A few summers ago I was given two small pieces of incredible curly maple. I knew they would be perfect for small boxes, but I couldn’t figure out what kind of boxes they wanted to be. I didn’t relish the thought of trying to saw tiny dovetails into such ornery wood, and plain old square mitered boxes felt like a missed opportunity.

Inspiration struck when a yogurt container fell off a shelf in my shop, spilling its cargo: What about a mitered box with six sides? Then, how would that even work, from top to bottom?

Working at this small scale, and almost entirely at the bench, is a great way to explore a finer level of detail in your work. I developed a few new jigs and techniques for these boxes, and found fitting the pieces together to be really fun. And because these small boxes are made from 1/4-in.-thick stock, they are perfect for those pretty little scraps and cutoffs we all tend to hang onto.

Each box starts as a strip of solid wood, which becomes the sides. Once that is mitered, rabbeted, and joined—by wrapping the six-sided tube with blue tape and rubber bands—the hexagonal top and bottom panels are set into the rabbets and the box is cut apart to separate the lid. Along the way, the little vessel is filled with distinctive details, crafted from a complementary wood.

Dig out your attractive scraps and have some small-scale fun

BY CLARK KELLOGG

Hexagonal Boxes Are Little gems

Photo, this page: Michael Pekovich
Little Gems

A word on woods
Assuming that contrasting woods are the same as complementary woods is a common mistake. They aren’t. Like colors in clothes or house paint, wood combinations can range from drab to actively awful. Ideally, you want woods that harmonize and complement one another, accentuating the overall form and tone of a piece rather than distracting from it.

One way to see if two or three woods complement one another is to handplane them and sweep the shavings into a heap. Does the pile remind you of a crisp fall day, full of reds and yellows and oranges that belong together? Or does it feel like a headachy day at a carnival? In this case, I used a combination of bird’s-eye maple on the sides, spalted maple on top, and teak for all the details.

Teak works beautifully with maple. Some of my other favorite combinations for boxes and furniture include walnut and beech, walnut and pecan, white oak and wenge, pear and cocobolo, cherry and cypress, cherry and Douglas fir, and maple and pear.

Miter, rabbet, and assemble the box sides
Start by prepping the sides of the box. To ensure continuous grain, start with an 18- to 24-in.-long piece of ¼-in.-thick stock. Its width should be the box’s height.

I start making the small mitered side pieces by cutting them to exact length at the tablesaw with the blade at 90°. I make a few extra pieces to use for setting up the miter cuts. Then I line up my best six pieces in sequence and number each one.
Start with the sides

**HOW TO CUT MITERS IN SMALL PARTS**

The sides are solid wood, cut from a single strip for grain continuity around the box. Follow the steps below for safe, accurate results with these small workpieces.

To control the small pieces safely as you miter their ends, I recommend a tablesaw sled. I clamp a small stop to the sled, and make test cuts to dial in its position, which stays the same for cutting both miters on each piece. The goal is to leave just a hairline of the original squared-off ends intact—imagine the amount that you could remove with a few strokes of 220-grit paper. Keeping this tiny blunt edge will give you positive registration against the fence. Don’t worry: It disappears during final sanding.

When the test pieces look good, miter the actual box sides. To check your work, arrange them facedown on the workbench, stretch blue tape across the outside faces, and wrap the sides into a tube. If the miters come together perfectly, buy yourself a lottery ticket and move on to glue-up. More likely you’ll see tiny gaps, or find that the tube won’t close completely. Not to worry: I almost always tune up miters by hand.

**Tune the miters with a handplane jig**—I use a guillotine-style miter trimmer to tune miters these days. For more about these lovely old-school tools, check out the online extra at FineWoodworking.com/285. If you aren’t inclined to shell out for a miter trimmer, you can fine-tune miters very effectively with a simple shooting jig for your block plane, which I did for years (see opposite page).

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**A box from scrap.** After resawing strips of curly maple for the sides and scraps of spalted maple for the top (left), Kellogg planed a long strip for the sides to 1/4 in. on a melamine sled (right).

