Marquetry Step by Step

Double-bevel cutting makes the process easy and accurate

by Gregg Zall

Flawless marquetry may be easier than you think. *The marquetry detailing across the drawers on the author's cabinet uses the natural colors of wood to paint a picture. The technique he uses ensures that pieces fit together correctly.*

Tilt the table, not the saw. *A plywood cutting table tilted at 8° creates the beveled edges of inlay and background pieces. The author moves a jeweler's saw straight up and down, not at an angle, and pulls the work into the saw to cut thepatterns.*

At woodworking school, I was given the time and the confidence to stretch my cabinetmaking skills to the limit. I challenged myself to include graphic arts in my cabinets, which would combine my love of drawing and furnituremaking. Painting surfaces seemed a shame, though, because paint covers up the wood. Instead, I decided to use the natural colors of wood to create pictures with marquetry.

After a lot of trial, error and advice, I came across a method called double-bevel cutting, which gave me the small, accurate details that I wanted on my cabinets, like the birds across the drawer fronts in the cabinet shown above. There are no distracting gluelines in the finished piece.

How is it done? First tape two pieces of veneer together like a sandwich, and then cut out your design, as shown in the photo at left. The trick is that you cut the hole for the inlay and the inlay piece itself simultaneously, so any deviation in the cut is mirrored in both the inlay and the hole.

Because the cut is made at an angle, the inlay piece on the bottom of the sandwich comes out fractionally bigger, taking up the sawkerf and making a perfect fit when glued in, as shown in figure 1 on the facing page. The bevel-edged inlay piece snugs down into the bevel-edged cutout just like the underside of a flathead screw fits into a countersink. It's really not that hard to do. So if you're game, I'll walk you through it step by step.

Photos: Jonathan Binzen

No need to buy veneer. *By cutting his own veneer, the author controls the figure of the wood used in the inlays and uses scrap that otherwise might be thrown out. He runs one face of a board over the jointer before cutting the 1/16-in.-thick veneers on a bandsaw.*

A palette of natural woods

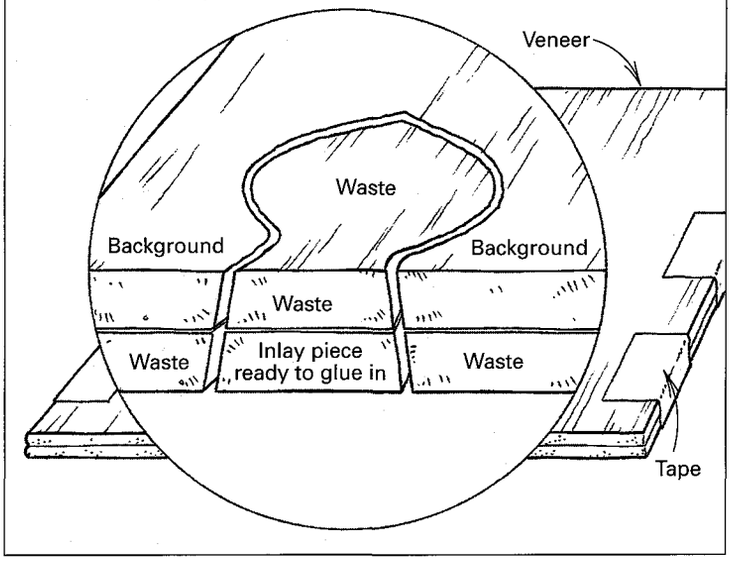
Natural wood colors, not stain or dye, offer plenty of variety for eye-catching marquetry.

Darks	Reds	Greens
Ebony	Bloodwood	Olive
Walnut	Pernambuco	Lignum vitae
Wenge	Pear	Greenheart
Imbuia	Bubinga	Tulip poplar

Lights	Yellows	Browns
Pear	Osage orange	Fir
Holly	Satinwood	Lacewood
Maple	Boxwood	Mahogany
Madrone	Lignum vitae	Yew
	Nutmeg	Walnut

Fig. 1: Cutting technique makes a perfect fit

Background and inlay pieces are stacked together and cut at the same time. Because the edges are beveled, the process ensures a tight fit between adjacent pieces and no visible gluelines in the finished marquetry.



Sawing your own veneer

I use my own hand-cut veneers for marquetry. One advantage is that I can pick the wood and figure. All the odd scraps of wood I couldn't bear to toss out are suddenly usable. I have my own favorites, which I've listed by color group in the chart above. Another advantage of cutting my own veneer is that the extra thickness makes the glue joints, and thus the work itself, stronger. I use a bandsaw equipped with a high fence to cut my veneers 1/16 in. thick, as shown in the photo above.

