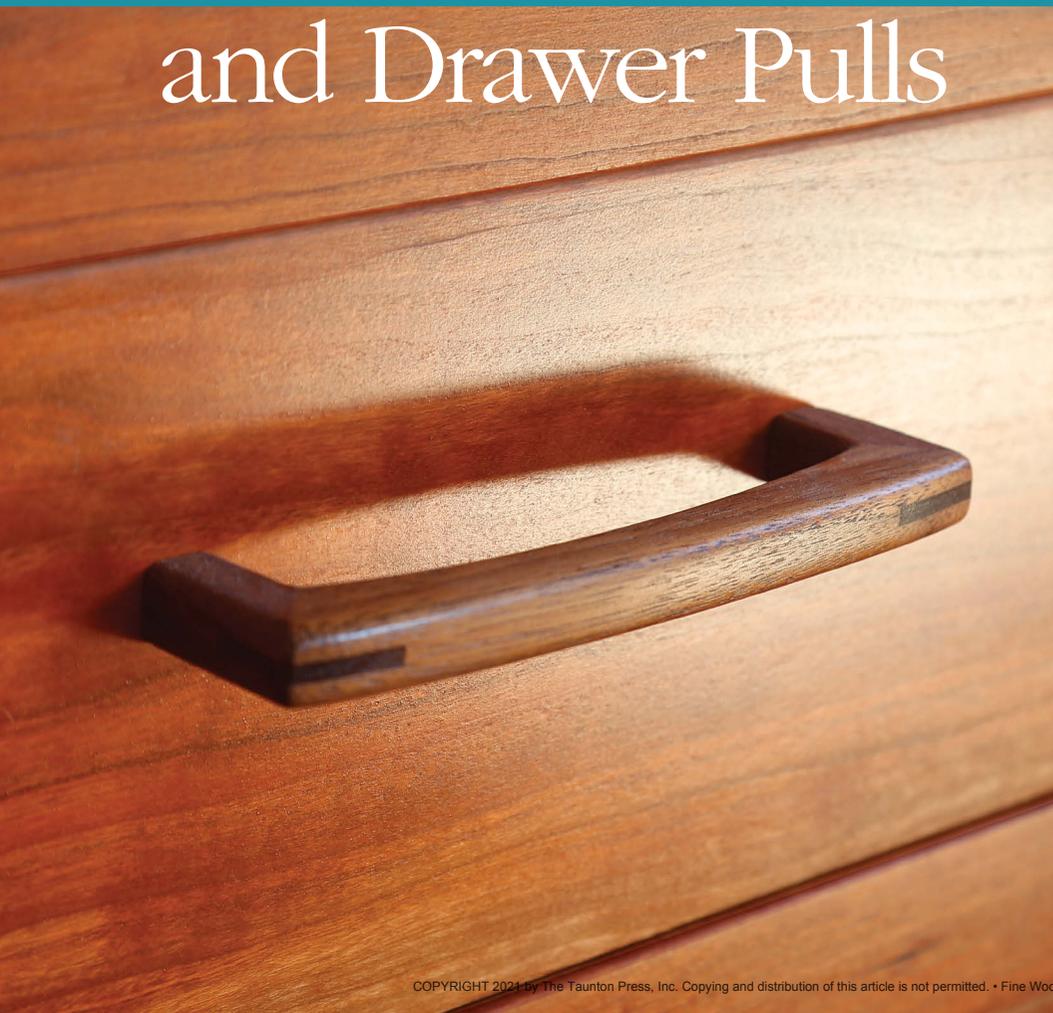


Contemporary Door and Drawer Pulls



When we design and make custom furniture, we also design and make the pulls. We often leave pull design until deep into the building process so that we can use the physical piece for inspiration. Making those final details is exciting because they can be what brings the whole piece together—the icing on the cake, if you will.

Our pull designs vary, but one common denominator is batch production. We always need multiple pulls (which are typically made with tiny parts) and we want making them to be a safe, efficient process that yields consistent results. For us, that means designing good procedures and building good jigs. We'll explain how we made these particular splined and mitered pulls, but the thinking behind the jigs and processes can be applied to other designs.

