

the family **handyman**

BUILD IT. FIX IT. LIVE IT!™

Super-Versatile

TOOL WALL

INSTANTLY MOVE
ANYTHING
ANYWHERE!

**9 EASY
TOILET
TUNE-UPS**

SIMPLE
**SPRINKLER
SYSTEM
FIXES**

**SPRING
START-UP
FOR YOUR
MOWER**

FAST WAYS
TO **CUT
METAL**

MAY 2018



Contents

MAY 2018

the family
handyman

**EXPERT
DIY ADVICE**
SINCE 1951

ON THE COVER

Put all your tools at your fingertips with this clever wall system.
Photographed by Tom Fenenga

32

French Cleat Tool Wall

This easy-to-build wall lets you super-organize your garage or shop.

38

Sprinkler System Fixes

Troubleshooting tasks that you can handle yourself.

46

Cordless Brad Nailers

We tested 10 models to help you choose the right one for you.

53

Toilet Tune-ups

Nine simple ways to get the best possible flush.

You might think you're cool.

We'll guarantee it.



Fujitsu mini-splits deliver infinite comfort in any environment.



Go ahead...dance and sing like no one's watching. Because even your hottest guitar solo is no match for the whisper-quiet cooling power of a duct-free Fujitsu mini-split. Want to tune in room-by-room customized temperature control with a simple touch of a button? No sweat...even from a remote location with our Wi-Fi enabled systems. These sleek, energy-efficient, wall-mounted units can also save you money with available utility rebates. Fujitsu...keeping your home in perfect harmony.



INFINITE COMFORT

constantcomfort.com



18

9 Stuff We Love

A superpower circular saw, a wide-mouth tool bag, and a pair of killer digging tools.

14 Handy Hints®

An easy-to-make wine rack, a salad bar greenhouse, and medicine cabinet magnets.

18 DIY Essentials

It's time to set aside your hacksaw. Here are eight ways to cut metal fast.

26 Best Pro Tips

Ready to learn how to weld? Practice your skills by building this simple welding table.

58 Home Care + Repair

Mini-split A/C and heating systems, pro advice for soldering ball valves, and much more.

63 Home Smarts

Tips for patching roofs, fixing nail pops, resurfacing walls, and keeping shower doors clean.

66 Car + Garage

Got grass to cut but your mower won't start? Here's how to get it going again.

69 What's Wrong?

The bathtub on the ledge, the easy-bake attic, and the stairway to nowhere.

71 Great Goofs®

When you're flying out the door, it really helps to remember that you removed the porch.

82 Reader Info

Want to know how to subscribe, renew, send us a hint, and more? Check out this page!

84 Home Smarts Basics

A handy tear-out guide to resetting a circuit breaker.

DIY Universe**Get ready for summer!****DIY PROJECT TUTORIALS**

[youtube.com/
thefamilyhandyman](https://youtube.com/thefamilyhandyman)

**HOW TO SHARPEN
YOUR LAWN MOWER BLADE**

tfhmag.com/lawnmowerblade

**PRO TIPS FOR
DIY REPAIRS**

tfhmag.com/acrepair

**RENEW
YOUR DECK
THIS
SUMMER**

[tfhmag.com/
renewdeck](https://tfhmag.com/renewdeck)

**40 OUTDOOR
PROJECTS FOR
BEGINNERS**

[tfhmag.com/
woodworking](https://tfhmag.com/woodworking)

**JOIN THE
DISCUSSION
ON FACEBOOK**

[facebook.com/
thefamilyhandyman](https://facebook.com/thefamilyhandyman)

**PINTEREST-WORTHY HANDY
HINTS BY THE HUNDREDS!**

pinterest.com/family_handyman



WANT MORE FAMILY HANDYMAN? Get our best tips and hints delivered directly to your inbox. Sign up at tfhmag.com/diytips



GOOF PROOF SHOWER®

Installation System



Install Your Shower – Fast, Easy & Right

Step 1



A unique tool that creates the proper sub floor slope needed underneath the pan liner to manipulate the water towards the weep holes that are an integral part of shower floor drains.

Step 2



A stay-in plastic form designed to eliminate the possibility of any nails puncturing the liner on the top or inside walls of shower curbs.

Step 3



A stay-in place screeding guide system that guarantees a properly pitched shower floor every time regardless of size and shape.

GOOF PROOF SHOWER®

Waterproofing of Your Choice

Roll-on Liquid Membranes



Tools used:

- 1) Pre-Pitch™
- 2) Kirb-Perfect®
- 3) Quick-Pitch®
- 4) Universal Center Ring

Handi-Kirb with Roll on and Sheet Membranes



Tools used:

- 1) Pre-Pitch™
- 2) Kirb-Perfect®
- 3) Quick-Pitch®

Low Profile curb

- 1) Pre-Pitch™
- 2) Handi-Kirb

Sheet Membranes



Tools used:

- 1) Quick-Pitch®
- 2) Quick-Clips
- 3) Kirb-Perfect®

String-A-Level™



Simultaneously attach and level a continuous stringer on which to stack heavy or large format tile vertically.

Mark E Industries, Inc. Toll Free: 1-866-771-9470

www.goofproofshower.com

info@markelindustries.com



TRACTOR ATTACHMENTS H.Q.

Your Headquarters for Tractor & ATV Implements!

Brush Cutters and Finish Mowers!



- ☒ FACTORY-DIRECT PRICES!
- ☒ EASY FINANCING!
- ☒ 6-MONTH HOME TRIAL!
- ☒ FREE SHIPPING!*

*Some limitations apply. Call for details.

SAVE UP TO \$500

- Aerators
- Harrows
- Spreaders
- Bucket Attachments
- Blades
- Rakes
- Post Hole Diggers

...and MORE!



Chippers



Tillers



Log Splitters



Trimmer Mowers

CALL TODAY and receive a FREE BUYER'S GUIDE
about the full DR® line of TRACTOR- and ATV-Compatible Equipment!

1-888-200-3210
DRpower.com/attachments

All New DR® CHIPPERS

Larger Capacity, Lower Prices!



LOWEST PRICES EVER!

Starting at just \$699⁹⁹

CHIP BIG BRANCHES
up to 5.75" thick!

SELF-FEEDING MODELS
available. No more force-feeding!

POWERFUL ENGINES
spin big flywheels (up to 62 lbs.), generating massive chipping force!

MODELS THAT SHRED
yard and garden waste as well as CHIP branches.

PTO MODELS TOO!



DRchipper.com

1887FA © 2018

The EASY DR® Way to TRIM and MOW!

The **DR® TRIMMER MOWER** gives you 5X the power and NONE of the backstrain of hand-held trimmers!



The ORIGINAL Trimmer on Wheels!

Starting at just \$349⁹⁹

TRIMS & MOWS thick grass and weeds without bogging down—the only trimmer guaranteed not to wrap!

ROLLS LIGHT AS A FEATHER on big, easy-rolling wheels!

THICKEST, LONGEST-LASTING cutting cord (up to 225 mil) takes seconds to change.



NEW TOW-BEHIND MODELS FOR TRACTORS, AND ATVS!

DRtrimmers.com

1887FB © 2018

World's Most Powerful Leaf Vacuum...at a New LOW PRICE!

Now Starting at Just \$999⁹⁹ with FREE SHIPPING

Perfect for SPRING CLEAN-UP!

DR® LEAF VACUUMS have proven in laboratory testing to achieve the most vacuum power versus competitors. And now, our All-New PILOT Model combines this same amazing yard clean-up power with an equally amazing new price!

- ☒ **Rated #1 in Vacuum Power**
- ☒ **Now at the Lowest Price Ever**
- ☒ **Converts to an All-Purpose Trailer**
- ☒ **Stores Flat in Minutes**



Unload with just one hand!



Doubles as a utility trailer!

DRleafvac.com

1887FC © 2018

FREE SHIPPING | **6 MONTH TRIAL** | **EASY FINANCING**

SOME LIMITATIONS APPLY. CALL OR GO ONLINE FOR DETAILS.

Call for a FREE DVD and Catalog!

Includes product specifications and factory-direct offers.

TOLL FREE **888-200-3210**



Stuff We Love

Our favorite DIY tools, materials + gear. By Spike Carlsen



FAST AND POWERFUL

A SAW FOR THE AGES

When I was a framing carpenter in Denver back in the day, pulling a mammoth “worm-drive” saw out of your truck and going to work was the sign you’d reached the big leagues. These monsters required Popeye forearms and a diet of canned spinach to operate, but they could cut through anything and were virtually indestructible.

The DeWalt 60-volt MAX circular saw (model DCS575T2) is the cordless equivalent of these vintage brutes. It has a lot to love. Like all

worm-drive saws, the left-side blade position makes it easy to see your cutting line. It’s a workhorse: The 60-volt battery coupled with DeWalt’s thin-kerf FLEXVOLT blade (specifically designed for cordless saws) creates a saw that’s fast and powerful. It can churn through materials up to 2-1/2 in. thick and cut bevels up to 53 degrees. The safety button is easy to access.

The saw also has some nice grace notes, like the on-board blade-changing wrench, a depth gauge that tells you how deep the blade is set, and a carrying bag. The swing-down rafter hook lets you hang the

saw from a joist or rafter between cuts (and believe me, you’ll want to give your arm a break between cuts).

The DeWalt Fast Charger is so hardworking that it’s fan cooled. The battery itself has a simple gauge that indicates how much juice is left.

Weighing in at 11 lbs., it still requires Popeye forearms to operate. And at nearly \$400 (with battery and charger), it takes a Popeye-size wallet too, but if you’re looking for a saw, corded or cordless, that’ll handle anything, this is the one. It’s available online or wherever DeWalt tools are sold.



SMARTER MARKING

A CARPENTER'S PENCIL THAT'S MORE LIKE A PEN

Legend has it that the classic rectangular carpenter's pencil was invented so carpenters would have a marking tool that wouldn't roll off the roof. Those pencils may stay put, but sharpening them is a fine art, they leave a wide mark when dull, and they're not up to the task of marking on dark woods and metals. Enter the FatBoy.

The FatBoy pencil looks and feels like a hefty pen. It comes with three leads: a regular lead for marking light woods, a white soapstone "lead" for marking metals and dark woods, and a red crayon "lead" for marking concrete. The interchangeable leads can be switched or advanced with a push of the end cap. That same end cap contains an eraser and a sharpener (though you can use a standard sharpener too). We liked them so much that we fired our old pencils and hired these guys.

FatBoy pencils come with extra leads and are available online and at home centers for about \$16. To find out more, go to fastcap.com.



A STAY-OPEN TOP

Tool bag that says "aah"

Hauling tools around can be a real pain in the a...arm. Digging for the tool you need is another hassle. The Tradesman Pro Wide-Open Tool Bag by Klein Tools solves both problems. The padded handles and shoulder straps make it easy on the back and hands. And the wide-mouth, stay-open top keeps your tools visible and easy to grab.

The bag is big enough to haul the hand and power tools you need for most any job but small enough to easily carry and store. The interior has 33 pockets for organizing small tools, a zipper pocket big enough for a laptop, and space for a battalion of cordless tools, batteries and chargers. The exterior has six large pockets—four with flaps—and two mesh bags for larger items. The molded plastic bottom keeps your stuff dry, and the ballistic nylon construction says "I'm here to stay."

The Tradesman Pro Wide-Open Tool Bag (No. 55469) costs about \$90. To buy it online or find a retailer, go to kleintools.com.

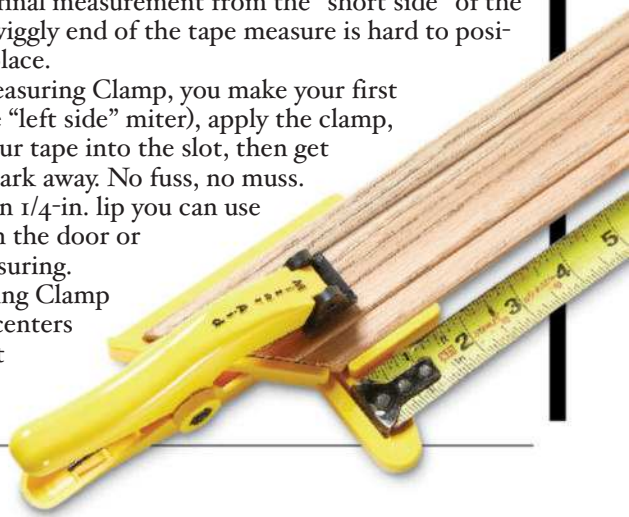
GREAT GADGET

EASIER MITER MEASURING

The trickiest part of trimming out doors and windows is measuring, marking and cutting each trim board the right length. The problem? You take your final measurement from the "short side" of the first miter cut—and the wiggly end of the tape measure is hard to position in exactly the right place.

With the Miter Aid Measuring Clamp, you make your first miter cut (it has to be the "left side" miter), apply the clamp, slip the hooked end of your tape into the slot, then get your measurement and mark away. No fuss, no muss. The tool also has a built-in 1/4-in. lip you can use to mark a 1/4-in. reveal on the door or window jamb before measuring.

The Miter Aid Measuring Clamp costs about \$16 at home centers and online. Learn more at trimclip.com.





Watering chores, water bills! Sweating behind a roaring mower!
Spraying poison chemicals and digging weeds...



...you can end such lawn drudgery – here's how!

THE ONE TIME, LIFETIME LAWN SOLUTION!



Mow your Zoysia lawn once a month – or less! It rewards you with weed-free beauty all summer long.

7 Ways Our Amazoy™ Zoysia Lawn Saves You Time, Work and Money!

1 CUTS WATER BILLS AND MOWING BY AS MUCH AS 2/3

Would you believe a lawn could look perfect when watered just once? In Iowa, the state's biggest Men's Garden club picked a Zoysia lawn as "top lawn – nearly perfect." Yet, this lawn had been watered only once all summer to August!

In PA, Mrs. M.R. Mitter wrote, "I've never watered it, only when I put the plugs in...Last summer we had it mowed 2 times...When everybody's lawns here are brown from drought, ours stays as green as ever." *That's how Amazoy Zoysia lawns cut water bills and mowing! Now read on!*

2 NO NEED TO DIG UP OLD GRASS

Plant Amazoy your way in an old lawn or new ground. Set plugs into holes in the soil checkerboard style. Plugs spread to create a lush, thick lawn, driving out weeds and unwanted growth. Easy instructions included with every order.

3 ENVIRONMENTALLY FRIENDLY

No weeding means no costly chemicals. Since Amazoy Zoysia lawns naturally resist insects, you'll save money, while helping to protect the environment. You'll never have to expose your family and pets to the risk of weed killers and pesticide poisons.

4 FOR SLOPES, PLAY AREAS, BARE SPOTS AND PARTIAL SHADE

You can't beat Amazoy Zoysia as the low-cost answer for hard-to-cover spots, play-worn areas, places that have partial shade and erosion on slopes.

Meyer Zoysia Grass was perfected by the U.S. Gov't, released in cooperation with the U.S. Golf Association as a superior grass.

5 IT STAYS GREEN IN SPITE OF HEAT AND DROUGHT

"The hotter it gets, the better it grows!" Plug-in Zoysia thrives in blistering heat, yet it won't winter-kill to 30° below zero. It just goes off its green color after killing frosts, and begins regaining its green color as temperatures in the spring are consistently warm.



6 CHOKES OUT CRABGRASS AND WEEDS ALL SUMMER

Your established Amazoy Zoysia lawn grows so thick, it simply stops crabgrass and most summer weeds from germinating!

7 NOW 3 WAYS TO START YOUR AMAZOY ZOYSIA LAWN!

1) **Freestyle plugs** come in uncut sheets containing a maximum of 150 - 1" plugs that can be planted up to 1 ft. apart. Freestyle plugs allow you to make each plug bigger and plant further apart – less cutting and planting – you decide.

2) **New Super Plugs** come precut into individual 3"x3" plugs ready-to-plant (minimum 1 per 4 sq. ft.). They arrive in easy to handle trays of 15 Super Plugs. Save more time and get your new lawn even faster!

3) **Amazoy Approved Seed-As The Zoysia Specialists** for 60+ years, we finally have a Zoysia seed available that meets our standards and homeowners expectations.

Learn why at zoysiafarms.com/mag or by phone at 410-756-2311.

Your Assurance of Lawn SUCCESS
Each Order for Amazoy Zoysia is GUARANTEED

Guaranteed to grow new green shoots within 45-60 days or we'll replace it FREE – for up to 1 year – just call us. We ONLY ship you living genuine Amazoy Zoysia grass harvested direct from our farms. Easy planting and watering instructions are included with each order. Every Reorder assumes success of previous orders (plantings), voiding any previous guarantees, but initiating a new one-year guarantee.

©2018 Zoysia Farm Nurseries, 3617 Old Taneytown Rd, Taneytown, MD 21787

ORDER TODAY - GET UP TO 1000 FREESTYLE PLUGS - FREE!

Dept. 5150

Plugs only shipped to Continental USA & not to WA or OR.

Freestyle Plugs You decide how big to cut the plugs. Each grass sheet can produce up to 150-1 in. plugs. Plant minimum 1 plug per sq. ft.

Max Plugs*	Free Plugs	Grass Sheets*	Your PRICE	+ Shipping	SAVINGS
150	—	1	\$15.95	\$8.50	—
500	100	4	\$50.00	\$15.00	33%
750	150	6	\$66.00	\$19.00	41%
1100	400	10	\$95.00	\$30.00	48%
2000	1000	20	\$165.00	\$45.00	57%

Super Plugs Precut plugs 3 inches by 3 inches. READY TO PLANT
Packed in trays of 15 Super Plugs. Plant minimum 1 plug per 4 sq. ft.

Super Plugs	Free Plugs	Trays	Your PRICE	+ Shipping	SAVINGS
15	—	1	\$24.95	\$8.50	—
60	15	5	\$90.00	\$20.00	34%
95	25	8	\$110.00	\$30.00	47%
120	30	10	\$125.00	\$35.00	50%
180	45	15	\$180.00	\$50.00	54%

EVERYTHING YOU NEED TO START AND MAINTAIN A CAREFREE BEAUTIFUL ZOYSIA LAWN

PLANTING TOOLS * PLANT FOOD * WEED AND PEST CONTROLS * ORGANIC PRODUCTS * SOIL TESTS * GARDEN GLOVES * EDGING AND MORE

All Available Exclusively at www.ZoysiaFarms.com/mag or 410-756-2311

ZOYSIA FARM NURSERIES, 3617 OLD TANEYTOWN ROAD TANEYTOWN MD 21787

AMAZOY IS THE TRADEMARK REGISTERED U.S. PATENT OFFICE for our Meyer Zoysia grass.

We ship all orders the same day the plugs are packed and at the earliest planting time in your state.

MY, WHAT SHARP TEETH

A pair of killer digging tools

When you see the word “assassin” in a company’s name, you figure it must have some killer products. Well, the two “Root Assassin” shovels we tried sure lived up to their name.

The Root Assassin Shovel has an alligator snout-shaped blade with aggressive teeth to match. It will easily sever small roots with a single plunge and can be used as a foot-powered saw for cutting through larger roots. The teeth are so sharp that you can use the tool for pruning above-ground branches. The blade and handle are unibody constructed of industrial-grade steel and guaranteed for life. It’s a heavy-duty tool, yet at 4 lbs., it’s light enough to carry around all day. If you ever need to dig a posthole or remove or transplant a root-bound bush or tree, this is the shovel to grab. The company also offers a small version of the tool.

The One Shot Shovel, also made by Root Assassin, has two features we love. The top of the blade has a wide flange that gives your foot more area to push and distributes the pressure over a wider area. The flange continues around the side of the shovel, allowing you to carry larger loads without spilling. The top and side flanges combine to increase the overall strength of the blade, making this a true workhorse.

The Root Assassin shovel retails for \$50, the One Shot shovel for \$40. You can buy them at rootassassinshovel.com and other online retailers.



WELL-BUILT TOOL

A LOW-VIBRATION SANDER

There’s not one BIG thing we love about Rockwell’s new Vibrafree random orbital sander—it’s a lot of little things. The split disc has inner and outer rings (one turns clockwise, the other counterclockwise) that counteract each other for less vibration. The split-disc design also provides a larger opening for more efficient dust collection (using either the clear collector shown or the vacuum attachment included). The sander feels good in the hand, and we like the variable speed—not a revolutionary feature on an RO sander, but like we said, it’s the little things. At first glance, the inner and outer sanding discs might seem like a disadvantage—more edges to catch and more sandpaper to tear—but they grip tenaciously.

The only drawback we see is the need to buy proprietary sanding discs; more stuff to store and keep track of. But the pain is lessened by the 15 discs that come with it, along with a tool bag to keep everything together.

The Vibrafree sander (about \$70) is available at home centers and online.



the family
handyman

BUILD IT. FIX IT. LIVE IT!

**SAVE
TIME &
MONEY**

Don't miss out...
Try It FREE!

NEW book!



Custom DIY Projects



Detailed Outdoor Improvements



Easy Electrical Upgrades



Pro Plumbing Tips



Clever Tool Hacks!

Tackle DIY Home Improvement with Confidence!

- **Handy Guides and Helpful Tips** for projects large and small.
- **700+ Detailed Photos**—that SHOW you how to finish the job.
- **Project Plans** with clear directions, cutting guides and shopping lists.
- **Expert Advice** you can trust from real pros.
- **288 Pages** filled with full-color inspiration and “you-can-do-it” confidence.



FREE
30-Day
Preview!

Claim your **FREE Preview** now at:

► **familyhandyman.com/TFH2018**

Handy Hints®

Clever solutions from our readers

SHARE
YOUR
HANDY HINT
WITH US!

submissions@
familyhandyman.com



Easy-to-make wine rack

If you need more space for wine storage, make this wine rack using pantry shelves and 1x2s. Cut the 1x2s to length to fit the shelf depth and use a router to round over their top edges. Then space the 1x2s about 2 in. apart and screw them to the shelf. Adjust the shelf spacing so there's about 5 in. of clearance for the bottles.

ROBERT LACKEY



SALAD BAR GREENHOUSE

The next time you hit the salad bar for lunch, save the plastic container to make a mini greenhouse for starting seeds. Wash the container and then punch some air holes in the top. Fill the bottom with potting soil, plant your seeds, add a little water and close the lid. Set the container in a sunny spot and watch your seeds sprout! Once the seeds sprout, take off the lid.

DIANE PLOWE

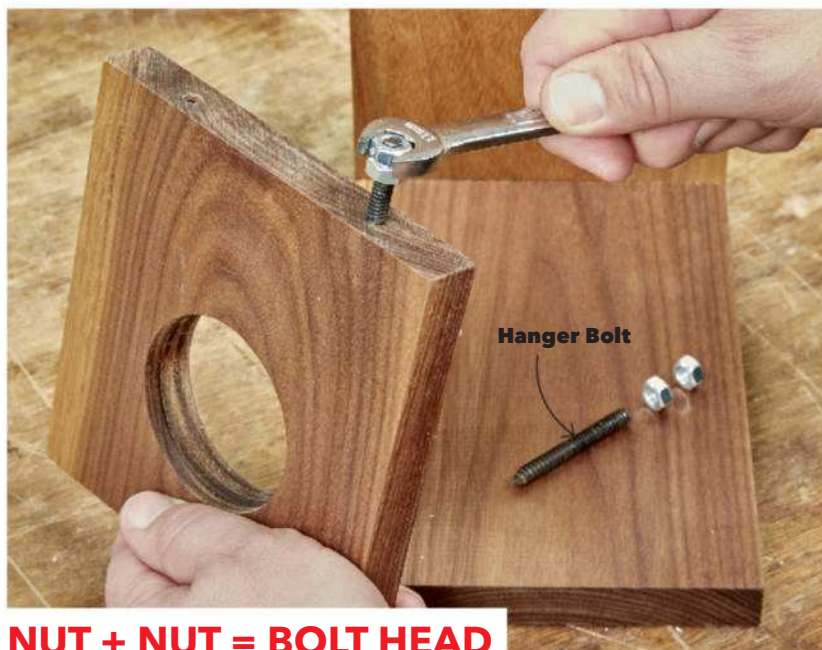


SEAL OUTDOOR FURNITURE FEET

Wooden outdoor furniture rots from the ground up, and the parts that touch the ground are usually end grain, which makes matters even worse. End grain readily wicks moisture from the ground.

