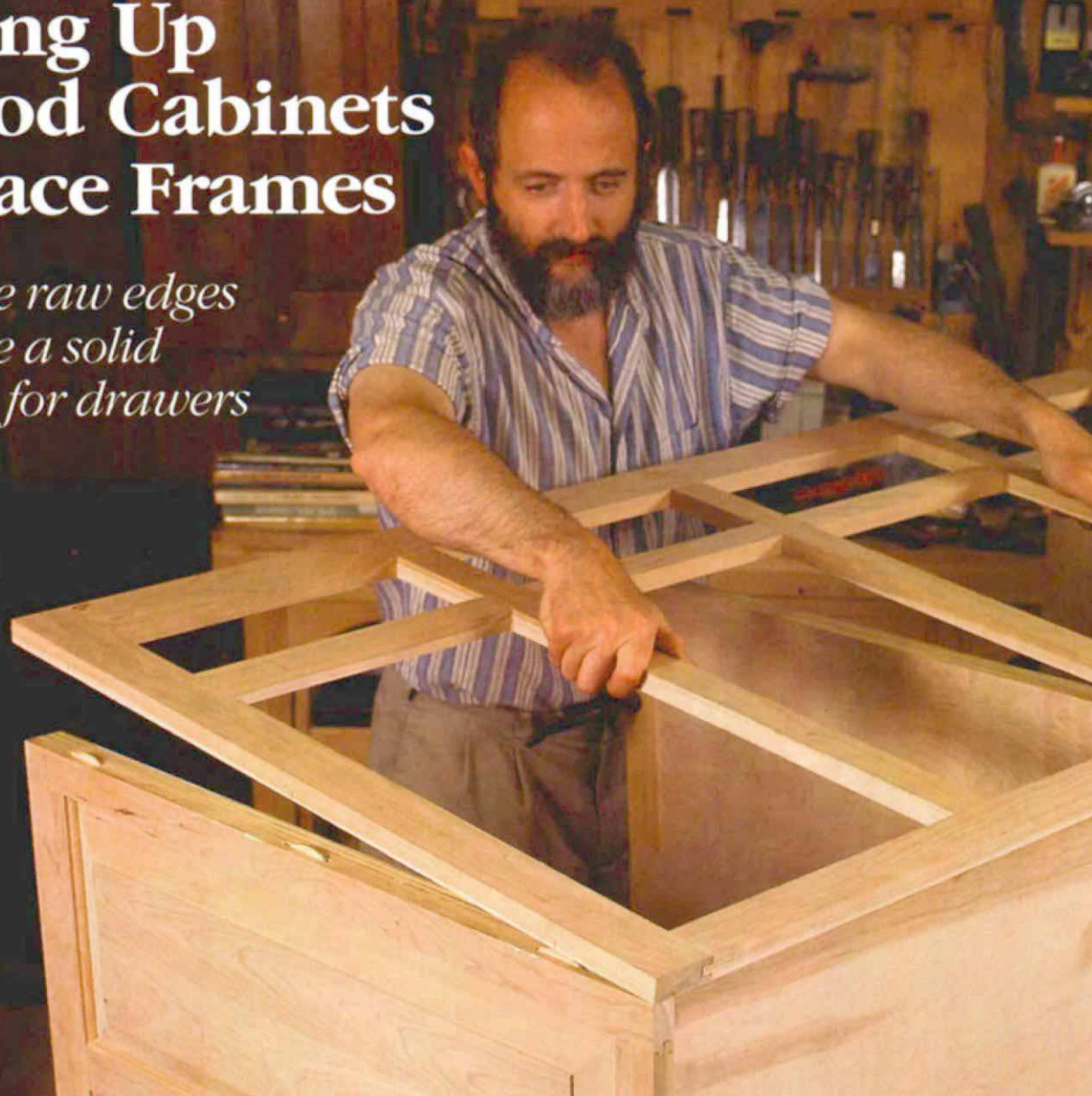


Dressing Up Plywood Cabinets with Face Frames

Frames hide raw edges and provide a solid foundation for drawers and doors

by Joseph Beals



Faceframes complete a cabinet. The author fits a face frame to a plywood carcass, giving the cabinet the appearance of solid-wood furniture.

