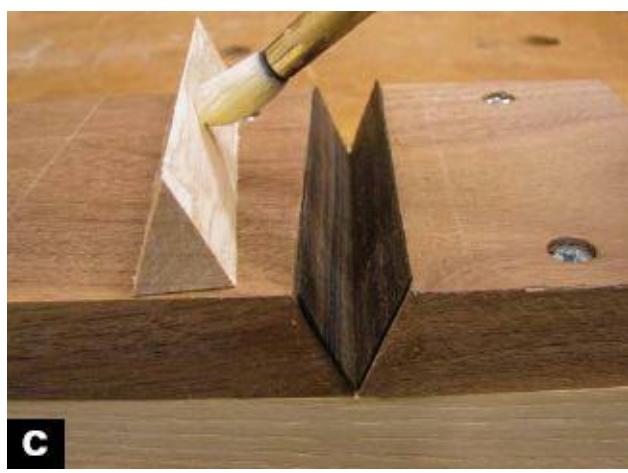
MAKE A TABLESAW JIG to mill the triangular pieces for the segmented feet. When cutting the pieces, cut only halfway into the push stick to create a stop, which helps prevent kickbacks.

1. Take a $\frac{13}{16}$ -in.-thick by 4-in.-wide by 32-in.- long piece of flamed birch and bevel rip a $22\frac{1}{2}^\circ$ angle along one edge. Flip the board end for end and make another pass over the blade to create a triangular shaped segment. Check to be sure the triangular piece measures $\frac{5}{8}$ in. wide at its base and $\frac{7}{8}$ in. along each angled side. Once satisfied, rip a total of four triangular segments. Then crosscut the segments into $3\frac{1}{2}$ -in.-long pieces. You should end up with 32 birch pieces (**PHOTO B**).



CUT BOTH SIDES of the birch segments at $22\frac{1}{2}^\circ$.

2. Make a clamping jig to aid in gluing ebony veneer to four of the eight triangular birch pieces. Start by cutting a $\frac{3}{4}$ -in.-thick by $3\frac{1}{2}$ -in.-wide by 22-in.-long hardwood board to serve as the base of the jig. Then cut a second hardwood board to $\frac{13}{16}$ in. thick by $3\frac{1}{2}$ in. wide by 24 in. long to act as the top clamping surface of the jig. Bevel-tilt the miter-saw blade to $22\frac{1}{2}^\circ$ and cut the second board into eight $2\frac{1}{2}$ -in.-long blocks; bevel just one end of each block. Now, screw each block to the base, butting them together bevel to bevel. The result will be a clamping jig with four $3\frac{1}{2}$ -in.-long V-shaped channels.
3. Use a scalpel or artist's mat knife to cut 32 strips of ebony veneer to $\frac{7}{8}$ in. wide by $3\frac{1}{2}$ in. long. Line each V-shaped channel in the clamping jig with two veneer strips. Brush yellow glue onto the veneer strips and onto the two $\frac{7}{8}$ -in.-long sides of each triangular birch piece (**PHOTO C**).



PLACE THE EBONY VENEER strips into the V-shaped channels of the clamping jig. Apply glue to the veneer and to the long sides of the birch triangles.

- 4.** Press the glued-up birch pieces down into the channels, then cover each one with a ½-in.-thick by ¾-in.-wide by 3½-in.-long scrap wood block. Clamp down the blocks to wedge the birch pieces against the veneer strips.
- 5.** Allow the glue to dry for just 30 minutes, then use a plastic mallet to tap out the four veneered birch pieces; that’s enough stock to make one segmented foot. Repeat this process to veneer the triangular birch pieces for the remaining three feet.
- 6.** Take eight triangular-shaped birch pieces—four veneered and four plain—and brush yellow glue onto the ⅞-in.-long sides of each piece. Assemble the pieces into an octagonal blank, making sure you separate each plain piece with a veneered piece. Hold the pieces together with several rubber bands (**PHOTO D**). Repeat for the remaining three segmented feet. Allow the glue to cure overnight, then remove the rubber bands and crosscut each of the four blanks to 3 in. long.

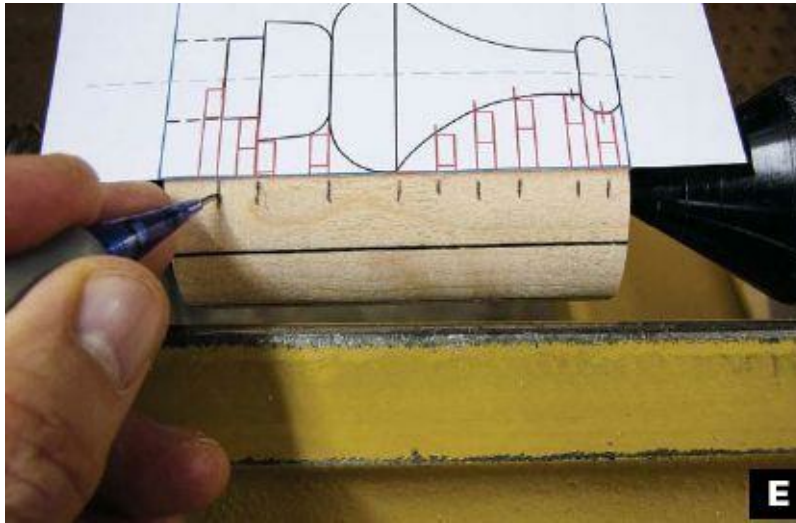


ASSEMBLE AND GLUE eight triangular pieces (four veneered and four plain) into an octagonal blank. Hold the pieces together with rubber bands.

Turn the segmented feet

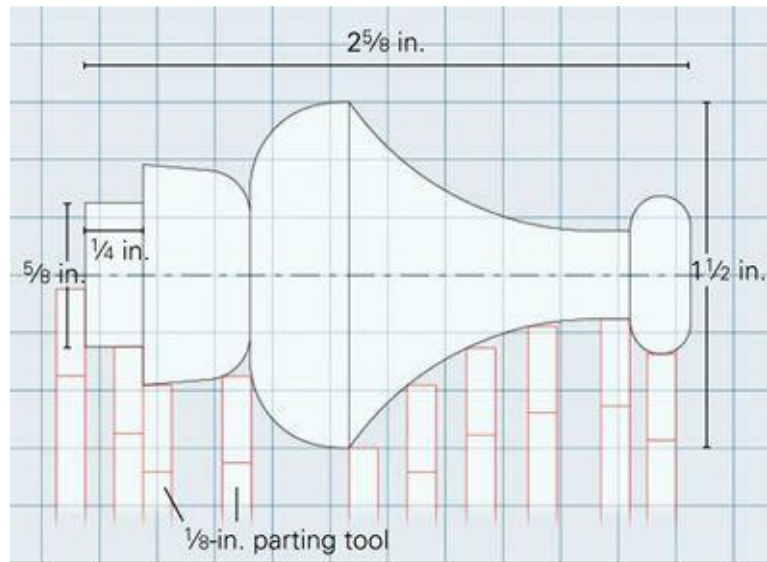
To turn the segmented feet on the lathe you'll need an outside caliper and four turning tools: a roughing gouge, $\frac{1}{8}$ -in. parting tool, skew chisel, and $\frac{3}{8}$ -in. round-edge skew.

1. Mount one of the octagonal blanks in the lathe and set the speed to about 500 rpm. Use a roughing gouge to cut the blank into a perfectly round $1\frac{1}{2}$ -in.-dia. cylinder. Stop occasionally and check the diameter with the calipers.
2. Photocopy the “Segmented Foot Template” below. With the lathe turned off, hold the template against the round blank and mark where to cut with the parting chisel (**PHOTO E**). Then hold the pencil point against each mark and rotate the blank by hand to draw cut lines all the way around the blank.



HOLD THE SEGMENTED-FOOT template against the round blank and mark the key cuts.

Segmented Foot Template

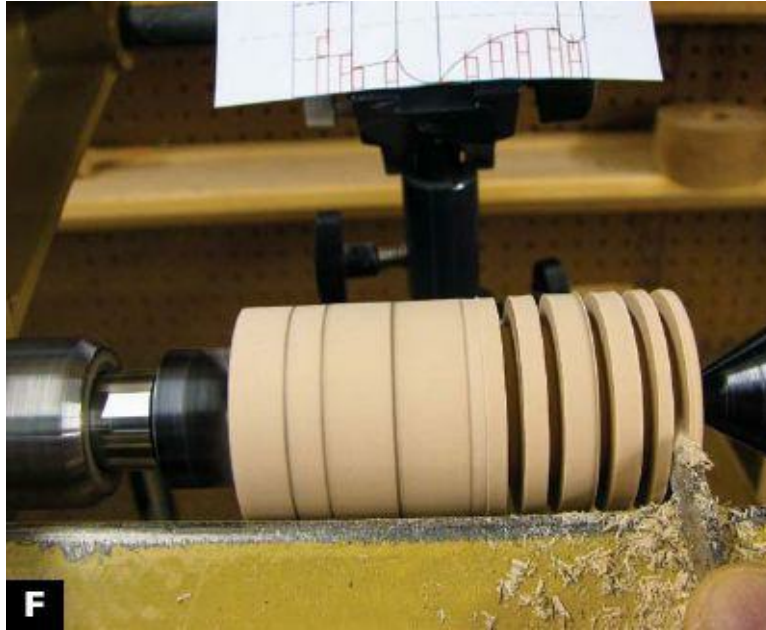


Template is full scale. Grid is ¹/₄ in. × ¹/₄ in.

WORK

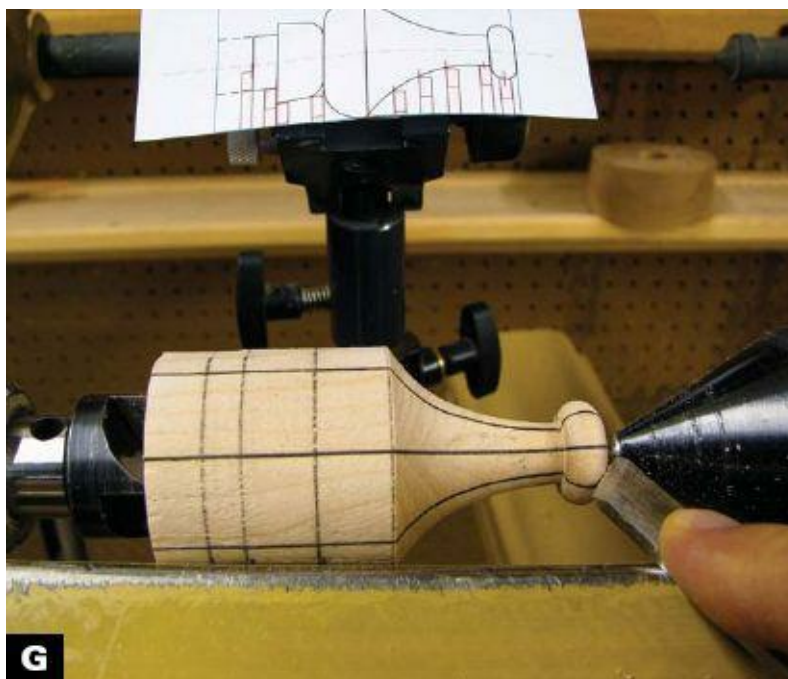
When turning the feet, be sure the gouge is always in contact with the tool rest. Position the tool rest no more than $\frac{1}{4}$ in. away from the spinning blank.

3. Starting at the bottom end of the foot, use the $\frac{1}{8}$ -in. parting tool to cut a depth kerf into the blank on each of the six lines (**PHOTO F**).



USE THE PARTING TOOL to make the initial cuts in the foot. Refer to the marking template to determine how deep to cut each kerf and then use calipers to maintain the proper diameter.

4. Crank up the lathe to about 800 rpm and use the round-edge skew to remove the waste wood and turn the bottom end of the foot. Be careful not to cut deeper than the depth kerfs.
5. Shape the rounded bun on the very end of the foot with a skew chisel (**PHOTO G**).



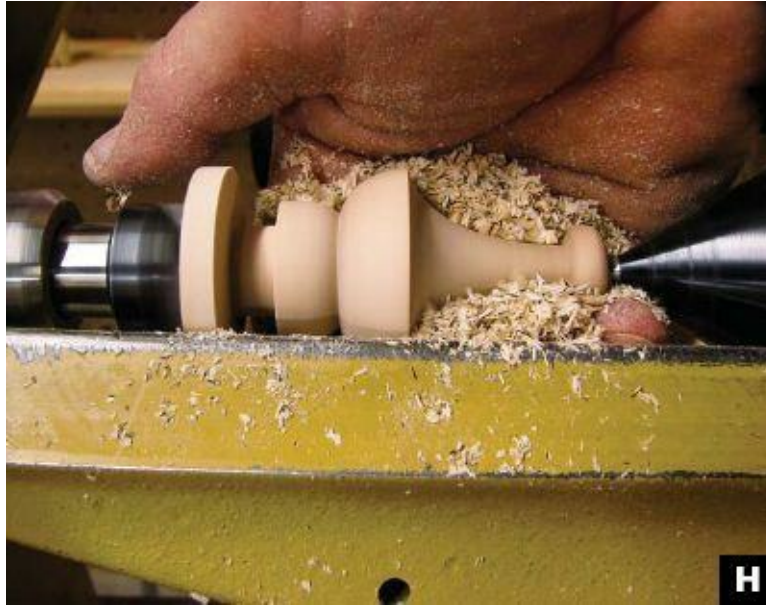
SHAPE THE ROUNDED BUN on the end of the foot with a skew chisel; be careful the skew tip doesn't cut into the foot and sever the bun.

- 6.** Turn the $\frac{1}{4}$ -in.-long tenon at the upper end of the foot with a parting chisel. Check with the calipers to ensure the tenon is exactly $\frac{5}{8}$ in. dia.
- 7.** Use the skew chisel to shape the large and small rounded sections of the foot. Work slowly, shaving off very small amounts of wood until you reach the final shape.

WORK

I like to keep my lathe at a slow setting from the beginning to the end. I keep my digital rotations per minute reading anywhere from 500 rpm to 900 rpm. When cutting with the roughing gouge, keep it lower (around 500 rpm) and then speed up when detailing with the other turning tools. The type of wood also determines my speed setting.

8. Reverse the direction of the lathe and set the speed to 900 rpm. Grab a handful of wood shavings and hold it against the spinning foot. The shavings act as ultrafine sandpaper to smooth the turned surface (**PHOTO H**).



WITH THE LATHE RUNNING in the reverse direction, hold a handful of wood shavings against the spinning foot to smooth the turned surface.

9. Cut the tenon to $\frac{1}{4}$ in. long using the parting tool. Don't cut all the way through the foot; leave approximately $\frac{1}{8}$ in. dia. remaining. Remove the foot from the lathe and use a fine-tooth handsaw to cut the excess wood from the end of the tenon. Repeat the previous steps to form the remaining three segmented feet.

Install the feet

Bore the holes into the box bottom to receive the segmented feet with a $\frac{5}{8}$ -in.-dia. Forstner bit, which will produce perfectly flat-bottomed holes.

1. Position the two front holes $\frac{5}{16}$ in. in from the chamfered corners. Bore the two rear holes $\frac{3}{4}$ in. from the back edge of the box and $\frac{5}{16}$ in. in from each end. To ensure each hole is just slightly deeper than $\frac{1}{4}$ in. deep, stick a small piece of tape onto the drill bit to act as a depth guide (**PHOTO 1**).



THE SEGMENTED FEET fit into $\frac{5}{8}$ -in.-dia. holes drilled in the box bottom.

2. Brush yellow glue onto the tenons and press the feet into the holes.

Veneer the box top

THIS MUSIC BOX FEATURES A TOP THAT has marquetry on both the inside and outside surfaces. Each image shows two violins lying on a scrolled sheet of music. Use the violin marquetry templates on [p. 124](#) to lay out and cut the veneer pieces.

To create both marquetry scenes you'll need eight sheets of veneer, each measuring $\frac{1}{42}$ in. by 8 in. by 15 in., and a photocopy of each marquetry cutting template. For the outside of the top, you'll need one piece each of maple burl, flat-cut walnut, black-dyed maple, Macassar ebony, and holly. And you'll need two pieces of flat-cut African mahogany, which have the wood grain angling at opposing 60° angles. You'll also need one inexpensive piece of veneer of any wood species. (I use the cheapest, thinnest mahogany veneer I can find.) This piece of “scrap” veneer gets glued to the cutting template.

To create the marquetry on the inside of the top, use the same veneers, except that the two pieces of mahogany are replaced with two sheets of bloodwood veneer. See [p. 215](#) for instructions on cutting and assembling the marquetry (**PHOTO A**).



PREPARE THE MARQUETRY for the box top following the directions given starting on [p. 215](#).

1. To make the box top, start with an 8-in.-wide by 15-in.-long substrate cut from $\frac{1}{2}$ -in.-thick birch or maple veneer plywood. It's important to use either birch or maple plywood because each has smooth, flat wood grain that won't telegraph through the veneer. In this case, I used plywood for the substrate, not hardwood, because plywood is lighter in weight and has less wood movement. Glue veneer to both sides of the plywood substrate, employing the same technique you used earlier to veneer the box ends, top, and front (see [p. 98](#)).

2. Once the box top is veneered, trace the box outline onto the outside surface of the box top (**PHOTO B**). Cut along the straight pencil lines on a tablesaw and use a miter saw to trim the two front corners to 45°.

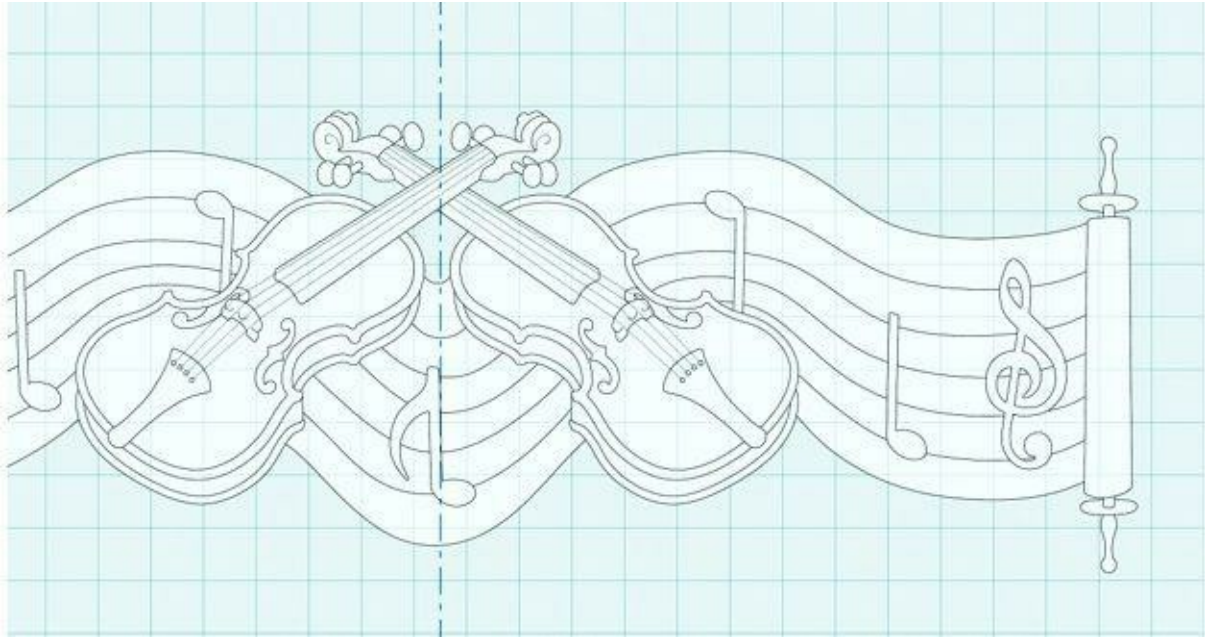


TRACE THE BOX OUTLINE onto the outside surface of the box top.

- 3.** Use a mat knife to cut a $\frac{5}{8}$ -in.-wide by $14\frac{3}{4}$ -in.-long strip of maple burl veneer. Glue and clamp the veneer to the back edge of the box top. After the glue dries, use a sharp flat chisel to trim the veneer flush. Then lightly sand the veneer and its edges with a sanding block and 150-grit sandpaper.

Marquetry Template (Left Side)

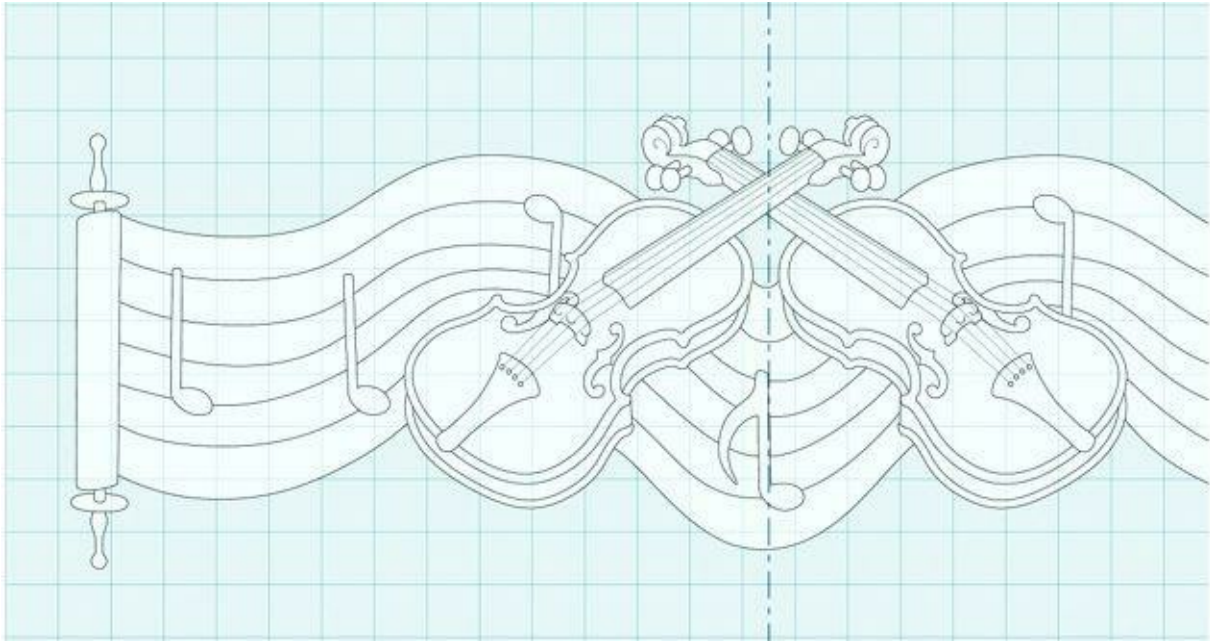
THE CUTTING TEMPLATE is mirrored right; glued to the substrate, it will be mirrored left.



Enlarge by 175% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Marquetry Template (Right Side)

THE CUTTING TEMPLATE is mirrored right; glued to the substrate, it will be mirrored left.

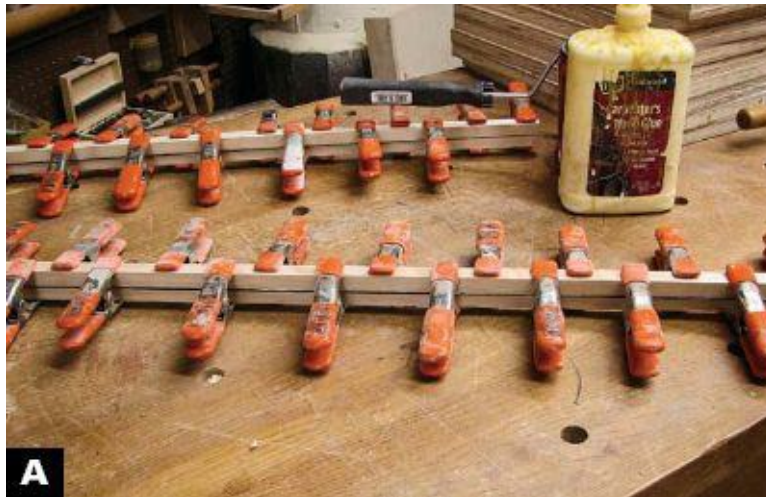


Enlarge by 175% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Attach trim to the box top

THE NEXT STEP IS TO FABRICATE THE veneered hardwood trim pieces that go around the ends, chamfered corners, and front of the box top. Cut two pieces of solid flamed birch, making one $\frac{1}{2}$ in. wide by $\frac{5}{8}$ in. thick by 22 in. long, and the second piece $\frac{1}{2}$ in. wide by $\frac{5}{8}$ in. thick by 14 in. long. Then cut a scrap piece of hardwood for use as a clamping caul (about $\frac{3}{8}$ in. thick by $\frac{3}{4}$ in. wide by 22 in. long).

1. Use a mat knife and straightedge to cut two $\frac{3}{4}$ -in.-wide by $24\frac{1}{4}$ -in.-long strips of black dyed veneer. Brush yellow glue onto one face of the birch hardwood and one face of the veneer. Press the veneer onto the birch trim, set the clamping caul on top, and clamp the pieces together with spring clamps (**PHOTO A**). Once the glue dries, sand the veneer flush to the hardwood with 150-grit sandpaper.



GLUE AND CLAMP the black ebony veneer to the two strips of birch trim.

2. Using a miter saw, cut five pieces of trim to fit around the box top. Note that the pieces that meet at the chamfered corners must be cut to $22\frac{1}{2}^\circ$. When cutting, hold the veneered surfaces against the saw fence to prevent splintering (**PHOTO B**).



CUT THE FIVE top trim pieces and dry-fit them to the top to make sure they're the correct length.

3. Attach the hardwood trim, starting with the front piece. Glue and clamp it to the box top using short bar clamps. Check to make sure its ends align perfectly with the angled corners. Then glue on the chamfered corners, followed by the end pieces. Note that the trim is about $\frac{1}{16}$ in. thicker than the box top. When attaching the trim, be sure it's centered on the edge, overhanging the top and bottom surfaces by $\frac{1}{32}$ in.

Rout the box top

THE HARDWOOD TRIM ON THE BOX TOP features a decorative profile routed into its top and bottom edges. Before you can rout the profiles, first rout the trim flush with the box top using a portable router fitted with a flush-trimming bit. Rout the top surface first, then flip the box top over and rout the bottom surface.

1. Move to the router table and install a $\frac{3}{8}$ -in.-radius cove bit. Set the box top on the router table with its top surface facing up. You need to cut a $\frac{3}{8}$ -in.-radius cove profile into the bottom edge of the hardwood trim, but you must shape the profile in three progressively deeper cuts to avoid splintering.
2. Adjust the bit for a shallow depth of cut and then make one pass by the bit, making sure you keep the box top pressed tightly against the bit's ball-bearing pilot. Raise the bit a little and make another pass. Finally raise the bit to produce a $\frac{3}{8}$ -in.-radius cove (**PHOTO A**).



MAKE THREE PASSES over a $\frac{3}{8}$ -in.-radius cove bit to rout the profile into the bottom edge of the hardwood trim.

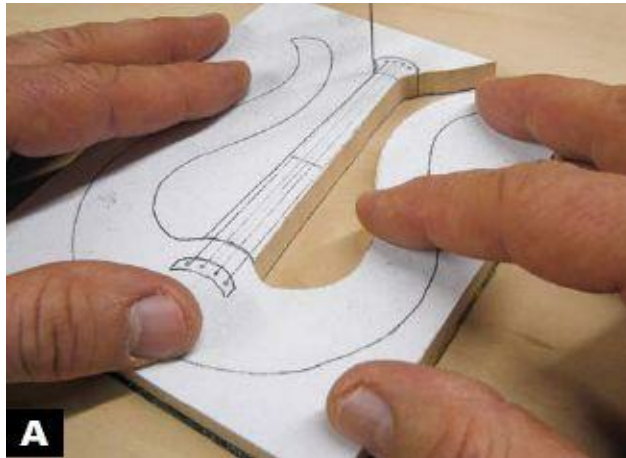
3. Replace the cove bit with a $\frac{3}{8}$ -in.-radius round-over bit. Flip the box top over so that its top surface is facing down. Now use the same three-pass technique to round over the top edge of the hardwood trim (**PHOTO B**). Lightly hand-sand the box top and trim with 150-grit sandpaper.



FLIP THE BOX OVER, switch to a $\frac{3}{8}$ -in.-radius roundover bit, and round over the top edge of the trim.

Make the lyre harp

1. The lyre harp attached to the front of the box completes the musical theme. To begin, cut a piece of solid flamed birch to $\frac{5}{16}$ in. thick by $4\frac{1}{2}$ in. wide by $5\frac{1}{2}$ in. long. Then cut a piece of black dyed veneer to $4\frac{5}{8}$ in. wide by $5\frac{5}{8}$ in. long. Finally make a $\frac{3}{4}$ -in.-thick by $4\frac{5}{8}$ -in.-wide by $4\frac{5}{8}$ -in.-long clamping block out of scrap wood.
2. Brush yellow glue onto the birch and onto the back of the veneer. Set the clamping block against the veneer and clamp the three pieces together. Allow the glue to dry overnight, then remove the clamps and block to reveal the lyre harp blank.
3. Make a photocopy of the “Lyre Harp Template” on the facing page and cut to fit the blank. Spray adhesive onto the blank and onto the rear of the paper template. Press the template to the blank.
4. Cut out the harp on the scrollsaw (**PHOTO A**). Use a series of small files and rasps to round over the edges of the harp. Hand-sand away the file markings with 150-grit sandpaper.



CUT OUT THE HARP on a scrollsaw, using a #5 reverse skip-tooth blade for a smooth, splinter-free cut.

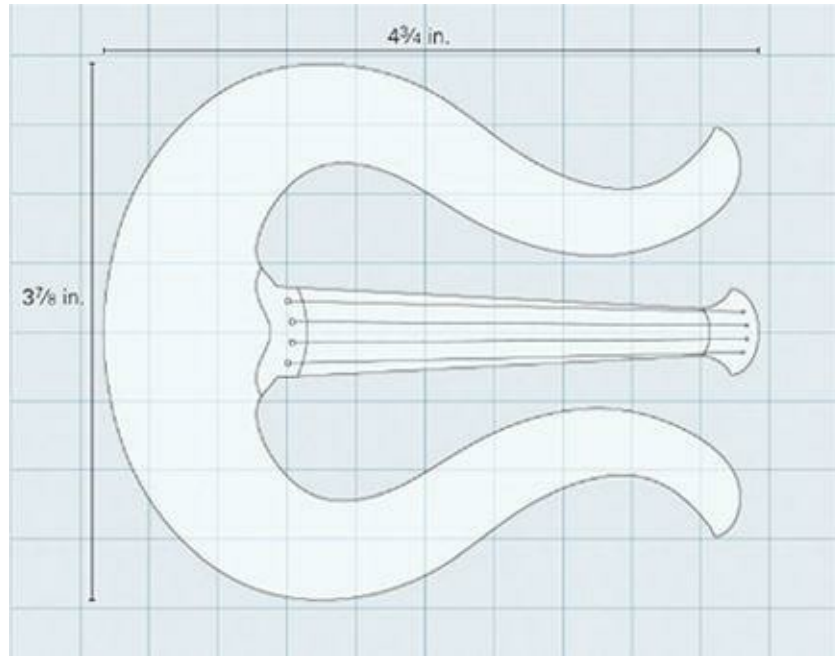
5. Now prepare to “lower the bridge,” which means cutting the bridge slightly lower than the surrounding surface. (The bridge is the straight arm in the middle of the harp.) This step is necessary so that when you veneer the bridge, the veneer will lay flush with the hardwood. Begin by using a #5/8 gouge to make a stab cut straight down into the hardwood precisely where the bridge meets the harp. Lightly tap the gouge with the mallet to cut only $\frac{1}{32}$ in. deep.
6. Switch to a #5/5 gouge and stab-cut the two outside corners at the same location on the harp (**PHOTO B**).



TO LOWER THE BRIDGE of the harp, make a stab cut in the center with a #5/8 gouge and then switch to a #5/5 gouge (shown here) to stab-cut the two outside corners.

7. Flat-carve up to the stab cuts using a #5/8 gouge. Then lower the rest of the bridge with a flat wood file until you've removed about $\frac{1}{32}$ in. of wood.

Lyre Harp Template



Enlarge by 135% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Veneer the bridge

1. Here's a simple way to veneer the bridge of the harp: Lay tracing paper over the harp, then trace around the bridge. Be sure also to outline the edges of the curved sections at the base and top end of the bridge.
2. Use scissors to cut the template into three pieces: the two curved sections and the straight arm of the bridge. Then take a white pencil and outline the curved pieces onto black dyed veneer. Trace the straight piece onto maple burl veneer.
3. Cut out the three pieces with a mat knife and then join them together with blue painter's tape (PHOTO **C**).



CUT OUT THE STRAIGHT ARM of the bridge (maple burl veneer) and the two curved sections at the base and top end of the bridge (black dyed veneer) and then join them together with blue painter's tape.

4. Brush glue onto the bridge and onto the back of the veneer pieces. Press the veneer to the bridge, cover with a small clamping block, and secure with three spring clamps. After the glue dries, flip the harp over and trim off the access veneer with a mat knife.
5. Hand-sand the veneer flush with 150-grit sandpaper and apply a light coat of lacquer. Then use an Ultra® Fine Grainer Black touch-up marker from Mohawk® (product No. M265-0501 Black GP6) to draw string lines onto the lyre harp and violins.
6. Set the finished lyre harp on the front of the music box. It should be $\frac{3}{4}$ in. down from the top edge and $\frac{3}{4}$ in. up from the curved piece of hardwood trim. Lightly trace around the harp with a pencil. Remove the harp and draw a line about $\frac{1}{8}$ in. inside the harp's outline. This second line represents the glue area. Erase the outside trace line.
7. Adhere the harp to the box with hot animal hide glue. Use an electric heat gun to warm the back of the harp and the box front. Brush the hot glue onto both surfaces and press the harp to the box front, making sure it's in the correct position. Hold the harp in place for two minutes.
8. Cut a $\frac{3}{4}$ -in.-thick block of wood slightly smaller than the harp. Lay the wood block on the harp and place a 20-lb. weight on top. Let the glue set for three hours before removing the weight (PHOTO

D).



GLUE THE HARP to the front of the box, placing a wood block between the harp and the weight.

Install the hinges

1. Prop up the top so that it's level with the box. Measure in from each end 1 in. and set the hinges flat across the seam between the top and box. Also position each hinge so that its knuckle—the cylindrical part that houses the pin—extends past the back edge by $\frac{3}{16}$ in. Trace around the hinges with a sharp pencil, marking their outlines onto the back of the box and the box top (**PHOTO A**).



THE TOP IS ATTACHED to the box with two $1\frac{1}{16}$ -in. by $1\frac{1}{4}$ -in. 95° stop hinges.

2. Use a wood chisel and mallet to cut just inside the pencil lines. Hold the chisel at precisely 90°. Cut to a depth of $\frac{3}{32}$ in.

3. Remove the waste wood from within each hinge mortise using #2/8 carving gouge. Again, remove just $\frac{3}{32}$ in. from each mortise. Dry-fit the hinges, predrill for the brass screws, but don't attach the hinges until after applying the finish.

Finish the music box

- 1.** Lightly sand all surfaces with 150-grit sandpaper. Blow off all the sanding dust and wipe everything down with a clean, dry rag.
- 2.** Spray on a very light coat of clear, precatalyzed lacquer, which acts as a sealer. Allow the sealer to dry one hour longer than is recommended on the container for a total of two hours.
- 3.** Sand again, this time with ultra-fine 320-grit sandpaper. Remove all the sanding dust, then spray on another light coat of lacquer. Be careful not to apply the lacquer too thickly or it could crack over time.
- 4.** Repeat the previous step by sanding first and then applying one final coat of lacquer. Let the finish dry overnight and then install the hinges and the musical movement.





Rose Box

MADE FROM mahogany with ebony accents, this attractive box is embellished—inside and out—with whimsical wild roses that were created with intricate relief carvings and colorful marquetry. And unlike simple rectangular boxes that have straight sides, the Rose Box has curved sides with an elegantly shaped top to match.

There are many methods for joining together box parts, but here I used mitered-corner elongated dovetail joints, which fit tightly together and look great, too. I show bandsaw techniques for cutting radiuses on the four box sides, including the double-radius end pieces.

The rose carvings serve as a focal point, adding style and beauty without overpowering the box. Here, I focus on carving techniques that take into account the shape, size, and depth of the carvings. These three details are critical for giving the carvings a natural, free-flowing style that complements the shape of the box. To help balance out the carvings on the box top, I added an elliptical-shaped center medallion fashioned from ebony hardwood.

The final creative touch, which appears on the inside of the box top and bottom, is marquetry, which is the ancient art of cutting thin veneers to create patterns and images. (I cover marquetry techniques in detail beginning on [p. 215](#).) The marquetry of roses lends an elegant touch to the completed box and reflects the rose carvings on the outside. If you're not quite ready to tackle carving and marquetry, don't worry, you can build a simpler box identical to the Rose Box, except for the carvings and marquetry (see the photo on the facing page).





Finished size of box: 5½ in. tall × 8⅝ in. deep × 13 in. long

MATERIALS			
QUANTITY	PART	SIZE	CONSTRUCTION NOTES
1	Top	1¾ in. × 10 in. × 14 in.	mahogany (oversize)
2	Ends	2¾ in. × 3¾ in. × 8⅝ in.	mahogany
2	Front and back	1½ in. × 3¾ in. × 10 in.	mahogany
2	Box ends and top ends trim	5/16 in. × 2 ¹³ / ₁₆ in. × 8 ¹¹ / ₁₆ in.	ebony
2	Box front and back and top front and back trim	5/16 in. × 1 ⁹ / ₁₆ in. × 10 ¹ / ₁₆ in.	ebony
1	Bottom	¼ in. × 8 in. wide × 13 in.	Baltic birch plywood (oversize)
1	Dovetail spline	3/8 in. × ½ in. × 24 in.	mahogany
5	Marquetry veneers	see p. 141	
1	Medallion	½ in. × 1½ in. × 2¼ in.	ebony (oversize)
1 pair	Butt hinges	1 in. × 1 in.	
1	Chain	¼ in. × 5½ in.	