Moisture always wins in the end, but you can extend the life of your outdoor furniture by coating the feet with two-part epoxy. Be sure the parts you're coating are dry before applying the epoxy. Allow the epoxy to fully cure according to the instructions on the package, then put your furniture back into use outside.

ALEX KUMMERFELDT



NUT + NUT = BOLT HEAD

Hanger bolts are tricky to install. One end is threaded for wood, the other end has machine threads, and there's no head. So I thread two nuts on the end with machine threads and tighten them against each other. This allows me to use a wrench to install these otherwise tricky bolts.

JAY NORMAN



PORTABLE CLOTHES PODS

Here's a cool way to pack your clothes for moving. First, cut a hole in the center of the bottom of a large trash bag. Grab a handful of clothes by the hanger hooks and slip the bag over it, pulling the hooks through the hole. Use a zip tie or wire to hold the hooks together, and then tie the open end shut. Your clothes stay clean in these easily portable pods, and you never have to take them off the hangers!

SOPHIE REHBEIN



The money wrench trick

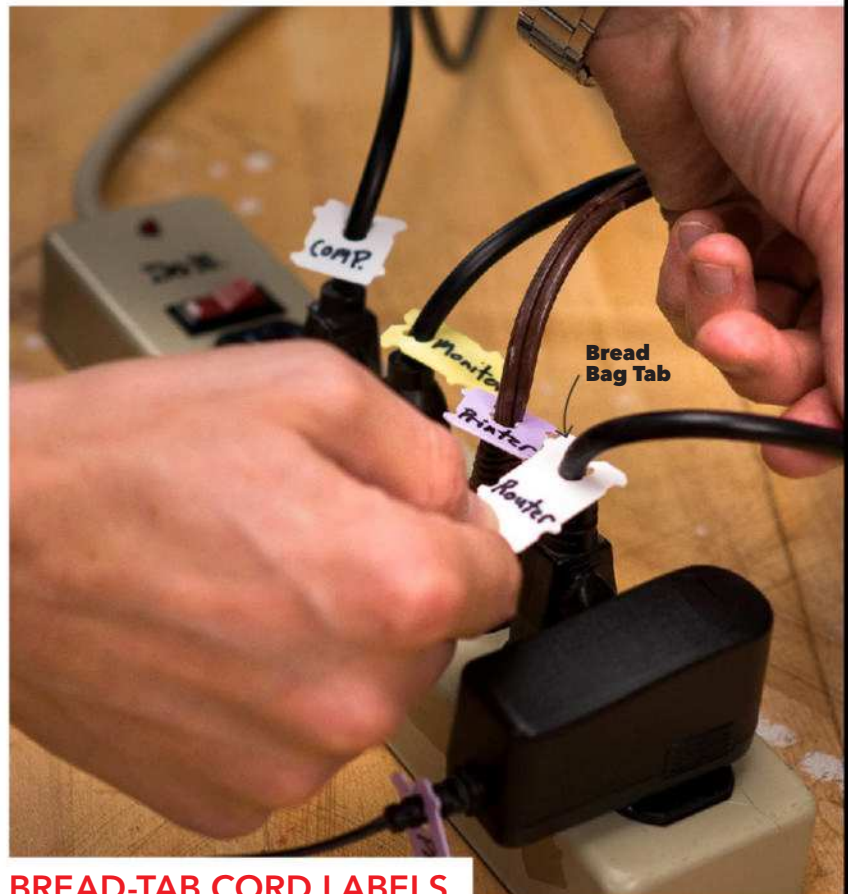
If you don't have the right size open-end wrench to fit a nut or bolt, just dig into your pocket and pull out your loose change. Shove the coins into the gap between the wrench jaw and the nut or bolt head until you get a snug fit.

GORDON MCKAY

MEDICINE CABINET MAGNETS

Nail clippers and tweezers tend to get buried in the medicine cabinet. So I hot-glued a few magnets to the back of the cabinet door to hang these small items in plain sight. I use cheap disc magnets from the hobby store; the more expensive rare-earth magnets are too strong.

DAVID FARRAND



BREAD-TAB CORD LABELS

Not sure which electronic device goes with which cord plugged into your power strip? Plastic bread tabs are perfect for labeling cords. They're sturdy and big enough to write on, and you can easily clip them around the plug end of a cord.

CHRIS JOHNSON

Knows you. Senses you. Adjusts to you.™

INTRODUCING THE SLEEP NUMBER 360® SMART BED

Discover the smartest, most adjustable sleep of your life. Responsive Air™ technology senses and effortlessly adjusts for your ideal comfort. Partner Snore™ technology* lets you sleep in peace. It's even designed to warm your feet to help you fall asleep faster.

DOES YOUR BED DO THAT?®



Adjust firmness on each side—your Sleep Number® setting



Senses and automatically responds to you



Foot warming—designed to help you fall asleep faster



Gently raise your partner's head to help alleviate mild snoring†



Control your comfort and see how you've slept with SleepIQ® technology

25-YEAR LIMITED WARRANTY†
lets you sleep with peace of mind

LASTS TWICE AS LONG
as an innerspring

9 OUT OF 10 BED OWNERS‡
say they'd recommend Sleep Number

Call or Click for Your Free Catalog • 1.800.831.1211 (ext. 404224) • www.sleepnumber.com/hmmay18

sleep  number.

*May temporarily relieve common mild snoring in otherwise healthy adults. Partner Snore™ technology is available with Split King and FlexTop® King mattresses on FlexFit™ adjustable bases. †2-Year Limited Warranty on SleepIQ® technology. Warranties available at sleepnumber.com. ‡Results from a 2017 Sleep Number survey of 200 owners asked about their likelihood to recommend Sleep Number to a friend, family member, or colleague. SLEEP NUMBER, SLEEP IQ, SLEEP NUMBER 360, the Double Arrow Design, SELECT COMFORT, and IT are registered trademarks of Sleep Number Corporation. ©2018 Sleep Number Corporation

DIY Essentials

Our best tips for getting your project done right. By Jeff Gorton

8 EASY WAYS TO CUT METAL FAST

There's nothing wrong with using a good, old-fashioned hacksaw, but there are faster, easier ways to cut metal. In this article, we'll show you power tool tips and techniques for cutting the types and thicknesses of metal that DIYers handle the most.



1. DITCH THE ABRASIVE GRINDER DISCS

An angle grinder fitted with an abrasive metal-cutting disc works well to cut all kinds of metal, including bolts, angle iron, rebar and even sheet metal. But the discs wear down quickly, cut slowly and shrink in diameter as you use them. Instead, we recommend using a diamond blade that's rated to cut ferrous metal. These will last much longer, cut faster and cleaner, and wear down much slower than abrasive discs. You'll find ferrous-metal-cutting diamond blades for \$13 to \$40 at home centers, hardware stores and online.

Grind Away ANY Size Stump FAST!



LOWEST PRICE EVER!

The **DR® STUMP GRINDER** uses carbide-tipped cutting teeth (taking 360 "bites" per second) to reduce any stump to a pile of woodchips. Grinds stumps below ground level so they are gone forever!

- **Faster, safer and easier** than digging, burning, or using chemicals.
- **New, more powerful** and lower-priced models.
- **Now towable** with your riding mower or ATV.



NEW Self-Propelled Model Available!

DRstumpgrinder.com

The Ultimate Offroad Trailer!

HAULS up to 2000 lbs.!



440 lb. LIFTING CAPACITY

The **DR® VERSA-TRAILER™** is the **ONLY trailer for offroad vehicles that—**

- Has a **swinging boom** for loading and unloading rocks, logs, balled trees, etc. with a back-saving winch.
- **Empties cleanly** every time, thanks to steep, boom-assisted dump angle.
- **Converts to a stake bed trailer** (in less than 5 minutes!) for harvesting trees and hauling long loads.
- **Galvanized bed and frame** tows easily behind ATVs, compact tractors and lawn tractors.
- **Pivoting, tandem wheels** "walk" over obstacles.

DRversatrailer.com

**FREE SHIPPING
6 MONTH TRIAL**

SOME LIMITATIONS APPLY
Call or go online for details.

Call for **FREE DVD and Catalog!**

TOLL FREE **888-200-3210**



RAINHANDLER USE RAINHANDLER GET RID OF YOUR GUTTERS

Installs easily

Each 5-ft section comes with 3 brackets & 6 screws. Do entire home in 3 or 4 hours.

Prevents Erosion

Runoff is changed to a 3 foot wide band of soft rain-sized droplets.

Self-Cleans

Unique louver design allows leaves and debris to blow or wash away. Self-cleaning system protects you from climbing ladders.

Maintenance-Free

All-aluminum Rainhandler louvers make messy, leaking gutters history.

Protects Property

Eliminates clogged, overflowing gutters & downspouts. No ground erosion, No more destructive ice dams.

Guarantees

Money-back satisfaction guaranteed for one full year, 25-year warranty.

For **FREE** information call or fax
Ph: 800-942-3004, Fax: 800-606-2028

SPECIAL OFFER! 30% OFF

Mention Code **FH0518**

when you call or enter online at checkout

www.rainhandler.com

OFFER EXPIRES 05/31/2018

MADE IN THE USA



The All-New Honda 2200 Watt Super Quiet Series Inverter Generators



Now packed with more features and 10% more power.*

HONDA

gen.honda.com

*10% more power at max load than the EU2000i Honda generator. Please read the owner's manual before operating your Honda Power Equipment and never use in a closed or partly enclosed area where you could be exposed to odorless, poisonous carbon monoxide. Connection of a generator to house power requires a transfer device to avoid possible injury to power company personnel. Consult a qualified electrician.
© 2018 American Honda Motor Co., Inc.

DIY ESSENTIALS

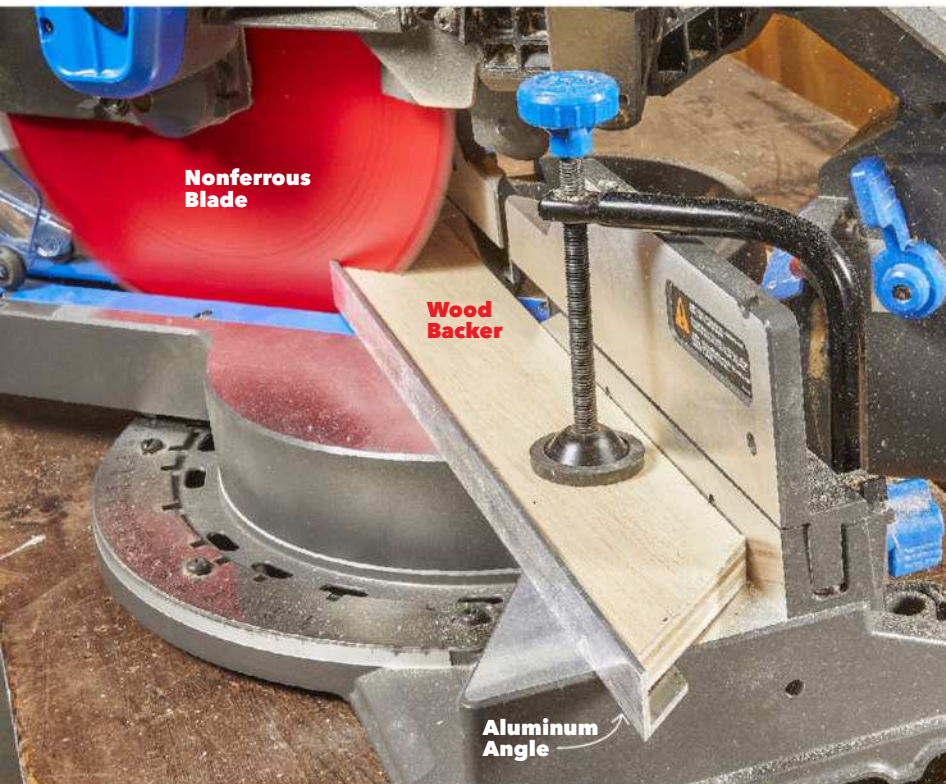
2. CUT METAL WITH YOUR CIRCULAR SAW

It may not be an obvious choice, but fitted with the right blade, a circular saw is a great metal-cutting tool. In our test, it cut through rebar like a hot knife through butter. You can cut mild steel up to about 3/8 in. thick using a ferrous-metal-cutting blade. Be careful, though! Hot metal chips will fly everywhere. Put on your safety gear, keep bystanders away, and cover anything you don't want coated with metal chips. You'll find ferrous-metal-cutting blades at home centers, hardware stores and online. There are two types: inexpensive steel-tooth blades and carbide-tooth blades (\$8 to \$40). Carbide-tooth blades are more expensive but will last longer.



Ferrous-Metal Blade

Metal Roofing



Nonferrous Blade

Wood Backer

Aluminum Angle

3. CUT ALUMINUM WITH YOUR MITER SAW

Making accurate cuts on aluminum rods, tubes and angles is easy with a miter saw and a blade designed to cut nonferrous metal (check the label). If the motor housing on your saw is open and could collect metal chips, tape a piece of cloth over the openings to protect the motor windings and bearings while you cut the aluminum. (Remember to remove it when the saw goes back into regular service or the motor will overheat.) Trapping the aluminum with a wood backer as shown reduces the danger of flying metal shards and makes it easier to hold the metal in place for cutting. This tip is especially important when you're cutting thin-walled pieces. Without the backing board, the blade will often catch on the metal and distort it and make it unusable.

TIPS FOR CUTTING METAL SAFELY

Cutting or grinding metal sends tiny chips or shards of metal everywhere. And they can be hot and sharp. To avoid eye injuries, cuts, burns and other injuries from cutting metal, follow these rules:

- Read and observe safety precautions printed on metal-cutting discs and blades.
- Wear safety glasses, a face shield (\$8 to \$30) and hearing protection.
- Cover all exposed skin with gloves, long-sleeve shirt and pants.
- Allow freshly cut metal to cool before touching it.
- Wear gloves when handling metal that could have sharp edges.
- Securely clamp metal before cutting it.
- Never allow anyone near you while you're cutting metal unless they're wearing hearing and eye protection.

ALL NEW CNC SHARK II®

A DECADE IN THE MAKING —
TOTALLY REDESIGNED



WHY OWN A CNC SHARK II?

- Use any standard 2 ¼ hp Router
- Color Pendant with USB Interface
- One-Year Warranty on Parts and Labor
- Compatible with Windows 7 or later
- Includes Vectric Desktop V9 Designing Software
- Prototype or Mass Produce your Own Parts
- Cut or Engrave on Wood, Soft Metals, Acrylics, Ceramic tile
- Robust CNC Functionality for Professional or Hobbyist

AVAILABLE ACCESSORIES

- Digital Duplicator
- 4th Axis
- Laser Engraver

Next Wave
Automation

www.NextWaveAutomation.com



✓Yes



✓Yes



xNo



✓Yes



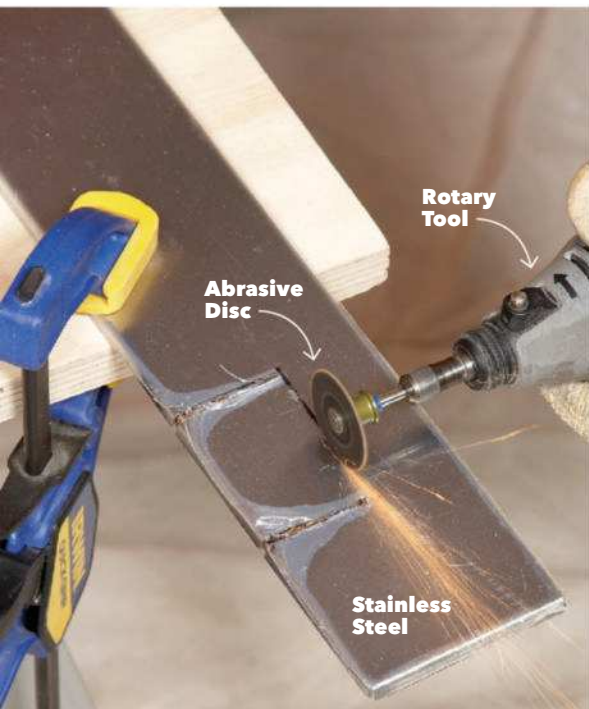
✓Yes



✓Yes

- ✓ Reliably Low Prices
 - ✓ Easy To Use Website
 - ✓ Huge Selection
 - ✓ Fast Shipping
- www.rockauto.com

RA
ROCKAUTO.COM
ALL THE PARTS YOUR CAR WILL EVER NEED.



4. CUT STAINLESS STEEL WITH A GRINDING DISC

There are many types of stainless steel, and some hard varieties are challenging to cut. For small jobs like cutting stainless steel backsplash tiles, a rotary tool fitted with an abrasive metal-cutting disc works fine. For larger jobs, mount an abrasive disc in an angle grinder.



5. SIMPLY SCORE AND SNAP

Siding contractors and roofers routinely score and snap aluminum siding and flashing to create straight, precise cuts. And you can use the same technique anytime you need a straight cut on aluminum or other light-gauge sheet metal, even steel. Clamp or hold a straightedge or square along the cutting marks and score a line with the tip of a sharp utility knife blade. Then bend the sheet back and forth a few times to snap it. You can use the same trick to cut steel studs. Snip the two sides. Then score a line between the cuts and bend the stud to break it.



6. GET INTO TIGHT SPOTS WITH AN OSCILLATING TOOL

When access is tight, or you need to make a flush cut, an oscillating tool fitted with a metal-cutting blade will solve the problem. Corroded mounting nuts on toilets and faucets are easy to cut off with an oscillating tool. You can also use an oscillating tool to cut plumbing pipes, automotive bolts, nails and other metal objects in places where a larger tool wouldn't fit. Just make sure the blade is intended to cut metal.

TAKE A STEP IN THE RIGHT DIRECTION!

Try Our Most Comfortable Men's Shoes Ever!

**SIZES
UP TO
13EEE!**



SOFT LEATHER LOAFERS

You Won't Want To Take Them Off!

These glove-soft leather slip-ons with manmade trim are extra comfortable for all-day walking ease!

Featuring air-cooled mesh insets at the insteps, moisture-absorbing foam-backed fabric linings, padded collars, and the famous Dr. Scholl's Tri-Level Comfort® insoles. A flexible TPR sole is treaded for traction and no-slip security.

Order Now!

**FREE
SHIPPING**
On Your Order!

**No-Slip
Tread!**

**Breathable
Mesh!**

**Soft, Supple
Leather!**

Copper

Brown

Black

Navy

Two-Tone

Tan

EVA contributes to energy return

Fabric aids in moisture control

Latex padding helps with shock reduction

Perfs promote better air circulation

EVA inserts in heel and forepart for added shock absorption

Heel cup enhances foot positioning

TPR outsole for lightweight, flexible comfort

Dr. Scholl's® is a registered trademark of Bayer. Distributed by Caleres, Inc. Under license from Bayer and its affiliates.



SOFT LEATHER LOAFERS

Only **29⁹⁹*** per pair

BUY MORE & SAVE! 2 pairs for 56.47 3 pairs for 81.45

Haband® PO Box 8, Warren, PA 16366-0008

☐ ☐ ☐ ☐ ☐ ☐ ☐

Card # _____ Exp.: ____/____/____

Mr. Mrs. Ms. _____

Address _____ Apt. # _____

City & State _____ Zip _____

Phone/Email _____ (P)

I enclose \$_____ purchase price, and only \$~~9.95~~ shipping & handling for my entire order. Please add applicable state & local sales tax for the following states:

CA, CO, FL, GA, LA, MA, MN, NJ, PA, RI, VT, WA, WI, & WV. **FREE SHIPPING!**

	7J8-42J4W	WHAT SIZE?	WHAT WIDTH?	HOW MANY?
D6	COPPER			
01	BLACK			
04	BROWN			
03	NAVY			
L9	TWO-TONE			
02	TAN			

D Widths:
7 7½ 8 8½ 9 9½ 10
10½ 11 12 13
***EEE Widths (\$5 more per pair):**
8 8½ 9 9½ 10 10½
11 12 13

☐ **Check here for Protection Plus! (X96)**
Expedites replacement of items lost in transit. Add \$2.95 to protect your entire order.

When you pay by check, you authorize us to use information from your check to clear it electronically. Funds may be withdrawn from your account as soon as the same day we receive your payment, and you will not receive your check back from your financial institution.

Satisfaction Guaranteed or Full Refund of merchandise purchase price up to 90 days after receipt.

For Faster Service Call: 1-800-543-4810 or visit www.Haband.com

MATCH THE BLADE TO THE METAL

With the right blade or grinding disc, you can cut almost any kind of metal. The key is to match the blade to the material.

There are two types of metal: ferrous and non-ferrous. (The term “ferrous” is derived from the Latin word “ferrum,” which means iron.) Any metal that contains iron is a ferrous metal and requires a ferrous-metal-cutting blade. Steel angle iron, steel roofing, rebar and steel bolts are examples of ferrous-metal building materials. Most metal-cutting blades and discs are labeled for cutting either nonferrous or ferrous metal.

The two most common nonferrous metals DIYers need to cut are aluminum and copper. Nonferrous metals are usually softer and easier to cut than ferrous metals.



7. CUT SMARTER: USE A RECIP SAW

The next time you reach for your hacksaw, grab your reciprocating saw instead. Mount a metal-cutting blade in your recip saw and you’ve got the ultimate power hacksaw for cutting bolts, rods, pipes and angle iron. A recip saw with a metal-cutting blade also works great for remodeling demolition when there are nails and pipes to cut off. Here are a few tips for cutting metal with a recip saw:

- Set your saw to straight rather than oscillating if there’s a choice.
- Extend blade life by keeping the saw’s speed slow.
- Choose a blade with 20 to 24 TPI (teeth per inch) for thin metal, 10 to 18 TPI for medium-thickness metal, and about 8 TPI for thick metal.
- Buy bimetal or carbide-tooth blades for longer blade life.



8. CUT METAL LATH AND MESH WITH A GRINDER

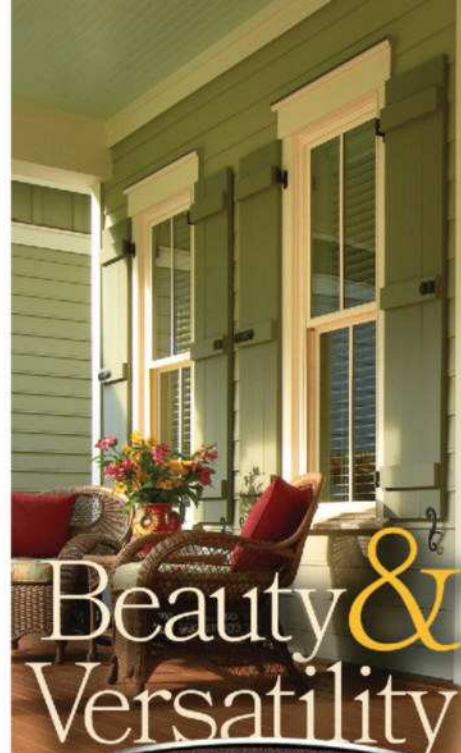
Metal lath and hardware cloth can be cut with a tin snips, but there’s an easier way. Mount a diamond blade in your angle grinder and use it like a saw to cut the mesh. We recommend using a diamond blade that’s labeled as a ferrous-metal-cutting blade, but many tradespeople use a regular masonry diamond blade with good results.



Keeps Paint Out. Keeps Lines Sharp.®

To learn what makes FrogTape® different, visit frogtape.com

©Shurtell Brands, LLC 2017/10/16



Beauty & Versatility



ZAR® DECK & SIDING SOLID COLOR STAIN

Protects against UV rays and extreme weather

Durable 100% acrylic covers like paint while accenting surface texture

Superior adhesion on wood, masonry, vinyl, fiber cement, and composite




SPEEDWASH™ Pressure Washing System

ULTRA-FAST. EASY to USE. BUILT to LAST.

