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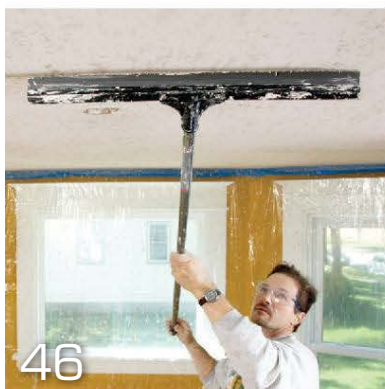


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BY MARK PETERSEN

feedback@familyhandyman.com

Tool chests— not just for mechanics

Mondo tool chests like the ones you see at professional mechanics' shops used to cost thousands of dollars. Way too much for the average shop rat. But prices on professional-grade tool chests have dropped into the \$1,000 range over the past few years, putting them within reach of most serious DIYers.

I recently picked up a Kobalt stainless steel tool chest (\$500) and a matching tool cabinet (\$680). The units are 41 in. wide and built with double wall construction. All 20 drawers have full-extension ball-bearing slides, each rated for a hefty 99 lbs., which is plenty strong for my needs.

This setup isn't just for mechanics either: The deeper drawers are perfect for locking up drills, nail guns and routers. And the drawers come with rubber liners so my chisels and hand plane blades won't get nicked up. The tool cabinet also comes with a side-mounted power strip, three built-in AC outlets and two USB ports. I added so much storage space that a couple drawers needed to be filled with more new toys. Assembly required a total of 10 minutes for screwing on the wheels. I bought my Kobalt tool chest and cabinet at Lowe's.

Rick Muscoplat,
Contributing Editor



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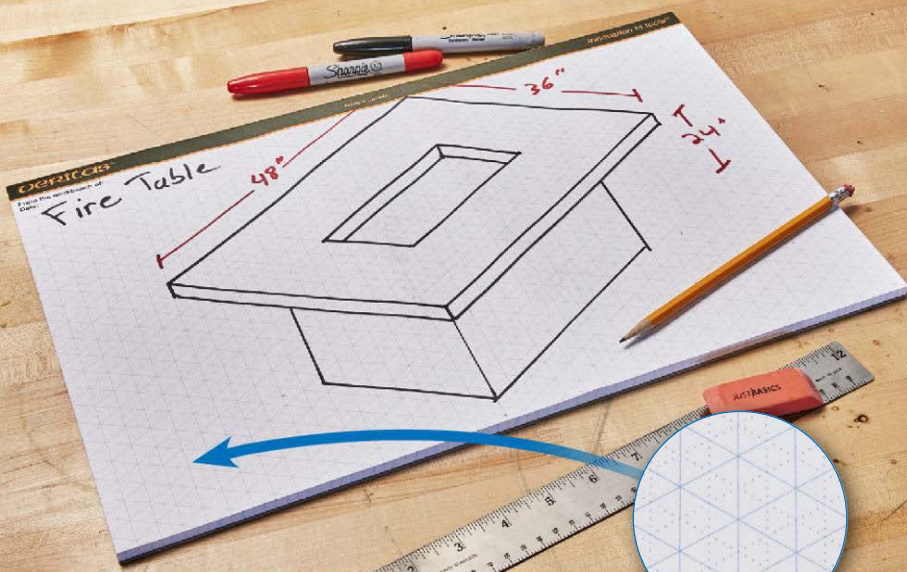
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Drawings with depth

Most projects I build start as a drawing on regular old graph paper. When I recently ran out, I asked to borrow a couple sheets from a coworker. He was kind enough to give me a whole pad of this bizarre paper with diagonal rather than perpendicular lines. He must have sensed my skepticism because he assured me that I would love it...he couldn't have been more right!

As soon as I put pencil to paper, I knew I would never go back to squares. The diagonal lines made it easy to create a perfect isometric image of the outdoor fire table I was building. It not only helped me fine-tune the proportions I wanted but also eliminated the need to create both a side view and an end view. The pad he gave me came from a three-pack of 11 x 17-in. (48 sheets per pack) Veritas Isometric Drawing Pads he had bought for \$17.50 at leevalley.com. As thanks, I bought him lunch at a local diner for \$12. I think I got the better end of the bargain.

Mark Petersen, Associate Editor



A full-performance table saw for half the price

I bought my first cabinet saw 10 years ago: a Grizzly G1023. It was a monster, with a 3-hp motor, a beefy fence and a dust collection system that actually worked. Unfortunately, an out-of-state move forced me to sell it.

Once I settled in, I bought a cabinet saw that cost twice as much as my Grizzly, but it didn't perform any better. I had to sell that one for another cross-country move. I decided to go with a Grizzly once again. Why pay twice as much for the same performance? But this time, I bought the G1023RLW—same as the G1023 but with a built-in router table. The newest version also has a European-style riving knife and an even better dust collection system. And like my first Grizzly, it's a monster! I paid \$1,395 plus shipping at grizzly.com.

Jason White, Associate Editor



A superior handsaw

When was the last time you used a handsaw? It was probably dull and hard to push, and I bet you couldn't follow a straight line to save your life. But saws are not all created equal. Irwin's 15-in. Universal Handsaw is truly remarkable: It's extremely sharp and easy to grip, and it cuts up to three times faster than other handsaws.

The secret is in the teeth. They're ground with three faces then hardened to stay sharp much longer than a conventional saw's teeth. Irwin calls this a "universal" saw because it performs equally well with the grain and across the grain. I use mine all the time to break down longer boards that don't easily fit on my miter saw. I also carry it with me to the lumberyard to cut down long lengths of wood so they fit in my car for the ride home. The teeth can't be sharpened, but for less than \$20, who cares? Buy one at a hardware store or online.

Tom Caspar, Contributing Editor



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Pro-grade protractor

Five years ago, I bought this Starrett 505A-12 Miter Protractor for a specific job, and I thought it would never get used twice. I was wrong. I've used it dozens of times and am amazed how handy it is. The long, 12-in. legs make it much more accurate than a T-bevel, and the hinge is tight enough to hold the legs in place without having to tighten knobs or wingnuts. The protractor dial shows angles, for making miter cuts.

I recently used it to mark flooring planks in a dome house, where every single end-cut was an unusual angle. This tool saved the day! Really, its only downside is the price, \$75, but like other Starrett tools, it's solidly built. Buy one at wood-working stories or online.

Ken Collier, Editor-at-Large



Need it evenly spaced? This tool makes it easy

I'm not much of a math guy, which is why I always have a heck of time trying to figure out equal spacing for things like coat hooks and shelf locations. So I was thrilled when I came across the Point 2 Point Mk2.

The Mk2 is an accordion-like apparatus with seven adjustable marking points. Just stretch it out so the distance between the marking points (or every two or three marking points) is the proper space you need, tighten the pinch bolts and mark the locations on your project. I've also used it to space fasteners, find center points and figure out how many small boards I can cut out of a larger one. My wife has even borrowed it as a guide to cut a large sheet cake into even pieces. Buy one at m-powertools.com for \$23.

Mark Petersen, Associate Editor



Powerful saw, smart batteries

Pros have been reluctant to cut the cord on larger tools because of a reduction in power and limited run-times. But DeWalt has addressed those concerns with a pro-grade double-bevel compound sliding miter saw equipped with a brushless motor run by two powerful FLEXVOLT batteries. And if there's a plug-in handy, the saw can be converted to a corded saw by means of an adapter.

The versatility of the new smart FLEXVOLT batteries that power this saw is another big plus. Two of these 60-volt batteries can be combined to produce 120 volts in larger tools like this miter saw. Or one battery can be used to power 60-volt tools like a cordless DeWalt circ saw or grinder. But here's where it gets interesting: This very same 60-volt battery knows when you plug it into a 20-volt tool and will provide 20 volts of power with 6.0 amp-hours of run-time. That's up to four times the run-time of previous batteries (a 9AH version will be available soon).

Now you only need a couple batteries to power a whole arsenal of tools, including the tools you already own. The complete package, including the DHS790AT2 saw, two FLEXVOLT batteries, dual-port charger and corded power supply, costs \$799 at home centers, tool stores and online retailers.

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J.A. Kemble



Ornament ho-ho-holder

I found a nifty way to store my Christmas ornaments using clear plastic tubs (with lids), some wooden dowels, and rubber leg tips that I got from the home center. I drilled two holes in each end of the tubs, inserted the dowels through them, and then capped the dowels with the rubber tips to keep the dowels in place. I store things like Christmas tree skirts in the bottom and hang ornaments from the dowels. Now it's really easy to see which ornaments are in each tub!

Carol Pierce



Neat sheet organizer

An expanding file from an office supply store was all I needed to keep my sandpaper organized by grit. It also has given me plenty of room to stash my instruction manuals, warranties and other paperwork.

Bruce Hinnenkamp



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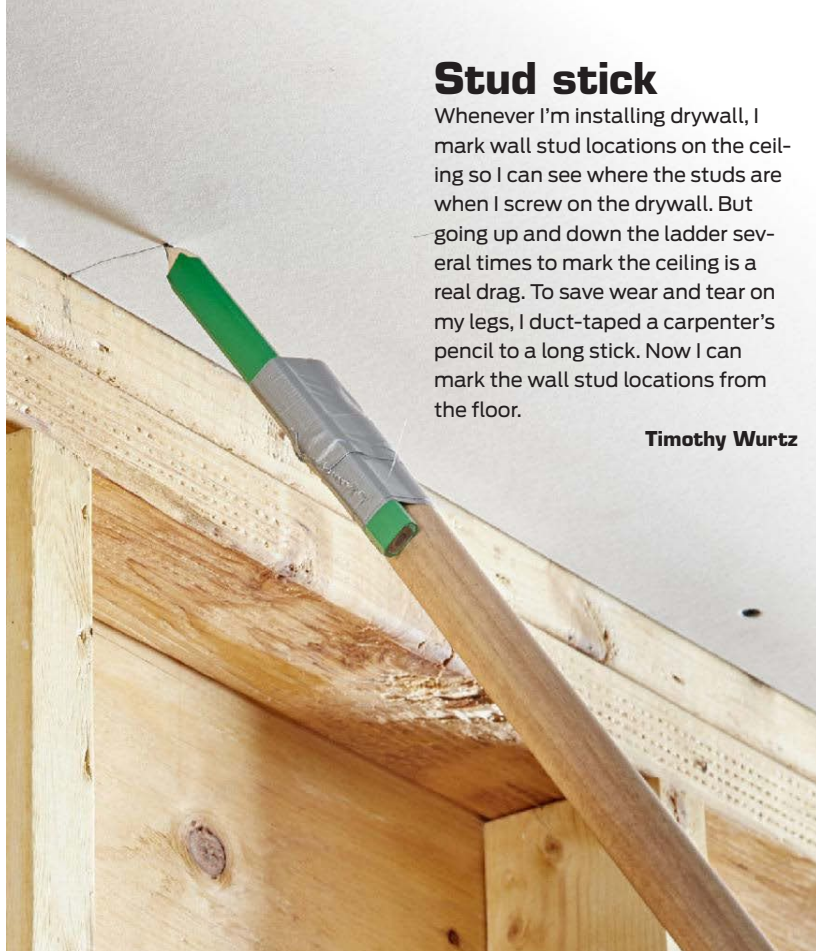
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Stud stick

Whenever I'm installing drywall, I mark wall stud locations on the ceiling so I can see where the studs are when I screw on the drywall. But going up and down the ladder several times to mark the ceiling is a real drag. To save wear and tear on my legs, I duct-taped a carpenter's pencil to a long stick. Now I can mark the wall stud locations from the floor.

Timothy Wurtz



Under-sink storage rod

I keep so much stuff in the cabinet under my kitchen sink that it gets cluttered beyond belief. I could never find what I needed quickly, so I bought an inexpensive spring-tension curtain rod and installed it under the sink. Now I have a place to hang things like towels, spray bottles and rubber gloves. I put the items I can't hang in a couple of plastic baskets, which are easy to pull out.

Gabi Perez



Gift wrap organizer

I used to keep rolls of wrapping paper under a bed or in the corner of a closet, making them hard to get at and covering them with dust. And then I'd go hunting for scissors and tape.

To make wrapping presents easier, I now use a clear garment bag as a portable gift wrap organizer. It's great for storing all my ribbons, bows, tape and scissors—all clearly visible and grouped together. I just hang it in the closet until I need it, and I can carry the whole shebang to the dining room table whenever I have a big wrapping project.

Sue Rosenkranz

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Sticky finger

When you need to screw on a nut in a tight space, hold it on your finger with a piece of Scotch tape. That makes it easier to get the screw started (the tape is thin enough for a machine screw to poke through).

Gordon Watson



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FLOATING SHELVES

**Customize them
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by Jason White
feedback@familyhandyman.com

You can buy floating shelves in stores or online for \$20 to \$80 each. But before you do that, consider building your own. For about the same cost, you can get the exact size, thickness and look you want. You can even finish them to match your trim or furniture. And your homemade shelves will be sturdier than most store-bought shelves—ours can support about 50 lbs. each. Plus, you'll earn serious bragging rights when you're done.



Money, time and tools

A pair of shelves cost us about \$150 to build. We were able to make two shelves from a single 4 x 8-ft. sheet of 1/2-in.-thick red oak plywood (\$40). It can be tough to find locally, so call around before you shop, or choose different plywood.

Our shelves are 2-1/2 in. thick and 72 in. long, so finding veneer long enough on store shelves is also a challenge. You can special-order it at some home centers, however. We bought ours online from Rockler Woodworking and Hardware (rockler.com), where a 24-in. x 96-in. roll costs about \$100 shipped. You can find less expensive veneer, but we love this stuff because you don't have to heat it or apply any glue—it's just peel and stick! Expect to spend an additional \$10 to \$20 on stain and other assorted materials.

It took us a couple of hours to build each shelf, including sanding, staining and mounting on the wall. We made ours using a circular saw and cutting guide, but you can make them much faster with a table saw. And you can certainly hand-drive small nails, but it's much faster and easier to use a pneumatic brad nailer (you can buy one at Harbor Freight Tools for about \$20). You'll need a small compressor to power it. It also helps to have a random orbit sander, especially for sanding the sides flush before applying the veneer (see p. 20). Bonus points if you own a belt sander for scribing!

WHAT IT TAKES

TIME: Two to three hours per shelf

COST: \$150 (for two shelves)

SKILLS: Beginner

TOOLS: Circular saw, belt sander (optional), brad nailer, edge-band trimmer, random orbit sander, drill/driver, stud finder, 4-ft. level.

MEET THE EXPERT



Jason has 15 years of woodworking experience and is an associate editor at *The Family Handyman*.

SELF-STICK VENEER FOR A SOLID WOOD LOOK

A shelf made from a single plank looks great, but long, thick planks can be hard to find, expensive or both. So we cheated and used adhesive-backed veneer made from real wood, which is easy to cut and apply and creates the seamless look of solid timbers. To see how to apply it, check out Photos 4 – 6.



Build cutting guides for perfect cuts

It's hard to get nice, straight cuts without something to help guide your circular saw. That's where a cutting guide comes in. We used a self-squaring crosscut guide for short cuts and a longer guide for "rip" cuts. The guide shown here is just a narrow piece of 3/4-in. plywood attached on top of a wider piece of 1/4-in. plywood, with a squaring fence on the bottom. The base of the saw rides against the guide's "fence." To see how to make one, go to familyhandyman.com and search for "saw cutting guide."



Cut and assemble the parts

Set a full sheet of 1/2-in. plywood on three or four 2x4s laid across sawhorses (**Photo 1**). Measure and mark the plywood for each of the shelf parts and use a circular saw and cutting guide (see “Build Cutting Guides for Perfect Cuts” on p. 19) to make your cuts. The cutting guide will help keep your cuts perfectly straight and minimize chip-out.

Next, glue and nail all the parts together (**Photo 2**). It helps to draw pencil lines on the top and bottom panels first so you’ll know where to drive the nails for the fillers after you cover them with the top and bottom panels. With all eight parts cut to size, it’s fairly easy to assemble the shelf with glue and nails. Start by laying the front rail (C) on end on top of your worktable (an old hollow-core door or plywood scrap on sawhorses works great), plus a couple of short support blocks cut from a 2x4. These blocks will support the top panel (A) while you glue and nail it onto the front rail. Carefully align the top and front pieces and use an 18-gauge pneumatic brad nailer to drive 1-in. brads.

Now stand the side rails (D) on end and glue and nail them to the top panel. Flip the whole thing over and install the fillers (E) with glue and brads. The fillers should be evenly spaced, but don’t be too fussy because they’ll be hidden once you install the bottom panel (B). Nail through the front rail into each of the fillers.

Then flip the whole thing over again and nail through the top panel into each of the fillers. Now flip the whole works over one more time and nail through the bottom panel into the fillers.

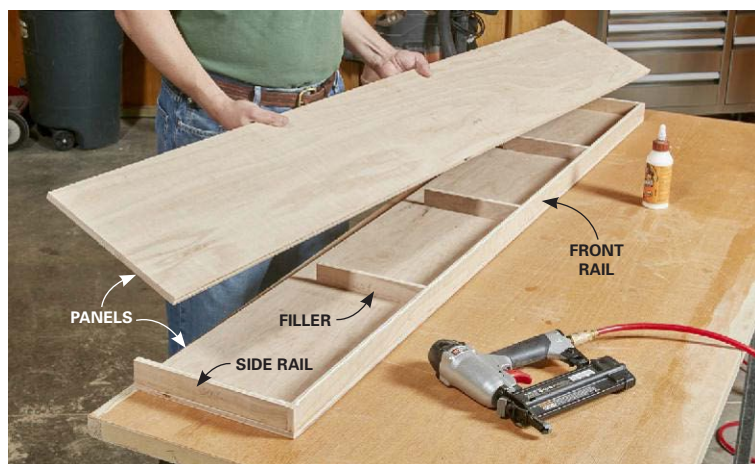
Apply the wood veneer

The top and bottom panels have exposed plywood edges that get covered with veneer. If those edges aren’t perfectly smooth and flush with the faces of the front and side rails, the veneer won’t stick properly. Sand everything flush with a random orbit sander and 100-grit sandpaper (**Photo 3**). Lay out the roll, veneer side down, and draw a straight line using a marker and straightedge at 3 in. wide along the entire length of the roll. This will give you 1/4 in. of overhang when you apply the veneer to the front and sides of the shelf.

Cut along the line with a pair of scissors and then cut the strip of veneer into three pieces for the front and two sides, leaving them long enough so there’s 1/4 in. of overhang on each end (**Photo 4**). Apply the veneer to the sides first, being careful to

1 CUT THE PARTS

Using a 60-tooth blade in your circular saw and a cutting guide, cut all the parts to size (see “Build Cutting Guides for Perfect Cuts,” p. 19.) A 4 x 8-ft. sheet of plywood will yield enough parts for two shelves.



2 GLUE AND NAIL THE FRAME TOGETHER

Apply carpenter’s glue to the edges of the rails and fillers and nail on the first panel with 1-in. brads. Then flip the shelf over and nail on the other panel.



3 SAND THE FRONT AND SIDES FLUSH

Using a random orbit sander and 100-grit sandpaper, sand the front and sides of the shelf so that the rails and panels are flush with each other. This will give you a flat, smooth surface on which to apply the veneer.

keep the veneer aligned with the shelf (**Photo 5**). Don't peel and stick more than a few inches at a time, and rub a block of wood over the veneer to press it on. Cutting the pieces slightly oversize helps in case you don't get it on perfectly straight.

Pull an edge-banding trimmer apart and use one of the two sides to trim the veneer flush with the shelf (**Photo 6**). This method works well going with the grain of the veneer, but not when trimming across it. For the short cuts across the grain, back the veneer up with a block of wood and trim the veneer flush (on the sticky side) with a sharp utility knife. A handheld router with a flush-trimming bit also works well. Install the front veneer piece after the sides. Then drill several countersink holes in the back of the shelf for some No. 8 wood screws (**Photo 7**). Space the holes about 12 in. apart and 3/4 in. from the back edge.

Make a wall cleat

Cut a wall cleat (H) out of a straight 2x4 and make it 1-1/2 in. x 1-3/8 in. x 70-3/4 in. (**Photo 8**). Use your circular saw and the same cutting guide you used to cut the plywood pieces to width (set another 2x4 under the guide to keep it from tipping). Rip the cleat to width and then crosscut it to length. The narrow part of the cleat should slip into the hollow opening in the shelf with just a bit of wiggle room.

Using an electronic stud finder and painter's tape, find and mark the stud locations on the wall. Transfer the stud locations to the wall cleat and predrill holes in the cleat slightly smaller than the diameter of the shanks of the lag screws. Hold the cleat to the wall and drill pilot holes in the wall using the cleat as a drilling guide.

Drive 4-in. lag screws through the cleat and into the wall (**Photo 9**). Start by driving a lag screw on one end of the cleat, check for level, then screw down the other end before driving the middle screws.

Fit the shelf to the wall

Slip the shelf onto the cleat and tight to the wall. If your wall isn't perfectly flat, you'll see some small gaps between the shelf and the wall. You can eliminate those gaps by "scribing" the shelf to fit the contours of the wall (**Photo 10**), but this step is optional—skip it if you don't mind the gaps. To scribe, drag a pencil against the wall and trace a line onto the top of the shelf. The line follows the contours of the wall.

Now use a belt sander to sand up to the pencil line (**Photo 11**). Trying to sand free-hand with the belt sander is tricky because



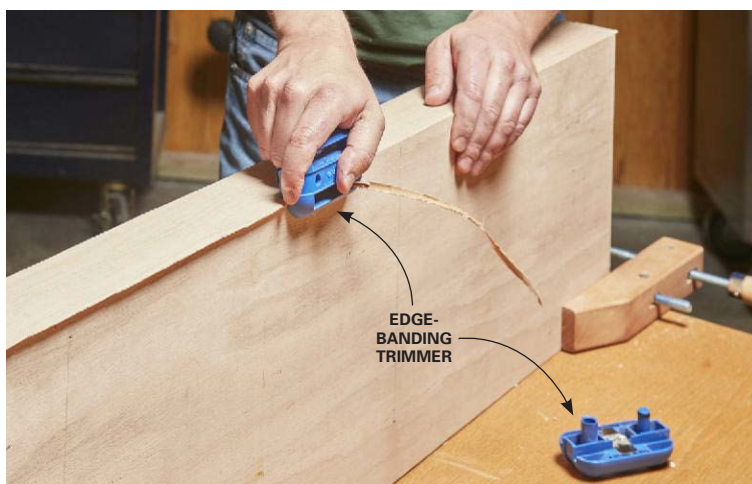
4 CUT THE VENEER TO SIZE

Using scissors, cut three pieces of oak veneer big enough to cover the front and sides of the shelf. Make them 3 in. wide so you'll have 1/4 in. of overhang on each side.



5 STICK ON THE VENEER

Peel off the back and stick on the veneer, leaving a little bit of overhang on all four edges. Press the veneer on firmly with a block of wood.



