

WIN
SHOP FULL OF TOOLS: P.85

20 CLUTTER-KILLERS FOR YOUR SHOP Page 90

WOODWORKER'S JOURNAL

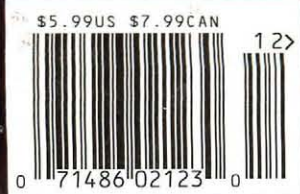
December 2004
Volume 28, Number 6

Our Annual Router Issue!

Creative Clamping
Go-bars, pinch dogs ...and
more! page 50

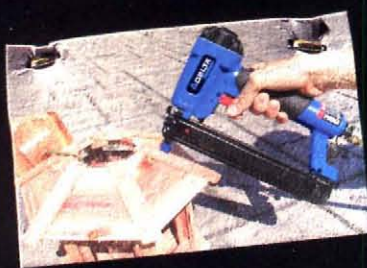
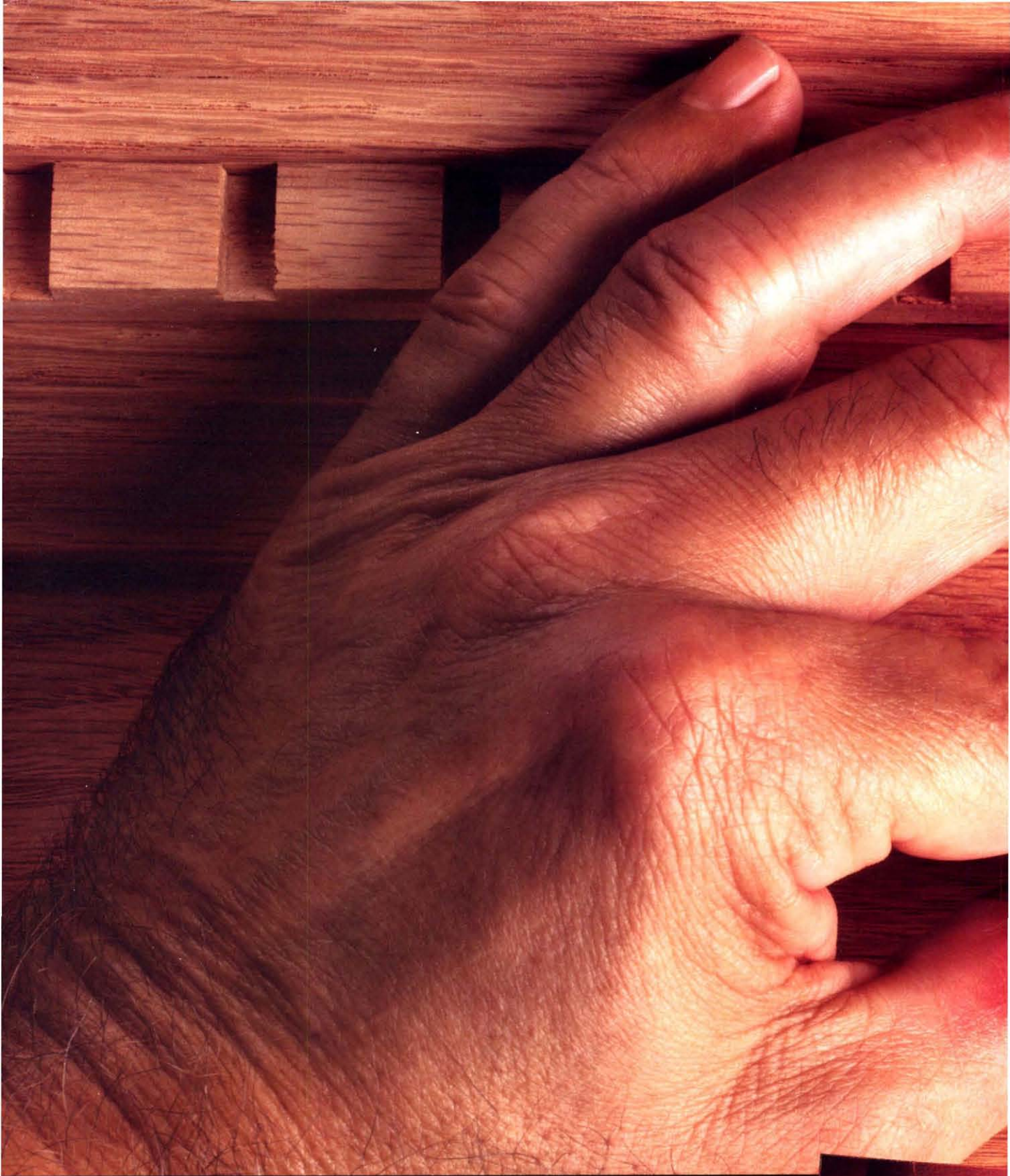
3 Over-the-Top
Router Accessories page 80

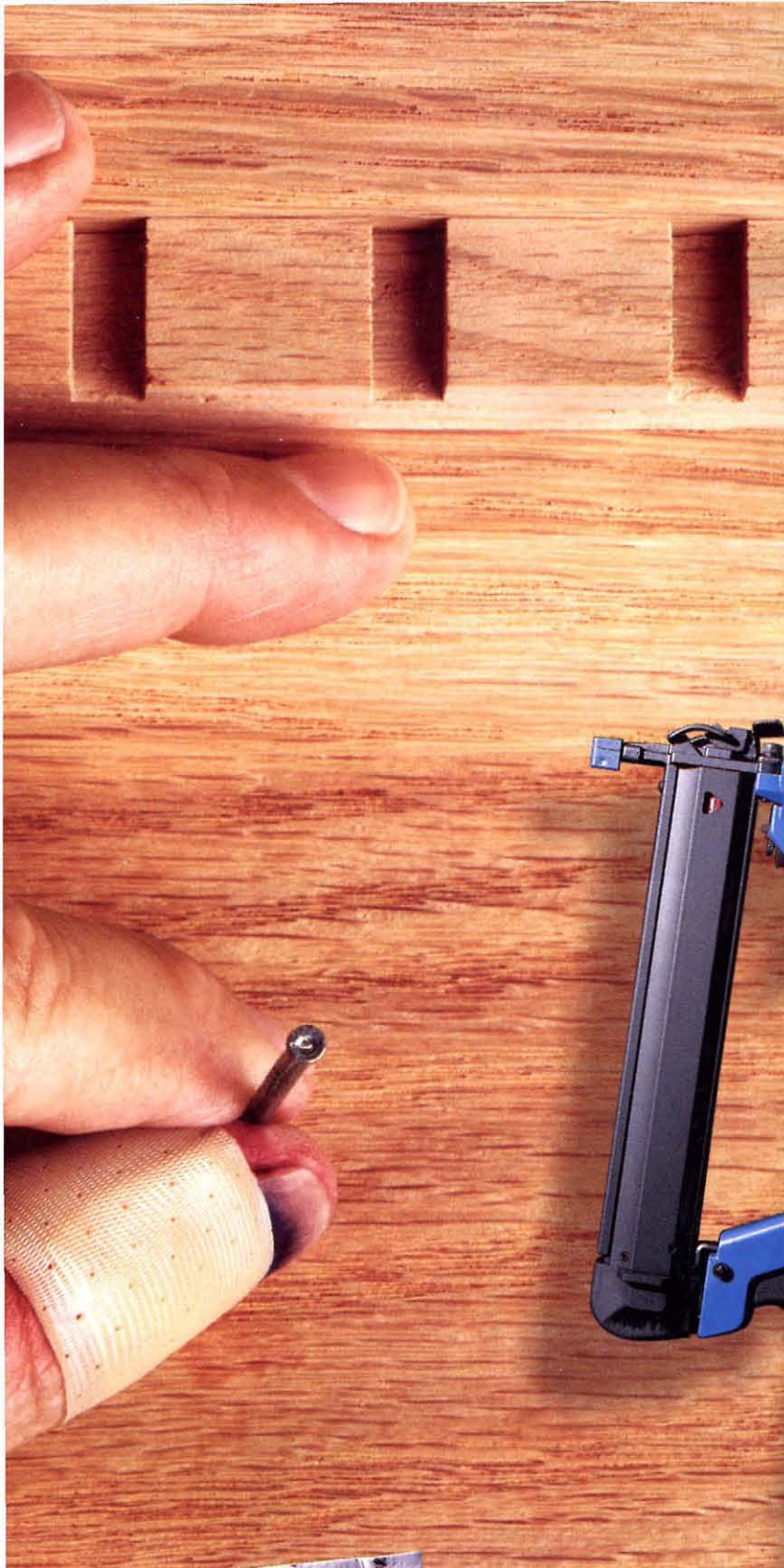
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Woodworker's Journal Features

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44 Basic Measuring Tools

By Ian Kirby

Ian Kirby takes you through the basic tools and techniques for measuring straightness, twist, angles and length.

50 Alternative Clamping Methods

By Stephen Shepherd

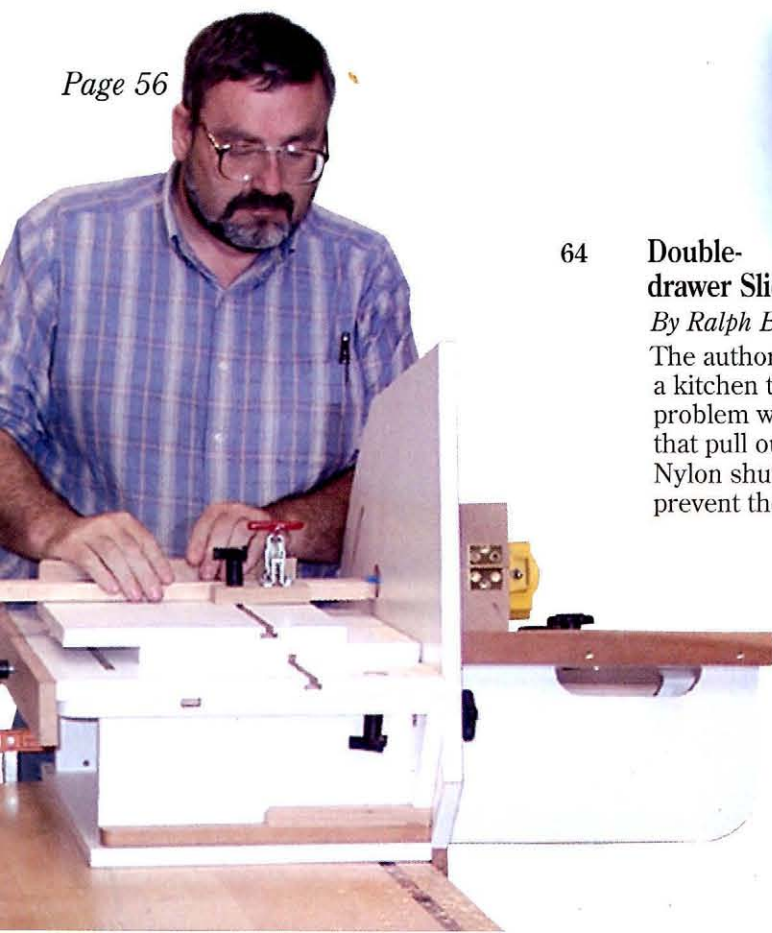
Can't find the clamp you need? Keep looking. From winding string to go bars, clamps are in the eye of the beholder.

66 A Router Jointer Jig

By Carol Reed

The "Router Lady" has a jig that allows her router to do a little jointing. Here are step-by-step directions for making your own.

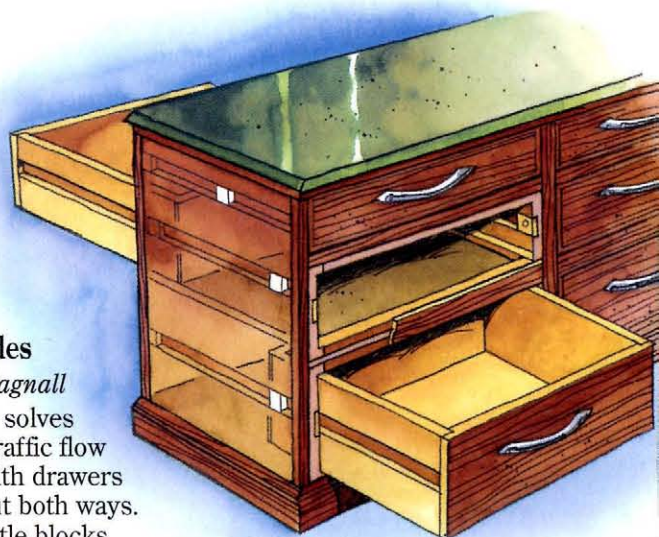
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64 Double-drawer Slides

By Ralph Bagnall

The author solves a kitchen traffic flow problem with drawers that pull out both ways. Nylon shuttle blocks prevent them from falling.



56 Horizontal Router Table

By John English

Turn your router into a milling machine with a rotating fence that can handle large stock and create a wide variety of joints.

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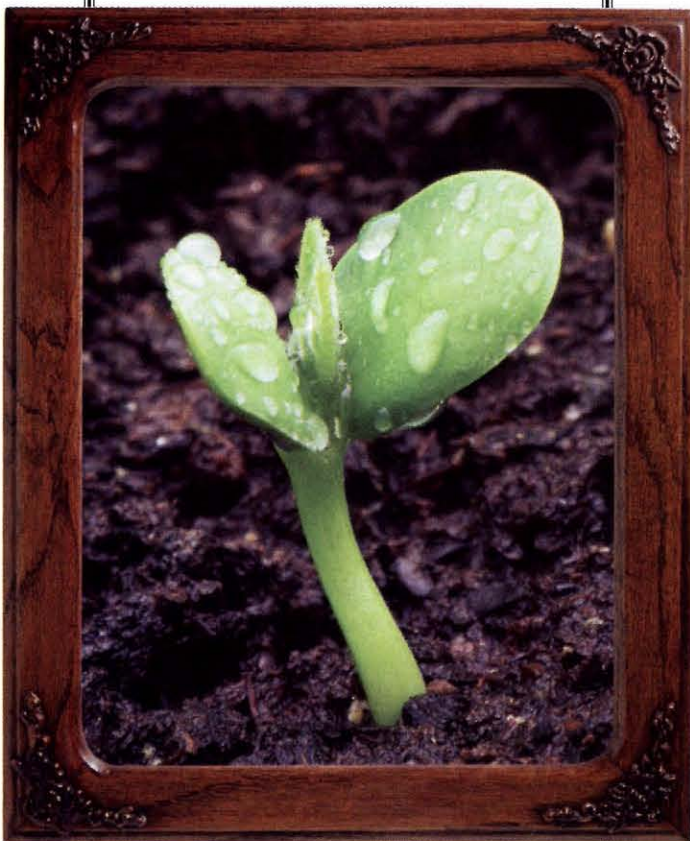
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*Source: Preference Test of the Varathane Line versus the Minwax Line of Interior Wood Stains, May 2003

Slide a “no-brainer” under the tree.

"I have found freedom, my friend. And it comes in the form of The Starter Kit."



"Take this battery and plug it... into this tool or this tool or this tool. Someone really gets it!"



"The granddaddy of all combo packs for my granddaddy!"



This Christmas, Ryobi's One+ System is the common sense way to give power tools. Or get 'em.

In the past, every cordless tool you bought came with batteries, a charger and case. Whether you wanted them or not. That's about as logical as requiring you to buy an extension cord and outlet with every corded tool you own.

Well, hallelujah!

Common Sense has finally arrived. Just in time for Christmas.

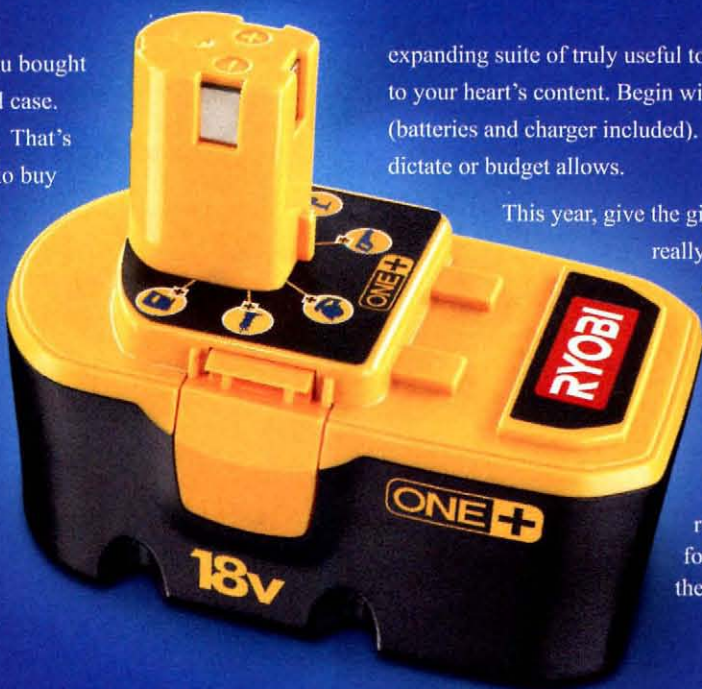
The idea's simple. **One** common power source that works with every 18V cordless tool we've ever made... or can imagine making. **Plus** a large and ever-

expanding suite of truly useful tools you can mix 'n match to your heart's content. Begin with a **Starter** or **Combo Kit** (batteries and charger included). Then add on as your projects dictate or budget allows.

