BASIC MARQUETRY and Beyond

EXPERT TECHNIQUES FOR CRAFTING BEAUTIFUL IMAGES WITH VENEER & INLAY

KEN HORNER

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by Ken Horner

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Dave Peck and Jim D'Anjou also read everything and made priceless suggestions. Fine wood workers both, they often recommended alternative methods of building a project and of explaining how it was done. Marcus Moody helped us with camera settings, the light booth and took the beginning photos.

I used projects from Linda Horner (Shaker Boxes, Fish Boxes, Flower Clock, Pendants and the Elliptical Mirror), Dave Peck (Curved Cup and Cone Top Vessel), Jim Sweet (Depth Picture), Rob Reed (Radial Match Table) and Bob Schultz (Timber Wolf).

Thank you all.

—Ken Horner

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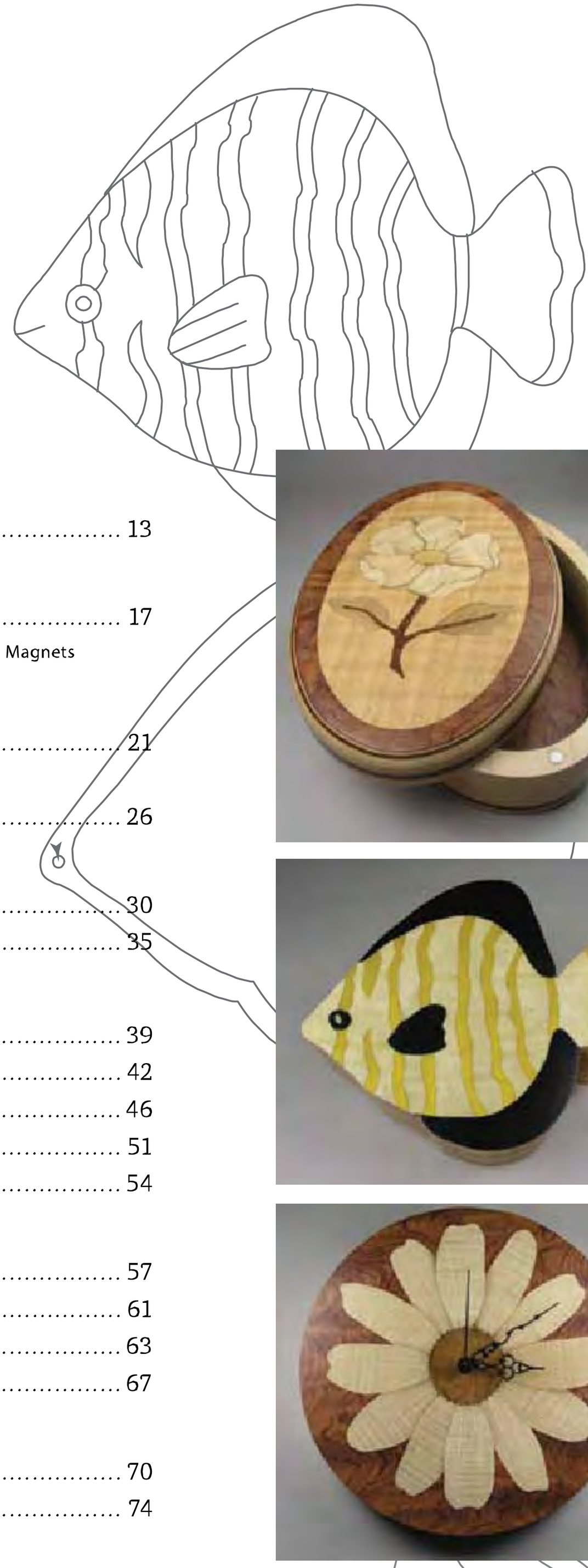
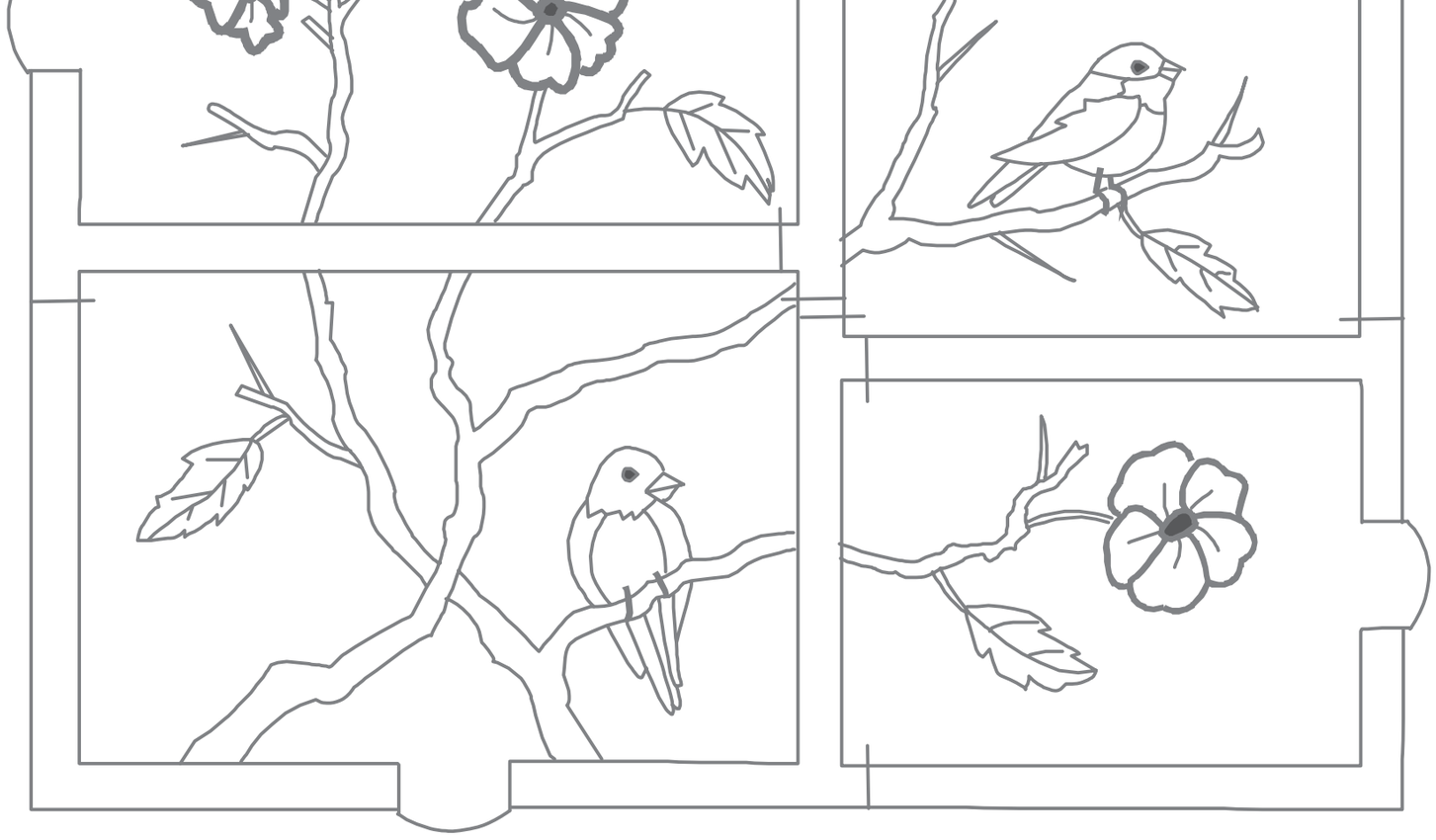
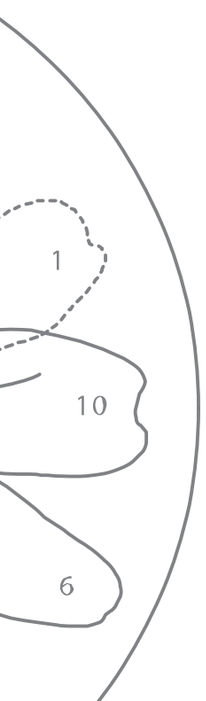






Introduction

Woodworkers make tables, chests, boxes and hundreds of items for general use. When these artisans want to make their pieces more attractive, they might add carvings, pyrography or marquetry. Marquetry (pronounced mar'-ka-tree) is the art or craft of making pictures and designs from wood veneers. Most veneers used in the U.S. are about 1/30-in. thick and most marquetarians here cut the pieces with either hand-held fret saws or electric scroll saws.

Wood veneers can be purchased in varying lengths and widths as hardwood, softwood or exotics. The log can be quarter cut, rotary cut or flat cut. The veneer can have normal grain or be figured and can come from burls, stumps and crotches. In addition to the natural colors, veneers can be bleached or dyed. With all these options, marquetarians have a wide choice when picking veneers for a project.

The price of veneer is anywhere from $0.60 to $1.50 per square foot in mixed packages although, just as exotic boards are more expensive, so do special veneers cost more. A lot of cabinet shops use veneer and are happy to give away the cut-offs and remnants. Most of the projects in this book can be made from less than ten pieces of veneer that all together measure maybe one or two square feet. This is one craft where the tools and materials are quite inexpensive.

The purpose of *Basic Marquetry and Beyond* is to teach two types of wood workers: first, the newcomer who will gain an introduction to marquetry and by working through the chapters will become quite adept. The second types are woodworkers who already know marquetry; they will find new projects along with new information and techniques.

The chapters are organized so the reader can advance from easy-to-do pieces to projects needing medium skills and finally move on to fairly difficult projects. The beginning pieces are simple; Bookmarks, Coasters, Tissue Boxes and other Little Boxes. Next come more complicated projects, both in construction and in marquetry, that are intended to build the reader's skills. The last projects are the most complex; marquetry on curved surfaces and in the bottom of bowls, a radial matched table and a large elliptical mirror where nine sections are fitted together. With each chapter the reader will gain skills in both woodworking and marquetry.

The Concepts section is to explain techniques that are common to many projects. As an example, rather than talking about Sand Shading in a dozen or so chapters, this subject is covered one time in Concepts. I suggest that you read the entire Concepts section first. Then you will better understand the construction and marquetry techniques as you work through the chapters.

Bright Ideas are scattered throughout the book. These hints and tips were gathered from my marquetry experience of over fifty years. In 1961 I bought a starter set from Constantine's and worked in my basement with a 6-in. coping saw. I still have the marquetry picture and I'm still quite proud of it.

—*Ken Horner*
Morgan Hill, Calif.
Feb. 2015

TOOLS & MATERIALS

These are the normal tools and materials needed in the projects that follow. Some projects require special tools or materials and these are listed at the start of each chapter.

Blades: Get a supply of 5-in. long, pin-less scroll saw blades. Buy them by the gross.

- Number 2/0 (smaller) for most purposes of 2–5 layers of veneer.
- Number 1/0 (larger) for thick pad cutting.

Brushes: Used to spread glue, to clean off veneer pieces and to push tape onto wood.

- Medium size glue brush, long bristle.
- Semi-stiff brush to clean frass off marquetry pieces.
- Brass brush to rub and burnish app tape so it sticks to the wood.

Chisels: Two usually will do.

- A ½-in. chisel to clean around the glued up marquetry.
- A 2-in. chisel to cut across stringers and borders when forming a 45° corner. A rubber or wood mallet is useful here to pound with.

Clamps: You can't have too many clamps.

- 'C' clamps for pressing together top and bottom boards for marquetry.
- Hand spring-clamps to be placed around the perimeter for holding small pieces.
- Rubber bands (¾-in. wide x 18-in. long) for cylindrical pieces. Cut them from tire inner-tubes or other sheets of rubber.
- Rubber tubing that stretches.
- Metal and nylon band clamps for boxes and round pieces.

Cutting platforms: Use wood base for sawing and rubber or plastic for knife cutting.

- A 'self-healing' rubber or plastic pad about 12-in. x 18-in. used for cutting veneer pieces with a knife. These are sold at most craft stores.
- A piece of ¼-in. plywood about 18-in. x 24-in. with a fence (½-in. high by ½-in. wide by 18-in. long) along one edge. This is used when cutting veneer with the veneer saw and for cutting equal-sized thin strips. When the surface becomes scored and ragged, make a new board. A ragged surface will leave jagged edges on the veneer.

Drills and push pins: You must make a hole to insert the blade.

- Hand drill with a very tiny bit; this leaves a hole.
- Metal push pin; this separates the wood fibers and does not leave a hole.

Finishes and sealers: The best sealer is shellac in alcohol; use this on the rough marquetry before you do any scraping or sanding. Wipe-on polyurethane is a perfect

finish; it goes on easily with no streaking, does not yellow with age and gives water protection. Paste wax as the last finish gives a nice feel to the object. For pictures or items that will not be near water, use a spray can of lacquer (Deft).

- Bottle of shellac.
- Can of wipe-on poly.
- Can of spray lacquer (Deft).s
- Paste wax.

Geometry tools: These can be inexpensive school sets found in most stationery stores.

- Plastic triangle (30-60-90°) for measuring wedges and other angles.
- Protractor for finding degrees.
- Compass to divide a circle or find degrees.
- Dividers to step off measurements and to draw arcs and circles.

Glues: Different glues for different purposes.

- Yellow carpenters glue (Poly-vinyl-acetate) to adhere marquetry pieces to the backer boards.
- White PVA glue to rub into joints as you are building the marquetry.
- Contact cement for areas where you can't use clamps such as picture edges and round surfaces.
- Cyano acrylate (CA glue) to grip screws in holes and to secure magnets.
- Paper adhesive to attach patterns; a spray can is convenient.
- Polyurethane to attach metal to wood (Gorilla glue).

Knives: Small sharp knives to cut marquetry and a larger knife to cut veneer pieces to shape.

- Small, pointed-tip X-Acto-type knife for cutting intricate shapes.
- Medical scalpel with additional blades; the #11 blade is most popular.
- Larger knife with wooden handle to cut large pieces of veneer.

Marking tools: You have to draw and make marks on wood and paper.

- Calipers or dividers to draw circles and to scribe a second line parallel to an existing line.
- Black ink pen.
- Number 2 pencil.
- Big eraser.

Measuring instruments: Note: rulers are **NOT** to be used for knife cutting unless a handle is added.

- 12 inch ruler.
- 18 inch ruler.

Presses: Veneer and marquetry pieces need to be clamped as they dry.

- A vacuum press; this is nice but certainly not a basic tool.
- A home-made press with a central 12-in. press/crank screw will meet most gluing needs. Use C-clamps around the edges.

Putty and wood fillers: Buy it or make your own.

- Buy the water-based filler from a hardware store in different colors.
- Make your own; see 'Concepts, Fillers' for details on this.

Putty knife: Flat blade to remove tape and scrape off glue.

- One inch wide blade.

Rollers: Rollers are used to flatten a marquetry piece before glue-up and used to make app tape adhere to the veneer.

- J-roller is a special marquetry tool with a rubber roller.
- Wooden roller (from an old wall-papering kit) used with a paper towel underneath as a cushion.

Sand-shading set-up: This is a simple but necessary item.

- Electric hot-plate with a 6-in. diameter element.
- Metal pan with lid, (the lid keeps the sand from cooling).
- Clean sand.
- Tweezers or tongs to hold veneer pieces.

Saws: The veneer has to be cut.

- An electric scroll saw with at least a 16-in. throat capacity and with a tilting table. Must be able to handle pin-less blades.
- Hand-held fret saw with 10-in. throat able to handle pin-less blades.
- Veneer saw.
- Table saw is handy to cut frames and to build the projects.
- Band saw is also handy but not necessary.

Scissors: Used to cut veneer to rough size.

- Large size with 8-inch blades.

Sharpeners: You need to keep cutters sharp.

- A whet stone for chisels.
- Set of diamond-encrusted sharpeners for knives.
- Self-made hones made of ½-in. MDF and sand paper. Glue sandpaper grits from 240 to 1000 grit to MDF 2-in. x 12-in. pieces.

Smoothing: Use sand paper after the piece has been sealed and scraped. Sand by hand or with a flat-pad, electric sander with vacuum hose attached. A sanding board is used to even veneer edges.

- Hand scraper (about 2½-in. x 4-in.) with burred cutting edge used to smooth rough marquetry.
- Sand paper. Have 80, 120, 220, 320 and 400 grits on hand.
- Steel wool (0000) to knock down tiny bubbles and turn a gloss into a satin finish.
- Sanding Board is a ¾" plywood or MDF 2" wide x 18" long with sand paper affixed.

Steel squares: Two are nice. These are used to square-up marquetry pieces.

- An 8-in. x 12-in. square.
- Carpenter's square (18-in. x 24-in.).

Straightedges for cutting: Attach a wooden handle to keep fingers away from the sharp blade when cutting with a knife.

- Knife cutting—Use double-sided tape and attach a ¾-in. high x ½-in. wide wood handle to an 18-in. long metal straight edge. Keep your fingers away from the knife cuts.
- Brass straightedges (¼-in. thick by 1¼-in. wide) one 10 inches and one 16 inches long. Both can be used for knife or saw cutting.
- Use ¾-in. MDF and fashion a cutting board 2-in. wide x 16-in. long. Put self-adhesive 220 grit sandpaper on the bottom. Use with a knife or a veneer saw.

Tapes: Four types will suffice.

- Application tape (1¼-in. wide, 2¼-in. wide and 3¼-in. wide 300 ft. rolls) used on the front and back of veneers to keep the little pieces from breaking off.
- Blue tape to hold packs together and to hold marquetry to a backer board during glue-up.
- Clear cellophane tape when you need to see below the tape and for hinging the pattern to the background.
- Double-sided tape to hold velvet to cardboard for box linings and other jobs.

Tracing paper: Purchase this at a hobby shop or stationary store. This is a transparent paper sheet laid over a drawing or picture on which the pattern is traced with a pen or pencil.

- One tablet (100 sheets).

Tracing stylus: For transferring patterns.

- Get two; one fine-point and one medium-point.
- A ballpoint pen without ink also works.
- A sharpened stick will serve.

Transfer paper: This is also purchased at a hobby shop or a stationary store. If the pattern is to be drawn directly upon the wood, use non-greasy type paper. Use carbon paper (it's cheaper) if you trace the pattern onto app tape which is covering the veneer piece.

- One pack carbon paper (50 sheets).
- One pack of wax-free paper, best found in art supply stores. These come in colors too.

Tweezers: Use these to pick up little pieces and for hot work.

- One fine-point tweezers to pick up small pieces,
- One ½-in. wide, flat-point item to slide under and pick up little pieces of veneer,
- Forceps; heavy and self-closing for sand-shading over a hot pan.

Wax paper: Glue doesn't stick to it.

- A large roll will last almost forever.

Project 1

BOOK MARKS

This is, perhaps, the simplest project in marquetry and a good way to get started. We will use the Pad method of cutting; see 'Concepts, Double-Bevel or Pad' for details on this. Two small sections of veneer are taped together, a hole is punched to let the blade in and then the Shark outline is cut out; see **Drawing 1-1**, Shark pattern. The two veneer sections are separated and inner part 1 is put into background 2. Likewise inner part 2 is put into background 1. A little white carpenter's glue is rubbed into the cut-lines and the pieces are lightly sanded on both sides. The final pieces are finished with wipe-on poly and allowed to dry for 15–20 minutes. The two bookmarks are sealed with clear tape, the excess tape is cut off and your first marquetry piece is completed. Note: Don't forget to sign and date each bookmark; later on you'll marvel at how fast you have gone from Book Marks, the simplest project, to quite advanced marquetry.

Photo 1-1

The second Book Mark pattern is a Tree; see **Drawing 1-1**. After you've made the Shark Book Mark, follow the same instructions and make two Tree Book Marks. Notice that the Tree profile is a little more complicated to cut with all the ins-and-outs.

The two veneers should be the same thickness as there will be very little sanding on this project. Here in the U.S. most of the veneers are ⅛-in. to ⅓₂-in. thick. If there is a noticeable difference in the thickness of the veneers you can sand the thicker one or select another veneer. The second option is preferable.

Throughout many chapters you will see references to the 'Concepts' section. Rather than repeat a "how-to" in many chapters, the "how-to" is written once in 'Concepts' and referred to from chapter to chapter. You would benefit by reading this section before you start doing the projects.

Also check the 'Tools and Materials' section of this book before you start. You should outfit yourself with these basic tools in order to complete the projects

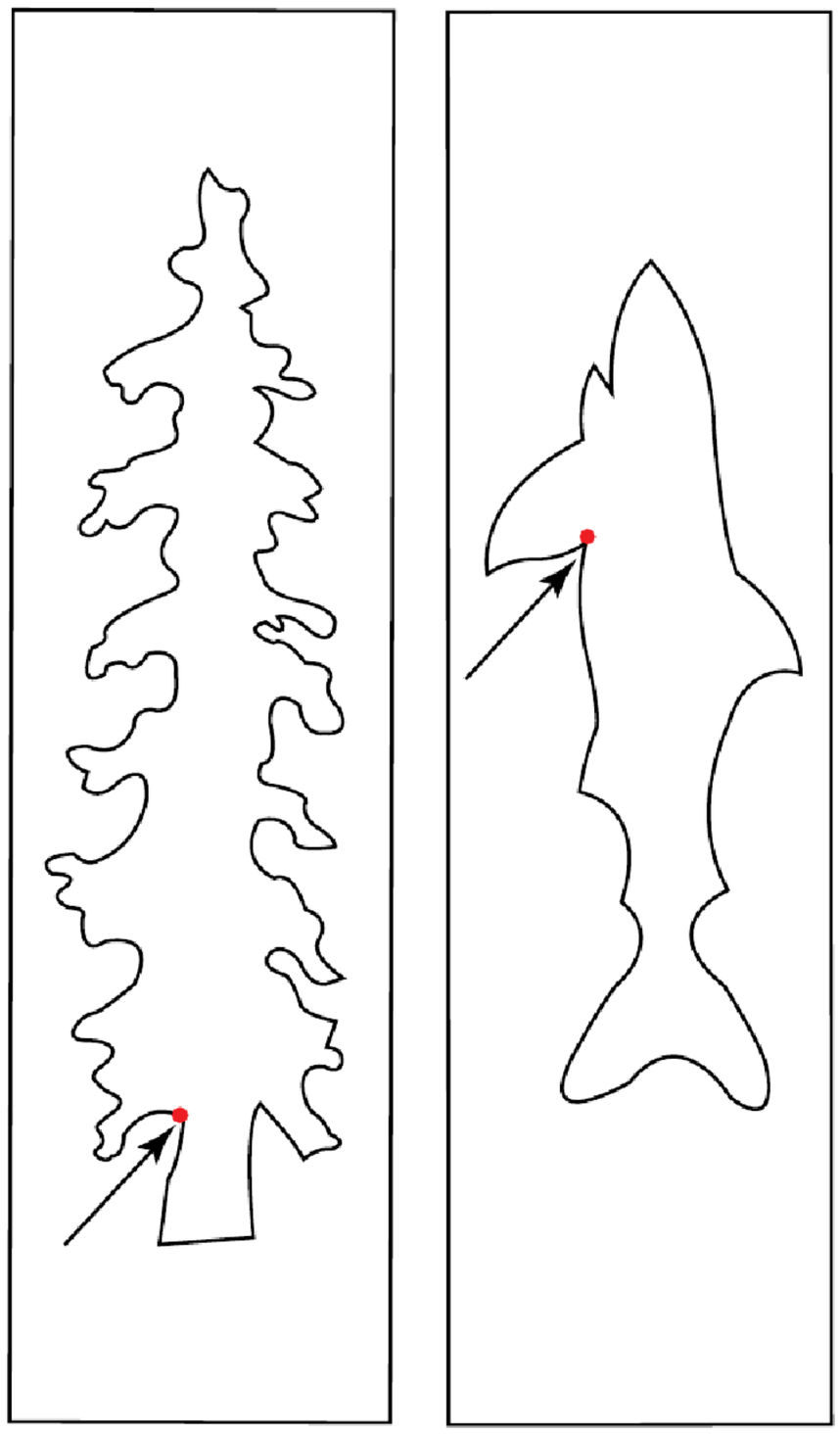
that follow. Some projects require special tools and materials and these are listed at the start of each chapter.

Extra Tools and Materials Needed: Two inch wide, clear cellophane tape.

Select the Veneers: The book mark looks best if the two veneers are contrasting.

1. Select a piece of light-colored and a piece of dark-colored veneer each about 2-in. wide x 6-in. long. The veneers in **Photo 1-1** are maple and walnut.
2. Cover a section of the veneer with app tape. Note: See 'Concepts, Tapes and Their Uses, Application Tape' for details.
3. Use a J-roller and a brass brush to affix the app tape tightly to each veneer. See 'Concepts, J-Roller and Brass Brush'.
4. Draw a rectangle 1½-in. wide x 5½-in. long on the tape. Make sure the grain of the veneer is running lengthwise.
5. Place each veneer on a cutting mat, tape side up and cut each piece of veneer to size using a sharp knife and a straight edge.
6. Place the veneer pieces together so app tape is on the top of the pack and on the bottom of the pack.
7. Fasten the two veneer pieces together with blue tape on all four edges. Note: see 'Concepts, Tapes and Their Uses, Blue Tape'.
8. Transfer the Shark pattern onto the app tape. See 'Concepts, Transfer Paper'. See **Drawing 1-1** for the pattern. Instead of tracing the outline, you can glue a full-size 'Shark' pattern to the veneer pack.

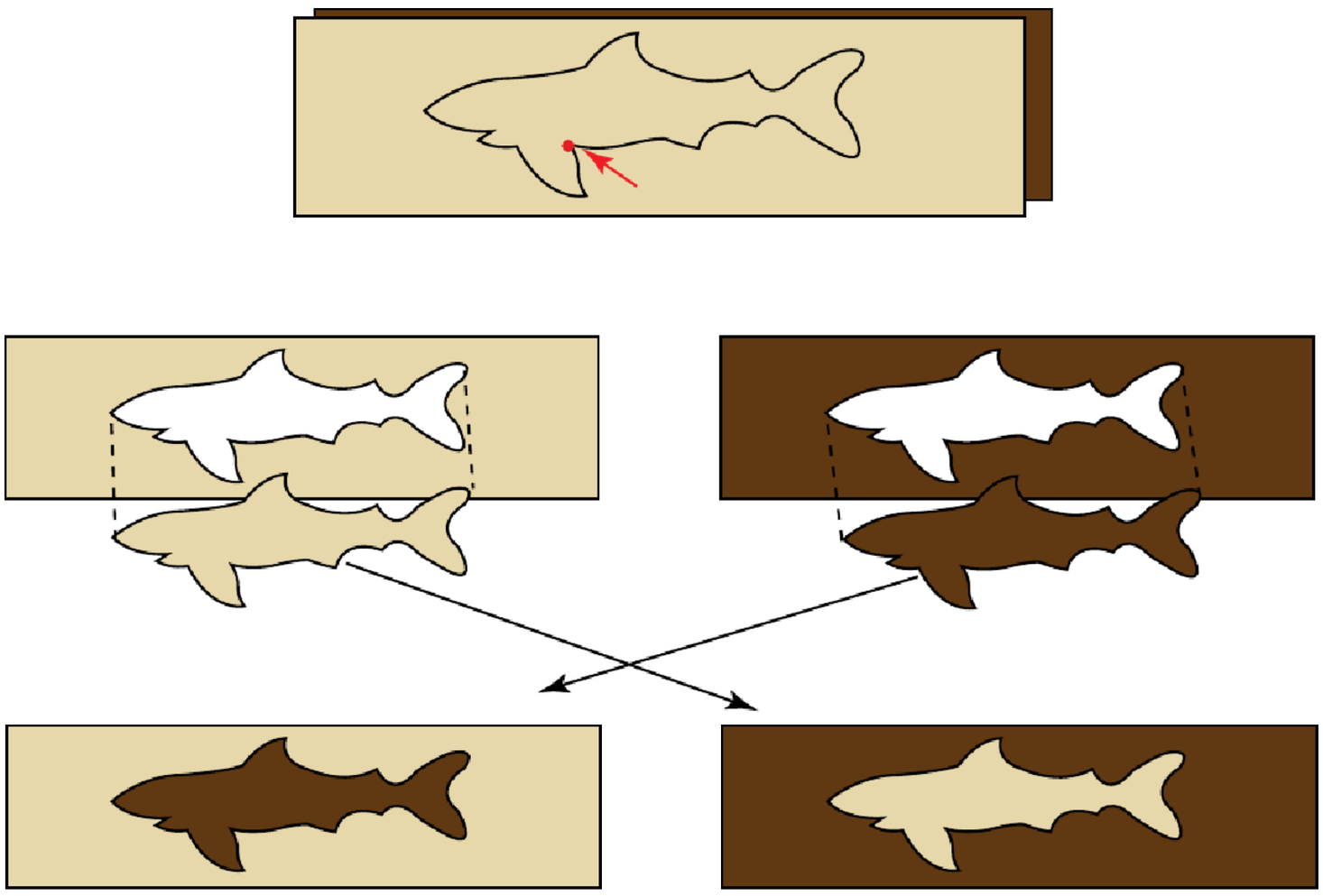
Application tape. App tape sticks to the surface, is strong and it peels off easily with no residue.



Drawing 1-1. Tree and Shark patterns. The red dots show the best places for blade entry; preferably at an inner turn to be most inconspicuous. The hole can be made with a drill bit or with a push pin and later be filled and be nearly invisible.

Cut the Pieces: Set the scroll-saw table at 90° (flat with no tilt) or if you are cutting by hand with a fretsaw, use a flat table. Use a small 2/0 blade and set the scroll-saw at a slow speed for this first project. See 'Concepts, Blades, Scroll-saw' for details on the size of blades.

9. Lay the veneer pack on your cutting mat and use a push pin to make an entry hole. The hole is best made at some inconspicuous spot. See **Drawing 1-1** for placement of the entry hole. See 'Concepts, Holes, Drill or Punch' for details.
10. Turn the piece over and enlarge the hole by punching with the pin through the back side.



Contact cement.
The good: easy to apply, ready to use out-of-the can and it doesn't need clamping.
The bad: once the two pieces touch they are sealed, no adjusting.

Drawing 1-2. The Cutout Pieces in Different Backgrounds. The Shark cutout from the light veneer is placed into the walnut veneer. Likewise, the dark Shark is put into the maple background.

11. Thread the blade through this hole and connect the blade to the top blade clamp. Cut around the outline; the direction of cut is immaterial when pad cutting. For this first effort, cut towards the back and around the tail; this section is a little easier to cut than the head and mouth section.
12. When you approach a sharp turn, slow down. When you get to the turn, pull the veneer towards you, make the turn as you let the back of the blade ride against but not cut the veneer. Once the turn is made, slowly push the veneer forward and cut along the line as before. Note: If after practice, you still can't make sharp turns, turn off the saw, turn the piece (carefully so as not to break the blade), turn the saw back on and continue. Use whichever method works for you.
13. As you cut, hold the veneer pack firmly to the table surface with a finger directly behind or beside the blade; don't let the pack vibrate or bounce up and down.
14. Watch the cut line closely and anticipate the turns; be ready to move the pack left or right depending on the turn.
15. Near the end of the cut as you approach the entry hole (your starting point), follow the pattern line closely so you end up at the starting hole.
16. When the outline has been cut, stop the machine, remove the pack from the saw and lay it on the workbench.
17. Hold the veneer pack tightly to the table and carefully remove the blue tape.
18. Separate the walnut section and set it to one side; keep the Shark cutout inside the background.
19. Position the walnut veneer piece so the taped side is up.
20. Use your knife and a brush to remove sawdust and tape debris.
21. Carefully remove the app tape from the walnut Shark while it is still in the walnut background.

22. Work on the maple veneer piece now and take the app tape off the maple Shark while it is still in the maple background.

Assemble the Bookmark Pieces: Put the inner cutouts into the appropriate background pieces; add glue and sand lightly. Add a finish and wrap the book marks in plastic.

23. Place the walnut 'Shark' into the maple background. See **Drawing 1-2.**
24. Cover one side completely with app tape.
25. Turn the piece over (there should be no tape on this side) and inspect to make sure that all the pieces are present. If some pieces are missing, check the app tape discard or under your scroll saw.
26. Fill any large gaps with veneer or with dark wood putty. See 'Concepts, Fillers' for more on this.
27. Rub a little white PVA glue (white carpenter's glue) into the cut lines (kerfs). See 'Concepts, Glue & How it Works' for details here. You also can read more on glues in *Woodworkers' Essential—Facts, Formulas & Shortcuts* by Ken Horner 2003, Cambium Press. Chap. 28, All About Glues.
28. Wipe off the excess glue and use a 1-in. putty knife to pull along the Shark to flatten the piece and to push the two pieces together.
29. Sand along the lines and then sand the whole piece. The glue and sawdust mixture will fill the gaps.
30. Turn the bookmark over and remove the app tape from the background, fill any gaps, rub white PVA glue into the kerfs, flatten with a putty knife and sand.
31. Rub both sides of the marquetry pieces with wipe-on poly. Note: See 'Concepts, Finishes' for details on this.
32. Let dry for 20 minutes.
33. Put 2-in. clear cellophane tape over the front and back of each book mark.
34. Cut off the excess tape.

Note: This might be a good time to try different methods:

a. Instead of punching the starting hole, use a fine bit and drill the hole.
b. Instead of using app tape, use paper-type veneer tape.
c. Instead of using app tape on the veneers, tape the veneer pieces to a backer of thin cardboard.
d. Put three pieces of veneer into the pack and make three book marks.

Use MDF as a backer. It's stable, flat and cheap.

Project 2

DRINK COASTERS, FLOWERS

This project will use six veneers to make a set of six Drink Coasters using the Pad Method of marquetry. The coasters will be 4-in. square and ¼-in. to 5⁄16-in. thick. The base board will be solid wood—maple, walnut, cherry or whatever—your choice. Each of the coasters will be different; having the same flower pattern but different veneers and different colors. You will also learn to sand-shade. See **Drawing 2-1** for the Flower Pattern.

Photo 2-1

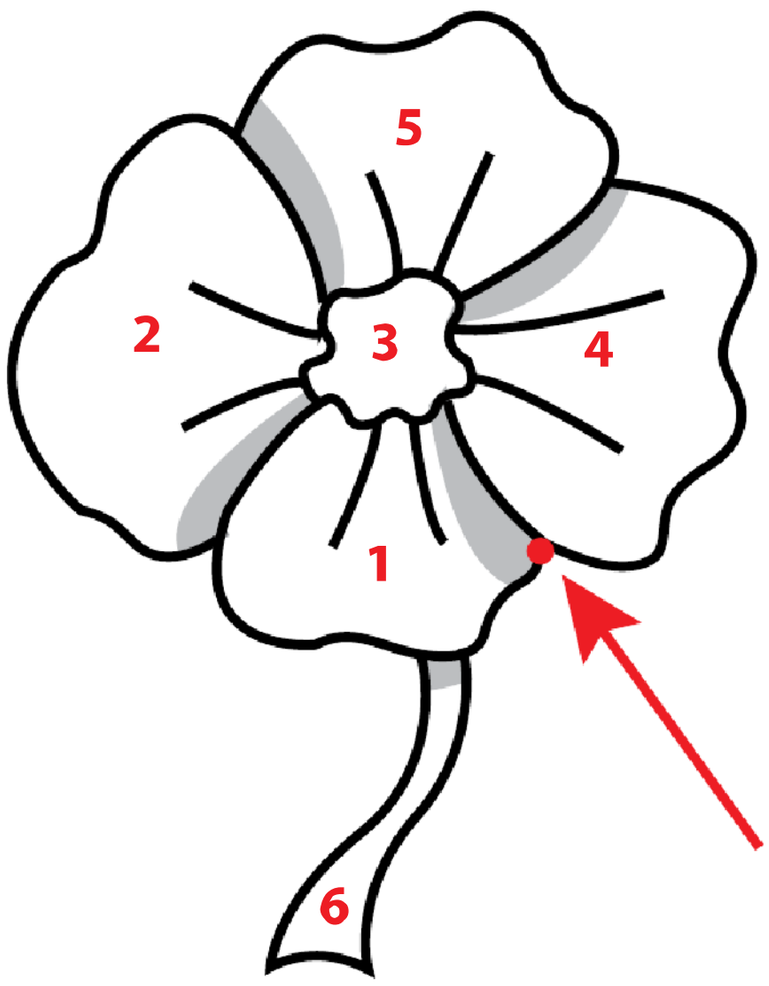
Extra Tools and Materials Needed: Solid stock (¼-in. to 5⁄16-in. thick) for six Drink Coaster bases.

Make the Coaster Bases: Use a nice hard wood for the bases; whatever looks good with the background veneer you choose.

1. Cut the base board into six 4-in. square pieces. Use an ink pen and put your name and the date on the back side.
2. Use wipe-on poly (or dilute regular varnish 1:1 with paint thinner) and finish the back side of the wood and all the edges. We will glue the marquetry to the front side. By putting a finish on at this point, you protect the bottom of the coaster and the edges from glue during the procedures that follow.

Gather the Veneer Pieces and Make the Pad: As you gather veneers for the pad, make sure they are all approximately the same thickness. We will have the light and the medium colored veneer squares oriented both horizontally and vertically (see v#1, v#2, v#3 and v#4 in **Drawing 2-2**. The medium dark veneer and the dark veneer will also be oriented in different directions (see v#5 and v#6 in **Drawing 2-2**).

3. Gather six pieces of veneer; two light-colored, two medium-colored, a medium brown and a dark brown piece.
4. Put app tape on the back of each piece; use a J-Roller and a brass brush to burnish the tape into the veneer crevices. See 'Concepts, J-Roller and Brass Brush' for details on this.
5. Cut the veneer pieces to 4½-in. squares.
6. Stack the six pieces as shown in **Drawing 2-2** with the taped side



Drawing 2-1. The Flower Pattern. This is an easy multiple-veneer project where the grains are oriented in two directions. There are four petals, the center and a stem to cut out. Thread the 2/0 blade through the hole at the place indicated and cut around the bottom Petal #1 first. Cut the pieces out in the order indicated. The gray areas are to be sand-shaded.

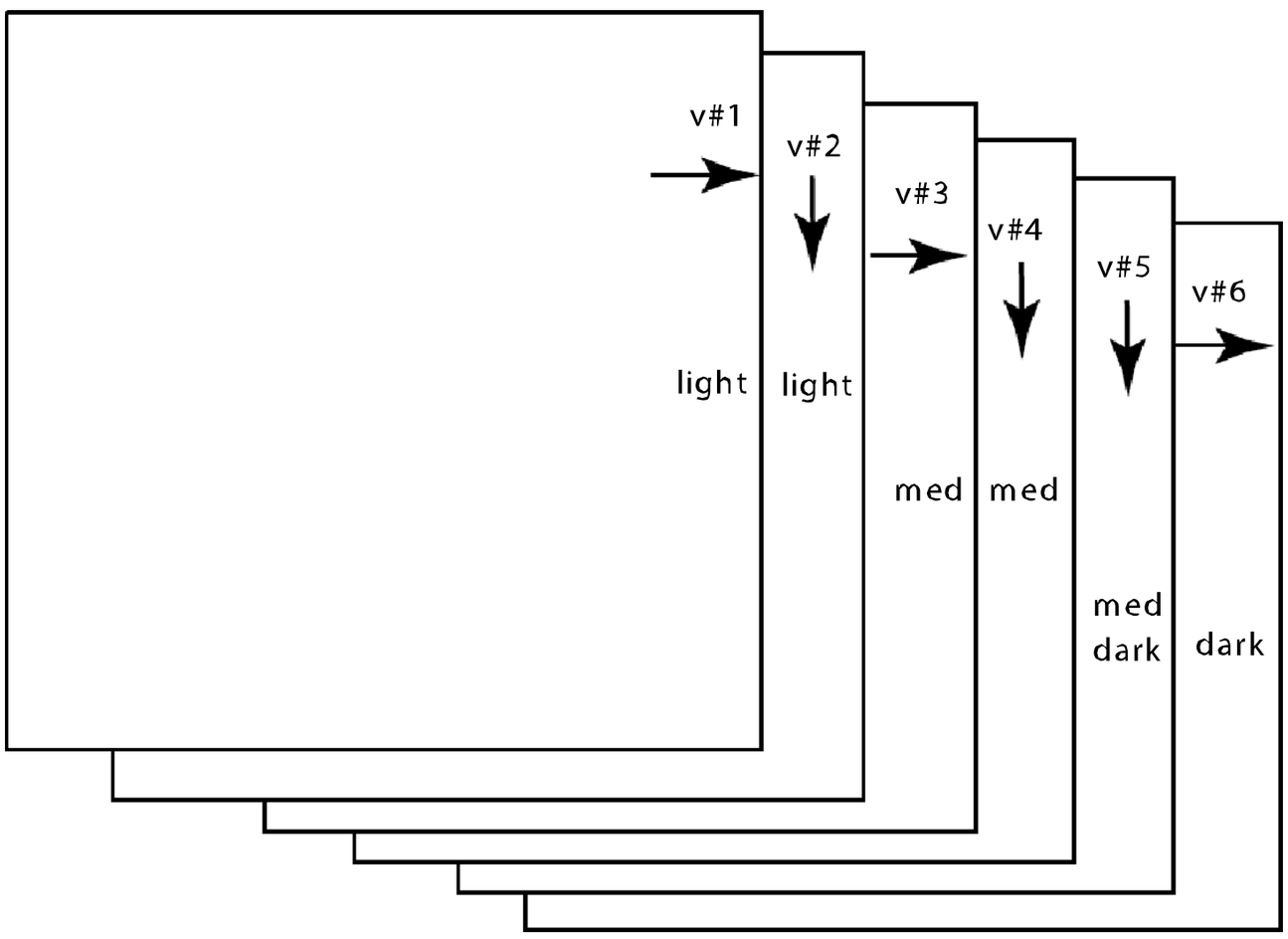
Photo 2-2

down and use blue tape on all four edges to fasten the pack together.

7. Put app tape on the top of the pad and mark 'UP' with an arrow. The pad should now have app tape on the underside of all six pieces plus a piece of app tape on the top of the pad.
8. Copy the pattern (**Drawing 2-1**) to the size needed. See 'Concepts, Pattern Sizing' for details on this.
9. Glue the flower pattern to the top of the 'sandwich' with spray adhesive. You also can trace the pattern onto the app tape with carbon or transfer paper and a stylus.

Cut the Pieces: As the pieces are cut, place them into separate cups in a muffin tin. In a recent workshop, students cut out all the pieces for the flower in about 20 minutes.

10. Punch a small hole in the pattern at the place shown on the pattern; see **Drawing 2-1**. See 'Concepts, Holes, Drill or Punch' for details on this.
11. Set the table to 90° (no tilt) and thread a 2/0 blade through the hole. See 'Concepts, Blades, Scroll-Saw' for details on this. The direction of cut is immaterial in pad marquetry.
12. Start cutting around petal #1 towards the center of the flower. At the top of the piece, cut into the petal to show the vein line. At the end of this cut, keep the machine running and back the blade out. On this first 'vein' cut it might be difficult to back the blade out. If this is so, make a sharp turn at the end of the 'vein cut' and saw back to the top edge of the petal.
13. Cut the second vein the same way; now that the pack has been opened up some, it will be possible to back the blade out. Continue cutting around petal #1 until you reach the entry hole.



Drawing 2-2. Make up the Pack. Gather four different colored veneers and make a six-pack; use two light- colored pieces, two medium-colored pieces, a medium dark and a dark piece. Cut them to 4½-in. squares and stack the veneers as shown; the arrows specify grain direction.

Colored wood fillers. Get the less expensive Carpenter's Wood Filler for light colored veneers. Mix in small bits of acrylic paint for colored fillers.

14. Stop the scroll-saw and carefully remove the six small pieces of veneer. Put these pieces (Petal #1) into one cup of the muffin tin.
15. Cut around Petal #2 in the same manner (also cutting the two vein lines) and set these six pieces aside.
16. Cut out the Center #3 and set these pieces in the muffin tin.
17. Now with the center out, cut the veins for Petal #4 and Petal #5.
18. Cut out Petal pieces #4, #5 and also Stem #6.
19. When all pieces have been cut, stop the scroll saw and remove the outside marquetry pad.

Assemble the Marquetry: Match the pieces to make a pleasing effect. Each coaster should have three different veneers for the flower (petals, stem and center) and a different piece of veneer for the background.

20. Set the pad, face up, on a flat surface and carefully remove the blue tape from the pack.
21. Lay out all the six backgrounds, taped side up.
22. Cover the window areas with app tape.
23. Turn the backgrounds over so the veneer side is up and the taped side is down.
24. Use a soft brush and remove sawdust and tape frass. These pieces still have app tape on the back.
25. Place the six #6 Stem pieces into a background (app tape side down). Move the pieces around until the mix is pleasing.
26. Next take the six #1 Petal pieces and place them in backgrounds; remember that the #1 Petal should not go into a background with color #1 or into a background where you have placed Stem #1.
27. Fill out each flower with Petals #2, #4 and #5 of the same veneer.
28. Add the center pieces #3 to each flower. Move pieces around until the colors

and grain direction are pleasing. See **Photo 2-1** for a possible arrangement.

29. Put a large piece of app tape over the flower and stem (this is the front side).
30. Turn the piece over and remove all the tape from the individual pieces. It is less likely that you'll break a piece if you remove tape when the piece is still in the background.
31. Cover this back side with app tape.
32. Turn the piece over and remove the app tape. We will work from the front in the next steps.

Sand Shade: Sand shading gives the illusion of depth. Any part of the flower that is behind another petal can be shaded. See 'Concepts, Sand Shading' for details on this. The darker woods will not show the effect of sand shading as much as the lighter woods.

33. Look at **Drawing 2-1** to see what part of each petal to sand-shade.
34. Remove the petal to be shaded from the assembly.
35. Use tongs and dip the part into the hot sand.
36. Put the shaded part back into the marquetry and sand-shade all of the other parts.

Close up Gaps: There will be pieces out of position and some gaps.

37. Hold the picture up to the light and adjust positions of pieces until most gaps are closed. Cover the front with app tape and turn the piece over. All filling will be done on the back side.
38. Use wood putty and a spatula or putty knife and fill any gaps. See 'Concepts, Fillers' for details on this.
39. Push a contrasting color of wood putty through the 'petal veins' so the veins will be visible in the final picture.
40. After the putty has dried, sand lightly.

Finish Up: Use PVA glue to attach the marquetry to the backers. A vacuum press reduces the clamp time as it removes moisture from the wood pieces. See 'Concepts, Clamping, Vacuum Press' for details on this. During the first part of the gluing process, app tape will be on the front of the marquetry piece.

41. Put yellow PVA glue on the wood square.
42. Put the marquetry piece on a flat surface, taped side down and place the wood square in the center. Hold the wood in place for a minute or so until the glue grabs.
43. Use blue tape on all four edges to keep the veneer pieces from shifting during clamping.
44. Clamp the piece for 30 minutes, unclamp, remove the app tape and scrape off any protruding glue. Put a piece of waxed paper next to the veneer, then two layers of paper towels and clamp for an hour.
45. Lay the coaster face down on a cutting mat and, using a sharp knife or a veneer saw, trim off the extruding veneer. Be careful here to not chip off any veneer.
46. Seal the veneers with shellac and then even the surface with a hand scraper. See 'Concepts, Scraping' for details on this.
47. Sand, starting at 120 and going to 320 grit. As you sand, use more shellac to seal the pieces.
48. Finish with polyurethane; start with four coats of wipe-on and then finish by wiping on a full-strength coat of polyurethane.

Bee's wax. Keep a piece of bee's wax on your bench; push your knife point into it occasionally. This makes knife cuts go easier.

Project 3

MOON-MOUNTAIN-TREE

This project is an introduction to Double Bevel marquetry, see 'Concepts, Double Bevel Cutting' for details on this. The picture needs seven different veneers; each will be cut into the background before the next veneer is added. In previous projects we used the Pad Method where all the veneers were stacked into a pad, the table was set to 90° (flat with no tilt) and the pieces were all cut at one time. We made multiple pieces; however there were noticeable gaps which we had to fill. The Double Bevel method has the advantage of producing a picture with no visible kerfs in the assembly; however only one piece is cut each time and only one picture is made. To study the differences see 'Concepts, Double Bevel or Pad Cutting.'

On pattern **Drawing 3-1**, The Moon, the bottom of the Snow and the Tree will be done with the table set at 11° because these require double bevel cutting. All the other cuts will be done with the table at 90° (no tilt) because these pieces fit together better if the edges are not beveled.

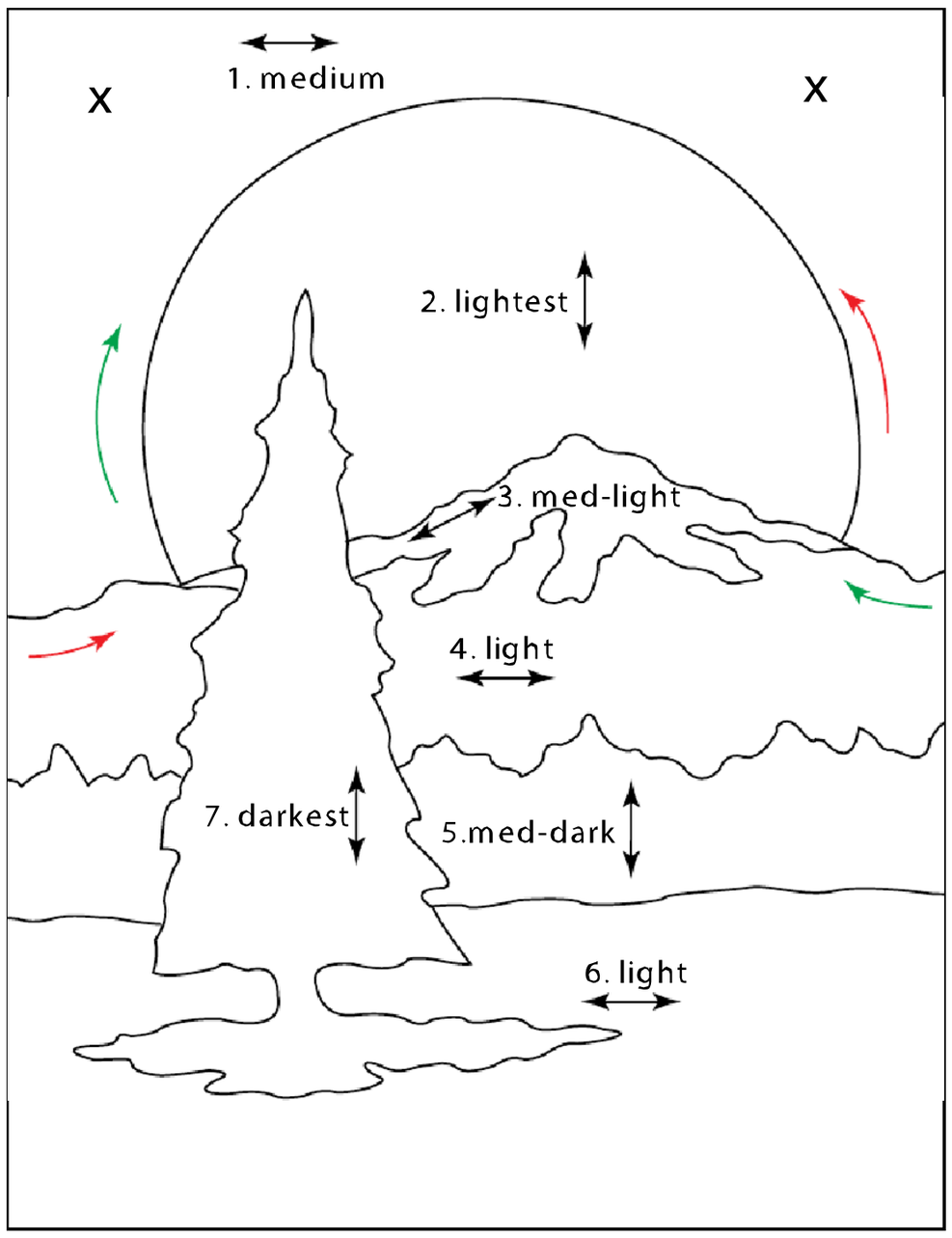
Drawing 3-2 shows how students in past classes have changed the pattern to make their pictures unique. By all means, change the size and color of any part of this picture; it's yours to do with as you want. For this first piece, keep Moon-2 behind Snow-3, behind Mountain-4 or behind Tree-7; the starting hole will thus be hidden.

Photo 3-1

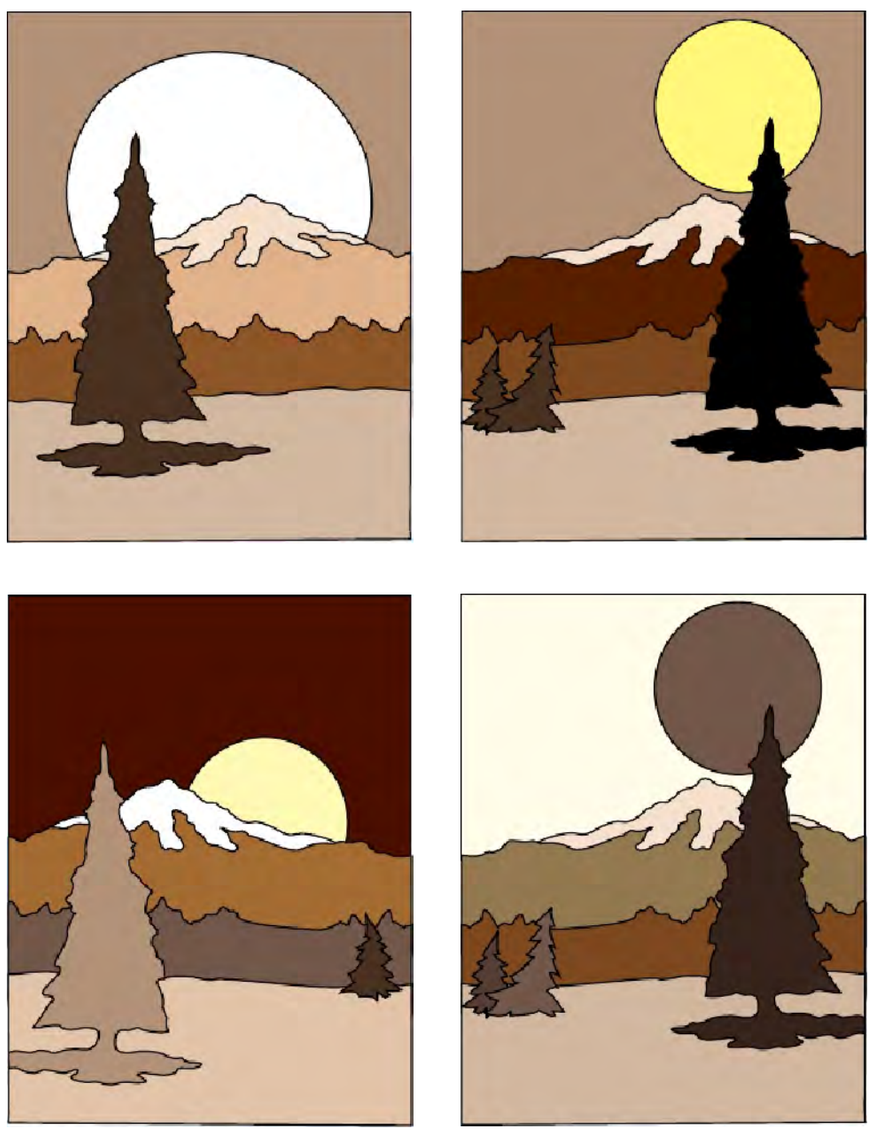
Extra Tools and Materials Needed: Backer board of ⅜-in. plywood or MDF.

Gather the Veneers: Select all seven veneers before you begin cutting. The pattern (**Drawing 3-1**) has suggested color tones and grain directions. To regenerate a wild veneer see 'Concepts, Veneer, Flattening Wild' for details on this.

1. Select a Sky-1 veneer *with* a visible grain pattern and one that is darker than Moon-2. Set this aside and mark it number '1' with a piece of tape.
2. Next choose Moon-2 veneer and mark it with a '2'.



Drawing 3-1. Moon-Mountain-Tree Pattern. Grain direction (arrows) and veneer shades are suggested. For a saw table tilting down on the right, follow green arrows. For tables tilting to the left side, cut clockwise (see the red arrows).



Drawing 3-2. Different Moon-Mountain-Tree Pictures. Students have changed the size of the Moon, altered its placement and used different colored veneers to give unique pictures. The small trees can be added or not.

3. Choose the other five veneers and mark numbers on them '3' through '7'.
4. Lay the veneers together and make sure that they are compatible. Confirm that Sky-1, for example, looks good with Mountain-4 etc.

Make the Pattern: Use the pattern (**Drawing 3-1**) as a start and enlarge it to 8¼-in wide x 11-in high. See **Drawing 3-2** for other possible changes. Note that Mountain-4 has been reversed in one picture, little trees have been added in others, and Moon-2 has changed size and position in others.

5. Draw the pattern on white paper with heavy black pencil and number all the parts 1-7. Also draw arrows to indicate grain direction.
6. Lay a piece of tracing paper over the pattern and transfer the lines.
7. Make 'X' marks on the upper left and upper right corners of the tracing paper to use as registration marks as in **Drawing 3-1**. See 'Concepts, Registration Marks' for details on this.

First Cut (11°)—Moon-2 (Drawing 3-3): Set the scroll saw table to the correct angle (usually about 11° for our US veneers and a 2/0 blade) and figure out the direction of cut, see **Drawing 3-1**. Make sure the Moon veneer is big enough and is placed correctly. See 'Concepts, Jig, Positioning Board' for details on this.

8. Cut Sky-1 to size (8½-in. wide x 11-in. high). Keep the grain horizontal and cover both the front and back with app tape.
9. Lay the pattern on top of Sky-1 and transfer the 'X' marks.
10. Register the pattern (line up the 'X's) and transfer Moon-2 lines. See 'Concepts, Transfer Paper' for details on this.
11. Put app tape on the back of Moon-2 veneer and place it in back of Sky-1 veneer.

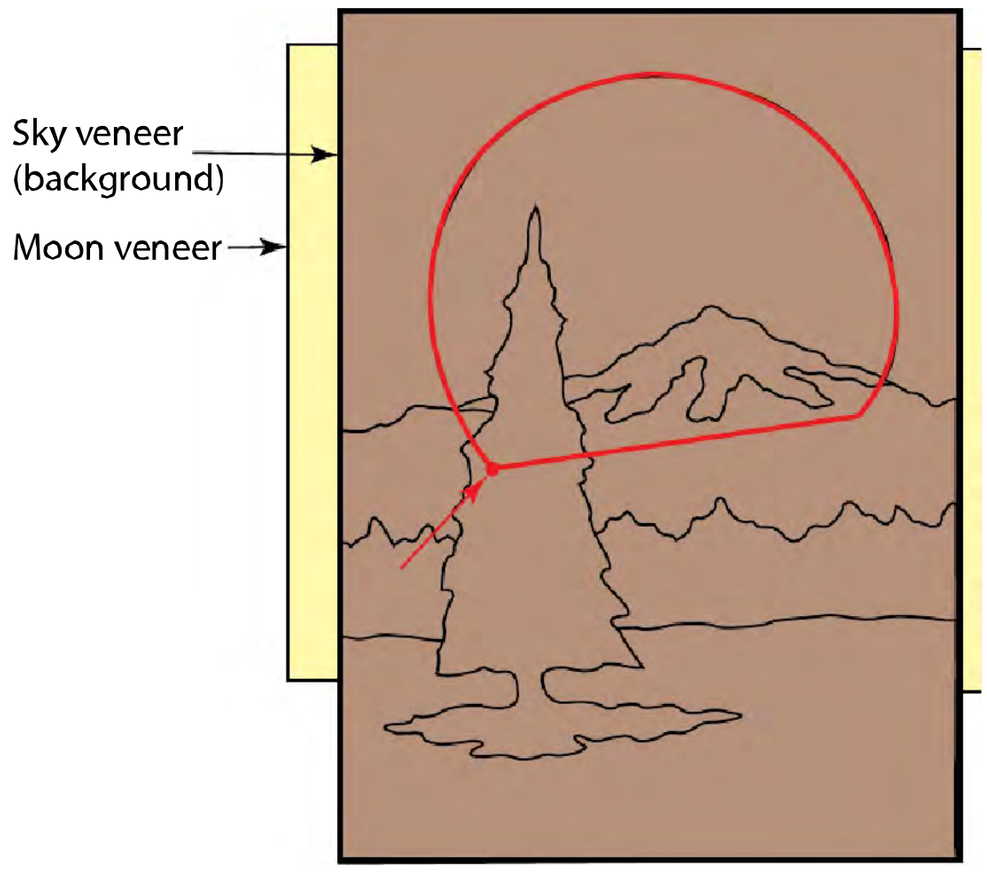
12. Use blue tape on the edges to secure it tightly.
13. Work from the front and punch a hole as shown in **Drawing 3-3**. This hole will be hidden when Snow-3 is cut in.
14. Tilt the table to 11°.
15. Thread a 2/0 scroll saw blade (See 'Concepts, Blades, Scroll- Saw') through the hole and cut out Moon-2 proceeding in the direction shown in **Drawing 3-1**.
16. Put the background face down on a mat and remove the waste veneer from around Moon-2.
17. Turn the piece over (back side down) and push the background down around Moon-2. The round background piece will come forward and can be discarded.
18. Turn the piece over and push Moon-2 all the way into Sky-1.
19. Secure Moon-1 in place with clear cellophane tape; see **Drawing 3-4**.

Second Cut (90°)—Snow-3 (Drawing 3-4):
Notice the difference between the 'cut-line' and the 'pattern line' and cut in Snow-3.

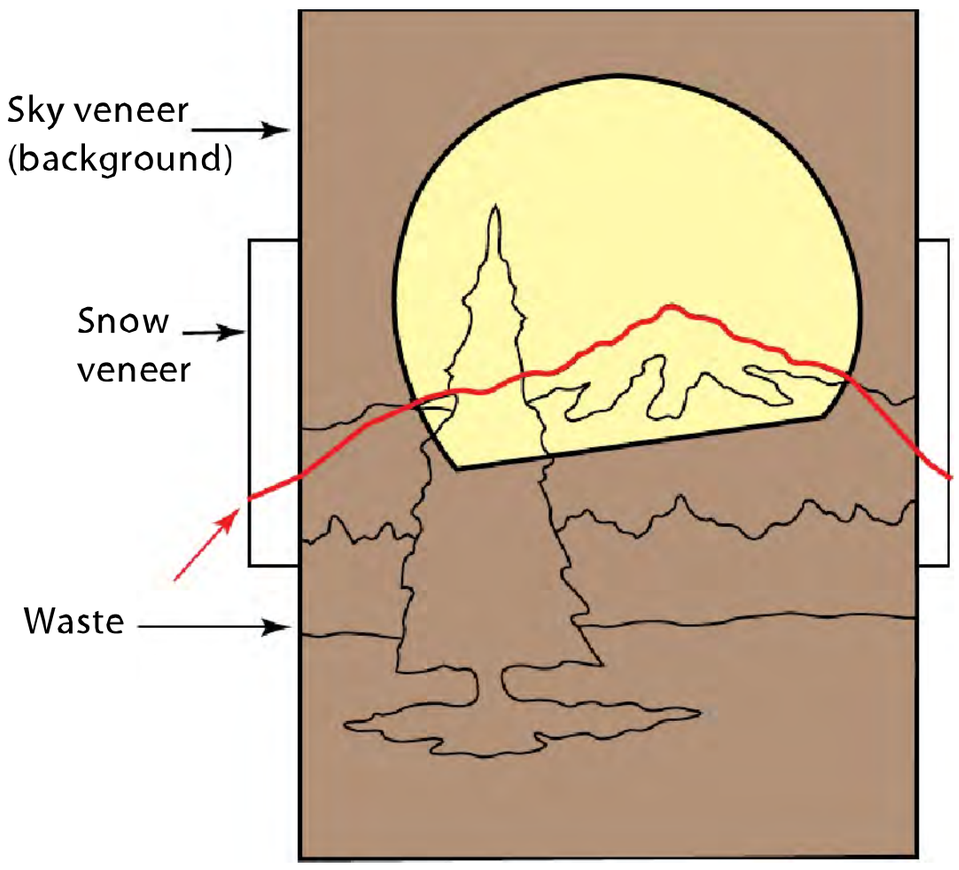
20. Turn the picture face-up and put the pattern in place by lining up the 'X's.
21. Transfer the cut-line for Snow-3 onto the background.
22. Put app tape on the back side of Snow-3 veneer and put it in place.
23. Start cutting from the left side as in **Drawing 3-4** and follow the red cut-line.
24. Remove extra veneers and tape Snow-3 into the background as in **Drawing 3-5**.

Third Cut (11°)—Mountain-4 (Drawing 3-5):
Cut in Mountain-4. See **Drawing 3-1** to start from the left side or the right.

25. Register the pattern and trace the new red cut-line at the bottom of Snow-3.
26. Place Mountain-4 veneer under the background.



Drawing 3-3. First Cut, 11°. Moon-2 veneer is taped in place behind. The entry point for the blade is indicated and the cut-line is shown in red.



Drawing 3-4. Second Cut, No Tilt. The Moon is in the background and the Snow veneer is below. Cut along the red line from left to right. Note that the cut-line is different from the pattern line.

ATTACH THE PATTERN TO THE PAD. Instead of tracing, glue it on with spray adhesive.

27. Cut from the left or right side as in **Drawing 3-5**.
28. Tape Mountain-4 into the background.

Fourth Cut (90°)—Tree Line-5 (Drawing 3-6): Cut in the Tree Line-5.

29. Register the pattern (line up the 'X's) and cut in Tree Line-5.

Fifth Cut (90°)—Foreground-6 (Drawing 3-7): Cut in Foreground-6.

30. Cut in Foreground-6 as in **Drawing 3-7**.

Sixth Cut (11°)—Big Tree-7 (Drawing 3-8): Cut in Big Tree-7. See **Drawing 3-1** for direction of cut.

31. Put Big Tree-7 veneer under the background; app tape side down.
32. Make an entry hole as in **Drawing 3-8** and cut in Big Tree-7. Note this will be the only hole in the picture that needs to be filled.
33. The completed picture is shown in **Drawing 3-9**.

Inner Strips and the Outer Borders: Now that all the pieces have been cut and placed in the background, the next step is to square up the marquetry piece and to add borders. See 'Concepts, Borders, Stringers and Corners' for details on this.

34. Use a large metal framing square and square up the picture using a veneer saw and a sharp knife.
35. Cut four veneer pieces 12-in. long and ¼-in. wide for the inner strips.
36. Cut four veneer pieces 14-in. long x 2-in. wide for the outer borders.
37. Tape these pieces to the edge of the picture.
38. Put clear cellophane tape at the corners and cut the 45° corners.
39. Cover the front completely with app tape.
40. Turn the piece over and fill any gaps with filler. See 'Concepts, Fillers' for details on this.
41. After the filler has dried, sand the back smooth.

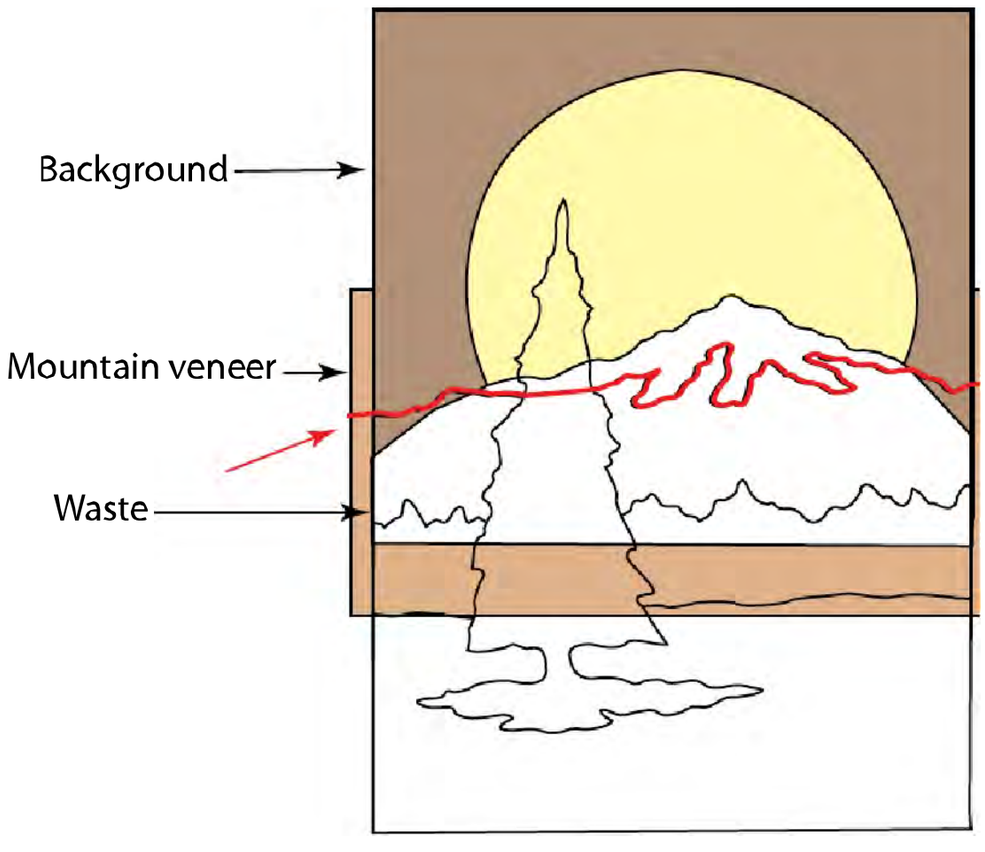
Glue to a Backer Board: Use ⅜-in. solid core plywood or MDF as the backer. See 'Concepts, Backer Boards' for details on this.

42. Cut the backer to 1-inch longer and 1-inch wider than the picture.
43. Spread yellow PVA glue on the backer and lay it out flat.
44. Place the picture on the backer with ½-in. gap on all edges.
45. Affix the picture to the backer with blue tape on all four edges.
46. Place the picture in a vacuum bag for 30 minutes.
47. Remove the picture; remove all blue tape and app tape.
48. Scrape off any extruded glue and cover the picture with waxed paper.
49. Put the picture back in the vacuum bag with four layers of paper towels on the waxed paper.
50. Keep the picture in the vacuum bag for 1 hour.

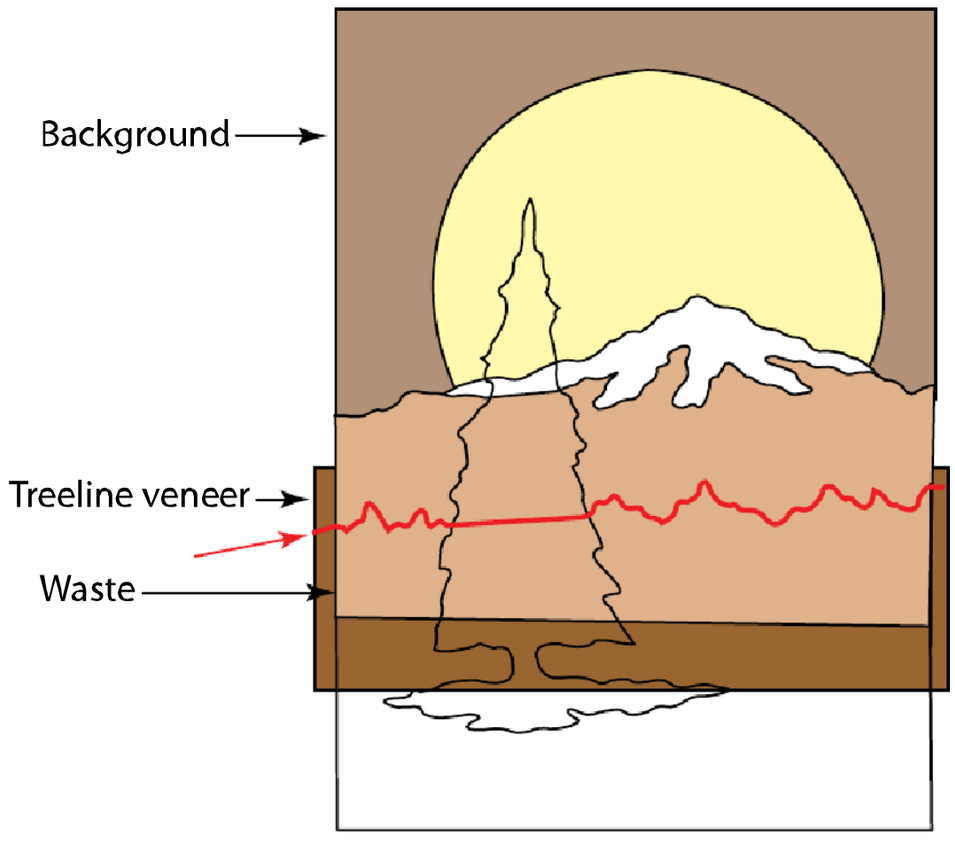
Even up the Picture on the Backer: The backer must be cut even with the veneer edges of the picture. See 'Concepts, Squaring up the Picture' for details on this.

51. Place the picture on the Sliding Jig on the table saw and cut all four edges even.

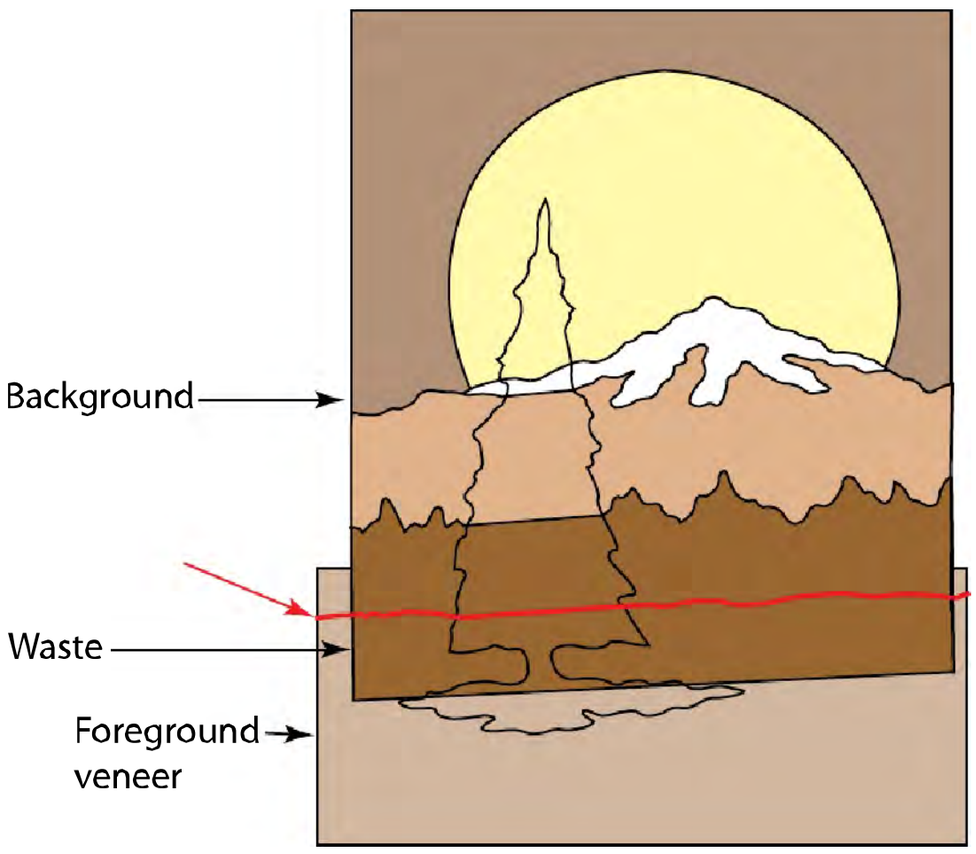
Finish: See 'Concepts, Finishes' and 'Sanding or Scraping' for details on this.



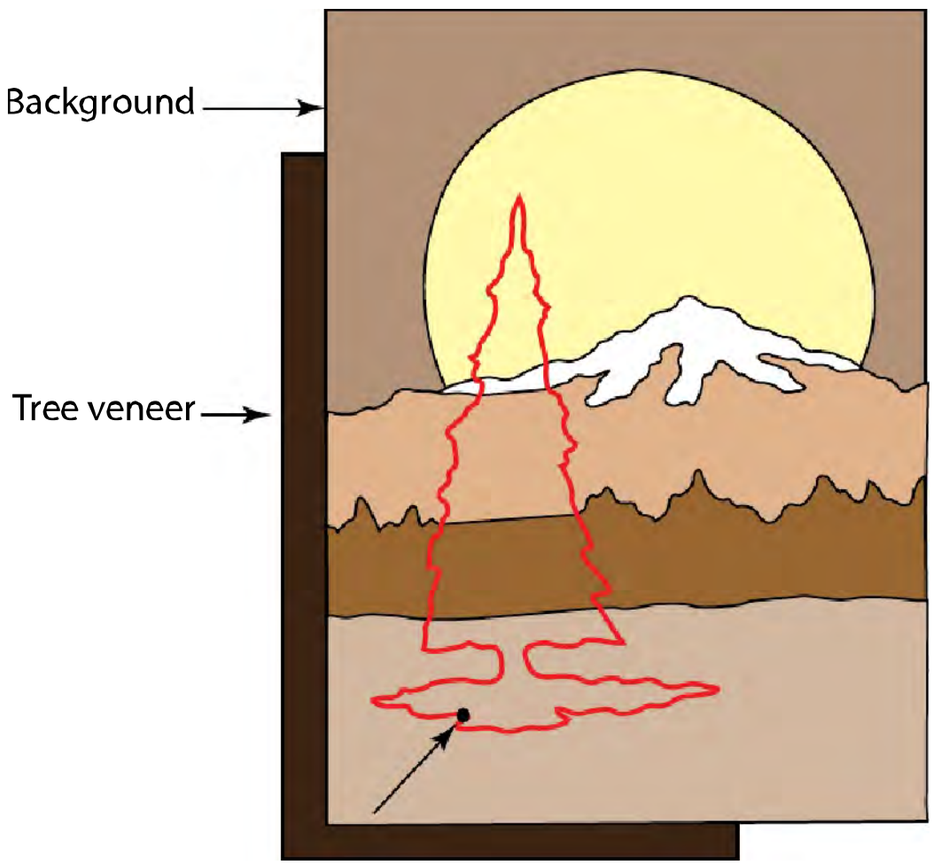
Drawing 3-5. Third Cut, 11°. The Moon and Snow are in the background and the Mountain veneer is below. This cut defines the bottom of Snow-3 and adds Mountain-4 to the picture.



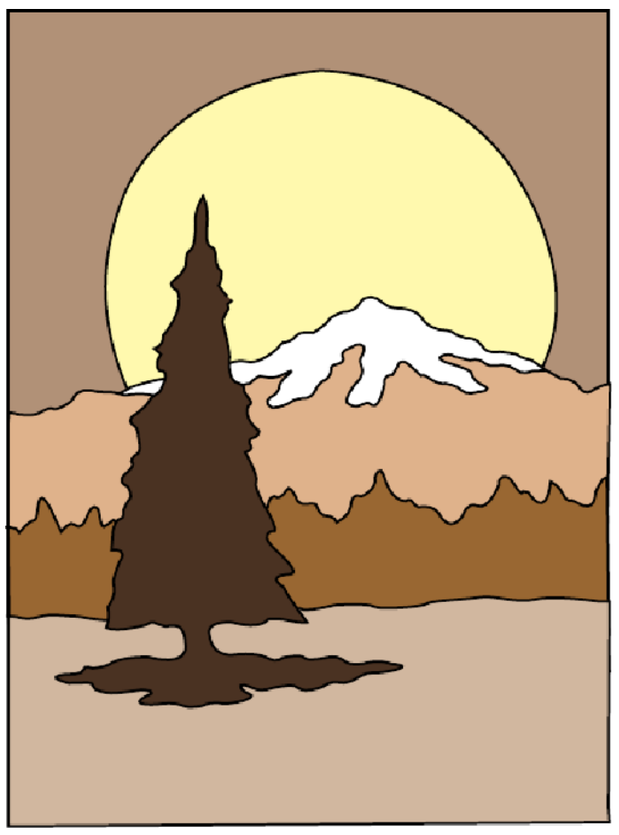
Drawing 3-6. Fourth Cut, No Tilt. This cut defines the bottom of the Mountain and adds the Trees section to the picture.



Drawing 3-7. Fifth Cut, No Tilt. This cut defines the bottom of the Trees section and adds the Foreground to the picture.



Drawing 3-8. Sixth Cut, 11°. The picture is complete except for the Big Tree. Use a push pin and pierce a hole at the point shown.



Drawing 3-9. Completed Picture. This Moon-Mountain-Tree picture has been the first double bevel marquetry piece for many, many beginners. Keep it as a reminder of your first piece.

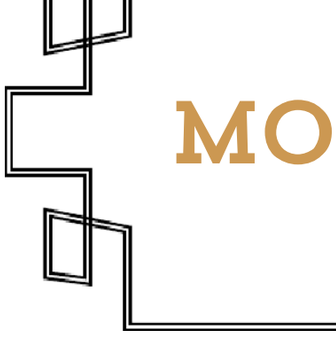
Project 4

MOON-MOUNTAIN-TREE PICTURE, FAST MARQUETRY

This picture is cut using the double bevel method and is called 'Fast Marquetry' because, once the veneers have been chosen, the pieces for the picture can be cut in less than one hour. This method does use more veneer but goes faster. Large pieces of veneer are taped in place for each cut without extra time taken to precisely position them and the order of cutting is planned precisely beforehand. In a demonstration in Morgan Hill, California in 2012, Dave Peck, an expert marquetarian, cut all the pieces with a hand-held fret saw and assembled the picture in 34 minutes. Dave probably could have added the inner strips and the outer border pieces in another 10 minutes.

Choose seven veneers for this picture—starting at the back and coming forward; Sky, Snow, Mountain, Tree Trunks, Tree Line, Foreground and Big Tree; see pattern **Drawing 4-1**. Choose the Sky so it is darker than the Snow but lighter than the Mountain. Choose the other four veneers and mark numbers on all the parts.

Extra Tools and Materials Needed: Backer board (⅜-in. MDF or plywood).

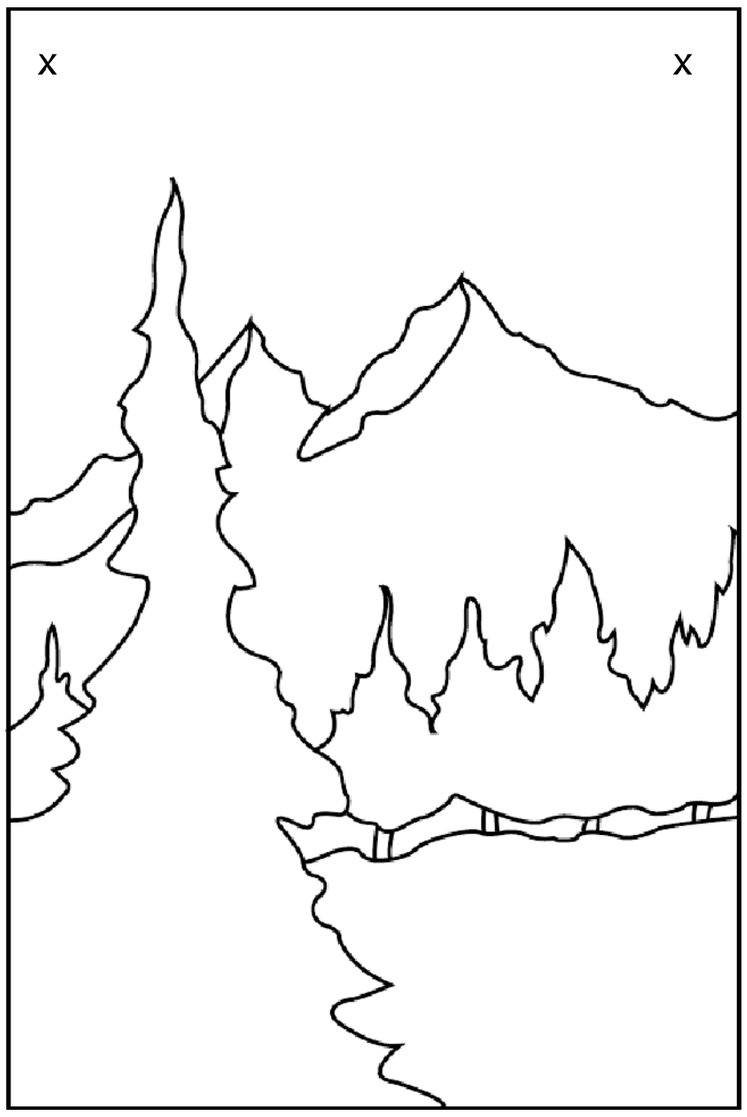


Paint the bottom. When you first open a package of new blades, paint the bottom of the pack red. Makes it easy to know which end is down.

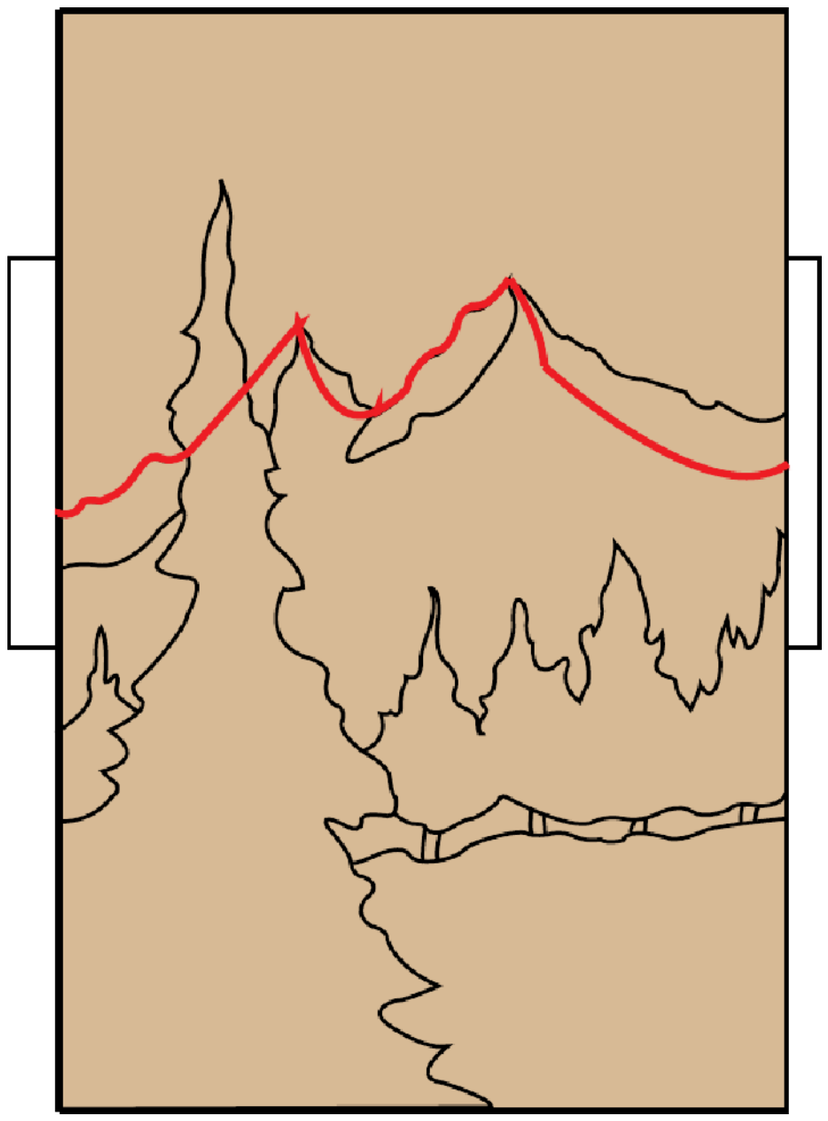
Photo 4.1

Make the Pattern: Enlarge pattern **Drawing 4-1** to 5-in. wide and 8-in. high.

1. Draw the pattern on white paper in heavy black pencil to size and number all the parts 1-7. Also draw arrows to show grain direction.
2. Lay a piece of tracing paper over the pattern and trace all lines.
3. Make 'X' registration marks on the upper left and upper right corners of the tracing paper. See 'Concepts, Registration Marks' for details on this.



Drawing 4-1. Moon-Mountain-Tree Pattern. Seven veneers are needed for this picture. Note the 'X' registrations marks.



Drawing 4-2. First Cut—Snow. Follow the red cut-line from left to right if your table tilts down on the left. Follow the red cut-line from right to left if your table tilts down on the right. Notice that the red line only follows the pattern line where the Snow touches the Sky.

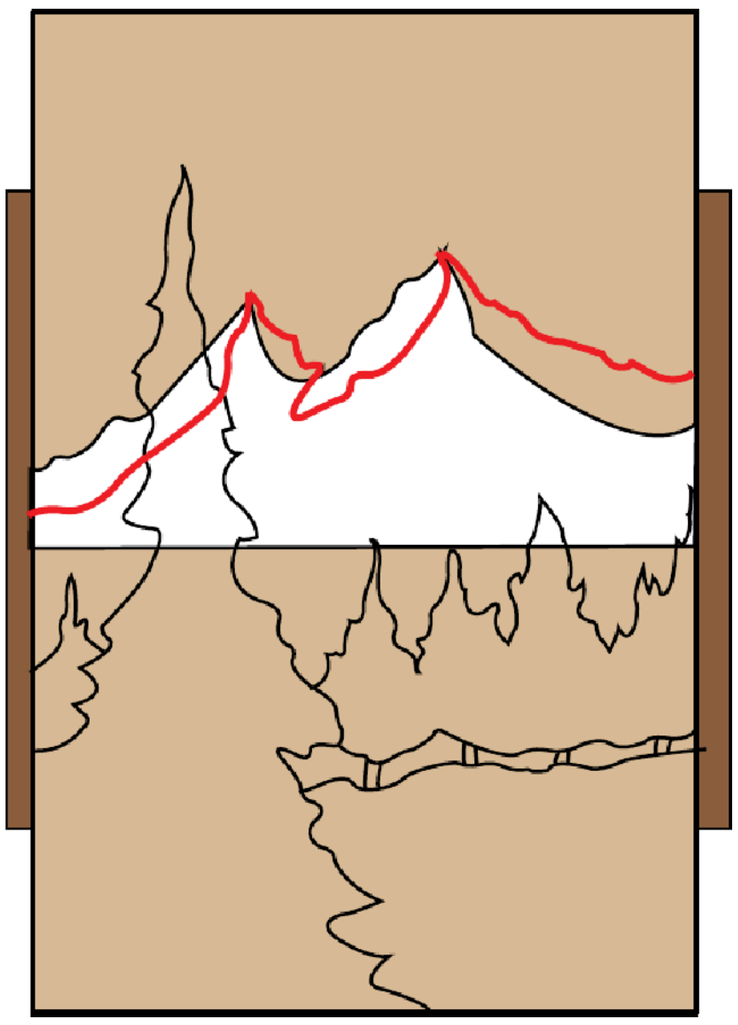
Start Cutting: Set your scroll saw table to the correct angle, usually about 11° for our US veneers, and figure out the direction of cut. See 'Concepts, Double Bevel Direction of Cut' for details on this.

Cut Sky veneer (#1) to size (about 5-in. x 8-in.) and put app tape on the front and back.

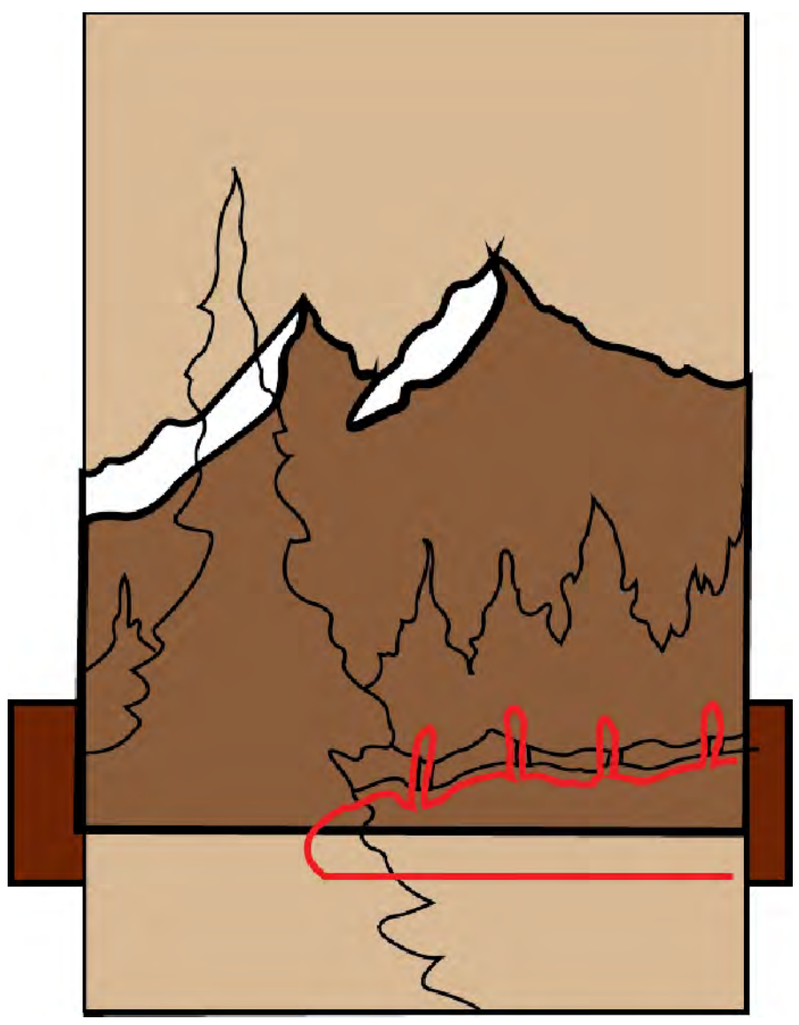
4. Put app tape on the back of the Snow veneer (about 2-in. x 5-in.) and use blue tape to affix it to the back of the picture; app tape side down.
5. Lay the pattern on top of the Sky and transfer the 'X' marks from the tracing paper to the background.
6. Register the pattern and transfer the Snow and Mountain lines onto the app tape on top of the background. See **Drawing 4-2**, the Snow veneer is in place.
7. Cut along the red cut-line. Note: take care cutting where the Snow touches the Sky, the other cuts in the waste area are less important.
8. Remove waste veneer from the front.
9. Turn the picture over; remove the blue tape and the waste veneer from the back.
10. Push the Snow piece into the Sky.
11. Put more app tape on the back.
12. Turn the piece over and cover the joints with clear cellophane tape. See **Drawing 4-3**, the Snow has been added.

Add Mountain: Cut in the Mountain.

13. Working from the front, put the pattern in place and line up the 'X's.
14. Transfer the next cut lines as shown in red in **Drawing 4-3**. Note: Be sure you are marking on tape and not on wood veneer.
15. Put the Mountain veneer behind and cover with app tape.



Drawing 4-3. Second Cut—Mountain. The Snow veneer is in place and the pattern has been traced on top of the veneer (actually on top of the app tape). The Mountain is cut following the red cut-line. Note that the cut-line connects the Mountain to the bottom of the Snow and to the Sky above.



Drawing 4-4. Third Cut—Tree Trunks. The Sky, the Snow and the Mountain are in place. Proceed along the red line out towards the middle and back out again.

16. Cut along the red cut-line, separate the pieces and tape the Mountain veneer in place. See **Drawing 4-4**.

Add Tree Trunks: Cut in the Tree Trunks.

17. Put Tree Trunk veneer behind the picture.
18. Cut along the red cut-line as in **Drawing 4-4**.
19. Tape the Tree Trunks veneer in place as in **Drawing 4-5**.

Add Tree Line: Cut in the Tree Line.

20. Put Tree veneer behind the picture and cut both the top and the bottom portions of Tree line veneer as in **Drawing 4-5**.
21. Tape the Tree Line into the background.

Add Foreground: Add the Foreground.

22. Cut in Veneer 6 (Foreground) next, see **Drawing 4-6**.
23. Tape the Foreground in place.

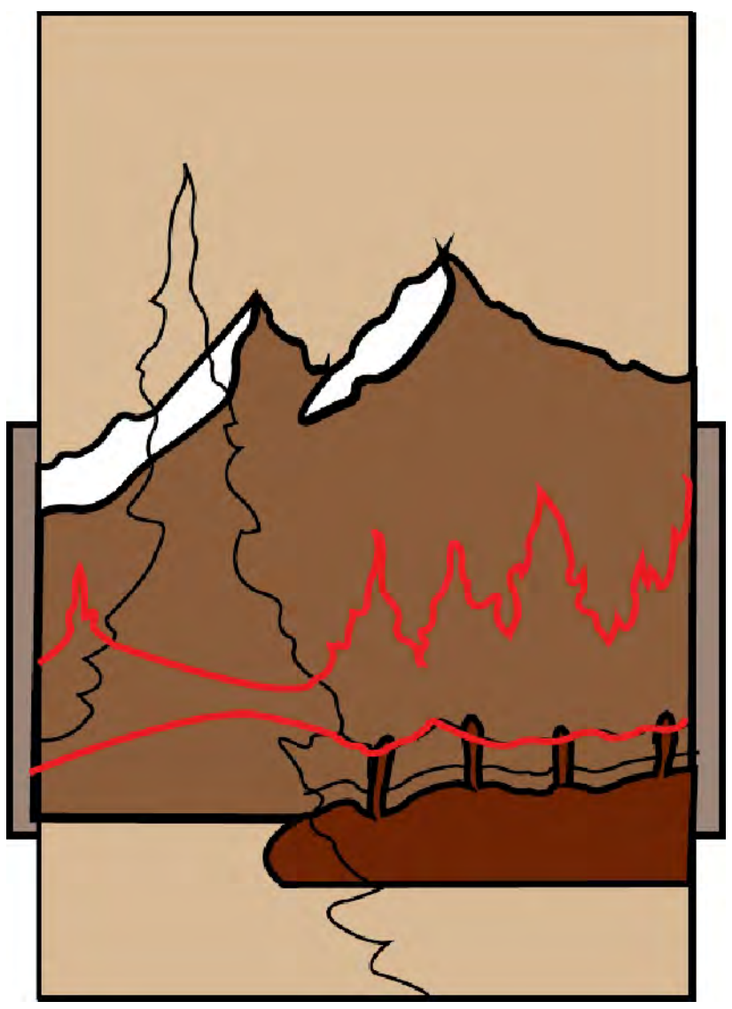
Add Big Tree: Cut in the Big Tree.

24. Put the Big Tree-7 veneer under the background and trace the lines.
25. Cut along the red cut lines as in **Drawing 4-7**.
26. Tape the Big Tree in as in **Drawing 4-8**.

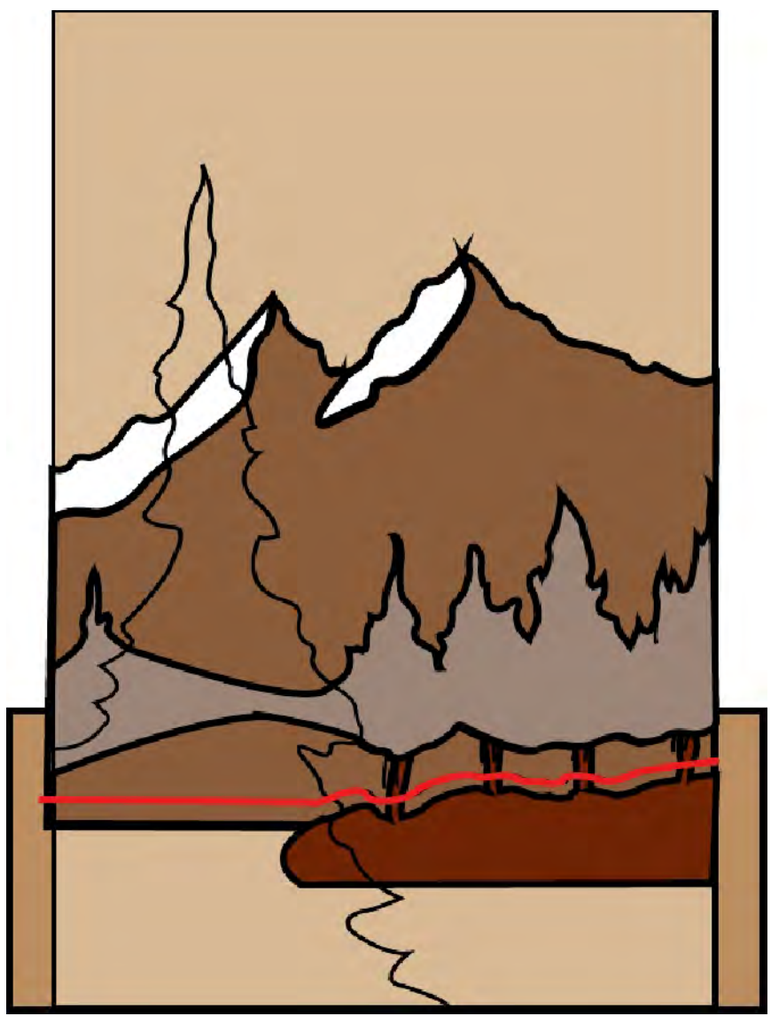
Fill and Sand: Prepare the picture for borders.

27. Take all app tape and clear cellophane tape off the front.
28. Cover the front with app tape.
29. Turn the piece over and remove all tape from the back.
30. Reposition any pieces as necessary and then fill and sand.

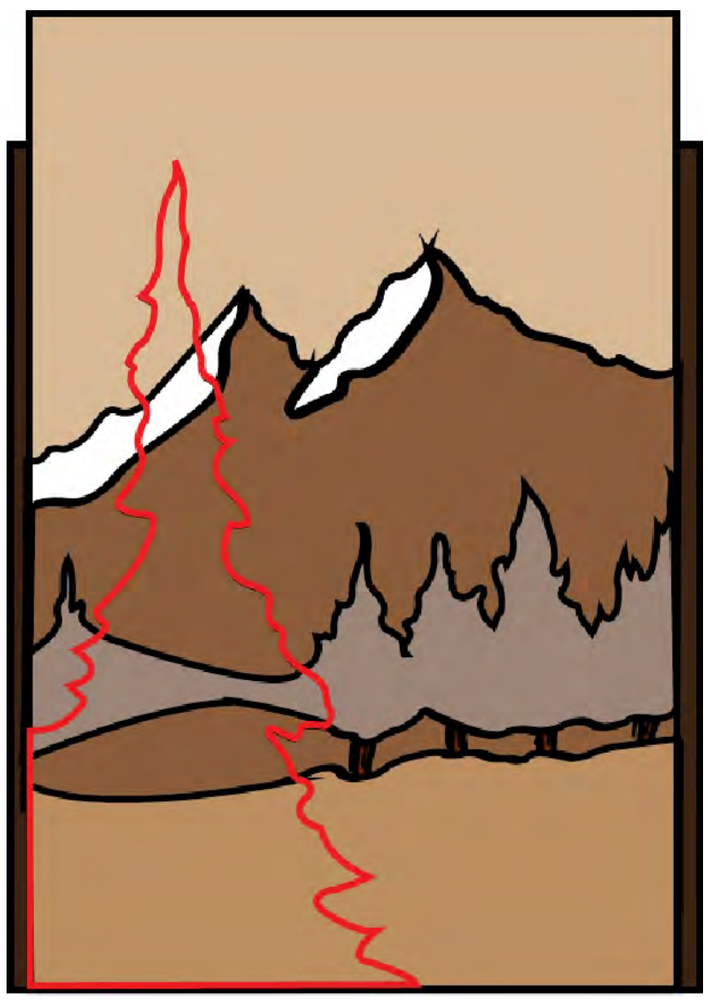
Inner Strips and Outer Borders: All the pieces have been cut and placed into the background; the next step is to square up the marquetry piece and to add borders. See the previous chapter for details on this.