6 TRIM THE VENEER FLUSH

Using half of a handheld edge-banding trimmer, trim the veneer flush with the edges of the shelf. You can also use a router with a flush-trimming bit.



COUNTERSINKING
DRILL BIT

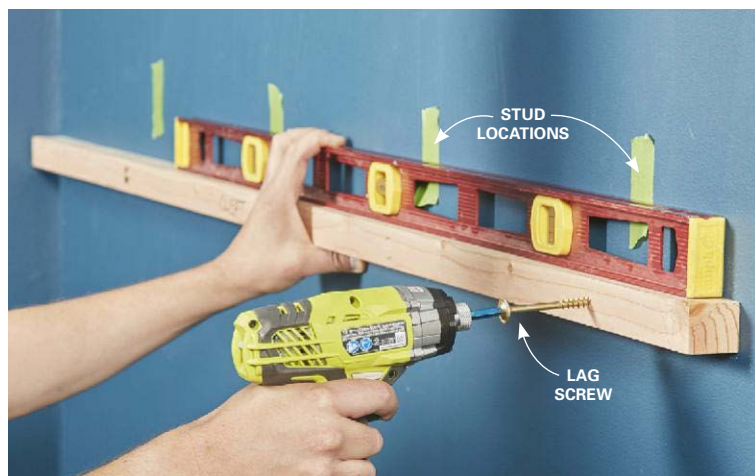
7 DRILL HOLES FOR SCREWS

Drill countersink pilot holes in the top of the shelf for some No. 8 wood screws. Drill them 3/4 in. from the "wall" edge and space them about 12 in. apart.



8 CUT THE CLEAT TO SIZE

Using a circular saw and a cutting guide, rip a wall cleat out of a 2x4. Make sure the 2x4 you're cutting from is dead straight.



STUD
LOCATIONS

LAG
SCREW

9 SCREW THE CLEAT TO THE WALL

Drill pilot holes in the cleat and wall and secure the cleat with 4-in. lag screws. There's no need for fender washers if you use washer-head type screws like the ones shown.



10 SCRIBE FOR A TIGHT FIT

Hold the shelf over the cleat and firmly against the wall and drag a pencil along the wall to trace a scribe line onto the shelf. Scribing and sanding (next photo) allow shelves to fit perfectly against wall contours, but you can skip these steps if you don't mind a few gaps.



BELT SANDER
CLAMPED TO
WORKTABLE

SCRIBE
LINE

11 SAND TO THE SCRIBE LINE

Using a belt sander clamped to a sacrificial worktable, sand up to the scribe line on the shelf.



WOOD
FILLER

12 FILL NAIL HOLES

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13 SAND AND STAIN THE SHELF

Sand all the sides of the shelf using 100- and 150-grit sandpaper. Remove all dust after sanding with the 100-grit to prevent loose granules from scratching the plywood's surface.



14 ATTACH THE SHELF TO THE CLEAT

Hold the shelf against the wall and drive 1-5/8-in. wood screws through the shelf's pilot holes and into the wall cleat.



15 HIDE THE SCREW HEADS

Hide the screw heads with wood putty that matches the color of your stain. Use "non-hardening" putty so you can dig it out if you decide to remove the shelf someday.

if you don't hold the sander perfectly perpendicular to the shelf, the scribe on the top and bottom panels won't match and the shelf won't fit tight to the wall. Instead, turn the belt sander on its side and clamp it on top of a temporary worktable like an old door or scrap of plywood. Turn it on and adjust the belt tracking so that the belt just barely disappears below the surface of the worktable (not all belt sanders let you do this). Run the shelf flat against your worktable and slowly sand up to the pencil line.

Sand, stain and install!

Using a fingertip or putty knife, push some "stainable" wood filler into each of the nail holes (**Photo 12**). The filler might shrink when it dries, so leave a bit extra in each hole—enough that it sits proud of the plywood. Once it dries, sand all sides of the shelf using a random orbit sander and 100- and then 150-grit sandpaper. After sanding with the 100-grit, vacuum or wipe off the sawdust so loose granules don't scratch up the shelf when you sand with the 150-grit. Vacuum up the dust or wipe it off with a tack cloth and apply stain following the directions on the can (**Photo 13**). If you want the shelf to look darker, wait a few hours and apply a second coat. Wait a day or two after staining and then brush on three coats of polyurethane for protection.

Holding the shelf over the cleat and tight to the wall, drive 1-5/8-in. wood screws through the pilot holes that you drilled earlier and into the wall cleat (**Photo 14**). Drive one of the middle screws first to help hold the shelf in place while you drive the others.

With the shelf secured, cover the exposed screw heads with a "non-hardening" type of wood filler colored to match your stain (**Photo 15**). This type of putty stays soft, allowing you to dig it out should you decide to remove the shelf someday.

Materials List (2 shelves)

ITEM	QTY.
4' x 8' sheet of 1/2" red oak plywood	1
24" x 96" roll of peel-and-stick veneer (enough for seven or eight shelves)	1
2x4	1
Non-hardening wood putty	
Tack cloths	
1-5/8" (No. 8) wood screws	
4" lag screws	
Stainable wood filler	
Wood stain	
Cotton rags	
Disposable foam paintbrushes	
1" brad nails (18 gauge)	
Carpenter's glue	

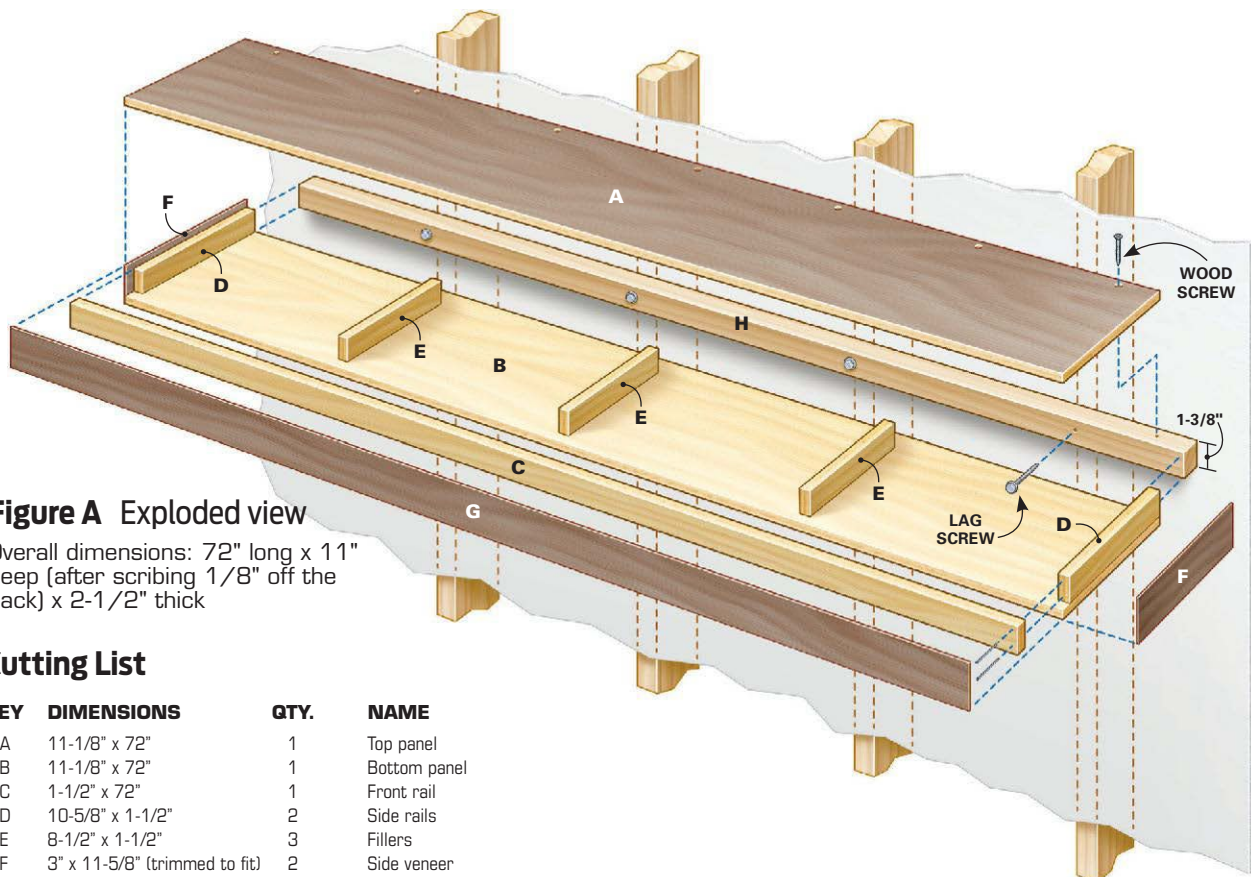


Figure A Exploded view

Overall dimensions: 72" long x 11" deep (after scribing 1/8" off the back) x 2-1/2" thick

Cutting List

KEY	DIMENSIONS	QTY.	NAME
A	11-1/8" x 72"	1	Top panel
B	11-1/8" x 72"	1	Bottom panel
C	1-1/2" x 72"	1	Front rail
D	10-5/8" x 1-1/2"	2	Side rails
E	8-1/2" x 1-1/2"	3	Fillers
F	3" x 11-5/8" (trimmed to fit)	2	Side veneer
G	3" x 72-1/2" (trimmed to fit)	1	Front veneer
H	1-3/8" x 1-1/2" x 70-3/4"	1	Wall cleat

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by Gary Wentz

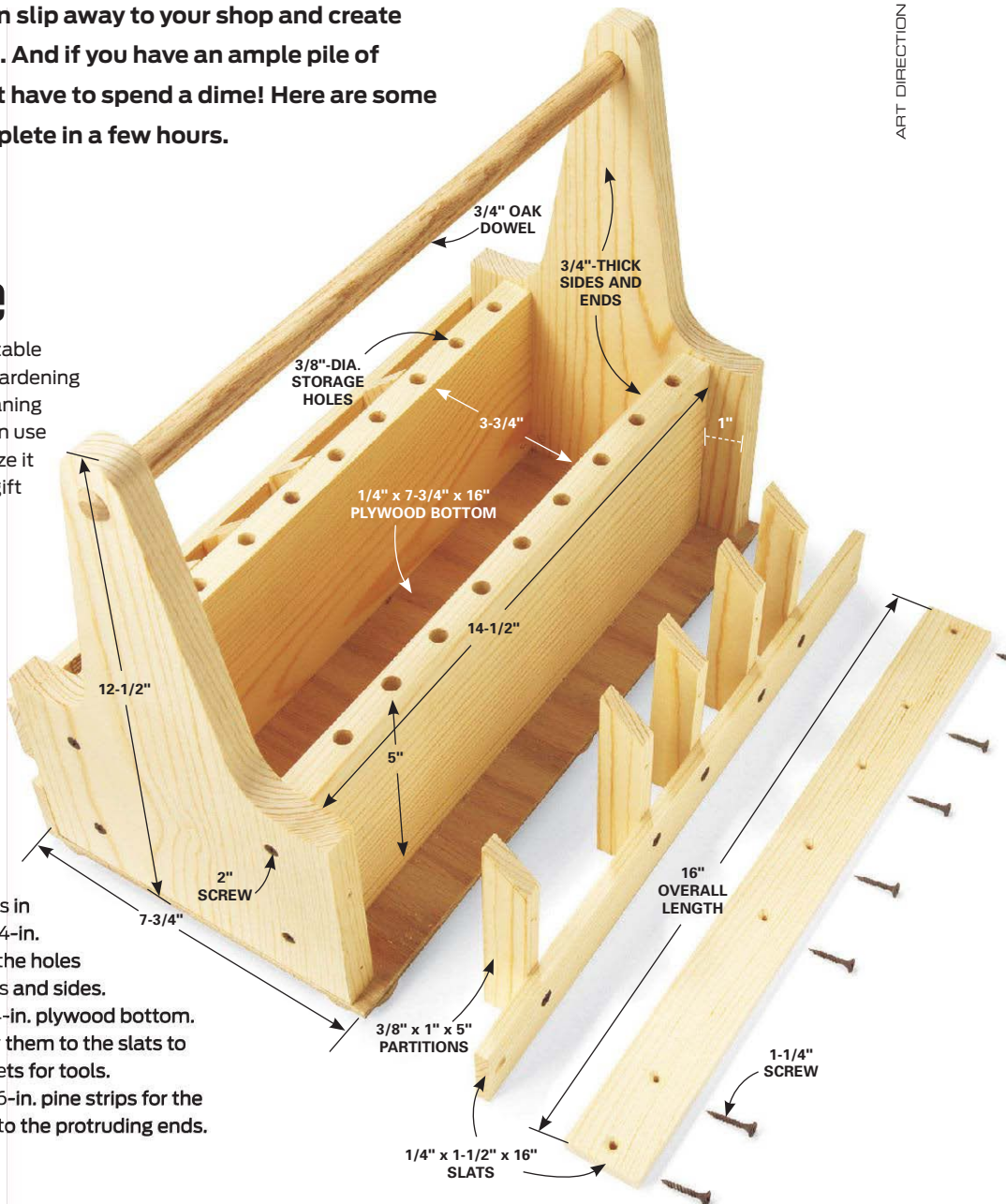
feedback@familyhandyman.com

'Tis the season for woodworkers. While others are slogging through crowded malls and spending hundreds on manufactured gifts, you can slip away to your shop and create handmade heirlooms. And if you have an ample pile of scrapwood, you won't have to spend a dime! Here are some projects you can complete in a few hours.

Tool Tote

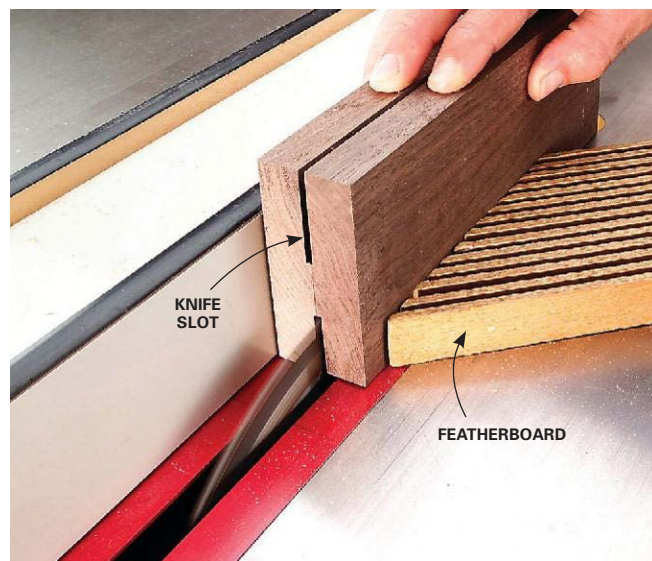
It's not just for tools: A portable organizer can be used for gardening gear, craft materials or cleaning supplies. To build it, you can use our dimensions or customize it to suit the person on your gift list. We cut our slats and partitions from 2x4 scraps with a table saw. Then we glued the partitions in place before adding the slats.

- Drill the 3/8-in. storage holes in the top edges of the sides before assembly.
- Screw together the sides and ends with the ends protruding 1 in. beyond the sides. Drill holes in the top of the ends for a 3/4-in. dowel handle and tap it in the holes before assembling the ends and sides.
- Cut and screw on the 1/4-in. plywood bottom.
- Cut partitions and screw them to the slats to create custom-width pockets for tools.
- Saw 1/4-in. x 1-1/2-in. x 16-in. pine strips for the side slats and screw them to the protruding ends.



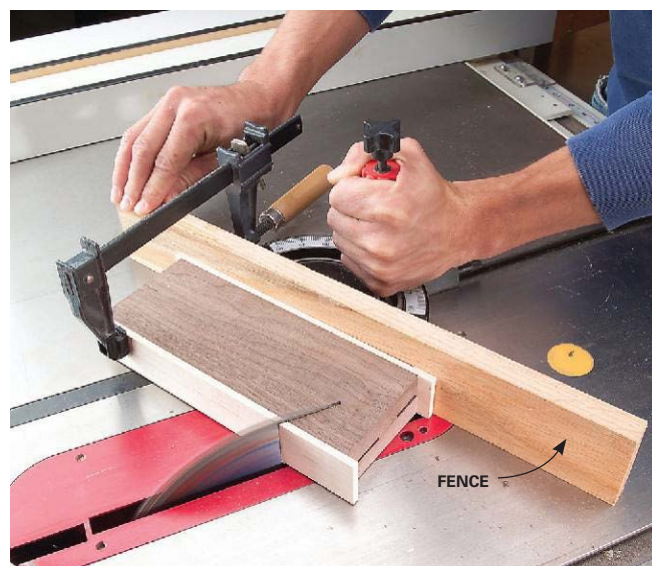
Space-Saving Knife Rack

Most people use one or two knives more often than all their others combined. So it makes sense to keep those favorite knives handy with a small block that doesn't take up much counter space. Ours is made from walnut and maple. Start by gluing two 9-in.-long 1x4s together. (To hold four knives, just glue three 1x4s together.) **Photos 1 – 3** show the rest!



1 CUT KNIFE SLOTS

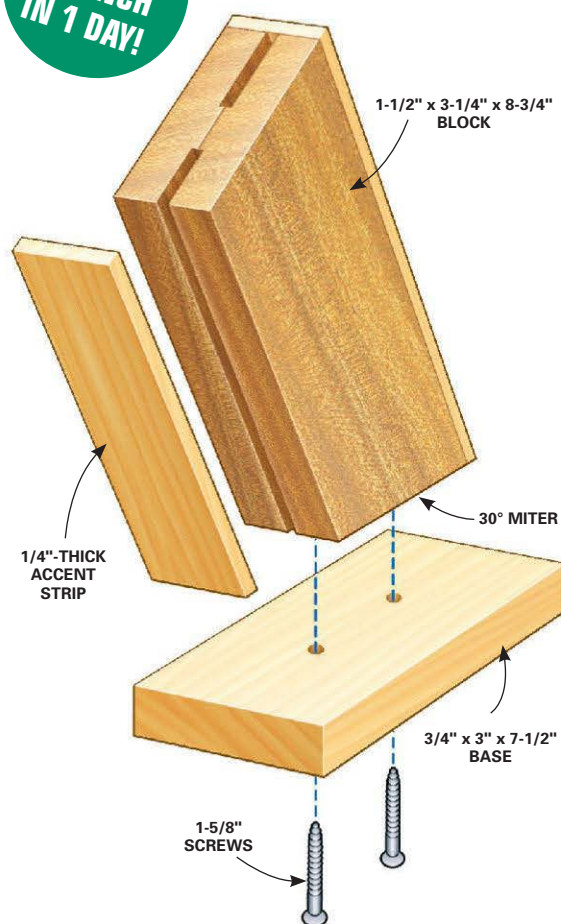
Set your table saw blade height to match the width of the knife blades, plus 1/8 in. Then cut slots in the block. A featherboard helps to keep the block tight against the fence. You have to remove the blade guard for these cuts—be extra careful!



2 CUT THE BLOCK

Glue strips to the block, covering the slots. Then cut a miter on one end of the block and square off the other end. Make these cuts with a miter saw or table saw. We removed the blade guard for photo clarity. Use yours!

**BUILD
A BUNCH
IN 1 DAY!**



3 MOUNT THE BLOCK

Mark the position of the block with masking tape and glue it to the base. Then add screws for extra strength.



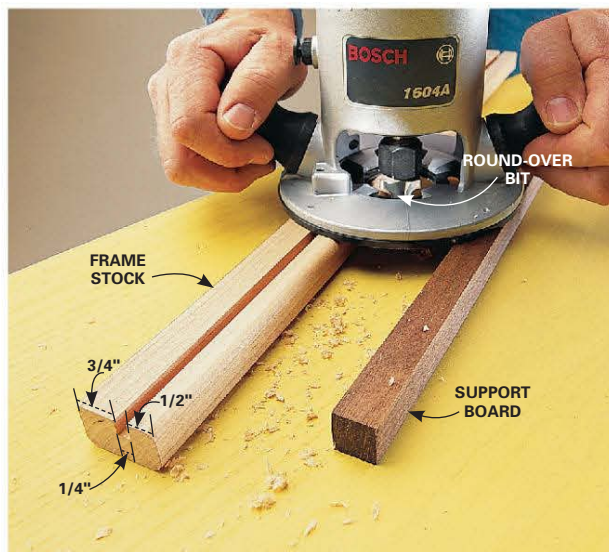
Two-Way Serving Tray

The perfect gift for your spouse? How about breakfast in bed—along with the tray it's served on. This simple folding tray can be used as shown for the royal treatment or, with the legs folded up, as an everyday serving tray. We used cherry wood, dowels and plywood; you can use any wood or combination of woods to build yours.

Begin by cutting the four 3/4-in. x 1-1/2-in. frame parts an inch longer than the final dimensions, then use your table saw or router table to cut a 1/4-in.-wide x 3/8-in.-deep groove exactly 3/4 in. away from the bottom edge (see **Figure A**, p. 28). Use a router and 1/4-in. round-over bit (**Photo 1**) to shape all four edges. Use a miter saw to cut the frame pieces to final length with 45-degree angles on both ends. Predrill, glue and nail three of the frame pieces to one another. Slip the 1/4-in. plywood into the groove (don't glue it), and install the final side of the tray (**Photo 2**).

Build the two leg assemblies from 3/4 x 3/4-in. strips of wood and 3/8-in. dowels, as shown in **Figure A**. Round both ends of the legs to a

GREAT FOR
VALENTINE'S
DAY, TOO!



1 PREP THE FRAME PARTS

Groove and rout the frame pieces. First cut the 1/4-in. x 3/8-in. groove in the frame stock, then round over all four edges. The support board helps keep the router base flat.



2 FRAME THE TRAY

Glue or epoxy the mitered corners together, then add nails or brads for extra strength. Don't glue the 1/4-in. plywood bottom to the sides—it should “float” in the grooves.

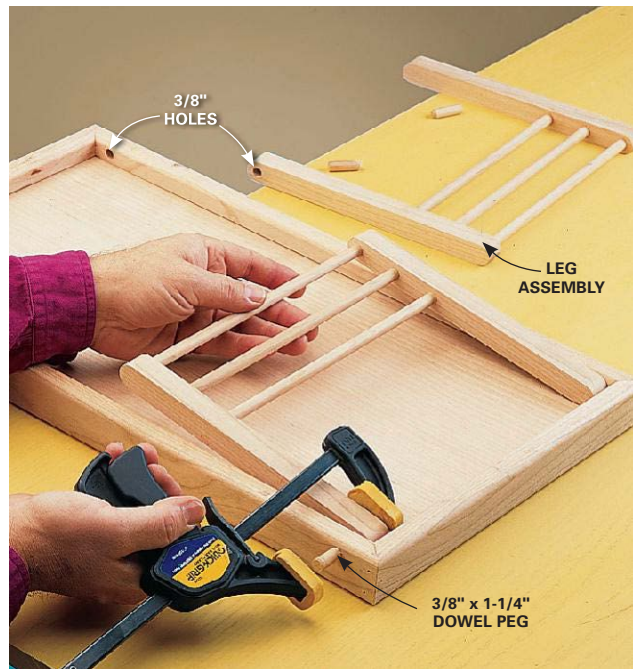
Cutting List

KEY	QTY.	SIZE	NAME
A	2	3/4" x 1-1/2" x 23-1/8"	Tray front/back
B	2	3/4" x 1-1/2" x 13"	Tray sides
C	1	1/4" x 12" x 22-1/8"	Plywood bottom
D	4	3/4" x 3/4" x 9-1/2"	Tray legs
E	6	3/8" x 10-3/8" dowels	Leg spacers
F	4	3/8" x 1-1/4" dowels	Leg swivels
G	4	3/8" x 2-5/8" dowels	Handle uprights
H	2	1" x 7" dowel	Handles
J	1	3/4" x 3/4" x 2-1/4"	Leg-lock block

3/8-in. radius. Drill 3/8-in. holes halfway through the top, outside surface of each leg and completely through both ends of the tray. Use a clamp (**Photo 3**) to install the 1-1/4-in. length of 3/8-in. dowel for connecting the legs and tray, then use a 3d finish nail to secure the dowel to the frame portion of the tray.