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Need a replacement battery?

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"Now I've got Christmas, birthdays and everything in-between covered for a long time comin'!"

"If I get one of each for me and just one for all of my friends, that's not greedy, right?"

"Dad's battery graveyard of a workbench is no more."

"Lots of tools and just one power source. Merry Christmas indeed!"

"One+ whatever we think of next."

"The one place to get One+."



17 great tools & extras



+ more on the way!

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Resolved to get (your shop) organized? Chris Marshall has all the storage solutions.



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Tool Merger-mania

I went to the biggest woodworking show of the year in Atlanta this past August and saw thousands of exhibitors demonstrating their tools and supplies. Based on the numbers, you'd have to conclude that woodworking is a vibrant and growing industry. Nonetheless, a couple of big-time purchases proved to be the "buzz" at the show. It had only recently been announced that Black & Decker, which purchased DeWalt back in 1960, has purchased the Pentair Tool Group, including the Delta, Porter-Cable and DeWalt lines. At the show, rumors were flying that Ryobi's parent company, TTI, was on the brink of purchasing Milwaukee Tools — as venerable a line as you're likely to come across in this country. It happened the day after the show concluded. What's going on? Are we going to end up with only two tool makers in a few years?

While the first reaction is to assume the announced purchases are problematic, a closer look leads me to believe that the consolidations might benefit all involved. TTI and B&D are giving every indication that the lines they have purchased will continue under their own brand names. Word at the show was that owners of all tools involved should rest easy: they will end up in good hands. We'll see ... I'll keep you posted as things develop. If you have questions, send them in, and we'll be your conduit for expressing them to the manufacturers ... you know they read our magazine.



... And you should, too. Especially this issue. You know your favorite tool (the router)? The one that's so popular among woodworkers (the router)? Well, we have some great articles in this issue which focus on ... the router. Find out how to build a fixture that lets you turn yours into a milling machine (page 56), or a jig that lets you use it as a jointer (page 66). You can buy some cool accessories to do all sorts of things with your router, and Bill Hylton tells you about some of the more unusual ones in our *Tool Review* department (page 80).

Plus, our inveterate experts Ian Kirby and Stephen Shepherd are back to tell you all about measuring tools and alternate clamping options, Chris Marshall's on the job to get your shop organized for the new year, and woodturner Steve Blenk has come up with some great tree toppers. What are you waiting for? Get routing ... I mean reading!

Larry N. Storker

About our cover: Speaking of routers The brand-new Hitachi KM12VC router pictured on our cover is so new that you're looking at the only one on the planet (when this photo was taken). More on the new Hitachi (and a cool trim router from RIDGID) in our next issue!

NOVEMBER/DECEMBER 2004

Volume 28, Number 6

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- A bonus video on CD for woodworking professionals and enthusiasts provides instructions on how to create raised panel doors simply.
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Angling for Workshop Safety



Missing a Screwdriver

This is no trick — just some old knowledge. I just received your *August* magazine and would like to refer you to *Hardware Hints*, particularly the photo with the various screwdrivers: there was one missing.

Recently, I had to install some large corner irons on an old cinder block wall to mount a TV. I used 1½" 10-12 lead anchors with 2" #12 F/H woodscrews. I started with my battery-powered screwdrivers, but they would only take the screws part way. Then I turned to my hand screwdriver with muscle — and I was still 1/2" to 3/4" short.

I am 83 years old and was born and raised in an old hardware store that my mother's father started in 1903. Young people might not know the power to be found in an old bit brace with a Phillips head bit on the driving end. I finished my job.

Watson R. Gabriel Sr.
Newton, North Carolina

From All Angles

The "Ultimate Angle Jig" (*August 2004*) article recalls the use of my very old Sears 8" table saw. It had a cast steel frame and iron table that tilted; the blade was stationary. By tilting the table instead of a jig, I constructed a library with 14 panel doors. That's progress for you.

Meyer Singer
Great Neck, New York

I love the concept of the table saw and angle jig shown in the *August 2004* issue and intend to build a similar one.

However, I cringed when I saw the cover photo. It shows exactly the situation that sent me to the emergency room with severe injuries.

The operator is not wearing safety goggles, is in line with the blade and is not using a zero-clearance insert. The tapered cutoff will likely drop into the slot; jam and be fired back like a bullet.

With all due respect for Mr. English, why tempt fate?

Robert L. England
Eugene, Oregon

WJ Responds:

Necessary guards and safety precautions are sometimes removed in our photos for clarity, but you make a good point about the need for a zero-clearance insert with this jig. (And I appreciate your concern: that's not Mr. English on the cover; that's yours truly, the editor.)

— Rob Johnstone

Seeing the Space

Your *August 2004* article in *Techniques*, "Getting Started With Letter Carving" by Simon Watts, mentioned the difficulty of spacing letters properly. Some time ago I too had that difficulty and I was advised by a mentor, "pay attention to the area of the space between the letters." As soon as I learned to see that area, the spacing of the letters became almost instinctive.

David Chisholm
St. Louis, Missouri

Top Ten Radial Advantages

I have noticed the absence of the use of radial arm saws in any of your projects, articles or their appearance in any shop photographs. Does this mean they will one day be contenders for your "What's This?" *Stumpers* column?

For those of us who still own a radial arm saw, here are my "top ten" advantages to owning one:

10. Temporary place for holding the new band saw blade while changing blades.
9. When repairing a puncture in a bicycle



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inner tube, it's a great place to hang the inner tube while the glue dries.

8. Perfect for cutting 2 x 4s for firewood starter.
7. Sectioning that frozen 10 lb. bulk package of ground beef that my wife told me to separate into 1 lb. sections *before* putting it into the freezer.
6. Makes a great cat perch.
5. Prevents clutter in a 4' x 4' space in the garage.
4. The table provides "temporary" storage space for short pieces of wood, tools and drawings.
3. It's great to own something that my neighbor doesn't have in his "high-tech" shop.
2. It's fun to tell my son, "one day this will be yours."
1. It's a great conversation piece in a yard sale.

*Kevin Masson
American Fork, Utah*

New; Not Tried and True

Truly enjoyed your article *On the Level*, "Life in the In-between," August 2004. So much truth. Unless you run a production shop, woodworking is not about time. It's about learning to use different tools, trying new techniques, mastering the tried and true, continuously improving your skill and, ultimately, the pride and satisfaction when the project is completed.

You take a step back and say, "Goodness gracious, did I really make that!"

*Dave Paine
Burke, Virginia*

End Table Success

Your April 2004 issue contained plans for an "Inlaid End Table" by Linda Haus. As a beginner woodworker, I attempted to make the inlay table, following Linda's plans. The project turned out GREAT!

continues on page 12 ...

Safety First Learning how to operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary guards have been removed from equipment shown in our magazine. We in no way recommend using this equipment without safety guards and urge readers to strictly follow manufacturers' instructions and safety precautions.

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I did the table project in about two weeks and the inlay work was very easy to complete. My wife enjoyed the table so much she wants me to make a second one. My honey-do list just got longer.

*Thom Taylor
Sacramento, California*

From a Slow-burn to Broken Finger: Gloves in the Shop

I'm writing about the *Woodturning* department "Down to the Finish," in the *August 2004* issue. In his paragraph on "burnishing," Steve Blenk remarks that because the process can generate a lot of heat, "A leather glove is a good idea." Yes, one's hand can get hot; no, wearing a glove is not a good idea.

The only accident I have ever had in more than 50 years of working with many power tools occurred while I was wearing a glove at my lathe. I was shining up stainless steel bar stock to make cabinet pulls for our kitchen. How could a glove catch — there was nothing to catch on! But it caught

nonetheless, darn near tearing my fingers off in the process. The glove was shredded — it now hangs above my lathe as a reminder. The broken finger bone mended, but now it has a funny kink as another reminder.

If Steve routinely uses a glove at the lathe and hasn't had an accident, he is lucky and/or very clever. But I certainly wouldn't advocate this practice to your readers — they could do serious damage to their hands in a New York minute!

*Allan Boardman
Woodland Hills, California*



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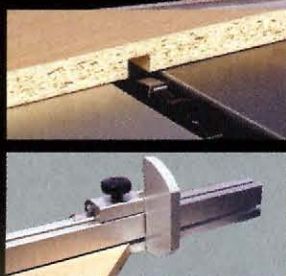
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Starting with the Basics

A To get started, you'll find your most important tool is actually a #2 pencil with a very fine point. You'll need it for drawing plans, taking measurements and marking your work. (Don't go into the shop without one!) Also required are tools for measuring and cutting or shaping. Until the Industrial Revolution, woodworking was done without power tools.

Power tools can save time and make some tasks easier, but are not necessary, especially when just beginning. Here's a list of essentials that are not power-driven:

- *Tape measure, 3/4" width*
- *T- or combination square*
- *Flexible 12" English ruler*
- *Utility knife*
- *Set of decent chisels*
- *Hand plane*
- *Cabinet scraper*
- *Hammer*
- *Hand saw*

Some beginning power tools that are small enough to fit into a garage or extra room are:

- *Router and router table*
- *Cordless drill driver*
- *Small table or chop saw*

These will enhance your ability to cut and shape wood.

Also, I would recommend learning woodworking (and thus about tools) from other people: taking classes, taking on apprenticeships or just



learning from a friend. This will help you to become more comfortable with the craft and its tools. After you've worked with just a few tools, you'll gain experience which will help you select your next tools.

— LiLi Jackson

Q I have recently read that when a router is mounted under a router table (bit spinning counterclockwise) that you have to feed the piece clockwise and around the fence. Why is that?

Andy Pozorski

Sauk Rapids, Minnesota

A Your question is best answered with a drawing. The view is looking down on the fence and bit. Notice that the bit is only partially exposed by the fence. As you push wood along the fence from your right to your left (called the feed direction in the *Drawing* above right), the rotation of the bit is against the direction you are pushing the wood. This allows the bit to safely cut the wood and you to safely push the wood along and finish the cut.

Now imagine pushing the wood from your left to your right. Notice that the rotation

Q I am often asked by students who are interested in beginning woodworking (generally furniture building), "Which tools should I purchase?" These are often persons who have no woodworking tools and are on limited budgets. I have some difficulty in answering them, and my usual response is to start with hand tools, then gradually move to power tools. I would be interested in what your experts would recommend and specifically which tools you would recommend. I realize this is a rather difficult question.

Peter A. Mion
Billings, Montana

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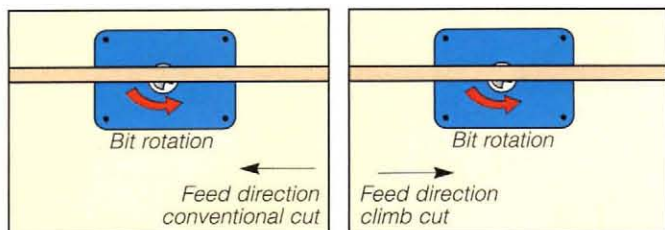
THIS ISSUE'S EXPERTS

LiLi Jackson is a reporter for the *Woodworker's Journal*. She spent the last year attending classes at many of the country's best woodworking schools.

Carol Reed is the author of *Router Joinery Workshop* from Lark Books and the force behind www.routerlady.com.

Ian Kirby is the author of *The Accurate Table Saw* from Cambium Press and a regular contributor to the *Woodworker's Journal*.

Mike Weiby is an engineering manager for power tools at Sears, Roebuck and Co.



Clockwise feeding of your workpiece in a router table, also known as a conventional cut, is much safer than a counterclockwise climb cut.

of the bit is now the same direction that you are pushing the wood. The bit now acts as a fast spinning wheel that grabs the wood out of your hands and quickly propels the wood across your shop, often

pulling your hands into the bit. This is a very dangerous practice and is to be avoided at all times.

When the feed direction is OPPOSITE the rotation of the bit, it is called a conventional cut. It is easy

to control and yields great results. When the feed direction is the SAME as the rotation of the bit, it is called a climb cut. Climb cuts have their place in routing, but generally speaking they are to be avoided on a router table. Save climb cuts for handheld router use only when the amount of wood you are removing is very little per pass and when you are intentionally doing it and are aware of the danger.

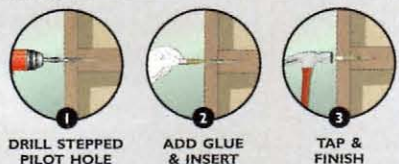
— Carol Reed

continues on page 18 ...

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The new "Mini-X" Miller® Dowel is perfect for joining 1/2" stock. Available in Birch, Cherry, Red Oak and Black Walnut.



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Enables mortise & tenons and dowel joints to be cut with a plunge router. Ideal for cabinet, chair and table construction.

- One set-up for both mortise and tenon giving perfectly fitting joints.
- Cuts mortise & tenon sizes of 1/4" to 3/4".
- Fully adjustable for compound angle joints up to 45°.
- Reversible templates to produce round and square end tenons.
- Templates can be used for accurate dowelling applications.
- Template guide bushes are included but router bits are required.

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Q What is the ideal humidity level for a workshop?

*Darin M. Peck
Greenville, Maine*

A “Humidity” is more accurately called “relative humidity” (RH), which is the actual amount of water vapor present in the air expressed as a percentage of the maximum possible for a specific temperature. Assuming the impossible condition that climate control in a workshop is even possible, air temperature of 65° and RH of 40 percent would produce a desirable wood moisture content of about 8 percent. However, before concluding that a RH of 40 percent is “ideal,” you must realize that in the real world workshop temperatures can range from 50° to 100° and the RH from 10 percent to 80 percent, changing the moisture content of wood accordingly. There’s also another variable beyond the woodworker’s control: furniture built in a low RH shop may end up in a high RH living room.

My explanation has been simplified by space constraints, but it’s enough to let me say that “humidity” is one part of a mix of variables that we don’t normally try to control in workshops. We live with what we get. The real kicker is that the construction techniques that we have developed to cope with variations in temperature and RH and consequent wood movement render the effort to achieve “ideal humidity” unnecessary.

— Ian Kirby



It’s all relative: According to Ian Kirby, controlling humidity in your shop is only one part of the picture ... e.g., where’s the piece going next?

Q I read a lot on woodworking and love the hobby very much, but there is one thing I’m not clear about regarding the horsepower information that comes with every power tool. I thought cabinet table saws with 3 HP or more required 220V, but I see there are tabletop or contractor’s saws out there that claim to have 4.4 HP.

Or, on vacuums: dust collection systems of more than 1.5 HP have to work on 220V, but you can find portable vacuums up to 6 HP that run on 110V.

Please clear this subject up for me.

*Yaniv Matza
Tamarac, Florida*

A Motors may be rated at two different points; one is at continuous duty horsepower, another is maximum developed horsepower. Continuous duty horsepower is defined as the maximum horsepower a motor can produce continuously (over two hours) without exceeding the temperature limitations of its components and materials. Induction motors

used primarily in bench and stationary power tools like drill presses, belt/disc sanders, bench grinders, and table saws are typically rated by continuous duty horsepower. These motors have a fixed speed based on their design. Typically, motors run without load at about 3,450 rpm or 1,750 rpm.



There is a wound field, called the stator, and a solid rotating member called the rotor. The rotor is not wound with copper wire but cast with aluminum. Induction motors are available in higher horsepower than universal motors. Induction motors may be direct drive or connected to drive trains that increase or decrease the speed.

— Mike Weiby



WINNER! For simply sending in his question on horsepower and voltage, Yaniv Matza of Tamarac, Florida wins a Hitachi DSI4DMR 14.4-volt Driver Drill. Each issue we toss new questions into a hat and draw a winner.

THREE KNIVES. TWO SPEEDS. ONE GREAT FINISH.



Three knife cutter-head provides 30% longer knife life than traditional two knife cutter-heads.



A two speed gear box allows users to choose between 96 and 179 cuts per inch.



An automatic carriage lock is built into the four posts to minimize the movement that causes snipe.



A fan-assisted chip ejection system picks up debris and exhausts it from the unit.

TWO SPEEDS AND THREE KNIVES ON THE DEWALT DW735 DELIVER THE ULTIMATE SURFACE FINISH.

The DW735 13" thickness planer from DEWALT revolutionizes surface finish through a one-of-a-kind three knife cutter-head, two-speed gear box combination. It offers the ultimate in finish quality — even on hard to plane figured woods — by offering the most cuts per inch available on any benchtop thickness planer. A fan-assisted chip ejection system aids in the removal of debris and prevents excess chips from marring material. The unique automatic carriage lock minimizes the movement that causes snipe without having to engage a lever before and after each pass. The solid 19-3/4" cast aluminum base provides twice the rigidity of traditional material support systems that utilize folding tables. The DW735 is a must for the serious woodworker. It takes planing to a whole new level.

