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What Your Garage Says About You

“Eyes are the window to the soul.”

That saying has prevailed for centuries. But we all know the real window to your soul is your garage.

A glimpse into your garage reveals a lot about you—obvious things like whether you like to ski or weld or go fly fishing. But also deeper things: Are you neat or disorganized? Practical or playful? A big spender or a penny pincher? You'll find clues to all this and more. Much more than a place to park, the garage may be the most versatile part of your home: a storage center, a workshop, a hobby space, a room for your toys. Increasingly, it's also a place for people to hang out, socialize and watch sports and movies. And that's the focus of our September issue: making your garage a better space for both work and play.

At *Family Handyman*, we've been watching garage trends for decades, and here are a few recent statistics that I found striking:

25%

... NEVER PARK IN THE GARAGE.

Some use the space for DIY projects rather than parking. But you can have both. Check out Brad Holden's ingenious space-saving workbench on p. 50.

30%

... ARE EMBARRASSED BY THEIR GARAGE. Lots of people keep their garage door closed so neighbors can't see the chaos inside. If that's your situation, part of the solution may be to get items into the attic of the garage. The ultimate aid for that is on p. 32.

50%

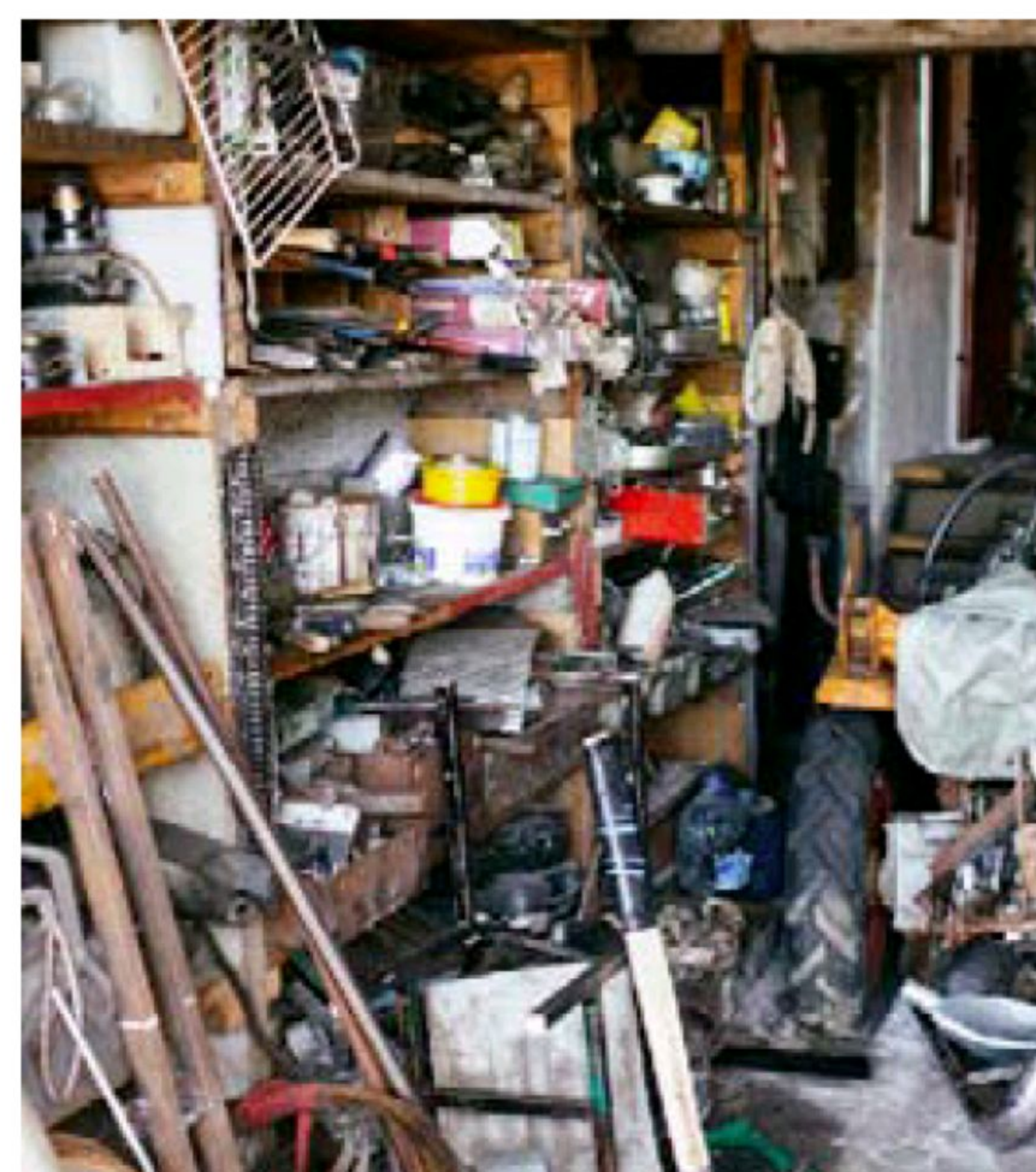
... SPEND AT LEAST ONE HOUR PER WEEK IN THE GARAGE. My guess is that *Family Handyman* readers average more than that and would love air conditioning in the garage. For DIYers, that's easier than you think. See p. 46.

99%

WANT A BETTER GARAGE?

Seriously, who doesn't? Drop me a line at feedback@familyhandyman.com and tell me about your greatest garage need. Organization? Lighting? Convenience and comfort? Thanks!

GARY WENTZ, EDITOR-IN-CHIEF



IMPROVE YOUR GARAGE!

We've been dreaming up great garage improvements since the 1950s. So whether you want to add organization, comfort or convenience, search for "garage" at familyhandyman.com.

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**family
handyman**

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DIY ADVICE
SINCE 1951**

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TREAT THE FUEL.**



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Measure once, dig twice; checking the oil the hard way; and failing to pull the plug.



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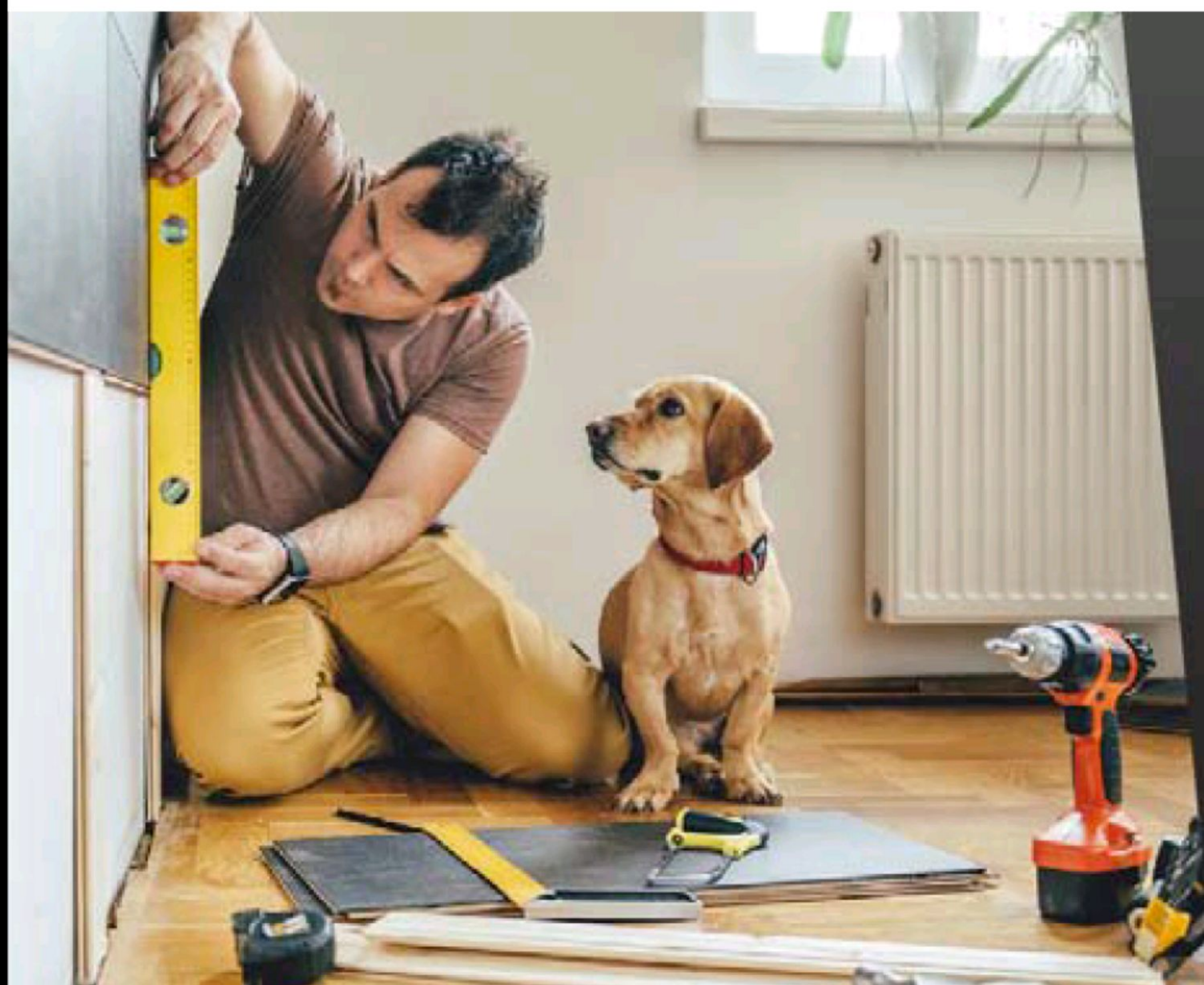
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Stuff We Love

Our favorite DIY tools, materials + gear. By Mike Berner

Deck fastening made easy

The Camo Drive deck fastening system features a drive attachment you can use with a drill you already own, while *standing*. The drill attachment uses collated strip screws that automatically advance so the next screw is ready for you right away.

The tool comes with three fastening guides to fasten deck boards in three different ways: For solid wood decking, the edge guide lets you hide fasteners on the edge of the board, while the face guide allows you to drive fasteners through the board's face. The clip guide is used with EdgeClip fasteners to lay grooved composite decking. You can find the Camo Drive tool online for about \$175.

Edge guide

Face guide

Clip guide



Fast roller cleaner

There are several products for cleaning roller sleeves on the market, but the Roller Ready tool stands out because it's so simple to use. It fits in the chuck of your drill, letting you spin off water as you rinse and clean your roller sleeve. The fully submersible, smooth design (no nooks and crannies for paint to get in) makes it really easy to clean when you're done.

To clean a roller, slip the sleeve onto the Roller Ready, spin it in and out of a bucket of water several times to rinse out the paint, then spin out the water. The sleeve will be dry and ready to use again in no time. You'll find the hard-plastic version for \$18 and a Pro Version made of aluminum for \$30 on Amazon.



TIME-SAVING DRYWALL

When it comes to a taping and mudding project, the corners that meet existing walls are my worst nightmare. Not only do you have to tape and mud the corner, but now you're stuck painting the entire wall, and there's never a good way to tape up to a wood or brick accent wall. Well, Trim-Tex makes a special tear-away bead so you don't have to lose sleep over a corner again.

Adhere the bead to the surface, staple it down, then run your mudding knife along the raised edge. Before your final sanding, tear away the leg that's sticking out. Tear-away bead is perfect for repairing or covering a ceiling or butting drywall to a surface you don't want to mud, like a paneled wall, exposed brick or existing trim. A 10-ft. stick costs less than \$3 at home centers.

MIKE BERNER, ASSOCIATE EDITOR



RETRACTABLE RATCHET STRAPS

The endless headache over your tangled ratchet straps may have finally come to an end with Quickloader straps. With standard straps, there's no easy way to store excess strapping—you could spend five minutes apiece rolling them up to store in your vehicle, only to have them unwind.

Instead, the Quickloader straps use a spring-loaded mechanism to keep the straps coiled. Like the blade in a tape measure, the straps are under tension and able to retract into the case. A 12-ft. strap rated for 1,500 lbs. costs about \$22 at The Home Depot and online.



MEMBER SPOTLIGHT

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SUBMITTED BY: BARBARA W. – PINE CITY, MN

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A BETTER PRUNING BLADE

The next time your list of chores includes branch trimming, put a pruning blade in your reciprocating saw and get to work. A standard wood-cutting or demo blade will get the job done, but a pruning blade will work much faster. The teeth are big and sharp and allow for fast cuts through big sticks and logs.

Pruning blades aren't limited to cutting branches and logs; if you're not worried about splintering or a very rough-cut edge, they'll work fast on any wood material, making them great for demolition as well. This Diablo blade features carbide-tipped teeth, which will stay sharp much longer than those on standard pruning blades. Pruning blades are made by many manufacturers and cost \$2 to \$9 each at home centers.



Peel-away protection

Peel-Tek 150 is a liquid masking; you brush or roll it on like paint and it forms a rubbery coating. It's used for painting and staining and other home improvement projects, as well as for crafting.

It's ideal for protecting surfaces that might get stained, chipped or scuffed during demolition. Cover your sink or tub ahead of renovating a bathroom, or roll it on a countertop before replacing your backsplash. It's easy to apply with just a brush or roller, and you can lay it on extra thick for more protection. When you're done with the job, peel up the masking and the surface will be just how you left it. Peel-Tek 150 is available in a quart for \$30 and a gallon for \$80. To buy it and see all its uses, visit peel-tek.com.



QUIET, SMART GARAGE DOOR OPENER

Most garage door openers are loud and frankly, not too bright. They're difficult to install, can set off your dogs, and it's easy to forget to close them when you drive away. The Genie SilentMax Connect is one of many smart garage door systems that solve these problems. We found it easy to install and program and were pleased by its ultra-quiet operation. With Wi-Fi and Bluetooth technology, it connects to your smartphone, allowing you to open and close the door while you're away. It also integrates with Alexa and Google Home for hands-free control, and doesn't charge a fee for linking with these smart devices. The opener is available for \$200 at homedepot.com.

JASON INGOLFSLAND, ASSOCIATE EDITOR



LIVE LIFE WITHOUT PAIN

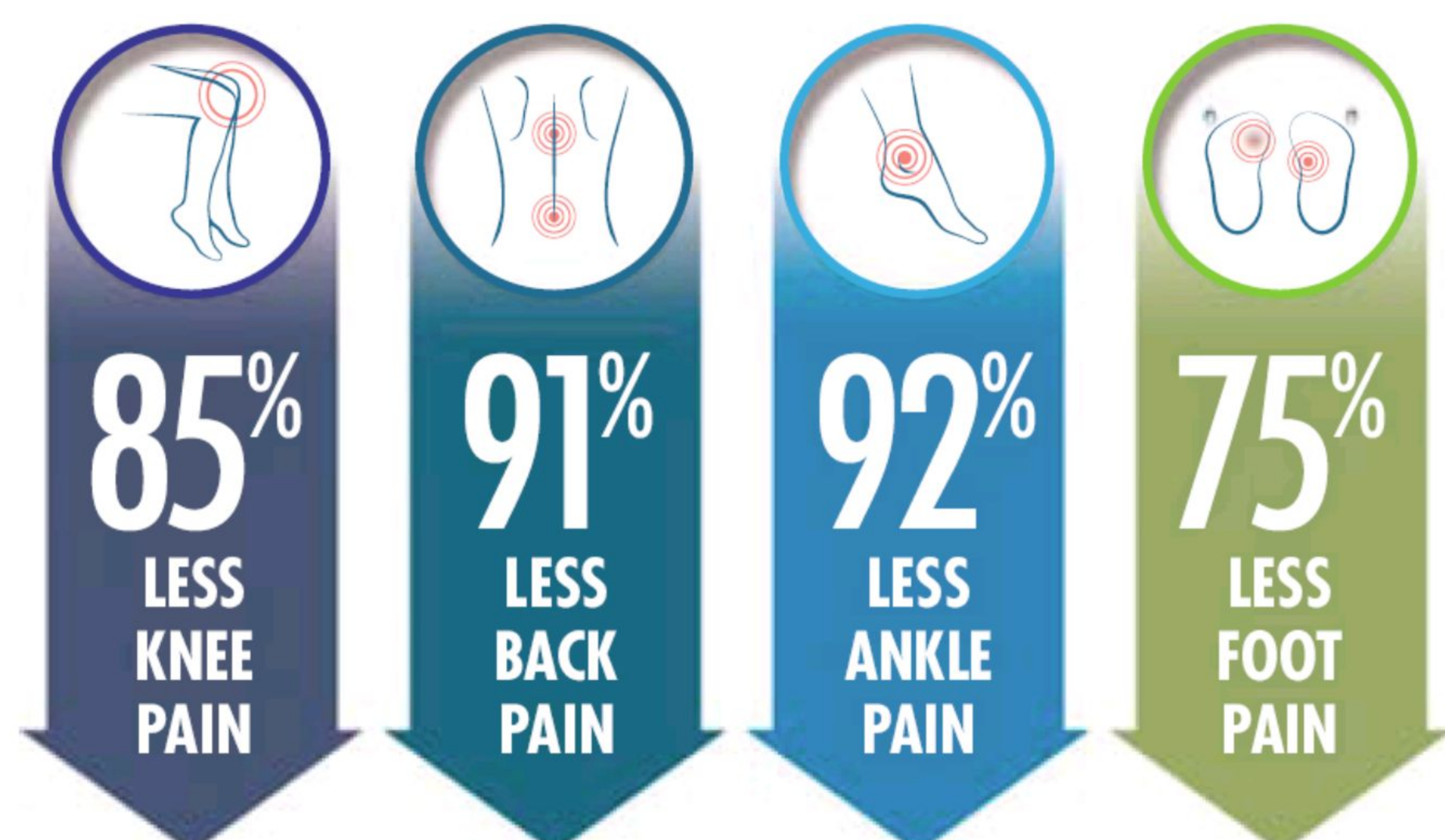
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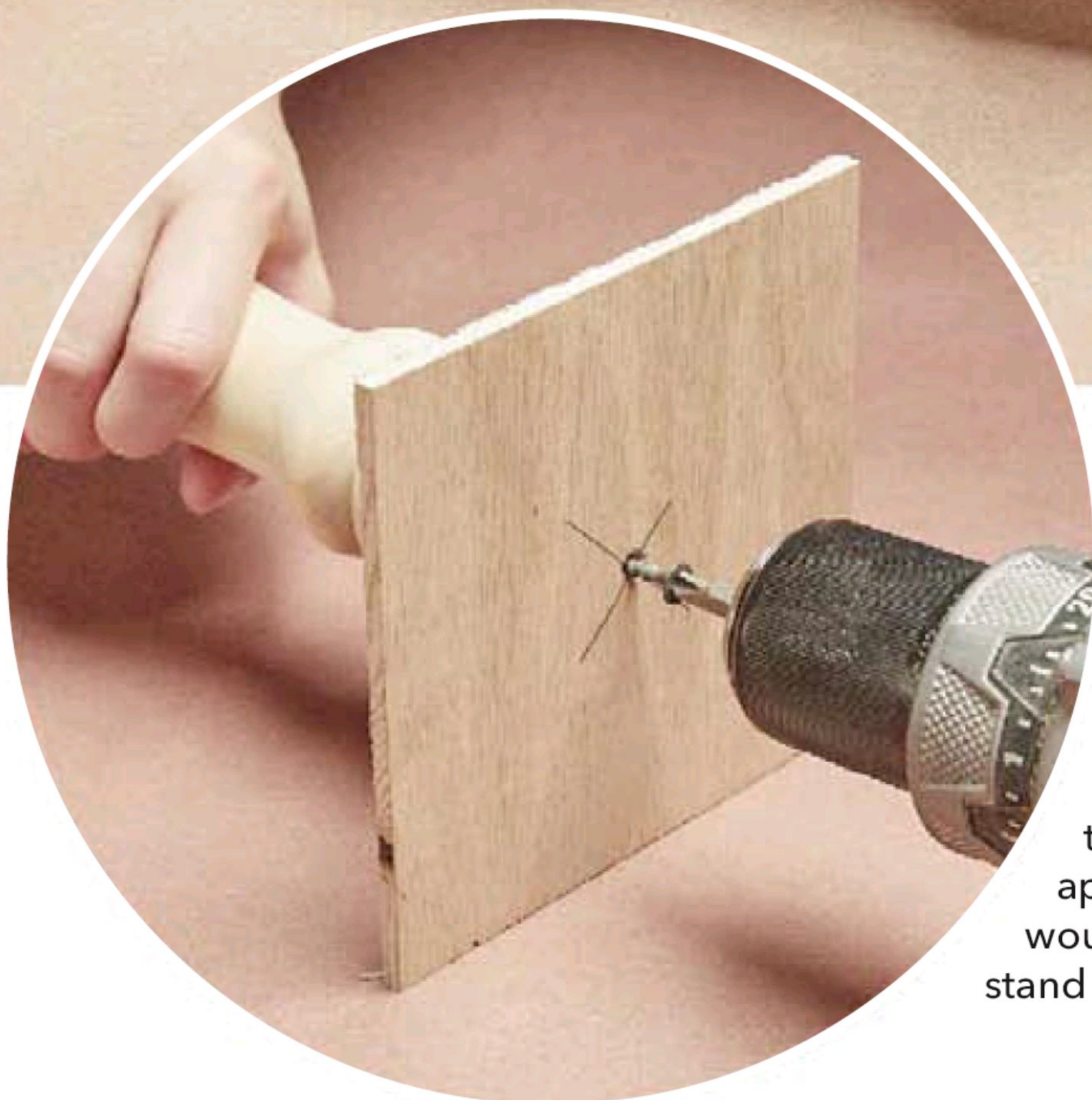


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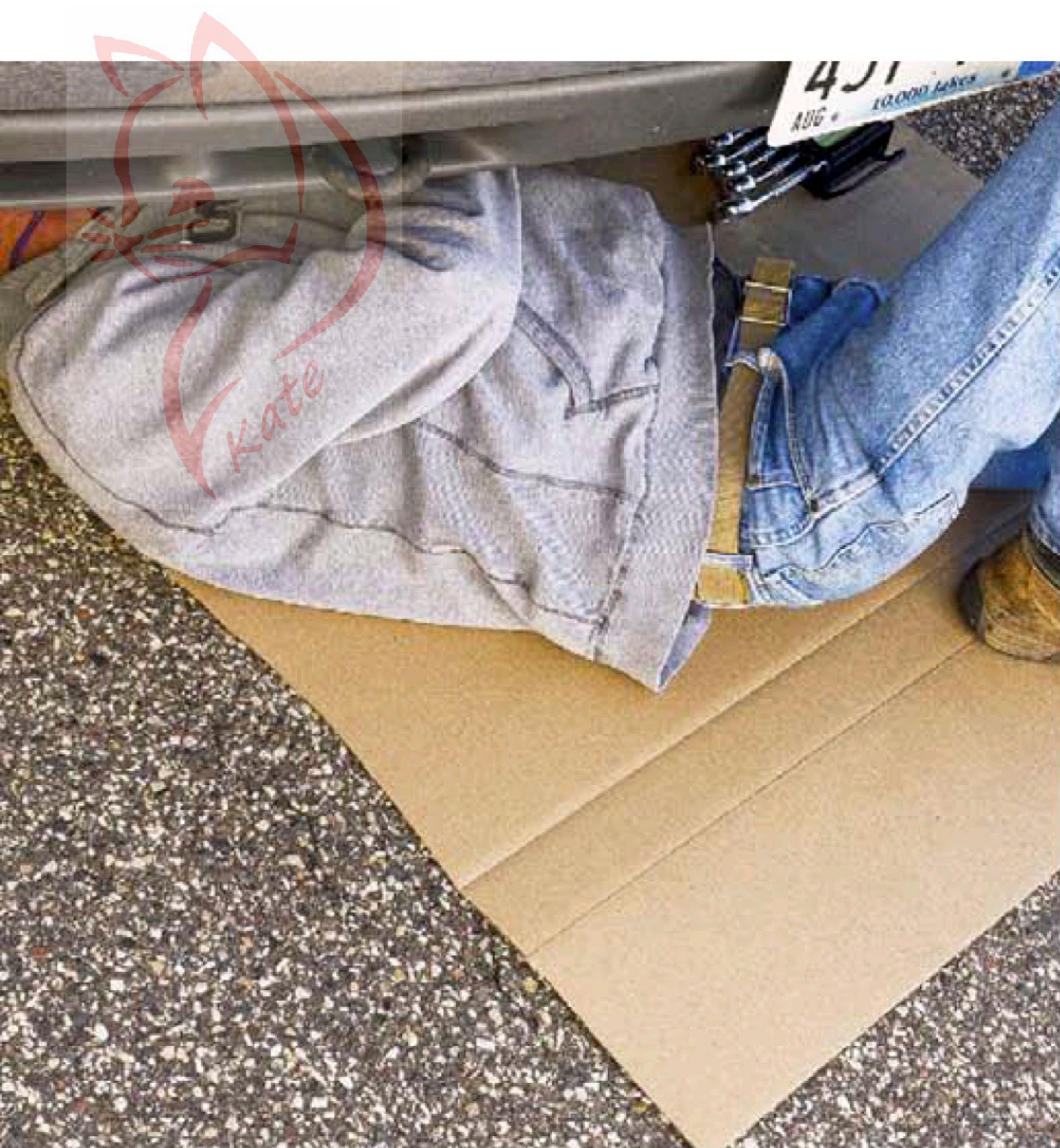
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Finishing Stands

When you're finishing table legs or other furniture parts, cut square 1/4-in. plywood "stands" and screw them onto each end. The table legs stay put as you apply your finish, making the job much easier than it would be if the parts were hung on a hook. And you can stand them vertically to dry.

DOUG MacQUEEN



CARDBOARD DROP CLOTH

Most of our cardboard boxes end up in our recycling bin, but I always make sure to save a couple of the larger ones. They're perfect for keeping my clothes clean when I crawl under the car. Stored flat, they don't take up much room.

MIKE McNAMARA

FASTER FILING WITH LESS CLOGGING

When you use metal files on soft, nonferrous metals such as aluminum or brass, the teeth clog quickly. This means frequent cleaning with a file card. To keep the teeth from getting clogged, try this old trick: Rub a piece of chalk along the teeth before using the file on the workpiece.

CONNOR WRIGHT



Fix for Paint Spills on Carpet

I used to think dropping a loaded paintbrush on the carpet meant replacing the carpet...until a carpet pro told me this little tip. Pour some denatured alcohol on a rag and scrub away the paint. Use a white rag (or one similar in color to the carpet) so the alcohol doesn't transfer unwanted dye to the carpet.

TOM GERDOWSKY



MITER SLOT STOP

When you trim parts with a hand plane, a board in the miter slot makes a perfect stop.

MIKE BERNER

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Pool noodle

Fishing Rod Saver

When I go on fishing trips, I'm notorious for being careless with my rods, just tossing them into the truck bed. But lately I've started covering my rods with pool noodles to avoid breakage. I cut a slot down the length of the noodle and slip it over the rod. No more damaged or broken rods, thanks to a \$2 pool noodle.

TIM WURLINGER

SCRATCH-FREE LENSES

If you have an old pair of eyeglasses or cheaters with scratched lenses, here's how to give them new life. Put a drop of metal polish on a 100 percent cotton cloth, the softer the better. Apply the product to the lenses, let it dry completely and then polish out the scratches.

WENDY VANCE



GRIT REMINDER

After remodeling my kitchen, I had a shoe-box full of sanding sponges of various grits and no idea what was what. Now, before I toss the packaging, I write the grit number on the end of the sponge with a permanent marker. Also, you can reuse sanding sponges that have lost their grit by simply wrapping them with sandpaper.

MATT OWCZARZAK

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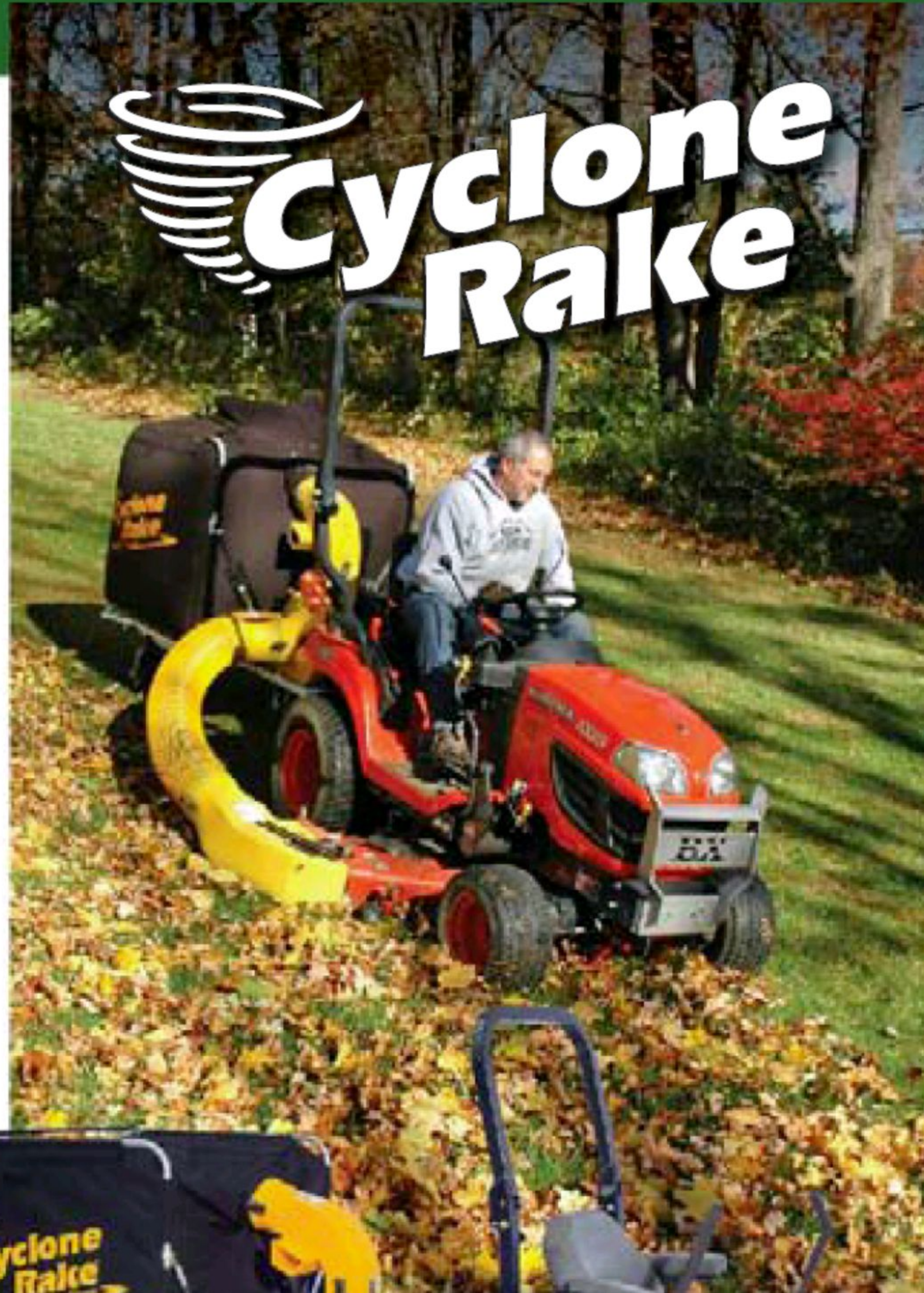
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Upgrade Your Garage Door for a Faster Sale

The garage door is often your home's largest architectural element. According to a 2019 study done by *Remodeling* magazine, a garage door replacement returns on average nearly 100 percent of the project cost at resale. In 2018 a major garage door manufacturer partnered with an independent research firm to conduct a study to "gauge Realtor perceptions" to determine if the garage

door's appearance was a key factor in a home's listing price. According to the study, if home shoppers don't like what they see from the street, they won't even go inside. Seventy percent of the real estate agents surveyed agree that a new garage door sells a home faster, and more than 80 percent believe a new one boosts a home's value. Here are options for maximizing the curb appeal of your garage door.

Paint it

This is the fastest and cheapest option if your door is attractive and in good condition. As with any other painting job, a clean, well-prepped surface is a must. You can easily finish this job in a weekend or less. Be sure to choose the proper paint and primer for your door, whether it's wood, vinyl or metal.



TOP PHOTO: CLOPAY

Give it a face-lift

If you have a metal door with a dull, aged finish, you can restore it with a Garage Door Renewal Kit from Everbrite (not shown). The kit for a one-car garage costs \$50.

You can add magnetic decorative “hinges” from your local home center. You’ll also find magnetic “windows” (not shown), which won’t let in any light but are surprisingly realistic.



Replace it

The cost of a new garage door ranges from a few hundred dollars up to thousands, depending on the style, size and material. Adding windows will increase the natural light as well as the price. If you’re not comfortable installing the door yourself, you’ll pay \$400 to \$500 to have it done for you.

To learn how to install a garage door yourself, go to **familyhandyman.com** and search for “how to install a garage door.” Before you buy a new door, search for “10 things to know before buying a garage door.”



Build your own

If you’re a hard-core DIYer, you may want to build your own door. For a fraction of the cost of a manufactured door and a weekend of your time, you can build a carriage house-style door using a standard hard-board garage door as a base. Search for “garage door make-over” at **familyhandyman.com**.



GARAGE DOOR FIXES!

If your garage door looks good but isn’t operating quite as it should, go to **familyhandyman.com** and search for “garage door tune-up.”

SEAL ATTIC AIR LEAKS

If you're about to add insulation to your attic and you've never heard the term "attic bypasses," you're missing the crucial part of insulating your attic. Attic bypasses are air leaks from your living space into your attic. These leaks occur where wires, air ducts or pipes go through the ceiling and into the attic. Bypasses must be sealed before adding insulation. In fact, in many states it's the law. However, in homes built before 1991, there was probably no attempt to seal bypasses. After that, there's a good chance some of the larger bypasses were sealed, but likely not all of them.

If the leaks aren't sealed, warm air is getting into your cold attic no matter how much insulation you add. But you're not just losing heat and increasing energy bills. You're also potentially causing frost and condensation in your attic, as well as ice dams, all of which lead to water/moisture damage, mold and rot. If you eliminate all attic bypasses, you'll probably eliminate most of those problems. But if you



add insulation before sealing attic bypasses, you could make the frost problem worse. So, before you add insulation, seal all leaks with caulk or expanding foam. If you're hiring

an insulation contractor, make sure this step is included in the work. For more information, go to **familyhandyman.com** and search "how to seal attic air leaks."

Photoelectric smoke alarms

Don't buy anything else

With the variety of smoke detectors available, it's easy to feel the urge to pull your hair out when you're standing in front of shelves of them at your local home center. Thankfully, you can keep your hair and sanity intact. You only need a smoke/CO detector with a photoelectric sensor, preferably hard-wired. Don't buy ionization or dual sensors. Ionization sensors are

prone to false alarms, so you're tempted to disable them. That puts you and your family in greater danger. Photoelectric sensors, on the other hand, detect smoldering fires faster and are less likely to have nuisance alarms.

If you're into tech, you can install a smart photoelectric CO detector, but any photoelectric smoke detector will do the job. For more information, go to **familyhandyman.com** and search for "smoke detector."

