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ISSUE 233 JULY 2015

Better Homes and Gardens®

WOOD

The World's Leading Woodworking Resource

Tansu Cabinet

p.36

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Fast from
Stock Cabinets**

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Fixes for Fussy Drawers p.10



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- Max. cutting height: 6"
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- Motor: 1 HP, 110V/220V, single-phase, TEFC, 11A/5.5A
- Precision-ground cast iron table size: 14" sq.
- Table tilt: 45° R, 15° L
- Cutting capacity/throat: 13½"
- Max. cutting height: 6"
- Blade size: 92½"–93½" L (1½"–¾" W)
- Blade speeds: 1500 & 3200 FPM
- Approx. shipping weight: 196 lbs.

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17" BANDSAW

- Motor: 2 HP, 110V/220V, single-phase, TEFC, 20A/10A
- Precision-ground cast iron table size: 17" sq.
- Table tilt: 45° R, 10° L
- Cutting capacity/throat: 16¼"
- Max. cutting height: 12½"
- Blade size: 131½" L (1½"–1" W)
- Blade speeds: 1700 & 3500 FPM
- Quick-release blade tension lever
- Approx. shipping weight: 346 lbs.

MADE IN AN ISO
9001 FACTORY

G0513P ~~\$895⁰⁰~~
SALE \$875⁰⁰



1½ HP SHAPERS

- Motor: 1½ HP, 120V/240V, single-phase, 12A/6A
- Precision-ground cast iron table size: 20¼" x 18"
- Spindle travel: 3"
- 2 interchangeable spindles: ½" & ¾"
- Spindle speeds: 7000 & 10,000 RPM
- Max. cutter dia.: 5"
- Approx. shipping weight: 221 lbs.

OPTIONAL
G1706
WING



GRIZZLY GREEN
G1035 ~~\$595⁰⁰~~ SALE \$575⁰⁰

POLAR BEAR WHITE
G1035P ~~\$595⁰⁰~~ SALE \$575⁰⁰



10" HYBRID TABLE SAW

- Motor: 2 HP, 120V/240V, prewired 120V, single-phase, 60 Hz • Amps: 15A at 120V, 7.5A at 240V
- Precision-ground cast iron table w/ wings: 40½" W x 27" D
- Table height: 35½" • Footprint: 21" L x 19½" W
- Arbor: ¾" • Arbor speed: 3450 RPM

New!



- Max. depth of cut: @ 90°–3¼", @ 45°–2¼"
- Rip cap.: 30" R, 15" L
- Overall size: 57¼" W x 35¾" H x 37½" D
- Approx. shipping weight: 348 lbs.

G0771 ~~\$795⁰⁰~~ INTRO. PRICE \$675⁰⁰

2 HP DUST COLLECTOR WITH 2.5 MICRON BAG

- Motor: 2 HP, 240V, single-phase, 3450 RPM, 9A
- 6" inlet with removable "Y" fitting with two 4" openings • Impeller: 12½" aluminum
- Portable base size: 21¼" x 33½"
- Bag volume: 5.7 cubic feet
- Height (with bags inflated): 78"
- Bag size: 19½" x 33" (2)
- Air suction capacity: 1550 CFM
- Max. static pressure: 11"
- Standard bag filtration: 2.5 Micron
- Approx. shipping weight: 122 lbs.

MADE IN
AN ISO 9001
FACTORY

FREE!
2-Stage Cyclone Separator
W1049—a \$34.25 value

G1029Z2P ~~\$345⁰⁰~~ SALE \$325⁰⁰



12" BABY DRUM SANDERS

- Sanding motor: 1½ HP, 115V, single-phase, 13A
- Conveyor motor: ½ HP, 115V, single-phase, 0.3A
- Drum surface speed: 2127 FPM
- Max. stock dimensions: 12" wide x 3½" thick
- Min. stock length: 8"
- Sanding drum size: 4"
- Sanding belt size: 3" x 70" hook & loop
- Dust collection port: 2½"
- Feed rate: 2.5–17.3 FPM
- Approx. shipping weight: 166 lbs.

GRIZZLY GREEN
G0459 ~~\$695⁰⁰~~
SALE \$550⁰⁰

POLAR BEAR WHITE
G0459P ~~\$695⁰⁰~~ SALE \$550⁰⁰



8" JOINTERS

- Motor: 3 HP, 240V, single-phase, TEFC, 3450 RPM, 15A
- Precision-ground cast iron table size: 9" x 72½"
- Cutterhead knives (G0656): 4 HSS, 8" x ¾" x 1½"
- Number of carbide inserts (G0656X): 40, 14 x 14 x 2mm
- Cutterhead speed: 4800 RPM • Cutterhead dia.: 3"
- Max. depth of cut: ½" • Max. rabbeting depth: ½"
- Cuts per minute: G0656–20,000, G0656X–21,400
- Approx. shipping weight: 523 lbs.

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BLOCKS

4 KNIFE CUTTERHEAD
G0656 ~~\$825⁰⁰~~ SALE \$795⁰⁰

SPIRAL CUTTERHEAD
G0656X ~~\$1250⁰⁰~~ ONLY \$1195⁰⁰



WOOD LATHE WITH DIGITAL READOUT

- Motor: 2 HP, 110V, single-phase, 14A
- Swing over bed: 16" • Swing over tool rest: 13"
- Distance between centers: 46"
- 1" x 8 TPI RH headstock spindle
- MT#2 spindle & tailstock tapers
- Spindle bore: ¾"
- 10 Speeds: 600–2400 RPM
- Indexed headstock rotation at 0°, 60°, 90°, 120°, and 180°
- Overall size: 72½" L x 19" W x 48" H
- Approx. shipping weight: 354 lbs.

DIGITAL SPEED
READOUT

2 HP MOTOR!

G0462 ~~\$625⁰⁰~~ SALE \$595⁰⁰



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The **WOOD**® difference: We build every project, verify every fact, and test every reviewed tool in our workshop to guarantee your success and complete satisfaction.

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FREE JIG PLANS. GO GET 'EM!



Bandsaw Circle Jig

woodmagazine.com/circlejig



Box-joint Jig

woodmagazine.com/boxjoint



Cope-cutting Sled

woodmagazine.com/coping



Miter Shooting Board

woodmagazine.com/shooter

TLC FOR YOUR TABLESAW

Do your expressions of love for your table saw bring awkward silences from your coworkers and concerned looks from your friends? Ditch those unhealthy relationships, and spend some time with your true love:

Video: Squeeze sweet accuracy from your main squeeze.

woodmagazine.com/squeeze

Plan: A miter sled makes perfect angles with your perfect angel.

woodmagazine.com/angleangel

Video: Zero-clearance inserts snuggle into your saw's curves.

woodmagazine.com/snuggle



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Filling the void



A much younger—and skinnier—Dave builds a baby crib out of cherry 20-some years ago, in the b.k. ("before kids") era.

For as long as I can remember, most days began with me asking my wife, Annette, "What's on the schedule for tonight?" Invariably, her response included a practice or performance by one or both of our kids, or a church or school committee meeting. Precious were the nights and weekends when I could grab some quality shop time. Now the kids are grown and gone. And the schedule has slowed.

It felt odd at first, coming home from work and simply not... having... anything... scheduled. With our newfound free time, it was tempting to just plop down in front of the TV and watch those can't-miss shows friends raved about.

Instead, I've been trying to get out into the shop every night, pitching over-the-hill finishes and glue bottles and gotta-have gadgets that seemed like a really good idea at the time. Between cleanings, I've sharpened and tuned up tools. I'm now back in b.k. (before kids) mode, spending more time with my passion—building furniture—without the hassle of having to remember what I was thinking when I machined all those parts a month (or year) ago.

Empty-nesting gives me a glimpse of what retirement could be like, and makes me feel a little sad for people who retire without a hobby and go right back to work out of boredom. Without woodworking, I could easily become a fat, old couch potato when I decide to quit my day job.

So, let's make a pact: Reach out to that overworked neighbor or colleague before they retire and invite him or her into your shop to build a simple project or two. They'll be rewarded with a pursuit they can enjoy literally for the rest of their lives; your reward is sharing your love of woodworking. I think the cooler stand (page 24) and A-frame planter (page 60) would be great fun and functional projects to try with them. 🌲

Dave Campbell
dave.campbell@meredith.com



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It takes one to carve one

Husqvarna asked me to carve a chainsaw sculpture of a chainsaw, and I thought *WOOD*® magazine readers would really dig the results! It was created in my studio in Medway, Massachusetts, and unveiled at the GIE+ (green industry and equipment) Expo in Louisville, Kentucky. It then went on tour around the country, and is now bound for Husqvarna's corporate offices in Charlotte, North Carolina.

—“The Machine” Jesse Green, Medway, Mass.
Official chainsaw sculptor of Husqvarna USA
and personality on National Geographic Channel's
“American Chainsaw”



Is the TV frame too hot?

Although the TV frame in issue 231 (March 2015) looks nice, I didn't notice any vents in the frame box—it appears it will seal the TV to the wall. I'd strongly recommend adding some ventilation at the top and bottom of the box/frame. Failure to provide adequate ventilation will likely lead to premature failure of the TV.

—Caleb Christopher, Basehor, Kan.

We were concerned about heat buildup, too, Caleb, so we ran our design by a veteran TV and video monitor expert, and he gave us his approval. Modern LED screens generate considerably less heat than older models, and even the small gap afforded by our design provides adequate airflow to prevent damage. However, if you want increased ventilation, simply drill a series of holes, or rout a slot, in the top box side (E) where it won't be seen.

—WOOD Editors



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WOOD magazine never uses outside parties to solicit subscription renewals. All legitimate renewal notices will contain the *WOOD* logo and a 10-digit subscriber number (preceded by WDM) that matches the one on your magazine's mailing label, and payments will always be to *WOOD*—never to

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FAQs about EABs

► Emerald ash borer (EAB) larvae feed on the inner bark of ash trees, disrupting the tree's ability to transport water and nutrients, eventually killing it.

► Since its discovery, the species has accounted for the death of 15 million ash trees.

► Woodpeckers like to eat EAB larvae, so heavy woodpecker damage on an ash tree may be a sign of an infestation.

► The good news? Researchers learn more each day about the biology of EABs, their rate of spread, methods for EAB detection, and how insecticides can be used to protect trees in infested areas. (For more information, visit emeraldashborer.info.)

A carving consideration

I enjoyed the "Simple Start to Relief Carving" in issue 232 (May 2015), but there was one small detail overlooked. Carving chisels and gouges are sharpened at a lower bevel angle (20°) than a typical bench chisel (around 25°) or mortise chisel (around 30°). A carving tool with a higher bevel angle would be difficult to get through the wood; the needed angle of attack would force the blade to go too deep.

—Roman Horoszewski, Fort Myers, Fla.

Article Updates

► Rolling tool chest

In issue 231 (March 2015), in the cutting diagram on page 24, parts J–M should be cut from ½" stock.

► Loft bed

In issue 231 (March 2015), on page 32, Drawing 9, the screw lengths should be 2½", not 1½".

► Traditional dresser

In issue 219 (July 2013), Drawing D2 on page 45 should indicate that the dresser legs (A) measure 52" long. 🌲

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Materials code 634

The Circle of Sharpening

Keep it simple; do it fast.

As woodworkers, we'd much rather be working *with* tools than working *on* them, so we tend to put off sharpening until we absolutely have to. The tools get too dull to make clean cuts, and the

drudgery begins. But with this simple, easy-to-remember technique, you can put your chisels and plane irons back to work with scalpel-sharp cutters in mere minutes. Here's how.

What we use

Veritas Mk II honing guide:

#05M09.01, \$68.50, Lee Valley, 800-871-8158, leevalley.com

Extra fine/coarse DMT DuoSharp diamond bench stone; 6,000-grit Shapton GlassStone ceramic water stone:

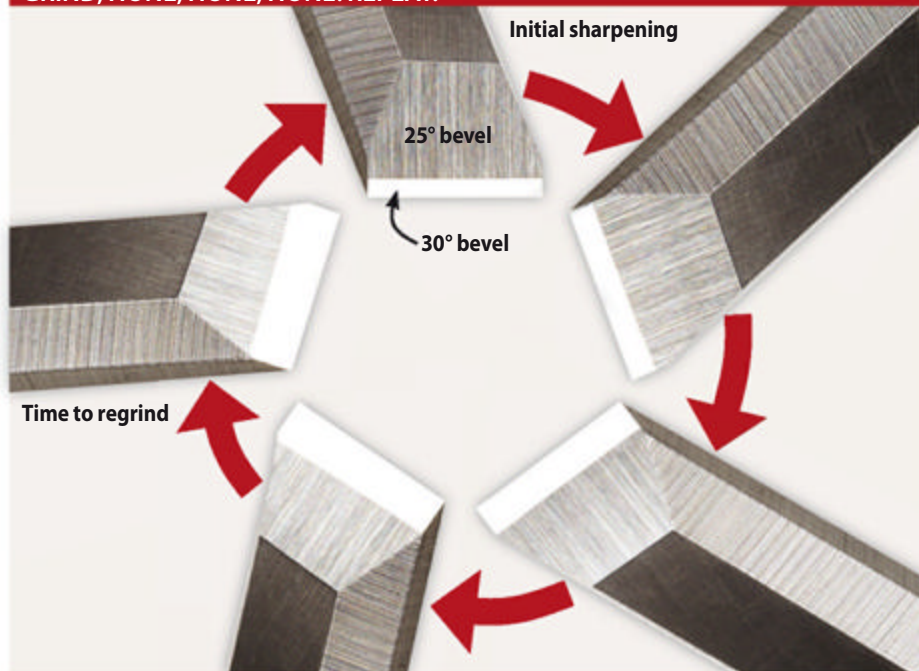
woodmagazine.com/sharpenstones

FLATTEN THE BACK ONCE



A chisel or plane iron must have a dead-flat back to cut properly. Spritz the coarse side of a 325-grit diamond stone with water and rub the back of the tool side-to-side until you get an even scratch pattern. Repeat the process on the extra-fine face of the diamond stone (1,200 grit), and then on the ceramic stone (6,000 grit) to polish the back. Stop when you achieve a flat, mirrorlike surface. Once the back shines, you'll never have to repeat this step again.

GRIND, HONE, HONE, HONE. REPEAT.



With a grinder or the coarse side of your diamond stone, establish a 25° bevel on the front face of your blade. Secure the blade in the honing guide and sharpen the tip at 30°, starting with the extra-fine diamond stone and polishing with the ceramic stone. When your tool shows signs of dulling, sharpen that tip again at 30° using the 1,200- and 6,000-grit stones. After several sharpenings, the leading edge will take up more and more of the blade's front face. When it approaches one third to one half of that surface, regrind the blade at 25° and start the circle of sharpening over again. 🌱

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George VondriskaWoodWorkers Guild of America
Vondriska Woodworks

See George discuss gluing tips and woodworking techniques at wwgoa.com.

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Great Ideas For Your Shop

Stand-up Tool Storage

Save benchtop space by storing long, narrow tools in this organizer. After building the box, cut lengths of PVC pipe to fill it, stairstepping the lengths to steady long tools at the rear and allow better access to shorter tools down front. Make it easier to drop tools into the pipe by cutting a 20° bevel on the top of each. Spread a thin layer of construction adhesive in the bottom of the box, and then stand the holders upright inside.

Project design: **Wes Bowling**
Herriman, Utah

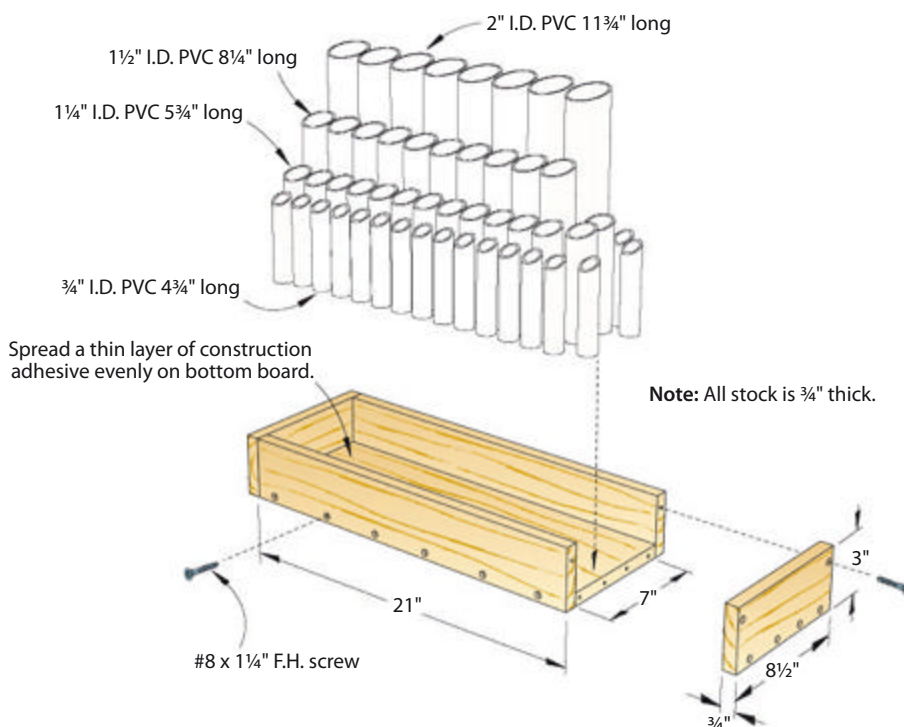
Bevel each
PVC pipe top.

20°



More Resources

► For more shop storage plans, visit
woodmagazine.com/shopstorage.



TRACK SAW

- Motor: 120V, 9A, 1100 watt, 5500 RPM
- Blade diameter: 160mm (6¼")
- Cutting capacity:
With track: 1¾" @ 90°, 1⅞" @ 45°
Without track: 2½" @ 90°, 1⅞" @ 45°



W1832
Track Saw Master Pack
Includes: Saw, Guide Rail,
and Accessory Pack



W1835 Track Saw only
D4363 Accessory Pack

D4362 Guide Rails

14" BANDSAW

- Motor: 1 HP, 110V/220V
- Precision-ground cast iron table size: 14" x 14" x 1½"
- Blade size: 93½" (⅞" to ¾" wide)
- Cutting capacity 13½" (throat)
- Cast iron frame and wheels
- Ball bearing blade guides
- Includes fence and miter gauge

*Feature
packed, and an
incredible value*



W1706 14" Bandsaw



PLANER MOULDER with Stand

- Motor: 2 HP, 240V, single-phase, 10.8A, 3450 RPM
- Precision-ground cast iron table size: 14⅞" x 10" x 7⅞"
- Max planing width: 7"
- Max planing height: 7½"
- Cuts per minute: 14,000
- 2 HSS knives



W1812 Planer Moulder with Stand



10" TABLE SAWS with Riving Knife

- Motor: 3 HP, 220V, single-phase motor
- Precision-ground cast iron table size: 27" x 40¼"; (W1819) 53⅞" with extension; (W1820) 74" with extension
- Max. rip capacity: (W1819) 29½", (W1820) 50"
- Camlock fence with HDPE face



*Free 10"
Carbide-Tipped
Blade*

W1819
SHOWN

W1819 10" Table Saw

W1820 10" Table Saw with Long Ext. Table

¾ HP 13" BENCH-TOP DRILL PRESS

- Motor: ¾ HP, 110V, 1725 RPM
- Overall height: 38"
- Spindle travel: 3¼"
- Swing: 13¼"
- Drill chuck: ⅝"
- **Speeds: 12, 250-3050 RPM**
- Table: 12⅞" dia.
- Table swing: 360°
- Table tilt: 45° left & 45° right



W1668 ¾ HP 13" Bench-Top Drill Press



6" x 12" HEAVY-DUTY COMBINATION SANDER

- Motor: 1½ HP, 120V, single-phase, 10.5A, 1725 RPM
- Precision-ground cast iron tables (2)
- Sanding belt size: 6" x 48"
- Belt Speed: 1066 FPM
- Disc size: 12"
- Disc speed: 1725 RPM



*Made in an ISO 9001
factory*

W1712 6" x 12" HD Combination Sander



OSCILLATING SPINDLE SANDER



- Motor: ½ HP, 120V, 3.5A
- 58 oscillations per minute
- Stroke length: ⅝"
- Sanding drum length: 4½"
- 2000 RPM (½" spindle)
- Table size: 15" L x 11½" W
- Dust port size: 1½"
- Switch: Paddle ON/OFF with disabling key
- CSA certified meeting CSA C22.2 #71.2-10 and UL 987-7 standards

VERY POPULAR!



W1831 Oscillating Spindle Sander

WALL DUST COLLECTOR

- Motor: 1 HP, 110V/220V, single-phase
- Air suction capacity: 537 CFM
- Bag capacity: 2 cubic feet
- Standard bag filtration: 2.5 micron
- Static pressure: 7.2"



W1826 Wall Dust Collector



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Cure Ailing Drawers

Don't get hung up on drawers that drag or tip. Instead, use these tricks for smooth sliding.

Whether it's a project fresh from your shop or one of Grandma's treasured antiques, drawer problems are common occurrences. Fortunately, most drawer ailments can be easily corrected.

First, determine the cause of the problem. Drawers too tight or too loose can be traced to changes in humidity levels. (High humidity causes drawers and surrounding cabinet-frame parts to swell and bind; dry conditions cause them to shrink.) They can also result from wear over time, or a construction mishap. And, drawers that were simply built too tight or too loose in their frames to begin with will never get better without a small dose of corrective action.

To get started, examine the drawer for loose, damaged, or worn parts. Inspect the joints. If the glue bonds have broken, carefully remove the offending pieces, and then sand off the old glue, going down to bare wood. Then, reglue, reassemble, and clamp the drawer box back together, checking for square.

If you find a cracked or split drawer side, reglue the part if it appears salvageable, or remake it from scratch.

In rare instances, you may need to build a replacement drawer box. If possible, reuse the original drawer front. Before remaking any drawer part, check the other drawers in the same piece to see whether a similar problem exists elsewhere. That way, you won't waste time having to go through tool setups and machining stages more than once. And by having the old drawer parts, you can extract exact measurements.

If the drawer appears okay, check its opening for obstructions or damage. The problems can be many and varied, but at *right* you'll find three common ones you may encounter, and a simple fix for each. 🌱



1. The drawer rubs along its top edge.

First, look for rub marks to identify where the drawer is sticking. If it's along the top edge, clamp the drawer to a workbench and use a block plane or 100-grit sandpaper to remove enough material in those sticky areas to allow the drawer to slide smoothly in its opening. Work slowly, frequently rechecking the fit. Don't create another problem by removing too much material.



2. The drawer drags loudly when pulled.

Apply adhesive-backed nylon glide tape, found at hardware or woodworking-supply stores. For best adhesion, first clean the area of any dust, debris, or old wax. Fit the glide tape snugly into the corners of the drawer opening, as shown.



3. The drawer rubs along its sides.

If the drawer rubs along its sides, you can uniformly remove a hair's thickness of material using a jointer. If the drawer has a front that can't be unscrewed, make a few quick passes with a belt sander instead.

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CELEBRATING 25 YEARS

Getting Back to Basics

by Dave Noftz, lessordinary.net



To pare down the tool clutter, think before buying a set of anything. Will you employ every chisel in the box? Buy it! Will you use only the ¼" round-over bit from the jumbo bit set? Avoid it!

I had an epiphany a few years ago while watching a television interview of a local athlete. When asked how his team would bounce back from a tough loss, he said, "We just need to work hard, get back to basics, and improve our fundamentals."

Okay, he regurgitated a cliché that he found in the back of his league-issued handbook for media relations, but his response still had merit when applied to woodworking. I realized that the gadgety tools that I loved in my early

woodworking years were holding me back, so I decided to also go back to basics and refocus my efforts around a core set of tools to develop the fundamental skills. Here are three key strategies that will help you create a similar tool kit.

Stay away from sets

Tool manufacturers love to offer some tools, such as router bits, chisels, and carving gouges, in sets. The humble chisel, for example, is nothing more than a pointy edge on a stick, but there are dozens of variations. Buying a set of chisels seems like a good way to instantly stock your shop with a broad variety of tools. But all too often, you end up with a few chisels you use regularly, and the rest just gather dust in a cabinet. In reality, you're better off buying just a few basic bench chisels; start with the most useful sizes: ¼", ⅜", and ½". Pare some end grain, whack them with a mallet, and practice sharpening. Using the tools will tell you which of the specialized forms you should learn more about, and which you can ignore.

Dave Noftz has been practicing the hobby of woodworking since 2003 in his Chicago-area basement shop. Recently he began asking himself, "Why?" More recently, he began sharing the thoughtful and entertaining answers in his blog at lessordinary.net.



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- 1 - Tripod



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Purge the one-trick ponies

The minimalist tool kit has no need for tools that aren't used often enough to justify the space they occupy in your tool cabinet. A dovetail jig does that one thing really well, but does it earn its keep in your shop? How often would you actually use it in a year? If you're not mass-producing dresser drawers, you may be better served learning to cut that same joint with the multi-purpose tools you already own. Cut them by hand with a saw and some chisels, or use your tablesaw or bandsaw, if you prefer power-tool methods. Once you hone your skills at cutting joinery with basic wood-working tools, you can walk into anyone else's shop and execute the same joint with the same quality.

Don't need it now? Don't buy it now

Ten years ago, I bought an array of C-clamps because I thought it was important to "build up my clamp collection." I haven't found a use for them yet, but they sure look great hanging on my clamp rack. I leave them there as a reminder to never buy a tool until I have an immediate need for it. If you're ever considering the purchase of a tool that "looks neat" or "could be useful," just put the catalog down and back away slowly. 🌱



The C-clamps of shame. After buying—then never using—these clamps, I established the rule that I won't buy a tool unless I can put it to work immediately.



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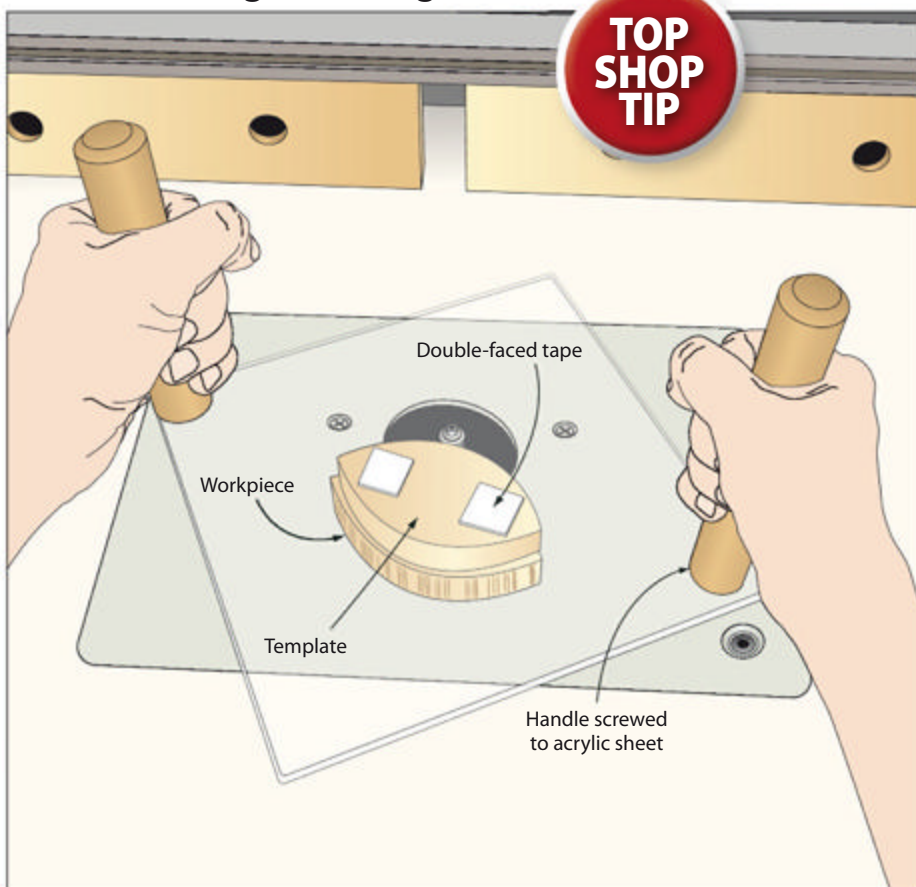
For safe routing, trap small parts beneath a “glass ceiling”

Routing small workpieces doesn't have to be dangerous or difficult. Just make this simple small-parts holder from clear acrylic and dowels. Double-faced-tape your workpiece to the holder's bottom face to template-route or add a profile. Because the acrylic is clear, your view is unhindered as you work.