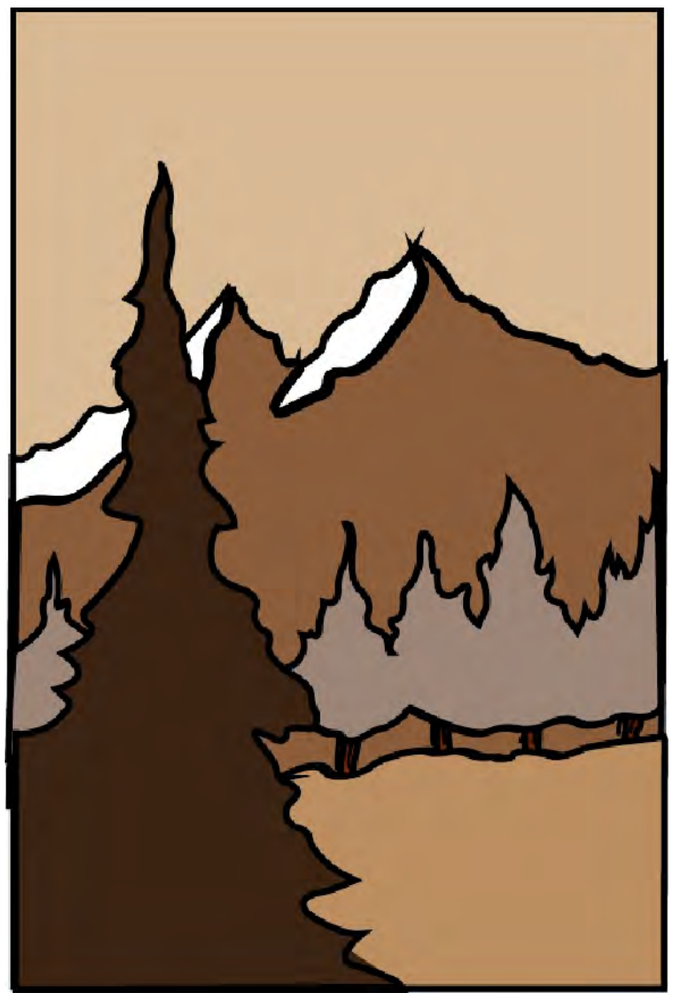
Drawing 4-5. Fourth Cut—Trees. The Sky, Snow, Mountain and Tree Trunks are in place. Start on either the left or right side and follow the red cut-line to cut the bottom of the Tree Line. Then follow the top line to cut the top of the Tree Line.



Drawing 4-6. Fifth Cut—Foreground. Follow the red cut-line to add the Foreground. Start the cut from right or left side.



Drawing 4-7. Sixth Cut—Big Tree.



Drawing 4-8. Completed Picture. This picture (minus the inner strips and the outer borders) should take 1.5 to 2 hours to cut and assemble after the veneers have been chosen.

Glue to a Backer Board: Use solid core plywood or MDF as backer. See the previous chapter for details on this.

Even up the Picture on the Backer: The backer must be cut even with the veneer edges of the picture. See 'Concepts, Squaring up the Picture' for details on this.

Project 5

TISSUE BOX HOLDER—SCENIC

This project will use the Pad Method of cutting the veneer; see 'Concepts, Pad Marquetry' for details on this. The marquetry for each side of the Scenic Tissue Box Holder is cut separately and the scene is different on all four sides however the Snow line flows from one panel to the next as in **Drawing 5-5**. Each piece of marquetry should be 5¾-in. wide x 5¾-in. high. This allows 3/16-in. to be trimmed off on both sides and the top and the bottom after the marquetry piece is glued onto the box.

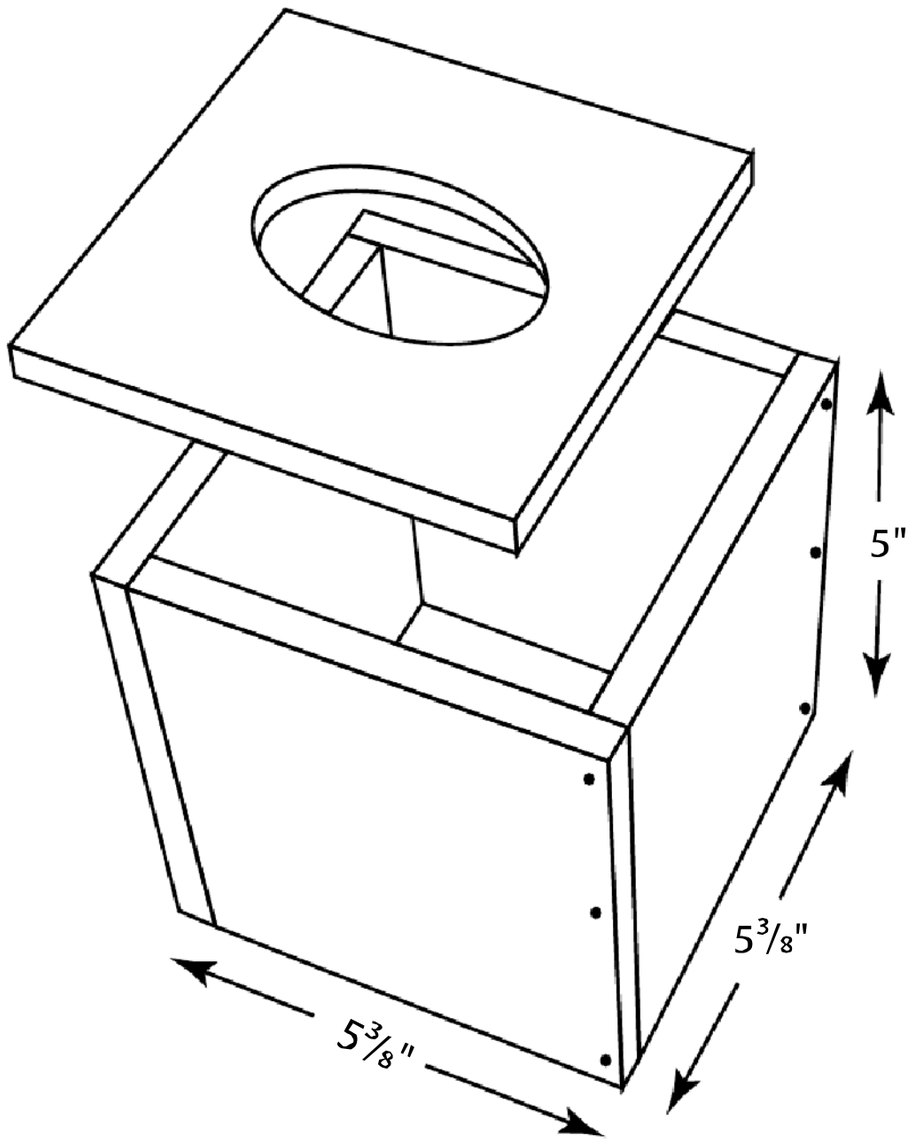
Use the instructions below to make the plywood box for this project and for the other tissue box project that follows. These tissue box holder projects have proved most popular at marquetry workshops and make great gifts.

Photo 5-1

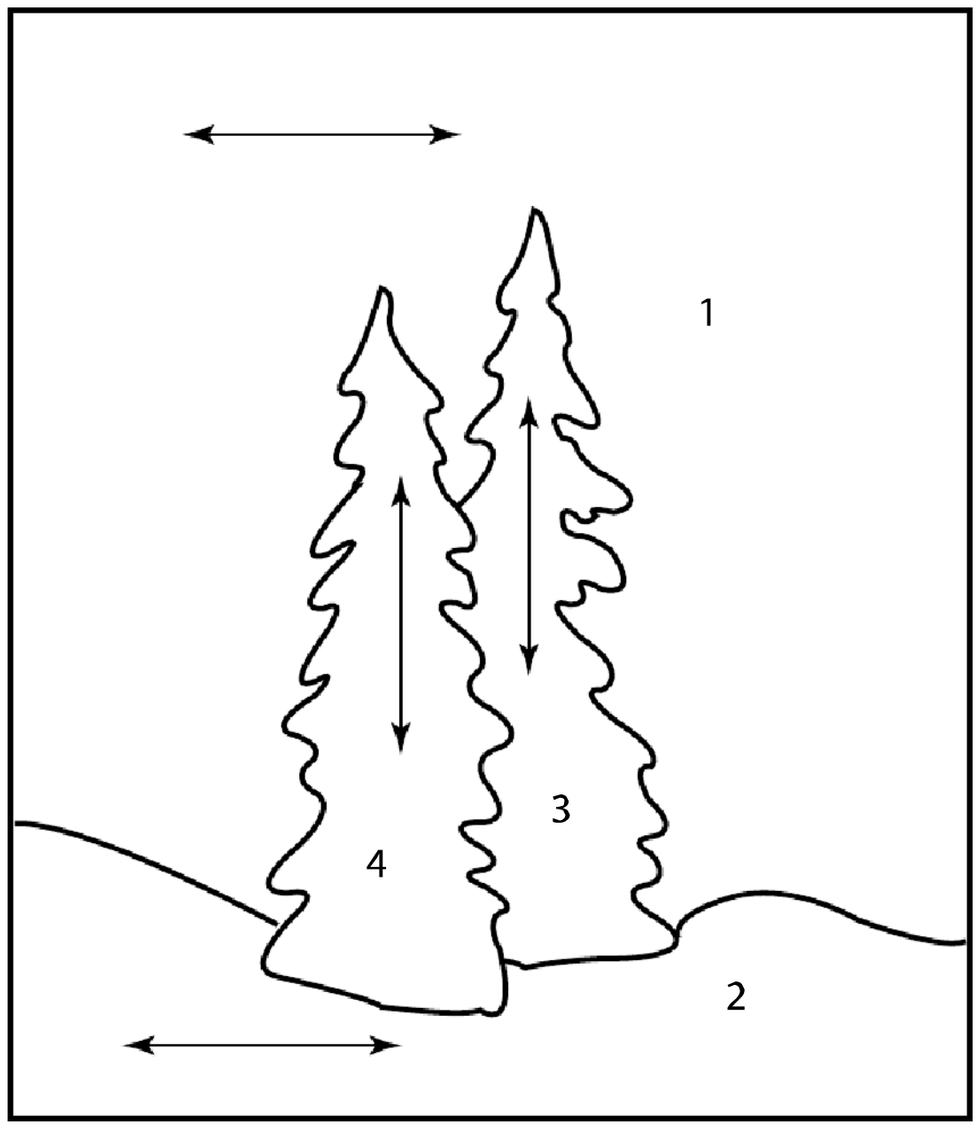
Extra Tools and Materials Needed: Plywood, ⅜-in. thick, for the box.

Make the Wooden Tissue Box Holder: Most cardboard tissue boxes that you buy at the store are 4½-in. square and 5-in. high; the dimensions of this wooden box should be altered if your tissues come in a different sized box.

1. Cut four sides out of ⅜-in. plywood (5-in. wide x 5-in. high). See **Drawing 5-1**.
2. Position the four wooden side pieces around the tissue box to make sure it will fit. The inside measurement of the plywood box should be ⅛-in. bigger than the tissue box for ease of fit.
3. Glue and nail the pieces together to make the box.
4. For the top, draw an ellipse 2½-in. x 3½-in.
5. Drill a ¼-in. hole in the top and cut out the opening using a #5 (thickness 0.016-in.) blade.
6. Sand the edges smooth and then glue and nail the top on.
7. Set the nails and fill the holes with wood filler. All of the joints should be flush; uneven edges will show through the veneer.
8. Sand the outside of the box.



Drawing 5-1. The Wooden Box. Nail and glue ⅜-in. plywood pieces together. These dimensions give an inside clearance of 4⅝-in. The ellipse is 2½-in. wide x 3½-in. long.



Drawing 5-2. Side 1. Use the same veneer for the Sky (V-1) and for the Snow (V-2) on all four sides. The two Trees use veneers V-3 and V-4.

Register the Marquetry Placement for All Four Sides: Because the Snow Lines of all the four marquetry pieces must meet at the corners of the box, make registry lines.

9. Mark one side of the box as '1', the next side '2' and the others '3' and '4'.
10. Use the pattern and make pencil marks on the corners of each side of the box where the Snow Line should be placed.
11. Later, as each marquetry piece is glued to a side, make sure the Snow Line on the marquetry is exactly on the Snow Line mark on the box. See **Drawing 5-2**.

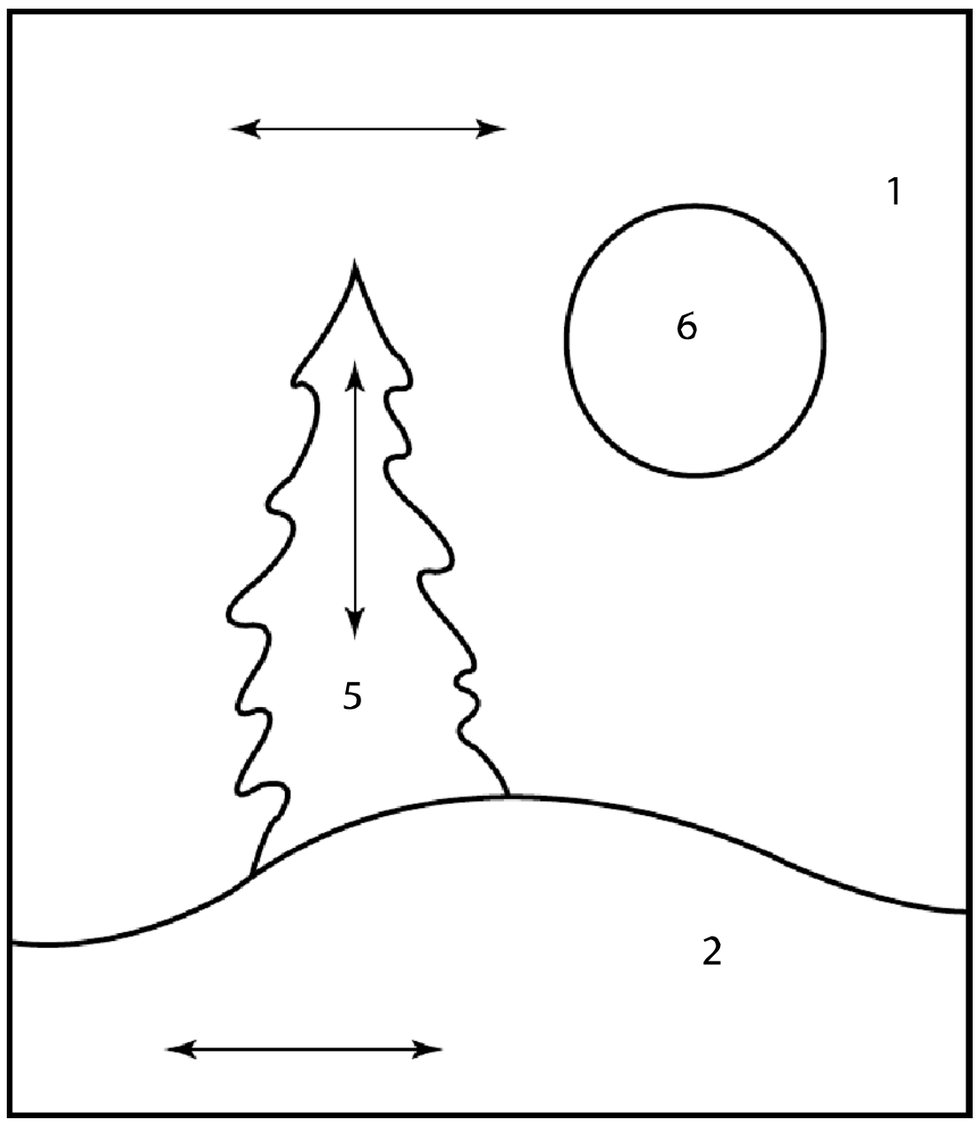
The Veneer Packs, in General: Before any packs are made, select the seven different veneers that will be used for this project. You will need : V-1 (Sky) walnut veneer, V-2 (Snow) a light-colored veneer, V-3 (Tree) dark brown veneer, V-4 (Tree) light brown veneer, V-5 (Tree) black or very dark veneer, V-6 (Moon) light veneer and V-7 (Cloud) light veneer. Number these veneers from 1-7. **Note:** some of these pieces will be put into the pack horizontally and some vertically as in **Drawing 5-3**.

Each pack will have four different veneers; see **Drawing 5-6**.

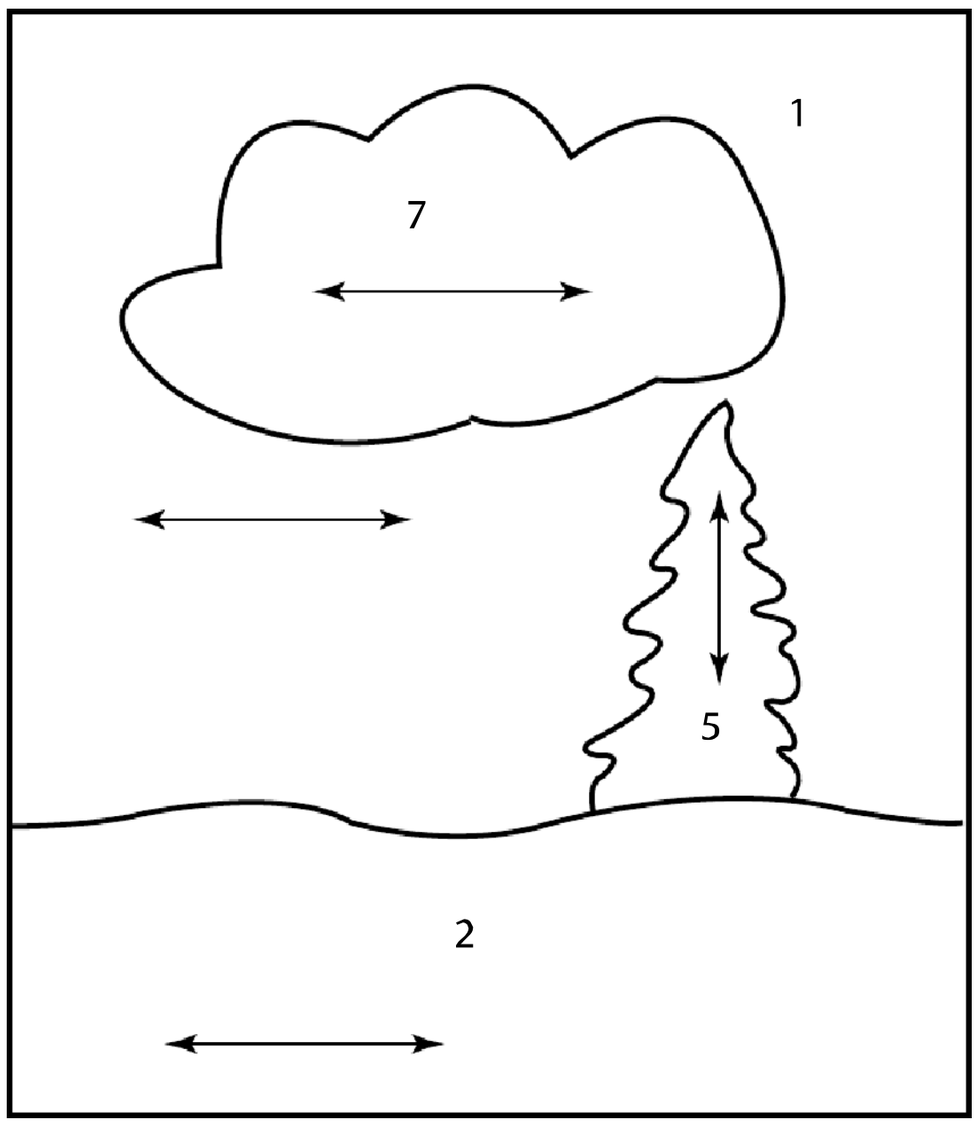
Note that the Snow line of each side matches the Snow line of the picture on adjoining sides.

Make the Packs: Get all the veneer pieces together and make the packs.

12. Cut four pieces of V-1 veneer to 5¾-in. wide x 5¾-in. high.
13. Cut the other pieces to the same size.
14. Put app tape on the back of each piece; this will keep the thin marquetry pieces from breaking.
15. Roll the tape with a J-roller or a wallpaper roller to make sure it is fastened to the



Drawing 5-3. Side 2. The Sky (V-1) and Snow (V-2) are the same on all four sides. Arrows show grain direction.



Drawing 5-4. Side 3. Push a small entry hole to cut out the Cloud.

veneer tightly. See 'Concepts, J-Roller and Brass Brush' for details on this.

16. Position the four pieces into a pad with the taped side down and fasten all four edges with blue tape.
17. Add app tape to the top of the pack.
18. Mark 'UP' on the top.
19. Glue a copy of the pattern to the top of the pack or trace the pattern.

Cut the Veneer at 90°: Side 1 and Side 3 can be cut from one side to the other without punching a hole for the blade. On Side 2 and Side 4, punch small holes in the Moon and Cloud outlines for the blade.

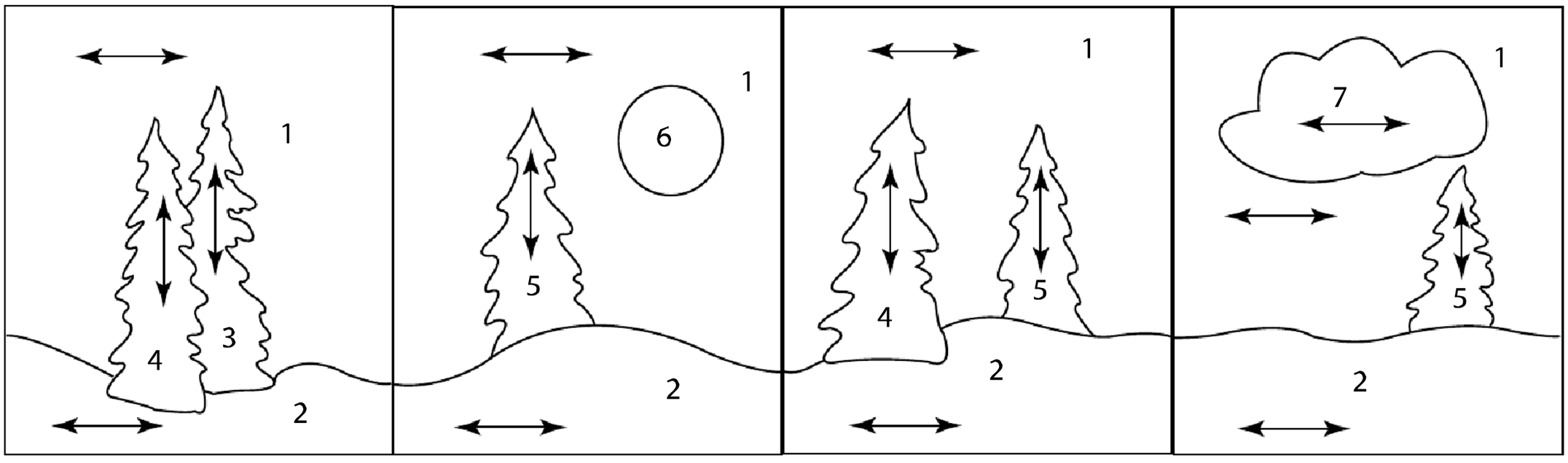
20. Make sure your scroll saw table is set at exactly 90°. Use a 2/0 blade and cut along the Snow line.
21. When all the parts have been cut out, take the pad apart and lay out the individual pieces.

Separate the thick pieces. Make a separate section: pieces too thick for marquetry but can be used as box separators etc.

22. Use a soft brush and clean the tape residue and frass from the pieces.
23. Assemble the pieces and put app tape on the entire front side.
24. Hold the picture up to the light and reposition any pieces that are too far apart.
25. Peel off the app tape from the back of the pieces.

Fill the Voids: Fill any voids with small pieces of veneer if a piece is missing; fill gaps with wood filler.

26. Make a paste of white PVA glue and sawdust or use commercial paste filler. You can buy fillers in colors—walnut,



Drawing 5-5. Orienting the Four Panels. When the four panels are placed in order, the Snow lines meet at each corner. The veneers for the Sky (V-1) and for the Snow (V-2) are the same in every panel; this allows the scene to flow around the box.

blond, ash and others. Use the dark fillers on dark woods, the light filler on light woods. You also can make your own filler, See 'Concepts, Fillers' for details on this.

27. Fill the voids in the picture from the back. Note that the other side still has tape on it. Push the fillers into the cracks and then scrape off the excess.
28. Hold the marquetry piece up to the light to make sure you've filled all the voids.
29. Immediately place each section between wax paper and place the stack on a flat surface. If the pieces are allowed to air dry, the moisture in the glue will cause the piece to warp and twist.
30. Place a board on the pile and put a weight on top. The sections will be dry in an hour.
31. After drying, remove each marquetry piece and sand the back with 220 grit sandpaper.

Glue the Marquetry to the Sides of the Box:

Glue the marquetry to one side of the box at a time. Make sure the Snow line on the marquetry lines up with the Snow mark on the box.

32. Put yellow PVA glue on Side-1 of the box. Use an old plastic credit card with little notches cut with scissors to spread and thin the glue.
33. Lay the Marquetry-1 piece flat on the bench and press the box down on it. Make sure the box is centered on the marquetry piece with about ⅛-in. protruding from all four sides.
34. Line up the Snow line registry marks on the Marquetry and on the box.
35. Clamp the marquetry piece onto the box side with a caul and a pad of paper towels next to the marquetry to even out the pressure.
36. Begin work on Marquetry-2.
37. After the glue has set (perhaps 1 to 1½ hours), use a sharp knife or a veneer saw and trim the sides. Note: the app tape is still on. Cut the cross grain first and then the long grain. Be careful to not tear any veneer.
38. Remove the tape from the side just glued on.

FRAMES. Besides having each corner add up to 90°, the opposite side and end pieces must be exactly the same length.

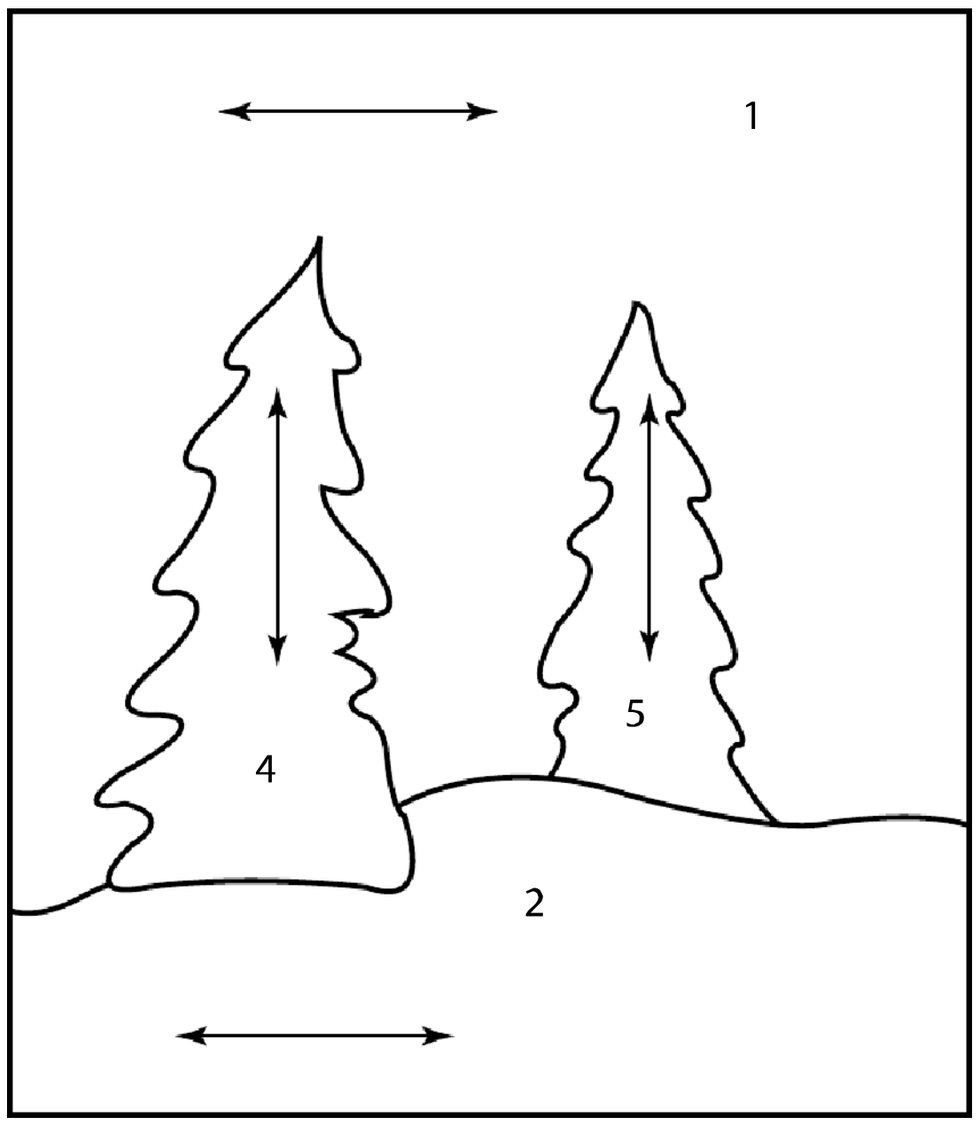
39. Prepare each of the other three sides (see **Drawing 5-3**, **Drawing 5-4**, and **Drawing 5-6**) and glue them on to the box one at a time in a similar manner. Be careful that the Snow line of one side is in line with the Snow line of the adjoining side.

Glue Veneer to the Top of the Box: Use the Sky-1 veneer to cover the top.

40. Affix the top veneer with yellow PVA glue and trim the edges.

Finish the Box: Seal and sand the sides.

41. Seal the marquetry with shellac before sanding. See 'Concepts, Finishes' for details on this.
42. Use a cabinet scraper and sand paper to get the veneer pieces flat and even. Try to work parallel with the grain.
43. Seal again with shellac and fill any voids with wood filler and scrape again. Now sand until each side is smooth; move from 120 grit to 220 and end with 320.
44. Finish with a wipe-on poly. Sand with 320 grit sandpaper between each coat. Add six wipe-on coats if the box will be around water—like in a bathroom.
45. Wipe on a paste wax and polish with a soft rag to give the piece a nice feel.



Drawing 5-6. Side 4. Trees on all four panels use the same veneer (V-3, V- 4 and V-5) and thus tie the scene together.

Registration marks. Use an 'X' on the transparent pattern and on the background to line them up, i. e. to *register* them.

Project 6

TISSUE BOX HOLDER—PUZZLE

This is a complicated project; my wife Linda, designed the convoluted pattern that makes this project a winner. The marquetry pieces are cut in a jigsaw puzzle design; sixteen pieces per side. There are four different veneers and four different colors. The veneers are positioned so a veneer on one side lines up with the same veneer on the adjoining side and wraps around the corner. The top row of veneer pieces on each side climb over the top and all merge at the elliptical opening. Follow the pattern and all will work out just fine. See **Photo 6-1**.

The Puzzle pattern in **Drawing 6-1** is drawn to fit wooden box sides 5½-in. wide x 5½-in. high. If your wooden box is a different size, then alter the Pattern accordingly.

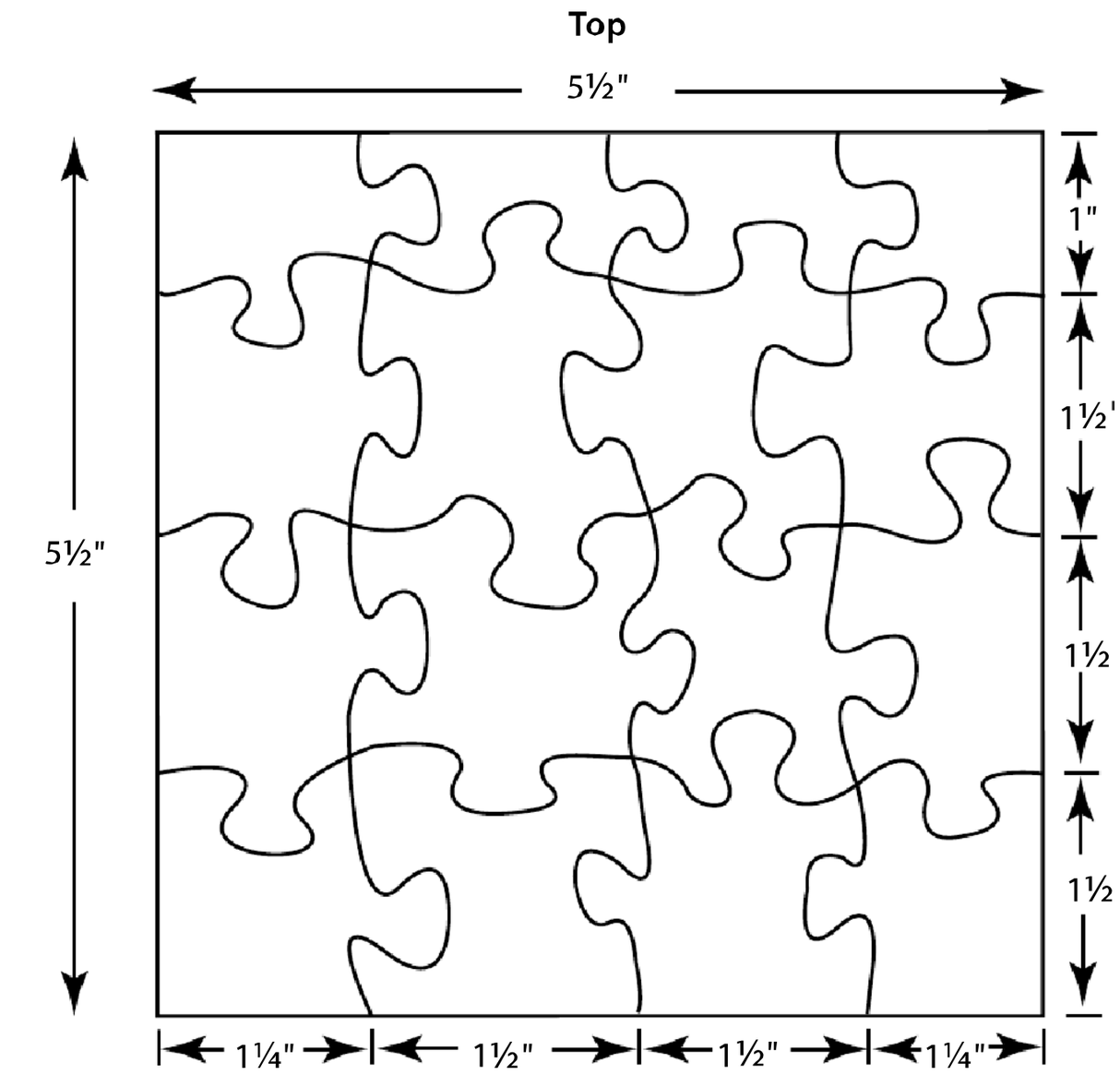
Photo 6-1

Extra Tools and Materials Needed: Plywood, ⅜-in. thick for the box.

Make the Wooden Tissue Box Holder: Use ⅜-in. plywood and make the wooden box using instructions from the Scenic Tissue Box Holder project but make it a 5½" cube.

Assemble the Veneer Pad for the Four Sides: Gather four veneers that will be distinctive when cut into the puzzle shapes. Make sure they are all the same thickness.

1. Put app tape on the four veneers and cut four 5¾-in. squares.
2. Make the four-veneer pad with taped sides down; put the strongest veneer on the bottom.
3. Cover the top veneer in the pack with app tape.
4. Use blue tape on all four edges to hold the veneers tightly in the pad.
5. Make a copy of the pattern **Drawing 6-1** to size and affix it to the top with spray adhesive.



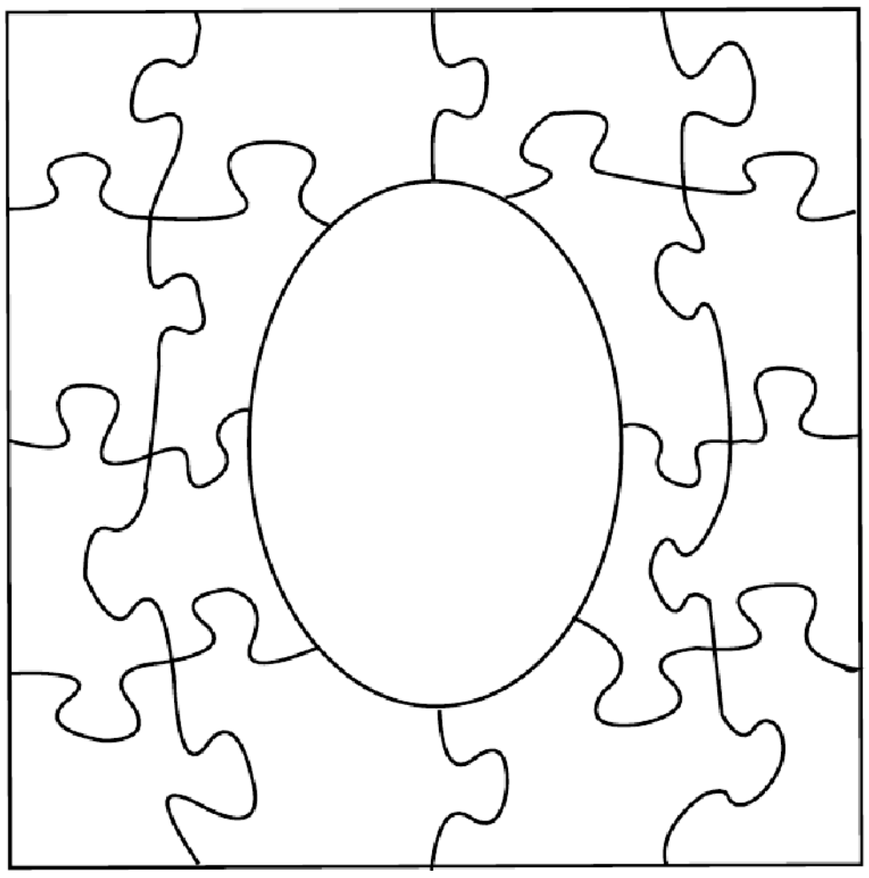
Drawing 6-1. Jig Saw Puzzle Marquetry. The pattern has 16 inter-locking pieces; four different veneers are scattered throughout. The edges (Columns 1 and 4) are 1¼-in. wide while the inner columns (2 and 3) are 1½-in. in width. The edge pieces of Side 1 are the same as the adjoining edge pieces of Side 2.

Cut the Puzzle Pieces Out: Start at any side and cut directly across the line. Because the pieces are inter-locked, it isn't necessary to tape the cut rows together.

6. Use a 2/0 blade and set the table at 90°.
7. Cut across the puzzle three times horizontally.
8. Push the rows together and put app tape along the joints.
9. Rotate puzzle piece 90° and cut across the pad three more times.
10. Set the pad on a flat surface and remove the blue tape.
11. Set out four pieces of paper marked 1, 2, 3 and 4.
12. Carefully separate each layer (different veneer) and place it on a different piece of paper.
13. Remove the pattern and app tape from the top layer.
14. We now have four colors, each cut into 16 pieces, and each on a numbered piece of paper.

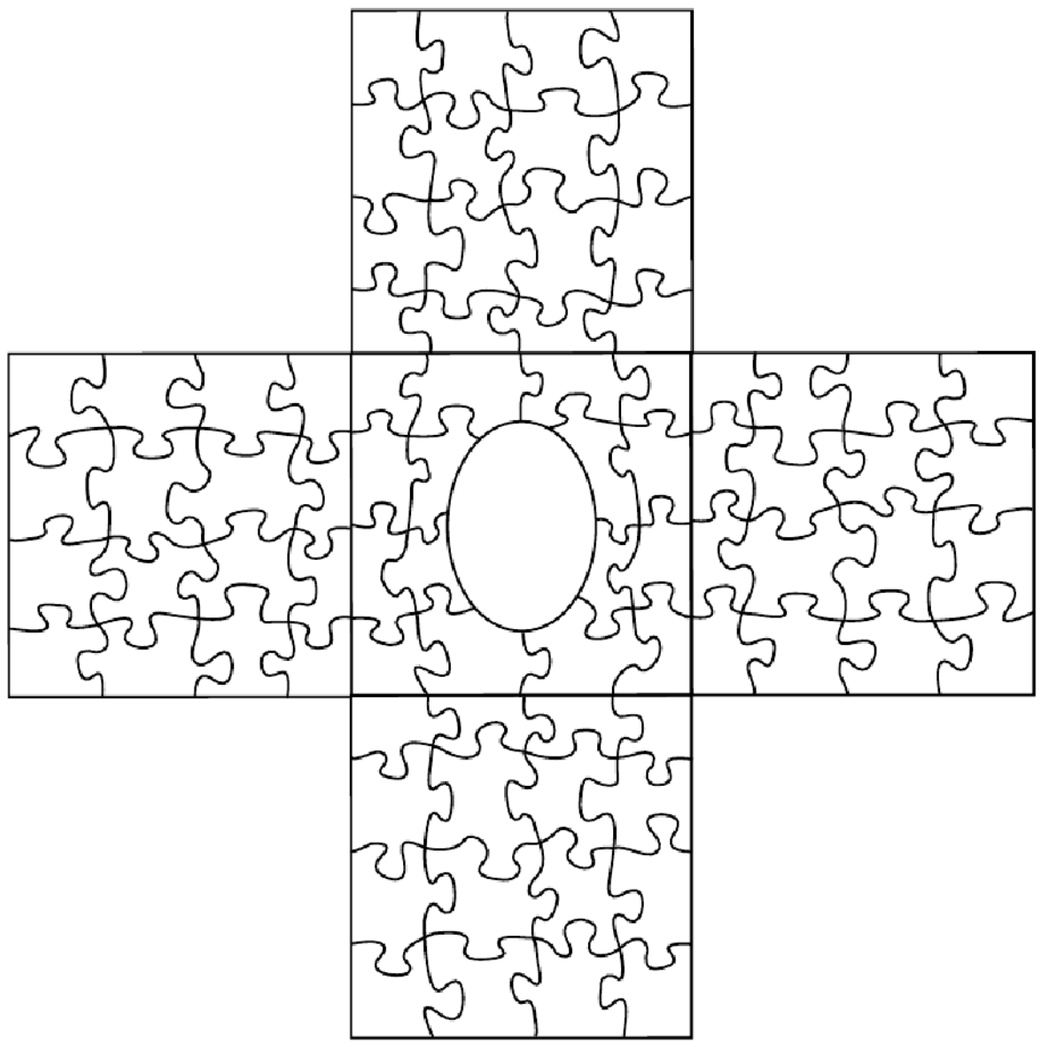
Assemble the Pieces for the Four Sides: Each of the four marquetry pieces for the four sides will have four puzzle pieces of each veneer; sixteen pieces in all. Use the schematic in **Drawing 6-4** to put each side together.

15. Side 1 will have veneers 1, 2, 3 and 4 across the top row.
16. The second row of Side 1 will have veneers 4, 1, 2 and 3.
17. Row three of Side 1 will have veneers 2, 3, 4 and 1.
18. The bottom row of Side 1 will have veneers 3, 4, 1 and 2.
19. Inter-lock all of the 16 pieces and check for missing parts.
20. Put app tape over the top of Side 1.
21. Turn the piece over and remove app tape from the individual pieces.
22. As above, assemble the pieces for Side 2, Side 3 and Side 4.



Box top

Drawing 6-2. Top Marquetry. The pieces are cut so the four edges of the top are the same size and the same veneer as the adjoining sides.



Drawing 6-3. The Sides and the Top Layout. The top row of veneer pieces of each side exactly matches the adjoining row of the top. The adjoining sides also match.

Glue on the Sides: Make registration marks on the corners of the box to help line up the sides as they are glued on. The box sides are 5½-in. and the marquetry pads are 5¾-in.

23. Measure down from the top and make registration marks that go around all four corners at 1-in., 1½-in., 1½-in. and 1½-in. as in **Drawing 6-5**.
24. Also make registration marks at the tops of each side at 1¼-in., 1½-in., 1½-in. and 1¼-in. as in **Drawing 6-5**.
25. Write the numbers 1-4 on the sides of the wooden box.
26. Put yellow PVA glue on Side 1 of the box.
27. Place Side 1 marquetry on a flat surface.
28. Place Side 1 of the box on the marquetry.
29. Place the box and the marquetry in a screw press with light padding and waxed paper beneath. See 'Concepts, Clamping, Screw Press' for details on this.
30. Line up the registration marks of the box with the joints in the marquetry.
31. Slowly put pressure on the box and make sure the joints continue to line up with the marks.
32. In 30 minutes, remove the box and take off the app tape.
33. Scrape off glue squeeze out.
34. Put the box back under pressure for one hour.
35. Remove the box from the press and use a cutting mat and a sharp knife to trim the four edges.
36. Affix marquetry side 2 to Side 2 of the box.
37. Use the same procedures and put the marquetries on side 3 and side 4.

Add the Top Marquetry: Make a pad of the same four veneers used to make the sides and assemble the top. Each edge of the top marquetry should have the same veneer sequence as the adjoining side.

38. Make a pad of the same four veneers; 5½-in. square.

Side 1

1	2	3	4
4	1	2	3
2	3	4	1
3	4	1	2

Side 2

2	3	4	1
1	2	3	4
3	4	1	2
4	1	2	3

Side 3

3	4	1	2
2	3	4	1
4	1	2	3
1	2	3	4

Side 4

4	1	2	3
3	4	1	2
1	2	3	4
2	3	4	1

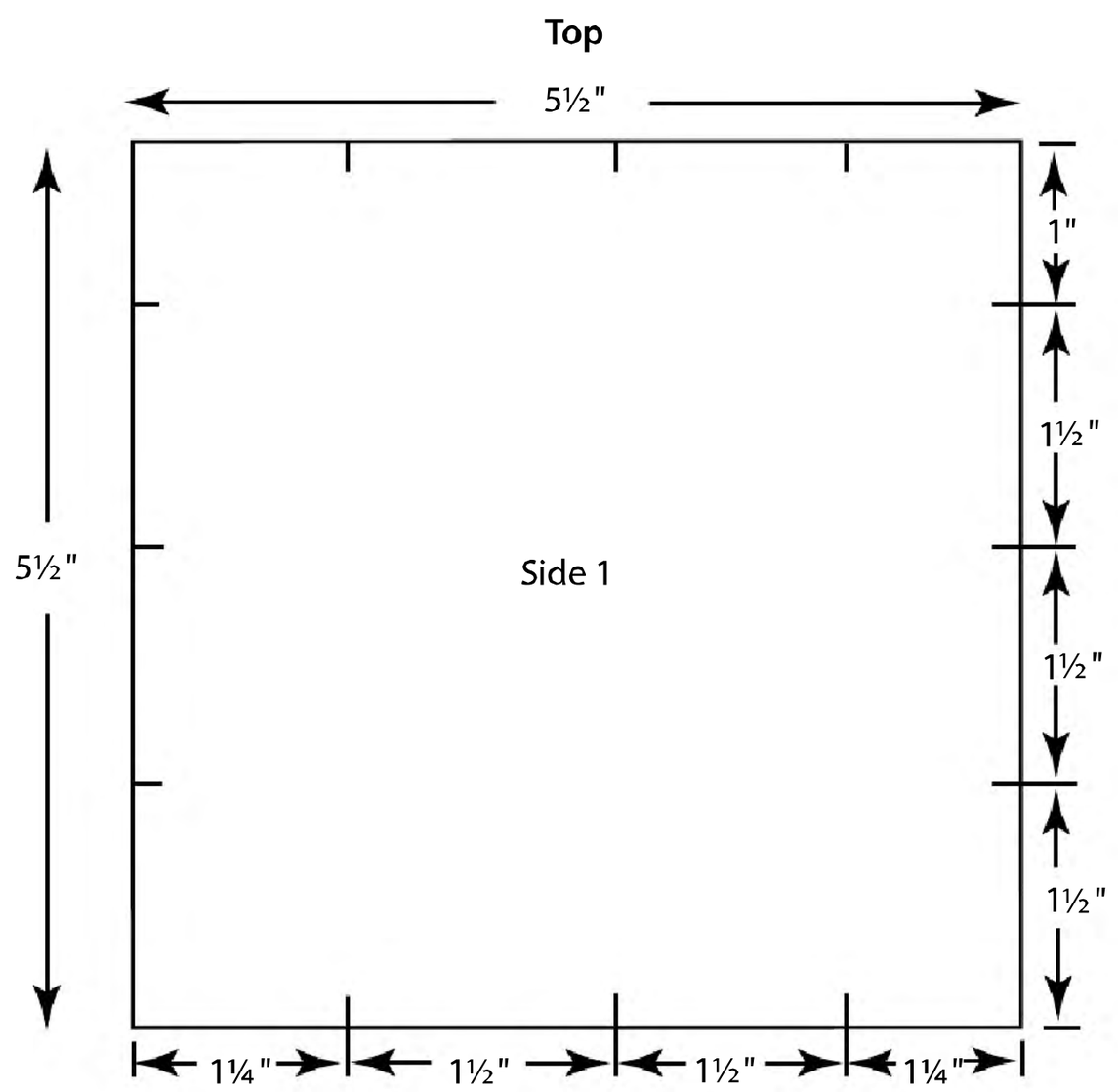
Drawing 6-4. The Veneer Matrix. Use this sequence of veneer pieces for the four sides. After the side marquetry pieces have been glued on, make the top marquetry using this top sequence.

Top

Side 3

2	1	4	3
3	4	1	2
4	3	2	1
1	2	3	4

Side 2 Side 4 Side 1

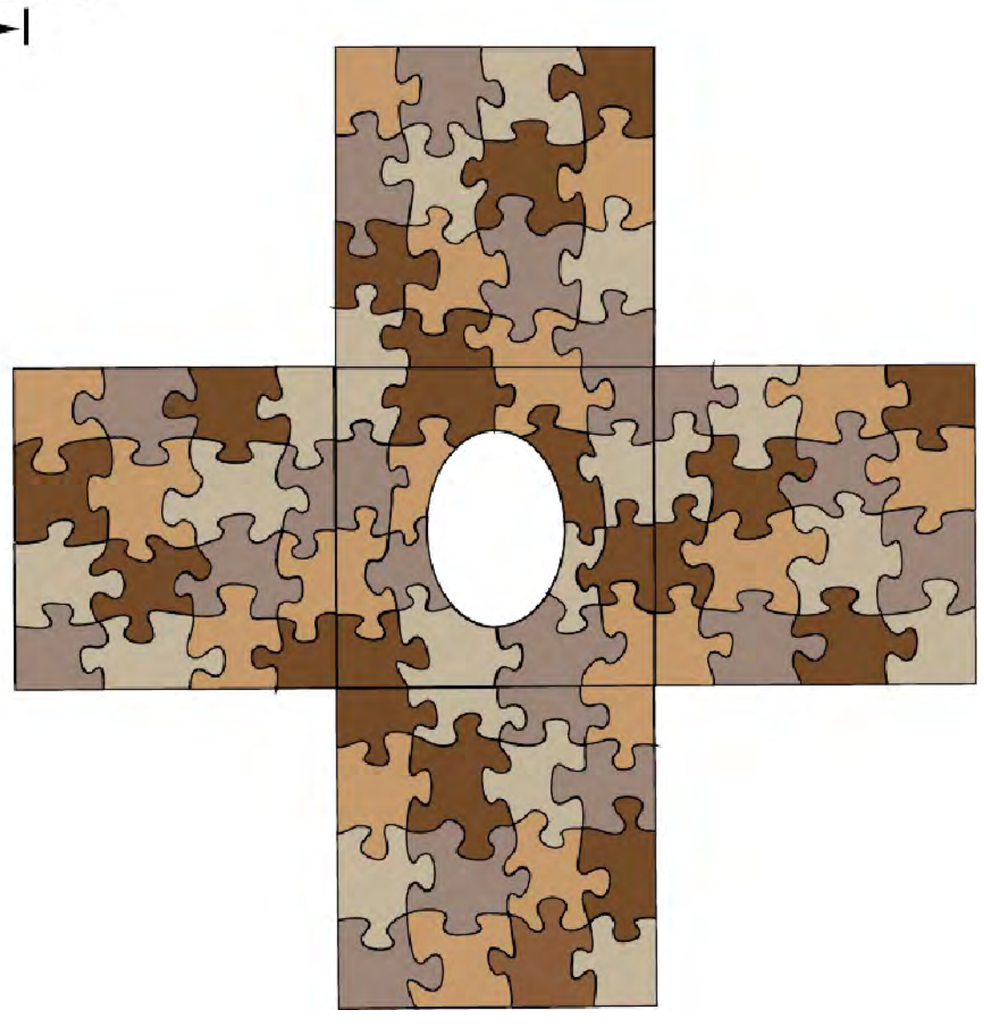


Box side

(left) **Drawing 6-5. Box Side and Registration Marks.** Make pencil marks on all four sides and the top of the box. Line up the puzzle joints with these marks as the marquetry is glued to a side.

39. Use the pattern in **Drawing 6-2** and cut out the Top marquetry.
40. Assemble the Top using the veneer sequence on each box side as a guide. Also see **Drawing 6-3** and **Drawing 6-4**.
41. Affix the top marquetry to the top with yellow PVA glue and the screw press.
42. Trim the four edges of the top.
43. Hold the box tight against a cutting mat and use a sharp knife to cut out the ellipse.

Finish the Box: Seal, scrape and sand the box.



Drawing 6-6. Sides and Top Layout in Color.

Project 7

PAPER CLIP BOX

This little swivel-top box can be set on a desk at work to hold paper clips, be used in the bedroom to keep rings or kept in the office to hold a roll of stamps. Start with a block of wood about three inches square. Cut a slice off the bottom, drill a large hole in the block, glue the bottom back on, attach a rotating top and add some marquetry. The marquetry can be made using the double bevel or the pad method. This box is easy to complete over a weekend or a few nights in your shop. **Drawing 7-1** shows the basic box.

Photo 7-1

Extra Tools and Materials Needed: Wood for the box, drill press, Forstner drill bit (2⅛-in. diameter), 1-in. long flat-head wood screw and a countersink bit.

Make the Body: Use a dark wood for the body and a light wood for the top; the contrast looks great. The box in **Photo 7-1** is made of Koa and English Sycamore (very much like our maple).

1. Start with a block of wood 3-in. wide x 3-in. long x 1¾-in. high.
2. Use a band-saw and slice off a ¼-in. piece.
3. Clamp the Body onto a drill press table and drill a 2⅛-in. hole completely through using a Forstner bit. Note: This is a little block of wood and a big drill; clamping the block before drilling makes good sense. This hole can also be made by drilling a small pilot hole and then using a saber saw or a scroll saw to complete the cut.
4. Sand the inside to 320 grit and apply a wipe-on polyurethane finish to the cavity.

Put on the Bottom: The bottom is attached with a contrasting piece in between.

5. Cut a thin contrasting piece 3-in. x 3-in. x ⅛-in.
6. Glue the contrasting piece and the bottom onto the body. See **Drawing 7-2**.

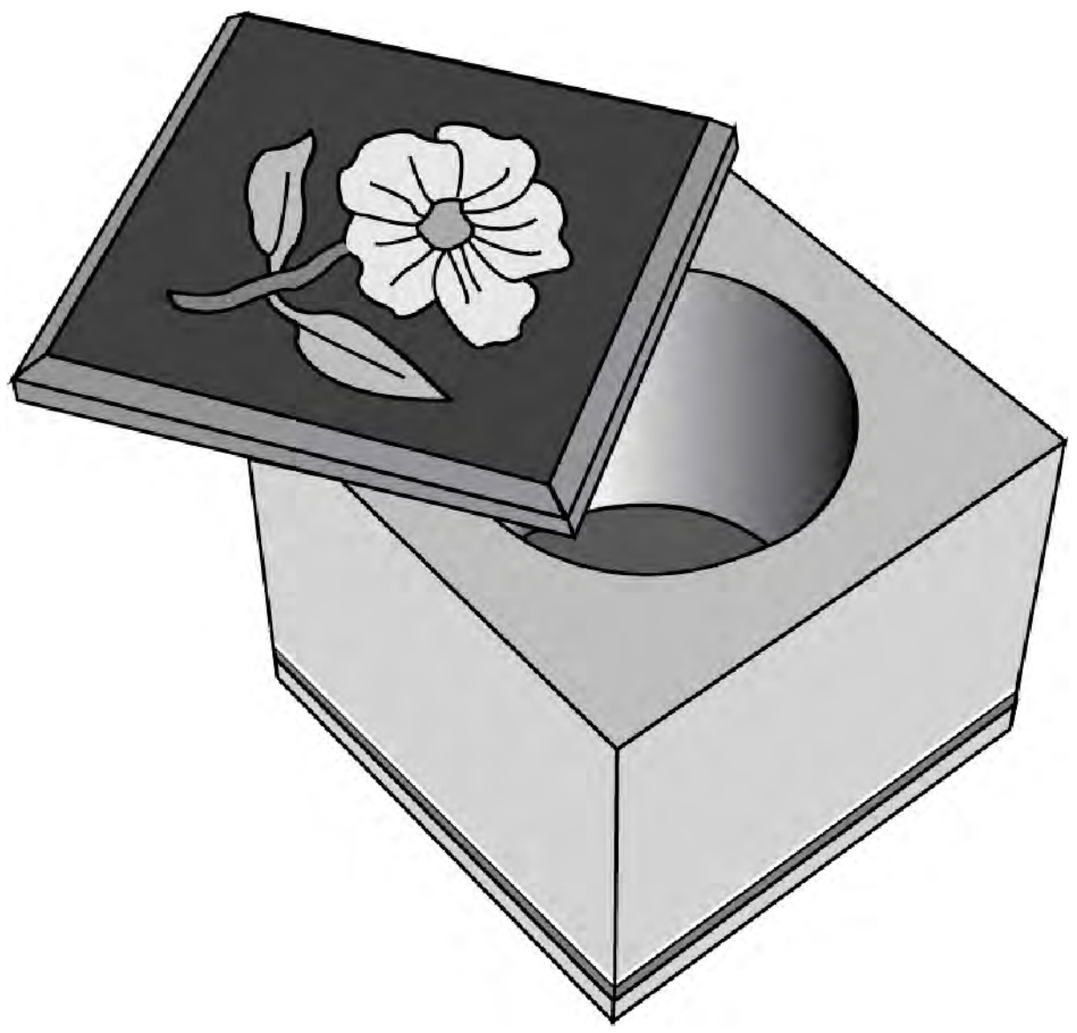
Check off the veneers. When you're putting different pieces into a stack, check them off on the pattern as you put them in.

Add the Swivel Sub-Top: The top is comprised of a sub-top (where the screw attaches the top to the box) and a top-top (where the marquetry is). Use contrasting colors for both pieces.

7. Cut the sub-top to size; 3-in. x 3-in. x ⅜-in.
8. Clamp this piece to the body and drill a 5⁄16-in. diameter hole (for the wood screw) through the lid and ¾-in. into the body. See **Drawing 7-3** 'Pivot Point'. The swivel hole in the sub-top should be a press fit for the shank of the screw.
9. On the drill press, use a countersink bit to relieve the swivel hole. See **Drawing 7-2**.
10. Put wipe-on poly on the underside of the lid.
11. Put some wax into the counter-sunk hole so the top swivels smoothly.
12. Put Gorilla glue or CA glue into the screw hole in the base of the box and use a 1-in. flat-head, wood screw to fasten the lid to the body. Tighten the screw just enough to hold the lid tight to the body and so the lid swivels easily.

Make the Marquetry: The marquetry design is fairly simple and relatively small, 3-in. x 3-in. The pattern **Drawing 7-4** shows a flower with five petals, a stem and two leaves.

13. Choose a background veneer that contrasts with the box top wood e.g. bubinga burl as in **Photo 7-1**.
14. The petals can be cut double bevel or at 90°. In the photo, these were cut at 90° one petal at a time so grain direction could be maintained.
15. After all the petals are cut, sand-shade the appropriate sections.
16. Cut the leaves and the stem.



Drawing 7-1. Paper Clip Box. Different colored woods for the top, the body and the bottom make this small box quite colorful.

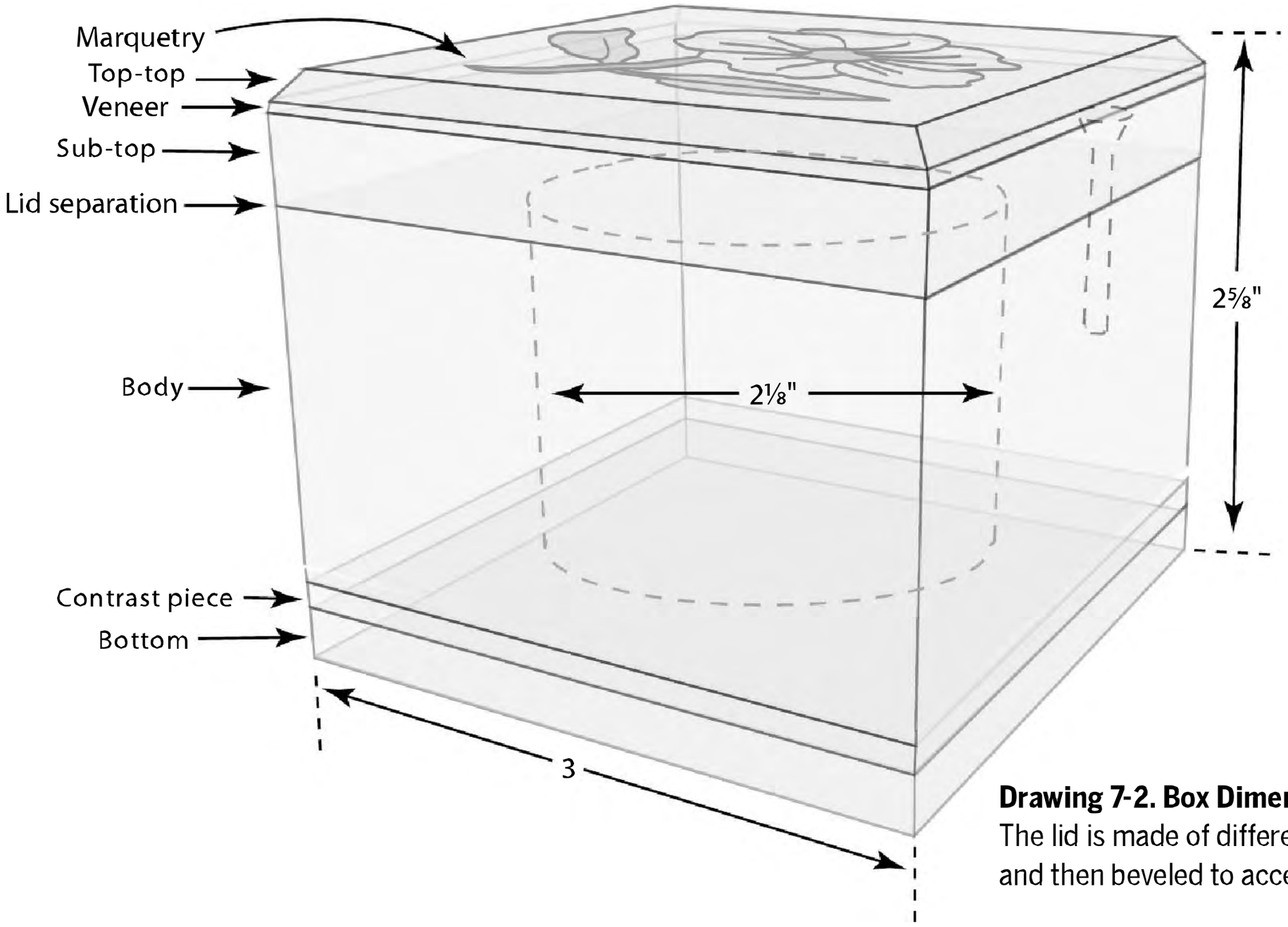
17. Set the marquetry aside until the top-top is made.

Add the Top-Top: The lid is comprised of the sub-top (where the screw fits) and a top-top where the marquetry sets. In between these two tops there is a decorative veneer.

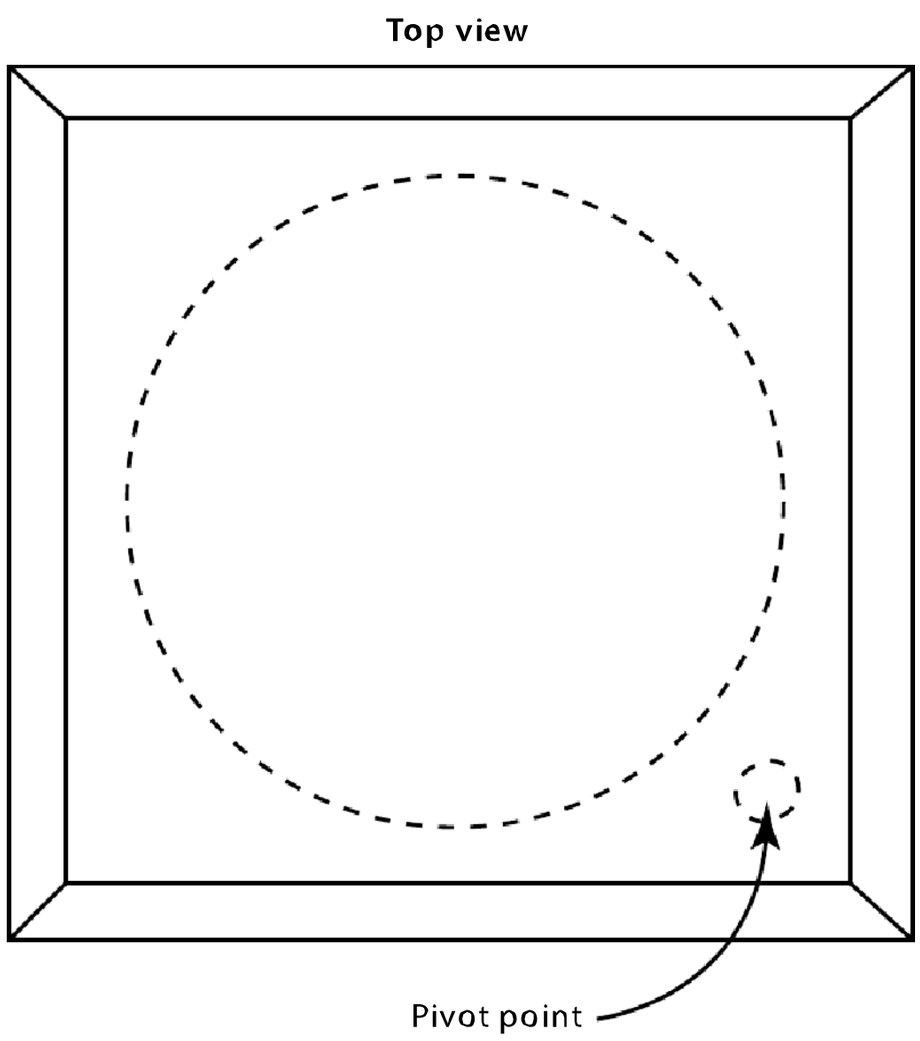
18. Cut a 3-in. x 3-in. x ¼-in. piece for the top-top.
19. Glue the marquetry to one side and glue a piece of contrasting veneer to the other side.
20. Glue this top-top to the sub-top. See **Drawing 7-2**.

Finish the Box: This box might get a lot of use and handling. Use polyurethane as a finish.

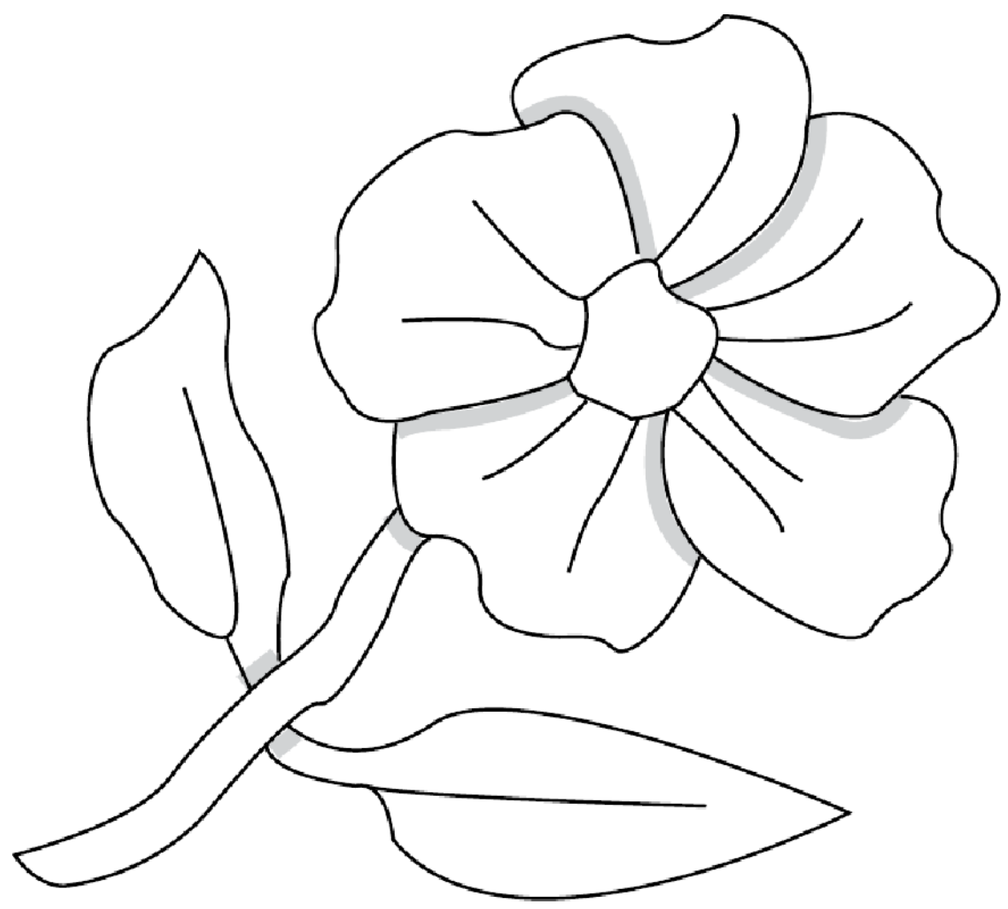
21. Bevel the top with a shaper using a 45° bit or chamfer the top by hand.
22. Finish with wipe-on poly.
23. Cut a piece of velvet to line the box. See 'Concepts, Box Linings' for details on this.



Drawing 7-2. Box Dimensions. The lid is made of different layers and then beveled to accent them.



Drawing 7-3. Basic Box. The lid swivels around an embedded screw and the lid is chamfered to show the colored stripe and the edge of the marquetry.



Drawing 7-4. Flower Pattern. Cut the petals one-at-a time so the grain direction is appropriate. Sand-shade parts of the petals and leaves.

Project 8

FREE FORM BOX

This is a fun project—and it's quick and easy. With all the woods possible for the box, all the different shapes and all the veneers possible for the stripes and for the marquetry, each box will be different.

Cut the top and bottom pieces off of a block of wood and drill a hole in the body for a saw blade. Cut a cavity in the box and glue the bottom back on. Put marquetry on the top and attach the lid with four strong magnets. See **Photo 8-1**.

Photo 8-1

Extra Tools and Materials Needed: Wood for the box, band saw, rare-earth magnets, 3/16-in. dowels and an oscillating spindle sander.

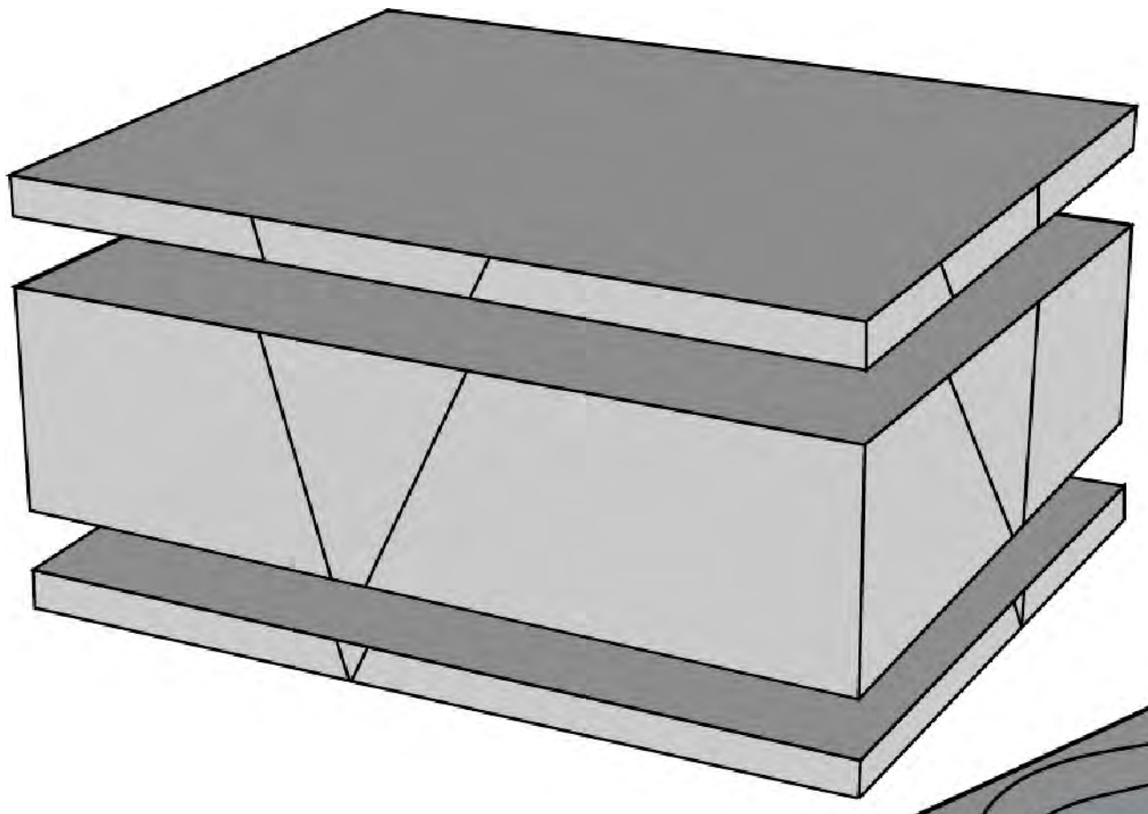
Cut the Block into Three Pieces: Use a band saw to cut off the bottom and top sections. See **Drawing 8-1**.

1. Start with a piece of wood 5½-in. long x 4½-in. wide x 2-in. thick. These dimensions are not critical; just get a block big enough to make your box.
2. Mark one side and one end with a 'V', open end pointing up.
3. Mark the lid 'Top' and mark the bottom 'Bottom'.
4. Cut off the Bottom and Top at ¼-in. thickness with a band saw.
5. Sand the cut edges flat on a belt sander. We now have a Top, a Body and a Bottom.

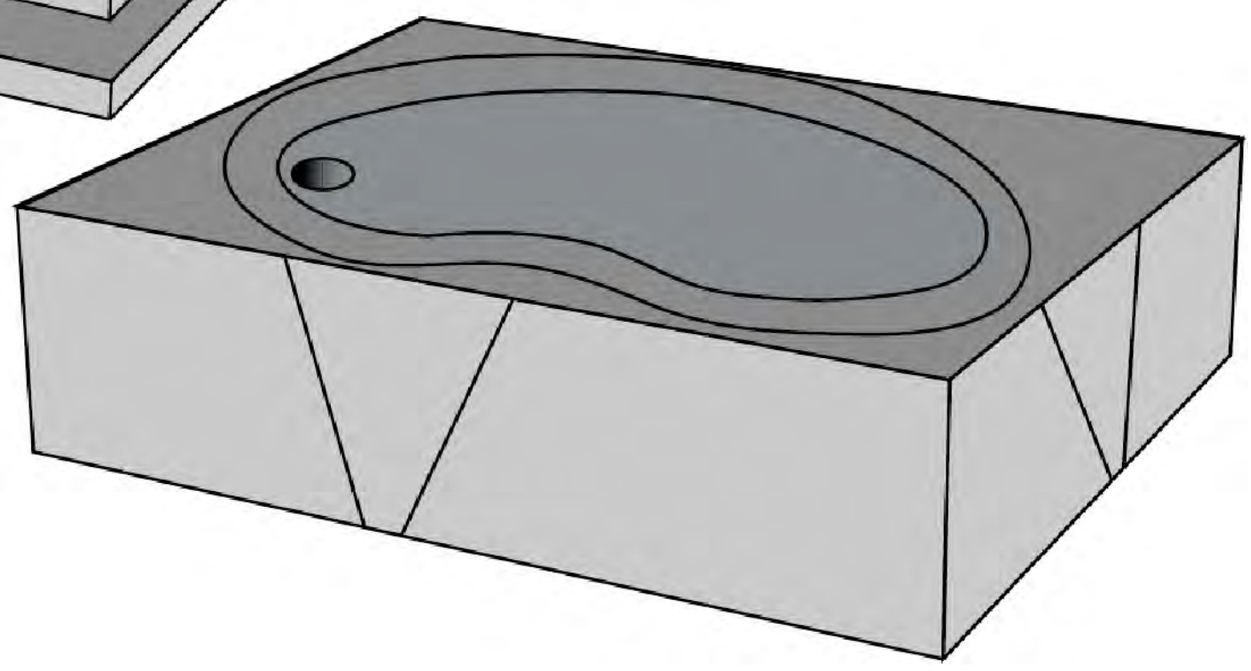
Draw the Interior and Exterior Walls: This is the free-form part. Draw an ellipse, a bean-shape or any free-form outline; they all will look good. See **Drawing 8-2**.

6. Draw the outer shape of the box on the Top of the Body section.
7. Draw the inner shape with approximately ⅜-in. walls.

Thin strips. Store 12" long black, white and brown veneer strips of different widths. Use as test strips when you are looking at stringers and borders.



Drawing 8-1. Top, Body and Bottom. Use a band-saw to cut ¼-in. pieces off the top and the bottom of a 2-in. thick block. Make 'V' registration marks on the end and side.



Drawing 8-2. Draw the Shape. Drill a ½-in. hole. The interior will be cut out with a scroll saw or a saber saw.

Hollow Out the Interior: You can use a coarse blade and a scroll saw, a hand-held coping saw or a saber saw for this cut. Do not cut the outer box shape yet.

8. Drill a ½-in. hole in one end of the body next to the inner box line. See **Drawing 8-2.**
9. Cut out the interior.
10. Sand the inside to 320-grit.
11. Apply a wipe-on poly to the inside; be careful not to get it on areas to be glued.

Make the magnet holes: Drill two holes in the body for the magnets. These holes will become four (two holes in the lid and two in the body) when the top is cut off. This will give us perfect alignment.

12. Drill two 3/16-in. holes in the top of the Body, ⅜-in. deep at each end for the two magnets. See **Drawing 8-3.**

Prepare the Bottom: Add two veneers to the bottom of the box. **Drawing 8-4.**

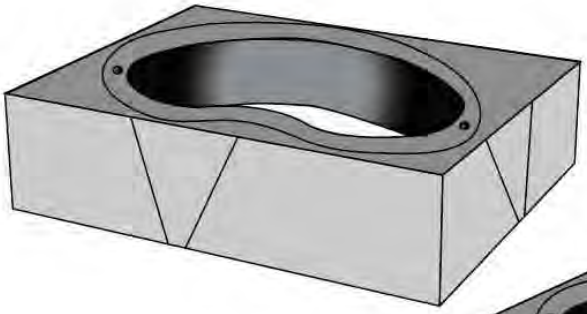
13. Glue two veneers together. Use a nice veneer for the bottom of the box cavity and a thicker veneer for the stripe.
14. Clamp for at least 30 minutes.
15. Glue this assembly to the bottom of the body.

Prepare the Top: Add two veneers to the top.

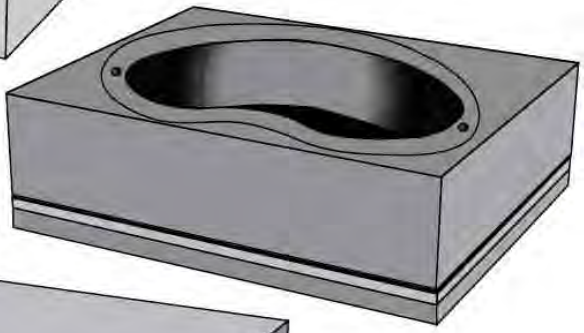
16. Glue two veneers to the Bottom of the Top. Use a nice veneer for the underside of the lid and a thicker veneer for the stripe.
17. Clamp for at least 30 minutes.
18. Glue Top to the Body. Note: Keep excess glue out of the magnet holes. See **Drawing 8-5.**

Finish the Marquetry: Work on the marquetry while the glue dries.

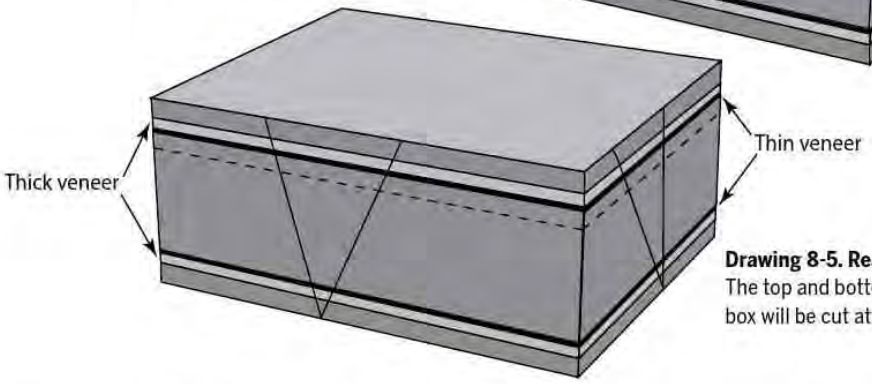
19. Make sure your marquetry boundaries are at least ⅜-in. inside the top outer border for later bevel. See **Photo 8-1.**



Drawing 8-3. The Body. The box has been hollowed and holes drilled for the magnets.



Drawing 8-4. The Box with Bottom. The bottom has been glued back on with two pieces of thin wood between.



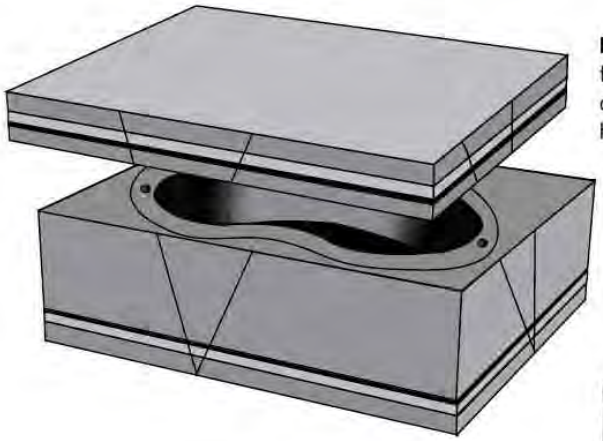
Drawing 8-5. Ready to Be Cut. The top and bottom are on; the box will be cut at the cut line.

Open Up the Box: By following these steps you are able to see the inside of the cavity as you draw the outside lines of the box. This method also allows you to line up the magnets.

20. Cut Top off ⅛-in. below the veneer stripe (thus exposing the magnet holes in the top and in the body). Sand the cut edges smooth. See **Drawing 8-6**.
21. Draw the outside shape of the box on the Body following the contours of the inside shape.
22. Leave extra wall thickness at each end of the box for the magnets. See 'Concepts, Marker Equidistance' for details on this.
23. Cut the outside of the body to shape with a band saw, see **Drawing 8-7**.
24. Temporarily attach the Top to the Body with 3⁄16-in. dowels (¼-in. long).
25. Cut the top to shape using the body as a pattern, see **Drawing 8-8**.
26. Sand outside of the body and top.

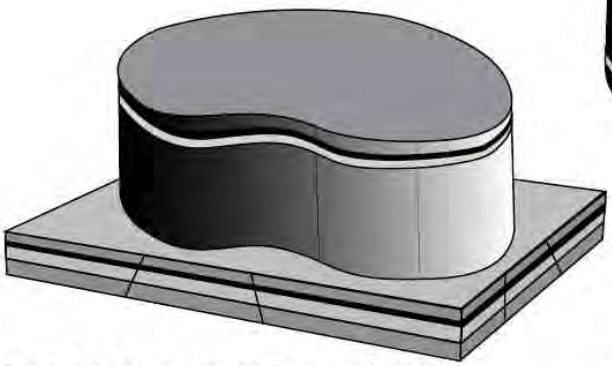
Finish the Box: Glue the marquetry to the top and chamfer the edges. On a dark box, use light veneer, dark veneer and marquetry with a light background. On a light colored box use dark veneer, light veneer and a marquetry with a dark background.

27. Glue three veneers on top of the Top; the top layer is the marquetry.
28. Seal the marquetry with shellac, sand and use a wipe-on poly.



Drawing 8-6. After the Cut. Mark the outside shape by following the contours of the inner shape. Magnet holes are shown.

Drawing 8-7. The Box. Ready for the lid.

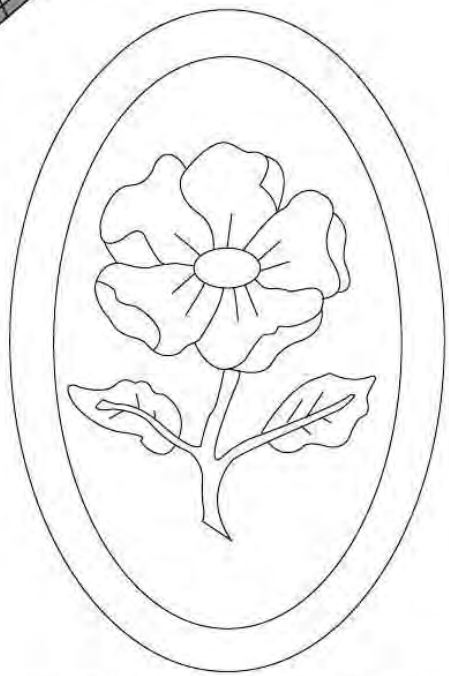


Drawing 8-8. The Box Upside Down on the Lid. Attach the lid to the body with 3/16-in. diameter dowels (1/4-in. long) and use the body as a pattern to cut the lid.

29. Chamfer the Top edge to 45°; use a file or a shaper for this task.
30. Fine-sand and finish the chamfered edge.

Insert the Magnets: If the magnets are put in correctly, the lid will only fit one way. See 'Concepts, Magnet Placement' for details on this.

31. Remove the temporary dowels.
32. Glue the magnets into the holes with CA glue.



Drawing 8-9. The Pattern. Use double bevel or pad to cut the marquetry. Sand shade to show depth.

Project 9

SHAKER BOX

Photo 9-1

These little bent-wood boxes have been made here for over 200 years. The United Society of Believers emigrated from England to upper New York in 1774 and soon began farming by day and making items for their own use and for sale in the evenings. The sects' rousing dance worship gave them the name 'Shakers'. Their oval boxes are recognizable artifacts of Shaker life and work. They were used to hold food stuffs in the pantry, buttons for the seamstress and tacks in the shop. Some boxes had lids and others had handles and were used as baskets. Graceful, well made, and of widespread utility, they represent virtues of the Shaker order itself; 'Plain in style, durable and functional'.

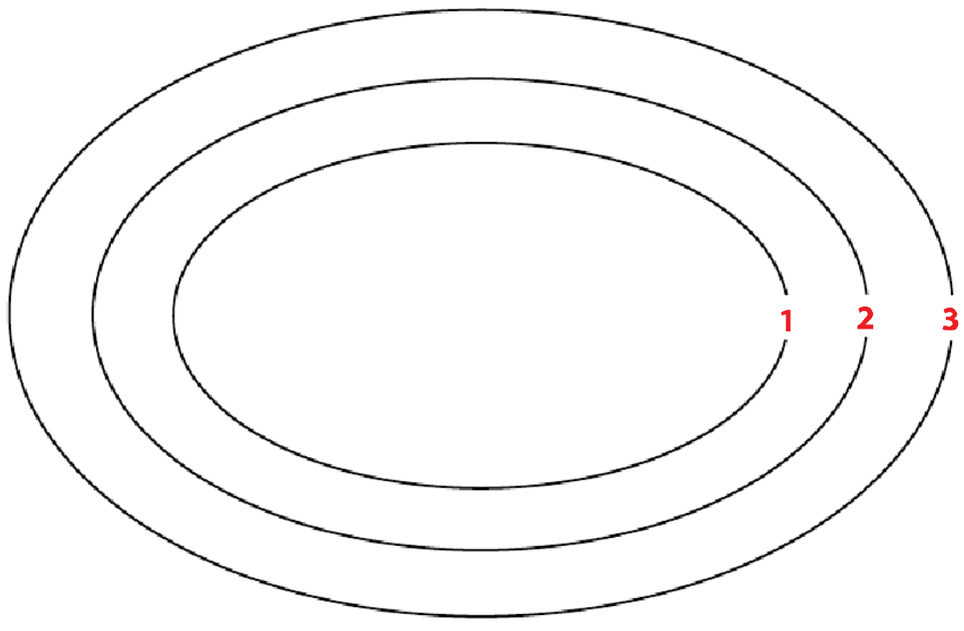
The original Shaker boxes used Maple for the sides and pine for the tops and bottoms. Other woods such as apple, ash, birch, cherry and walnut also bend well. For this project we will use cherry which is easy to come-by, not especially expensive, long grained and bends easily without breaking. Cherry also takes a finish well. The Top will be plywood with veneer ply on both sides. Shaker boxes are numbered from 000 to 20; sizes range from 2-in. long to 38-in. long. **Drawing 9-1** shows the size and shape of boxes 1, 2 and 3. In this project we will make a #2 box; 5¾-in. long and put marquetry on the top.

Yes, I do remember the 'plain in style' admonition, but this is a marquetry book and I think old Mother Ann Lee, one of the Shaker founders, who preached 'purity, simplicity and utility' would approve. See **Photo 9-1**.

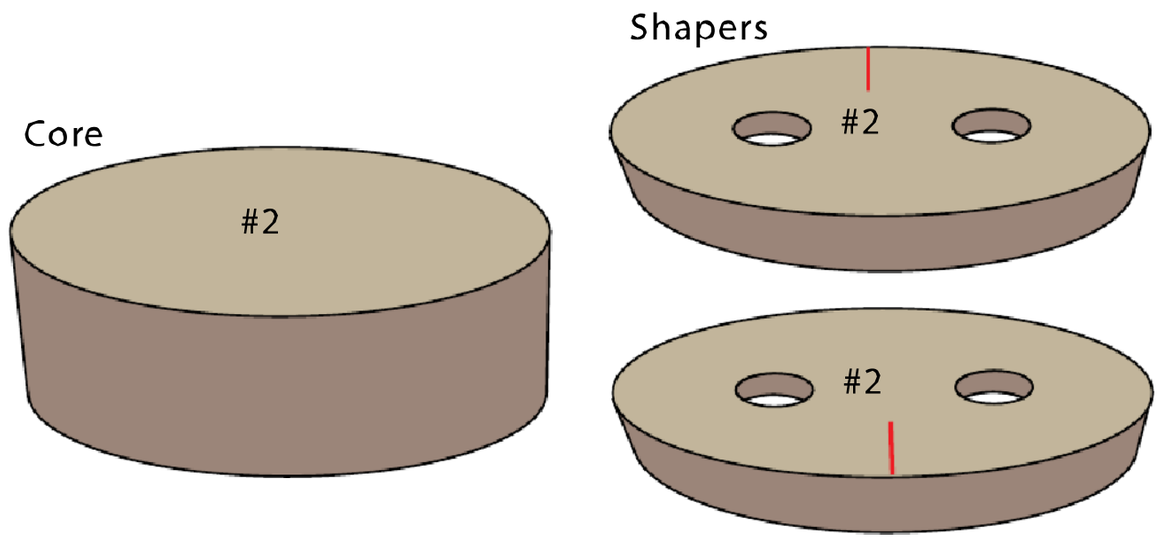
Extra Tools and Materials Needed: Thin cherry stock for the bands, plywood for the top and bottom, 7/32-in. long copper tacks, round tooth picks, and a water tank with a heat source.

Make the Core and the Shapers: Each box requires a wooden elliptical-shaped core to bend the hot box band around and two shapers to place into the top and bottom to keep the band in the oval profile as it dries.

1. Make the #2 core blank as shown in **Drawing 9-2** using a 2-in. thick block of pine or glued up plywood pieces.
2. Cut the ellipse to 5¾-in long x 3½-in. wide on a band saw. See 'Concepts, Ellipses' for details on this.
3. Use a disc or belt sander and smooth the sides.
4. Make two shapers as in **Drawing 9-2** using ¾-in. material; they are both the same size as the # 2 core.
5. The two shapers are beveled at 10° on a disc sander or upright belt sander so they will slip into the top and bottom of the box band.
6. Drill two 1-in. holes into each shaper for ventilation and as finger holes.



Drawing 9-1. Three Shaker Boxes. The various boxes are made successively larger so one will fit inside the next. Boxes #1 (2 9/16-in. wide x 4 9/16-in. long), #2 (3½-in. wide x 5 ¾-in. long) and #3 (4½-in. wide x 7-in. long) are shown.



Drawing 9-2. The Core and Shapers. The core for a #2 box is made from 2-in. material. The shapers are beveled at 10°. The center marks are to line up the shaper with rows of tacks.

Prepare the Band Blanks: Select a piece of cherry for the two box bands. Check the wood for clear grain and absence of knots and irregularities.

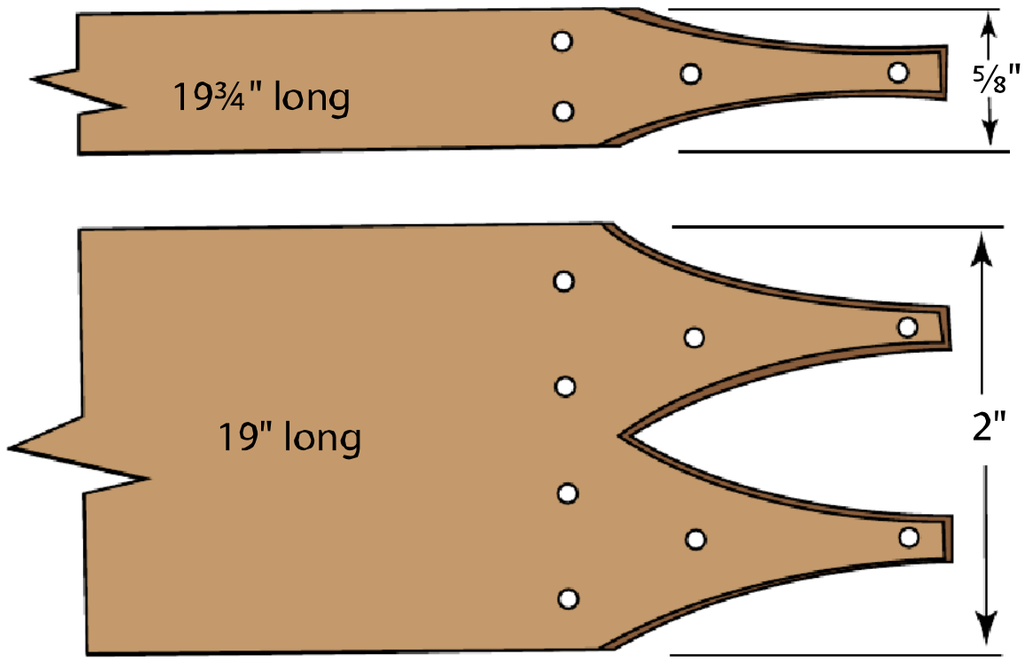
Cut the blank to 2¾-in. wide x 20-in. long.

7. Resaw the blank on a table saw or a band saw to a thickness of about 0.07-in. Note: most of the veneer sold in the U. S. is 1/28-in. (0.036-in.) thick. The box bands are about twice the thickness of a piece of veneer.
8. Cut the box band from the cherry blank; 2-in. wide x 19-in. long.
9. Also cut the top band from the blank to size; ⅝-in. wide x 19¾-in. long.
10. Feather one end of both bands, starting the taper 1½-in. from the end of the blank.

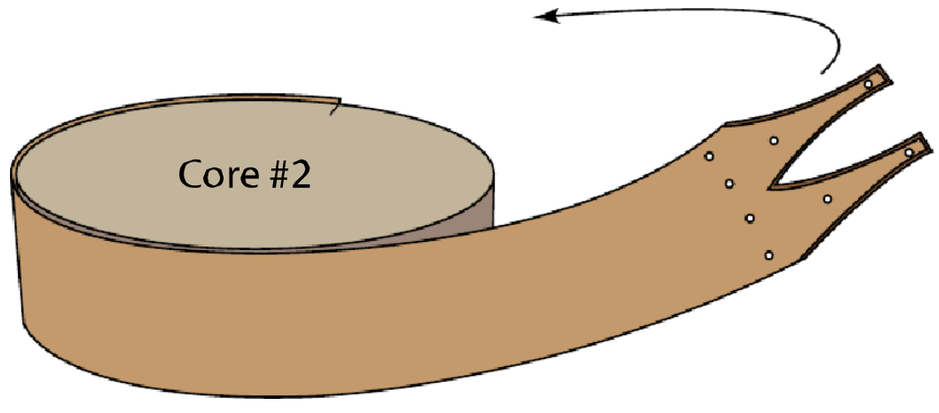
Cut the Finger Patterns: See Drawing 9-3 for the patterns.

11. Transfer the finger patterns to the body band and to the top band at the un-tapered ends.
12. Cut the finger patterns for both pieces with a scroll saw.
13. Drill 3/16-in. tack holes.
14. Soak the fingers in hot water for a few minutes and then use a sharp knife to bevel the sides of the fingers.

Heat the Body Bands and Bend them: The wood veneers become pliable in hot water. When you take them out of the hot tank, wear



Drawing 9-3. Fingers for #2 Top Band and the #2 Body Band. Cut the fingers and bevel with a knife.



Drawing 9-4. Bend the Body Band. Start at a mark on the flat side; make sure the beveled side of the fingers faces out.

gloves and have everything ready—you have just a minute or two here.

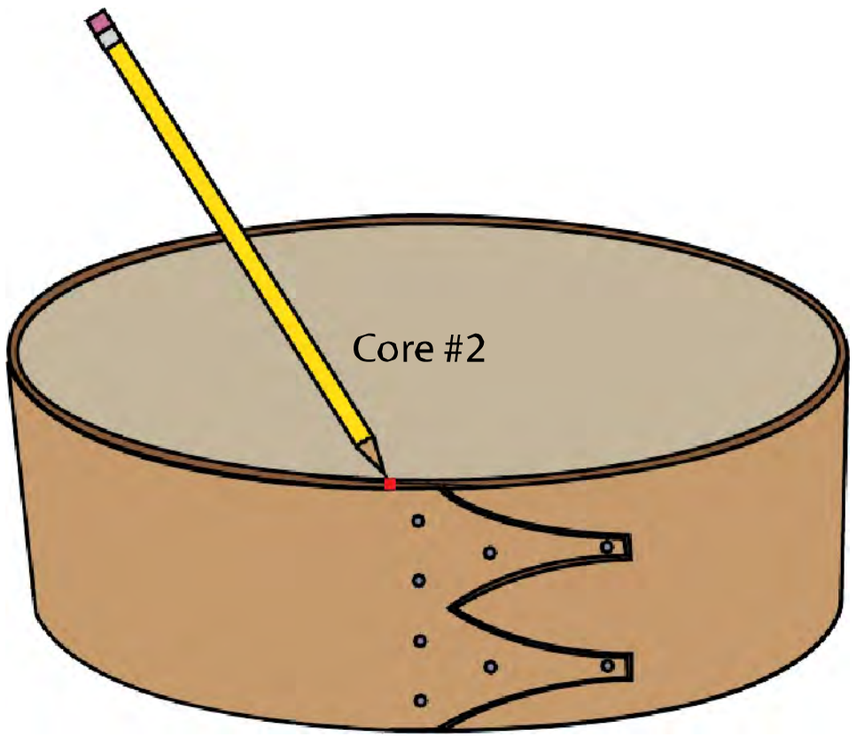
15. Soak the bands in hot (near boiling) water for 15-20 minutes.
16. Use gloves and pull the hot bands from the water with tongs.
17. Be sure the beveled sides of the fingers are facing out.
18. Quickly place the feathered end of the band on one side of the #2 core and line the end up with the mark on the core piece. See **Drawing 9-4**.
19. Bend the hot piece around the core ending with the fingers.
20. Hold the band around the core until it cools—a minute or so. Note: Hold the fingers securely or the band might split between the fingers.
21. Use a pencil and make a mark across both pieces at the edge of the lap. See **Drawing 9-5**.

Tack the Box Together: Take the body band from around the core and tack the two ends together. See **Drawing 9-6**.

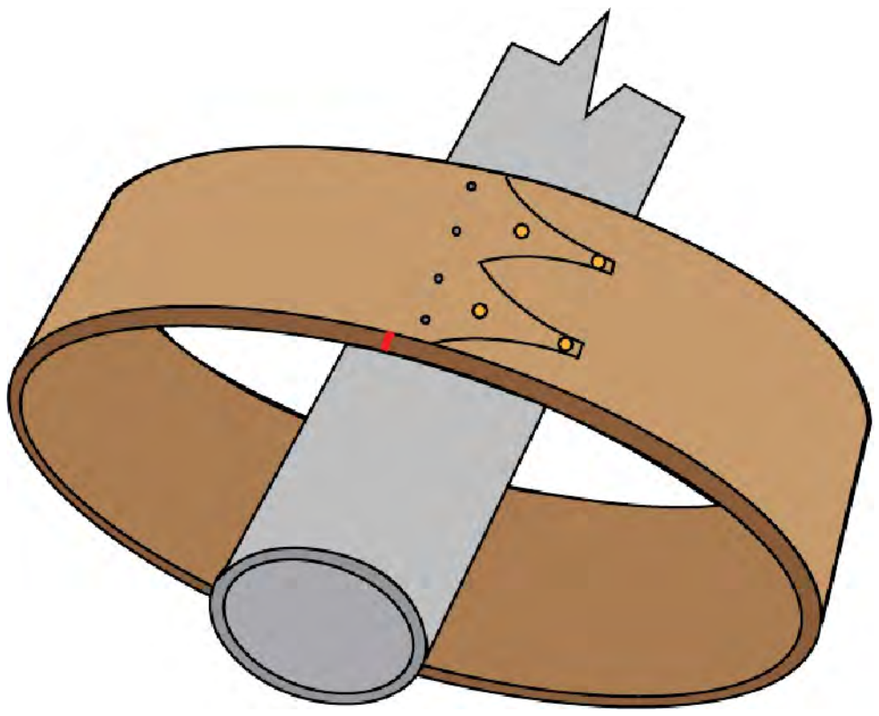
22. Remove the body band from the core.
23. Reposition the band so the overlap marks line up.
24. Place the oval on a pipe or anvil. Note: See 'Concepts, Pipe Anvil' for details on how to make a pipe anvil. **Drawing 9-6**
25. Push a copper tack into the end hole of one of the fingers.
26. Hammer it until it clinches.
27. Hammer a tack into the end of the other finger.
28. Put tacks into the remaining holes and clinch them.
29. Check the inside and pound any tacks that need clinching.

Shape the Box and Let it Dry: Use the shapers to keep the box in a proper contour as it dries. See **Drawing 9-7**.

