

CHAPTER TWO

Supporting a Drawer

A drawer alone — just an open box — is an oddity. For it to work as intended, it has to be installed in a case in a way that allows it to be opened and closed. The movement has to be smooth, and once open, the drawer has to be able to stay open without your help. This movement can be controlled in several ways. Some mounting systems are integral to the case, while others are add-ons. Regardless, the mounting system should be carefully planned along with the case and drawer design.



Runners, Guides, and Kickers

Most of the subassemblies that support drawers in a case or table must be incorporated as you build the piece itself. Sure, hardware makes it easy, though fairly expensive, to hang drawers in an open, undifferentiated case, but this approach is largely limited to kitchen cabinetry and similar built-ins. Most of what we consider “furniture” is built using traditional approaches.

The traditional approach to casework is to partition the case using drawer dividers. A divider is a rail — and, yes, a lot of woodworkers just call it a rail — extending from one side of the case to the other. It separates the drawers visually and physically.

But drawer dividers do more than separate one drawer pocket from another. They also keep the case sides straight and parallel. As such, they need to be integral to the overall design and construction of the case.



ABOVE A chest of drawers may use the case bottom as the support for the lowest drawer and simple frames composed of dividers and runners to support the others. The solid chest walls guide each drawer into its pocket.



TOP LEFT In cabinetry constructed from sheet goods, the interior is sometimes divvied up into drawer pockets with solid panels. It's an expedient approach, since you neither have to dress stock for dividers and runners nor cut joinery to assemble frames.

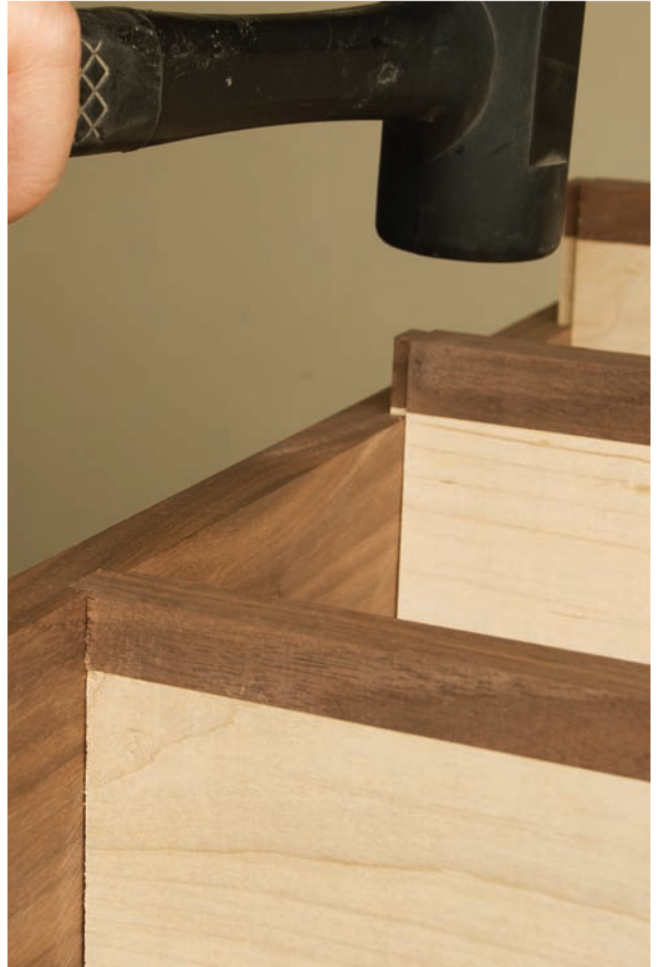


BOTTOM LEFT If drawers of different widths are to be housed in a chest, the internal architecture is bound to be more complicated. In the lower portion of this chest (viewed from the back), full-width drawers are supported by dividers and runners that are attached to the case sides. The top two tiers house multiple drawers, so back rails are used to support intermediate runners and guides.

A stopped dado is a simple way to join a drawer divider to the case side. Rout a shallow dado, just a bit shorter than the divider's width, and square the ends with a chisel. Notch the front corner of the divider. Fitted snugly and glued, the joint is sound.



