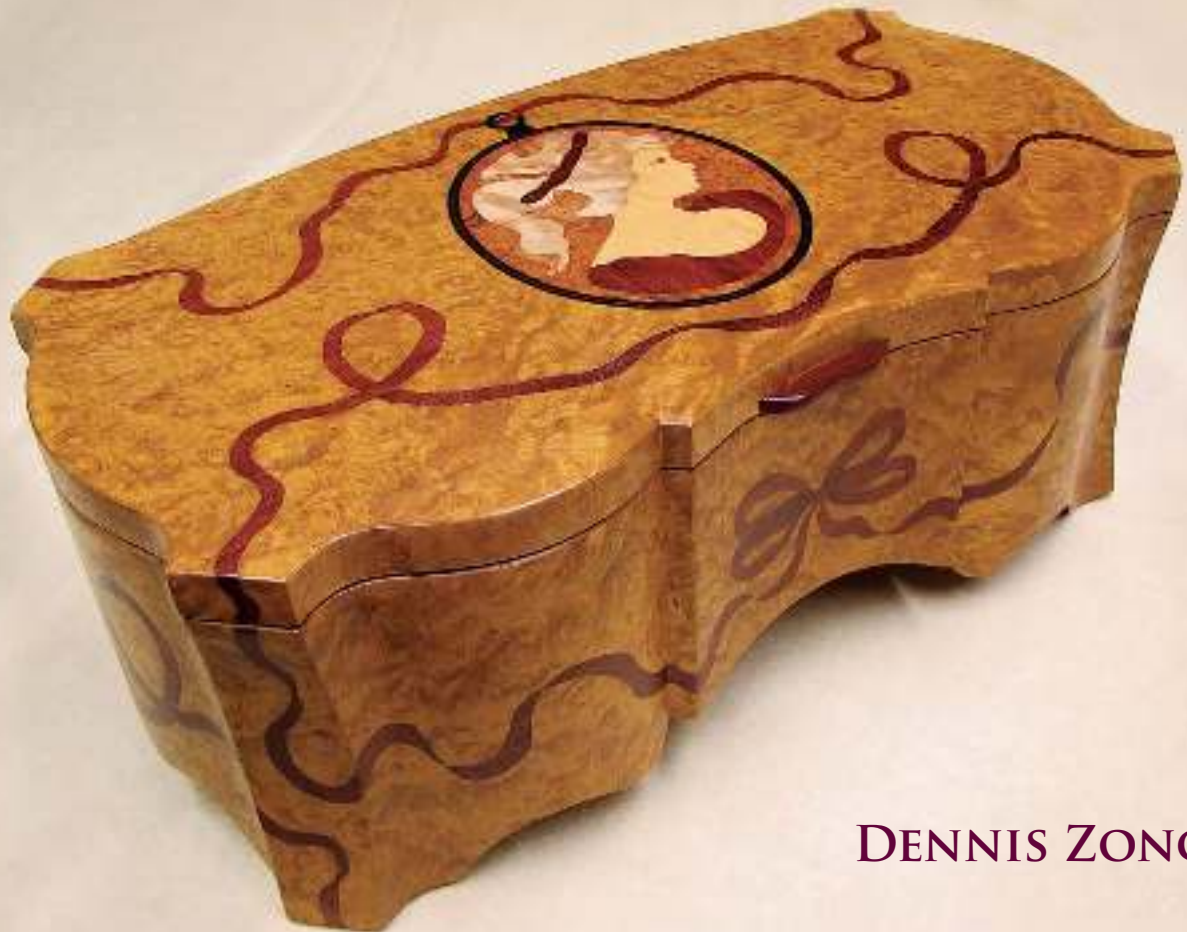




WOODEN BOXES

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 Taunton Press

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Working with wood is inherently dangerous. Using hand or power tools improperly or ignoring safety practices can lead to permanent injury or even death. Don't try to perform operations you learn about here (or elsewhere) unless you're certain they are safe for you. If something about an operation doesn't feel right, don't do it. Look for another way. We want you to enjoy the craft, so please keep safety foremost in your mind whenever you're in the shop.

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.

