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# FREE TIME

OUR WEEKENDS LOOK A LOT LIKE OUR WORKWEEKS!

**F**ive days a week, we're either building something, thinking about building something or writing about building something. So what do we do on weekends? I recently added surface-mounted electrical outlets in my garage plus more shelving, and I'm repurposing a bookshelf for my home office. Can't have enough projects!

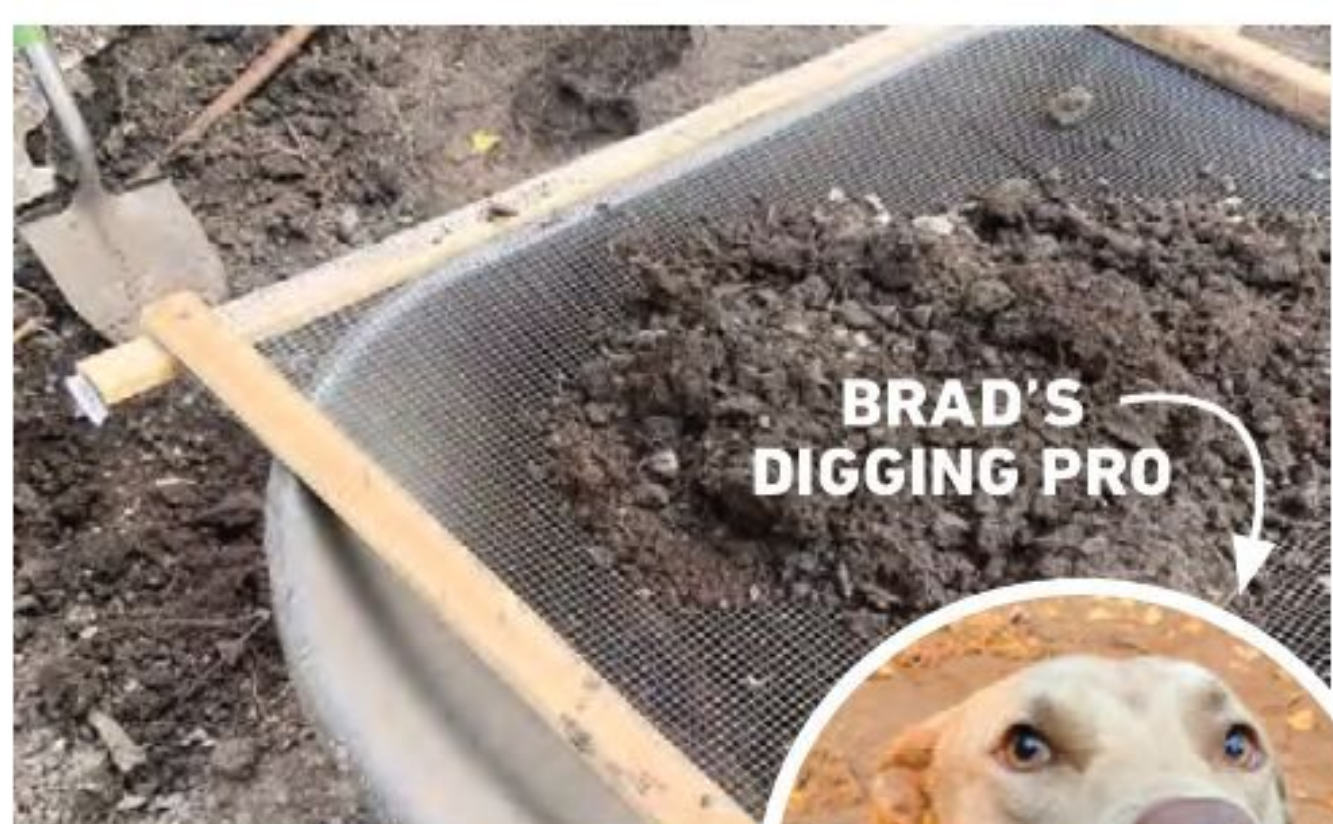
GLENN HANSEN  
DEPUTY EDITOR

## HERE'S WHAT MY TEAMMATES ARE UP TO:

**M**y current project is a music room, which includes soundproofing, acoustic tuning and wiring. I'm also transforming my laundry area, which means replacing the ductwork for the dryer, installing water hammer arresters, and building a platform for the washer and dryer. And I'm building a new work space in the basement; a 16-ft. workbench is my most recent addition.

*I love the process of transforming a room, especially when I can turn an ordinary space into one specially designed for music production.*

JAY CORK, ASSOCIATE EDITOR



**T**his summer we tore out a few 30-year-old bushes to accommodate new front steps and a stoop. Now I'm working on landscaping: cutting up sod, bringing in new soil and, before I run out of good weather, adding some edging, mulch and new plants. I do a lot of this myself since it's basic grunt work, which I don't like to pay for. Yep, like most DIYers, I love to hang on to money.

BRAD HOLDEN, SENIOR EDITOR



**I** am STILL working on building a fence. I also just installed some blinds in the kids' rooms. (Editor's note: Mike even used vacation time to work on his house projects. He can't get enough!)

I do these projects myself because it saves me loads of money, I want the jobs done a certain way, and I have the ability, although not the time. Plus, I do a lot of these things around the house so the kids can see me work and even be a part of my work. At 1, 3 and 5 years old, they help me stack offcuts or hand me tools and screws. It's fun for them—but it's also why it takes me so long!

MIKE BERNER, ASSOCIATE EDITOR



**I** wanted a place to store cookbooks, and after looking at sideboards online, my husband said, "We can probably make that." So I designed what I wanted in SketchUp, sizing it to fit between a pair of windows and to hold our largest cookbooks. We chose to DIY this because we enjoy building things and it gave us something to do during the pandemic. I would like to say we saved money, but after materials and some new router bits, the jury is still out. Our next project is to build a set of floating shelves to go above it.

JENNY MAHONEY, ART DIRECTOR

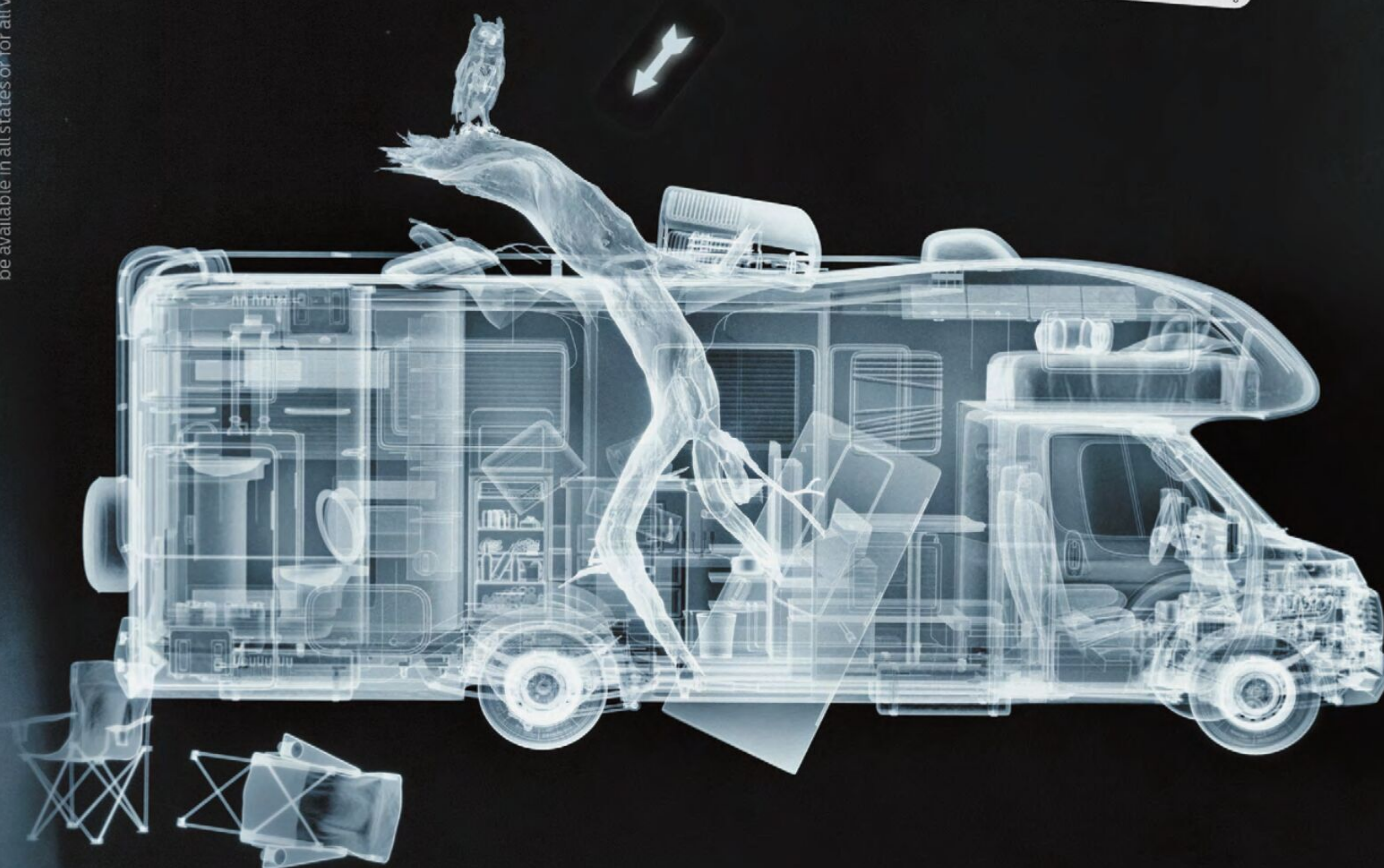
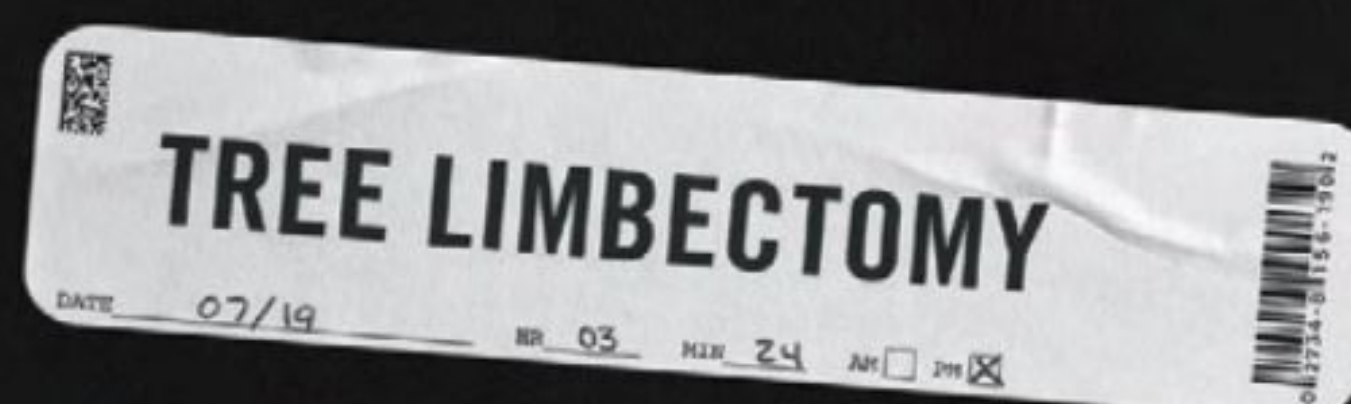


What are your Free Time projects? Drop us a line at [editors@thefamilyhandyman.com](mailto:editors@thefamilyhandyman.com).



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Upflow systems let you add a basement bathroom without tearing up the floor.

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# WHAT'S NEW?

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New homeowners Josh and Mariah don't even mind shoveling snow. Yet.

## FIRST-TIME HOMEOWNERS

Josh Tuggle and Mariah Cates, the junior art director here, have lived in their house almost a year. They've already tackled a lot of projects: removing wallpaper (the worst!), painting most of the walls, and tiling the kitchen floor and back-splash. Next up is a big one: finishing the basement and adding an egress window.

On their way to becoming experienced DIYers, Mariah and Josh have signed up for our New Homeowner email newsletter. It's filled with the how-to and tool info first-time owners need to upgrade and repair their home. If that sounds like you or someone you know, sign up at [familyhandyman.com/newsletter/](https://familyhandyman.com/newsletter/)



## WATERPROOF TILE INSTALLATION

In our Sept. '21 issue about planning and building a vacation home, we showed how to install a tile shower. We focused on how to install a prefabricated shower pan, with prefab niches and a glass wall kit.

We thought we'd nailed it, but a reader named Richard gently pointed out that we did not mention "one

important detail: WATERPROOFING!"

We had installed Johns Manville GoBoard, a water-proof backer board,

as a substrate for the tile, but we failed to point it out. Help keep us on our toes! Write to [editors@thefamilyhandyman.com](mailto:editors@thefamilyhandyman.com).



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# IF YOU HAVE DIABETES— YOUR EYES NEED ATTENTION

If you have diabetes, excess blood sugar can damage the blood vessels inside your eyes—a condition known as **diabetic retinopathy**. Even if your vision seems fine and you don't notice it happening, there still may be damage that could lead to vision loss. Fortunately, an eye doctor may be able to help your eyes and protect against vision loss.

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August 2021 OPH.21.07.0012



# HANDS ON



TOOLS, GADGETS + GEAR WE RECOMMEND

## THREE-IN-ONE DRILL KIT

I've had my Festool CXS for about eight years now, and it's the drill/driver I reach for most often. A 12-volt, 2.6-amp-hour lithium-ion battery provides plenty of power for most household and woodshop tasks. The interchangeable heads make this tool a standout for me. When I'm predrilling holes for fasteners, I can leave the drill bit in the chuck and switch back and forth between the chuck and the standard driver head in a second.

The right-angle head gets me into a tight area; it can be rotated to keep the body of the drill out of the way in most circumstances. The CXS's light weight, compact size and belt hook make it easy to carry while on the job.

The kit, which includes two batteries, a charger and all three heads, runs \$315 online.

**BRAD HOLDEN** SENIOR EDITOR



**RIGHT-ANGLE  
HEAD**



**DRIVER  
HEAD**



**STANDARD  
CHUCK**

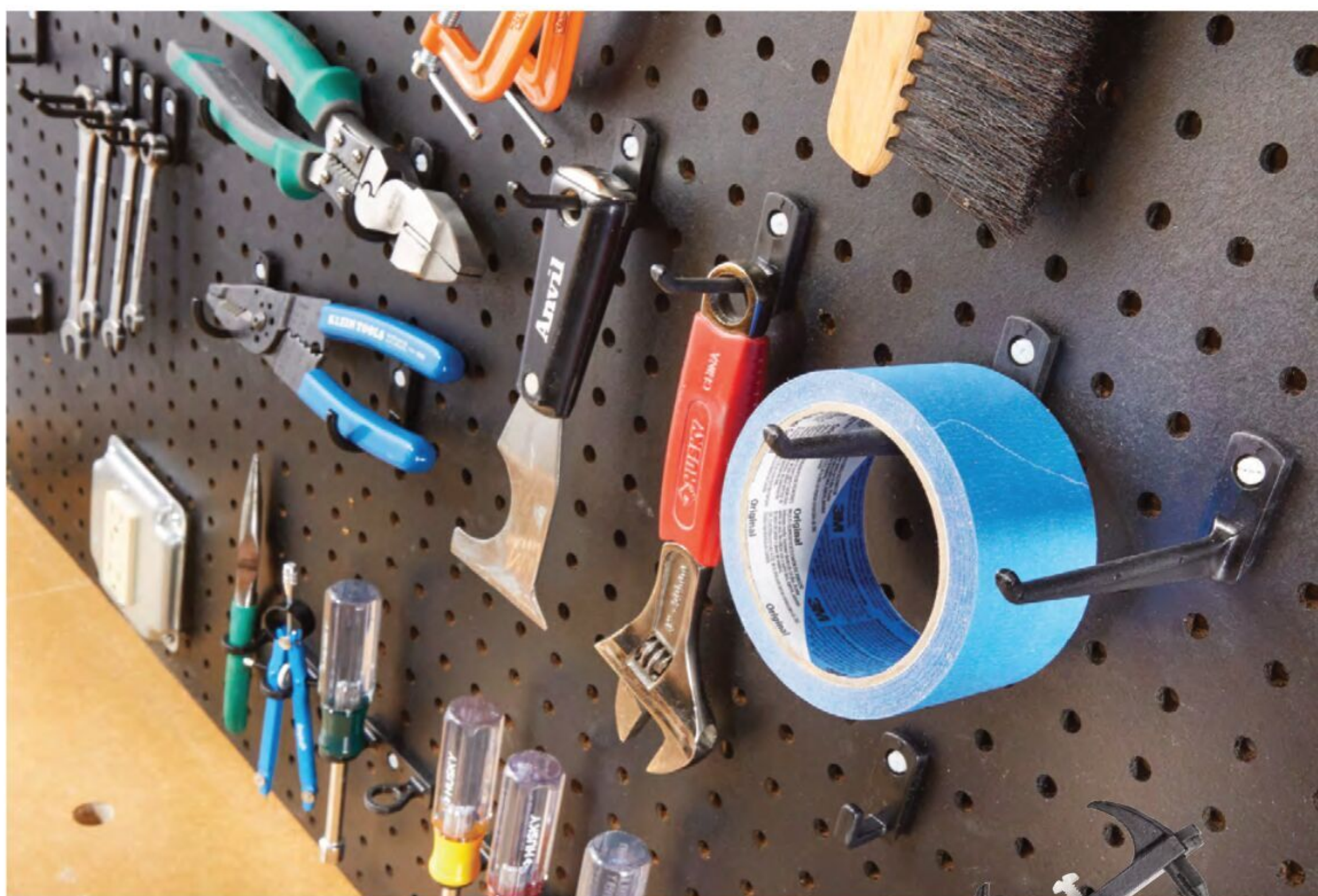




## NO MORE STINKY BOOTS

*After a day of yard work or hiking, boots can be wet from rain and perspiration. And wet boots are smelly! Not only that, moisture shortens the life of leather and other boot materials. My PEET boot dryer uses thermal convection to quietly and safely dry my boots in three to eight hours. The dryer works on all types of materials. You can get one online for \$50.*

**MIKE BERNER** ASSOCIATE EDITOR



## STAY-IN-PLACE PEGBOARD HOOKS

**P**egboard seems to be a part of every home shop and garage. Since the '50s, it has helped homeowners organize and store tools. But there's one thing that annoys everyone who uses it: When you grab something from the pegboard, usually the hook comes off too.

Of all the home hacks and products to solve this, these TalonHooks are the best I've seen. Pushing a locking expander into the pegboard with your thumb locks the hook. And if you need to reconfigure your hooks, you can back out the threaded inserts with a Phillips screwdriver.

Designed for standard 1/4-in. pegboard, these nylon TalonHooks come in seven styles and in a variety of packages. I got my set of 50 at [talonhooks.com](http://talonhooks.com) for \$35. You can also get them at woodworking stores and online retailers.

**BILL BERGMANN** ASSOCIATE EDITOR



## YOU MIGHT NEED A BIDET...

I didn't think I needed a bidet, but a serious injury changed my mind. While I was recovering, I enlisted a friend to install the Fluidmaster Soft Spa, which took about 30 minutes. This bidet works on my one-piece toilet, but because of a curve where the tank meets the bowl, the seat would fit better on a traditional two-piece model. If you do install a bidet requiring power, you may want to add an outlet in a convenient spot to keep the cord out of sight.

It's easy to adjust the temperature, direction and pressure controls to whatever suits you. The cleaning is thorough and comfortable, and the seat warmer is a nice touch. The unit also features a night-light, an effective deodorizing function and a drying fan. The dryer takes longer than I'd like, so I still use some toilet tissue, but my TP use is down about 75%. This bidet made me a believer, and using a typical toilet now feels a bit barbaric! The Soft Spa sells for \$400 at [fluidmaster.com](http://fluidmaster.com).

**VERN JOHNSON** CREATIVE DIRECTOR







## ALWAYS THE SHARPEST KNIFE IN THE DRAWER

A dull knife—whether in your pocket or in the kitchen—is next to useless. But putting a truly keen edge on a knife takes a measure of skill and know-how, and it can be a chore. The Work Sharp Mk.2 makes the process a whole lot easier.

The Mk.2 has three abrasive belts: one for honing, one for general sharpening and a coarse-grit belt for reviving a knife edge that's been butchered. Using the coarse or medium belt will create a lot of metal dust, so do that work in the garage (and remember to wear eye protection). Just install the abrasive belt you need, flip a lever for the proper angle (25 degrees for pocketknives, 20 for kitchen knives), pull the trigger and drag your blade through the guide. Once my knives are sharp, I mainly use the honing belt for quick touch-ups. The Work Sharp Knife & Tool Sharpener Mk.2 is \$99 at [worksharptools.com](http://worksharptools.com).

NICK GRZECHOWIAK CHIEF CONTENT OFFICER

## HANDY TOOL FOR GEARHEADS

*Here's the motorcycle and ATV tool kit quandary: The stock tool kit is weak, but your ideal kit is too bulky to carry. CruzTools, known for making portable tool kits for gearheads, has a solution. I like the Outback'R M14 multi-tool for its versatility beyond a bike, quad or snowmobile.*

*Less than 4 in. long, this multi-tool includes hex keys, slotted and Phillips screwdrivers, a driver with 8, 10 and 12 mm sockets, 13 and 14 mm open-end wrenches and three spoke wrenches. I haven't used the spoke wrenches, but they blend into the open-end wrench arm of the tool and take up no space. Sometimes I wish the tool had a knife or pliers, but I wouldn't want to make it heavier or more complex.*

*CruzTools also makes tool kits for musicians, and the company backs all its tools with a lifetime warranty. I had to test that warranty once, and the company delivered with no questions asked. You can find the Outback'R M14 online for about \$20.*

GLENN HANSEN DEPUTY EDITOR



## DEAD-ON CORNER MEASUREMENT

Measuring into a corner is guesswork. Sometimes "close enough" is fine, but when accuracy is crucial, having a tape measure clip like this in my tool belt gets me out of any corner with a dead-on measurement.

To use one, just bend the tape into the corner as you usually do, then slip on the clip, slide its end up to the corner and release the spring clasp so it holds tightly to the tape. Lift the tape out of the corner and read the measurement at the end of the clip. Several brands are available; the one shown here, from Homthia, runs \$13 online.

MIKE BERNER ASSOCIATE EDITOR





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## LONG-LASTING LEATHER GLOVES

**A**s a farm kid, during haying season I'd go through several pairs of leather gloves. The twine on the hay bales was merciless. I wish I'd had a pair of Vermont gloves to put to the test then. As a big kid, I've had the opportunity to use a pair called The Vermonter for landscaping, cutting logs, splitting and stacking logs, concrete work and working with rough stone. So far, they have laughed it all off and are breaking in nicely.

They're made from goat leather, which the manufacturer says stays soft and supple through wet/dry cycles because of its natural oils. These gloves are hand-stitched, with double-stitched fingertip seams, and all the seams are on the outside to take it easy on your fingers. You can beat the tar out of them day in and day out, but at \$100 a pair, you'll want to treat them to a bit of Neatsfoot oil from time to time to add a few years of service. The Vermonter gloves and the rest of the range are available at [vermontglove.com](http://vermontglove.com).

**BRAD HOLDEN** SENIOR EDITOR



## A BAG FOR BITS & PIECES

*My fasteners are about the only thing that stays organized in my shop. I owe this to my parachute bags: I have one for drywall screws, one for exterior screws, one for framing nails, one for wire nuts and so on. I can stack them up to four high in a 5-gallon bucket for easy transit. The drawstring tightly cinches the top closed, so a bag rarely tips or spills. Plus, the outside pockets are handy for stowing small tools and accessories. I have a mix of Bucket Boss parachute bags and CLC 1148 bags. Find them online and in home centers and auto parts stores for \$15 to \$22—a small price to pay for finding what you need, when you need it.*

**BILL BERGMANN** ASSOCIATE EDITOR



## SOCK PERFECTION

Darn Tough Vermont is a family-owned business with nearly 40 years of experience knitting socks in Northfield, Vermont. As a nod to their quality, the socks are guaranteed for life. If a pair ever fails, send it back and they'll send a new pair. An employee inspects each returned pair to see how they can improve.

Darn Tough socks come in many activity-specific styles and three padding levels. My favorite is the mid-weight hiker with full cushion. Additionally, Darn Tough socks are made from naturally antibacterial merino wool to help keep your socks and shoes stink-free. Since trying out a pair about 10 years ago, I'll never wear any other socks. They're that comfortable! Prices range from \$15 to \$30 a pair at [darntough.com](http://darntough.com).

**NICK GRZECZOWIAK** CHIEF CONTENT OFFICER





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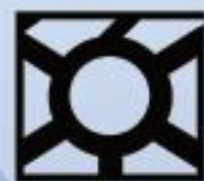


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# HANDY HINTS



CLEVER SOLUTIONS FROM OUR READERS



## SPINDLE PAINTER

**A** neat, fast way to paint stair spindles or other hard-to-brush objects is to use an old sock. First, put on a rubber or latex glove, then slip the sock over your hand. Dip your covered hand into the paint and apply it. You'll cover the entire surface, including all the details.

REV. O.E. LYONS





## SHOVELING YOUR SHOP

Sure, you can buy long-handled dustpans to make cleanup easier on your back, but a child's snow shovel does the job just as well and costs much less. You can get a kiddie shovel for less than \$10 at home centers and discount stores.

THOMAS P. KELLEY



## QUICK, NO-MESS FUNNEL

Every time you add oil, coolant or windshield washer fluid to your car, you spill a little, right? Keep a supply of unwaxed paper cups in the garage to use as funnels. When needed, just punch a hole in a cup bottom and throw it away when you're done. No mess. They're perfect for filling mowers, chain saws or any container with a small opening.

ALLAN FURTH



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## HANDY HINTS



### LADDER-FREE CEILING CLEANER

It's not often I have to clean the ceiling, but after squashing a spider against it recently, I had no choice. To make it easy, I used a paint pad on an extension handle. I sprayed the cleaner on the pad, washed the spot, then wiped it with a clean cloth over the painting pad. I didn't have to balance on a ladder, and the square shape of the pad can reach into corners.

STEVEN PEPPER



### STAINLESS STEEL SINK SAVER

My stainless steel kitchen sink was so scratched, stained and etched that I was ready to replace it. As a last resort, I gave it a good rubdown with 400-grit extra-fine sandpaper wetted with vegetable oil. It came out looking much nicer and bought me some time to replace it. Make sure you move the sandpaper in the same direction as the original polishing lines.