To create the leg-lock block (J), turn the tray upside down and measure the distance between the bottom dowels on each leg when the legs are folded; make the ears of the lock 1/8 in. wider than this measurement. Secure the block with carpenter's glue and clamps.

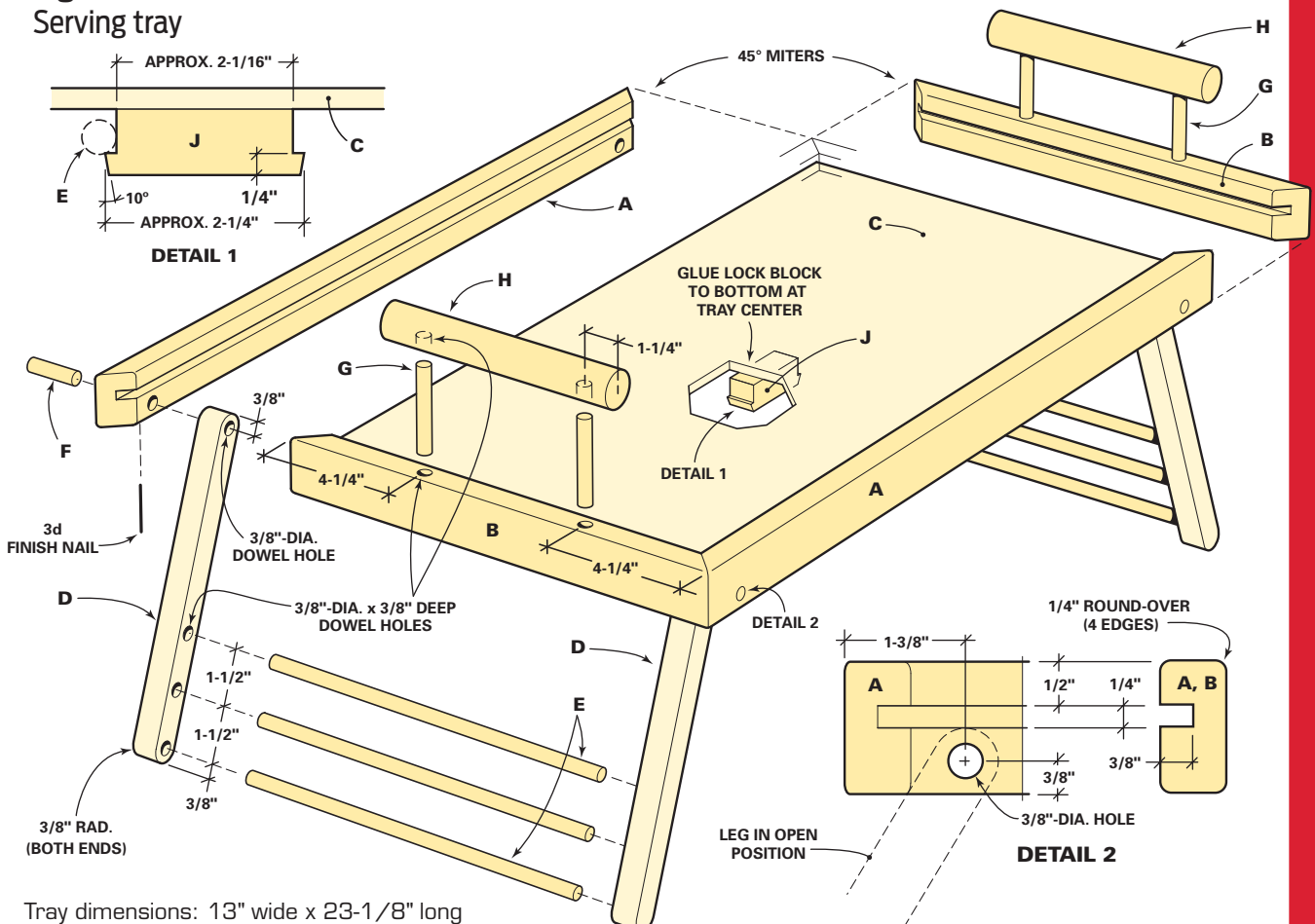
Finish all components with three coats of tung oil, letting it dry then lightly sanding between coats. Now you're really ready to start cooking!



3 ADD THE LEGS

Build and install the leg assemblies. Use a clamp to squeeze the dowels that join the legs to the tray into place, then secure the dowel to the tray frame using a 3d finish nail.

Figure A
Serving tray



Tray dimensions: 13" wide x 23-1/8" long

Clever Keepsake Boxes

If you have thick blocks of wood (such as 4x4s) lying around, you're ready to make handsome boxes with your band saw. If not, you can glue up thinner boards to make blocks; contrasting woods yield a nice two-tone effect. We started with a 3 x 4 x 18-in. block and made three boxes. Here's how:



- For smooth cuts and nearly invisible glue joints later, install a fine band saw blade (10 teeth per inch or more).

- Set your band saw fence 3/8 in. from the blade and slice off both sides.

- Flip the block on its side and cut another 3/8-in.-thick part for the lid.

- Remove the fence, sketch the cutout for the inside of the box on the side of the block and cut it freehand.

- Sand the cutout, then glue the sides back onto the block. Round the box and lid edges with a file, sand the parts and add a lid handle if you like.

You can make more boxes and lid handles from the leftover cutout.



JUST FOUR CUTS

Make these cuts and you'll have all the box parts in minutes.

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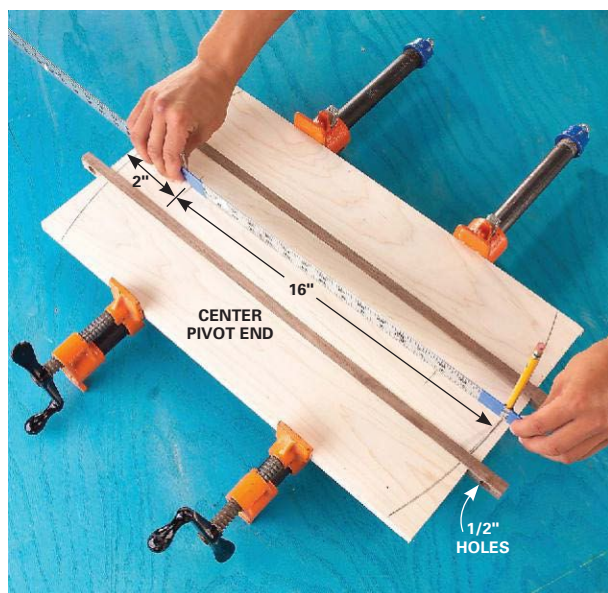
Cutting Board & Serving Tray

Use it as a cutting board or a serving tray for breads or cheeses. Either way, it's an elegant piece that's surprisingly simple to build using scrap wood. The size and design are up to you. Here are the parts we used:

- Three 3-1/2-in. x 20-in. maple boards (3/4 in. thick).
- Two 23-1/2-in. x 1/2-in. x 3/4-in. walnut strips.
- Two 5-in. x 1/2-in. dowels (handles).



MAKE IT
ANY SIZE
YOU LIKE!



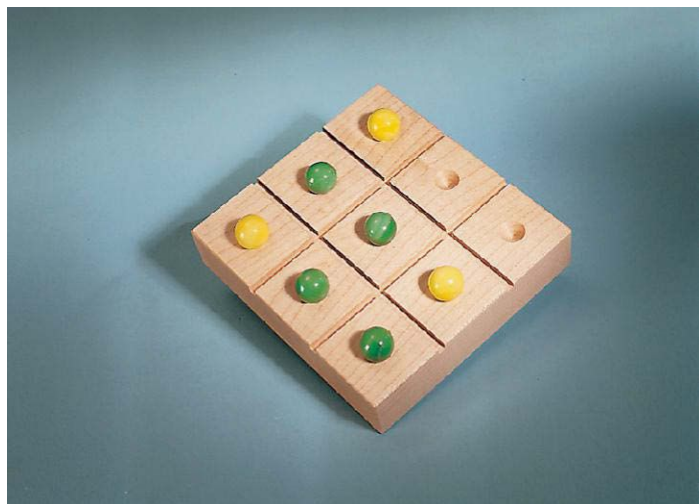
1 MARK THE CURVES

Clamp the parts together (without glue!) and mark the curves as shown using a yardstick. Unclamp the boards and cut the curves using a jigsaw. Then sand the cut ends.



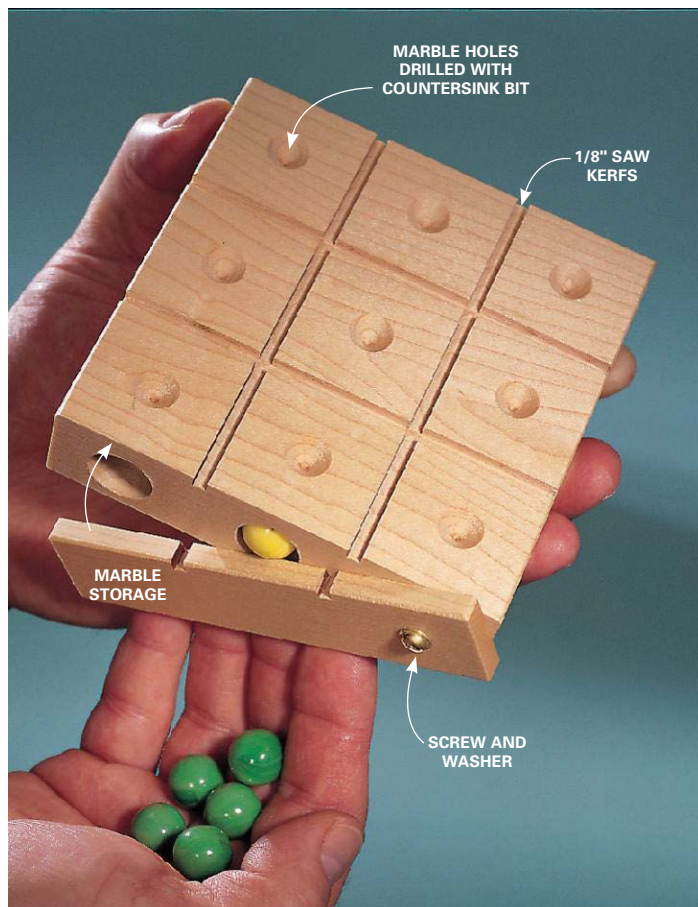
2 GLUE IT UP

Apply exterior glue (such as Titebond III) and clamp the parts together. A snug fit is typically enough to secure the handles. If not, use only a tiny dab of glue. Sand the entire assembly and apply a food-safe finish such as mineral oil or butcher block finish.



Take-Along Tic-Tac-Toe Board

Even in this age of techno-toys, kids still like a game they can play with anyone, anywhere. This version is made from a 1-in.-thick block (4-3/8 in. x 4-3/8 in.), but other dimensions will work. The door is a 1/8-in.-thick strip, fastened with a brass screw and washer. Make a dozen of them in one afternoon!



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3 REASONS TO LOVE EURO HINGES

Euro hinges—also called “cup hinges” or “concealed hinges”—look complicated. But they’re actually much easier to install than traditional hinges.



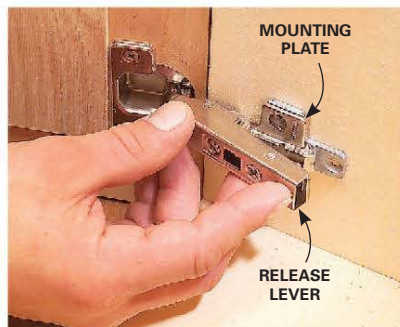
EASY TO INSTALL

Traditional hinges are fussy to install. And if you get it wrong, you’re stuck. With Euro hinges, you just bore one large hole and drive some screws. Get that hole in the right spot and the rest is goof-proof.



EASY TO ADJUST

With traditional hinges, you can spend hours getting the fit right: planing or sanding the door, shimming or moving hinges... With Euro hinges, you can move a door in and out, up and down, or side to side just by turning screws.



INSTANT ON AND OFF

With traditional hinges, you have to remove screws or hinge pins to remove doors. Euro hinges like this one just snap onto mounting plates so you can instantly check the door’s fit. Then pull a release lever to remove the door for finishing.

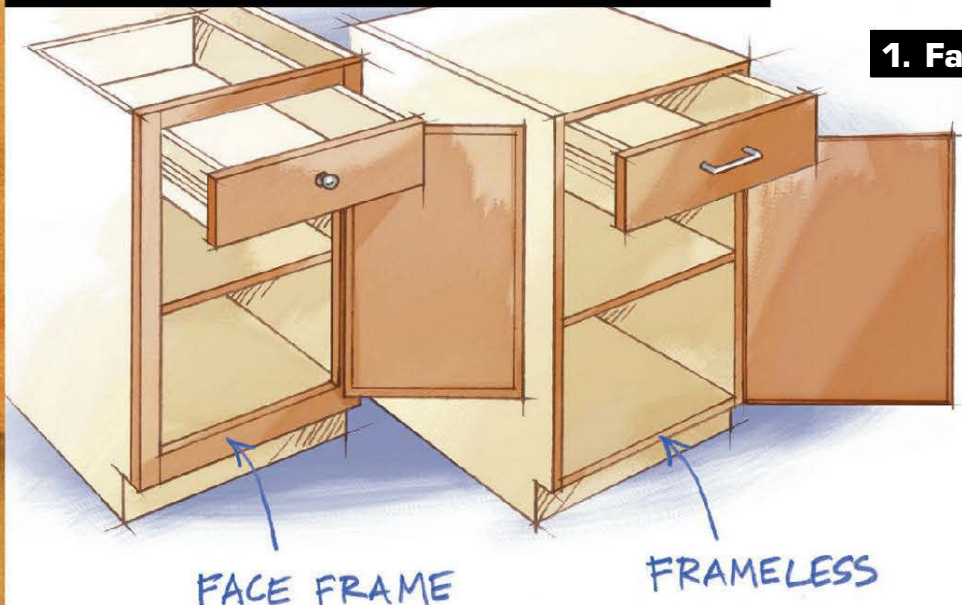
by Tom Caspar
feedback@familyhandyman.com

CHOOSING THE Right Hinge

You need to answer 4 basic questions

Most Euro hinges cost about \$2 each, though some specialty hinges cost \$10 or more. To get hinges that suit your situation, you need to answer these questions:

1. Face frame or not?



A frameless or "Euro-style" cabinet is basically a box. A face frame cabinet has a frame surrounding the opening of the box.



Hinges like this one mount onto the face frame, typically with a single screw.



Hinges like this one attach to a mounting plate that's screwed to the cabinet. They're made for frameless cabinets but can be used with face frame cabinets if you buy special mounting brackets.

2. Inset or overlay doors?

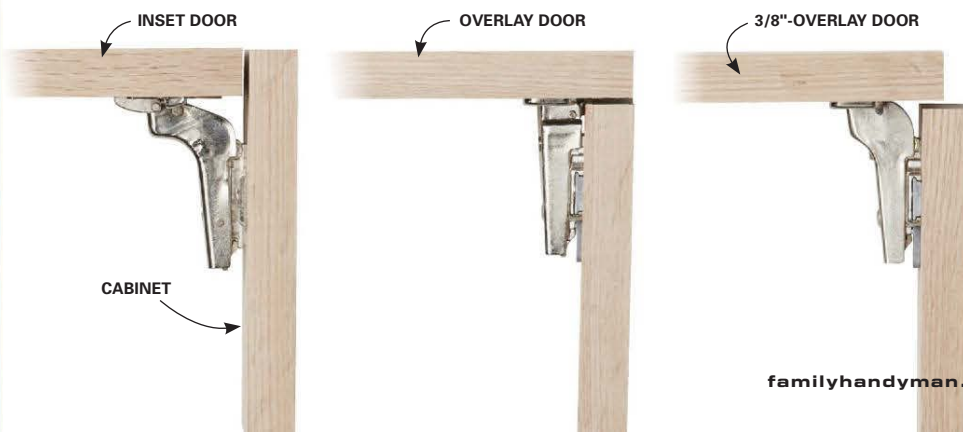
Inset doors are flush with the front of the cabinet; overlay doors cover all or part of the front. Some doors, called "partial inset" (not shown) are a combination of both. We show frameless cabinets here, but the same terms apply to face frame cabinets.

3. How much overlay?

If you choose overlay doors, you'll have to decide how much. With some frameless hinges, the amount of overlay is determined by the thickness of the mounting plate; a thicker mounting plate results in a lesser overlay.

4. How far do you want your doors to open?

The simplest, smallest and least expensive hinges usually open to 105 or 110 degrees. If you want your doors to open farther for easier access inside the cabinet, the hinges will be bulkier and more expensive.



INSTALLING Euro hinges

No matter what type of hinge you choose, the hinges are mounted on the door first and then the cabinet. You'll be drilling two sets of holes in the door. First, there's the "cup hole," the large hole that the hinge drops into. This hole is 35 mm (1-3/8 in.) diameter for all Euro hinges. You'll need a Forstner bit to drill it (\$20 at home centers or online).

Second, you'll drill two pilot holes for the screws that fasten the hinge to the door. The instructions will tell you what bit to use.

Some Euro hinges come with a full-size template for marking both sets of holes, but many hinges don't. In that case, the instructions will include a scale drawing in millimeters (not inches) and you'll have to make a template yourself.

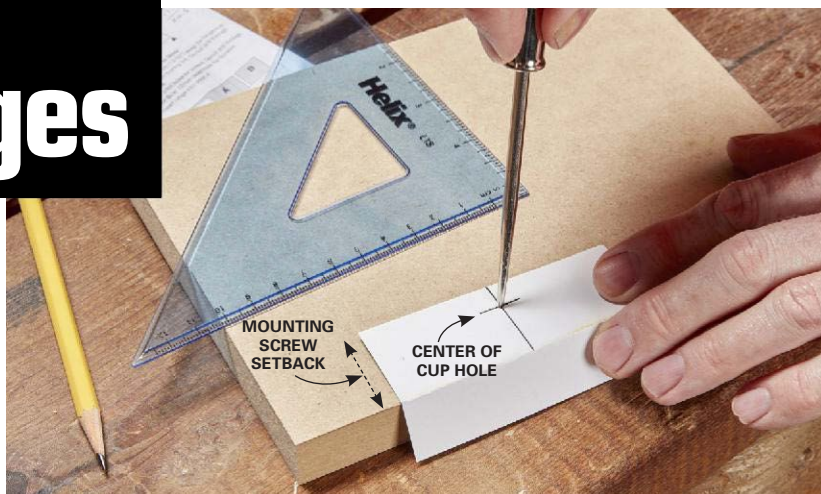
Make the template from an old business card. Fold the card around the edge of a scrap of wood (**Photo 1**). Measuring from the fold, draw a line indicating the mounting screw locations. Cut the card along this line.

Draw a centerline on the card, then measure the distance from the folded edge to the center of the cup hole. Poke a hole here using an awl.

Install the hinge on the door

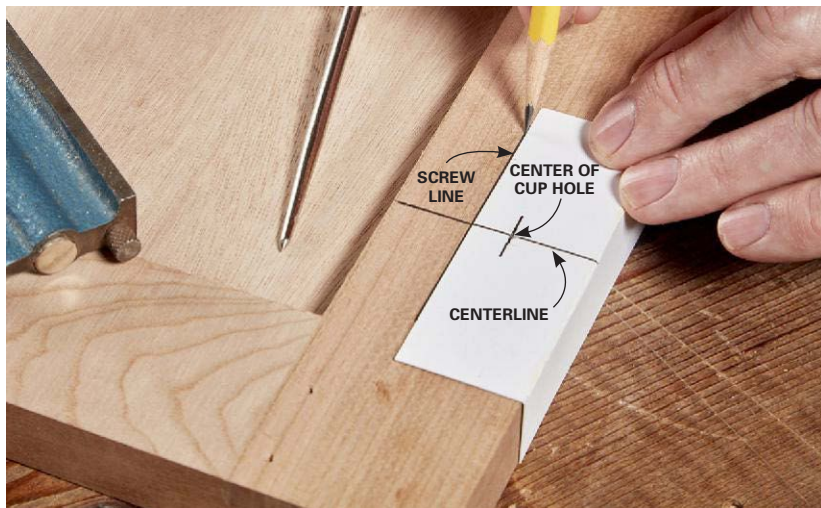
Determine the location of the hinges on the door. The distance from the top or bottom of the door to the hinge's centerline is usually about 2 in. to 3 in. Draw centerlines for the hinges using a square or a wood scrap.

Align the template with the centerline, then trace the edge of the



1 MAKE A TEMPLATE

Fold a business card around a scrap of wood, then cut the card to match the setback of the hinge's mounting screws. Poke a hole in the card to mark the distance to the center of the hinge's cup hole.



2 MARK THE DOOR

Align the template with a centerline indicating where the hinge will go. Trace the edge of the card to mark the mounting screw line, then use an awl to mark the center of the cup hole.



3 DRILL THE CUP HOLE

Using a 35-mm (1-3/8-in.) Forstner bit, drill until the top of the bit is about level with the wood. Close is good enough.

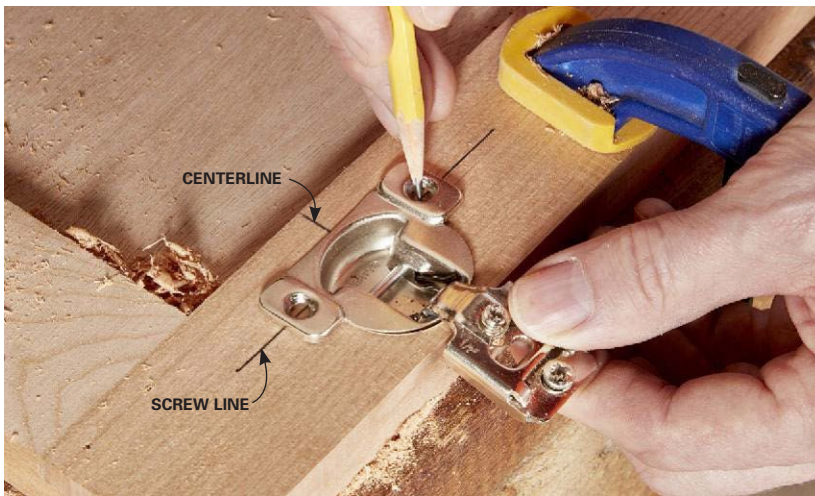
MEET THE EXPERT

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



SHOP ONLINE

Home centers carry a limited selection of Euro hinges, so it's smart to browse online as well. Sources like rockler.com and www.hardware.com carry hinges with features like soft-close or cover plates to hide screws. They also have experts available to help you choose the right hinge system.



