Make strong, simple joints with dowels

BY ASA CHRISTIANA

Online Extra

For a step-by-step video series on this table project, go to **FineWoodworking.com/extras.**

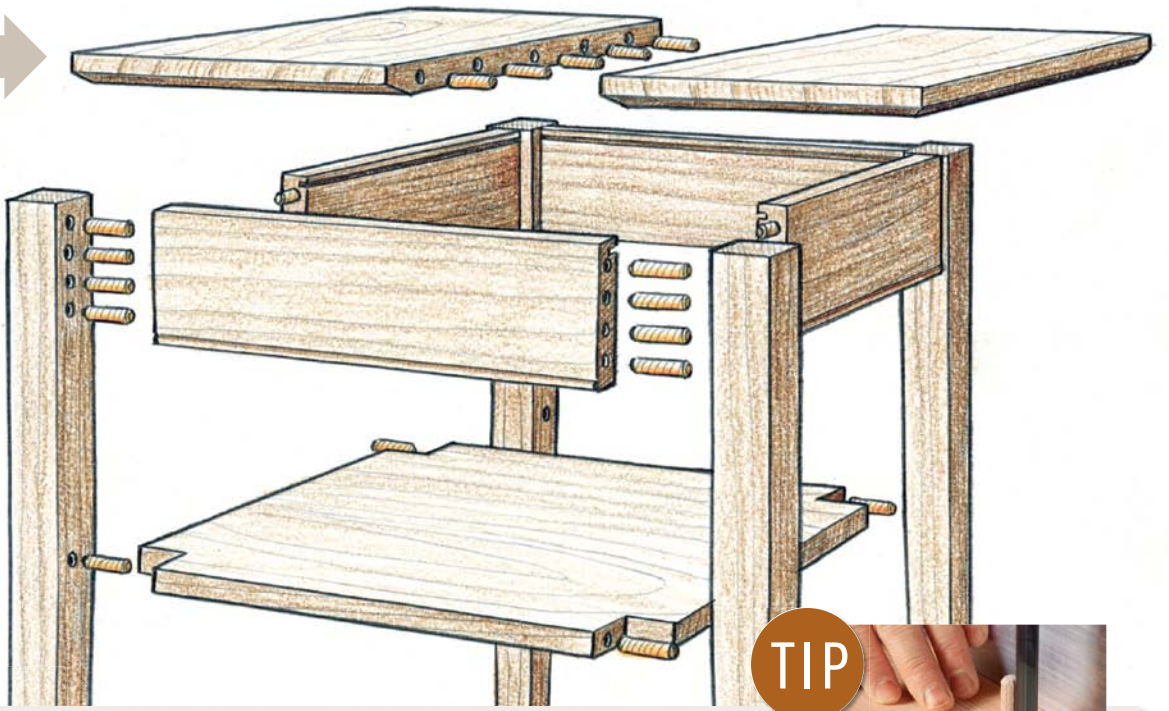
In all of woodworking, no joint is as undervalued or underused as the one held together by the lowly dowel. Why? The answer lies in a mountain of broken chairs and cabinets. Decades of bad factory-made furniture have given the sturdy little peg a rickety reputation. But savvy pros know better. Dowel joints offer a simple, strong way to make fine furniture, and they often succeed where other joints can't.

Shaker table shows that these humble pegs can do it all

1. ALIGN PANEL GLUE-UPS
Dowels seated in perfectly mated holes ensure a panel with flush surfaces.

2. A MORTISE-AND-TENON SUBSTITUTE
Multiple dowels act as slip tenons, mortised into both mating pieces with a large glue surface.

3. JOINTS IN TIGHT SPACES
A single dowel creates a hidden joint where traditional joinery would be cumbersome.



SECRETS OF SUCCESS

A good dowel joint depends on a snug fit between dowel and hole. Hardware-store dowels won't do, but good, cheap dowels are available from online woodworking suppliers.

To drill accurate holes, use a brad-point bit. Its center spur prevents the bit from wandering and enlarging the hole. To keep mating holes aligned and ensure that the holes are square to the surface, you'll need a doweling jig. The $14 model from Rockler at left works with dowels of ⅜-in. diameter, a good all-purpose size.