Contents



2 Introduction

4 Serpentine Coin Box

- 6 Cut the hardwood parts
- 7 Cut and veneer the box top and bottom
- 9 Cut the miters and rabbets
- 10 Cut the bottom groove and rabbet
- 11 Lay out the serpentine front
- 12 Cut the serpentine front
- 14 Rout the corner dovetails
- 14 Make the dovetail splines
- 15 Glue the box together
- 16 Veneer the box top
- 17 Make a serpentine caul
- 18 Cut the box veneer
- 20 Cut the box in half
- 21 Cut rabbets for the ebony banding
- 22 Cut the ebony banding
- 26 Cut the base parts
- 27 Shape and assemble the base
- 28 Turn the bun feet
- 30 Install a full-mortise lockset
- 33 Install the hinges
- 34 Make the coin trays
- 36 Apply the finish
- 37 Install the tray liners

38 Playing Card Box

- 40 Make the banding
- 45 Window method of marquetry
- 50 Make the box bottom
- 51 Cut the bottom groove
- 51 Rout the box miters
- 53 Cut the box in half
- 54 Veneer the edges
- 55 Rout rabbets for the banding
- 57 Install the hinges
- 58 Make the box feet
- 58 Turn the knob
- 60 Cut the interior dividers

62 Artist Sketch Box

- 64 Cut the hardwood and plywood box parts
- 70 Cut the pencil-tray parts
- 72 Glue the box together
- 74 Make the decorative banding
- 75 Veneer the decorative side panels
- 78 Glue on the veneered end panels
- 80 Cut the top veneer panel
- 81 Make the Greek key banding
- 85 Cut the rabbet and the corner banding
- 87 Cut the box in half
- 89 Make the interior panels





- 92 Make the inside cleat and support blocks
- 94 Install the hinges
- 94 Attach the catches and handle
- 95 Finish the box

96 Music Box

- 98 Veneer the hardwood parts
- 100 Lay out and cut the box parts
- 106 Glue the box together
- 107 Veneer the top edges
- 108 Construct the inner box
- 110 Install the radius trim block
- 111 Fabricate the decorative trim with inlay
- 117 Install the trim
- 118 Make the segmented feet blank
- 123 Veneer the box top
- 125 Attach trim to the box top
- 126 Rout the box top
- 126 Make the lyre harp
- 129 Install the hinges
- 129 Finish the music box

130 Rose Box

- 132 Prep the parts for glue-up
- 134 Cut and glue the ebony accent pieces
- 135 Cut the miter joints
- 137 Shape the front, back, and ends
- 139 Cut the box top and bottom
- 140 Assemble the box
- 142 Prepare the center medallion
- 145 Shape the top
- 147 Stab-cut the roses onto the top and front
- 152 Rout the top for ebony trim
- 156 Install the hinges
- 157 Finishing touches

158 Cameo Jewelry Box

- 160 Cut the hardwood box parts
- 164 Rout for the splines and bottom
- 165 Cut the bottom profiles
- 167 Veneer the inside surfaces

- 168 Veneer the outside surfaces
- 172 Glue the box together
- 174 Prepare the outside corners
- 175 Veneer the top edges
- 176 Make the box top
- 177 Veneer the box top
- 179 Rout the cameo marquetry recess
- 180 Glue the cameo marquetry to the box top
- 182 Make the elliptical inlay
- 185 Veneer the box top edges
- 186 Create a finger pull
- 187 Make the inside dividers

188 Traditional Jewelry Box

- 191 Make the bottom platform
- 194 Veneer the lower box parts
- 195 Fabricate the back and back base
- 197 Cut the mitered base trim
- 200 Make the two box ends
- 202 Make the drawer slides
- 203 Make the fronts, corners, and return corners
- 207 Make the upper tray sides
- 209 Veneer the edges
- 210 Make the tray bottoms
- 211 Turn the maple columns
- 212 Start assembling the box
- 213 Mill the maple accent trim
- 214 Make the radius doors
- 215 Select and cut veneers
- 218 Nail and rivet the veneer packets
- 219 Cut the veneer packet
- 223 Glue the marquetry to the door
- 224 Make and attach the door pulls
- 226 Build the drawers
- 229 Make the box top
- 231 Install the door hinges
- 231 Install the door catches
- 232 Install the box top hinges
- 232 Finishing and flocking
- 233 Mount the chain carousels
- 235 Metric Equivalents



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

MATERIALS (CONTINUED)