In a case for lipped drawers, a shouldered half-blind dovetail looks better because it shifts the tail out from under the lip, so it can be seen. Cut a dado, then rout the dovetail slot.



A half-blind dovetail, often called a sliding dovetail in this application, joins divider and case side in a way that resists tension stresses well (even without glue). The tail on the divider's end slides into a matching slot in the case side. Just one divider holds the case sides in place, making case assembly fairly easy for the lone woodworker. Two or three raps with a dead blow mallet will seat a properly fitted joint.

Installing Runners

Of course you need more than a drawer divider to support a drawer — you need runners under each drawer side. A runner, simply, is a strip of wood that extends from the divider to the back of the case. Typically, the runner is joined to the divider with some form of tenon — either a conventional mortise and tenon or a stub tenon housed in a groove.

Inevitably in casework, the runner is cross-grain to the side. It's got to be attached to the side, of course, but in a way that allows the side to expand and contract. Otherwise, it can prompt the side to split or buckle.



TOP RIGHT The mortise-and-tenon is the traditional way of joining runners to the drawer dividers. Assemble the joint without glue so the tenon can shift in and out in the mortise. Though the case side to which the runner is fastened expands and contracts, the runner stays connected to the divider.



MIDDLE RIGHT A loose tenon fitted to matching mortises in the runner and divider is a modern variation of the mortise and tenon.

BOTTOM RIGHT A quick-and-easy connection between runner and divider is afforded by the groove and stub tenon. You cut the groove — stopped or through — with a slot cutter on the router table. Then lower the cutter slightly and cut the stubby tenons with it.





LEFT Runners can be seated in a shallow dado cut across the case side. Use no glue in the assembly. A tenon — a loose one here — joins the runner to the divider, and screws driven through oversized or elongated holes in the runner fasten it to the case side. The dado aligns the runner and keeps it from sagging.

BELOW LEFT A simple method from the 17th and 18th centuries is to join the runner to the divider with an unglued mortise-and-tenon and nail the back end to the case side. When the side expands and contracts, the tenon shifts slightly in and out of the mortise.

BELOW In a case with full-width drawers, no back rail is necessary. Chamfer the end of the runner to reduce the length of mounting screw you need, and screw it to the case side. Building in a period of high humidity? Leave a gap of about $\frac{1}{8}$ " between the runner's shoulders and the divider's edge. The joint with the divider is unglued, and the gap will close as humidity declines.



Where a runner will be trapped between the divider and a back rail, you can glue the mortise and tenon between the runner and the front rail (**LEFT**), leaving the joint with the back rail unglued. Join the runners to the divider, then set the rail in place and drive it home (**ABOVE**).

Web Frames

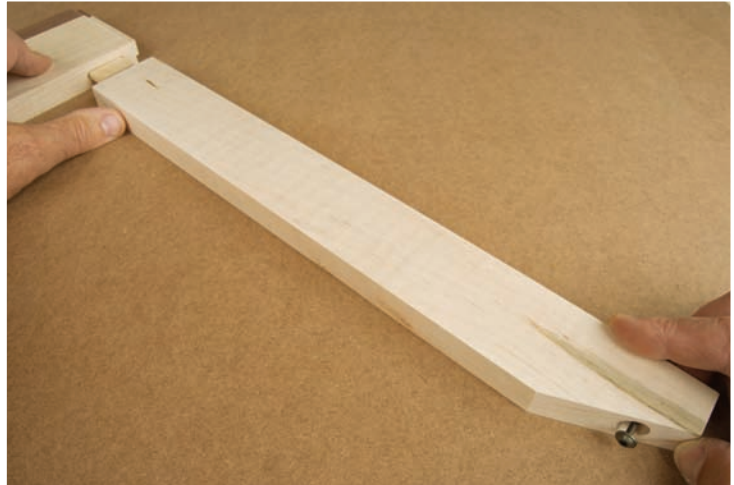
Often, the system of drawer dividers and runners is turned into a complete frame, with two (or more) runners trapped between rails front and back. The resulting frame, usually called a web frame, can be constructed and installed in a variety of ways, all derivative of how drawer dividers and runners are joined to each other and to case sides.