A complete pressure washing system from Generac that provides ALL the tools you need for every application.

Up to 3200 PSI MAX for FAST, thorough cleaning!

POWERDIAL™ GUN puts pressure control at your fingertips!

CLEANING TOOLS make washing anything FAST and EASY!

CLEANS FASTER ▼
The Power Broom cleans decks and driveways up to 4X faster!

LIMITED-TIME, FACTORY-DIRECT OFFER!

GET THE COMPLETE SYSTEM with FREE Cleaning Tools & FREE Shipping!

SpeedWash models start at **JUST \$349!**

Order Today
TOLL FREE **800-761-1854**
GeneracSpeedWash.com

1887AX © 2018



Visit UGL.COM for inspirational photos, how-to videos and brochures

Best ProTips

Expert advice from the job site. By Mark Petersen

BUILD A WELDING TABLE

Admit it: You've always wanted to learn how to weld. This pro will show you how.



Welding intimidates a lot of people, even some of us hard-core DIYers. And that's a shame because welding opens up a whole new world of household repairs and cool projects. We asked a pro welder to demonstrate some basic techniques by building a welding table. She'll walk you through each step and provide helpful tips along the way.

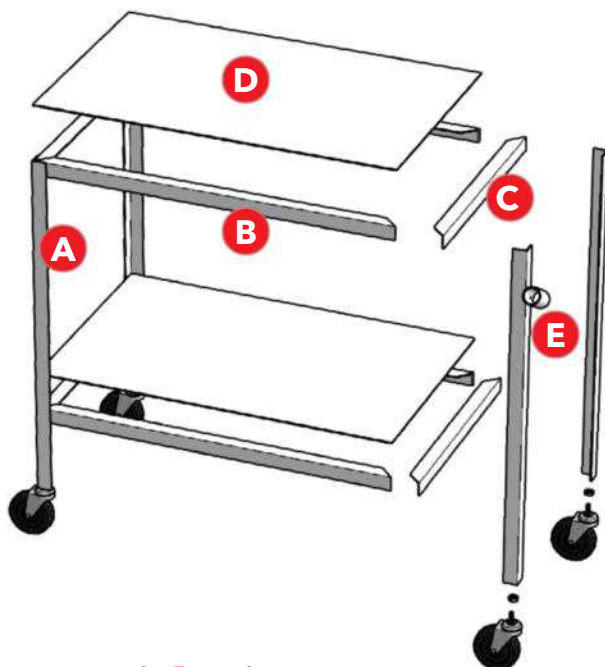
MEET THE EXPERT

Heidi Olson, a certified welder, currently works at a shop that makes cooling parts for walk-in freezers and cold-storage rooms.



A metal welding table is the perfect project to start with because you can build all your future welding projects on it. The materials will cost about \$160.

This table was built using a Lincoln 210MP. This machine can function as a MIG (metal inert gas/wire feed) welder, a TIG (tungsten inert gas) welder and a stick welder, but we used the MIG wire-feed function. To learn more about the equipment needed to get started in welding, including advice on how to choose a machine, check out our March '18 issue, p. 16.



Materials List

ITEM	QTY.
1-1/4" x 1-1/4" x 1/8" x 10' angle iron	3
32" x 20" x 1/8" sheet metal	2
1-1/2" x 1/8" x 4" round tube	1
4" x 130-lb.-rated caster with brake	4
7/16" non-zinc or galv. nuts (fit to casters)	4

Cutting List

KEY	QTY.	DIMENSIONS	NAME
A	4	1-1/4" x 1-1/4" x 1/8" x 31"	Legs
B	4	1-1/4" x 1-1/4" x 1/8" x 32"	Table/shelf side brace
C	4	1-1/4" x 1-1/4" x 1/8" x 20"	Table/shelf end brace
D	2	32" x 20" x 1/8" *	Table/shelf
E	1	1-1/2" x 1/8" x 4" *	Steel pipe

* Have it cut by supplier

Grizzly Industrial

PURVEYORS OF FINE MACHINERY, SINCE 1983
CELEBRATING 35 YEARS!

SUMMER SALE!
APRIL 2 - JULY 9 2018

5-SPEED BABY DRILL PRESS



FANTASTIC COMPACT SOLUTION AND GREAT FOR MINIATURE WORK!

MADE IN AN ISO 9001 FACTORY

G7942 ~~\$135.00~~ SALE **\$125.00**

HANGING AIR FILTER, 3-SPEED



G0738 ~~\$179.95~~ SALE **\$165.00**

OSCILLATING EDGE BELT AND SPINDLE SANDER



MADE IN AN ISO 9001 FACTORY

T27417 ~~\$245.00~~ SALE **\$229.95**

13" BENCHTOP PLANER WITH DUST COLLECTION



MADE IN AN ISO 9001 FACTORY

G0832 ~~\$389.95~~ SALE **\$369.95**

2 HP DUST COLLECTOR WITH ALUMINUM IMPELLER



MADE IN AN ISO 9001 FACTORY
2.5 MICRON TOP BAG

G1029Z2P ~~\$375.00~~ SALE **\$359.95**

6" JOINTER WITH CABINET STAND



G0814 ~~\$669.95~~ SALE **\$639.95**

14" DELUXE BANDSAW 35TH ANNIVERSARY EDITION



G0555LA35 **ONLY \$625.00**

10" HYBRID TABLE SAW WITH T-SHAPED FENCE



G0771Z ~~\$845.00~~ SALE **\$819.95**

PLEASE VISIT GRIZZLY.COM* FOR COMPLETE DETAILS & SPECIFICATIONS

PRICING CODE
18FAMILY
ENTER THIS CODE WHEN PLACING YOUR ORDER
19492

1-800-523-4777
grizzly.com

TECHNICAL SERVICE:
570-546-9663
FAX: 800-438-5901

VIEW VIDEOS AT
grizzly.com

amazon
paypal
VISA
DISCOVER

BEST PRO TIPS



1. CUT METAL WITH A CHOP SAW

Fourteen-inch metal-cutting saws like this, outfitted with an abrasive blade, cost \$100 to \$200. These saws can cut bricks and pavers as well. A large metal-cutting saw with carbide teeth cuts metal like butter and with less burrs, but it will set you back more than \$250. Never put a carbide-tooth blade on an abrasive saw because this saw runs at twice the rpm, a speed that could destroy the blade or worse. Miter saws designed to cut wood also spin too fast for metal-cutting blades, and since their motors aren't sealed, the metal chips and shavings can destroy the motor.



2. GRIND THE EDGES

Smooth rough edges smooth with an angle grinder. It's also important to grind away any paint or rust. Wire-feed welders work best on clean metal.



3. LEAVE A GAP

Metal from the wire is being added to the weld and will mound up a bit. If you're welding a butt joint that you want to look good, leave a small gap, at least the thickness of the wire, to minimize the buildup. Grinding right angles into the abutting surfaces will also create room for the wire and lower the profile of the bead. This wasn't a crucial step on this project because these welds are on the bottom of the shelves and won't be seen.



4. GROUND THE METAL

Workpieces need to be grounded in order to complete the circuit and create an arc. If your workspace is a metal table, the ground clamp can be attached to the table, but if it's a wood table, the clamp needs to be attached directly to the workpiece. Note: You may want to build your table on the ground to avoid burn marks in your workbench top. We didn't mind the marks.

Buying metal

Home centers and hardware stores carry a small variety of sheet metal and common steel stock. The selection and prices are fine for smaller welding jobs, but for larger projects like this table, shop at a metal supplier. Metal suppliers charge up to 50 percent less, and most will be able to cut your sheet metal to exact dimensions.



5. TACK FIRST

Line up the shelf braces on the surface of the table and clamp them together. Tack each brace corner to the table and to each other before welding the whole joint. This will allow you to make corrections if something gets out of alignment.



6. DISPERSE THE HEAT

Welding too long in any one area creates excessive heat, which will expand the metal so much that the whole project could warp when it cools. Weld a few inches on one side, rotate the assembly, weld a few inches on another side, and so on. There is no reason to weld the whole joint between the table/shelf surface and the braces. Note: Fume extractors start at about \$1,200 but are unnecessary if you're welding in a well-ventilated area.



Practice first

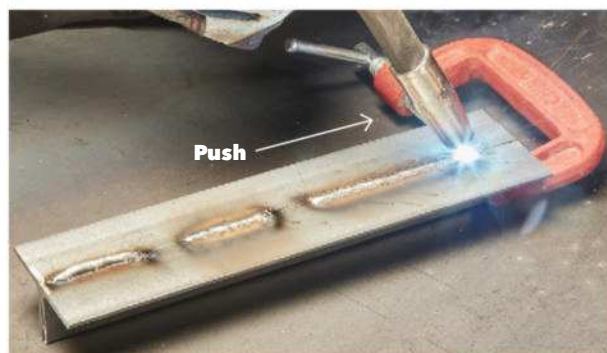
Each type of welder is different, so read your operator's manual. Achieving a good weld comes down to combining the right voltage with the proper wire speed, and this requires practice. Fine-tune the settings on the welder by practicing on the same material you plan to work with.

The wire should protrude about 1/2 in. from the gun, and the gun should be about 3/8 in. away from the surface before you pull the trigger. When you're working on horizontal surfaces with wire-feed welders, you want to push the gun forward. The gas creates a contaminant-free environment, which improves the welding process. If you pull the gun, it could outpace the gas.

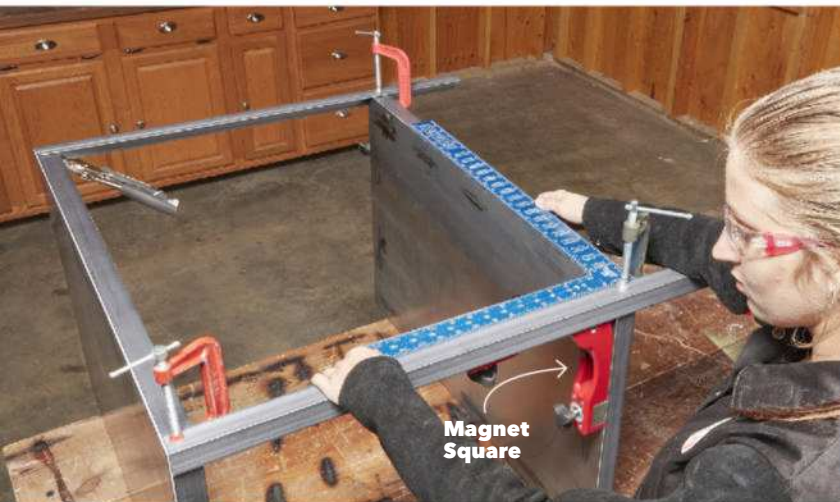
The speed at which you move the gun will also affect how hot the metal gets and how much wire you lay down. One popular welding technique is to move the tip slightly forward and back as you go. Called "whipping," it helps control your speed, creates good penetration, and results in a narrower bead than

you'd get by making tiny circles as you moved along.

The welding process shouldn't produce snapping or popping noises. If a welder is adjusted properly, you should hear a consistent buzzing or sizzle, like the sound of bacon frying. This all may seem complicated, but in just a few minutes you'll be creating solid welds (maybe not pretty ones—that comes later).



BEST PRO TIPS



7. SQUARE, CLAMP, TACK AND THEN WELD

Follow the same procedure you used to assemble the table and shelf: Be sure everything is square and fitting together properly before welding all the joints. Tackle one leg at a time. Square the leg to the shelf horizontally and vertically before tacking it into place, and then square, clamp and tack the leg to the tabletop. Follow the same procedure for the other three legs. There are magnets available to help hold pieces in place, but a framing square and C-clamps will also do the job.



8. PROTECT THREADS FROM SPLATTER

Buy casters that have threaded stems (bolts) so you can replace one if it gets damaged. Weld the nut in place while it's attached to the caster. That way, the caster will line up perfectly with the bottom of the leg. Whenever you weld near nuts and bolts, always protect the threads with tape.



9. ACCESSORIZE

You'll always be looking for a safe place to set down your welding gun, so a gun holder is a must-have accessory on every welding table. A simple pipe works great. You could also add a box at the end to hold your hand tools.



10. WELD "VERTICAL DOWN"

Welding from the top down works best, so whenever possible, try to keep your welding surface in a vertical position. The arcing process turns the metal into a liquid, and gravity pulls it down, resulting in a smoother bead.



11. GRIND SHARP EDGES

Grind down the sharp edges of the table and any ugly beads you want to smooth out. Clean the surface of the metal before you paint. Start with a household degreaser/cleaner and then wipe down with acetone. Don't paint the tabletop or top rail; you won't be able to ground your next welding project through the table with the ground clamp.



12. KEEP THE GUN CLEAN The nozzle and the tip on the gun will get covered in splatter, so it's important to clean them off periodically. Welding pliers are the perfect tool for the job. They're also designed for cutting wire and removing bushings, tips and nozzles, and they can work as a hammer in a pinch.

WELD SMART-STAY SAFE

- Wear thick leather gloves.
- Wear a welding cap under your helmet. (Yes, we know our expert didn't wear one.)
- Wear a long-sleeve shirt and pants made from cotton or leather. (These will also protect you from the arc rays, which can burn your skin like rays from the sun.)
- Wear hearing protection and safety glasses when cutting.
- Wear a welding helmet when welding to protect your face from sparks and your eyeballs from welder's flash (sunburn on your eyes).
- Keep flying sparks away from flammable or explosive materials.
- Don't touch the electrode (wire) with bare skin, and keep yourself and your clothing dry.
- Remove loose jewelry.
- Always maintain a proper ground.
- Always weld in a ventilated area, even if you use a fume extractor.
- Only weld on bare metal. Breathing in the fumes from zinc and other galvanized coatings can be extremely hazardous to your health.



TURN YOUR DREAMS INTO REALITY

Marmoleum® Click Cinch Loc is a high quality, easy to install flooring system made from natural materials. Available in a wide choice of colors, this water-resistant floor is ideal for every room in your home. Marmoleum® Click Cinch Loc comes in 12" x 36" panels and 12" x 12" squares and features a patented click system, which guarantees easy, problem-free installation. Because it's easy to clean, Marmoleum® Click Cinch Loc makes life easier for people with asthma, allergies and other respiratory disorders. With Marmoleum® Click Cinch Loc, it really is easy to turn your wildest dreams into a beautiful reality.

marmoleum® *click*  **cinch LOC**



creating better environments



www.forboflooringNA.com
+800 842 7839



FLOORING SYSTEMS

French Cleat TOOL WALL

*Easy to build, easy to reconfigure
as your tool collection grows*

BY TRAVIS LARSON

Just think of it—a tool storage system for your garage or shop that you can endlessly reconfigure to accommodate all your tools. They'll be right at your fingertips whenever you

need them. And when it's time to straighten up at the end of the day, you'll know right where everything goes, making cleanup quick and easy.

How much you spend depends not only on the size

of your storage wall but also on the level of finish you're after. We spent about \$500 on the materials for our wall, but you could build it for about half the price by using 3/4-in. CDX construction plywood.

WHAT IT TAKES

TIME: 2 weekends as shown

COST: \$500 as shown (about \$10 per square foot)

SKILL LEVEL: Intermediate

TOOLS: Miter saw, table saw, drill/driver

To learn how to build this, go to familyhandyman.com and search for "tray tower."







What is a FRENCH CLEAT?

French cleats are an ingenious means of hanging just about anything. Mating 45-degree bevels—one on the wall, the other on the tool holder—interlock to form a rock-solid connection. You just drop the tool holder over the cleat and it's done—perfectly level, perfectly solid. No fasteners!

BUILD THE WALL

Size to fit your needs

Our wall is two horizontal sheets of 3/4-in. birch plywood (a 4 x 8-ft. sheet and a 2 x 8-ft. sheet; **Photo 2**), with 1x2 maple trim (**Photo 3**). The size of your wall depends on how much you want to store and how much space you have. The construction techniques are the same for any size wall.



1. MOUNT A TEMPORARY LEDGER

Cut one of the wall cleats to width (Photo 4) and then level it and screw it to the wall studs.

2. HANG THE PLYWOOD

Rest the first sheet on the temporary ledger and screw it to the studs with 2-in. screws spaced every 12 in. Rest the second sheet on top of the first and screw it to the studs as well. Remove the temporary ledger.

Apply the finish to full sheets before cutting

We prefinished the plywood and trim boards. You should too, because it saves lots of time and gives you a smoother finish. You'll still have to coat the cut edges, but that's a lot easier than finishing the entire wall after it's built.

We used Varathane Summer Oak and American Walnut stain to create the light and dark parts. We rolled on the stain with 4-in. foam rollers and then wiped it off with cotton rags. Topcoat with a water-based polyurethane.

A table saw makes the project much easier

The best tool for ripping the parts and cleats is a table saw. However, if you don't have access to one, you can also make the cuts with a straightedge and a circular saw. If you go that route, it's worth building a dedicated straightedge. To find out how, search for "create circular saw cutting guides" at familyhandyman.com.

A miter saw works well for cutting miters on edge banding and the 45-degree angles on many of the components. Flatten the point of each bevel (**Photo 4**) so they won't cut you or splinter off when you hang your tool holders. You can assemble your tool holders with either glue and 2-in. brads, or 2-in. and 1-1/4-in. trim-head screws.



MEET THE EXPERT

Travis Larson has been building homes, decks and additions and doing serious wood-working for well over 40 years. He's been an editor at *The Family Handyman* for the last 20 of those years.



3. ADD THE BORDER

Cut the 1x2 to fit around the perimeter and nail it into place with 2-in. 18-gauge brads.



4. CUT THE WALL CLEATS

Rip the French cleat strips for the wall to 4 in. wide. Then reset the saw to 45 degrees and adjust the fence to leave about a 1/8-in. flat area at the point of the bevels. Cut the 45-degree bevels on the strips. Repeat the process for the accessory cleats, but rip them to 2-1/2 in. wide.



5. MOUNT THE WALL CLEATS

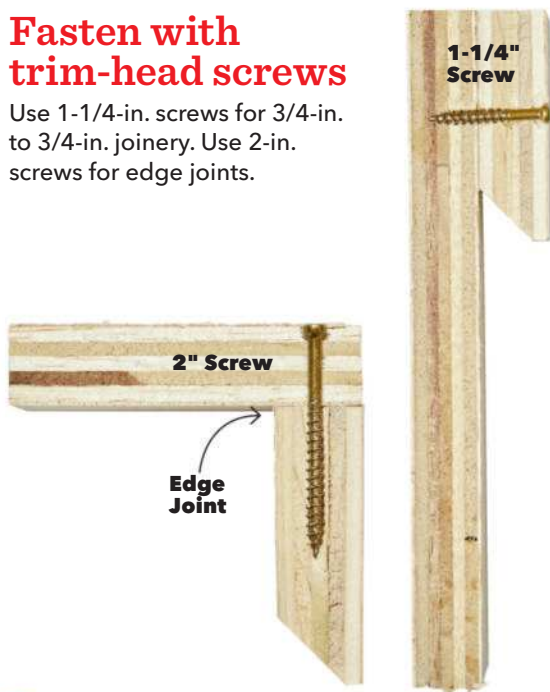
Space the cleats with a 2x4 block and secure them with a pair of 1-1/4-in. trim-head screws spaced every 16 in. Keep the screws 1 in. from the top and bottom of the cleats.

BUILDING TIPS

Most of the tool holders take less than 20 minutes to build. Have fun and don't be afraid to toss your failures and try again. Here are tips to help you build your wall and make custom holders for your tools and gear.

Fasten with trim-head screws

Use 1-1/4-in. screws for 3/4-in. to 3/4-in. joinery. Use 2-in. screws for edge joints.



The plywood is optional

If your garage or shop wall has exposed studs, you'll find the plywood in our plan ideal for finishing the wall. But you could also screw the wall cleats right through existing plywood or drywall or even directly to the studs.



Build a test wall

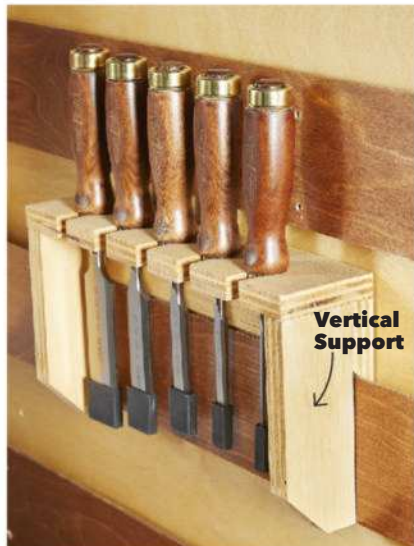
Mount three cleats on a half sheet of plywood to mock up a test wall. Use it to test and assemble your shelves, bins, hangers and more.



Plan your tool holders

Lay out the tools or other items to help you decide what type and size holder will work the best.

What kind of support will it need?



SMALL SHELVES can get by with minimal support. They'll only need vertical supports that cover one wall cleat.



MEDIUM-SIZE shelves, depending on their design and the weight of their contents, may need to span more than one cleat.



SUPPORT LARGE, heavy units with double cleats. Screw the top cleat to the tool holder, then hang it on the wall with the bottom cleat already nested in the wall cleat. That way you can screw the tool holder to the bottom cleat from the front in exactly the right position.



PLAN FOR OUTLETS

If you have existing outlets near the floor, you can tap into those outlets to feed new outlets in the slat wall itself. These new outlets can be at workbench level to feed battery chargers or up high to power lights.

You can cut holes in the drywall and feed cable up to those locations. You don't need to patch those holes because they will be covered by the slat wall. Leave the cables coiled behind the plywood and note their locations. Then you can cut outlet holes in the plywood and insert "remodeling" junction boxes.

Take advantage of the hardware aisle

Stroll through the hardware section at your favorite home center. Choose hooks, racks and shelf brackets and build components to suit them.

Sprinkler System Fixes



Your irrigation system may seem complex, but it's made up of simple components you can repair or replace yourself in just an hour or two. Don't be intimidated: The pipes are plastic and much easier to repair than the plumbing in your house. The electrical lines are low voltage, so they're not hazardous. You may need a multimeter (\$30) to diagnose electrical problems, but you can master that step in just a few minutes.

Problem:

Sprinkler heads not working

Solution 1: REPLACE A BROKEN SPRINKLER HEAD

Broken sprinkler heads are easy to identify. Just look for cracked or broken plastic casing on the heads, heads that don't pop up, or heads that spray water wildly or not at all. It's common to find the top of the head completely broken off. This typically happens to heads that are set too high and get run over by vehicles or hit by lawn mowers.

Replacing the head is one of the simplest fixes. Replacement heads are available at home centers and online, starting at \$5. Be sure to buy the same type of head that you're replacing.

To remove a broken head, turn off the system and dig a 2-ft.-diameter hole around the head. Using a square shovel, slice the sod into easy-to-remove pieces. Set the sod on a tarp so you can put it back in place at the end of the job.

Dig down to the "riser" (the vertical pipe that branches off the main line), which is connected to the sprinkler head. Dig gently to avoid damaging the plastic water line, which is 8 to 12 in. underground.

Turn the head counterclockwise to remove it from the riser. While the head is off, take care not to spill dirt into the riser. Sprinkler heads are installed only hand-tight, but after they've been in the ground for several years, you may need a wrench to unscrew them. If the head doesn't turn easily, hold the riser with a slip joint pliers to keep it from twisting loose from the fittings below.

Attach the new sprinkler head by placing it on the riser and turning it hand-tight (**photo right**). Don't use Teflon tape or joint compound on the riser threads.

Sprinkler heads are tested at the factory to make sure they work. As a result, they're often packaged still wet, so don't be surprised to see water in a new head.

Before filling in the hole and replacing the sod, set the desired sprinkler pattern (see "Reset the Spray Pattern," p. 40).

