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BY MARK PETERSEN editors@thefamilyhandyman.com

PRO TOOLS + GEAR

Be the envy of the job site

Time to ditch that beat-up old coffee thermos and ramp it up a bit with the new COFFEEBOXX single-cup brew system. This job-site coffee-maker works with any K-Cup packs. It has a 3-ft. retractable cord and a huge 2.5-liter removable water tank. The drip tray detaches for taller mugs, and there's a separate hot water line for making tea or instant soup.

Above all, the COFFEEBOXX is rugged; it won't break if you drop it...off a cliff. It could even be used as a step stool in a pinch, unless you weigh more than 1,500 lbs.! And how many coffeemakers are equipped with stainless steel tie-downs? (I bet your thermos doesn't have tie-downs.) The Oxx COFFEEBOXX is available for about $250 at oxx.com and other online retailers.

ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **TOM FENENGA** • ILLUSTRATION **FRANK ROHRBACH III**

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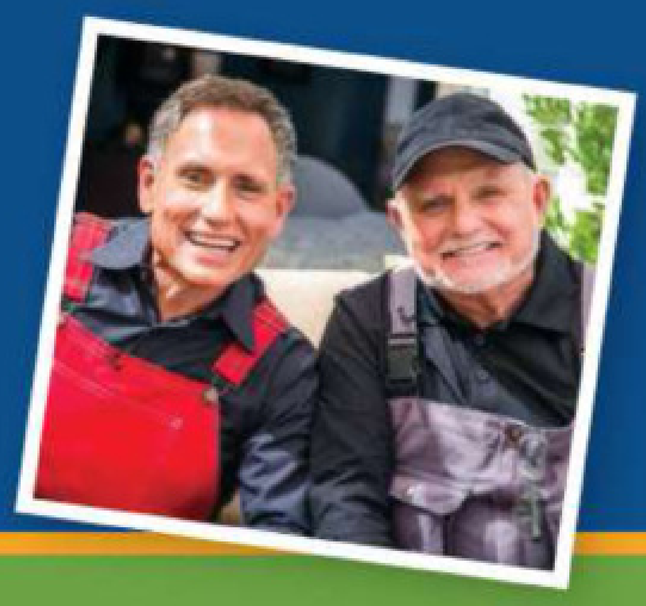
On the House

With the Carey Brothers
Tips of the Month



PREVENTING CLOGGED GUTTERS

A single leaf landed in one of our gutters and positioned itself over the downspout and acted like a plug. The gutters overflowed, flooded our kitchen and caused over thirty thousand dollars in damage. We weren't about to let that happen again so we went searching for a gutter protection system. We discovered all sorts of systems – louvers, screens, caps and more. We wanted a system that would block all kinds of leaves and pine needles. We also didn't want the system to be visible from the street or to affect the curb appeal of our home. We selected GutterBrush. As the name implies, the system consists of short sections of a cylinder shaped brush that fills the gutter. It looks like a big bottle brush. The best part is that it performs like a champ and you can't see it from the street because it tucks neatly into the gutter. GutterBrush does a great job of blocking leaves and needles and is simple to install. All you need is a ladder – no tools. Simply bend the wire core when rounding corners. GutterBrush is available in various sizes from 3¼"- 8." For more information visit **gutterbrush.com** or call 1-888-397-9433.

PLUG COVER PLATES THAT DO COOL THINGS

We recently encountered a new product that we had not seen before – an electrical receptacle cover plate with a built-in LED night-light that doesn't require batteries. The SnapPower Guidelight has two clips on the back of the cover plate that automatically begin drawing power from the receptacle once the cover plate has been installed. Removal and replacement of the cover plate is all that it takes to make the change. The cover doesn't hamper the use of either of the two outlets. The wattage used is less than most conventional night-lights and during the day it turns itself off. And because the LED's are located at the bottom edge of the plate they do a great job of lighting the floor and literally out of sight when not in use. The amount of illumination is perfect – just bright enough to see, yet not bright enough to keep you awake. SnapPower has also invented a cover plate with a built-in USB charger. A USB charger built into a receptacle isn't a new idea, but the SnapPower Charger has the USB charger located on the cover plate – instead of the receptacle. Consequently, anyone can add a USB charger to any receptacle in less than a minute – and without knowing anything about electricity. Both products have a MSRP of $15.00. For more information visit **snappower.com.**

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Visit their website at **OnTheHouse.com** for recaps of the show & other helpful info.

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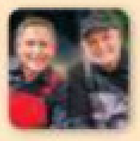

Storemags

One for all

Wandered down the caulking aisle in a home center lately? There are a dozen different construction adhesives to choose from: dedicated adhesives for masonry, wood, foam, decking, paneling, marble, mirrors, drywall—you name it. Multipurpose adhesives are available, which is great, but wouldn't an *all*-purpose adhesive be even better?

That's exactly what Gorilla Construction Adhesive is: all-purpose and all-surface. It takes hold in as little as 30 seconds and works indoors and out. Buy a 9-oz. tube of Gorilla Construction Adhesive for $8 at a home center or hardware store.

HOMAX

SAFETY TWO-IN-ONE

You'll be more likely to use eye and ear protectors if they're readily accessible, so why not keep them together—better yet, why not buy a pair of safety glasses that has built-in earplugs? These ReadyMax SoundShield safety glasses are equipped with a pair of earplugs that tuck into the ends of the earpieces/temples. Pull the plugs out of the earpieces when your work gets loud, and yank them back in with the retractable string when it quiets down a bit. These are perfect for construction, hunting or just cutting up wood in the garage. There are various styles to choose from—some glasses are tinted, some clear—and replacement earplugs are available. Buy a pair for $20 at amazon.com.

POPCORN IN A CAN

So you fixed the leak that caused that big, ugly water stain on the textured ceiling. But now it's time to deal with the damaged texture and the stain itself. If it's only a few square feet, you can tackle the job with the Homax Pro Grade popcorn ceiling patch.

Just spray it on thick and feather out the edges (practice on a piece of cardboard first). You'll have to scrape away the old texture and seal the stain, but then there's a good chance the new texture will blend right in. You may have to paint to get a good color match, but that's a lot easier than scraping the whole ceiling and respraying. A 14-oz. can costs $19 at home centers. Watch the instruction video at homaxproducts.com.

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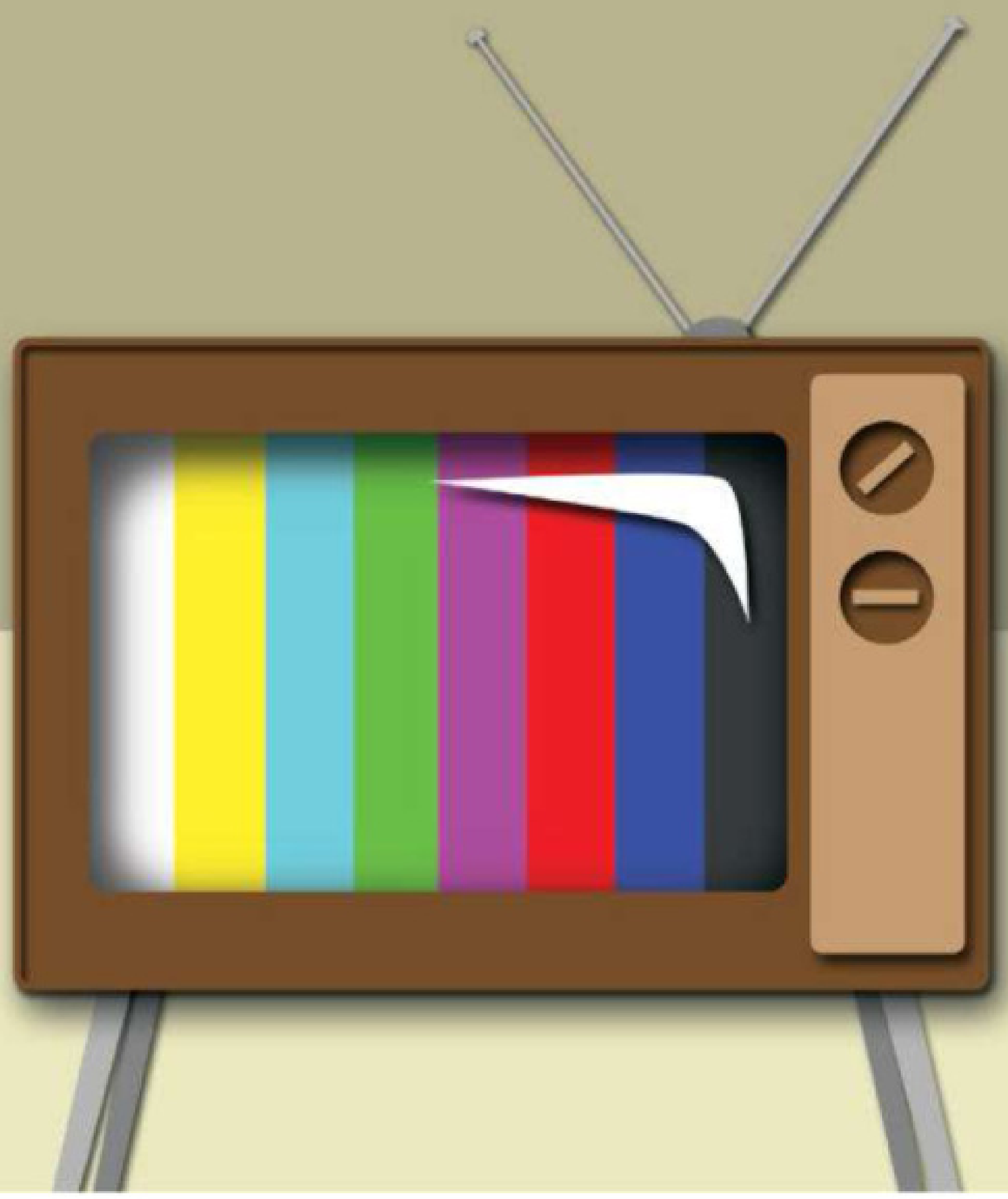

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DIY WORK WEAR

Full-motion jacket

If it never gets cold where you live or your outdoor projects only require you to stand in one place with your arms at your sides, then stop reading. But if you actually need to move around in frigid weather, check out the new Full Swing jackets by Carhartt. These jackets are warm and ruggedly built like traditional Carhartt jackets but are equipped with well-placed gussets and flexible material. Now you can reach farther with less restriction and bend sharper with minimal binding. Buy one at carhartt.com for $130 to $140.

GOOD THINGS IN SMALL PACKAGES

Epoxy can solve lots of repair problems, but trying to push the right amount out of each side of an old, crusty dispenser can drive a person nuts. And half the time the hardener has turned rock solid in the tube.

Most of my repairs don't require much adhesive, so I often reach for the single-serving packets from Hardman Epoxy. Hardman packages a wide range of products in small packages. Hardman Double Bubble Epoxy is available at amazon.com in quantities from 10 to 100, but I recommend the five-pack sampler ($13). With set-times ranging from three minutes to three hours, you'll be ready to fix anything.

Tom Caspar, Contributing Editor

Lubrication where you want it

I try to lube the sliding door rollers on my minivan every fall. If I spray the lube up at the roller, the overspray gets on the roof. If I shoot down onto the roller, the overspray hits the inner door panel and window.

The new WD-40 EZ-REACH has a bendable straw, which puts an end to all that mess. I just bend a tight 90-degree turn at the end of the straw, position it on the top of the roller and give it a quick shot. The roller gets the lube it needs, and there's no overspray to clean up.

The 8-in. straw maintains its shape until you straighten it out for storage or reshape it for another job. The EZ-REACH is brilliant and long overdue. Buy a 14.4-oz. can for about $8 at home centers.

Rick Muscoplat, Contributing Editor

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BUYING tips

BY TRAVIS LARSON editors@thefamilyhandyman.com

Interior trim

Interior trim can add definition and refinement to a room, and wood remains a good choice for material. To get a pleasing result with wood, you need to carefully select the individual pieces of lumber at the store, paying attention to grain and color. Today, synthetic trims can sometimes be a better option. Here are a few tips to help you no matter which material you choose.

COMBINE SMALLER MOLDING TO CREATE LARGE PROFILES

You can save yourself money and hassles by buying separate pieces of trim and assembling them yourself rather than buying elaborate premilled moldings. Cutting, coping and fitting wide trim is tricky. If you mess up, you'll be wasting trim that can cost several dollars per foot. If possible, try to replicate the profile you're after by assembling the correct individual pieces yourself.

ART DIRECTION **MARY SCHWENDER** • PHOTOGRAPHY **TOM FENENGA UNLESS NOTED**

Buy primed trim if you're painting

This is a no-brainer. Primed trim speeds up the finishing process. It's easier to spot defects and nail holes on primed trim, so you can fill them before the final coats of paint. It's even simpler to cope primed trim because the contrast between the raw wood and the painted surface gives you a crisp profile line to follow. So don't buy raw wood if you're going to paint.

GET THE LONGEST PIECES YOU CAN HANDLE

Even if you need mostly short pieces, it's wise to buy the longest trim you can fit into your vehicle. Here's why:

- You'll have fewer splices and more one-piece trim lengths, which look much better than any splice ever would.
- You'll be able to pick and choose to closely match grains so they blend together.
- You'll have plenty of short lengths left over for smaller projects.

You can order rare moldings

No lumberyard or home center carries every molding profile made. Some styles are rare, especially in an older home. Even so, most are still made and available by special order. Take a short length of trim with you to the store and ask to see the profile chart. Any store that sells trim will have one. Match it to your sample and ask whether it can be ordered. It may be expensive, but you'll get the molding you want.

AVOID USING MDF TRIM IN MOIST PLACES

MDF (medium-density fiberboard) is inexpensive and a great material for painted trim, but only if you're installing it in a permanently dry place. Installing it near the floor or near windows where water or condensation sometimes collects is a recipe for disaster. The MDF will soak it up like a sponge, expand and shed paint in very short order. So avoid using MDF anywhere at risk for getting wet.

BILL ZUEHLKE

Match the grain

Occasionally you'll need to splice trim pieces. If you're trimming with natural wood, that splice will stick out like a sore thumb if you're not careful. If you need to splice trim on long walls, spend extra time choosing those pieces to make sure the grain patterns match and the wood tones are similar. When the pieces are joined, the splice will be nearly invisible.

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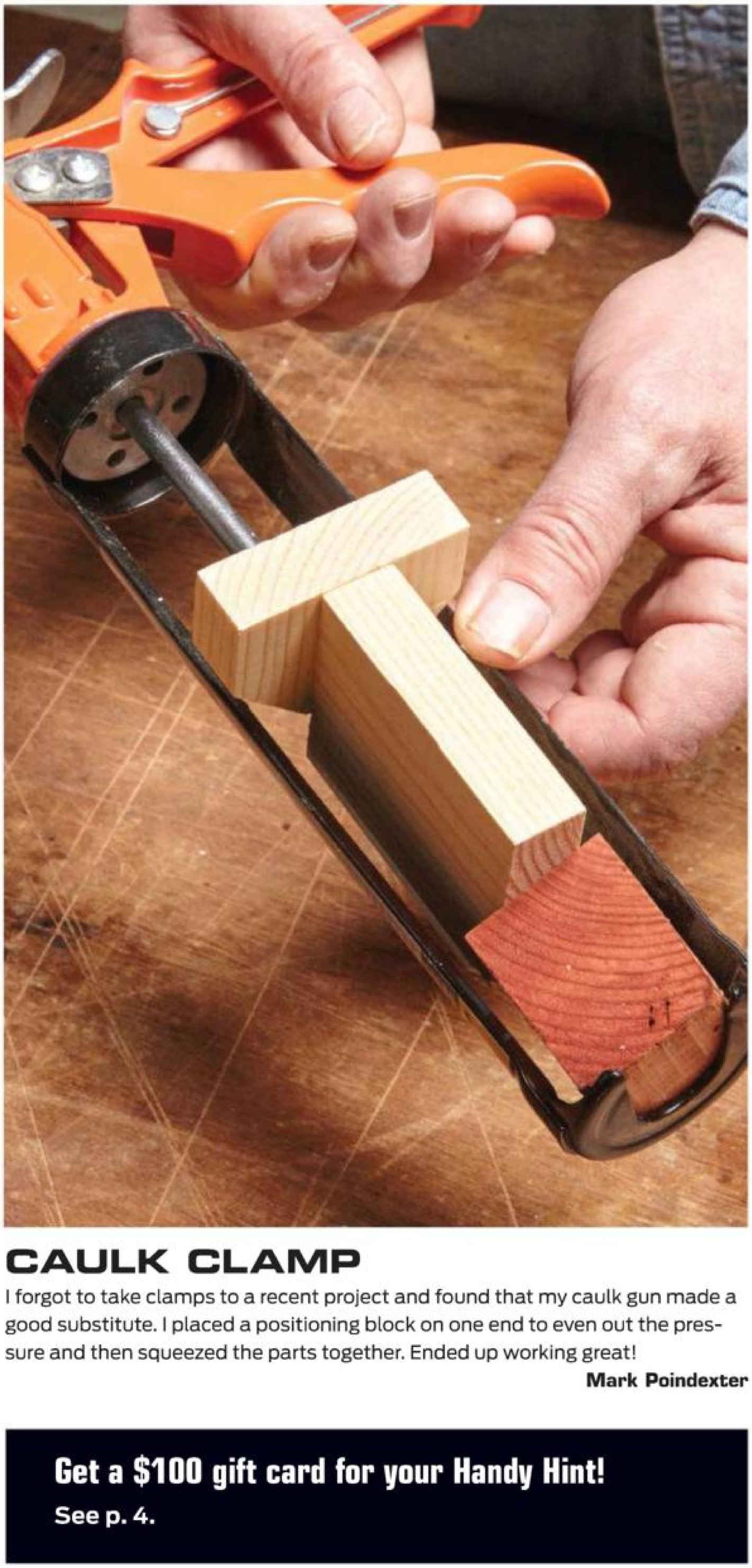

CAULK CLAMP

I forgot to take clamps to a recent project and found that my caulk gun made a good substitute. I placed a positioning block on one end to even out the pressure and then squeezed the parts together. Ended up working great!

Mark Poindexter

Get a $100 gift card for your Handy Hint!
See p. 4.

Ready-to-go hangers

If I hang clothes up immediately from the dryer, they stay fairly wrinkle-free. To keep hangers handy, I installed a towel bar right above the dryer under the cabinets. When the clothes are dry, I just grab a hanger and hang them right away instead of stuffing them into a laundry basket.

Bob Johnson

CLASSIC HINT

Electrical circuit ID

Doing electrical work at home got a lot safer when I began using this smart labeling technique. I took the time to identify which electrical circuit breaker controlled the current to each outlet and switch, then I removed each cover plate. On the back of the cover plates, I wrote the number of the corresponding circuit breaker. Now, when I change a fixture or do other electrical work, I unscrew the plate and see which breaker I need to shut off before I start.

Matt Kelly

EDITOR **GARY WENTZ** • PHOTOGRAPHY **HSP**

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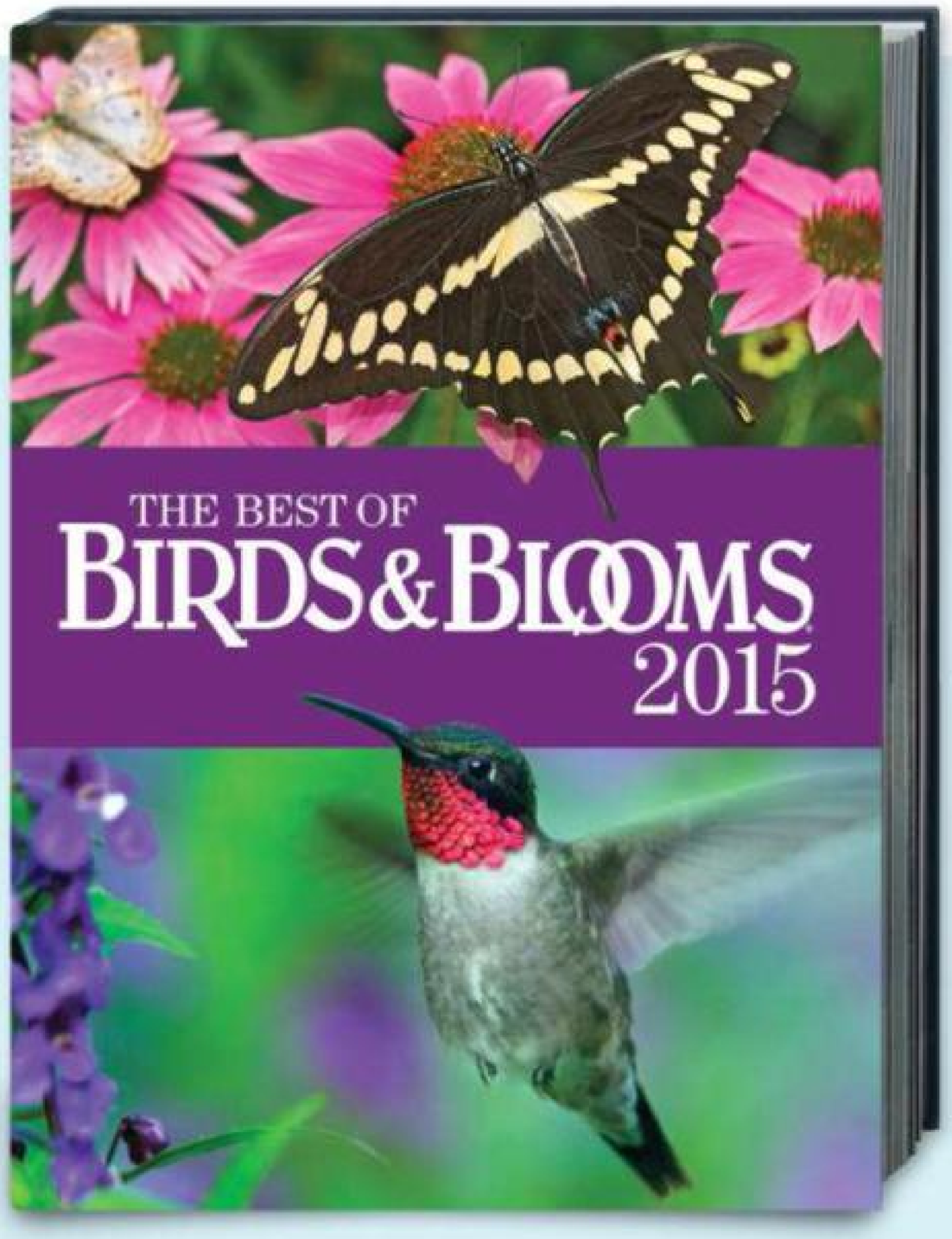

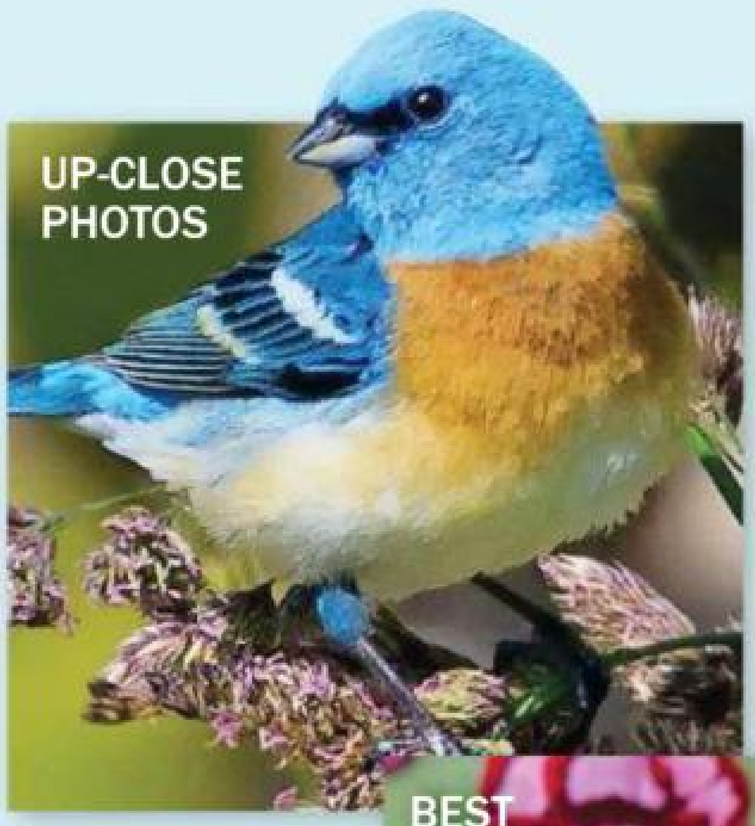

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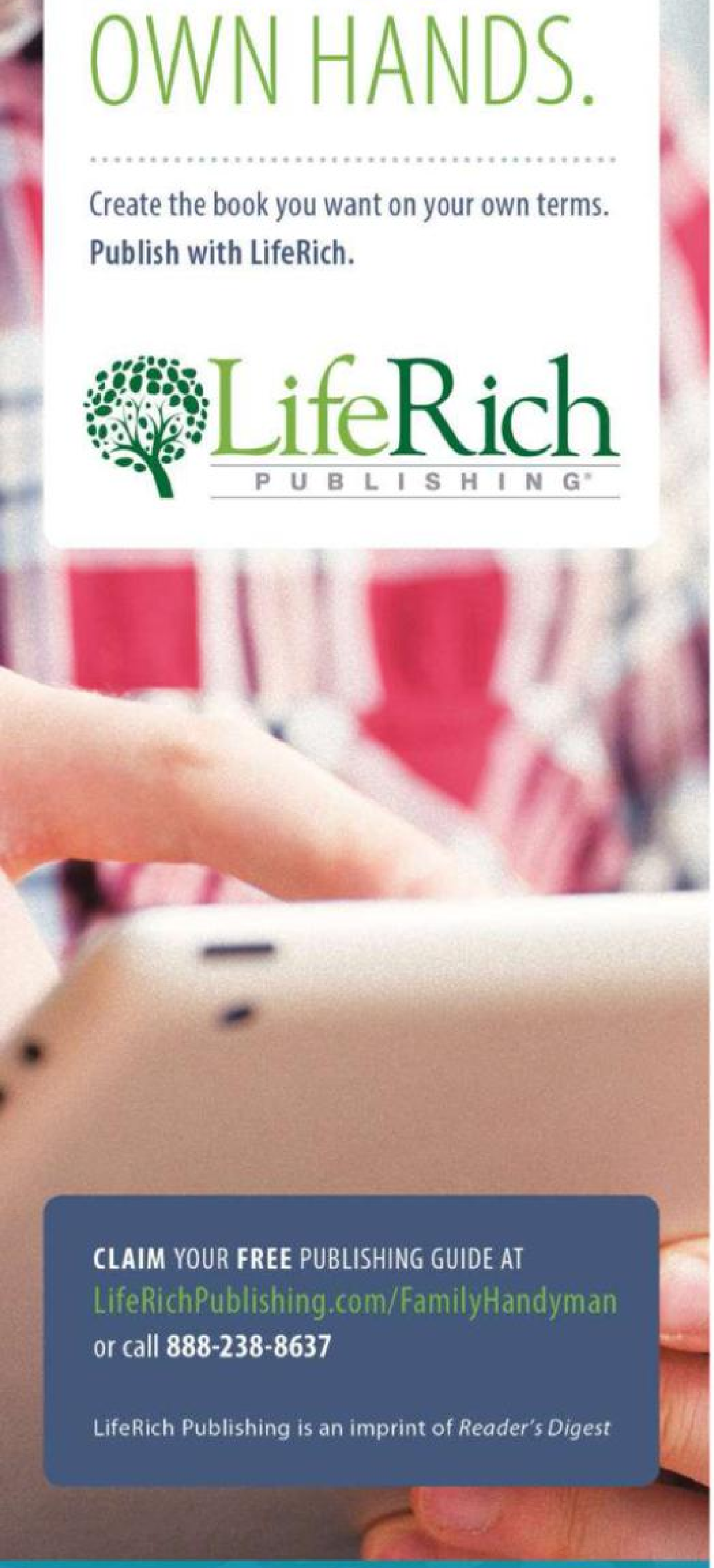

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Unclog your showerhead

Every few months, my showerhead gets partially clogged with calcium deposits from our well water. I used to remove the showerhead and soak it overnight in vinegar until the small holes were cleared. To get the job done faster, I bought a welding tip cleaner at my local home center for about $5. The cleaner has different-size abrasive needles that quickly knock out the mineral chunks from the tiny holes—no need to remove the showerhead.

Mike Henrich

No-odor disposer

Tired of a smelly garbage disposer? When your liquid laundry jugs are empty, rinse them and pour the leftover suds down your garbage disposer. No more bad-smelling sink!

Daniel Beltz

NONSTICK CLAMPING

When you're making a panel by gluing together several boards, clamp cauls near the ends of the boards to keep them aligned as the glue sets. To keep the cauls from sticking to the panel, enclose them in plastic wrap. When you remove the clamps, just scrape the wrap free from the hardened glue.

Carl Engstrom

Right-hand rule

When winding Teflon tape onto pipe threads, I use a simple rule to get the direction of the wrap correct. If I insert my right thumb into the end of the pipe, my fingers will point in the direction that I need to wrap.

Josh Whited

Polishing bag

Whenever I finish a furniture project with polyurethane, I let the finish cure and then reach for a paper grocery bag for the final luster. Just cut the bag into large pieces, crumple them slightly and then rub the finish to an even sheen. The paper is slightly abrasive and works like a polishing compound.

Vern Johnson

Artistic touch-ups

Home centers carry stain markers to touch up damaged finishes. But if you want a perfect match, stop by an art supply store. They'll have every color you can imagine. If you get two or three colors, you can even match the colors and pattern of wood grain.

