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SMART HOME IMPROVEMENT[®]

VINTAGE

CAMPER REVIVAL

MODERN UPGRADES MAKE
IT BETTER THAN NEW



**GARDEN
TOOLSHED**
BUILD IT IN
A WEEKEND

**EASY
LAWN CARE**
HOW TO FIX
DEAD SPOTS
P. 68

SMOOTH WALLS
PRO RESULTS WITH
BEGINNER SKILLS

JULY/AUG 2020



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3 THINGS

I learned this month

Nuggets of knowledge picked up on the job

GARY WENTZ

EDITOR-IN-CHIEF



The key camper question

Our camper rehab is complete! And we're thrilled with the results. Step 1 in the project was getting advice from RV experts, who all stressed this: Before buying an old camper, check the subfloor for soft spots. Rotten plywood subfloors are common, and replacement is a huge task—everything inside has to be removed before you can get at the floor. Luckily for us, the subfloor was in great shape.

**Our
camper
project
begins
on p. 24.**



**He saved
\$4 on caulk.
What a deal!**

Expensive caulk is a bargain

I recently looked at a house that had water damage in a dozen spots—the subfloor near the shower, countertops, siding ... I found the source of the problem in the basement: an empty carton of cheap caulk. It had likely cost \$1 per tube but failed within a few years. A carton (12 tubes) of high-quality caulk would have cost an extra 50 bucks and prevented about \$3,000 of water damage. I guess I don't have to explain the moral of this story.

Goodbye, can lights

More than a year ago, senior editor Brad Holden told us about low-profile recessed lights. They look like traditional recessed lights but don't require a metal "can" inside the ceiling, which makes them super easy to install and more versatile. I finally got around to installing some and I'll never buy another can light.

To see Brad's complete how-to article, search for "low profile LED" at familyhandyman.com.



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FEATURES

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Vintage Camper Revival

See how we transform a drab 1972 camper into a gotta-have-it showpiece.

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Portable Prep Center

Need a kitchen at the campsite or by your grill? This fold-up one even has running water!

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Outdoor Handrail

We'll show you how to install a custom iron railing so you can step up safely—and in style.

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Garden Tool Cabinet

This slim shed can store your rakes and shovels next to your lawn.

The risk information provided here is not comprehensive. To learn more, talk about IMBRUVICA® with your healthcare provider or pharmacist. For more information, call 1-877-877-3536 or go to www.imbruvica.com.

What is IMBRUVICA®?

IMBRUVICA® is a prescription medicine used to treat adults with:

- Mantle cell lymphoma (MCL) who have received at least one prior treatment
- Chronic lymphocytic leukemia (CLL)/Small lymphocytic lymphoma (SLL)
- Chronic lymphocytic leukemia (CLL)/Small lymphocytic lymphoma (SLL) with 17p deletion
- Waldenström's macroglobulinemia (WM)
- Marginal zone lymphoma (MZL) who require a medicine by mouth or injection (systemic therapy) and have received a certain type of prior treatment
- Chronic graft versus host disease (cGVHD) after failure of 1 or more lines of systemic therapy

It is not known if IMBRUVICA® is safe and effective in children.

What should I tell my doctor before taking IMBRUVICA®?

Before taking IMBRUVICA®, tell your healthcare provider about all of your medical conditions, including if you:

- have had recent surgery or plan to have surgery. Your healthcare provider may stop IMBRUVICA® for any planned medical, surgical, or dental procedure.
- have bleeding problems
- have or had heart rhythm problems, smoke, or have a medical condition that increases your risk of heart disease, such as high blood pressure, high cholesterol, or diabetes
- have an infection
- have liver problems
- are pregnant or plan to become pregnant. IMBRUVICA® can harm your unborn baby. If you are able to become pregnant, your healthcare provider will do a pregnancy test before starting treatment with IMBRUVICA®. Tell your healthcare provider if you are pregnant or think you may be pregnant during treatment with IMBRUVICA®.
 - **Females** who are able to become pregnant should use effective birth control (contraception) during treatment with IMBRUVICA® and for 1 month after the last dose.
 - **Males** with female partners who are able to become pregnant should use effective birth control, such as condoms, during treatment with IMBRUVICA® and for 1 month after the last dose.
- are breastfeeding or plan to breastfeed. Do not breastfeed during treatment with IMBRUVICA® and for 1 week after the last dose.

Tell your healthcare provider about all the medicines you take, including prescription and over-the-counter medicines, vitamins, and herbal supplements. Taking IMBRUVICA® with certain other medicines may affect how IMBRUVICA® works and can cause side effects.

What should I avoid while taking IMBRUVICA®?

Do not drink grapefruit juice, eat grapefruit, or eat Seville oranges (often used in marmalades) during treatment with IMBRUVICA®. These products may increase the amount of IMBRUVICA® in your blood.

What are the possible side effects of IMBRUVICA®?

IMBRUVICA® may cause serious side effects, including:

- **Bleeding problems (hemorrhage) are common** during treatment with IMBRUVICA®, and can also be serious and may lead to death. Your risk of bleeding may increase if you are also taking a blood thinner medicine. Tell your healthcare provider if you have any signs of bleeding, including:
 - blood in your stools or black stools (looks like tar)
 - pink or brown urine
 - unexpected bleeding, or bleeding that is severe or that you cannot control
 - vomit blood or vomit looks like coffee grounds
 - cough up blood or blood clots
 - increased bruising
 - dizziness
 - weakness
 - confusion
 - change in your speech
 - headache that lasts a long time or severe headache
- **Infections** can happen during treatment with IMBRUVICA®. These infections can be serious and may lead to death. Tell your healthcare provider right away if you have fever, chills, weakness, confusion, or other signs or symptoms of an infection during treatment with IMBRUVICA®.

- **Decrease in blood cell counts.** Decreased blood counts (white blood cells, platelets, and red blood cells) are common with IMBRUVICA®, but can also be severe. Your healthcare provider should do monthly blood tests to check your blood counts.
- **Heart rhythm problems (ventricular arrhythmias, atrial fibrillation and atrial flutter).** Serious heart rhythm problems and death have happened in people treated with IMBRUVICA®, especially in people who have an increased risk for heart disease, have an infection, or who have had heart rhythm problems in the past. Tell your healthcare provider if you get any symptoms of heart rhythm problems, such as feeling as if your heart is beating fast and irregular, lightheadedness, dizziness, shortness of breath, chest discomfort, or you faint. If you develop any of these symptoms, your healthcare provider may do a test to check your heart (ECG) and may change your IMBRUVICA® dose.
- **High blood pressure (hypertension).** New or worsening high blood pressure has happened in people treated with IMBRUVICA®. Your healthcare provider may start you on blood pressure medicine or change current medicines to treat your blood pressure.
- **Second primary cancers.** New cancers have happened during treatment with IMBRUVICA®, including cancers of the skin or other organs.
- **Tumor lysis syndrome (TLS).** TLS is caused by the fast breakdown of cancer cells. TLS can cause kidney failure and the need for dialysis treatment, abnormal heart rhythm, seizure, and sometimes death. Your healthcare provider may do blood tests to check you for TLS.

The most common side effects of IMBRUVICA® in adults with B-cell malignancies (MCL, CLL/SLL, WM and MZL) include:

- diarrhea
- tiredness
- muscle and bone pain
- rash
- bruising

The most common side effects of IMBRUVICA® in adults with cGVHD include:

- tiredness
- bruising
- diarrhea
- mouth sores (stomatitis)
- muscle spasms
- nausea
- pneumonia

Diarrhea is a common side effect in people who take IMBRUVICA®. Drink plenty of fluids during treatment with IMBRUVICA® to help reduce your risk of losing too much fluid (dehydration) due to diarrhea. Tell your healthcare provider if you have diarrhea that does not go away.

These are not all the possible side effects of IMBRUVICA®.

Call your doctor for medical advice about side effects. You may report side effects to FDA at 1-800-FDA-1088.

What are the ingredients in IMBRUVICA®?

Active ingredient: ibrutinib

Inactive ingredients:

IMBRUVICA® capsules: croscarmellose sodium, magnesium stearate, microcrystalline cellulose, and sodium lauryl sulfate. The 70 mg capsule shell contains gelatin, titanium dioxide, yellow iron oxide, and black ink. The 140 mg capsule shell contains gelatin, titanium dioxide, and black ink.

IMBRUVICA® tablets: colloidal silicon dioxide, croscarmellose sodium, lactose monohydrate, magnesium stearate, microcrystalline cellulose, povidone, and sodium lauryl sulfate. The film coating for each tablet contains ferrousferic oxide (140 mg, 280 mg, and 420 mg tablets), polyvinyl alcohol, polyethylene glycol, red iron oxide (280 mg and 560 mg tablets), talc, titanium dioxide, and yellow iron oxide (140 mg, 420 mg, and 560 mg tablets).

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DEPARTMENTS

9 Stuff We Love

A worm-drive miter saw, work wear for women, and a wood pellet grill—with Wi-Fi!

14 Handy Hints®

Wine-bottle plant sitter, a movable bike rack, and a better way to clean cast iron.

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A sump pump failure could spell disaster if you're not home when it goes out. This smart outlet will alert you!

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80 Great Goofs®

A spotty way to kill weeds and a speedy way to unload lumber.





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SUMMER PROJECTS

On our website, you'll find our collection of essential summer projects. From keeping your house cool to building the perfect patio to setting up the ideal outdoor kitchen for entertaining with friends, *Family Handyman* has you covered.

To see the collection, scan this code with your smartphone:



OUTDOOR COOKING

This summer, you can find all kinds of new ways to enjoy outdoor cooking at familyhandyman.com, from smoker techniques to the best temperature controllers to the latest accessories for your charcoal grill.



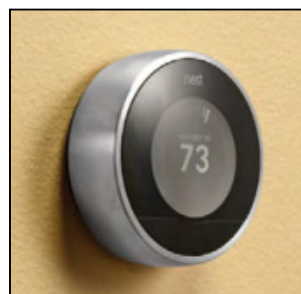
WHAT HAVE THE FH EDITORS BEEN UP TO?

Like you, the editors here at *Family Handyman* have found ourselves with free time lately. See what we've all been working on around the house at familyhandyman.com/diy-advice/projects.



BRAND NEW BOOK!

Claim your FREE preview now at familyhandyman.com/FAMILY20. Inside, you'll find tons of brilliant tips that save time, trouble and money, plus complete, detailed plans and step-by-step photos for our favorite projects.



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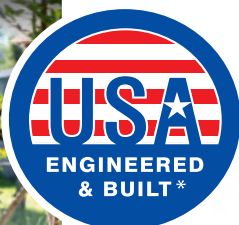
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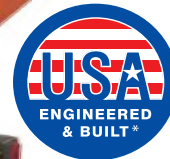


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Gear-driven for big power

When you think of worm-drive saws, you might picture the big rear-handle SkilSaw model that framers use. Indeed, that's what comes to mind for most, but SkilSaw has taken the power of worm drive and applied it to a miter saw. The SkilSaw 12-in. miter saw definitely makes a carpenter's day easier, especially when it comes to cutting the green-treated lumber or engineered beams that slow down other saws.

I recently cut miles of green lumber with the SkilSaw miter saw; it cut all day long with ease. And it's 5 to 10 lbs. lighter than other top 12-in. saws. The trade-off for all the extra power is a little maintenance in the form of checking and changing gear oil. You can find the SkilSaw miter saw for about \$600 online and at home centers.

MIKE BERNER, ASSOCIATE EDITOR



WORK WEAR FOR WOMEN

Women who are hard-pressed to find good work clothing need to check out Dovetail Workwear, a company founded by women. The Freshley Overall shown is a retool of classic bibs to fit and move on a woman's body. It includes great comfort features like flexible suspenders, fronts that are reinforced up to the thigh, and gusseted crotch panels that allow for unlimited movement.

The 13 functional pockets include a four-pocket bib, a locker loop for quick hanging, a hammer loop and easy-insert access for kneepads. Check out Dovetail Workwear and pick up these comfortable, rugged overalls online for \$130.

ANDREA SORENSEN
GRAPHIC DESIGNER



High-speed primer

I retrimmed my house last year, and like all my other home projects, it was a rush job. To speed up the prepainting, I primed with Zinsser BIN. It's a shellac-based primer that can be tinted to any color and has excellent adhesion. But what made it so helpful was that it dried extremely fast and was easy to sand. I'd lay 10 sticks on horses and coat one stick at a time, and when I was finished with all 10, I could start on the second coat right away. There are two downsides: It's expensive, \$45 a gallon, and there is a learning curve because of the fast drying time.

MIKE BERNER, ASSOCIATE EDITOR



Green light indicates there's no leak

SIMPLE GAS DETECTOR

I recently rearranged my laundry room and in the process needed to disconnect the gas line to my dryer. I didn't think twice about it—I've done this sort of thing a million times. But later, when I was shopping, I saw this HOME-FLEX electronic gas leak detector. I decided to buy it to check my work.

Sure enough, the connection to the dryer wasn't up to snuff. The detector picked up a leak and let me know it was significant with a series of beeps and an orange indicator light. I redid the connection and checked it again—good to go! Available at The Home Depot for \$25, the detector was worth every cent.

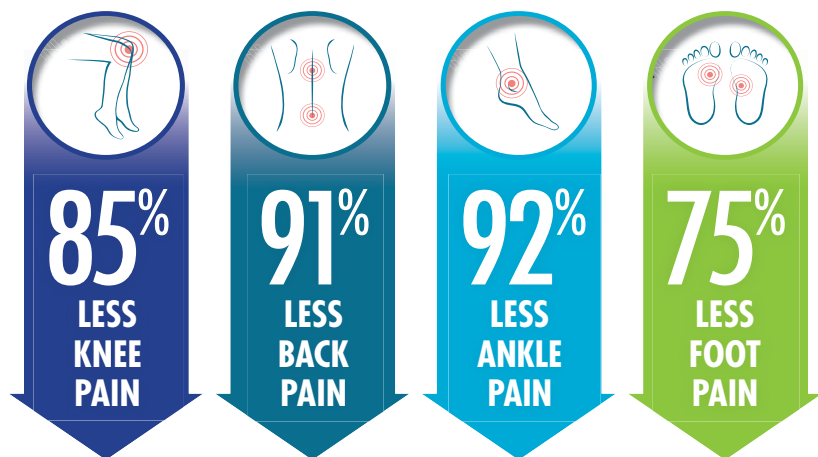
MIKE BERNER, ASSOCIATE EDITOR

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BASEBOARD HEATER MAKEOVER

If you have baseboard heat covers that are rusty or dented, here's a quick cure: EZ Snap Covers will cover the damage and update the look. The galvanized steel parts include end caps, inside and outside corners, and couplers, allowing you to cover almost any hot water baseboard radiator. You can buy kits or build your own in your choice of two finishes and two heights. A kit for a 6-ft. heater starts at less than \$190 at ezsnapcovers.com.

HARRISON KRAL, ASSISTANT EDITOR



Worn and rusty

Modern and clean!



WOOD FIRE GRILLING, MADE EASY

Enjoy grilling, smoking, baking and roasting? Well, you can do it all with a wood pellet grill. Traeger's WiFIRE grills make it easy to cook entire meals with exceptional wood fire taste—as easy as baking a frozen pizza. Once the grill reaches the temperature you select, the WiFIRE digital controller automatically maintains it by adjusting the amount of wood pellets and the speed of the fan that circulates the heat and smoke.

The Traeger smartphone app lets you relax—no more constantly checking the grill. A built-in probe (or two) sends the temperature of your food to your device and signals when it's perfectly done. The WiFIRE controller is available on the Pro Series, Ironwood and Timberline grills, which start at about \$800 at traegergrills.com.

NICK GRZECZOWIAK, CHIEF CONTENT OFFICER

Spray Anything

Do you ever wish you could turn a can of paint into an aerosol spray? Well, that's exactly what the Preval spray system does.

Fill the jar with paint, finish or just about any solution and the aerosol-powered sprayer will spray it. When you're done, cleanup is easy; just put water or solvent in the jar and spray.

One note: I found that latex paint and oil finishes spray better when thinned, so experiment by adding small amounts of water (for water-based products) or mineral spirits (for oil-based). You can get a complete kit at home centers for \$5 and a replacement sprayer for \$4.

JAY CORK
ASSOCIATE EDITOR



Replaceable power unit

Reusable reservoir

TOP: EZ SNAP COVERS; BOTTOM LEFT: TRAEGER

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Wine-Bottle Watering

To keep a plant watered while you're away for a few days, rinse an empty wine bottle and fill it with water. Before you leave, water the plant as usual. Then push the upside-down bottle into the soil, holding your thumb over the bottle's opening until it's buried. The water slowly drains from the bottle as the soil dries.

CORRINE BLANCHARD

JIFFY CHARCOAL STARTER

Run out of lighter fluid for your charcoal grill again? If you have a 2-lb. coffee can, you can make a reusable coal starter and skip the fluid altogether. Cut the bottom out first, and then pierce the sides with a can opener to make air vents.

Place the can in the barbecue and loosely crumple newspaper in the bottom one-third of the can. Fill the rest of the can with charcoal and light the newspaper through one of the vents. After the coals start to gray, lift the hot can off with tongs, leaving glowing coals behind.

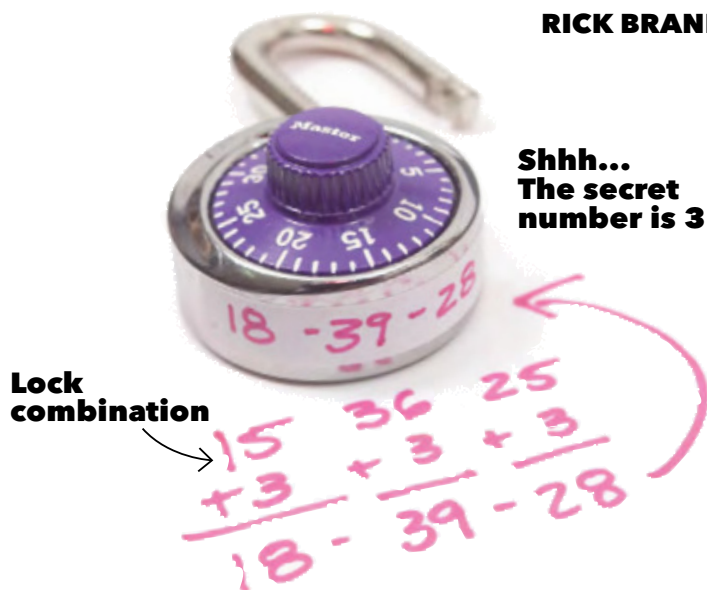
JOHN DEITHLOFF



NEVER FORGET THE COMBINATION

If you have trouble remembering your lock combination, try this: Pick a secret number and add it to each of the combination numbers. Mark the resulting higher numbers on the lock itself with a marker or rotary tool. When you need to open the lock, subtract your secret number from each number to determine the combination.

RICK BRANDAU



CUT A BOLT IN SECONDS

When you need to shorten a bolt, let your drill do the work. Put two nuts on the bolt and tighten them against each other. Then stick the bolt in a drill and hold a hack-saw against the spinning bolt. The nuts help to steady the saw blade and remove burrs when you take them off the bolt.

LAWRENCE ORJADA



Steam-Clean Your Microwave

I've found that steam is the best way to clean my microwave. But I don't use just water. Here's my special mix: Combine 2 cups of water, 2 tablespoons of vinegar, and lemon rinds in a microwave safe bowl. Microwave the mixture on high for about five minutes, and then, with the door still closed, let it sit for three minutes more. Remove the bowl and wipe down the interior with a sponge.

KARY MURPHY



RENEW A KNIFE BLADE

Utility knife blades usually dull near the tip long before the rest of the blade loses its edge. To get more mileage out of a blade, put on a pair of safety glasses and snap off the tip with a pair of pliers. Presto! You've got a new sharp tip.

CARL HINES



PROTECT SAW BLADES

Here's a quick way to protect the carbide teeth of your saw blades. Cut a length of split wire loom to length and wrap it around your blade.

SAMUEL WARD



ENLARGE TINY PRINT

The print on some containers is so small that even someone with perfect vision would have trouble reading it. Instead of searching for a magnifying glass, grab your phone and take a photo of the text. Now, you can open the photo and zoom in to make the words legible.

CESAR LOPEZ



A dab marks the top

Tired of guessing which side of a USB plug should face up when you're plugging it into the port? Put a dab of hot glue on the top face of the plug. Now you'll be able to tell the right direction without even looking.

MARK DONLEY



A BETTER WAY TO CLEAN CAST IRON

Removing baked-on food from a cast iron pan is tricky. Soap can strip away the pan's "seasoning," so what do you do? Scrunch up a piece of tinfoil and run hot water over the pan, using the foil to scour away the stuck-on food.

KIM ZHANG



SPRING-LOADED PLIERS

If you can't manipulate your pliers one-handed in tight quarters, here's what to do. Press the ends of a short length of vinyl tubing over the handles to hold them open. Squeeze to close. P.S. Take your pliers to the hardware store or home center to help you get tubing that's a perfect fit.

SHELLY JACOBSEN

MOVABLE BIKE RACK

Tired of that bike hanging in your way? Build this movable bike rack from a 2x4 and a pair of bicycle hooks. Cut four 3-1/2-in. blocks, stack them in twos and screw them together. Now screw them on the end of a 4-ft. 2x4 and repeat the process on the other end.

Drill a hole in the middle of the stacked blocks and screw in the bicycle hooks. Lay the rack across your garage ceiling joists, and hang your bike from the hooks. When you need to get behind the bike, simply slide the entire rack out of the way.