The drawing (bottom) shows a workable way of constructing and installing a web frame. Typically, the parts of the web frame are not glued together, though the frame rails are glued to the case.

In most cases, the runners should be slightly (about $\frac{1}{8}$ ") short at the back so that the side can shrink, closing this gap between the runner and the back rail without pushing the rail out.

In a frame-and-panel (or post-and-panel) assembly, wood movement is moot. The runner can be edge-glued to a rail in the side assembly, or it can be set into dadoses in the side assembly stiles and glued, so long as it isn't glued to the panel. The runner could also be mortised into a drawer divider and glued to the back stile.

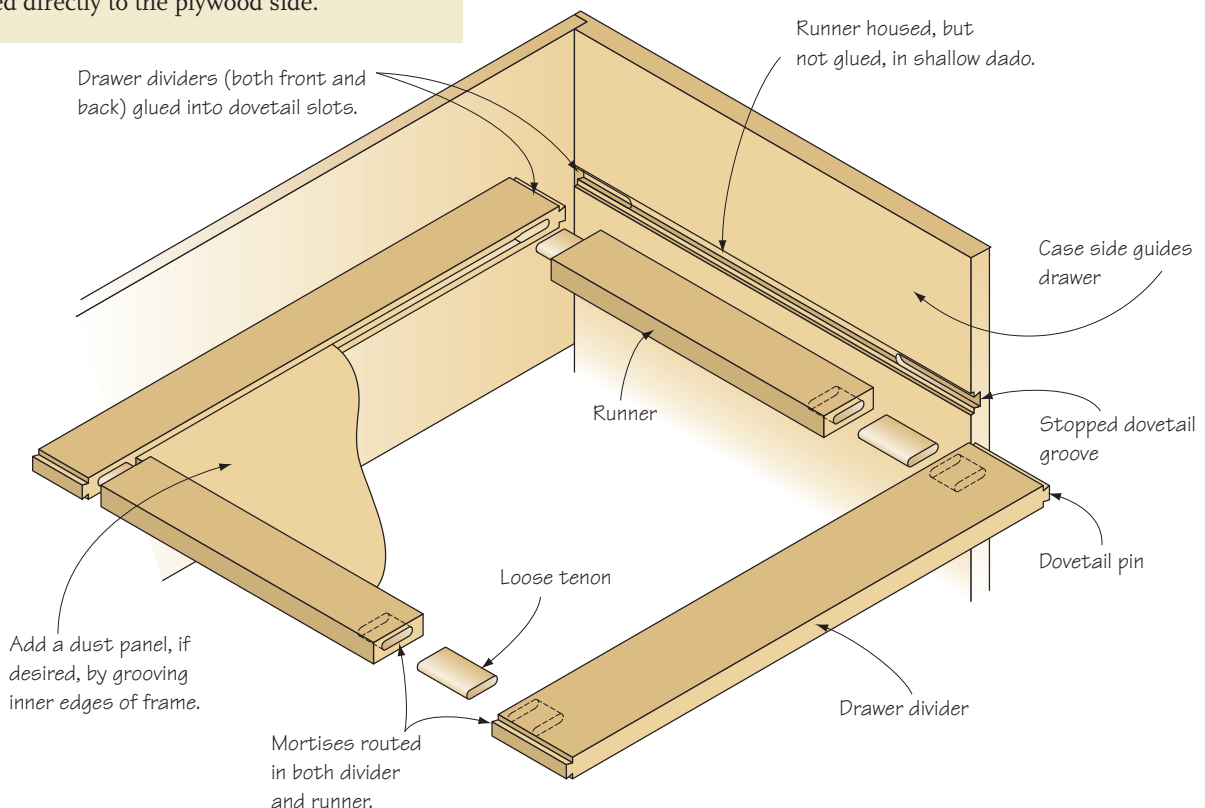
In plywood construction, a runner can be glued into a shallow dado or simply glued and screwed directly to the plywood side.