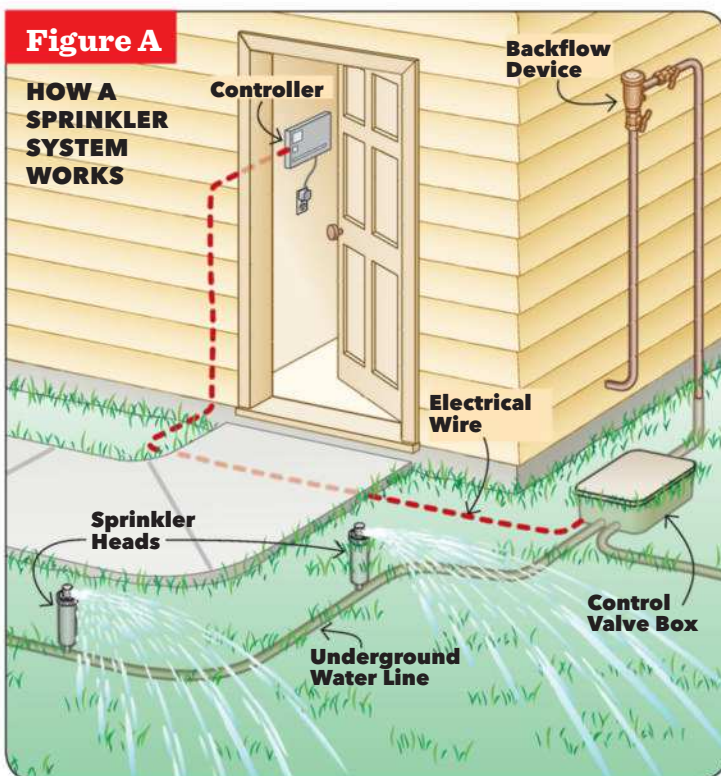


Figure A

HOW A SPRINKLER SYSTEM WORKS

HOW A SPRINKLER SYSTEM WORKS

The controller sends a signal to the control valves in the control valve box. The valves open, sending water through the underground water line, which causes the sprinkler heads to pop up and spray.



CAUTION

Before you dig, call 811 to have your underground utility lines marked.

SCREW ON A NEW HEAD

Dig around the sprinkler head to expose the riser. Unscrew the broken sprinkler head from the riser and screw on the new one.

Solution 2: CLEAN A CLOGGED HEAD

A head that's clogged with dirt may rise but not spray, stay up after watering, or produce an erratic spray pattern.

To clean the head, dig it out and remove it from the riser (see p. 39). Take the head apart by holding the bottom of the canister and turning the top of the head counterclockwise. Once it's unscrewed, lift it out of the canister (**Photo 1**).

Remove the screen basket, which serves as a filter, at the base of the head. If you can't pop the screen out with your fingers, pry it out with a screwdriver or pull it free with a pliers. After rinsing the screen (**Photo 2**), clean the rest of the sprinkler head. Reinstall the head. If it still doesn't work, replace it with a new head.

RESET THE SPRAY PATTERN

When you install a new head or reinstall an old one, you may need to adjust it to water a specific area. Adjustment methods vary. You can adjust some head types by turning a slot at the top with a screwdriver. Others require a special key that you insert into the head and turn (**Photo 3**). Some heads also allow you to adjust the spray pattern by turning a tiny screw located next to the nozzle.

Adjust the heads before installing them, then fine-tune them once they're in place, with the sprinkler running.

First, turn the top clockwise until it stops. That nozzle location is the starting point (the head will turn counterclockwise from there). Adjust the head to set the watering rotation anywhere from 40 to 360 degrees counterclockwise from the starting point.

Set the head in the canister. Standing behind the head, align the nozzle with the right edge of the area you want to water, such as along a driveway. Tighten the head in the canister. Carefully backfill the hole and replace the sod.

Turn on the sprinklers and allow the head to rotate a few times, then make additional adjustments while the system is running.

TWO TYPES OF PIPE

Some sprinkler systems use black polyethylene pipe joined with barbed fittings and hose clamps. Others use PVC pipe, which is usually white and joined with PVC cement.

1

TAKE THE HEAD APART

Unscrew the top from the canister. Rinse away soil and debris in a bucket of water.



2 CLEAN THE SCREEN

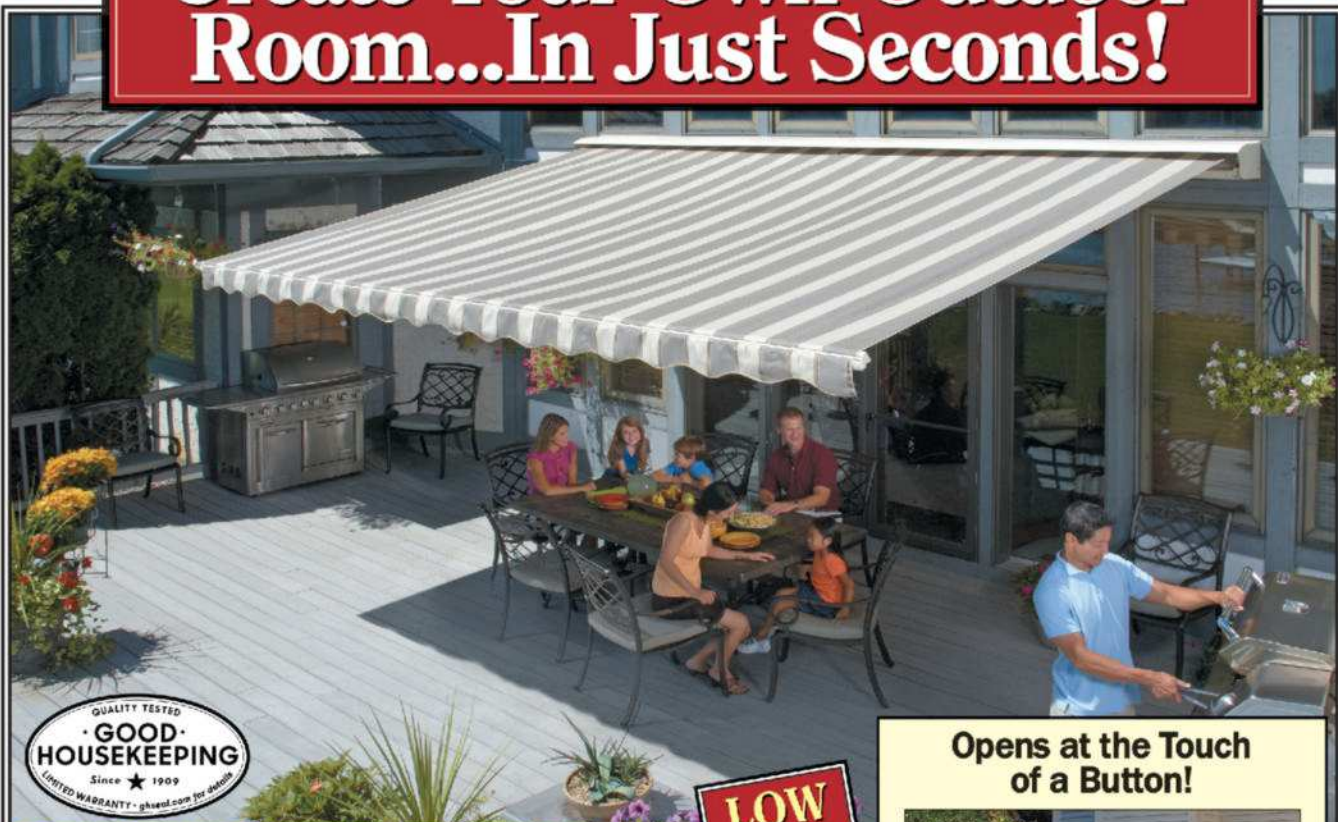
Remove the screen basket from the bottom of the head, then rinse it clean.



3 ADJUST THE PATTERN

Set the watering range of the sprinkler head before installing it. Place the head in the canister so the nozzle is at the edge of the area to be watered. Make final adjustments with the water running.

Create Your Own Outdoor Room...In Just Seconds!



Motorized & Manual Awnings Available!

**LOW
Factory
Direct
Prices!**

Introducing The Revolutionary SunSetter Retractable Awning!

If you're tired of having your outdoor enjoyment rained on...baked out...or just plain ruined by unpredictable weather...

At last there is a solution! One that lets you take control of the weather on your deck or patio, while saving on energy bills! It's the incredible SunSetter Retractable Awning! A simple...easy-to-use...& affordable way to outsmart the weather and start enjoying your deck or patio more...rain or shine!

The SunSetter® is like adding a whole extra outdoor room to your home...giving you instant protection from glaring sun...or light showers! Plus it's incredibly easy to use...opening & closing effortlessly in *less than 60 seconds!*

So, stop struggling with the weather...
& start enjoying your deck or patio more!

For a **FREE** Info Kit & DVD email your name & address to freedvd@sunsetter.com

**FREE!
Info Kit
& DVD**

**Opens at the Touch
of a Button!**



Protects you from 99% of UV rays



You choose full sun or total protection in just seconds!



FREE Info Kit & DVD
Call Toll-Free: 1-800-876-8060 Ext. 34160

☒ **Yes!** Please send your **FREE** Info Kit & DVD...including a \$200 Savings Certificate...TODAY

Name _____
Address _____
City _____ State _____ Zip _____
Email _____

(Important: Be sure to give us your email address to receive our best deals!)

SunSetter®
RETRACTABLE AWNINGS

184 Charles Street, Dept. 34160, Malden, MA 02148
Visit us today at www.sunsetter.com

\$200 Savings Certificate Included!

Problem:

Low water pressure

Solution 1: TURN ON VALVES AT BACKFLOW DEVICE

Low water pressure will result in the sprinkler heads barely shooting water. In extreme cases, many of the heads won't even pop up. Start with the easiest solution. Make sure the valves at the backflow device are fully open. The backflow device is located above ground, with the valve at least 12 in. above the highest sprinkler head in the yard. Most backflow devices have two valves, one on the horizontal pipe and one on the vertical. Turn the valves to their open positions as shown. The valve is open when the handle is parallel with the pipe.



MAKE SURE THE WATER IS ON

Check the valves on the backflow device to make sure they're open. Turn the valve on the horizontal pipe first, then the vertical pipe valve.

Solution 2: FIND AND REPAIR LEAKS

Check for leaks in the water line. Look for a series of sprinkler heads that aren't watering properly. A water line problem is always located between the last working head and the first nonworking head.

Look for signs of leaking water, such as water bubbling up from the soil when the sprinklers are running, a depression in the ground, or a very wet area. If you find running water, follow the water to the highest point to locate the source.

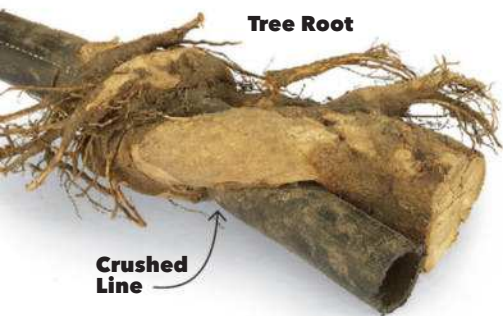
Once you locate the approximate leak site, dig straight down to the water line. Then enlarge the hole along the line, following the flow of the leaking water until you find the break or crack. Before making the repair, be sure the system is turned off at the controller.

To fix the leak, cut out the damaged section of pipe. A hacksaw cuts plastic pipe easily. Replace the damaged section with a repair coupling (\$5 at irrigation supply stores). Turn on the system to check for leaks, then backfill the hole with dirt and replace the sod.



REPLACE DAMAGED PIPE

Cut out the damaged section of line and replace it with a repair coupling. Repair couplings come in several styles. This one expands and contracts like a telescope.



Solution 3: CHECK FOR CRUSHED PIPES

If you can't locate a leak, the water line may be crushed or obstructed. Sometimes roots wrap around the line and squeeze it closed over the course of several years (**photo above**). Or vehicles can compress

the soil, causing the line to collapse.

These problems are harder to find and often require a lot of digging. Again, look for the problem after the last working head. Dig along the water line until you find the damaged section. If the line runs near a tree, start your digging there.

Once you locate the damaged section, cut it out with a hacksaw. If the line was damaged by tree roots, reroute the line by digging a new trench away from the tree.

Cut a new section of pipe to replace the damaged one. Then install the new section of pipe, connecting it at each end with regular couplings and hose clamps (**photo right**).

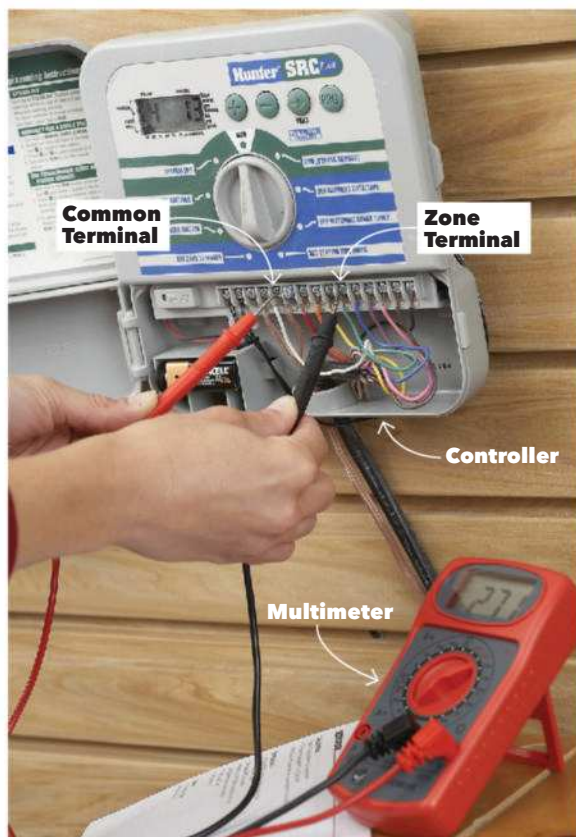


REPLACE CRUSHED PIPE

Cut out the damaged section. Replace it with a new pipe, making connections with couplings and hose clamps.

Problem:

One or more zones not working



CHECK THE VOLTAGE

Touch the leads to the common terminal and zone terminal. If the voltage is too low, replace the controller.

Solution 1: CHECK FOR VOLTAGE TO THE BAD ZONES

Your watering system is divided into a series of zones. Each zone has an electrically activated valve that controls the heads for a designated area.

Generally, if you have a zone that's not turning on, you have an electrical problem. To solve the problem, make sure the zone wires are firmly attached to the terminals in the controller, the transformer is plugged in and the circuit breaker at the main panel is on.

Next, test for voltage to the nonworking zone, using a multimeter (\$30 at home centers and hardware stores). Turn on the nonworking zone at the controller. Turn the multimeter dial to voltage and place one lead on the common terminal (marked "c" or "com"). Place the other lead on the terminal of the zone that's not working (**photo left**). It doesn't matter which lead goes to which terminal.

Refer to your owner's manual to see whether the voltage reading falls within the required range (usually 24 to 28 volts). If it doesn't, the controller needs to be replaced. (If you don't get any voltage reading, see "Check Fuse and Transformer," p. 44.)

Fortunately, controllers rarely go bad unless they're struck by lightning. New ones start at \$175 and can cost upward of \$400. Replace a damaged controller with the same brand and model as you currently have. To replace it, label each wire that's connected to the controller with a piece of tape. Unhook the wires, then attach them to the new controller in the same sequence.

Spring
into savings!
with
Cache[®]



Threads directly
into the spout,
hidden from view.

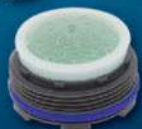
Easy installation
into select faucets.

Hidden aerator keeps
the beauty of your faucet.

Available in 4 different sizes.



1.8 GPM



1.5 GPM



1.2 GPM



In stores and online
www.homedepot.com



flow, stop and go[®]
www.neoperl.com/consumer
For more information,
email us at
info@neoperl.com



Transformer
Terminals

Controller

Transformer

REPLACE THE TRANSFORMER

Place the multimeter leads on the terminals marked "24 vac" with the transformer plugged in. If the reading is less than 22, replace the transformer.

Solution 2: CHECK FUSE AND TRANSFORMER

If no zones will turn on, first turn the controller to the manual setting to see if the system will run. If it turns on manually, the controller is good, but the rain sensor may be stopping the automatic programmed watering, which is what it's designed to do.

Rain sensors conserve water by preventing the system from running when the ground is already saturated. Some states require rain sensors on all new systems. (Your rain sensor is bad if the system runs when the ground is already wet.)

If the system doesn't run in the manual position, check the controller for power. If it has a fuse, make sure it's not blown. Or, if it has a circuit breaker reset button, press the button, then try the system again. If the system is plugged into a GFCI receptacle, press the GFCI reset button.

If it still doesn't turn on, make sure the outlet that the power transformer is plugged into is working by plugging in a power tool. If it's working, plug the transformer back in, turn the system off and test the transformer for voltage. Using a multimeter, place a lead on each of the two transformer terminals. It doesn't matter which lead goes to which terminal.

The transformer terminals are marked "24 vac." A 24-voltage transformer should normally test between 24 and 28 volts. If the voltage falls below the manufacturer's range, replace the transformer (\$25). Simply unscrew the terminals that hold the two transformer wires in the controller and remove the transformer (**photo above**). Insert the wires on the new transformer through the designated opening in the controller. Attach the wires to the controller terminals marked "24 vac" by placing the wire ends under the screws, then tightening them.



Solution 3: REPAIR A BAD VALVE

If the controller, fuse and transformer check out OK, test the resistance “ohms” between the common terminal and the nonworking zone. Turn off the system, turn the multimeter to test for ohms (the omega symbol), and place the leads on the common terminal and zone terminal, just as you did to test for voltage.

Compare the ohms reading with the range listed in your owner’s manual (usually 20 to 60 ohms). If the ohms fall below the required amount, the switch (solenoid) that operates the control valve for that zone is defective and needs to be replaced. The defective solenoid will be connected to the same color wire as the zone wire at the controller. (If the reading is too high, see “Repair Damaged Wires.”)

Control valves are typically grouped with three to six valves in one box (**Photo 1**). The boxes are located in the ground with a cover that simply lifts off. They can be located anywhere in the yard but are usually close to the main water supply.

Although valves themselves rarely need to be replaced, solenoids do occasionally fail. Replacing them is quick and easy.

Be sure the controller is in the off position (you don’t need to shut off the power) and the water valves on the backflow device are turned off (see **top photo**, p. 42). Inside the control valve box, remove the wire connectors and disconnect the two wires on the defective solenoid. Turn the solenoid counterclockwise to unscrew it from the valve (**Photo 1**). Water will slowly seep out of the valve opening, even with the water turned off. Place a new solenoid in the valve.

Twist the ends of the new solenoid wires onto the same common and field wires that the old solenoid was attached to (**Photo 2**). It doesn’t matter which solenoid wire goes to the common and which one goes to the field wire. Twist a new waterproof wire connector over

1 REPLACE A SOLENOID

Disconnect the wires and unscrew the defective solenoid from the control valve. Insert a new one and turn it until it’s finger-tight.

2 RECONNECT THE WIRES

Connect the two wires on the new solenoid to the common wire and a field wire, using waterproof connectors.



each connection (**Photo 2**). To make waterproof connections, use a silicone-filled “direct bury” connector, available at home centers for \$15 for a package of 10.

REPAIR DAMAGED WIRES

If the ohms reading between the common terminal and the nonworking zone terminal is too high (it’s sometimes an infinity reading), the problem is a severed or bad wire to the control valve. If only one zone isn’t working, the field wire is damaged. If none of the zones in a control valve box are working, the common wire is damaged, although the field wires could also be bad.

To find a bad wire, bypass each in turn by temporarily substituting a 14-gauge wire for the original that you run above ground. Make the wire connections with the controller turned off. Then turn the controller back on. Test the field wire first. If the zone turns on, the old field wire is bad. Replace it with an 18-gauge wire rated for underground burial. Bury the wire at least 8 in. underground. Follow the same procedure to test the common wire.

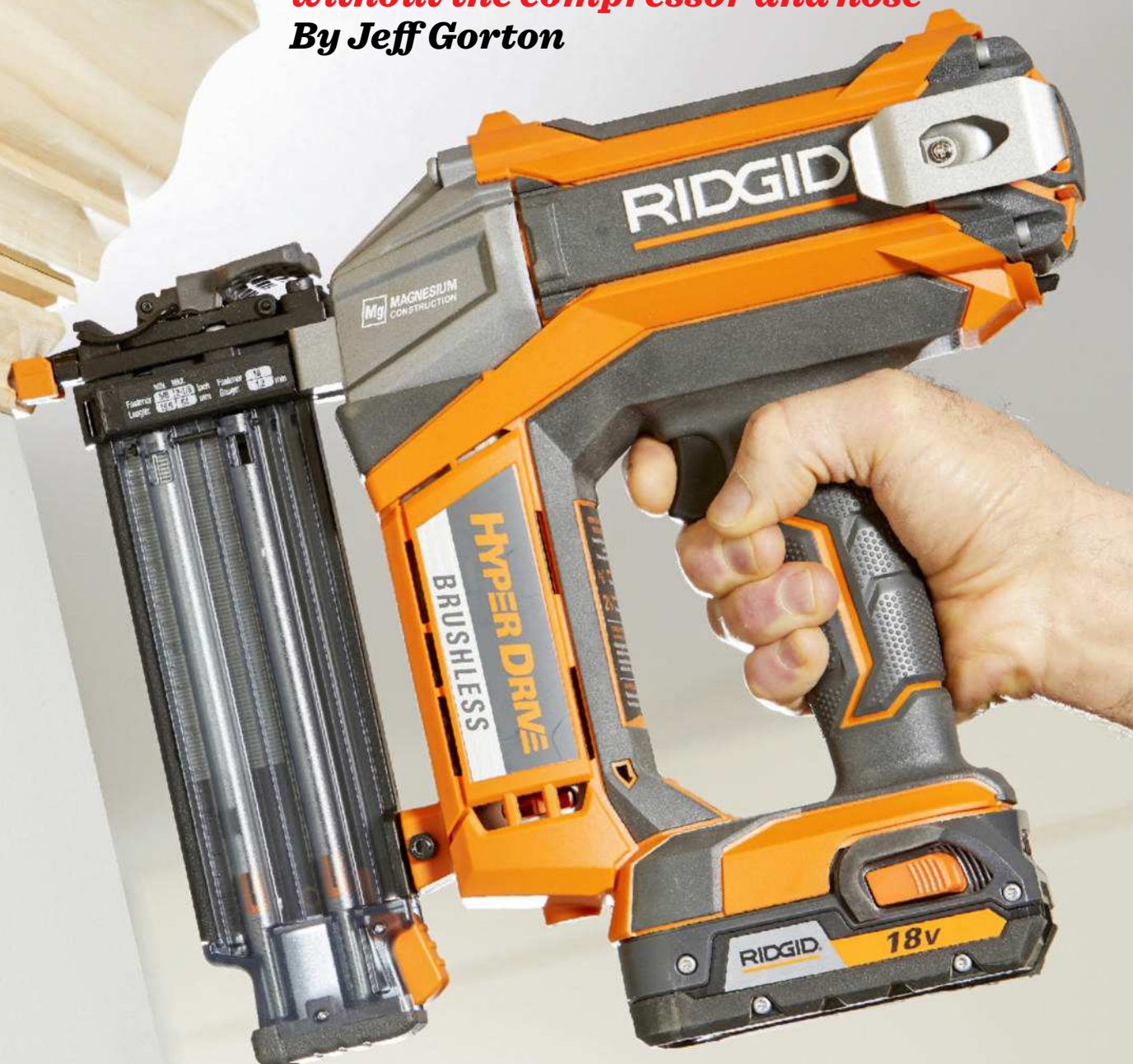


Waterproof Connector

CORDLESS BRAD NAILERS

*Speed and convenience—
without the compressor and hose*

By Jeff Gorton



Our shop is full of compressor-powered nail guns. But with all the advances in battery and motor technology, we wondered if cordless nailers had finally improved enough to replace our trusty pneumatic tools. To find out, we rounded up ten 18-gauge brad nailers and put them to the test. Here's what we discovered.

The Basics

Bare tool or kit?

Most of these nailers are available as kits containing a battery and charger. Six of the nailers are also available as bare tools. If you own other battery-powered tools, you'll save money if you can find a brad nailer that uses the same battery. Otherwise, the kits are usually a better deal.