REUBEN SALTZMAN
HOME INSPECTOR



MEET THE EXPERT
Reuben Saltzman has been a home inspector since 1997 and is the president of Structure Tech, a home inspection company in St. Louis Park, MN.



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4-3/4" TALL SLIDING FENCES

LED PRECISION SHADOW GUIDE LIGHT

\$299 \$349.99

SAVE \$300 **COMPARE TO DEWALT \$599**

MODEL: 56120L

21553295

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FORTRESS **SUPER COUPON**

2 GALLON, 1.2 HP, 135 PSI ULTRA QUIET OIL-FREE PROFESSIONAL AIR COMPRESSOR
Customer Rating



NOW \$169.99

SAVE \$30 \$199.99

SAVE \$30

ITEM 64596/64688 shown



21554113

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Customer Rating **4-1/2" ANGLE GRINDER**



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SAVE 44%

COMPARE TO PERFORMAX \$17.99

MODEL: 2411-1

\$14.99

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21554800

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Bauer **SUPER COUPON**

Customer Rating **15 AMP, 12-1/2" PORTABLE THICKNESS PLANNER**



SUPER COUPON



NOW \$269.99

\$329.99

ITEM 63445

SAVE \$179 **COMPARE TO DEWALT \$449**

MODEL: DW734

21566363

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POWDER-FREE NITRILE GLOVES

PACK OF 100

• 5 mil thickness

SAVE 59% \$7.99

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MODEL: VEN4145

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Customer Rating



12¢ PER PAIR

21576868

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12" RATCHETING BAR CLAMP/SPREADER **LIFETIME WARRANTY**



Customer Rating



COMPARE TO IRWIN \$19.98

MODEL: 1964718

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SAVE 85% \$4.29

NOW \$2.99

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6 ft. to 8 ft. 10"

COMPARE TO WORX \$99.98

MODEL: W6309

ITEM 68862/63190/62896 shown

SAVE \$39

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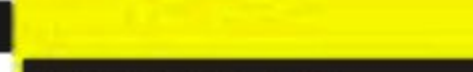
drillmaster **SUPER COUPON**

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(572°/1112°)



Customer Rating



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\$14.99

COMPARE TO BLACK+DECKER \$28.06

MODEL: HG1300

ITEM 35776/62340/62546/63104/96289 shown

21579278

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CHICAGO **ELECTRIC** **POWER TOOLS** **SUPER COUPON**

4" BISCUIT PLATE JOINER



Customer Rating



COMPARE TO MAKITA \$179

MODEL: PJ7000

ITEM 38437
68987 shown

SAVE \$134

NOW \$44.99

21582824

LIMIT 3 - Coupon valid through 12/20/19*

PITTSBURGH **SUPER COUPON**

16 OZ. FIBERGLASS HANDLE HAMMERS **LIFETIME WARRANTY**



Customer Rating



SAVE 70% \$5.79

COMPARE TO KOBALT \$9.98

MODEL: 62742

ITEM 69006/60715/60714/47872

YOUR CHOICE \$2.99

Item 47873 shown

TYPE

CLAW 69006/60715/60714/47872

RIP 69005/61262/47873

21588253

LIMIT 4 - Coupon valid through 12/20/19*

HaulMaster **SUPER COUPON**

72" x 80" MOVING BLANKET



Customer Rating



COMPARE TO BLUE HAWK \$19.99

MODEL: 77280

ITEM 69505/62418/66537 shown

SAVE 70% \$8.99

NOW \$5.99

21603324

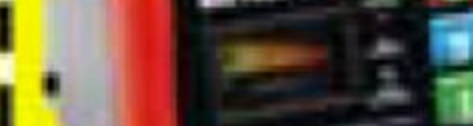
LIMIT 5 - Coupon valid through 12/20/19*

CENTECH **SUPER COUPON**

2/10/50 AMP, 12 VOLT BATTERY CHARGER AND ENGINE STARTER



Customer Rating



SAVE 49% \$54.99

NOW \$29.99

COMPARE TO SCHUMACHER ELECTRIC \$59.77

MODEL: SE-1250

ITEM 60581/3418
66783/60653 shown

21604042

LIMIT 2 - Coupon valid through 12/20/19*

PITTSBURGH **SUPER COUPON**

4 PIECE WOOD CHISEL SET WITH CLEAR PVC HANDLE **LIFETIME WARRANTY**



Customer Rating



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SAVE 83% \$7.99

COMPARE TO DEWALT \$29.97

MODEL: DWHT16063

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Troubleshoot Your Toilet: Do the Bucket Test

If your toilet's flush is weak, the first thing you need to determine is whether the problem is in the drain or the toilet. Before you snake out the drain or replace your fill valve, try this. Dump a bucket of water into the bowl. If it flushes slowly, the problem is in the drain. If it flushes quickly, the problem is in the toilet. This doesn't fix the problem, but at least it tells you where to start looking. For solutions to all kinds of toilet trouble, search for "toilet" at familyhandyman.com.

MALCOLM McADAM

Seal openings in electrical boxes

When you're doing electrical work, take a look at the junction boxes. According to the NEC (National Electrical Code), if there are missing knock-outs that don't have any wires running through them, they need to be sealed. Otherwise, each opening exposes flammable materials to possible sparks. Knockout seals cost less than a buck apiece at home centers.



BEWARE OF PERMANENT CHALK

When I built my house at the ripe old age of 27, I thought all chalk for snapping lines was the same. Not so. Some is temporary and some is permanent. Permanent is great for stuff that won't be visible, but I had chalk lines showing on my house and garage roofs for years. If you do accidentally snap a permanent line where you don't want one, an oxidizing cleaner such as OxiClean followed up with water removes permanent chalk pretty well. I've tested it on unfinished plywood, paint and unsealed concrete, all with very good results.

TRAVIS LARSON, FORMER FH SENIOR EDITOR



DIY & Your Hearing

3 Things You Must Know

1. Most power tools do damage

OSHA requires hearing protection for extended exposure to noise at 85 decibels or above, and most power tools, lawn mowers and chain saws are louder than that.

Vickie Tuten, a member of the American Speech-Language-Hearing Association and an audiologist with the U.S. Army, offers a rule of thumb—if someone walked up to you and started talking while you were working, would you have to turn the tool off to hear them? If so, there's a good chance it's hazardous and you should be wearing hearing protection.

2. Plugs and muffs don't work as labeled

How much hearing protection you need depends on two factors—how loud your equipment is and how long you're exposed to the noise. Tuten says both earmuffs and earplugs work as long as you wear them properly. With earmuffs, make sure the temple of your protective goggles (or anything else) doesn't break their seal. And with earplugs, be sure to insert them according to the instructions on the package.

When you purchase earmuffs or earplugs, they'll have a noise reduction rating (NRR) on the package. But you can't simply subtract that number from the decibels you're exposed to. "That's a number derived under lab specifications with an expert fitter," Tuten says. NIOSH (the National Institute for Occupational Safety and Health) recommends that the labeled NRRs (Noise Reduction Ratings) be adjusted for real-world use as follows:



EARMUFFS:
Subtract 25 percent from the manufacturer's labeled NRR.



FORMABLE EARPLUGS:
Subtract 50 percent from the manufacturer's labeled NRR.



ALL OTHER EARPLUGS:
Subtract 70 percent from the manufacturer's labeled NRR.

To increase your protection, you can wear earplugs and earmuffs together. Results vary depending on the products you choose, but expect four to eight dB of additional protection.

3. Every exposure does some damage

Tuten says a lot of people believe that a one-time exposure to loud noise doesn't matter. "That's a false sense of security," she says. "Damage actually does often occur. It's a cumulative kind of damage." Even if you've already lost some hearing, with protection you can preserve the hearing you have left. "If you can keep the loss at a mild level, that's a win," Tuten says.



Fast Fact

The decibel scale is logarithmic, so, for example, 85 dB is 15 times louder than 70 dB. Many power tools are loud enough to damage your hearing. Here are a few examples from the University of Florida's Hearing Conservation Program:

DECIBEL SCALE

Tool	Decibels	Needed Noise Reduction
CHAIN SAW	110	32
MITER SAW	109	31
BAND SAW	104	26
HEDGE TRIMMER	103	25
PRESSURE WASHER	100	22
TABLE SAW	93	15
AIR COMPRESSOR	92	14

Want a fridge in your garage?

Cold facts you need to know

No one needs to be convinced of the convenience of a garage refrigerator. Whether you have one already or are thinking about getting one, here's how to help it perform its best.

Understand the basics

In a non-climate-controlled garage, refrigerators struggle. Excessive heat forces them to work extra hard, resulting in high electric bills and early failure. Freezing temperatures make your refrigerator think it doesn't need to work, letting frozen things thaw and refrigerated items freeze. Humidity is also an issue, as it can cause rust on the coils. The ideal way to keep your garage refrigerator running at peak performance is to condition the garage air. However, this gets expensive and involves insulating the garage. You could frame up, insulate and condition a small space within the garage, but that's not very practical and there are easier options.

Keep things cool

If your garage gets too hot (over 100 degrees F), set up a fan to increase airflow over your fridge's cooling coils. Just make sure the air



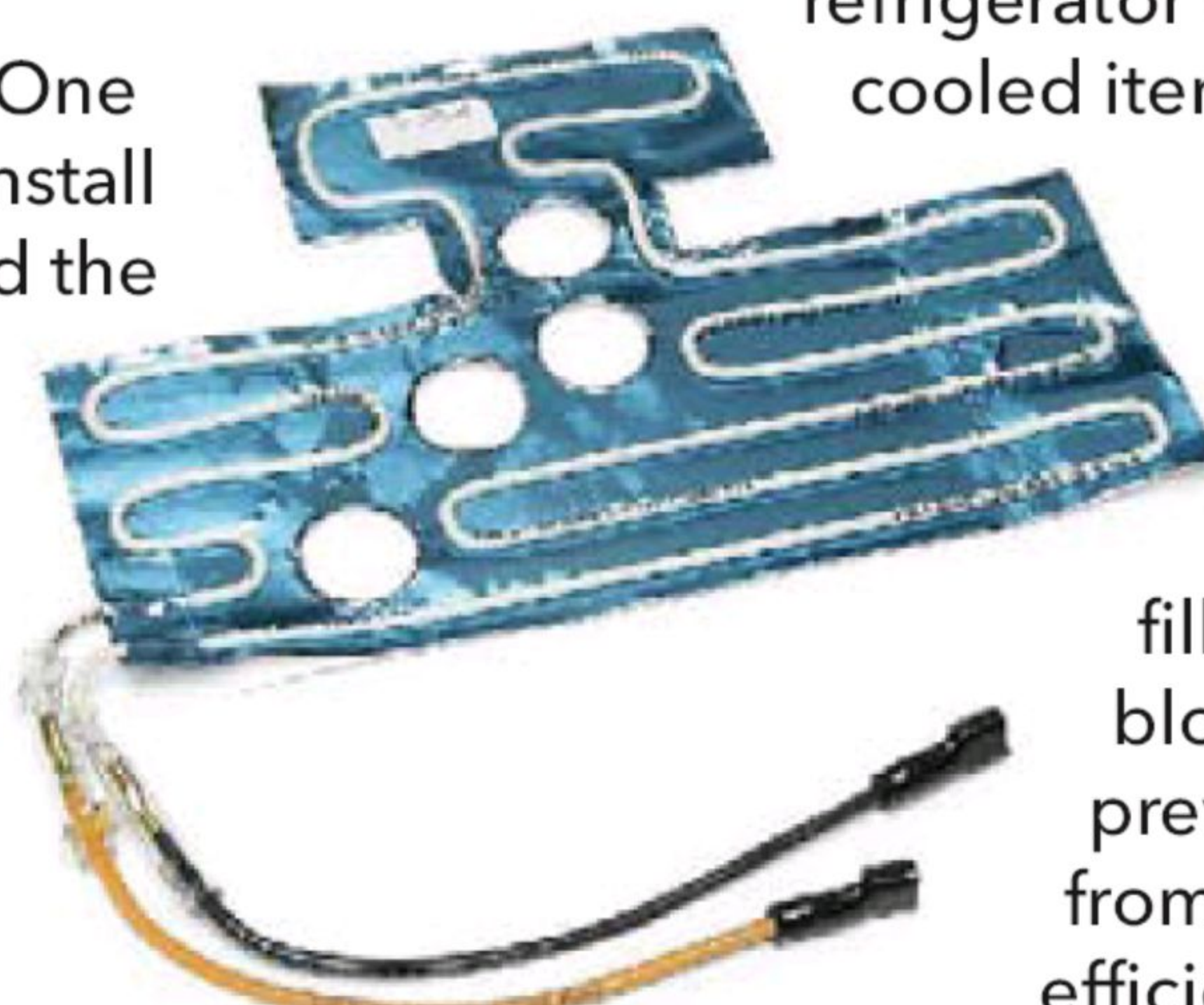
Garage-ready refrigerators

Standard new refrigerators, because of their efficiency, often struggle in a garage more than old refrigerators. But you can buy a "garage-ready" refrigerator. These are designed to take extreme temperatures and humidity. However, some units are built for heat but not cold, and vice versa.

is moving across and around the back of the fridge. If humidity is an issue, set up a dehumidifier. If your garage is also your workshop, clean up sawdust daily and make sure it doesn't build up on your refrigerator's coils.

Fridge heaters

In cold climates, you need to heat the air around the fridge's thermostat. One way to do this is to install a heating coil around the thermostat. Many manufacturers make heating coils for their refrigerators and freezers, or you can buy a generic heater. These units



cost less than \$50. Another option is to put a metal clamp-on work lamp near the fridge with an incandescent lightbulb aimed at the thermostat.

Stock smart

Every time you open and close the fridge door, the air is sucked out and replaced. Keep your garage refrigerator well stocked. The cooled items inside help cool the new air, preventing the fridge from working too hard. But don't fill it too full. This can block the blower, preventing cold air from circulating efficiently.



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Advice for new HOMEOWNERS

For tips on homeownership, there's no better panel of experts than our readers—many of them have owned several homes over decades. So I asked them to send in their best advice for new homeowners. Here are some of my favorites.

GARY WENTZ
EDITOR-IN-CHIEF

A stack of three cardboard boxes is shown. On top of the middle box sits a potted plant with green, rounded leaves in a dark blue pot. The background is a plain, light-colored wall.

Live in It Before You Remodel

Don't try to make your home perfect right away. Live in it and let ideas come and go. You will eventually find the right one, and you won't waste money on something that isn't necessary.

LINDA LANDSVERK

Keep Track of Improvements

Immediately start a home improvement file. Take photos of all projects that are done to improve your home and keep the receipts with those photos. If possible, go paperless in case of a major disaster.

CAROLYN AND PAUL BROSSOIT

Pad Your Budget

Most renovations will run over budget and cost more than you think. The final project costs presented on renovation TV shows just aren't reality.

CHRIS JANOSA

Unpack Your Tools

Set up your workbench and tool areas first. They'll come in handy as soon as the movers pull away.

DAVE POLULAK



♥ Enjoy It Now

Don't wait until you're ready to sell to make improvements. I see so many people redo their kitchens in preparation for selling their home when they could have enjoyed that new kitchen for years. And redo those rooms the way you like, not the way the latest trends dictate.

PEG MEEHAN

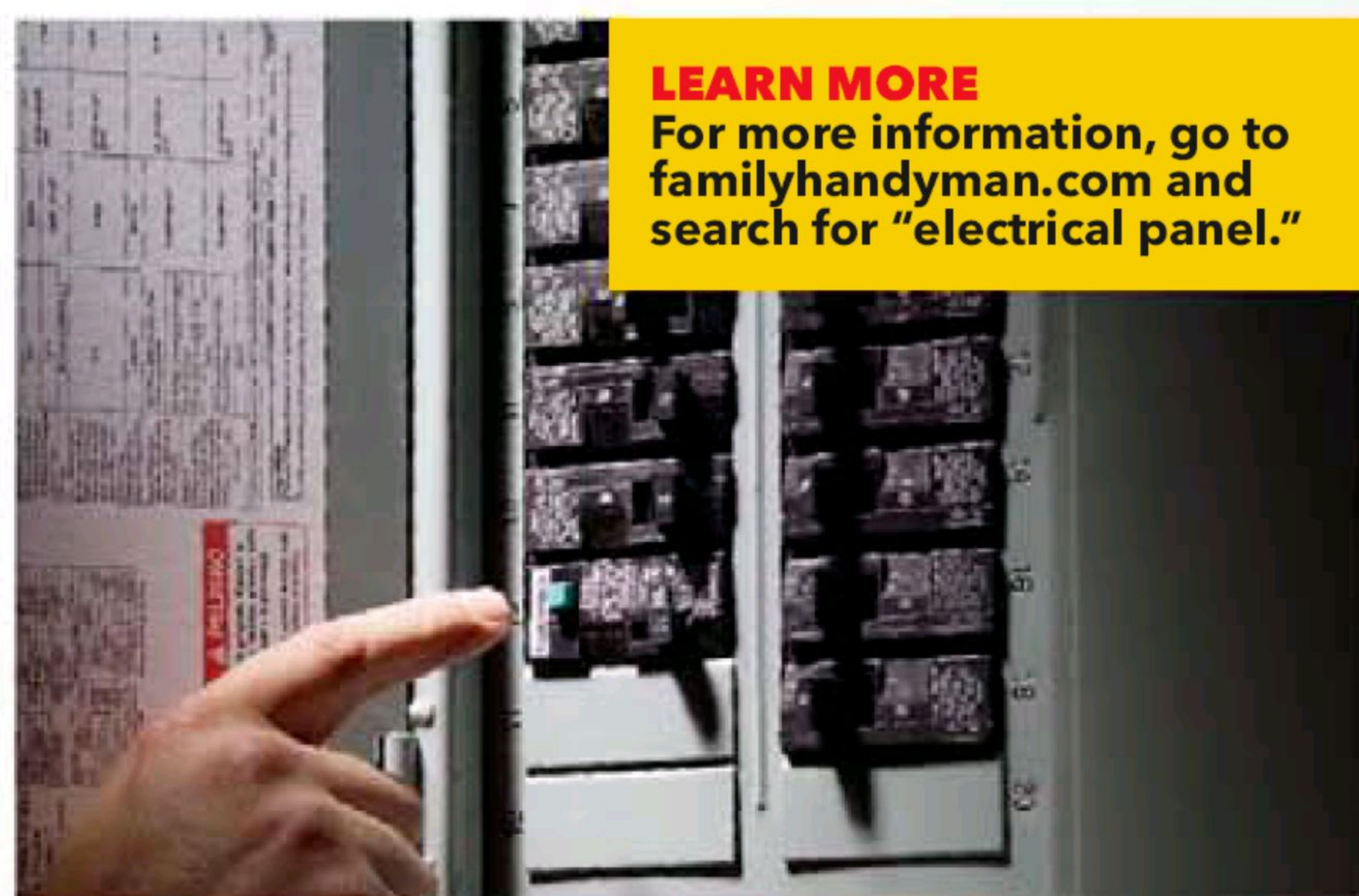


LEARN MORE
To find out where it's located, go to familyhandyman.com and search for "water shutoff valve."

💧 Be Ready for Emergencies

Every homeowner should know where the main water shutoff valve is. This could prevent severe water damage to your home.

MAX MALLON



LEARN MORE
For more information, go to familyhandyman.com and search for "electrical panel."

⚡ Locate the Main Panel

Everyone in your home should know the location of the main panel and how to reset a tripped breaker. As you learn what circuits provide power to which areas of your house, add them to a list and keep it near your panel.

MIKE BERNER

“ Know Your Hardware Store

When my late wife and I bought our house, we thought we were going to be here two years and gone. Thirty-eight years later, I'm still in the same house. The best advice comes from an issue of *Reader's Digest* published more than 40 years ago: "When you buy a house, you think you have a place to live. You don't; you only sleep there. You actually live in the hardware store."

RT FULLER



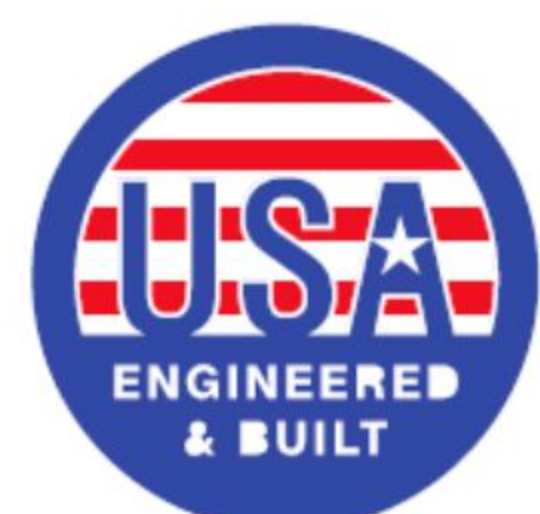
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Dual-duty GARAGE

FAMILY HANDYMAN has been improving garages for decades. This year, we found a family overdue for a garage makeover. Their simple desire to clean up the garage led to a unique conversion that extended their living space while still leaving space for cars. It was a big transformation, but the projects were easy:

■ **TO CUT CLUTTER**, we installed an electric attic lift. That made moving out-of-season gear into the attic safe and effortless—and opened up lots of floor space. Aside from careful positioning and adjustments, the installation was quick and simple.

■ **FOR YEAR-ROUND COMFORT**, we added ductless mini-split heating/cooling. If you're intimidated by this HVAC project, don't be. Supplying the power took creative planning, but the rest was amazingly easy.

■ **TURNING A GARAGE INTO A HOME THEATER** could be as simple as hanging a TV on the wall. But we wanted to protect all the electronics from sawdust and stray basketballs, so we built a giant cabinet. Don't be fooled by the size; it's big, but construction was basic.

■ **CONCRETE FLOORS** are bland and hard to keep clean. Our solution was an epoxy floor coating. More than any other project, this stunning floor transformed the garage into an inviting living space.

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Page 38



MEET THE HOMEOWNERS

The Dempseys—JD, Heather, sons Donovan and Jack, and their puppy, Joe Louis—have lived in their home for 14 years but had never given their garage any TLC. “It was kind of a mess, just a place to keep things,” says Heather. “When we first started the project, all I wanted was to declutter and clean up. Now it’s a great space to hang out with friends and family and entertain more often.”

GARAGE UPGRADES GALORE

For videos and how-to on these projects and many more, go to FAMILYHANDYMAN.COM/GREATGARAGE

ATTIC LIFT

Send heavy loads to the attic—with the press of a button

BY MIKE BERNER

Having attic space above your garage just about doubles your storage options. But carrying stuff up the ladder is a hassle and can be dangerous. An attic lift makes the chore safe and effortless. You can even store things like a lawn mower or snow blower that you wouldn't think of hauling up a ladder.

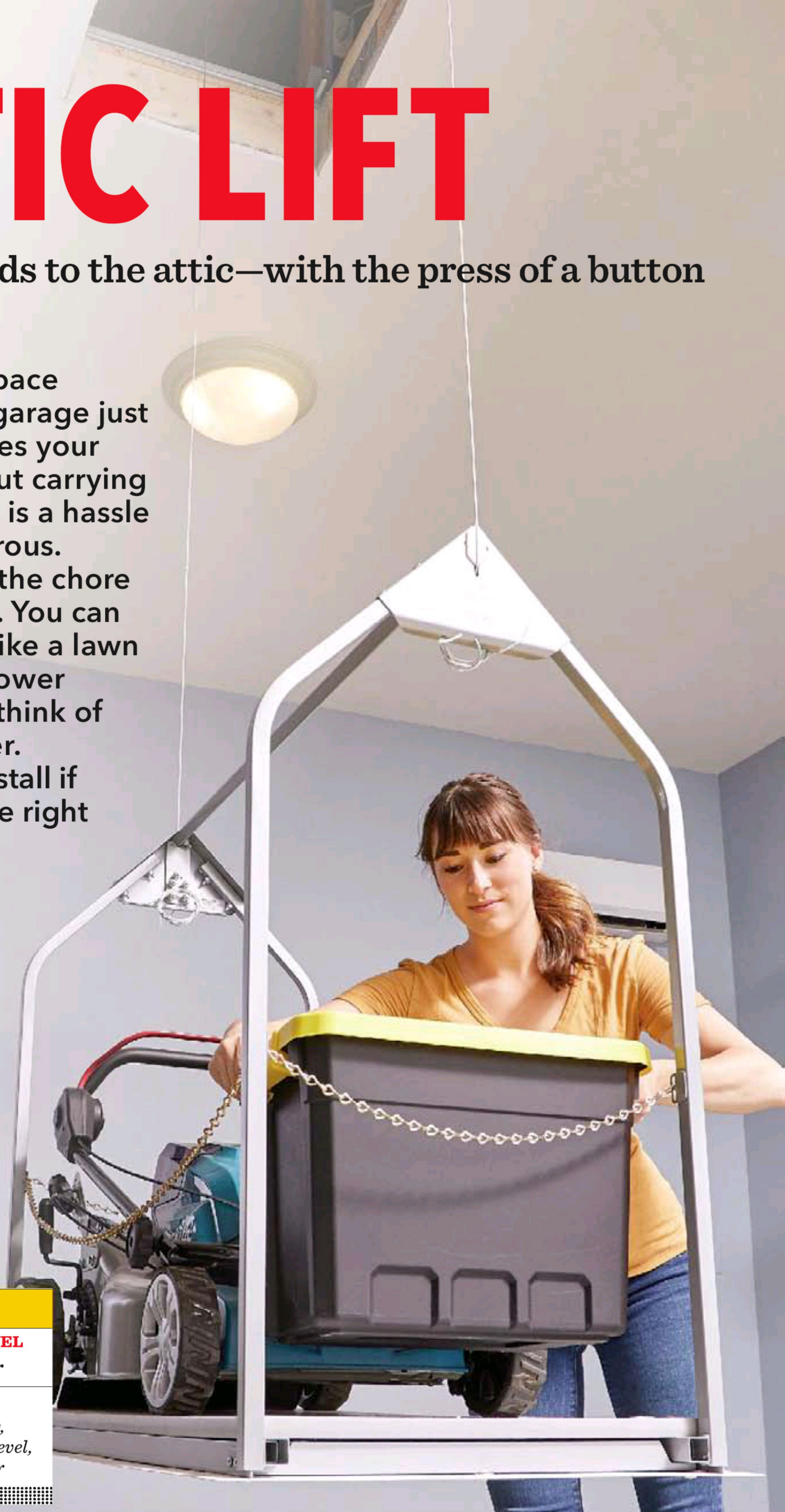
A lift is easy to install if your garage has the right bones, and it uses power you likely already have. We'll tell you what you need to know before you buy and walk you through the installation.

WHAT IT TAKES

TIME	COST	SKILL LEVEL
1 day	\$2,600	Beginner

TOOLS

Reciprocating saw, circular saw, framing square, tape measure, level, wrench or socket set, drill/driver



BEFORE YOU BUY

ASSESS THE CEILING

STRUCTURE: Standard trusses or framing may not handle the weight of a loaded lift or all the items you want to store. Attic or storage trusses, on the other hand, are designed to support extra weight. If your garage attic has a floor (plywood or OSB) and enough space for you to stand up, chances are you have trusses suitable for an attic lift.

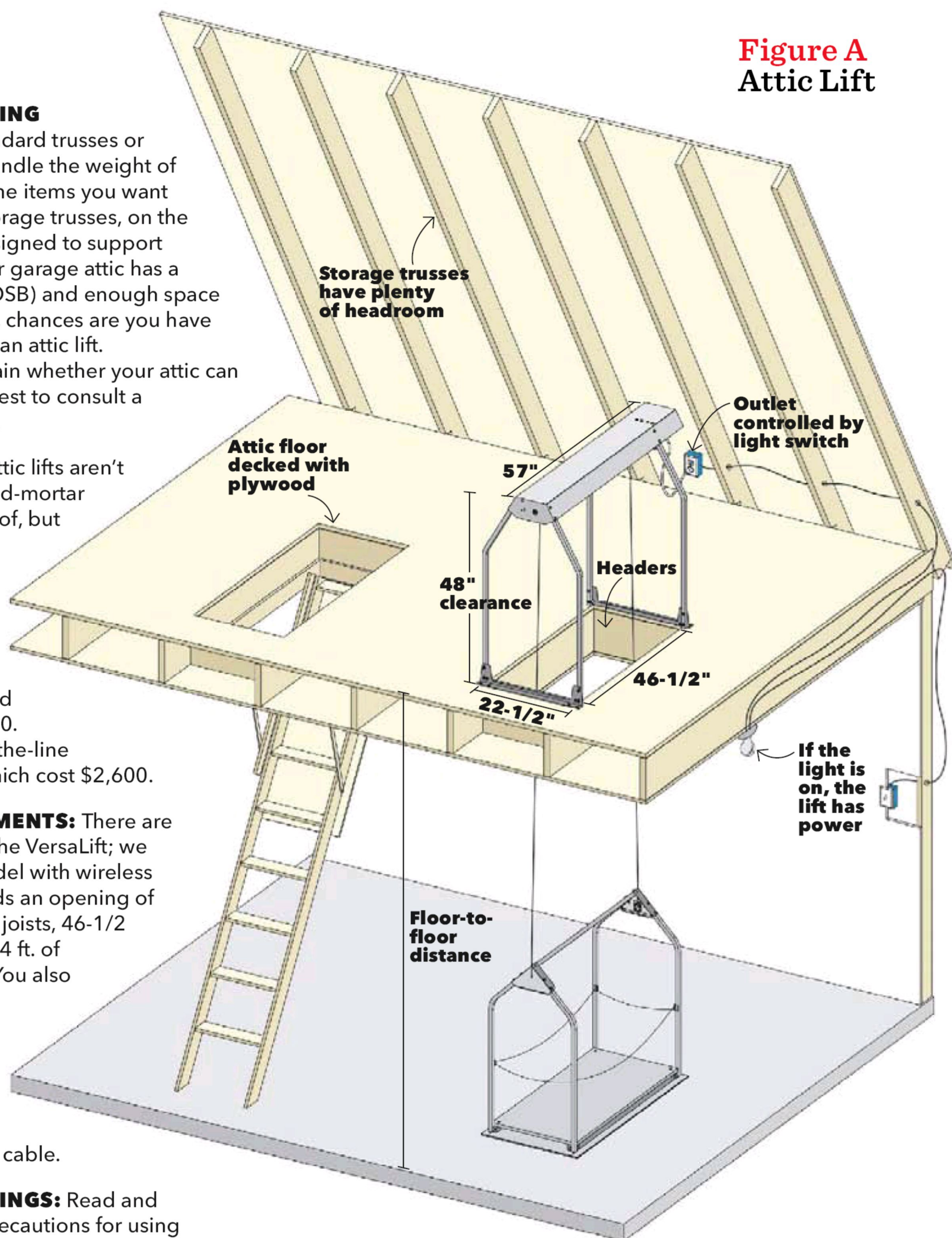
If you're not certain whether your attic can bear the load, it's best to consult a structural engineer.

SHOP ONLINE: Attic lifts aren't sold in any brick-and-mortar stores we're aware of, but several brands are available online: VersaLift, Auxx-Lift and Aladdin storage lifts were the options we found. Prices ranged from \$900 to \$3,500. We chose a top-of-the-line VersaLift model, which cost \$2,600.

SPACE REQUIREMENTS: There are several models of the VersaLift; we used the 24-in. model with wireless remote, which needs an opening of 22-1/2 in. between joists, 46-1/2 in. along them and 4 ft. of vertical clearance. You also need to know the distance from the garage floor to the attic floor because the models come with different lengths of cable.

HEED THE WARNINGS: Read and follow the safety precautions for using the lift. The instructions also caution against turning on the lift before you connect the cables to the platform. Doing so will cause a big headache and add many extra steps.

Figure A
Attic Lift



Powering the lift

Check to see whether there's already an outlet close enough for the power cord to reach. If there isn't one, the best way to add one is by connecting the new outlet to an existing attic light. This way the VersaLift has power only when the garage light is on, and it can be turned off without a special trip to the attic. For help with that project, search for "wire an outlet" at familyhandyman.com.



INSTALLATION

1 CUT THE OPENING FROM ABOVE

Start in the attic by snapping lines on the floor along the inside of the joist space you're using for the lift. Snap two more lines to make a rectangle 46-1/2 in. long and 22-1/2 in. wide. Make sure you have at least 4 ft. of vertical clearance above the marks, then cut the opening into the floor with a reciprocating saw.

2 INSTALL HEADERS BETWEEN TRUSSES

Install blocks 1-1/2 in. beyond the opening at each corner. Then cut headers and screw them to the blocks. Double-check the opening to be sure it's sized correctly and square.

3 CUT THE DRYWALL

Slice around the rough opening to open the hole to the garage. Hang a plumb bob from each corner of the opening and mark the garage floor. This will help later on when you attach the platform to the lift.

4 COVER THE CORNERS

For the platform to move through the opening smoothly, nothing can protrude into the opening, including nail heads, splinters and screws. If there are any protruding edges, trim them off with a flush-cut bit in your router. Cover the corners from the top of the floor to the bottom of the ceiling with the L-flashing provided with the lift.





5 LEVEL THE LIFT

Position the lift over the opening and start the lag screws that fasten it to the floor. But leave the lag screws loose so you can adjust the mounting rails later (see **Photo 9**). Level the lift housing by sliding shims under the legs (see **Photo 6**).

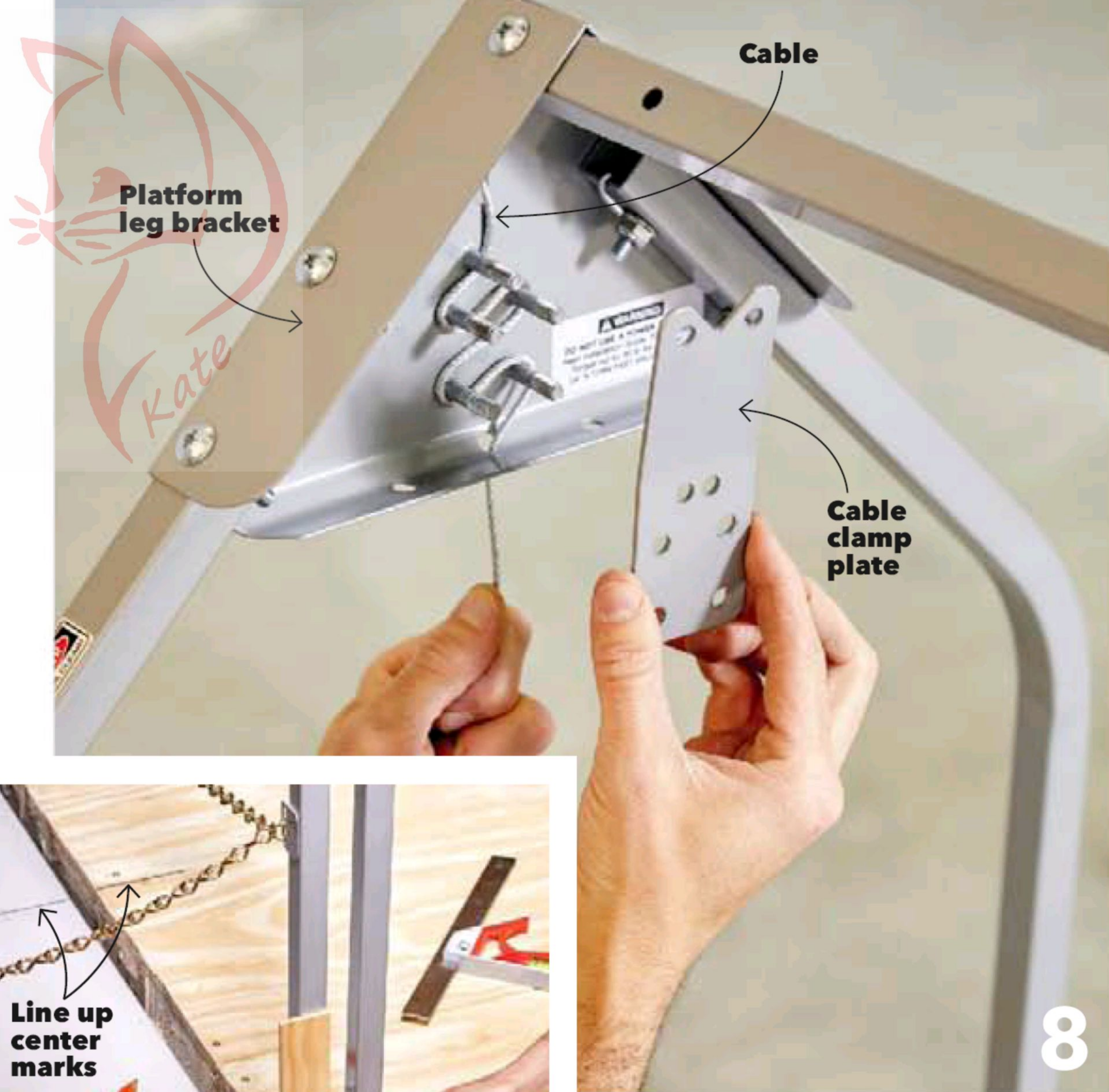
6 LOCK THE LEGS IN PLACE

At this point, the bolts that hold the legs to the mounting rails are loose. The bolt holes are slotted, so with the legs shimmed and the unit level, push the mounting rails to the decking and tighten the bolts that hold the legs to the mounting rails.