The simplest web frame consists of a drawer divider and a couple of runners. Here, the runner is linked to the divider with an unglued loose tenon. A single screw will fasten the back end to the case side, fixing the runner at that spot. As the case side expands and contracts, the space between the runner and divider will vary.

Typical Web Frame Construction

Properly assembled and mounted, a web frame allows solid-wood casework to expand and contract. Cut the runners about $\frac{1}{8}$ " short and join them to the drawer divider with glued mortise-and-tenons. Leave the joint between runners and back rail unglued to allow the case sides to move.



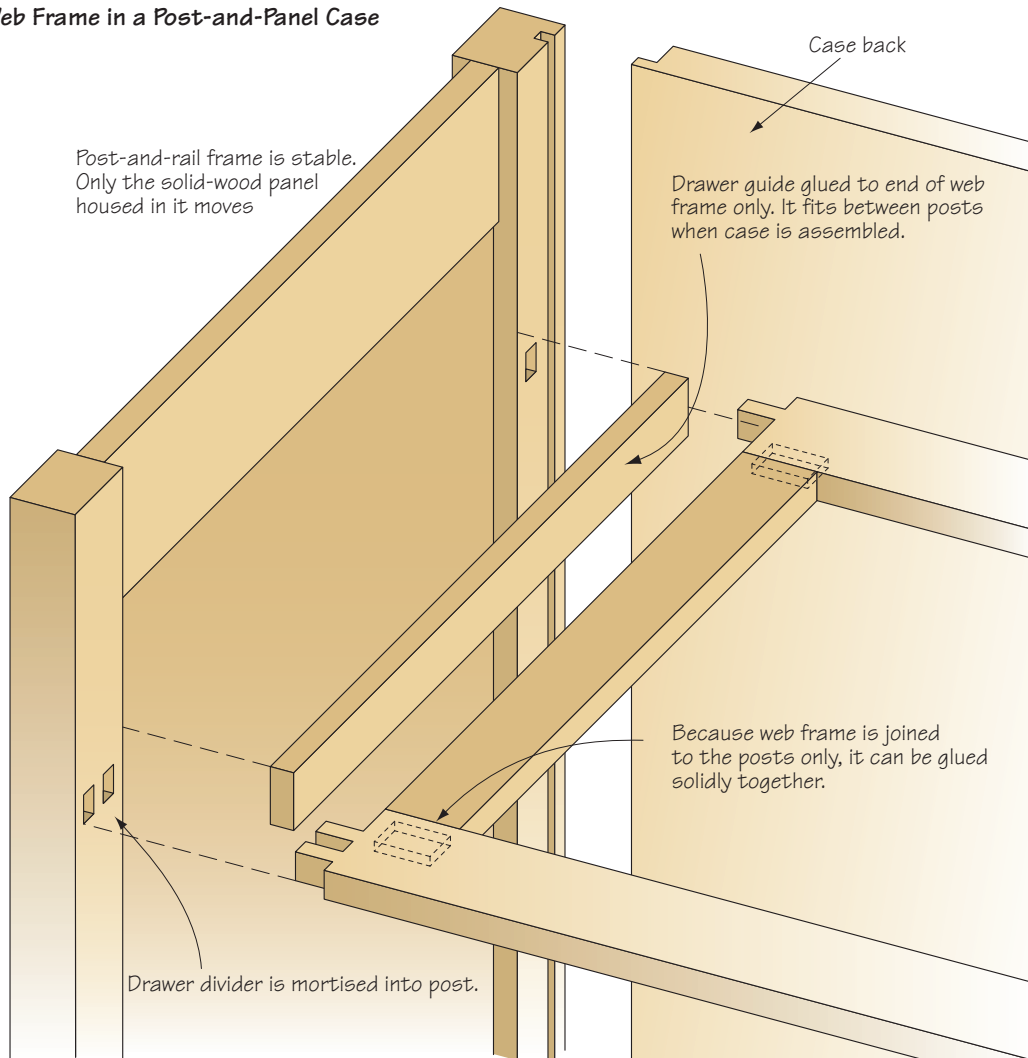


Keep a drawer's contents clean by fitting a dust panel into a web frame. Before plywood was invented, a solid-wood panel would be incorporated to double as a runner. Nowadays, plywood or hardboard panels are fitted to the web frames.