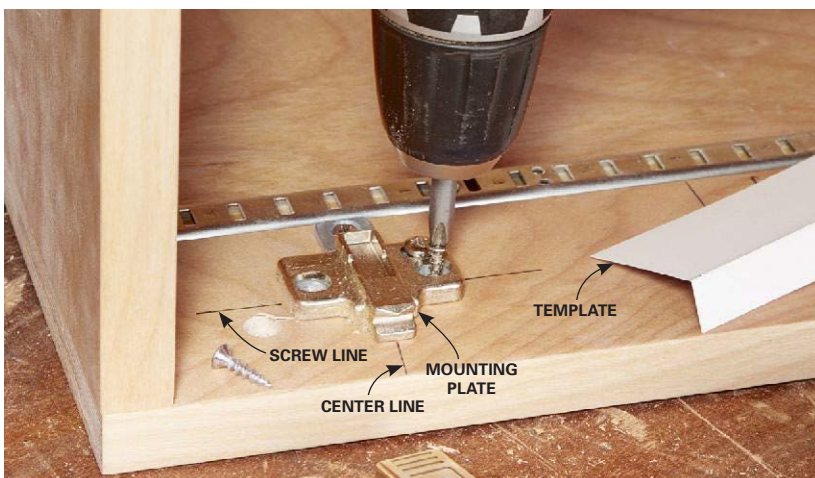
4 MARK SCREW HOLES

Place the hinge in the cup hole, then mark the locations of the mounting screws. Drill pilot holes and install the hinge.



5 FACE FRAME: FASTEN THE HINGE

For a face-frame cabinet, simply position the door and screw the hinge to the face frame.



6 FRAMELESS: INSTALL A MOUNTING PLATE

For a cabinet without a face frame, make a second template to mark the screw line. Fasten the plate to the cabinet, then snap the door hinge onto the plate.

card (Photo 2). Use the awl to mark the center of the cup hole.

Drill the cup holes (Photo 3). These holes must be at least 1/2 in. deep. Most Forstner bits are about 1/2 in. thick, so it's easy to use the bit itself to judge how deep you've drilled.

Place the hinge in the cup hole, then mark the hinge's mounting screw holes (Photo 4). Drill pilot holes (making sure you don't drill through the door!), then fasten the hinge to the door.

Install the hinge on the cabinet

To install hinges on face-frame cabinets, turn your cabinet on its side, then place the door alongside it. Rest the protruding parts of the hinges on the face frame. Center the door.

Make sure the tabs on the hinges are butted up to the face frame, then use an awl to mark the centers of the mounting screw pilot holes. Drill the holes and install the screws (Photo 5). Stand up the cabinet and fine-tune the door's position by turning the hinge's adjusting screws.

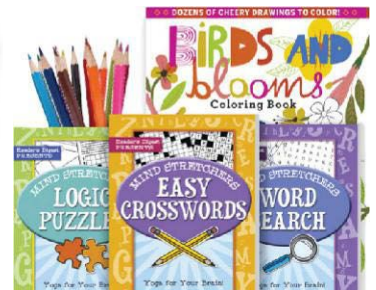
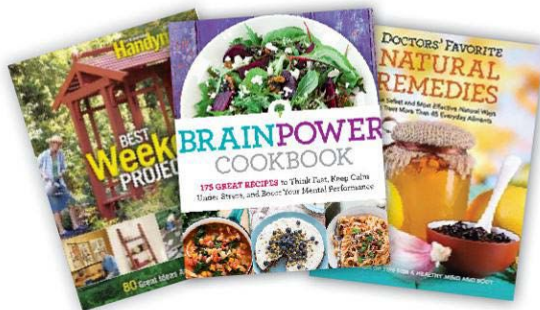
Hinges for frameless cabinets have a separate mounting plate. The instructions will show you the correct distance from the front edge of the cabinet to the screw line. Draw screw lines inside the cabinet.

Attach the mounting plates to the hinges. Place the cabinet on its side, then butt the door to the cabinet. Center the door side-to-side. Align the mounting plate's holes with the setback lines. Mark the centers of the holes.

Pull the door away from the cabinet and remove the mounting plates. Drill pilot holes, then fasten the mounting plates to the cabinet (Photo 6). Snap the hinges onto the plates, then stand up the cabinet and adjust the hinges as needed.

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TIPS FOR Euro hinges



Mark your template

Store-bought templates like this one include lots of holes to accommodate various hinges. It's all too easy to use the wrong holes. To prevent that, mark the holes you need with paint or a marker.

Go metric

In the world of Euro hinges, everything is metric. You'll need a metric ruler to make your own marking template, for example. For about a buck, you can pick up a metric ruler at any store that carries school supplies.



Drill shallow starter holes

The tiny screws that come with Euro hinges often strip out in softwoods or plywood. So instead of drilling a full-depth pilot hole for screws, just create a divot to position the screw using a drill bit, awl or even a nail.

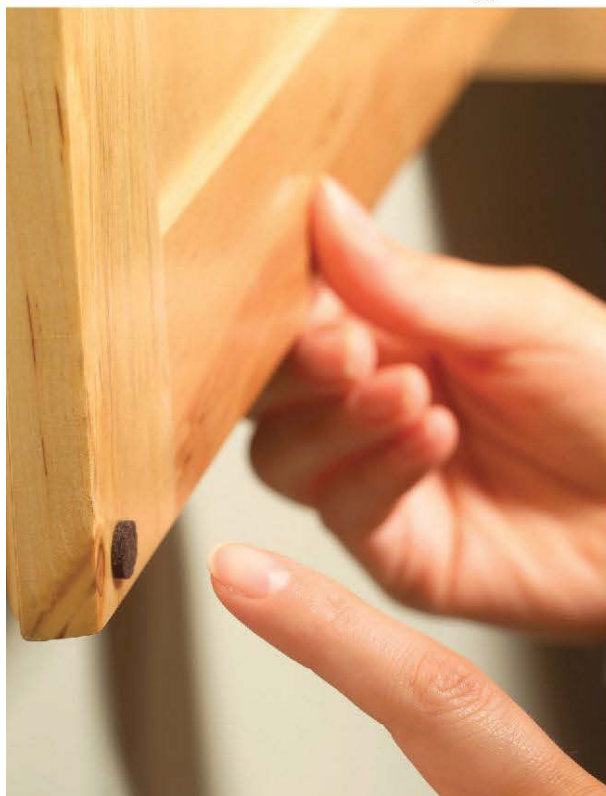
A corded drill is best

You can bore cup holes with a cordless drill, but that strains the drill and drains the battery fast. A corded drill does the job faster and better.



Buy before you build

Having your hinges on hand makes the planning and building details much easier and prevents major mistakes.

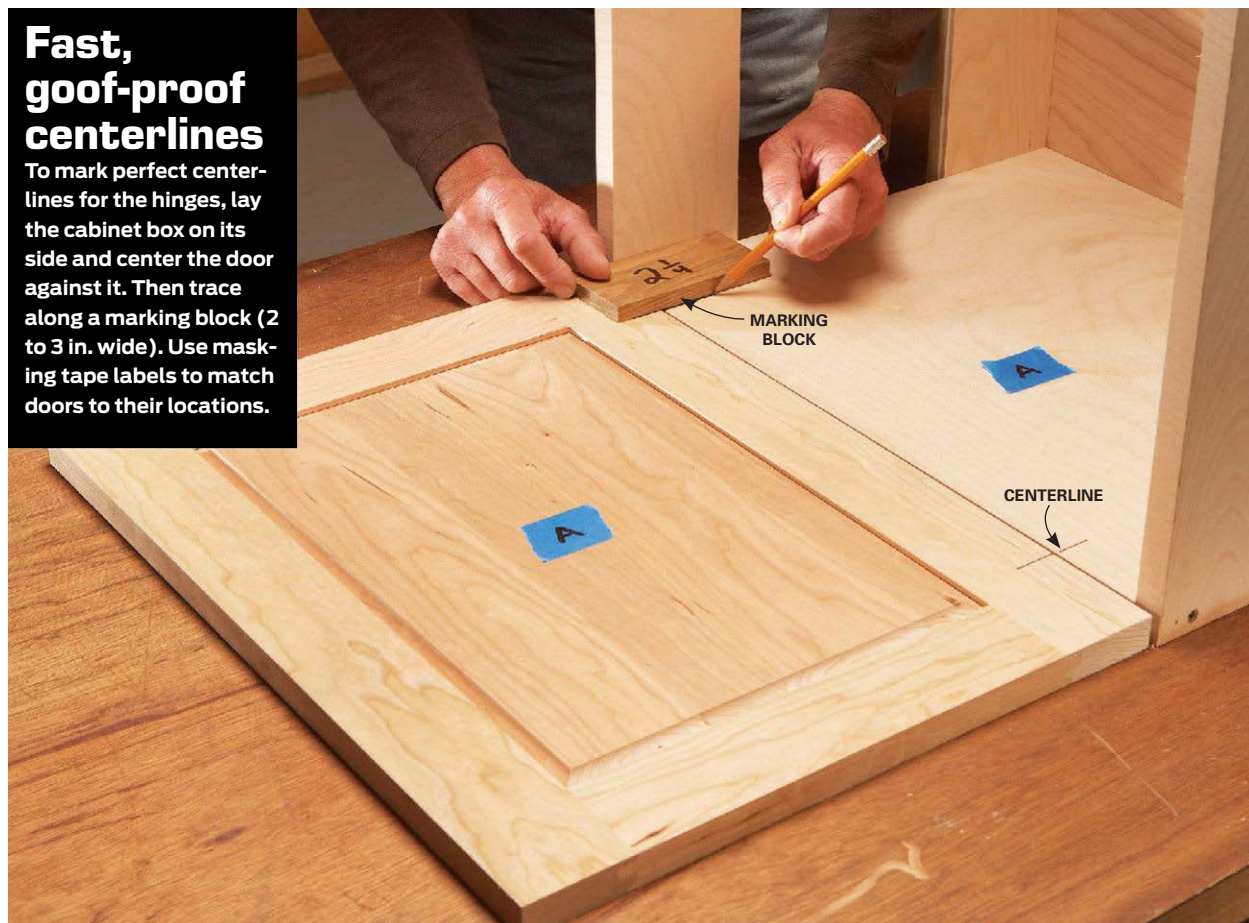


Don't forget the bumpers

Most Euro hinges are self-closing, which means doors slam hard and loud. Pick up sheets of adhesive-backed cabinet bumpers at any home center for a couple bucks.

Fast, goof-proof centerlines

To mark perfect centerlines for the hinges, lay the cabinet box on its side and center the door against it. Then trace along a marking block (2 to 3 in. wide). Use masking tape labels to match doors to their locations.



Leave adjustments for last

Euro hinges allow for absolutely perfect alignment. But don't bother with that until cabinets are installed. Fussing with adjustments before your cabinets are squared up and level is a waste of time.



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3

SOLUTIONS FOR A POPCORN CEILING

**The best method depends
on your situation and your skills**

by Jason White

feedback@familyhandyman.com

Millions of homes have “popcorn” texture applied to ceilings. And while it does a pretty decent job of masking small imperfections in old plaster and drywall, this texture is a little out of fashion and notorious for trapping dust and cobwebs. It’s also tough to make a good-looking repair with it. There’s good news, however: You’ve got some options for dealing with an old popcorn ceiling.

1. Cover it with drywall

It's not an easy project, but there are some good reasons to consider installing drywall directly over your popcorn ceiling (and some good reasons not to).

Pros:

- **No texture to scrape off.** Scraping, even wet-scraping, is hard, messy work. And if the popcorn texture is painted, it'll be even harder to scrape off.
- **Lower asbestos risk.** Popcorn texture applied before 1980 might contain asbestos, which poses a lung cancer danger if disturbed and inhaled. Covering the ceiling with drywall minimizes your risk because there's no scraping involved.
- **No repairs to make.** If you have problems like flaking texture, stains, cracks or holes in your ceiling, you can skip trying to fix all those things by covering them up. Hanging new drywall over the old ceiling gives you a fresh start!

Cons:

- **It's a big job.** Drywall is heavy, and lugging full sheets around—especially up and down stairs—is hard work. Plus, most of the work you'll be doing is overhead, so be ready for a sore neck and shoulders. Applying tape and joint compound to seams also takes skill and practice to master.
- **It's time consuming.** There's the time needed to hang the drywall, plus the time it takes to apply the tape and joint compound. It can easily take you a week to finish one room.
- **Finishing requires skill.** Screwing the drywall to the ceiling might seem easy enough, but making your seams look good is another story. Applying tape and joint compound is a bit of an art. Remember, this is your ceiling! And ceiling flaws are much more visible than wall flaws.
- **It costs money.** For a 12 x 12-ft. room, your cost will be about \$160 for all the materials, including drywall, joint compound, paint and the rental fee for a drywall lift.



Other key considerations:

- **Do you have the time?** You'll need a week or more to get the drywall hung, the seams taped and several coats of joint compound on and sanded. And it might take you even more time if you're a drywall newbie. Plus, don't forget you'll still have to paint the ceiling when you're done.
- **Tight on space?** Ever try to maneuver a full sheet of drywall up a narrow staircase, around a corner and into a small room? Cutting it into smaller pieces is an option, but that means you'll have more seams to tape and finish.
- **Existing crown molding?** If you have crown molding on the ceiling, you'll have to remove it before installing new drywall and reinstall it afterward. That's not a big deal, but it's one more thing you'll have to do. The good news about crown molding, however, is that you won't have to mud and tape along the perimeter of the room because the crown molding will cover the seams between the ceiling and the walls.

HIRE A PRO?

Covering a ceiling is a big job, and taping drywall—especially on a ceiling—takes skill. So even if you think you can do it yourself, it's a good idea to get a bid from a pro to know how much money your hard work will save. Costs vary widely by region, but expect to pay \$600 to \$1,800 for a 12 x 12-ft. room.



2. Cover it with wood

Installing tongue-and-groove (T&G) planks on a ceiling is another good way to hide popcorn texture. Most of what you'll find in home centers and lumberyards is 1x6 or 1x8 pine or spruce, although you can special-order other kinds. And if you're working solo, it's a lot easier to handle T&G boards than 4 x 8-ft. or 4 x 12-ft. sheets of drywall. To see how to install T&G boards on a ceiling, visit familyhandyman.com and search for "tongue and groove."

Pros:

- **It's easier to install than drywall.** Since T&G planks are much smaller than 8-ft. or 12-ft. sheets of drywall, you'll have an easier time installing them, especially if you're working alone. And because you'll be covering the old ceiling, you won't have to worry about asbestos or patching and painting the drywall or plaster.

Cons:

- **Cost.** Wood isn't cheap. A single 1x8 pine T&G plank costs about \$7. Covering a 12 x 12-ft. ceiling will cost at least \$175.
- **Tools.** Cutting and installing T&G boards requires several power tools (miter saw, router, pneumatic finish nailer and a compressor). Altogether, those tools will cost at least \$400.



3. Scrape it off

Scraping off popcorn texture is a lot of work, but totally doable and worth the effort if your ceiling is in decent shape and you're not afraid to get dirty.

Pros:

- **Less work than covering with wood or drywall.** However, if the ceiling has been painted, water won't penetrate easily and you might have to dry-scrape it first—a tough and dusty job.
- **Wet popcorn often comes off easily.** Plus, if you mist the popcorn texture with water and scrape it off while it's still wet, you'll practically eliminate airborne dust (see p. 52).

Cons:

- **Risk of asbestos exposure.** Any popcorn texture applied to a ceiling before 1980 might have asbestos in it. Scraping releases asbestos fibers into the air, which can be inhaled and cause lung cancer.
- **Repairs.** After scraping, you might be left with lots of gouges, dings, loose drywall tape and other imperfections that you'll have to repair after you remove all the texture. And as with taping and mudding drywall, it takes time and skill to fix them.



KNOCKDOWN TEXTURE: A SLICK SOLUTION FOR AN IMPERFECT FINISH

Whether you cover your ceiling with new drywall or scrape off the texture, you're going to be left with some mudding and taping to do. And unless you're really good at it, getting a smooth ceiling will be slow or difficult or both. Instead, considering applying "knockdown texture." You basically spray texture from a hopper onto the bare drywall and knock down the high spots with a big squeegee. Your ceiling won't be perfectly smooth, but the texture hides small imperfections and looks more up to date than popcorn.

For step-by-step instructions on how to install drywall over a popcorn ceiling or how to apply knockdown texture, visit familyhandyman.com and search for "popcorn" and "knockdown texture."



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REMOVE CEILING TEXTURE

**11 TIPS FOR SCRAPING OFF
POPCORN FASTER AND EASIER**



by Jason White

feedback@familyhandyman.com

Popcorn ceilings were all the rage back in the '60s and '70s. Applying the texture to drywall and plaster ceilings was a quick and easy way to hide imperfections and didn't require any painting afterward. But the rough texture catches lots of dust and cobwebs, and it can be a real pain to match if you have cracks or holes in need of patching.

Removing popcorn texture from a ceiling is a messy chore but worth the effort if the substrate underneath is in good shape. Here are some tips to take some of the pain out of scraping the popcorn texture off your ceiling.

Do a scrape test

Before you go to all the trouble of prepping the room, try scraping a small area. Try it dry first, then dampen the texture with water (see p. 52) and try again. Some texture comes off easily without water, but in most cases wetting is best. If the water doesn't soak in and soften the texture, the ceiling has probably been painted or paint was added to the texture mix. In that case, wetting the ceiling may not help, and you'll have to decide whether you want to tackle a really tough scraping job or choose another way to hide your popcorn ceiling (see p. 46).

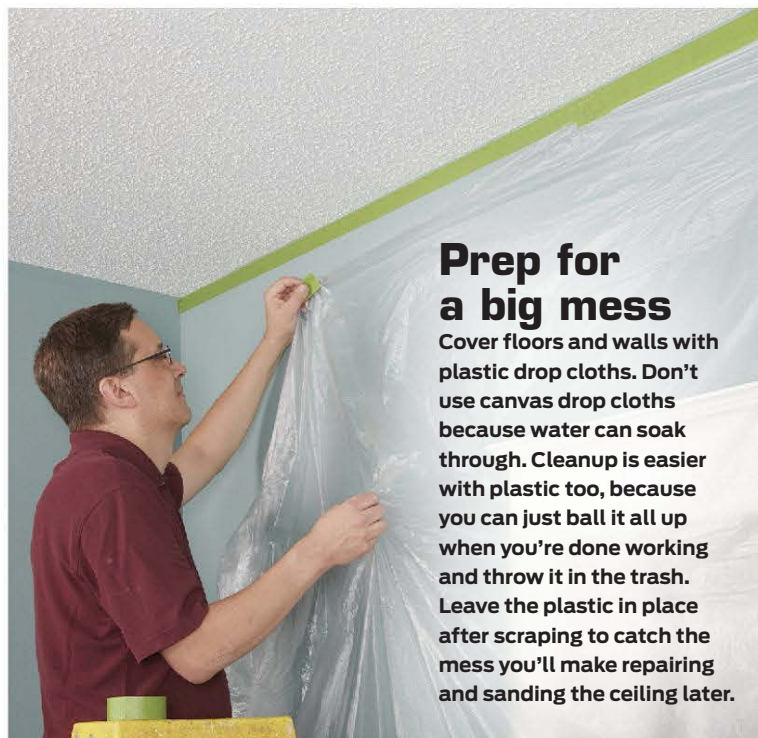


TEST FOR ASBESTOS!

Any popcorn ceiling installed before 1980 might contain asbestos—a known cause of lung cancer. Before trying to scrape off any popcorn texture, contact your local health department and ask about getting a sample tested. If the test comes back positive, cover the popcorn with new drywall or tongue-and-groove planks (see p. 48), or hire an asbestos abatement contractor to remove the popcorn.

Prep for a big mess

Cover floors and walls with plastic drop cloths. Don't use canvas drop cloths because water can soak through. Cleanup is easier with plastic too, because you can just ball it all up when you're done working and throw it in the trash. Leave the plastic in place after scraping to catch the mess you'll make repairing and sanding the ceiling later.



Get the furniture out

If possible, remove all furniture from the room you'll be working in. Scraping popcorn is messy work, and you won't want furniture in your way every time you move the ladder around. If moving everything out of the room isn't possible, cluster it and cover it with drop cloths.

Remove ceiling fixtures and fans

You might think it's easier to leave light fixtures and ceiling fans in place, but they'll just be in your way and get covered with wet popcorn. Plus, you don't want to accidentally spray water into an electrical fixture.



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Protect can lights from water spray

If you have recessed "can" lights, stuff newspaper or rosin paper inside them to keep them dry. Also, make sure the power to those fixtures is turned off at the circuit breaker panel or fuse box.



Wet it with a pump sprayer

For easier scraping and practically no dust, use a garden pump sprayer to mist the ceiling and let it soak in for about 15 minutes before scraping. Only give it a light misting—too much water could damage the dry-wall or loosen the joint tape. If the texture hasn't softened after 15 minutes or so, spray it again and wait another 10 to 15 minutes.

If the texture still hasn't softened, it might be painted, or paint might have been mixed into the texture before application. In either case, water won't easily penetrate. If the texture is painted, you might be able to dry-scrape it first to expose some of the unpainted texture and follow up with wet scraping. If the texture has paint mixed in, you might have to dry-scrape the whole ceiling or cover it up with drywall or T&G boards (see p. 48).



The Most Versatile Tool in the Box.