Bare Tool



Tool weight matters

If you're installing crown molding overhead, a few pounds could make the difference between aching shoulders and a pain-free job. The Paslode nailer weighs in at a measly 4.7 lbs. At the other end of the spectrum is the 7.65-lb.

Hitachi. The weights shown in the chart on p. 49 include batteries with ratings of about 2 amp-hours.



7.65 Lbs.

How Do They Work?

Paslode pioneered cordless nail guns with its fuel-powered nailers. Paslode nailers contain a canister of fuel that provides the driving force when a small amount of fuel is ignited in a cylinder. The advantage of this design is that the battery can be small and light since its main function is to provide ignition for the fuel. These nailers are also very powerful. But they do have some drawbacks: The exhaust fumes smell bad and you have to buy replacement fuel canisters.

Most of the nailers we tested use the motor to compress air in a cylinder. The compressed air pushes a piston that drives the brads.

DeWalt, Bostitch and Porter-Cable have taken a different approach from the two above. In their nailers, a spinning flywheel provides the driving force. To ensure rapid firing, a few of these nailers rev up as

soon as you press the nose to the workpiece.

Other than the significantly lighter weight of the Paslode, we didn't find any advantage of one technology over the other.

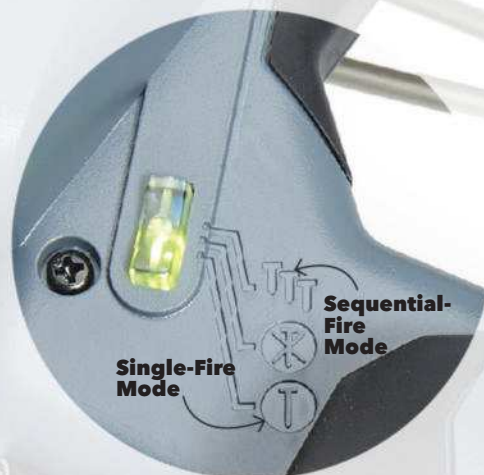
There's a split-second delay with the flywheel models, but it's not bothersome. They all drove brads well enough to install standard trim.





Look at the tip

When you're installing trim, it's important to place nails accurately. And to do this with a brad nailer, it helps to have a clear view of the gun tip. The Porter-Cable and Bostitch nailers are examples of guns with a clear view of the tip. The tip on the Milwaukee tool is harder to see.



Do you need sequential firing?

All but two of these brad nailers include the option to switch from single-fire to sequential firing. In single-fire mode, you must release the trigger between shots. Switching to sequential firing allows you to hold the trigger down and "bump-fire" brads by simply pressing the nose against the workpiece. You should be aware of this feature, but don't let it drive your buying decision. Bump firing isn't critical to most trim carpentry or woodworking.

Dry-fire lockout is a nice feature

Many of these nailers have a dry-fire lockout feature that prevents the gun from firing when there are no brads. Without this feature, you could keep on nailing without realizing that the gun had run out of fasteners. Also, most of the guns have a small window in the nail cover with some means of signaling that the brads are running low. We like Ridgid's transparent cover that allows you to see at a glance how many brads are left and what length they are.

Do you need maximum power?

You'll probably never have to drive a 2-in. brad into solid oak. (Even some conventional nailers can't do that.) But we thought it would be an interesting test. The Makita and Ryobi nailers were the only ones that struggled in this test. But every model we tried is capable of driving 1-1/2-in. brads through 3/4-in. oak into a pine jamb. And this is probably the most difficult nailing job you'll encounter in normal circumstances.



**Tool-Free
Jam
Clearing**

Clear jams easily

In our testing, we had very few brads get jammed in the tip of the tool. But when this does happen, it's nice to be able to clear the tip without tools. All but one of the brad nailers have tool-free jam clearing. On most tools, you release a latch on the front to access the jammed brad. To access a jam on the Milwaukee tool, you just release the nail clip cover.

Occasionally the driver in these brad nailers will get stuck. A few tools have a "stall release" lever to reset the driver. Other tools instruct you to remove and then replace the battery. Then you press the nose against a scrap of wood and pull the trigger to reset the driver. Be sure to read this section of your instruction manual to see how your tool works.

How long will the battery last?

Manufacturer claims run from about 700 to 2,000 brads fired on one battery charge. But since there are no testing standards, it's hard to say what this really means.

Considering that it takes about 600 brads to nail on the baseboard, casing and crown moldings in an average-size room, we would expect all of these nail guns to complete the task on a single charge. And most would have power left to finish another room or two. So unless you're trimming out an entire house and have only one battery, we don't think the number of brads you can fire on a single charge is a key consideration.



**Pneumatic
Brad Nailer**



**Battery-Powered
Brad Nailer**

Is a battery-powered brad nailer right for you?

If you're a pro, the answer is probably yes. For the small odd job, or to take care of punch-list items, it's hard to beat the convenience of a battery-powered brad nailer. But for DIYers, the choice is a little more difficult. Compressor-powered brad nailers have the advantage of being smaller and lighter, and you don't have to worry about keeping a battery charged. And you can buy a kit containing a brad nailer, small compressor and hose for about the same price as one of these battery-powered nailers. On the other hand, it's convenient to be able to grab a battery-powered brad nailer and start working without setting up the compressor and having to drag a hose around behind you.

18-Gauge Brad Nailer Specifications

	MODEL #	Bare Tool	Weight w/Battery (lbs.)	Dry-Fire Lockout	Bump and Sequential Firing	Tool-Free Jam Clearing
Bostitch	BCN680D1	Not available	6.4	✓	✓	✓
DeWalt	DCN680D1	\$250	6.2	✓	✓	✓
Hitachi	NT1850DE	Not available	7.65		✓	✓
Makita	XNB01Z	\$249	7.4	✓	✓	
Milwaukee	2741-21CT	\$249	6.8	✓	✓	✓
Paslode	IM200LI	Not available	4.7			✓
Porter-Cable	PCC790LA	\$149	6.2			✓
Ridgid	R09890K	\$159	7.2	✓	✓	✓
Ryobi	P320	\$129	6.3	✓	✓	✓
Senco	6E0001N	Not available	6.4	✓	✓	✓



The brad depth is adjustable

Overdriving a brad can cause it to go completely through thin material so it won't hold. It can also leave unsightly driver marks in the trim. And under-driving a brad will leave it protruding. To avoid these problems, all of these brad nailers have adjustable tips that help regulate the fastener depth. Some of the adjusters operate more smoothly than others, but they all accomplish the task. The Ryobi tool also has an air-pressure adjustment for even more control of the fastener depth.

Models We Tested

To see how the 18-gauge battery-powered brad nailers performed under adverse conditions, we drove hundreds of 2-in. brads into 2-1/4-in. solid oak. Then we tested in real-world conditions by nailing oak casing to an oak jamb. Here's what we discovered:



RIDGID

R09890K
\$298

This is a ruggedly built tool with the advantage of Ridgid's lifetime warranty. We like the transparent magazine cover and the two styles of no-mar tips that Ridgid supplies so you can choose your favorite.



DEWALT

DCN680D1
\$299

This nailer appears to be nearly identical to the Bostitch. Both nailers drove 2-in. brads consistently into solid oak and worked perfectly in our testing.



MILWAUKEE

2741-21CT
\$399

From the sleek, compact body to the precision brad-depth adjuster, this tool has a high-quality feel. Our only gripe is that the view of the tip is obscured by the jam-release lever. The nailer responds instantly and performed well in our testing.



BOSTITCH

BCN680D1
\$299

This nailer has a flywheel-type drive system that revs up as soon as you press down on the tip, ensuring a quick response when you pull the trigger to drive the brad. The nailer has every feature you could want and performed flawlessly in our shop.



HITACHI

NT1850DE
\$299

Weighing in at 7.65 lbs., this is the heaviest tool of the lot. The nailer performed well in our testing and would be a good choice if you have other Hitachi tools to share batteries with. Our only complaint is the depth adjustment, which is hard to turn and disconnects from the safety tip if you turn the adjuster too far.



SENCO

FUSION F-18
6E0001N
\$309

Senco uses a sealed cylinder in conjunction with a motor to drive the brads. This results in good power and almost instantaneous response. We like the balance and feel of this tool.



PASLODE

IM200Li
\$329

This brad nailer is in a class of its own. The gas-fuel technology is sort of old-school, but it's tried and true. In our test, this tool was the lightest (4.7 lbs.) and felt the most comfortable. If you're willing to shoulder the additional cost of fuel canisters and put up with the faint smell of exhaust, put this gun at the top of your list.



PORTER-CABLE

PCC790LA
\$190

We like the weight and balance of this nailer. And it drives brads consistently without problems. The only downside is the lack of a dry-fire lockout to prevent firing when there are no nails in the magazine.



MAKITA

XNB01Z
\$378

We like how easy it is to see the tip, aiding in accurate brad placement. But the shape of this nailer gives it a back-heavy feel that we found uncomfortable. This is the only gun that requires a tool to take apart the nose to clear jams.



RYOBI

P320-P128
\$188

This model performed well and has all the features of more expensive nailers. The unique adjustable air pressure could be handy for fine-tuning brad depth. It uses Ryobi's One+ battery—great if you own other tools using the same battery platform.



Do You Suffer From:

- Plantar Fasciitis
- Joint Pain
- Heel Pain
- Back/Knee Pain
- Bunions
- Heel Spurs
- Arthritis
- Neuropathy



Bobby S.

I stand on cement floor eight hours a day, but my body just can't take the pounding of walking or even standing. After trying Gravity Defyer shoes, I can keep my job and enjoy it pain free. I am Gravity Defyer's #1 fan.



G-DEFY
ION

Enjoy the benefits of exercise without harmful impact on your joints!

Boost energy

Combat health issues

Increase mobility

Relieve pain

VersoShock
PATENTED TECHNOLOGY

X-ray view simulated.

Our patented VersoShock® technology provides the ultimate protection for the entire body in a way no other shoe can. It is designed to absorb harmful shock from the ground up, converting the shock into renewed positive energy for your next step. Having this kind of cushioning allows you to not only physically feel better, but improve your posture and be on your feet longer without any restrictions holding you back.

WITHOUT GRAVITY DEFYERS...



WITH GRAVITY DEFYERS...



Don't Forget
to check out our other products to relieve discomfort:



Men's Dress
Woodford \$185



Women's Flats
Maddison \$145



G-Comfort Insoles
TF501, TF502

VersoShock® U.S. Patent #US8,555,526 B2. This product has not been evaluated by the FDA. Not intended to treat, cure or prevent any disease. \$30 off applies to orders of \$100 or more. Shoes must be returned within 30 days in like-new condition for full refund or exchange. Credit card authorization required. See website for complete details.

**WIDE
WIDTH
AVAILABLE**

ION

Men Sizes 7.5-15

- Red/Gray TB9022MRG
- Black TB9025MBB

Women Sizes 6-11

- Black/Blue TB9022FTL
- Gray/Teal TB9022FGL



~~\$150~~ **\$120⁰⁰**

9% CA sales tax applies to orders in California.

\$30⁰⁰ OFF
Your Order

Free Exchanges • Free Returns

Promo Code: PH2EKD6

Expires August 31, 2018

Call 1(800) 429-0039

GravityDefyer.com/PH2EKD6

Gravity Defyer Corp.

10643 Glenoaks Blvd. Pacoima, CA 91331

gravity defyer®
COMFORT FOOTWEAR TECHNOLOGY



**ACCREDITED
BUSINESS**

TOILET TUNE-UPS



**9 super-simple ways
to optimize your flush**
By Brad Holden

The toilet is arguably the most important seat in the house. If your toilet isn't flushing well, don't just live with it! You can probably fix the problem in less than 30 minutes. We've put together nine simple tips to help you get the best possible flush every time.



MEET THE EXPERT

John Koeller, a principal at Maximum Performance (MaP) Testing, contributed his

toilet expertise to this article. For more toilet tips, product reviews and flush ratings, visit map-testing.com.



IS YOUR TOILET HOPELESS?

These tune-ups will help your potty achieve its full potential. But some toilet designs just don't have much potential. To see if your model is a sewage superstar or a flushing failure, look it up at map-testing.com.

1 Clean the rim jets

Over time, particularly if you have hard water, mineral deposits can plug the rim jets. If you notice the sides of the bowl aren't clean after flushing, the rim jets likely need cleaning. You'll need a mirror to see them. Depending on the size of the jets, use a coat hanger or small screwdriver to clean them out.



2 Get a flapper with a chain float

A chain float helps the flapper stay open a bit longer, allowing more water to enter the bowl for a better flush. You can adjust the float up or down on the chain to fine-tune how long the flapper remains open.



3 Switch to single-ply

Sometimes a poor flush is caused by partial drain clogs. The majority of these clogs are caused by toilet paper, particularly the luxuriously soft two- and three-ply varieties. Switching to single-ply toilet paper can help because it breaks down faster, even if you use the same amount of toilet paper.

4 Try a different flapper

The flapper is the part inside the tank that goes up when you press the flush handle. There are hundreds of flapper styles, including some that allow you to adjust the amount of water per flush—but not all are compatible with every toilet. Plumbers often carry a variety in their truck and, through trial and error, choose the one that works best. If you've tried everything else, buy a few different flappers and see which one works the best on your toilet. Check map-testing.com to find flappers compatible with your specific toilet. Flappers cost \$3 to \$20 each.



5 Adjust the water level

Most toilets have an indicator line showing the proper water level. If yours doesn't, set the fill level 1 in. below the top of the overflow pipe. Closer than that might be asking for trouble. In the evening, the demand on your municipal water supply drops, which can increase water pressure. This can cause the water level in your tank to rise a bit.

If water is continuously flowing into the overflow pipe, you're flushing money as well as water down the toilet. There are many different mechanisms for adjusting your tank's water level. The most common methods are an adjustment screw on the fill valve, an adjustment screw connected to the float, or a spring clip connected to the float.



BASEMENT TOILET TROUBLE?

Basement toilets are notoriously bad flushers. There often isn't enough of a drop from the toilet to the horizontal drain that leads to the main sewer line, limiting the assist of gravity. This can also be a problem if you have a toilet in a building with no basement. A pressure-assist toilet might be your only option in this case.



7 Open the water supply all the way

When you flush, it's not just the water from the tank that's making the flush. The fill valve also opens, allowing more water to immediately enter the tank. The more water flowing in, the better your flush will be.



8 Adjust the flapper chain

Adjust the chain so that it just allows the flapper to seat. If the chain is too long, the flapper will close too soon for a good flush. If the chain is too short, the flapper won't seal. To adjust the length, move the clip to a different chain link. Be sure there are no kinks in the chain, squeeze the clip closed and cut off the excess chain.



9 Aim the refill tube

Make sure the refill tube is aimed directly into the overflow pipe; you don't want any water spraying outside it. That little tube refills the bowl with water from the tank after flushing. A low water level in the bowl contributes to a weak flush, and fails to clean the sides of the bowl.

How To: Get Rid Of Deep Belly Fat

Researchers have announced a radical technique that not only fights potentially deadly belly fat, but can also lead to slimmer waists and, perhaps, improved health.

The only catch? The establishment wants to spend 5 years – and \$65 million – testing this technology.

But one doctor thinks that the technology is so effective, it is immoral to make people wait.

So he's offering a version of the technique...now.

"The science has already been tested, and it's effective," says Dr. Rand McClain, Chief Medical Officer at Live Cell Research. "I can't make people wait 5 years for something that could be helping them today."

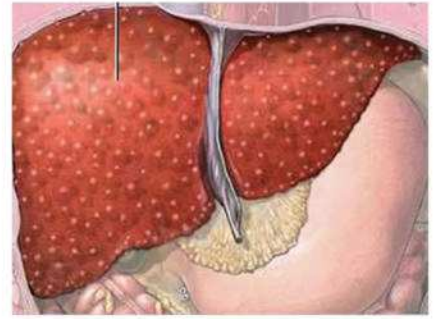
McClain is referring to a field of health research that is said to activate a "master switch" inside your body's cells.

This switch controls when your cells store fat, and when they convert the fat into energy. Control the "master switch," the theory goes, and you also control fat.

To researchers, this is far more than just an appearance issue. It could be even more important to Americans who mistakenly believe that small amounts of exercise can radically change their bodies.

According to Dr. Todd Miller, professor in the Department of Exercise Science at George Washington University, "People don't understand that it is very difficult to exercise enough to lose weight. If that is why you are doing it, you are going to fail."

So a way to battle belly fat could be the breakthrough the health community has been waiting for. McClain believes the technique works best for people over 30, particularly those who may be experiencing



fatigue, weaker bodies and even "foggy" thinking.

Best of all, McClain announced that he is making his method available – and affordable – to virtually all Americans.

With demand already high for his stunning technique, McClain created an Online presentation detailing how the health breakthrough works.

You can watch the presentation here at **www.NoFat39.com**

In this video, Rand is telling it like it is...we need more doctors like this! People should be advised to watch the entire video report before committing to such an unconventional method.

Watch the video at **www.NoFat39.com**

HomeCare+Repair

Fix it, maintain it, improve it. By Brad Holden



Mini-split systems

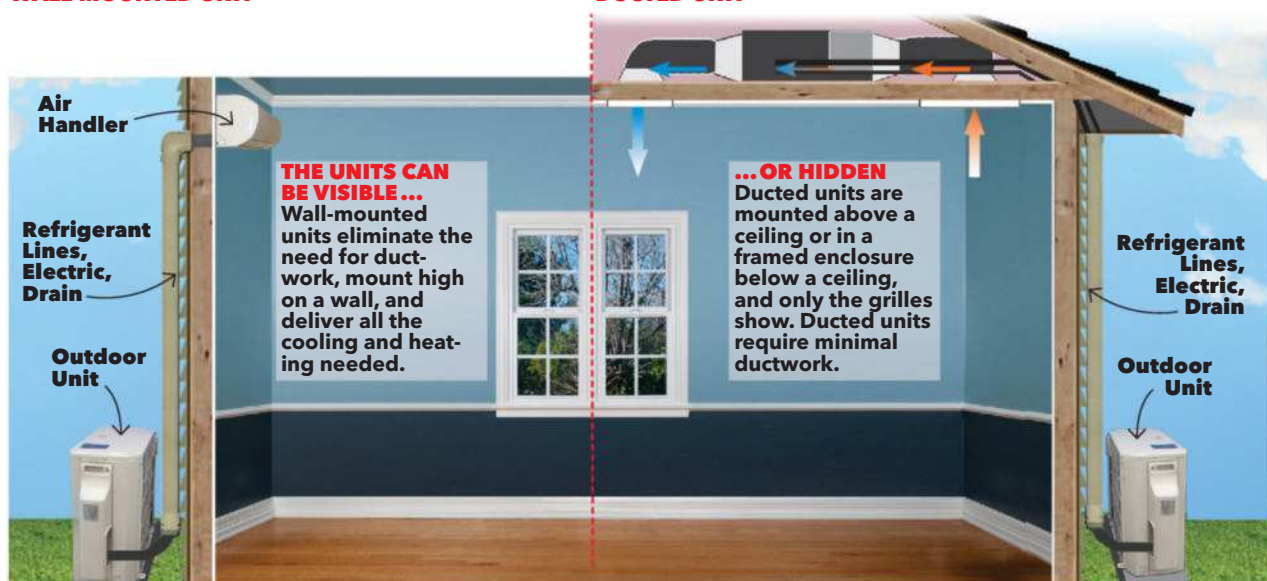
What is a mini-split?

Mini-split systems are A/C and heating units that are increasingly popular, mainly because most installations don't require ductwork. Similar to conventional HVAC systems, mini-splits have an outdoor condenser and one or more air handlers inside. They're somewhat like a window A/C unit split in half—hence the name.

How does a mini-split work?

Like a conventional A/C unit, a mini-split uses copper tubing to carry the refrigerant from the outdoor unit, which contains the compressor and condenser, to the indoor air handler. But with a mini-split, the conditioned air blows directly out of the indoor air handler into the room, rather than being routed through

WALL-MOUNTED UNIT



PHOTOS AND ILLUSTRATION: FUJITSU GENERAL AMERICA



Floor Unit

CHOOSE YOUR STYLE

Indoor air handlers come in a variety of styles including wall mount (facing page), floor mount (above) or ceiling mount (below). Choose the one that you find most suited for the room where the unit will be installed.



Ceiling Unit

ductwork. A typical compressor can run four or five air handlers, which are mounted in different zones (or rooms) throughout the house. The indoor units can be mounted on the wall, floor or ceiling.

In the winter, the refrigerant absorbs heat from the outside (because the refrigerant is far colder than the air) and carries it to the air handlers. In the summer, the refrigerant absorbs heat from inside the house, carrying it out to cool the house.

Will a mini-split work for you?

A mini-split is a viable option for a house with no existing ductwork, such as one with a boiler

and radiators. You won't have to install ductwork, which can be both expensive and difficult to accommodate. A mini-split can also be a good choice for a large house with rooms that don't get used often. Rooms that aren't served well by existing forced-air systems also make good candidates.

Manufacturers claim that a mini-split system can cut your heating and cooling costs by up to 50 percent. However, the savings vary according to the square footage of the conditioned space and the efficiency of the equipment you're replacing.

Are mini-splits DIY friendly?

Most mini-splits are installed by professional HVAC companies, but you can buy do-it-yourself kits with prices starting at about \$1,500. (Pros will charge at least double that.) If you go online and search for "DIY mini-splits," you'll find many companies that can provide you with products and advice.

Installing a mini-split yourself, however, is advanced DIY. You'll have to run electrical service to the unit and route refrigerant lines through the walls from outside. These units come with precharged refrigerant lines, a big benefit because charging the lines requires special know-how and tools.

TOUGH No Foam, Dries Natural Color GLUE



**For the Toughest Jobs
on Planet Earth®**



www.gorillatough.com

©2018 The Gorilla Glue Company



[PRO ADVICE]

Soldering ball valves

Many ball valve manufacturers recommend soldering with the valve in the closed position. But if the ball valve contains water and is sealed closed, heating the valve on both ends can turn the trapped water to steam and rupture the ball valve seal. For that reason, our pro plumber, Les Zell, prefers to have horizontal valves open while he's sweating the joints. It allows expanding gas or air to exit and reduces the chance of blowing bubbles through the solder joint. But if the ball valve is in a vertical position, it's best to close it so no solder can run into the ball and prevent the valve from opening or closing properly.



MEET THE EXPERT
Les Zell is a master plumber with more than four decades of experience in the field.



[PROBLEM SOLVER]

Camellia oil prevents tool rust

The ideal way to prevent rust on tools is to keep them in a climate-controlled shop. Many of us, however, store our tools in an unheated garage. To keep my tools rust-free, I use camellia oil. It's also known as tea seed oil because the camellia plant is used to make tea. I coat my tools after use and then wipe off any excess just before I use them again. Lubricants like WD-40 also work, but I've found that they tend to get a little gummy over time, and I don't like the strong smell. Camellia oil has a light viscosity and is nearly odorless. It doesn't interfere with wood finishes, and a little goes a long way. I bought a 3.4-oz. bottle (\$15) and applicator (\$15) about five years ago at japanwoodworker.com, and the bottle is still half full.

BRAD HOLDEN, ASSOCIATE EDITOR



[READERS DEBATE]

Ground plug up or down?

Whether to install an outlet with the ground plug on the top or bottom is an age-old debate, but it doesn't matter either way. However, one reader had this to say: "Receptacle testers are meant to be used with the ground prong on the bottom. You can see the lights either way, but you can only read the printed information with the ground plug on the bottom. So if for no other reason than making receptacle testers easier to read, outlets should be installed ground down."

With that settled, let's get to the more serious controversy. Should toilet paper rolls dispense from over the top or underneath?



[BROUGHT TO YOU BY **TROY-BILT**]

Multipurpose garden tools

If you're in the market for a string trimmer, consider this new trend in lawn and garden gear—multipurposing. You buy one power head, which usually comes with a straight-shaft string trimmer. But then you can buy other attachments, like the pole chain saw shown, a cultivator, a leaf blower, a grass edger or even a hedge trimmer.