—Jim Moorehead, Barrigada, Guam



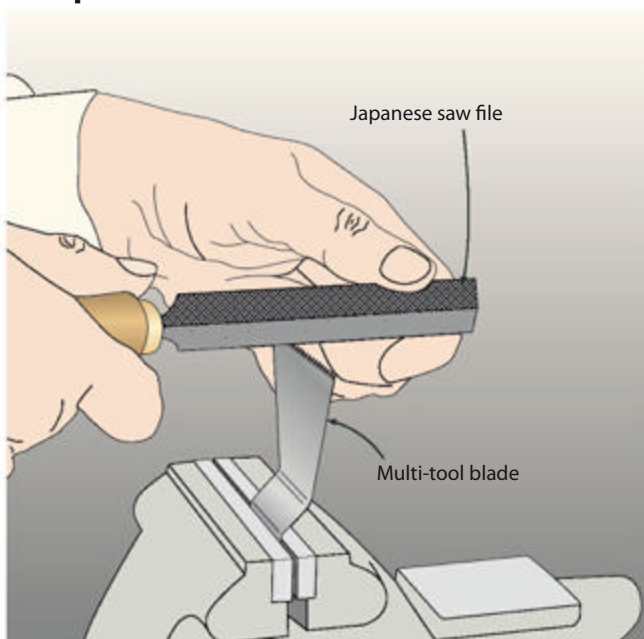
For sending this issue's Top Shop Tip, Jim receives two 10" DMT DuoSharp bench stones valued at \$335.



File this one under sharper multi-tool blades

While cutting out damaged molding in my home using my oscillating multi-tool, the tool's blades began to dull, burning the wood after only a few cuts. Because the blades cost around \$10 each, and throwing out blade after blade seemed wasteful, I decided to resharpen them. I bought a set of Japanese saw files (no. 06Q10, \$39.99, 800-225-1153, woodcraft.com) for the job, and soon had all my blades sharpened.

—Sal Alomia, Staten Island, N.Y.



TIPS EARN \$\$\$

Have a clever trick for overcoming a shop conundrum? Share it with us, and if we print it, you could earn up to \$150. If your tip is the best of the issue, it'll win Top Shop Tip honors, and you'll receive a tool prize worth at least \$300!

Send your tip, photos or drawings, and contact info to

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continued on page 18

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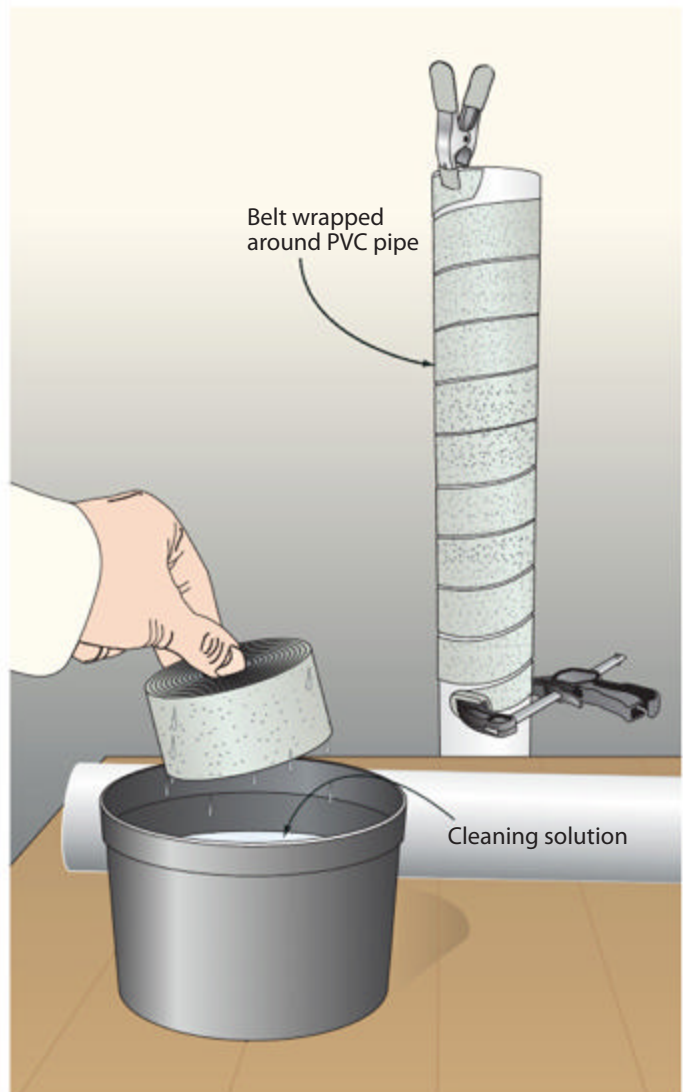
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Shop Tips

Control the curl when cleaning drum-sander belts

Here in Wyoming, we have quite a bit of beetle-kill pine, making it an inexpensive option for project builds. The downside: Pitch from the soft wood quickly builds up on my drum-sander belts. To remove the pitch, I soak the belts in cleaning solution. But the wet belts tend to curl uncontrollably as they dry. I turned that tendency to my advantage by wrapping the belt around a PVC pipe about the same diameter as my sander's drum, clamping it in place until it dries fully.

—Dan Pepe, Laramie, Wyo.



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continued on page 20

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Fixing those ugly scratches and gouges on your wood furniture from everyday use or moving is no longer a major chore, thanks to Touch-Up Solutions furniture care products. Fill, cover and protect damaged furniture easily. Whether you're a rookie or professional simply coloring a nick or repairing a gash, Touch-Up Solutions has the product to fix it right the first time.

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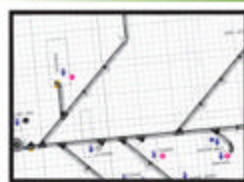
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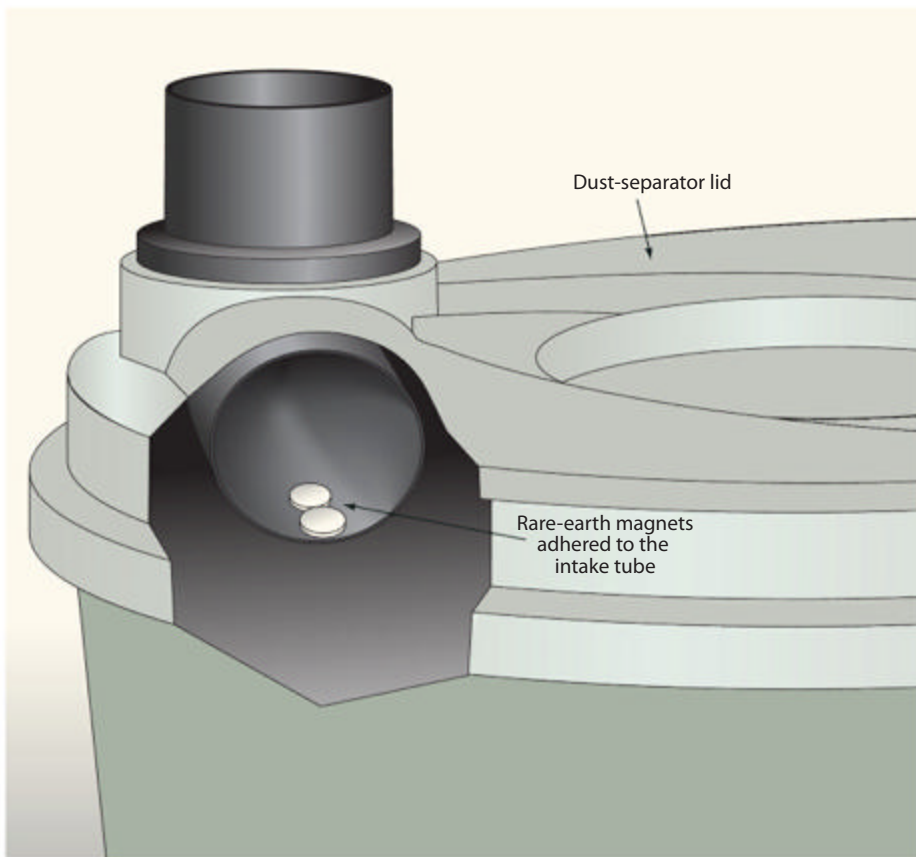
Clean Air! Clean Shop! Clean Tools!

Shop Tips

Magnetic gatekeepers nab metal fly-bys

While spending the better part of an hour sifting through the contents of my dust separator, looking for a screw that had been accidentally sucked up, I came up with this quick ductwork modification that would save me from having to do so again. By epoxying rare-earth magnets on the separator lid's intake tube, all incoming metal pieces get caught and held in an easily accessible spot. 🌱

—Jim Hemphill, Evans, Ga.



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Overall dimensions: 32" W x 17½" D x 37¾" H
Approximate cost: \$240 including cooler and hardware

Cooler Stand

Turn an eyesore into an eye-catcher by building this no-stoop stand.

Note: You may have to make some adjustments to the dimensions of this plan to fit your cooler. We used a flat-topped 48-quart Coleman cooler (no. 3000000021, \$45, 800-835-3278, coleman.com) with a drain and an easily removable lid. Measure the height of the cooler with the lid and add 1½" to determine the length of the stiles (A, D). When determining length and depth, be sure to accommodate handles or hinges that may protrude.

Begin with a box

1 From ¾" cedar, cut to size the front/back stiles (A), front/back upper and lower rails (B, C), end stiles (D), and upper and lower end rails (E, F) [Materi-

als List]. Cut centered ¼" grooves along the inside edges of each of these parts [Drawing 1]. On the upper and lower rails (B, C, E, F), cut the ¼" tenons on the ends. Rout ⅛" chamfers on the rails along the front face of their grooved edges.

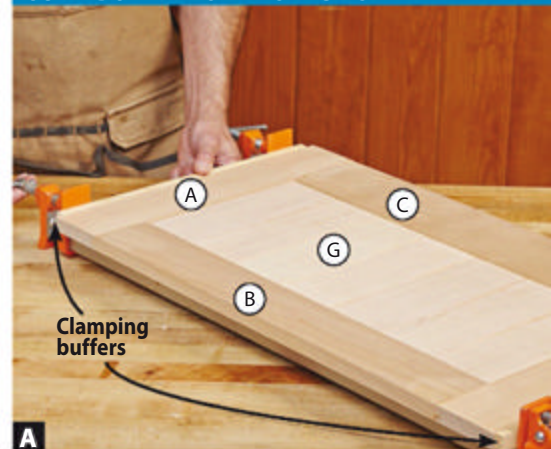
2 From ½" cedar, cut the panel slats (G) to size. Rabbet both faces on each end to create a tongue that fits the grooves in the rails [Drawing 1]. Plane or sand ⅛" chamfers on the front faces of the slats. (A router will work only on the edges without tenons.)

3 Dry-fit the front/back panels (A, B, C, G) and the end panels (D-G).

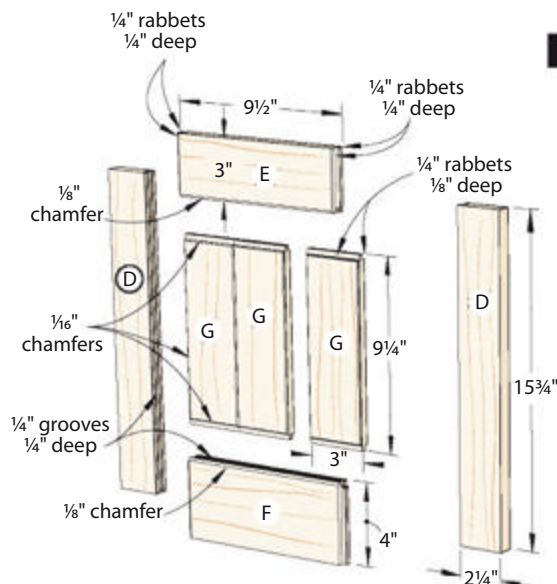
Quick Tip! To allow for seasonal movement of the panel slats (G), leave a ⅛" space (overall) between the slats and the front/back stiles (A). You may need to shave down one or two slats using a block plane. Space the slats evenly from side to side before assembly.

When satisfied with the fit of the parts, sand them to 220 grit. Then, glue and clamp the panels [Photo A].

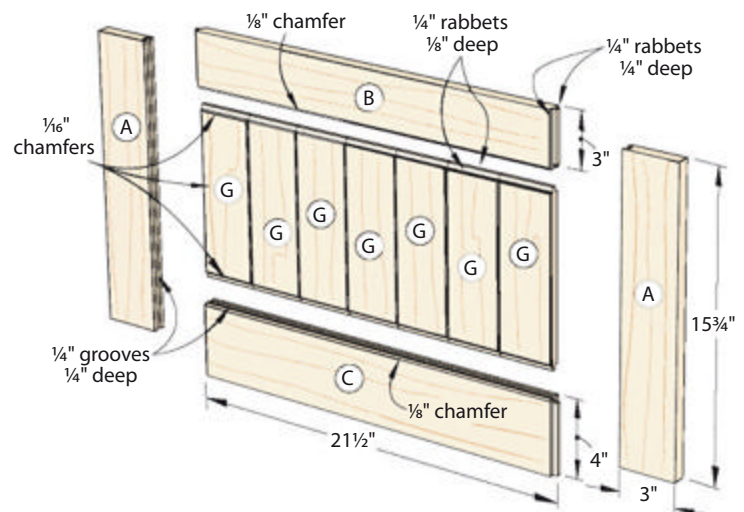
USE A BUFFER FOR PROTECTION



A Given cedar's softness, clamping can crush the edge of your workpiece. Avoid damage by using a thin buffer between the clamps and the workpiece.



1 PANEL ASSEMBLIES



4 Assemble the box (A-G), gluing the end panels between the front/back panels [Photo B]. Cut the support cleats (H) to size [Drawing 2]. Glue and screw them to the box's inside bottom edge. Cut the bottom slats (I) to size and screw them in place atop the support cleats, leaving a 3" gap between each slat.

5 Laminate four handle blocks (J), cut them to shape, and drill the hole where shown [Drawing 2a]. Place a 11½" length of ½" copper pipe between two of the handle blocks. Glue and screw this assembly to the side of the box (A-G) [Drawing 2]. Repeat for the other side.

Put a lid on it

1 Cut the lid rails (K) and stiles (L) to size [Drawing 3]. Glue up the lid panel (M) slightly oversize. When the glue is dry, cut the panel to final size.

2 Center ¼" grooves in the lid rails (K), stiles (L), and panel (M) [Drawing 3]. Cut ¼" tenons on the ends of the lid rails. Add a 14° bevel to the top face of the lid panel [Drawing 3a].

Quick Tip! When beveling the top panel, add a tall auxiliary fence to your tablesaw for added support.

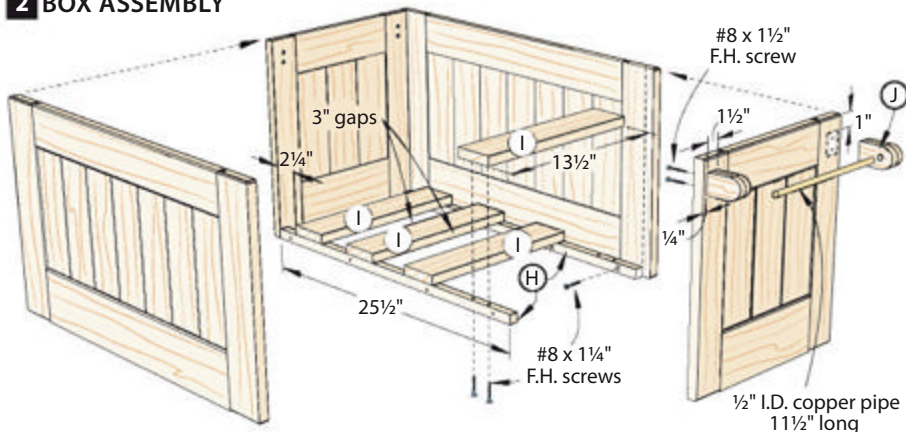
3 To make the lid spacers (N), cut 2"-wide stock to fit between the lid stiles (L). Sand the lid (K/L/M) parts to

GLUE THE BOX UP SQUARELY

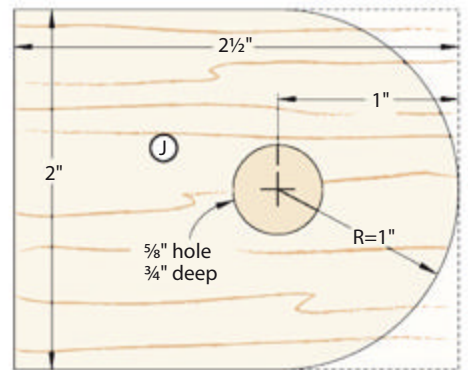


B To ensure the box assembly (A-G) goes together squarely, measure its diagonal dimensions. They must be equal.

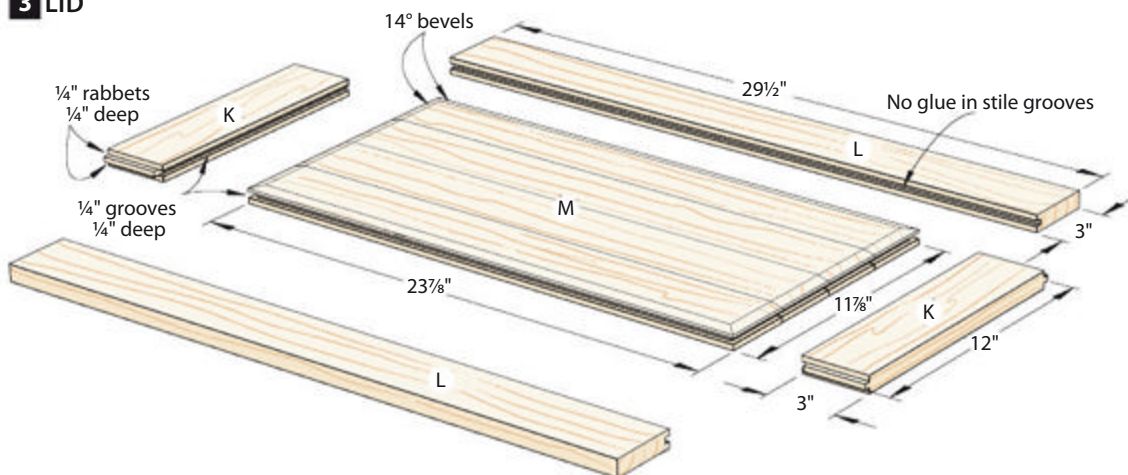
2 BOX ASSEMBLY



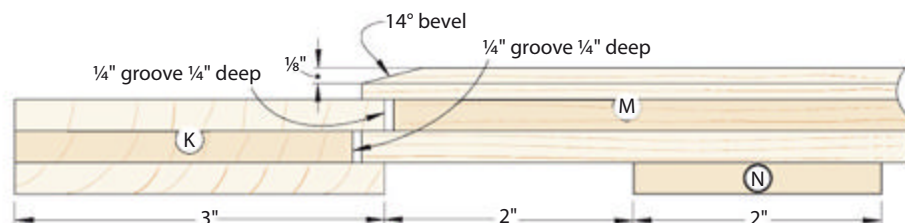
2a HANDLE BLOCK



3 LID



3a LID SECTION (Front view)



Quick Tip! To allow the lid panel (M) to expand freely, apply glue only to the middle 1" of the panel's short edges during glue-up.

1 Cut the stretchers (O), base ends (P), and upper base ends (Q) to size. Rout ¼" chamfers on the top edge of the upper base ends [**Drawing 4**]. Screw together the two base frames (O/P, O/Q). Sand them to 220 grit.

2 After cutting the base support cleats (R) to size, glue and screw them flush with the top edge of the lower stretchers (O). Cut the base slats (S) to size, then rout $\frac{1}{8}$ " chamfers on the top edge of each. Sand them to 220 grit and set them aside for now.

3 With the leg fronts (T) and leg sides (U) cut to size, glue them together in pairs, making two left legs and two right legs [**Drawing 4**]. After the glue dries, cut 1/8" chamfers on the outside ends. Sand the legs to 220 grit.

4 Attach the legs (T/U) to the base frames (O/P, O/Q) **[Photo C]**. Retrieve the base slats (S) and screw them in place from the underside, through the base support cleats (R) **[Drawing 4]**.

5 Install your cooler in the box (A–G). (See “**Mate the drain to the hose bib,**” on the next page.)

6 Hacksaw a length of continuous hinge to 24", and then screw it to the edge of the back upper rail (B). On the hinge's other leaf, place a strip of double-faced tape. Place the lid (K/L/M) atop the box, centered side-to-side and front to back. Press the lid down firmly, and then carefully open it. Drive the screws to attach the hinge to the lid.

7 To attach the cooler lid to the box lid (K/L/M), screw the lid spacers (N) to the underside of the lid [**Photo D**]. Remove the factory hinges from your cooler. Apply double-faced tape to the spacers, place the cooler's lid atop the cooler, and close the box lid, pressing down firmly. Lift the box lid and mount the cooler lid to the spacers [**Photo E**].



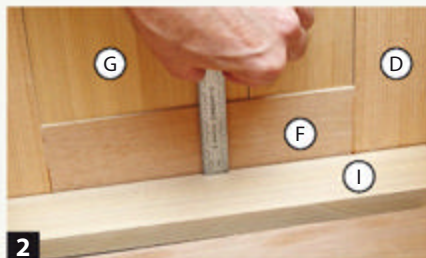
Place a left and right leg (T/U) facedown on your bench with the top frame positioned $\frac{3}{4}$ " above the legs, the bottom frame 3" from the bottom edge.

Position the spacers a few inches from the lid rails (K). Don't worry if they're not cut to perfect length—they'll be hidden by the cooler lid.

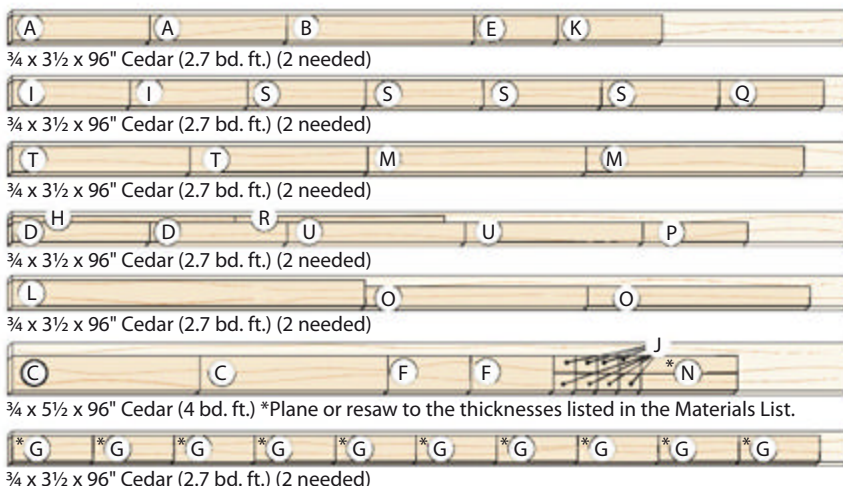
Drive panhead screws with washers through the cooler lid and into the lid spacers (N) to mount it to the box lid (K/L/M).

Mate the drain to the hose bib

Measure the distance from the bottom of the cooler to the drain (**Step 1**). Transfer that measurement to the inside of the box (A–G) (**Step 2**). To avoid drilling the drain hole through the panel slats (G), you may need to redirect the drain, as we did, using $\frac{1}{2}$ " copper pipe. We epoxied two 90° fittings to two short lengths of copper pipe in order to lower the output to the lower end rails (F). Measure the offset (**Step 3**), then mark the hole center location on the rail. Drill a $\frac{1}{8}$ " pilot hole on the mark. Enlarge that hole to 1" from the outside of the box. Epoxy the pipe to your cooler drain, and then place the cooler inside the upper box (**Step 4**). Slide the hose bib over the exposed end of the pipe and epoxy in place.



Cutting Diagram



8 Finally, remove the cooler and all hardware before applying two coats of a penetrating oil finish to the base, box, and lid. We used General Finishes' Outdoor Oil. When dry, haul this stand outside and crack open a cool one. 🍷

Produced by **Nate Granzow** with **Kevin Boyle**

Project design: **Kevin Boyle**

Illustrations: **Lorna Johnson**

Materials List

Part	FINISHED SIZE				Matl.	Qty.
	T	W	L			
Box						
A	front/back stiles	¾"	3"	15¾"	C	4
B	front/back upper rails	¾"	3"	21½"	C	2
C	front/back lower rails	¾"	4"	21½"	C	2
D	end stiles	¾"	2¼"	15¾"	C	4
E	upper end rails	¾"	3"	9½"	C	2
F	lower end rails	¾"	4"	9½"	C	2
G	panel slats	½"	3"	9¼"	C	20
H	support cleats	¾"	¾"	25½"	C	2
I	bottom slats	¾"	3"	13½"	C	4
J	handle blocks	1½"	2"	2½"	LC	4
Lid						
K	lid rails	¾"	3"	12"	C	2
L	lid stiles	¾"	3"	29½"	C	2
M*	lid panel	¾"	11⅞"	23⅞"	EC	1
N	lid spacers	¼"	2"	11½"	C	2
Base						
O	stretchers	¾"	2¼"	25½"	C	4
P	base ends	¾"	2¼"	12"	C	2
Q	upper base ends	¾"	3"	12"	C	2
R	base support cleats	¾"	¾"	24"	C	2
S	base slats	¾"	3"	13½"	C	8
T	leg fronts	¾"	3"	20⅜"	C	4
U	leg sides	¾"	2¼"	20⅜"	C	4

*Part initially cut oversize. See the instructions.

Materials key: C—cedar, LC—laminated cedar, EC—edge-glued cedar.

Supplies: #8x $\frac{1}{4}$ " F.H. screws (88), #8x $\frac{1}{2}$ " F.H. screws (8), #8x $\frac{3}{4}$ " F.H. screws (4), #8x $\frac{3}{4}$ " P.H. screws (4), $\frac{3}{4}$ " washers (4), #4x $\frac{1}{2}$ " F.H. screws (24), $\frac{1}{2}$ " copper pipe 24" long, $\frac{1}{2}$ " brass hose bib, stainless steel continuous hinge 24" long.

Blade and bits: Dado blade, chamfer router bit; $\frac{1}{8}$ ", $\frac{5}{8}$ ", 1" drill bits.

Source

Copper pipe, hose bib, elbows, and hinge:
woodmagazine.com/coolerparts

Make the great outdoors greater.



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step-by-step plans at
woodmagazine.com/outdoor

Choose the Right Glue

With so many adhesives available, selecting the best one for your woodworking project can be puzzling. From polyvinyl acetate (PVA, aka yellow wood glue) to polyurethane to epoxy to hide glue, all of these choices bond wood to wood (and cloth, paper, and leather). But to find the *best* choice for your project, simply review the charts *below*, and then refer to the descriptions on the *next page* to make your decision.

If your project will not be exposed to moisture, use the top chart. For those that will get wet, use the bottom chart,

even if the project will be indoors. Then just cross-reference needed assembly time with the other listed criteria.

Quick Tip! A bottle of weatherproof or waterproof PVA may be all you need for most indoor and outdoor projects.

INDOOR ADHESIVES

ASSEMBLY TIME →		LESS THAN 5 MIN	10–15 MIN	20–25 MIN	60 MIN
BOND NEEDED	Permanent bond	Cyanoacrylate, No-drip PVA, Polyurethane hotmelt, 5-min epoxy	Standard PVA, Weatherproof PVA, Dark weatherproof PVA, Polyurethane	Extended-time PVA, Weatherproof extended-time PVA, Waterproof PVA	Structural epoxy
	Semi-permanent bond*	Traditional hide glue	n/a	Premixed hide glue	n/a

*Applying steam dissolves the glue for disassembly if needed.