QUANTITY	PART	SIZE	CONSTRUCTION NOTES
2	Tray ends (3 from each; 6 total)	5/8 in. × 3 5/8 in. (1 in.) × 7 1/8 in.	quilted bubinga
2	Tray fronts and backs (3 from each; 6 total)	5/8 in. × 3 5/8 in. (1 in.) × 12 5/8 in.	quilted bubinga
3	Tray bottoms	1/4 in. × 6 5/16 in. × 11 13/16 in.	maple plywood
6	Horizontal tray dividers	3/16 in. × 3/8 in. × 11 3/8 in.	bubinga
15	Vertical tray dividers	3/16 in. × 3/8 in. × 5 7/8 in.	bubinga
3	Self-adhesive black velvet	5 7/8 in. × 11 3/8 in.	

Cut the hardwood parts

1. Start by using a tablesaw to rip a 1 7/8-in.-thick blank of quilted bubinga to 5 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 7/8-in.-thick blank. Also, raise the blade to 2 5/8 in. so it'll cut slightly more than halfway through the 5 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 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 5/8 in. thick and then cut the back to 16 in. long and both ends to 10 1/2 in.

Cut and veneer the box top and bottom



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

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**).

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).

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

WORK SMART

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.

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 SMART

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.

WORK SMART

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.



B **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.



C

GLUE THE VENEER to the plywood substrate.

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**).

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.

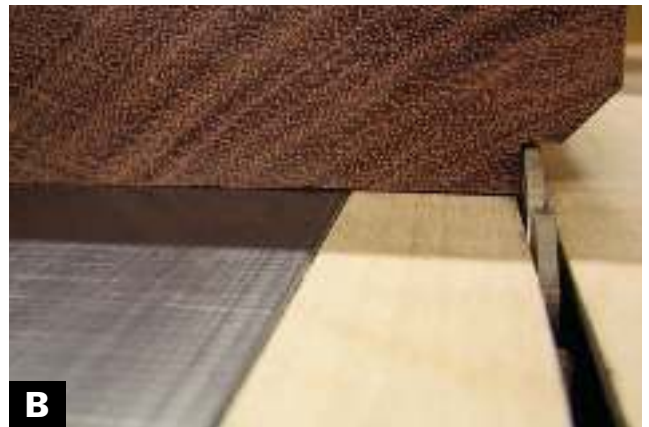
4. Cut rabbets into the front, back, and ends. Set the tablesaw blade height to $\frac{5}{16}$ in. to split the $\frac{5}{8}$ -in. thickness in half. Then adjust the fence to $4\frac{5}{8}$ in. to create a $\frac{3}{16}$ -in.-deep by $\frac{5}{16}$ -in.-wide rabbet. Run all four pieces—front, back, and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

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.



A

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



B

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

WORK SMART

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



CUT A 1/4-IN. by 1/4-in. groove for the plywood bottom into the four hardwood box parts.

I MADE THE BOX BOTTOM FROM 1/2-IN.-THICK plywood for the extra strength needed to support the base trim and the weight of the coin trays. A 1/4-in.-wide groove is cut into the inside surfaces of the box front, back, and ends to receive the box bottom, which has a 1/4-in.-thick rabbet cut into its four edges.

1. Start by cutting a 1/4-in. by 1/4-in. groove into the four hardwood box parts. Set the tablesaw blade to 1/4 in. high and the fence to 3/8 in. Make the first pass into all four inside faces of the front, back, and ends. Then reset the fence to 1/4 in. and repeat to create 1/4-in. by 1/4-in. grooves (**PHOTO A**). If your tablesaw blade is narrower than 1/8 in., you'll need to make three passes to form the 1/4-in.-wide grooves. The maple plywood I used was slightly less than 1/2 in. thick, so after veneering both surfaces it measured 1/2 in. thick.