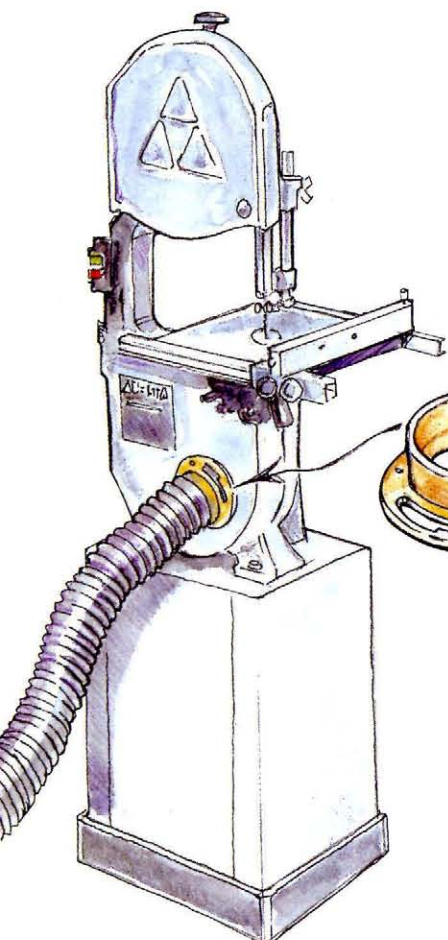
For more information, call 1-800-4-DEWALT or visit our web site at www.DEWALT.com/planers

DEWALT

©2003 DEWALT. The following are examples of trademarks for one or more DEWALT power tools and accessories: The yellow and black color scheme; the "D"-shaped air intake grill; the array of pyramids on the handgrip; the kit box configuration; and the array of lozenge-shaped humps on the surface of the tool.

(Circle No. 32 on PRODUCT INFORMATION form)

Circling Around to Quick Solutions



Flush the Dust

My band saw dust collector had never functioned effectively because the 2" exhaust pipe was too small. Then I stumbled upon a PVC toilet flange in our local hardware store that exactly fit the 4" hose from my dust collector. I drilled some starter holes, then cut a 4" circle out of the lower door with a metal-cutting saber saw.

I then drilled 5/16" mounting holes, deburred the sharp edge, and mounted the flange. The fit was so good that I didn't bother with a gasket or seal.

*Jay Hitchens
Hillsborough, North Carolina*

Mixing Epoxy

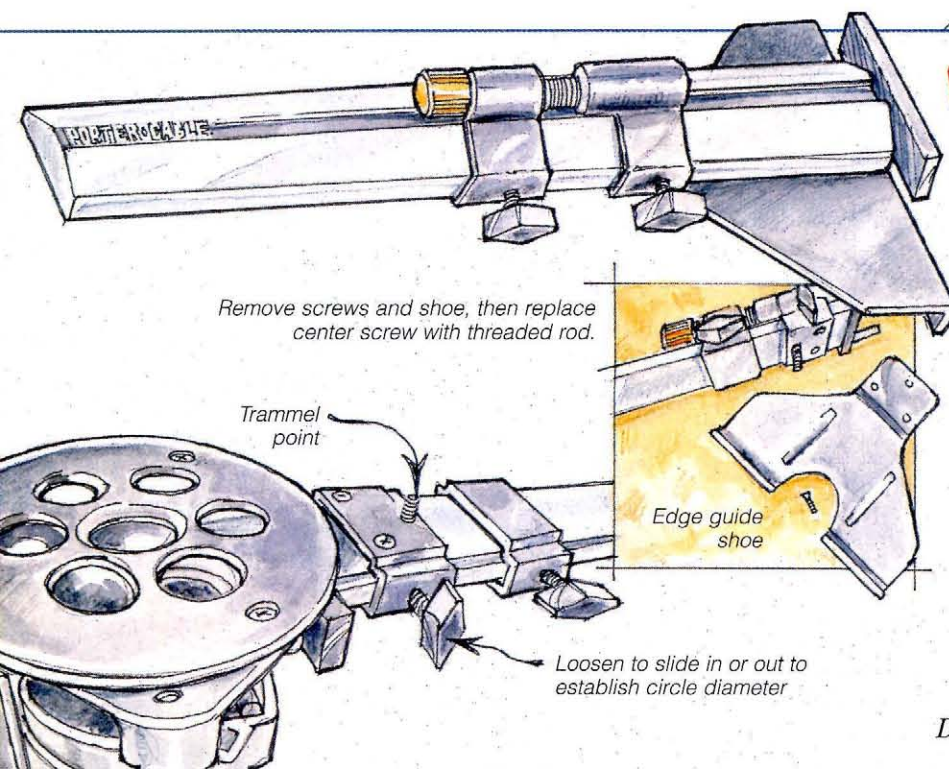
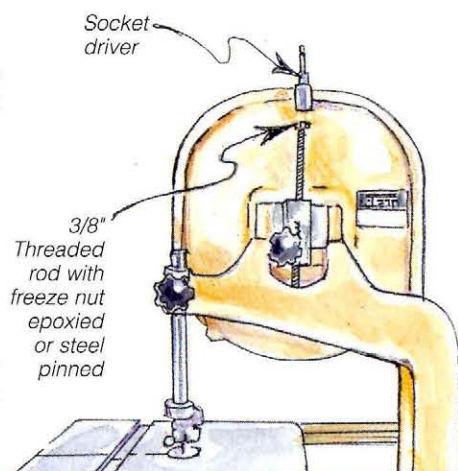
When mixing small quantities of a two-part glue (such as epoxy), I use the dish-shaped hollow at the bottom of an aluminum beverage can. Such cans are stable, easy to hold and plentiful.

*Tom Berg
Sioux Falls, South Dakota*

Band Saw Tension Release

It seems I'm not the only woodworker to find tensioning and releasing band saw blades a chore. Here is a simple solution I use on my JET band saw. All you need do is buy a short length of 3/8" - 16NC threaded rod and a nut. Drill and pin the nut to the rod (or immobilize it with epoxy) and use a regular 9/16" socket driver to change the tensioning.

*C.J. Wiesenfarth
Eagle Point, Oregon*



**PICK
OF THE
TRICKS**

Circle-cutting Attachment

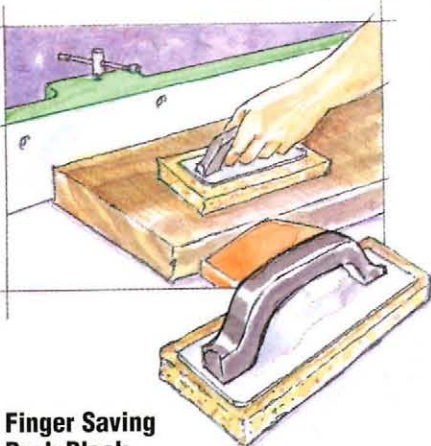
I needed a circle-cutting attachment for my Porter-Cable plunge router, so I decided to modify the existing guide. I removed the three flathead screws holding the edge guide shoe and set it aside. I then replaced the two outer screws for safekeeping and threaded a short length of 10 - 24 threaded rod into the center hole to act as pivot. In a few minutes (and at practically no cost), I had a circle-cutting attachment with micrometer adjustment.

*Ron Watkins
Manteca, California*

Chalk to the Rescue

When working on dark, laminated shelving, I had trouble seeing the layout lines. The solution was simple: I just rubbed white chalk into the scribed lines and then wiped the surface. When I wiped off the excess chalk, the cut lines became highly visible.

*Marie Roberts
Tucson, Arizona*



Finger Saving Push Block

For pushing heavy stock through a saw or jointer, I find that a rubber float (used for applying grout) works best. They cost less than \$5, last indefinitely and are available at any building or home repair center.

*Yaniv Matza
Tamarac, Florida*

Artful Stripping

I strip a lot of furniture and have found table legs and small turned pieces a messy chore. My solution was to cap several lengths of plastic pipe of various diameters, pour stripper into them and immerse the parts. The stripper doesn't evaporate, even if I leave the parts in overnight. They usually come out clean enough, but I can always repeat the process if necessary.

*T.J. Ferrell
Woodstock, Virginia*

continues on page 22 ...

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- Drives 5/8" brad nails
- Unique wire fastening attachment flips over to accommodate a variety of wire sizes
- Drive power adjustment dial

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- Shoots 6 size T50® staples
- Drives 5/8" brad nails
- 10 foot cord • 14 amps
- Exclusive on/off safety trigger lock
- One-piece solid steel base construction
- Ergonomic cushioned grip for comfort
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Nail Master™ 2 Heavy-Duty Electric Nail Gun

- Drives 4 size brad nails up to 1-1/4"!
- Comfortable ergonomic design
- Surface contact and trigger safety lock
- Non-marring bumper
- 10 foot cord • 14 amps

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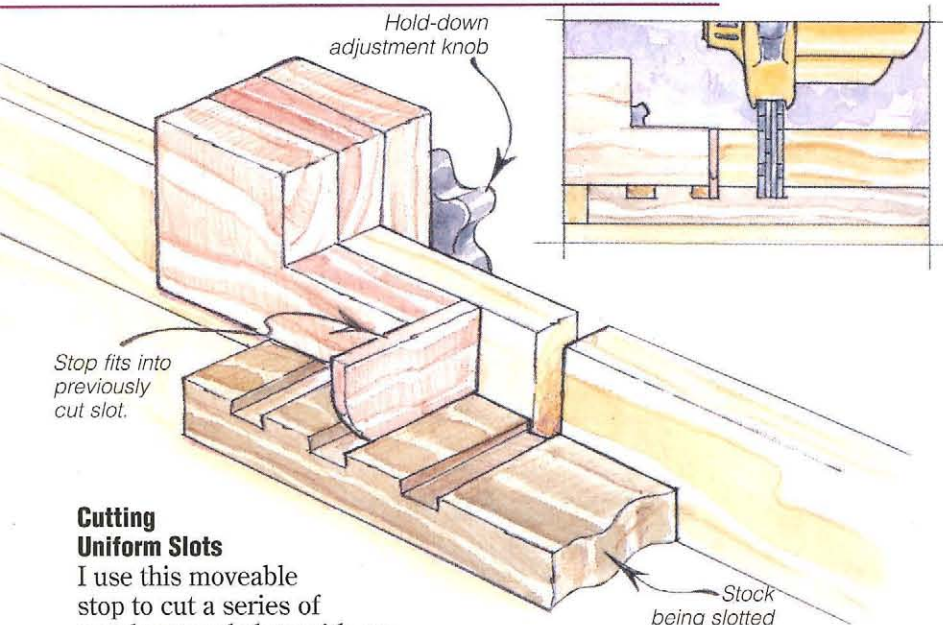
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(Circle No. 10 on PRODUCT INFORMATION form)

TRICKS OF THE TRADE



Cutting Uniform Slots

I use this moveable stop to cut a series of evenly spaced slots with my radial arm saw. (Forming dental molding for example.) After each cut, I slide the work out and down, engage it with the stop, and make another cut. The spacing of the slots is determined by the distance between stop and saw blade (or dado cutter). Take care that sawdust doesn't accumulate between the fence and your work.

Theodore Skyrca
Johnson City, New York



WIN! In addition to our standard payment, a reader is selected for each issue's "Pick of the Tricks" to receive a tool (such as the

Drill Doctor DD400PK shown above). We pay from \$100 to \$200 for tricks used. To join in the fun, send us your original, unpublished trick. Please include a photo or drawing if necessary. Submit your Tricks of the Trade to Woodworker's Journal, Dept. T/T, P.O. Box 261, Medina, MN 55340. Or send an e-mail to: tricks@woodworkersjournal.com

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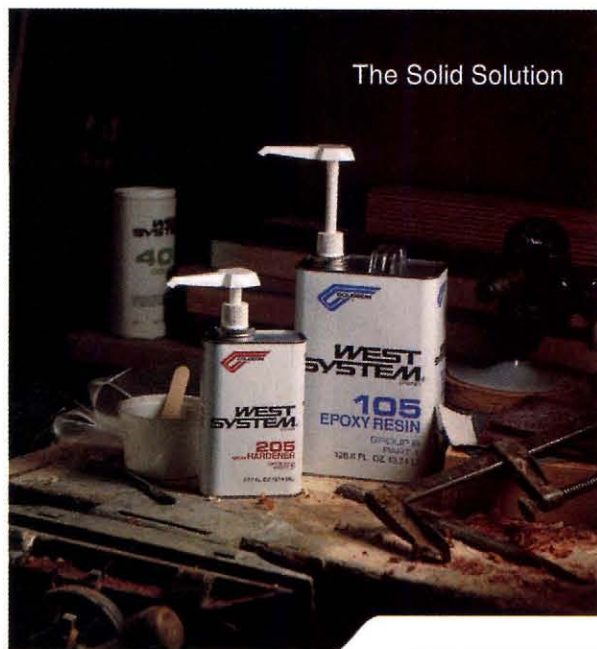
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COLONIAL SAW

Not all plate joiners are created equal. That's why successful professional woodworkers tell us all the time that they become very attached to their Lamellos. For many, it is their most valuable tool. Their accuracy and repeatability allow users to get it right the first time, every time. The ergonomic design is comfortable even over long periods of use. And, Lamellos are built tough. Even when they've been dropped a few times they still outperform the other guys!

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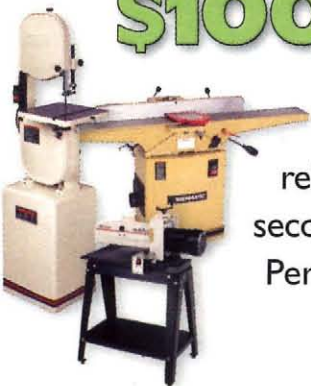
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\$100



Purchase one of 21 qualifying products, and we will send you a \$100 rebate on the purchase of a second JET®, Powermatic®, or Performax® machine with a retail purchase price of \$399 or more.

OR

Receive a \$50 rebate for the purchase of:

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- B.) The purchase of \$50 or more of JET, Powermatic, Performax or Wilton accessories.

\$50



Purchases must be made between September 1, 2004 and December 31, 2004 to qualify.

For all the promotional details ask your local distributor, or visit us at our website – www.wmhtoolgroup.com.

Look for the green tags...

(Circle No. 65 on PRODUCT INFORMATION form)



J E T[®] POWERMATIC[®]

WMH TOOL GROUP, Inc.

Furniture Gets Its Day in the Sun



Jacob Cress's mahogany chair, entitled "Oops!" tips a playful hat to woodworking's traditional ball and claw feet.

Each One-of-a-Kind

American Studio Furniture

Museum-going woodworkers will want to catch an exhibit at the Smithsonian American Art Museum's Renwick Gallery before it concludes on January 17, 2005. "Right at Home: American Studio Furniture" contains 58 objects by 47 artists, including both functional and sculptural pieces.

Most of the items in the exhibit were created after 1990, but it also pays homage to the post World War II generation with pieces from Sam Maloof, George Nakashima, Wharton Esherick and Wendell Castle. Studio furniture, according to the Smithsonian, is "one-of-a-kind, custom-designed pieces for the home created in small-scale shops, not mass-produced."

Find more information by calling 202-633-1000 or visiting their web site www.AmericanArt.si.edu.

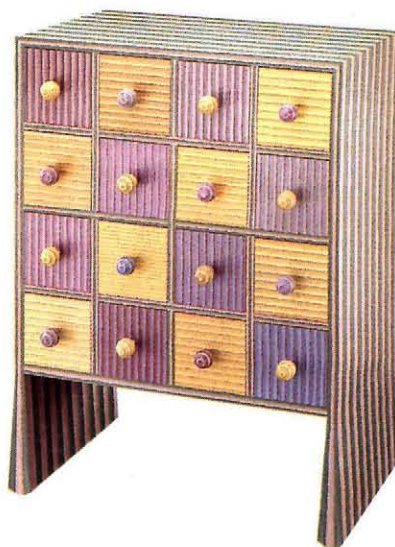


The "Upholstered Chair" by Dale Broholm incorporates materials like walnut burl veneer, ash, Italian poplar plywood, leather and milk paint.



Influenced by 16th century cabinets of curiosities, Kim Schmahmann's "Bureau of Bureaucracy" opens up drawers that are hidden, solid or bottomless.

Daniel Jackson displays the black walnut and oak in his "Four-step Library Ladder," while Tom Loeser finishes with acrylic and milk paint on his mahogany "Four by Four" cabinet.





A catch-all tool for your catch-all drawer.



Available
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batteries, plus charger,
case and bits.

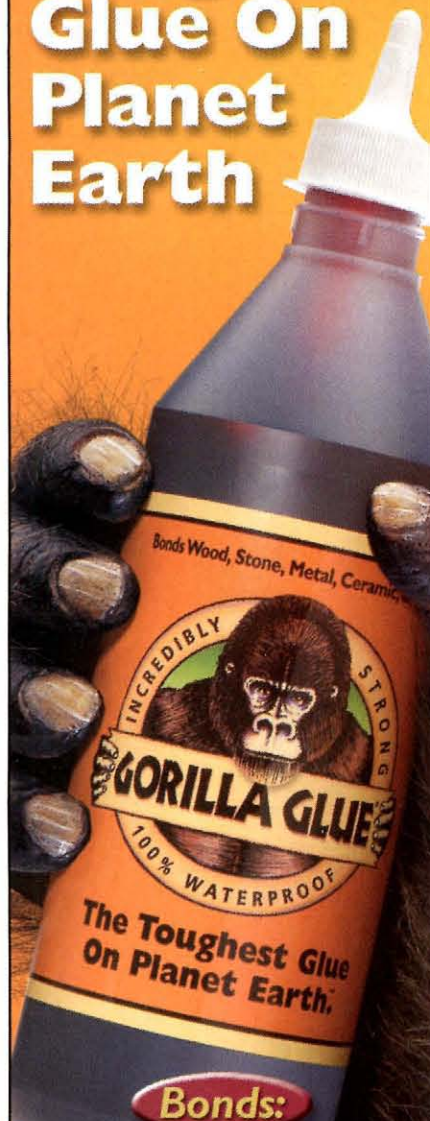
If you're gonna own one power tool, this should be it. Ryobi's new HP Series screwdriver/drill is lightweight, affordable, comfortable and really versatile. 20% more powerful, too, making any home repair or installation project faster and easier. It's the perfect tool for smaller hands and smaller projects. So when you're putting up drapes or installing closet shelves, reach for the HP. Right there in the catch-all drawer... where your screwdriver used to be.