One of the first face frames I built was a nightmare at every step. It was a maple behemoth, more than 11 ft. long, for a row of cabinets I had built at the job site. When I glued up the frame in my shop, the dowel joints would not line up until I fairly beat them together. I applied the finished frame on-site just as a thunderstorm blew in. I spread white glue on the back of the frame and used two hands, two knees and my forehead to hold it in place. A lightning bolt took out the power at about the third nail. As I set the

frame by kerosene lamp, I decided face frames must be the nastiest job invented.

I have made plenty of face frames since then, and they don't seem nearly as difficult anymore. I now make them with mortise-and-tenon joints and attach them to carcasses with biscuits or with counter-bored and plugged screws.

How a face frame is made is no more important than how it's designed. Face frames should be a subtle element in the composition of a cabinet. A face frame that draws attention to itself through awkward pro-



portions or wild grain isn't doing its job.

And no matter how face frames are made, they all do the same thing. A solid-wood face frame provides a finished front on casework that's usually made of some manufactured material such as plywood or fiberboard. The frame covers the raw edges, provides a place to hang doors, fit drawers and attach trim. Face frames are appropriate for a variety of practical, built-in and free-standing furniture.

Design face frames like doors

Parts of a face frame are best put together as if they were a conventional door frame: Outer stiles should run full height, with top and bottom rails let in between. Internal partitions should follow the same pattern (see the drawing below).

These rules serve well in most instances, but they should be modified when a pair of face frames are joined end to end. The joint between them will look best if the top and bottom rails butt into each other, rather than into side-by-side stiles. This will give the illusion of a continuous frame, which looks better.

It's important to use straight-grained, stable stock for face frames. Wild grain should be avoided, even when the rail or stile is fastened along its length, such as along a

cabinet bottom. It will draw the eye to a pattern that probably has no symmetry or other resolution. The frame should not compete visually with the doors and drawers it surrounds.

There are no best dimensions for the various rails, stiles and partitions, just some guidelines to keep them visually balanced. I mill rough 4/4 stock to $1\frac{3}{16}$ in., but standard $\frac{3}{4}$ -in. stock is fine. The parts should be neither so wide as to appear clumsy nor so narrow as to seem fragile. The proportions of smaller parts such as drawer partitions should be reduced to keep them from looking oversized. For a face frame that will house flush-mounted doors and drawers, I find $1\frac{3}{4}$ in. to be the most satisfying width for ordinary stiles, and I derive other component dimensions from it.

Outside stiles need to be wider at corners because they form a joint. To make both appear $1\frac{3}{4}$ in. wide and maintain symmetry around the corner, one must be cut down to 1 in. wide or less. Working with such a narrow piece is not worth the effort, especially if grooved for a panel. I widen the front stile to $2\frac{1}{4}$ in. and make the side stile $1\frac{1}{2}$ in. wide. (For more on how to get around a corner, see the box on p. 47.)

You have several assembly choices

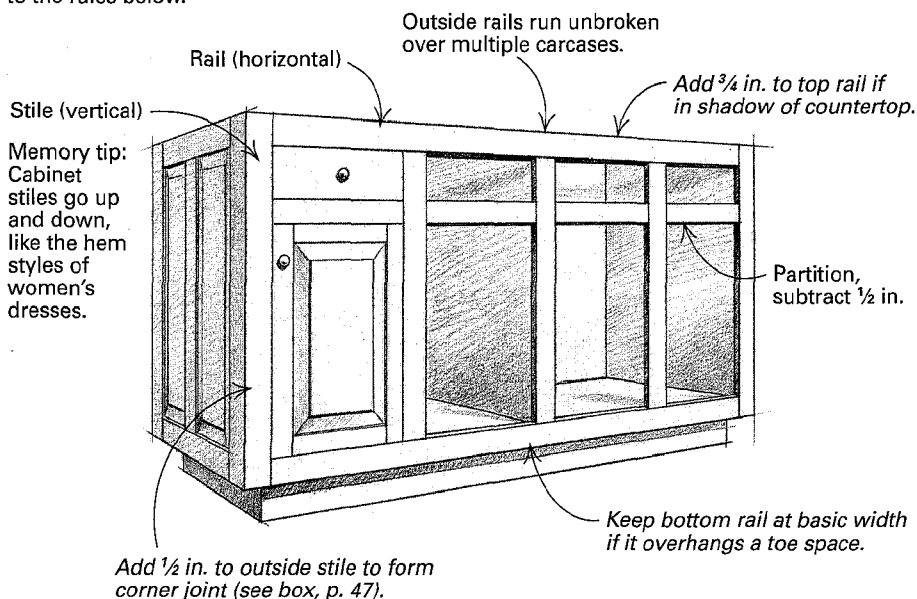
There are at least four ways to make a face frame: with dowels, biscuits, pocket screws or more traditional mortise-and-tenon joinery. Your choice will probably depend on what tools you have on hand and which method you have experience with. For me, the best approach is the old-fashioned way—the mortise and tenon—even if it takes a little longer and is a little more complicated. (The first three methods are explained in more detail on p. 44.)