KITTY FAY



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SUPER COUPON

drillmaster ★★★★★ (2,734)

80 Piece Rotary Tool Kit

Save 69%

\$6⁹⁹

~~\$9⁹⁹~~

Compare to Professional Woodworker 51832 \$22.76

ITEM 63235 63292

97626 shown

Use Online & In-Store

40222195 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

PITTSBURGH ★★★★★ (359)

24" Clamp Edge and Saw Guide

LIFETIME WARRANTY



\$9⁹⁹

Save 85%

Compare to Bora 543030K \$70.28

ITEM 66126

Use Online & In-Store

40232466 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

drillmaster ★★★★★ (5,805)

4-1/2" Angle Grinder

\$9⁹⁹

Save 44%

Compare to Performax 2411-1 \$17.99

ITEM 69645 60625 shown

Use Online & In-Store

40233848 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

PITTSBURGH ★★★★★ (903)

4 Piece Wood Chisel Set

LIFETIME WARRANTY



\$5⁹⁹

Save 80%

Compare to Dewalt DWHT16063 \$29.97

ITEM 42429 69471 shown

Use Online & In-Store

40248428 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

★★★★★ (1,173)

Two Tier Easy-Store Step Ladder

\$19⁹⁹

Save 40%



Compare to Werner S322A-1 \$33.88

ITEM 67514

Use Online & In-Store

40251499 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

CENTRAL PNEUMATIC ★★★★★ (3,650)

3 Gallon, 100 psi Oil-Free Air Compressors

\$39⁹⁹

Save 59%



Compare to Porter-Cable PCFP02003 \$98.62

ITEM 66126

Use Online & In-Store

40274916 LIMIT 2 - Exp. 8/16/20*

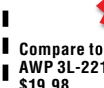
SUPER COUPON

VOYAGER ★★★★★ (4,007)

12" Tool Bag with 21 Pockets

\$4⁹⁹

Save 75%



Compare to AWP 3L-2216 \$19.98

ITEM 38168 62163 62349 61467 shown

Use Online & In-Store

40275987 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

PITTSBURGH ★★★★★ (843)

6" Digital Caliper

Includes two 1.5v SR44 button cell batteries.



\$9⁹⁹

Save 66%

Compare to Husky 1467H \$29.97

ITEM 63711 61585/62387 47257 shown

Use Online & In-Store

40278342 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

CENTRAL MACHINERY ★★★★★ (532)

16" Variable Speed Scroll Saw



\$69⁹⁹

Save \$129

Compare to Porter-Cable PCB375SS \$199

ITEM 62519 63283 93012 shown

Use Online & In-Store

40281628 LIMIT 1 - Exp. 8/16/20*

SUPER COUPON

Lifetime CARBIDE ★★★★★ (117)

Aluminum Oxide Sanding Sponges Pack of 10

\$3⁹⁹

Save 40%

Coarse ITEM 46751/63918 Medium ITEM 46752/63915 Fine ITEM 63912/46753



ITEM 46751 shown

Use Online & In-Store

40287178 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

BANKS ★★★★★ (556)

18 Gauge Brad Air Nailer

\$24⁹⁹

Save 71%



Compare to Dewalt DWFP12233 \$89

ITEM 64140

Use Online & In-Store

40288857 LIMIT 3 - Exp. 8/16/20*

SUPER COUPON

CENTRAL PNEUMATIC ★★★★★ (2,376)

20 oz. Gravity Feed Air Spray Gun

\$9⁹⁹

Save 80%



Compare to Husky H4840GHVSG \$49.98

ITEM 67181 62300 47016 shown

Use Online & In-Store

40288926 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

HaulMaster ★★★★★ (4,849)

4 Piece, 1" x 15 ft. Ratcheting Tie Downs

\$6⁹⁹

Save 69%

Compare to Keeper 5505 \$22.80

ITEM 90984 63056/63057 63150/56668 63094 shown

Use Online & In-Store

40289245 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

PITTSBURGH #1 SELLING JACKS IN AMERICA ★★★★★ (1,205)

Rapid Pump® 1.5 Ton Lightweight Aluminum Floor Jack

\$59⁹⁹

Save \$91

Compare to K Tool KT163094 \$151.42

ITEM 64552 64832/64980 64545 shown



Use Online & In-Store

40290415 LIMIT 1 - Exp. 8/16/20*

SUPER COUPON

Super Glue - Pack of 3 ★★★★★ (2,533)

99¢

Save 75%

Compare to Gorilla 78001 \$3.98

ITEM 42367



Use Online & In-Store

40293608 LIMIT 4 - Exp. 8/16/20*

SUPER COUPON

Bauer ★★★★★ (1,769)

20v Lithium-Ion 1/2" Compact Drill/Driver Kit

\$59⁹⁹

Save \$39

Compare to Ryobi P1811 \$99

ITEM 64754 63531 shown

Use Online & In-Store

40294117 LIMIT 2 - Exp. 8/16/20*



SUPER COUPON

PITTSBURGH ★★★★★ (1,628)

12" Ratcheting Bar Clamp/Spreader **LIFETIME WARRANTY**

\$2⁹⁹ ~~\$4²⁹~~ **Save 85%**

Compare to Irwin 1964718 \$19.98
ITEM 62123 46807 63017 shown
40297032 **LIMIT 4** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

HaulMaster ★★★★★ (4,780)

40" x 72" Moving Blanket

\$3⁹⁹ ~~\$4⁹⁹~~ **Save 60%**

Compare to Pratt Retail Specialties HOMOVLAN \$9.98
ITEM 69504 62336 47262 shown
40297370 **LIMIT 4** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

Bauer ★★★★★ (318)

15 AMP, 12-1/2" Portable Thickness Planer

\$299⁹⁹ ~~\$349⁹⁹~~ **Save \$149**

Powerful 15A, 9400 RPM motor for faster, smoother cuts in hardwood
Four-carriage frame reduces the movement that causes snipe
Two-knife cutter head leaves a blemish-free surface
Extra long in-feed and out-feed tables provide over 31" of material support
ITEM 63445
40299107 **LIMIT 1** - Exp. 8/16/20*

Handles lumber 12-1/2" wide to 6" thick

SUPER COUPON

CHICAGO ELECTRIC POWER TOOLS ★★★★★ (4,424)

6 AMP Variable Speed Reciprocating Saw

\$19⁹⁹ ~~\$27⁹⁹~~ **Save 66%**

Compare to Porter-Cable PCE360 \$59.98
ITEM 65570 61884 62370 shown
40302093 **LIMIT 4** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

drillmaster ★★★★★ (1,178)

1/4" Trim Router

\$19⁹⁹ ~~\$29⁹⁹~~ **Save \$79**

Compare to Makita RT0701C \$99
ITEM 62659 61626/44914 64314 shown
40303273 **LIMIT 3** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

10" Pneumatic Tire ★★★★★ (4,317)

\$3⁹⁹ ~~\$6⁹⁹~~ **Save 50%**

Compare to Farm & Ranch FR1055 \$8.09
ITEM 69385 62388/62409 62698 30900 shown
40303843 **LIMIT 4** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

200 Lumen LED Super Bright Flip Light ★★★★★ (5,560)

\$1⁹⁹ ~~\$3⁹⁹~~ **Save 60%**

Compare to Premier SW-SWITCH-12/24 \$4.99
ITEM 64189 64723 63922 shown
40307829 **LIMIT 4** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

HARDY ★★★★★ (250)

Padded Mechanics Gloves

\$7⁹⁹ ~~\$8⁹⁹~~ **Save 33%**

Compare to Husky 006-321 \$11.97
ITEM 64541/64540 62424/62423 64539 62425 shown
40367263 **LIMIT 4** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

GOOD **CHICAGO ELECTRIC POWER TOOLS** ★★★★★ (3,063)

12" Dual-Bevel Sliding Compound Miter Saw

\$129⁹⁹ ~~\$150⁰⁰~~ **SAVE \$88**

3-1/2" VERTICAL CROWN MOLDING CAPACITY
2-5/8" TALL SLIDING FENCES
LASER GUIDE LIGHT
COMPARE TO PROFESSIONAL WOODWORKER MODEL 9037
ITEM 56597 61970 61969 shown
40327702 **LIMIT 1** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

BETTER **ADMIRAL** ★★★★★ (759)

12" Dual-Bevel Sliding Compound Miter Saw with Led And Laser Guide

\$179 ~~\$199⁹⁹~~ **SAVE \$90**

6-1/2" VERTICAL CROWN MOLDING CAPACITY
4-1/2" TALL SLIDING FENCES
LASER GUIDE LIGHT & LED WORK LIGHT
COMPARE TO RYOBI MODEL 78312Z
ITEM 64686 40334230 **LIMIT 1** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

BEST **HERCULES** ★★★★★ (769)

Professional 12" Dual-Bevel Sliding Compound Miter Saw with Led Shadow Guide

\$329 ~~\$349⁰⁰~~ **SAVE \$270**

7-1/2" VERTICAL CROWN MOLDING CAPACITY
4-3/4" TALL SLIDING FENCES
LED PRECISION SHADOW GUIDE LIGHT
COMPARE TO DEWALT MODEL 90970
ITEM 56682 63978 shown
40338769 **LIMIT 1** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

CENTRAL MACHINERY ★★★★★ (305)

14" Oscillating Spindle Sander

\$109⁹⁹ ~~\$149⁹⁹~~ **Save \$43**

Compare to Triton Tools TSPS450 \$152.99
ITEM 62146 69257 shown
40347097 **LIMIT 1** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

HaulMaster ★★★★★ (4,554)

18" Working Platform Step Stool

\$19⁹⁹ ~~\$29⁹⁹~~ **Save 50%**

Compare to Neocraft 60635 \$39.99
ITEM 62515 66911 shown
40347372 **LIMIT 3** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

CENTRAL MACHINERY ★★★★★ (514)

10", 12 Speed Benchtop Drill Press

\$99⁹⁹ ~~\$139⁹⁹~~ **Save \$61**

Compare to Wen 4212 \$161.97
ITEM 63471 44836 60237 shown
40347767 **LIMIT 1** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

CHICAGO ELECTRIC POWER TOOLS ★★★★★ (2,617)

Mobile Miter Saw Stand

\$99⁹⁹ ~~\$124⁹⁹~~ **Save \$69**

Supports 16 ft.
Compare to Hitachi UU240F \$169
ITEM 63409 62750 shown
40348730 **LIMIT 1** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

WINDSOR DESIGN ★★★★★ (187)

Dovetail Jig

\$27⁹⁹ ~~\$37⁹⁹~~ **Save 40%**

Compare to General Tools 861 \$47.16
ITEM 34102 40348894 **LIMIT 2** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

PORTLAND ★★★★★ (6,462)

7 AMP Electric Pole Saw 9.5" Bar

\$59⁹⁹ ~~\$79⁹⁹~~ **Save 25%**

6 ft. to 8 ft. 10"
ITEM 68862 63190 56808 62896 shown
40355648 **LIMIT 1** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

HaulMaster ★★★★★ (2,024)

1000 lb. Capacity Swing-Back Bolt-On Trailer Jack

\$18⁹⁹ ~~\$26⁹⁹~~ **Save 62%**

Compare to Reese Towpower 74410 \$49.99
ITEM 69780 41005 shown
40358811 **LIMIT 4** - Exp. 8/16/20*

Use Online & In-Store

SUPER COUPON

TAILGATOR ★★★★★ (1,124)

900w Max. Starting 2 Cycle Gas Powered Generator

\$114⁹⁹ ~~\$124⁹⁹~~ **Save \$11**

Compare to PowerSmart PS50 \$126.10
ITEM 63024 63025 shown
40363239 **LIMIT 1** - Exp. 8/16/20*

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homeLAB

A TESTING ZONE FOR *INNOVATIONS*



STAY CONNECTED WHEN THE POWER IS OUT

BY JASON INGOLFSLAND

When the power goes out, your home network is helpless; you won't be able to work from home, send that last email or keep your smart devices humming along. An inverter generator is one solution. Generators are expensive, though, and if you just want to keep the Wi-Fi on, the benefit may not justify the cost.

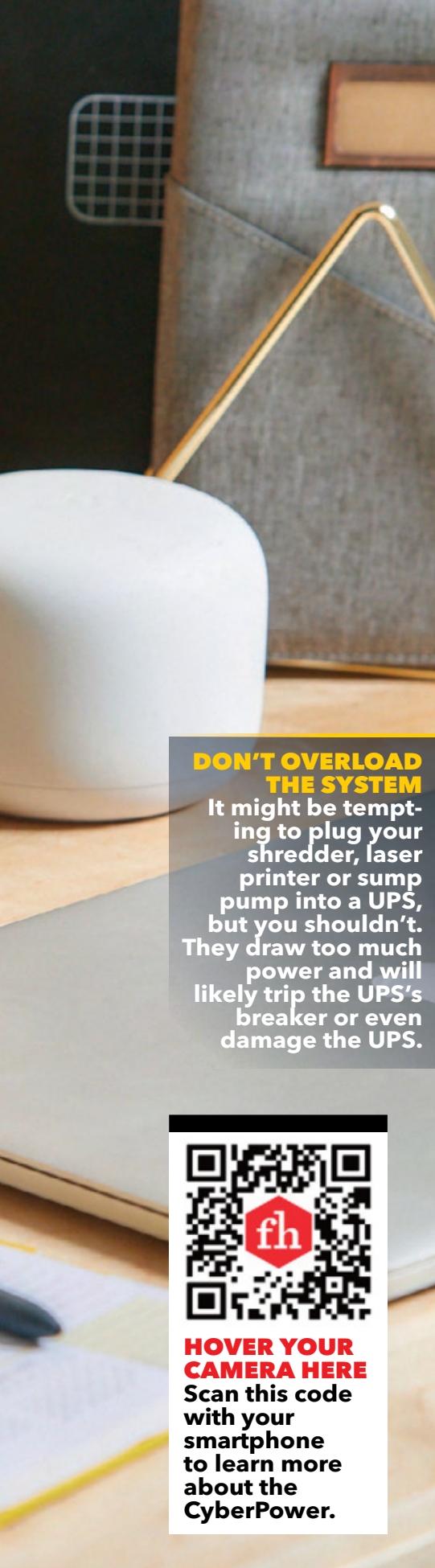
Enter the battery backup, or "uninterruptible power supply" (UPS). These small, affordable power units act as a power source for your sensitive electronics in case of a power outage. But will they keep your Wi-Fi running long enough, and if so, do they all perform the same? To answer that question, I put three units to the test.

How it works

A UPS is basically a battery with built-in electronic controls. Plugging it into an outlet keeps the battery charged and provides power to your electronics. When the power goes out, the battery kicks in automatically, powering whatever you have plugged into the UPS without interruption.

What size should I get?

UPS units are rated by volt-amps (VA) and watts, which is a power limit and a rough estimate of how long the battery will last. Many UPS systems are marketed using the volt-amps measurement, but they sometimes include the wattage too. A 350VA unit costs about \$50 and should power a router for almost two hours,



DON'T OVERLOAD THE SYSTEM

It might be tempting to plug your shredder, laser printer or sump pump into a UPS, but you shouldn't. They draw too much power and will likely trip the UPS's breaker or even damage the UPS.



HOVER YOUR CAMERA HERE

Scan this code with your smartphone to learn more about the CyberPower.

AMAZON BASICS 600VA

\$60

Run-time: 4 hours

The price is great, but I think more run-time is worth a few extra bucks.



APC 600VA

\$75

Run-time: 5 hours and 10 minutes

APC has a reputation for reliability, which may justify the slightly higher cost.



CYBERPOWER 600VA

\$70

Run-time: 5 hours and 30 minutes

The best run-time and a competitive price make this my top pick.



BEST VALUE

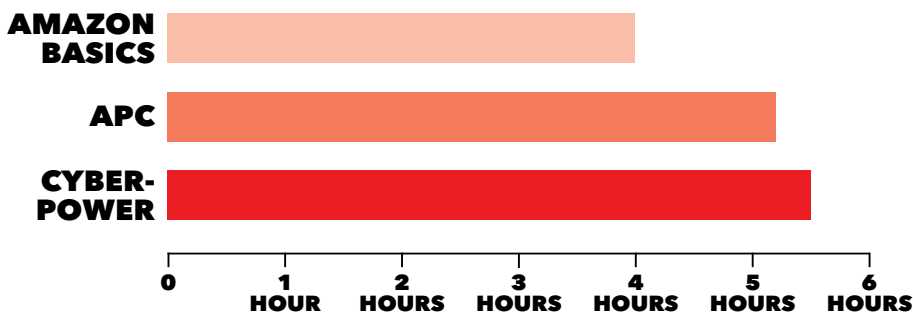
depending on the router's wattage. A 2,200VA system costs about \$700 and can power a router for about 18 hours. A big, pricey system like that might make sense if you need your computer and home network powered for your livelihood. But for those who want to keep the Wi-Fi running, I think a small UPS is adequate. So I tested 600VA units.

The homeLAB test

I charged each of the three UPS units for eight hours as recommended. When they were fully charged, I plugged in the homeLAB's Wi-Fi router, which uses 15 watts, and unplugged the UPS to activate the battery. I connected to the Wi-Fi, waited until the battery died and then disconnected from the internet.

The results

The CyberPower lasted the longest, at five hours and 30 minutes, though the APC was close behind. The Amazon Basics UPS didn't maintain power nearly as long as the other two. The full prices are given here, but the units are often on sale online.



Washable area rugs

Area rugs are prone to three problems: They slip and slide; get dirty from foot traffic, food and pet accidents; and can be tough to clean.

Ruggable tries to solve these problems with a two-part system. The nonslip pad has hook-and-loop fasteners on the top to hold the rug, and textured vinyl on the bottom. The rug itself grips to the pad. Intrigued, I tested one of its 3 x 5-ft. rugs (\$109 online) in an entryway. Here's what I learned.

GRIPS ON HARD FLOORS, SLIDES ON CARPET

Ruggable's nonslip pad works great. The rug unrolls over the pad easily. Once it's on, all you have to do is

smooth out any wrinkles with your hands. The bottom of the pad clings well to hardwood floors. Despite my best efforts to get it to move and fold, it hardly budged. It slides more readily on carpet.

EASIEST AND FASTEST CLEAN RUG

It didn't take long to get the rug dirty from foot traffic. Washing any rug in a washing machine can be a bit of a gamble; it could bleed and not get very

clean. If it survives the washer, you're better off letting it hang to dry to avoid shrinkage. And machine washing isn't an option for larger area rugs.

With Ruggable, however, I easily pulled the rug from the pad and threw the rug in the washer. It came out of the dryer like new, without any wrinkles.

Of course, there are limitations. Smaller Ruggable rugs fit in a 2.2-cu.-ft. washer; larger rugs require

a 3.8-cu.-ft. washer. The nonslip pad should be spot-cleaned only.

DOUBLE THE COST OF AN AVERAGE RUG

On average, a 3 x 5-ft. Ruggable rug costs a little over double what you'd find at home centers and warehouse stores. But the ease of washing, especially when you can avoid the expense of professional cleaning, makes these rugs even more attractive.



PREVENT A SUMP PUMP CATASTROPHE

Last spring, my sump pump died in the middle of the night. Luckily, I was home and noticed before the breakdown became a disaster. But it got me

wondering: What if I hadn't been home? That's why I wanted to try the PumpSpy (available online for \$200), which sends an alert to your phone when something goes wrong with the pump.

HOW IT WORKS

The PumpSpy is a smart outlet that wirelessly connects to your home Wi-Fi. The setup takes about 15 minutes. You plug it into the outlet that powers your pump. Then run the high-water sensor down into the basket, fastening it to the pipe attached to your pump. Download the app to your phone. Once

the pump is plugged into the smart outlet, PumpSpy tracks when the pump has been activated and sends that information to the app through Wi-Fi.

TRACKS HIGH WATER LEVELS

If water gets too high, PumpSpy will notify you immediately. When I tested the high-water sensor, I received a notification in about 14 seconds. PumpSpy notifies you when things go back to normal too.

SENDS ALERT IF THE PUMP LOSES POWER

PumpSpy lets you know if the pump has lost power.

To test this, I shut off the breaker to the pump. I got a notification right away. But if your Wi-Fi lost power, you wouldn't get a notification. Instead, you'd need to check the app to see if PumpSpy had lost the signal. One solution is to connect your Wi-Fi router to a battery backup.

MONITORS PUMP USAGE ACTIVITY

PumpSpy provides data on the pump's cycle times, estimated gallons pumped, time stamps of each pump cycle and more. You can also add friends and family to the contact list so they can be alerted if something's wrong.



SECRETS OF A BILLIONAIRE REVEALED

*"Price is what you pay; value is what you get.
Whether we're talking about socks or stocks, I like
buying quality merchandise when it is marked down."*
— wisdom from the most successful investor of all time

We're going to let you in on a secret. Billionaires have billions because they know value is not increased by an inflated price. They avoid big name markups, and aren't swayed by flashy advertising. When you look on their wrist you'll find a classic timepiece, not a cry for attention— because they know true value comes from keeping more money in their pocket.

We agree with this thinking wholeheartedly. And, so do our two-and-a-half million clients. It's time you got in on the secret too. The **Jet-Setter Chronograph** can go up against the best chronographs in the market, deliver more accuracy and style than the "luxury" brands, and all for far, far less. \$1,150 is what the **Jet-Setter Chronograph** would cost you with nothing more than a different name on the face.