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SHOP TALK



Travels With LiLi

Furniture Society 2004

In the culmination of her travels around the country this year, *Woodworker's Journal* reporter LiLi Jackson spent time with over 300 other woodworkers and furniture makers at the Furniture Society's 8th Annual Conference in Savannah, Georgia.

Under the theme of "Embracing Technology and Honoring Tradition," the Society brought people together for demonstrations, discussions and shows.

Of particular interest to her, LiLi said, were discussions on emerging artists and the use of ecologically sound materials in building. She also attended demonstrations on steam bending, veneering, inlay and patination. These sessions were among those offered by over 75 presenters at this year's affair.

While the Furniture Society's conferences concentrate more on discussions and shows than on hands-on experiences, the ability to talk to others is invaluable, LiLi said. "Everybody there was incredibly talented. It's amazing to be around people who are so passionate about furniture." The popular "slide wars" sessions (when attendees show pictures of their work) offered a chance to see what others were doing. "There was everything from 'this one's in my mom's living room,'

Works from award winners like Garry Knox Bennett and others were on display at the Furniture Society conference.



to 'this one's in the Museum of Modern Art in Amsterdam.'"

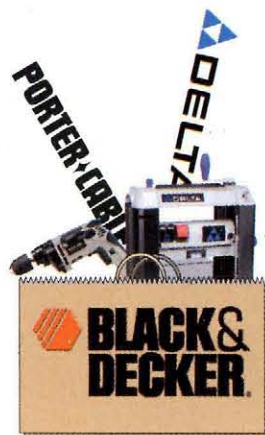
Next year's conference will be held June 8 - 11, 2005 in San Diego. For more information, visit www.furniture society.org or call 828-255-1949.

Black & Decker Goes Shopping

*Picks Up
Venerable
Tool Lines*

Black & Decker Corporation announced this summer that it had signed an agreement to purchase the Tools Group from Pentair, including the Porter-Cable, Delta, DeWalt, Air Power, Oldham Saw and FLEX brands. The DeWalt brand is already a division of Black & Decker.

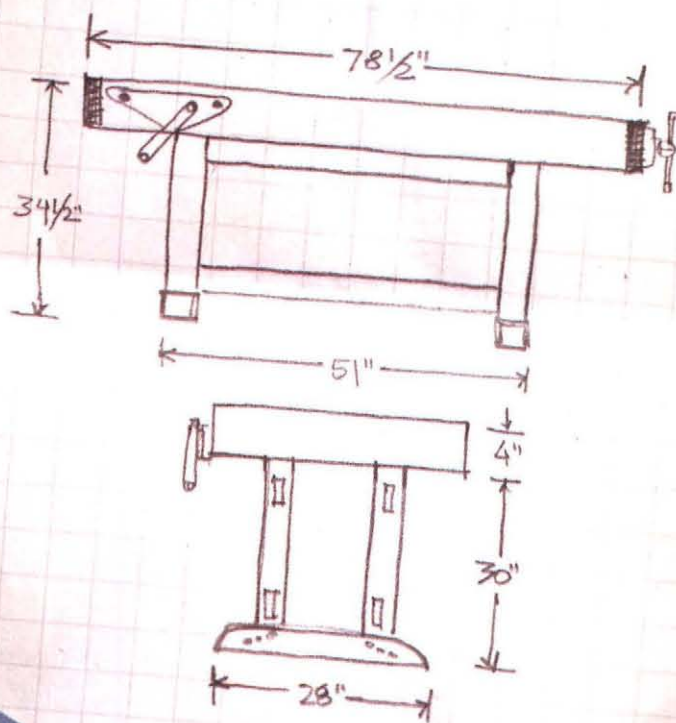
The acquisition, which must be approved by federal agencies, is scheduled to take effect in the fourth quarter of the year. Until then, it's too soon to answer specific questions about the various brands and factories involved in the merger, Black & Decker representatives said. Pentair is headquartered in Golden Valley, Minnesota, while Black & Decker's corporate offices are in Maryland.



continues on page 31 ...

(Circle No. 52 on PRODUCT INFORMATION form)

**TO IMPROVE YOUR WOODWORKING PROJECTS,
ALWAYS START WITH A TRIANGLE.**





Offer extended by popular demand.

Purchase any Delta X5® machine and receive:

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BAND SAWS

Our innovative features are often copied, but never equaled.



18" Steel Frame Band Saw 28-682

- RAPID-RELEASE™ tension lever allows for quick blade changes.
- Table extensions for full support towards frame.
- 2 HP, 230V, single 60 Hz motor.
- 12" re-saw capacity⁽²⁾

FREE CORDLESS DRILL



14" Band Saw with 1HP Motor & Enclosed Stand 28-206

- RAPID-RELEASE™ tension lever.
- Nine-spoke precision-balanced wheels.



14" Band Saw with 3/4HP Motor & Open Stand 28-276

- RAPID-RELEASE™ tension lever.
- Nine-spoke precision-balanced wheels.

DRILL PRESSES

Smooth performance makes drilling jobs easier than ever.



16 1/2" Drill Press 17-965

- Powerful, 3/4HP induction motor for long lasting, smooth performance.
- New external micro-adjustable depth stop is easily accessible for making faster, more accurate depth adjustments; locks in place instantly for repetitive drilling operations.
- Standard 3-jaw, 5/8" capacity key chuck for accepting a variety of standard bit sizes.
- Now offers a selection of 16 spindle speeds for drilling in a variety of materials.

FREE MORTISING KIT



12" Variable Speed Bench Drill Press DP350

- Induction motor for long-lasting, smooth performance.
- Adjustable-position, locking depth stop for accurate depth measurement and repetitive drilling.



Deluxe Mortiser 14-651

- Easy and open access to drill chuck for bit changing.
- Adjustable depth stop.
- Chuck key/hex wrench for bit and chisel changing.
- Adjustable rack and pinion fence and rack and pinion head raising and lowering.

CONTRACTOR SAWS®

An industry first.

10" CONTRACTOR'S SAW® 36-680

- Powerful 1 1/2 HP induction motor handles tough cutting operations.
- Large cast-iron table with cast-iron extension wings measures a full 40" x 27".



- Includes Delta T-Square Fence System 30" or 50" capacity less table board (use 78-851 table board).

- Deluxe Miter Gage with adjustable stops at 45 degrees and 90 degrees.

\$30 CASH BACK



10" CONTRACTOR'S SAW® 36-681

- UNIFENCE® Saw System 30" or 50" capacity.



10" CONTRACTOR'S SAW® 36-682

- BIESEMEYER® Commercial Fence System 30" or 50" capacity.

PLANERS

Rough lumber is no match.



13" Two-Speed Finishing Planer 22-580

- Two-speed material feed rate system: dimensioning speed (60 CPI) to quickly reach desired thickness; finishing speed (90 CPI) for an ultra smooth surface on final pass.
- Patented cutterhead lock stabilizes cutterhead to virtually eliminate snipe.
- High-speed, double-sided knives.
- Full-range depth stop for repeatable thicknesses at any dimension across the entire height range.

\$30 CASH BACK



12" Portable Planer TP300

- Powerful, 15 amp, 120V motor for superior stock removal.
- Solid-steel, 2-knife, cutterhead mounted on ball-bearings assures smoother operation and maintenance-free life.
- High speed steel knives are double edged/reversible for twice the cutting life.

Create projects, not dust.

DUST MANAGEMENT



Dust Collection Canister 50-850A

- 2 micron Pleated Filter.
- Handle for easy cleaning of inner filter.
- Powerful, induction motor for long-lasting, smooth performance, totally enclosed to protect it from damaging dust.
- Top and bottom collection bags provide large dust collection capability.
- Curved steel impeller produces maximum air velocity for efficient dust collection.

\$30 CASH BACK



NEW 1 1/2 HP Single Stage Dust Collector 50-760

- 1 1/2 HP induction motor.
- 1200 CFM.
- 1 Micron Filtration Bag.



NEW Down Draft Mat AP075

- Lightweight for easy portability.
- Anti-skid top surface provides stable work surface for sanding or routing.
- 20" x 40" table for large work surface.



Ambient Air Cleaner with Work Light AP100

- 450 CFM.
- Filter system includes coarse pre-filter, 5 micron inner filter.
- Eye bolts for suspending from ceiling.
- Separate hanging on/off pull cords for lamp or fan.



NEW 2 HP Single Stage Dust Collector 50-761

- 2 HP induction Motor.
- 2100 CFM.
- 1 Micron Filtration Bags.



NEW 3 HP Single Stage Dust Collector 50-762

- 3 HP Single Phase induction Motor.
- 3100 CFM.
- 1 Micron Filtration Bags.
- Model 50-763 has a 3 Phase induction motor.

Compact, portable and precise.

MITER SAWS



12" TWINLASER® Miter Saw 36-255L

- Bright TWINLASER® cut lines clearly indicate both sides of the blade kerf, whether or not the blade is rotating.
- Extra-tall sliding fence adjusts for increased work support.
- Powerful 15 amp, 3500 rpm motor for maximum cutting power.
- Large bevel scale for quick, easy tilt settings with adjustable positive stops at 0° and 45° L.



12" Dual Bevel Miter Saw with FRONT BEVEL LOCK™ 36-412

- Patent pending rear blade access and secondary blade guard for cutting up to 9 1/2" base or 7 3/4" crown molding.
- Patent-pending blade and motor orientation for maximum cutting capacity, including the ability to crosscut a 2" x 10" dimensional lumber.
- Patent pending FRONT BEVEL LOCK® with 5 adjustable positive stops and a large readable scale for making quick and accurate compound cuts.



12" Single Bevel Compound Miter Saw with FRONT BEVEL LOCK™ 36-312

- Large rear cutout for cutting up to 7 1/2" crown molding or 6 1/2" baseboard.
- FRONT BEVEL LOCK® with adjustable positive stops at 0, 33.9 & 45 degrees left and a large readable scale for making quick and accurate compound cuts.

The cornerstone of any shop.

TABLE SAWS



10" Table Saw TS350

- Large cast-iron table with cast-iron extension wings measures a full 22 1/4" x 38 3/8".
- Miter gage with adjustable stops at 90 degrees and 45 degrees (right and left) for continued accurate straight and angle cutting.
- Cast-iron carriage for precise cutting and minimal vibration.
- Powerful 1 HP, 120V, single-phase induction motor provides plenty of cutting power and speed.



10" CONTRACTOR'S SAW® 36-675

- Powerful 1 1/2HP induction motor handles tough cutting operations.
- Includes two steel wings and Delta T-SQUARE® Fence System 30" capacity less table board.

A smooth finish every time.

SANDERS



Sanding Center 31-300

- Moveable deflector allows for more efficient dust collection.
- Powerful 1 1/2 HP TEFC motor for long-lasting smooth performance; features manual thermal overload protector to prevent burn-out.
- Star-wheel, eccentric belt tracking control for easy, accurate belt alignment.
- Sturdy steel stand for greater operating stability.



6" Belt/12" Disc Finishing Machine 31-735

- Powered by a heavy-duty, 1 1/2 HP, TEFC motor.
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Cedar Ridge High School student Will Sredzienski's walnut dresser helped his school place first. The table at left is by Dana Noble and Il'ya Maydanyuk of second place Central Valley High School in Shasta, California.

summer's International Woodworking Fair that Cedar Ridge High School of

Hillsborough, North Carolina, was the first prize winner based on the furniture samples its students submitted.

The Cedar Ridge woodworking students, under the supervision of teacher Keith Yow, entered photos of the furniture they had built out of wood — as well as details on the materials, tools and techniques. In reward for the



Keith Yow and his Cedar Ridge classes (pictured above) make greenwood stools as a beginning woodworking project.



skill levels demonstrated by these students, each of whom is involved in the entire process of making each piece, their school received a Laguna LT 16 HD band saw, a four-station workbench, a 16" Knapp jointer/planer and the school's choice of a wide belt sander or a panel saw.

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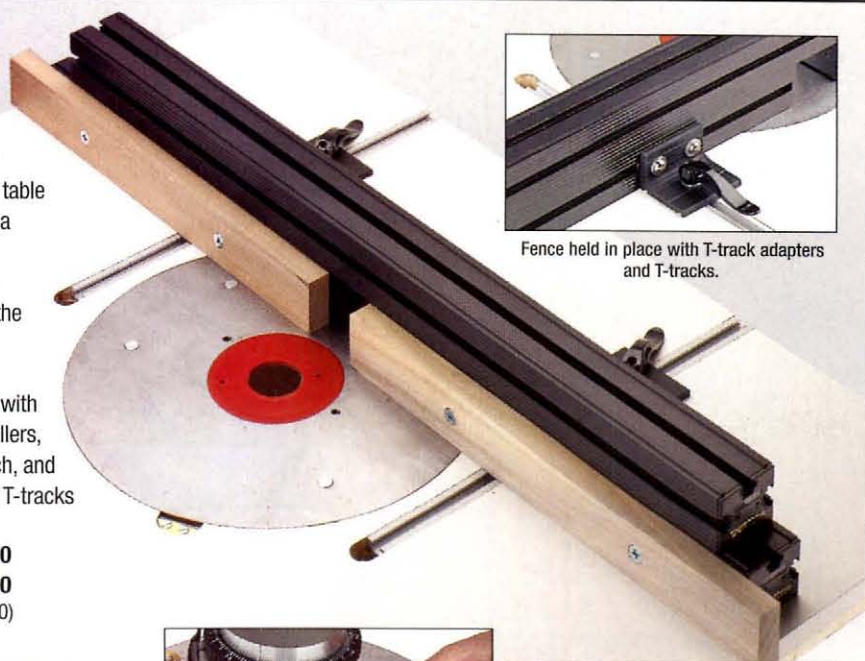
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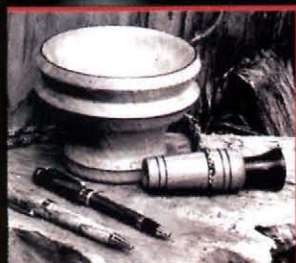
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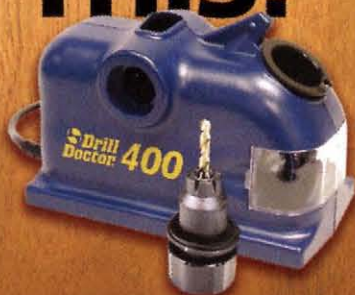
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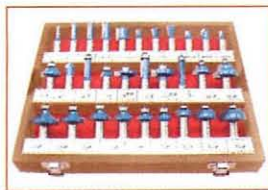


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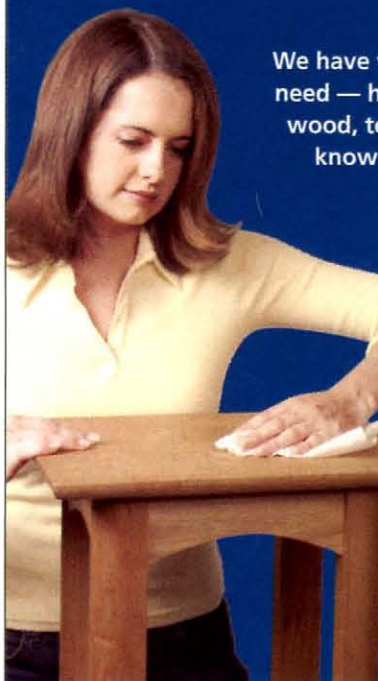
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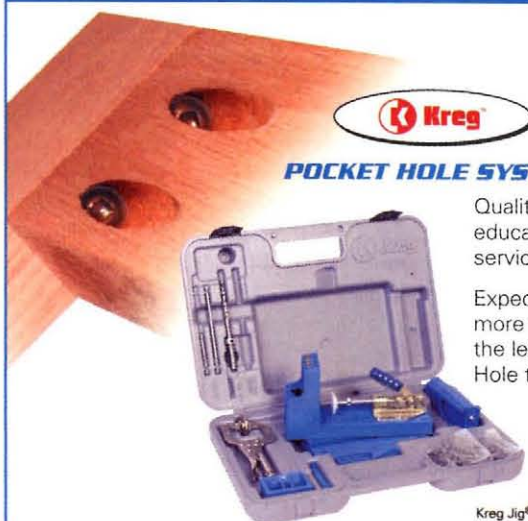
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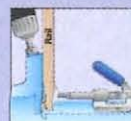
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'Tis the Season ... Turn... Turn... Turn...

By Steve Blenk



Ornaments are a favorite around my shop, signaling the start of the holiday season. The turned variety give you a chance to stretch the creative process on the lathe.

But be warned, your relatives and friends will all be waiting to see what this year's ornaments will look like, and to add one to their collection! Like potato chips ... you'll NEVER make just one!