A web frame to support three drawers needs a back rail. All the runners are suspended between it and the drawer divider using loose tenons. The divider has two dovetail grooves for vertical dividers, and drawer guides will be glued to the wide runners.

Web Frame in a Post-and-Panel Case



Guides

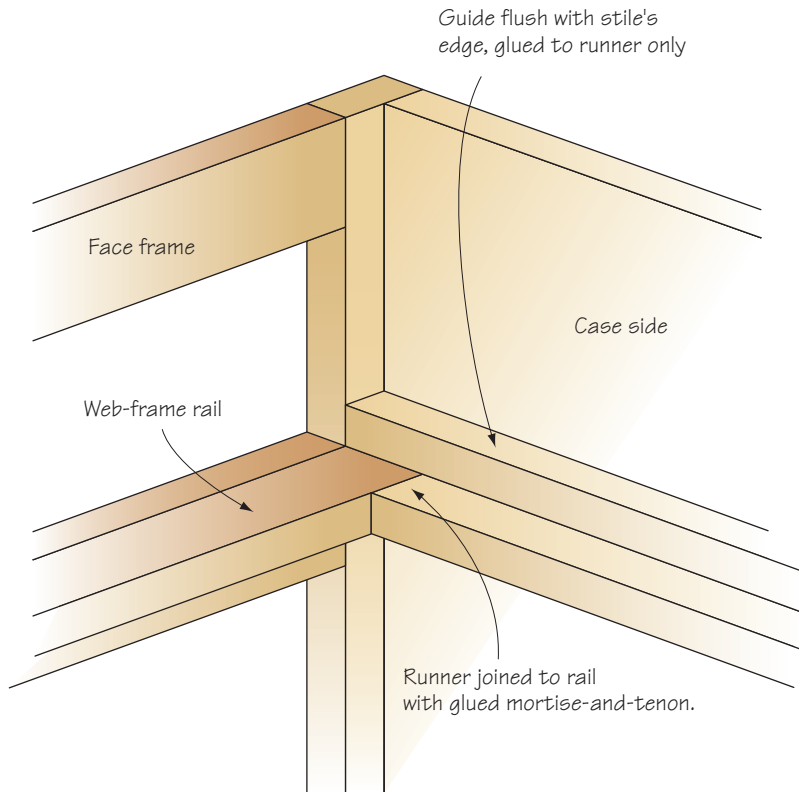
A drawer's movement in and out of its "pocket" usually is directed by the case sides. But sometimes, as in a case with a face-frame or a post-and-panel case, you need drawer guides. The guides form a channel just a tad wider than the drawer (so the drawer can't get cocked and wedged half-closed).



Guides are sometimes needed to control the drawer as it moves in and out of its pocket. In this utilitarian cabinet with a face frame, extra strips of wood attached to the web frame form a channel just wide enough for the drawer.

1. Guides

Runner and Guide in a Face-Frame Cabinet



Chances are that a drawer in a frame-and-panel chest will cock slightly when you close it and the end of the side will jam against the side assembly's rear stile. So a guide, planed flush with the stiles, must be glued to the drawer runner, so the drawer always opens and closes smoothly without jamming.

Center Runners and Guides

Side-by-side drawers, often included in dressers and other chests, need support in the middle of the chest, away from the sides. The usual approach here is to suspend a wide runner between the drawer divider in front and a rail in back. A vertical divider with a guide behind it separates the neighboring drawers.