MOISTURE-RESISTANT and MOISTURE-PROOF ADHESIVES

ASSEMBLY TIME →		LESS THAN 5 MIN	10–15 MIN	20–25 MIN	60 MIN
MOISTURE EXPOSURE	Occasional exposure	Polyurethane hotmelt, 5-min epoxy	Weatherproof PVA, Dark weatherproof PVA, Polyurethane	Weatherproof extended-time PVA, Waterproof PVA	Structural epoxy
	Frequent exposure	Polyurethane hotmelt, 5-min epoxy	Polyurethane	Waterproof PVA	Structural epoxy
	Submerged exposure	n/a	n/a	n/a	Structural epoxy

Bold indicates adhesive can be used on damp wood.

POLYVINYL ACETATE (PVA)

This general-purpose adhesive is great for interior projects that won't be exposed to moisture. Available almost everywhere, from department stores to lumberyards, it's also the most economical choice listed.

Clamp time: 30 minutes
Full-strength time: 24 hours



EXTENDED-TIME PVA

Sharing the same properties as regular PVA glue, this adhesive provides extra open time that makes assembly and clamping of complicated glue-ups easier.

Clamp time: 45 minutes
Full-strength time: 24 hours



NO-DRIP PVA

Designed for vertical woodworking applications, such as applying interior trim, this extra-thick PVA adhesive has fast initial tack—you can clamp pieces by hand for a few minutes—and won't run or drip.

Clamp time: 10 minutes
Full-strength time: 24 hours



WEATHERPROOF PVA

A good choice for use on exterior projects subjected to rain and snow, but not submerged. Works well for any interior project but especially those that may come into contact with food or water, such as bowls or cutting boards.

Clamp time: 30 minutes
Full-strength time: 24 hours



EXTENDED-TIME WEATHERPROOF PVA

This adhesive shares the same properties of standard weatherproof PVA, but the extra open time it provides eases assembly and clamping of complicated glue-ups.

Clamp time: 45 minutes
Full-strength time: 24 hours



DARK WEATHERPROOF PVA

Simply a dyed version of weatherproof PVA glue, the darker color of this adhesive helps hide squeeze-out on dark hardwoods, such as walnut and mahogany.

Clamp time: 30 minutes
Full-strength time: 24 hours



WATERPROOF PVA

Waterproof PVA meets the highest level of water resistance possible, including brief submersion, and costs less than most polyurethane or epoxy adhesives. It requires no mixing, and creates less mess than other waterproof adhesives. It's also perfectly suitable for projects that won't get wet.

Clamp time: 30 minutes
Full-strength time: 24 hours



POLYURETHANE

Because it requires moisture to cure, polyurethane works well with damp woods, such as treated lumber. If there's no moisture present, dampen one side of the joint before application. Squeeze-out expands and foams as it cures. Wear rubber gloves, as the glue turns black upon contact with skin and is difficult to remove.

Clamp time: 60 minutes
Full-strength time: 24 hours



POLYURETHANE HOTMELT

Choose this adhesive for jobs requiring quick grab, such as when joining difficult-to-clamp parts. Requires a specialized heated applicator. It comes in both 30- and 60-second setup formulas.

Clamp time: 1–2 minutes
Full-strength time: 24 hours



HIDE GLUE

This adhesive has been used for centuries, making it ideal for period-exact repairs on antiques and musical instruments. Mix up a batch as needed by dissolving powdered glue in hot water. Because it stiffens as it cools, it requires a glue pot or other warming device. Cured bonds can be dissolved with warm water or steam.

Clamp time: 10 minutes
Full-strength time: 24 hours



PREMIXED HIDE GLUE

A ready-to-use liquid version of traditional hide glue, this adhesive can also be dissolved with steam or warm water after it cures so that joints can be disassembled. But because it doesn't need to be mixed or heated, it's more convenient to use.

Clamp time: 60 minutes
Full-strength time: 24 hours



STRUCTURAL EPOXY

Two parts—resin and hardener—must be mixed before use. It fills gaps, and is ideal for joints that will be completely submerged (boat builders use it), and for joints requiring extreme strength. This is one of your most expensive options.



5-MINUTE EPOXY

Fast grab makes this a good choice for hard-to-clamp assemblies. It bonds oily woods, such as teak, and works great for end-grain joints or filling gaps, but is not as strong as its sibling, structural epoxy. It is second only to cyanoacrylate in cost per ounce, so for small jobs, choose the two-chambered syringe dispenser.

Clamp time: 5–20 minutes
Full-strength time: 24 hours



CYANOACRYLATE

Ounce for ounce, this most expensive of the listed adhesives is also known as instant glue or CA. Find it in thick, medium, and thin formulas. Thin formulas wick into small crevices, while thick can fill small gaps. Spritz on an accelerant (typically sold alongside the adhesive) for an almost instantaneous set. The brittle bond can be broken with a sharp sideways blow, making this adhesive useful for temporarily attaching parts. Its quick grab can help hold a piece in position while a second, stronger adhesive cures.

Clamp time: <1 minute
Full-strength time: 24 hours





Construction-grade Roller

Add another piece of heavy equipment to your stable. This one smooths pretend pavement to the highest highway standards.

Start with the chassis

1 From laminated maple, cut a $4 \times 2\frac{3}{4} \times 5\frac{1}{2}$ " blank for the chassis (A). Lay out the tapers, the rabbets at the top, and the dado in each side [Drawings 1, 1a].

2 Install a $\frac{3}{4}$ " dado set in your tablesaw, attach an extension to your miter gauge to back the cut, and saw the dadoes in the sides of the chassis. Then cut the rabbets in each end [Photo A]. Bandsaw the tapers and sand them smooth.

3 Prepare a $\frac{1}{4} \times 2\frac{1}{4} \times 26$ " walnut blank. Make two photocopies of the **Chassis-Pivot Pattern** on page 34. **Note:** Make sure you use the chassis-pivot pattern, not the similar-looking drum-pivot pattern. Spray-adhere the pattern copies to the blank, positioning them to leave a blank

cutoff at least 16" long for a later step. Drill the holes where shown, then cut and sand the chassis pivots (B) to shape. Remove the patterns by soaking them with mineral spirits, then finish-sand the pivots to 220 grit. Glue the pivots into the rabbets on the chassis (A) [Drawing 1].

Add a cab to the chassis

1 Laminate walnut stock and cut a $3\frac{3}{4} \times 3 \times 4$ " blank for the cab (C). Drill the $\frac{1}{4}$ " through-hole for the windows and chamfer the edges [Drawing 1]. Finish-sand the cab and glue it to the chassis (A), centered.

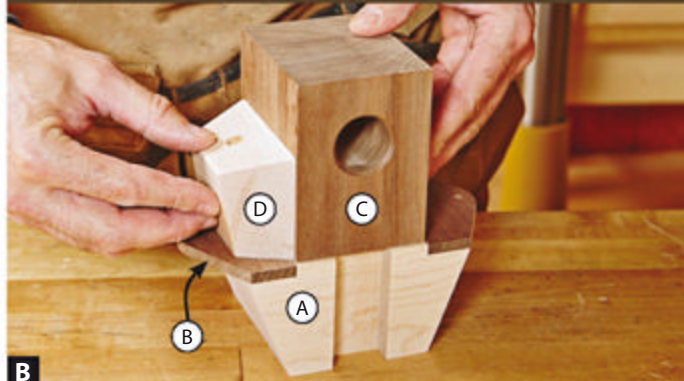
2 Cut a $1\frac{1}{2} \times 2\frac{1}{4} \times 12$ " blank for the chassis tanks (D) [Drawing 1b]. Tilt your

SHAPE THE CHASSIS



To make identical chassis rabbets, set the rip fence so the dado blade aligns with the layout mark, then cut each rabbet in several passes.

ATTACH THE CHASSIS TANKS

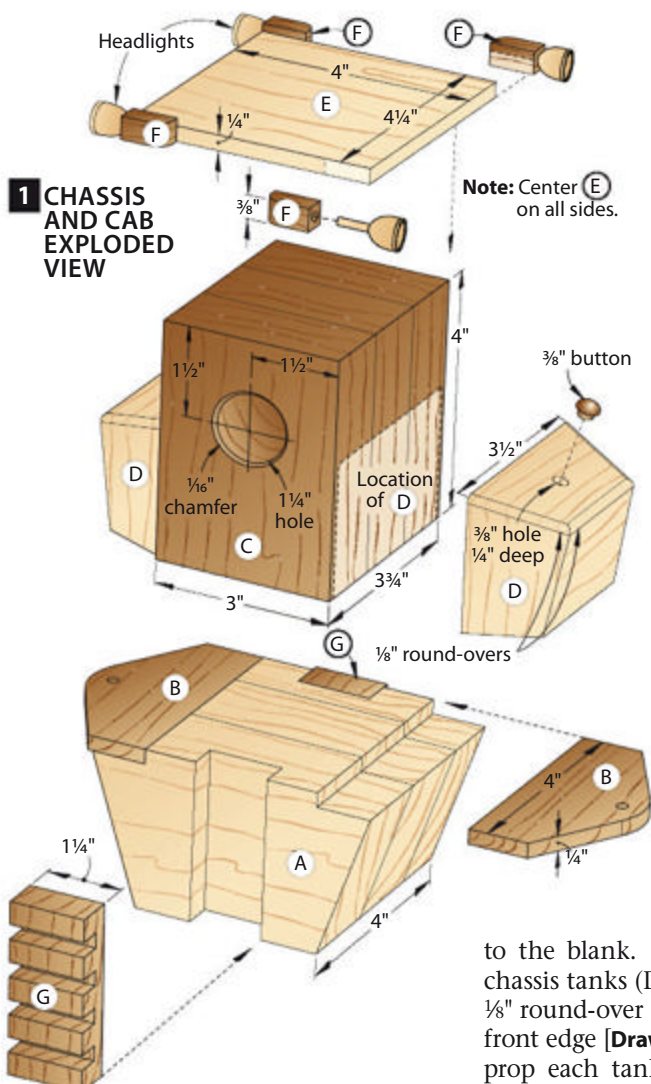


B Apply glue to the bottom and rear faces of a tank. Center the tank on a cab end and hold it in place until the glue grabs. Repeat for the other tank.

DRILL FOR THE LIGHT



C Grip a headlight block (F) in a handscrew, using a square to ensure that the block is vertical. Then drill the hole at the drill press.



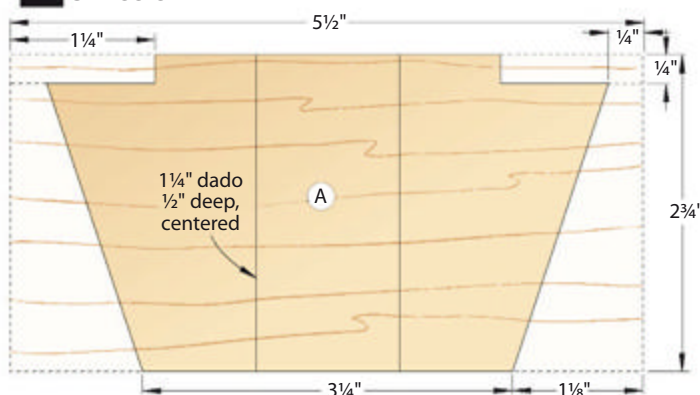
tablesaw blade to 10° and set the rip fence 1 1/8" from the blade. Stand the blank on edge and bevel-rip one face. Reset the blade to 7° and with the sawn face down, bevel-cut the edge. Save the cutoff for the next step.

3 Make two photocopies of the **Chassis Tank Pattern** and spray-adhere them

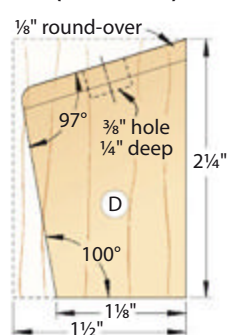
to the blank. Bandsaw and sand the chassis tanks (D) to shape. Then, sand a 1/8" round-over around the top ends and front edge [Drawing 1]. At the drill press, prop each tank on the tapered cutoff from the previous step and drill the hole where shown. Finish-sand the tanks and glue them in place [Photo B]. Glue a 3/8" walnut button [Source, page 33] into the hole in each tank.

4 Cut the roof (E) to size [Drawing 1] and finish-sand it. Set this part aside while you work on the headlights in the next step.

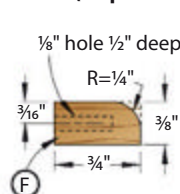
1a CHASSIS PART VIEW



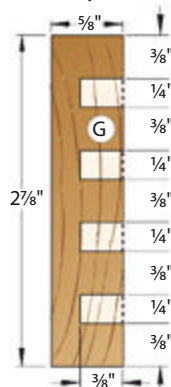
1b CHASSIS TANK (Side view)



1c HEADLIGHT BLOCK (Top view)



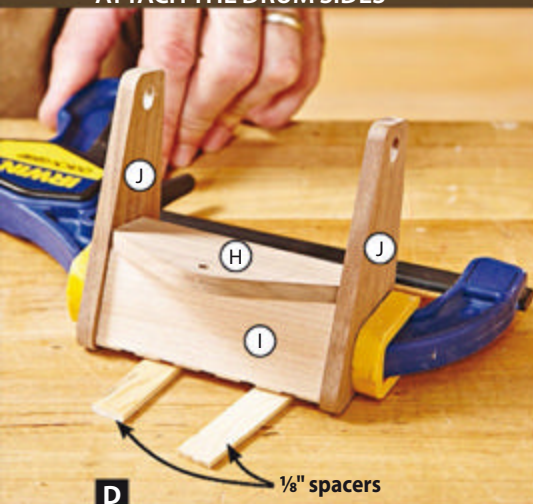
1d STAIRS (Side view)



5 Cut a 3/8x3/8x12" walnut blank for the headlight blocks (F). Sand a 1/4" radius on each end, then cut a headlight block from each end [Drawing 1c]. Repeat to make two more blocks. Drill the hole in each block [Photo C]. Glue a block to each corner of the roof (E) with their bottom faces flush [Drawing 1]. Glue the headlights [Source] into the headlight blocks. Then, glue the roof on the cab (C), centered.

6 To make the stairs (G), cut 1/4" dados 3/8" deep across a 5/8x2 3/4x8" walnut blank, where shown in Drawing 1d. Rip the blank to fit the dados in the chassis

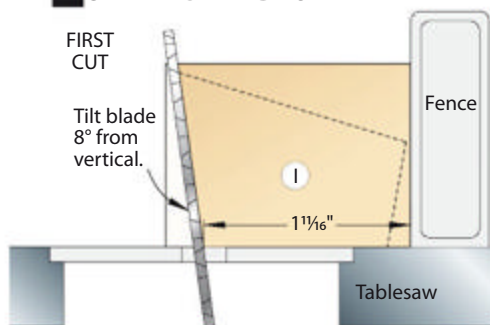
ATTACH THE DRUM SIDES



D 1/8" spacers

To assemble the drum sides (J) with the drum pivot/tank assembly (H/I), rest a tank upside down on two 1/8"-thick spacers and glue the sides in place.

2 SHAPING THE DRUM TANK



(A) and crosscut the stairs from each half. Glue the stairs in place against the bottom of the cab (C).

7 Apply finish to the chassis/cab assembly (A-F). (We sprayed on three coats of aerosol lacquer.)

Bang out the drums

1 Make two copies of the **Drum-Pivot Pattern** and spray-adhere them to the walnut blank remaining from the chassis pivots. Drill the holes where indicated, then bandsaw and sand the pivots (H) to shape. Remove the patterns and finish-sand the pivots.

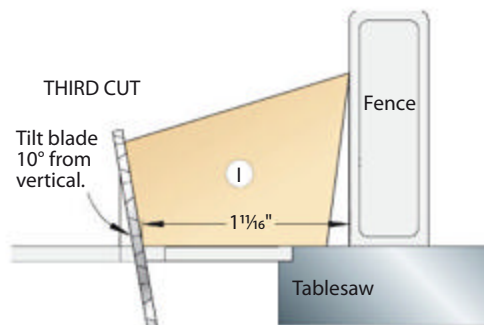
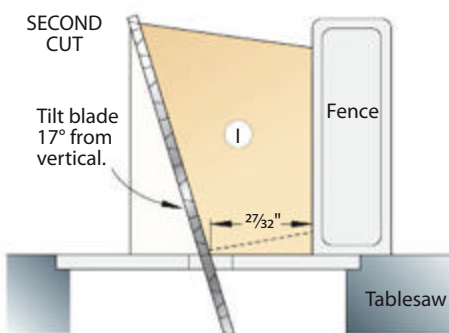
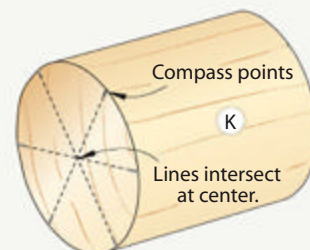
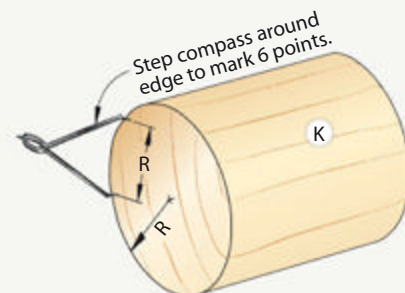
SHOP TIP

Trust your compass to lead you to the drum center

To mark the centers on the ends of the drums, set your compass to the drum radius. Then, place the compass point right at the edge of an end face and swing an arc, making a mark at the edge. Move the compass point to that mark, and make

another mark. Continue stepping around the drum, making six marks. The last one should coincide with your starting point.

Draw diametric lines across the drum, connecting opposite points. The three lines intersect at the center of the drum. Repeat on the remaining drum ends.



2 Prepare a 1 1/2x2x12" maple blank for the drum tanks (I). Following the cutting sequence in **Drawing 2**, bevel-rip three edges of the blank. Crosscut the drum tanks to length.

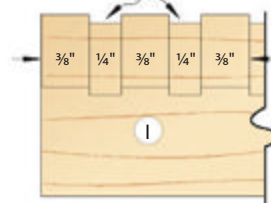
3 Install a 1/4" dado set in your table saw and cut 1/16"-deep dados across the top faces of the drum tanks (I) [**Drawing 2a**]. Sand 1/4" round-overs on the upper edges. Finish-sand the tanks.

4 Glue the drum pivots (H) to the bottom of the drum tanks, aligning the front of the tank (I) where indicated on **Drawing 3**. The tank overhangs the edge of the drum pivot by 1/2".

5 For the drum sides (J), prepare a 1/4x2 1/4x18" walnut blank. Make four copies of the **Drum Side Pattern**, adhere

2a DRUM TANK (Front view)

1/4" dados 1/16" deep



them to the blank, and drill the holes where shown. Cut and sand the parts to shape and finish-sand them. Glue the drum sides to the ends of the drum pivot/tank assemblies (H/I), centered [**Photo D**].

6 Laminate a 3 1/4x3 1/4x12" blank for the drums (K). Using your lathe, turn



Give the crane (issue 185, September 2008) a spin on its base, and raise and lower its bucket with a crank.

Build the whole crew!

Purchase plans and kits for these companion projects at woodmagazine.com/cgtoys.

Pour it on with the concrete truck (issue 224, March 2014).

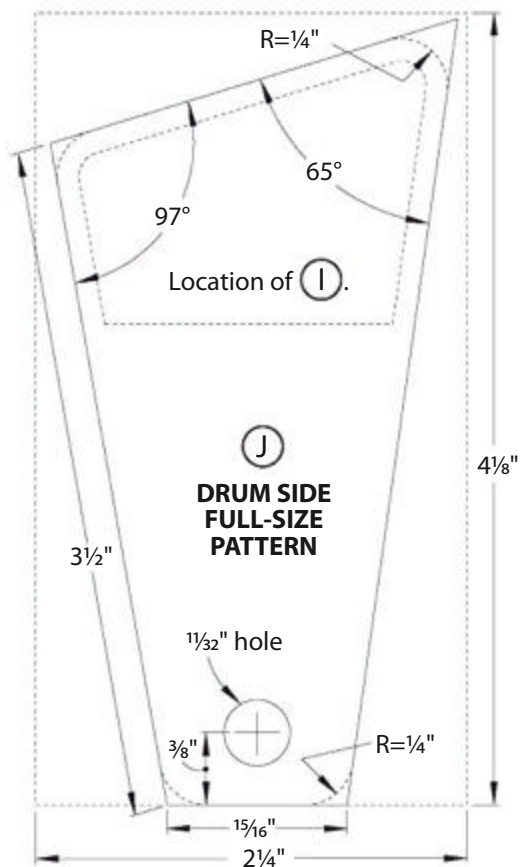
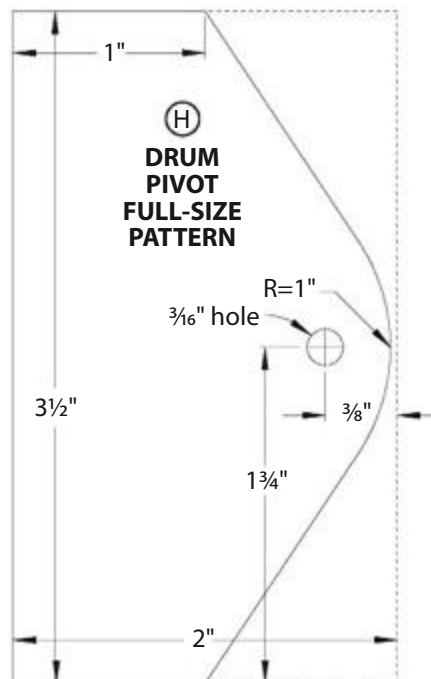
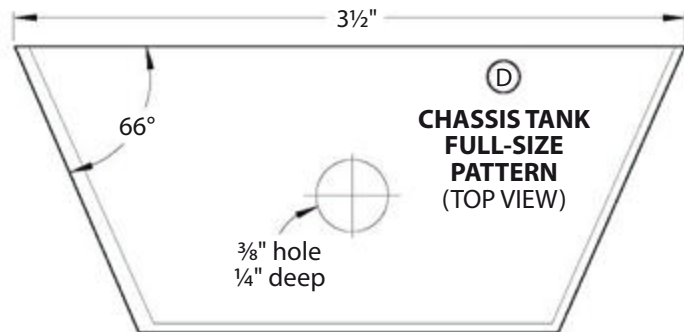
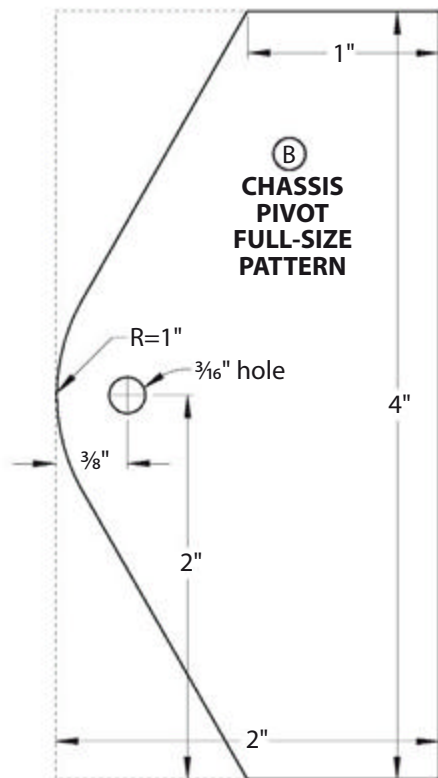


Load and spin with the skid loader (issue 211, May 2012).



Reach out and scoop with the excavator (issue 194, November 2009).

For heavy hauling, fill the dump truck (issue 215, November 2012).





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Tansu Cabinet

While it may look complex, this tansu simply consists of four sizes of boxes that share similar construction. Build this one, and you'll learn almost everything you need to build them all.

Tansu defined

Tansu cabinetry originated in Japan hundreds of years ago. It was built in small segments that could be easily transported, then stacked in a variety of ways. Arranged as shown at left, it could even serve as stairs. Tansu held everything from clothing to food to firewood and featured solid joinery to support a person's weight and withstand the stresses of frequent moves.



Dimensions:

1x1 box: 15 $\frac{3}{4}$ "W x 15"H x 15"D
 1x2 box: 30 $\frac{3}{4}$ "W x 15"H x 15"D
 2x2 box: 30 $\frac{3}{4}$ "W x 29"H x 15"D
 1x5 box: 76 $\frac{1}{2}$ "W x 15"H x 15"D

Approximate lumber cost for arrangement shown: \$795



This updated version of a centuries-old cabinetry system includes four variations of a basic cube-shape box that fit together in many configurations. You can easily customize each box to suit your needs. Leave the front open or add hinged or sliding doors, and drawers. Like the boxes, the doors and drawers share similar construction; only the part sizes change. In fact, you can work most efficiently by constructing all of the boxes first, then building and installing the doors and drawers.

The drawers feature dovetails, which may seem like a lot of work. (Substitute a lock-rabbit joint, if you like.) But our method of crafting them on the table-saw and bandsaw creates a tight-fitting, hand-cut look in a fraction of the time of hand-cutting. We used mortise-and-loose-tenon joints for our boxes and provide two methods for cutting them.

Learn the fundamentals by building the 1×1 box

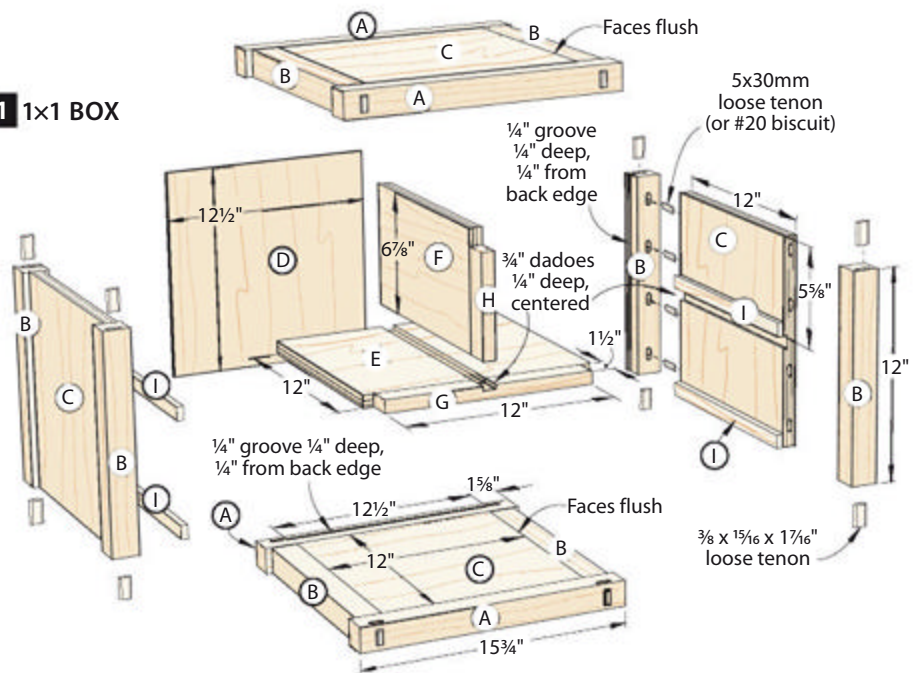
Note: Quantities indicated in the Materials Lists on page 44 are for one box. Multiply the part quantities by the number of boxes you plan to build.

1 For each 1×1 box, cut to size the horizontal and case rails (A, B), the case panels (C), and the back (D). To make the top and bottom assemblies, glue a case rail (B) to each end of two case panels (C) with their top faces flush [Drawings 1, 2].

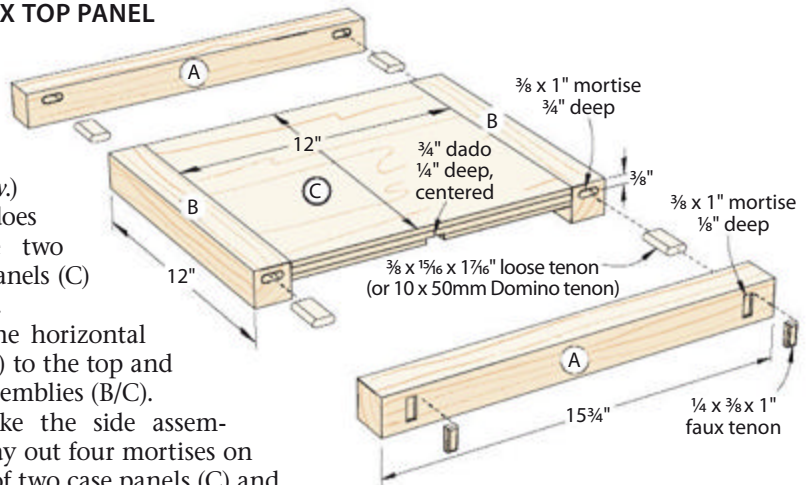
2 After the glue dries, dry-fit the horizontal rails (A) to the B/C assemblies and mark mortise locations across each horizontal and case rail [Drawing 2]. Cut the mortises [Photo A; or Woh, Woh, Domino, next page].