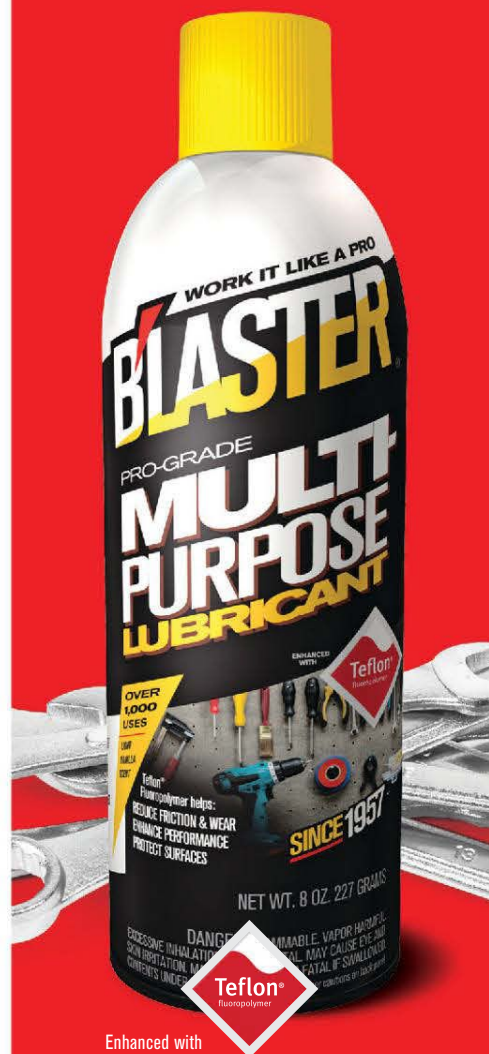
Cover electrical boxes

Shut off the power to any electrical junction boxes in the ceiling and cover them with painter's tape to keep the wiring dry when spraying water on the popcorn. Overlap the sides of the junction box with the tape, and then trim around the perimeter with a utility knife, being careful not to nick the wires.



Work in small sections

Only spray and scrape a small area at a time—about 4 x 4 ft. If you work too large of an area at once, the popcorn might dry before you have time to scrape it off. If that happens, respray the area and wait another 10 to 15 minutes before scraping.



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Get two scrapers

A stiff 6-in. putty knife (\$8) works great for smaller areas, and a 12-in. drywall tapping knife (\$10) helps you get a wide area done faster.



Tame the mess with a mud pan

Use a mud pan—the kind for holding joint compound—to catch the wet popcorn before it hits the floor. That way, you're not tracking it all over the place when you walk and move the ladder around. Also, use the edge of the pan to clean off your scraper when it gets loaded up with wet popcorn. A mud pan costs \$6 to \$20 at home centers.

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Prevent gouging

Round off the corners of your scraper—whether it's a wide putty knife or dry-wall tapping knife—so it won't gouge the ceiling and leave you with dozens of ceiling wounds to repair. Use a file, a sander or an electric grinder to do this.

AFTER SCRAPING ...

Scraping alone won't leave you with a paint-ready ceiling. You'll probably have small dings and gouges to fix. At a minimum, you'll have to sand the ceiling to get it perfectly smooth before painting.

For tips on fixing drywall and getting it ready for paint, visit familyhandyman.com and search for "preparing walls for paint."

Top Ten TIPS

BY TRAVIS LARSON

feedback@familyhandyman.com

Hot Glue— a Wood Shop Staple!

I used to think hot glue guns were just for school projects and holiday decorations. But then I discovered just how useful hot glue can be in the workshop, and now my gun is one of my favorite tools.

Here are some of my favorite hot glue tips. They're mostly for wood-working since that's my passion. But with a little creativity, you'll find uses for a hot glue gun no matter what your hobby.

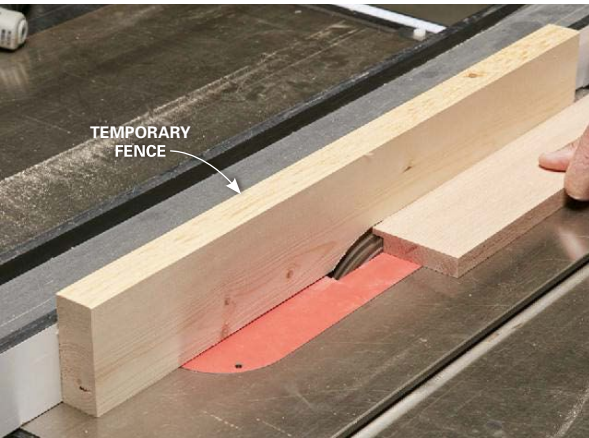
MEET THE EXPERT



Travis Larson, our senior editor, has been a builder, remodeler and woodworker for more than 30 years.



BACK OF
TEMPORARY
FENCE



TEMPORARY
FENCE

1 Fasten a temporary fence

When you're woodworking, you often need a temporary fence or stop on a table saw or router table or other power tools. Clamps aren't always an option because they can get in the way, and you probably don't want to drill holes in the machine's fence or table for bolts or screws. Instead, use a few dollops of hot glue to hold your temporary fence in place.



2 Hot-glue parts together for shaping and sanding

When you have several identical parts to make, hot-glue them together and work on them all at once. This will save you lots of time, and all the pieces will be exactly the same. Don't use too much glue—just a little dab will do ya. Use too much and it can be nearly impossible to separate the parts later. Apply glue near edges so you can easily cut it with a putty knife later.



CUT THE GLUE
AT ONE END



TWIST THE
BOARDS APART

3 Cut and twist to separate

Hot glue is a tenacious fastener. If you just pry apart the wood, you're very likely to tear out some of the grain along with the glue. Instead, cut through the glue blob at one end with a putty knife. Then twist the boards apart to free the other end. That'll break the bond without damaging the wood.



4 Remove leftover glue with a chisel

If possible, place glue dabs where they'll be trimmed off later, such as along edges or on ends. Then you won't have to deal with glue residue. But if you do have glue dabs to remove, shave them off with a sharp chisel held flat to the board. Get as much as you can without gouging the wood, and then sand off the residue. Be sure to get it all—leftover glue won't accept finishes.



5 Glue small parts to a pedestal

Sometimes it's impossible, impractical or downright dangerous to hold small pieces in your hand while you shape or sand them. So just hot-glue them to a temporary pedestal and clamp that in a vise while you work on them.

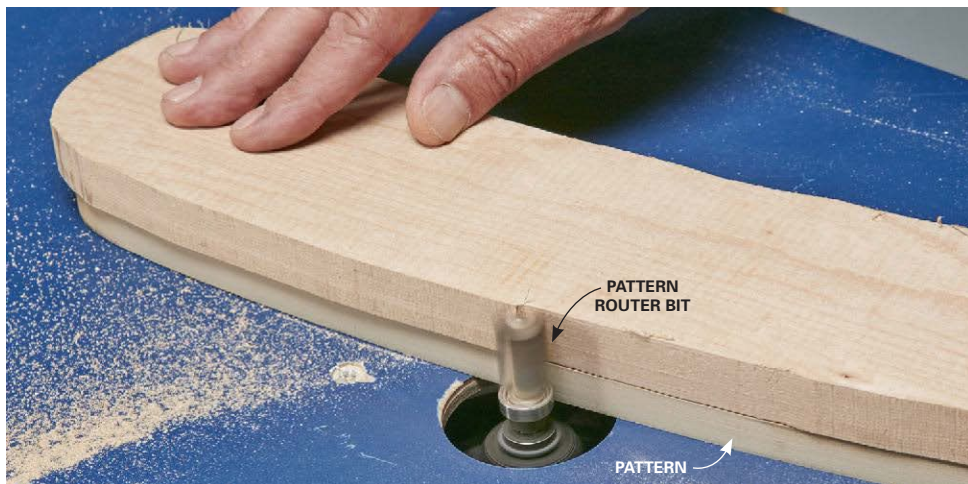


6 Hard-to-clamp repairs call for hot glue

When you need to glue parts that can't be clamped together, hot glue is the answer. Hot glue will set in just a few seconds while you hold the pieces together.

7 Hot glue for pattern routing

The best way to make multiple identical parts is to first create a perfect pattern from 1/2-in. MDF. Then cut out the parts slightly oversize, and final-shape them by using a router and a pattern bit to transfer the shape to the part. The best way to temporarily attach the pattern is with hot glue.





8 Stick stock to your workbench

If you need your workpiece to be stationary but clamps would be in the way, use a few dabs of hot glue to hold it in place.



9 Position drawer fronts

When you're installing new cabinet drawer fronts, apply hot glue, align the fronts perfectly in the cabinet opening and hold them against the drawer box until the glue sets. Then pull out the drawer and fasten them permanently with screws from the back.



10 Secure mirrors or glass in cabinet doors

Swivel clamps are typically used to hold glass in cabinet door rabbets. But hot glue is a quick, rattle-free alternative. Just don't skimp on the glue or the glass may fall out. If you ever need to remove the glass, just heat the back with a heat gun to soften the glue.

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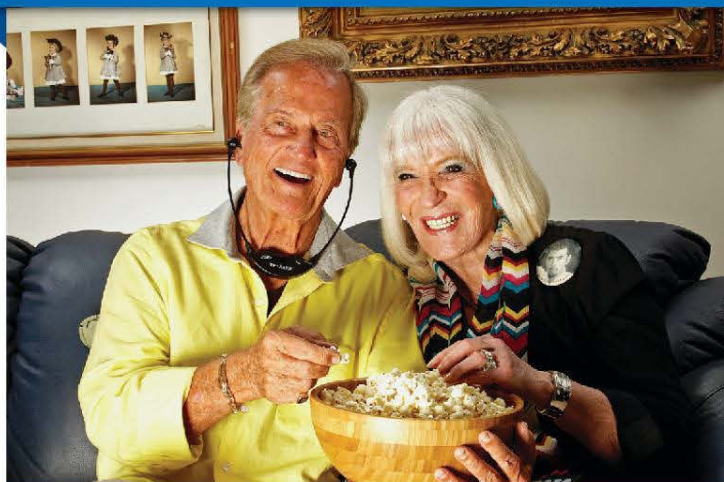
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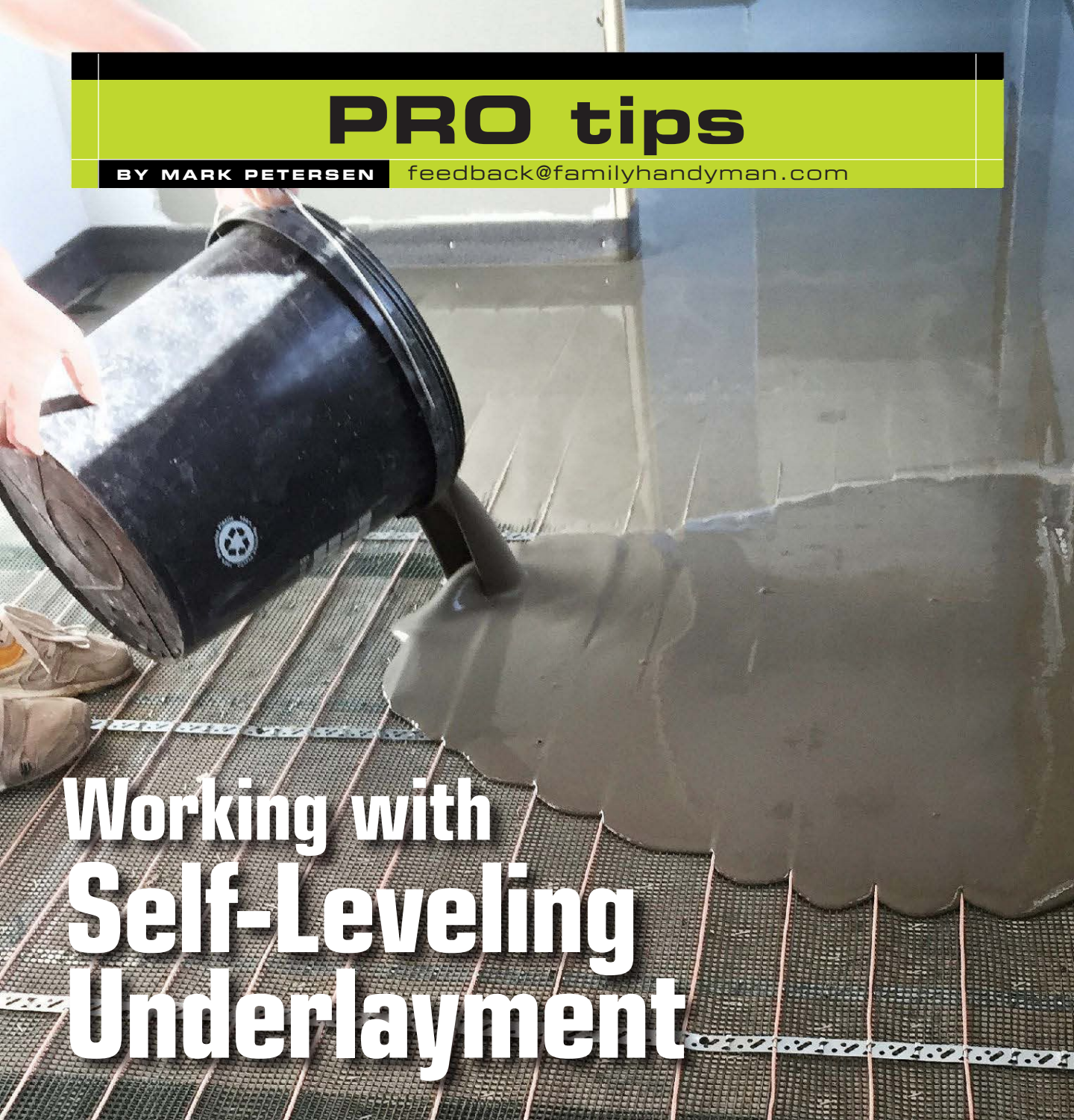
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PRO tips

BY MARK PETERSEN

feedback@familyhandyman.com



Working with Self-Leveling Underlayment

Whether you're installing ceramic tile, laminate planks or carpet, self-leveling underlayment is a great choice for floors that are rough, uneven or out of level. And it's the absolute best choice for tile installations over an in-floor heating system.

Self-leveling underlayment is easy to work with and doesn't require a lot of fancy tools or years of training. However, there is a fair amount of prep work that needs to be done—and done right, because once the pouring starts, you'll need to

work fast. We'll show you the step-by-step process to achieve a perfectly flat and level underlayment that's smooth as glass.



MEET THE EXPERT

Josh Risberg, our lead carpenter, is a certified tile installer. He also has 10 years under his tool belt as a lead carpenter for high-end remodelers and home builders.



Seal every hole and crack

Thoroughly sweep and vacuum the entire floor, and then seal all holes and seams in the plywood with caulking. The self-leveler will drain through an opening as small as a nail hole, so be thorough. Get the type of caulk that goes on white but turns clear when it dries so you can tell when it's done setting up.

Taping over the caulk with packing tape isn't required, but it's a terrific way to avoid stepping in a glob and tracking it around the rest of the house. When working on an older house with floor planks instead of plywood, cover the whole floor with self-adhering roofing underlayment.

Cost

One 40-lb. bag of self-leveling underlayment costs about \$38 and will cover about 20 sq. ft. at 1/4 in. thick.



Build dams around big openings

Isolate large holes like heating vents and floor drains with cardboard. Just shape the cardboard to the hole and tape it in place. Caulk the cardboard to the floor.



Make the walls leakproof

Sill sealer (a foam gasket that carpenters use to seal between the foundation and the bottom wall plates) makes a great barrier to keep the self-leveler from escaping into other rooms or into the basement. Hold it in place with staples from a staple gun. Keep the staples low enough so the staple holes will be hidden by the base trim. Sill sealer that's either 3-1/2 in. or 5-1/2 in. wide will work, but the wider sealer does a better job of protecting painted walls from splashes.

Caulk the sill sealer to the floor. Smear the caulk with your finger to make sure it adheres to both surfaces. Once the pour is complete, the seal sealer can easily be cut flush with a razor. The small void near the wall won't affect any finished floor installation.



Strengthen the floor with lath

Lath adds strength to the underlayment the same way rebar adds strength to concrete. Use plastic lath instead of metal when working with in-floor heating. Check with the manufacturer of the heating system as to whether the lath should be installed over or under the mat/cables.

Overlap the lath at least 3 in., and secure it with a hammer tacker stapler. Keep the lath an inch or so away from the walls so it doesn't poke through the sill sealer when you're installing it. Try to keep the lath as flat as possible; you don't want any part of it projecting through the leveler after it's placed.

Always check the continuity of the heating cables or mats before you start mixing. If you accidentally sever or nick a cable, it's easier to repair it before the underlayment is poured... that's an understatement!



Build dams in doorways

Dam up doorways with strips of wood. Make sure you seal the wood to the floor with caulk as well as the area where the wood strip meets the sill sealer. Think through the placement. For the best look, the joint between the newly finished floor and the adjoining floor in the next room should typically fall directly under the middle of the door.



Prime the wood

Covering the floor with two coats of primer will prevent the plywood from absorbing water. Waterlogged wood swells. It shrinks back down when it dries, which could create cracks in the underlayment and tiles above. Floor primer can be rolled on or brushed, but our expert prefers spraying it on because it's fast and easy and there are no brushes or rollers to clean up. He uses a pump-up sprayer on larger jobs and a simple spray bottle on smaller ones. No primer is needed if you use self-adhering underlayment.



Keep bags dry

Bags of self-leveler can be ruined by wicking up moisture from concrete out in the garage or on the basement floor. Keep your bags dry by setting them on a pallet or a sheet of plywood resting on scrap 2x4s.

Order 20 percent extra

Running out of self-leveler before a pour is finished is a big hassle, so don't let that happen. Buy 20 percent more than you think you need. A large room poured even 1/16 in. thicker than planned can gobble up several additional bags. You can return any unused bags.



Prep the bags

Most bags filled with dry cementitious mixes have a vent in the top. It's there so the bags don't break open when they're handled. Minimize the mess by keeping the vent side up. Line the open bags up next to the buckets. Mixing is a messy business, so do it outdoors whenever possible, or protect the floor. Extreme temperatures can affect the time it takes the leveler to set up, so store the bags at room temperature before use.



Fill a separate bucket for the mixer

Keep the paddle mixer in a bucket of water between pours to prevent the paddle from getting crusty. Fill the bucket at least three-quarters full so the mixer won't tip over.



Pull water from a garbage can

Drill holes in your fill bucket at the fill line so the bucket will drain to the proper level. For fast filling, dip a bucket into a barrel or garbage can filled with water. At this stage of the game, speed is important.



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AND
GET BACK TO WORK**

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- ▶ Sharpens and creates split point bits



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Mix a lot at once

Mixing self-leveler in 5-gallon buckets is a messy proposition. Get yourself 6-gallon buckets if you can. Many flooring stores carry them. Fill all your buckets with the recommended amount of water first, and then add the self-leveler. Keep the buckets close to each other to reduce the mess when moving the mixer from one bucket to another, and keep all the bucket handles facing out so they're easier to grab (every second counts).

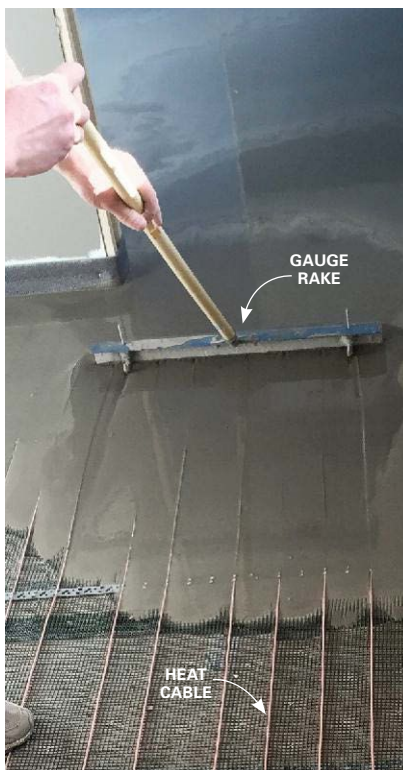
Once you've mixed all the buckets, go back to the first, and mix it up again for a few seconds in order to stir up the sand that has settled. After dumping each bucket, fluff the sand in the next one before hauling it in. Set the mixer in the next bucket to be hauled in, and then store it in the bucket of water between batches.



Spread as you pour

Move the bucket along the floor as you pour. Keep the bucket low to minimize splashing. If you do splash on the wall, try to resist the temptation to wipe it off right away because small drops can quickly become large smudges. You'll have better luck letting it dry and scraping it off.

Completely cover the heating cables/mats with self-leveler to avoid damaging them with a trowel while installing the thin-set. The depth of your pour may vary depending on your project, but shoot for a thickness between 1/2 in. and 3/4 in. Anything over 3/4 in. will likely require two pours, but confirm that by reading the instructions printed on the bag of the product you're using. Check the thickness with a gauge rake, a junky tape measure or just a stick with the desired thickness marked on it.



Move self-leveler with a gauge rake

A gauge rake is a metal squeegee that rides on two adjustable depth guides. This tool isn't absolutely necessary, but it does work well at spreading the self-leveler, and it helps gauge how thick the self-leveler is. It's especially useful for large pours. Be careful to work the rake very gently near the heating cables or mat. Gauge rakes cost about \$45 at flooring stores and online.

Start at the far end of the room and work your way to the door. If you pass other entry points along the way, lock the doors and hang "keep out" signs.

Wash buckets right away

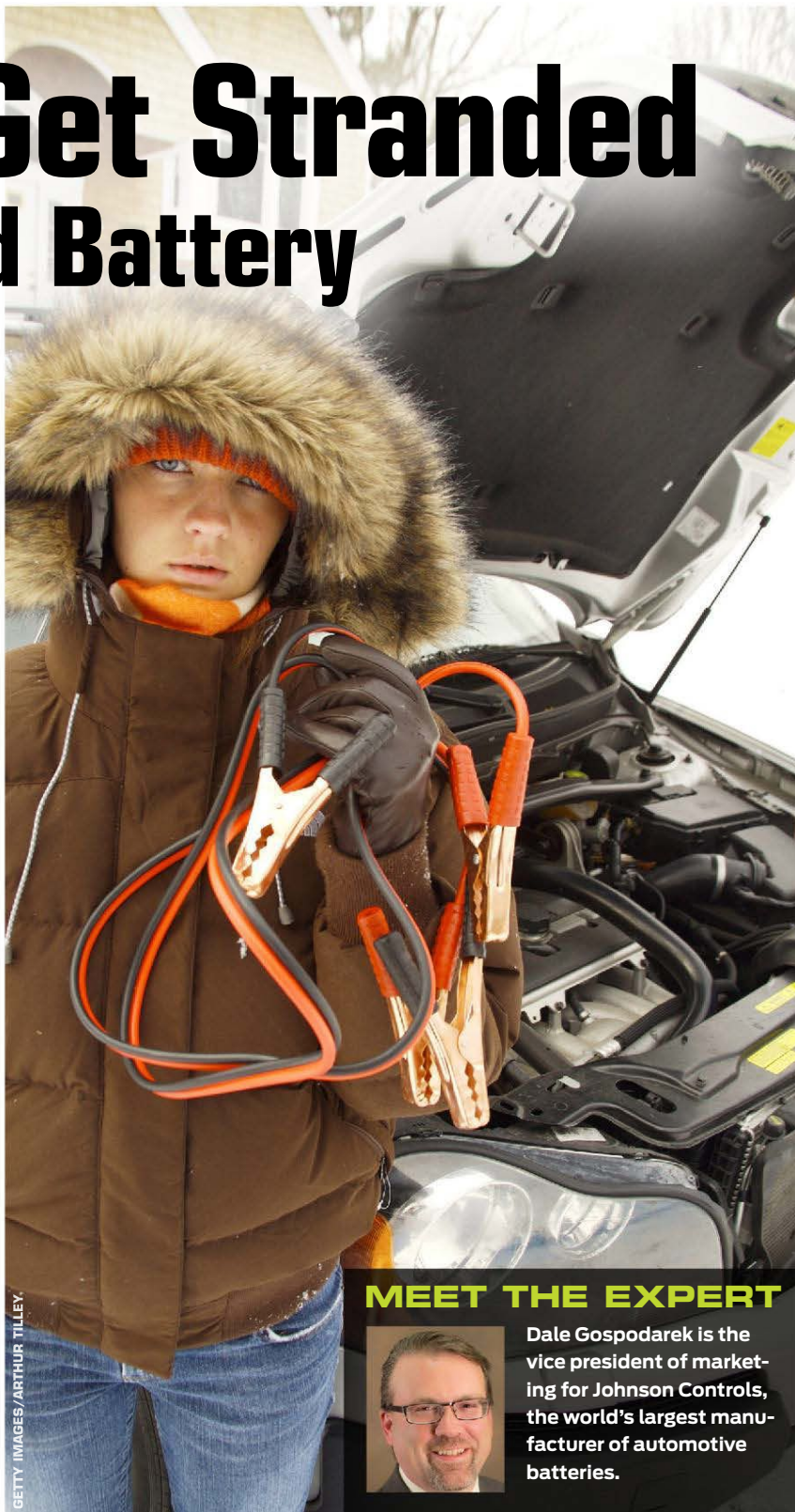
Wash your buckets as soon as you're done pouring, and never dump the dirty water down a drain.

