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64

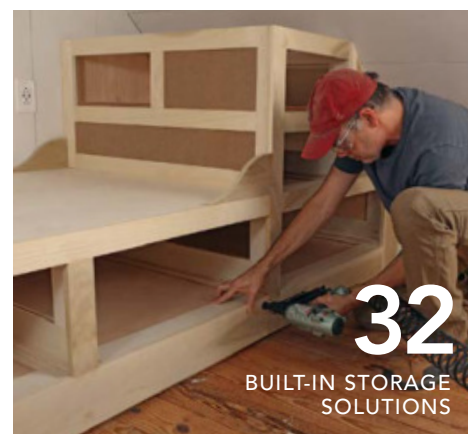
SOME ASSEMBLY
REQUIRED

FEATURES



54

CAST IRON,
UNDER COVER



32

BUILT-IN STORAGE
SOLUTIONS

32 A Bevy of Built-Ins

A bed, a desk, a closet, and a laundry hamper transform an attic into a cozy, do-it-all space

BY RODNEY DIAZ

40 10 Trim-Carpentry Essentials

Use these tips to increase efficiency, minimize mistakes, reduce headaches, and boost quality in your interior finish work

BY TYLER GRACE

46 COVER STORY // TOOL TEST Compact Cordless Miter Saws

A veteran carpenter puts eight ultraportable sliders to the test

BY BEN BOGIE

50 The FHB Interview: Gary Katz

A master carpenter and pioneering educator teaches us that the best way to learn is to never stop being a student

BY AARON FAGAN

54 Custom, Shop-Built Radiator Covers

A furniture maker pairs traditional looks with mechanical fasteners to manage extreme temperatures

BY BRIAN ALCORN

60 Drawer Slides for Every Budget

Undermount, soft-close slides are a cabinetmaker's dream, but lower-cost options can be reliable when installed with care

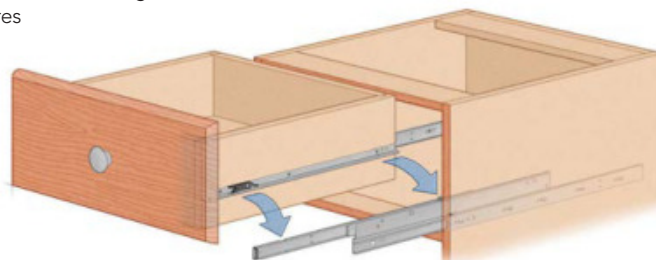
BY BEN SCOTT

64 One-Stop Woodshop

Sometimes it makes sense to have one company handle all the woodwork for a project, from fabrication to installation

BY STEVEN BACZEK

60 HARDWARE MATTERS



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IN EVERY ISSUE

8 **FINEHOMEBUILDING.COM**

10 **CONTRIBUTORS**

12 **LETTERS**

14 **TIPS & TECHNIQUES**

- Scribing a skirtboard to an existing stair
- Can't-fail stud finder
- Taper flat stock
- ...and more

20 **KNOW THE CODE**

Taste is not the code's concern

24 **TOOLS & GEAR**

- Hardworking brad nailer
- Modern plumb bob
- Precise box-joint cutter

70 **HOUSES BY DESIGN**

75 **SPEC**

- Old-world finish for interior woodwork
- Find finesse with flexible trim
- Three unique adhesives

78 **ASK THE EXPERTS**

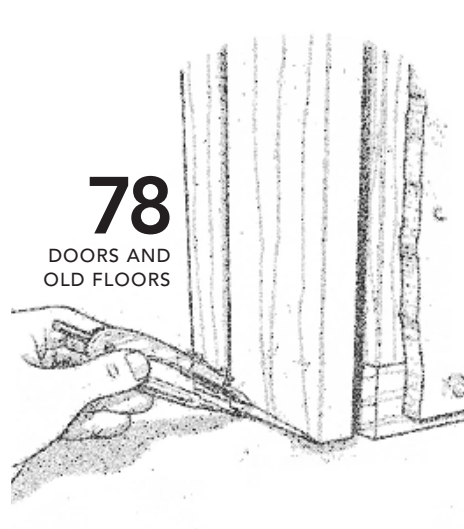
- Fitting out-of-level prehung doors
- Working with tongue-and-groove boards
- Get casing miters tight
- ...and more

82 **BUILDING MATTERS**

What is "good enough"?

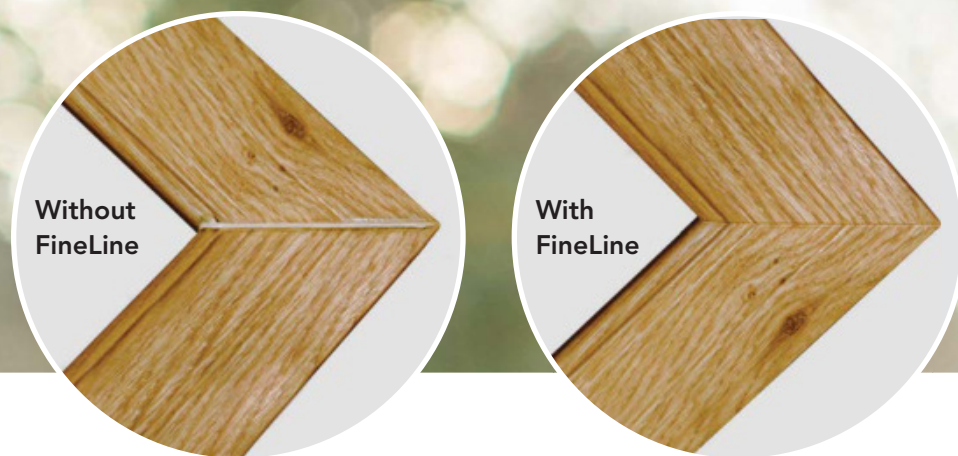
86 **KEEP CRAFT ALIVE**

Garland Wood,
master carpenter



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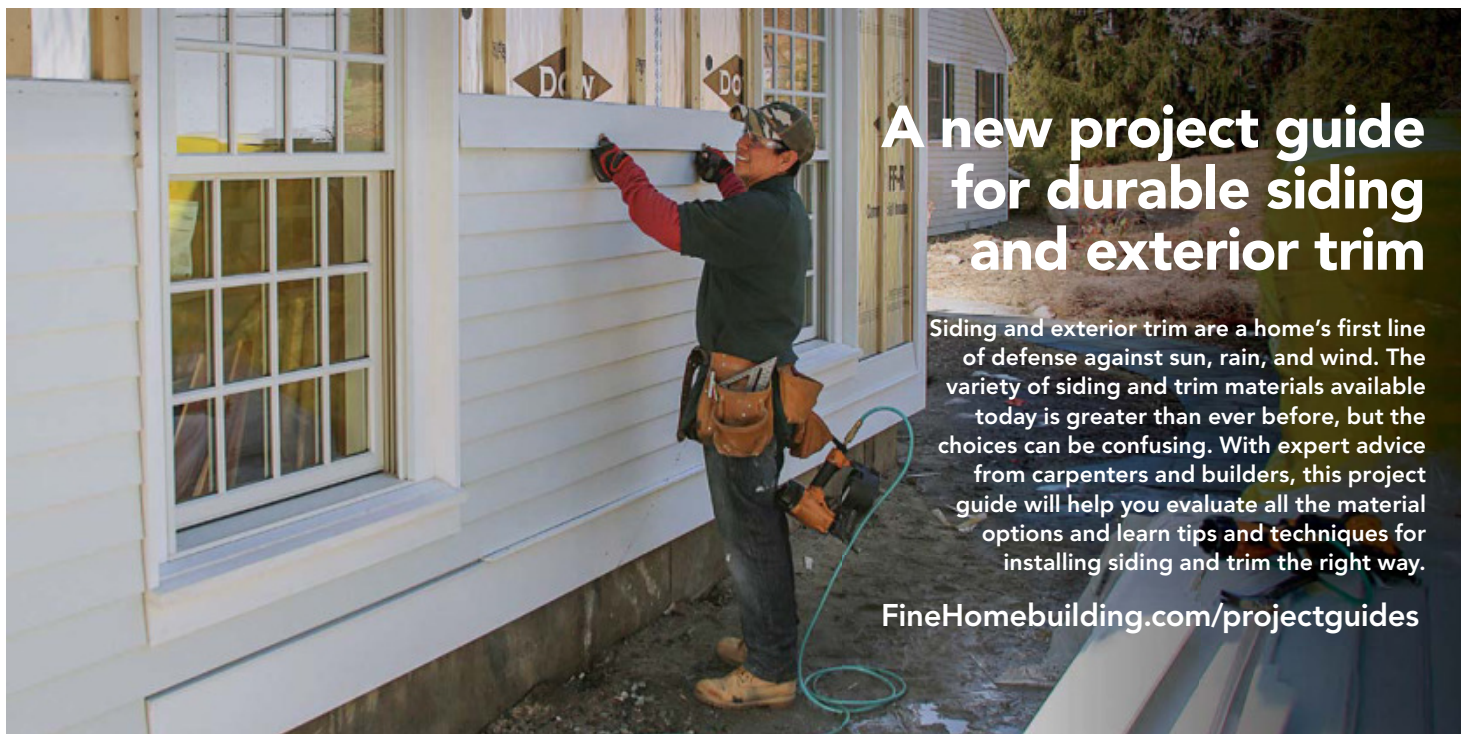
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A new project guide for durable siding and exterior trim

Siding and exterior trim are a home's first line of defense against sun, rain, and wind. The variety of siding and trim materials available today is greater than ever before, but the choices can be confusing. With expert advice from carpenters and builders, this project guide will help you evaluate all the material options and learn tips and techniques for installing siding and trim the right way.

FineHomebuilding.com/projectguides

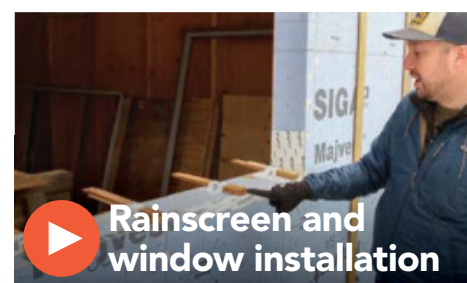
How to build and install kitchen cabinets

Are you building cabinets from scratch, or fixing warped cabinet doors? Do you want to use stock cabinets, or get them custom-made? Not sure where to start? Whatever the problem you're trying to solve, this collection of helpful hints and step-by-step guides will assist you in the process of creating or installing beautiful kitchen cabinets: FineHomebuilding.com/kitchen-cabinets.



Ep. 262: PRO TALK with Dejah Leger

Senior editor Patrick McCombe talks with carpenter Dejah Leger about her career shift into carpentry. Watch this and more episodes at FineHomebuilding.com/protalk.



In this Job-Site Diaries video, builder Josh Salinger shows how to install, waterproof, and air-seal a window in a wall with rainscreen siding details: FineHomebuilding.com/jobsitediaries.

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THE VOICES OF EXPERIENCE



BRIAN ALCORN ("Custom, Shop-Built Radiator Covers," pp. 54-59) is a woodworker and furniture maker who uses both hand and power tools to create and replicate period furniture and architectural elements, though he also enjoys making modern pieces. In order to support his woodworking habit, Brian is a full-time real estate conveyancing attorney. He lives and works in Westford, Mass., with his wife, dog, and two cats. You can follow Brian's woodworking exploits on Instagram @alcornwoodworking.

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Architect **STEVEN BACZEK** ("One-Stop Woodshop," pp. 64-69) has been in the building industry for over 30 years, and has designed hundreds of projects across the spectrum of energy performance and sustainability. Steven is committed to marrying beautiful aesthetics with trusted durability, health, comfort, environmental responsibility, and energy efficiency for all his clients. In addition to his design work, he is the author of over a thousand energy-smart construction details for GreenBuildingAdvisor.com.

write an article

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The fun part

At *Fine Homebuilding*, we hold houses to a high standard. Our ideal home has a smart floor plan and is no bigger than it needs to be, is extremely durable, exceeds the energy codes for its climate, considers homeowner comfort and health with well-designed mechanicals and proper ventilation, and uses the homeowner's budget wisely to reach these goals. In light of all of this, I was recently challenged to justify the projects we choose to share in our HOUSES by Design department, which are commonly the most lavish and expensive projects in the magazine.

It's true, we don't vet the homes we publish in our design department for the characteristics listed above—we choose them solely for the inspiration they offer. Given the practical sensibilities of our editorial team, I have to admit that HOUSES by Design does

sometimes feel out of place in the magazine. But I was recently reminded by former Green Building Advisor editor Martin Holladay how important it is to be inspired by our homes. In fact, he said that it's the most important thing.

Preparing for a new project, I emailed Martin looking for advice. Familiar with Martin's writing on what makes a Pretty Good House, I predicted some of his answer: simple shapes, an

unobstructed south-facing roof for a PV array, well-planned mechanicals. What I didn't expect was his first comment: "It's OK to be idiosyncratic. If you want a certain design, go for it. It's your house. (Remember, beauty and love trump energy efficiency.)"

Martin's right. What we love about homes tends to be the work of trim carpenters and those of us who tackle trim, cabinetry, and built-in projects for the love of the work, and of the result. It's this work that often makes our homes beautiful. And so, that's what we're featuring in this issue—skills, tools, materials, and project ideas to empower and inspire you to make sure you, and your clients, love your homes. And I bet you'll agree, of all the hard work that goes into a house, this is the fun part!

—BRIAN PONTOLILO
editorial director



“It's OK to be idiosyncratic. If you want a certain design, go for it. It's your house.”

—MARTIN HOLLADAY



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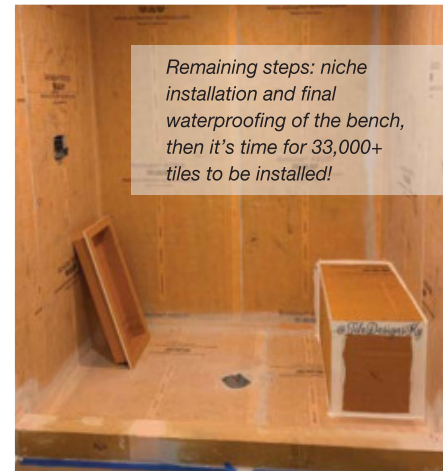
Contractor Profile Tile Designs LLC



Tiling is Like a Hobby I Get Paid For

Tile Designs LLC, based near Louisville, Kentucky is owned and operated by Brandon Doner and Jordan Pearson. The duo does all their own work and has narrowed their focus so they only build tile showers, primarily custom showers. Brandon does all the tile work and Jordan's specialty is mud beds. She explains, "We feel like we have more control over the project, especially with details like drain placement when we install a mud bed."

Brandon got his start working in the family flooring business. Around 2010 he started to concentrate on tile projects and attended his first 4-hour Schluter-Systems seminar. "I quickly saw that it was easier than the prior methods we had been using and we started to find more places to use Schluter," says Brandon. Since that initial introduction he has attended two additional hands-on Schluter workshops, learning about new systems each time. "When we first saw KERDI-BOARD we knew it was a game-changer. We'll never go back to using other wallboard products. Those curbs have changed our life. They are really easy to customize and are so much better than working with wood."



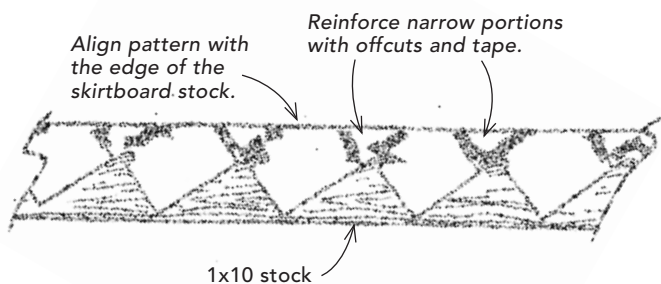
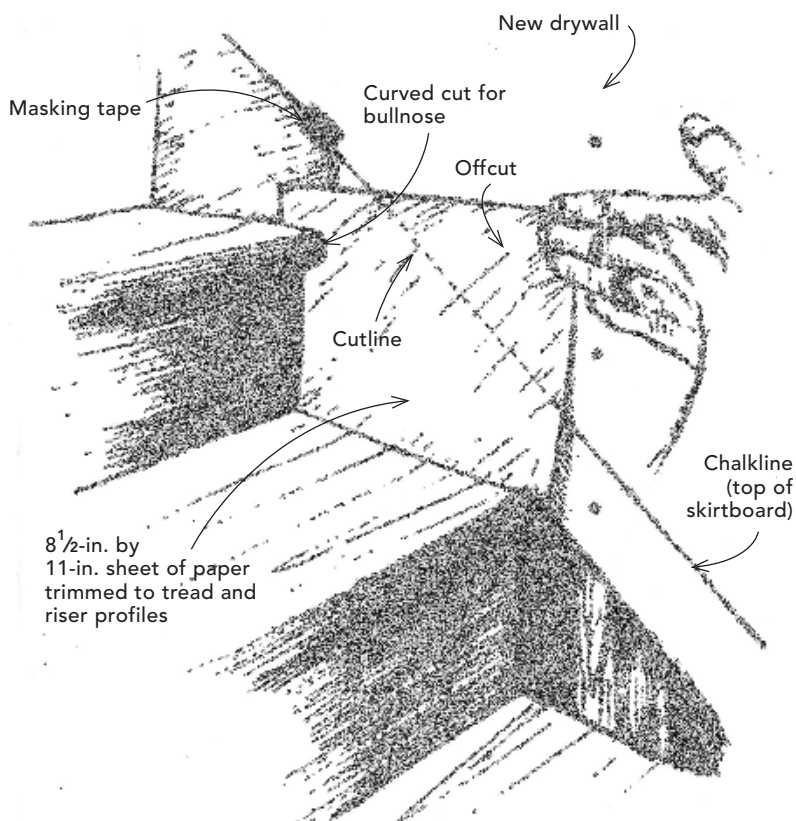
"I quickly saw that it was easier than the prior methods we had been using and we started to find more places to use Schluter."

Their skills were put to the test when a homeowner produced a photo of an ombre shower they wanted Tile Designs to replicate in their 4' x 6' shower. "We said yes right away but really had no idea how big the project would become!" according to Brandon. "We ended up getting the whole family involved. The project consumed 33,800 7/8" x 7/8" tiles in nine different colors. The tiles came on paper-faced sheets, so all of the sheets had to be soaked and the tiles peeled off by hand." The team of six spent two weeks laying out each individual tile on trays, being very careful to avoid creating any patterns.

The finished space is a thing of beauty and has become a marquee project that has helped Tile Designs land other unique and challenging projects. "Our business is all about quality and we try to make it perfect every time," says Brandon. "I love it. It's like having a hobby I get paid for."

www.schluter.com





Got a tip?

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TIMELESS TIP

ISSUE 196 // JULY 2008

Have you ever found yourself installing a skirtboard after the stairs are in place, perhaps when remodeling? If so, you can thank Forrest McCannless for sharing this tip. He describes how he made a 14-ft.-long paper pattern to make templates of the stair skirt with all its ins and outs. The finished product fits so well, you'd never know it was installed after the treads and risers.

—CHARLES MILLER

Scribing a skirtboard to an existing stair

Typically, skirtboards are sandwiched between the stair stringer and the wall, and are installed before the treads and risers that abut them. That's the easy way. In a recent remodel, I had to put in a skirtboard the hard way—with the treads and risers already in place.

As shown in the drawing, I made a pattern out of taped-together 8½-in. by 11-in. sheets of paper. Without any measuring, this method yielded an exact profile of a stair that had its share of crooked lines.

First, I snapped a diagonal chalkline at the angle of the stair. The chalkline represented the top of the skirtboard. Working from the top, I next cut, fit, and taped together pieces of printer paper, filling each triangular space from the tread and riser up to the snapped line. I used scissors to cut the curve around the tread bullnose and tapered the riser cuts in places where the risers weren't plumb. I used the offcut triangles from each piece to reinforce the narrow parts of the pattern.

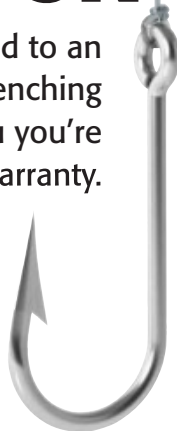
This process yielded a 14-ft.-long pattern, which I cut away from the wall and taped to a 1x10 piece of skirtboard stock. I aligned the long edge of the pattern with the stock and carefully traced the outline. This paper-doll pattern worked like a charm.

—FORREST MCCANLESS
Oxford, Ga.

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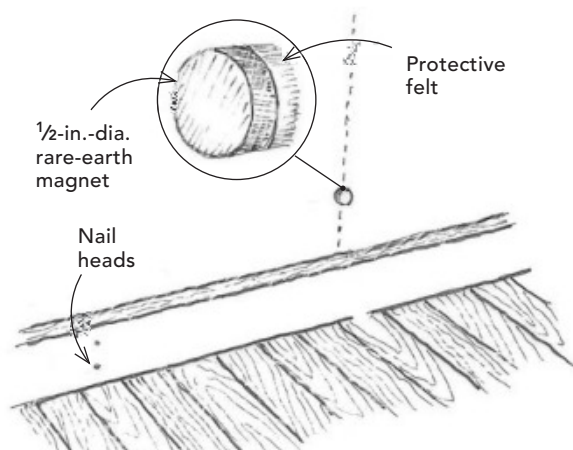
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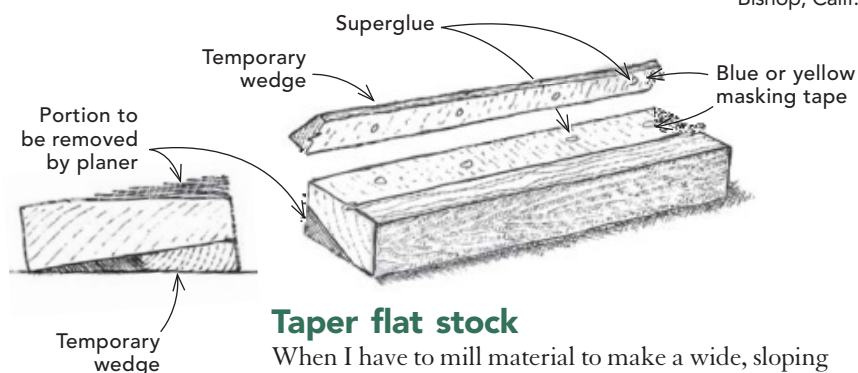




Can't-fail stud finder

Forget electronic stud finders and punching endless holes in drywall with a finish nail to find framing members. Instead, use a 1/2-in.-diameter rare-earth magnet and cover one side with self-stick felt pad to prevent scuffing the paint. You can find both items at the local hardware store. There are mass-produced magnetic stud finders, but I think my version works better. One additional benefit to a magnetic stud finder is that you can stick the magnet to a drywall nail or screw and leave it there—no pencil marks needed.

—TODD BRADLEE
Bishop, Calif.



Taper flat stock

When I have to mill material to make a wide, sloping surface—for a flooring transition, for example—I use my planer, temporarily attaching a wedge-shaped piece of scrap to the underside of the stock and gradually removing material until I reach my desired profile.

To do this, cut a piece of scrap wedge at the correct angle, clean up any saw marks on the jointer, and cut it again to its final height on the tablesaw. Next, adhere a piece of painter's tape to the underside of the workpiece and the wedge, and place dabs of superglue on the tape—one on the wedge and a corresponding dab on the workpiece. Set your planer height so that it just nips off the top corner of your workpiece, and take extra care to guide the piece so that the wedge and the workpiece are making good contact with the bed rollers.

—LAURA SMARRITO
Philadelphia

Try metric measurements

A few years ago, as an experiment, I trimmed out a few rooms in my house using the metric system for measuring. After some initial awkwardness, I found it was faster and more accurate than using inches. I think it's because metric measurements use whole numbers, which are almost always easier to manage than fractions—especially when math is involved.

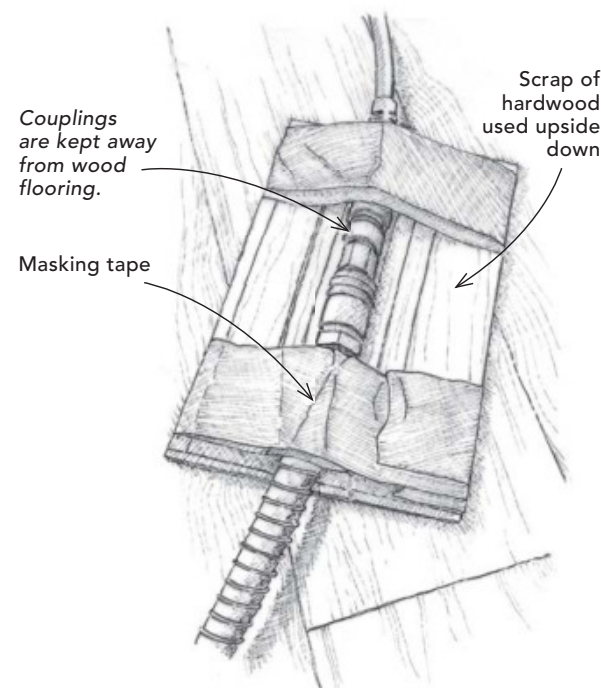
For example, can you divide 1044 in half faster than 41 1/8 in.? How about adding a couple of 14-mm reveals to a 1133-mm window case, versus 9/16-in. reveals to a 44 5/8-in. case? I now use the metric system almost exclusively. The only downside to going metric in the United States is that nobody else will understand your measurements. I highly recommend taking the measuring system the majority of the world uses for a test drive.

—TIM SAMUEL
Kent, Wash.

Protect your wood floors

The scratches left from dragging an air-hose coupling across hardwood flooring while you're installing it or nearby trim can ruin your day (and your client's too). A great way to prevent this expensive mistake is with a flooring scrap. Tape the hard fittings to its back side with duct tape, as shown in the drawing. The scrap protects the floor from damage if someone steps on or drags the fitting.