Prep the parts for glue-up

THE MAIN BOX PARTS are cut from ribbon-striped African mahogany. One reason I chose mahogany is that you can still buy 8/4 mahogany in large sizes. That means you don't have to glue up two or more boards to form the top; it looks much better and cleaner when made from a single piece of wood. I purchased a piece of African mahogany measuring 2 in. thick by 12 in. wide by 7 ft. long from a local hardwood supplier. It produced enough mahogany to make two complete boxes.

1. Start by using a power miter saw and tablesaw to crosscut and rip to size the parts that'll make up the four sides of the box. Also, cut an oversize blank for the box top. It's important to first mill the sides and assemble the box, so you can then accurately mark and cut the top. This sequence ensures the top will fit perfectly. This first phase consists of a lot of cutting, gluing, mitering, routing dovetails, cutting radiuses out on the bandsaw, and routing the groove for the box bottom. Remember, you must make the box before you can start on the top.

2. Prepare to laminate, or glue together, the mahogany blanks for the ends of the box. Laminating is necessary to build up the thickness of the boards to permit bandsawing the curves later. Start by sanding the surfaces to be glued together with a flat sanding block and 80-grit sandpaper (**PHOTO A**). Remove the sanding dust with compressed air and a soft rag. Mark the top edges of the blanks to aid in reassembling them in the right order (**PHOTO B**).



PREPARE TO LAMINATE the mahogany blanks for the ends of the box by sanding the surfaces to be glued with 80-grit sandpaper.



MARK THE TOP EDGES of the blanks to aid in assembling them in the right order. These are the ends of the box (enough to make two boxes).

Laminate the blanks

1. Apply Titebond® III or similar yellow carpenter's glue to the surfaces that were hand-sanded. Spread the glue with a good-quality paint roller.
2. Tightly clamp together the pieces, making sure your layout marks line up. Allow the glue to cure overnight (**PHOTO C**).



CLAMP TOGETHER the four pairs of blanks, making sure the layout marks line up.

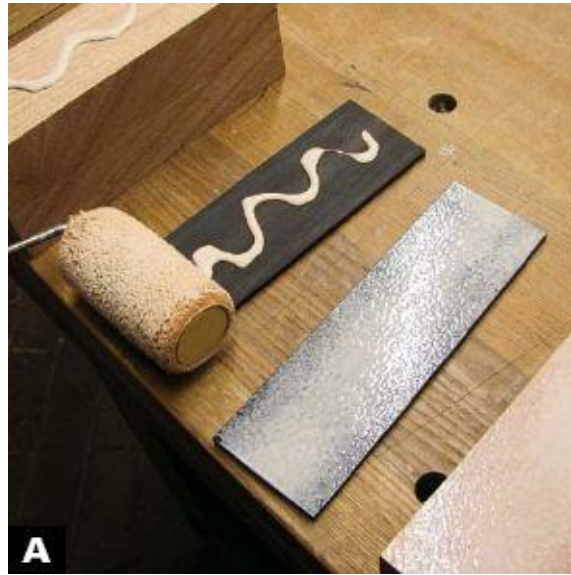
3. Once the glue is completely dry, use a jointer to square up the sides of the laminated blanks. Set the cutting depth of the jointer to approximately $\frac{1}{32}$ in. Squaring the blocks can take two or three passes, so be careful not remove too much wood before the blanks are square.
4. Use a tablesaw and power miter saw to cut all four sides of the box to their finished dimensions (see “Materials” on [p. 131](#)). If your tablesaw can't cut all the way through the blank in one pass, cut slightly more than halfway through, then flip the blank over and complete the cut.

WORK

I chose ebony hardwood for the decorative trim and medallion, but any complementary dark wood would be suitable, including walnut.

Cut and glue the ebony accent pieces

- 1.** You'll need two ebony pieces for the top edges of the ends, each measuring $\frac{5}{16}$ in. thick by $2\frac{13}{16}$ in. wide by $8\frac{11}{16}$ in. long. And two more pieces for the top edges of the front and back cut to $\frac{5}{16}$ in. thick by $1\frac{9}{16}$ in. wide by $10\frac{1}{16}$ in. long.
- 2.** Use 80-grit sandpaper and a flat sanding block to roughen the surfaces to be glued on the mahogany blanks and the ebony accent pieces. Remove the sanding dust with compressed air and a rag.
- 3.** Apply glue to both surfaces, then spread it evenly with a paint roller (**PHOTO A**). Tightly clamp together the pieces and let them dry overnight.



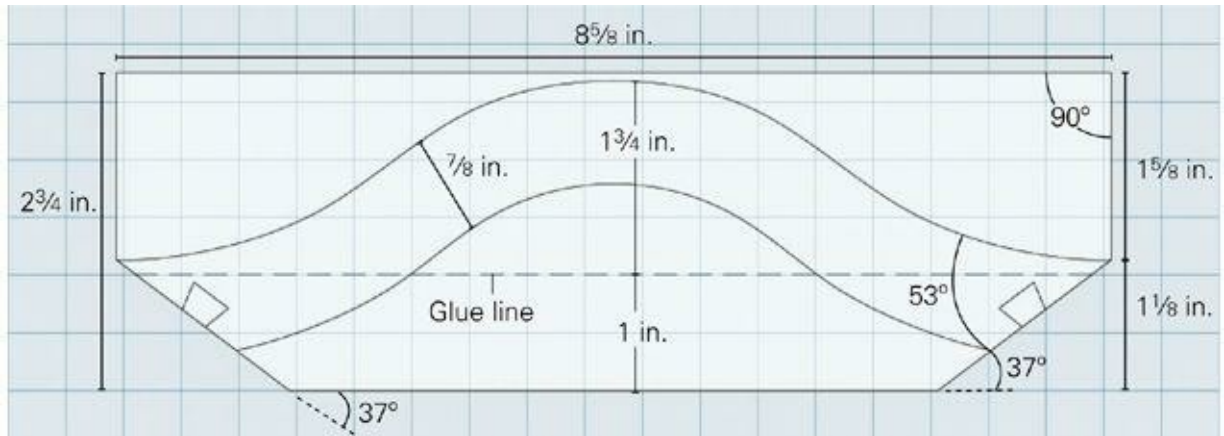
APPLY GLUE evenly to the ebony accents and the surface of the laminated blanks.

WORK

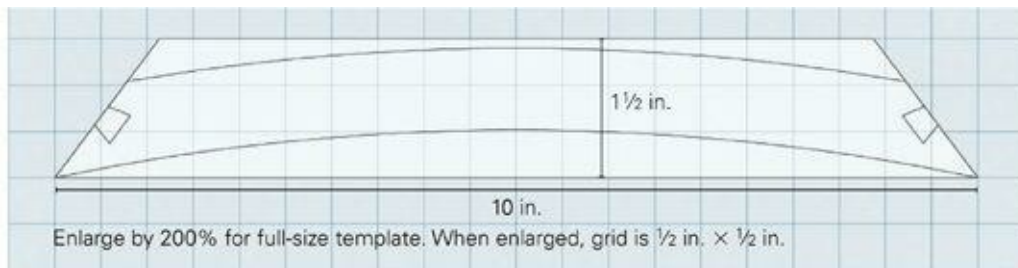
Cut the ebony a bit larger than needed and use clamps to align it with the sides. This makes the ebony easier to sand flush. Apply as much pressure as you can to ensure a tight bond.

Templates

Plan view of sides



Plan view of front and back



Enlarge by 200% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Cut the miter joints

1. Draw the miter angles onto the blanks with a protractor and white pencil, which will produce easy-to-see cut lines on the dark wood. Draw a 53° angle onto the box ends, and a 37° angle onto the front and back pieces (**PHOTO A**).



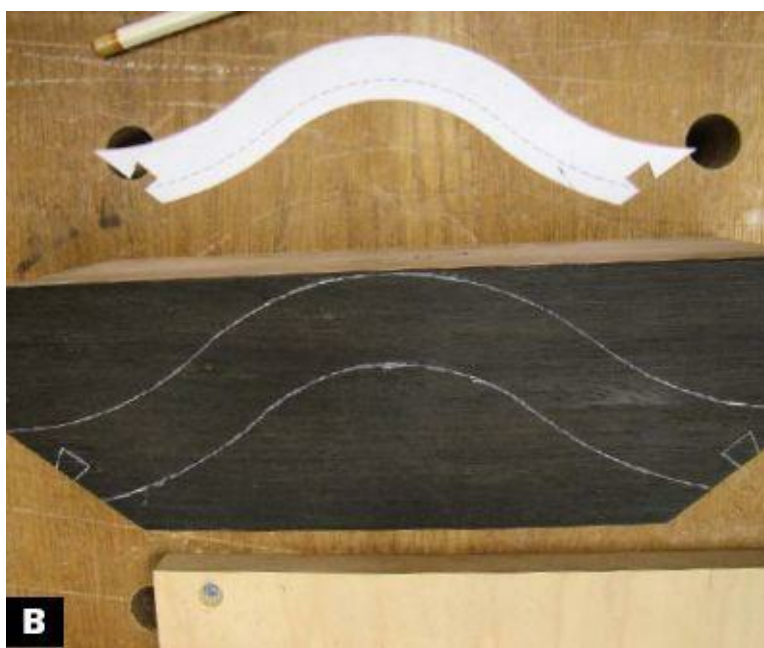
MARK THE MITER ANGLES onto the dark wood with a white pencil: 53° for the box ends and 37° for the front and back pieces.

2. Adjust the blade angle of the miter saw to align with the white cut line. If your saw doesn't cut to 53° , slip shims between the blank and the miter-saw fence. Firmly hold the box end in place, and carefully cut the angle. Rotate the sawblade to the opposite miter angle and cut the other end of the pieces.

T B C

When building the Rose Box, you can't simply cut the box corners to 45° because there are two different sizes of radiuses meeting at each 90° corner. Also, the box sides are $\frac{7}{8}$ in. thick, and the only way to maintain that thickness is to cut two different angles, one at 53° and the other at 37° . When they come together, they'll form 90° corners.

3. Prepare to cut the dovetail slots in the box parts. Start by making photocopies of the end templates shown in the drawings on the facing page. Cut out the templates, then draw their shape onto the wood blanks. Be sure to draw the outline of the dovetail slots too (**PHOTO B**).



TRANSFER THE OUTLINE of the end templates onto the wood blanks. Be sure to draw the outline of the dovetail slots too.

WORK

Make sure the glue line on the two end pieces faces toward the inside of the box. That way, the lines won't be visible from the outside.

Cut the dovetails

1. Dry-assemble the box. Lay a $\frac{3}{8}$ -in.-wide by 14° dovetail router bit across each of the four dovetail joints to confirm that the router bit aligns with the outline of the dovetail slot.
2. Using the miter saw, cut a 37° angle onto the four outside corners of the two ends; along with the already 53° angle, this will yield a 90° angle. This cut allows you to guide the parts along the router-table fence when routing slots for the sliding-dovetail joints.
3. Set the dovetail bit so that it projects $\frac{1}{4}$ in. above the router table. Adjust the router-table fence to align the bit with the dovetail outline drawn onto the box ends. Mount a piece of scrap wood, mitered to 53° , to the router table's miter gauge to prevent blowout. Check the fence and miter gauge for square, then make a few practice cuts in scrap. Turn on the router and use the miter gauge to push one of the box ends across the dovetail bit (**PHOTO C**).



CUT THE DOVETAIL SLOTS in the ends, front, and back. Note that when routing the ends, you must hold the 90° cut flat against the router-table fence.

4. Readjust the router-table fence and cut mating slots into the front and back pieces. For safety and accuracy, cut a push block $1\frac{3}{4}$ in. thick $\times$ 4 in. wide $\times$ 6 in. long with a 37° angle cut into the front edge for the front and back to rest on while routing the dovetails.
5. Now use the router table to mill dovetail-shaped mahogany splines, which will slide into the dovetail slots. Make one long spline measuring $\frac{3}{8}$ in. thick by $\frac{1}{2}$ in. wide by 24 in. long, which will be crosscut to form the individual splines.
With the dovetail bit set $\frac{1}{4}$ in. above the router table, position the router fence $\frac{1}{8}$ in. away from the center of the dovetail bit, a distance equal to $\frac{1}{16}$ in. less than the bit's width. Run all four sides of the spline stock past the router bit. Be sure to use a push stick and block of wood to protect your fingers as you mill this narrow piece (**PHOTO D**).



RUN ALL FOUR SIDES of the spline stock past the router bit to cut the dovetail spline.

6. Check to see how the spline fits into the dovetail slots in the dry-assembled box. If necessary, readjust the router table setup and recut the spline. Once satisfied with the fit, crosscut the splines to 4 in. long, which is about $\frac{1}{2}$ in. longer than needed.

7. Slide a spline into each of the four corner joints, but don't glue them in place just yet.

Shape the front, back, and ends

1. Cut the front, back, and ends along the white lines drawn from the template. Apply light, even pressure to the pieces when sawing and avoid stopping once you start cutting (**PHOTO A**). Save the cut-off pieces and mark which part they came from; you'll need them later to mark the arches on the box bottom.

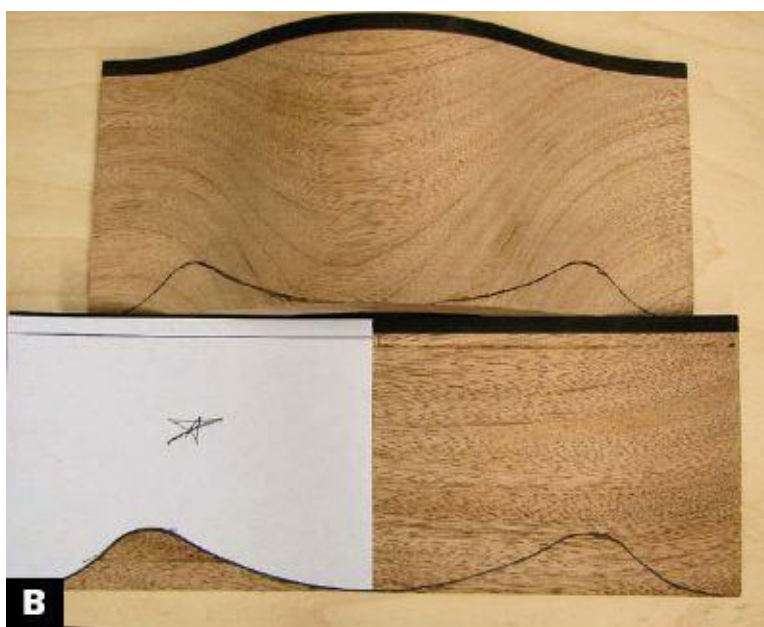


CUT OUT THE FRONT, back, and ends on the bandsaw. Use a square to make sure the bandsaw blade is perfectly square to the table. Set the bottom of the blade guide about $\frac{3}{4}$ in. above the top of the box, so the cutting line and blade are clearly visible.

2. Use a drum sander with 100-grit sleeve to remove all of the bandsaw-blade marks. Then hand-sand all surfaces with 150-grit sandpaper to remove any remaining scratches. Make sure to sand in the direction of the wood grain.

3. Prepare to cut a groove into the box parts to receive the $\frac{1}{4}$ -in. plywood box bottom. Install a $\frac{1}{4}$ -in.-wide by $\frac{3}{8}$ -in.-deep rabbet bit or groove-cutting bit into the router table. Set the bit to cut $\frac{7}{8}$ in. up from the bottom edge of the box parts; this positioning allows room for cutting in the lower arches. Rout the groove.

4. Make a photocopy of the templates of the decorative arches on the lower edges of the box ends, front, and back (see “Arch Templates” on [p. 138](#)). Cut out the templates, and then trace them onto the appropriate box part (**PHOTO B**).

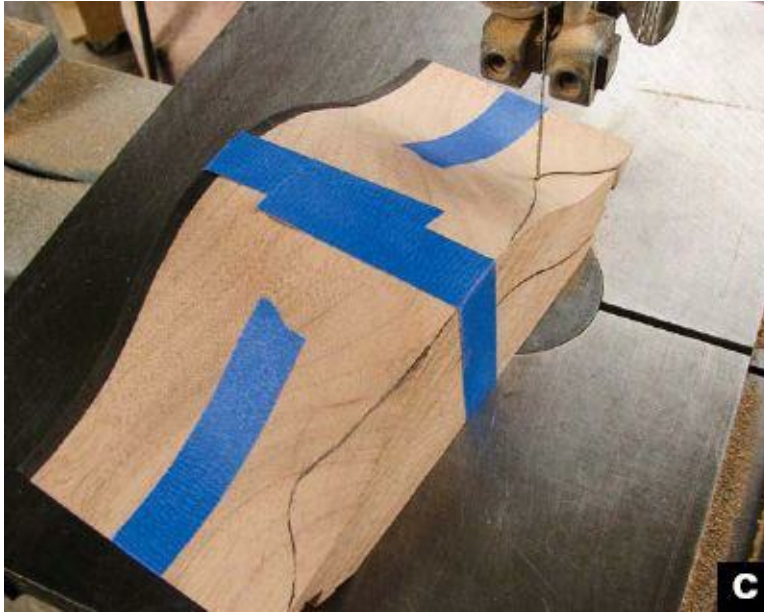


TRACE THE APPROPRIATE template of the decorative arches onto the lower edges of the box ends, front, and back.

WORK

When cutting the decorative arches, it's important to set the blade guide about $\frac{1}{4}$ in. above the thickest part of the ends. In that position, the guide will be nearly $2\frac{1}{2}$ in. above the thinner part of the ends, but that's necessary in order to clear the thick, center section.

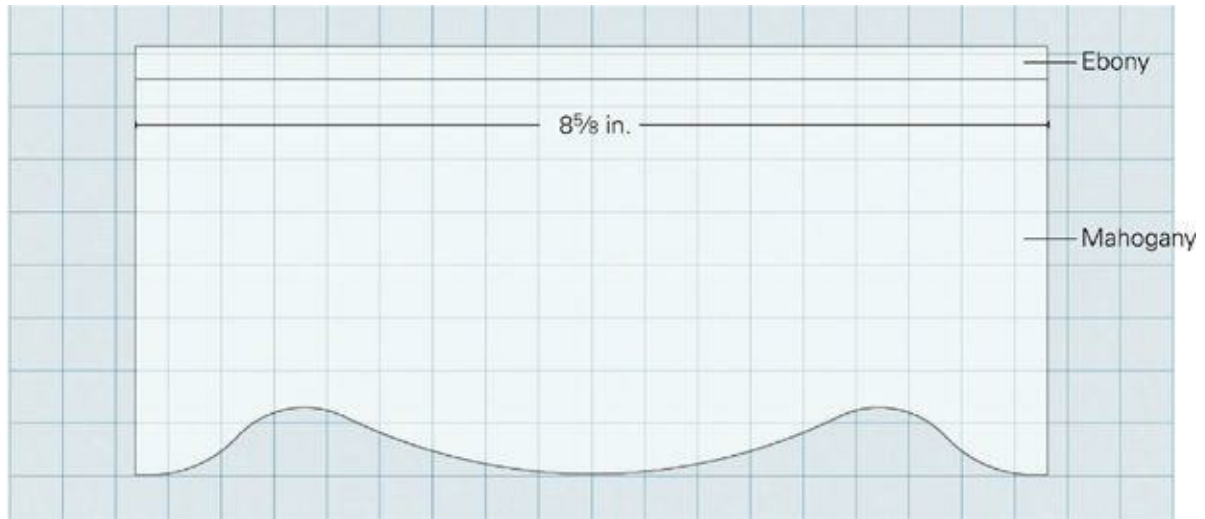
5. Use blue painter's tape to secure the scrap pieces back onto the inside surfaces of the ends, front, and back. This will provide a broad, flat surface for easier cutting. Use the bandsaw to cut along the template lines to form the decorative arches (**PHOTO C**). Smooth the bottom edges of the box parts, first with a drum sander, then by hand-sanding.



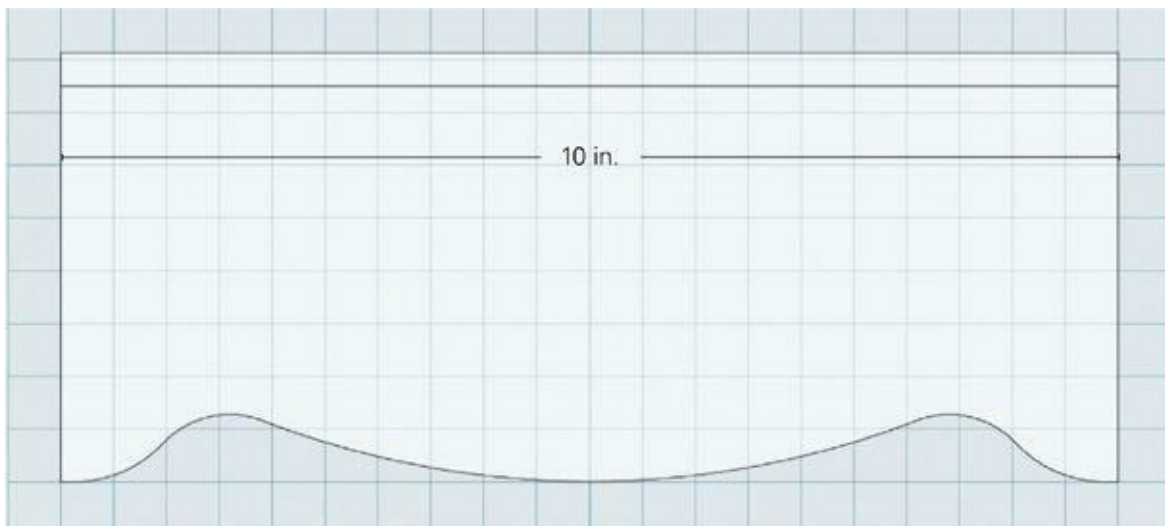
CUT ALONG THE TEMPLATE lines to form the decorative arches.

Arch Templates

Bottom, side cutout template



Bottom, front/back cutout template

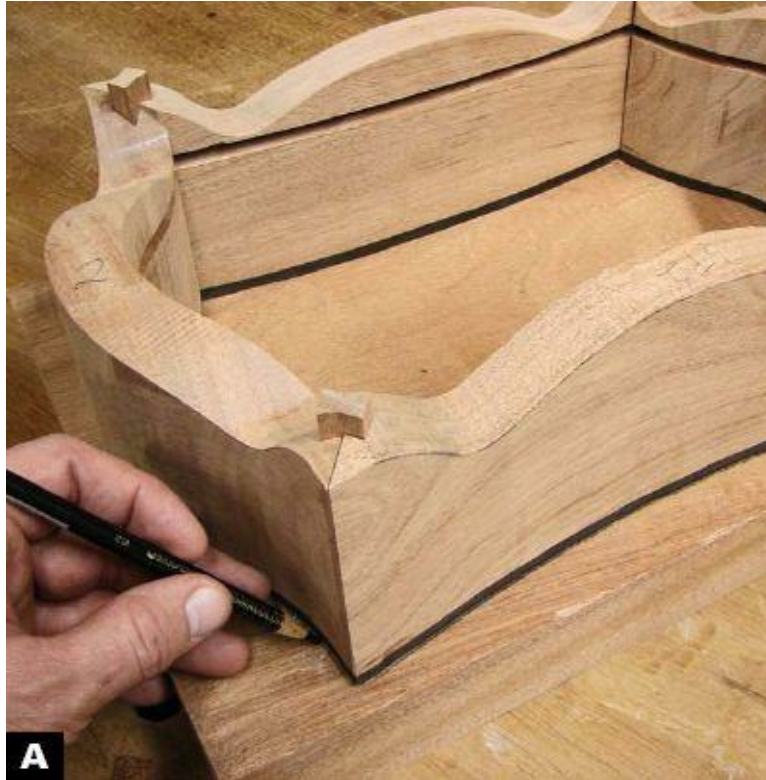


Enlarge by 200% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Cut the box top and bottom

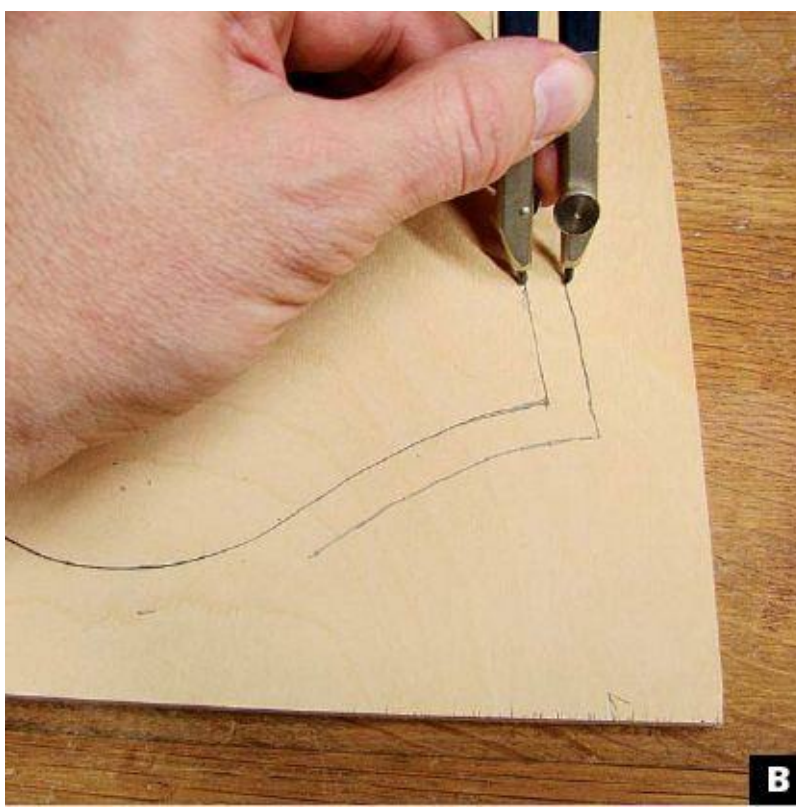
DRY-ASSEMBLE THE BOX, THEN FLIP IT upside down and set it onto the mahogany blank you cut earlier for use as the top of the box. Be sure the box is sitting perfectly square on the blank, not cocked off line.

1. Trace around the perimeter of the box to mark the top (**PHOTO A**). Cut along these lines with a bandsaw to form the box top.



SET THE BOX UPSIDE DOWN on the mahogany top blank and trace around the perimeter of the box to mark the top.

2. Cut an 8-in. by 13-in. piece of $\frac{1}{4}$ -in.-thick birch plywood for use as the bottom of the box. Set the box upside down on top of the plywood, and trace around the inside of the box.
3. Using a compass, draw a second line $\frac{11}{32}$ in. outside of the line you just traced onto the plywood. As you move the compass, guide its metal pivot point along the first traced line and the pencil point will mark the second line parallel with the first line. When you're done tracing, cut the box bottom to shape on the bandsaw, making sure you cut along the outside line (**PHOTO B**).



ON THE PLYWOOD BOX BOTTOM, trace one line around the inside of the box and then add a second line $\frac{11}{32}$ in. out from the first line.

Assemble the box

NOTE THAT SOME OF THE PHOTOS IN THIS section show the marquetry detailing; see “Adding Marquetry” on the facing page and on [p. 215](#) for instructions on veneering and marquetry.

1. Lay out all the box parts on a flat, clean work surface (**PHOTO A**). Place masking tape wherever glue may squeeze out of the corner joints. Apply wood glue to the dovetail slots and miter joints, being careful not to get any glue in the bottom grooves or onto the plywood bottom. Trim the four dovetail splines to their finished length.

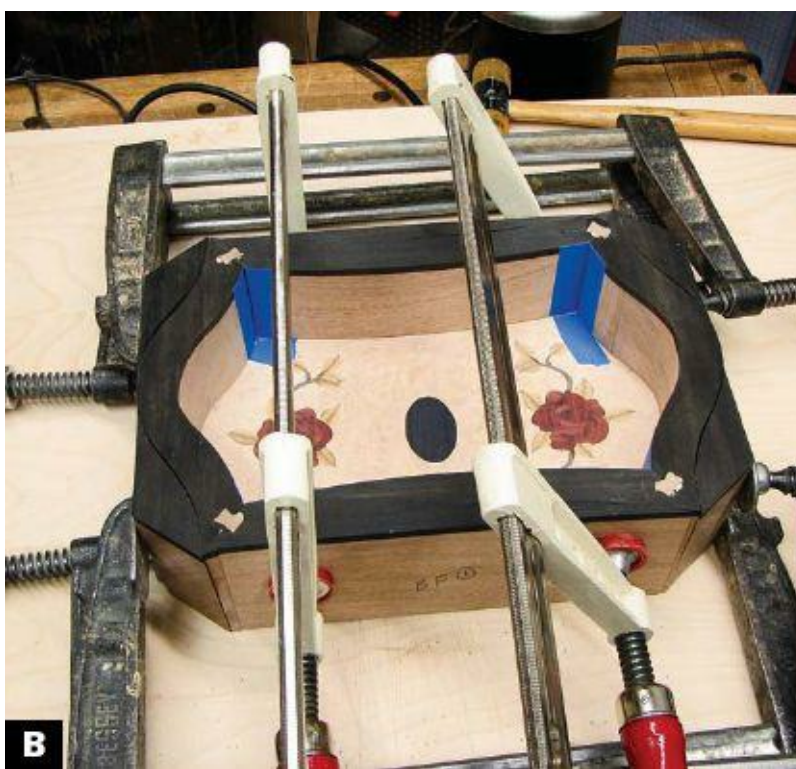


LAY OUT ALL THE PARTS on a flat, clean work surface.

2. Assemble the box with the plywood bottom nestled into the grooves.

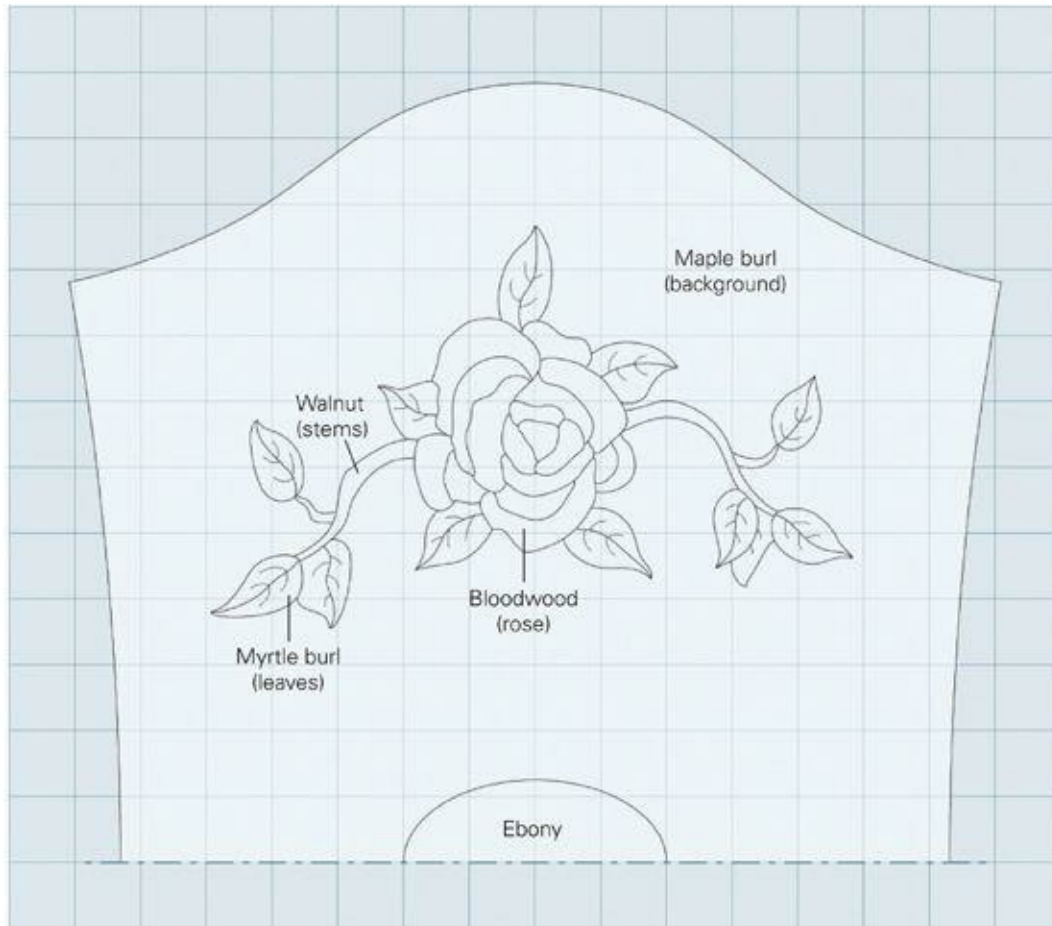
3. Spread glue onto the dovetail splines and then slide them into the dovetail corner joints.

4. Clamp the box together, using cut-off waste pieces on the ends to create flat clamping surfaces. Wipe away any excess glue and allow the glued-up box to cure overnight (**PHOTO B**).



SLIDE THE PLYWOOD BOTTOM into the grooves and clamp the box together, using the cut-off waste pieces on the ends to create flat clamping surfaces.

Marquetry Template



Enlarge by 140% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

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If you choose to glue marquetry into the underside of the box top and the top side of the box bottom, use the “Marquetry Template” above (it is a mirror image on both sides of the design).

When choosing veneers, it’s important to select colors and grain patterns that best duplicate natural colors and textures. And by changing wood-grain directions, you can add depth and shadow to the marquetry image. To make the roses, vines, and stems on this box look as natural as possible, I selected a mix of bloodwood, myrtle burl, maple burl, walnut, and ebony veneers. You’ll need one sheet each of the following veneers:

- Bloodwood veneer: $\frac{1}{42}$ in. by $7\frac{1}{2}$ in. by $12\frac{1}{2}$ in.
- Myrtle burl veneer: $\frac{1}{42}$ in. by $7\frac{1}{2}$ in. by $12\frac{1}{2}$ in.
- Maple burl veneer: $\frac{1}{42}$ in. by $7\frac{1}{2}$ in. by $12\frac{1}{2}$ in.
- Walnut veneer: $\frac{1}{42}$ in. by $7\frac{1}{2}$ in. by $12\frac{1}{2}$ in.
- Ebony veneer: $\frac{1}{42}$ in. by $1\frac{5}{8}$ in. by $2\frac{1}{4}$ in.

Prepare the center medallion

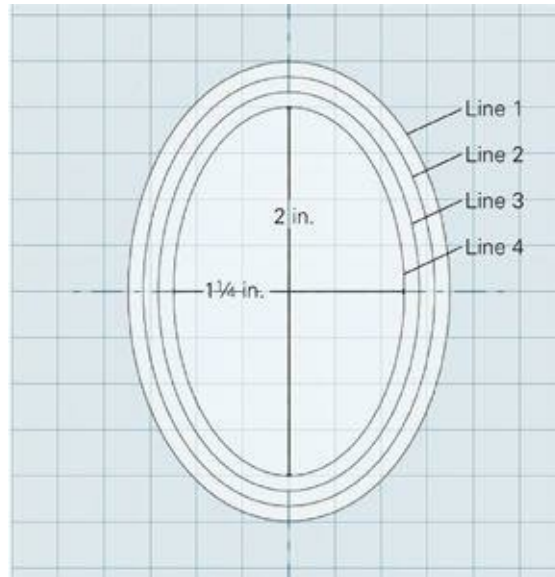
1. To make the decorative center medallion that graces the top of the box, start by milling a small block of ebony to $\frac{1}{2}$ in. thick by $1\frac{1}{2}$ in. wide by $2\frac{1}{4}$ in. long. Make a photocopy of the full-scale “Medallion Template” below. Cut out the template and trace the center medallion outline onto the ebony piece with a white pencil.
2. Cut along the outside of the white line on a bandsaw. By cutting just beyond the outline of the medallion, you’ll end up with a little extra wood to work with when filing and sanding the medallion to its finished dimension (**PHOTO A**).



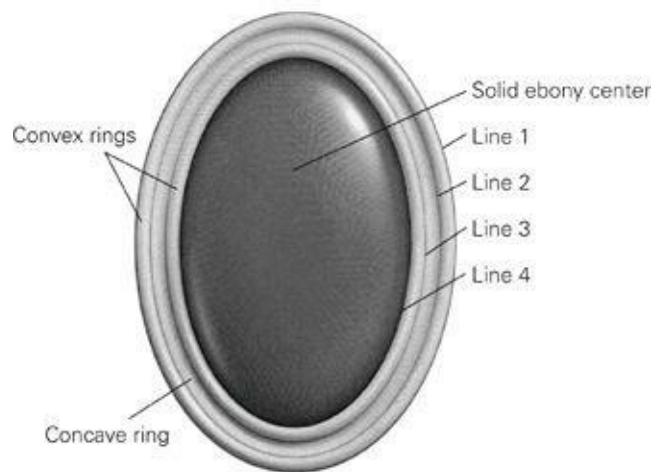
CUT OUT THE MEDALLION on the bandsaw, cutting just outside the white line to leave a little extra wood for final dimensioning.

3. Use a rasp or coarse file to round over the top edge of the medallion. Once you have achieved the oval shape, hand-sand the medallion smooth with 150-grit sandpaper. Set the medallion aside; it doesn't get affixed to the box until right before you install the hinges.