KEVIN McCAFFERTY

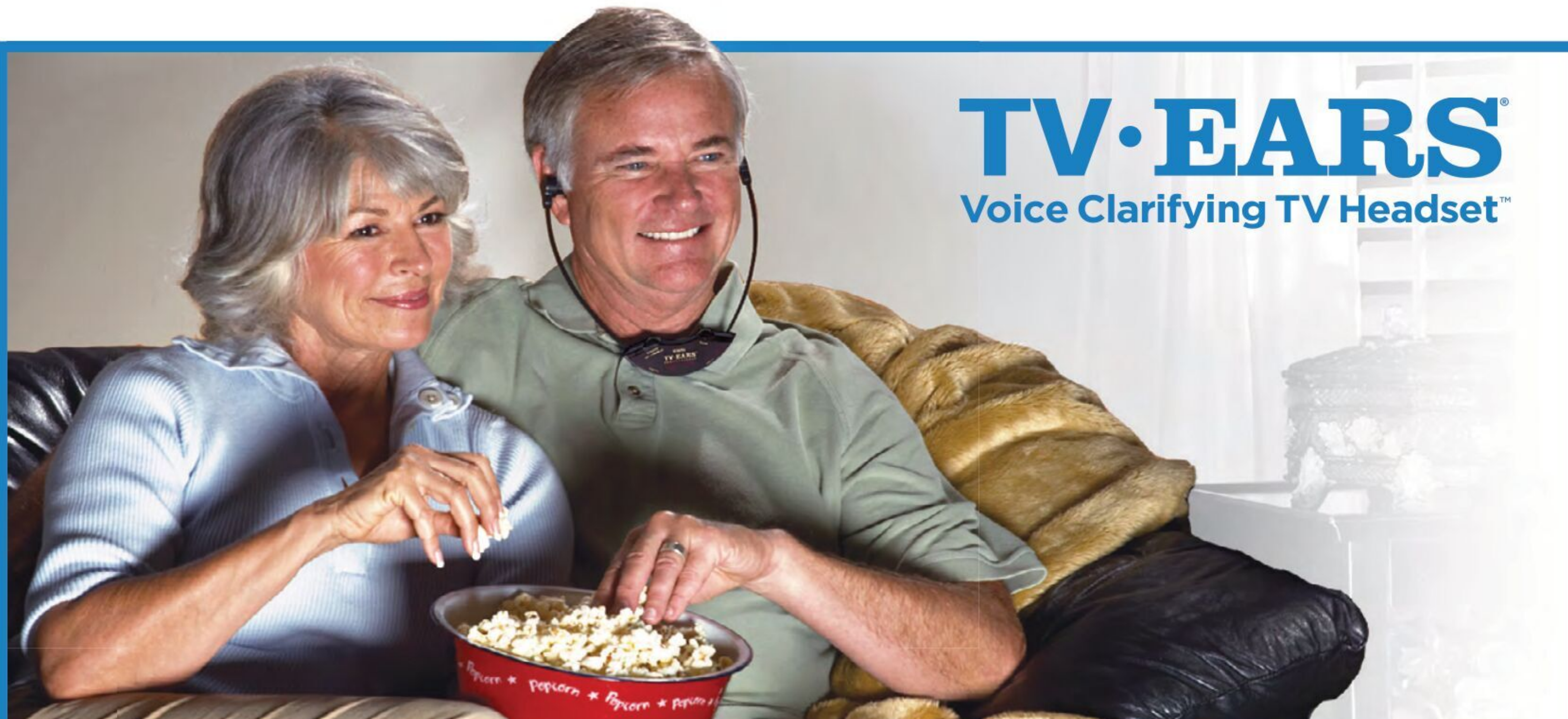
### HOMEMADE TAPE DISPENSER

When we were selling our home, I was sealing moving boxes and didn't have a dispenser for the packing tape roll. I started snipping the tape with scissors, but then I rigged up this simple dispenser with a heavy-duty zip tie. After applying a length of tape to a box, I poked the cut end of the zip tie into the tape and it tore easily.

KELLY FERGUSON







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## GET A GRIP

If you're in a region that gets freezing rain or snow, keep a milk jug filled with sand in a winter emergency kit in the trunk of your car. If you get stuck on ice, just sprinkle sand under your tires to give your car the grip it needs.

ROBERT L. ROWELL



## MORE HINTS FOR YOU!

If organizing, cleaning, maintenance and easy fixes are on your to-do list this winter, our readers' Handy Hints can help! Get this collection of more than 200 of the best time- and money-saving solutions for just \$10—and shipping is free. [familyhandyman.com/HIN21](http://familyhandyman.com/HIN21)



## PIPE CLAMP HOLDER

A good place to store bar and pipe clamps is right under your workbench. Buy a length of 3-in.-diameter PVC or ABS pipe, cut out a notch to fit the clamp jaws and then fasten the pipes under your workbench. Just slide the clamps into the pipes—they'll always be right where you need them.

JAY SAUNDERS



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# HOMELAB

**fh** A TESTING ZONE FOR INNOVATIONS

## CLEANER AIR & HELPFUL DATA



You can do two things about air pollution immediately. First, increase your awareness of indoor and outdoor air conditions and, second, clean the air inside your home. I've been testing the Aura Air purifier device in my home for several weeks. Once plugged in, the device goes to work immediately to clean the air and to inform me about the quality of the air I'm breathing, and that's one of the manufacturer's main goals.

"We want to inform and provide a solution," said Roei Friedberg, CEO of Aura Air, when we spoke over Zoom recently. "As we work to build a new standard for indoor air quality, we know that information is an important element of the process."

To clean indoor air, the Aura Air purifier uses a system of filters, sensors, a UVC LED light and a recirculating fan. The device's prefilter snares large particles such as dust, pollen and even pet hair. The unit's larger ray filter targets the contaminants you can't see. This filter—about the size and shape of an old automotive air cleaner—includes a high-efficiency particulate air (HEPA) filter, a carbon filter to absorb volatile organic compounds (VOCs) and foul odors, and a zinc-lined copper fabric filter for virus-killing properties. The UVC LED light works to kill pathogens in the air; this technology is increasingly common in air-cleaning devices. The Aura Air's Sterionizer element converts oxygen molecules into positive and negative charged atoms, which can reduce the spread of airborne pathogens.

**E**ven with the relatively clean air in Minnesota, I wonder about my home's indoor air quality. Smoke from wildfires hundreds of miles away, fumes from construction projects, chemicals sprayed on neighboring yards, my own drywall project—who knows what's in the air I breathe? What I do know are the potential harmful effects of air pollutants, from a nagging cough to asthma symptoms to long-term lung conditions.

BY GLENN HANSEN



In clinical trials performed in Japan, the Sterionizer reduced influenza H1N1 virus levels in the air by 92 percent after 30 minutes of exposure and 98.9 percent after 60 minutes.

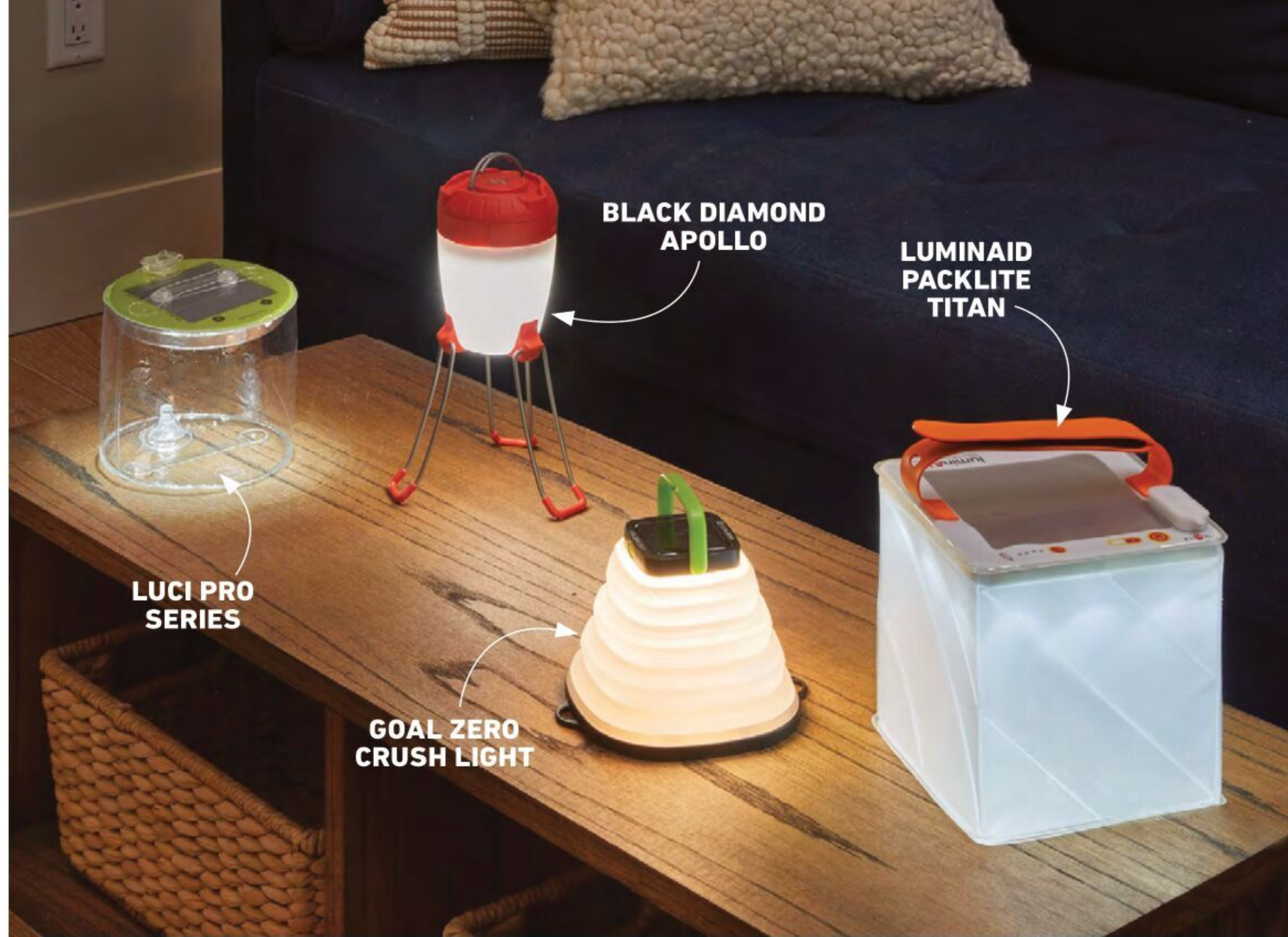
The Aura Air wall-mounted cube weighs about 12 lbs. and measures about 15 in. across. I mounted it on the wall outside my bedrooms and home office, and I was able to secure it easily with the included hardware. Then I plugged in the unit, downloaded the app and connected the device to my home network.

Once I entered my Wi-Fi password, the small light on the Aura Air turned green and it began to work. I know it did because I could hear it. I mean, I could definitely hear it. Louder than I expected it to be, the Aura Air's fan works hard to pull air through all its filters. The sound reminded me of a small window air-conditioning unit.

But while I explored the app and the unit's settings, I noticed the Aura Air became quieter, as if it shifted down a gear or two. With the unit in Auto Mode, it will cycle as needed from low to high. I discovered I can manually set it to any mode (including Silent Mode) and program a Night Mode to quiet the device and turn off the indicator light.

With the app and my connected Aura Air, I have access to loads of data about indoor and outdoor air quality. Information about particulate matter, VOCs and the overall air quality index is important to those suffering with asthma or allergies. The Aura Air monitors CO and CO<sub>2</sub> indoors, and it reports on nitrogen oxides, ozone and sulfur dioxide in the outdoor air. It also works as a smoke detector.

The Aura Air, designed to handle about 600 sq. ft. of living space, retails for \$500. There's also an Aura Air Mini, a battery-powered portable unit, for use in hotels or smaller work spaces. If you're curious about the air quality where you live, enter your zip code at [airnow.gov](http://airnow.gov), a site created in part by the U.S. EPA.



## EMERGENCY LIGHT ANYWHERE

For someone who rarely camps, I own too much camping equipment. But I feel no guilt; this gear is so darn functional. Camping lanterns may be the best example of that. If you've ever lost power in your home or apartment, you'd appreciate owning at least one of these. They're safer than candles, easier to use and store, and much more versatile. Decent work lights too. I tried out four brands and styles of LED lanterns.

The **Goal Zero Crush Light Solar Lantern** (\$20) is a collapsible, lightweight device about 5 in. square and 4 in. high when expanded. It has a small solar panel on top, plus a micro USB outlet for charging. The LEDs can be set to high (60 lumens), medium, low or a "candle flicker" setting. The light lasts for three hours on high. The detachable handle lets you hook this device to almost anything. And it's all waterproof—for camping, you know. It's simple, small, inexpensive and easy to store. Goal Zero is known for making a wide range of power stations, solar panels and lights.

The **Luci Pro Series Outdoor 2.0** provided my light as I wrote this. The inflatable lantern (\$45) might feel like an inexpensive blow-up pool toy, but it's a serious lantern that can put out 150 lumens of LED light and charge your cell phone. It collapses to a 5-in.-diameter disc and weighs just 6 oz. Choose low, medium or high light output, or the flash setting, perhaps for camping emergencies. It is all waterproof and can be charged by the sun or a USB cable, with a battery indicator light to tell you how you're doing. On high power, the light lasts about five hours, as advertised. I loved the size, the brightness and the price, but the clear plastic bubble means the light can be a bit glaring.

The **Black Diamond Apollo Lantern** (\$65) runs on a rechargeable lithium-ion battery or 3 AAs. No solar charge option here. But the high-setting output is 250 lumens of warm white light, the equivalent of a 30-watt incandescent bulb. Instead of preset outputs, this one is dimmable. It has three fold-up legs, plus a metal loop on top for hanging. It's also capable of charging a cell phone and includes dual USB ports, a nice feature. Black Diamond is well known in camping and outdoors circles.

In this lantern quartet, the **Luminaid PackLite Titan** is the brightest, the most expensive (\$75) and the only one with a red-light setting for night vision. In its white-light high setting, the PackLite emits 300 lumens; it stayed bright for me for nearly seven hours. This one has both micro and regular USB ports, like the Black Diamond, but it adds a large solar panel. It can even charge other devices. The Luminaid's cool-white light made it less appealing to my eyes, but it's easily the brightest of this group. It's also waterproof and it floats.



# IF THIS THEN THAT: WHAT IS IT? WHAT'S IN IT FOR YOU?

The “internet of things” is real. Each American home has, on average, 25 internet-connected devices: a thermostat, smart TVs and speakers, a connected garage door opener and more. On our phones we each have an average of 35 mobile apps. But are our apps and devices connected to one another? They can be, delivering benefits you’ve probably hoped for.

**If This Then That**, or **IFTTT** for short, puts the internet to work for you. With this automation tool, you define the “this” trigger and the “that” action to connect devices and make things happen. You can trigger your robot mower to park itself anytime it rains. You can turn the entryway light on when your smart door lock opens. You can use voice commands to power a room full of electronics and lights.

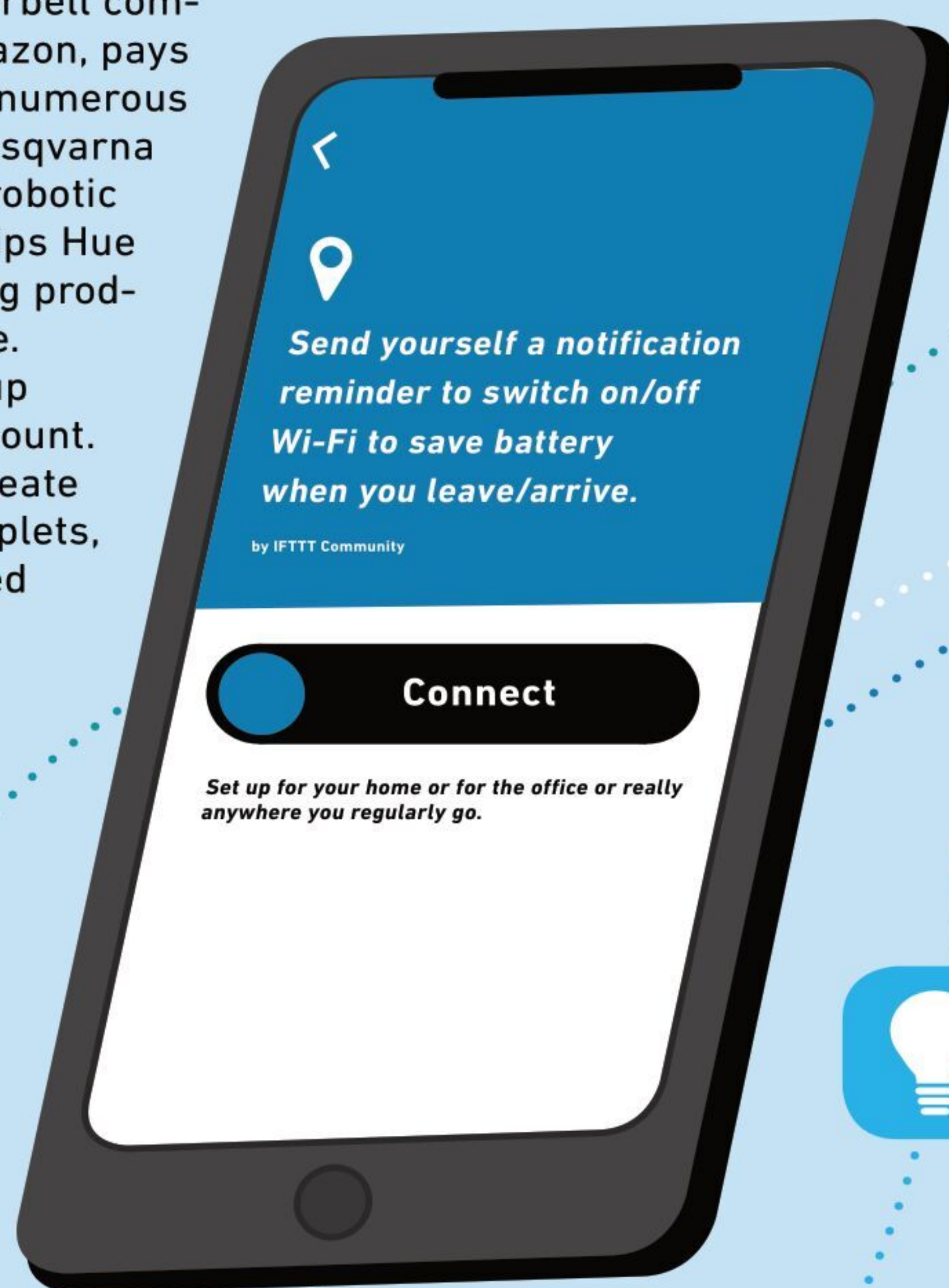
The combination of an IFTTT trigger and an action is called an applet. You can discover useful applets using the IFTTT website or cell phone app. Anyone can create an applet if the devices they want to trigger are connected to the internet and recognize IFTTT. I created one to trigger my Aura Air purifier to email me if particulates in the air reach a certain unhealthy level.

I found many other interesting applets on the site; some were

created by individual users and many by companies that hope I’ll find the applets useful and expand the use of their products. I found one, for example, that enables my smart garage door opener (Chamberlain, with the MyQ smart application) to close by 10 p.m. if I forget. Applets like this are a big part of how IFTTT makes money. Ring, the smart doorbell company owned by Amazon, pays IFTTT a fee to host numerous applets, as does Husqvarna for its Automower robotic lawn mowers, Phillips Hue for its smart lighting products and many more.

I initially signed up for a free IFTTT account. With that, I could create three of my own applets, like the one I created

for my air purifier, and get unlimited use of any applets already created. I’ve since upgraded to a Pro account for \$4 per month, and if my smart-home device library grows, I’ll need it. I can always cancel later. My Pro account also lets me use “queries,” but more on that on the next page.



## SPONSORED

### SMART INSURANCE FOR SMART HOMES

As homeowners turn to internet-enabled solutions to keep everything connected with ease, **Branch Insurance** is there to simplify insurance in a very smart way.

Branch Insurance is tech-savvy. Money-saving. Simply better. Get a quote in as little as 30 seconds by visiting [ourbranch.com](https://ourbranch.com).







# Smart Insurance for Smart Homes

**As the saying goes: Work smarter, not harder.** That's especially true on the home front. With the help of technology, it's never been easier to manage your home—and, at the same time, protect it. As homeowners turn to internet-enabled solutions to keep everything from air conditioning to security systems connected with ease, Branch Insurance is there to simplify insurance in a very smart way.

With a mission to make insurance better and more affordable for all, Branch puts data and tech to work. A home, renter's or auto insurance quote on Branch's website, [ourbranch.com](https://ourbranch.com), can take as little as 30 seconds. It's based on just two questions: your name and your address. Behind the scenes, Branch does smart searches to safely and securely deliver you an accurate and cost-effective quote.

Branch's efficiency is passed along to you in the form of savings. Bundling auto and home insurance

can be done instantly and saves even more money. In fact, Branch offers the deepest discounts for having a home security system.

Just as you use apps to make your home work smarter, the Branch mobile app makes it easy for policyholders to view and adjust coverage, access ID cards even when offline, request roadside assistance at the push of a button, and chat or email with a customer service agent immediately. Claims can be filed via the app or over the phone.

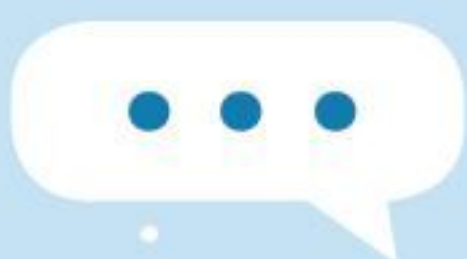
When policyholders do call Branch, they get the best service possible, with a U.S.-based team that prides itself on responsiveness.

Branch was founded on a very simple idea: insurance should be a force for communal good. By putting technology to work for their customers, and with a service team that treats policyholders like family, Branch works smart to protect what matters most to you. ■

**Get your Branch Insurance quote today by visiting [ourbranch.com](https://ourbranch.com).**







○ If it's 7 a.m., then...  
○ get a report for today's weather forecast.



Discovering facts is part of the fun. I learned that the city of Louisville—via its “Smart Louisville” initiative—became the first city in the nation to partner with IFTTT. It created a trigger that citizens can use to create their own applets. Here are other interesting ones:

- Get notified when the International Space Station passes over your house, but only if the skies are clear and it's dark.
- Email the song title when you save a track on Spotify.
- Have a lamp or two blink on and off when it starts to rain.
- Get an email or text notification if the pollen count is high.
- When your Android phone battery is getting low, turn off Bluetooth.

You can also create industry-specific and news-focused actions. For example:

- Get an email when a company files a 10-Q with the SEC.
- Get a text message when the State Department issues a travel alert.
- Get notified when the USDA posts a new food recall due to allergens.

- And this: Order Domino's when the National Science Foundation declares we've discovered aliens. Because, you know, aliens.

IFTTT enables many trigger-action combos for use with smart-home hubs like Amazon Alexa and Google Home Assistant. Helpful, indeed, but IFTTT isn't flawless. I found broken applets and a less-than-ideal search function. I enjoyed the novelty of discovering intriguing ideas that aren't useful to me, but I spent way too much time doing so!

IFTTT gets even more interesting when you add a query, which is basically another “if this” trigger. Here's an example from IFTTT's own help site:

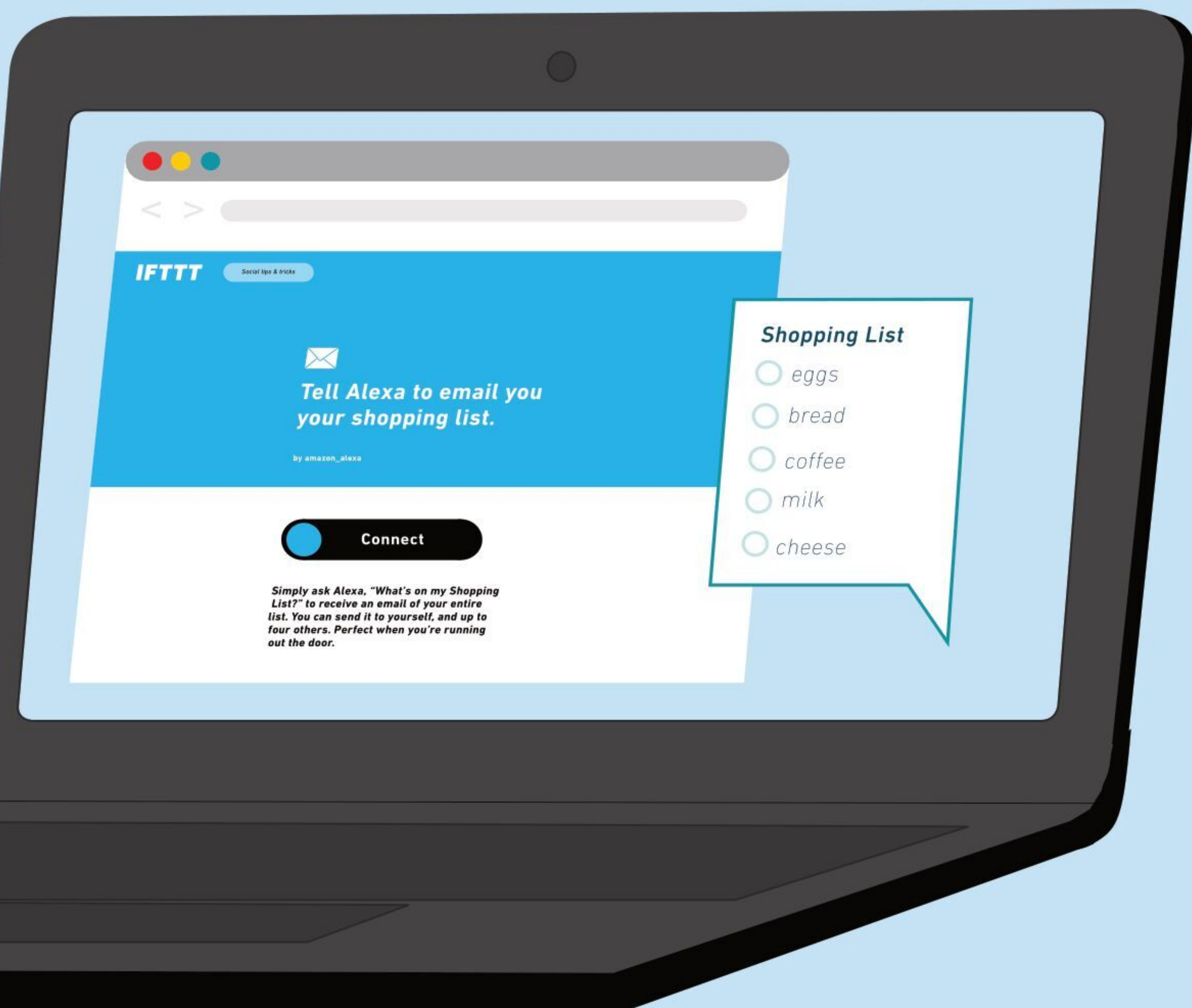
**TRIGGER:** If the temperature rises above a certain threshold, then...