—ARON JONES
Grand Manan, N.B., Canada





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Taste is not the code's concern

As you've probably noticed, the theme of this issue is interior trim and cabinetry. But if you read through the pages of the 2021 International Residential Code (IRC), or versions before it, you'll discover very little regarding either. Code gets very specific about things like how many nails of a particular size are needed to fasten sheathing, but says little about installing door casing or kitchen cabinets. Not that it has nothing at all to say about the topics, but what it does say is often indirect. For the most part, trim and cabinetry are fabricated and installed according to conventions developed by carpenters, not code writers. But there are some things that require planning and attention in order to pass inspection.

Many final inspections fail because electrical, plumbing, or mechanical "trim" isn't correct. Carpentry trim can fail, too, and it's usually something related to stairway handrails, which we touched on in "Guardrails vs. handrails" in *FHB* #289. In this issue, let's look at some other places where the code and trim carpentry meet—or at least pass each other and wave.

Stairs

With your handrails up to snuff, let's clarify some other

things related to stairs. Rise and run is a common subject and it's wise to verify the math at rough and final inspections. Within a flight of stairs, the tread finish material won't affect the riser height, as adjacent treads generally have the same thickness. However, the risers adjacent to the upper and lower landings often create headaches. The top and bottom landings are usually part of a larger floor, and the thickness of the finish flooring may be different than the thickness of the treads. Planning the flooring before building the stairs is critical so that your tallest riser is no more than $\frac{3}{8}$ in. taller than the shortest. Don't worry about carpet, rugs, or runners, though. Since 2009, the IRC has required the dimensions be measured exclusive of these textiles.

Baseboard

Baseboards aren't something you generally think about with codes, but there is some relation—just ask plumbers. Pipes that run through wall plates and studs typically require large holes, which don't leave a lot of wood between the pipes and the drywall. Plumbing, as well as wires and dryer vents, needs to be protected from errant fasteners, and this is usually accomplished with stud guards—strips of steel applied



Mind the gap. Code requires at least 30 in. of clearance from the top of a cooktop to combustible materials above it, which can factor into the range-hood design with custom cabinets.

to the plates and studs—to prevent fasteners from poking holes in these utilities. These guards protect from drywall fasteners, but also from a nail from hanging a photo, or a nail from baseboard or crown molding. On the plumbing side of things, this requirement originally came from the 1993 BOCA plumbing code serving the Northeast, and says that when nail-plate protection is required at bottom and top

plates, it must extend at least 2 in. above and below the top or bottom edge of the plates. This extended protection is specifically to safeguard pipes from nails in baseboards and crown molding. That's plumbing code, not trim carpentry, but it does speak to the relationship between every trade and feature in a building.

One place that baseboard has unfortunately faced code is in overzealous interpretation of



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minimum stair and hallway width requirements. Section R311.7.1 requires stairways to be at least 36 in. wide. Though baseboard would reduce the clear width at the treads, this section makes it clear that the 36-in. width is only required above the stair-handrail height of 34 in. to 38 in., but not below. Baseboard or other finishes below the handrail can intrude on the stairs just as much as the handrail, which can protrude as much as 4½ in. on one or both sides of a stair, leaving a minimum 27-in. clear space between handrails. This allowed reduction in width follows the shape and movement of the average person using a stair: wider at the shoulders than the feet.

Though the code is clear that it's OK for baseboard to encroach on stairways, section R311.6 for hallway width doesn't make the same statement. Hopefully there are few inspectors who would make an issue about it, but they do exist. Commentary to the code has previously stated that the requirement for 36-in.-wide hallways was meant to accommodate moving furniture into rooms off the hallway and allow safe egress from the structure (commentary for the 2021 IRC hasn't been published yet). If that same furniture is hauled up a stair with 27 in. between handrails, it will fit through a 36-in.-wide hall with standard baseboards—whether it can make the turn into a bedroom with a 16-in.-wide door is another question. When considering the importance of hallway width and if baseboards should be a concern, keep in mind that there are zero requirements for interior door size and keep things in reasonable perspective.

Cabinetry

When it comes time to set the cabinetry, the code is mute on how to install it, but there are some provisions to consider. The code won't stop you from arranging kitchen cabinets in such a way as to make the space unusable, but if you want to include cabinets or a range hood of combustible materials above your new range, you'll have to look to the mechani-

ACCA Manual D, an engineering standard for duct design. Following this standard, you find, not surprisingly, that you can't effectively push supply air into a room unless there is a path for return air to leave. In recent years, builders and building departments have caught on to this standard, and called for transition grilles in walls between bedrooms and hallways, where a large

“...no one expects the trim carpenter to peek at the HVAC plans.”

cal and fuel gas chapters of the code. Sections M1901.1 and G2447.5 require at least 30 in. between the top of a cooking top and combustible materials above. Section G2447.5 goes a step further and includes metal cabinets, with exceptions for items with adequate flame protection. Wood and wood-clad range hoods are allowed, but their design and placement has to be carefully planned. If you want to install a microwave with integral exhaust over the cooking surface, section M1503.2 requires these systems be listed and labeled in accordance with UL 923.

Doors and windows

When setting interior doors, as mentioned above, there are no size requirements. However, depending on the HVAC design, you may have to pay attention to the space between the bottom of the door and the floor. For nearly two decades the IRC has required duct designs to comply with

return-air opening is located. However, codes and standards are full of options, and you can design a large undercut under the door rather than a transition grille. How much undercut is needed is directly related to the cubic feet per minute (CFM) delivered to each room and the width of the door; the height of undercut based on these two variables is provided in Table A12 of ACCA Manual D.

That said, undercutting a door to serve as a return-air path is not exactly the best choice. An average-size room could require 200 CFM, and for a 30-in.-wide door, a 3.2-in. vertical undercut is required—measured from the top of the finished flooring or carpet. Communication from the superintendent or foreman is critical for this design, as no one expects the trim carpenter to peek at the HVAC plans.

Windowsills are also part of the trim package, and the code once referred to them in a very important subject—egress

windows, which are known as “emergency escape and rescue openings” in the IRC. These can be no more than 44 in. above the floor. Up until the 2021 IRC, the maximum height of 44 in. above the floor was referenced to the “window sill,” which led some people to measure to the trim in front of the actual window. A large revision to this entire section was approved in the 2021 edition and the reference is now to the “bottom of the window opening,” clearing up an issue that likely stressed many a builder/building inspector relationship.

What about trim?

It's worth mentioning the one and only code provision that specifically refers to “trim,” described as “picture molds, chair rails, baseboards and handrails.” It's in an exception to section R302.9.1, which covers the “flame spread index” of wall and ceiling finishes. The IRC limits the flame spread index of wall and ceiling finishes to 200 or less but exempts the above trim details, as well as doors and windows and their frames, from the limit. Though it's not specifically listed, it's fair to include crown molding in this category. It might not matter, though, as common wood species are all below 200 anyway. The “smoke developed index” for these trim elements is limited to 450 or less under section R302.9.2 and doesn't carry this same exception. However, wood products have a smoke developed index below 200, so this is another nonissue for conventional trimwork.

Glenn Mathewson is a consultant and educator with BuildingCodeCollege.com.



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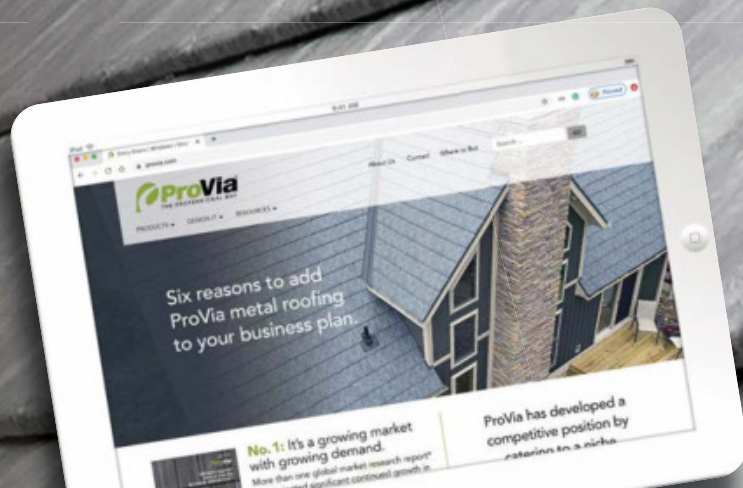
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HARDWORKING BRAD NAILER

With an ability to drive a $\frac{5}{8}$ -in. to 2-in. nail, an 18-ga. brad nailer has to be one of the finish carpenter's most versatile tools. I use my pneumatic brad nailer all the time, but I've never felt the need to buy a cordless model, because lugging a small compressor—all that's needed for a brad nailer—isn't a huge deal. However, managing the hose, which seems to get hung up at the worst possible moments, can be a problem, and rolling it out and coiling it up adds time to the beginning and end of every job. Unfortunately, most cordless brad nailers are pretty big and heavy compared to my air-powered version, which makes them less appealing.

A notable exception is Metabo HPT's new cordless brad nailer. The maker claims it's 30% smaller and lighter than the previous model, and the size comparison seems legit to me. But most importantly, it works without drama and checks all of the boxes for a full-featured brad nailer: headlight, bump and sequential firing, and adjustable depth-of-drive. There's no dry-fire lockout, but

it does have a yellow indicator on the magazine that tells you when you're running out of nails. The belt hook is frustration-free and you can put it on either side of the tool. Visibility at the driver tip is good and the contact safety is small and unobtrusive. There is no ramp-up like the early flywheel nailers and it drives brads as fast as I can fire them. Although I haven't had a single jam, it has a tool-free nosepiece for clearing them.

The manufacturer claims 1650 nails per charge, but doesn't specify the nail length or material. For testing, I drove 1080 $1\frac{1}{4}$ -in. brads into Douglas-fir 2x4s before the battery was spent. The fan-cooled charger brings the 18v pack to a complete charge in just over a half-hour. It's a great tool because you don't have to think about it—it just works.

Patrick McCombe, senior editor



Metabo HPT NT1850DF

Weight: 5.4 lb.

Height: 11 in.

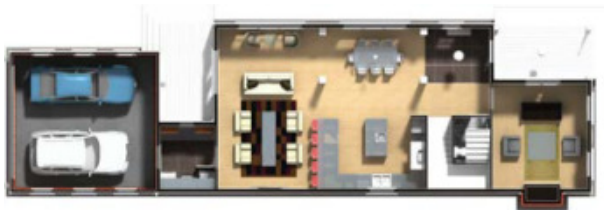
Length: 10½ in.

Thickness: 3½ in.

Price: \$350 (kit with 3-amp-hr battery and charger)



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Modern take on an ancient tool

There was a time when a \$200, 78-in. door-hanger's level wasn't a toolbox standard. When I started out, in the pre-laser days, we used plumb bobs to plumb anything over 4 ft. Plumb bobs never get knocked out of calibration. They take up very little room in a toolbox or pouch, and the batteries never die. And you can check plumb on a skyscraper if you have enough string. But now we've reached the rub: the string. No matter how carefully you wind it up, the string ends up a matted rat's nest of impossible knots. Plumb-bob history—and my life—took its biggest step forward in 4000 years when Tajima, the Japanese company, came up with the Plumb-Rite 400 plumb bob (about \$40). Finally, a plumb bob designed for carpenters. It has a self-retracting line to mind the string, a spring-loaded pin that can be driven into

a wooden door jamb, and even a magnet for steel jambs.

The original version had a $2\frac{3}{16}$ -in. offset, which corresponds to some metric standard, but the new ones are 2 in. even. Yes, you have to measure the distance between the string and jamb, but you can get it close with your eye and make adjustments with the string in place instead of re-checking with the level every time you move a shim. And with Tajima's plumb bob, I can carry everything I need to set a door in a 5-gal. bucket. Even though I have high-quality European levels in every size from a torpedo to a 12-ft. plate level, the 14½-ft. Plumb-Rite is still my favorite door-setting tool.

Andrew Grace, a roofer and remodeler in Ligonier, Pa.

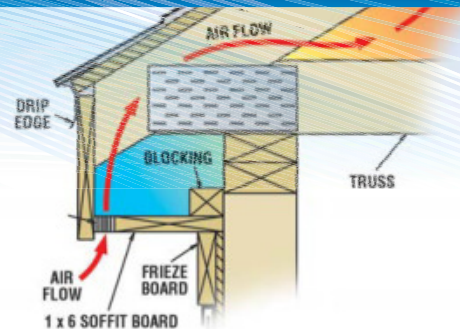
Photos: Rodney Diaz

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Precise, fast joinery

Freud's 8-in. Box Joint Cutter Set (\$95) has been a favorite of woodworkers and cabinet-makers for many years. Its two blades cut precise 1/4-in.- or 3/8-in.-wide box joints and grooves. Compared to a dado set, two groove sizes might seem limiting, but this is offset by their fast setup and precise cutting, which results in box joints or grooves with flat, square bottoms and zero tearout. I put these cutters through a workout on a recent built-in project. Using loose-spline joinery for web frames and carcass construction, the cutter's 1/4-in. groove perfectly matched my 1/4-in.-thick MDF splines, making web-frame glue-up fast and easy. Where hidden dust panels were needed, I opted for 1/4-in. plywood, which is slightly undersized and slid easily within the grooves. For paint-grade frame-and-panel construction, I used the same setup but switched back to MDF for the panels. The tight-fitting MDF aided in aligning frame members as I pocket-screwed them together.

You can use slot cutters and straight bits in a router table for these joints, but the Box Joint Cutter eliminates the tearout that sometimes comes with router-cut joinery. When it came time to build 15 drawers, I employed a tongue-and-rabbet joint that uses a single setup on the table-saw to cut the drawer sides and the fronts and backs. This requires a groove exactly half the thickness of the drawer stock. For 1/2-in. stock, I used 1/4-in. grooves. For beefier drawers made from 3/4-in. stock, I used 3/8-in. grooves. The 1/4-in. setup was also ideal for grooving the sides and fronts for the drawer bottoms. Few specialty tools can do so many things.

Rodney Diaz, creative director

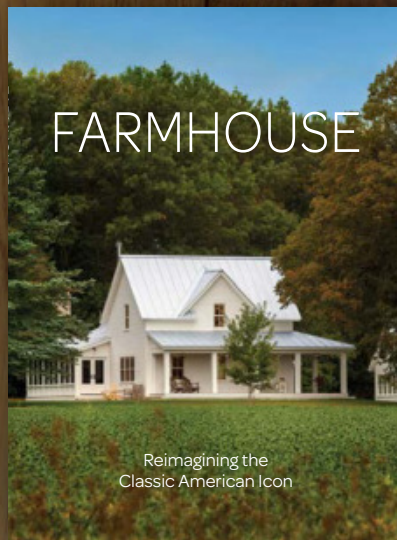


At the ready. A case with a threaded knob secures and protects the two cutters. The set makes perfect 1/4-in. and 3/8-in. grooves and box joints.

Photo: Rodney Diaz


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ZIP SYSTEM™ ROOF ASSEMBLY STAYS DRY IN HURRICANE CONDITIONS



The Insurance Institute for Business & Home Safety (IBHS) conducted a hurricane-force, wind-driven rain demonstration on January 9, 2020, to show the water resistance of a FORTIFIED Roof™ built with a ZIP System Roof Assembly. ZIP System Roof Assembly is the first manufacturer-warranted roof sheathing system that meets the sealed roof deck standard for a FORTIFIED Roof. FORTIFIED Roof sealed roof deck standards are based on more than 20 years of scientific research and real-world testing.

In the demonstration, 105 fans reaching peak speeds of 105 mph and a rainfall rate of 8 inches per hour were released onto a model house outfitted with a ZIP System Roof Assembly. The wall of fans was programmed to provide gusts and triangulation of wind to replicate wind trace data collected during Hurricane Florence. The sealed roof deck built with ZIP System® sheathing and tape was 830 square feet and faced over 2,000 gallons of rain in 30 minutes, equating to about 4 inches during the 30-minute demo.

“We’ve calculated that an unsealed roof deck allows up to 60% of the rain that hits a damaged roof to enter into the attic. A sealed roof deck can reduce water entry by as much as 95%,” said Anne Cope, Ph.D., P.E., chief engineer for IBHS. “If all the shingles came off a 2,000-square-foot unsealed roof, up to 750 gallons of water could enter the attic for every inch of rain that falls — equivalent to nine bathtubs full of water.”

“We’ve calculated that an unsealed roof deck allows up to 60% of the rain that hits a damaged roof to enter the attic. A sealed roof deck can reduce water entry by as much as 95%.”

Anne Cope, Ph.D., P.E.
Chief Engineer, IBHS

The resulting well-protected interior with a dry attic demonstrated that ZIP System Roof Assembly provides an effective water barrier even when completely exposed during Category 1 hurricane conditions.

“This impressive demonstration subjected the ZIP System Roof Assembly to a punishing, realistic period of high wind and wind-driven rain. The rain downpours and wind gusts simulated those that occurred during Hurricane Florence,” said Kurt Koch, vice president of product engineering and quality for Huber Engineered Woods. “We couldn’t be happier with the results — ZIP System® roof really delivered as a sealed roof deck solution. We are proud of the team and their accomplishments to create the first fully warranted roof sheathing system that meets the sealed roof deck standards for a FORTIFIED roof.”

ZIP System Roof Assembly is a streamlined approach to a sealed roof deck using integrated sheathing with a built-in, weather-resistive underlayment and taped seams. It eliminates the need for felt and provides a continuous water and air barrier that helps meet FORTIFIED Roof standards to keep the water out, even in a high-wind-driven rain event.

Since its introduction in 2006, ZIP System sheathing and tape has been widely adopted by construction teams as a replacement for traditional sheathing and housewrap or felt. Completed with taped panel seams using high-performance ZIP System™ flashing tape, the system helps achieve quicker dry-in and reduces the risk of re-work, while providing advanced moisture protection and reduced air leakage.

The IBHS mission is to conduct objective, scientific research to identify and promote effective actions that strengthen homes, businesses and communities against natural disasters and other causes of loss. Learn more about IBHS at DisasterSafety.org.

Watch the full IBHS demonstration by scanning the QR code below.



For more information on ZIP System Roof Assembly, visit ZIPSystem.com/Roof.

A Bevy of Built-Ins

A bed, a desk, a closet, and a laundry hamper transform an attic into a cozy, do-it-all space

BY RODNEY DIAZ

A 5-ft.-tall access door off the stair landing, just a couple of steps down from the second floor in our house, makes for an awkward entry to the 13-ft. by 12-ft. space above the kitchen. But once inside, there's a surprisingly large amount of room to move around in under the gable ceiling. Originally an unconditioned storage space, the previous owners attempted to finish out the room with fiberglass-batt insulation behind paneling, padded carpet over a plank subfloor, and rudimentary electrical outlets and a ceiling fixture.

We gutted the room, insulated it properly, and installed outlets and light fixtures to comply with code and coordinate with built-in cabinetry designed to fit the space and maximize the room's functionality. The design of the built-ins was a long time in the making, as it was challenging to figure out how to make the most of this small space. The construction, by comparison, took less time but was no less of an undertaking. The end result is a carefully planned and executed build-out that I hope inspires you to make the most of an underused or overlooked living space in your home or office. □

Rodney Diaz is *Fine Homebuilding's* creative director. Photos by Jody Lawson.





DESIGN NOTES

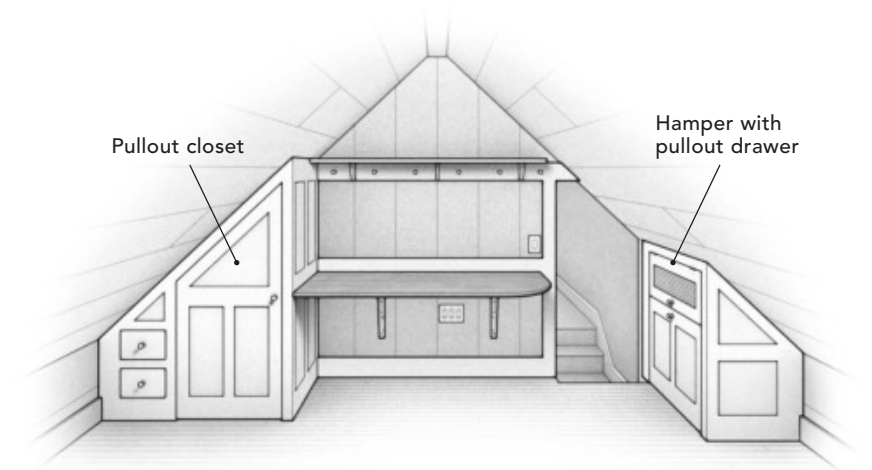
A TALE OF TWO WALLS

With a roof pitch of roughly 12-in-12 (give or take a couple of degrees), the steeply sloped ceilings left short kneewalls on either side of the room. At less than 2 ft. tall, this space under the eaves had little practical use. Leaving that floor space open and confining the cabinetry to the gable-end walls creates a sense of a larger space, with a surprisingly roomy 6 ft. between the bed and the desk.



The window wall

A single double-hung window on the exterior gable wall provides ample natural light, yet limits the options for cabinetry at that end of the room. To maximize storage, a bed platform centered under the window is flanked by matching corner cabinets outfitted with drawers. A trio of drawers under the bed align with the lower drawers in the corner cabinets, tying everything together in a 13-ft.-wide chest of drawers.



The door wall

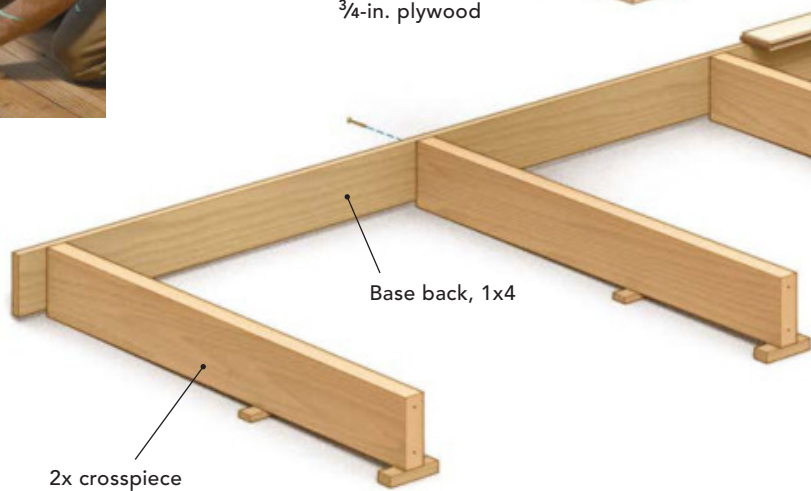
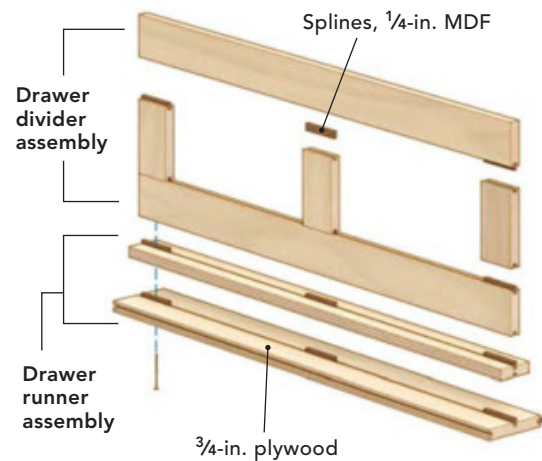
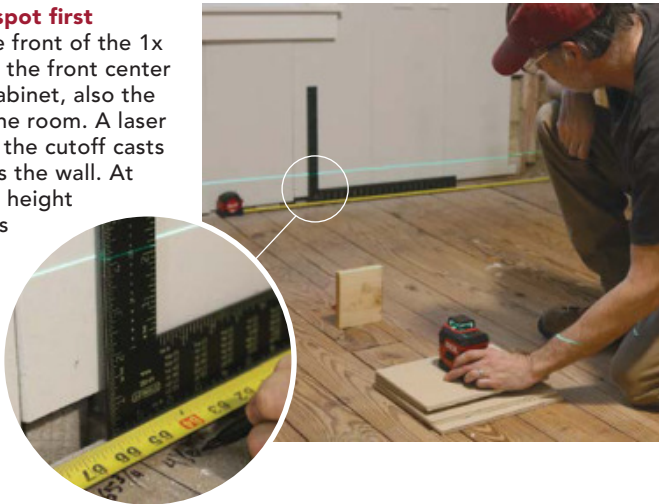
The gable wall opposite the bed houses a pullout closet, a floating desktop, and a hamper for dirty clothes. The closet is actually a large pullout drawer mounted on heavy-duty drawer slides, outfitted with a rod for hanging clothes. A pair of drawers fills the void to the left of the closet. The desktop is mounted to the wall with large angle brackets, eliminating desk legs and keeping the floor space open. The corner hamper is tucked under the eave next to the doorway. It has a pullout drawer that holds a laundry basket.

START WITH A LEVEL BASE

Building a massive cabinet that spans the width of the room was challenging. Did it make more sense to build the bottom row of large drawers as a unit, then add the smaller drawers on either side of the bed? Or would it be better to build and install the corner cabinets and tie them together with the bed platform? Either way, a level base had to come first, as the floor was out of level by as much as 1½ in., sinking toward the center of the room from the window wall and the eave walls.