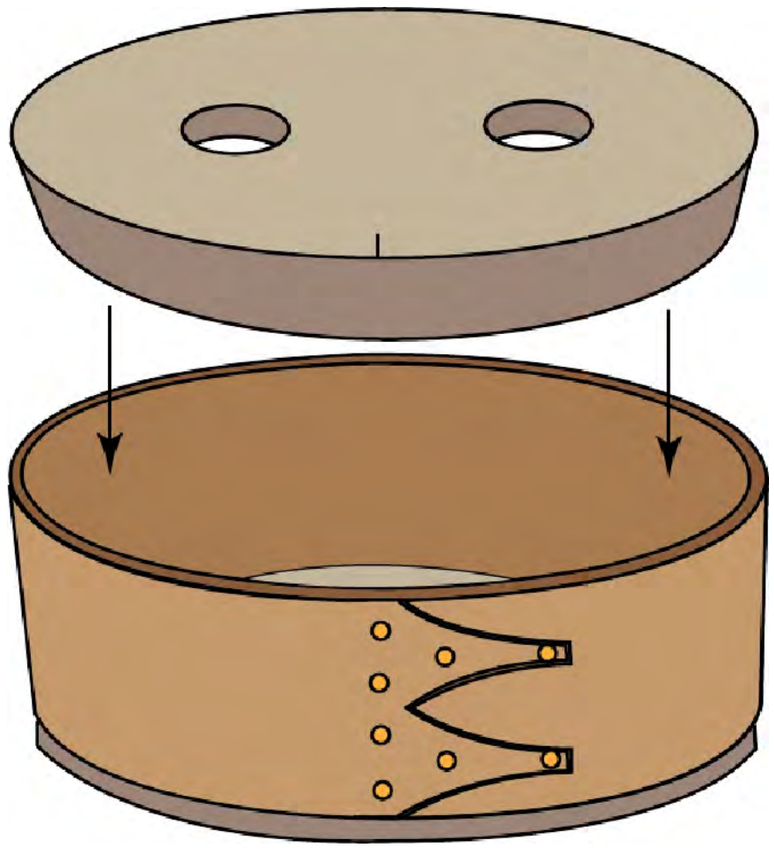
30. Push one of the #2 shapers into the top of the box.
31. Position the box band so the main row of tacks is in line with the center line of the shaper.
32. Turn the box over and push in the other shaper. Note: Don't push the shaper in too far or the sides will bow.
33. Let dry overnight. You can use a fan to move the air about but don't put the box in the sun. It should dry slowly.



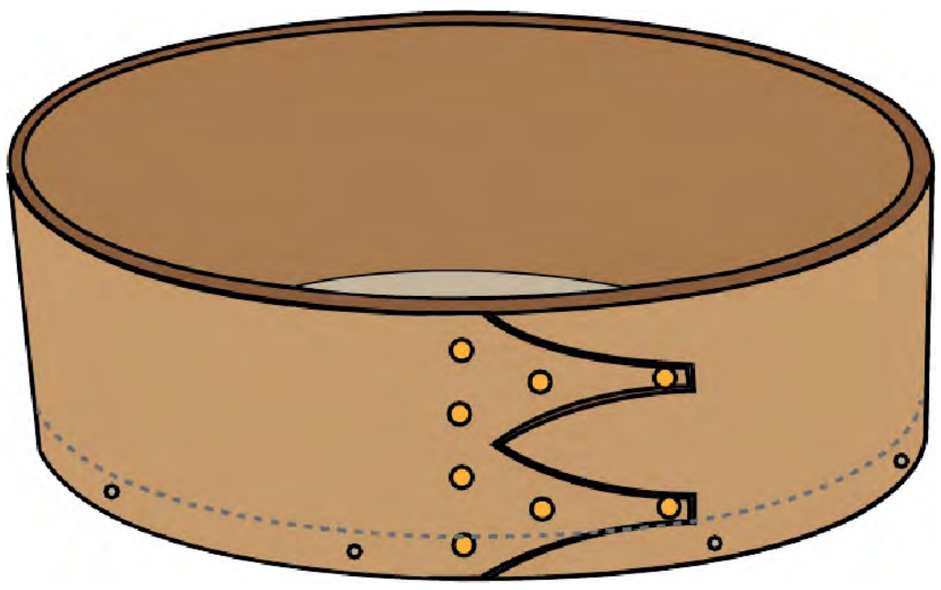
Drawing 9-5. Mark the Band. Make a pencil mark where the pieces overlap.



Drawing 9-6. Clinch the Tacks. Place the band around a pipe, line up the pencil marks and clinch the copper tacks.



Drawing 9-7. Put the Shapers In. Push the #2 shapers into the top and bottom and let dry.



Drawing 9-8. Add the Bottom. Drill holes and peg the bottom in.

Make the Bottom: Use the shape of the box to make the bottom piece.

Sand the inside of the box and improve the inside feathered ends if necessary.

34. Position the box so the fingers point to the right.

35. Place the ¼-in. bottom wood upside down on the bench.

36. Set the box on the bottom piece and trace around the inside.

37. Use a band-saw and cut just outside the line.

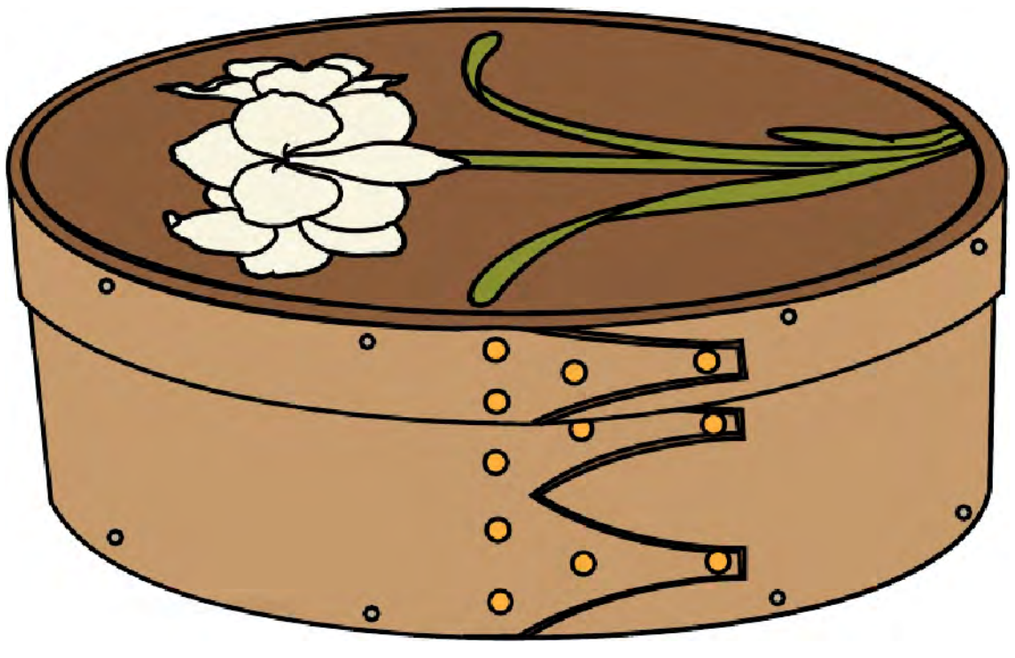
38. Tilt a disc sander to 5° and sand to the pencil line. This procedure makes the up side of the bottom slightly smaller than the bottom side.

39. Fit the bottom into the box.

Attach the Bottom to the Box: Small dowels (round tooth picks) are used to fasten the bottom.

40. Put the bottom wood into place inside the box.

41. Drill eight 5⁄64-in. holes ½-in. deep around the bottom edge of the box; four on each side. See **Drawing 9-8**. Center the holes



Drawing 9-9. Finished Box. The Amaryllis flower was sized to fit onto the top of the #2 Shaker Box.

into the width of the bottom. Note: Do not drill holes in the ends of the box; these are high stress areas due to bending.

42. Break off the points of round tooth picks, dip this end into yellow PVA glue and tap the 'dowel' into the hole. Do this for all eight holes.
43. Use wire cutters and nip off the dowels.
44. Sand the dowel ends with 220 grit sandpaper.

Make the Top Band: The form of the top band is determined by the box. Once the band comes out of the water, move quickly.

45. Soak the top band for 15-20 minutes in hot (near boiling) water.
46. Bend the hot band around the box and position it so the main tack rows line up.
47. Mark the overlap.
48. Remove the top band and reposition it so the overlap marks line up.
49. Place the band on a pipe or anvil and clinch copper tacks.
50. Place the top band back on the box to dry, lining up the finger tacks.

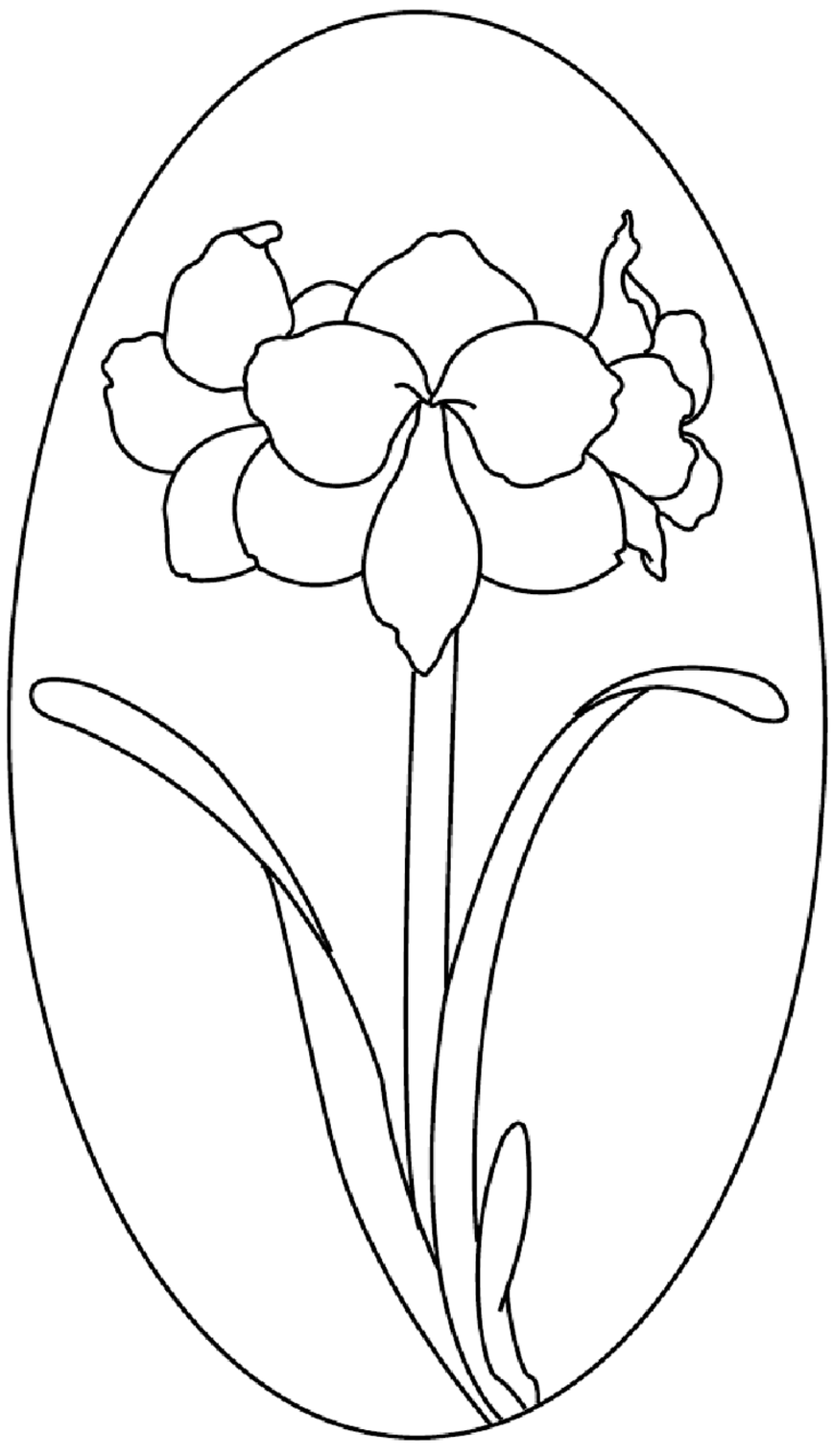
Make the Top: Make the top the same way you made the bottom.

Use the top band to draw the size and shape of the top.

51. Make the marquetry for the top: Now you know the size of the top and the wood used for the box; make the marquetry to match. See **Drawing 9-9**.
52. The area of the top of the #2 box is about 5½-in. x 3⅜-in. Measure your top and design the marquetry accordingly.
53. The boxes in the **Photo 9-1** were made by Linda Horner. See **Drawing 9-10** for the pattern.

Attach the Top: Small dowels are used here. Note: the marquetry is already attached to the top.

54. Sand the edges of the top to about 5° slant and ease it into the top band.
55. Drill holes and use PVA glue and dowels to attach.



Drawing 9-10. Pattern. By Linda Horner. This Amaryllis pattern was cut using the double bevel technique.

Project 10

FLIP TOP BOX

Photo 10-1

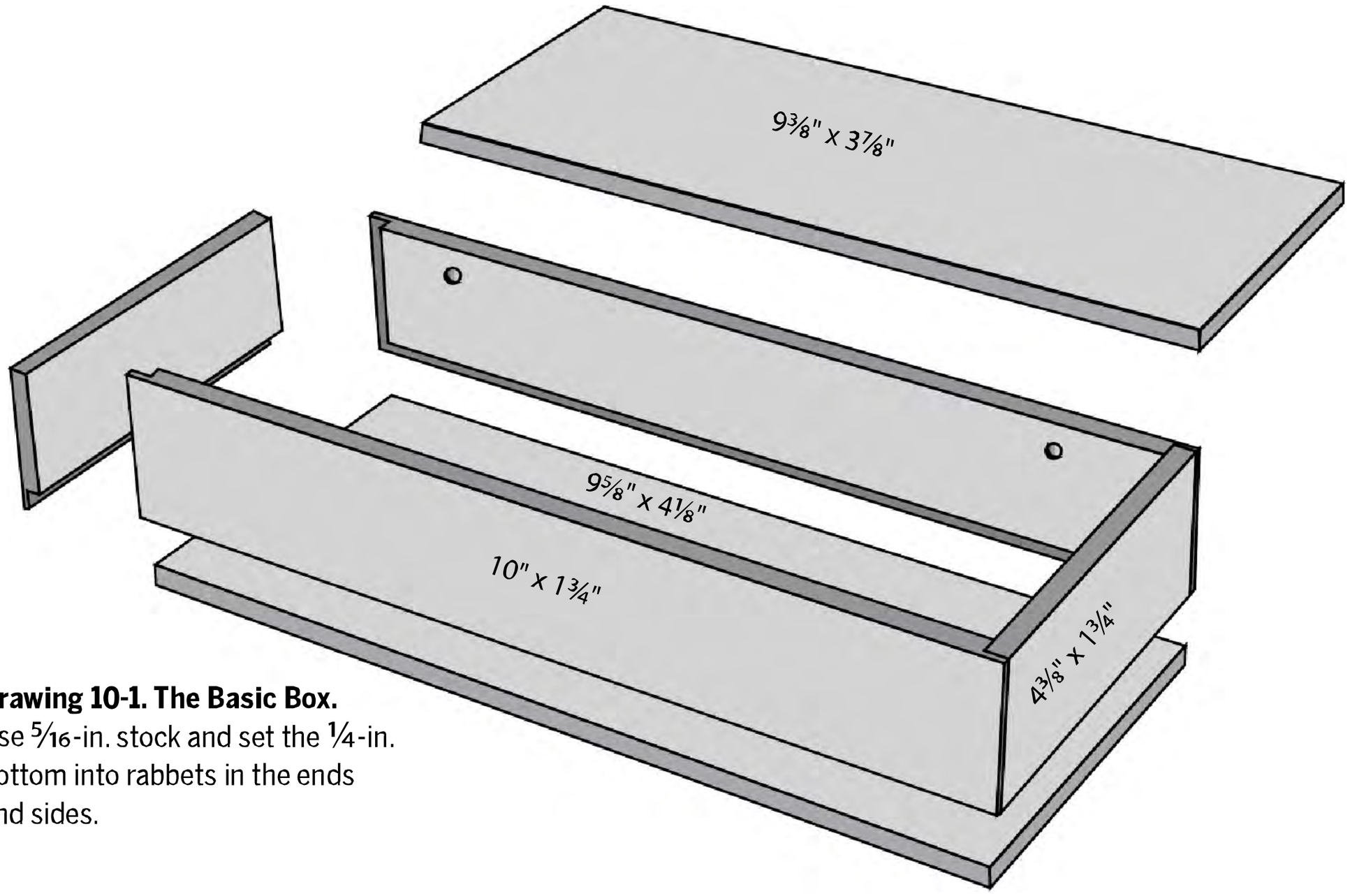
These boxes are easy to make and are great for jewelry, pencils or for holding whatnots. What, you don't have any nots? The marquetry on the lid can be exquisite and complicated or as simple as you want. The lid in the photo (**Photo 10-1**) and in the pattern (**Drawing 10-4**) shows a southwestern scene with a large sun setting over mountains and ridges, reminiscent of my New Mexico high school and college days. The boxes can be opened easily with one hand; just push down on either end.

The box is made of 5/16-in. stock and measures 4½-in. wide x 10-in. long x 1¾-in. high; see **Drawing 10-1** for an exploded view of the box. The lid is also 5/16-in. and rests on four ¼-in. dowels set into the sides. The lid can be made of any wood. The bottom is made of ¼-in. stock and is captured by rabbets cut into the sides and ends; the corner joints are modified butt joints, see **Drawing 10-3**.

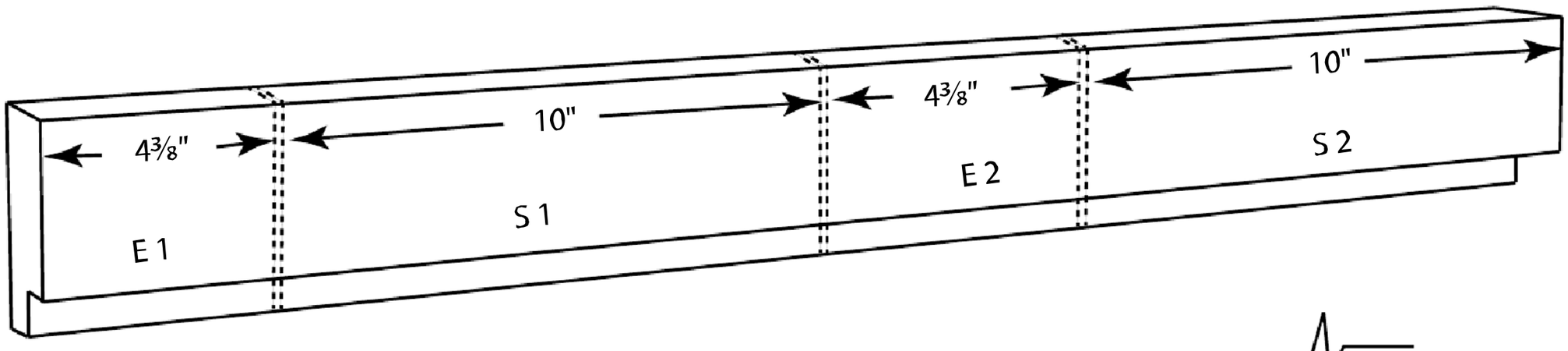
Extra Tools and Materials Needed: Box and lid stock (5/16-in. solid), ¼-in. plywood for bottom, ¼-in. dowels, a router and velvet for the lining.

Cut the Pieces to Length: Use cherry, walnut or any hardwood that will finish nicely. Follow the guidelines in **Drawing 10-2** so the grain is continuous around the box except for one corner. To make all four corners match, resaw a thicker board; see 'Concepts, Grain, Continuous Grain in a Box' for details on this.

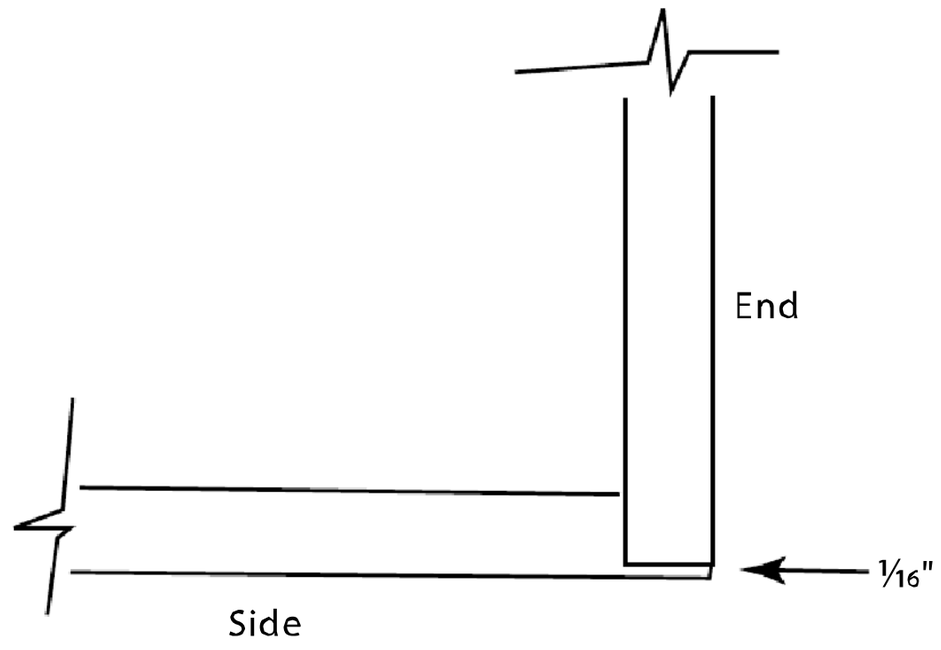
1. Resaw the stock to ⅜-in. thick and sand smooth to a finished 5/16-in.



Drawing 10-1. The Basic Box.
Use 5⁄16-in. stock and set the ¼-in. bottom into rabbets in the ends and sides.



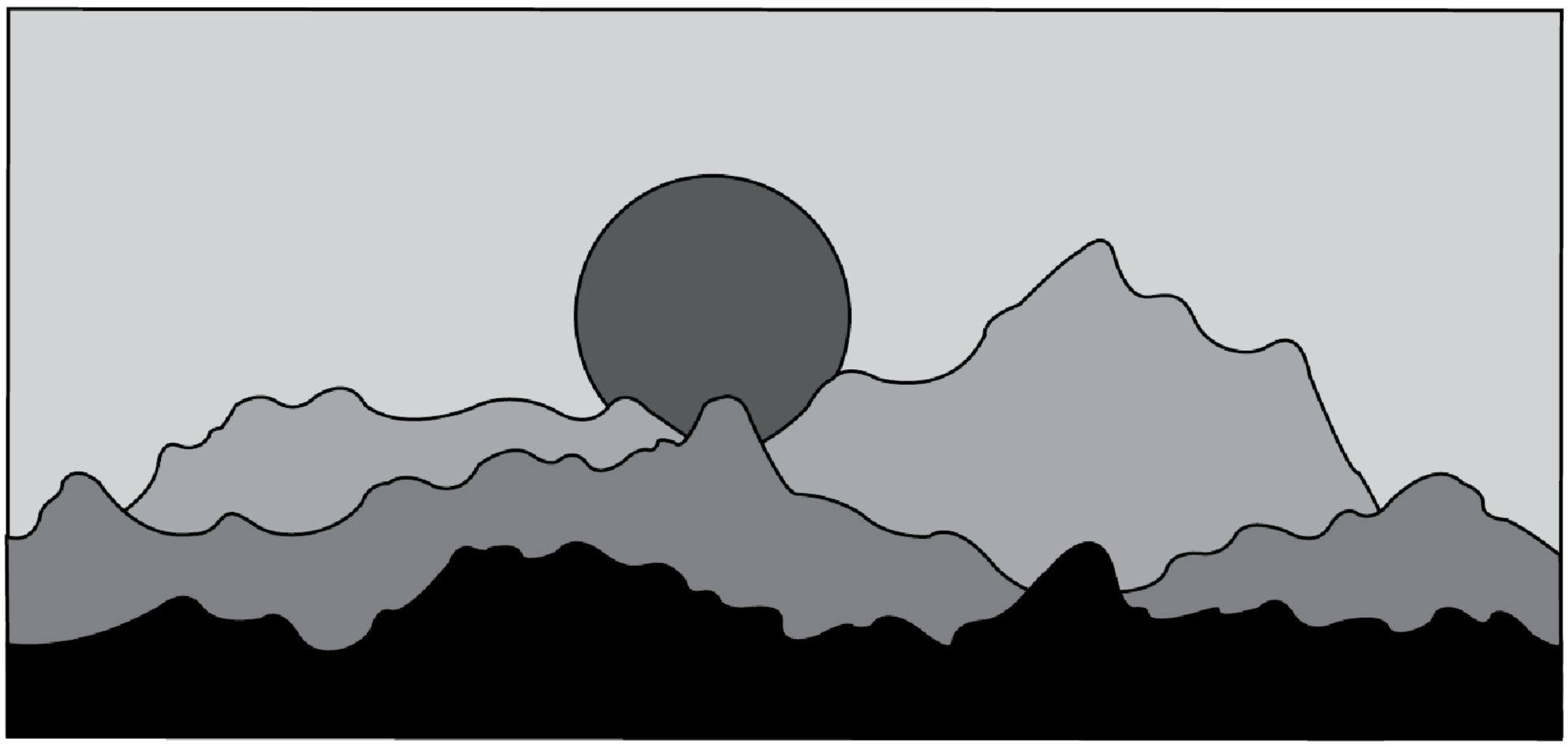
Drawing 10-2. Mark the 5⁄16-in. Stock. Cut a 5⁄16-in. rabbet and mark End-1, Side-1, End-2 and Side-2. Cut where indicated so the box is made of continuous grain pieces.



(right) **Drawing 10-3. The End-Side Joinery.** Use a modified butt joint.

Cover the whole pad. When making up a stack for pad cutting, use veneer pieces big enough to cover the whole main piece. You can never tell when these can be used in a finished piece.

2. Cut the stock to 1¾-in. wide by 30-in. long; enough for two sides and both ends.
3. Cut a ¼-in. rabbet on the inside bottom edge of the long piece. See **Drawing 10-2**.
4. Mark the board with the box parts and cut 'E1' at 4⅜-in, 'S1' to 10-in., 'E2' to 4⅜-in. and 'S2 to 10-in.



Drawing 10-4. Pattern. The ridges and mountains emphasize the setting sun. Let the color of the veneers go from dark to light.

5. Cut rabbets on both ends of the two sides as in **Drawing 10-3**.

Make Dowel Holes: The correct placement of the dowels is important so the lid does not rock and tips up easily. The lid can be even with the top of the box or set slightly proud.

6. Drill four ¼-in. holes 7/16-in. down from the top of the side and 1¾-in. from the end. See **Drawing 10-1**.

Cut the Bottom and Put the Box Together: The bottom is made of ¼-in. plywood and can be plain or have a nice piece of veneer glued to the top so it is visible from inside. Maybe put some marquetry here; a red rose that peeks from a nice maple burl? If the box is to be used for jewelry, put velvet lining on the bottom.

What's the angle?
On double-bevel cutting, set the table at 10° and cut out a circle. If the piece is too small, increase the tilt to 11°. If the piece is too big, change to 9°.

7. Cut the bottom piece to fit; approximately 9⅝ long x 4⅛-in. wide.
8. Glue on a nice figured veneer or add a piece of marquetry here.
9. Check for fit.
10. Glue the box together; checking for square as you clamp.
11. Sand the box to 320 grit and use a wipe-on poly for the finish.
12. Glue ½-in. long dowels into the four holes.

Prepare the Lid and the Marquetry: The lid is made of solid 5/16-in. stock. It should be about 9⅜-in. long x 3⅞-in. wide. Measure the inside dimensions of your box and make the lid smaller by about 1/16-in. both in length and width.

13. Prepare the marquetry for the lid and glue it in place. See pattern **Drawing 10-4**. Trim as needed.
14. If you put marquetry on the inside bottom of the box, you are through.
15. If the box bottom is plain, make a cloth lining. See 'Concepts, Box Linings' for details.

Project 11

TWO FISH BOXES

In the previous box projects, the box was cut to shape and then the marquetry was made to fit. In these Fish Boxes, the marquetry was made first and then the box was shaped to fit the marquetry. These boxes were made by Linda Horner and, as usual, she used the double bevel technique. **Photo 11-1** shows a *Palometa* deep water fish and **Photo 11-2** shows a *Discus* fish, both made of dyed veneers.

Photo 11-1

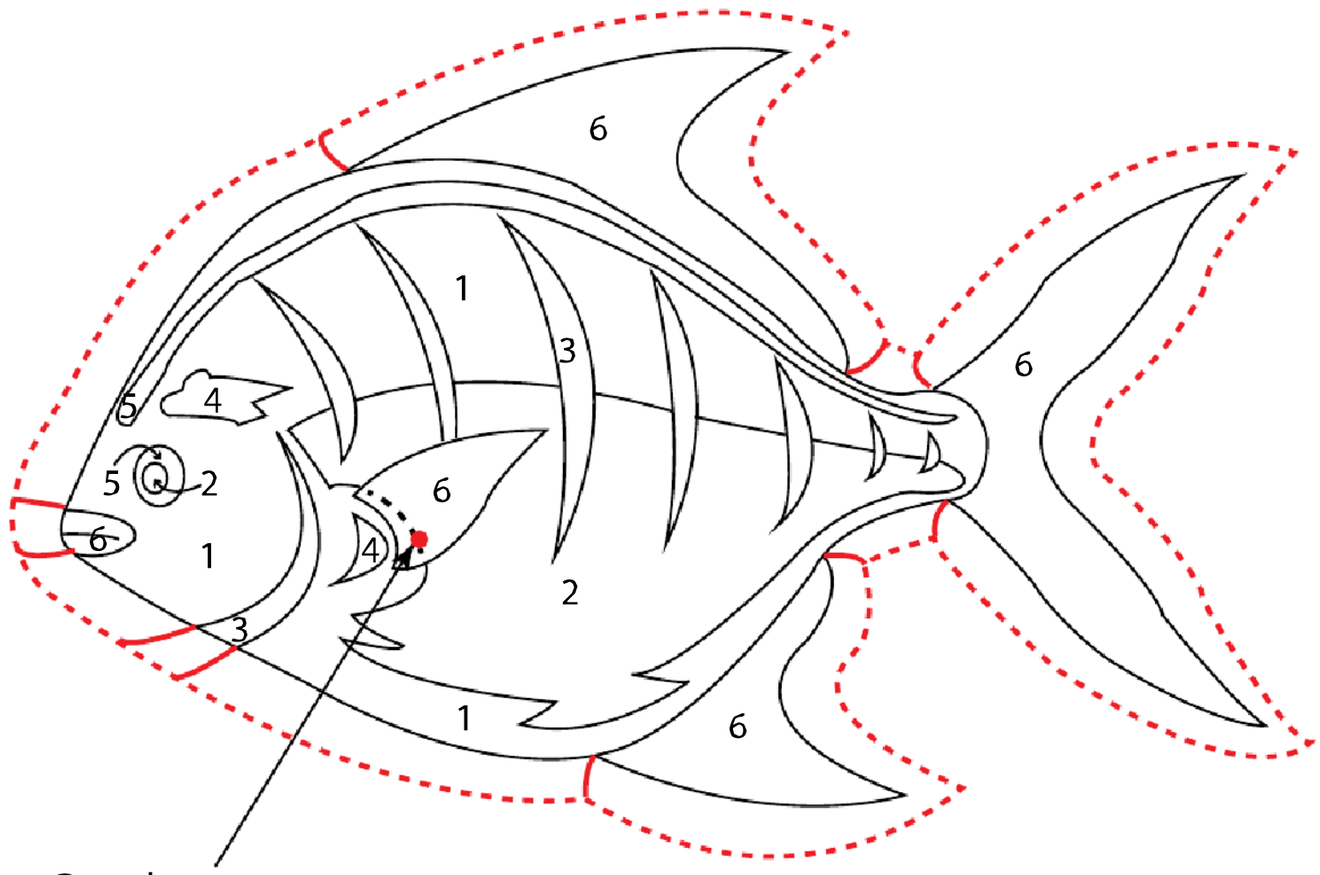
Photo 11-2

Extra Tools and Materials Needed: Solid stock (2-in. x 4½-in. x 6½-in.), rare earth magnets and a band saw.

Make the Marquetry for the Palometa Fish: Both Fish Boxes were made in the same way so these instructions apply to both. Each incoming veneer was put under the background and cut in from the bottom.

1. Transfer the pattern **Drawing 11-1** onto tracing paper.
2. Cut a piece of veneer (V-1) for the body of the fish, 5-in. x 7-in.; about ¼-in. larger than the pattern.
3. Cover the top and bottom of the veneer with app tape.
4. Transfer the outline for the white-veneer (V-2) to the background.

Too dusty? Before you scrape or sand a finished piece, wipe on a coat of clear shellac to keep sawdust from spreading from a dark veneer to a light veneer.



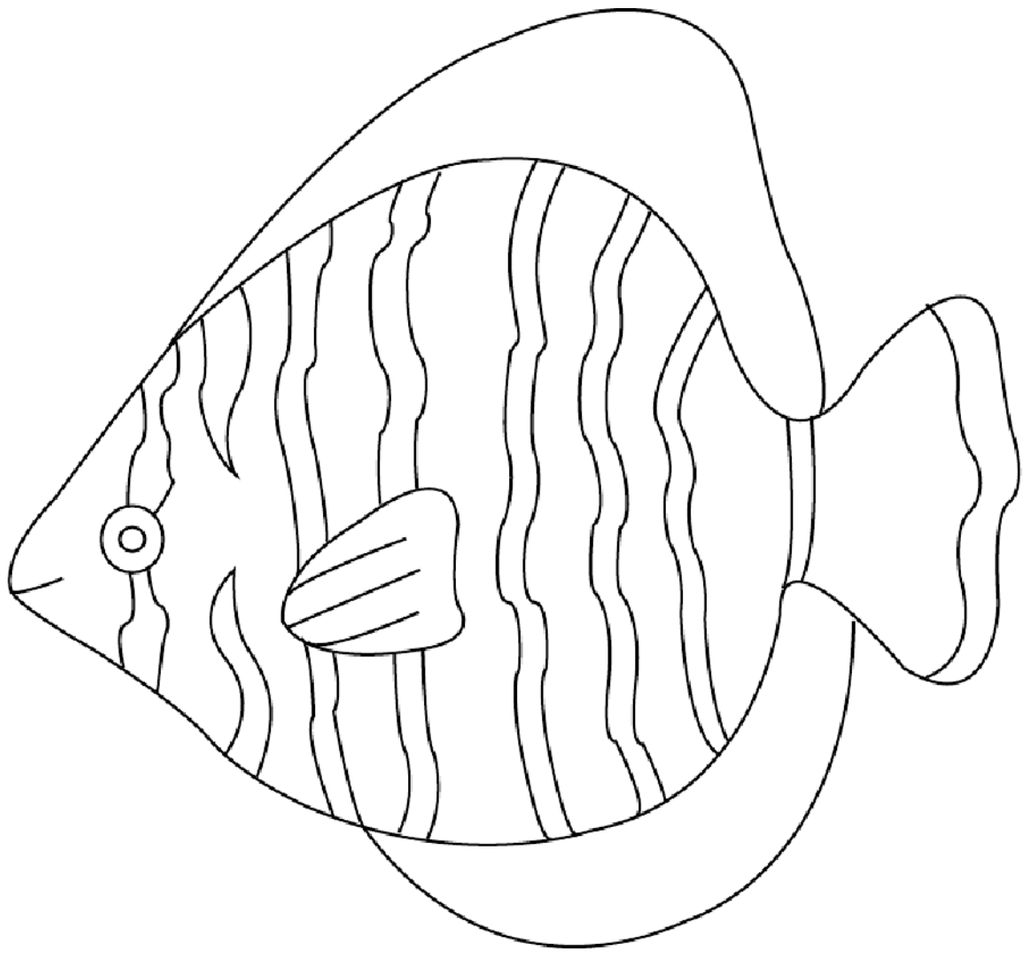
Drawing 11-1. The Blue Palometa Fish Pattern. The box measures 6¼-in. x 4⅛-in. Six dyed veneers were used; Gray (V-1, Background), white (V-2), dark blue (V-3), red (V-4), black (V-5) and light blue (V-6). The eye was cut in last; first the white portion and then the black. The red dashed line shows the initial marquetry; the final box is cut to the inner profile.

5. Put app tape on both sides of (V-2) and attach it to the back of (V-1).
6. Punch a hole (see **Drawing 11-1**) and cut out the marquetry piece.
7. Discard the background piece (V-1) and use clear cellophane tape to affix V-2 into the hole.
8. Trace V-3 pattern lines on the front and cut the blue pieces into the background.
9. Continue in this manner to add the other veneer pieces oversize, cutting to the outside red line. See **Drawing 11-1**.
10. The 'Eye' is added; white (V-2) and then black (V-5); see 'Concepts, Circles, Cutting Small' for details on this.
11. The marquetry portion of the box is now complete; oversize before the box is cut. The fish outline is the black line (See **Drawing 11-1**) and the marquetry now should be the red line.
12. Use the pattern and draw the cutline around the entire fish; but don't cut yet.

Make the Box: Use the Pattern **Drawing 11-1** to find a piece of walnut for the box. The block should be about 2-in. thick x 6½-in. long x 4½-in. wide. For detailed Step-by-Step instructions on making the box, see the Free Form Box project.

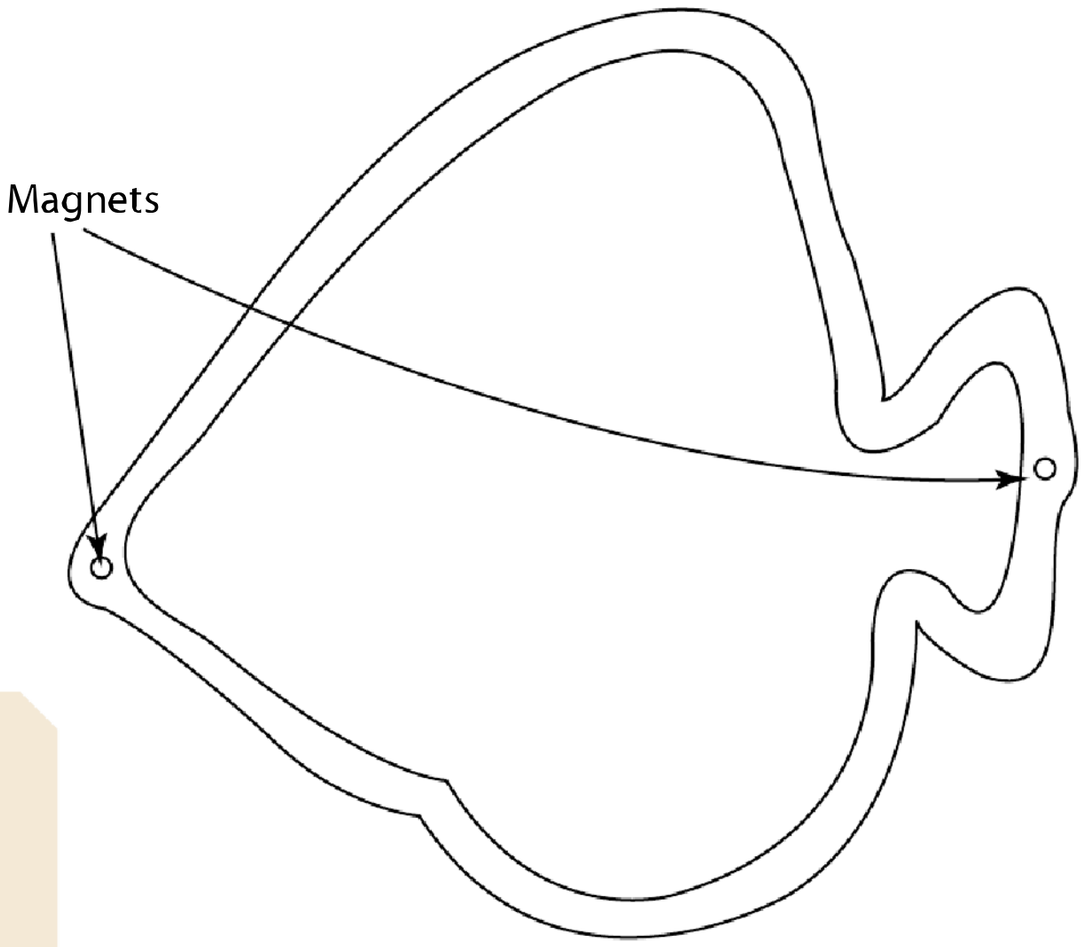
13. Glue marquetry on top of the block.

14. Cut out the shape of the Fish on the lines, see **Drawing 11-1**. Save the cut-away pieces and tape them back on the block before cutting off the top in step 19. This will stabilize the block on the band saw table.
15. Slice ¼-in. off the top and bottom.
16. Hollow out inside of box.
17. Drill 3/16-in. holes ⅜-in. deep for magnets.
18. Glue top and bottom back on.
19. Cut top off at ⅜-in. See 'Concepts, Box Lid Cutoff' for details on cutting the lid off.



Install the Magnets and Finish: Use four rare earth magnets to hold the lid in place. See 'Concepts, Magnet Placement' for details on this.

20. Use CA Glue or Gorilla Glue and fasten the four magnets in place.
21. Sand the box.
22. Apply four coats of wipe-on poly.



Drawing 11-2. The Discus Fish Pattern. The box measures 5-in. x 4⅝-in. There are only three veneers used here (yellow, black and white) and all were dyed. Note the position of the magnet holes.

IS THE HOLE TOO BIG? If the opening in the scroll-saw table allows small pieces to fall through, make a hole in a business card and tape it to the table.

Project 12

TWELVE PIECE RADIAL CLOCK

Twelve segments are cut, sand-shaded and tweaked on a shooting board. Each segment is scalloped and a dark veneer piece is added. The clock mechanism is battery driven and can be purchased locally or online. The backer is made of two pieces of MDF. **Photo 12-1** shows a clock with maple and walnut veneers.

Photo 12-1

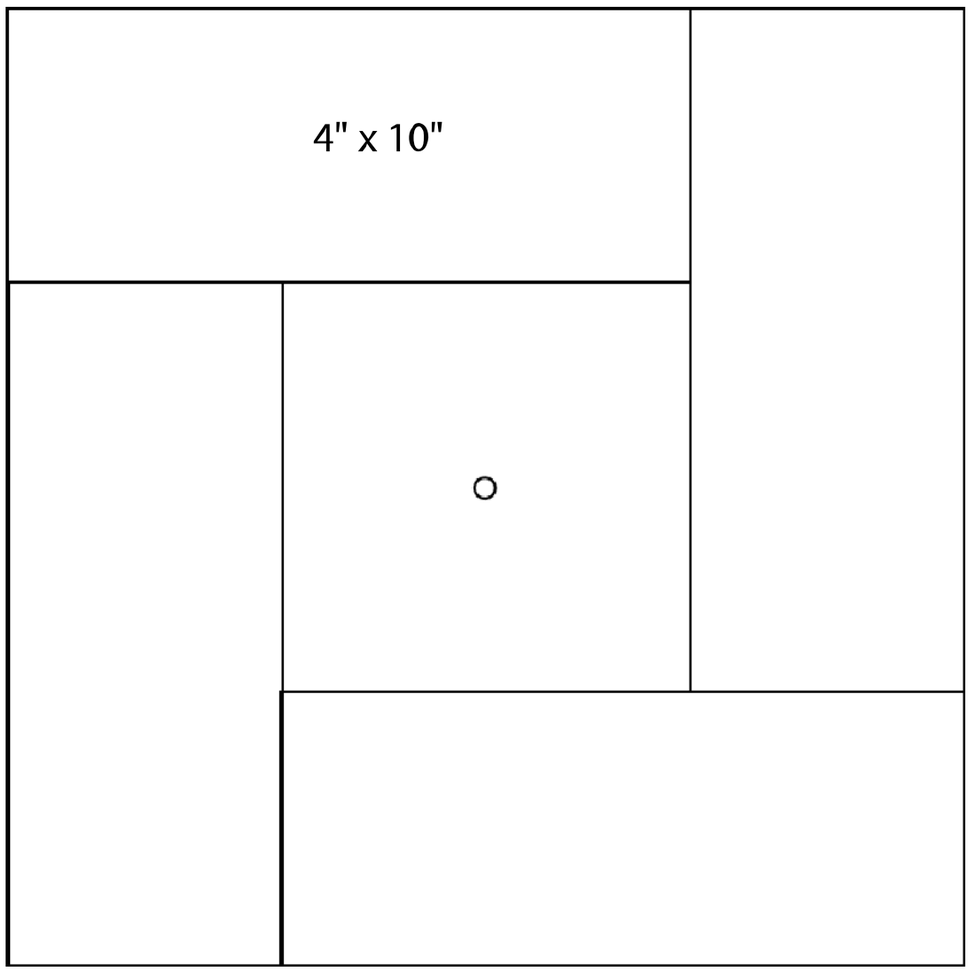
Extra Tools and Materials Needed: MDF for the backer, shooting board, band saw, disc sander, clock mechanism (1-in. long stem and 6-in. hands) and plastic for the patterns.

Make the Base: Glue two pieces of MDF to give 1¼-in. thick stock.

1. Cut a piece of ¾-in. thick MDF to 14-in. x 14-in.
2. Cut four pieces of ½-in. MDF to 4-in. wide x 10-in. long.
3. Glue the ½-in. pieces to the back of the thicker MDF to leave a 6-in. x 6-in. cavity in the center for the clock mechanism. See **Drawing 12-1**.
4. Drill a ¼-in. hole in the center.
5. Draw a 13-in. circle and cut out on a band-saw.
6. Use a sanding jig to round the piece, see 'Concepts, Circle Jig, Disc Sander' for details on this.
7. Glue a piece of light cardboard (card stock or picture matting) to the back of the base to cover the 'patch work'.
8. Use a sharp knife and cut away the center square of the matting.

Prepare the Wedges: Choose a light veneer with straight grain.

9. Use a 30-60-90 triangle and make a 7-in. long 30° pattern from a piece of Polycarbonate plastic.
10. Gather the light-colored maple veneer, 7-in. wide by 23-in. long with grain running crossways.



Drawing 12-1. The Clock Base. Glue four pieces of ½-in. material to the ¾-in. thick 14-in. x 14-in. MDF base.

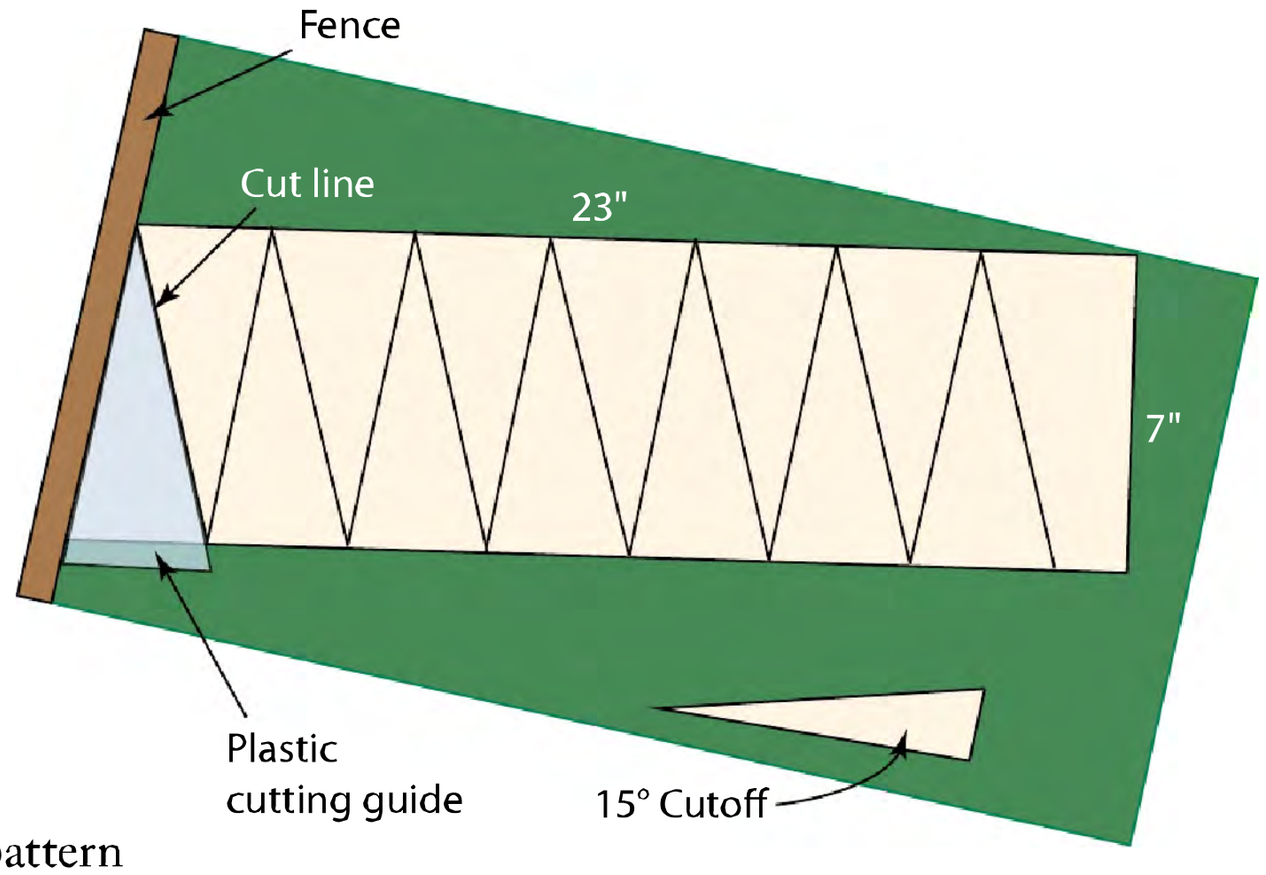
11. See **Drawing 12-2** and cut off a 15° segment from one end before starting.
12. Cut 13 wedges, each 6-in. long. The grain should run from the point directly to the base of the wedge. Cut from the point towards the wide part of the wedge. As each wedge is cut, flip the veneer piece over, nestle the cut edge against the fence and cut a new wedge.
13. Sand-shade both of the long sides of each wedge.
14. As each wedge comes out of the hot sand, rub the whole piece with a damp rag and put under pressure between paper towels.
15. Place each wedge on a shooting-board set at 30° and use sandpaper attached to a board to smooth both edges of each wedge. See **Drawing 12-3**.
16. Fasten three wedges together with app tape along the edges. Flip the section over and rub white PVA glue in the joints. Wipe excess glue off, put app tape along these joints. Set them aside for 30 minutes under a light weight. Do this for all 12 of the wedges, making four quarter-circles.
17. Test and if the three wedges do not make 90°, set the shooting board to 90° and sand both sides of the three-wedge section until the angle is 90°.
18. Tape the four sections into two half circles. Flip each over and rub PVA glue in the joints. Remove excess glue and tape along the joints.
19. Check that the each half section has a straight edge; if not, use a sanding board to make them straight.
20. Hold the two sections together and make sure the joints are even and the two form a circle.
21. Tape the two sections into a circle and rub the joint with PVA Glue.
22. Tape the circle to a cutting mat; use six pieces of ¾-in. blue tape, one at the end of every other wedge. See **Drawing 12-5**.

Make the Walnut Ends: The walnut veneer should have grain direction running lengthwise.

23. Cut a piece of walnut veneer 3½-in. wide by 26-in. long.
24. Cut this veneer into thirteen 2-in. pieces. Note: We only need twelve.
25. Make a 5-in. diameter circle out of the polycarbonate plastic to use as a pattern for the scallops. See **Drawing 12-4**.
26. Use the round plastic pattern and cut an arc onto the end of all the pieces. Note: The clock face looks best if the walnut grain is in line with the maple grain.

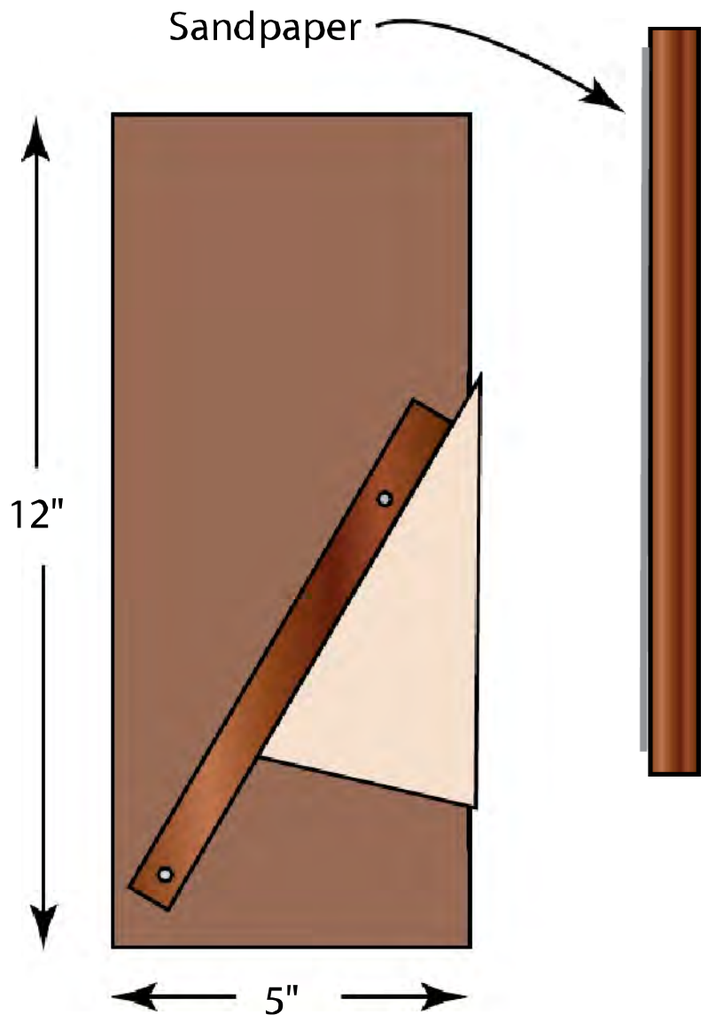
Scallop the Ends of Both Pieces: Keep the clock face fastened to the mat until all the cutting has been done.

27. Measure out from the center and make a pencil mark at 5½-in. on each veneer joint. See **Drawing 12-5**.



Drawing 12-2. Cut the 30° Wedges. Remove a 15° cutoff and use the plastic wedge to cut 13 pieces.

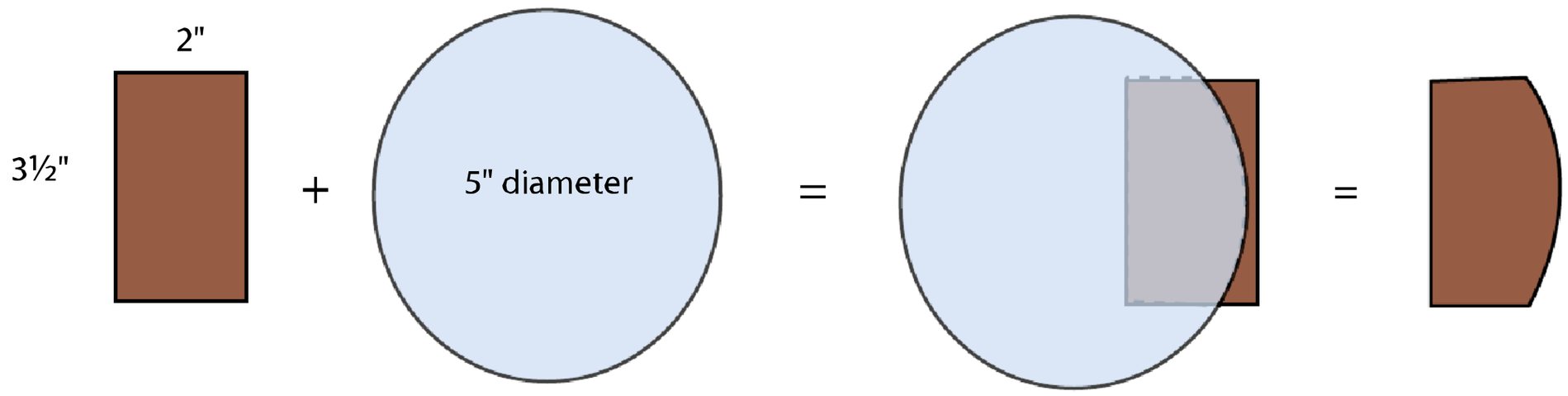
28. Use the plastic 5-in. diameter pattern and a knife to cut a scallop on the end of every other radial piece. Cut from both edges towards the center.
29. Put PVA glue on the rounded end of a walnut piece and tape it in place at the end of a maple wedge.
30. Use a long straight edge extending from the center of the big circle along the veneer edge and carefully cut the walnut end piece to shape on both sides.
31. When six walnut pieces are glued in place, move the blue tape from the uncut pieces to the finished wedges.
32. Cut the other six wedges.
33. Check for gaps and fill with veneer pieces as necessary.



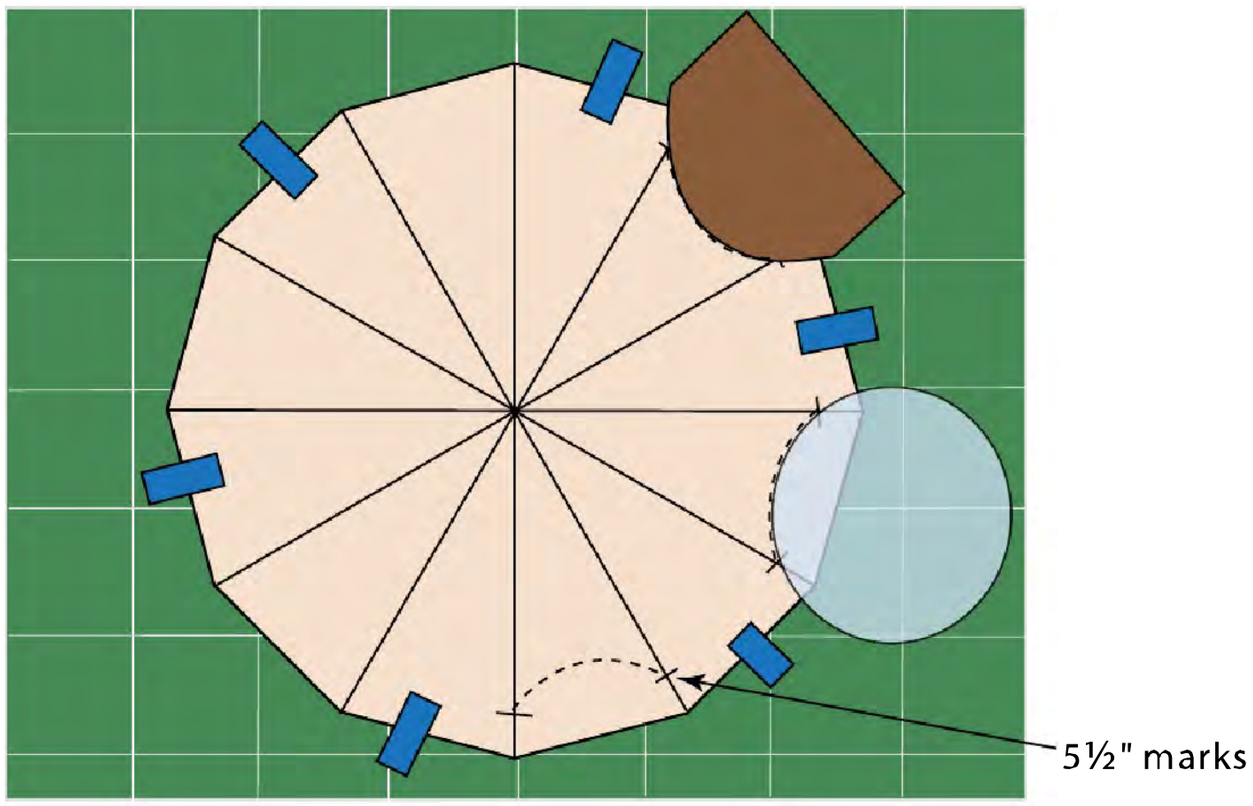
Drawing 12-3. Smooth and Straighten the Edges. The shooting board is at 30°. Sandpaper attached to a board is used to set both edges.

Glue the Veneer Piece to the Backboard:
The parquetry is now ready to be glued to the MDF base.

34. Use a knife and cut a ¼-in. hole in the center of the clock veneer.
35. Put yellow PVA glue on the backer board and put the veneer piece on it. Note: Use a ¼-in. dowel protruding 1-in. through the backer board to guide the veneer piece into place.
36. Tape the veneer to the backer, remove the guiding dowel and clamp or use a vacuum bag to set the glue.
37. When the glue has set, hold the wood circle face down on a cutting mat and carefully cut the extruding veneer even with the wood circle.



Drawing 12-4. Cut the Walnut Pieces. Use a plastic pattern to cut the arc at the ends of the walnut pieces.



Drawing 12-5. Cut the Scallops. Cut an arc at the end of every other wedge and add the walnut pieces.

Put a Band Around the Outside Edge: Rub the sides of the veneer band against your cheek; mark the smoother side and make this the outside of the bend.

38. Cut a piece of walnut veneer 1½-in. wide by 41-in. long. Theoretically the length needs to be: pi x diam. = 3.14 x 12.5-in. = 39.25-in.
39. Decide which part of the clock is up, i. e. Twelve O'clock, and mark this 'UP' on the back. Note: We will make the splice at the top of this hanging clock and it will not be noticeable.
40. Put contact cement on the veneer band and on the edges of the clock board. Let dry for the time recommended on the can.
41. Put a 3-in. piece of wax paper on the edge of the clock at the 'UP' position.
42. Roll the veneer around the clock edge.
43. Overlap the veneer ends over the wax paper and cut them at an angle with a sharp 2-in. chisel.
44. Peel off the wax paper and stick the pieces down with a roller.
45. Trim the excess veneer from the front and back.

Finish the Clock: Seal the veneers with shellac and use a hand scraper to smooth the surface.

46. Wipe on a few coats of shellac and use a hand scraper to smooth the surface.
47. Use sandpaper to smooth, ending with 320 grit and finish with multiple coats of wipe-on poly.
48. Install the clock mechanism and the hands.

Project 13

FLOWER CLOCK

This clock by Linda Horner is similar to the 'Twelve Piece Radial Clock'. However, instead of building the face from wedges, petals were cut into the background one-at-a-time using the double bevel procedure. The MDF base and the clock mechanism are the same. In **Photo 13-1**, Linda used a patterned bubinga veneer for the background and fiddle-back maple for the petals; the center is bird's eye cherry. Note that the maple veneer is oriented so the 'ribbons' go around the flower.

Photo 13-1

Extra Tools and Materials Needed: MDF for base of clock, clock mechanism and disc sander with circle jig.

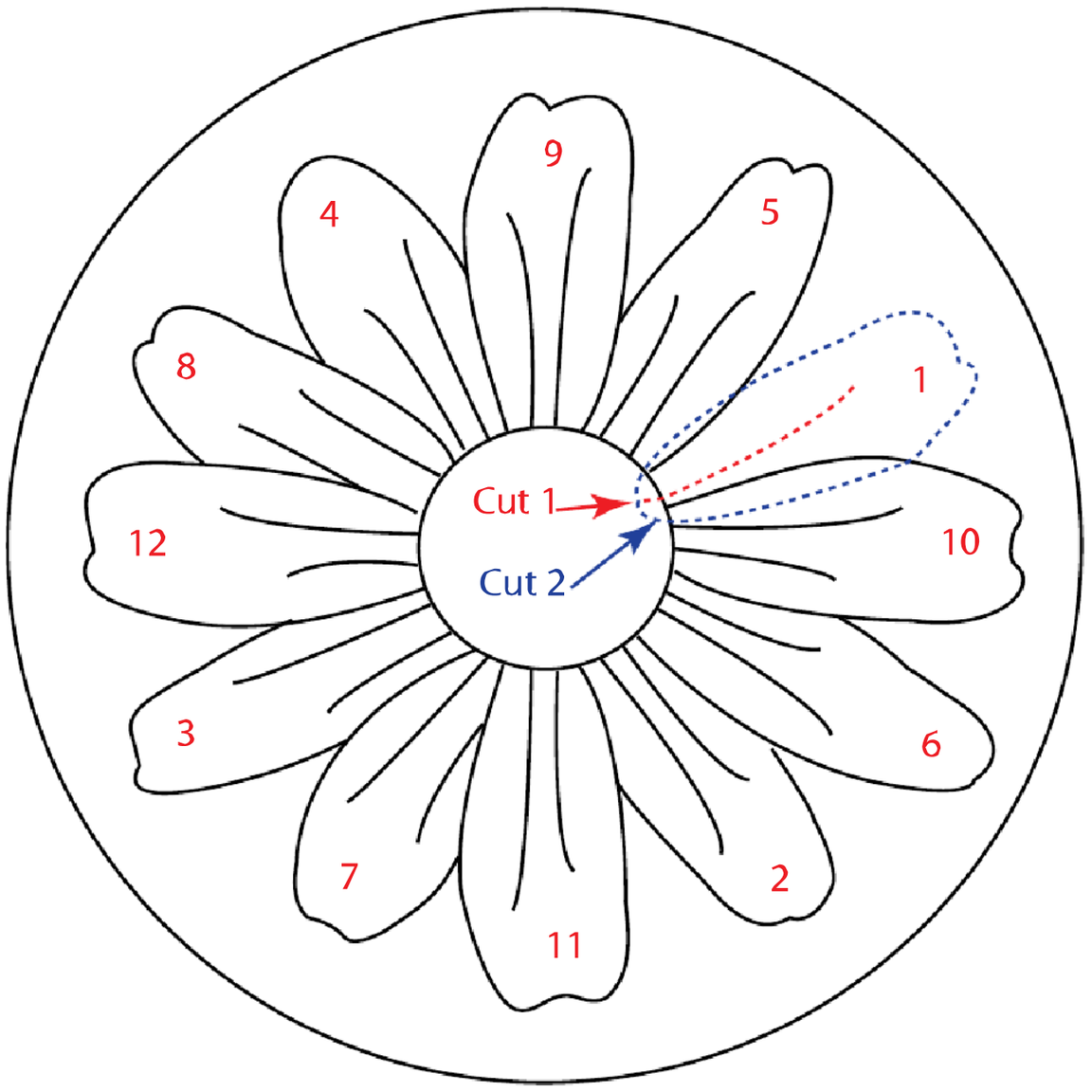
Build the Clock: The Petals were cut into the background with the table set at 11°; the veins were cut at 0° tilt. Each Petal was brought in from the bottom and taped into place before the next petal was cut. The new petal was not glued in place because sand shading was added later.

1. Cover the bubinga (13-in. square) background with app tape on both sides.
2. Make registration marks (X) and trace the outline of the first Petal onto the app tape surface. See **Drawing 13-1** for the cutting order.
3. Flip the piece over and blue-tape the first petal veneer in position so the 'ribbon' is parallel to the center of the flower. Note: The maple veneer has app tape on front and back
4. Push a hole in the flower center close to Petal #1. See **Drawing 13-1**.
5. Set the scroll saw at 90° (no tilt) and cut the veins; saw to the end of the vein and, with the saw running, back out.

Shellac. Add denatured alcohol to non-waxed, blond flakes in a bottle and shake. As long as there are undissolved flakes, you have a good solution.

A no tilt cut makes a wider kerf so the dark filler is more noticeable.

6. Set the scroll saw to 11° and cut out the first Petal. See **Drawing 13-1**.
7. Set the marquetry piece face down and remove waste veneer from the back.
8. Turn the piece face up and press the background until the top, waste piece pops up and the inset piece moves up and in.
9. Fasten the new inlay in the hole with app tape on the front and on the back.
10. Push a new hole next to Petal #2, set the scroll saw to 90° and cut the two veins.
11. Set the scroll saw to 11° and cut out Petal #2.
12. Continue in this manner to cut Petal #3 and Petal #4, fastening each petal in place with app tape.
13. Cut Petals #5 through #8 next; always cutting the veins first with no tilt.
14. Lastly, cut Petals #9 through #12.
15. Cut out the center of the flower with the table at 11° and insert the burl.



Drawing 13-1. Flower Pattern and Cutting Sequence. Cut the veins with no tilt (red line) and the petals with a 11° tilt (blue line).

Sand-Shade and Glue to Backer: Once all the pieces have been cut and are in place, examine the marquetry for any voids.

16. Take all the small pieces of tape off the front and re-tape with large pieces of app tape.
17. Remove all the tape from the back of the marquetry.
18. Sand-shade any portion of a petal that lies behind another petal.
19. Make a round backer-board and glue the marquetry to the backer as in the Wedge Clock project.

Add Outside Banding: The bubinga burl does not come in 30-in. pieces therefor use three pieces of veneer and join them together.

20. Cut three or four strips of bubinga veneer to 1¼-in. wide.
21. Join the ends of the pieces with blue tape to make a strip long enough to go around the perimeter.
22. Use contact cement and follow instructions in the Twelve Piece Clock project.
23. Install the clock mechanism.

Rubber clamps. Cut rubber strips from an old tire inner-tube or use rubber tubing to clamp veneer to a curved surface.

Project 14

LOTUS FLOWER CLOCK

The Lotus Flower design (**Photo 14-1**) was inspired by the Lotus Temple in New Delhi, India. This 112-ft. high marble structure was completed in 1986 and attracts some 8,000-10,000 visitors daily. The Baha'i House of Worship is famous for its flower-like shape when viewed from above. The New Delhi flower has only nine sections so we used the basic contour of the temple and added three more segments for our Lotus Clock design. See pattern in **Drawing 14-1**.

The Twelve Piece Radial Clock was cut with a veneer saw and knife and the twelve segments were joined to give a 360° circle. The Flower Clock was cut with a scroll saw using the double-bevel technique; it also had twelve segments but was not symmetrical.

This Lotus Flower Clock was pad-cut in quarters with a scroll saw. After the pieces were cut, the four quarters were assembled and joined to make the completed clock. Instead of being rounded on the perimeter, the outer border is jagged.

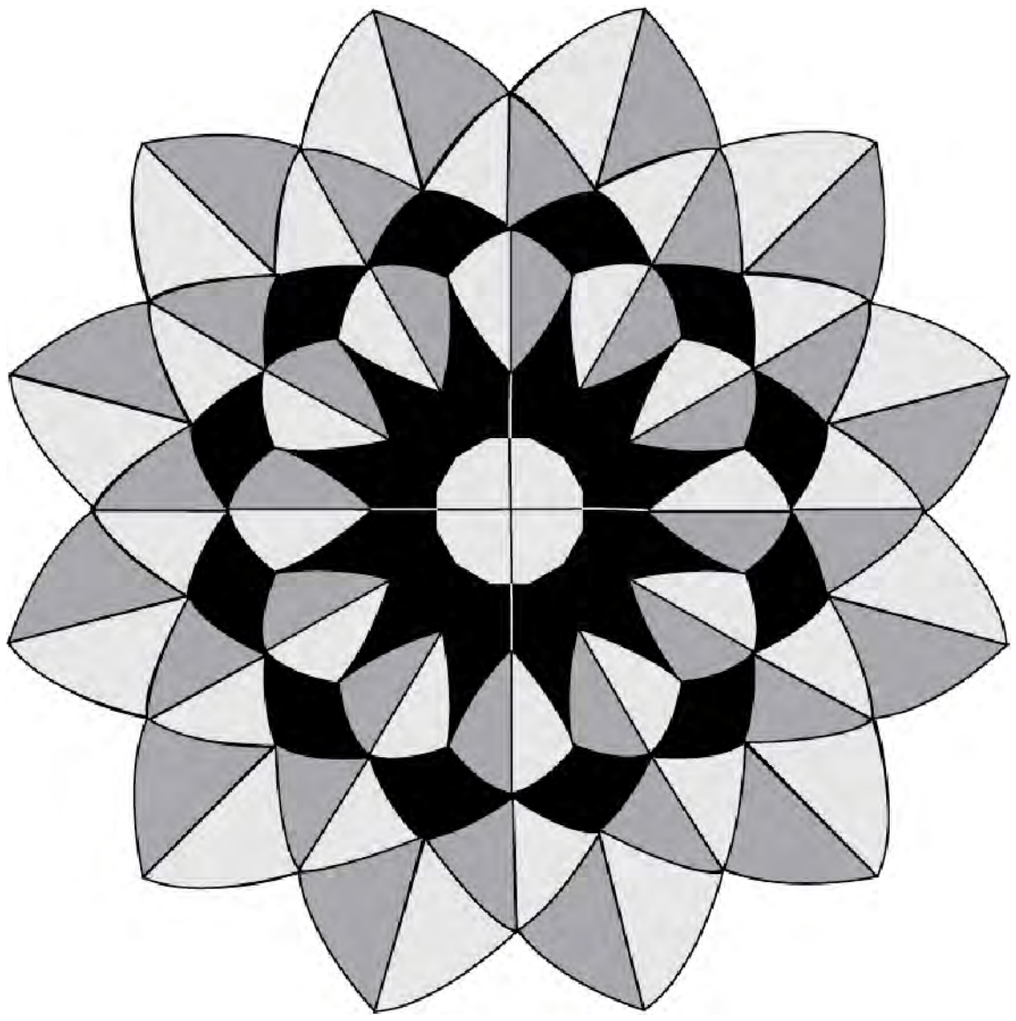
Extra Tools and Materials Needed: MDF for clock base, clock mechanism, light cardboard stock, table saw, air gun pin-nailer, round plastic pattern (6-in. diameter), band saw and a 1-inch upright belt sander.

Photo 14-1

Make the Base: Use instructions of 'Twelve Piece Radial Clock'.

Gather the Veneer Pieces: The clock requires three different colored veneers—Dark, Medium and Light; see **Drawing 14-1**.

1. Cut four pieces of each veneer to 6½-in. squares.
2. Cover the bottom side of each with app tape and mark grain direction.
3. Put the 12 pieces into a pad, each veneer will have two pieces oriented horizontal grain and two vertical.
4. Tape the pack together and glue the pattern to the top.



Drawing 14-1. The Lotus Flower Pattern. The lotus design is cut in quarter sections and the pieces are assembled to make the full flower design. Use dark, medium and light-colored veneers. Enlarge this pattern to full-size.

5. Pin the pad. See 'Concepts, Pin Nailing' for details on this. Note the five red 'pin spots' on the quarter pattern, **Drawing 14-2**.
6. Use a table saw and cut two sides of the pad to 90°.
7. Retape the cut surfaces.

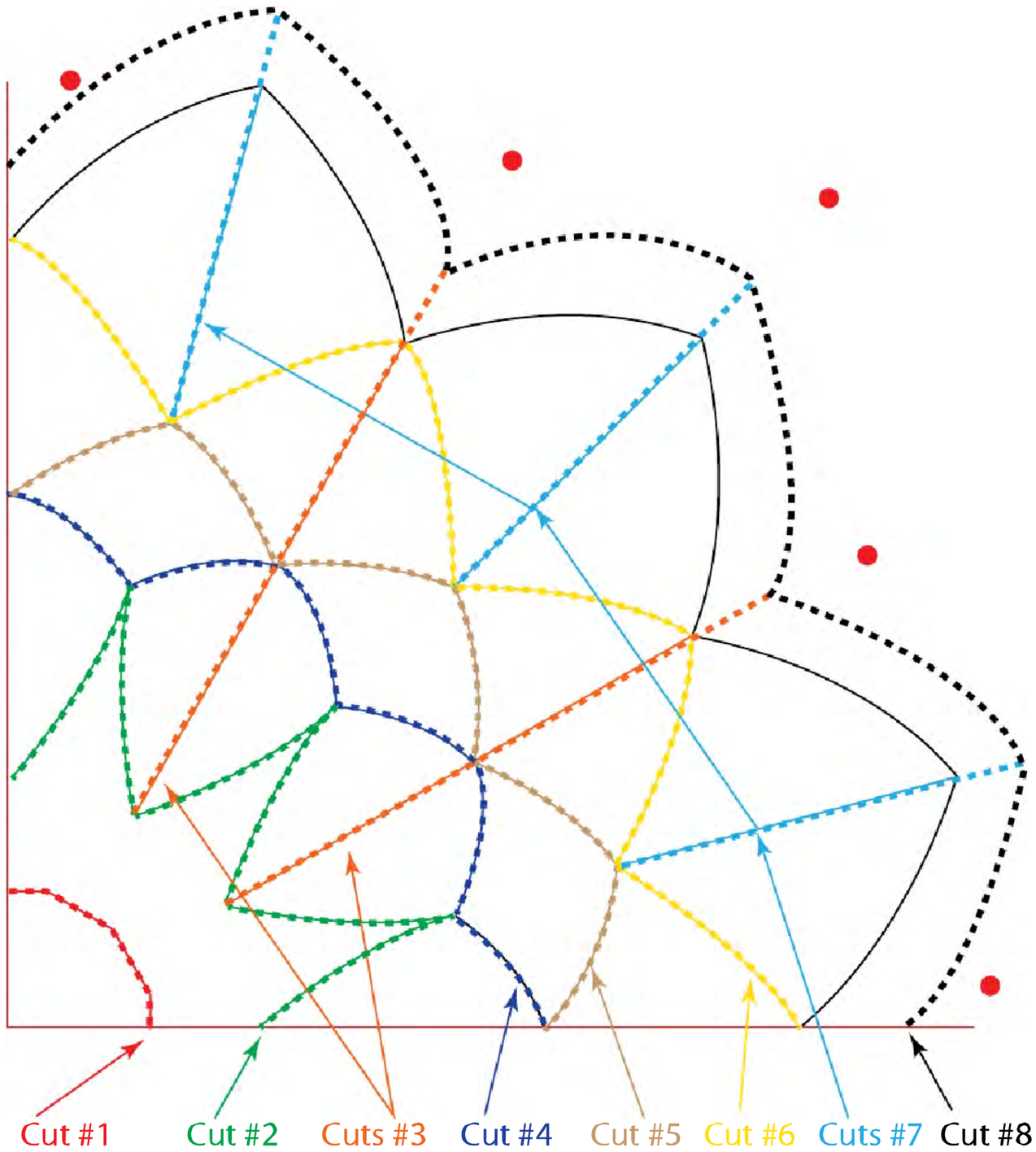
Cut the Marquetry Sections: There are 23 sections (see **Drawing 14-2**) to be cut from the pad and set aside. Each section will have twelve veneer pieces but only four will be selected for use. With so many pieces (23 sections x 12 veneers in the pad = 276) it is necessary to keep careful track of all the parts.

8. Start with Cut #1 at the inner pattern area. See **Drawing 14-2**. Place this packet onto the quarter pattern.
9. Tape the large packet back together.
10. Do cut #2 and place this section on the quarter pattern, **Drawing 14-2**.
11. Do #3 cuts and back the blade out.
12. Do cuts #4, #5 and #6 and separate the pieces.
13. Do cut #7 three times and back the blade out.
14. Cut #8 leaves the outer three petal parts (six sections) big by about ½-in.; see **Drawing 14-2**.
15. With all the sections cut and placed on the pattern, it's time to assemble the flower.

Assemble the Flower: Make a full-size pattern using **Drawing 14-1** as a guide; pull the four needed pieces from each stack and put them in position on the pattern.

16. Start with the four middle pieces. Place them in exact position and app-tape them together.
17. Take the next four pieces (the dark pieces that resemble a crown) and put them in position. Make sure the cut lines are aligned and then tape them together.
18. Continue in this manner until all of the Lotus Clock pieces are laid out.

NAILING PAD MARQUETRY. To secure the pieces in place, use a 23 gauge pin nailer and clinch the pins. Later remove the pins and push the fibers back into the small hole.



Drawing 14-2. The Quarter Pattern. The pad has 12 veneers; the red dots mark the location of the pins that hold the pad together. Once the pad has been secured with blue tape and the five pins, square up two sides (the red lines) on a table saw. Use a scroll saw and start cutting from the center; see Cut #1, Cut #2, Cut #3 etc. Cut the outer row of petals large by about ½-in.

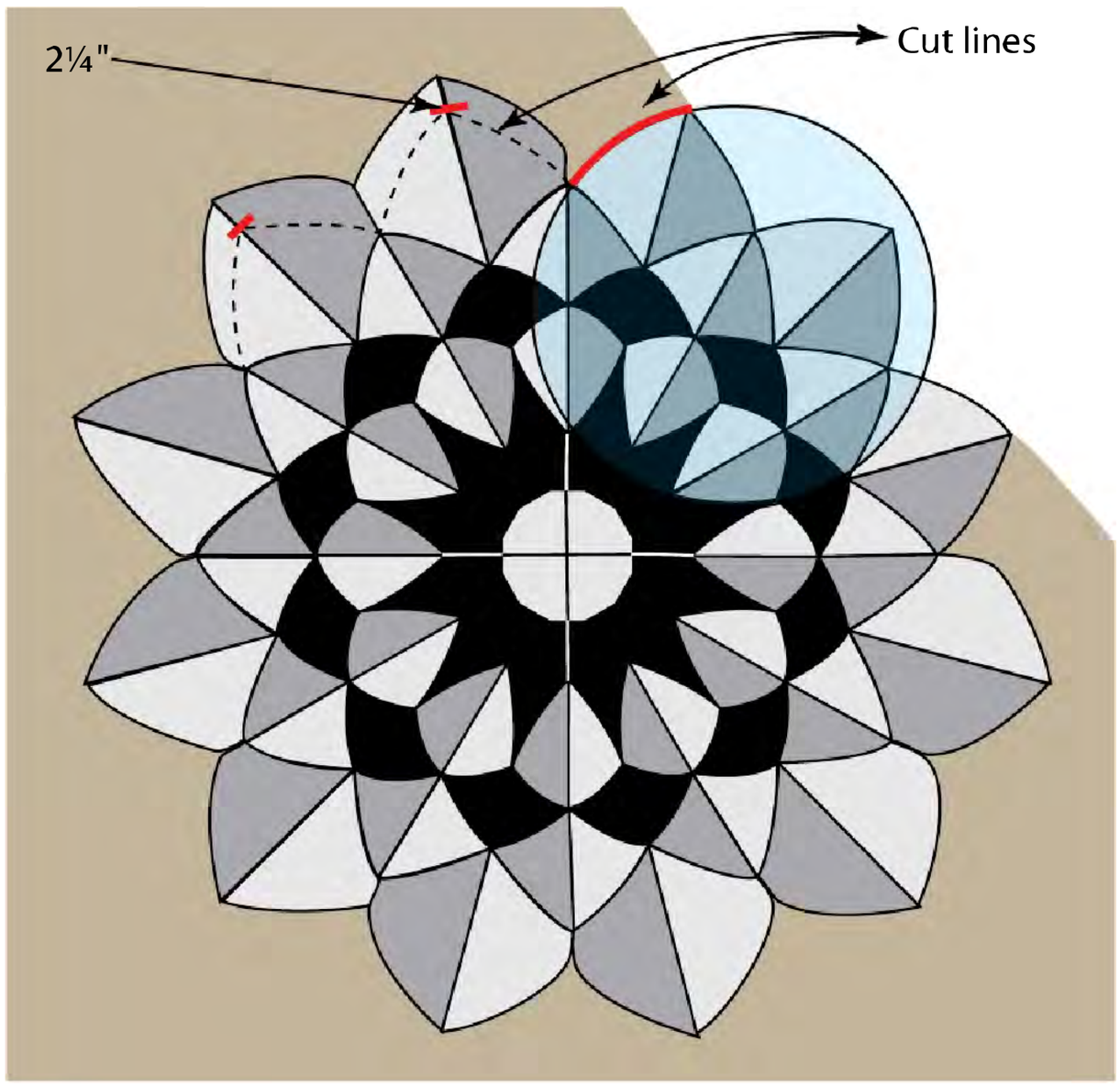
19. Use wide (six inches) app tape and completely cover the pieces.
20. Turn the marquetry over and remove all small pieces of tape from the backside.
21. Reposition any piece that is out of place.
22. The outer row of 12 petals will be on the pattern without the outer edges being defined.

Glue the Marquetry to the Backer Board: The marquetry is ready to be attached to the background.

23. Use the full-size pattern and transfer the outline onto the backer board.
24. Spread yellow PVA glue on the backer within the outline.
25. Secure the marquetry to the backer with blue tape.
26. Put wax paper and layers of paper towels on the top and clamp. **Note**: A clamping table is ideal here. See 'Concepts, Clamping Table' for details on this.
27. After 45 minutes remove the clamps, take the piece out and remove the app. tape.
28. Scrape off protruding glue, put wax paper and padding back on and clamp for 1-2 hours.

Cut the Perimeter: Draw the outline of the petals and cut the lotus flower to shape.

29. Make a pencil mark at 2¼-in. for each of the outer petals. See **Drawing 14-3**.
30. Use a round plastic guide (6-inches in diameter) and draw the outline of the petals.
31. Use a band saw and cut the petal shapes.
32. Use a 1-inch upright belt sander and sand the edges of the petals smooth.



Drawing 14-3. Draw the Outer Petals. Make a mark at 2¼-in. along the petal line and use a 6-in. diameter circle guide to mark the outer petal outline. This is the cut-line for the outline of the clock.

Put Veneer on the Petal Edges: Glue veneer pieces to the edges of the backer board.

33. Cut 12 light-colored and 12 medium-colored veneer pieces to 1⅝-in. wide x 2⅜-in. long. Note: no dark-colored veneer is used.
34. Use contact cement and glue 12 light-colored pieces to the sides of 12 petals. See 'Concepts, Glue & How it Works' for details on this.
35. Roll the surfaces of the veneers with a wooden dowel.
36. Cut the veneer pieces to the size of the petal.
37. Repeat the above with the medium-colored veneer pieces.

Finish: Seal with shellac and wipe-on polyurethane.

38. Seal the marquetry with shellac.
39. Scrape and sand until smooth.
40. Add three coats of wipe-on poly.
41. Put in the clock mechanism.

Consider an ellipse. When cutting a marquetry piece into a background, use an ellipse. It is more interesting than a circle and router collars make it easy to cut the background hole and the inset piece.

Project 15

SMALL CLOCK

This project introduces a more complicated 'Window Method' type of construction. The Small Clock will be knife-cut and will also introduce pre-assembled insert pieces. See pattern **Drawing 15-1**. The Clock (see **Photo 15-1**) will be 7-in. square and the parquetry will be 6-in. x 6-in.

Photo 15-1

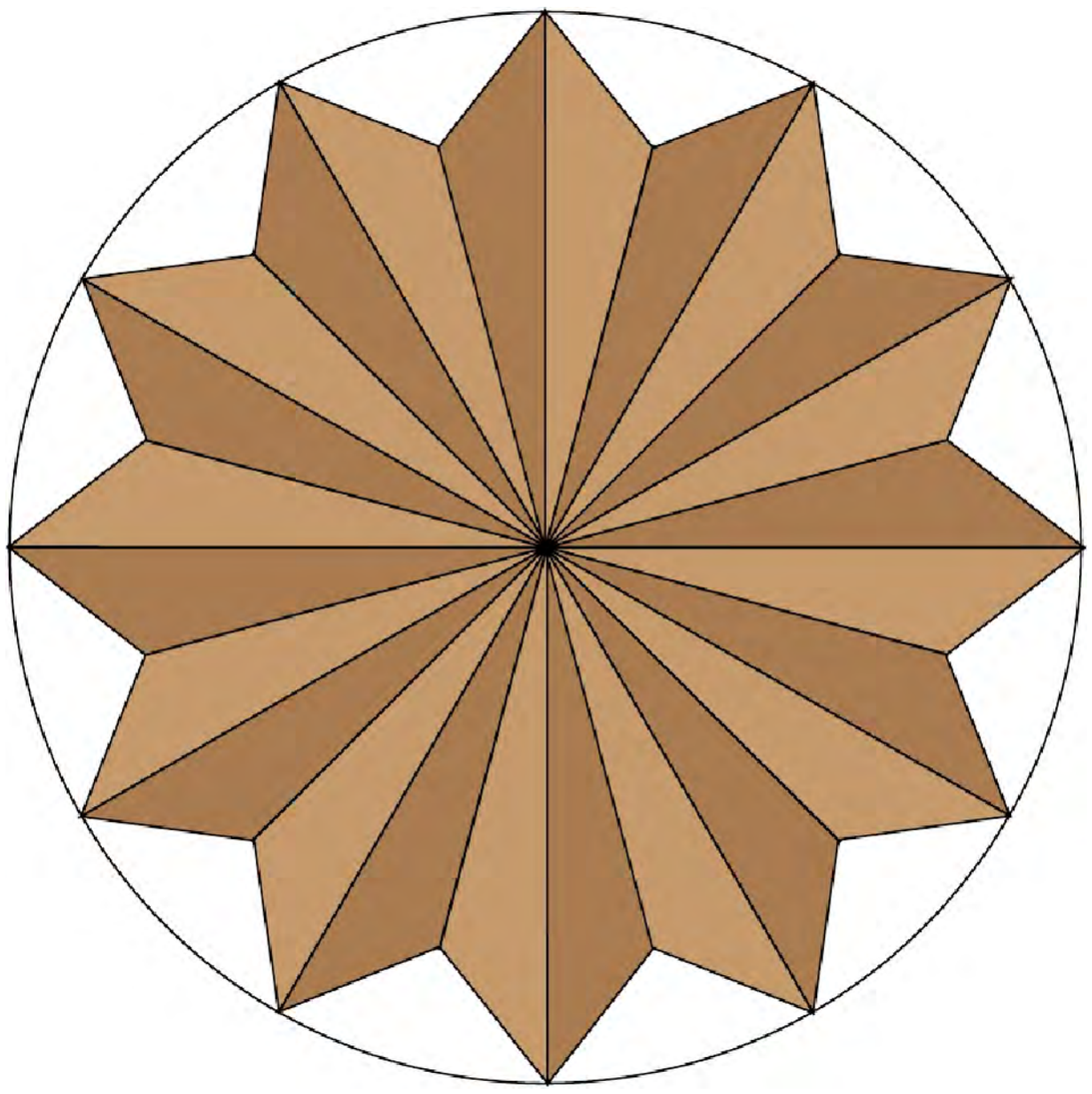
Extra Tools and Materials Needed:
Plywood for background and
Clock mechanism.

Make the Insert Strips: The strips are made of two different colored veneers. Make twelve, each 3½-in. long x 1½-in. wide.

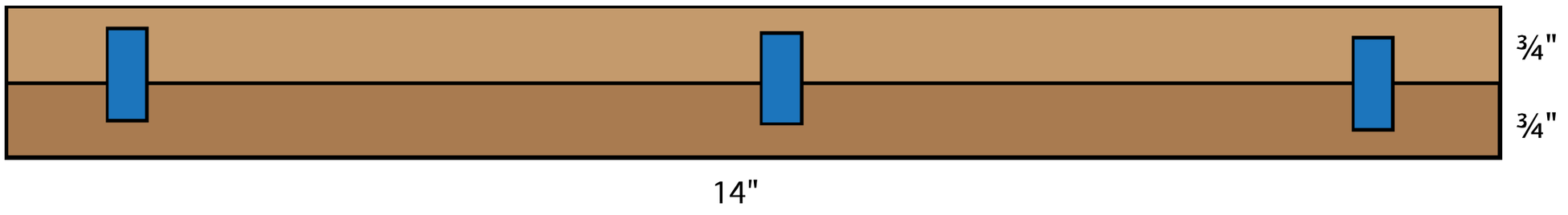
1. Select a medium-colored veneer and a light-colored veneer for the clock points.
2. Use a cutting mat and spacers and cut three medium-colored strips 14-in. long x ¾-in. wide and three light-colored strips to the same size.
3. Use a sandpaper shooting board and dress the edges of the strips.
4. Blue-tape two strips together, bend the joint open and rub yellow PVA glue along the joint. See **Drawing 15-2**.
5. Wipe off excess glue and add app tape along the joint lengthwise; let the glue dry.
6. Cut twelve insert pieces each 3½-in. long.

Cut the Windows: Select a background veneer of size 7½-in. square.

7. Cover this background veneer with app tape front and back.
8. Lay out the twelve pointed design **Drawing 15-1** on the background piece with straightedge and pen.
9. Start at one sector and use the tip of a knife to make stab marks at the four points.
10. Lay a straightedge along two marks and draw the blade towards you until it engages the second stab mark. Do this three or four times until the knife cuts through the veneer.



Drawing 15-1. The Clock Pattern.



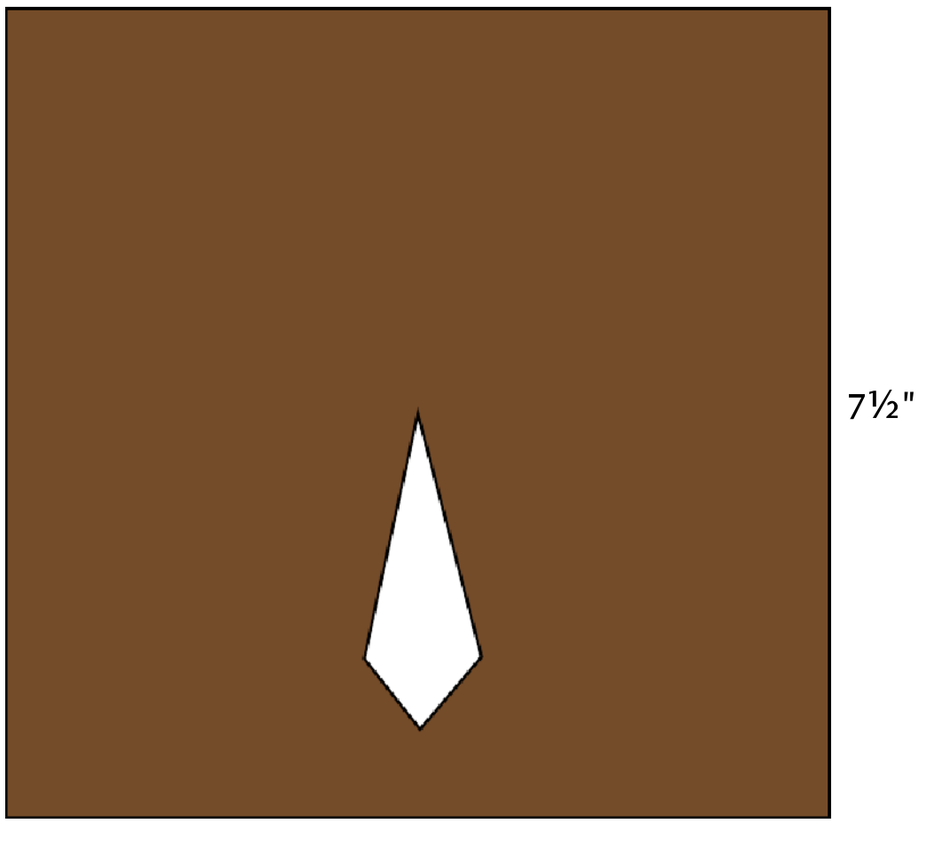
Drawing 15-2. Preassembled Pieces. Two strips of veneer are glued together and then cut into the windows as a unit.

11. Move the straightedge and cut the other three sides of the sector.
12. Remove the cutout segment and set it aside.
13. Remove any burrs on the edges of the window and make the points as sharp as possible, **Drawing 15-3**.

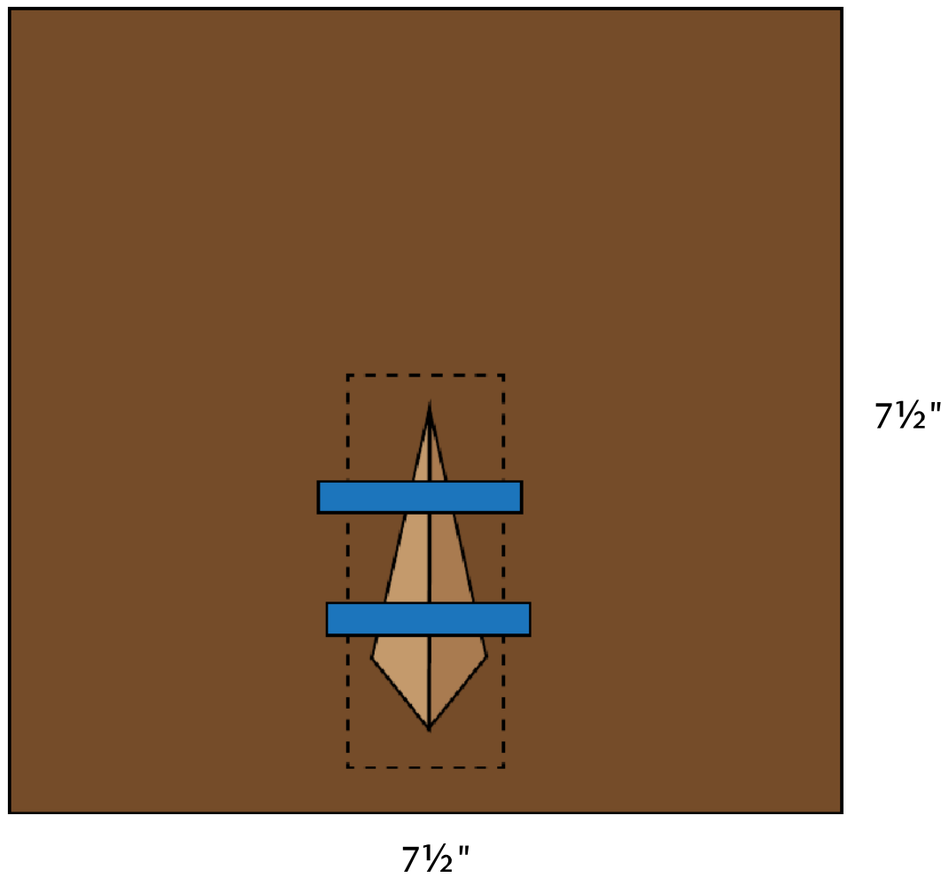
Cut and Add the Insert Piece: By pre-assembling the two veneers and gluing them together, the insertion process is simplified.

14. Align the double-veneer strip under the window and tape it in place. See **Drawing 15-4**.
15. Use a push pin and make four holes in the strip at the four points.
16. Move the insert piece to a cutting mat and use a straightedge and a knife to cut out the piece.
17. Insert the new piece into the window and glue it into place. **Drawing 15-5**.
18. Cover the insert piece with app tape.
19. Move to a point across the background and continue to cut windows and set the insert pieces into place.
20. When all twelve points have been added, examine the piece and make repairs.

Glue the Parquetry to the Backer: Glue to a piece of ½-in. plywood and add the clock mechanism. The center circle of light-colored veneer makes it easier to see the clock hands.



Drawing 15-3. Window in Background. The background veneer is covered with app tape front and back before each window is cut.

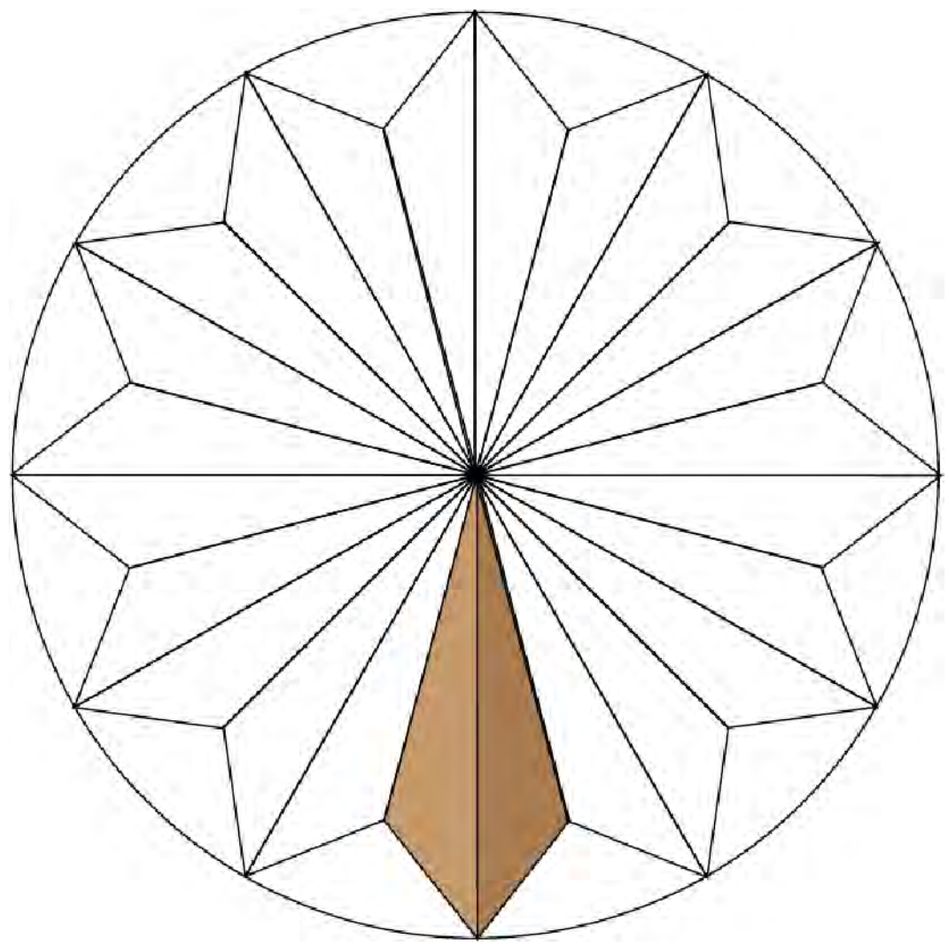


Drawing 15-4. Insert Piece. Tape the new piece under the window and mark the outline. The inset piece has app tape on the underside.

21. Drill a ¼-in. hole in the plywood for the clock stem.
22. Glue the parquetry to the plywood and trim the edges.
23. Glue veneer strips to the edges of the plywood.
24. Cut a 2¼-in. circle of light-colored veneer and glue it to the center of the dial.

Finish the Clock: Use an appropriate finish and add the battery-driven mechanism. If the clock is to hang on a wall, it's finished. If the clock is to set on a desk, make a stand or a box to house it.

25. Seal with shellac, scrape and sand.
26. Finish with multiple coats of wipe-on polyurethane.



Drawing 15-5. The Inset in Place. Glue the inset into the window and continue to add pieces.

KNIFE OR SAW? Use a veneer saw on heavy veneers and when you are cutting with the grain. Use multiple light strokes.

Project 16

MAKING A CHECKER/ CHESSBOARD

This project requires cutting long strips of veneer with a knife and a veneer saw. Geometric marquetry is called parquetry and a checkerboard is the most basic of all the designs and perhaps the most useful. A regulation chessboard has 2¼-in. squares; for non-regulation use (I'm assuming you are not a Grand Master) 1½-in. squares make a nice sized playing area (12-in. x 12-in.). Adding a ⅜-in. inner border and a 2¼-in. outer border will give us a final board about 17-in. square; easier to store than the bigger board. Note: For all of us less cerebral blokes, we can use this board for checkers. See **Photo 16-1**.