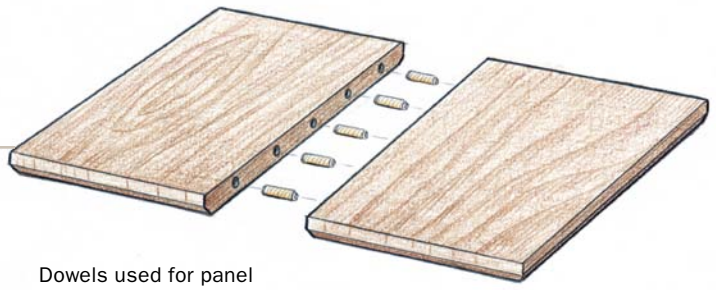
For places where the jig can't go, a set of dowel centers is a smart accessory. These metal plugs (left photo, center) fit a hole precisely and transfer its location to the mating piece (see p. 26).

TIP

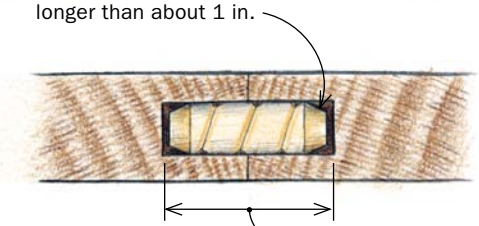
A lengthwise slit releases air and excess glue. A simple bandsaw jig (Methods of Work, *FWW* #103) handles the task safely.

Drawings: John Tetreault

Glue up perfect panels



Dowels used for panel alignment need not be longer than about 1 in.



In this joint, the depth of each hole should be half of the dowel's length, plus 1/16 in. or so at each end to accommodate excess glue.

Set the depth. *Insert the drill bit into the doweling jig until the point protrudes to the desired depth. To create a simple depth stop, wrap a piece of painter's tape into a "flag" around the bit where it enters the top of the jig.*

Layout is simple. *Make a series of pencil marks squarely across each joint to locate the mating holes.*

Drill the holes. *Registration marks on the doweling jig align with your pencil marks to locate the jig. When the depth-stop flag begins sweeping chips from the work surface, you've reached the correct depth.*

Dowels are easy to use in part because they are cylindrical, meaning you can quickly create accurate holes for them using a handheld drill. As to strength, our recent joint test ("Joinery Shootout," *FWW* #203) showed that properly executed dowel joints are strong enough for all but the most demanding applications. This strength means you only have to make simple butt joints before drilling holes. And the best news, especially for beginning woodworkers, is that all you need is that drill, a couple of good drill bits, and an inexpensive jig. Here are my favorite ways to use dowels.

Align glued-up panels perfectly

Woodworkers often edge-glue several boards into a panel for a wide part like a door or tabletop. Dowels work well to keep the boards aligned so their surfaces stay flush.

To mark out for the joinery, draw tick marks across the joints, about 6 in. or 8 in. apart. Use these marks to align the doweling jig for drilling. This joint's strength comes from the long, edge-grain glue surface, so the dowels don't need to be numerous or large. I usually use 3/8-in.-dia. dowels, unless the panel is less than 5/8 in. thick.

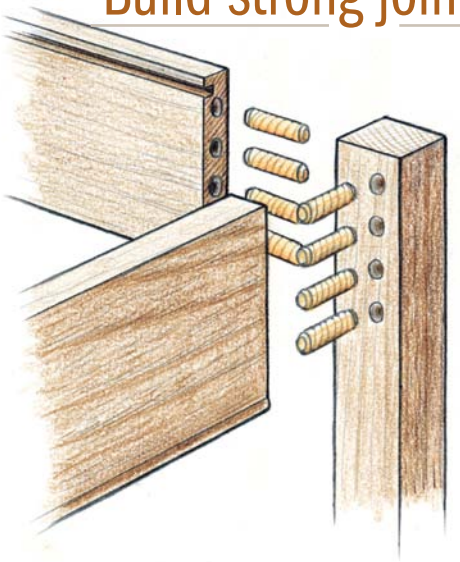
For another dowel joint, see Q&A on p. 84.

Be sure to drill 1/16 in. or so deeper than needed to hold excess glue when the joint goes together. Also, when gluing any dowel joints, don't put glue on the dowel itself; the hole will scrape it off and create a

The strength in a panel glue-up comes from the large long-grain mating surfaces. Be sure to apply glue on these surfaces as well as in the dowel holes, spreading it evenly inside and out.