3 (Skip this step when building a 1×1 box without drawers.) Rout a dado in the top case panel (C) to accept the vertical divider (F) [Drawing 2]. (See **The rout way to**

1 1×1 BOX



2 1×1 BOX TOP PANEL



dado, below.)

Rout dadoes across the two side case panels (C) [Drawing 1].

4 Glue the horizontal rails (A) to the top and bottom assemblies (B/C).

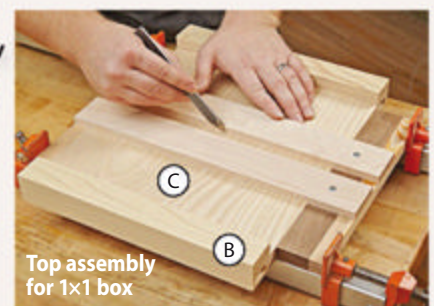
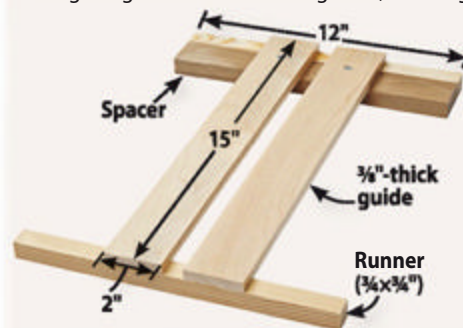
5 To make the side assemblies, lay out four mortises on the edges of two case panels (C) and

The rout way to dado

The 1×1 and 1×5 boxes house the dividers that create the drawer openings in dadoes. To cut these, we used a dado cleanout bit [Sources] in a router, and the simple jig shown below. When gluing the guides to the runners, create the gap between the guides by sandwiching a cutoff of the plywood used for the case panels (C).

Before routing across the 12"-wide case panels, screw a 1 1/2"-wide spacer to the guides, against one runner. Remove the spacer later when routing across wider panels.

Quick Tip! For clean cuts, clamp the jig to the workpiece, then score the plywood veneer along the guides with a marking knife, below right.



A DOMINO CUTS JOINTS FAST



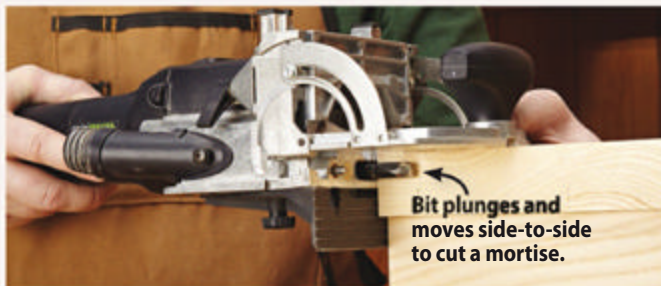
Cut the slots in the case rails (B) and horizontal rails (A). Set the tool for 10×50mm tenons centered 10mm (3/8") from the top face of the assembly.

Woh, Woh, Domino

We used a Festool Domino joiner to cut mortises for the loose tenons in this project because it quickly makes a strong joint that aligns parts automatically. The tool works like a biscuit joiner, but instead of a spinning blade, a bit similar to an upcut spiral router bit moves side-to-side, cutting a mortise that accepts a loose tenon. Change bits to cut mortises for different sizes of loose tenons. (See the Domino in action and see more loose-tenon joinery options in a free video at woodmagazine.com/loosetenon.)

Don't have a Domino? No problem. Use the router jig shown at *right* (you need it anyway to make recesses for the faux tenons on the front of each box) and a biscuit joiner.

To make the jig, use a 6" cutoff from a rail (A or B) for the post. Mark its position centered along one end of the base, then drill and chisel a slot $\frac{1}{16}$ " from the marked location of the post. Glue and screw the post to the base, making sure the face near the slot is parallel to the slot. Using a square, extend lines from the edges of the post along the length of the base to help align parts before routing. Likewise, draw parallel

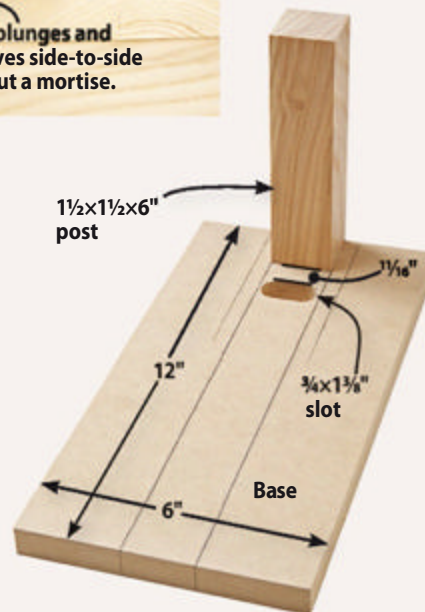


Bit plunges and moves side-to-side to cut a mortise.

lines $\frac{3}{8}$ " outside of these lines to help position the end of a workpiece. Install a $\frac{3}{4}$ " guide bushing and $\frac{3}{8}$ " upcut spiral bit in your router to cut the $\frac{3}{4}$ "-deep mortises. Clamp the jig and workpiece as shown *below*, depending upon the location and orientation of the mortise.

Use the router jig to cut mortises where a joint involves end grain (as when gluing part B to part A [Drawings 1 and 2]). Use biscuits to help align long grain joints (as when gluing parts B to part C). For a biscuit joiner, set the fence to center the slot on $1\frac{1}{2}$ "-thick pieces, *bottom left*. Then, to cut mating slots in the plywood, attach a $\frac{3}{8}$ "-thick spacer under the fence with double-faced tape, *bottom right*.

Make plenty of loose-tenon stock by cutting lengths of $\frac{3}{8} \times \frac{1}{16}$ " hardwood, routing a $\frac{3}{16}$ " round-over along each edge, and then cutting $1\frac{1}{16}$ "-long tenons from the blanks.



After cutting the first mortise, slide the workpiece down to cut the second.

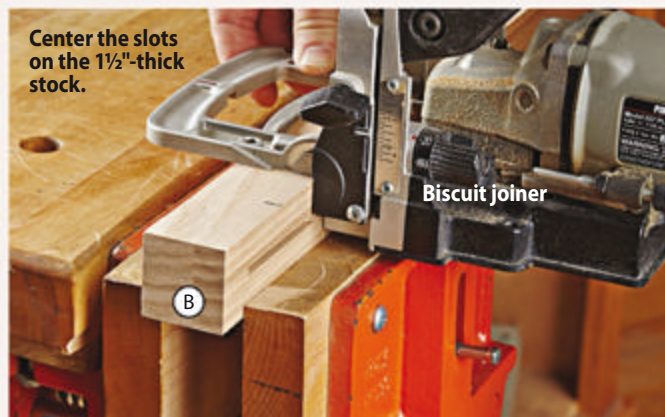
A



B

For mortises in a face or edge and parallel to a long edge, align the workpiece with a line as shown, clamp it in place, then secure the jig and workpiece in your vise. Remove the clamp and rout. Keep mortises aligned by sliding the workpiece down the jig, registering the post against the same face.

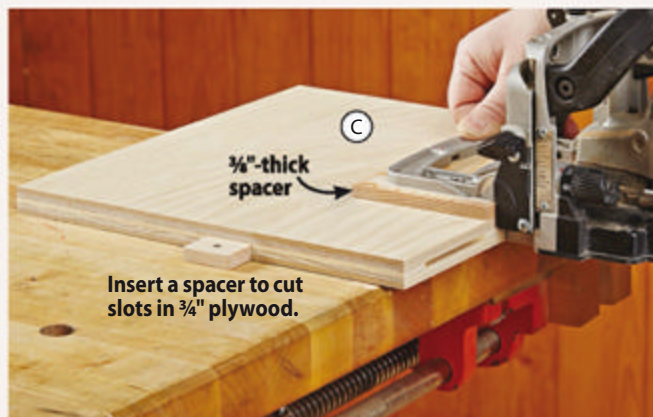
For mortises in the end of a piece, align it flush with the edges of the post and tight to the base. Clamp as shown, then rout.



Center the slots on the $1\frac{1}{2}$ "-thick stock.

Biscuit joiner

B



$\frac{3}{8}$ "-thick spacer

Insert a spacer to cut slots in $\frac{3}{4}$ " plywood.

C

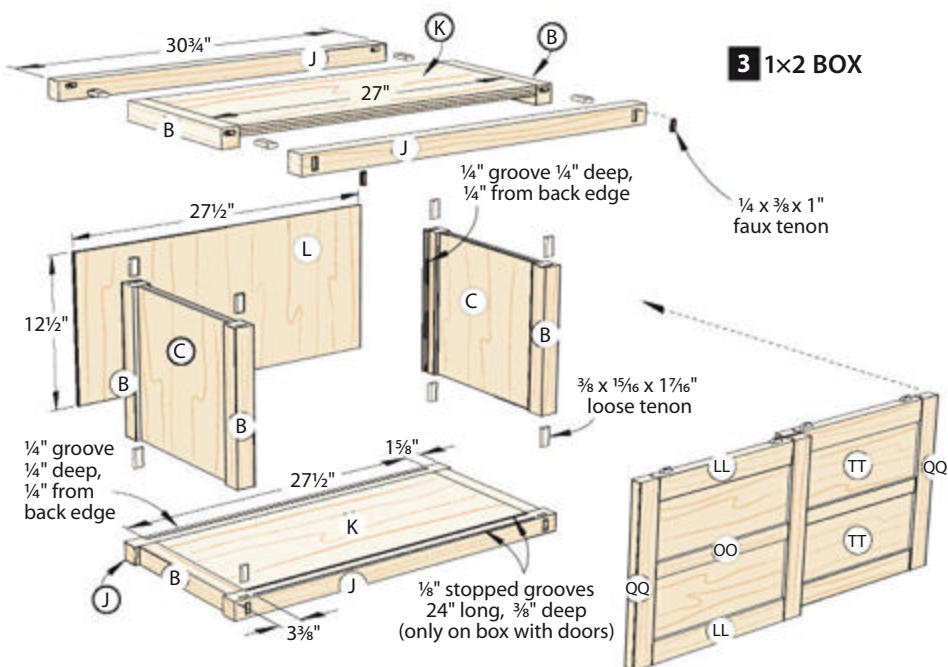
four case rails (B). Cut mortises (or biscuit slots) on all pieces centered on their thicknesses. Glue the rails and panels together [Photo B].

6 Dry-fit the four assemblies into a box with the outer faces of the case rails (B) aligned. Mark locations for loose tenons in the horizontal rails (A) and vertical case rails. Cut the mortises [Photo C, Drawing 1].

7 Using the router jig described on the previous page, cut shallow mortises for the faux tenons in the front faces of the horizontal rails (A) [Drawing 2, Photo D]. Chisel the corners square. (You'll make and add the faux tenons after building all the boxes.)

8 Using a router with an edge guide, rout the 1/4" grooves to accept the back panel (D) [Drawing 1]. Note that the grooves in the horizontal rails (A) are stopped. If you're building the box without drawers, glue it together, skip Step 9 below, and move on to the 1x2 box.

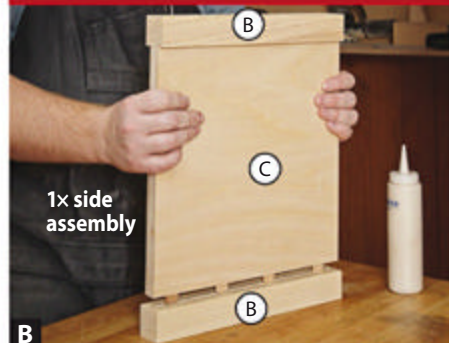
9 For a box with drawers, cut the horizontal and vertical dividers (E, F),



divider trim (G, H), and drawer guides (I) to size. Glue the trim to the dividers [Drawing 1]. After the glue dries, remove the spacer from the router dado jig, and rout the dado across the horizontal

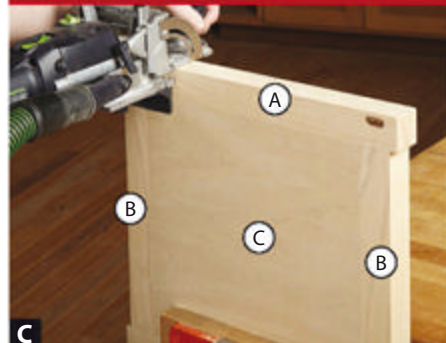
divider assembly (E/G). Following the steps shown in Photos E, F, and G, glue up the box.

CENTER THE PANELS BETWEEN RAILS



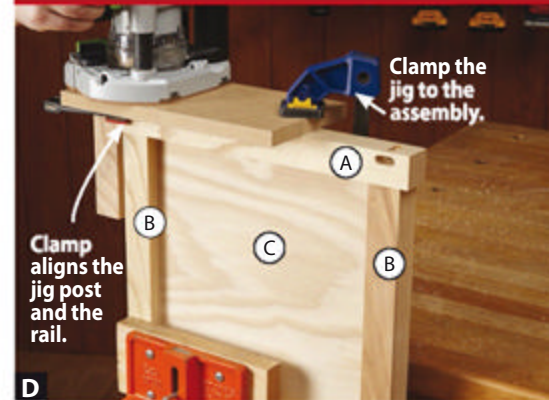
Loose tenons (or biscuits) keep the panels properly positioned between the rails, even while clamped, and create identical reveals on both edges.

CUT MORTISES FOR LOOSE TENONS



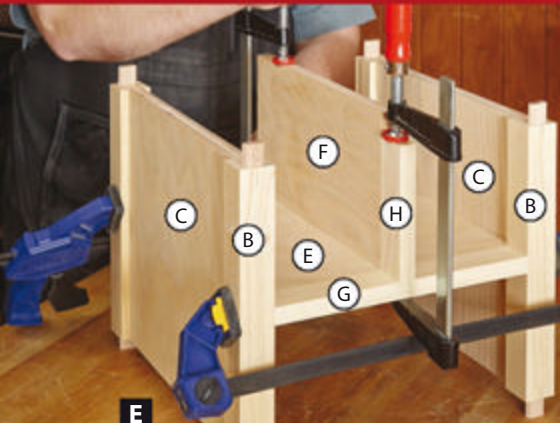
Set the joiner thickness gauge at the 20mm setting to cut the mortises in the horizontal rails (A) and the ends of the case rails (B).

ROUT MORTISES FOR FAUX TENONS



Clamp each top and bottom assembly (A/B/C) in a vise, secure the router jig to it, and rout the 1/8"-deep mortises in the front horizontal rails only.

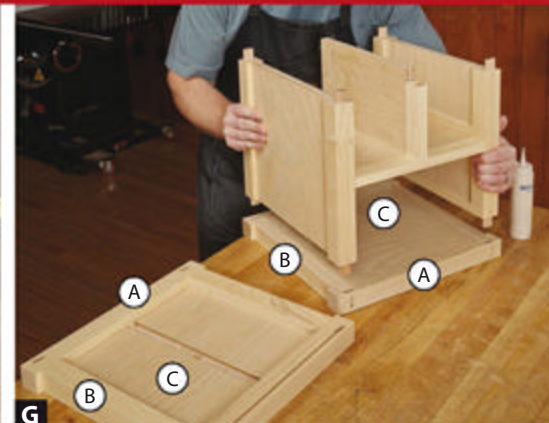
ASSEMBLE A BOX WITH DRAWER DIVIDERS



Glue and clamp the horizontal divider (E/G) between the dadoed sides (B/C). Then, add the vertical divider (F/H). Check the assembly for



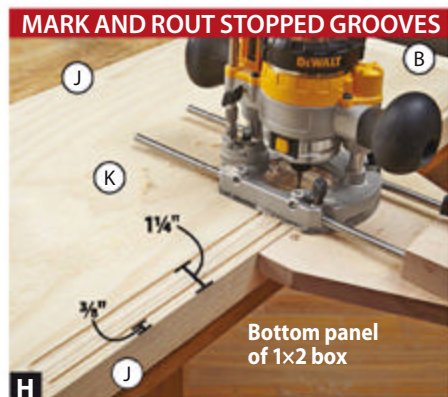
square. After the glue dries, glue on the drawer guides (I) to fill the space between the interior face of the case panel (C) and the edge of the case rails (B). Use cauls



to help distribute pressure. Finally, glue the sides assembly to the bottom panel (A/B/C), insert the back panel (D), and add the top panel.

The 1×2 box

Build the 1×2 boxes following the same procedures as for the 1×1 box and using the dimensions listed in the **Materials List** and **Drawing 3**. However, for a 1×2 box with sliding doors, rout $\frac{1}{8}$ " grooves to accept the door rollers in the front horizontal rails (J) before assembly [**Photo H**, **Drawing 3**].



Mark lines $3\frac{3}{8}$ " from each end of the front horizontal rails (J). With an edge guide on your router, rout two grooves between the marks.

The 2×2 box

1 Refer to the **Materials List** and **Drawing 4**, and cut the rails (B, J, M) and panels (K, N, O) to size. Assemble the top and bottom panels (B/J/K) as with the 1×1 box.

2 Glue two side/middle rails (M) to the edges of the third top/bottom panel (K), flush on the top face. After the glue dries, rout grooves for the door rollers in

the top face of the middle panel assembly (K/M), and bottom face of the top panel assembly (B/J/K).

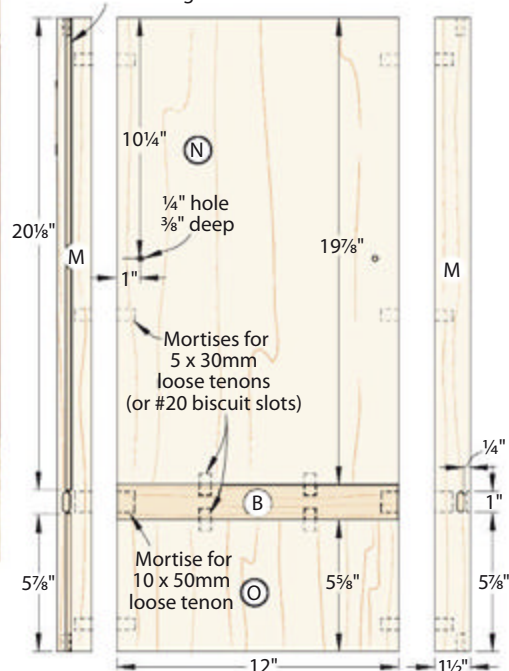
3 To help with alignment, cut two mortises in opposite edges of the two unused case rails (B) and in one end of each side panel (N, O), centered on their thicknesses [**Drawing 5**]. Glue the panels and case rails together [**Photo I**].



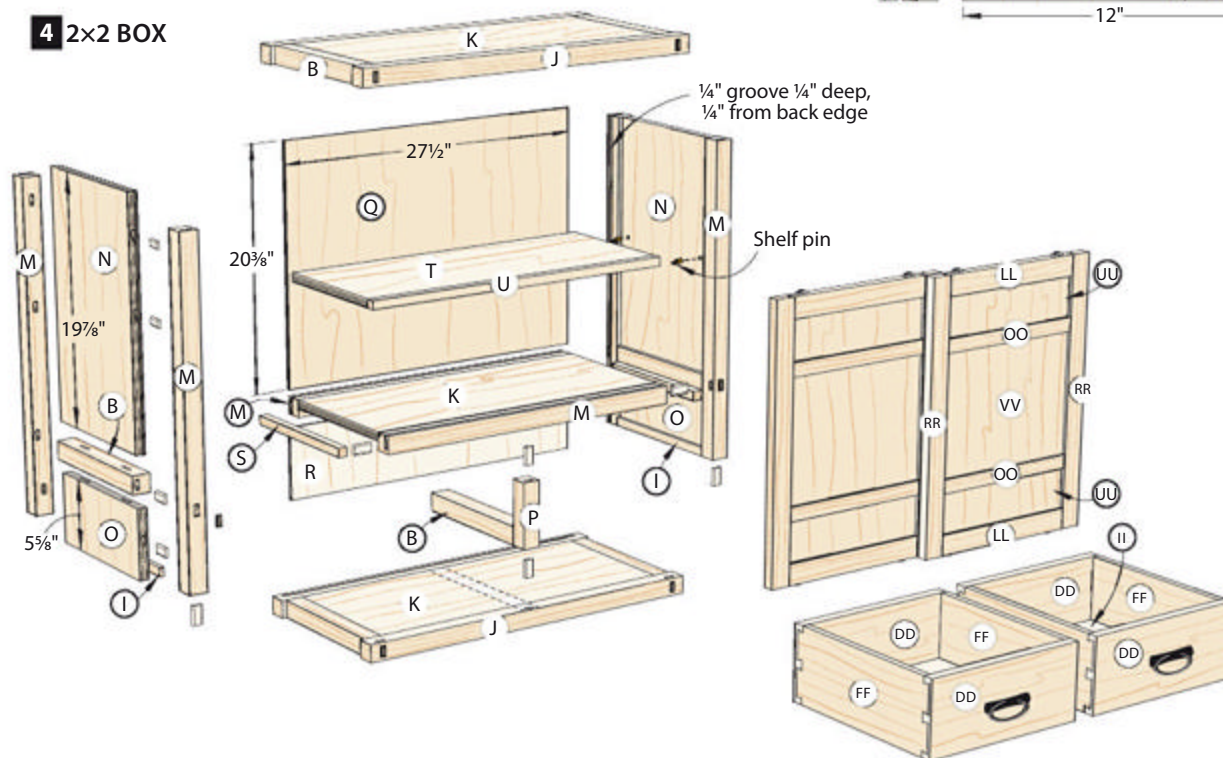
Glue loose tenons into the case rail (B), then glue and clamp the bottom side panel (O) to the rail. Add the top side panel (N) to this assembly.

5 2×2 BOX SIDE ASSEMBLY (Inside face shown)

$\frac{1}{4}$ " groove $\frac{1}{4}$ " deep, $\frac{1}{4}$ " from back edge



4 2×2 BOX



4 Dry-fit each side assembly (B/N/O) between two side/middle rails (M) and mark for four mortises on each edge [Drawings 4, 5]. Cut the mortises, then glue the rails to the side assembly.

5 Dry-fit the case, cut the vertical divider (P) to length, and add it to the dry-fit. Mark for mortises in the ends of the side/middle rails (M) and divider and corresponding mortises on the mating pieces. Disassemble the case, cut the mortises, and rout six faux tenon recesses [Drawing 4]. **Note:** To rout the recesses on the side/middle rails (M), place a $\frac{3}{8}$ " spacer between the post of the router jig and the outer face of the rail.

6 Drill $\frac{1}{4}$ " holes for shelf pins in the top side panels (N) [Drawing 5]. (We drilled only four. If you want an adjustable shelf or more than one shelf, drill more holes.) Rout grooves to accept the backs (Q, R). Cut the backs to size.

7 Cut the thick drawer guides (S) to size and glue them to the underside of the middle panel (K/M) where dimensioned in Photo J.

8 Begin assembling the box by gluing the middle panel (K/M) between the two side assemblies. Add the drawer guides (I). Slip the backs (Q, R) into place and glue and clamp the divider (P), and then the top and bottom assemblies. Glue the remaining case rail (B) behind the divider to serve as a drawer guide.

9 Cut the shelf (T) and shelf trim (U) to size and glue them together.

The 1×5 box

Similar in construction to the 1×1 box with drawers, this elongated version includes sliding doors like those on the 1×2 box.

1 Begin by cutting the case rails (B), drawer guides (I), thick drawer guides (S), and horizontal rails (V) to size. Then, cut the case panels (C), top/bottom panels (W), and vertical divider (X) to size [Materials List, Drawing 6].

2 Glue a case rail (B) to each end of the top/bottom panels (W). While the glue dries, rout the dados across one case panel (C) and the vertical divider (X) to accept the horizontal divider (Z). **Note:** The case panel and vertical divider are different lengths. Cut dados where shown in Drawing 6a. Then, use the router dado jig to help rout the dados for the vertical divider in the top/bottom panels.

3 Glue a case rail (B) to each edge of the case panels (C). Mortise the ends of the remaining case rail and glue it to the front edge of the vertical divider (X), 1" from the divider's top end [Drawing 6].

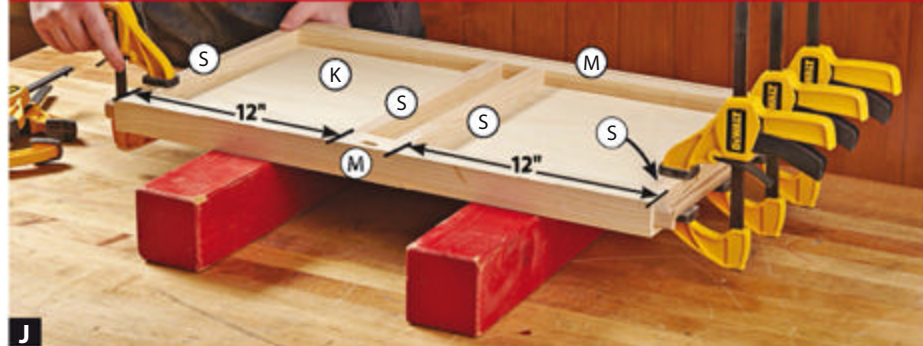
4 Glue the horizontal rails (V) to the top/bottom panels (B/W). Then, rout the grooves for the sliding door rollers and the back (Y) in the top/bottom assemblies and side assemblies. Notch the back corners of the vertical divider (X) to fit around the horizontal rails.

5 Cut the horizontal divider (Z) and trim (AA) to size, and glue them together.

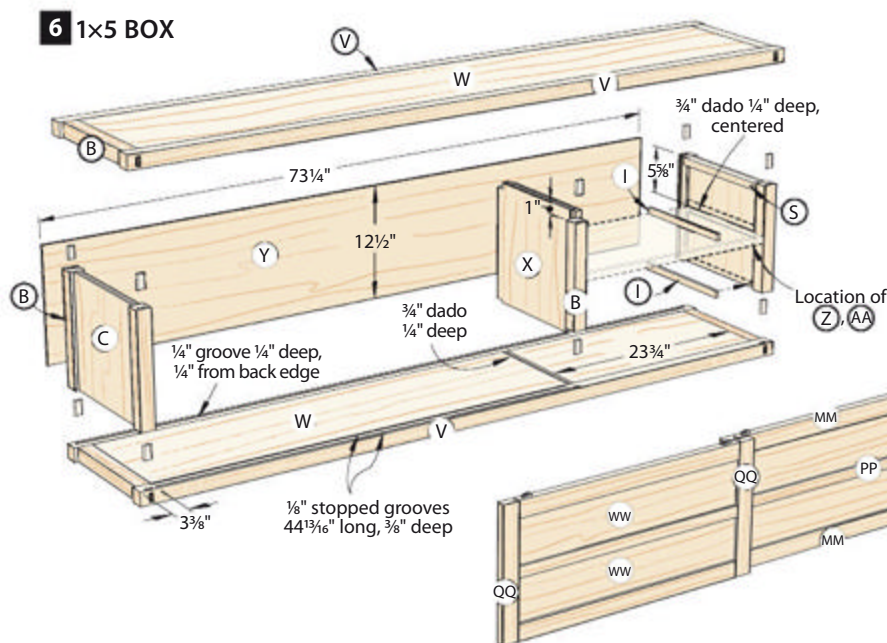
6 Assemble the box as you did the 1×1 box: Glue up the H-shape assembly with B/C, B/X, and Z/AA [Drawing 6]. Add the drawer guides (I, S), then complete the glue-up.

With the boxes complete, you can start mass-producing drawers.

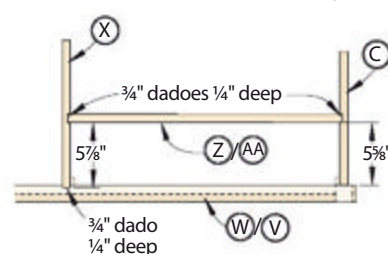
THICK DRAWER GUIDES PREVENT TIPS



Glue a thick drawer guide (S) flush with each end of the middle panel (K/M), and 12" from each end. These prevent an extended drawer from tipping.