Dianne Nussmeier

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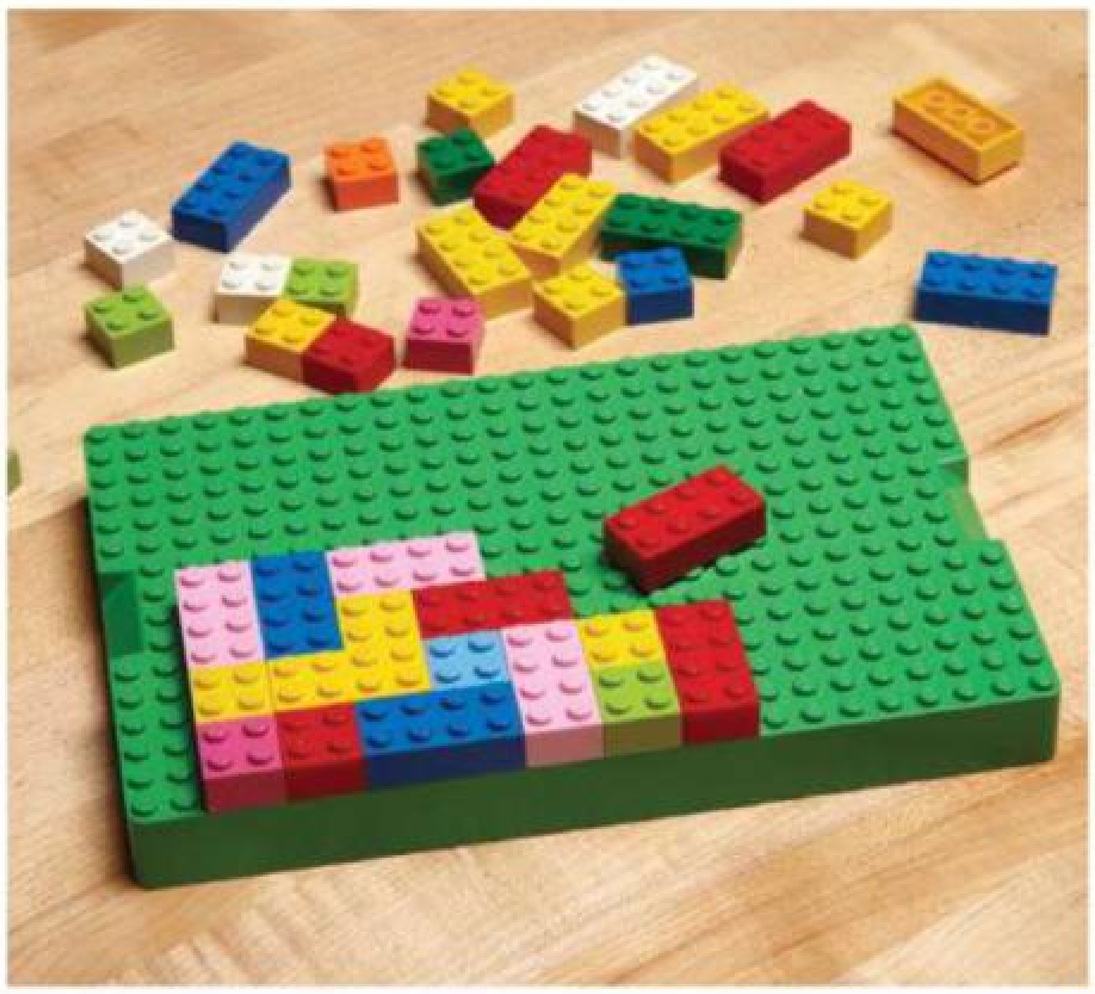
ART DIRECTION **MARCIA ROEPKE** • PHOTOGRAPHY **TOM FENENGA** • TECHNICAL ILLUSTRATION **FRANK ROHRBACH III**

A stunning wall unit that's infinitely flexible—customize it to suit your space and your stuff

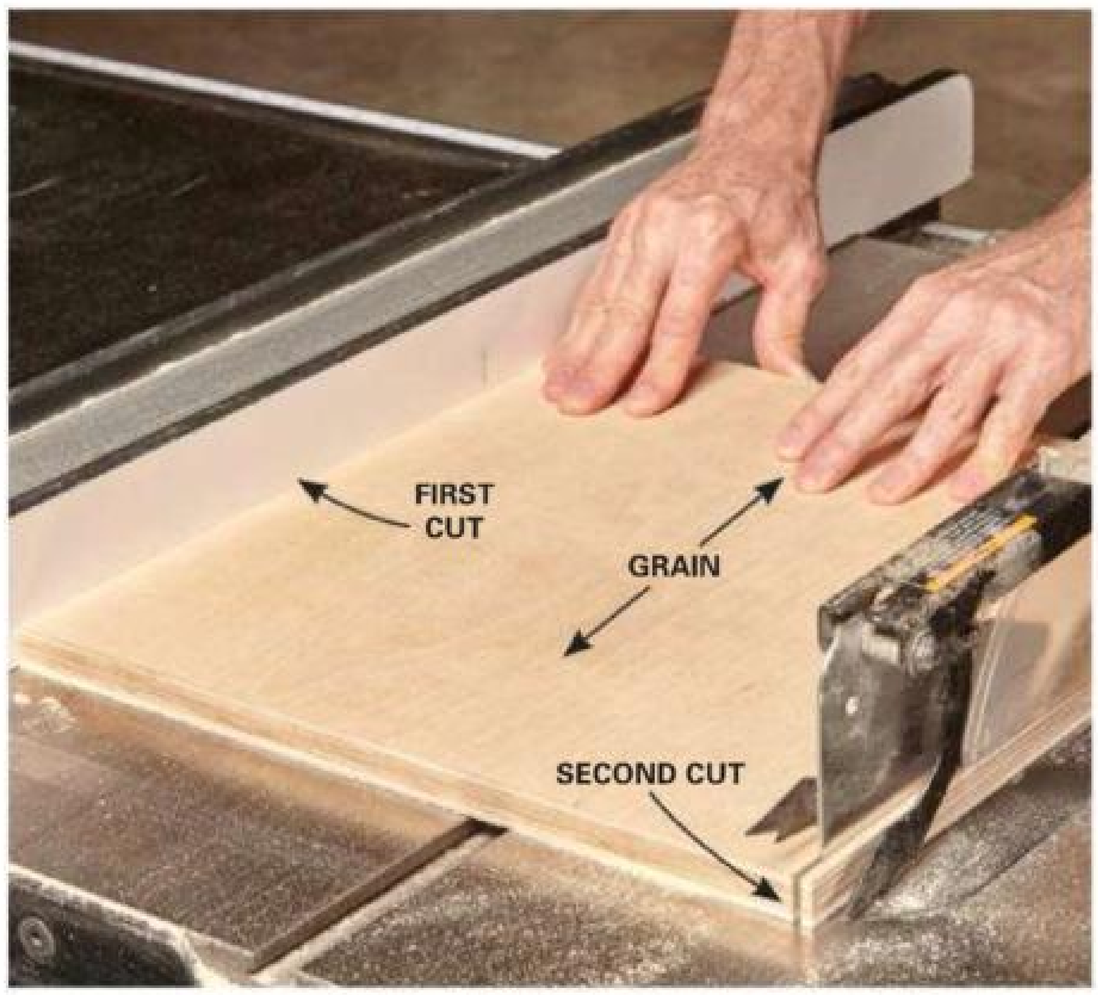
Back when I was just starting out in my first apartment, I piled up milk crates to store all my worldly goods. It was a simple idea, and it worked like a charm. Fast-forward many years: Faced with a need to store and display lots more stuff, I made plywood boxes in two sizes and mixed them up, adding doors to some and painting the inside backs of others the same color as my wall. The result was a stunning showcase that's adaptable to any situation and includes useful storage space.



1 DESIGN WITH LEGOS BLOCKS
Here's an easy way to design your wall unit: Use LEGO blocks to represent single and double boxes. Take photos of various patterns, then compare the photos to decide which arrangement works best.

2 LAY OUT PARTS WITH TEMPLATES
Your wall unit may require dozens of parts, but there are only three rough sizes. Cut full sheets of plywood into 16-in.-wide strips, then mark the parts using a set of three cardboard templates, based on the rough sizes given in the Cutting List.

3 CUT THE ROUGH-SIZED BLANKS
Crosscut the plywood strips using a table saw sled or guide for a circular saw.



4 CUT TWICE FOR A PERFECT EDGE
To ensure that one edge of each blank is dead straight, rip it twice. Make one cut, rotate the piece 180 degrees, reset the fence and cut again. The second cut will result in a perfectly straight edge. Mark it.

Create your own design

To plan the unit, I used my kid's LEGO blocks to play around with different patterns (**Photo 1**), but you could just use paper or cardboard. Before you start, note any outlets or vents along the wall (see "Dealing with Outlets and Vents," p. 30).

Once your design is set, figure out how much plywood you'll need. Each box is composed of five parts: a back (A and E; see Cutting List, p. 36), top and bottom (B and F), and two ends (C and G). You can also add doors (D and H).

Count the number of single and double boxes in your design, then take a look at how many of these pieces you can get from one sheet of plywood (**Figure B**). The sheet I've drawn yields two single boxes and one double box, but you could cut one sheet into all singles or all

WHAT IT TAKES

TIME: 8 days
COST: $900 as shown
SKILL LEVEL: Intermediate
TOOLS: Table saw, drill/driver, brad nailer, clamps, basic edge-banding tools

Steve Maxwell

Figure A
How parts fit together

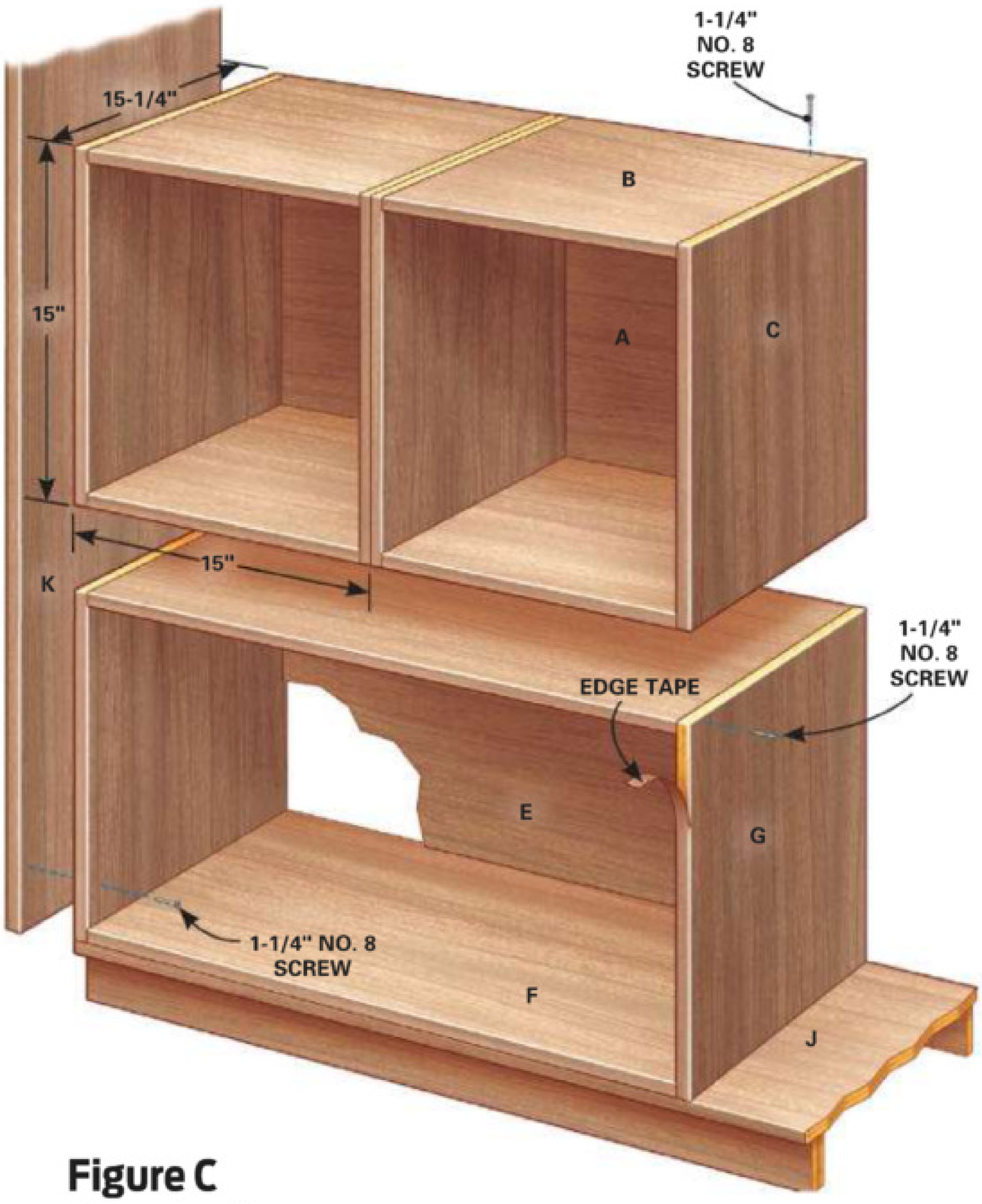


Figure B
A typical yield from one sheet of plywood

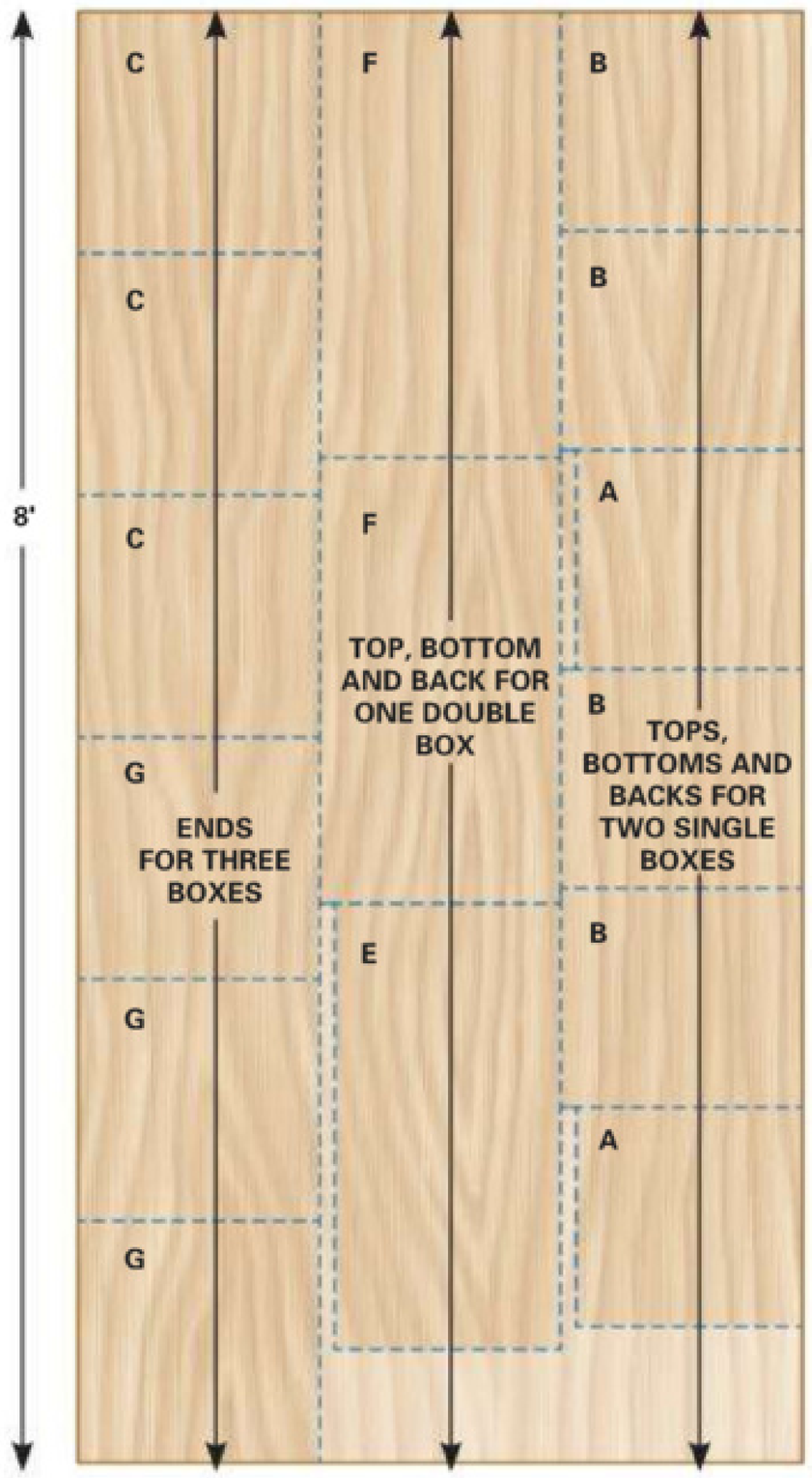


Figure C
Squaring jig

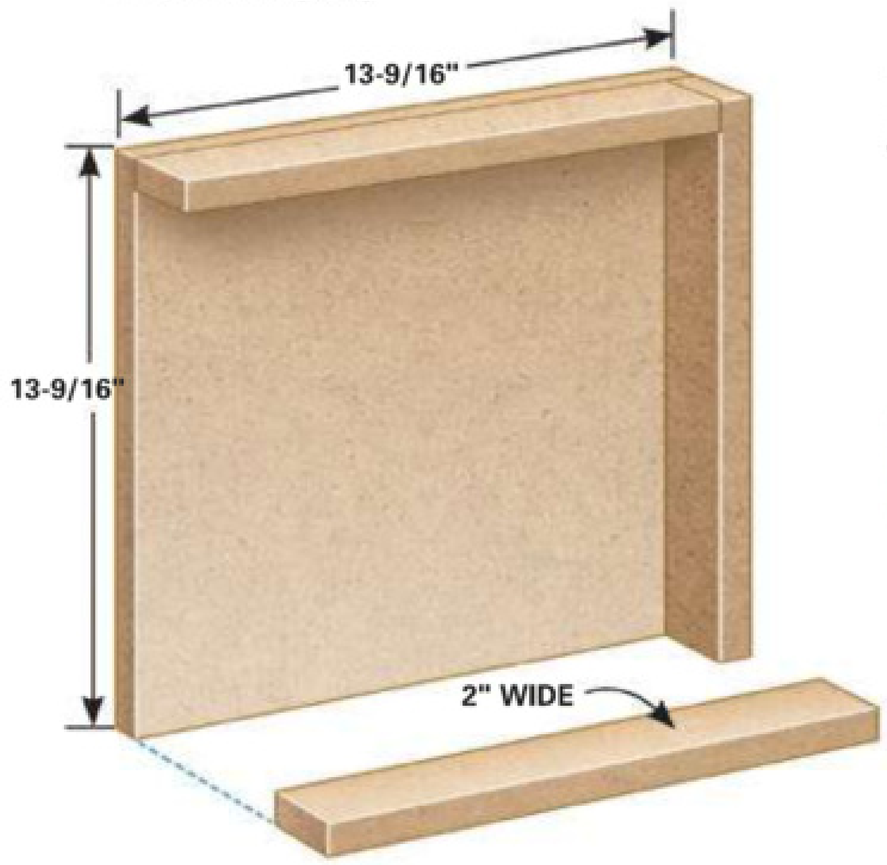
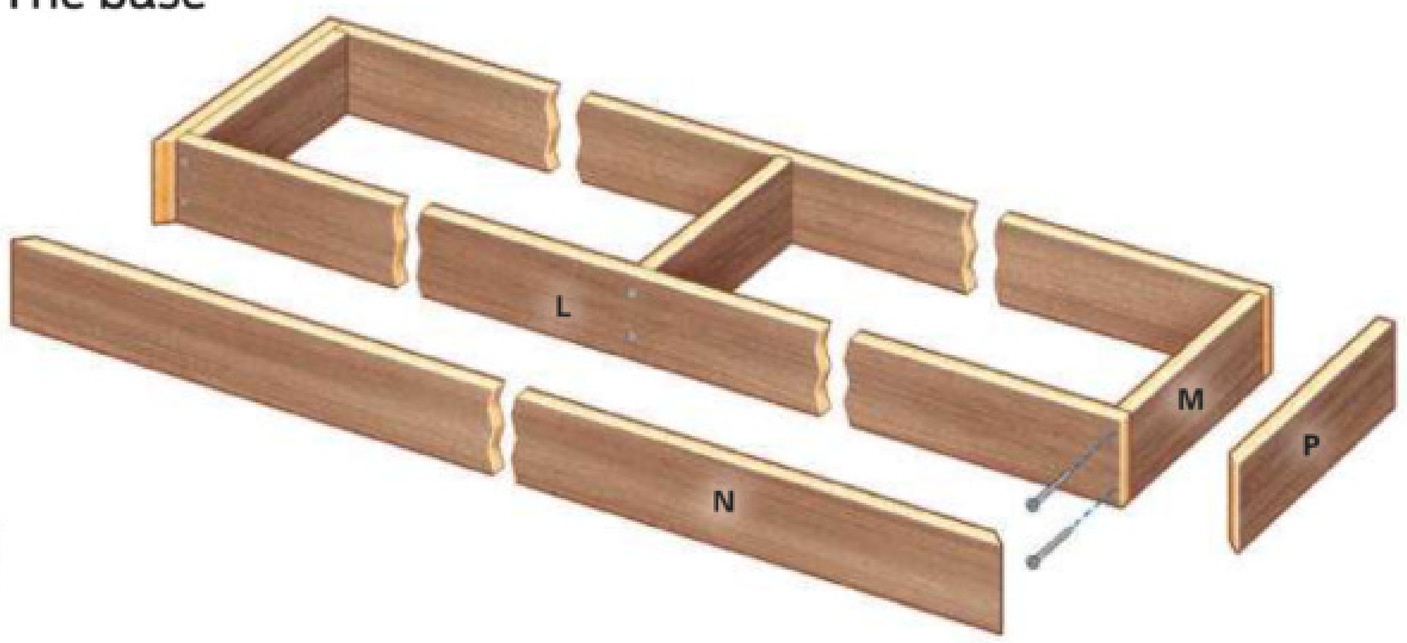


Figure D
The base



doubles or any mix of the two sizes. Birch plywood costs $35 to $50 per sheet; my enormous project required 15 sheets.

In addition to the boxes, you'll need more plywood to surround the unit on all four sides (J and K; **Figure A**). These pieces aren't essential, but they give the unit a clean, finished look by hiding all the seams. And they make all the members look equal in thickness.

You may also need plywood to build a base for the boxes to stand on (L – P; **Figure D**). This part isn't essential either (you could stack the boxes directly on the floor), but I definitely recommend it for a large unit like this one. Starting out with a level base—rather than an uneven floor—makes aligning the boxes much easier when you stack them.

Materials List

- 3/4-in. birch plywood
- Edging tape
- 1-1/4-in. deck screws
- 1-1/4-in. coarse-thread drywall screws
- Electrical tape (for shimming)

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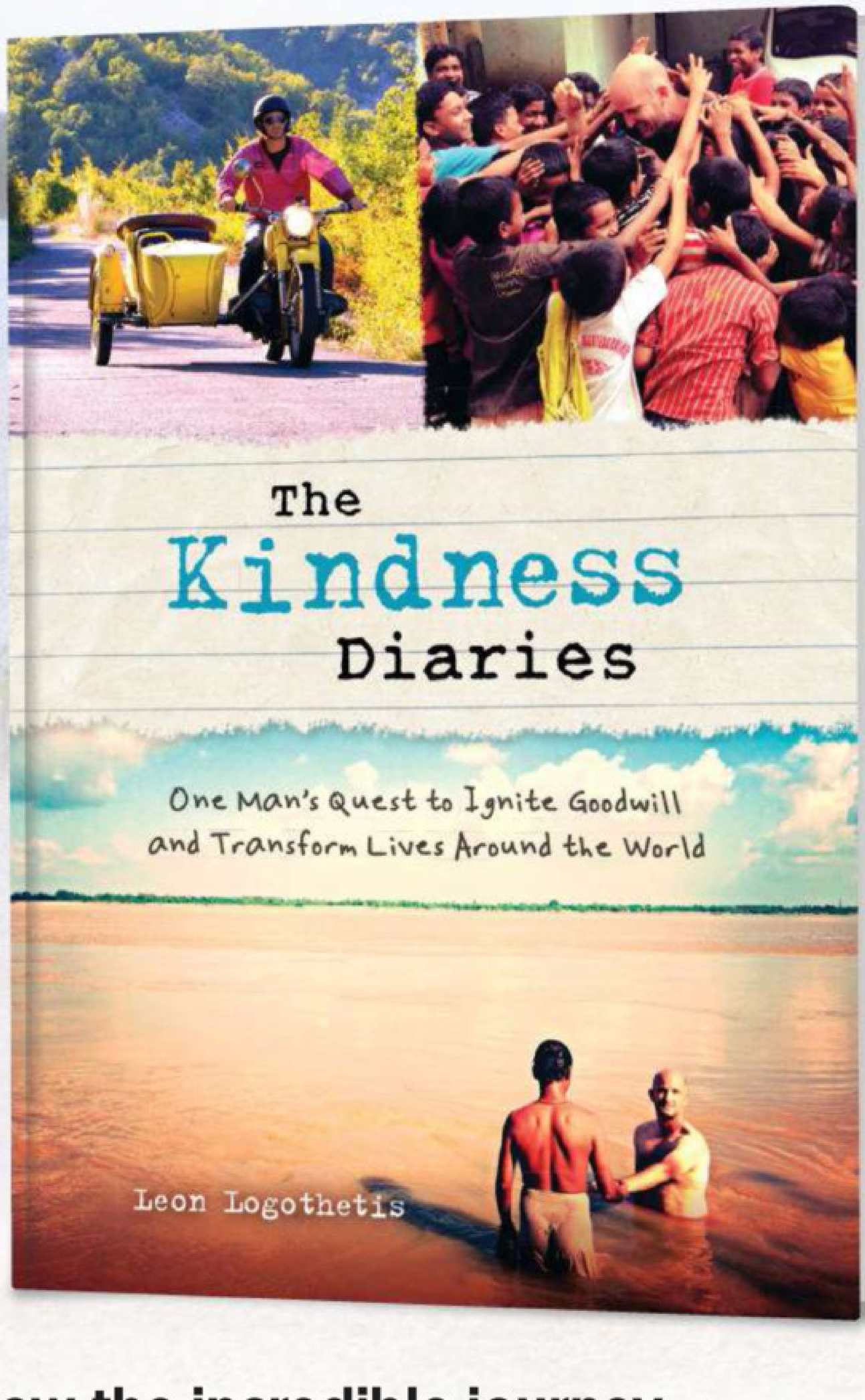