**Set the blade to 60°.** The bevel setting is critical, so Kellogg relies on a digital-angle gauge (above). To cut the small workpieces, he uses a tablesaw sled (right). Dial in the position of the stop with a series of test cuts on your extra pieces, aiming to leave just a hairline of the mitered edge square. Then cut the real sides. A single stop setting will work for both miter cuts.
Shoot the joints. To make this jig, leave the tablesaw blade at 60° and bevel one edge of the base. Then screw on a fence and plane its end flush with the plywood.

Keep opposite sides equal. It’s critical to keep opposite sides of the box exactly equal in length. Check them as you go.

Rabbets on the router table. Attach a zero-clearance fence to support these small workpieces safely.

It’s vital for opposite sides of the box to be exactly the same length. Check the joinery with another tape-wrap dry-fit to be sure it’s perfect before moving on.

Cut rabbets and pre-finish the inside faces—Now cut the rabbets in the sides. Rout the rabbets on the router table, making sure to cut them on the inside face. Next, plane and sand the inside of the sides to 320 grit. Then pre-finish the top third of the inside faces with shellac and wax, keeping finish off the miters. The pre-finished area will be the inside of the lid, and should be as polished as the outside of the box. The rest of the interior will be covered by liner pieces.

I use shellac on boxes, since it leaves no odor inside and builds to a high polish in a few hours, letting me move on to the next steps.

Assemble the sides with innovative clamps—Once the interior faces are finished, check the miters one last time and unroll the tube on your bench, keeping the blue tape in place. Now comes the glue. I particularly like Titebond’s Translucent Wood Glue for box work. It sets quickly.

Assemble in order. Line up the parts in sequence, tip to tip, with the top and bottom edges perfectly aligned, and then stretch two strips of painter’s tape along their backs.

Thin lines of glue. After flipping over the strip, Kellogg applies Titebond Translucent Glue, putting just a thin line in the bottom of each joint, to minimize squeeze-out inside the box.

Tape then rubber. After wrapping the box into a tube and pulling blue tape across the last open joint, Kellogg wraps bicycle tubing around the box, securing the ends with spring clamps.
Add the top and bottom

SIMPLE PARQUETRY

Since the top and bottom panels are sandwiches of veneer, there's a nice opportunity to hide a surprise inside the box: hexagonal parquetry in a complementary wood. It's easy to make.

**Cut out the pieces.** Kellogg jointed one face of a piece of teak before resawing it to a fat \( \frac{3}{16} \) in. on the bandsaw. Then he laid out and cut the triangles he needed.

**Shoot the edges.** A basic bench hook, with a 60° fence attached, makes it easy to plane the end-grain edges straight and true. Flip the parts to plane with the grain.

**Divide and conquer.** Glue three triangles together at a time, pulling the joints together with strips of blue tape before weighting the assemblies to keep them flat while they dry.

**Join the halves.** Shoot the long edges of the initial glue-ups, using the same jig. Then apply glue and pull the halves together with more blue tape (right). Keep the panels flat to dry.

**Top and bottom are veneer sandwiches**

Avoid using solid wood for the top and bottom panels, as seasonal movement could split the joints apart. Instead, I recommend a stable sandwich of two layers of shop-sawn veneer and a core of thin plywood. I saw my veneers at 2mm (a fat \( \frac{3}{16} \) in.) and use \( \frac{1}{4} \)-in. birch plywood (which is a bit less than \( \frac{1}{4} \) in. thick) for the core.

Once the top and bottom are pressed up, you should have two roughly \( \frac{3}{8} \)-in.-thick panels. When placed in the \( \frac{1}{4} \)-in.-deep rabbets in the box sides, these panels end up about \( \frac{1}{8} \) in. proud at the top and bottom, creating a \( \frac{1}{8} \)-in. by \( \frac{1}{8} \)-in. rabbet that gets filled with edge-banding. For a closer look at the anatomy, see the drawing on p. 59.

**Online Extra**

Learn about an amazing traditional tool for trimming miters at FineWoodworking.com/285.
MAKE SANDWICHES

The top and bottom panels are sandwiches of thin plywood, parquetry, and veneer. Solid-wood panels could break the box’s miter joints with seasonal expansion.