Don't Get Stranded by a Dead Battery

If you're like most other car owners, you just start your car every morning until the day you turn the key and find out your battery has died. But you shouldn't be shocked when it drops dead out of the clear blue. All car batteries wear out eventually, and about half of them die without any advance warning. So how do you know when to replace a battery?

Test now to avoid surprises later

Our battery expert, Dale Gospodarek, says there's an easy way to avoid the surprise of a dead battery. He recommends getting a battery checkup at every oil change to monitor its health. That way you'll know when it would be wise to replace it. Combine that with regular battery maintenance and you'll never get stranded. We'll walk you through the battery testing procedure and relay Dale's battery-buying advice and tips for getting the longest life out of your battery.



GETTY IMAGES/ARTHUR TILLEY

MEET THE EXPERT



Dale Gospodarek is the vice president of marketing for Johnson Controls, the world's largest manufacturer of automotive batteries.

How to Test Your Battery



1 PROGRAM THE TESTER

Program the battery type first, then set the CCA rating.



2 READ THE RESULTS

Scroll through the different tests and read the results for state of health, state of charge and internal resistance.

CAUTION! CAUTION! CAUTION!

Never disconnect the battery terminals on a late-model vehicle (2000 and later) without first providing backup power to the vehicle's diagnostic port. Loss of battery power for even a few seconds can cause an electronic throttle body to forget its "home" position, resulting in a no-start, rough-idle or limited-acceleration condition when you connect the new battery.

Depending on the vehicle, you may have to tow it to a shop to have the throttle body reprogrammed (about \$125). Disconnecting the battery without proper backup power will also wipe out the memory for all your electrical accessories (seats, mirrors, radio station presets, etc.).

If your vehicle is equipped with start-stop technology (engine turns off when stopped and restarts when you press the gas pedal), battery replacement is more complicated because the computer **MUST** be reprogrammed. That's a job best left to a qualified repair shop.

New testers can predict problems

The latest digital battery testers are light-years beyond the obsolete testers that just measured the battery's state-of-charge and load potential. Those testers could tell you the battery's condition at that particular moment but couldn't tell you what lay ahead.

The newer digital testers are different. They still check for charge and load, but they also perform resistance and conductance tests that can determine the condition of internal cell plates and all electrical connections, so they're much better at determining a battery's overall health.

Test for free or buy a tester

Many auto parts stores and repair shops offer free battery testing while it's in your car, or if it's dead, you can remove it from your car and bring it in. But if you own several vehicles, it may make sense to buy your own digital tester. Just choose a tester that can test all the types of batteries you may encounter over the next 10 years, including traditional flooded lead acid, absorbed glass mat (AGM—traditional rectangular shape and spiral wound), start/stop batteries and gel cell (used in small engines).

In addition, look for a unit that performs a starting and charging system test as well. That way you'll be able to diagnose starting problems if the battery is still good. Digital battery testers are available at auto parts stores and online. We're using the SOLAR BA9 because it's reasonably priced (less than \$100), tests all battery types and tests the starting and charging systems.

When and how to test your battery

Most batteries are damaged by excessive engine compartment heat, but they don't quit until the first cold snap. So it's always smart to test your battery before winter. Before you begin the test, you'll need to know the battery type and its cold cranking amp (CCA) rating.

If you have an older vehicle (pre-2015), chances are you have a standard flooded lead-acid battery. However, many late-model luxury vehicles have an AGM battery. Vehicles with start/stop technology (shuts off engine at every stop and then restarts) usually have either an enhanced flooded or a special AGM-type battery. Find the specs for yours on the battery label.

Clean the battery posts and terminals to get the most accurate results (see caution at left). Then, turn off all electrical accessories, remove the key from the ignition and close the doors to eliminate all electrical power draw. Next, connect the tester directly to the battery posts and enter the type and CCA rating (**Photo 1**). Activate the battery test and read the results (**Photo 2**). If the battery fails any of the tests, start shopping for a replacement.

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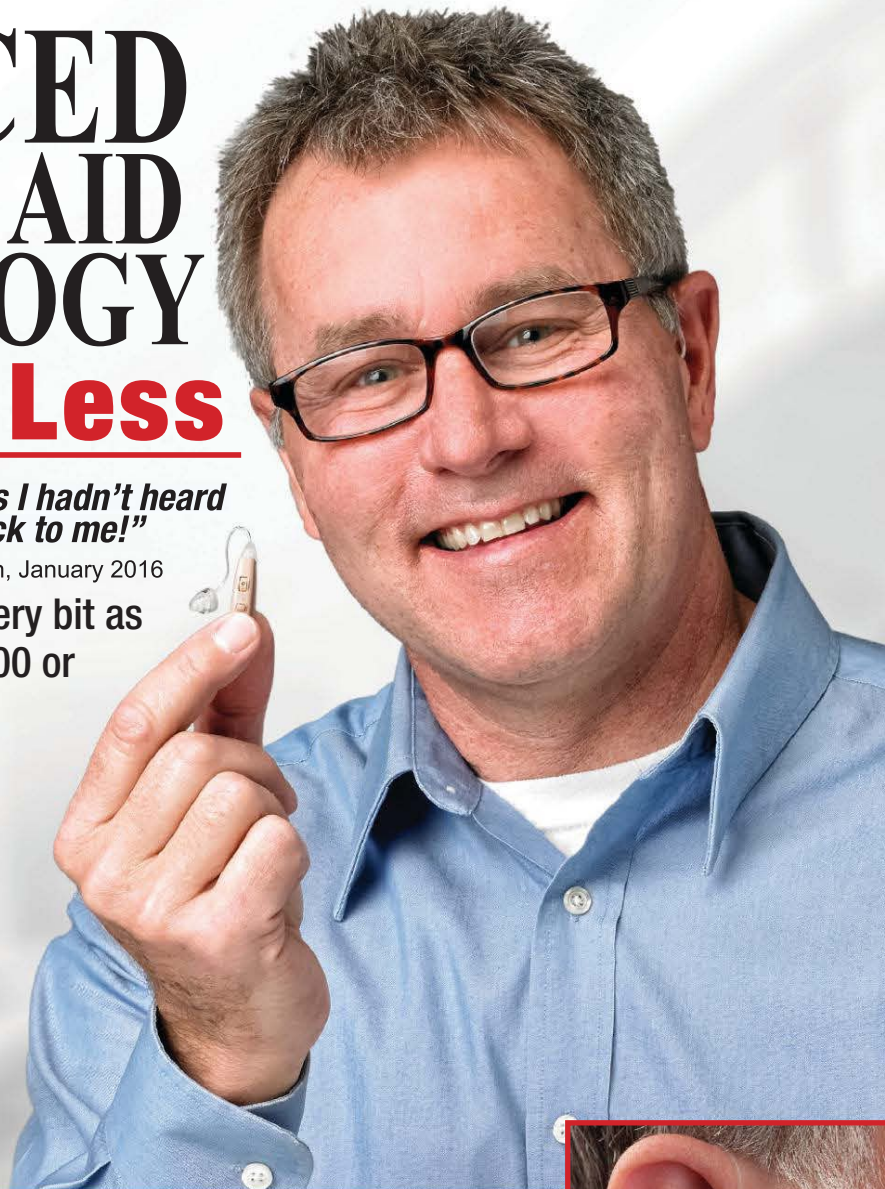
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Battery Care Tips



1 CLEAN IT UP

If you have corrosion on your battery, remove the battery terminals and clean with a battery brush. Then clean the posts. Spray battery neutralizer/cleaner on the battery and hold-down hardware.



2 PROTECT AGAINST CORROSION

Spray the battery posts and terminals with battery protectant spray. Allow it to dry before driving (some sprays are flammable).

Safe Jump-Starting

If you find yourself stranded with a dead battery or want to be a good Samaritan and help someone jump-start their car, follow these safety tips.

- Never smoke when jump-starting a vehicle. Dead batteries can explode and cause severe injuries.
- Turn off all electrical accessories in both vehicles before connecting the jumper cables.
- Connect the positive cable clamp to the positive terminal on the dead vehicle and the clamp on the other end to the positive battery terminal on the good vehicle. Then connect the negative cable clamp to a metal engine part far away from the dead battery before connecting the other clamp to the negative battery post on the good vehicle. Remove the cables in reverse order.
- Let the dead vehicle charge for at least five minutes before you try starting. If the dead vehicle won't start after 15 minutes, it's never going to start with a jump. Call a tow truck.

Extend the life of your battery

- Reuse factory battery insulators when you replace a battery. They protect the battery against high temperatures under the hood.
- Keep battery posts and terminals clean and protected against corrosion (**Photos 1 and 2**). A small amount of corrosion can have a huge impact on the charging system's ability to recharge the battery. Prolonged undercharged conditions dramatically reduce battery life.
- If you take lots of short trips in winter weather and use your lights, seat heater, blower and defogger, you'll drain more power from your battery than the charging system can replace. That will leave your battery in a discharged state, which can shorten its life. After several short trips in cold weather, make a longer trip at higher speeds to top off your battery.
- If you drain your battery, use a battery charger at its lowest setting to bring it back to full charge. It's bad practice to charge a dead battery just enough to start the engine because driving fast for short periods on a barely charged battery can shorten its life.
- Connect a battery maintainer if you're not going to drive for more than a month. Car computers draw power (even when the engine isn't running) and can fully drain a battery in about three weeks. Plus, all lead-acid batteries lose up to 25 percent of their charge per month even in warm weather even if they're disconnected from the car. A lead acid battery at 70 degrees F self-discharges about 1 percent a day even when it's sitting on the shelf at the store.

How to buy a new battery

The old folklore was to buy a battery with the most CCAs. That's bad advice, according to Dale. Refer to your owner's manual to find the factory-recommended CCA rating and battery "group" size and buy a battery with those same specs—period. A battery with a higher or lower CCA may not perform as well and may actually have a shorter life span.

Should you upgrade to an AGM battery?

AGM batteries are designed to withstand deeper and more frequent discharge rates/cycles. If your vehicle is loaded with high-draw electrical accessories like heated seats, high-wattage sound systems, snow plows or winches and you're experiencing short battery life, consider upgrading to a standard AGM or a yellow-top spiral-wound AGM battery (OPTIMA by Johnson Controls is one popular brand).

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Ceiling fans:

You get what you pay for

If you've ever shopped for ceiling fans, you've probably been struck by the huge price variations. Fans with the same style and features, blade size and air movement (cfm) specs can cost anywhere from \$80 to \$300. We wondered if there's really an electrical/mechanical difference between the high-priced fans and the economy models and whether those differences were worth the extra cash. So we called in Tom Breeden, vice president of engineering at Hunter Fan, to get his take on the issue. We learned that there are two key questions to ask yourself:

\$300 FAN

\$79 FAN

1. How much does noise matter to you?

Fan manufacturers offer some great-looking models at really low prices. To sell at those prices, the manufacturers use lower-quality bearings and mounting brackets with minimal noise isolation. The noise levels may be tolerable when the fan is new, but once the bearings wear, the fan will start to wobble and transmit an annoying rumbling sound across your ceiling.

Premium fans, on the other hand, are built with high-quality bearings filled with synthetic grease to ensure long life and minimal wear. They also incorporate noise-dampening features into the body, blade irons, downrod connections and ceiling mount to isolate the vibrations created by the fan blades.

Noise probably won't be an issue if you're installing the fan in a kitchen, eating area or family room. But if you're buying the fan for a bedroom, living room or study, Tom recommends digging deeper to get a better-quality unit.

2. Will you run it constantly?

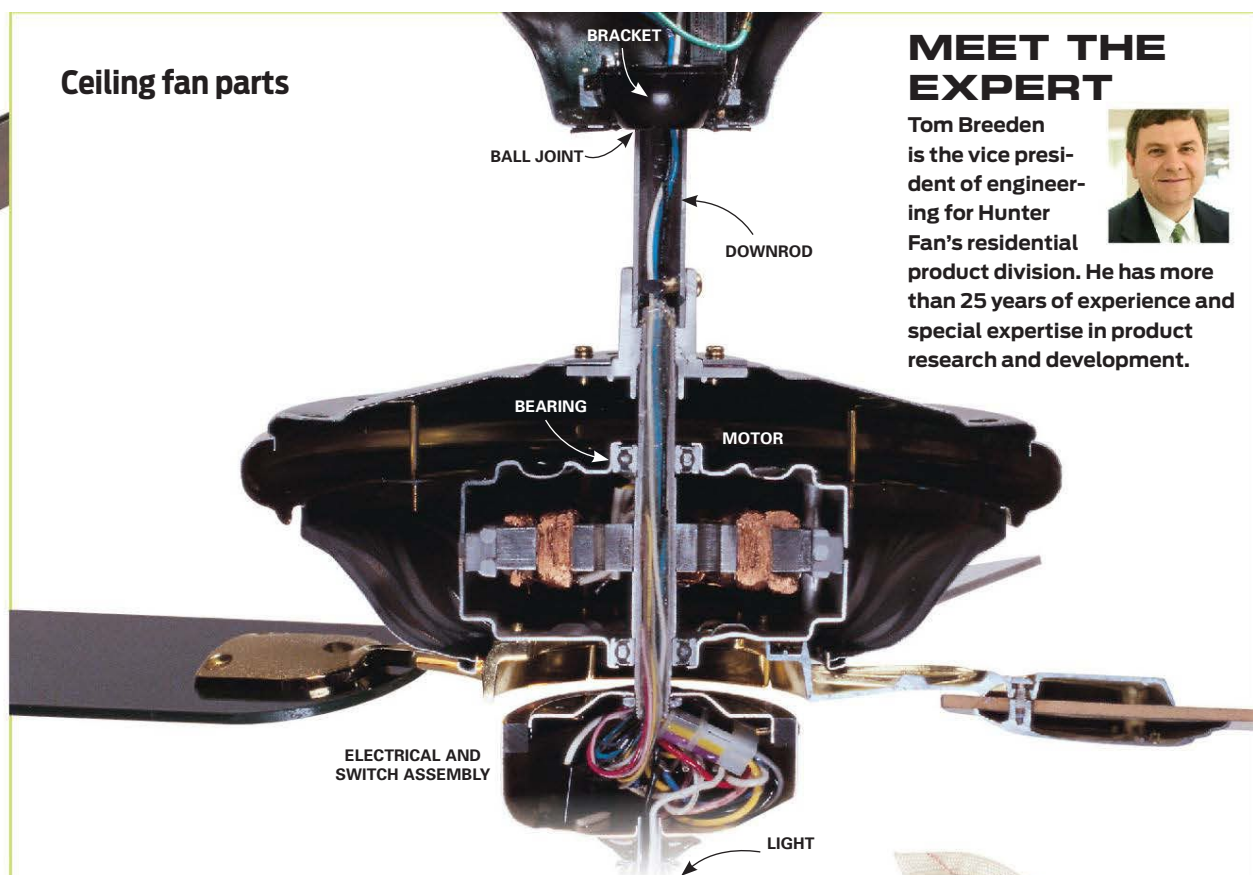
Besides longer-lasting bearings, premium fans include higher-quality remote control electronics, switches and speed controls. If you plan to run the fan constantly and want to avoid trouble, buy a premium fan. That's especially true if the fan will be mounted on a high ceiling where service or replacement can be a real hassle.

Tom says fan noise, wobble and shorter life span are the three biggest complaints about economy fans, and he doesn't recommend them for any location. But we think low-cost fans can be a good choice if you're on a budget and need a fan for a kitchen, family room or a low-use guest room. Choose a premium fan for a primary bedroom or other areas where you expect peace and quiet.

Ceiling fan parts

MEET THE EXPERT

Tom Breeden is the vice president of engineering for Hunter Fan's residential product division. He has more than 25 years of experience and special expertise in product research and development.



THE INNARDS ARE WHAT MATTER

The differences in these small parts may not look significant, but they play a big role in the fan's noise level and longevity.

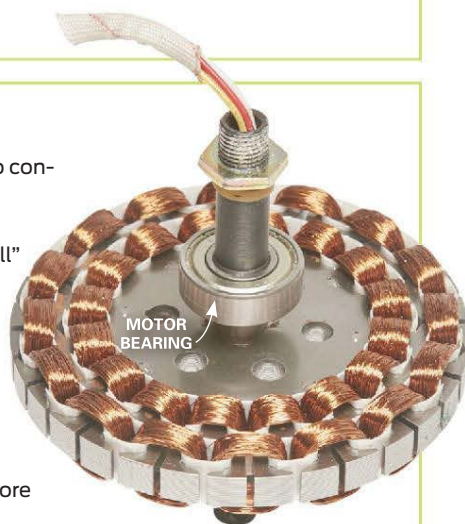
Motor bearings: High-quality bearings are the most important component of a premium fan. Low-quality bearings wear out quickly and make noise that transmits up to the ceiling.

Mounting systems: On economy fans, the notched single-insulated ball-and-bracket pin design transmits more vibration to the bracket. The foam-rubber noise isolators compress during

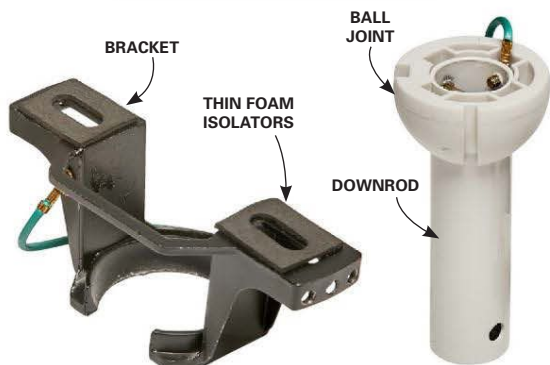
installation, allowing the bracket to contact the ceiling and transmit noise.

On premium fans, the double-insulated and ribbed triangular "ball" joint transmits far less noise to the bracket. The four rubber noise isolators prevent the bracket from touching the ceiling, further reducing noise transmission.

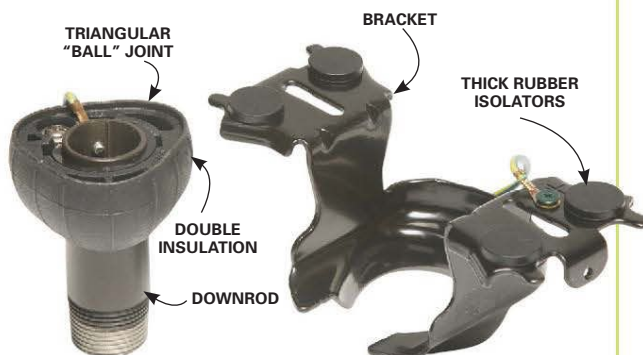
Electronics and switches: Economy speed and light switches and motor run capacitors fail far more often than premium components.



ECONOMY MOUNT



PREMIUM MOUNT



WATER SOFTENER MAINTENANCE

Three ways to get the iron out

Well water and city water with high iron content can coat the resin beads in your water softener and reduce their efficiency. There are three ways to clean the beads to keep your water softener's resin bed in tip-top shape:

1. Buy water softener salt that includes a rust removal agent (Diamond Crystal Iron Fighter and Morton Rust Remover are two examples). It costs a bit more than ordinary salt, but it's the easiest way to keep iron at bay.



2. Pour an antirust liquid or powder directly into the brine tank at the first sign of rust building on your plumbing fixtures. Track how long it takes to recur, then establish a regular treatment schedule to stay ahead of the game. (Summit Brands' Iron Out, \$6, is one example.) Then send the softener through the recharge cycle.



3. Add a drip dispenser to your brine tank. Fill it with an antirust product (one choice is Pro Products' ResCare RK11K Easy Feeder Starter Kit for \$20).

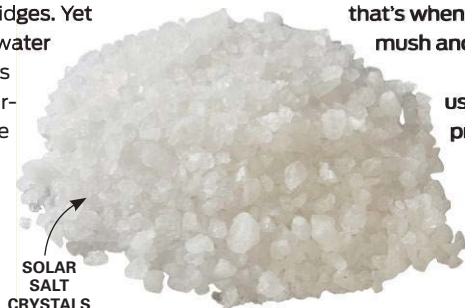


Salt crystals or pellet salt for your water softener?

Readers often ask which form of water softener salt they should buy—rock salt, solar salt crystals or pellets. Rock salt contains the highest percentage of insoluble particles (dirt), which can muddy up the brine tank, coating the tank walls with scum. Solar salt crystals are cleaner but can still cause brine tank dirt buildup.

Salt pellets and cubes are the cleanest of the three types. However, some water experts don't recommend them because they can get mushy or form salt bridges. Yet other water

experts discourage the use of solar



salt crystals because of the dirt problem.

To get the scoop, we contacted Emily Arthurs, senior brand manager at Morton Salt. Emily said that the way pellets and cubes are manufactured determines whether they'll mush and form salt bridges. Some economy-brand pellets and cubes are shaped first and then sprayed with a binding agent to hold them together. The binding agent washes off as soon as the pellets or cubes reach the brine and **that's when they fall apart, turn to mush and bridge.**

Emily said Morton uses a manufacturing process in which the

binding agent and other key ingredients are blended throughout the batch *before* it's formed into pellets. Instead of washing off, the binding agent "time releases," holding the pellet together to prevent mushing and bridging.

If you've used pellets or cubes and had mushing or bridging problems, don't just give up and switch back to solar salt crystals. Try a few premium brands of pellets until you find one that stays together without mushing or bridging.



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Adjust a self-closing spring hinge

If the self-closing door to your garage isn't closing hard enough to latch properly or the door slams shut, you can adjust the spring tension with a hex wrench and pliers. Start by removing the locking pin (**Photo 1**). Then add or release tension until you get the proper close rate (**Photo 2**).