I joint one face of the stock before sawing and then use the veneer just as it comes off the saw. The veneers need to be pretty consistent. Because every bandsaw blade cuts at a slightly different angle, it's essential to clamp a fence to the bandsaw table parallel to the natural drift of the blade. (For more on how to cut your own veneers on the bandsaw, see *FWW*#107, pp. 44-48.)

Setting up a saw and angled table

If you want to try this marquetry technique and you don't have a scroll saw, try a jeweler's saw with an 8-in.-deep throat (available from Frei and Borel, 126 2nd St., Oakland, Calif. 94607; 800-772-3456). A saw this size allows you to do a 6-in.-sq. design, and this saw is more than capable of producing beautiful work. I fitted mine with a longer handle, like the ones found on Japanese saws. And you'd better buy a few dozen blades because they break often.

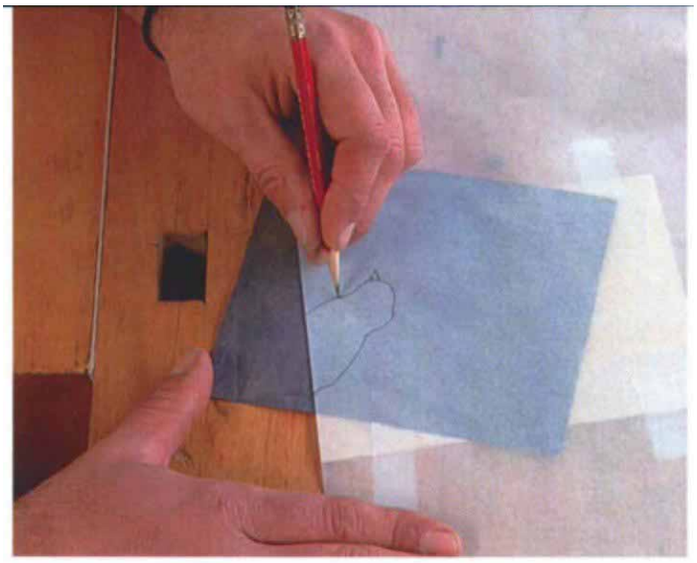
There's a little trick to installing blades in a jeweler's saw. First insert one end of the blade in the collet by the handle. The teeth should point down toward the handle. Adjust the saw's frame length so that the top collet is 1/8 in. beyond the end of the blade. Then butt the top end of the saw against the workbench, and flex the frame until the blade fits in the collet. If it's tight enough, it should make a musical note when you pluck it.

A scroll saw would be the next logical step in choosing a tool for marquetry. I use a 20-in. electric scroll saw, which gives me more accuracy and allows me to do bigger designs. For blades, whether you choose a jeweler's saw or a scroll saw, use size 2/0 (2/0, *not 2).*

An angled table is the key to double-bevel cutting. If I'm cutting 1/16-in.-thick veneer on a scroll saw, I tilt the table 8°, but the angle might have to be adjusted for veneers of different thickness. If you're using a jeweler's saw, you'll need to make a simple angled table, as shown in figure 2 on p. 82. I made mine from 3/4-in. plywood and tilted the top at 8°. I cut a notch, or bird's mouth, in the front edge of the table, as figure 2 shows, so the work is supported all around the sawblade. I clamp the table to my bench when I need it and stow it underneath when I don't.

When you're using the jeweler's saw, move the work into the blade, just as you would with a scroll saw. The table holds the work at the correct angle, so keep the saw vertical. You'll probably find it relatively easy to keep the blade from tilting left or right,