Locate the low spot first

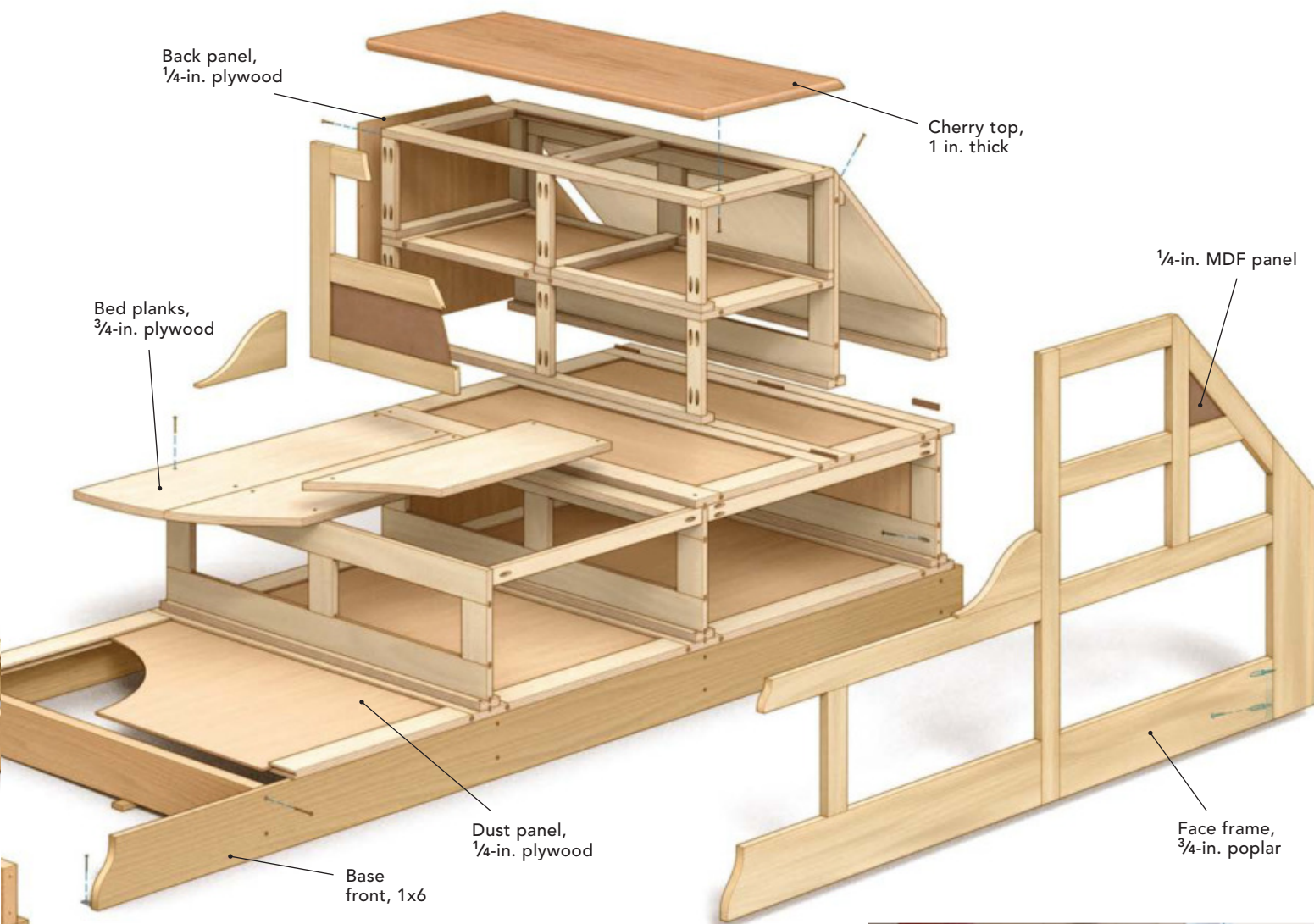
A cutoff from the front of the 1x base is placed at the front center location of the cabinet, also the lowest point in the room. A laser set to the top of the cutoff casts a level line across the wall. At six locations, the height of the level line is measured where 2x framing will run from front to back under the built-ins. Each 2x is ripped to width.



Scribed, shimmed, and screwed

The front of the base is a long 1x6 scribed to the floor. With the back ends of the 2x crosspieces resting on the floor at the wall, the front ends are shimmed flush with the top of the front and screwed together (above). The back ends of the 2x crosspieces are fastened flush with the top of a long 1x4, which is in turn screwed to wall studs (right). With the base secured at the wall, a few angle brackets are screwed to the backside of the base front and fastened to the floor to lock everything in place (far right).





LIGHTWEIGHT BUT STURDY FRAMEWORK

The web-frame construction of these chests of drawers was borrowed from traditional furniture-making. Using loose-spline joinery makes glue up easy. The grooves are cut with Freud's box-joint cutter and are exactly 1/4 in. wide, which matches the thickness of the MDF splines, resulting in tight glue joints. Where dust panels need to float in the grooves, 1/4-in. plywood, which is slightly less thick, slides in easily. This approach also keeps the weight of the carcase down compared to using only 3/4-in. plywood.



Groovy joinery

Unless the tablesaw is set up to cut exactly in the center of each workpiece, the potential for misaligned parts during glue up is high. Make a light pencil mark on one side of each piece and make sure that side is against the fence as it's grooved.



Glue up in stages

The vertical drawer dividers are glued up separately from the flat drawer runners. Once the glue sets, the two are glued and screwed together from the bottom, creating a strong framework to support the bed platform.



BUILD IN LAYERS

Once the cabinet construction began, it became clear that building the corner cabinets separately and connecting them with the bed platform was the way to go. At over 3 ft. square, each cabinet is hefty but slides easily into place thanks to the level base. Cabinet face frames are added to the front and side before installing the bed framework, planks, and face frame.



Clamps as a workbench

The bottom web frame is glued up with parallel bar clamps, which proved to be a solid, stable platform for the rest of the cabinet build.



Add the second layer

The upper web frames are added and incorporate a lip to support the ends of the planks that make up the bed platform.



Support where you need it

Blocks clamped to the vertical divider hold the web frame for the top row of drawers at the proper height. Outer supports are pocket-screwed to it and the frame below.



Top off the framework

The subtop is fastened in the same way, while drawer runners for the upper drawers are glued and clamped in place.



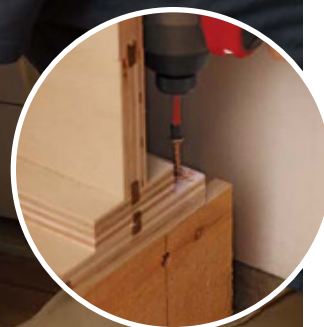
Solid backup

The angled subtop is screwed from the outside with angled cleats holding it in position. It and the short outer support are the only solid 3/4-in. plywood components.



Slide it into place

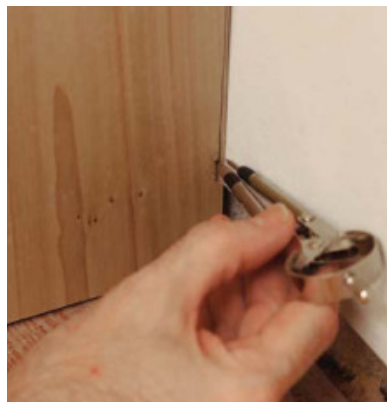
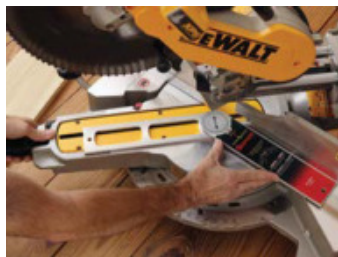
With a 1/4-in. plywood back added to lock everything square, the assembly comes out of the clamps and slides into final position before being screwed to the base at the outer front edge (inset, right) and the opposite rear corner.





Scribe the face-frame parts

The face frame is scribed to the ceiling with an angle finder. The angle is transferred to the miter saw for a matching cut.



Scribe, scribe again

Scribed to the wall with a compass and to the floor with a scrap of new flooring, the side and bottom edges are trimmed with a jigsaw.



Assemble the face frame

The parts scribed to the wall and the floor are pocket-screwed together. The assembly is then clamped in place while subsequent parts are cut and fit one at a time. The last piece of the puzzle is a triangular 1/4-in. MDF panel set into grooves cut in the same fashion as the web-frame joinery.



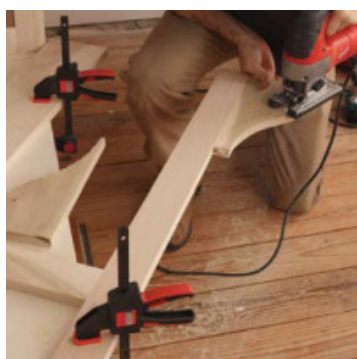
A clean front

The assembled face frame is clamped in position and screwed from behind, leaving a clean front that needs no nail holes filled. The end panel facing the bed is installed using the same technique.



Fill in the gap

With the plywood bed planks installed, cleats are installed between drawer dividers to add rigidity behind the face frame at the front edge of the bed.



Cut curves in place

Rectangular stock for the curved bed-rail brackets is easier to attach to the face frame before shaping with a jigsaw and sandpaper.



Pulling it all together

Like the corner cabinets, the bed's face frame is installed as a unit, pocket-screwed from behind, except for the bottom, which had to be face-nailed.

A PAIR OF PULLOUT BOXES

The closet and the hamper function in a similar fashion, with drawer boxes riding on full-extension drawer slides. The closet is outfitted with a false front door and a rear upright panel supporting a closet rod. The hamper works in the same way, with a cabinet-door panel on the front of a box that holds a laundry basket.

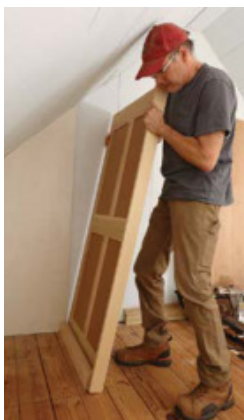


Square the opening

A plywood mounting block is squared flush with the front of the corner cabinet and pocket-screwed to the floor.

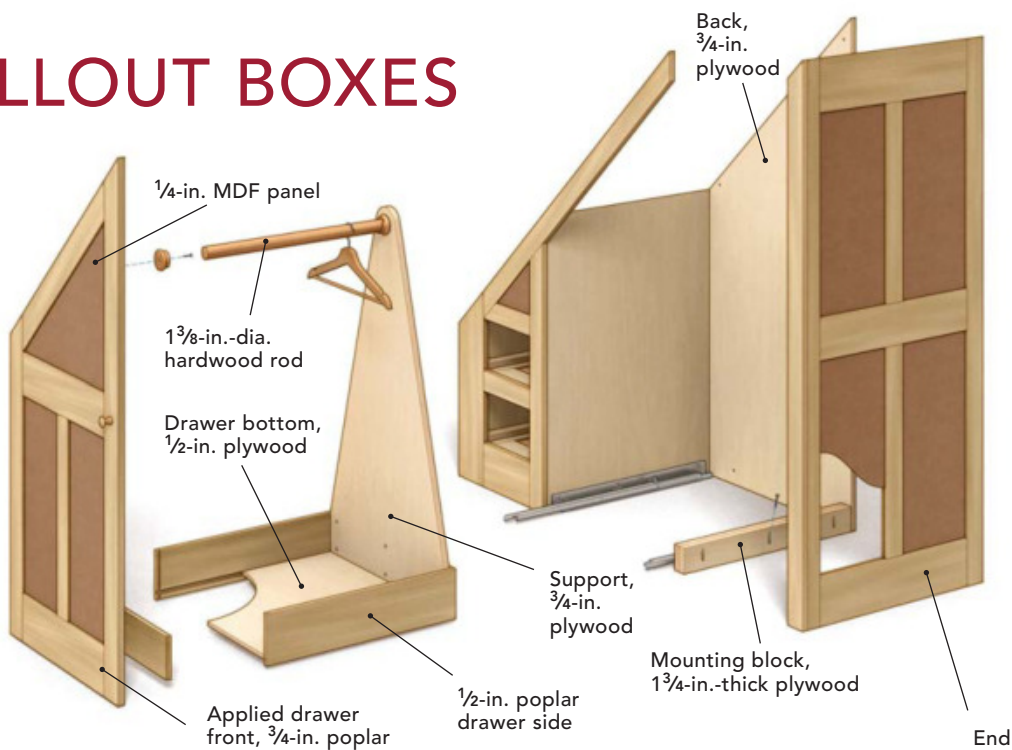
Install the end panel

The end panel is pocket-screwed from behind to the mounting block at the bottom and to a 3/4-in. plywood back panel that's secured to the wall.



Nail it off

A plywood cleat fastened to the ceiling provides backing for nailing the top edge of the face frame and the end panel.



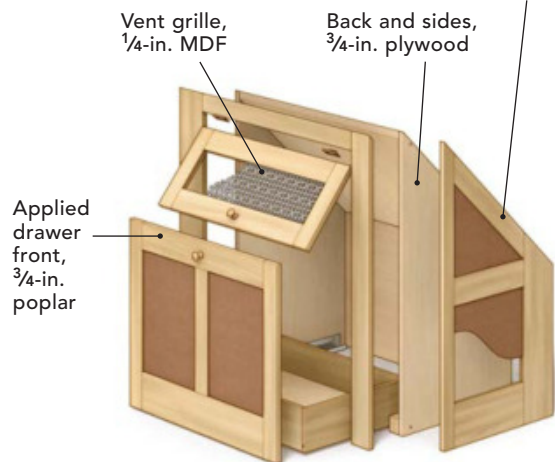
Mark in place

The face frame is assembled with the top diagonal piece left long. Once clamped in place, the horn is marked where it meets the end panel and trimmed to fit.



Hidden hardware

Blum undermount drawer slides enable the closet to smoothly open and close while supporting a rack of hanging clothes.



Get the funk out

The hamper is a miniature version of the closet in both form and function. Its one unique feature is a laser-cut 1/4-in. MDF vent grille in the hinged hanging door for airing out dirty laundry.

A FLOATING DESKTOP

A 5-ft. long panel of solid cherry is fastened to wall-mounted workstation brackets. Absent legs or an apron, the surface appears to float against the wall. Above the desktop is a shelf mounted on top of a Shaker-style peg rail.



A touch of Shaker trim

A 10-in.-deep shelf is pocket-screwed from behind to the peg board before the assembly is nailed to wall studs.



Bracketology

Aluminum brackets from A&M Hardware are screwed to wall studs. Weighing only 4 lb. each, the two brackets support over 1400 lb. together under load testing.



Turn the corner

The corner of the desk is curved with a 13-in. radius to ease entry into the room. The edge is softened with a bullnose profile routed with a 5/8-in.-radius roundover bit.

LAST BUT NOT LEAST

CABINET TOPS AND DRAWERS

The corner cabinets are capped with 1-in.-thick solid cherry tops that mirror the desktop. Unlike the closet and hamper, the drawers slide on drawer runners built into the cabinets.



A consistent overhang

Each cabinet top is scribed to the wall, then an angled cut on the back pins it under the ceiling. The tops are marked from underneath where they meet the face frames. Then the top is flipped upside down and a 1-in. offset is marked and cut.



The movement you need

The leading edge of the top is held in place by screws fastened from below through slotted holes in the subtop, allowing for seasonal movement. The exposed edges are shaped with the same bullnose profile found on the desk.



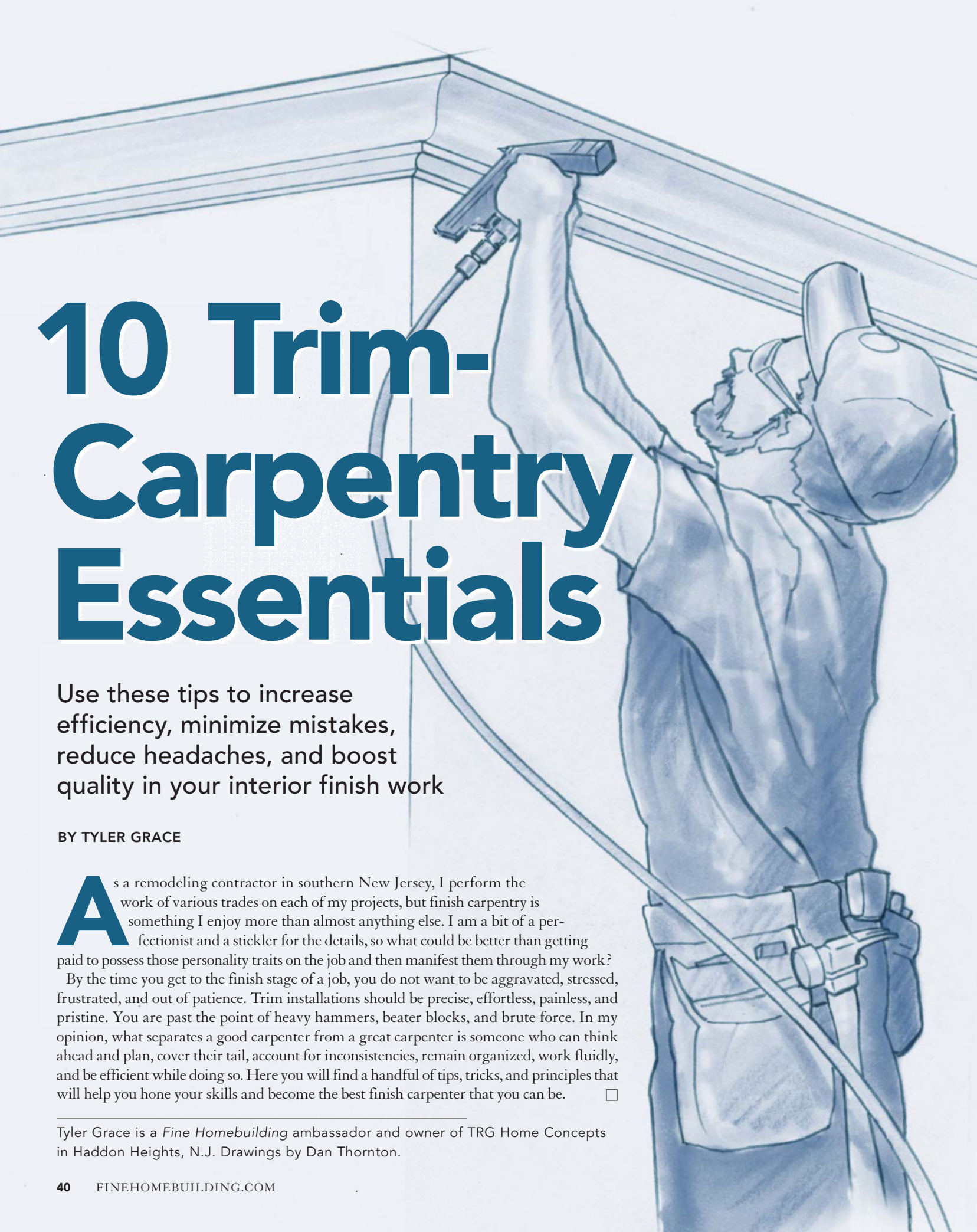
Easy sliders

A coat of paste wax applied to the drawer runners in the cabinets and to the bottoms of the drawer sides make even the biggest drawers slide in and out with ease.



Drawer details

For a step-by-step look at the drawers' rabbet-and-groove construction, visit FineHomebuilding.com/magazine.



10 Trim-Carpentry Essentials

Use these tips to increase efficiency, minimize mistakes, reduce headaches, and boost quality in your interior finish work

BY TYLER GRACE

As a remodeling contractor in southern New Jersey, I perform the work of various trades on each of my projects, but finish carpentry is something I enjoy more than almost anything else. I am a bit of a perfectionist and a stickler for the details, so what could be better than getting paid to possess those personality traits on the job and then manifest them through my work?

By the time you get to the finish stage of a job, you do not want to be aggravated, stressed, frustrated, and out of patience. Trim installations should be precise, effortless, painless, and pristine. You are past the point of heavy hammers, beater blocks, and brute force. In my opinion, what separates a good carpenter from a great carpenter is someone who can think ahead and plan, cover their tail, account for inconsistencies, remain organized, work fluidly, and be efficient while doing so. Here you will find a handful of tips, tricks, and principles that will help you hone your skills and become the best finish carpenter that you can be. □

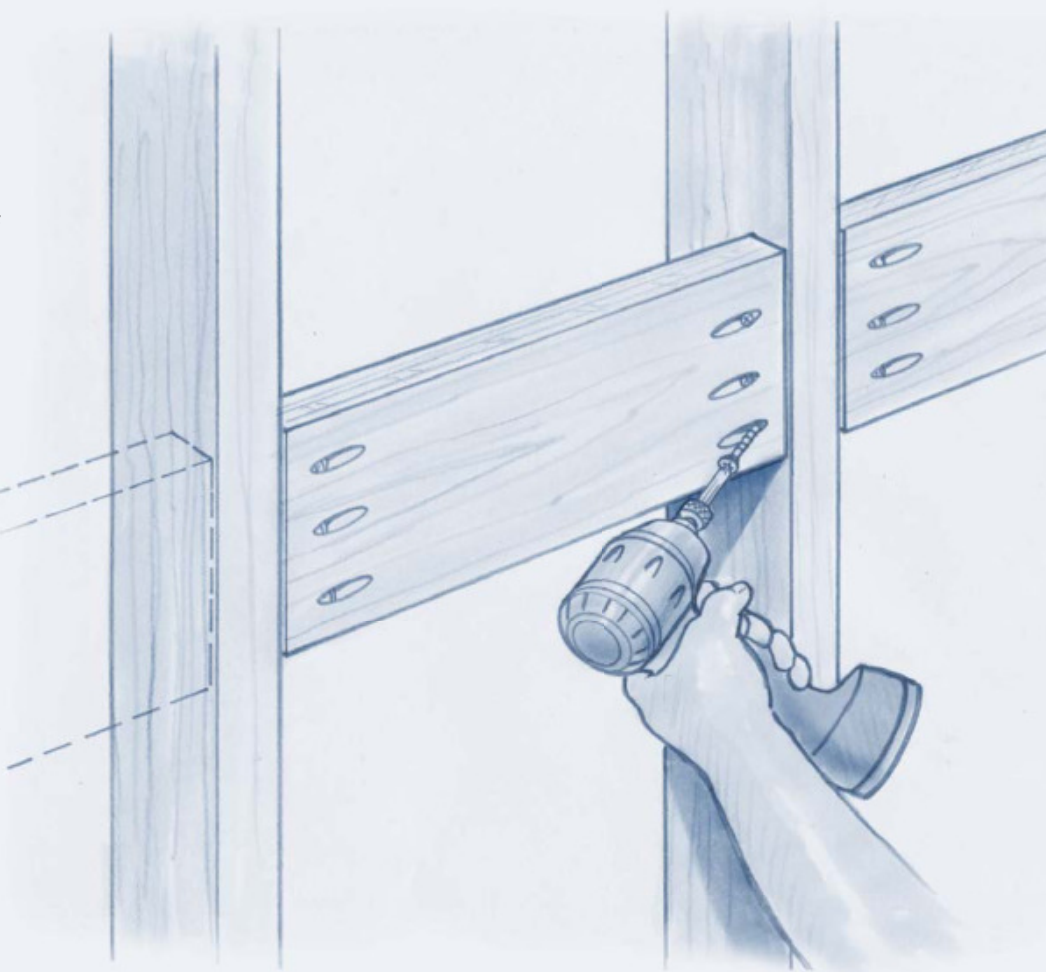
Tyler Grace is a *Fine Homebuilding* ambassador and owner of TRG Home Concepts in Haddon Heights, N.J. Drawings by Dan Thornton.

1 PLAN FOR TRIM FROM THE GET-GO

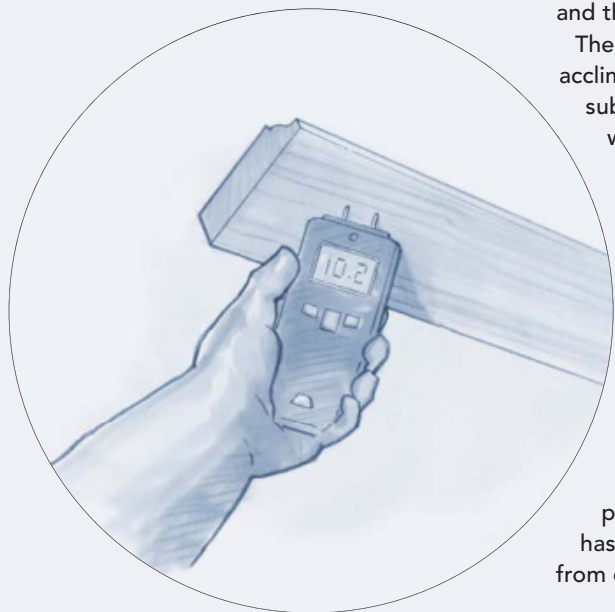
A quality finish-carpentry project requires adequate forethought and planning. Success is not a fluke or coincidence. If you want to deliver a great product, you need to plan to do so. You cannot simply show up on day one with your tool belt and expect to knock it out of the park.

One of the best things you can do is take the time to walk the job after mechanical rough-ins are complete. Mark all of your studs on the subfloor, and highlight critical areas such as the location of utilities and where blocking is needed. And document the job site with photos. I constantly refer back to my phone while trimming to see what is behind the walls. It's saved me many errant nails over the years.

Now is also a great time to install any blocking that will aid in your trim, millwork, or cabinetry installation. Ensuring you have structure where kitchen crown will be installed, cabinets will be hung, stair skirts are located, and trim will be installed will save you boatloads of time throughout the duration of the project. It will also reduce the number of callbacks you have down the road. Start wrapping your head around the finish carpentry to come at the rough-carpentry phase of the project. It will make your life much easier when the time comes to break out the compressors and saws.



2 ACCLIMATE YOUR MATERIALS



Wood moves. It is affected by temperature and moisture. You must do everything that you can to get your material to the job site as early as possible to acclimate. The job site must also be conditioned. It does not matter if your trim or cabinets show up to a job a year early if they're sitting in a hot and humid work site. As soon as the HVAC is fired up, and the moisture is drawn from the space, those tight joints will not be so tight anymore.

There is no specific amount of time that it will take for your trim and millwork to acclimate to a site. You have to measure the moisture content of the wood and the substrate to which you are applying the material. I have had molding dropped that was in a safe range to install on day one, and I have had lumber dropped that after a week still required dehumidifiers to reduce the moisture content of the wood. I recommend getting to the job when the material is delivered, measuring the existing site conditions and the moisture content of the wood, and tracking them until they are both within a stable range independently and with respect to each other.

I do my best to ensure that the moisture content of trim in a conditioned space is between 6% and 10% prior to installation. Typically it gets delivered from an unconditioned space and arrives with a moisture content between 12% and 14%. The relative humidity in the room will affect how quickly that newly delivered trim will acclimate. I also aim for the moisture content between the material and the substrate to which it will be applied to be within 2% to 3% of each other. Installing properly acclimated trim with a 7% moisture content onto plywood or drywall that has a moisture content of 16% will wreak havoc on that installation. They are 9% off from each other and the trim will draw the moisture from the substrate.