With over two million timepieces sold (and counting), we know a thing or two about creating watches people love. The **Jet-Setter Chronograph** gives you what you need to master time and keeps the superfluous stuff out of the equation. A classic in the looks department and a stainless steel power tool of construction, this is all the watch you need. And, then some.

Your satisfaction is 100% guaranteed. Experience the **Jet-Setter Chronograph** for 30 days. If you're not convinced you got excellence for less, send it back for a refund of the item price.

Time is running out. Now that the secret's out, we can't guarantee this \$39 chronograph will stick around long. Don't overpay to be underwhelmed. Put a precision chronograph on your wrist for just \$39 and laugh all the way to the bank. Call today!

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that can go for ten times
the price or more."*

— Jeff from McKinney, TX

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Rating of A+



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VINTAGE CAMPER REVIVAL

HOW A SHABBY OLD TRAILER
BECAME A SHOWPIECE

BY JAY CORK

For decades, the July/August issue of *Family Handyman* has focused on a yard shed project. But this year, we took on a different challenge, inspired by a daydream. Have you ever looked at an old, neglected thing and envisioned what it could be? That's how I felt when I first saw our camper. I looked past the dents and rust, the flat tires and the dull, oxidized aluminum.

Instead, I saw a mint-condition trailer rolling down the road, a traveling showpiece that would really turn heads. What's more, I imagined the freedom of a home on wheels. Go anywhere, anytime. Independent travel.

That freedom can come with a big price tag. A new camper of this size costs at least \$20,000 and often twice that much. We got this relic for less than \$7,000

and spent about the same on rehab. Not bad. But the real success goes way beyond economics. We got the best of old and new: a completely rehabbed camper, with a vintage style all its own; a little piece of history that grabs attention on the road and at campsites.





After almost 50 years outdoors in the sun, snow and rain, every exterior surface of this camper needed work.



A CHANGE OF PLANS

My first plan was to restore the aluminum exterior to its original gleam. I talked to experts, amassed an arsenal of polishing gear and began experimenting. I was able to achieve a mirror-like shine, but progress was incredibly slow. Our schedule simply didn't allow for it.

So I searched for paint that would form a tough, shiny surface. The answer turned out to be easy: alkyd paint. Water-based acrylic paints are best for most DIY jobs, but old-fashioned oil-based alkyds generally level out better and form a harder film. Spraying paint in our workspace would be too messy, so I tried rolling. The results were great and better than spraying in one way: The slight texture left by the roller hid small dents and scratches.



Coal slag

Pressure washer

▲ SANDBLASTING—WITH WATER

To remove old paint and rust, I first considered sandblasting. But that requires a big air compressor and creates a huge, dusty mess. So I gave “vapor blasting” a try. Like sandblasting, vapor blasting pummels a surface with sand or other abrasive media. But vapor blasting relies on water from a pressure washer rather than air. That reduces the mess and takes advantage of a tool you may already own. I tried a generic pressure washer vapor blasting kit (\$30 online), and I learned three key things:

■ Match the gun to your pressure washer. There are different sizes available, with specific psi ratings. The pressure washer psi rating must match the range of the kit; the first one I bought, for \$120, was too large and wouldn't function with my 2,700 psi pressure washer.

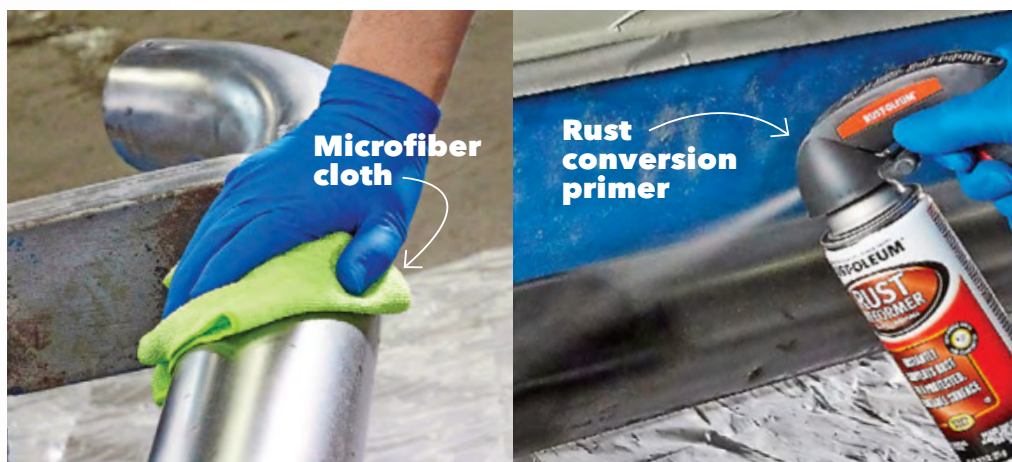
■ A bigger pressure washer is better. My 2,700 psi machine worked, but it was slow. A system in the range of 5,000 to 7,000 psi would produce results much faster.

■ Weight and size of the media make a difference. I tried three types of blast media before finding one that worked well. The coarse coal slag from Tractor Supply Co. (\$10 for 50 lbs.) did the trick.



Siphon wand

Vapor blasting attachment

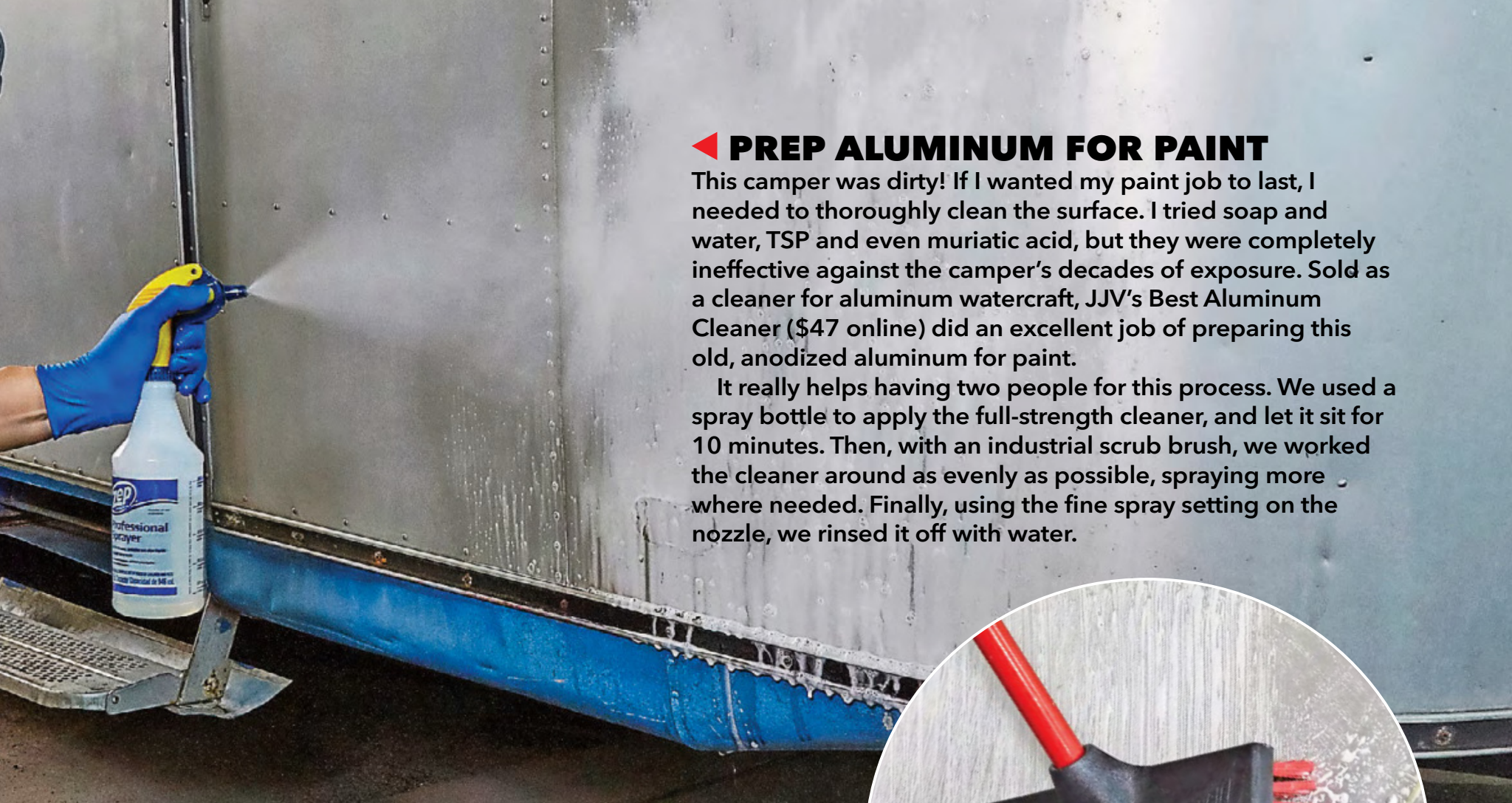


Microfiber cloth

Rust conversion primer

▲ PREVENT “FLASH RUST”

Prepping steel for paint is a lot of work, so here's something you need to know: Moisture in the air will quickly cause “flash rust” on bare steel, and it might not even be visible. This will come back to haunt you after the paint has been applied. To prevent that, I immediately wiped everything down with denatured alcohol and then sprayed it all with a black rust conversion primer.



◀ PREP ALUMINUM FOR PAINT

This camper was dirty! If I wanted my paint job to last, I needed to thoroughly clean the surface. I tried soap and water, TSP and even muriatic acid, but they were completely ineffective against the camper's decades of exposure. Sold as a cleaner for aluminum watercraft, JJV's Best Aluminum Cleaner (\$47 online) did an excellent job of preparing this old, anodized aluminum for paint.

It really helps having two people for this process. We used a spray bottle to apply the full-strength cleaner, and let it sit for 10 minutes. Then, with an industrial scrub brush, we worked the cleaner around as evenly as possible, spraying more where needed. Finally, using the fine spray setting on the nozzle, we rinsed it off with water.

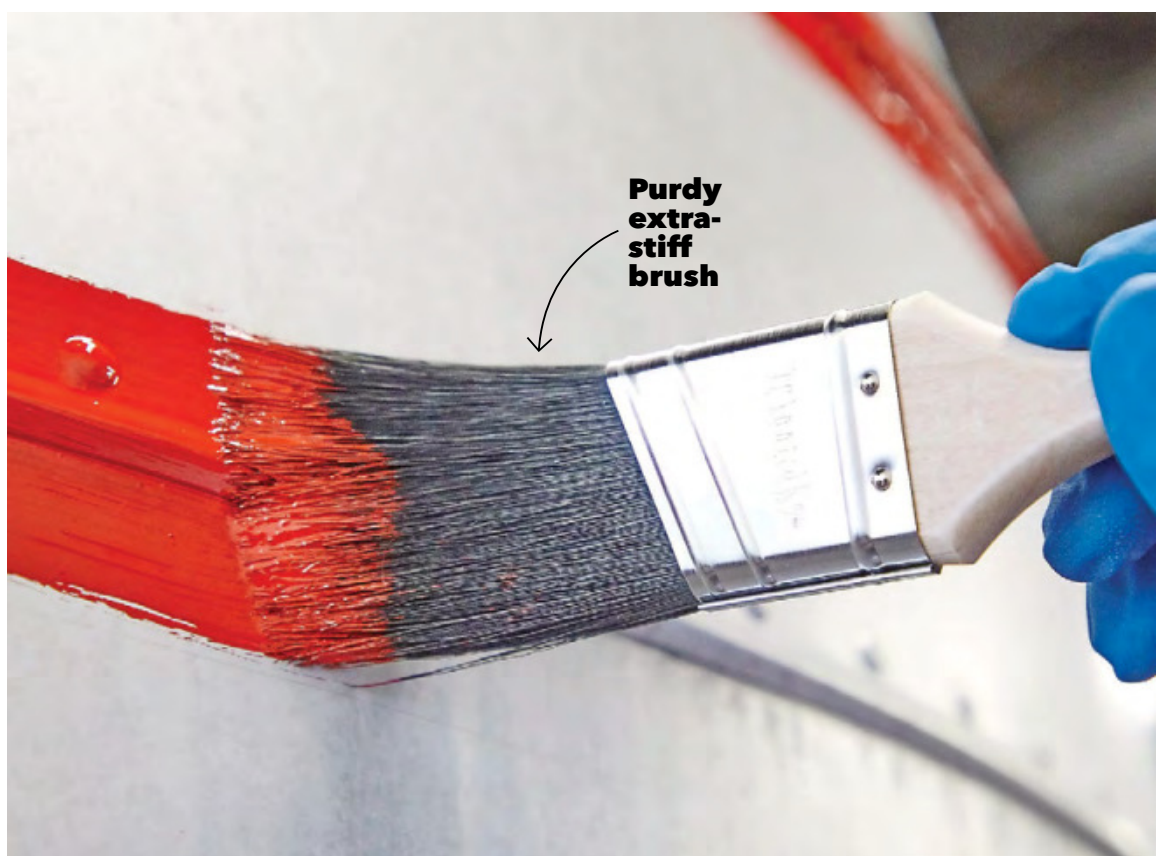


Painting with a spray rig would have provided the smoothest finish, but that wasn't an option in our workspace. So I went with the next best approach and selected paint and tools that would give a smooth, tough finish.



▲ ADD A CATALYST

I used oil-based alkyd paint because it levels out well and forms a tougher finish than most water-based paints. I chose Krylon Farm and Implement paint (\$40 a gallon at O'Reilly Auto). To make the paint even more durable and to speed curing, I added Krylon's catalyst hardener (\$18 online).



▲ BRUSH, THEN ROLL

I brushed paint onto spots that the roller would miss, then immediately ran over them with the roller for a consistent texture. This paint is thick, so I chose an extra-stiff brush with natural bristles.

WEEKEND PAINTING PARTY

Our workspace was in a shop that produces concrete sinks and countertops—and tons of dust. To avoid painting while the concrete guys were stirring up a storm, I drafted a crew for a weekend painting marathon.



Getting it right would take some choreography: careful brushing around trim, then quickly rolling those areas to minimize texture mismatches. And we'd have to do it all twice for complete coverage. When we all got into the groove, our gray camper turned red fast. Two coats took less than six hours.

When we stepped back and looked at our work, there was a long silence, but then someone said what we were all thinking: "Red is so much better than polished aluminum!"

Yep. Just wish I'd known that before sinking so many hours into polishing experiments.

ENDLESS EXTERIOR DETAILS

We upgraded all the exterior lights to new LEDs, refurbished the name plates, installed a toolbox in the trailer's tongue... But the whitewall tires are my favorite detail. They cost four times as much as blackwall trailer tires, but the classic look was worth every penny.



▲ QUALITY ROLLERS ARE THE KEY

Don't buy cheap roller sleeves! High-quality sleeves are worth the extra cost because they give you much smoother results. I used a 3/16-in. Soft Woven Roller Cover from Sherwin-Williams.

PAINLESS RIVETING ►

When the paint had cured and it was time to reinstall all the name plates and decorative pieces, I used POP rivets (aka blind rivets).

POP rivets are really simple; they're made of two pieces, the "hat" and the "mandrel." Rivets are inserted into predrilled holes and set using a rivet gun. The gun pulls the mandrel through the hat, mushrooming the end of the mandrel. The mandrel is then sheared off, leaving just the rivet head showing. The length of the rivet is important. It needs to be twice its width plus the thickness of the material. So, if you're using 1/8-in. rivets to join 1/4-in. material, the rivet needs to be 1/2 in. long.

Handheld rivet guns are common, but I always feel like I need a third hand when using them. I was dreading riveting by hand, but then I found the Milwaukee M12 battery-powered rivet gun. It handled all the rivet sizes I needed to use, and I could even use it single-handedly. At \$230, the bare tool isn't cheap, but it makes this job much easier on your hands.



Milwaukee M12 rivet gun



Hand-powered rivet gun

POP rivets

COOL COOLER SLIDE-OUT ▶

With the camper's old refrigerator gone, its access and venting door no longer served a purpose. So we decided to give it a new purpose. We built a lidded box/table just inside the door to house a cooler. The cooler sits on a platform that's mounted on heavy-duty 32-in. drawer slides. No need to heft a cooler full of ice or step inside to crack a fresh beverage. Just open the door and pull the cooler outside!



HOVER YOUR CAMERA HERE
Scan this code with your smartphone to see this slide-out cooler in action!

CUSTOM DECAL ▶

As much as we favor DIY, we chose to hire out the work on our camper's name badge. The front and back decals cost a total of about \$200.



▲ NONSLIP STAIR TREAD

This simple trick can add a nonslip surface to just about anything. I learned this technique making skateboards, using epoxy and clear grit. For the camper step, I used POR-15 OEM Bed Liner coating and coal slag left over from vapor blasting. I rolled the bed liner on the stair tread and then sprinkled the coal slag on top of it.



VINTAGE CAMPER REHAB *BETTER THAN NEW!*

**MODERN MATERIALS
AND TECHNOLOGY MAKE IT
SMARTER THAN THE ORIGINAL**

BY GARY WENTZ



Meet our camper: a 1972 Avion Voyageur. The Avion company produced campers for about 40 years, beginning in 1955. Like many other businesses, it was a child of the WWII industrial boom. It adapted materials and expertise from aircraft manufacturing to build campers. And not just any campers, but sleek, luxurious beauties. One vintage camper expert calls them "the best travel trailers ever made." In 1972 our Voyageur sold for about \$8,000. In today's dollars, that's almost \$50,000.

Our first plan was pure restoration, making the camper look factory-new. But as we got deeper into the details, that plan seemed less and less realistic. That's partly because finding exact replacement parts could have turned into a yearlong quest; a tiny camper sink in avocado green isn't easy to find. We also realized we could make our camper better than the original, with less expense and effort. With today's superior building materials and technology, we could make our camper more comfortable, convenient and durable inside. This make-it-better approach turned out to be a smart choice.





CAMPER CABINETS

REDESIGNED TO CREATE AN AIRY, OPEN SPACE

BY BRAD HOLDEN



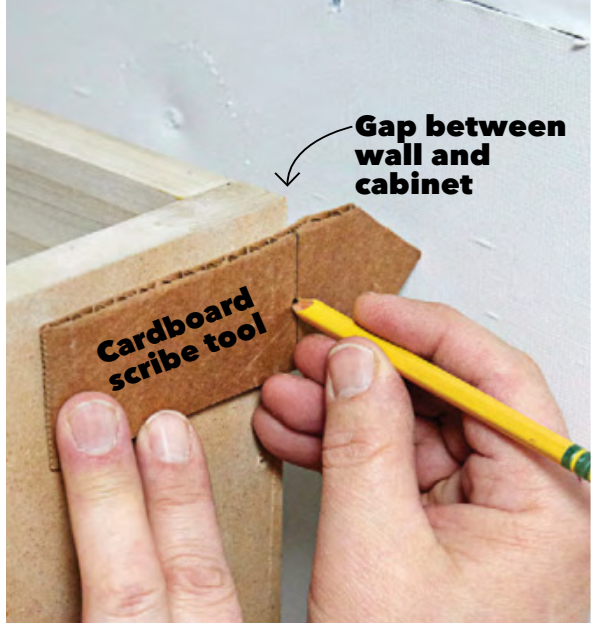
THE CABINETS THREW US A CURVE

Our cabinetry plan called for a new sink-base cabinet and a cabinet/bench combo that would provide extra seating and storage without losing open space. In a house, those are simple projects. But unlike a

house, our camper doesn't have walls that are flat, straight and square; all the surfaces are curved. Building curved cabinets is a bit time consuming, but the simple tricks shown here make it doable for DIYers.

The curved cabinets we built are unique in other ways too. They're made largely from MDO, a material that's been around for decades but is unfamiliar to most builders. The smooth, uniform surface makes it a great choice for painted cabinets and





▲ NEW CABINETS ON CURVED WALLS

To accommodate a new cooktop, I tore out the old sink-and-stove cabinet and built a new one. Mostly, it was a standard cabinet project. But the concave walls threw me for a bit of a loop. There are a number of tools and techniques designed for scribing cabinets and countertops to perfectly fit a wall. My method involves whatever I happen to have on hand—in this case, a piece of cardboard.

■ MAKE A MARKING TOOL

I cut a scrap of cardboard, making a point at one end. With the cabinet as close to the wall as possible, I poked my pencil through the cardboard at the widest gap between the cabinet and the wall.

■ FOLLOW THE CURVE OF THE WALL

Holding the cardboard level, I followed the wall with the point, allowing my pencil to transfer the wall's contour onto the cabinet's side.

■ CUT THE CURVE

I followed the line with my jigsaw, then perfected the curve with a belt sander.

■ TEST THE FIT

My cabinet fit the wall perfectly. But that doesn't always happen. Sometimes I have to tweak the curve a few times with a belt sander.



doors. For the countertops, we chose Richlite, another old but unfamiliar material.

We decided to paint our cabinets, mainly to brighten the camper's interior and make it feel more open. But paint has other advantages too: Our old cabinets had taken a beating over the

years and required a lot of wood filler. Unlike a natural wood finish such as stain and polyurethane, paint makes those repairs completely invisible. And since cabinets in a small space can be expected to suffer damage, paint will make our cabinets easier to touch up.



REUSE OR REMOVE?

Every element in this camper required a decision: Fix it or replace it? Mostly, we decided that replacement was best. The countertops, base cabinets and all the cabinet doors, for example, were easier to replace than to renew. We also removed the fridge, stove and a cabinet that housed a propane furnace. It was a giant space hog that could be replaced with a small electric heater. There was a lot of breaking up, cutting up and carrying out.