Starting Off Easy: Icicles:

If you're new to making ornaments on the lathe, a simple icicle form is a good place to start. I typically turn icicle forms 4 - 6" long between centers, and keep the maximum diameter under about 3/4" or so. There are no real rules here for the shapes, but long graceful tapers to thin sections work well, as do sudden changes to round forms or coves. Light cuts with skews and gouges are the rule here. If your skills are up to a challenge, try working a small spiral section into the design. You might also try leaving a larger 1" round section near the top of an icicle, and then drill to the center of it from three or four points to leave "windows." Since I use a chuck on one end of my mounting, it's easy to mark these holes where the jaws align ... no need for indexing. The chuck mounting also makes boring the hardware hole in the icicle's end a snap.

I find that using lighter colored woods for my icicles makes them stand out well on the dark green tree. Finishing is easy, and shiny is the goal. I simply hang these ornaments from a wire and give them several coats of gloss lacquer. To hang your icicles on the tree,

try using silver- or gold-filled jewelry findings: they lend a touch of class to your work.

Step Two: Have a Ball!

Once you've mastered turning icicles, try going for the Victorian look of a ball or globe ornament. Inspired by blown glass ornaments of a bygone era, these forms are a bit more challenging and incorporate a hollow area into their design.

Start with a cylinder of wood large enough to turn a 3" - 4" diameter sphere or ellipse. Choose some real eye candy for this piece — maple burl or highly spalted material. I grab it with a chuck and make my outside shape first. I am partial to ellipsoids, but ball forms work as well. Leave a good 1" or more attachment at the headstock end. Bore through the form using a 1/2" or 3/4" bit in the tailstock to get ready

for the tricky part. You must hollow the majority of the waste out of your ball to get the ornament weight down. This involves hollowing blind through the bore hole in the bottom without going through the side or the top of the form. I use a small offset scraper for the job and blow the waste out frequently with air pressure.

The good news here is you can hog this waste out without worrying about the surface: no one will see the inside of this form. Get it as thin as your skill and nerve will allow ... lighter is better.



Slender and elegant is the key to turning attractive "icicles." The author finds that lighter wood stands out well against a dark green tree.

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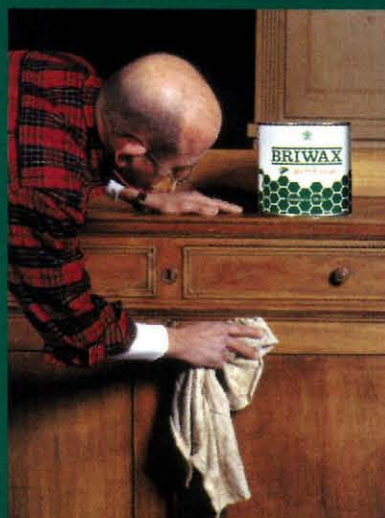
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WOODTURNING



When turning a globe style ornament, you must hollow the ball to reduce weight. An offset scraper is the tool of choice for this task.



Some turners create a ball form as a two-piece turning, fit together like a box. This may be easier than blind hollowing for some folks.

(I know some turners who do this ball form as a two-piece turning and fit them together like a box ... this may be easier than blind hollowing for some folks.)

I then sand this ball down to 400 grit or so and apply a coat of French polish (shellac) as a sealer right on the lathe. Part it off to the bore you made, and you now have a hollow ball or ellipse with holes top and bottom. Next step? Turn a 4 - 5" icicle with a tenon on top to fit one bore, and a small cap to fit the top hole to hold your hanging hardware. I use harder exotic woods for these pieces and try to get very fine diameters and details to contrast the ellipse form. Glue the pieces in place with CA adhesive and lacquer as desired.

Can You Top This?

OK ... now to this year's project. I keep the fun in the project each year by trying to come up with something unique and a bit more challenging. Here's the idea.

I decided to flip things over this season and work from the top. Instead of an icicle pointing down, I am making a spire to point to the heavens. Start by making your standard ellipse or ball and hollow it out as you choose. I am throwing a little curve here with my own design by joining two hollow forms together with a turned collar of contrasting wood. I have the smaller one on top, graduating down to the larger. Next, turn a somewhat

larger scale icicle, perhaps with a spiral or even an open carved spiral section. This will be the spire. Finally, bore out a nicely turned cylinder and fit a tenon on the smaller end to the bottom of the larger hollow form. Be sure to make this piece large enough to accommodate your tree's top branch and bore it deeply enough to keep the top stable once it is in place. I am sticking to exotic woods here (ebony on this one) to be sure I have strength as well as form. And, best of all, you won't have to look very long to find this one on the tree!

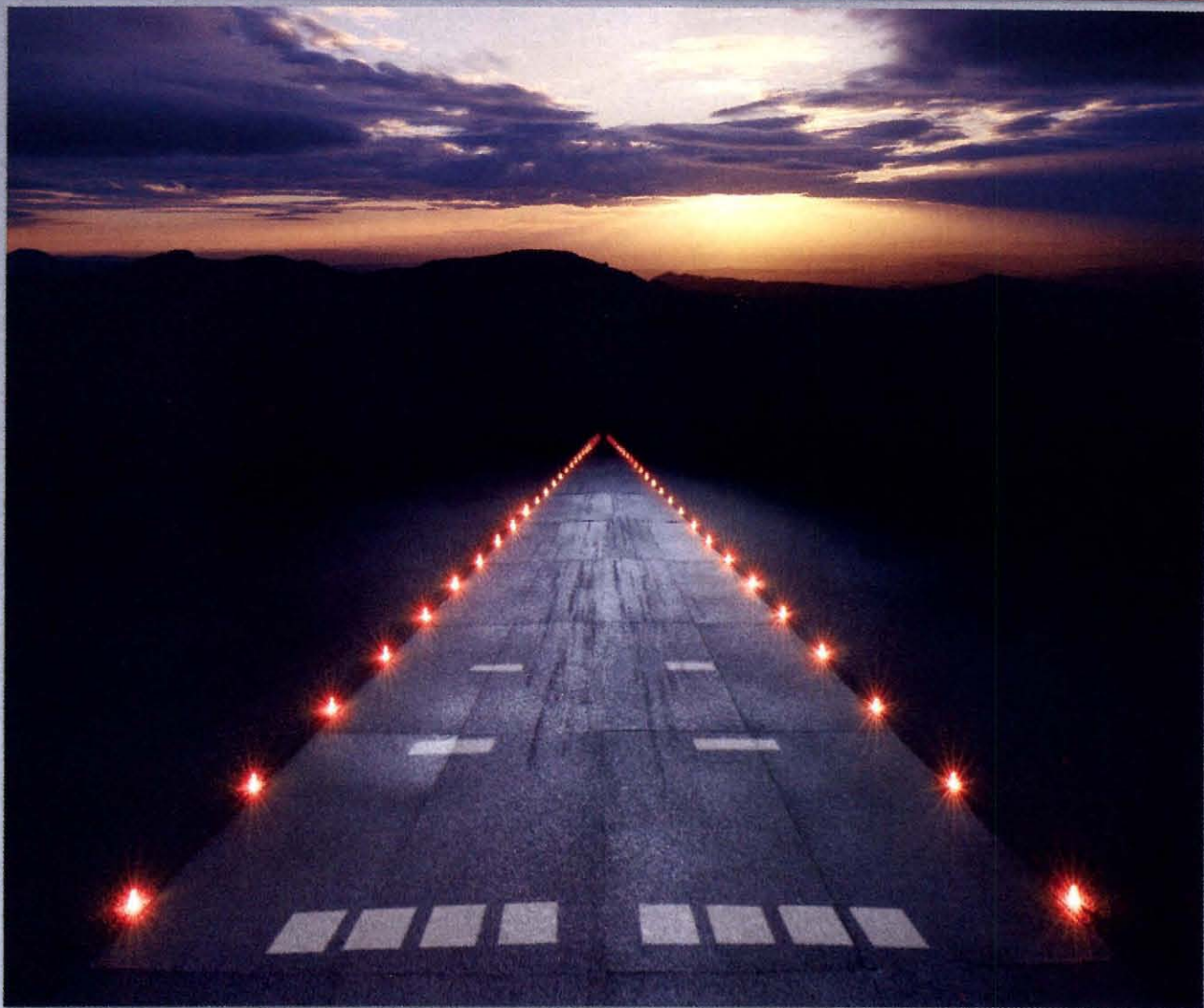
... Happy Holidays!

Steve Blenk is a Washington state woodturner who also knows a couple of things about catching salmon.



We have no doubt many of you can "top" Steve's ideas for ornaments, and we'd love to see what our readers produce in the way of lathe-turned holiday ornaments. Send us pictures of your efforts, and we will select the best ones for display in an upcoming issue!

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*"Two lasers are better than one", RICK ARNOLD and MIKE GUERTIN
of Fine Homebuilding "12-inch Compound Miter Saws," July 2004, No. 164: 68-73.*



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What's This?

Mike Logan from Riverton, Wyoming sent in the tool above. And he's not the only one looking to I.D. this unusual tool. **Know what it is?** Send in your answer for a chance to win a prize!

Good From Any Angle

Fencing Off..Set

[The *August* mystery tool is] half a set of offset fences, used when you mold or plane with a radial saw. The saw shaft is rotated into the vertical position and the blade is replaced with a molding head and cutter. The idea is the same as the in and out tables on a jointer. The outface side is adjusted to make up for the wood removed.

I've never used the ones I have. They were given to me, 40 years ago, by Three-fingered Ralph, and he had used them only once. Since then, they only come out for pictures. You will notice, I have washed the 40-year-

old blood off them for the photo.

— *Garth Jones via Internet*

No Need to Swing the Arm

Well, Garth, let's hope that "Three-fingered Ralph" got his nickname by using the mystery tool incorrectly — although **C. Christy** of Trussville, Alabama, does agree that, "you need two of them, and it is safer if they are not attached to two separate pieces of wood. One long piece with a cut for the molding cutterhead is safer."

The way you should use it, according to **W. Leroy Cole**

of Wellington, Kansas — who owns and has read the directions, is that, "The flat angle on one side is to be clamped in the table. The pieces on the top can be turned to the desired angle you want to make various cuts such as shaping, edge jointing with planer blades, circular edge shaping, miter cuts and cross cutting."

Luther Woodward of Liverpool, Ohio, goes on, "The complete setup contains two pieces (one right- and one left-handed.) There are holes to attach wood fences



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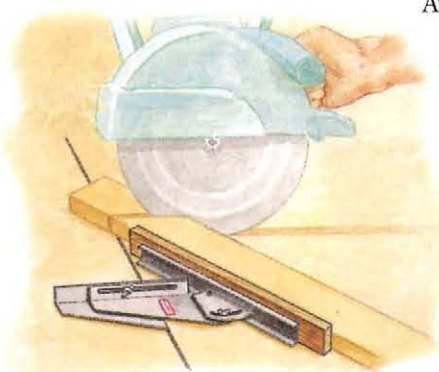
to the bases, and the outer part of the arms slide back and forward when the lock nut is loosened (the lock bolt can be moved to one of three holes for a longer travel)."

Adjustable from 0° to 45°, the tool was used, says **Lou Haller** of Appleton, Wisconsin, "to cut various miters and angles without swinging the arm for left and right miters. The arm was positioned for a 0° crosscut."

Part of the solution to August's mystery tool is that you need two — one right-handed, one left — clamped to your radial arm saw fence.

It is called, says **James I. Matt**, who sent us in a copy of his old literature on the tool, a "Craftsman Fence Attachment for the Accra Arm Saw" — a radial arm saw sold in the 1960s.

Loren Neher of Powell, Wyoming, says that, when



he saw the tool pictured in our magazine, "I knew it was one of those rarely used tools in the bottom of my father's Craftsman radial arm saw cabinet. According to the Craftsman radial arm tools manual copyright 1961, 'Our Craftsman Fence Attachment is practically a *must* for shaping circular and other curved work.'" Loren says, "I only remember Dad using it a few times when he would use the molding head. Soon after that, we acquired a router."

— **Joanna Werch Takes**

If you have your own woodworking mystery tool (or the answer to this issue's entry), send it to Stumpers, c/o Woodworker's Journal, P.O. Box 261, Medina, Minnesota 55340.

Or send us an e-mail:

jtakes@woodworkersjournal.com



WINNER! **Lloyd Hill** from Downey, California wins a **Delta ShopMaster Model LA200K MIDI LATHE**. We toss all the Stumpers letters into a hat to select a winner.

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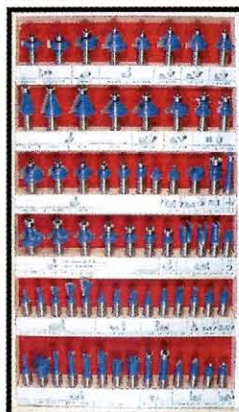
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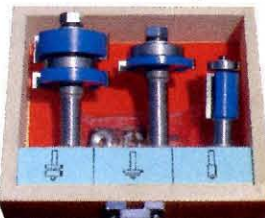
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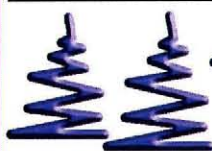
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Ian's Must-have Measuring Tools

By Ian Kirby

The range and variety of measuring tools has exploded since the days of wooden, shop-made versions. The author simplifies your choices by dividing them into four categories and assessing their pros and cons.

The walls of one shop in which I worked were covered in sayings. One of them declared, "If it looks right — it is right." Another goes back to my early days in an English chairmaking shop where they measured things by "a skeg of the eee." Especially on Chippendale style chairs, if you measured carefully, the left and right sides are not exactly alike — same as your face. But if it looked (skeg) right to the eye (eee), then it was complete. Nevertheless, we make things with the aid of measuring tools, but then again, they all rely on the "eee" to determine right or wrong!

As woodworkers we need to be able to measure four things:

- alignment — straightness
- planar accuracy — twist
- angular accuracy — angles
- linear dimension — length

Of the tools we use for our measurements, only the dimension

measures are calibrated so that we can say the measurement is too small or too large and by how much. The rest tell us right or wrong but not by how much. In other words, we rely on our eyes to gauge a given measurement. For instance, if you want to check that an edge is square to a face, you plant a try square on the face of the board and look to see if light is showing through between the edge and the tool. In real terms, that's a lot of leaps of faith:

- is the try square actually square?
- is the face on which you put the stock of the square flat?

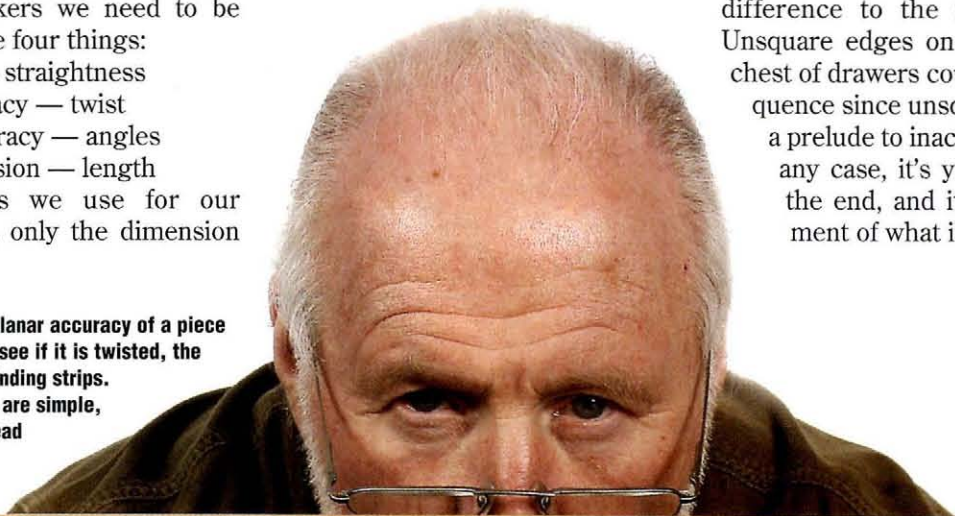
- are you holding the square in contact with the face of the board?
- could you actually detect an inaccuracy of a degree or so?

Valid questions all, but how much does it matter? The answer lies in what you are making.

What Are You Making?

If it's an Adirondack chair nailed together from scrap softwood, as the originals were, you are likely applying a different set of standards than if your goal is a chest of drawers in quartersawn oak. The absence of square edges on the boards of the chair will make little difference to the final outcome. Unsquare edges on the parts of a chest of drawers could be of consequence since unsquare edges are a prelude to inaccurate joints. In any case, it's your decision in the end, and it's your assessment of what is square.

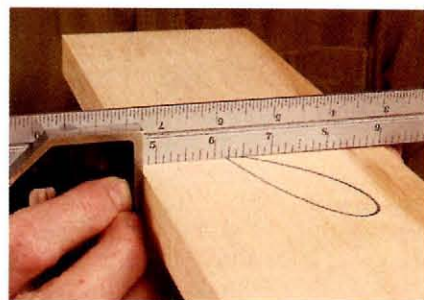
To gauge the planar accuracy of a piece of stock ... to see if it is twisted, the author uses winding strips. Winding strips are simple, elegant and dead accurate.



Here's a little game you can play to take another look at a "square edge." Plane a square edge on a piece of flat wood about 5" wide and check it as normal by putting the stock on the 5"-wide face. Once you are satisfied it's right, check it again, but this time put the square on the edge so the blade is going across the face. Chances are, what you were satisfied with as square in the first case is less than square in the second case.