6a DIVIDER (Front section view)



Build a bunch of drawers

Quick Tip! Use a lock-rabbet joint [More Resources, page 44] if you don't want to cut dovetails for the drawers.

1 Surface stock for the drawer fronts, backs, and sides (BB, CC, DD, EE, FF) [Materials Lists]. All drawer fronts, backs, and sides are 5½" wide, so after planing the stock, rip it to width, then crosscut pieces to the lengths listed. All drawer sides are identical, so multiply the number of drawers needed by two and cut that many drawer sides in one operation. Cut the bottoms to size.

2 Find the best-looking face of each drawer front (BB, CC, DD, EE) and mark them as the outside faces. To hide the dovetails after the drawers are assembled, resaw ¼" from the outside face of each drawer front and back [Photo K]. Mark the pieces and cutoffs so you can mate them up again after cutting the joinery.

3 Cut a groove in each piece to accept the plywood drawer bottoms [Drawing 7]. Craft the dovetail joints as shown in Machine-cut half-blind dovetails, no jig needed, below.

RESAW THE DRAWER FRONTS



K Mount a sharp, wide blade in your bandsaw and cut slowly to achieve the smoothest surface. Even with saw marks, the pieces will mate up again perfectly.

Machine-cut half-blind dovetails, no jig needed

You don't need a pricey special jig to create half-blind dovetails. You can do the job with your tablesaw and bandsaw and probably in less time than it takes to set up a jig. Just follow the steps below.

First the pins. Following the dimensions in Drawing 7, make a story stick to match the width of the drawer front and use it to help mark the locations of the pins on the outside (sawn) faces of the drawer fronts and backs. With a square, extend the marks about 1" down the sawn faces. Set a bevel gauge to 10° and transfer the marks across the ends of the pieces, with the narrow portion of each pin to the outside. Save the bevel gauge setting until you finish cutting the pins.

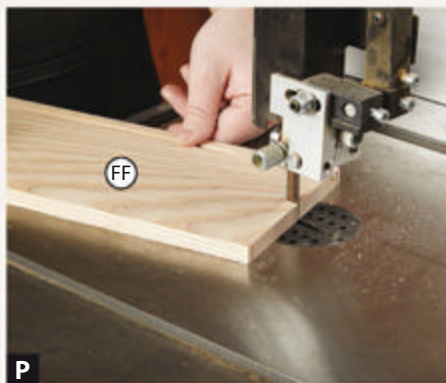
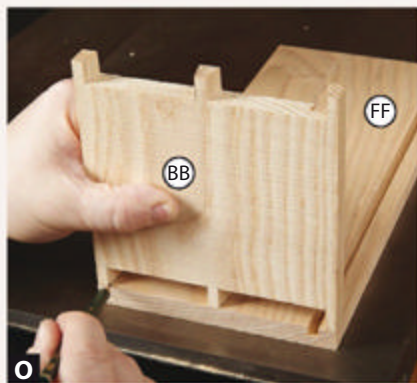
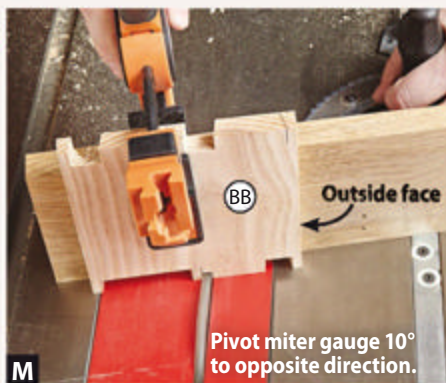
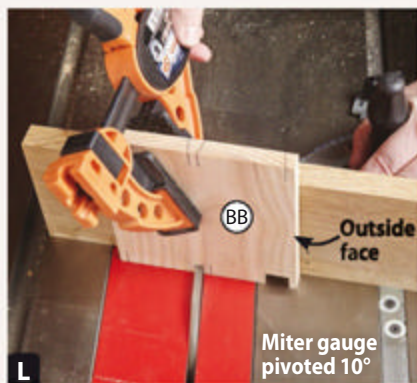
Mount a dado blade in your tablesaw. (We used a ¼" blade simply because we had a zero-clearance insert to match it. A wider blade will speed up removing the waste between the pins.) Attach an auxiliary face to your miter gauge to support the workpieces and to prevent chip-out. Use the bevel gauge to set your miter-gauge head to 10°.

Notch along one edge of two pins [Photo L] and remove some of the waste; then, flip the drawer front/back end for end and make similar cuts on the other end. Do this to all drawer fronts/backs.

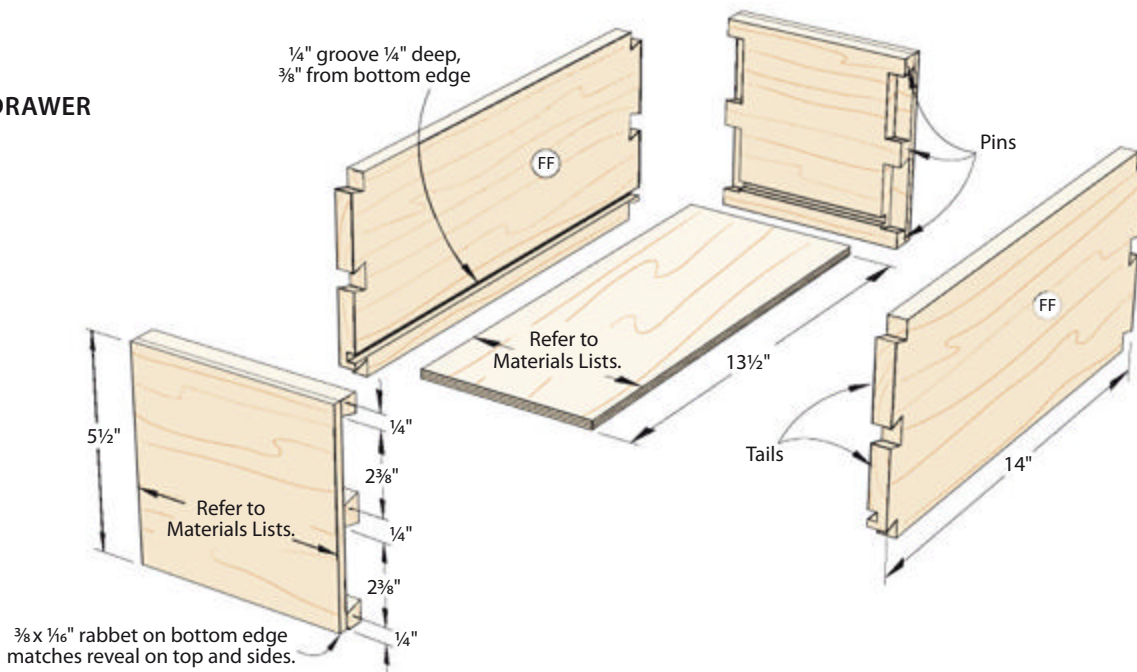
Swing the miter-gauge head to the opposite 10° setting and repeat this process, making additional passes to remove the waste between the cuts [Photos M, N].

Scribe and trim the tails. Trace the pins onto the drawer sides (FF) [Photo O]. Before removing the drawer front/back, also scribe the baseline (the inside face of the drawer front/back) onto the drawer side. Bandsaw to the waste side of each line, stopping just short of the baseline [Photo P], then cut away the waste at each edge. Chisel away the waste between the dovetails [Photo Q], then test the fit of each drawer and fine-tune the joints with a chisel as needed.

Reassemble the fronts and backs. Glue the resawn portions back to their respective drawer fronts and backs. Allow the glue to dry before gluing up the drawers, trapping the bottoms. Install a pull or pulls [Sources] on each drawer front.



7 DRAWER



Roll on to the doors

1 Following the **Materials Lists**, cut the door parts (KK–WW) to size, labeling them with their part letters as you go.

2 With a rip blade in your tablesaw, cut a centered groove on the inside edge of each rail (KK, LL, MM) and stile (QQ, RR) to fit the plywood door panels

[Drawings 8, 9]. Cut matching grooves on both edges of all mid rails (NN, OO, PP).

3 Mount a dado blade in your tablesaw and rabbet each end of the rails and mid rails to create centered tongues that fit the grooves in the stiles.

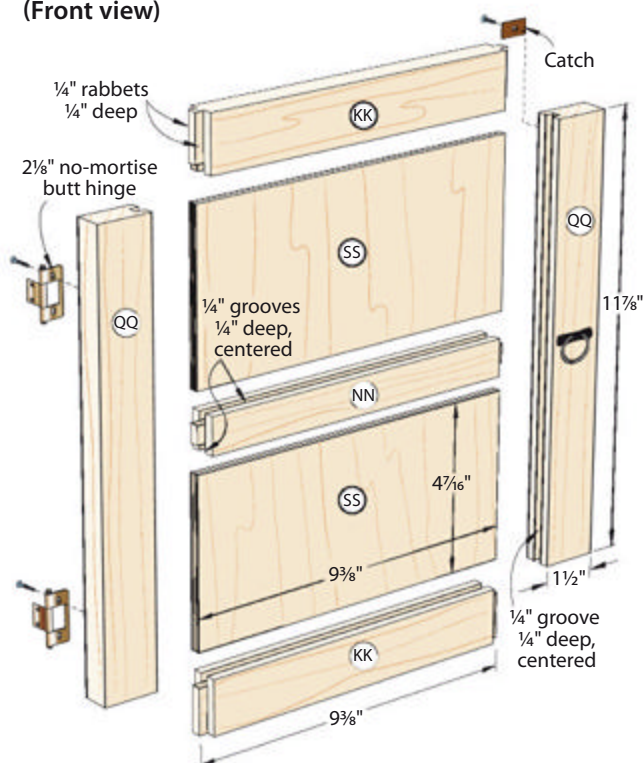
4 Sort the parts into their respective assemblies, and glue up the doors.

Note: Construction of the 2×2 box sliding doors is very similar to that of the 1×2 door.

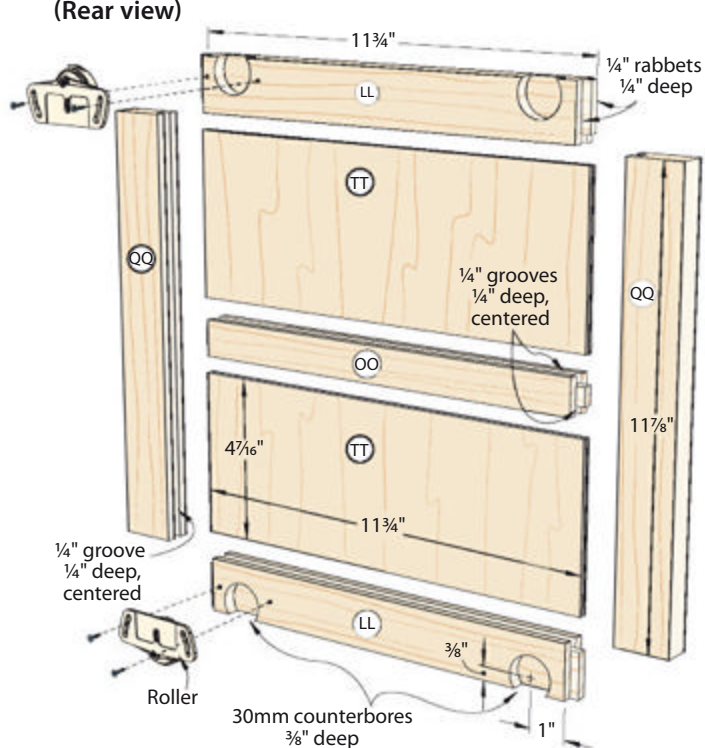
5 Screw the hinges [**Sources**] to the 1×1 door(s) and install the door in the box.

6 For sliding doors, drill 30mm counterbores where shown in **Drawing 9** and install the rollers [Sources]. Test the fit of the doors in their boxes.

**8 1x1 BOX
HINGED DOOR
(Front view)**



**9 1x2 BOX
SLIDING DOOR
(Rear view)**



Time for the big finish

1 For the faux tenons, prepare a $\frac{3}{8} \times 1 \times 24$ " ash blank. Install a $\frac{1}{8}$ " round-over bit in your router table. Set up your tablesaw with a crosscut blade, zero-clearance throat insert, an auxiliary miter-gauge fence, and a stop in front of the blade [Photo R]. Round over each end of the blank, then cut off a faux tenon from each end. Repeat until you have enough faux tenons. Glue them into the recesses in each case.

2 Remove the hardware and apply a finish to all pieces. (We wiped on a 2:1 mix of Watco Natural and Watco Medium

Walnut oil finishes to add some color, then applied three coats of spray lacquer.) Reinstall the hardware, install the doors, slide the drawers into place, then stack your tansu in a configuration that suits your needs. 🌿

Download a free cutting diagram for the tansu at woodmagazine.com/tansuCD.

Produced by **Craig Ruegsegger** with **John Olson**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**
Project design: **Kevin Boyle**

CUT FAUX TENONS FROM A BLANK



R Position a stop to leave a $\frac{1}{4}$ " gap between the stop and the blade. Round over each end of the blank, cut off a faux tenon from each end, and repeat.

Materials List-1 × 1 Box

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
1 × 1 box						
A	horizontal rails	1 ½"	1 ½"	15 ¾"	A	4
B	case rails	1 ½"	1 ½"	12"	A	8
C	case panels	¾"	12"	12"	AP	4
D	back	¼"	12 ½"	12 ½"	AP	1
E*	horizontal divider	¾"	12"	13 ¼"	AP	1
F*	vertical divider	¾"	6 ⅞"	12"	AP	1
G*	horiz. divider trim	¾"	1 ½"	12"	A	1
H*	vert. divider trim	¾"	1 ½"	5 ⅝"	A	1
I*	drawer guides	⅜"	¾"	12"	A	4
1 × 1 Drawers						
BB*	small front/back	¾"	5 ½"	5 ½"	A	4
CC*	medium front/back	¾"	5 ½"	11 ⅞"	A	2
FF*	sides	½"	5 ½"	14"	A	6
GG*	small bottoms	¼"	5"	13 ½"	AP	2
HH*	medium bottom	¼"	11 ⅜"	13 ½"	AP	1
1 × 1 Door						
KK†	rails	¾"	1 ½"	9 ⅜"	A	2
NN†	mid rail	¾"	1"	9 ⅜"	A	1
QQ†	stiles	¾"	1 ½"	11 ⅞"	A	2
SS†	panels	¼"	9 ⅝"	4 ⅞"	AP	2

*Parts needed for boxes with drawers only

†Parts needed for boxes with doors only

Materials key: A—ash, AP—ash plywood.

Supplies: 2⅝" no-mortise hinges (2), ¼" shelf pins (4), magnetic door catches (2).

Blade and bits: Stack dado blade; ⅜" upcut spiral, dado cleanout, ⅛", ⅜", ⅝" round-over router bits.

***Needed only if making loose tenons.

Sources:

Roller hardware, no. 00B10.26 \$22.50 per 4-pack (one pack needed for each door); 30mm Forstner bit, no. 06J72.30 \$14.40, Lee Valley, 800-871-8158, leevalley.com. Pulls: warabi handles no. B1 (4) \$18, no. B3 (3) \$18, no. B4 (2) \$18, moon handle no. O2 (1) \$18, easternclassics.net, 510-526-1241.

Materials List-1 × 2 Box

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
1 × 2 box						
B	case rails	1 ½"	1 ½"	12"	A	8
C	case panels	¾"	12"	12"	AP	2
J	horizontal rails	1 ½"	1 ½"	30¾"	A	4
K	top/bottom panels	¾"	12"	27"	AP	2
L	back	¼"	27½"	12½"	AP	1
1 × 2 Doors						
LL†	rails	¾"	1 ½"	11¾"	A	4
OO†	mid rails	¾"	1"	11¾"	A	2
QQ†	stiles	¾"	1 ½"	11⅞"	A	4
TT†	panels	¼"	11¾"	4⅞"	AP	4

Materials List-1 × 5 Box

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
1 × 5 box						
B	case rails	1½"	1½"	12"	A	9
C	case panels	¾"	12"	12"	AP	2
I	drawer guides	⅜"	¾"	12"	A	4
S	thick drawer guides	¾"	¾"	12"	A	2
V	horizontal rails	1½"	1½"	76½"	A	4
W	top/bottom panels	¾"	12"	72¾"	AP	2
X	vertical divider	¾"	13"	13¼"	AP	1
Y	back	¼"	12½"	73¼"	AP	1
Z	horizontal divider	¾"	12"	24⅝"	AP	1
AA	horizontal divider trim	¾"	1½"	23⅝"	A	1
1 × 5 Drawers						
EE*	fronts/back	¾"	5½"	23¼"	A	4
FF*	sides	½"	5½"	14"	A	4
JJ*	bottoms	¼"	22¾"	13½"	AP	2
1 × 5 Doors						
MM†	rails	¾"	1½"	22⅜"	A	4
PP†	mid rails	¾"	1"	22⅜"	A	2
QQ†	stiles	¾"	1½"	11⅞"	A	4
WW†	panels	¼"	22⅜"	4⅞"	AP	4

Materials List-2 × 2 Box

Part		FINISHED SIZE			Matl.	Qty.
		T	W	L		
2 × 2 box						
B	case rails	1½"	1½"	12"	A	7
I*	drawer guides	⅜"	¾"	12"	A	2
J	horizontal rails	1½"	1½"	30¾"	A	4
K	top/bottom panels	¾"	12"	27"	AP	3
M	side/middle rails	1½"	1½"	27"	A	6
N	top side panels	¾"	12"	19⅞"	AP	2
O	bottom side panels	¾"	12"	5⅝"	AP	2
P*	vertical divider	1½"	1½"	5⅝"	A	1
Q	top back	¼"	27½"	20⅝"	AP	1
R	bottom back	¼"	27½"	6⅞"	AP	1
S*	thick drawer guides	¾"	¾"	12"	A	4
T	shelf	¾"	11⅞"	27⅝"	AP	1
U	shelf trim	¾"	¾"	27⅝"	A	1
2 × 2 Drawers						
DD*	fronts/back	¾"	5½"	12⅝"	A	4
FF*	sides	½"	5½"	14"	A	4
II*	bottoms	¼"	12⅞"	13½"	AP	2
2 × 2 Doors						
LL†	rails	¾"	1½"	11¾"	A	4
OO†	mid rails	¾"	1"	11¾"	A	4
RR†	stiles	¾"	1½"	19¾"	A	4
UU†	small panels	¼"	11¾"	3⅞"	AP	4
VV†	mid panels	¼"	11¾"	9⅝"	AP	2

More Resources

► Learn how to make a lock-rabbet joint on the tablesaw with this free article: woodmagazine.com/lockrabbet; then, watch the process in action in this free video: woodmagazine.com/simpledrawers.

Mirror with Shelf

Build a mirror that's anything but ordinary by adding a unique, natural-edge shelf. Don't have a natural-edge plank? No problem—build a nice-looking shelf from stock material.

First, make the frame

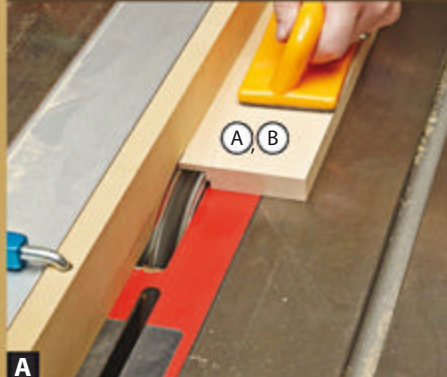
1 From $\frac{3}{4}$ " stock (we chose maple), cut four $3\frac{5}{8}$ "-wide blanks for the frame sides (A) and top and bottom (B), about 3" longer than finished length [Drawing 1].

2 Install a $\frac{3}{4}$ " stacked dado set in your tablesaw, and cut a $\frac{3}{16}$ "-deep groove for the mirror $\frac{7}{8}$ " from one edge of each blank [Drawing 2], leaving a $\frac{1}{8}$ " "tab" along the outer edge. Attach an auxiliary fence to your rip fence and slide it against the dado set so it just touches the teeth. Raise the cutting height to $\frac{9}{16}$ " and cut a rabbet along the edge of each blank [Photo A].

3 Remove the dado set and auxiliary fence, and install a rip blade and tall fence. Tilt your blade 13° from vertical, and bevel-rip each side (A) and top/bottom (B) blank [Drawing 2, Photo B]. Clean up the beveled edge with a bench plane or sanding block.

Quick Tip! You can make this beveled cut on a bandsaw if you prefer. But if you do, rip a slightly thinner offcut to allow for cleaning up the rough cut.

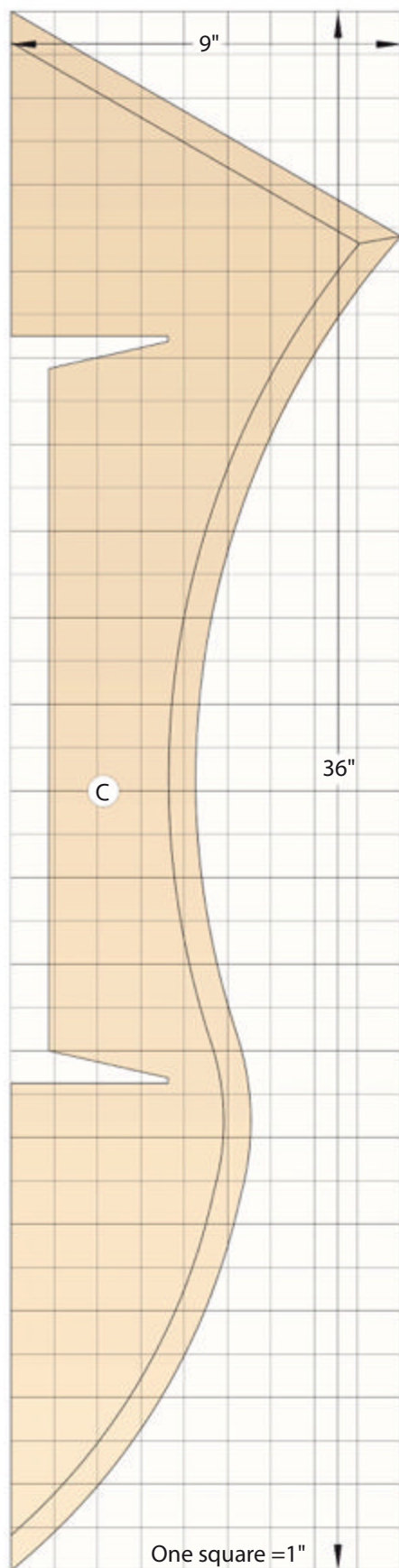
MAKE SPACE FOR THE MIRROR AND BACK



To accept the back (D), cut a rabbet that overlaps the mirror groove in the frame sides (A) and top/bottom (B) blanks.



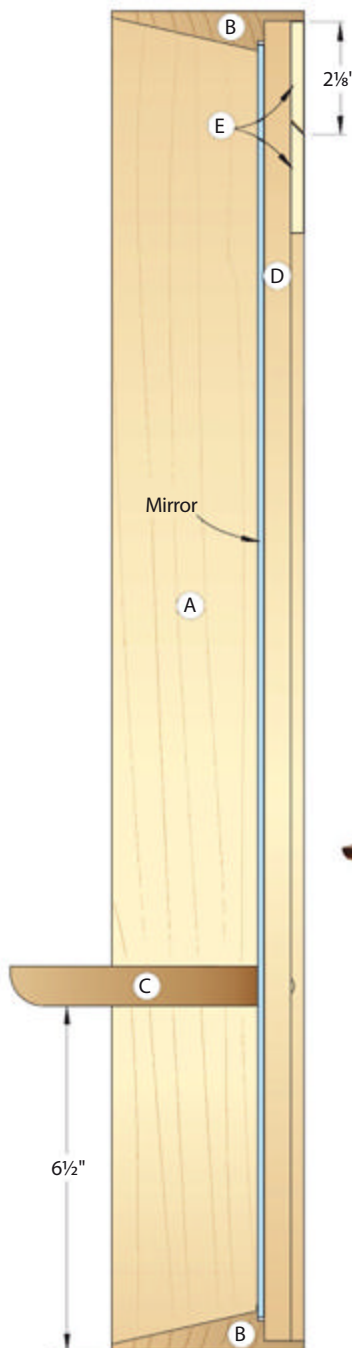
3 SHELF PATTERN



Enlarge 400% for full-size pattern.

along the sawn ends and smoothed the transitions from natural to machined edges with rasps and a spokeshave. If you're making a shelf from a dimensioned board to match the shape in **Drawing 3**, make a full-size pattern and transfer it onto the board. Cut out the notches to fit over the frame (A/B), and then cut the shelf to shape. Rout a $\frac{3}{4}$ " round-over along the front edges and ends, and sand it smooth.

4 SIDE SECTION VIEW



2 Apply finish to the frame (A/B) and shelf (C). We applied three coats of clear shellac.

Assemble the frame and shelf

1 Secure the shelf to the frame with screws [Drawings 1 and 4].

2 Cut a plywood back (D) to fit in the rabbets in the frame assembly (A-C). Drill countersunk pilot holes and screw it to the frame.

3 Cut two wall cleats (E) to size, each with a 45° beveled edge. Screw one to the top of the back with the beveled tip pointing down and facing out. Cut the remaining cleat to 16 1/2" long (to make hanging the mirror easy), and screw it to a wall stud with #8x2 1/2" screws, point facing up and out.

4 Remove the back (D) and cleat (E), install the mirror, and replace the back and cleat. Now hang your mirror and enjoy the smile you see! 🌱

Produced by **Bob Hunter** with **John Olson**

Project design: **John Olson**

Illustrations: **Roxanne LeMoine**; **Lorna Johnson**



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* sides	$\frac{3}{4}$ "	$3\frac{5}{8}$ "	$25\frac{1}{4}$ "	M	2
B* top/bottom	$\frac{3}{4}$ "	$3\frac{5}{8}$ "	$17\frac{1}{4}$ "	M	2
C* shelf	$\frac{3}{4}$ "	9"	36"	W	1
D back	$\frac{1}{2}$ "	$16\frac{7}{8}$ "	$24\frac{7}{8}$ "	P	1
E wall cleats	$\frac{1}{4}$ "	$2\frac{1}{8}$ "	$16\frac{7}{8}$ "	M	2

* Parts initially cut oversize. See the instructions.

Materials key: M-maple, P-plywood, W-walnut.

Supplies: #8x $\frac{5}{8}$ " screws (7); #8x1 1/2" screws (4); #8x1 1/4" screws (20); #8x2 1/2" screws (2); $\frac{1}{8}$ x16x24" mirror.

Blade and bit: Dado set; $\frac{3}{4}$ " round-over router bit.

7 Ways to Customize Cabinets

Get organized fast by converting store-bought cabinets for shop use.

Building your own shop cabinets isn't rocket science (See **More Resources**, page 52 for cabinet-building tips). But if you'd rather buy than build, start shopping for inexpensive unfinished or ready-to-assemble cabinets at a home center. (We found a 12"-wide unfinished wall cabinet for \$35, for example.) Most you can finish and install for all-purpose storage—if they don't buckle under a stack of stone-ware dinner plates, they'll hold your tools. You can also modify them for special uses, such as tool stands.

If you're on a tight budget (or no budget), ask kitchen remodeling pros if they'll let you haul away old cabinets they remove. Or shop recycled building-material stores, such as a Habitat for Humanity ReStore (habitat.org).

Up against the wall

New or used, most stock cabinets follow standard dimensions, making it easier to mix cabinets from more than one source. Base cabinets measure 24" deep and 34½" tall. Wall cabinets measure 12" deep and either 30" or 42" tall. And cabinet widths vary from 9" to 36" in 3" increments.

To install a row of base cabinets, use a level to find the highest point of any slope on the floor. Position the first base cabinet there and shim the bottom edges until the cabinet is level from front to back and side to side (*below*). Then screw the back to the wall studs.

Now position the second cabinet next to the first one and shim it level and flush at the front and top. Attach this cabinet to the first one and then to the wall. Repeat for the remaining cabinets.



Drive shims under the cabinet to level the first cabinet front to back and side to side. Later, attach trim to the toekick to hide gaps.

Then, fasten on a countertop (plywood or MDF work great) and go to work.