Demolition work often feels like a step backward, making things worse before they get better. But clearing things out of our camper made an immediate improvement. The effect was incredible. Suddenly, the claustrophobic camper felt open, airy, a pleasant place to be, no longer a cramped cave. That resulted in changes to our original plans. We all wanted to retain the spacious feel. Overall, that meant fewer cabinets, trading some storage space for open space.



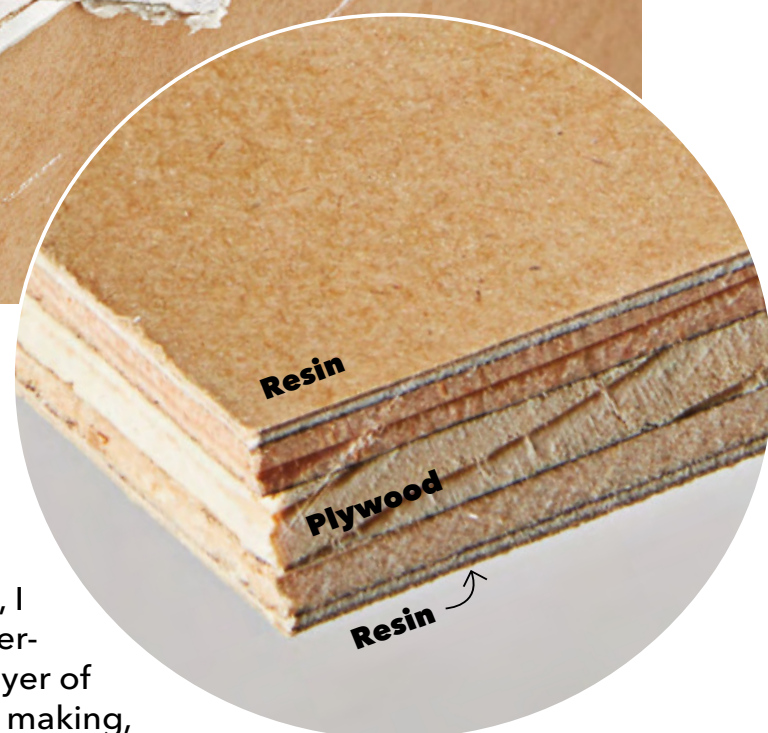
▲ MY FAVORITE FILLER

With decades of dents and dings, our cabinets were in need of wood filler. There are lots of wood fillers available, but most have a gritty texture, making it difficult to fill the smallest imperfections and achieve a perfectly smooth finish. If I'm painting cabinets or doors, I use MH Ready Patch instead. Ready Patch has the texture of joint compound, but it's harder and more durable when it dries. It sands smooth, leaving no trace of the dent or hole being filled.



▲ CABINET DOORS FROM MDO

Our cabinet doors were in rough shape. Since they were just slabs of birch plywood, I decided it would be easier to make new ones than to repair them. And since they would be painted, I chose to use MDO (medium-density overlay). MDO is basically plywood with a layer of resin on both faces. Developed for sign making, MDO is smooth, holds paint well and stands up to moisture. Like most plywood, MDO has ugly gaps in the edges. I filled them with my favorite filler (see above). MDO isn't carried by most home centers, but you can special-order it. I paid about \$50 for each 4 x 8-ft. sheet of 1/2-in. MDO.





▲ A SMOOTH PAINT JOB

Flat cabinet doors like these are much easier to paint than raised panel doors; all you need is a roller. But which roller will give you the smoothest finish? I tried flock foam and microfiber rollers but found that a cheap foam roller (and high-quality paint!) gave me the best results. The only downside is that foam doesn't hold as much paint as the others, so you have to dip it in the tray more often.

▲ FASTEST FINISHING STANDOFFS

When I was painting all the cabinet doors, standoffs allowed me to coat the backs, then immediately flip the doors over to coat the edges and fronts. You can buy finishing standoffs, but why? I used to run screws through blocks or strips of plywood, but this is even quicker. Using 3/4-in.-thick plywood strips, just shoot 1-1/4-in. or 1-1/2-in. brad nails through the strips, spaced somewhat evenly.



DOOR PULL DRILLING JIG ▶

Got a bunch of pulls to install? A drilling jig makes it fast and easy. Carefully lay out and drill the holes on a scrap of plywood and attach a fence to the edge for easy alignment. Just clamp the jig on the door and drill away!



LAB-GRADE COUNTERTOPS

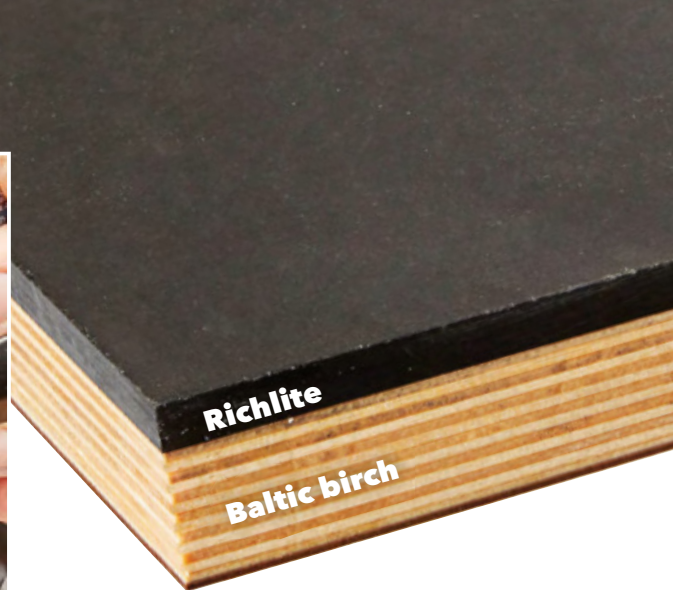
If our Richlite countertops look familiar, it may be a high school memory. This tough material was the tabletop of choice for many chemistry labs. But we chose it because the slatelike slabs look great combined with plywood.



VANITY REVIVAL

We couldn't find a replacement bathroom sink that would fit in a camper—and we certainly couldn't keep the avocado green version—so we gave the old one a fresh coat of white. We chose Rust-Oleum Tub & Tile, an acrylic epoxy (\$15 online).

The results were great; not as smooth as the original glazing, but you have to look hard to find imperfections. The finish is also surprisingly tough. We were able to scratch a test area with a screwdriver, but it took some effort.



◀ HOT "NEW" COUNTERTOP SURFACE

Richlite has been around for about 70 years. It was originally used for industrial tooling and patternmaking. Recently, because of its extreme durability, it's being used in many other products, ranging from guitar fretboards to sunglasses to high-end countertops.

Richlite is 65% recycled paper and 35% phenolic resin. The surface is smooth, but the random pattern of the natural fibers in the paper imparts an eye-pleasing texture. Richlite is easily workable with standard woodworking tools, comes in a wide variety of colors and thicknesses, and can be used alone or bonded to a substrate.

For this countertop, 1/4-in. Richlite was bonded to 3/4-in. Baltic birch. Bonding to a substrate is best done with a vacuum press, but you can also glue it down with contact cement.



▲ FLOORING AS TABLETOP

Thinking about a durable table surface for a rec room or an RV? We used luxury vinyl plank (LVP). Made to endure heavy foot traffic, it's super-durable and comes in many colors and patterns. LVP is only about 3/16 in. thick, however, as it's always installed on a subfloor. So, we installed it on 3/4-in. plywood and used a Liquid Nails adhesive called Fuze-It to bond it to the plywood. To finish the edges, we glued and nailed on prepainted 1/4-in. hardwood edge banding.

RENEW FILTHY WALLS

TWO-STEP PREP FOR A FRESH COAT OF PAINT
BY MIKE BERNER

▲ EXTRA PREP FOR GRIMY OLD WALLS

The original wall color in our camper was a light beige. But years of grime and nicotine had turned the walls a brownish-yellow. To give the space an open feel, we chose white paint. But I knew from experience that you can't paint filthy walls without doing special prep work. That meant two things: thorough cleaning and stain-blocking primer.

■ SCRUB THE WALLS

I first doused the walls with Krud Kutter Tough Task Remover and scrubbed with a stiff brush. And scrubbed. And scrubbed. Then I wiped away the filth with a sponge and scrubbed more. Removing the buildup from those old walls left my arms stiff for a couple days.

■ SEAL IN STAINS

Stains like rust and nicotine will bleed through paint no matter how many coats you apply. To seal in any deep grime that wasn't scrubbed off, I applied two coats of stain-blocking primer. For this job in an enclosed space, I chose KILZ 3 Premium because it's water-based. Stain-blocking primers also provide good adhesion on problem surfaces like the vinyl on our camper walls.



A NEW FLOOR OVER THE OLD

TIPS FOR INSTALLING LUXURY VINYL,
IN A CAMPER OR ANYWHERE!

BY MIKE BERNER

Luxury vinyl is easy to install and clean, and hard to damage. And since this vinyl can go right over many types of flooring, I didn't have to tear out the old floor. However, I did have to make a couple quick fixes.



▲ STAPLE THE EDGES

There's no need to remove the old flooring if the subfloor isn't squishy or soft. But take care of any curled-up flooring. If it's brittle enough to break if stepped on, cut it away, then staple down the loose edge.



▲ FILL THE GAPS WITH FLOOR PATCH

Fill holes and voids with floor-patching compound. This will harden and support the new floor and help prevent wear marks in those areas later. Use a mudding knife to smooth and level the compound to match the old flooring.

▶ EASY CURVED CUTS

There were a lot of rounded cuts and notches to make! I tried using an angle grinder with a cutoff wheel. The grinder worked great but created a lot of dust. I wore a respirator and had to wipe the dust off each plank before I installed it.



Secure your workpiece



HOVER YOUR CAMERA HERE

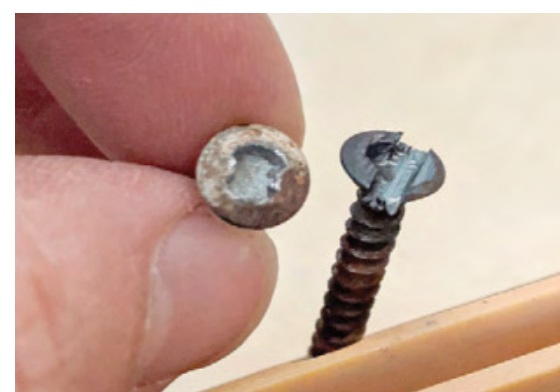
For more tips on installing luxury vinyl flooring, scan this code with your smartphone.



Transition strip

▲ CHANGE DIRECTIONS

It can be difficult to wrap vinyl planks around doorjamb. If you need to lay flooring through a doorway, plan to end the flooring in the opening and change the plank direction in the next room. Then add a transition strip for the finishing touch.



▲ SOLUTION FOR TRICKY SCREWS

Our camper had hundreds of odd-ball screw heads. We couldn't find a bit to fit them, so I cut slots into the heads using a rotary tool fitted with a cutoff wheel. That allowed me to remove screws with a regular flathead screwdriver. This solution works for corroded screws too. I learned this trick while restoring an old motorcycle. Works every time!

IT'S LUXURY VINYL FOR THE WIN

Luxury vinyl was a slam dunk for our camper floor because it's one of the most DIY-friendly options available. Unlike most types of flooring, it isn't attached to the subfloor with adhesive or fasteners—it's a floating floor. That saves installation steps up

front and eliminates huge replacement hassles later. It can be removed in minutes rather than hours or days.

Another advantage of luxury vinyl is that it's relatively thin, so you can install it right over existing flooring without removal

or building up the floor to the point where it interferes with doors.

Luxury vinyl comes in two forms. Luxury vinyl planks (LVP) generally have the look and shape of wood boards. Luxury vinyl tile (LVT) mimics tile or stone in shape and pattern. We chose LVP for its warmer color tone.



EASY LIGHT ANYWHERE

SUPER-VERSATILE LEDs PROVIDE BRIGHTNESS, AMBIENCE—OR BOTH!

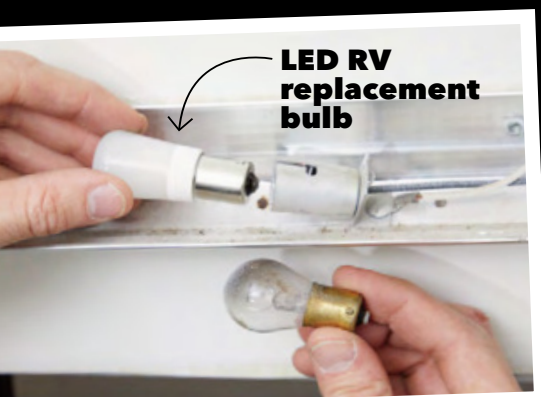
BY MIKE BERNER



LEDs: THE SMART CHOICE

Upgrading the lighting in this camper reminded us just how inefficient lighting used to be and how great it is today. As expected, LED lighting gave us more light.

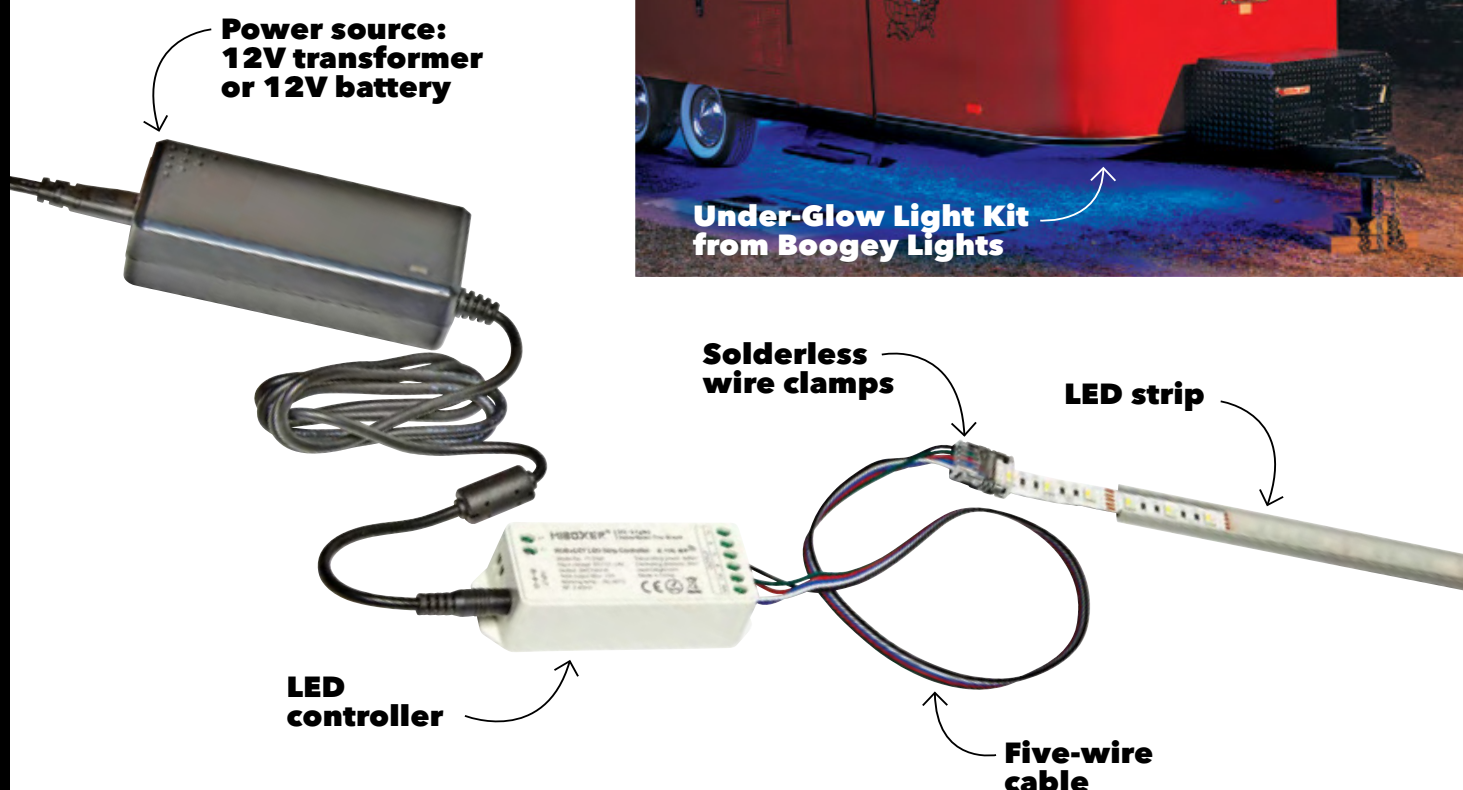
But the other advantages of LEDs are particularly helpful in a camper. First, they draw less power. That means less load on a generator or battery pack. Second, they produce less heat. In a small space on a warm day, that matters. That also allows you to use LEDs in creative ways like we did, tucking them into tight spots, where heat buildup could lead to fire.



LED RV replacement bulb



Under-Glow Light Kit from Boogey Lights



PEEL-AND-STICK LIGHTING ▶

Our camper lighting was completely outdated incandescent bulbs: excessive energy and low light. To get more light and less heat while using less power, I chose LED strips. I used DynamicColor lights, but there are many similar products. I bought strips, controllers, wire and clamps. Buying the components separately gives you the flexibility to put them anywhere.

Figuring out what components you need is the hardest part. Here's what you need (p. 40) and how to put everything together. With these strips, I could dim the light or change it to a variety of colors.

■ CUT STRIPS TO ANY LENGTH

Cut the strip right on the line going through the copper contacts so the connection is maintained; on my LED strip, there was a line every three LEDs. Connect the strip to the cable with solderless clamps, attach the controller, then hook it up to the power. I didn't have to solder a single wire.

■ STICK STRIPS ANYWHERE

Peel away the adhesive backing and stick them wherever you need light. For the camper, I stuck them to the back of the curtain valance for accent lighting.

■ ENCLOSE THE STRIPS

I also placed the strips above the beds. I wanted them to be concealed, so I put them in an aluminum channel and mounted it. The channel came with a frosted lens, which provided a finished look.



**HOVER YOUR
CAMERA HERE**

Scan this code with
your smartphone to
learn more about how
to buy and install LED
strip lights.



◀ MODERN TECHNOLOGY FOR AN OLD FIXTURE

We liked the old ceiling light fixture in our camper and wanted to keep it. My solution was to stick an LED strip around the inside circumference of the light fixture. Before I mounted the fixture, the strip worked. But when I attached the light fixture to the ceiling, it didn't work.

It turns out the contacts on the back of the LED strip were making a connection to the metal fixture. When I mounted the fixture to the ceiling, I created a short in the circuit. I took down the fixture and put a piece of double-sided tape (not shown) between the strip and the fixture and got it up and running again.

OLD CAMPER, NEW TECH

CONVENIENCE, SAFETY AND ENTERTAINMENT ARE EASIER THAN EVER

BY JASON INGOLFSLAND



Homemade
projector screen

By today's standards, the technology in our 1972 camper was primitive. So we harnessed new technology—everything from a convection cooktop to a Bluetooth sound system—to make our camper better than before. But these upgrades are our favorites.

This MB Quart
Sound Bar has
Bluetooth, a built-
in amplifier and
LED lights.

ENTERTAINMENT IN A CAN ▶

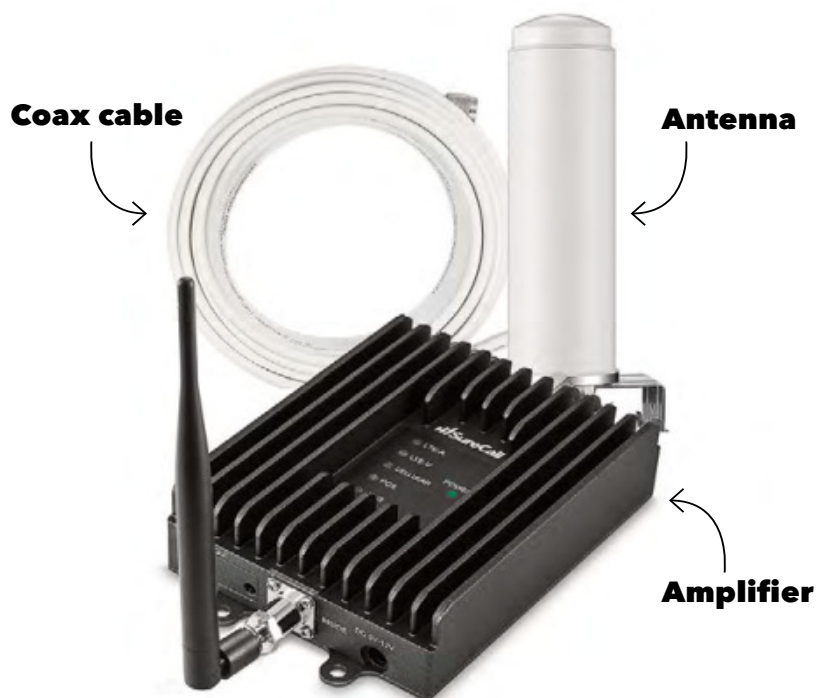
A video projector is just right for a camper; it can display movies or sports inside or on a big screen outdoors. I chose the Anker Nebula Capsule II (\$580 online). It's tiny, about the size of a 12-oz. can, but it can project a large image (up to 100 in. diagonal). You can connect it to various video sources via cables, but I just used my phone to wirelessly stream movies. To make a screen, I cut 1/2-in. medium-density overlay (MDO) plywood to size and coated it with Ultra HD screen paint (\$75 a quart online). To mount the projector, I rigged up a magnet on the ceiling.