2. Set the rip fence to 1/8 in. (to equal 1/4 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.

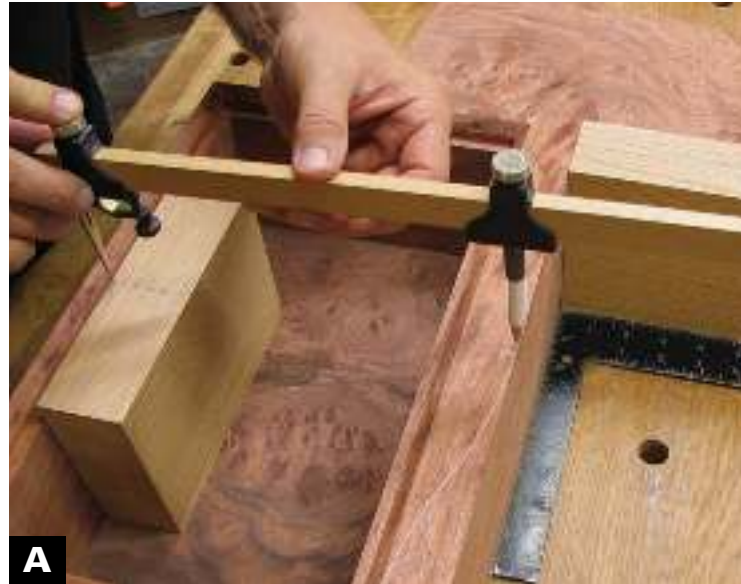
Cut the box to size

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.

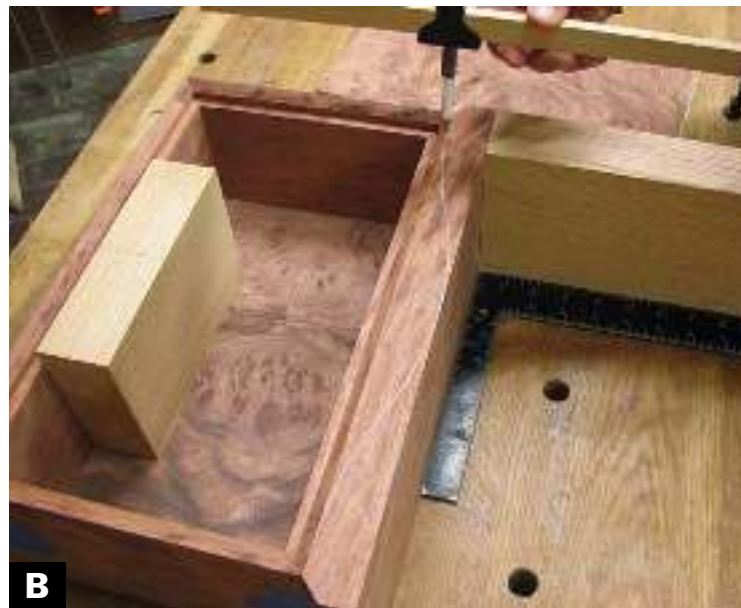
Lay out the serpentine front

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.
- 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.



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



B 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**).
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.



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

MAKING A DOVETAIL SLED

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**).
5. Draw a pencil line from one corner to the other on both sled side pieces. On the bandsaw, cut along the lines to create the two angled sides. Assemble the sled as shown in the drawing on the facing page, using yellow glue and a pneumatic nailer with $1\frac{1}{4}$ -in.-long nails.
6. To hold the box parts securely during routing, mount two quick-action toggle clamps to the sled. Place one clamp on each side of the box part, at approximately $6\frac{1}{2}$ in. on-center. For extra clamping strength, screw each toggle clamp to a $\frac{1}{2}$ -in.-thick by $1\frac{1}{2}$ -in.-wide by $2\frac{1}{4}$ -in.-long mounting block (**PHOTO B**).
7. To prevent the router bit from blowing out and splintering the box parts as it exits the cut, install a $\frac{3}{4}$ -in.-thick by $\frac{3}{4}$ -in.-wide by 6-in.-long hardwood cleat to the sled. Cut a 45° angle onto one end of the cleat and put the angled end down on the sled bottom. Screw the vertical cleat to the left side of the sled, tight against the toggle-clamp mounting block.