3 STABILIZE YOUR MATERIALS

Acclimating your materials and dialing in site conditioning is a fantastic start, but it is not always enough. My feeling is that we should do all that we can to ensure our installation remains intact for years to come. How do we do that aside from acclimation?

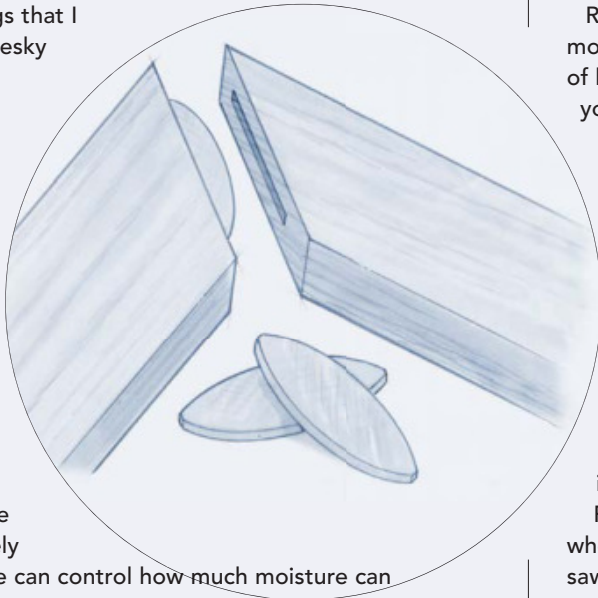
Here are a few things that I do to help control pesky material movement.

Prime all of your drywall or plaster prior to installing trim. Primer seals the surface of the substrate and reduces the transmission of moisture from one material to another.

Also, back-prime any unfinished lumber to ensure the material is completely sealed. The more we can control how much moisture can penetrate the materials, the better off we are.

Ensure that areas around windows, mudsills, doors, and floors are air-sealed. Leaking air will create temperature fluctuations within the space which will affect your installations. I carry around a can of spray foam while installing trim. That way, I can seal off any drafts prior to installation.

For interior millwork, I do not seal my end cuts with primer. With proper acclimation, you should not have enough movement to create any major moisture transmission through those surfaces. I do use mechanical joinery whenever possible. Although nothing can actually prevent wood from moving when it wants to move, glue, adhesive, tenons, pocket screws, biscuits, and other mechanical joinery will help immensely. It is an additional layer of protection to ensure a long-lasting installation.



4 SORT AND BREAK DOWN STOCK WISELY

Properly sorting and breaking down trim and millwork parts is not only one of the first steps of many trim jobs, but done right, it improves the quality of the work, makes the most of the material, and saves you trips to the lumberyard when you run short.

Running baseboard is a good example. While it may be more convenient to run down your cutlist and cut each piece of baseboard in sequential order, you should instead cut all of your longest lengths first and set them aside. There is nothing worse than needing to purchase more stock because you ran short of long lengths, and there is no need to cut a 16-in. piece of baseboard out of a 16-ft. piece of stock unless you have no other choice. As you go, save all of your scrap pieces to use for returns, closets, and other choppy areas like halls and bathrooms.

Place damaged boards aside to use in an inconspicuous area. Painters can often fix damaged boards, but use them inside of a closet, behind a sofa, or in an attic or basement space where imperfections matter less. Do not use the worst piece of trim in the foyer of the home where it will be seen as soon as you walk in the door.

Finally, always double-check your lumber at delivery, not when you are strapping on your tool belt and setting up your saw. Ensure that you have extra stock and that what was dropped at the site is what you ordered. It would be very disappointing to show up to a job with the finish-carpentry crew only to realize that you are short on material, or the material is incorrect or damaged. That's time and money lost while the crew waits for the right material to arrive.



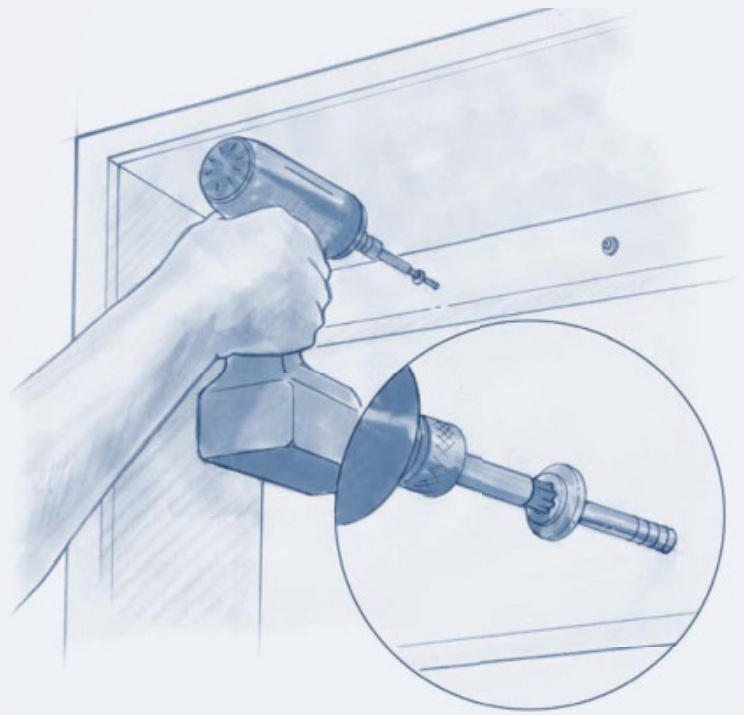
5 USE THE RIGHT FASTENERS THE RIGHT WAY

Not all fasteners are created equal. It is important to understand how fasteners work, when to use various gauges, and why we use different fasteners for different applications. Some hold better than others, some have more drawing power, some are easier to conceal, some are used in the place of clamps, and some have a higher shear strength.

When I first started installing trim, I always questioned which fastener to use when. I believe there are no steadfast rules, but common sense is an incredibly powerful start. Most trim is ornamental and simply needs to be able to support its own weight, such as casing, baseboard, wall details, crown molding, and cornices. Other trim and millwork needs to be able to handle loads, like door jambs, cabinetry, and thresholds. I prefer to use the smallest fastener possible for each job to help create a better paint or stain finish.

Cabinetry must be held in place with structural fasteners. Drywall screws have very little shear strength, and cannot support the load of the cabinet and their contents. If you have gotten away with installing cabinets with drywall screws in the past, it is probably because of the friction caused by the pressure between the wall and the cabinet, and not the shank of the screw. You must ensure that you penetrate the framing adequately as well and choose an appropriate-length fastener for cabinetry. I prefer using a fine-thread structural screw with a head that locks into a specialized drill bit. These screws are stronger and easier to drive, and your driver won't jump off the fastener and damage the cabinetry.

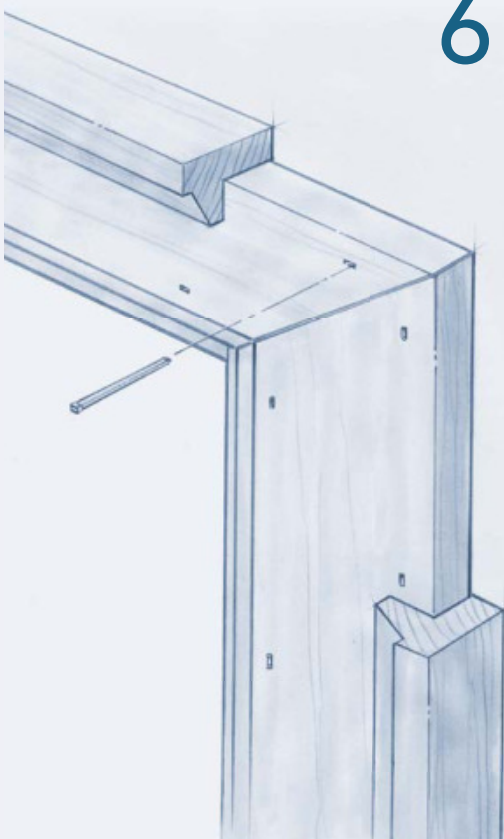
Prehung doors and door jambs require a fastener that is long enough to penetrate the framing, but also thick enough with a substantial head to reduce movement. Typically jambs and prehangs are installed with 15-ga. nails, but I often get away with



16-ga. nails, ensuring that I adequately nail my casing into my jamb. This locks the assembly together and secures it as one unit.

Baseboard, casing, and crown molding can be installed with 18-ga. or 16-ga. fasteners depending on how much holding power you need. I like assisting my installation with adhesive so I can use a smaller-gauge fastener, which finishes better and the piece is still fully supported with the adhesive. This technique is great for prefinished cabinetry trim and millwork. You can back-glue the trim and use a headless pin to hold it in place until the adhesive cures, which requires less putty and results in a cleaner install.

6 BE PRECISE WITH PLACEMENT



Every subtrade should have the following trade in mind. Carpenters are not an exception to this rule. Typically the painters follow the trim carpenters, and you should do all that is within your power to make their lives easier. Whenever it is possible, you should attempt to hide nails where they will be covered by succeeding layers of trim. Nail casing where a backband will cover your holes, nail baseboard low enough that the shoe molding or quarter-round laps over the fasteners, nail fascia or frieze where the bed molding will hide the brads, and so on.

Moldings should be fastened in a specific pattern and consistent manner. Ensure that nails penetrating the jamb are in the same horizontal plane as the nails for the casing. Line your nails up on baseboard, cap molding, and transitional moldings. Does this affect the structural integrity of the installation? It does not, but it shows that you care, it makes the painters' lives easier by not having to search for fasteners, and it ensures that you do not miss any necessary fastening locations.

When fastening prefinished moldings or stain-grade trim, nail placement is even more critical. Divide your material length into equal segments so that any visible fasteners are uniform and neat, ensure the nail is not proud or too deep, and nail with the grain where possible to disrupt the grain of the wood as little as possible. A nail placed with the grain of the wood will enter the material and set itself without crushing and damaging the area around the fastener. All of these efforts show that you have integrity for your craft, and they also make for a better finished product.



7 TAKE CARE WITH YOUR TOOLS

You can own the best tools in the world, but if you do not know how to use them, how to maintain them, or how to tune them, they are worthless. Always protect your tools. One violent drop of a miter saw can create out-of-square cuts that will make you want to pack it in and quit. Every good carpenter should know how to tune their miter saw. You need to understand how to ensure that the fence is square to the blade and coplanar on each side of the blade. You should be able to inspect the table of the saw and adjust the height, detents, bevels, and miters. A well-tuned miter saw is worth its weight in gold.

Make sure that you know when it is time to sharpen your bits and blades. A good carpenter understands when you can get away with a quick cleaning, when you need a full sharpening, and when you must replace a bit, blade, or chisel. After every job I sort through my sawblades, router bits, knife blades, chisels, and plane irons and inspect them. I dispose of those items that are past their usable life span, I package blades that need to be shipped off to be professionally sharpened, I clean pitch off blades that are still in decent shape, and I sharpen my irons and chisels on sharpening stones. Having sharp blades is not only safer, but it creates cleaner and tighter joinery.

It is also important to clean your tools to ensure that metal is not rusting, bearings are lubed, electronics are clean, and brushes are fresh. At the end of the day I always vacuum the sawdust off of my tools. Many people blow compressed air into their tools, which drives dust and debris into the motor, electronics, bearings, and seals. This is not ideal and will create issues down the road. Invest in high-quality tools and routinely take care of them; you will be rewarded with well-performing, reliable equipment for years to come.

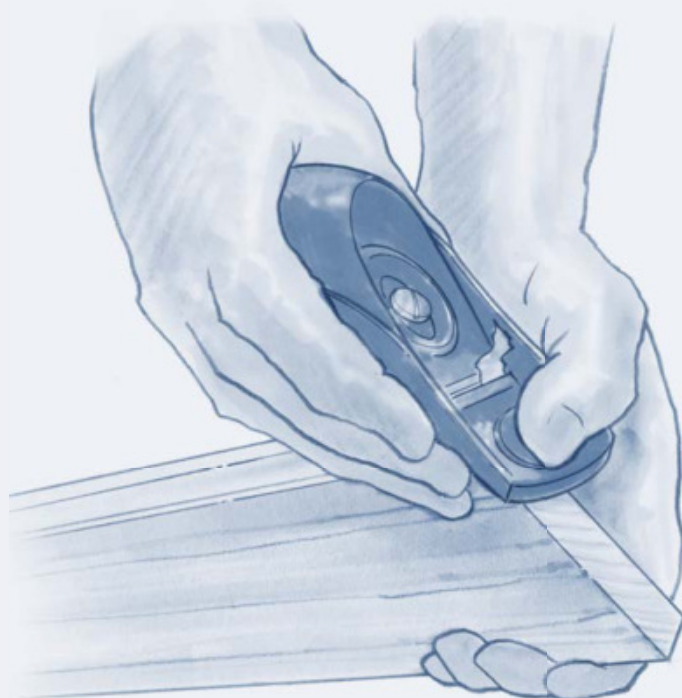
8 MINIMIZE YOUR STEPS

In order to be efficient as a finish carpenter, you must understand economy of motion. Each task and movement must be purposeful and deliberate. Each added step and trip back to the saw reduces efficiency and in turn reduces profitability. Therefore, each project should be broken down into repeatable tasks. If possible you should complete each task prior to moving onto the next. For example, you should prep your entire job for trim prior to beginning trimming. It is not as efficient to cut back drywall, sand down mud, and address out-of-square corners as you go as it is to do it all at once. If you have to stop what you are doing to grab different tools and then clean up before getting back to it, you are losing a lot of time and wasting a lot of energy.

Do your best to batch-cut parts. It is possible to measure each window and/or door and then calculate all of your dimensions for stools, aprons, and casing at once. You can do it at a workstation or at the saw—it does not need to be done at each window or door. You can pre-cope all your ends at once, so that you do not need to constantly be adjusting and switching the saw, back-cutting, and filing. It is much faster to line up all your cuts at once and blow through each task entirely than it is to hop back and forth.

Use hand planes whenever possible. You can save a lot of footsteps and trips back to the saw by having a quality low-angle block plane to adjust miters, back-bevel a scribe, or relieve the back of a piece of molding to flush out a miter. Every finish carpenter should have a high-quality plane in their tool belt.

Do your best to reduce the amount of times you switch between nail guns or fastener sizes. Ideally, use multiple nailers—but if that is not financially feasible, learn to nail off molding in a way that allows you to switch nailers once throughout the task. Bouncing back and forth between an 18-ga. and a 16-ga. nailer for every door, window, and baseboard can waste a lot of time.





9 KNOW WHEN AND HOW TO SCRIBE

A decent finish carpenter should comprehend the fundamentals of scribing. You must understand if you are scribing to be parallel or scribing to be plumb, level, and square. Not all situations call for plumb, level, and square, and doing so can, at times, make the irregularities more pronounced. You must be able to grasp the nuances of each and know when to apply the appropriate principle.

Scribing to an irregular surface will draw attention to that transition. At times this is good, and at times this is less than desirable. A complex scribe around a natural stone or brick wall can showcase your carpentry talent and create a tight joint that makes an incredible focal point. On the other hand, scribing a baseboard to an irregular or uneven tiled floor can highlight the undesirable floor irregularities, and is at times better disguised with one gradual cut.

Scribing should be an accurate and finely tuned technique. It helps to back-bevel the molding you are scribing, so that once you are ready to make a final pass, you do not have to hog out so much material. It is easier and more accurate to only remove a portion of the stock when fine-tuning your scribes. I typically use a combination of a tablesaw, a track saw, a belt sander, a Festool RAS (a grinder-type tool with dust collection), and a hand plane to scribe moldings and millwork.

10 KEEP IT NEAT

Last but not least, you must maintain a clean and organized workspace. Finish carpentry requires skill and patience. You are often working in and around completed spaces and components that must not be dirtied or damaged. Having a tidy, well-thought-out, organized workspace can make or break morale and the overall project.

A carpenter should have the forethought to set up their workspace for the duration of the project. You do not want to be constantly altering, adjusting, or moving your setup for various tasks. Adequate space to function and prevent damage to existing surfaces is critical.

I prefer to create stations to perform each task. I will create a cut station for my miter saw, a station for my tablesaw and outfeed, a large area for assembly, a place to break down larger pieces of plywood or cabinet parts, a space for scribing, and a place for fasteners and tools. At the end of each day you must reorganize, neaten up, and provide a clean slate for the following day. Starting each day with clutter creates haste, inefficiencies, and mistakes, and reduces quality. Having a clean, organized workspace and job site also shows your customer that you respect their home, you respect your craft, and you respect yourself.



Compact Cordless Miter Saws

Tool Test



A veteran carpenter
puts eight ultraportable
sliders to the test

BY BEN BOGIE

Although the trend in the last 10 years seems to be increasingly bigger and heavier sliding miter saws, I started my career over 20 years ago learning on an 8½-in. Hitachi, so returning to this size of saw feels familiar. There's a lot to like about sliders this size. The small blades deflect less than

larger blades, resulting in exceptional cuts, but the ability to easily carry the saw to the work site with one hand and get right to work cord-free is the real reason to get one. For this test, I limited our selections to 7¼-in. saws, assuming that this will be a super-portable second saw to complement the larger miter saw you probably already have.



**BEST
OVERALL**



METABO HPT C3607DRAQ4

BARE TOOL \$950

**BATTERY AND
CHARGER** \$200

BLADE DIAMETER 7¼ in.

VOLTAGE 36

CROSSCUT 90° 2¼ in. by 12¹³/₁₆ in.

CROSSCUT 45° 2¼ in. by 8⁹/₁₆ in.

WEIGHT 34 lb.

**BEST
VALUE**



RIDGID R48607

BARE TOOL \$380

BATTERY AND CHARGER \$150

BLADE DIAMETER 7¼ in.

VOLTAGE 18

CROSSCUT 90° 2x8

CROSSCUT 45° 2x6

WEIGHT 25 lb.

I also included the 7½-in. Makita because it seemed close enough.

If you're used to a corded saw, you may assume these battery-powered versions are just for punch lists, but modern high-capacity batteries mean you can set up one of these saws up in the morning and cut a day's worth of trim without ever tripping

CRAFTSMAN CMCS714M1

KIT WITH BATTERY AND CHARGER \$230
BLADE DIAMETER 7¼ in.
VOLTAGE 18
CROSSCUT 90° 2x8
CROSSCUT 45° 2x6
WEIGHT 26 lb.



DEWALT DCS361M1

KIT WITH BATTERY AND CHARGER \$380
BLADE DIAMETER 7¼ in.
VOLTAGE 18
CROSSCUT 90° 2x8
CROSSCUT 45° 2x6
WEIGHT 29 lb.

KOBALT KMS 0724B-03

BARE TOOL \$270
BATTERY \$100
CHARGER \$45
BLADE DIAMETER 7¼ in.
VOLTAGE 21.6
CROSSCUT 90° 2x10
CROSSCUT 45° 2x6
WEIGHT 30 lb.



over a cord. I compared all the models, side by side, making cuts in 2x stock, ¾-in. plywood, 5/4x6 poplar, and 1x9 hard maple. I quickly plunged the saws into 2x stock to evaluate their power and cut quality. I made crosscuts in wide maple to check for wandering cuts. The Achilles heel of sliders is play in the sawhead. Excessive play causes the blade to wander and creates a belly-shaped cut in wide pieces. At full extension, most of these saws had minimal head movement—I was surprised. The Craftsman and Kobalt had the most play, with the DeWalt, Milwaukee, Makita, and Metabo HPT having almost none. The others fell in between.

Controls and features

Out of the box, only three saws had their miter and bevel stops and pointers properly calibrated: the Metabo HPT, the Makita, and the DeWalt. I make it standard practice to check and calibrate a new saw, but it's a nice feature to not have to. All of the saws have front miter locks and bevel locks in the back. Milwaukee has a miter-detent override, a nice feature when working close to a detent. The Kobalt makes you hold up the lock lever to pass detents, which I found awkward.

For bevel locks, the Makita and Metabo HPT have short-throw levers that are quick and effective. The Metabo HPT has a bevel-adjust knob that allows you to dial in the exact setting. All of the saws have compact footprints compared to 10-in. and 12-in. miter saws, which is nice for portability, but also means there isn't a lot of room to support stock. Makita and Metabo HPT include accessory wings that expand the saw table. The small footprints also mean that some of these saws couldn't crosscut through the 8¾-in. maple. The Makita, Metabo HPT, and Kobalt have larger crosscut capacity.

Many of the saws feature a shadowline cut indicator, which I find to be superior to lasers as they're crisp and don't require eventual adjustment while also illuminating the cut zone in low-light conditions. Notably, the Ryobi and Makita feature neither a light nor a laser, which felt like a glaring omission. The Metabo HPT was the only one in the pack to use a laser, which is quite good, and also includes onboard lighting with two brightness settings.

Build-quality and power vary

As far as material quality, machining, and assembly, the Makita and Metabo HPT saws

are very close, with a slight advantage to the Metabo HPT. The Ryobi and the Kobalt scored lowest in this area. For power and cut quality, it's hands down Makita with Metabo HPT very close behind. Both of these saws feel more powerful than the others and absolutely plow through cuts with no noticeable hesitation or blade run-out.

The cut surfaces were smooth, square, and straight. The Ryobi was the least powerful-feeling while still delivering fair cut quality, and the Craftsman was adequately powered, but had a great deal of blade run-out, resulting in poor cut quality that I don't think was a blade issue. An honorable mention goes to the Ridgid, as it's well-powered, bevels in both directions, and makes decent cuts, even in hardwood.

And the winner is ...

For me, it all comes down to quality of cut and precision of the adjustments. Overall, the Makita and Metabo HPT saws are the clear leaders. They are beautifully executed saws with excellent cut quality. I'll gladly take either for the most demanding finish carpentry. But for me, the Metabo HPT takes the crown. It has excellent cut quality, great capacity, and dual-bevel capabilities, and was the only one with a bevel-adjustment knob. You can also run it with a 110v adapter. My only complaint is that I'd prefer a shadowline cut indicator instead of the laser.

The Makita saw is a close second; it has phenomenal cut quality and power, great capacity, and great build quality, but loses points for missing lighting and no cutline laser or shadow, and it's only single bevel. Next would be the Milwaukee and DeWalt saws, which are perfectly adequate, but lack the refinement and precision of the Metabo HPT and Makita. The budget winner here for me is the Ridgid. It's a good-quality tool with strong features and decent performance at a good price.

Note: For the specs listed here, we weighed all the saws and checked miter and bevel capacities ourselves. Battery offerings by manufacturer are varied and constantly changing—we've done our best to present a fitting comparison for each tool if a kit was not available for purchase. □

Ben Bogie is project manager for BPC Green Builders of Ridgefield, Conn. Photos by Melinda Vazquez, except where noted.

MAKITA XLS02Z

BARE TOOL \$600
TWO BATTERIES WITH DUAL-PORT CHARGER \$260
BLADE DIAMETER 7½ in.
VOLTAGE 36
CROSSCUT 90° 2¼ in. by 11¾ in.
CROSSCUT 45° 2¼ in. by 8¾ in.
WEIGHT 34 lb.



MILWAUKEE 2733-21

KIT WITH BATTERY AND CHARGER \$550
BLADE DIAMETER 7¼ in.
VOLTAGE 18
CROSSCUT 90° 2x8
CROSSCUT 45° 2x6
WEIGHT 28 lb.

RYOBI PBT01B

BARE TOOL \$200
BATTERY AND CHARGER \$130
BLADE DIAMETER 7¼ in.
VOLTAGE 18
CROSSCUT 90° 2x10
CROSSCUT 45° 2x6
WEIGHT 25 lb.



The **Fine Homebuilding** Interview

Gary Katz

A master carpenter and pioneering educator teaches us that the best way to learn is to never stop being a student

BY AARON FAGAN

For more than 30 years, Gary Katz, a licensed general contractor based in Oregon, has specialized in every aspect of finish carpentry. He has been a pioneering presenter at national trade shows and lumberyards, and has taught everything from basic techniques to advanced design and joinery to generations of carpenters.

A prolific contributor to leading trade magazines and finish-carpentry forums, he is also the author of *The Doorhanger's*

Handbook (The Taunton Press, 1998) and *Finish Carpentry: Efficient Techniques for Custom Interiors* (JLC/Craftsman, 2001). More recently, Gary launched THISisCarpentry.com, described by carpenter and author Craig Savage as “today’s version of the pamphlets carpenters read in the 18th century.” Written by carpenters for carpenters, the site offers detailed, illustrated articles about construction techniques as well as a community to those looking to improve their carpentry skills.

AF: You have remained active in the building industry through a long and dynamic period of its development. What are some of the most interesting changes you have witnessed?

GK: I would compare them to the changes that occurred in my father’s or your father’s lifetime—it’s dramatic. For example, I’ve been working on this little meditation-deck project down by the river near my house here in Oregon. I bought a cordless rotary hammer with a 2-ft.-long, 1-in. carbide bit with which I was able to drill 18-in. holes into solid rock in minutes. Then I bought two-part epoxy in a caulking tube with a special tip that mixed it automatically as I filled the holes and stuck in rebar that I cut with a chop saw with a metal-cutting blade. Then I used cardboard Sonotube and scribed it to the rock, instead of having to build some plywood form for the footing. There were some gaps at the bottom of the tube, so I used closed-cell expansive foam to fill them in. It just goes on and on. None of that stuff existed when I was a kid.

AF: It’s hard to imagine how someone would have executed a project like that on one’s own.

GK: Next to where I’m putting this deck there is an old bolt embedded in the rock—it must be an inch and a half in diameter with a steel plate on it. It’s all rusted and bent over. The gold miners who came through here in the late 19th or early 20th century probably had some kind of a dredge or maybe even a little bridge secured to that bolt in the bedrock. I look at that thing frequently. You can’t help but imagine how much effort and work they went through to place that thing. And here I am, able to put those footings in alone in less than a day.

AF: You were able to use the skills of several people as one person.