7 ASSEMBLE THE PLATFORM

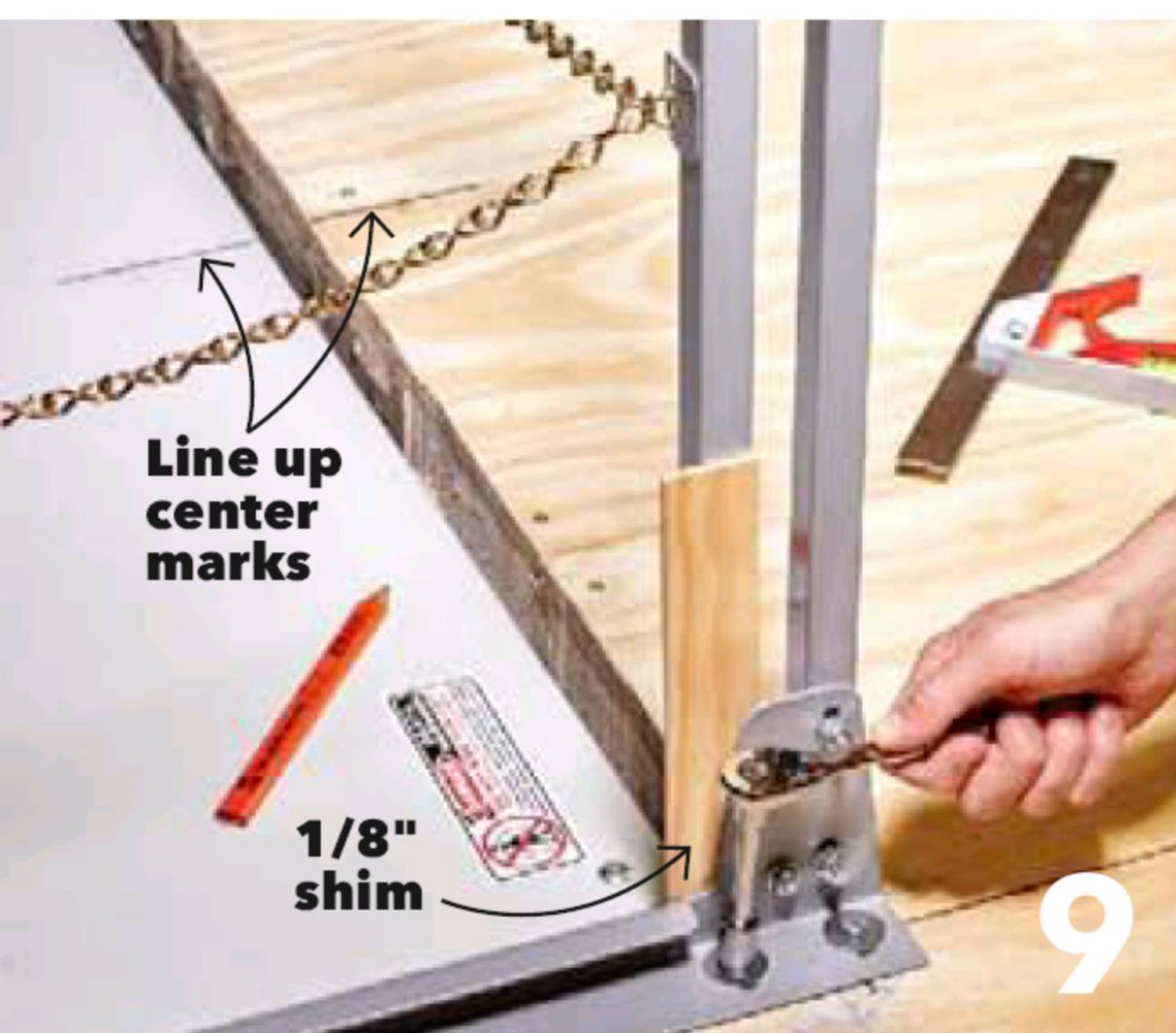
Build the lift platform and door, then set the platform assembly on the door. Screw the spring brackets to the door braces. Then set the unit inside the corner marks on the floor.





8 CONNECT THE CABLES TO THE PLATFORM

Drop the cables from the lift housing into the opening and thread each cable through the slot in the platform leg brackets. Pull the cable tight and wind it back and forth through the studs on the inside of the bracket and then back through the hole on the bottom of the bracket. Then attach the cable clamp plate and aluminum spacers to the brackets with locknuts. These should be tightened to the specified torque of 5 ft.-lbs. or snug plus a half turn. Loop the excess cable up and hold it in place with zip ties.



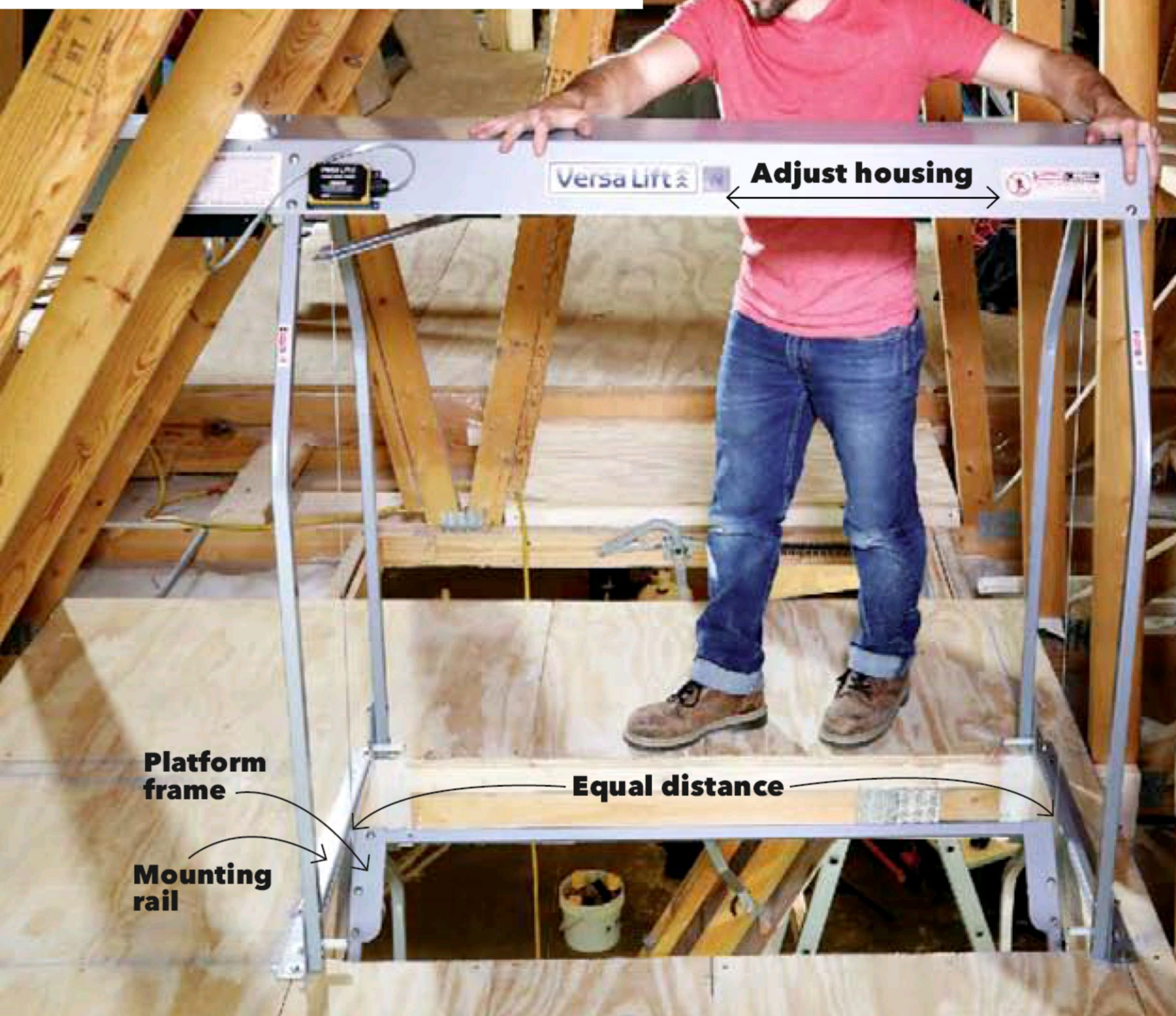
9 CENTER THE LIFT

Adjust the mounting rails to line up center marks on the platform and outside the opening lengthwise. Place a small shim between the mounting rails and the platform legs to maintain spacing before tightening the lag screws that hold the mounting rails to the attic floor. Repeat this at each corner.



10 ADJUST THE HOUSING

Lower the top of the platform frame even with the mounting rails to check that the platform hangs centered between the mounting rails. If the spacing between the brackets and the mounting rails isn't equal, push the lift housing to make the spacing the same on both sides.



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SIMPLE TV CABINET

TURN YOUR GARAGE INTO A HOME THEATER

BY TOM DVORAK

A TV turns a garage into a gathering spot, the perfect informal place to watch a game with friends or binge on a miniseries. But garages aren't always TV-friendly—sawdust, spray paint and flying balls are threats. Protect your electronics by building this handsome cabinet.



MEET THE EXPERT
Tom Dvorak keeps busy as a carpenter, landlord and contributing editor, so he doesn't have time to watch TV.

WHAT IT TAKES		
TIME 2 days	COST \$600	SKILL LEVEL Intermediate
TOOLS Table saw or track saw, drill/driver, basic hand tools		



**WHEN THE
SLIDING DOORS
ARE OPEN, THEY
BLOCK OUT
LIGHT. CLOSED,
THEY PROTECT
THE TV.**



This cabinet began as basic, utilitarian protection for a garage TV but became much more. It has space for other electronics like speakers and gaming equipment, and the finished product is attractive enough for any home theater. "Looks too good for a garage!" is the reaction I hear again and again.

This is a huge cabinet but an easy project. If you can accurately slice up plywood parts and screw them together, you can do it. All the parts dimensions are in the Cutting List, and **Figure A** shows how they fit together. Sized for a 75-in. TV, the design can be altered to suit other sizes. Plywood makes up most of the cabinet and most of the cost. Depending on the plywood you choose, your materials bill might be \$100 less than mine, which was \$600.



1 ASSEMBLE THE CABINET

I tacked the parts together with brad nails just to hold them in place, then added trim screws for strength. Don't forget to position the parts so that the best-looking veneer faces outside or up where it's most visible.

2 BUILD THE VALANCE

Assemble the plywood parts of the valance, then wrap the front and sides with 1x4. I couldn't get long enough stock at a home center, but I found nice pine 1x4s at a traditional lumberyard.



3 FILL THE EDGES

Ordinary joint compound—normally used on drywall—is great for smoothing out edges of plywood that will be painted. Just smear it on, let it dry and sand with 100-grit sandpaper. I used it to fill screw holes too. It shrinks as it dries, so you might need two coats.

4 EDGE-BAND THE DOORS

Since the doors got a clear coat rather than paint, I covered the edges with iron-on banding. For complete how-to, go to familyhandyman.com and search for “edge banding.” **Tip:** Pick up an old iron at a garage sale. Getting glue and sawdust on the household iron causes marital strife.

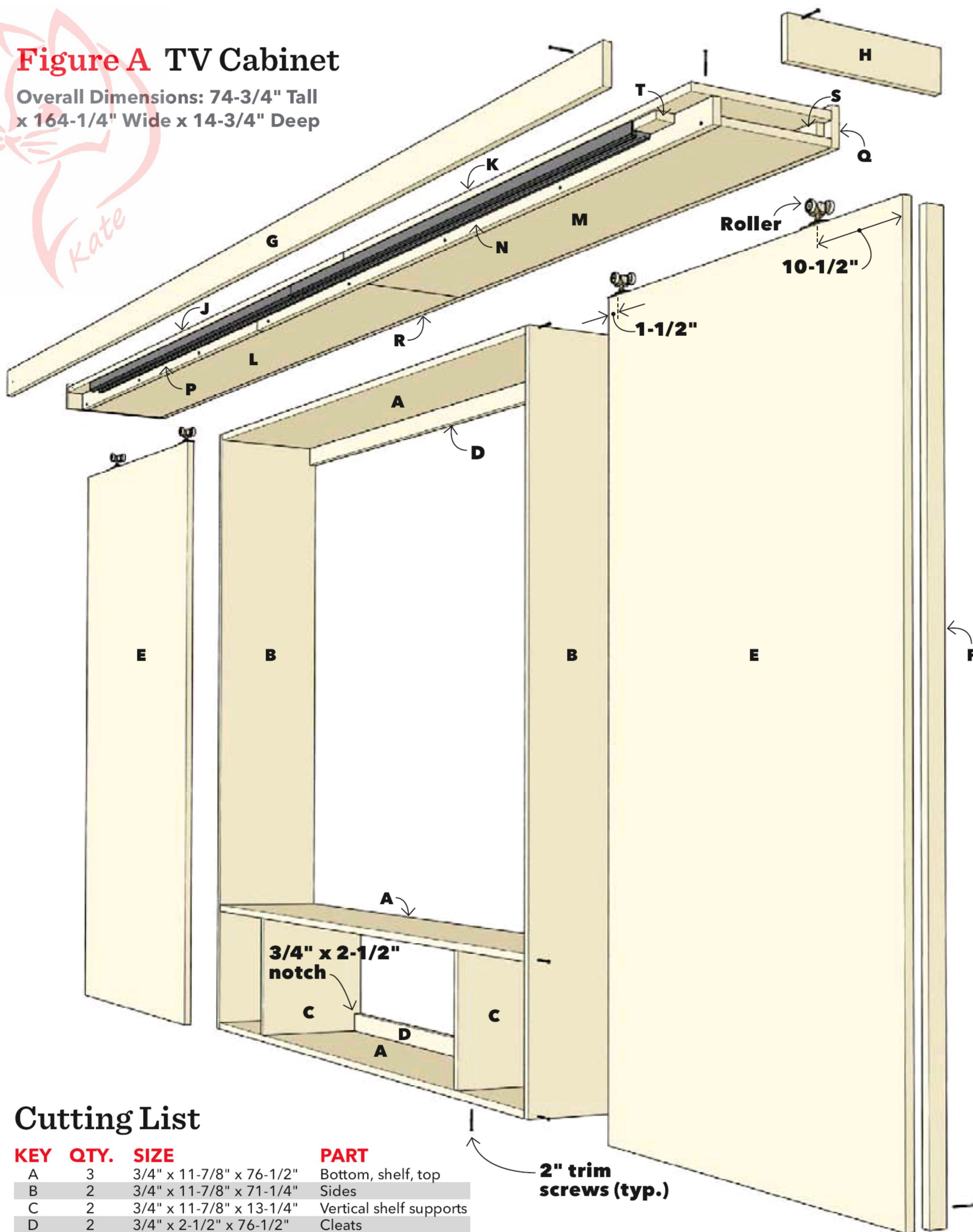
5 HANG THE CABINET

Getting the cabinet perfectly positioned required some fuss: It had to be square, level and precisely centered between the windows. To make this easier, I first marked all the stud locations and screwed a temporary 1x4 ledger to the wall, perfectly level and at the right height. With the ledger as a support, I was able to drive and remove screws as I adjusted and readjusted the position of the cabinet.



Figure A TV Cabinet

Overall Dimensions: 74-3/4" Tall
x 164-1/4" Wide x 14-3/4" Deep



Cutting List

KEY	QTY.	SIZE	PART
A	3	3/4" x 11-7/8" x 76-1/2"	Bottom, shelf, top
B	2	3/4" x 11-7/8" x 71-1/4"	Sides
C	2	3/4" x 11-7/8" x 13-1/4"	Vertical shelf supports
D	2	3/4" x 2-1/2" x 76-1/2"	Cleats
E	2	3/4" x 40" x 71-1/2"	Doors
F	2	3/4" x 1-1/2" x 71-1/8"	Door dust seals
G	1	3/4" x 3-1/2" x 164-1/4"	Valance front
H	2	3/4" x 3-1/2" x 14"	Valance sides
J	1	3/4" x 13-1/4" x 96"	Valance top
K	1	3/4" x 13-1/4" x 66-3/4"	Valance top
L	1	3/4" x 10-1/2" x 96"	Valance bottom
M	1	3/4" x 10-1/2" x 66-3/4"	Valance bottom
N	1	3/4" x 2-1/4" x 96"	Valance rail
P	1	3/4" x 2-1/4" x 66-3/4"	Valance rail
Q	1	3/4" x 3-1/2" x 96"	Valance back
R	1	3/4" x 3-1/2" x 66-3/4"	Valance back
S	8	3/4" x 1-1/2" x 6"	Spacer blocks
T	2	3/4" x 1-1/2" x 2"	Track stop blocks

Materials List

ITEM	QTY.
3/4" x 4' x 8' plywood	5
1x4 x 14' pine	1
1x4 x 6' pine	1
Johnson Hardware 100PD 72" track kit	2
Edge banding	50'
1-1/2" screws for stop blocks (T)	4
2" trim screws	100
Joint compound, 100-grit sandpaper, paint, polyurethane, 3" screws	



6 ADD THE VALANCE

The valance is heavy. You'll need a helper to set it on the cabinet. Then just center it and screw it into place through the cabinet top.

6



7 INSTALL THE TRACK

The doors glide on standard hardware, the kind typically used for closet doors. Screw the rollers to the doors and mount the tracks inside the valance. The two sections of track meet at the center of the valance, leaving a gap at the outer ends.

7

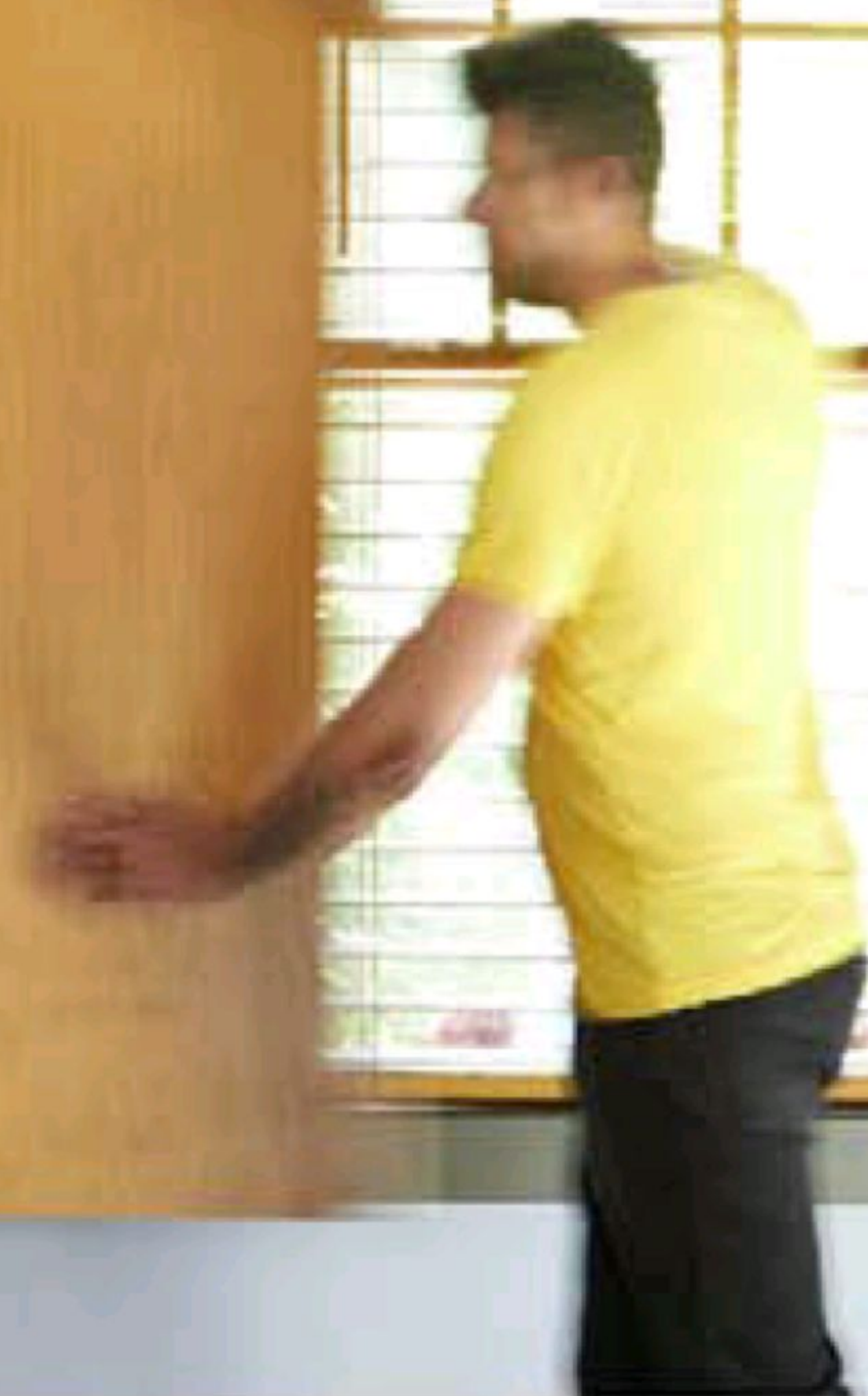


8 HANG THE DOORS

Slip the rollers into the track and check the fit of the doors. Adjusting the doors is a trial-and-error process. Unlike with a typical closet, the valance doesn't allow access to the adjustment nuts. So you'll have to remove the door, make adjustments—and repeat. Don't forget to add the stop blocks or the doors will roll off the tracks (see **Figure A**).

8





LIGHTING TO SET THE MOOD

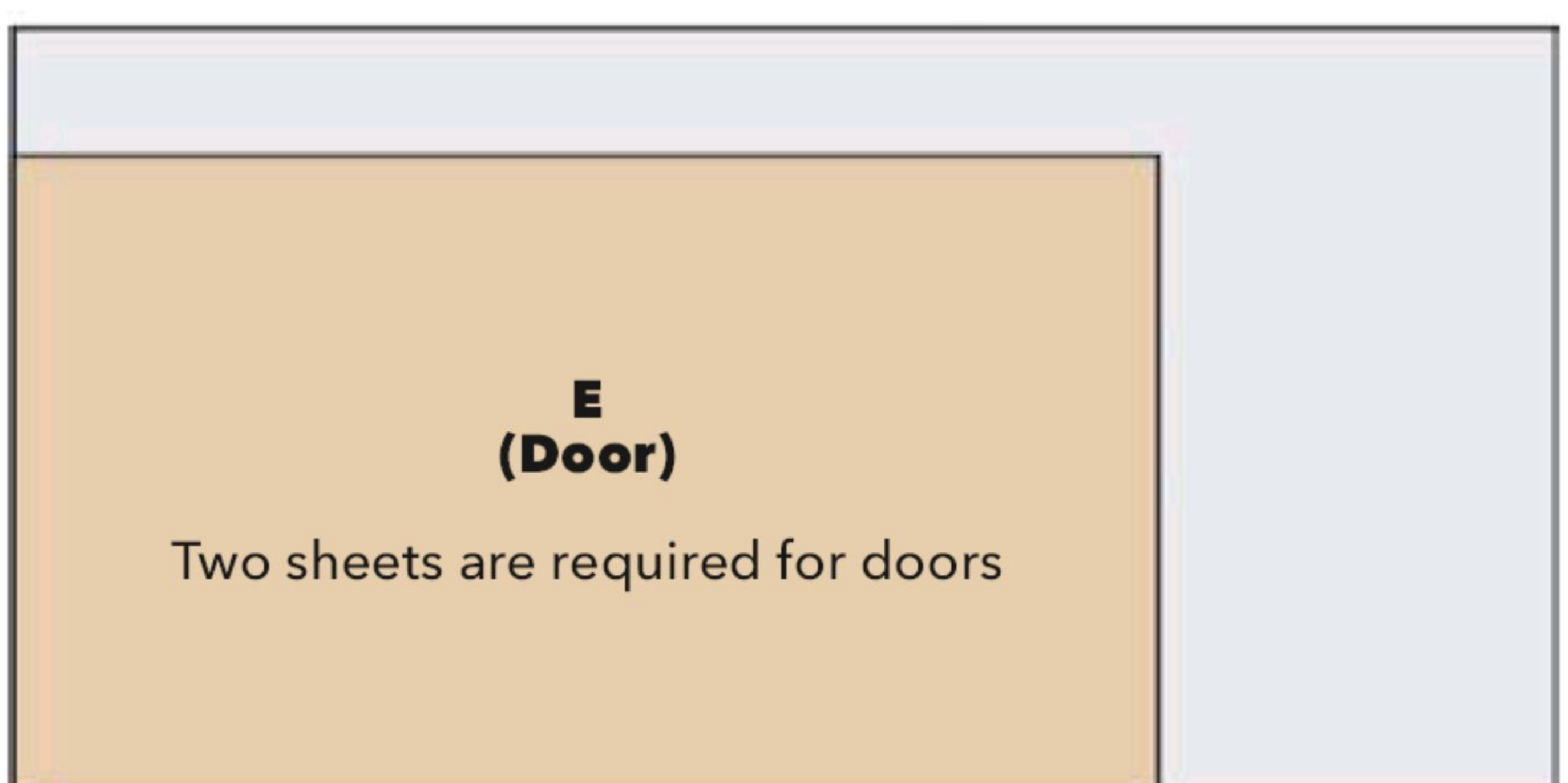
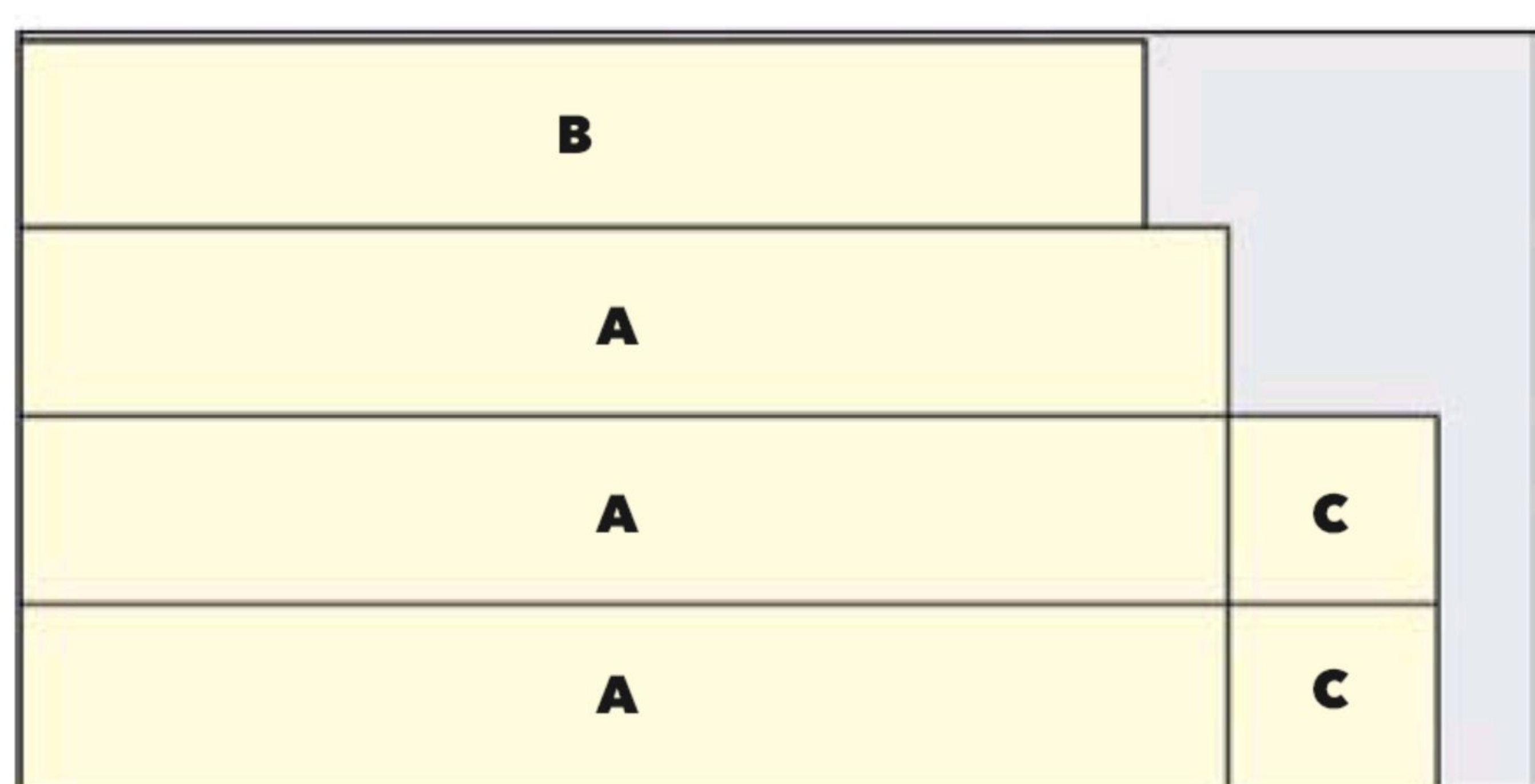
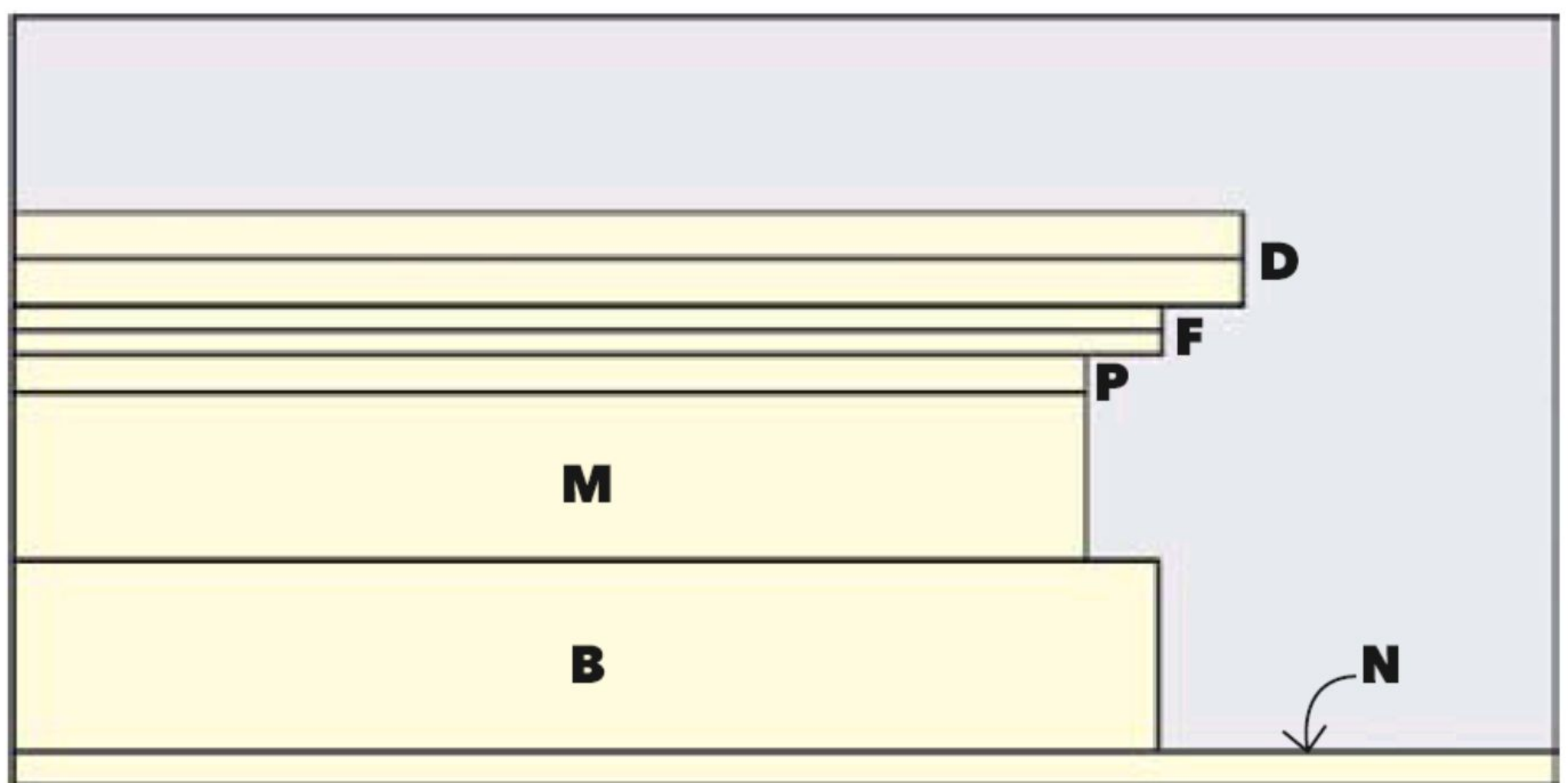
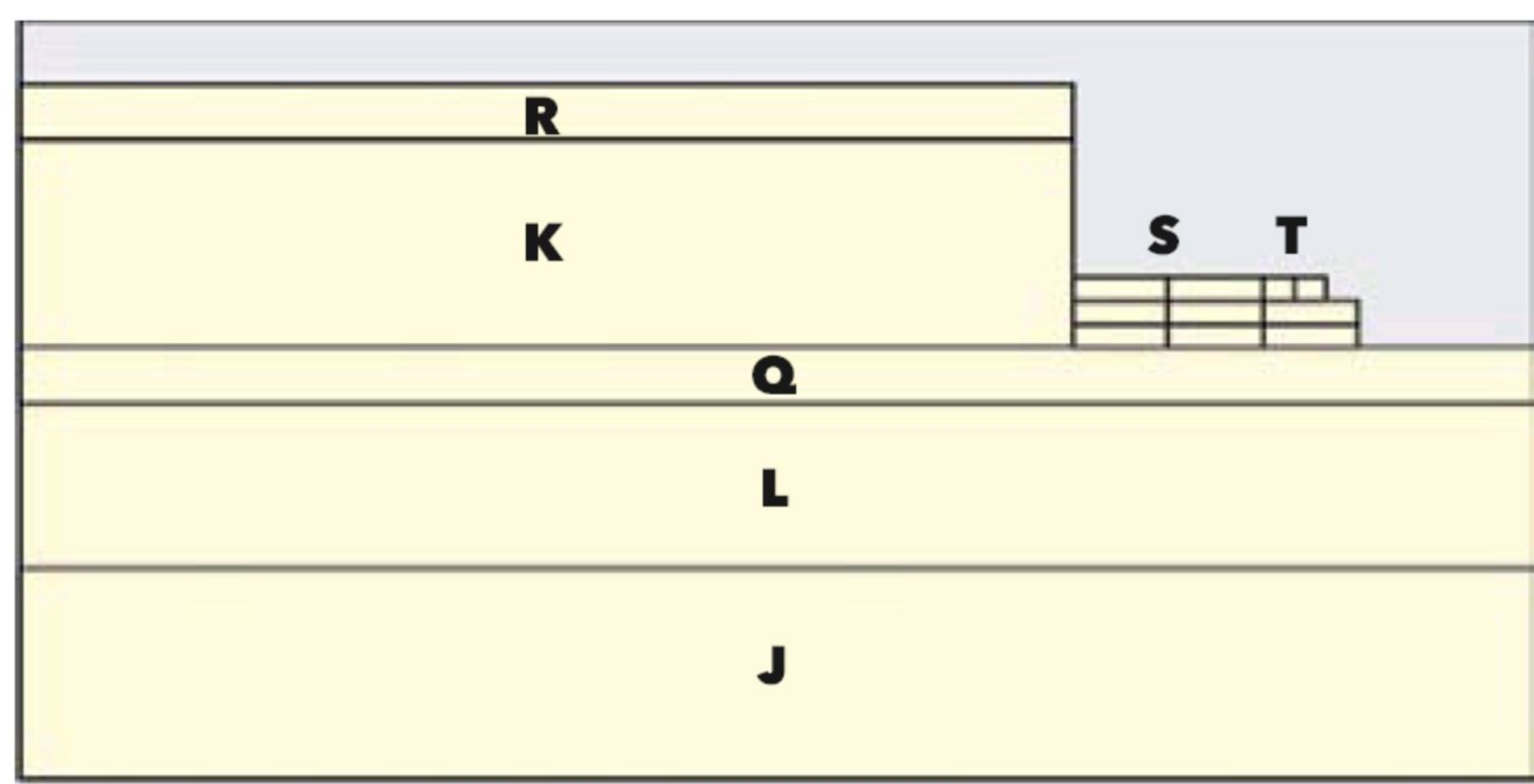
I inset the top of the valance to create a shallow recess for strip lighting. The light strips are powerful enough to brighten the room, but their real purpose is mood lighting. Using an app on your phone, you can dim them or select colors (purple lighting shown above!). I used Philips Hue Lightstrips and a Hue Bridge controller (\$150 total).