A

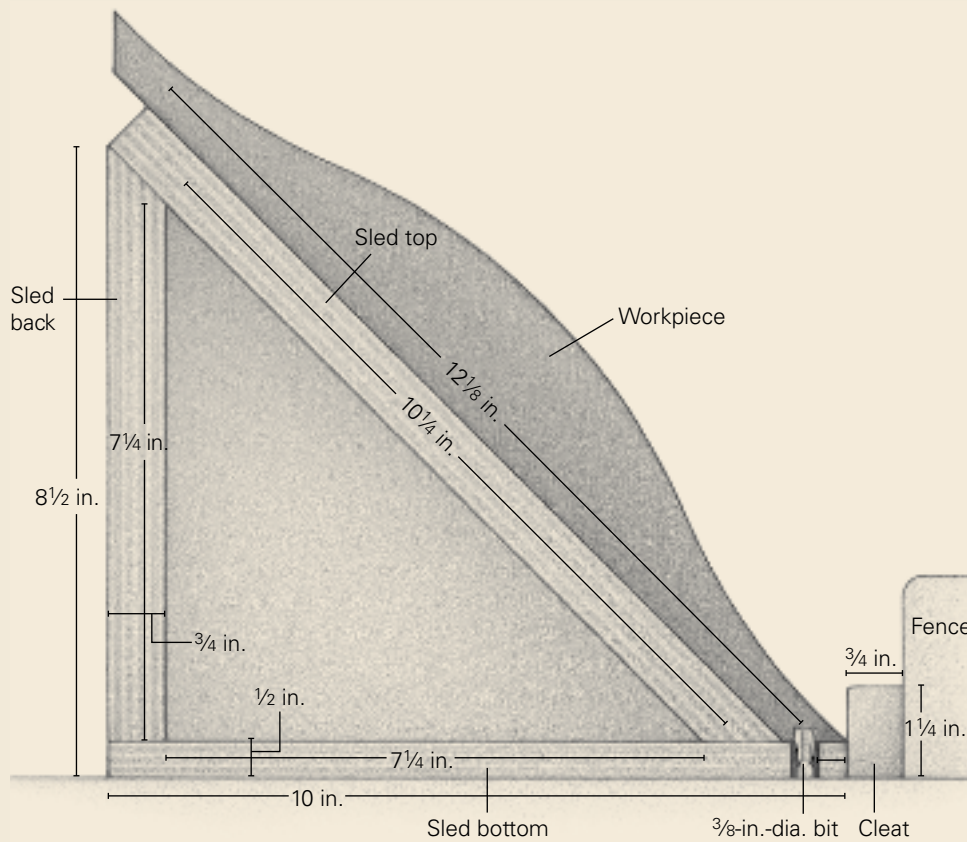
CUT AN 8-IN.-LONG through slot in the sled bottom.



B

MOUNT TWO QUICK-ACTION toggle clamps to the sled, and attach a 6-in.-long hardwood cleat to prevent the router bit from blowing out and splintering the box parts as it exits the cut.

Dovetail Sled (Vertical Section)



Rout the corner dovetails

- 1.** Leave the router-table fence at the same $1\frac{1}{8}$ -in. setting used to cut the through slot in the dovetail sled (see “Making a Dovetail Sled” on p. 12). Install a $\frac{5}{16}$ -in.-wide dovetail bit with an 8° angle and $1\frac{3}{8}$ -in. cutting length. Adjust the height of the bit to $\frac{3}{16}$ 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**).
- 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.



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

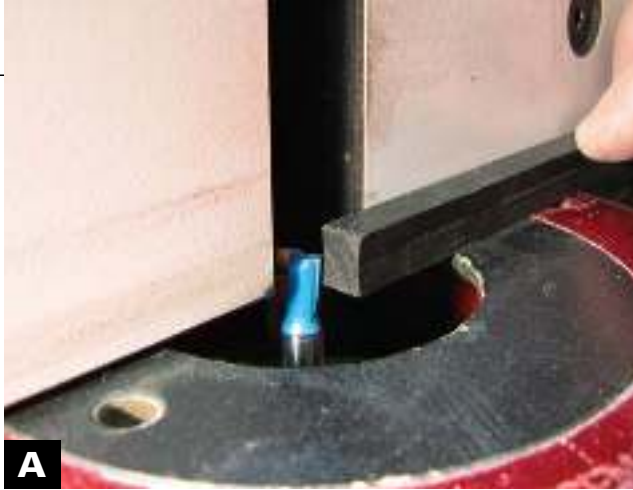
WORK SMART

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).

**A**

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**).

**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**).

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.

**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.

Veneer the box top



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.

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**).

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**).

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.



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.

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 ¾-in.-thick bending plywood to 5½ 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 ¼-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**).
- 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.
- 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



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



C

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.

the clamp pads. When veneering the box ends, glue and clamp both ends to the box at the same time.

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.



D

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.

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