Marking and cutting the miters

We made the pulls in two sizes, shorter for doors and longer for drawers. To create a

Smart construction
makes fashioning
their small parts
safe and repeatable

**BY LARISSA HUFF
AND ROBERT SPIECE**

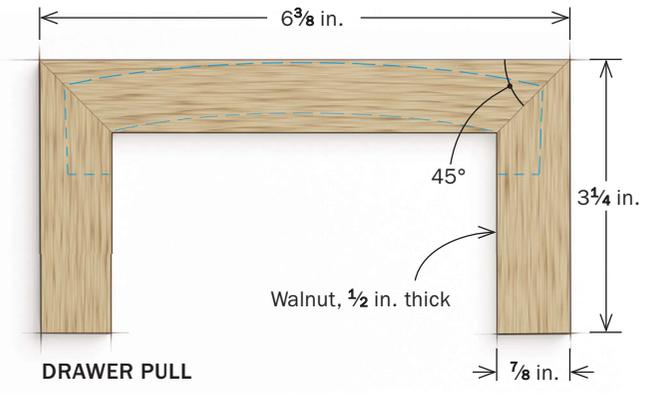
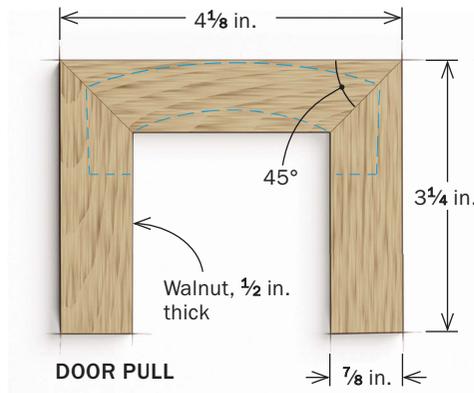
continuous grain match, we cut the three parts for each pull from a single blank. After milling all the blanks, we accurately laid out the parts for one short pull on a short blank and one long pull on a long blank. The blanks for the rest of the pulls were just quickly marked with chalk to indicate the direction of the miters. Using a different color marker for each blank, we also drew an offset line along the outer facing edge of the blank to keep track of the continuous grain after the parts had been cut.

To miter the tiny parts safely, we made a small sled with an angled fence and a toggle clamp. We fixed a stop block to the

Photos: Anissa Kapsales

GRAIN WRAPS AROUND MITERED PULLS

To make continuous-grain pulls, cut the three parts for each pull from a single blank. Blanks for door pulls are $\frac{1}{2}$ in. by $\frac{7}{8}$ in. by $11\frac{1}{4}$ in. For drawer pulls, blanks are $\frac{1}{2}$ in. by $\frac{7}{8}$ in. by $13\frac{5}{8}$ in.