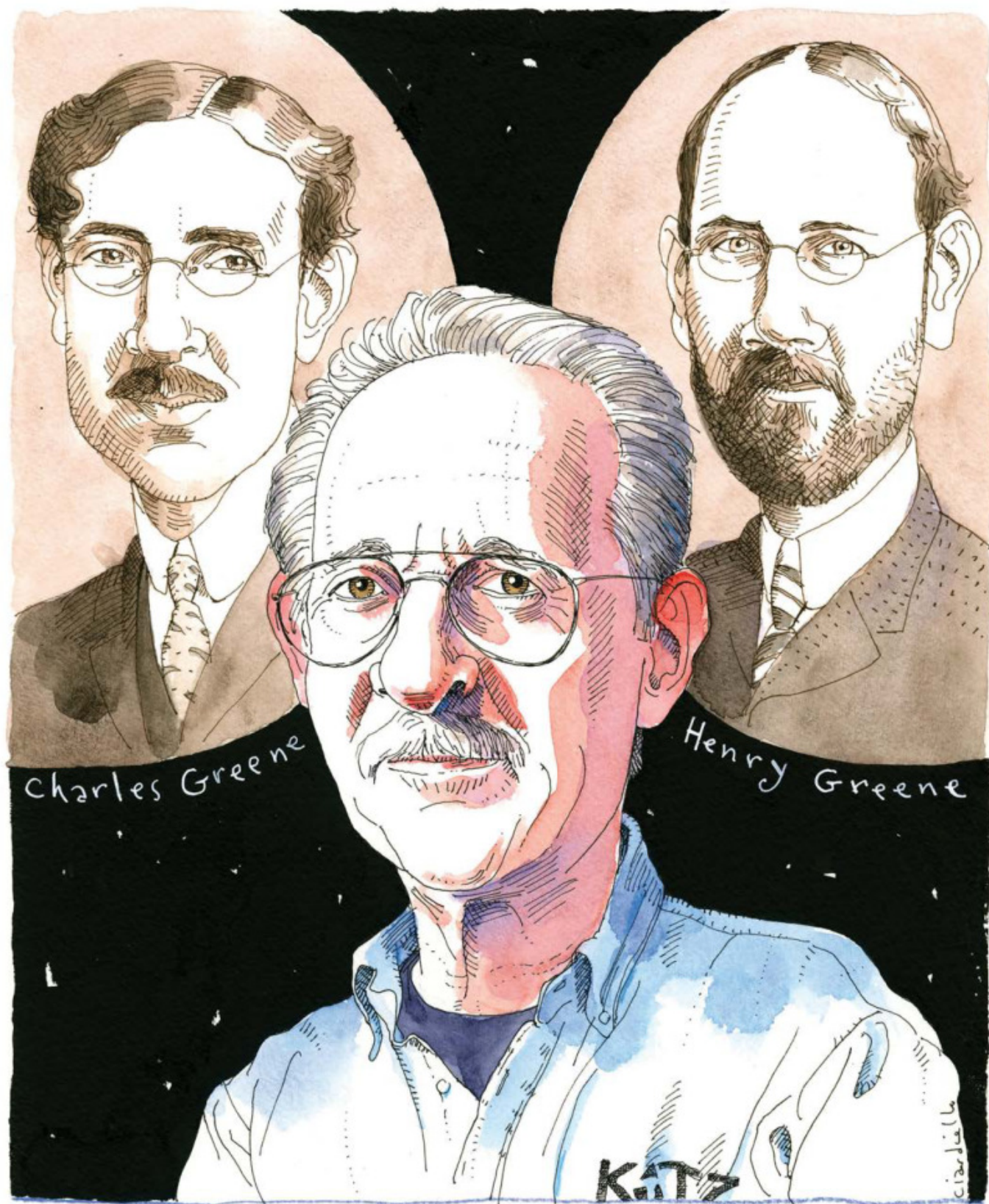
GK: It used to be even more that way. It may appear that I’m using all these different skill sets from the example I just gave, but if you look at it through a historical lens, it reminds me of my dad’s carpenters who used to do everything. They would come

on the job and set the forms for the concrete, and they’d pour the concrete. They’d set the steel, and supervise the excavators. Then they’d come back to frame the house. Then they’d come back after the plasterers and electricians and trades had done their jobs and set the finish. They would build the cabinets right there on the job. *They* did everything. That day is definitely done.

AF: Even the distinction between a framing carpenter and a finish carpenter didn’t come until after WWII.

GK: Precisely—not until true production building stepped into high gear with the postwar boom brought about by the VA housing and education program for veterans. That’s what really fueled the specialization trend. It started in Southern California with production framers and finish crews. Slowly but surely, you’d encounter a crew that just hung doors or just built stairs.

AF: Social media does a lot to educate building professionals and clients alike



about what quality craftsmanship is. Can you talk about using education as part of a business model?

GK: I love the phrase “marketing through education.” Twenty years ago, I toyed around with that idea in various ways and it became the secret sauce of the Katz Roadshow, which was the only national, hands-on, peer-to-peer series of carpentry clinics, hosted at lumberyards all over the United States. We depended on marketing through education for our success. We convinced all these manufacturers to support the roadshow with what I thought at the time were big dollars. It cost tens of thousands of dollars for each sponsor to support our program, and we produced 20 to 30 events every year. People would come in for a whole day of serious, hands-on training with professionals. The companies supported it because they wanted to sell their products.

Some of the lumberyards had been hesitant to bring our sponsors’ products in, which is one reason the shows were valuable to the manufacturers for what they call “pull through.” The idea is that if we used the products, the audience would realize the benefits and ask the lumberyard to bring those products into the store. Of course, many of the sponsors also wanted to support the show because their number-one problem was improper installation: improper flashing techniques or incompatible sealants and on and on. They wanted to get the word out on how to properly install their products. It spares both builders and manufacturers time, money, and damaged reputations.

All of it, the secret to the whole thing, was marketing through education. It stunned me to find myself in this position, keeping people in their seats for a whole day and simultaneously using a variety of different products without making it look like a sales thing. We stuck to real solid techniques while using a company’s products. It was a perfectly balanced program.

That’s what’s neat right now. I see it today—companies supporting people on Instagram who are really teaching other people serious stuff. And occasionally they use a product by that company, but they’re not focusing on supporting the company

or product promotion, they are focusing on techniques, instruction, and education. These companies are seeing folks with 300,000 followers, and they want to get their products into the hands of those influencers. It’s remarkable what social media is doing for our trade.

AF: What is your advice to young people trying to educate themselves?

GK: Until you discover the real motivation inside of you, you’re not going to be educated. You won’t learn anything until you are truly motivated from the inside. What that motivation is doesn’t matter. If you are motivated by money, great. If you are motivated by desire, wonderful, that’s even better. Whatever it is, you need real fuel to drive you. When you grow from your mistakes as a carpenter, you evolve as a person.

AF: Where are you at in your own evolution and education as a carpenter?

GK: It would be fair to say carpentry is still pursuing me. I can’t get away from it. I just love it. I love making stuff. I’m glad I’m a carpenter. These days—while I’m still working almost every day in my shop or on something around my place—I am trying to finish a book I started 20 years ago on American mantel pieces. And to do

“When you grow from your mistakes as a carpenter, you evolve as a person.”

it, I’ve been having an enormously good time researching architecture and learning more about architectural history and period styles, and putting together a lot of missing pieces of my puzzle.

I have tried for decades to understand why certain architectural styles make me feel giddy and why certain architectural ornaments stick in my mind like Devils Tower did for Richard Dreyfuss’s character in *Close Encounters of the Third Kind*. The Craftsman stuff has driven me crazy—the cloud lift and the waterfall brackets. All

that kind of stuff that the Greene brothers originated and borrowed from Japan and the Victorian architects. It has driven me nuts. They learned a lot about it from the 1893 World’s Columbian Exposition in Chicago, where they were exposed to the Japanese pavilion. So were Frank Lloyd Wright and the architects McKim, Mead, & White. I’d always thought the Greene brothers came up with those ideas out of thin air. Or that Frank Lloyd Wright came up with the prairie style all on his own. But this past year, with the studying I have been doing, I see there is a clear evolutionary line. Each one of those ingenious inventions has an evolutionary tail. It has been fantastic to see that and learn to recognize it. I don’t know if I will ever finish my mantelpiece book, but boy has that project been a winner for me.

AF: Asher Benjamin’s handbooks had a nearly ubiquitous influence on early American architecture, and that influence persists in many ways. Who was he to you?

GK: He was a profiteer and a plagiarist. Asher Benjamin plagiarized Sir William Chambers’s books in an egregious way. He didn’t just take a paragraph here and there, he took whole chapters and published them verbatim with the same illustrations and called them his own. He never gave Chambers any credit at all—none. You read any good architectural historian like Vincent Scully, and they’ll tell you the truth about who Asher Benjamin really was. He had an enormous impact on the whole classical drift of architecture in the United States, primarily because he was so driven to be seen as an authority. He published the same kind of stuff over and over again, and republished his books. He was good at marketing and sales. All the way through the 19th century, that whole extension of the Federal and classical styles—some people call it “academic style”—was largely dependent upon people like him and him specifically.

Yeah, I think his homes were wonderful. I have an incredible appreciation for the Greek-revival, classical, Georgian, and Federal styles. I go nuts over them because they’re so perfect. But if you idolize his

homes, then you're not recognizing the real essence of architecture, which goes way beyond those styles that are so common in the New England area.

I think a lot of folks out there bought into this partly because of writers like Asher Benjamin, and unfortunately they still aren't able to truly appreciate what the early Victorian architects accomplished. I mean, how many of those neat old Federal and Georgian homes have a front porch? Or a back porch? Or even something you might call a veranda where you can put your chairs and sit outside to enjoy a sunset or sunrise? None. Those houses didn't have them. They didn't have stuff like that because they were classically inspired boxes that were cut up inside into little boxes. Whereas in the mid-1800s, architects like Andrew Jackson Downing and Henry Hobson Richardson embodied that style of building homes that expressed what made humans comfortable. They brought the outdoors indoors and the indoors outdoors. That was huge. They built verandas all the way around a house like they did down in the South. Federal homes in the South had these huge verandas all the way around a house—you couldn't live without one.

AF: Speaking of appreciating accomplishments, who are some figures we should never forget?

GK: The Greene's homes should all be museum houses and never be threatened. Frank Lloyd Wright's houses should never be threatened either, even though he was a terrible builder. His houses leak like a sieve and his cantilevers were totally over-extended and unsupported. To repair, fix, and save many of his homes would be a gargantuan amount of money—many would have to be pretty much rebuilt.

Then you have to go back to the 1850s and '60s and save stuff even earlier than that. We've already lost a lot of those houses. I never knew who Downing and Richardson were. I never knew that McKim, Mead & White originally designed revolutionary homes. I think those houses need to be saved. Personally, I believe more effort should be made to expose people to those revolutionary and beautiful ideas and a little less energy put into trying to educate people about the classical orders. Sure,

it's important for people to understand the Tuscan, Doric, Ionic, Corinthian, and Composite orders, their differences, and what makes them proportionate and all that, but there's also other things that are truly equally important, and that's the part of the art form that's a bit more human. People like Asher Benjamin and the propo-

// ...it's not the finished thing that ultimately turns you on the most, it's what you learn from doing it. //

nents of the academic style say it's all based on human proportion and it's natural. But it's not based on human proportion and it's not natural, it's a temple. It's all based on temples. Temples aren't made to be lived in. Temples are places of worship. I am not demeaning religion. I'm saying we're not gods, we're humans; and to be comfortable, we need to create homes that are more human.

AF: What's your favorite thing to work on?

GK: I really enjoy working on something that's way over my head, that I've never done before, and that I have little chance of succeeding at, which frankly is pretty easy to find. I really like working on stuff that I don't feel I need to finish right away so that it can sit in different stages while I absorb what's going on or it absorbs me more. I guess that's a good way of putting it: It absorbs me. I'm able to allow the project to evolve before I force its completion. It changes because of that.

Take this deck I am doing down at the river—such a perfect example. It's just a little project, yet so compelling in a way. I've already installed the deck boards. I did it really quickly once I got the joists up. I put ice-and-water strips on top of all the joists. I used hidden fasteners. I bought the decking material from this company I've worked with in the past named Thermory, which makes thermally modified decking. I used products I believe in. Instead of using some

composite decking or plastic or whatever, I wanted to use wood.

It's right next to the water, and it's beautiful—it's more than you can handle sometimes, it's so overwhelmingly glorious. I wanted to put my yoga mats right above where the water comes out and over some rocks into a pool right at this deck, and I kind of hurried to put the deck boards down so I could start using it right away.

I put them down, but I didn't want to cut the ends off until I sat with it for a while and decided what the final shape should be because it's tucked between these big bedrock outcroppings. I kept thinking, one side should be scribed a couple inches from the rock all the way, so it looks like it came out of the rock but doesn't touch it. And the other side should be straight so it's angular. And then a friend pointed out that it will be under water when the river comes up every year and it would be good if I could remove a few of the deck boards. It would reduce some of the hydraulic pressure on the uplift as the river's rising. And I thought, what a good idea. Then I realized, thinking about it a few days more, what a bother it would be unscrewing those boards because eventually the screws would rust or strip or snap off. Then it dawned on me that I should take three or four boards and panelize them, put 2x4s under them that land in between the joists bays, and then screw the deck boards to those so you can lift the whole panel out. And don't bother screwing the panel down, it won't move. Just lift the panel out each year before the river comes up above it.

That's the kind of thing I really enjoy: having the time to allow some of my projects to evolve and cook, and me to learn from them, because it's not the finished thing that ultimately turns you on the most, it's what you learn from doing it. We learn in little pieces throughout our lives, but it's not until we have the opportunity to let go of the completion that we truly understand the value of that experience—how much we learn from waiting and patience. □

Aaron Fagan, a former associate editor for *Fine Homebuilding*, is a freelance writer and the author of three books of poetry, including *A Better Place Is Hard to Find* (The Song Cave, 2020).

Custom, Shop-Built

Radiator Covers



A furniture maker pairs traditional looks with mechanical fasteners to manage extreme temperatures

BY BRIAN ALCORN

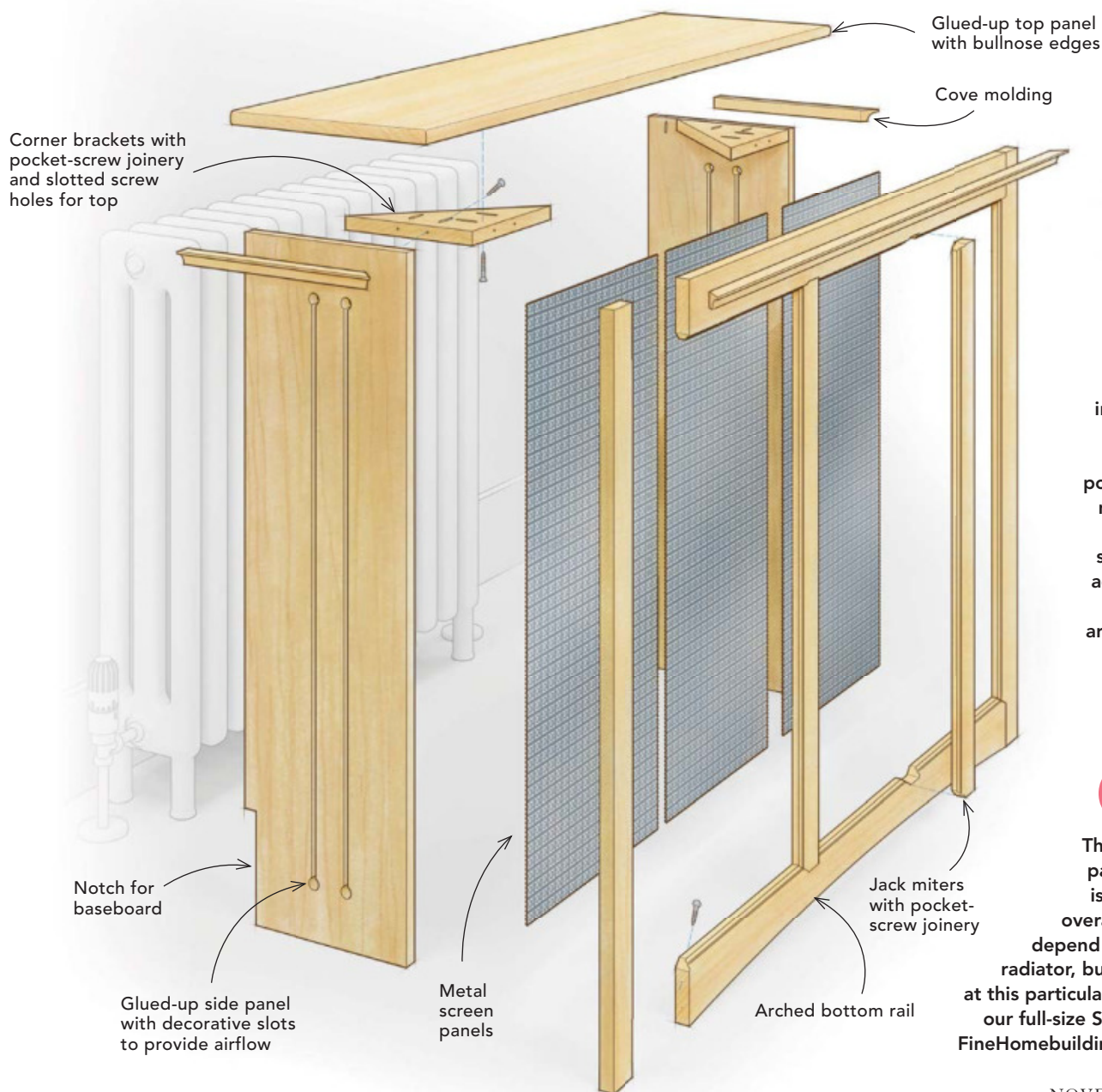
As a woodworker whose focus is furniture-making, most of what I do is more likely to end up in the pages of *Fine Woodworking* than *Fine Homebuilding*. But I do get the odd commission that falls into the home-building realm, usually projects like replacing columns and stair parts or repairing damaged or timeworn elements of the colonial-era homes where I live in eastern Massachusetts. Recently, though, a family needed a solution to cover their home's eight cast-iron radiators.

Installing covers to protect occupants from possible burns from old radiators is a requirement in some jurisdictions, especially for rental properties and for houses that shelter foster children, like my clients' home. Some homeowners just don't like the look of the old radiators, and many don't appreci-

ate the constant cleaning—radiator ribs are highly efficient at collecting dust and cobwebs.

The techniques I use here can easily apply to other woodworking projects where traditional joinery may not work, or is too fussy for something that isn't intended as an heirloom piece. If you're planning to make your own radiator covers, measure carefully, and be sure to leave at least one inch clearance above, in front of, and on each side of the radiator. From there, based on your material thicknesses and desired overhang, you can figure out the dimensions of the sides, face frame, and top. □

Brian Alcorn is owner of Alcorn Woodworking and a real estate attorney in Westford, Mass. Photos by Matthew Millham, except where noted.



JUST LIKE A SMALL CABINET

These decorative radiator covers are built with stiles, rails, and intermediate panel dividers joined together with pocket-screwed jack miters. The arched bottom rail and slotted side panels add style and allow for more airflow around the radiator.

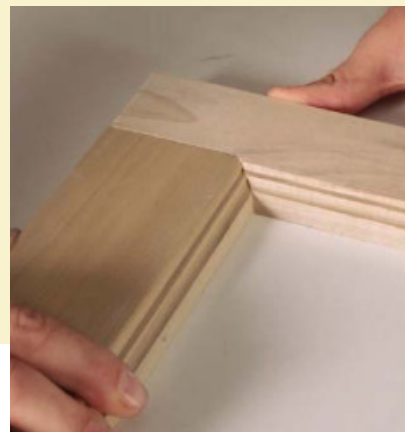


Build it yourself

The material for this paint-grade cabinet is $\frac{3}{4}$ -in. poplar. The overall dimensions will depend on the size of the radiator, but for a closer look at this particular cover, download our full-size SketchUp model at FineHomebuilding.com/magazine.

FACE FRAMES FIRST

While not all radiator covers will be the same size, the construction of the front face frames is the same, each with a pair of rails and stiles like those found on kitchen cabinets. After considering the swings in heat these joints will see, I determined that pocket-screw joinery would work best.



Joint, rip, and profile. For straight material and tight joints, run the stock through a jointer. Rip the rails to 3 in. and the stiles to 2¼ in. Profile one edge of each piece on the router table with a beading or cove bit.



Nip the rails, cut the stiles. Less prone to opening from wood movement, jack miters combine a 45° miter at the profile and a butt joint for the rest of the material. With the blade tilted at 45°, cut the miter on the stiles equal to the depth of the profile. For the flat portion of the joint, use a tenoning jig to hold the stock vertically and square as it passes through the blade. Nip off the corner of the profile on the corresponding rail (Not shown). Cut and practice with sacrificial boards until you fine-tune the setup.

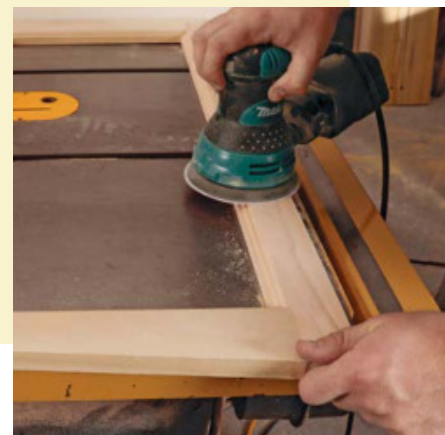
Draw and cut the arch. The lower rail gets an arch cut in it to aid in airflow and to help with installation later in the event of any wonkiness in the homeowner's floor. It's easier to lay this out with the face frame temporarily assembled with pocket screws. I laid out the arch by making a mark 1 in. up from the midpoint of the lower rail and struck the profile using a flexible batten as a guide. I then roughed it out on a bandsaw and finished with a spokeshave for a perfect curve.



Dividers need some handwork. With the frame temporarily assembled with clamps, you can lay out the 2-in. divider locations on the rails and mark the mitered cuts and flat bottom of the joint using a combination square. The double-mitered ends of the dividers are easily cut with a miter saw set at 45°.

For the rails, you can use a router and jig, a coping saw, or a number of other methods, but I prefer to remove the waste for the flat portion of the joint using a crosscut sled and a dado set on the tablesaw. I then use a wide chisel and 45° miter jig that sit on the rails like a saddle and has a bevel that the chisel rides on to remove the corners of the miters cleanly.



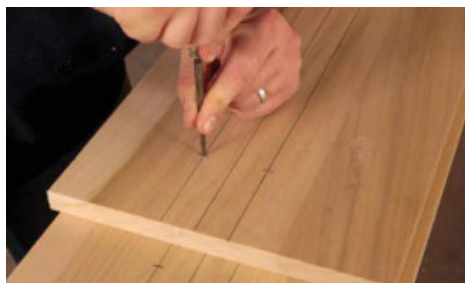


Pocket screws pull it together. With the female portion of the jack miters cut, assemble the outer perimeter of the face frame, measure and cut the lengths for the dividers, miter their ends, drill a pair of pocket holes in each end, and fasten the dividers into the frame.

SIDES SECOND

I make the sides by jointing and edge-gluing stock with Titebond III. To help with airflow and for a more aesthetically pleasing look, rout $\frac{1}{4}$ -in. slots into the sides, 2 in. apart and centered in the case. The face frame will be added to the sides, so account for this when measuring.

Lay out the slots. Strike lines delineating the centerlines of the slots, and mark points 3 in. from the top and bottom of the piece for the $\frac{5}{8}$ -in. holes. Mark $\frac{1}{8}$ in. from each side of the centerlines to find the outside of the $\frac{1}{4}$ -in. slots. I prick the hole locations with an awl to help center the spur of the Forstner bit when I cut the holes at the drill press.



Bore and rout. After boring the holes, rout the slots. Raise the bit up through the hole and align it using the marks struck earlier. With the router table fence adjusted and locked and the bit centered in the hole, start the router and cut the slots in a single pass, moving slowly and steadily to account for the thickness of the material.



ALL TOGETHER NOW

The top is a glued-up panel with a bullnose profile and is sized for a 1¼-in. overhang on the front and sides. A cove molding complements the face-frame profile nicely. I use Titebond III glue again and 1½-in. 18-ga. brads to join the sides to the face frame, with corner brackets to square it up and secure the top.

Hold it square. Use 90° clamping jigs to do a dry assembly of the sides and face frame, then, leaving the jigs in place, glue and fasten one side at a time.



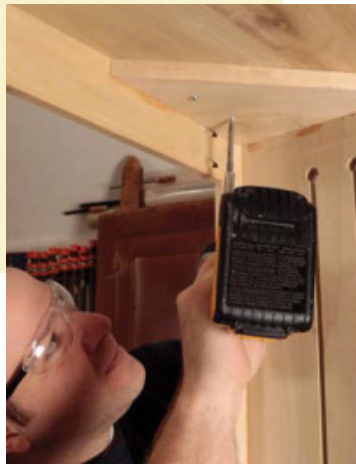
Clamp it up. In order to ensure tight joints, immediately clamp the entire case and leave the clamps in place while the glue sets. Look for a uniform amount of glue squeeze-out along the joints and clean it up immediately.



Block it square. Once the glue is set, replace the 90° clamping jigs with a pair of right-triangle blocks glued and pocket-screwed into the upper corners. Cut the blocks so that the grain runs parallel to the triangle's hypotenuse in order to maximize the strength of the joint. These triangle blocks hold the case square and provide a means of attaching the top.



Shape the top. Using the router table, profile the ends first (across the grain) and then the length in order to minimize the chances of the corners blowing out deeper than the bit will cut.



Attach the top. Drill pocket holes near the back of each side of the case, and drill elongated holes into the triangle corner blocks. The screws at the rear hold the top fast in place, while the screws in the elongated holes allow the top to expand and contract and minimize the risk of warping or cracking. If expansion does occur, it can only move outward, preventing a gap from opening at the wall.



Make a cove. Use a cove bit in a router table to make a cove molding. Profile both sides and rip the pieces free at the tablesaw.



Attach the cove. Mark the cove sections using the case as a guide and fasten them with short brads and glue to the sides only. Fastening to the top could cause the cove to separate if the top expands from the heat.