Mortise-and-tenon joints are strong, very reliable and easily made. They give positive, foolproof alignment of parts. To cut mortises, I use a small slot mortising machine. You could use a router, which is also very fast and accurate.

I make the mortises about $\frac{3}{8}$ in. deep and about $\frac{5}{16}$ in. wide. It's not necessary to make them deeper because a face frame is not subject to particularly severe loading. They should be easy to put together but without too much play (see the photos

Guidelines for designing face frames

Start with a basic width of $1\frac{1}{4}$ in. for rails, stiles and partitions, and vary it according to the rules below.



Three common ways to build a frame

Face frame joints don't need to be particularly strong, but they should go together easily and be simple to align. Mortise-and-tenon joinery is traditional (see a description of my approach on pp. 46-47), but face frames can also be assembled with dowels, biscuits or pocket screws.

Dowels

Pros: Doweled face frames are easy to lay out because you don't need to figure in tenon lengths.

Cons: To prevent frame pieces from rotating, each joint requires two dowels, which can be difficult to align accurately. Once drilled, dowel holes can't be adjusted to compensate for even the smallest alignment mistakes during assembly. If used with yellow glue, doweled joints must be pressed tight at one go: a lapse of a minute or less will let a dowel seize with the joint open.

Biscuits

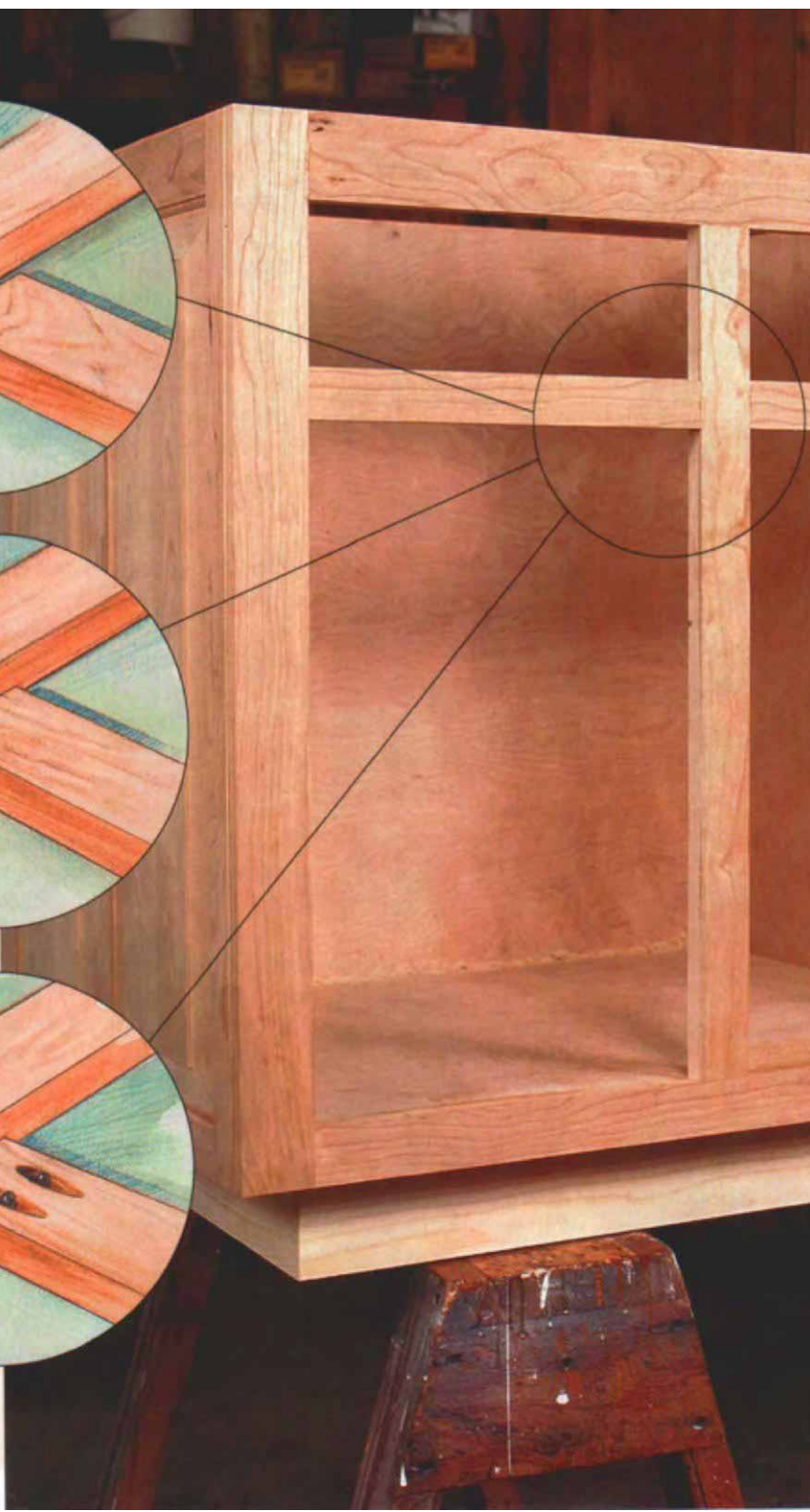
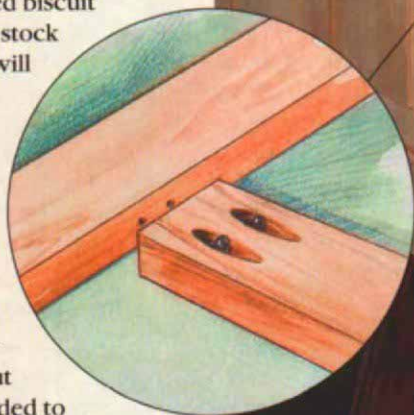
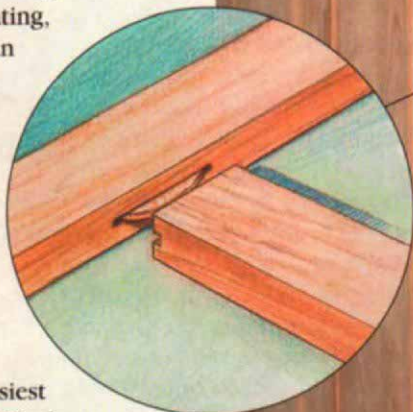
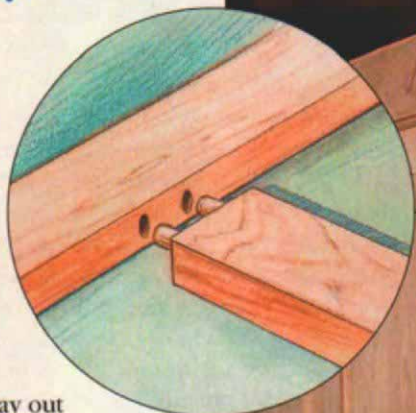
Pros: Biscuit joints are the fastest and easiest joint to make. They align quickly and positively.

Cons: Kerfs for the smallest standard-sized biscuit will break through and show on edges of stock narrower than 2³/₈ in. If a molding detail will be added to the inside of the face frame, biscuits may be the most convenient joinery choice.

Pocket screws

Pros: Pocket screws on the back of the frame make a fast and simple joint.