Some manufacturers offer battery-powered models with interchangeable attachments, but if you want the power and run-time of a gas engine, check out this two-stroke gas-powered Troy-Bilt base model. It comes in at about \$129, with additional accessories costing \$60 to \$100 each. You can switch from one attachment to another in less than 30 seconds. You save money by not having to buy a dedicated machine for each task, and you have only one engine to maintain for all these different tools. To learn more, visit lawncare.familyhandyman.com.

[PROTECT YOUR INVESTMENT]

Add an hour meter to power equipment

Most small-engine manufacturers recommend service intervals based on hours of operation. You're keeping track of the minutes every time you run your generator, tiller or pressure washer, right? We didn't think so.

Most hour meters need a power source, making them hard to install on small engines. But the ENM PT15 (about \$35 at electronics stores) is self-powered with a lithium battery. Simply install the meter in a plastic case (about \$7 at electronics stores). Then secure it to your power equipment and connect it (photo right). Zero the memory and concentrate on other things besides tracking minutes.



SET THE METER IN THE CASE AND CONNECT THE WIRES

Secure the hour meter to your equipment with zip ties or a clamp. Then wrap the sensing wire four times around the spark plug wire. Install a ground wire from the meter to any metal part of the equipment.

HOME CARE+REPAIR

Oil
Channel

Stick with the original brand for chain-saw chains

When you need a replacement chain for your chain saw, you might save five or ten bucks by choosing a brand that's different from your saw brand. But, according to Christian Johnsson of Husqvarna, that's not a good idea. Here's why.

When designing a chain, engineers make dozens of decisions about every little component in the chain. And those decisions are made with a specific saw in mind. The result is a perfect match between the chain and the saw—and optimum performance. If you install a chain that wasn't made to match the saw, overall performance will suffer, maybe just a little, or maybe a lot.

**MEET THE
EXPERT**
Christian
Johnsson is
a product
manager for
Husqvarna
North America.



Another tip from Christian: After every eight hours of use, remove the bar, flip it over and reinstall. That results in even wear on both sides and a bar that lasts longer. For more on using and maintaining a chain saw, search for "chain saw" at familyhandyman.com.



Chains and saws are designed for each other. For example, X-Cut chains, engineered for Husqvarna saws, are prestretched at the factory and include a unique feature: Oil channels in the drive links distribute bar oil efficiently, for better performance and less wear.

NEW and IMPROVED DR® Field and Brush Mowers

Faster...Easier... Lower-Priced!

Mow fields, brush, even saplings
with never-before ease!

- ✓ **NEW WIDE CUT MODELS** for faster mowing!
- ✓ **NEW POWER STEERING** for easier handling!
- ✓ **NEW LOW PRICES** reduced up to \$500!

ROUGH CUT & FINISH MOWERS—
the most complete selection available.



ATTENTION: TRACTOR AND ATV OWNERS!
NEW MODELS starting at \$1399⁹⁹



FREE SHIPPING | **6 MONTH** TRIAL | **EASY** FINANCING

SOME LIMITATIONS APPLY. CALL OR GO ONLINE FOR DETAILS.

Call for **FREE DVD and Catalog!**

TOLL FREE **888-200-3210**

DRfieldbrush.com



Home Smarts

The knowledge you need to be a better homeowner. By Gary Wentz



KEEP COOL WITH SHADE

Shade from trees, trellises and vines blocks direct sunlight through windows, which is responsible for about half the heat gain in your home. Carefully positioned trees and horizontal trellises on the east and west sides can save up to 30 percent of a household's energy consumption for heating and cooling.



EMERGENCY ROOF PATCH

A section of flashing is the perfect patch for smaller holes, which are often caused by blown-down tree branches. Slide the flashing under the shingles above the hole and nail down the exposed corners of the flashing. Don't forget to caulk around the hole and the nail heads. Special roof sealant is best, but any type of caulk is better than nothing.

HOME SMARTS



Resurface bad walls

You can patch cracks in plaster walls, but there's a good chance they'll come back. Wall liner, on the other hand, can bridge cracks and flex with seasonal movement. It's basically wallpaper but much thicker and paintable. Some versions are smooth, others textured. Find it at home centers and online.



KEEP SHOWER DOORS CLEAN

After a shower, when the beads of water left on your glass door dry, they leave unsightly mineral spots. This dried residue can be tough as nails to remove. You can avoid water beads altogether by coating the glass with an auto-glass treatment. Aquapel and Rain-X are two brands that you'll find at auto parts stores and some discount stores.

Introducing the NEXT GENERATION of Lawn Care from DR® POWER EQUIPMENT!

PROFESSIONAL GRADE. BATTERY-POWERED.

POWERFUL 62-VOLT lithium-ion batteries provide the performance of gas, without the noise, maintenance or mess!

HI-TECH BRUSHLESS MOTORS are powerful, durable, and energy efficient.

LONG RUN TIMES of up to 75 minutes!

SELF-PROPELLED model with variable speed drive available.

DURABLE STEEL DECK but half the weight of most gas mowers.



62 VOLT
LITHIUM-ION BATTERY



3 Models available—
21" Self-Propelled shown



Our compatible tools are
powered by 62 Volt
Lithium-Ion
Batteries



1887EX © 2018

FREE SHIPPING | **6 MONTH TRIAL** | **EASY FINANCING**

SOME LIMITATIONS APPLY. CALL OR GO ONLINE FOR DETAILS.

Call for **FREE** Catalog & Special Offer!

TOLL FREE **888-200-3210**
DRbatterytools.com





Let it rest in peace

My son and I painted our rowboat perfectly. For faster drying, I turned on a fan—and blew dust all over it, creating thousands of tiny “dust whiskers.” There are lots of ways to destroy a finish with dust before it dries: opening the garage door, running a shop vacuum, sweeping the floor... I’m sure you can invent your own method. Or you could just walk away and let it dry in peace.

MARK HAWLEY, *THE FAMILY HANDYMAN* FIELD EDITOR

FIX NAIL POPS—AND KEEP THEM FROM COMING BACK

Nail pops happen when drywall nails or screws break through the surface. They’re usually caused by shrinking and swelling of the wall studs. If you just pound them in and patch them, they’ll be back. Here’s how to fix them permanently.



1. PREPARE FOR PATCHING

Drive drywall screws into the stud above and below the pop. Don’t use nails. If the drywall has puckered around the pop, slice it out. If the area is flat, leave it alone. Remove the popped nail or screw.



2. PATCH THE HOLES

Fill the depressions with joint compound. Let the compound dry and coat it again (and probably again!) until the patch is flat. Smooth the patch with 100-grit sandpaper, then prime and paint.



PROSENSOR 710+

FINDING STUDS

JUST GOT A LOT EASIER

- » EASIEST
- » MOST ACCURATE
- » INSTANTLY DETECTS

FRANKLIN SENSORS
PROFESSIONAL STUD FINDERS

www.franklinsensors.com

Franklin Sensors is available at Amazon, Lowe’s and hardware stores near you.

Car + Garage

Expert advice on repair, maintenance and gear. By Rick Muscoplat

Start a Dead Small Engine



When you're staring at a yard full of grass that desperately needed cutting two weeks ago, the last thing you want is a lawn mower engine that won't fire up. Before you have a heart attack pulling on the starter rope of your lawn mower (or in the winter, snow blower), check the fuel and carburetor. They're the root cause of more than 80 percent of all no-starts. I'll walk you through the steps to identify the source of the problem.

You'll need hand tools and a socket set, a can of carburetor cleaner and an air compressor. And you'll likely have to make a trip for parts. But after an hour of effort, you might just have a working engine, and you'll have saved a bundle by fixing it yourself. Let's dig in.



MEET THE EXPERT

Rick Muscoplat has decades of automotive repair experience and a great website: ricksfreeautorepairadvice.com.

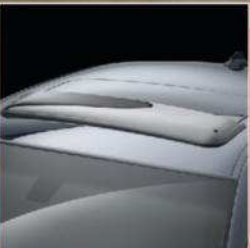
WeatherTech®

Automotive Accessories



COMPLETE COVERAGE FOR YOUR VEHICLE

See our full line of Automotive Accessories
at WeatherTech.com

BumpStep®XL	TechLiner®	No-Drill MudFlaps	Sunroof Wind Deflector	Side Window Deflectors
				

Accessories Available for

Acura · Alfa Romeo · Aston Martin · Audi · BMW · Buick · Cadillac · Chevrolet · Chrysler · Dodge · Ferrari · Fiat · Ford · Genesis
GMC · Honda · Hummer · Hyundai · Infiniti · Isuzu · Jaguar · Jeep · Kia · Land Rover · Lexus · Lincoln · Maserati · Mazda
Mercedes-Benz · Mercury · Mini · Mitsubishi · Nissan · Oldsmobile · Plymouth · Pontiac · Porsche · RAM · Saab · Saturn
Scion · Smart · Subaru · Suzuki · Tesla · Toyota · Volkswagen · Volvo and more!

Order Now: 800-441-6287



American Customers
WeatherTech.com



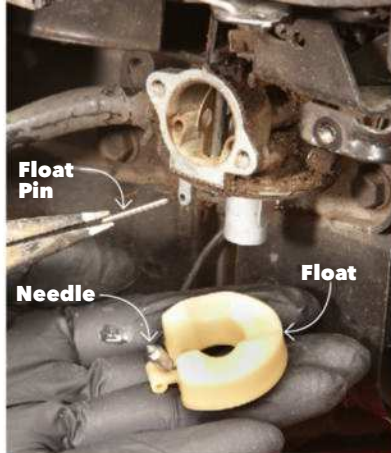
Canadian Customers
WeatherTech.ca



European Customers
WeatherTech.eu



1. Remove the bowl
Set a small cup under the carburetor to catch any spills. Then loosen the bowl nut with a socket. Once the nut is loose, unscrew it by hand and lower the bowl. Gas should drip out.



2. Remove the inlet needle and seat
Pull the float pin straight out. Catch the float, inlet needle and retaining spring with a rag. Remove the rubber spring with a small pick. Reverse the procedure to install the new parts.



3. Check the condition of the carburetor
Examine the inside of the carburetor. If you see white chalky or powdery corrosion like this, the carburetor is a goner and you'll need to replace it.

Check the plug

I'll assume you've cleaned the air filter, so the next step is to remove the spark plug to see if it's wet. If it is, there's no way the engine will start. So clean the plug with carburetor cleaner (not shown) and let it dry. Cleaning it with compressed air isn't enough; use a solvent to remove any oil residue. If the plug is wet, move on to **Photo 2**. If it's dry, skip to **Photo 3**.

If the fuel is more than a month old, properly dispose of it and refill the tank with fresh gas. Then reinstall the spark plug and try starting. It may take quite a few pulls to suck the new gas into the carburetor, so be prepared to clean and dry the plug a few more times.

Check the carburetor bowl for gas

The engine can't get gas if the fuel filter is plugged or the carburetor inlet needle is stuck. Check the fuel filter (if equipped) by removing the fuel line at the carburetor. Gas should run out. If it doesn't, remove the fuel line ahead of the fuel filter inlet. If gas flows, the filter is clogged. Replace it. If you still don't get any gas, the fuel line is kinked or plugged. And check inside the tank for any debris that might clog the outlet.

If you're getting gas to the carburetor, check to see if there's any fuel in the bowl. Clamp off the fuel line with a C-clamp. Then remove the bowl (**Photo 1**). If the bowl is empty, the problem is a stuck inlet needle and seat. They're easy and cheap to replace (**Photo 2**). But before you buy the parts, check the condition of the rest of the carburetor's interior (**Photo 3**). If you see any corrosion, it's "game over." A corroded carburetor is a dead carburetor. Replace it.

Clean the jet

A clogged main jet is a pretty common problem. You can try cleaning it with spray carburetor cleaner (**Photo 4**). Then try starting. If the engine still isn't getting gas, replace the carburetor.

If it starts but runs rough

If you got the engine to start by cleaning the main jet, but it runs rough or the idle speed surges, you have two choices—rebuild or replace the carburetor. For rebuilding instructions, go to familyhandyman.com and search for "carburetor." Otherwise, disconnect the old carburetor from the linkage, remove the two retaining bolts and install a new carburetor.



4. Clean the main jet

Remove the carburetor bowl nut. Insert the carburetor cleaner straw directly into the main-jet passage and squeeze the trigger on the can several times until the spray shoots into the venturi of the carburetor. That'll confirm the passage is open.

WHAT'S **WRONG** WITH THIS PICTURE?

We'll show you the problem—and the fix. By Jeff Gorton



LIFE ON THE EDGE

One Small Step...

This bathtub must have been installed in a tightrope walker's house. Just think about turning on the water to fill the tub, then walking the ledge to get in. After your bath, you'd be getting out with wet feet on 8 in. of slippery tile. Talk about a fast trip down the stairs!



Thanks to our friends at the American Society of Home Inspectors for sharing photos submitted by their members. For more, visit ashireporter.org.

WHAT'S WRONG



WEAK LINK

MISSED THE STUD

Drywall anchors are the hardware of choice for hanging pictures and mirrors, but handrails need more support. The installer of this rail either didn't bother to find a stud or miscalculated the location of the handrail bracket.

THE RIGHT WAY:

Find and mark the studs with masking tape. Then hold the handrail in position and mark where the brackets should be mounted so they'll align with the studs. This ensures a safe, solid connection.



EASY-BAKE ATTIC

IS IT AN ATTIC HEATER?

There's enough wattage here to fry a circuit and enough heat to melt snow on the roof. Bulb sockets like this aren't meant to be daisy-chained. You could safely achieve the same brightness using a low-wattage LED light fixture.



GOOD PLANNING?

STAIRWAY TO NOWHERE

Now that's what you call planning ahead! It looks like these folks have a future second-floor addition in mind. Of course they'll have to add a handrail to meet building code requirements.

Great Goofs®

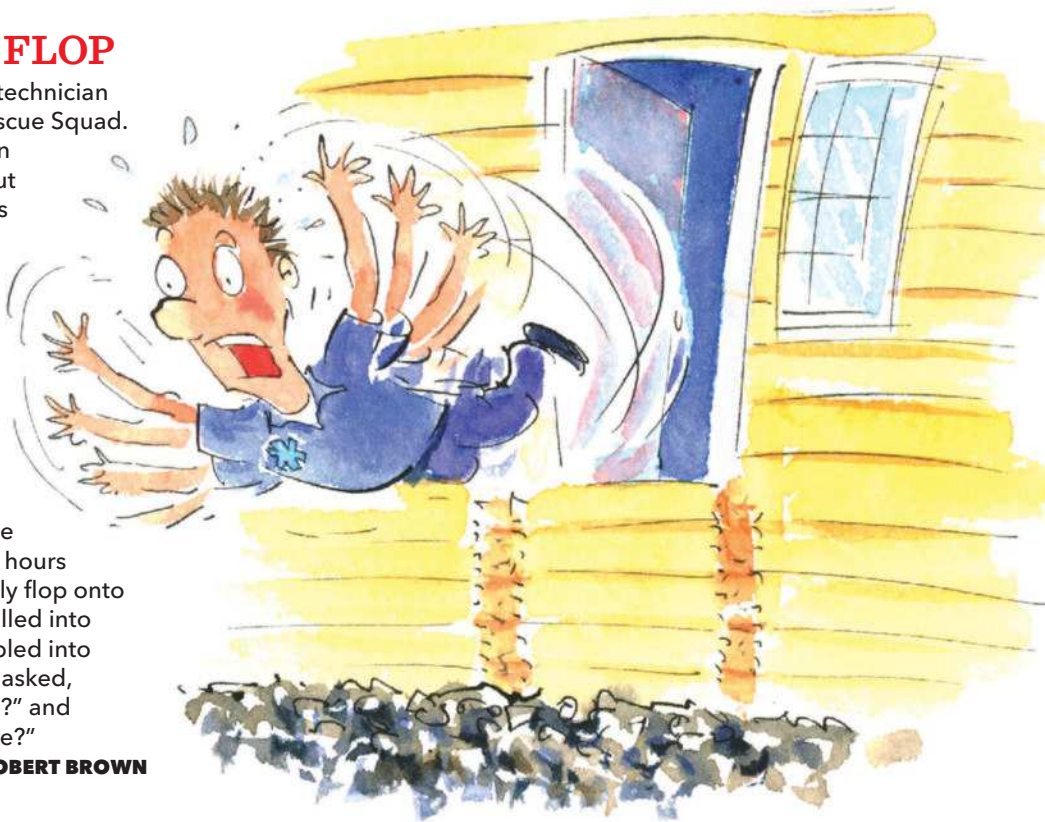
Laughs and lessons from our readers

PORCH BELLY FLOP

I'm an emergency medical technician with our local Volunteer Rescue Squad. I've always prided myself on being able to get up and out the door within two minutes of a call—even after a tough day of major renovation on my house.

At 2:30 one morning, I got the alert and was out of bed, rescue shirt on, boots pulled up and flying out the door—literally. I was in midair when I remembered that my dad and I had ripped most of the old porch off my house just hours before. I did a heck of a belly flop onto the gravel driveway. As I pulled into the rescue station and hobbled into the ambulance, my partner asked, "How's the new deck going?" and "Do you need an ambulance?"

ROBERT BROWN



MOTOR OIL MIX-UP

When I opened the bottle of laundry detergent, I made a mental note not to select that brand again—I didn't care for the scent. But it was the only bottle left on the garage shelf where we store such bulky things, so I started a load.

When I returned later to move the wet clothes into the dryer, my washing machine looked like an oil tanker had run aground!

Seems when my eco-friendly husband last changed the car's oil, he put the dirty oil in the empty detergent bottle for proper disposal later. How it ended up with the household products is still a mystery.

DARLENE DIRICO

"K" HIDES THE SPOT

When I was replacing my garage door, I installed the door's four panels from bottom to top in the same order as they had come out of the box. When the second section was in place, I drilled the holes for the lock and handle. This worked great because I could easily reach both sides of the door panel.

But when I had all four sections in place, something wasn't quite right, so I broke down and read the directions. I discovered that the "second" door section out of the carton goes on the top!

Needless to say, the large "K" in the center of the door isn't just for vanity—it covers the holes I drilled in the wrong place!

LEROY KOSTERMAN



SUPER COUPON

FREE

WITH ANY PURCHASE
3-1/2" SUPER BRIGHT ALUMINUM
• 9 LED FLASHLIGHT
• Compact, Lightweight

COMPARE TO \$150
RAYOVAC MODEL: RAYOVAC 9

ITEM 69111/63599/62522/62573
63875/63884/63886
63888/69052 shown

84374770

Cannot be used with other discounts or prior purchases. Original coupon must be presented. Valid through 8/13/18 while supplies last. Limit 1 FREE GIFT per customer per day.

CENTRAL MACHINERY

SUPER COUPON

14" SPINDLE SANDER

NOW \$109.99
\$144.99

SAVE \$54

COMPARE TO \$164.98
ROCKWELL MODEL: R63811

ITEM 62146/6257 shown

84385787

LIMIT 4 - Coupon valid through 8/13/18

HaulMaster

SUPER COUPON

18" x 12" MOVER'S DOLLY

• 1000 lb. capacity

NOW \$7.99
\$10.99

SAVE 51%

COMPARE TO \$16.43
MODEL: HDPOOLLY

ITEM 61899/63095/63096
63098/63097/93888 shown

84387861

LIMIT 7 - Coupon valid through 8/13/18

PORTLAND

SUPER COUPON

7 AMP ELECTRIC POLE SAW

9.5" BAR

NOW \$59.99
\$79.99

SAVE \$39

COMPARE TO \$99.98
WORX MODEL: W6280

ITEM 68862/63190/62896 shown

84395370

LIMIT 3 - Coupon valid through 8/13/18

HaulMaster

SUPER COUPON

STEP STOOL/ WORKING PLATFORM

• 350 lb. capacity

NOW \$19.99
\$29.99

SAVE 65%

COMPARE TO \$57.55
GPL MODEL: H-21

ITEM 62515/66911 shown

84409225

LIMIT 7 - Coupon valid through 8/13/18

SUPER COUPON

20% OFF

ANY SINGLE ITEM*

84381257

LIMIT 1 coupon per customer per day. Save 20% on any 1 item purchased. *Cannot be used with other discount, coupon or any of the following items or brands: Inside Track Club membership, Extended Service Plan, gift card, open box item, 3 day Parking Lot Sale item, compressors, floor jacks, sales, saw mills, storage cabinets, chests or carts, trailers, trenchers, welders, Admiral, Ames, Bauer, Cobra, CoverPro, Daytona, Earthquake, Fischer, Hercules, Icon, Jupiter, Lynxx, Poulan, Predator, Tailgator, Viking, Vulcan, Zurich. Not valid on prior purchases. Non-transferable. Original coupon must be presented. Valid through 8/13/18.

Bauer

SUPER COUPON

20 VOLT LITHIUM CORDLESS 1/2" COMPACT DRILL/DRIVER KIT

• 450 in. lbs. of torque
• 1.5 amp hour battery
• Weighs 3.4 lbs.

NOW \$64.99
\$74.99

SAVE \$34

COMPARE TO PORTER-CABLE \$99
MODEL: PC63811B

ITEM 63531

84391764

LIMIT 5 - Coupon valid through 8/13/18

CENTRAL MACHINERY

SUPER COUPON

10" 12 SPEED BENCHTOP DRILL PRESS

NOW \$109.99
\$139.99

SAVE \$69

COMPARE TO \$179.05
WEN MODEL: 4212

ITEM 63471/60237 shown

84395912

LIMIT 3 - Coupon valid through 8/13/18

Lifetime CARBIDE

SUPER COUPON

ALUMINUM OXIDE SANDING SPONGES PACK OF 10

COARSE ITEM 46751 63918
MEDIUM ITEM 46752 63915
FINE ITEM 46753 63912

SAVE 20%

YOUR CHOICE \$3.99
\$4.99

84414137

LIMIT 8 - Coupon valid through 8/13/18

PITTSBURGH #1 SELLING JACKS IN AMERICA

SUPER COUPON

RAPID PUMP® 3 TON LOW PROFILE HEAVY DUTY STEEL FLOOR JACK

• Weighs 73 lbs.

NOW \$199.99
\$279.99

COMPARE TO HUSKY \$149.98
MODEL: H90015

SAVE \$69

ITEM 62326/61282/61253 shown

84381439

LIMIT 5 - Coupon valid through 8/13/18

U.S. GENERAL

SUPER COUPON

30", 5 DRAWER MECHANIC'S CARTS

ITEM 64031

ITEM 64061/64059 64060 shown

• 8100 cu. in. of storage
• 700 lb. capacity
• Weighs 139 lbs.