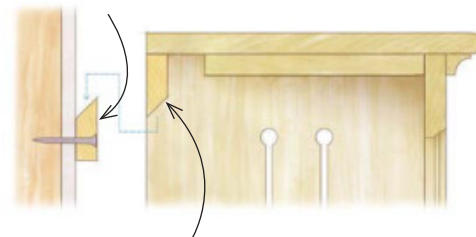
FINAL TOUCHES

The inner field of each face frame is filled with perforated decorative sheet metal, which is readily available at most big-box stores in 2-ft. by 3-ft. panels—large enough to fit the field on smaller covers. For larger ones, I use inner dividers to break up the field. I opted to make the center panel slightly narrower on this cover for interest.



Fill the frame. Cut each sheet roughly 1½ in. larger than the openings in both directions, and predrill the sheets for the #6 washer-head screws so that the sheets don't distort when the screws are driven.

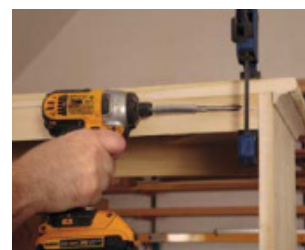
Beveled cleat fastened to framing with structural screw

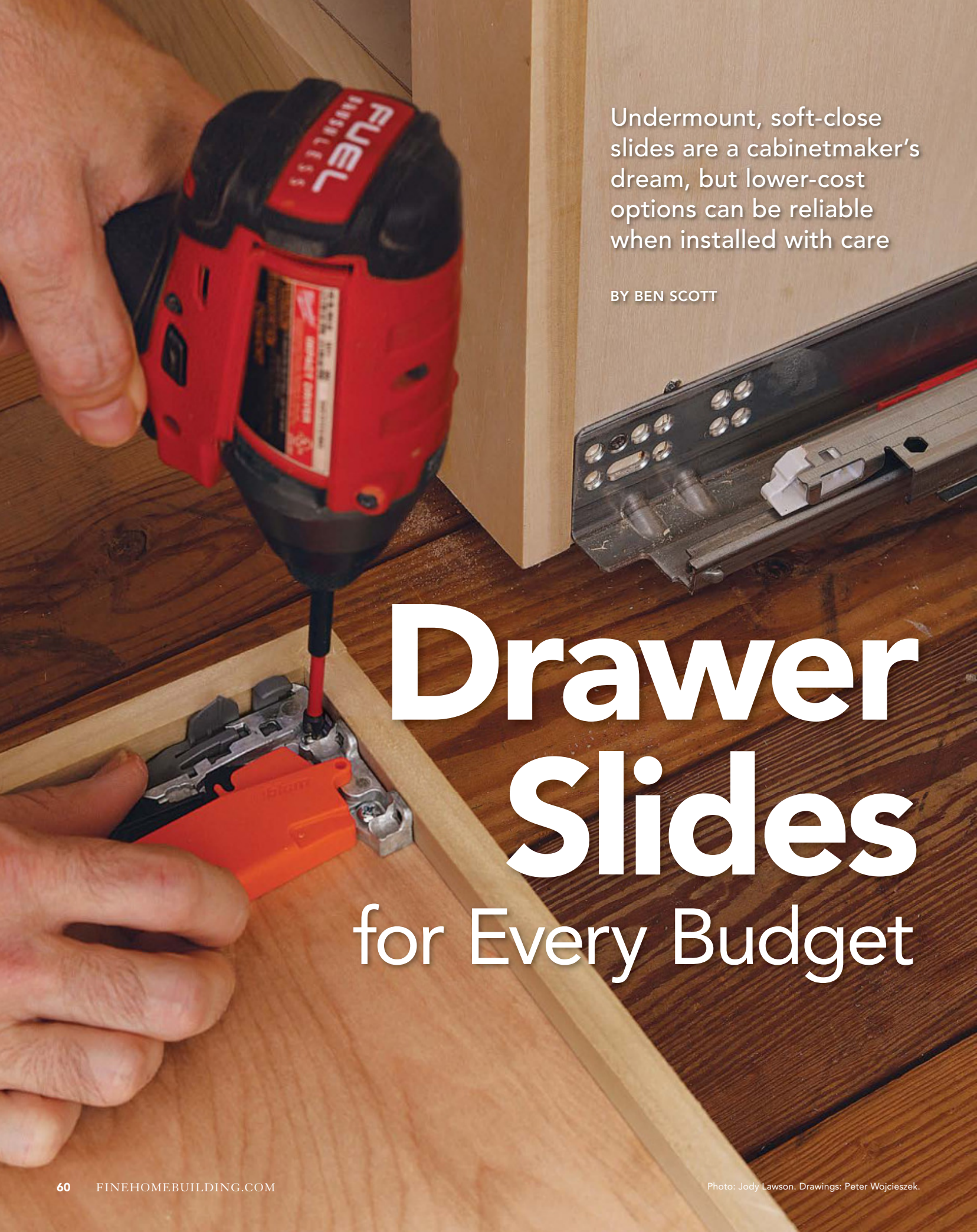


Mating beveled cleat inset between sides of the assembly

Secure it with cleats.

To prevent tall, narrow covers from tipping, install French cleats. Rip these from a 4-in. piece of square stock. Fasten one half to the case with pocket screws and the other to the wall. During installation, the screens can be quickly popped out for cleat alignment.





Undermount, soft-close slides are a cabinetmaker's dream, but lower-cost options can be reliable when installed with care

BY BEN SCOTT

Drawer Slides

for Every Budget

With over 21 years in the custom cabinet and furniture industry, I've used most of the drawer slides on the market, but now my shop only uses undermount soft-close slides. Their smooth operation, weight capacity, and adjustments in all directions make up for any cost savings that come with a lesser slide. But not every budget has room for the most-expensive slides available, so in this look at drawer slides, I included some lower-cost options that I've had good success with. The two low-cost options are a bit more finicky to install because they lack built-in up/down and tilt adjustments, but they are very reliable when installed with care. The more-expensive slides have built-in adjustments and ultra-smooth operation. And they mount on the drawer bottom instead of the sides, so they're hidden from view when the drawer is open, letting the craftsmanship you put into your drawer boxes shine instead of the hardware.

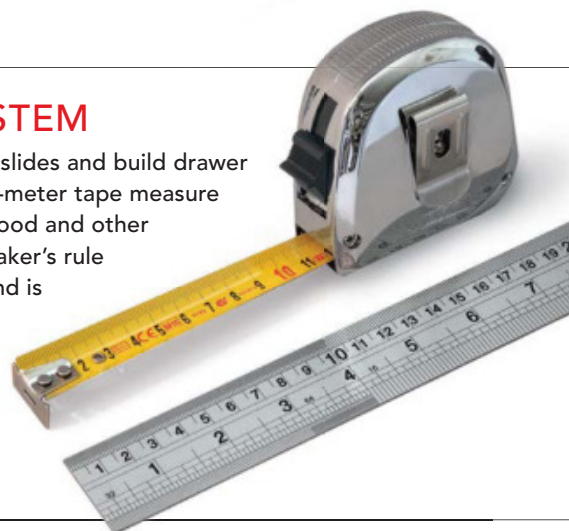
One of the keys to drawers that operate smoothly is getting the slides installed on the cabinet box at the same height and square to

GET WITH THE SYSTEM

The most accurate way to install slides and build drawer boxes is to use millimeters. An 8-meter tape measure is useful for breaking down plywood and other panel products. A 3-ft. cabinetmaker's rule includes metric measurements and is useful for precision work.

8-Meter Tape Measure
Lee Valley 06K1108, \$12

Cabinetmaker's Rule
Lee Valley 06K2036, \$21



the front of the case on both sides. Drawer boxes must also be made the correct size. Using metric measurements makes both of these tasks easier, because all the drawer-box measurements and slide layouts are in millimeters. Good metric tape measures and rulers are available from Lee Valley.

We use an adjustable Blum jig to drill the holes for the slides at the needed height; it is quite costly, but it saves a lot of time. You can also lay out the slide mounting holes on a

plywood or MDF template and use it to drill the holes in the cabinet sides before attaching the slides. The slide dimensions here fit a 24-in.-deep cabinet, and the prices include a pair of slides and the locking devices for the drawer box. The Grass prices include the rear drawer-box mounting brackets as well. □

Ben Scott is cabinetmaker in Maple Ridge, B.C., Canada. Photos by Rodney Diaz, except where noted.

HEAVY DUTY Accuride 4034 side mount

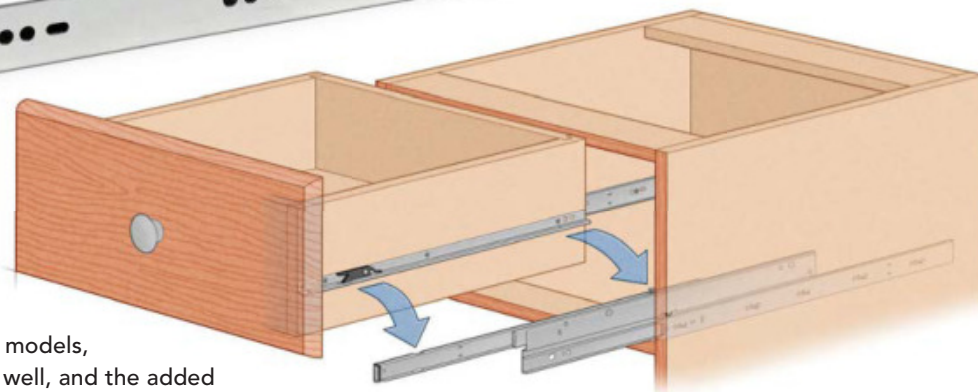
MODEL NO. C403422D **LENGTH** 22 in.

LOAD RATING 150 lb. **PRICE** \$35 per pair



These are standard slides for commercial projects. They operate well, are fairly smooth-running, and have a good load capacity. This model is not self- or soft-close—you have to push the slides closed and a detent holds them shut. There are soft-close models, but in my experience, they don't operate very well, and the added cost comes to nearly the same as heavy-duty undermount slides. Drawer boxes can be made with a plant-on bottom or grooved-in bottom, but because the slides mount to the sides of the drawer box, a plant-on bottom can pull off if it isn't well-attached.

Side clearance is $1\frac{1}{16}$ in. smaller than the opening. We typically use veneer core plywood for our drawer boxes, with a $\frac{3}{4}$ -in. front and back and $\frac{1}{2}$ -in. sides, doweled together. The $\frac{1}{2}$ -in.



material is usually $\frac{1}{32}$ in. undersized, so we cut the front and back of the drawer box 2 in. smaller than the inside of the cabinet. The undersized $\frac{1}{2}$ -in. material provides the additional $\frac{1}{16}$ -in. clearance needed. The slides must be straight on the cabinet and the drawer for proper operation. The downsides are a lack of adjustments and side-to-side racking on wide drawers.

NO FRILLS Blum 230M side mount

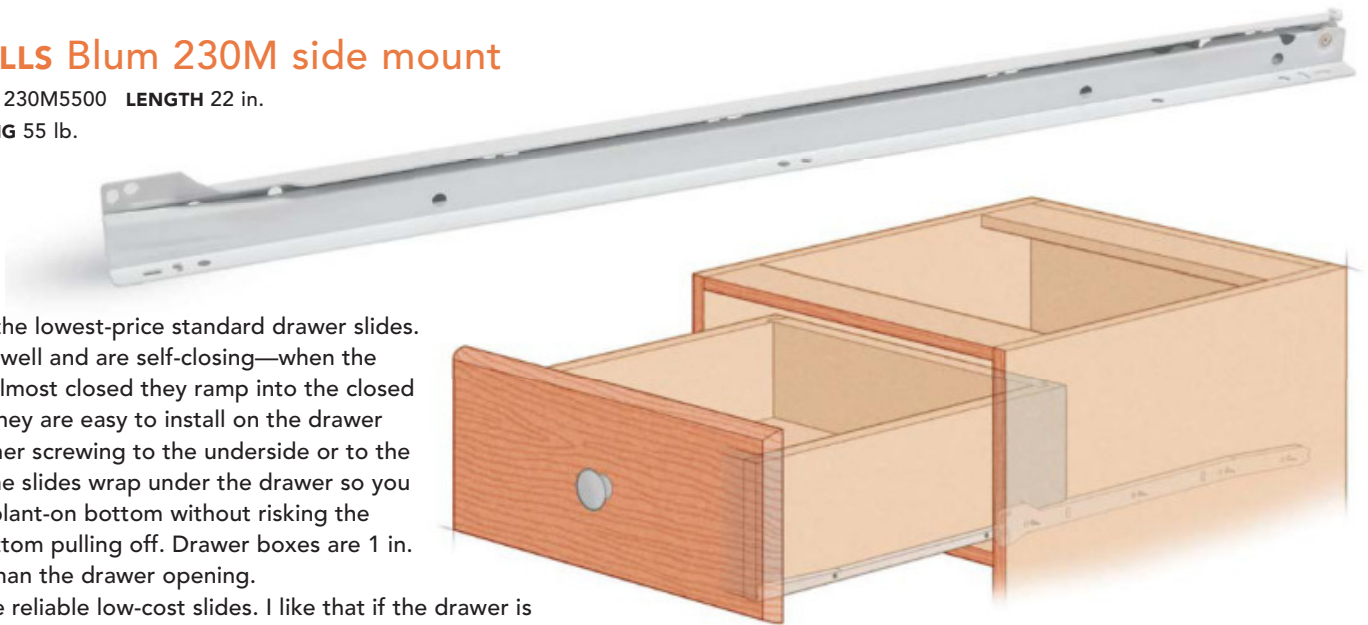
MODEL NO. 230M5500 LENGTH 22 in.

LOAD RATING 55 lb.

PRICE \$7

These are the lowest-price standard drawer slides. They work well and are self-closing—when the drawer is almost closed they ramp into the closed position. They are easy to install on the drawer box by either screwing to the underside or to the outside. The slides wrap under the drawer so you can use a plant-on bottom without risking the drawer bottom pulling off. Drawer boxes are 1 in. narrower than the drawer opening.

These are reliable low-cost slides. I like that if the drawer is slightly smaller, the slides will still work, because one side of the slide hooks the nylon wheel to keep it tracking correctly, and the other, straight side accommodates up to $\frac{1}{8}$ -in. undersizing. These slides aren't as smooth-running and are a little louder than more-expensive options. The weight capacity is the lowest of the bunch, and there is no soft-close option. And with only three-quarter extension, there's limited access to the back of the drawer.



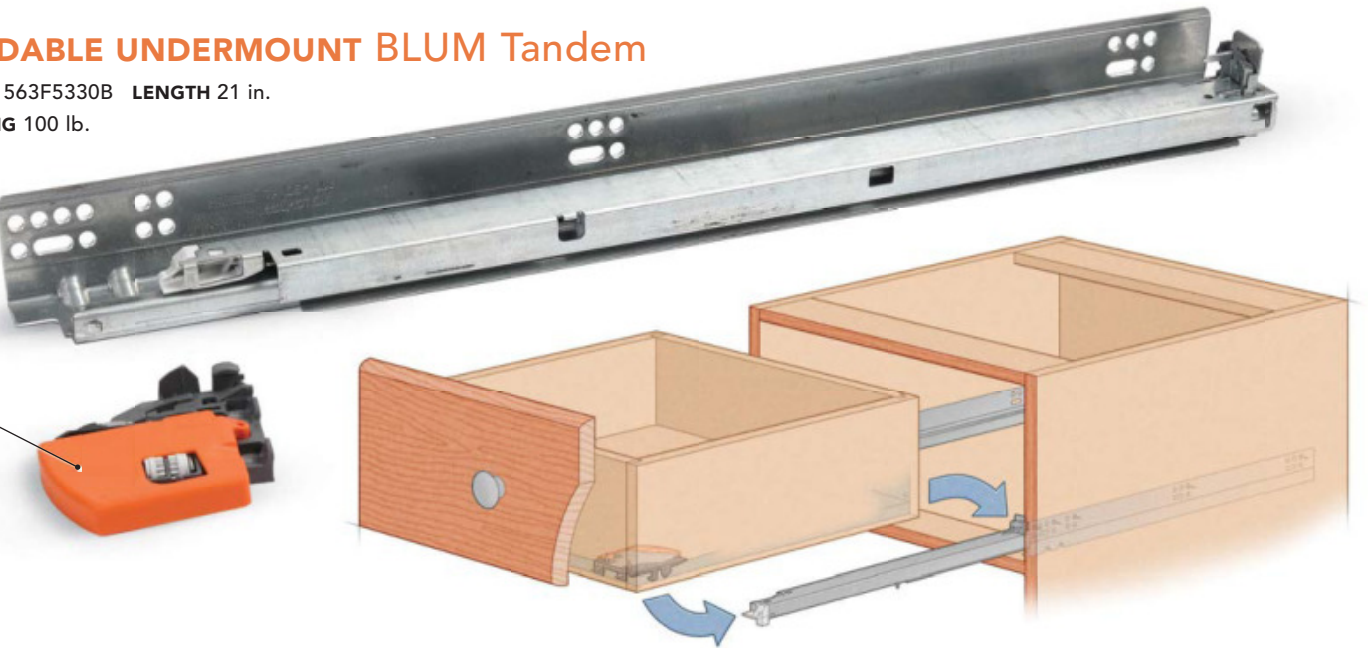
AFFORDABLE UNDERMOUNT BLUM Tandem

MODEL NO. 563F5330B LENGTH 21 in.

LOAD RATING 100 lb.

PRICE \$30

Standard locking device



These were the first widely available undermount drawer slides I used. They're smooth-running, they mount under the drawer box, and they're hidden by the drawer sides when the drawer is open. The first version didn't have soft-close, and then the feature was an add-on; now, all Tandem slides have soft-close built in. These were the first slides that I used with up/down and tilt adjustments to the drawer faces. Clips hold the drawer box to the slide at the front, and a 6-mm hole drilled into the back of the drawer holds the back of the drawer box and provides the tilt adjustment. The drawer bottom must be above the bottoms of the drawer sides for attachment and so the slides are hidden from view.

All undermount slides from Blum and Grass use the same sizing. The drawer-box front and back are 42 mm smaller than the inside measurement of the cabinet. The drawer-box sides can be any thickness up to $\frac{5}{8}$ in. (16 mm). The depth of the drawer is determined by the slide length, sold in 50-mm increments. The drawer is always 10 mm shorter than the slide length. For example, a 550-mm slide holds a 540-mm drawer.

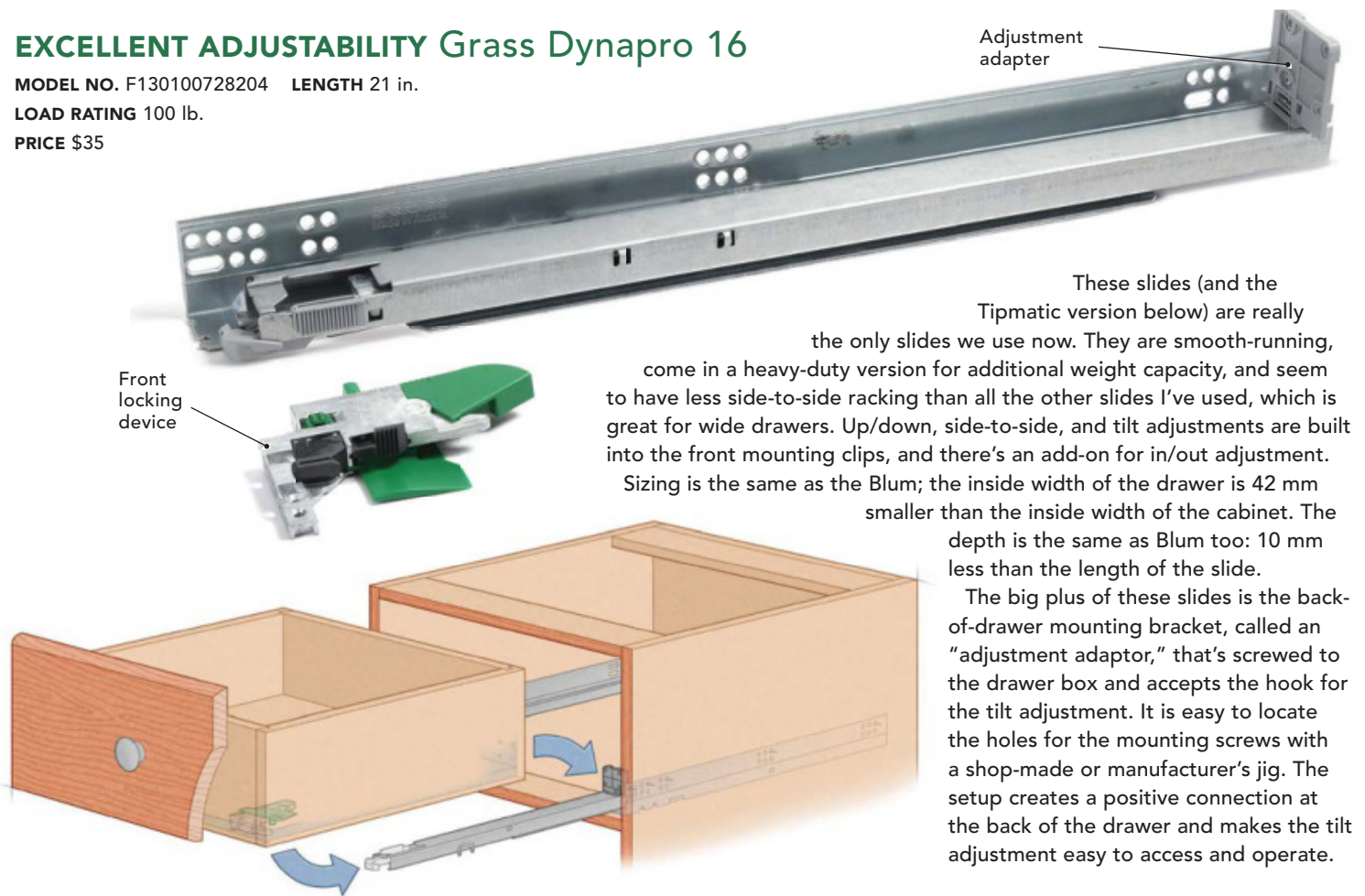
The drawbacks are no side-to-side adjustment, and the hole in the back of the drawer is hard to locate. It typically lands where the drawer bottom and the back of the drawer box meet. We use the manufacturers' jigs to drill these holes, but the location isn't ideal.

EXCELLENT ADJUSTABILITY Grass Dynapro 16

MODEL NO. F130100728204 LENGTH 21 in.

LOAD RATING 100 lb.

PRICE \$35



These slides (and the Tipmatic version below) are really the only slides we use now. They are smooth-running, come in a heavy-duty version for additional weight capacity, and seem to have less side-to-side racking than all the other slides I've used, which is great for wide drawers. Up/down, side-to-side, and tilt adjustments are built into the front mounting clips, and there's an add-on for in/out adjustment.

Sizing is the same as the Blum; the inside width of the drawer is 42 mm smaller than the inside width of the cabinet. The depth is the same as Blum too: 10 mm less than the length of the slide.

The big plus of these slides is the back-of-drawer mounting bracket, called an "adjustment adaptor," that's screwed to the drawer box and accepts the hook for the tilt adjustment. It is easy to locate the holes for the mounting screws with a shop-made or manufacturer's jig. The setup creates a positive connection at the back of the drawer and makes the tilt adjustment easy to access and operate.

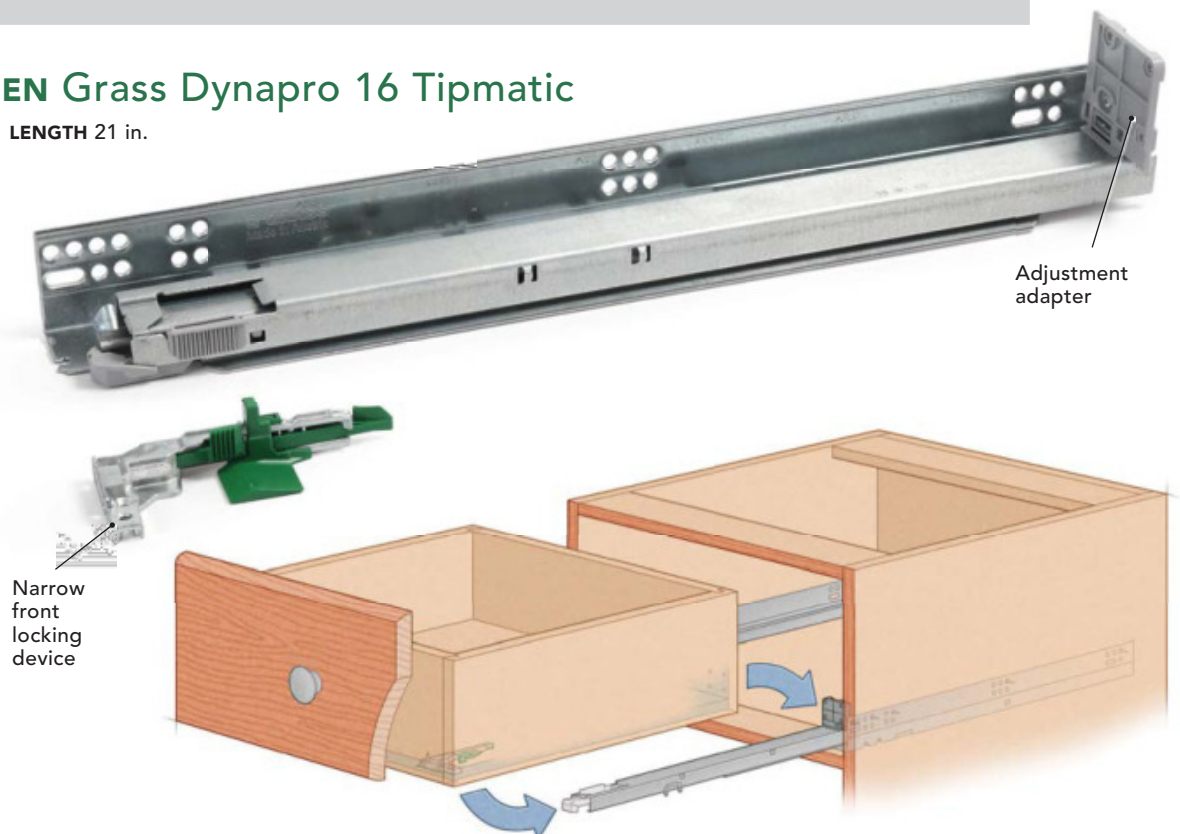
BEST PUSH-TO-OPEN Grass Dynapro 16 Tipmatic

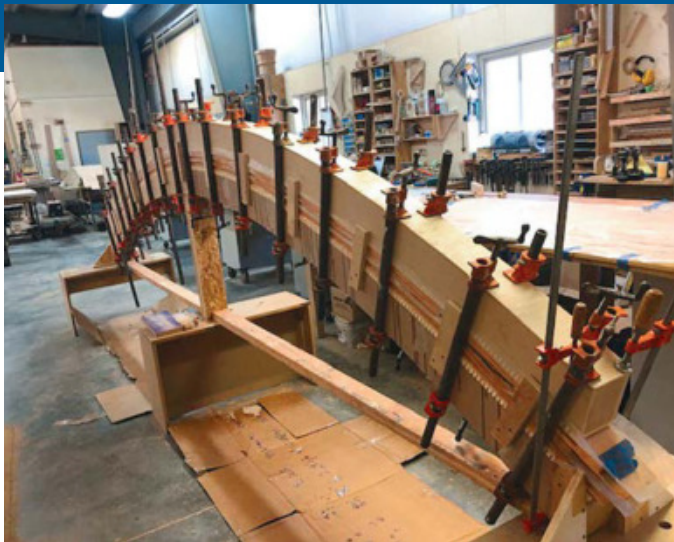
MODEL NO. F130116434204 LENGTH 21 in.