Medallion Template



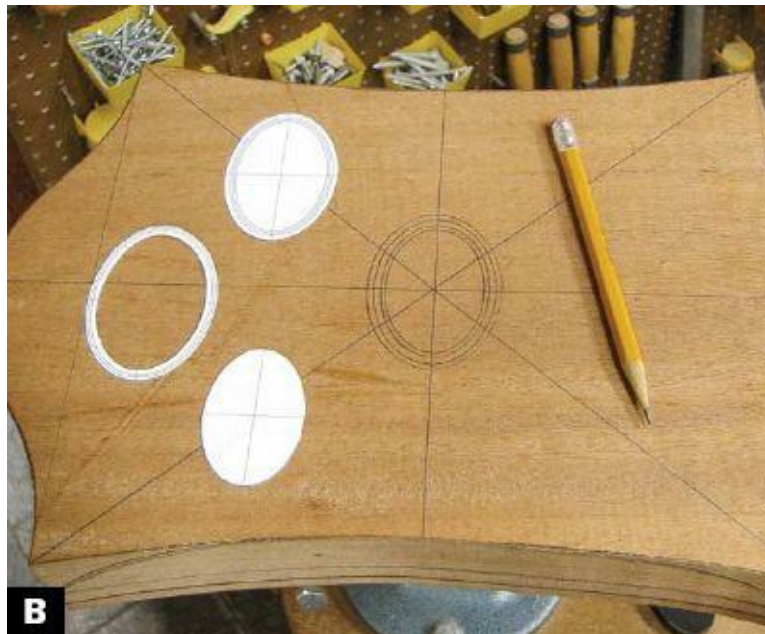
Template is full scale. Grid is $\frac{1}{4}$ in. $\times$ $\frac{1}{4}$ in.



Carve the elliptical rings

The ebony medallion sits in the center of two elliptical rings that are carved into the mahogany top.

1. Find the center of the box top by drawing four lines: vertical centerline, horizontal centerline, and corner-to-corner diagonals. Make a full-scale photocopy of the top medallion, shown on the facing page. From that template cut out all four rings starting with line no. 1 and working to no. 4. After cutting out each ring, trace its shape onto the top (**PHOTO B**).



TRANSFER THE FOUR RING LINES from the template onto the center of the box top.

2. Start on the outside line, using three carving gouges: #5/12, #3/12, and #2/8. Match the sweep of the gouge to the radius of the line. Begin by making a stab cut by holding the carving gouge perfectly vertical. Lightly tap the gouge's handle with a mallet (**PHOTO C**).



WITH THE GOUGE HELD PERPENDICULAR to the surface, make stab cuts along the outside ring, matching the sweep of

the gouge to the radius of the line. Cut no more than $\frac{1}{16}$ in. deep.

As you work your way around the outside line, be sure to cut only about $\frac{1}{16}$ in. deep into the mahogany top. Now repeat this stab-cut technique to score around the inside ellipse line, only this time, use #3/8 and #2/8 carving gouges.

3. After scoring the outer and inner ellipses, use a #9/3 gouge to carve out the concave center ring that's located between the second and third ellipse lines (**PHOTO D**).



USE A #9/3 GOUGE to carve out the concave center ring between the second and third ellipse lines. Again, carve no deeper than $\frac{1}{16}$ in.

4. Use a technique called *flat carving* to remove $\frac{1}{16}$ in. of wood from the center of the ellipse, and from around the outer perimeter of the ellipse. Carve as flatly as possible using a #2/8 carving gouge. Remove $\frac{1}{16}$ in. of wood from the entire center of the inner ellipse ring. Then start about $\frac{3}{4}$ in. outside the outer ring and carve away wood up to the ring. As you work, lightly tap the gouge handle with a mallet; don't try pushing it through the wood. The mallet delivers an even amount of pressure on the gouge, thus reducing the chance of slipping and cutting through the rings (**PHOTO E**).



FLAT-CARVE WOOD from the center of the ellipse and from around the outer perimeter, effectively raising the elliptical rings by removing the wood surrounding them. It's important to carve the center of the ellipse completely flat, so that the medallion will sit flat and even.

5. Use small files to shape and smooth the elliptical rings, including a round file called a detail

riffler. The diameter of the riffler changes around its circumference, making it easy to change radius when filing. Shape the middle concave ring first, rounding the inside up to the convex part of the rings. Continue filing all the way around the carving to complete the elliptical rings (**PHOTO F**).



USE A DETAIL RIFFLER to shape the elliptical rings. Shape the middle concave ring first, rounding the inside up to the convex part of the rings. Continue filing all the way around the carving to complete the elliptical rings.

WORK

Using small files and rifflers allows you to carve very precise details. However, keep in mind that filing the elliptical rings can take a couple of hours, so be patient and work carefully.

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Carving gouges come in a wide variety of sizes and shapes and are designated by numbers that resemble fractions. The first number represents the *sweep*, or radius, of the gouge; the larger the number, the more of a radius the gouge has. The second number stands for the *width* of the gouge in millimeters. So a #3/5 gouge has a #3 sweep and is 5 mm wide. To carve the Rose Box, you'll need the following gouges: #3/3, #3/5, #5/5, #2/8, #3/8, #5/8, #3/12, #5/12, #3/25, #8/7, and #9/3.

Shape the top

1. You need to remove a good amount of material to give the top its sinuous profile. Start with a #3/25 carving gouge to flatten the top around the center elliptical ring. Carve outward away from the center holding the gouge handle at approximately 20°. Tap the gouge handle with a mallet for better control (**PHOTO A**).



ALWAYS CARVE AWAY from your body to avoid getting cut should the gouge slip.

2. Shape the left-and right-sides of the top with a rasping plane, such as a Stanley Surform® tool. Lightly rasp down each side, going about ¼ in. deeper at the very outer edges.

3. After forming the rough shape of the box top, use a #8/7 gouge to carve a series of depth cuts into the top. This technique provides an accurate way to remove a lot of wood very quickly. Start carving about 1¼ in. away from the left and right of the elliptical ring, and ½ in. from the front and back of the ring. Use a mallet to tap the gouge, and as you get closer to the outer edges of the top, cut a little deeper. At the very edges, cut approximately 5/16 in. deep. Repeat this step around the top, leaving about ½ in. of wood between the cuts (**PHOTO B**).



TO REMOVE A LOT OF WOOD rapidly, use a #8/7 gouge to carve a series of depth cuts into the top, leaving about ½ in. of wood between the cuts.

4. Carve away the waste material between the depth cuts with a #5/12 carving gouge and mallet. Start near the center of the top, and work toward the outer edges. Continue carving in this manner until you've removed all the waste wood (**PHOTO C**, [p. 146](#)).



SWITCH TO A #5/12 GOUGE to carve away the waste material between the depth cuts.

5. Smooth away the carving marks with a rasping plane. I like to use a Stanley Surform arched rasp, which easily conforms to the shape of the rounded top. After removing all the gouge marks, repeat steps 3 and 4 to shape the top until it's rounded on the sides and even (**PHOTO D**).



SMOOTH AWAY the carving marks with a rasping plane, such as a Stanley Surform.

6. Before carving the roses into the top, smooth the top's surface with a bastard wood file. Leave a flat area about $\frac{5}{16}$ in. wide around the perimeter of the top to accept the ebony trim. This area needs to be flat and thick enough to accept the hinge screws, which are about $\frac{3}{8}$ in. long.

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It's important to keep your carving gouges sharp. They'll cut quicker and easier and eliminate accidents caused by forcing dull gouges through the wood. I keep my gouges sharp with a Tormek® sharpening system, which provides a very fast, easy way to sharpen gouges. This compact machine has a wet grinding stone and a leather honing wheel. As soon as the gouges become dull, I use the honing wheel with buffing compound to sharpen the edges and then I don't have to use the grinding wheel so often to completely sharpen the gouges.

Stab-cut the roses onto the top and front

WOODCARVING IS A WONDERFUL SKILL TO master because it can be used on many different projects. Here, I chose roses for their natural beauty and because they complement the shape of the box.

1. Make a photocopy of the left and right top carving templates shown on [p. 148](#) and cut out the rose, vines, and leaves as one piece. Set the templates on the box top, centered in the area to the left and right of the elliptical rings. Use a pencil to very lightly trace around the templates.
2. Spray adhesive onto the backs of the templates, then press them onto the top, using the pencil lines for proper placement. Firmly press down on the templates to ensure they won't move. Now, draw a dark line around the template with a pencil, but this time, mark the line approximately $\frac{1}{8}$ in. away from the template. This border represents the outer edge of the rose carving (**PHOTO A**).



AFFIX THE TEMPLATES to the box top and then draw a pencil line about $\frac{1}{8}$ in. away from the edge of each template.

3. Stab-cut around the perimeter of the paper template (not the pencil line). For this, you'll need seven carving gouges: #2/8, #3/3, #3/5, #3/8, #3/12, #5/5, and #5/8. As you work your way around the template, it's important to be able to choose the gouge with a sweep that most closely matches the curve of the outline.

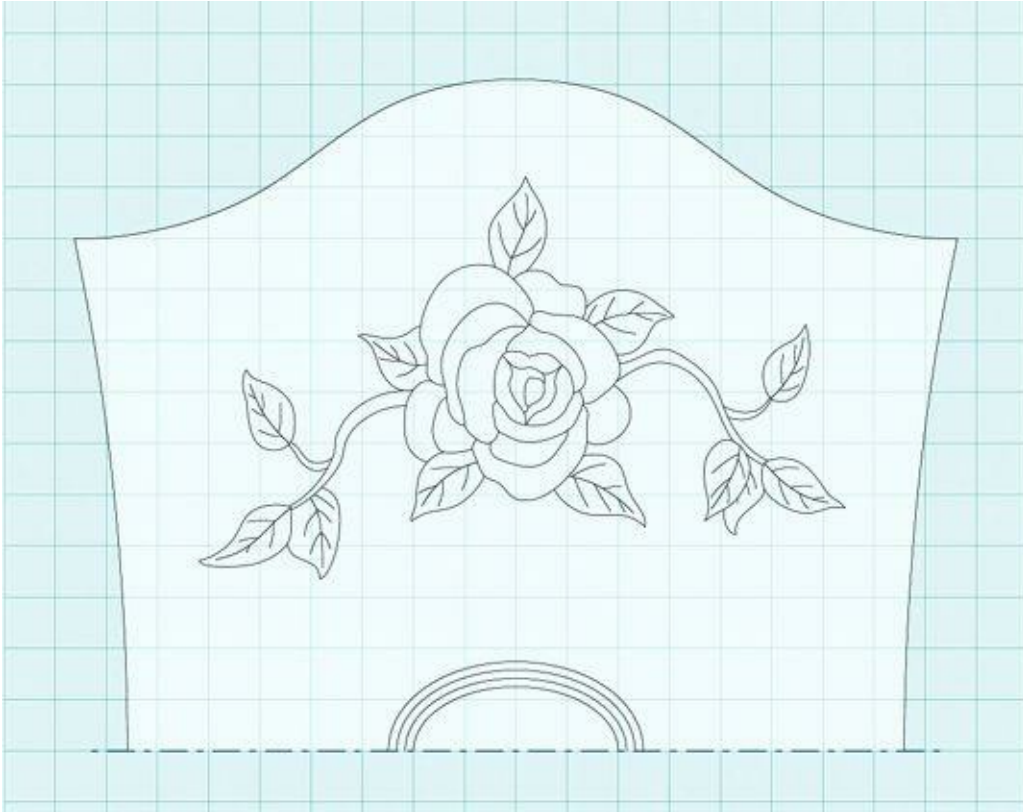
Pick a starting point anywhere along the edge of the template and hold the carving gouge at 90° to the surface. Lightly tap the gouge twice with a carving mallet, cutting approximately $\frac{1}{16}$ in. deep. Continue to work your way around both templates, changing gouges as necessary to match the curves (**PHOTO B**).



MAKE STAB CUTS around the perimeter of the paper template, switching gouges to match the curve of the outline. Cut about $\frac{1}{16}$ in. deep.

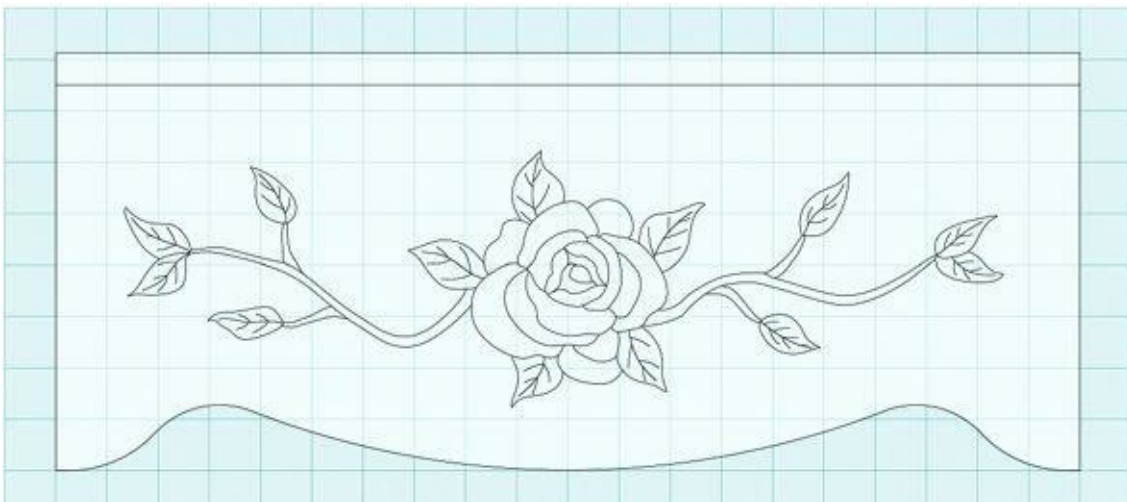
Carving Templates

Top (left and right)



Enlarge by 180% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Front



Enlarge by 180% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Carve the roses and petals

1. Once you've completed all the stab cuts, you can begin relief carving along the pencil line that's $\frac{1}{8}$ in. from the template. Hold a gouge on the pencil line at a 60° angle and lightly strike it with a mallet to cut up to the stab cut. (Using a mallet provides greater control and helps prevent accidentally carving beyond the stab cut.) **(PHOTO C)**.



ONCE YOU'VE COMPLETED all the stab cuts, begin relief carving along the pencil line that's $\frac{1}{8}$ in. from the template. These sharply angled cuts create a border outline that gives the carving much depth and shadow.

2. Using the same method of stab and relief cuts, carve one rose petal at a time, starting with the outside petals and working in toward the center of the rose. Match the carving gouge to the lines of each petal. And it's best to complete each petal before moving on to the next, as opposed to stab-cutting all the petals and then coming back to carve them all. Stab-cut $\frac{1}{16}$ in. down into the wood **(PHOTO D)**.



CARVE THE ROSE PETALS one at a time using the same method of stab cuts and relief carving.

3. Relief-carve up to the stab cuts while holding the gouge at approximately 45° . You need to hold the gouge at this slightly shallower angle because the rose petals are relatively wide **(PHOTO E)**.



MAKE THE RELIEF CUTS on the petals with the gouge held at approximately 45°.

WORK

When creating the relief carvings of roses, vines, and leaves, work slowly and deliberately. And remember, carving isn't as complicated as it looks; these methods can be learned by novices or seasoned woodworkers. All you need is a little patience and practice.

Carve the leaves

1. When you get to a leaf, use the same stab-cut and relief-carving method. Only now, go back to holding the gouge at 60° to create more depth. When carving the leaves located close to the rose, tap the gouge very lightly. If you strike too forcefully with the mallet, you risk breaking off or cracking one of the rose petals.
2. Start by using a #3/5 gouge to carve a concave wave down into the wide, lower part of a leaf (PHOTO **F**).



RELIEF-CUT the wide, lower part of the leaf using a #3/5 a gouge.

3. Switch to a #7/4 gouge to cut into the narrow area between the middle of the leaf and its pointed tip. Work side to side, cutting about $\frac{3}{32}$ in. deep. Be careful not to carve away wood from the middle or very tip of the leaf (PHOTO **G**).



MOVING ONTO THE LEAVES, use a #7/4 gouge to carve a concave wave across the widest part of the leaf and then, using the same gouge, work the area near the leaf tip.

When done, the middle and tip of the leaf will look as though they are arching upward. To create the

opposite effect, carve away the pointed tip and it'll look as though the leaf is curving down into the wood. This is a good time to be creative. Make each leaf a little different from the previous one. Once the leaves are carved, smooth them with a small round file or detail riffler.

WORK

To make leaves look as real as possible, I carve into each one a slight wave, which mirrors the natural curves and bends that occur in leaves (it's useful to look at photos for inspiration). However, it's important that the leaves don't all look alike. This box features 24 leaves on the top and 13 on the front, so it takes a little bit of forethought and creativity to make them look different from each other.

Shape the vines

Before carving the meandering vines that extend out from the roses, note that the vines taper from about $\frac{3}{16}$ in. wide near the rose down to about $\frac{1}{16}$ in. wide where they meet the leaves. Also note that the vines arch upward and downward, creating high spots and low spots.

1. Carve the vines with two small gouges: #3/3 and #3/5. While it's always important to use sharp gouges, it's particularly critical when carving fine details, such as vines and leaves. As you cut along the template outline, carve only about $\frac{1}{16}$ in. deep, carving the low sections of the vines first **(PHOTO H)**.



USE SMALL GOUGES to carve the vines, working the low sections of the vines first.

2. Shape a radius along both sides of the vines, essentially rounding them off. Keep shaving away wood until you achieve natural-looking vines.

3. Carve some realistic details into the leaves. Start by cutting a small radius around the edges of each leaf and clean up the juncture where the leaves meet the vines. This is also a good time to cut very fine veins into the leaves. Start by freehand drawing veins onto all the leaves. (I find it helpful to look at the carving template when drawing the veins.)

Cut the shallow veins with a #15/3 V-tool carving knife. Hold the V-tool at 30° to 45° , then lightly cut along the pencil lines. You don't need a mallet for this step; simply push the tool through the wood with light pressure. Carve along all the pencil lines, making sure to cut deep enough—about $\frac{1}{32}$ in.—to create shadow lines along all the veins on each leaf **(PHOTO I)**.



USE A #15/3 V-TOOL carving knife to carve the shallow veins in the leaves (you don't need a mallet for this step).

File and sand the carvings

1. Use small files to fine-tune the carving details. I recommend using files because sandpaper can easily remove smaller details. And although filing can be a bit tedious and time-consuming, it's more precise and provides the best way to create realistic-looking carvings.
2. For this carving, I used two detail rifflers to smooth out all the rough spots and to highlight the details along the petals, leaves, and vines **(PHOTO J)**. Once you're done filing, lightly sand with a sanding sponge, which gets into all the small areas without sanding off the details.

Now repeat the entire carving process to create the rose pattern on the front of the box. Use the front template on [p. 148](#), and carve with the same gouges used to make roses on the box top.



THE ROUNDED CIRCLE end of the riffler is particularly well suited for smoothing out areas around the rose petals.

WORK

It's best to sand carvings last because the grits from the sand-paper get trapped into the wood. If you carve after sanding, you run the risk of dulling or chipping your carving gouge on the abrasive grits.

Rout the top for ebony trim

NOW PREPARE THE BOX TOP TO RECEIVE the ebony accent trim that runs around the underside of the top. The ebony trim fits into a rabbet routed into the underside of the top. To cut the rabbet, you must first make a tracing template of the top out of paper and then cut out a particleboard routing template.

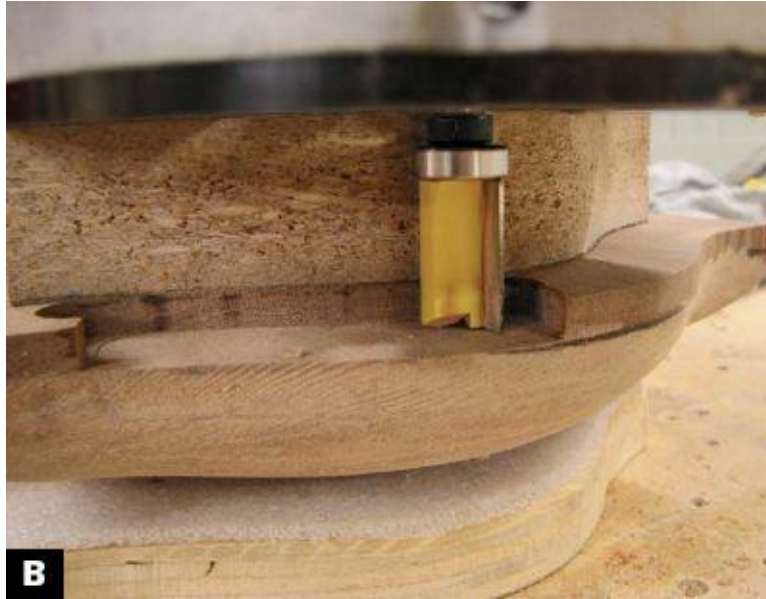
- 1.** Set the box top down onto a sheet of paper and trace around it. Next, adjust a pencil compass to $\frac{7}{8}$ in. and trace around the box top outline, making sure to mark inside of the outline. Cut out the paper template with scissors. The result will be a paper cutout shaped exactly like the box top, only $\frac{7}{8}$ in. smaller on all sides.
- 2.** Trace the paper template onto a piece of $1\frac{1}{4}$ -in.-thick particleboard. Cut the particleboard template to size on the bandsaw and then sand its edges smooth with a drum sander.
- 3.** Screw the particleboard routing template to the underside of the box top, making sure it's centered and equally spaced from all four edges (**PHOTO A**). The resulting screw holes will be covered later by marquetry. If you're not planning to do marquetry, secure the template to the top with two clamps. This method is a bit tricky because you must rout half the rabbet, move the clamps, and then rout the second half, but it eliminates having to drive screws into the top. When clamping the template, be sure to place protective blocks under the clamps' pads, and check to make certain the clamps are tight so the template can't move.



CENTER A PARTICLEBOARD routing template on the underside of the box top and screw or clamp it down.

Can't find 1¼-in.-thick particleboard for the routing template? No problem. Make the template from two pieces of ⅝-in. material or one piece of ¾-in. and one piece of ½-in. material.

- 4.** Cut the rabbet with a ¾-in.-dia. pattern-making router bit that has a 1-in. cutting height and is 2¼ in. long overall. This style bit has a ¾-in.-dia. ball-bearing pilot positioned above the bit's carbide cutters. Adjust the router's depth-of-cut to ⅝¹⁶ in. Clamp the box top to the workbench and then set the router onto the template, with the bit clear of the top. Turn the router on and then slowly cut into the box top until the bit's ball-bearing pilot comes in contact with the template (**PHOTO B**).



AS YOU ROUT the rabbet for the ebony trim, the bearing rolls along the particleboard template and the bit cuts the shape of the template into the box top.

- 5.** Advance the router, moving left to right, while all the time keeping the pilot pressed against the template. Shift the router outward occasionally to trim away waste wood from the rabbet. When necessary, reposition the clamps and continue routing until you've cut a rabbet all the way around the box top.

Cut and attach the ebony trim

1. Use the particleboard routing template and a white pencil to draw outlines of the trim pieces onto the ebony boards. Be sure the ebony accent pieces are slightly thicker— $\frac{1}{32}$ in. to $\frac{1}{16}$ in.—than the depth of the rabbet (**PHOTO C**).



DRAW THE OUTLINES of the trim pieces onto the ebony boards with a white pencil.

2. Cut out the decorative pieces on the bandsaw or scrollsaw. Cut very close to the inside lines and then sand the edges perfectly smooth to ensure the pieces fit tightly against the rabbet. Saw each ebony trim piece to length.

WORK

The best adhesive for attaching the ebony trim is hot animal hide glue, which bonds fast and doesn't require clamping. Heat the glue to 140°F to 150°F in an electric glue pot.

H G B

When melting hide glue, I use an electric glue pot that's thermostatically controlled, so I can easily maintain a temperature of 140°F to 150°F. There are two basic types of hide glues available: granular and pearl. The difference between the two is strength and drying time. As the strength of the glue increases, the time you have to work before the glue begins to harden decreases. Granular hide glue is extremely strong, so it has a short drying time; it's ideal for uncomplicated assemblies for which strength is a top priority. Pearl hide glue isn't as strong as the granular type, so it takes longer to dry; it's preferred for applications where you need a little extra time to assemble and clamp parts together.

- 3.** Use an electric heat gun to apply heat to one section of the rabbet and one ebony trim piece. Once the surfaces are warm, brush on hot animal hide glue and press the piece into place with your hands. Hold it in place for about two minutes. Repeat to attach the remaining three trim pieces (**PHOTO D**). Let the accent pieces dry for four hours to six hours and then sand them flush.



AFFIX THE EBONY TRIM to the top with hot animal hide glue, which bonds fast and doesn't require clamping.

- 4.** To make the box easier to open, rout shallow finger pulls into the ebony trim on the top and on the box. Close the box and use a white pencil to draw the finger pulls onto the ebony trim. Make each pull about 1¼ in. long. Then rout the finger pulls into the trim using a ¼-in.-dia. cove bit (**PHOTO E**).



USE A ¼-IN.-DIA. cove bit to rout finger pulls into the edge of the trim to make the box easier to open.



5. Take the ebony medallion you made earlier and glue it in the center of the elliptical rings carved into the box top. Secure the medallion with hot animal hide glue.

Install the hinges

THE TOP IS ATTACHED TO THE BOX WITH two 1-in. by 1-in. butt hinges. However, because the hinges are positioned close to the box corners, they cover up the dovetail splines. To remedy that, cut a V-shaped notch into one leaf of each hinge.

1. Make the notches about $\frac{1}{16}$ in. larger than the dovetail spline. Then cut one notch from each hinge using a scrollsaw fitted with a #3/0 by 61-tpi jewelers' blade.
2. Lay the box top upside down on some cork blocks and butt it up against the box. Use a steel rule or similar straightedge to align the hinges with each other. Mark their positions onto the top and onto the box with a white pencil. These white lines represent the outlines of the hinge mortises (**PHOTO A**).



NOTCH EACH HINGE around the dovetail splines and use a straightedge to align the hinges.

3. To cut the shallow hinge mortises, start by using a flat chisel to make stab cuts straight down into the ebony. Carefully cut right on the white pencil lines. After scribing each hinge mortise, use a #2/8 carving gouge to make relief cuts across the mortises and up to the stab cuts.
4. Repeat these steps until the hinges sit flush in the mortises. Attach the hinges with $\frac{3}{8}$ -in.-long screws.

WORK

Ebony is extremely hard and splits easily. Be sure to drill pilot holes before driving in the hinge screws.

Finishing touches

I FINISHED THE BOX WITH MAGNALAC® precatalyzed lacquer, a clear finish made by M.L. Campbell®.

- 1.** Start by lightly hand-sanding all surfaces with 150-grit sandpaper. Then blow off all sanding dust and wipe the piece down with a clean, dry cloth.
- 2.** Spray on a very light coat of lacquer finish, effectively sealing the wood's grain. Let the lacquer dry for about two hours, which is one hour longer than recommended. This extra time ensures the finish dries completely.
- 3.** Hand-sand all surfaces with extra-fine 320-grit sandpaper. Sand the carvings with a finishing scratch pad, which is a soft scouring pad (**PHOTO A**). Blow off the sanding dust and wipe the surfaces clean.



- 4.** Spray on another light coat of lacquer, let it dry, and then apply a third and final coat. Note that it's important to apply thin coats. If you spray lacquer on too thickly, it will eventually crack. Let the final coat dry overnight.
- 5.** Install a short length of chain to hold open the box top at approximately 95°. Mark an X on the box top where you want to attach the chain. (If you inlaid marquetry, affix the chain to the center of the ebony oval.)
- 6.** Adjust the chain so the top opens slightly beyond vertical, about 95°. Use a round rasp or file to cut a 3/8-in. half circle into the center back edge of the box. This small cutout helps keep the chain in place when you open and close the top. Screw the chain to the underside of the top and to the inside, back of the box.

P

M

If desired, paint the hinges and chain black to blend in with the ebony trim. Start by sanding the hinges with 600-grit sandpaper and then clean them and the chain with lacquer thinner. Thoroughly dry the parts and spray-paint with flat black enamel paint.





Cameo Jewelry Box

THE ELABORATE design of this Cameo Jewelry Box is based on classic cameo necklaces, which have been worn as a symbol of prestige since the 16th century. Throughout the years, cameo jewels represented not only wealth but also love and were much sought after by royalty throughout Europe.

This box is both elegant and beautiful with many curves and straight, angular lines blending together with a bloodwood ribbon inlay surrounded by a warm-brown chestnut burl. Centered on the box top is a marquetry design of a cameo with winding ribbons flowing from sides to the top, creating the illusion of a necklace.



In this chapter, you'll learn advanced bandsaw techniques for cutting the radiused front, back, and ends from 3-in.-thick hardwood. There are step-by-step instructions for gluing veneers together to form radiused inlays around the cameo marquetry. The Cameo Jewelry Box measures 5½ in. tall by 8 in. deep by 15 in. long, providing plenty of space to store jewelry of any size, including cameo necklaces.



MATERIALS

QUANTITY	PART	SIZE	CONSTRUCTION NOTES
2	Front and back	3 in. × 5 ¹ / ₁₆ in. × 14 ¹ / ₂ in.	cherry
2	Ends	3 in. × 5 ¹ / ₁₆ in. × 7 ¹ / ₂ in.	cherry
4	Splines	¼ in. × ½ in. × 5 ¹ / ₂ in.	cherry
1	Back interior	¼ in. × 5¼ in. × 12 ³ / ₈ in.	chestnut burl veneer
2	End interior	¼ in. × 5¼ in. × 5 ⁵ / ₈ in.	chestnut burl veneer
1	Front center interior	¼ in. × 4¼ in. × 4 ⁵ / ₁₆ in.	chestnut burl veneer
2	Front end interior	¼ in. × 5¼ in. × 4¼ in.	chestnut burl veneer
2	Front flat center edges interior	¼ in. × 4¼ in. × 7 ¹ / ₁₆ in.	chestnut burl veneer
5	Marquetry packets for front and ends		see p. 168
1	Back	¼ in. × 5¼ in. × 12 ³ / ₄ in.	chestnut burl veneer
2	Straight corners	¼ in. × 1 ¹ / ₃₂ in. × 4 ³ / ₈ in.	chestnut burl
2	Straight corners	¼ in. × 1 ¹ / ₃₂ in. × ¾ in.	bloodwood
1	Bottom	¼ in. × 9 in. × 16 in.	maple plywood
1	Bottom interior	¼ in. × 7½ in. × 14½ in.	chestnut burl veneer
4	Outside corners	¼ in. × 17 ¹ / ₁₆ in. × 5 ¹ / ₈ in.	1 piece <i>each</i> chestnut burl veneer, bloodwood veneer, and scrap veneer
1	Front top edge	¼ in. × 1 ⁵ / ₈ in. × 13½ in.	chestnut burl veneer
1	Back top edge	¼ in. × 1 ⁵ / ₈ in. × 13½ in.	chestnut burl veneer
2	End top edges	¼ in. × 1 ⁵ / ₈ in. × 6½ in.	chestnut burl veneer
1	Top	½ in. × 9 in. × 16 in.	maple veneer plywood
1	Top background	¼ in. × 9 in. × 16 in.	chestnut burl veneer



1	Ribbon	$\frac{1}{42}$ in. $\times$ 9 in. $\times$ 16 in.	bloodwood veneer
1	Template	$\frac{1}{42}$ in. $\times$ 9 in. $\times$ 16 in.	scrap veneer
1	Necklace loop	$\frac{1}{42}$ in. $\times$ $1\frac{1}{2}$ in. $\times$ $1\frac{1}{2}$ in.	black-dyed veneer
1	Underside of box top	$\frac{1}{42}$ in. $\times$ $8\frac{1}{2}$ in. $\times$ $15\frac{1}{2}$ in.	chestnut burl veneer
5	Cameo marquetry veneers	$\frac{1}{42}$ in. $\times$ $4\frac{1}{4}$ in. $\times$ $5\frac{1}{4}$ in.	see p. 180
4	Cameo inlay veneer (top and bottom)	$\frac{1}{42}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 6 in.	black-dyed veneer
1	Cameo inlay veneer (top and bottom)	$\frac{1}{42}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 6 in.	bloodwood veneer
4	Cameo inlay veneer (sides)	$\frac{1}{42}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 5 in.	black-dyed veneer
1	Cameo inlay veneer (sides)	$\frac{1}{42}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 5 in.	bloodwood veneer
16	Top edges	$\frac{1}{42}$ -in. veneer	see p. 185
4	Corner ribbons	$\frac{1}{42}$ in. $\times$ $\frac{5}{8}$ in. $\times$ $\frac{5}{8}$ in.	bloodwood veneer
1	Finger pull	$\frac{3}{16}$ in. $\times$ $\frac{7}{8}$ in. $\times$ $2\frac{1}{2}$ in.	bloodwood hardwood
1	Long divider	$\frac{3}{16}$ in. $\times$ $1\frac{7}{8}$ in. $\times$ $13\frac{1}{8}$ in.	bloodwood hardwood
2	Short dividers	$\frac{3}{16}$ in. $\times$ $1\frac{7}{8}$ in. $\times$ $5\frac{1}{16}$ in. long	bloodwood hardwood
1 pair	95° angle stop hinges	$1\frac{1}{16}$ in. $\times$ $1\frac{1}{4}$ in.	

Cut the hardwood box parts

IT'S BEST TO USE 3-in.-thick hardwood for the box parts, but if you can't find hardwood that thick, you could always laminate together two or more boards to equal 3 in. thick. I built this box from a piece of cherry hardwood that measured 3 in. thick by 10¼ in. wide by 36 in. long, which was plenty of wood to get all four box parts: front, back, and each end.

Mill the hardwood blank

1. Rip the cherry blank into two $5\frac{1}{16}$ -in.-wide boards. To avoid burning the wood or straining the saw motor, push the wood past the blade very slowly.
2. Crosscut the two boards to produce the box front, back, and two ends. Be sure to cut each part about 1 in. longer than necessary, which makes it easier to lay out the templates and cut the parts on the bandsaw (**PHOTO A**).



CUT THE BOX FRONT and back to $5\frac{1}{16}$ in. wide by $14\frac{1}{2}$ in. long and cut each of the two ends to $5\frac{1}{16}$ in. wide by $7\frac{1}{2}$ in. long.

3. Use a jointer to mill the hardwood parts to their finished width. Adjust the jointer's depth of cut to $\frac{1}{32}$ in., then turn on the machine and pass both edges of each part over the spinning cutterhead at least once. The finished width of the parts is 5 in., but it's okay if they're a little wider or narrower, as long as the parts are all the same exact size.

S

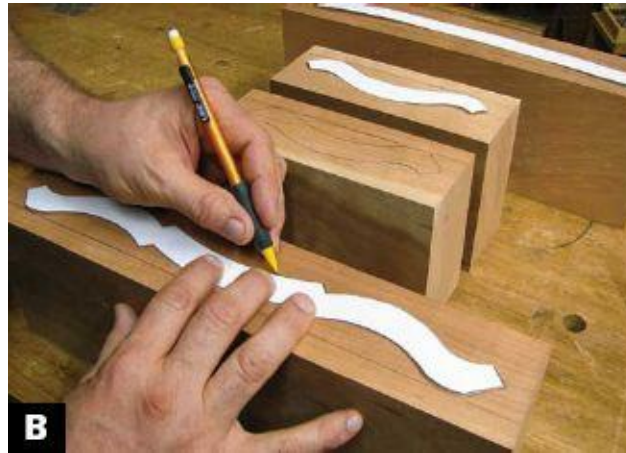
R

H

When choosing hardwood for the box parts, it's best to use tight-grain wood, such as basswood, cherry, maple, or birch as opposed to oak or ash, which are open-grain woods. I've discovered that open-grain woods will telegraph through the veneer, reducing the impact of the marquetry design. For this particular box, I chose cherry hardwood.

Mark and cut the curves

1. Photocopy the front, back, and end templates, shown in “Profile Templates” on [p. 162](#). Cut out the templates and center them on the top edge of the box parts (**PHOTO B**). Use a sharp pencil to carefully draw around each template. It’s important to trace the templates as accurately as possible, especially at the angled ends of each template. These slanted lines represent the mitered joints that eventually meet to form the 90° corners of the box. If these lines aren’t marked and cut precisely, the box will be out of square.



CENTER THE TEMPLATES on the top edge of the box parts and carefully draw around each one.

2. Before cutting the curved shapes on the bandsaw, use the miter saw to cut two 45° angles at each end of the four box parts. It’s important that the saw is cutting precisely at 45°, so first cut some scrap wood and check the angle with a combination square. Once you’ve confirmed the accuracy of the saw, hold each part tight against the saw’s fence and worktable and cut along the 45° lines.

3. Prepare the bandsaw for cutting the curved shapes into the four box parts. Start by installing a $\frac{3}{16}$ -in.-wide by 10-tpi (teeth per inch) bandsaw blade. Then use a try square to confirm that the bandsaw blade and worktable form an exact 90° angle. Adjust the bandsaw’s cutting height to 5¼ in., which will help prevent the blade from veering away from the cutting line.