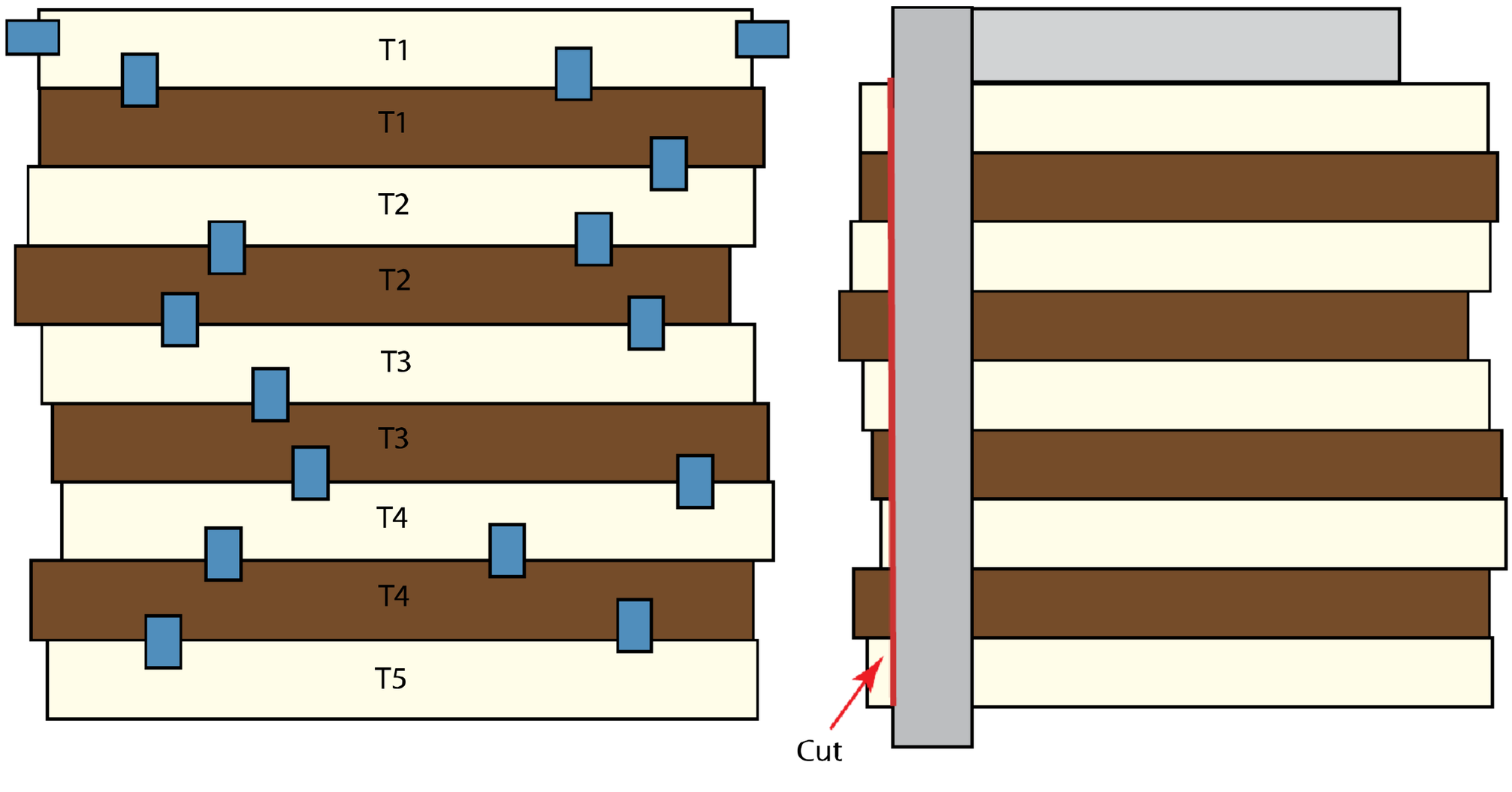
Photo 16-1

This seems like a simple project; just cut 32 light-colored squares and 32 dark- colored squares, push them all together and glue them onto a board. Sounds easy, but the result would be disappointing. Herding sixty-four little blocks together to make a perfect 12 x 12-inch square is a lot of work and the result will be frustrating. The trick is to work in strips; they are easier to cut and easier to assemble.

Gather enough light- and dark-colored veneer to cut strips 1½-in. wide x 15-in. long. The strips should be from single pieces of veneer and as each strip is cut it should be marked. On the final piece, it is important that all squares are all from the same side of the veneer, all are in sequence and they all have grain going the same direction. The outer border requires four pieces of veneer each about 2½-in. wide x 20-in. long.

Five strips of light veneer are cut when only four are needed; one square is cut off and discarded during construction. If we

Sharpen your veneer saw. If it's not sharp, it will not cut well. Use a flat file, a whetstone and a triangular file.



Drawing 16-1. Tape Light and Dark Strips Together. Keep the strips in order.

Drawing 16-2. Square One End. All joints on the bottom side are covered with app tape.

didn't have this extra row, that discarded end square would be put at the other end of the row and this would destroy the sequence and the grain direction. Light reflection and chatoyance would be a distraction to what would have been a beautiful piece of parquetry.

Extra Tools and Materials Needed: Strip cutting jig, sandpaper shooting board, Masonite flattening boards, ¾-in. plywood base and an outer band of ¼-in. thick maple.

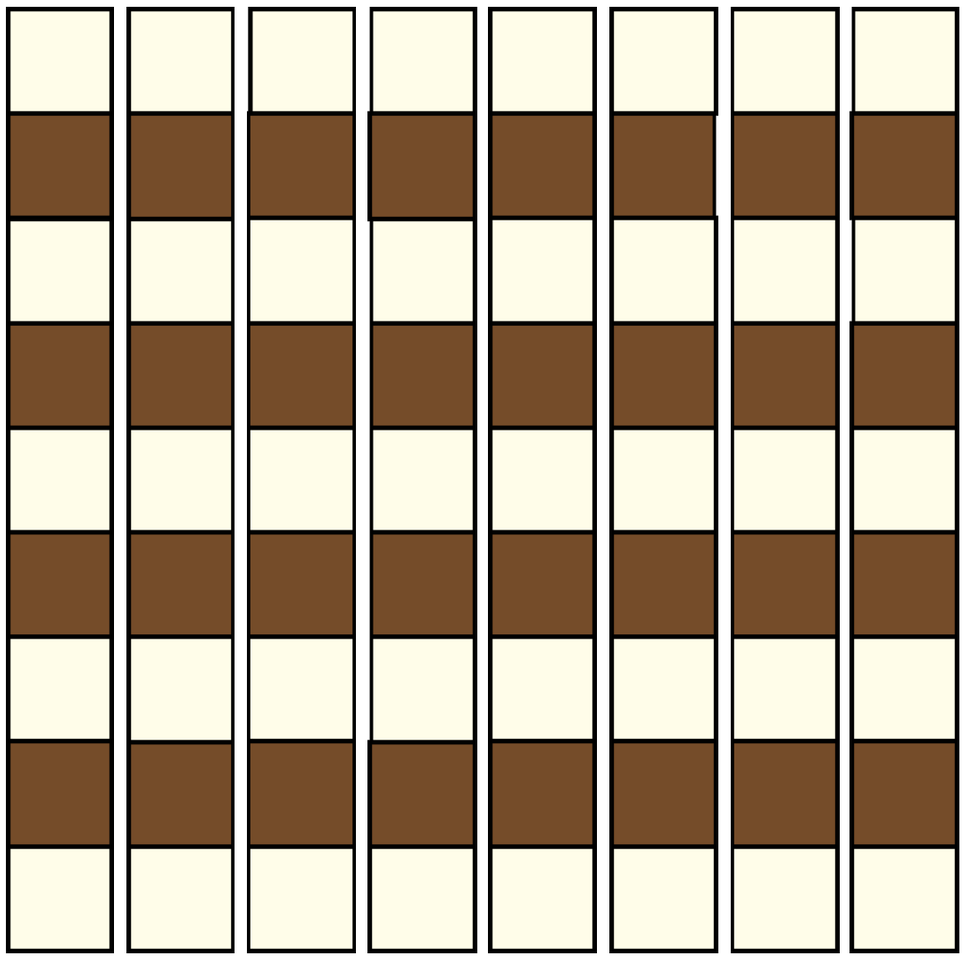
Start Out: Cut all the strips first. Use a cutting jig with 1½-in. spacers and a sandpaper shooting board to smooth the edges. See 'Concepts, Jig, Strip Cutting' for details on this.

Don't drill the hole, punch it. Use a push-pin or a sharpened nail in a drill press. No wood is removed and it is easy to push the fibers back in place later.

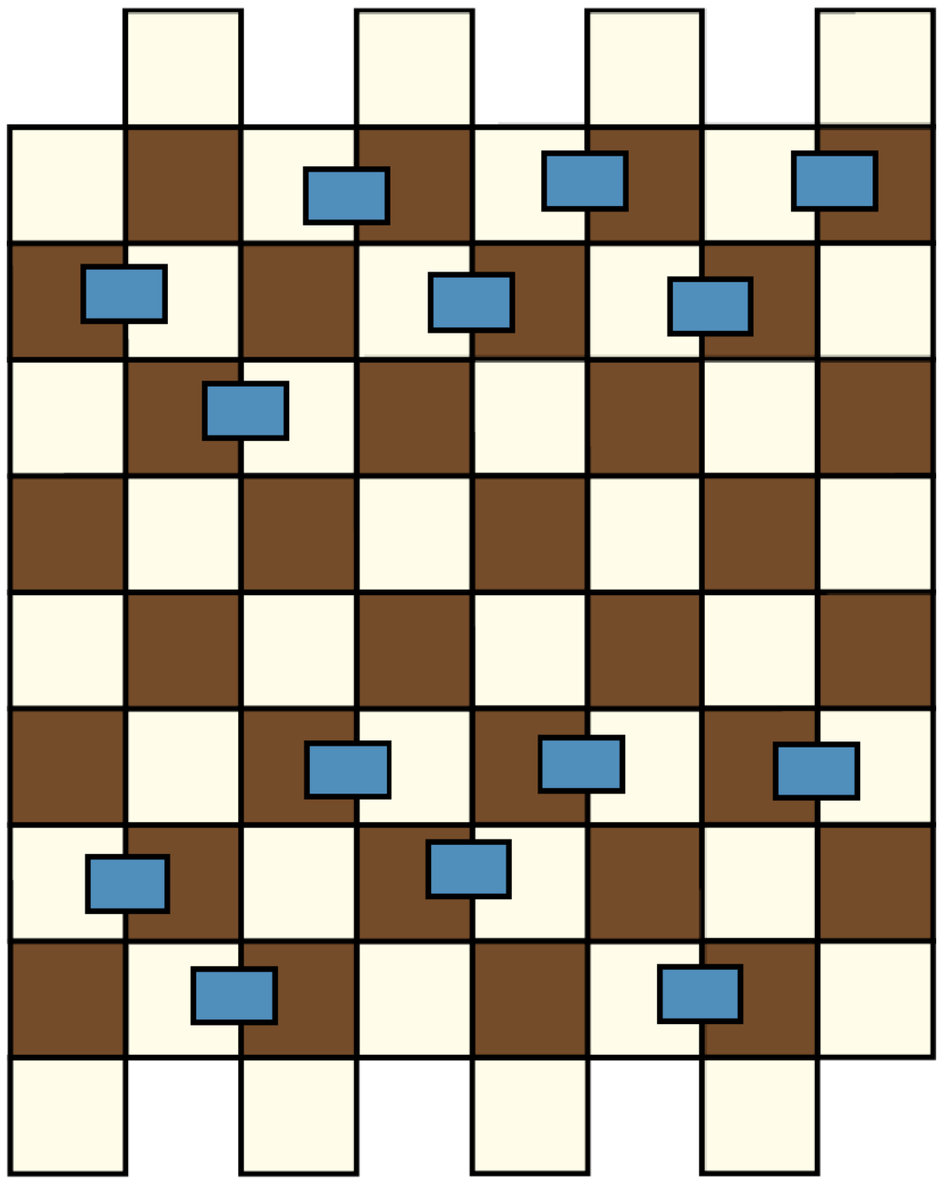
1. Use the jig and cut five strips of light-colored veneer each 1½-in. wide and 15-in. long. As each strip is cut mark it 'Top 1', 'Top 2', etc.
2. Cut four strips of dark-colored veneer as above and mark them 'Top 1' etc.
3. Use a sanding board to smooth the edges of all the strips.

Tape the Strips Together: Fasten all the strips together with blue tape and then glue them together.

4. Tape light-colored strip 'T1' to a board.
5. Position dark strip 'T1' and push the two strips together. Check that the joints mesh and tape the two strips together.
6. Keep building the square by taping light-colored strip 'T2' and then dark-colored strip 'T2' etc. until there are five light strips and four dark strips. See **Drawing 16-1**.
7. Hold the large square up to the light and check for gaps. Reposition the strips to eliminate gaps or use of the shooting board to straighten the strips.



Drawing 16-3. Cut Eight Strips. Use the cutting jig and cut the 1½-inch strips.



Drawing 16-4. Join the Strips. Trim off the extra blocks.

8. Turn the large taped piece over and, working from the back side, rub white PVA glue into each long joint.
9. Rub off excess glue and cover each joint with a long strip of app tape.
10. When all the joints have been glued and covered with app tape, turn the piece over (top side up) and lay a big piece of Masonite on it and let it set.
11. After 30 minutes remove the blue tape.

Cut the Pattern Strips: Use a framing square to cut one end at 90˚.

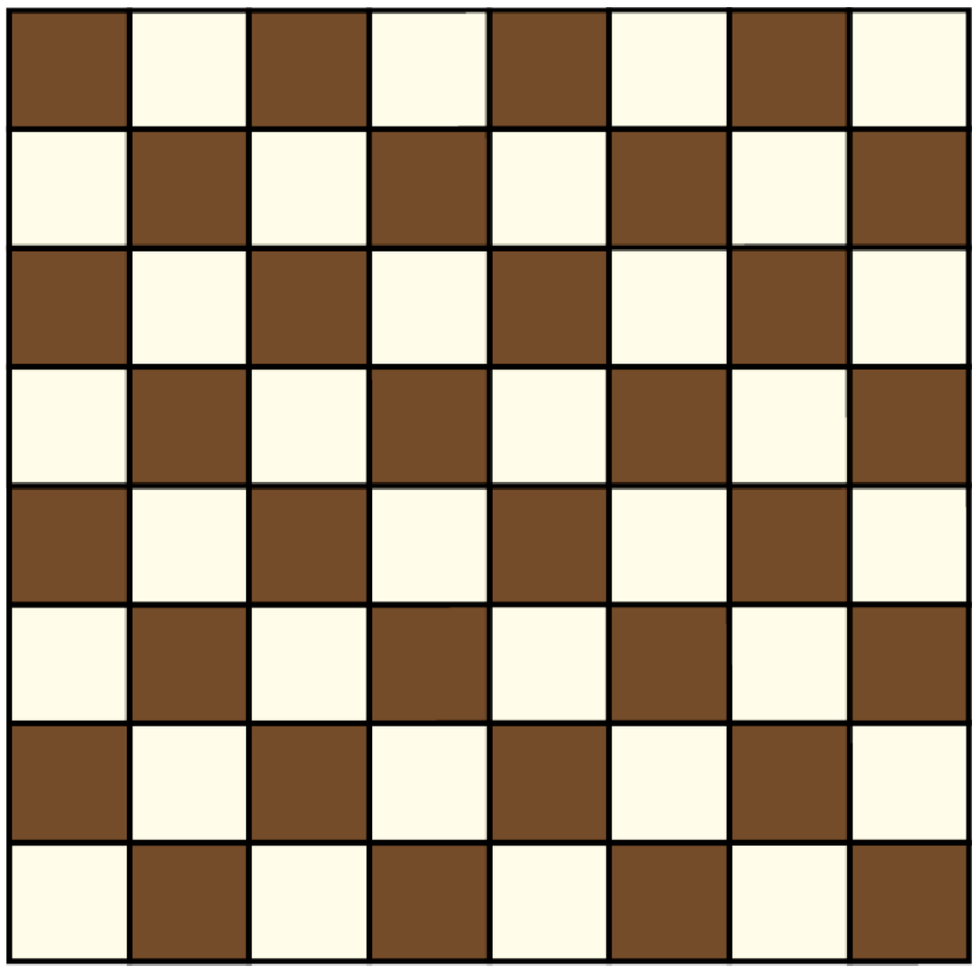
12. Work from the front and use a 24-in. steel square to trim one end of the taped layout to 90˚. See **Drawing 16-2**.
13. Use the cutting jig and cut eight strips at 1½-in. See **Drawing 16-3**.
14. Use the shooting board and lightly sand both edges of each strip just cut. Keep the strips in order.

Make the Pattern: tape the strips together and make the checkerboard pattern.

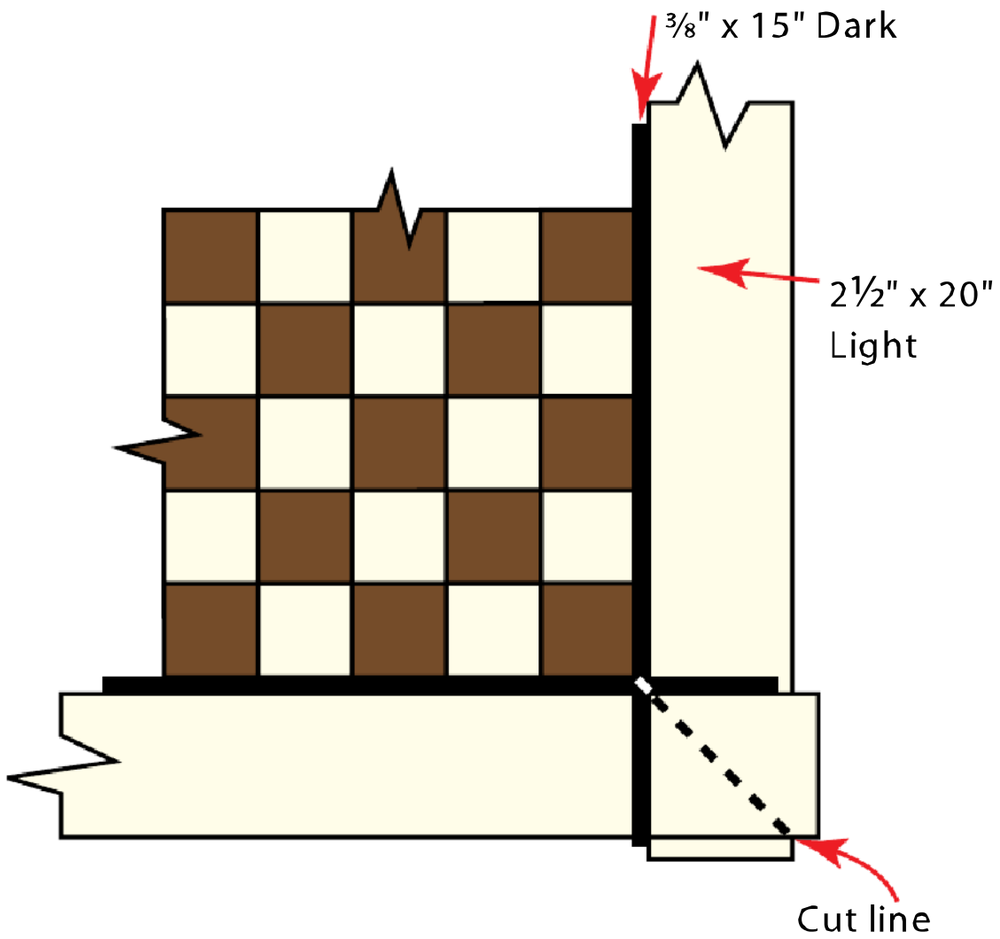
15. Assemble the arrangement as shown in **Drawing 16-4** by shifting the strips.
16. Use blue tape and PVA glue to fasten the strips together.
17. Cut off the extruding ends. See **Drawing 16-5**.

Add the Borders: Add the inner strips and the outer borders. Cut four strips ⅜-in. wide x 15-in. long for the inner strips.

18. Cut four strips 2½-in. wide x 20-in. long for the outer borders.
19. Tape these pieces to the checkerboard. See 'Concepts, Borders, Stringers and Corners' for details on this.
20. Cut across the joints from inner corner to outer corner; see **Drawing 16-6**.



Drawing 16-5. The Final Checkerboard. Ready for the inner strips and outer borders.



Drawing 16-6. Make the Inner Strips and the Outer Border. Cut at the line to make 45° corners.

Glue the Parquetry to a Backer Board and Protect the Edges: A game board gets some hard use. After the veneer pieces have been glued down, the edges of the veneer need to be protected.

21. Glue the veneer piece to a ¾-in. piece of plywood.
22. Add an outer band of ¼-in. thick maple.
23. Seal with shellac and then rub on a few coats of wipe-on poly.
24. Scrape and sand until the surface is smooth.
25. Wipe on more coats of polyurethane.

Hang a heavy picture. Attach the wire at the bottom rail and thread it through eye screws on the each side and then on to the top. This puts the pressure on the bottom of the frame and not on the top or sides.

Project 17

CRAZY CHESSBOARD OR A WALL HANGING

This project can be a Chessboard or a Modern Art Form—or both. Linda Salter Horner made this chessboard a long time ago when she was teaching her son, Mike, to play chess. After a few lessons Mike, only 8 years old at the time, began to understand the game. Within a few days, young Mike was winning a game now and then. In just a few weeks, Mike was beating the soup out of mama. So Linda decided to make a chessboard that was confusing—so confusing that she hoped to befuddle her young son and win more games. The first game with the new chessboard went well; mama won as son Mike seemed awed by the strange board and was unable to concentrate. However, as you might expect, just as young Mike had solved the complexity of chess, he soon disentangled the convoluted and diabolical form of the Crazy Chessboard and before long he was routinely beating the soup out of mama again.

Photo 17-1

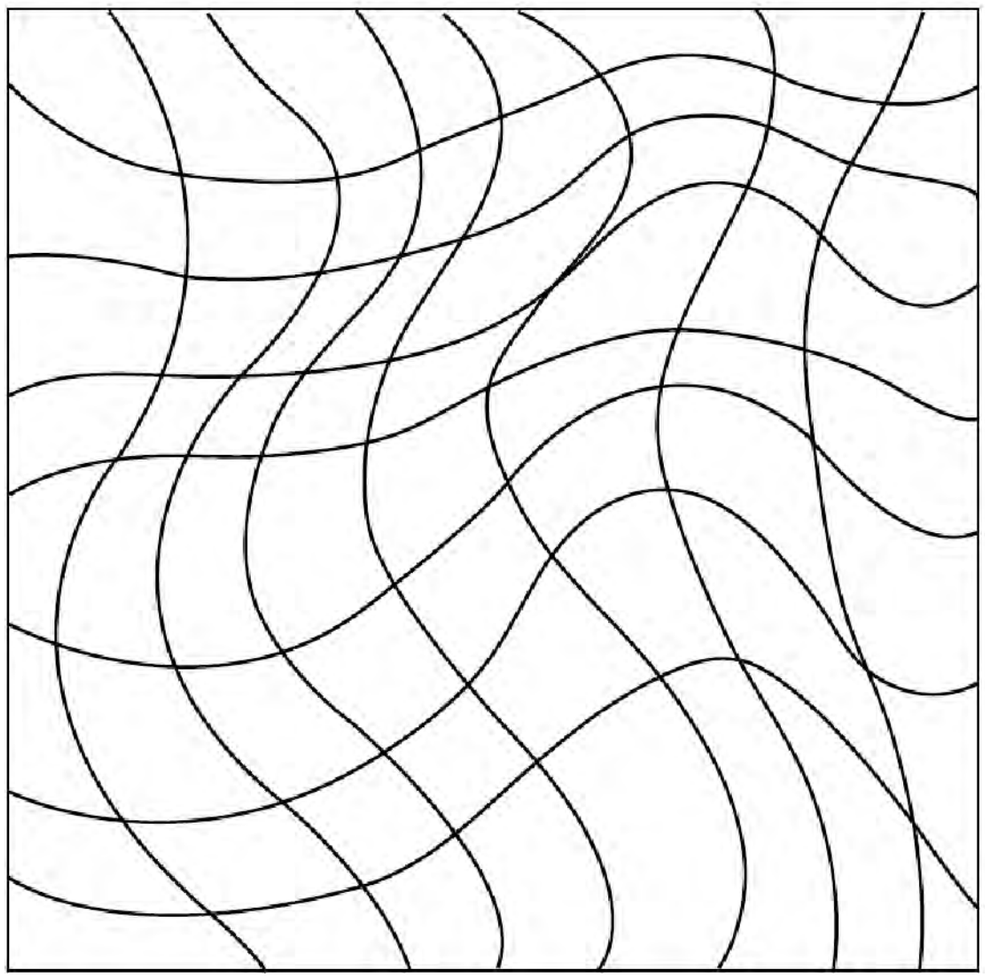
So, mama retired the Crazy Chessboard and it became a Wild Wall Hanging. See **Photo 17-1**.

The marquetry part is 16-in. x 16-in. and the final board is 22-in. square. See pattern **Drawing 17-1**.

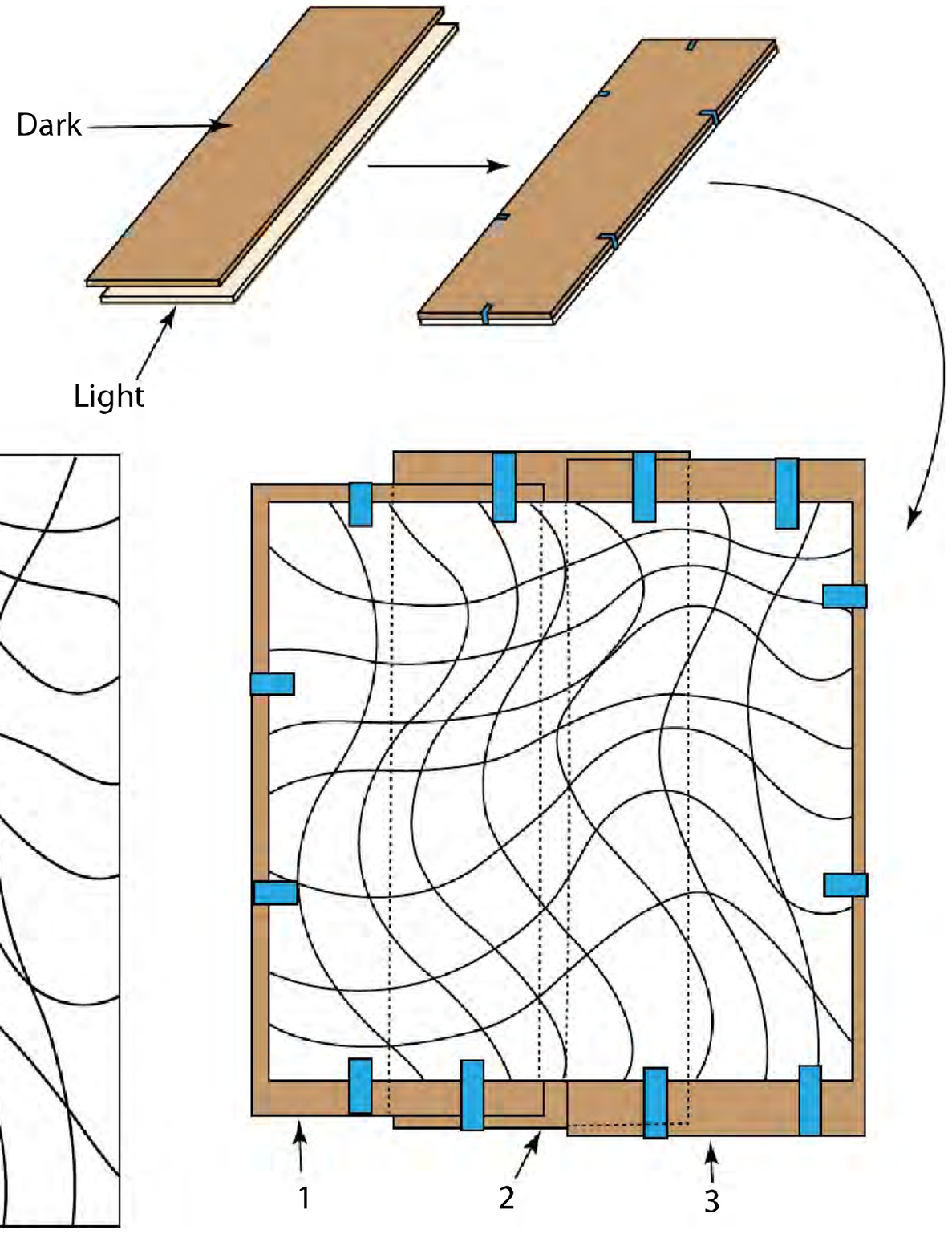
Extra Tools and Materials Needed: Birch plywood (½-in.) for the board and ebonized outer strips (½-in. x ¼-in.).

Gather the Veneer: You will need three dark and three light pieces of veneer, each 9-in. x 17-in. Tape these pieces into three packs and

Wood straightedge for a saw. When you slip, the wood won't dull your veneer saw like a metal straight edge will.



Drawing 17-1. The Pattern. Note that the Chess Board is still eight squares (or shapes) per side or 64 total sections; see photo Photo 17-1.



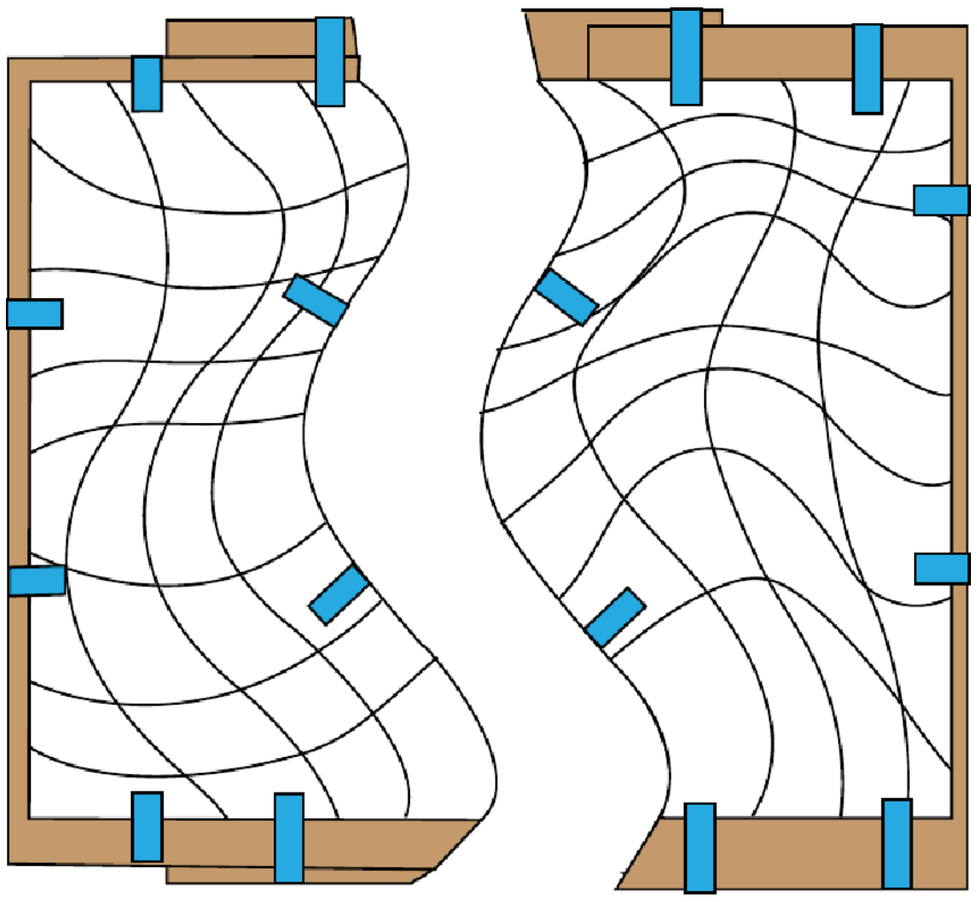
Drawing 17-2. Placing the Veneers. Make three packets of dark and light veneer (each 9-in. x 17-in.) and tape them below the pattern.

place them under the pattern—allow plenty of overlap.

1. Make three veneer packets, each pack with two layers of veneer with one dark and one light, each 17" long x 9" wide.
2. Cover the top and bottom of each pack with app tape.
3. Blue-tape the three veneer packs onto a card board backer as in **Drawing 17-2**.
4. Glue the pattern to the top and set the saw to 90° (no tilt).

Cut the Pieces: Cut directly across the pack, tape the raw edges of both sides of the pack back together (see **Drawing 17-3**), cut across the pack again and remove the cut section and set it aside. Continue cutting until all eight strips are separated. Tape the pack back together, rotate 90° and cut the other direction.

5. Cut the strips apart. If your scroll saw will not reach; cut halfway, back the blade out and cut from the other side.
6. Fasten the edges of the pack back together with clear cellophane or blue tape. See **Drawing 17-3**.
7. Place the cut rows side-by-side as they come off the scroll saw.
8. When all the strips have been cut, tape the pack back together.
9. Turn the packet 90° and cut full-length strips across the pack as before.



Drawing 17-3. Cut the Pieces. Cut across the pattern seven times, tape the strips back together, rotate the pack 90° and then cut seven times across the pack the other way.

Lay out the Chessboard: All the pieces have been cut and there are parts enough to make two chessboards.

10. Put app tape (sticky side up) on two large plywood pieces—about 24-in. x 24-in.
11. Carefully remove all the app tape and blue tape from the top of one outer strip.
12. Discard all the partial pieces and put the best pieces in place on the proper board.
13. Do this for the next strip and for the rest of the strips.
14. When each board is complete, check for missing parts.
15. Cut small fragments and glue them in place to fill the voids or find a better replacement from the discards.

Square up the Chessboard: Use two 24-in. framing squares to form the 16-in. x 16-in. square. Shift the framing squares until all the outer sections are of a size to accommodate a chess piece.

16. Use two framing squares to define the 16-in. x 16-in. square.
17. Make small pencil marks at the four corners.
18. Remove the framing squares and put app tape from corner to corner.
19. Use a straight edge and a sharp knife and cut each edge.

Add the Borders: Check different colors and different widths of veneer to find the best fit.

20. Cut four pieces of black veneer each 18½-in. x ¼-in.
21. Cut four pieces of light-brown veneer each 24½-in. x 2¾-in.
22. Tape these pieces in place and cut the 45° joints at each corner.

Glue the Chessboard to a Backer Board: The backer board should be thick enough and sturdy enough to endure the rigors of the give-and-take of a kid's and adult's game board. But, it also should be light enough to hang on the wall—just in case the owner of the Crazy Chess Board loses too many games and, like Linda Salter Horner, decides to use it as a wall hanging. Add ebonized outer strips to the plywood.

23. Cut a piece of ½-in. birch plywood to 24-in. x 24-in.
24. Use yellow PVA glue and attach the parquetry piece to the plywood.
25. After the glue has dried, trim the plywood backer to the outer dimensions of the Crazy Chessboard.
26. Add ½-in. wide x ¼-in. thick strips to the four edges to hide the plywood edges and to protect the edges of the veneer. In the photo these strips are black, ebonized walnut. See 'Concepts, Ebonizing Wood' for details on this.

Project 18

VALET TRAY

Photo 18-1

This little tray can go on the Master's dressing table and be the repository of coins, cuff links and rings. It is gorgeous (in a manly way) and has some interesting features. The tray has eight sides (an octagon) while the fan-shaped parquetry in the bottom is made of 12 pieces (a dodecagon). The wedges are sand-shaded and scalloped on the ends. **Drawing 18-1**.

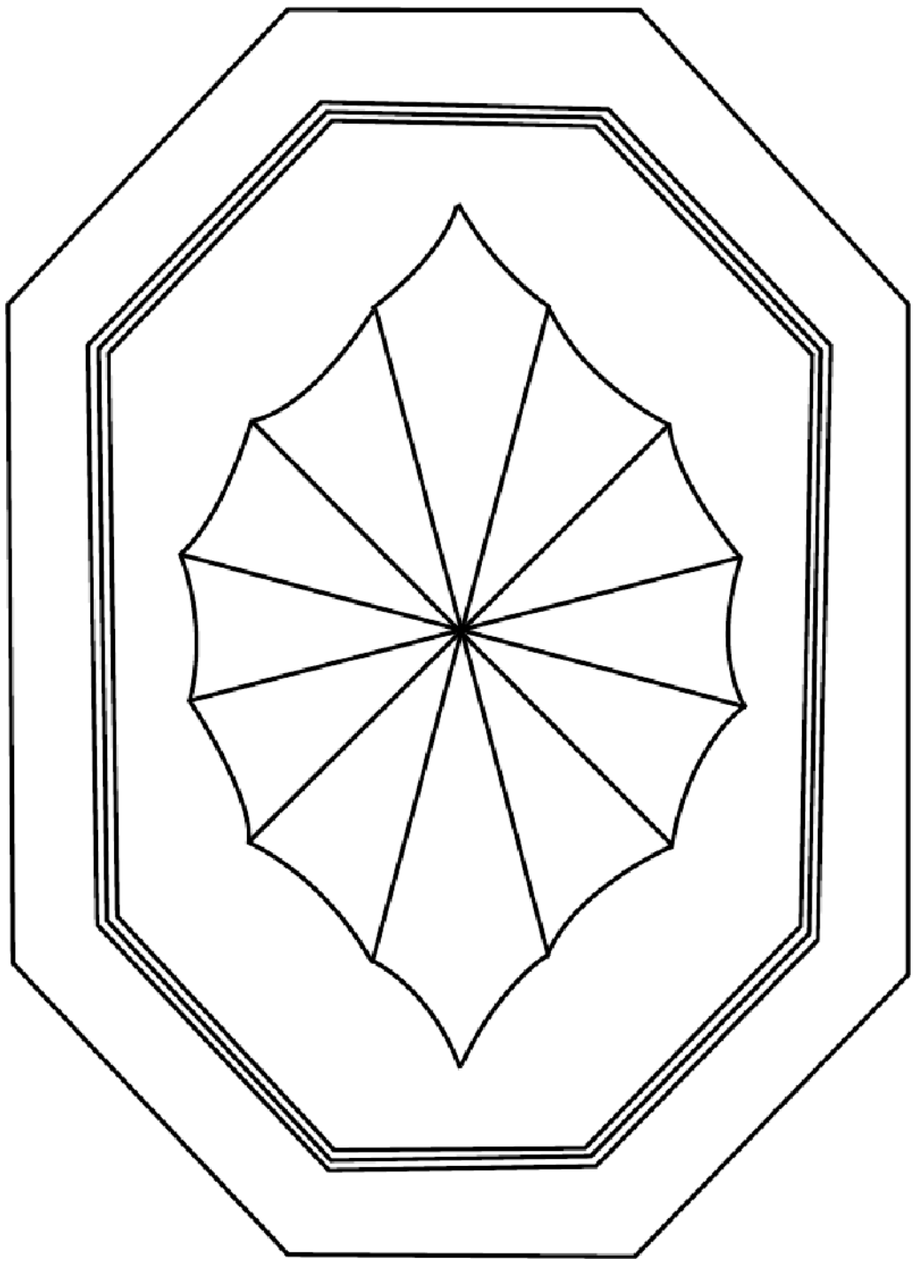
Extra Tools and Materials Needed: ¼-in. plywood for the bottom, ¼-in. stock for the sides, 2½-in. plastic pattern and a router.

Make the Baseboard: The base for the parquetry (the bottom of the tray) is a piece of veneer-covered plywood.

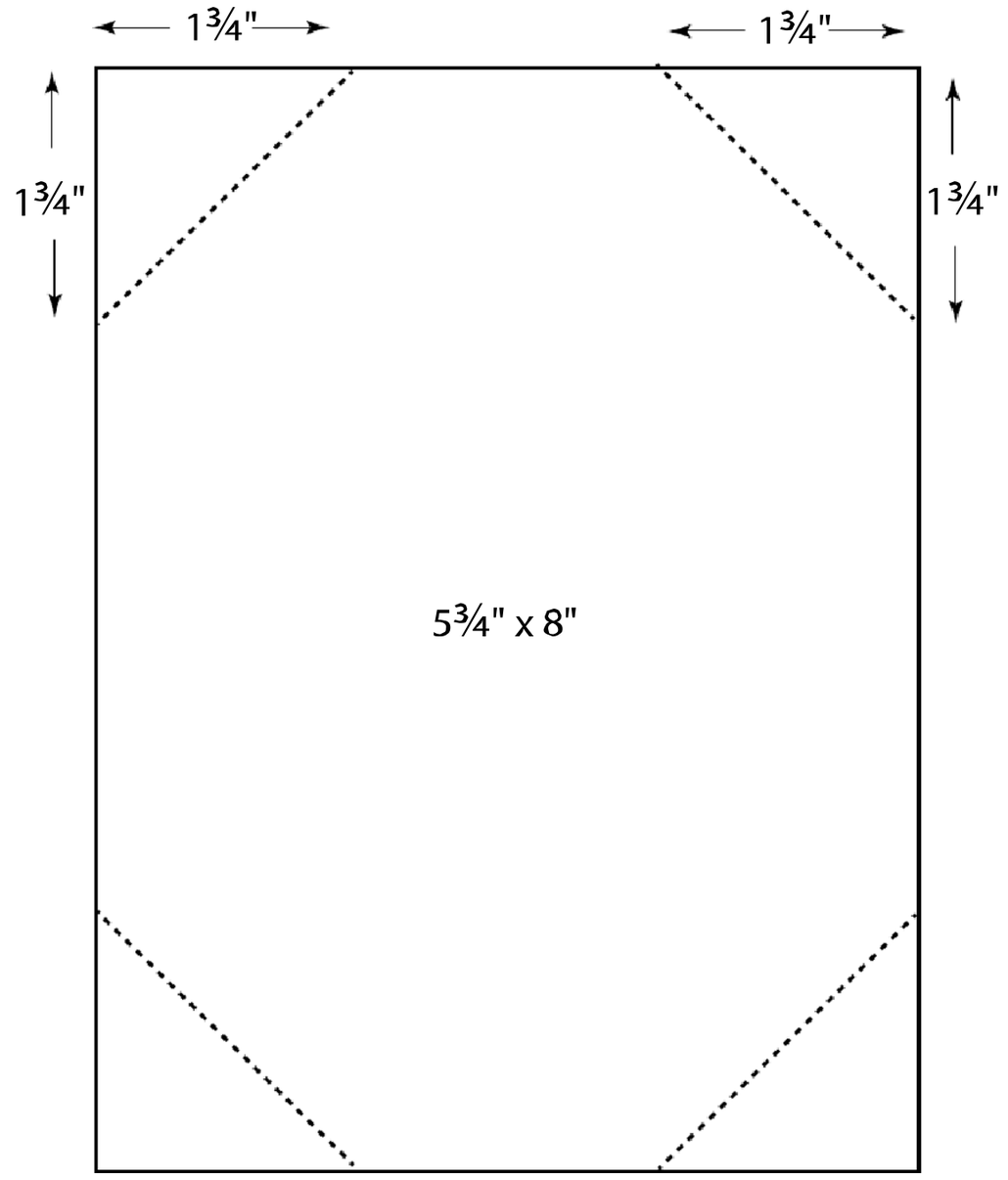
1. Cut a piece of ¼-in. veneer-covered plywood to 5¾-in. x 8-in.
2. Make marks 1¾-in. in from all corners. See **Drawing 18-2**.
3. Cut the plywood along these lines.

Make the Wedges: There are twelve wedges; the longest is about 3 inches long. Each wedge is cut, sand-shaded and put into a fan shape.

4. Refer to Twelve Piece Radial Clock project for details on cutting the 30° wedges.



Drawing 18-1. Pattern. The sunburst has 12 wedges each cut at 30° and sand-shaded. The tray and the outer border are octagons.



Drawing 18-2. Rectangle to Octagon. Make the cuts as shown.

Make the Parquetry: Three wedges should make a 90° angle.

5. Tape all the pieces together with app tape and rub white PVA glue into the joints.
6. Fasten the piece to a cutting mat, taping every other wedge. **Drawing 18-3**.
7. Use the plastic circle (diam. 2½-in.) and cut an arc at the end of each wedge.

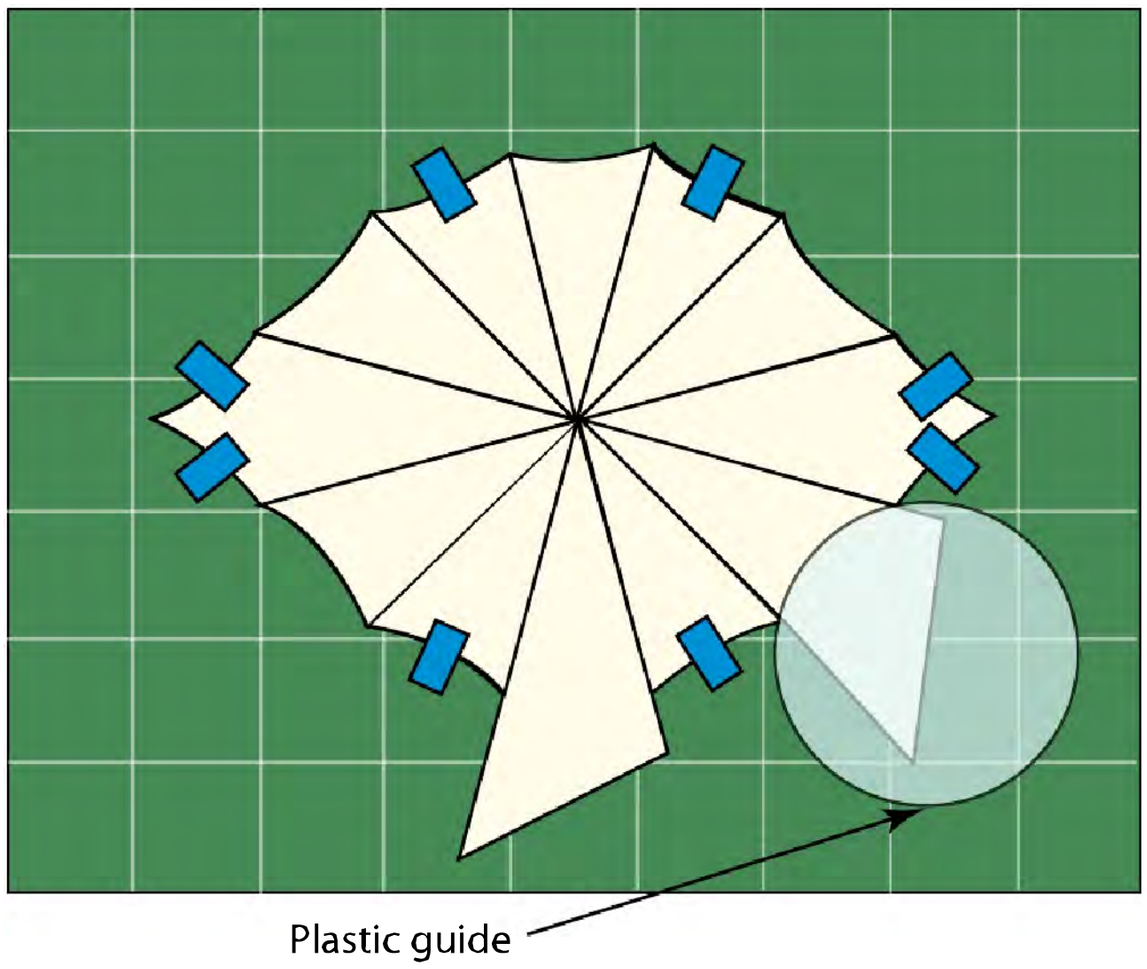
Cut the Parquetry into the Background: Use the parquetry piece as the pattern.

8. Choose a background veneer that looks good with the fan veneer.
9. Cut it to 6-in. x 8-in. and cover the back and front with app tape.
10. Tape the background veneer to a cutting mat.
11. Fasten the parquetry piece to the background with blue tape on every other wedge. See **Drawing 18-4**.
12. Use the plastic guide to cut six arcs, move the blue tape and cut the other six arcs.
13. Put the sunburst into the background and glue it in place.

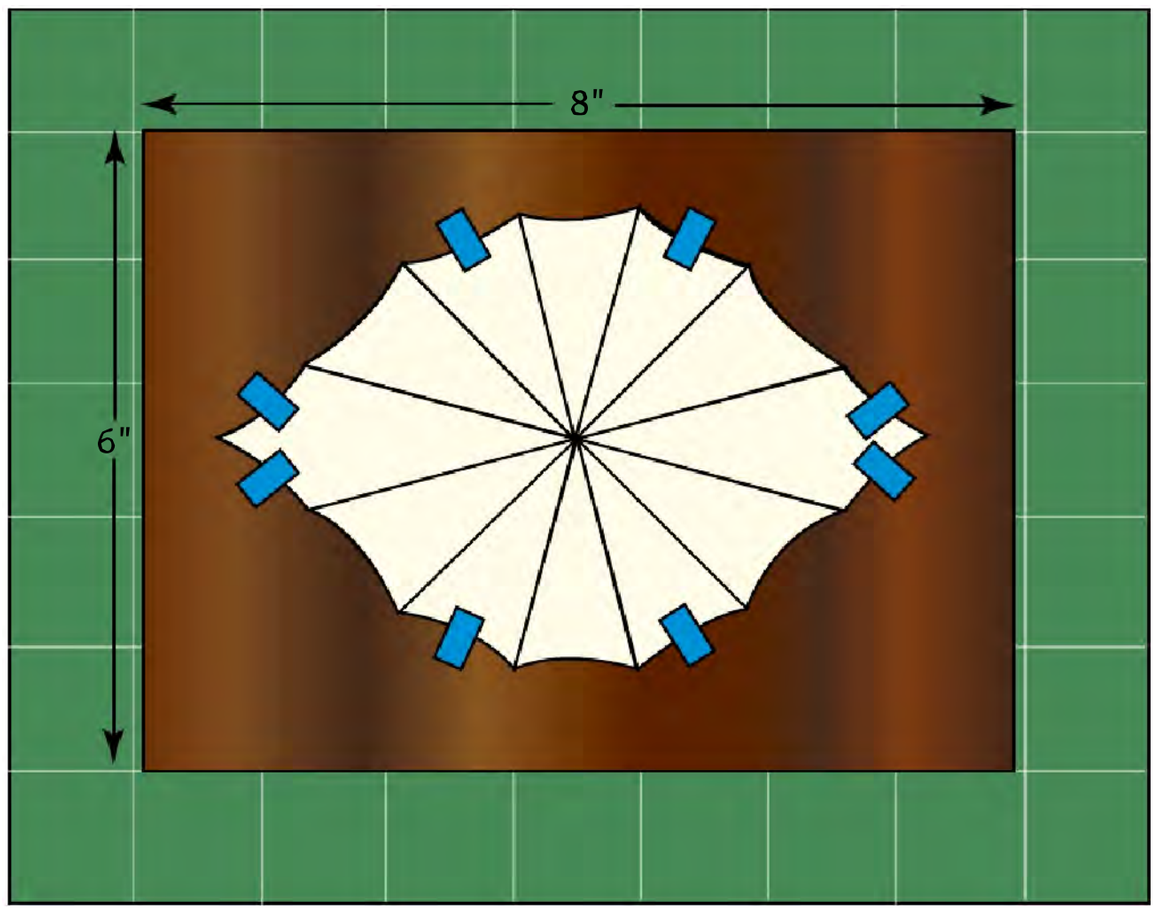
Cut the Dark Background to Size and Add the Accent Lines: The background is cut to size and the thin accent lines are added.

14. Use **Drawing 18-1** as a pattern and cut the background veneer to octagon size.
15. Make thin veneer strips from dark and light wood.

Border corners. It's more important that the two pieces in a criss-cross outer border meet at the corner of the marquetry piece than that they are exactly 45°.



Drawing 18-3. Sunburst on Mat. Fasten the 12-segments with blue tape and cut the arcs using a 2½-in. diameter plastic guide.



Drawing 18-4. Cut Background. Tape the sunburst to the background and cut around the edges.

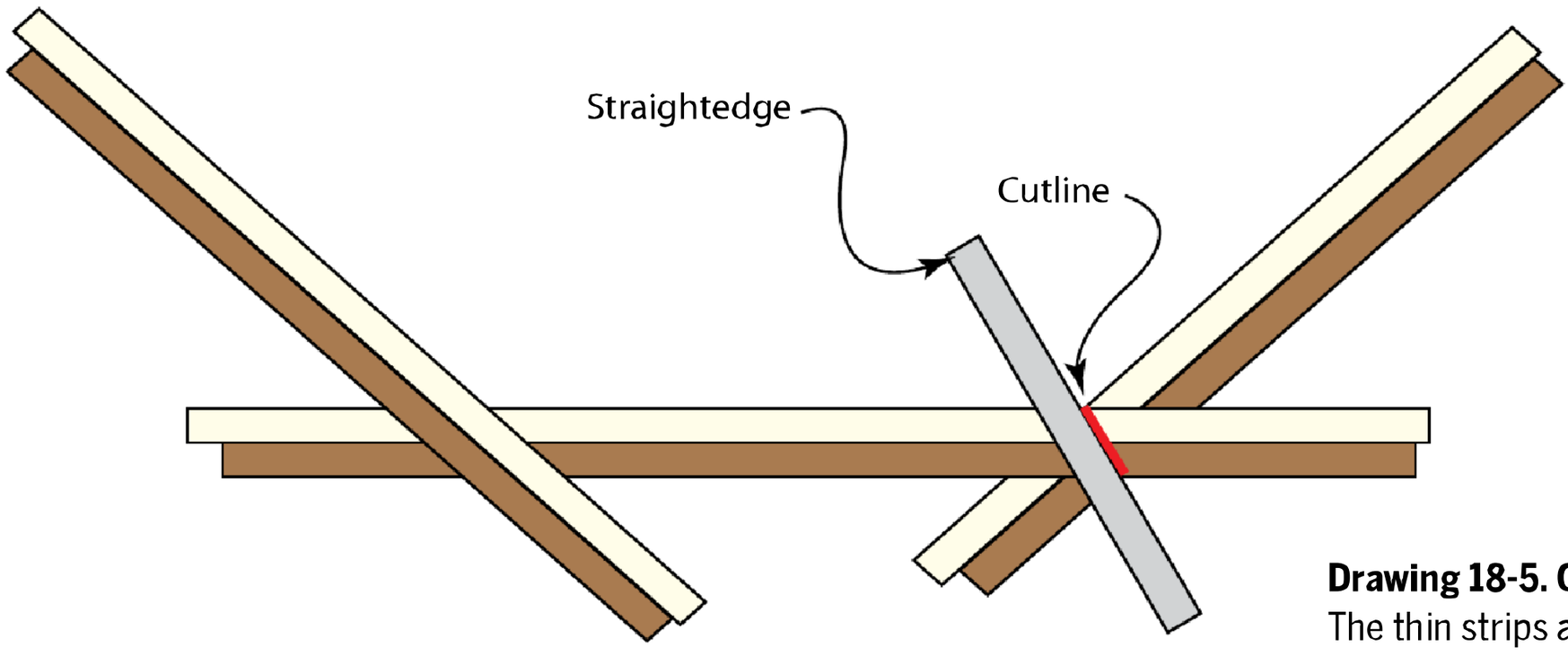
16. Use white PVA glue and tape the strips to the sides of the octagon.
17. Overlap the corners and use a straight edge and a sharp knife to cut across each joint. See **Drawing 18-5**.

Cut The Assembly into the Background:

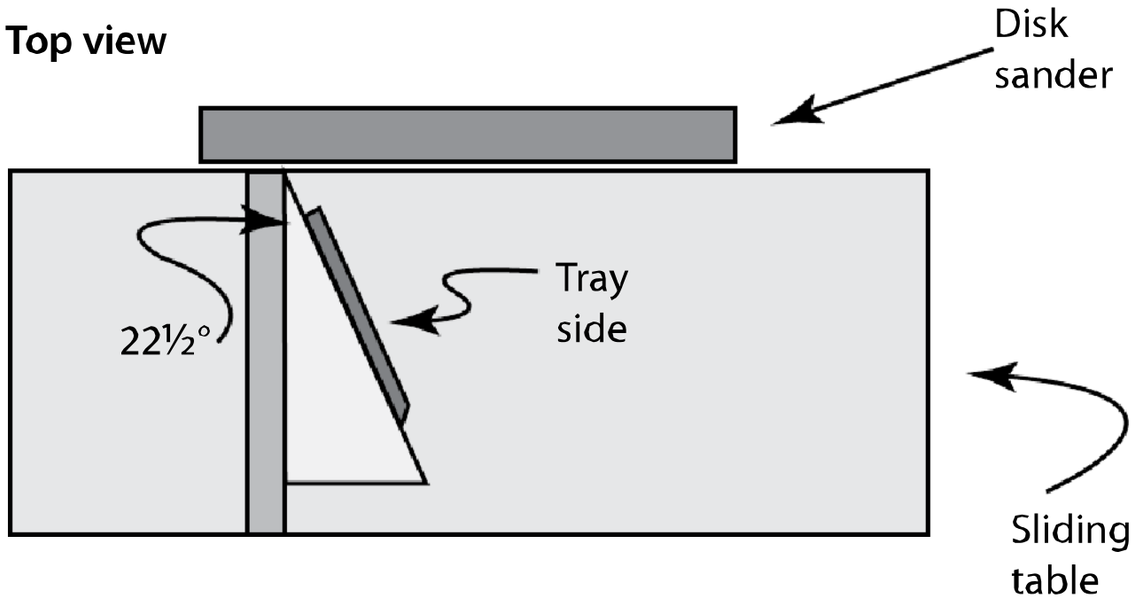
The background will have app tape on front and back. The parquetry inset piece will have app tape on the backside.

18. Cut the dark-colored veneer for the background (8½-in. long x 6-in. wide).
19. Cover it front and back with app tape.
20. Fasten the parquetry piece to the background veneer with tape at every other side of the octagon.
21. Use a knife and a straight edge and cut through four sides.

ADD EXTRA VENEERS TO THE PACK. Always put in an extra base veneer when pad cutting. It never hurts and this may be the best base of the lot.



Drawing 18-5. Cut the joints. The thin strips are glued together and are added to the parquetry as a unit.



Drawing 18-6. Shape the Tray Joints. Use a 22½° wedge to make the side joints.

22. Move the tape to the cut sides and cut the other four sides.
23. Rub white PVA glue into all the joints, sand lightly and cover the joints with app tape.

Fasten to the Backer Board: The parquetry piece is ready to be glued to the plywood.

24. Use wipe-on poly on the veneer side of the backing plywood.
25. Glue the parquetry to the backer and clamp.
26. Scrape and sand before assembling the tray.

Make the Tray: The tray is made of ¼-in. stock; 1½-in. wide x 30-in. long.

27. Prepare the stock (**Photo 18-1** is cherry) and cut a rabbet along the bottom edge.
28. Using the tray bottom as a guide cut each side to length plus ⅜-in.
29. Use a 22½° wedge and the disk sander table to make the joints. See **Drawing 18-6**.
30. Glue the tray sides to the bottom.

Where's that old paper cutter? Use a paper cutter to make multiple cuts—straight or angled. If the veneer splits, add app tape to the back.

Project 19

DOUBLE FEATHER TRIVET

The usual definition of marquetry is 'making a picture or design using thin materials'. The materials range from wood, metal, plastic, gems and bamboo, with stones, shells and straw tossed into the mix. For this project we'll use thick wood stock instead of thin materials for two reasons: (1) hot dishes will be placed on it and a thin veneer glued to a backer board will not hold up and (2) in the event a hot dish burns the wood or a red wine stains it, the thick material can be refinished.

Photo 19-1

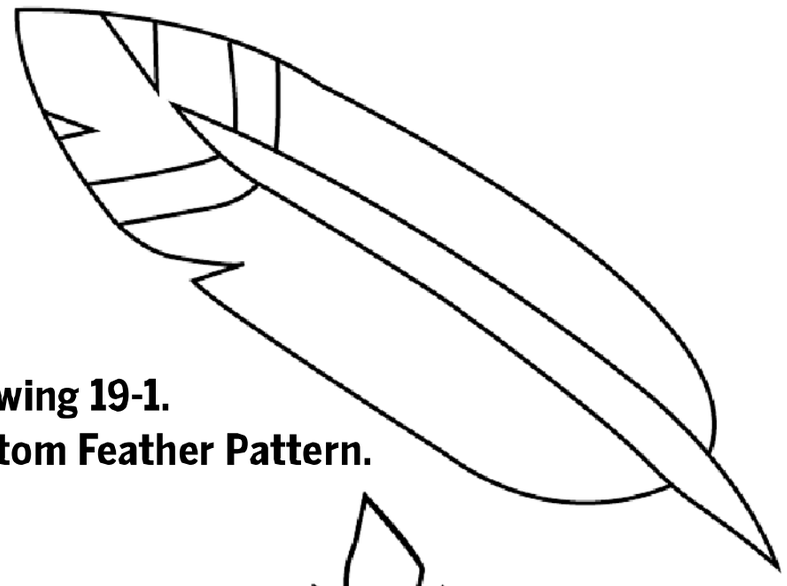
I grew up in the Arkansas River Valley of southeastern Colorado, went to high school and college in New Mexico and went to grad school in Arizona. The Double Feather design on this trivet is reminiscent of La Junta, Santa Fe, Albuquerque and the whole Southwest. Red oak is used for the background along with maple, blood-wood and walnut for the beautiful trimmings. The feather design (**Drawing 19-3**) is made up of a bottom feather (**Drawing 19-1**) and a top feather (**Drawing 19-2**).

Extra Tools and Equipment Needed: Stock: ¼-in. thick red oak, maple, blood-wood and walnut.

Prepare the Background: Start with ¼-in. red oak stock.

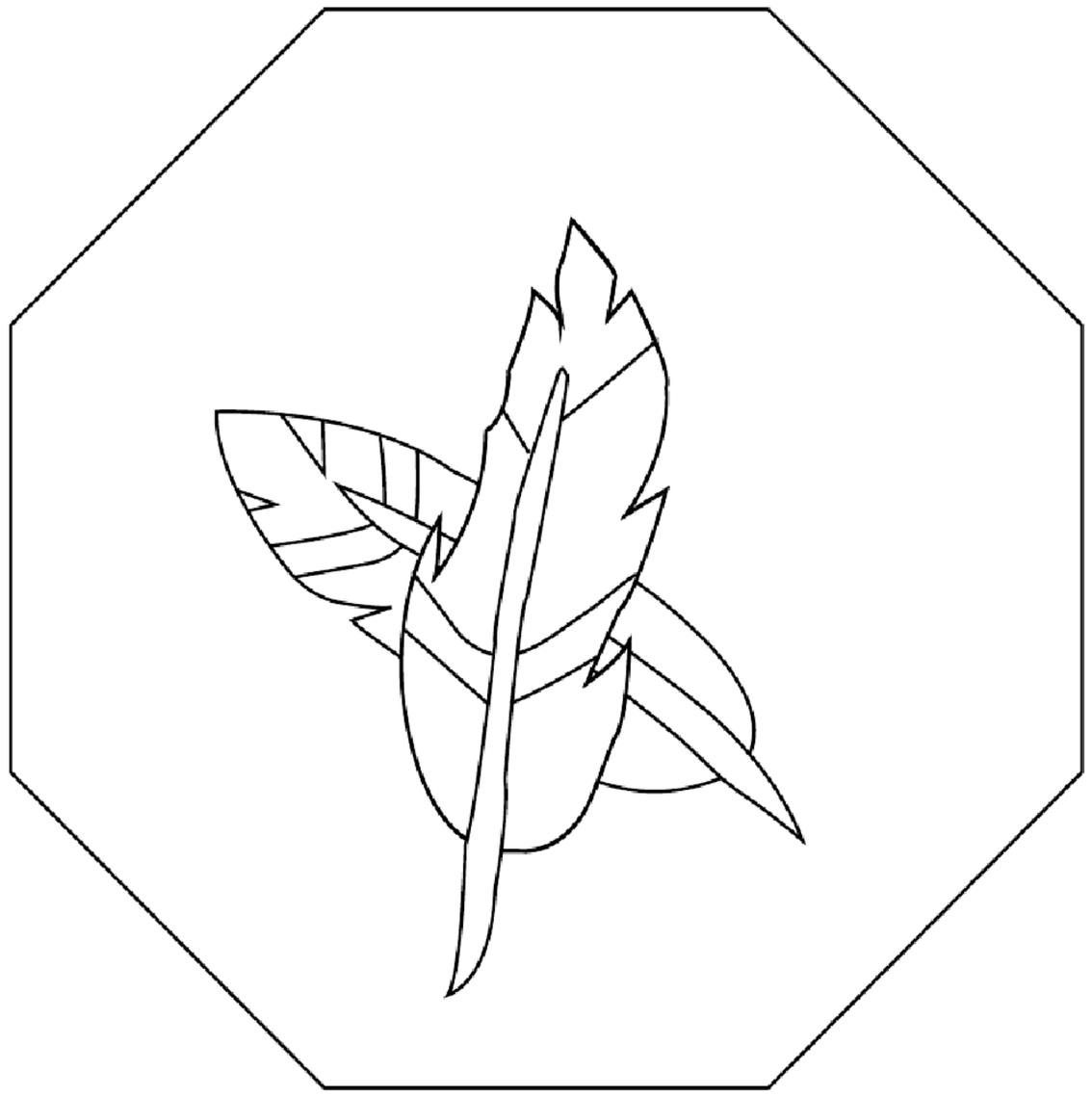
1. Prepare a 9-in. x 9-in. square and sand both sides.
2. Cut off the corners (**Drawing 19-4**).
3. Seal both sides with wipe-on poly.

Slipping straightedge. Use double-sided tape to secure 220 grit sandpaper under the piece.



Drawing 19-1.
Bottom Feather Pattern.

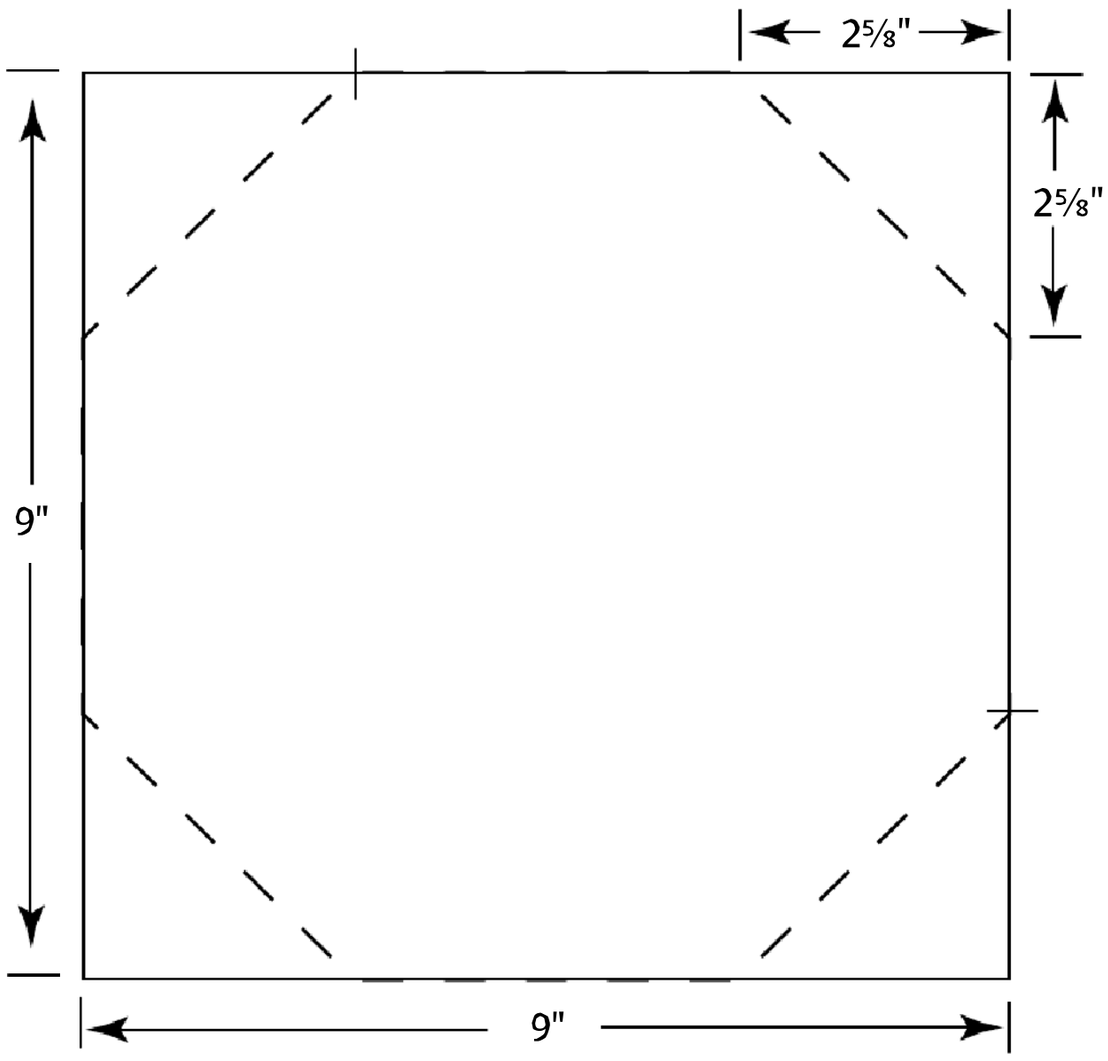
Drawing 19-2.
Top Feather Pattern.



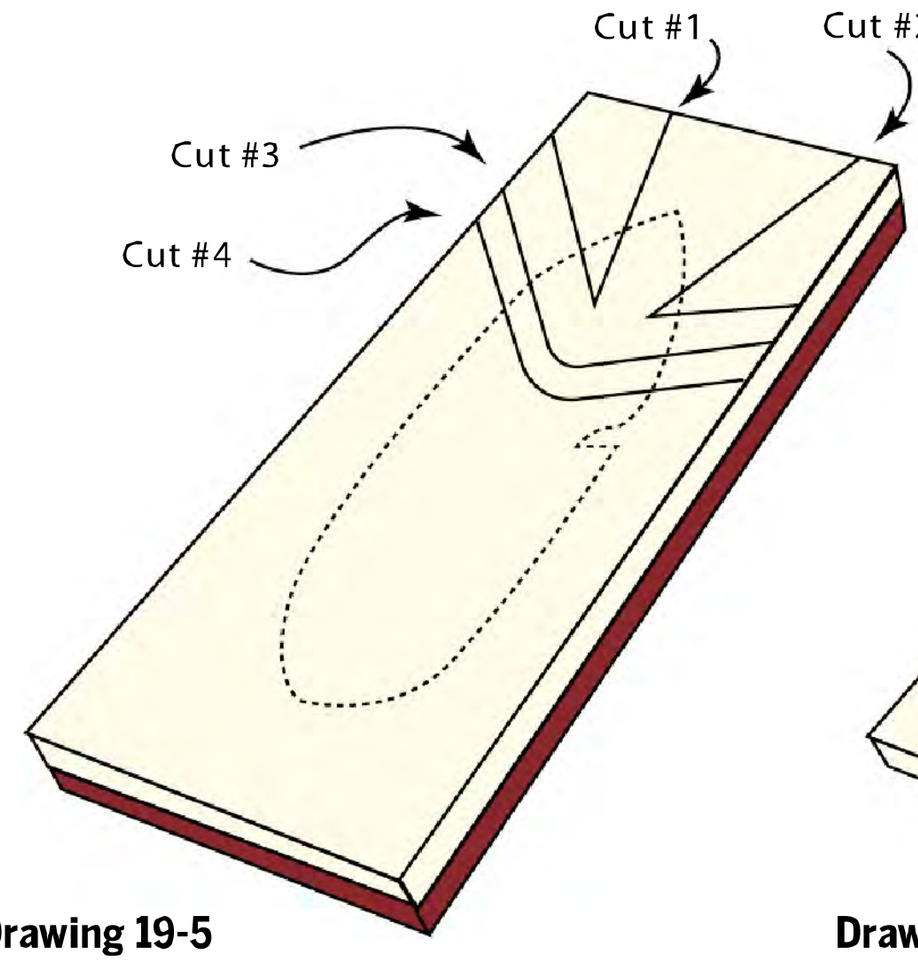
Drawing 19-3.
Both Feathers.

Prepare the Bottom Feather: Each Feather is made larger than needed and then is cut into the background. The stack woods are ¼-in. thick x 3-in. wide x 7½-in. long. Use scroll saw blades No. 3 or No. 4.

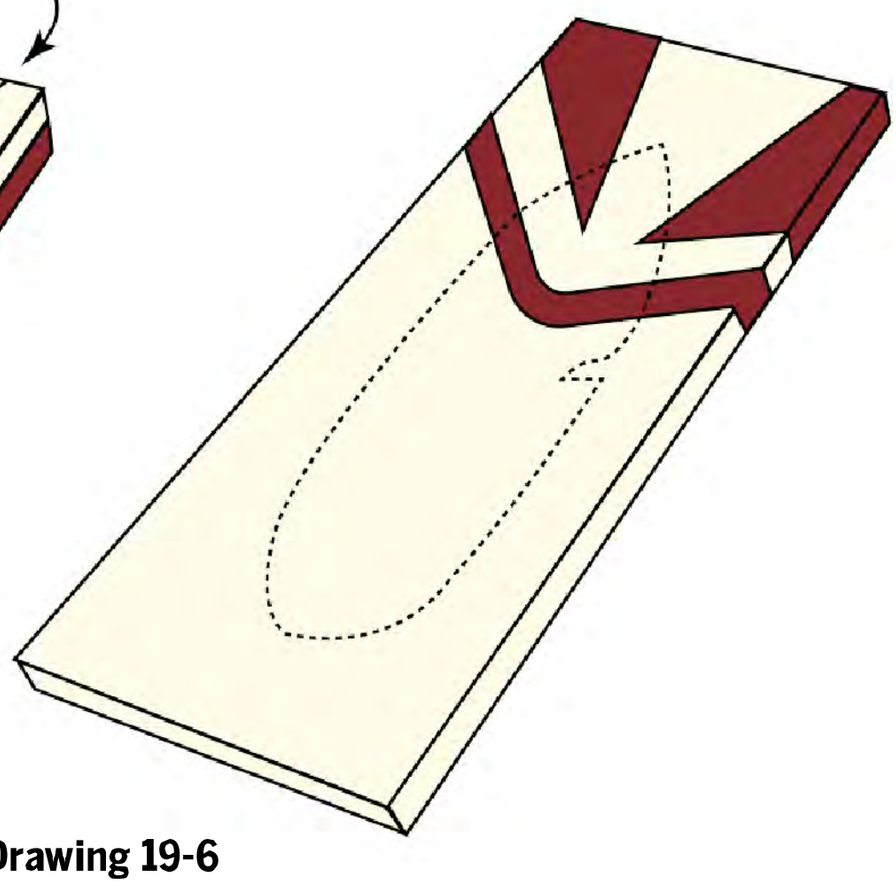
4. Use Bottom Feather pattern (**Drawing 19-1**) and make a stack of blood-wood and maple (**Drawing 19-5**). Tape the stack together.
5. Set the saw to 90° and make four cuts.
6. Glue the pieces together (**Drawing 19-6**).
7. Put the walnut piece under the maple-blood-wood section and cut (**Drawing 19-7**).
8. Glue the walnut stem into the background (**Drawing 19-8**).
9. Draw the feather outline (**Drawing 19-1**) as in **Drawing 19-8** and set this Bottom Feather sub-section aside.



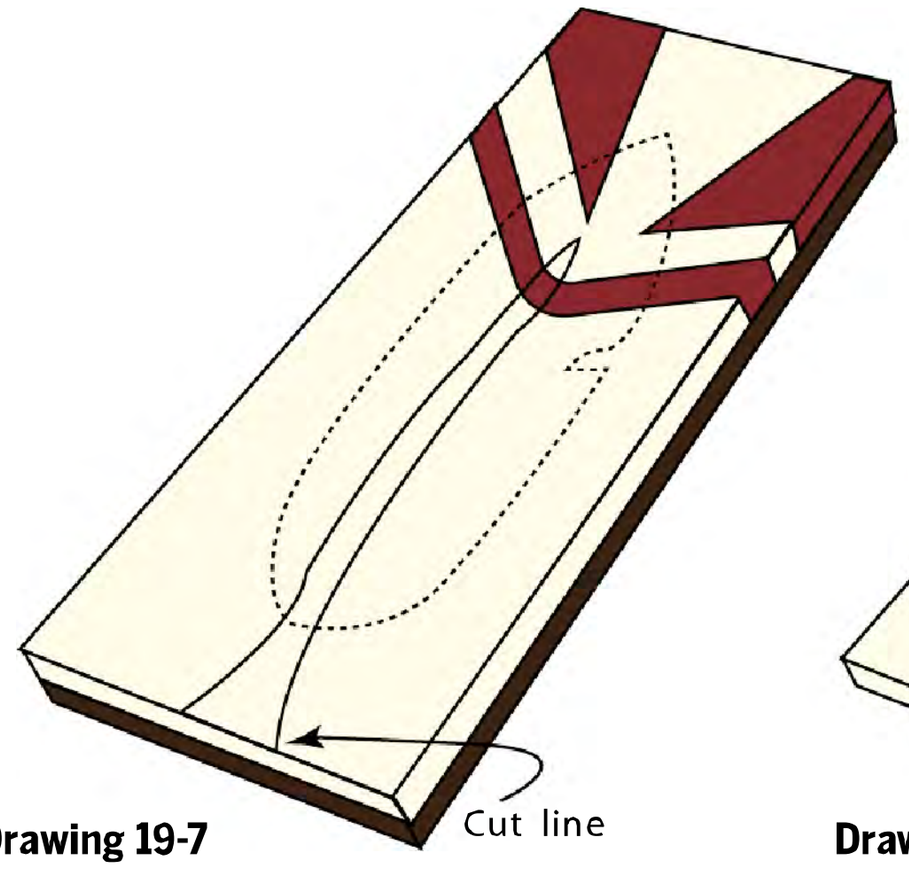
Drawing 19-4. Square to Octagon. Cut at the marks.



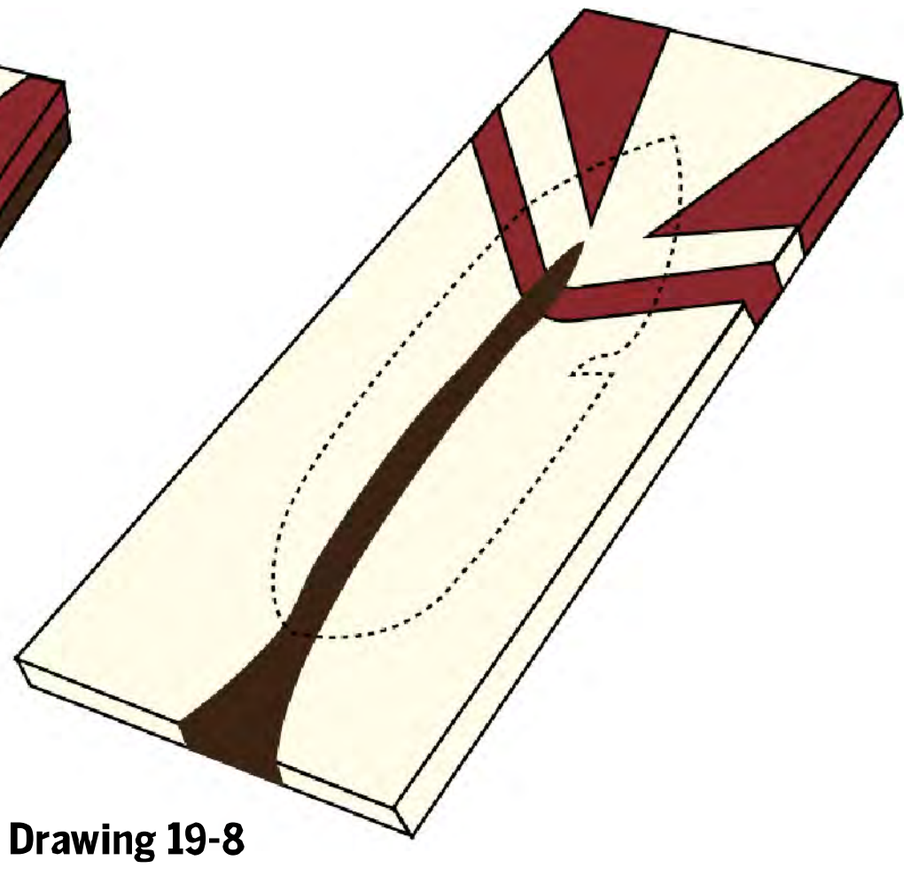
Drawing 19-5



Drawing 19-6



Drawing 19-7



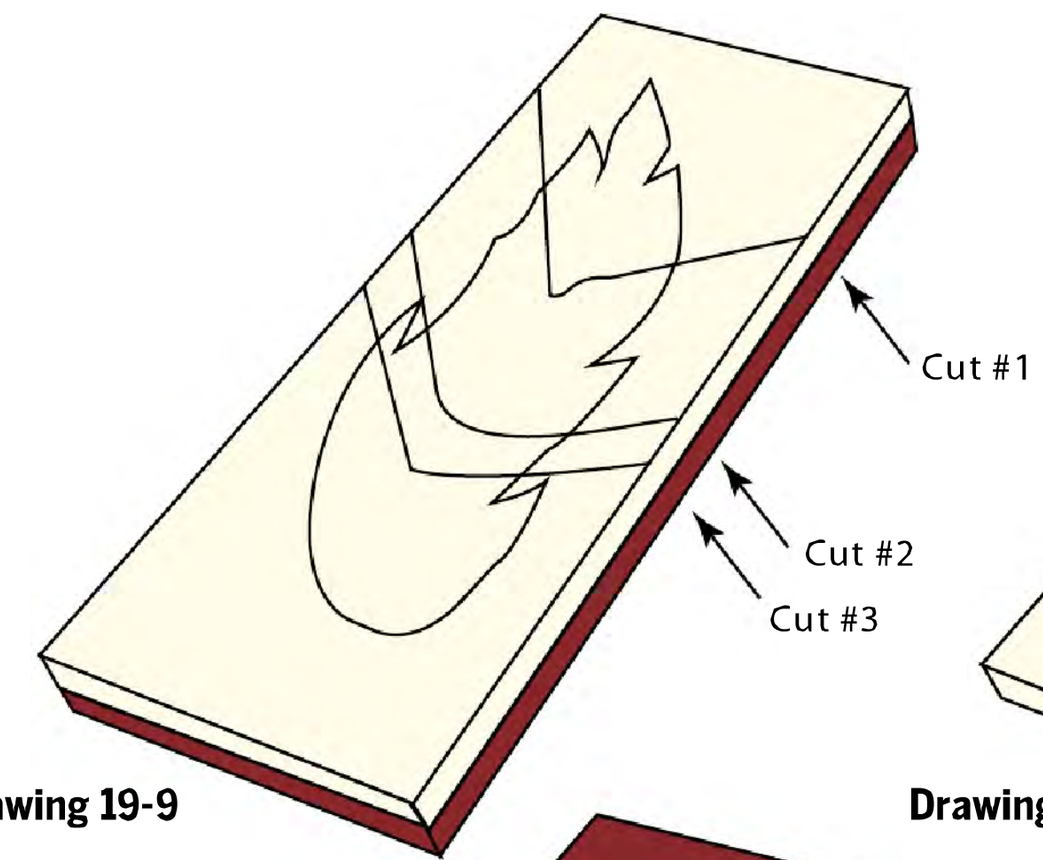
Drawing 19-8

Build the Bottom Feather. Cut the bloodwood and maple pieces along the lines (19-5). Add the walnut section and cut (19-7). The bottom feather is ready to be cut into the background (19-8).

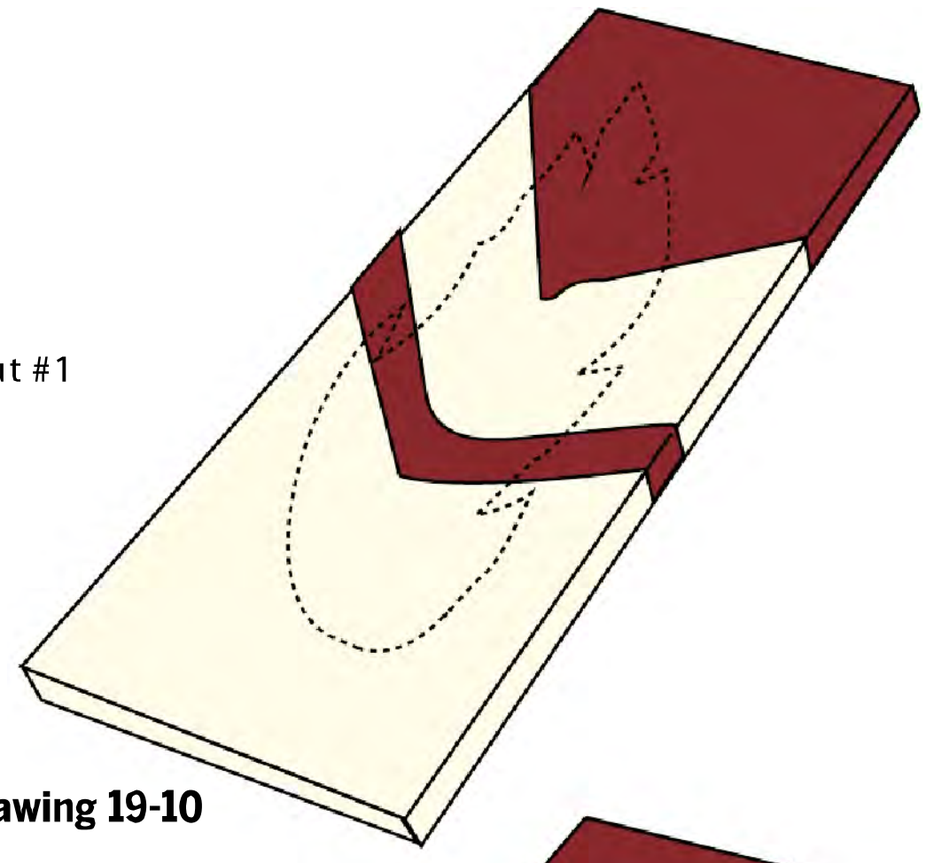
Prepare the Top Feather: Stack-cut the woods (each two-at-a-time) to make the top feather in the same way that the bottom feather was made.

10. Use Feather pattern (**Drawing 19-2**) and make a stack of blood-wood and maple.
11. Do three cuts as in **Drawing 19-9**.
12. Glue the sections together (**Drawing 19-10**) and add the walnut (**Drawing 19-11** and **Drawing 19-12**).
13. Set this Top Feather sub-section aside.

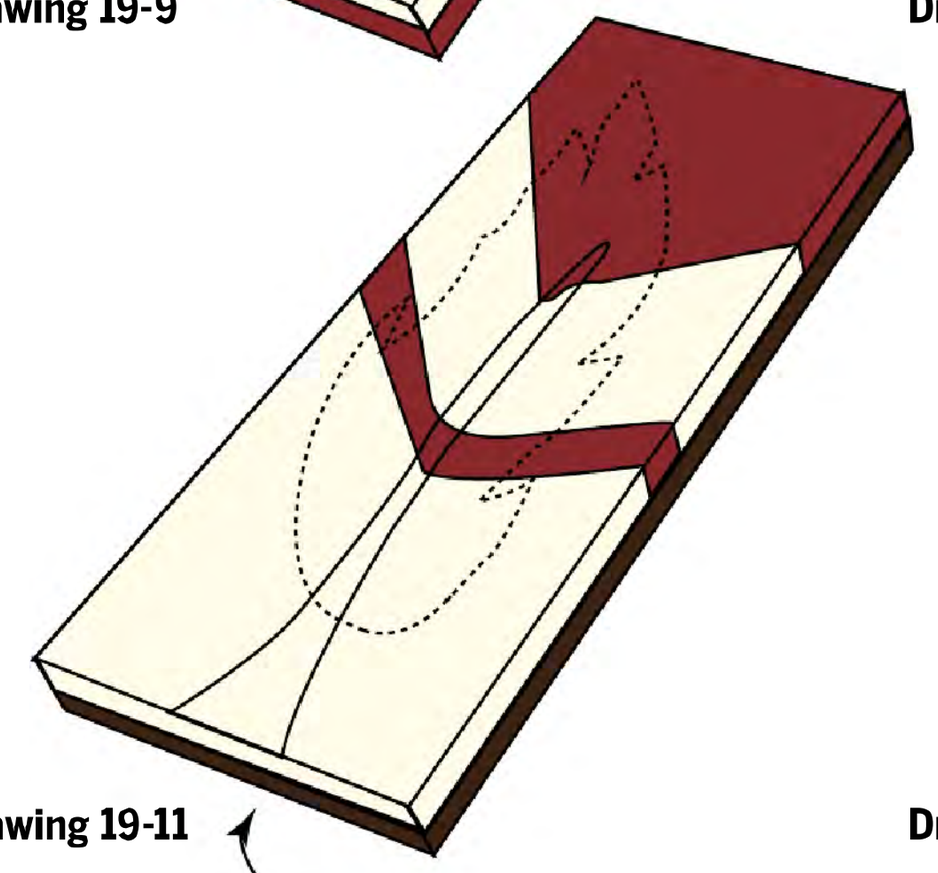
Keep your marquetry flat. When you stop work on a marquetry piece, put a flat board on top with a weight to keep it flat. I use a plastic jug that contains extra sand for shading. Dave Peck uses a gallon jug filled with water.



Drawing 19-9

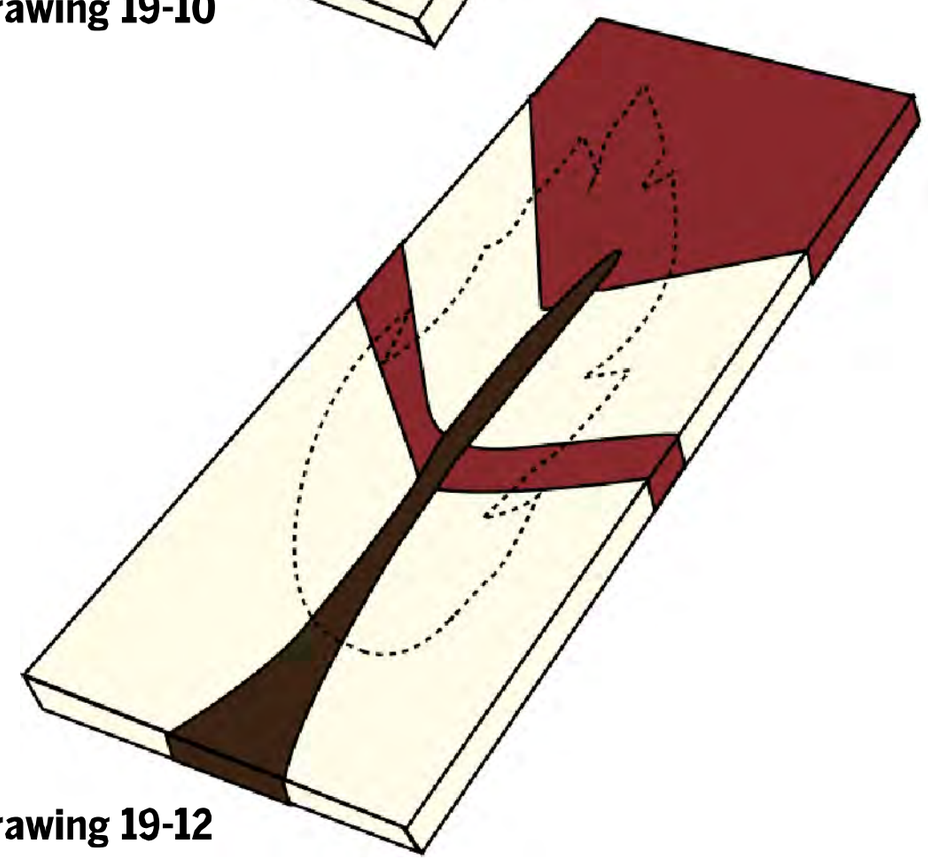


Drawing 19-10



Drawing 19-11

Cut line



Drawing 19-12

Build the Top Feather. Join bloodwood and maple (19-9 and (19-10). Add walnut (19-11) and the top feather is ready to be cut into the background (19-12).

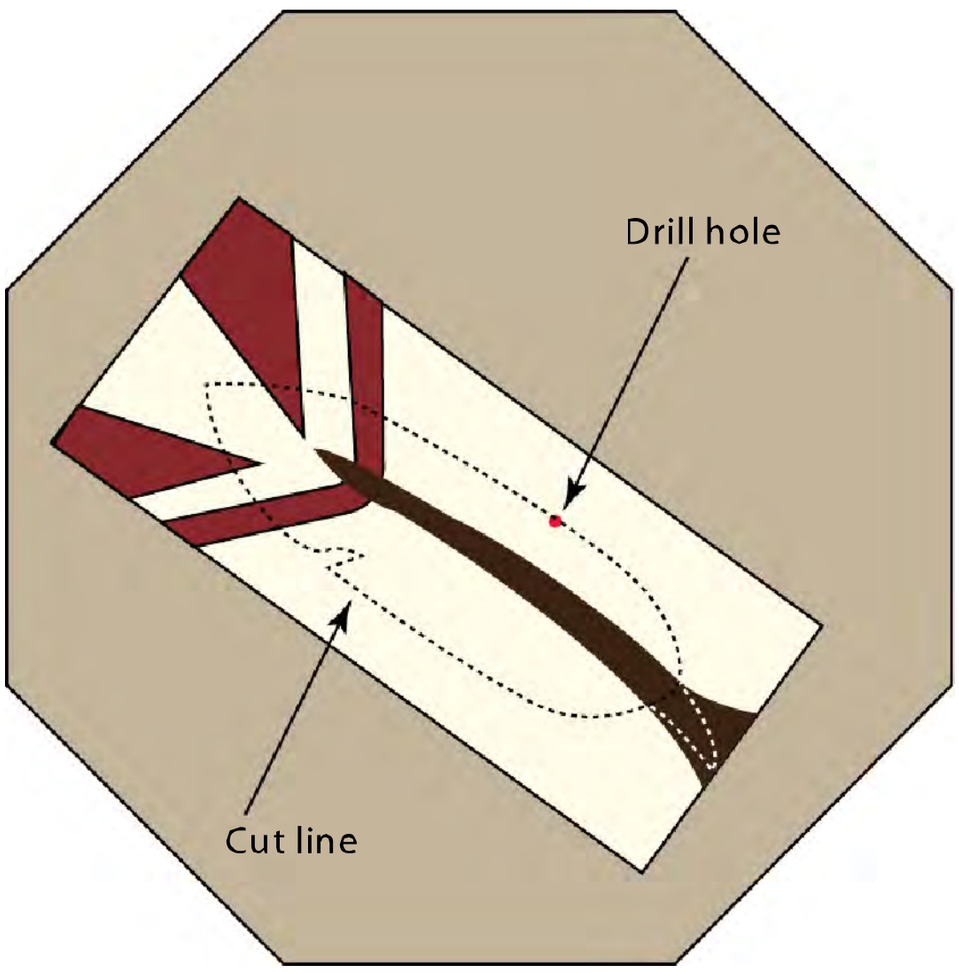
Cut the Bottom Feather into the Background: The Top Feather will be added later.

14. Tape the Bottom Feather section (**Drawing 19-8**) onto the background (**Drawing 19-13**).
15. Cut the section into the background, see **Drawing 19-14**.
16. Sand on both sides.

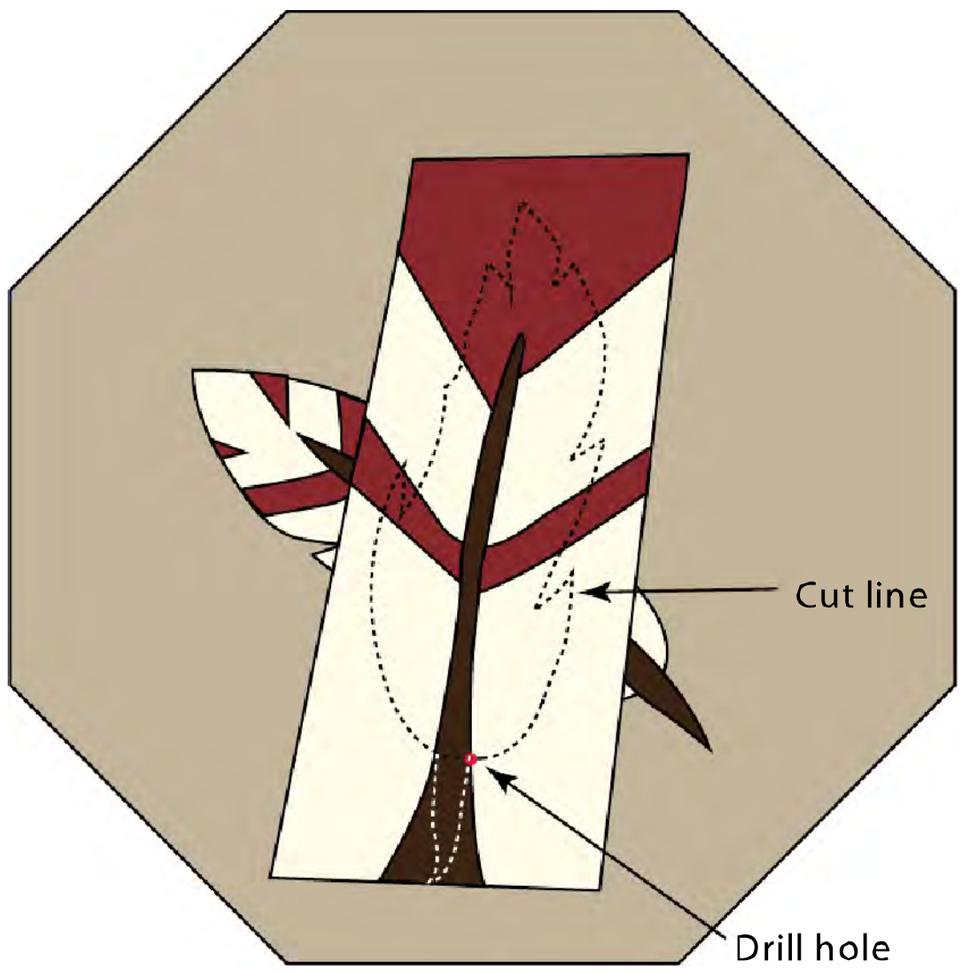
Cut the Top Feather into the Background: The background now includes the bottom feather.

17. Cut and glue this section into the background (**Drawing 19-15**).
18. Sand on both sides.

Hard veneers. Ebony and teak are hard and resinous making them difficult to cut with a saw. Put a piece of wax paper between the layers to lubricate the saw teeth. You may also need to use a small brush to clean the teeth.



Drawing 19-13

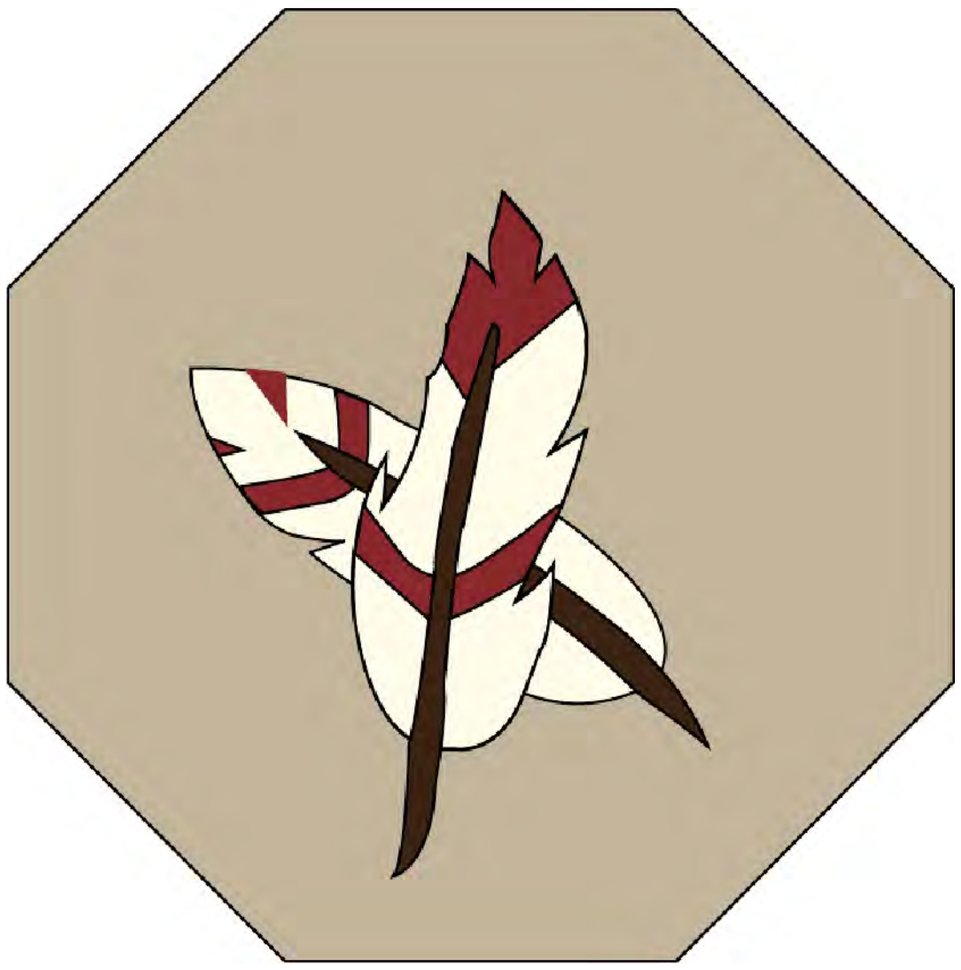


Drawing 19-14

Cut Both Feathers into the Background. Drill a hole and cut along the lines for the Bottom (19-13) and Top feather in (19-14).

Finish the Trivet: This piece will get a lot of use; the best protection against water, alcohol, heat and general banging around is polyurethane.

19. Use a palm sander with a vacuum attachment and sand the piece ending with 320 grit paper.
20. Sign your 'John Hancock' and the date somewhere.
21. Add five or six coats of wipe on poly, sanding lightly between coats.
22. Brush on another five to six coats of full-strength polyurethane.
23. Finis! Or whatever those Frenchies say.



Drawing 19-15. Both Feathers in the Background. This is the completed trivet.

Project 20

CURVED BORDER TRAY

The bottom design is notable for the curved border around the inner marquetry. The border is made of three strips and the grain of the larger, inner piece is oriented so it bends easily without breaking. The final size of the inner marquetry portion is 13½-in. long x 8½-in. wide. The marquetry is glued to a ¼-in. backer board which is then fastened into rabbets in the tray sides and ends. A cleat holds the bottom in. Use a plastic form to cut the inner marquetry and to position the Rose image at the best location in the tray bottom.

Photo 20-1

Extra Tools and Materials Needed: Table saw, ⅛-in. thick polycarbonate plastic for a template, ¼-in. plywood for the tray bottom, cork dots, band saw and disc or belt sander.

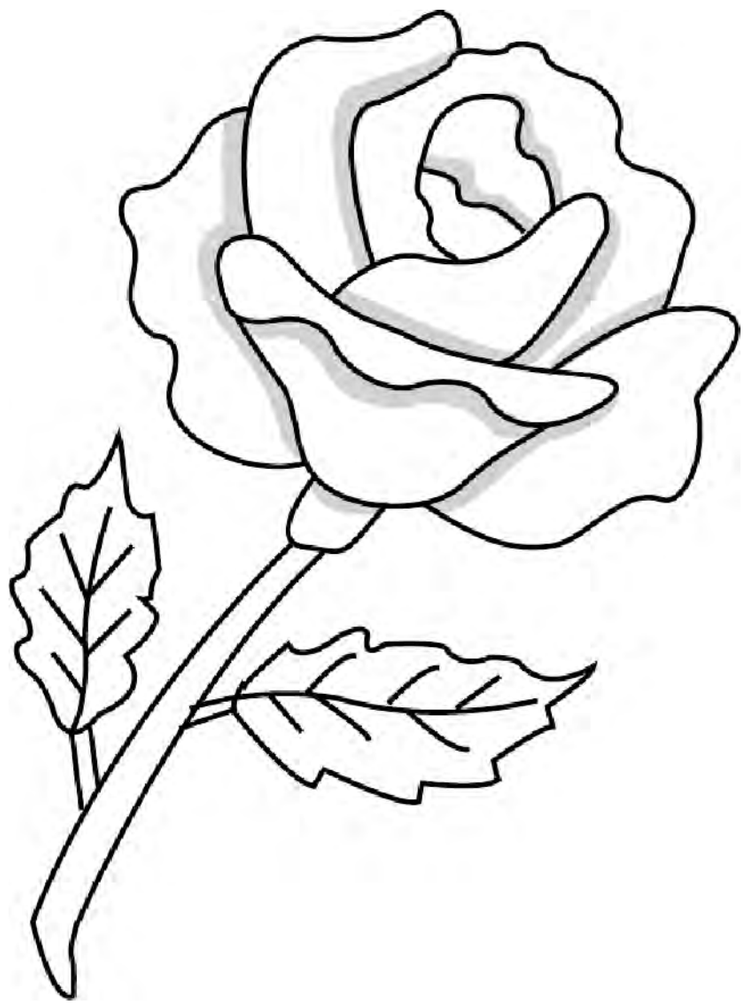
Build the Tray: The base of the tray needs to be large enough to hold the bottom panel which is 14-in. wide x 19-in. long and will fit into ¼-in. rabbets. The tray is made of walnut and the sides and ends splay outward at 20°.