Magnetic
base



CELL BOOSTER SYSTEM ▶

Whether designed for homes, cars or RVs, cell booster systems all work on the same principle. An outside antenna—larger and more effective than the one in your phone—receives a signal and sends it to an amplifier, which enhances and transmits the signal. I chose the SureCall Fusion2Go 3.0 (\$435 online).



REARVIEW CAMERA ▶

To make backing up safer and easier, I installed a camera on the back of the camper. There are lots of backup cameras available, but I narrowed the choices by searching for two features: First, I wanted a wireless model, to save the hassle of running cable through the camper's frame. (I still had to wire the power supply to the camera, but that was easier.) Second, I wanted high definition for a sharp image. Many backup cameras have 720P monitors. I chose a DoHonest 1080P model (\$160 online). Aside from running some low-voltage wiring, installation was as simple as riveting a bracket to the camper's shell.



TOP LEFT & BOTTOM LEFT: VIA AMAZON

TECH UPGRADES ARE EASY

Our technology improvements gave us bigger benefits with far less effort than the other projects. Until a few years ago, retrofitting audio or video equipment meant hours of wiring work, figuring out how to snake cables from one

device to another. Today, wireless systems like Bluetooth eliminate most of that hassle. We still had to hardwire some power supplies, but that was pretty simple. The small size of devices is another big plus. Our video projector, for

example, provides a large, sharp picture but takes up about as much space as an old transistor radio.

We did keep one piece of old technology, though: the main control panel. It no longer controls anything—but it looked so cool that we just couldn't bring ourselves to tear it out.



portable **PREP CENTER**

Running water
and a work surface
for convenient
outdoor cooking

BY GARY WENTZ



WHAT IT TAKES

TIME	COST	SKILL LEVEL
1 day	\$250	Beginner

TOOLS & MATERIALS

Basic hand tools, drill/driver,
jigsaw, circular saw

Even when you've left behind the comforts of your kitchen, you still need to wash vegetables or season the steak before mealtime. This table makes those tasks a whole lot easier. The sink serves up running water, while the countertop gives you a convenient work surface. When you head for home, the whole thing folds up for easy transport. And when you get home, you just might find it perfect for the patio.



1 BUILD THE BOX
Arrange the box parts with the best-looking sides facing outward, and join the corners with trim-head screws. Choose the top and the front of the box and label them to prevent confusion later.

2 DRILL THE LEGS
A drill press is best for making the bolt holes in the legs. But if you don't have one, a homemade drill guide will help you bore the holes straight. All you need are a couple blocks cut at 90 degrees.



PLANNING AND BUILDING TIPS

■ This prep table is intended for outdoor use and will withstand a little rain, but it isn't built for constant exposure to the weather. When you're not using the table, protect it with a tarp or grill cover.

■ I used poplar because it's knot-free, fairly hard and mid-priced. The countertop panel is aspen.

■ I cut the legs from 1x6 stock, but some home centers carry 2-1/2-in.-wide material, which would let you skip that step.

■ The upper ends of the legs must be rounded. I traced around a can of spray paint and cut the curves with a jigsaw.

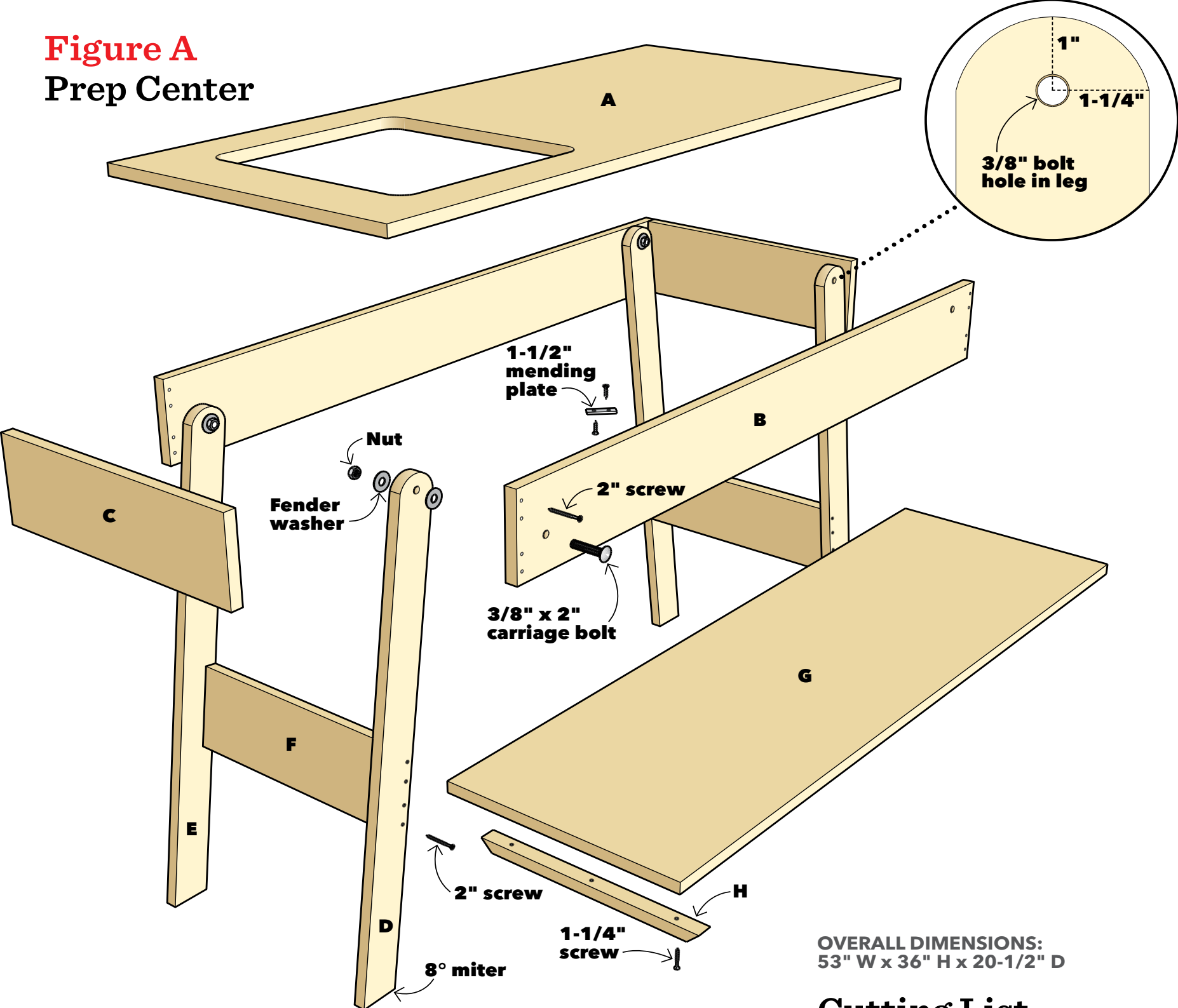
■ The sink is optional. Without it, you'll gain more work surface, making the table useful for other tasks.

■ The lower shelf is optional. It's handy and it adds strength and stability, but it's not absolutely necessary.

■ To position the shelf cleats, set the shelf on the stretchers, trace along them and then screw the cleats along the traced lines.

■ I finished the table with a couple coats of spar urethane. It will hold up to water and is easy to renew with a fresh coat.

Figure A
Prep Center



OVERALL DIMENSIONS:
53" W x 36" H x 20-1/2" D

Cutting List

KEY	QTY.	SIZE	PART
A	1	20-1/2" x 48"	Top
B	2	5-1/2" x 46"	Box sides
C	2	5-1/2" x 17"	Box ends
D	2	2-1/2" x 33-1/4"	Short legs
E	2	2-1/2" x 35-1/2"	Long legs
F	2	5-1/2" x 15-3/8"	Stretchers
G	1	15-1/8" x 48"	Shelf
H	2	1" x 14-1/2"	Cleats

Materials List

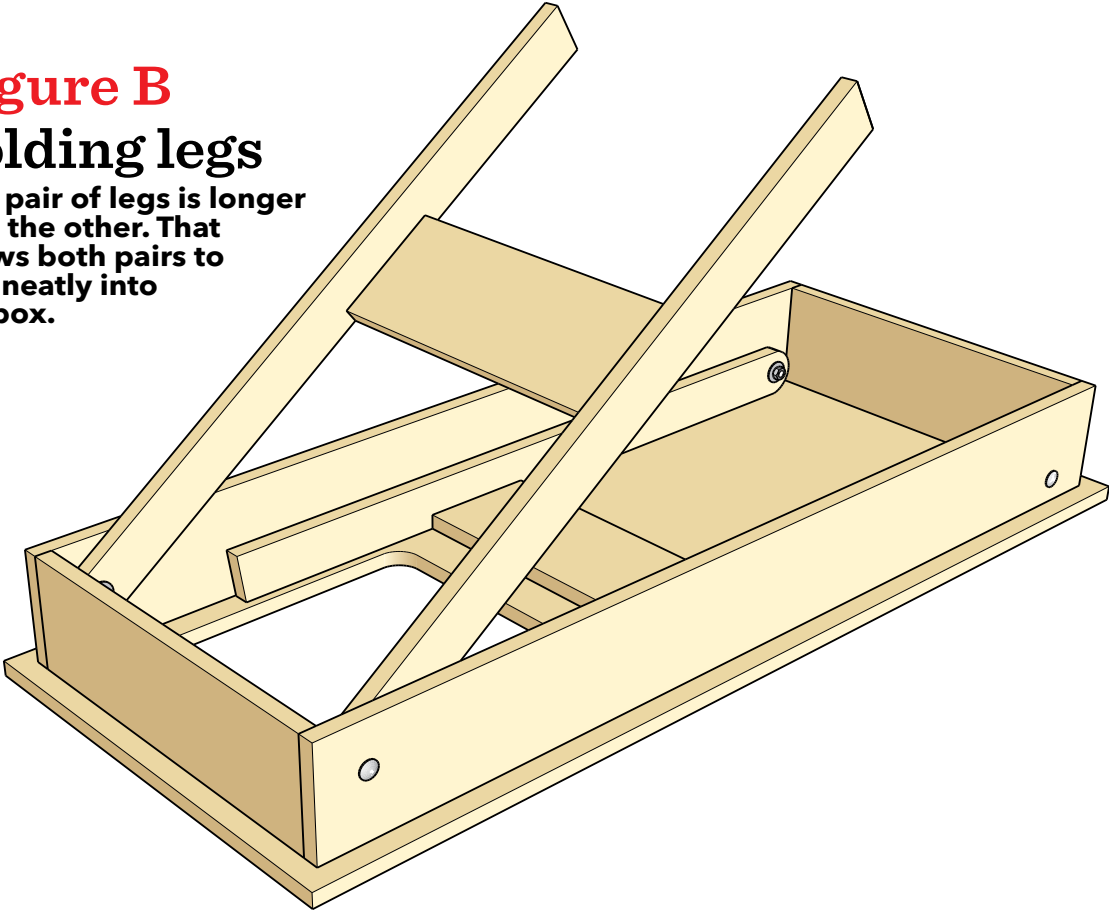
ITEM	QTY.
1x6 x 8'	3
24" x 48" solid wood panel	1
20" x 48" solid wood panel	1
3/8" x 2" carriage bolts and nuts	4
3/8" fender washers	8
1-1/2" mending plates	8
2" trim-head screws	
Finishing supplies	

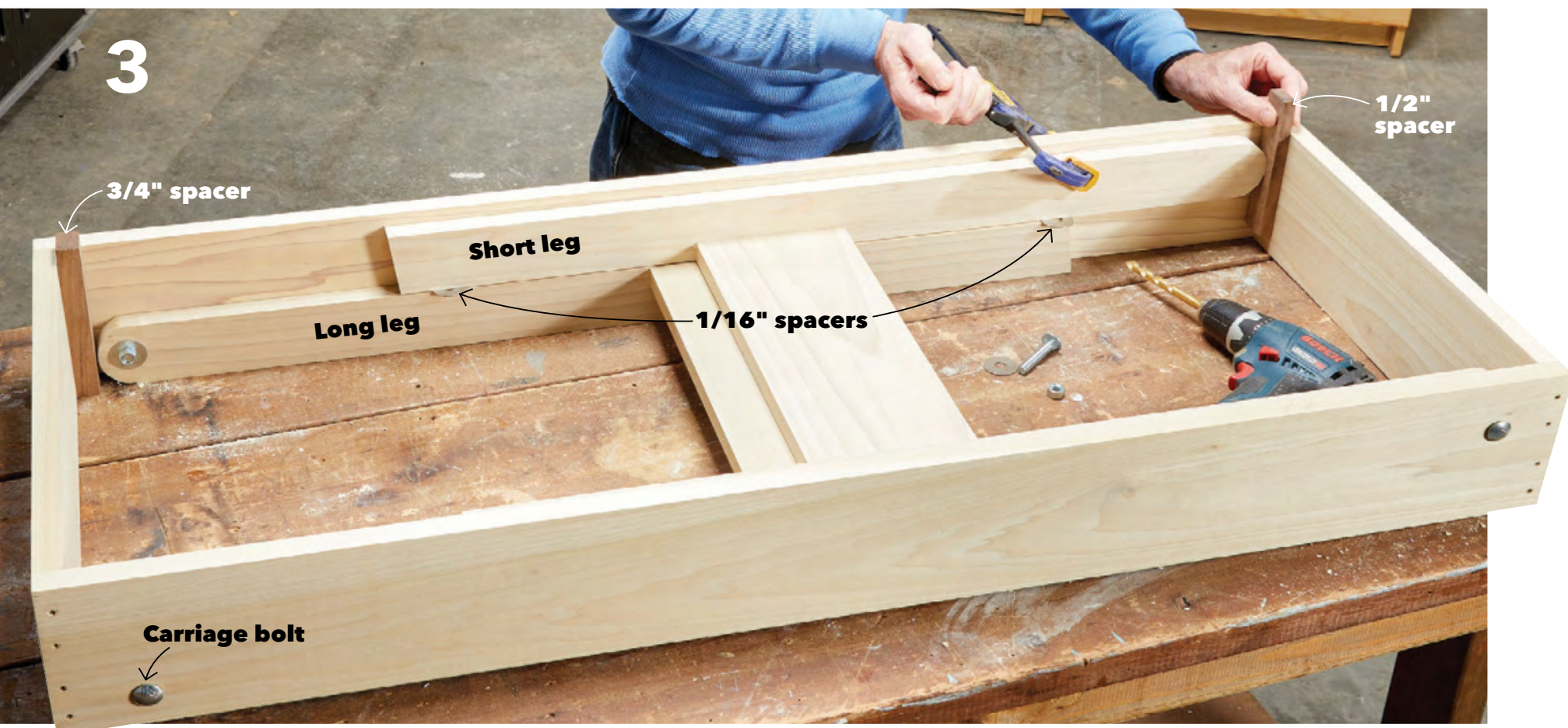


MEET THE EXPERT
As editor-in-chief of *Family Handyman*, Gary Wentz lies awake nights dreaming up projects like this one.

Figure B
Folding legs

One pair of legs is longer than the other. That allows both pairs to fold neatly into the box.



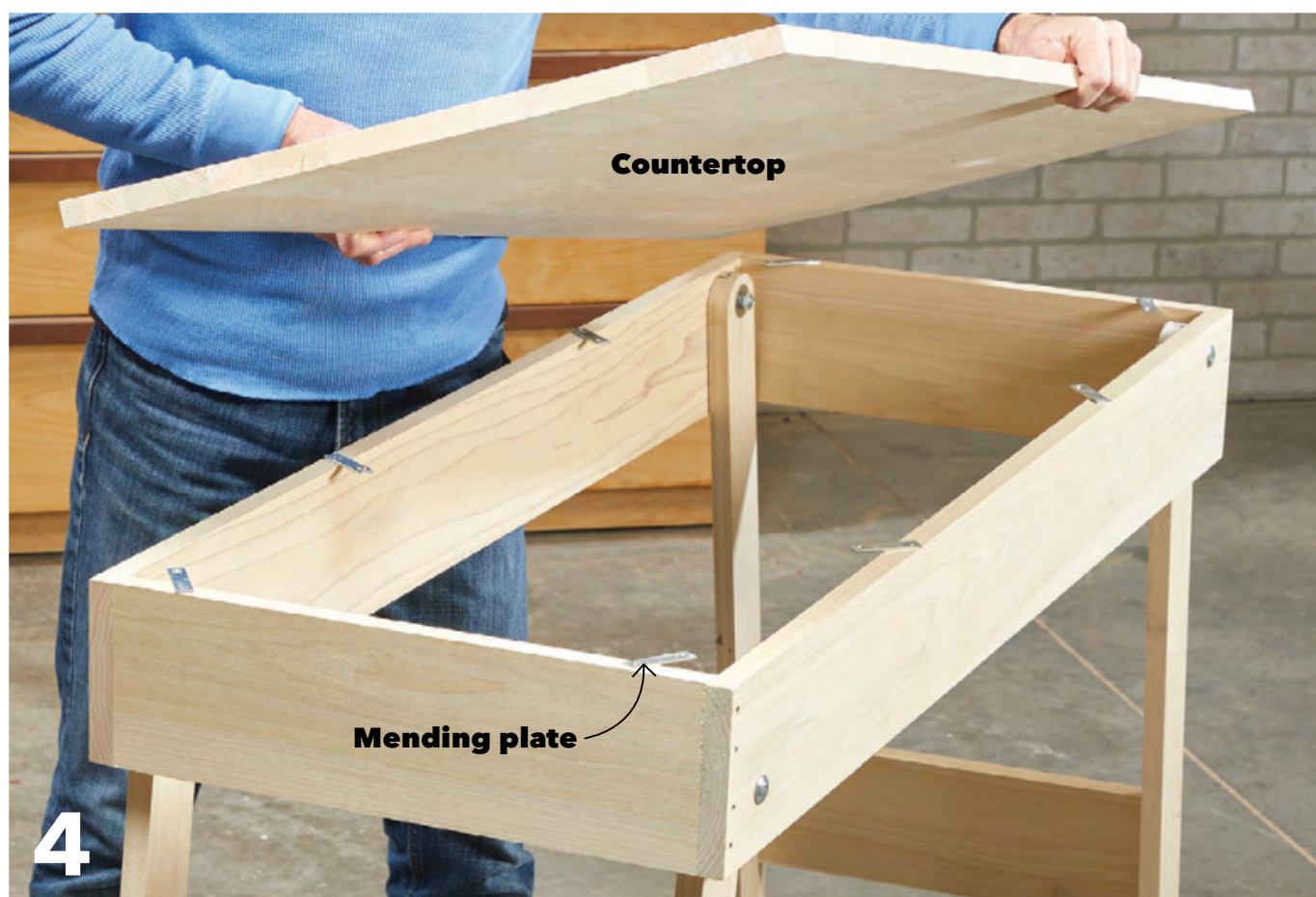


3 DRILL THE BOLT HOLES

Assemble the leg sets. Lay the longer set in the box against a 3/4-in. spacer. Drill through the box, using the leg holes as a guide. Bolt the legs to the box. Then place the short legs on the long legs against a 1/2-in. spacer. Slip 1/16-in. spacers between the legs, then drill and bolt the legs into place.

4 INSTALL THE COUNTERTOP

Place each 1-1/2-in. mending plate at an angle on the top of the box, and screw it into place. Center the countertop and screw the plates to it. The plates will allow the top to move slightly as it shrinks and swells with changes in humidity.



5 CUT THE SINK HOLE

Place the sink upside down on the countertop and trace around it. Then mark your cutting lines 1/4 in. inside the traced lines. Drill a starter hole and cut along the inner lines. Install the sink according to the manufacturer's instructions. **Tip:** Drive a screw into the cutout to provide support as you finish the cut.



How I plumbed the sink

This setup enables you to easily switch between two water supplies, for use away or at home. The female garden hose adapter under the faucet can be connected to tubing that leads to a foot pump as shown, or it can connect to a garden hose and outdoor faucet. I bought the Whale Babyfoot galley pump online for \$50. I found the rest of the items at a local home center for about \$100.



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INSTALL AN OUTDOOR HANDRAIL

Add safety and style with a custom railing

BY JEFF GORTON

A new iron handrail on the front steps will enhance your home's curb appeal, but the real benefit is the safety it provides. Whether you need to replace a wobbly old railing or add a railing where there isn't one already, we'll show you how to order and install a new one.

Iron handrails range in price from \$50 to \$150 and up per running foot. In addition, some companies charge several hundred dollars to measure for and install the railing. Here's where you can save cash. We'll show you how to measure a simple set of steps so you can order a custom railing. If your entry steps are curved, have jogs or are an unusual shape, ask the railing company to measure for you. Either way, we'll also show you how to securely bolt the completed railing to your concrete steps.

Order a custom railing

Careful measuring is the key to a successful handrail order. **Photos 1 - 4** show how to take the measurements you'll need to order the railing. Record the measurements on a sketch as we show at right. Take the sketch to the railing fabricator to place the order.