WORK

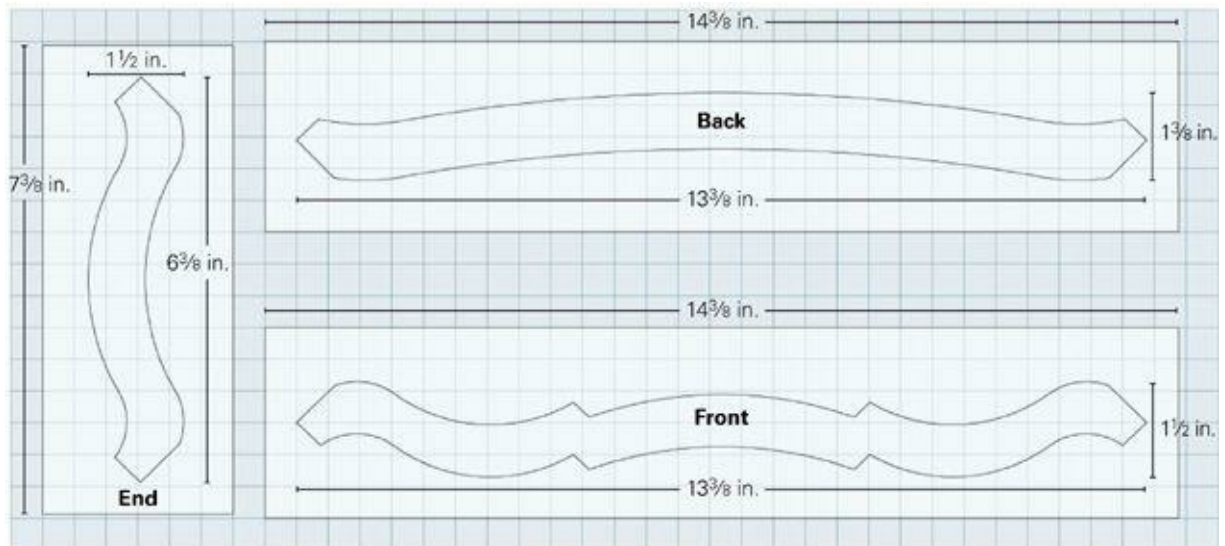
The most accurate way to cut out paper templates is with a scalpel or artist mat knife on a self-healing mat. Lightly press down on the knife and slowly follow the lines to form each full-size paper template.

4. Start the bandsaw and slowly push the box part into the blade. Steer the blade right down the center of the pencil line with a smooth, steady push (**PHOTO C**). Save the cut-off parts for use in clamping down the veneer.



CUT THE CURVED SURFACES of the front, back, and two ends, guiding the blade right down the center of the pencil line with a smooth, steady push.

Profile Templates



Enlarge by 290% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

WORK

When cutting the box parts on the bandsaw, remember to save the cutoff pieces. You can use them later as clamping cauls when you veneer the inside and outside surfaces of the box, a great way to clamp the veneers if you don't own a vacuum press.

Smooth the box parts

After cutting curves into both the inside and outside surfaces of the four box parts, take a few minutes to smooth away the bandsaw-blade marks using a half-round file and 80-grit sandpaper.

1. Firmly clamp the part in a bench vise to prevent it from moving. Hold the file with both hands and apply an equal amount of pressure as you draw it back and forth across the surface. Use the flat side of the file to smooth the flat and convex surfaces. Smooth the concave surfaces with the file's rounded side. Continue to file until you've removed all the bandsaw-blade marks.
2. Smooth all the filed surfaces using a homemade sanding stick. Take an 80-grit pressure-sensitive adhesive (PSA) sanding disk and stick it to a 1¼-in.-dia. wooden dowel. Use the sanding stick to smooth away all the file marks (**PHOTO D**). This is also a good time to file and sand the cut-off pieces, which will be used later as clamping cauls when gluing down the veneer.



AFTER FILING the curved surfaces, use a homemade sanding stick fitted with 80-grit sandpaper to smooth away the file marks.

3. Throughout the filing and sanding process, stop and check periodically to make sure you're not removing too little or too much wood from the surfaces. Lay a try square across the wood's surface and look for high and low spots. Stop sanding when the surfaces are perfectly flat and even.

Rout for the splines and bottom

THE NEXT STEP IS TO CUT GROOVES into the box parts to accept hardwood splines and the ¼-in.-thick plywood box bottom. The splines are used to reinforce the four corner joints of the box. Start by cutting four ¼-in.-thick by ½-in.-wide by 5½-in.-long pieces of hardwood for use as the splines. Any hardwood species will suffice because the splines will later be covered by veneer.

1. Rout spline grooves into both ends of the four box parts (front, back, and ends) using a router table fitted with a ¼-in.-dia. double-flute straight bit. Position the router-table fence ⅞ in. from the center of the ¼-in.-dia. bit. Mount a piece of scrap wood to the router table's miter gauge to prevent blowout. Then use the miter gauge to push the box parts over the bit, cutting the spline grooves. Note that it's best to make two ⅛-in.-deep cuts to produce the ¼-in.-deep groove (**PHOTO A**).



ROUT THE ¼-IN.-DEEP grooves for the hardwood splines into both ends of the four box parts. Make the cut in two passes to reduce tension on the small-diameter router bit and minimize chipping to the inside face of the parts.

2. Prepare to cut a groove for the plywood box bottom by installing a ¼-in.-wide by ½-in.-deep three-wing slot cutter into the router table. Be sure the bit has a ½-in.-dia. shank and is at least 3¼-in. long. The long shank is needed because the grooves are located 1¾ in. up from the bottom edge on the box parts. Also, install a starter pin into the table to provide additional control as you guide the curved parts past the cutter. Rout the groove into the inside surface of the box front, back, and ends (**PHOTO B**).



ROUT THE ¼-IN.-WIDE groove for the box bottom. Guide each part into the spinning cutter and against the starter pin, pushing the parts slowly and steadily.

Cut the bottom profiles

LOOK CLOSELY at the photos of the finished cameo box on [p. 158](#) and you'll notice that there are contoured profiles cut into the bottom edges of the front, back, and ends of the box. These refined details are cut on the bandsaw and lend eye-catching definition and elegance to the overall design.

1. To create the contoured profiles, start by photo-copying the “Bottom Profile Templates” shown on [p. 166](#). Cut out the templates and trace them onto the face of each part (**PHOTO A**).



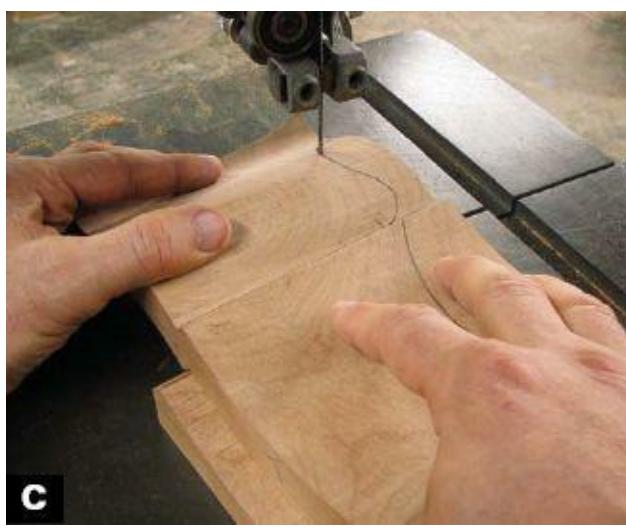
TRACE THE BOTTOM PROFILES onto the face of the front (shown here), back, and two ends. When tracing the outside radius onto the front corners, be sure the inside of the radius doesn't extend more than $\frac{5}{16}$ in. into the corner; otherwise, you'll cut into the spline grooves.

2. Make the first bandsaw cut along the ends of the parts, which will eventually meet to form the corners of the box. Flip the piece around and cut the opposite end. Repeat for the box back and ends (**PHOTO B**).



TO CUT THE OUTSIDE RADIUS, hold the box front at a 45° angle with the spline groove flat against the bandsaw table. Saw along the curved pencil line.

3. To cut the contoured profile along the bottom edge of the four box parts, first set a cutoff piece of wood on the bandsaw table and then place the box part on top. The cut-off piece will support the box part and allow you to cut squarely at 90° (**PHOTO C**).



SUPPORT THE WORKPIECE on a cutoff block when cutting the contoured profile along the bottom edge of the four box parts. Be sure the box part is positioned slightly offset, so you don't saw into the cutoff block.

- 4.** After bandsawing all the box parts, use a drum sander with 120-grit abrasive sleeve to smooth away all of the bandsaw marks.
- 5.** Dry-assemble the box with clamps and hardwood splines inserted into the corner-joint grooves. Then clamp the assembled box to the workbench with one corner overhanging the edge. Sand the corner flush using an 80-grit PSA disk adhered to a round block of wood. Repeat for the remaining three box corners (**PHOTO D**).

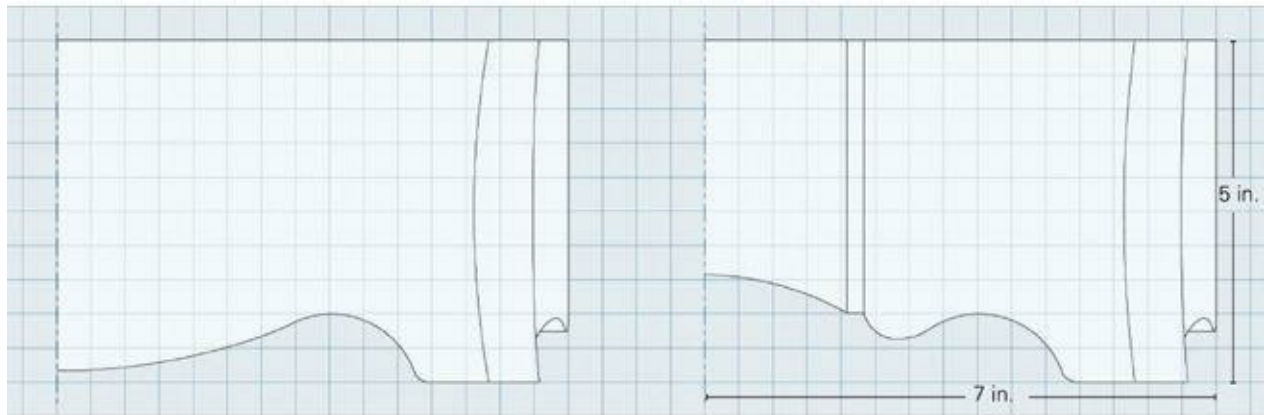


DRY-ASSEMBLE the box and sand the corner flush.

Bottom Profile Templates

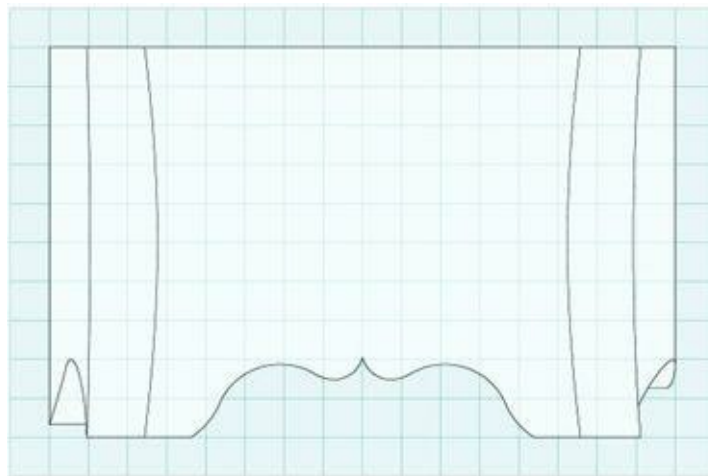
Back

Front



The front and back half templates are mirror images; use these templates for the right-hand side and flip to draw the left-hand side.

End



Enlarge by 270% for full-size templates. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Veneer the inside surfaces

THE FOLLOWING SEQUENCE explains how to apply chestnut burl veneer to the interior surfaces of the box parts. I prefer using hot animal hide glue to adhere veneer, but yellow carpenter's glue can be used as well. For this box I purchased a flitch of chestnut burl, which consists of seven sheets of veneer, each $\frac{1}{42}$ in. thick by 12 in. wide by $16\frac{1}{2}$ in. long. You'll need only six sheets, but it's good to have one extra in case of any problems or mishaps.

1. Start by using spray adhesive to stick $\frac{1}{16}$ -in.-thick poly foam to the face of the clamping cauls. Poly foam is a flexible and nonabrasive lightweight wrap that can be found at most shipping supply stores. The foam makes up for the roughly $\frac{1}{16}$ in. of wood that was sawn away by the bandsaw (**PHOTO A**).



ADHERE $\frac{1}{16}$ -IN.-THICK poly foam to the face of the clamping cauls (the foam makes up for the thickness of the wood sawn away by the bandsaw).

2. Use a self-healing cutting mat and scalpel or artist mat knife to cut veneer for the inside of the box front, back, and ends. You'll need a total of eight veneer pieces (see "Materials" on [p. 159](#)). The box front requires five veneer pieces because of its intricate shape.

3. Use blue painter's tape to cover the ends and bottom groove to prevent glue from getting onto these areas.

4. Heat the hot animal hide glue in an electric hot pot. Then use an electric heat gun to warm the backside of the veneer and the interior surface of the box back. Warm each surface for about one minute. This allows more setup time when brushing on the hide glue (**PHOTO B**).



BEFORE BRUSHING on the hot animal hide glue, warm the backside of the veneer and the interior surface of the box part to allow more setup time.

5. Use a 1½-in.-wide paintbrush to apply hot animal hide glue to both surfaces. Lightly press the veneer to the box back.
6. Place a piece of thin cardboard between the veneer and the foam-covered clamping caul and use several short bar clamps to clamp down the veneer (**PHOTO C**, [p. 168](#)). Let the glue cure overnight.



CLAMP DOWN THE VENEER, with a piece of thin cardboard inserted between the veneer and the foam-covered clamping caul.

7. After removing the clamps, use a scalpel or artist knife to trim the veneer flush along the edges, and to uncover the groove routed earlier for the box bottom.
8. Remove the blue painter's tape and make a ¼-in.-thick sanding block out of any scrap hardwood; wrap the block with 150-grit sandpaper. Sand the veneer flush with the groove. Then use small files to smooth the veneer perfectly flush with the hardwood around the perimeter of the part.
Repeat to veneer the interior of the three remaining box parts.

Veneer the outside surfaces

THIS IS A RELATIVELY SIMPLE marquetry pattern because you'll be using only three pieces of veneer for each of the five marquetry packets. You will need a packet for the front center, for each of the two front sides, and one for each of the two box ends.

Each packet consists of three pieces of $\frac{1}{42}$ -in.-thick veneer: chestnut burl for the background, bloodwood for the ribbon, and scrap veneer for the cutting template. Templates for all the inlays are shown in "Front and Side Marquetry Templates" on the facing page.

The sizes of each veneer packet are

- Front center: $4\frac{1}{8}$ in. by $4\frac{3}{4}$ in.
- Front right side: $4\frac{5}{8}$ in. by $5\frac{1}{4}$ in.
- Front left side: $4\frac{5}{8}$ in. by $5\frac{1}{4}$ in.
- Box right end: $5\frac{1}{4}$ in. by $6\frac{1}{4}$ in.
- Box left end: $5\frac{1}{4}$ in. by $6\frac{1}{4}$ in.

1. Use the scrollsaw to cut the five veneer packets. For specific instructions, refer to [p. 215](#).
2. After cutting the marquetry packets, use the shading technique shown on [p. 221](#) to shade the bloodwood ribbons. The most effective place to add shading is where two pieces of ribbon meet.
3. Prepare the veneer for gluing by sticking the outer surface of the veneer to a piece of double-tack mounting film (available at art-supply stores). The sticky film will securely hold the veneered pieces in position (**PHOTO A**).

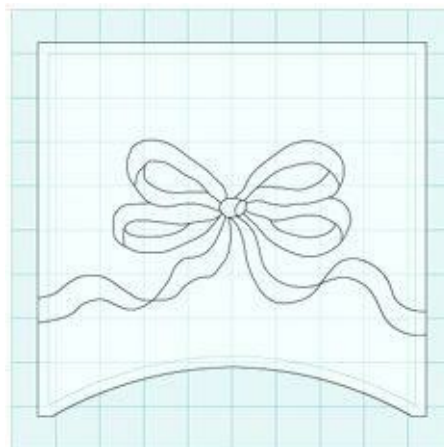


STICK THE OUTER SURFACE of the veneer to a piece of double-tack mounting film.

Front and Side Marquetry Templates

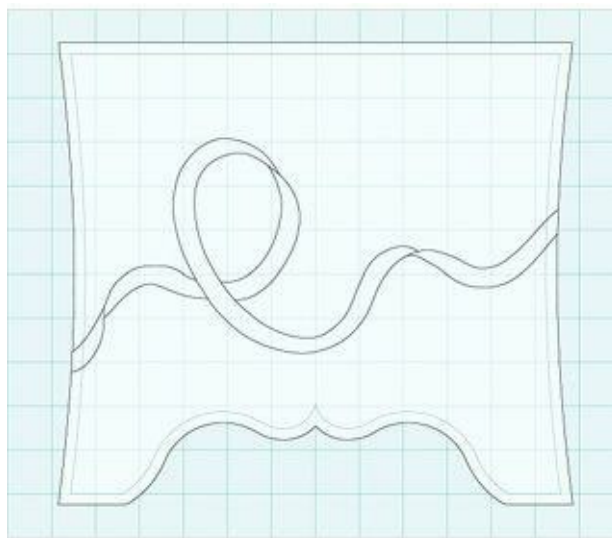
Front bow template

Cutting face left = glue right



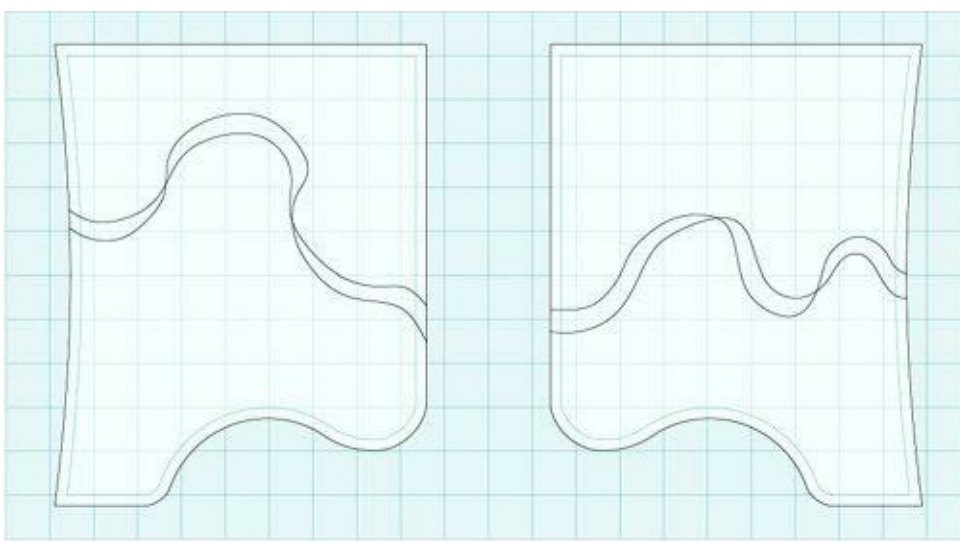
Left side end template

Cutting face left = glue right; for the right side end, the template is reversed.



Front side templates

Showing face left = right side Showing face right = left side



Enlarge all templates by 210% for full-size templates. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

4. Use an electric heat gun to warm the backside of the veneer and the outer surface of the box part. Then brush hot animal hide glue onto both surfaces.
5. Press the veneer to the box part, then cover it with a single layer of $\frac{1}{16}$ -in.-thick poly foam. Set the cut-off piece on top of the foam and securely clamp down the veneer with short bar clamps (**PHOTO B**). Let the glue dry at least three hours (I prefer to wait overnight to ensure a good glue bond when gluing veneer to any type of radius).



CLAMP THE VENEER to the box part in this order: box part, veneer, layer of $\frac{1}{16}$ -in.-thick poly foam, and cut-off piece on top.

6. After removing the clamps, use a scalpel to trim off the extra veneer and small files to smooth the veneer edges. There will be some paper left on the marquetry face; lightly sand off the paper with 150-grit sandpaper (**PHOTO C**). Repeat this step for the remaining box parts.



REMOVE THE CLAMPS and trim off the extra veneer; lightly sand off any paper left on the marquetry face.

7. For the outside back surface of the box you will not need a packet, just a single sheet of chestnut burl veneer. Brush hot animal hide glue onto both surfaces and then press the veneer to the box part. Clamp down the veneer securely with short bar clamps.

M

M

P

When creating marquetry designs with veneers, it's important to glue kraft paper to the face of the veneer before cutting the veneer to size. The kraft paper flattens and strengthens the veneer and helps prevent chipping and cracking while cutting on the scrollsaw.

When sawing the veneer, the face with the kraft paper should always be face down because the underside is vulnerable to chipping. The exception is the upper sheet of the marquetry packet where the paper template is glued on top of the waste veneer.

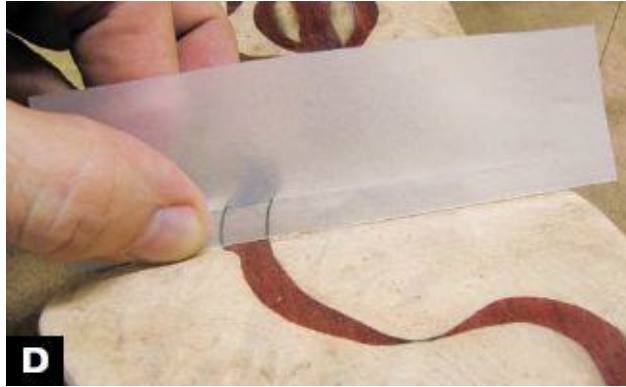
And remember, when preparing a marquetry packet, the top cutting template is facing the opposite direction to the actual finished marquetry. This is because the front of the image is facing down. For example, the woman shown in the center cameo is facing left when the veneer is being cut, but when glued down to the box top she is facing right.

For this cameo box you'll use the packet method of marquetry, except for the two front corners, four box corners, and four top corners. These smaller pieces must be cut individually to match up exactly with the other ribbons. This technique is explained in greater detail on the facing page. The use of packet marquetry is explained on [p. 215](#).

Veneer the small straight corners

The front of the box features a center section that's slightly concave and embellished with a marquetry red-ribbon bow. At each end of the center section are narrow, straight corners that return back and connect to the convex front sections. The red ribbon flows from the bow out in both directions across the box front. The following steps describe how to cut thin strips of marquetry—which include short lengths of ribbon—to cover the two narrow, straight corners.

1. Hold a piece of tracing paper on the concave center section of the box, so that you can see the ribbon through the paper. With a pencil, draw the two lines of a slightly arched ribbon that will go across the narrow corner and match up with the ribbon on the convex section (**PHOTO D**).

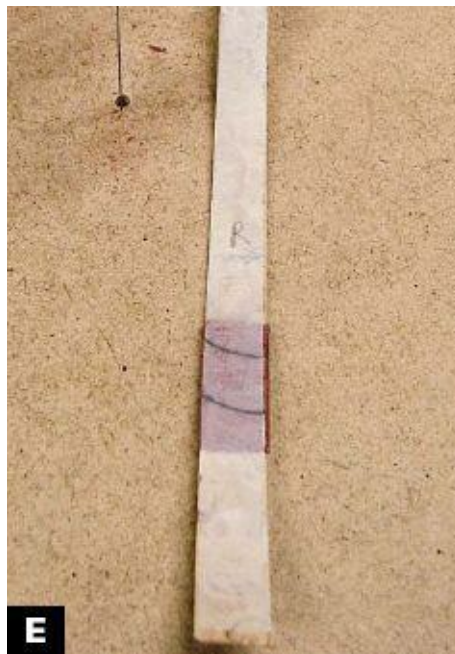


USE A PIECE OF TRACING PAPER to outline the narrow piece of ribbon trim that bridges the straight corner between the convex outer section and the concave center section of the front.

WORK

It's important for the bloodwood ribbon grain to be going in the same direction. On the small straight corners at the ends of the front center section the wood grain should be horizontal.

2. Using a straightedge, self-healing mat, and scalpel, cut the veneer for the two narrow, straight corners. You'll need two pieces of chestnut burl $1\frac{1}{32}$ in. wide by $4\frac{3}{8}$ in. long, and two pieces of bloodwood $1\frac{1}{32}$ in. wide by $\frac{3}{4}$ in. long. Spray clear adhesive to the backside of the bloodwood and then stick it onto the chestnut burl from where the ribbon will be cut out.
3. Take the tracing-paper template and spray a clear adhesive on the backside. Press it onto the top of the bloodwood and chestnut burl with the ribbon cutting lines centered on the bloodwood (**PHOTO E**).



AFFIX THE NARROW TRACING-PAPER template onto the top of the bloodwood and chestnut burl, with the ribbon cutting lines centered on the blood-wood. Cut out on the scrollsaw.

4. Install a 3/0 by 61-tpi jeweler's blade in the scrollsaw and set it to the slowest speed. Then cut the ribbon and background at the same time by following the pencil lines. Guide the narrow piece slowly and steadily into the blade, which will help prevent the blade from veering off course.
5. After the veneer is cut, use blue painter's tape to stitch the top and bottom chestnut burl background veneer to the center ribbon. Hot animal hide glue is a great choice for adhering this small piece of veneer to the corners because it's difficult to get clamps to work in this area (**PHOTO F**).



ASSEMBLE THE STRAIGHT CORNER, hold together with blue painter's tape, and glue in place, aligning the ribbons on either side.

Another way to cut out the ribbon and background veneers is to employ a technique that's known as the window method. This method is explained on [p. 45](#).

6. Take the heat gun and lightly heat the backside of the veneer and the face of the box corner. Brush hot animal hide glue onto both surfaces, then press the veneer onto the corner. Be sure to align the corner ribbon with the ribbons to the left and right. Hold the veneer with your fingertips for about one minute, then firmly press down the veneer with a wooden veneer hammer. Let the glue dry for about three hours and then trim with your scalpel or artist knife and sand the veneer flush.

WORK

Hot animal hide glue is the best adhesive for adhering smaller veneer pieces to a substrate. If you don't get a good bond the first time, you can always reheat the veneer with an electric heat gun and reposition the veneer.

Glue the box together

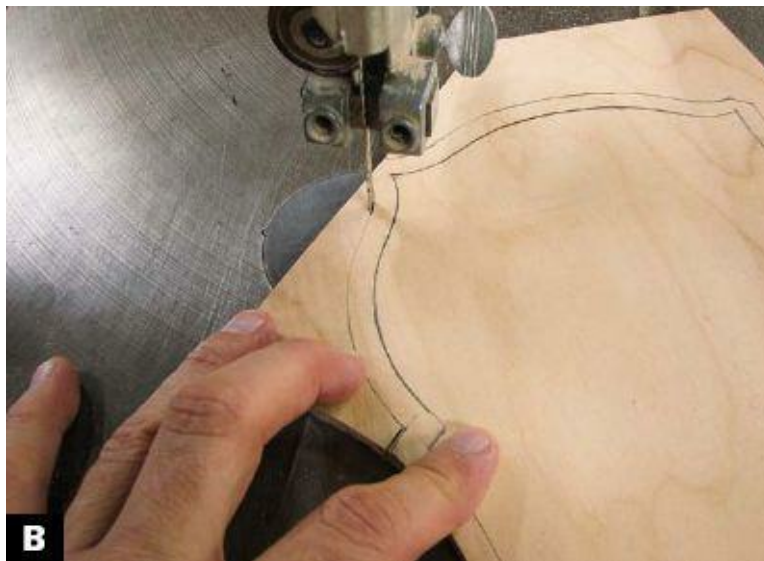
BEFORE CONTINUING with the veneering, you must make the bottom of the box and then glue together the four sides of the box.

1. Dry-assemble the box by installing the wooden splines into the four corners. Then use two long rubber bands to hold the box square. Set the box upside down onto a piece of ¼-in.-thick by 9-in.-wide by 16-in.-long maple plywood. Trace the inside shape of the box onto the plywood (**PHOTO A**).



TO MEASURE FOR THE BOTTOM PANEL, dry-assemble the box and trace the inside of the box onto the plywood.

2. Use a compass to draw a line parallel to and $1\frac{5}{32}$ in. outside the pencil outline you just traced. This second line represents the finished size and shape of the box bottom and allows $\frac{1}{32}$ -in. expansion space for the bottom to fit into the ½-in.-deep groove. Cut out the box bottom (**PHOTO B**).



DRAW A LINE $1\frac{5}{32}$ IN. outside the pencil outline and cut out the box bottom, making sure you steer the bandsaw blade down the center of the outer line.

3. Dry-assemble the box with the plywood bottom installed. If the box joints don't fit together, remove the box bottom and cut or sand away a little material. Reassemble to make sure that all the box parts fit tightly together.

- 4.** Next, prepare to veneer the box bottom by cutting a 7½-in.-wide by 14½-in.-long piece of chestnut burl. Apply the bottom veneer using yellow glue and a vacuum bag. After the glue is dry, set the bottom upside down onto a self-healing mat. Use a scalpel to trim the veneer close to the plywood edge, then file or sand the veneer edge flush.
- 5.** Apply blue painter's tape along the inside ends of the box parts, to protect the surfaces from glue squeeze-out. Cut the four splines to 5¼ in. long, which is ¼ in. longer than necessary. Brush yellow glue onto the corner joints and spline grooves, and then assemble the box. Be careful not to get glue into the box bottom grooves. Clamp the box together, using the cut-off parts as clamping cauls, and then let the glue cure overnight (**PHOTO C**).



GLUE THE SPLINES into the corner joints and assemble the box. Clamp, using the cut-off parts as cauls.

- 6.** Use a sanding block and 150-grit sandpaper to sand the splines flush with the top and bottom edge of the box. Then clean off any excess glue on the face of the corners using a scraper or sandpaper.

Prepare the outside corners

TO ENSURE THAT the bloodwood veneer ribbons on the corners match up with the ribbons on the front and ends of the box, use a pencil to draw the ribbons onto the hardwood corners of the box. Here, you can be a little creative, shaping the ribbons as you like. Just be sure they align with the front and end ribbons. And to make the ribbons appear to twist, simply draw the ribbon to a point from each direction (**PHOTO A**).



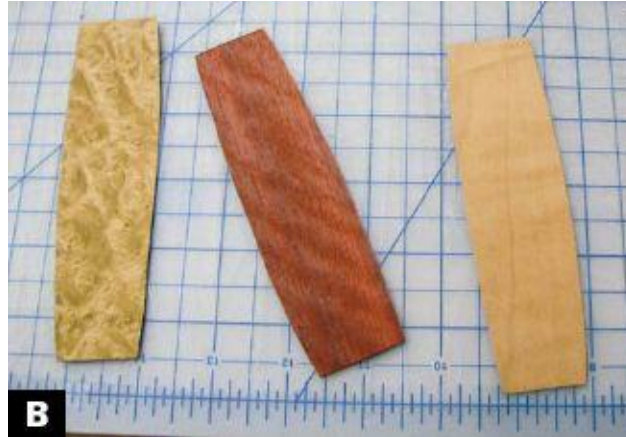
CONNECT THE RIBBONS on the front and ends of the box by continuing them across the hardwood corners of the box. You can afford to be creative here.

All four of the box corners will have ribbons running across them. The two back corners will have a single ribbon, the two front corners require two ribbons each. After drawing the ribbons onto the hardwood corners, cover each corner with tracing paper and trace the ribbon outlines onto the paper. This will be the cutting template for the veneers used to cover the corner.

Veneer the outside corners

The following steps guide you through creating the marquetry detail at the four outside box corners. This simple technique ensures that the inlaid-veneer patterns will flow smoothly from the box front, across the corners, and onto the box ends.

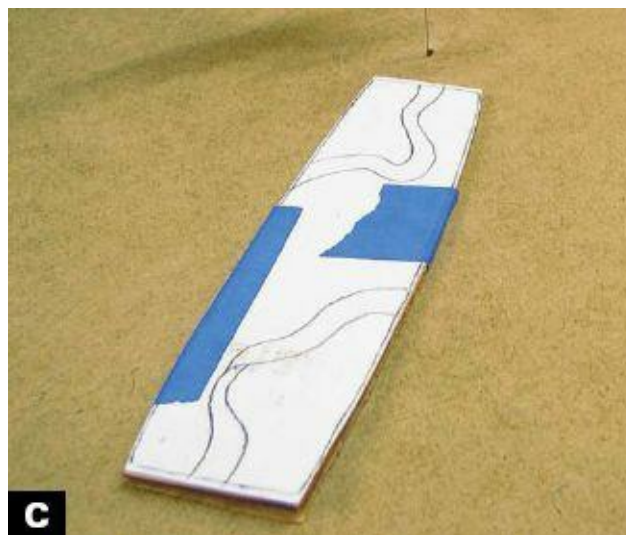
1. For each box corner cut three pieces of veneer, each approximately $1\frac{7}{16}$ in. wide by $5\frac{1}{8}$ in. long. You'll need one piece of chestnut burl for the background, one piece of bloodwood for the ribbon, and one piece of scrap veneer for the template. Cut out the veneer using a scalpel and self-healing cutting mat (**PHOTO B**). Be sure the wood grain on the bloodwood veneer is running vertically. That way, the ribbon will look like it's flowing upward to the top.



YOU NEED THREE PIECES of veneer to create the outside corners: one piece of chestnut burl for the background, one piece of bloodwood for the ribbon, and one piece of scrap veneer for the template.

2. To preserve your tracing-paper template, make a photocopy of the original. Then cut out and glue the copy to the face of the waste veneer using spray adhesive. Stack the three pieces of veneer and tape together two edges to form a small packet.

3. Set the scrollsaw to its slowest speed and cut the stacked-veneer packet along the pencil lines (**PHOTO C**).



ASSEMBLE THE STACKED-VENEER packet and cut along the pencil lines.

4. Place the cut veneer pieces back together face-side down onto a sheet of mounting-film paper.

Then trim off the excess paper with a scalpel.

5. Using an electric heat gun, lightly warm the glue side of the veneer and the face of the hardwood corner. Brush hot animal hide glue onto both surfaces, then lightly press the veneer into place; hold with your fingertips for about one minute. Lightly rub down the veneer with a wooden veneer hammer (**PHOTO D**). Let the glue dry at least three hours before trimming and sanding the edges flush. (Note that if you're using yellow glue instead of hot animal hide glue to adhere the veneer, you'll have to make a clamping caul to match the outside radius corners.)



PRESS THE CORNER VENEER into place, rubbing down lightly with a wooden veneer hammer.

Veneer the top edges

USE THE SAME CUTTING TEMPLATES that you used to cut the hardwood cherry front, back, and ends (see [p. 162](#)) to cut the chestnut burl veneer for the top edges of the box. Only this time, draw a line $\frac{1}{8}$ in. larger around the templates. Follow the radius profiles, but mark the ends at 45°. Check to be sure the mitered ends of the templates fall centered on the mitered box corners. Trace the templates onto the veneer and cut out the four pieces.

1. Use the heat gun to lightly warm the glue side of the veneer and the hardwood edge. Brush hot animal hide glue onto both surfaces (**PHOTO A**).



USE HOT ANIMAL HIDE GLUE to attach the top edge veneer to the box; apply glue to both surfaces.

2. Lightly press down the veneer with your fingertips, hold for one minute, and then rub down the veneer with a wooden veneer hammer.
3. Before veneering the remaining three edges, dry-fit each veneer piece to ensure that it fits precisely at the mitered corners. Then glue down the veneer pieces.
4. After the glue is completely dry, place the box upside down on a self-healing cutting mat and use a scalpel to trim off the excess veneer around the outside and inside of the box. Be careful not to cut too close or you might accidentally slice into the box. File the veneer edges flush, then finish by lightly sanding with 150-grit sandpaper, rounding over the sharp corners.

Make the box top

1. Cut a $\frac{1}{2}$ -in.-thick by 9-in.-wide by 16-in.-long piece of maple-veneer core plywood for the top. Place the box upside down on top of the plywood and trace around it. Cut the top to size on the bandsaw, steering the blade along the inside of the pencil line.
2. Sand the edges of the plywood box top flat and smooth with a sanding block and 80-grit sandpaper. As you're sanding, check occasionally to see how well the top fits the box. The top should be $\frac{1}{42}$ in. smaller at all edges to allow for the veneer.
3. To square up the hinges along the contoured back edge of the box top, start by drawing a straight line onto the inside surface of the top, about 1 in. from the rear edge. Mark the centerline of the top onto the straight line and then center each hinge $3\frac{3}{8}$ in. to the left and right of the centerline. Use these reference lines to draw outlines for two $1\frac{1}{16}$ -in. by $1\frac{1}{4}$ -in. 95° angle stop hinges.
4. Cut the outline of each hinge mortise with a flat chisel. Keep the edge of the chisel on the inside of the pencil line and hold it precisely at 90° . Lightly tap the chisel with a mallet.
5. Next, remove wood from the mortise using a #2/8 carving knife. The hinge leaf is $\frac{3}{32}$ in. thick, but remove only half of that— $\frac{3}{64}$ in.—at a time. Cut from the center of each mortise up to the outline cuts. Repeat to recess the mortises to $\frac{3}{32}$ in. deep (**PHOTO A**).



USE A FLAT CHISEL to cut the outline of each hinge mortise on the box top. Remove wood from the mortise using a #2/8 carving knife.

6. Repeat steps 4 and 5 to mortise the hinges into the back edge of the box. Then attach the box top by screwing on the hinges. Once you've confirmed that the top fits properly, remove the hinges and place them aside until the box is complete.

Veneer the box top

PHOTOCOPY AND CUT OUT the “Top Mar-quetry Templates” on [p. 178](#). Note that the template is $\frac{1}{8}$ in. larger on all sides than the plywood box top. That little bit extra template allows you to see better how the ribbons line up at the four corners.

1. Using a scrollsaw at its lowest setting with a 3/0 by 61 tpi jeweler’s blade, cut the box top following the outside line of the template (**PHOTO A**).