1 REMOVE THE LOCKING PIN

Place the hex wrench into the socket at the top of the hinge and turn in either direction to release tension on the pin. Remove the pin with a pliers.



2 TIGHTEN OR LOOSEN IN SMALL STEPS

Rotate the wrench until the next hole comes into view and install the pin. Test the door close rate. Repeat until the door closes and latches without slamming.



A slight turn of the dial makes water heaters safer

Water heaters set too high send thousands (mostly children) to hospitals each year with burns from water from a faucet. Most safety experts recommend a setting of 120 degrees F. But finding that setting on the dial isn't easy—most dials aren't labeled with numbers. If the stickers on the water heater don't tell you how to set the temperature and you can't find the owner's manual, use this method: Run hot water at the tap closest to the water heater for at least three minutes. Then fill a container and check the temperature. If the water is above 120 degrees, adjust the dial, wait about three hours and check again. Repeat until you get 120-degree water. For a final test, check the temperature the following morning, before anyone uses hot water.



Perfect Choice HD Ultra™ is simple to use, hard to see and easy to afford...

Invention of the Year

PERSONAL SOUND AMPLIFICATION PRODUCT (PSAP)

IT'S NOT A HEARING AID

NEW
Speaker in
ear design for
power and
clarity!

**Understand what
people are saying...
the first time**



Now you see it...

*Now you
don't*



Perfect Choice HD Ultra™ is NOT a hearing aid. It is a Personal Sound Amplification Product (PSAP). Hearing aids can only be sold by an audiologist or a licensed hearing instrument specialist following hearing tests and fitting appointments. Once the audiologist had you tested and fitted, you would have to pay as much as \$5000 for the product.

The designers of the Perfect Choice HD Ultra™ have moved the tiny but powerful speaker to the end of the hearing tube, so it is closer to the eardrum, giving you more volume and clarity. It features dual microphones that focus on voices for better conversational listening. It also automatically senses noisy or quiet environments and suppresses background noise, so sounds and conversations are easier to hear and understand.

The unit is small and lightweight enough to hide behind your ear...

only you'll know you have it on. It's comfortable and won't make you feel like you have something stuck in your ear.

Try it for yourself with our exclusive home trial. This remarkable product has been designed with the finest micro-digital components on the market today. Thanks to the efforts of a doctor who leads a renowned hearing institute, it's manufactured in an efficient production process that makes it available at an affordable price. Call now, and you'll find out why so many satisfied seniors are now enjoying their Perfect Choice HD Ultra, hearing their grandchildren and what the world has to say. Call today, and be sure to ask about our special discounts for Seniors and Military personnel.

**Perfect
Choice HD**
ULTRA™

**Call now toll free for
our lowest price ever.**

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104710.

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1998 Ruffin Mill Road,
Colonial Heights, VA 23834

Perfect Choice HD Ultra is not a hearing aid.
If you believe you need a hearing aid, please
consult a physician.

It's Better

COMFORT	Less than 1 ounce
SOUND QUALITY	Excellent: Optimized for speech
FITTING REQUIRED?	No
ONE-ON-ONE SETUP	Free
SENIOR AND MILITARY DISCOUNTS	Yes

What homeowners **MUST** know

BY GARY WENTZ

feedback@familyhandyman.com



ART DIRECTION MARY SCHWENDER • PHOTOGRAPHY HSP

STINKY WASHING MACHINE? THERE'S A PILL FOR THAT

If your front-loading washer has developed a moldy odor, here's the problem: Unlike top loaders, front loaders seal up airtight. The drum doesn't dry out between uses, and that dark, damp space is perfect for mold. There are several home remedies for this—usually using bleach or vinegar—but our appliance pros recommend washing machine cleaners, which are available as tablets, liquids or powders. Just put the product in the machine and run through a wash cycle. You'll find washing machine cleaners at discount stores or online for about \$7.



Getting new carpet? Seal pet stains

If your old carpet has the lingering smell of pet urine, there's a good chance the urine also penetrated the subfloor. So it's smart to treat the subfloor after the old carpet is out and before the new carpet goes in. Wet any stained areas with a 50/50 mix of water and bleach. After a five-minute soak, wipe up the water and let the floor dry. Then paint over the spots with a stain-blocking primer such as KILZ, BIN or 1-2-3.



Stretch wrap is essential

Keep a roll of stretch wrap handy and we promise you'll use it. Wrap unruly items for storage, tie box lids down or bind assorted items together for transport. A roll costs \$8 at home centers, and you'll have enough to last for years.

Statement of ownership, management, and circulation

Statement required by the Act of August 12, 1970, Section 3685, Title 39, United States Code, showing the ownership, management and circulation of THE FAMILY HANDYMAN (USPS 013-271) published monthly (except bimonthly in December/January and July/August) 10 times a year, at 1610 N. 2nd St., Suite 102, Milwaukee, WI 53212-3906, as filed on Sept. 30, 2016. Annual subscription price: \$24.

The names and addresses of the publisher, editor and managing editor are: Publisher, Russell S. Ellis, 750 Third Ave., New York, New York County, NY 10017; Editor, Gary Wentz, 2915 Commers Drive, Suite 700, Eagan, Dakota County, MN 55121; Managing Editor, Donna Bierbach, 2915 Commers Drive, Suite 700, Eagan, Dakota County, MN 55121.

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The Family Handyman

Issue date for circulation data: October 2016

Average number of copies of each issue during preceding 12 months, and of the single issue published nearest to filing date, respectively, is as follows:

	Average	Single Issue
Total number of copies printed (net press run)	1,302,188	1,242,676
Mail subscriptions	1,074,035	1,111,712
Paid distribution—sales through dealers and carriers, street vendors and counter sales	42,094	37,790
Total paid distribution	1,116,129	1,149,502
Free or nominal-rate distribution	113,545	23,602
Total distribution	1,229,674	1,173,104
Copies not distributed	72,514	69,572
Total	1,302,188	1,242,676

Percent paid and/or requested circulation	90.77%	97.99%
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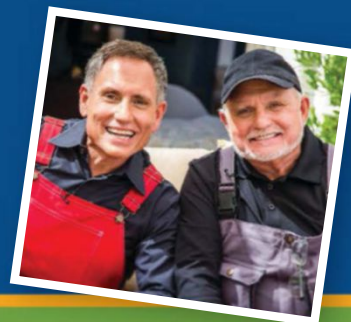
Paid electronic copies	33,653	23,876
Total paid print copies	1,149,782	1,173,378
Total print distribution	1,263,327	1,196,980
Percent paid	91.01%	98.03%

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

Jim Woods, Vice President, Planning, Consumer Marketing

On the House

With the Carey Brothers
Tips of the Month



SPLITTING LOGS THE EASY WAY

An axe may have worked for Honest Abe, but today, there are safer, easier, and more efficient ways to split logs. We had the opportunity to have a look at the latest and greatest in log splitters at the YARDMAX™ exhibit at this year's National Hardware Show. When it comes to splitting logs, size and power really do matter. The folks at YARDMAX offer both gas and electric log splitters with forces that range from 5 to 35 tons. The YARDMAX 5-Ton Electric Log Splitter is lightweight and easy to maneuver. It can be used indoors or out, includes a built-in stand, a stroke limiter for shorter logs, and a log table to catch split wood. The YARDMAX gas log splitters can split logs in both a horizontal or vertical position, are available in full or half beam models, and are powered by Briggs & Stratton engines. The half beam model offers simple, one-person assembly and dual-side loading, while the full beam model is easy to transport to remote locations. Some accessories that enhance the log splitting experience include an easily attachable 4-way wedge to split wood 4 ways, a patent-pending spinner foot plate for natural log rotation, and an extended table length for longer logs. For further questions, YARDMAX outlines all factors to consider when shopping for a log splitter at their website at yardmax.com.



EASY AND AFFORDABLE NEW LIFE FOR OLD SURFACES

Can't bear the look of your blistered laminate countertop? Tired of fighting grungy tile grout? Want to breathe new life into your faded concrete path, patio, driveway or pool deck? If the prospect of tearing your house apart doesn't appeal to you, there's an easy, attractive, and affordable alternative: a surface coating that goes right over the existing finish. Daich Coatings, a leading manufacturer of high performance concrete sealers, anti-slip paints, and epoxy systems, has an array of product offerings that can transform virtually any interior or exterior surface for a fraction of the cost. Daich concrete coatings are made from real stone, which means they are tough, able to withstand salting and shoveling, and weather resistant. If you have an old laminate countertop or table that you want to give an elegant new stone surface without spending hundreds of dollars, the



Daich SpreadStone™ Countertop Finishing Kit is the answer. For garages, Daich's DaiHard® Epoxy Garage Floor Kit bonds to existing concrete to create a durable and attractive finish that resists salt, chemicals, and hot tire traffic. For a showroom finish, top coat with DaiHard Epoxy Clear Coat. If you can roll paint, you can create a real stone finish for paths, patios, porches, driveways and pool decks with RollerRock®. Available in fifteen standard colors, just pour it into a tray and roll away. daichcoatings.com.

Ask the Carey Brothers a home improvement or remodeling question on their live radio broadcast every Saturday from 9:00 a.m. to 12:00 p.m. Eastern Time.

Call toll-free at 1-800-737-2474 to ask your question.

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

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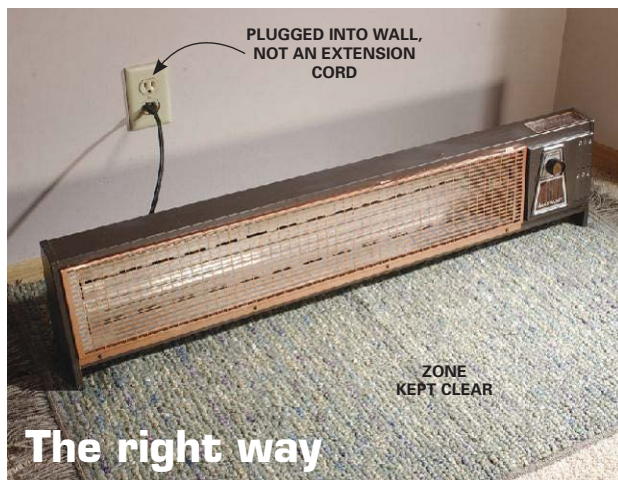


CHECK OUT OUR VIDEOS ON



The statistics:

15% of household fires, 13% of deaths are caused by heaters



The right way

Stay warm, but don't burn

Most deaths from household fires occur when wood stoves or space heaters are in use and ignite nearby combustibles while everyone's asleep. Wood stoves also cause fires when embers in discarded ashes smolder and ignite other trash. Creosote buildup and sparks can cause a chimney fire that ignites combustibles located too close to a wood stove.

Prevention:

- Keep space heaters at least 5 ft. away from drapes, bedding and other flammables.
- Plug space heaters directly into outlets, not into extension cords.
- If your space heater has electric elements, don't use it while sleeping.
- Empty wood-stove ashes in a metal container and store them outside away from combustibles for at least a week before dumping them into the trash.
- Have chimneys inspected and cleaned every year.
- Keep any combustible objects at least 5 ft. away from the stove or fireplace.



Less Pees, More Zzz's...

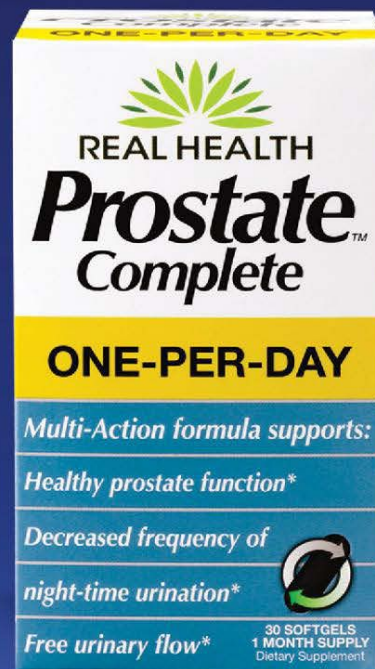
One of the signs of an aging prostate is an increased need to urinate, often in the middle of the night.

That's where Prostate Complete can help. With just one pill per day, Prostate Complete helps support:

- ✓ Healthy Prostate Function
- ✓ Free Urinary Flow
- ✓ Healthy Prostate Size

In short? More time catching Zzz's, less times getting up to pee.

For coupons and more information:
www.ProstateOnePerDay.com



Buy today at Walmart

Holiday Gift Guide

Find gifts for the DIY'ers on your list this holiday season, including yourself.

New COB LED Technology



The CT1000 (yellow) and CT1200 (camo) Pocket COB Work Lights provide 175

lumens of light output. With

rugged, water resistant ABS bodies, they can withstand indoor and outdoor use. The flood beam effect brilliantly illuminates a wide area. Featuring a magnetic base and rear pocket clip for hands-free use, these lights are perfect for working in any shop, fixing a flat tire, or walking the dog.

CatLights.com



Crescent Tongue & Groove Pliers

NEW Crescent® Tongue and Groove Pliers have a concave, non-marring grip zone that holds plated pipes and fixtures without damage.

Deep "V" jaws provide a better grip on various objects, and a unique tooth design lets you apply more torque. Available at

The Home Depot. CrescentTool.com



CRESCENT
BRAND

The Original Gettysburg Cigar!®

These fine cigars are hand crafted in Gettysburg, PA at the oldest operating cigar factory in America. Available in a variety of sizes, wrappers, and package configurations exclusively from Great Gettysburg Tobacco Company.™

GettysGear.com

GETTYSBURG
TOBACCO COMPANY™



RYOBI ONE+ 18V Ultimate Combo

This DIY RYOBI Ultimate Combo Kit is chock-full of 18-Volt lithium-ion devices that will turn chores into hobbies. Over 70 tools work with the RYOBI ONE+ 18-Volt battery platform.

RyobiTools.com

RYOBI 18V **ONE+**



How Does Harbor Freight Sell GREAT QUALITY Tools at the LOWEST Prices?

We have invested millions of dollars in our own state-of-the-art quality test labs and millions more in our factories, so our tools will go toe-to-toe with the top professional brands. And we can sell them for a fraction of the price because we cut out the middle man and pass the savings on to you. It's just that simple! Come visit one of our 700+ Stores Nationwide.

VALID **NOW** ON 5,000+ ITEMS.

20% OFF

ANY SINGLE ITEM

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, automotive lifts, compressors, floor jacks, saw mills, storage cabinets, chests or carts, trailers, trenchers, welders, Admiral, Badland, Bremen, CoverPro, Creekstone, Daytona, Diablo, Doyle, Drummond, Earthquake, Franklin, Hercules, Holt, Jupiter, Lynx, Maddox, Portland, Predator, Quinn, StormCat, Union, Viking. Not valid on prior purchases. Non-transferable. Original coupon must be presented. Valid through 3/15/17.



SUPER COUPON

FREE

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

ITEM 69030
69031 shown



\$497
VALUE

LIMIT 1 - Cannot be used with other discount, coupon or prior purchase. Coupon good at our stores, HarborFreight.com or by calling 800-423-2567. Offer good while supplies last. Shipping & Handling charges may apply if not picked up in-store. Non-transferable. Original coupon must be presented. Valid through 3/15/17. Limit one FREE GIFT coupon per customer per day.



SUPER COUPON

12" SLIDING COMPOUND DOUBLE-BEVEL MITER SAW WITH LASER GUIDE

★ **WINNER** ★
Best Value Award
- The Family Handyman

CHICAGO ELECTRIC POWER TOOLS

Customer Rating
★★★★★

ITEM 69684 shown
61969/61970

SAVE \$259



\$139.99

~~\$199.99~~ comp at \$399

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WOW SUPER COUPON

8750 PEAK/7000 RUNNING WATTS 13 HP (420 CC) GAS GENERATORS

ITEM 68530/63086
69671/63085 shown

ITEM 68525/69677
63087/63088

CALIFORNIA ONLY



\$529.99

~~\$599.99~~ comp at \$999

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Wheel kit and battery sold separately.

SUPER COUPON

1/4" TRIM ROUTER drillmaster

ITEM 61626/62659
44914 shown

SAVE \$79

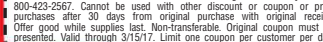
\$19.99

Customer Rating
★★★★★

~~\$29.99~~ comp at \$99



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SUPER COUPON

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

ITEM 69265/62344
93897 shown

SAVE \$129



\$59.99

~~\$89.99~~ comp at \$189

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Customer Rating
★★★★★

SUPER COUPON

2 HP INDUSTRIAL 5 MICRON DUST COLLECTOR

70 gallon capacity

ITEM 61790
97869 shown

Customer Rating
★★★★★

SAVE \$200



\$179.99

~~\$229.99~~ comp at \$379.99

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Customer Rating
★★★★★

SUPER COUPON

29 PIECE TITANIUM NITRIDE COATED HIGH SPEED STEEL DRILL BIT SET

ITEM 62281
61637 shown

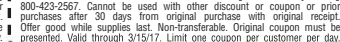
SAVE 78%

\$12.99



~~\$19.99~~ comp at \$59.97

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WOW SUPER COUPON

14" OSCILLATING SPINDLE SANDER

SAVE \$70

\$99.99



~~\$149.99~~ comp at \$169.99

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Customer Rating
★★★★★

WOW SUPER COUPON

2.5 HP, 21 GALLON, 125 PSI VERTICAL AIR COMPRESSOR

Customer Rating
★★★★★

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

Long life oil-lubricated motor

Reduced vibration stabilizers

Heavy duty 2.5 HP motor

Single capacitor motor with thermal overload protection

SAVE \$347

ITEM 69091/67847 shown
61454/61693/62803

\$149.99

~~\$179.99~~ comp at \$497

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Customer Rating
★★★★★



ITEM 69091/67847 shown
61454/61693/62803

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Customer Rating
★★★★★

SUPER COUPON

ALUMINUM OXIDE SANDING SPONGES PACK OF 10

SAVE 59%

\$3.99

YOUR CHOICE

~~\$4.99~~ comp at \$9.95

Customer Rating
★★★★★



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Customer Rating
★★★★★

SUPER COUPON

12" RATCHET BAR CLAMP/SPREADER

SAVE 85%

\$2.99

~~\$3.99~~ comp at \$20.76

Customer Rating
★★★★★



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Customer Rating
★★★★★

SUPER COUPON

72" x 80" MOVING BLANKET

SAVE 66%

\$5.99

~~\$8.99~~ comp at \$17.97

Customer Rating
★★★★★



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Customer Rating
★★★★★

FOR THE FAMILY Handyman



700+ Stores
Nationwide

WOW SUPER COUPON

SAVE \$670

44", 13 DRAWER INDUSTRIAL QUALITY ROLLER CABINET
US*GENERAL PRO
ITEM 69387/62744/63271
68764 shown

Customer Rating ★★★★★

• 2633 lb. capacity
• Weighs 245 lbs.

\$359.99
~~\$379.99~~ comp at \$1029.99

39742352

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WOW SUPER COUPON

26", 16 DRAWER ROLLER CABINET
US*GENERAL PRO
ITEM 61609/67831 shown

• 1060 lb. capacity
• 14,600 cu. in. of storage

\$319.99
~~\$369.99~~ comp at \$952.99

Customer Rating ★★★★★

39725128

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WOW SUPER COUPON

30", 5 DRAWER TOOL CART
US*GENERAL PRO
ITEM 69397/61427
63308/95272 shown

• 704 lb. capacity

SAVE \$235

Customer Rating ★★★★★

\$164.99 ~~\$189.99~~ comp at \$399.99

39680737

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WOW SUPER COUPON

80 PIECE ROTARY TOOL KIT
drillmaster
ITEM 97626 shown
63235/6896/69451

SAVE 71%

\$6.99
~~\$9.99~~ comp at \$24.15

39791146

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WOW SUPER COUPON

NO. 33 BENCH PLANE
ITEM 97544
270 WINDSOR DESIGN

SAVE 82%

Customer Rating ★★★★★

\$7.99 ~~\$9.99~~ comp at \$45.44

39785569

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WOW SUPER COUPON

7 FT. 4" X 9 FT. 6" ALL PURPOSE WEATHER RESISTANT TARP
ITEM 69249/69115/69137
69129/69121/877 shown

Customer Rating ★★★★★

SAVE 64%

\$2.99 ~~\$4.99~~ comp at \$8.48

39711594

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WOW SUPER COUPON

4" X 36" BELT/6" DISC SANDER
CENTRAL MACHINERY
ITEM 82502
87181 shown

Customer Rating ★★★★★

SAVE \$87

\$5.99 ~~\$79.99~~ comp at \$147.55

39690894

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WOW SUPER COUPON

MECHANIC'S GLOVES
HARDY
Customer Rating ★★★★★

SAVE 73%

\$3.99 ~~\$5.99~~ comp at \$14.97

39688379

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WOW SUPER COUPON

20 OZ. GRAVITY FEED SPRAY GUN
ITEM 47016 shown
67181/62300

Customer Rating ★★★★★

SAVE 79%

\$9.99 ~~\$15.99~~ comp at \$49

39763977

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WOW SUPER COUPON

PITTSBURGH 4 PIECE WOOD CHISEL SET WITH CLEAR PVC HANDLE
ITEM 42429
69471 shown

Customer Rating ★★★★★

SAVE 83%

\$4.99 ~~\$7.99~~ comp at \$29.97

39737378

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WOW SUPER COUPON

17 FT. TYPE I A MULTI-TASK LADDER
HaulMaster
ITEM 62656/62514
67646 shown

Customer Rating ★★★★★

SAVE \$238

\$119.99 ~~\$139.99~~ comp at \$357.99

39752313

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WOW SUPER COUPON

MOVER'S DOLLY
HaulMaster
ITEM 60497/93888 shown
61899/62399/63095/63096
63098/63097

• 1000 lb. capacity

Customer Rating ★★★★★

\$7.99 ~~\$10.99~~ comp at \$19.97

39708055

LIMIT 7 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/15/17. Limit one coupon per customer per day.

WOW SUPER COUPON

12" TOOL BAG
ITEM 61467 shown
62163/62349

Customer Rating ★★★★★

SAVE 66%

\$4.99 ~~\$8.99~~ comp at \$14.99

39789786

LIMIT 8 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/15/17. Limit one coupon per customer per day.

WOW SUPER COUPON

2.5 HP, 10" TILE/BRICK SAW
CHICAGO ELECTRIC
ITEM 62391
69275 shown

Customer Rating ★★★★★

SAVE 66%

\$219.99 ~~\$279.99~~ comp at \$499

39689089

LIMIT 3 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/15/17. Limit one coupon per customer per day.

WOW SUPER COUPON

ORBITAL HAND SANDER
drillmaster
ITEM 61509
61311 shown

Customer Rating ★★★★★

SAVE 66%

\$9.99 ~~\$13.99~~ comp at \$29.97

39760189

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WOW SUPER COUPON

3-IN-1 PORTABLE POWER PACK WITH JUMP STARTER
CENTECH
ITEM 62376
38391
62306 shown

Customer Rating ★★★★★

SAVE 20%

\$47.99 ~~\$59.99~~ comp at \$59.99

39757930

LIMIT 4 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/15/17. Limit one coupon per customer per day.