Most large cities have an iron railing fabricator that will be glad to show you the railing designs it sells. There are a few standard styles—you just have to choose between

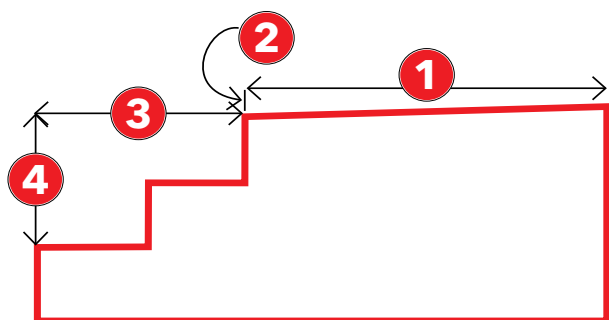
straight and twisted spindles, and perhaps between a top rail that starts with a "lamb's tongue" like ours (**Photo 8**), and a scroll.

We added a few upgrades to the basic railing to come up with our design. First we chose to install a brass cap rail. Then we added a second rail 4 in. below the top. We also increased the size of the straight spindles from the standard

1/2-in. width to 5/8 in. for a heavier appearance. For an easy do-it-yourself installation, ask the railing company to weld 3-in.-square stainless steel plates to the bottom of each post and drill 3/8-in. holes in all four corners. Then you can simply bolt the rail to the stairs as we show here. Get a quote from your fabricator for your railing design.

PHOTO: JON LOVETTE/GETTY IMAGES

After ordering your custom railing, you'll probably have to wait a few weeks for it to be completed. But once you get the railing home, it'll take you only a few hours to do a top-notch installation. The only special tool you'll need is a hammer drill with a 3/8-in. masonry bit. You can rent a large hammer drill for about \$30 for four hours, and the bit will cost about \$10. Purchase 3/8 x 1-7/8-in. sleeve anchors and 5/16-in. cap nuts for each. Make sure you wear safety glasses and hearing protection when you're drilling.



Make a simple sketch and jot down four measurements to help the fabricator build a perfect railing.

1 MEASURE THE LANDING

If you're installing railings on both sides, make separate sketches and take separate measurements for each side.

2 MEASURE THE SLOPE

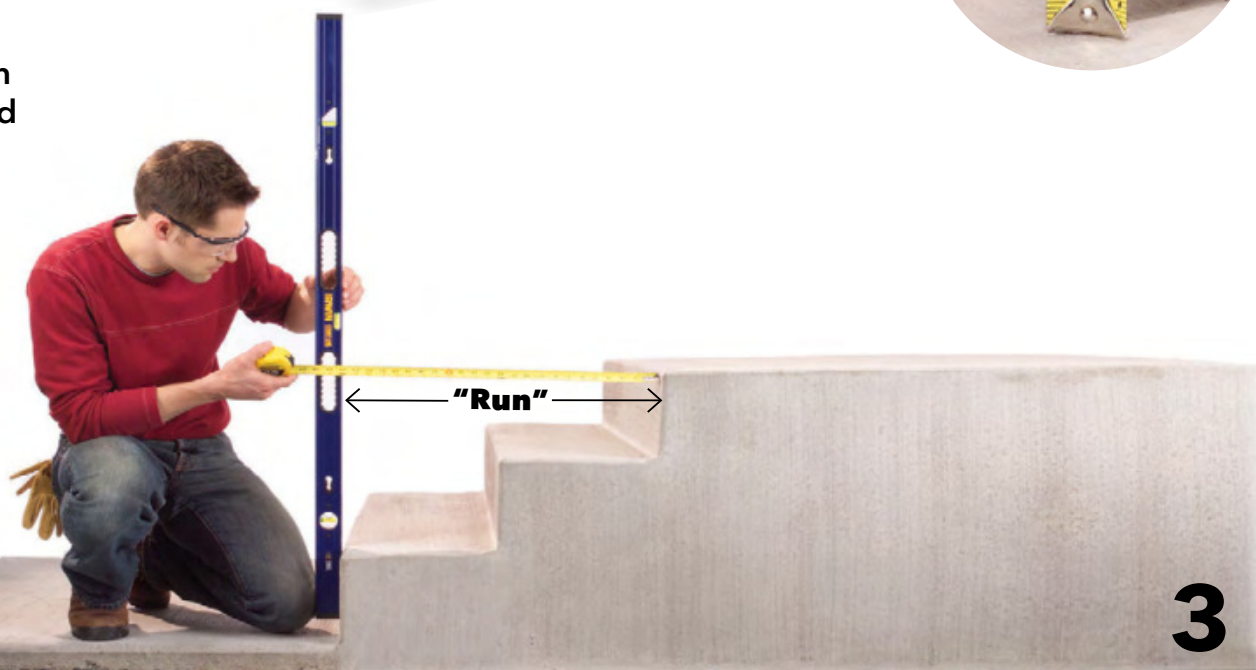
Lay a level on the landing and shim it until the bubble is centered. Then measure the gap between the level and the landing.

3 MEASURE THE RUN

Hold a level against the lowest step and adjust it until the bubble reads plumb. Then measure from the edge of the level to the edge of the landing.

4 MEASURE THE RISE

Lay a level on the landing and adjust it until the bubble is between the lines. Measure from the level to the top of the bottom step to determine the total rise of the two steps.



Strong anchors make for a sturdy railing

Sleeve anchors provide strong support in solid concrete. But the pressure exerted by the anchors as you tighten the nuts can crack or “blow out” concrete that’s not structurally sound. Before you order a new handrail, be sure the concrete is solid—that is, free of cracks and surface deterioration.

If your steps are covered with brick or stone, materials that can easily crack, you may have to use a different anchoring method, such as a two-part epoxy anchoring system. Ask the railing fabricator for advice before you order the rail.

Photos 5 and 6 show how to locate and drill for the anchors. Set the railing on the steps with the edge of the plates at least 1-1/2 in. from both the front and the side of the step. Adjust the railing position until the mounting plates are parallel with the side of the steps. Then mark the hole locations with the drill while the railing is in place to ensure accurate bolt placement.

Start by drilling one starter hole through each of the end brackets and dropping an anchor bolt into the hole. This keeps the railing from shifting while you mark the remaining holes. When all the holes have been marked, remove the railing and complete the holes by drilling them 2-1/2 in. deep. Drill vertical holes; otherwise, the plate may not fit over the bolts. Set the gauge on your hammer drill for accurate hole depth.

When all the holes have been drilled, tap anchor bolts into each one and set the railing into place (**Photo 7**). Snug up the bolts, but don’t fully tighten them until you’ve checked the posts for plumb (**Photo 8**).



5 LOCATE THE ANCHOR HOLES

Position the railing with the plates an equal distance from the edges of the steps. Drill one hole at each end and drop in anchors to hold the railing in place. Then mark the remaining holes by drilling shallow starter holes.

6 DRILL ANCHOR HOLES

Set the railing aside and drill 2-1/2-in.-deep holes.

7 INSTALL THE ANCHORS

Tap in the anchors. Then remove the nuts, set the railing into place and snug up the nuts.





Stainless steel washers

Shim posts for a perfect installation

Out-of-level steps can cause the handrail posts to lean. **Photo 8** shows how to check for and solve the problem. We used stainless steel washers because they're thinner than galvanized washers and won't rust. They're readily available at hardware stores and home centers. As an added precaution against corrosion, spread a layer of high-quality caulk under each plate before bolting them down. This keeps water out of the bolt holes and provides a little extra strength.

For a neater-looking job, we cut off bolts that were too long and replaced the hex nuts with decorative cap nuts (**Photos 9 and 10**). The railing company painted the cap nuts to match the railing.

8 CHECK THE POSTS

If a post leans, loosen the nuts and slide a washer under the side it leans to. Snug the nuts and recheck the post.

9 CUT THE BOLTS

Saw the bolts flush to the hex nuts with a hacksaw. Then remove the hex nuts.

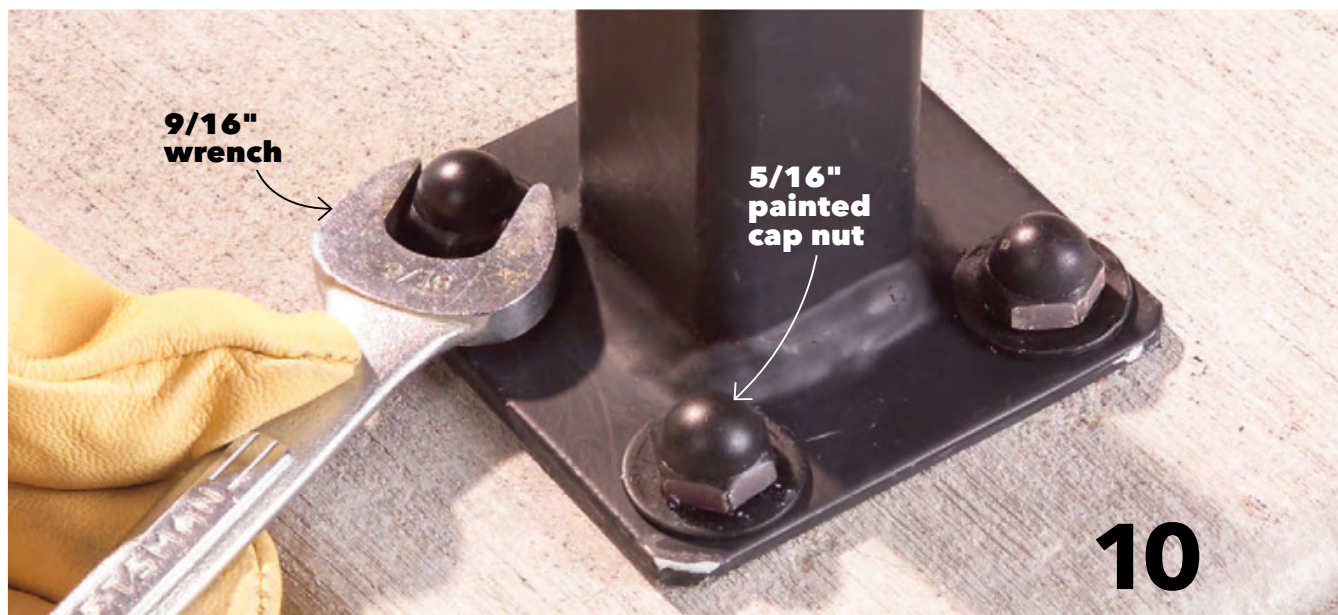
10 ADD CAP NUTS

Thread cap nuts onto the bolts and tighten them.



Mini hacksaw

Hex nut



9/16" wrench

5/16" painted cap nut

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BY DAVID RADTKE



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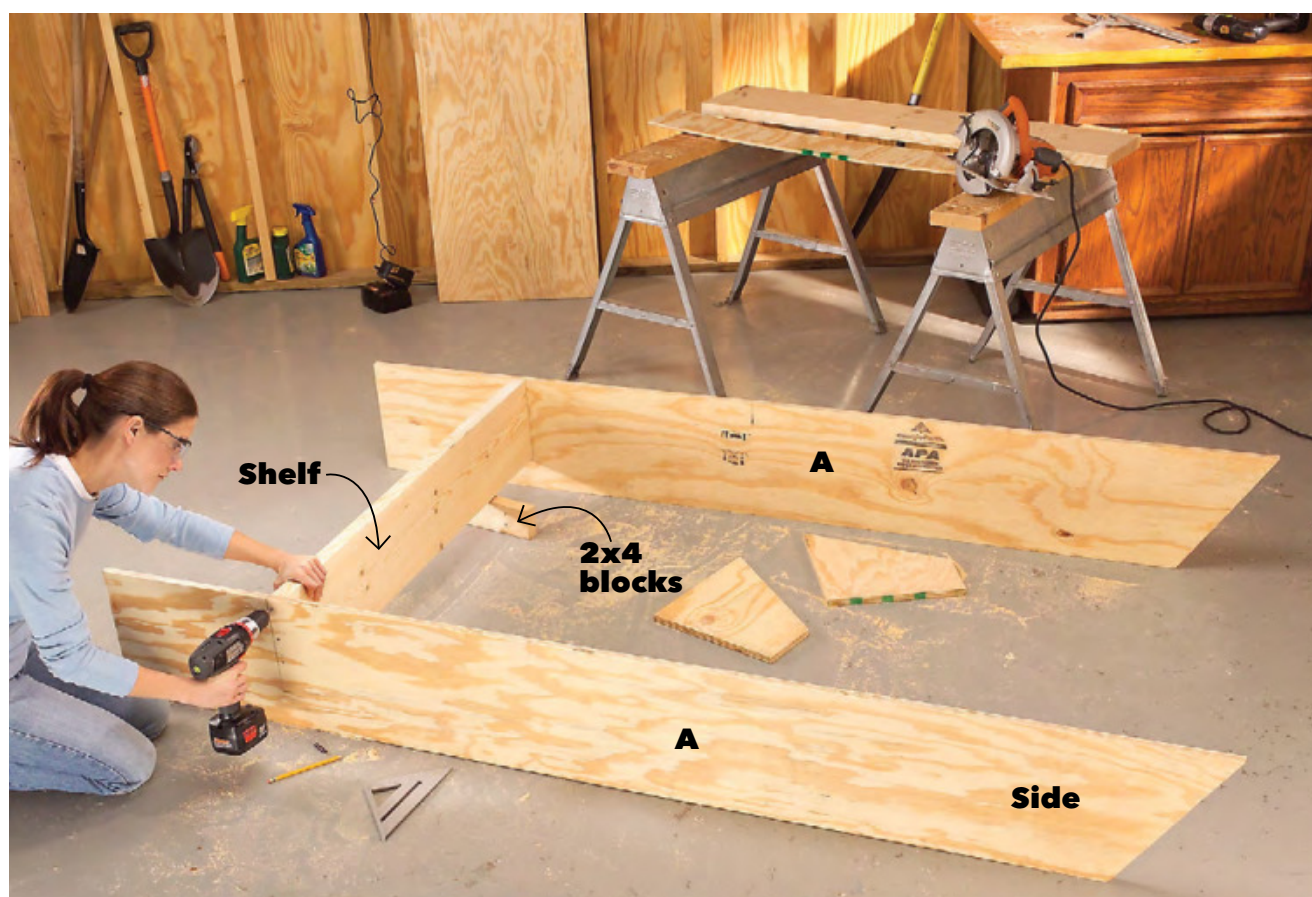
Intermediate

TOOLS & MATERIALS

Basic carpentry tools,
drill/driver, circular saw



Most of us store our yard and garden tools in the garage because that's the only space available. But here's a better solution: This cabinet lets you clear clutter out of your garage and put tools near the places where they get used. And, designed especially for yard tools, it keeps them organized and accessible. It doesn't have the capacity of a shed, of course, but it makes efficient use of every inch and takes up only a small area of your yard or patio. It's also easy to build, even if you've never tackled a carpentry project like this one.

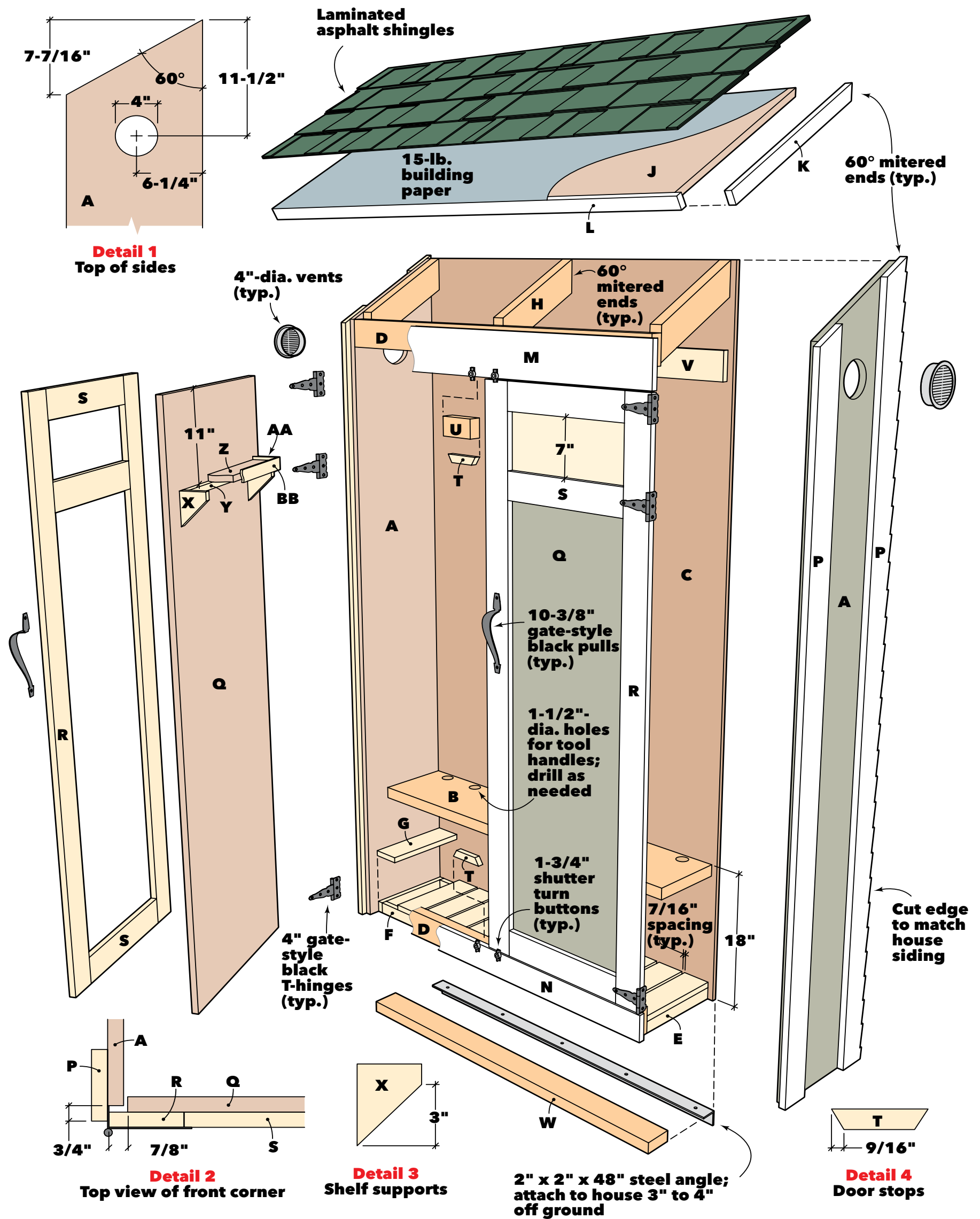


1 ASSEMBLE THE BOX

Cut the plywood sides and 2x10 shelf, prop up the shelf with 2x4 blocks and fasten the sides to the shelf with 2-in. screws.

Figure A
Garden Tool Cabinet

61-1/2" WIDE x 92" TALL x 20" DEEP

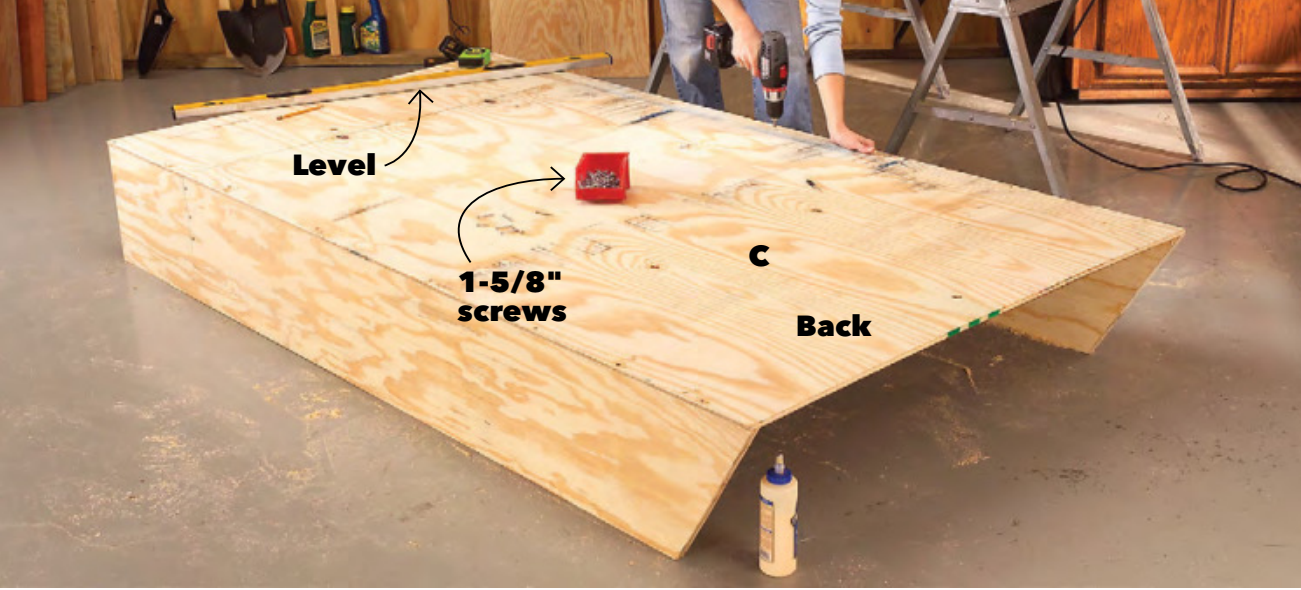


Assemble the main box

Exterior-grade plywood is the basic building material for this project. Unfortunately, you'll never find absolutely flat pieces of plywood at a home center or lumberyard, but the flatter you can find them, the better this project will turn out. Choose "BC" grade plywood. Put the good side ("B") on the outside and the "C" side inside.