DOOR PLYWOOD: WILD GRAIN, HALF PRICE

The doors are prominent on this project, so the two sheets of plywood you choose should match and look great. It's worth digging through the stack at a home center and selecting a perfect pair of sheets. I went to a lumberyard that caters to cabinet shops and found matching cherry "rejects." The tiny knots and dark stripes were flaws in the eyes of cabinetmakers, but they gave my doors a unique look. And I got them for half price.

Plywood Cutting Diagrams

Five 4 x 8-ft. sheets of 3/4-in. plywood—we used three birch and two cherry.



Only \$29!

*You would be hard pressed to find a
timepiece of this outstanding
quality and precision
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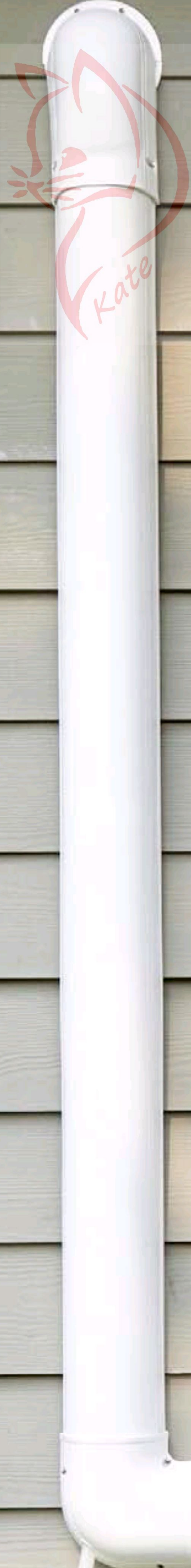
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DIY Ductless Air Conditioning

Installing cooling is surprisingly easy with a mini-split system

BY MATTHEW KNOPP

Adding an A/C system sounds like a job for pros only. And usually it is. But two non-pros installed this ductless “mini-split” system in a garage in one day.

The installation was fast and easy because of the special line set (**top right**). It comes prefilled, or “precharged,” with refrigerant and includes connectors that don’t require special skills or tools. Just mount the two main units and connect the line set to the condenser. Some mini-splits include an easy-install line set, but most don’t.

A mini-split system can be installed in a home, a garage, a cabin or a shed. Some offer heating as well as cooling, and some include multiple evaporators to serve multiple rooms. Depending on features and size, most DIY mini-splits cost from \$700 to \$2,000.

Choosing the system

Very few brick-and-mortar stores carry DIY systems, so online shopping may be your only option. Luckily there are many online suppliers. The size of the system is listed in BTUs (British thermal units). The higher the number, the greater the cooling capacity. To select the right size mini-split, calculate the

heat loss of the room. Several websites simplify these calculations. Don’t just guess; an undersized system won’t keep up, and an oversized system will cycle on and off too frequently, shortening the condenser’s service life. We installed a 12,000-BTU heating and cooling system that costs about \$1,100 at climateright.com. The other necessary materials totaled about \$275.

Providing power

Scan the photos on the following pages and you’ll see that installation is mostly basic DIY stuff: measuring, drilling holes, driving screws... Usually the biggest challenge is running power to the system. With a small system, you may be able to draw power from a nearby underloaded 20-amp circuit. More likely, you’ll want to install a new circuit dedicated to the mini-split. That can be a small job or a major project depending on how easy it is to run cable from the main panel to the unit.

By cutting—and later patching—three small holes in drywall, we were able to run cable from the basement up through the garage wall, through the attic, then down and out the exterior wall and into a disconnect box. (The disconnect provides an easy, certain



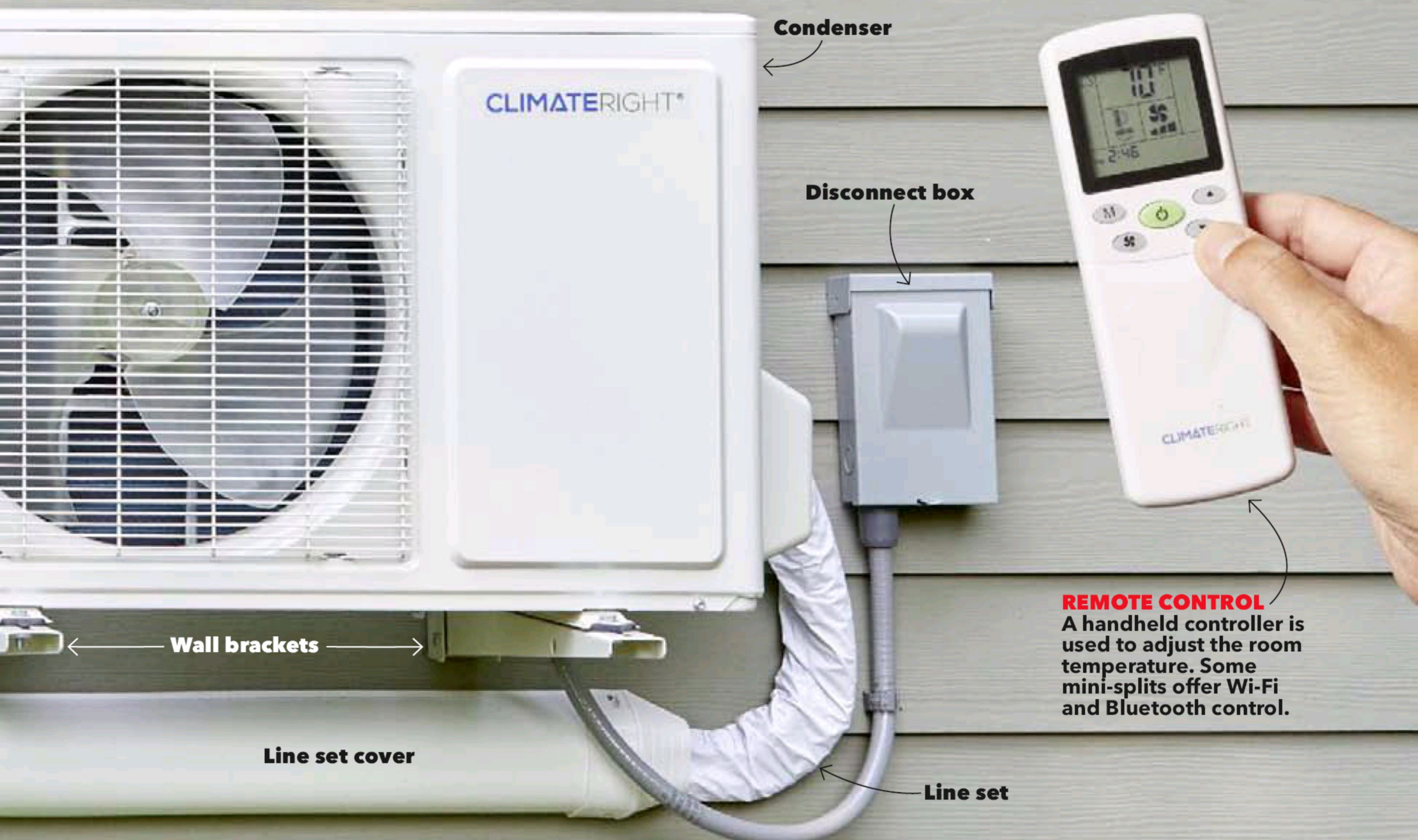
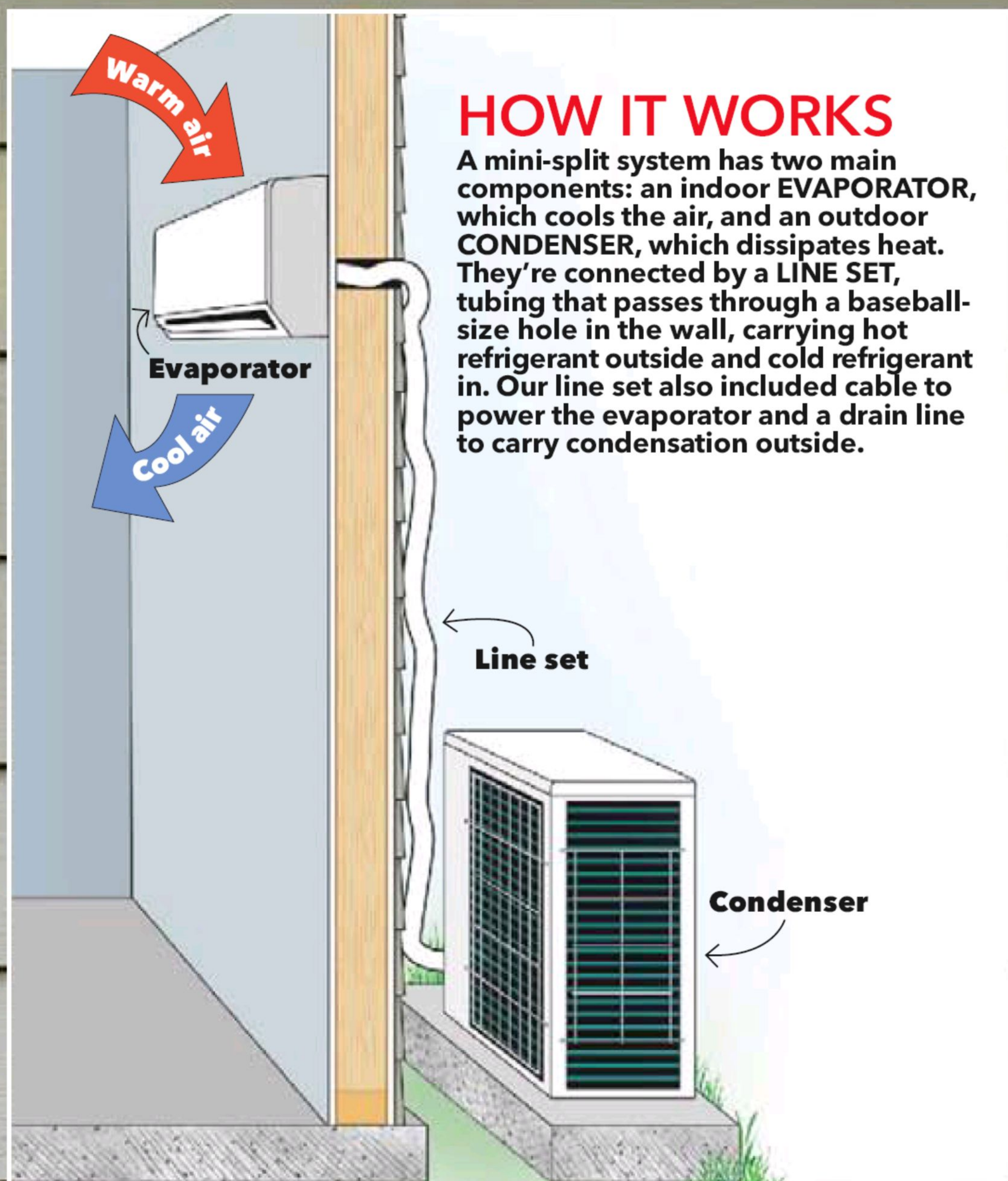
way to turn off power when servicing the unit.) Power then runs from the disconnect to the condenser. Cable running alongside the line set powers the evaporator. Our bill for electrical supplies was about \$160. A local electrician estimated that work at about \$500.

If you have some electrical know-how but need extra guidance, don't forget your local electrical inspector. It's not an inspector's job to act as a consultant, but most will give you some advice and outline code requirements. Expert help and certainty that the job is done right—not bad for the cost of an electrical permit.

Other materials

The condenser needs a level surface to rest on. You could pour a concrete pad, but a plastic condenser pad (\$50 and up online) is instant and easy. We mounted ours on condenser wall brackets (\$60 online).

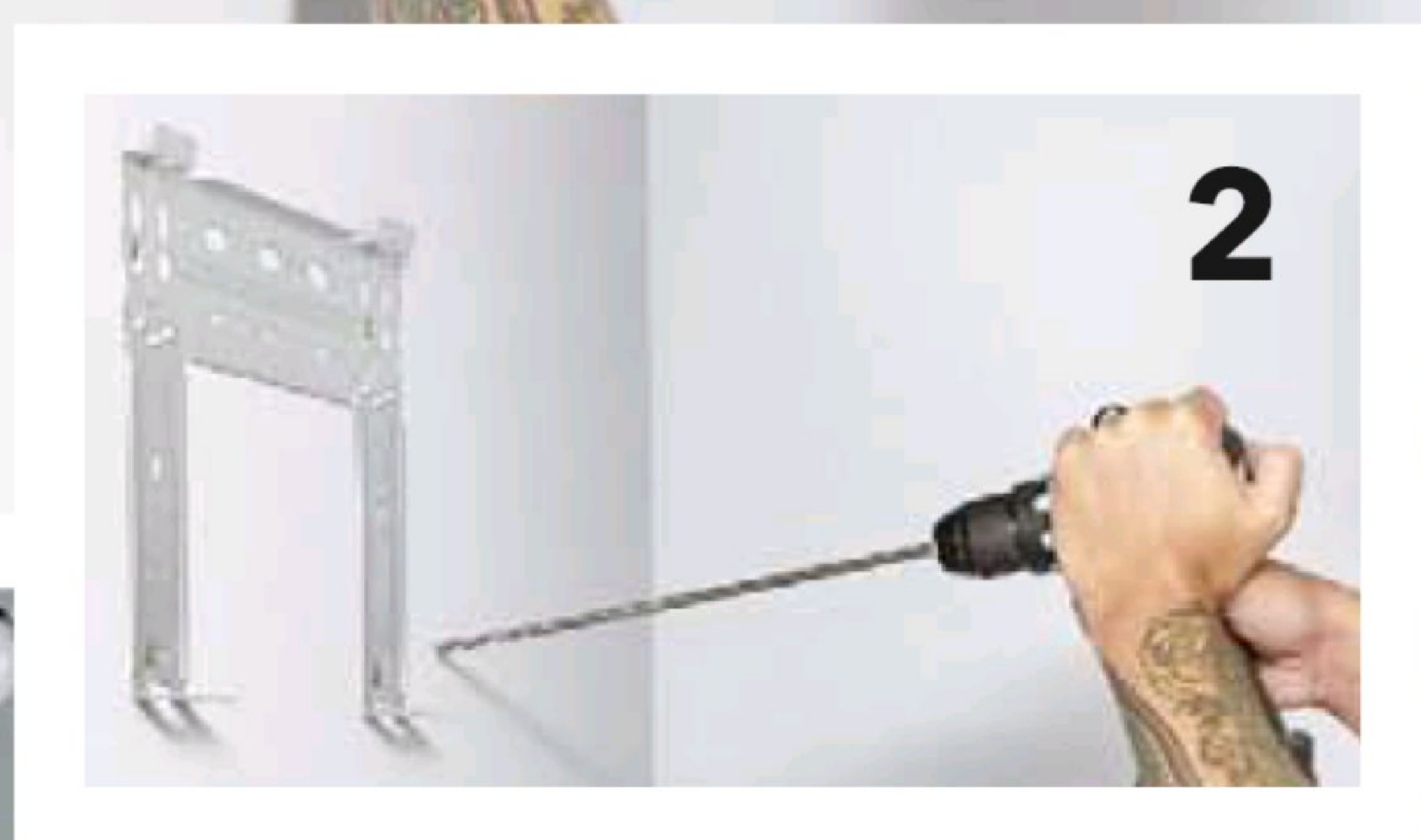
The fabric sleeve covering the line set isn't attractive or easy to keep clean. The solution is a plastic line set cover kit, which costs about \$50 online.





1 INSTALL THE MOUNTING BRACKET

Mount the evaporator inside the room on an exterior wall away from direct sunlight, doorways and sources of dust. Make sure this area of the wall is free of wires, pipes and ducts that would interfere with making a hole for the line set. Mark the stud locations and fasten the bracket to them with screws.



2 DRILL A PILOT HOLE

The line set hole must slope slightly downward to the outside so condensate from the evaporator can drain outside. Begin by drilling a pilot hole from inside to outside. Then go outside and make sure no trim or other obstructions will complicate drilling the full-size hole.



3 BORE THE FULL-SIZE HOLE

Cut with a hole saw from inside, move aside any insulation and inspect the wall cavity for obstructions. Finish the hole by drilling from the outside.



4 RUN THE LINE SET

Carefully uncoil the line set from the back of the evaporator. With an assistant outside, feed the line set through the hole. As it emerges, the assistant should gently bend the line set downward and to the side as needed to reach the condenser. Keep the rigid plastic collar surrounding the line set at the end that connects to the condenser. The drain line is shorter and goes through last, below the other lines. Add the drain extension and wrap the joint with electrical tape to keep it secure.



5 INSTALL THE EVAPORATOR

Wrap the foam sleeve around the section of line set within the hole and replace any insulation

in the wall cavity that was disturbed. Then hang the evaporator on the mounting bracket. Your helper may need to feed a few more inches of the line set outside as you do this. On the outside, insert the two-piece plastic trim into the hole to prevent any rough edges from damaging the line set.

6 INSTALL THE CONDENSER

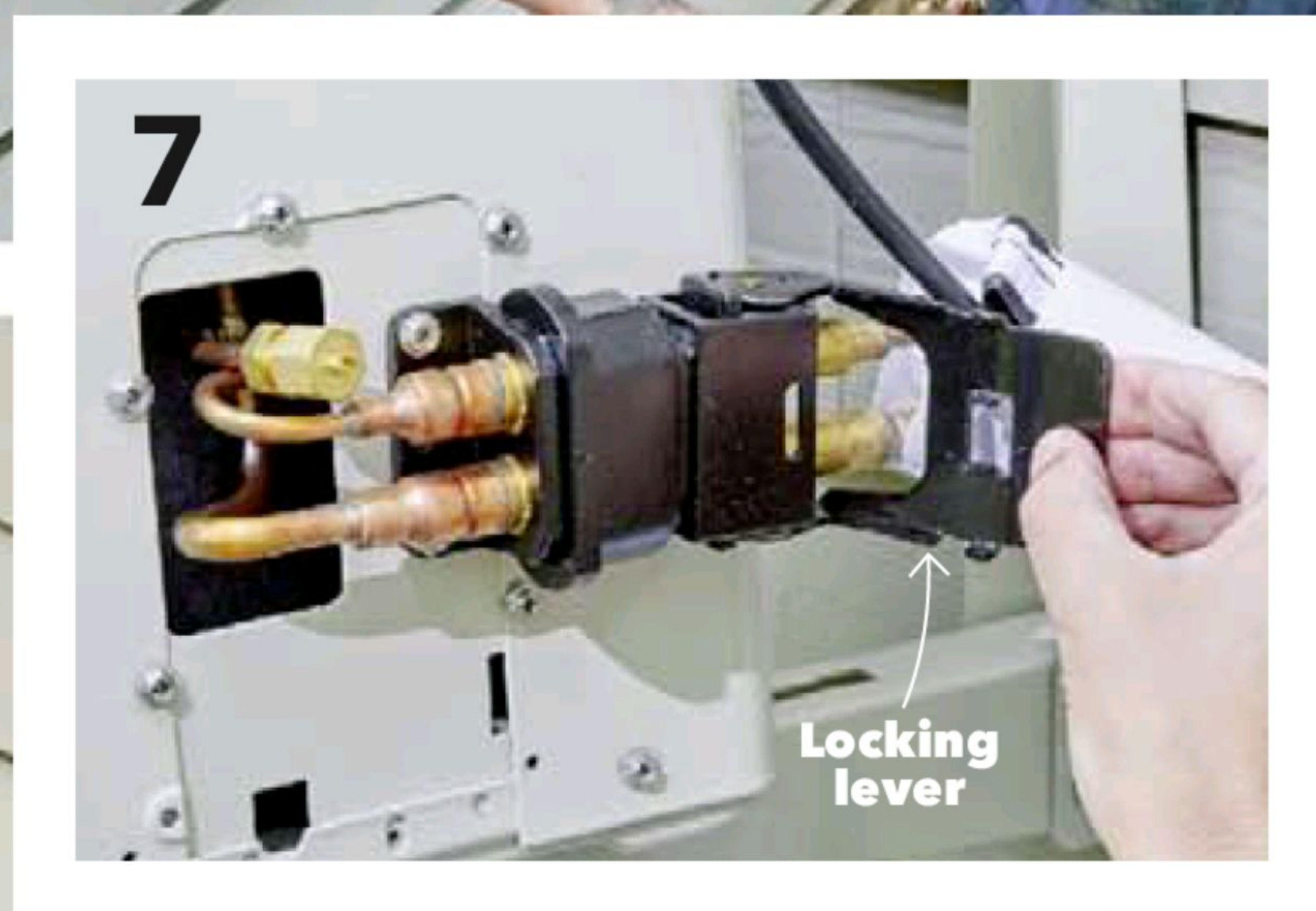
Set the condenser on a pad on the ground or mount it on a wall bracket so that the refrigerant lines can reach it easily. Route the line set so it stays tight to the building exterior and doesn't leapfrog any obstructions. This makes it easier to install a cover. Ensure the condenser has the recommended clearance from walls and bushes. Avoid placement where ice or packed snow could fall on it or where other appliances vent. A location on the east or north side of the structure maximizes cooling efficiency.

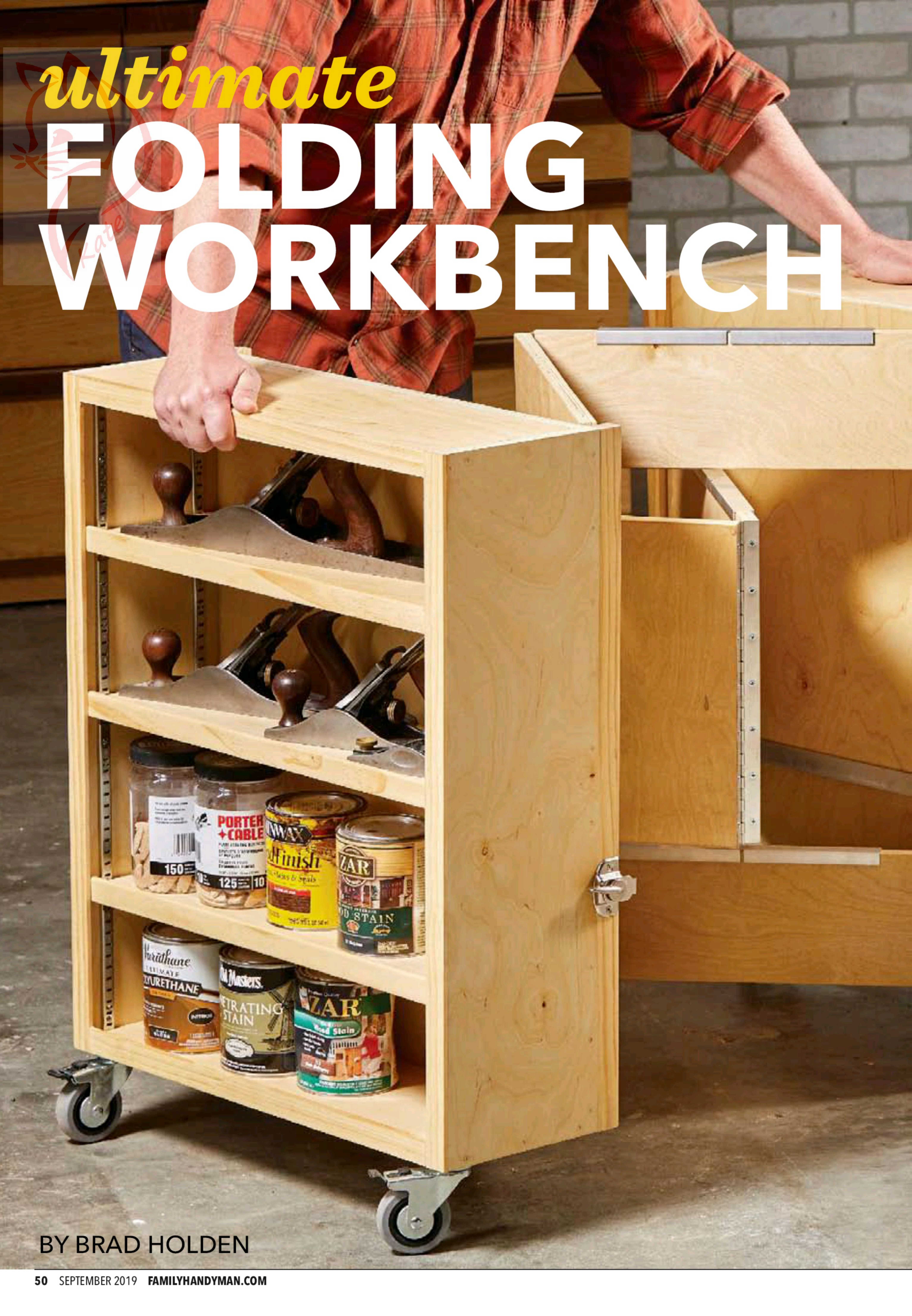
7 CONNECT THE REFRIGERANT LINES

This step varies by manufacturer. With this system, a locking lever presses the line connections together. Before powering up, inspect the refrigerant lines for kinks and verify the electrical connections. Then go inside and set the temperature using the handheld controller.

8 COVER THE LINE SET

Insulate and seal the hole in the outside wall, then cover the line set using sections of plastic or metal channel cut to length. Place the back half of the channel behind the line set, plumb it and anchor it to the wall with self-tapping screws. Our line set travels horizontally to the compressor, so when we added the channel corner (see p. 46), we drilled a hole in it to allow the drain line to exit straight down.





ultimate FOLDING WORKBENCH

BY BRAD HOLDEN



**A BIG
BENCH**
WHEN YOU NEED IT
COMPACT
WHEN YOU
DON'T!



READY TO USE

I built a folding workbench for *American Woodworker* magazine about 20 years ago—I think it was one of the first ever built. It has served as a lumber cart, finishing stand, cutting station, job-site workbench and as an assembly table. Because it's been so useful, I designed a deluxe anniversary model with extra features. If you want to build the original, simpler version instead, search for "folding workbench" at familyhandyman.com.

5 Fresh Features:

- 1 A TOUGH WORK SURFACE**
For a durable, smooth work surface, I glued a layer of tempered hardboard over plywood.
- 2 TWO TOPS**
The large top allows ample room for work and tools. When the bench is folded up, the small top is just right for a benchtop tool like a drill press or miter saw.
- 3 A LARGE LOWER SHELF**
This big space is the perfect spot to park tools during projects. The shelf's ends clip into the cabinets, making the bench extremely rigid.
- 4 ADJUSTABLE SHELVES**
I replaced the end frames on the original with cabinets. This one holds adjustable shelves.
- 5 DEEP DRAWERS**
The drawer cabinet is the same size as the shelf cabinet, so you could opt for two shelf cabinets or two drawer cabinets.



FOLDED UP



THE ORIGINAL



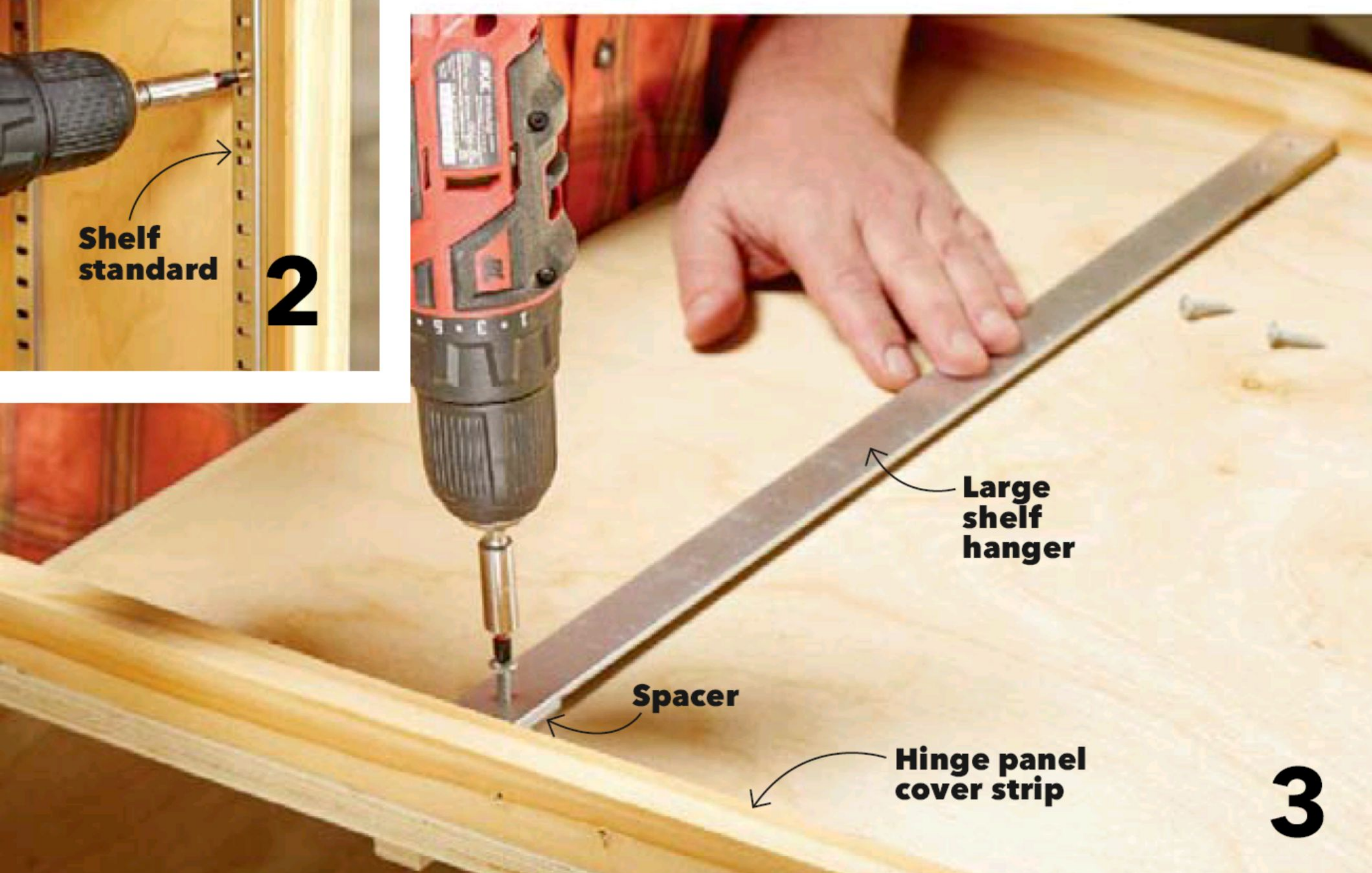
1 BUILD THE CABINETS

Cut all the cabinet parts to size. Plywood thicknesses vary slightly, so double-check dimensions as you build. Sand all the parts, and then screw the drawer glides to the drawer cabinet sides (don't use glue, in case you need to make adjustments). Assemble both cabinets.



2 INSTALL SHELF STANDARDS

Cut the shelf standards to length. Install the standards using No. 6 x 3/4-in. screws, with the factory ends of the standards set on the cabinet's bottom. Attach the hinge panel cover strips to both cabinets. Apply finish.



3 ATTACH SHELF HANGERS

Cut to length the hangers and spacers that support the lower shelf. Attach the hangers to the cabinets using pan-head screws.

4 ATTACH SHELF BRACKETS

Cut the large shelf and shelf brackets to size. Attach brackets flush with the ends of the shelf using pan-head screws.