CUT THE BOX TOP following the outside line of the template.

2. To veneer the box top, you’ll need three pieces of veneer: chestnut burl for the background, bloodwood for the ribbon, and scrap veneer for the template. Cut each piece 9 in. wide by 16 in. long. Detailed marquetry instructions are given on [p. 215](#), but there are a couple of extra steps needed to create this top.
3. On the marquetry packet for the loop of the necklace, use a small piece of black-dyed veneer, measuring $1\frac{1}{2}$ in. by $1\frac{1}{2}$ in. Tape the black square of veneer to the underside of the scrap veneer template precisely where the loop is located. For a detail this small, there’s no reason to use a full sheet of veneer.
4. The center ellipse is waste veneer that you’ll cut out when following the center of the cutline. This will also be the centerline of the $\frac{1}{8}$ -in. inlay recess that you’ll rout to receive the cameo necklace marquetry.

M

C

C

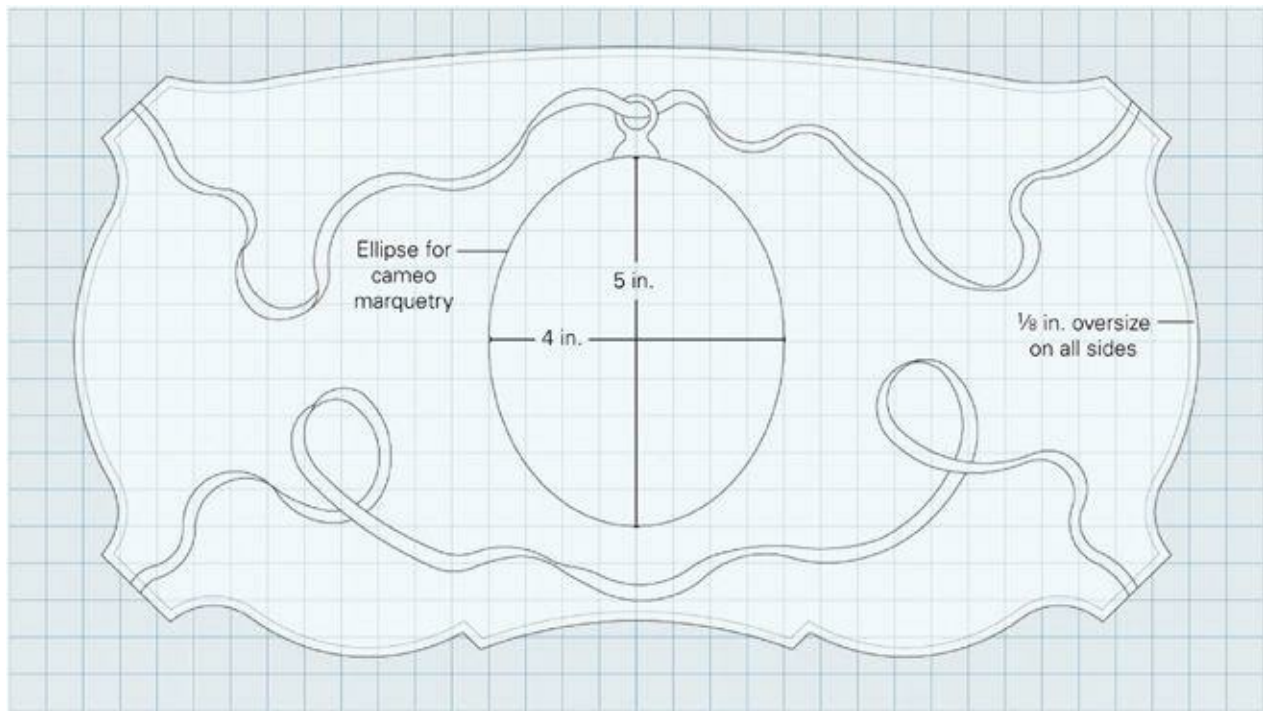
B

T

For gluing the marquetry to the box top, I make two clamping cauls from a piece of $1\frac{1}{4}$ -in.-thick particleboard to provide extra support for keeping the veneer flat to the top when clamping. I make one the same size and shape as the top, so I can clearly see the veneer when clamping, and one slightly larger, measuring $1\frac{1}{4}$ in. by 12 in. by 19 in., which supports the veneer.



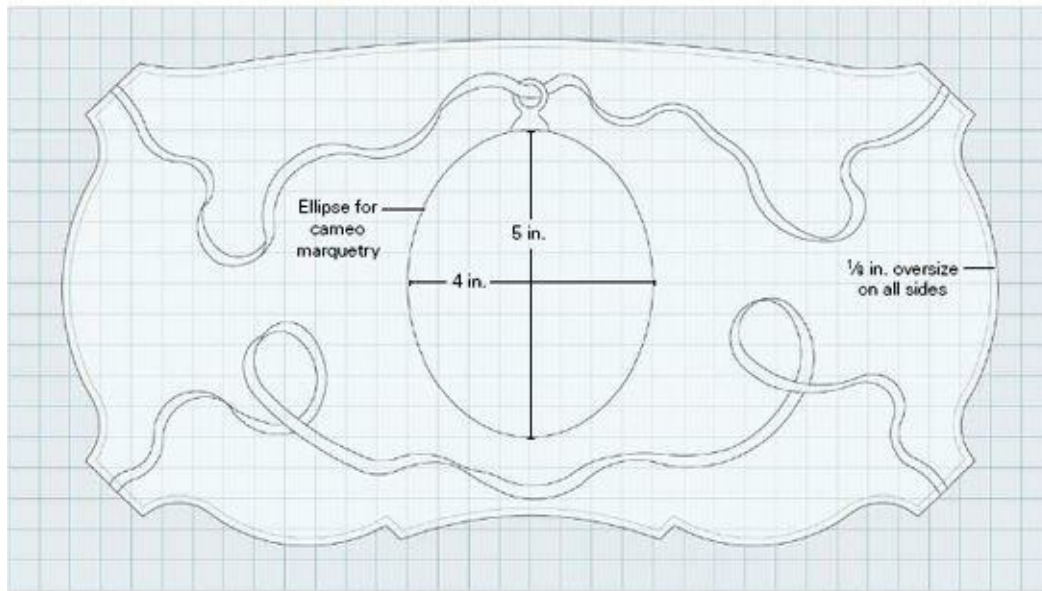
5. After you're done cutting and shading the top marquetry packet, place all the pieces back together face-side down onto a sheet of mounting film paper. Be sure the sheet is slightly larger than the veneer (**PHOTO B**). Then use a scalpel to cut off the excess paper.



ASSEMBLE THE CUT VENEER pieces for the box top face down on a sheet of mounting film paper.

- 6.** Brush the hide glue onto both the upper surface of the box top and marquetry. Then clamp with bar clamps and let the glue dry overnight. Clamp the center of the clamping caul first, then the outer edges so glue will seep outward, creating a fast bond.
- 7.** After the glue is dry, place the top upside-down on a self-healing mat and use a scalpel to cut away the excess veneer. Then clamp the top in a bench vice and use a small file to trim the veneer flush.
- 8.** To cover the underside of the box top, cut an 8½-in.-wide by 15½-in.-long piece of chestnut burl and adhere using the same steps described earlier for gluing on the marquetry veneer.

Top Marquetry Templates



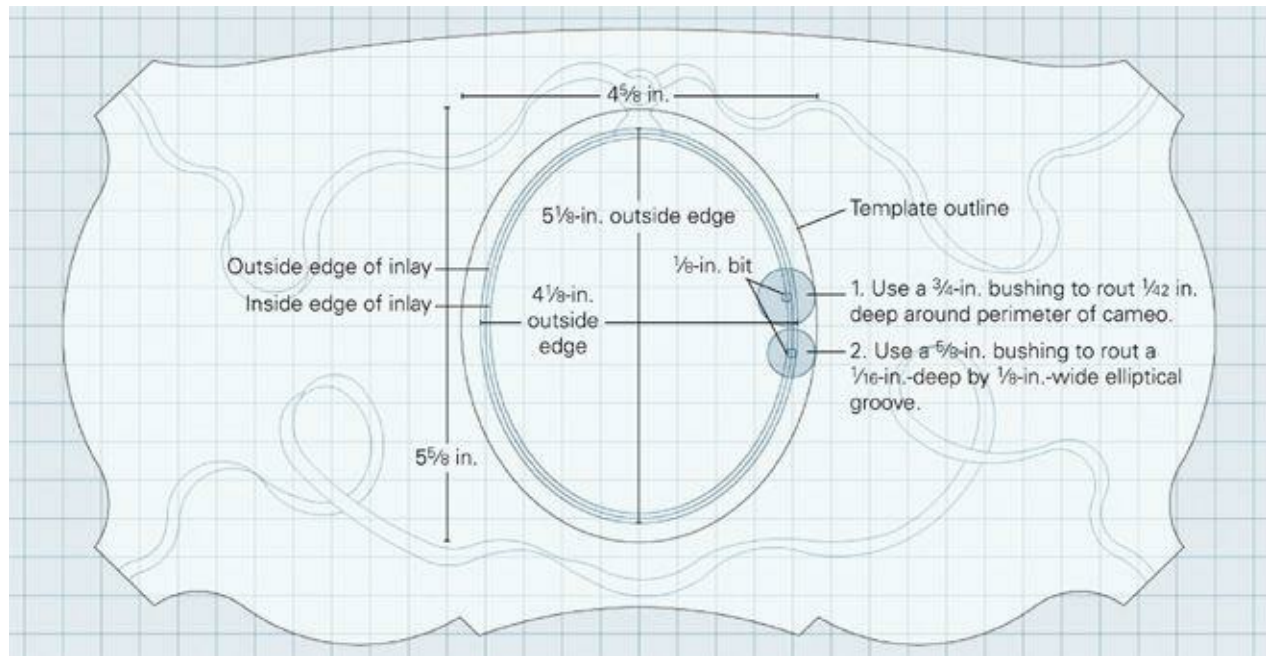
Enlarge by 250% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Rout the cameo marquetry recess

EARLIER YOU MADE A CLAMPING CAUL cut to the same size and shape as the box top (see [p. 177](#)). You'll need it again for this step, only this time you'll have to cut an ellipse from the center of the caul so you can rout a recess for inlaying the cameo marquetry.

- 1.** Make a photocopy of the ellipse template, shown below. Cut out the template and then trace it onto the center on the clamping caul.
- 2.** Drill a ¼-in.-dia. hole on the inside of the ellipse, very close to the cutline. Move to the scrollsaw and feed a #5 crown-tooth scrollsaw blade through the hole. Carefully cut out the 4⅝-in.-wide by 5⅝-in.-long ellipse, which is the same size as the router-bushing guide template.
- 3.** Use a rounded sanding block with 80-grit sandpaper to smooth the edge of the ellipse. Once the ellipse is sanded smooth, clamp the caul to the box top, lining up all edges.
- 4.** To rout the recess for the cameo marquetry, first attach a ¾-in.-dia. guide bushing to the plunge router base. Then install a ⅛-in.-dia. straight-cutting router bit and set the depth to be flush with the top substrate, cutting only the ¼-in.-thick veneer.

Ellipse Template and Router Layout

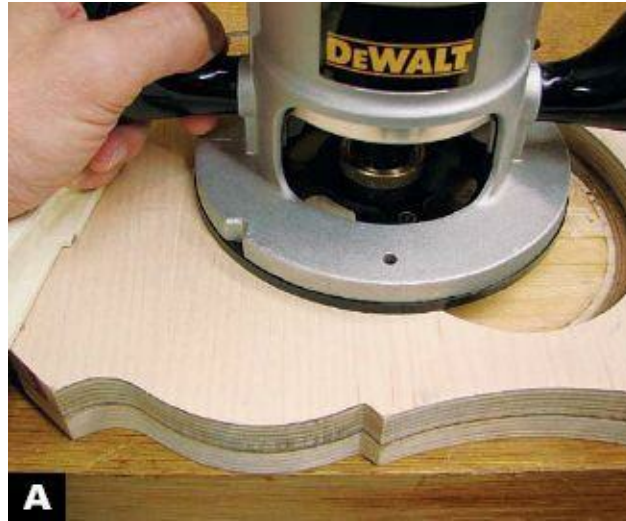


Enlarge by 240% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

WORK

Always wear eye and hearing protection when routing. Be sure all bits, attachments, clamps, and locking devices are secured before starting the router. And always unplug the router when removing or installing a bit.

5. Start the router, lower it down onto the clamping caul, and slowly guide it around the elliptical cutout. Be sure to hold the guide bushing tight against the edge of the cutout. The bit will cut the outline of the 4-in.-wide by 5-in.-tall ellipse (**PHOTO A**).



WHEN ROUTING the recess for the cameo veneer, it's best to use a plunge router, which is easy to adjust and provides the most accurate results.

6. Once the elliptical ring is routed out, scrape off the excess glue using a $\frac{3}{4}$ -in.-wide flat chisel.

Glue the cameo marquetry to the box top

TO CREATE THE CAMEO VENEER PACKET, you'll need five pieces of veneer:

- Maple burl for the background
- Bloodwood for the dress and hair band
- Quilted maple for the hair
- Flat-cut maple for the face, neck, and shoulders
- Scrap veneer for the cutting template

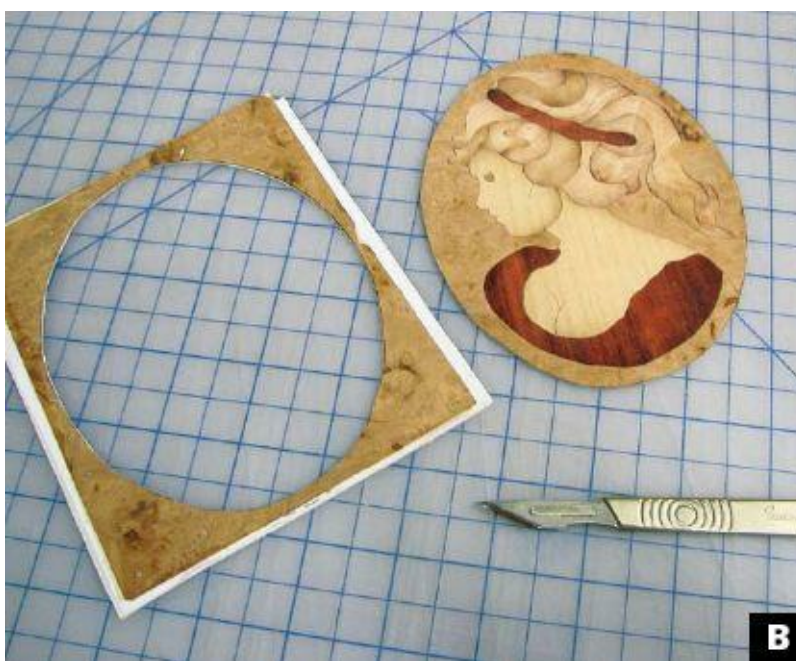
Cut each piece 4¼ in. wide by 5¼ in. long. Again, detailed marquetry information can be found on [p. 215](#).

1. To match the cameo to the top ellipse, lay a sheet of tracing paper over the elliptical cutout on the box top. Use a scalpel to cut out the ellipse, then transfer it to the cameo marquetry (**PHOTO A**).



TRANSFER THE TRACING-PAPER elliptical cutout to the cameo marquetry.

2. Using a self-healing mat and scalpel, cut out the ellipse using short cuts and three to four light passes until the cameo is free from its background (**PHOTO B**).



WORKING ON A SELF-HEALING MAT, use a scalpel to cut out the cameo.

3. Flip over the cameo marquetry, so that the paper film is facing up. Place the cameo marquetry into the ellipse on the box top, making sure it fits. If there are a few places that won't lay flush with the top veneer, use a scalpel to trim away any access veneer. The cameo is now ready for gluing to the top.
4. Cut a clamping caul from $\frac{3}{4}$ -in. plywood. Make it $4\frac{1}{8}$ in. wide by $5\frac{1}{8}$ in. tall, which is slightly larger than the ellipse.

Cameo Template

When cutting, woman faces left; when gluing, woman faces right.



Enlarge by 140% for full-size template. When enlarged, grid is ½ in. × ½ in.

5. Use an electric heat gun to slightly warm the underside of the cameo veneer and the ellipse recess routed in the box top. Brush hot animal hide glue onto both surfaces, then clamp the cameo marquetry in place. Let the glue set for at least three hours before removing the clamps.

T

D

G

C

When gluing down the cameo marquetry, I prefer to use darker glue, which helps fill in and hide the small sawkerfs. The darker glue also blends with the veneer much better than does white or yellow glue. For example, dark glue makes the cleavage line much more visible against the flat-cut maple veneer. Use dark glue wherever there are dark-colored veneers and you want to hide the sawkerf lines. Titebond II dark wood glue is a darker version of the company's Titebond II yellow wood glue. You could also use animal hide glue, which is rather dark in color.

6. Remove the clamps and lightly sand the cameo with 150-grit sandpaper. Be careful not to sand too aggressively. At this stage you need to sand off the mounting film and glue only. Save the final sanding for just before finishing (**PHOTO C**).



ONCE THE CAMEO MARQUETRY is in place and the glue is dry, lightly sand off the mounting film and glue.

Make the elliptical inlay

TO ROUT THE 1/8-IN.-WIDE GROOVE around the cameo inlay, use the same clamping caul that you used earlier for routing the ellipse into the box top. The elliptical inlay is formed by setting a piece of bloodwood veneer in the middle between four pieces of black-dyed veneer.

1. Set the router's depth of cut to $\frac{1}{16}$ in. deep and replace the $\frac{3}{4}$ -in. guide bushing with a $\frac{5}{8}$ -in. guide bushing (see "Ellipse Template and Router Layout" on [p. 179](#)). Run the router around the elliptical cutout to cut a 1/8-in.-wide elliptical groove around the marquetry picture (**PHOTO A**). The router bit will split the veneer seam in half, making the finished size of the ellipse $4\frac{1}{8}$ in. wide by $5\frac{1}{8}$ in. tall.



USING THE SAME CLAMPING CAUL used earlier for routing the ellipse into the box top, rout a 1/8-in.-wide elliptical groove around the marquetry picture.

2. Make clamping jigs for laminating together the five strips of veneer that make up the elliptical ring that goes around the cameo marquetry. Note that the ring is made up of four laminated veneer sections: one each for the top and bottom of the ellipse, and one for each side of the ellipse.
3. From $\frac{3}{4}$ -in. plywood cut an elliptical-shaped block that's $3\frac{7}{8}$ in. wide by $4\frac{7}{8}$ in. long; this is the size of the inside dimension of the elliptical groove. This center block is used to form all four sections of the elliptical ring.

WORK

When routing the 1/8-in. inlay, switch off the router at the end of the cut and wait for the bit to stop spinning before lifting the router off the workpiece. That will prevent you from accidentally cutting into the cameo.

4. Now cut one 3/4-in. plywood block to the outside dimension and shape of the top of the elliptical groove. This block is used to laminate the top and bottom sections of the elliptical ring.
5. Cut a 3/4-in. plywood block to the outside dimension and shape of the side of the elliptical groove. This block is used to laminate the left and right side sections of the elliptical ring.
6. Cut the 10 strips of veneers needed to make the elliptical inlay. To form the top and bottom of the ellipse, cut four pieces of black-dyed veneer and one piece of bloodwood veneer to 3/4 in. wide by 6 in. long. For the right and left sides of the ellipse, cut four pieces of black-dyed veneer and one piece of bloodwood veneer to 3/4 in. wide by 5 in. long. Note that these pieces are longer than needed to allow for final cutting and fitting. You'll complete two glue-ups, which will produce enough veneer to form the elliptical inlay.
7. Brush yellow glue on all faces of the veneer and then clamp the five pieces of veneer in between the plywood clamping jigs. Start by laminating together the veneer pieces that will make up both the top and bottom sections of the elliptical ring (**PHOTO B**).



CLAMP THE FIVE PIECES of veneer (four black-dyed veneer and one bloodwood) that form the top and bottom sections of the elliptical ring. Then repeat for the pieces that make up the sides.

Repeat this step to laminate the veneer strips that will produce the left- and right-side sections of the elliptical ring. Allow the glue to cure overnight. From these two laminations, you'll be able to cut the four sections needed to create the elliptical ring.

F

V

E

G

The five pieces of veneer at 1/42-in. thickness don't quite equal the 1/8-in. width of the elliptical

groove. But when you take into account the glue between the veneer layers, the inlay will fit very tightly. Keep in mind that veneers vary in thickness, so it's a good idea to check the thickness before gluing.



8. Before cutting the laminations to their finished thickness, use a sanding block and 80-grit sandpaper to sand flat both edges. This will ensure that they'll sit flat into the bottom of the elliptical groove.

9. Use a white pencil to mark a cut line $\frac{1}{8}$ in. from the edge of the veneer strip. Use a scrollsaw with a #5 crown-tooth blade to cut along the line, producing a $\frac{1}{8}$ -in.-wide strip of veneer (**PHOTO C**).



C

MARK A CUT LINE $\frac{1}{8}$ IN. from the edge of the veneer strip and use a scrollsaw to make the cut.

Trim and fit the elliptical inlay sections

1. Use a sharp chisel to cut approximate 45° miters into both ends of the left-side veneer strip. The exact angle of the miter isn't critical, any angle close to 45° will help hide the joints much better than will a straight cut.
2. Make a small sanding block from 1/8-in.-thick scrap wood and glue a piece of 150-grit sandpaper onto it. Set the inlay veneer strip onto a piece of 3/4-in. plywood that's approximately 6 in. by 6 in. Hold the veneer strip with its mitered end slightly overhanging the plywood edge. Stand the sanding block on edge on the workbench and slide it back and forth across the plywood, lightly sanding the end of the veneer flat and smooth.
3. Set the left-side veneer strip into the elliptical groove and then mark with a pencil the miter lines on both sides of the top veneer piece (**PHOTO D**). Place the next inlay piece into the groove, overlapping where the two pieces meet. Mark the angle with a white pencil, then cut the miter the same way with a chisel and sanding block. Repeat these same steps on all four pieces of inlay. Don't glue any of the veneer inlay pieces into the elliptical groove until they've all been cut, trimmed and dry-fitted.



FIT THE SIDE VENEER STRIP into the elliptical groove and then mark for the miter cuts on both sides of the top veneer piece.

4. Make six clamping blocks with cork glued to their faces out of 3/4-in. plywood; make each one 1½ in. sq. These will be used to clamp down the veneer without causing any damage. You'll also need one larger clamping block made from 3/4-in. plywood, measuring 8 in. sq., for the underside of the top.
5. Apply hot animal hide glue in all four of your inlays. Then using six bar clamps, clamp down the full elliptical inlay, letting the glue dry for three hours before removing the clamps.
6. Clamp the box top to the workbench and sand the inlay smooth using a sanding block wrapped with a 3-in. by 21-in. sanding belt. Start with 80-grit sandpaper, then switch to a 150-grit sandpaper, using a circular sanding motion (**PHOTO E**).



WITH THE BOX TOP CLAMPED to the workbench, sand the inlay smooth using a circular sanding motion.

Veneer the box top edges

TO COVER THE EDGES of the box top, you'll need a total of 16 pieces of veneer: 12 cut from chestnut burl and 4 cut from bloodwood. Set the top onto the box, which will make it easier to match up the burl pattern. Cut the following veneer pieces to size using a scalpel, straightedge, and self-healing mat.

1. Start with the four corners, which have bloodwood ribbons running through to match up the ribbons on the top. Use the same techniques as you did for veneering the two small straight corners on the box front (see [p. 171](#)).

MATERIALS			
QUANTITY	PART	SIZE	CONSTRUCTION NOTES
1	Back edge	5⁄8 in. × 12 7⁄8 in.	chestnut burl veneer
2	Ends	5⁄8 in. × 6 1⁄8 in.	chestnut burl veneer
1	Front center	5⁄8 in. × 4 1⁄2 in.	chestnut burl veneer
2	Front ends	5⁄8 in. × 4 3⁄8 in.	chestnut burl veneer
4	Corners	5⁄8 in. × 1 3⁄8 in.	chestnut burl veneer
2	Front small corners	3⁄8 in. × 5⁄8 in.	chestnut burl veneer
4	Corner ribbons	5⁄8 in. × 5⁄8 in.	bloodwood (grain running vertically)

2. Draw the ribbons directly onto the plywood edge of the box top. Then cut a piece of tracing paper the same size as the corner veneer: 5⁄8 in. wide by 1 3⁄8 in. long. Place the tracing paper on the corner and trace the ribbons you just drew (**PHOTO A**).



DRAW THE RIBBONS onto the edge of the box top and trace onto a piece of tracing paper the same size as the corner veneer.

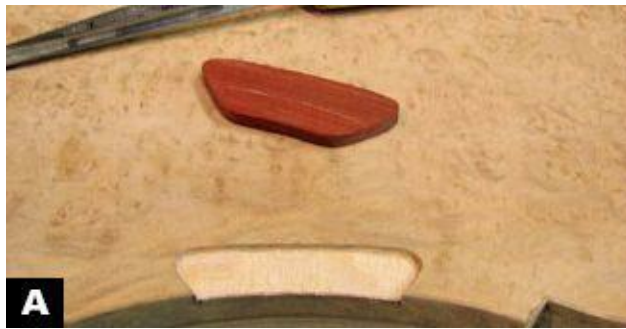
3. Use a clear adhesive and spray the backside of the bloodwood veneer and the tracing template. Place the bloodwood on top of the chestnut burl and the tracing template onto the bloodwood.

4. Install a 3/0 by 61-tpi jeweler's blade into the scrollsaw. Adjust the saw to its slowest speed. Cut the ribbon and the background at the same time by following the pencil lines.

- 5.** Separate the pieces of veneer and then use blue painter's tape to stitch the bloodwood ribbon to the chestnut-burl background pieces.
- 6.** Use an electric heat gun to warm the back side of the corner veneer pieces and the edge of the box. Brush hot animal hide glue to both surfaces, then lightly press the veneer on to the corner. Hold the veneer with your fingertips for about one minute. Then firmly press down the veneer with a wooden veneer hammer.
- 7.** Use the same clamping cauls that you used for veneering the faces of the box and clamp the top edges.
- 8.** After the glue has completely dried, trim off the excess veneer with a scalpel and then file the edges flush with a small, flat needle file.

Create a finger pull

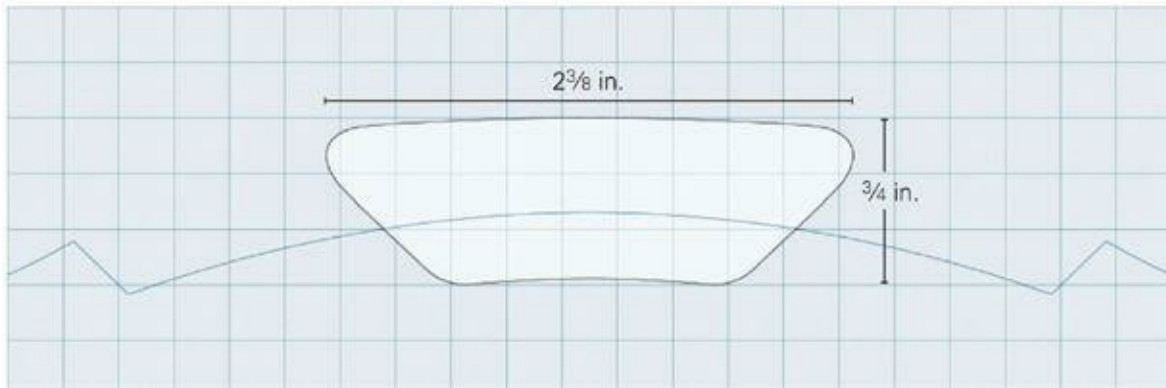
1. Make a photocopy of the “Finger-Pull Template,” shown on the facing page. Cut out the template and use spray adhesive to attach it to a $\frac{3}{16}$ -in.-thick by $\frac{7}{8}$ -in.-wide by $2\frac{1}{2}$ -in.-long piece of bloodwood hardwood.
2. Cut the finger pull to shape on the scrollsaw using a #5 crown-tooth blade. Sand the edges flat with a 150-grit sanding block.
3. Place the pull onto the bottom of the box top and trace around it with a pencil. The finger pull will overhang approximately $\frac{5}{16}$ in., which allows you to lift open the lid easily.
4. Chisel out wood from within the outline, creating a $\frac{3}{16}$ -in.-deep mortise for the bloodwood finger pull. It's best to cut the mortise with three chisels: a $\frac{3}{4}$ -in.-wide flat wood chisel, #2/12 gouge, and #8/4 gouge. Stab-cut along the pencil line, then relief-cut up to the stab cut. Repeat this step a couple of times until you've removed $\frac{3}{16}$ in. of wood (**PHOTO A**, facing page bottom).



CHISEL A $\frac{3}{16}$ -IN.-DEEP mortise for the bloodwood finger pull.

5. Dry-fit the finger pull into the mortise. Once satisfied with the fit, apply a little yellow glue to the mortise and clamp the finger pull in place. After the glue dries, lightly sand the front of the pull to soften the sharp edge.

Finger-Pull Template

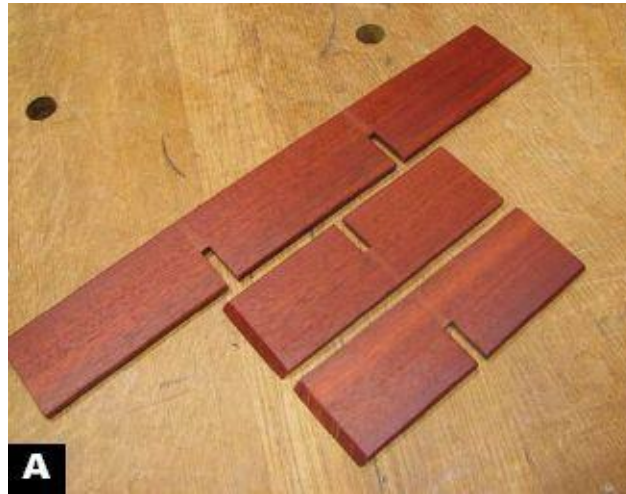


Template shown is full scale. Grid is $\frac{1}{4}$ in. $\times$ $\frac{1}{4}$ in.

Make the inside dividers

THE INTERIOR OF THE CAMEO BOX is divided into six compartments, which are created by dividers cut from $\frac{3}{16}$ -in.-thick bloodwood hardwood.

1. Cut three pieces of bloodwood: one for the long divider and two for the short dividers (see “Materials” on [p. 160](#)). Cut edge-lap joints into the pieces using the tablesaw’s miter gauge. Set the sawblade height to $\frac{15}{16}$ in. to cut halfway through the $1\frac{7}{8}$ -in.-wide dividers (**PHOTO A**).



CUT $\frac{15}{16}$ -IN. EDGE-LAP joints into the three interior dividers.

2. Trim the front ends of the short dividers to 45° . This angle allows the short dividers to fit tightly against the inside angles of the box front.
3. Finish the box, as described on [p. 157](#). Once the finish dries, attach the box top with the two hinges.



Traditional Jewelry Box

THIS STATELY walnut and maple jewelry box combines a graceful design with Old World craftsmanship. The box is designed and built much like a miniature piece of fine furniture, embellished with doors, drawers, and turned columns that elevate the design beyond mere function.

For this chapter, I built two boxes, one with rose-themed marquetry and one without. Choose the design you like. Both boxes feature walnut-burl veneer and bird's-eye maple trim. The veneers used in the marquetry include purpleheart for the roses, poplar for the leaves, and ebony and myrtle burl for the scrolls and vines.



Under the lid, bird's-eye maple dividers help separate and organize jewelry. The front door swings open to reveal three hidden storage drawers, and the box also has two side doors that conceal rotating carousels specifically designed for neatly storing and displaying necklaces.

This spacious box is designed to accommodate a treasure trove of jewels, and it represents the underlying spirit of fine craftsmanship, dedicated artistry, and high-quality woodworking. Build this traditional-style box and rest assured that it will be treasured and passed down throughout the generations.



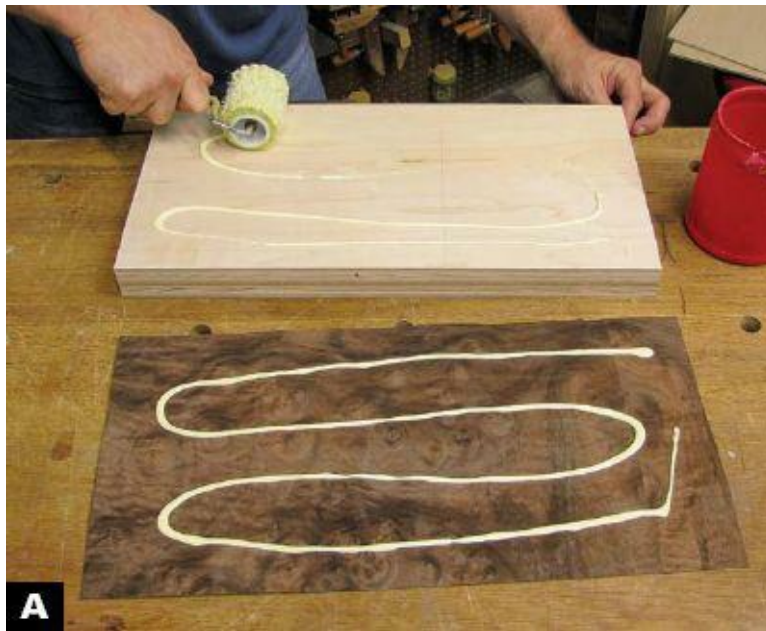
MATERIALS

QUANTITY	PART	SIZE	CONSTRUCTION NOTES
2	Bottom platform	¾ in. × 9⅛ in. × 18⅝ in.	maple or birch veneer-core plywood
5	Sheets	¼ in. × 24 in. × 31 in.	walnut burl veneer
1	Back	½ in. × 8⅞ in. × 14½ in.	birch veneer plywood
2	Ends	½ in. × 8⅞ in. × 8⅛ in.	birch veneer plywood
2	Front panels	½ in. × 3½ in. × 8⅞ in.	birch veneer plywood
2	Corner pieces	½ in. × 1¾ in. × 8⅞ in.	birch veneer plywood
2	Return corner pieces	½ in. × 1¼ in. × 7⅝ in.	birch veneer plywood
1	Back base	½ in. × 1⅝ in. × 15⅝ in.	bird's-eye maple
2	Splines	¼ in. × ½ in. × 48 in.	walnut
1	Base trim	2 in. × 8 in. × 96 in.	birds-eye maple (enough for 2 boxes)
6	Drawer slides	⅝ in. × ¾ in. × 7¼ in.	walnut
1	Upper tray sides	½ in. × 1⅜ in. × 24 in.	maple plywood
1	Front tray	⅛ in. × 2 in. × 8½ in.	bending plywood (4 pieces)
1	Front tray	¼ in. × 2 in. × 8½ in.	maple veneer (1 piece)
1	Front tray	¼ in. × 2 in. × 8½ in.	walnut burl veneer (2 pieces)
1	Side tray	⅛ in. × 4 in. × 8½ in.	bending plywood (4 pieces)
1	Side tray	¼ in. × 4 in. × 8½ in.	maple veneer (1 piece)
1	Side tray	¼ in. × 4 in. × 8½ in.	walnut burl veneer (2 pieces)
3	Tray bottoms	¼ in. × 11 in. × 20 in.	birch plywood (enough for 3 bottoms)
2	Column blanks	1⅞ in. × 1⅞ in. × 8⅛ in.	bird's-eye maple
1	Accent trim, front radius	⅜ in. × ⅞ in. × 9½ in.	bird's-eye maple (3 layers) ▶▶

2	Accent trim, side radius	$\frac{3}{32}$ in. $\times$ $\frac{7}{16}$ in. $\times$ 8 in.	bird's-eye maple (6 layers)
12	Front, side doors	$\frac{1}{8}$ in. $\times$ 8½ in. $\times$ 9½ in.	bending plywood
3	Front, side doors	$\frac{1}{42}$ in. $\times$ 8½ in. $\times$ 9½ in.	maple veneer
3	Veneer packets for doors		see p. 215
3	Door pulls	$\frac{1}{4}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 1 in.	walnut
6	Drawer sides	$\frac{3}{8}$ in. $\times$ 2¾ in. $\times$ 8 in.	walnut
6	Drawer fronts and backs	$\frac{3}{8}$ in. $\times$ 2¾ in. $\times$ 6⅞ in.	walnut
3	Drawer bottoms	$\frac{1}{8}$ in. $\times$ 6⅞ in. $\times$ 7⅝ in.	plywood
1	Dowel	$\frac{1}{8}$ in. dia. $\times$ 24 in.	maple
1	Center tray divider	$\frac{5}{16}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 8⅝ in.	bird's-eye maple
2	Center tray dividers	$\frac{5}{16}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 6¾ in.	bird's-eye maple
2	Side tray dividers	$\frac{5}{16}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 7 in.	bird's-eye maple
2	Side tray dividers	$\frac{5}{16}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 3½ in.	bird's-eye maple
2	Side tray dividers	$\frac{5}{16}$ in. $\times$ $\frac{3}{4}$ in. $\times$ 2⅞ in.	bird's-eye maple
2	Top straight trim	$\frac{9}{16}$ in. $\times$ $\frac{7}{16}$ in. $\times$ 21 in.	bird's-eye maple
1	Front radius trim	$\frac{9}{16}$ in. $\times$ 1¼ in. $\times$ 8¾ in.	bird's-eye maple
2	Side radius trim	$\frac{9}{16}$ in. $\times$ 1¾ in. $\times$ 7¼ in.	bird's-eye maple
1	Top	$\frac{1}{2}$ in. $\times$ 10¼ in. $\times$ 19¼ in.	maple veneer plywood
1	Veneer packet for top		see p. 229
6	Door hinges	$\frac{5}{8}$ in. $\times$ $\frac{3}{4}$ in.	brass
3	Door catches		
1 pair	95° stop hinges	1⅞ in. $\times$ 1¼ in.	
4	Chain carousels		
2	Carousel blocks	$\frac{1}{2}$ in. $\times$ 2¼ in. $\times$ 6 in.	walnut
	Flocking fibers		brown

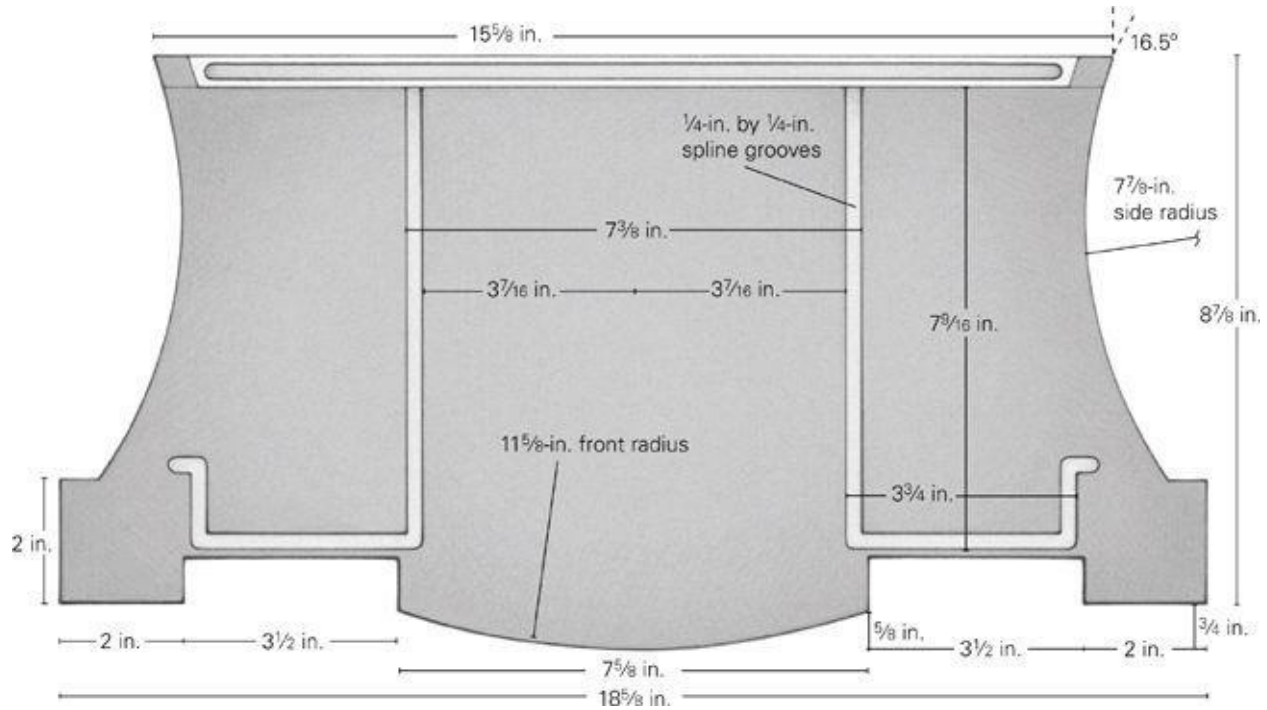
Make the bottom platform

1. Start by cutting two pieces of $\frac{3}{4}$ -in. maple or birch veneer-core plywood (see “Materials” on [p. 189](#)). Brush yellow carpenter’s glue onto one surface, and then clamp the pieces together to form a $1\frac{1}{2}$ -in.-thick blank.
2. For the whole box, you’ll need a flitch of five sheets of $\frac{1}{42}$ -in.-thick walnut burl veneer, each measuring 24 in. wide by 31 in. long. (You may want to get a couple extra sheets in case of any mistakes or unforeseen problems.) Use a self-healing mat and scalpel to cut a $9\frac{1}{2}$ -in.-wide by 19-in.-long piece of walnut burl veneer for the bottom platform.
3. Apply yellow glue to the veneer and bottom platform, and spread it evenly with a roller (**PHOTO A**). Press the veneer down onto the $1\frac{1}{2}$ -in.-thick bottom platform.