1. Prepare the wood stock—½-in. thick x 1¾-in. wide and cut to approximate length; two sides each 22-in. long and two ends each 16-in. long.
2. Refer to 'Concepts, Joints, Compound Butt' for details on constructing the basic tray.
3. Cut a ½-in. high by ¼-in. deep rabbet in the bottom sufficient to house the marquetry panel which will be 14½-in. wide x 19½-in. long.

Make the Marquetry: Start with a piece of 11-in. x 16-in. walnut veneer. Use the rose pattern **Drawing 20-1** and make the White or the Red Rose, see **Photo 20-1** and **Photo 20-2**. Use the Pad Method of Marquetry in this project but cut only one color of veneer each time.

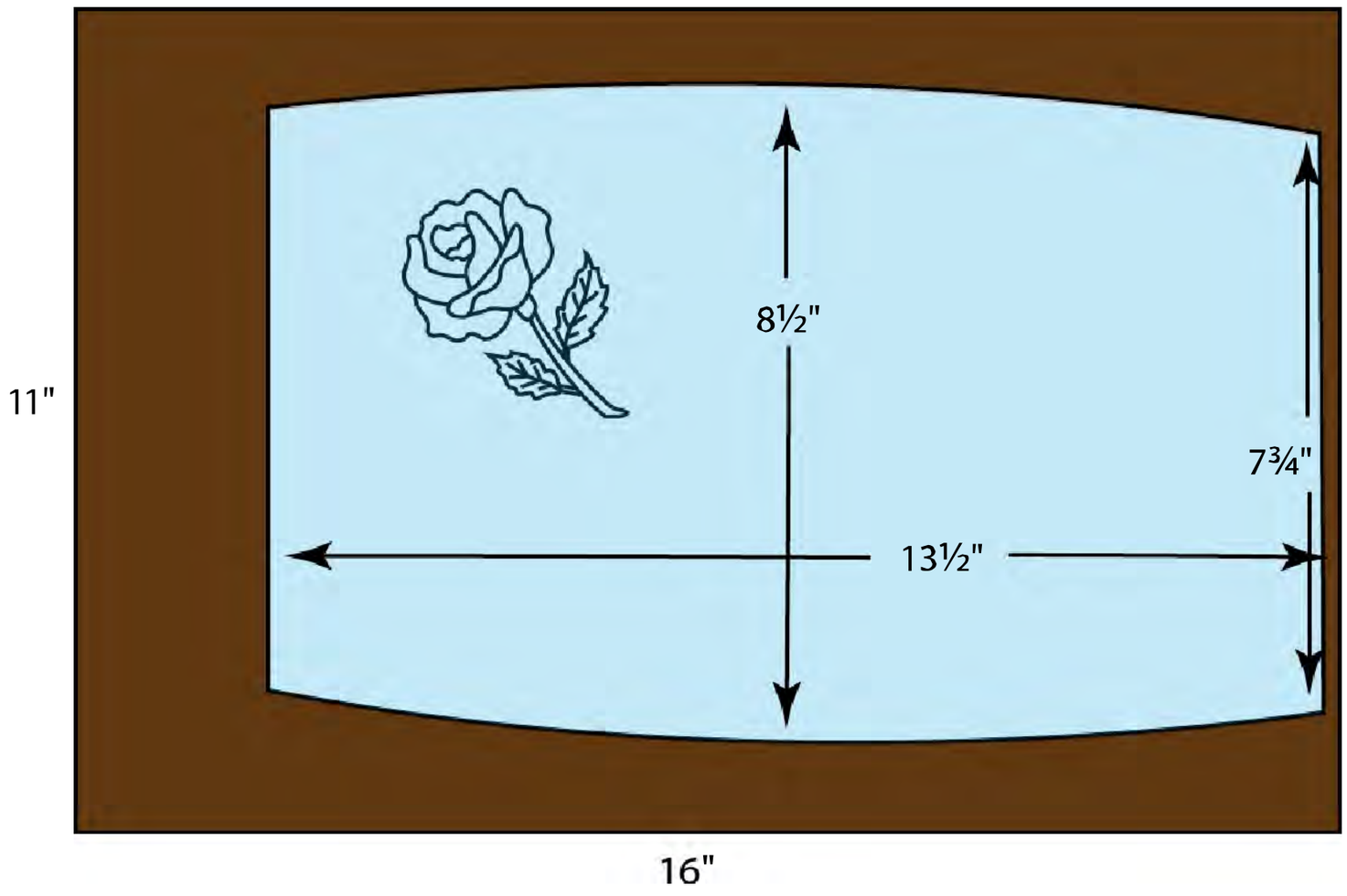
Photo 20-2

4. Put app tape front and back on the walnut background where the Rose marquetry will go.
5. Glue or trace the pattern to the background. See **Drawing 20-1**.
6. App-tape two pieces of light-colored green veneer (about 2-in. x 2-in.) to the back of the walnut veneer. Orient these in a 'Y' pattern so the grain is parallel to the leaves.
7. Set the scroll saw to 0° (no tilt), drill or punch a hole in the stem and cut the green pieces.
8. Place the green parts back into the background and tape them in position.
9. Choose a piece of light-colored brown veneer for the stem about 2-in. x 6-in. and tape it on the underside of the background.
10. Cut the Stem and tape the piece into the background.
11. Tape three pieces of white veneer (for the white rose) each about 5-in. x 5-in. under the background; they should be oriented at 60° to each other.
12. Continue to cut each veneer into the background as above.
13. Sand-shade as needed.



Drawing 20-1. The Rose Pattern. The marquetry requires only four different veneers—white, light green, green and walnut but multiple pieces of each color are used. Sand-shading gives the rose the illusion of depth.

Cutting and joining two pieces. For a nearly straight line, set the blade at 90° instead of 11°. A bevel cut allows one veneer to slide under the other.



Drawing 20-2. Plexiglas Form. Make a transparent form the size of the inner part of the tray bottom and move it around on the marquetry to position the Rose. Cut the walnut piece to the size of the pattern.

14. Fasten the Rose marquetry into the walnut background with app tape on the top.
15. Turn the piece over (back side up) and fill and sand smooth.

Make a Plastic Template and Cut the Walnut Bottom Veneer: Use a plastic template to orient the Rose marquetry piece on the bottom panel. Then use the plastic pattern to cut the inner marquetry panel.

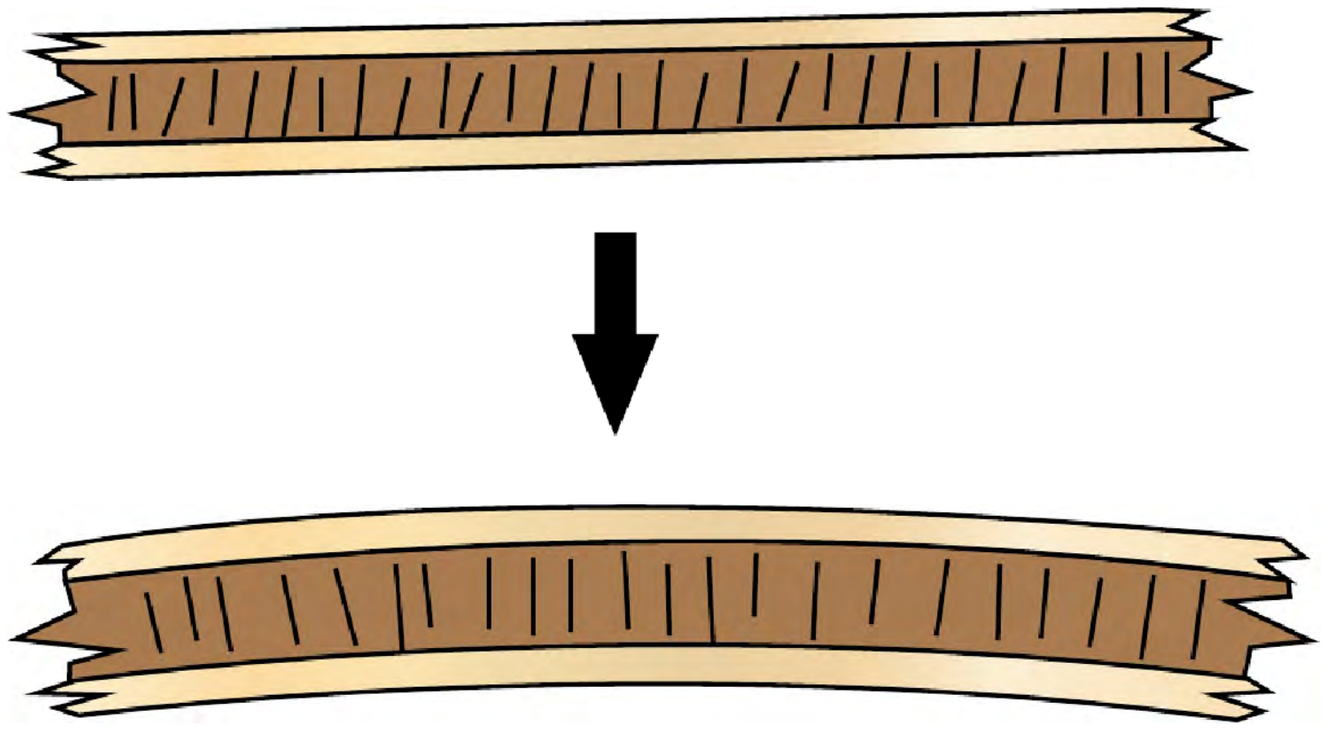
16. Draw a rectangle on a piece of paper 7¾-in. x 13½-in. See **Drawing 20-2**.
17. Draw arcs on the two long sides to make the inner distance 8½-in. See 'Concepts, Arcs'.
18. Use this pattern to make a template from ¼-in. polycarbonate plastic.
19. Move this plastic template around on the walnut bottom veneer until the Rose image is in the correct position.
20. Use the pattern to cut out the bottom veneer.

Make the Marquetry Side Border Strips: The strips are made separately and then added to the walnut center piece. See **Drawing 20-3** and **Photo 20-2**.

21. Fasten strips of ⅛-in. light-colored veneer (longwise grain) to a strip of ⅜-in. veneer (cross-grain).
22. Glue these pieces to the walnut background.

Make the Marquetry Curved Border Strips: The top and bottom strips are bent to the shape of the panel and taped into place. About four feet of this border material is needed. See **Drawing 20-3**.

Blue tape. Don't use blue tape on the face of veneers. It is too strong and it will pull wood fibers from the veneer. Use blue tape to join pads of veneers together.



Drawing 20-3. Inner Borders. The Side Borders (top drawing) have no curve. The Top and Bottom border strips (bottom drawing) are curved; the grain orientation of the inner sections makes this possible.

23. Cut enough ⅛-in. light-colored (grain longwise) and ⅜-in. strips (grain cross-wise) to make the top and bottom borders.
24. Bend a ⅛-in. piece of veneer to the curved edge of the walnut and tape in place.
25. Bend the ⅜-in. piece to the curve and tape it in place. Note: if it will not bend, put app tape on the back and use a 1-in. wood chisel and chop through the veneer every ½-in.
26. Add the last ⅛-in. piece and tape it in place.
27. Overlap the ends and apply clear cellophane tape on the top and bottom of the corners.
28. Use a sharp knife and a straight edge and cut the corner angle.

Add the Outer Border Pieces: All that is needed now is to add the outside border pieces.

29. Lay two walnut veneer pieces against the sides and tape them in place.
30. Slide two walnut pieces under the top and bottom arcs and cut the outside border pieces to shape.
31. Overlap the ends and cut the corners to shape.

Glue the Panel to the Bottom Plywood: Fasten the marquetry to the plywood.

32. Use PVA glue and fasten the Rose marquetry to the ¼-in. plywood bottom panel.
33. Cut the ply to size.

Put the Bottom into the Tray: Glue the bottom into the rabbets.

34. Glue the Rose marquetry panel into the rabbets of the tray bottom.
35. Add walnut cleats to secure the bottom.
36. Add cork dots to the bottom corners and you are through.

Don't glue the marquetry. Put glue on the backer board rather than on the marquetry piece. All carpenter's glues (PVA) contain water and your small veneer pieces will immediately start to curl.

Project 21

VRIZ MARQUETRY

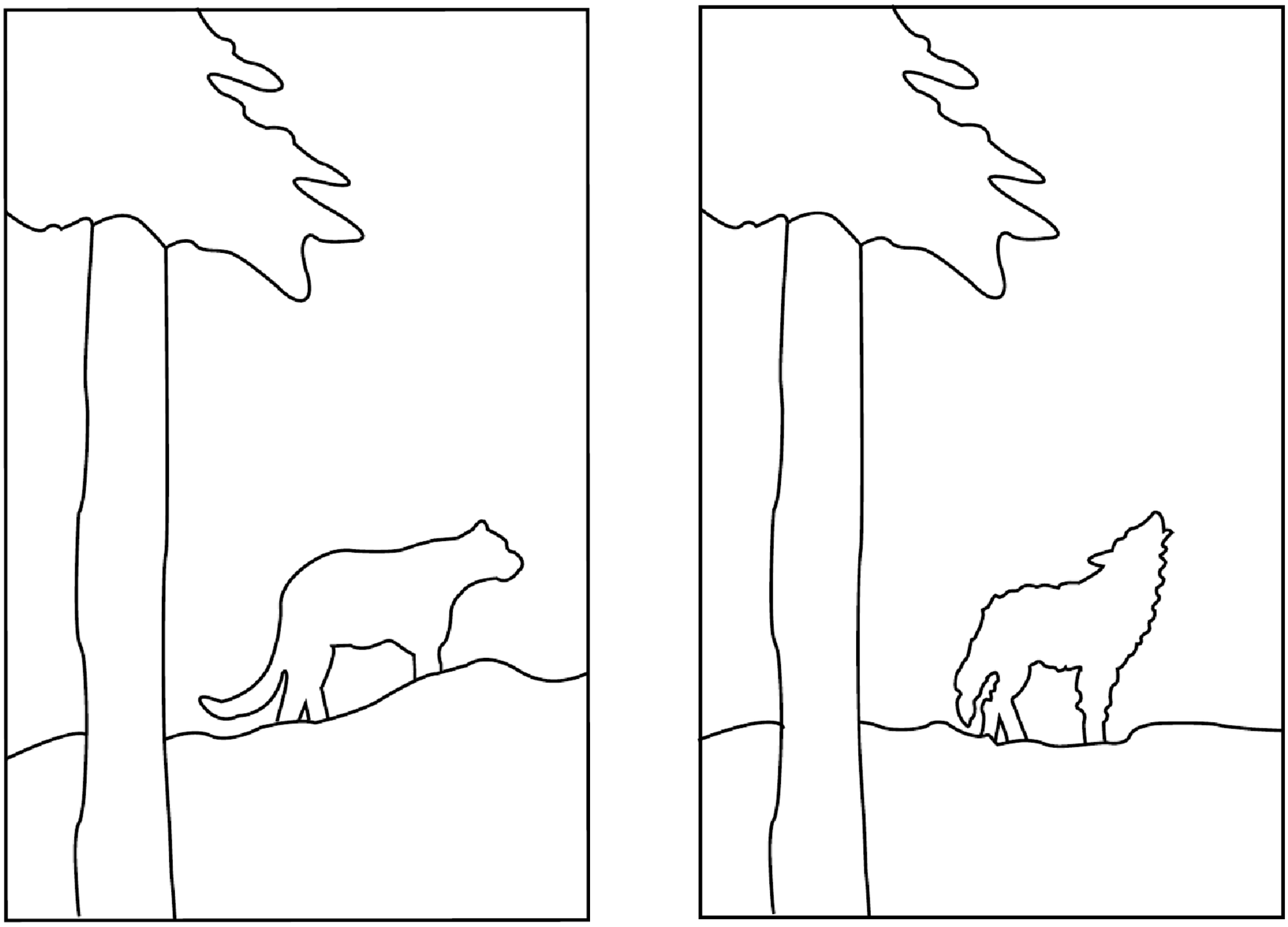
Photo 21-1

There are two projects here and both seem complex but actually are quite simple. One is 'Wolf Howling into the Mist' and the second is 'Cougar Crouching as the Fog Rolls In'. Gotta love those names, huh?

During the late 1980s, Frenchman Georges Vriz began experimenting with a technique of marquetry where two layers of veneer were glued one on-top-of-the-other and then the top layer was sanded until the bottom layer was partly visible. This technique is still used in France however here in the US, it is seldom used.

We first worked on these pictures at a workshop conducted by Dave Peck. Pattern **Drawing 21-1** shows the background for the 'Cougar in Fog' and the 'Wolf in Mist'. Each finished marquetry piece is glued to a backer board and sanded smooth. **Drawing 21-2** is the pattern for the Top marquetry for both pictures.

Extra Tools and Materials Needed:
Backer boards.



Drawing 21-1. The Cougar and Wolf Pattern. Cut the pieces and glue them to a backer.

Make the Bottom Marquetry: The marquetry is pretty simple.

1. Choose the five veneers for the Bottom piece; the Sky should be light-colored.
2. Cut the pieces using pattern **Drawing 21-1**. Use either the double-bevel or the pad method.
3. Assemble the picture and glue it to a backer board.
4. Scrape and sand until the picture is smooth. Do not put on a finish.

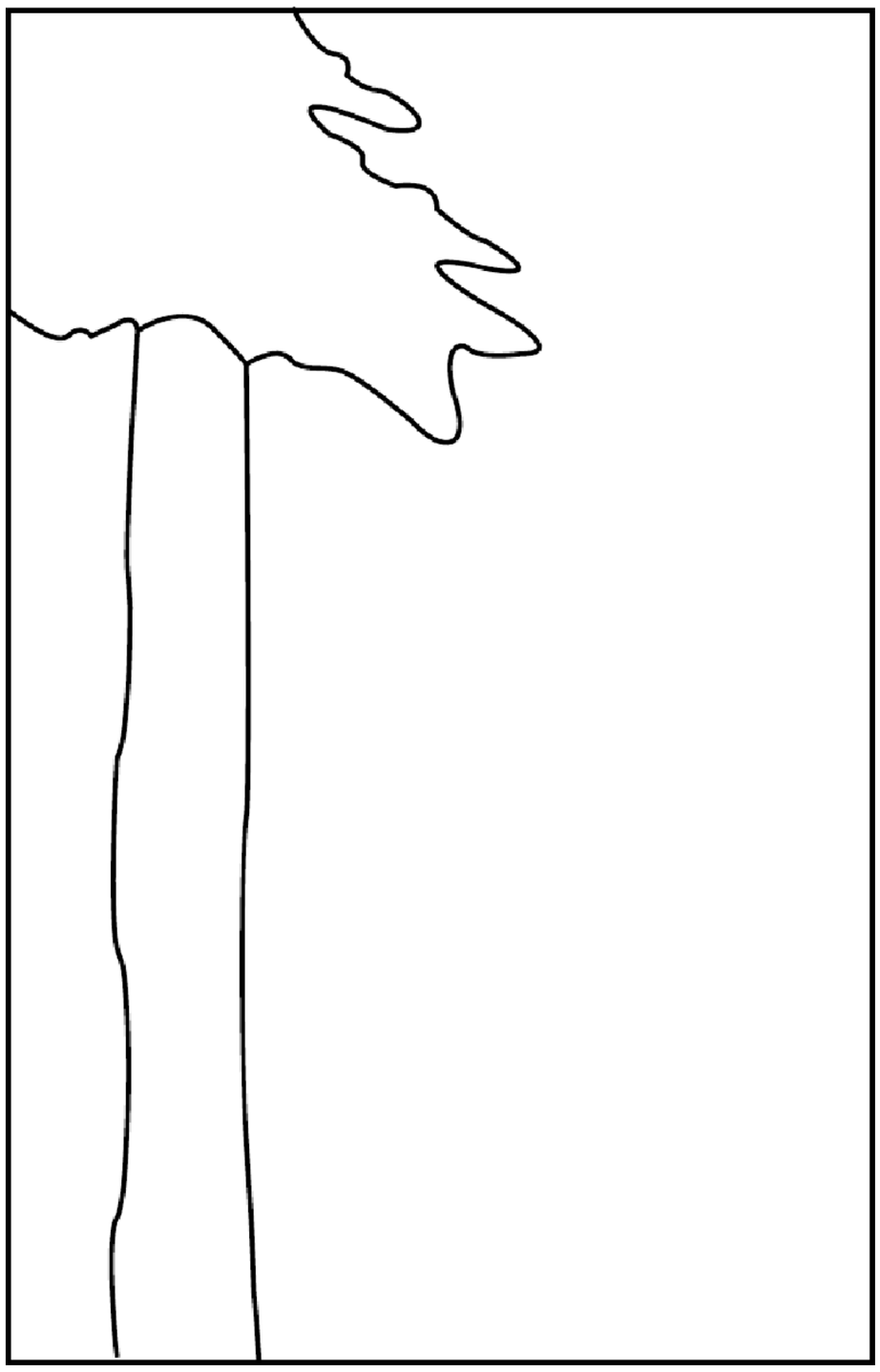
Make the Top Marquetry: Use the same veneers here as for the bottom marquetry; except leave out the Wolf/Cougar and the Ground.

5. Cut the pieces for the Sky, Tree Trunk and Tree canopy and assemble the Top Marquetry. See pattern **Drawing 21-2**.
6. Put app tape on the top, turn the piece over and sand the back smooth.

Glue the two Pieces Together: Attach the top marquetry to the bottom layer.

7. Use white PVA glue and attach the top layer to the bottom. Make sure the Trees line up.
8. After the glue has cured, remove the app tape.

Trouble with Sharp Turns? Turn off the saw, rotate the marquetry and start cutting again. Slow but effective.



Drawing 21-2. The Top Pattern. Use the same veneers here as were used in the underlying marquetry.

Sand the Piece: This is where the Vriz method comes into play. Sand until just a part of the bottom marquetry can be seen.

9. Hand sand the entire picture. Keep the sanding pad *flat*; don't dig into the veneers.
10. Stop and examine the piece often. The Tree and Sky are on the top and the bottom layers; you won't see any change here.
11. Keep watching the Animal and the ground.
12. When you just begin to see an animal, stop sanding.
13. Change to a finer grit.
14. Sand but *stop often* and examine the piece.
15. If you like it; stop sanding. You can't change your mind if you go too far.
16. Use wipe-on poly to finish the piece.

Tune up the pattern. Before you start cutting, look closely at the pattern. If there are small pieces that are unnecessary or that are too small, redraw the pattern to eliminate these.

Project 22

PICTURE IN FRAME

This is a pretty simple project but the end effect is startling. People expect the border to enclose the picture; while in this case, the marquetry spills over into it, see **Photo 22-1**. To keep the background as firm as possible, as each marquetry piece is cut, it is glued (not just taped) in. Use cherry for the breast, yellow for the beak and claw and shades of gray for the rest of the bird. The two wing sections are oak veneer—note the grain is similar to the feather layers.

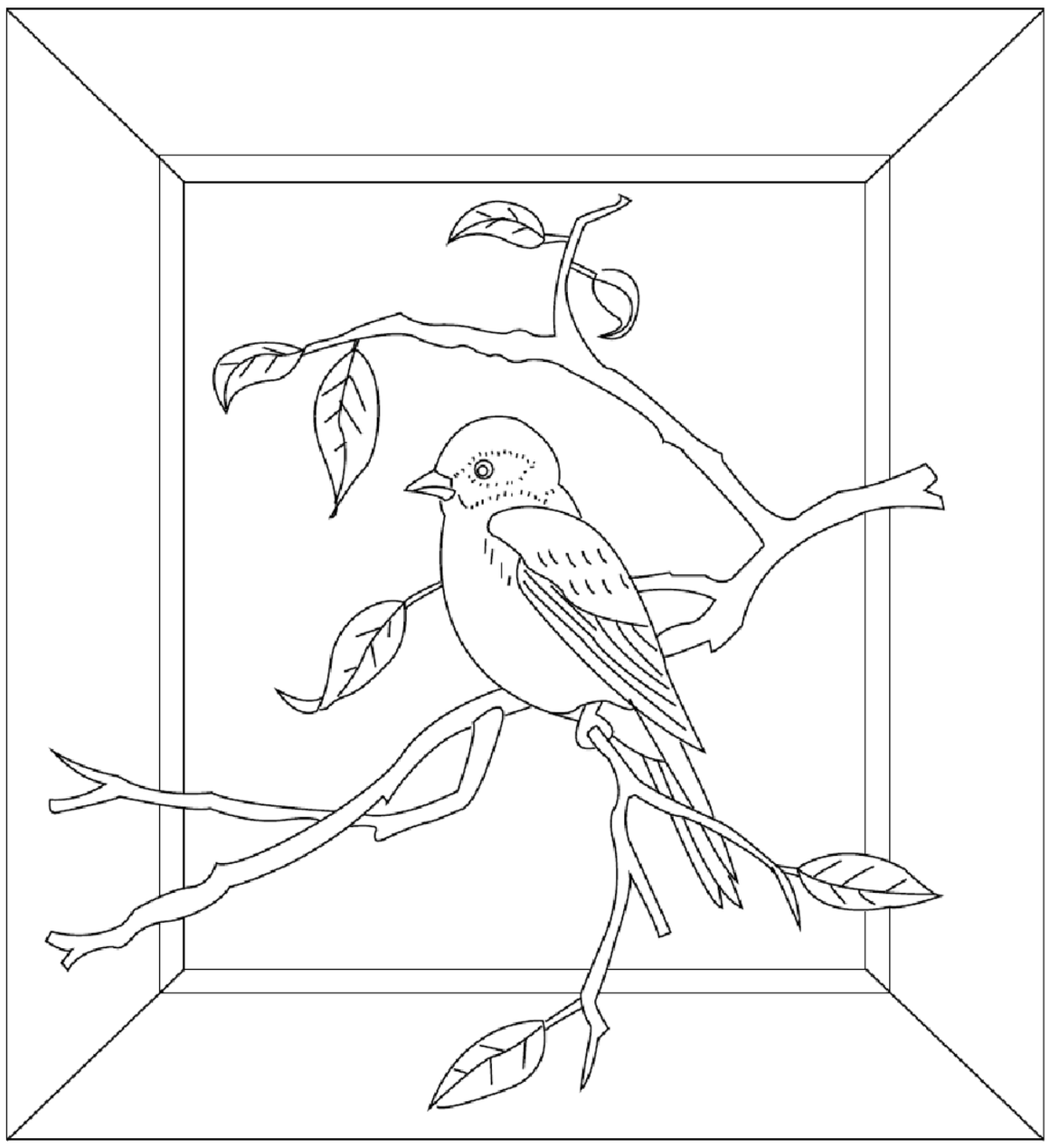
Photo 22-1

Extra Tools and Materials Needed: Backer board (⅜-in. MDF) and leather punches.

Make the Background: As Drawing 22-1 shows, the background includes the inner border (stringer) and the outer border.

1. Choose the veneer for the background and cut it to size; 6¼-in. wide x 7¼-in. high. Have the grain going horizontal.
2. Cut the stringers from medium- or dark-colored veneer to 3/16-in. wide; see 'Concepts, Jig, Thin Strip Cutting' for more on this.
3. Cut the outer border pieces from a light colored veneer; 1¾-in. wide.
4. Attach the border pieces to the background with clear cellophane tape.
5. Cut the corner joints; see 'Concepts, Borders, Stringers and Corners' for details on this. Note the outer border should be slightly wider than needed for the final picture. It will be trimmed later.

YELLOW PVA GLUE. After initial set, yellow PVA glue can be reactivated with heat (about 250° F.) for up to ten days.



Ebonizing wood. Add steel wool to vinegar and apply with a brush or a rag. Dry, sand and use or add more to further darken.

Drawing 22-1. The Pattern. The background includes the thin inner strips plus the outer borders. To keep the background strong, as each piece is cut, glue it into the background.

6. Rub white PVA glue in all the joints, rub off the excess glue.
7. Cover both sides with app tape.

Add the Leaves and Tree Marquetry: Treat the new background like any other but glue each piece in and cover that area with app tape. Note: do not cut the limb the bird is standing on yet.

8. Cut the leaf veneers first and as each is cut, sand shade it and then glue it into place.
9. Next cut the branches.

Add the Bird Marquetry: The Bird is in front of the tree except for the bottom twig. See **Photo 22-1**.

10. Put a bird eye into a piece of veneer; see 'Concepts, Circles, Cutting Small' for details on how to make an eye.
11. Position the veneer with the 'eye' and cut in the head. See 'Jig, Positioning' for details on this.
12. Cut in the other parts.
13. Let the completed picture stand under a board with a weight for 3-4 hours.
14. Remove the app tape pieces from the front and cover it with new app tape.
15. Remove the tape from the back and repair as necessary.

Final Work and Finishing: Glue to a backer board and finish it up.

16. Use yellow PVA glue and a piece of ⅜-in. MDF.
17. Seal with two coats of shellac.
18. Carefully scrape and sand. Note: an electric sander hooked to a vacuum reduces the chance that dark saw-dust will contaminate the light-colored veneer.
19. Finish with wipe-on poly and mount in a nice frame.

The Frame: I used maple and walnut for the frame.

Project 23

TIMBER WOLF

This complicated piece was made by my friend Bob Shultz of Los Gatos, California. Use a knife to cut the 'fur' and a scroll saw for the smooth pieces (lips, nose, eyes and ears). Follow the step-by-step carefully; the Wolf is constructed from the outside moving inwards. The pattern was adapted from *Animal Portraits in Wood*, Fox Chapel, 2006, p. 82.

Each 'fur' piece is added the same way; cut a window in the background using zigzag cuts, trace the 'fur' pattern onto an insert piece , cut the piece and glue it into the window.

Photo 23-1

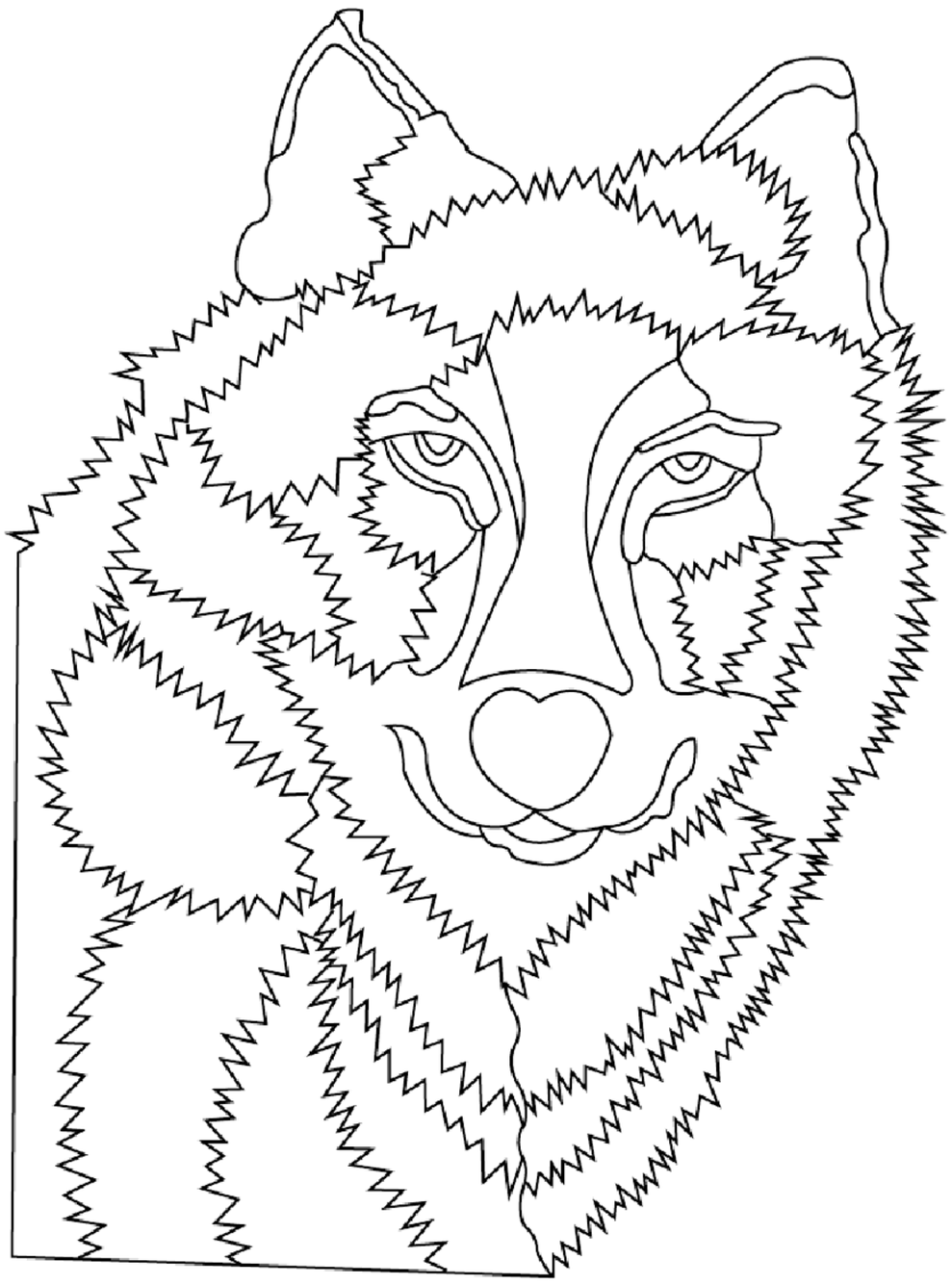
Extra Tools and Materials Needed: None.

Choose the Veneers: The light comes from the upper left, therefore that side has light-colored veneers; the right side is in partial shadow and has dark-colored veneers. See photo **Photo 23-1**.

1. Pick six veneers for the fur: black (ears), dark brown (right side of neck), medium brown, light brown, tan and light-colored Holly.
2. Use a vertical-grain background (8-in. x 11-in.); the 'furs' are mostly horizontal.

Make the Windows: Cut each window and bring the new piece in from the back. The window is oversize and large enough for the new section plus space for the next insert. See **Drawing 23-1**.

3. Cover the front of the background with app tape; cut from the back.
4. Draw the outline of the window-segment on the bare veneer plus an area big enough to cover the border of the next veneer. See **Drawing 23-2**.
5. Cut the outside portion of the window using zigzag strokes. Make the cuts toward the center of the picture so the crossing cut- lines are in waste veneer.
6. Cut out the rest of the window.



Drawing 23-1. Pattern. The grains of the veneer rotate and point inwards. The outer 'fur' is made up of 24 separate pieces of veneer, each about 3/8-in. high.

The First Fur Piece: The grains at the bottom of the Wolf's neck point slightly down to the right, just as normal animal 'hair' would do. The grain to the right of the mouth points horizontal and the grain under the ear points left and slightly down. For this 'rotation', use short (3/8-in. to 3/4-in. long) pieces of veneer. See **Drawing 23-5**.

7. Put app tape on the front side of the inlay veneer.
8. Place this veneer face up (app tape showing) under the window.
9. Use a pencil and mark where the grain direction starts to veer off. This will be the size of the inlay segment.
10. Use a knife and scribe the zigzag marks onto the new segment.
11. Place the piece on a mat and cut so the cross-over cuts are in the waste.
12. Glue the inlay segment into the window.
13. Use the pattern (**Drawing 23-3**) and scribe the zigzag for the next inlay piece.
14. Cut the zigzag to define the left/inner side of the first inlay piece and the right/outer side of the second inlay.

Add the Second Inlay: Add the other inlays. Cut a window, place the new veneer underneath, scribe the outline, cut the new piece and glue it in.

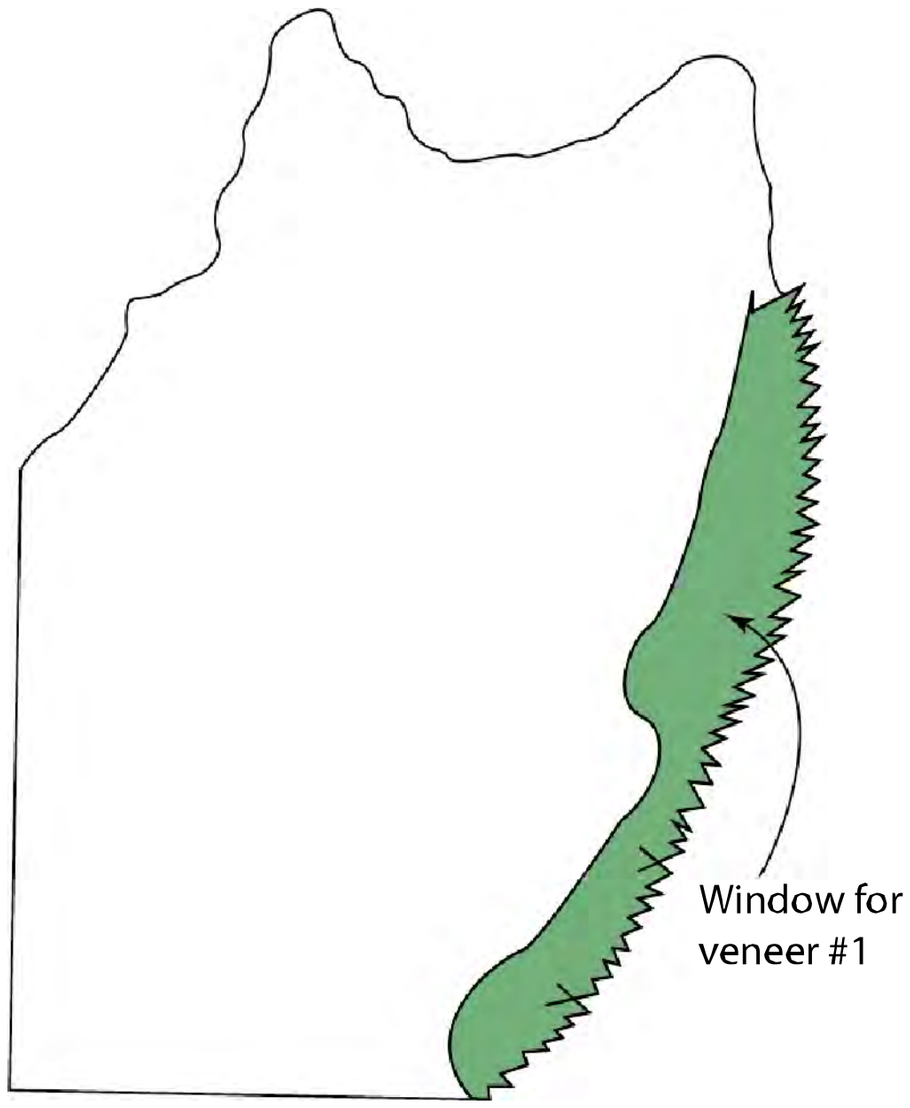
15. Trace the pattern onto the next inlay veneer piece. See **Drawing 23-4**.
16. Cut the new piece and glue it.
17. When all in the inlays have been added on the right side, work on the left side. Note: The lighter veneers *do not* look realistic when they are made of many small segments because the joints between are too visible. Cut the lighter veneers as single pieces rather than many segments.

The Face: Once the 'fur' segments surrounding the Wolf's face are complete, cut the lips, nose, eyes and ears with a scroll saw.

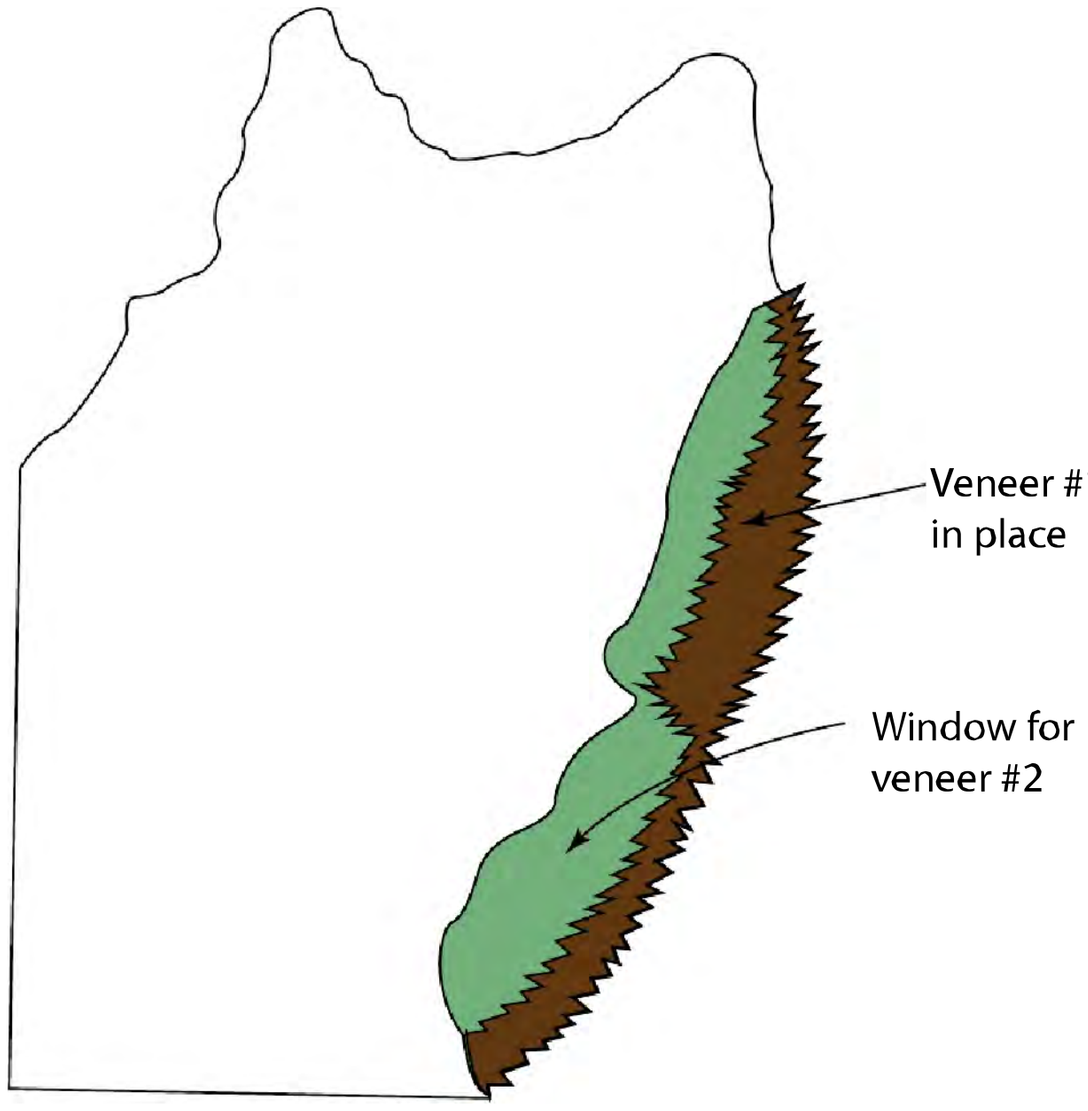
The Nose: The bridge of the nose was done in several steps.

18. Make the zigzag cuts at the top on a veneer piece large enough for the entire nose with a knife.
19. Tape the piece in place and then double-bevel cut along the sides and bottom with the scroll saw.
20. Sand shade the piece and glue it in place.

Cut with the grain. Use a veneer saw to cut with the grain; use light strokes so you cut the fibers and do not split the veneer.



Drawing 23-2. First Window. The window is large enough for the first veneer plus extra space.



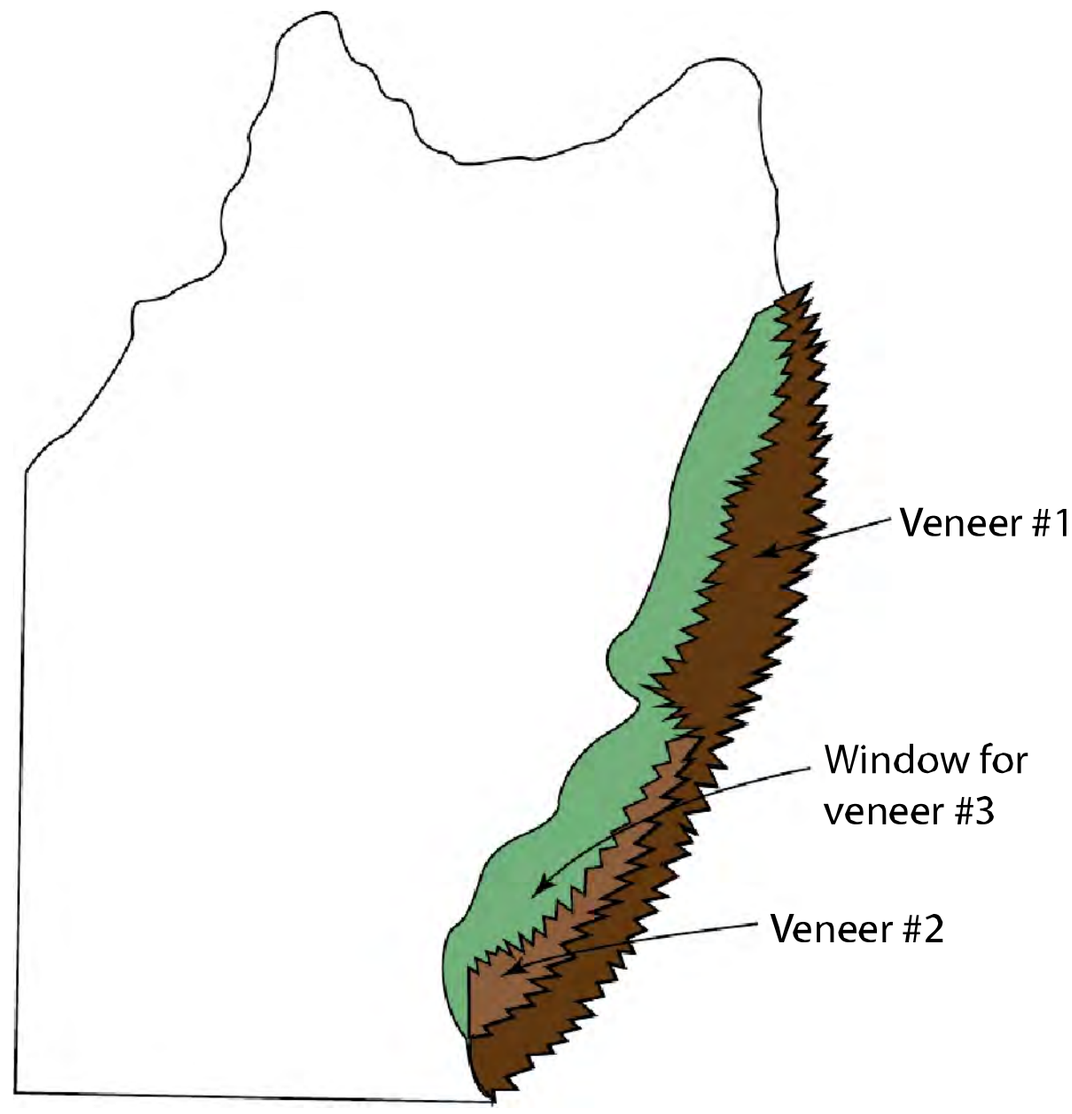
Drawing 23-3. First Inlay. The first inlay is in and a new window has been cut.

The Eyes: These are, by far, the most challenging. Use a scalpel to cut the dyed yellow veneer for the small iris.

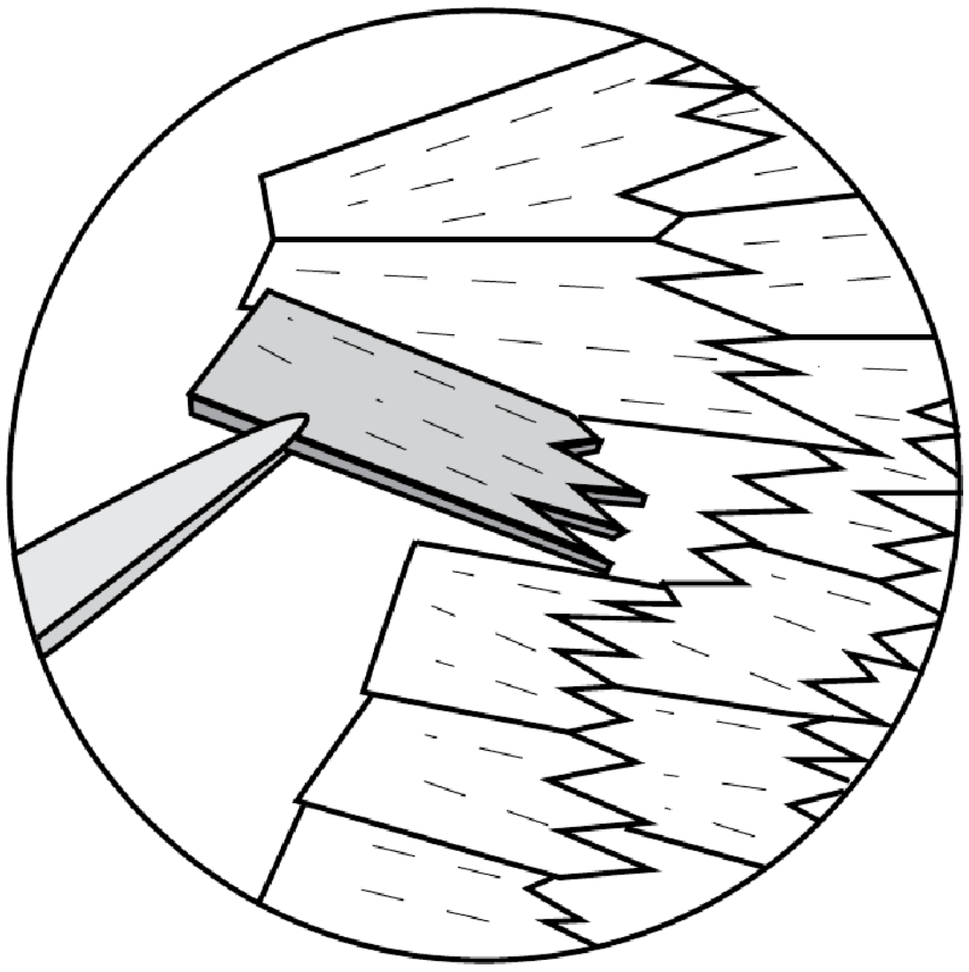
21. Drill small holes into dyed black veneer for the pupils.
22. Fill the holes with white veneer.
23. Position this sub-section under the window and cut it into the iris.
24. Use the scroll saw and carefully cut the iris into the eye.

Border: Add the inner and outer borders and cut the corners.

25. Use ⅛-in. strips of dyed black veneer for small strips and ¾-in. strips for the centers.
26. Tape these pieces to the background and cut the corners at 45°. See 'Concepts, Borders, Stringers and Corners' for details on this.



Drawing 23-4. Second Inlay. The second inlay pieces have been added and a new window is ready.



Drawing 23-5. Small 'Fur' Pieces. Rotate the grains.

Different thickness veneers. Choose veneers that are the same thickness. This will save a lot of scraping and sanding later.

Fill and Mount: Glue the marquetry to a backer board and finish.

27. Cover the front with app tape.
28. Remove all the small pieces of app tape from the back.
29. Inspect for missing pieces and repair as needed.
30. Glue to a ⅜-in. piece of backer board with PVA glue.
31. After 2 hours, remove the piece and trim the perimeter square.
32. Apply dyed black veneer to the edges of the picture with contact cement.

Finish: Seal, scrape and sand.

33. Seal with two coats of shellac.
34. Scrape, sand and finish with eight coats of wipe-on poly and two coats of furniture polish.

Project 24

BOOK ENDS

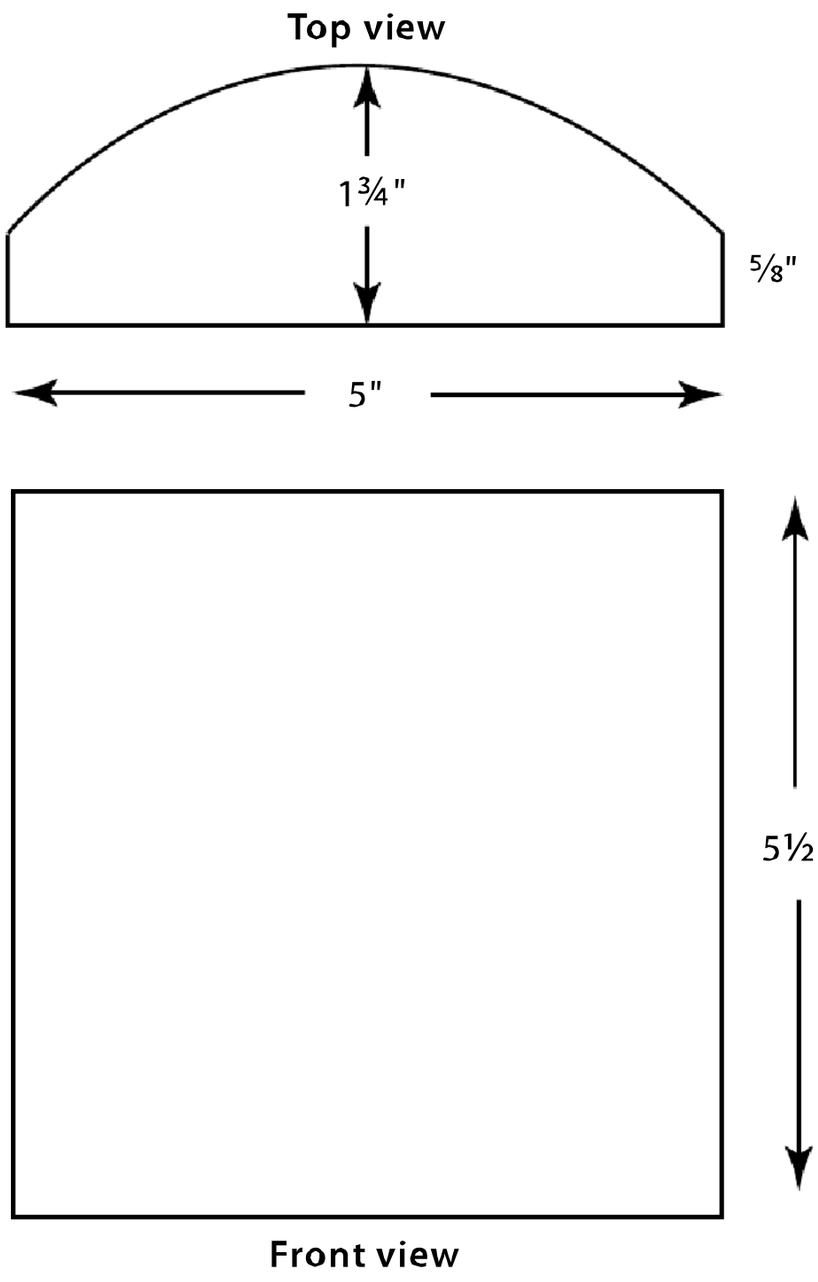
Photo 24-1

Use a silhouette of your kid, grandkid or your favorite pet for the pattern. Make a pad, cut the veneers and glue them onto curved forms to make two book ends. The silhouettes should measure about 4-in. x 4-in. There are four ways to bend the veneer pieces around a curved form for gluing: (1) sandbags, (2) vacuum press, (3) band clamps and (4) with cauls and screw clamps. See 'Concepts, Clamping to Curved Forms' for details on these. This project was presented by Dave Peck at a workshop in Oct. 2010. The book ends in the photo are made of walnut and maple. The silhouettes (**Photo 24-1**) are of my sons Doug Horner and Greg Horner when they were in grade school.

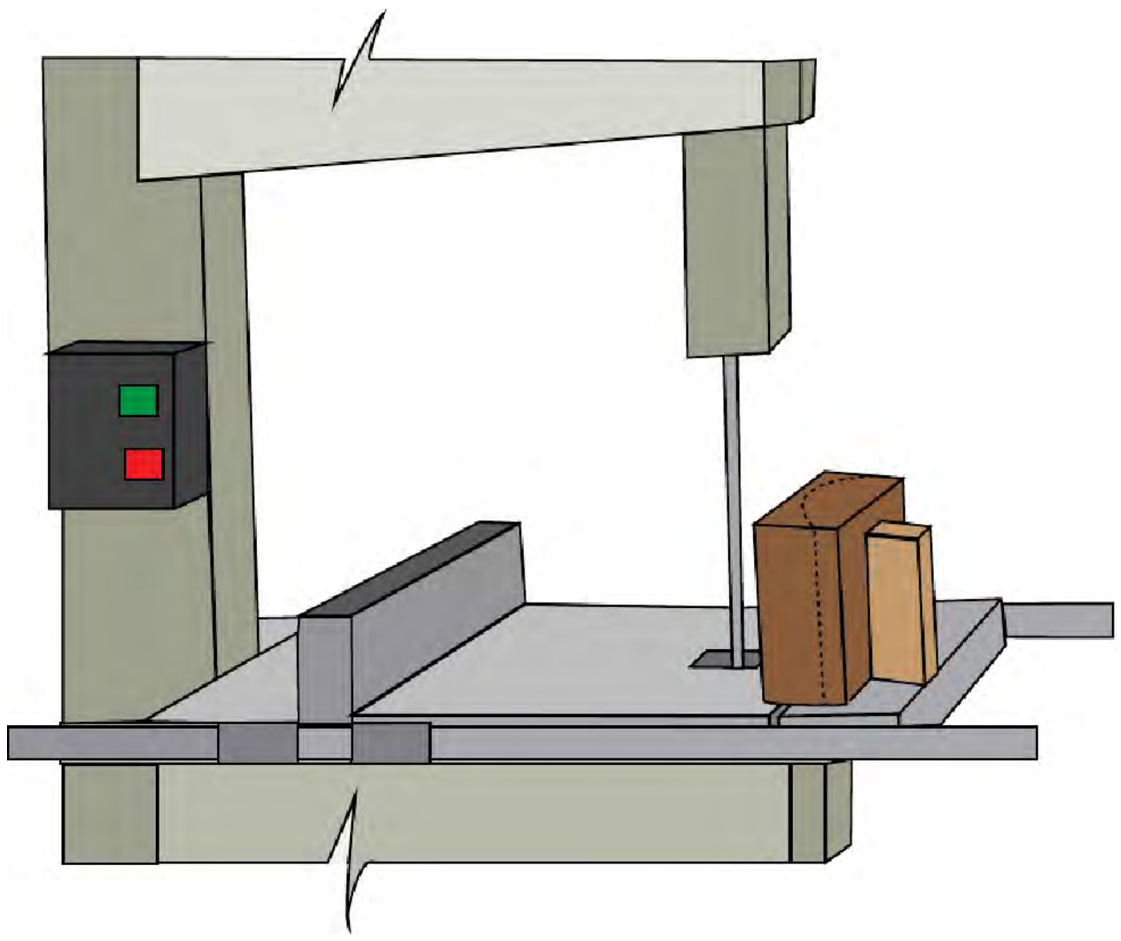
Extra Tools and Materials Needed: One dark and one light block of wood (5-in. wide x 5½-in. high x 1¾-in. thick), band saw, vacuum press, metal or plastic book stand and light cardboard.

Prepare the blocks: Make a handle and cut the block on a band-saw so it has a 3¼-in. radius and a ⅝-in. wide side. See **Drawing 24-1**.

1. Use heavy-duty, double-sided tape to attach a piece of wood to the block.



Drawing 24-1. The Book ends. Cut the blocks to these dimensions. Use a dark and a light wood.



Drawing 24-2. Cut the Arc. Attach a 'handle' to the block and cut the arc.

2. Use a band saw to cut the arc. See **Drawing 24-2**.
3. Sand the cut edge smooth.

Cut the Silhouettes: A silhouette (outline, shape or profile) is easily made. Place the subject (small child, pet or whatever) on a chair next to the kitchen table, place a lamp on the table, dim all the other lights and note the shadow/profile on the wall. Tape a piece of white paper to the wall and move the subject and the lamp until a clear profile is projected. Cajole, threaten or bribe the subject to be especially still and use a black felt-tip pen to trace the outline.

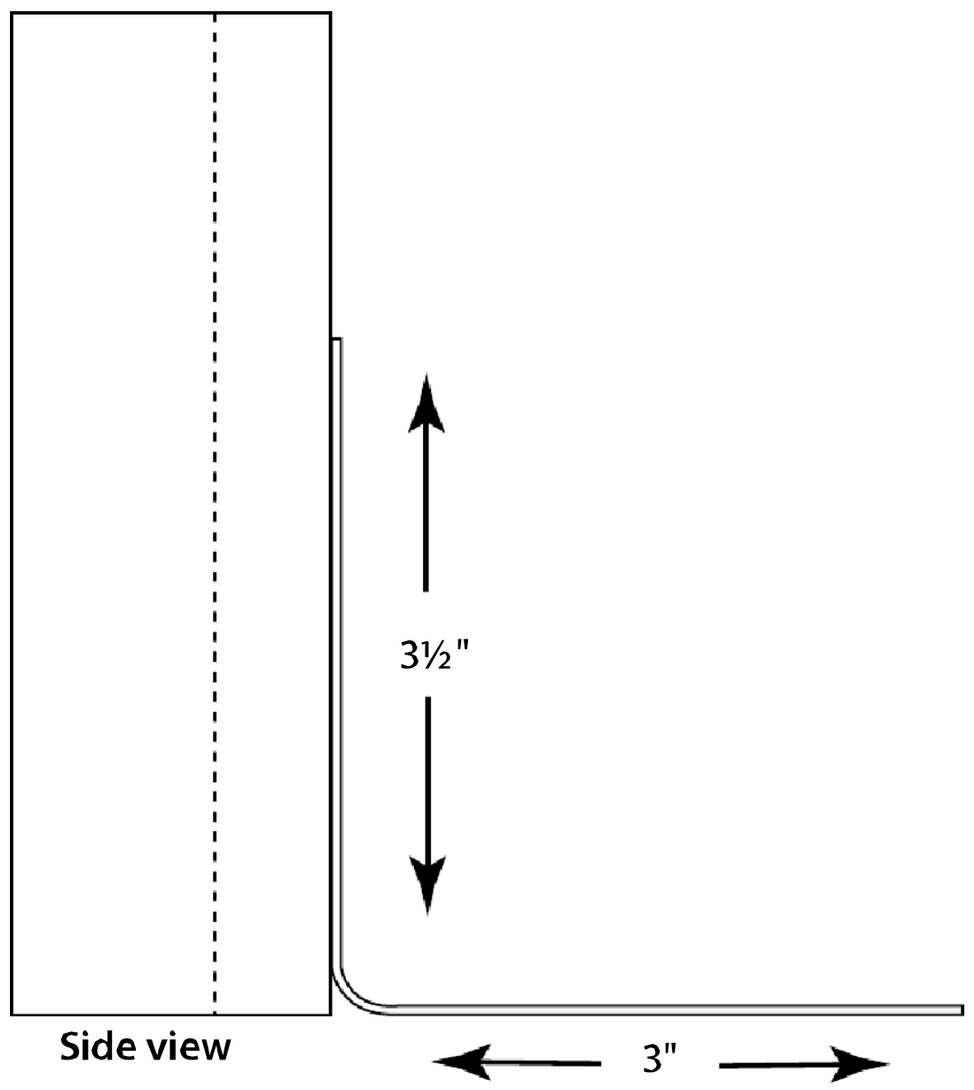
4. Cut a light and a dark veneer to 5-in. x 5½-in. Grain direction should run vertical—i.e. up and down. Veneers and marquetry bend easier with, rather than across, the grain.
5. Put app tape on the top of one veneer and on the bottom of the other veneer.
6. Make a pad with app tape on the top of the pack and on the bottom.
7. Blue-tape the pack together on all four sides.
8. Set the scroll saw table at 90° (level, no tilt).
9. Cut the pieces.

Grain direction. If you are concerned with grain direction of a small piece, cut a window into the background just a little smaller than the insert will be. Then slide the insert piece under the hole and rotate it around. This way you can see what the piece will look like before cutting.

10. Put the two silhouettes into the appropriate backgrounds, rub white PVA glue into the joints, sand lightly and let dry.

Make the Book End: Glue the marquetry to the block and add the book stand.

11. Cut a piece of light paperboard (cold cereal box cardboard) to 5-in. x 5½-in. to use as an overlay to compensate for any variation in veneer thickness.
12. Put PVA glue on the block and wrap the veneer around the block.
13. Use blue tape to fasten it in place.
14. Add waxed paper and then the paperboard; tape in place.
15. Place in a vacuum bag for 30 minutes.
16. Remove from the bag and take off the app tape.
17. Reclamp for another 30 minutes.
18. Trim the extruding veneer, seal with shellac, sand and finish with wipe-on poly.
19. Attach the book stand. This can be a piece of sheet metal or a piece of plastic. See **Drawing 24-3**.



Drawing 24-3. The Stand. This can be a piece of metal or plastic.

VACUUM PRESS. PVA glues set by water evaporation and polymerization. Vac presses remove moisture and so speed glue-ups.

Project 25

WINE COOLER

This project involves some precise work on the table saw (rip-cutting ten staves at 18° on both sides), gluing them together and then some easy lathe work to turn the deca-faceted (ten sided) cylinder round. Once the cylindrical base has been made, the marquetry is rather simple—just some grape clusters and some vines. At 16½ inches in length, the piece is too long for some scroll-saws so the piece was cut in two sections. Wrapping the finished piece around the cylinder without cracking the veneer or losing any pieces is rather challenging too. You will agree however, that the final creation is worth the effort, **Photo 25-1**. On the pattern **Drawing 25-1**, the red line shows how the pattern was divided.

Photo 25-1

Extra Tools and Materials Needed: Wood stock (⅝-in. thick) for staves, table saw, lathe, stainless steel insert, digital angle guide, rubber straps and six 10-in. band clamps.

Make the Cylinder: The stainless steel insert is 7⅛-in. long, 3⅝-in. in diameter and has a 4½-in. diameter lip. The wood cylinder is made to accommodate this insert which can be ordered from Craft Supply, Provo, Utah.

1. Use ⅝-in. stock and cut 10 wood staves 7¾-in. long x 2-in. wide.
2. Set the table saw blade at 18°, see 'Concepts, 'Blade, Table Saw Set' for details on this.
3. Set the fence to just take off one edge.
4. Reset the fence to cut the other edge so the large side of the stave is 1⅝-in. See **Drawing 25-2**.
5. Cut ten staves and then fasten two 16-in. strips of blue tape on the workbench, face-up.

6. Place each stave (wide-side down) onto the tape strips, grab the blue tape and roll the staves into a cylinder and fasten with the blue tape.
7. Re-cut any staves as necessary.
8. Rub yellow PVA glue into each joint, roll the staves into a cylinder and fasten with tape.
9. Put two band clamps around the cylinder, top and bottom.
10. Later, remove the clamps and use a band-saw to trim the ends of the cylinder to 7¼ inches long.

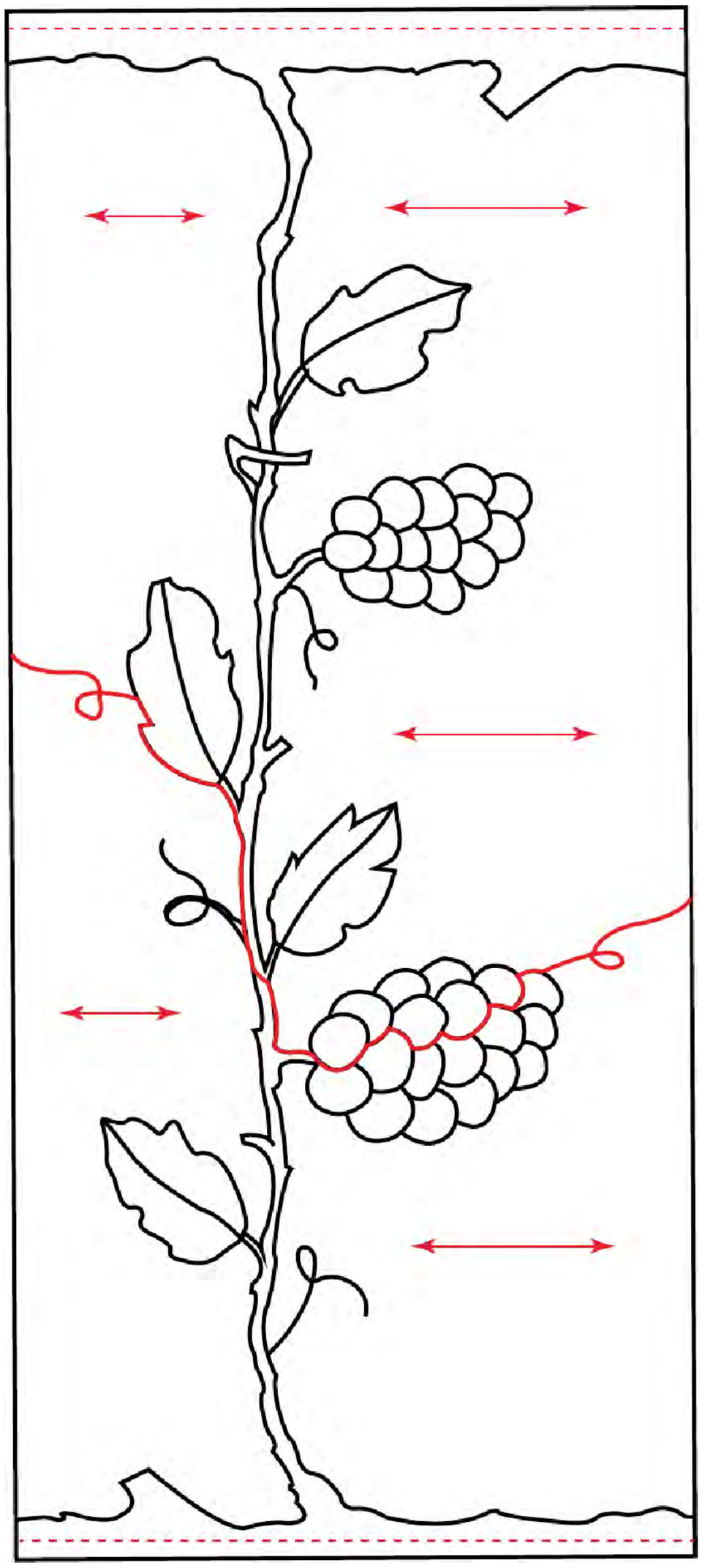
Round the Cylinder: Use a lathe or a power sander. See **Drawing 25-2**.

11. Make end plugs and use a lathe to turn the faceted cylinder or
12. Use wood rasps and a power sander to ease the joints.

Make the Marquetry: The outside area of the cylinder is 7¼-in. high x 16⅜-in. long; measure to confirm this. The final piece will bend around the cylinder easier if the grain is vertical i. e. runs up-and-down; see red arrows in **Drawing 25-1**.

Adjust the length of the pattern so it is ¾-in. longer than the circumference of your cylinder.

13. Put app tape on the back of all the veneers and make the pad.
14. Put multiple veneers in place and later choose the best.
15. Use blue tape to seal the pad.
16. Cut along the red line to separate the pad. See **Drawing 25-1**.
17. Retape the open ends with clear cellophane tape.
18. Cut out each part and assemble the marquetry piece.
19. Sand-shade any parts as needed.

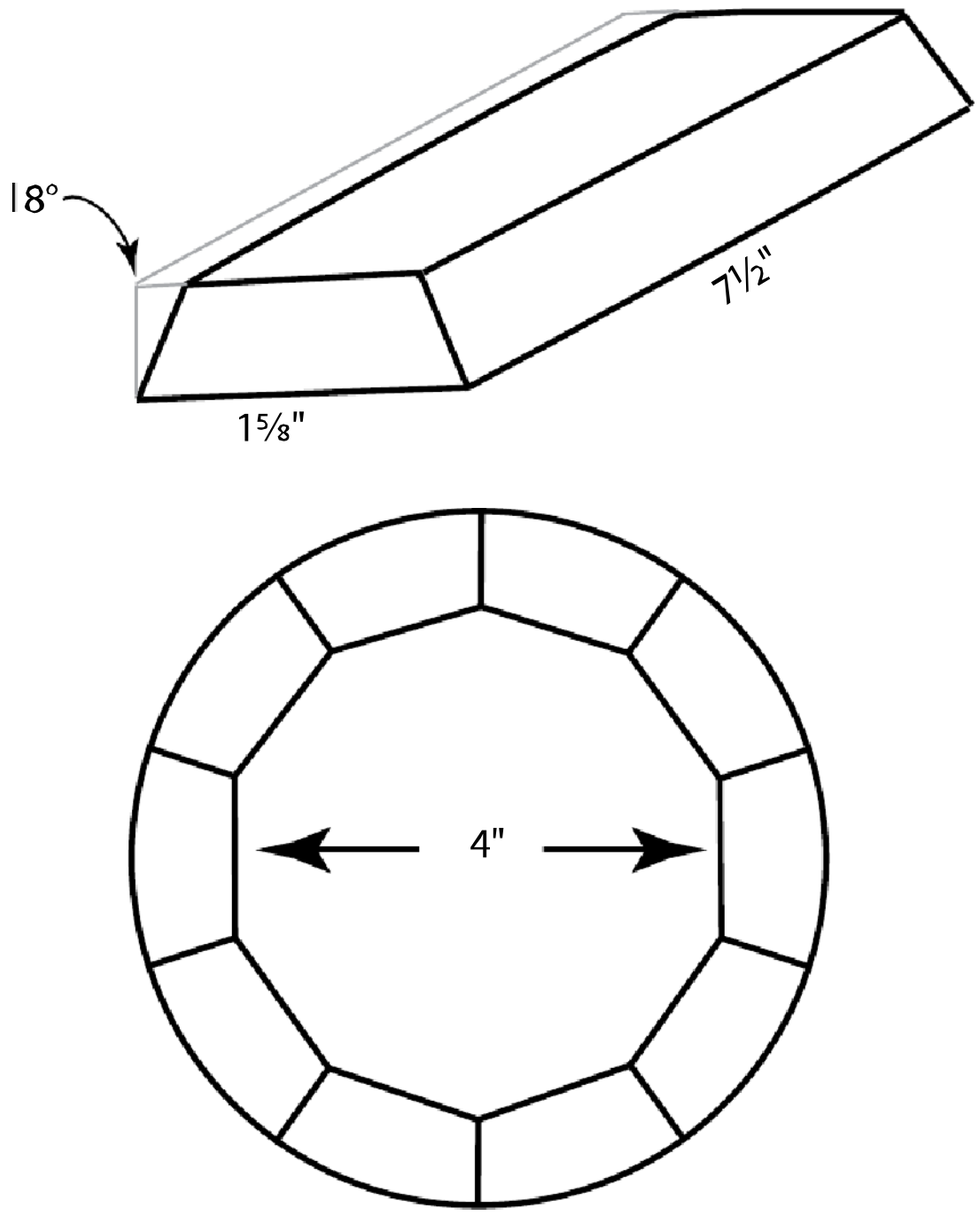


Drawing 25-1. The Pattern. The pattern is 17⅛-in. long (¾-in. longer than needed); after the marquetry is wrapped around the cylinder, the overlay will be trimmed off, see dashed red lines. The red line shows how the pattern is divided into two pieces. The red arrows show grain direction for the background.

Looking for patterns? Check craft stores for quilting books. Kid's coloring books also have good drawings.

Apply the Marquetry to the Cylinder: The marquetry must be held together securely with tape and then carefully wrapped around the cylinder. If your marquetry piece doesn't bend easily, use veneer softener; see 'Concepts, Veneer, Flattening Wild' for details on this.

20. Cover the front side completely with app tape.
21. Fill the back of the marquetry as necessary; scrape and sand smooth.
22. Put a 1-inch wide piece of wax paper vertically on the cylinder from top-to-bottom at the point the marquetry will join; tape the ends inside the walls.
23. Apply PVA glue to the cylinder up to the wax paper strip and carefully wrap the marquetry piece around it.
24. Allow the two ends to overlap with the wax paper underneath.
25. Wrap 1-in. rubber strips around the marquetry to bind it tightly to the wood cylinder. As each strip ends, tuck the loose end under the band.
26. Put eight large band clamps over the rubber strips and tighten. Put extra rubber pads under the screw-tightening mechanisms so they will not dent the veneer.
27. After 30 minutes, remove all the clamps and remove the app tape.
28. Scrape off any excess glue, put clean white paper and paper towels around the cylinder and reclamp with the rubber strips and band clamps.
29. Keep the glue-up in a warm room for 24 hours and then remove the clamps and paper.
30. Use a straight edge and a veneer saw and cut through the two overlapping pieces down to the wax paper.
31. Remove the extra veneer pieces and the wax paper.



Drawing 25-2. The Stave and the Cylinder. Cut ten staves from ⅝-in. stock. Glued together, the inside diameter is 4-in. Smooth the outer surface with a lathe or with files and a sander.

32. Put glue under all the edges; use small strips of paper to push the glue or use compressed air to blow glue into the tight areas.
33. Glue the ends.

Make the Cylinder Top and Bottom: Cut and fit two walnut pieces for the top and bottom.

34. Glue a 3/16-in. thick piece of walnut, 5½-in. diameter to the bottom of the cylinder.
35. Use a band-saw to cut the bottom piece to near-size and then sand by hand to fit.
36. Make a walnut ring 3/16-in. thick and 5½-in. outside diameter and 4½-in. inside diameter to fit the metal insert.
37. Glue this ring to the top of the cylinder.
38. Use a band-saw and then hand sand to shape.
39. End up as usual: seal with shellac, scrape, sand and finish with wipe-on poly.

Project 26

MARQUETRY ON A COMPLEX CURVE

This project is quite advanced. Marquetry can be wrapped around a cylinder and a cone fairly easily because the surface is flat and curves in only one direction. It is difficult to wrap marquetry around a complex curve, such as a ball or a bowl, where the surface changes in two directions as in this project. See **Photo 26-1**. The veneer pieces will conform in one direction but will buckle and crease in the other direction. The secret is to choose veneers that will 'stretch' and to apply small pieces, one at a time and thus allow their small amount of elasticity to conform to the complex curves. This open vessel was made by my friend Dave Peck of Redwood Valley, California. The Open Vessel is 6-in. tall and 4-in. in diameter.

We will assume you have the open vessel; either turn this piece yourself or persuade a friend to turn it for you. The lathe is also a perfect 'holding devise' while you do the clamping of the marquetry work.

Extra Tools and Materials Needed: Lathe or open vessel, rubber or elastic bands for clamping.

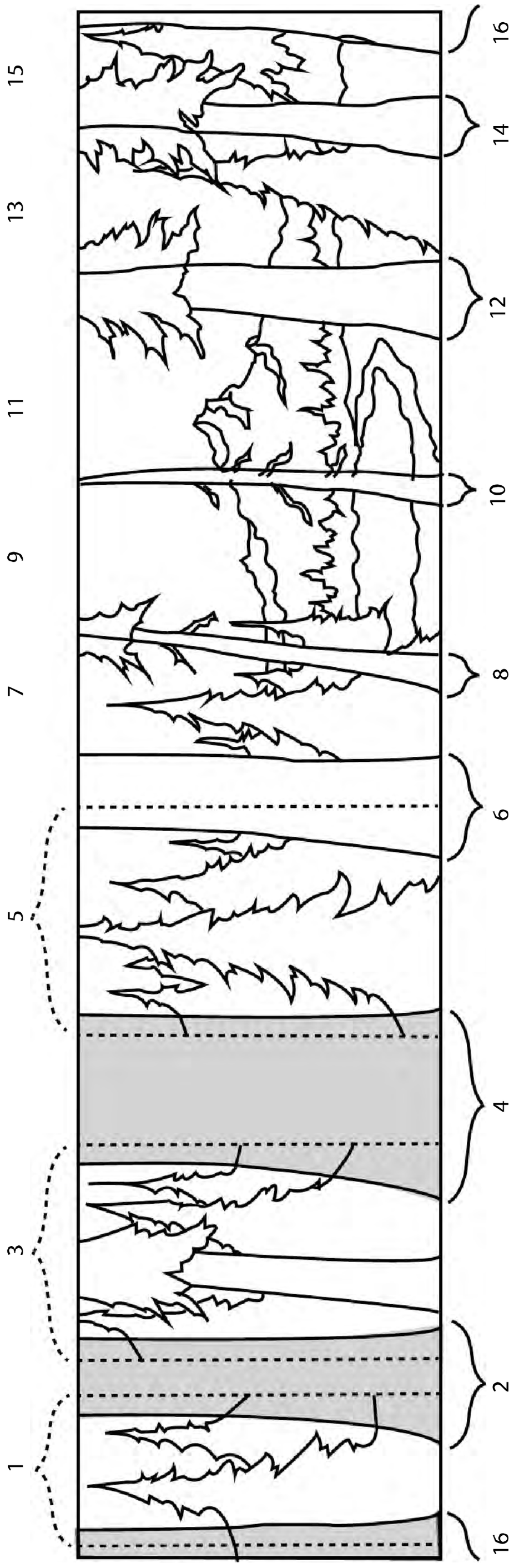
Photo 26-1

Make the 'Sky/Background' Marquetry: Enlarge pattern **Drawing 26-1** to the circumference of your turned vessel plus ½-in. The turned vessel in **Photo 26-1** is 12½-in. circumference and the pattern is 13-in. long. Make the eight odd-numbered veneer sections ½-in. wider, ¼-in. on both the left and right sides. Therefore 1=1⅜-in., 3=2-in. etc. Position

all veneers vertically, so the grain runs up-and-down. The sky/background veneer is the same in all eight panels.

1. Choose the veneer for the eight Sky/background sections. Each will be about 4-in. tall x these widths: 1=1⅜-in., 3=2-in., 5=2-in., 7=1⅜-in., 9=1½-in., 11=1⅞-in., 13=1⅝-in. and 15=1-in. Note in **Drawing 26-1** the dotted lines show how background pieces 1 and 3 are oversize.
2. Put app tape on the top of a background piece.
3. Place a foreground/tree veneer under the background and tape it in place.
4. Use the double bevel method and cut out the section.
5. Place it into the background and rub PVA glue and sawdust into the joints. Because the pieces fit into the back, they tend to remain in place as it is bent around the open vessel later. Add the next pieces until the section is complete.
6. Make all eight marquetry panels this way. Note the foliage on top of 8, 12 and 14 are part of sections 7, 9, 11, 13 and 15 and these foliages have to overlap so they can fit. See #14 below.

Cut with a veneer saw or a knife? There is no rule. With a veneer saw, cut very lightly with about six strokes. If the edge is rough and the cut wanders along grain lines, try a sharp knife.



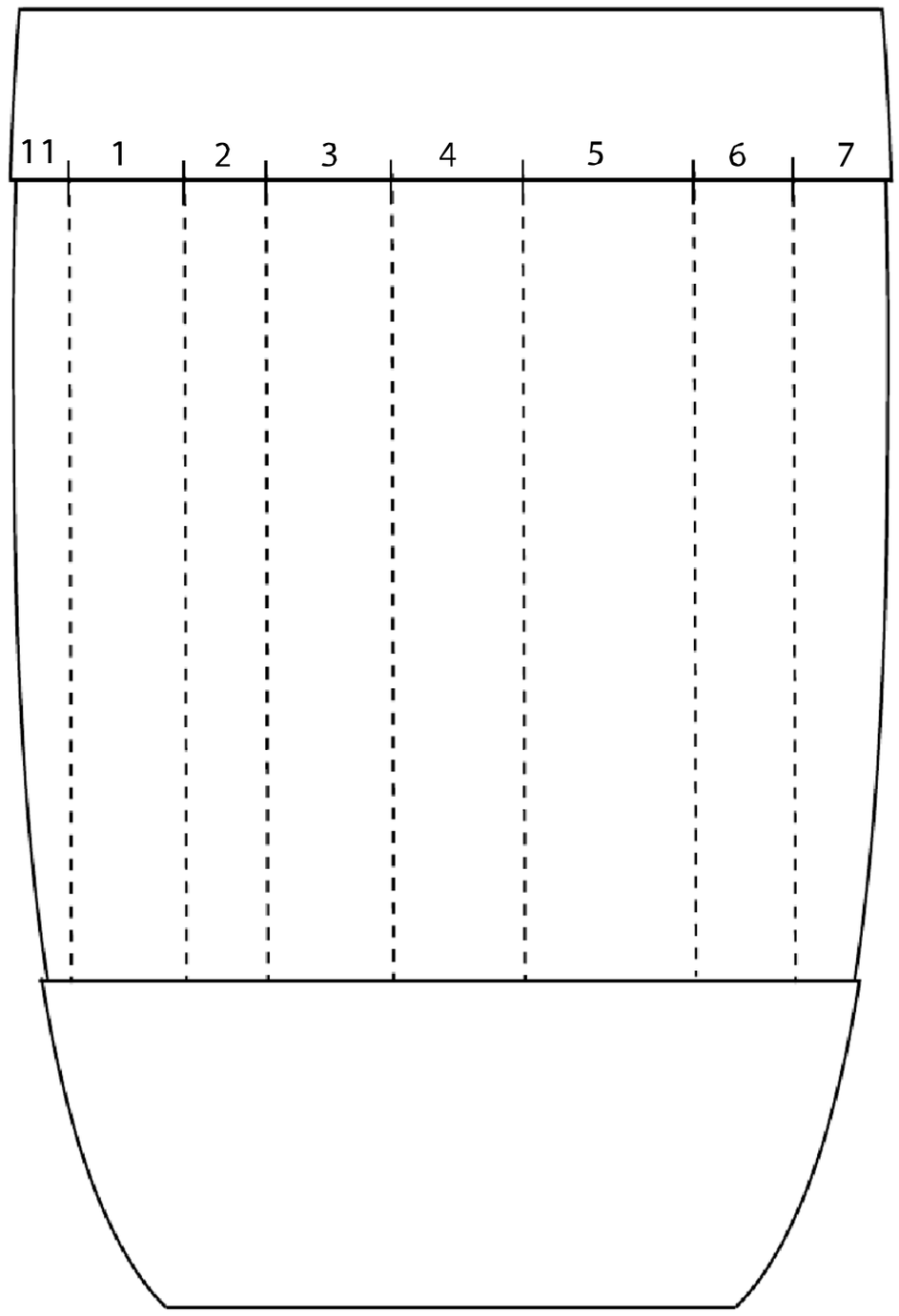
(right) **Drawing 26-1. Trees Pattern.** The eight odd-numbered pieces (the foliage #1–15) are 'over-sized' by ½" (see dotted lines for #1, 3 and 5) and are glued on first. The eight even-numbered pieces (the tree trunks #2–16) are used as guides to trim the background pieces and then they are glued in place. The foliage at the top of numbers 8, 12 and 14 are part of the background. Section #16 is one piece, glued on at the end.

Apply the Sky/Background Marquetry: The eight Tree marquetry sections (odd-numbered pieces) are put on first, see **Drawing 26-1**. After they are set, the Tree Trunk sections (even-numbered) are applied. Mark the vessel as in **Drawing 26-2** to position the strips into the recessed area.

7. Use Tree Pattern **Drawing 26-1** to mark where each section will go; see **Drawing 26-2**. Note that the pieces are cut oversize in width and will be trimmed to size when the tree trunks (even-numbered pieces) are put on. See **Drawing 26-1**.
8. Apply a ⅜-in. wide line of PVA glue vertically in the middle of the Number 1 area.
9. Fasten #1-marquetry piece in place with blue tape; top, middle and bottom.
10. Do the same for sections 5, 9 and 13.
11. Wind ¾-in. rubber strips or elastic bands around the piece completely top-to-bottom to hold the marquetry sections in place.
12. When these sections are dry, remove the bands and the blue tape.
13. Glue sections 3, 7, 11 and 15 onto the vessel as above.
14. On sections 7–9, 11–13 and 13–15, use a knife and cut down the middle of the top overlap making each fit as a single piece. See **Drawing 26-1**, top of sections 8, 12 and 14.

Trees/Foreground Marquetry: All the even-numbered Sections (2–16) are merely straight sections of veneer. The foliage at the top of 8, 12, 14 and 16 are part of the background already applied.

15. Cut each of the eight even-numbered marquetry sections to exact size.
16. Sand the edges smooth.



Drawing 26-2. Open Vessel Pattern. The middle area is recessed to receive the marquetry. Marks show where all 16 pieces will be placed. The final widths of the odd-numbered sections are: 1=⅞", 3=1½", 5=1½", 7=⅞", 9=1", 11=1⅜", 13=1⅛" and 15=½".

Apply the Foreground/Tree Marquetry: All eight of the sky/background pieces (odd numbers) have been glued in place. Now the eight tree/foreground pieces (even numbers) are used as a guide to cut off the excess veneer from the background pieces. Because the sky/background strips are held in place only in the

Colored veneers. To dye your own veneers use liquid Rit color-fast fabric dyes sold in grocery stores. Soak a light colored, open grain veneer for 30 minutes to an hour in a warm solution of two teaspoons of dye per quart of water.

center, it is easier to cut and remove the outer veneer strip. If the glue spread out and stuck the whole piece down, use a chisel or carving tool to remove the dried glue.

17. Tape a trunk/ foreground piece in place with blue tape.
18. Use a sharp knife to cut along the outer edges of each trunk. Note on sections with foliage at the top (7, 9, 11, 13 and 15) cut across the top of the tree section under the foliage.
19. Force glue under the already applied piece (compressed air helps) and on the entire opening where the new piece will go.
20. Tape and clamp the new piece in place with rubber strips and allow it to dry. Repeat and do as many sections as you feel comfortable doing until all are done.
21. Go over the surface with your fingers to feel for any spots where the veneer has not adhered properly. Look, tap, listen and feel. It's better to find a problem now than after the finish is applied.
22. To fix spots where the veneer has popped up or has not adhered, lift the section with a knife blade and blow glue into the recess. Clamp once more.
23. Seal the marquetry with shellac, scrape and sand.
24. Add wipe-on poly to the cup.

Final Steps: If you are turning the Open Vessel on a lathe, remove wood from the inside after the marquetry has been sanded and given a coat of finish.

25. Turn the inside to the desired thickness.
26. Do the final finishing making sure all scratches have been removed.

ADD APP TAPE. Put app tape on the top piece of veneer in a stack. Makes it easier to transfer the pattern.

Project 27

MARQUETRY ON A CONE

Photo 27-1

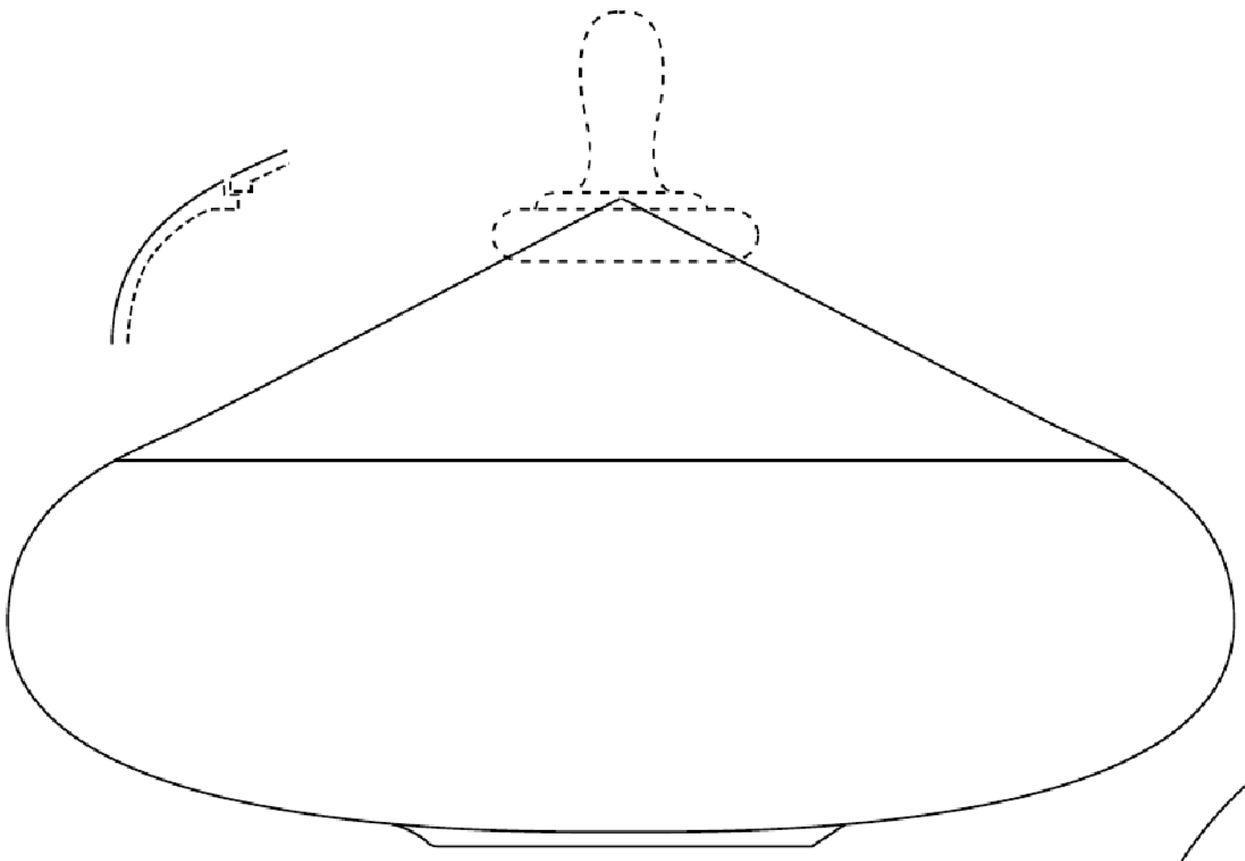
This project is advanced; wrapping veneers around a conical surface takes planning and precise execution. We still use a flat piece of veneer but the pattern is circular, see **Drawing 27-4**. Also the size and grain direction of the marquetry pieces are more important here. This decorated cone was made by my good friend Dave Peck of Redwood Valley, California.

We will assume you have the turned box (**Drawing 27-1**) with the cone-shaped lid. Either turn this piece yourself or persuade a friend to turn one for you. The lid is 7¼-in. diameter and 3¾–in. high.

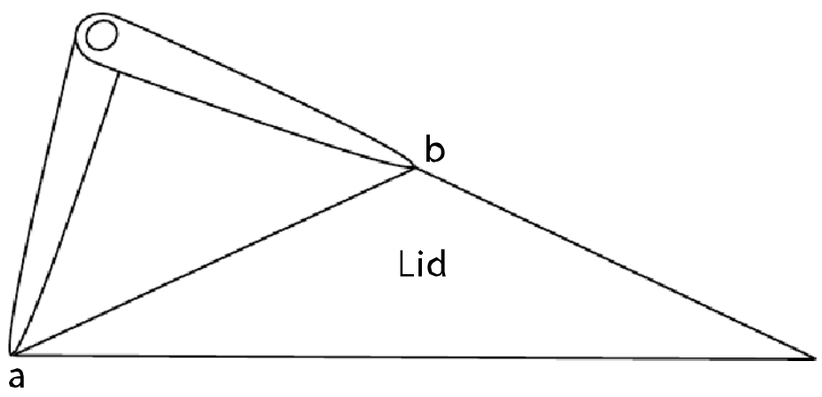
Extra Tools and Materials Needed: Lathe or box with cone-shaped lid, spring clamps and rubber strips.

The Cone Pattern: The pattern is still flat but has a different shape. The size of the marquetry depends on the height of the cone and the circumference of the base.

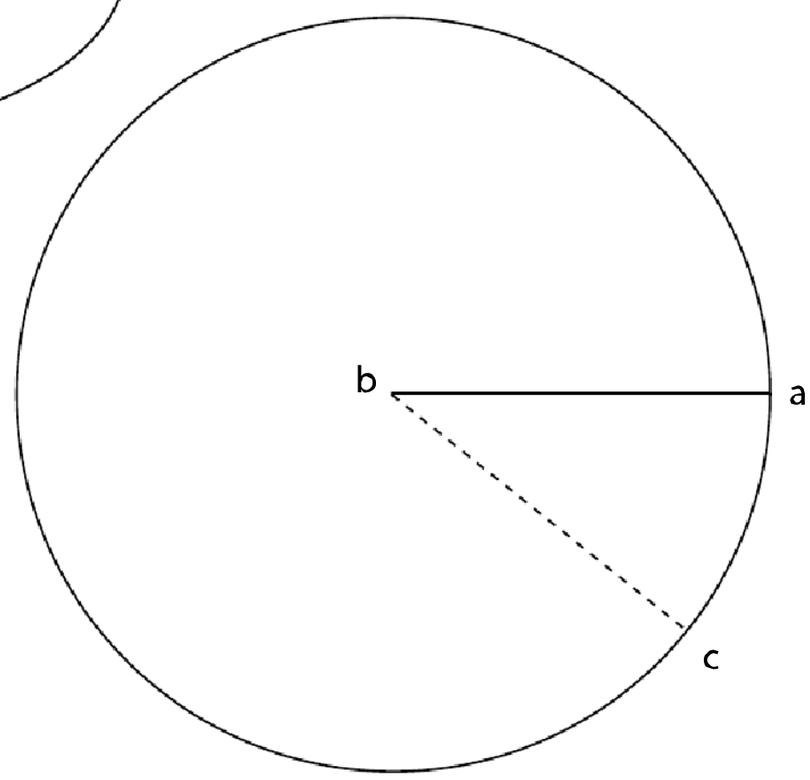
1. Set dividers to the length of the slant side of the Cone (a-b), see **Drawing 27-2**.
2. Draw a circle with length a-b as the radius, see **Drawing 27-3**.
3. Cut out the circle and cut from point a-b.



Drawing 27-1. Box with Conical Lid. The box is 7¼-in. diameter x 3¾-in. high. The inset shows how the lid fits into the box. The point is cut off later and a finial is attached.



Drawing 27-2. Find the Height. Distance (a-b) is the pattern height.



Drawing 27-3. Find the Length. Wrap the pattern around the cone. Mark the overlap (a-c) and the dashed line (c-b) is the cut line.

4. Wrap this circle around the cone and mark where the two ends overlap at 'c'. **Drawing 27-3.**
5. Cut the paper from 'c' to 'b' in the center. This is the exact pattern as in **Drawing 27-4.**
6. Plan your marquetry for this size plus ½-in. overlap on one end.

Make the Marquetry: Use the cone pattern **Drawing 27-4** and draw the marquetry. Choose veneers that bend easily, i. e. burls and soft woods. Most hardwoods bend poorly or not at all.

7. Cut the background veneer piece to size, see **Drawing 27-4.**
8. Put app tape on the front and back of the background veneer and trace the pattern.
9. Use the double-bevel method and bring the pieces in from the back; they will be more likely to stay in place when the piece is bent around the cone.
10. Sand-shade pieces as needed.
11. Completely cover the top of the marquetry with app tape and turn the piece over.
12. Remove app tape from the back.
13. Fill and repair any areas as needed.

To bend veneer. Rub a piece of veneer against your cheek; bend the veneer so the smooth side is in.

Drawing 27-4. The Pattern. The dotted line shows exact fit. Make the marquetry ½-in. longer.

Prepare the Cone: Mark the overlap area and put on glue.

14. Draw a vertical line (up and down) on the cone showing where the marquetry ends.
15. Put a 2-in. wide wax paper strip or app tape at this vertical line.
16. Put PVA glue around the cone up to the two inch space with wax paper.

Glue the Marquetry to the Cone: This is a two-step process; first the marquetry is glued to the cone leaving the ends long and overlapping. Later the marquetry is cut to exact length and the ends are glued down. The shape of the cone determines the best pressing method. For a wide shape like this, PVA glue, clamps and rubber strips work well. A vacuum press may also be used.

17. Push the center of the marquetry strip (at the Stem of the flower) onto the glued surface directly across from the wax paper area. Hold it here for a minute until it is partially set and then put a spring clamp on the bottom edge.
18. Start at the clamped area and slowly push the marquetry around the cone in one direction for two-three inches. Put another spring clamp here.
19. Go back to the middle and push the marquetry against the cone in the other direction. Once it starts to hold, put a spring clamp along the bottom edge to hold it in place.

Polyurethane sealer. Dilute regular poly about 1:1 with paint thinner to make a wipe-on poly.

20. Do this until the marquetry is around the whole cone.
21. Use blue tape at the overlapping joint to secure the ends.
22. Wrap long rubber strips around the piece.
23. If the marquetry slips, tap in a small brad to hold it in place.
24. After the glue has set, pull out the brad/brads and take off the wax paper or app tape at the joint.
25. Cut off the excess veneer to form the joint.
26. Put glue along this over-lap area using small slips of paper or an air gun.
27. Clamp these pieces.

Use a Vacuum Bag: The vacuum bag process is faster than clamps and rubber strips. See 'Concepts, Clamp, Vacuum Press' for details on this.

White PVA glue. After initial set, white PVA glue can be reactivated with heat (about 180° F.) indefinitely.

Finish the Marquetry: Seal the marquetry and then scrape and sand.

28. Examine the marquetry and if there are any areas where it is not glued to the cone, use a household iron set to medium (wool) and slowly rub the surface to reactivate the glue; clamp again.
29. Seal with shellac and scrape until the surface is smooth.
30. Use an electric sander with a vacuum so dark dust doesn't become embedded in light-colored veneers.
31. Put on four or five coats of wipe-on poly.

Add the Finial: The finial was added after the marquetry was put on.

32. Flatten the top of the cone.
33. Drill a ¼-in. hole in the top of the cone.
34. Use a dowel and glue to attach the finial to the top of the cone, see **Drawing 27-1**.

Project 28

WOODY WOODWORKER MAGAZINE RACK

This is the most ambitious of the pad projects. The pad has 22 pieces of veneer and we will use 20 in the final piece; the two extras are in case the first choices don't pan out. Use a 1/0 scroll saw blade (0.008-in. kerf) with the table set at 90°; see **Drawing 28-1** for the pattern. The stack will be thick in places (⅓₀-in. for each veneer x 22 pieces = 0.73-in. plus lots of tape), so it will be nailed together. The magazine rack in photo **Photo 28-1** was made of cherry and the background veneer is also cherry.

Photo 28-1

Extra Tools and Materials Needed: Air gun pin-nailer and solid wood stock (¼-in.) for the rack.

The Magazine Rack: Use ¼-in. stock, **Drawing 28-2**. Make the marquetry piece before making the rack.

1. Cut the pieces to size and check for fit.
2. Set the pieces aside until the front piece has marquetry on it.

Heavy marquetry piece. Attach the hanging wire to the backer board, not the frame.

Choose the Veneers: Gather 20 veneers plus a few extras. As each piece goes into the pack, check it off on the pattern.

3. Choose the background veneer first; put a piece of tape on this veneer piece and write '1' on it and set it aside.
4. If you are unsure of a pattern section, choose multiple veneer pieces and number them '5A' and '5B' etc. You can also use two pieces of the same veneer oriented differently.

Drawing 28-1. The Pattern. Change any small pieces that will be difficult to cut. Mark 1 through 20 on the pattern and circle the number as each piece goes into the pack. The "X" marks show where the pins are placed.

Make the Pad: When you've chosen all the veneer pieces, start the pad assembly.

5. Make the background veneer about 10% larger than the finished piece and put app tape on the back side.
6. Blue-tape the base veneer (app tape side up) to a piece of light cardboard.
7. Select each piece of veneer, cut it to size, put app tape on the back and then tape it in place; starting with the largest pieces first.
8. Make sure the grain is in the right direction and that the veneer is under the appropriate cartoon part.
9. Check off each piece on the cartoon as it is added to the pad.
10. When the pad is complete, put a piece of cardboard on top and blue-tape the four sides.
11. Glue the pattern on top.
12. Use a pin-nail air gun with ¾-in. 23-gauge nails to secure the pad. See 'Concepts, Pin-Nailing' for details on this.

Which direction do I cut? In double-bevel marquetry, imagine that you are cutting a cone or a plug. If the bottom veneer is coming up, tilt the table and cut so the wide part of the cone is down. If the top veneer is going down, cut so the cone is wide at the top.