The Family of Measuring Tools

The first measuring tools, like the objects being made, were fashioned by the woodworker for his own use. Now they come from a variety of measuring tool manufacturers. What we need to measure hasn't changed much, but what we use to measure with has changed considerably — in some cases radically. The most important and most used are straight-edge, winding strips, and try square.



Any inaccuracy in the squared edge is augmented when the blade is placed across the side instead of the edge.

Straight to the Point – Alignment

To measure straightness you need a straightedge. Given a long plane, you can plane a piece of wood straight that is about three times longer than the plane. To check that the edge is straight, you would make three pieces as you would a butt joint and test them one on the other. The preferred wood for this and most measuring tools was straight-grained Cuban mahogany. It's very stable, dense and easily worked.

Most woodworkers would make at least two straightedges, one short and one long, to deal with different situations. They were made to the highest standards of design finesse and finish. Elegantly thin in section to keep down the weight — and damage to both tool and workpiece if dropped — they were often made even more workmanlike by the inlay of an ebony edge which would extend the life of the tool and better resist knocks.

Commercial straightedges were slow to arrive in workshops. The woodworking tool manufacturers probably knew they would be in competition with shop-made products, so we don't find Marples or Stanley marketing a wooden straightedge. Instead, we take a leap into the world of metalwork

and begin to use steel straightedges that are made by companies making measuring tools for the machinist.

Types of Straightedges

They come in different lengths with square or chamfered edges. They're not cheap — but they last a lifetime. It's the one tool you should "hand on" in as good a shape as the day you bought it. Don't use it as an edge to cut against because it's too easy to remove a sliver of metal from the straightedge with a misdirected marking knife.



Shop-made straightedge.
Mahogany: 3/8" x 2" x 21".
Ebony: 1/8" x 5/8".



Metal straightedges, 12" and 24" with chamfered edges, are most useful. A 24" rule from your combination square will also do the job.



Checking straightness of the face side of a board with a wooden straightedge.



Checking straightness on the face edge of a board with a wooden straightedge.

Planar Accuracy – The Long and Short of Winding



Mahogany winding strips: the overall dimensions are 3/8" x 2 1/4" x 14 1/4". The maple strip tapers from 7/16" down to 3/16" at the top edge.

Twist is referred to by the woodworker as winding. A board or assembly in winding has its ends twisted in opposite directions. To check for twist, you need a set of winding strips. Winding strips come as a pair of parallel-sided straight

pieces of wood of the same dimension. They are not commercially available, so you make your own.

The preferred wood for measuring tools, Cuban mahogany, is long gone, but you could source some by dismantling an old piece of furniture. However, new Honduras mahogany will do fine. The prime stuff is referred to as "pattern maker's grade." If unavailable, any clear, straight-grained, quartersawn and dry material will do the job. Make as many pairs to any dimension that suits your type of working and fuss with inlay to your heart's content. Provided they are made accurately, plain or fancy works equally well. The important thing to realize is that winding strips are the basis of measuring planar accuracy —

there is no alternative.

The center marks are essential because, to get a correct reading, you align them as you sight the work.



Check for twist by putting winding strips at each end (at right angles to the board) and align your eyes with the center marks. Half the board may be flat, the other half in twist. Complete the survey by moving the winding strips.

Angular Accuracy — Measuring on the Bias

The measuring tools we use to determine angles fall into three sub-groups:

- try squares which measure 90°
- miter squares which measure 45°
- sliding bevels which measure variable angles.

There is more design variety in this group in general and try squares in particular than any of the other measuring tools. Indeed, try square changes reflect a loose history of the changing nature of woodworking. To "try" means to apply a test to determine whether a standard is met, and the standard tested by a try square is 90°.

The tool measures (and assists marking) a right angle in three ways:

In the simplest of terms, it's two pieces of wood with straight parallel edges fastened together at right angles. The part you hold is called the "stock"; the part at right angles to it is called the "blade" — though of course it doesn't cut anything.

Shop-made Try Square

Few of the original shop-made versions of the try square exist, but contemporary drawings and early photographs show them quite clearly. Once the basic design had been settled on — the design that was handed down to us — the shop-made tool had few drawbacks to it. At best it was made as a very elegant slim-bladed tool using boxwood, a dense, stable, yellow wood, now almost logged out. You might imagine that a major difficulty when using an all-wood try square would be the tendency to slice up the blade when knifing a line round a shoulder. The answer was a striking knife, beveled on one side only, the flat side being held against the try square blade.



Mahogany stock and blade fitted with durable ebony edge to mark against. Stock: 5/8" x 1 1/8" x 5 3/4". Blade: 3/16" x 2" x 6 1/4".

Try Squares made by Woodworking Tool Manufacturers:

These were a mixture of wood and metal. The wooden stock, which defined it as a woodworker's tool, was fortified on the inside edge with a brass strip — a clear nod to superior aesthetics and quality. The hard blue steel blade, held in place by three studs, clearly stated this was a sound, workmanlike tool built to last. These companies created a family of tools by making miter squares and sliding bevels of the same materials.

The three brass studs in the Marples try square became a symbol of distinction. The diamond-shaped cutouts in the wooden stock were made with the most primitive hand-cranked drill

Try squares (left to right) by Stanley, Marples, and E.C. Emmerich.



To “try” means to apply a test to determine whether a standard is met, and the standard tested by a try square is 90°.

which had a split Dremel-like bit. It revolved in a heavy steel template that had the three diamond-shaped openings in it. I well remember the day I was in the Marples factory in Sheffield and tried my hand with this tool, which I was convinced had descended from an ancient culture. The mess I made with that “simple” tool left Marples short one try square stock for the day’s production.

Try Squares by Specialty Tool Makers: The gradual downmarket quality of the big hand tool manufacturers’ products has been countered by the emergence of small companies making hand tools, such as Lie-Nielsen and Clifton.

Each tool they make is superior to the versions made by their bigger predecessors. While the tools don’t bring increased performance, they are invariably heavier, more precious, more handsome — and more expensive. You might say their market axiom is, “We care more, we give more, we charge more.”

A good example is Bridge City Tools, which has been making try squares for more than 20 years. They are an exquisite combination of rosewood, brass and stainless steel. You must decide for yourself whether to preserve their pristine looks or put them to use in the rough and tumble of bench use.



Try square and combination square by Bridge City Tools.

All-Metal Try Square (Engineering Machinist’s Square): An all-steel square, shaped the same as wooden ones, is made by an industry that makes tools for metalworkers. Its standard of accuracy is higher than we

will ever need as woodworkers.

I always think the economical price makes it a very worthwhile purchase.

4" and 6" all-metal try squares ... quality at an affordable price.



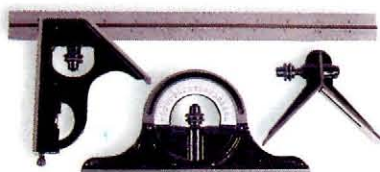
Combination Square Made By Specialist Measuring Toolmakers

For Machinists: This is the traditional standard of machinist’s squares. It’s been in use for as long as any of us remember. Long ago it spawned cheap knockoffs. It’s the first example of woodworkers dipping into the machinist’s toolbox.

The design has two features not associated with a try square. First, the blade is graduated so that it works also as a rule. Second, the blade slides.

With these differences come new capabilities, but the difference extends beyond these because the usual 12" blade can be replaced by a 24" or 36" blade. Then again, any of these blades can have a revolving head or a 45° head attached to it instead of the usual 90°. It’s these features that make it a “combination square.”

I use this as my standard square, not because of the additional useful but minor capabilities it brings and not because of add-ons that make it a combination square, but because of the assurance of knowing that it locks at 90°. That faith derives from the reputation of the maker: in this case, Starrett.



Starrett combination set, available in black crackle finish or black glass finish with hardened parts.

Combination Square from Mass Marketing Companies: These look-alike squares are made to sell at different price points, so their quality of detail varies and their accuracy is suspect. Although they look like the more expensive combination square, the heft and feel tell a different story.



Less expensive versions of combination squares have the features of the more expensive models, but not the quality.

Made by the Specialist Measuring Tool Manufacturers for the Consumer Market:

This tool is made by Starrett, so it carries with it all of the confidence we place in that company’s product. The popular blade lengths are 4" and 6". The square stock makes it useable from either side, which is an advantage over the “combination” shape stock.

For me it’s like an extension to the wooden try square with clear advantages and no drawbacks. I use both sizes ongoing and greatly enjoy them.

New Polypropylene Square: This is not altogether a try square — you can check an edge with it — but it warrants inclusion.

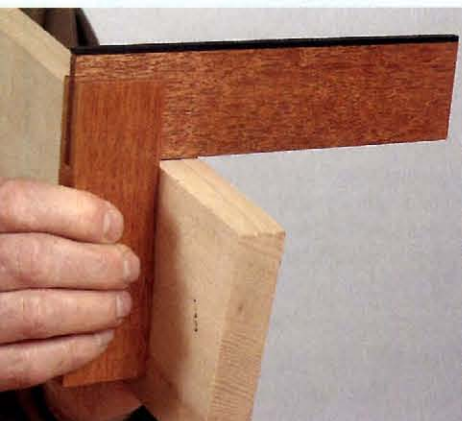
It’s cheap, it’s lightweight, it’s durable, and it’s resilient. For marking out boards when you’re harvesting parts or marking out any crosscut, it’s handy.

The author is fond of these inexpensive polypropylene squares for marking out boards while harvesting stock.



Try Square Cubed!

As demonstrated by the series of photos below, there are three 90° angles that are found on a try square. The inside edges of the stock and blade, the outside edges of those same parts and the inside edge of the stock with the outside edge of the blade.



Inside edge of stock and inside edge of blade.



Outside edge of stock and outside edge of blade.



Inside edge of stock and outside edge of blade.

45° Miter Squares

Here we dipped into not only the machinist's toolbox with the miter face on the combination square, but also the Japanese woodworker's tools.



Miter squares, foreign and domestic. Another gift from the machinist's tool bag.

Using a Miter Square

A miter square is used mostly for measuring and marking corner miter joints, which means that it's often only operating over a distance of 3/4" or so. The machinist's square and the wood-and-metal type are good for checking miters because you can offer them to the work like a try square. They are less good for marking out because you have to position the marking knife by deciding where you think the miter will fall by positioning your knife on the top edge — there is no assist. Although the Japanese miter square is poor for checking miters, it's very good for marking out because of the lip that hooks onto the workpiece. Put the point of your marking knife in the knifeline on the face of the workpiece and hold it at right angles. Slide the miter square up to it and it's accurately positioned to knife the miter line.



You have to position the knife where you think the miter will fall, then slide the square to it. "Sometimes the magic works; sometimes it doesn't." — *Little Big Man*.



Position your marking knife in the line on the face of the workpiece, then slide the miter square to the knife.

Sliding Bevels

Three types are available. The all-metal model in the middle has a useful feature. The curved end is separated from the straight edge by a small step. This allows you to position the bevel accurately on the odd occasion that you have to work with only a small area to land on with the end of the bevel. I find the locking mechanism mediocre. The tab is uncomfortable to tighten and it doesn't take much pressure to change the setting. The bottom level is the one I use. The knurled lock nut is positive and the tool is beautifully made and finished by Starrett.

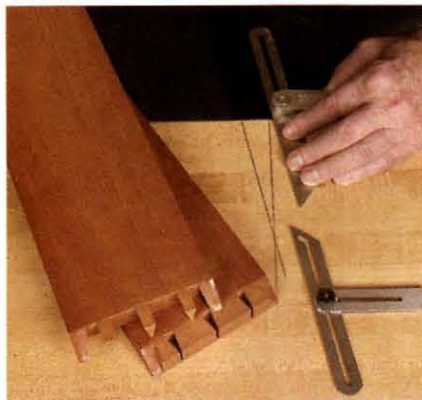


Three types of sliding bevels.

Using a Sliding Bevel

A sliding bevel is set to the required angle from a drawing. We don't know what the angle measures in degrees, and it wouldn't help because the tool isn't graduated. The angle of pins and tails on a dovetail joint is expressed as the slope: the ratio of width to length. In this case, the slope is 1:4⁷/₈.

To set a sliding bevel to mark out a beveled shoulder line on a tenon, you need a full-size working drawing. Clamp a piece of wood in place on top of the drawing and set the bevel to them.



Draw the required slope on the bench and set the sliding bevel to it.



An angled shoulder line on a tenon is made by first setting the bevel to pieces of wood clamped in place on the drawing.

Linear Dimension — The Long and Short of Graduated Scales



The linear dimension family: tapes, rules and calipers.

This is a unique family of measuring tools because they are graduated. Different situations call for the use of different tools. The most common tool is the metal tape. When checking diagonals for square with a tape, take care to fit the tab end exactly the same way in each corner, and don't let the tape bend or kink.

For most bench work in furniture making the 12" and 24" rule are the most useful. It's easy to set gauges to and take positive measurements.

The Vernier caliper, also borrowed

from the machinist's toolbox, is offered in metal and plastic. The black plastic model is graduated in 1/64" and is very popular. At about the same price, the metal version is graduated in 1/1000ths of an inch and often used by machinists for some rigorous comparative measurements. The digital model atop its red case, graduated in imperial and metric to three decimal places, is hardly necessary for woodworkers, but it's offered in many catalogs. Go figure.



Checking squareness of an assembly with a tape measure.



Pinch rods are sharpened so they will fit into the corners. Sight and touch make the measurement.

Using Vernier Calipers

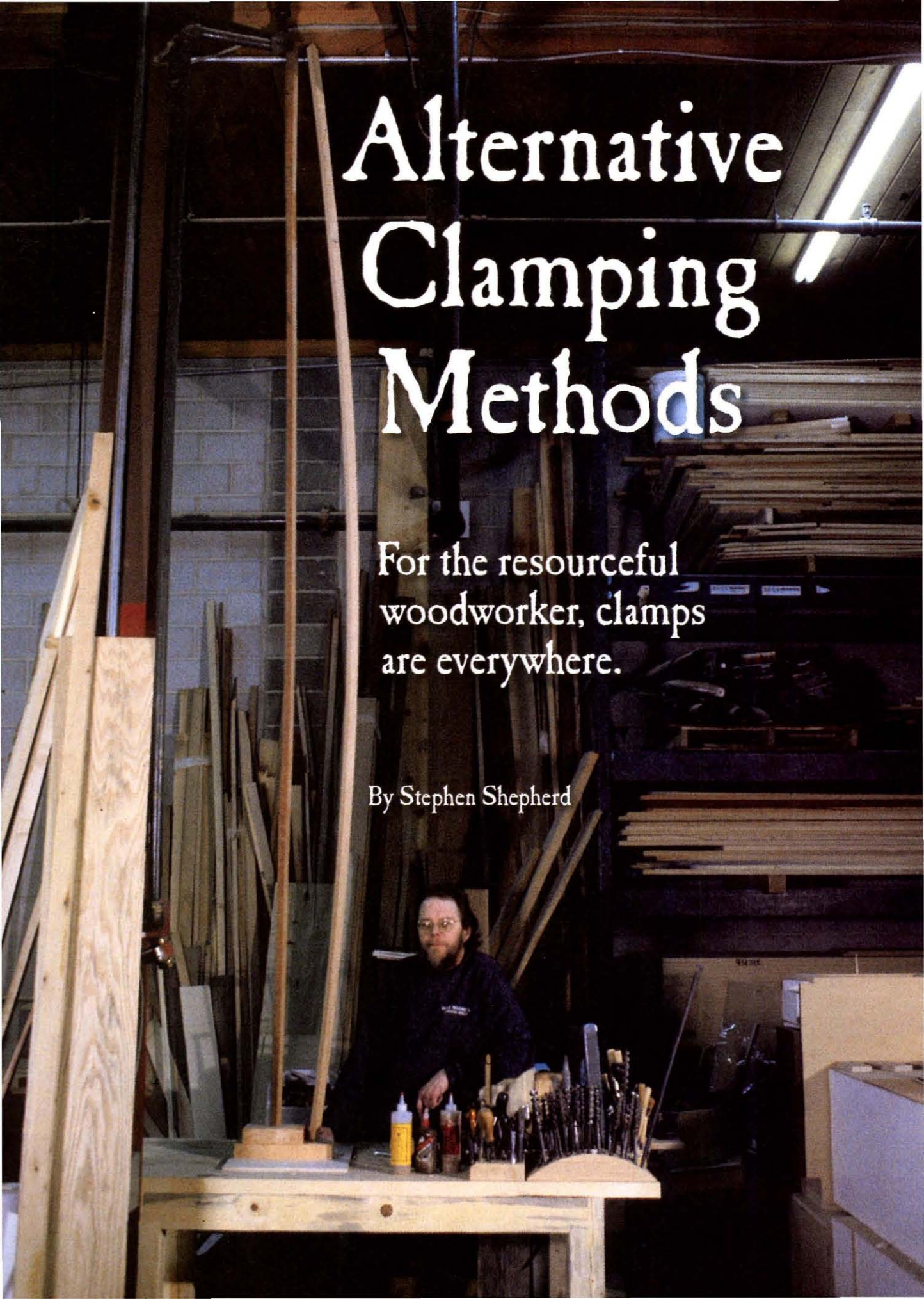
The vernier is an excellent gauge for measuring the depth of grooves, stopped holes or stopped mortises. The knife edges on the other side of the main jaws are used to measure the inside dimensions of grooves or tenons. The key to accuracy is to first make firm contact on the workpiece with the fixed jaw.