To install wall cabinets—usually the same widths as your base cabinets—assemble two 17"-long temporary supports, like the ones shown *below*, and two ½"-thick spacers to fit under them. Rest each support on a spacer and place the first cabinet on the supports and against the wall. Adjust the cabinet position and screw it to the wall studs. Then repeat for the remaining cabinets.



After you've fastened a cabinet to the wall, remove the ½" spacer under the support in order to create the space needed to pull the support free.

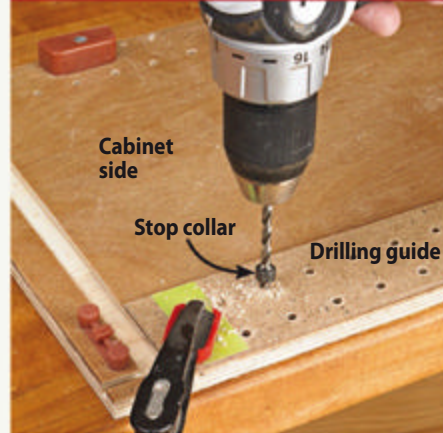
Create a sandpaper storage cabinet

Cabinet manufacturers design their wall units to accept one or sometimes two shelves, but you may want more than that for shop storage. Ready-to-assemble (RTA) cabinets that disassemble quickly give you the easiest opportunities to add more shelves. But any cabinet wide enough to accept a drill and bit can be modified to add enough shelves to create a sandpaper center.

To disassemble RTA cabinets like the one shown, first remove the screws attaching the back and slide the back free of the case. Then loosen the fasteners holding the sides to the top and bottom and the face frame to the case. Cut a perforated-hardboard drilling guide to fit between the top and bottom dadoes in the cabinet sides. Clamp the guide to the cabinet side and drill shelf-pin holes 1" apart along one edge of the cabinet side, as shown *right*. Repeat for the opposite edge and other cabinet side. Reassemble the cabinet except for the back.

Cut additional shelves and insert shelf pins, slide the new shelves in from behind, and replace the back.

DRILL SHELF-PIN HOLES



A SHELF FOR EVERY GRIT



Build in custom touches

Often, cabinets need a little help to make them more shop-friendly. To boost the storage capacity of preassembled cabinets, screw metal shelf standards to the sides, middle of the back, and inside the center stile to hold extra shelves. For another way to add shelves, see **"Create a sandpaper storage cabinet,"** above.

Then make any cabinet more useful by adding accessories, such as these seven options. (For help with modifications, see **More Resources** on page 52.)

1 Install pull-out trays. Reaching to the back of a base cabinet can be a pain, but pull-out trays bring the contents to you. Modify the tray plans *below* to fit the width and depth of your cabinet opening. Size the tray 1" narrower than the face-frame opening and 1" shorter than the interior depth of the cabinet.

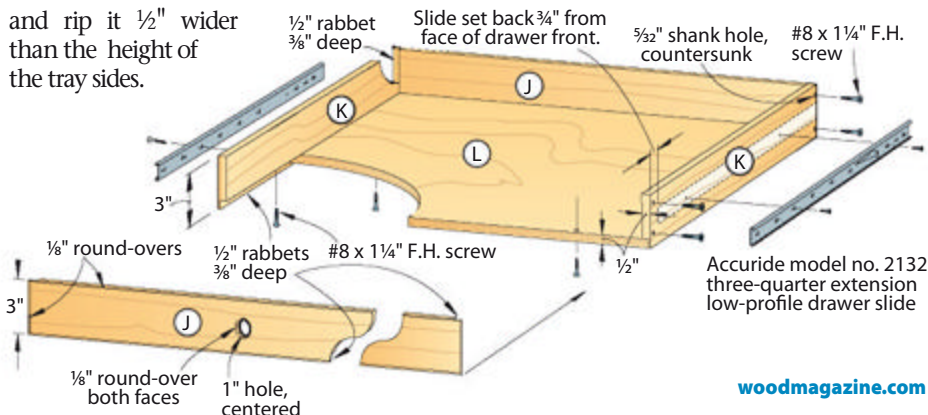
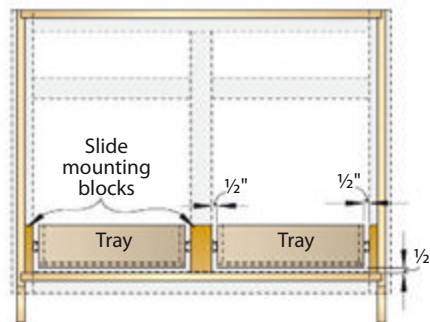
To mount drawer slides in face-frame cabinets, block out the cabinet sides to bring the slides flush with the face-frame stiles, as illustrated at *right*. For cabinets with a center stile, plane a center slide-mounting block to the width of the center stile

and rip it 1/2" wider than the height of the tray sides.

TRAYS PUT CONTENTS IN EASY REACH

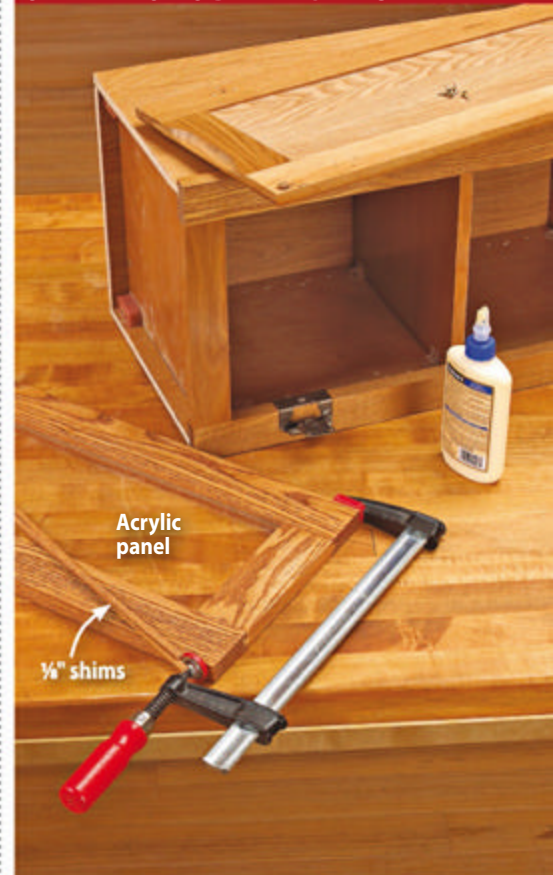


Whether it's one tray or a stack of them, pull-outs save you the trouble of reaching into the back of dark cabinets to find what you need.



2 Mount see-through doors. To take the mystery out of a cabinet's contents, replace the original doors with clear acrylic-panel doors. To build simple frame-and-panel doors, see **More Resources**.

SEE WHAT'S INSIDE AT A GLANCE



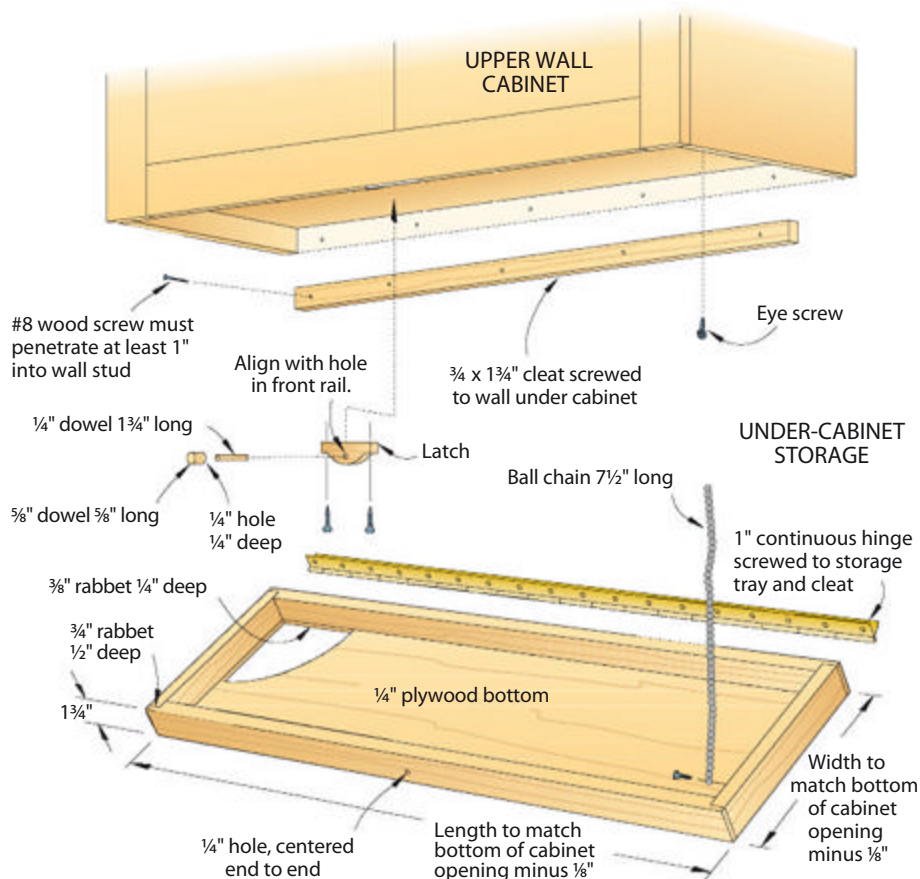
Make this simple door with 1/4" stub tenons and grooves. Fill grooves with 1/8"-wide shims to hold the 1/8"-thick clear panel in place.

3 Attach drop-down tray storage. We've used trays like these in the *WOOD*® magazine shop for more than a decade. Adapt the size to fit under your wall cabinets and customize the interior layout to organize your tools.

HANG UNDER-CABINET TRAYS



You'll feel like you gained another shelf after installing these drop-down trays. Use them to store layout tools, chisels, or screwdrivers.



4 Transform a cabinet into a mobile tool base. Adding a set of casters (see **Source**) to a cabinet turns it into a rolling tool stand. To start, choose a cabinet based on the height you need and how you'll use the cart. For example, a 42"-tall wall cabinet on casters would place a benchtop drill press at the right height. Use a narrow wall cabinet to mount a bench grinder.

A 30"-tall wall cabinet measures about the same height as a base cabinet with the toe-kick removed. Turning a base cabinet into a portable miter saw stand takes advantage of the base unit's depth and drawers. Choose casters with wheel diameters that produce a comfortable cabinet height.

To customize a base cabinet for casters, first remove the toe-kick area beneath the cabinet bottom. This lets you mount casters closer to the cabinet corners for added stability. Depending on your cabinet, cut the sides and back using a jigsaw and a straightedge. Then use a handsaw to remove the rest of the toe-kick, as shown *right*.

Now, install mounting blocks for your casters. We cut these from 3/4" oak about

1" larger than the caster mounting plates. Drill mounting-screw pilot holes in each block, then glue and clamp the

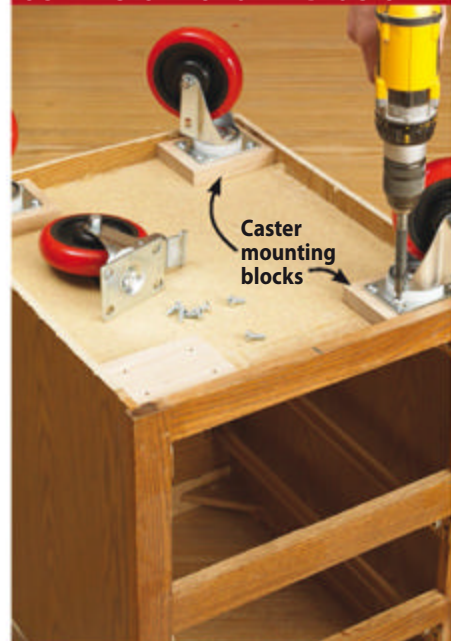
blocks to the cabinet bottom. Wait two hours for the glue to dry, then attach the casters, as shown *below*.

REMOVE THE TOEKICK



Base cabinets commonly have empty toe-kick space between the cabinet bottom and the floor. Check for metal fasteners before you cut.

SCREW CASTERS TO THE BLOCKS



For maximum mobility and ease of use, install two swivel casters in the cabinet's back and two locking-swivel casters in front.

shown *below*. Next, give each router bit in your collection its own holder. Cut blocks in three sizes to hold router bits and accessories with different shank and cutterhead sizes (*bottom*).

Diagram illustrating the assembly of a wooden workbench, showing the main components and their dimensions:

- Top Panel:** 10½" wide, 10¼" deep. Features a 5/8" hole, centered, and a 3" wide section.
- Hardboard Dividers:**
 - 1/8 x 10½ x 11¾" hardboard divider (top).
 - 1/8 x 8¾ x 11¾" hardboard divider (middle).
- Support Structure:**
 - 11¾" wide, 10¼" deep base.
 - 11" wide, 3¼" high vertical support.
 - 5½" wide, 4¾" deep base section.
 - 5¼" wide, 11" deep base section.
- Fasteners and Details:**
 - 1/2" dowel, 3½" long (used for assembly).
 - 3/4" dado, 3/8" deep, centered.
 - 3/4" rabbet, 3/8" deep.
 - 3/4" x 11 x 20" MDO (Medium Density Overlay) panel.
 - 1/2" hole, 1/2" deep.
 - 1" wide, 1" high section.
 - 3/4" wide, 4" high section.
 - 2¾" wide, 4" high section.

A collection of various mechanical parts, including bolts, nuts, washers, and small tools, arranged on a wooden surface. The parts are organized into rows and columns, with some larger tools like a wrench and a screwdriver visible in the background. The image is a close-up shot, highlighting the intricate details of the hardware.

3/4 x 2 1/2 x 2 1/2" MDF

1/8" chamfers on top edges

3/4 x 3 3/4 x 3 3/4" MDF

3/4 x 1 1/4 x 1 1/4" MDF

Drill blocks with either 13mm holes (for 1/2" shanks) or 17/64" holes (for 1/4" shanks).

Large block drilled to store high-speed rotary-tool bits

1/4"-hardboard spacers customize the fit and form trays for wrenches, bearings, and other accessories.

6 Top base cabinets with a flat work surface. For an inexpensive, durable, and flat counter or benchtop, it's hard to beat two laminated sheets of $\frac{3}{4}$ " MDF. Most countertops measure 25" deep to allow a $1\frac{1}{2}$ " overhang, but you can get by with 24"-wide counters to use 4x8' sheets efficiently. To dress up the tops, edge them with $\frac{1}{2}$ x $1\frac{1}{2}$ " hardwood strips to match your cabinets. Then, center the top on the cabinet and mount it in place using the cabinet's existing mounting corners or stretchers.

MDF MAKES A BARGAIN TOP



For a flat, stable, and economical work surface, laminate layers of $\frac{3}{4}$ " MDF to make the top. This also raises the tool height $1\frac{1}{2}$ ".

Source

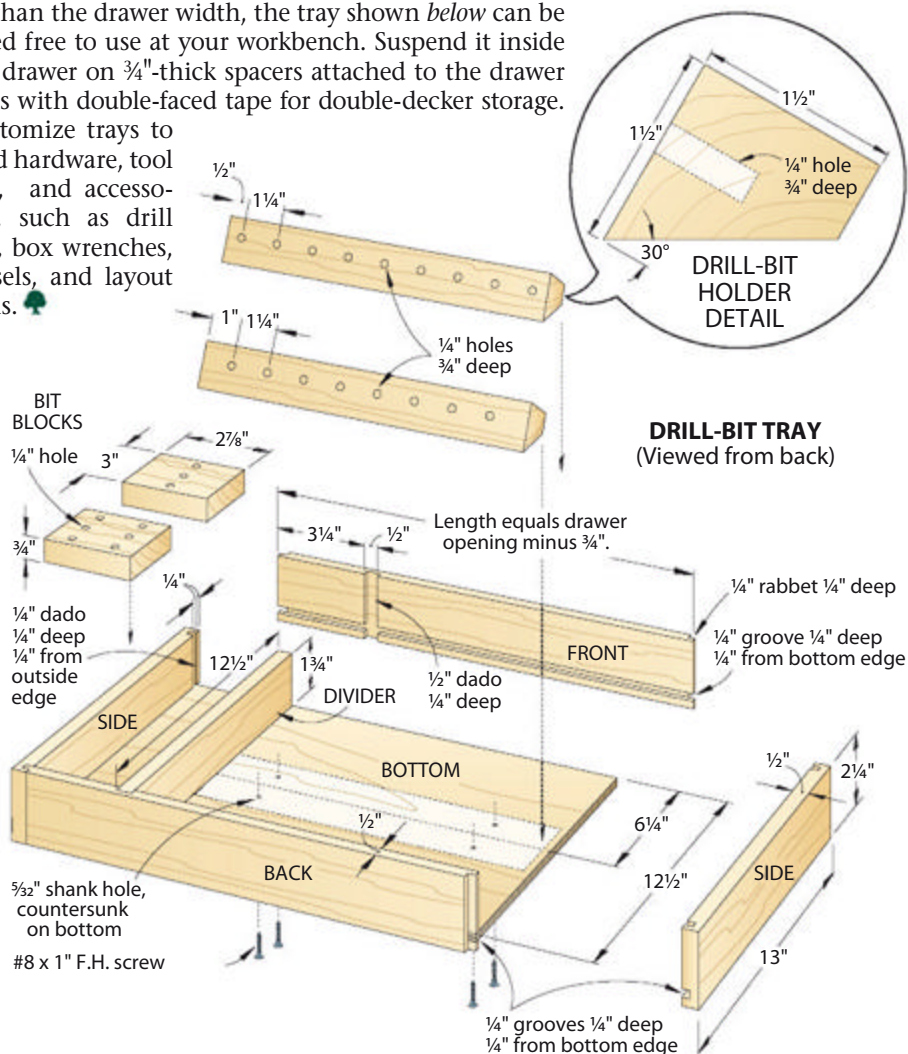
Casters: Locking 5" swivel casters no. 37138, \$47 per pair, and 5" swivel casters no. 39507, \$35 per pair, Rockler, 800-279-4441, rockler.com.

More Resources

- For a free video on drilling shelf holes, see woodmagazine.com/shelfholes.
- Check out these 11 must-have cabinetmaking tools: woodmagazine.com/11cabinettools
- For a guide to making flawless frame-and-panel doors, see woodmagazine.com/frameandpaneltips.



7 Add lift-out organizers. Designed to be $\frac{1}{4}$ " narrower than the drawer width, the tray shown *below* can be lifted free to use at your workbench. Suspend it inside the drawer on $\frac{3}{4}$ "-thick spacers attached to the drawer sides with double-faced tape for double-decker storage. Customize trays to hold hardware, tool sets, and accessories, such as drill bits, box wrenches, chisels, and layout tools.



BUILD A TRAY THAT CAN DOUBLE AS A TOOLBOX



Take tools where you need them in a lift-out tool tray. The tray rests on supports taped to the sides of deep drawers. If your storage needs change, build a new tray, replace the supports as needed, and your old drawer gains a new life.

Block Planes



Often the first hand tool many woodworkers learn to use, a block plane helps you clean up an edge or trim a part to fit in no time flat. Learn which model belongs on your shopping list.

We recently tested 15 block planes in the *WOOD*® magazine shop, putting them through extensive use in many applications, as well as multiple resharpenings. Eight of the planes have blades bedded at a low angle, while the others have a steeper, or standard, angle. See the sidebar at *right* to learn which of the two types best suits you.

Four critical block plane traits

► **A flat sole** The body of a block plane must have a dead-flat sole to prevent it from rocking or conforming to subtle contours on a workpiece surface. All four Lie-Nielsen planes and all but one Veritas arrived with flat soles ready to go. Three planes needed only a few minutes of lapping on a diamond stone to get flat. But the Kunz, Shop Fox standard

Low angle or standard angle?

All the planes we tested come with blades ground to a 23–25° cutting bevel. Add that to the 12–15° bed angle of a low-angle block plane and you get a combined cutting angle of 35–40°. Standard-angle block planes have 20–22° bed angles, steepening the cutting angle to 43–47°. We recommend getting a low-angle plane first if you can get only one because it's more versatile than a standard-angle version. Here's what each style does best:

Low angle

- Cuts end grain better than standard-angle planes.
- More comfortable to hold and use because of its lower profile.
- Sharpening the blade to steeper angles gives you the same benefits as a standard-angle plane to avoid grain tear-out.

Standard angle

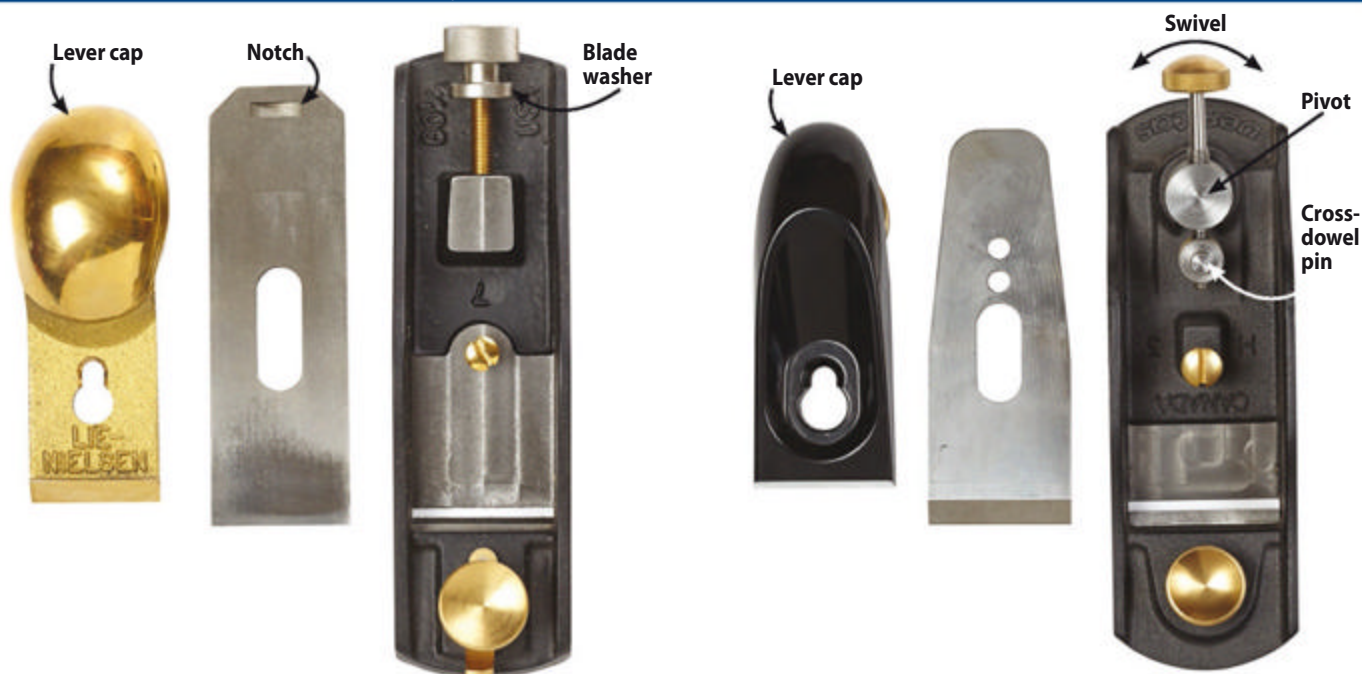
- Steeper cutting angles work best on figured woods and dense hardwoods.
- Taller body may be easier to grip and hold for larger or arthritic hands.

Note: Apron planes are essentially smaller versions of block planes. They have either low- or standard-angle configurations similar to larger block planes, but have fixed mouths.

angle, and Stanley Sweetheart planes each needed about 30 minutes of lapping to make them flat.

► **Easy blade adjustments** Two factors come into play here: how easily the blade travels forward and back,

BLADE-DEPTH ADJUSTERS: STRAIGHT IN, OR STRAIGHT WITH A TWIST



Most block planes (Lie-Nielsen 60½ shown) use a single-screw adjuster. A washer or flange on the mechanism fits into a notch on the blade, driving it forward or back as you turn the screw.

A Norris-style adjuster (shown on a low-angle Veritas) serves two functions. A cross-dowel pin on the screw fits into the blade, driving the blade forward or back with each turn. The adjuster also pivots to help square the blade to the body.

and how effectively the lever cap secures the blade. The plane's depth adjuster should move the blade with smooth, reliable precision. And because the blades are slightly narrower than the body cavity, they can skew a little, resulting in the blade cutting more deeply on one side.

To remedy that, the Veritas and Stanley planes use a Norris-style adjuster (shown *above right*), which swivels to square the blade to the mouth as well as front-to-back when you turn the screw.

But the Stanley adjusters have nearly two full turns of backlash—a lack of blade movement when changing directions—that frustrated us when setting blade depth. The three larger Veritas planes have setscrews to guide the blade, as shown *below left*.

The lever cap on each plane has a locking mechanism to hold the blade in place. We preferred the WoodRiver planes' cam locks, shown *below*, similar to older Stanley No. 65s, to the thumbwheels on all others.

► **A sharp blade** Out of the box, all of the Lie-Nielsen, Stanley, and Veritas blades were sharp enough to go to work, and the Veritas blades had a nice microbevel (a slightly steeper secondary bevel on the cutting edge). The WoodRiver blades were not ground to a sharp point and needed to be sharpened before use. Blades that were not flat had to be lapped and made so, but once done, it's no longer an issue. The Stanley blades needed about 10 minutes to flatten, and the Kunz 220 and Shop Fox D3832 blades required more than 20 minutes.

Blades come in three types of steel alloys: O1 carbon, A2, and PM-V11. Carbon-steel blades sharpen quickly, but also dull quickly. A2 blades are hardest, take the longest to sharpen, but hold an edge for a long time. The PM-V11 blades (our favorite) hold a sharp edge longer and sharpen quicker than A2; only the Veritas planes have this type of blade.

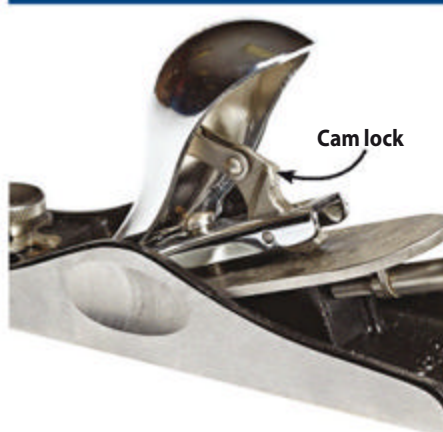
► **A tight mouth** An adjustable front toe lets you close up the mouth in front of the blade to help prevent tear-out, and all but four of the tested planes have one. The Lie-Nielsen 102 apron plane is one of those four, but its mouth opening, with a blade installed, measured a mere ⅛", making it as good as an adjustable-mouth plane.

NO SIDE-TO-SIDE WOBBLE



Setscrews on all Veritas planes but the apron plane align the blade perpendicular to the mouth opening, preventing any sideways movement.

EASY-ON AND -OFF LEVER CAPS



The two-piece knuckle-joint lever caps on both WoodRiver planes snap open and closed via a cam-lock mechanism similar to Vise-Grip locking pliers.