**QUERY:** Current electricity price...

**FILTER CODE:** Check to see if the electricity price is above a certain threshold; if false, run action, then...

**ACTION:** Turn on the AC

Queries help make your home and smart devices even smarter. If it saves you time and/or money, then you're the smart one. See, I created an IFTTT right there.





## SMART LEAK DETECTION AND WATER CONTROL

**C**opper pipe remains the standard for plumbing in as many as 85 percent of homes in the United States. But copper is prone to corrosion over time from overly acidic water supplies. When California began adding chloramine to its water supply to help kill bacteria, homeowners saw an increase in pinhole leaks developing in copper plumbing. These and other failures in copper pipes are often difficult to detect until significant water damage has occurred.

To be fair, polyethylene (or PEX) piping isn't perfect either. Leaks can develop in PEX piping or at fittings, and they may go undetected as well. The solution? Leave all your plumbing exposed indoors so you can easily identify leaks. Or install a device that does this for you.

My home has copper main lines and plumbing manifolds that lead to PEX supply lines for fixtures and appliances. I can see much of the plumbing in my unfinished basement, but I still want more information and the security of a "smart" system. I installed the Flo by Moen smart water valve, which is part of the manufacturer's Smart Water Security System.

Installation on your home's main line—3/4- to 1-1/4-in. pipe diameter—is fairly simple if you have experience working with copper pipe. Or it's quick work for your favorite plumber. Depending on the location and strength of your router, the Flo by Moen connects easily to Wi-Fi. It works with Alexa and Google systems, but it doesn't require a smart-home hub.

When installed on the main water supply line, this valve monitors water flow rates and pressure in real time. It then reports the data through an app on your phone. During setup, the app asked me questions about water use, like whether I have a sprinkler system. Then over 7 to 10 days, the system learned my water-use habits. The valve was in Sleep mode then and not protecting me, but it was monitoring.

After its first day in Learning mode, it reported a 632-gallon usage for my sprinkler system. When the learning was complete, the device continued to monitor for changes in pressure and flow rate. If there's a catastrophic failure, like a burst pipe or the water is left running, I get an alert and can shut off the water from anywhere. I can set it up to shut off the water automatically as well.

If I'm planning to use an unusually large amount of water, maybe to fill a new hot tub, I can put the system in Sleep mode and it won't think there's a leak somewhere. The app will also notify me of situations like a running toilet or a faucet not completely closed.

Preventing major water damage is the main benefit of this Flo system. I had a pipe burst once because it froze in the winter. I don't want to go through that again. I can also use this smart

water valve to measure and rethink my family's water usage, saving money as well.

The smart valve system runs daily Health Tests on my plumbing. It closes the main valve for a bit to test for changes in pressure. The system will schedule this test for a time when we don't use water. Water use at the time will override the test. I can also schedule these tests myself.

The Flo by Moen smart valve is designed to work on its own, no subscriptions needed. You can also add Moen's Smart Water Detector devices, which you place at individual plumbing fixtures or appliances. They'll communicate with the smart valve directly or work through the Moen app. Moen does offer a monthly subscription service called FloProtect, which includes an extended warranty, additional customer support and money toward an insurance deductible. Your insurance company may provide you with discounts for any of these services.



FLO BY MOEN  
SMART VALVE



MOEN SMART  
WATER  
DETECTOR



For certain adults with **newly diagnosed metastatic non-small cell lung cancer (NSCLC)** that **tests positive for PD-L1**



**= A CHANCE FOR  
MORE BIG HORIZONS**

## A Chance to Live Longer™

### THE ONLY FDA-APPROVED **CHEMO-FREE COMBINATION** OF **2 IMMUNOTHERAPIES** THAT WORKS DIFFERENTLY

**In a study of newly diagnosed advanced NSCLC patients, half of those on OPDIVO + YERVOY were alive at 17.1 months versus 14.9 months on platinum-based chemotherapy.**

**Thank you to all the patients, nurses, and physicians in our clinical trials.**

Results may vary. OPDIVO® + YERVOY® is not approved for patients younger than 18 years of age.

#### **Indication & Important Safety Information for OPDIVO (nivolumab) + YERVOY (ipilimumab)**

Only your healthcare professional knows the specifics of your condition and how OPDIVO in combination with YERVOY may fit into your overall therapy. The information below does not take the place of talking with your healthcare professional, so talk to them if you have any questions.

#### **What are OPDIVO and YERVOY?**

OPDIVO and YERVOY are prescription medicines used to treat people with a type of advanced stage lung cancer called non-small cell lung cancer (NSCLC). OPDIVO may be used in combination with YERVOY as your first treatment for NSCLC when your lung cancer has spread to other parts of your body (metastatic) **and** your tumors are positive for PD-L1, but do not have an abnormal EGFR or ALK gene.

It is not known if OPDIVO and YERVOY are safe and effective when used in children younger than 18 years of age.

#### **What is the most important information I should know about OPDIVO and YERVOY?**

OPDIVO and YERVOY are medicines that may treat certain cancers by working with your immune system. OPDIVO and YERVOY can cause your immune system to attack normal organs and tissues in any area of your body and can affect the way they work. These problems can sometimes become serious or life-threatening and can lead to death and may happen anytime during treatment or even after your treatment has ended. You may have more than one of these problems at the same time. Some of these problems may happen more often when OPDIVO is used in combination with YERVOY.

#### **Call or see your healthcare provider right away if you develop any new or worse signs or symptoms, including**

- **Lung problems:** new or worsening cough; shortness of breath; chest pain
- **Intestinal problems:** diarrhea (loose stools) or more frequent bowel movements than usual; stools that are black, tarry, sticky, or have blood or mucus; severe stomach-area (abdominal) pain or tenderness
- **Liver problems:** yellowing of your skin or the whites of your eyes; severe nausea or vomiting; pain on the right side of your stomach area (abdomen); dark urine (tea colored); bleeding or bruising more easily than normal

- **Hormone gland problems:** headaches that will not go away or unusual headaches; eye sensitivity to light; eye problems; rapid heartbeat; increased sweating; extreme tiredness; weight gain or weight loss; feeling more hungry or thirsty than usual; urinating more often than usual; hair loss; feeling cold; constipation; your voice gets deeper; dizziness or fainting; changes in mood or behavior, such as decreased sex drive, irritability, or forgetfulness
- **Kidney problems:** decrease in the amount of urine; blood in your urine; swelling in your ankles; loss of appetite
- **Skin problems:** rash; itching; skin blistering or peeling; painful sores or ulcers in mouth or nose, throat, or genital area
- **Eye problems:** blurry vision, double vision, or other vision problems; eye pain or redness

**Problems can also happen in other organs and tissues. These are not all of the signs and symptoms of immune system problems that can happen with OPDIVO and YERVOY. Call or see your healthcare provider right away for any new or worsening signs or symptoms, which may include:**

- Chest pain; irregular heartbeat; shortness of breath; swelling of ankles
- Confusion; sleepiness; memory problems; changes in mood or behavior; stiff neck; balance problems; tingling or numbness of the arms or legs
- Double vision; blurry vision; sensitivity to light; eye pain; changes in eye sight
- Persistent or severe muscle pain or weakness; muscle cramps
- Low red blood cells; bruising

#### **Getting medical help right away may help keep these problems from becoming more serious.**

Your healthcare team will check you for these problems during treatment and may treat you with corticosteroid or hormone replacement medicines. Your healthcare team may also need to delay or completely stop your treatment if you have severe side effects.

#### **What should I tell my healthcare provider before receiving OPDIVO and YERVOY? Before you receive OPDIVO and YERVOY, tell your healthcare provider about all of your medical conditions, including if you:**

- have immune system problems such as Crohn's disease, ulcerative colitis, or lupus
- have received an organ transplant





**Talk to your doctor about OPDIVO + YERVOY**

**[www.OPDIVOYERVOY.com](http://www.OPDIVOYERVOY.com) 1-855-OPDIVOYERVOY**

- have received or plan to receive a stem cell transplant that uses donor stem cells (allogeneic)
- have received radiation treatment to your chest area in the past and have received other medicines that are like OPDIVO
- have a condition that affects your nervous system, such as myasthenia gravis or Guillain-Barré syndrome
- are pregnant or plan to become pregnant. OPDIVO and YERVOY can harm your unborn baby
- are breastfeeding or plan to breastfeed. It is not known if OPDIVO or YERVOY passes into your breast milk. Do not breastfeed during treatment with OPDIVO or YERVOY and for 5 months after the last dose of OPDIVO or YERVOY

**Females who are able to become pregnant:** Your healthcare provider should do a pregnancy test before you start receiving OPDIVO or YERVOY.

- You should use an effective method of birth control during your treatment and for at least 5 months after your last dose of OPDIVO or YERVOY. Talk to your healthcare provider about birth control methods that you can use during this time.
- Tell your healthcare provider right away if you become pregnant or think you are pregnant during treatment with OPDIVO or YERVOY. You or your healthcare provider should contact Bristol Myers Squibb at 1-844-593-7869 as soon as you become aware of the pregnancy.

**Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements.**

Know the medicines you take. Keep a list of them to show your healthcare providers and pharmacist when you get a new medicine.

**What are the possible side effects of OPDIVO and YERVOY?**

**OPDIVO and YERVOY can cause serious side effects, including:**

- **See “What is the most important information I should know about OPDIVO + YERVOY?”**
- **Severe infusion reactions.** Tell your healthcare team or nurse right away if you get these symptoms during an infusion of OPDIVO or YERVOY: chills or shaking; itching or rash; flushing; shortness of breath or wheezing; dizziness; feel like passing out; fever; back or neck pain

- **Complications, including graft-versus-host disease (GVHD), of bone marrow (stem cell) transplant that uses donor stem cells (allogeneic).** These complications can be severe and can lead to death. These complications may happen if you underwent transplantation either before or after being treated with OPDIVO or YERVOY. Your healthcare provider will monitor you for these complications.

**The most common side effects of OPDIVO when used in combination with YERVOY include:** feeling tired; diarrhea; rash; itching; nausea; pain in muscles, bones, and joints; fever; cough; decreased appetite; vomiting; stomach-area (abdominal) pain; shortness of breath; upper respiratory tract infection; headache; low thyroid hormone levels (hypothyroidism); decreased weight; and dizziness.

These are not all the possible side effects of OPDIVO and YERVOY. Call your doctor for medical advice about side effects.

You are encouraged to report side effects of prescription drugs to the FDA. Call 1-800-FDA-1088.

*OPDIVO (10 mg/mL) and YERVOY (5 mg/mL) are injections for intravenous (IV) use.*

This is a brief summary of the most important information about OPDIVO and YERVOY. For more information, talk with your healthcare providers, call 1-855-673-4861, or go to [www.OPDIVO.com](http://www.OPDIVO.com).



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# ENTER IN STYLE!

THREE PROJECTS DESIGNED  
TO CREATE AN INVITING SPACE

MODERN SHELF

SIMPLE  
COATRACK

JAY CORK

## MEET THE BUILDER



JAY CORK, AN ASSOCIATE  
EDITOR, LOVES TO BUILD  
MID-CENTURY MODERN  
STYLE FURNITURE.





**BENCH  
WITH  
STORAGE**

## WHAT IT TAKES

| TIME   | COST  | SKILL LEVEL  |
|--------|-------|--------------|
| 3 days | \$875 | Intermediate |

### TOOLS

Table saw, band saw, miter saw, palm sander, cordless drill, pocket hole jig, dowel jig, basic carpentry tools

**W**elcome family and friends to your home with a pretty spot to hang coats and a comfy bench to make it easy to remove shoes and boots. The eye-catching shelf is positioned here to create a stylish boundary for an open entryway, but it could grace any living space. That's the best part of this project—you can build one or two pieces, or the whole trio!

## GETTING STARTED



### MAKE THE ROUTING TEMPLATES

To save money, I wanted to cut the shelf legs and coatrack legs from the same boards. Routing templates make it easy to produce multiple parts consistently. I made my routing templates from 1/2-in. MDF.



### PRO TIP

Rout with the grain whenever possible.

### CUT AND ROUT THE PARTS

After tracing all the shapes on the boards, cut close to the line but not up to it. I used a combination of double-sided tape and micro pins to secure the routing template onto the wood. Rout the parts on a router table.

## WORKING WITH CHERRY

Cherry, a common North American hardwood, is one species I rarely stain. It naturally darkens over time and develops such a beautiful patina all on its own. On the downside, it tends to burn when milling; use sharp blades or expect to spend time sanding out burn marks.





## THE COATRACK

### 1 CUT THE CENTER BLOCK

This three-legged coatrack presents a unique challenge during assembly because there's no good way to use a clamp; a combination of glue and screws will get the job done. I glued the three legs together around an inner triangle of wood. Cut this triangular block on the table saw with the blade set to 30 degrees. Each face should be the same thickness as the legs.

### 2 GLUE THE LEGS TOGETHER

When I can't use clamps, I use a trick called a rub joint—rubbing two pieces of wood together until the glue becomes tacky. Hide glue works well for this because it dries fast. Glue the center block to one leg first, and let it dry. Glue the other legs onto the center block one at a time, allowing the glue to dry before gluing the next leg. Use tape to help keep things from shifting around while the glue dries.

### 3 MAKE THE HAT HOOKS

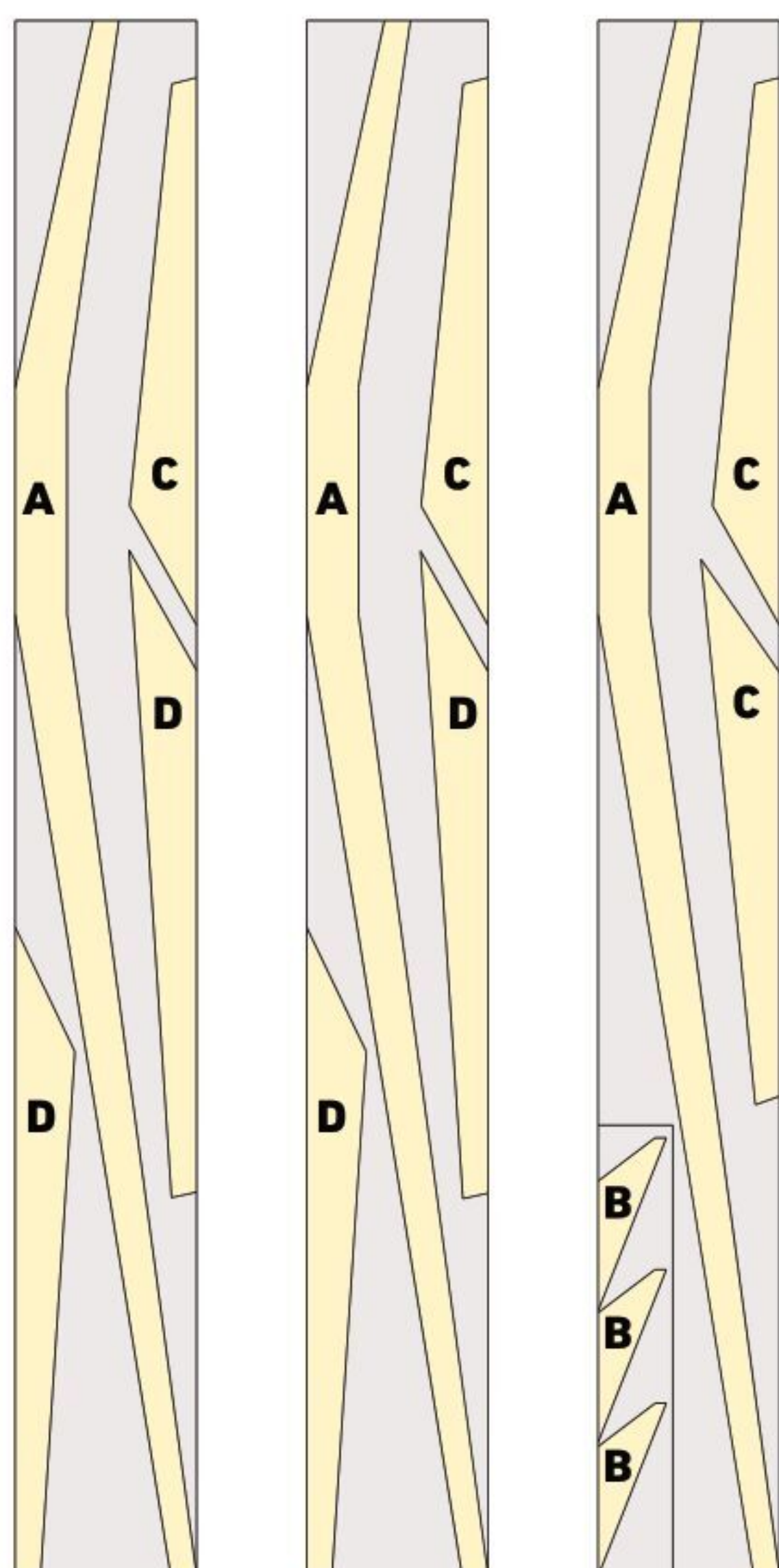
The hat hooks will need a double bevel on the inside edge to fit between the legs of the coatrack. You'll need to make two passes on the table saw with the blade set to 30 degrees. Predrill for the assembly screw with a countersink bit.

### 4 PREDRILL FOR FINAL ASSEMBLY

Using thick CA glue, attach the hat hooks onto the legs, staggering each one a few inches. Let the glue set up for 10 minutes, then drill pilot holes and countersink for 3-in. screws. The combination of screws and glue will strengthen this coatrack for the heaviest winter jackets.

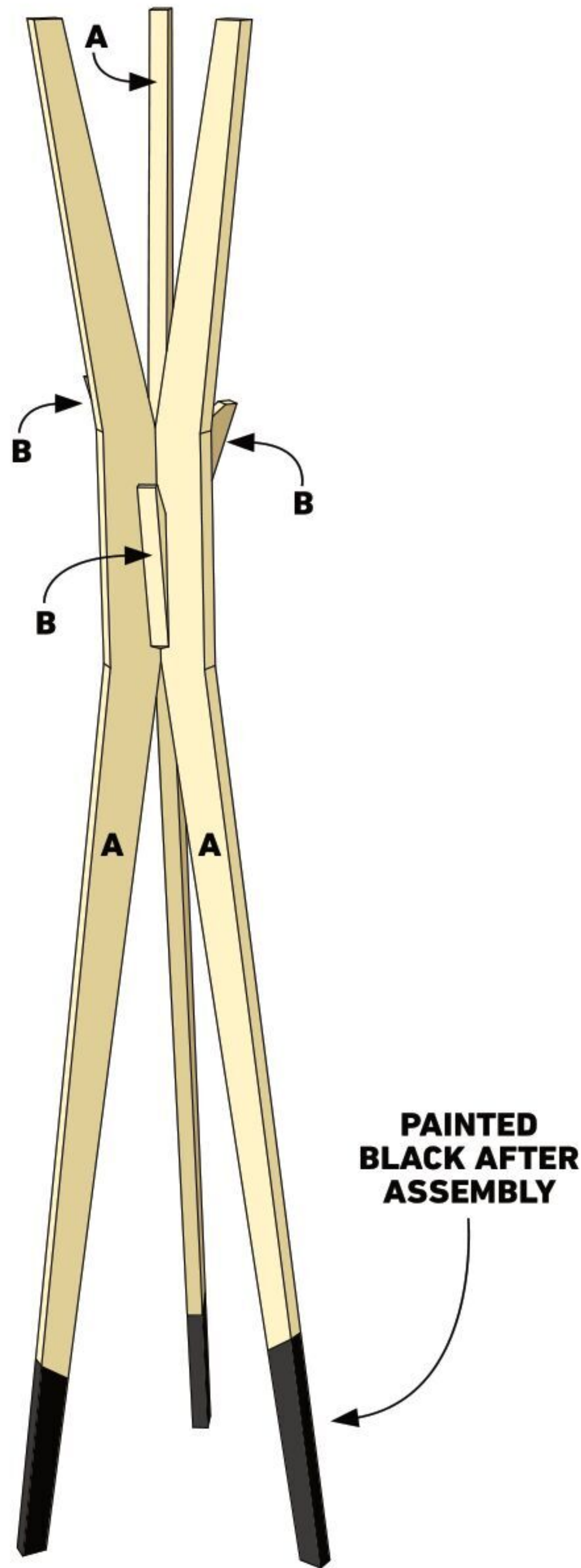
## FIGURE A CUTTING DIAGRAMS

OVERALL DIMENSIONS OF EACH BOARD:  
4/4 x 8"W x 72"L

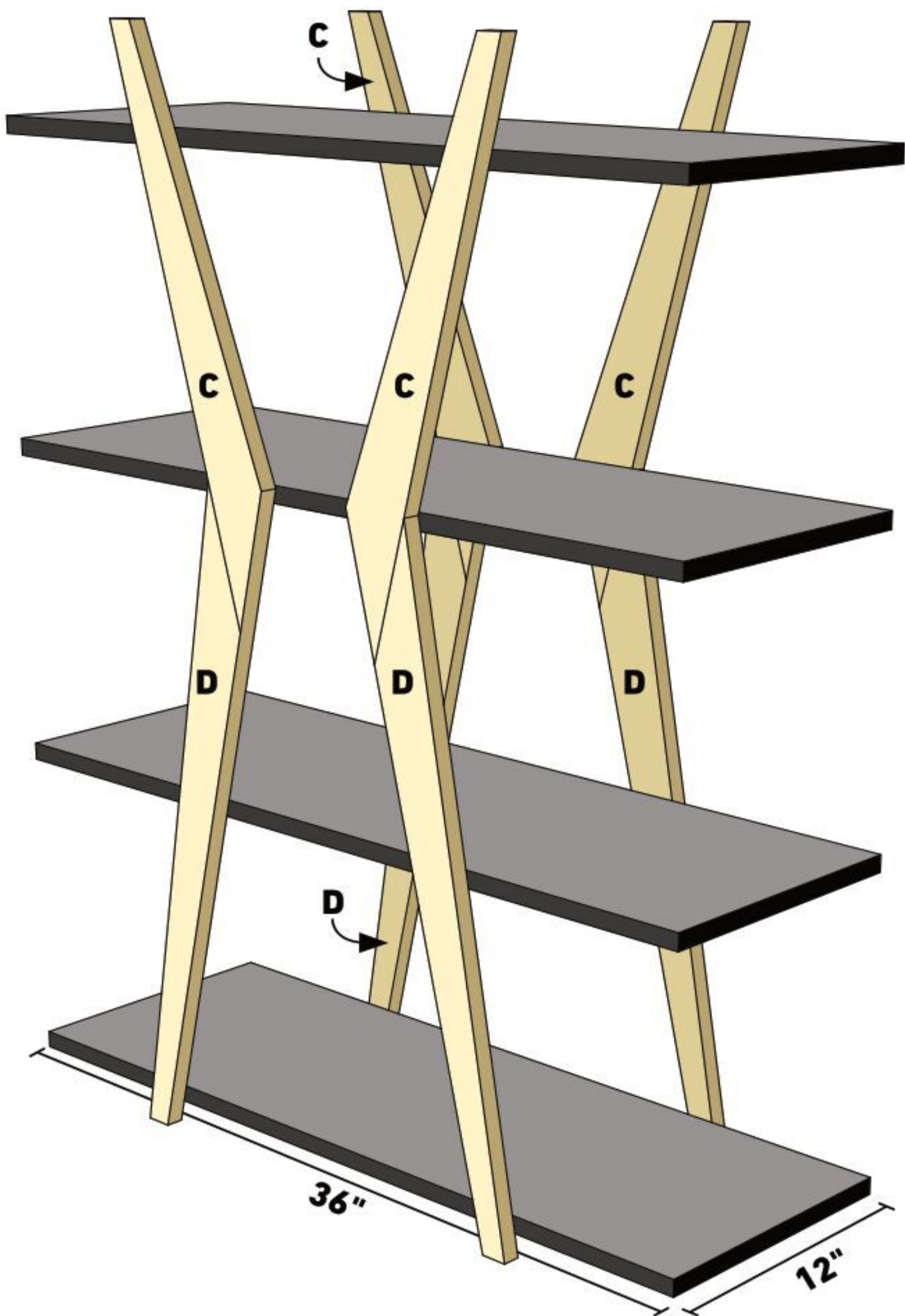




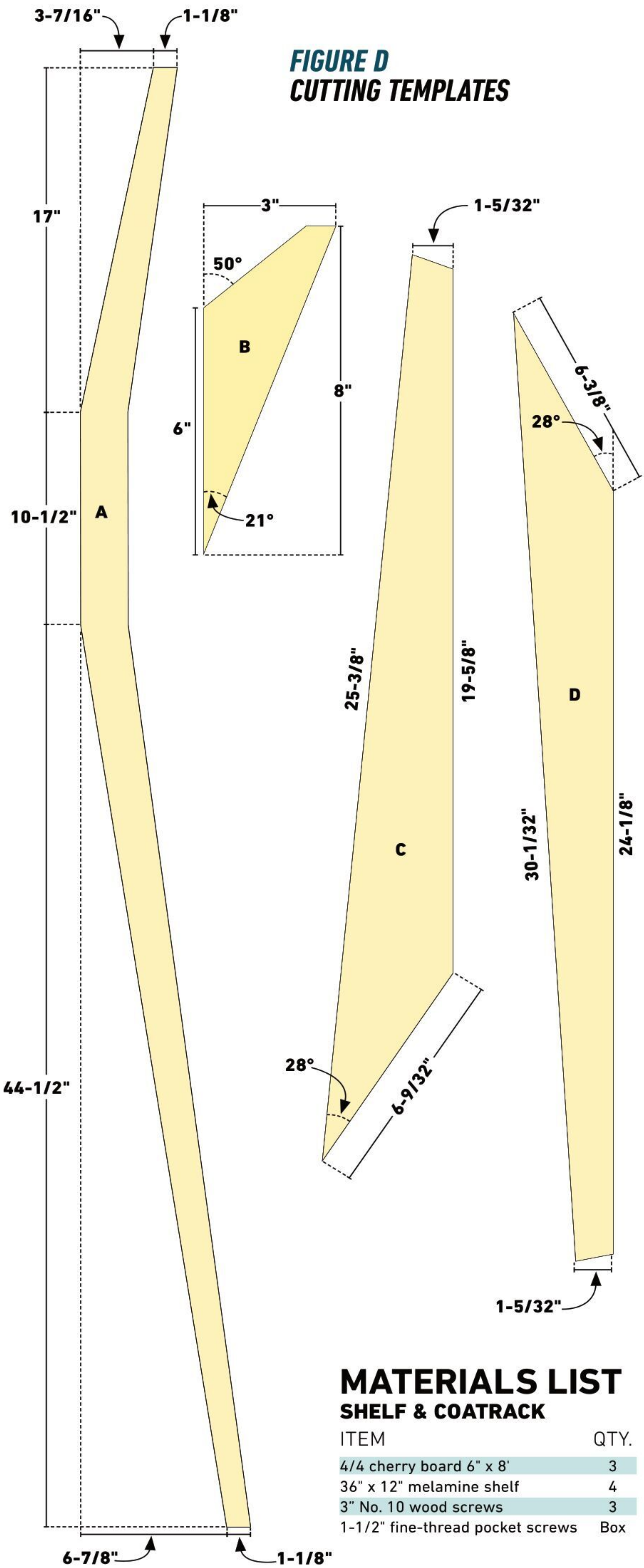
**FIGURE B  
COATRACK**  
OVERALL  
DIMENSIONS:  
12"W x 72"H