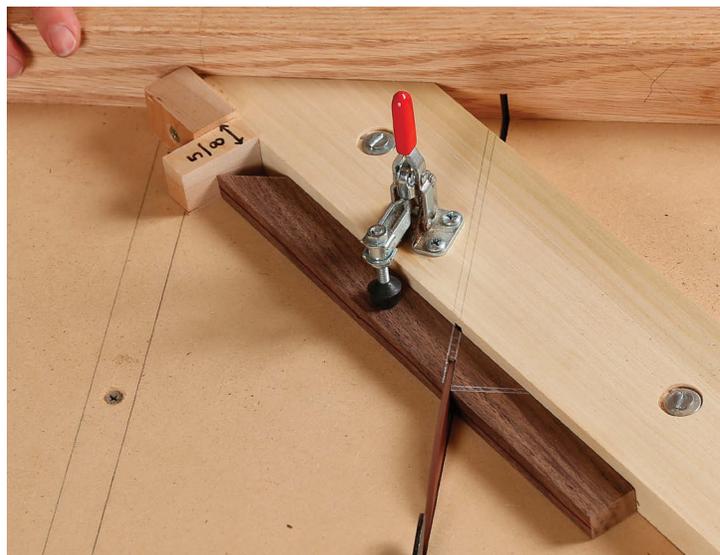


A SLED TO MITER THE PARTS

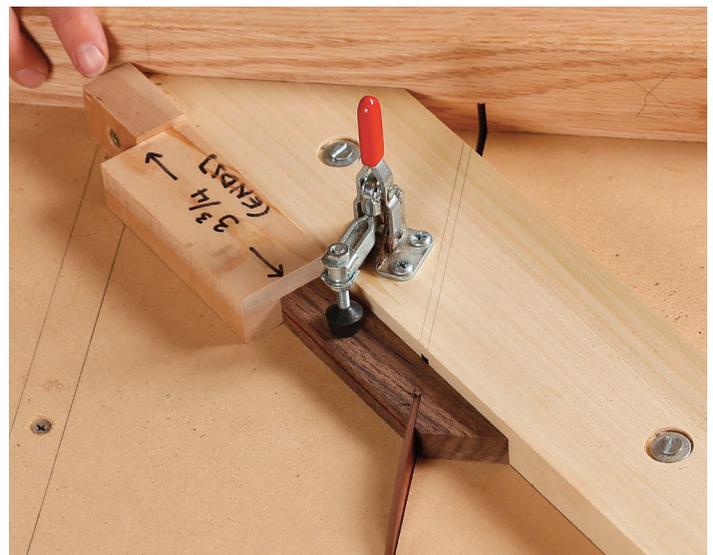
A tablesaw sled with a 45° fence, a stop block, spacers, and a toggle clamp makes cutting the miters on small parts accurate, repeatable, and safe.



First leg first. To cut the first leg, place the longest spacer against the fence and the stop block. Then slide the blank up to the spacer and engage the toggle clamp. The chalk layout lines remind you which way the miters go. After cutting the leg miter (right), turn the blank over to cut the first miter for the pull's crosspiece, trimming as little off the end as possible.



Cut the crosspiece. After cutting the first miter on the crosspiece, flip the blank again, insert the short spacer, and make the second miter cut on the crosspiece (above).

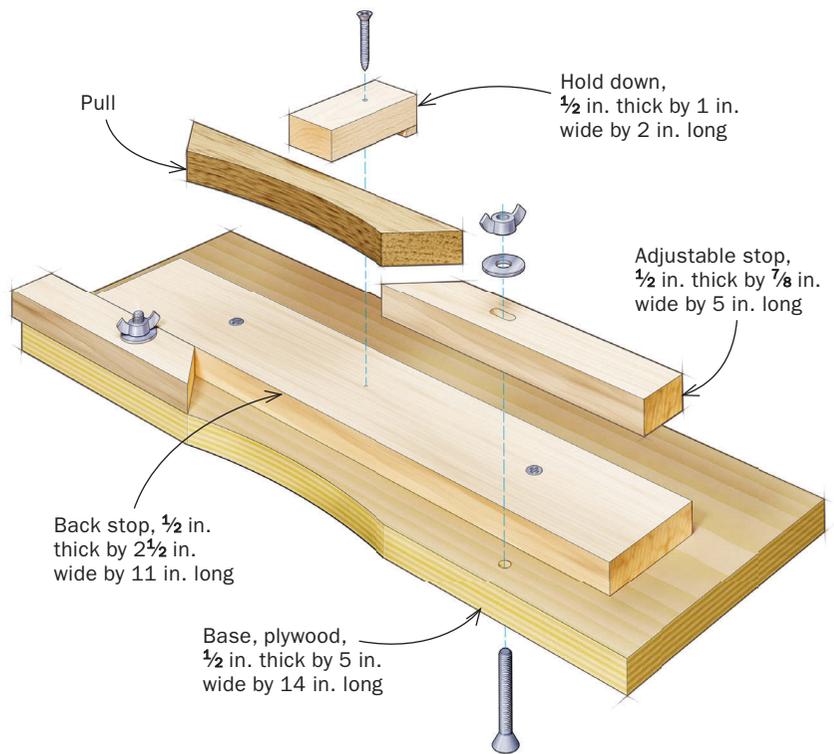


Second leg finishes up the miter cuts. With the leg spacer back in place, cut the final leg miter.

TACKLE THE INSIDE CURVE

Before gluing up the pull, you need to cut and finish the inside curve on the crosspiece.

Make a simple fixture. On the bandsaw, cut the curve of the pull into a piece of plywood. Add stops and a hold down to keep the blank in place during routing.