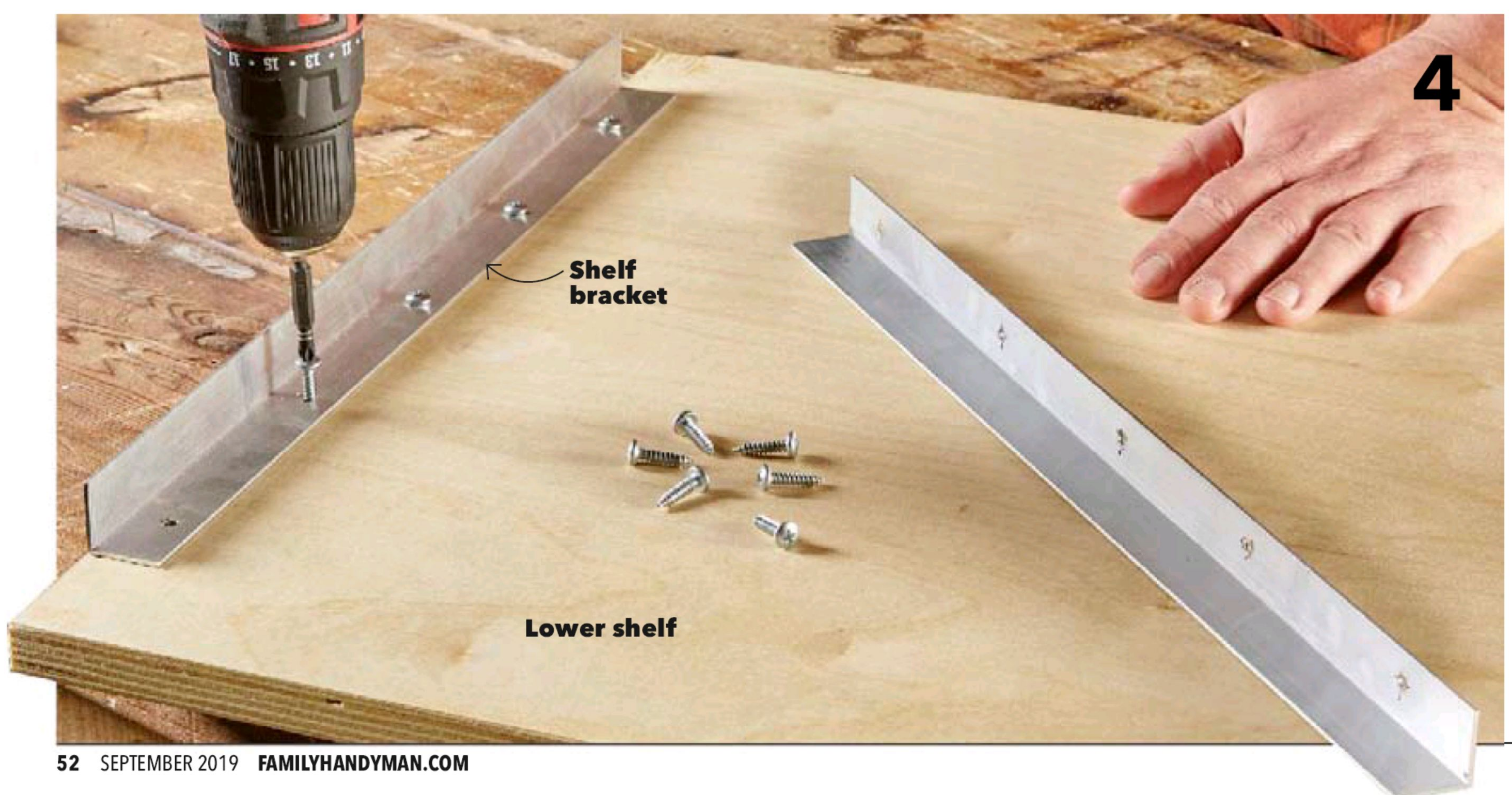
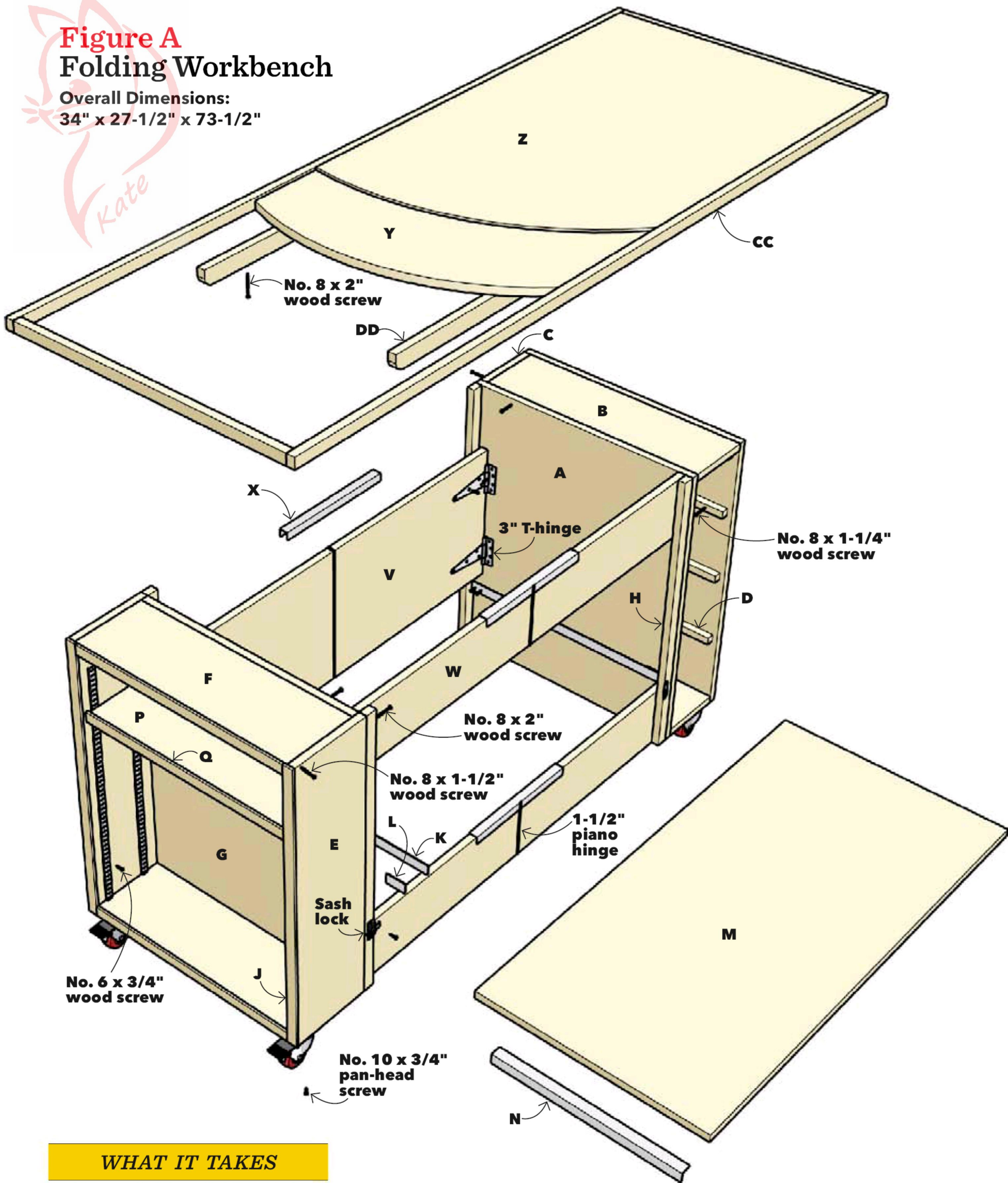


Figure A Folding Workbench

Overall Dimensions:
34" x 27-1/2" x 73-1/2"



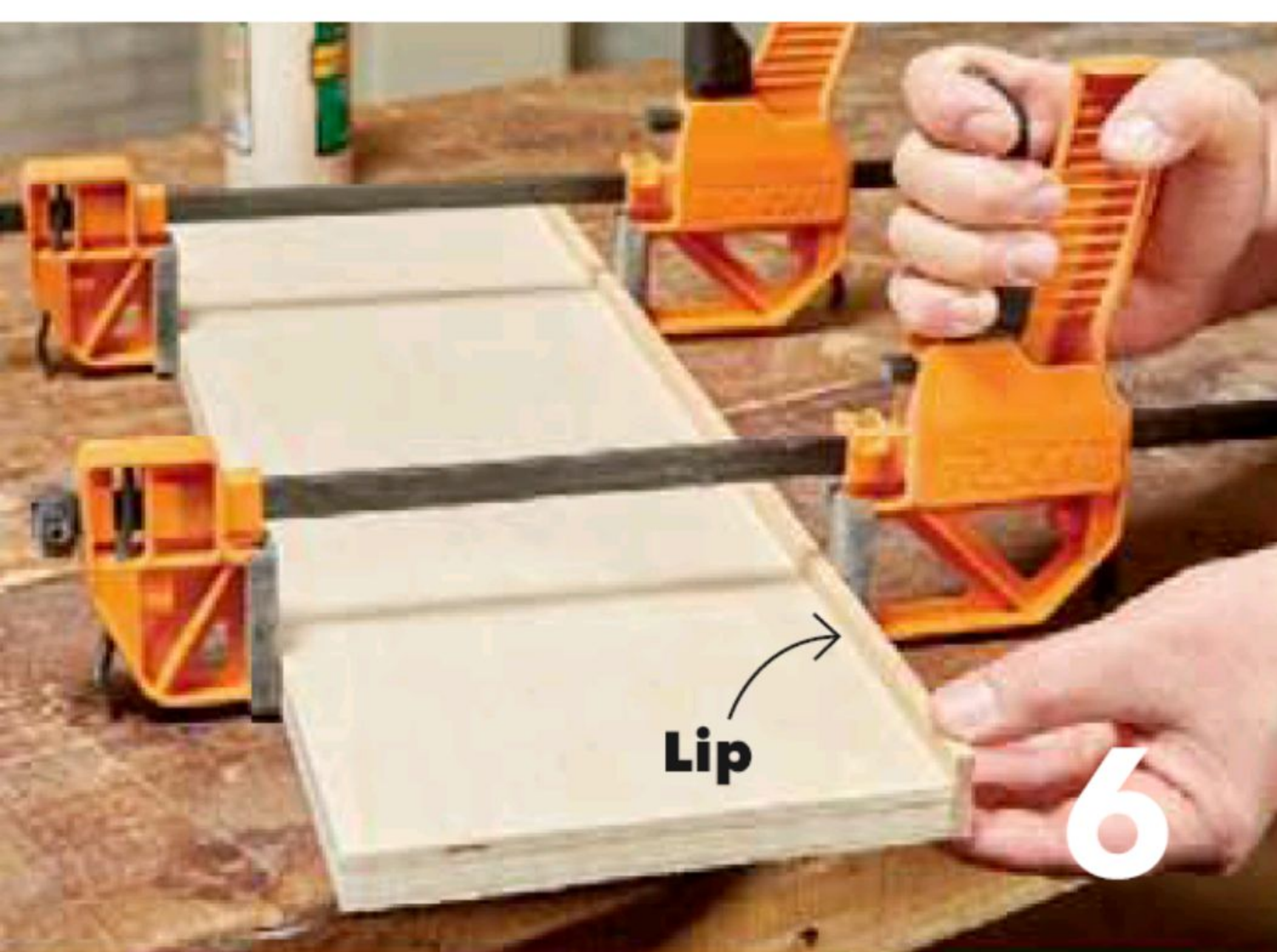
WHAT IT TAKES

TIME	COST	SKILL LEVEL
2 days	\$300	Intermediate

TOOLS
Circular saw, table saw,
clamps, drill, jigsaw, hacksaw



5 ATTACH CASTERS
Fasten the casters near the outer ends of the cabinet bottoms using washer-head screws. I used swiveling casters that lock to prevent rolling as well as pivoting, so the bench stays put while in use.



6 BUILD THE SHELVES
Cut the small shelves to size, allowing about 1/8 in. of play between the shelf standards. Sand the shelves and then attach the shelf lip. The lip overhangs the tops of the shelves to keep contents from sliding out. Sand the shelves and apply finish.



7 BUILD THE DRAWERS
After cutting the drawer parts, draw an arc on one of the drawer fronts using a roll of tape or a paint can as a guide. Cut out the arc and sand it smooth (sandpaper stapled to the cutout works well for this). Repeat for the other drawer fronts. Dado the fronts and sides to accept the bottoms. Assemble the drawers using glue and brad nails, and then apply finish.



8 CUT THE HINGES
Secure the piano hinge in a vise and cut the lengths needed for the hinge panels using a hacksaw. File the cut edges smooth.

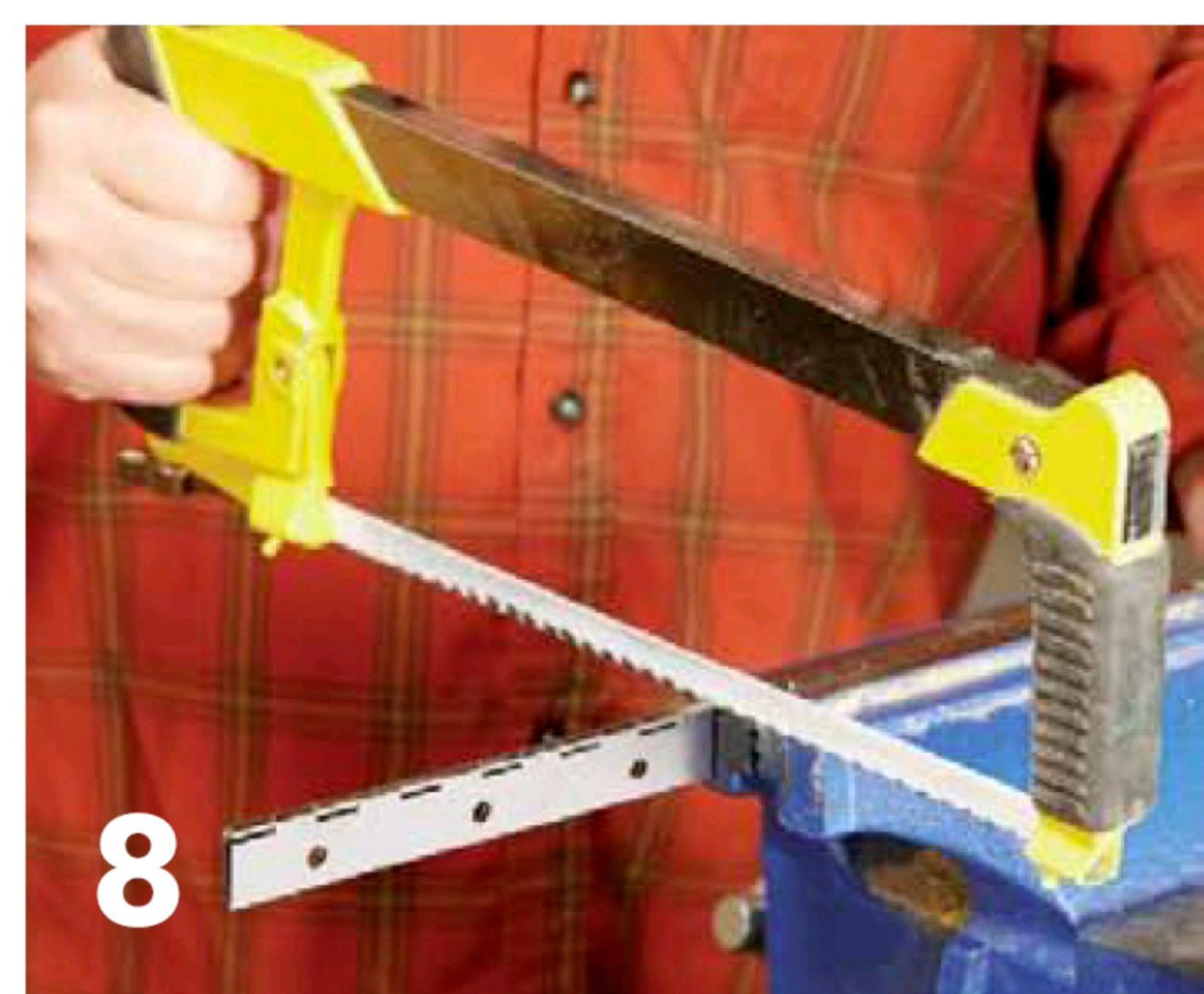
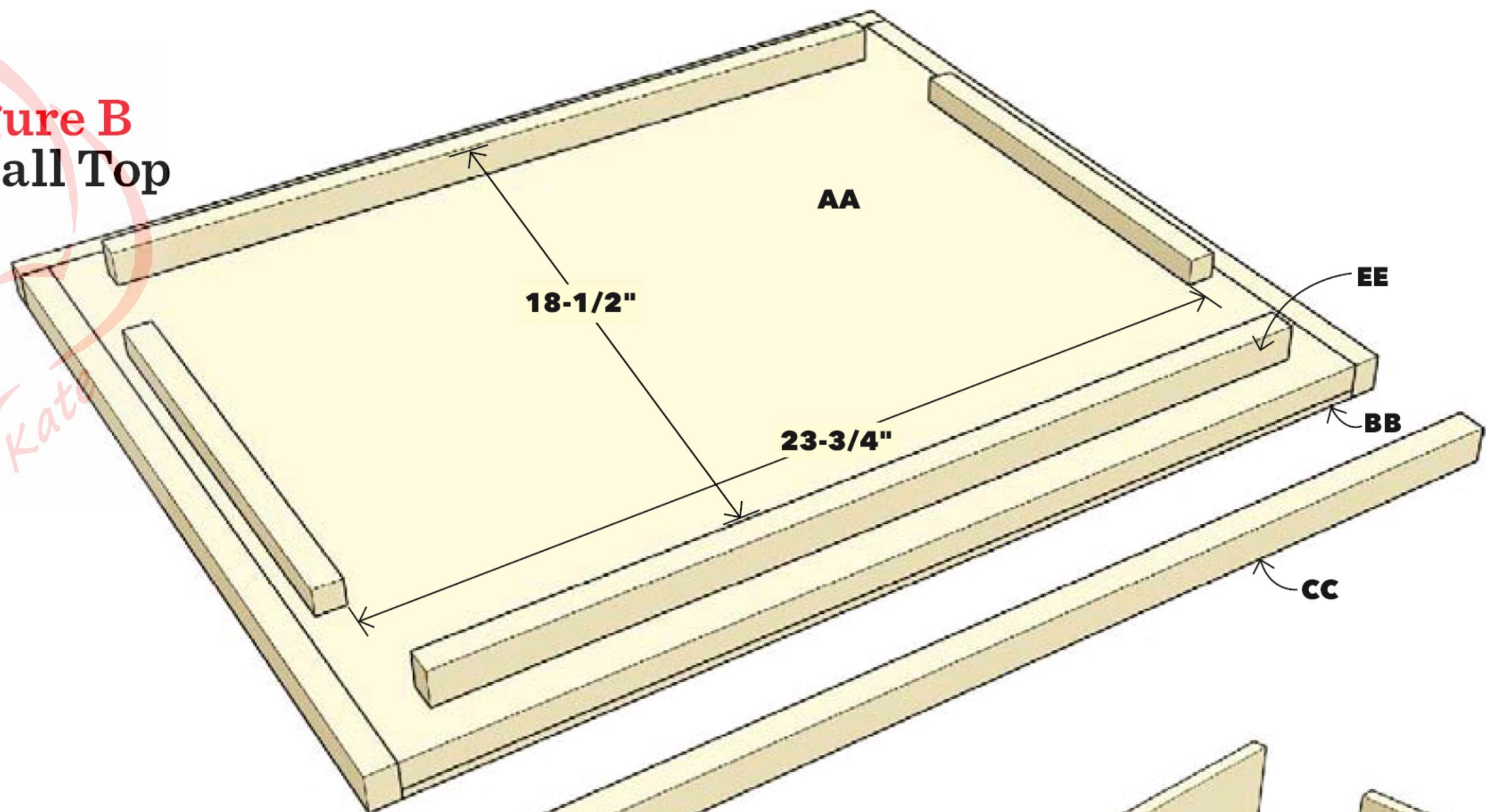


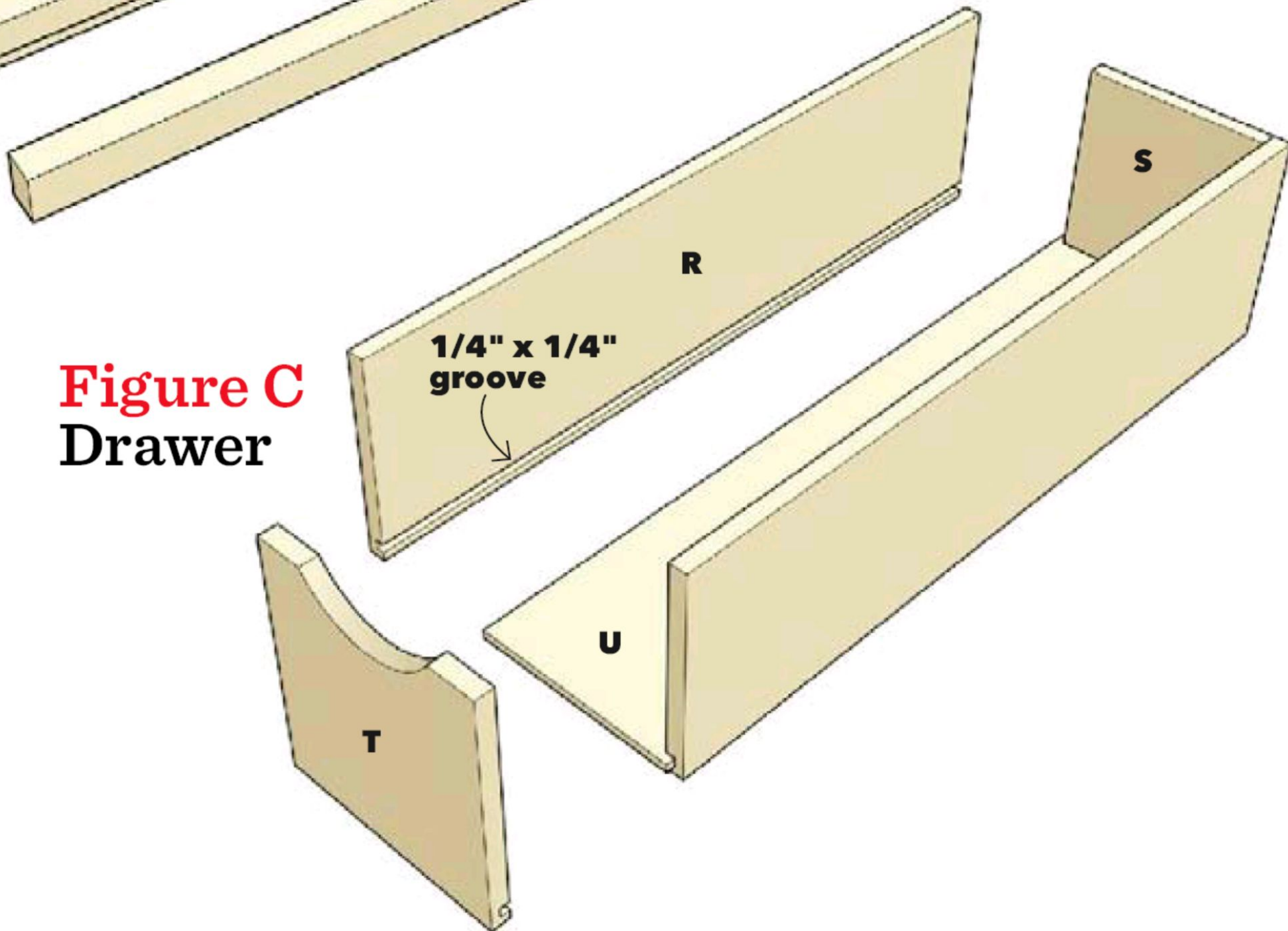
Figure B
Small Top



Materials List

ITEM	QTY.
3/4" birch plywood	2 sheets
1/2" birch plywood	1 sheet
1/4" tempered hardboard	1 sheet
1 x 4 x 8' pine	3
1/4" x 1" x 8' pine mullion trim	2
Shelf standards	4
Shelf clips	12
1-1/2" piano hinge	36"
3" T-hinges	8
3" casters	4
Sash locks	2
3/4" aluminum channel	36"
1" x 1" aluminum angle	36"
1/8" x 1" flat aluminum	48"
No. 6 x 3/4" wood screws	Sm. box
No. 8 x 1-1/4" wood screws	Sm. box
No. 8 x 1-1/2" wood screws	Sm. box
No. 8 x 2" wood screws	Sm. box
No. 10 x 3/4" pan-head screws	Sm. box
18-gauge 1-1/2" brad nails	Sm. box

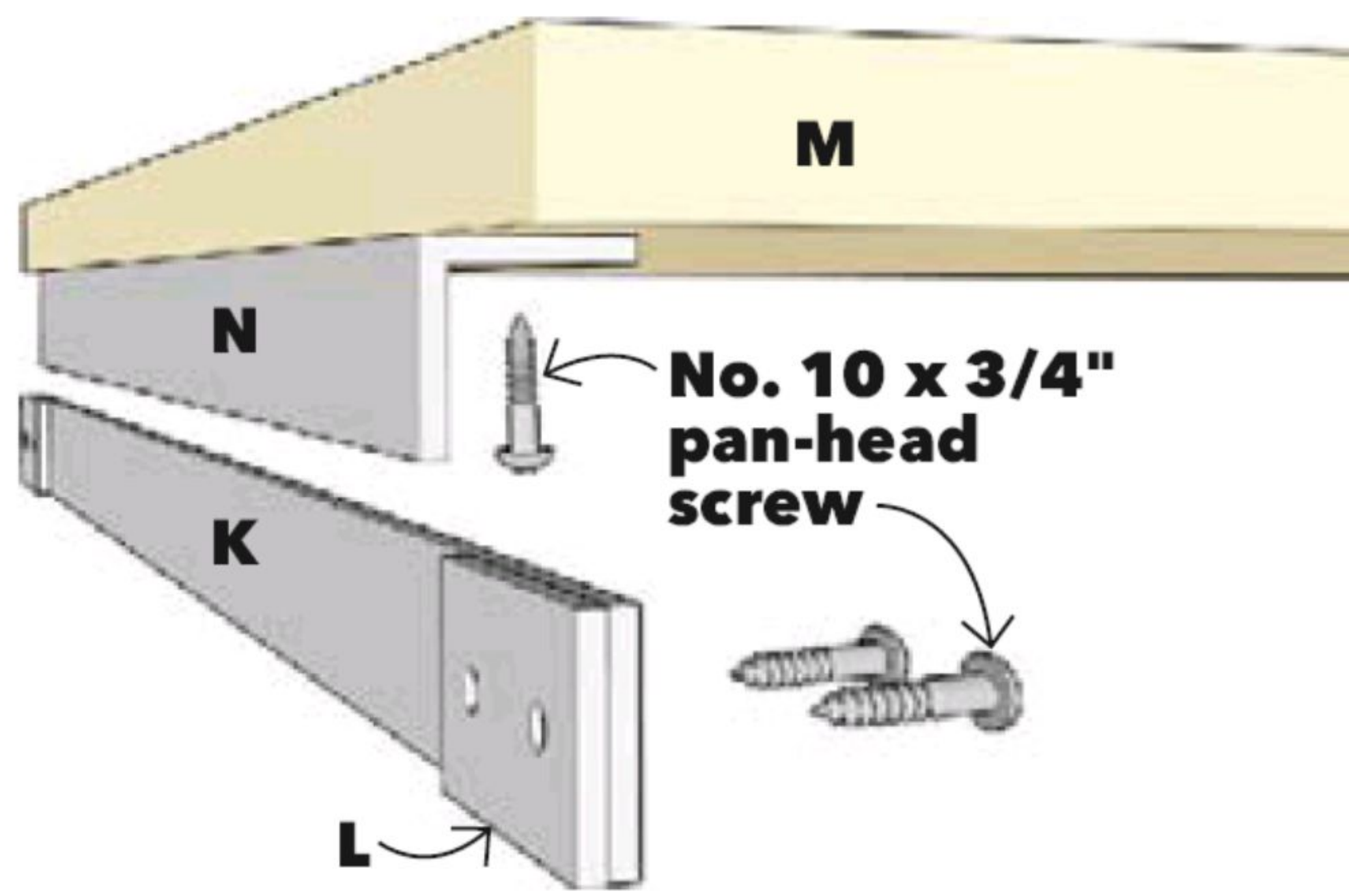
Figure C
Drawer



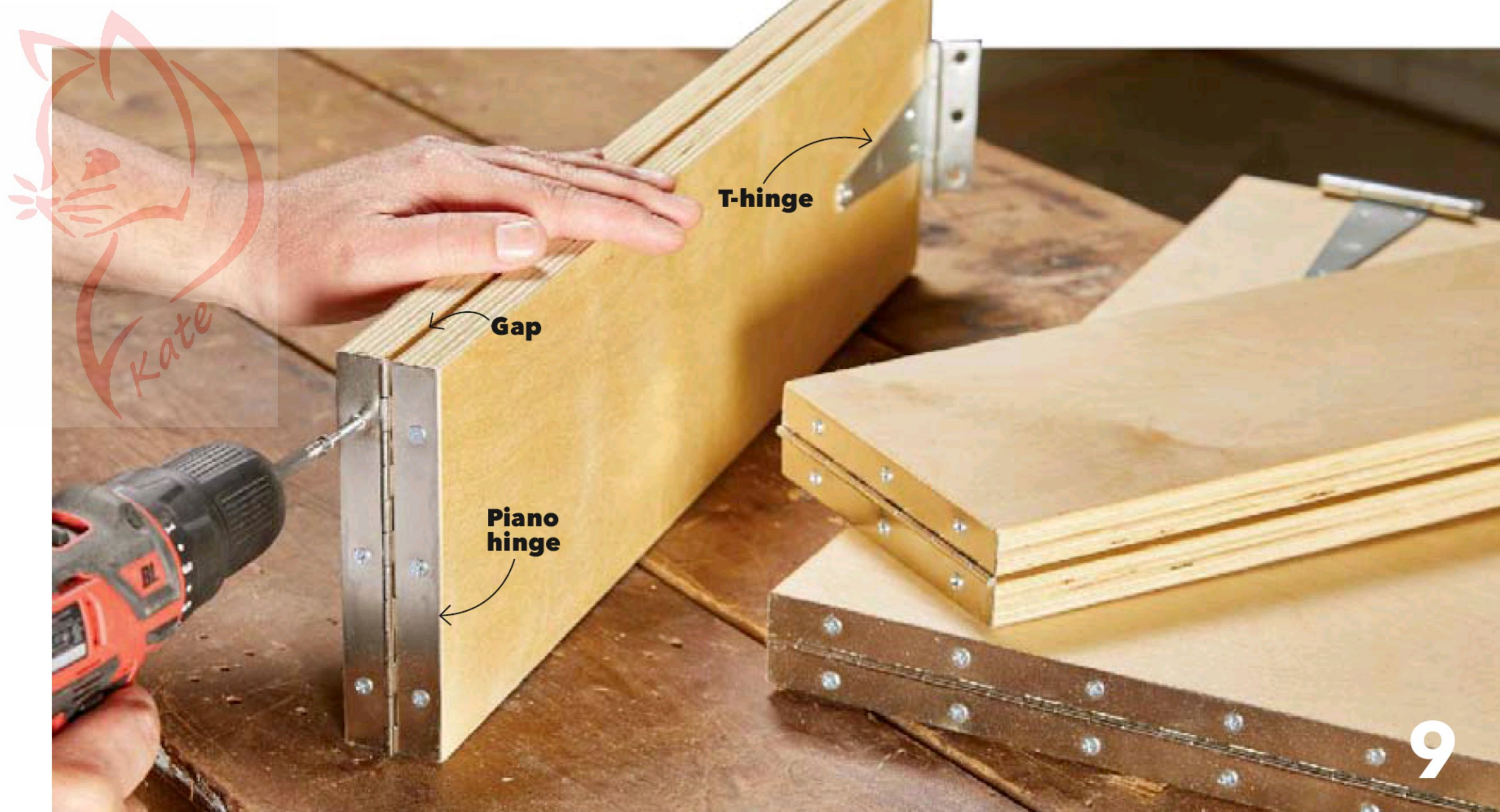
Cutting List

KEY	QTY.	DIMENSIONS	MATERIAL	PART
A	2	3/4" x 23-3/4" x 29"	3/4" birch plywood	Drawer cabinet sides
B	2	3/4" x 6-1/2" x 23"	3/4" birch plywood	Drawer cabinet top & bottom
C	1	3/4" x 6-1/2" x 29"	3/4" birch plywood	Drawer cabinet back
D	6	3/4" x 3/4" x 22-1/2"	3/4" birch plywood	Drawer glides
E	2	3/4" x 8" x 29"	3/4" birch plywood	Shelf cabinet ends
F	2	3/4" x 7-1/4" x 22-1/4"	3/4" birch plywood	Shelf cabinet top & bottom
G	1	3/4" x 22-1/4" x 29"	3/4" birch plywood	Shelf cabinet back
H	4	3/4" x 1-1/8" x 29"	1x4 pine	Hinge panel cover strips
J	1	1/4" x 1" (cut to fit)	Pine mullion	Shelf cabinet trim
K	2	1/8" x 1" x 22-1/4"	Flat aluminum	Shelf hangers
L	2	1/8" x 1" x 2"	Flat aluminum	Shelf hanger spacers
M	1	3/4" x 21-1/4" x 42-11/16"	3/4" birch plywood	Large shelf
N	2	1" x 1" x 17-1/2"	Aluminum angle	Shelf brackets
P	3	3/4" x 6-1/2" x 21-7/8"	3/4" birch plywood	Small shelves
Q	3	1/4" x 1-1/2" x 21-7/8"	Pine mullion	Shelf lips
R	8	1/2" x 6" x 22-1/4"	1/2" birch plywood	Drawer sides
S	4	1/2" x 5-1/2" x 5-1/4"	1/2" birch plywood	Drawer backs
T	4	1/2" x 6-3/4" x 6-1/4"	1/2" birch plywood	Drawer fronts
U	4	1/4" x 5-3/4" x 22-1/2"	Tempered hardboard	Drawer bottoms
V	2	3/4" x 14" x 21-1/4"	3/4" birch plywood	Wide hinge panels
W	4	3/4" x 6" x 21-1/4"	3/4" birch plywood	Narrow hinge panels
X	3	3/4" x 3/4" x 12"	Aluminum channel	Panel locks
Y	1	3/4" x 26" x 72"	3/4" birch plywood	Large top base
Z	1	1/4" x 26" x 72"	Tempered hardboard	Large top skin
AA	1	3/4" x 22-1/4" x 26"	3/4" birch plywood	Small top base
BB	1	1/4" x 22-1/4" x 26"	Tempered hardboard	Small top skin
CC	8	3/4" x 1" (cut to fit)	1x4 pine	Top edging
DD	2	3/4" x 1-1/2" x 42-11/16"	1x4 pine	Large top stays
EE	4	3/4" x 3/4" x 6' (cut to fit)	1x4 pine	Small top stays

Figure D
Shelf Detail



MORE ONLINE!
For plans and video detailing the original model, search for "folding workbench" at familyhandyman.com



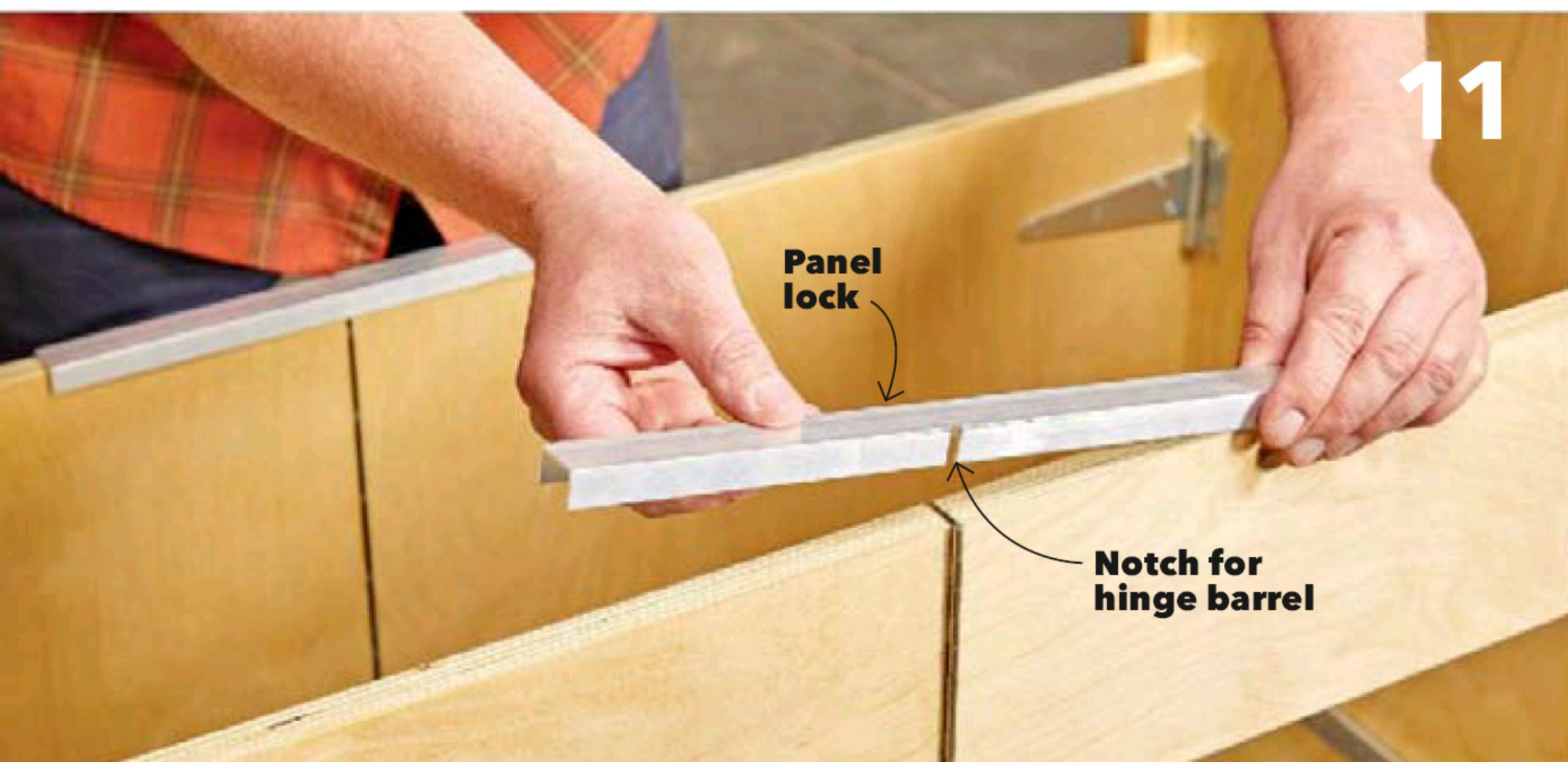
9 ASSEMBLE THE HINGE PANELS

Join each pair of hinge panels using a section of piano hinge and No. 8 x 1-1/4-in. wood screws, predrilling for the screws. Leave a gap equal to the hinge barrel's diameter. Install the T-hinges on the free ends of each panel.