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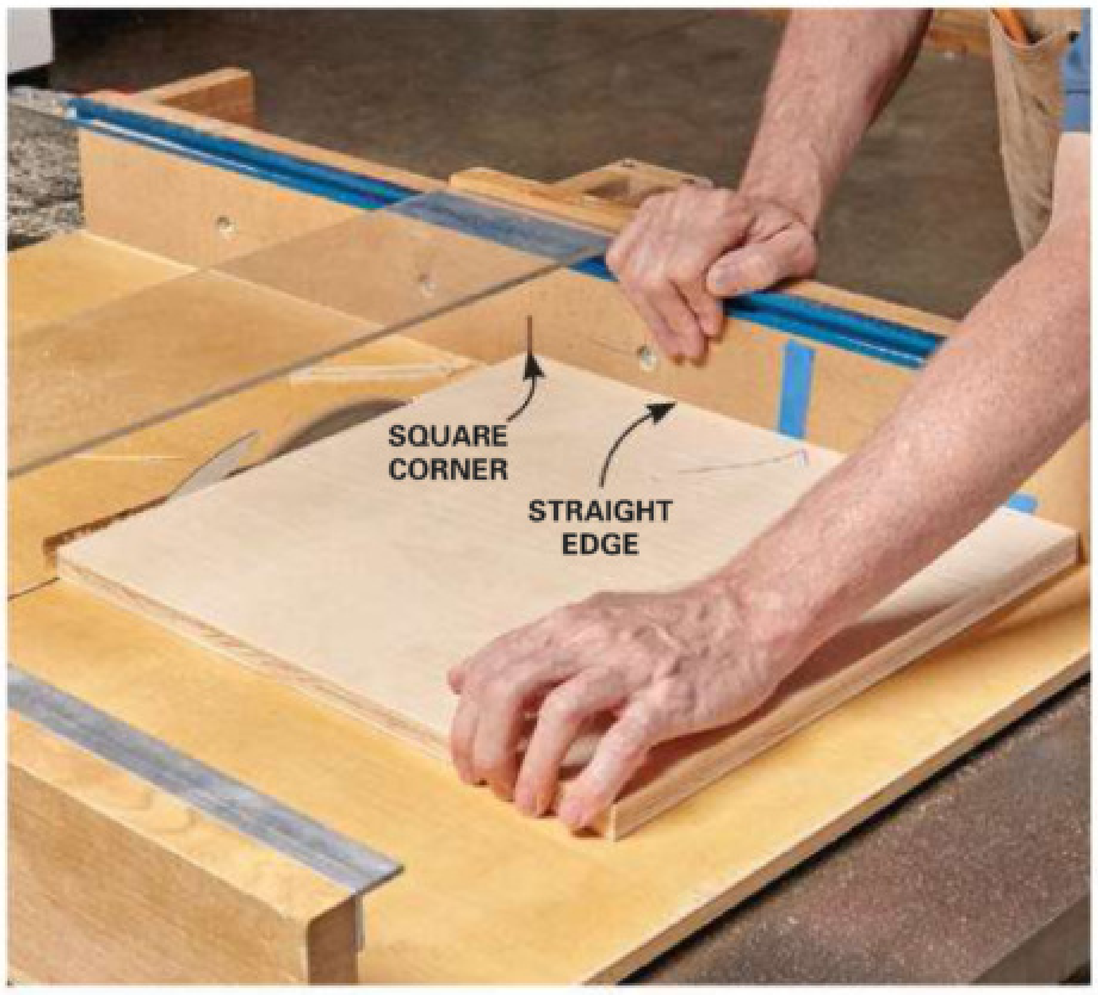
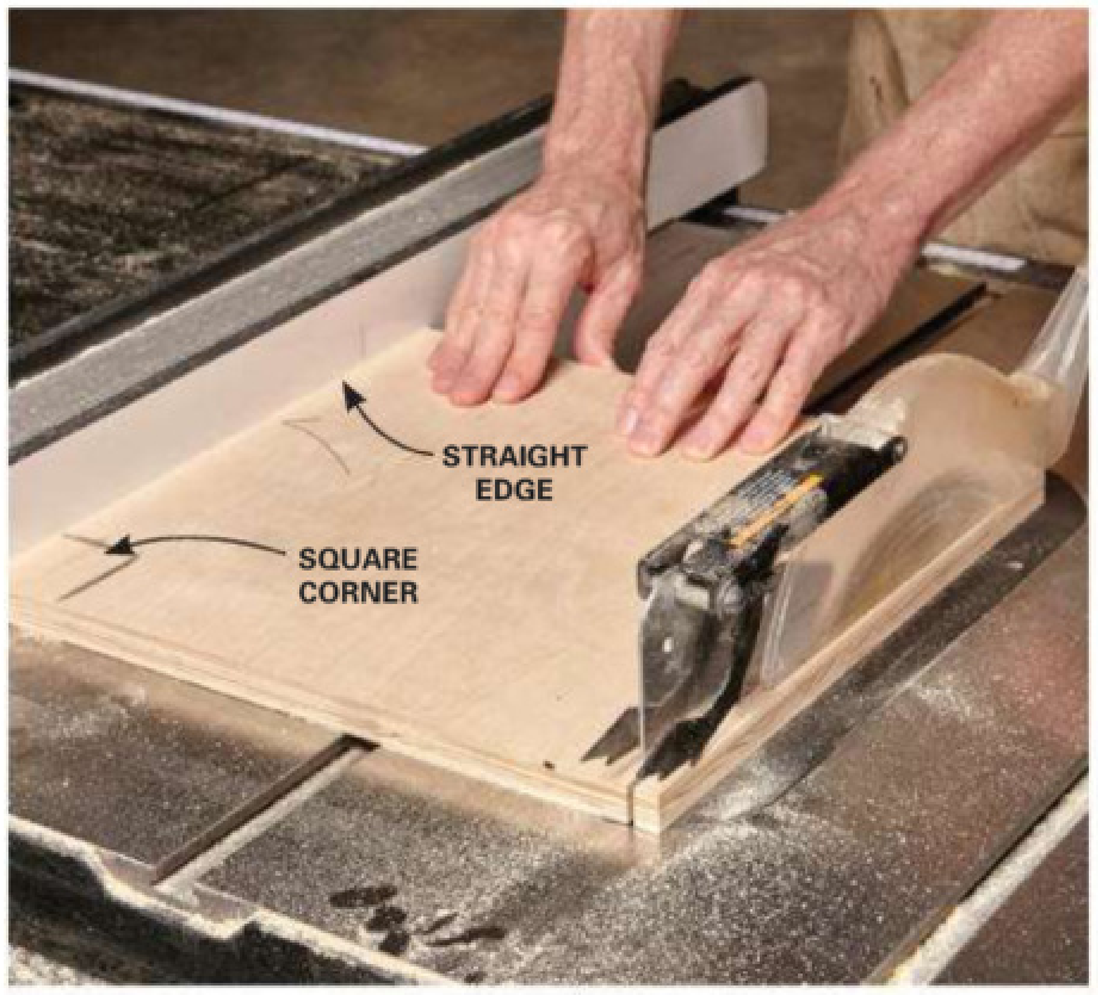
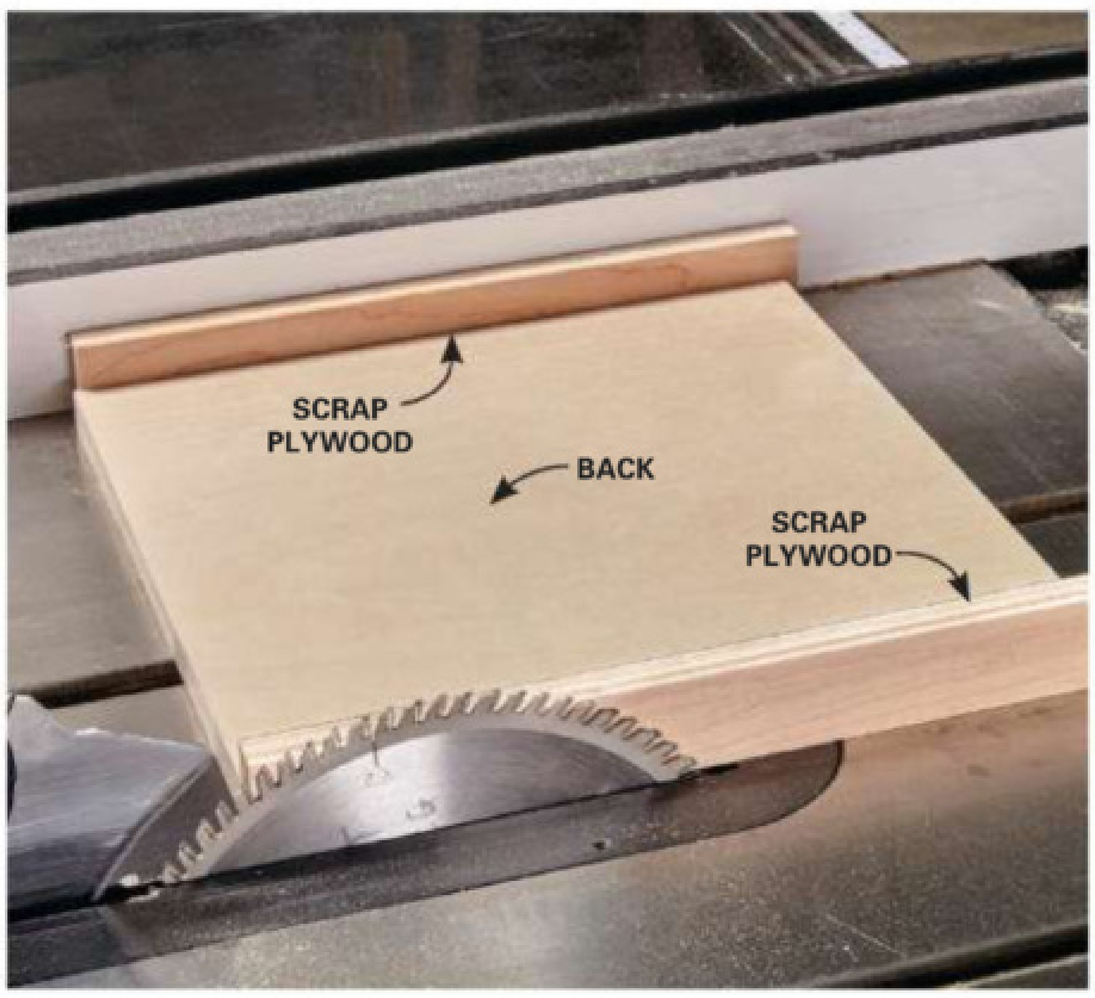


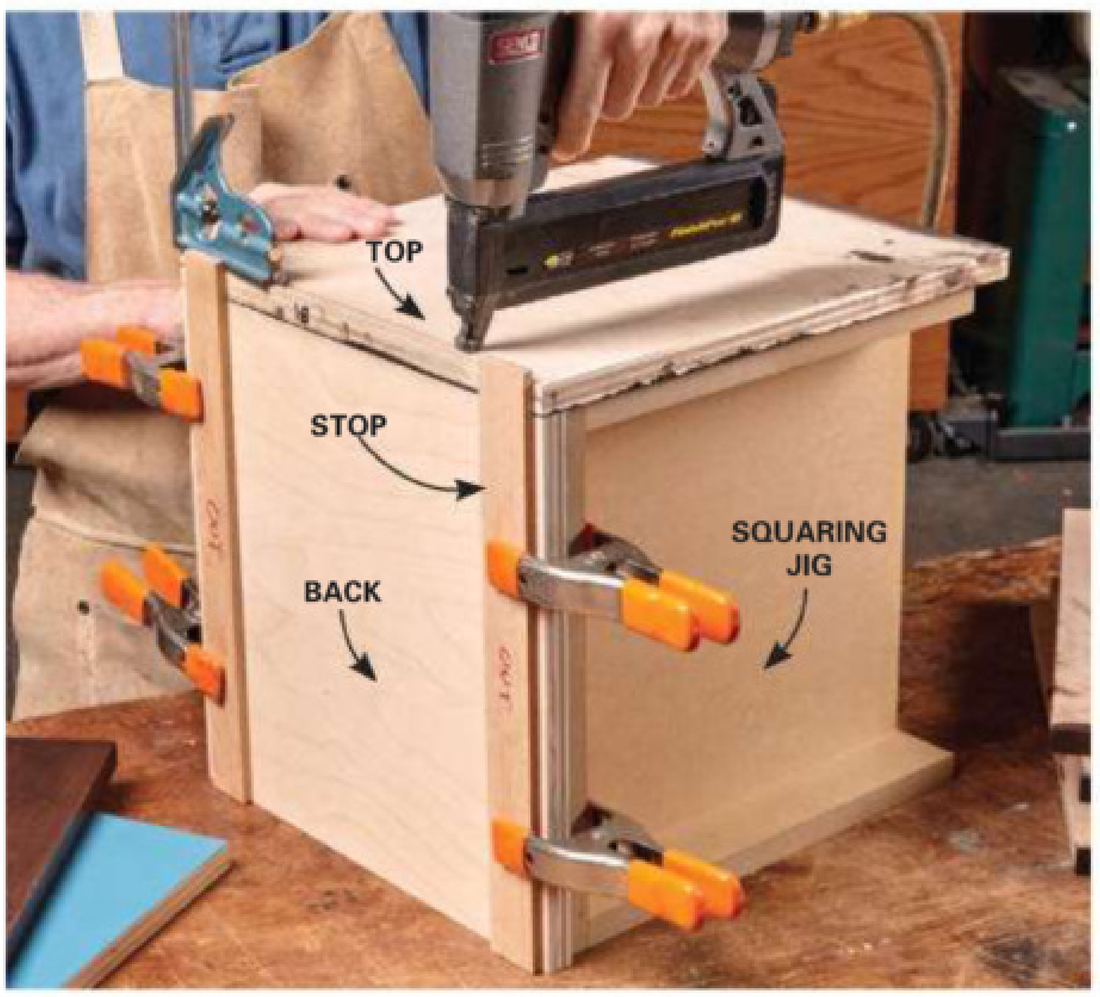
5 CUT ONE PERFECT CORNER
Place the marked straight edge of each blank against the sled's fence, then crosscut one end of the blank. Mark the square corner.



6 TWO CUTS MAKE A SQUARE
Use the saw's fence to cut the single-box backs to final size. Make one rip cut, then rotate the piece 90 degrees and make a crosscut. The result will be a perfect square.



7 SET YOUR FENCE TO CUT THE ENDS
The length of each end piece equals a back plus two thicknesses of plywood. Unplug your saw and flip up the guard. Place these pieces next to the saw blade, then butt the fence up to them. Cut the remaining pieces to width and length using the fence as well.



8 JOIN THE TOP AND BOTTOM TO THE BACK
Begin assembling each unit by fastening a top and bottom to a back. Use two simple jigs and a pair of stops to align the parts. Shoot three brads to lock the parts in place, then drill pilot holes and drive in screws.

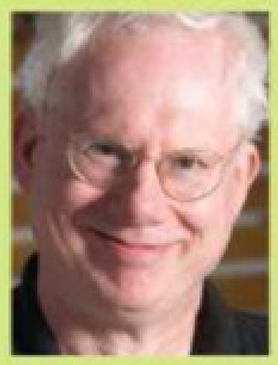
Cut the plywood to rough size

Building plywood boxes is usually no big deal, but these have to fit together just right. Every square box has to be absolutely square—that is, its height must be exactly the same as its width. And a double box must be exactly twice as long as a single.

If that level of precision sounds intimidating, don't worry. I've worked out a method of cutting, building and assembling the boxes that guarantees success.

Here's the best strategy for cutting the plywood: Break down your sheets into oversize backs, tops, bottoms and ends first, then cut each of these pieces to final size in batches. You'll be making "rip cuts" and "crosscuts." Rip cuts go with the grain and determine a piece's width; crosscuts go across the grain and determine a piece's length.

MEET THE BUILDER

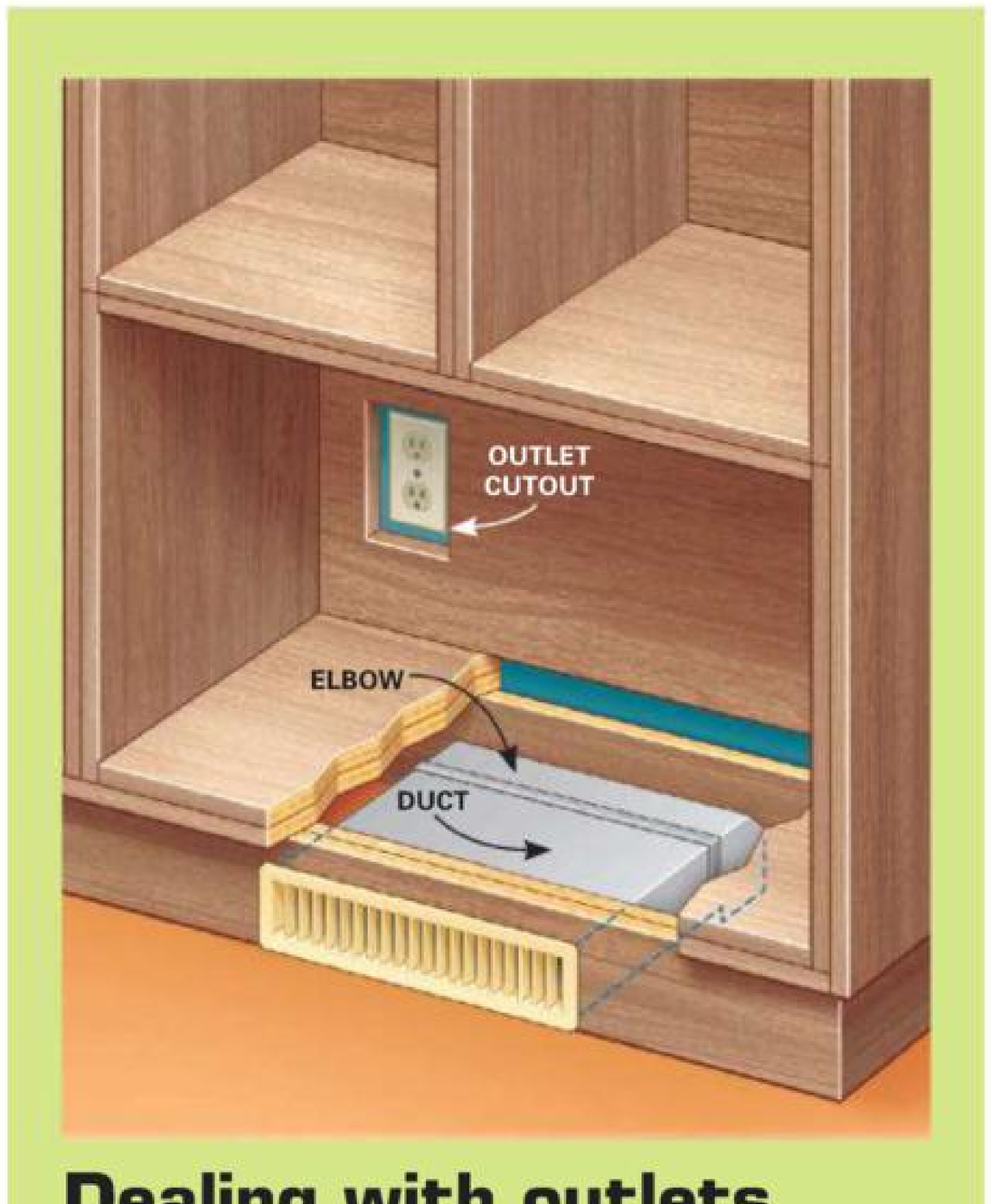


Tom Caspar is a professional furniture maker and former editor of *American Woodworker* magazine.

9 ADD THE ENDS
Use the jigs again to hold the parts square. Make sure all the front edges are flush before fastening the parts together.

10 BUILD A LEVEL BASE
Build a base from plywood and level it with shims to ensure your wall unit will be plumb. Wrap the base with "skins" (N, P) and cover it with the platform (J).

11 CLAMP, THEN FASTEN
Use small clamps to assemble a couple of rows of boxes. Shift the boxes as needed to align them, then fasten them together from the inside.



Start by making three cardboard templates using the rough dimensions given in the Cutting List. Cut each piece of plywood into three 16-in.-wide strips, then use the templates to draw every crosscut you intend to make (**Photo 2**). Label the parts and tally them to be sure you have enough of each kind. Add two extra single-box backs to your list. You'll need these to build a pair of jigs that are essential for assembling the boxes (**Figure C**).

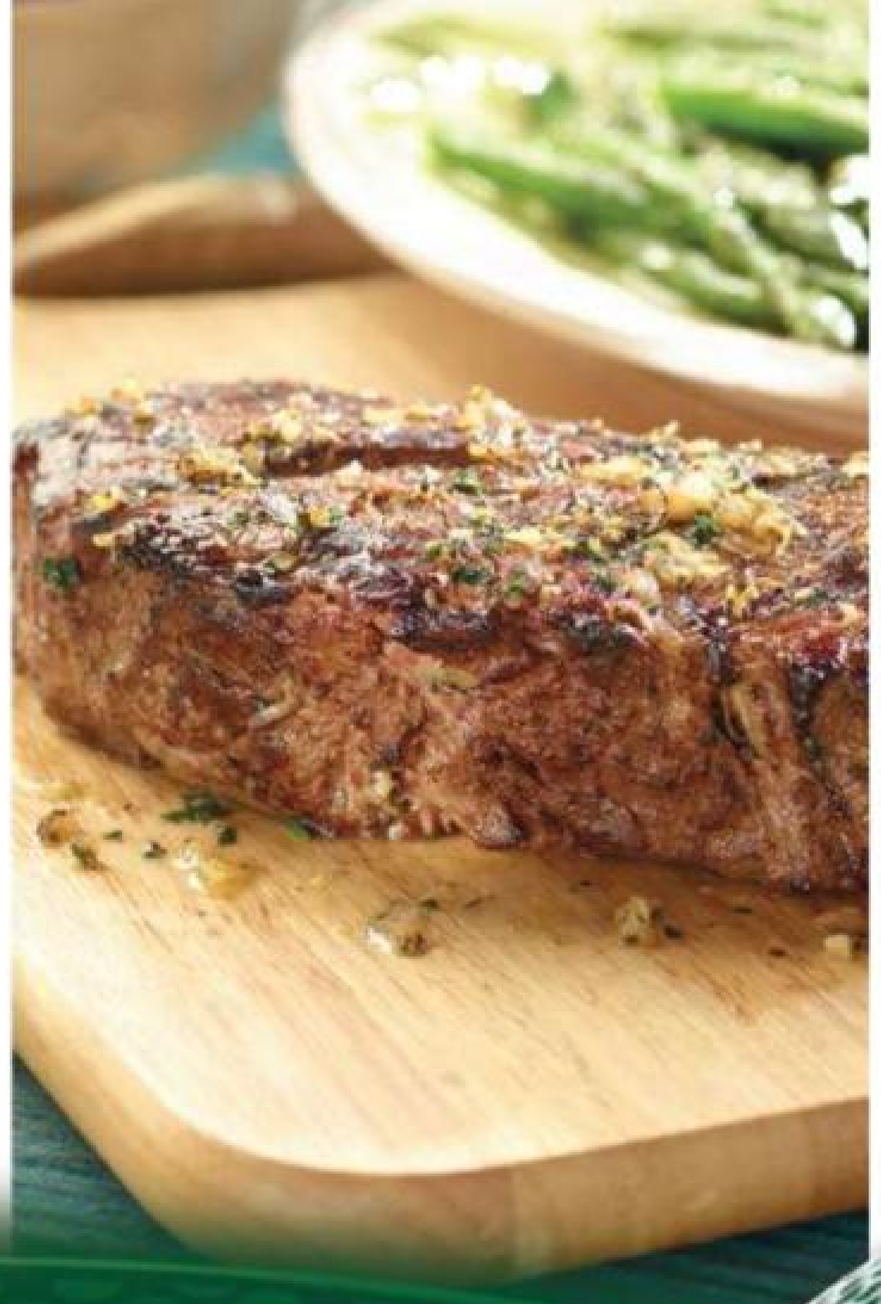
Crosscut each strip using a sled on your table saw (**Photo 3**). Use a 60-tooth or higher crosscut blade to avoid chipping out the face veneers. For tips on building and using a sled, go to familyhandyman.com and search for "table saw sled." Sort the parts into clearly marked piles.

The next step is to make one perfectly straight edge on

Dealing with outlets and vents

Don't cover electrical outlets and air vents—work around them. Plan ahead so a box's edge won't cover an outlet. The outlet must sit "inside" a box, accessible through a hole in the box's back. Cut the hole when you're stacking the boxes to be sure you put it in the right place.

To allow airflow from a floor vent, add an elbow and extend the duct to the front of the base. Cut a hole in the front of the base to receive the duct and then fasten the vent cover to the base.



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12 ADD END CAPS
Build up one side of the entire assembly first, then fasten end cap to cover the seams. Add the remaining boxes a couple of rows at a time before fastening them together. Then add the other end cap and top.

ENDLESS POSSIBILITIES

You can mix and match boxes in any pattern, any size. Think big and you can fit a TV and speakers in between them. Think small and you can fill a short wall with just a few boxes.

each part, following the grain. The best method is to rip each part twice—the cut edge will become straighter, and smoother, with each cut you make. First, set your saw's fence to cut 15-3/4 in. wide, then rip all the pieces from their straightest side (**Photo 4**). Mark these edges, then reset the fence to 15-1/2 in. and rip each piece again, running the marked edge against the fence. Make a different mark on this new edge to indicate it's the best one.

Next, cut one square corner on each piece (**Photo 5**). Make test cuts first to be sure your sled is cutting absolutely square (see "Super-Tune Your Sled," p. 34). Be fussy—accuracy will pay off when you assemble the boxes.

Cut the parts to final size

The backs determine the overall size of each box, so make them first. Start with the smallest ones—the single-box backs. Begin by setting the saw's fence to 13-9/16 in., then make a rip cut from the good edge of each single-box back (**Photo 6**). Rotate each piece 90 degrees and make a crosscut from the other good edge.

This dimension—13-9/16 in.—is repeated in a number of other parts, so it's best to cut them all at the same time. Crosscut all the single-box tops and bottoms, then rip all the double-box backs at this setting.

Next, cut all the double-box backs to length. It's better to use actual parts, rather than a ruler, to figure out this dimension (about 28-9/16 in.). The length of a double's back equals the sum of two single backs plus the thickness of two pieces of plywood. Place these four parts next to your saw's blade, then butt the saw's fence next to them. (Use two scraps to represent the plywood's thickness.) Crosscut all the backs to this length. Cut all the double-box tops and bottoms to this length as well.

Use a similar method to figure out the precise length of all the end pieces (**Photo 7**). This dimension equals the width of a single-box back plus the thickness of two pieces of plywood. Place these pieces next to the saw's blade and butt the fence to them. Crosscut all the ends at this setting (about 15 in.).

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The final cuts determine the outside depth of both boxes. Set the fence to 15-1/4 in. and rip the ends, tops and bottoms at this setting.

Build the boxes

Apply iron-on edging to the fronts of all parts. For tips on that, go to familyhandyman.com and search for "edge band." I actually cheated and paid $250 to have my parts edged by machine at a cabinet shop.

It's much easier to finish the boxes before building them than after! I chose a dark stain to hide any small gaps between boxes; using a dark color, gaps just look like shadows.

Build two jigs to help with assembly (**Figure C**). Start assembling the single and double boxes by attaching a top to a back (**Photo 8**). Support the top with the jigs. Butt the top up to two stops clamped to the back. Be sure both pieces are aligned side-to-side, then shoot three 1-1/2-in. brads to lock the pieces into place.

Next, drill three pilot holes and drive in screws. The nails prevent the pieces from shifting; the screws pull the parts together. (Tight joints are essential for the boxes to nest together properly.) I used deck screws that have a smooth shank right under the screw's head. To drill the pilot holes, I used a combination bit and countersank the holes halfway into the top piece of plywood so none of the screw's threads would engage it—that's the key to pulling parts tight.

Leave the jigs in place, then turn the assembly over and repeat the procedure for attaching the box's bottom piece.

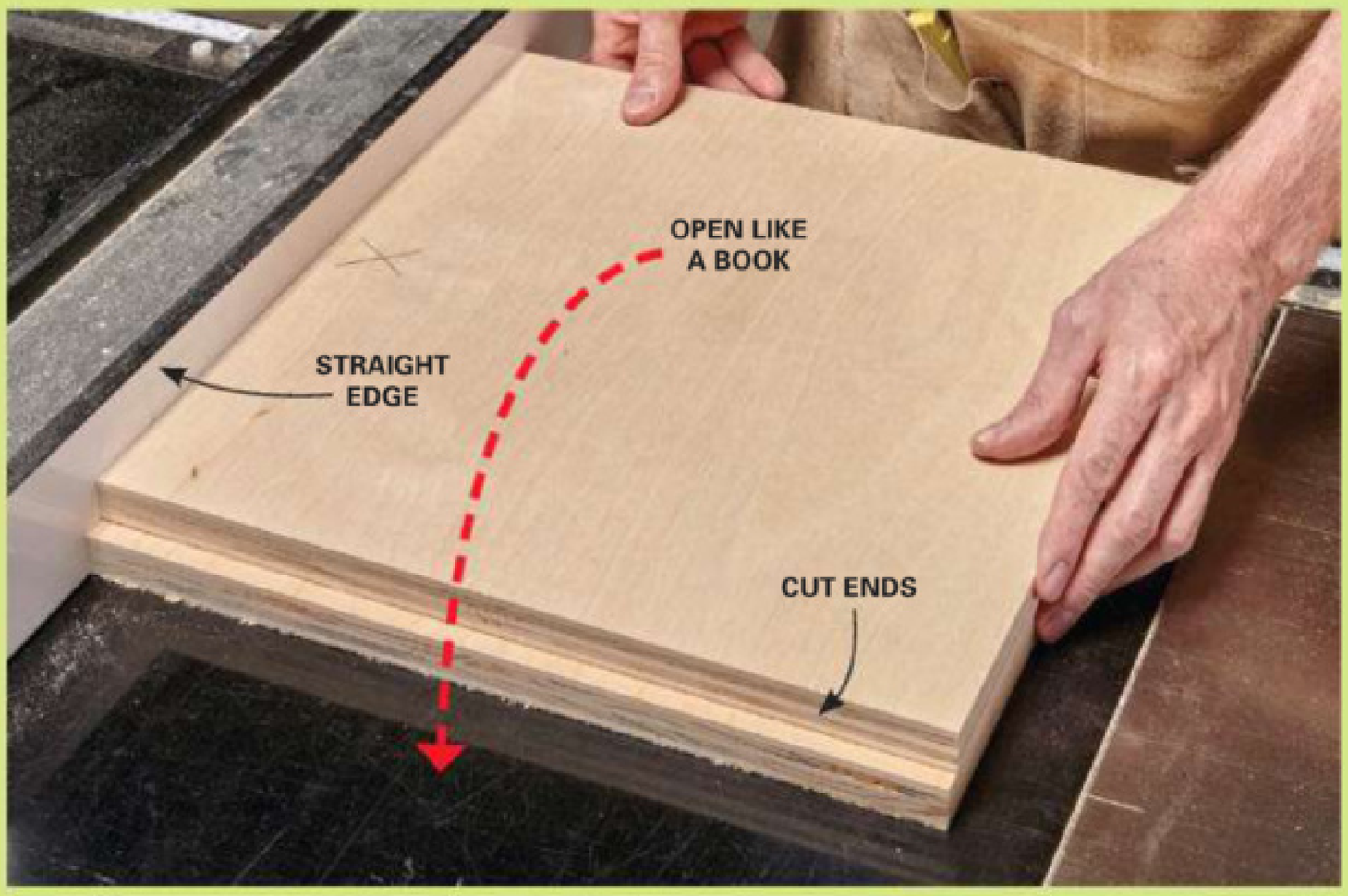
Next, reverse the jigs and clamp the open end of the U-shape assembly (**Photo 9**). Nail and fasten the top of one end piece, making sure front edges are flush. Turn the assembly over. Use a clamp, if necessary, to nudge front edges flush again, then

Super-tune your sled

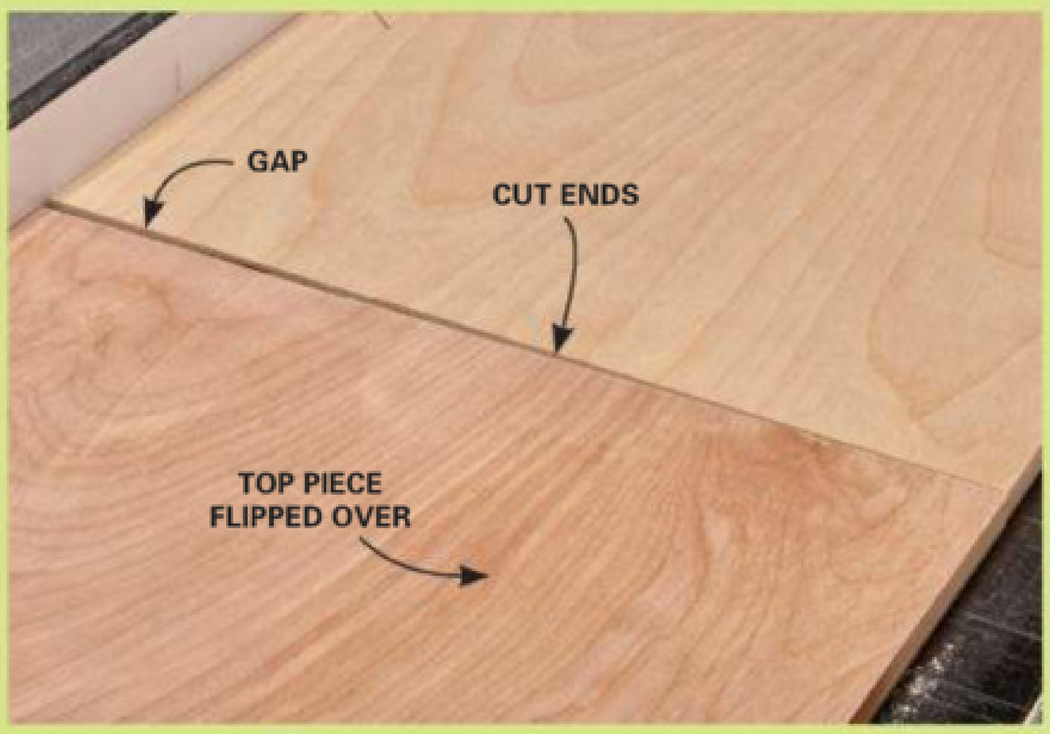
I always use a sled to cut plywood panels on my table saw. It's easy to build—to see how, search for "table saw sled" at familyhandyman.com.