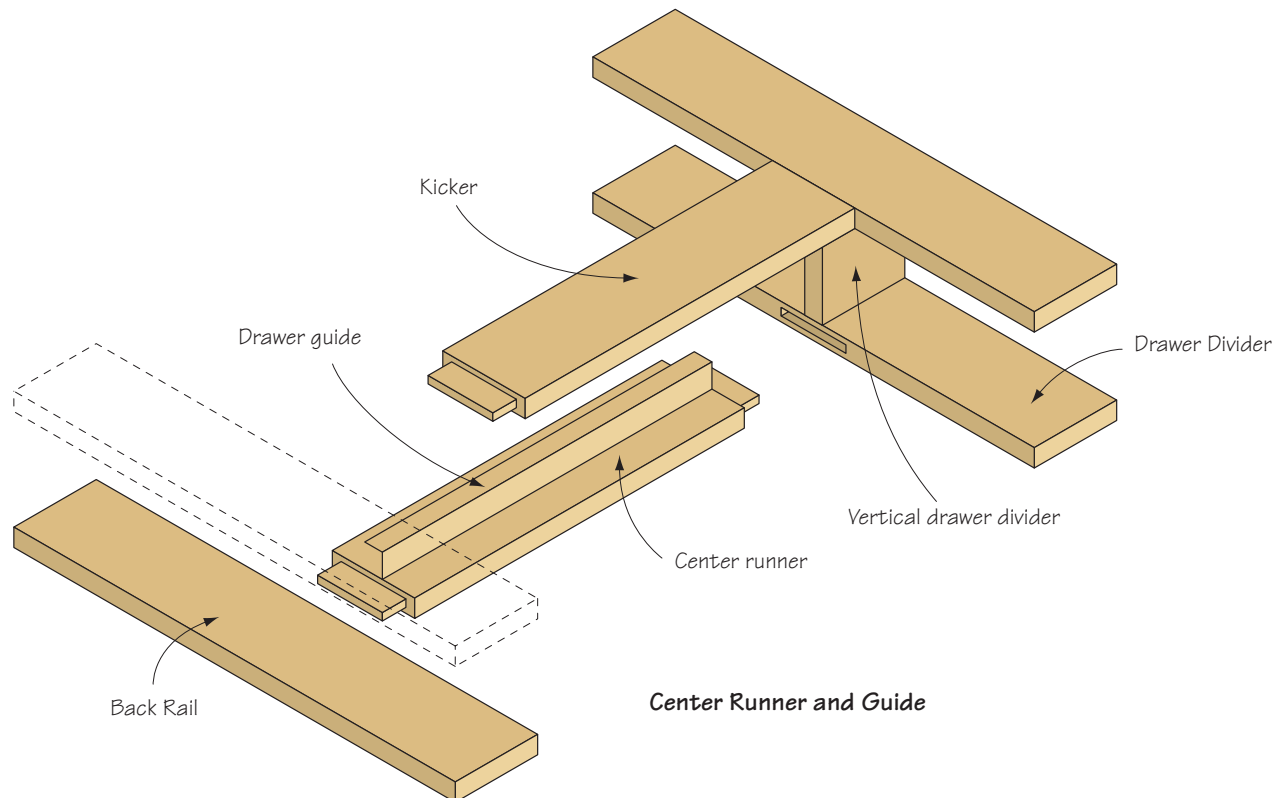
Two wide runners and two narrow runners trapped between a drawer divider and a back rail form a web frame to support three drawers. This is a test fitting. As I assemble the case, I'll glue the divider to the case sides, then the runners to the divider, and finally glue the back rail to the case but not to the runners.



Vertical drawer dividers partition the low, wide space between horizontal dividers into narrower drawer pockets. This divider is joined to the assembly with sliding dovetails.



To control the movement of the drawers, glue guides to the wide runners, directly behind the vertical drawer dividers. A wide straight scrap, set against the vertical divider and clamped to the horizontal divider, aligns the guide.