Cut the Pieces: There are 20 pieces; many are small and some are similar.

Use a small drill and make a starting hole.

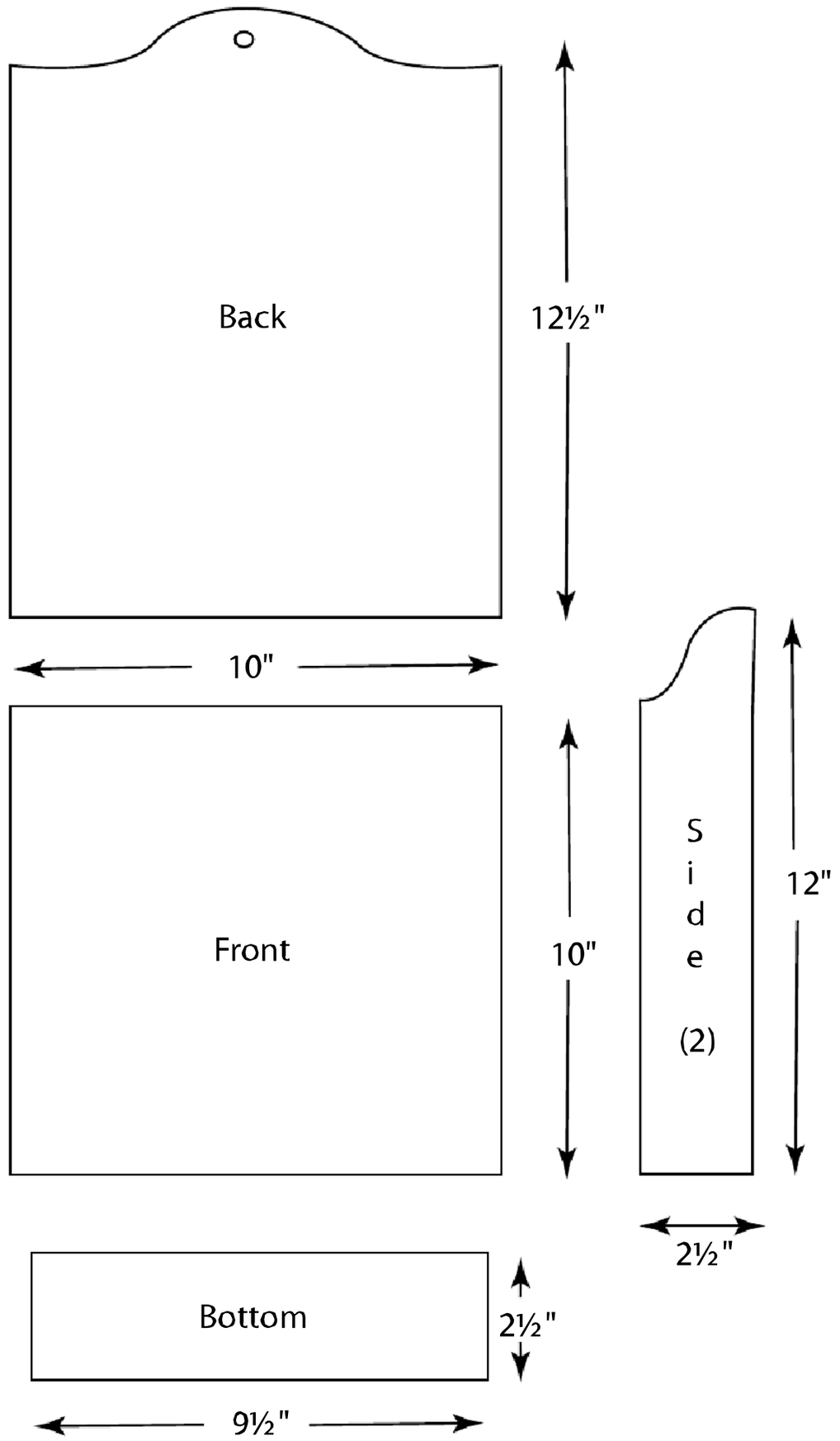
13. Thread the blade through and start cutting.
14. Use a copy of the cartoon and as each section is cut out, discard the cardboards and put the proper piece (or pieces) in place, taped side down.

Assemble the Picture:

15. Take the pad apart and use a small solder brush to clean the cut edges.
16. Cover the back side with app tape; both the veneer and the window.
17. Turn it over and lay it face up.
18. Clean each piece with the brush and fit it into the window pushing it lightly onto the backing tape. Eliminate big gaps by centering the piece in the background hole.
19. Also try all the alternate pieces.
20. Now the picture is complete. Check for missing or broken pieces by holding the picture up to the light. Repair as needed.

Add the Fine Details: The Face, Hammer, Chisel, Blueprint and Square all have fine details that are added after the marquetry pieces are cut and some finish is on.

21. Face—The Eyes and Nostril are added by cutting small circles, see 'Circles, Cutting Small' for details on this. The black veneer for the Eyebrows and Inner-ear were cut in the main pad. The Eyelids, Nose Outline, Mouth and Chin lines are added with a fine-tip ink pen.
22. Chisel, Hammer, Square and Blueprint—The veneer for the end of the Hammer Handle was added in the pad; the Outline is added with an ink pen. The Hammer Head lines, the Chisel lines, the Square lines and the Blueprint lines are added with an ink pen also.
23. Hand Saw—The Handle Rivets are added by cutting small circles.
24. Other Details—Lines in the Pencil, Hands, Pants, Arm and Shoes are made with an ink pen.



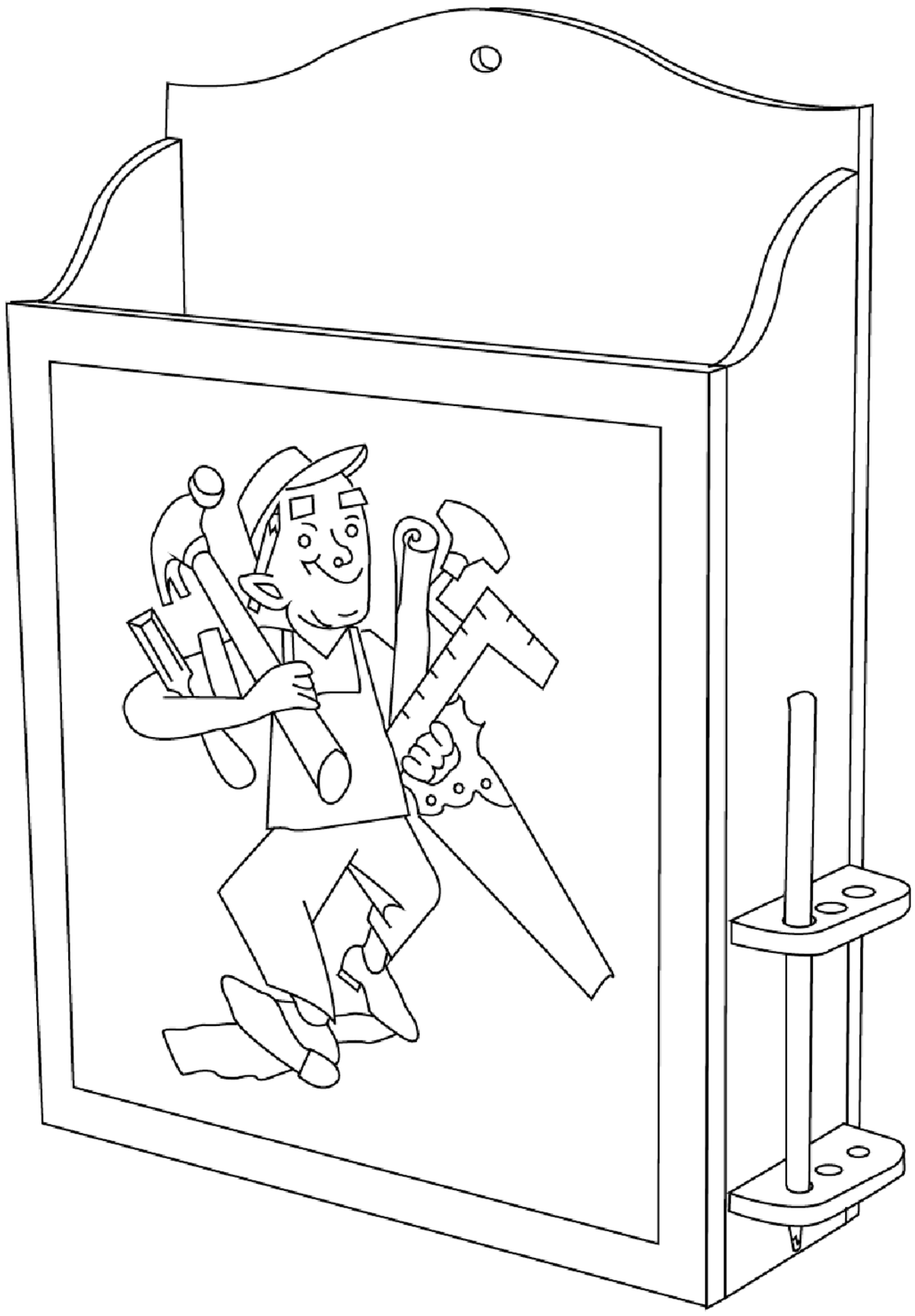
Drawing 28-2. The Magazine Rack. All the pieces are cut from ¼-in. stock. Make the Woody marquetry and glue it to the FRONT before assembling the rack.

Make the Borders and Glue to the Background: The inner banding and the outer border are made to the size of the Front of the Woody Magazine Rack; 10-in. x 10-in.

25. Cut the marquetry piece to size (8¾-in. x 8¾-in.) with a square and a veneer saw.
26. Cut the inner border strips to ⅛-in. wide and the outer border pieces to ½-in. wide.
27. Attach these to the marquetry background with clear cellophane tape overlapping at the corners.
28. Cut the corners.
29. Apply app tape to the front of the picture, including the borders.
30. Turn the piece over and remove any app tape.
31. Glue the marquetry to the front piece.
32. Seal it with shellac.
33. Cut the marquetry to fit the cherry front piece.
34. Smooth, sand and use wipe-on poly for the final finish.

Complete the Magazine Rack: Put the rack together, see **Drawing 28-2**.

35. Use glue and small nails for assembly, see **Drawing 28-3**. The sides and bottom go inside the front and back panels.
36. The pencil holders are 2¾-in. long x 1-in. wide. Top holes are ⅜-in.; bottom holes are ¼-in. They are spaced 2¾-in. apart and the bottom piece is 1-in. from the bottom.
37. Attach the pencil holders and finish the rack with wipe-on poly.



Drawing 28-3. Magazine Rack with Pencil Holders.

Make a handle. Attach a wooden handle to your straightedge with double-sided tape and use it for knife cutting. Keep your fingers up-up-and-away.

Project 29

WALL JEWELRY HOLDER

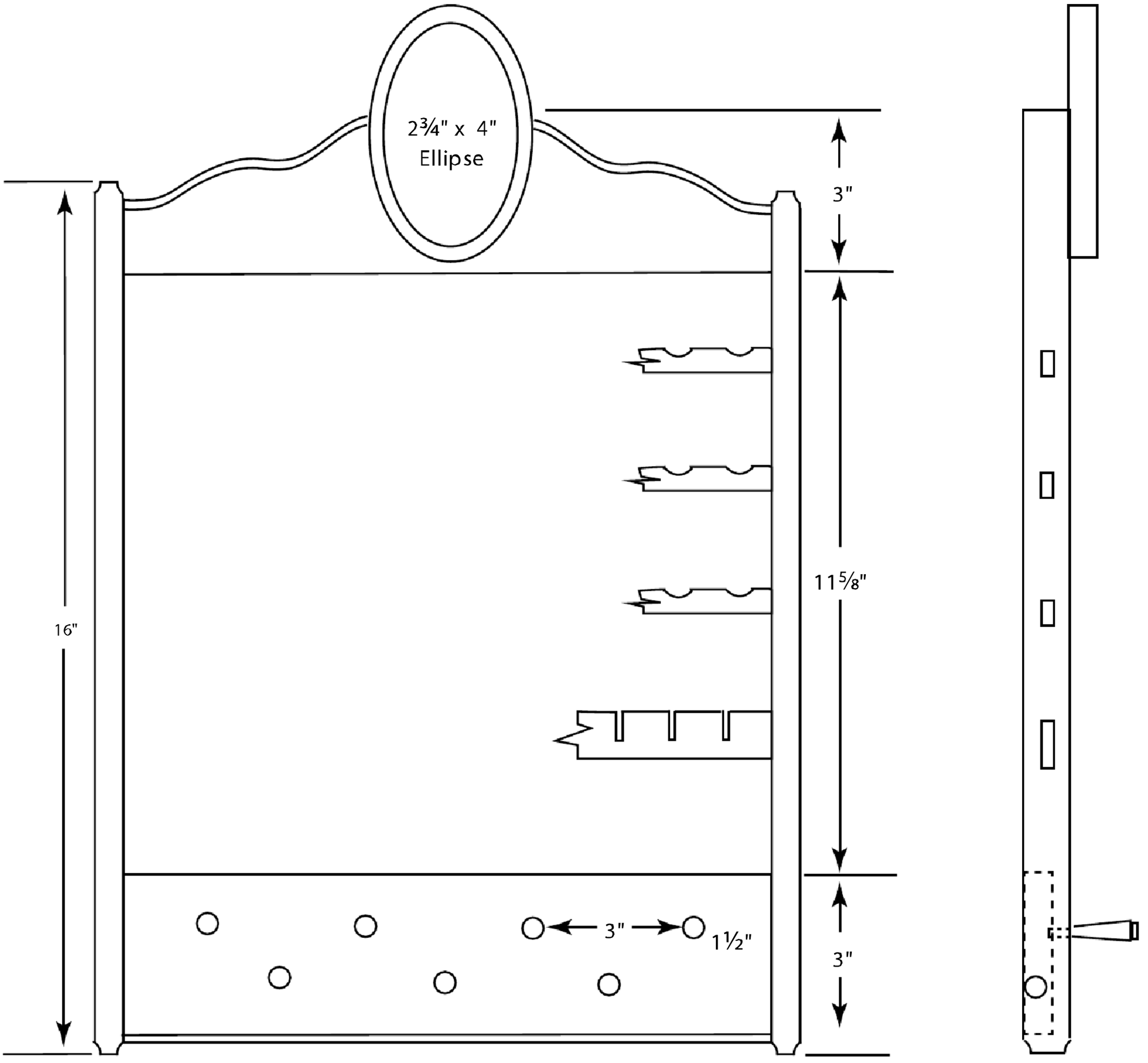
Choose a nice hardwood and add some marquetry embellishment. The rack is 16-in. high x 13-in. wide. Pegs on the bottom rail hold necklaces and chokers while the cross boards hold post- and hoop earrings. The Holder in **Photo 29-1** is made of walnut.

Photo 29-1

Extra Tools and Materials Needed: Band saw, Router/shaper, ½-in. diameter sander or file.

Make the Frame: Cut all the solid wood pieces as in **Drawing 29-1**. Use a router to cut the cove on the top and bottom rails.

1. Gather enough ½-in. walnut for the top and bottom rails.
2. Cut both rails to 3-in. x 12-in.
3. Drill seven ⅜-in. holes in the bottom rail ¼-in. deep at a 5° angle for the necklace pegs.
4. Cut seven walnuts pegs 1¾-in. long and glue them in place.
5. Use pattern **Drawing 29-1** and band-saw the top rail shape.
6. Use a ½-in. cove bit and ease the top of the top rail and the bottom of the bottom rail.
7. Cut two posts ½-in. x ⅞-in. x 16-in.
8. Use the cove bit and ease the top and bottoms of the posts.
9. Fasten the two rails to the two posts with ¼-in. dowels and yellow PVA glue.
10. Make three cross pieces of ⅛-in. stock ½-in. wide x 12-in. long.
11. Make marks 1-in. apart and use a ½-in. sander or circular file to cut indents along the length of the three cross pieces.
12. For the larger, bottom cross rail use ⅛-in. stock ¾-in. wide x 12-in. long.



Drawing 29-1. Jewelry Rack Pattern. Use ½-in. stock for the top and bottom rails. The two side pieces are ½-in. x ⅞-in.

13. Cut ¼-in. long kerfs every 1-in. with a thin-bladed saw.
14. Glue these jewelry slats in place and to make sure they are anchored strongly, drill small holes in each end and drive in brass brads.

Make the Marquetry: Use pattern Drawing 29-2 to make the rose design. The marquetry will go into a cherry ellipse which is 3½-in. x 4¾-in.

15. The marquetry ellipse is 2¾-in. x 4-in.
16. Cut the marquetry with the pad method.
17. Glue it to a piece of ⅛-in. stock.
18. Seal, scrape and sand the piece.
19. Finish with wipe-on poly.

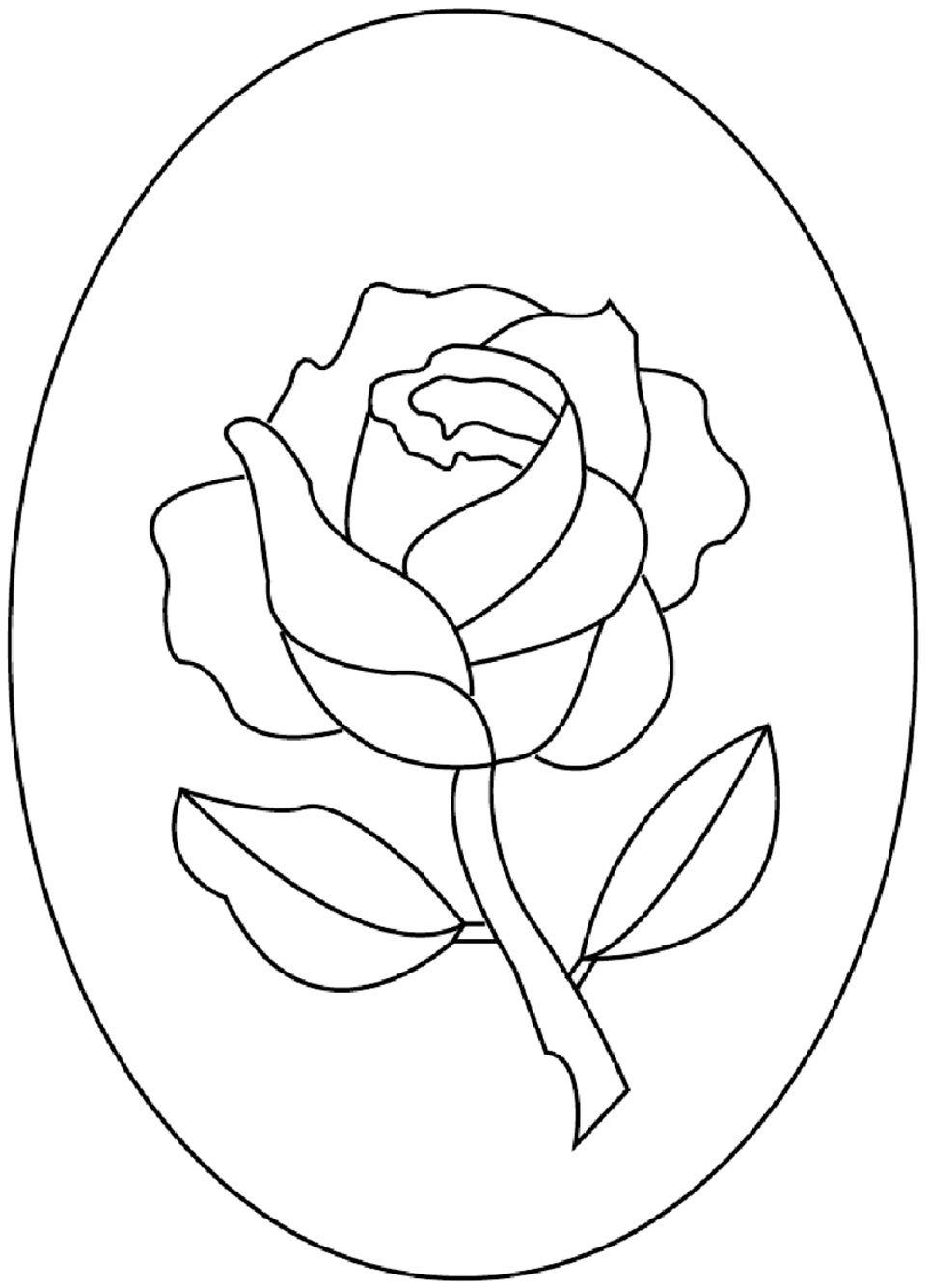
Marquetry around a circle. Glue and rubber band-clamp the work leaving 1" unglued at the end. Later use a chisel to cut through both pieces and glue these ends down. If you use contact cement, no clamps are needed.

Make the Cherry Ellipse: Use ¼-in. cherry stock 4½-in x 5-in. and cut out the ellipse.

20. Use a scroll-saw and cut an elliptical hole 2¾-in. x 4-in. in the cherry stock.
21. Fasten the marquetry pad to the back of this cherry piece using double-sided tape.
22. Drill a small hole to admit a scroll-saw blade and set the table to 90° (no tilt).
23. Cut around the inside of the cherry ellipse cutting the marquetry pad to fit in the hole.
24. Glue the marquetry ellipse onto a ⅛-in. piece of cherry stock 4-in. wide x 5-in. long.
25. Glue the ¼-in. cherry ellipse onto the marquetry pad.
26. Use a scroll-saw to cut the outer lines of the cherry ellipse 3½-in. x 4¾-in.
27. Use files and then a belt sander to even the outer edges.
28. Sand and finish the cherry ellipse.

Fasten the Ellipse to the Frame: The marquetry piece and the frame have both been finished with polyurethane.

29. Use solvent-based contact cement and glue the ellipse to the frame. Follow instructions on the can.
30. The rack can set on a dresser or hang on the wall.



Drawing 29-2. Rose Marquetry Pattern. The five veneers were cut using the pad method.

More on sand shading. Heat may make the veneer piece shrink and curl. Rub a little water on the piece and place it between two pieces of paper and weight it down. It will regenerate; then when the piece is cool, flatten it and use as usual.

Project 30

FOUR PART JEWELRY BOX

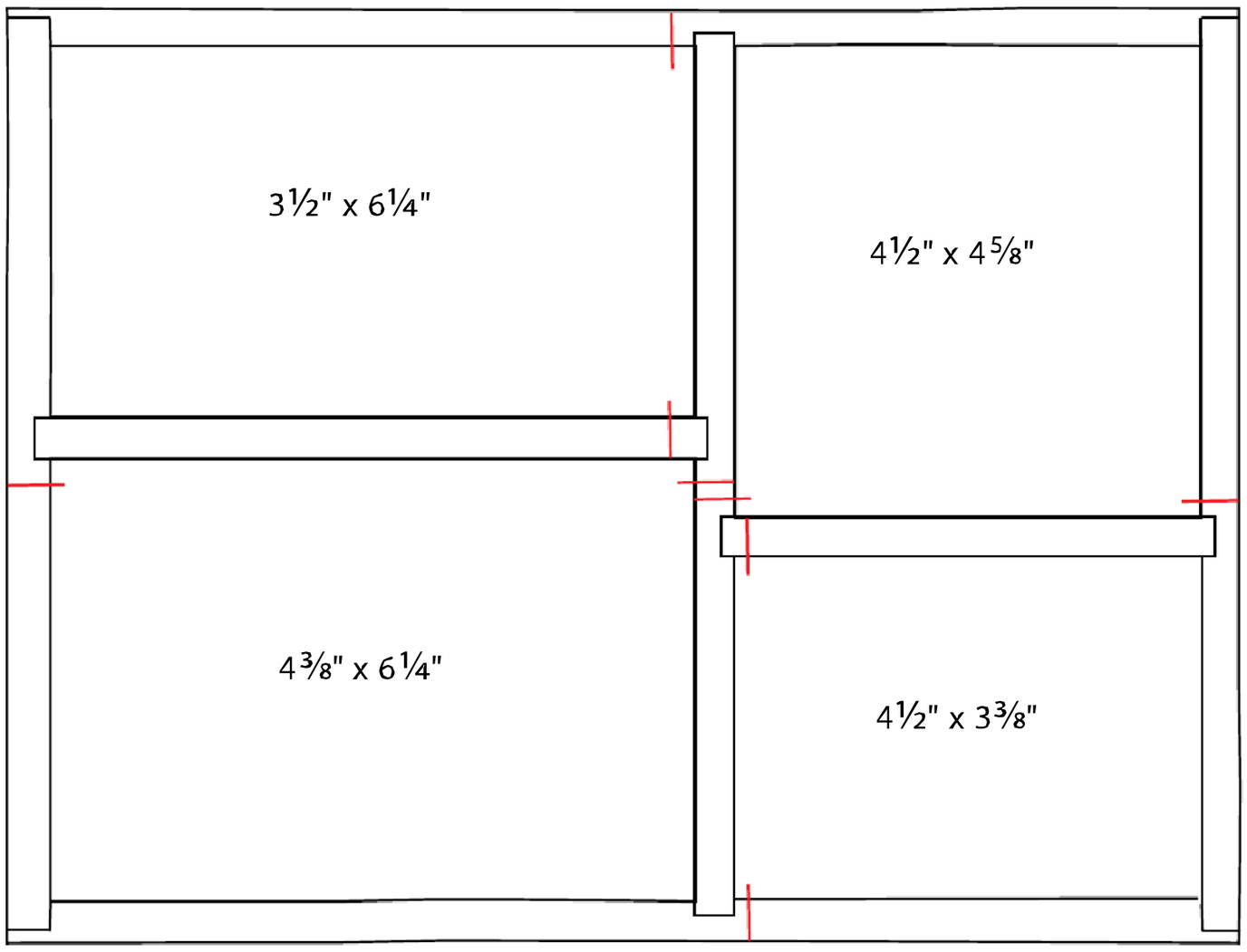

Photo 30-1

The four compartments are arranged so the lids open in four different directions using little lift tabs. The marquetry flows across the top and tends to pull the whole project together. My design was influenced by a beautiful box made by Dick Schultz of Edina, Minnesota.

Extra Tools and Materials Needed: Mahogany stock for box (5/16-in.), maple stock for lids (5/16-in.), plywood bottom (¼-in.), table saw, drill press, block plane, leather punches, velvet cloth and finishing nails for hinge pins.

Build the Box: The box is 9⅛-in. wide x 11⅞-in. long x 2-in. high and is made of ⅜-in. mahogany, see **Photo 30-1**. The bottom is ¼-in. plywood covered with mahogany veneer. The inside of each compartment is covered with velvet.

1. Cut the mahogany pieces to length for the sides and ends as in **Drawing 30-1**.
2. Cut rabbets at the ends of the side pieces.
3. Cut the cross pieces to length.
4. Cut dados for all of the cross pieces. See **Drawing 30-1**.



Drawing 30-1. Four-Part Box. The box is 9⅛-in. x 11⅞-in. and made of ⅜-in. stock. The ends are modified butt joints and all interior sections are set into dados. The dimensions are for the openings; the lids will be smaller. Holes for the pivots are indicated in red.

5. Drill small holes for the lid pivots in all the pieces. Cut notches in the sides for the lid lifts.
6. Drill 1/16-in. holes in the sides for the hinge pins.
7. Glue the box together, sand and finish with wipe-on poly.

Make the Lids: The lids are made of 5/16-in. maple; they were cut to exact size before the marquetry was attached. **Drawing 30-1** shows the interior sizes; the lids were made slightly smaller to fit snugly into the openings. Small finishing nails act as pivot pins.

8. Cut each lid to size.
9. Drill holes in each lid for the pivots.
10. Use a block plane and round over the top back edge of all the lids.
11. Test fit the lids.

The Marquetry: Each piece of veneer was taped under the background and cut at 90°. The flowers were made separately as subsets and then cut into the background as in **Drawing 30-3**.

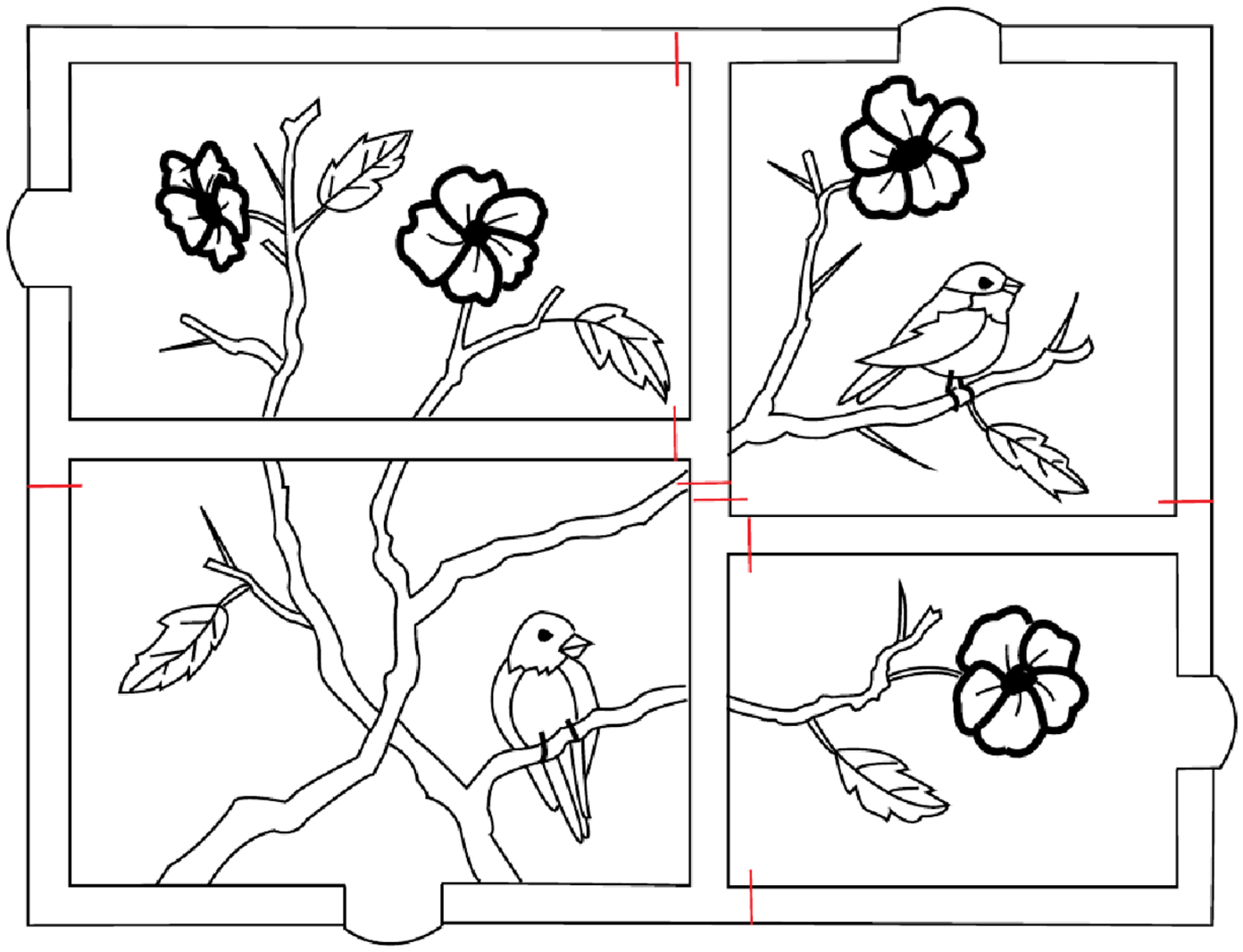
Start with the pattern for the large lid and cover the background veneer back and front with app tape. Transfer the pattern **Drawing 30-2**.

12. Start with the Leaf Branch first.
13. Cover the Leaf veneer with app tape and affix it to the back with blue tape.
14. Set the scroll saw table to 0° and cut in the Leaf as two pieces; sand-shade each half.
15. Glue the Leaf pieces into the background.
16. Cut in the black 'Thorn' piece next.
17. Add the Leaf Branch.
18. Lay two pieces of Back Branch veneer behind the background and tape in place.
19. Cut in the Back Branch.
20. Use two other 'Tree Branch' veneers and cut in the front Front Branch pieces.

The Bird: Cut the Bird in next. Use the double bevel technique.

21. Cut the bird into the background leaving the Head for last.
22. Make the Bird's eye. See 'Concepts, Circle, Cutting Small' for details on this.
23. Position the Head veneer under the bird and cut in the head (including the Eye).

The Flowers: The white flowers are made separately and then cut into the marquetry, see **Drawing 30-3**.

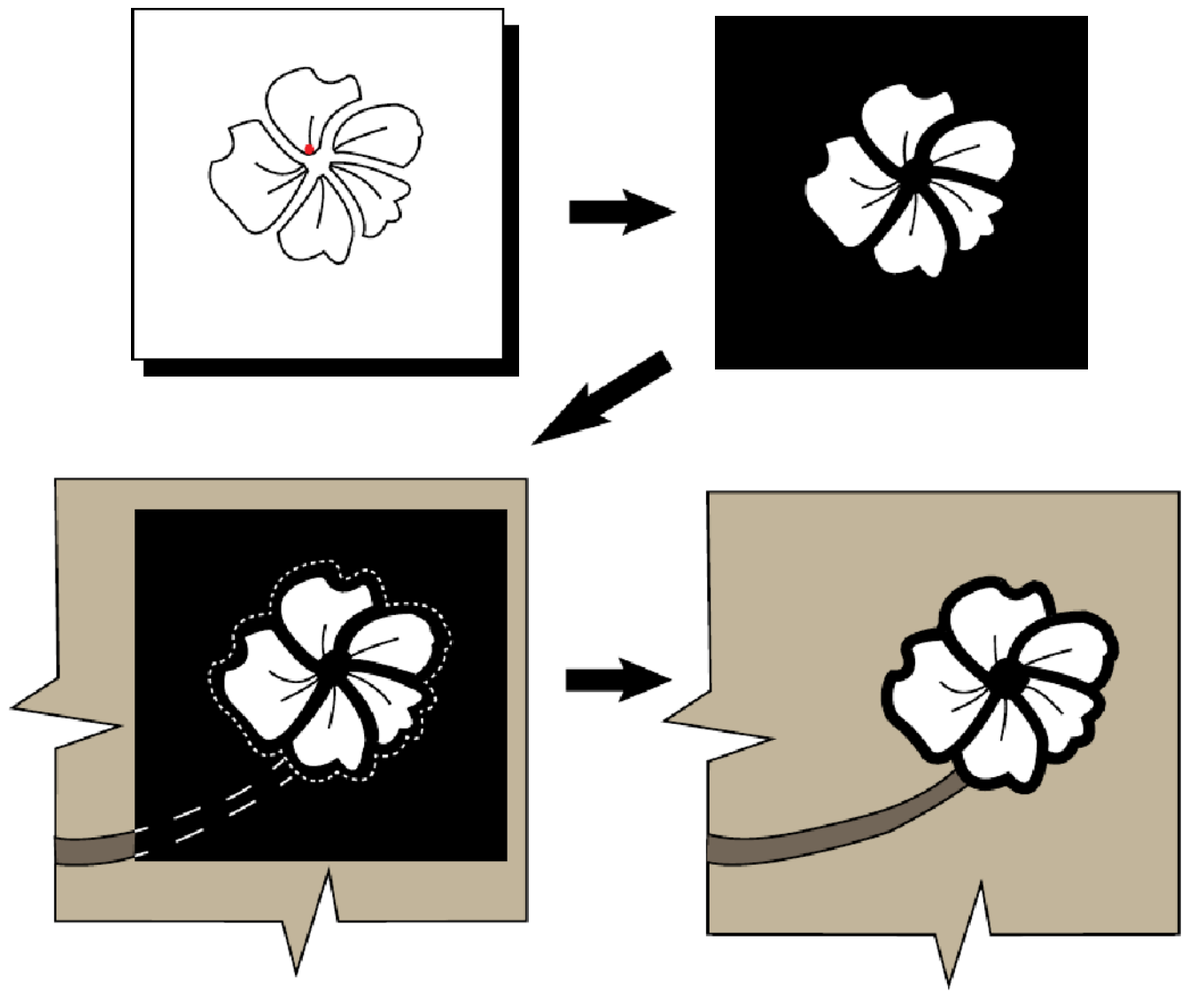


Drawing 30-2. Pattern. The Branches extend across the joints of the box. The flowers were made outside and cut into the background. The lids are opened with extruding tabs and pivot on hidden pins marked in red.

24. Cut a piece of white veneer and a piece of black veneer, each about 4-in. x 4-in.
25. Put app tape on both sides of each piece.
26. Blue-tape the two pieces together.
27. Draw the flower pattern on the top.
28. Set the scroll-saw to 90° (no tilt) and drill a hole in the center of the flower, see **Drawing 30-3**.
29. Cut the veins in this petal and then cut out the petal and set it aside.
30. Drill a hole at the base of a second petal and cut the veins and then cut out the petal.
31. Do the same and cut out the other three petals.
32. You are left with a skeleton of black, missing only the petals.
33. Separate the pack and remove all the app tape.
34. Glue the five white petal pieces into the black background.
35. Cover the piece with app tape.
36. Place the black flower piece onto the main marquetry background and cut along the dashed line. See **Drawing 30-3**.

Do the Other Three Panels: Use the same techniques and make the other marquetries.

37. Make the other panels and glue them to the lids.



(right) **Drawing 30-3. Make the Flowers.** Make a pack of two veneers—white and black. Drill a separate blade entry hole (red dot) for each petal. Cut the veins and then cut out the petals. Glue the white petals into the black veneer. Lay the piece on the background and cut at the dashed line to set the flower into the background.

Project 31

PENDANT

This beautiful project was made by Linda Horner using thin pieces of plastic, ebony and black-dyed veneer. The pendant (see photo **Photo 31-1**) measures 3-in. high x 2⅛-in. wide. Linda cut the six plastic pieces (white, lime green, dark green, yellow, red and turquoise) from pen blank materials on a band-saw to about ⅛-in. thick—the same thickness as the black-dyed veneer. Other pendant patterns are shown in **Drawing 31-4**.

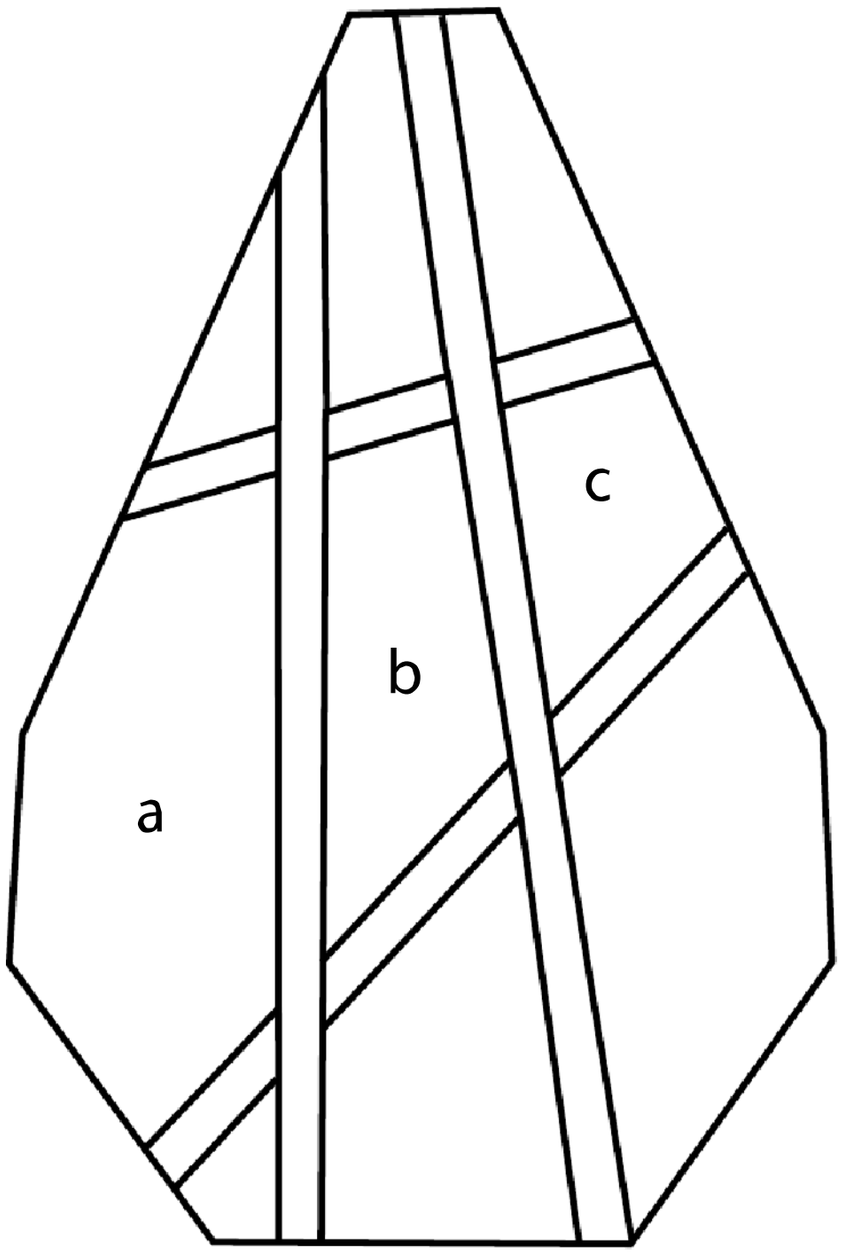
Photo 31-1

Extra Tools and Materials Needed: Band saw, disk sander, 1-in. belt sander, colored plastic pieces, ebony, necklace chain and a wire split-ring or bezel.

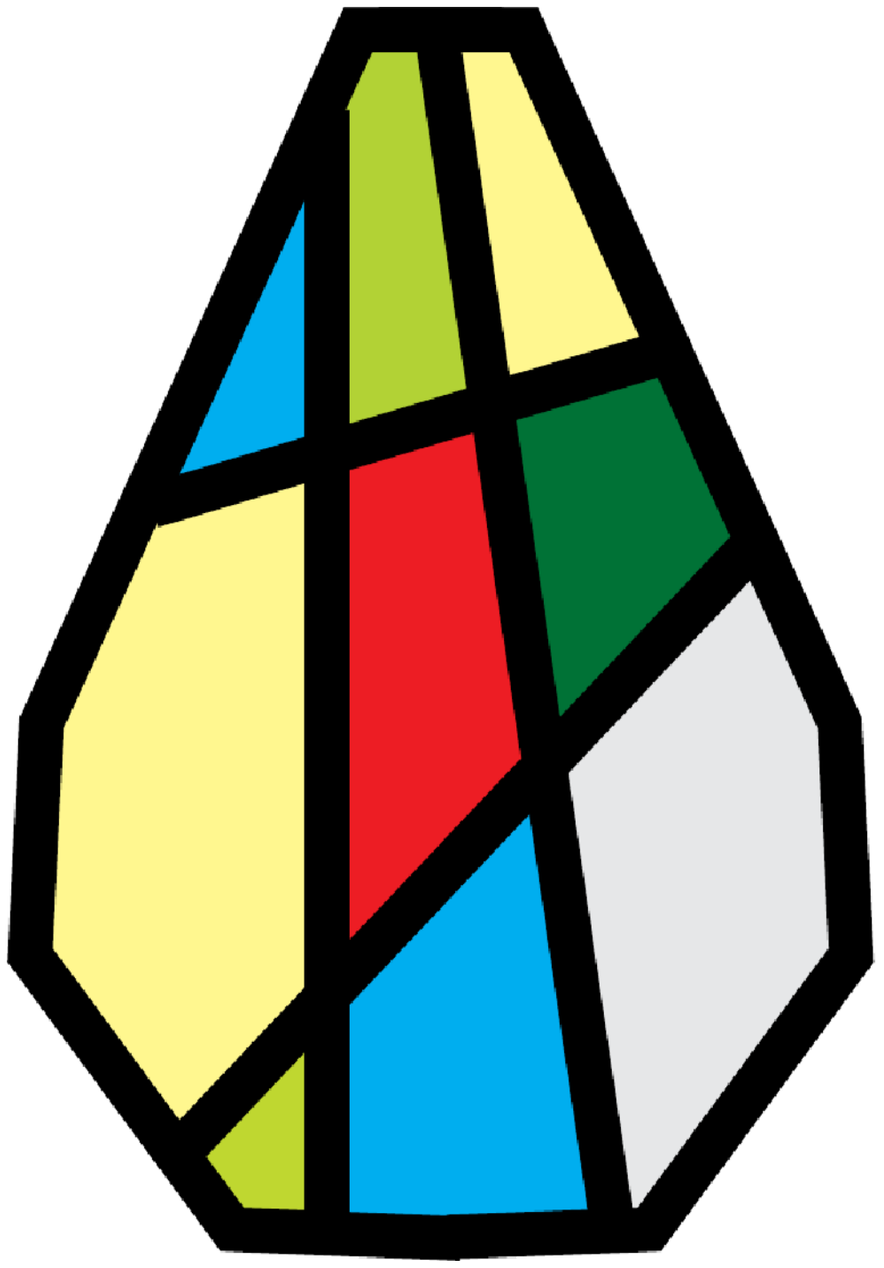
Cut the Materials: Woodcraft stores and on-line wood turning suppliers sell pen blanks (⅝-in. x ⅝-in. x 5-in. long) for reasonable prices . The six blanks will yield enough material for 15 or more pendants. See color pattern **Drawing 31-2**.

1. Gather six plastic pen blanks.
2. Use a band saw or a hand backsaw and cut the acrylics to the near thickness of the black veneer.
3. Sand until each slice is smooth and the thickness of the veneer.
4. Use pattern **Drawing 31-1** and cut the yellow piece (a) using a scroll saw.
5. Stick the yellow part to a piece of app tape.
6. Cut a few strips of black-dyed veneer to 3/16-in. wide.
7. Put a 3-in. long strip of the black veneer to the right of the yellow acrylic on the app tape.
8. Cut a red piece (b) to size and place it in position, again following **Drawing 31-1** and **Drawing 31-2**.
9. Place another piece of black veneer to the right of red piece (b).
10. Cut green piece (c) and put it in place.
11. Continue to add colored pieces and veneer strips.

Muffin tins. When pad cutting, use a cupcake pan to hold all the little pieces.



Drawing 31-1. Pattern. The piece is 3-in. high x 2⅛-in. wide.



Drawing 31-2. Colored Pattern. Use colored acrylic, black dyed veneer and ebony.

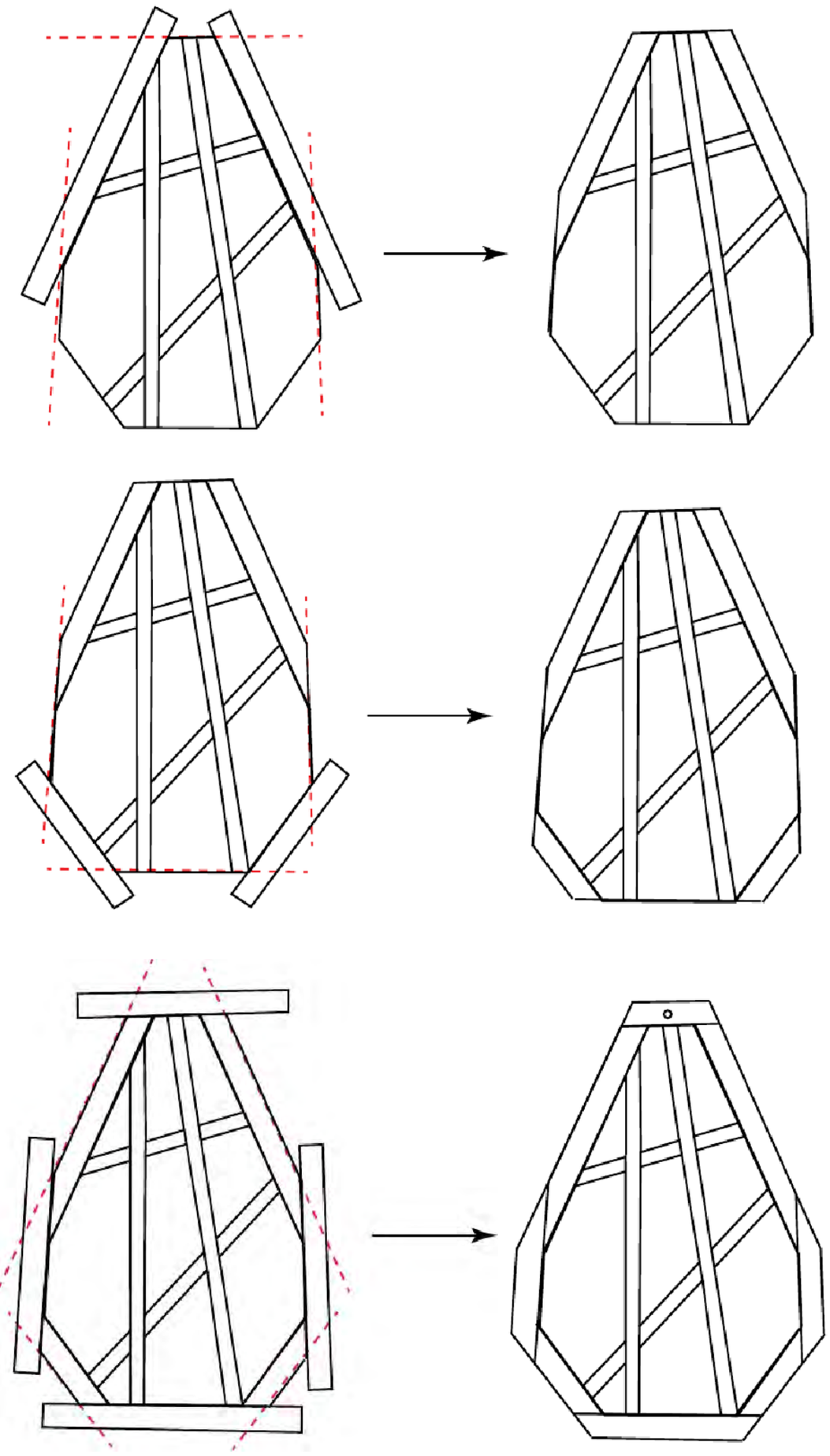
Glue to a Backer: Use 1/16-in. thick plywood or door-skin here.

12. Cut a piece of backer to size about 2½-in. x 3½-in.
13. Glue a piece of black dyed veneer (2½-in. x 3-in.) to the back of the plywood.
14. Put app tape on the top of the pendant matrix.
15. Remove all the tape from the back side.
16. Glue the acrylic and black veneer matrix to the front side of the backer with yellow PVA glue.
17. Clamp for one hour.

Keep it clean. Always clean the area beneath your scroll saw before you begin. This way when (not if) you drop a small piece, it will be easier to find.

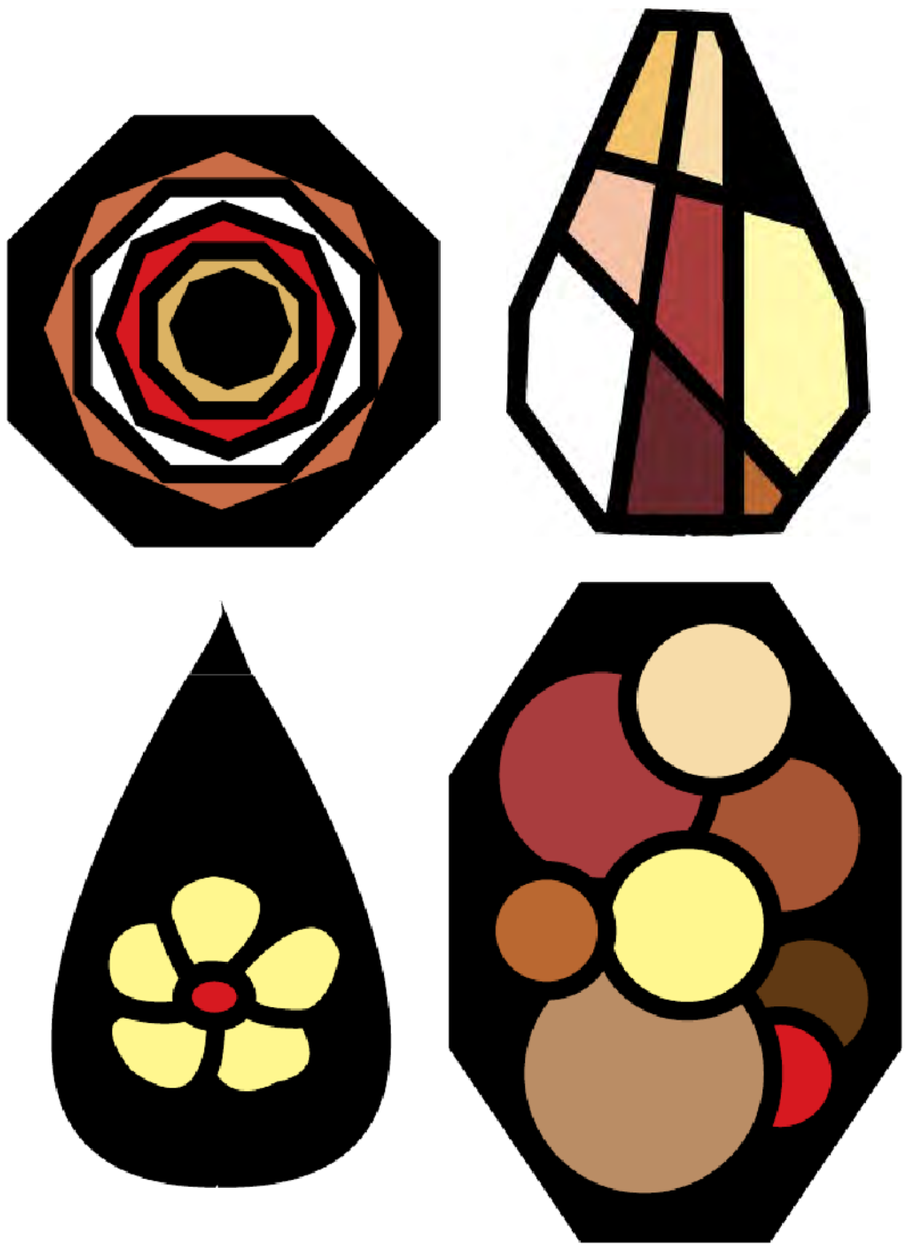
Cut the Shape: The pendant now has nine plastic pieces in place, separated by black veneer strips. There is no outer border yet.

18. After drying, cut the backer to the shape of the pendant using a scroll-saw.
19. Use a disc sander and/or a 1-in. belt sander to true up the edges.
20. Cut strips of ebony to size, 3/16-in. wide x ⅛-in. thick.
21. Cut one ebony strip to about 2-in. long and glue it to the upper left part of the pendant using PVA glue. Rub the joint until it grabs. See **Drawing 31-3**.
22. Glue another ebony strip to the opposite side.
23. Let the joints set for 30 minutes.
24. Cut the ends of the ebony strips to rough length on a band saw.
25. Use a 1-in. belt sander and sand the ends smooth.



Drawing 31-3. Three Steps. Glue ebony strips in place and then trim.

Veneers change colors. Most woods change color as they age and as they are subjected to sunlight. Paduak is especially annoying; starts as a beautiful red and within six months turns brown.



Drawing 31-4. Other Pendant Patterns.

26. Continue to add ebony strips and to sand them smooth as in **Drawing 31**-3.
27. Drill a small hole at the top for the ring that attaches the necklace chain.

Finish the Pendant: Finish the piece with wipe-on poly.

28. Sand the surface of the pendant by hand with sanding blocks using 120, 220, 400 and finally 600 grit sandpaper.
29. Use wipe-on poly to finish.

Project 32

ELLIPTICAL MIRROR FRAME

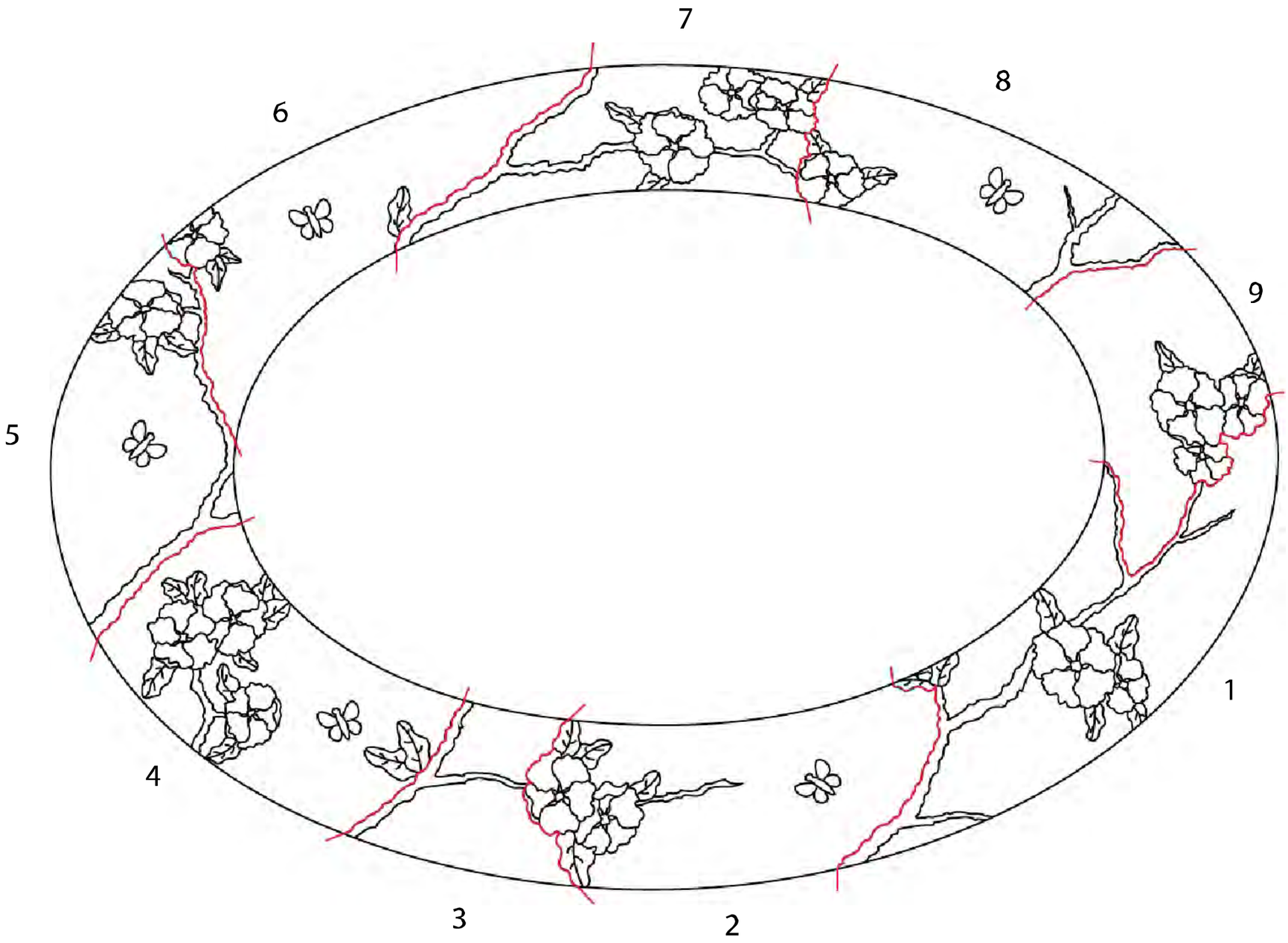
Photo 32-1

This Frame by Linda Horner is quite ambitious because of the size and complexity. The outside measurements are 27-in. x 40-in. to go around a mirror 16½-in. x 26½-in. The marquetry was made in nine sections (**Drawing 32-1**) and then these sub-sections were joined at the red lines. All of the pieces were cut using the double-bevel method, sand-shaded and taped into place before the sections were joined.

Advanced sand shading. Make a mask by cutting a hole in a piece of veneer, fasten it to the main piece and put hot sand in this window.

Extra Tools and Materials Needed: Elliptical mirror, Mother of Pearl for the Butterflies (**Note 1**) and ½-in. MDF.

Make the Marquetry: The background veneer is quilted sapele ordered especially for this job (**Note 2**). The pattern was sized so all nine sections could fit on a 16-in. scroll saw table.

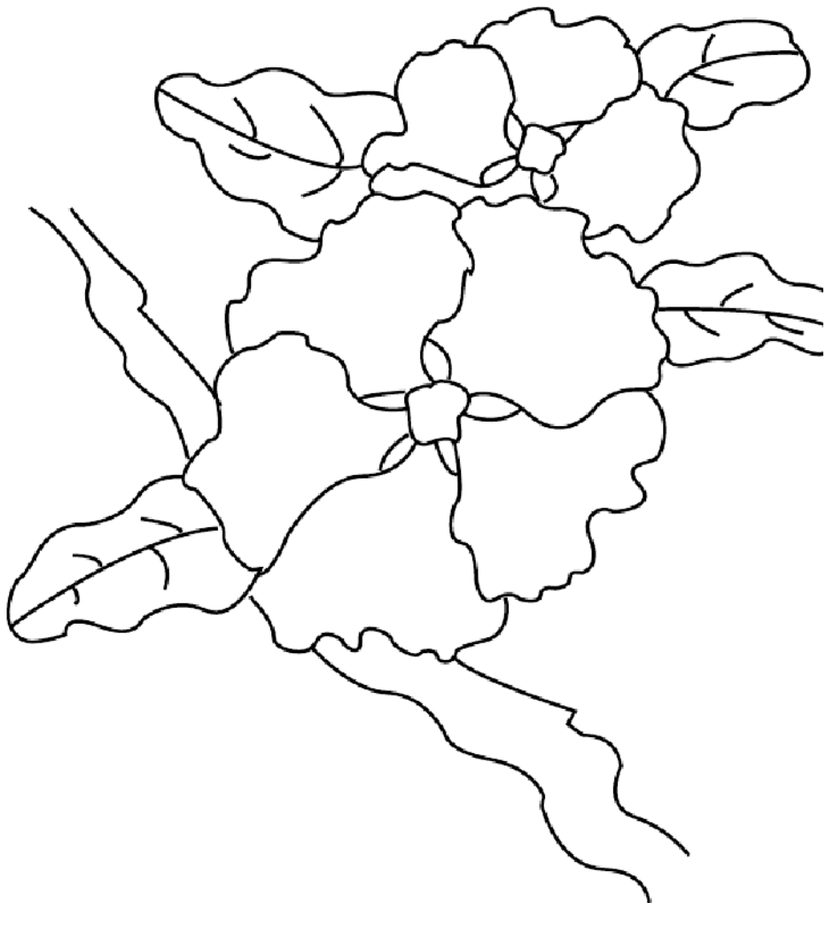


Drawing 32-1. The Pattern. Red lines show the nine sub-sections. The 'Branch' between Section #1 and #2 was made larger on the #2 side. The sections were joined by laying one on top of the other and cutting along the red line.

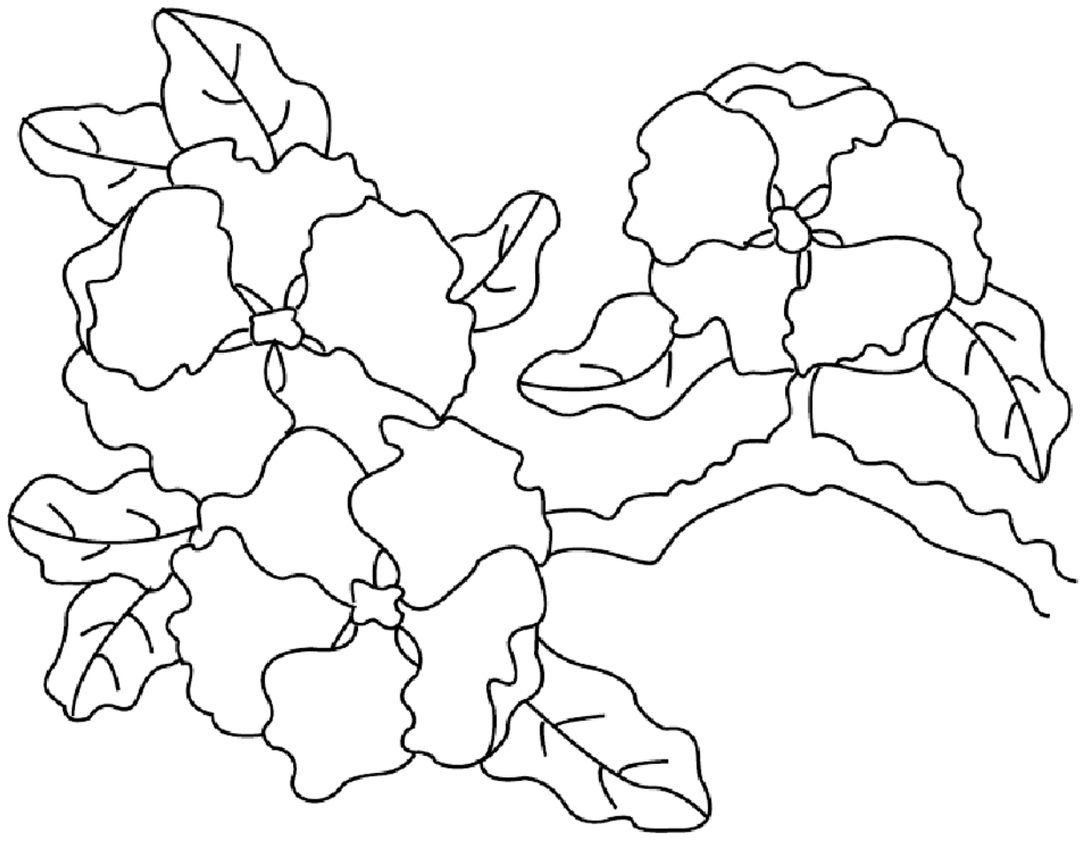
Use patterns **Drawing 32-2**, **Drawing 32-3** and **Drawing 32-4**.

1. Cut the background veneer to size and put app tape on the front and back.
2. Tape the incoming piece of veneer underneath and set the saw to 11°.
3. Start with section #1 and cut all pieces.
4. Make the branches at both ends slightly larger than the pattern. See **Drawing 32-5** for a close-up of Section 1.
5. When section #1 is finished, remove pieces and sand-shade.
6. Tape the #1 sub-section front and back and lay it aside.
7. When all nine sections have been made (oversize at the ends), lay them out on a full-size pattern.
8. Align the elliptical lines for all nine sections and blue-tape them together.
9. Remove sections #1 and #2 (still taped together), and cut at the red line. See **Drawing 32-5**.
10. Put Section #1 back on the full-sized pattern.
11. Tape Section #2 and #3 together and cut across the red line between them.
12. Continue in this manner until all nine sections have been cut and joined.

Advanced sand shading. When sand shading in the middle of a piece (for example along the middle vein of a leaf), use a spoon to heap hot sand on parts that can't be put directly into the sand.



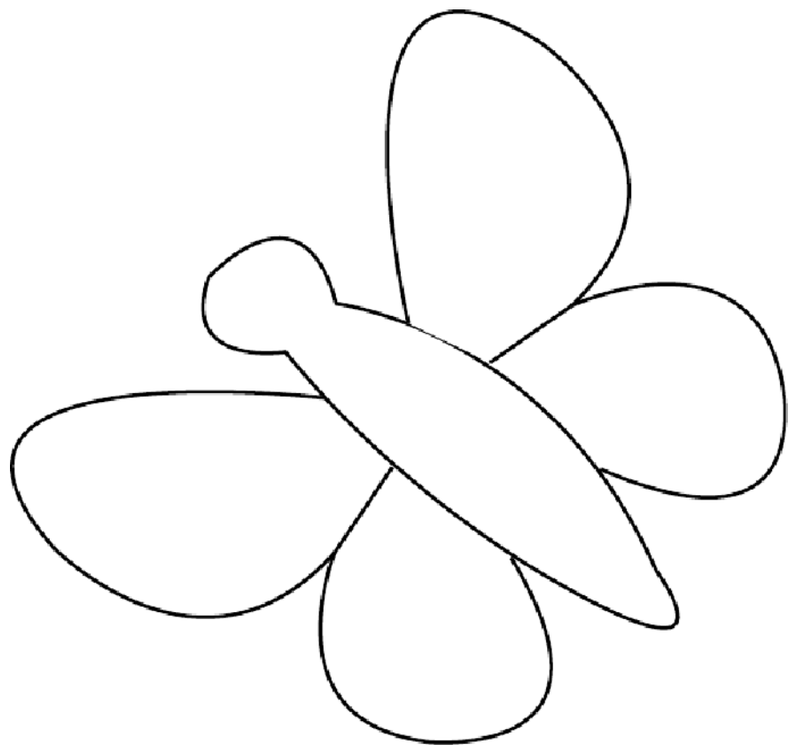
Drawing 32-2. Double Flower Pattern. None of the flower sections are the same but they do use the same five flowers made larger or smaller and turned or reversed.



Drawing 32-3. Three Flower Pattern. This piece measures 6-in. x 6-in. in section 4.

Glue it Down: Cut the MDF and glue the marquetry to the background.

13. Cut an ellipse in the MDF to fit the outside of the mirror, **Drawing 32-6**.
14. Glue the rough-cut marquetry piece to the MDF.
15. Cut the outside of the MDF to the elliptical shape needed to cover all the marquetry.
16. Trim the overhanging sections of the marquetry to fit the background.
17. Seal the marquetry with shellac.
18. Carefully scrape and sand the piece.



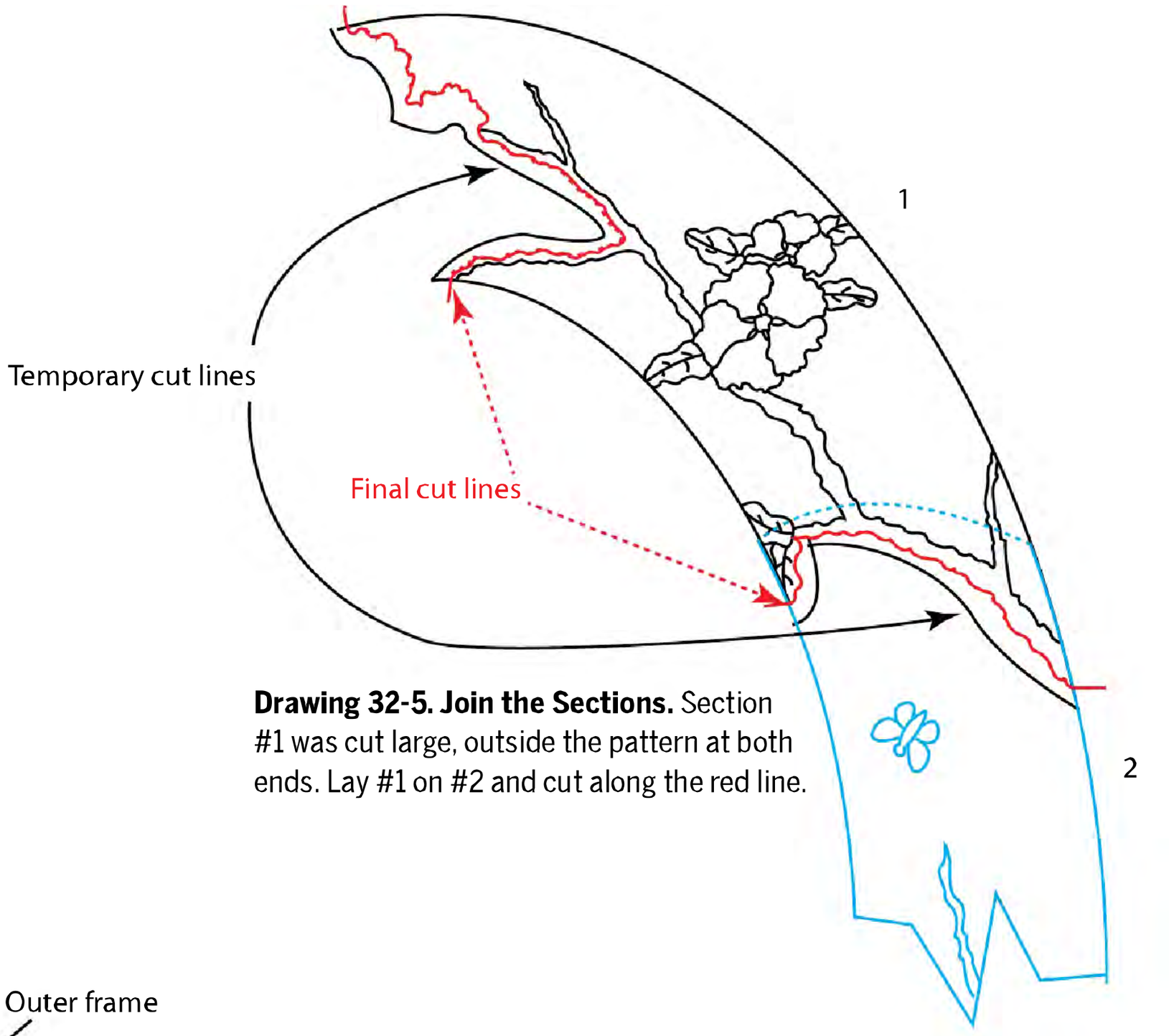
Drawing 32-4. Butterfly Pattern. Each Butterfly is 1¾-in. x 1½-in. and is made of Mother-of-Pearl. Alter size, shape and orientation throughout the marquetry.

Make the Frames: The inner frames are made of 12 sections of cherry; the outer frames are made of 24 sections. Shape the frame using a ¼-in. MDF pattern.

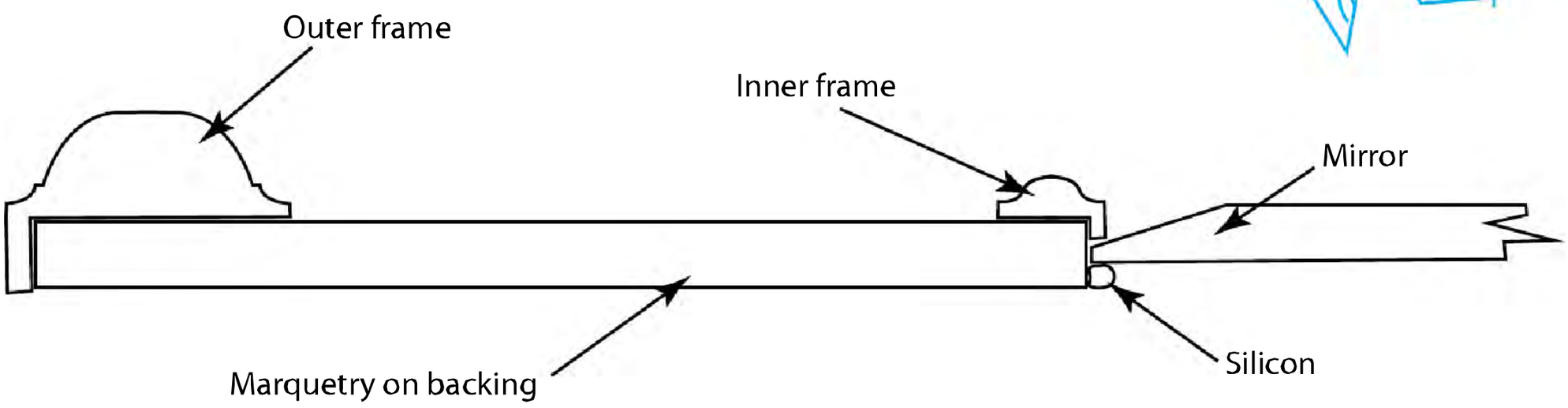
Store veneer. Keep veneer on a flat shelf away from direct sunlight. Cover with a flat board. A cool and damp basement is preferable to a hot attic.

Make a Full-Sized Paper Drawing to determine joint lines for each piece of cherry.

19. Cut the cherry sections to shape on the table saw; refine angles on a disc sander.
20. End-glue the sections to make the frame.
21. Make two full-side patterns of ¼-in. MDF and attach (hot-melt glue or silicon sealer) the rough frame to it.
22. Use a pilot bit on a shaper and rout both inside and outside shapes, see **Drawing 32-6**.



Drawing 32-5. Join the Sections. Section #1 was cut large, outside the pattern at both ends. Lay #1 on #2 and cut along the red line.



Drawing 32-6. Frame Cross Section. The outer- and inner-frames are made of 12 sections. Segments were end-glued together and then routed to shape.

23. Use hot-melt glue or silicon sealer and attach the frames to the marquetry.
24. Fasten the mirror in place with silicon sealer (specially made for mirrors).

Hang the Mirror: The mirror plus two frames and the MDF backer is heavy.

25. Put a 20-in. French cleat on the back of the mirror and an accompanying cleat to the wall.

Note 1: Mother of Pearl was ordered on-line from New Zealand.

Note 2: The Quilted Sapelle veneer was ordered from Sauers & Co., Lexington, NC. www.sveneers.com

Project 33

TWO PLATES

Adding marquetry to a turned plate is combining two crafts; if you are not a turner, perhaps it's time to learn that skill. Otherwise, see if a friend will turn a plate for you. There are two projects here; a small 7-in. diameter plate with stack-cut marquetry (**Photo 33-1**) and a larger 8¾-in. diameter plate with marquetry using the double bevel technique (**Photo 33-2**). After the marquetry was inset and the top of the plate was sanded and a finish applied, the piece was reversed on the lathe and the bottom of the plate was shaped using extension jaws.

Instructions are given for the small plate; the larger one is made in a similar manner.

Photo 33-1

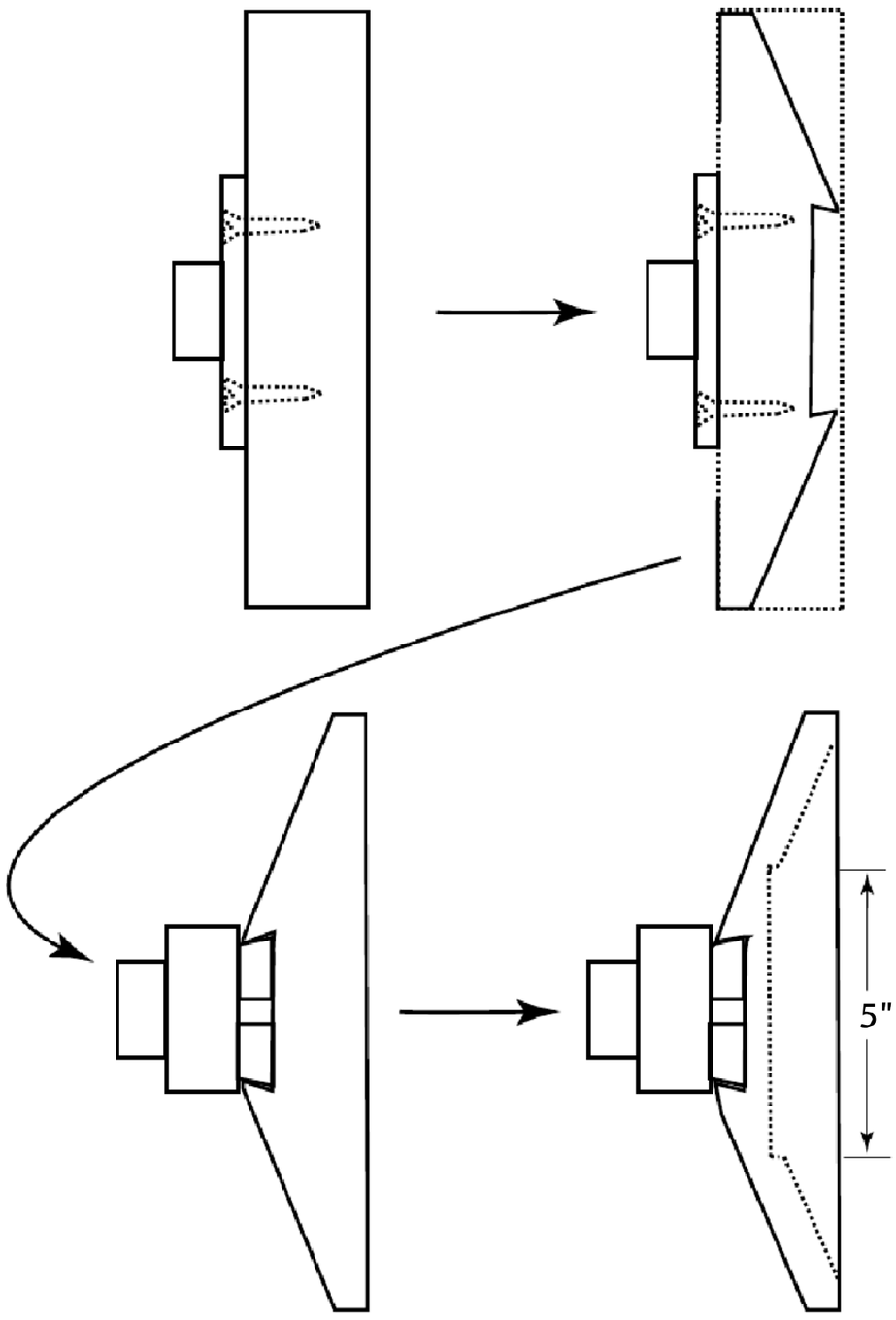
Photo 33-2

Extra Tools and Materials Needed: Wood for the small plate (1-in. x 7½-in. square) and for the large plate (1-in. x 9-in. square), wood lathe, band saw, dial or digital caliper and door-skin (⅛-in. thick plywood).

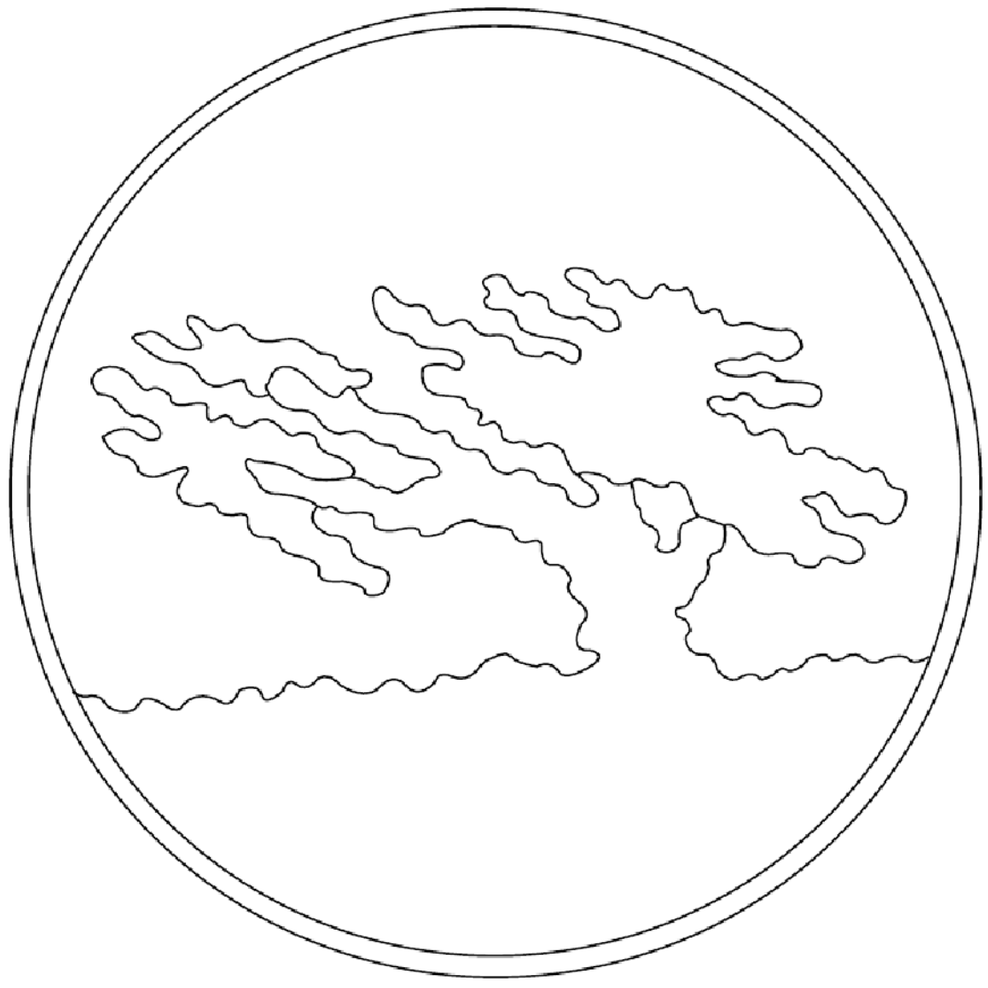
Turn the Small Plate: Cut 1-in. stock into a 7½-in. circle. The plate in **Photo 33-1** was made of maple.

1. Mount the block on a 3-in. faceplate with wood screws and turn to 7-in. outside diameter.
2. Turn the bottom of the plate and cut a 2½-in. diameter recess. See **Drawing 33-1**.
3. Reverse the piece and mount on expanding chuck jaws.
4. Shape the inside of the plate so the bottom is ⅜-in. thick.

Spread glue. Use a used plastic credit card with scalloped edges to spread glue.



Drawing 33-1. Turn the Plate. The bottom is turned with a recess for expanding jaws. The reversed piece is shaped with a 5-in. diameter flat in the bottom.



Drawing 33-2. Monterey Cypress Pattern. Use three veneers to make three pictures. The walnut ring is ⅛-in. thick and ⅛-in. wide.

5. Use a scraper and make a 5-in. diameter flat. The inset marquetry will be a little thicker than ⅛-in.

The Marquetry: The 'Monterey Cypress' pattern looks nice with the maple plate. Use the pad method and make three marquetry pictures. Mount one to a backer and turn the assembly round. Scrape, sand and use wipe-on poly.

6. Gather three veneers for the 'Cypress' pattern, see **Drawing 33-2**.
7. Cut each veneer to 5½-in. square.
8. Put app tape on the back of each piece.
9. Put the three veneers into a pack (taped side down) with the grain running horizontally (left to right).
10. Fasten the pack together with blue tape.
11. Add app tape to the top of the pack and glue the on pattern.
12. Use a 2/0 blade and set the table to 0°, no tilt.
13. Cut out the three sections and assemble the three marquetry pieces.
14. Choose one and cover the top side with app tape.
15. Remove any app tape from the bottom.
16. Fill any gaps and replace any missing veneer.
17. Use yellow PVA glue and glue the marquetry piece to the ⅛-in. door-skin.
18. Seal with shellac, scrape, sand and put on a few coats of wipe-on poly.

Shift during glue up. To keep a marquetry piece from shifting, tape the piece to the backer board on all four sides.

Drawing 33-3. Mountain Scene Pattern. Use the double bevel technique. The plate is 8¾-in. diameter; the marquetry section is 5⅜-in. diameter.

Make the Walnut Ring: The thin walnut ring is added to the plate bottom before the marquetry is added.

19. Resaw a piece of walnut to the thickness of the inset piece; about ⅛-in.
20. Mount a 6-in. square on a face plate with double sided tape.
21. Use a sharp skew and cut the thin walnut piece to 4½-in. diameter.

Cut the Recess: This step needs to be carefully done. Use a scraper and parting tool to make the recess.

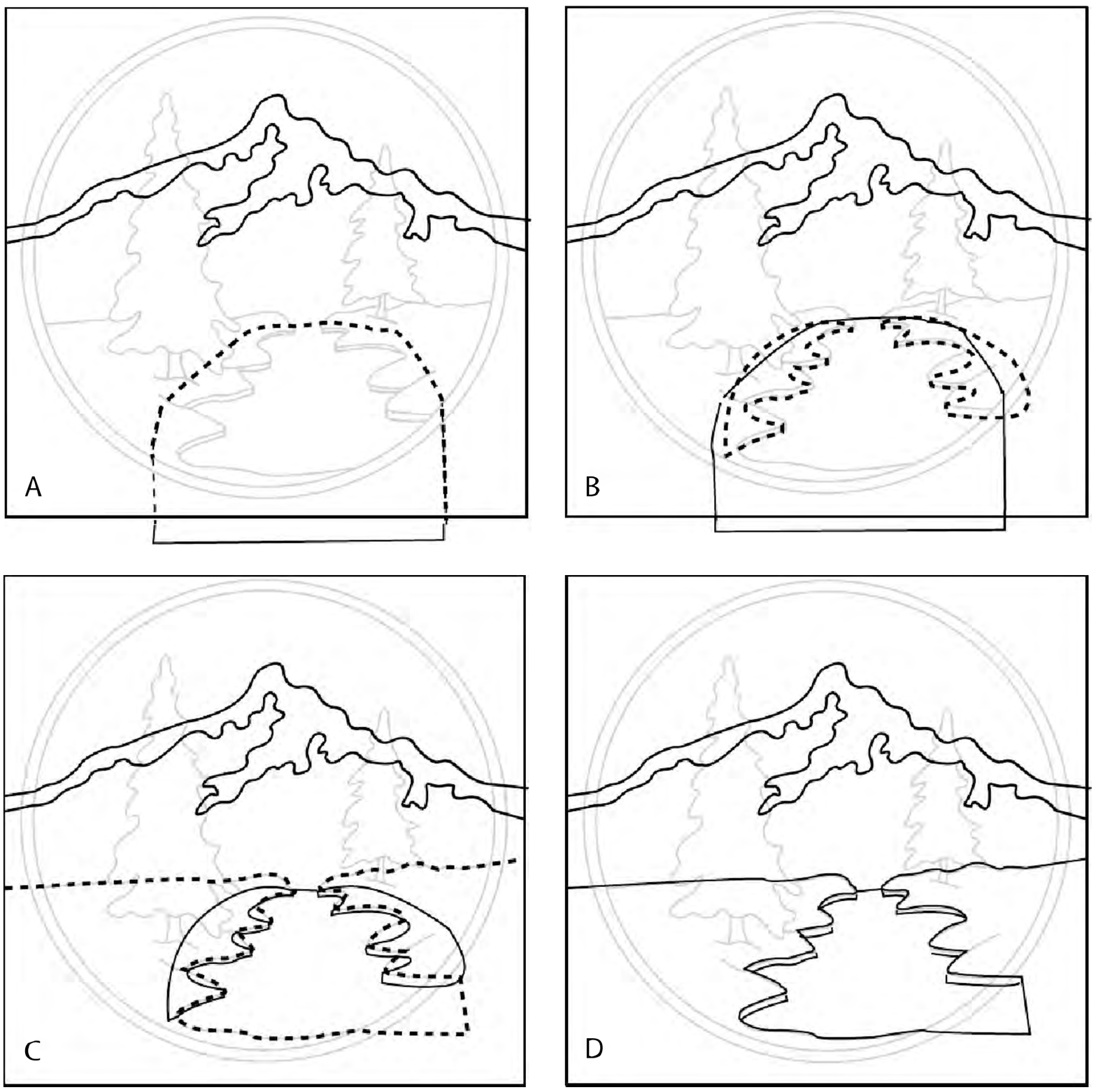
22. Draw a 4½-in. diameter circle in the bottom of the plate.
23. Use a parting tool and scraper to make a ⅛-in. deep recess.
24. Use a 4-in. straight edge to insure the recess is flat and even.
25. Use a caliper to measure the thickness of the walnut piece.
26. Make the recess the same depth.

Add the Walnut Ring: Use a sharp skew and cut the recess in the bottom of bowl to a diameter so that the walnut ring will fit in place.

27. Glue the walnut circle into the recess.
28. Use a sharp skew and cut so a 3⁄16-in. wide walnut ring remains.
29. The recess should be about 4¼-in. diameter.
30. Use a dial or digital caliper to measure the thickness of the marquetry inset piece.
31. Make the recess in the bowl just slightly deeper.
32. The bowl is now ready to receive the marquetry.

Add the Marquetry: Turn the marquetry to fit into the recess. Testing for fit is time consuming and tedious. The plate area can be turned down and sanded; the marquetry should set a little below it.

33. Use a band saw to cut the marquetry piece to a 4½-in. circle.
34. Attach the marquetry piece to a face plate waste block with double-sided tape.
35. Cut the marquetry piece round and so it will fit into the plate recess, i. e. about 4¼ diameter.
36. Remove the marquetry piece from the face plate.



Drawing 33-4. 'Mud Banks'. (A) Cut in the water. (B) Cut in two black pieces. (C) Cut in the snow. (D) Add the trees and it is finished.

37. Mount the plate on the lathe and slowly remove wood until the marquetry piece fits.
38. Once the marquetry fits in the recess, glue it in with yellow PVA glue and a circular caul. This gluing can be done with the bowl mounted on the lathe and using the tail stock to push.

Finish Up: Finish the top of the plate and turn the bottom.

39. Carefully turn away the wood around the marquetry until it is level with the inset piece.
40. Sand lightly until the two pieces are even.
41. Apply wipe-on poly and then paste wax.
42. Reverse the plate and use expanding jaws to shape the bottom.
43. Sand and finish the bottom with wipe-on poly and wax.

The Large Plate: Make the large plate in a manner similar to the small plate. Cut the recess to fit 5⅜-in. diameter inset including the ⅛-in. walnut ring. Use pattern **Drawing 33-3**.

Marquetry: Make the thin 'mud banks' as in **Drawing 33-4**.

Project 34

WINDOW SCENE

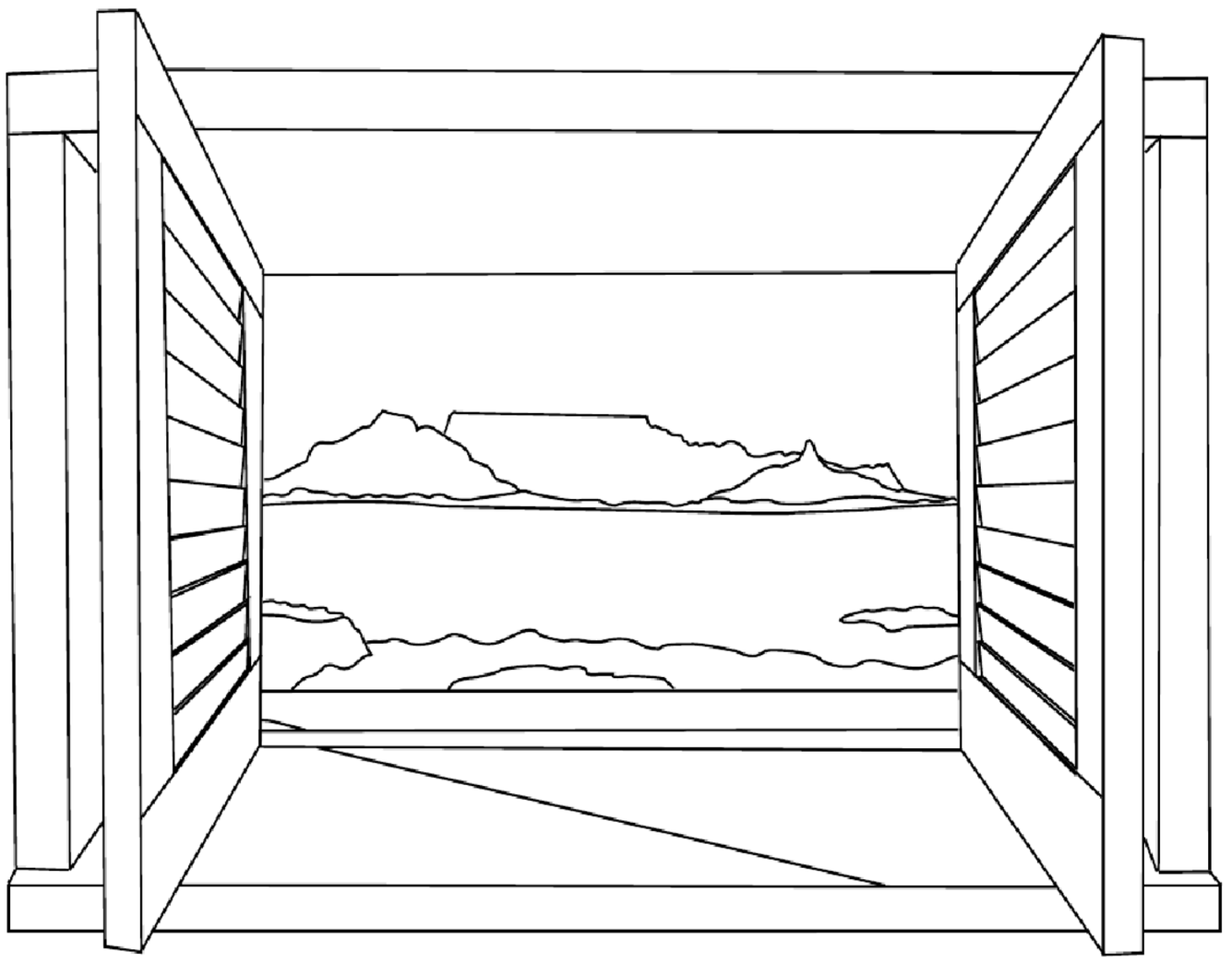
Photo 34-1

This three-dimensional marquetry picture (**Photo 34-1**) was made by my friend Jim Sweet of Candler, North Carolina. He calls it 'My Tafel Berg' (Afrikaans for 'Table Mountain'), the back-drop for Cape Town, South Africa where Jim's mother was born and where Jim went to high school. Table Mountain is viewed across Table Bay through a window with partially open shutters. The French call this 'trompe-l'oeil' or 'fool-the-eye' where a flat image appears to be three-dimensional.

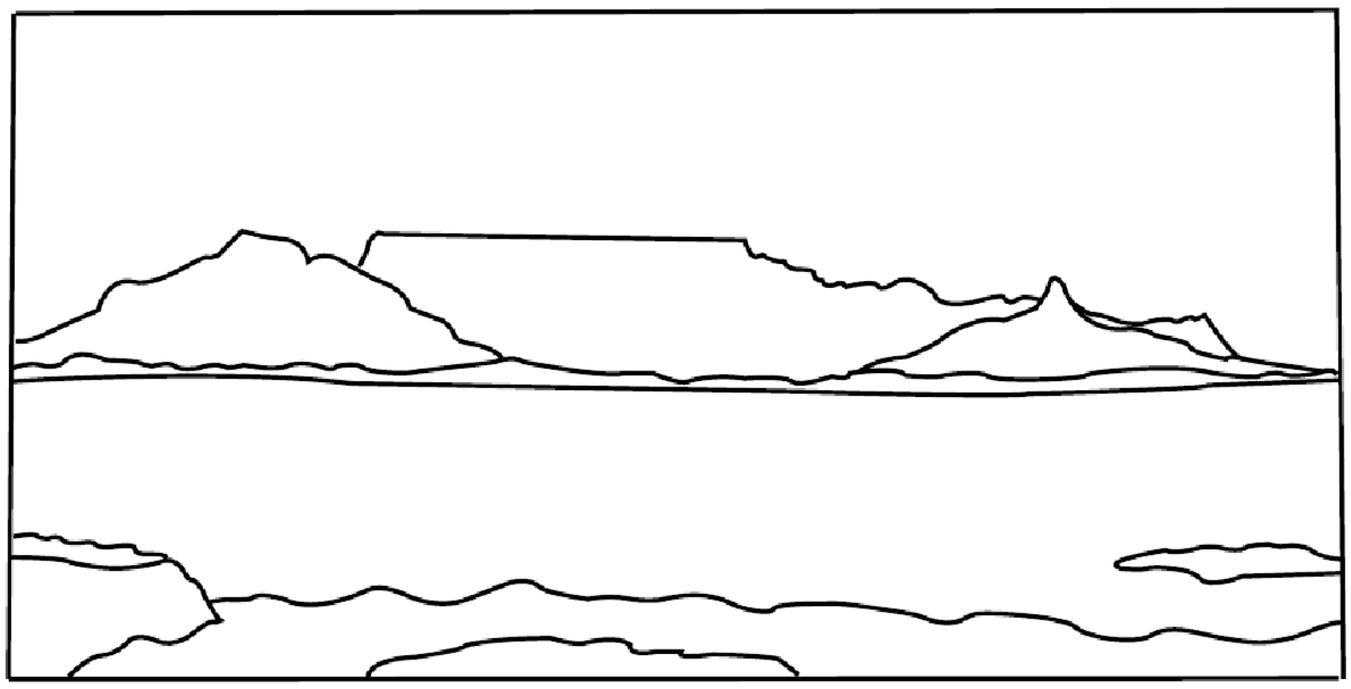
Extra Tools and Materials Needed: Table saw and wood for the frame.

Planning the Project: Enlarge pattern **Drawing 34-1** to full size; 22¼-in. wide x 16-in. high. Make the picture in three sections; Central Marquetry (**Drawing 34-2**), Left Shutter (**Drawing 34-3**) and Right Shutter (**Drawing 34-4**). Fit these together and then add the outer pieces.

Select Veneers: Use figured grains for the rocks on the near shoreline and for the mountains. For the bay, choose one that changes color from light to dark to show distance.



Drawing 34-1. Full Picture Pattern. Cut the picture in three sub-sections.

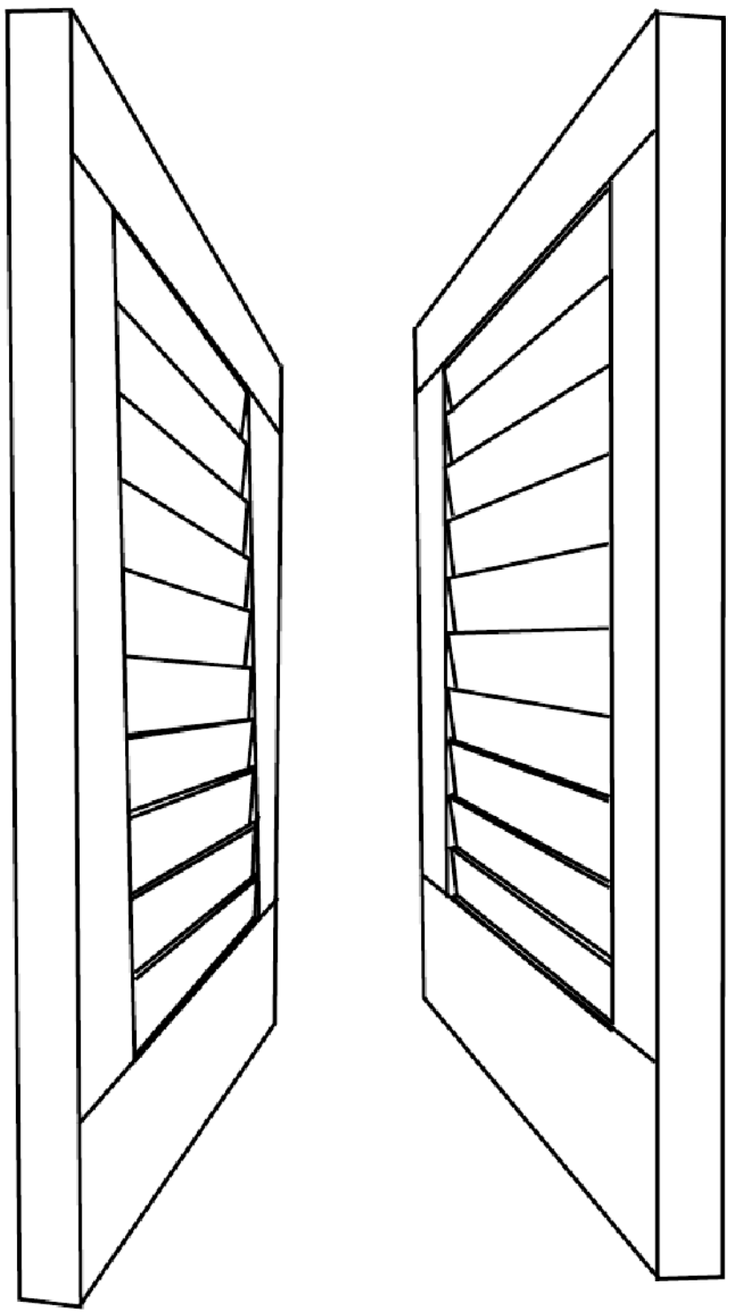


Drawing 34-2. Marquetry Pattern. Choose appropriate veneers for the Sky, Water, Rocks and Mountain.

Marquetry Background: Make the picture slightly larger so it can be cut to size once the shutters and window are over-laid. The marquetry is about 5-in. x 9-in. Use the double bevel cutting method. See **Drawing 34-2**.