GLUE THE WALNUT BURL veneer onto the bottom platform.

Bottom Platform



4. Cut a 9½-in.-wide by 19-in.-long clamping caul from a piece of ¾-in. plywood. Set the caul on top of the veneer-covered bottom platform. Secure the three pieces—platform, veneer, and caul—with strips of blue painter’s tape. Place the assembly into a vacuum-press bag and let dry for about three hours.
5. Once the glue has cured, turn the bottom platform upside down onto a self-healing mat and trim away excess veneer from the edges.
6. Refer to “Bottom Platform” on [p. 191](#) to accurately mark layout lines onto the bottom platform. Use a large compass or trammel points to strike the 11⅝-in. front radius and the two 7⅞-in. side radii.
7. Install a ⅜-in.-wide by 10-tpi blade in your bandsaw and cut the bottom platform to shape by following the outside edge of the pencil lines. Slowly cut the three outside radius edges and inside corners (**PHOTO B**). Cut the two outside square corners on a tablesaw to ensure that they’re perfectly square.



FOLLOWING THE OUTSIDE EDGE of the pencil lines, cut the bottom platform to shape on the bandsaw (with the exception of the two outside square corners, which should be cut on the tablesaw).

8. Tighten the bottom platform into a bench vise with the clamping caul protecting the veneered surface. Smooth away all the bandsaw-blade marks with a half-round wood file. Be sure to file away from the veneered surface to prevent chipping the walnut burl veneer.

Rout the spline grooves

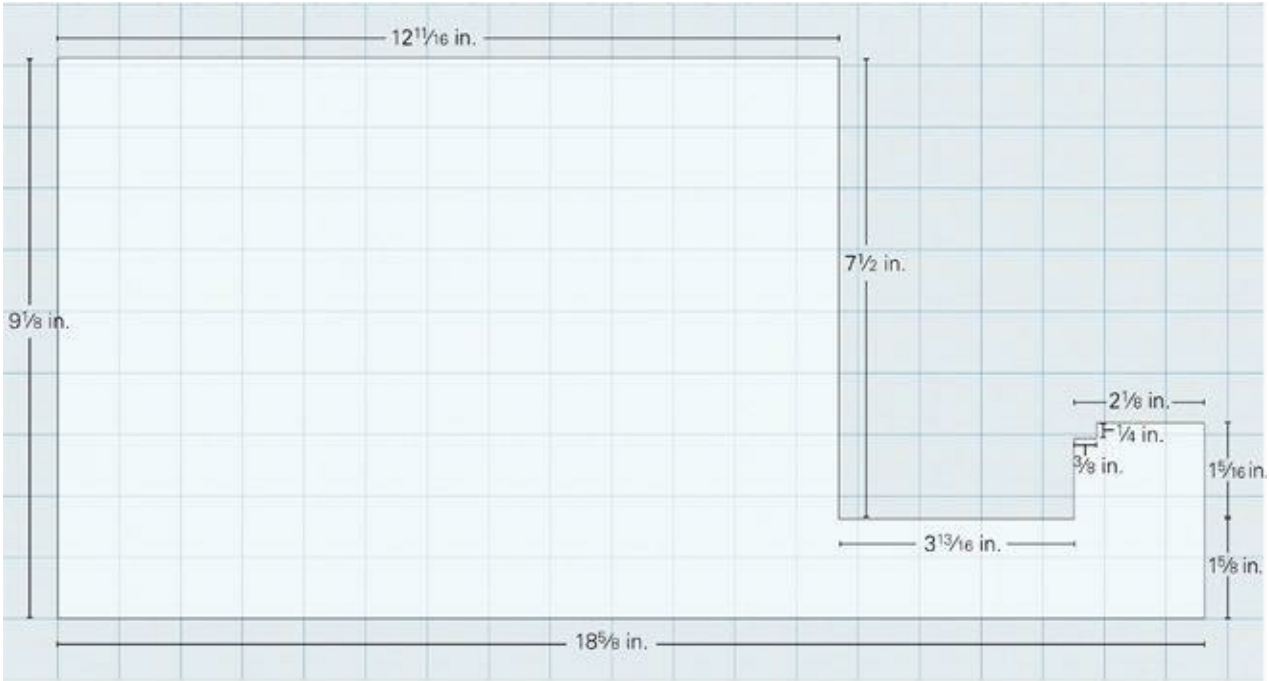
The next step is to rout a series of grooves into the bottom platform to receive ¼-in.-thick hardwood splines. The splines will connect the bottom platform to the box ends, front, and back.

1. Start by making a routing template from a piece of 1-in.-thick particleboard measuring 9½ in. wide by 18⅝ in. long. Refer to “Bottom Spline Routing Template” on the facing page and transfer the measurements onto the particleboard; cut out the template on the bandsaw. Sand the edges smooth with 80-grit sandpaper.
2. To rout the spline grooves, use a ¼-in.-shank double-flute straight router bit that measures ¼ in. dia. by ½-in. cutting length by 2-in. overall length. That way, you won’t need to use a guide bushing. Set the cutting depth to ⅛ in. deep and then guide the router around the template, making two ⅛-in.-deep passes to produce the ¼-in. by ¼-in. groove for the splines (**PHOTO C**). This half template is used to rout spline grooves into one end of the bottom platform. Flip it over to rout the grooves in the opposite end.



FOLLOW THE TEMPLATE and rout the ¼-in. groove for the splines in the bottom platform in two ⅛-in.-deep passes, using a slow, steady pace to prevent the bit from burning the template.

Bottom Spline Routing Template



Veneer the lower box parts

NOW PREPARE TO CUT PIECES of ½-in. birch-veneer plywood and walnut burl veneer for the lower box parts, which include the back, two ends, two front panels, and four corner pieces. I recommend veneering both the inside and outside of the box because it balances the plywood and prevents warping. And it always looks better when the inside of the box is finished with veneer.

- 1.** Cut the ½-in.-thick birch-plywood parts to size on a tablesaw. You'll need one 8⅞-in.-wide by 14½-in.-long back piece and two 8⅞-in.-wide by 8⅞-in.-long end pieces.
- 2.** Saw one front panel and two corners from one piece of plywood; this makes it much easier to match up the veneer and cut the miters on the tablesaw. Because there are two front panels and four corners, you must cut two pieces of plywood to 8⅞ in. wide by 7¾ in. long. The finished sizes of the six pieces are listed in "Materials" on [p. 189](#).
- 3.** Cut the walnut burl veneer for the inside and outside surfaces of the box parts. As noted earlier, you can cut all the pieces from five sheets of veneer: you'll need two back pieces (9⅛ in. wide by 14¾ in. long), four end pieces (9⅛ in. wide by 8⅜ in. long), and four front corner pieces (9⅛ in. wide by 8 in. long) (**PHOTO A**).



CUT THE WALNUT BURL veneer for the inside and outside surfaces of the box parts.

- 4.** Make two ¼-in.-plywood clamping cauls for each box part, each the same size as the veneer for that part. Apply a bead of yellow glue to the veneer and substrate; spread it evenly with a roller to ensure a long-lasting bond. Glue and veneer both surfaces of the substrate.
- 5.** Set a clamping caul on both sides of the veneer. (Round the corners of the top caul so that it won't puncture the pressure bag.) Wrap blue painter's tape around all four sides of the cauls to hold the veneered plywood and cauls together. The tape helps keep the pieces from sliding once the air pressure bag starts clamping down.
- 6.** Place the parts into the vacuum press, turn on the vacuum, and let the glue dry two hours. Remove the parts from the vacuum bag and use a scalpel to trim the veneer flush to the plywood edges. Use a sanding block with 150-grit sandpaper to sand each edge smooth.

V

M

Matching up the veneer pattern on the rear and inside surfaces of the box isn't terribly important.

However, on the outside surfaces, the veneer pattern should match up on both ends. Also, keep in mind that the front-door veneer should match up with the veneer on the two front panels. Mark and set aside the matching door veneer for installation later in this chapter.

Fabricate the back and back base

YOU NEED TO MAKE THE BACK and back base now because the bottom platform has a groove running through the back side and that groove must align with the grooves in the back. The back and back base must be dry-fitted and splined together before the base trim can be made.

1. The back is $\frac{1}{2}$ in. thick by $8\frac{7}{8}$ in. wide by $14\frac{1}{2}$ in. long, which includes a 16.5° angle cut on both short ends of the back (to accommodate the radius of the side doors). Tilt the tablesaw blade to 16.5° and then lower the sawblade underneath the saw table.

Set the saw fence $14\frac{1}{2}$ in. from the blade and then clamp a $\frac{3}{4}$ -in.-thick MDF or plywood auxiliary top to the saw table. Turn on the tablesaw and raise the blade to cut through the auxiliary top. Stop raising the blade when it's approximately $\frac{3}{4}$ in. above the auxiliary top. Turn off the saw. Reset your fence outward slightly to allow for the difference that the $\frac{3}{4}$ -in.-thick auxiliary top makes with the 16.5° angle in order to cut the width of the back at $14\frac{1}{2}$ in. long.

2. Cut one side slowly through the sawblade, keeping the other side tight to the fence. Then turn the bottom around to cut the same angle into the other side (**PHOTO A**).



CUT THE BACK TO $14\frac{1}{2}$ IN. wide with a 16.5° angle on each end.

3. Cut the back base out of $\frac{1}{2}$ -in.-thick bird's-eye maple; make it $1\frac{5}{8}$ in. by $15\frac{5}{8}$ in., which is longer than necessary to allow for the side doors. Use a miter saw to cut the ends of the back base to 16.5° . These angled ends will butt up against the radius trim installed later (see [p. 199](#)).

4. Rout two vertical grooves into the back where the box ends will be splined to the back and bottom platform. Set up the router table with a $\frac{1}{4}$ -in.-dia. double-flute straight bit. Position the fence $3\frac{11}{16}$ in. to the center of the router bit. Make two $\frac{1}{8}$ -in.-deep passes to form the $\frac{1}{4}$ -in.-wide by $\frac{1}{4}$ -in.-deep grooves into the back. The top edge of the back will need to be veneered with walnut burl, so mark stop grooves $\frac{1}{4}$ in. away from the top edge by drawing pencil lines on the fence for the stop locations.

5. Place the inside face of the back flat onto the router table, lining up to the pencil line. Raise the bit to the $\frac{1}{4}$ -in. cutting depth and slowly feed the back across the router bit (**PHOTO B**).



ROUT TWO GROOVES into the back where the box ends will be splined to the back.

6. Rout spline grooves into the top edge of the base and the bottom edge of the back. Position the router table fence to center the $\frac{1}{4}$ -in.-dia. router bit on the edges of the base and back. Rout $\frac{1}{4}$ -in.-deep grooves into both pieces. Stop the grooves approximately $\frac{1}{4}$ in. from the back corners, matching the base grooves to the same length.

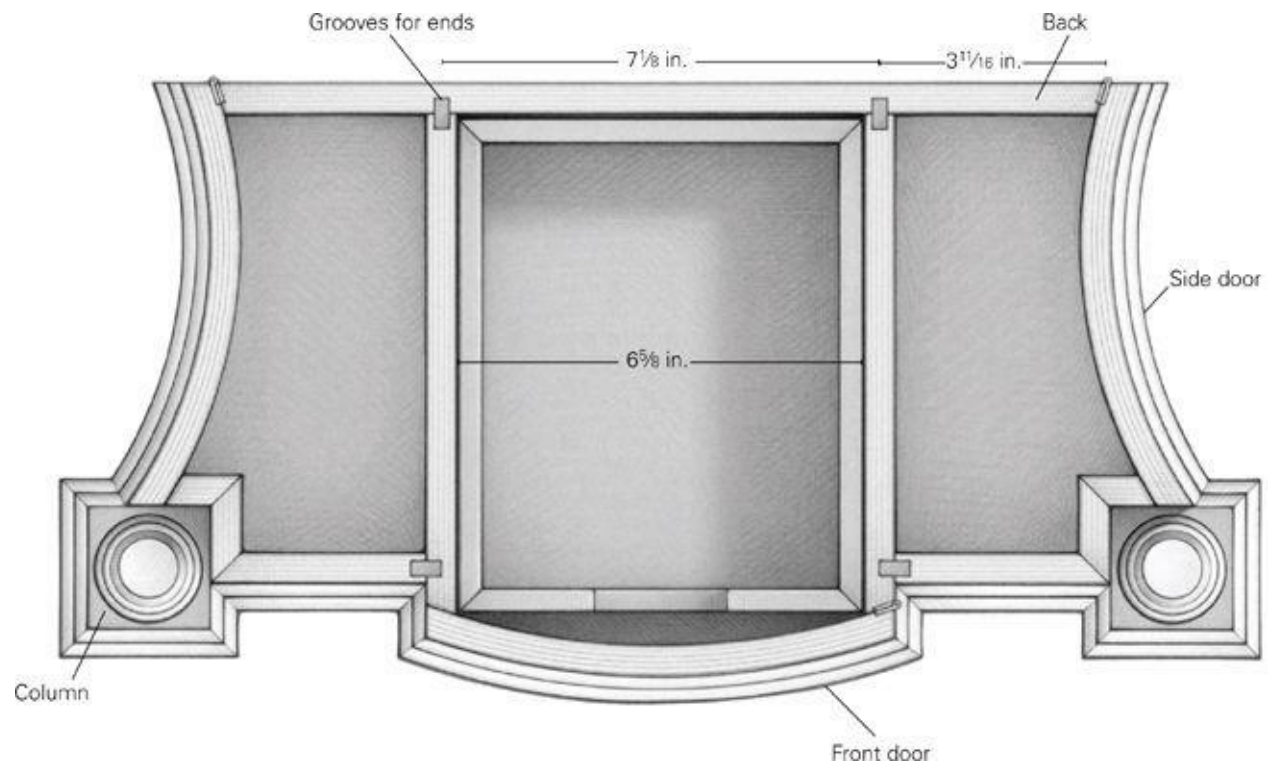
7. Rout into the top edge of the base on the ends so the walnut burl veneer will be flush to the hardwood. On the router table, position the $\frac{1}{4}$ -in.-dia. router bit $\frac{1}{42}$ in. above the router table, which is the thickness of the veneer. Using your miter gauge set at 16.5° , hold the base upside down to trim off the hardwood.

8. Apply yellow glue to two small pieces of walnut burl veneer on the top ends of the bottom base and clamp the veneer to the base. Let the glue dry for two hours. Then trim and sand with 150-grit sandpaper making the veneer flush to the base.

WORK

There are a lot of small splines needed for this box, so cut two longer pieces, each measuring $\frac{1}{4}$ in. thick by $\frac{1}{2}$ in. wide by 48 in. long. Then cut the splines to length as you need them.

Middle Horizontal Section



V

S

P

On the top edge of the base, the very ends must be veneered with a piece of walnut burl $\frac{9}{16}$ in. from the outside edge where the back gets glued to the base. This step is necessary so that when the side doors are opened, the small $\frac{1}{2}$ -in. by $\frac{9}{16}$ -in. edge will look as if it were part of the bottom platform.



Cut the mitered base trim

I PURCHASED A LARGE PIECE of bird's-eye maple, measuring 2 in. thick by 8 in. wide by 96 in. long, which is plenty enough for two boxes. It's always a good idea to purchase a little extra because wood grain, texture, and color can change from board to board. A box looks best when all the trim is cut from the same piece of stock.

1. Cut a piece of 2-in.-thick bird's-eye maple trim to 8 in. wide by 14 in. long. Run it through the thickness planer until it is $1\frac{5}{16}$ in. thick. Next use the tablesaw to rip two strips, each measuring $\frac{9}{16}$ in. thick by $1\frac{5}{16}$ in. wide by 14 in. long. Then run the two strips through the planer until each is $\frac{7}{16}$ in. thick.

2. Set a 10-in.-long piece of the bird's-eye maple under each of the two ends and front parts. Use a pencil and metal washer with a $\frac{7}{16}$ -in. offset to draw the platform radius and the outside radius. Be sure to draw the radii long enough to allow for mitering the corners (**PHOTO A**).



USE A PENCIL and metal washer with a $\frac{7}{16}$ -in. offset to outline the profile of the bird's-eye maple trim.

3. Use a bandsaw with a $\frac{3}{16}$ -in.-wide by 10-tpi blade to cut out the radiused pieces (**PHOTO B**).

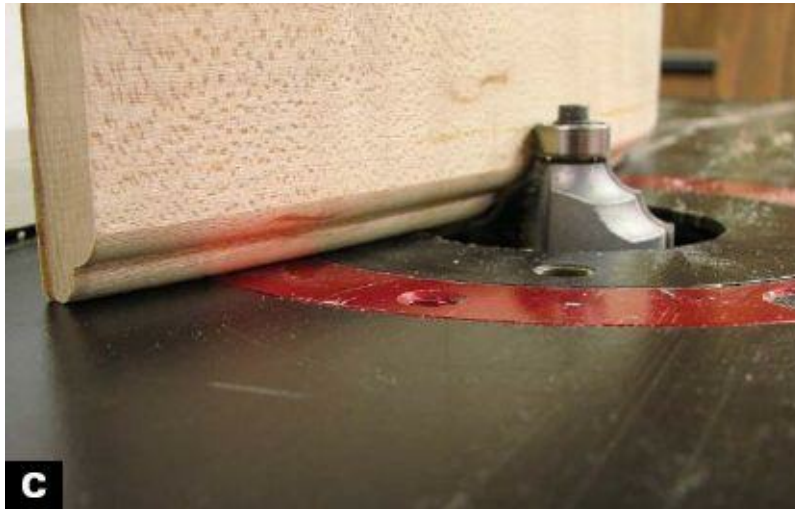


CUT OUT THE RADIUSED TRIM pieces follow the outside edge of the pencil lines.

4. Before routing the profile into the base trim, the outside surface of the radius trim must be sanded to provide a smooth surface for guiding the router bit's ball-bearing pilot. For the front and outside radii, use a flat sanding block with 80-grit sandpaper. Sand smooth the two end radii pieces with a curved sanding block and 80-grit sandpaper.

5. Rout the base trim using a double-round $\frac{7}{32}$ -in.-radius bit that has a $\frac{7}{16}$ -in. cutting depth and $\frac{5}{8}$ -in. cutting height (**PHOTO C**). First rout the profile into the two straight pieces using the router-table

fence as a guide. Keep the trim tight to the fence and use a push stick for safety. Set the router bit to make two or three passes to prevent any chipping or kickbacks. For the radius pieces, use a starter pin to start the routing. The pin can be used for stability by pressing the trim against it while routing.



ROUT THE BASE TRIM profile using a double-round $\frac{7}{32}$ -in.-radius bit.

6. Before mitering and gluing the maple trim to the bottom platform, sand away the bandsaw-blade marks from the inside surface of the three radius pieces. For the front radius trim, cut a sanding block to match its $11\frac{5}{8}$ -in. radius. Stick an 80-grit sandpaper sheet to its face and sand the surface smooth. Smooth the two radius ends with a flat sanding block and 80-grit sandpaper. Sand the convex shape with long, overlapping strokes.

Fit the mitered base trim

- 1.** Use the power miter saw to cut all the maple trim pieces for the base platform. Dry-fit the pieces before gluing, using blue painter's tape to hold them in place. Note that all the miters for the trim are cut to 45° , except for the front radius trim, which is cut to 55° , and the straight trim mitered up against it, which is cut to 35° .
- 2.** For the two end radius pieces of trim, you must cut a 62° angle. Because miter saws don't cut that sharp of an angle, you need to make a support block: Cut a 2-in. by 2-in. by 8-in. block of wood to a $7\frac{7}{8}$ -in. radius, which matches the inside radius of the trim piece. Adjust the miter-saw blade to 45° , set the support block behind the radius trim, and then cut the trim to produce a 62° angle. Then cut the straight trim—without the support block—to 28° ; the two pieces will come together to equal the 90° corner.

WORK

Hold the trim pieces against the bottom platform and draw pencil lines onto the trim before cutting the miters. Marking in place will help prevent you from marking—and cutting—the parts too short.

3. Glue and clamp the trim to the bottom platform. Once the glue has dried, use a small block plane to shave the maple hardwood flush with the veneer (**PHOTO D**).



THE BIRD'S-EYE MAPLE base trim glued to the bottom platform (including the end radius piece, which is cut at 62°).

4. Use a $\frac{3}{4}$ -in.-dia. Forstner bit to drill holes (mortises) for the turned columns. Use an awl to mark a center point on both front corners. Then bore $\frac{1}{2}$ -in.-deep holes to form the two mortises (**PHOTO E**).



DRILL $\frac{3}{4}$ -IN.-DIA. HOLES for the two turned columns on the front corners of the bottom panel.

C**R****T**

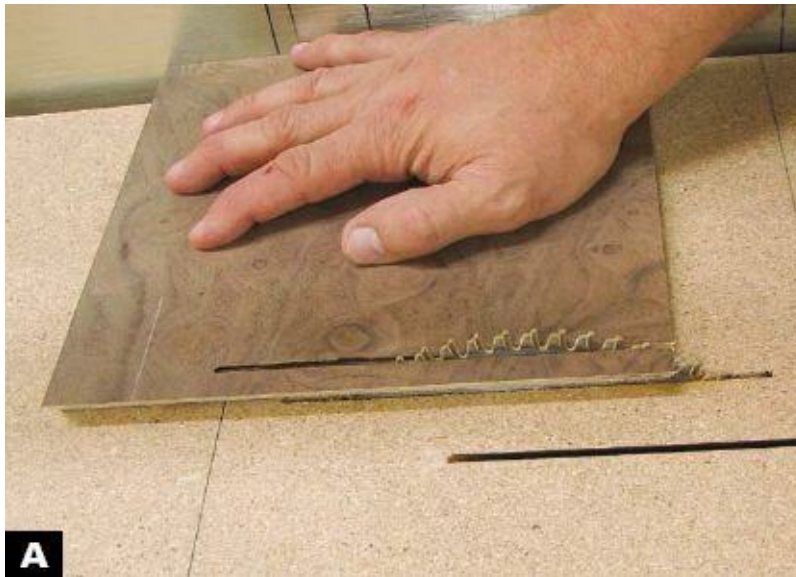
To cut the front radius trim on the miter saw, use the same block that you used for sanding the back face. (Make sure the sandpaper doesn't get cut by the sawblade or simply remove the sandpaper.) Place the block against the miter-saw fence so that the radius trim is positioned 90° to the miter-saw blade. Set the miter gauge at a 55° angle and then cut both miters into the front radius trim. Cut the straight trim that is mitered up to the radius trim at a 35° angle.



Make the two box ends

THE FRONT EDGES OF THE BOX ENDS have two different angles facing in different directions. The lower section is 7½ in. long and has an 18° angle to accommodate the front door. The upper 1⅜-in.-long section has a 35° angle to accept the upper tray of the box. Keep in mind that both ends must be cut as mirror images with a left-hand and right-hand piece.

1. Use the tablesaw to cut both ends to 8½ in. wide with the blade tilted to 35°. This cut is the upper tray angle. To cut the opposing angles, set the tablesaw blade to 18°.
2. For the right end, lower the tablesaw blade below the table. Lay the box end flat on the saw table, turn on the saw, and raise the blade. Be careful not to cut into the upper tray section. For the left end, push the board into the blade, stopping right before the upper tray section (**PHOTO A**).



THE FRONT EDGES of the box ends are cut at two different angles. The lower section has an 18° angle to accommodate the front door. The upper section has a 35° angle to accept the upper tray of the box.

3. Cut two scrap boards with the same 18° angle as the box end. Clamp one scrap board to each side of the box end. Then use a Japanese detail saw or dovetail saw to cut up to the upper tray line, which is 1⅜ in. down from the top edge (**PHOTO B**). Now cut straight into the front edge, following the pencil line.



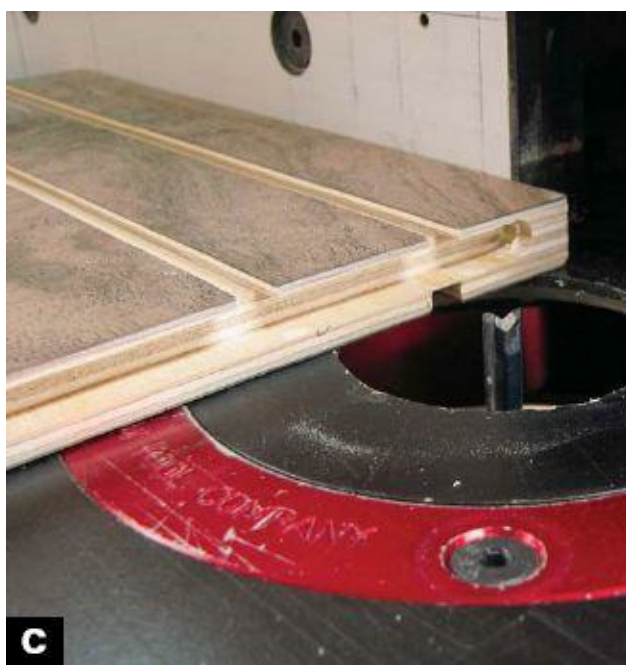
WITH THE BOX END CLAMPED between two scrap boards with the same 18° angle as the box end, cut up to the upper tray line, which is 1 $\frac{3}{8}$ in. down from the top edge.

4. Use a router table and $\frac{1}{4}$ -in.-dia. straight bit to rout a groove into the box ends for the upper tray. Set the fence 1 in. down from the top of the box end. This will be the height of the upper trays. On the inside of the end, rout the groove all the way through to the edge, but on the outside, stop the groove approximately $\frac{1}{4}$ in. from the front edge.

5. Cut $\frac{1}{8}$ -in.-deep grooves into the inner face of the ends for the wooden drawer slides. The grooves must align with the center of each drawer. Rout the three stop grooves approximately 1 $\frac{1}{4}$ in. from the front edge of the ends.

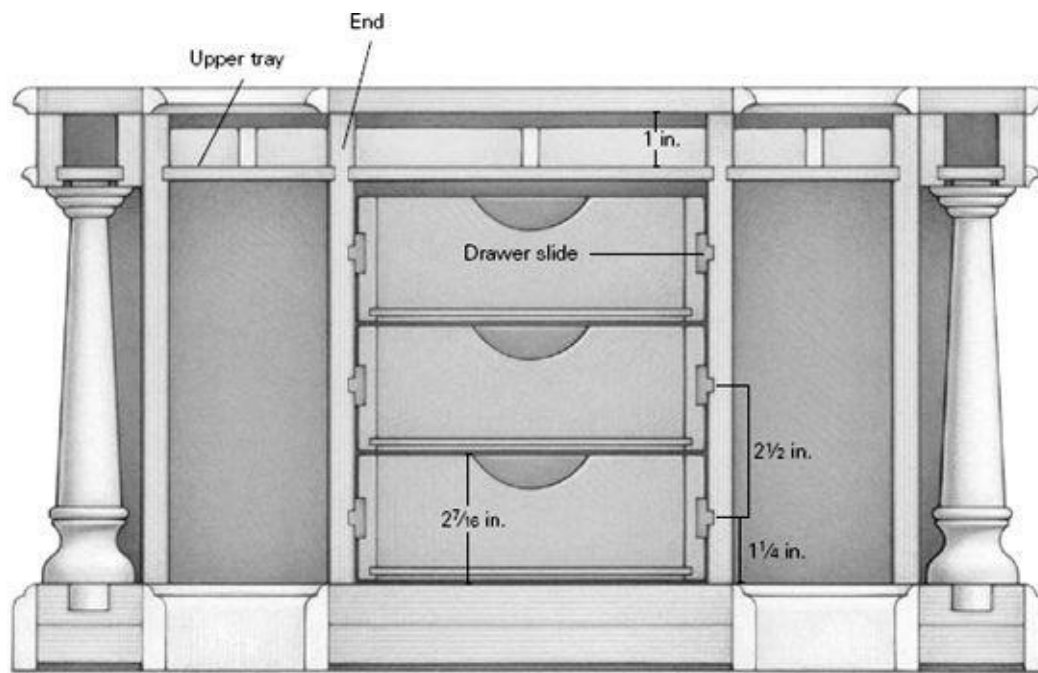
Also, rout a $\frac{1}{4}$ -in.-deep by $\frac{1}{4}$ -in.-wide groove in the outside face of both ends. These will be used later to spline the front to the ends. Using the back edge of the box side as a reference, adjust the router table fence to $7\frac{7}{16}$ in., which will be the center of the router bit. This groove stops at the top edge of each side.

6. Rout $\frac{1}{4}$ -in. by $\frac{1}{4}$ -in. spline grooves into the back and bottom edges of the ends. Set the router table fence so that the $\frac{1}{4}$ -in.-dia. router bit is centered on the edge of the part, which will leave approximately $\frac{1}{8}$ -in. space on each side of the groove. Cut these stop grooves about $\frac{1}{4}$ in. from the front and top edges (**PHOTO C**).

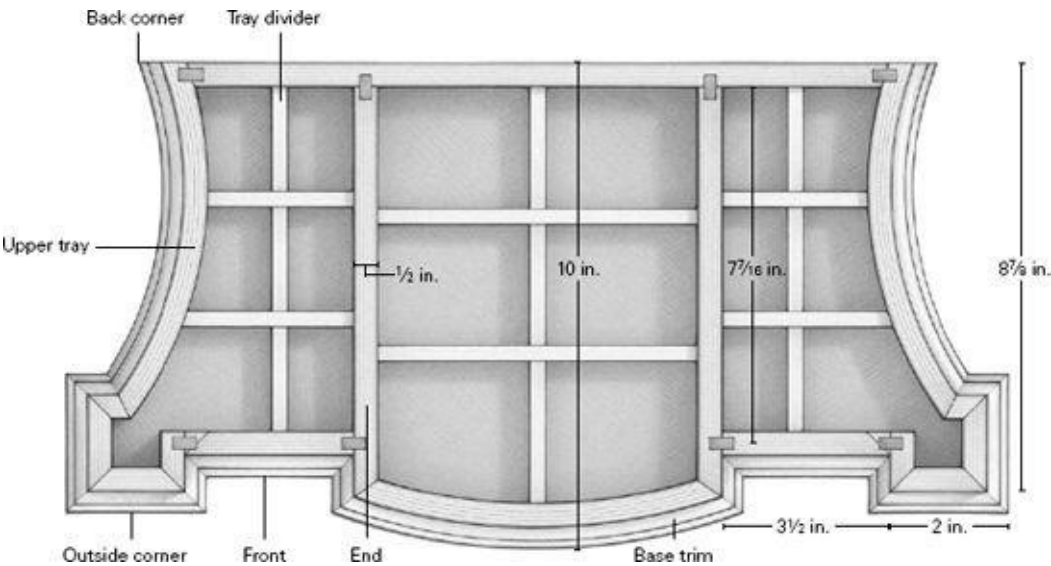


ROUT 1/4-IN. STOPPED GROOVES into the back and bottom edges of the box ends.

Front Vertical Section



Front Horizontal Section



Make the drawer slides

FOR THIS BOX, you'll need six drawer slides, each measuring $\frac{5}{16}$ in. thick by $\frac{3}{4}$ in. wide by $7\frac{1}{4}$ in. long. It's easier to work with one piece 48 in. long and then cut the slides to length.

1. Set the tablesaw fence to $\frac{3}{16}$ in. wide and the blade height at $\frac{1}{4}$ in. Running both sides through the saw will give you a $\frac{1}{4}$ -in. wide by $\frac{1}{8}$ -in. deep spline (**PHOTO A**).



WHEN CUTTING THE DRAWER slides on the tablesaw, use two featherboards, one on the top and one on the front, to keep the cut straight and clean.

2. Cut the slides on the miter saw to $7\frac{1}{4}$ in. long on all six slides. You'll have to trim off both ends of the spline in order for the spline to fit into the stop groove; it will also need to clear the spline on the back side of the box.
3. Mask off the drawer slides with blue painter's tape to prevent getting any glue on the veneer. With a small brush apply yellow glue on both the slide and the grooves on the inner face of the box ends where the slides will go (**PHOTO B**). Clamp the drawer slides onto the inner face of the box.



APPLY YELLOW GLUE on both the drawer slide and the grooves on the inner face of the ends where the slides will go.

Make the fronts, corners, and return corners

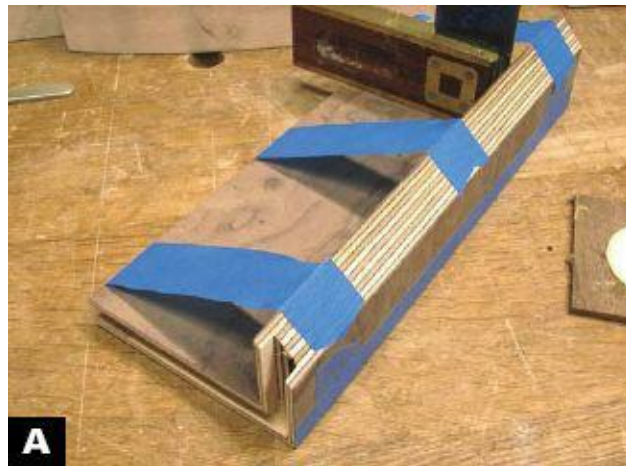
1. On the tablesaw, cut the left and right box fronts as a pair with matching grain; be sure to saw a 45° angle onto each long edge with the angles going in the same directions.

For the two return corners, cut one angle to 45° for gluing to the box corner and the other angle to 30° for matching up to the side doors.