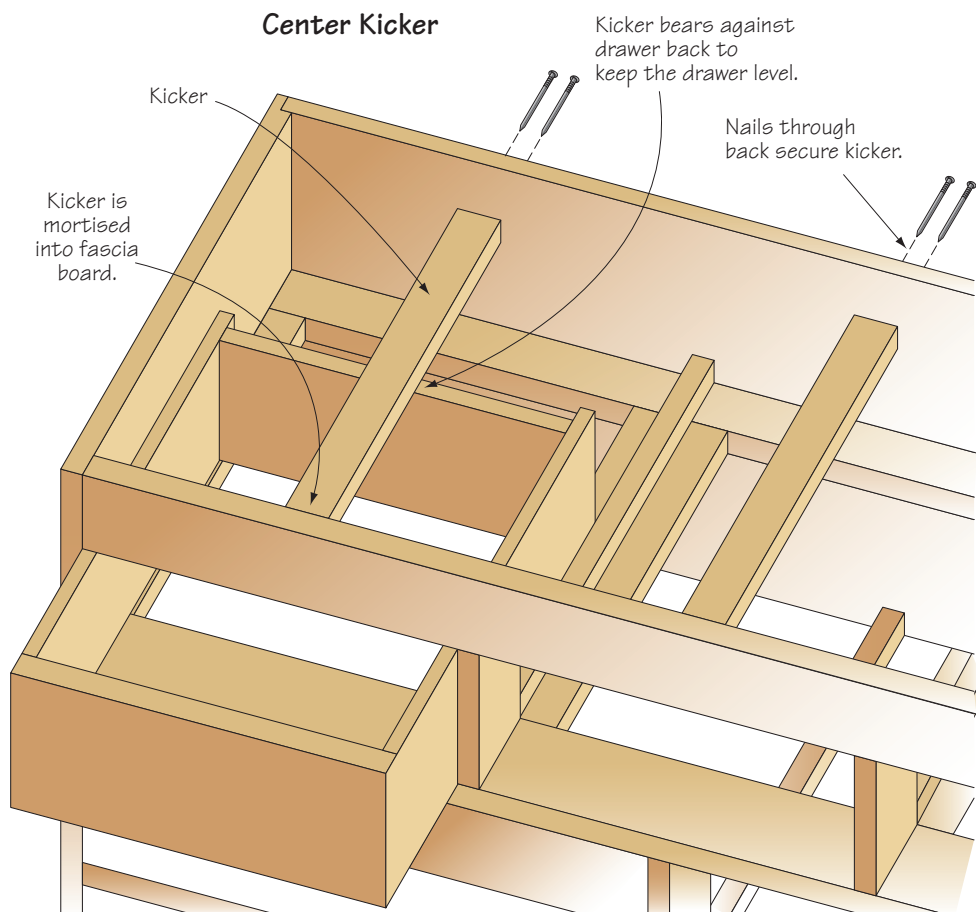
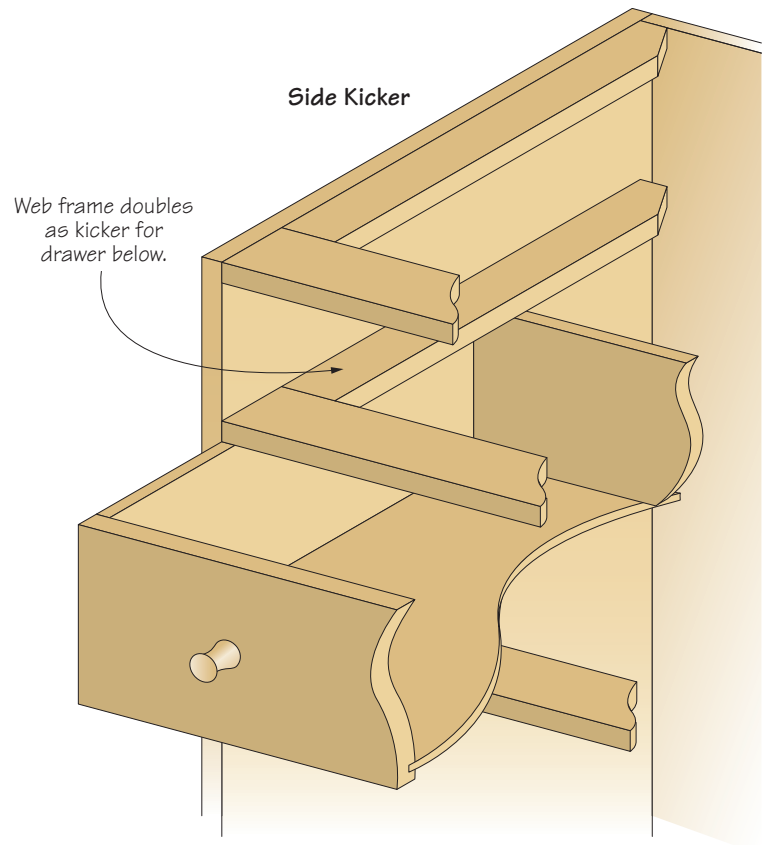
Center Runner and Guide