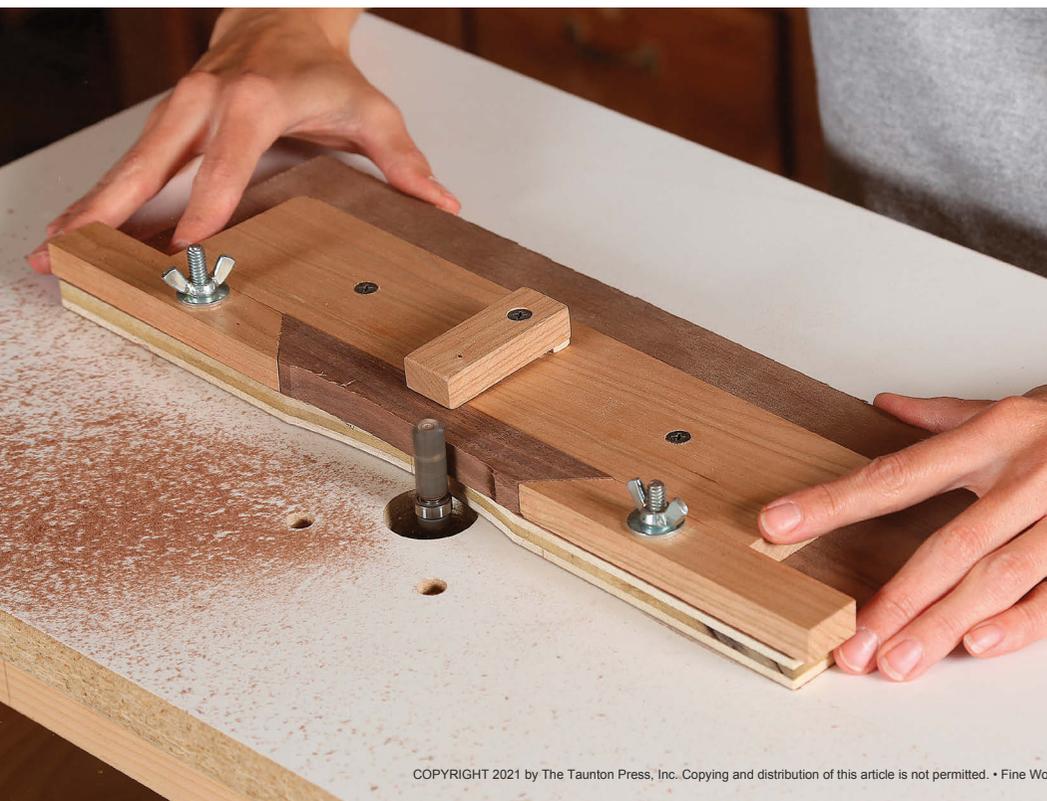
Shape and sand the inside curve. With the blank in the jig, take multiple shallow passes with a bearing-guided straight bit to cut the curve. You can easily sand the inside curve with a sanding drum on the drill press.



fence 6 in. to the right of the line of cut. Then we made spacer blocks that register against the fixed stop to control the length of the various parts being mitered. We used the accurately laid-out blanks to determine the correct length for the different spacers. Our spacer block for the legs of both pulls was $3\frac{3}{4}$ in., but you could vary this based on your sled. Our spacer block for the longer pull's crosspiece was $\frac{5}{8}$ in., and for the shorter pull's crosspiece it was $2\frac{3}{4}$ in. Once the spacers are made, you can cut all the miters.

Shaping the inside curves

Before the miters are glued together, you'll shape the inside curve of the crosspieces. A template routing jig helps shape the small pieces safely. We made one



ASSEMBLE THE THREE PARTS



Fine-tune the joint. Prior to glue-up, Huff uses a handplane on a shooting board to clean up the miters.



Rub joint gets the job done. Use a dab of glue and rub the joints back and forth against each other until the glue grabs. Hold the joint firmly in place for about 30 seconds and leave the pulls to dry overnight.



Cut the legs to length. After glue-up, use another simple jig to hold the pull in place while cutting the legs to length on the tablesaw.



End run around end grain. Because screws into end grain can weaken over time, add threaded inserts to the legs. Bore holes for them on the drill press. Use a fence, a stop block, and a toggle clamp to keep the piece firmly against the fence. But don't glue the inserts in place yet.

AFTER THE GLUE DRIES

Two final construction details are adding the keys to the miters and shaping the outside of the pulls.



Kerf the pulls and install the keys. With an over-the-fence sled cradling the pull at 45°, cut a kerf (with a thin-kerf rip blade) in the center of the miters and glue in the keys. The keys should be longer and wider than the key slot to make gluing them in easier.



The outer shape. Use a template to trace the final shape on all the pulls. Then carefully cut that shape out on the bandsaw.

for the shorter pulls and another one for the longer pulls.