1. Select Sky veneer 4-in. high x 10-in. long with the grain running horizontal.
2. Put app tape on the front and back.
3. Trace or glue the pattern onto the front.
4. Tape the veneer for each piece under the Sky.
5. Cut and add each section.
6. Make repairs, fill and sand.
7. Set this marquetry piece aside with app tape on the back.

Wet it first. Wet MDF backer-boards before glue-up. The clean and damp piece will respond to the glue better.



Drawing 34-3. Left Shutter. This shutter is in shadow and the veneers are darker than the right shutter.

Drawing 34-4. Right Shutter. Sun-light makes these veneers light in color.

Left Shutter: This part is in shadow and the veneers are dark (**Photo 34-1**). Slats above eye level have a shadow line on the bottom; slats below eye level are lighter on the top. Add the small triangles after the shutter is taped down.

8. Use the full-sized pattern (**Drawing 34-3**) and cut each slat to size.
9. Cut the left and right stiles and the top and bottom cross pieces.
10. Lay down app tape (sticky side up) and build the left shutter.
11. Sand shade the top or bottom of each slat for shadow.
12. Cut in the small dark triangles.
13. Put app tape on the front, turn the piece over and remove all tape from the back side.
14. Make repairs, fill and sand.
15. Set the Left Shutter sub-assembly aside.

Right Shutter: These slats are in direct sun thus the veneers are light in color. The bottom slats have sand-shading along the bottom; the top slats are shaded at the top.

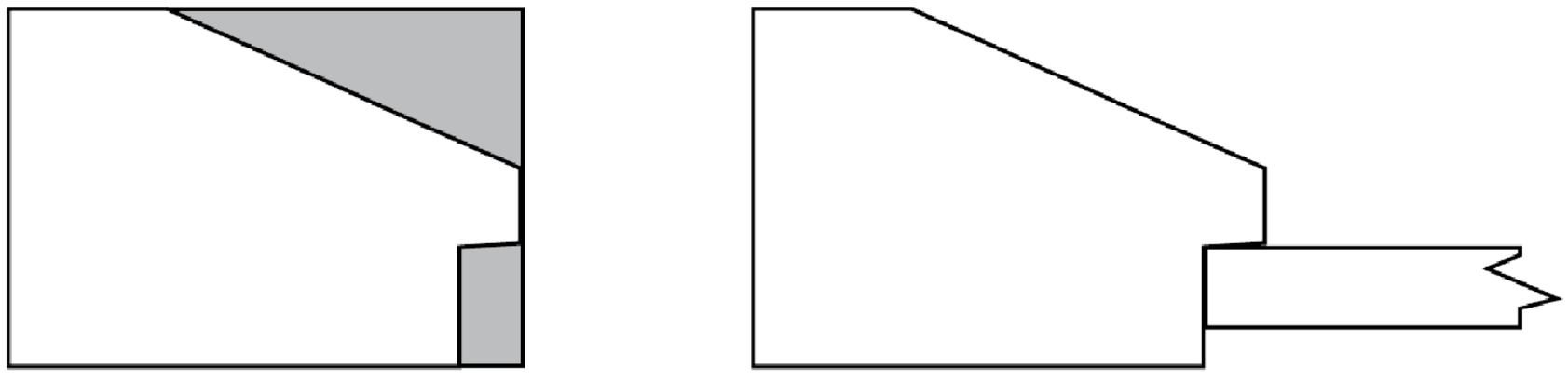
16. Cut out each slat (**Drawing 34-4**).
17. Add the small triangles at the end of the slats.
18. Cut out the shutter frame.
19. Sand-shade some slats.
20. Make repairs, fill and sand.

Select the Surrounding Veneers: The inside wall is white, the window casing is brown and there are shadows behind the shutters. The sun is shining on the right side of the picture, but not on the left. The window frame and shutters need straight grained veneers to be realistic.

Put the Picture Together: Join the central Marquetry Piece, the Left Shutter and the Right Shutter. All the other parts are added afterwards. See **Drawing 34-1**.

21. Tape the marquetry background to a cutting mat front side up (app tape below).
22. Square the piece to size, 5-in. high x 9-in. wide.
23. Tape the Left and Right Shutters in place.
24. Cut strips to size and add the Top Window Frame.
25. Cut strips to size and add the Bottom Window Sill.
26. Add the Left Window Frame and the Right Window Frame pieces.

To cut thin strips. Glue the veneer to be cut to another piece of veneer and then cut off the thin strip with either a saw or a knife. Now cut or break off the thin piece.



Drawing 34-5. Frame Detail. The teak frame is made from 1¾-in. x 1¼-in. stock.

Add the Inside Walls: Use white veneer strips here.

27. Cut all the pieces and tape them in place.
28. This completes the picture.
29. Cover the front with app tape and remove all tape from the back side.
30. Make repairs, fill and sand.

Mount to a Backer Board: Use ½-in. MDF here.

31. Cut the backer board slightly oversize and spread yellow PVA glue.
32. Secure the marquetry to the backer with blue tape.
33. Place in a vacuum bag or screw press.

Finish the Picture: Seal the marquetry before scraping or sanding.

34. Seal with shellac and then scrape and sand with 180, 220 and finally 320 grit.
35. Spray the surface with glossy Deft (lacquer). See 'Concepts, Finishes' for details on this.
36. Let the lacquer dry about 30 minutes and then spray again. Repeat this until eight coats have been applied.
37. After all the coats have been applied, let the surface dry thoroughly for 24 hours.
38. Buff the surface lightly with 0000 fine steel wool to cut the glossy surface and produce a rich, deep satin finish.

The Frame: Cut the frame from 1¼-in. x 1¾-in. stock, (**Drawing 34-5**).

39. Finish it with wipe-on poly.
40. Add a hanger; see 'Concepts, Hangers' for details on this.

Flitch. This is a pack of sequentially cut veneer pieces. Number the pieces with chalk and keep them in order for a future Radial Match piece.

Project 35

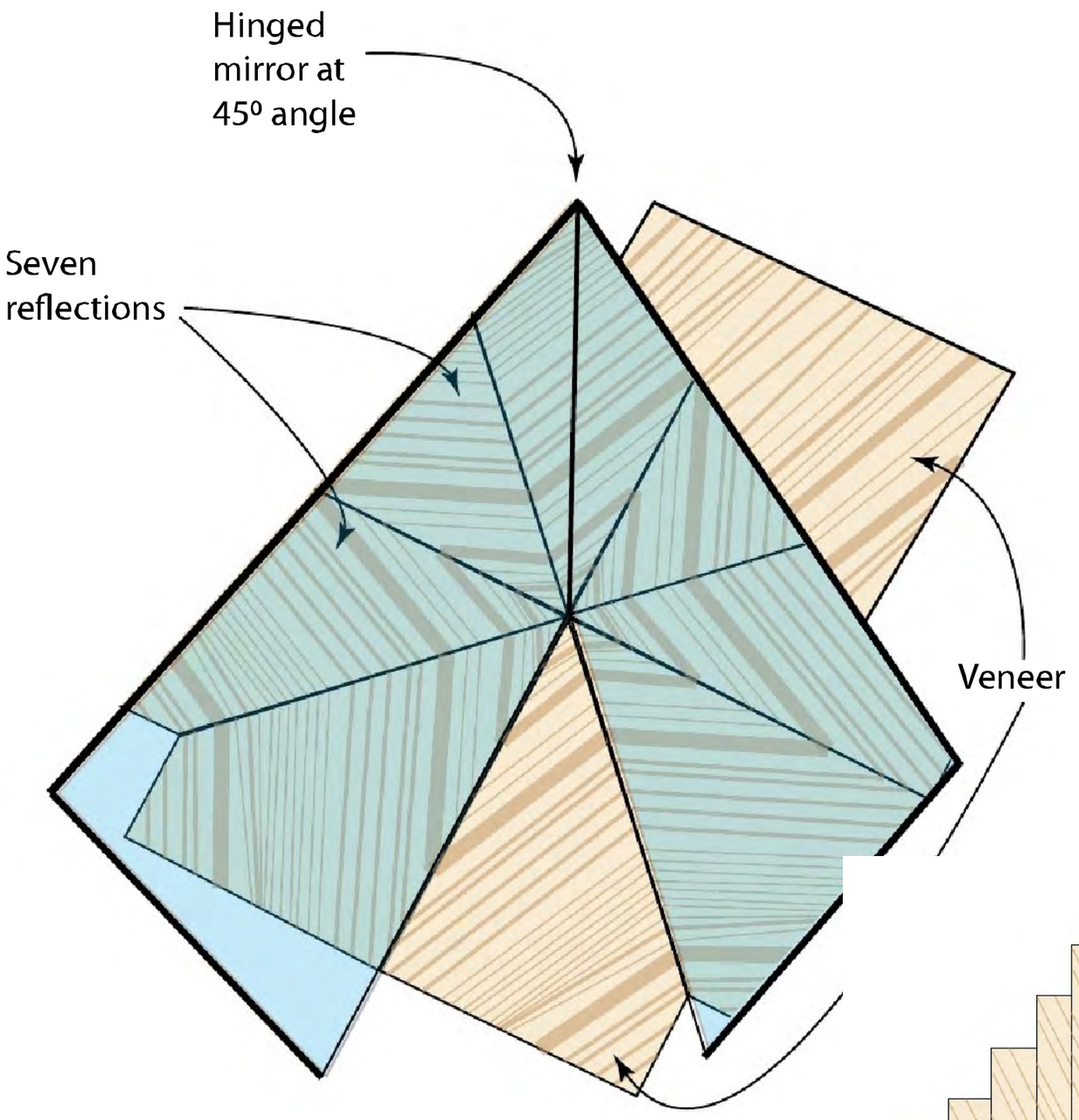
RADIAL MATCH TABLE

Radial matching is a process in which veneers from a flitch (successive pieces of thin wood cut from the same log) are oriented into a pleasing circular pattern. **Photo 35-1** shows a table with an eight-piece radial match. The veneer piece is 10-in. square, see also **Photo 35-02**. In practice, the flitch pieces are indexed and cut. The wedges are then arranged into a design and glued to a backer board. The process here came from a workshop conducted by my friend Rob Reed of Oakland, California. Rob also built the table.

Extra Tools and Materials: Eight-part veneer flitch, hinged mirrors, protractor and router (or shaper) with a ⅛-in. slot cutter.

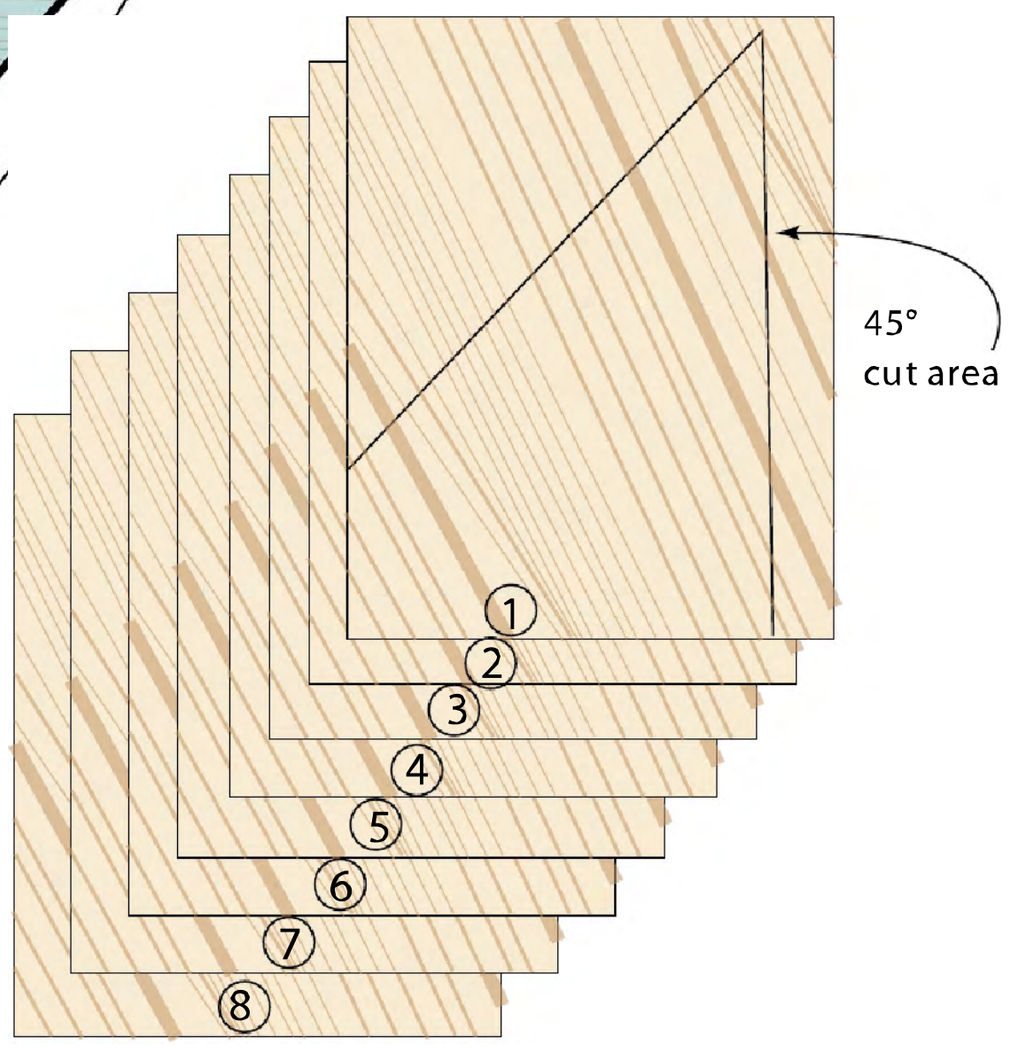
Photo 35-1

Photo 35-2



(left) **Drawing 35-1. Choose the Design.** Set the hinged mirrors on a piece of veneer and move around until a pleasing design is found. There are seven images and one veneer section.

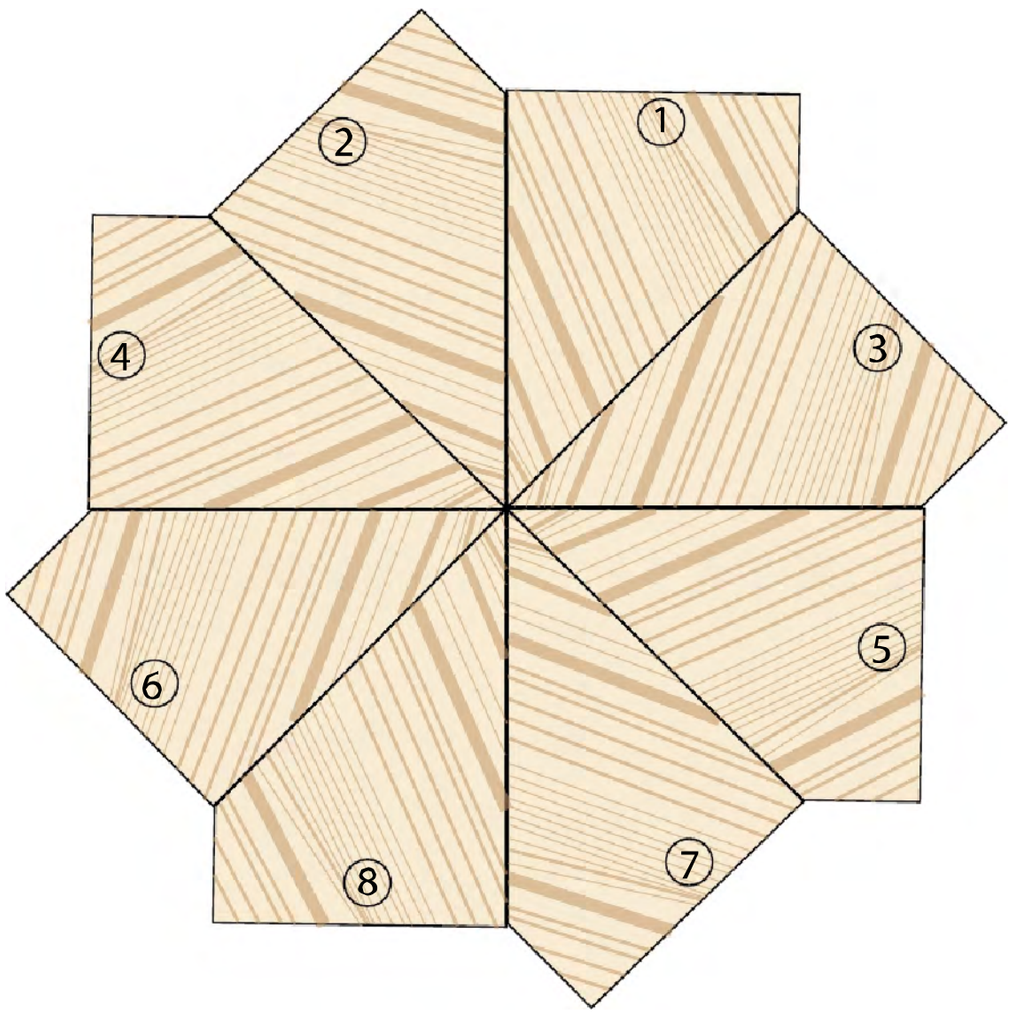
(below) **Drawing 35-2. Wedge Section.** This wedge conforms to the shape drawn with the edges of the mirrors.



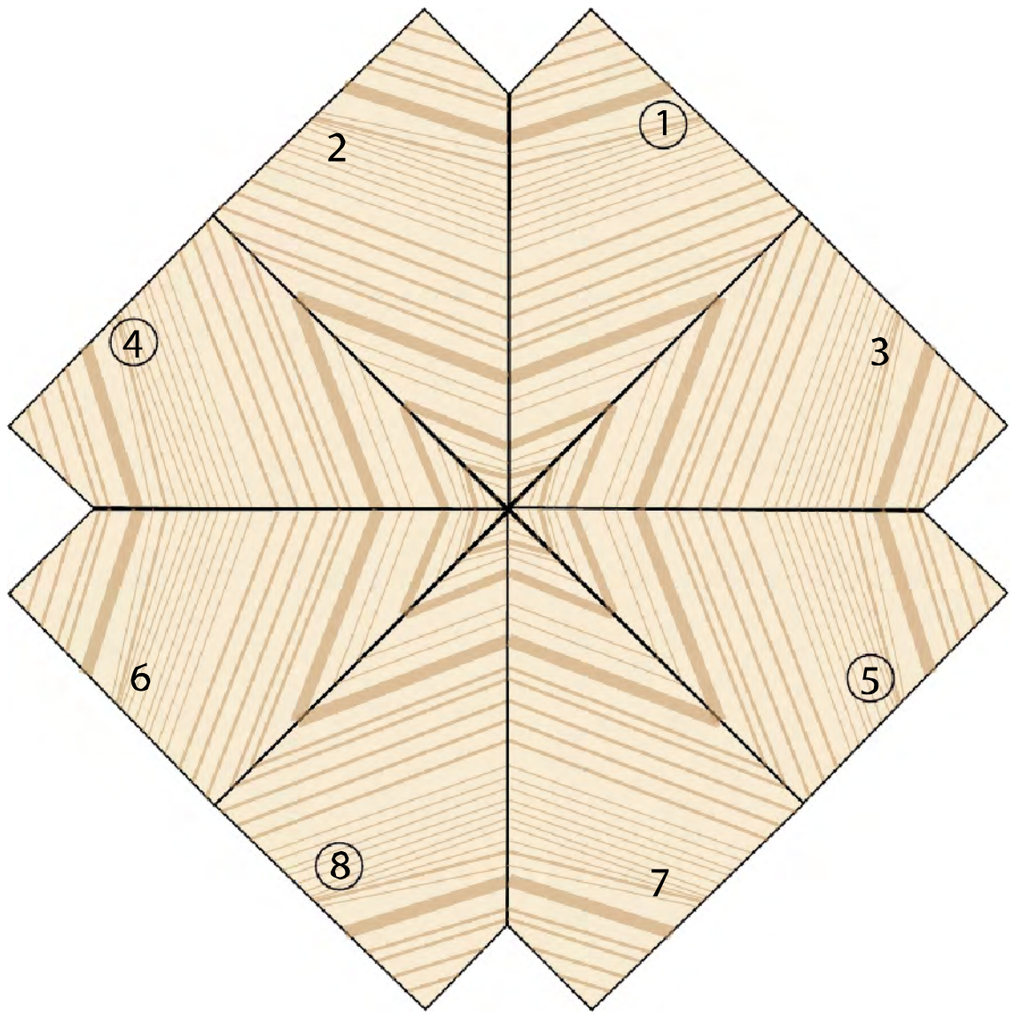
Choose the Veneer: Straight grained veneers are easy to work with and give the best patterns. Burls, swirls and whorls are hard to cut and give muddy designs. Veneers with no grain pattern are poor choices.

Index the Pieces: Veneers from a flitch are similar but not identical. Stack the pieces so a distinctive feature (a knot, a colored stripe or a patch of color) runs through the pack in the same position. Indexing is slow but time spent here makes for a better design. Make the hinged mirror by cutting two pieces of regular mirror glass to 6" x 9" and 6" x 7". Tape the ends together so they can move back and forth.

1. Number the leaves 1 through 8 from top to bottom with chalk.
2. Set the mirrors to 45° and place them on the top piece of veneer; you will see one veneer section and seven reflections radiating out from the center. **Drawing 35-1.**
3. Shift the mirrors around, maintaining the 45° angle, until you find a design you like. See **Photo 35-1.**
4. Use the mirror as a guide and draw pencil lines along the two edges. This 45° wedge shows the size and center point of your design. **Drawing 35-2.**
5. Put small pieces of white tape on each piece in the stack and number the pieces again from 1 to 8 just inside the points. Draw a circle around each number.



Drawing 35-3. Arrangement. The eight sections are arranged 1, 3, 5, 7, 8, 6, 4 and 2 so no one piece is more than one place removed from its original place in the flitch.



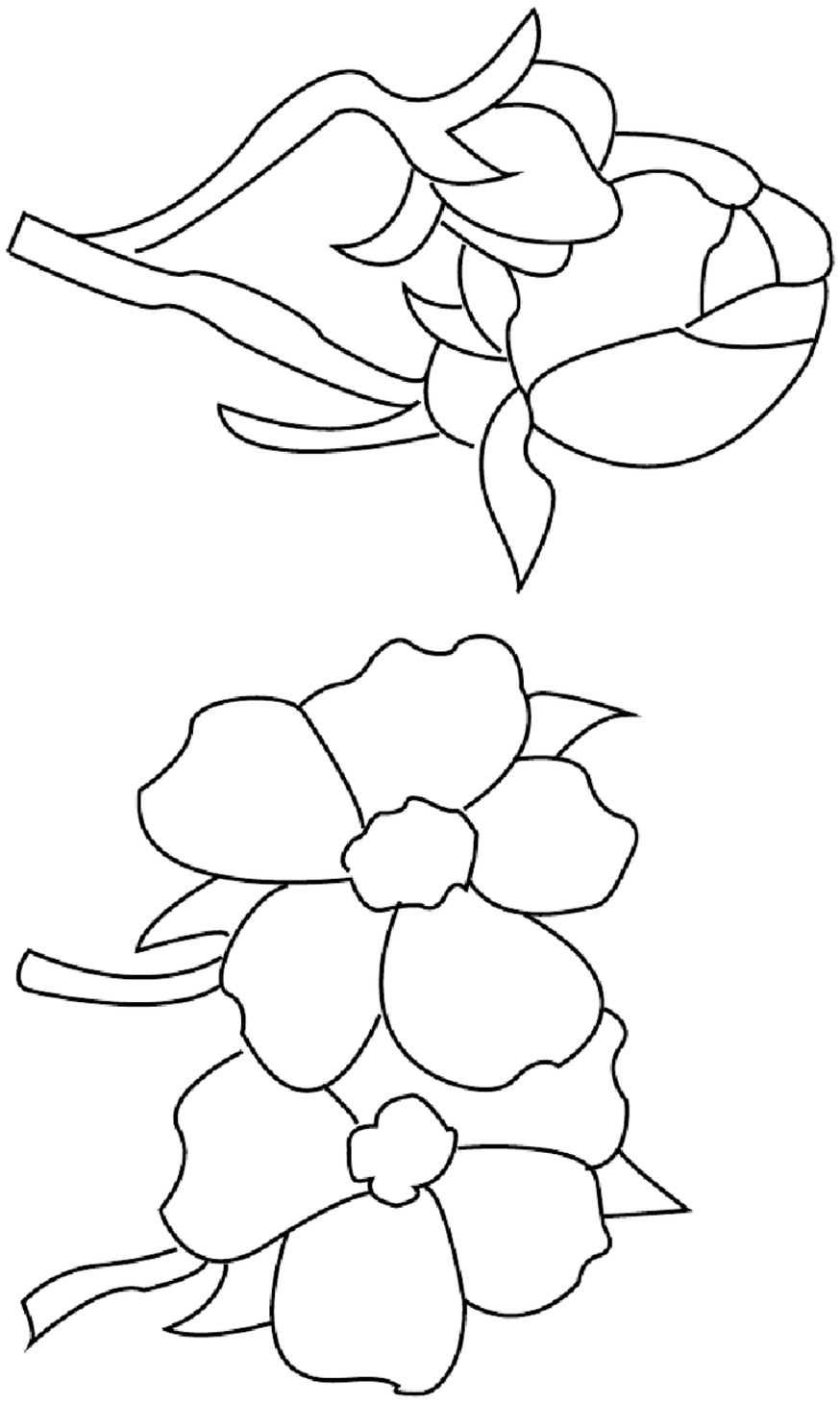
Drawing 35-4. Flip every other piece. This now gives the pattern as seen in the hinged mirrors and eliminates chatoyance.

6. Flip the stack over and number the bottom side of each leaf, again 1 to 8; no circles this time. This shows the order and the top and bottom side of each wedge; circle on top, no circle on bottom.
7. Put the pack back together and look at the top piece (#1 with circle) for an indexing feature (knot, color or stripe) within the wedge you've drawn.
8. Move veneer #2 back and forth under veneer #1 until the indexing feature is directly underneath.
9. Index the other veneers (numbers 3-8) in the pack so this indexing feature runs through at the same position.
10. Blue-tape the 'indexed' bundle together. Later when the stack is cut, the eight wedges will be nearly identical.

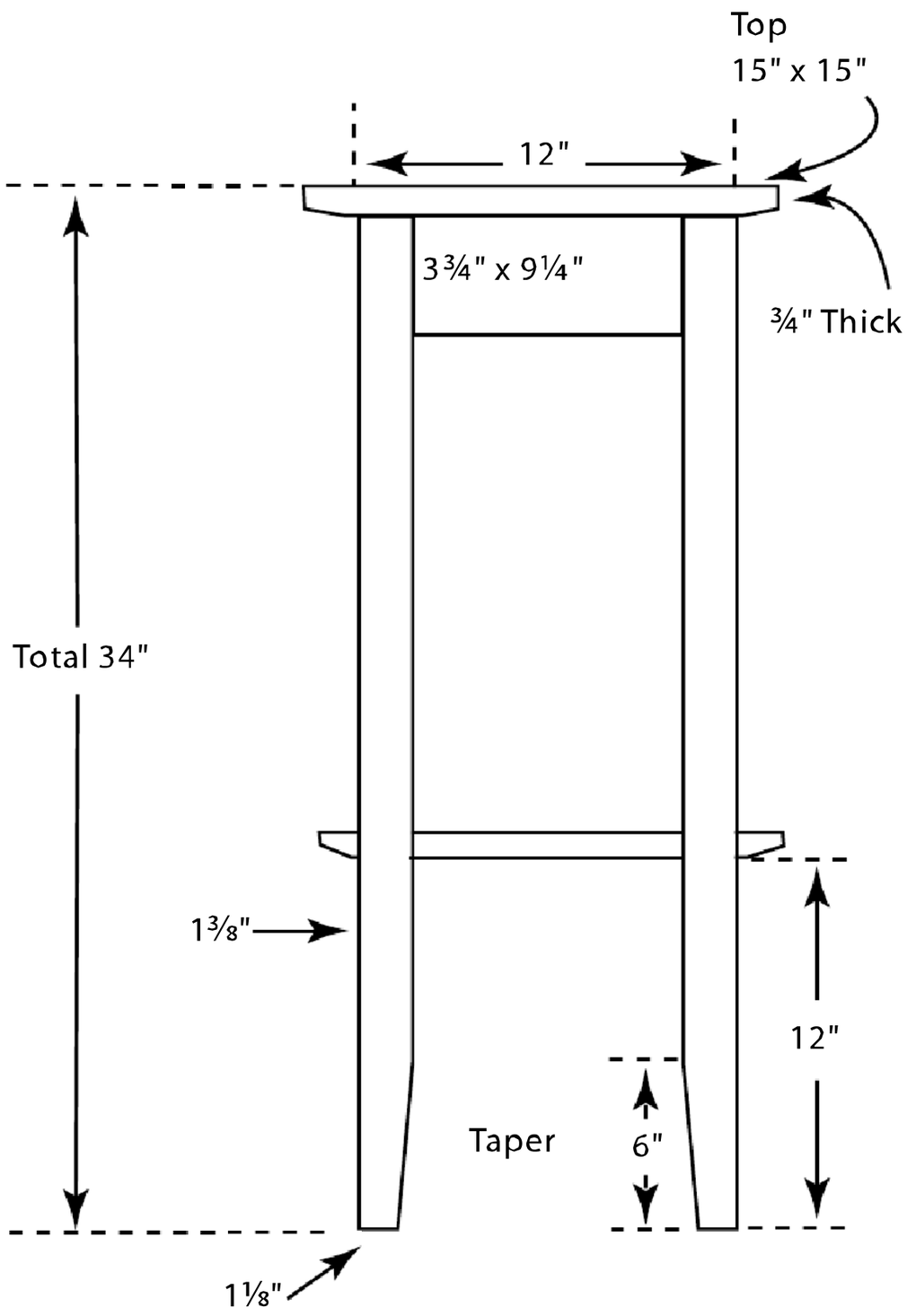
Cut the Wedges and Make the Circle: If the wedges are arranged numerically in a circle, numbers 1 and 8 will be adjacent and these two are least likely to be similar in color and grain. Instead run the odd numbers around one side and the even numbers around the other so no wedge is more than one position from its original place in the flitch. **Drawing 35-3.**

11. Lay the taped and indexed bundle on a cutting surface with the points facing away.
12. Use the mirrors to re-check the angle and then use a veneer saw and cut through the pack; cut away from the points.
13. Blue-tape the cut edges of the pack.
14. Make a line at 45½° to the cut surface. To do this, just nudge the straight-edge a little more than 45°. This bigger angle will allow us to sand the edges of each wedge.

Use the grain.
When using the same veneer in a flower, change grain direction for each petal. This slight variation makes each petal appear separate and distinct.



Drawing 35-5. Bud and Flower Pattern. Use whatever veneers suit your radial-match piece and the woods in the table. These patterns are from Rob Reed.



Drawing 35-6. Table Dimensions. The top has a frame surrounding the radial-match panel.

15. Saw this new line to give eight radial-matched wedges, each a little over-sized.
16. Take the pack apart and lay the pieces out in a circle.
17. Rearrange the wedges so the numbers run 1, 3, 5, 7, 8, 6, 4 and 2 around the circle. **Drawing 35-3.**
18. Flip over every other piece. See **Drawing 35-4.**
19. Use a long sanding block and straighten the edges of all wedges.
20. Use app tape and fasten the veneers into two semicircles.
21. Push the two half-circles together. Because of the extra ½°, there will be a gap between the two semicircles near the center.
22. Trim and sand the long edge of each half-circle until the two fit nicely together. Be careful of the tips.
23. App-tape the two halves together to make the final piece.

Transfer a Pattern. Use regular carbon paper if the transfer is onto app tape. It's best not to transfer directly onto the veneer.

Make the Marquetry: The radial-match is the background.

24. Put app tape on the bottom side of the radial-match piece.

25. Use a carpenter's square and cut the piece to 11-in. x 11-in.
26. Remove all small strips of tape from the top side and cover it completely with app tape.
27. Glue or trace the Bud pattern (**Drawing 35-5**) to one corner. See **Photo 35-2**.
28. Put app tape on the back of six veneers.
29. Make a pad and blue-tape it under the parquetry background.
30. Set the scroll saw to 90° (no tilt) and cut out the pieces.
31. Sand-shade and glue the pieces in place; cover top and bottom with app tape.
32. Make another pad and add the Flower design to the opposite corner, **Drawing 35-5**.
33. Glue the finished piece to a 10-in. x 10-in. piece of ¾-in. MDF.
34. Cut off the protruding pieces of veneer.
35. Cover the bottom of the MDF with a piece of veneer also.
36. Seal the marquetry with shellac, scrape and sand smooth. Put on three coats of wipe-on poly.
37. This radial-matched panel is ready to go into the table.

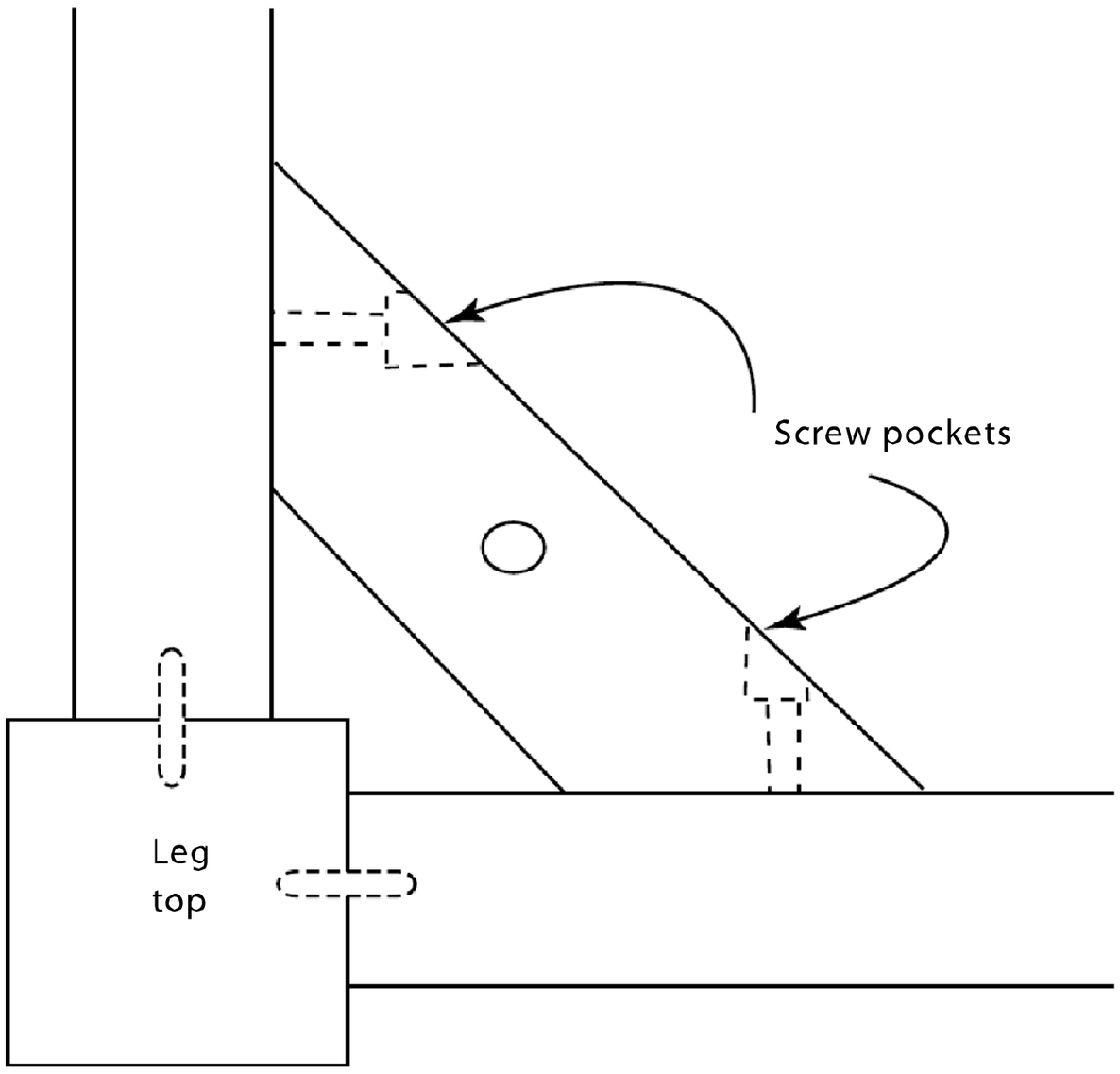
Build the Table Base: Join the pieces with glue and biscuits. See **Drawing 35-6**.

38. Cut four legs from maple, 1⅜-in. square by 34-in. long.
39. Taper the two inside faces of each leg to 1⅛-in. starting 6-in. from the bottom.
40. Cut four aprons also from maple, 3¾-in. wide x 9¼-in. long.
41. Fasten the aprons to the legs at midpoint so the leg has 5/16-in. reveal both front and back. See **Drawing 35-7**.
42. Attach four braces (¾-in. x 1¼-in.) with screws. See **Drawing 35-7**.
43. The bottom shelf can be grill work as in Rob's table or can be solid. See **Drawing 35-8**.

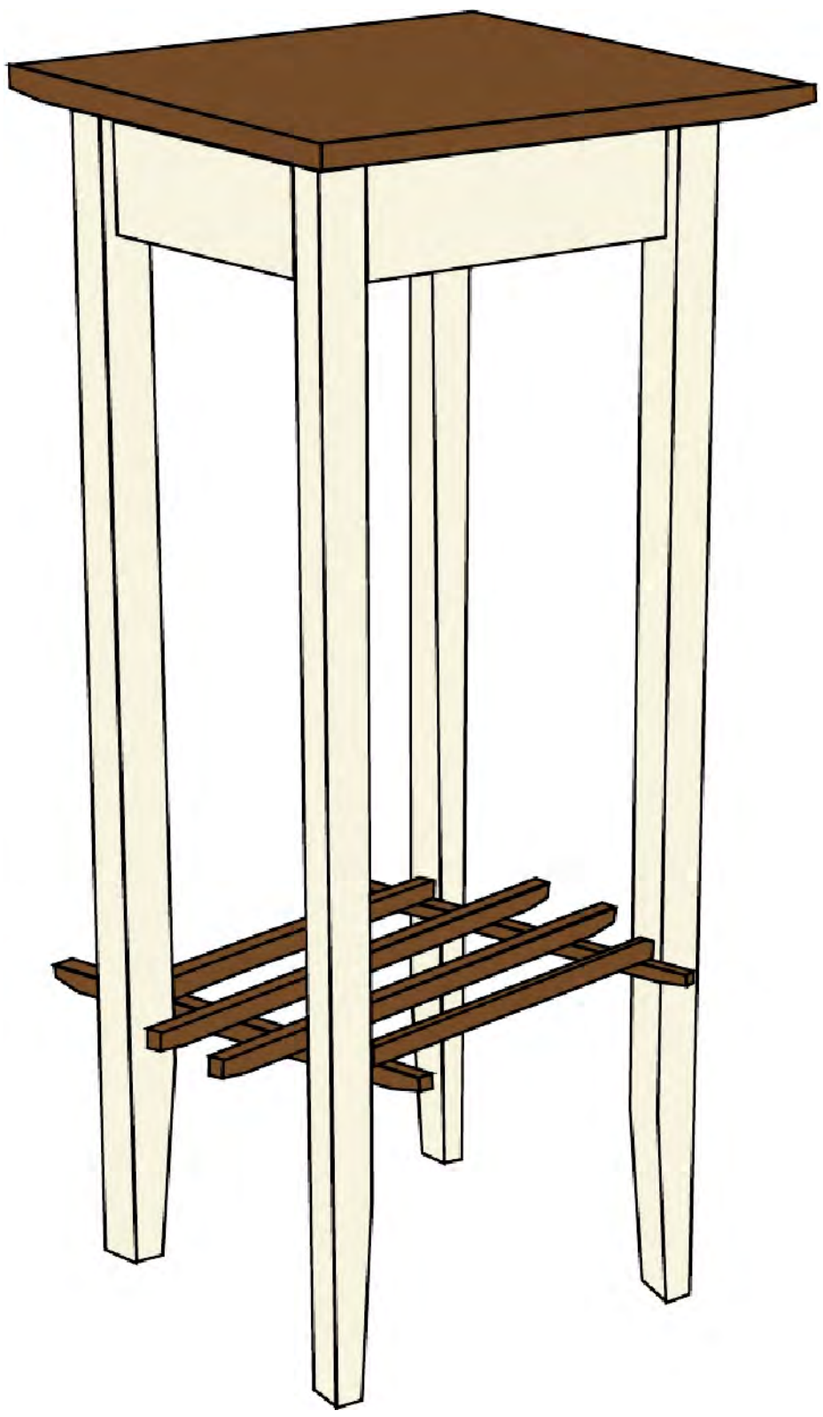
Make the Table Top: Join the walnut frame pieces to the marquetry top with splines. Bevel the edges after assembly. See **Drawing 35-9**.

44. Plane the stock to the thickness of the marquetry panel.
45. Cut four pieces, 15-in. long x 2½-in. wide.
46. Cut ⅛-in. x ¼-in. slots in the pieces with a router and a ⅛-in. wing cutter.
47. Cut the ends at 45° and cut slots here also. Keep the bevel in mind as you cut the slots.
48. Cut matching slots in the marquetry panel.
49. Use ⅛-in. x ½-in. splines and glue the frame to the marquetry panel.
50. Also use splines in the miter joints.
51. Tip the table saw blade to 10° and cut the bevel on the top.
52. Attach the top to the base with screws through pockets in the braces.

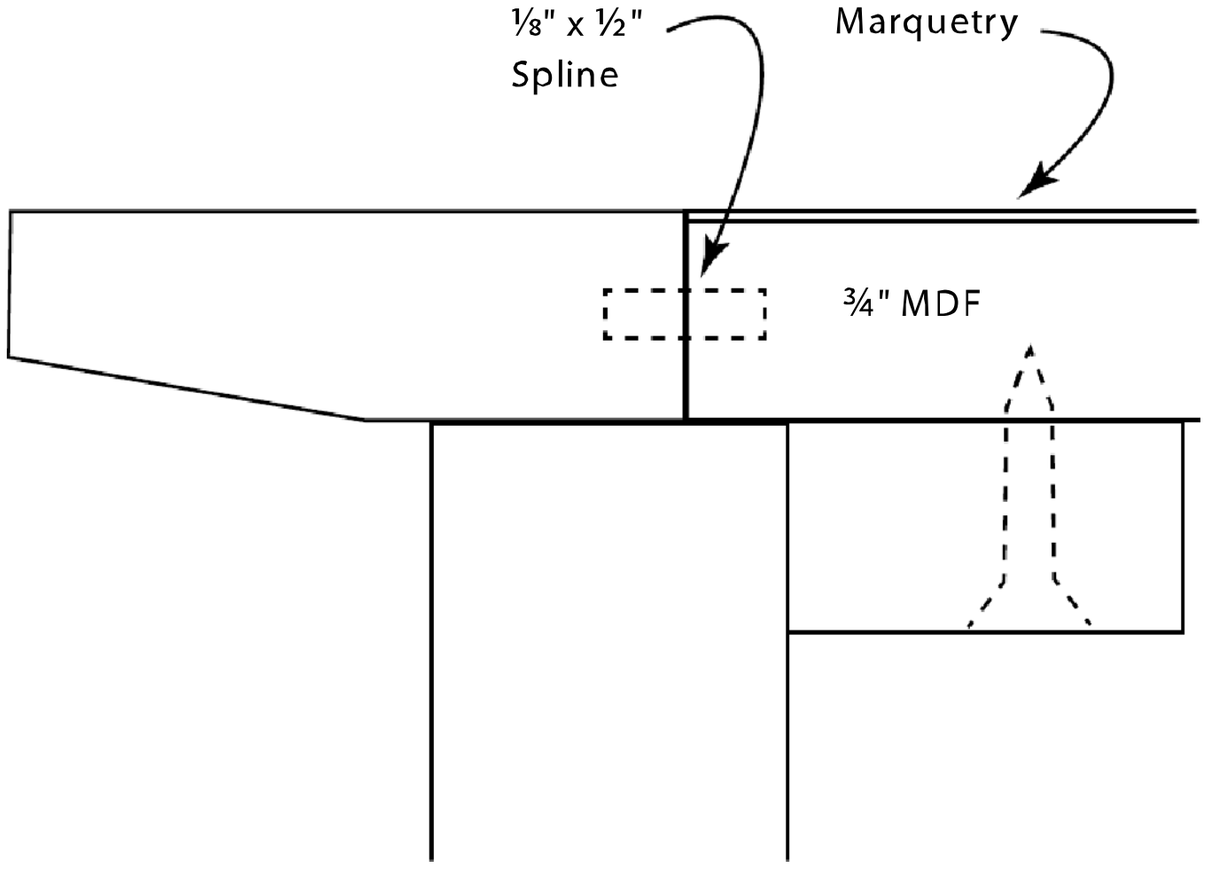
Fix big bubble areas. Heat a ¼" thick metal plate to 325° in an oven and clamp on the area overnight.



Drawing 35-7. Corner Detail. Attach the aprons to the legs with glue and biscuits.



Drawing 35-8. The Table. The bottom shelf can be grill-work, rungs or a solid shelf.



Drawing 35-9. Top detail. The panel is joined to the frame with splines. The frame is beveled from ¾-in. to ½-in.

Project 36

ALTON'S BOX

Photo 36-1

Alton was a good buddy and a very good wood worker. Every time we worked together, I learned something. We went to wood-working classes at the College of the Redwoods in Ft. Bragg, California, to a 5-day wood turning class in Provo, Utah and flew to Southern California for a two-day class with Sam Maloof on Chair Making.

I answered the phone one morning back in January, 2011 and it was Alton. This was not unusual. We'd usually talk on the phone a couple of times each week and get together fairly often to work on a project together.

"Hi, Kenny. How's it going?"

I replied, "Pretty good, Alton. What's up?"

"Hey, good buddy. Wonder if you can help me build a coffin?"

This was an odd request, but I said "Sure".

Alton said a doctor had found pancreatic cancer and had given him 'six months' which turned out to be about three months; the diagnosis had been earlier and Alton hadn't mentioned this over the Christmas holidays. Actually, Alton died May 19, 2011 at 6:00 pm.

When I got to his house the next morning, Alton was sitting in a big arm chair and didn't look too good. He had a 'Build Your Own Coffin' book and the instructions said the inside width should be 4-5 inches wider than the intended user's shoulder width. I picked up a yard stick and raised

my eyebrows in question. Alton nodded and sat forward; 19-in. across the shoulders. The book said the inside length should be five inches longer than the user's height; Alton said that he was 5-10. I read that the depth should be at least 15-in. So, I had the basic inside measurements of our 'box'; about 23-in. wide, 15-in. deep and 75-in. long.

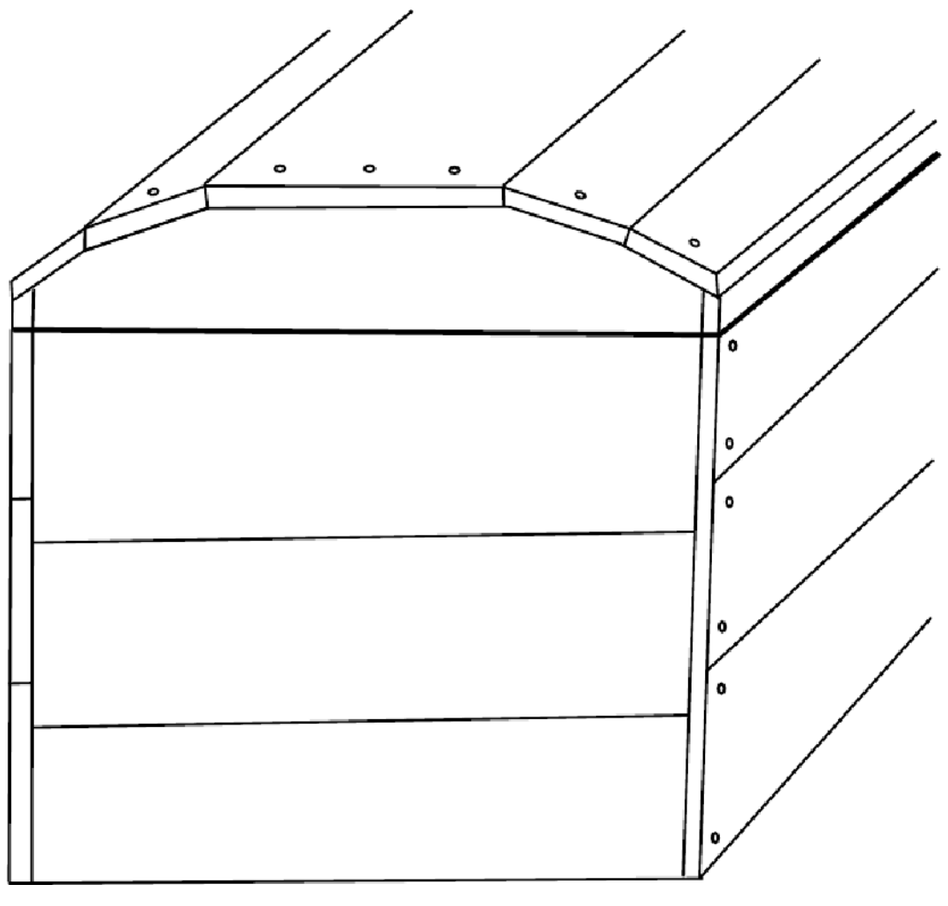
The shape of the 'box' took a little more time. I remember cowboy movies and when a bad guy 'bit the dust', the next scene was at the undertaker's shop. He would cut some 1 x 6 pine boards, nail them together and then he would tell the sheriff, "That'll be ah-dollar-and-fifty cents, Jim". We spent a little more time on the shape.

Alton had the lumber; we pulled pieces piled against his bedroom wall, from under his bed, from his shop and from other cached and hoarded places. It was beautiful Claro Walnut that he and his dad had harvested and Alton had been saving since the 1940s. The walnut was from trees that grew in the Sacramento Valley of Central California where Alton was born. We separated out the pieces that seemed to be ¾-in. thick and 6-ft. long.

Later I took a few 'box' drawings to Alton; he liked the plain box with a faceted lid, see **Drawing 36-1**. We made a few changes and I was ready to start.

Extra Tools and Materials Needed:
Wood for the Box, table saw, Forstner bit (⅜-in.), drill press, plug cutters and a router with inset collars.

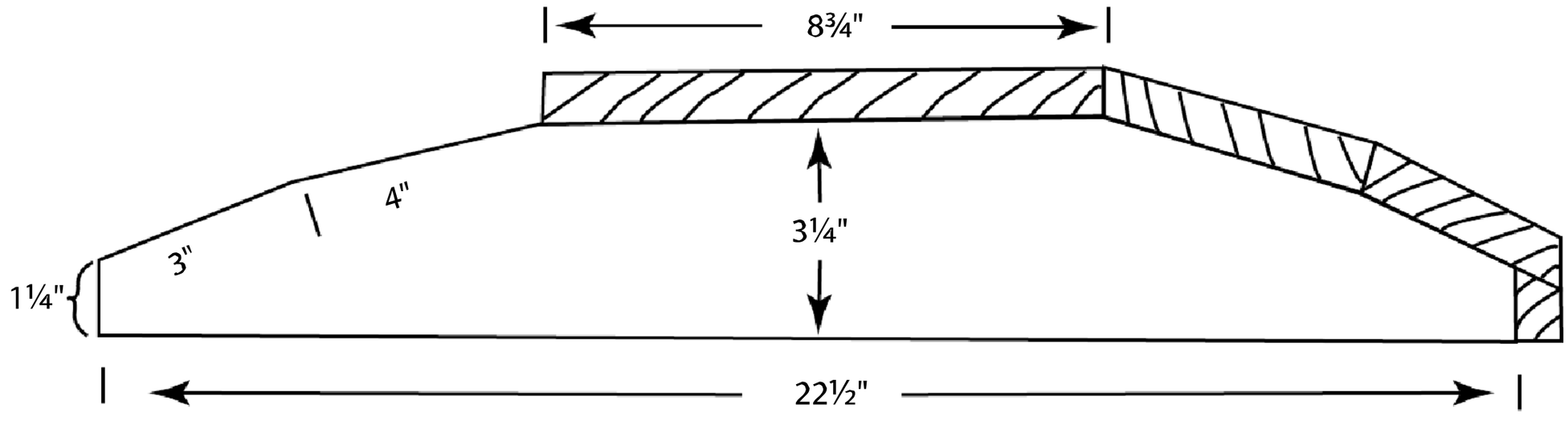
Rubber clamps. Cut rubber strips from an old tire inner-tube or use rubber tubing to clamp veneer to a curved surface.



Drawing 36-1. The Basic 'Box'. Made out of old-growth Claro Walnut from the Central Valley of California, the box is 24-in. wide x 75-in. long x 18-in. high. The top adds about 4-in. more in height.

Build the Box: It is 75-in. long x 24-in. wide x 18-in. high. The butt-joined ends were fastened with wood screws; the holes plugged with ebony pieces.

1. Cut boards to 78-in. long, rip to width and joint the edges.
2. Edge-glue pieces to make at least 18-in. width.
3. Cut two sides to 18-in. wide x 75-in. long.
4. Cut two ends to 22½-in. long x 18-in. wide.
5. Drill pilot holes for the screws and Forstner holes for the plugs.
6. Fasten the box together with 1¼-in. wood screws. See **Drawing 36-1**.
7. Plug the holes with ebony pieces.
8. Cut a piece of ¾-in. plywood for the bottom.
9. Use wood screws and PVA glue and fasten ¾-in. x ¾-in. walnut pieces to the bottom inside edges of the sides and ends. Note: these wood pieces must be firmly attached as they will later be subjected to 180-200 pounds of weight.



Drawing 36-2. The Ribs and the Top Boards. The edges of the top board are 90°. The other four boards have one side at 90°.

10. Drop the bottom in from the top allowing it to rest on the ¾-in. ledges.
11. Fasten the bottom in place with 1¼-in. wood screws driven in from the bottom.
12. Drill ⅛-in. holes in from the sides of the box every 10-in. and drive 1½-in. finishing nails from the outside into the plywood bottom. Set the nail heads and fill the holes.
13. Finish the box inside and outside with a Maloof oil-varnish finish. See 'Concepts, Finishes, Maloof Finish' for details on this.

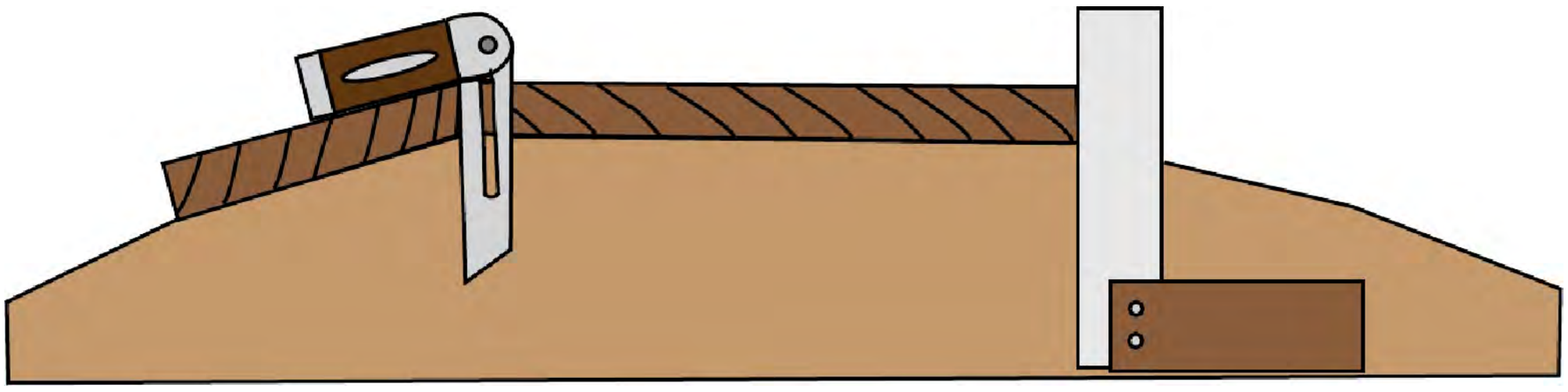
Build the Lid: The lid is coopered and the four gussets have five flat facets where the top boards are fastened, see **Drawing 36-2**. The center plank has both edges at 90°; the other four boards have one edge at 90° and one edge angled. For more on coopering, see *More Woodworkers' Essential—Facts, Formulas & Shortcuts* by Ken Horner, 2006, Fox Chapel, Chap. 14, 'Coopering'.

14. Cut four walnut gusset pieces, **Drawing 36-2**.
15. Cut the top plank to 75-in. long x 8¾-in. wide.
16. Drill pilot holes and plug holes at both ends and 25-in. from each end.
17. Fasten the top plank to all four gussets with 1¼-in. wood screws.
18. Cut the next two boards and use a sliding bevel to measure the angle (**Drawing 36-3**).
19. Transfer this angle to the table saw (**Drawing 36-4**) and rip two boards, leave one side of each board at 90°.
20. Add the last two boards to make the lid 24-in. wide.
21. Add the long narrow side pieces that run under the last boards from end-to-end.
22. Plug all holes with hand-made ebony pieces.

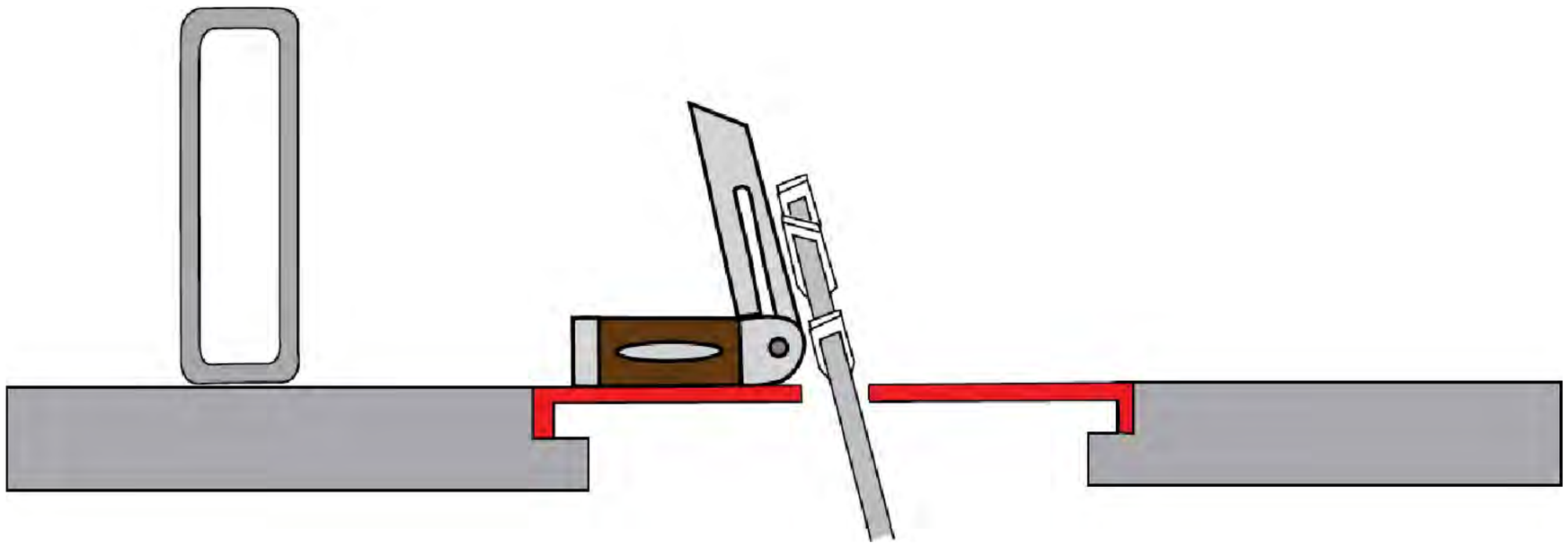
Add the Handles: The box handles are leather Trunk Handles with pinned metal loops. The handles are 11-in. long x 1¼-in. wide and are quite strong, being 5⁄16-in. thick, see **Drawing 36-5**.

23. Fasten the first metal loop on the side of the box, 6-in. from a corner.
24. Fasten the second loop so the handle lies flat when not in use but can be pulled out with room for a hand.
25. Drive in the metal pins.

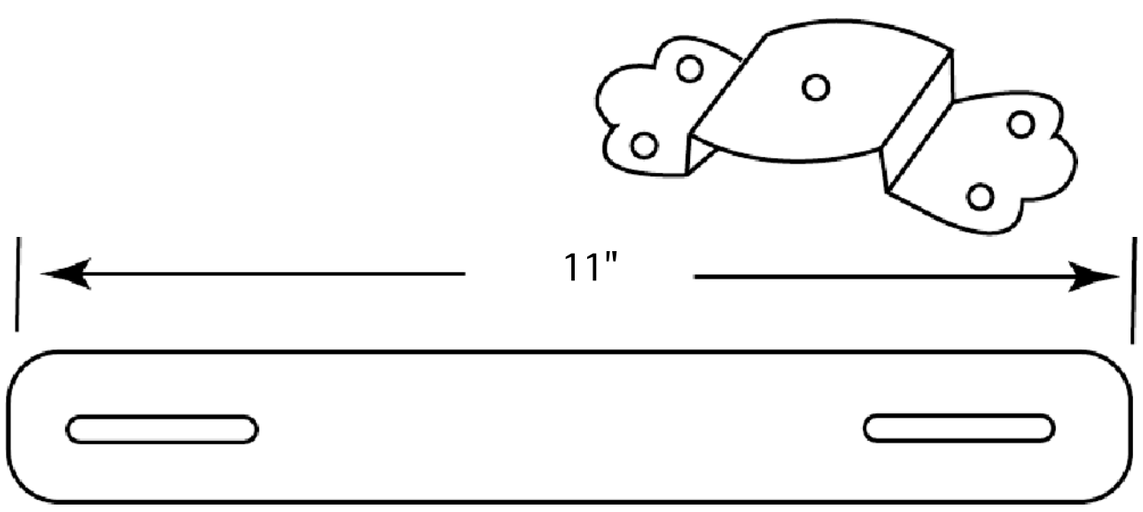
The Marquetry: Alton was an active member of our local Northern California Chapter of the American Marquetry Society. He asked my wife, Linda Horner, to make a marquetry piece for the top, see **Drawing 36-6**. Linda used the Double Bevel technique, see **Photo 36-1**.



Drawing 36-3. Find the Rip Angle. Place the new board temporarily in position and set the sliding T-bevel in place.



Drawing 36-4. Set the Table Saw Blade Angle. Use the sliding T-bevel to set the tilt.



Drawing 36-5. Leather Strap and Pinned Loop. Six sets made the handles.

26. The flower and leaf pattern is 3½-in. x 8-in., the surrounding ellipse 5-in. x 10-in.

27. The background is Water-fall Bubinga, the leaves quilted maple and the flower ribbon maple .

28. Glue the marquetry to a piece of ¼-in. plywood at least 6-in. x 12-in.

Make the Recess: Use a router and collars here.

29. Strap the elliptical pattern onto the lid and cut a ¼-in. recess.

30. Use a wood chisel to even out the bottom of the recess.

Cut the Inset to Shape: Use a router and collar to size the marquetry.

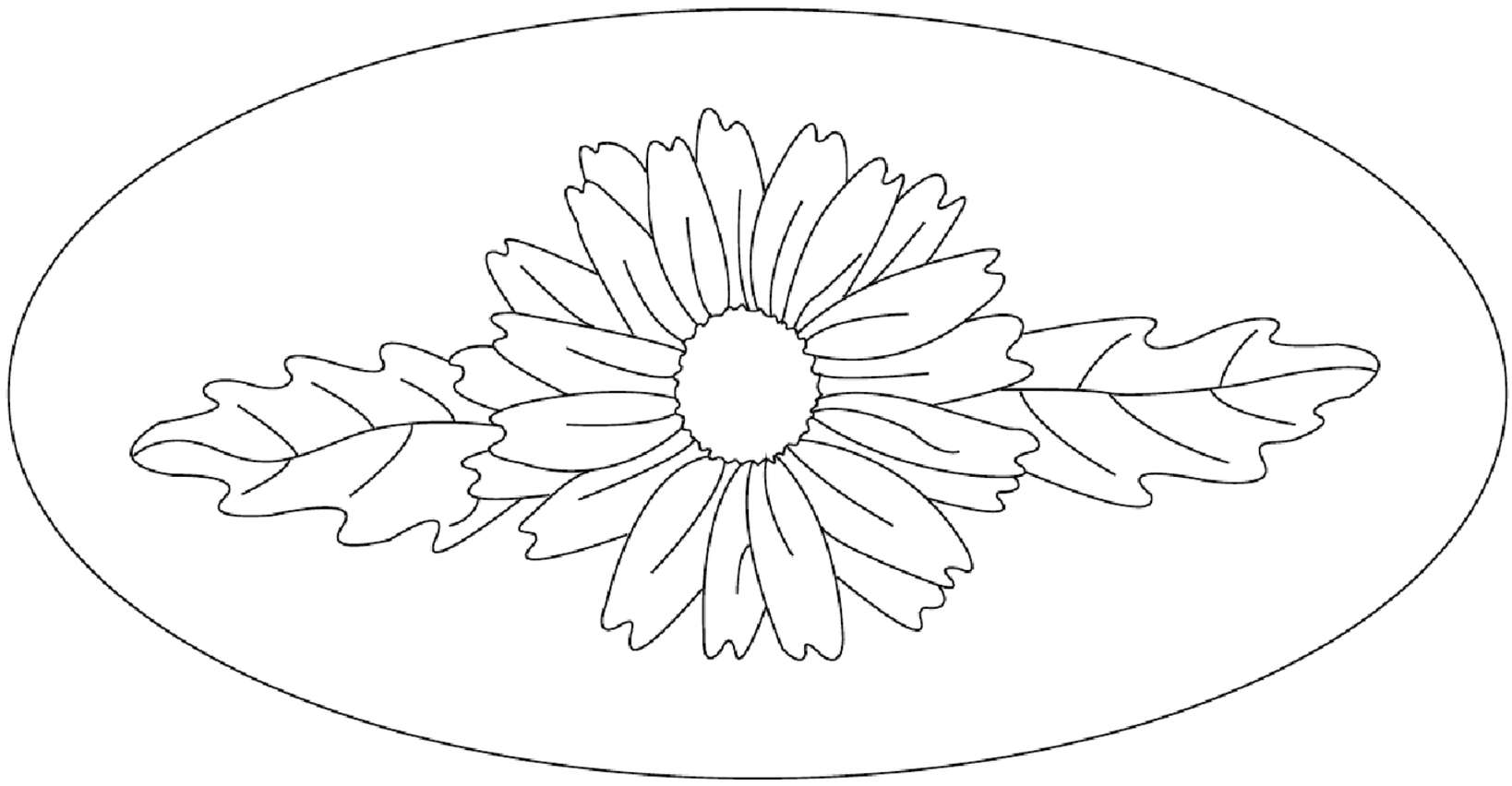
31. Fasten the plywood back board with the marquetry to a waste board with double-sided tape.

32. Use the router, the same pattern and a different collar and cut the outline of the marquetry piece.

Glue the Marquetry Piece in Place: Use yellow PVA glue and a heavy weight, I used an anvil.

33. Glue the marquetry piece into the top of the box lid.

34. Seal, scrape and sand the top.



Drawing 36-6. Marquetry Pattern. Linda Horner used the double bevel technique.

Attach the Lid to the Box: Even though it seems the lid will be opened only a few times, we used a strong hinge because the lid was heavy. Alton also got the 'box' a few weeks before and asked another friend to add lining and padding. Alton also showed his 'box' to a lot of people.

35. This was pretty simple, just a long piano hinge.
36. There was no lock or latch added.

Epilog: Alton and his son drove to my house and picked up the casket in March. Alton was too weak to get out of the cab; he and Linda just chatted as we loaded it in. Alton stored the box in his shop under a heavy moving pad. A friend added the bottom pad and white silk lining. Alton asked me once, "How thick do you think the pad should be?" I replied that "I don't think it really matters." He nodded and smiled. Alton moved into a care center March 19 and Linda and I visited him there frequently. He was in good humor but poor health.

Once I phoned his room at the care center and his daughter answered the phone. I heard Alton's voice in the background "Is that Kenny?"

She answered "Yes"!

And I heard him say—"Just tell him to come over here and shoot me."

The End: May 19, 2011 Alton's daughter called about 10 pm; "Ken, I'm sorry to call this late but dad just passed away."

I was surprised even though I was expecting this. "Aw. I'm sorry to hear that. Darn. I knew it was coming but I'm really sorry to hear that."

She said, "Ken, if you'd have seen him this last week you wouldn't have been sorry. It was a blessing."

Alton used his 'box' and we all gathered to say farewell on May 24 at the Mission Chapel in San Jose, California. Prayer cards were handed out 'In loving memory. Alton Elvis Jensen, b. Nov. 12, 1925, d. May 19, 2011'. Alton and his box were transported to California's Central Valley and Alton was buried in the family plot amid almond and walnut orchards.

CONCEPTS

1. Arcs

In the Curved Border Tray project, it is necessary to draw a curve along the long edge.

- Use a jig knowing the length and height of the arc. This method draws the arc; it does not calculate the length of the radius.
- Fasten a piece of paper (15" wide x 10" high) onto a piece of plywood.
- Drive nails at the end points of the arc (AC, 13½") and at the highest point (D, ½").
- Lay two sticks across points AD and CD and tack them together.
- Remove the nail at D.
- Hold a pencil in the interior joint (D) and slide the 'compass' from the middle to each end, allowing the pencil to trace the arc.
- For more on arcs see *Woodworkers' Essential—Facts, Formulas & Shortcuts*; by Ken Horner. Chapter 11, Arcs and Arches, p. 108, published by Cambium Press, 2004.

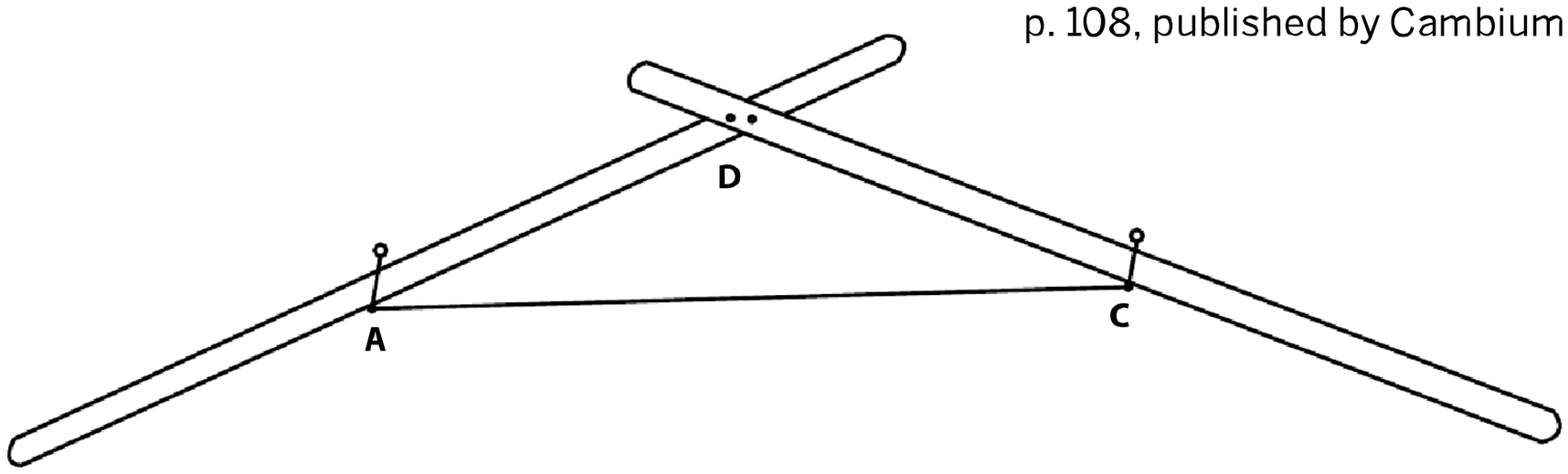


Figure 1. Swing the boards and pencil from D to A and from D to C.

2. Backer Boards

Boards of 5⁄16" and thicker do not need a backing veneer however one might be used for decorative reasons.

Composites: These man-made boards are stable because they are made from wood chips, sawdust and glue. Chip boards and OSB have uneven surfaces which will telegraph through and have rough edges when cut. The LDF (low density fiberboard) is structurally weak and has a rough surface; HDF (high density fiberboard) is too hard to cut and work.

Medium Density Fiberboard (MDF) is the best as it has a smooth surface, is easy to cut and comes in various thicknesses.

Plywood: Plywood has been used as a backer board for years. The high-grade material has a smooth surface, has no voids and is resistant to warping. It is heavier than MDF and costs more. Avoid the cheaper plywood with voids and uneven surfaces.

Solid Wood: This is the least suitable material on which to mount veneer pictures as it is more prone to warping than the man-made materials. In its favor, neither the back nor the edges have to be covered with veneer.

3. Scroll-Saw Blades

A big question—what blade to use?

Sizes: The blades used in marquetry are the 1/0, 2/0, 3/0 and 4/0 sizes. The smaller blades (3/0 and 4/0) are used for double bevel (only two veneers) and the larger blades (1/0 and 2/0) for pad marquetry.

Check online for Otto Frei of Oakland, CA. These jewelers' blades and sharp and strong.

4. Borders

The wrong border; too wide, too narrow, the wrong color or the wrong wood detracts from the overall effect. In Figure 4, the pieces are flip-flopped.

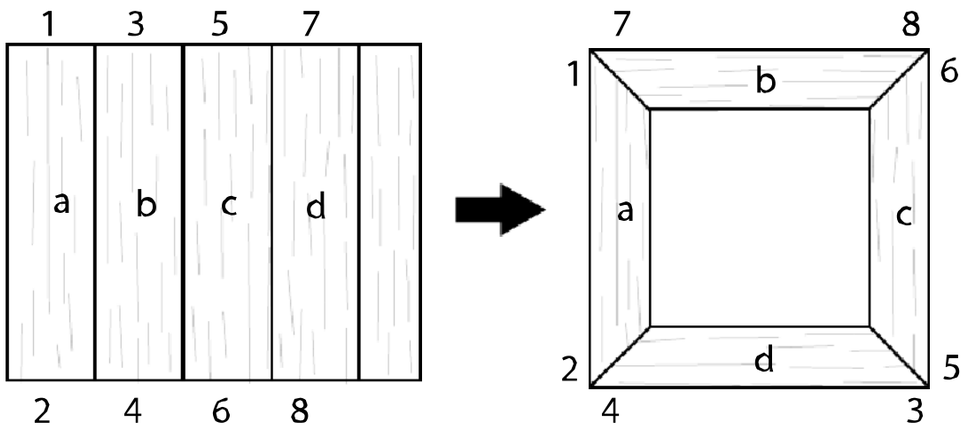


Figure 1. Traditional. Four consecutive sections joined randomly or in matching pairs. Color and grain differences are minimized except for the 1-7 connection.

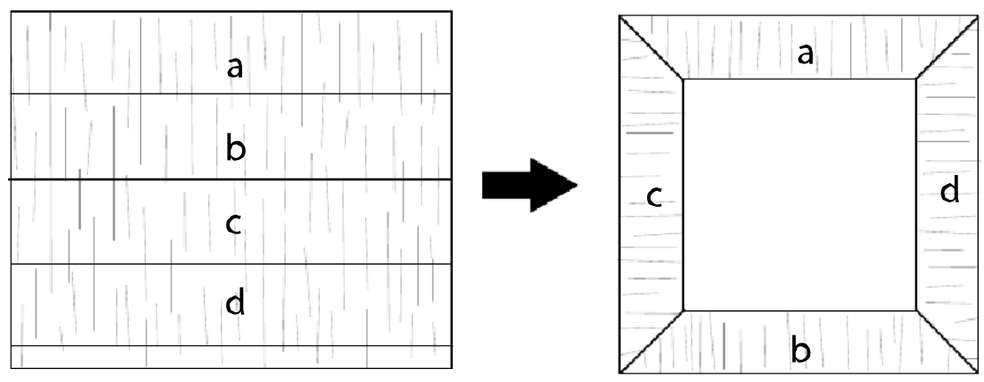


Figure 2. Cross-Cut. The grain pattern points inward.

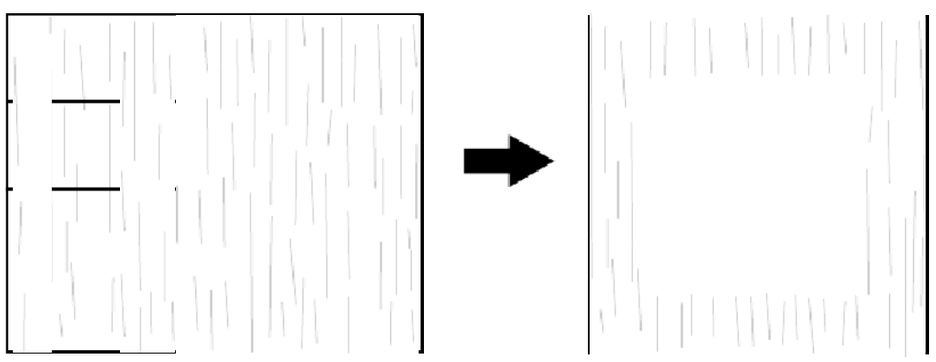


Figure 3. Vertical and Cross-Grain. This border appears to be from a solid piece of wood.

or

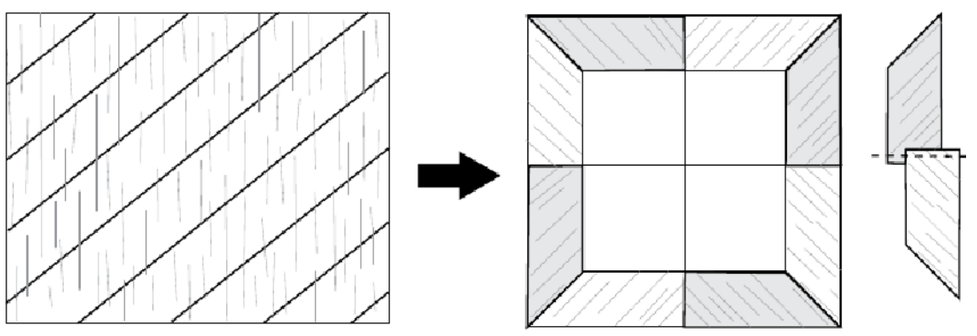


Figure 4. Diagonal Cut, Flip-Flop. Four strips are from the top and four from the bottom of the veneer piece. Chatoyance might be a distraction.

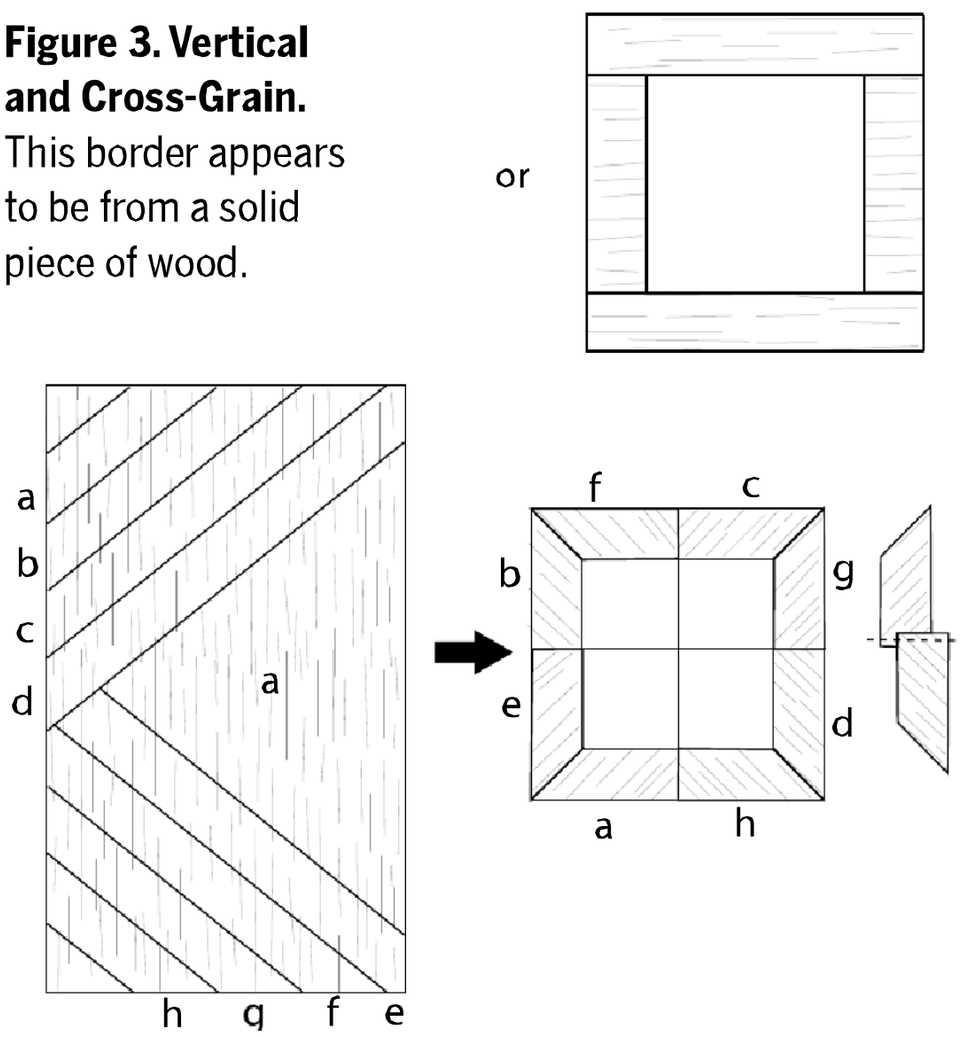


Figure 5. Diagonal Cut, Top Face Only. All the pieces are from the top of the veneer.

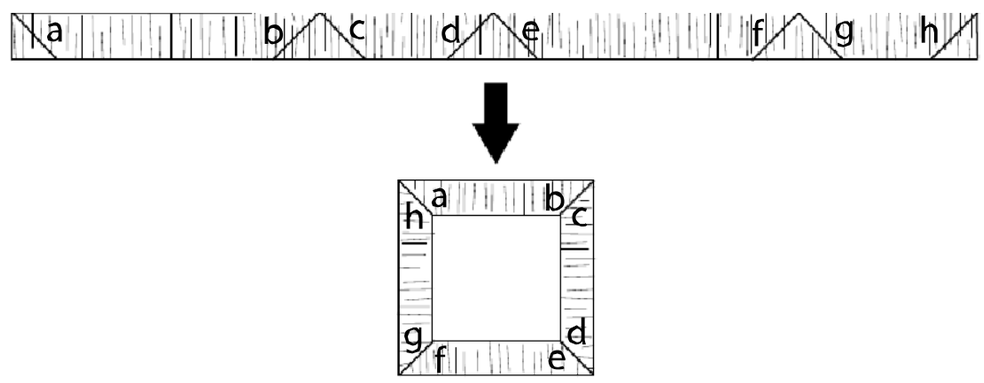


Figure 6. One Long Piece. Cut the piece so all joins are similar except 'h' to 'a'.

5. Borders, Stringers and Corners

Borders are usually made of the same veneers as the picture. All sides should be uniform in width, match the mood of the picture and enhance the image. The border should lead the eye toward the picture. A 'too big' border will diminish the picture; one bright and flashy will seem out of place on a somber picture. A border should be attractive but not at the expense of the picture. Veneers of a similar hue and texture lend a sense of harmony to the whole. Light borders project the picture forward; dark borders give a feeling of depth. Choose a stringer that is a different color from any veneer that it touches; black is a good choice.

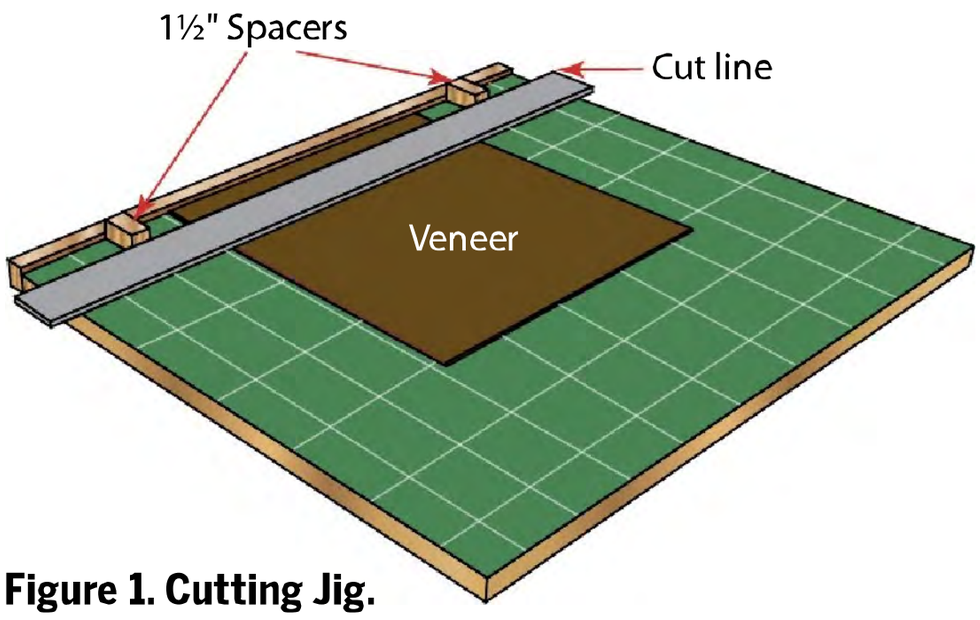


Figure 1. Cutting Jig.

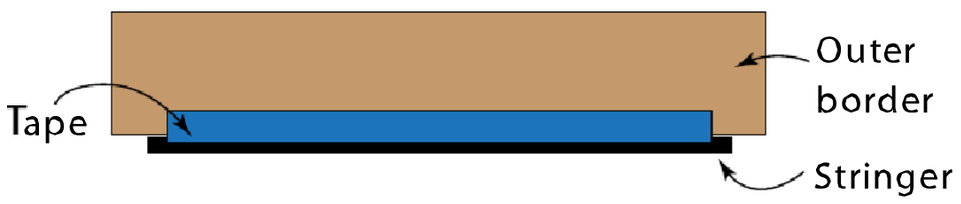


Figure 3. Join individual strips with blue tape.

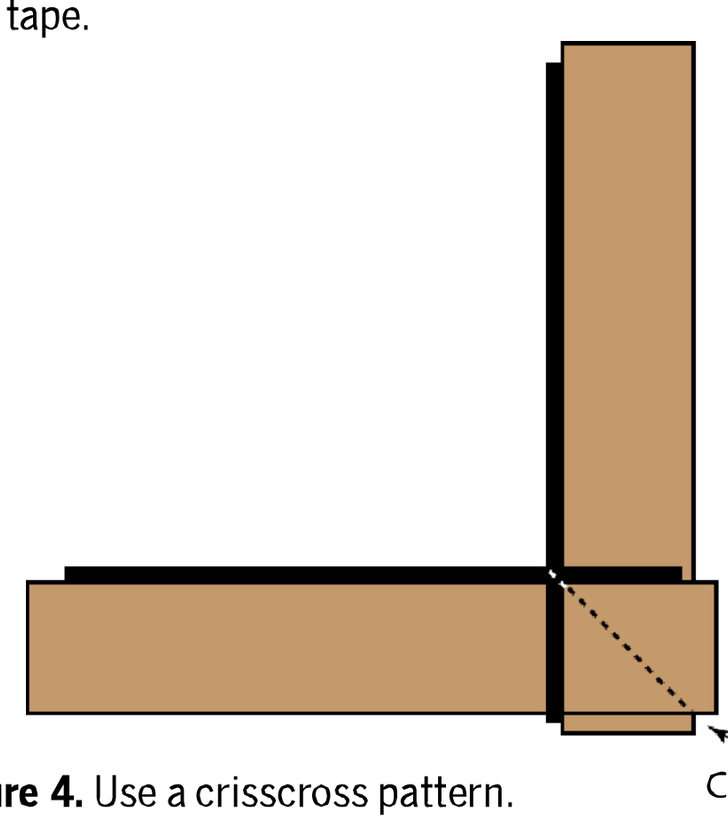


Figure 4. Use a crisscross pattern.

Cut the Veneers: Use a cutting jig, Figure 1. Smooth one edge (Figure 2), place spacers along the fence and push a metal straight edge into place. Use three or four gentle strokes with a sharp knife and cut the strips.

Tape the Borders: Glue the stringer and outer piece together before adding them to the picture. See Figure 3. Square the picture and affix the border to the picture with clear cellophane tape every 3". Stop short of the ends. Use a crisscross pattern at each corner. See Figure 4.

Cut the Corners: Put clear cellophane tape on the front and the back of the corners and lay a straight edge as in Figure 5. Use a sharp knife and carefully cut from the inside out. Pull out and discard the extra pieces and secure the joint with clear cellophane tape.

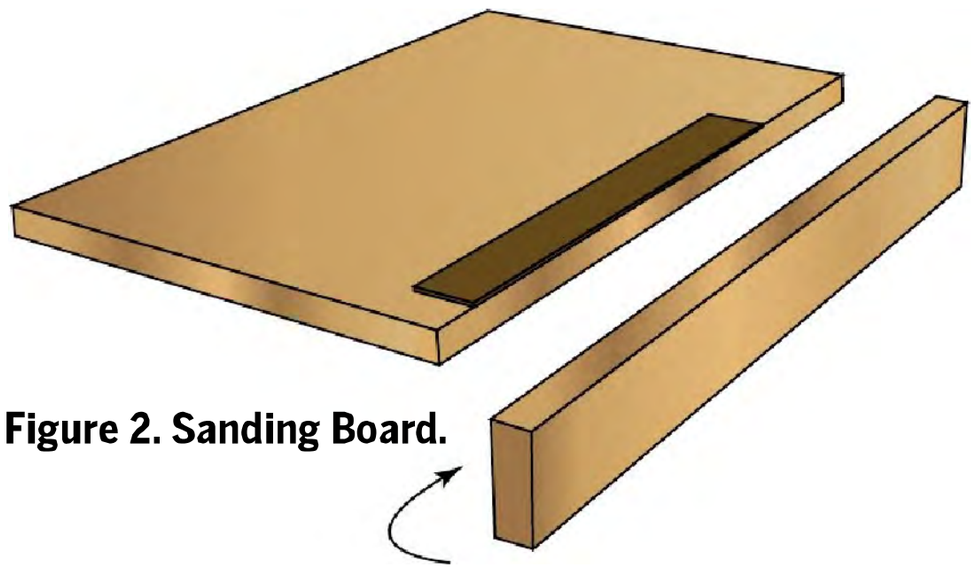


Figure 2. Sanding Board.

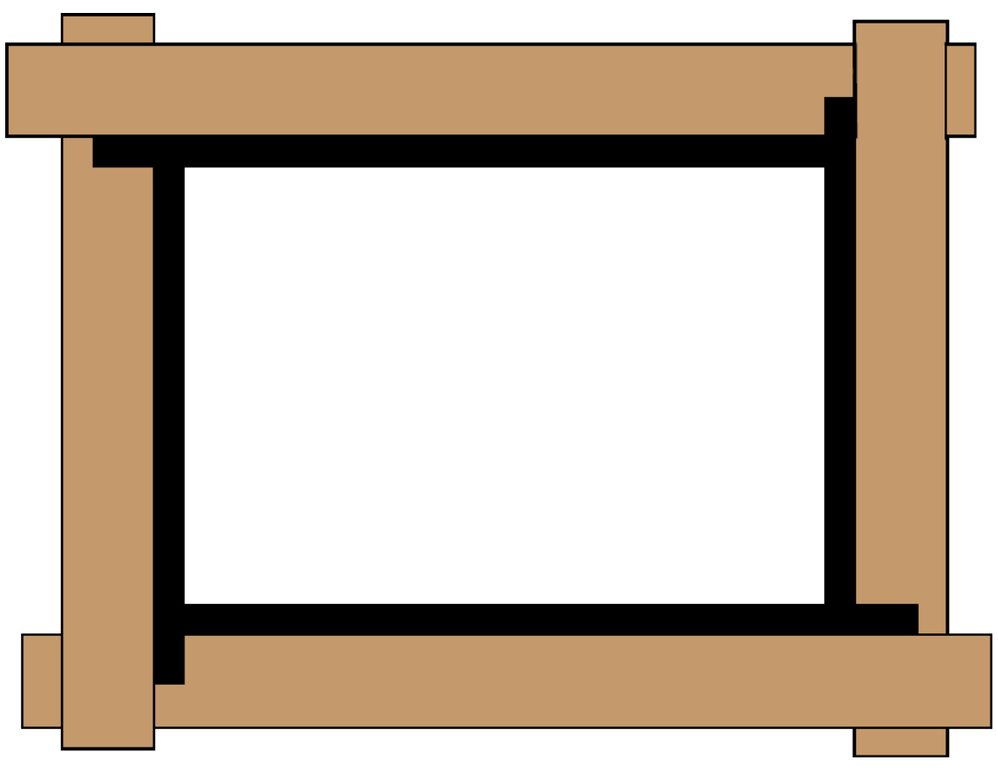


Figure 5. Cut the corner angle.

6. Box Lid Cut Off

Some boxes in the Projects section start as modified cubes. They are hollow, six sided boxes. The reason for this method of construction is:

- Continuity of Grain—By making the two sides and the two ends out of one long piece of wood, the grain pattern continues around the box and when the lid is cut off, the grain pattern of the sides and ends also matches that of the lid.
- The Fit—It is difficult to make a box and lid so they match perfectly in size.
- Economy of Work—It is easier to glue up six pieces of stock and then to cut off the lid.

Band Saw: The band saw has a thinner blade and cuts with a smaller kerf.

Table Saw: Use a table saw when the joinery requires that the cut depth be controlled.

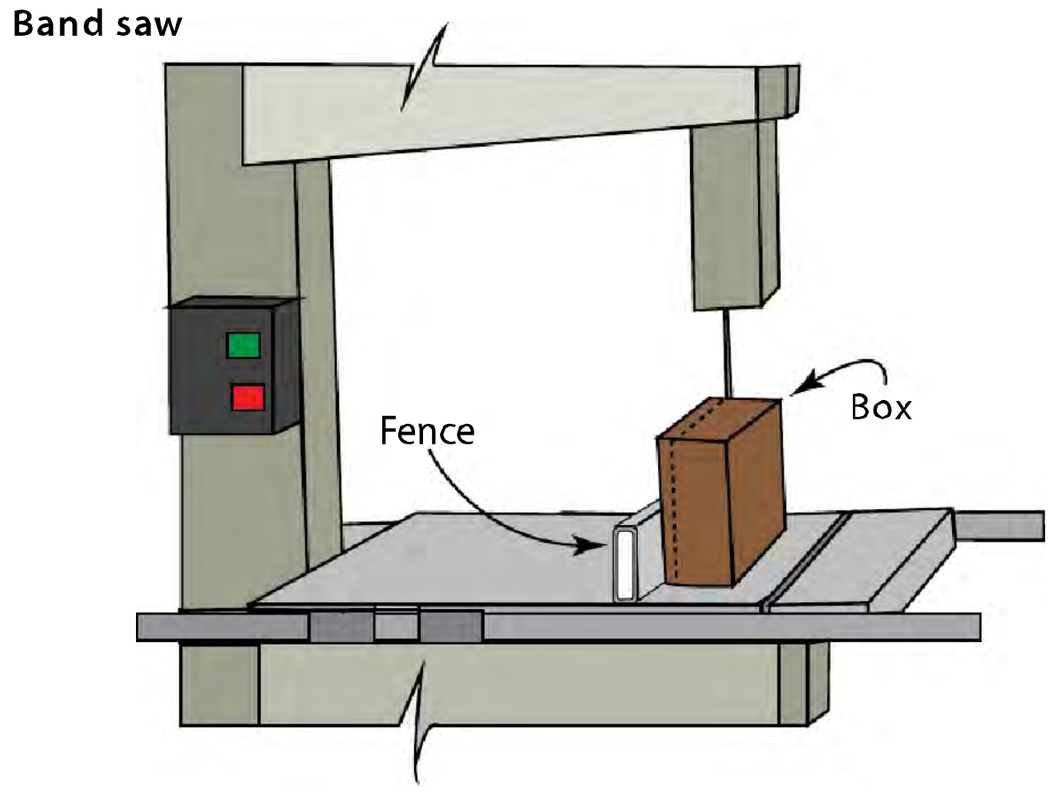


Figure 1. Cut the Lid Off the Box. Use a Band saw to cut the lid off. Use a table saw to cut when a controlled depth is needed.

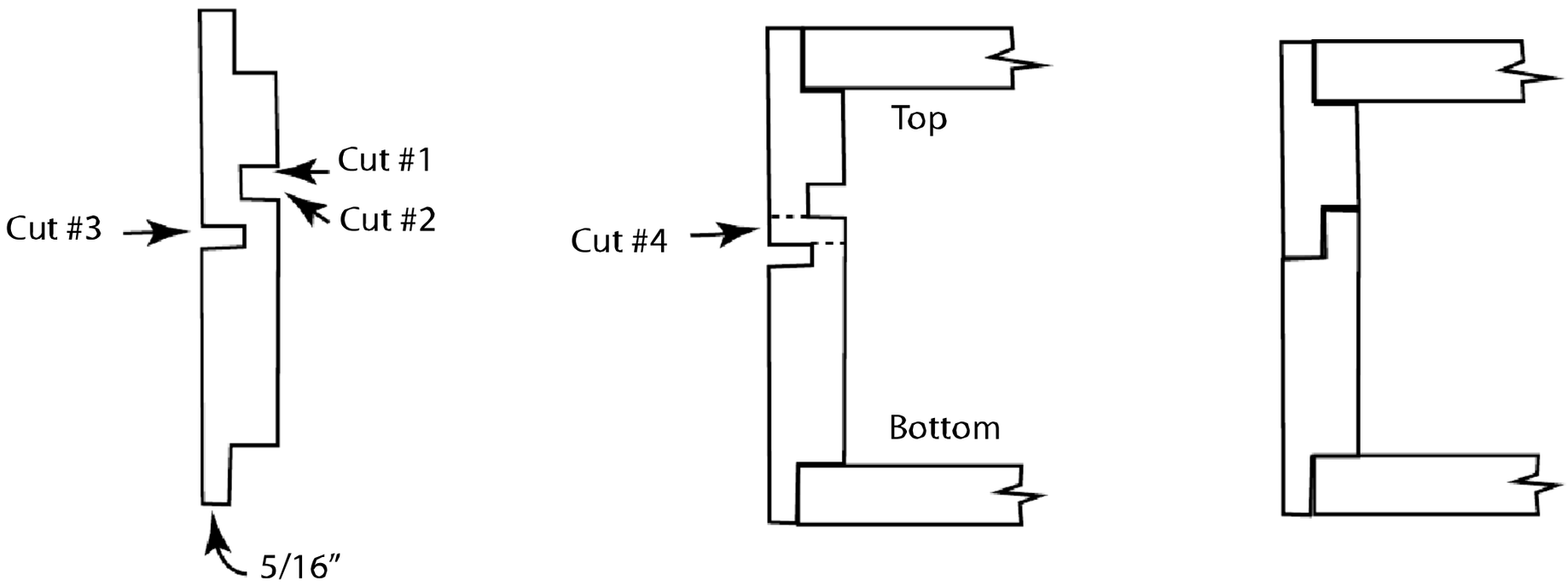


Figure 2. Make a Lid Fit the Box. Cuts 1, 2 and 3 (top) are the width of the saw blade. After the box is glued up (center), one last cut (bottom) frees the lid.

7. Box Linings

Cut a piece of stiff cardboard 1⁄16" smaller than the box and cut the lining material so there is a ¾" border on all sides. Glue the liner to the cardboard. Cut out the triangular sections and fold the overlapping material onto the cardboard.

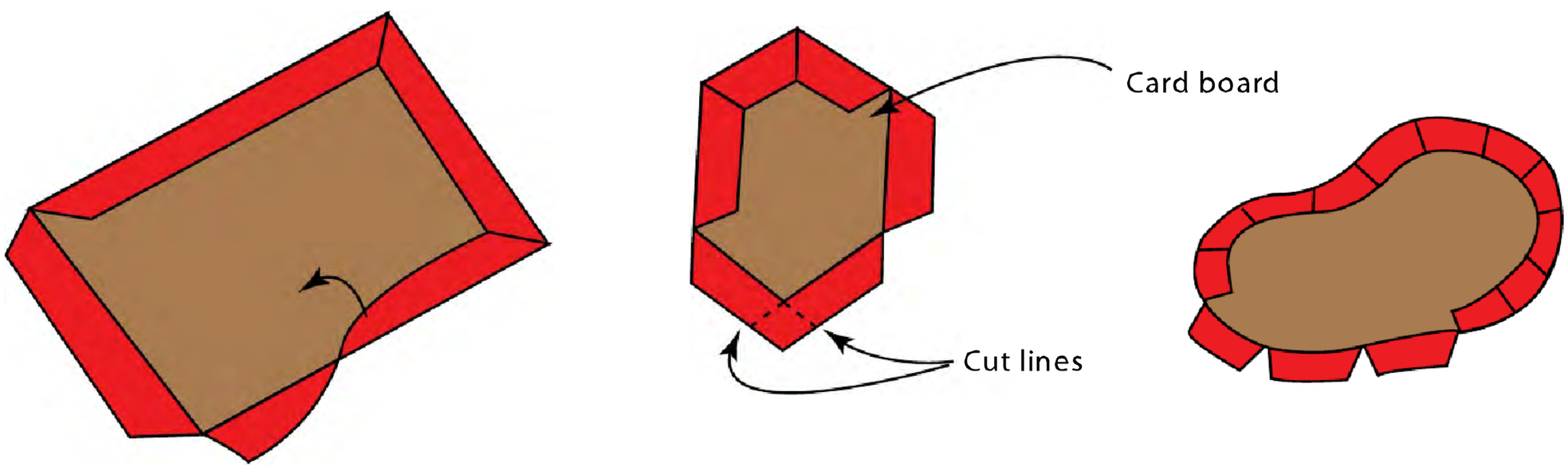


Figure 1. Box Linings.

8. Bubbles in Marquetry

Some veneers refuse to stay flat after gluing. It is fortunate that polyvinyl acetate glues (white and yellow PVA glues) can be reactivated after they are applied. This is a major reason to use PVA glues on your marquetry.

Metal Plate: White PVA glue can be reactivated indefinitely with heat and yellow PVA for up to 10 days after initial set. Heat a metal plate (¼" x 4" x 12") in the oven at 325° for 10 minutes. Place the metal plate on the marquetry and add about 5 pounds weight. The heat drives moisture from the veneer and shrinks the wood. The heat also semi-melts the glue. Remove the plate and clamp the piece with a flat board for ten minutes.

Household Iron: Lay a piece of grocery bag paper on the bubbled area and rub a hot iron over the area for 2-3 minutes. When the wood feels hot and the bubble can be depressed with your thumb, leave the paper on and clamp or set a weight on the area. Don't put a cloth or paper towels between the weight and the bubbles; you need to press the veneer with a hard flat surface.

Heat Gun: Use a heat gun to heat the bubbled area. Use the clamping techniques above to depress the bubbles.

9. Circles, Cutting Small

Cutting circles with a scroll saw is difficult and using a knife isn't any easier.

Use leather punches (5⁄16" to ½") for small holes. Put app tape on the front and back of each piece of veneer. Chuck the punch into a drill press and put a piece of soft wood underneath. Cut equal sized holes in both the inset veneer piece and in the background. If the punch is sharp and the tape is firmly attached, there will be no splitting. No wood is removed from either the inset or from the background therefor when glue is applied (white or yellow PVA) and the marquetry picture is put into a press, the two pieces just flow together.