Kickers

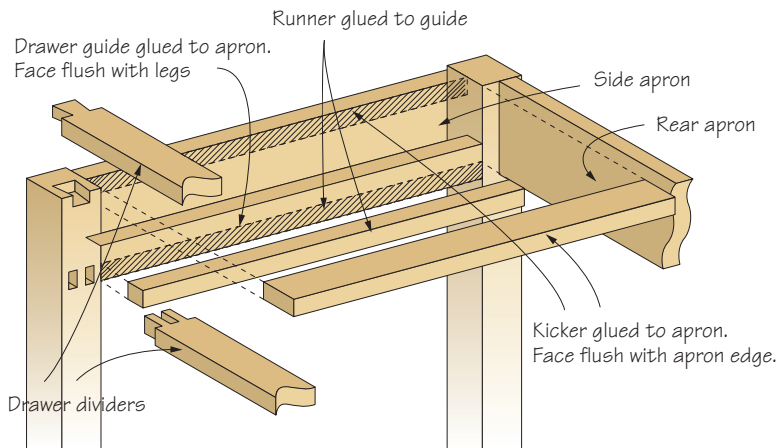
An important element in most drawer mounting systems is the kicker. A kicker prevents the drawer from tipping down as it is pulled open. It is just like a runner, but generally, it's mounted above the drawer side. A single center kicker may be used for a top drawer.



Stationed just above a drawer, the kicker keeps it level as it's pulled open. Typically in a chest of drawers, a runner doubles as the kicker for the drawer beneath it. That's the case in this chest, despite the staggered arrangement of its drawers.



Runner, Guide and Kicker in a Table



Sturdy framing supports multiple drawers in a table. A vertical divider mortised into upper and lower rails stiffens them. The runner and kicker, also mortised into the rails, double as cross members. The drawer guide is glued to the runner.



At the back, the runner and kicker are mortised into the apron.

Tables with Drawers

Adding a drawer or two to a table makes it more useful. A drawer in a bedside table holds (and hides) what would otherwise clutter the tabletop. In the kitchen, it becomes a work table, the drawer holding utensils. In the den, drawers in a table transform it into a desk.

But drawers make engineering the table more challenging because it occupies space where a solid apron would otherwise be. A critical design variable is the drawer's width. If the drawer (or drawers) span the space from leg to leg, then a double rail construction is appropriate. Two rails, turned on edge, connect the legs, forming a drawer pocket. The top rail is almost always let into the top of the legs with a dovetail joint. The bottom rail joins the legs with either a twin mortise-and-tenon joint or a sliding dovetail.

The same sorts of runners and guides and kickers that support drawers in a case serve in the table. But because the table's aprons almost invariably have their grain running from leg to leg, you can just glue the parts in place. You don't have to accommodate wood movement.

Two drawers fitted side-by-side under a table top are always separated by a vertical divider, and it ought to join the horizontal drawer rails with either a twin mortise-and-tenon or a sliding dovetail joint. The latter offers the best structural support because it locks the parts together mechanically in a way the other two joints do not.

Behind the vertical divider, of course, must be a center runner, guide and kicker almost exactly like what you'd use in a case. Instead of back rails, you'd mortise the runner and kicker into the back apron, or better, into ledgers glued to, and stiffening, the apron.

A couple of cautions are in order. When planning a table with drawers, remember that the wider the span, the more likely it is that the drawer-rail assembly will sag. Remember too that the total height of the drawer rail assembly should be no more than 6" if you expect to sit with your legs under the table.