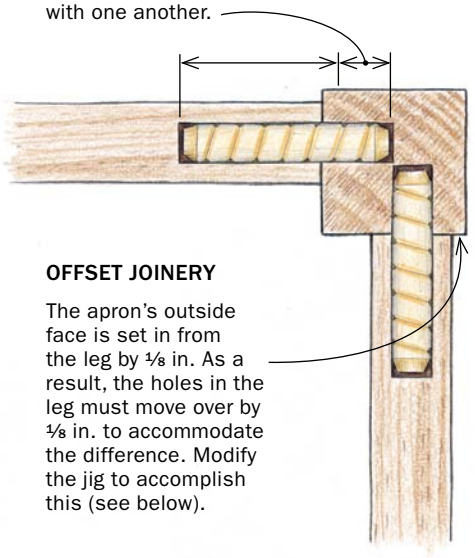
Photos: Steve Scott

Build strong joints



HOLE DEPTHS DIFFER

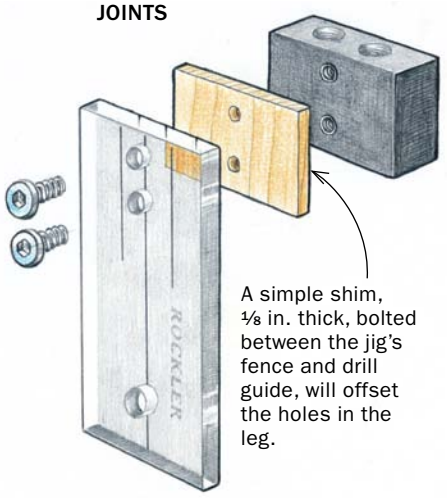
With a 2-in. dowel, the holes in the leg must be shallower to avoid interfering with one another.



OFFSET JOINERY

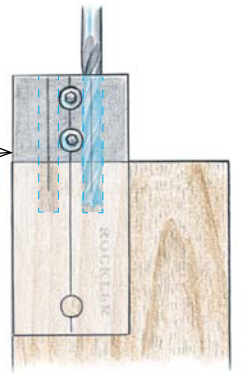
The apron's outside face is set in from the leg by ⅛ in. As a result, the holes in the leg must move over by ⅛ in. to accommodate the difference. Modify the jig to accomplish this (see below).

HOT-ROD THE JIG FOR OFFSET JOINTS



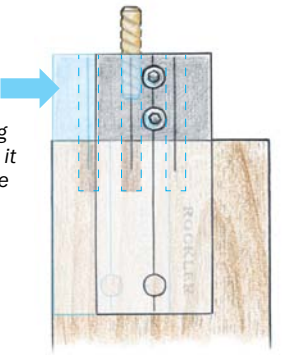
A simple shim, ⅛ in. thick, bolted between the jig's fence and drill guide, will offset the holes in the leg.

TRICK FOR ACCURATE SPACING



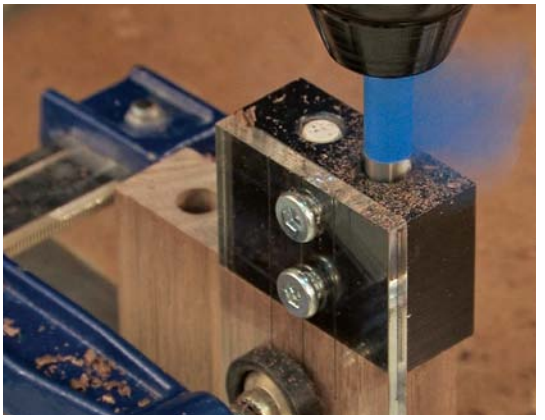
Start with the jig flush to the edge of the workpiece.

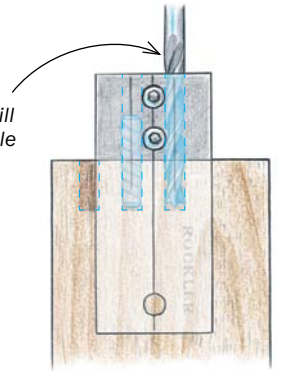
Drilling the first two holes. *Secure the apron in a vise and clamp the jig so its edge is flush with the top of the apron.*



Move the jig and secure it with a spare dowel.

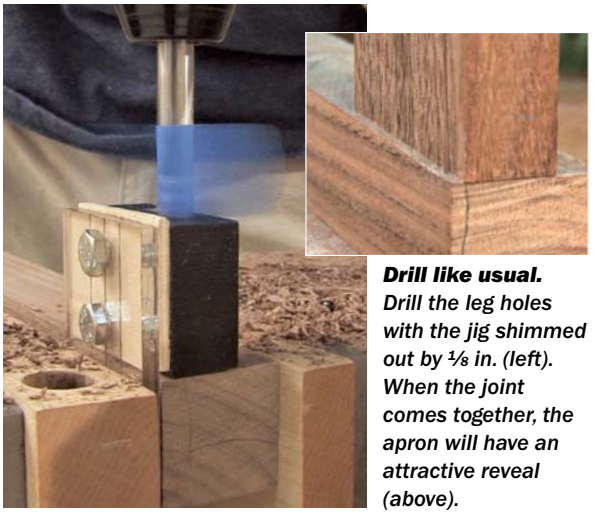
Move the jig over. *To continue the line of holes beyond the jig's reach, use a dowel to hold the jig in the last hole you drilled.*





With the jig secured, drill the next hole in line.