**Cut parts a bit oversize.** Use the assembled sides to mark the outline on the plywood and veneer. Note that the top gets spalted maple, but plain maple is fine for the bottom. Trace and cut ¾-in.-thick MDF cauls now too.

**Apply glue evenly.** Spread glue on the plywood using a notched piece of veneer. The order is parquetry, plywood, then veneer, with paper on the outside faces to keep squeeze-out from sticking to the cauls.

**Stack and clamp.** Tape the stack to be sure the parts stay aligned as you clamp them. The thick cauls help to ensure even pressure.

**FIT AND ATTACH THE TOP AND BOTTOM**

Bandaging will cover the joints, so the top and bottom don’t have to be flawlessly fitted. But be sure they bottom out in the rabbets so there are no gaps visible inside the box.

**Trace the rabbets.** Aligning the seams of the parquetry with the corners of the box, trace the inside edge of the rabbets with a sharp pencil.

**Saw and shoot.** Bandsaw the two sandwiches close to the pencil lines, then use the shooting-board setup to fine-tune the edges, until the top and bottom drop into their rabbets.

**Glue both at once.** Reuse your clamping cauls to glue in the top and bottom panels. Don’t overdo the pressure here or you could break the box.
Inlay the banding

Plane the banding flush. Start by planing a light chamfer on the tips of all the miters so you don’t chip one piece when planing another. Plane the banding close to flush, and then use a scraper or sanding block to bring it the rest of the way.

Solid edge-banding is glued in oversize.

Saw and shoot. Saw the banding to length, and use the 60° bench-hook setup to trim the ends.

One at a time. After planing the ends to line up with the corners of the box, glue and attach the first piece with blue tape, stretched tightly across it. Then plane one end of the next piece, and hold it in place to mark the opposite end (left). Plane that end until it lines up with the next corner, and then attach it with more glue and tape (right).

Sawing your own veneers lets you take advantage of pretty wood scraps you already own. In this case, I used spalted maple for the top of the lid, which adds interest to the outside and ties in nicely with the maple sides and teak edge-banding. Of course, you can use commercial veneer, but I would sooner spend a week balancing the books and answering robocalls than spend two minutes trying to work with this paper-thin, hateful material. But that’s just me.

Joint the face of the veneer stock before resawing it. If your bandsaw is set up well and you use a freshly sharpened blade, you usually can use the sawn face as the glue side; if the cuts are too bumpy, you’ll need to sand or plane them.

Parquetry adds a nice surprise—The veneered top and bottom of the box allow me to add another design detail to this little box: hexagonal parquetry on the inside faces, made from the same teak accent wood. You can replace the parquetry with plain veneer, but it’s so attractive and easy that I recommend you try it.

Saw and trim the triangles as shown on p. 62. Before gluing them together, I create a flat, non-stick platform by stretching packing tape over plywood.

To get ready to glue up the top and bottom sandwiches, trace the assembled box onto all the layers: the plywood, the veneer, the parquetry, and two ⅛-in. MDF clamping cauls. Then cut them out on the bandsaw. Ultimately, you want about ¼ in. of extra material around the edges, to be...
Slice the top from the bottom

There is no better time to sand the outside than now. Then you can saw the box open and reveal the interior.

Score the box for sawing. Kellogg uses a marking gauge (shown) to score a line roughly one third of the way down from the top edge. To keep the saw on track, it also helps to follow with a stringing gauge to open up a thin groove.

Saw in stages.
Saw a little bit into each side, going gradually deeper as you rotate the box. The groove from the stringing gauge helps keep the saw on track, but be careful nonetheless.

The big reveal. Until now you’ve had no idea what the interior looks like. It’s a sweet moment. Clamp or stick sandpaper onto a flat surface and rub the box and lid on it to smooth and flatten the edges.

safe. Parallel-jaw clamps and thick cauls work fine for pressing the panels. At this scale, there’s no need for a vacuum bag or two-part veneering adhesive.