10 POSITION AND ATTACH HINGE PANELS

Attach the top and bottom hinge panels flush with the top and bottom of the cabinets, directly behind the hinge panel cover strips. Mount the center hinge panel on the opposite side of the cabinets, on a line 1/2 in. below the top hinge panel.



11 INSTALL PANEL LOCKS

Panel locks stiffen the hinged panels, making the whole bench more rigid. Cut them to length using a hacksaw. Cut a notch in one side of each panel lock for clearance around the hinge barrels.

Figure E
3/4-in. Plywood

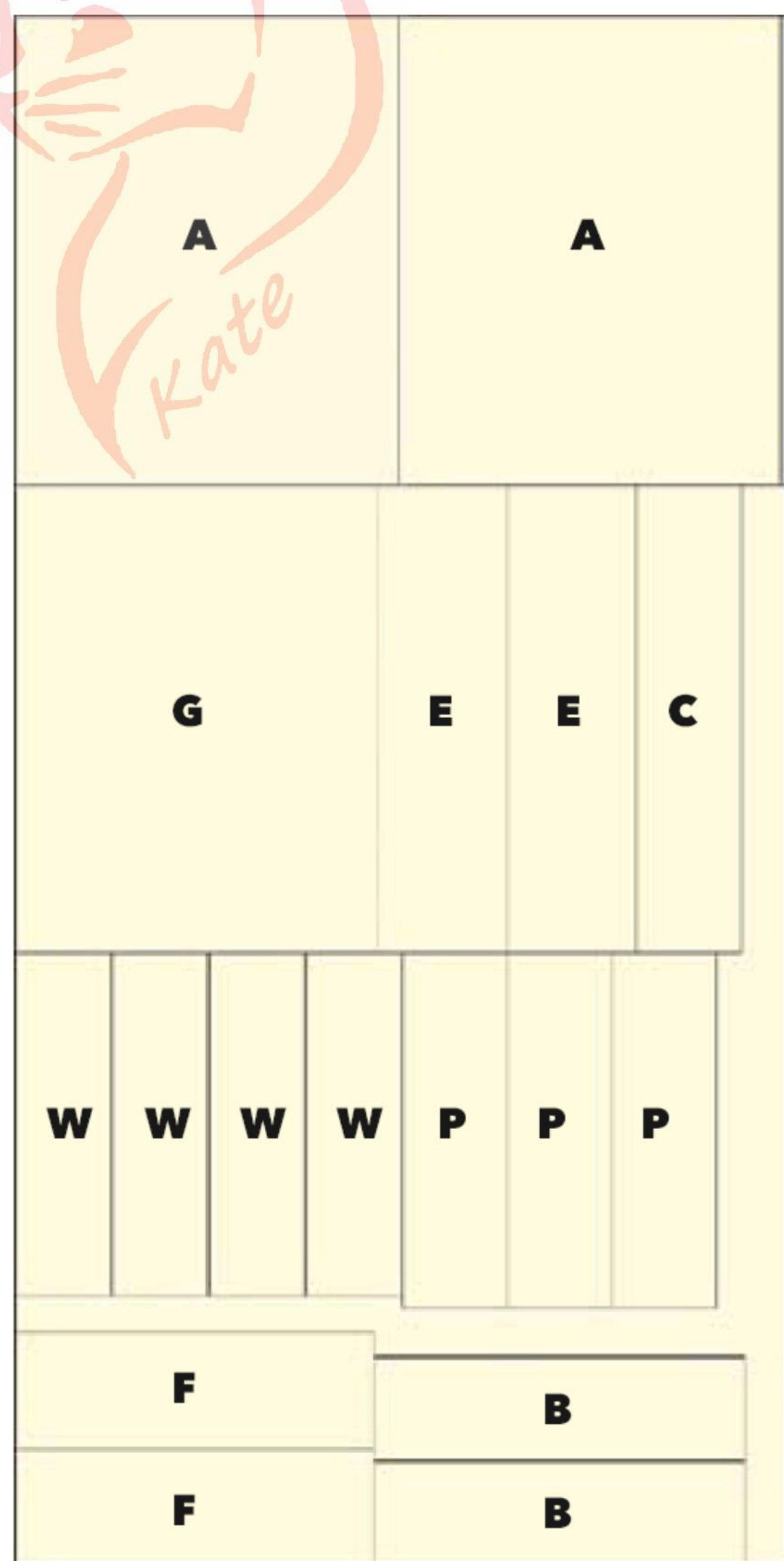
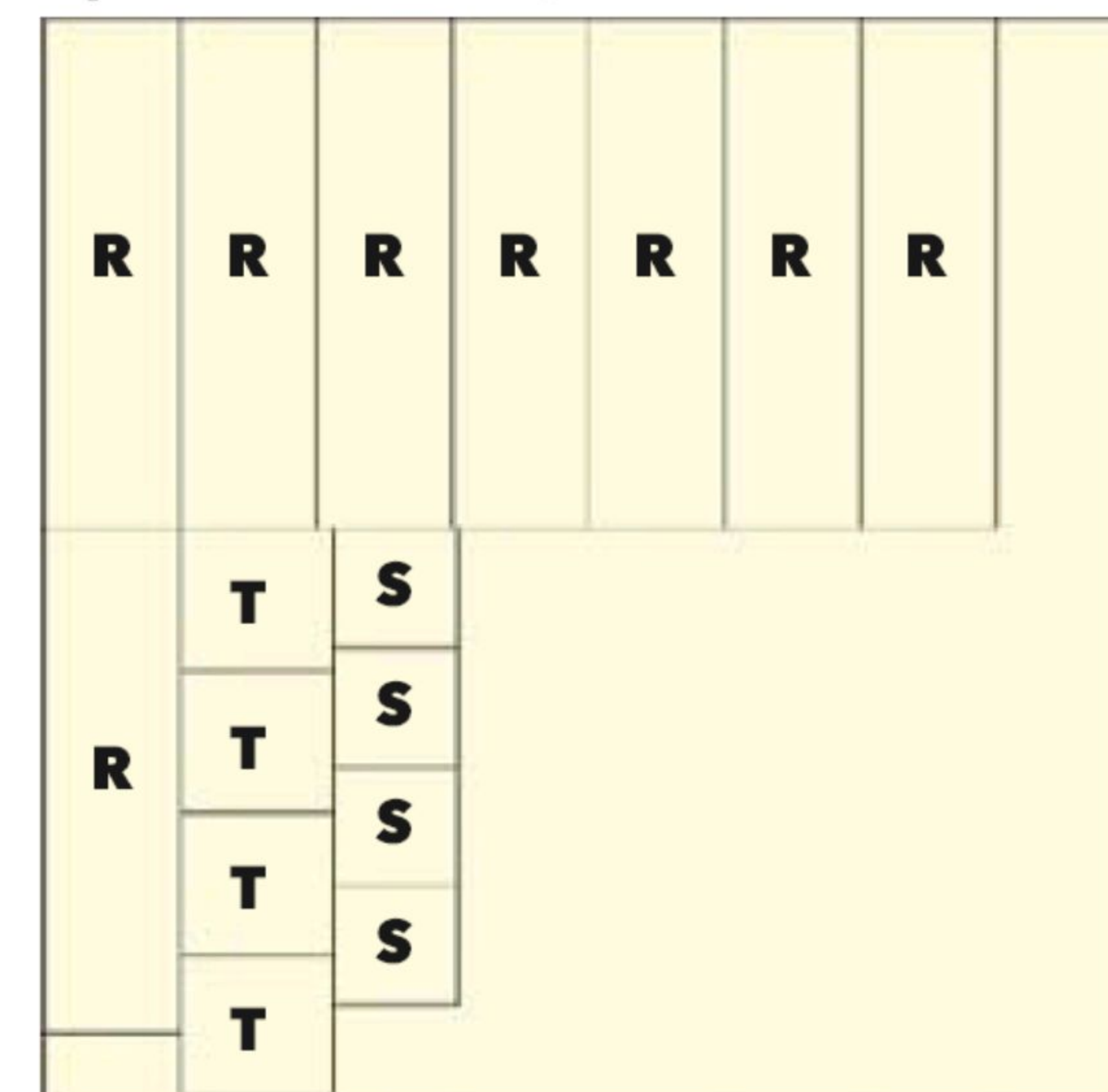
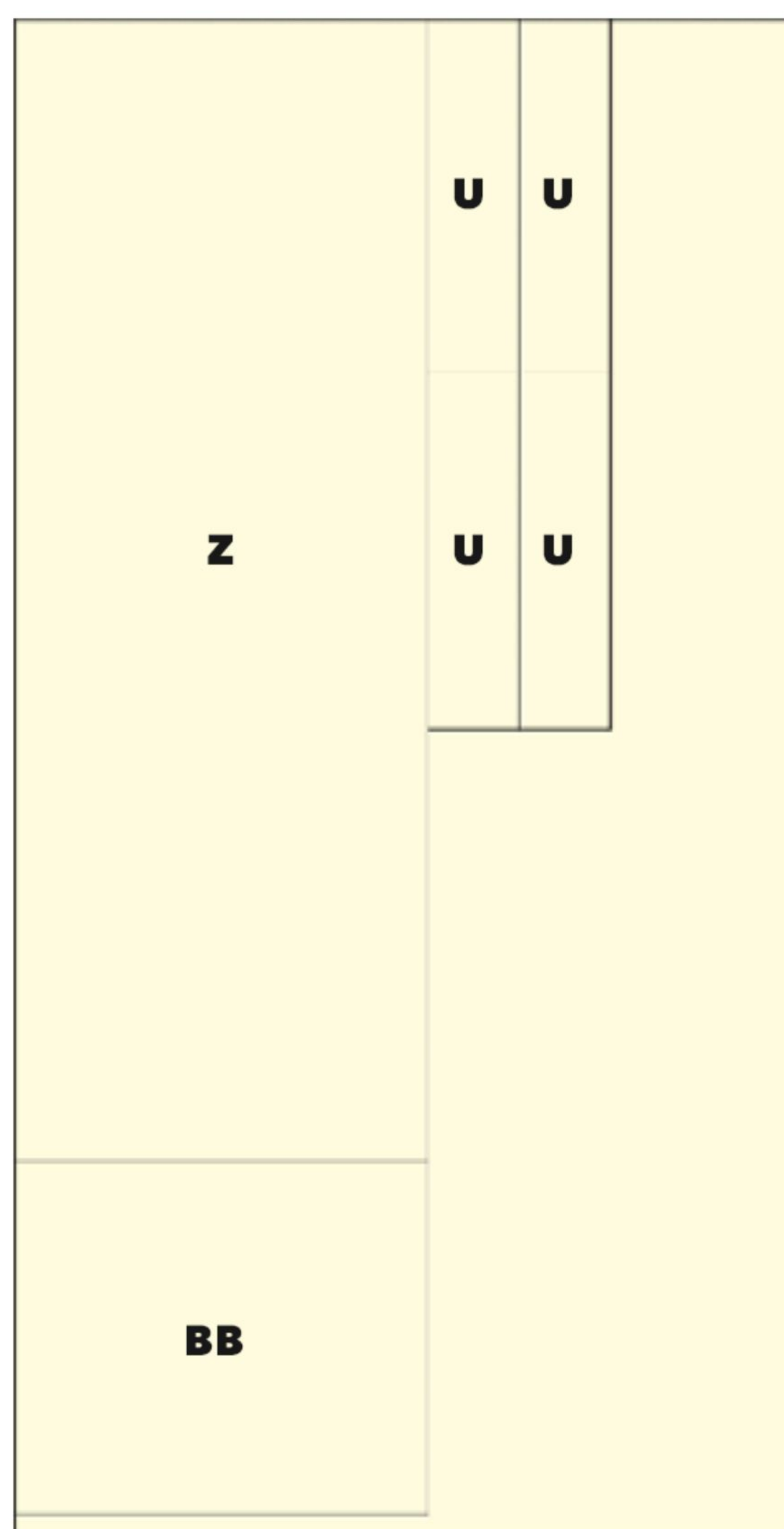


Figure F
1/2-in. Plywood



*With a few basic tools,
you can build this
versatile workbench
in a weekend. Even
if you build just the
original design, you
won't regret it. Mine
has been in constant
use for 20 years!*

Figure G
Tempered
Hardboard



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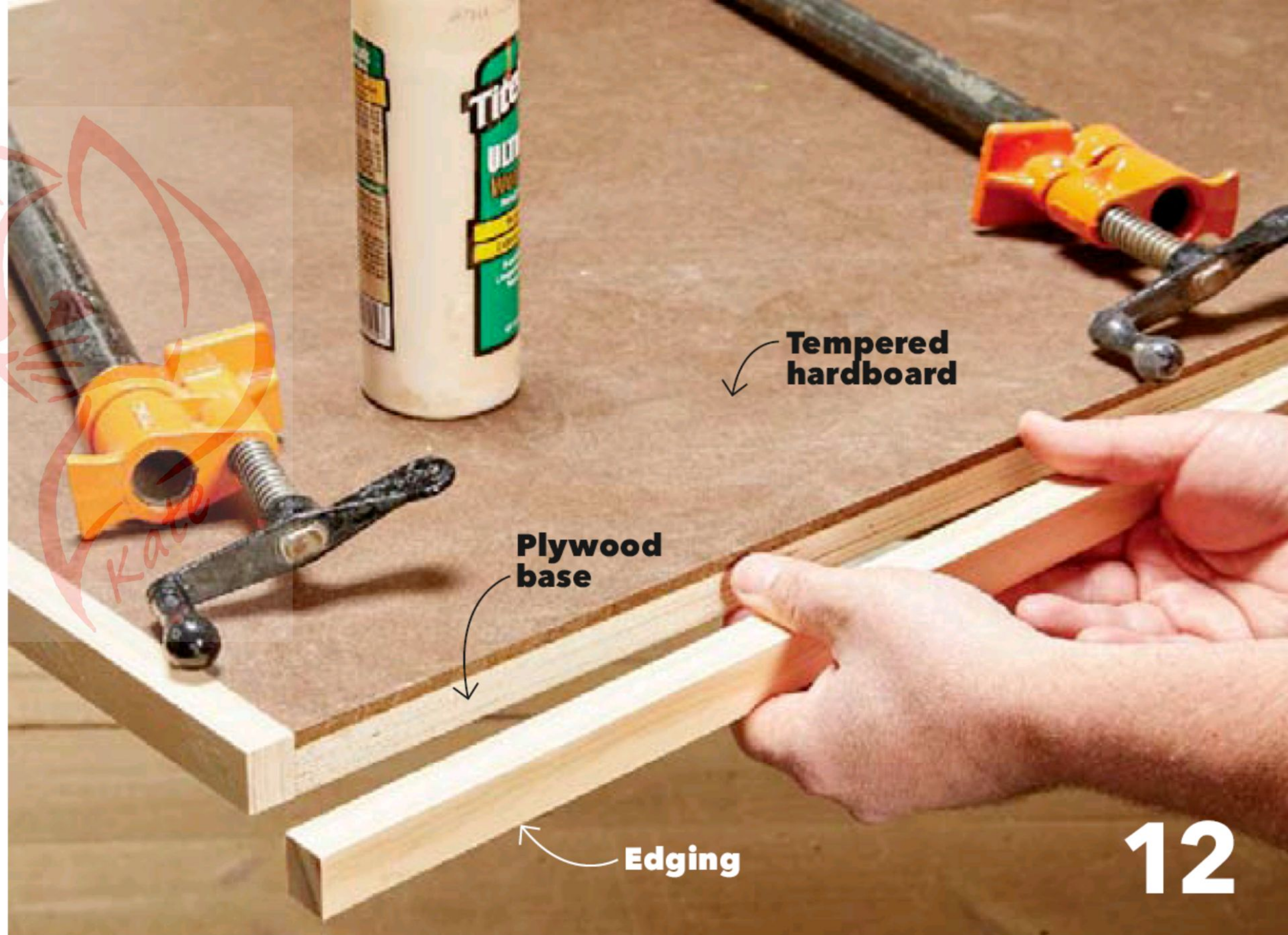
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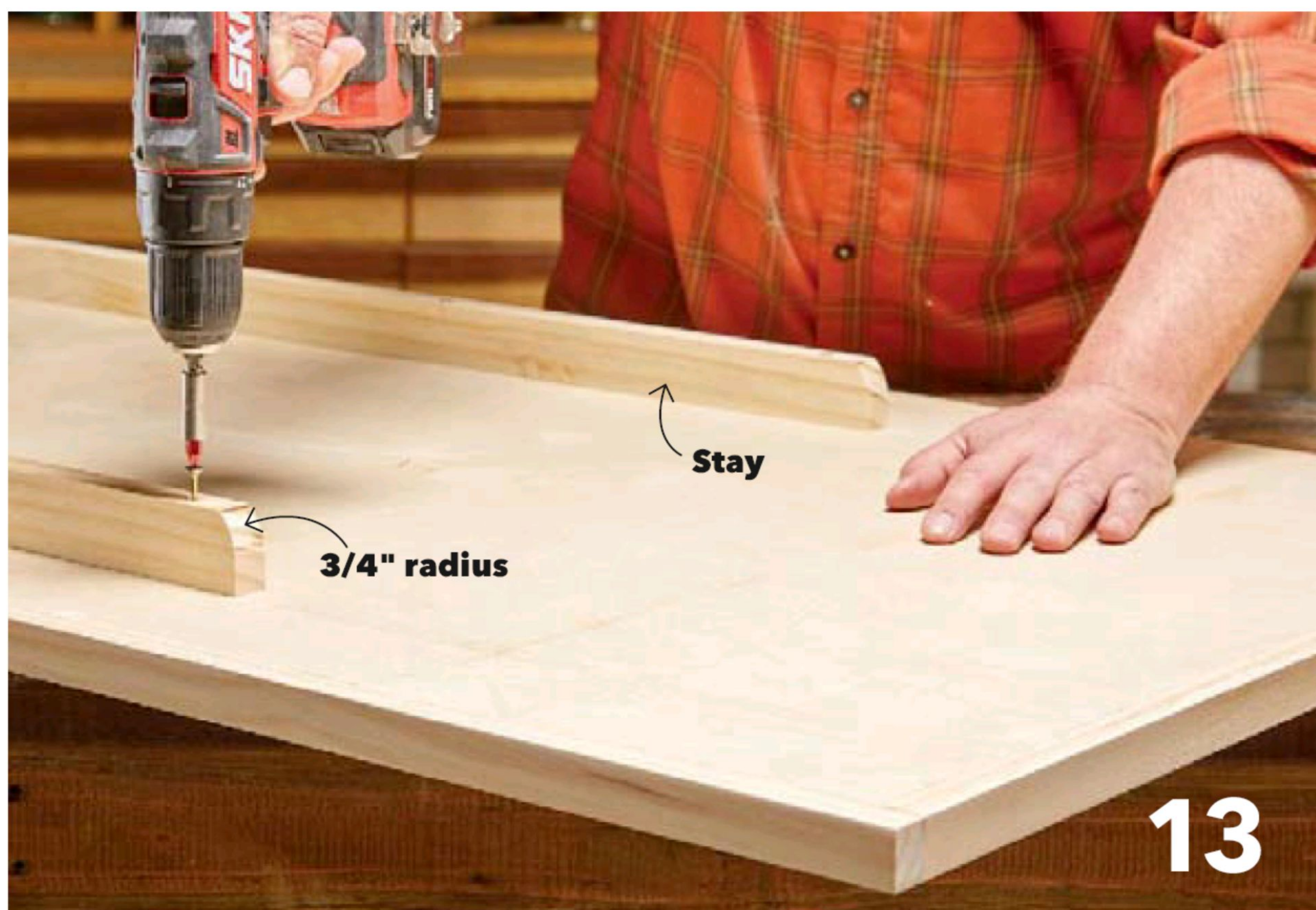
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12

12 BUILD THE TOPS
Hardboard "skins" provide a smooth, tough surface for the large and small tops. Cut the top bases and skins slightly oversize, and then glue the skins to the bases. When the glue is dry, cut the tops to finished size. Attach the edging using glue and clamps.



13

13 ATTACH STAYS TO TOPS
Glue and screw the top stays to the underside of both tops. The stays on the large top lock the two cabinets in their open position. The small top stays lock the cabinets in their closed position and prevent the top from sliding.

14 INSTALL SASH LOCKS
To hold the cabinets together, install sash locks on the hinge panel cover strips 6 in. from the bottom of both sides of the cabinets.

15 ADD THE SHELF
Drop the shelf into place, slipping the shelf brackets behind the shelf hangers. This addition makes the bench very rigid.



14



15

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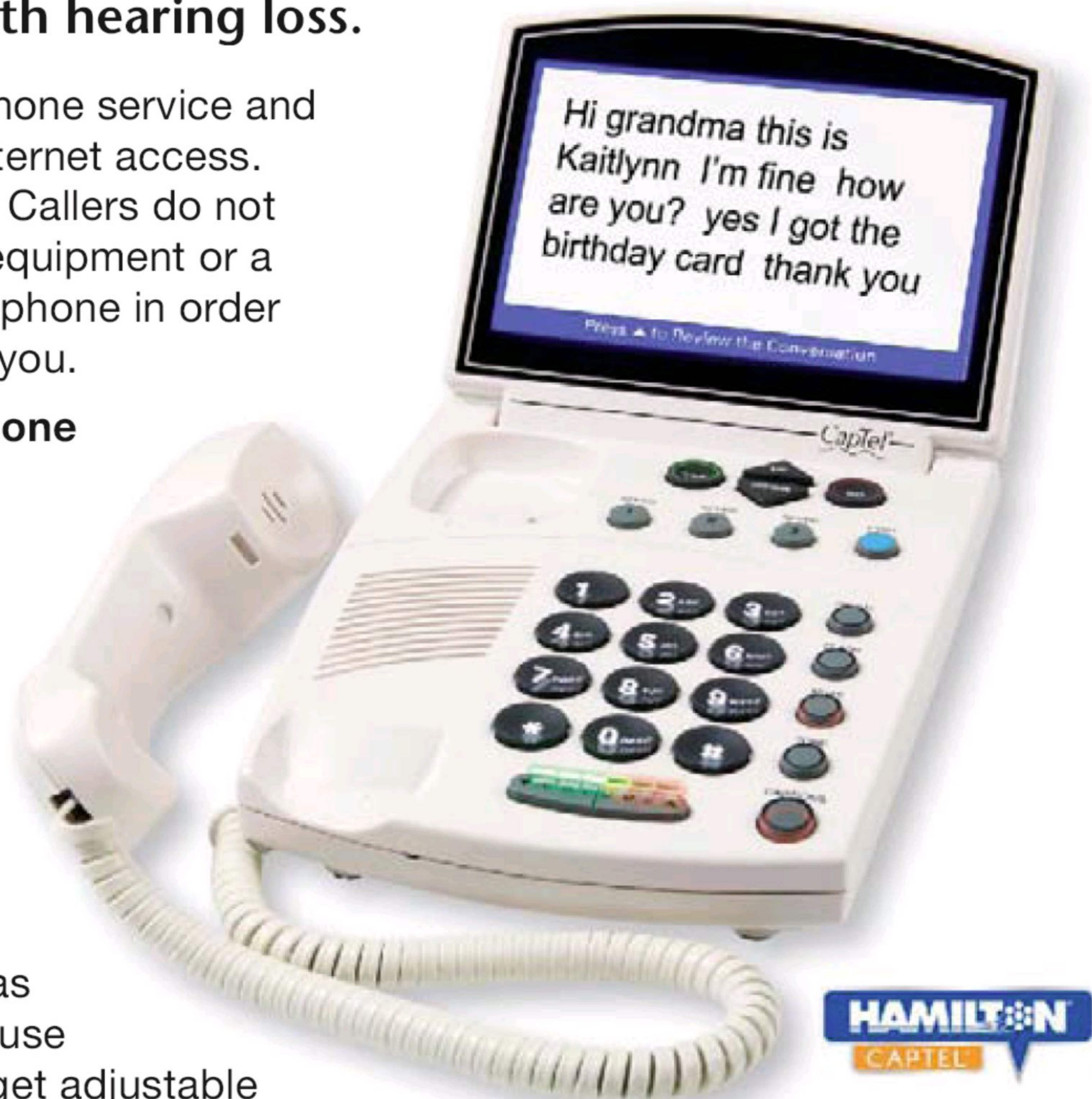
requires telephone service and high-speed Internet access. WiFi Capable. Callers do not need special equipment or a captioned telephone in order to speak with you.

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The Hamilton CapTel phone is also packed with features to help make phone calls easier. The keypad has large, easy to use buttons. You get adjustable volume amplification along with the ability to save captions for review later. It even has an answering machine that provides you with the captions of each message.



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Please mention promotion code 110985.

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9 SECRET Hiding Places

Safeguard your treasure—whether it's jewelry, important papers or emergency cash

BY BRAD HOLDEN



Hall table hideaway

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For tiny stuff, take apart a cheap universal remote. Pull out the guts and cut out any interior ribs with a utility knife to create more space.





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Secret drywall door

Sometimes the inside of a closet gets drywalled but doesn't get taped and painted. Above the inside of a closet door, patch in a piece of drywall over one stud cavity. It'll look like you were just using up drywall scraps to finish out the closet. Don't mud the joints, so you can just remove the screws to get at your stash.



Under attic insulation

A thief would need to be pretty determined to set up a ladder and crawl into your attic. Underneath the insulation is a perfect spot for low-profile items. Keep in mind that attics are often attractive places for rodents, so this is probably not the best place for paperwork.



Free toy inside!

Carefully open a cereal box from the bottom and shove in your stash under the plastic cereal bag. Reseal the box flaps with hot glue.



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Floor vent safe

A fake floor heat register gives ample room to store a whole trove of treasure. Before you commit to cutting a hole in the floor, locate the floor joists with a stud finder, and choose a spot away from existing ductwork. Install phony ductwork under the hole if the ceiling below the floor isn't finished.



An undetectable cache

There's a little space inside a CO detector for small items. Install it somewhere in addition to, not in place of, your working detectors. Never disassemble a smoke detector. Some of them contain tiny amounts of radioactive material!

Cold, hard cash

Wrap up a stack of bills or other valuables in foil like leftovers and stick them in a plastic bag in the freezer.



Leading Acid Reflux Pill Becomes an Anti-Aging Phenomenon

Clinical studies show breakthrough acid reflux treatment also helps maintain vital health and helps protect users from the serious conditions that accompany aging such as fatigue and poor cardiovascular health

by **David Waxman**
Seattle Washington:

A clinical study on a leading acid reflux pill shows that its key ingredient relieves digestive symptoms while suppressing the inflammation that contributes to premature aging in men and women.

And, if consumer sales are any indication of a product's effectiveness, this 'acid reflux pill turned anti-aging phenomenon' is nothing short of a miracle.

Sold under the brand name AloeCure, it was already backed by clinical data documenting its ability to provide all day and night relief from heartburn, acid reflux, constipation, irritable bowel, gas, bloating, and more.

But soon doctors started reporting some incredible results...

"With AloeCure, my patients started reporting less joint pain, more energy, better sleep, stronger immune systems... even less stress and better skin, hair, and nails" explains Dr. Liza Leal; a leading integrative health specialist and company spokesperson.

AloeCure contains an active ingredient that helps improve digestion by acting as a natural acid-buffer that improves the pH balance of your stomach.

Scientists now believe that this acid imbalance is what contributes to painful inflammation throughout the rest of the body.

The daily allowance of AloeCure has shown to calm this inflammation which is why AloeCure is so effective.

Relieving other stressful symptoms related to GI health like pain, bloating, fatigue, cramping, constipation, diarrhea, heartburn, and nausea.

Now, backed with new clinical studies, AloeCure is being recommended by doctors everywhere to help improve digestion, calm painful inflammation, soothe joint pain, and even reduce the appearance of wrinkles – helping patients to look and feel decades younger.

FIX YOUR GUT & FIGHT INFLAMMATION

Since hitting the market, sales for AloeCure have taken off and there are some very good reasons why.

To start, the clinical studies have been impressive. Participants taking the active ingredient in AloeCure saw a stunning 100% improvement in digestive symptoms, which includes fast and lasting relief from reflux.

Users also experienced higher energy levels and endurance, relief from chronic discomfort and better sleep. Some even reported healthier looking skin, hair, and nails.

A healthy gut is the key to a reducing swelling and inflammation that can wreak havoc on the human body. Doctors say this is why AloeCure works on so many aspects of your health.

AloeCure's active ingredient is made from the healing compound found in Aloe vera. It is both safe and healthy. There are also no known side effects.

Scientists believe that it helps improve digestive and immune health by acting as a natural acid-buffer that improves the pH balance of your stomach.

Research has shown that this acid imbalance contributes to painful inflammation throughout your entire body and is why AloeCure seems to be so effective.

EXCITING RESULTS FROM PATIENTS

To date over 5 million bottles of AloeCure have been sold, and the community seeking non-pharma therapy for their GI health continues to grow.

According to Dr. Leal, her patients are absolutely thrilled with their results and are often shocked by how fast it works.

"For the first time in years, they are free from concerns about their digestion and almost every other aspect of their health," says Dr. Leal, "and I recommend it to everyone who wants to improve GI health without resorting to drugs, surgery, or OTC medications."

"I was always in 'indigestion hell.' Doctors put me on all sorts of antacid remedies. Nothing worked. Dr. Leal recommended I try AloeCure. And something remarkable happened... Not only were all the issues I had with my stomach gone - completely gone – but I felt less joint pain and I was able to actually sleep through the night."

With so much positive feedback, it's easy to see why the community of believers is growing and sales for the new pill are soaring.

THE SCIENCE BEHIND ALOECURE

AloeCure is a pill that's taken just once daily. The pill is small. Easy to swallow. There are no harmful side effects and it does not require a prescription.

The active ingredient is a rare Aloe Vera component known as acemannan.

Made from of 100% organic Aloe Vera, AloeCure uses a proprietary process that results in the highest quality, most bio-available levels of acemannan known to exist.

According to Dr. Leal and several of her colleagues, improving the pH balance of your stomach and restoring gut health is the key to revitalizing your entire body.



When your digestive system isn't healthy, it causes unwanted stress on your immune system, which results in inflammation in the rest of the body.

The recommended daily allowance of acemannan in AloeCure has been proven to support digestive health, and calm painful inflammation without side effects or drugs.

This would explain why so many users are experiencing impressive results so quickly.

REVITALIZE YOUR ENTIRE BODY

With daily use, AloeCure helps users look and feel decades younger and defend against some of the painful inflammation that accompanies aging and can make life hard.

By buffering stomach acid and restoring gut health, AloeCure calms painful inflammation and will help improve digestion... soothe aching joints... reduce the appearance of wrinkles and help restore hair and nails ... manage cholesterol and oxidative stress... and improve sleep and brain function... without side effects or expense.

Readers can now reclaim their energy, vitality, and youth regardless of age or current level of health.

One AloeCure Capsule Daily

- Helps End Digestion Nightmares
- Helps Calm Painful Inflammation
- Soothes Stiff & Aching Joints
- Reduces appearance of Wrinkles & Increases Elasticity
- Manages Cholesterol & Oxidative Stress
- Supports Healthy Immune System
- Improves Sleep & Brain Function

HOW TO GET ALOECURE

Due to the enormous interest consumers have shown in AloeCure, the company has decided to extend their nationwide savings event for a little while longer. Here's how it works...