Drill and repeat. *With the jig secured, drill the next hole. Repeat as needed for a line of evenly spaced holes.*

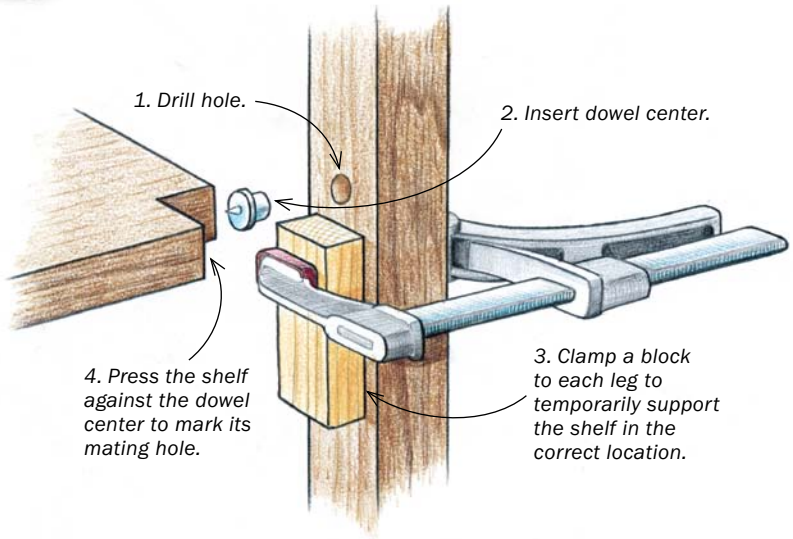


Drill like usual. *Drill the leg holes with the jig shimmed out by ⅛ in. (left). When the joint comes together, the apron will have an attractive reveal (above).*

TIP

The leg-to-apron joint derives no real strength from glue on the mating surfaces, so apply glue to the dowel holes only.

Dowel centers solve tricky joints



mess. Instead, put glue in each hole and spread it with a small brush or stick.

Build sturdy tables, doors, and cabinets

Almost any joint that calls for a mortise-and-tenon—table bases, door frames, face frames—is a candidate for dowel joinery.

Because this joint relies exclusively on the dowels for strength, you need longer dowels—and more of them. A good rule for dowel size here is one-half the thickness of the workpiece, with ¾ in. or more extending into each hole. A ⅜-in.-dia., 2-in.-long dowel works great in most situations. To ensure that the holes in the mating pieces line up accurately, start with the jig referenced along a common edge. In this case, use the top edge of the rail and the top of the leg, which will be flush when the pieces are assembled. Also, don't apply glue to the mating surfaces. The end grain won't add much strength and you'll get excess squeeze-out, which is best avoided.

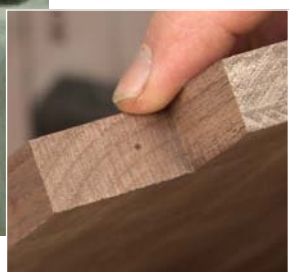
Hide a joint where there's no room to hide

Furniture makers often draft an overall design for a piece first and sort out the joinery afterward. This allows creative freedom but can lead to situations where traditional joinery won't work.

One example is the lower shelf on this table. Rest it on stretchers or cleats and it will look clunky. Traditional joinery would be difficult to execute or visually distracting. Dowels offer a clean solution. You can use the jig to drill the dowel holes in the table legs, but the jig won't work on the small notched corners of the shelf. Instead, dry-fit the legs to the aprons, and clamp a support block to each leg so that its top is level with the shelf bottom. Then insert a dowel center into each hole and rest the shelf on the blocks. A light mallet tap on the outside of each leg will press the dowel center's point into the shelf edge, marking for the mating hole. Now drill the dowel hole in the shelf edge. Again, place glue only in the dowel holes. □

Asa Christiana is Fine Woodworking's *editor.*

Locate the shelf. *A support block clamped to the leg holds the shelf in place.*



Tap once. *A light mallet tap drives the dowel center into the shelf edge (left). The dimple (below) locates the drill bit for a perfectly aligned hole.*

Drill the shelf edge. *Eyeball the drill and the edge of the shelf to make sure the hole is straight and square.*