The author gauging depth with a dial caliper. Linear dimension requires measuring tools with graduated scales.



Use your thumb to firmly press the fixed jaw into full contact with the workpiece.

A photograph of a woodworker in a workshop. The woodworker, a man with a beard and glasses, is standing behind a workbench. On the workbench are various tools, including a glue bottle and a container of drill bits. The workshop is filled with stacks of lumber and other materials. The title 'Alternative Clamping Methods' is overlaid on the top right of the image.

Alternative Clamping Methods

For the resourceful
woodworker, clamps
are everywhere.

By Stephen Shepherd

**“I have nothing
against regular clamps
— I use them all the
time. But I’ve learned
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when it comes to
clamping the many
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kinds of joints and
assemblies that an
active woodworker is
likely to see.”**

There’s an old saying that a woodworker’s wealth can be measured by the number of clamps he or she owns. With today’s bewildering variety of clamps and holding devices, it’s easy to forget that early woodworkers managed quite well without any of them. Instead, they relied on their wits and a repertoire of clever, low-tech clamping methods to hold parts in place while the glue was drying.

Since those days, technological advances have added even more of these “alternative” clamping methods to the resourceful woodworker’s tool kit. Most are cheap, if not free, and readily available. More important, alternative clamps are often the best or quickest way to handle awkward or unusual clamping situations.

“Go” Bars

A “go bar” is a piece of springy wood that can be bowed between the workpiece and a ceiling joist of the shop to apply clamping pressure in the middle of a large piece of work where a regular deep-throat clamp will not reach. For example, piano manufacturers use go bars to apply pressure in the middle of large wooden soundboards.

Typically, go bars are made from strong, dense, springy woods such as ash, oak, osage orange or hickory. They must be thin enough to flex and to supply enough spring pressure, and they must be long enough to reach from the workpiece to the ceiling with a few inches to spare. The ends are usually sharpened to a blunt point in order to concentrate pressure and prevent skidding.

To use a go bar, first apply glue to your workpiece and position it under a suitable ceiling joist. Place a scrap of wood on the work to protect it, then spring the go bar between the joist and the work. You can increase the pressure by adding more scraps between the go bar and the workpiece.

Sometimes the simplest and best way to clamp something is with a little creativity and one of these ingenious “alternative” clamping methods. The hardwood “go bar” shown here is applying spring pressure to this large panel assembly.

Hose Clamps

Round automotive hose clamps can be of great value in the shop, especially for repairing broken spindles, round tenons and other round or turned work. I’ve also used them to make collet chucks for the lathe and to attach conduits and fixtures to support columns in the shop.

Hose clamps are available in sizes from 1/4" to 4" and larger, and I try to keep a supply of various sizes in stock. When using them for repair work, I usually place a piece of waxed paper

between the clamp and the work to prevent the metal from discoloring the work and to keep the clamp free of glue.

Joiner’s Dogs or Pinch Dogs

Joiner’s dogs are probably the quickest and simplest way to join two boards. Made of iron or steel, joiner’s dogs have two pointed legs that are tapered on the inside, so when you drive them into the end grain of two adjacent boards, they pull the boards together. You can use them on other types of joints as well.

The biggest disadvantage of joiner’s dogs is that they leave holes in the work. If you are using them to join panels, the best way to eliminate the holes is to make the panels longer than necessary and trim them to size after the glue dries. If you are clamping groundwork for veneer, the veneer skin will cover the holes.

Nails and Screws

Nails and screws are usually used to hold things together permanently, but they can also serve as temporary clamps until the glue dries.

Headless brads, finishing nails and carpet tacks may all be used to hold parts together temporarily. Cut nails can be used as impromptu wedge clamps due to the wedge-shaped design of the nails.

Screws have the dual advantages of allowing you to precisely control the location and amount of pressure and of being easy to remove once the glue has dried.

Wooden Pegs

Wooden pegs, both straight and tapered, may also serve as clamps and clamping accessories.

The draw-bored mortise and tenon joint is one prime example. To make this joint, you first cut the mortise and tenon. Then, with the tenon removed, drill a peg



Hose clamps of various sizes are indispensable for repairing small round parts such as chair tenons.



These iron joiner's dogs (pinch dogs) have tapered legs that pull boards together when driven into end grain.



Rubber bands are particularly useful where band clamps are too big or bulky to do the job.

hole through the mortise. Next, position the tenon in the mortise and mark the hole location on the tenon. Remove the tenon and drill a hole slightly offset toward the tenon shoulder. When you reassemble the joint and drive a tapered peg into the hole, it draws the tenon tightly into place. Often, these joints were assembled without glue.

In many traditional shops, tapered pegs are used to secure assemblies and glue-ups to the workbench or a clamping board. A clamping board is a stout, flat

board (or boards) with many holes to allow for a wide variety of clamping arrangements. Simply place pegs in appropriate holes and drive wedges between the pegs and the workpiece to apply pressure where needed.

Rubber Bands

Rubber bands of various sizes are excellent for repairing small or irregularly shaped pieces, such as broken fretwork. They also come in handy for assembling small boxes and other projects. Choose the size or number of bands you need to provide the right amount of pressure. Rubber bands won't mar the surface of your work, and glue doesn't stick to them.

Sprung Boards

This is a technique often used by musical instrument makers to edge-glue two boards, particularly thin ones such as guitar or violin soundboards. First, you attach two cleats to a workbench or base board, parallel and slightly closer together than the total width of your glue-up. After applying glue to the edges to be joined, place the outer edges against the cleats, with the glued edges forming a peak where they meet in the center. Press down on the peak to flatten and clamp the edges together, using a weight to prevent the assembly from springing back. You may need to experiment to determine the ideal spacing for the cleats to get the right amount of pressure.

Upholstery Springs

Sections of coil springs from discarded upholstered furniture can be fashioned into clamps that are serviceable and useful for a variety of jobs.

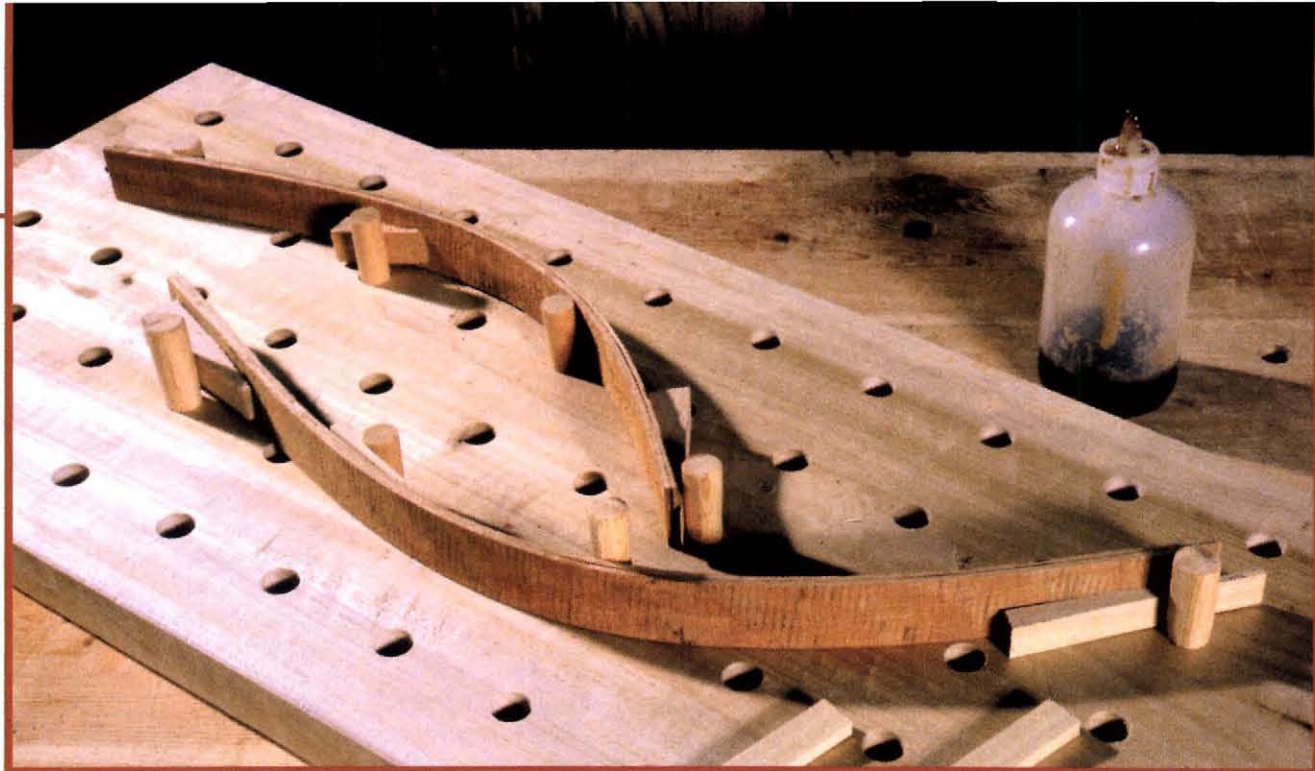
Coils that are made of better steel can be difficult to cut. If diagonal pliers or end cutters don't work, try bolt cutters. Cut the coil on a bias to produce points on the ends. The points will hold themselves in the wood even at odd clamping angles such as mitered picture frames.

The downside of coil spring clamps is that they produce holes in the wood. In some cases, you can protect your workpiece with clamping blocks or wood scraps. If you need to repair a hole, you can usually swell it shut with hot water or steam.

String, Rope and Twine

Any time a piece of string will be in contact with glue, it pays to wax it prior to use. Just run the string over a piece of beeswax a few times to coat it adequately.

String and blocks. A piece of string and eight blocks of wood make the ultimate, one-size-fits-all, picture frame clamp. The continuous loop of string ensures proper clamping pressure at all the miters until the glue dries. You may need to use two strings to distribute the pressure properly on wide frames or boxes. I've even seen this method used for cabinet carcasses.



A clamping board and wooden pegs can adapt quickly to any shape. Wedges exert pressure between the pegs and the work. Creativity is the key to using any clamping process, standard or alternative. The necessity of glue-up has caused generations of woodworkers to be inventive.

You can use any kind of string, twine or cord that will take a bit of stress. Loop it around the frame and tie a knot to form a fairly tight loop, leaving enough slack to get the eight blocks of wood between the frame or box assembly and the string.

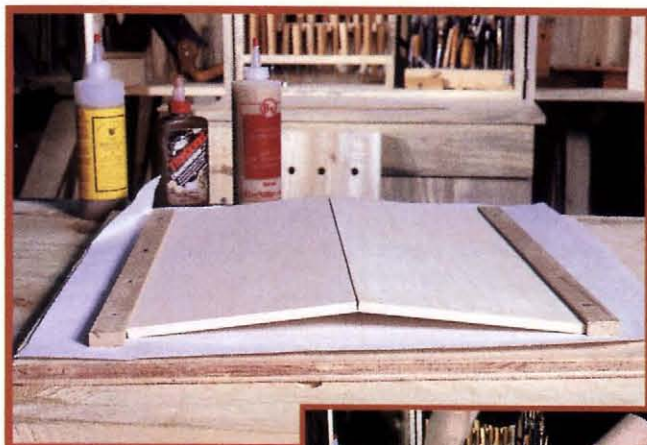
Place two blocks between the string and each side of the frame, in the middle where the string is looser. With that done, slide the blocks outward toward the corners of the frame. This tightens the string and directs the pressure to the mitered corners. Then, you can further direct the pressure by sliding the individual blocks.

Tourniquets. The tourniquet is probably the first clamp ever invented. It certainly is a primitive and elegant clamping solution for square, rectangular, oval and round objects, as well as for awkward or oddly angled assemblies such as chair legs.

I prefer to make my tourniquets with soft cotton rope. It will stretch, yet it doesn't mar the surface like hemp or manila rope does.

To create a tourniquet, I tie a loop in one end of the rope, wrap it around the work a couple of times and tie it through the initial loop. Then I insert a stick, or "toggle," between the ropes and twist them to shorten the rope and apply pressure. When the tourniquet is tight enough, I block the toggle to prevent it from untwisting.

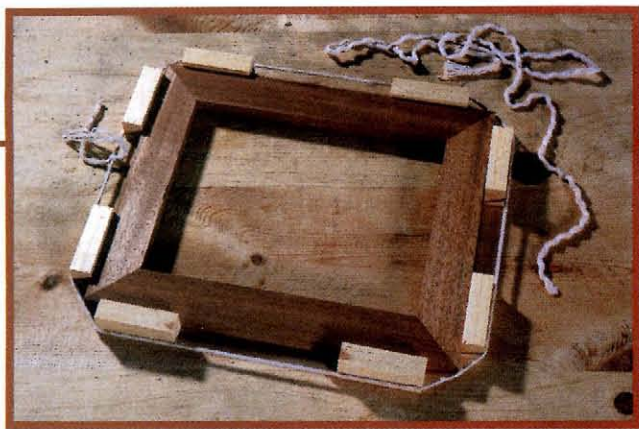
"Serving" string. String works well for wrapping around pieces such as veneered columns to hold the veneer in place while the glue dries. This technique also works well for restoration and repair work for round, oval or odd shapes where other methods will not work.



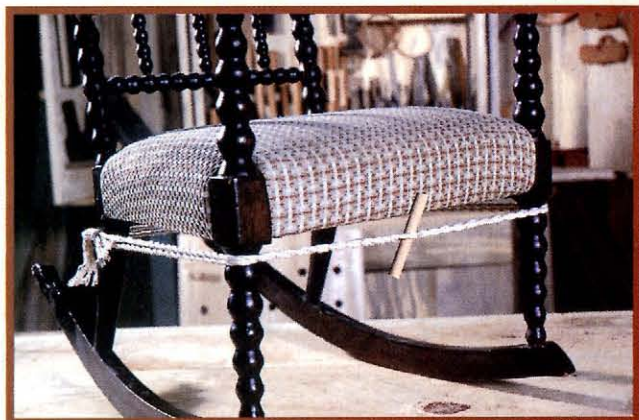
Instrument makers have long used this "sprung" board arrangement to join thin book-matched panels together without clamps.



Upholstery coil springs make great impromptu clamps for mitered assemblies and other odd angle joints.



This classic method of clamping frames needs only a piece of string and eight small blocks of scrap wood.



Nothing beats a tourniquet for awkward clamping jobs like chair leg assemblies. All you need is cotton rope and a wooden "toggle" to twist it.

But, wrapping (or "serving") the string around and around the work can be time-consuming and clumsy; so, the traditional craftsman often made a "serving mallet" that acted as a bobbin and a tensioning device for the string.

Wedges

Wedges. The wedge is by far the most common and time-honored method of applying force, and one of the handiest "tools" ever invented, since its principle underlies many kinds of joints and clamping devices found in woodworkers' shops.

Dovetail joints, for example, are open mortise and tenon joints that rely on their wedging action to remain tight and square while the glue dries.

Wedges are also used to secure tenons in their mortises or sockets, either as blind-wedged (fox-wedged) tenons totally enclosed in blind mortises, or as through tenons, where the exposed end is wedged with one or more wedges to keep the shoulders tight and prevent the assembly from racking.

On solid seat construction in Windsor chairs, the wedges are wider than the tenon. This extra width locks into the wood to prevent the leg from rotating in the socket.

Many clamp designs are based on the wedge principle. The thread on a screw clamp is actually an inclined plane, a variation of the simple wedge. Another popular type of clamp, the cam clamp, is essentially just a circular pivoting wedge.

Wedges may also be used in conjunction with other clamping devices to add specific pressure to a certain area. For example, if you are using a spanner beam to exert pressure in the middle of a large workpiece or assembly, you might use a wedge between the beam and your clamping block to push it down a little tighter.

As mentioned earlier, many craftspeople use wedges in conjunction with pegs in a workbench or gluing or clamping board, where they can exert just the right pressure in just the right place. I keep a small container of various sized wedges near my workbench and use them on a daily basis.

Wedges used in pairs ("folding wedges") are great for applying uniform, controlled pressure, even in many places where clamping is impossible by any other means.

Clamp Extensions

I first became aware of these handy items many years ago, when I spotted them in an old engraving. They were designed to lengthen clamps and keep boards flat as the glue dries.

Wooden clamp extensions are easy to make and can save you from having to buy long, heavy clamps that you'll seldom use.

Unlikely Clamps

With a little ingenuity, you can make a clamp out of just about anything. Here are a few examples:

Drill press: If your drill press has a tightening device to lock the quill, you can use it to clamp a glued-up assembly until the glue dries. If your table has a rack and pinion, you can also place the work under the chuck and crank up the table to apply the pressure.

Lathe: Position the work between centers and advance the tailstock screw to clamp the work.

Jacks: The new scissors jacks work great for certain applications, as do the very old screw jacks from Ford Model A and Model T automobiles. For heavier-duty clamping jobs, you can use a house jack. I once needed to hold a lathe in place while turning a rather large chunk of wood, so I rigged up a couple of 4 x 4s and a house jack to apply pressure between the ceiling beams and the ways of the lathe.