LOAD RATING 100 lb.

PRICE \$75

These are Grass's top-shelf slides. They have up/down, side to side, and tilt adjustments as do the standard Dynapro, but these slides also include a push-to-open feature that is built into the slides. The push-to-open has three settings so you can adjust them for each drawer weight.





One-Stop Woodshop

Sometimes it makes sense to have one company handle all the woodwork for a project, from fabrication to installation

BY STEVEN BACZEK

In the not-so-distant past, building a house was much simpler. Contractors were generally carpenters who worked with one or two helpers to cover most of the tasks needed to complete the building. The same crew that framed the house installed plaster and did the trimwork too—the responsibility for the entire building was largely on one crew.

As production-building methods took hold, crews became more and more specialized and building products came from supply houses instead of being made on-site. On a typical job these days, the finish work is broken down into several dedicated disciplines: One crew installs kitchen cabinets and bathroom vanities, another crew hangs interior doors, a separate crew installs trim, and so forth. While this is often the fastest and least-expensive approach, consistent quality of workmanship and materials, as well as coordination, often

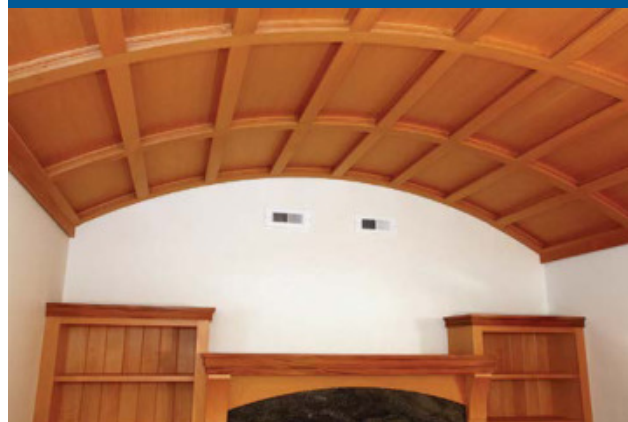
becomes a challenge relative to the complexity and expectations of the project.

On a recent gut remodel, my client wanted the look of clear-finish Douglas fir and mahogany installed with top-quality craftsmanship for all the interior woodwork. With those expectations in mind, the builder and I closely scrutinized the conventional approach to finish work. We could hire a subcontractor for each of the interior finishing tasks and shop around for door and cabinetry and custom millwork. But with different companies supplying those things, we were concerned about maintaining consistency in the grain, color, and finish of the wood. The clients also wanted the woodwork to have a unified, custom look, which would be difficult to produce with lots of different contractors. Beyond the materials themselves, we also worried about coordinating and timing the installation of the work. How



CURVED COFFERED CEILING

The crew laminated the curved panels and built this ceiling in five sections in the shop, and then installed the sections on the living-room ceiling.



could we ensure an exceptional level of craftsmanship and consistency throughout the house?

Hire a woodshop that does it all

After working through these questions with the builder and client, our solution was to have a single millwork shop handle all the interior woodwork. One shop would be responsible for sourcing and milling the wood; building and finishing all the doors, paneling, cabinetry, and trim; and installing it all in the home. The builder had previously worked with Traditional Wood Works (TWW) out of Berwick, Maine, and after a meeting with the builder, the shop owner, the shop manager, and myself, TWW seemed to be a good solution to our concerns. We discussed the parameters of the project and agreed on a strategy that would work for everyone. At that point we'd all have a

CUSTOM PROCESS FOR A CUSTOM OUTCOME



Having one woodshop responsible for assembling and installing all the doors allowed for a process that resulted in a durable assembly, minimized exposed fasteners, and matched grain and finish throughout the house. The install starts, as usual, with shimming and plumbing the door jams.



HIDDEN ATTACHMENT

To minimize visible fasteners, the crew drives screws through a shallow dado in the jamb. Stops fit into the dado to cover up the screws.



STOP INSTALL

The stop strips, with rabbets along the edges, glue into the dados in the door jambs to conceal the attachment screw.

stake in the project, with each of us relying on the talents of the other team members for its success.

TWW offers complete woodworking services. The same team that fabricates everything in the shop installs what they build on-site. This approach covered our aesthetic concerns, while providing a single source of responsibility and accountability for the work.

The strategy for executing the finish work in this manner begins with me, as the architect. I guide the client through each design decision. With the client's approval, I develop the details and then give that information to the builder. After approving my drawings, the builder sends them to the millwork shop. The shop then generates precisely detailed drawings that are used to build and install each component. This process helps us manage expectations, timing, and of course, costs.

Cost-effectiveness comes with scale

As with most projects I work on, the goal is never to make things cheap, but rather to use the most cost-effective methods to achieve the desired result. With this project, we could have shopped around for less expensive materials, and then just hoped the look and finish matched. But with single-source millwork, all the wood used for the interior finish can be purchased at the same time from the same wood lot. The trimwork made from that wood then has a consistent appearance—from baseboard and wainscot to doors and built-ins.

The interior doors in this project are a good example of that way of thinking. Well-made Douglas-fir doors are available from many different manufacturers. But going that route would mean sacrificing control over consistency, as well as limiting the potential to customize the look of the doors. On top of those factors, installing and trimming



BISCUIT TRIM

The crew cut slots in the trim and the jambs for biscuit joinery earlier in the process. Here they insert biscuits into the slots for attaching the trim. Note that the outside edge of the jambs were left unfinished to facilitate the gluing process.

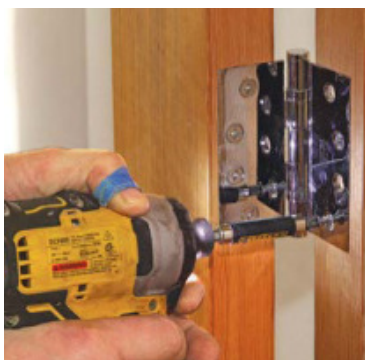
NO HOLES, NO FILLER

After applying glue to both surfaces, the crew clamps the trim into place without leaving fastener holes to putty.



INVISIBLE PINS

Tiny pins that are nearly invisible hold the stop strip in place while the glue sets.



REATTACHING THE HARDWARE

Each door has custom-fit hinges and latches, so the crew simply inserts the hardware back into the mortises and drives the screws.



RAIN-GLASS DOOR

A few of the 36 interior doors custom-built in the shop include translucent rain-glass panels. The crew prebuilt the jamb assemblies and casing kits in addition to the doors themselves.

the doors would be additional considerations. Working with TWW for everything eliminated all of those concerns.

When questioned about the cost-effectiveness of this strategy, the shop owner gave me this simple answer: "If you ask me to build one or two interior doors, I can't compete with the cost of commercially manufactured doors. But give me all 36 interior doors, and now I can be competitive. Throw in the trim and installation, and the cost-effectiveness improves further, and so on."

In other words, this approach becomes more cost competitive as the scale of the project increases, while streamlining the process by combining responsibility for the manufacturing with the installation of all the finish work. A single woodshop can handle each of the tasks individually for a project, but the more they're asked cover, the more efficient and cost-effective the process becomes.

Custom meets production

This one-shop solution allowed us to customize the look and change the parameters of these interior doors. Instead of the conventional 1⅜-in. thickness, we upgraded to 1¾ in. for a heavier, more solid feel. We also widened the top rails to 5¼ in. and the bottom rails to 7¼ in. These changes would have raised the costs exponentially for a typical door manufacturer, but with one millwork shop making all the doors, it was a simple and easy adjustment to the production process.

Despite being mass-produced, each of the 36 doors was targeted for a specific opening in the home. Each door was mounted in jambs made from the same fir, and the hinges and locksets were fitted to each door in the shop. The shop also made a trim kit for each door from the same wood. At the job site, the crew pocket-screwed the trim assemblies together and then biscuit-slotted both the trim and

the jamb assemblies. The assembled trim kits and the jambs were then stacked or racked awaiting installation. Before delivery to the job site, each piece was sanded and given a coat of clear finish. This coat of finish protects the wood during shipping and installation. Once the installation was complete, the crew applied another coat of finish, finalizing the process on-site.

This project included a laundry list of custom features: a barrel-vaulted coffered ceiling, wood-paneled divider walls, wainscot, pass-through pocket doors, and stairs and stair parts, along with many built-in cabinets and components—and all that in addition to the doors and trim. With all these moving parts, it was imperative that everything be manufactured, brought to the site, and installed in the right order. Again, TWW took the responsibility for coordination and timing out of our hands.

When the work is done in the conventional manner, the builder has to be constantly vigilant to make sure that things are done in the right order to prevent damage or having to redo work. With one shop responsible for all the finish work, everything is done in the proper sequence. For example, the crew installed ceiling finishes (coffers and paneling) first, so that those rooms could be used for storing and staging other material such as doors and trim kits. With one company carrying all that responsibility, the more efficiently they work, the better their financial rewards.

Installation starts at the shop

I have some experience and knowledge of building and woodworking, but I was happy to rely on the expertise and experience of TWW for the installation. The curved coffered ceiling would have been an interesting challenge for any crew, but the team had the benefit of prefabricating the ceiling sections in their shop. The same crew then raised and installed the sections on-site.

After I gave them the dimensions and basic design, the shop did working drawings and the crew built the ceiling in five sections. They used Festool Dominoes to connect and precisely align the sections as they were raised into place. Having built the actual sections, the crew had direct knowledge of exactly how the ceiling would go together, resulting in a smooth, flawless, and efficient installation.

The crew had a particularly innovative approach to installing and trimming the doors with the goal of minimizing exposed fasteners in the natural wood finish. Their process begins in the shop. After fabricating and labeling the doors, jambs, and trim kits, everything is stacked neatly on the job site to await installation. During fabrication, the stops for the side jambs are purposely left off, with wide, shallow dadoes plowed into the center of each jamb.

For installation, crew members set the designated jamb assembly in the opening and shim it level and plumb. When satisfied with the fit, they drill holes through the center dado and screw the jamb to the rough frame. Next, the crew typically installs the trim, inserting biscuits and clamping the trim to the jambs. Note that the outer edges of the jambs were unfinished during assembly so glue could be used. Additional fasteners are driven as needed to draw the jambs into any uneven places in the wall. Plinth blocks at the bottoms of the jambs provide microadjustment to fill in the spaces to the floor.

After reattaching the door to the jambs, the crew installs finished stops on the side jambs. Those stops have rabbeted edges that fit into the dadoes on the side jambs. Glue and pins hold the stops in place. Using these methods, the doors go in quickly and efficiently, and in

For this project, the architect and client worked out the trim, cabinetry, and other millwork details in a Craftsman style with traditional Douglas fir that the woodshop sourced, milled, and used to fabricate every piece.



PASS-THROUGH POCKET DOORS

Pocket doors open to reveal a pass-through from the kitchen into the dining room. The crew built the doors and mounted the original stained-glass panels, and also mounted the doors and trimmed out the opening. Vertical fir paneling graces the adjacent walls of the dining room.

most cases, there is almost no work to be done before they receive their final coat of finish.

Using a single woodshop worked exceptionally well for this project, and I learned a lot working with this team. While you may experience success using this strategy with a smaller project—say a library or an extensive kitchen renovation—the economy of scale makes single-source woodworking an even better choice for a whole-house remodel or new construction. Ultimately, it always comes down to choosing the right team and being open to a collaborative effort to solve problems and share information for the best outcome on any project. □

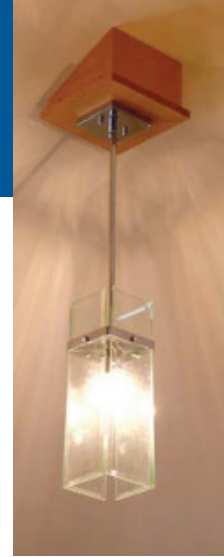
Steven Baczek is an architect from Reading, Mass., who specializes in high-performance homes. Photos by Roe Osborn, except where noted.

CRAFTSMAN STYLE



PINWHEEL PANELED CEILING

In the dining room, the crew installed fir ceiling panels in a pinwheel pattern. In addition to the window trim, they also custom-built wooden valances to conceal the window-shade hardware.



NO DETAIL TOO SMALL

These small, angled fir brackets allow the level mounting brackets for these pendant lights to fit against the cathedral ceiling.



CRAFTSMAN CORBELS

Flanked by built-in bookcases, Douglas-fir corbels support a mahogany mantel.



CUSTOM STAIRS

Every element in this dividing wall and stairway located just inside the entry to the home was custom-made in the shop, including the handrail and tapered balusters.



HORIZONTAL WAINSCOT

In the primary bedroom, the crew installed horizontal Douglas-fir wainscot around the window on the exterior wall.

HOUSES

ARCHITECTURAL CHALLENGES AND SOLUTIONS

BY DESIGN

CURATED BY JANICE ROHLF



COTTAGE CAMOUFLAGE

Ingenuity on the part of the designer and builder was called for to make this 3000-sq.-ft. golf-course cottage built on the footprint of a pre-existing residence feel more spacious. The owners wanted it to be both fully functioning and elegant. First, to grab height where possible, the wood shiplap ceiling (painted Benjamin Moore's Frostline in a satin finish) was raised to an open 24-ft. peak above the great room, making the new structure feel graciously proportioned despite its modest size. To solve the conundrum of incorporating a full chef's kitchen into the large common room, appliances and other components were camouflaged in such a way that they're completely hidden from view when not in use: The wall oven is concealed behind cabinet doors; the exhaust hood pops up from behind the Wolf induction cooktop; the Dornbracht faucet retracts down; the sink can be covered with a stone cutting board that matches the absolute-black granite countertop; and a refrigerator panel with a touch latch virtually disappears into the high-sheen lacquered walls, as do the cabinets that house a coffee station and pantry. In other rooms, sleek floating nightstands and a bathroom vanity feature cantilevered custom millwork in a white-lacquer finish. Additionally, the bedside tables have integral outlets and light switches positioned on the sides facing the bed.

Designer Suzanne Lovell, Inc., suzannelovellinc.com

Builder Hobgood Construction, Inc., hobgoodconstruction.com

Location North Palm Beach, Fla.

Photography Eric Piasecki/OTTO







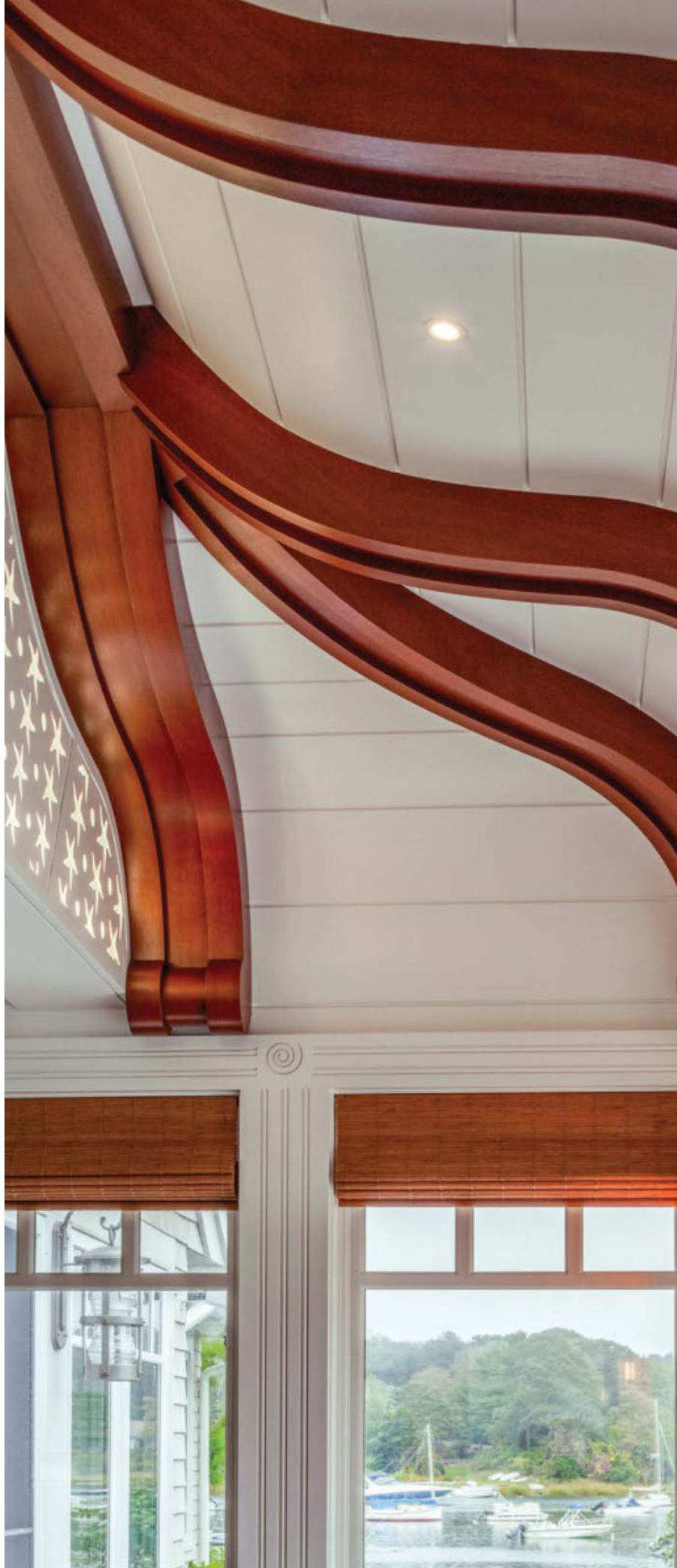
FROM SHIP TO SHORE

For the contemporary interpretation of a nautical theme in this waterside house, the client gave Polhemus Savery DaSilva Architects Builders the latitude to be playful. In turn, the firm studied, designed, and proportionally calculated myriad trim details to come up with ship motifs and abstracted 19th-century Greek-revival elements like columns and balustrades. Perched high in the two-story bunkroom with built-in beds that sleep nine, you can stand in a facsimile of a tugboat's wave-splashed pilot house and see the water outside through a dormer window across the room. In the primary bedroom, a fanciful built-in wood canopy for the bed fills the space hollowed out into the roof, which forms a cupola above. Throughout the home, built-in furniture for maximum storage is the result of judicious allocation and use of space. Restricted by the footprint and height of the former house on the site, architects John and Sharon DaSilva were challenged to devise ceilings that lent airiness to the rooms, like arched and coffered ceilings. In the roof space of a bay window, mahogany beams resemble the curved timbers of a ship's bow, while nearby a backlit perforated wood panel creates a pattern of stars and dots that you can experience from inside or outside the home through the windows. To make the study feel taller, horizontal paneling on its walls, doors, and ceiling fools the eye into thinking the upper panels are farther away than they really are. Starting at the floor and going up to the high point of the ceiling, each panel is a different width, becoming incrementally narrower as they go up.

Architect/builder Polhemus Savery DaSilva Architects Builders, psdab.com

Location Cape Cod, Mass.

Photography Brian Vanden Brink





2020 Fine Homebuilding House

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Concrete-tile porch floor

A Porch With Character

FHB House Connecticut is nearing completion and the exterior is looking great. Updated for a clean, yet still rustic style, the house's main entry has an original take on the farmhouse porch. The porch floor is made with 36-in.-square, 2½-in.-thick precast concrete pavers by Wausau Tile in Wisconsin. The structural posts and beams are wrapped with hemlock from The Pennsylvania Sawmill Company and are finished with Benjamin Moore's ARBORCOAT exterior stain. Decorative rafter tails were added to complete the modern farmhouse look.

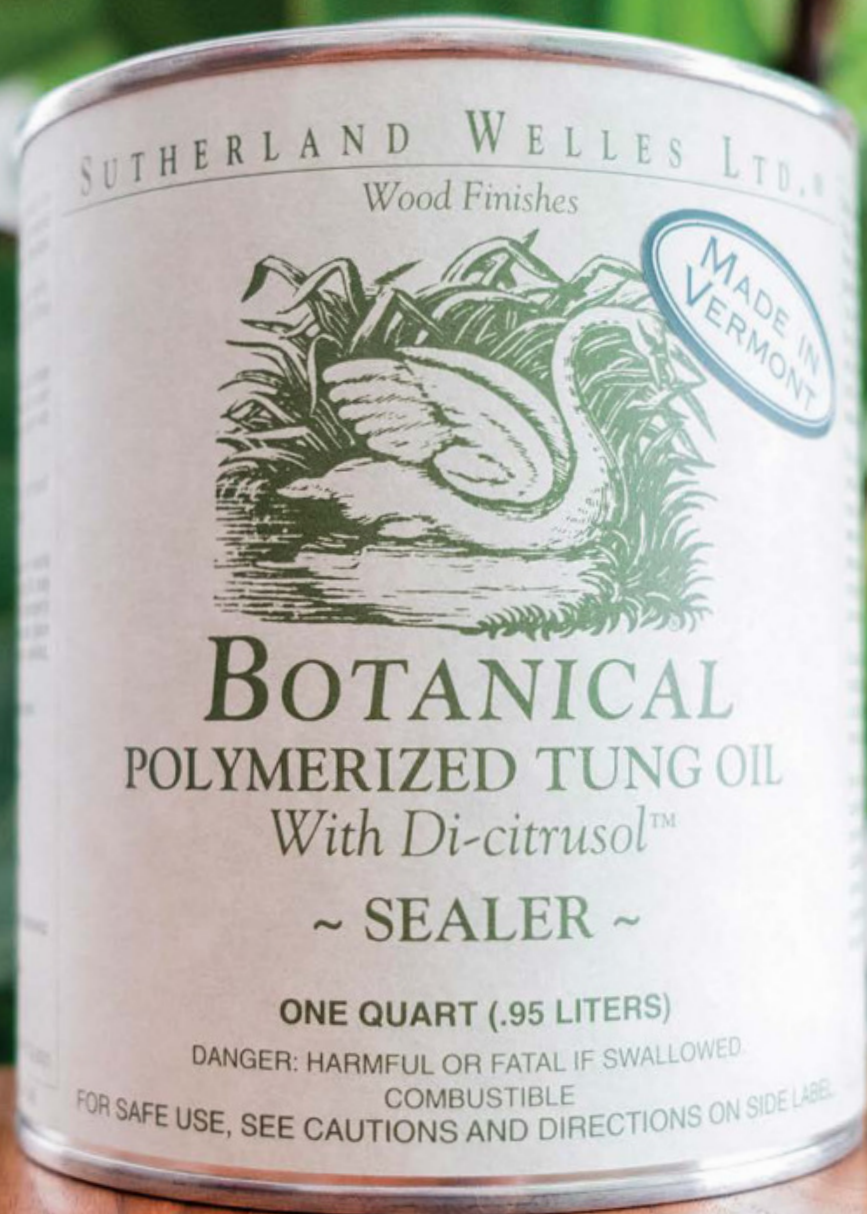
Follow the build: @finehomebuilding and [FineHomebuilding.com/fhb-house](https://finehomebuilding.com/fhb-house)

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SPEC

NEW AND NOTABLE PRODUCTS



OLD-WORLD FINISH FOR INTERIOR WOODWORK

A natural oil finish is a great alternative to polyurethane or lacquer for wood flooring, countertops, doors, trim, or any interior wood surface if you want to show off the beautiful grain and vibrant colors that inspired you to choose real wood in the first place. Because of its ease of application and durability, my go-to clear finish for any interior surfaces is Sutherland Welles's Polymerized Tung Oil, which is available in low, medium, and high-lustre versions, plus in a tung-oil sealer that's generally used as a first coat. Since I started using Sutherland Welles products years ago, the company has introduced a Botanical line of this finish, which is simply their same high-quality polymerized tung oil that's been formulated with an even more sustainable, non-ozone-depleting citrus-based solvent instead of the traditional petroleum-based solvent.

At \$105 to \$160 per gal. with 600 sq. ft. to 1000 sq. ft. of coverage per coat, a hand-rubbed oil finish like this costs a bit more than basic polyurethane, but the rich look that the tung oil provides is well worth it. Plus, unlike polyurethane or lacquer, tung oil is a living finish that can be refreshed or even spot-finished at any time with just another coat of oil without the hassle of sanding or stripping the original finish like you would need to with most other interior finishes. —Rob Wotzak, digital brand manager



FIND FINESSE WITH FLEXIBLE TRIM

Crisp lines and precise angles are common signs of a well-executed construction project, but there is something about an arched window or a curved staircase that will never go out of style. Carter Millwork, Inc. makes the curved trim details needed for these features much more accessible with its several lines of bendable molding. Made of flexible polyurethane, these trim options are resistant to moisture and can be matched to the original grain of wood you're working with. To find the specific molding you are looking for, you can peruse the thousands of profiles on their website or send in images to get the right match.