Cons: Joints are difficult to align perfectly flat and can't be adjusted in any practical manner during assembly without pulling out screws. A dedicated jig is needed to drill screw holes.



showing my approach on pp. 46-47).

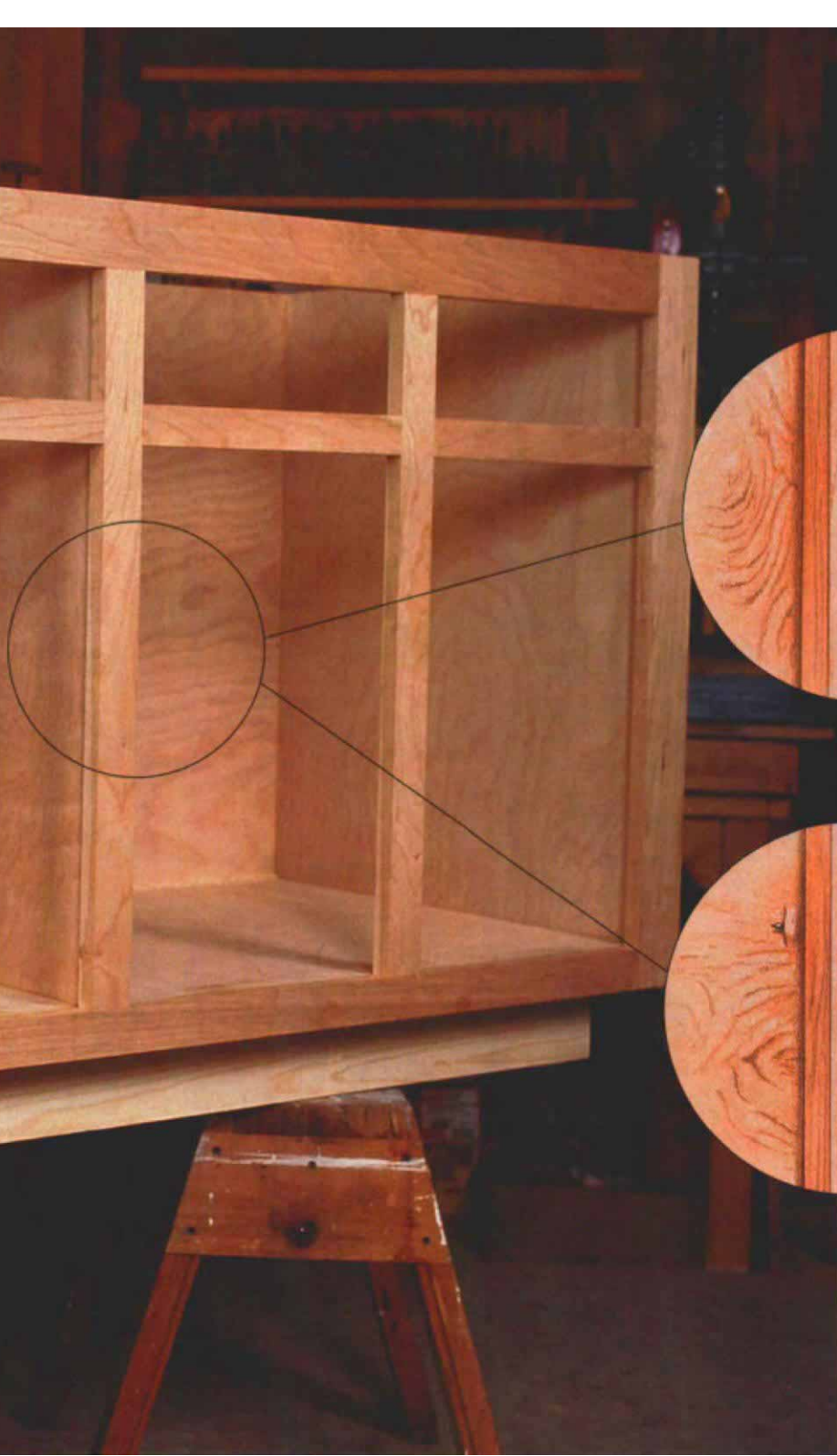
When all the joints have been cut, I dry-fit the face frame and compare it to measurements on my drawings and the carcass. It helps to imagine the finished cabinet and overlay that mental picture on the face frame, in case something brutally obvious has slipped through the design process. If all is well, I glue it together.