**FIGURE C SHELF**  
OVERALL DIMENSIONS: 36"W x 13-1/2"D x 48"H



**FIGURE D  
CUTTING TEMPLATES**



# MATERIALS LIST SHELF & COATRACK

| ITEM                             | QTY. |
|----------------------------------|------|
| 4/4 cherry board 6" x 8'         | 3    |
| 36" x 12" melamine shelf         | 4    |
| 3" No. 10 wood screws            | 3    |
| 1-1/2" fine-thread pocket screws | Box  |





WARM THE  
HIDE GLUE

## THE SHELF

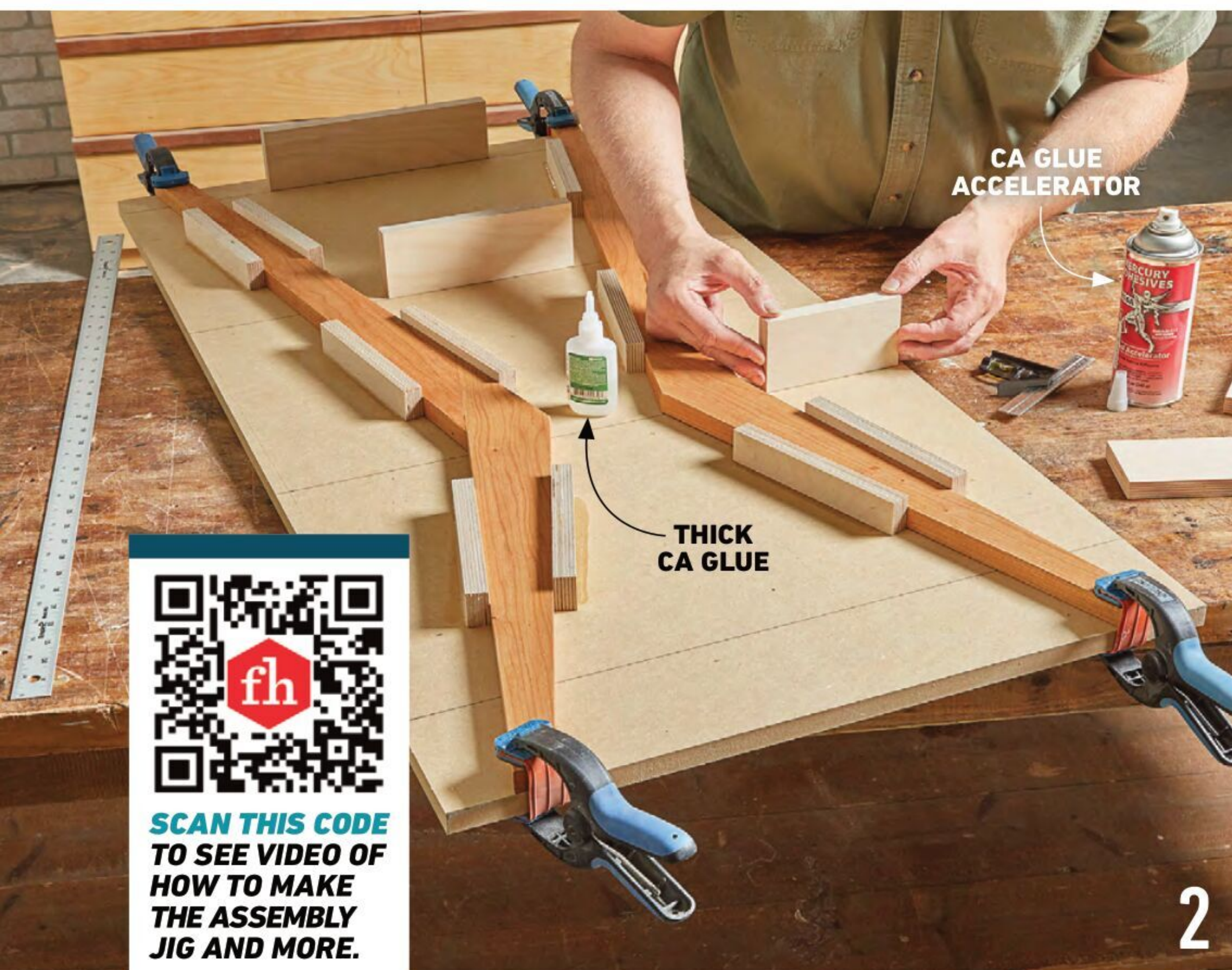
### 1 GLUE UP THE LEGS

The way these angled legs join makes using clamps difficult. Once again, use the rub joint technique, cleaning off any glue squeeze-out. Let the glue joints set up overnight before moving on to the next step.

### 2 MAKE THE ASSEMBLY JIG

A jig makes shelf assembly easier. Clamp the legs to a 2 x 4-ft. piece of MDF, making sure they're evenly spaced. Attach guide blocks using thick superglue and accelerator. I used 1-in. blocks for the legs and 3-in. for the shelves.

**PRO TIP:** Use only dabs of glue or risk gluing the legs too!



CA GLUE  
ACCELERATOR

THICK  
CA GLUE

### 3 MARK FOR POCKET SCREWS

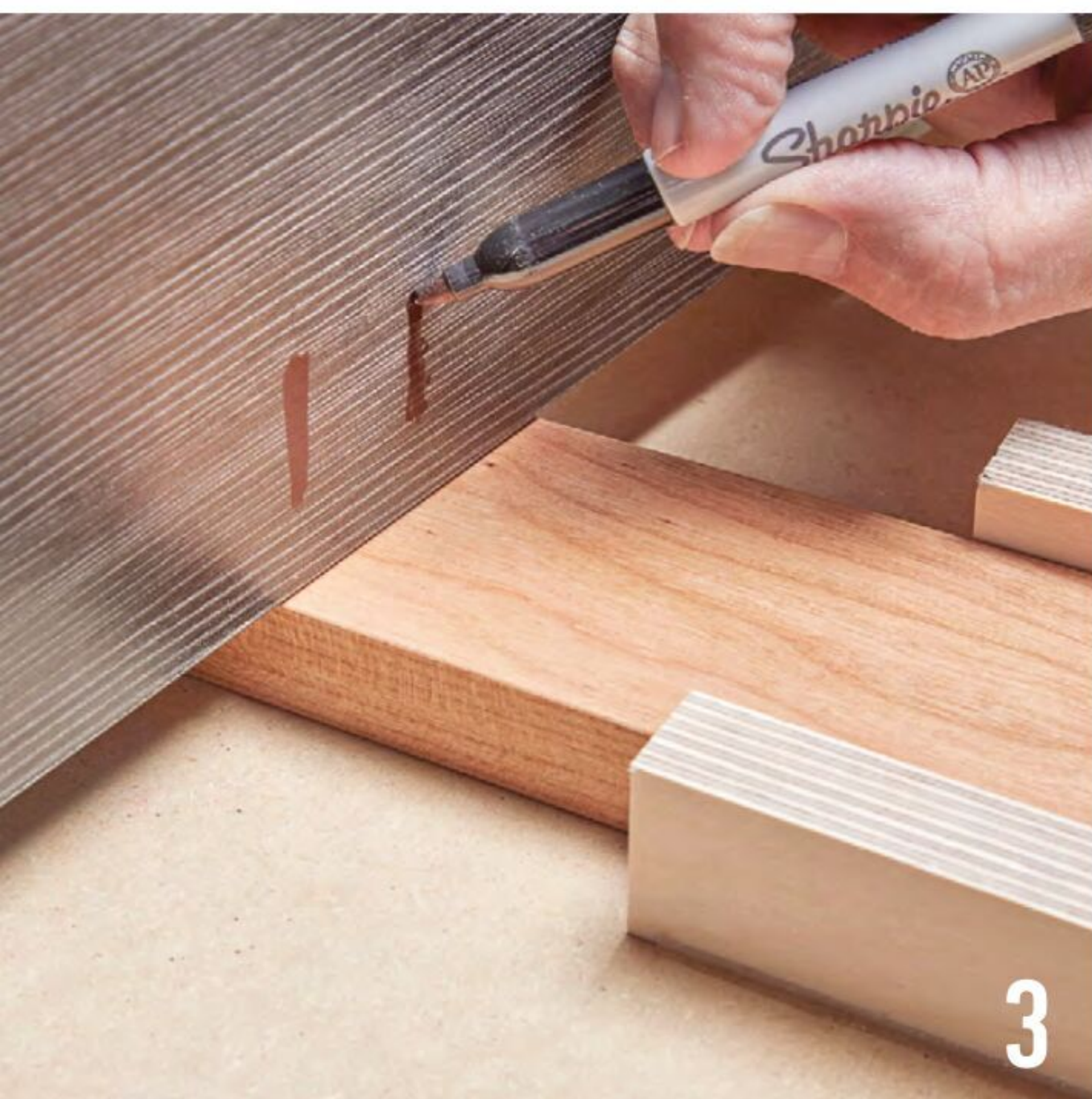
With two legs in the assembly jig, place the shelves in the jig and mark where the pocket holes need to go. Mark two holes per joint and drill them with a pocket hole jig.

### 4 ASSEMBLE THE SHELF

After drilling for the pocket holes, place the shelves back in the jig. Using 1-1/2-in. pocket screws, attach the shelves to the legs. When you've completed the first side, flip everything over and repeat the process for the other two legs.



SCAN THIS CODE  
TO SEE VIDEO OF  
HOW TO MAKE  
THE ASSEMBLY  
JIG AND MORE.



3



1-1/2" POCKET  
SCREW

4



## THE ENTRY BENCH

### 1 MAKE THE BENCH TOP

Glue the two halves of the bench top together, using dowels to help keep them aligned during glue-up.

I was lucky; my lumberyard had milled 4/4 and 6/4 cherry—the perfect thicknesses to edge-glue pieces together to achieve the width I needed. Don't be shy about asking your lumberyard if it offers milling services!

### 2 ATTACH THE LEGS

I found steel legs in the style I was after at [tablelegs.com](http://tablelegs.com) (see p. 36 for details), so I decided to save time and buy, not build. Screw the legs to the bottom side of the bench with 1-in. washer-head screws. I made a positioning jig out of scrap 1/2-in. plywood. This easy-to-make jig will ensure precise spacing and alignment of all four legs.

### 3 CUT SKIRTS TO SIZE AND ATTACH

Use a bevel gauge to determine the angle of the leg, and then transfer that to your table saw blade. Cut that bevel on one edge of a little more than 2 ft. of the skirt material.

With the legs attached, mark the two end pieces against the legs and cut them to length. Once those have been screwed into place, set the longer skirt pieces up against them and mark for cuts. Cut them on the miter saw and attach them with pocket screws.

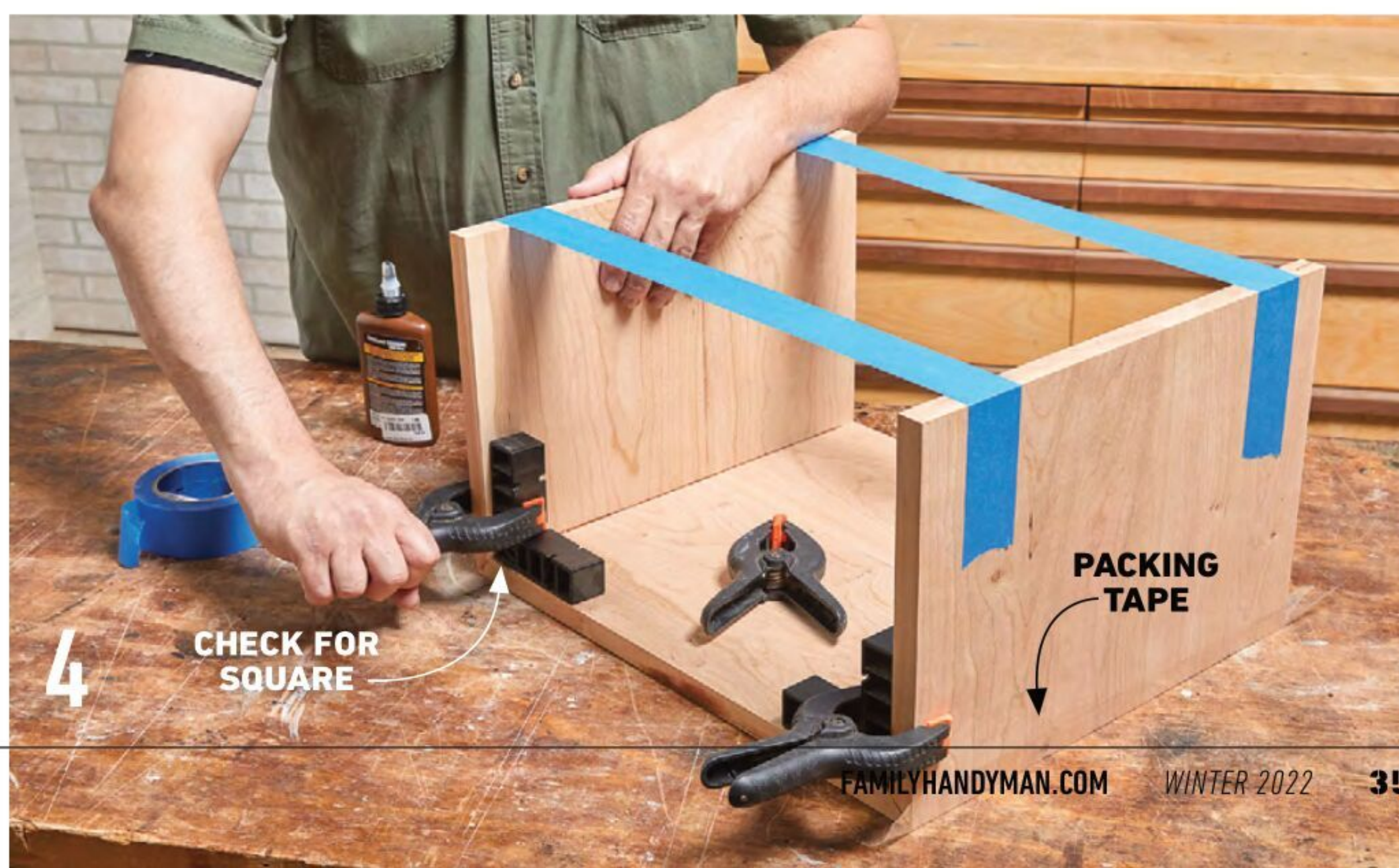
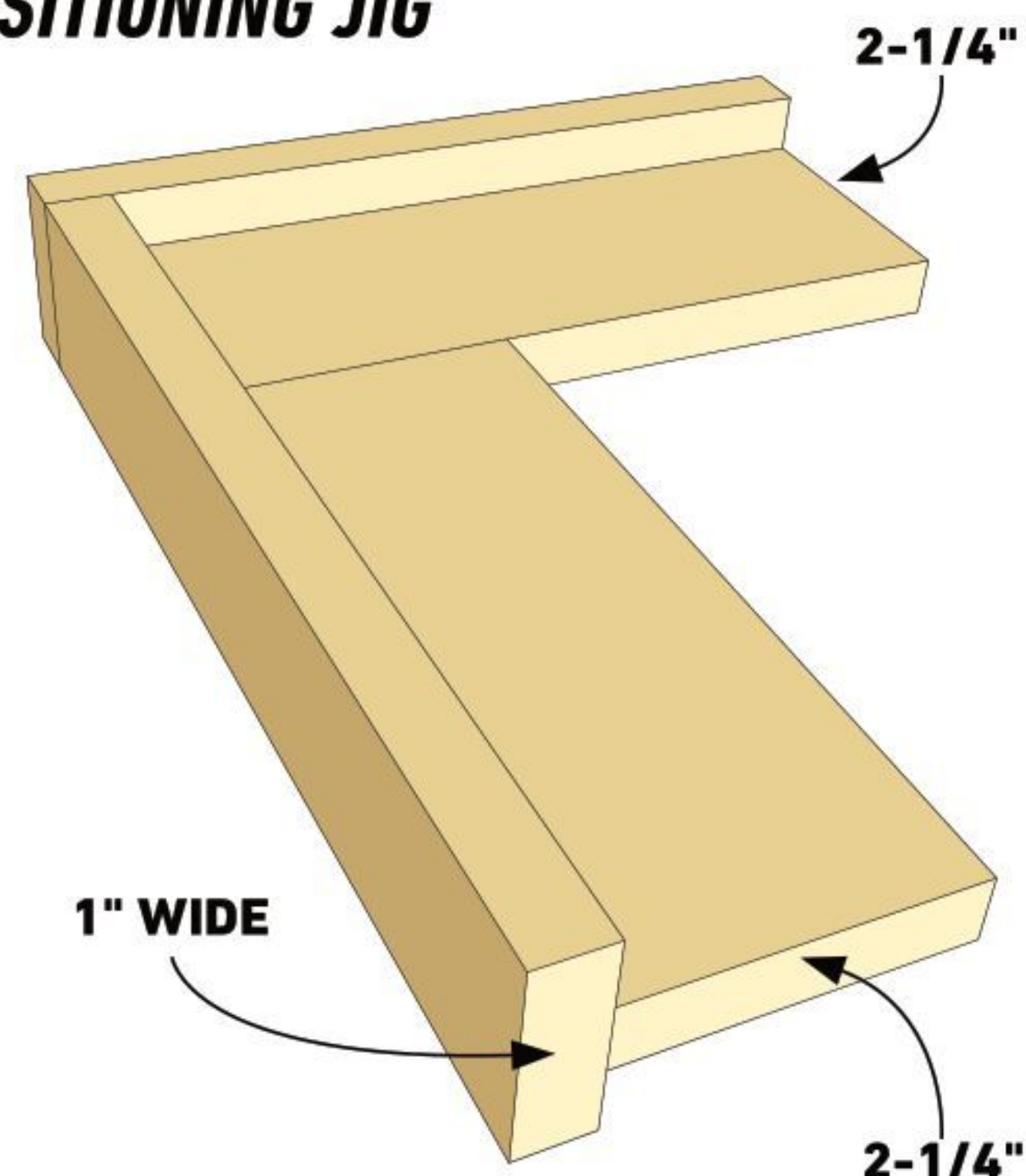
### 4 MAKE THE DRAWER CASE

The cabinet case will be made from solid cherry and will feature mitered corners. Make the 45-degree cuts using a table saw. To glue these parts together, lay them flat with the insides facing down, and tape the edges together. Flip everything over, apply glue to the joint and tape the two sides together, keeping them square.

**PRO TIP:** Drill your pocket holes before glue-up.



**FIGURE E  
POSITIONING JIG**



**CHECK FOR  
SQUARE**

**PACKING  
TAPE**



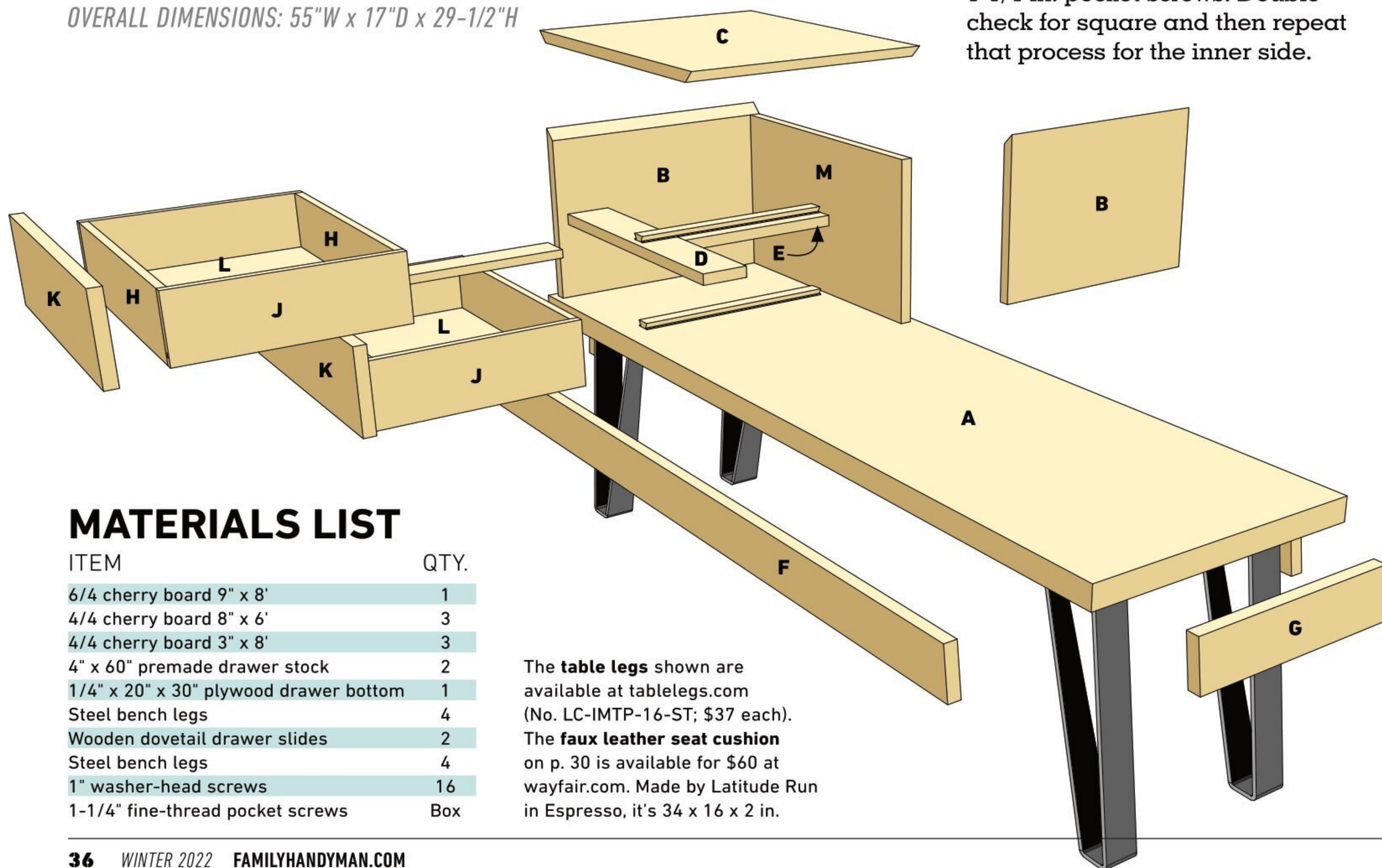


## CUTTING LIST

| KEY | QTY. | DIMENSIONS               | PART                      |
|-----|------|--------------------------|---------------------------|
| A   | 2    | 1-1/2" x 55" x 8-1/2"    | Bench seat                |
| B   | 4    | 7/8" x 8" x 12-1/8"      | Drawer case side          |
| C   | 2    | 7/8" x 8" x 19-1/2"      | Drawer case top           |
| D   | 1    | 7/8" x 17-7/8" x 3"      | Cross member              |
| E   | 1    | 7/8" x 11-1/4" x 3"      | Drawer slide support      |
| F   | 2    | Cut to fit               | Skirt—front and back      |
| G   | 2    | Cut to fit               | Skirt—side                |
| H   | 4    | 1/2" x 16" x 4-1/4"      | Drawer box front and back |
| J   | 4    | 1/2" x 12-5/8" x 4-1/4"  | Drawer box side           |
| K   | 2    | 7/8" x 17-1/2" x 5-1/2"  | Drawer face               |
| L   | 2    | 1/2" x 16-1/2" x 12-1/8" | Drawer bottom             |
| M   | 2    | Cut to fit               | Drawer case back          |

### FIGURE F ENTRY BENCH

OVERALL DIMENSIONS: 55"W x 17"D x 29-1/2"H



## MATERIALS LIST

| ITEM                                   | QTY. |
|----------------------------------------|------|
| 6/4 cherry board 9" x 8'               | 1    |
| 4/4 cherry board 8" x 6'               | 3    |
| 4/4 cherry board 3" x 8'               | 3    |
| 4" x 60" premade drawer stock          | 2    |
| 1/4" x 20" x 30" plywood drawer bottom | 1    |
| Steel bench legs                       | 4    |
| Wooden dovetail drawer slides          | 2    |
| Steel bench legs                       | 4    |
| 1" washer-head screws                  | 16   |
| 1-1/4" fine-thread pocket screws       | Box  |

The **table legs** shown are available at [tablelegs.com](http://tablelegs.com) (No. LC-IMTP-16-ST; \$37 each).

The **faux leather seat cushion** on p. 30 is available for \$60 at [wayfair.com](http://wayfair.com). Made by Latitude Run in Espresso, it's 34 x 16 x 2 in.

### 5 FIT THE DRAWER CASE BACK

Once the drawer case is glued together, take an exact measurement and cut the back to fit. Use a few clamps to hold it in place, and secure it with 1-1/4-in. pocket screws.

### 6 ATTACH THE CASE TO THE BENCH TOP

The drawer case should be offset 1/2 in. from the side and front of the bench. Clamp it in place. Start with the outer side first, attaching it to the bench top with 1-1/4-in. pocket screws. Double-check for square and then repeat that process for the inner side.



## 7 ASSEMBLE THE CROSS MEMBER

Assemble the cross member with a little glue. Then screw the dovetail drawer slide perfectly centered.

**PRO TIP:** I cut the cross member parts a little oversize, and then cut them to fit once the case was assembled and installed.



## 8 COMPLETE THE CASE

Install the lower dovetail drawer slide. Then cut the cross member to fit and attach it with 1-1/4-in. pocket screws. I used a spacer block to help me position it perfectly.



## 9 MAKE THE DRAWERS

Assemble the drawers using 1-in. pocket screws. Notch a space in the drawer back for the center-mounted drawer slide. Using a small square, make sure the slide is square to the box, then glue it in place.

**PRO TIP:** Premade drawer stock saves a lot of time—it's preslotted for the drawer bottom and comes prefinished. Woodcraft sells 60-in. lengths for \$16.