Block planes: Performance that packs into your apron pocket

BRAND AND MODEL	STOCK NUMBER	PERFORMANCE RATINGS (1)							TYPE OF BLADE ADJUSTER (2)	BLADE MATERIAL (3)	BLADE WIDTH, INCHES	BLADE BEVEL ANGLE, DEGREES (4)	BED ANGLE, DEGREES	MIN. MOUTH OPENING, INCHES (5)	SOLE DIMENSIONS (W × L), INCHES	COUNTRY OF ASSEMBLY (6)	SELLING PRICE (7)	CONTACT INFORMATION	
		FLATNESS OF SOLE	EASE OF ADJUSTING BLADE DEPTH	EASE OF LOCKING BLADE IN PLACE	EASE OF ADJUSTING THROAT OPENING	OVERALL FIT AND FINISH	SHARPNESS OF BLADE	FLATNESS OF BLADE										PHONE NUMBER	WEBSITE
APRON PLANES																			
LIE-NIELSEN 102	102	A	A-	B+	NA	A	A	B+	S	A	1¼	25	12	⅞*	1⅞ × 5⅜	U	\$115	800-327-2520	lie-nielsen.com
LIE-NIELSEN 103	103	A	A-	B+	NA	A	A	B+	S	A	1¼	25	20	⅞*	1⅞ × 5⅜	U	\$125	800-327-2520	lie-nielsen.com
VERITAS	05P27.71	A	A	B+	NA	A	A-	A	N	P	1¼	23*	12	⅞*	1⅞ × 5½	CA	\$94	800-871-8158	leevalley.com
LOW-ANGLE PLANES																			
LIE-NIELSEN 60½	1-60-1-2	A	A-	B	A	A	A	B+	S	A	1⅜	25	12	0	1¾ × 6¼	U	\$165	800-327-2520	lie-nielsen.com
SHOP FOX	D3831	B-	B+	B	C+	B	B	B	S	C	1⅜	25	15	0	1⅜ × 6¼	CH	\$90	360-734-3482	woodstockint.com
STANLEY SWEETHEART 60½	12-139	C	C	B	A-	B	A	C+	N	A	1⅜	24	12	0	2⅞ × 6⅜	M	\$90	800-262-2161	stanleytools.com
VERITAS	05P22.71	B+	A	B	A	A	A-	A	N	P	1⅜	23*	12	0	2⅞ × 6½	CA	\$165	800-871-8158	leevalley.com
VERITAS DX60	05P70.06	A	A	B+	A	A	A-	A	N	P	1⅜	23*	12	0	1⅜ × 6½	CA	\$199	800-871-8158	leevalley.com
WOODRIVER	151125	A-	B-	A	A-	A-	D	B+	S	C	1⅜	25	12	0	2 × 6⅞	CH	\$100	800-225-1153	woodcraft.com
STANDARD-ANGLE PLANES																			
KUNZ 220	581-0220	C	B	C+	NA	B-	B-	D	S	C	1⅞	25	20	⅞*	1⅞ × 6⅜	G	\$60	800-509-0081	traditionalwoodworker.com
LIE-NIELSEN 9½	1-9-1-2	A	A-	B	A	A	A	B+	S	A	1⅜	25	20	0	1¾ × 6¼	U	\$175	800-327-2520	lie-nielsen.com
SHOP FOX	D3832	C+	B+	B	C+	C+	B	D	S	C	1⅜	25	22	⅞	2⅞ × 6¼	CH	\$90	360-734-3482	woodstockint.com
STANLEY SWEETHEART 9½	12-138	C+	C	B	A-	B	A	C+	N	A	1⅜	24	20	0	2⅞ × 6⅜	M	\$90	800-262-2161	stanleytools.com
VERITAS	05P22.81	A	A	B+	A	A-	A-	A	N	P	1⅜	23*	20	0	2⅞ × 6½	CA	\$165	800-871-8158	leevalley.com
WOODRIVER	151124	B+	B-	A	A-	A-	D	B+	S	C	1⅜	25	20	0	2 × 6⅞	CH	\$100	800-225-1153	woodcraft.com

1.  Excellent  Poor
 Good  Not applicable
2. (N) Norris adjuster
 (S) Single-screw adjuster
3. (A) A2 steel
 (C) O1 carbon steel
 (P) PM-V11 steel
4. (*) 23° primary bevel
 with 25° secondary bevel
 5. (*) Mouth not adjustable
6. (CA) Canada
 (CH) China
 (G) Germany
 (M) Mexico
 (U) United States
7. Prices current at time of article production and do not include shipping, where applicable.

As with most tools, price and performance go hand-in-hand

If we could buy only one block plane, or were buying our first, we'd get a low-angle model. And we'd choose either the Lie-Nielsen 60½ or Veritas DX60. They share Top Tool honors. They both work great, with their primary differences being the depth adjuster and blade steel.

If you prefer a standard-angle plane, the Lie-Nielsen 9½ and Veritas 05P22.81 are our favorites.

But for a lot less money, the low-angle Lie-Nielsen 102 and Veritas 05P27.71 apron planes deliver great performance in a smaller package. They share Top Value honors.

Produced by **Bob Hunter** with **John Olson** and **Kevin Boyle**

Lie-Nielsen 60½, \$165



Veritas DX60, \$199



Veritas apron plane, \$94



Lie-Nielsen 102 apron plane, \$115



Sharpening Station



Compact enough to fit on a shelf, but so handsome it begs to be left out in the open, this easy-to-build station integrates simple, no-tip drawers and a handy flip-open top that conceals a no-slip surface.

First, build the case

1 Cut parts A-F to size [Materials List] and set two pieces of long edging (C) aside. Glue the dividers (A) to the back (B) as shown in **Drawing 1**. Glue the long edging and short edging (D) to the top

and bottom panels (E). **Note:** The $\frac{3}{4}$ "-thick edging will stand proud of the $\frac{1}{2}$ "-thick plywood. Just make sure one side of the edging lies flush with a face of the plywood panel.

2 Rout a $\frac{1}{2}$ " round-over in the long edging (C) attached to the back edge

GLUE UP THE CASE



A Glue the bottom panel assembly (C-E) to the dividers and back (A/B) first, followed by the top.

TRANSFER THE LID PIVOT HOLES



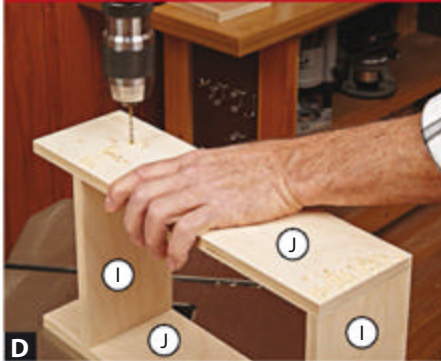
B Clamp the case sides (F) and the lid (C/G/H) to the case. Drill through the pivot hole in the lid sides (H) to a depth of $1\frac{1}{2}$ ".

CHECK THE MOVEMENT OF THE LID



Slowly open the lid. If you feel resistance, mark the point where the lid is rubbing, then remove the lid and sand away the extra material.

REINFORCE THE DRAWER JOINTS WITH DOWELS



Mark a line with a pencil on the drawer sides (J) to mark the center of the drawer front and back (I) thickness. Then, drill four $\frac{1}{8}$ " holes per joint, $1\frac{1}{4}$ " deep. Apply a small amount of glue in each hole before tapping in the $1\frac{1}{4}$ "-long dowels.



of the top panel (E). (This provides room for the lid to swing open.) Glue the case (A–E) together [Photo A]. Rip the taper on the case sides (F) [Drawing 2] and set them aside.

Next, assemble the lid

1 Cut the lid panel (G) and sides (H) to size, tapering the sides as shown in Drawing 2. Bevel-cut one piece of long edging (C) for the lid [Drawing 2a]. Glue the beveled piece and the unaltered piece of long edging to the back and front edges of the lid panel (G) [Drawing 3].

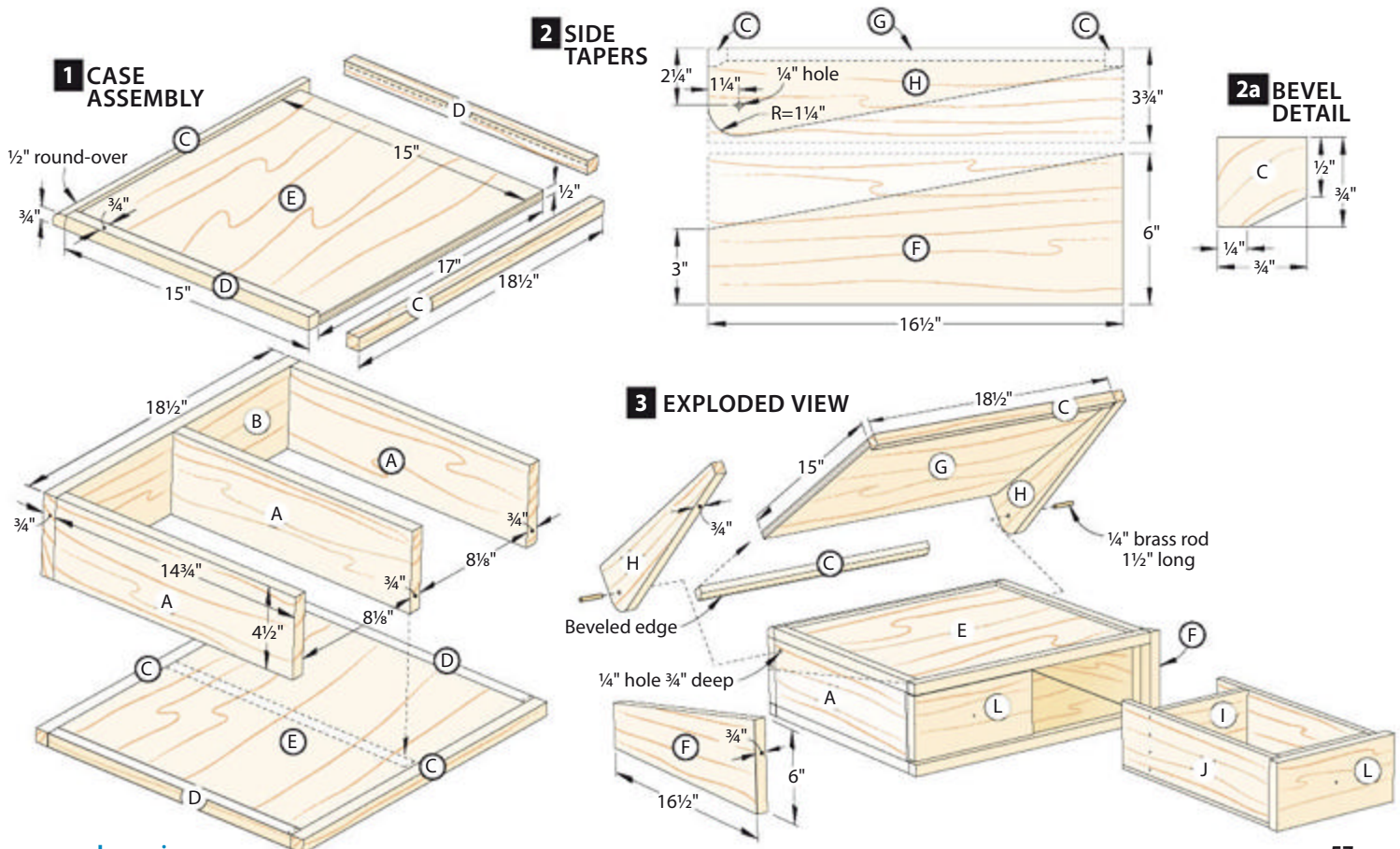
2 Mark the radius on the lid sides (H) using a compass; then, bandsaw the sides to shape [Drawing 2] and plane or sand the sawn edge smooth. Drill the $\frac{1}{4}$ " hole for the brass rod pivots, where shown. Glue the lid sides to the lid assembly (C/G), top edges flush.

3 Transfer the pivot holes from the lid sides (H) to the case dividers (A) [Photo B]. Then, glue the case sides (F) to the case, flush with the case's bottom edge, as shown in Drawing 3. Cut the brass rod pivots to length and insert them into the holes in the lid and case

sides, but leave them $\frac{1}{4}$ " proud so you can pull them out. Check the lid's movement [Photo C]. When you're satisfied with the fit of the lid, remove it until after applying a finish.

Finally, add drawers and finish

1 Cut the drawer parts I–L to size. Glue the drawer fronts and backs (I) to the drawer sides (J) [Drawing 4]. When dry, drill $\frac{1}{8}$ " holes through the drawer sides and into the fronts and backs [Photo D]. Glue dowels in the holes [Photo E] and sand the drawer sides smooth.





F Place the false fronts (L) inside the case, snug to one side. Measure the gaps between the false fronts and the case (*above*). Divide the vertical gap by three

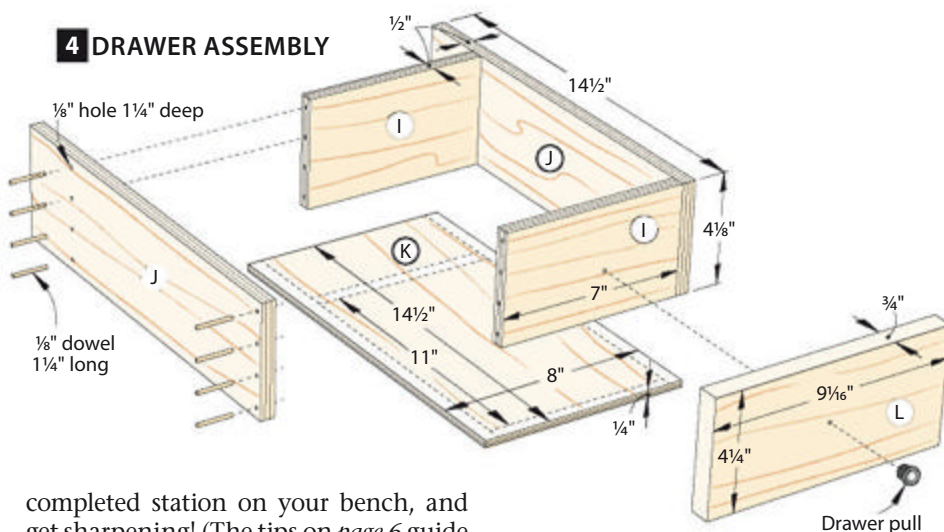


G to determine the thickness of the shims needed for an even reveal side-to-side, and divide the top gap by two for the top/bottom reveal (*above*).

2 Glue the drawer bottoms (K) to the drawer assemblies (I/J). Determine the ideal reveal for the false fronts (L) [Photos F and G]. With the drawer boxes in the openings, apply double-faced tape to the back face of each false front, shim them for an even reveal, and apply pressure to stick them to the drawers.

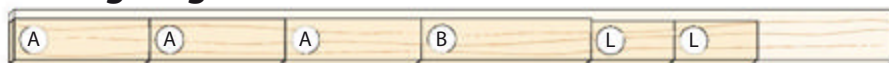
3 Sand the entire sharpening station to 220 grit. Wipe clean. Apply three coats of spray polyurethane to the station, sanding between coats with 320-grit sandpaper. Drill through the false fronts (L) into the fronts (I) to attach the drawer pulls. Then, attach the lid (C/G/H) to the case. Finally, cut mesh nonslip drawer liner to fit the top panel (E) and drawers. Load up the drawers with your sharpening stones, park the

4 DRAWER ASSEMBLY



completed station on your bench, and get sharpening! (The tips on *page 6* guide you through this process.)

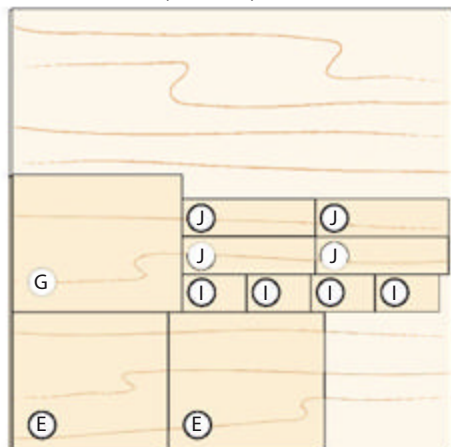
Cutting Diagram



3/4 x 5 1/2 x 96" Oak (4 bd. ft.)



3/4 x 7 1/4 x 96" Oak (5.3 bd. ft.)



1/2 x 48 x 48" Birch plywood



1/4 x 24 x 24" Birch plywood

Produced by **Nate Granzow** with **John Olson**
Project design: **John Olson**
Illustrations: **Lorna Johnson**

Materials List

Part	FINISHED SIZE			Matl.	Qty.	
	T	W	L			
Case						
A	dividers	¾"	4½"	14¾"	O	3
B	back	¾"	4½"	18½"	O	1
C	long edging	¾"	¾"	18½"	O	6
D	short edging	¾"	¾"	15"	O	4
E	top and bottom panels	½"	15"	17"	P	2
F*	sides	¾"	6"	16½"	O	2
Lid						
G	panel	½"	15"	18½"	P	1
H*	sides	¾"	3¾"	16½"	O	2
Drawers						
I	fronts and backs	½"	4⅛"	7"	P	4
J	sides	½"	4⅛"	14½"	P	4
K	bottoms	¼"	8"	14½"	P	2
L	false fronts	¾"	4¼"	9⅞"	O	2

*Parts initially cut oversize. See the instructions.

Materials key: O—white oak, P—Baltic birch plywood.

Supplies: 1/4"-diam. brass rod 4" long, 1/8"-diam. dowel 36" long (2), mesh nonslip drawer liner, drawer pulls (2).

Bits: 1/8" and 1/4" brad-point drill bits, 1/2" round-over router bit.

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Start with a frame

1 From 2×2 lumber, cut the rails (A), large supports (B), medium supports (C), small supports (D), and legs (E) to length, mitering the indicated ends at 10° [Materials List, Drawing 1]. Mark the locations of the supports on the rails. Then, attach the rails to the supports [Photo A]. (We used #9×3½" exterior-grade multipurpose screws. See **Shop Tip**, next page, and **Sources**, page 63.)

2 Mark the locations of the rails (A) on the legs (E) [Drawing 1]. Use clamps to dry-assemble the frame (A–E), testing the alignment [Photo B], before attaching the legs to the rails [Photos C and D].

ATTACH AT AN ANGLE

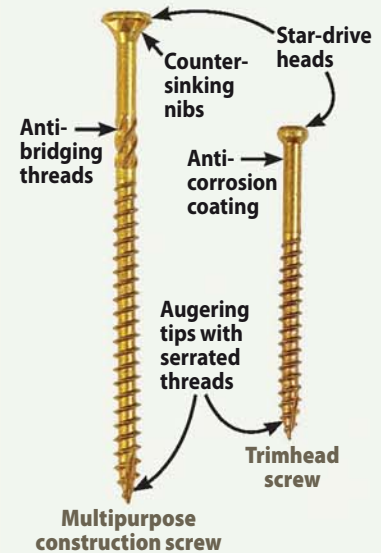


A Before driving, drill ⅛" pilot holes for the #9 screws. A clamp makes assembling the angled parts a simple, two-handed job.

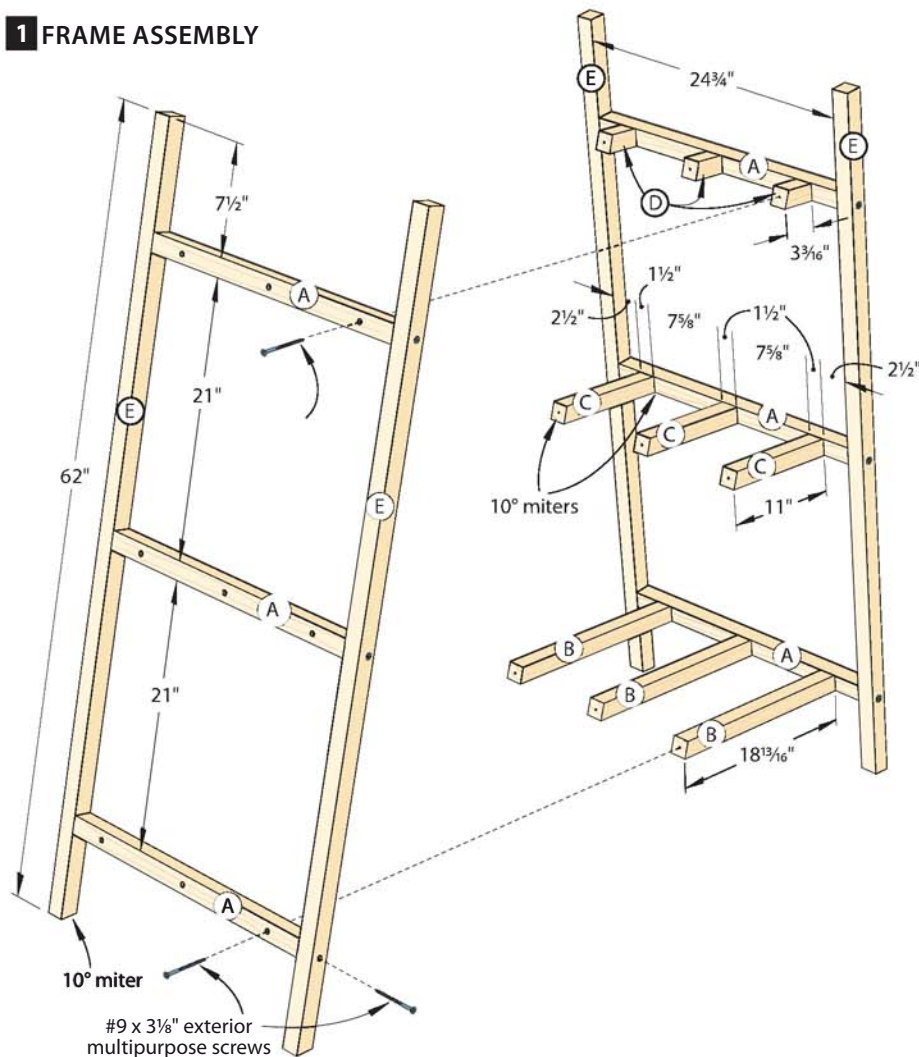
SHOP TIP

Join the screw revolution

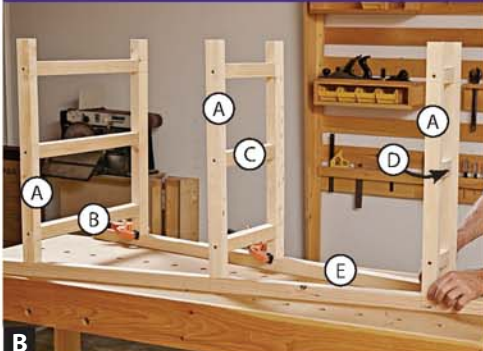
We didn't have to sneak these high-tech screws (see **Sources**, page 63) past DARPA security. In fact, we found them at the home center. But these modern exterior screws pack plenty of performance-enhancing features. Both have an anti-corrosion coating that stands up to the weather as well as the corrosive chemicals in treated lumber. Both feature augering tips with serrated threads that ease the following threads through the pilot hole. And both sport star-drive heads for no-slip driving. (Larger boxes include the bits.) The multipurpose construction screw, *left*, has countersinking nibs and anti-bridging threads that prevent board separation while you drive the screw. The trim screw, *right*, trades those features for a narrow head to minimize its visibility.



1 FRAME ASSEMBLY

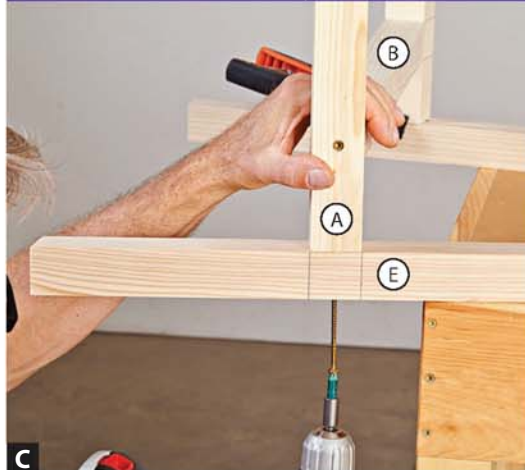


DRY-ASSEMBLE THE FRAME



Adjust the rails' position up or down the frame to make them flush with the legs. If the tops of the legs touch, trim them until there is about a $\frac{1}{8}$ " gap.

BOTTOM UP FIRST. THEN, TOP DOWN.

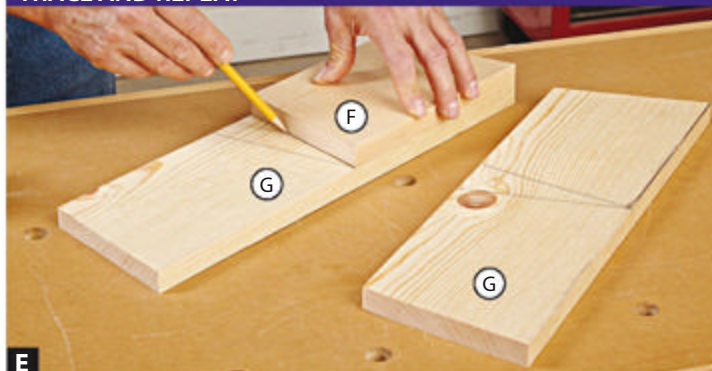


Slide the assembly to gain access to the underside. Applying downward pressure, drill a pilot hole and screw a leg to a rail. Repeat for all rails on the bottom face.



Keeping downward pressure on the leg to secure it, drill and screw the upward-facing leg to the rail. Repeat at all rail locations.

TRACE AND REPEAT



E With edges aligned, trace the shape of the small tray end (F) onto the medium (G) and large (H) tray ends, repeating to fill their lengths.

DRILLING $\times 2$ = EFFICIENCY



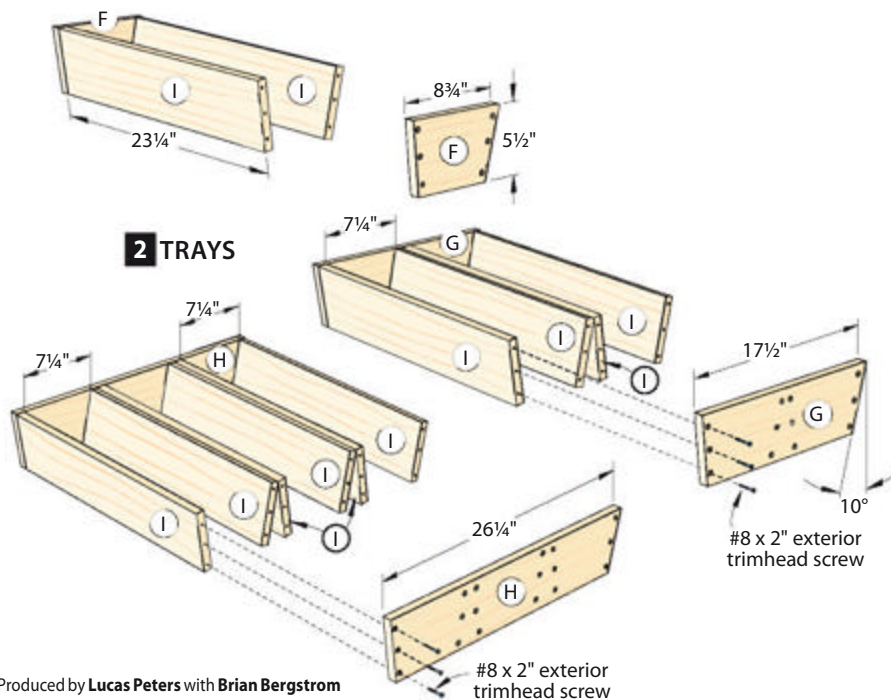
F Cut layout and drilling in half by stack-drilling. Back the tray ends with scrap, align the ends and edges of two tray ends, and drill holes at each mark.

Top it with trays

1 From 1x6 lumber, cut the small tray ends (F), medium tray ends (G), and large tray ends (H) to size, mitering the ends 10° [Materials List, Drawing 2]. Cut the tray dividers (I) to length. Now, mark the locations of the tray dividers on the medium and large tray ends [Photo E].

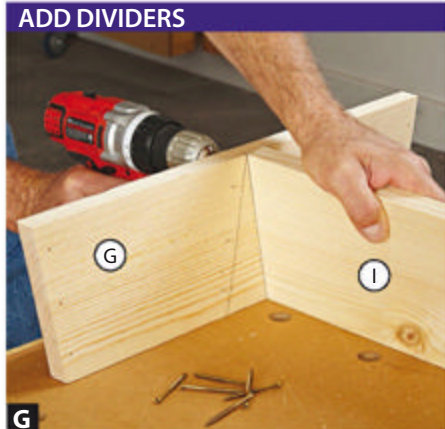
2 On one tray end of each size (F, G, and H), measure and mark screw locations $\frac{3}{8}$ " from the tray ends and the marked lines. Drill $\frac{3}{32}$ " pilot holes [Photo F] and assemble the trays [Photo G] using 2" exterior trimhead screws.