Call the AloeCure number and speak to a live person in the US. Callers will be greeted by a knowledgeable and friendly person approved to offer up to 3 FREE bottles of AloeCure with your order. AloeCure's Toll-Free number is **1-800-746-2987**. Only a limited discounted supply of AloeCure is currently available.

Consumers who miss out on the current product inventory will have to wait until more becomes available and that could take weeks. They will also not be guaranteed any additional savings. The company advises not to wait. Call **1-800-746-2987** today.

Best Pro Tips

Expert advice from the job site. By Mark Johanson

The easiest way to add garage outlets



INSTALLING SURFACE-MOUNTED RACEWAY is the slickest way to add lighting or outlets in a finished garage—even if you’re already a master at running conduit or fishing wire. Like conduit, it eliminates the need to tear into walls or ceilings. Unlike conduit, it doesn’t require special tools or materials. And raceway looks neater. A raceway system typically begins at an existing outlet. From there, it can run anywhere: up, down, around corners or in multiple directions at once.

The raceway system shown cost about \$60. Raceway itself (sold in 5- and 10-ft. lengths) costs about \$1 per foot. The surface-mounted junction boxes cost \$5 to \$10; the elbows and tees about \$5 each. You’ll also need mounting clips and other accessories. Home centers carry a variety of parts, and you’ll find even more online. The cost of wire, switches and outlets will add at least \$50 to the total. Raceway is often called “Wiremold,” the name of a common brand.

Planning tips

- Building a raceway system is kind of like plumbing; it requires the right parts and fittings, which can mean repeated trips to the store. To avoid that, sketch out a plan and make a list of the items you'll need. When in doubt, buy extra parts and return the leftovers.
- When possible, locate the new boxes directly above, below or level with the original box to minimize elbows and bends. It's less work for you and makes for a neater installation.
- Try to locate the new boxes at studs so you can screw directly into wood and minimize the need for drywall anchors.

CAUTION:

Turn off the power at the main panel and check with a noncontact voltage detector before you begin work.

1 START AT AN EXISTING OUTLET

Remove the outlet from an existing junction box and screw on a baseplate. Don't forget to add a No. 10 grounding screw to the baseplate. The entire raceway assembly must be grounded.

2 MARK THE PATH AND MEASURE

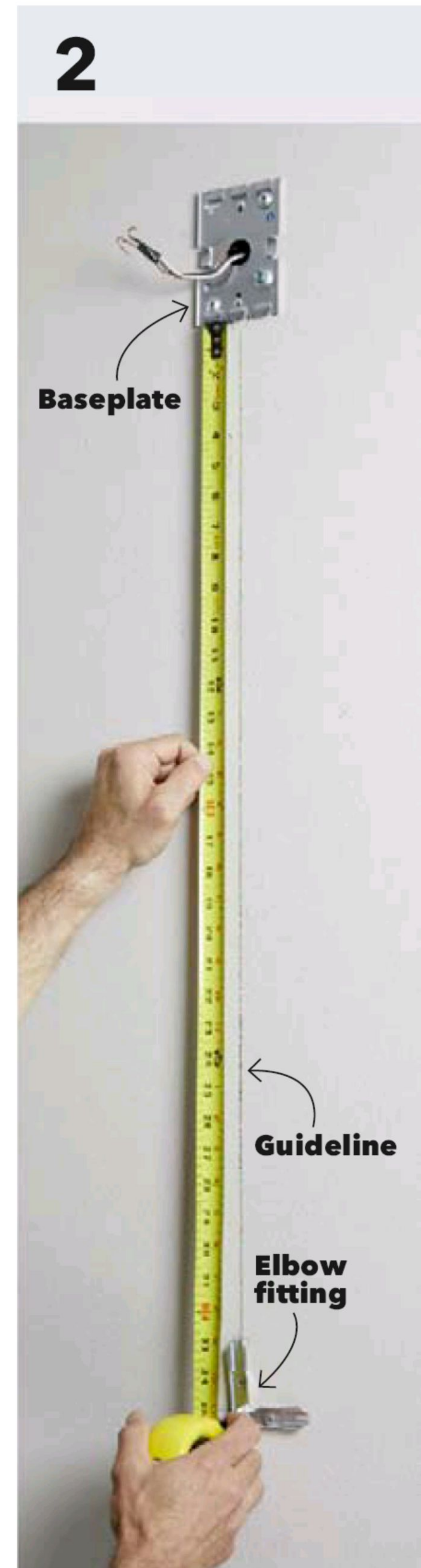
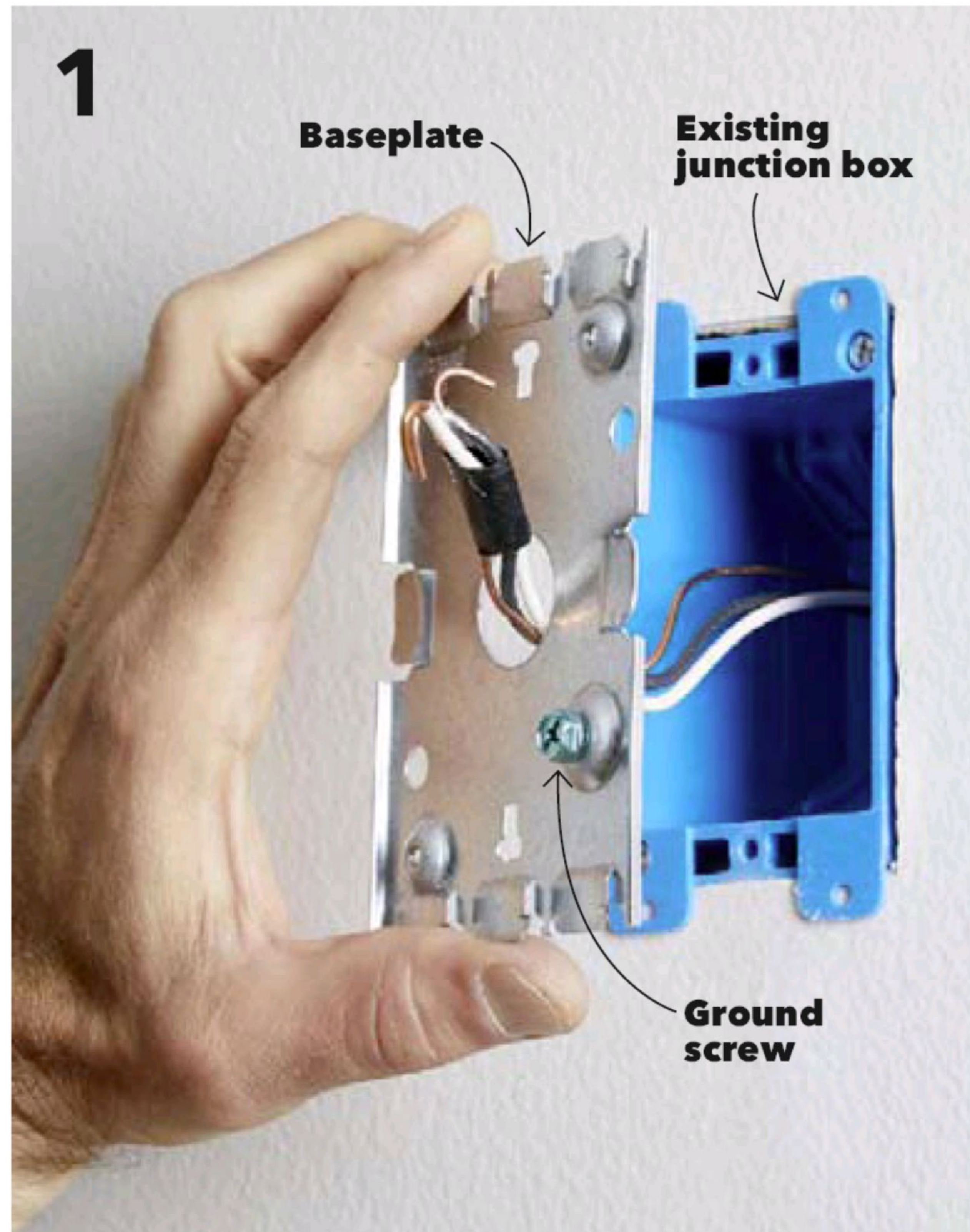
Draw a line marking the path of the raceway to the next baseplate or fitting. I like to temporarily screw that box or fitting into place. You'll have to anchor it later anyway, and having it locked in place makes measuring easier. Measure between the plate and the fitting. Add 3/8 in. for each end (3/4 in. total) to get the total length of the raceway.

3 CUT THE RACEWAY

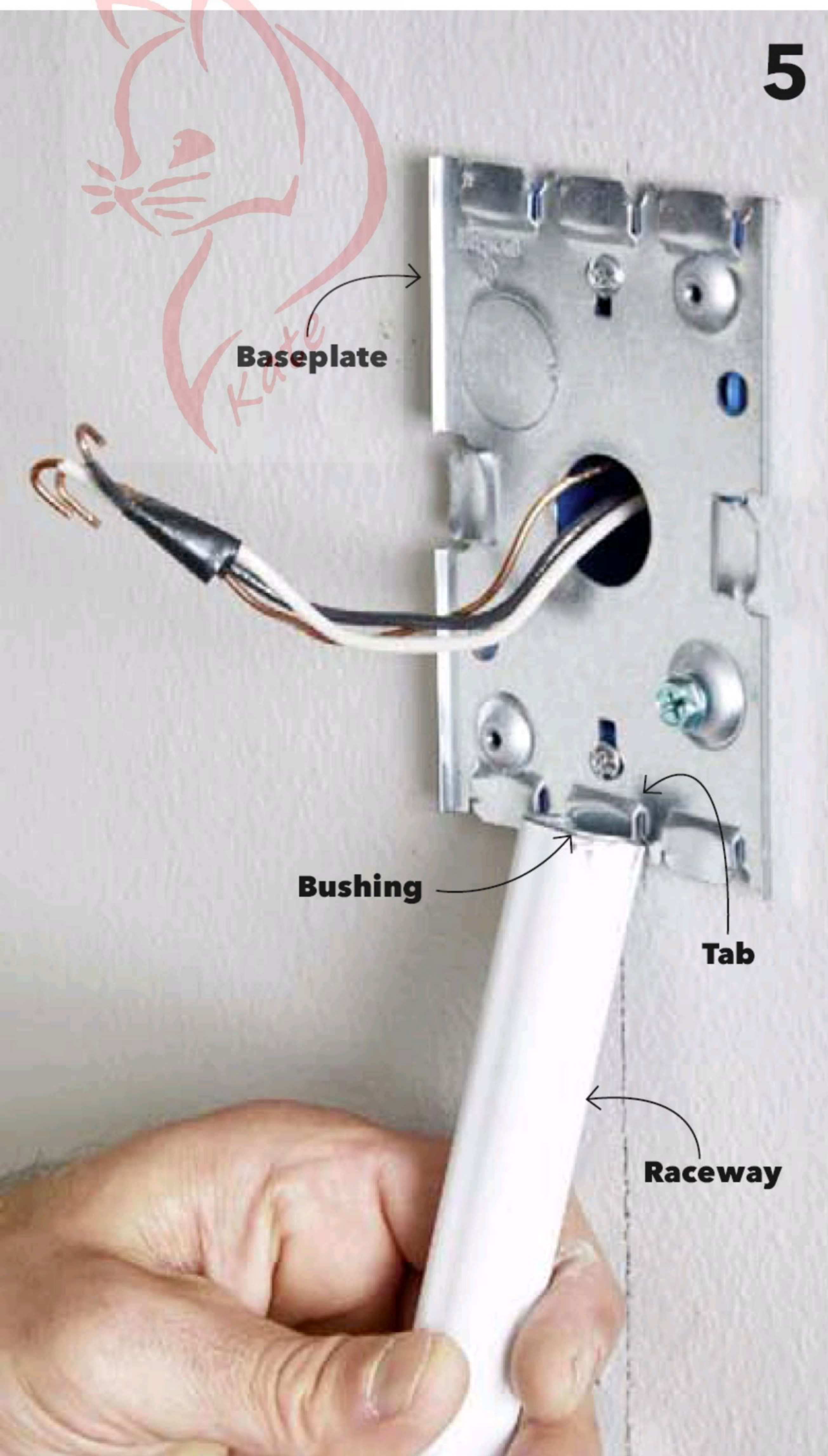
Cut the raceway track to length with the "show" side facing up. A reciprocating saw or jigsaw will do the job, but I use a hacksaw to avoid marring the finish. Deburr the cut ends with a metal file, then insert metal bushings (provided with the accessories pack) in both ends.

4 INSTALL THE CLIPS

You have two choices for fastening the raceway: clips that go on first and snap around the raceway base, and straps that go over the raceway and attach to the wall. I use clips because they're less visible. Either way, you need support every 32 in. For fastening clips or baseplates, I like screw-in drywall anchors rather than the anchors that come with the raceway. (E-Z Ancor is one brand.)



BEST PRO TIPS



5 CONNECT TO THE STARTER BOX

Remove the fitting temporarily installed earlier and slip it into one end of the raceway. Slide the other end of the raceway under a tab on the baseplate. Don't forget: Both ends of the raceway require bushings to protect the wires from sharp edges.

6 SNAP THE RACEWAY INTO THE CLIPS

Hand pressure is usually enough, but I sometimes persuade stubborn clips with a rubber mallet.

7 FASTEN THE SECOND FITTING

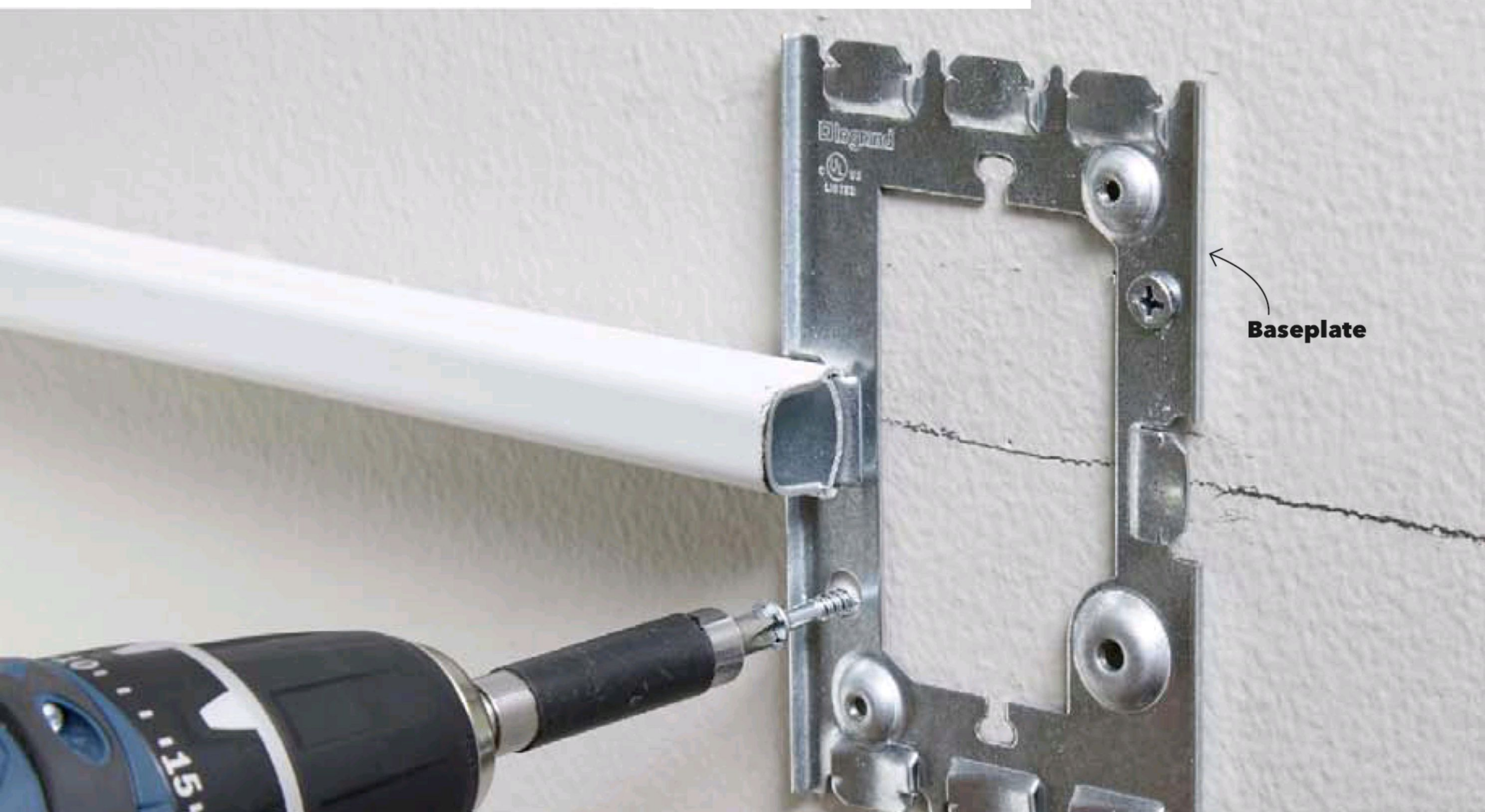
Screw the fitting or baseplate to the wall—permanently this time. Drive screws until they're snug, but don't overtighten them and strip out the drywall anchor.

8 ADD AND REPEAT

From here on, you'll just repeat the steps, building the raceway system one section at a time. When in doubt, add more outlets. Nobody ever complains about having too many.



8



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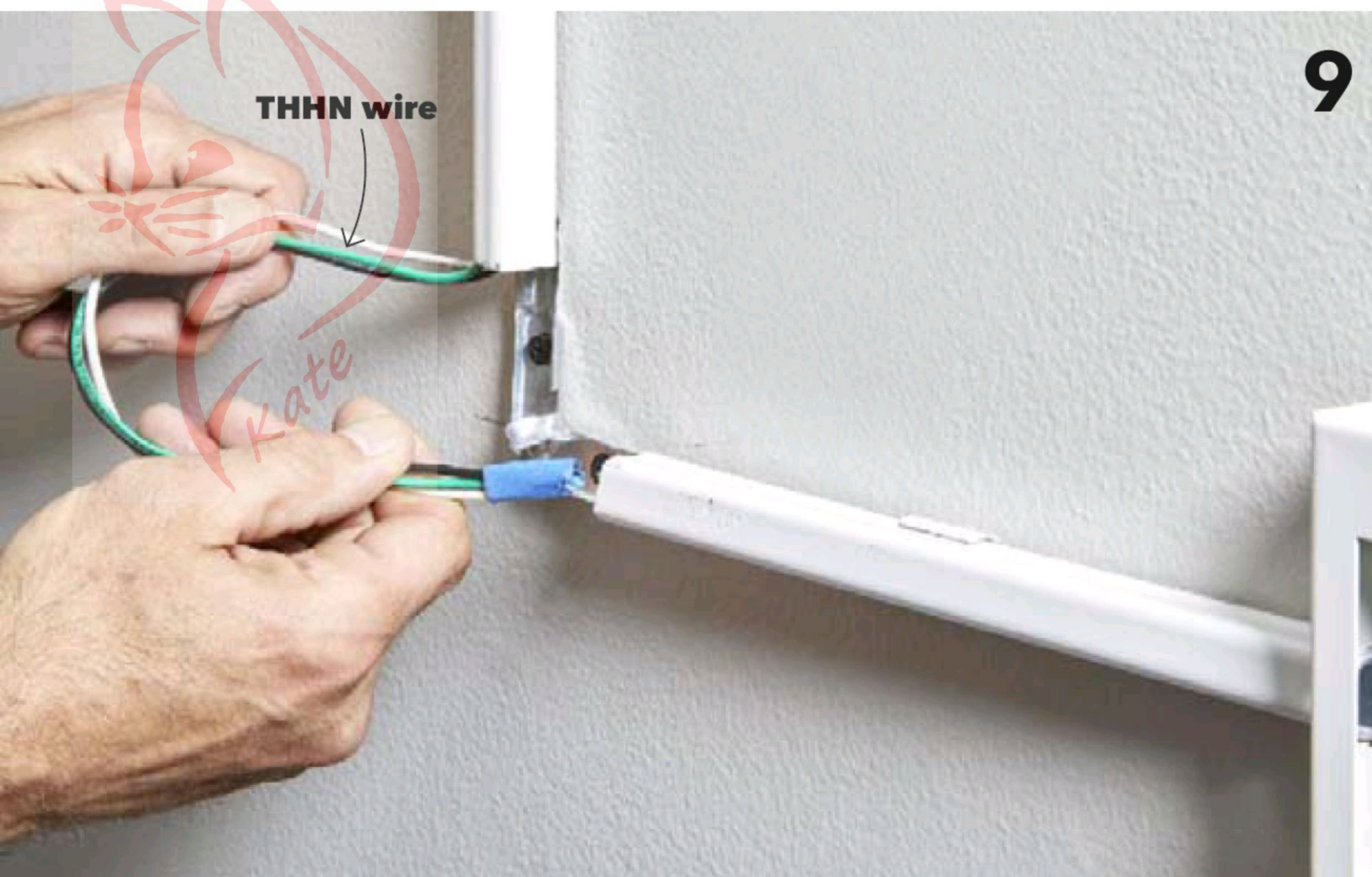
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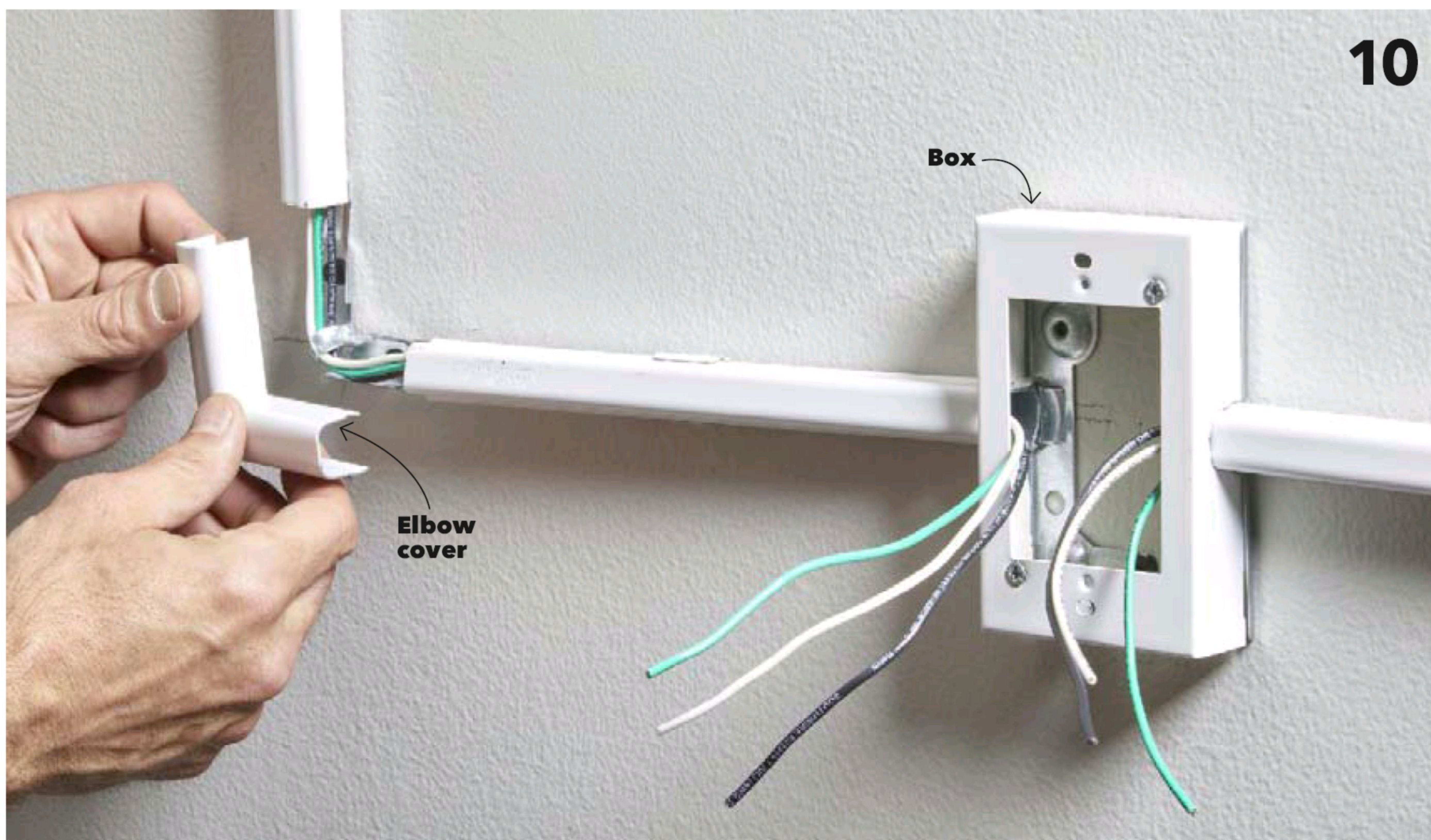
9

9 FEED IN THE WIRE

Tape the ends of the wires together and push them through the raceway. Depending on the raceway size and wire gauge, you can run 5 to 10 wires (check the instructions). Use "THHN" wire. Don't use sheathed cable (often called "Romex").

10 INSTALL BOXES AND COVERS

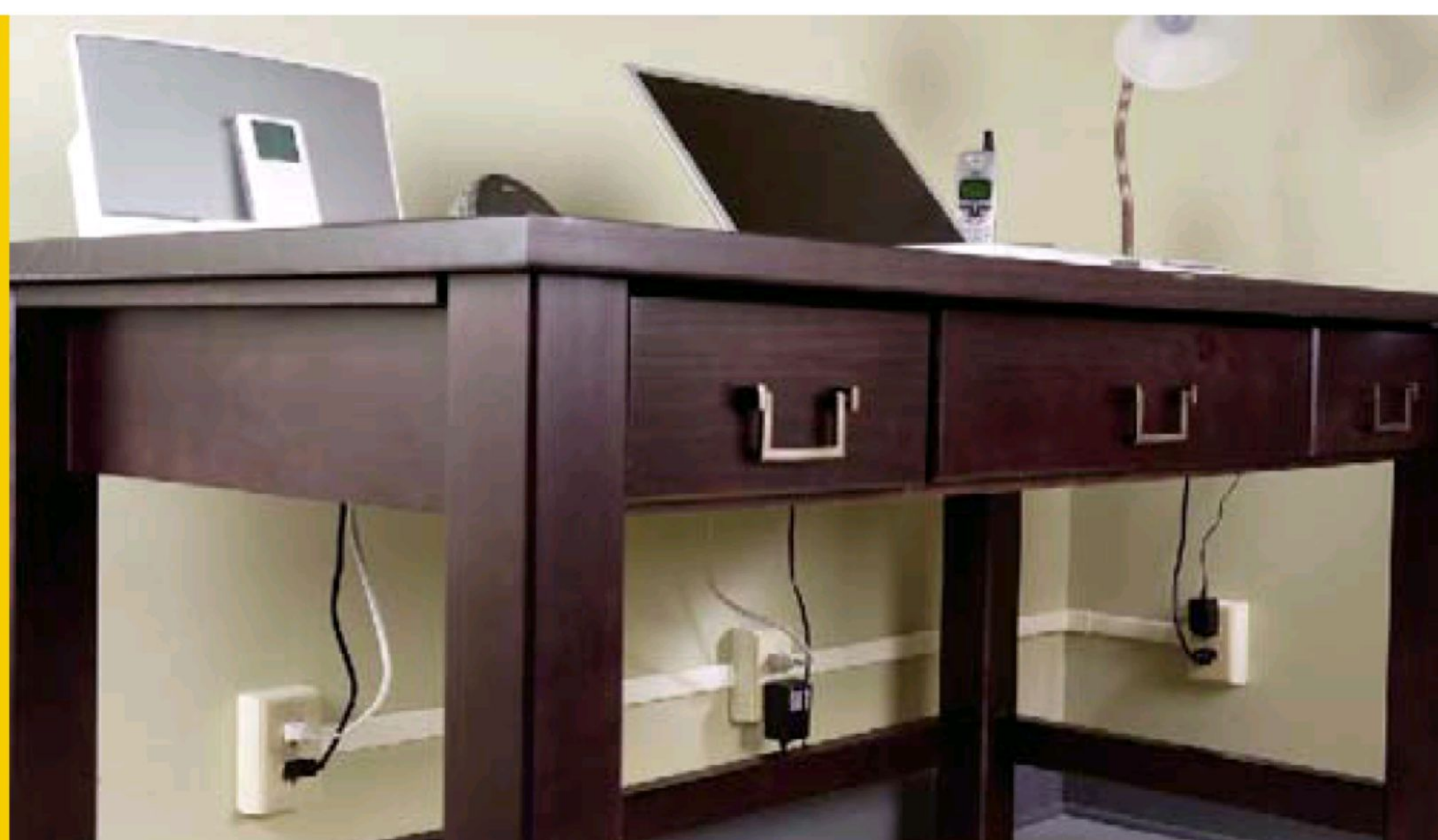
Snap fitting covers into place. Before screwing the boxes to the baseplates, you'll have to grab pliers and remove knockouts to create openings for the raceway. It's easy to make mistakes here by removing the wrong knock-outs. To get it right, hold the box in place and mark the correct locations. With the raceway system complete, you're ready to add outlets, switches and lighting.



10

Metal or Plastic?

Raceway comes in plastic and in metal. The stores in my area carry a better selection of metal parts, so I always go with metal, which is shown above. But plastic is a bit easier to work with and a good choice for smaller jobs. If you choose plastic, make sure it's rated for 120-volt wiring. Some plastic is intended only for low-voltage wiring like speaker or phone cables. To see how to install plastic raceway, search for "raceway" at familyhandyman.com.



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Work Wheels

Expert advice on repair, maintenance and gear. By Josh Risberg



Your very own dump truck for \$40

If weekend projects are your thing, think about getting your hands on this Haul-Master 1/2-Ton Truck Bed Cargo Unloader. It's ingenious even though it's nothing more than a sheet of polypropylene mesh that wraps around a shaft turned by a hand crank. Just hook it on the end of your lowered tailgate, pull the mesh sheet across

the length of the bed and load your cargo right on top.

When you're ready to unload, just spin the crank and watch your precious cargo spill right out the back; no more tiresome trips up into the bed with a shovel. If you need to spread gravel or topsoil, you could drive slowly and have a buddy dump the load as you go.

The Haul-Master Truck Bed Cargo Unloader can handle a load up to 2,000 lbs. and takes less than 10 minutes to install—no tools required. It won't work well on an antislip bed surface, and it may not fit on the thicker tailgates on some new trucks. You can pick up the Haul-Master for \$40 at Harbor Freight, or find out more at harborfreight.com.

TWO-DOLLAR, TWO-MINUTE THEFT PREVENTION

Truck tailgates are easy to remove and can cost thousands, making them a target for thieves. Prevent theft, or at least slow it down, with a stainless-steel hose clamp. Simply wrap the hose clamp around the open-sided tailgate hanger bracket, the one usually found on the passenger side. Get the clamp snug with a screwdriver, slide the fastening nut as far forward as you can, and then finish tightening with a small wrench.



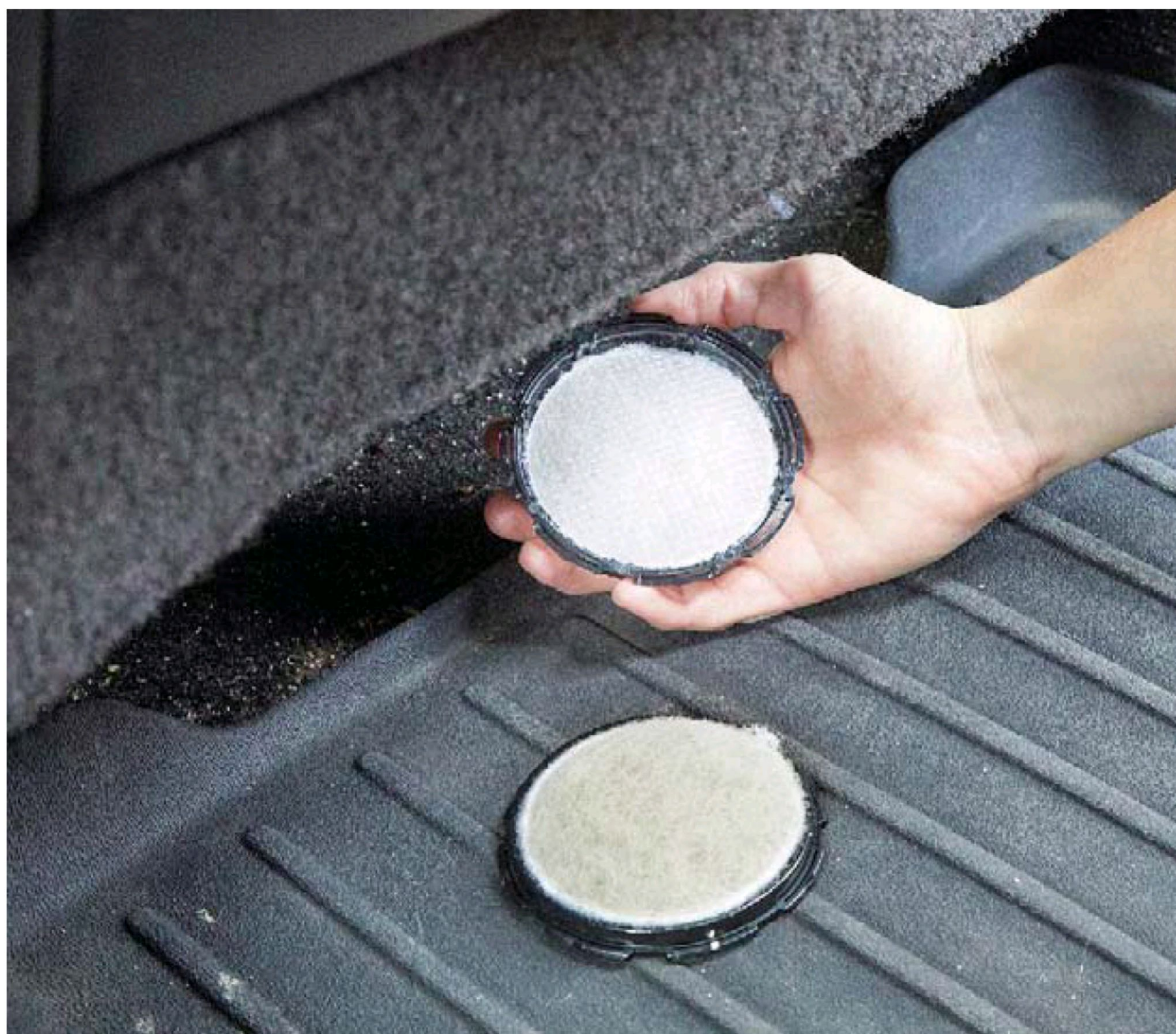
Make trailer wiring last

Get more miles from your trailer wiring harness by occasionally dabbing dielectric grease onto the male parts of the connectors. The grease will help prevent corrosion and oxidation. Make sure to use a nonconductive, silicone-based formula sometimes called tune-up grease. The one shown here costs less than \$10 online.

Replace seat filters

Most air-conditioned seats are just seats covered in a perforated fabric with a fan strapped underneath to circulate cool cabin air up onto your backside.