## 10 ATTACH THE DRAWER FACES

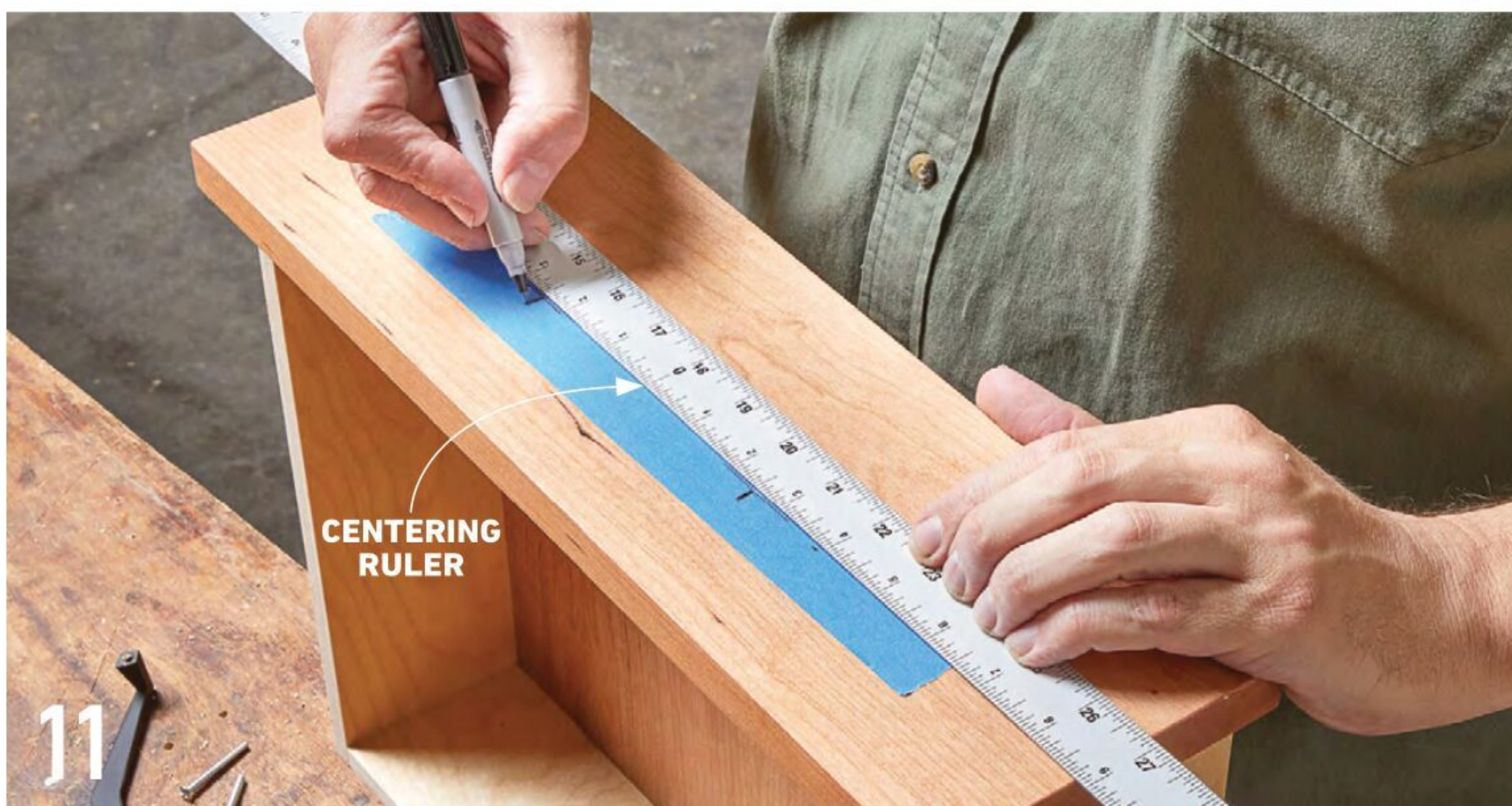
I used wood spacers to help me achieve a 1/8-in. reveal around the drawer faces. With the drawer box inserted, place two dabs of hot melt adhesive on the back of the face then press it against the drawer box. After the glue sets, secure the drawer face with 1-in. washer-head screws.



## 11 INSTALL THE DRAWER PULLS

Center and mark the holes for the drawer-pull mounting screws on the drawer face. Using a 5/16-in. drill bit, drill completely through the drawer face and drawer box. Mount the drawer pulls with the supplied mounting screws.

**PRO TIP:** Make your marks on a piece of tape on the drawer face. Your marks will be easier to see, and you'll protect the wood while it's being drilled.





# BEAUTIFUL BEAMS

////////////////////////////////////  
NO ONE NEEDS TO KNOW THEY'RE FAUX

BY MIKE BERNER

**M**agicians never reveal their secrets, but I'm a carpenter, so I'll tell you one of mine. You know those beautiful ceiling beams you see in rustic, industrial and farmhouse interiors? Most of them aren't real!

This is good news—it means you can get the look even if you don't have exposed beams. You can add depth and character to any room by building your own. You can stain them, paint them white or choose a weathered, decades-old look. I'll show you how to make beams for any home.

## MEET THE BUILDER



**MIKE BERNER**  
IS A CARPENTER AND  
WOODWORKER WHO  
LOVES UNCOVERING  
THE MAGIC BEHIND  
THE CRAFT.





### WHAT IT TAKES

| TIME      | COST  | SKILL LEVEL  |
|-----------|-------|--------------|
| A weekend | \$600 | Intermediate |

#### TOOLS

Table saw or track saw, drill/driver, finish nailer, featherboard, basic woodworking tools, belt sander, ladder

#### MATERIALS

2x6 boards, red oak 1x6s and 1x8s, 3-in. construction screws, glue, reinforced packing tape, trim screws, stain and finishing supplies

*Cabinetry and table courtesy of FindFurnish.com*



## AUTHENTIC, SEAMLESS BEAMS

For this project, I'm going for a real-beams look. Using a method called miter folding, I'll transform a pair of 1x6s and a 1x8 board into a hollow beam. The miter seams will be invisible, and each beam will look like an actual solid piece. You'll need a table saw or a track saw to pull this off, but your beams will look as if they are actually holding up the ceiling.



### 1 FASTEN CEILING CLEATS

First, locate and mark the position and direction of each ceiling joist around the edges of the ceiling. Then, avoiding ceiling fixtures, mark where the beams will be positioned. Keep their spacing even and ensure each beam will be attached to a joist. The beams can be installed across or along the ceiling joists. Next, attach 2x6 cleats to the ceiling joists where you'll place the beams. I used a pair of 2x6 boards to wedge the cleats into position while I fastened them to the ceiling joists.

### 2 CHECK FOR FLATNESS

While you're installing the cleats, check to see how flat the ceiling is. Hold a straightedge along the 2x6 cleat. Take note of any gaps more than 1/8 in. between the level and the ceiling. This will come in handy when you scribe and trim the beams to get a perfect fit.

### 3 CHOOSE THE RIGHT BOARDS

Begin the actual beam-building process by choosing the material that suits your style.

■ **HARDWOOD:** Choose the straightest boards possible at a length that will span the entire room. Bowed boards will be trouble when you're cutting and assembling. Sight down the edges and put only straight ones in your cart.

■ **FINGER-JOINTED BOARDS:** Built to be straight, these are a great option if you'll be painting your beams.

■ **VENEERED PLYWOOD:** Perfectly straight factory edges ensure crisp corners, and strips are easy to cut and assemble. But lengths are limited.

■ **RECLAIMED LUMBER:** Go this route to nail the rustic look, but expect extra work to get a straight edge. You'll need to send one edge of reclaimed boards through a jointer, use a table saw with a jig or use a track saw.





## 4 CUT THE LONG MITERS

This is the trickiest part of building seamless faux beams. Set up a table saw to make a 45-degree bevel and adjust the fence so the narrow face between the bevel cuts is at least 5-1/2 in. wide. Cut a bevel on both long edges of the 1x8 boards. Use a featherboard to keep the material against the fence and press the board to the table as you feed it through the saw. Then cut the same bevel on one edge of the 1x6 boards.

## 5 BACK-BEVEL THE TOP EDGES

The 1x6 boards will turn into the sides of the beams, and the top edge will meet the ceiling. Cutting a slight bevel on the top edge, opposite the 45-degree bevel, will help you if your ceiling is not flat. If you found a 1/8-in. or smaller gap when you checked how flat the ceiling was (in Step 2), cut a 5-degree bevel. If your ceiling has 1/4-in. or larger gaps, cut a 15-degree bevel. Cutting a steeper bevel than necessary might cause the wood to split where the screws are installed.

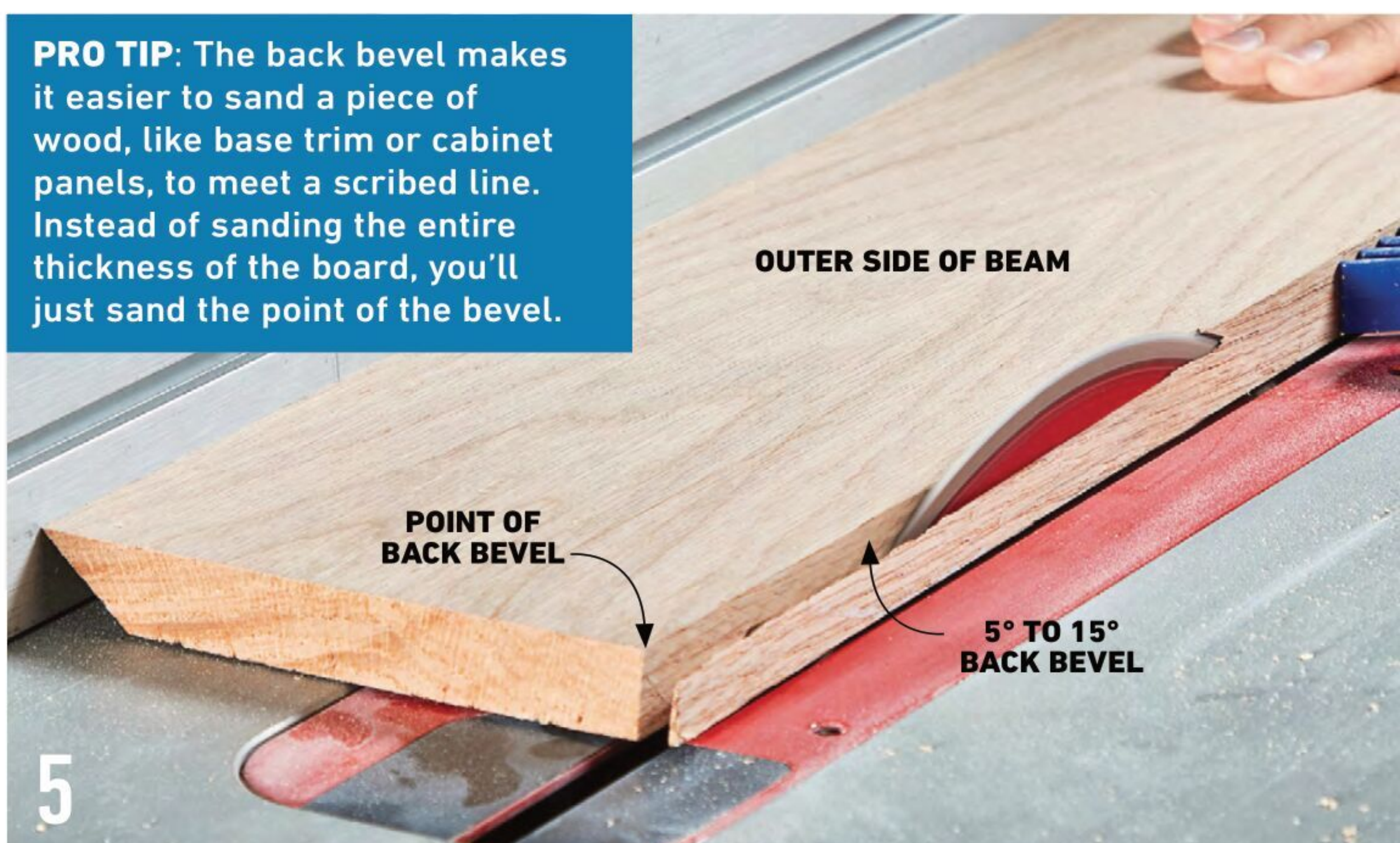
## 6 TAPE THE SEAMS

Arrange the three boards on sawhorses with the bevel cuts down and the points of the miters touching. Using reinforced packing tape, join the boards across the seams, then down the lengths of the seams. I sandwiched the ends of the boards with scrap offcuts and clamps to secure them; this helped keep everything together when the boards were flipped for the next step.

Our blade guard is removed for demonstration only. Keep all safety devices in place.



**PRO TIP:** The back bevel makes it easier to sand a piece of wood, like base trim or cabinet panels, to meet a scribed line. Instead of sanding the entire thickness of the board, you'll just sand the point of the bevel.







## 7 GLUE AND FOLD

Flip the boards over, then spread glue on the beveled edges. Titebond III glue is great when I need extended working time, and it's easy to spread with a brush. I folded the edges of the beams up and used more packing tape to hold the tops in place while the glue dried. Don't be afraid to use a few 18-gauge brad nails to pin the miter together at the ends.



## 8 BURNISH THE CORNERS

With the tape still on and the glue still drying, run a screwdriver shaft along each corner. This presses the corner of the miter completely closed while the glue is still wet to make a tight, invisible miter that will last. Be careful not to rip the tape as you burnish the corners.



## 9 SCRIBE IN PLACE

Once the glue is dry and the beam is sanded and stained, fit each beam into place. Hold the beam tight to the ceiling. With your pencil flat on the ceiling, run the tip along the entire length of the beam.





SAND THE  
BEVELED POINT  
TO THE LINE

10



11

## 10 SAND TO THE SCRIBE

With the beams back on sawhorses, use a belt sander to sand the top edges to the scribed line. The back-beveled tops make this a quick and easy job. Instead of sanding down the entire 3/4-in. thickness, you need to remove only the point of the outside face.

## 11 INSTALL THE BEAMS

Drill pilot holes along the tops of the beams every 16 in. Then lift the beams back into place and fasten them to the cleats with trim screws. Fill the small screw holes with wood putty and touch them up with stain. The beams will look as if they've been holding up the ceiling since day one.

# BEAM STYLES FOR ANY HOME

## HARDWOOD + STAIN

This is the clean, modern real-beam look I used for this project. I used red oak lumber with Simply White 275 Minwax stain.

## BOX BEAMS

You can build this beam style without a table saw by using 1x6 boards right from the store; no long bevel cuts needed.

■ **PAINTED:** Use finger-jointed preprimed boards, which come perfectly straight. Just nail them together, and then caulk, paint and install them.

■ **HARDWOOD:** Use straight-grained hardwood like mahogany, and the seams almost disappear. Nail the boards flush, apply finish and install.

## VENEERED PLYWOOD

The advantage of veneered plywood is that the sheets come straight as an arrow, making them easy to cut and fold together. The downside? You're limited to the length of a sheet of plywood. Build longer beams by butting them together and covering the seam with a piece of matching molding.

## RUSTIC/DISTRESSED

With reclaimed barn wood, you can achieve that authentic farmhouse look. Barn wood is much more forgiving because it already has nail holes, dents and dings, and it requires no staining or finishing.

## READY-MADE FAUX BEAMS

A few companies manufacture beams of all styles using high-density foam. These beams are lighter than wood, easier to install and look realistic. Barron Designs customizes ultra-realistic beams in any length, width and height, and can even cap beams with a decorative scrolled end.



RED OAK WITH SIMPLY  
WHITE STAIN BY MINWAX



PRIMED POPLAR PAINTED WITH  
WHITE DOVE BY BENJAMIN MOORE



MAHOGANY



MAPLE PLYWOOD



RECLAIMED BARN WOOD



TIMBER BEAM IN RICH WALNUT  
WITH SCROLLED CAP BY  
BARRON DESIGNS



# HIDEAWAY WORK SPACE

NEED A ZONE TO CALL YOUR OWN?  
LOOK INSIDE THE CLOSET!

BY BILL BERGMANN



|   |                                                     |
|---|-----------------------------------------------------|
| S |                                                     |
| M | dentist @ 11:30                                     |
| T |                                                     |
| W | staff meeting @ 1<br>parent-teacher conferences @ 7 |
| T | happy hour @ 4                                      |
| F |                                                     |
| S | oil change                                          |



**W**orking from home has become a reality for many, and not every home has a spare bedroom that can become an office. Even if you don't work from home, you might long for a dedicated space for your craft or hobby, or a place for kids to do their homework.

Converting a closet allows you to gain space without taking over a room or remodeling. I'll show you how to transform your closet into a multipurpose work space using hollow-core doors and basic tools. You can find doors at a reuse center, as I did, or buy them new at a home center.

### WHAT IT TAKES

| TIME   | COST  | SKILL LEVEL  |
|--------|-------|--------------|
| 2 days | \$600 | Intermediate |

#### TOOLS

Drill/driver, basic hand tools, stud finder, circular saw, hacksaw, jab drywall saw, pull saw, 4-ft. level and/or torpedo level, electrical wire stripper/cutter, 3-in. hole saw, oscillating multi-tool



*When you're done,  
just fold up the desktop  
and call it a day!*

## MATERIALS LIST

| ITEM                                                                                         | QTY. |
|----------------------------------------------------------------------------------------------|------|
| Hollow-core doors: 6' 8" x 2'                                                                | 3    |
| 8' 2x6s (to cut for hollow-core filler)                                                      | 2    |
| Primed 1x2: 8' length                                                                        | 2    |
| Primed 1x2: 12' length                                                                       | 1    |
| 3/4" x 3/4" piano hinge: 30"                                                                 | 2    |
| 1" 18-gauge nails                                                                            |      |
| 2" 18-gauge nails                                                                            |      |
| 2-1/2" trim screws                                                                           |      |
| Folding leg bracket hinges                                                                   | 2    |
| Electrical supplies<br>(outlets with USB ports, NM-B cable,<br>remodel boxes, light fixture) |      |
| Computer cord ports/grommets                                                                 |      |
| Power strip                                                                                  |      |
| Construction adhesive, wood glue                                                             |      |



**HOVER YOUR  
CAMERA HERE  
TO SEE HOW  
EASILY THE  
DESKTOP  
FOLDS AWAY.**





EDGE GUIDE

## 1 MAKE FILLER STRIPS

After you cut the door slabs to fit your closet space, you need to make the filler pieces that fit inside to reinforce the hollow core. Measure the inner door cavity. Mine measured 1-1/8 in.; that's typical, but it can vary. You can cut filler pieces to that size from a 2x6. I have wood-topped sawhorses, so I fastened down the 2x6 with 2-in. screws. Clamps would work just as well.

With the blade depth set to 1-5/8 in., make a short test cut to be sure the edge guide is set to the right width and the zero stop on the saw's bevel gauge is cutting at 90 degrees. Keeping the wider part of the saw's baseplate on the 2x6, I was able to get two passes with a solid footing of my saw's baseplate on the board, which ensured accurate cuts. Despite some waste, this is a safe technique if you don't have a table saw.



HOLLOW DOOR CAVITY

FILLER STRIP

## 2 INSTALL FILLER STRIPS

Most new hollow-core doors have a cardboard web inside to support the outer panels. With a sharp chisel and a pull saw, you can quickly cut and push that out of the way. If you're repurposing older doors, you may encounter a thin wood filler that takes more time to clear. Install your new solid filler pieces with glue and 1-in. nails. Be sure to add filler pieces on the fold-down top and leg to give solid purchase for the leg bracket screws. Then sand the filler pieces smooth and flush with the outer panels.



STUD LOCATIONS

WALL CLEAT

## 3 INSTALL WALL CLEATS

A comfortable desk height is about 30 in. I wanted enough height between the desk and the first shelf for my computer monitor, and enough room above the upper shelf to fit the boxes I previously had in the closet. With all this in mind, I marked the height for the desk and shelves inside the closet.

With a torpedo level taped to a straight piece of 1x2, I made level lines on the back closet wall for the cleats. Locate the wall studs and mark them with painter's tape. Nail the back wall cleats to the studs. In case I ever need to remove the desk, I skipped the glue here. A few small



holes are easier to repair than long swaths of paint and drywall. I then used the torpedo level to install the side wall cleats. If you don't find studs to which you can fasten the side cleats, use hollow-wall anchors.

## 4 RUN THE WIRING

To add an outlet below the desktop, I pulled a wire from the closet ceiling fixture. The first step with any wiring project is to locate and turn off the breaker feeding the circuit you're working on. To get a wire up a wall and into a ceiling cavity, you'll need to drill through some framing members. To access them, cut two 5-in. square holes, one in the ceiling and the other in the wall directly behind the light fixture box. Save the drywall squares for reuse. Then drill a hole through the top plate of the wall framing.

## 5 EXPECT THE UNEXPECTED

What you find inside a wall often isn't "typical." I encountered a 2x6 drywall backer nailed over drywall that ran over the top plate, probably from a previous remodel. This kept me from simply pushing the wire through the top plate into the ceiling cavity. To make this 90-degree turn, I cut a notch with a multi-tool in the 2x6 framing to pull the wire through.

Before I cut that notch, I double-checked to be sure this 2x6 framing wasn't a structural piece, like the bottom chord of a truss or a floor joist. I then fished the wire up through the wall from the outlet cutout below the desktop, through the top plate and into the ceiling to make my connections in the closet light fixture box. To complete this step, I installed the remodel box and outlet, patched the wall and ceiling, and installed a 6-in. flush-mount LED ceiling fixture to replace the old bulb socket in the closet.

## 6 FINISH AND PAINT

For the best results, paint or finish your desktop and shelves before installation. I used a water-based polyurethane finish for my desktop and shelves, and I coated the shelf cleats with latex enamel paint. Prime and repaint the wall and ceiling patches.



### PRO TIP

Patch the holes using your 5-in. drywall cutouts. Install an 8 x 3 x 1/2-in. plywood backer, then screw the drywall cutouts back into place.







## 7 INSTALL THE DESKTOP AND SHELVES

You may need to install your desktop first if the upper shelves will prevent you from getting the desktop into place. Because I may want to restore this closet to its original configuration someday, I didn't use adhesive. A couple 2-1/2-in. trim screws at each alcove end and one in the center are all I needed to secure everything in place.

## 8 ASSEMBLE THE FOLDOUT

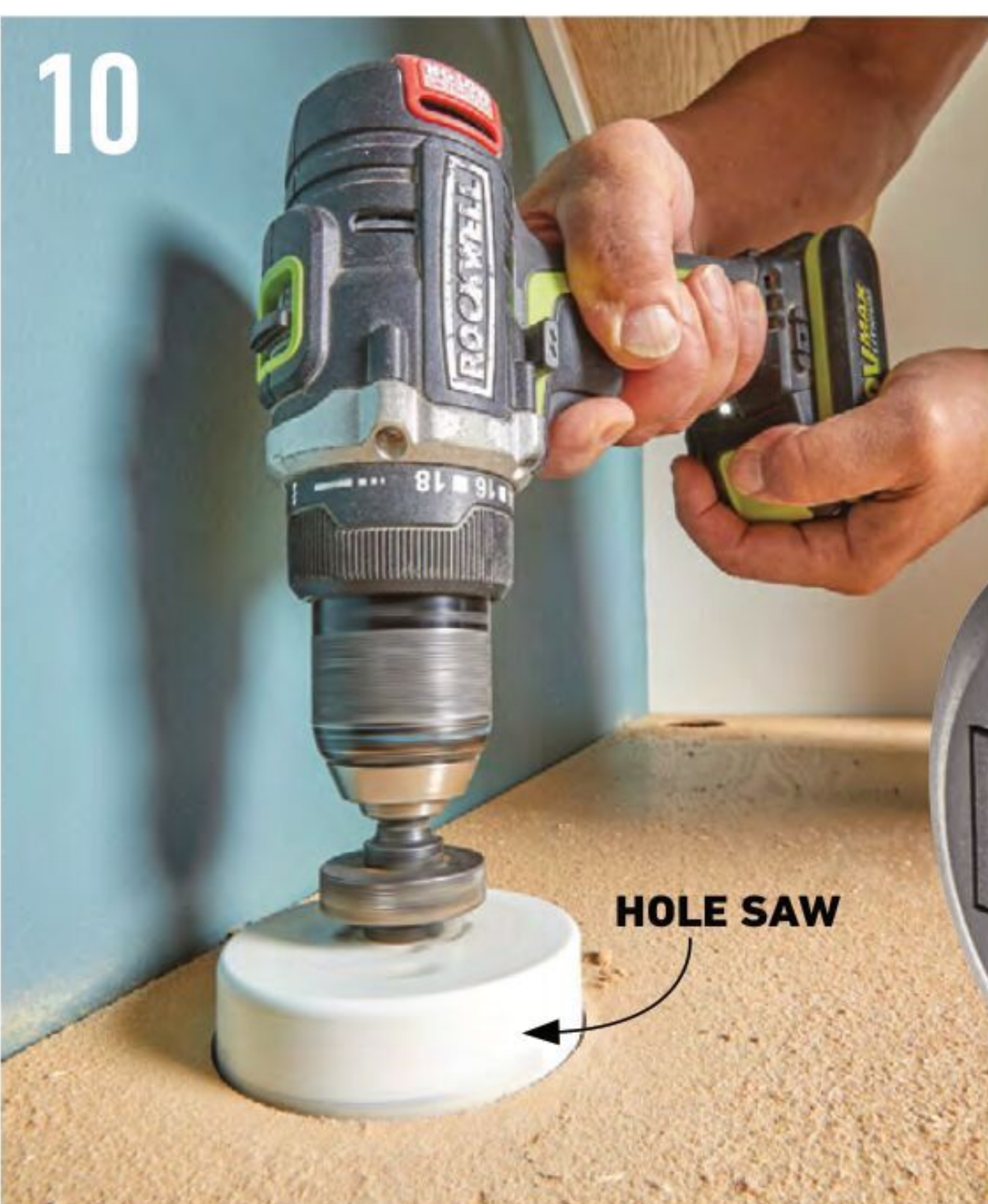
Cut the piano hinge to length and attach one of its leaves to the desktop. Using a combination square, mark the placement for the folding leg brackets on the back of the leg and underside of the folding desk. Predrill holes and install the brackets with the supplied screws.

## 9 ATTACH THE FOLDOUT

Using clamps to hold the folding desktop in position, attach the other leaf of the piano hinge to the desktop.

## 10 ADD CORD AND POWER GROMMETS

Mark the placement for the desktop outlets—whatever is convenient for your desktop. I put a cord grommet in the center of the desk and one outlet grommet in each of the back corners. Use a 3-in. hole saw to cut the holes through the desktop. Underneath the desk I attached a surge protector power strip with additional USB ports. Using zip ties, I secured all the cords under the desk.