Molding lengths typically come in foot-long increments between 4 ft. and 12 ft., but longer lengths are available. For installation, common woodworking tools work just fine with this trim, and pieces should be fastened with a combination of construction adhesive and narrow finish nails or screws. Pricing is dependent on the profile and material choice. —Lana Melonakos-Harrison, assistant editor



THREE UNIQUE ADHESIVES

The one drawback of glue in the debate between adhesives and nails is the time required to establish a chemical bond. Glues provide strong, permanent adhesion, but they often need clamps to hold pieces until the glue sets. Enter Tightbond's Instant Bond Wood Adhesive Gel. Used with the activator, the glue gives you 30 seconds of handling time, has a 20-second set time, and takes 60 seconds to cure. Used without the activator, the time doubles. Designed specifically for wood, the viscous gel works like a clamp for quickly bonding difficult-to-clamp shapes and preassembling moldings, such as door and window casings, to install as a single unit. The 2-oz. option is available for around \$10.

Sometimes, glue comes out of the tube in sloppy globs that make it difficult to do fine work. To glue the finer things, Loctite has introduced Power Grab Ultimate, a high-tack, multisubstrate adhesive. The dispenser metes out a single dot of adhesive with each click. Two clicks will hold 2 lb. instantly and 44 lb. after full cure. A 9-oz. tube is just over \$10.



Glue manufacturers have paid little attention to the aesthetic characteristics of their products. Visible glue lines can spoil a clean joint. And when the glue oozes out inadvertently, it can ruin an adjacent surface. The Gorilla brand's new caulk-cartridge dispensable Max Strength Construction Adhesive Clear blends the company's strongest adhesive into a crystal-clear bead that is paintable, VOC-compliant, and non-foaming, and that works even underwater. A 9-oz. bottle is \$12. —Fernando Pagés Ruiz, home builder and developer

ON STANDBY WHEN IT COUNTS

FHB
HOUSES
2021

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Having your power go out is never fun. With severe storms becoming a more common occurrence, and longer outages as the result, it has also become a safety issue. Fine Homebuilding House Wisconsin is now backed up for good with a whole-house standby generator from Champion Power Equipment. Local electrician Justin Schraufnagel of Just In Time Electric installed the 14kw generator and 200-amp transfer switch. This means that when the grid goes down, the generator fires up automatically and powers the circuits that the homeowner prioritizes. With this setup, there's also no chance of back-feeding the grid, keeping the lineworkers safe as they work to restore power in the area.

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askthe experts

YOUR QUESTIONS—PRO ANSWERS

Fitting out-of-level prehung doors

I'm new to installing prehung doors. I'm finding that I sometimes can't get the head level without raising one of the legs off the floor with a shim. Is there a better way to accomplish this?

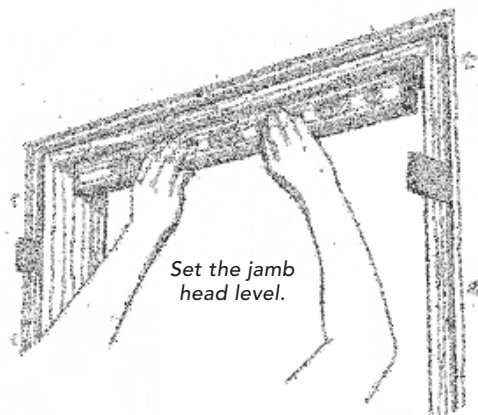
—DIANA
via email

Contributing editor Andy Engel replies:

Assuming both jamb legs (by the way, the term “jamb” comes from the French word for leg) are the same length, this means your floor isn't level. I work on a lot of old houses and encounter this condition all the time.

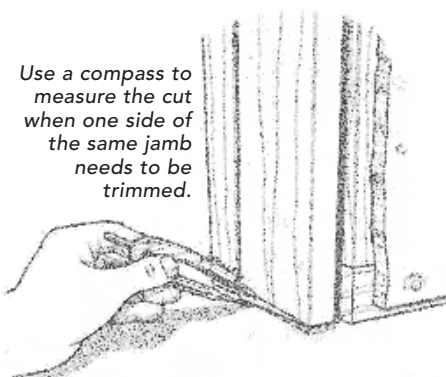
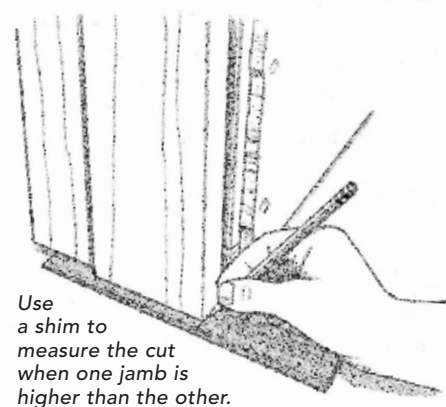
For ease, take the door out of the frame, and then put the frame in the opening. Stick a couple of shims between the studs and the jambs at the head to hold the frame in place, then check the head for level. Raise the low side by inserting a tapered shim between the bottom of the jamb leg and the floor. When the head is level, make a pencil mark on the shim where it meets the bottom of the jamb. The thickness of the shim at this point is the amount you need to cut from the bottom of the other jamb leg for the head to sit level.

In old houses, it's common for the floor to be out of level in both axes and under both jamb legs. The process is a little more involved here. Start the same way, with the door frame shimmed into the opening and the head level. Take a compass—the cheap metal kind with the sharp point that kids can't take to schools anymore works best—and open the gap between the metal point and the pencil point to the widest



LEVEL THE HEAD

Prehung doors have equal-length jamb legs, but old floors are often out of level. To install a door in this situation, start by getting the head level with a shim beneath the jamb leg on the low side, which will help you to determine how much you need to cut from the opposite leg. If the floor is out in the other direction, scribe and cut the jamb legs to level the door.



space between either of the jamb legs and the floor. Hold the compass with the point on the floor directly below the edge of the jambs, and scribe lines on each jamb leg. This is the line you'll cut. It should be zero at the point the jambs are highest above the floor, and at the maximum where the jambs touch the floor.

Make the cut with whatever works—miter saw, handsaw, or jigsaw. In many cases, it's good to back-bevel the cut slightly—the old floor will be higher in the spots where earlier door jambs were located than between them because of previous floor sanding.

Working with tongue-and-groove boards

I plan to finish the walls of a room with tongue-and-groove boards—the real stuff, not sheet goods with beads milled in the face. Are there any tricks I should know to handle wood movement due to changes in humidity?

—JOHN POND
via email

Andy Engel replies: It sounds like you already know that the most important consideration when creating wall paneling with solid-wood boards is wood movement. You cannot stop it—you can only minimize and accommodate it. Like wood floors, solid-wood paneling needs to be able to expand or shrink with changes in humidity. Whenever possible, use quartersawn or vertical grain (VG) boards because they are more stable during humidity swings than plain-sawn material.

Store the boards on-site until they become acclimated to the room's temperature and humidity level. This will happen faster if they are unbundled and stacked with stickers between the layers. And finishing the boards prior to installation makes a difference. Not only does finishing slow the

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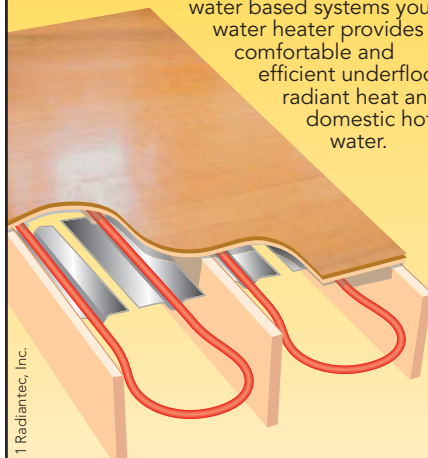
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wood's moisture gain or loss, it prevents unfinished wood from showing through the joints if the planks do shrink.

Your installation will depend on the conditions of the material and the site. If you're installing high-moisture planks on the hottest, most humid week of the year, you can expect them to shrink when things cool down and dry out. This may leave gaps, so the planks can be butted tight to one another. If you're installing dry planks during the coldest and driest week of the year, the planks will likely expand with the rise in humidity, which could cause them to buckle. Gaps may be unsightly, but severe buckling can be a disaster.

If you suspect the planks will expand, the main trick is to avoid pinning both ends of long planks tightly between intersecting walls. The planks on the longest wall will see the greatest total amount of movement and will need bigger gaps to accommodate that movement, so starting on the long walls will allow you to cover up those gaps with a corner board or the planks on the adjacent wall.

Narrower pieces of wood expand less than wider ones, so I vary the gaps between boards depending on the width of the board. For stock under 3 in., I'll use a thin drywall knife to gap the planks at both ends. For wider stock, I'll use the thin end of a cedar shim, doubling or tripling that for very wide planks such as 1x12s.

You also need to allow the paneling to move at intersections with door and window casing just as with abutting walls. I've seen paneling swell enough to jam the door so it won't close. You can avoid this by simply using wider jambs and installing the casing over the paneling.

In short, think about how the wood is likely to move after installation and accommodate that movement.

Getting casing miters tight

When I'm installing prehung interior doors, I often have trouble getting the casing miters tight. I'm sure this is because the framing and drywall aren't perfect and the wall ends up being a little thicker than the

jambs. Do you have any tips on how to work around this?

—JACOB SMITH
via email

Brian Campbell, finish carpenter for Solid LLC in Saint Paul, Minn., replies: I wish manufacturers would add another 1/16 in. to 1/8 in. to the standard jamb to avoid this issue altogether. But they don't, and trim carpenters have to fix it in the field.

Preassembling mitered casing with biscuits and glue will handle minor discrepan-



"Preassembling mitered casing with biscuits and glue will handle minor discrepancies in wall thickness."

cies in wall thickness. When the drywall is no more than about 1/8 in. proud, I score it with a utility knife and beat the rock back with a hammer, which allows the casing to fit without rocking on the proud edge of the drywall, though it doesn't help the miters. To get these miters tight, I'll sometimes set

the miter on the saw to 45° and the bevel to 1° so that it takes a little more off the front of the molding than the back. Usually, I leave the saw's bevel at 90° and just shim the back of molding up by the amount the drywall is proud of the jamb. That saves me the trouble of forgetting I've set the bevel at 1°.

Making and applying jamb extensions is a good choice when the wall is 1/4 in. or more thicker than the jamb.

The opposite happens occasionally too, when the jamb is deeper than the wall. Then it's just a matter of shimming the front of the molding instead of the back. Final tuning of miters can be done with a low-angle block plane as the trim is installed, and just that simple old tool can save many trips back to the saw.

Keep jambs from rotting

I'm concerned about my exterior door jambs (and bathroom door jambs, for that matter) rotting because they soak up water. Is there something I can do to prevent this?

—R. H.
via email

Andrew Young, owner of Young & Son Woodworks in Portland, Ore., replies: My company always seals the end grain at the bottom of jambs for exterior doors, as well as for interior doors set on concrete, and we've started taking the same approach for all interior doors because of the overall decline in the quality of jamb stock.

Spray-can primer or lacquer seals jambs quite well, as does a quart of primer and a steady supply of chip brushes. In a pinch, even exterior-grade wood glue does a great job. Just paint on a couple of coats with your finger and give it a few minutes to dry.

Along with the door jambs, we also seal the top and bottom edges of interior doors to prevent movement and fit issues down the line. Temperature and humidity vary a lot on a job site before the painters show up, and the sooner the vulnerable end grain of a door's stiles are sealed, the better. This is especially important for pocket doors, which don't have hinges to help keep them true and are often used in bathrooms where the humidity levels are high.



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What is “good enough”?

My friend Buffalo is trying to finish a custom kitchen renovation. Unfortunately, the homeowner is helping. The other day Buffalo caught him up on a ladder, using a vernier caliper to measure the reveals around the window casing that Buffalo had just installed. He was checking to make sure they were each *exactly* 1/4 in.

Buffalo didn't have to move any casing, so apparently his reveals passed muster. But the homeowner also took photos of a joint in the crown molding and sent them to Buffalo's boss. Maybe the painter could have hidden the gaps and minimized the misalignments, but we'll never know because the homeowner insisted that it be redone. It wasn't Buffalo's fault—another carpenter had installed the crown—but it was Buffalo's responsibility to fix the problem and make the homeowner happy.

The most critical aspects of a home—the structure, insulation, and mechanical systems—are subject to the scrutiny of the building department. But a building inspector is not going to make value judgments about the grout joints in your tile or the miters in your trim. Nobody's life depends on them. Finish work just has to look good—or good enough. But what exactly is “good enough,” and who gets to decide?

Years ago, I worked with an old carpenter who used to say,

“I don't care if it's an outhouse or a courthouse, I can find a mistake in it.” And despite wanting to add the line “We settle for perfect” to the business cards for my remodeling company, I know he was right. Perfect does not exist. Not in the real world. Every day, all day long, I make judgment calls about my own work, deciding what is and isn't “good enough.”

Sure, I still shoot for perfect miters and perfect scribes, and everything exactly plumb, level, and square. But in the old houses I work on, the floors slope and the boards are cupped. Walls and ceilings aren't flat. Corners are never square. And I am paid by the hour. If the initial fit of the

I will admit that, while I consider myself to be an extremely conscientious carpenter, my best work varies. So does my judgment. What time of day is it? I do my best work in the morning, when I'm rested and the day's frustrations haven't yet worn me down. More than once, I have begun my day by ripping out and redoing something that had seemed “good enough” at the end of the day before.

How comfortable am I? I can work under the sun in 95°F heat with 75% humidity, but I'll do better work in the shade and even better work in the air conditioning. What kind of mood am I in? Did I just scratch off a winning lottery ticket? Or did I just have a fight with my wife?

reveals around their window casing with a set of calipers. That said, there is something about the process of building and remodeling that makes people pickier than they would normally be.

Maybe because the work costs so much money (and builders can have such sketchy reputations), homeowners want to make sure they're getting what they paid for. But homeowners also are being asked to consider so many details—from trim tiles to drawer pulls—a process that heightens their awareness and demands that they look closely at things. It can make an otherwise normal person become strident about the difference between a piece of trim with a 1/4-in.-diameter beaded

“...a building inspector is not going to make value judgments about the grout joints in your tile or the miters in your trim. Nobody's life depends on them.”

trim is a little bit off, then making it better will cost someone money—whether it's me, my boss, or my customer, somebody's paying. Is it worth it? The answer depends. How bad is it? Is it interior or exterior work? Is it paint-grade or stain-grade? Is it in the back of a closet or in the front entry hall?

The definition of “good enough” also varies from project to project, usually because of money. The best work takes longer and costs more. Not everyone can afford it. But it's also true that not every homeowner cares about the details to the same degree. For example, most people do not measure the

edge and one with a 3/16-in. bead. As designer Jamie Wolf puts it, “Details can take on a significance out of proportion to their place in the finished project.”

Five or six years ago, my friend Pat tackled his first really big job—a gut renovation outside of Boston. He had worked

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There's a lot of work that goes into a build before drywall is hung and finished, yet it is an exciting time when you can see the home's interior begin to take shape. Because there is still paint, trim, and other finishes to come, it is important to make sure the drywall installation is done well. While drywall has a straightforward look, there are some details you can use to make your home more interesting. Builder Jason Mollak and his wife Lindsey chose to install chamfer bead from Trim-Tex on outside corners. Chamfered corners soften the drywall's edges for a simple, modern look with an elegant shadowline—the look that Jason and Lindsey were after.

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for the owners on their previous place. That project had gone smoothly, so as he put it, “I was cocky.” He assumed all would go well this time around. He was wrong.

When the owner saw the finished tile job in the walk-in shower, she was livid. The grout lines were not all perfectly straight, nor were they a consistent width. Pat said the discrepancies were 1/16 in.

the right person had a bad day. It happens; you fix the problem and move on. The other explanation is trickier: Maybe the work is good enough and the client is being unreasonable. What then?

At that point, you have to ask yourself, am I fixing a legitimate problem and therefore reestablishing trust with the client? Or am I acquiescing to an unreasonable demand

on “good enough,” or what they refer to as “achievable minimum levels of workmanship.” It’s called the *Residential Construction Performance Guidelines*, and you can view a PDF online free of cost or buy a print copy for \$34.

The guidelines cover everything from foundations to landscaping. In the section on interior finish, you’ll find the following: “When the contrac-

you out of court. As my friend Pat learned, there are some people you can never make happy. But it’s important to know that industry standards exist, and their existence is a reminder that acceptable tolerances vary—from job to job, from homeowner to homeowner, and from carpenter to carpenter.

So many things affect the quality of the work I do that it would be hard to list them all. My years of experience matter, of course, but at 40-plus, it’s hard to say whether they’re a factor in favor or against. Tools make a difference. I can generally do better work in the shop than in the field because of the tools available. The difficulty of the actual task matters too. Scribing baseboard to a hardwood floor is easier than scribing a mantel shelf to a stone fireplace. I’ll likely do a better job with the former.

Ultimately, though, I am a professional, which means the variation between my best work and my worst work won’t be something most will notice. Yes, you can still catch me saying “good enough” on occasion, and it means I’m not happy with the result. I’m always aiming for perfect and usually settle for good. “Good enough” means I’m running out of time, or patience, or both, but it also means I’m pretty sure that no one else will question the result.

Of course, I’ve never worked for someone who used a feeler gauge to check the gaps around my inset cabinet doors. No wonder Buffalo still hasn’t finished that kitchen.

Kevin Ireton, editor-at-large, is a writer and remodeling contractor who divides his time between Connecticut and Arizona.

“...there is something about the process of building and remodeling that makes people pickier than they would normally be.”

or less, but the owner didn’t care—she wanted a new shower. According to Pat, “It was all so emotional for her.” He thought to himself, “This is her dream house. I have to make her happy.” He also worried that without good referrals he wouldn’t be able to stay in business.

Pat ripped out the tile and had his installer redo the shower, but the result was the same. She was still unhappy. Whether to his credit or his shame, Pat ripped out the tile a second time and had a different installer tile the shower. He heard nothing for a week, then got a text from the homeowner saying that she had marked a few problem areas with tape. “When I got to the job,” Pat said, “there was blue tape everywhere.”

When a homeowner declares that something isn’t good enough, there are two possible explanations. First, you screwed up, and the work really isn’t good enough. The wrong person was assigned the task, or

and ceding authority over the acceptable tolerances in my profession? You really don’t want to give up control of the job.

Some builders resolve conflicts by turning to industry standards. Various organizations offer them. If my friend Pat had known where to look in the ANSI standards, he would have found the following: “Of necessity, in any installation, some grout joints will be less and some more than the average minimum dimension to accommodate the specific tiles being installed.” He could have gone on to explain that tiles are made from clay, which naturally shrinks when fired in a kiln, and it doesn’t always shrink uniformly. That leads to minor variations in the dimensions of the tile. By varying the width of the grout joints slightly, a good tilesetter can mask the variation in the dimensions of the tile.

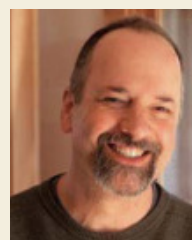
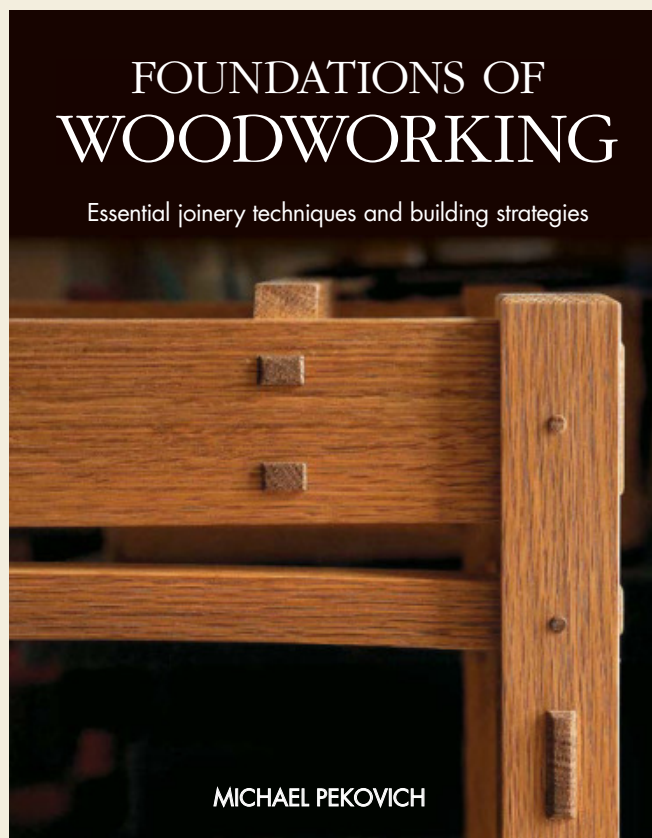
The National Association of Home Builders (NAHB) publishes an entire manual

tor installs the door frame and door, the door edge will be within 3/16 inch of parallel to the door jamb.” Also this: “Individual cabinets should not have a deviation of more than 3/16 inch out of level.” And this: “...gaps between mitered edges in trim and molding will not exceed 1/8 inch.”

As a veteran trim carpenter, I found the standards horrifying when I first read them. An early mentor of mine once pointed to a miter joint that was open 1/8 in. and said, “You could throw a cat through that gap.” These days, I draw miters together with pocket screws and beat myself up over gaps of 1/32 in. But the NAHB is not recommending 1/8-in. gaps in miter joints. They’re defining the worst possible result that would still be acceptable. Any worse and either the work gets torn out and fixed, or the lawyers get a phone call.

Of course, pointing to industry standards may not mollify an irate homeowner or keep

NEW FROM MICHAEL PEKOVICH

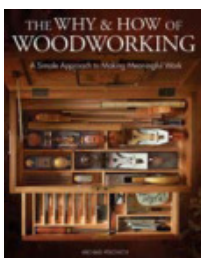
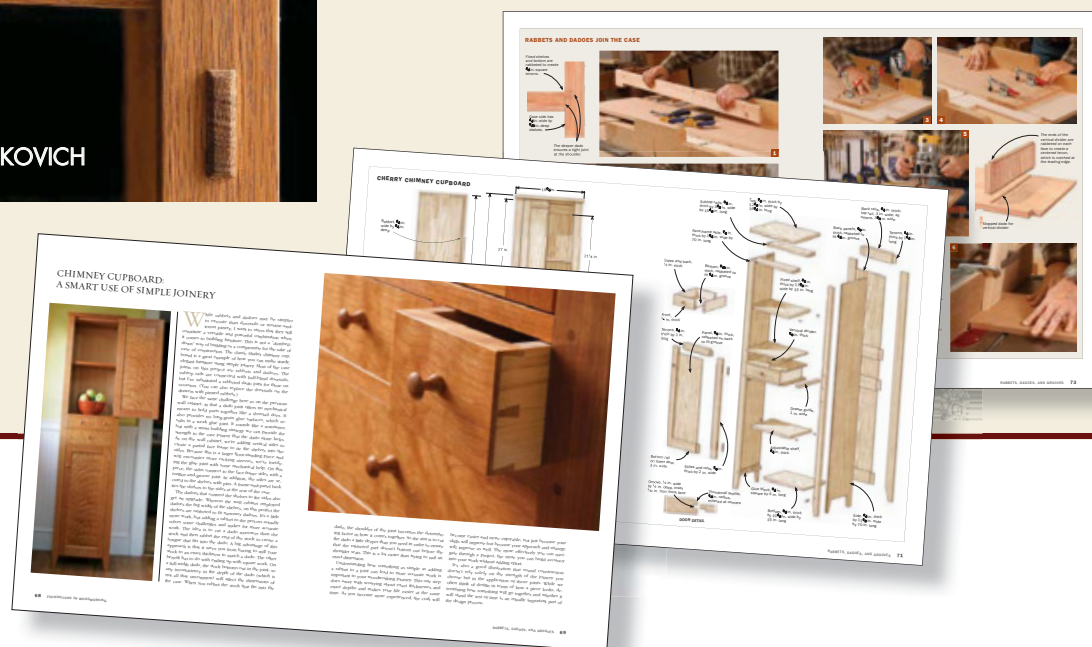


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gets to the very core of the craft of woodworking: laying out, cutting, and assembling joinery for furniture and other

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The book concludes with a selection of inspiring projects, including a wall cabinet, a chimney cupboard, an arched entry table, a desk divider, a dining chair, and many more.



Michael Pekovich's first book, *The Why & How of Woodworking*, was the woodworking event of the year when it was published in 2018. *Foundations of Woodworking* is sure to pick up where *Why & How* left off, inspiring and instructing thousands of woodworkers worldwide.

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In the summer of 1982, after his junior year of college, Garland Wood took a six-week job at renowned Colonial Williamsburg, the world's largest living history museum. He was hired into the carpentry department, at the time a fledgling two-year-old program, and worked under carpenter Roy Underhill. Roy was the very first master carpenter at Colonial Williamsburg and the energizing force behind the institution's approach to building traditional homes completely by hand while providing the public the opportunity to watch. His influence on Garland was immeasurable. Garland would spend another 38 years at Colonial Williamsburg, helping exponentially expand the historical trades program, constructing 50 of America's most treasured buildings, and rising to the position of master carpenter himself—only the second person to be given the designation in the foundation's history.

Garland oversees a crew that employs exclusively 18th-century techniques and processes in the construction of colonial-era buildings. From pit-sawing pine boards, hand-hewing timbers, and hand-splitting shingles to cutting and raising timber frames in the Tidewater style and laying up hand-made bricks in oyster-shell mortar—the painstaking approach to historical accuracy in the work is nothing short of incredible. Garland and his crew spend nearly 60% of their project time just milling and producing the materials of a build. And they will spend many months raising a home or village building on a new brick foundation in the very same way it was done over 240 years ago—teaching fellow tradespeople and the public throughout the entirety of the process. —Rob Yagid, executive director, Keep Craft Alive

"Building a house is simply a matter of solving problems. I can only use 18th-century solutions."

GARLAND WOOD
MASTER CARPENTER
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