FANTASTIC NEW COLORS

NOW \$109.99
\$169.99

COMPARE TO \$1,175
SNAP-ON MODEL: K9233AP8

SAVE \$1005

ITEM 64032/64030 64033 shown

84382322

LIMIT 3 - Coupon valid through 8/13/18

COVERPRO

SUPER COUPON

10 FT. x 20 FT. PORTABLE CAR CANOPY

NOW \$99.99
\$129.99

SAVE \$106

COMPARE TO \$205.99
SHELTER LOGIC MODEL: 2832

ITEM 63054/62858 shown

84393059

LIMIT 4 - Coupon valid through 8/13/18

BADLAND ZXR

SUPER COUPON

12,000 LB. ELECTRIC WINCH WITH REMOTE CONTROL AND AUTOMATIC BRAKE

NOW \$299.99
\$399.99

SAVE \$400

COMPARE TO \$699.99
WARN MODEL: 9820

ITEM 64046/64045 63770 shown

84395001

LIMIT 3 - Coupon valid through 8/13/18

HARDY

SUPER COUPON

POWDER-FREE NITRILE GLOVES PACK OF 100

• 5 mil thickness

NOW \$5.99
\$7.99

SAVE 55%

COMPARE TO VENOM \$13.32
MODEL: VEM145

ITEM 61363, 68497, 61360, 61359, 68498, 68496 shown

84397347

LIMIT 6 - Coupon valid through 8/13/18

CENTRAL MACHINERY

SUPER COUPON

4" x 36" BELT/ 6" DISC SANDER

NOW \$59.99
\$79.99

SAVE \$39

COMPARE TO GENERAL INTERNATIONAL \$99
MODEL: 80700A

ITEM 62502/97181 shown

84401292

LIMIT 5 - Coupon valid through 8/13/18

PREDATOR

SUPER COUPON

6.5 HP (212 CC) OHV HORIZONTAL SHAFT GAS ENGINE

NOW \$99.99
\$119.99

SAVE \$20

COMPARE TO HONDA \$329.99
MODEL: GCM212Z

ITEM 60363/69730 69727 shown

84700154

LIMIT 4 - Coupon valid through 8/13/18

PITTSBURGH

SUPER COUPON

16 OZ. HAMMERS WITH FIBERGLASS HANDLE

LIFETIME WARRANTY

NOW \$2.99
\$4.99

SAVE 70%

COMPARE TO KOBALT \$9.98
MODEL: 62742

ITEM 69006/60715/60714 69005/61262/47873

84414429

LIMIT 5 - Coupon valid through 8/13/18

HERCULES

12" DOUBLE-BEVEL
SLIDING COMPOUND
MITER SAW



LIMIT 4 - Coupon valid through 8/13/18*

NEW

NOW \$379.99

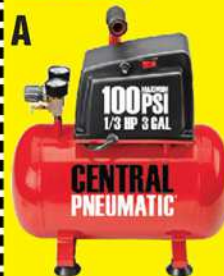
\$399

SAVE \$19

ITEM 63978

CENTRAL PNEUMATIC

Customer Rating 3 GALLON, 100 PSI OIL-FREE
AIR COMPRESSORS



• Air delivery:
0.6 CFM @ 90 PSI
1 CFM @ 40 PSI

COMPARE TO PORTER-CABLE \$98.62

SAVE 59%

\$57.99

YOUR CHOICE \$39.99



LIMIT 5 - Coupon valid through 8/13/18*

FREE

WITH ANY PURCHASE
PITTSBURGH
1" x 25 FT.
TAPE MEASURE

• Thumb Lock
• Rubber Wrapped Case



Cannot be used with other discounts or prior purchases. Original coupon must be presented. Valid through 8/13/18 while supplies last. Limit 1 FREE GIFT per customer per day.

PREDATOR

2000 WATT SUPER QUIET
INVERTER GENERATOR



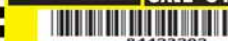
Customer Rating

★★★★★

• 4.7 hours run-time

COMPARE TO HONDA \$999

SAVE \$549



LIMIT 4 - Coupon valid through 8/13/18*

Bauer

15 AMP, 12-1/2" PORTABLE
THICKNESS PLANER



COMPARE TO DEWALT \$399

SAVE \$149

LIMIT 3 - Coupon valid through 8/13/18*

YUKON

46" MOBILE WORKBENCH WITH
SOLID WOOD TOP



COMPARE TO \$299

SAVE \$30

LIMIT 5 - Coupon valid through 8/13/18*

CENTRAL MACHINERY

2 HP, 5 MICRON
INDUSTRIAL
DUST COLLECTOR



COMPARE TO SHOP FOX \$324.99

SAVE \$155

LIMIT 4 - Coupon valid through 8/13/18*

KRAUSE & BECKER

AIRLESS
PAINT SPRAYER KIT



COMPARE TO GRACO \$299

SAVE \$129

LIMIT 4 - Coupon valid through 8/13/18*

PITTSBURGH

50" CLAMP AND
CUT EDGE GUIDE



COMPARE TO BORA \$38.98

SAVE 61%

LIMIT 6 - Coupon valid through 8/13/18*

CENTRAL PNEUMATIC

18 GAUGE, 2-IN-1 NAILER/STAPLER



COMPARE TO HITACHI \$59.99

SAVE 73%

LIMIT 7 - Coupon valid through 8/13/18*

HARDY

MECHANIC'S GLOVES



COMPARE TO MECHANIX \$14.99

SAVE 73%

LIMIT 6 - Coupon valid through 8/13/18*

drill master

4-1/2" ANGLE GRINDER



COMPARE TO PERFORMAX \$25.80

SAVE 61%

LIMIT 8 - Coupon valid through 8/13/18*

CHICAGO & ELECTRIC

2.5 HP, 10" INDUSTRIAL
TILE/BRICK SAW



COMPARE TO KOBALT \$499

SAVE \$279

LIMIT 6 - Coupon valid through 8/13/18*

ALL PURPOSE/WEATHER RESISTANT TARP

7 FT. 4" x 9 FT. 6"



COMPARE TO BLUE HAWK \$8.58

SAVE 85%

LIMIT 7 - Coupon valid through 8/13/18*

THUNDERBOLT solar

100 WATT SOLAR PANEL KIT



COMPARE TO SUNFORCE \$325.92

SAVE \$175

LIMIT 3 - Coupon valid through 8/13/18*

*Original coupon only. No use on prior purchases after 30 days from original purchase or without original receipt. Valid through 8/13/18.

All Harbor Freight Tools, the "Compare to" price means that the specified comparison, which is an item with the same or similar function, was advertised for sale at or above the "Compare to" price by another national retailer in the U.S. within the past 90 days. Prices advertised by others may vary by location. No other meaning of "Compare to" should be implied. For more information, go to HarborFreight.com or see store associate.

SUPER COUPON

FREE

WITH ANY PURCHASE

COMPARE TO PROKIT **\$135**
MODEL: 911206

7 FUNCTION DIGITAL MULTIMETER

- 3.5" LCD Display
- Battery Included

ITEM 63604/63758
98025/69096/63759/90899 shown

84376309

Cannot be used with other discounts or prior purchases. Original coupon must be presented. Valid through 8/31/18 while supplies last. Limit 1 FREE GIFT per customer per day.

CENTRAL PNEUMATIC

21 GALLON, 2.5 HP, 125 PSI VERTICAL OIL-LUBE AIR COMPRESSOR

- Air delivery: 5.8 CFM @ 40 PSI 4.7 CFM @ 90 PSI

Customer Rating **★★★★★**

NOW \$149⁹⁹

COMPARE TO HUSKY **\$219**
MODEL: C201H

SAVE **\$69**

ITEM 69091/61454
62803/63635/67847 shown

84449838

LIMIT 3 - Coupon valid through 8/31/18

PITTSBURGH

4 PIECE WOOD CHISEL SET WITH CLEAR PVC HANDLE

LIFETIME WARRANTY

Customer Rating **★★★★★**

NOW \$4⁹⁹

SAVE 83%

COMPARE TO DEWALT **\$29⁹⁷**
MODEL: DWMT14063

ITEM 42429/69471 shown

84450877

LIMIT 4 - Coupon valid through 8/31/18

Lynxx

40 VOLT LITHIUM CORDLESS BRUSHLESS BLOWER

Customer Rating **★★★★★**

NOW \$129⁹⁹

COMPARE TO DEWALT **\$199**
MODEL: DCBL790B

SAVE **\$79**

ITEM 63284

84453036

LIMIT 4 - Coupon valid through 8/31/18

EARTHQUAKE XT

1/2" COMPOSITE PRO EXTREME TORQUE AIR IMPACT WRENCH

Customer Rating **★★★★★**

1190 TORQUE FT. LBS. 80T BREAKAWAY

- Weighs 4.4 lbs.

NOW \$129⁹⁹

COMPARE TO SNAP-ON **\$524⁹⁵**
MODEL: IW723

SAVE **\$84**

ITEM 62891

84457783

LIMIT 5 - Coupon valid through 8/31/18

CENTECH

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

Customer Rating **★★★★★**

NOW \$299⁹⁹

SAVE 57%

COMPARE TO SCHUMACHER ELECTRIC **\$69⁹⁹**
MODEL: SE-1250

ITEM 60581
60653 shown

84458104

LIMIT 5 - Coupon valid through 8/31/18

CHICAGO ELECTRIC

125 AMP FLUX-CORE WELDER

Customer Rating **★★★★★**

EVERYTHING YOU NEED TO WELD

NOW \$99⁹⁹

SAVE \$80

COMPARE TO IRONTON **\$179⁹⁹**
MODEL: 45433

ITEM 63583/63582 shown

84458844

LIMIT 3 - Coupon valid through 8/31/18

CHICAGO ELECTRIC

4" BISCUIT PLATE JOINER

Customer Rating **★★★★★**

NOW \$44⁹⁹

COMPARE TO MAKITA **\$179**
MODEL: P-7100B

SAVE **\$134**

ITEM 68987

84461033

LIMIT 2 - Coupon valid through 8/31/18

luminar OUTDOOR

24 FT., 18 BULB, 12 SOCKET OUTDOOR STRING LIGHTS

Customer Rating **★★★★★**

NOW \$199⁹⁹

COMPARE TO PORTFOLIO **\$39⁹⁸**
MODEL: SL-C12BK

SAVE 50%

ITEM 63483

84462402

LIMIT 6 - Coupon valid through 8/31/18

CENTRAL MACHINERY

350 LB. CAPACITY FOLDABLE SAW HORSE

Customer Rating **★★★★★**

NOW \$87⁹⁹

SAVE 43%

COMPARE TO STANLEY **\$160¹**
MODEL: ST-11200

ITEM 60710
61979/69446 shown

84462475

LIMIT 2 - Coupon valid through 8/31/18

CENTRAL PNEUMATIC

3/8" x 50 FT. RETRACTABLE AIR HOSE REEL

Customer Rating **★★★★★**

NOW \$59⁹⁹

COMPARE TO KOBALT **\$99**
MODEL: SG-AIR1 84

SAVE **\$39**

ITEM 69265/62344/93897 shown

84462861

LIMIT 3 - Coupon valid through 8/31/18

SUPER COUPON

EAR MUFFS

Customer Rating **★★★★★**

NOW \$3⁹⁹

COMPARE TO MORRIS PRODUCTS **\$6⁹⁹**
MODEL: M-52116

SAVE 75%

ITEM 94334

84468175

LIMIT 9 - Coupon valid through 8/31/18

CHICAGO ELECTRIC

10" SLIDING COMPOUND MITER SAW

Powerful 15 amp motor

Customer Rating **★★★★★**

NOW \$84⁹⁹

COMPARE TO KOBALT **\$117⁹⁹**
MODEL: SAGE5071W

SAVE **\$114**

ITEM 61972/61971 shown

84469701

LIMIT 3 - Coupon valid through 8/31/18

PITTSBURGH

TORQUE WRENCHES

Accuracy within ±4%

Customer Rating **★★★★★**

LIFETIME WARRANTY

DRIVE ITEM

1/4"	2696/61277/63381
3/8"	807/61276/63380
1/2"	62431/239/63382

COMPARE TO HUSKY **\$84⁹⁷**
MODEL: H20TOR

SAVE 88%

ITEM 239 shown

84470576

LIMIT 8 - Coupon valid through 8/31/18

SUPER COUPON

TWO TIER COLLAPSIBLE EASY-STORE STEP LADDER

225 lb. capacity

Customer Rating **★★★★★**

NOW \$199⁹⁹

COMPARE TO WERNER **\$338⁸⁸**
MODEL: S322A-1

SAVE 40%

ITEM 67514

84477509

LIMIT 1 - Coupon valid through 8/31/18

TAILGATOR

900 MAX. STARTING/700 RUNNING WATTS 2 HP (63 CC) 2 CYCLE GAS GENERATOR

5 hours run-time @ 50% capacity

Customer Rating **★★★★★**

NOW \$89⁹⁹

COMPARE TO ALL POWER **\$119⁹²**
MODEL: APS300AA

SAVE **\$29**

ITEM 63024/63025 shown

84478673

LIMIT 5 - Coupon valid through 8/31/18

UNION

1.51 CUBIC FT. ELECTRONIC LOCK STEEL FLOOR SAFE

Customer Rating **★★★★★**

NOW \$89⁹⁹

COMPARE TO SENTRYSAFE **\$109⁹⁹**
MODEL: SFW200TC

SAVE **\$85**

ITEM 91006/62678/62977 shown

84482962

LIMIT 4 - Coupon valid through 8/31/18

PITTSBURGH

PNEUMATIC ADJUSTABLE ROLLER SEAT

300 lb. capacity

Customer Rating **★★★★★**

NOW \$199⁹⁹

COMPARE TO DURALAST **\$64⁹⁹**
MODEL: TR200C

SAVE 69%

ITEM 61160/61896
63456/46319 shown

84486209

LIMIT 6 - Coupon valid through 8/31/18

BADLAND

2500 LB. ELECTRIC WINCH WITH WIRELESS REMOTE CONTROL

Weights 14.3 lbs.

Customer Rating **★★★★★**

NOW \$499⁹⁹

COMPARE TO SUPERWINCH **\$799⁹⁹**
MODEL: 112520

SAVE **\$130**

ITEM 61840/61297/63476/61258 shown

84486678

LIMIT 4 - Coupon valid through 8/31/18

PITTSBURGH

6" DIGITAL CALIPER

Customer Rating **★★★★★**

Includes two 1.5V SR44 button cell batteries.

Customer Rating **★★★★★**

NOW \$9⁹⁹

COMPARE TO HUSKY **\$29⁹⁷**
MODEL: 1467H

SAVE 66%

ITEM 61585/62387/63711/47257 shown

84486717

LIMIT 5 - Coupon valid through 8/31/18

FREE

PITTSBURGH

- Soft-Grip Handle
- Stores Bits
- 2 Slotted
- 2 Phillips Head

WITH ANY PURCHASE
4-IN-1 SCREWDRIVER

COMPARE TO
HDX
\$3.97
MODEL: 12050120

ITEM 61988/98899/69470 shown

84372144

LIFETIME WARRANTY

Cannot be used with other discounts or prior purchases. Original coupon must be presented. Valid through 8/13/18 while supplies last. Limit 1 FREE GIFT per customer per day.

PORTLAND

1750 PSI ELECTRIC PRESSURE WASHER

Customer Rating ★★★★★

- 1.3 GPM
- Adjustable spray nozzle

SAVE \$99

COMPARE TO BRIGGS & STRATTON
\$179.33
MODEL: 20080

ITEM 63255/63254 shown

84400684

LIMIT 5 - Coupon valid through 8/13/18*

CENTRAL MACHINERY

UNIVERSAL TOOL STAND

• 500 lb. capacity

NOW \$299

SAVE 28%

COMPARE TO CRAFTSMAN
\$41.99
MODEL: 22285

ITEM 69805

84497370

LIMIT 5 - Coupon valid through 8/13/18*

WINDSOR DESIGN

DOVETAIL JIG

Customer Rating ★★★★★

NOW \$279

COMPARE TO GENERAL TOOLS
\$46.99
MODEL: 961

SAVE 40%

ITEM 34102

84504634

LIMIT 2 - Coupon valid through 8/13/18*

CHICAGO ELECTRIC POWER TOOLS

VARIABLE SPEED MULTIFUNCTION POWER TOOL

Customer Rating ★★★★★

Accessories included.

NOW \$249

COMPARE TO DREMEL
\$79
MODEL: M825-02N

SAVE 68%

ITEM 63113/62867/63111 shown

84521844

LIMIT 4 - Coupon valid through 8/13/18*

HAULMASTER

FULL-MOTION TV WALL MOUNT

Customer Rating ★★★★★

- Fits most 37" to 80"

SAVE \$110

COMPARE TO ROCKETFISH
\$149.99
MODEL: RF-HVMM170C

ITEM 64037/63155 shown

84487739

LIMIT 3 - Coupon valid through 8/13/18*

HAULMASTER

10" PNEUMATIC TIRE

Customer Rating ★★★★★

NOW \$39

SAVE 60%

COMPARE TO FARM & RANCH
\$10
MODEL: FR1005

ITEM 69385/62388/62409/62698/30900 shown

84491826

LIMIT 4 - Coupon valid through 8/13/18*

HAULMASTER

HEAVY DUTY HAND TRUCK

Customer Rating ★★★★★

- 600 lb. capacity
- 10" pneumatic tires

NOW \$299

COMPARE TO MILWAUKEE
\$59.99
MODEL: 70018

ITEM 62775/62776/62973/95061 shown

84499037

LIMIT 4 - Coupon valid through 8/13/18*

HERCULES BEATS DEWALT

20 VOLT LITHIUM CORDLESS 1/4" HEX COMPACT IMPACT DRIVER KIT

Customer Rating ★★★★★

- 1500 in. lbs. of torque
- 2.5 amp hour battery
- Weighs 8.4 lbs.

NOW \$99

SAVE \$80

COMPARE TO DEWALT
\$179.99
MODEL: DCF985S2

ITEM 63380

84507691

LIMIT 4 - Coupon valid through 8/13/18*

Apache

ULTRA-LIGHT, CRUSH PROOF WEATHER-RESISTANT LOCKABLE CASE

Customer Rating ★★★★★

NOW \$99

SAVE \$14

COMPARE TO PELICAN
\$29.95
MODEL: 11150

ITEM 63518

84526404

LIMIT 8 - Coupon valid through 8/13/18*

HAULMASTER

72" x 80" MOVING BLANKET

Customer Rating ★★★★★

NOW \$59

COMPARE TO BLUE HAWK
\$19.99
MODEL: 7280

ITEM 69505/62418/66537 shown

84488199

LIMIT 8 - Coupon valid through 8/13/18*

CHICAGO ELECTRIC WELDING

MIG-FLUX WELDING CART

Customer Rating ★★★★★

NOW \$299

COMPARE TO FORNEY
\$99.99
MODEL: 11735989

ITEM 60790/61316/69340 shown

84494772

LIMIT 4 - Coupon valid through 8/13/18*

HAULMASTER

SOLAR ROPE LIGHT

Customer Rating ★★★★★

- Great outdoor accent lighting
- Super bright light

NOW \$99

SAVE 66%

COMPARE TO HAMPTON BAY
\$29.97
MODEL: 82056-05568

ITEM 62533/63941/68353 shown

84499091

LIMIT 7 - Coupon valid through 8/13/18*

Lynxx

40 VOLT LITHIUM CORDLESS 14" BRUSHLESS CHAIN SAW

Customer Rating ★★★★★

NOW \$149

SAVE \$29

COMPARE TO KOBALT
\$179
MODEL: KCS 120-06

ITEM 63287

84508141

LIMIT 2 - Coupon valid through 8/13/18*

COBRA

4 CHANNEL WIRELESS SURVEILLANCE SYSTEM WITH 2 CAMERAS

Customer Rating ★★★★★

- Night vision

NOW \$229

COMPARE TO ALC
\$329.99
MODEL: ALC-ANS200

ITEM 63842

84530127

LIMIT 5 - Coupon valid through 8/13/18*

WINDSOR DESIGN

60" HARDWOOD WORKBENCH WITH 4 DRAWERS

Customer Rating ★★★★★

NOW \$129

COMPARE TO GRIZZLY
\$415
MODEL: H7723

ITEM 93454/69054/63395/62603 shown

84488828

LIMIT 4 - Coupon valid through 8/13/18*

CENTECH

AUTOMATIC BATTERY FLOAT CHARGER

Customer Rating ★★★★★

NOW \$49

SAVE 50%

ITEM 69955

84495614

LIMIT 7 - Coupon valid through 8/13/18*

PITTSBURGH #1 SELLING JACKS

RAPID PUMP® 1.5 TON ALUMINUM RACING JACK

Customer Rating ★★★★★

- 3-1/2 pumps lifts most vehicles
- Lifts from 3-1/2" to 14-1/8"
- Lightweight 34 lbs.

NOW \$59

SAVE \$40

COMPARE TO DURALAST
\$99.99
MODEL: T9150161

ITEM 68053/62160/62496/62516/60569 shown

84502631

LIMIT 5 - Coupon valid through 8/13/18*

HAULMASTER

4 PIECE, 1" x 15 FT. RATCHETING TIE DOWNS

Customer Rating ★★★★★

- 400 lb. working load

NOW \$69

SAVE \$12

COMPARE TO ATE TOOLS
\$40.88
MODEL: 23079

ITEM 63057/63056/63094/90984/60405/63150/61524 shown

84516907

LIMIT 5 - Coupon valid through 8/13/18*

FRANKLIN

17 FT. TYPE IA MULTI-TASK LADDER

Customer Rating ★★★★★

- Versatile - 24 configurations
- Safe + secure + stable
- Super strong - holds 300 lbs.
- Weighs 34 lbs.

NOW \$109

SAVE \$189

COMPARE TO LITTLE GIANT
\$298.99
MODEL: LG M17

ITEM 63418/63419/62656/67646/62514/63417 shown

84531638

LIMIT 4 - Coupon valid through 8/13/18*

*Original coupon only. No use on prior purchases after 30 days from original purchase or without original receipt. Valid through 8/13/18.

At Harbor Freight Tools, the "Compare to" price means that the specified comparison, which is an item with the same or similar function, was advertised for sale at or above the "Compare to" price by another national retailer in the U.S. within the past 90 days. Prices advertised by others may vary by location. No other meaning of "Compare to" should be implied. For more information, go to harborfreight.com or ask store associate.

work+shop

FREE INFORMATION

Circle the numbers for
each advertiser or category
on the attached card,
stamp and mail
or visit

WorkShop-FreeInfo.com

AUTO

100

1. **geico.com**

You could save 15% or more.
Get a FREE rate quote today.
1-800-947-AUTO Geico.com



2. Buy everything
from one lug nut to a new fender
at reliably low prices. Get your
auto parts at **RockAuto.com**

BUILDING & CONSTRUCTION

101

3. **DRYLOK[®]** by UGL Waterproofing
masonry made
easy. See how easy it is to protect
basement walls and other masonry
surfaces from the damaging
effects of water penetration with
Fast Plug and DRYLOK Etch.
United Gilsonite Laboratories.
1.800.272.3235 ugl.com

4. **Forbo**
FLOORING SYSTEMS Beautiful,
healthy,
easy to install flooring solutions.
ForboFlooringNA.com
1.800.842.7839

5. **Genovations[®]**
Deck Flooring
& Rolling Low-maintenance
PVC decking with
a lifetime warranty. Contact us
at **888-309-1808** or visit us at
GenovationsDeck.com

6. **pro'wood**
PROFESSIONAL GRADE[™]
ProWood[®] professional grade
treated lumber offers a wide
selection including color-
infused ProWood Dura Color[®].
ProWoodLumber.com

KITCHEN & BATH

104

7. **Johnson**
HARDWARE
Engineered Excellence For Pocket Door
Hardware,
visit **johnsonhardware.com**, call
800-837-5664, or follow on
Twitter **@JohnsonHrdware**.

8. **MARK E**
INDUSTRIES Goof Proof
Showers: Shower installations
made easier with our own unique
products. **1-866-771-9470**
MarkEindustries.com

9. **NEOPERL**
flow, stop and go[®] NEOPERL, Inc.
designs and
manufactures water-saving
products that enhance the
stream quality and control the
flow rate of faucets and shower
products. **Neoperl.com**

OUTDOOR/LAWN & GARDEN

105

10. **Cyclone Rake**
Get your weekends back with
the Cyclone Rake leaf and lawn
vacuum. Find out how you can
save hours on your tedious yard
cleanup. **Cyclonerake.com**
888-531-7253

11. **LP**
BUILDING PRODUCTS Get so much more
than a shed. Discover
unique practical
benefits, plus tools and advice
to help you get started.
LPshed.com 1-844-557-7433

12. **POST SHIELDS[™]**
Post Shields is an appealing and
innovative solution protecting
existing or new posts from
string trimmers and other lawn
equipment damage. 10% off at
PostShields.com CODE: Handyman
855-757-4435

MISCELLANEOUS

108



- 13.** SIMPSON is a leading brand of pressure washers and other outdoor power equipment including generators and water pumps. simpsoncleaning.com



- 14.** Want a great lawn? Start with a better grass – Amazoy Zoysia Grass! **1-410-756-2311**
Zoysiafarms.com

TOOLS

107

- 15.** **Grizzly Industrial, Inc.** Purveyors of Fine Machinery since 1983.
Grizzly.com **1-800-523-4777**



- 16.** Harbor Freight Tools is the leading discount tool retailer in the U.S. selling great quality tools at “ridiculously low prices” in over 800+ stores nationwide and on its website. HarborFreight.com
1 800 423 2567

- 17.** **Next Wave Automation** is an award-winning, U.S. manufacturer of affordable CNC routing equipment and automated machinery for makers, professionals and hobbyists.
NextWaveAutomation.com



- 18.** Shop Woodcraft Supply for quality woodworking products – 20,000 including brand-name tools and hardware – at stores nationwide, our catalog and Woodcraft.com



- 19.** Upgrade your outdoor security lighting with LED motion activated, flood and dusk-to-dawn consumer products. Learn more at Eaton.com/lighting



- 20.** Looking for a certified electrical contractor in your area to help you with your electrical needs? Eaton's Certified Contractor Network (ECCN) can help you! To learn more visit MyHome.Eaton.com  



- 21.** SimpliSafe wireless home security systems are easy to self-install, easy to purchase direct online, and don't require a contract or a telephone line. 24/7 Professional Monitoring for just \$14.99 a month. That's smarter home security. Protect your home today. Go now to SimpliSafe.com/handy or call **888-799-1859**

IKEA HOME TOUR



- 22.** The IKEA® Home Tour Squad is hitting the road helping America with simple design solutions. A team of five IKEA® experts is touring the country and providing everyday families with free makeovers and helping them improve their life at home. Watch or join the IKEA® Home Tour at HomeTourSeries.com.