To trim the glued-up panels to fit into the rabbets, center the corners of the box on the seams of the parquetry, and trace inside the rabbets with a sharp pencil. Then bandsaw each panel, staying clear of your pencil lines, and shoot each edge with a block plane, using the same bench hook you used for the parquetry.

Don’t worry if there are small gaps between the panel and the inside of the rabbet; those will be covered up by the edge-bandung. But make sure the bottom of the rabbet is clean and the panel will press all the way down, because gaps at the bottom edge will show inside the box.

As you did with the box sides, sand, shellac, and wax the inside face of the parquetry before gluing these panels into the box.

Edge-banding is easy
The edge-bandung at top and bottom is attractive and easy to apply. As a bonus, it hides gaps between the top, bottom, and sides. For safety reasons, I rip the $\frac{3}{16}$-in.-sq. banding stock on the bandsaw, not the tablesaw, leaving the sawn edges facing
All that's left now is to install the liner and apply a finish.

**Plane and fit the liner parts.** Use the edge-shooting jig from before to fine-tune the fit of these small pieces (right), dry-fitting and installing them one by one with a few dots of glue and a spring clamp (below).

Outward at glue-up. I plane them flush and smooth afterward.

When applying the banding, I suggest starting with the bottom ring, just in case things don't go absolutely swimmingly the first time around. Attach each piece with white glue, with blue tape acting as clamps once again. Finally, use a block plane to trim the edge-banding flush on all sides.

You now have a six-sided box that can't be opened, a perfect gift for someone you don't particularly like. Tell them it's a puzzle.

**Smooth the sides and open the box**

Before I cut the box in two, I do the bulk of the surface prep on the outside faces. That way I know the two halves of the box will line up perfectly. Also, it's safer to exert pressure on the closed box, which is more rigid than the open halves.

I cut these boxes apart with a handsaw. I start by scribing a line with a marking gauge all the way around the box. For some reason, the proportions that always seem to look right to me are a 40/60 split between the lid and the box, with the lid at least 1 in. tall. If the lid is much thicker, the box tends to look top heavy; any thinner, and the lid starts to look insubstantial, like a trash can lid.

Next, I use a stringing gauge—the Latta Straight-Line Cutter from Lie-Nielsen—to establish a sawkerf along the scribed line. You don't have to do this, but it helps to keep the saw from "jumping the tracks."
To clean up the sawn edges, I stick adhesive-backed 220-grit sandpaper to a flat surface, and rub the box and lid on it with circular strokes and light, even pressure. Check your progress frequently; you don’t want to sand a dip into either rim. Set the lid on the box to check for wobbling or gaps.

**Add the box liner and a shellac finish**
The last step is fitting and installing the liner inside the box, which conveniently doubles as a lip that holds the lid in place. Mill up several feet of \( \frac{3}{8} \)-in.-thick stock in a complementary wood, about \( \frac{1}{2} \) in. wider than the depth of the box. Shellac and polish one face of the stock, and then, working piece by piece, cut each section slightly overlength and trim the miters to fit—using the same bench-hook jig you used on the parquetry and edge-banding.

Each piece should just slide into the box without putting much pressure on the joints. Watch for dried bits of squeeze-out in the corners that you missed earlier; any little crumb can be enough to hold the liner maddeningly out of place.

Work your way around until all six liner pieces are dry-fitted, tight to the inside walls of the box. Then remove the pieces one by one and glue them in with a few drops of Titebond Translucent and a spring clamp. Once the glue has set, remove the spring clamps, and test the fit of the lid. What you are after is a lid that lowers itself on a cushion of air, and has slight suction as you take it back off.

Finally, lightly chamfer the banding on the top and bottom edges with a block plane, and shellac the outside. I apply two or three coats of freshly mixed, 1-lb. cut, super-blond shellac with a pad. The next day, I sand this base layer back with worn-out 400-grit paper, and then follow with three or four coats of a 2-lb. cut. I give it another day to cure, and then buff the surface with 0000 steel wool. Finally, I buff with a thin coat of a relatively soft wax, such as Briwax “Creamed” Beeswax.

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