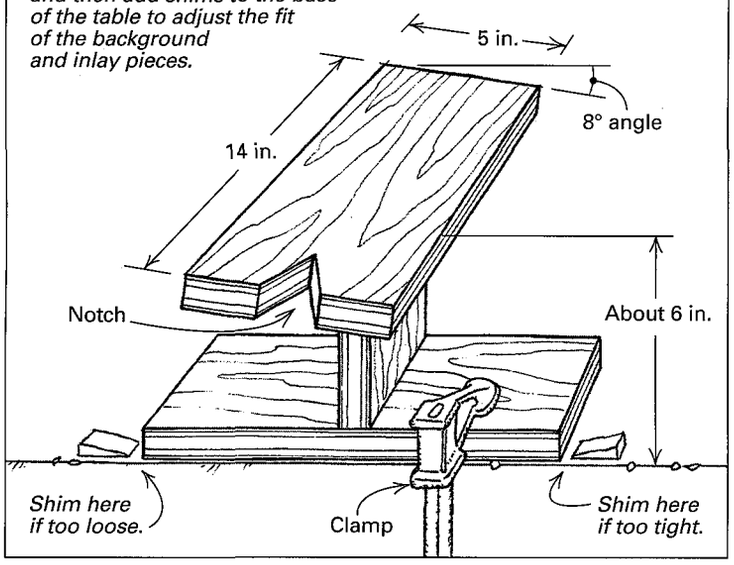
Drawings: Mike Wanke

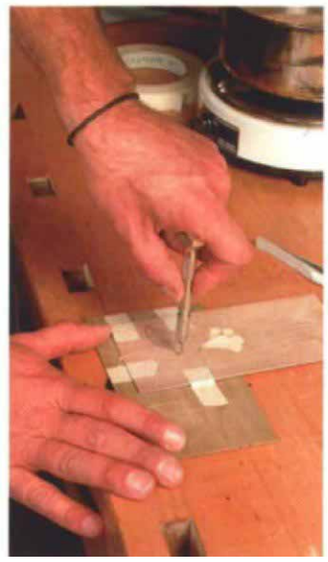


Carbon paper for the design. *To transfer patterns to the workpiece, the author starts with tracing paper and then uses carbon paper to reproduce the pattern on the veneer he intends to cut.*

Fig. 2: Build the cutting table at an angle

When cutting the beveled pieces by hand, results are more accurate when the saw is held straight and the workpieces are at an angle. The author uses a plywood cutting table with a canted top. For veneers 1/16 in. thick, try an 8° angle, and then add shims to the base of the table to adjust the fit of the background and inlay pieces.





A drill can help get a cut started. *When an inlay must be dropped into the middle of a piece, the author starts the cut with a tiny drill bit.*

No tape and no clamps. *After pieces have been cut out, the author glues the inlay into the background material from the back side.*

but you might have to fight the tendency to let the handle of the saw tilt toward you. If your curves consistently come out looking sloppy, this is probably the cause. Make your saw a consistent, smooth, slow-cutting machine that stays in one place at one angle. If your inlay pieces are consistently too tight or too loose, try changing the tilt angle of your table. With the jeweler's saw table, a shim will do the trick. With either the handsaw or scroll saw, keep an eye on any small pieces of veneer. It's easy to lose them.

Start with a simple design

It's time to do some marquetry. First choose a background veneer and a contrasting veneer to inlay into the background. Make a sandwich of the two pieces with the background veneer on top. Tape the veneers together with masking tape. Tape them securely, creasing the tape into the corners with your fingernail. Any movement will distort the final fit of the inlay, so don't reuse the tape.

Draw a design on your background veneer. Except for the simplest designs, I use tracing paper to copy the original. Then I lay the tracing on the veneer with a sheet of carbon or graphite paper between the two and retrace the design, as shown in the top photo.

For a start, try something easy like a little blob. I always cut counterclockwise. Because the teeth on the scroll saw face me as I'm cutting, tilting the table down from right to left produces the correct bevel. With the jeweler's saw, the teeth face away from me, so I built the table with the opposite tilt—running downward from left to right.

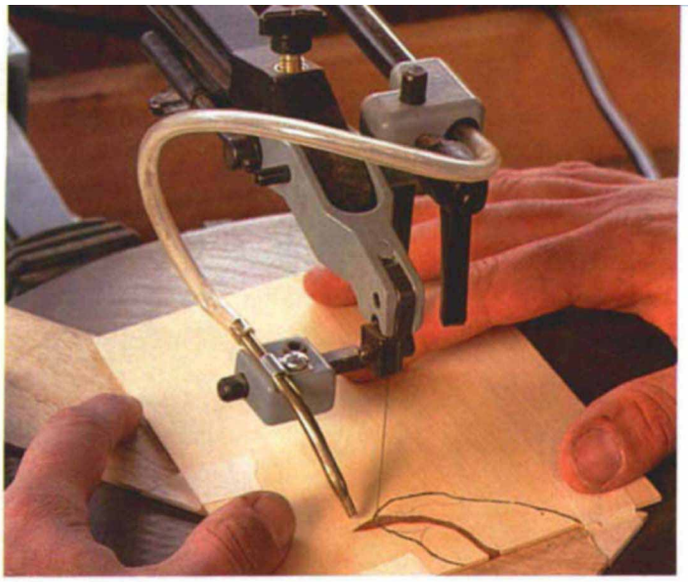
When you feel more confident, try cutting multi-curved blobs and other simple patterns. Now try a point. At the tip of the point, keep your saw moving gently in one spot as you bring the work all the way around. You'll be grinding a small hole, but with practice, the parts will fit correctly.

I need a bunch of clamps, right?