I brush yellow glue in the mortises and

on the tenons and fit the frame together across sawhorses (see the bottom left photo on p. 46). I clamp across all joints with just enough pressure to bring the tenon shoulders home tight, checking once again to make sure the joints are flat. Adjustments can be made by shifting a clamp or moving it to the opposite side. However, unlike a door, a face frame does not need to be perfectly flat. Because it's relatively thin, the

frame will be fairly limber and will be drawn flat when fitted to the carcass. I also check each joint for square and lateral alignment, adjusting them with a hammer and block if necessary.

I measure diagonals to check the face frame for square (see the photo at right on p. 46). This is crucial, but easy to forget. To square a slightly racked face frame, I skew each clamp slightly. If that doesn't work, I



Attaching frames on the job site

It's often easier to apply face frames while cabinets are still in the shop, but very large or long cabinets are a different story. When a number of smaller cabinet components are put together on a job site, they can be joined with a common face frame. In that situation, frames can be attached to the cabinets with screws or nails.

Plugged screws

Pros: Plugged screws are useful when clamping a biscuit joint is not an option. They are the equal of biscuits for strength and overall convenience, and can be used with biscuits for better alignment. Use 1 $\frac{5}{8}$ -in. black drywall screws through a $\frac{13}{16}$ -in.-thick face frame. They grip well in plywood and do not require a pilot hole.

Cons: The plugs show if the cabinet is finished bright.

Nails

Pros: The oldest and simplest method is glue and nails, especially for painted work. Nail holes are small and can be filled easily.

Cons: Nails will sometimes wander sideways in a plywood edge, shifting the face frame. Occasionally, a nail will split the plywood or pop out of a cabinet side. Nailed frames are difficult to align exactly without biscuits.

add a clamp across the long diagonal to pull it into place. Despite every care, the square of the door and drawer openings on a complex face frame may not agree with the overall squareness of the frame. When this happens, I split the difference.

Attach face frame to carcasses

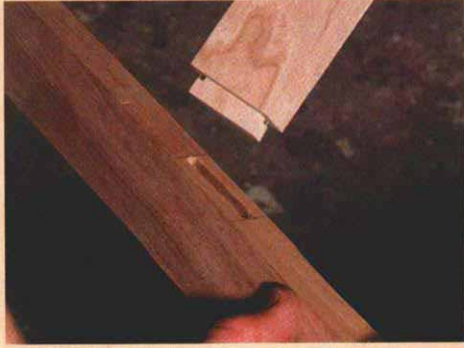
Whenever possible, I attach the face frame in my shop because all my tools are near-

by, and clamping a frame to a cabinet is much easier when the cabinet can be parked on a couple of sawhorses. Attaching them on-site is an option if the carcasses and frames are too big to carry as a single unit. Attaching a face frame to carcasses after they've been set in place is my last option, though there are circumstances when it's the best method.

No matter where you end up attaching

face frames, the single most demanding detail is keeping the top edge of the bottom rail flush with the inside of the cabinet bottom. (One exception is when the cabinet bottom becomes a door stop.) The veneers on most cabinet-grade plywoods are very thin and will not withstand much planing or sanding. The top edge of the bottom rail must, therefore, be fastened dead flush or a fraction proud to permit finishing to a

My way of making face frames



Use mortise-and-tenon joinery for a strong, easily aligned joint. To save time, cut the tenon shoulders on the table saw without changing the blade height.



Before glue-up, dry-fit the whole frame. This ensures all pieces will go together smoothly when coping with glue that sets quickly and an armload of clamps.



Sawhorses make clamping up easy. They'll let you fit clamps on both sides of the frame for even clamping pressure.



Only perfect rectangles have equal diagonals. The author compares diagonals to make sure the face frame is square. Angling the clamps corrects minor problems.

smooth joint. This joint has always been particularly important to me. I think it's a sign of sloppy work when it's not flush, but others may not be so obsessed.