A sled is supposed to guarantee a square cut, and truly square cuts are essential for the boxes of this wall unit to stack properly. Was my sled really that accurate? I've checked panels I've cut with a combination square and they seemed OK, but before building these boxes I put my sled to the ultimate test (**Photos 1 and 2**).

The result? My sled was off just a teensy bit. The best solution is to readjust the sled's fence, but, in a hurry, I just shimmed it with a few layers of tape (**Photo 3**). Now it's dead-on perfect.



1 CUT TWO PIECES
To check your sled's accuracy, cut two large pieces of plywood from the same side of the sled's fence. Stack the pieces on top of each other with the newly sawn edges facing the same way. Lay the stack against the table saw or other straight edge, then flip the top piece over—like opening a book.



2 LOOK FOR A GAP
If there's no gap, your sled is producing perfect cuts. A gap shows you twice the amount of error the cut deviates from 90 degrees.

3 ADJUST WITH TAPE
To correct the angle, add tape to the sled's fence one piece at a time. Repeat the flip test and add or subtract tape until the gap disappears.

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EASY, INVISIBLE HINGES

To complement the unit's sleek, modern look, I wanted the door's hinges to be hidden from the outside. Euro-style hinges are the way to go.

Euro hinges may look complicated, but that's just because they're fully adjustable. After you install them, you can easily even up the gap around a door simply by turning some small screws on the hinges.

Installing Euro hinges is pretty darn simple, but you'll need a 35mm (1-3/8-in.) Forstner bit. A template for locating the hinge holes is handy too. You can get both in one package at woodcraft.com (DrillRite Hinge Jig and Bit, No. 143958, $11.50). I used Blum 110-degree soft-close hinges (B071B3650, $5.50 each) and Blum 9mm clip mounting plates (B175H719, $2.50 each). Both are available online.

Cutting List

PARTS	ROUGH WIDTH x LENGTH	FINAL WIDTH x LENGTH
SINGLE BOX		
A - Back	16" x 14-1/2"	13-9/16" x 13-9/16" (a)
B - Top and bottom	Same as A	15-1/4" x 13-9/16"
C - End	16" x 16"	15-1/4" x 15"
D - Door	Same as A	13-3/8" x 13-3/8" (b)
DOUBLE BOX		
E - Back	16" x 29-1/2"	13-9/16" x 28-9/16"
F - Top and bottom	Same as E	15-1/4" x 28-9/16"
G - End	Same as C	15-1/4" x 15"
H - Door	Same as E	13-3/8" x 28-3/8"
SURROUND		
J - Platform and top		15-1/4" wide (c)
K - End cap		15-1/4" wide (d)
BASE		
L - Front and back		4" wide (e)
M - Cross members		4" x 11"
N - Skin, front		4-1/2" wide (f)
P - Skin, return		4-1/2" wide (f)

Notes: ALL PARTS ARE CUT FROM 3/4" PLYWOOD. (a) All dimensions assume two layers of plywood equal 1-7/16" thick. (b) Final dimensions allow for a 3/32" gap all around the door and include edging on all four sides of the door. (c) Length equals one row of boxes. (d) Length equals height of column of boxes plus 1-7/16". (e) Length is 3-7/16" shorter than part J. (f) Width includes 1/2" for scribing.

finish nailing and screwing the end. Repeat the procedure for the other end, then remove the jigs.

Assemble the wall unit

As with building a house, the foundation of this wall unit must be level and straight before you start stacking boxes. The easiest way to do that is to make a ladder-like base (**Photo 10** and **Figure D**). Size the base so that the wall unit will overhang it by 1 in. on all four sides. My base is 4 in. high—just tall enough to raise the wall unit above my baseboard molding. My wall unit was so long that I had to make two bases and screw them together.

After leveling the base, make a "skin" of stained and finished plywood pieces to cover the screw holes in the base. Rip the skin pieces extra wide so you can scribe them to the floor, covering the gaps where the base is shimmed. The skin is mitered at the corners and nailed to the base.

Screw one plywood piece or pieces to the base to create a shelf for stacking the boxes. The length of this shelf must equal the length of the bottom row of boxes. To figure it out, temporarily clamp together a row of boxes and measure it.

Assemble the first couple of rows on the shelf (**Photo 11**). Use clamps to temporarily hold the boxes together, then shift individual boxes as needed to align their front edges. When things look good, fasten the boxes together with drywall screws. Their black heads will be almost invisible.

Complete stacking one end of your wall unit and add an end cap (**Photo 12**). Fasten the cap from inside the boxes.

Fill in the remaining boxes, working from the end cap over. You may need to shim here and there to keep edges aligned. I used rubber electrical tape for shimming ($5 for a 15-ft. roll). It's a hefty 1/32 in. thick, black all the way through, and sticks anywhere.

Fasten a few of the boxes to studs in your wall so there's no chance of the unit toppling forward. Top the boxes with another piece of plywood to preserve a "double wall" look throughout the unit.

EXPANDING FOAM

17 ways to master this magical stuff

ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **TOM FENENGA** • ILLUSTRATION **STEVE BJÖRKMAN**

by Jeff Gorton
editors@thefamilyhandyman.com

Despite the obvious drawbacks—it's messy, sticky and impossible to remove once it cures—there's nothing better than expanding foam for plugging and sealing cracks, gaps and holes of every size and shape. Which is why it's the perfect choice for sealing energy-wasting air leaks. But that's not the only job it's good for. In this article, we'll show you the best ways to use foam on your energy-saving projects, tips for getting the most out of a can, and some other ingenious uses for this versatile product.

Stop drafts—and mice!

Plugging holes on the exterior of your house with foam is a great way to stop air infiltration, but it may not keep out pests. Mice can and will chew right through regular expanding foam, but there are formulas that stop insects and rodents. So the next time you plug exterior holes, choose foam labeled to resist pests.

Add an extension tube

The short, stiff straw on cans of expanding foam makes it difficult to reach some areas. The solution is to buy a length of 1/4-in. tubing at the home center and use it to extend the straw. With this setup, you can reach almost anywhere.

Dampen for fast curing

Expanding polyurethane foam requires moisture to expand and cure. If you're applying foam to dry wood or other dry surfaces, or working on a day with little humidity, misting the area first will help the foam expand and cure faster. Be careful, though; you want to dampen the area, not wet it. Foam won't stick well to a wet surface. You can also mist the foam after it's applied to maximize expansion and speed up the curing process.

For pre-cure cleanup

Acetone is a solvent that dissolves uncured polyurethane foam and can be used to clean up foam before it cures. Acetone-based nail polish remover will also work to remove uncured foam. Unfortunately, these products don't have any effect on cured foam. Once it cures, you'll have to scrape or sand off unwanted foam.

Check the expiration date

Like food, expanding foam is best when it's fresh, or at least not expired. So always make sure you're getting a fresh batch by checking the "best by" date on the bottom of the can before you purchase it.

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Firm up a wobbly showerhead

Squirt a little expanding foam around a loose shower arm, and it'll be solid as a rock. Let the foam set up until it's stiff and carve off any excess around the shower arm. Slide the cover plate tight to the wall and you'll never know there's foam holding things together. This same trick firms up any other loose or wobbly pipe.

Splurge on a gun—you won't regret it

If you've got more than a few windows or doors to seal with foam or are planning to make the whole house airtight, you should consider investing in a gun to dispense the foam. A basic model like the one shown here costs about $30. Guns have several advantages over cans with plastic straw applicators. First, turning the knob on the back adjusts the flow rate, so you can dial in the size of the foam bead to match the project. The long, rigid tip gives you better control and access, especially with the added disposable tip attached.

When you're done using the foam for the day, just wipe off the tip and set the whole works aside. A ball in the tip seals in the foam so it won't cure in the gun. You can leave it like this for up to a month without cleaning. When you do want to clean up the gun, buy a can of cleaner, screw it on, and spray until the gun is clean. You can also buy cans of urethane adhesive and use the gun to apply it.

Cut cured foam with a bread knife

A serrated knife with a flexible blade is perfect for cutting off excess foam. Just make sure the foam is completely cured and firm all the way through or it'll stick to the blade.

Be careful where you set the can!

A problem with expanding foam is that sometimes it expands when you don't want it to, like when you're done foaming and set the can down. One way to avoid this is to keep a cardboard box handy and always set the foam can in the box to catch the drips.

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Seal foam with foam

Basement or crawl space rim joists are a major source of energy loss in a house, so it's well worth the effort to add insulation and seal any cracks and gaps. A good DIY approach is to cut rigid foam insulation to fit between the joists. Cut it about 1/2 in. undersized so it's easy to fit in. Shim the rigid foam in place with little chunks of foam. Then fill the space around it with expanding foam. Don't forget to caulk or foam the joint between the sill plate and the foundation too.

Leave accidents alone

When foam goes where you don't want it, you'll be tempted to wipe it up. DON'T! You'll only spread the goo and make the mess worse. Instead, let it harden completely and then scrape or sand it off.

Big holes need a double dose

Some holes are so big that the foam starts to sag. For large holes like this, the trick is to fill the perimeter, let the foam cure and carve it off. Then add another layer to finish the job.

Black foam hides in the shadows

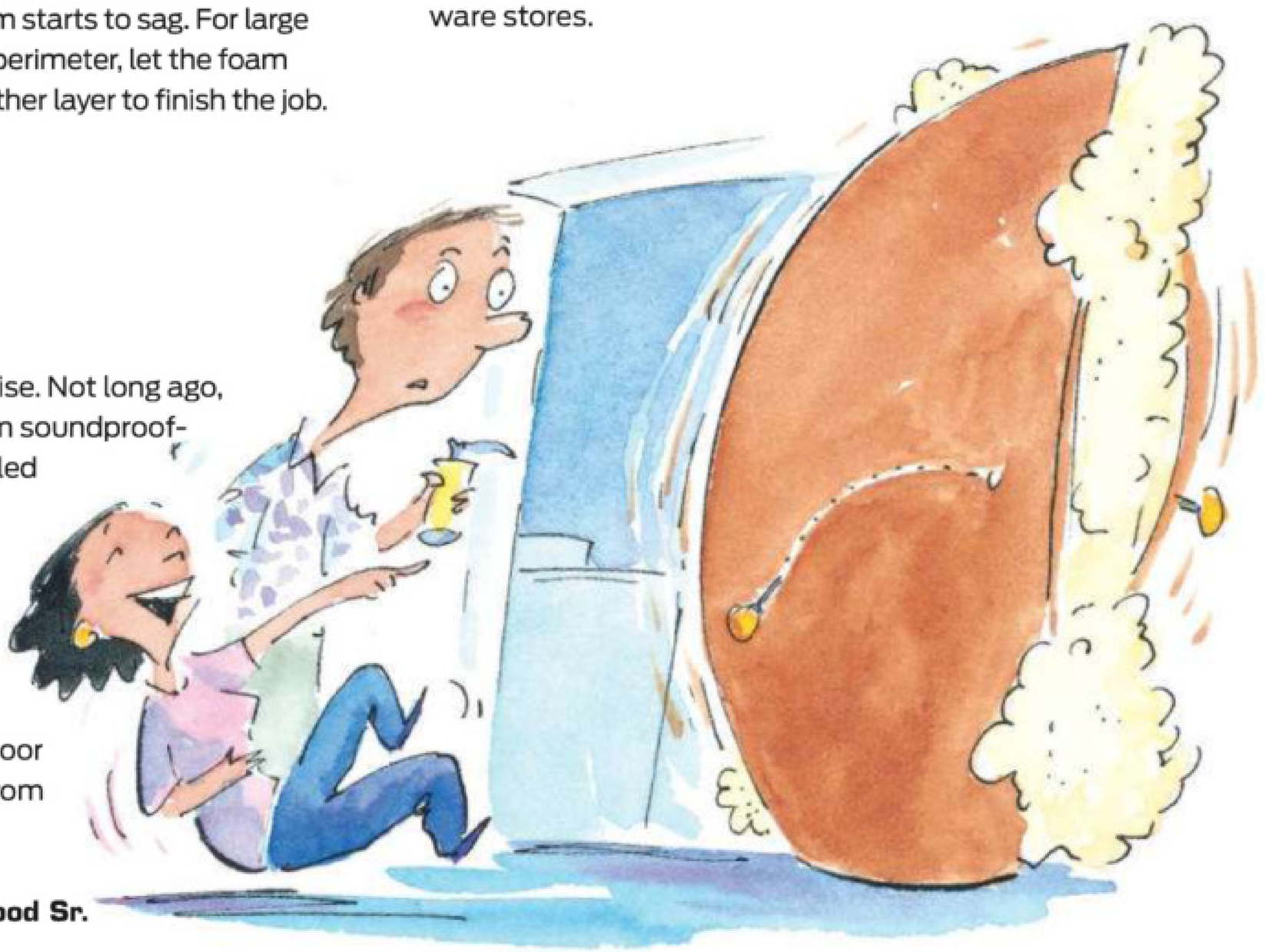
What's special about "landscaping" foam? It's black, so it disappears in the shadows. And just like other canned foam, it expands to fill irregular spaces, sticks tenaciously to almost everything including stone, and cures to form a waterproof barrier, making it ideal for plugging holes in water features or retaining walls and even gluing wobbly stones in place. You'll find this black expanding foam at garden centers, home centers and some hardware stores.

Great Goof

Snap, crackle, poof!

My clothes dryer makes a lot of noise. Not long ago, I decided to do a little laundry room soundproofing to quiet things down a bit. I drilled several holes in the side edges of the hollow-core door to the laundry room. I then got some spray foam insulation from the hardware store and sprayed it into the holes to fill the inner door cavity. A half-hour later, the door self-destructed and oozed foam from every corner. Needless to say, I've installed a new solid-core door.

Thomas Wood Sr.



Play it safe around windows and doors

Sealing around windows and doors is one of the most common uses for expanding foam. But it can actually push the jamb inward, making them impossible to open.

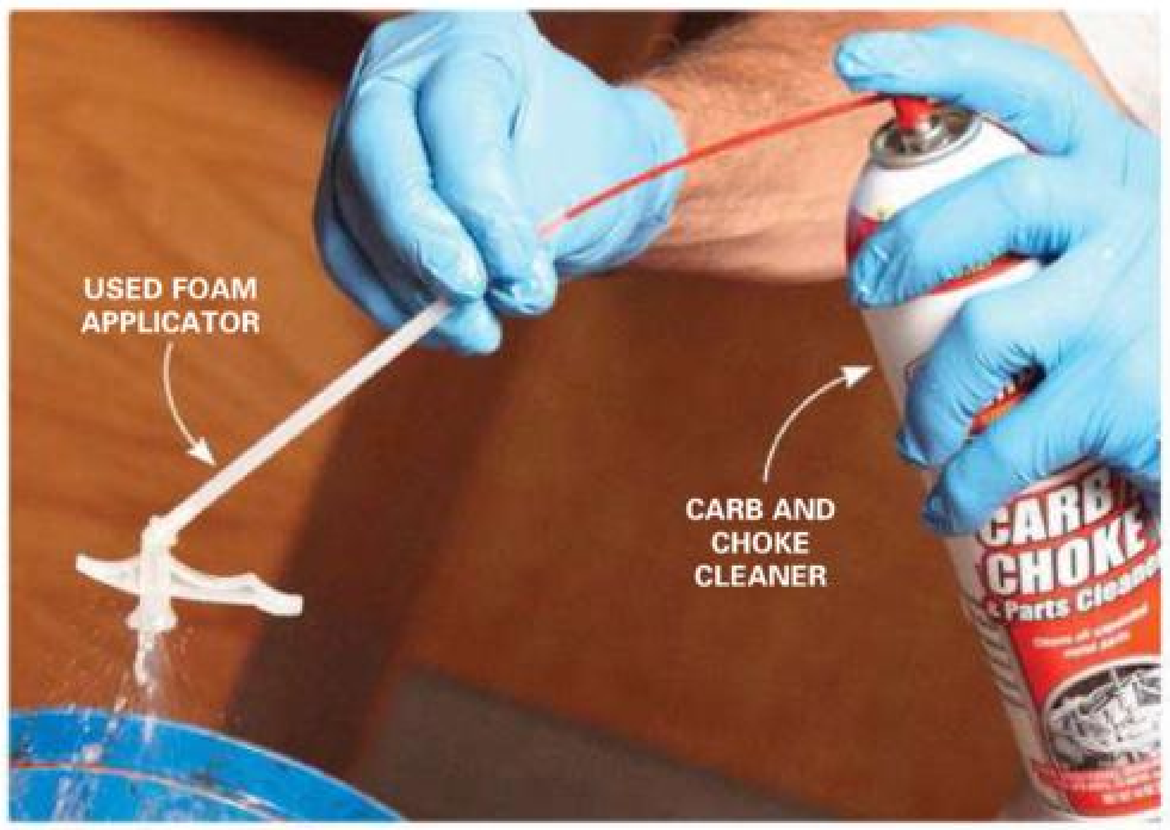
Avoid this by using minimal expanding foam. It's formulated to fill the space around windows and doors without excess expansion. Look for cans labeled for use on windows and doors. Another good idea is to fill the space with two layers. Push the applicator tip all the way to the back of the space and move it quickly along as you pull the trigger. Let this first layer expand and cure. Then add another if necessary.

Wear gloves—or wear stains

Expanding foam is nearly impossible to keep off your hands, and once it's there, it's equally hard to get off. So unless you want to wear the foam until it wears off, put on gloves. Disposable vinyl or nitrile gloves are a good choice. And make sure to wear old clothes because you'll probably get foam on those, too.

Protect fragile stuff

Got a fragile vase to ship? Encase it in foam to keep it in one piece. Start by lining the box with plastic wrap and filling it about a third of the way with foam. Let the foam stiffen enough to support the vase. Place a layer of plastic wrap on the foam. Wrap the vase in plastic wrap too. Set the vase on the foam and add a layer of plastic wrap on top. The two layers of plastic will allow the foam to separate into two pieces for easier unpacking. Now fill the rest of the box with foam. Remember, the foam will expand, so don't fill it to the top. When the foam has cured, carve off any overflowing bits and seal the box for shipping.



Reuse the straw

One of the biggest complaints about cans of expanding foam is that if you don't use the whole can, cured foam clogs the applicator tip and you can't use it again. There are several solutions to this problem, but the slickest we've found is to buy a can of carb and choke cleaner (about $3 at auto parts stores) and use it to clean uncured foam from the tube and trigger immediately after you're done applying foam. The acetone in carb cleaner works perfectly on expanding foam. And the straw included with the carb cleaner is just right for inserting into the foam applicator straw. Be sure to wear safety glasses because the pressurized cleaner can blow back when you're cleaning the straw.

25 TIPS FOR DRIVING SCREWS

by Jason White
editors@thefamilyhandyman.com

We've been there. You're driving a screw and it breaks, or you strip the head, or you're trying to get the dumb thing started and it pops off the driver bit and tumbles to the floor. Ugh! We feel your pain. Driving screws can be a real exercise in frustration, but it needn't be. Here are 25 tips to help make your next fastening chore a little less screwy.

1 Reach for the stars

Phillips-head screws appear to be going the way of the dodo and are quickly being replaced by **star-drive** screws (aka "Torx"). And it's a change for the better! The multi-lobed heads on star-drive screws offer much better gripping power and are less likely to strip out. Expect to spend a few cents more per box, but they're worth it.

One downside, however, is that there are several sizes of star-drive heads out there, so keep a few different sizes of bits on hand. **Square-drive** screws are also a great alternative to Phillips screws, but they can be hard to find.

StoreMags.com

2 Wooden plugs hide screw heads

Using plugs is an easy way to hide screw heads. Simply drive a countersink bit deep enough to create a recess called a counterbore. Then just drive your screws, add a little glue, and gently tap the plugs in. Once the glue dries, you can sand the plugs flush. To make the plugs even less noticeable, align the grain of the plug with the grain of the workpiece. You can make your own plugs or buy packs of them at home centers and woodworking supply stores.

3 Give paint-clogged screw heads a tap

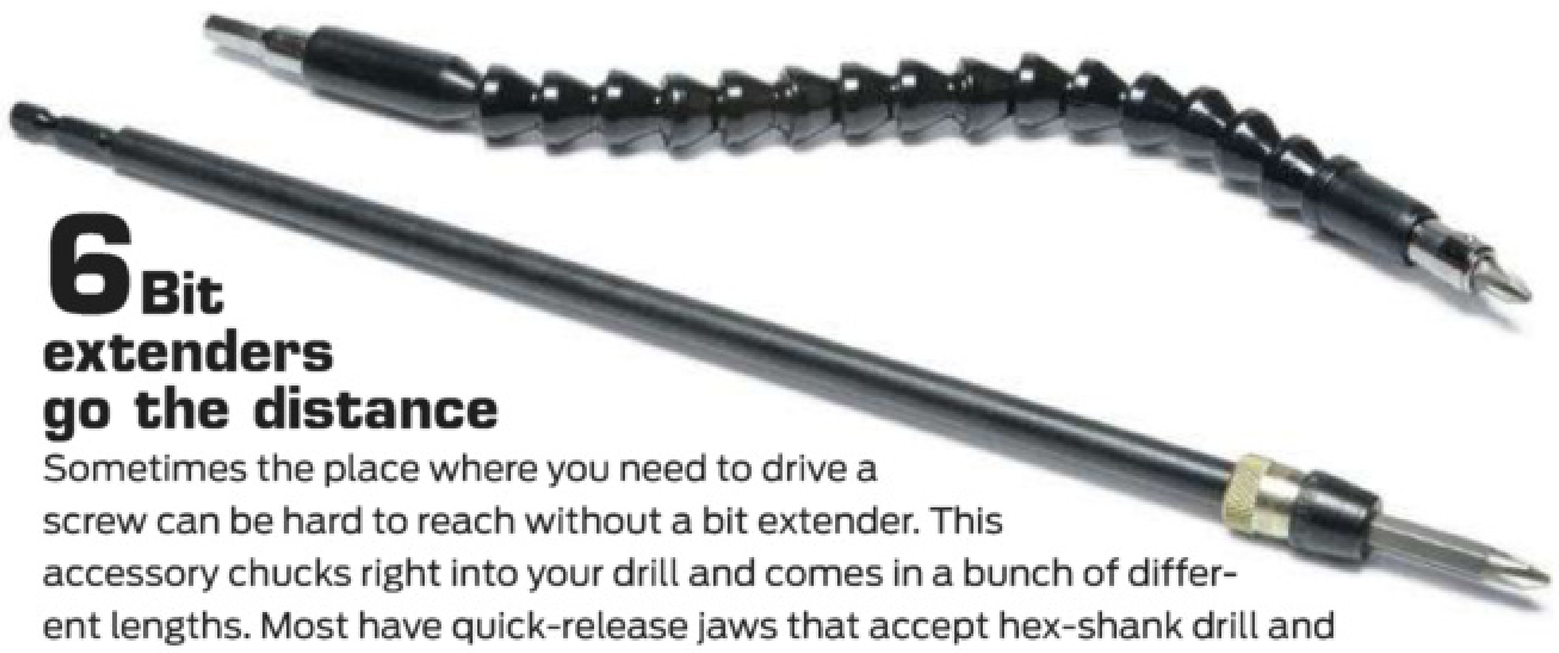
If you live in an old house, you've probably run into screw heads clogged with layers of paint. Instead of trying to scrape out the paint, try this trick: Simply take a driver bit, set it on top of the screw head, and give it a couple of taps with a hammer until it seats itself in the screw's slots.

4 Like a third hand

This magnetic bit holder has a self-retracting guide sleeve. The bit grips the head of the screw and the sleeve holds the screw straight, allowing you to drive it one-handed. The sleeve retracts as you drive the screw home. Available in hardware stores and home centers for about 5 bucks.

5 Lubricate screws

Rubbing wax onto screw threads makes the screws easier to drive, especially when driving them by hand. Spend a few minutes looking for some wax instead of an hour trying to remove a stripped or busted screw. You'll be glad you did.



6 Bit extenders go the distance

Sometimes the place where you need to drive a screw can be hard to reach without a bit extender. This accessory chucks right into your drill and comes in a bunch of different lengths. Most have quick-release jaws that accept hex-shank drill and driver bits. Buy more than one and you can click them together for even longer reach. Flexible bit extenders are also available.

7 Impact drivers require spare bits

If you've ever used impact drivers, you know they pack quite a wallop. And sooner or later, all of that torque will snap the ends off your driver bits. Be sure to buy hardened bits made specifically for impact drivers, but be forewarned—they still break, so keep plenty of extras on hand.

ART DIRECTION **VERN JOHNSON and MARCIA ROEPKE** • PHOTOGRAPHY **TOM FENENGA**

8 Better than lag screws

Structural screws may look wimpy, but don't be fooled. They're a definite improvement over traditional lag screws. Their shanks may be narrow, but these screws are specially hardened and have tremendous shear strength and corrosion resistance. They're also labor savers because they zip right into thick, dense framing lumber with just a cordless drill/driver—no need for pilot holes. Be ready for sticker shock, though. Structural screws cost about three times as much as traditional lag screws. Shown here are the SPAX, GRK and FastenMaster versions.

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9 Perfect junk drawer driver

Ratcheting screwdrivers make driving and removing screws by hand a breeze, and many come with an assortment of bits that store inside the handle for just about any type of screw head. Keep it in your kitchen junk drawer and you'll always know where it is. $5 to $40.

10 Screw too long? Drive it at an angle!

Ever drive a screw that you thought was short enough, only to have the tip of it break through the other side of your workpiece? Instead of dashing to the hardware store for shorter screws, try this trick: Drive the screws that you already have at an angle. They'll have just as much holding power but won't poke out the other side.

11 Double-duty bit holders

Special bit holders allow one drill/driver to do the work of two. With one type, you just snap a driver bit onto the countersink bit. Another has a countersink bit on one end and a driver bit on the other. You just drill, flip and drive! $10 to $50.

12 Screws for hanging cabinets

When you're installing cabinets on walls, use "washer head" screws. Their large heads are far less likely to pull through, which is especially helpful if you're working with crumbly materials like particleboard. The self-drilling tips can eliminate the need for pilot holes. And depending on the brand, you can get them with either star-drive or square-drive heads, so they're less likely to fall off your bit or strip out. The screw shown is made by FastCap.

13 Use a new bit

If you strip more than a couple of screw heads, it's probably time for a new driver bit. Check to see if the tip of your driver bit is worn or rounded over. If it is, replace it.

14 Pressure prevents cam-out

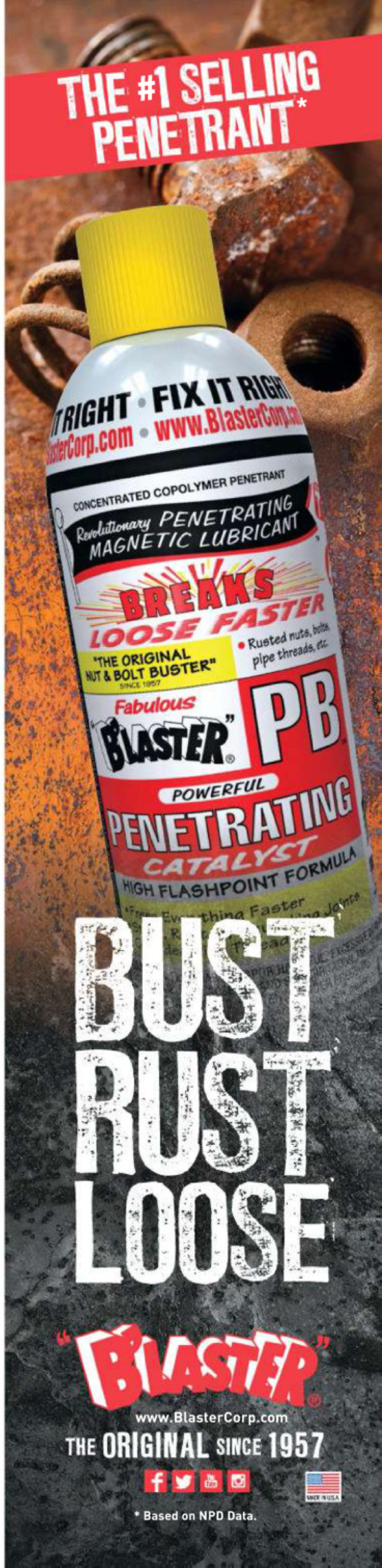
If you find yourself stripping a lot of screw heads, try applying more pressure. Simply push on the top of the drill with your other hand. If that doesn't work, try leaning into it and using your body weight to your advantage.