WOW SUPER COUPON

16 OZ. HAMMERS WITH FIBERGLASS HANDLE
PITTSBURGH
ITEM 69006
60715/60714

Customer Rating ★★★★★

SAVE 77%

\$3.99 ~~\$4.99~~ comp at \$17.99

39772110

LIMIT 8 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/15/17. Limit one coupon per customer per day.

SUPER COUPON

24" CLAMP AND CUT EDGE GUIDE
PITTSBURGH
ITEM 66126

SAVE 83%

\$7.99
~~\$12.99~~ comp at \$49.23

Customer Rating ★★★★★

39811991

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SUPER COUPON

16" x 30" TWO SHELF STEEL SERVICE CART
US • GENERAL
ITEM 60390
5107 shown

SAVE 50%

\$29.99
~~\$39.99~~ comp at \$59.98

Customer Rating ★★★★★

39792606

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SUPER COUPON

32 PIECE SCREWDRIVER SET
PITTSBURGH
ITEM 61259/90764 shown

SAVE 59%

\$5.99
~~\$8.99~~ comp at \$14.88

Customer Rating ★★★★★

39851589

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SUPER COUPON

11 PIECE WOOD CARVING SET
WINDSOR DESIGN
ITEM 62673
60655 shown

SAVE 33%

\$5.99
~~\$8.99~~ comp at \$8.99

Customer Rating ★★★★★

39869043

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SUPER COUPON

3 TON HEAVY DUTY STEEL JACK STANDS
PITTSBURGH
ITEM 61196/69597
38846 shown

SAVE 42%

\$19.99
~~\$24.99~~ comp at \$34.99

Customer Rating ★★★★★

39806395

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PITTSBURGH AUTOMOTIVE

HEAVY DUTY RAPID PUMP® FLOOR JACKS

WOW SUPER COUPON

3 TON LOW PROFILE HEAVY DUTY STEEL FLOOR JACK
ITEM 62326/61253
61282 shown

SAVE \$185

\$84.99
~~\$99.99~~ comp at \$269.99

Customer Rating ★★★★★

39833418

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SUPER COUPON

1.5 TON ALUMINUM RACING JACK
ITEM 60569 shown
68053/69252
62160/62496/62516

SAVE \$60

\$59.99
~~\$89.99~~ comp at \$119.99

Customer Rating ★★★★★

39856370

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SUPER COUPON

1500 WATT DUAL TEMPERATURE HEAT GUN (572°/1112°)
ITEM 96289 shown
63104/62340/62546

SAVE 71%

\$8.99
~~\$14.99~~ comp at \$31.47

Customer Rating ★★★★★

39835035

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SUPER COUPON

16" VARIABLE SPEED SCROLL SAW
CENTRAL MACHINERY
ITEM 62519/63283/93012 shown

SAVE \$49

\$69.99
~~\$99.99~~ comp at \$119

Customer Rating ★★★★★

39800034

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SUPER COUPON

350 LB. CAPACITY FOLDING SAW HORSE
CENTRAL MACHINERY
ITEM 61979
60710
69446 shown

SAVE 44%

\$9.99
~~\$12.99~~ comp at \$17.97

Customer Rating ★★★★★

39841451

LIMIT 9 - Good at our stores or HarborFreight.com or by calling 800-423-2567. Cannot be used with other discount or coupon or prior purchases after 30 days from original purchase with original receipt. Offer good while supplies last. Non-transferable. Original coupon must be presented. Valid through 3/15/17. Limit one coupon per customer per day.

SUPER COUPON

UNIVERSAL TOOL STAND
CENTRAL MACHINERY
ITEM 46075/69805 shown

SAVE 63%

\$29.99
~~\$39.99~~ comp at \$81.39

Customer Rating ★★★★★

39801309

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SUPER COUPON

4 PIECE 1" x 15 FT. RATCHETING TIE DOWNS
ITEM 63056/63057/60405/63094
63150/61524/62322/90984 shown

SAVE 57%

\$7.99
~~\$12.99~~ comp at \$18.85

Customer Rating ★★★★★

39857925

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WOW SUPER COUPON

4 CHANNEL WIRELESS SURVEILLANCE SYSTEM WITH 2 CAMERAS
ITEM 62368

SAVE \$260

\$239.99
~~\$279.99~~ comp at \$499.99

Customer Rating ★★★★★

39881153

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SUPER COUPON

6.5 HP (212 CC) OHV HORIZONTAL SHAFT GAS ENGINES
PREDATOR ENGINES
ITEM 60363/69730
ITEM 68121/69727 shown
CALIFORNIA ONLY

SAVE \$228

\$99.99
~~\$119.99~~ comp at \$328

Customer Rating ★★★★★

39826050

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SUPER COUPON

RECIPROCATING SAW WITH ROTATING HANDLE
CHICAGO ELECTRIC POWER TOOLS
ITEM 65570 shown
61884/62370

SAVE 66%

\$19.99
~~\$29.99~~ comp at \$59

Customer Rating ★★★★★

39809426

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SUPER COUPON

AIRLESS PAINT SPRAYER KIT
KRAUSE & BECKER
ITEM 62915
60600 shown

SAVE \$129

\$169.99
~~\$299.99~~ comp at \$299.99

Customer Rating ★★★★★

39830574

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WOW SUPER COUPON

12" x 33-3/8" WOOD LATHE WITH REVERSIBLE HEAD
CENTRAL MACHINERY
ITEM 34706

SAVE \$68

Customer Rating **★★★★★**

\$279⁹⁹

~~\$319⁹⁹~~ comp at \$347.99

39963241

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WOW SUPER COUPON

18 GAUGE 2-IN-1 NAILER/STAPLER
CENTRAL PNEUMATIC
ITEM 63156/68019 shown

Customer Rating **★★★★★**

SAVE \$93

\$15⁹⁹

~~\$22⁹⁹~~ comp at \$109

39960252

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WOW SUPER COUPON

27 LED PORTABLE WORKLIGHT/FLASHLIGHT
ITEM 67227 shown
69567/60566/62532

SAVE 71%

Customer Rating **★★★★★**

\$2⁹⁹

~~\$3⁹⁹~~ comp at \$10.41

39939798

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WOW SUPER COUPON

10", 12 SPEED BENCHTOP DRILL PRESS
CENTRAL MACHINERY
ITEM 60237

SAVE \$112

Customer Rating **★★★★★**

\$109⁹⁹

~~\$139⁹⁹~~ comp at \$222.75

39966511

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WOW SUPER COUPON

2.5 HP 12" THICKNESS PLANER
CENTRAL MACHINERY
ITEM 62555
95082 shown

SAVE \$129

Customer Rating **★★★★★**

\$239⁹⁹

~~\$299⁹⁹~~ comp at \$369

39970525

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WOW SUPER COUPON

STEP STOOL/WORKING PLATFORM
HaulMaster
ITEM 62515
66911 shown
• 350 lb. capacity

SAVE 65%

Customer Rating **★★★★★**

\$19⁹⁹

~~\$29⁹⁹~~ comp at \$57.55

39950409

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WOW SUPER COUPON

60", 4 DRAWER HARDWOOD WORKBENCH
WINDSOR DESIGN

Customer Rating **★★★★★**

SAVE \$255

\$139⁹⁹

~~\$159⁹⁹~~ comp at \$395

39986633

ITEM 69054/93454
63395/62603 shown

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Tools sold separately.

WOW SUPER COUPON

1195 LB. CAPACITY 4 FT. x 8 FT. FOLDABLE HEAVY DUTY TRAILER
HaulMaster

Customer Rating **★★★★★**

SAVE \$170

\$259⁹⁹

~~\$299⁹⁹~~ comp at \$429.99

39980274

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• DOT certified tires
ITEM 62648/62666
90154 shown

WOW SUPER COUPON

3 GALLON, 100 PSI OILLESS AIR COMPRESSORS
A. HOT DOG
ITEM 69269/97080 shown
B. PANCAKE
ITEM 60637/61615
95275 shown
YOUR CHOICE

Customer Rating **★★★★★**

\$399⁹⁹

~~\$59⁹⁹~~ comp at \$98.62

39913486

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WOW SUPER COUPON

10", 13 AMP INDUSTRIAL TABLE SAW
CHICAGO ELECTRIC POWER TOOLS
ITEM 63118/68827
63117 shown

SAVE \$50

Customer Rating **★★★★★**

\$119⁹⁹

~~\$189⁹⁹~~ comp at \$169.99

39958954

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WOW SUPER COUPON

PNEUMATIC ADJUSTABLE ROLLER SEAT
PITTSBURGH AUTOMOTIVE
ITEM 46319 shown
61160/61896

Customer Rating **★★★★★**

SAVE 50%

\$19⁹⁹

~~\$27⁹⁹~~ comp at \$39.99

39896543

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WOW SUPER COUPON

MULTIFUNCTION POWER TOOL
CHICAGO ELECTRIC POWER TOOLS
ITEM 62279/62302/62866
68861 shown

"The Price is Irresistible" - Family Handyman Magazine

Customer Rating **★★★★★**

\$14⁹⁹

~~\$19⁹⁹~~ comp at \$49.99

39943473

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WOW SUPER COUPON

10 FT. x 20 FT. PORTABLE CAR CANOPY
ITEM 60728/63054
69034/62858 shown

Customer Rating **★★★★★**

SAVE \$106

\$99⁹⁹

~~\$149⁹⁹~~ comp at \$205.99

39984953

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WOW SUPER COUPON

EAR MUFFS
WESTERN SAFETY
ITEM 94334

SAVE 77%

\$3⁹⁹

~~\$6⁹⁹~~ comp at \$17.97

39984096

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OUTDOOR/LAWN & GARDEN

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tractors, chainsaws and trimmers.
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TOOLS

107

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MISCELLANEOUS

108

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Home TECH

BY RICK MUSCOPLAT

feedback@familyhandyman.com

Avoid freeze-up disaster

4 ways to get a wake-up call before your pipes burst



ART DIRECTION: MARCIA ROEPKE • PHOTOGRAPHY: KIRTHMON F. DOZIER/DETROIT FREE PRESS VIA ZUMA

When your heat goes out, your pipes can freeze, burst and flood your house. On this house, burst pipes led to curtains of ice, inside and out.

Your tropical vacation memories can turn into a nightmare if you return home to find frozen pipes and water damage caused by a dead furnace. Asking family members or neighbors to check your home daily can't prevent serious damage if your furnace fails between visits. In the dead of winter, pipes can freeze in a matter of hours.

A freeze alert device will most likely prevent the disaster. You can install one yourself in less than an hour without any special tools. The units range from less than \$100 to about \$400, depending on how you want to be notified—phone call, text message or email. There are four basic systems you can choose from.

Freeze alert systems

Deciding on the best system for your home depends first on how you, your family and your neighbors prefer to receive the low-temperature warning—verbally by phone, or text or email. Then you can choose a unit based on the communications technologies available in your home or vacation place—phone line, Wi-Fi or cell phone.

Wi-Fi-based (\$150 to \$550)



Several companies make Wi-Fi temperature monitoring systems that send email and text alerts or activate the notification feature on a smartphone or tablet app. A Wi-Fi thermostat is the least expensive way to go for Internet-based alerts and is easy to install and configure.

The Sensi Wi-Fi thermostat (less than \$140 at home centers and online) is one popular brand, but other Wi-Fi thermostat brands offer the same features. The Sensi thermostat is factory programmed to send an Internet alert to a smartphone or tablet app when the room temperature drops to 45 degrees F or rises above 99 degrees (an important feature if you have pets and your A/C fails).

In addition to the high/low alerts, the thermostat also alerts you if the room temperature rises or falls by 5 degrees when the thermostat is calling for either heat or cooling. That kind of temperature change means your HVAC system can't keep up with the demand and can mean you've got a power outage or an equipment failure.

By notifying you way before temps dip dangerously low or get too high, you'll have enough time to summon a family member or neighbor to check on your home. This particular thermostat also alerts you to a high-humidity condition (greater than 78 percent) that could indicate a water leak.

If you choose a Wi-Fi unit, make sure you have a good signal in the room where it's installed and provide backup power to your Wi-Fi router. Then program the temperature set points (if equipped) and the text phone numbers and email addresses for everyone you want notified of a temperature alert.

Keep things running when power is out

Most Wi-Fi thermostats and freeze sensors require backup batteries to provide power during an outage. But if you don't provide backup power for your Wi-Fi router, the alerts won't go through. Many cable and phone company Wi-Fi routers have a backup battery compartment, but they don't supply the battery. You have to buy one and install it yourself. Router backup batteries run the unit on standby for about eight hours and cost about \$35. Replace the battery every few years. Or, buy an uninterruptible power system (UPS) and plug the router and temp alert device into it.

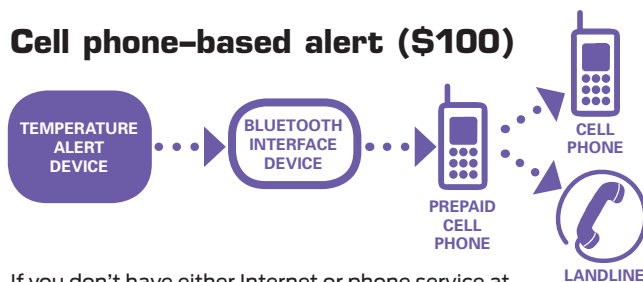
A disaster for one of our own

When one of our editors returned home from vacation, he discovered that the furnace had died and his water lines had frozen and burst, causing all kinds of expensive

damage. His son had checked the house just the day before and everything was fine. The repairs came to about \$60,000. His family had to live in temporary housing for six weeks

while repair crews put the house back together. If he had installed a heat loss monitor/freeze alarm, he could have avoided all that.

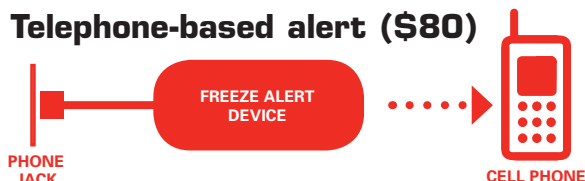
Cell phone-based alert (\$100)



If you don't have either Internet or phone service at your home or vacation place, but do have a strong cell phone signal, purchase a phone alert unit and a prepaid cell phone that works with that carrier's signal and has the Bluetooth feature. Then buy a Bluetooth interface device (one choice is the Sensaphone FGD-0230; \$110 at DIYcontrols.com).

The interface provides dial tone to the temperature alert device and completes the call through the prepaid cell phone using Bluetooth. Program the alert unit, pair the phone and Bluetooth interface and connect the components. Make a test call.

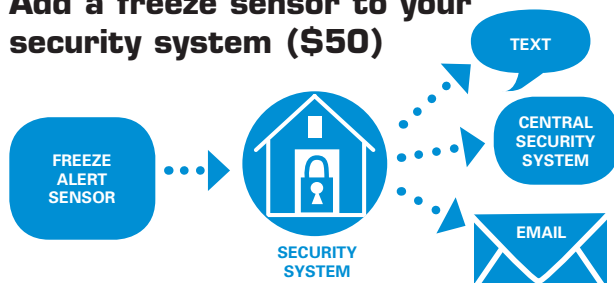
Telephone-based alert (\$80)



If your home has a landline or a voice over Internet protocol (VoIP) phone line, choose from the many freeze and high-temperature alert devices on the market. The Home Sitter unit from Control Products (HS-700; \$80) has factory preset high (85 degrees F) and low temperature (45 degrees) set points and a water sensor. It calls three phone numbers.

Just add batteries, plug the unit into an outlet, program the phone numbers to call and plug the phone cable into the nearest phone jack. When the unit detects water or an out-of-range temperature, it calls all the programmed phone numbers and plays a recorded voice alert.

Add a freeze sensor to your security system (\$50)



If you already have a home security system and it alerts you by email, text or central station, add a wired or wireless freeze sensor for about \$50 (homesecuritystore.com is one online source).

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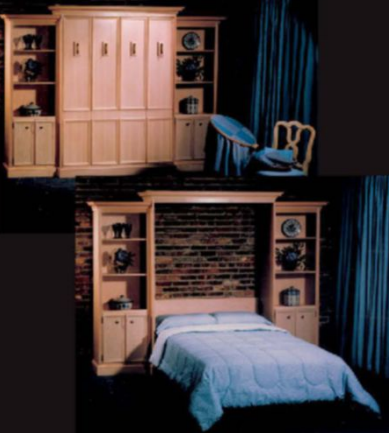
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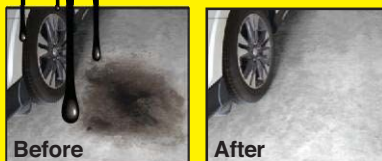
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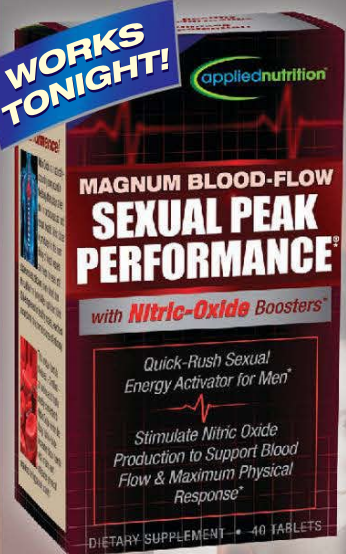
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SCREWY POCKET DOOR

My daughter had recently bought a house with her fiancé, and there was a problem with the master bedroom closet. The weight of their clothes was too much for the flimsy shelving, held in place with only hollow wall anchors. No problem for “Handy Dad,” though.

During their honeymoon, I went to work reattaching everything in the closet, being careful to drive screws into the studs of the closet’s back wall. A few days later, my daughter called. The closet was fine, but she couldn’t open a pocket door in the bedroom. Turns out the pocket door shared a wall with the back of the closet, and my screws had gone through the pocket door’s frame. Some shorter screws fixed the problem, but not my red face.

Mike Fritz



Hold on!

We wanted to move our washer and dryer down to the basement. Although my wife was due home shortly to help, I decided to get a start on it. I loaded the dryer onto a dolly and rolled it toward the steep, narrow staircase.

I was in trouble immediately. The dryer began to pull me forward, so I dropped to the floor and lodged my feet against both sides of the doorjamb. Ten minutes later my wife arrived home to find me sprawled at the head of the stairs, sweating and holding on with all I had. She began giggling uncontrollably.

One of us had to get below the dryer quickly before I dropped it down the stairs, but the staircase was too narrow for my wife to squeeze past. The basement has an exterior door, so my wife held the dolly while I ran outside and entered the basement. Next time, I’ll be more patient and wait until my wife gets home.

John McAllister



Drilling debacle

My dad was doing some electrical work at home and had drilled a hole in a wall so he could run some new wiring. Unbeknownst to him, directly behind that wall on a shelf was a very full bottle of liquid laundry detergent. By the time we found out what had happened, most of an entire gallon of goopy, gloppy detergent was all over the floor. It took an entire roll of paper towels to clean up that mess.

Kevin Barnes

Got your own DIY mistake?

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See p. 4.

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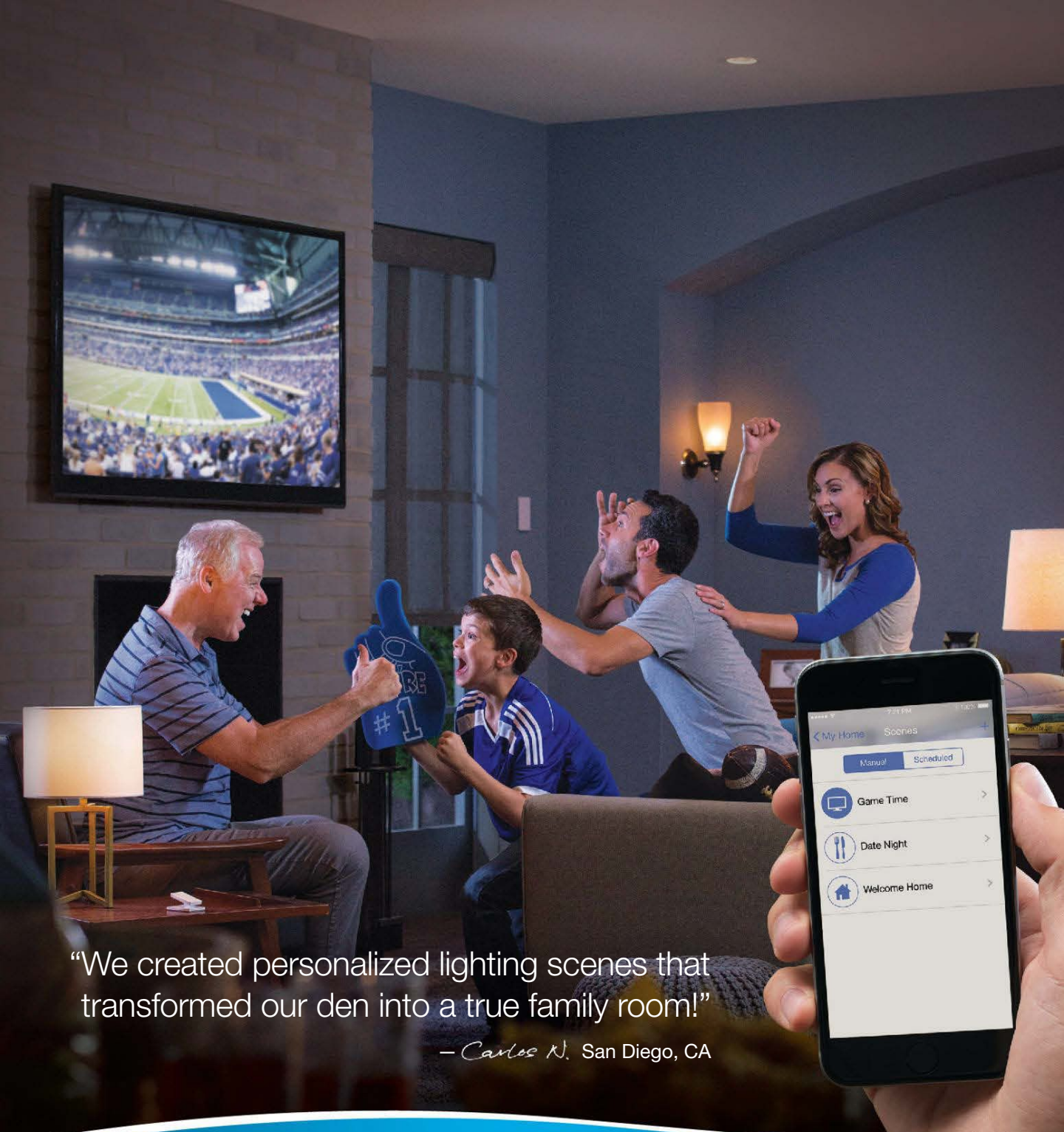
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