Shop installation with biscuits and clamps—When I attach face frames in the shop, I use biscuits almost exclusively (see the top photo on the facing page). The biscuit joint is strong, accurate and doesn't show. Also, biscuits are invaluable along the bottom rail, which demands accurate positioning. However, it's foolish to trust the biscuit to align everything perfectly because there can be some occasional play in the slots. Even with biscuits, you should expect to make adjustments.

In some materials, such as medium-den-

sity fiberboard, biscuits may be the only practical attachment because screws hold poorly in the edge and tend to split the material. Although biscuits allow me to eliminate screws entirely, the disadvantage is that I need to use clamps (see the bottom photo on the facing page). Clamps tie up the carcass for at least an hour, and they always get in the way of cleaning off glue that squeezes out of the joints.

On-site installation with plugged screws—For a very long run of cabinets, on-site installation of face frames has some benefits. Long runs of cabinets look better when united with a single face frame, but attaching them all in the shop and moving them to the site later is impractical. Multiple

Biscuits are best. Although strong, biscuits can be difficult to align when the face frame hangs over the edge of the cabinet. Instead of resetting the fence on his biscuit joiner, the author uses a spacer block the thickness of the overhang to align the tool.

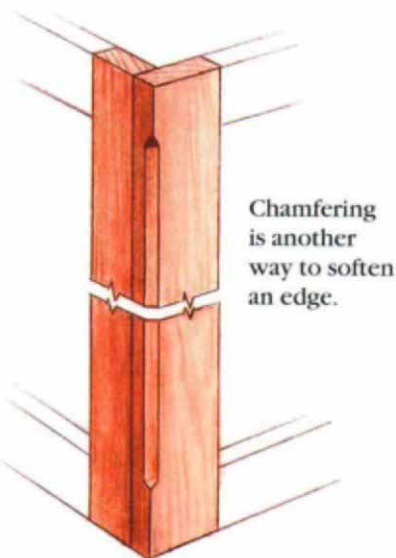
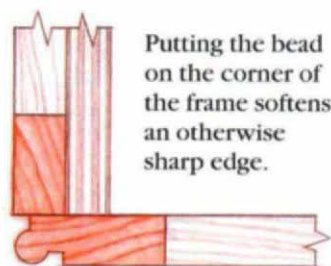
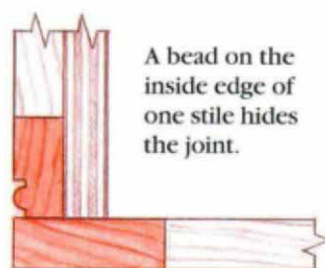
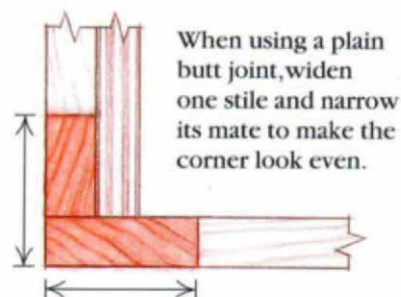


Clamp-up is a cinch with the carcass on its back. Face frames attached with biscuits need to be clamped. Sawhorses make it easy to reach all the edges of the carcass and face frame.



Turning a corner

As seen from the top, face frames can be joined at a cabinet corner in several ways.



cabinets should be set in place individually, then fastened together to ensure they're square, plumb and aligned.

Shop installation of face frames is convenient because the cabinets can lie on their backs, which gives full access for clamping. On-site, after the cabinets are set against the walls, clamping access disappears. In this application, counterbored, plugged screws are hard to match for strength and overall convenience. Once they're in, the attachment is done. Screws grip well in plywood and do not require a pilot hole in the plywood edge.

To hide the screws, I use plugs cut from the same stock as the face frame. For bright finished work, I try to match grain pattern and color as well. After the glue dries, I

strike off most of the excess plug with a chisel and watch how the grain runs. If the grain runs down into the plug, some of the plug can pop off below the surface, leaving a tedious repair job. To avoid it, I finish paring off the plug from the other direction.

Plugged holes vanish under paint, but even with careful grain and color matching, that little circle is always visible under a bright finish. This isn't necessarily offensive, but it requires that screw holes be carefully and symmetrically aligned. I find that there is something pleasing about a thoughtful, geometric pattern of plugs along the edges of a face frame. □

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