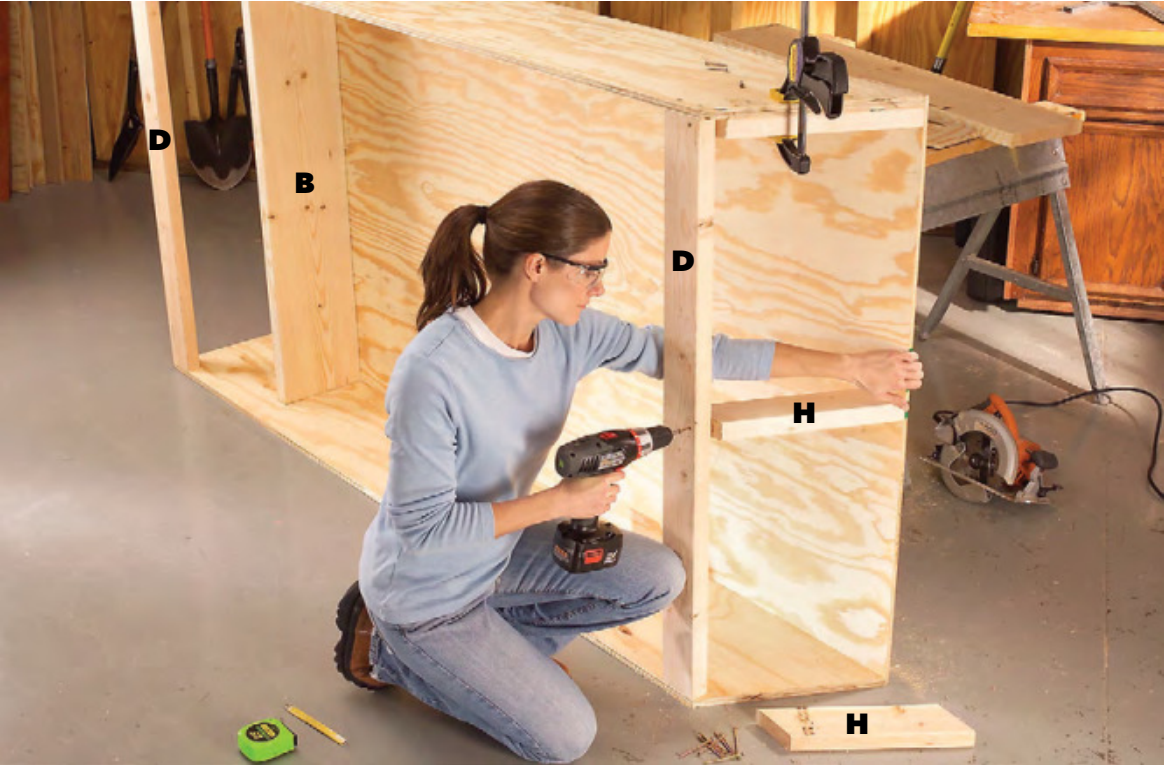
Once you get the plywood home, keep it out of the sun or your flat panel will turn into a tortilla chip in no time. It's best to cut the pieces in the shade or in your garage. A long straightedge cutting guide for your circular saw will help you get nice straight cuts if you don't have a full-size table saw. Look at the Cutting List below and cut all the parts to size except the door stiles, rails and trim pieces, which are best cut to fit once you've constructed the main plywood box.

Choose the flattest sheet of 3/4-in. plywood for the door cores. As you lay out all the pieces, choose the best-looking side of the plywood for the painted parts. The sides of the cabinet form a 30-degree slope for the roof. Use a Speed square (see Photo 1) to mark the angled roof supports (H) and ends of the trim pieces that follow the roofline. It's easier to cut



2 ADD THE BACK

Screw the back to the sides and center shelf. Use a level or straightedge to mark the shelf location on the back side of the plywood.



3 FRAME THE ROOF

Cut the subrails (D) and the roof supports (H), then screw them into place. Use 2-in. screws for the subrails and 3-in. screws for the roof supports.

Materials List

ITEM	QTY.
3/4" x 4' x 8' BC plywood	2
1/2" x 4' x 8' BC plywood	1
2x10 x 4' pine	1
2x4 x 8' pine	2
1x6 x 8' pine	1
1x4 x 8' pine	12
1x2 x 8' pine	3
2x4 x 8' treated wood	1
12" x 48" hardware cloth (1/4" grid)	1
Bundle of asphalt shingles	1
3' x 5' strip of 15-lb. building paper	1
1-5/8" galv. screws	2 lbs.
2" galv. screws	2 lbs.
3" galv. screws	1 lb.
4" T-hinges	6
Shutter turn buttons	4
4" round vents	2
1-1/4" finish nails	1 lb.
1/4" x 3" galv. lag screws, washers	9
2" x 2" steel angle	1
7/8" shingle nails	1 lb.
Exterior wood glue	16 oz.

Cutting List

KEY	QTY.	SIZE	PART	MATERIAL
A	2	3/4" x 12-7/8" x 90	Sides	Plywood
B	1	1-1/2" x 9-1/4" x 46-1/2"	Shelf	Pine
C	1	1/2" x 48" x 90"	Back	Plywood
D	2	1-1/2" x 3-1/2" x 46-1/2"	Subrails	Pine
E	2	3/4" x 1-1/2" x 11-3/8"	Bottom cleats	Pine
F	2	3/4" x 1-1/2" x 45"	Bottom cleats	Pine
G	12	3/4" x 3-1/2" x 11-3/8"	Bottom slats	Pine
H	3	1-1/2" x 3-1/2" x 15-1/8"	Roof supports	Pine
J	1	3/4" x 21-7/8" x 60"	Roof	Plywood
K	2	3/4" x 1-1/2" x 21-7/8"	Roof trim	Pine
L	1	3/4" x 1-1/2" x 61-1/2"	Roof trim	Pine
M	1	3/4" x 5-1/2" x 48"	Upper trim rail	Pine
N	1	3/4" x 3-1/2" x 48"	Lower trim rail	Pine
P	4	3/4" x 3-1/2" x 91"	Side trim	Pine
Q	2	3/4" x 23" x 72-3/4"	Doors	Plywood
R	4	3/4" x 3-1/2" x 72-3/4"	Door stiles	Pine
S	2	3/4" x 12-7/8" x 90"	Door rails	Plywood
T	2	3/4" x 1" x 4-1/2"	Door stops	Pine
U	1	1-1/2" x 2-7/16" x 4-1/2"	Door stop support	Pine
V	1	3/4" x 3-1/2" x 46-1/2"	Hang rail	Pine
W	1	1-1/2" x 3-1/2" x 48"	Mounting board	Treated
X	1	3/4" x 3" x 4"	Shelf supports	Pine
Y	1	3/4" x 3/4" x 16-1/2"	Shelf mounting cleat	Pine
Z	1	3/4" x 3" x 20"	Shelf	Pine
AA	2	1/4" x 1-1/2" x 3"	Shelf edging	Pine
BB	1	1/4" x 1-1/2" x 20-1/2"	Shelf edging	Pine



4 INSTALL FLOOR SLATS

Glue and nail the 1x2 cleats (E and F) to the sides, back and subrail (D) and then screw the 1x4 floor slats (G) to the cleats. Start with the center slat and leave 7/16-in. gaps.



5 INSTALL THE ROOF

Mount the 1x2 roof trim to the 3/4-in. plywood roof, then center it and mark the position. Then temporarily screw it to the roof supports with a pair of 2-in. screws on each side.



6 TRIM THE SIDES

Glue and screw the 1x4 side trim to the plywood sides, keeping the trim pieces 3/4 in. proud at the front. Cut the 4-in.-diameter side vents.

accurate slopes on the larger side pieces (A) by first measuring each side, marking a diagonal line from point to point and then cutting along the mark. Assemble the main box of the cabinet as shown in **Figure A** and **Photos 1 - 5**. Drill pilot holes for all screws with a No. 8 combination countersink and pilot bit. Use 2-in. galvanized deck screws to fasten the sides to the shelf and 1-5/8-in. screws to fasten the back to the sides.

Note: Cut a piece of 1/4-in. hardware cloth to fit under the floor slats of the cabinet. This wire mesh will keep furry critters from making your tool cabinet their home.

Cut the roof panel (J) and trim pieces (K and L), then glue and nail the trim to the front and side edges of the roof panel. Center the panel (**Photo 5**) and temporarily screw it to the roof supports so you can install the side trim (P) and the upper rail (M).

Add trim and assemble the doors

Make sure to extend the front edge of each side. Set the trim (P) 3/4 in. beyond the front edge of the plywood side (**Photo 6**). Next cut and nail the front upper rail (M) and the lower rail (N) to the subrails. Both ends should butt tightly to the side trim.

Even though the doors are made mainly from plywood, the rail and stile trim boards glued and screwed to the front side give the doors a handsome frame-and-panel look. Be sure to lay the doors out on a flat surface and then glue and nail the stiles (long vertical pieces) and rails (short horizontal pieces) to the plywood surface. The stile on each hinge side must hang 3/4 in. past the plywood (see **Photo 10 inset**).

You'll need to alter the factory T-hinge for the inset design of the doors. The hinge flap is screwed to the side trim (P) as shown in **Photo 8**. If you were to use the factory-supplied pan head screws, the door would bind on the screw heads. To solve this problem, taper the edges of the existing holes with a countersink bit. Remove just

enough steel (**Photo 7**) so the head of the tapered No. 8 x 3/4-in. screw fits flush with the hinge flap surface.

Cut the small door stops with a handsaw and then glue and nail them to the edges of the subrails. With the door stops in place, set the doors into the opening. Make sure you leave a 1/8-in. gap at the top and bottom and a 3/16-in. gap between the doors. You may need to plane or belt-sand the door edges to get a good fit.

Note: Because the flaps of the hinge that fasten to the side trim are about 7/8 in. wide instead of 3/4 in., your doors will sit about 1/8 in. proud of the side trim.

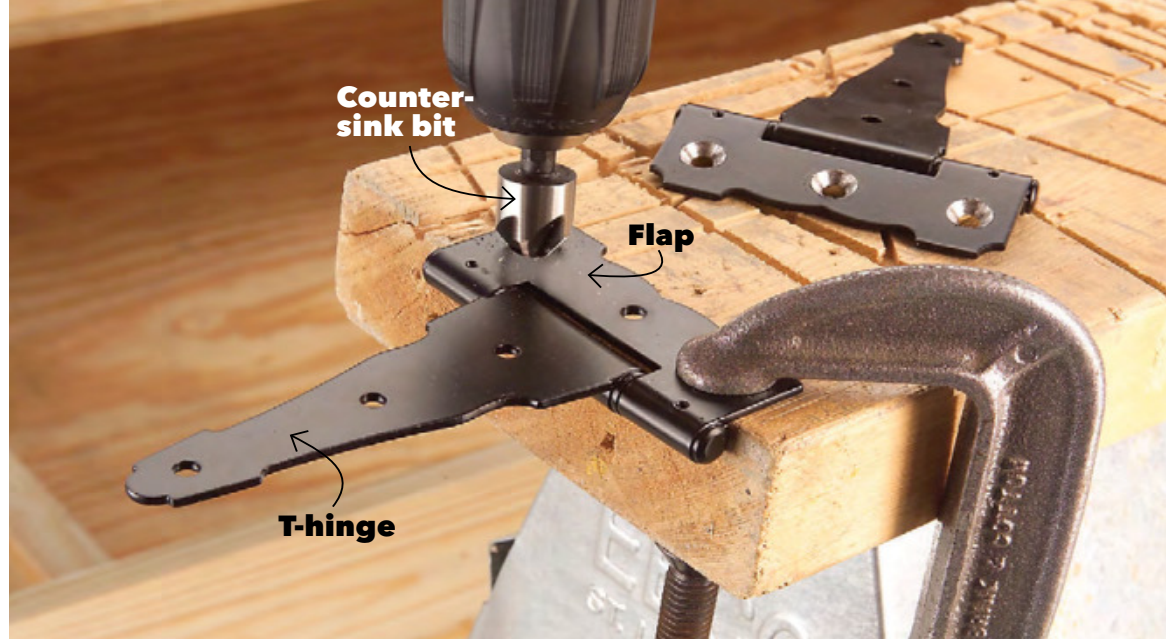
Mount the cabinet to the wall

Fasten a 4-ft. 2x4 to the top flange of a 4-ft.-long piece of steel angle (**Figure A**). At a hardware store, you can usually find steel angle that measures 1-1/2 in. x 1-1/2 in. with holes drilled every 3 in., but any steel angle that's at least 1/8 in. thick will do.

Locate the exact position of your cabinet on the wall at least 3 in. above grade and then fasten the angle to the wall with 1/4-in. galvanized lag screws. It must be level. You may need to cut a course or two of siding to get the angle to lie flat. Our slab was several inches off the ground, so I drilled into the side of the slab, installed lag shields and fastened the angle. If your slab is too close to the ground, you can fasten the angle farther up into the wood studs of the garage. The weight of your cabinet rests entirely on this wall cleat. It's not necessary to fasten the bottom of the cabinet to it.

Mark the locations of the wall studs on the cabinet back. Locate three 1/4-in.-diameter pilot holes in the hang rail (V) and another three holes 4 in. up from the bottom at the stud locations.

Now, strap your cabinet to a furniture dolly (with the doors and roof removed to reduce the weight) and wheel it over to the wall cleat. Set the cabinet onto the cleat, center it and temporarily brace it against the wall. Drill 5/32-in. holes into the wall studs



7 COUNTERSINK THE HINGES

Taper the holes in the inside of the hinge flaps to accept the tapered heads of the mounting screws.



8 MOUNT THE HINGES

Position the flaps of the hinges against the plywood sides at the centers of the door rail locations. Drill pilot holes and drive the screws into the side trim to secure the hinges.



9 BUILD THE DOORS

Glue and nail the door rail and stile trim to the 3/4-in. plywood core. Overhang the stile on the hinge side of each door 7/8 in. See **Figure A** for the exact placement.



10 HANG THE DOORS

Install the door stops (Figure A), then set each door into its opening. Use the decorative pan head screws provided by the manufacturer for the long decorative flap on the door surface.



11 MOUNT THE CABINET

Fasten a steel angle to the foundation with a 2x4 attached to its top (Figure A). Lift the cabinet into place and stabilize it with an 8-ft. 2x4 brace against the ground, forcing the cabinet back against the wall.



using the existing pilot holes as a guide. Drive the 3-in. lag screws and snug the cabinet to the wall.

Finishing touches

Lay the side trim (P) against the siding. You may need to cut it with your jigsaw to conform (**Photo 12**). Screw the roof panel to the cabinet. Staple a layer of 15-lb. building paper to the roof panel and shingle the panel using 7/8-in. roofing nails. Avoid driving shingle nails through the overhangs where the points might show. When you get to the last course, trim the shingles to fit and run a bead of matching caulk at the siding to seal the edge.

Rehang the doors and then mount the door handles and the catches at the top and bottom of the door. Wait to add your vents until you've finished painting. We spray-painted the vents to match the color of the sides.



12 FIT THE TRIM

Scribe the 1x4 side trim to fit the siding. Cut the notches with a jigsaw. Nail it to the cabinet side. Screw on the roof panel and shingle it.

NOTE: If you have vinyl, aluminum or steel siding, here's how to prevent the siding from deforming as you tighten the cabinet to the wall. Instead of tightening the lag screws one at a time, gently tighten them alternately to even out the pressure as you go.

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Best Pro Tips

Expert advice from the job site. By Gary Wentz

Smooth walls with beginner skills

9 LESSONS FROM VETERAN DRYWALL TAPERS



1 Eliminate as many hard-to-hide butt joints as you can

To hide "butt joints" (where two non-tapered ends of drywall meet), you have to build up a hump of joint compound that's very thin and wide. This is time consuming and difficult to do well. So if you're a novice drywall finisher, you'd be smart to avoid butt joints.

The best way to avoid butt joints is to use sheets of drywall that are long enough to run the entire length of walls and ceilings. As a result, you'll have only tapered joints to finish. Drywall sheets are commonly available in 8- and 12-ft. lengths, and specialty drywall suppliers carry longer sheets (up to 20 ft.!).

If your ceiling is longer than your sheets, you can't avoid butt joints. But you can still avoid butt joints on a long wall. Simply hang the sheets vertically rather than horizontally. That way, you'll have several tapered joints to cover, but no butt joints. Hanging drywall vertically is slower than hanging it horizontally because you have to make sure the tapered edges fall at the centers of studs. Cut the first sheet to width so the tapered edge lands on the center of a stud. After that, the edges of each sheet should fall perfectly on studs. If you run into misplaced studs, nail 2x2s to them. If you have 9-ft. ceilings, call a drywall supplier to find 10-ft. sheets.

2 Use mesh tape, not paper

Paper tape is the strongest choice for joints. But in less-skilled hands, it can ripple, slip or trap air bubbles. If you push too hard as you embed it, you'll squeeze out all the joint compound behind it and the tape will peel off later.

Adhesive-backed mesh tape eliminates those glitches. Just stick it in place and it stays put. And since it doesn't require an underlying layer of compound, mesh allows for a thinner buildup over butt joints and repairs. You can use it anywhere except on inside corners.

Since mesh tape isn't as strong as paper, some pros insist on using setting-type joint compound because it's stronger than premixed types. Whichever compound you choose, apply mesh tape no more than a few hours before covering it. Left uncovered, it will eventually fall off.

3 Fill joints faster with setting-type compound

Mixing setting compound is a messy nuisance, but it's sometimes worth it. Setting compound has three advantages over premixed types: It's stronger, it hardens faster and it shrinks much less. Quick hardening and low shrinkage make setting compound perfect for deep filling. A thick layer of premixed compound takes days to dry and it shrinks. You'll need several coats to fill the depression, and the more layers you add, the harder it is to get smooth results.

For small repair jobs, you can mix setting compound with a paint paddle. For larger jobs, use a corded drill with a mixer attachment. The key to a smooth, chunk-free mix is to let it stand for about five minutes after the initial mixing. That lets the chunks absorb water before final mixing.

The hardening time for setting compounds ranges from 5 to 210 minutes. The 45- or 90-minute versions are best for most jobs. Use a "lightweight" setting compound; other versions become so hard that sanding away mistakes is nearly impossible. Even lightweight versions are harder to sand than premixed compound, so it's best to use setting compound for the first coat and premixed for later coats. Clean up tools before the setting compound hardens.





4 Coat inside corners faster and smoother with a corner knife

It takes a steady hand to embed tape in inside corners with a standard dry-wall knife. One little slip of the knife and you'll gouge one side while you're smoothing the other. An inside corner knife (\$10) not only eliminates that problem but does the job faster. Outside corner knives are also available, but we don't recommend them, since corner bead makes smoothing outside corners almost foolproof.

Apply compound and place the tape as usual. Load some mud onto the corner knife to lubricate the knife and then spread a thin coat of compound over the paper. Start at the top of the corner and drag the knife down to about 16 in. from the floor. Then start at the floor and drag upward. Ease off when you reach the area that's already smooth. You may have to repeat this process two or three times to fully embed the tape and create a smooth, straight corner. A corner knife doesn't ensure straight corners, so reinforced corner tape is a good idea (see p. 65). Use a corner knife for the first coat only; after that, coat one side at a time, allowing the first side to harden before you coat the other.



5 Dunk paper tape to avoid bubbles and bulges

Paper tape can ripple, slip, bulge and bubble. But if you choose to use it, minimize these problems by dropping it into a bucket of water. Wet paper tape is more pliable, so fewer air bubbles get trapped behind it. Water also makes the paper slick; your knife slides over the tape without creating ripples or creases. Wetting doesn't eliminate the squeeze-out problem, so you still have to be careful to leave a thin layer of mud between the tape and the drywall. Don't let the tape soak—that will soften the paper and make it more susceptible to scuffs and tears.



METAL-BACKED TAPE IS MAGICAL
Embed reinforced tape at inside corners to provide a straight guide for your knife. Be careful not to kink the metal strips.

6 Keep corners straight with reinforced tape

Inside corners are tough to keep neat and straight. Unless you have a very steady hand, your knife can wander as you embed the tape. And if you create a wavy corner with the first coat of mud, straightening the corner with subsequent coats is almost impossible. The solution is to use tape that's backed with metal or plastic strips (\$12 for 100 ft. at home centers). This tape is especially helpful on odd-angled corners, which are very hard to keep straight. It's still possible to create a wavy corner if you push too hard, so apply light, even pressure as you smooth the joint compound. The strips reduce ripples and bubbles too, so there's no need to wet the tape. Don't overlap the tape where inside corners meet the ceiling. Instead, cut the tape short to avoid a triple-thick buildup of tape.

7 To lessen sanding, flatten bumps between coats

Everyone hates the dust cloud raised by sanding drywall. And the best way to minimize sanding later is to knock down high spots between coats. Left alone, high spots will grow higher and wider (and harder to fix) with each coat. Don't worry about low spots; subsequent coats will fill them.

If you used setting-type compound, inspect the joints before the compound has hardened completely. Run a 12-in.-wide knife over every joint. The blade will scrape off small ridges and nubs. More important, it will act as a straightedge, revealing larger bumps and bulges. When the compound is about the consistency of a bar of soap, you can easily shave down bulges without gouging. You can sand and scrape it after it's completely hard, but that's more work.

With standard joint compound, however, let each coat dry completely before inspecting, scraping and sanding. If you don't, the surface may be firm while the underlying material remains soft and easy to gouge.



SCRAPE BETWEEN COATS
Shave off high spots in setting-type compound before they harden. Allow standard joint compound to dry completely before you scrape and sand.