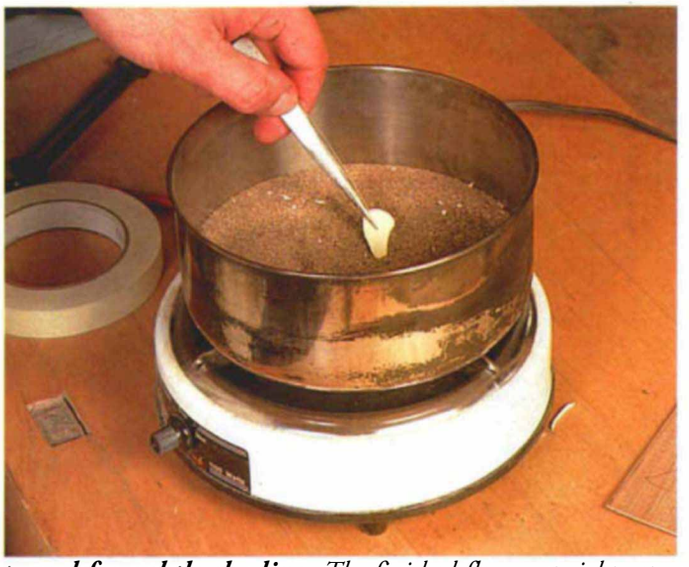
Gluing in the inlay pieces requires no tape and no clamping. Just place the background veneer face down on any flat surface, spread glue on the edges of the inlay piece and press it in from the back (see the bottom right photo). The bevel-to-bevel fit provides the only pressure you need. By the time you get the next piece of inlay veneer taped to the background, the glue will have set enough to let you proceed with the sawing.

Overlay and piercing

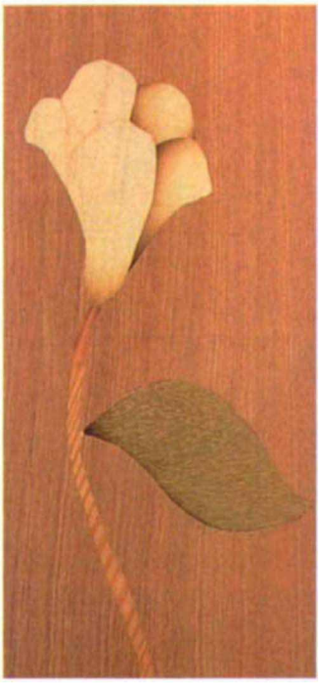
Marquetry comes alive when one piece is inlaid over another. This is overlay. You can learn the basics of overlay by cutting a bird's



First the beak, then the head. *Crisp boundaries are achieved by overlaying one part of a pattern into another, as the author is doing with this bird's beak and head. The scroll-saw table is tilted at 8°.*



Hot sand for subtle shading. *The finished flower at right gets a sense of visual depth from the shading between adjacent petals. To achieve the effect, the author uses hot sand to scorch the edges of some of the pieces. But be careful—too much heat on large pieces of veneer will change the fit.*



Petals are cut in one at a time. *Crisp boundaries between individual petals in this sample piece enhance the image's three-dimensional feel.*

head. First draw the outline of a bird's head on your background, and then inlay a beak into the background. Spread glue on the edges, and press the beak in from the back. Then make the cut for the head through the beak piece, giving a nice crisp edge where the head overlaps, as shown in the top photo.

Piercing involves drilling a tiny hole to slip the sawblade through. It's easiest to start all your cuts from an edge of the background, but inevitably, you'll have to drop a piece into the center of a background. Or you'll want to go back to add a piece after completing a design. That's where piercing comes in.

First I tape the pieces together. Then I use a tiny drill bit in a hand-held pin vise to pierce both veneers. Drill at one tip of the piece to be cut out (see the bottom left photo on the facing page). Release the blade from the top of your saw, and gently slip the blade through the hole in the underside of the bottom veneer. Reattach the blade, and cut out the design. This leaves a small hole in one corner of the pattern. It can be well-hidden with a mix of sawdust and glue.

Shading with hot sand

This last trick—sand shading—really adds depth and shadow to your design, as the flower in the photo at right shows. Wash some fairly fine sand, and heat it up on a hot plate. Pick up the inlay piece that needs a little shading with a pair of tweezers. Then dip an edge of the piece into the sand, as shown in the bottom left photo.

Check the inlay piece constantly because once the wood starts to toast, it darkens quickly. Be careful not to toast large pieces of veneer for too long because they have a tendency to shrink in the heat and distort the fit.

Finishing up

When your marquetry is finished, glue it down to a plywood core at least ⅛ in. thick. And always glue veneer to the back of the core simultaneously to keep the stresses balanced and the core flat. I put a layer of cardboard on the marquetry and stack a few inches of particleboard on top when I clamp the veneer. Then I use as many clamps as I can fit.

After sanding, I finish with shellac because it doesn't distort the color of the wood too much. It's magic when you put on the first coat and the contrasts jump out at you. In this medium, you get textures, pores, colors and light reflections. That is really what makes marquetry so special.

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