Note: Harbor Freight and most big box carpentry stores sell sets of hollow leather punches (5⁄16, ¼, ⅛, 5⁄32, 3⁄16 and 7⁄32-in.).

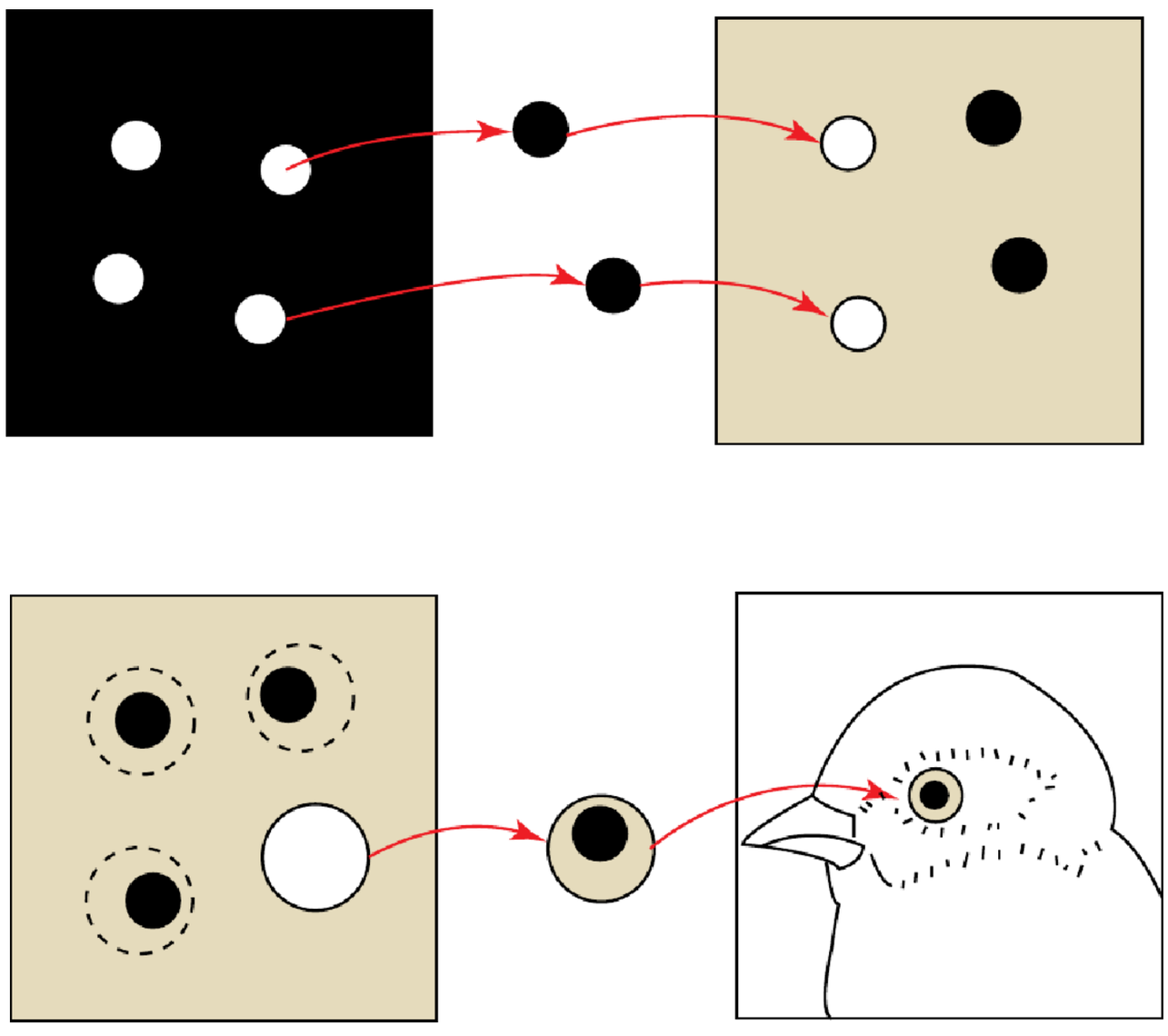


Figure 1. Make an Eye. Glue the black dot into the light-colored background. Cut out an eye and glue it into the Bird's Head.

10. Clamping.

Prepare the marquetry piece by covering the top side with app tape. Have the backer-board slightly over size and always put the PVA glue onto the backer board and not onto the marquetry. Make a package: Bottom board, marquetry piece blue-taped to the backer board, wax paper, paper towel padding and top board.

Place the package in the press and clamp for 30 minutes. Remove the package, take off all tape and scrape off any extruding glue. Reclamp the piece with paper towels for 30 minutes; no wax paper. If the piece feels damp, add new padding and reclamp.

11. Clamping Table

Use a table as a clamping station. Cut 2" x 4" studs to length and cut slots in the ends. Lay the marquetry piece on the table, put the 2" x 4" cauls on top and clamp as needed.

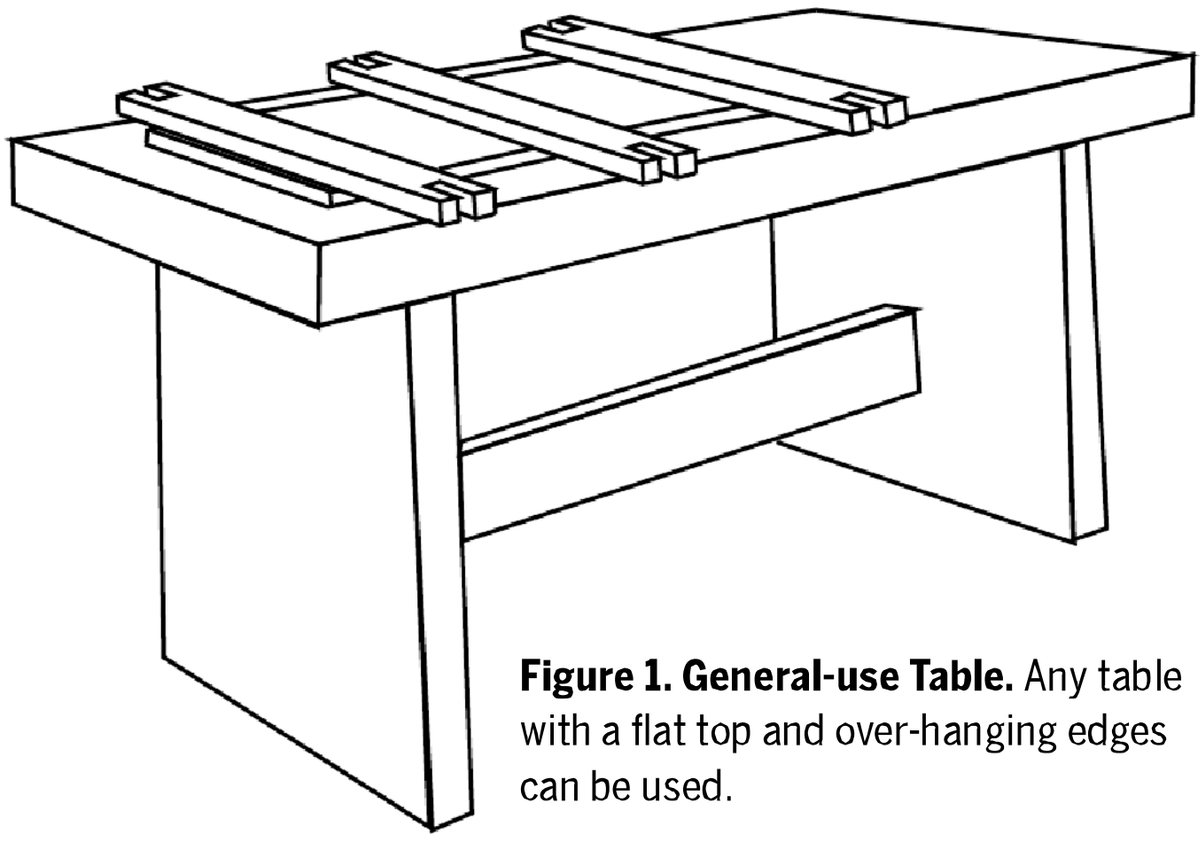


Figure 1. General-use Table. Any table with a flat top and over-hanging edges can be used.

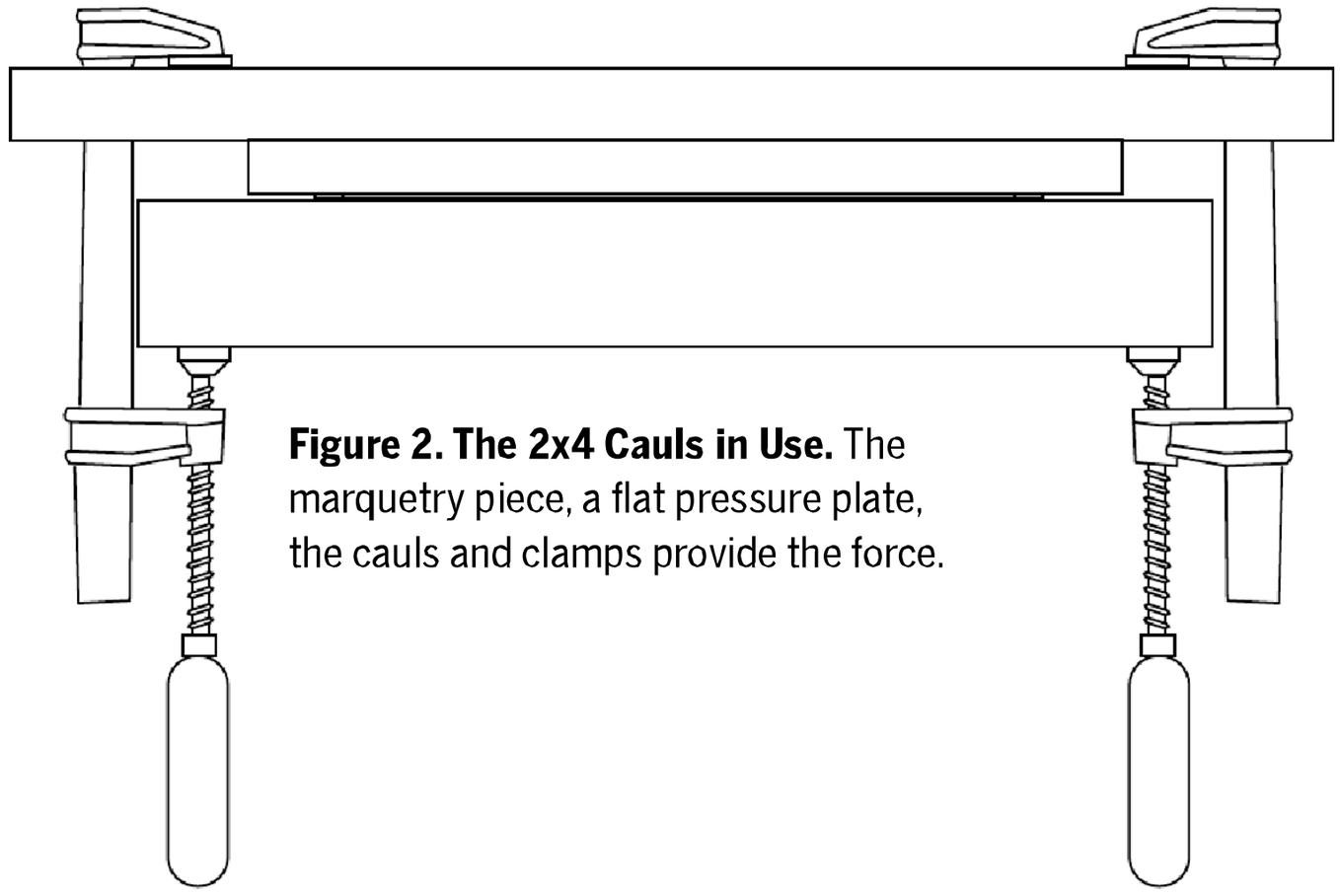


Figure 2. The 2x4 Cauls in Use. The marquetry piece, a flat pressure plate, the cauls and clamps provide the force.

12. Clamping to Curved Forms

There are at least five ways to clamp a marquetry or parquetry piece to a curved form. The easiest is by use of a vacuum system and a plastic bag (1). Sandbags (2) have been used for hundreds of years and this is still a good choice. Band clamps (3) using the newer nylon straps do a good job. Rubber strips(4) wound around the form is a cheap and effective way. Using cauls and band or screw clamps (5) is perhaps the most time consuming as the caul must be made beforehand.

Vacuum Bags: See Concepts 'Clamp, Vacuum Press' for a full discussion on vacuum pressing.

Sandbags: Tape the marquetry piece to the form, tape a piece of light cardboard over the marquetry, lay it all on a flat surface and use sandbags to apply pressure.

Band Clamps: Tape the marquetry to the form, cover with light cardboard and use nylon band clamps to apply pressure.

Rubber Bands: Rubber strips from tire inner tubes can be wound around a curved surface and exert tremendous pressure. Or use rubber tubing from home supply stores.

Cauls: Use the band saw to cut cauls the same radius as the substrate. Tape the marquetry to the wood form, add a piece of card board and use cauls and clamps for pressure.

13. Clamping, Screw Press

A simple but effective press can be made using four 2 x 4's and a long screw. Make two of these units and stretch a backer board between the two to press larger units.

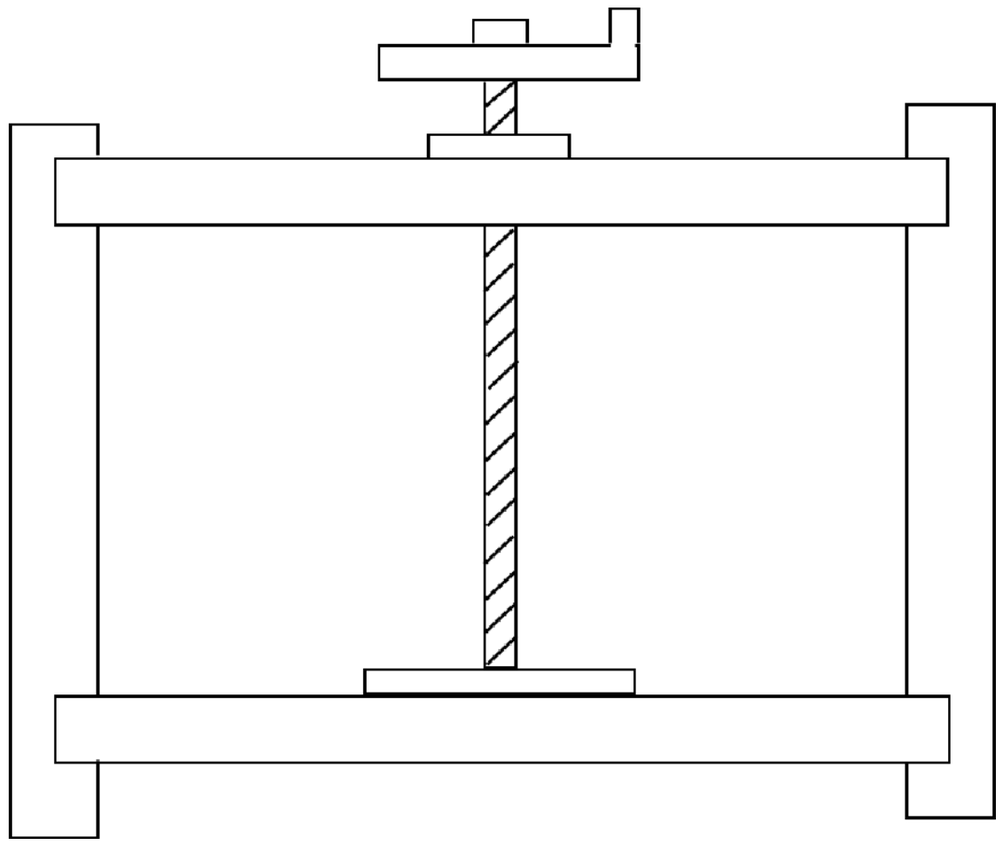


Figure 1. A 9" or 12" screw is fitted to the 2 x 4 frame; dado the cross pieces into the uprights for maximum strength.

14. Clamps, Vacuum Presses

For normal pressing, most marquetarians use hand clamps. These are fine as long as the piece is flat. In the Projects Section of this book, there are items that are not flat; the Portrait Book Ends, Wine Cooler, Curved Cup and the Domed Box. These projects require special clamping treatments.

A vacuum press consists of an electric pump connected by a tube to a plastic bag. The piece to be pressed is placed in the bag, the end is sealed and the vacuum pump is switched on. The air in the bag is drawn out to create a partial vacuum. The top of the bag conforms to the shape of the marquetry piece and applies equal pressure across the whole surface.

Atmospheric pressure at sea level is about 15 PSI. Theoretically, this means 2160 pounds of pressure can be exerted on a 12" x 12" piece (12 x 12 x 15 = 2160). This is over a ton of weight on the one square foot area.

PVA glues are water-based and part of the drying/setting process is water evaporation. The vacuum system draws water from the pieces and speeds up the glue-set.

15. Blade, Tablesaw Set

An exact setting is necessary for some projects. Use a Digital Angle Gauge ($30, 2013). This small (2-in. square and 1-in. thick) gauge has a magnet on the bottom and so attaches to the saw table top and to the blade.

Place the gauge on the saw table and push 'Zero'; the digits now read '0.00'. Attach the gauge to the blade and make the fine adjustments necessary. After use, remove the little disc battery to extend its useful life.

16. Double Bevel Cutting

This is a procedure where two pieces of veneer are fastened together and the design is cut out with the blade at an angle to the veneer. One of the cut sections is then discarded and the other section is placed into the background and the cutting continues. The incoming veneer may be placed on top of the background veneer or underneath and while the beveled angle is the same in both instances, the cutter must go clockwise or counter clockwise around the pattern.

The beginner is continually confounded by the problem of which direction to cut. Picture cutting a tapered plug to be inserted into a conical hole in the background; the plug can be inserted from the top or from the bottom. Only one cut direction will give the required tapered plug.

Note: A formula for calculating this angle and a table of tilt angles can be found on page 132 of *More Woodworkers' Essential—Facts, Formulas & Shortcuts*, Cambium Press, 2006 by Ken Horner.

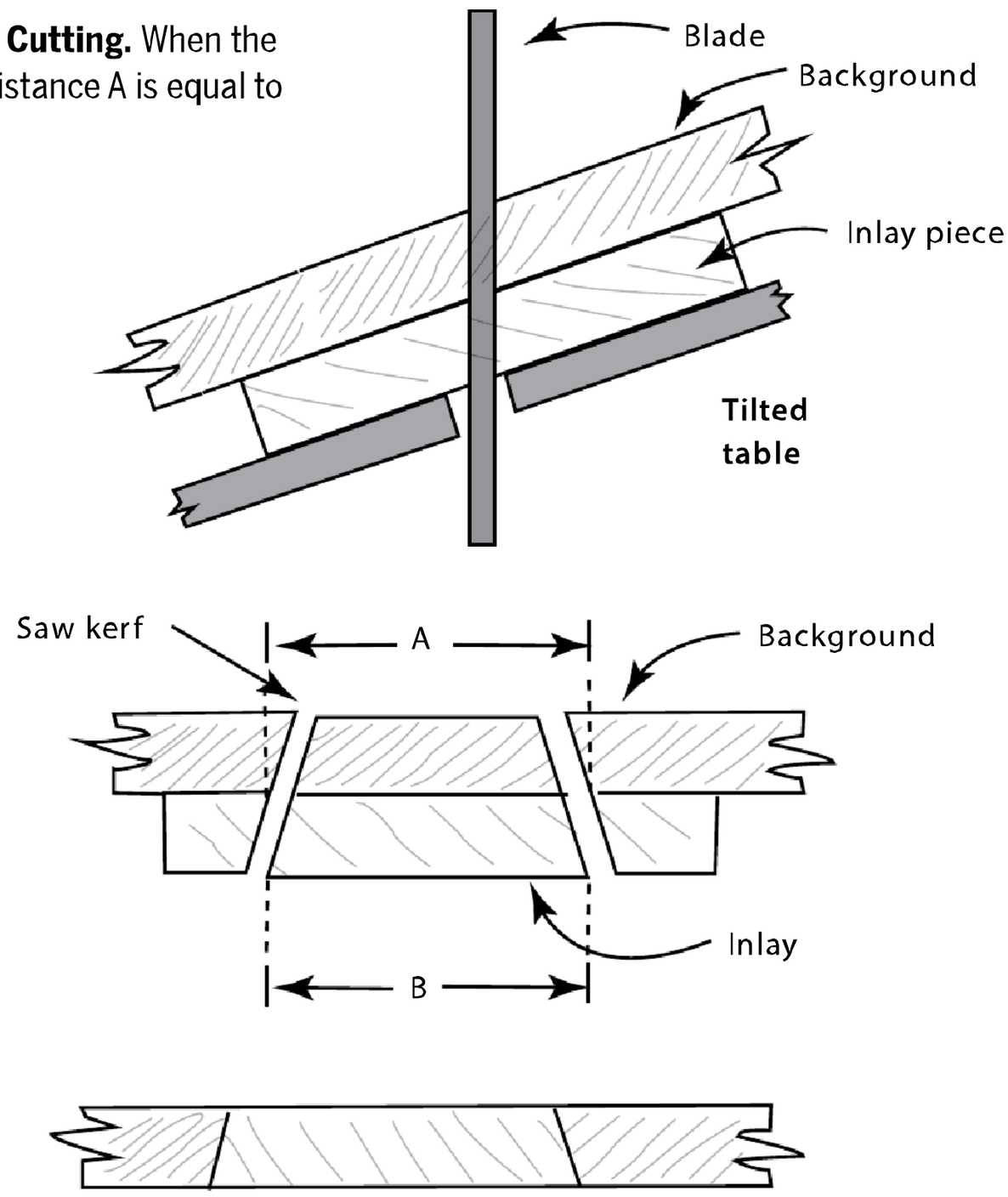


Figure 1. Double Bevel Cutting. When the correct angle is used, distance A is equal to distance B.

Which Way to Cut?

Table Angled Down to the Right	New Piece Inserted from Below	Cut Counter Clockwise
Table Angled Down to the Right	New Piece Inserted from Above	Cut Clockwise
Table Angled Down to the Left	New Piece Inserted from Below	Cut Clockwise
Table Angled Down to the Left	New Piece Inserted from Above	Cut Counter Clockwise

17. Bevel or Pad Cutting

Marquetry made by 'bevel cutting' has very tight joints but only one piece of the final picture is cut at a time. Perfect fit, but slow.

In the 'pad method', all the pieces of veneer are placed in a pad, the blade is set at 90° (no tilt) and all of the pieces are cut at one time. The disadvantage is that there are spaces left between the pieces; the advantage is it is relatively fast. Also, by putting more than one veneer for a particular piece of the picture into the pad, you may later pick the veneer piece with the best color or grain arrangement.

Which method is best? Bevel cutting allows one to look at the picture as it develops and to choose veneers for the next portion according to color, grain pattern and grain direction. Sand shading can be done as the picture develops thus helping to choose the next veneer. This method also uses less of a special or rare veneer.

Pad cutting is fast and by pushing colored fillers into the back of the marquetry before gluing, the spaces left by the saw blade kerf can become almost invisible. At times the filler outlines are needed when the incoming veneer and the background veneer are similar in color.

Often a combination of bevel and pad cutting are used in the same picture as when veins of leaves need to be emphasized. The veins in each petal are cut at 90° and then the outer parts of the petals are cut beveled. Later dark filler is used in the veins.

18. Ebonizing Wood

A black frame around a piece of marquetry draws attention to the light colored veneers within, that otherwise might seem dull and drab. In the Crazy Chessboard project the outer frame is ½-in. wide x ¼-in. thick. Cut black walnut pieces to size and treat them with a solution made of common household items. The result is quite satisfactory.

Fill a pint jar about three-quarters full with household vinegar (5% Acetic Acid). Add a piece of steel wool. Make sure the steel wool is not a kitchen cleaner type of cleaning pad. Put the lid on the jar and set it in a warm place for about 24 hours.

In use, have the walnut frame already made, but with no finish. Use a foam brush and paint the iron acetate solution onto the surface. Wait until it dries and sand lightly. If you want a deeper black, put on more solution and sand again. Finally, seal with polyurethane.

19. Fillers

Fillers are used to fill little gaps and to emphasize a line in the marquetry picture.

Sawdust and Glue: This is one of the oldest and still a good choice. Mix beforehand or as you sand, stop and wipe a little glue into the crack. Used regularly to fill and even out the marquetry back side.

Water Based: These are sold in many colors, but they dry out and become useless in a short time. Reconstituting with water doesn't work.

Oil Based: These fillers work quite well. They do not dry out as fast as the water-based filler, however, they cost more.

Home Made: Make your own filler as needed. Buy wood putty plus small tubes of acrylic paint; brown, red, yellow and black. You can match any wood from Holly and pine (light colored), cherry (reddish brown) to walnut and ebony (dark brown and black). Do repairs from the back. Working from the front, first seal the surrounding area with shellac. Keep the filler area localized and remove all slop-over immediately.

20. Finishes

Wood projects need a finish for protection from moisture, dust, dirty and oily hands, spilled water and from UV light. Many finishes do one or two of the above however none do them all. The most injurious to marquetry is UV rays and there is no finish that completely protects a piece from the ravages of the sun. The best you can do is to keep the piece away from direct sunlight.

Shellac: Shellac will not stand up to water or alcohol but is great as a first coat sealer. When a piece comes out of the clamps, use a cabinet scraper to remove high spots and glue build up. Then wipe on a saturated solution of shellac. Let it dry for 10 minutes and wipe on a second coat. As you sand, the dark sawdust will not contaminate the light-colored woods. Always use a vacuum with the sander.

Polyurethane: This man-made polymer is easy to use, dries quickly, does not darken the veneer and is waterproof. It is readily available, fairly inexpensive, has no bad odors and comes in a thinned, wipe-on form. This is the best over-all finish (IMHO).

Oil: Any finish that contains oil (Tung, linseed or mineral oil) darkens the wood. We marquetarians spend a lot of time choosing veneers for a project. The last thing we want is for a finish to indiscriminately darken ALL the veneers.

Lacquer: This is the finish of choice for a lot of people. It comes as a spray (Deft) or in a can as a liquid. It goes on easy, multiple coats can be applied fifteen minutes apart and it comes in glossy or satin finishes. Use it on pictures or any wall hangings but beware; lacquer has one bad trait. It does not stand up to moisture and it shows water spots. Tissue boxes near a sink, coasters and table tops—all will be spotted.

21. Glue & How It Works

Before building a box, a tray or a magazine rack, understand how glue works.

Carpenter's Glue—Yellow or White. Make sure all surfaces are straight, sound and square; they should also be free of saw and jointer marks. Rework any glazed or burnished edges. Spread glue on both pieces and if any board looks dry, add more glue. Clamp the boards together and squeeze out the excess glue.

Contact Cement. Used mainly for veneer-to-substrate bonding. Brush the solvent-based cement on both surfaces and let dry. If the surfaces are not glossy, brush on a second coat. Lay the veneer face up, put a piece of wax paper on top and position the base on top. Slide the wax paper from between the two pieces until about one-half inch of glued surface shows. Press these two glued surfaces together. If the positioning is correct, pull the paper out and push the surfaces together.

Gorilla Glue, Epoxy and Cyano Acetate. These are for fastening metals to wood.

For more about adhesives and glues, see *Woodworkers' Essential—Facts, Formulas & Short-Cuts*. Cambium Press, 2003, p. 261. All about Glues.

22. Grain, Continuous on Box Sides

For a box to look nice, the grain pattern on the sides and ends should match.

Three Corners Match: Mark the board as shown (1, 2-2, 3-3, 4-4, 1) and cut miters as in Figure 1.

Four Corners Match: Resaw a board and cut as in Figure 2.

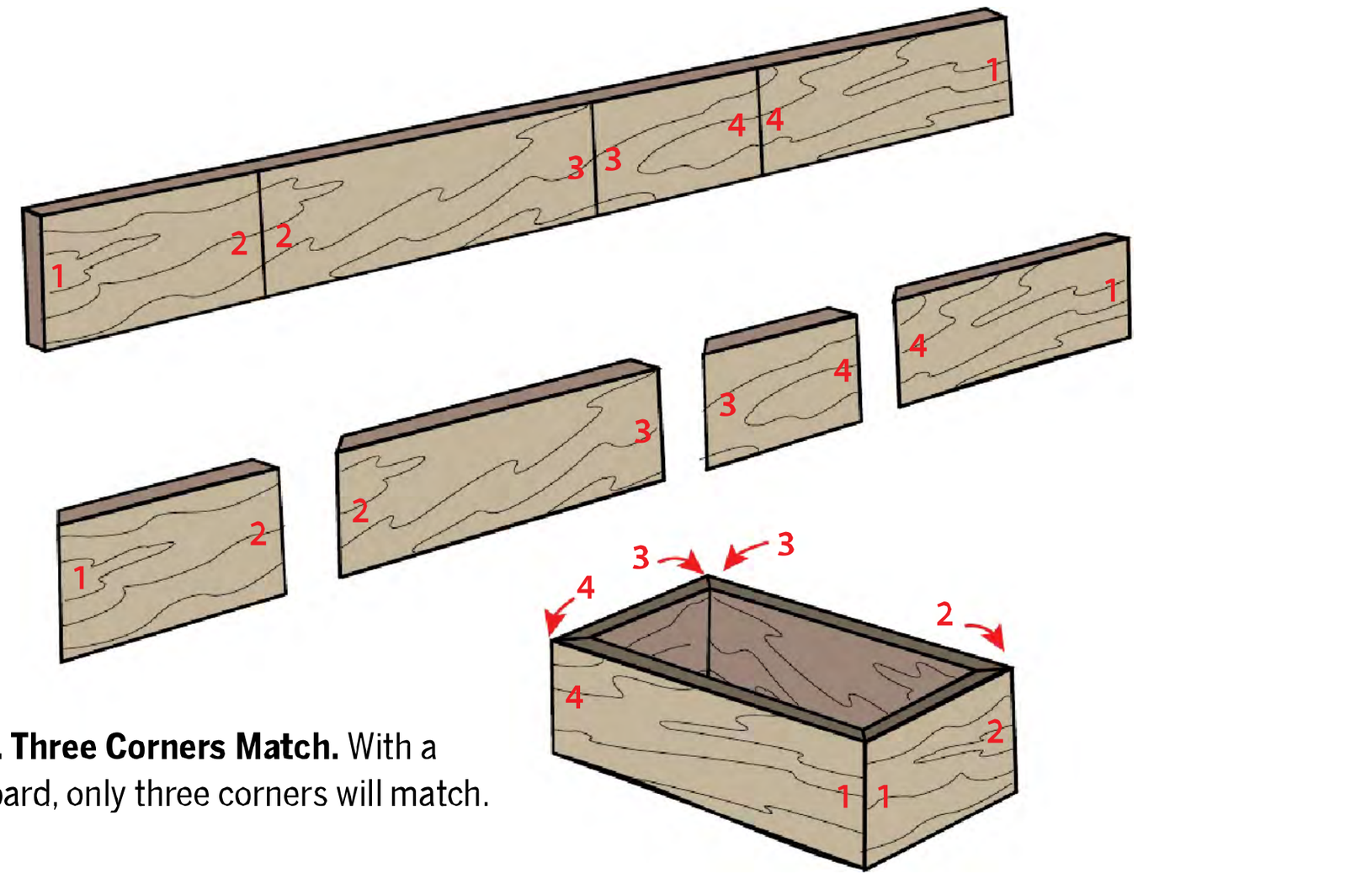


Figure 1. Three Corners Match. With a single board, only three corners will match.

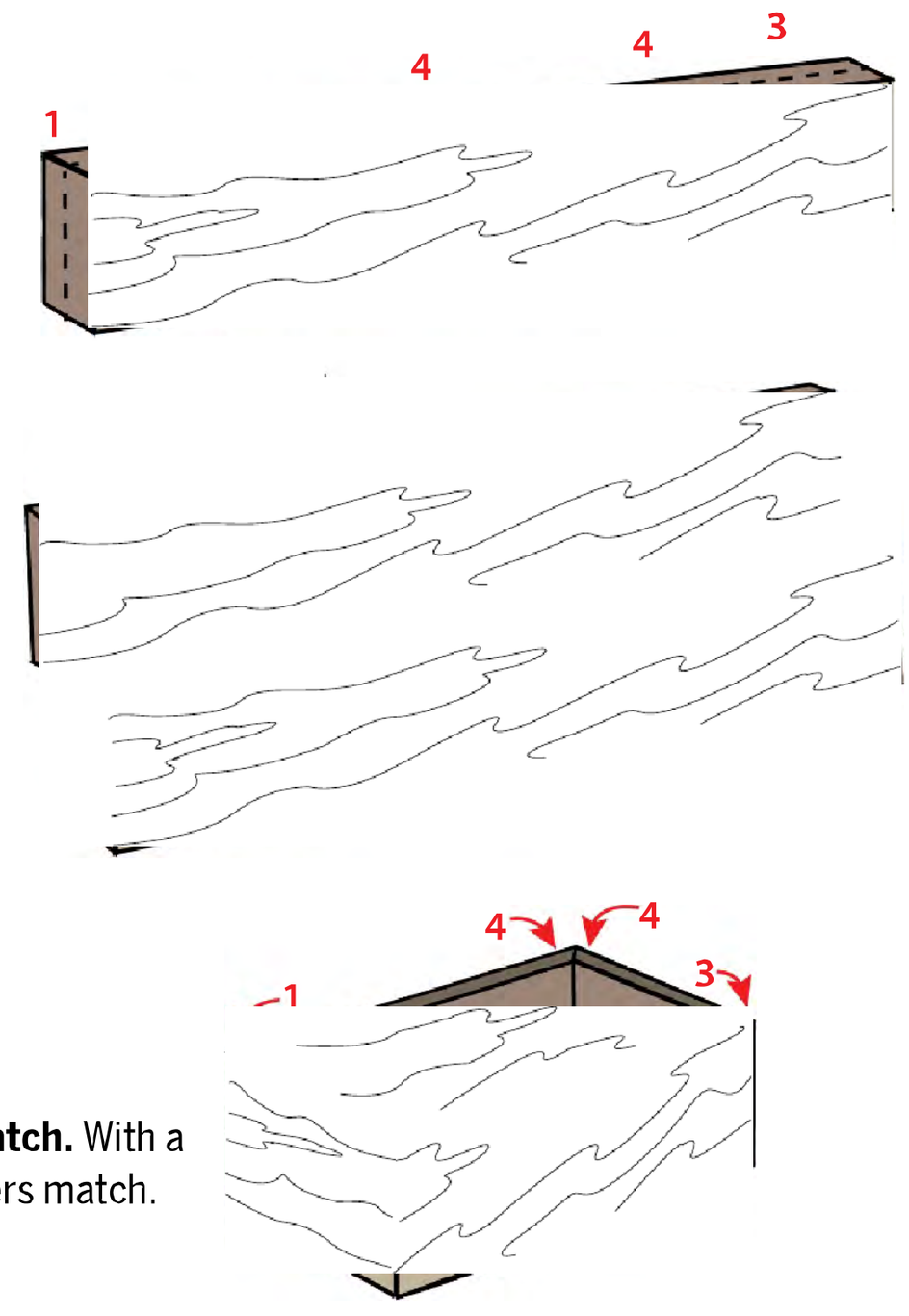


Figure 2. Four Corners Match. With a thicker board all four corners match.

23. Hangers

Pictures either sit on a shelf or hang on a wall. The different hanger options depend on the size of the picture, the weight and the type of wall. Pictures that hang should have felt or rubber bumpers on the bottom of the frame.

Knot and Hole: Thread twine through a small strip of wood, tie a knot and glue the knot and the strip down. See Figure 1.

Heavy Picture: To keep a frame from coming apart (the bottom dropping away), use a harness type hanger. Put two eye hooks on the bottom of the frame and one eye-hook on each of the side pieces. Tie the wire to one of the bottom eye hooks and thread it through one side hook, over to the other side hook and finally tie the wire end off at the other bottom hook. This arrangement pulls the bottom of the frame up, pulls both sides of the frame in and assures that the frame will stay together. See Figure 2.

Peg and String: Put a little yellow PVA glue in the hole, stretch the end of the string across and tap in a dowel. After 15 minutes, cut the dowel off even with the surface. See Figure 3.

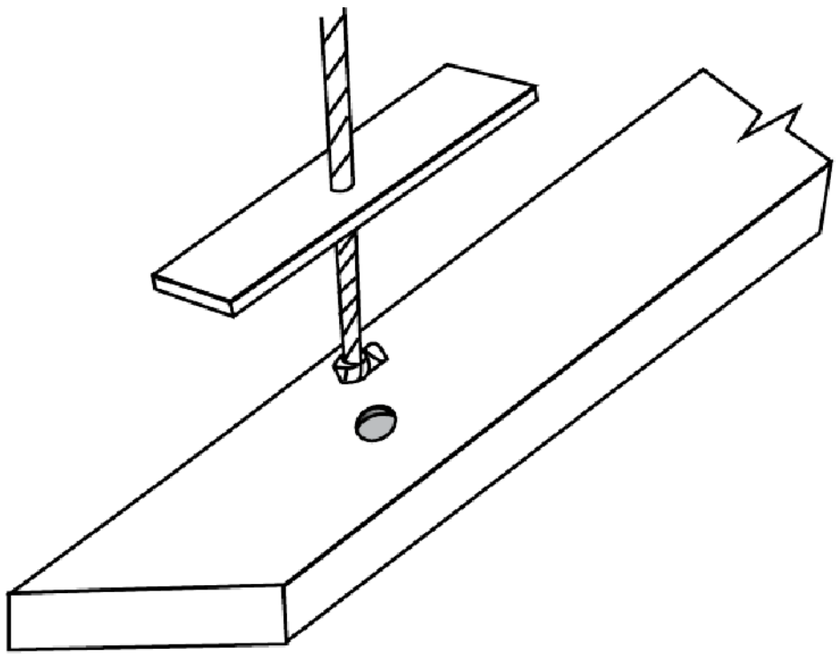


Figure 1. Knot and Hole. The picture lays flat on the wall and is very strong.

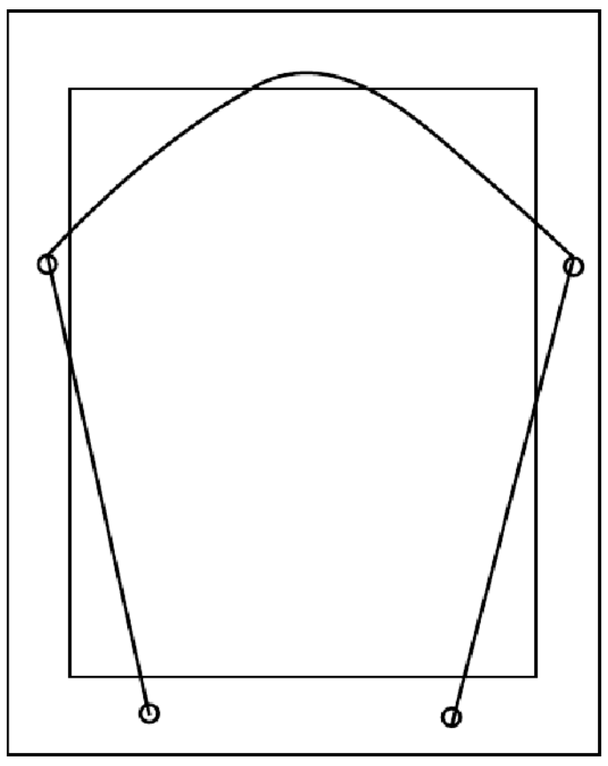


Figure 2. Heavy Picture. This harness-type arrangement pulls the bottom and sides tighter.

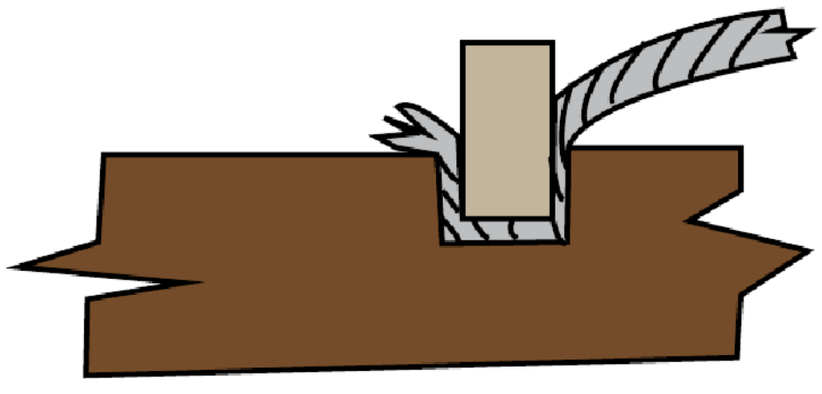


Figure 3. Peg and String. A nice option for hanging.

24. Holes, Drill or Punch.

Some marquetry projects need a blade entry hole, this can be drilled or punched.

Drill: In pad marquetry when 10-20 veneer pieces are in the pack plus app tape and blue tape, one must drill the hole. If there are only two or three veneers in the pack, the hole can be punched or drilled. To finish the piece, rub colored filler into the drilled hole.

Punch: In double bevel marquetry with only two veneers, it is best to punch the hole. Lay the taped up piece on a rubber mat, push a pin through and wiggle it a little. A permanent set-up is a piece of sharpened dental tool or small nail chucked into a small drill press.

Most of the projects in this book suggest use of yellow or white carpenter's glue. This PVA glue is water-based and swells the wood fibers, thus closing small gaps and holes. A small punched hole becomes invisible.

25. Jig, Circle on Disc Sander

An easy way to make wooden circles is to cut the rough shape on a band saw and then to use a disc sander to get the perfect circle. See Figure 1.

Make the Sander Table: Cut a plywood piece to size, about 12" x 12", and attach a slide underneath that will fit in the sander miter gauge slot. Cut a groove in the plywood that runs towards the sanding disk. Cut a slat (1" wide x 14" long) so it slides in the plywood groove. Drill a hole in the slat near one end to take a ¼" dowel.

In Use: Drill a ¼" hole in the center of the work piece and mount it on the dowel. Clamp a 'stop' on the slat and rotate the disc by hand. Move the table left and right and push the work piece towards the sanding disc.

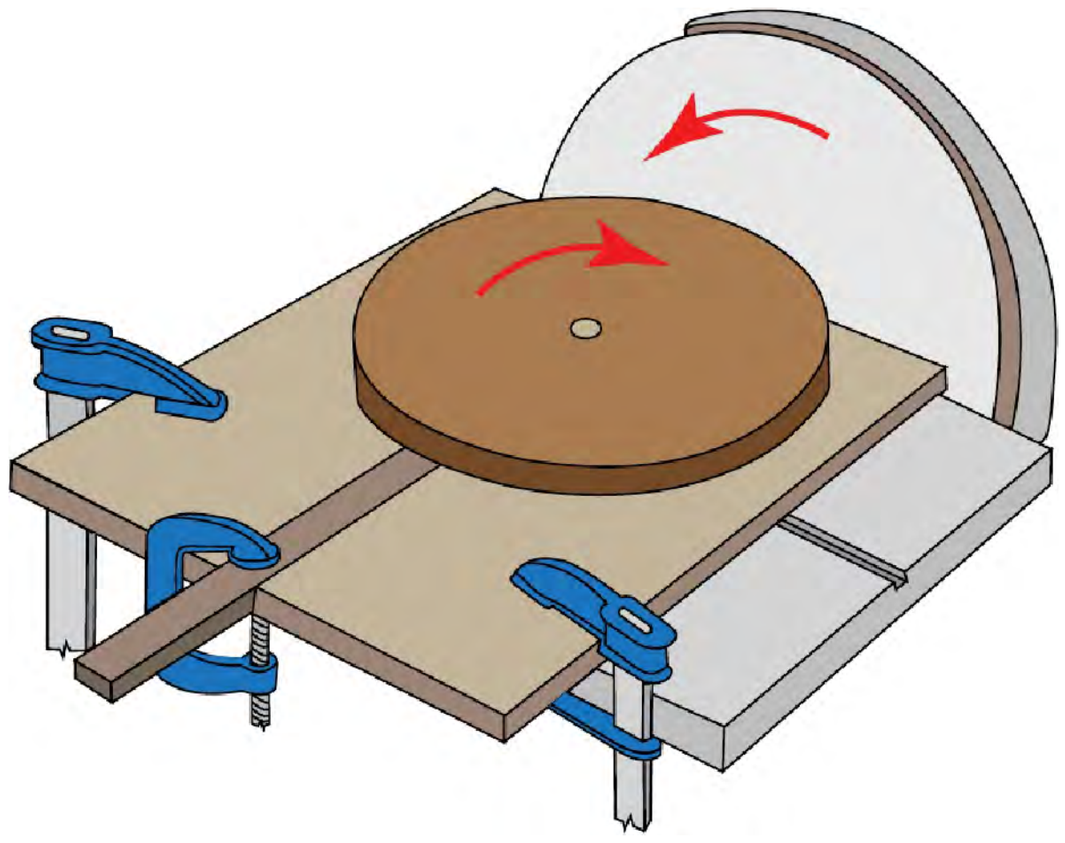


Figure 1. The Jig in Use. Rotate the piece against the disc until a circle is achieved.

26. Jig, Positioning Board

Fasten the two ends of a piece of hard poster-board 12" long by 4" wide. Cut a notch in the other end. See Figure 1.

To use, put the incoming piece of veneer in place on top of the background. Hold the Positioner in place, turn the background over and position the veneer piece back in the notch and tape it in place.

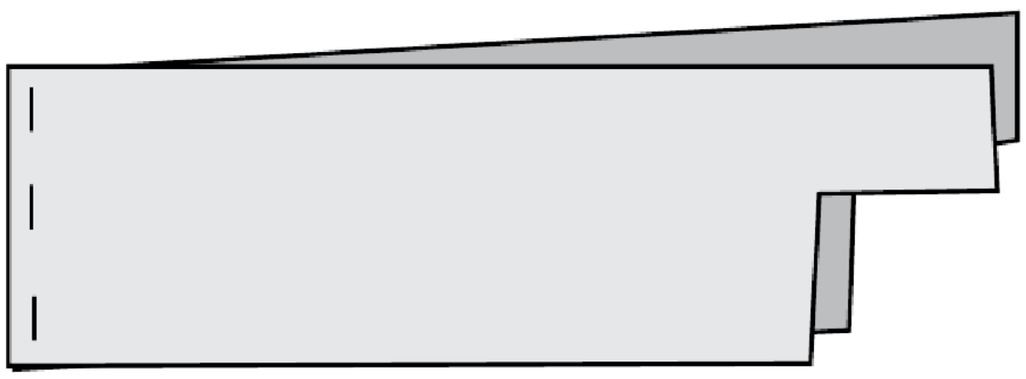


Figure 1. Use poster board or plastic.

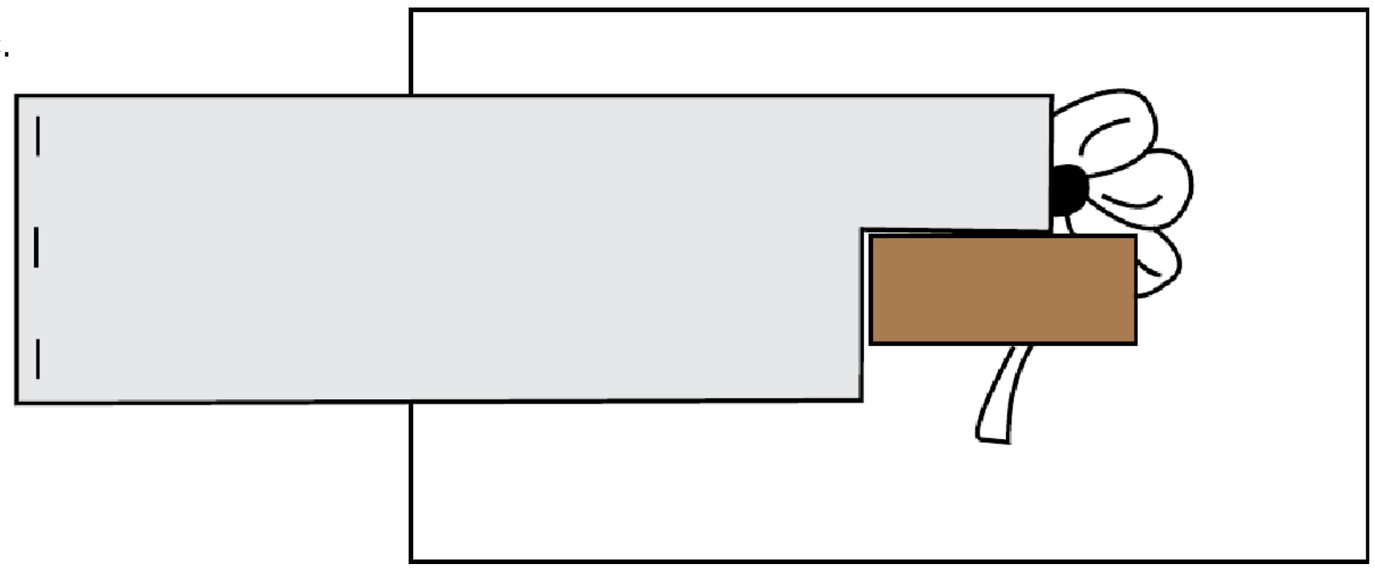


Figure 2. Position the board next to the veneer, keep it in place, turn the background over and reposition the veneer piece to the back side.

27. Joints, Compound Butt:

A compound butt joint can be more complicated than a compound mitered joint. Unlike the mitered joint, a butt joint can have the ends tilted at 15° while the sides are at 20°; this fact makes for complications. See Figure 1.

For a tray with a 20° slope for sides and ends, set the table saw blade to 6.8° and set the miter gauge to 71.2°. Put the miter gauge in the left slot of the table saw and cut four corners. Switch the miter gauge to the right-hand slot and cut the other four corners.

For more on this see *More Woodworkers' Essentials*, by Ken Horner. Compound Butt Joints, Chapter 22.

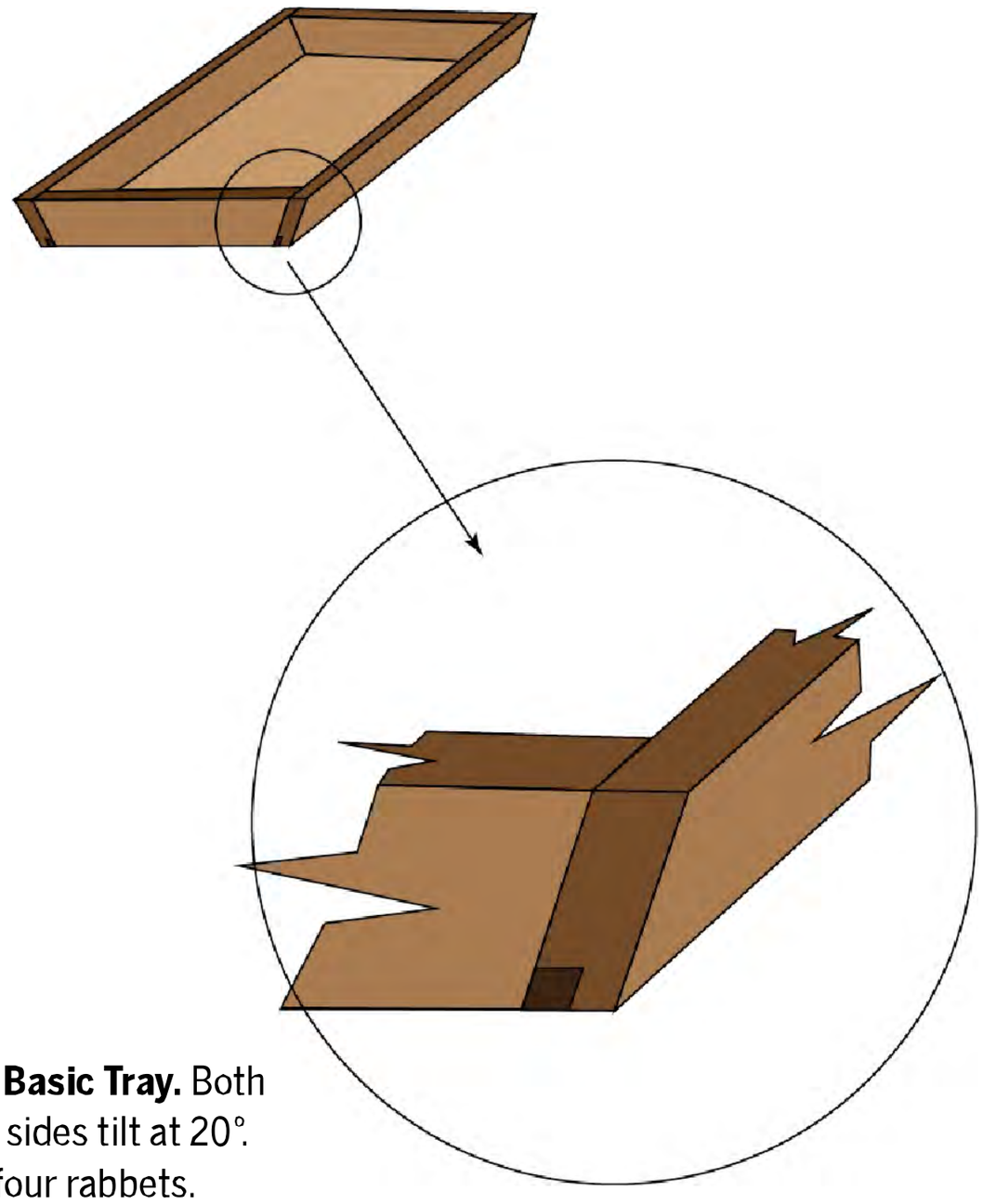


Figure 1. Basic Tray. Both ends and sides tilt at 20°. Plug the four rabbets.

28. Magnet Placement

Put the magnets in correctly and the lid will only fit one way.

- Use CA glue and put one magnet into a body hole; it doesn't matter which hole or which side of the magnet is up.
- Put clear cellophane tape over the magnet, sticky side up.
- Put CA glue into the hole in the Lid that is the mate of this first magnet.
- Drop a magnet onto the sticky clear cellophane tape (it will land correctly).
- Transfer this magnet (tape sticky side down) to the corresponding lid hole that has the CA glue.
- Put CA glue into the other body magnet hole.
- Place a piece of clear cellophane tape on the first body magnet, sticky side up.
- Drop a magnet onto the sticky tape and transfer this magnet to the other body hole; sticky side down.
- Put CA glue into the one remaining lid hole.
- Put clear cellophane tape (sticky side up) on the corresponding body magnet.
- Drop a magnet onto the tape and transfer this last magnet to the one remaining hole.

This procedure insures that the magnets are placed with 'N' and 'S' in the Body and with 'S' and 'N' in the Lid. Now the top cannot be put on incorrectly.

Note: Neodymium rare earth magnets, 3⁄16" x 1⁄16" Disc N42, Ni. 100 count for $26 incl. S&H (2013). www.KJmagnetics.com

29. J-Roller and Brass Brush

Application Tape is used on every project in this book. Its function is to strengthen the veneer and to keep small pieces from breaking off during the cutting. To be effective, the app tape must be affixed tightly to the veneer.

Affix the app tape to the veneer piece and use your fingers to smooth out the tape and push it onto the veneer. Use the J-roller (with black rubber cylinder) and roll it back and forth pushing down hard. Use a large brass brush and rub it back and forth on the tape to push it tightly onto the veneer.

30. Marker, Equidistance

This little gizmo is used in the Free Form Box project.

Cut two pieces of ¼" plywood to 2" x 2" and drill a ¼" hole through the center of one end. Add a threaded screw with flat washer and wing nut. Drill a 5⁄16" hole between the two pieces and glue in a 5⁄16" dowel. Push a pencil stub between the screw and the dowel and tighten the wing nut.

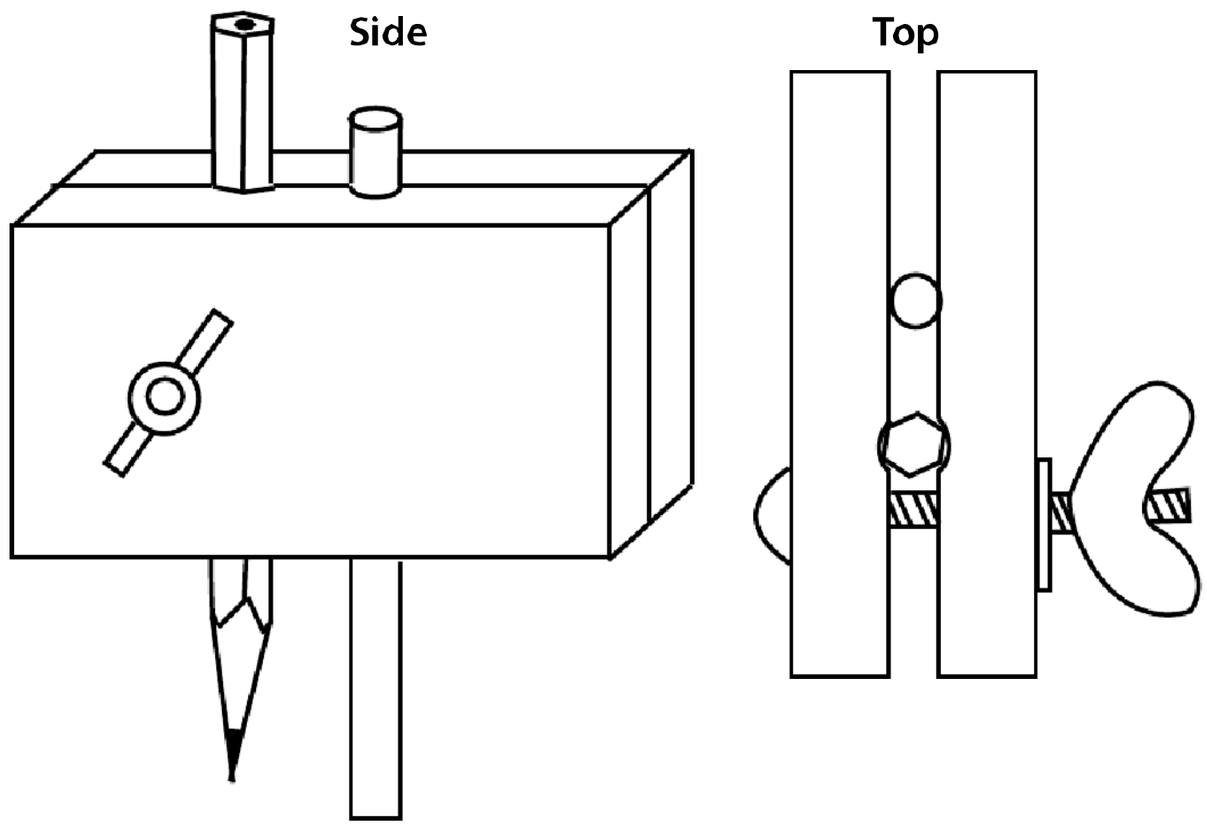


Figure 1. The dowel is fixed; the pencil can be moved.

31. Pattern Sizing

A pattern from a book or a magazine often needs to be resized. Use a home copy machine or scan the original into a computer and resize.

The grid method is old. Draw a grid of ten lines by ten lines on the original pattern. Draw a similar set of grid lines on a blank sheet of paper but make this second set larger or smaller depending on whether you are going to enlarge or reduce. Use a pencil and transfer the pattern lines paying especial attention to where each line crosses each grid.

Use a light projector when great enlargement is needed. Place the pattern under the projector, tape a piece of blank paper to a wall, position the projector to get a clear image and then trace the enlarged pattern with an ink pen.

32. Pin Nailing in Pad Marquetry

In a large pad, it is important that none of the pieces shift. See the Woody Magazine Rack project, Figure 1 for an example.

Use a pin-nail air gun with ¾" or 1" 23-gauge nails. Use a wooden shoe to elevate the gun above the pad so the pins don't go all the way through. See Figure 1.

Put the pad on a piece of carpet (bottom side up) and shoot one pin into the pack. Adjust the height of the shoe so about ¼" of the nail protrudes at the top of the pad and at the bottom. Shoot pins around the cartoon. Keep the pad on the carpet and bend the brads over towards the outer edges of the pack. Turn the pad upside down and pound the nails flat, again forcing them towards the outsides. The bent pins should form a 'C' and not an 'S'.

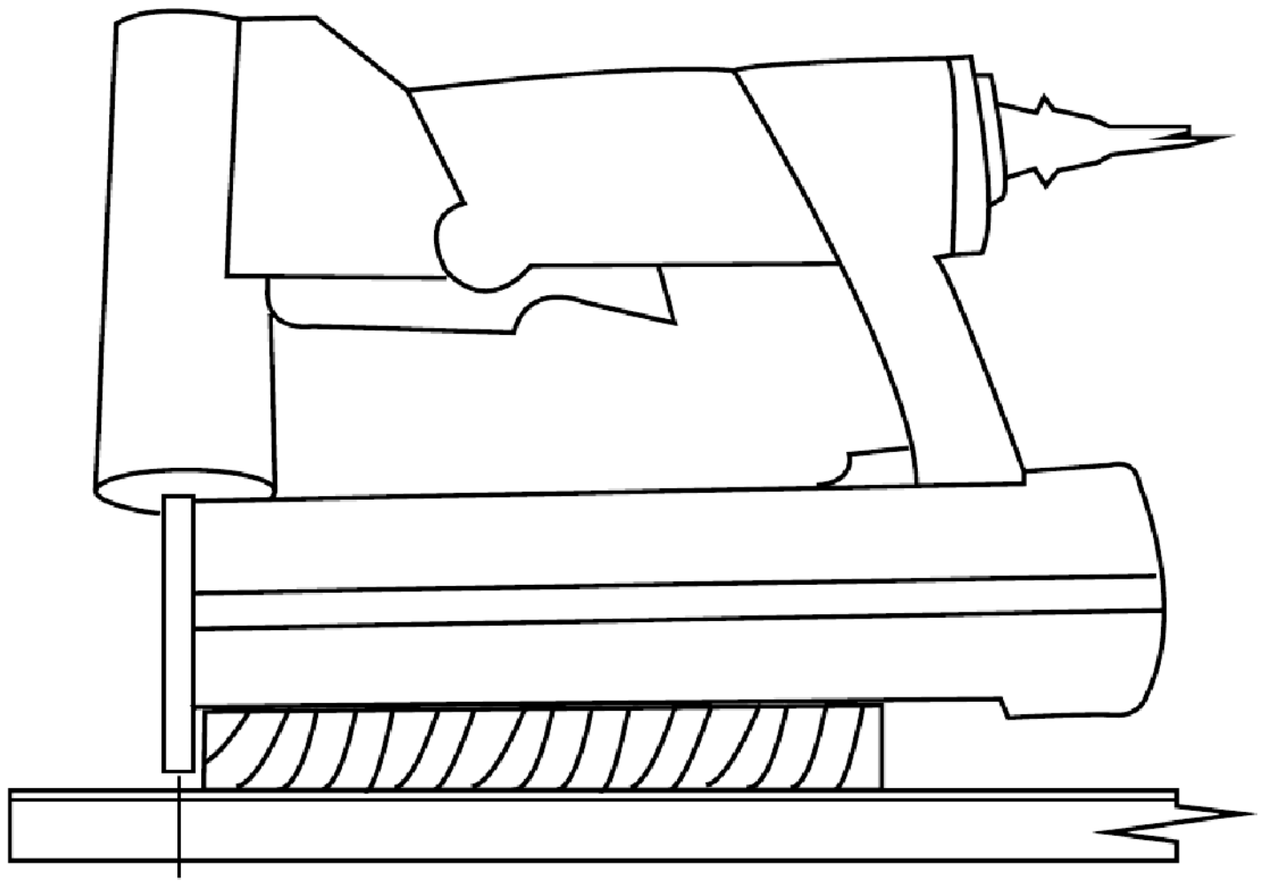


Figure 1. Use a ½" thick piece of plywood (6" long x 2" wide) to hold down the pad and to hold the pin nailer above the marquetry surface.

33. Pipe Anvil

Use in the Shaker Box project to clench the copper tacks.

Make the base with a piece of ¾" plywood 6" wide x 12" long. Drill a 2" diameter hole ¾" deep in the center of a 12" long pi ece of 2" x 3" stock. Cut the stock crosswise in the middle to make two identical pieces. Attach these uprights to the base with 2" screws and fasten a 2 x 4 cleat underneath so the anvil can be held in a wood vise.

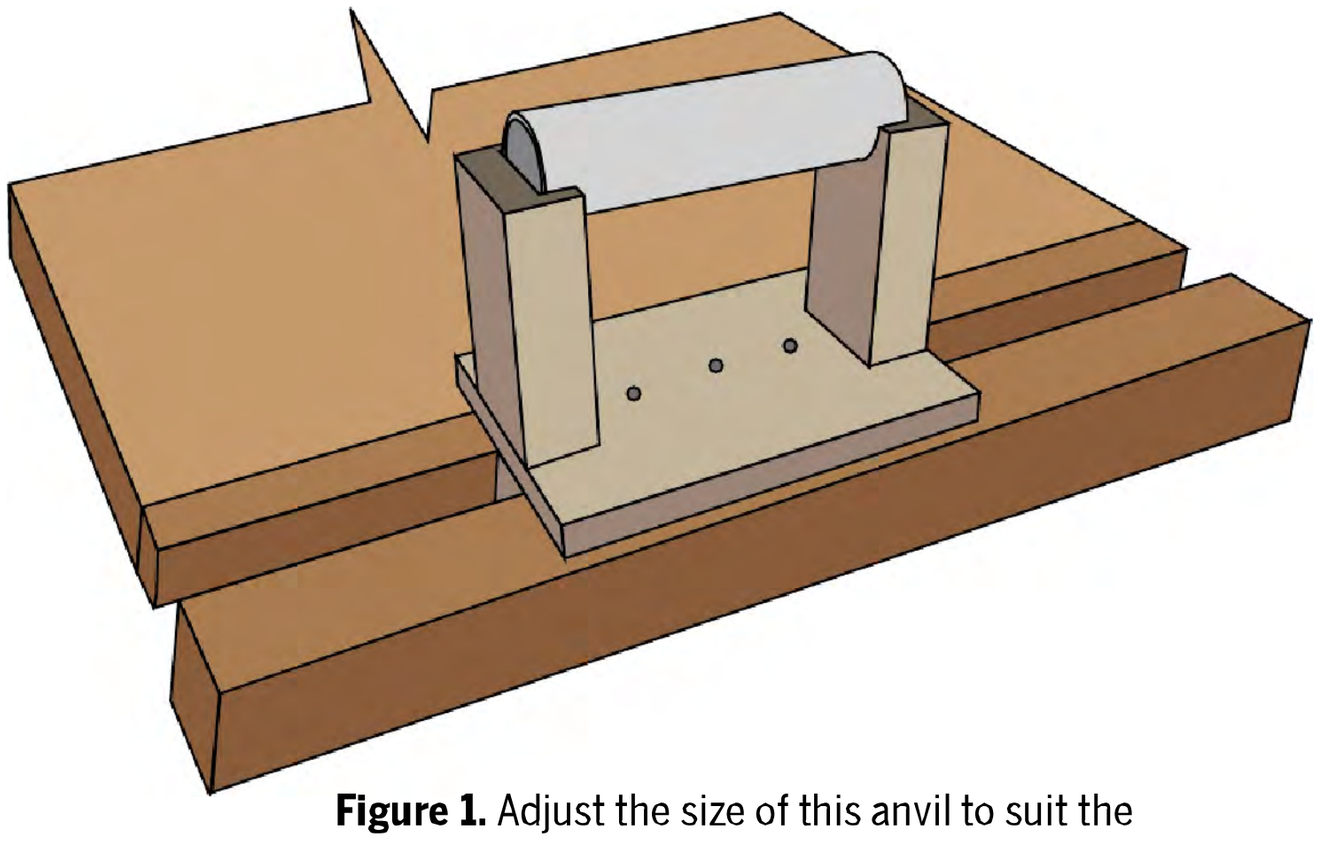


Figure 1. Adjust the size of this anvil to suit the Shaker box you're making.

34. Registration Marks

The 'X' marks on the pattern correspond with 'X' marks on the front and back of the background and are used to realign the pattern with the marquetry as work proceeds.

Put 'X' marks at the top right and top left corner of the background. Place the tracing paper with pattern on the background and transfer the 'X' marks from the background to the tracing paper. Mark 'F' (Front) on the pattern next to each of the 'X' marks.

To mark the back of the Background, use a push pin and make holes through the front 'X' marks. Turn the piece over and make 'X' marks over the pin holes. Mark 'B' (Back) on the pattern.

35. Sand Shading

Sand shading is a technique whereby pieces of veneer are heated in hot sand so the charred portion appears in shadow to give the picture a look of depth and realism. See Figure 1.

Heat the sand in a cast iron skillet; the exact temperature of the sand is vague. Use forceps and grip the piece directly opposite where the shading is to take place. Dip one edge in and quickly pull it out and examine it. Some woods char and darken easily; others require more heat. If the veneer piece curls and shrinks, wet it and let it dry under a weight.

To shade a portion other than on an edge, use a spoon and dribble sand on that part or mask part of the piece with another piece of veneer and add hot sand to the uncovered portion.

Sometimes it is better to sand shade the veneer before the marquetry piece is cut as in Figure 2.

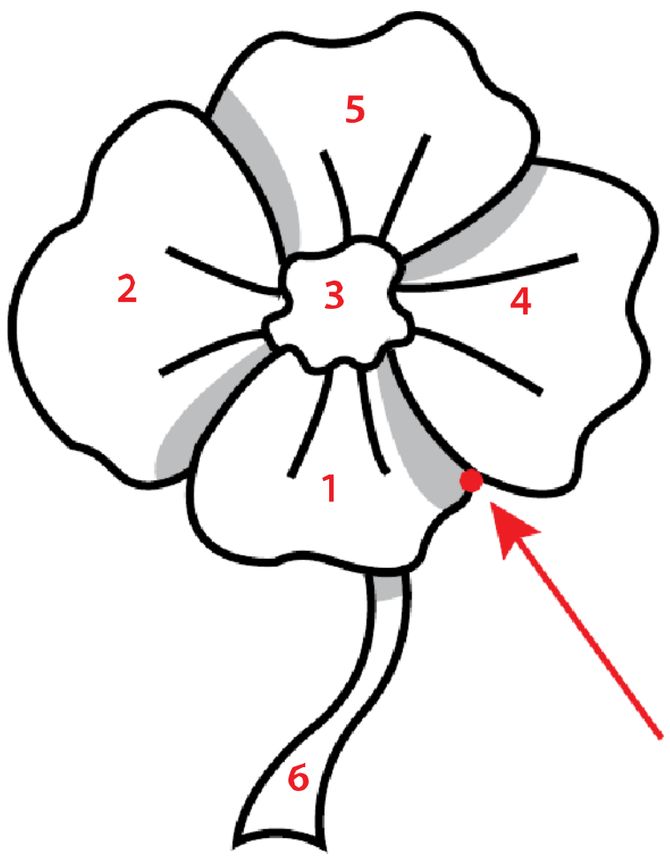


Figure 1. Shade to Show Depth. The under edges of the petals have been shaded to show depth and shadow.

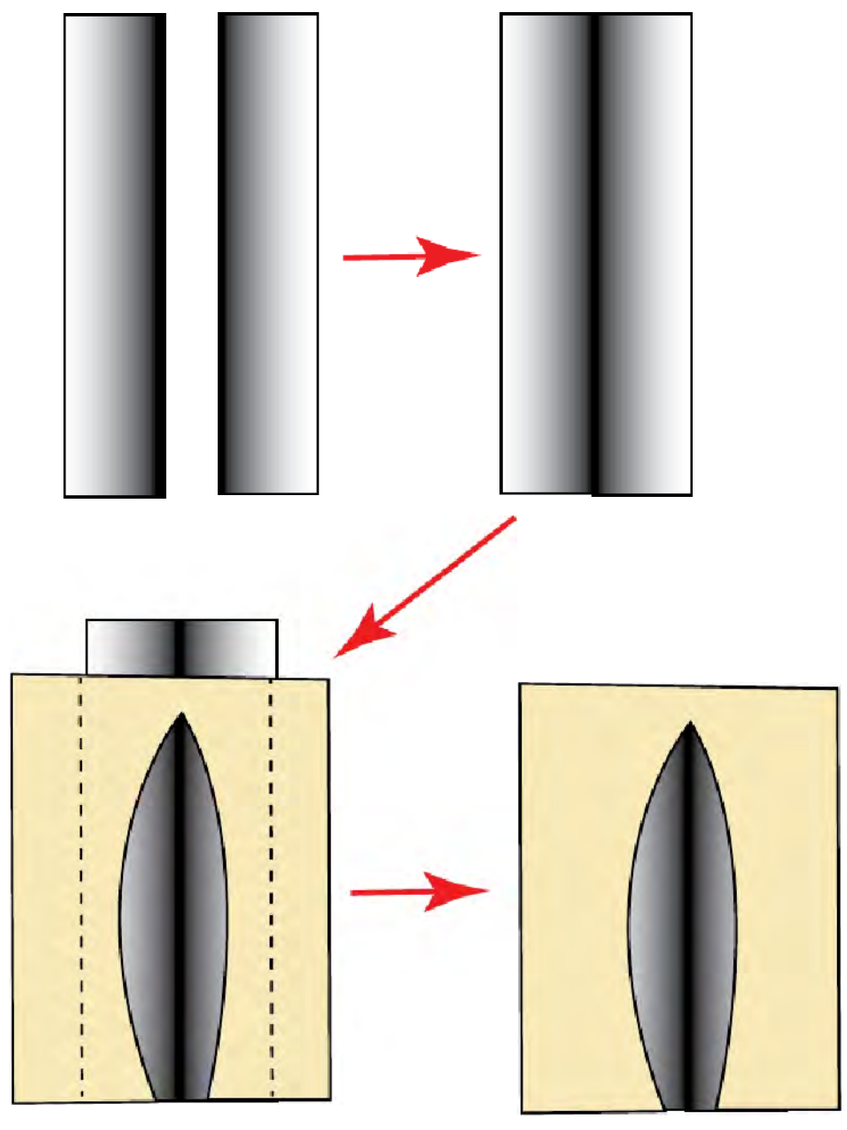


Figure 2. Shade Before Cutting. Two veneer pieces are shaded first, joined together and then cut into the background.

36. Scraping and Sanding

Once a marquetry piece has been cut and glued to a backer board it needs to be made flat and smooth. Before proceeding, seal the surface with shellac.

Scraping: Use a carpenter's cabinet scraper to even out the surface. Carefully pull the scraper across the surface at an angle but still in the direction of the grain of the wood. Apply more shellac and proceed until the surface feels even.

Sanding: Once the surface is even, use sand paper to smooth it. Start with 220 grit held on a firm, flat block. Stop often to inspect and to add more shellac as needed. Proceed to 320 grit to finish. Using an electric sander, keep the sanding pad flat to the surface and use the vacuum accessory to whisk away the dust.

37. Tapes and Their Uses

In every marquetry project a lot of tape is used. Each of the types below has its good points and drawbacks.

Paper Veneer Tape: The old standby is gummed on the back and has holes or not. The tape is torn to length, wetted and rubbed along the joint. It holds well, is easy to see when it is time to remove it and can be removed by wetting and scraping with a hand scraper. If the veneer is thick enough, the paper tape can be sanded off. This tape is not strong and can't be used where strength is needed.

Blue Tape: This tape comes in widths of ¾" to 2". It should not be used as a backer; it holds too tightly. It is used to hold veneer pads together or to secure marquetry pieces to a backer board; in these applications the blue tape is separated from the veneer by app tape.

Masking Tape: This tape comes in a variety of widths also. The most useful is the ¾" width. It has the same good and bad qualities as Blue Tape. Masking tape stretches and can be used to pull joints together when edge-gluing veneers. Both blue and masking tape leave a sticky residue when left on for any length of time, especially if left in the sun or in a warm room.

Clear Cellophane Tape: This tape is tenacious, transparent and is used in ¾" width. In Pad Marquetry it keeps the pieces in place as they are cut. In Bevel Marquetry it holds pieces of a fragile cutting in place as the cut continues. It is sometimes difficult to find and remove from the surface of a piece of marquetry. Rub the marquetry surface with alcohol to expose and loosen this tape.

Application Tape: Auto painters use it extensively in detailing. It is relatively new to marquetarians. It is put on the back and front of a piece of veneer before cutting. It is strong enough to keep small pieces from breaking off and can be removed quite easily. Because of the qualities of app tape, many marquetarians no longer use cardboard backers when cutting. This tape is available online from Sign Warehouse in Texas.

38. Veneer Saw, Tune-Up

Old veneer saws get dull and need sharpening; new saws need to be tuned up. Figure 1.

Alignment: The teeth should have no set. Remove the two screws and lay the blade on a flat surface. Use a whetstone and rub back and forth on both sides until the teeth are even with the rest of the blade.

Sharpen the Teeth: Put the blade in a small vise with about ½" of teeth showing. Use a small triangular file and cut crosswise; one short pull stroke in each valley. Figure 2.

Sharpen the Blade: The saw should be sharp; like a knife with teeth. Determine which side of the blade lays against the guide board in normal use; file the opposite side. Use a flat file and stroke away from the saw at an angle of 20°. Figure 3.

Final Tune-up: Use a whetstone and rub both sides of the teeth area to remove any burrs. Store the saw in a cardboard pouch.

Figure 1

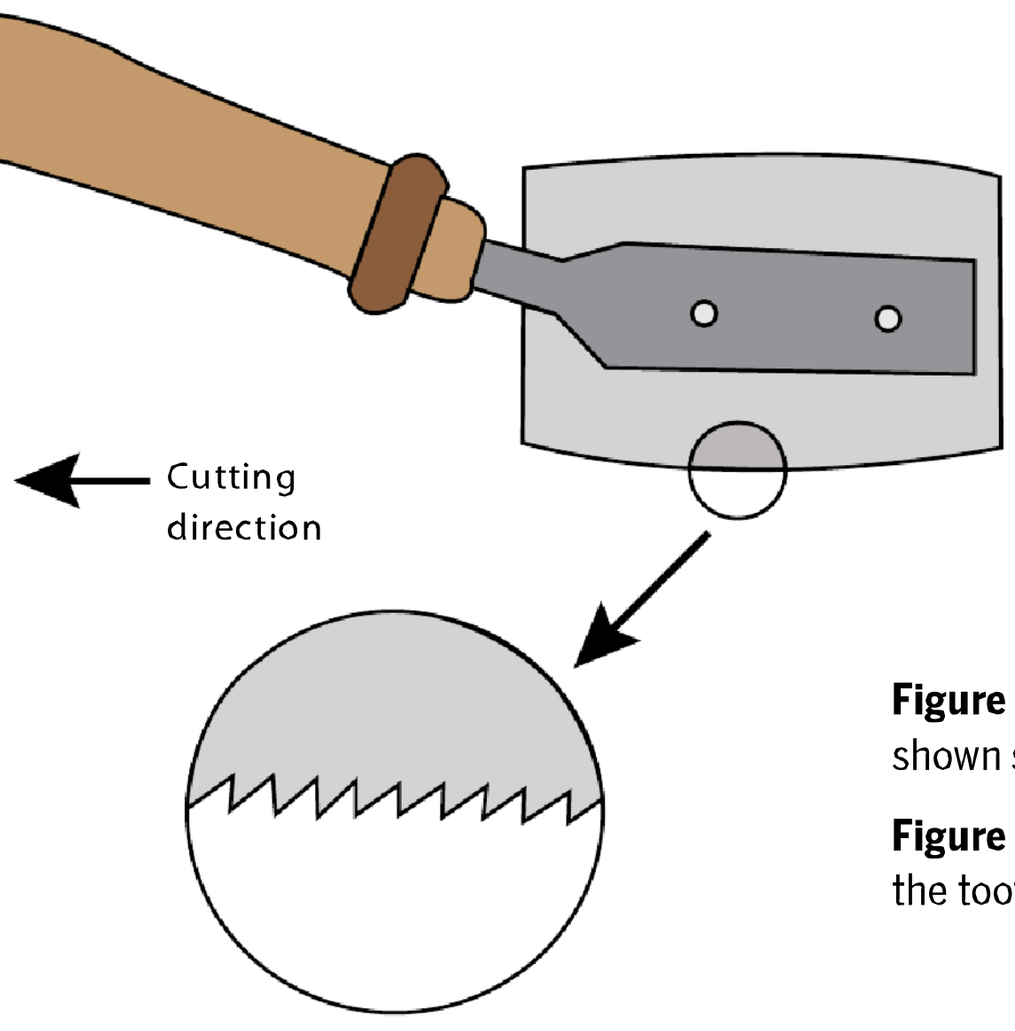


Figure 2

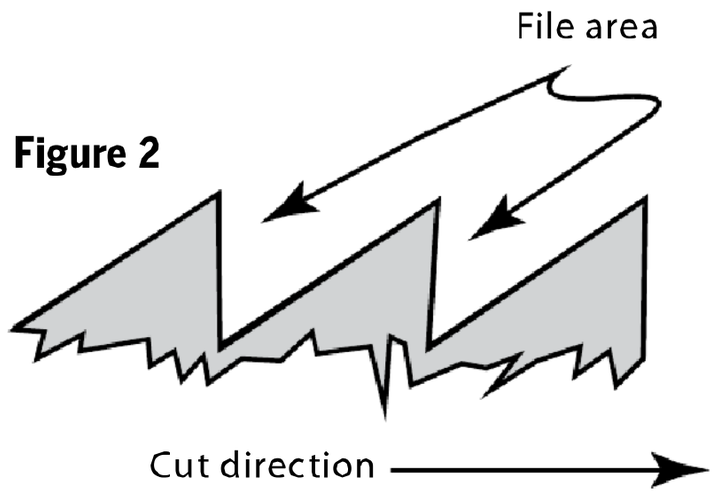


Figure 1. Veneer Saw. Teeth should be raked as shown so the saw cuts on the pull stroke.

Figure 2. Sharpen the Teeth. File straight across the tooth and sharpen the leading edge.

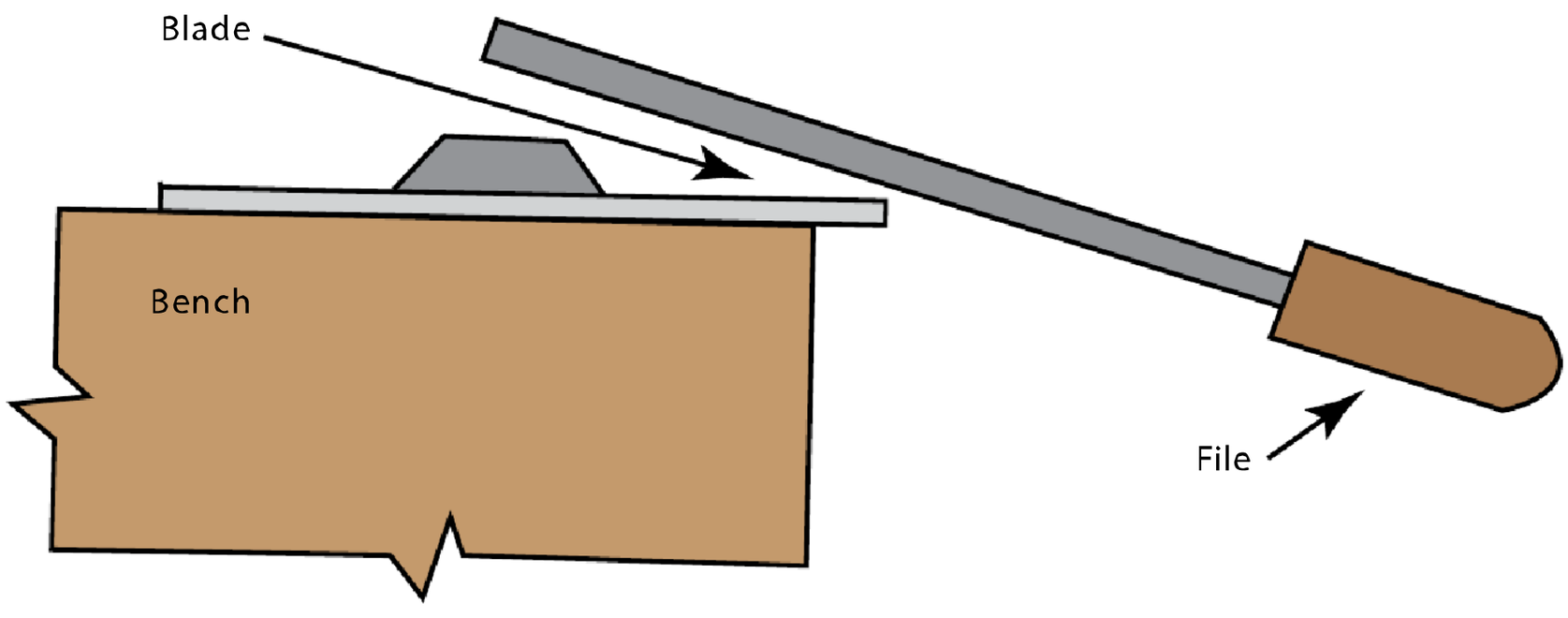


Figure 3. File the Blade. The angle should be about 20° on only one side of the blade.

39. Veneers, Flattening Wild

At times, we all come across a piece of veneer that is pretty much unusable because it's very dry and brittle. Sometimes the unusable veneer may be fairly new but quite wrinkled with lots of valleys and swoops or it's a wild burl with lots of swirls and craters. How do we flatten and tame these wild grains?

Two ingredients are necessary, water and glycerin. Glycerin because of its facility to attract and hold water, i. e. it is hygroscopic, and water to replace the lost moisture. Because glycerin attracts and holds water, as it moves from the surface of a piece of veneer into the interior, it also brings the attached water with it. Loss of water and oil is what makes wood dry, brittle and wrinkled. Treating wood with glycerin-water adds both oil and water back into the fibers.

How To: Mix one ounce of glycerin (about one tablespoon) with one pint of warm water in a canning jar and stir it. As a retired organic chemist having worked in research in both the medicinal and pharmaceutical fields, I'm pretty sure that it is not terribly important whether we mix a little more or a little less of the glycerin in the water.

Lay the veneer out on a piece of plastic and daub the glycerin-water solution onto it. Use a rag and make sure the wood is thoroughly wet on one side then turn the veneer over, you'll usually see water wicking through the fibers from the front. Wet this back side and then wait until the veneer is flexible enough to bend (usually just a few minutes) and put the veneer between two pieces of Masonite. Clamp the package in a wood vise or use a few clamps for about one half hour. Open up the package and wipe the excess water from the wood and from the Masonite. The veneer will be a little cold so warm it to body temperature with a hair dryer. Sandwich the veneer between two pieces of paper hand towels next to the Masonite. Clamp the package again for another half hour then change the paper, warm the veneer once more and reclamp for one hour. Unclamp the veneer and you'll find it is flat and supple. Total time for the process is about two hours. If you are going to use the veneer right away treat it as normal. If you are going to use the veneer later, keep it pressed between boards until ready to use.

Figure 1. Flattening Wild Veneer. This wild Bubinga burl veneer is rough, brittle and has cracks and curls. As such, it is of no use in marquetry.

Figure 2. Wild Veneer Treatment. A solution of glycerin and water is rubbed on the front and the back of the wild veneer.

39. Veneers, Flattening Wild *continued*

You'll find the pieces of treated veneer might twist slightly over time but not enough to treat them again. They will be smoother than the original and fairly pliable. The color might be a little darker which one would expect because oil and water were added. The treated veneer cuts and glues just as a normal untreated veneer does. Some veneers are very fragile and this process will strengthen them by adding some 'body' and making them less likely to break.

Glycerin can be ordered from Rockler and many drug stores sell glycerin.

Figure 3. The Treated Veneer. After treatment, the veneer is smooth and pliable and ready for use in a marquetry project.

40. Transfer Paper

The pattern may be transferred directly onto the veneer or onto app tape. If the tracing is on app tape; the type of transfer paper is immaterial. However, if the image is traced directly onto veneer, don't use common carbon paper that uses a mixture of wax and grease and will stain veneers.

Saral Wax-Free Transfer Paper comes in rolls (12" wide x 12' long) and in sheets (8½" x 11"). It also comes in five colors; white, graphite, yellow, blue and red. Saral is available at most art supply stores. They are waxless, greaseless, smudge proof, erasable on sealed surfaces and won't bleed or run through finishes.

When tracing a pattern onto a dark wood like walnut, the white or yellow paper can be used. The tracings can be erased like a pencil mark, they do not smear and the paper seems to last forever.

41. Zigzag Joinery

Side-to-side joinery usually gives invisible seams. Straight-across, end-to-end joints however give a visible joint. Solution: make a zigzag joint.

Lay the two veneers end-to-end so the colors are similar, Figure 1. Trim the pieces to equal width and put app tape on the back and front of both, Figure 2. Tape the pieces together and draw staggered cut lines; vary both the width and the length, Figure 3.

Place the two veneers on a cutting mat and use a wood chisel and a mallet to cut the lines. Pull the pieces apart and remove the tape, Figure 4. Join the two pieces with app tape and rub white PVA glue into the joints. Wipe off excess glue and sand lightly, Figure 5.

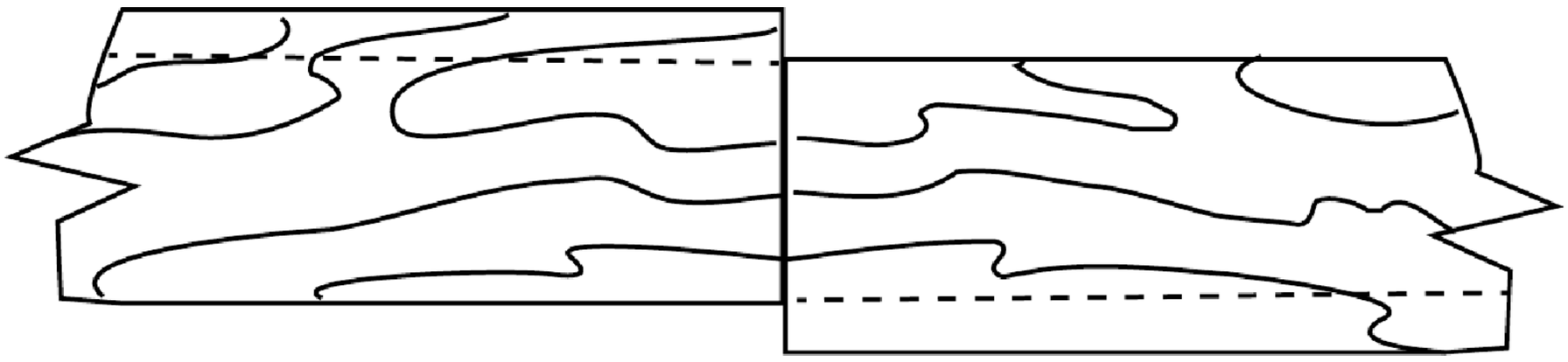


Figure 1. Line up the grain patterns.

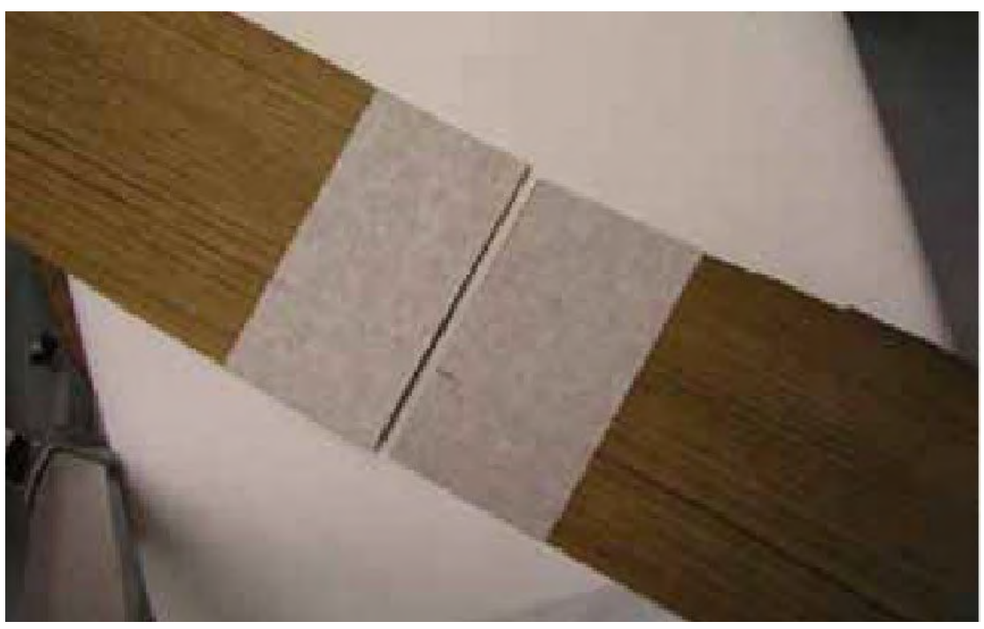


Figure 2. Cut to the same width and tape the ends.

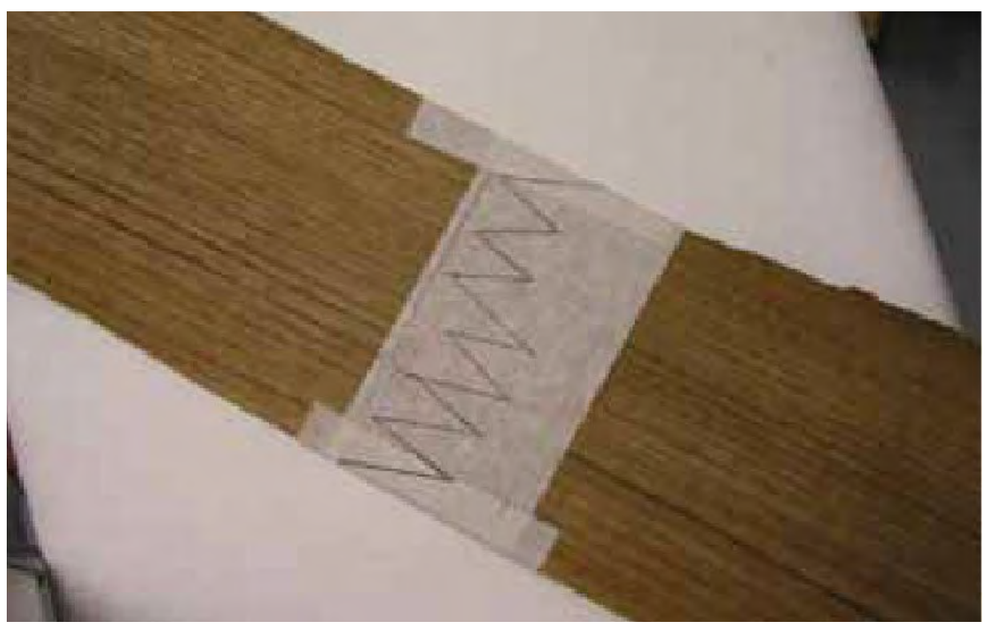


Figure 3. Tape them together and draw staggered joints.

Figure 4. The cuts look good.

Figure 5. The final joint.

42. Square up the Picture

After the marquetry piece has been glued to a backer board, it must be cut to size. A sliding table for the table-saw makes this job easy.

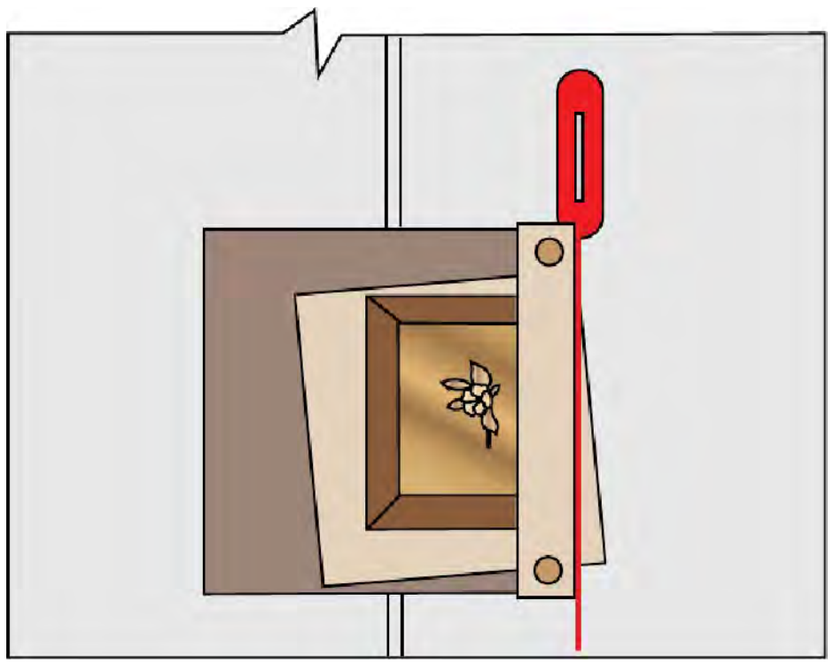


Figure 1. Cutting Board. The Sliding Table fits in the miter groove and the hold-down board is kept in place with two dowels.

See Figure 1. The outer borders should be trimmed so the cut goes from one corner to another corner. See Figure 2.

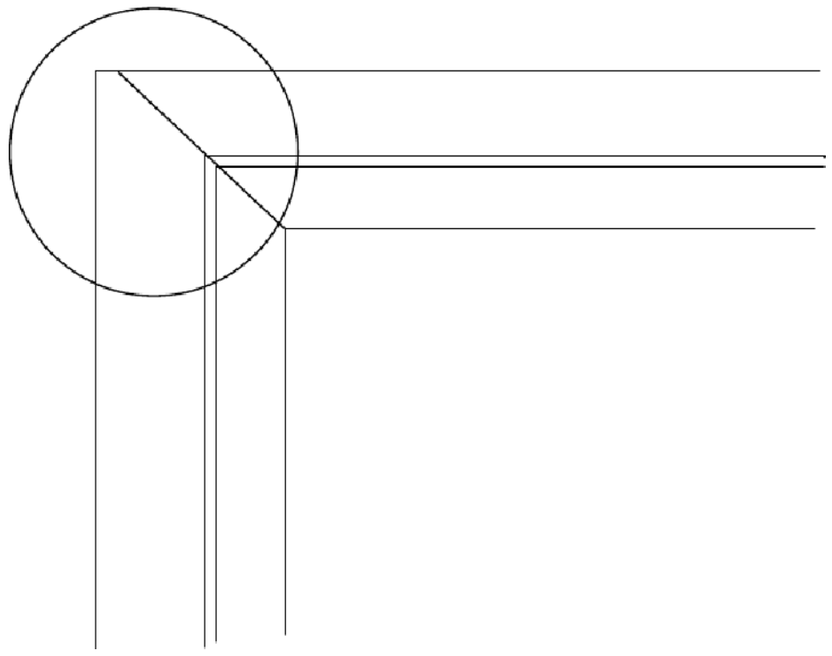


Figure 2. Cut the Edge. Cut from one veneer corner to the next.

43. Frames

A marquetry picture often needs a frame to look finished and to direct the eye to the important parts of the image. The frames at right can be made with a table saw and router.

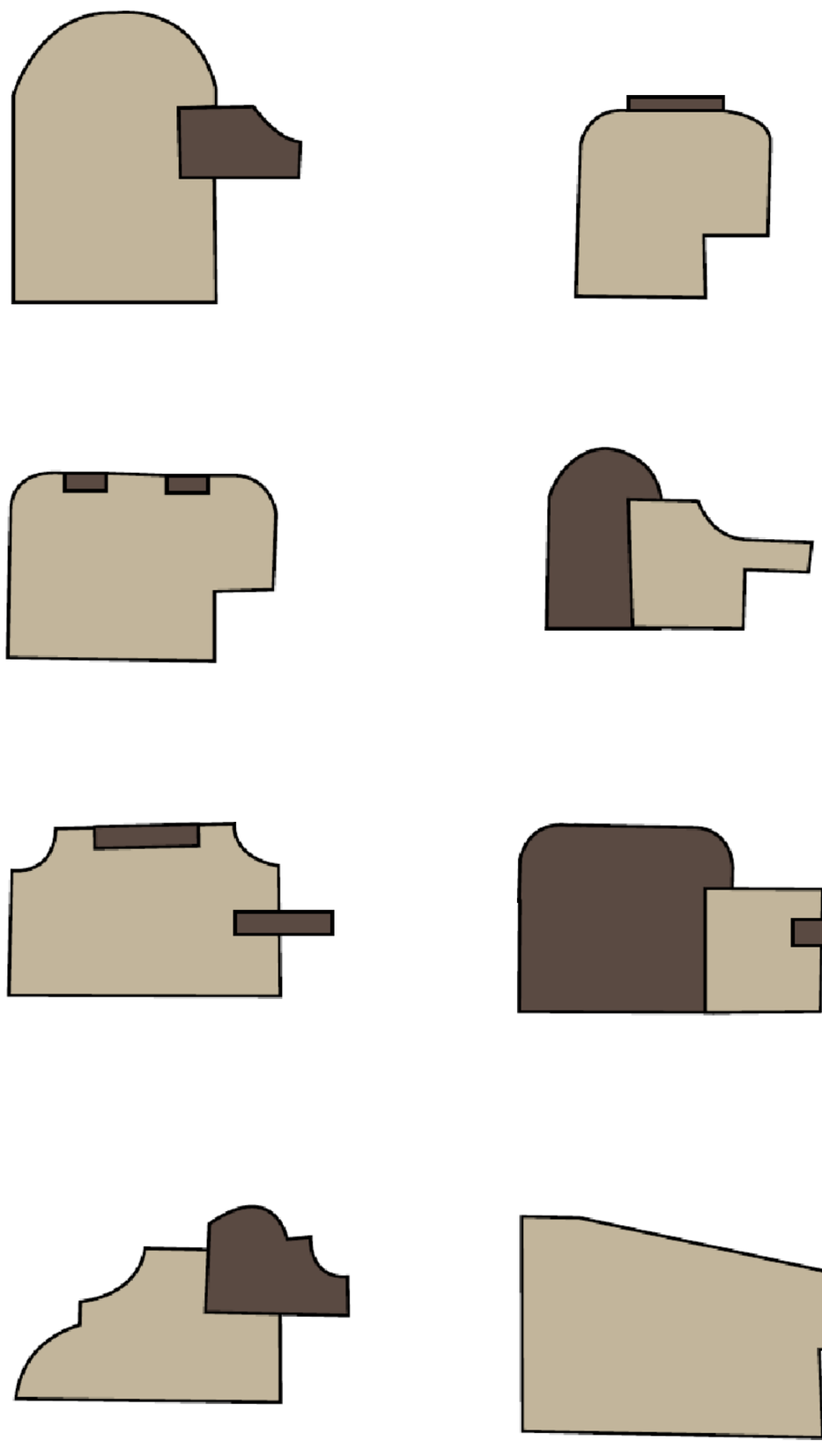


Figure 1. These eight frames are easy to make.

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ABOUT THE AUTHOR

Ken Horner has been doing marquetry since 1961, having learned woodworking from his father and grandfather. He is still active in the craft, teaching classes to beginners and conducting workshops for advanced students at his home shop in Morgan Hill, California. He is the president of the American Marquetry Society and president of the Northern California Chapter of the AMS. Ken also is the author of three very successful woodworking books: *Woodworkers' Essentials—Facts, Formulas & Short-Cuts* (2003), *More Woodworkers' Essentials* (2006) and *The Essential Guide to the Steel Square* (2009).

Linda Salter Horner is an accomplished wood carver (life size carousel animals), wood turner (segmented bowls) and marquetarian. She is past president of the West Bay Woodturners, of the Bay Area Woodworkers Association and of the South Bay Woodworkers. Linda has taught classes and has lectured on segmented bowl turning throughout the U.S.A. Ken writes and Linda illustrates; she hates to write!

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