15 Drive easier with an impact driver

Thanks to their incredible torque, cordless impact drivers make driving most screws a one-hand operation. They even do a great job of driving Phillips screws, which are especially prone to stripping and cam-out.

16 Drill a pilot hole

Drilling pilot holes will almost always make driving screws easier. Pilot holes reduce the risk of splitting boards and allow you to get tighter-fitting, better-looking joints (especially if you use a countersink bit). They also virtually eliminate stripping and breaking of screws and reduce wear and tear on both you and your drill/driver.



17 Self-drilling screws save time

The specially designed tip and threads on many modern construction screws can eliminate the need for pilot holes. Just before this writing, we drove a dozen screws of this type through doubled-up 3/4-in. red oak boards with no predrilling. They all drove easily with no stripping or breakage and sat perfectly flush without the need for a countersink bit. We also observed no splitting when driving them near the ends of the boards. Impressive! SPAX and GRK are two brands available.

18 Make a clearance hole

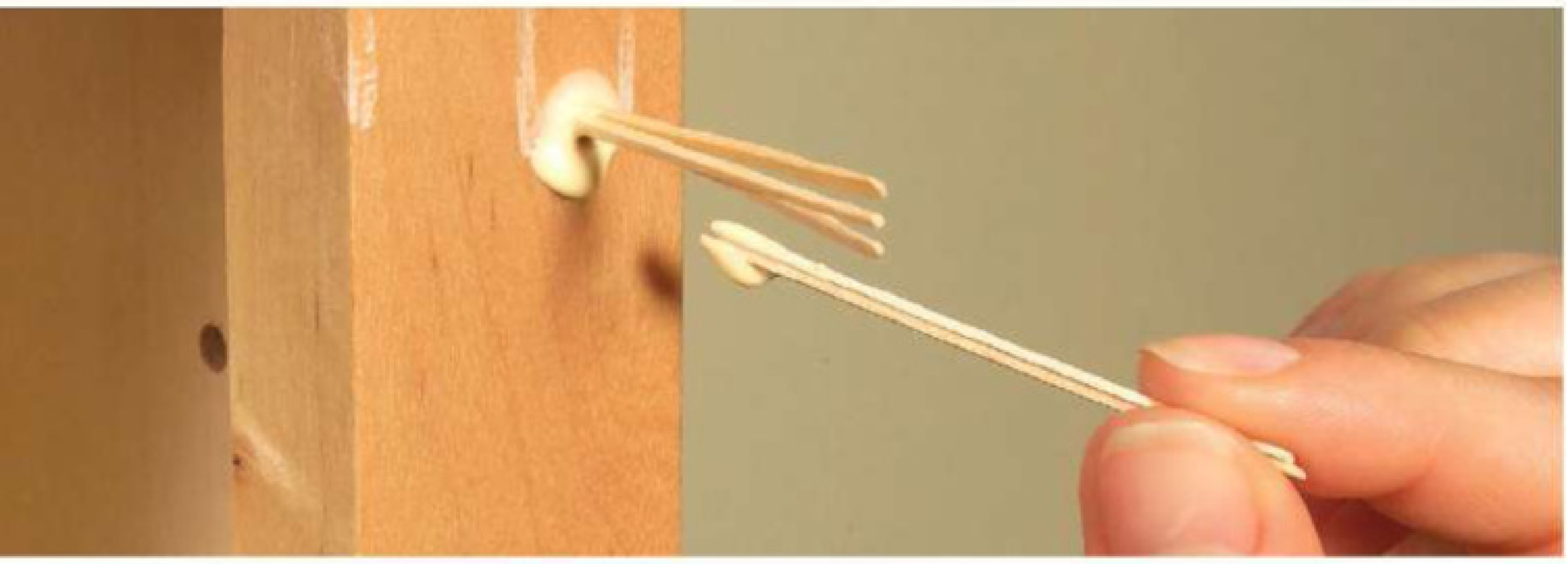
Have you ever driven a screw through two boards only to have them push apart? The screw you used likely had threads that ran from the tip all the way to the underside of the screw's head. One way to prevent boards from pushing apart is to create a clearance hole. This hole allows a screw's threads to slip through the top board so it can pull tightly against the bottom board for a nice, tight joint.

19 Slower speed = more torque

Most cordless drill/drivers have a speed switch on top. The lower the speed setting, the higher the torque. Generally, you'll want a faster speed for drilling holes and a slower speed for driving screws—especially when they're long ones.

20 Hit dead center

When you're installing door hinges, perfectly centered screws are crucial. A self-centering pilot hole bit, sometimes called a Vix-Bit (a brand name), makes the job easy. This spring-loaded bit has a tapered nose that seats itself in the holes of a hinge, and a spring-loaded shaft that retracts, keeping the bit perfectly centered as you drill.



21 Toothpicks fix stripped holes

If you have a stripped-out screw hole and can't use a larger screw, simply apply some wood glue to a few toothpicks and shove them into the hole. Once the glue dries, cut off the protruding ends of the toothpicks and drive the screw. Just be careful not to overtighten or you'll strip the hole again.

22 A right-angle adapter for close quarters

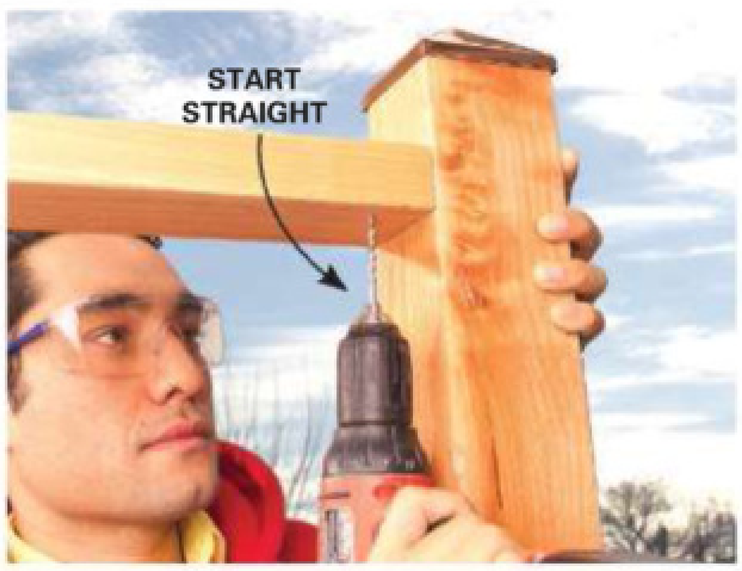
A right-angle adapter is a handy gadget for driving screws in places where the body of your drill won't fit. $15 to $50.

23 Two jobs, one bit

You can drill a pilot hole with a standard drill bit, then create a recess for the screw head with a countersink cutter. Or, you can do both at once with a countersink bit. Pick one up at a home center or woodworking supply store for $5 to $20.

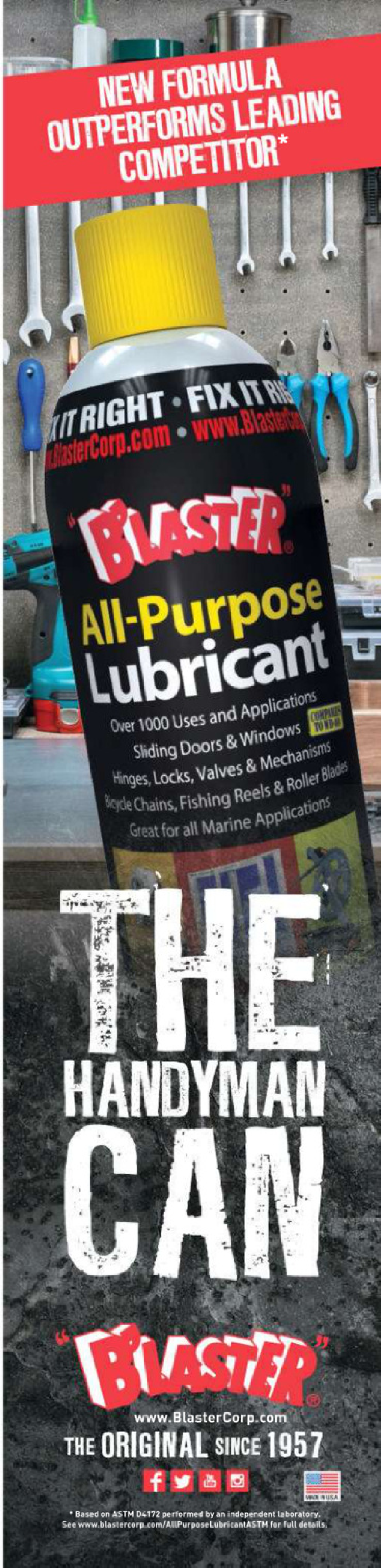
24 Drywall screws are for drywall

We've used drywall screws for all sorts of carpentry projects, with mixed results. They're strong, which is great. But they're brittle, which is not. With so many different types of wood screws available, you're better off using drywall screws only for hanging drywall.



25 Two steps for toe-screwing

Like toenailing, toe-screwing is a great way to make right-angle connections. You simply drive a screw at an angle. But getting the screw started can be tricky because the screw's tip often wants to slide. A pilot hole helps, but starting the pilot hole at an angle can be tough too. So, try this: Start the pilot hole straight until the tip of the bit engages the wood. Then turn the bit at an angle and drill the pilot hole. Works every time!



HOME TECH

Every day our mailboxes overflow with press releases touting the latest high-tech gadget every homeowner "must have." Each one promises to increase your home's security and automate every aspect of your daily life. We've culled the offerings and found some new products that are truly innovative and offer real benefits. Plus, we've included a few gadgets that are just plain cool. Here's the roundup.

Six gadgets that make life easier

by Rick Muscoplat
editors@thefamilyhandyman.com

Monitor your grill from your smartphone or tablet

It's billed as a grilling thermometer, but it works in your kitchen oven as well. The iGrill2 comes with a controller and two temperature probes but will accept up to four (additional probes are $25 each), so you can track the temperatures of different food items that you're grilling at the same time. Or use one of the probes to remotely track the temperature inside the grill when you're slow roasting, smoking or using the rotisserie.

Just download the app for your Apple or Android phone. Then insert the probes into the chow and route the cables so they won't be exposed to flames. Set the app for the desired temperature and activate the alarm. Then walk away. Monitor the progress on your phone from up to 150 ft. The iGrill2 app will let you know when you've reached the set temperature. Buy the iGrill2 ($100) and accessories from idevicesinc.com, online stores and discount stores.

storemags.com

There is something TERRIBLY WRONG with the Home Security Industry

Hi. Maybe you've been broken into before, or maybe you haven't. But if you ever decide to protect your home against unfortunate events like that, you're in for a shock. We don't want to scare you off of protecting your home, because honestly, it's really important that you do it. But we feel responsible for sharing these facts with you: Most alarm companies take advantage of people who want to feel safe. They offer you a "free" outdated alarm, but then require you to sign a long-term contract full of nasty fine print. It's pretty sickening really...but this isn't going to be all bad news. There is a better way to protect your home—get a SimpliSafe home security system. Our founder, a Harvard engineer, studied the alarm industry and found all kinds of problems with it. He designed SimpliSafe to fix them, so you can be safe, without having to spend a fortune or sign any contracts. SimpliSafe is wireless, you can order it online, and it's easy to install yourself—anyone can do it. It fits any home, apartment, or business. And it's more affordable, more reliable, and stronger than just about anything else out there.

Most companies say "trust us" and then ask you to sign on the dotted line. We're asking you to let us prove that a SimpliSafe home security system is the smarter choice. Try SimpliSafe for 60 days. We think you'll love it. But if you don't, that's okay too. Return it to us for a full refund, no questions asked.

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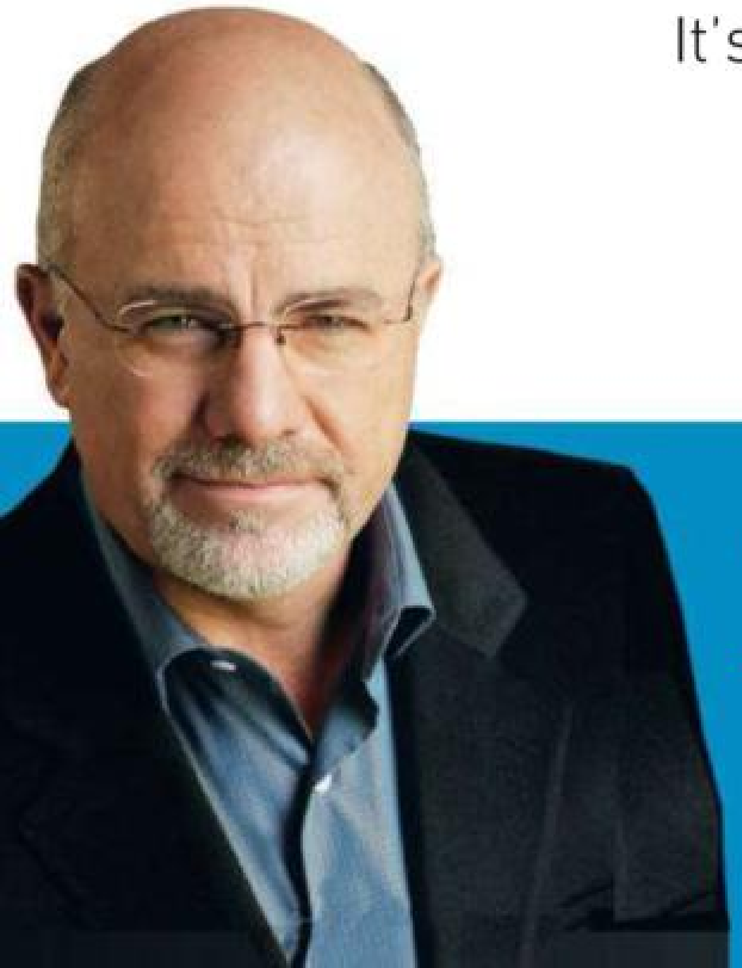


"Protecting your family is important, but don't ever sign a contract. Do it the right way with SimpliSafe."

—Dave Ramsey, financial expert & New York Times bestselling author

SUPER-FAST WI-FI ROUTER

If you're into wireless home video streaming or gaming, or home automation, you need a Wi-Fi router with the best range and fastest speed. Most Wi-Fi routers have a hard time delivering all the available bandwidth when multiple users are online. That's because they deliver data to only one device at a time. So everyone's speed is based on the speed of the oldest and slowest device in use at the time. The Netgear Nighthawk X6 Tri-Band Wireless Router ($300 at newegg.com, one online source) solves that problem by adding an extra traffic lane. When the router sees a slowpoke device come online, it diverts the faster devices to the new traffic lane, so everybody gets the fastest possible speed.

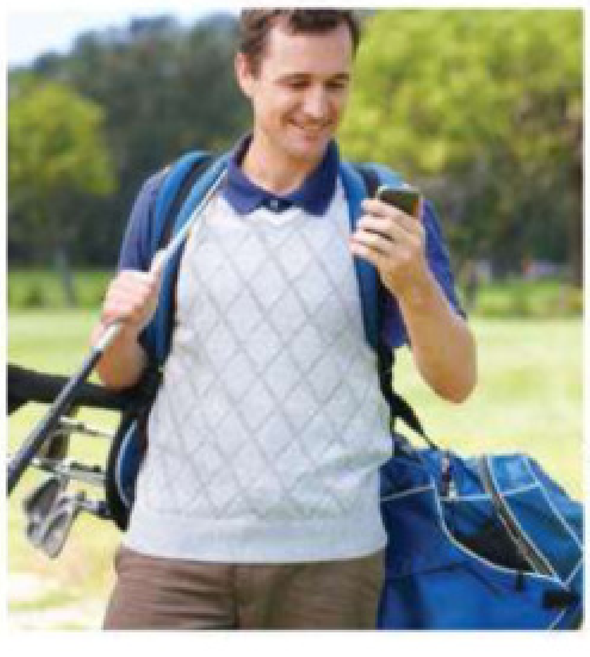
The Nighthawk router also uses six antennas and Beamforming software to locate and direct the signal toward each device. Together with a fast dual-core processor and a powerful amplifier, this Wi-Fi router gets you the strongest signal at almost every spot in your house.

Answer or open the door from any phone

You get packages and you don't want them sitting on your doorstep. Or, you need to open the door for housecleaners and contractors when you're not at home. Forget the spare keys. Forget the dead bolt codes. These two products from Viking Electronics allow you to answer the door, speak with the visitor from any phone anywhere, and even open the door remotely.

Install the C-250 controller ($230) between the landline demarcation box and your home phones or between your router and your VoIP box. Connect the controller to the Viking E-40-BN-EWP door box ($350). (One online source is thetelecomspot.com.) Then program the controller to dial up to five family cell phone numbers. When a visitor presses the button, the controller rings your home phone with a double ring so you know it's a visitor at the door and not a regular phone call. Answer the door and open the door from any home phone.

When you leave the house, simply program the controller to forward the door box calls to your cell phone. If you don't have land or VoIP service, leave the controller in call forwarding mode and it'll send all door box calls to a portable phone. The forwarded call will show up on your portable phone's screen as your front door. Answer the call and enter a code to activate your door strike or Wi-Fi–enabled dead bolt. The Viking units are a bit pricey, but they're commercial-grade products, so they'll last much longer than cheaper consumer-grade versions.



GETTY IMAGES

Control your tools with your phone

Milwaukee's ONE-KEY line of tools is a new generation of "connected tools" that can be programmed to suit the job.

Let's say you're installing metal vent using self-drilling screws. Just use the Milwaukee app to find the setting for the gauge and type of metal and the size of the screw. Then program the drill or impact driver using your phone's Bluetooth. When you squeeze the trigger, the tool will start at a low rpm to prevent the tip from walking across the metal. The electronic torque monitoring senses when the screw bites in and boosts the speed to drive the screw in. Then it'll slow down and cut off power when the screw reaches the programmed torque—all with a single trigger pull.

The ONE-KEY system also has an inventory management and tool reporting feature for pros to keep track of tools and monitor their workers' productivity.

Motion-sensor power strip trims your electric bill

Your cable/satellite box, Blu-ray player, TV sound system and streaming devices all draw power 24/7, even when the TV is off. It's the same with your computer and its attached printer, scanner and accessory speakers. The TrickleStar Motion Sensor PowerStrip ($40 at amazon.com and other retailers) shuts off those power-sucking devices when they're not being used. It takes its cues from whatever device (TV or computer) is plugged into the "control" receptacle, along with input from the attached motion sensor.

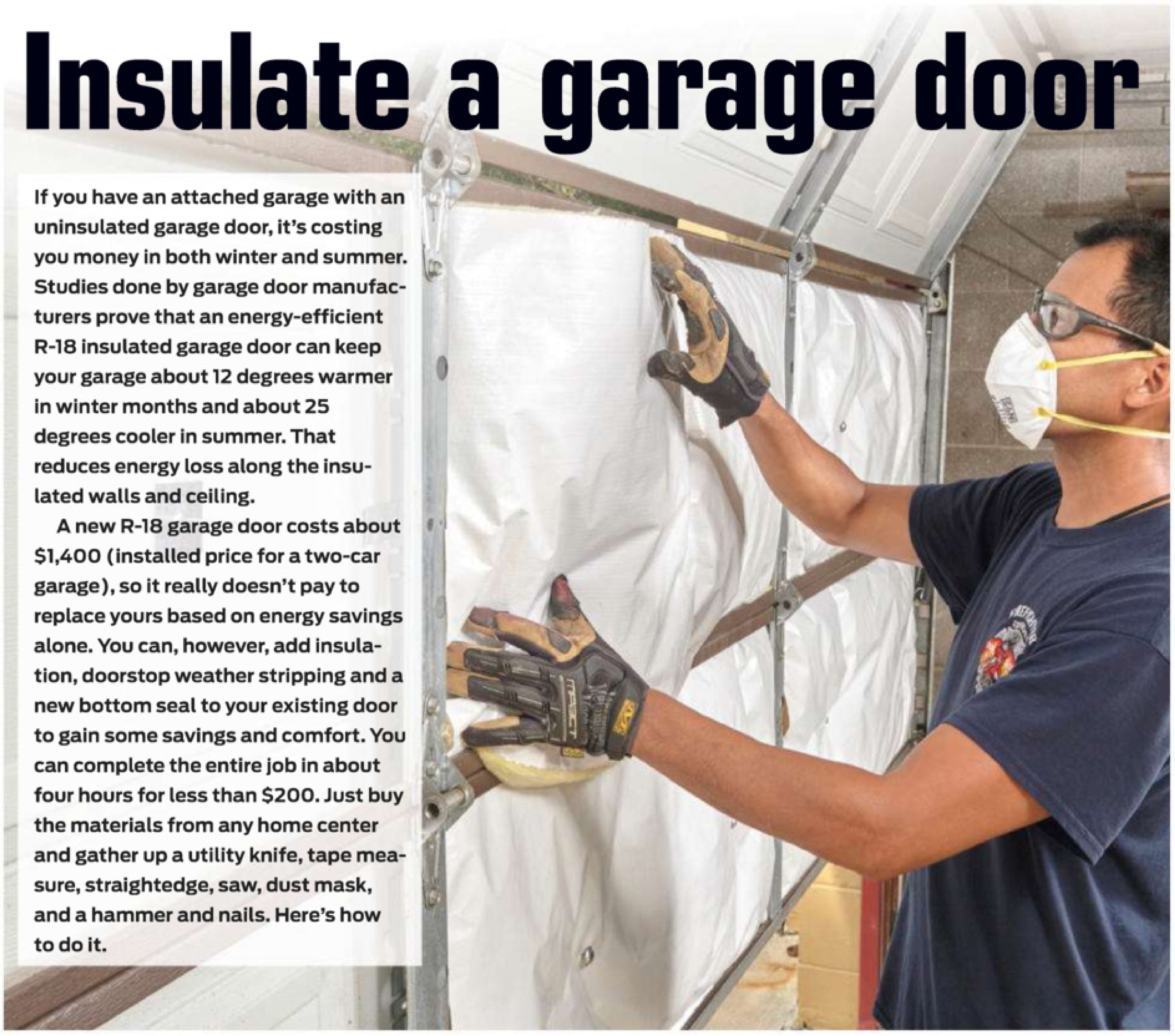
Here's how it works. When you turn on the TV or computer, the power strip immediately powers up three switched receptacles for your accessories/peripherals. When you turn the TV or computer off, it shuts off the switched receptacles. And, if the TV or computer is on, but you leave the room for 30 minutes or longer, the motion sensor shuts off the switched receptacles. Come back and it powers them back up. The unit has one control receptacle, three switched receptacles and three always-on receptacles, along with built-in surge protection (1080 joules) for all outlets.

Vacuum dustpan saves your back

You may think this Crowley Jones EV1850 Eye-Vac Pro Electric Dustpan ($120 at smarthome.com) represents the ultimate in laziness. But if you have back issues, this smart vacuum/dustpan is for you. Just set the unit to automatic mode and sweep the debris toward it. The motion sensor detects when your broom is within range and starts up the vacuum. Aim the dirt pile toward the suction port and the vacuum will suck it up. If you have pets, they may activate the motion detector when they walk by. That's why there's a switched manual mode to activate the vacuum.

BY RICK MUSCOPLAT editors@thefamilyhandyman.com

Insulate a garage door



ART DIRECTION **MARCIA ROEPKE** • PHOTOGRAPHY **TOM FENENGA**

If you have an attached garage with an uninsulated garage door, it's costing you money in both winter and summer. Studies done by garage door manufacturers prove that an energy-efficient R-18 insulated garage door can keep your garage about 12 degrees warmer in winter months and about 25 degrees cooler in summer. That reduces energy loss along the insulated walls and ceiling.

A new R-18 garage door costs about $1,400 (installed price for a two-car garage), so it really doesn't pay to replace yours based on energy savings alone. You can, however, add insulation, doorstop weather stripping and a new bottom seal to your existing door to gain some savings and comfort. You can complete the entire job in about four hours for less than $200. Just buy the materials from any home center and gather up a utility knife, tape measure, straightedge, saw, dust mask, and a hammer and nails. Here's how to do it.

Shop for materials

You can buy two types of garage door insulation kits at home centers. An R-8 vinyl-faced fiberglass batting kit provides a relatively high R-value. (Two examples are the ADO Products Single Garage Door Insulation Kit, No. 1611025, $60, and Owens Corning Garage Door Insulation Kit, No. 500824, $70 each.) It takes two kits to insulate a typical 16-ft.-wide garage door. Or you can buy precut R-4 expanded polystyrene (EPS) panel foam online (one choice is the Garage Door Insulation Kit from Cellofoam, $58 for a single-garage door, at homedepot.com). Just cut each panel to length and bend and snap it into the horizontal rails on your door. However, at R-4 per inch, EPS has the lowest R-value. If you live in a moderate climate, that may be enough.

If you're willing to do a lot of precise cutting, you can achieve a higher R-value, up to R-9.8 with 1-1/2-in.-thick foil-faced fire-rated extruded polystyrene (XPS). (Johns Manville CI Max and Dow Thermax are two brands, $40 each at home centers and commercial insulation distributors.) Unfaced non–fire rated XPS rigid foam should not be used to insulate a garage door. It's extremely flammable and when ablaze, yields toxic fumes.

Next, buy enough doorstop vinyl weather stripping to seal the top and sides of your garage door (about $1 per ft. at home centers). You'll also need new vinyl bottom seal to fit your existing track, or buy a new track if yours is damaged.

Insulate the door

We chose the R-8 fiberglass insulation kit from ADO Products for our door, so we won't be showing you how to cut and install XPS foam panels in this story.

Start by washing each door panel with household cleaning spray and rags. Then rinse the areas with clean

water and let dry. Next, install the retaining pins (**Photo 1**). Measure the height and width of each panel and add 1 in. to the length and width when you cut the batting to size for a snug fit (**Photo 2**). Panel sizes may differ along the door, so measure each one as you go rather than pre-cutting all the panels based on one measurement. Fit the cut insulation into the panel with the vinyl side facing into the garage. Then secure it to the retaining pins (**Photo 3**). Repeat until all the panels are insulated.

Mount the doorstop weather stripping

Starting at the top of the door, tack the doorstop weather stripping to the top jamb. Mount the side doorstops the same way (**Photo 4**, p. 63). Then press against the door to simulate how much it might move in strong winds (**Photo 5**). Readjust the doorstop so it seals against the door even in windy conditions. Then pound the nails in all the way. If the door has too much play to adjust the doorstop properly, or you can see light through the doorstop weather stripping, replace your existing hinges with spring-loaded versions that press the door against the weather stripping at all times (a set of six spring-loaded hinges is $85 at greenhingesystem.com).