**TALK
SHOP**
FOR A CHANCE TO
**WIN
STUFF!**

Join The Family Handyman
Inner Circle today!

IT'S FREE!

- Share feedback & chat with editors
- Answer quick polls on DIY topics
- Chances to win great prizes & more!

GO TO
TMBINNERCIRCLE.COM

**ENTER FOR A CHANCE
TO WIN A**

**\$100
AMERICAN
EXPRESS
GIFT CARD**

**WHEN YOU REQUEST
ANY OF THIS FREE
INFORMATION ONLINE
OR WITH THE CARD
ATTACHED**

No purchase necessary to enter or win. Sweepstakes begins 2/6/18 and closes 1/23/19. Open to residents of the U.S., its territories and possessions, ages 21 and over. Void where prohibited. For entry and other details including official rules visit WorkShop-FreeInfo.com.

Add These Silver Bullets to Your Assets

FREE Shipping: N5742



Just \$29!

One Troy Ounce of Hard-Asset Silver

These pure 1-oz. .999 fine investment grade silver bullets are replicas minted to almost the exact dimensions of a real .45 ACP cartridge. The splendid silver reproductions celebrate the cartridge designed for a Colt semi-automatic .45 pistol. Perfect for any budget at **JUST \$29 each (#46458)**. 30-Day No-Risk Home Examination: Money-Back Guarantee.

International Coins & Currency
62 Ridge Street, Dept. N5742, Montpelier, VT 05602

1-800-451-4463

www.iccoin.com/n5742



SELF-CLEANING Rain Gutter OUTLET

Which outlet do you want in YOUR rain gutters?

Self-CLOGGING Outlet



Standard Outlet

Self-CLEANING Outlet



SpoutOff Outlet

Super-Size Your Outlets & Outsmart Your Gutters!

thespoutoff.com

1-866-289-1442

NEW! DR® Lawn & Garden Edger



Professional Edges Made EASY!

4 WHEEL DESIGN for stable and precise operation.

CURB HOP feature lets you straddle a curb, with one wheel at street level, for stable, precise cuts.



18842X © 2018

PIVOTING BLADE allows for bevel cuts along garden borders (up to 15°).

FREE SHIPPING 6 MONTH TRIAL

SOME LIMITATIONS APPLY

Call or go Online for Special Offers!

877-405-7455
DRpower.com/edger



ULTRA SAFE
SUPER EFFICIENT
TOTALLY SILENT
HEATING
FOR YOUR PEACE OF MIND!



envi
WALL-MOUNTED ROOM HEATER

WWW.EHEAT.COM

1-800-807-0107

ENERGY SAVING
heats room as little as 4 cents per hour!*

ULTRA-SAFE
leave unattended 24/7; cool to the touch

HEALTHY
fanless - doesn't blow dust or dry the air, ideal for those who have asthma or dry eyes

SILENT
fanless design, auto dimming power light

STYLISH AND SLEEK
slim space saving design, only 2" thin!

EASY INSTALL
installs in minutes, no drill required; hardwired & easy plug-in models available

10% off 2 or more Envi Heaters coupon code: **FH1810** | Free Shipping!



Weed Razer

The most efficient & effective tool made for removing aquatic weeds.

Clears your lake or pond weeds in minutes!

Weed Razer Pro clears a path up to 62"

Using the Weed Razer is simple:

1. Give it a toss
2. Let it sink
3. Pull it in

Also Available
Weed Raker
The LONGEST, WIDEST, ALL-IN-ONE Lake Rake

Visit our website to see our Algae control and other pond products!

877-356-6455
www.WeedRazers.com

5-Minute Fence Stain




- Stain 100 ft of fence in just 5 minutes!
- Sprayer attaches directly to garden hose.
- No masking, simply hose off over-spray.
- One quart covers 600 square ft.
- Select from three natural wood tones; Natural Cedar, Dark Cedar or Redwood.

FiveMinuteFence.com

Earn \$500 a day making bunk beds from your shop!

Even if you only have basic woodworking skills you can learn this business.

THIS MONTH'S SPECIAL

Super Low Limited Time Offer

\$100

FLAT FEE PER MONTH for any size territory!
Recover your investment with ease.
Ranked A+ by the Better Business Bureau

ACT TODAY to see if your territory is available!

1800BunkBed

It's Your Business!™

Visit 1800BunkBed.com



FloorLiner™
Laser Measured



Sunroof Wind Deflector



AlloyCover™

WeatherTech®

American Manufacturing Done Right™

Accessories Available for

Acura · Alfa Romeo · Aston Martin · Audi · BMW · Buick · Cadillac · Chevrolet · Chrysler · Dodge · Ferrari · Fiat · Ford · Genesis · GMC · Honda · Hummer · Hyundai · Infiniti · Isuzu · Jaguar · Jeep · Kia · Land Rover · Lexus · Lincoln · Maserati · Mazda · Mercedes-Benz · Mercury · Mini · Mitsubishi · Nissan · Oldsmobile · Plymouth · Pontiac · Porsche · RAM · Saab · Saturn · Scion · Smart · Subaru · Suzuki · Tesla · Toyota · Volkswagen · Volvo and more!

Order Now: 800-441-6287

 American Customers
WeatherTech.com

 Canadian Customers
WeatherTech.ca

 European Customers
WeatherTech.eu

© 2018 by MacNeil IP LLC

INCINOLET® electric incinerating toilets

PROBLEM SOLVED!

Need a toilet conveniently located?
Home, cabin, shop, boat or dock –
INCINOLET is your best solution!

SIMPLE to
install, maintain.
Only electricity
needed: 120
or 240 volts

ULTRA CLEAN:
waste reduced
to sterile ash,
as little as a
cupful weekly.
Dump in garbage.

TOP QUALITY: stainless steel,
platinum odor control, quality
construction for a lifetime of satisfaction.

www.incinolet.com

**Call 1-800-527-5551 for info,
prices and personal attention.**



RESEARCH PRODUCTS/Blankenship
2639 Andjon • Dallas, Texas 75220

Storm Windows — to protect your windows against weather, hurricanes, heat and cooling loss, cut noise



Inner AND outer frames, made to your size

- Most innovative new DIY exterior AND interior storm windows
- Interior easy mount press fit for insulation and sound blocking
- Exterior frames to preserve window frames, insulation, noise reduction, hurricane impact, break-ins. **Amazing strength**
- Protect and preserve old windows from water damage and dust
- Avoid having to buy expensive new windows, use our solution!
- For the south, Hurricane impact protection, no more plywood
- Easy install, removal of window panels for seasonal needs
- Direct from Manufacturer, built in Chicago, see our factory video
- Low cost – Save big on utilities
- Any custom size made for you fast, easy online ordering



sales@stormwindowsfast.com
Alpina Manufacturing, Chicago, IL
1-800-915-2828



Visit our website for easy online ordering or call us for info. **STORMWINDOWSFAST.COM**

Underbed Dressers



**Put Up to 24 Drawers
Under Your Beds**

ultimatebed.com

Where will your customers
look for the things they need
to get the job done?

The Workshop

Advertise today.

Call 212-779-7172 x232
for more information.

Need more space? Build your own murphy bed.



Piston-lift
mechanism kit
includes
step-by-step
construction plans
and instructional
DVD

Create-A-Bed®

Toll Free **1-877-966-3852**

www.createabed.com

ATHENA PHEROMONE 10x™



Created by Dr. Winnifred Cutler,
co-discoverer of human pheromones in 1986

INCREASES AFFECTION



unscented

Vial of 1/6 oz. added to 2-4 oz. of
your favorite fragrance, worn
daily lasts 4 to 6 months.

Will work for most, but not all. 10:13 for
women \$98.50, 10X for men \$99.50.
Cosmetics **FREE US SHIPPING.**

Visit our **NEW MEN'S CORNER** on the web

♥ **Glen (FL)** 36 orders "I have been your
customer for over 20 years. When I first bought
10X, I did a non-scientific test of my own. I had
38 secretaries in my office and I wore 10X one
week, then I did not wear it the
following week. **The difference
was incredible!** I am 73 and
have a younger girlfriend who
loves the smell. Thank you Dr.
Cutler" Rec'd 9/11/17



Not in stores **610-827-2200**

Athena Institute, 1211 Braefield Rd., Chester Spgs, PA 19425

or view the science and order online at

Athenainstitute.com

FHD

Custom Made for Your Cabinets
Kitchens • Pantry • Bathrooms
Limited Lifetime Warranty
Baltic Birch Construction
100 Pound Capacity

1-800-598-7390
www.shelvesthatslide.com
Order On-Line

**Custom pull out shelves
and Kitchen cabinet accessories**



Call or email for a free catalog

BEST BARN'S Do-It-Yourself and SAVE!



Large Selection of Do-It-Yourself Kits.



online catalog available at
www.mysshedkit.com

NEW!

Oil Vanish™
Oil Stain Remover



Quickly dissolves oil stains from driveways, garages, and parking areas

Penetrates deep to lift the toughest stains - new or old

Easy-to Use: Apply, Scrub and Rinse

OilVanish.com

Available at these fine retailers



Homeowners... Put That Shovel Down!

The MAGNATRAC RS1000 is Your #1 Solution to Your Tough Jobs!

SAVE Over \$4,000!



*on this RS1000 package for a LIMITED TIME ONLY!!!

- ✓ Landscape Yards, Grade Driveways
- ✓ Pull Logs, Plow Snow, Food Plots
- ✓ Make Trails, Gardens, Small Ponds

The MAGNATRAC® RS1000 is your year round power solution for the toughest jobs on your property. It's rugged with 1,500 lbs. of pulling power! - Factory Direct Pricing & Made in USA!

Get Your FREE Catalog Today!

STRUCK Use Code: FHM518
1-877-828-8323
StruckCorp.com/homeowner

8 CIGARS ONLY \$10*



FIRST-CLASS PREMIUM CIGAR SAMPLER

When it comes to cigars, no one even comes close to Cigars International and we're ready to prove it to 'ya with an outrageous intro offer: 8 premium handmade cigars for just \$10.* Go ahead, price shop this one and prepare to be stunned. When you're ready, we're here waiting with the world's largest selection of premium handmade cigars at the planet's lowest prices, delivered fast and fresh. That's our guarantee.



www.CigarsIntl.com/SA7330

You must enter complete web address for special offer

1-888-244-2790 Mention code SA7330

Item #: CA49-SP

*Plus 12% s/h. PA residents add 6% tax; taxes on orders shipped outside of PA are the responsibility of purchaser. First-time purchasers only. One per customer. No sales to anyone under the age of 21. For more information see www.CigarsIntl.com/ageverify. Offer expires 7-15-18.

UPGRADE NOW! \$5 UPGRADE ADD A TRAVEL HUMIDOR

PERFECT FOR:

- Golf: worry about golf, not cigars.
- Fishing: airtight and it floats - perfect for fishing!
- Hunting: keep your cigars protected even in nature's toughest conditions.



Includes 1 each of: Torano • HC Series • 5 Vegas • Ramón Bueso
Gran Habano • Black Ops • Alec Bradley • Rocky Patel

\$52
Value

READER INFO



**Need more
Family Handyman?
Get our best tips
and hints in your
inbox. Sign up at
tfhmag.com/diytips**

GOT A DIY QUESTION?

Finding answers is easy at familyhandyman.com. Just use the search box at the top of the page to get expert step-by-step help with your projects.

GOT A HANDY HINT OR TIP FOR US?

To share your information with us, submit a copy of your original contribution, including photos and/or sketches, by email to:

submissions@familyhandyman.com

Or mail to: *The Family Handyman*,
2915 Commers Drive, Suite 700,
Eagan, MN 55121

Please include your name, mailing address and email address if you have one, and indicate to which department you are submitting. We reserve the right to publish your submission in any appropriate department, or elsewhere. Contributions will not be acknowledged or returned.

RIGHTS

By submitting material to us, you grant Home Service Publications, Inc., its parent company subsidiaries, affiliates, partners and licensees worldwide use of the material without time limitation, including the right to use your name and city/state/province in connection with any such use. We reserve the right to modify, reproduce and distribute your material in any medium (now or hereafter existing) and in any manner or appropriate place, including but not limited to magazines, promotional merchandise and marketing, and other related materials.

By submitting material to us, you represent and warrant that you have full authority to grant the rights set forth above and that your material will not, in whole or in part,

infringe the intellectual property rights, rights of privacy or publicity, or any other rights of any third party. You further represent and warrant that you have attained the legal age of majority in your state/province (18 in most states/provinces). If you're a minor under the law of your state/province, your parent or guardian must submit on your behalf.

CUSTOMER CARE

For subscriptions, renewals, gifts, payments, account info and other inquiries, email customercare@familyhandyman.com or visit familyhandyman.com/customercare

You can also write to: *The Family Handyman* Customer Care, PO Box 6099, Harlan, IA 51593-1599

Single copies of past issues are available for purchase at our affiliate, Shoptasteofhome.com. The cost is the cover price (either \$3.99 or \$4.99) plus \$1 shipping and handling for each copy.

COMMENTS AND SUGGESTIONS

We welcome your ideas and opinions. Write to: The Editor, *The Family Handyman*, 2915 Commers Dr., Suite 700, Eagan, MN 55121. Fax: 651-994-2250. Email: feedback@familyhandyman.com

TO REQUEST PERMISSION TO REPRINT

If you'd like permission to reprint any material that appears in *The Family Handyman*, please write to us with the nature of your request. Please include as much detail as possible relating to your intended use of the material and specify the issue date and page number (or URL, as applicable) where the material originally appeared. Please email permissions@tmbi.com

the family handyman

EDITORIAL

Editor-in-Chief **Gary Wentz**
Senior Editors **Mary Flanagan**
Travis Larson
Mark Petersen
Associate Editors **Jeff Gorton**
Brad Holden
Managing Editor **Donna Bierbach**
Assistant Editors **Matt Boley**
Elizabeth Flaherty
Contributing Copy Editor **Peggy Parker**
Contributing Editors **Spike Carlsen**
Rick Muscoplat
Josh Risberg
Lead Carpenter **Peggy McDermott**
Editorial Services Associate

ART

Associate Creative Director **Vern Johnson**
Senior Designer **Marcia Roepke**
Graphic Designer **Mariah Cates**
Production Artist **Mary Schwender**
Photographer **Tom Fenenga**

DIGITAL

Digital Product Manager **Gina Kapfhamer**
Senior Analyst, Digital Analytics **Ashley Knoebel**
Senior Digital Editor **Jenny Stanley**
Associate Digital Editor **Nick Gerhardt**
Social Media Manager **Kellen Berg**
Online Learning Manager **Kat Gritsenko**
Video Producer **Will Leighton**

Chief Content Officer **Beth Tomkiw**

ADVERTISING

Director of Ad Sales Analysis **Heather McKean**
Brand Sales Leader **John Dyckman**
New York **Greg Messina**
646-518-4215
Richie Matz
Ray Rienecker
Kelly Loalbo
Midwest, 312-540-4824 **Matt Avery**
West Coast **Catherine Marcussen**
catherine.marcussen@TrustedMediaBrands.com
Canada
416-598-0101, ext. 220
Classified and Small Display
Ads: 212-779-7172, ext. 221
Executive Brand Director **Christina Masterson**
Associate Marketing Director **Ashley Martinez**
Marketing & Partnerships Manager **Alexis Aliquo**
Associate Marketing Manager **Christine Galletta**
Art Director **Ed Jackson**
Advertising Coordinator **Selena Cohen**
Senior Production Manager **Leslie Kogan**

TRUSTED MEDIA BRANDS, INC.

President & Chief Executive Officer **Bonnie Kintzer**
Chief Financial Officer **Dean Durbin**
Chief Marketing Officer **C. Alec Casey**
Chief Digital Officer **Vince Errico**
SVP, Global HR & Communications **Phyllis E. Gebhardt, SPHR; SHRM-SCP**
General Counsel **Mark Sirota**
VP, Product Marketing **Brian Kennedy**
VP, Consumer Acquisition **Heather Plant**
VP, Operations **Michael Garzone**
VP, Consumer Marketing Planning **Jim Woods**
VP, Digital Product & Technology **Nick Contardo**
VP, Digital Content & Audience Development **Kari Hodes**

EDITORIAL OFFICE

2915 Commers Drive, Suite 700,
Eagan, MN 55121; 651-454-9200



THE FAMILY HANDYMAN® ISSN: 0014-7230, USPS: 515-930. Vol. 68, No. 3, 586th Edition. Published 8 times per year: March, April, May, June, July/August, September, October/November, December/January/February by Home Service Publications, Inc., 1610 N. Second St., Suite 102, Milwaukee, WI 53212. We may also occasionally publish extra issues and special issues (which count as two in a subscription). Periodicals postage paid at Milwaukee, WI, and at additional mailing offices. **POSTMASTER:** Send address changes to customercare@familyhandyman.com, visit familyhandyman.com/customercare or write to *The Family Handyman* Customer Care, PO Box 6099, Harlan, IA 51593-1599. **SUBSCRIPTIONS:** In the U.S.A., its territories and possessions, \$24 for one year (8 issues). For countries outside the U.S.A., subscriptions are \$28.97 per year in American currency. Canadian GST registration number R123771891. CPM agreement number 40065693. **Printed in the U.S.A.** Copyright ©2018 Home Service Publications, Inc. All rights reserved. Unauthorized reproduction, in any manner, is prohibited. *The Family Handyman*, Handy Hints and Great Goofs are registered trademarks of Trusted Media Brands, Inc. Wordless Workshop, Workshop Tips and  are trademarks of Trusted Media Brands, Inc. **SUBSCRIBERS:** If the U.S. Postal Service alerts us that your magazine is undeliverable, we have no further obligation unless we receive a new address within one year. **CONSUMER INFORMATION:** *The Family Handyman* may share information about you with third parties for the purpose of offering products and services that may interest you. If you would rather not receive such offers via postal mail, please write to: *The Family Handyman* Customer Mailing List, PO Box 3122, Harlan, IA 51593-0188. You can also visit www.tmbi.com/preference-center to manage your preferences and opt out of receiving such offers via email. Please see our Privacy Policy at www.tmbi.com/privacy-policy.

NORTH AMERICA'S #1 Selling Walk-In Tub

Advanced Air System-
Introducing **MicroSoothe!**



Financing available
with approved credit



The best walk-in tub just got better with breakthrough technology! **Presenting the all new Safe Step Walk-In Tub featuring MicroSoothe®.** An air system so revolutionary, it oxygenates, softens and exfoliates skin, turning your bath into a spa-like experience. Constructed and built right here in America for safety and durability from the ground up, and with more standard features than any other tub.

- ✓ Heated seat providing warmth from beginning to end
- ✓ Carefully engineered hydro-massage jets strategically placed to target sore muscles and joints
- ✓ High-quality tub complete with a comprehensive lifetime warranty on the entire tub
- ✓ Top-of-the-line installation and service, all included at one low, affordable price

You'll agree – there just isn't a better, more affordable walk-in tub on the market.

Call today and receive exclusive savings of up to

\$1500 OFF

FOR A LIMITED TIME ONLY

Call Toll-Free 1-800-676-5002



For your **FREE** information kit
and DVD, and our Senior
Discounts, Call Today Toll-Free

1-800-676-5002

How to reset a circuit breaker



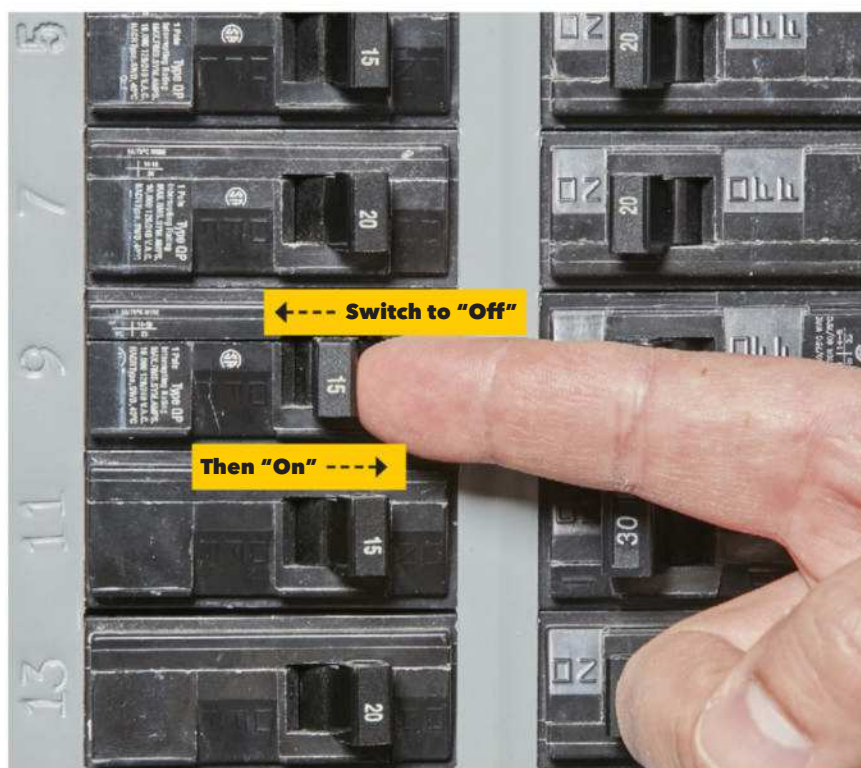
You may already know how to reset a circuit breaker, but you're not always around. Show everyone in your household where the main panel is and post this guide near it.

1 Don't worry!
All the dangerous parts are behind the breaker switches. You can't get a shock by flipping breaker switches.

2 Find the tripped breaker
Open the panel's door and look for the breaker switch that's out of line with the others. It will be about midway between the "off" and "on" positions. You may have to look closely to spot it.

3 Reset the breaker
To reset a breaker, move the switch all the way to its "off" position, then back to "on." You might hear a few beeps from smoke detectors and appliances when you turn the power back on, but that's normal.

4 It trips again
If that happens, the circuit is probably overloaded. To reduce the load, unplug or switch off items that are using the circuit. If that doesn't work, there may be a problem with your electrical system. If you lack the know-how to troubleshoot your wiring, call an electrician.





See how much you could save on
insurance for your truck, motorcycle,
RV, boat and more.

GEICO[®]

geico.com | 1-800-442-9253 | Local Office

Some discounts, coverages, payment plans and features are not available in all states or all GEICO companies. Motorcycle and ATV coverages are underwritten by GEICO Indemnity Company. Boat and PWC coverages are underwritten by GEICO Marine Insurance Company. GEICO is a registered service mark of Government Employees Insurance Company, Washington, D.C. 20076; a Berkshire Hathaway Inc. subsidiary. © 2017 GEICO