CORD GROMMET



OUTLET GROMMET



**Only \$29!**

*You would be hard pressed to find a timepiece of this outstanding quality and precision at this price.*



*"Are you kidding?  
What a great watch  
at a ridiculous price.  
Thank you Stauer!"*

— Gitto, Hicksville NY

## IT'S ENOUGH TO MAKE YOU BLUE IN THE FACE

Time to take a stand against overpriced watches with the Stauer Urban Blue, **now only \$29.**

**Y**ou need a new watch...the one you are wearing was made when Nixon was in office, but extravagantly-priced watches that add zeros just because of a high falootin' name are an insult to your logic. Why shell out big money so some foreign company can sponsor another yacht race? It's time to put an end to such madness. It's absolutely possible to have the highest quality, precision classic timepiece without the high and mighty price tag. Case in point: The Stauer *Urban Blue*.

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*"Blue watches are one of the growing style trends seen in the watch world in the past few years"*—WATCHTIME®

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**MEET THE EXPERT**



**CARMEN BOSSI**  
IS THE PRESIDENT/  
FOUNDER OF  
SANIFLOSTORE.COM

# NO-DEMO BATHROOM

ADD A BATHROOM IN YOUR BASEMENT  
WITHOUT BUSTING UP THE CONCRETE FLOOR

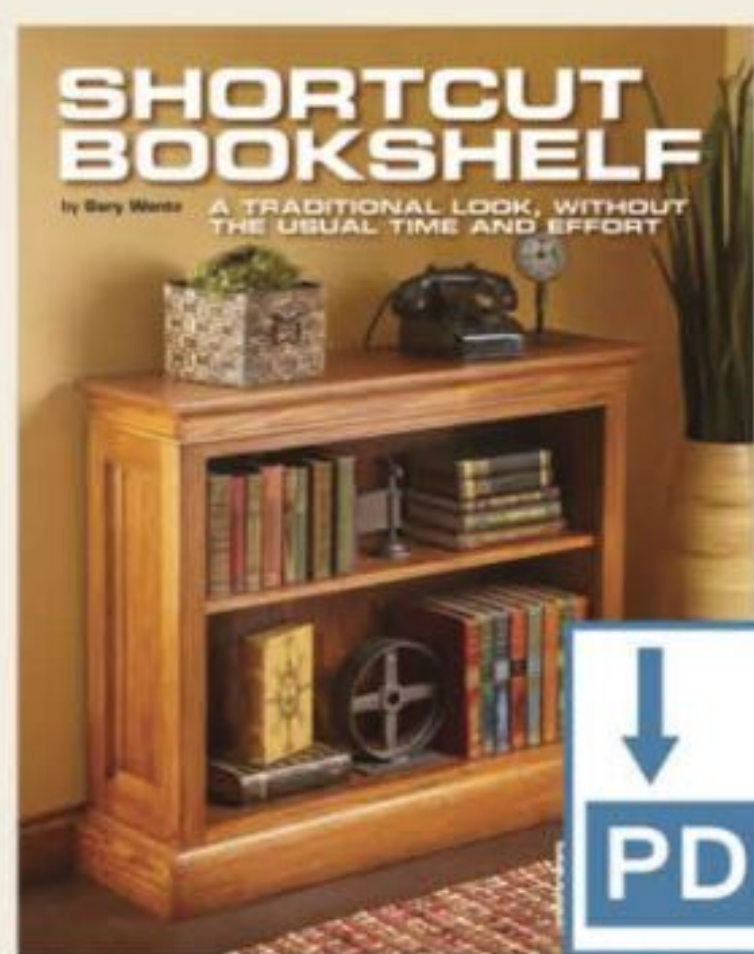
BY BRAD HOLDEN

**T**he addition of a full bathroom, including a shower, sink and toilet, can be a huge improvement to any home, particularly if you have only one bathroom and a growing family. It can also be a huge, expensive job. Upflow bathroom systems simplify the plumbing of a basement bathroom, putting this valuable home improvement job within reach of a DIYer. These systems include a macerator/pump that can be tucked into a wall directly behind a rear-discharge toilet. All the fixture drains flow to the macerator/pump, which grinds solids and then pumps waste upward to connect to your main drain line, instead of relying on gravity. Shower and sink drains do use gravity to reach the pump, and those are easy installations.

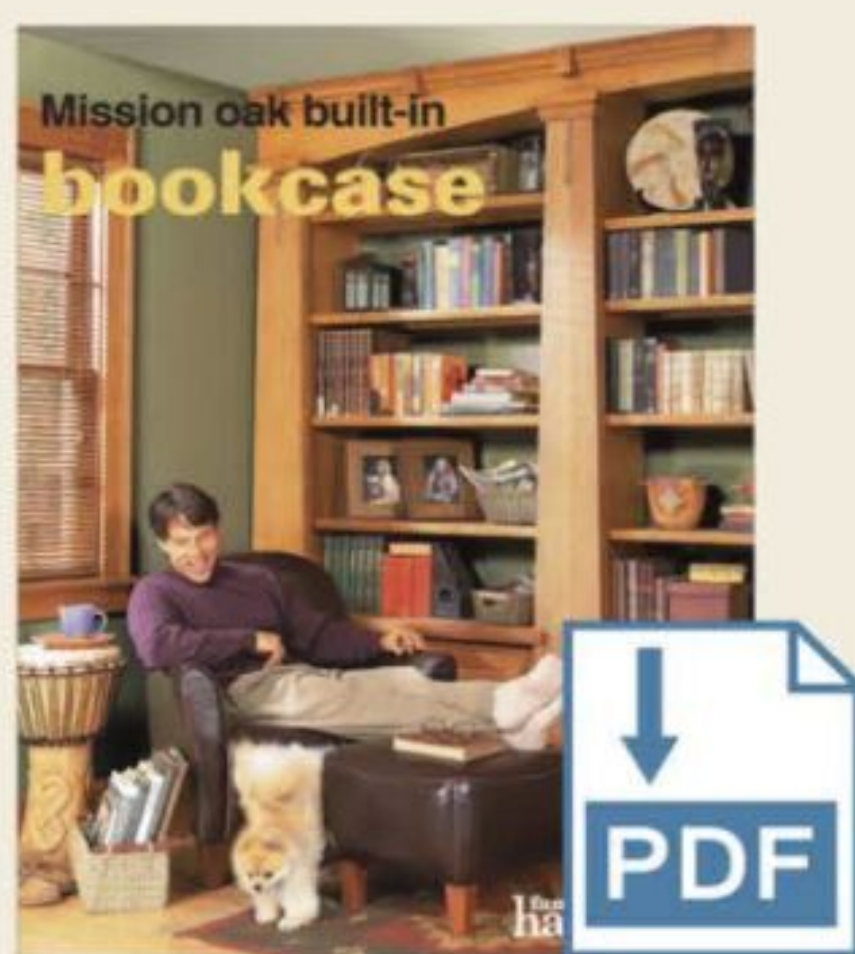
**WHAT IS A MACERATING TOILET?**  
Think of it as similar to a garbage disposal in your sink. In a macerating toilet, waste is channeled to the macerator/pump, which reduces solids to be easily pumped through a 3/4-in. discharge pipe. Our system, the SaniAccess 3 from Saniflo, includes a rear-discharge toilet and a macerator/pump with fittings. You'll supply the rest of the standard plumbing pipes and fittings.

| WHAT IT TAKES                                                                                                    |                        |                                    |
|------------------------------------------------------------------------------------------------------------------|------------------------|------------------------------------|
| <b>TIME</b><br>2 – 4 days                                                                                        | <b>COST</b><br>\$1,500 | <b>SKILL LEVEL</b><br>Intermediate |
| <b>TOOLS</b><br>Basic plumbing, carpentry and electrical tools                                                   |                        |                                    |
| <b>MATERIALS</b><br>Saniflo SaniAccess 3 (saniflostore.com), framing lumber, GFCI outlet, PVC pipe, PVC adhesive |                        |                                    |





Shortcut Bookshelf  
\$6.99



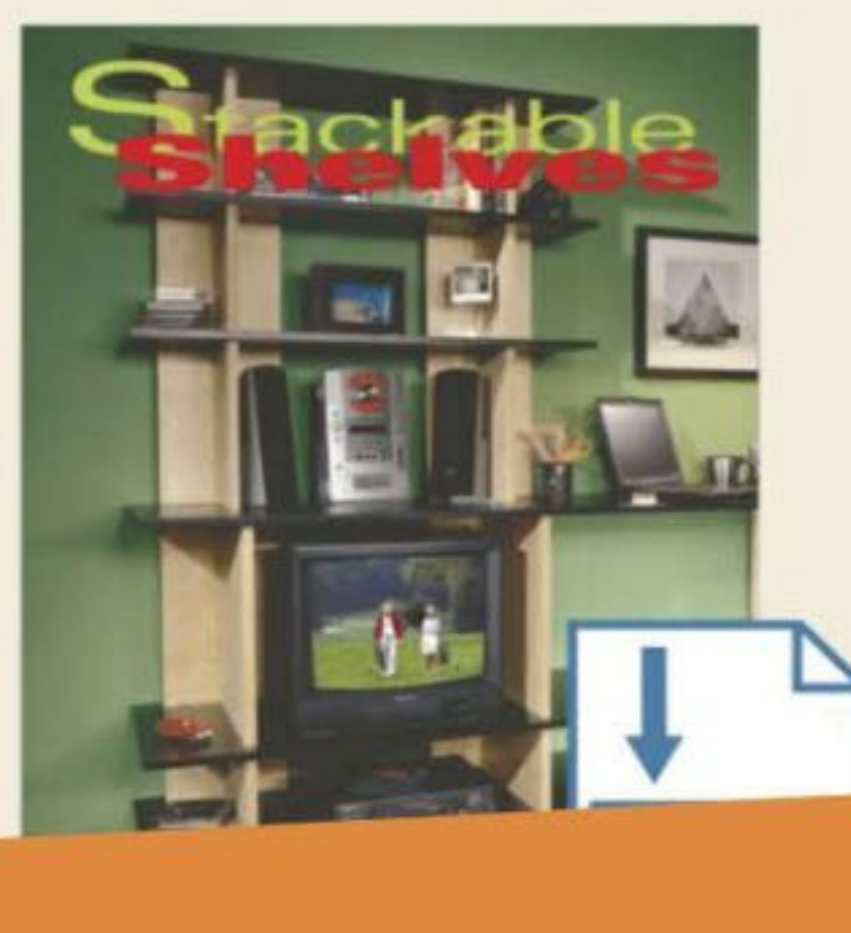
Mission Oak Built-in Bookcase  
\$6.99



Outdoor Storage Bench  
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Leaning Tower of Shelves  
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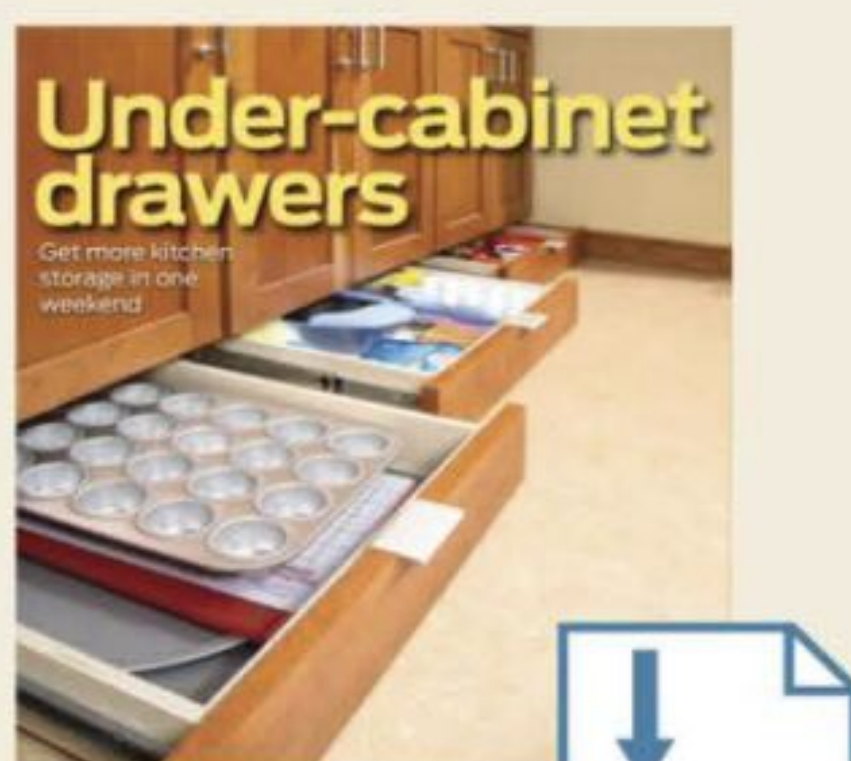
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## SYSTEM ADVANTAGES

The biggest advantage of an upflow system is not having to break up a concrete floor to run drains. There are other advantages too: First, the discharge line is much smaller than a standard drain line, so you can fit it into places where a standard drain might not work. Second, you can install a bathroom anywhere—you don't need to be concerned with how the toilet's drain aligns with existing drain lines in your home.



## 1 PLACE THE MACERATOR/PUMP

Set the macerator/pump in place behind the wall framing. The unit needs to be on the same level as the toilet. Install the rubber feet and secure the pump to the floor. If you're in a cold climate, allow space between the pump and the wall for insulation. Insulation in front of the pump will help dampen the minimal noise from the macerator/pump.

## 2 INSTALL A GFCI OUTLET

The macerator/pump needs its own GFCI outlet. Install the outlet inside the wall framing, near the pump. The outlet needs to be within 12 in. of an access panel and facing the room. Be sure to check local codes before installing this outlet.





### 3 BUILD THE SHOWER PAN STEP-UP

With your shower plumbing in hand, calculate the height of the platform, including the P-trap as well as a 1/4-in. drop per foot of horizontal run to the pump. The minimum height is 6 in., and that's usually enough depending on your P-trap and the distance to the pump. You may need to add an extra step, depending on the finished height. To lower the platform height, you can chip out some concrete for the P-trap. If your basement has low ceilings, you may need to consider a tub instead of a shower.

### 4 CONNECT THE SHOWER AND SINK DRAINS

Hook up the shower drain and run the pipe into the wall. Use an elbow to turn the pipe toward the pump. In our bathroom, the sink is between the shower and the toilet, so we tied in the sink drain on the way to the pump. The pump has a drain entrance on both sides, so you can configure your bathroom however you like. In our case, we used a provided plug to cap the entrance on the other side of the pump.

### 5 INSTALL THE VENTS

Along the drain line, you'll install a vent for each fixture. Connect these vents and tie them into the vent system on your existing plumbing. Mechanical vents won't work with this system; only a free air vent can be used.

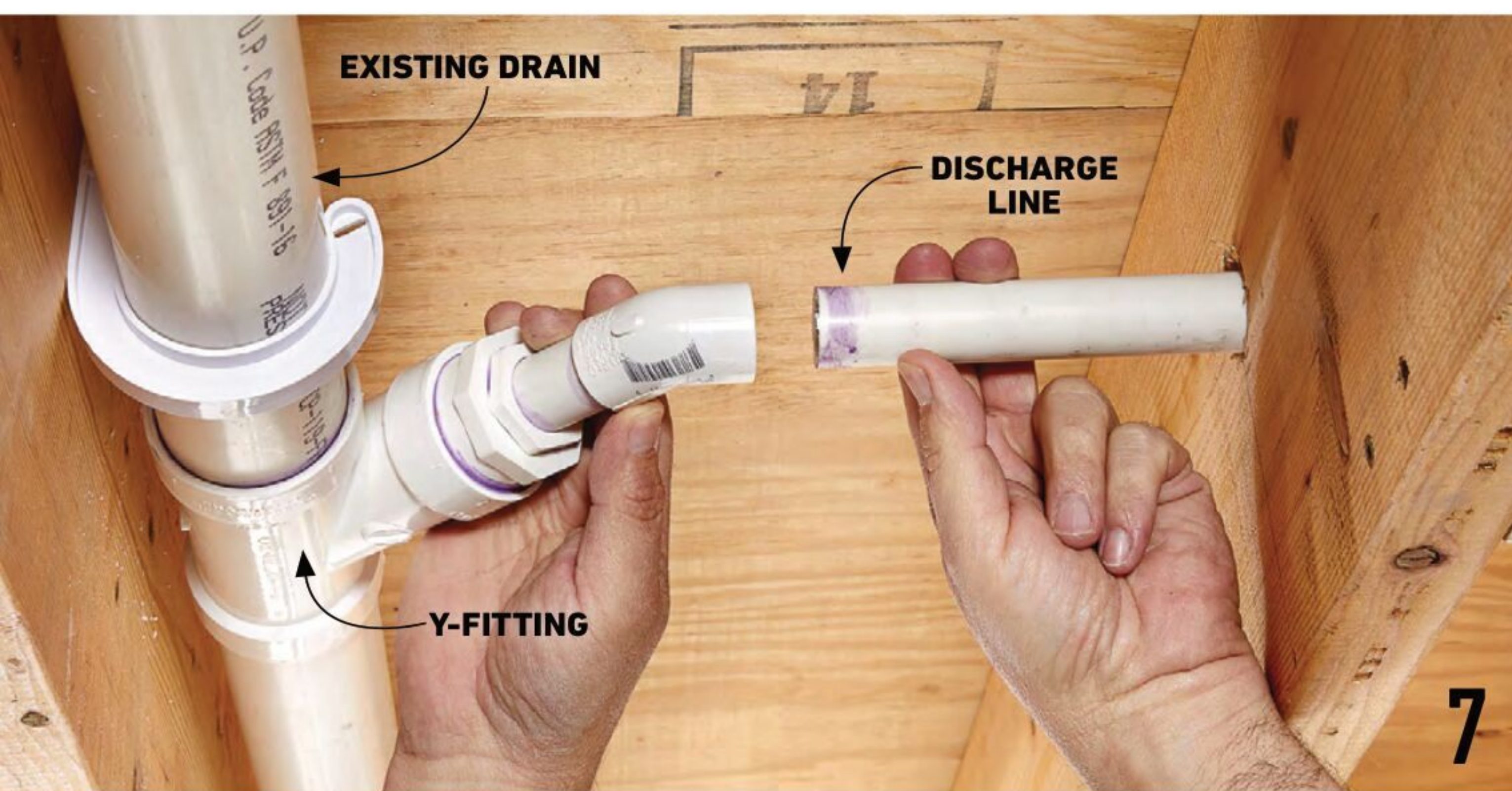






## 6 CONNECT THE DISCHARGE TO THE PUMP

Slip the flexible discharge tube onto its port on the pump and secure it with a hose clamp. At the end of the tube, you can install a shutoff ball valve. If you ever need to remove the pump, that valve will prevent backflow. After the first hard 90-degree turn from the pump, any turns in the discharge pipe need to be sweeping—no more hard 90s. Use a sweep elbow or two 45-degree elbows instead.



## 7 CONNECT THE DISCHARGE TO THE MAIN SEWER LINE

The discharge line can run horizontally at first, but for no more than 18 in. before it turns vertically. After the first vertical turn, the pipe can run horizontally again but not make another vertical or diagonal turn. The total run from the pump to the main sewage line must be a minimum of 3 ft. The easiest place to tie into the main drain is at a cleanout using a reducer fitting. If that's not an option, you can install a Y-fitting (not a T-fitting) on any horizontal run, but the discharge must enter the pipe from the top or side. No other lines can feed into the discharge from the pump.

## DISCHARGE OPTIONS

If you have a cleanout in a convenient spot, you can connect the discharge there. Just remove the plug and install a reducer to connect the 3/4-in. discharge pipe. If your drains are steel pipe, you'll need to cut out a section and install a Y-fitting using mission clamps. You can't use the type that just have hose clamps though, only the fully banded type.



MISSION CLAMP







8

TOILET DISCHARGE  
EXTENSION

## 8 CONNECT THE TOILET

Set the toilet into position, then connect the flexible boot to the toilet's discharge port. Next, connect the boot on the other end to the pump. Make sure the connection boot faces the right direction. Zip ties keep the boot in place, as this is a drain, not a pressurized supply line.

## 9 INSTALL THE TOILET

Mark holes on the floor through the holes on the toilet's base. Slide the toilet out of the way, then drill the holes for the supplied concrete anchors using a correct size masonry bit. Slide the toilet back into position, and then install the lag screw anchors. Use shims under the toilet as needed to keep it from rocking. Be careful not to overtighten the bolts; you can crack the toilet.



CONCRETE  
ANCHOR



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CAMERA HERE  
TO WATCH A  
VIDEO OF THE  
INSTALLATION.**



CARDBOARD

**PRO TIP** Making a straight cut on a large-diameter pipe starts with an accurate line. Wrap a piece of cardboard with one straight edge around the pipe and mark your line with a Sharpie.



**PRO TIP** To make the cut, first saw all the way around the pipe just enough to remove the mark. Keep sawing a little deeper each time around until you're through the pipe.



# HOUSE NUMBER LIGHT BOX

YOUR DINNER GUESTS WILL FIND YOUR HOUSE THE FIRST TIME!

ONE-DAY  
PROJECT

**T**his solar-power LED light box can illuminate your address to make it pop! And you can build it in an afternoon with only a few tools. Place the box in an area of your front yard that gets at least four hours of direct sunlight.

## WHAT IT TAKES

| TIME    | COST      | SKILL LEVEL  |
|---------|-----------|--------------|
| 1/2 day | \$20-\$50 | Intermediate |

**TOOLS**  
Drill/driver, 1/2" drill bit, 18-gauge brad nail gun, measuring tape, miter saw, table saw

BY JOE CRUZ





## 1 CUT A GROOVE

With your pieces cut to size according to the Cutting List, make a 1/8-in.-wide x 1/4-in.-deep groove 1/2 in. from the edge of both sides for the glass to fit into.

## 2 ASSEMBLE BOTTOM BLOCKS

Join the two bottom blocks with wood glue and 3/4-in. nails, keeping the blocks flush on four sides. Next, also using wood glue and 3/4-in. nails, attach one of two glass stop blocks to the bottom blocks, keeping it flush on three sides. Attach a front to the bottom blocks, leaving a 1/8-in. gap for the glass.

## 3 ATTACH THE SIDES

Before you attach the sides, draw a line on the inside of both sides, 1 in. from the top. You'll need it later. Apply wood glue to the left side of the bottom block assembly and position it with the front facedown. Now, attach the left side to the bottom block assembly with 1-1/4-in. nails. Be sure the left side is flush at the front and bottom of the bottom blocks, and the 1/8-in. grooves on each piece align. Attach the right side the same way.

## 4 ATTACH GLASS STOP

First drill a 1/2-in. hole in the upper glass stop block. Attach the upper stop block to each of the sides, just below the 1-in. line and behind the 1/8-in. groove, using wood glue and 1-1/4-in. nails. Attach a front to both sides, leaving a 1/8-in. gap between the inside of the front and the glass stop block. The front should be flush with the front edge of both sides.

## 5 CUT ACRYLIC SHEET

Cut a piece of 1/8-in. acrylic sheet to 4-5/16 x 23-1/2 in. Test the fit by sliding the acrylic sheet into the 1/8-in. slot at the top of the box.