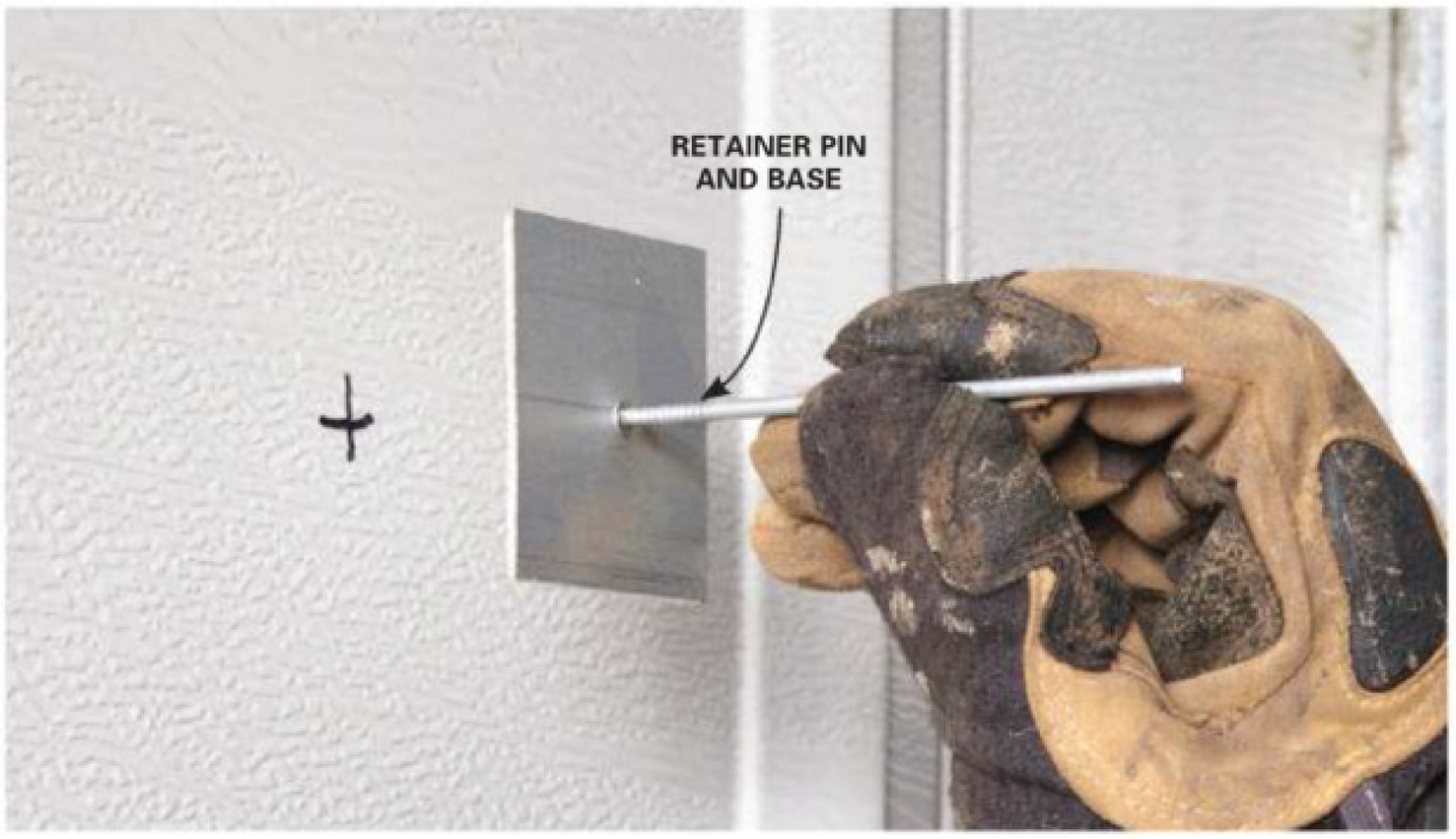
Install a new bottom seal

Most steel doors have a track along the bottom to hold a vinyl seal. The vinyl can harden from sun exposure and crack or break off in sections, letting in cold air. Installers usually crimp the slots at each end of the track to retain the seal. Open the crimps (**Photo 6**) and slide out the old seal. Then install the new one (**Photo 7**).

Test the door

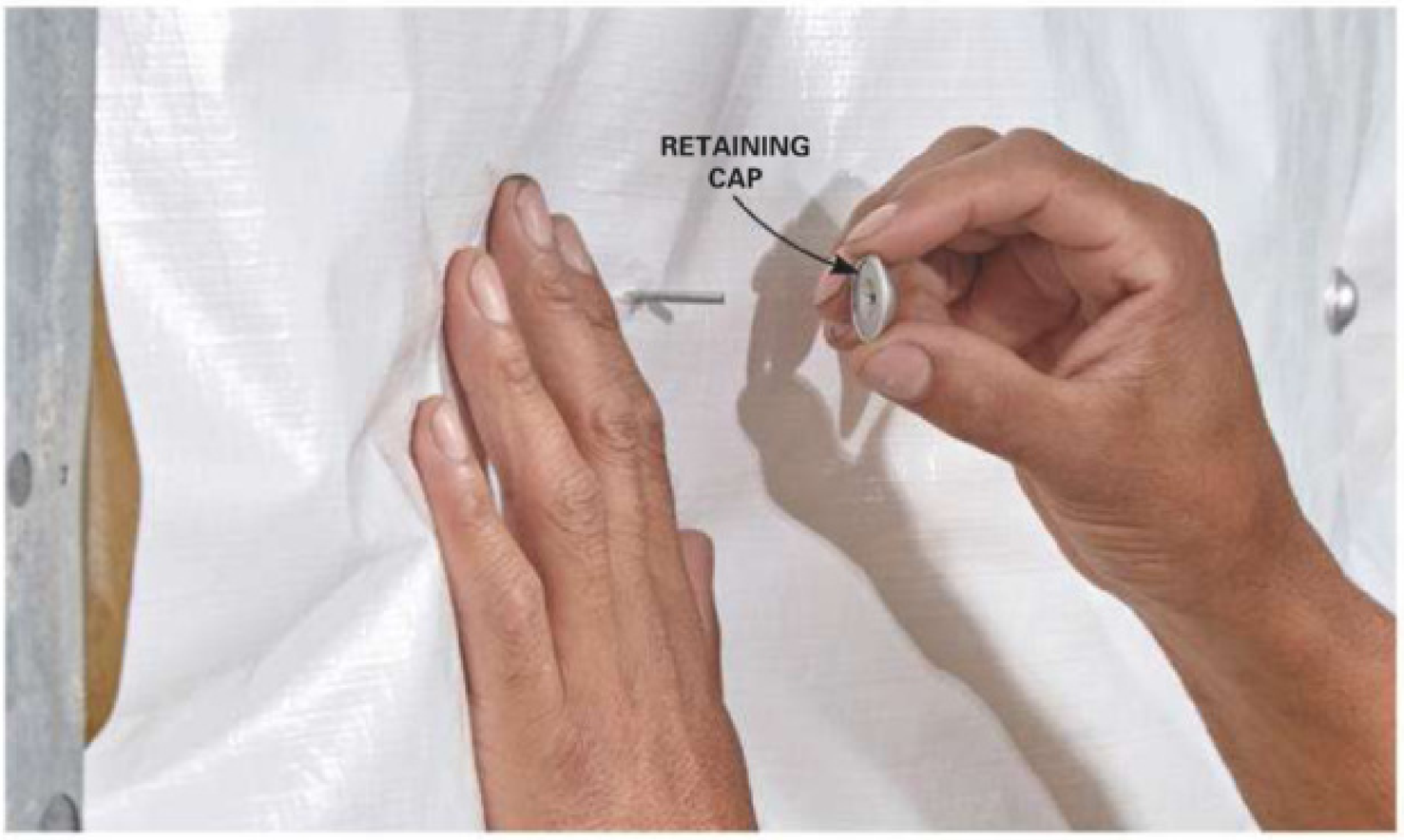
A properly balanced garage door should stay in place if you lift it partway and let go. However, insulation adds weight to the door, and that may throw off the balance. If your door falls after you let go of it, hire a garage door service company to readjust the spring tension. Leaving the door in an unbalanced state can damage your garage door opener.

Continued on p. 63



1 MEASURE, MARK AND INSTALL THE RETAINER PINS
Measure to find the spot that's 12 in. from each edge of the panel and midway between the horizontal rails. Mark the location. Then peel off the adhesive backing paper and press the retainer pin base onto the panel. Install two retainer pins in each panel.

2 CUT THE BATTING
Roll out the batting with the vinyl side down and mark the cutting lines. Place the batting on scrap plywood. Then compress the insulation with a straightedge and cut with a utility knife.



3 LOCK THE BATTING IN PLACE
Line up the insulation so it's centered in the panel and push it against the retaining pin until it punctures the vinyl facing. Then push the retaining cap over the pin until it snaps into place.

FROM THE READERS OF

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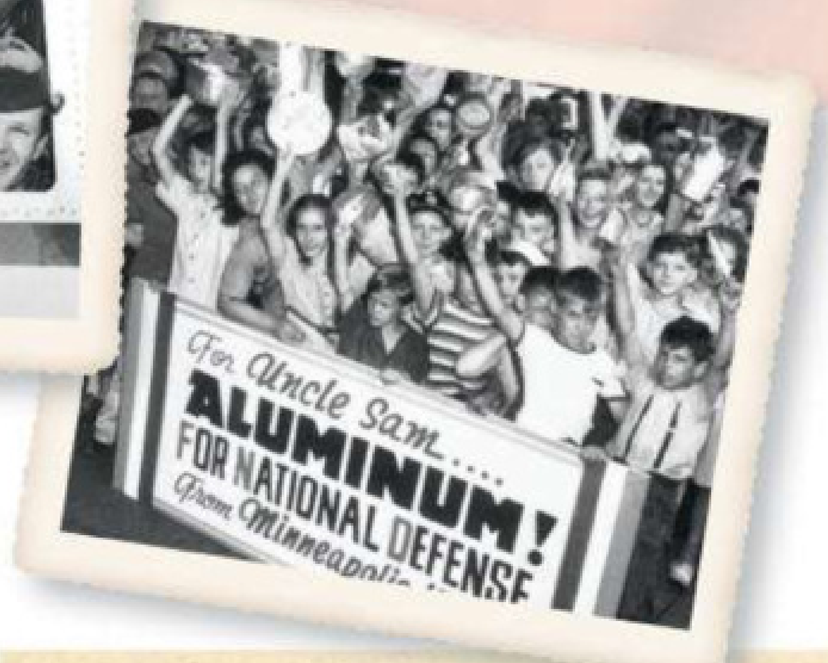

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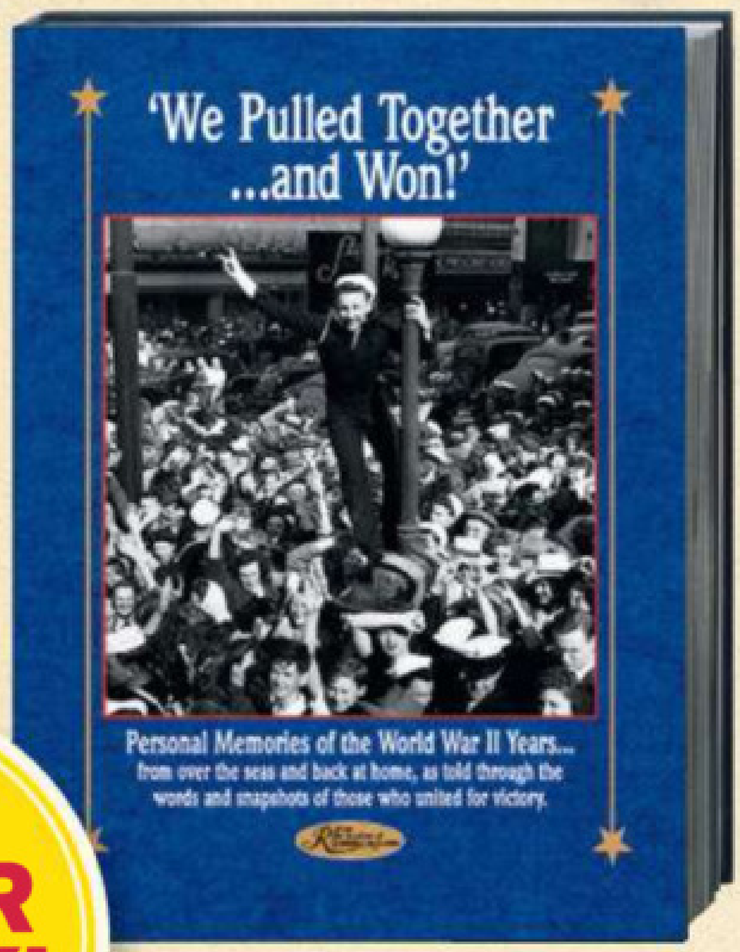

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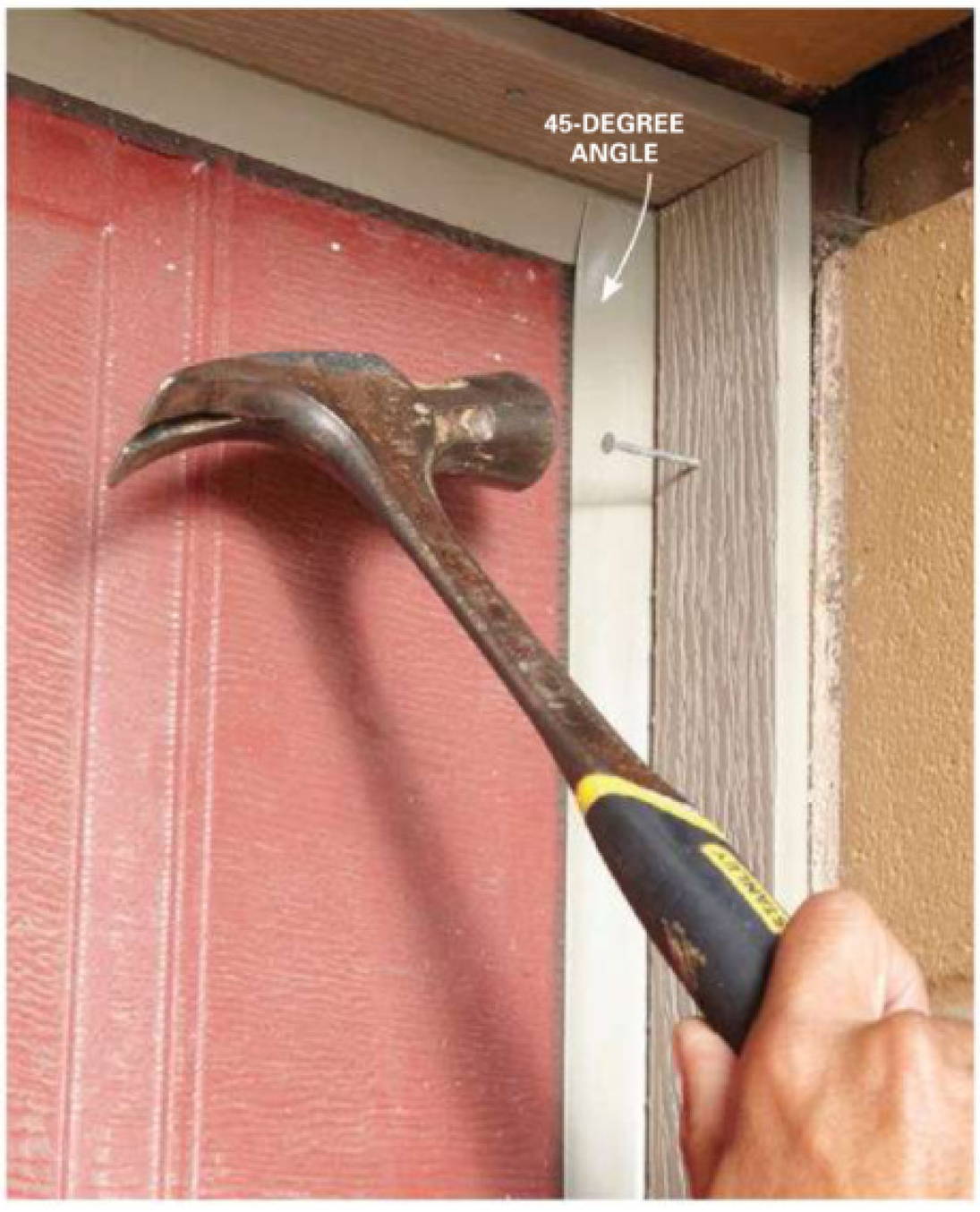

4 TEST-FIT THE DOORSTOP
Place the doorstop against the top and side jambs so the vinyl weather stripping is at a 45-degree angle. Temporarily secure it in place with nails pounded in only partway.

5 READJUST TO ACCOMMODATE DOOR MOVEMENT
Apply pressure to the door to simulate the effect of a strong wind. Then move the doorstop inward to maintain a good seal. The gap may not be the same in every location along the sides, so check it in several spots and readjust accordingly.

6 UNCRIMP THE BOTTOM SEAL TRACK SLOTS
Jam a flat-blade screwdriver into the crimped area and twist to gently bend out the aluminum track. Repeat on each end of the track.

7 SLIDE IN THE NEW BOTTOM SEAL
Slather some dishwashing detergent onto the slots along the bottom track or spray them with silicone. Then insert the vinyl seal and pull it into place. Cut off the excess vinyl with a utility knife and crimp the ends of the track with a pair of pliers.

BY RICK MUSCOPLAT editors@thefamilyhandyman.com

4x4 smarts

GETTY IMAGES/SHAUNL

Chances are you bought a four-wheel-drive (4WD) vehicle to avoid getting stuck in snow and ice, mud and sand. But do all the drivers in your family really know when and how to engage the 4WD? Or which gearing (4HI or 4LO) is best for which driving conditions?

We'll walk you through the basics of using 4WD for city and highway driving. We won't cover off-roading, however, since that's a story in itself. And, because most late-model vehicles are also equipped with traction/stability control, we'll explain how you can get better results by turning it off when you're stuck.

StoreMags

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Not sure which system you have?

Four-wheel-drive systems are offered in many configurations such as part time, full time, manual shift, on-the-fly shifting, and fully automatic (see "4WD vs. AWD: What's the Difference?"). Each system has its own requirements for how you engage and disengage it and when you can operate the vehicle in 4WD mode. If you're unsure which system you have, ask a dealer, who can figure it out from your VIN.

4WD can be dangerous

- 4WD doesn't improve handling on slick ice- and snow-covered roads. If you drive faster than conditions allow, you're far more likely to flip and roll because of your higher center of gravity.
- 4WD doesn't help you brake better or give you more stability in turns while braking. So slow down when you're turning and brake sooner.
- 4WD contributes to overconfidence. Guess which vehicles end up in the ditch more often?

GETTY IMAGES/SAM BURT PHOTOGRAPHY

Don't waste gas

When you're in 4WD, you're spinning a lot more heavy metal. Getting those extra gears and drive shafts up to speed and keeping them spinning take extra energy, which lowers your gas mileage. If you don't need 4WD, turn it off and save some dough at the gas pump.

If you get stuck

Resist the temptation to shift between forward and reverse to rock yourself out of a rut. Instead, shift into 4HI and slowly feather the gas pedal to inch your way out. Don't spin your wheels. If that doesn't work, rock the vehicle back and forth by applying and releasing the gas.

Don't destroy your drivetrain

Driving a part-time 4WD system on dry pavement can break the front axles, shear the differential gears and even break apart the differential case. As soon as you hit dry pavement, shift back into 2WD.

4WD vs. AWD: WHAT'S THE DIFFERENCE?

Carmakers offer many different types of 4WD systems, and some of them actually blur the line between traditional 4WD and all-wheel drive (AWD) systems. We'll give you the traditional definitions here. But talk to the dealer to see what's in your vehicle.

Traditional **4WD**

In two-wheel-drive mode, the system delivers all the engine torque to the rear differential, so each rear wheel receives 50 percent of the available engine torque. In 4WD mode, each wheel receives 25 percent of the available engine torque. Older 4WD systems must be manually shifted between 2WD and 4WD and from 4HI to 4LO while the vehicle is stopped. Newer systems have electronic push button "on the fly" features that let you shift while driving.

Traditional **AWD**

An AWD car can deliver all engine torque to all four wheels all the time. But some AWD systems deliver all engine torque to the front differential until the system detects wheel slip. Then it transfers a varying degree of engine torque (0 to 100 percent) to the rear wheels. So it's a 2WD system most of the time. Other AWD systems work differently; they split the engine torque 50/50 between the front and the rear differentials at all times unless they detect wheel slip. Then they "reapportion" the torque between the front and the back differentials based on need.

ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **AS NOTED**

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Know how to engage and disengage your 4WD

Some older and more basic 4WD systems must by engaged manually with the vehicle at a complete stop and the transmission in either Park or Neutral. Don't try to engage these systems when the vehicle is moving or you can damage expensive components. However, most 4WD systems can now be shifted into or out of 4WD on the fly at the push of a button. The most sophisticated 4WD systems are fully automatic. They shift into and out of 4WD automatically as the system detects the need for more traction.

Knowing when to use 4HI or 4LO is what causes the most confusion for 4WD vehicle owners, so here are some rules.

WHEN TO USE 4LO:

- When you need more torque (power) for heavy pulling at slow speeds.
- When you're climbing steep grades at slow speeds and need extra power.
- When you're descending steep hills with a heavy load—the low gearing provides engine braking assistance.
- ***Don't use 4LO*** to get unstuck in mud and snow. The extra torque will cause the tires to spin.

WHEN TO USE 4HI:

- When you're on slippery surfaces and driving at street or highway speeds.
- When you're stuck in snow, mud or ice.

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How to use traction/stability

Most new cars and trucks have a traction/stability control feature. The system automatically turns on every time you start your vehicle. When the traction/stability control system detects wheel slip or vehicle instability, it immediately tries to compensate by cutting engine power, braking the slipping wheel or braking other wheels to force the vehicle back into its intended path. It works great when you're traveling along the road and hit a slick spot. But when you're stuck, traction/stability control can work against you, making it harder to get out of a rut in snow, mud or ice.

So when you get stuck, turn *off* your vehicle's traction/stability control. The procedure is different for each vehicle, so refer to your owner's manual. Depending on the vehicle, the traction/stability control may turn itself on again after a set period or after an engine restart. You may have to turn it off repeatedly if you're stuck for an extended period.

4WD—USE IT OR LOSE IT

4WD systems work best and last longest when they're used regularly and maintained according to factory recommendations. When a 4WD system sits unused for months at a time, the linkage and hub components seize, the seals dry out and the lube drains off gears. The best way to keep all 4WD components lubricated and in good operating condition is to engage your 4WD at least once every few months on wet pavement (preferably in a secluded parking lot) while performing a few figure eights.

Next, follow your owner's manual for differential and transfer case fluid changes even if you don't use your 4WD very often. And grease drive-shaft slip joints and U-joints (where possible).

Tire size & tire rotation are critical

The front, center and rear differentials in 4WD vehicles are designed to compensate for short-term differences in wheel speeds encountered when turning a corner or changing lanes. But mismatched tires, whether they're a different size or a different tread depth, force the differentials to operate full time even if you're going straight down the road. That constant operation creates excessive heat and causes premature wear that can cost thousands in unnecessary repair bills. A difference in tread depth of just 1/16 in. among tires is enough to cause early failure.

Front tires wear faster than rear tires because they carry more weight, perform more braking and turn the vehicle. So rotating your tires every 5,000 to 7,000 miles is critical to spreading the wear evenly and minimizing differential operation. If a tire is wearing unevenly, exceeding the 1/16-in. threshold, you'll have to buy four new tires, or shave down the new tire to match the tread depth of the others.

Finally, different tread brands, tread patterns and even different rubber compounds can result in different traction rates between the tires, and that stresses 4WD components. So avoid mixing different brands or tread patterns on your 4WD vehicle.

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DIY Quiz

BY MARK PETERSEN editors@thefamilyhandyman.com

Put on your thinking cap and take this month's quiz to see just how smart you are when it comes to DIY. Here's how it works:

- There are easy, intermediate and really tough questions all mixed together.
- There may be more than one correct answer!
- The answers begin on p. 70. Get your DIY rating on p. 71. Good luck!

ART DIRECTION **MARCIA ROEPKE** • PHOTOGRAPHY **HSP**

1. What is the main advantage of working with MDF (medium-density fiberboard) over plywood?

A. It's lighter.
B. It's more water resistant.
C. It cuts with less dust.
D. It looks better painted.

2. Why does a plumbing drain system require venting?

A. It allows water to drain without gurgling.
B. It prevents water from being sucked out of the traps.
C. It discharges sewer gas.
D. All of the above.

3. What is the purpose of control joints in concrete slabs and walkways?

A. They prevent unsightly, jagged cracks.
B. They keep the concrete from shrinking.
C. They form a channel for water runoff.
D. They prevent scaling.

4. True or False? Moisture from inside your house can cause your exterior paint to peel.

Storemags

5. **What is the best natural home remedy for controlling ants?**
A. Pour hot water on anthills in your yard.
B. Make a trail of charcoal bits for them to ingest.
C. Spray vinegar wherever you've seen them.
D. Set mothballs near entry points.

6. **True or False? Tire pressure sensors need to be repaired every time you buy new tires.**

7. **What's wrong with this photo?**
A. The wires are wrapped the wrong way.
B. There are two wires connected to one terminal.
C. The black and white wires are reversed.
D. There is nothing wrong with it.

8. **What's the best technique for cleaning a computer keyboard?**
A. Wipe it with a moist, lint-free cloth.
B. Soak it in window cleaner for 10 minutes.
C. Remove the keys and wash them individually.
D. Run it through the dishwasher.

Find the DIY Quiz answers on pp. 70–71.

9. **Where would you find these?**
A. Underneath the washing machine
B. Inside the dishwasher door
C. On the garage door
D. On top of an air exchanger

10. **True or False? Outlets in a bedroom should be installed within 6 ft. of one another.**

11. **Which is the best lubricant to loosen a sticking vinyl sliding window?**
A. WD-40
B. 3-in-One oil
C. Silicone
D. Teflon

12. **What is this tool for?**
A. Opening paint cans
B. Gapping spark plugs
C. Testing electronic circuits
D. Pulling fuses

13. **What should you do in the event of an oven fire?**
A. Turn off the heat.
B. Open the door and douse the flames with water.
C. Open the door and throw baking soda on the fire.
D. Run away.

14. **What's the best way to protect the outdoor unit of your air conditioner from winter weather?**
A. Bury it in snow.
B. Remove the refrigerant.
C. Wrap it with a tarp or other cover.
D. Turn off the power.

15. **What is the purpose of the aerator on faucets?**
A. It reduces splashing.
B. It increases perceived water flow.
C. It filters out bacteria.
D. It prevents backflow.

DIY Quiz Answers

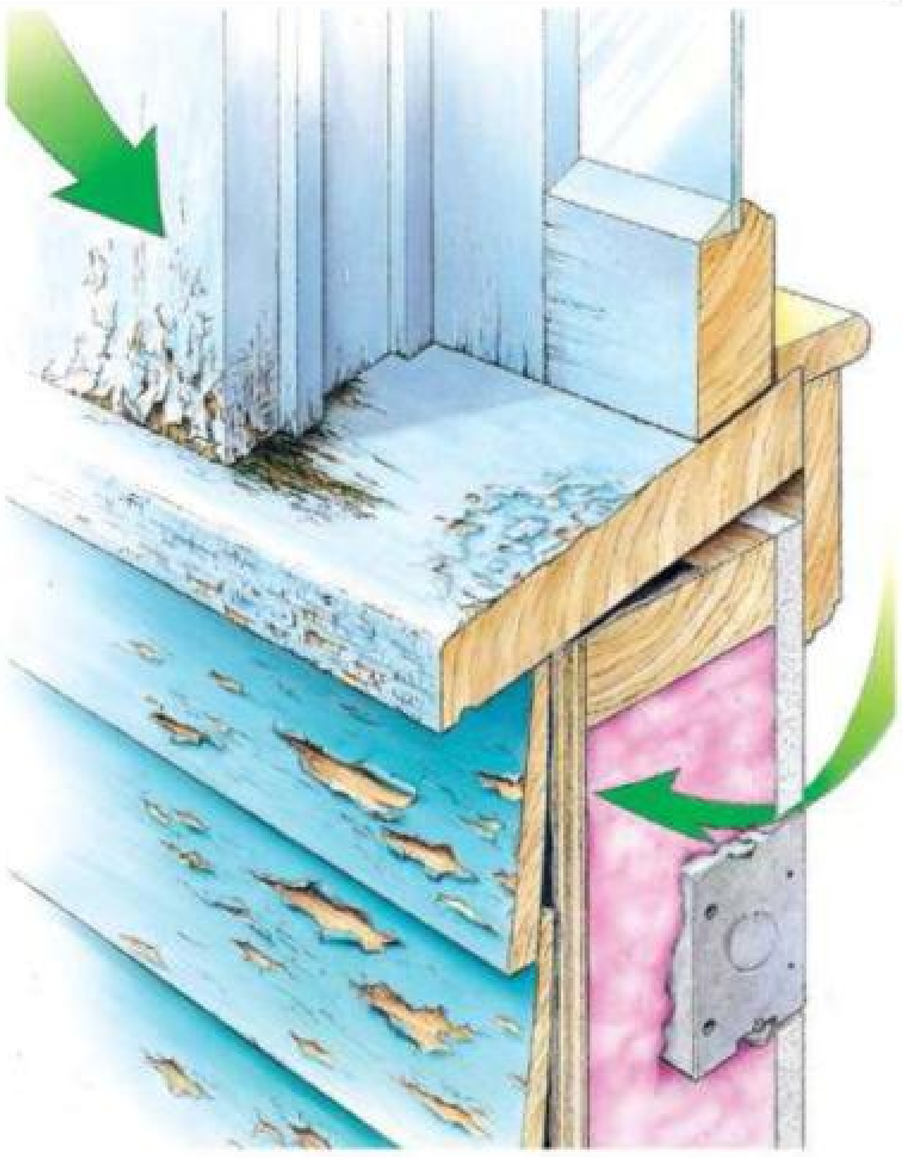
1. (**D**) Medium-density fiberboard is a versatile building material because it's inexpensive and fairly stable. It's a good choice for projects like shelving and storage cabinets. MDF is great for decorative projects too. The smooth surface is perfect for painting, and a router leaves crisp profiles with no splintering, burning or tear-out. On the other hand, MDF is heavy and soaks up water like a sponge. It also creates a lot of nasty dust when cut with a saw or shaped with a router; cut MDF outside whenever possible.

2. (**D**) Without venting, a slug of sewage racing through a waste line would create air pressure and vacuum in the pipe. That causes noisy, gurgling drains as air is sucked through water-filled traps. Even worse, that vacuum can suck all the water out of the traps, allowing sewer gas into the house instead of discharging it out above the roof. Yuck!

3. (**A**) Concrete shrinks slightly as it cures. It will crack at irregular, unsightly intervals if not "controlled." Joints should be spaced about 8 to 10 ft. apart on a 4-in.-thick slab and no more than 15 ft. apart on thicker slabs. Space the joints every 4 ft. on sidewalks and walkways. Control joints should be cut one-fourth the thickness of the slab or a minimum of 1 in. Make them with a groover when you pour, or cut them in with a diamond blade saw after the concrete hardens.

4. **True. A paint job is doomed when water gets into the wood. Wet wood causes paint to peel. Rain is the usual culprit, but moisture from inside your house can leak out, saturate the siding and trim, and cause the paint to peel.**

Modern houses have a vapor barrier that prevents moist air from migrating into wall cavities. Older homes don't have a vapor barrier, but moisture migration can sometimes be minimized with a fresh coat of latex paint on the interior walls and sealing around windows, outlets and switches.