2. Cut two pieces for the fronts, each measuring $\frac{1}{2}$ in. thick by $3\frac{1}{2}$ in. wide by $8\frac{7}{8}$ in. tall. Cut two corner pieces, each $\frac{1}{2}$ in. thick by $1\frac{3}{4}$ in. wide by $8\frac{7}{8}$ in. tall, and two return corners at $\frac{1}{2}$ in. thick by $1\frac{1}{4}$ in. wide by $8\frac{7}{8}$ in. tall.

3. After the parts are cut to size, rout a $\frac{1}{8}$ -in.-deep by $\frac{1}{4}$ -in.-wide groove for the upper tray into the back surface of both fronts using a router table and the same 1-in. setting used for the sides and back grooves.

4. Apply yellow glue to both right and left fronts and corners, then use blue painter's tape as clamps to hold the joints closed (**PHOTO A**). Don't glue the return to the corner at this time.



GLUE THE FRONT SQUARE to the corner and clamp with strips of blue painter's tape.

(continued on [p. 206](#))

M

R

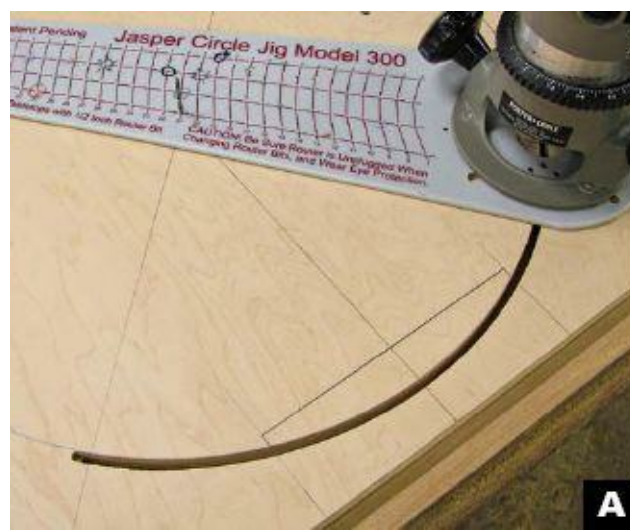
D

T

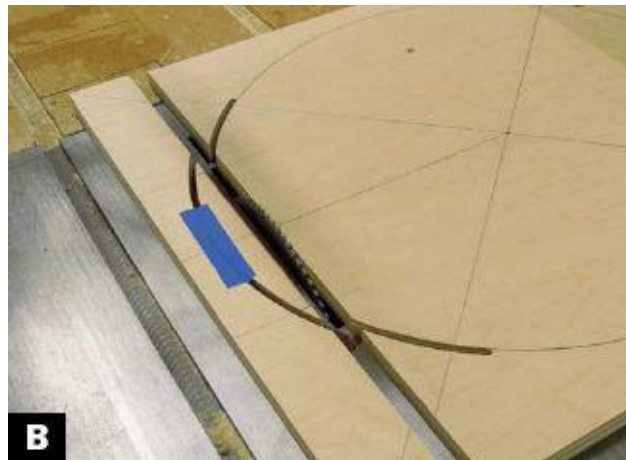
F

To create the curved doors, you need to build two radiused forms, one for the front door and one for the side doors. Note that the side door radii are the same as the upper tray sections of the box. Each form consists of seven curved ribs cut from $\frac{3}{4}$ -in. plywood. For the front door, cut seven $1\frac{1}{8}$ -in.-wide by 8-in.-long ribs. And for each side door, cut seven $1\frac{5}{16}$ -in.-wide by $7\frac{1}{4}$ -in.-long ribs.

1. Start by cutting two pieces of $\frac{3}{4}$ -in.-thick plywood. Make one 18 in. sq. and the other 24 in. sq. Use a circle-cutting jig and router to cut a $7\frac{3}{8}$ -in. radius out of the 18-in. plywood square for the side doors, and a $10\frac{5}{8}$ -in. radius out of the 24-in. square for the front door, routing only a couple inches past the actual lengths of the ribs (**PHOTO A**).



2. Apply masking tape to the rib and outside waste material to keep the rib from kicking into the sawblade. Cut the width of the two ribs on the tablesaw and then the length on the miter saw **(PHOTO B)**. These two pieces will be used as templates to make the remaining ribs.



3. Place the ribs on top of the plywood blanks and make sure they are square before drawing in the radius with a pencil. Then cut out the remaining 12 ribs on the bandsaw, cutting on the outside edge of the pencil line.

4. It's important to make all the ribs exactly the same size. Screw the rib template to the top of the other ribs and rout the radius edge flush to the template using a router table with a bearing flush-trimming router bit **(PHOTO C)**.



5. Cut the bottoms of the forms. The front bottom is $\frac{3}{4}$ in. thick by 8 in. wide by 11 in. long, and the side bottom is $\frac{1}{2}$ in. thick by $7\frac{3}{4}$ in. wide by 11 in. long.

6. Use a pneumatic pin nailer, $1\frac{1}{4}$ -in.-long pins, and yellow glue to fasten each rib to the bottom. Place a $\frac{15}{16}$ -in.-wide spacer block between each rib to keep them evenly spaced and parallel with one another (**PHOTO D**).



7. Cut four pieces of bending plywood to create a $\frac{1}{2}$ -in.-thick skin. You will need one piece of $\frac{3}{8}$ -in.-thick bending plywood and one piece of $\frac{1}{8}$ -in.-thick plywood for each door template to equal the $\frac{1}{2}$ -in. skin. The pieces measure $8\frac{3}{4}$ in. wide by $11\frac{1}{2}$ in. long.

8. Roll yellow glue onto the ribs and onto the mating surfaces of the bending plywood. Place the $\frac{3}{8}$ -in. plywood onto the ribs, and then set the $\frac{1}{8}$ -in. plywood on top (**PHOTO E**).



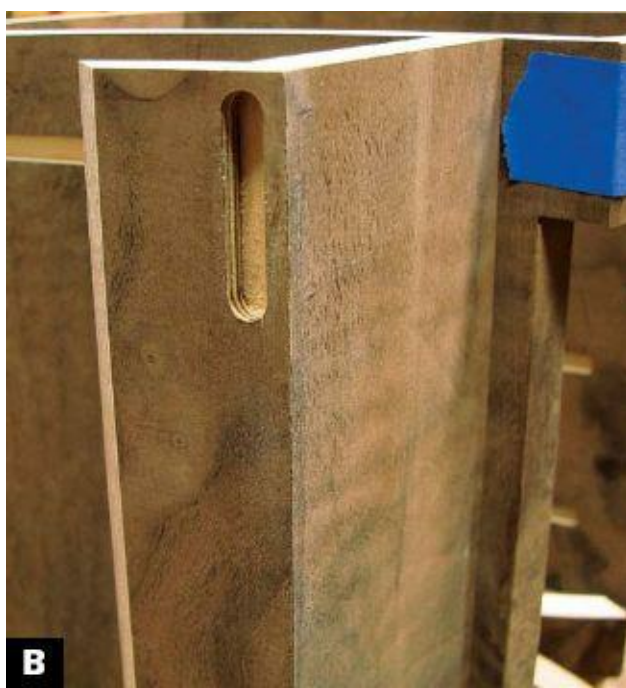
9. Use a pin nailer to shoot $1\frac{1}{4}$ -in.-long pins through the plywood and the ribs. Nail into each rib, using as many nails as needed to secure the bending plywood to the ribs.

10. Place both forms into a vacuum press bag and let the glue dry for a couple of hours before removing.

11. Make an L-shaped straightedge from ½-in. plywood and clamp the straightedge to the tablesaw fence. Then adjust the fence to trim the bending plywood flush with the form. Repeat to trim all four sides to both forms (**PHOTO F**).



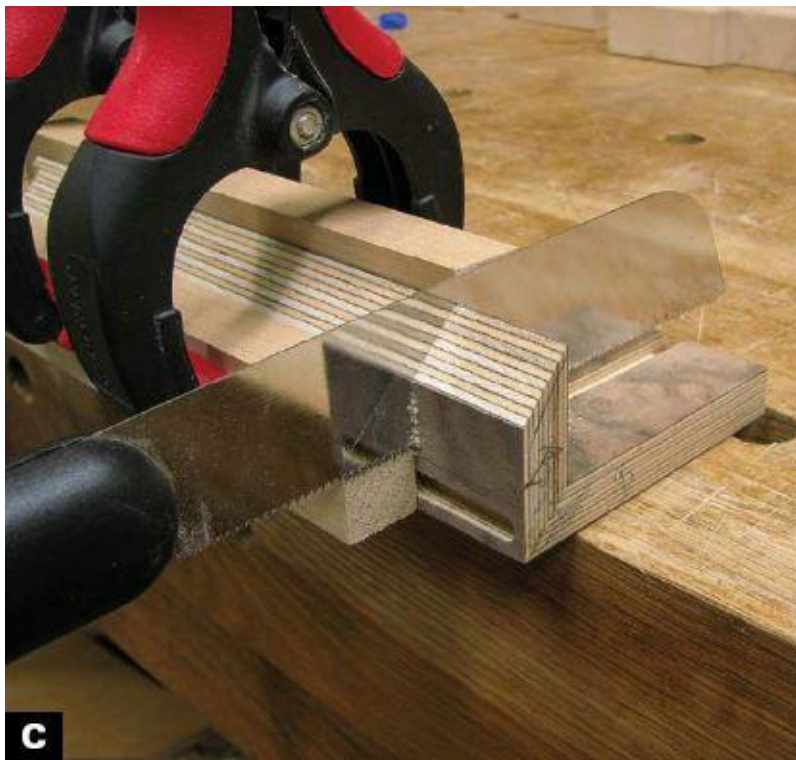
5. Rout a short stopped groove into the upper face of the corners, which will be used to spline the corners to the upper tray. Set the router-table fence ⅛ in. from the router bit and then lower the router bit below the router table. Hold a corner in position and raise the router bit to cut ⅛ in. into the corner. Push the corner into the bit and up to your stop. Lower the router bit before lifting the corner. The size of the groove will be ⅛ in. deep by ¼ in. wide by 1⅛ in. long, stopping ⅛ in. from the top edge (**PHOTO B**).



B

ROUT A SHORT stopped groove into the upper face of the corners; the groove will be used to spline the corners to the upper tray.

6. In order for the tray bottom to fit around the tray sides, the left and right corners must be cut down to $7\frac{5}{8}$ in. to match the height of the return corners. Use a Japanese detail or dovetail saw to cut the front down to $7\frac{5}{8}$ in., leaving a $\frac{1}{2}$ -in.-wide by $1\frac{3}{8}$ -in.-tall section with the groove, which is used to attach the tray sides (**PHOTO C**).



C

CUT A NOTCH in the top of the corners to match the height of the return corners and accommodate the tray bottom.

7. Glue the return corners to the box corners, which will produce two front corners that are ready for veneering the edges.

WORK

Before cutting the fronts and corners to their finished size, use the larger panels you veneered earlier. It is easier to rout the ¼-in. by ¼-in. groove into the bottom edge and also the long edge of the front that gets splined into the outside face of the sides before the parts are cut to size.

Make the upper tray sides

1. Cut one piece of ½-in.-thick maple-veneer plywood to 1⅜ in. wide by 24 in. long. You'll need this length to allow for the miter cuts and matching up the grain.
2. To glue the veneer to both surfaces of the tray sides, start by cutting two clamping cauls out of ¼-in.-thick MDF or plywood. Make each caul 1½ in. wide by 24⅞ in. long. Cut two pieces of walnut burl veneer for the faces, each one 1½ in. wide by 24⅞ in. long. Then cut two more veneer pieces for the edges, each at ⅝ in. wide by 24⅞ in. long each. Use a small roller to apply yellow glue to the veneer and both faces of the tray (**PHOTO A**). Place the cauls on both sides of the trays, sandwiching the veneer. Use masking tape to hold the pieces together and then place them into the vacuum press bag. Let the glue dry for two hours.



VENEER THE FACES and edges of the upper tray sides with walnut burl veneer.

3. After both faces and edges of the maple plywood strip are glued, veneered, and trimmed flush, rout a ⅛-in.-deep by ¼-in.-wide groove for the upper tray bottom. Use the same 1-in. spacing on the router-table fence that you used for the ends, back, and fronts.

To cut miters into the small ends of the upper tray corners, use a miter saw and an L-shaped plywood fence to prevent the pieces from moving or chipping. The miters for these upper tray corners will be cut at 45°, except for one miter into the back corner, which must be cut to 28° to match the radius tray sides (see “Front Horizontal Section” on [p. 202](#)).

4. Cut two 1¼-in.-long plywood pieces for the inside face, four 2-in.-long pieces for the outside corner, and two ⅞-in.-long pieces for the back corner.
5. After cutting all the miters into the upper tray corners, rout a groove into the outer surface of the inside face piece, which will be splined to the main front corner. Rout a ¼-in.-deep by ¼-in.-wide by 1⅞-in.-long groove into the inside face piece. Stop the groove ⅛ in. from the top and bottom of the part.
6. To finish the upper tray sides, use the side and front radius forms (see [pp. 204–205](#)) to make the

two side radius trays and the front radius tray. Spray adhesive onto the face of the forms and stick down $\frac{1}{16}$ -in.-thick foam. This cushiony layer will eliminate any voids when gluing the veneer to the core (**PHOTO B**, [p. 208](#)). See “Materials” on [p. 189](#) for the dimensions of the front and side tray parts.



USE THE SIDE and front radius forms to make the two side radius trays and the front radius tray.

When cutting the $\frac{1}{8}$ -in. bending plywood, cut an extra piece to be used for the top clamping caul, which will protect the veneer from the vacuum press bag. There will be seven layers to make each one of these tray sides: one piece of walnut burl veneer placed on the form, then the maple veneer, four layers of the bending plywood, and finally another piece of walnut burl veneer.

7. Roll yellow glue on all mating faces and stack them in order. Hold the bundle together with blue painter’s tape and then place it into the vacuum press bag. Let the glue dry for three hours before removing.

8. Using the form as a sled on the tablesaw, trim the edges of the radius trays. Then cut the width of the tray ends and front to $1\frac{3}{8}$ in. wide. But before cutting them to length, rout a $\frac{1}{8}$ -in.-deep by $\frac{1}{4}$ -in.-wide groove into the inside faces, which will receive the tray bottom. Use a slot-cutting bit in the router table and set the bit to cut $\frac{1}{8}$ in. deep (**PHOTO C**).



ROUT A GROOVE into the inside faces of the radius trays to receive the tray bottom.

When cutting the radius tray parts to length, be sure to dry-fit the box together and measure for the length before cutting to size.

- 9.** Use the miter saw to cut the radius tray ends and front, just as you did for the solid base trim (see [p. 197](#)).
- 10.** For the radius side trays, make a solid- hardwood jig to hold the side trays at 90° to the router-table fence. Be careful when cutting this groove to make sure the sides don't move. Set the ¼-in.-dia. router bit to cut ⅛ in. deep, and make several passes (**PHOTO D**). Rout this groove through the inside face of the tray sides, and then glue a ⅛-in. by ¼-in. stop groove plug into both ends for veneering the edges.



TO ROUT THE GROOVES in the ends of the radius side trays, make a jig to hold the side trays at 90° to the router-table fence.

- 11.** Rout a groove into the inside surface of the two side trays and into both short upper edges of the back (**PHOTO E**). Lower the router bit flush with the router table. Then start the router and raise the bit up approximately ⅛-in. at a time allowing for the 16½° angle already cut into the edge. Make about three passes over the bit, raising it ⅛ in. each time, to equal ⅝-in. deep. Be sure to allow for the spline. Cut a 1⅛-in.-long groove, stopping ⅛ in. from the top edge.



ROUT A GROOVE into the inside surface of the two side trays and into both short upper edges of the back.

Veneer the edges

NOW THAT ALL THE BOX PARTS have been made, it's time to veneer all the edges.

1. Use a self-healing cutting mat, straightedge, and scalpel to cut strips of $\frac{1}{42}$ -in.-thick walnut burl veneer for the edges.

Here are the sizes of the edge-veneer pieces required:

- 4 Radius side trays: top, bottom edges $\frac{1}{42}$ in. by 2 in. by $7\frac{5}{8}$ in.
- 2 Radius front tray: top, bottom edges $\frac{1}{42}$ in. by $1\frac{1}{4}$ in. by $7\frac{7}{8}$ in.
- 1 Back: top edge $\frac{1}{42}$ in. by $\frac{5}{8}$ in. by $14\frac{3}{4}$ in.
- 2 Back: side edges $\frac{1}{42}$ in. by $\frac{5}{8}$ in. by $9\frac{1}{8}$ in.
- 2 Sides: top edges $\frac{1}{42}$ in. by $\frac{5}{8}$ in. by $8\frac{3}{4}$ in.
- 2 Sides: front edges $\frac{1}{42}$ in. by $\frac{5}{8}$ in. by $7\frac{3}{4}$ in.
- 2 Front: top edges $\frac{1}{42}$ in. by $\frac{5}{8}$ in. by $3\frac{3}{4}$ in.
- 2 Return corners: side edges $\frac{1}{42}$ in. by $\frac{5}{8}$ in. by $7\frac{7}{8}$ in.

2. Brush yellow glue onto both the edge and veneer using straight and angled clamping cauls. Clamp the veneer to the edges and let the glue dry for two hours before trimming and filing the edges flush (**PHOTO A**).

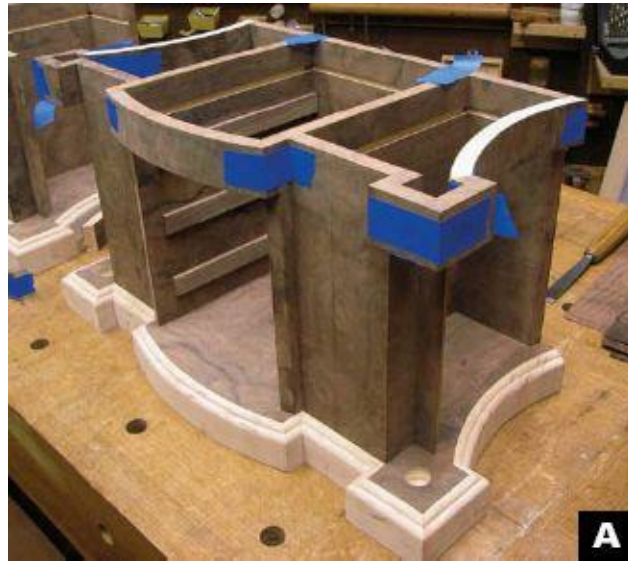


ONCE ALL THE BOX PARTS have been made, veneer all the edges with the walnut burl veneer. It's a good idea to make angled clamping cauls for the angled edges (shown here is the left-side end of the box).

Make the tray bottoms

AT THE BEGINNING OF THE PROJECT, we cut two 48-in.-long splines for joining together the tray, back, sides, and fronts (see [p. 196](#)). To make sure the splines fit snugly, measure and cut them individually as you assemble the box.

1. After all the box edges have been veneered and all the splines have been cut and fitted, dry-fit all the parts to the bottom platform (**PHOTO A**). Use blue painter's tape to hold together the upper tray corners. Then flip the box upside down and set it onto a piece of ¼-in.-thick by 11-in.-wide by 20-in.-long birch plywood.



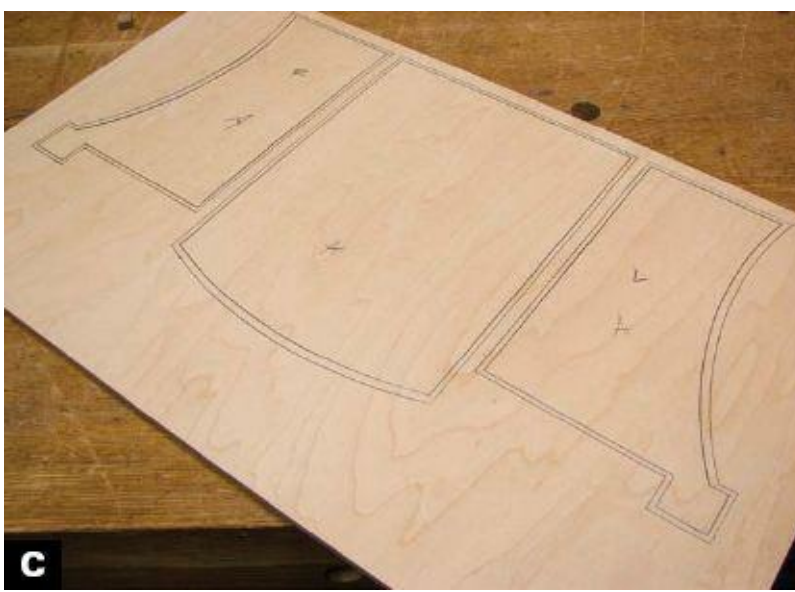
DRY-FIT ALL THE PARTS to the bottom platform, using blue painter's tape to hold the upper tray corners together.

2. Trace around the three tray openings, marking the plywood where the bottom trays will be inserted (**PHOTO B**).



WITH THE BOX UPSIDE DOWN on a piece of ¼-in.-thick birch plywood, trace around the three tray openings.

3. Remove the box and draw a line $\frac{3}{32}$ in. outside of each tray outline. This outer line represents the cut line and will allow the tray bottoms to extend into the ⅛-in. grooves (**PHOTO C**).



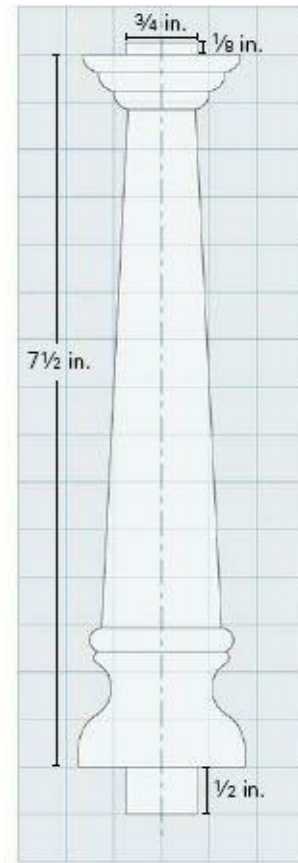
REMOVE THE BOX and draw a cut line $\frac{3}{32}$ in. outside of each tray outline.

4. On the bandsaw, cut along the center of the outside pencil line. Then fit the bottoms into the grooves.

Turn the maple columns

ONE OF THE MOST EYE-CATCHING features of this jewelry box is the pair of turned maple columns that stand guard at each front corner. The round columns perfectly complement the curved doors and bowed front. For cutting in the profile of the columns, refer to the directions for the turned segmented feet for the Music Box on [p. 118](#). To turn the columns on the lathe, you'll need an outside caliper and five turning tools: roughing gouge, ½-in. spindle gouge, ¼-in. spindle gouge, skew chisel, and ⅛-in. parting tool.

Column Template



Enlarge by 200% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

1. Start by cutting two maple blanks, each measuring $1\frac{7}{8}$ in. square by $8\frac{1}{8}$ in. long.
2. Bevel-tilt the tablesaw blade over to 45° and trim off the four corners of each blank, creating octagonal-shaped blanks.
3. Mount one blank onto the lathe and use the roughing gouge to turn down to $1\frac{3}{4}$ in. dia. Repeat for the second blank.
4. Make a photocopy of “Column Template” at left. Use the template as a guide in turning the columns to their final shape (**PHOTO A**).



TURN THE TWO MAPLE columns that sit at the front corners of the box.

Start assembling the box

IT'S DIFFICULT TO GLUE all the box parts together at the same time, so break down the assembly process into a couple of steps. Start by gluing the sides to the front corners and then attach the upper inside tray to the front.

1. To make sure all the parts fit together accurately, dry-fit the back, sides, and front corners onto the bottom platform, and assemble the upper inside tray with the splines slipped into the grooves. Put masking-tape strips along the joints to prevent any glue squeeze-out from getting onto the face of the veneer.
2. Take off just the front and inside tray, leaving the side and back still splined and dry-fitted to the bottom platform. At this stage you're gluing and clamping only the sides to the front corners and the upper tray to the front corner (**PHOTO A**).



GLUE AND CLAMP the front corners to the sides.

3. Remove the back of the box and put strips of tape along the glue joints on the bottom platform. Also put tape along the lower sections of the sides and front corners for gluing them to the platform. You will also be gluing the two columns onto the platform.
4. Remove the sides and front corners and brush glue into the grooves and onto the splines. Also glue the mortises and tenons for the columns. After gluing, reassemble the parts.
5. Cut a $\frac{3}{4}$ -in.-thick by 10-in.-wide by 19-in.-long piece of plywood for use as a clamping caul. Place it on top of the sides and front corners and then set a 50-lb. weight on top. After the glue is fully cured, repeat the same steps for attaching the back, only this time, clamp the back tight against the back edges of the ends and the bottom.
6. Slide all three tray bottoms into their grooves. Dry-fit and clamp all of the tray sides and fronts, making sure the joints fit tightly together (**PHOTO B**). Brush glue on both faces of the tray parts, then clamp them together. It's best to glue and clamp one complete corner and radius side tray at a time. Once the glue dries, glue and clamp on the front tray.



TO MAKE IT EASIER to clamp the radius tray front to the box, make a clamping block with the same radius on one face and a straightedge on the opposing side. The block will prevent the clamps from slipping off.

Mill the maple accent trim

A SMALL BAND of bird's-eye maple separates the lower box section from the upper tray. This light-blond trim piece accents the base, columns, and top trim while complementing the dark-brown walnut burl veneer. Because this trim is relatively small, the radius front and side pieces must be laminated together from several thin strips before shaping the final profile on the router table. If you were to cut this trim from solid wood, it wouldn't hold up during routing. The finished size of the accent trim is $\frac{9}{32}$ in. thick by $\frac{3}{8}$ in. wide.

1. Use the tablesaw to cut three strips of maple for the front radius trim. Make each piece $\frac{3}{32}$ in. thick by $\frac{7}{16}$ in. wide by $9\frac{1}{2}$ in. long. Cut three strips for each of the two side radius pieces. Make each strip $\frac{3}{32}$ in. thick by $\frac{7}{16}$ in. wide by 8 in. long.

2. Take three side pieces and brush yellow glue onto both surfaces of the center strip. Stack the strips and clamp them to the box tray face, which will act as a clamping caul. Be careful not to glue the trim to the box. Let the glue dry for four hours before removing the clamps. Repeat this step for the opposite side and front (**PHOTO A**).



GLUE AND CLAMP the three pieces for the side radius trim, using the box tray face as a clamping caul.

3. Adjust the jointer to cut $\frac{1}{64}$ in. deep and trim the top and bottom edges flush until all three strips are $\frac{3}{8}$ in. wide.

4. Use the tablesaw to cut two straight pieces of maple trim, one for each side of the box. Make these pieces $\frac{9}{32}$ in. thick by $\frac{3}{8}$ in. wide by 16 in. long; the extra length will allow you to cut the mitered ends.

5. To rout the necessary profile into the maple trim pieces, you'll need two router bits. The top profile is formed with a $\frac{3}{16}$ -in.-radius roundover bit and the bottom profile is created by a $\frac{3}{16}$ -in.-radius cove bit. To rout the straight pieces, keep the trim tight against the fence and use a push stick and featherboard for safety. Rout the profile into the front radius trim using the fence and ball-bearing

guide on the bit (**PHOTO B**, [p. 214](#)). When routing the two side radius pieces, remove the router-table fence and use a starter pin as a safety guide.



THE MAPLE ACCENT TRIM for the radius front and side pieces must be laminated together from several thin strips before shaping the final profile on the router table.

- 6.** Lightly hand-sand the trim pieces with 150-grit sandpaper.
- 7.** Cut the miters into the small trim pieces; be sure you use an L-shaped fence. Follow the same cutting techniques you used on the base trim for cutting the miters (see [p. 197](#)). Place blue painter's tape on the walnut burl veneer to prevent glue from seeping onto the veneer.
- 8.** The trim is attached flush to the bottom edge of the tray with the cover profile facing down to the base. Use a small brush and apply yellow glue to both the veneer and backside of the trim. Use blue painter's tape to clamp down the small straight pieces of trim and spring clamps to attach the radius trim.

Make the radius doors

EACH OF THE THREE curved doors is composed of five layers: four pieces of $\frac{1}{8}$ -in.-thick bending plywood and one piece of maple veneer glued to the front surface. The door faces will then be covered with a marquetry design. The maple veneer prevents the plywood's wood grain from telegraphing through the marquetry.

1. To build the three doors, cut 12 pieces of $\frac{1}{8}$ -in.-thick bending plywood, each measuring $8\frac{1}{2}$ in. wide by $9\frac{1}{2}$ in. long, and three pieces of $\frac{1}{42}$ -in.-thick maple veneer, each $8\frac{1}{2}$ in. wide by $9\frac{1}{2}$ in. long. Note that these dimensions are slightly oversize to allow the doors to be trimmed to size later.

WORK

To prevent glued layers from shifting out of position while inside the vacuum press bag, hold the pieces together with Gorilla Tape. This heavy-duty, double-thick duct tape has superior holding power.

2. Roll yellow glue onto all mating surfaces. Then secure each bundle with duct tape.
3. Place the glued-up door blanks into the vacuum press bag, turn on the vacuum, and let the glue dry for three hours.
4. Before trimming the doors to size on the tablesaw, carefully measure each doorway opening on the box, remembering to allow for the door-edge veneers. Use the clamping forms as sleds to cut the height and width of each door (**PHOTO A**).



TRIM THE FRONT and side doors to size on the tablesaw, using the clamping forms as cutting sleds.

Select and cut veneers

WHEN SELECTING VENEERS for the doors, keep in mind that it's best to use walnut burl or a similarly dark veneer for the background and lighter colors for the intricate design, in this case, the roses and petals. A dark background veneer also effectively hides the tiny brad holes left behind after nailing together the veneer packet.

1. Cut six clamping cauls from $\frac{3}{4}$ -in. plywood: two 8-in.-sq. pieces for the front door, and two $7\frac{1}{2}$ -in.-wide by 8-in.-long pieces for each of the two side doors.
2. Cut the veneer using a scalpel and self-healing cutting mat. Place one of the plywood clamping cauls on top, press down firmly, and cut around the perimeter (**PHOTO A**).



CUT AROUND THE PERIMETER of the plywood clamping caul, making two or three cuts using medium pressure to slice through the veneer.

M

T

P

M

There are many different ways to cut and produce marquetry. The technique I explain in this chapter is called the *packet method*. This style of preparing and cutting is easy to learn and is an excellent way to produce several different copies with just one packet.

The marquetry steps shown here are for the front radius door. The same techniques can be applied to the other marquetry designs for this box or any other box in this book. Here are the veneer pieces you'll need for each packet.

FRONT DOOR (all pieces are 8 in. sq.)

- 2 Rose petals: purpleheart veneer
- 1 Background: walnut burl veneer
- 1 Rose vines: myrtle burl veneer
- 1 Rose leaves: poplar veneer
- 1 Cutting template: scrap veneer
- 1 Back surface of front door: walnut burl veneer

SIDE DOORS (all pieces are $7\frac{1}{2}$ in. wide by 8 in. long)

- 4 Rose petals: purpleheart veneer
- 2 Background: walnut burl veneer

- 2 Rose vines: myrtle burl veneer
- 2 Rose leaves: poplar veneer
- 2 Cutting templates: scrap veneer
- 2 Back surface of side doors: walnut burl veneer

You'll also need 5 pieces of 8-in.-sq. newsprint or kraft paper and 10 pieces that are 7½ in. by 8 in., the front door template (see [p. 216](#)), and the templates for the side doors (see [p. 217](#)).

3. When preparing to cut the veneers, keep in mind that each layer can be divided into different types of veneer. For example, when you cut the purpleheart veneer to create the rose petals, you won't need the whole sheet to cut out the rose petals; instead, cut a piece of waste veneer of any type that is scrap or a cheaper veneer. Cut and tape it together with the purpleheart using blue painter's tape. This way you can save your important veneers while still keeping the packet flat when nailing it together for accurate cutting (**PHOTO B**).

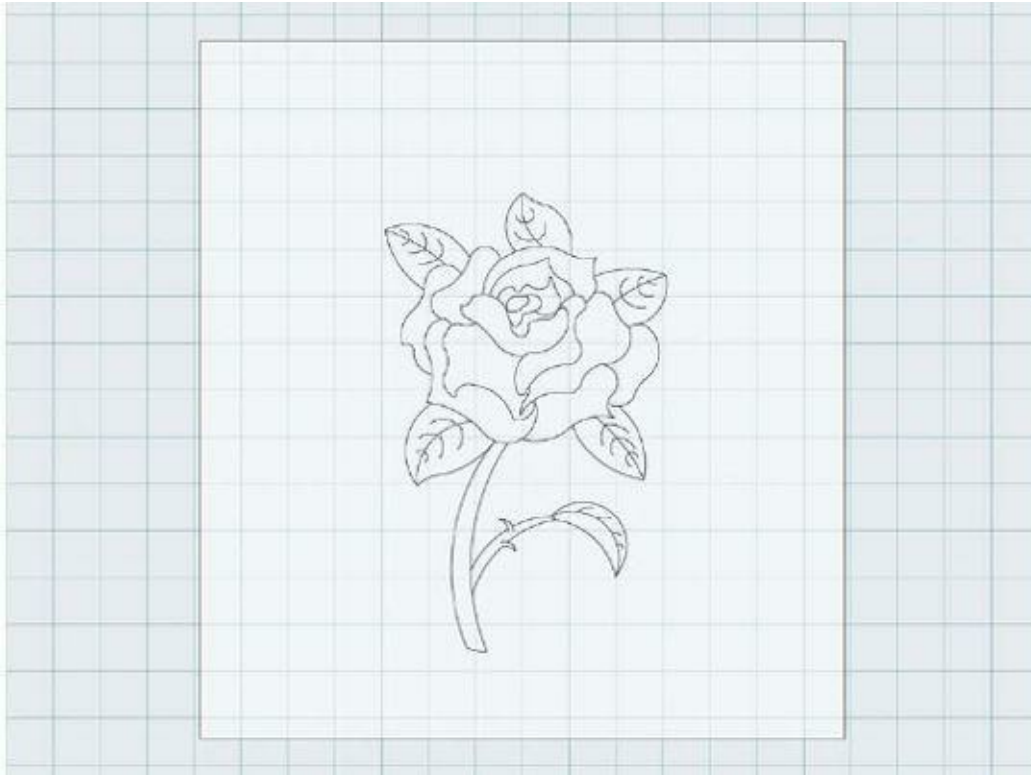


TO ECONOMIZE when cutting veneers, attach a piece of scrap veneer to a partial sheet of veneer (here, purpleheart) if a whole sheet isn't needed.

WORK

It's best to make clamping cauls from plywood because it's a softer material and is ideal for nailing together the veneer packets.

Side Door Marquetry Template



Enlarge by 200% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

Glue paper to the veneers

The next step is to glue newsprint or kraft paper to the face of each piece of veneer. The paper helps flatten and strengthen the veneers to prevent them from chipping and cracking while being cut on the scrollsaw. Use hot animal hide glue to adhere the paper to the veneer; it dries quickly and doesn't penetrate through the pores of the veneer.

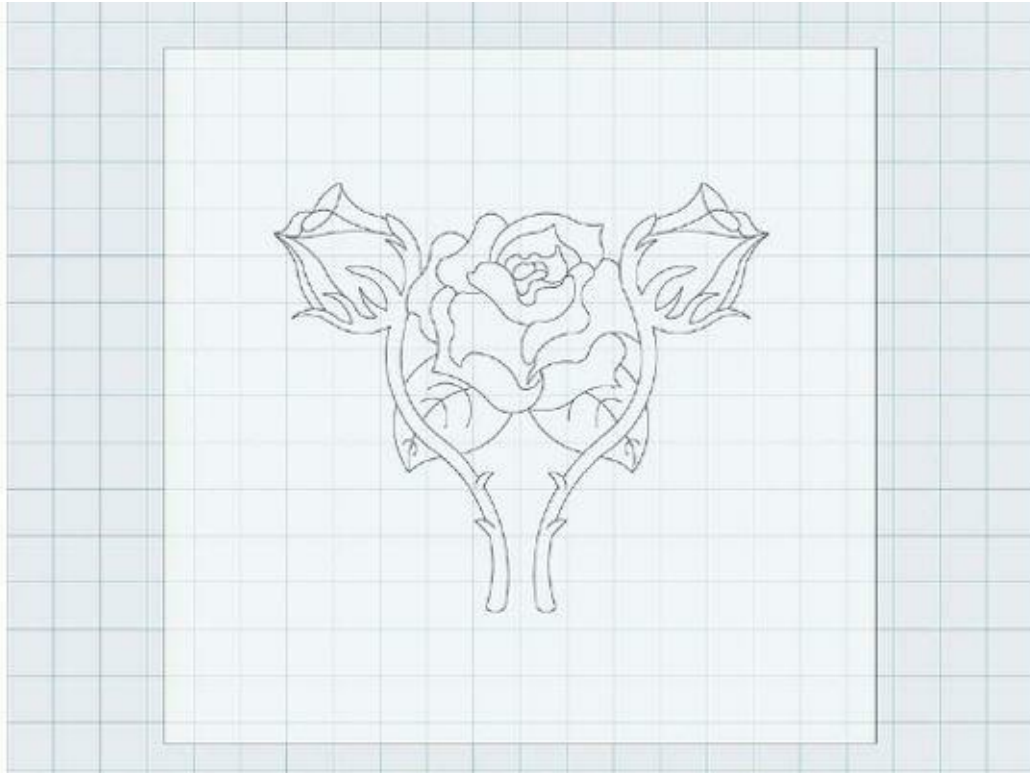
1. Brush a thin layer of hide glue onto the veneer and then place the paper on top. Fold up a clean cotton cloth into a tight ball. Use the cotton ball to rub and flatten the paper down to the veneer (**PHOTO C**).