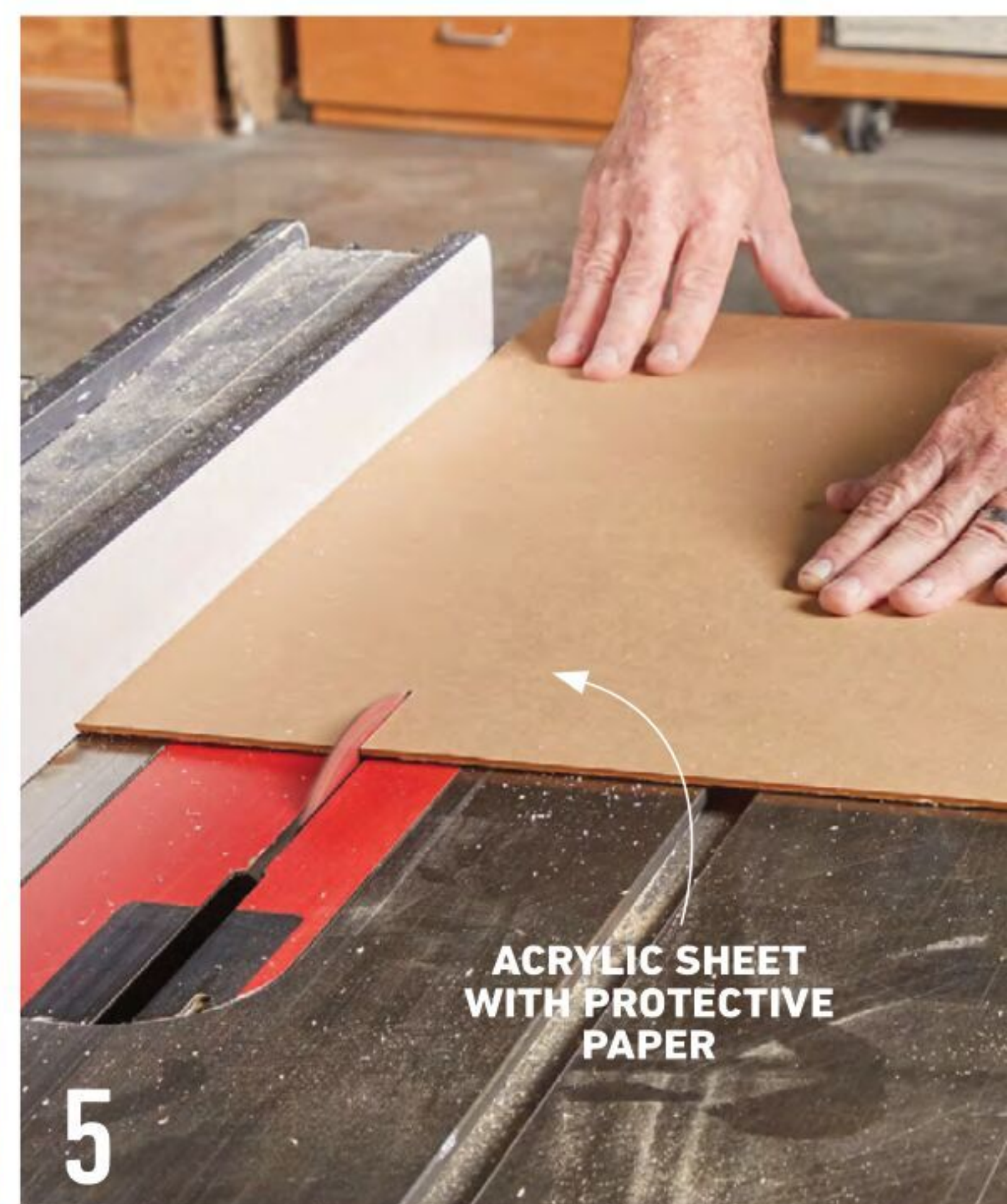
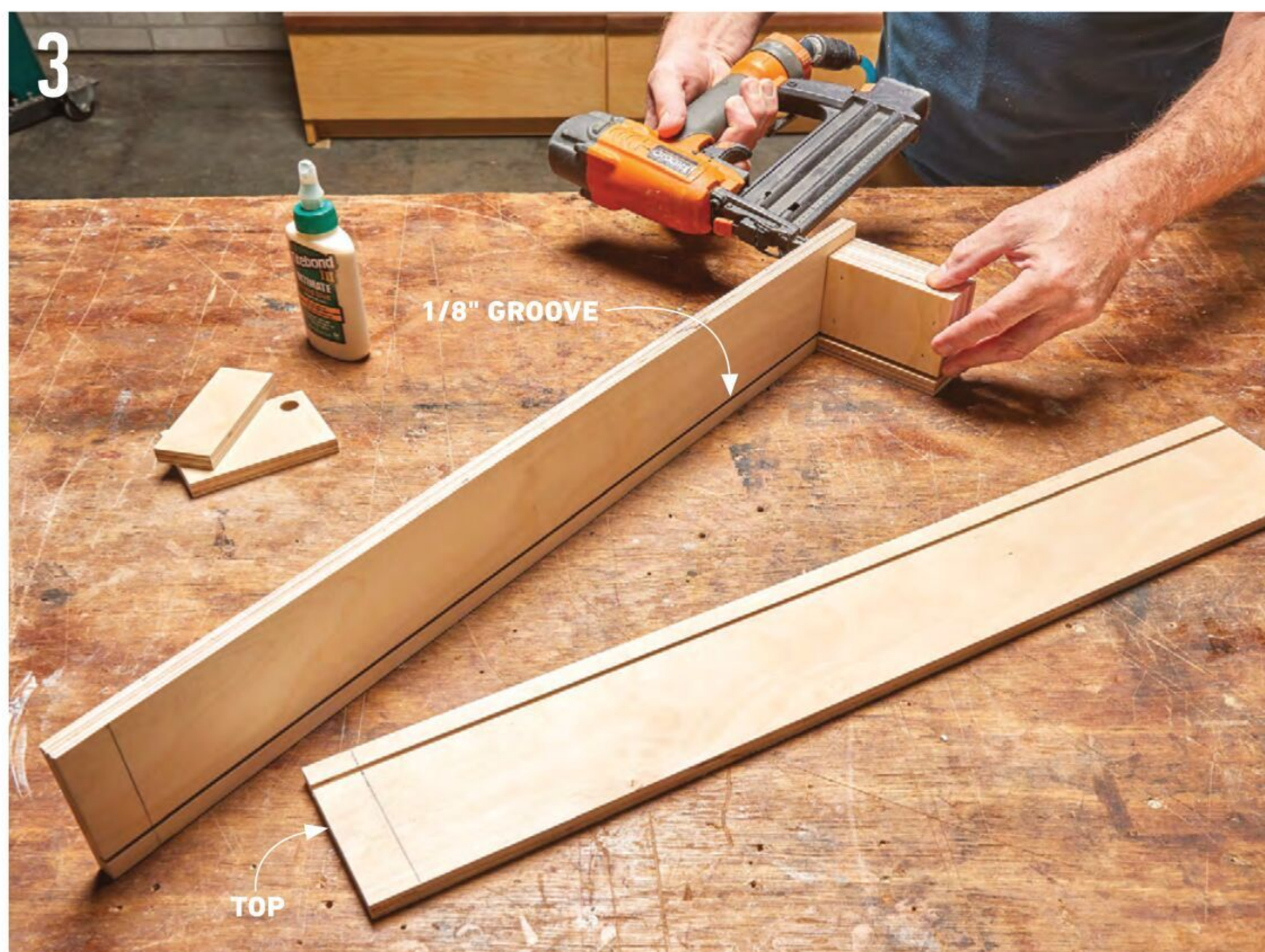
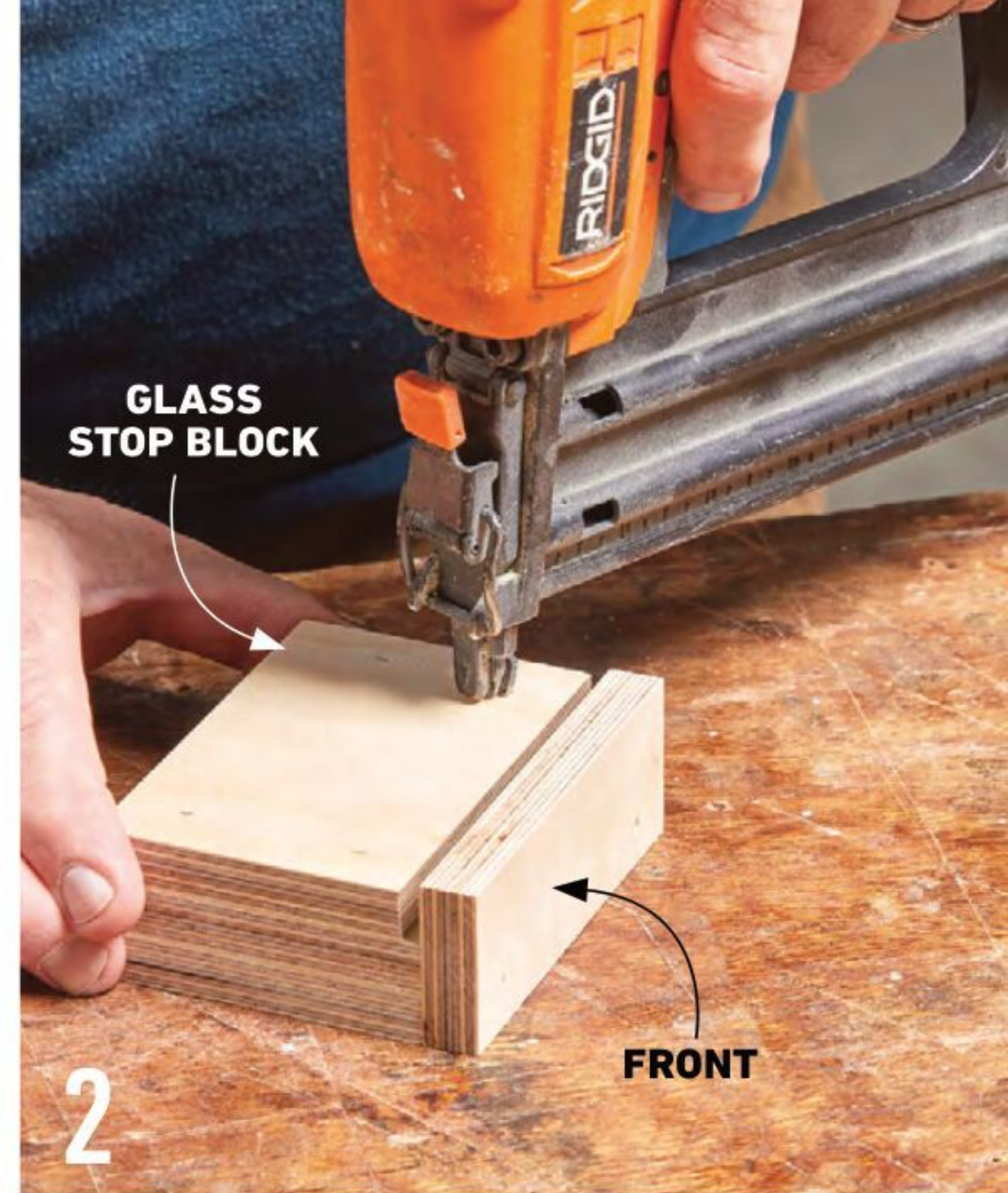
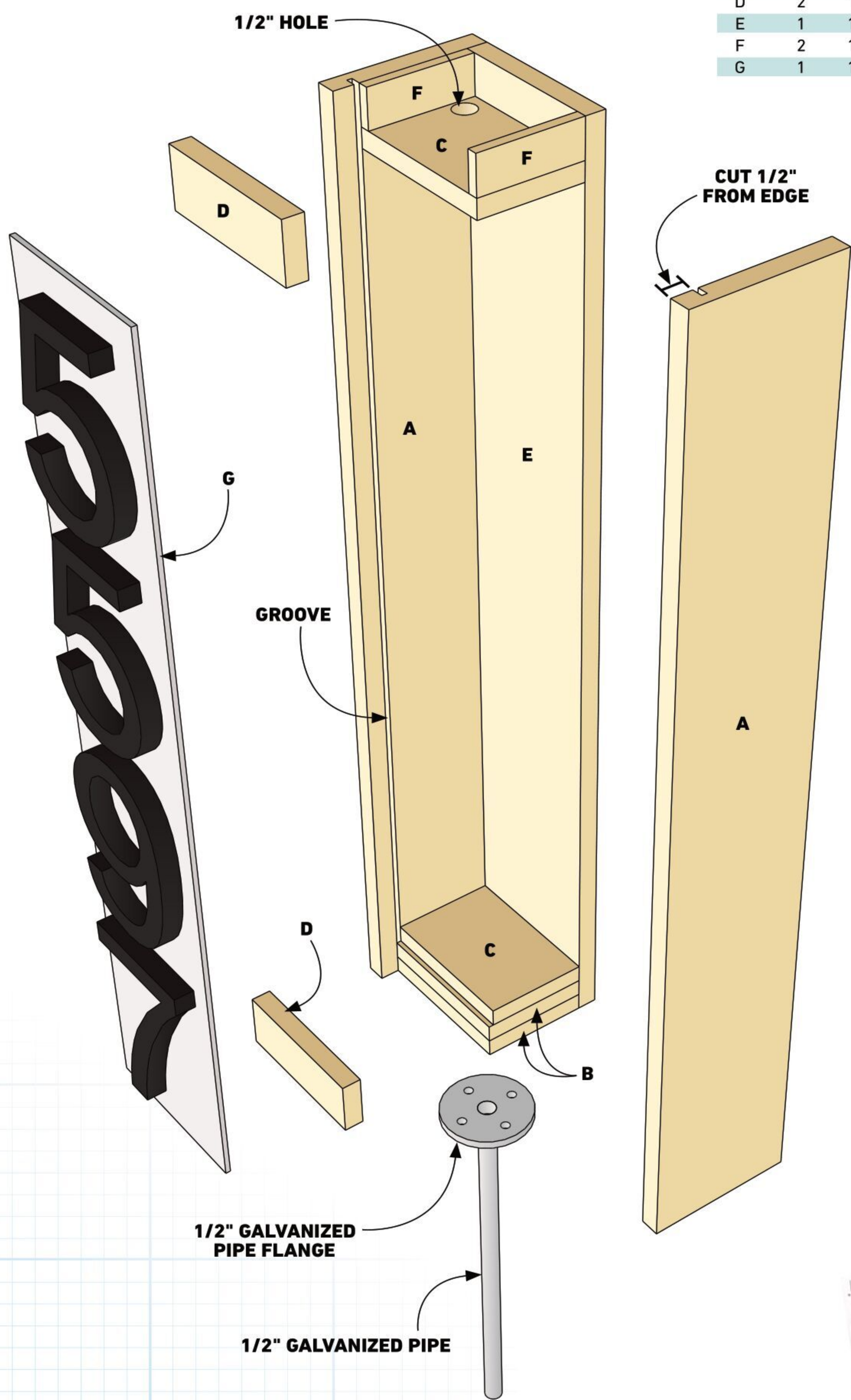




FIGURE A  
HOUSE NUMBER LIGHT BOX

OVERALL DIMENSIONS:  
4-7/8"W x 3-3/4"D x 25-1/2"H



CUTTING LIST

| KEY | QTY. | DIMENSIONS               | PART              |
|-----|------|--------------------------|-------------------|
| A   | 2    | 1/2" x 3-3/4" x 25-1/2"  | Sides             |
| B   | 2    | 1/2" x 2-3/4" x 3-7/8"   | Bottom blocks     |
| C   | 2    | 1/2" x 2-5/8" x 3-7/8"   | Glass stop blocks |
| D   | 2    | 1/2" x 1-1/2" x 3-7/8"   | Front             |
| E   | 1    | 1/2" x 3-7/8" x 25-1/2"  | Back              |
| F   | 2    | 1/4" x 1" x 2-5/8"       | Spacers           |
| G   | 1    | 1/8" x 4-5/16" x 23-1/2" | Acrylic sheet     |

MATERIALS LIST

| ITEM                                  | QTY. |
|---------------------------------------|------|
| 12" x 36" x 1/2" Baltic birch plywood | 1    |
| 1/8" acrylic sheet 12" x 24"          | 1    |
| Solar LED light strip                 | 1    |
| 1/2" galvanized pipe flange           | 1    |
| 1/2" x 12" galvanized pipe            | 1    |
| 1-1/4" 18-gauge brad nails            |      |
| 1-1/4" wood screws                    |      |
| 3/4" 18-gauge brad nails              |      |
| Acrylic latex exterior paint          |      |
| Plastic wood filler                   |      |
| Waterproof wood glue                  |      |

CHOOSE YOUR NUMBERS

You can use peel-and-stick number decals, or attach flush-mount numbers to the acrylic sheet. You can also paint numbers freehand or spray-paint using stencils.

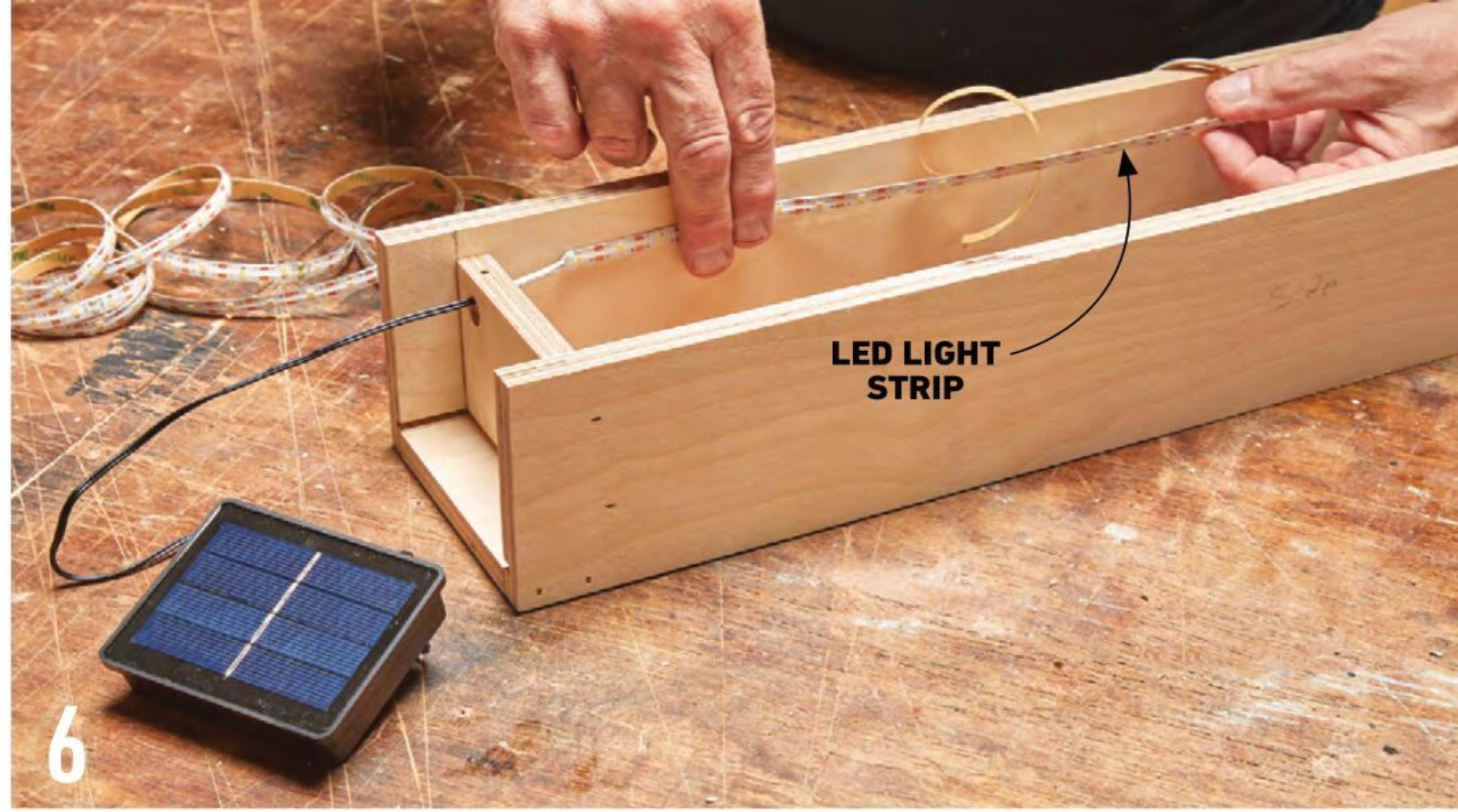
For flush-mount numbers, position the numbers in the center of the acrylic sheet so there are equal gaps between each number and from each side. (Some numbers come with templates.) Mark all the holes for the numbers and drill 3/8-in. holes at each mark. Slide the acrylic sheet out of the box and set it off to the side.





## 6 INSTALL LED LIGHT STRIPS

Through the 1/2-in. hole in the upper glass stop block, feed the solar LED strip lights until all the lights are inside the box. Peel back a few inches of the tape from the back of the LED strip. Stick the LED strips to the inside of the box, starting at the top, working your way down one side, then across the bottom and up the other side. Peel the tape as you go.



## 7 INSTALL THE NUMBERS

Peel the protective paper from both sides of the acrylic sheet and slide the sheet into the box. Attach your numbers. (If you're using screws, don't overtighten them; you may crack the acrylic sheet.)



## 8 INSTALL THE BACK

Position the box with the front face-down. Slide the back between the two sides, keeping it flush with the top of the sides. (If the back is too tight, trim it a bit.) Drill two 3/16-in. holes through the back into the bottom blocks and two 3/16-in. holes through the back into the top glass stop block, 1-1/4 in. from the edge of both sides. Drill two more 3/16-in. holes through the middle of each side into the back, 1/4 in. from the back edge. Secure the back by driving six 1-1/4-in. screws into your predrilled holes.



## 9 FIT THE SOLAR PANEL

Each solar panel is a little different; you may have to custom-fit yours into the box. You could add spacers to the inside of the solar panel compartment or notch out the back, depending on the size of your solar panel. Be sure the solar panel fits snug before gluing the two spacers to each of the sides in the solar panel compartment. Loop any excess wire and store it under the solar panel. Be sure to press the ON button before fitting the solar panel into the box.



## 10 FINISHING TOUCHES

Finish off the box by filling all the holes with plastic wood filler. Sand all the surfaces with 150-grit sandpaper. Seal the box with exterior spar urethane or paint it to match your house trim. Attach the pipe flange in the center of the bottom blocks with four 1-1/4-in. screws. Thread the pipe into the flange and tighten.





# BEST PRO TIPS



EXPERT ADVICE FROM THE JOB SITE

## NO-MYSTERY UPHOLSTERY

REPAIR YOUR OWN  
CUSHIONS AND COVERS

BY JAY CORK

**E**ver wonder how pros sew buttons onto pillows or how they get their cushions so perfectly straight and smooth? Unwrap the mystery of upholstery, and stitch together some skills to sew small projects and make repairs. I spent a day with Nate Van Hofwegen at his shop talking about his upholstery magic and what tricks he could teach us.



### USE THE RIGHT NEEDLES FOR THE MATERIAL

Choosing the correct sewing needle for your material eliminates frustration and breakage. Nate uses 140/22 needles for most of his vinyl projects. Leather and denim require thicker, stronger needles.

### MEET THE EXPERT



**NATE VAN HOFWEGEN**  
HAS BEEN AN UPHOLSTERER FOR 20 YEARS. HIS FAVORITE PROJECTS ARE VINTAGE VAN AND MOTORCYCLE SEATS.



## MAKE YOUR PLEATS NEAT

Making rounded corners and edges look consistent is not easy. Here are the steps Nate takes to achieve the same look around the entire seat cushion.



First, he gathers the material tightly around the corner and spaces the staples evenly.



He then trims the excess material, snipping the crowns off the pleats.



Finally, stapling about 1/2 in. from the edge, he fastens the loose tails so they lie flat.



## REPLACE, DON'T REPAIR

We've all seen the upholstery repair kits that claim to "work like magic." The problem is, they don't. Often it's easier to just replace your item; sometimes you can't beat new.



## CHOOSE THE RIGHT FABRIC

Use the right material for your project—outdoor cushions need fabric designed to withstand the elements. There are even special types of vinyl designed to make upholstery easier.

## WHAT IS A YARD?

Commercially available upholstery material is typically 54 in. wide. At a fabric store, you may find some material that's not this wide, but no matter how wide the material is, a yard of fabric is always 3 ft. long.



## BEST PRO TIPS



### CUTTING FOAM

Nate has a saw designed to cut foam. An everyday alternative to this pro tool is an electric bread knife. A bread knife's serrated edges easily cut through thick foam, and the knife is also lightweight and easy to control.



### STIFFEN EDGES WITH BATTING

Polyester batting stiffens a cushion and eliminates wrinkles, making a cushion cover taut and smooth. Glue the batting to foam with a spray such as 3M Headliner & Fabric Adhesive (\$25).



LOCK  
STITCH

### LOCK YOUR STITCH

Backstitching locks a stitch in place, ensuring it won't unravel. Start by going in reverse about an inch, and then go forward over that bit of stitching. This locks in the thread at the beginning of the seam. Do the same at the end of the seam.



### MAKE A PATTERN

When you're going to make more than one of anything, a pattern is essential. Nate suggests making patterns that account for the seam allowance, so you don't have to remember to offset the line every time you trace the pattern. Nate uses chalk, not markers, for marking his lines. Chalk isn't permanent, and markers tend to bleed.

### SHOPPING FOR MATERIALS

Most materials needed for an upholstery project—even foam—are available at local fabric and hobby stores.





## USE A SPECIAL FOOT FOR ZIPPERS

Zippers and piping often require stitching closer to the edge than a regular foot will allow. For these operations, Nate uses this special foot on his sewing machine.

## LEAVE THE PIPING FOR THE PROS

Piping adds a significant level of style to any cushion and also a significant amount of difficulty. Piping requires the use of a special foot on the sewing machine (as shown above), and the machine itself must be able to handle thick material.



## REPLACE A MISSING BUTTON

The buttons on a tufted cushion often come loose, get damaged or disappear. Nate showed me how easy it is to replace them. With a long needle called a regulator and a simple knot, you can replace a button on any cushion.

### UPHOLSTERER'S SLIPKNOT



## EXTEND-A-DRAIN

By GOOF PROOF SHOWERS

### DRAIN HEIGHT EXTENSION KITS



#### EXTEND-A-DRAIN 2 1/2" - 3"

- Raises drain by 1/4" to 1/2"

GPEAD-2123R



#### EXTEND-A-DRAIN 3 3/8"

- Raises drain by 1/4" to 1/2"

GPEAD-338R

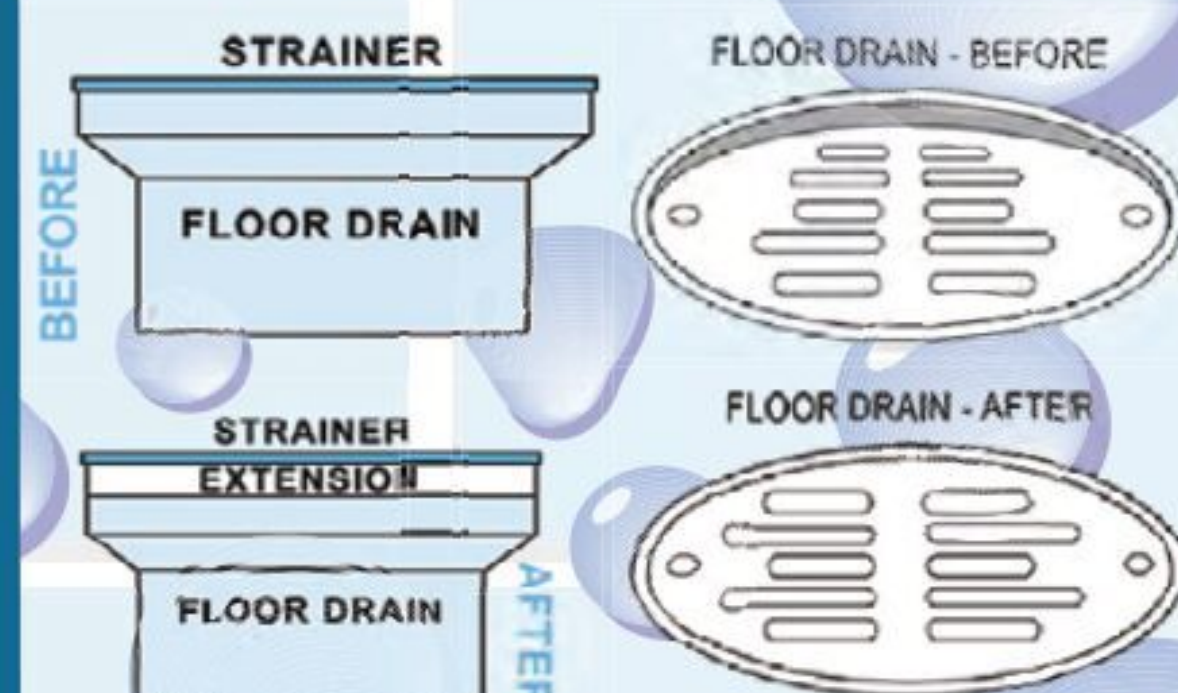


#### EXTEND-A-DRAIN 4 3/8"

- Raises drain by 1/4" to 1/2"

GPEAD-438R

**DIRECTIONS:** 1. Remove drain cover plate. 2. Install rubber washers as needed. 3. Install drain height extension. 4. Using the screws provided reinstall drain cover plate. 5. RegROUT around drain. **NOTE:** If screws are too long use a 1/8" or 3/32" drill bit to lengthen the screw holes.



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## NATE'S TOOLS OF THE TRADE

Here are the essential tools Nate uses every day in his upholstery shop.

### STAPLE REMOVER

This essential tool for removing staples costs about \$30 online.



### PNEUMATIC STAPLER

A pneumatic stapler is probably the most-used tool in Nate's shop. He uses 1/2-in. staples. Expect to pay \$80 for a good one.



### SOFT TAILOR'S TAPE

Essential for measuring curved surfaces, these flexible tapes are available at fabric stores for about \$5.



### REGULATOR

A regulator is the needle used to replace tufting buttons. Expect to pay about \$10 for one.

### FOAM-CUTTING SAW

For large pieces of foam, this purpose-built saw is indispensable.



### NEEDLES

A great assortment of needles will serve you well. Find them at your local fabric, hobby or leather working stores.