Partially hardened setting compound



SKIM IT SMOOTH
Flatten ridges with a knockdown knife. Press lightly as you drag the knife over joint compound.

8 Create a smooth surface with a knockdown knife

Feathering out a butt joint or skim-coating a whole wall is difficult. Your knife leaves ridges on the broad surface—and touching them up often creates even more ridges. The solution is a “knockdown” knife. With its soft rubber blade, this squeegee-like tool floats over the surface, flattening ridges without creating new ones.

A knockdown knife won’t scrape down big bulges or fill wide depressions, so make the surface as flat as you can with a 12- or 14-in. metal knife first. Then drag the knockdown knife gently over the surface in one continuous pass. Apply light, even pressure and don’t stop or hesitate. On a butt joint, you’ll have to make two or three passes to smooth the whole surface. You can make more passes, but stop before the compound starts to harden. The blade is soft, but it can still make a mess of partially hardened compound.

Knockdown knives are available in 18- and 22-in. widths at drywall suppliers and some home centers and hardware stores. A 22-in. is best for butt joints.

9 Keep crumbs out of your mud to prevent scars

You can’t create a smooth surface using joint compound that has crumbs of hardened compound in it. One tiny chunk clinging to your knife will leave a scar across the whole joint.

Cleanliness is the key to keeping your mud free of chunks. Scrape down the inside of the bucket every time you scoop out mud. Then wipe the sides clean with a wet rag. At the end of the day, cover the compound with a thin layer of water. The water will remain on top of the compound, so you can pour it off before you use the remaining mud. Never dump leftover compound from your mud pan back into the bucket; just throw it away.

To keep the pan and tools clean between uses, scour them with an abrasive sponge or immerse them in water. Setting-type compound will continue to harden even under water, so wash tools as soon as you’re done. Never send large amounts of setting compound down the drain—it can plug pipes.



KEEP YOUR MUD UNDER WATER
Prevent crumbs of dry compound from forming in the bucket. Wipe the inside of the bucket clean and cover the leftover compound with water.



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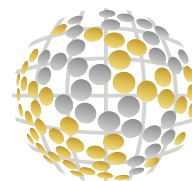
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FIXING DEAD SPOTS IN YOUR LAWN

Some spots need extra care

If you spilled fertilizer and killed a patch of grass, or if your dog made a deadly deposit on the lawn, you can't just sow new seed and expect it to thrive. Grass seed may not germinate there, and if you lay sod over the spot, it might slowly die.

Here's the solution:

You're up against contaminated soil. And whether the contamination is from fertilizer or dog urine, the solution is simple.

First, drive a spade deep into the ground and turn over clumps of soil. That buries the most contaminated top layer of soil deep in the ground, where the contaminants will dissipate before new roots grow down that far. Then flood the area with a garden hose for at least 15 minutes. The water will drive contaminants deeper into the soil. Now you're ready for seed or sod. Be sure to water the new grass daily until it's established.

IS URETHANE PAINT WORTH THE PRICE TAG?

Quality urethane paints cure to a harder, more durable finish than non-urethane paints. But they cost substantially more than non-urethane paints, ranging from \$65 to \$100 per gallon. Are they worth it? It depends on what you're painting. If you're painting walls and ceilings, surfaces that don't get hard use, acrylic latex paints are better. For trim, doors or cabinets, however, urethane paints might save you money over the long run, as they won't need to be repainted as often. Sherwin-Williams Emerald Urethane Trim Enamel, for example, was formulated specifically for durability, resistance to stains, scratches, abrasions, weathering and washing.

Urethane paints also have their place in exterior applications. Obviously, exterior doors benefit from a hard-wearing coating, but I wouldn't use urethane to paint my whole house. Because of its hardness, urethane paint may not expand and contract with building materials as well as acrylic latex paints. But for small projects such as railings, light posts and mailboxes, urethane paint may be more durable than other exterior paints.

That said, there are a few caveats: (1) No paint performs well without good prep work. (2) You can buy inexpensive urethane paints. You get what you pay for. (3) Don't skimp on application tools. For the highest quality finish, I recommend a synthetic soft-woven roller cover such as Purdy's White Dove series, and a nylon/polyester brush.



MEET THE EXPERT

Rick Watson has been with Sherwin-Williams for 32 years and is the director of product information and technical services.



Can I ignore a foundation crack?

If you notice a crack, see if it changes over time. If there's little or no change over a year, you're probably safe to ignore it. If there's significant change over a year (or less), consult with a foundation repair specialist. If the crack is letting in groundwater, take care of drainage problems on the exterior, then patch the crack. It may be helpful to patch any crack so you can more easily track any changes.



MEET THE EXPERT

Reuben Saltzman has been a home inspector since 1997 and is the president of Structure Tech, a home inspection company.

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AN ELECTRICAL PERMIT IS A BARGAIN!

When the topic of permits and inspections comes up, people often want to "avoid the red tape." Here are three excellent reasons to get an inspection:

- 1.** In Minnesota, for as little as \$35 (the minimum fee for a single inspection), you'll get a professional consultant on your project.
- 2.** You'll be positive your work is done correctly. Most homeowners do a good job because of all the do-it-yourself resources available. It's rare for an inspector to recommend hiring a contractor to fix the project. Inspectors want to help people pass inspection!
- 3.** If you're planning to sell your home, you can avoid selling problems. Real estate agents are wary of lawsuits, and home buyers are savvy, so it's easy—particularly with the help of a home inspector—to discover unpermitted work, which you may then be required to fix.

The National Electrical Code lays out all the requirements for protecting people and property from electrical hazards. But it's lengthy and at times hard to understand; it's best to contact your local, county or state inspector about projects you're planning.

Inspections are not only a bargain; they're required for the following projects:

- Wiring a new home
- Upgrading electrical services
- Room and porch additions
- Finishing basements
- Replacing light fixtures and ceiling fans
- Installing or replacing appliances, furnaces and air conditioners
- Installing wiring to detached garages and sheds
- Installing outdoor wiring and wiring for hot tubs and swimming pools.

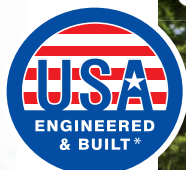


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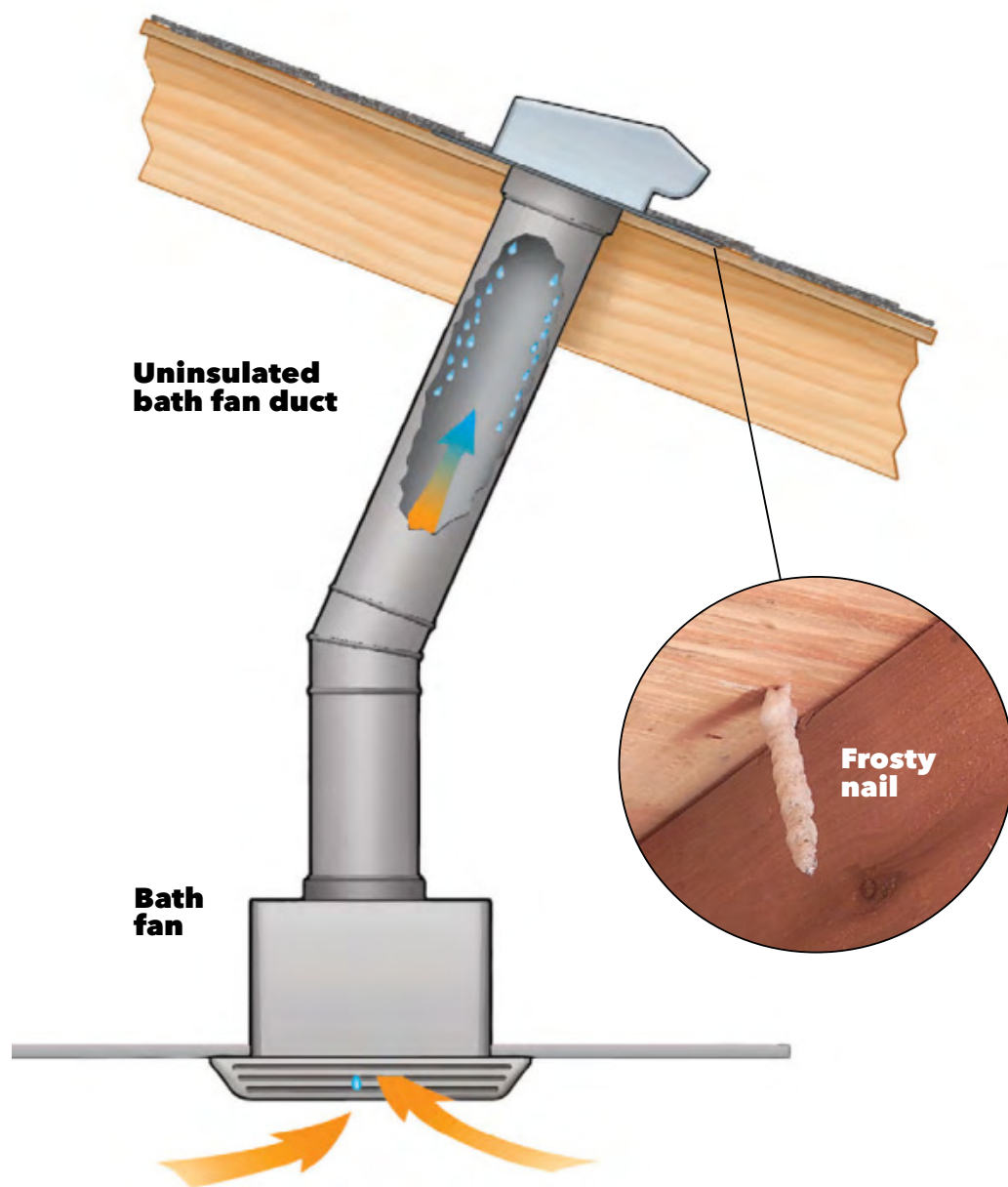
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PHANTOM ROOF LEAKS

As a roofing contractor for 35 years in the Denver area, I often get calls about leaky roofs after a big snowfall and low temperatures. In fact, all of those "leaks" were due to condensation.

The problem starts with warm, moist air that migrates into a cold, poorly vented attic. As trapped water vapor condenses, it freezes, most visibly on metal surfaces. When this ice eventually melts, the water finds a way to "leak" into the house. The problem is more common in a low-humidity area like Denver, where whole-house humidifiers introduce large amounts of moisture into the home.

Something similar happens around bath fans. Here the likely culprit is an uninsulated metal exhaust duct near a cold roof. As moist air passes through the duct, the moisture condenses and freezes. When warmer weather melts the ice, "leaks" appear, usually as a ceiling stain near the fan.

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HOME CARE

REPLACE A TUB SPOUT

Bathtub spouts can go bad in three ways: First, the diverter can wear out so it no longer blocks the water flow or sends water to the shower-head. Second, the threads inside the spout can crack or corrode where the spout screws onto the pipe. Water can then trickle along the pipe and drip inside the wall. Finally, the spout's finish can flake off or corrode.

Replacement is the solution to any of these problems. A new spout (\$20 to \$40) and everything else you might need are available at hardware stores and home centers. But before you buy a new spout, determine what type you need. First look under the spout. If you see a setscrew (**Photo A**), you have a "slip-on" spout. The setscrew might be smaller and harder to see than the one shown here; you may need a flashlight to spot it.

Replacing a slip-on spout is easy: Just loosen the setscrew (usually with a hex wrench) and pull the spout off the copper pipe that protrudes from the wall. Twist the spout as you pull and be gentle so you don't loosen any pipe

connections inside the wall. Then slide on the new spout and tighten the setscrew.

If the spout doesn't have a setscrew, it's a screw-on spout (**Photos B and C**). Twist the old spout counterclockwise to remove it. If the pipe that protrudes from the wall is copper with a threaded fitting (**Photo B**), simply cut off the fitting with a tubing cutter (\$10) and install a new slip-on spout (**Photo A**). If the pipe coming out of the wall is steel (**Photo C**), you need a new screw-on spout.

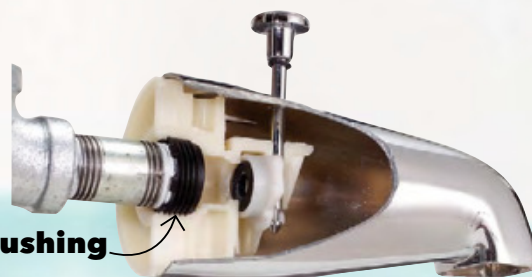
Ideally, the new spout will fit perfectly onto the old pipe. But there's a good chance that the pipe protrudes too far or not far enough. There's also a chance that the threads are too corroded for you to screw on a new spout. Either way, you'll have to remove the old pipe (**Photo 1**) and screw in a new pipe of the correct length (**Photo 2**). Short sections of threaded pipe (called "nipples") are usually available in 1-in. increments. They cost less than \$5 each, so buy a couple of different lengths and save yourself a trip back to the store.



A Slip-on spouts slide over 1/2-in. copper pipe and fasten with a setscrew. This "universal" version also has threads inside, so it can screw onto threaded pipe.



B Screw-on spouts have threads deep inside. They can connect to a copper threaded fitting or to steel pipe.



C Screw-on spouts may have threads at the back end. Most come with a bushing so they fit either 1/2-in. or 3/4-in. pipe.

TIP: Leg-shaving can lead to tub spout trouble. The spout makes a convenient footrest for shaving, but that can damage the diverter or loosen pipe connections. The rim of the tub or a stool makes a much better footrest.



1 Unscrew the old nipple with a pipe wrench. If the nipple is too short to grab with a wrench, use an "internal" pipe wrench (\$12).



2 Wrap both ends of the new nipple with thread tape and screw it into the fitting inside the wall. Seal around it with silicone caulk and screw on the new spout.

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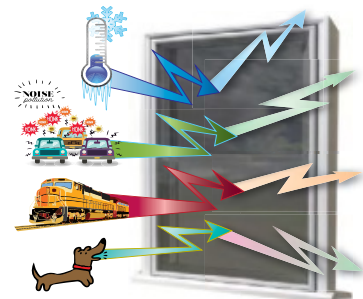
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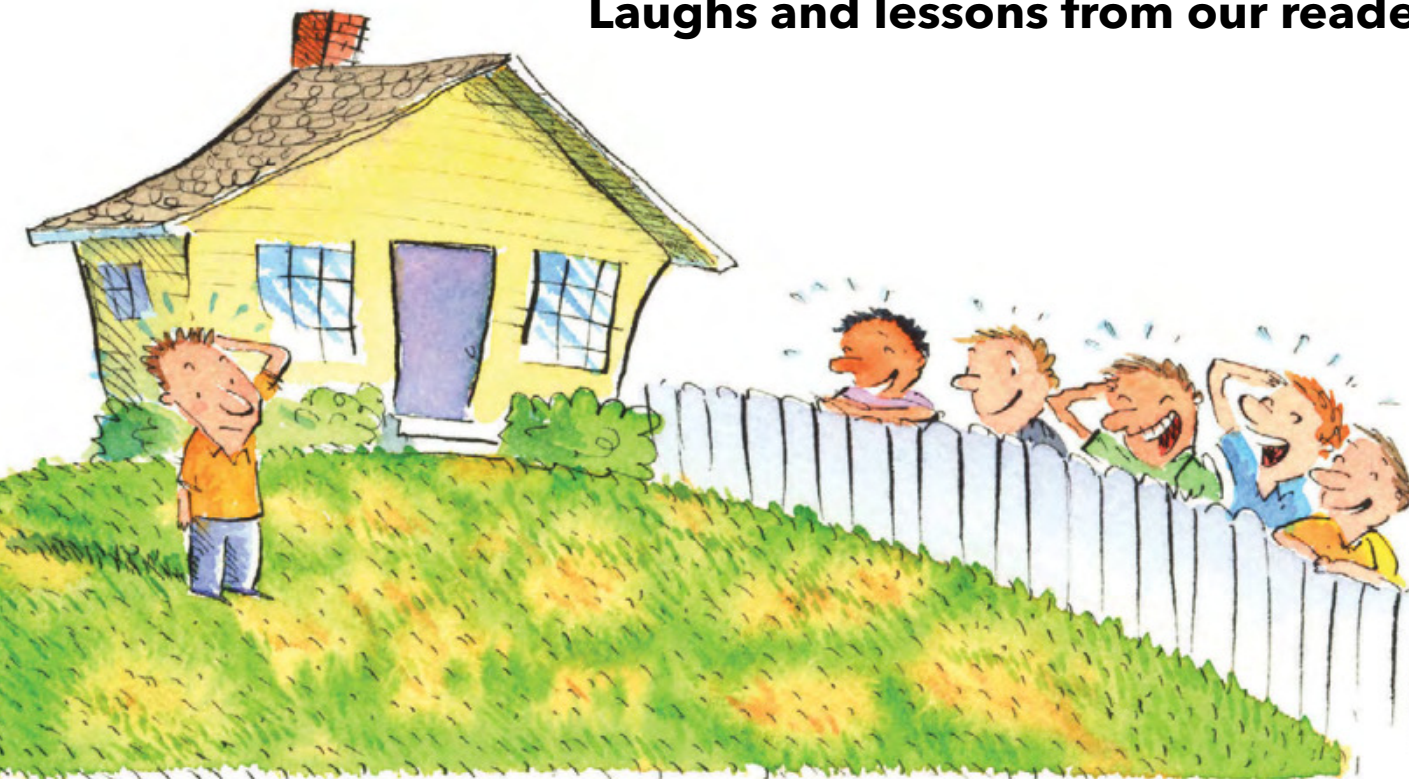
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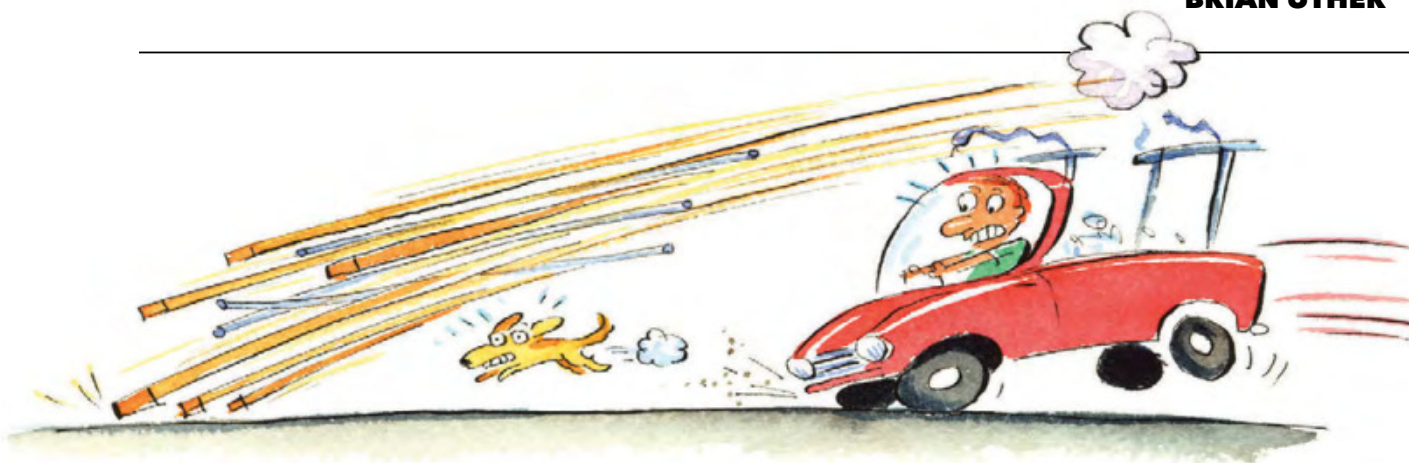


HOW NOT TO KILL WEEDS

This spring, I noticed my neighbor spot-spraying weeds that had invaded his lawn. He told me he'd bought a weed killer at our local hardware store to wipe them out. I had weeds in my lawn too, so I decided to give his remedy a try. I went to the same hardware store, bought weed killer, then came home and attacked the weeds.

After a few days, my lawn looked as spotted as a leopard. The weeds were dead, but so was the grass around them. Turns out, the product I had purchased was grass and weed killer. Now I'm the talk of the neighborhood for my goof. I guess no one will be asking me for lawn care advice!

BRIAN UTHUR



FASTEST WAY TO UNLOAD LUMBER

I was at the home center buying yet another load of materials to finish my basement. I strapped the lumber and copper pipe to my truck rack, then hit the highway.

All was well and good until I was almost home and a small dog darted into the street right in front of me, forcing me to slam on my brakes. My truck stopped, but my load didn't. The lumber and piping went flying off the rack, landing in the street. Luckily, there wasn't a car in front of me, or it would have had an unexpected delivery straight through its back window. The dog ran off unscathed, but I swear he was laughing at me.

CARL ERICKSON

MYSTERIOUS MEOW

I volunteered to install a handicap shower for my uncle, who was recovering from knee surgery. To start, I framed in a corner of his bathroom. His four cats were constantly underfoot while I was working, so I carried them out of the room.

I finished the framing, installed the shower and even built a couple of shelves in the corner. Then I went home, ate and settled down to watch football. Right after kickoff, my uncle called. He'd heard meowing in the bathroom but couldn't figure out where it was coming from. You guessed it—one of the cats had somehow snuck back into the room and crawled into the space between the studs and the new shower just before I finished hanging the new drywall. I had to cut a hole in the wall to get Midnight out.

I guess I'll find out whether walling off a black cat in a bathroom brings bad luck.

JASON ROUSH



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