After sawing and smoothing the desired curve in the edge of a piece of ½-in. plywood, mount a back stop, two adjustable end stops, and a hold-down. Use a router table with a pattern bit to ride the template and copy the curve into the inside edge of the pull. Take several light passes, removing slightly more material with each pass until the bearing of the bit rides along the template. After routing, clean up any machine or burn marks with a quick stop at the spindle sander or by hand sanding.

Glue up and reinforce the miters

To glue the miters we use the quick, effective rub joint. On a clean, flat surface, apply glue and slide the mating miters against each other until the two tack together. Apply finger pressure for half a minute and let them dry overnight.

Then cut the legs to length on the table-saw. To do it safely, we use a simple sliding jig with a fence and a toggle clamp. Next drill holes into the ends of the legs. Mounting pulls by screwing into end grain is not a plan for longevity, so we add threaded inserts, and these holes accept them.

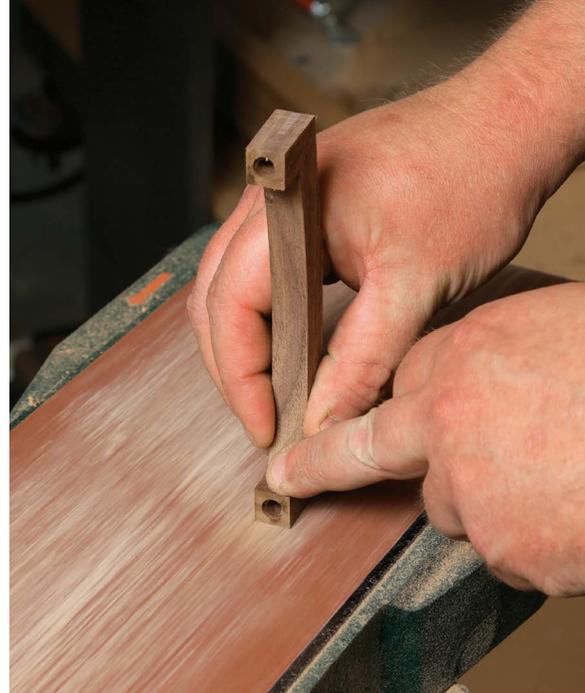
To strengthen the tiny miter joints, we use shopmade keys made from the same wood as the pulls. To cut slots for the keys, we made a jig that straddles the table-saw's rip fence and cradles the pull at 45°. Once we've cut the slots, we use a caliper to measure the width of the kerf, and then



FINISH IT UP

Final steps include sanding, routing a roundover, adding finish, and gluing the inserts in place.

Smooth the sawmarks. After bandsawing the outside shape of the pulls, sand them to a finished surface. A stationary belt sander refines the shape and removes machine marks. It's followed by a flap sander on the drill press.



Round it over. With a $\frac{1}{8}$ -in. roundover bit at the router table, round all the edges of the pull, except the bottom of the legs. Then hand sand to remove any machine marks.



Pop the grain with finish. Huff and Spiece start with boiled linseed oil to bring out the grain of the wood, and then they topcoat with spray lacquer from a can.



Threaded inserts are the final step. Use 5-minute epoxy to secure the inserts. The insert has a shoulder, and a barbed shaft that fits a $\frac{1}{4}$ -in.-dia. hole (stafast.com, No. TS083207).

rip key stock at the tablesaw to fit the kerf. Rip several long strips to thickness and hand-cut or bandsaw the keys to length. Apply glue to the slot and the key. Press the key into place, ensuring it seats fully, and leave it to dry.

Shaping and finishing touches

We trace a template to establish the outside shape of the pull. Then we cut the shape at the bandsaw and refine it on a disk sander. The cross-grain disk sander scratches are removed on the sanding belt.

With a $\frac{1}{8}$ -in.-radius bit at the router table, round over all the edges. Sand the pull flat by rubbing it on 180-grit sandpaper on a flat surface. Touch up the edges with 180-grit to remove tearout from the router.

To further refine the shape and give the pull a nice, soft quality, we finish up those hard-to-reach edges with a flap sander in the drill press. This sanding tool gives the pull a wonderfully tactile feel. Be sure to

wear gloves as it is not such a lovely, tactile feel on your bare hand.

Finishing up

Walnut really comes to life with a splash of boiled linseed oil. The pulls are liberally wiped with oil, then wiped clean and left to dry for five days. We topcoat them with spray lacquer. Apply three coats, buffing with 0000 steel wool in between. □



Larissa Huff and Rob Spiece run Lohr School of Woodworking in Schwenksville, Pa., and make custom furniture.