5. (**C**) Ants leave a scented trail that other ants follow. Sweeping or mopping isn't enough to eliminate the scent. Instead, mix 1 part vinegar with 3 parts water in a spray bottle, and then spray near entry points or wherever you've seen them in the past. The vinegar won't kill the ants, but it will confuse them and potentially stop outdoor nesting ants from entering the house to forage for food. Pesticides are your best bet to kill an ant nest. Mothballs are not "natural"—they contain pesticides that should not be inhaled.

6. **True.** Some tire stores charge a small fee to rebuild the tire pressure sensor when they replace a tire. It may sound like a scam, but it's completely legit. No shop wants to risk damaging four $100 tire pressure sensors while changing your tires. So the technician unscrews each one from the wheel before dismounting the old tire. Once the sensor's gasket is disturbed, it can't be reused. To guarantee a leak-free seal on the reinstall, the technician uses a new gasket, washer and retaining nut. Then a special torque wrench is used to tighten the nut. So you're paying for some parts and labor.

7. **(B) It may seem OK to put two wires under the screw of an outlet or switch, but it's not. The screw terminals are engineered to handle the loads as long as the wire is in firm contact with both the screw and the outlet/switch. Stacking two wires creates a weak connection that's subject to overheating and subsequent loosening. If you need to make additional connections, use wire connectors and pigtails.**

StoreMags.com

8. (A) Start by tipping the keyboard upside down to shake out the crumbs, then blow out the keys with a can of compressed gas (about $5 at office supply and hardware stores). Wipe down the keyboard with a lint-free cloth moistened (not soaked) in a mild household cleaner.

Use cotton swabs dipped in a 50/50 solution of alcohol and water to clean between the keys, but hold the keyboard upside down so the solution doesn't drip inside. Some keyboards do have removable keys, but yours may not. Never spray cleaner directly onto a keyboard.

9. (C) Garage door rollers and hinges should be lubricated at least once a year. Rollers eventually wear out and need to be replaced. Nylon rollers, like this one, are more expensive than the steel versions but will make your garage door open and close more quietly.

10. False. The general rule is that outlets in most living areas should be placed within 12 ft. of one another so that a receptacle outlet is within 6 ft. of any point on the wall. The reason for this rule is that table lamps and other devices typically have cords that are only 6 ft. long. You should be able to place the table lamp anywhere around the perimeter of the room and stretch the cord in either direction to reach a receptacle outlet without using an extension cord, which can be a trip and fire hazard.

11. (D) When vinyl windows and doors don't operate smoothly, it's usually because gunk has built up in the channels. But sometimes even clean windows and doors can bind. Try applying dry PTFE (Teflon) spray lubricant on the contact points and wiping it off with a rag. Silicone can discolor some vinyl. Oil lubricants will attract dirt, and some can actually dissolve vinyl.

12. (B) Always check the gap before installing new spark plugs. Use a wire-style gap gauge instead of an inexpensive variable-thickness "disc-style" gauge. It can bend the electrode off-center or even break it off. Slide the correct wire gauge between the electrodes. The wire should drag slightly between them. If the gap is too small, open it with the gap gauge. If the gap is too large, tap the side electrode lightly on a solid surface.

13. (A) It's tempting to open the oven door when you see flames, but don't do it! Stay calm and turn off the heat; the fire should eventually go out on its own.

14. (D) An air conditioner can be damaged if it's turned on in cold weather, so either turn off the breaker or remove/flip over the pull-out fuse located near the unit. There is no reason to cover an air conditioner in the winter, and many manufacturers advise against it. Some covers trap moisture inside the unit and create a cozy home for critters. Set a piece of plywood on top if you need to protect it from falling icicles.

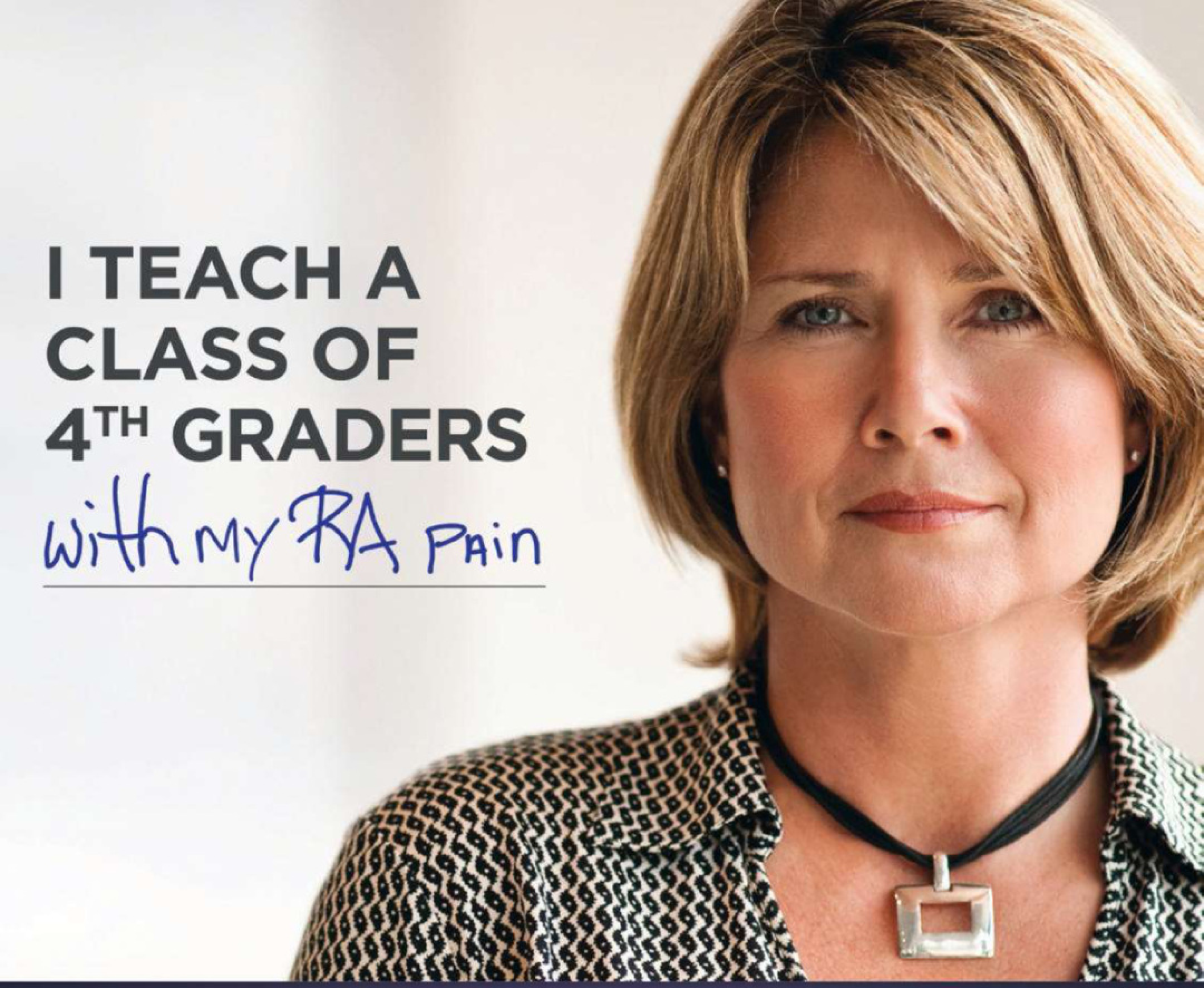
15. (A & B) The screen in aerators separates the water flow into many tiny streams, which reduces splashing. It also introduces air into the flow, which makes it feel like the water pressure is higher than it actually is. Aerators actually reduce flow, which helps conserve water.

WHAT'S YOUR LEVEL OF EXPERTISE?

Beginner: 0 – 5 correct
Intermediate: 6 – 12 correct
DIY Guru: 13 – 15 correct

I TEACH A CLASS OF 4TH GRADERS

with my RA pain



IT'S NOT OK TO JUST GET BY WITH RA PAIN.

Nobody chooses to have RA, but you do have control over how you live your life with it. If you feel like you're just getting by, talk to your doctor. But keep in mind that patients and rheumatologists often think about RA in different ways. Rethinking how you have the conversation could make a difference in what your doctor recommends.

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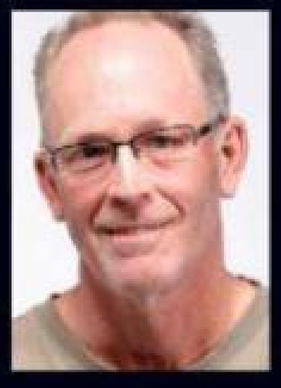
BY JEFF GORTON editors@thefamilyhandyman.com

Setting mosaic tile

In some ways, setting mosaic tile is just like setting any other tile. But because the individual tiles are small (usually 2 in. or less), mounted on sheets and often made of glass, mosaic tiles present some unique challenges. So we asked Dean Sorem, our go-to tile expert, to show us his best tips for cutting and setting mosaic tiles.

MEET THE EXPERT



Dean Sorem installed his first tile in 1979 and has been a professional tile setter for 30 years. He's done everything from single-tile repairs to an 8,000-sq.-ft. floor, and he currently runs Sorem Tile & Stone in Hudson, WI. He is also an avid DIYer at home.

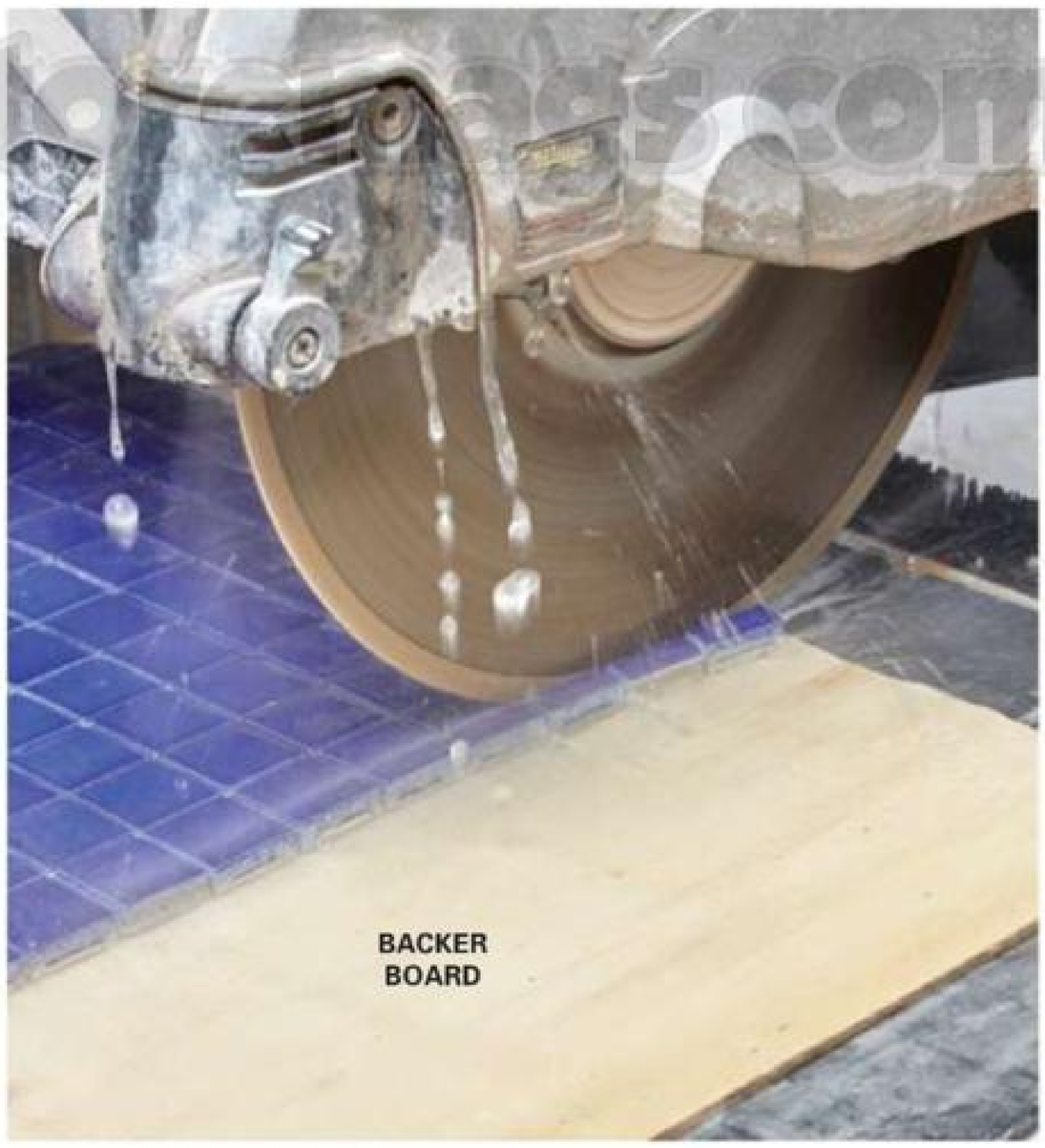
ART DIRECTION **MARCIA ROEPKE** • PHOTOGRAPHY **TOM FENENGA**

FLATTEN WAVY WALLS

Dean says that one of the most important tips for any tile-setting job, including mosaics, is to start with a perfectly flat surface. Before you begin tiling, check the surface with a straightedge. If you find a dip in a wall, flatten it by screeding a layer of setting-type joint compound over it as shown here. For floors or walls in wet areas, use thin-set instead of joint compound. Let the joint compound or thin-set harden and you're ready to set tile.

Save your old toothbrushes

Even if you take all the standard precautions, you're bound to get an occasional bit of thin-set oozing out between tiles, especially if they're really thin like these glass mosaics. If this happens to you, wait for the thin-set to firm up a little. Then use a toothbrush to clean the thin-set out of the grout spaces. You don't want to leave thin-set between the tiles because it may show through the grout.



CUT ON A BACKER

The slot in the bed of most tile saws is so wide that small mosaic tiles will fall in, making them difficult to cut. The solution is to place a thin scrap of plywood under the sheet of mosaic tile as you cut it. Adjust the saw's cutting depth so you're not cutting into the plywood. Then just saw as usual.

Carve out curves

Cutting curves in mosaic tile is tricky. Here's how Dean does it. After marking the curve on the sheet of mosaic tile, he brings the sheet to the saw, where he removes individual tiles for cutting. He eliminates the bulk of the waste with straight cuts, or by making a series of fingers and breaking them off. Then he carves along the line, using the blade like a grinder.

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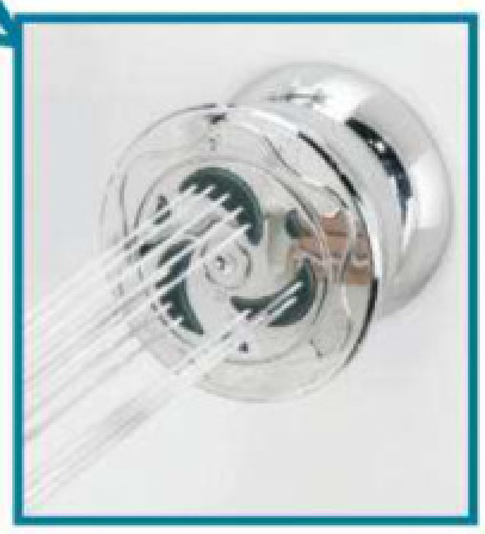

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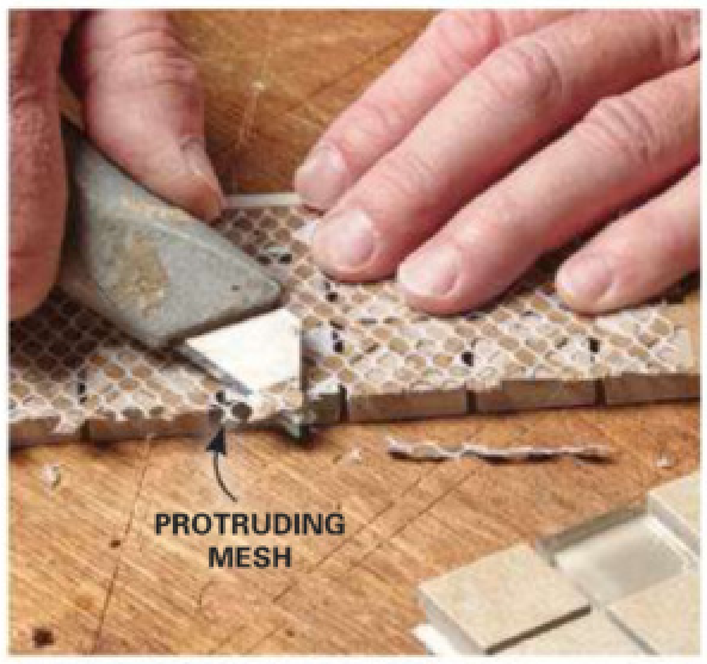
FLATTEN THE THIN-SET

If you're working with thin mosaic tile or glass mosaic tile that isn't painted on the back, apply the thin-set with a notched trowel and then flatten it slightly with the *flat* side of the trowel before setting the tile. Flattening will prevent the ridges and air pockets from showing through transparent glass tile. It will also help keep thin-set from squeezing out between the spaces of thin mosaic tile.



Trim the backing

The mesh, plastic or paper backing that holds mosaic tiles together can get in the way if you don't trim the edges. Mesh can stick out into the grout space and cause grouting trouble. And protruding backing can prevent you from pushing adjoining sheets close together. So before you set mosaic sheets, inspect them and slice off any excess backing with a sharp utility knife.

Cheat the spacing

If you get to the end of a wall or up against an object and are left with a gap that's too narrow to fill with tile but too wide to caulk, you can close it by spreading the rows of tiles slightly. The bigger the gap, the more rows you'll have to spread to make an inconspicuous cheat. Cut the mesh between the rows with a sharp utility knife. Then use the edge of your trowel to nudge each row into place, making sure to keep the grout lines between the spread-out rows even.

TAMP THEM FLAT

To make sure mosaic tile is fully embedded and the faces of all the tiles are flush with the rest, it's important to tamp them with a block after setting the sheets in the thin-set. The tamping block Dean uses has beveled edges to make it easier to hold and a thin sheet of rubber glued to the face to protect the tile. But he says a wood float with a handle on it works great too. In a pinch, just use a block of wood, but keep the face free of grout, which could scratch the tile. Hold the block so the face is parallel to the surface and bounce it up and down to set the tile.

HOW TO SET A DECORATIVE BAND

Often, the tile used for a decorative band is thinner than the tile that surrounds it. If the tile making up the decorative band is large, you can simply apply an extra-thick layer of thin-set under it and press it in until it's flush with the thicker tile. But this doesn't work with mosaics. Here's how Dean solves the problem.

Step 1: Create a precise gap

First Dean carefully calculates how wide the band will be by measuring the width of the tile band and adding the width of two grout spaces. Then he cuts wood spacers and uses them to align the tile and to leave room for the decorative band of mosaic. Here Dean is removing the spacers after the adhesive behind the surrounding tile has set up.

Step 2: Screed with a customized putty knife

Next, Dean creates a custom screed by notching a plastic putty knife. He makes the depth of the notches equal to the thickness of the tile band, plus about 1/8 in. for the thin-set. He spreads a layer of thin-set in the band area and uses the notched trowel to screed the thin-set to the right thickness. Dean lets this layer of thin-set firm up before moving on to the next step.

Step 3: Spread the thin-set

Next, Dean cuts 1/8-in.-deep teeth in the custom trowel. Then he spreads another layer of thin-set over the base layer and uses the notched trowel to create an even layer of adhesive. If the mosaic band is glass tile or thin mosaic, he flattens this layer of thin-set with a flat putty knife.

Step 4: Set the mosaic band

Finally Dean is ready to embed the decorative band in the thin-set. The built-up thin-set base ensures that the surface of the mosaic band will be perfectly flush with the surrounding tile.

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PRO talk

BY MARK PETERSEN editors@thefamilyhandyman.com

TIP FROM A FELLOW PRO

Tangle-free extension cords

If you're in the habit of wrapping a cord around your hand and elbow, knock it off! That method permanently twists the cord and makes for a tightly wound pile of spaghetti that's guaranteed to get tangled. Here's a way to make cords last and avoid tangles:

1. Wind the cord in big loops and plug the ends together.

2. Pull one of the outside loops away from the rest.

3. Wind the separated loop around the rest a couple of times.

4. Stick the end of the separated loop through the top opening and give it a tug.

Matt Burnside

PROJECT I'M PROUD OF

READER PHOTO

Eyebrow entry

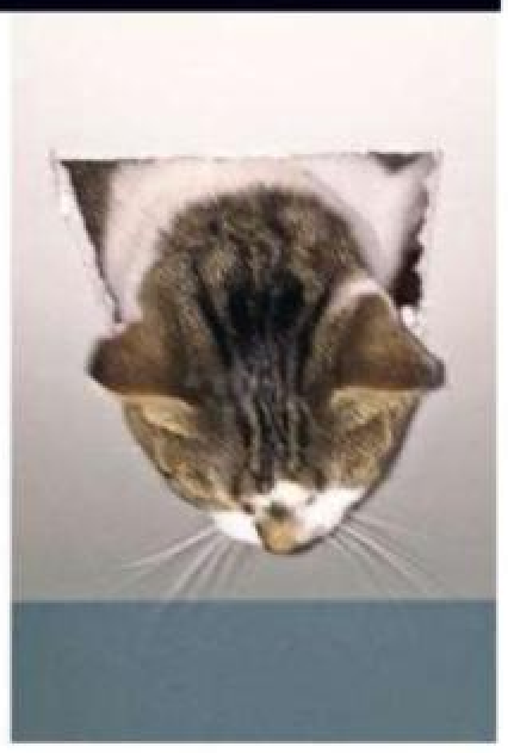
There were a lot of interesting architectural details on this house, but the entry was probably the most challenging. The ledger, ribbon and drop beam were all made from laminated layers of plywood, and the joists were all LVLs. We sheathed the roof with two layers of 3/8-in. sheets of plywood. The whole thing was held up with four 6x6 posts, which we boxed in for the stone guys. To complicate matters, the structure needed to be held several inches away from the wall so the stone could run behind it.

A woodshop milled the cove and the cantilevered fascia, and we trimmed the rest in cedar. All the flashing was copper as was the entire roof (installed by others). From start to finish, the entry took about 140 hours. I love projects like this, ones that require more than just a framing gun and a level. Luckily, I get to work on a bunch of them.

Tyler Ferguson

PRO GOOF

Confined feline



After patching a hole in an apartment ceiling, my coworker and I heard meows. We looked around for the tenant's cat with no luck. Then we realized the cries weren't coming from inside the apartment but from above it.

The cat must have used the ladder to "investigate" the space above the ceiling while we were at lunch, and we had inadvertently trapped it when we finished patching. After we reopened the ceiling, the poor cat darted from the hole and stayed out of sight for the remainder of the job.

Suzanne C. Banner

Got something for us?

If you've got a tip, a brag photo or a project you'd like to share with fellow pros, send it to us at editors@thefamilyhandyman.com. We issue a $100 gift card for each one we publish.

ART DIRECTION MARCIA ROEPKE • PHOTOGRAPHY HSP UNLESS NOTED

Top Ten TIPS

BY JASON WHITE editors@thefamilyhandyman.com

Gluing wood

Even the most experienced carpenters and woodworkers occasionally break into a sweat when it comes time to glue up a project, especially one that takes lots of clamps after the glue is applied. You only get one shot at it, so there's little room for mistakes. Before your next glue-up, read our top 10 tips for gluing wood and save all that sweating for the gym.

ART DIRECTION **VERN JOHNSON** • PHOTOGRAPHY **TOM FENENGA** • ILLUSTRATION **FRANK ROHRBACH III** • CONSULTANTS **BOB BEHNKE, CHEMIST AT FRANKLIN INTERNATIONAL (TITEBOND); TOM CASPAR and DAVID MUNKITTRICK**

DO A DRY RUN

To head off any glue-up catastrophes, be sure to dry-fit and clamp together all the parts and pieces of your project *before* you apply glue. Do this no matter what type of glue you choose.

1 Plain old wood glue is best

Dozens of glues claim to work well on wood and a variety of other materials. But regular wood glue is the best choice for raw wood-to-wood joinery. Most wood glues are a type of polyvinyl acetate (PVA). Also sometimes called carpenter's glue, wood glue is formulated to penetrate wood fibers, making glue joints that are stronger than the wood itself.

2 Wood glue can last for years

You may have heard that PVA glue goes bad after freezing or sitting around for a long time, but the truth is that it might still be OK. Try stirring it with a stick to mix all the glue particles (don't just shake it). If it's a little thick, add some water—up to 5 percent. If glue flows freely from the bottle and feels slippery between your fingers—not stringy or clumpy—it's probably OK to use. But if in doubt, throw it out. It's not worth taking the chance.

3 Water finds hidden glue

Once squeezed-out glue has been removed, there's still a chance that some is hiding. And if you don't find it now, you'll see it later when you apply stain or finish. Spray some warm water near glue joints to make hidden glue more visible. The water will also soften the dried glue, making it easier to scrape off.

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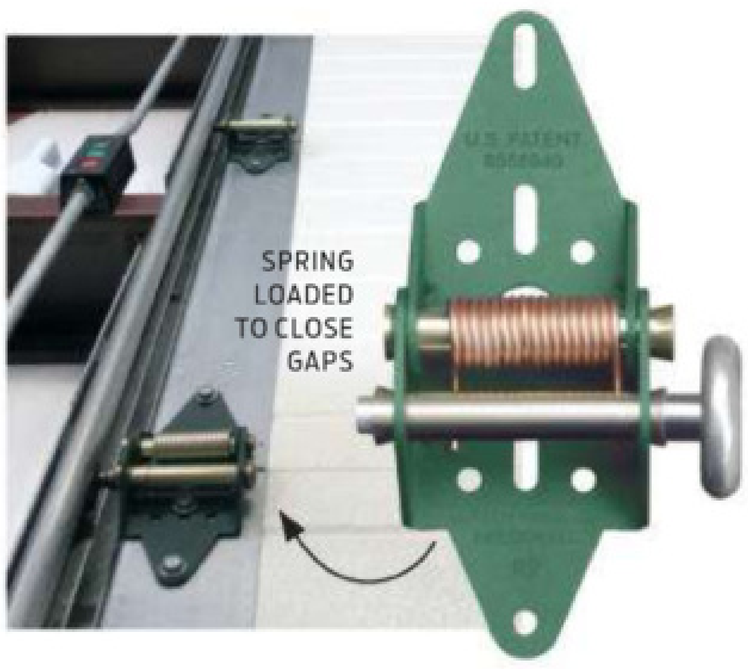

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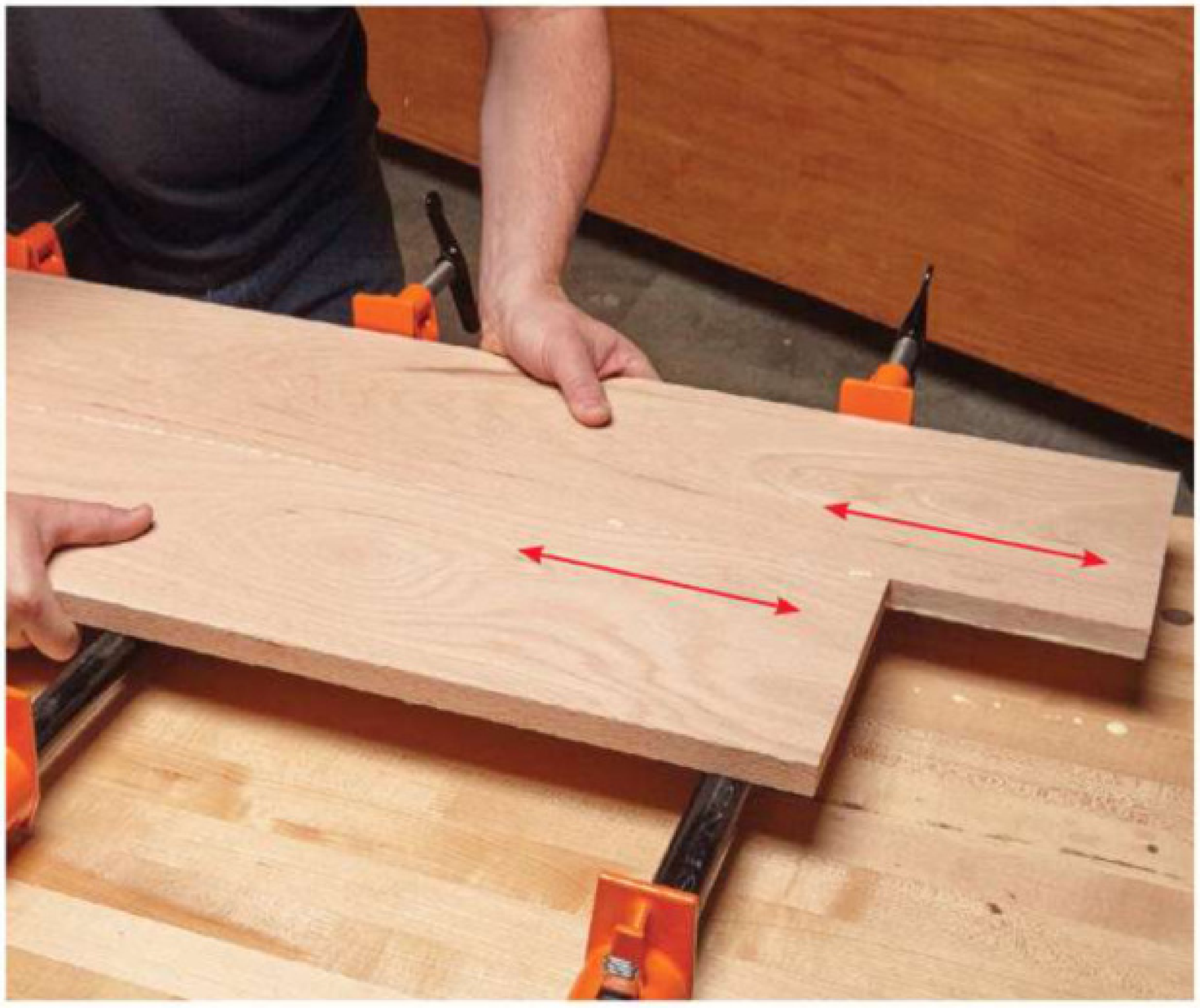
4 Use enough glue, but not too much

Use too much glue and you'll have a big mess on your hands, but too little can give you a weak joint. You'll know you have the right amount of glue when you see a fairly even bead of squeeze-out—about the thickness of a penny—the entire length of the joint.