3 Plane or sand the edges of the tray dividers (I) [Photo H]. Attach the tray assemblies to the frame [Drawing 3, Photo I]. Then, wipe on at least two coats of an exterior penetrating oil finish. We used Penofin Transparent Hickory. Drop in plastic window boxes [Sources], get out your green thumb, and get to planting. 🌱



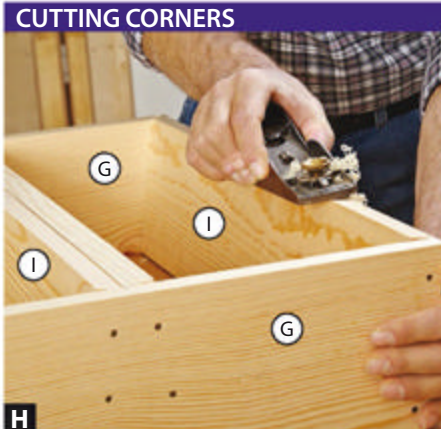
Produced by Lucas Peters with Brian Bergstrom
Project design: John Olson
Illustrations: Lorna Johnson

ADD DIVIDERS



G Hold the tray dividers (I) firmly against the tray ends (F, G, and H) to ensure that they don't shift from the marked lines as you drive screws.

CUTTING CORNERS



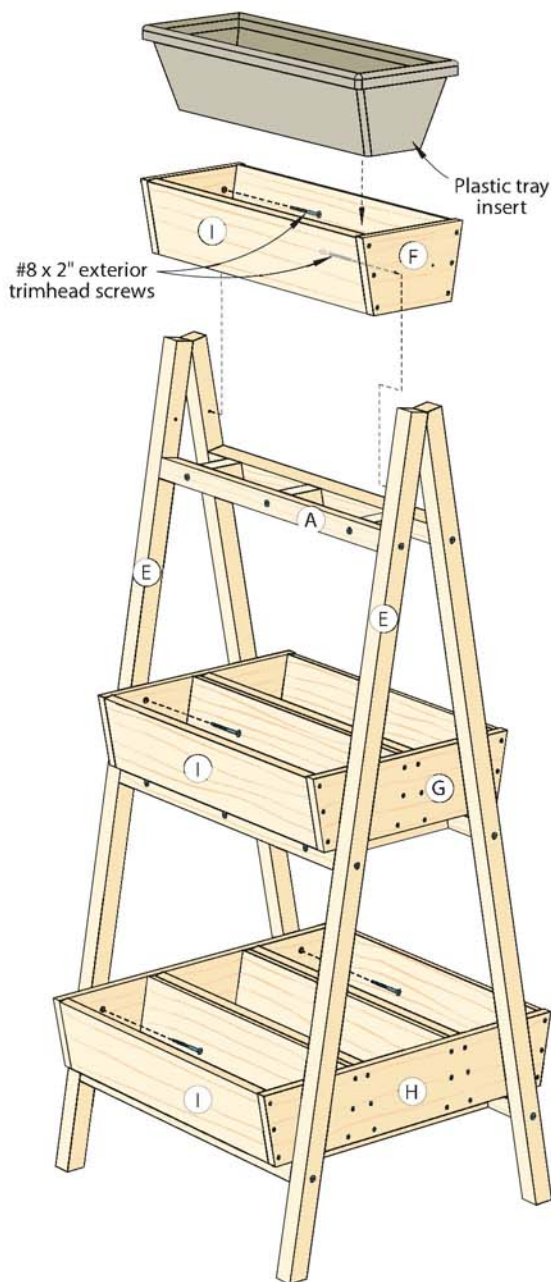
H Use a block plane to flatten the protruding edges of the tray sides (I), trimming them until they align with the tray ends (F, G, and H).

PUT IT ALL TOGETHER

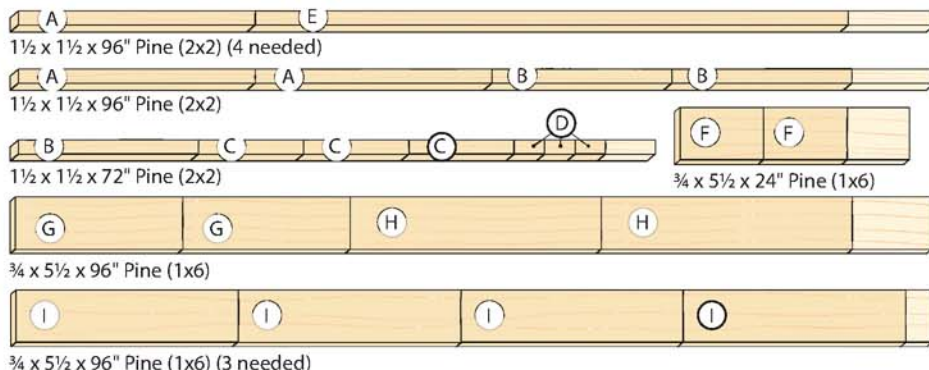


I Center each tray assembly on its corresponding supports. Drill $\frac{3}{32}$ " pilot holes and attach them to the legs (E) with 2" trimhead screws.

3 EXPLODED VIEW



Cutting Diagram



PLANT LIKE A PRO

We left the picking and planting to the professionals that manage the *Better Homes and Gardens Test Garden*®. You can find these plants at major home centers and duplicate their arrangement.



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A rails	1 1/2"	1 1/2"	24 3/4"	P	6
B large supports	1 1/2"	1 1/2"	18 1/8"	P	3
C medium supports	1 1/2"	1 1/2"	11"	P	3
D small supports	1 1/2"	1 1/2"	3 3/8"	P	3
E legs	1 1/2"	1 1/2"	62"	P	4
F small tray ends	3/4"	5 1/2"	8 3/4"	P	2
G medium tray ends	3/4"	5 1/2"	17 1/2"	P	2
H large tray ends	3/4"	5 1/2"	26 1/4"	P	2
I tray dividers	3/4"	5 1/2"	23 1/4"	P	12

Material key: P-pine.

Bits: 7/64" and 3/32" drill bits; T-25 and T-10 star-drive bits.

Sources

GRK #9 x 3 1/8" multipurpose screws (no. 492187), \$25; GRK #8 x 2" trimhead screws (no. 727462), \$7, Home Depot, homedepot.com, 800-466-3337. Garden Treasures 6 x 7 7/8 x 23 3/4" window box (no. 44256), \$8, Lowe's, lowes.com, 877-465-6937.

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No planing plywood—unless you like to change knives

Is it okay to run plywood through a planer? I made door panels out of plywood that had only one good face. To get two good faces without adding thickness, I planed some material off the backs of two pieces, and then laminated them. It worked, but is it recommended?

—Tony Stich, Gulfport, Miss.

You *can* do it, Tony, but you may have already discovered two good reasons to *not* do it. First, the glue holding the plies together dulls knives quickly. (The same goes for other glue-laden sheet goods, such as MDF or particleboard.) And planing across the grain of a ply creates long stringy fibers rather than tiny chips, which can clog the planer's dust port. In the future, should you need plywood with two good faces, we suggest laminating pieces of thinner plywood or applying veneer over the "bad" face.



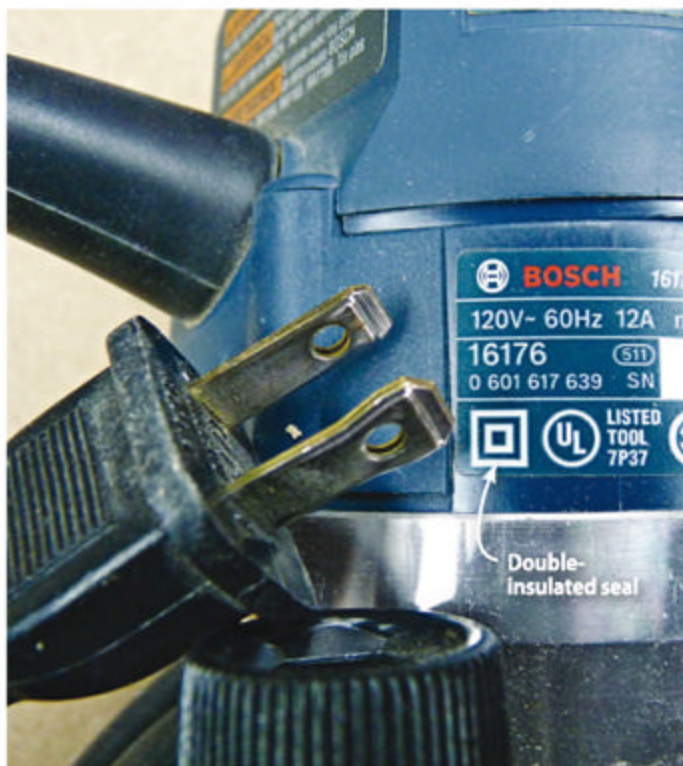
Two prongs or three, they're both safe

Why do some electric tools' plugs have three prongs, while others have only two? Is one version safer than the other?

—Tom Bowman, Conway, Ark.

Two-prong plugs are just as safe as three-prong plugs, Tom. All tools, whether grounded or double insulated, carry a first layer of protection: the rubbery insulation coating on the wires and other components inside the tool. This keeps conductive bare metal from being exposed. If this insulation should ever fail, such as from a chafed wire, then current could flow through conductive parts of the tool and shock you. To prevent this, manufacturers add a ground wire (the third prong) on some tools to safely carry errant current back to the ground circuit.

Double-insulated tools, identified on the label with a double square, shown *left*, come with two-prong plugs and have nonmetallic tool housings. These tools may still have metallic parts, but they—and the user—are isolated from electrically live components by nonconductive parts of the tool body. That eliminates the need for the third grounding prong.



continued on page 66

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Ask WOOD

Vise vexes: Is left really right?

Why are vises typically located on the left front corners of workbenches? This seems backward for right-handers wanting to handsaw a piece gripped in the vise. If it were on the right, the offcut portion of the board would extend past the bench, giving you room to saw.

—Edward Dixon, Middletown, N.Y.

The answer lies in the distant past, Edward. Before power tools, wood-workers relied on long jointer planes to straighten and square edges on boards. And right-handed woodworkers—let's face it, righties have always outnumbered lefties—work a plane from right to left (shown *below left*). Bench vises hold better when you push toward them, with the mass of the bench behind the workpiece. That's why face vises usually are placed on the left end of the bench. When sawing workpieces (*below*), a left-side vise also lets you hold onto the offcut, with the keeper piece safely secured in the jaws, resulting in a cleaner cut.

But that said, you can mount a vise wherever it suits you best. Better still, mount two vises to your bench. We like a face vise on the left, and a tail vise on the right. 🌲





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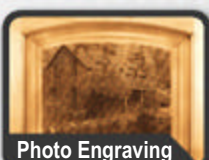
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WOW SUPER COUPON

SAVE \$85

PITTSBURGH RAPID PUMP® 3 TON HEAVY DUTY STEEL FLOOR JACK

• Weighs 74 lbs.

LOT 68048 shown
69227/62116
62590/62584

\$74.99

REG. PRICE \$159.99

86881734

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SUPER COUPON!

16" x 30" TWO SHELF STEEL SERVICE CART

US GENERAL

• 220 lb. Capacity

LOT 60390/5107 shown

\$29.99

REG. PRICE \$69.99

86884379

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SUPER COUPON!

POWDER-FREE NITRILE GLOVES PACK OF 100

HARDY

• 5 mil. thickness

YOUR CHOICE!

\$6.49

REG. PRICE \$11.99

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WOW SUPER COUPON

PACIFIC HYDROSTAR 1650 PSI PRESSURE WASHER

LOT 69488

• 1.3 GPM

SAVE \$50

\$79.99

REG. PRICE \$129.99

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SUPER COUPON!

4-1/2" ANGLE GRINDER

drillmaster

WE CARRY A FULL LINE OF GRINDING AND CUT-OFF WHEELS

LOT 95578/69645
60625 shown

\$9.99

REG. PRICE \$19.99

86888376

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SUPER COUPON!

8" 5 SPEED BENCH MOUNT DRILL PRESS

CENTRAL MACHINERY

LOT 62520/62390/60238 shown

\$49.99

REG. PRICE \$99.99

86882403

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SUPER COUPON!

50 FT. ELECTRIC DRAIN CLEANER

HYDROSTAR

LOT 61856
68285 shown

\$199.99

REG. PRICE \$399.99

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Customer Rating ★★★★★

AWARD WINNING QUALITY

US*GENERAL

26", 16 DRAWER ROLLER CABINET

LOT 61609/67831 shown

- 1060 lb. Capacity
- 14,600 cu. in. of storage

SAVE OVER \$332

\$317.83 ~~\$369.99~~

REG. PRICE \$449.99

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WOW SUPER COUPON

FREE

WITH ANY PURCHASE

3-1/2" SUPER BRIGHT NINE LED ALUMINUM FLASHLIGHT

LOT 69052 shown
69111/62522/62573

\$6.99 **VALUE**

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WOW SUPER COUPON

RECIPROCATING SAW WITH ROTATING HANDLE

CHICAGO ELECTRIC TOOLS

\$21.99

REG. PRICE \$54.99

LOT 61884/62370/65570 shown

SAVE 60%

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WOW SUPER COUPON

"Impressive Accuracy, Amazing Value" - Car Craft Magazine

TORQUE WRENCHES PITTSBURGH

1/4" DRIVE LOT 2696/61277

3/8" DRIVE LOT 807/61276

1/2" DRIVE LOT 62431

239 shown

SAVE 66%

\$9.99 ~~\$21.99~~

REG. PRICE \$29.99

• Accuracy within ±4%

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WOW SUPER COUPON

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

CHICAGO ELECTRIC TOOLS

LOT 69684 shown
61776/61908/61970

SAVE \$165

\$134.99 ~~\$299.99~~

REG. PRICE \$299.99

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WOW SUPER COUPON

2-IN-1 FLOORING AIR NAILER/STAPLER CENTRALPNEUMATIC

LOT 97586
69703/61689 shown

WE CARRY A FULL LINE OF FASTENERS

SAVE \$70

\$99.99 ~~\$169.99~~

REG. PRICE \$169.99

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WOW SUPER COUPON

2 HP INDUSTRIAL 5 MICRON DUST COLLECTOR

• 70 Gallon Capacity

LOT 61790
97869 shown

\$159.99 ~~\$249.99~~

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WOW SUPER COUPON

NEW 700 RUNNING WATTS 2 HP (63 CC) 2 CYCLE GAS RECREATIONAL GENERATOR

LOT 60338/62472
66619/69381 shown

SAVE \$80

\$99.99 ~~\$179.99~~

REG. PRICE \$179.99

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1/4" TRIM ROUTER

drillmaster

LOT 61626
44914 shown

\$19.99 ~~\$34.99~~

REG. PRICE \$34.99

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WOW SUPER COUPON

60", 4 DRAWER HARDWOOD WORKBENCH

LOT 62603/69054/93454 shown

SAVE \$110

\$139.99 ~~\$249.99~~

REG. PRICE \$249.99

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WOW SUPER COUPON

2.4" COLOR LCD DIGITAL INSPECTION CAMERA

CENTECH

LOT 67979 shown
61839/62359

SAVE \$80

\$69.99 ~~\$149.99~~

REG. PRICE \$149.99

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These woodworking wares passed our shop trials.

Totable organizers

These versatile storage units help you make the most of precious workshop time, and when you need to work off-site, they're ready to roll with what you need.



Plano 3600 Size Stow-n-Go Pro Rack (1363-30), \$22

800-226-9868, planomolding.com

Better known for manufacturing fishing-tackle boxes, Plano also makes great hardware organizers. This handy unit has three lidded trays with removable dividers, so you can customize them to organize various sizes and amounts of screws, nails, and small fasteners. The 4"-deep top compartment holds boxes of fasteners or small hand tools. We also like that you can carry individual trays when the whole box gets heavy.



Craftsman Cantilever Tool Box (17186819), \$26

800-549-4505, craftsman.com

This hard-plastic case with clear lid works great for organizing small hardware, fasteners, and other supplies. The top tray contains 12 removable $2\frac{1}{4} \times 3\frac{1}{2}$ " bins, and it lifts and slides back, providing access to a lower compartment with six $3\frac{1}{2} \times 5$ " bins. Metal clasps keep everything secure, and a metal handle makes for easy carrying.



Top box

Bottom box

Stanley Click-n-Connect 2-in-1 Tool Box (STST19900), \$20

800-262-2161, stanleytools.com

We like this 12x20" toolbox for its divided storage you can customize, and detachable elements that work well alone or hooked together. Subdivide the 5"-deep storage top section into as many as 12 units to custom-fit your fasteners or tools. There's also two shallow pockets on the lid. The bottom unit can be divided into 16 units $2\frac{3}{4}$ " deep to fit hardware and fasteners.

DeWalt Multi-Level Workshop (DWST20880), \$90

800-433-9258, dewalt.com

It's always nice to have your tools organized, but it's a bonus when they're also ready to roll. Pull this mobile storage unit around with its retractable handle, or slide open the three compartments—on ball-bearing drawer slides—for easy access to your tools. The middle section has dividers for up to eight compartments to store fasteners and accessories, and the top and bottom have deep, open storage for larger hand and power tools.



How a Chicago Doctor **Shook Up** the Hearing Aid Industry with his **Newest Invention**

New nearly invisible digital hearing aid breaks price barrier in affordability

Reported by J. Page

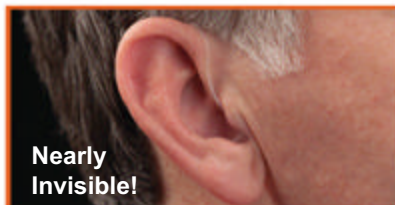
Chicago: Board-certified physician Dr. S. Cherukuri has done it once again with his newest invention of a medical grade **ALL DIGITAL affordable hearing aid**.

This new digital hearing aid is packed with all the features of \$3,000 competitors at a mere fraction of the cost. **Now, most people with hearing loss are able to enjoy crystal-clear, natural sound — in a crowd, on the phone, in the wind — without suffering through “whistling” and annoying background noise.**

New Digital Hearing Aid Outperforms Expensive Competitors

This sleek, lightweight, fully programmed hearing aid is the outgrowth of the digital revolution that is changing our world. While demand for “all things digital” caused most prices to plunge (consider DVD players and computers, which originally sold for thousands of dollars and today can be purchased for less), the cost of a digital medical hearing aid remains out of reach.

Dr. Cherukuri knew that many of his patients would benefit but couldn't afford the expense of these new digital hearing aids. Generally they are *not* covered by Medicare or most private health insurance.



SAME FEATURES AS EXPENSIVE HEARING AID COMPETITORS

- ✓ Mini Behind-The-Ear hearing aid with thin tubing for a nearly invisible profile
- ✓ Advanced Noise Reduction to make speech clearer
- ✓ Feedback Cancellation eliminates whistling
- ✓ Wide Dynamic Range Compression makes soft sounds audible and loud sounds comfortable
- ✓ Telecoil setting for use with compatible phones, and looped environments like churches
- ✓ 3 Programs and Volume Dial to accommodate most common types of hearing loss even in challenging listening environments

The doctor evaluated all the high priced digital hearing aids on the market, broke them down to their base components, and then created his own affordable version — called the MDHearingAid® **AIR** for its virtually invisible, lightweight appearance.

Affordable Digital Technology

Using advanced digital technology, the MDHearingAid® **AIR** automatically adjusts to your listening environment — prioritizing speech and de-emphasizing background noise. Experience all of the sounds you've been missing at a price you can afford. **This doctor designed and approved hearing aid comes with a full year's supply of long-life batteries. It delivers crisp, clear sound all day long and the soft flexible ear buds are so comfortable you won't realize you're wearing them.**

Try It Yourself At Home With Our 45-Day Risk-Free Trial

Of course, hearing is believing and we invite you to try it for yourself with our RISK-FREE 45-Day home trial. If you are not completely satisfied, simply return it within that time period for a full refund of your purchase price.

Can a hearing aid delay or prevent dementia?

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

“Satisfied Buyers Agree AIR is Best Digital Value!”

“I am hearing things I didn't know I was missing. Really amazing. I'm wearing them all the time” —Linda Irving, Indiana

“Almost work too well. I am a teacher and hearing much better now” —Lillian Barden, California

“I have used many expensive hearing aids, some over \$5,000. The AIRS have greatly improved my enjoyment of life” —Som Y., Michigan

“I would definitely recommend them to my patients with hearing loss” —Amy S., Audiologist, Munster, Indiana



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"Your blades are without question the best by miles, and I have tried them all."

Bob Jensen, Fridley, MN

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Woodworker II—Best rated, all-purpose blade for rips and crosscuts.

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Fine Woodworking

Chop Master
Woodshop News

Duraline Hi-AT
Woodshop News

Dado King
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Midprice drill press gets the job done

Ridgid's affordable 15" drill press proved powerful enough to handle all my drilling tasks without bogging down, even when drilling with large Forstner bits. I found changing belt position and tensioning the belt easy, increasing the likelihood that I'll actually do it when the job calls for a different spindle speed.

The keyless chuck holds bits firmly with no runout after applying only mild hand tightening, and the dial-type depth stop built into the quill handle hub worked dependably, holding the same depth for 50 holes. The flexible, well-located gooseneck LED lamp provides bright task lighting wherever needed.

The only downside is the traditional metalworking-style table. I'd prefer a table with thinner edges for clamping workpieces, and a removable zero-clearance block in the center.

—Tested by Nate Granzow,
General-Interest Editor



15" drill press (R1500)

Price

\$500

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ridgid.com



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Make the Wrapping Gift
It never fails, I come up short one or two gifts at Christmas, and then it's off to the shop store for the always-essential gift card. It's the gift that just screams, "I forgot you!" So last year, I got smart. A few weeks before Christmas, I whipped up a few of these Fold-Up Kasekate Boxes. They're one of my favorite boxes to make because they're quick, eye-catching, and can be made from scraps.
But most importantly... **Kasekate Boxes!**

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3 FOR THREE
BUY THREE \$3 SHOP PLANS & GET THREE FREE!
SHOP NOW

WOODWORKING WARRIOR SERIES Workshop Drawer Organizer
No matter the size of your shop drawers, this compact/drawered box keeps everything tidy. It's made to fit, so you can remove the box quickly to whenever you're working.

VALENTINE'S DAY

Get Organized

Basic Wood Cabinet \$2.95	Workshop Organizer \$2.95	Workshop Bin Storage \$2.95
Countertop Tool Station \$2.95	Workshop Organizer \$2.95	Workshop Cabinet \$2.95

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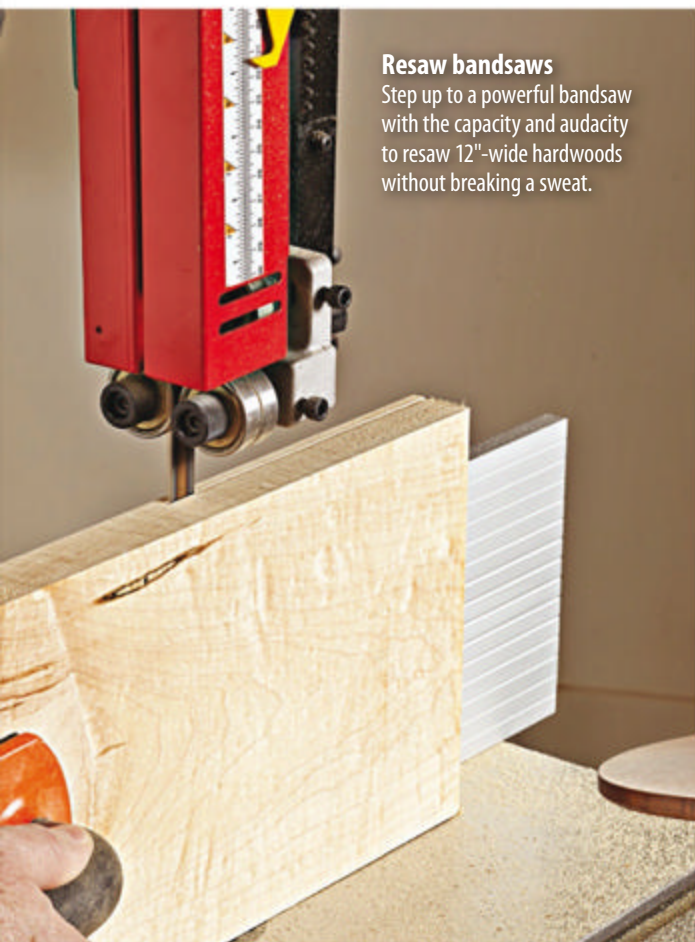
NEW DOWNLOADABLE VIDEO SERIES
SEASONS 1-3
WOODWORKS
WITH DAVID MARCUS

HAVE THE PERFECT V-DAY PLANS?
Simple, Stackable Assembly Stands
These assembly stands put your projects at a comfortable height for working. Added bonus: They conveniently stack, taking up little floor space when stored.

Forget V-day? WOOD's 5-Step Guide to Making Up

What's Ahead

A glimpse inside the
September issue
(on sale July 7)



Resaw bandsaws

Step up to a powerful bandsaw with the capacity and audacity to resaw 12"-wide hardwoods without breaking a sweat.



Go-anywhere desk lamp

Batteries and bright LEDs mean you can use this sleek lamp whether you have an available outlet or not.



Shades of great

This easy-to-build arbor for windows and patio doors makes your house cooler on both the inside and outside.



Limbirt coffee table

This classically styled Arts & Crafts coffee table is sure to impress guests with its visually intriguing cutouts and subtle curves.

Let'er rip (and crosscut)

Some jobs, only a handsaw can handle. We show you how to get great results when you grab this basic tool.



Don't let your work collect dust

Delta continues the development of new and innovative wood working machinery for the professional as well as the home shop owner. We are proud to introduce our new line of dust collection units. Our compact size 1.0 HP and powerful 1 1/2 HP dust collectors are well suited for your dust pick-up needs, for the larger, down to the smaller woodworking shops. With castors and large rubber wheels, both mobile units are highly maneuverable around any busy shop environment.



NEW 50-723

- Standard 1 micron filtration dust bag with sewn in, snap-in filter bag ring for easy installation
- Powerful TEFC induction motor for long-lasting performance
- 6 mil plastic chip collection bag
- Sturdy steel base and frame structure
- Two front swiveling casters and two rear large rubber 8 in wheels for smooth mobility
- Dust bag support poles with convenient spring button lock connection
- Single 45° inlet port for less turbulent air flow



1 HP Motor, 120/240V (Wired 120V), 1PH, 60 Hz

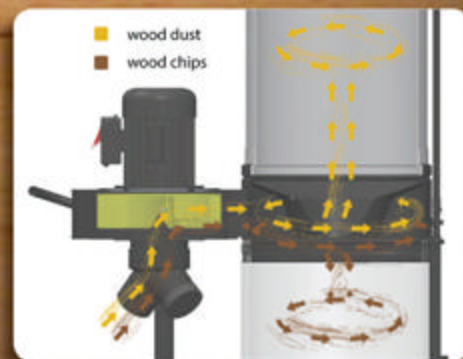
Max CFM: 750 CFM
Max Static Pressure: 5 1/2 in. of water
Impeller Diameter: 11 1/2 in.
Filter Bag Area: 10 sq. ft., .95 sq. m.
Chip Bag Area: 1.7 cu. ft., 48 L

NEW 50-767

- Standard 1 micron filtration dust bag with sewn in, snap-in filter bag ring for easy installation
- Powerful TEFC induction motor for long-lasting performance
- 6 mil plastic chip collection bag
- Sturdy steel base and frame structure
- Two front swiveling casters and two rear large rubber 8 in wheels for smooth mobility
- Dust bag support poles with convenient spring button lock connection
- Wide adapter with dual inlet port for multiple equipment connection



Spring Button
Lock Connection



1 1/2 HP Motor, 120/240V (Wired 120V), 60 Hz, 1PH

Max CFM: 1500 CFM
Max Static Pressure: 8 in. of water
Impeller Diameter: 11 1/2 in.
Filter Bag Area: 20.5 sq. ft., 1.9 sq. m.
Chip Bag Area: 2.4 cu. ft., 67 L

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Now the most technologically advanced general purpose blade on the market includes an one-of-a-kind tooth geometry with 30 degree Hi-ATB, a double side grind design, and an Axial Shear Face Grind to produce the ultimate polished finish with minimal resistance! Whether you're ripping or crosscutting, the next generation Premier Fusion blade is the best for flawless cuts in laminates, melamine, veneered plywoods, hardwoods, softwoods, and thick stock lumber.



NEW FUSION TRIO TOOTH GEOMETRY

DOUBLE SIDE GRIND
design for delivering
polished cross cuts

30° Hi-ATB
for slicing through
plywood and melamine

AXIAL SHEAR FACE GRIND
that glides through wood
and sheet goods with
minimal resistance



For more information visit: www.freudtools.com/premierfusion

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