GLUE A LAYER of newsprint or kraft paper to the veneer and flatten the paper down using a ball of cotton cloth.

2. Place the paper-covered veneer between two clamping cauls. Tighten one bar clamp in the center to press down the paper. Repeat this procedure for the other veneers. Also, glue and clamp the cutting template to the waste veneer. When clamping the last layers, be sure they're not sticking to each other. Leave the pieces clamped tight for at least three hours or, better yet, overnight.

Front Door Marquetry Template



Enlarge by 200% for full-size template. When enlarged, grid is $\frac{1}{2}$ in. $\times$ $\frac{1}{2}$ in.

V

P

D

When cutting a veneer packet, the surface with the kraft paper should be face down because the underside is most vulnerable to chipping or cracking. The exception is for the top sheet of the marquetry packet, which should always be face up. And remember when preparing a marquetry packet, the top cutting template is facing the opposite direction of the actual final marquetry design. For example, the lower leaves on the side doors face one direction when cut from the packet but face the opposite direction when glued to the door.

Nail and rivet the veneer packets

TO CONNECT THE VENEER PACKETS, nail into the face of the veneer. Once the packet is nailed together, flip it over, and snip off the nail points, leaving about $\frac{1}{32}$ in. of nail protruding. Strike the snipped nails with a tack hammer to mushroom over the nails, creating rivets to hold the packet together.

1. Remove the veneer from the clamping cauls and peel off the painter's tape. Position the poplar piece with the wood grain going vertically. Arrange the wood grain of the two purpleheart pieces with one going vertically and the other horizontally. The myrtle burl veneer can be oriented in either direction. The walnut burl must match as close as possible to the front sides. Then place on top the waste veneer piece that has the cutting template attached.
2. Place the six veneer pieces on top of a plywood clamping caul, square up their edges, and then lightly clamp the center of the packet and plywood caul to the workbench.
3. Use a pencil to mark the cutting template where the nails should be placed into the background veneer only. Starting in the center of the packet and moving outward to the edges, use a pair of needle-nose pliers to hold the $\frac{1}{2}$ -in.-long 20-gauge nails in place and then nail through the packet and into the plywood clamping caul until the head is flush with the template (**PHOTO A**).



HAMMER THE $\frac{1}{2}$ -IN. nails through the packet and into the caul, using a pair of needle-nose pliers to hold the small nails.

4. Use a thin prybar or narrow slotted screwdriver to pry the veneer packet off the plywood clamping caul. Then place the packet upside down on a hard flat surface.
5. Take side-cutting pliers and snip off the pointed tips of each nail, leaving just a tiny bit of the nail protruding (**PHOTO B**). Use a hammer to tap the snipped nails flush with the bottom sheet of veneer. This will create a rivet that holds the veneer packet together.



PRY THE VENEER packet off the plywood clamping caul and snip off the tips of each nail.

Cut the veneer packet

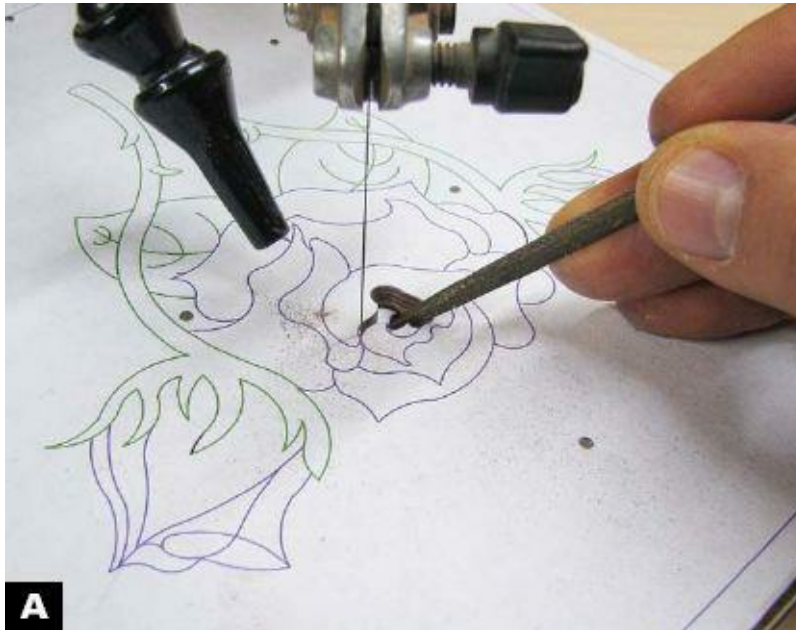
TO CUT THE INTRICATE MARQUETRY design, I use a 20-in. variable-speed scrollsaw that can be slowed down to just 400 strokes per minute (it's much easier to make precise cuts at slow speeds). And to cut the veneer packets, I use an Olson® 5-in., #3/0 jewelers' metal-piercing scrollsaw blade with 61 tpi. The benefit of using such a small blade is that it provides superior control when cutting into tight corners and sawing out the tiniest, most intricately shaped pieces. Plus the blade is only 0.0095 in. thick, which leaves an incredibly small gap between the pieces, and those gaps will be filled in with glue.

The only drawback to using smaller blades is that they wear out much faster than larger blades. For example, I went through three blades just to cut the front-door marquetry packet. However, the additional cost and inconvenience were well worth it, considering how precisely these blades cut.

WORK

Make a ¼-in.-thick platform out of MDF or plywood the same shape as your scrollsaw table to give you more control when cutting the veneer packet. Drill a ⅛-in.-dia. hole where the blade is located. Then tape the edge of your platform to the scrollsaw table edge. This platform will prevent the smaller pieces from falling through and provides a better cutting surface for your marquetry packets.

1. Start by boring a 1/64-in.-dia. hole through one of the cutting lines in the center of the veneer packet. Then feed the scrollsaw blade through the hole in the packet and through the ⅛-in. hole in the plywood auxiliary table. Lock the blade into the lower blade clamp and set the tension.
2. It's best to cut out the center pieces first and then work your way toward the outer pieces. To remove the smaller pieces after cutting, stop the saw, lift the corner of the packet, and slide out the small pieces using a narrow file or similar tool (**PHOTO A**, [p. 220](#)).



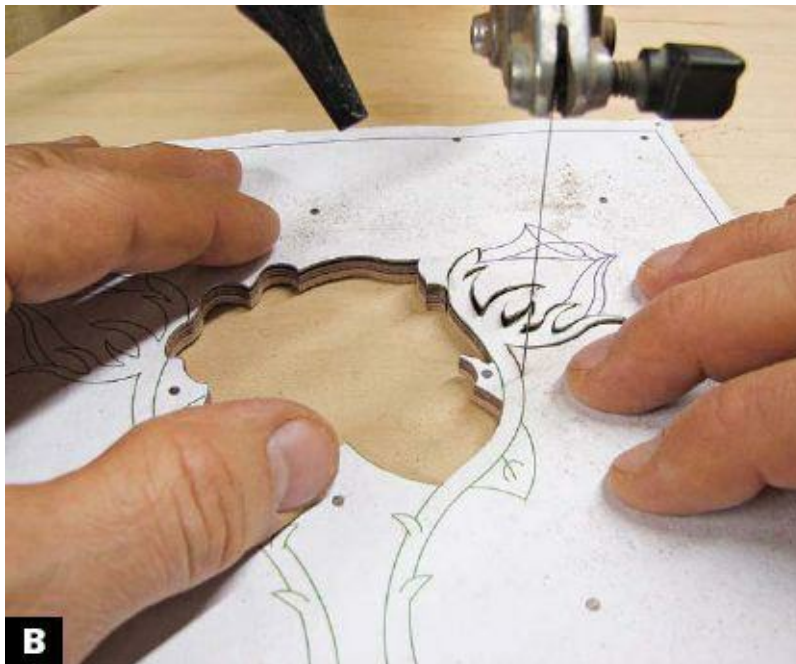
WHEN CUTTING the veneer packet, cut out the center pieces first and then work your way toward the outer pieces.

WORK

It's important to keep the blade cutting straight and on course when feeding the packet into the blade. Don't get impatient and don't push too hard; let the blade do the work. Also, while you're cutting, occasionally lift up your fingertips very slightly, then immediately press the packet back down. This will reposition the packet by straightening the blade. It will also help keep the blade cutting straight and on course.

3. When cutting the veins into the leaves, just follow the template lines, and then back out the blade with the saw running. The resulting kerfs (gaps) made by the blade will fill with glue, creating dark lines that make the veins look very realistic.

4. To cut the sharp corners of the rose stems, saw right up to the tip of the stem and then turn off the scrollsaw. Remove the blade, turn the packet around so that the next cut is straight, and reinstall the blade. Turn on the scrollsaw and cut up to the next sharp corner. Repeat these steps for each sharp corner cut (**PHOTO B**).



TO CUT SHARP CORNERS, saw right up to the tip of the corner and then turn off the scrollsaw. Remove the blade, turn the packet around so that the next cut is straight, and reinstall the blade.

Another way to cut sharp corners is to rotate the packet at a faster pace right at the tip of the corner. This will take a little practice but works just as well and is a faster method.

Now finish cutting all the pieces in the marquetry packet.

As you're cutting the veneer packet, place the cut pieces into a tray, so they won't get mixed up. The way I keep everything organized is to place the center rose into the center of the tray and the left and right rosebuds and stems into the same location in the tray.

C

S

H

S

Silica sand is used to shade marquetry pieces by lightly burning the veneer, producing a three-dimensional effect. This type of sand is very fine and thus provides a uniform burn into the veneer. Some of the best places for shading marquetry are where two pieces meet or at the center or outside edges of leaves. However, be careful not to overdo it. A little shading in the proper places is all that's required to give the marquetry picture a natural look. (It's smart to practice with several different types of veneers because veneers shade—and burn—at different rates.)

1. Start by filling a cast-iron skillet about two-thirds full with very fine silica sand. Set the skillet onto an electric stove or portable burner and heat the sand for about 30 minutes.
2. Meanwhile, place all the front-door marquetry pieces on top of one of the plywood clamping cauls, making sure to set them into their final positions (**PHOTO A**).



3. Once the sand is hot, use tweezers to pick up the marquetry pieces and partially bury them into the sand. Leave the veneer pieces in the sand for short periods of time, 5 seconds to 10 seconds, while periodically checking the veneer. Be careful not to burn them or they'll become brittle and flake off. The goal is to get a light to medium shade of color, which gives the veneer a three-dimensional appearance (**PHOTO B**).

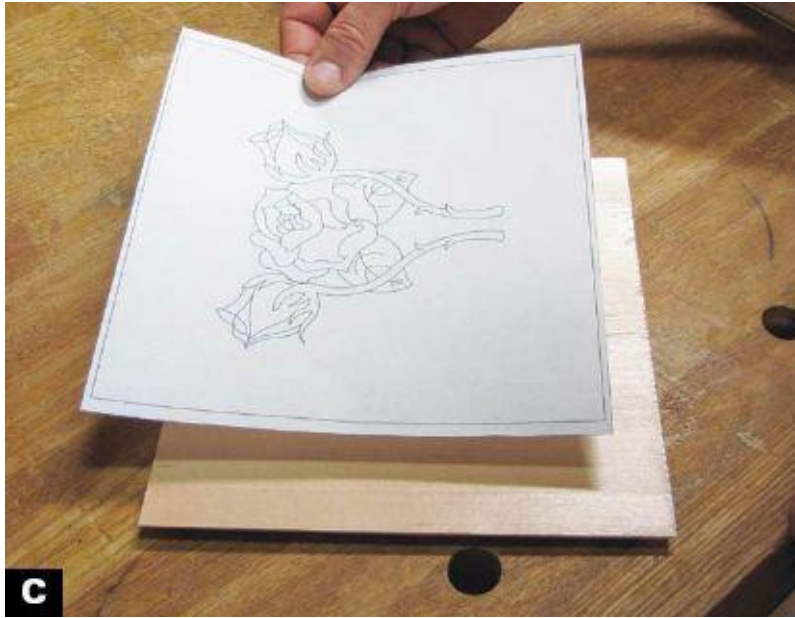


4. After removing the marquetry pieces from the sand, they'll curl up a little as they cool. To flatten them out, place all the shaded pieces onto a plywood clamping caul. Then lightly mist the pieces with water, place another plywood caul on top, and clamp together for three hours. This will flatten the marquetry pieces (**PHOTO C**).



Place the marquetry pieces together

1. Cut a piece of scrap veneer to the same size as the door packets; it will be used as a clamping caul for the radius doors. Also cut two pieces of double-tack mounting film (available at most art-supply stores) the same size as the door packets for each door.
2. Peel off the protective backing paper from one side of the mounting film and press it to the scrap veneer. Then peel off the backing from the remaining side and stick down a photocopy of the door marquetry template (**PHOTO C**).



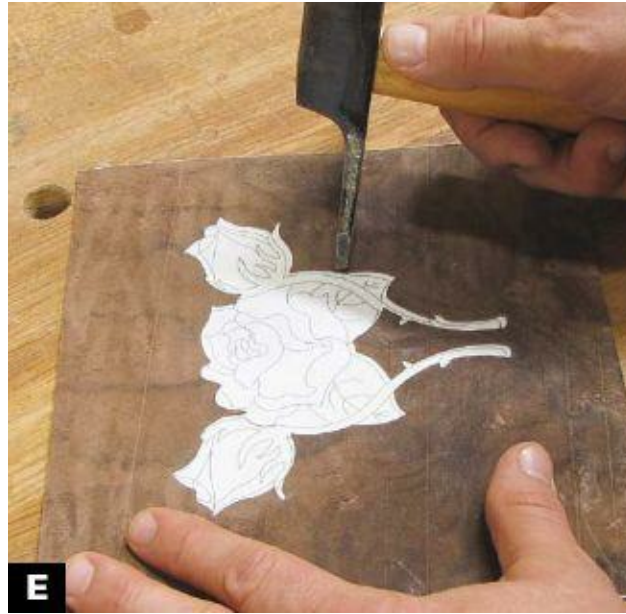
AFFIX A COPY of the door marquetry template to the double-tack mounting film on the surface of the scrap veneer.

3. Apply another piece of mounting film to the top of the template and then peel off the backing paper so you can stick down the background veneer and marquetry.
4. Take the veneer packet you cut on the scrollsaw earlier and use a slotted screwdriver to separate the background veneer from the nails (**PHOTO D**). Snip off the nail heads with side-cutting pliers, which will make it easier and cleaner to remove the remaining background veneer.



USE A SCREWDRIVER to separate the background veneer from the nails and remove it from the veneer packet.

5. Use a veneer hammer to firmly press the back-ground veneer onto the paper template (**PHOTO E**). Use tweezers to place the marquetry pieces back together onto the template (**PHOTO F**). When positioning the veneer pieces, be sure to leave a tiny gap between the pieces to represent the sawblade kerfs. This is necessary to allow all the marquetry pieces to fit perfectly into the background veneer. And don't worry about the gaps; they'll get filled in with glue.



PRESS THE BACKGROUND veneer onto the paper template using a veneer hammer.



USE TWEEZERS to reassemble the marquetry pieces on the template.

6. Once all the pieces have been set in place, press them down with the veneer hammer.

Glue the marquetry to the door

THE NEXT STEP IS to glue the marquetry design to the face of the front door and veneer walnut burl to the rear of the door—at the same time.

- 1.** Use the same foam-faced radius forms used earlier (see [p. 204](#)). Cut a piece of ¼-in.-thick bending plywood the same size as the veneer and glue a layer of foam to one surface to create the top clamping caul.
- 2.** Brush a thin layer of Titebond liquid hide glue to both sides of the door and to the back side of the rear veneer and front marquetry (**PHOTO A**). I like this particular glue because its brown color blends in well with the marquetry; it's also very slow setting, so you've got plenty of time to glue on both surfaces.



GLUE THE WALNUT BURL veneer to the back of the door and the marquetry design to the front.

- 3.** Place the door into a vacuum press bag, turn on the vacuum, and let the glue dry for four hours.
- 4.** Remove the door from the vacuum press bag but leave it on the form to sand the veneer flush with the edges. Place the form on the workbench, holding the door to the form. Use a large 3-in.-wide sanding block with 150-grit sandpaper glued to the face. Slide the block back and forth against the edges until the veneer is flush to the door edges. Repeat this step for all four edges (**PHOTO B**).



B

USE A SANDING BLOCK with a 150-grit sandpaper face to sand the veneer flush with the edges.

5. Using 150-grit sandpaper, lightly sand off the paper face covering the marquetrie design.

Make and attach the door pulls

EACH OF THE THREE DOORS has a pull made from solid walnut, which blends in beautifully with the walnut burl veneer. Cut the walnut pulls using the tablesaw and scrollsaw and then use a router table to notch the doors to receive the pulls.

1. Cut three walnut pulls, each measuring $\frac{1}{4}$ in. thick by $\frac{3}{4}$ in. wide by 1 in. long. Then move to the scrollsaw and cut a $\frac{3}{8}$ -in. radius into the front edge of each pull. Sand the pulls smooth with 150-grit sandpaper.

2. To rout the slot into the edge of the doors, build a sled using the radius forms and a $\frac{3}{4}$ -in.-thick by 11-in.-wide by 11-in.-long panel with a cutout in the front edge (to allow for the router bit). Screw the panel to the long edge of the forms. Set the router fence so the $\frac{3}{4}$ -in.-dia. straight-cutting router bit is centered to the doors. Adjust the height of the bit to cut a $\frac{1}{4}$ -in.-deep by $\frac{3}{4}$ -in.-wide slot into the long edge of the doors (**PHOTO A**).



MAKE A ROUTING SLED to support the door as you cut the slot for the door pull.

Veneer the door edges

1. Make curved clamping cauls out of $\frac{3}{4}$ -in.-thick plywood or MDF for veneering the radius edges of the three doors. Cut each caul $\frac{1}{4}$ in. wider and $\frac{1}{4}$ in. longer than the door radiuses. Now use these cauls as cutting templates to cut the walnut burl veneer pieces to cover the door edges.

WORK

When adjusting the router table's depth of cut, remember to allow for the thickness of the veneer, which will be adhered to the edges of the doors.

2. You'll need two veneer pieces for the front door, each 1¼ in. wide by 8 in. long, and four pieces for the side doors, each 2 in. wide by 7¾ in. long. Those curved pieces will be cut for the top and bottom edges of the doors. You'll also need six straight pieces, measuring ⅝ in. wide by 7½ in. long, for the vertical edges of the doors.
3. Starting with the radius edges, brush yellow glue onto the top and bottom door edges and onto the back surfaces of the veneer pieces. Clamp the veneer pieces to the door edges using the clamping cauls and short bar clamps. Repeat this process to veneer the straight door edges.
4. Once the glue dries, trim the edges flush. Place the door edge flat onto the self-healing cutting mat and trim the veneer flush to the face using a scalpel (**PHOTO B**).



GLUE THE WALNUT BURL veneer to the edges of the doors, trimming the edges flush once the glue is dry.

5. After veneering all the door edges, place masking tape around the perimeter of the routed notches in the doors. Then glue and clamp the walnut door pulls into the notches (**PHOTO C**). Allow the glue to dry for about four hours, then remove the clamps and peel off the tape.

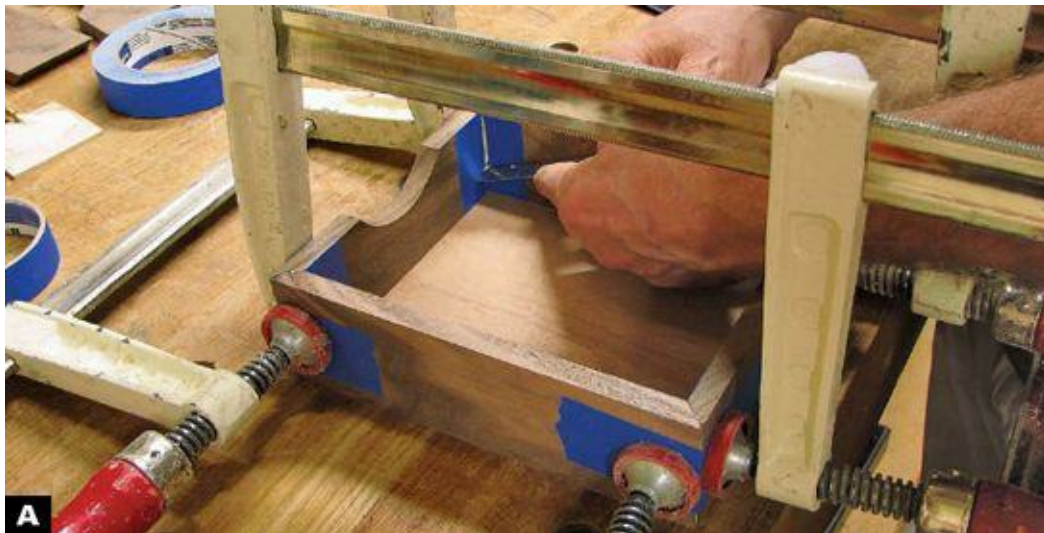


GLUE AND CLAMP the walnut door pulls into the notches.

Build the drawers

FOR THE CENTER FRONT SECTION of the box, I chose to make three hidden storage drawers from ½-in.-thick solid walnut, which blends in beautifully with the walnut burl veneer. For the bottom of the drawers I used ⅛-in.-thick plywood suitable for flocking.

1. To make the drawer parts, start with two pieces of ½-in. walnut, each measuring 2⅜ in. wide by 36 in. long. Use a thickness planer to surface the walnut down to ⅜ in. thick.
2. Cut a groove for the ⅛-in.-thick plywood bottoms. Set the tablesaw fence ⅛ in. from the blade and adjust the blade height to ⅛ in. Then push both 36-in.-long boards through the sawblade to produce ⅛-in. by ⅛-in. grooves, positioned ⅛ in. up from the bottom edges.
3. Cut the drawer sides, fronts, and backs to length with a miter saw. Set up a stop block to ensure accuracy for cutting the 45° angles on both ends of each piece for the length.
4. To make the finger pulls, draw a centerline onto all three drawer fronts. With a compass set at a 1⅛-in. radius, place the center point ½ in. above the drawer front then strike the arch, which will give you an ellipse at ⅝ in. tall by 2 in. wide.
5. Use a scrollsaw to cut out all three elliptical finger pulls. Then use 150-grit sandpaper to smooth the scrollsaw blade marks.
6. Cut the three ⅛-in.-thick drawer bottoms on the tablesaw.
7. Once all the parts are cut, stick masking tape to the inside corners. Brush yellow glue onto the mitered ends, slip the plywood drawer bottoms into the grooves, and assemble each drawer. (Don't brush glue into the grooves.) Clamp the drawer parts together and let dry for at least four hours **(PHOTO A)**.



CUT AND ASSEMBLE the drawer parts, masking the inside corners to keep the glue off the walnut.

Drawer-slide grooves and corner joints

To make simple and durable drawer slides, without any screws or hardware, rout a groove in the drawer sides to fit over the wooden slides. Rout the grooves using a $\frac{3}{4}$ -in.-dia. straight-cutting router bit. Set the router bit $\frac{7}{32}$ in. above the router table. The grooves should stop approximately $\frac{1}{4}$ in. from the drawer's front face; draw lines onto the fence for the starting and stopping locations.

1. To cut the drawer-slide grooves into the right side of each drawer, start the router, then carefully lower the drawer side down into the spinning bit, with the bottom edge of the drawer tight to the fence **(PHOTO B)**. To cut the left-side grooves, simply push the drawer into the bit, stopping at the stop line.



ROUT GROOVES in both sides of the drawer sides to fit over the wooden slides. Be sure the bottom edge of the drawer is tight to the fence.

2. Reinforce the drawers' corner joints with $\frac{1}{8}$ -in.-dia. maple hardwood dowel pins. Use a drill press to bore four $\frac{1}{8}$ -in.-dia. by $\frac{3}{4}$ -in.-deep holes through each side, two at each end. Cut eight 1-in.-long dowel pins for each drawer.

3. Smear yellow glue onto the dowels, then tap them into the holes **(PHOTO C)**. Wipe off the excess glue, then trim the dowels flush. Sand the drawers smooth with 150-grit sandpaper.



REINFORCE THE CORNER JOINTS of the drawers with $\frac{1}{8}$ -in.-dia. maple dowel pins.

Make the upper tray dividers

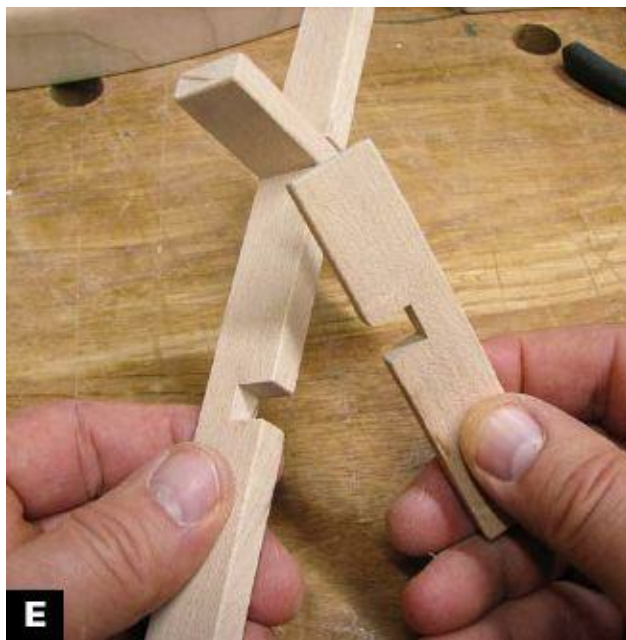
I made the tray dividers out of $\frac{3}{4}$ -in.-thick bird's-eye maple to accent the bird's-eye trim and columns on the box. I divided the center and side trays to have six openings per tray.

1. Rip the maple into $\frac{5}{16}$ -in.-thick by $\frac{3}{4}$ -in.-wide strips and then cut the strips to length (see “Materials” on [p. 190](#)).
2. To establish where to cut the half-lap joints, set the maple strips into their respective trays and mark where they overlap each other.
3. Adjust the tablesaw blade to $\frac{3}{8}$ in. high, which will split the width of the dividers in half. Use a miter gauge with a block of wood attached for support and to protect the back edge of the dividers from chipping. Use your pencil marks to show where to cut the half-lap joints (**PHOTO D**).



CUT THE HALF-LAP JOINTS in the drawer dividers, using a miter gauge with a block of wood attached for support.

4. Once all the joints are cut, glue the divider parts together. Let the glue dry for two hours and then sand the edges and corners with 150-grit sandpaper (**PHOTO E**).



GLUE THE DIVIDER PARTS together for the center and two side trays.

Make the box top

THE TOP HAS THE SAME STYLE of roses as the doors, as well as a blend of lines and scrolls intertwined into the rose design. For the box top, I made the marquetry pattern to the same dimensions as the outside edges of the box: 9 $\frac{5}{8}$ in. wide by 18 $\frac{5}{8}$ in. long. Then, after veneering the marquetry on the box top and applying the walnut burl on the backside, I added bird's-eye maple hardwood trim to the edges of the box top. With the routed profiles, it leaves the top overhanging slightly, with the bottom cove profile used to lift the top.

1. Cut a piece of $\frac{1}{2}$ -in.-thick maple veneer plywood for the box top. Cut the piece slightly oversize at 10 $\frac{1}{4}$ in. wide by 19 $\frac{1}{4}$ in. long. Flip the box upside down and set it onto the plywood top. Trace a pencil line around the box and onto the plywood.

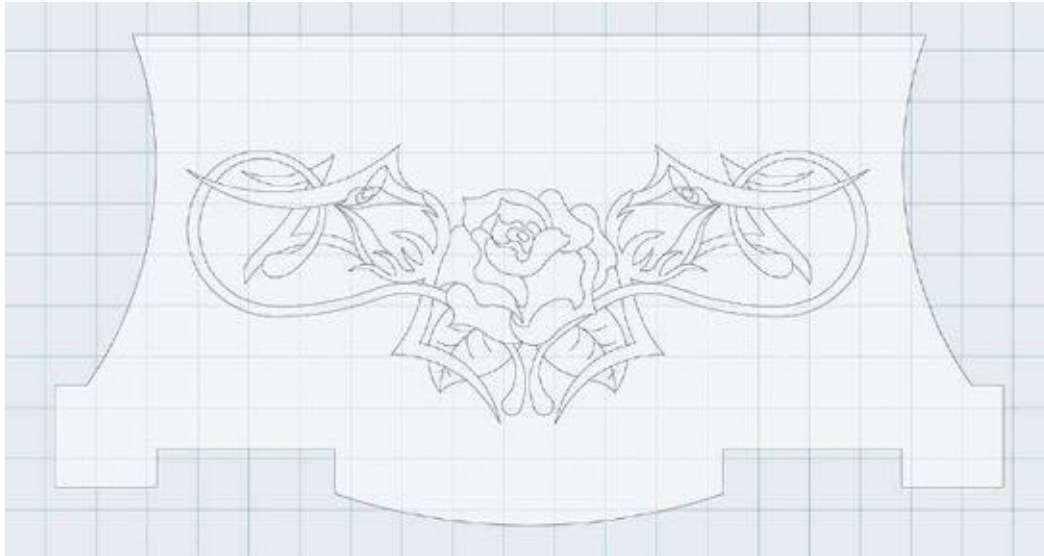
2. Use the “Top Marquetry Template” shown below to lay out and cut the veneer pieces. Follow the same steps described on [p. 215](#). The veneer packet for this top measures 10 $\frac{1}{4}$ in. wide by 19 $\frac{1}{4}$ in. long.

Here are the veneer pieces required for the box top marquetry packet:

- 2 Rose petals: purpleheart veneer
- 1 Background: walnut burl veneer
- 1 Rose vines: myrtle burl veneer
- 1 Rose leaves: poplar veneer
- 1 Scrolls: black-dyed ebony veneer
- 1 Cutting template: scrap veneer
- 1 Underside of box top: walnut burl veneer

3. Cut the two 2-in. by 2-in. square outside corners of the box top on the tablesaw. Then move to the bandsaw and cut the radius profile and the inside corners, using a $\frac{3}{16}$ -in. by 10-tpi bandsaw blade for a clean, smooth cut (see the photo on [p. 192](#)).

Top Marquetry Template



Enlarge by 300% for full-size template. When enlarged, grid is 1 in. × 1 in.

4. Use a bench vise and two clamping cauls placed on the veneer side on both sides of the top to protect the veneer. Remove all the bandsaw-blade marks with a half-round file. Make sure you file straight or angling slightly toward the bottom to prevent chipping the walnut burl veneer.
5. Glue a strip of walnut burl veneer to the rear edge of the box top. It's important to veneer the edge before installing the maple trim.
6. To create the $\frac{9}{16}$ -in.-thick bird's-eye maple top straight trim, cut two pieces $\frac{7}{16}$ in. wide by 21 in. long. For the front radius trim, cut one piece $1\frac{1}{4}$ in. wide by $8\frac{3}{4}$ in. long, and for the side radius trim, cut two pieces $1\frac{3}{4}$ in. wide by $7\frac{1}{4}$ in. long.
7. Making the bird's-eye maple trim for the top edges is similar to making the base trim for the bottom platform, using the same steps for cutting and shaping the top trim (see [p. 197](#)). To rout the radius and cove profiles, follow the same steps used to make the small accent trim (see [p. 213](#)), except the top radius profile router bit and the cove router bit each have a $\frac{5}{16}$ -in. radius.
8. Once the maple trim is glued on, use a low-angle block plane to shave it flush with the veneer on each side of the box top (**PHOTO A**). Sand smooth the cove and radius profiles with 150-grit sandpaper.



USE A LOW-ANGLE BLOCK PLANE to shave the maple trim flush with the veneer on each side of the box top.

Install the door hinges

TO HINGE THE THREE RADIUS DOORS I used three pairs of the smallest brass butt hinges I could find; the hinges are $\frac{3}{4}$ in. tall by $\frac{5}{8}$ in. wide.

1. Make a hinge template from heavyweight paper or thin cardboard, $\frac{1}{2}$ in. wide by $7\frac{1}{2}$ in. long. Cut two $\frac{1}{4}$ -in.-wide by $\frac{3}{4}$ -in.-long notches into the template, positioned $\frac{1}{2}$ in. from each end to represent the hinge-mortise locations.
2. Place the template onto the edge of the jewelry box and use a pencil to outline the hinge mortises onto the box (**PHOTO A**). Repeat to mark the hinge mortises onto the radius door edges.



USE A TEMPLATE to mark the location of the hinges for the three radius doors.

3. Cut the $\frac{1}{32}$ -in.-deep hinge mortises using a $\frac{1}{4}$ -in.-wide wood chisel and a #2/8 carving gouge.
4. Before screwing on the hinges, drill $\frac{1}{16}$ -in.-dia. pilot holes so you don't snap the screws or strip their heads.

Install the door catches

TO HOLD THE JEWELRY-BOX DOORS CLOSED, install small door-snap closures, which can be purchased at any hardware store.

- 1.** Start by drilling a $\frac{1}{8}$ -in.-dia. hole into the door. Next, mix up some epoxy adhesive and glue the brass button point into the hole.
- 2.** Press the door closed and the button point will mark a small indentation into the edge of the box. Drill a $\frac{1}{8}$ -in.-dia. hole on the mark, and then use epoxy to glue the other half of the door catch into the hole. Repeat for the other doors.

Install the box top hinges

1. To attach the box top, use two $1\frac{1}{16}$ -in. by $1\frac{1}{4}$ -in. 95° stop hinges mounted $1\frac{3}{4}$ in. in from the box ends. Place each hinge square onto the top back edge of the box with its $\frac{3}{16}$ -in.-dia. knuckle hanging off the back side. Trace around the hinges with a very sharp pencil.
2. Butt the box top up against the back edge of the box and lay the hinges flat onto the top. Trace the hinges onto the box top.
3. Start cutting the hinge mortises with a $\frac{3}{8}$ -in.-wide wood chisel and mallet. Holding the chisel on the inside edge of the pencil lines and perfectly vertical, lightly tap the chisel into the wood. The finished depth of each mortise must be $\frac{3}{32}$ in., but cut away only half of the wood at a time. Switch to a #2/8 carving gouge to remove the waste material from each mortise.
4. Pre-drill and screw the hinges to the box top and bottom. Remove until after you have put the finish on the box.

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It's necessary to cut a hinge mortise into the back edge of the box, but plywood doesn't stand up to chiseling as well as hardwood does. That's why I always clamp a small hardwood block to the inside surface of the box, which provides extra support and helps prevent the plywood from chipping, cracking, or splitting.



Finishing and flocking

AN INEXPENSIVE WAY to protect your jewelry from sliding around inside the three small drawers is to use suede flocking. Search online for woodworking and hardware companies that carry mini-flocker suede fibers and adhesive. The undercoat adhesive is especially formulated to hold the suede fibers firmly in place; it will not crack after drying and is color coordinated to match each shade of the suede fibers.

- 1.** Lightly hand-sand all surfaces with 150-grit sandpaper. Blow off all the sanding dust and wipe everything down with a clean, dry rag.
- 2.** Spray on a very light coat of precatalyzed lacquer finish, which acts as a sealer. Allow the lacquer to dry one hour longer than is recommended on the container.
- 3.** Sand again, this time with ultra-fine 320-grit sandpaper. Remove all the sanding dust and then spray on another light coat of lacquer. Be careful not to apply the lacquer too thickly or it could crack over time.
- 4.** Repeat the previous step by sanding first and then applying one final coat of lacquer. Let the finish dry overnight.
- 5.** Apply a brown undercoat adhesive by either brushing or spraying onto the bottoms of the three drawer and three upper trays.
- 6.** While the undercoat adhesive is still wet, spray on a coating of brown flocking fibers with a hand-operated mini-flocker. Let the fibers and adhesive dry overnight.

Mount the chain carousels

THE LAST STEP is to install two chain carousels behind each of the side doors. The chain carousels are designed for holding necklaces (**PHOTO A**).



INSTALL TWO CHAIN CAROUSELS (designed to hold necklaces) behind each of the side doors.

- 1.** Cut two pieces of solid walnut, each measuring $\frac{1}{2}$ in. thick by $2\frac{1}{4}$ in. wide by 6 in. long. Drill two $\frac{3}{8}$ -in.-dia. holes with equal spacing through each block. Glue and clamp the blocks to the underside of the upper trays.
- 2.** Squeeze some epoxy adhesive into the holes and then insert the chain carousels. Use bar clamps to hold the carousels in place until the epoxy dries.
- 3.** Reattach all the hinges and assemble the completed box parts.

Metric Equivalents

Inches	Centimeters	Millimeters	Inches	Centimeters	Millimeters
1/8	0.3	3	13	33.0	330
1/4	0.6	6	14	35.6	356
3/8	1.0	10	15	38.1	381
1/2	1.3	13	16	40.6	406
5/8	1.6	16	17	43.2	432
3/4	1.9	19	18	45.7	457
7/8	2.2	22	19	48.3	483
1	2.5	25	20	50.8	508
1 1/4	3.2	32	21	53.3	533
1 1/2	3.8	38	22	55.9	559
1 3/4	4.4	44	23	58.4	584
2	5.1	51	24	61.0	610
2 1/2	6.4	64	25	63.5	635
3	7.6	76	26	66.0	660
3 1/2	8.9	89	27	68.6	686
4	10.2	102	28	71.1	711
4 1/2	11.4	114	29	73.7	737
5	12.7	127	30	76.2	762
6	15.2	152	31	78.7	787
7	17.8	178	32	81.3	813
8	20.3	203	33	83.8	838
9	22.9	229	34	86.4	864
10	25.4	254	35	88.9	889
11	27.9	279	36	91.4	914
12	30.5	305			



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