5 Rub the joint

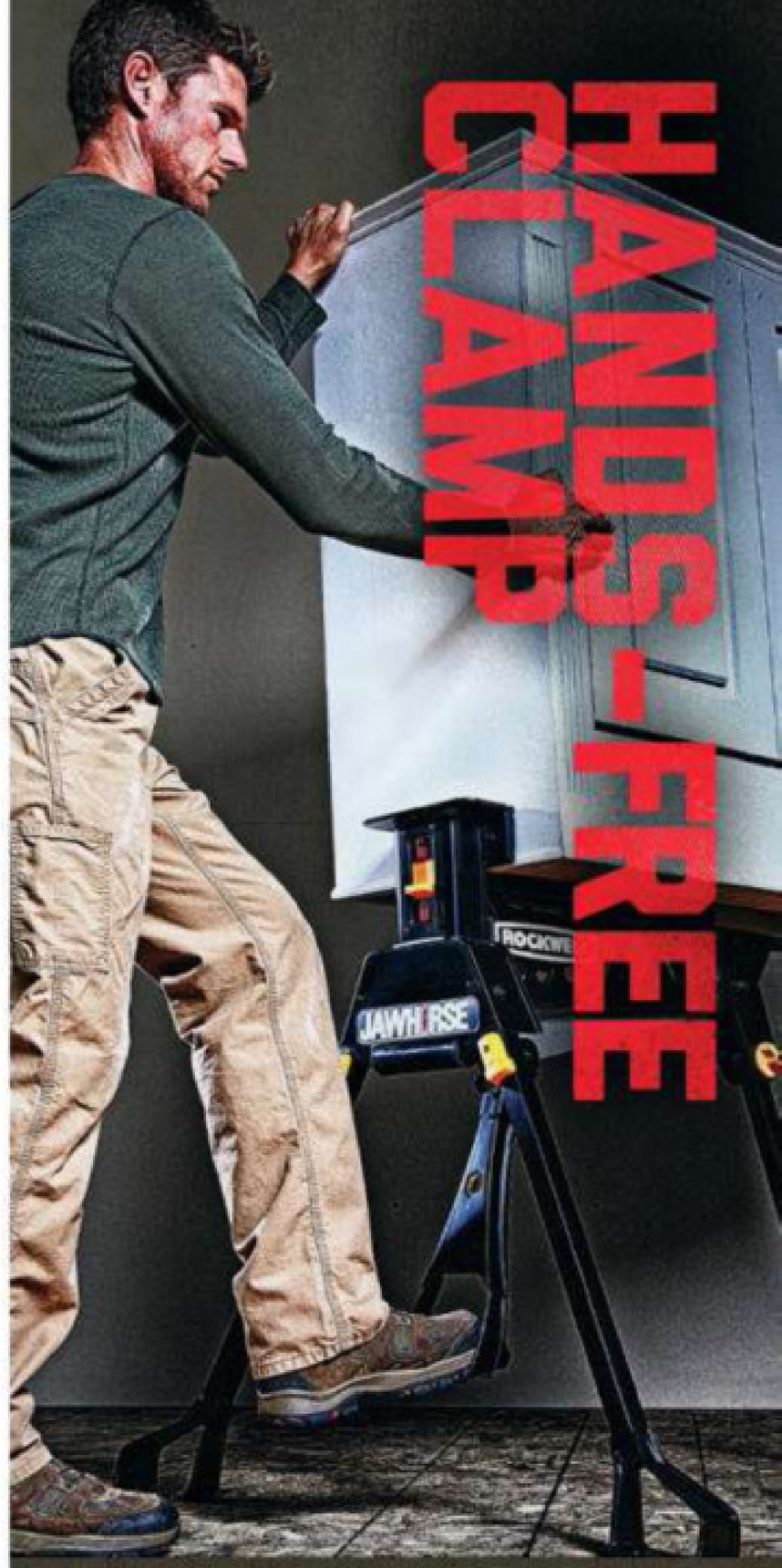
One good way to ensure a strong glue joint is to use the "rub joint" method. Simply apply glue to the edges of one or both boards and rub them together to help spread the glue evenly before clamping.

6 Use waterproof glue for outdoor projects

If your carpentry project might get wet, use glue that stands up to water. Glues labeled "water resistant" are fine for things that'll only get wet occasionally. For most outdoor projects, however, choose "waterproof" glue, which comes in both PVA and polyurethane formulas. Both types are plenty strong and stand up to the weather, but polyurethane glue has the added benefit of being able to bond materials like stone, metal and glass. It's messy stuff, though, so wear gloves while using it.

7 Removing glue squeeze-out

The best time to remove glue squeeze-out is when it's starting to set up and slightly rubbery—about 20 minutes or so after clamping. Just scoop it off with a chisel and wipe off the excess with a damp (not wet!) rag. If you wait until the glue is dry, you'll have to scrape it off, which is a lot more work and can damage the wood.



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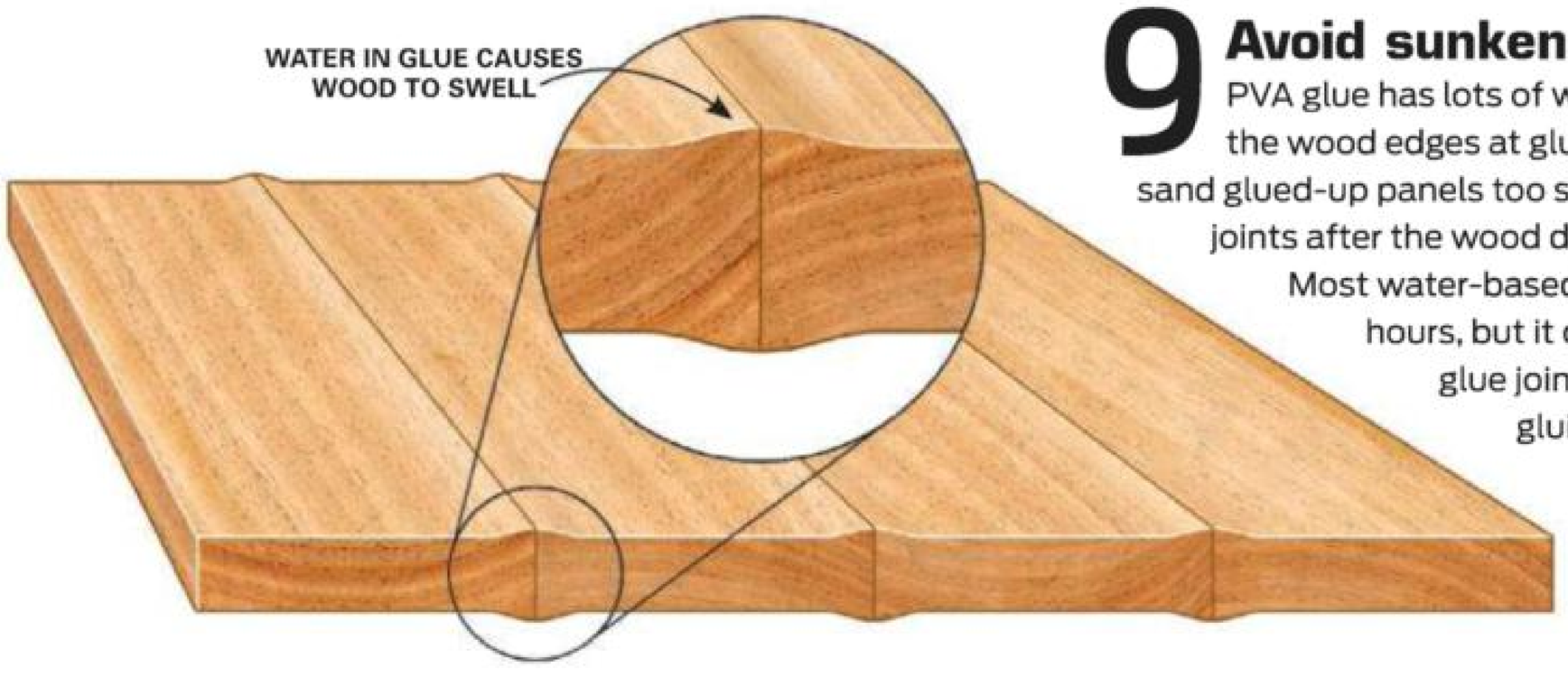
8 Glue + sawdust = wood filler

When you need wood filler that matches the color of your project, mix some fine sawdust and glue together until it forms a paste, which you can use to fill small gaps and cracks. For best results, use sawdust from the same species of wood as your project; you can get some from the bag on your electric sander. Just don't try this trick for large gaps or patches—they'll stick out like a sore thumb.



9 Avoid sunken joints

PVA glue has lots of water in it, and that water will cause the wood edges at glue joints to swell. If you plane or sand glued-up panels too soon, you could be left with sunken joints after the wood dries and shrinks to its original state. Most water-based glues reach full cure in about 24 hours, but it can take several days for swollen glue joints to shrink back to size. If you're gluing up a fine piece of furniture that you hope will become a family heirloom, wait a few days after gluing up your project before sanding or planing.

10 Slow-setting glue buys you time

Most wood glues set up quickly, which can be a blessing or a curse. Sometimes you want a quick bond, but on a complicated glue-up, you might want more time before the glue starts to set up. Slow-setting glues have labels that say "longer assembly time" or "longer open time."

What homeowners MUST know

BY GARY WENTZ editors@thefamilyhandyman.com

CAULK LEAKY WINDOWS

Removable caulk is a great solution for leaky, energy-wasting windows. It looks a whole lot better than covering windows with plastic film, and you can easily pull it off when springtime rolls around. If you don't find it at a local home center, just search online for "removable caulk" (about $6 per tube). Don't use any caulk on bedroom or other windows that may have to be opened quickly to escape a fire.

Remove painting mistakes

If you slop some paint on varnished wood, don't worry. Home centers carry liquid paint remover products for just that situation. Let the paint dry and mask off the paint you don't want to remove. Gently scrape off as much paint as you can with a putty knife. Then squirt a few drops of remover on an old toothbrush and scrub away the rest.

Soft-close cabinet doors

Many new cabinets offer soft-close doors. But you don't have to buy new cabinets to get that luxury feature. Just search online for "cabinet door damper." Dampers come in various styles to fit various cabinet types, cost $2 to $4 each and install with just a screw or two. Easy! But they work only with self-closing hinges.

ART DIRECTION **MARY SCHWENDER** • PHOTOGRAPHY **HSP**

FATAL FUSE FOLLY

If you live in an older home that has fuses rather than breaker switches in the main electrical panel, NEVER replace one fuse with another that carries a higher amp rating. Yes, a 20-amp fuse will work with a 15-amp circuit. And it may save you the frustration of replacing fuses on a circuit that overloads frequently. But it also allows more power flow than the circuit was designed to handle. This mistake has led to thousands of home fires, even deaths.

Paint-proof windows and doors

Paint rollers throw off a mist of paint that speckles everything below. Here's the quickest way to protect doors and windows: Tape around door and window trim using tape that's wide enough to project at least 1/2 in. from the trim. That way, you can stick light plastic to the protruding tape—there's no need to tape the perimeter of the plastic separately. For doors, slit the plastic with a utility knife so you can slip through.

Hire the best carpet cleaner

Regular cleaning doesn't just make your carpet look better; it makes it last longer too. Most carpet manufacturers recommend professional hot-water extraction as the primary cleaning method for synthetic carpets. The best strategy is to hire a professional every year or two and clean the carpet yourself between pro cleanings. Here are some hiring tips:

- Hire a pro who uses truck-mounted equipment rather than portable steam cleaning equipment. Truck-mounted equipment exhausts the dirty air and humidity outside. Its stronger suction leaves carpets drier too.
- Ask for a high-pressure rinse. This agitates the pile and neutralizes the carpet's pH.
- Ask the pro to set furniture on blocks or pads after cleaning. This prevents stains from transferring from furniture legs to the damp carpet.
- Make sure the estimate includes everything—such as furniture moving, vacuuming (some charge extra for this, so check), routine spot removal, preconditioning and deodorizing—as part of a standard cleaning package.

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As water heats up, it expands with tremendous force—enough to fracture the tank and launch the water heater through the roof (seriously, that does occasionally happen). The temperature and pressure relief valve prevents this by opening if the tank pressure becomes too high. But when a relief valve lets off a little pressure (or just leaks), some homeowners "fix" it by plugging the valve or the pipe connected to it. A very, very bad idea. Boilers also have relief valves, and blocking them is just as dangerous.

Don't ignore a rocking toilet

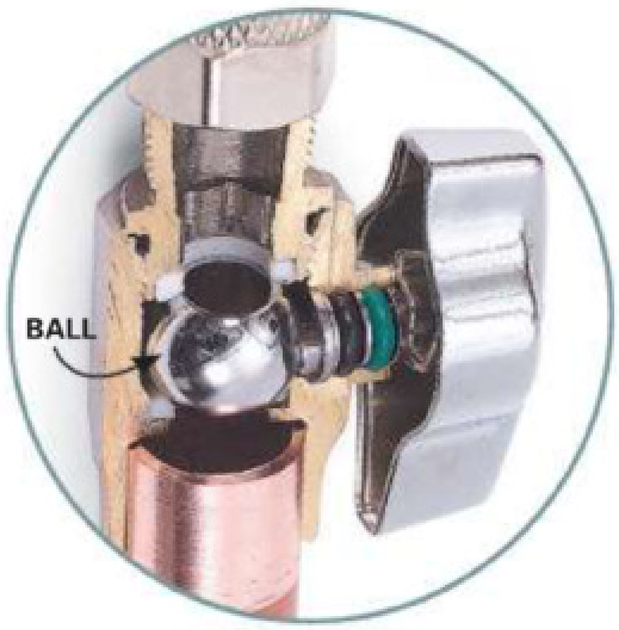
If your toilet isn't solidly fastened to the floor, there may be trouble in your future. Any movement of the toilet damages the wax seal. That leads to leaks and major repairs. To steady a rocking toilet, cut plastic shims to fit and slip them underneath (you may have to remove caulk before adding shims). Then caulk around the toilet and snug down the nuts on the bolts. But don't crank them down super-tight; that can crack the toilet.

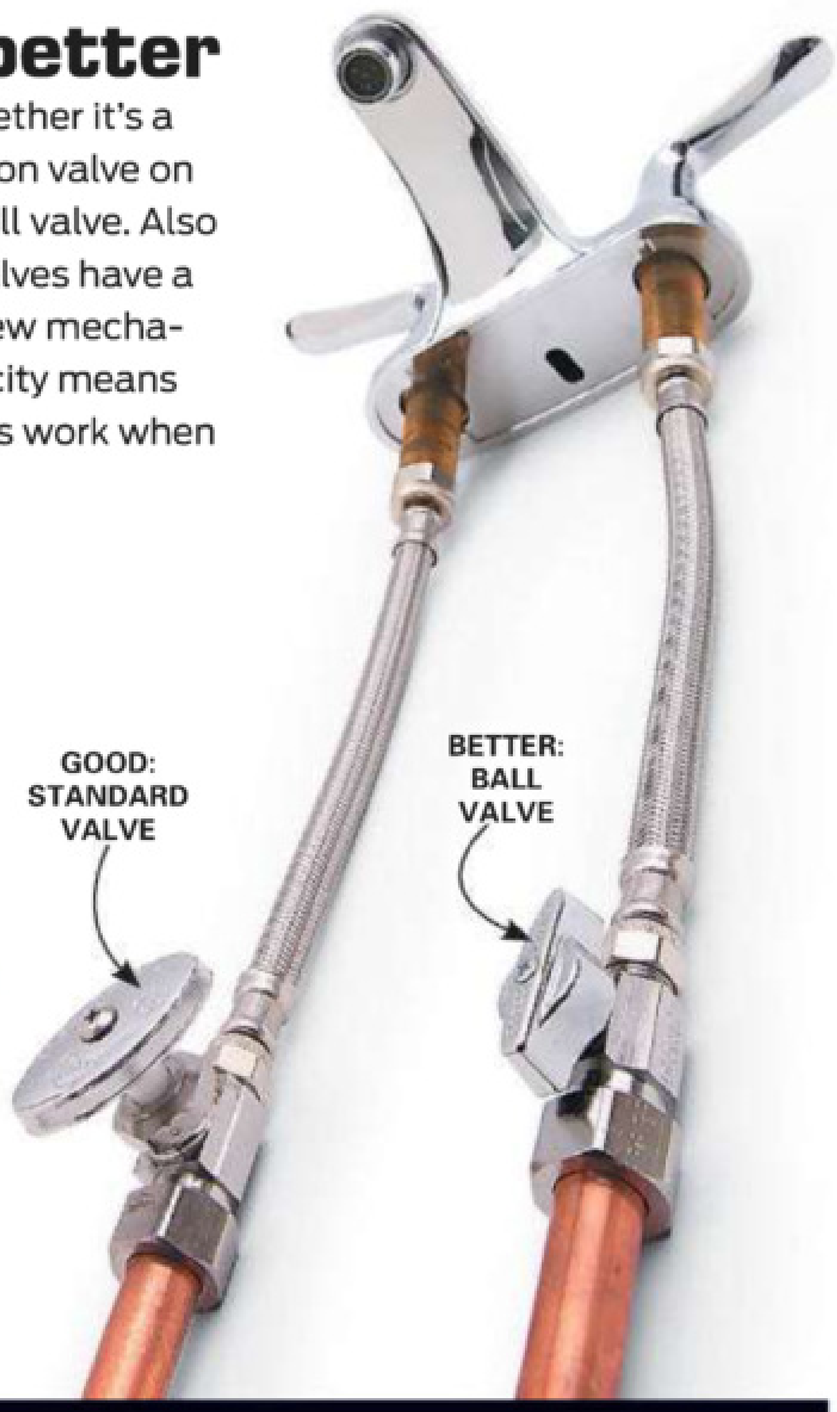
Clean a vent hood grease filter

The standard way to clean the filter from a kitchen exhaust fan is to stick it in the dishwasher. If that doesn't get your filter clean, try an auto mechanic's approach: Buy water-based degreaser at an auto parts store, fill your laundry tub with hot water and degreaser, and let the filter soak for a few minutes. After that, all it takes is a rinse.

Ball valves are better

Whenever you replace a valve—whether it's a shutoff under the sink or the isolation valve on your water heater—upgrade to a ball valve. Also called "quarter-turn" valves, ball valves have a simple ball inside rather than a screw mechanism and rubber seals. That simplicity means reliability; ball valves almost always work when you need them.





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	Average	Single Issue
Total number of copies printed (net press run)	1,251,813	1,236,709
Mail subscriptions	1,045,258	1,079,778
Paid distribution—sales through dealers and carriers, street vendors and counter sales	49,407	46,714
Total paid distribution	1,094,665	1,126,492
Free or nominal-rate distribution	63,557	24,043
Total distribution	1,158,222	1,150,535
Copies not distributed	93,591	86,174
Total	1,251,813	1,236,709
Percent paid and/or requested circulation	94.51%	97.91%

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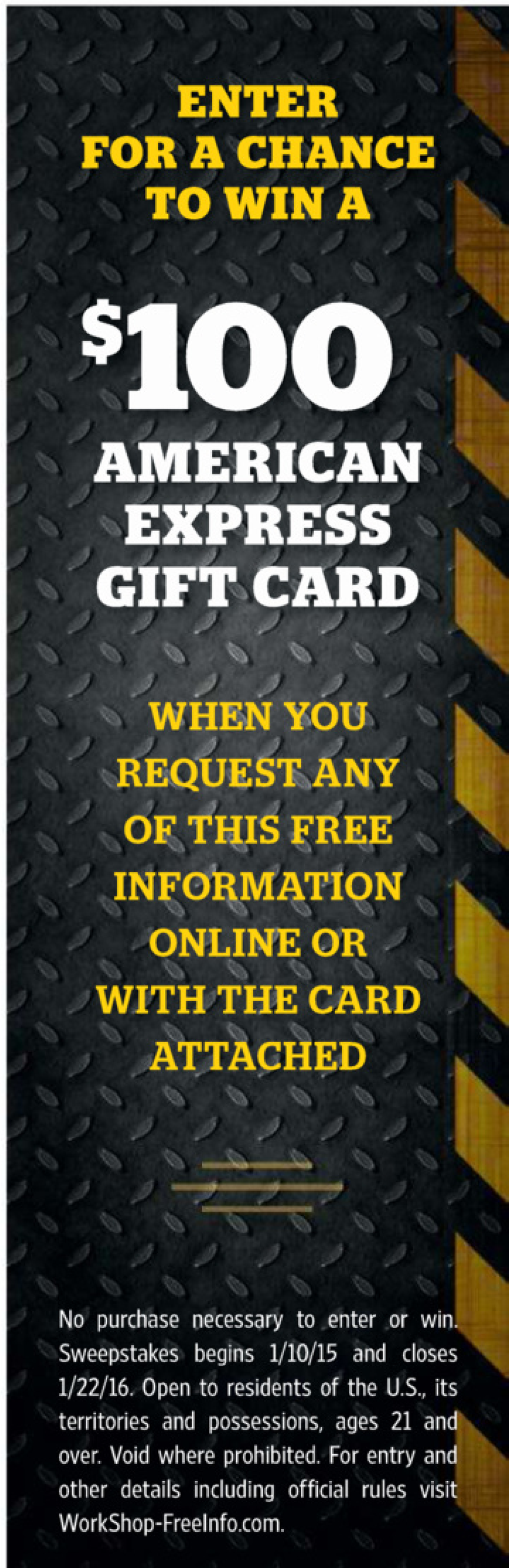

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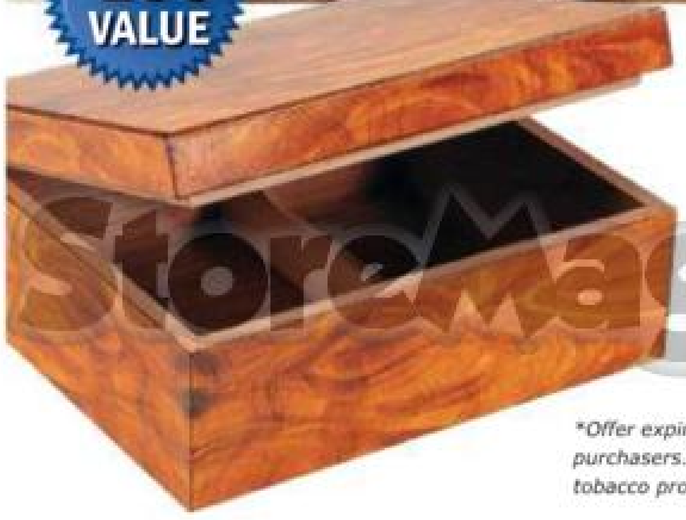

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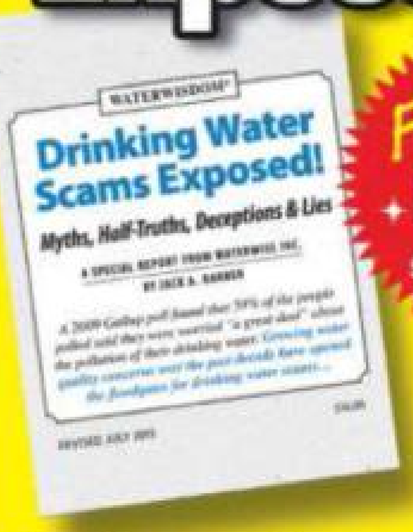

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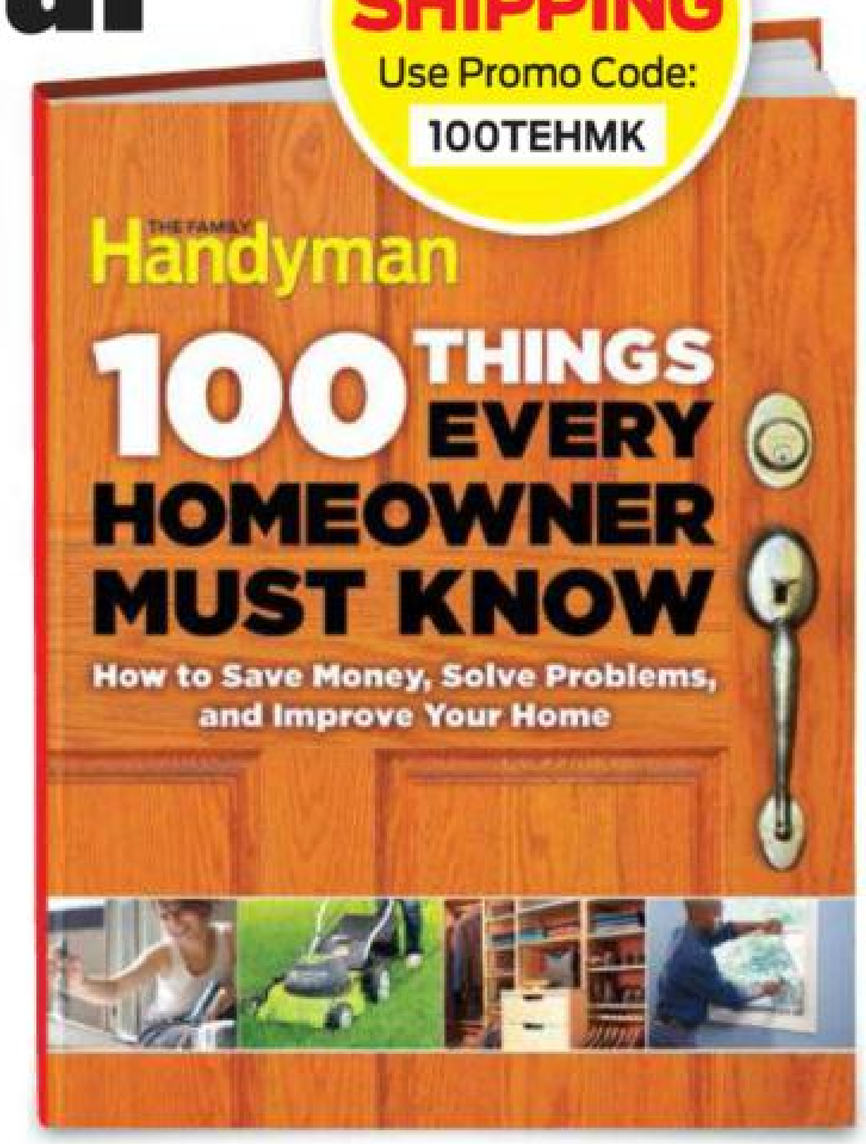

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BROKEN TOY BOX

The toys at my northern Michigan cabin were multiplying in the garage, so I decided it was time for an addition. I doubled the length of the garage, making it an end-to-end two-car structure. To save money, I hand-framed the roof rather than use factory-built trusses. With all this extra garage space, I'd be able to buy even more toys!

After several snow and ice storms up north, I received a call from my neighbor, who asked the dreadful question, "Remember the garage you used to have?" The weight of the snow had caused the roof to cave in, crushing my speedboat, trailer, snowmobiles and dirt bike inside. After careful forensic study, I figured the overloaded rafters had pushed out the walls until the roof collapsed. I probably hadn't used enough collar ties, leaving me with the lesson that a sturdy toy box is worth the extra expense.

Robert A. Jones

Bathroom bust-out

I take my painting prep very seriously. So before painting the bathroom door, I took off the door handle rather than masking it off. But when I closed the door and heard the lock click, I realized I had left the latch in the door. "No need to panic," I thought.

I fit the handle back into the door—but the latch wouldn't catch. I then tried to manually pull back the latch—but it wouldn't move. Then I used my nail punch and hammer to remove the hinges—a sure bet—but the door was so tight in the frame I couldn't budge it. There I was, trapped in my own bathroom.

I considered escaping through the window, but given the 9 in. of snow outside, my stocking feet and no key to get back into the house, I decided against it. Mild panic fueled a couple of karate kicks that broke that hollow-core door into splinters. I think I'll paint the new door before I hang it.

Rich Sharbaugh

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DIY TIP GENIUS

Chain-saw faux pas

Years ago, I was clearing trees for the site of a new house. At day's end, the owners wanted to look over the site before I went home. Being smart, I set the chain saw behind my truck so I wouldn't forget it when I left. Well, "smart" would have been putting it into the truck. As I backed out, I heard the hiss of a blown tire. Fortunately, my wheel missed the saw's engine and I escaped with only $160 worth of stupidity (tire plus bar plus chain).

Troy Nevermann

EDITOR DAVID RADTKE • ART DIRECTION MARY SCHWENDER • ILLUSTRATIONS STEVE BJÖRKMAN

Got your own DIY mistake? GET A $100 GIFT CARD FOR YOUR GREAT GOOF! See p. 4.

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