## CHALK

Instead of markers, Nate uses chalk to mark his fabric.

## STRAIGHTEDGE

Just like a craftsman in a wood shop, an upholsterer also uses a straightedge.

## PLIERS

A good pair of pliers costs less than \$10.

## ELECTRIC BREAD KNIFE

For the rest of us, an electric bread knife does a great job of cutting foam.

## TACK HAMMER

When you're working with studs, a tack hammer makes life so much easier. Find one for about \$30 online.

## HOLE PUNCH

Nate's professional leather punch from Craftool costs about \$50.

## SCISSORS

Nate has many pairs of scissors and, like most upholsterers, he is unwilling to share. Buy your own for about \$30.

## ADHESIVE

Nate relies on 3M Headliner & Fabric Adhesive. Find it at your local automotive store.

## SEAM RIPPER

A seam ripper is perfect for ripping long seams and getting where scissors just can't reach. Find one at the fabric store for about \$7.



# HOME CARE

**fh** MAINTENANCE & REPAIR | STORAGE & ORGANIZATION | HEALTH

## SEAL YOUR GARAGE DOOR

**I**f you want to keep the heat within your garage this winter or retain the cooled air next summer, you will have to do more than just install an insulated door. Most of the conditioned air escapes around and through all the cracks.

Here are four simple steps to seal that door as much as possible. You can do the whole job in an afternoon for as little as \$100, depending on the size of your door.

### MEASURE THE GARAGE DOOR

Start by measuring the width, height and thickness of your garage door. You'll need those measurements to buy a door stop with a built-in sealing lip and a new bottom seal. Also buy new V-strip weather stripping, a tube of exterior caulk and a small can of wood sealer (if you have a wooden door).

Some garage doors come with a metal track that holds a replaceable rubber seal. Over time, the seal flattens and cracks. If that's what you have, replace it with a "cold weather" silicone-type seal, which remains flexible in cold weather and lasts longer. Many home centers and hardware stores stock them. Lubricate the silicone seal with dishwashing detergent and slide it into the track slots.



For extra sealing power, a rubber threshold (like the Storm Shield Garage Door Threshold, about \$60 for 16 ft. online) mounts on the garage floor and seals out elements, but it can also trap water in.

### INSTALL NEW TRACK AND WEATHER STRIPPING

If you have a wooden garage door, rip off the nailed rubber seal. Then coat the wood with wood sealer. While the sealer dries, prepare the

new aluminum track by cutting it to length and notching the ends so it fits around the bottom roller. Next, lay down a thick bead of caulk along the leading edge of the door and attach the track setup (**Photo 1**).

Prepare the areas between the door sections by cleaning them with a rag and household cleaner (be careful not to pinch any fingers). Then install the pressure-sensitive V-strip weather stripping (**Photo 2**). Repeat for each section.



## INSTALL THE THRESHOLD

Now move on to the threshold. Start by cleaning the concrete with degreaser and water. Rinse and let dry. Then unroll the threshold into place with the hump on the inside of the garage door and cut it to the width of the opening. Gently close the door onto the threshold and square up the hump to meet the door seal. Mark the edge of the threshold on the floor at each end and snap a chalk line along your marks. Next, glue the threshold into place. Close the door firmly against the threshold and leave it closed until the adhesive dries (**Photo 3**).

## INSTALL THE STOP

Pry off the old door stop and install a new door stop that has a sealing lip (**Photo 4**).

### 1 INSTALL A NEW SEAL ON THE DOOR BOTTOM

Push the track into wet caulk, tightly against the door bottom. Clamp it into place. Then drill and screw the track to the back of the door with 1-in. screws.

### 2 APPLY WEATHER STRIPPING IN THE DOOR SECTION SEAMS

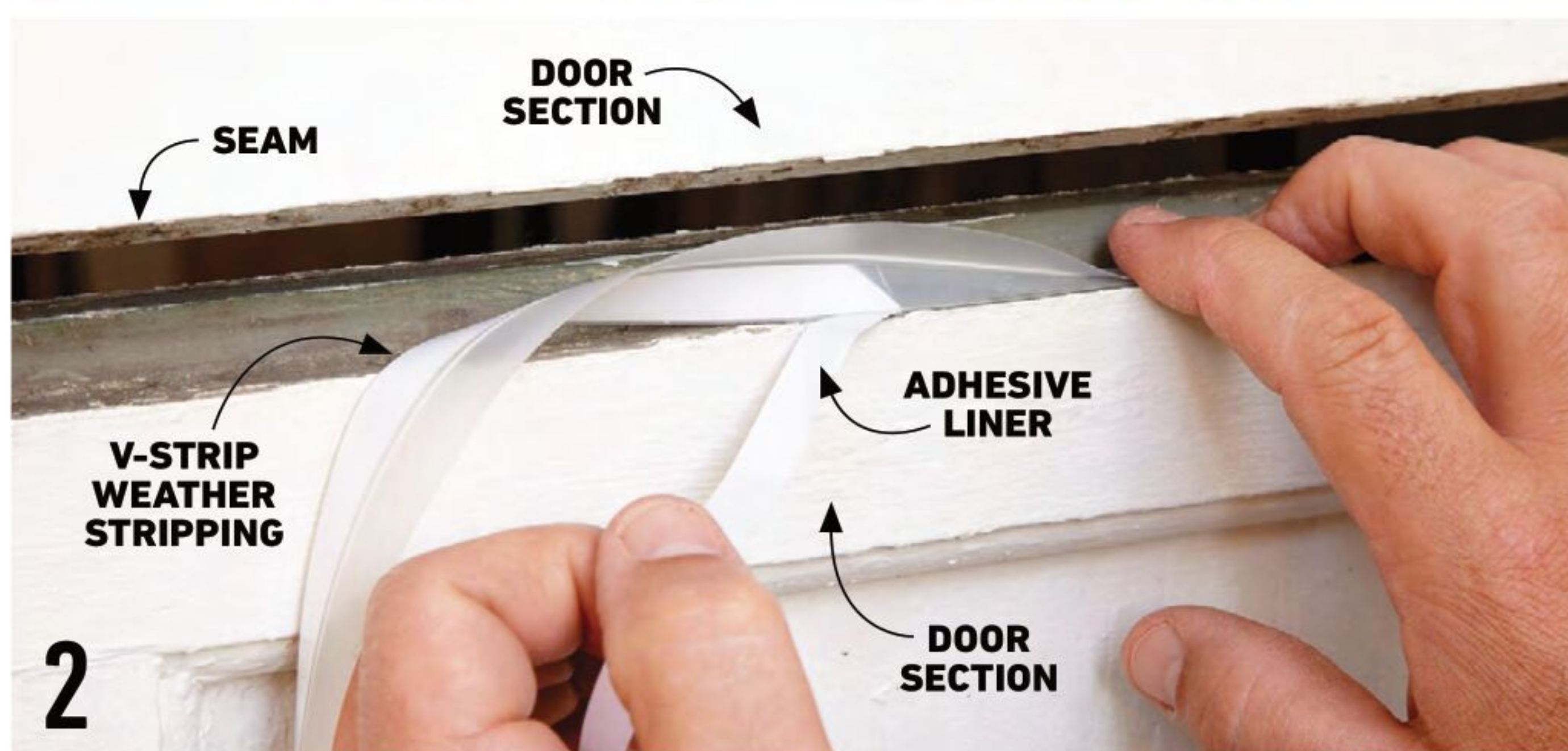
Cut the weather stripping into strips the width of the door. Then fold along the crease so the "V" faces the outside. Insert the strip between the door sections, remove the adhesive backing and press it into place.

### 3 GLUE DOWN A NEW THRESHOLD

Squirt out a bead of threshold adhesive according to label directions. Then move the threshold into place and align it with the chalk line you made earlier. Close the garage door and let the weight hold it in position until the adhesive sets up.

### 4 NAIL ON SELF-SEALING DOOR STOP

Slide the door stop against the garage door so the vinyl seal bends at about a 45-degree angle. Then nail the stop into place with galvanized (or aluminum) 1-1/2-in. nails.







HOW TO BLEED YOUR RADIATOR THE RIGHT WAY

A warm radiator on a cold day is like a hot cup of cocoa, welcoming you and thawing your frigid digits. When air gets trapped inside a radiator, hot water can't flow through and the radiator turns to cold steel. Getting rid of that trapped air is simple.

At the top of your radiator, on one end, sits a small metal valve. If this valve has been painted over, carefully chip that paint off with a knife or small screwdriver. Now find your radiator key; you'll need it to open and close the valve. You could also use, depending on the radiator's valve type, a 1/4-in. 12-point socket or a flat screwdriver.

Using whatever tool works best on your radiator valve, slowly turn the valve counterclockwise. When you hear air hissing out of the valve, you're fixing the problem. Hot water will push the air out to refill the cold radiator, and when that water starts coming out of the valve, close it tightly.

Bleeding air from your radiator might lower your system's water pressure, and you may need to slowly add water to increase the pressure. In fact, you may need to add water while bleeding the radiator to help purge the air from the system. This is where a helper will save you trips up and down the stairs.

If you're unfamiliar with your system, call a pro. How much pressure you need depends on how high the water must rise in your home. The basic rule is 1 lb. of pressure for every 2 ft. of rise. Your gauge may read in pounds, feet or both. A basic two-story house, with the boiler and expansion tank in the basement, needs 12 to 15 lbs., or 25 to 30 ft., of pressure.

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I certify that the statements made by me above are correct and complete.

Jim Woods,  
Vice President, Magazine Planning



# DOES YOUR CAR NEED WINTER TIRES?

If you've ever watched a car race or a motorcycle race, you know that extreme temperatures make tires perform differently. And that's true for low temps as much as high temps. If the roads you drive freeze during the winter, that's reason enough to consider buying winter tires for your car or truck. The all-season tires you currently have on your vehicle are made with a rubber compound designed to perform over a wide range of moderate and warm temps. But winter tires use a compound designed to stay flexible in the coldest temps; these tires don't care for hot pavement.

Some tire service centers will store your off-season tires for you. This nice service will ensure that your tires are stored properly (indoors, out of the sun, clean and in tire bags), and the shop will change your tires again when the time is right. You do not want to drive with your winter tires on warming pavement.

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# SALT IS THIS SEASON'S SEASONING

**Y**ou've heard "salt lowers the freezing point of water," but what does that mean? It's called freezing point depression, and it means that salt makes it harder for water molecules to bond into solid ice. When table salt (or sodium chloride, NaCl) dissolves in water, it separates into sodium and chloride ions, and those ions interfere with the formation of ice. Calcium chloride (CaCl<sub>2</sub>) breaks down into three ions—one calcium and two chloride—providing even more ions to block the bonding.

Enough science; what does this mean for your icy sidewalk? Instead of freezing at 32 degrees F, water will stay liquid until about 15 degrees F after salt is applied, or maybe even 0 degrees F, depending on the type of salt you use. Here are the most common types. They are sold under different brand names, so check ingredients lists.

## ROCK SALT OR HALITE

In states where roads can freeze, DOT crews for years have spread basic rock salt on public roadways. Rock salt is table salt (sodium chloride) that hasn't been purified for human consumption. Its impurities include aluminum, lead, iron and phosphorus, which are bad for the environment. Rock salt can damage trees, plants along your sidewalk or driveway, and any waterways it will eventually wash into. Plus, it's mostly ineffective when the temp drops below 15 degrees F. But it's readily available and a 50-lb. bag costs about \$10.

## CALCIUM CHLORIDE

Calcium chloride is a much more effective ice melter than rock salt; it can melt ice at temps below zero. It's less corrosive to ferrous metals, which helps protect cars and any metal in the infrastructure, and it is less toxic to aquatic plants. The downside? CaCl<sub>2</sub> is more expensive than NaCl. Calcium chloride is often blended with magnesium chloride, which is also an effective ice melt chemical. However, magnesium chloride is less effective than CaCl<sub>2</sub> and is more corrosive to both metals and concrete. All the chlorides can be hard on pet paws.

## UREA

Used in several deicer products labeled as "pet safe," urea is a nitrogen-rich organic compound. (Urea is not urine; it's formed in the liver to help humans and animals excrete urine—fun fact.) With its high nitrogen content, urea is produced widely as an agricultural fertilizer. It's not as corrosive as chloride-based deicers, so it's kinder to metal, concrete and pet paws, but urea is much less effective as a melting agent. And its high nitrogen content can make it harmful to nearby bodies of water. Pet owners, read labels carefully.

## DIY SOLUTIONS

If you have leftover **lawn fertilizer**, spread a few handfuls of it on your icy walkway. It's abrasive and will melt ice, and it will nicely settle into your lawn in the spring. However, if you can **prevent ice from forming** on your sidewalk and driveway, you won't have to worry about ice melt chemicals. **Fix leaks in gutters**—check corners and transitions—so they don't drip meltwater that will refreeze and form treacherous spots. **Clear snow quickly** before it gets packed and hardens into ice. An ice chipper or heavy shovel can help you remove ice as it forms and before it gets too thick.

## BEET JUICE MIX

Better than salt and safer for pets and the environment, beet juice lowers the freezing point of water to as low as 20 degrees below zero. First used commercially on roadways in northern Minnesota (beet farming is big business there), a combination beet juice-brine solution is a highly effective ice melter and is now used in states across the north. Beet juice deicer is also easier on vehicles, pavement and the environment. Make your own beet-brine solution (25% beet juice and 75% salt water) and keep it in a spray bottle near the front door. Use white or golden beets to avoid stains.





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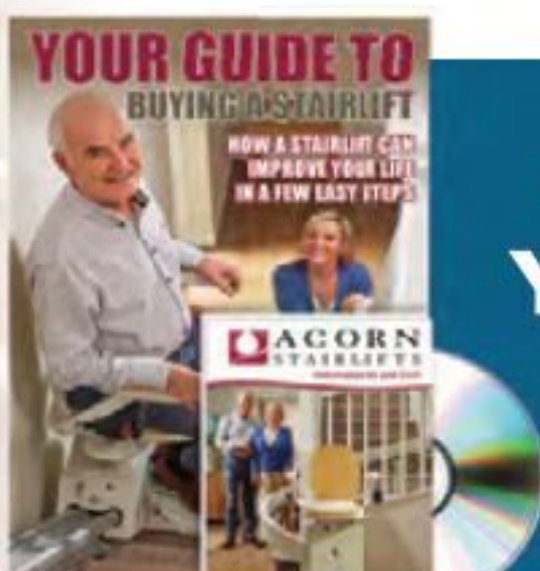
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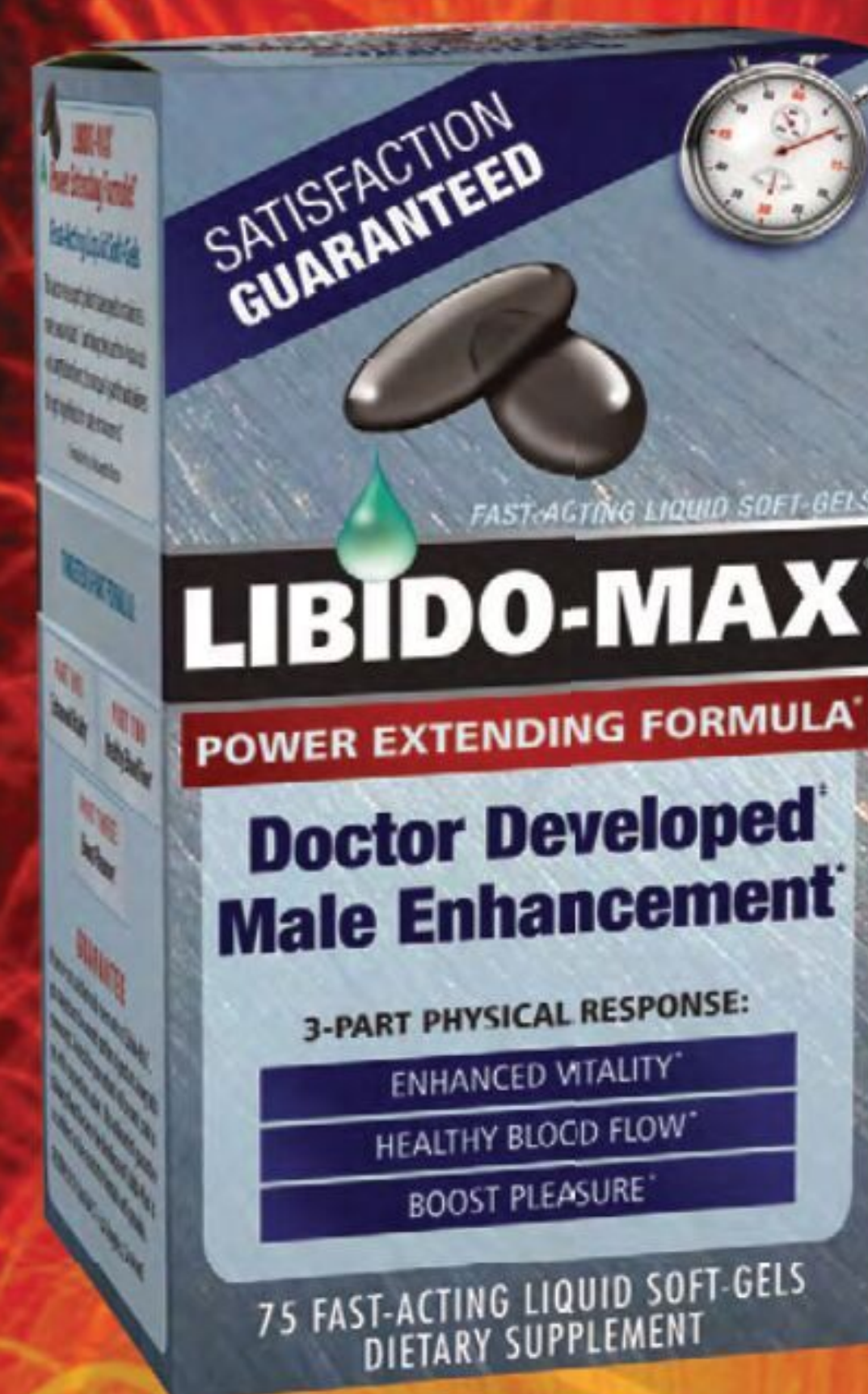


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# family handyman

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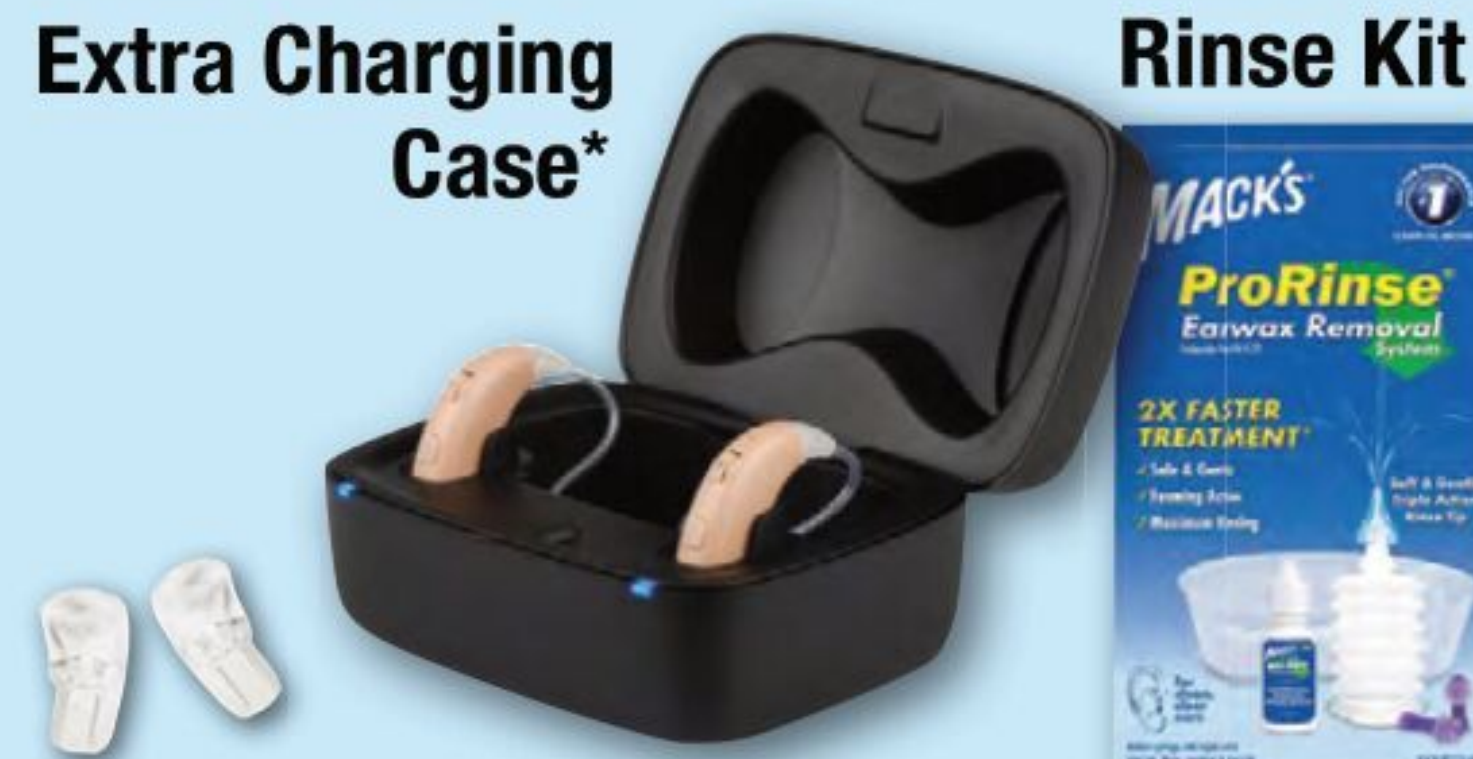
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LAUGHS AND LESSONS FROM OUR READERS

## SOUTHERN SNOW REMOVAL

As a southern girl, I didn't have much experience with snow removal. So when I moved north and got married, I decided it was high time I learned. One snowy morning, I told my husband I wanted to learn how to snow blow. We went outside, and he showed me how to move the blower side to side and make turns. He made one pass to get me started and then went back to shoveling. I eagerly got behind the blower and started down the driveway. It was a lot harder than I expected, and it took everything in me to get down to the end of the driveway. On the way back, I was nearing exhaustion and sweating up a storm. I kept wondering why it looked easy when my husband did it. When I FINALLY reached the top, my husband was waiting for me. "What the heck am I doing wrong?" I asked him. "Old people can do this!" My husband just smiled and put it in gear; then the thing took off on its own. I didn't know I had to engage the self-propel lever.

CARRIE WILKINSON

## PLASTER—IT'S WHAT'S FOR DINNER

My parents were turning the attic space directly above our dining room into an extra bedroom. The space had no flooring, which was one of the first jobs they wanted to tackle. One evening, they set out dinner and went upstairs to work while we ate. Suddenly, we heard a scream and a crash, and then we saw Mom's foot come through the ceiling! She'd forgotten about the lack of flooring and stepped right through. She wasn't hurt, but the soup that night was pretty crunchy—with the plaster dust and all.

ELLEN SAMUEL

## ONCE WASN'T ENOUGH

We have a double-sink vanity in our bathroom, and the left sink drain was clogged. Instead of buying drain cleaner, I thought it would be better to use my shop vacuum to suck out the clog. Then I had an even brighter idea: "Why put the disgusting clog and water in my shop vac? I'll reverse the vacuum to blow the clog down the drain."

As I did this, the pressure blew water and debris out of the other sink. A geyser of nasty water blew all over the mirror, ceiling and wall. I pulled the stop on the other sink drain and tried again. This time, water blew out of the overflow of the sink I was unclogging. It would have been so much easier to clean my shop vacuum than the entire bathroom.

JOE DUFFY

ILLUSTRATIONS: STEVE BJÖRKMAN



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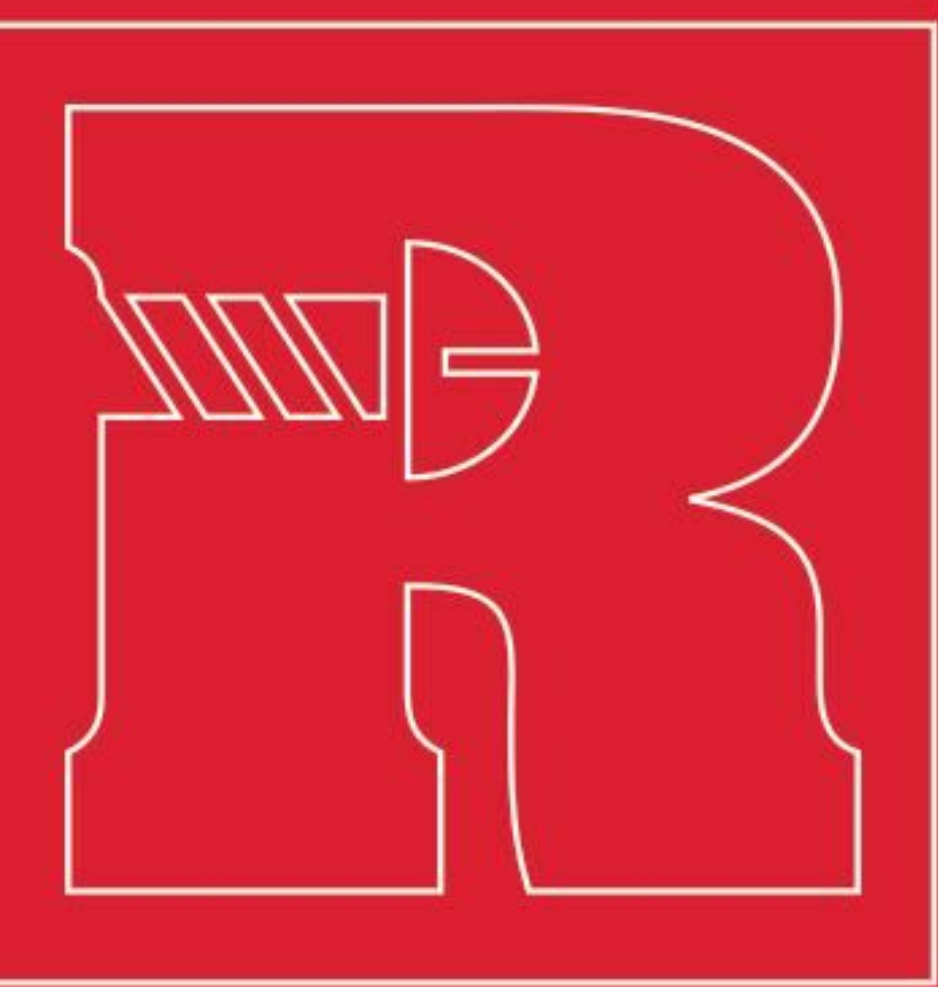


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