If your seats aren't keeping you as cool as they used to, check to see whether the seat filter is dirty. To replace it, you can usually just turn the filter to unlock it. Installing the new one works the same way. Filters are available for about \$15 online or from your local dealer.



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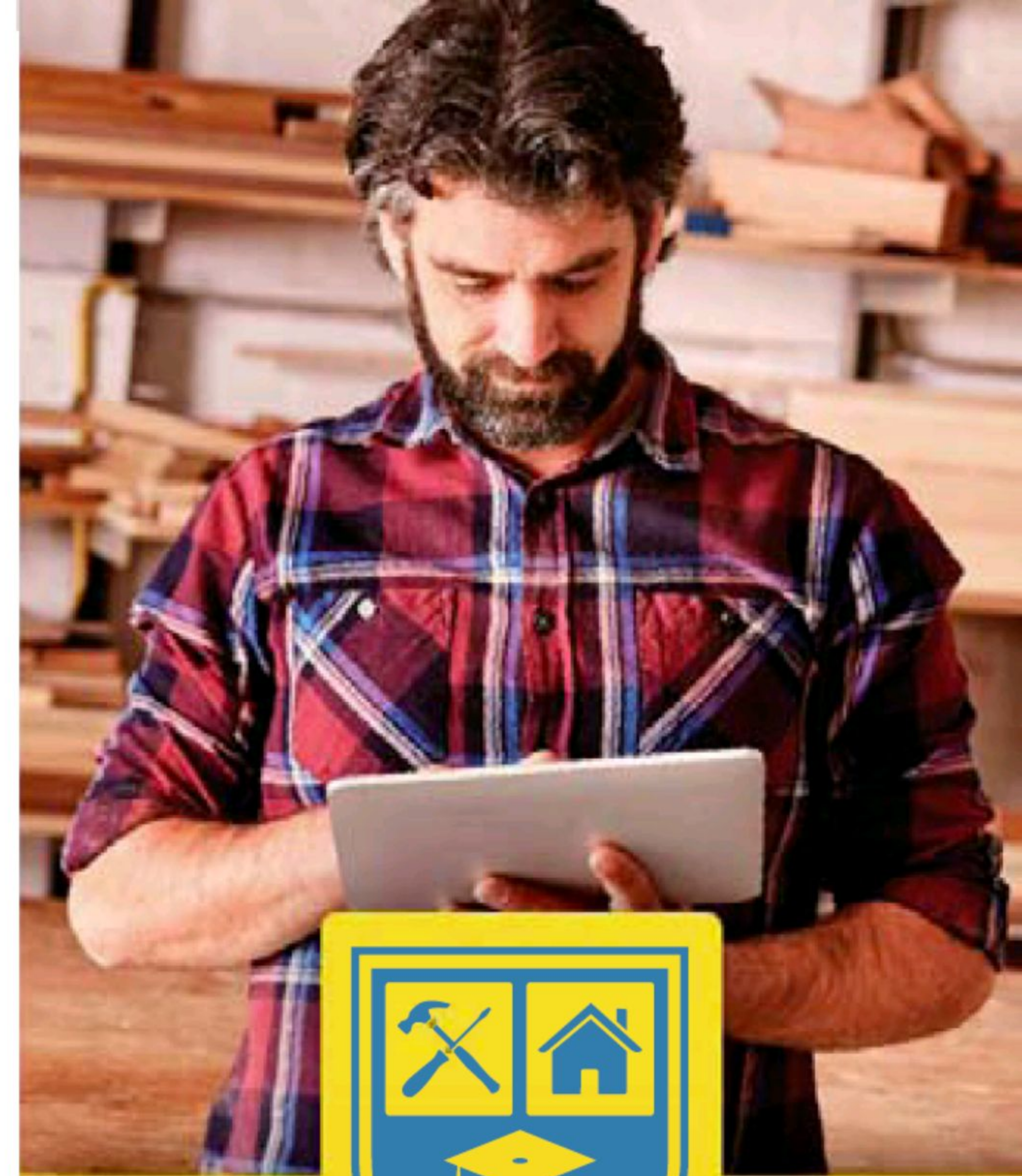
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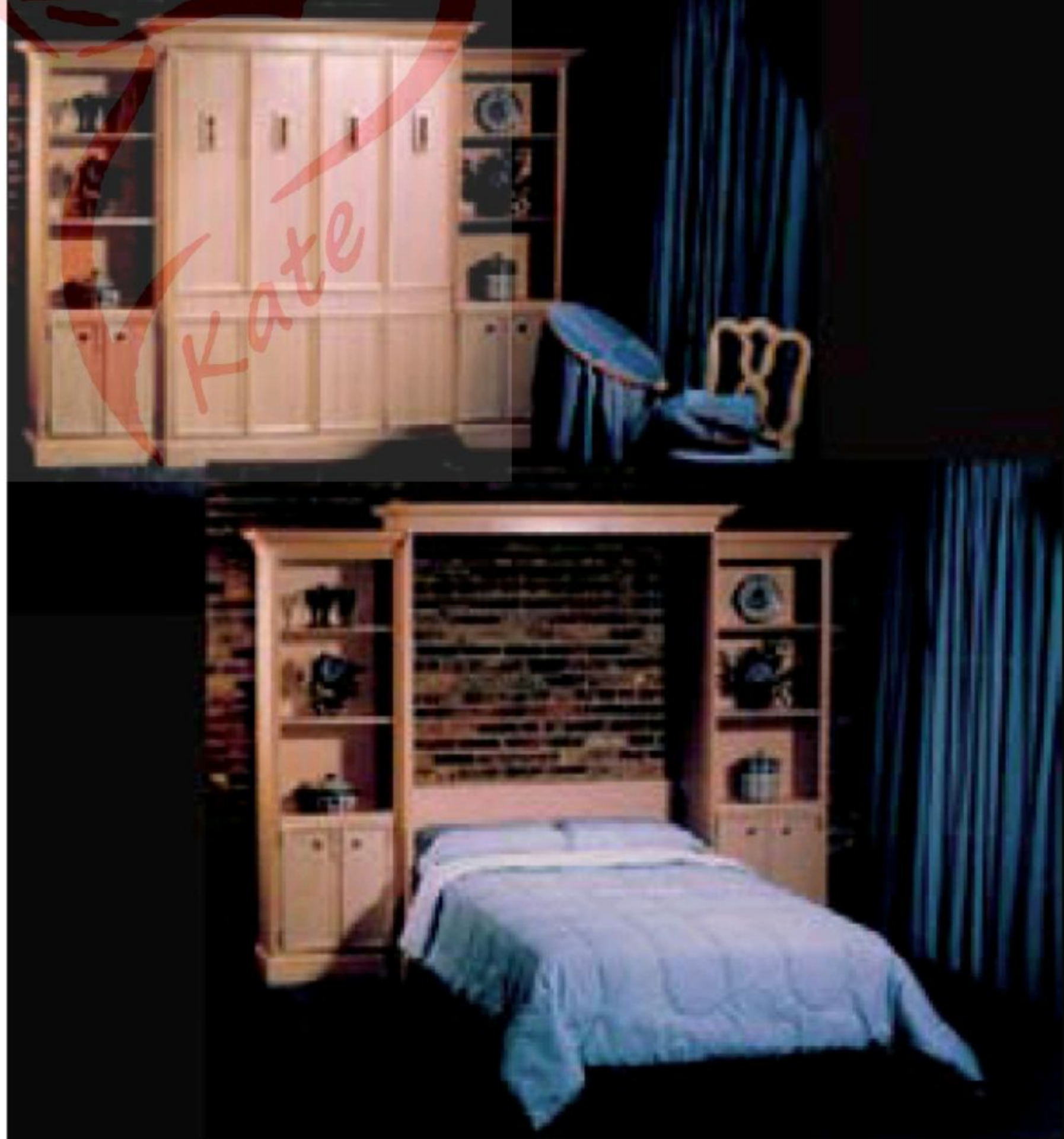
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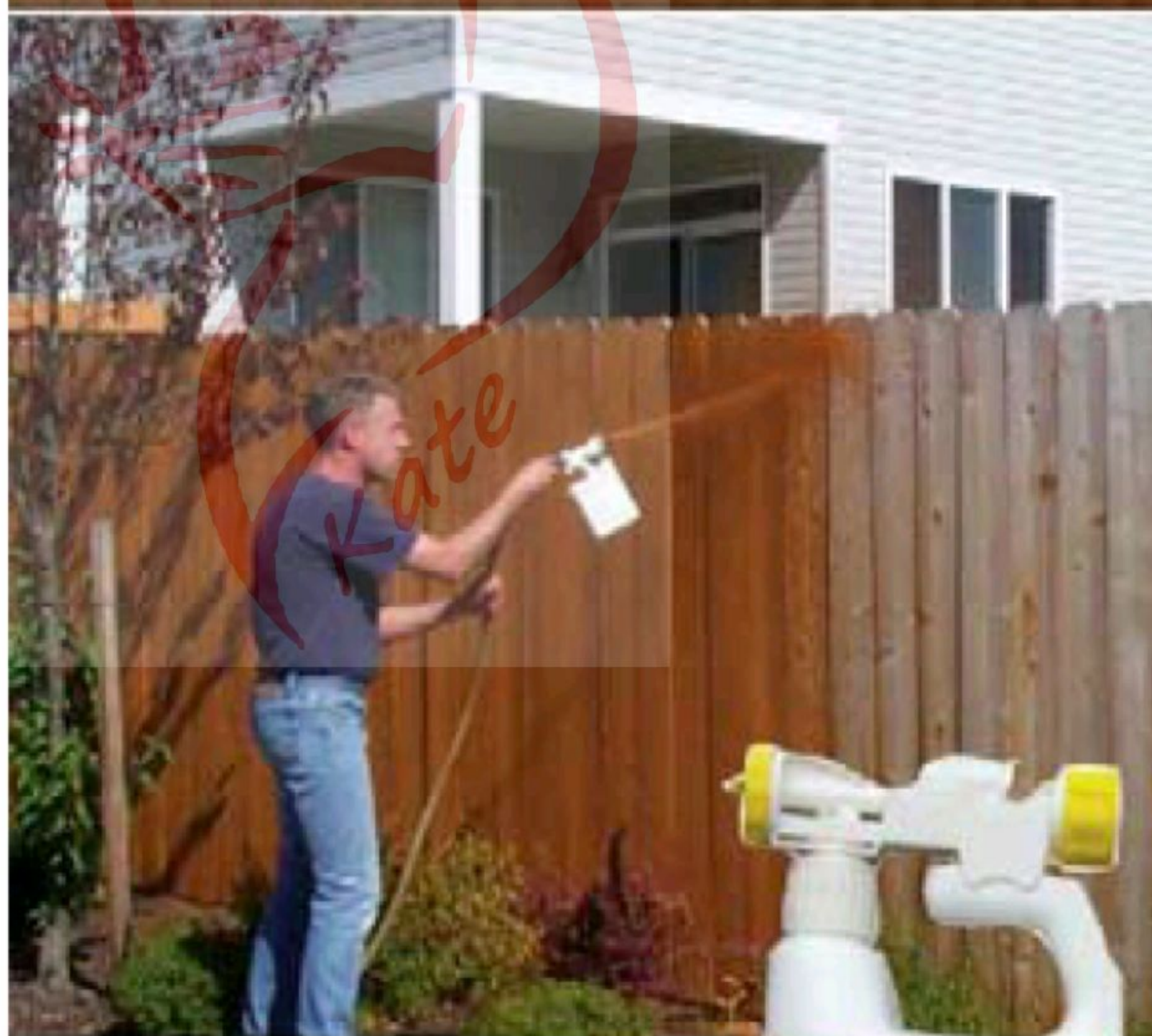
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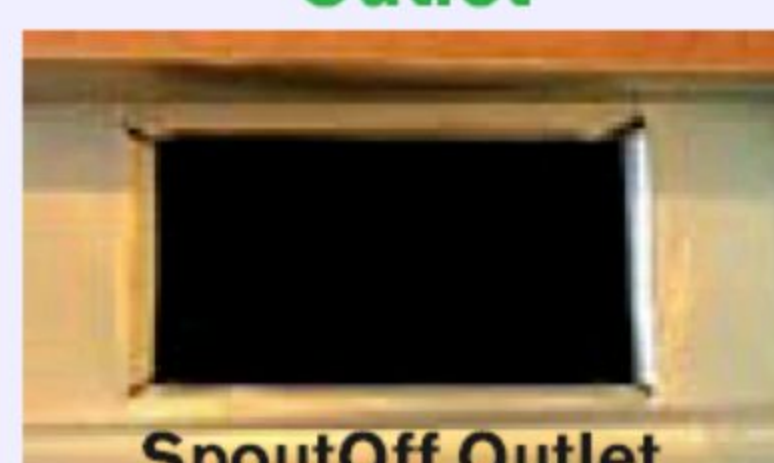
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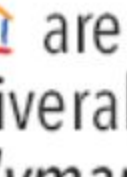
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*"This is truly a miracle... I don't even know
how to begin thanking you for giving me my life back!"*

— Sherri H., Granville, NY

**How can a hearing aid that
costs only \$199⁹⁹** be every bit as
good as one that sells for \$2,400 or more?

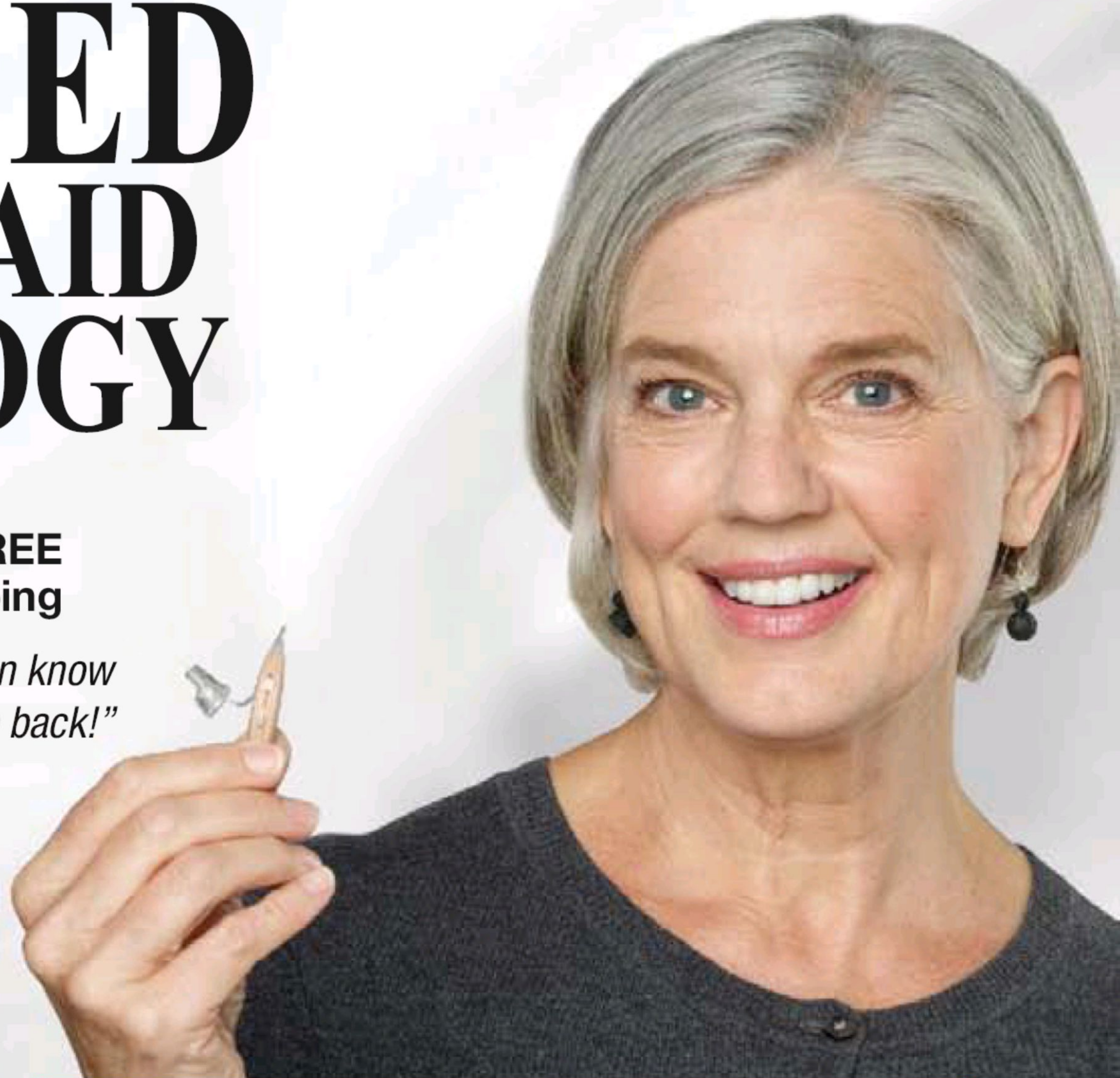
The answer: Although tremendous strides
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Technology, those cost reductions have
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MDHearingAid® uses the same
kind of Advanced Hearing Aid Technology
incorporated into hearing aids that cost
thousands more at a small fraction
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Over 350,000 satisfied **MDHearingAid**
customers agree: High-quality,
FDA-registered hearing aids don't
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for a hearing aid. **MDHearingAid**
is a medical-grade hearing aid
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of the box with no time-consuming
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company provides such extensive
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DOCTOR DESIGNED | AUDIOLOGIST TESTED | FDA REGISTERED



Can a Hearing Aid Delay or Prevent Alzheimer's and Dementia?

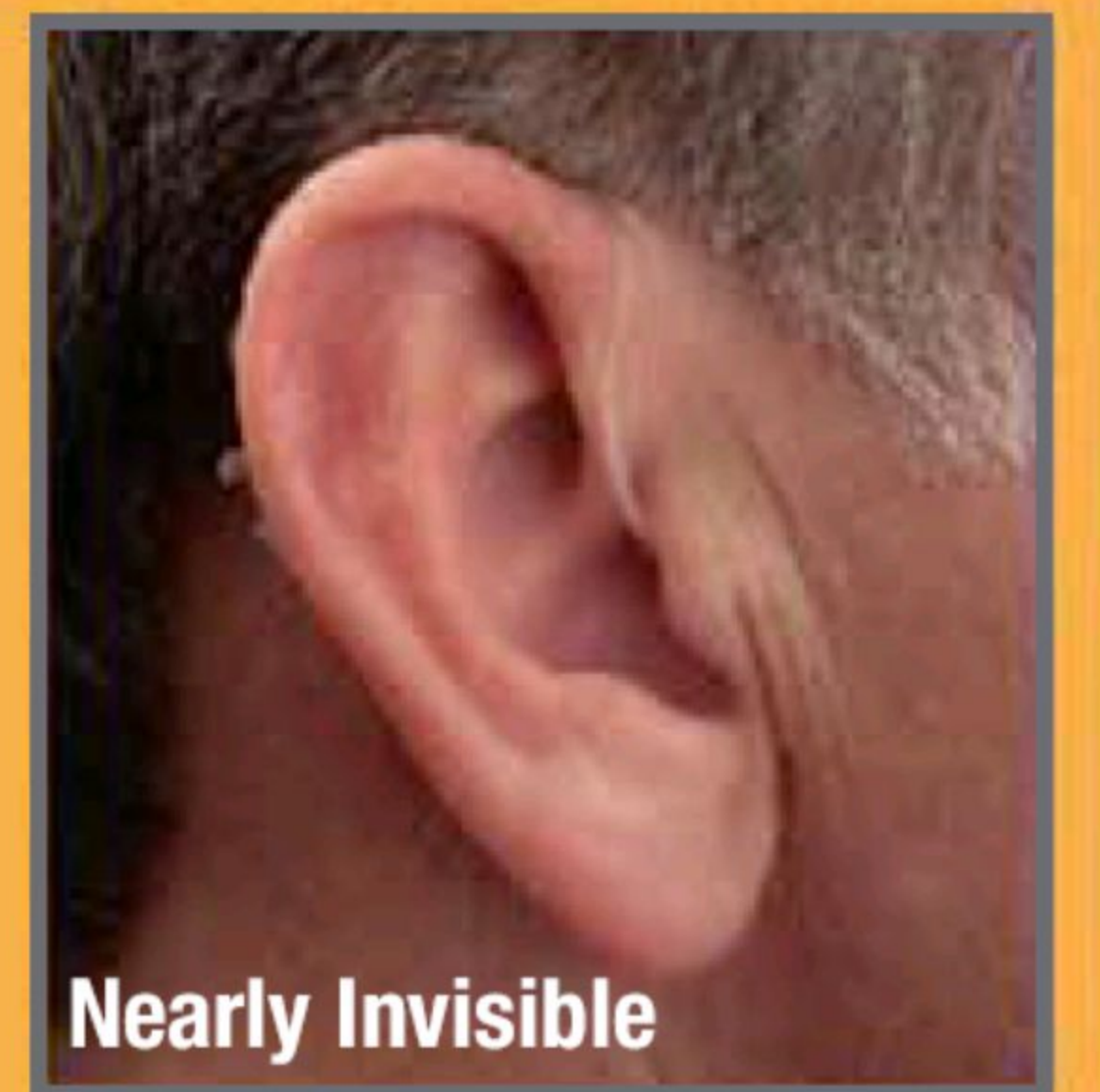
A study by the National Institute on Aging suggests older individuals with hearing loss are significantly more likely to develop Alzheimer's and dementia over time than those who retain their hearing. They suggest that an intervention — such as a hearing aid — could delay or prevent this by improving hearing!

TAKE ADVANTAGE OF OUR 45-DAY RISK-FREE TRIAL!

Hearing is believing and we invite you to try
this nearly invisible hearing aid with no
annoying whistling or background noise for
yourself. If you are not completely satisfied
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OUT OF THE BOX!

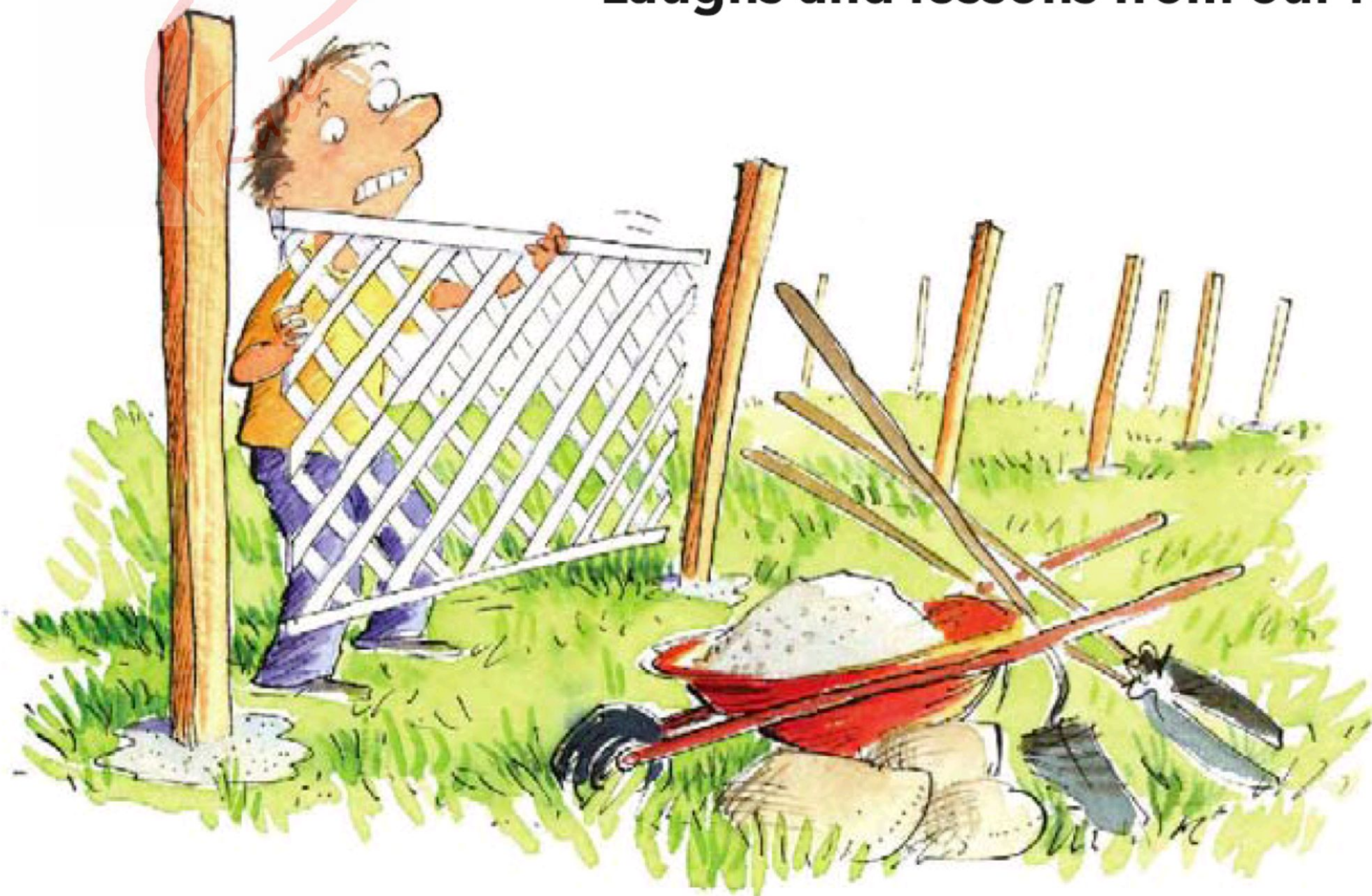
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Laughs and lessons from our readers



MEASURE ONCE, DIG TWICE

When I retired, I moved into a new home with a large yard. My previous home had a 6-ft. privacy fence around the backyard, and I wanted one at my new home too. Since I had more time than money, I decided to do the work myself.

I carefully measured the distance for each post, and then manually dug all 38 postholes. Then I set all the posts perfectly plumb and added the concrete. The next day, I began to install the first fence section, and oh, did my heart sink. That's when I realized my math was off. I had set the posts 8 ft. apart for the 8-ft. fence sections. But they were supposed to be 7-1/2 ft. apart so the sections would fit inside the posts. I spent the next three weeks digging up and moving the posts. Let's hope the rest of my retirement goes a lot smoother!

JOHN A. GERKIN

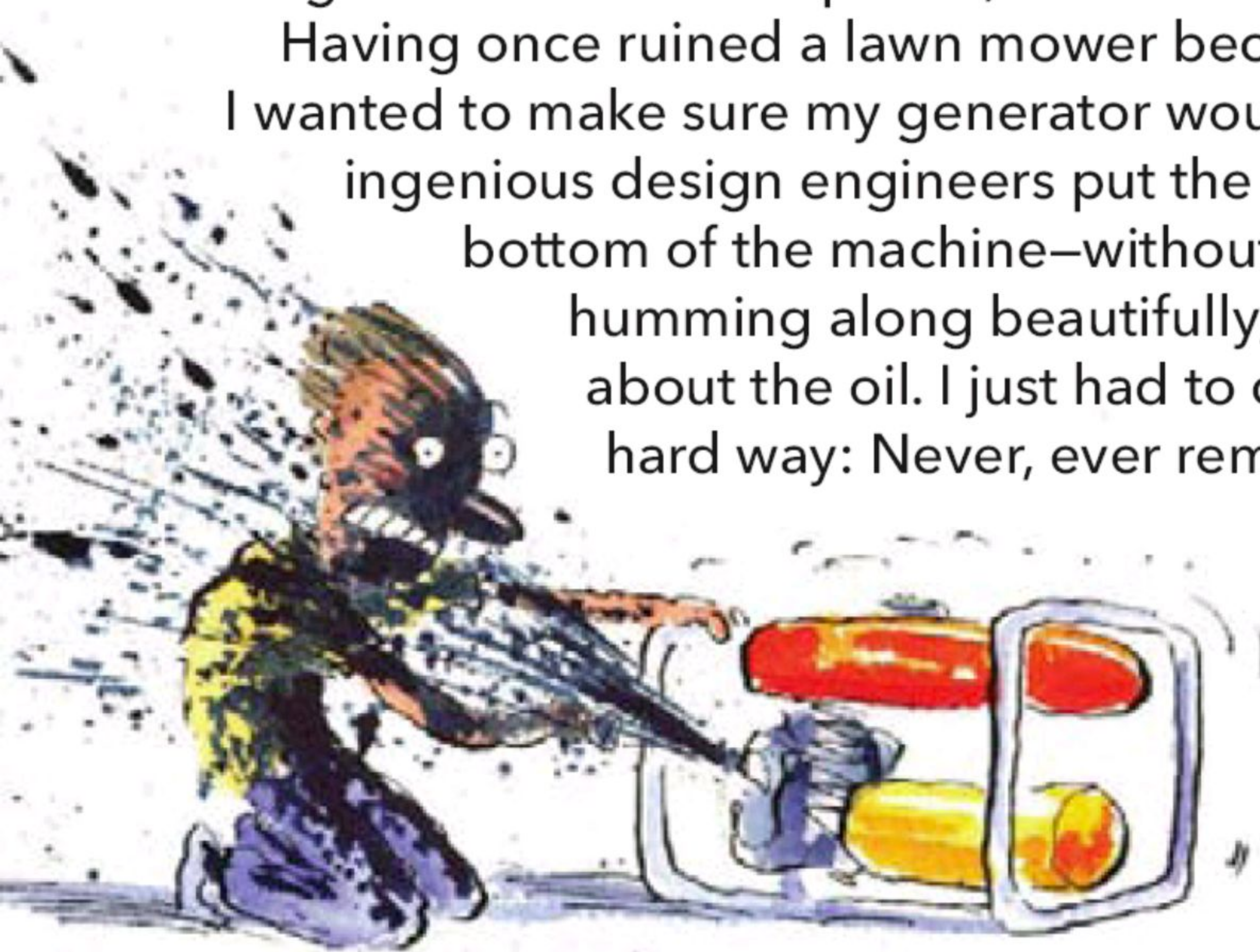
I'VE STRUCK OIL!

I moved to a rural area where power outages are common, so I bought a portable generator. When I woke up one morning to find my entire neighborhood without power, I started it up.

Having once ruined a lawn mower because it didn't have enough oil, I wanted to make sure my generator wouldn't suffer the same fate. The ingenious design engineers put the oil compartment at the very bottom of the machine—without a dipstick. The generator was humming along beautifully, but I couldn't stop thinking about the oil. I just had to check it. Here's what I learned the hard way: Never, ever remove the oil cap while the machine

is running. It's amazing how fast and how far oil can shoot out of an engine. I was covered from head to toe with dripping oil. I guess the generator was full of oil after all.

GRACE W. GLOWACKI



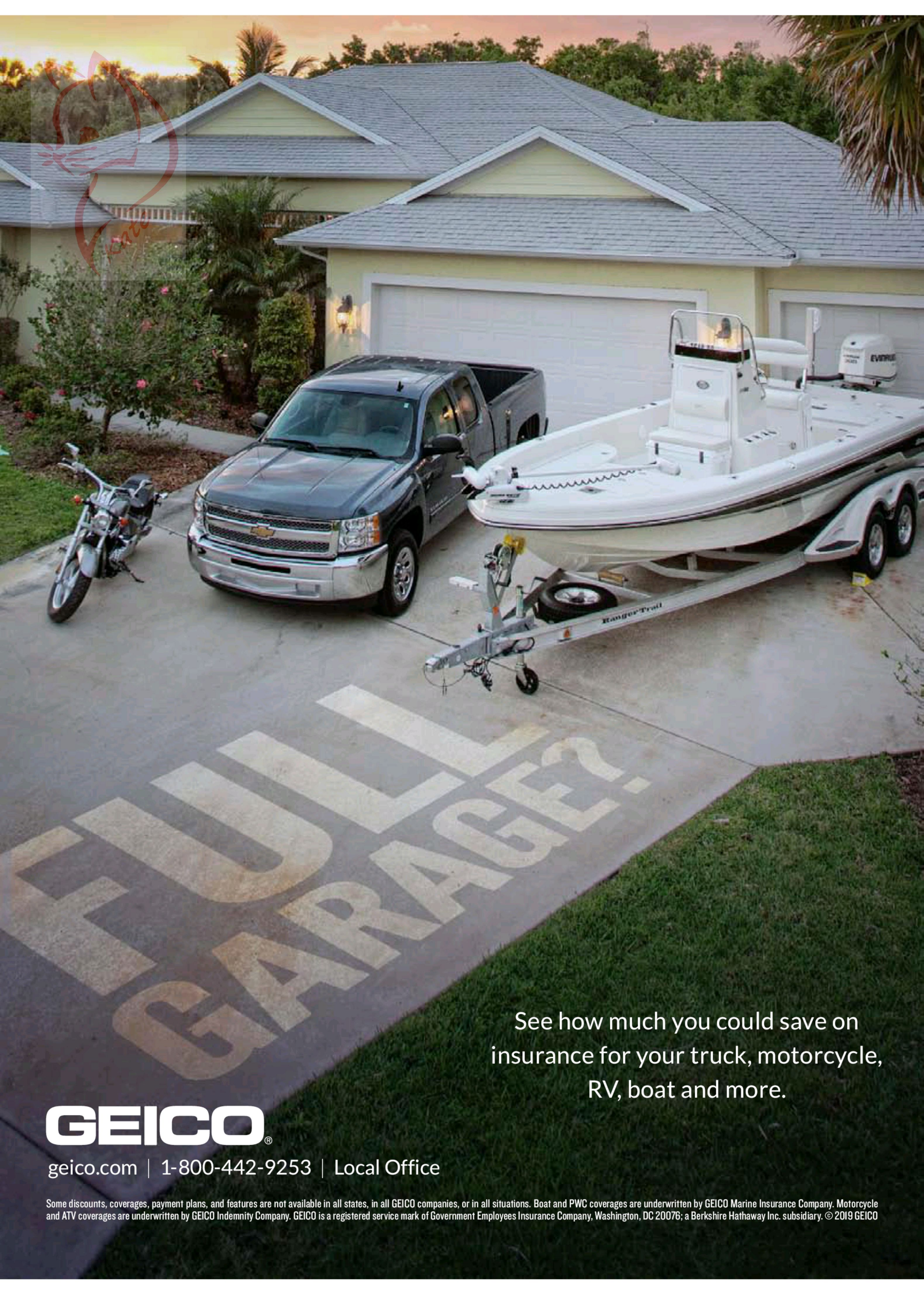
KNOW WHEN TO PULL THE PLUG

When my garbage disposal went on the fritz, I purchased and installed a new disposal that same day. I turned on the disposal and everything worked perfectly. Feeling proud of myself for conquering a problem without hiring a pro, I did a little victory dance in front of the sink.

That night, my dishwasher quit mid-wash and wouldn't drain. Since this problem was out of my comfort zone, I called for help. When the service technician showed up and looked under the sink, he asked who had installed the disposal. I hung my head and mumbled an expletive, then explained that I'd followed the easy installation directions.

"Yeah, but the directions don't mention that you're supposed to remove the factory plug from the drain line that runs to the dishwasher," he said. Sure enough, he unhooked the drain line, popped out the plug and solved the problem. My oversight wasn't a total bust—the technician showed me how to tune up and clean the dishwasher.

MARK BLAIR



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