Tires and inner tubes: I have seen small trailer tires used to glue up round rings of laminated veneer. First, you wrap the glued-up layers of veneer around the deflated tire. Then, bolt a two-part wooden caul around the veneer, and inflate the tire to force the laminated wood against the caul. Deflate the tire to release the clamping pressure. You can do the same thing with



When used in pairs, wedges provide an elegant way to apply direct, parallel clamping pressure without clamps.

inner tubes from cars, trucks and bicycles. They are thin and can be used as long tubes by cutting near the stem and sealing both ends. Used against fences or cauls, the air pressure can apply specific clamping pressure until the glue dries. Deflating releases the pressure and glue does not usually stick to the rubber.

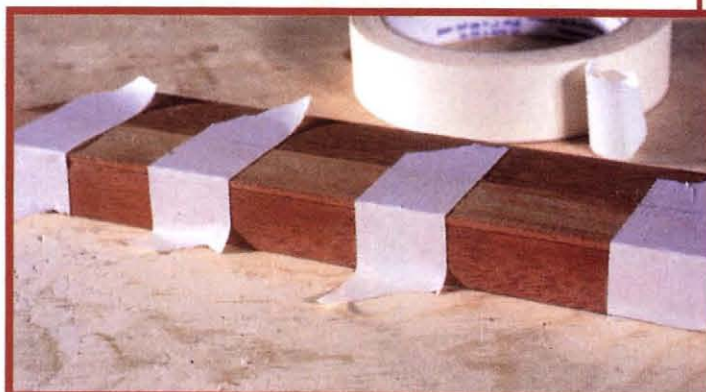
Doors: Of all the unlikely clamps, I have actually used a spring-hinged door to clamp a small repair on the edge of a box. The box was delicate and the pressure from the self-closing hinge was just enough to do the trick. Of course, I couldn't move the door until the glue dried.

Tape: Tape can be very handy for a lot of clamping situations. Masking tape, painter's tape, Scotch™ brand tape, packing tape and duct tape all have their uses in the shop. Masking tape in particular is useful for applying edgebanding, purfling and inlays. Its ability to stretch enhances the clamping pressure. Painter's tape is the best choice if you need to protect the surface of the work from the tape adhesive.

Weights: What could be simpler than harnessing gravity to do your clamping for you? Anything of mass such as rocks, bricks, barbells, canvas bags full of sand, or chunks of iron can be used to clamp two pieces of wood together. Always use a clamping pad to avoid damage to the finished surfaces.

Wire: Brass, copper or iron wire can be wrapped, twisted and tightened around an unusual shape to hold it in place. Iron or baling wire will react with the glue and leave a mark, so use wax paper or other protection between the iron and the wood. Select the gauge of wire that is appropriate for the particular application.

Miscellaneous clamping helpers: I have used a piece of foam rubber as a clamp to provide pressure on delicate, uneven gluing where just a little pressure is required. I have also used a sponge for the same purpose. Paper clips, binder clips and clothespins can also provide limited



Masking tape and other kinds of tape are useful for controlled clamping operations like gluing inlay banding into the edge of a mirror frame.

clamping pressure for small gluing jobs. I have even used one of those small food-saver vacuum units to vacuum veneer small pieces.

And on and on it goes ...

As you can see, the list of alternative clamps and methods is limited only by your imagination. I have nothing against regular clamps — I use them all the time. But I've learned to think out of the box when it comes to clamping the many odd and different kinds of joints and assemblies that an active woodworker is likely to see. By mastering a few principles and rules of thumb, it's amazing how easily and efficiently you can adapt unlikely items and materials to your clamping needs.

Stephen Shepherd (www.ilovewood.com) is a woodworker and woodworking historian living in the Salt Lake City area.

Build a Horizontal

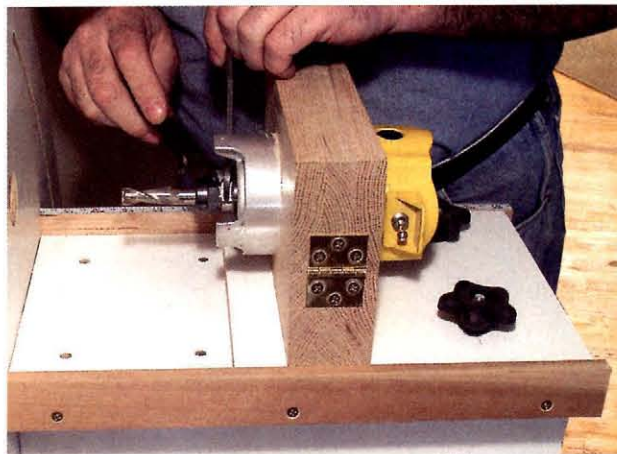
By John English

Turn your spare router into a versatile milling machine featuring: easy and accurate depth of cut, super-easy fence adjustment, and above-the-table bit changes.

All of the horizontal routers I've seen have maximum adjustment between the bit and the table of just a couple of inches. This limits work on thick stock, panels, wide boards and other workpieces. I decided to avoid this limitation by going with a rotating fence, rather than simply moving the router up and down. That way, I could take advantage of the unique geometry of an arc. The motor is mounted on a moving sled which provides incredibly quick and easy bit changes above the table. It also lets you adjust the depth of cut in a couple of seconds. The rotating horizontal fence delivers a huge range of bit-to-table adjustment: you can center the bit anywhere from almost 8" above the table to an inch below (which is great for working with wide bits), and change the setting in seconds. Add sliding tables to the machine, and you can nibble away a deep mortise or long tongue without ever adjusting the fence or bit height.

The author has so far discovered that his milling machine will form a corner bridle, corner half-lap, standard dado, rabbeted dado, keyed miter, loose tenon, mitered half-lap, mitered slip joint, rabbet, round mortise, shouldered dado, slot dovetail, splined miter, tapered finger joint, through mortise, a tongue and groove ... and he's still working on finding its limits.

Routing System



The router motor is mounted in a mobile base which slides back from the vertical fence. This provides complete access to the router for bit changes. The same mechanism is used to set the depth of cut.

The Router Table

The heart of the machine is a router table to which the rotating fence and sliding motor mount are attached. This table is designed to be clamped to a workbench with the fence rotating down behind it. The first part to make is the table base (piece 1), which is cut to the size shown on the *Material List* on page 58. I used white melamine-coated MDF — widely available at lumberyards. Seal the edges with heat-activated edge-banding tape (piece 2); a household clothes iron works well. Trim the edges with a sharp chisel and 220 grit sandpaper (**Figure 1**).

Cut the two router table sides (pieces 3) to size, then attach them to the base with $1\frac{3}{4}$ " countersunk, pre-drilled screws, driven up through the bottom, as shown in the *Exploded View* on page 58. Each of these two critical joints is reinforced with a hardwood brace (piece 4). Ease the outside front corner of each with a sander to avoid sharp edges. Attach them with three screws driven up through the table base, and three more through each table side.

On the side of the table where the fence will be hinged, an additional short hardwood cleat (piece 5) is

required. Chamfer one side and one end along the top edge, then glue and screw it in place.

The top of the router table (piece 6) is cut to size, then its two front corners are radiused with a belt sander. Apply melamine tape to all four edges and trim it flush, then plow a groove across the top the same size as the guide bar on your table saw's miter gauge. Use the same setup to plow a couple of stopped, $1/4$ " deep grooves in the bottom face of the tabletop as shown on page 59. These house the top edges of the sides as you glue and clamp the top to the sides.

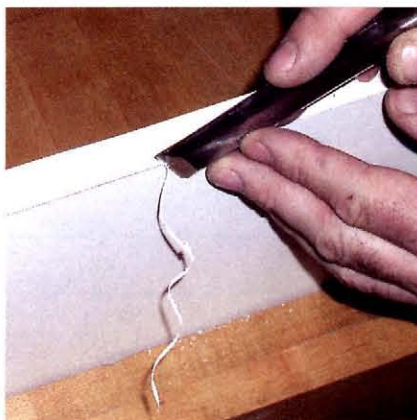


Figure 1: Use a household clothes iron to apply plastic edge banding, then trim the excess with a sharp chisel and sandpaper.

After the glue is dry, embed three T-nuts (pieces 7) in the tabletop at the locations shown on page 58. Use a Forstner bit to counterbore holes for them, so they sit just below the surface, as shown in **Figure 2**. Drill three holes for stove bolts, nuts and washers (pieces 8, 9 and 10) to secure the T-nuts: this method allows them to withstand more serious pressure than the very small screws which come in the package.

The last elements of the router table are the two plates (pieces 11), which are attached at the back, outside the table sides. Each has a slot routed in it to accommodate a T-bolt head (see page 59), and another hole drilled for the bolt (piece 12). These are glued and screwed in place through the table sides and top: make sure the heads of the screws going down through the top are totally below the surface.

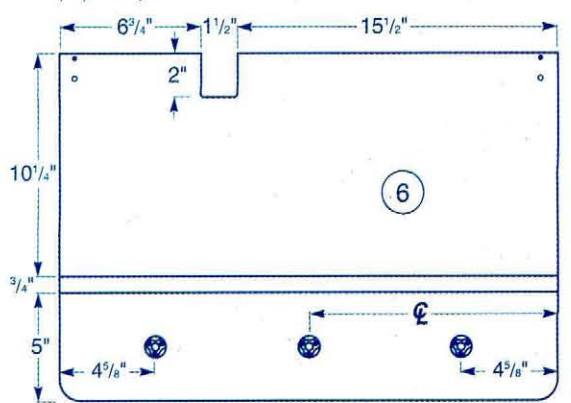
The Rotating Fence

With the table completed, the next task is to make the melamine-coated MDF fence (piece 13). On the table

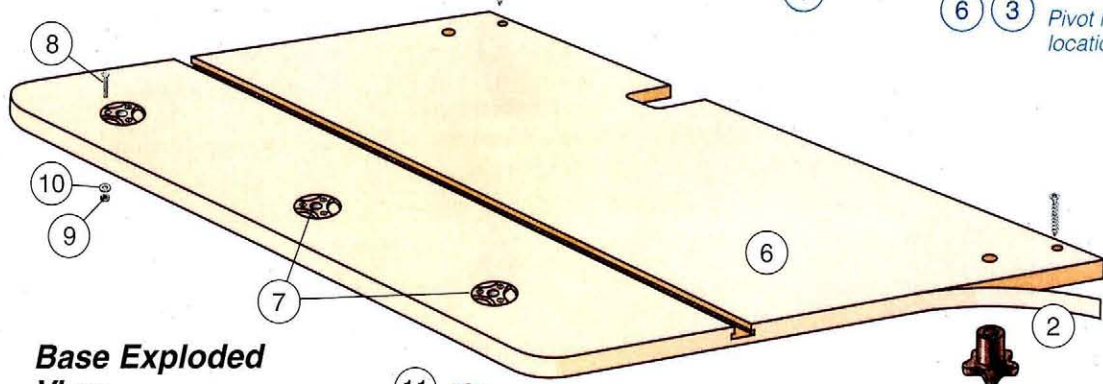
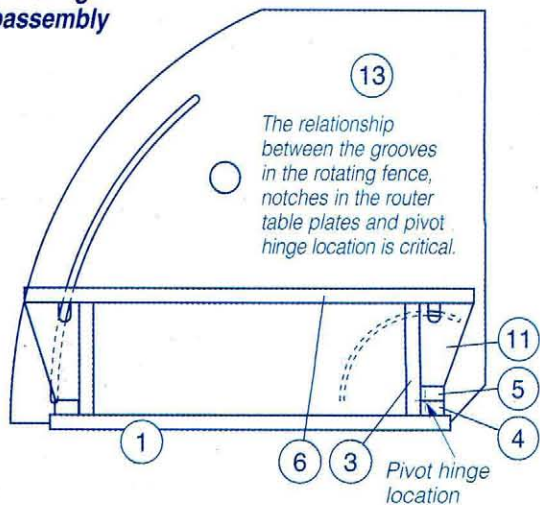


Figure 2: Three T-nuts embedded in the tabletop add versatility to the machine by allowing for the easy addition of jigs and hold-downs.

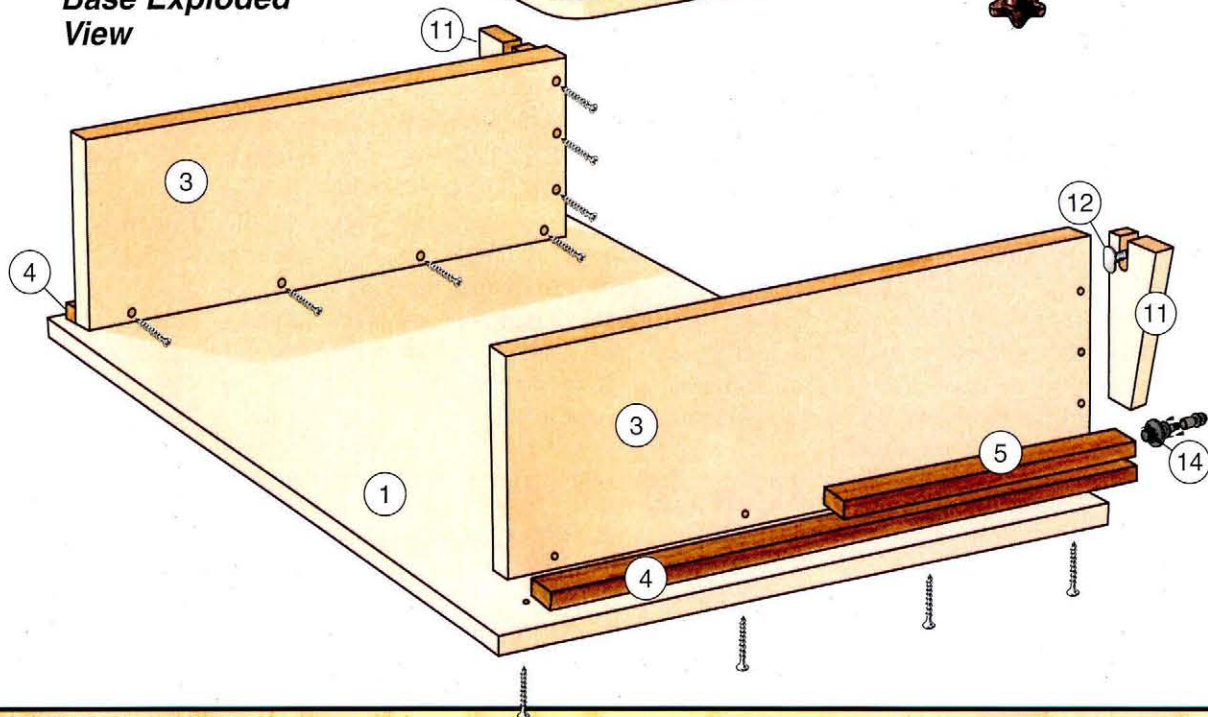
Router Table Top (Top View)



Base and Rotating Fence Subassembly Detail (Front View)



Base Exploded View

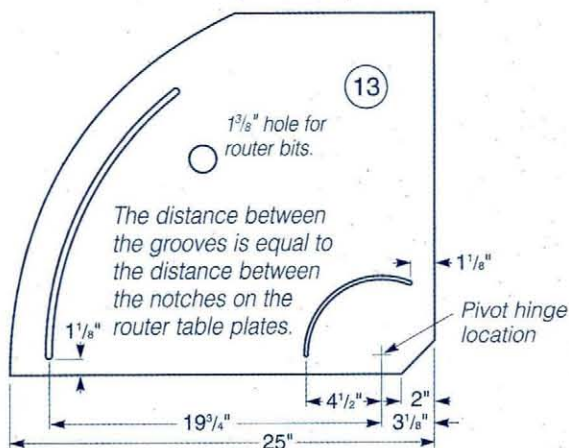


MATERIAL LIST (Base)

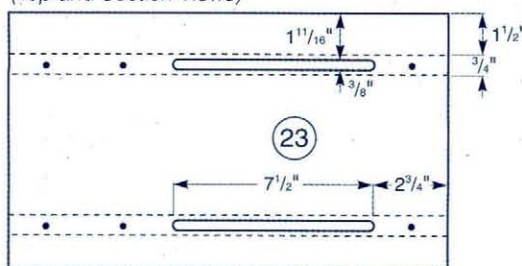
	T x W x L		T x W x L
1 Router Table Base (1)	3/4" x 14 1/2" x 21"	8 Stove Bolts (9)	To fit T-nuts x 1 1/4"
2 Edge Banding (2)	1/32" x 7/8" x 25'	9 Stove Bolt Nuts (9)	To fit stove bolts
3 Router Table Sides (2)	3/4" x 5 3/4" x 14"	10 Washers (9)	Steel
4 Router Table Braces (2)	3/4" x 1 1/4" x 14"	11 Router Table Plates* (2)	3/4" x 2 7/8" x 5"
5 Router Table Cleat (1)	3/4" x 1 1/4" x 7"	12 T-Bolts (17)	5/16" x 2 1/2"
6 Router Table Top (1)	3/4" x 16" x 23 5/8"	13 Rotating Fence (1)	3/4" x 25" x 21 1/4"
7 T-nuts (3)	5/16" x 18	14 Pivot Hinge (1)	Rockler exclusive

*Trim one to length.

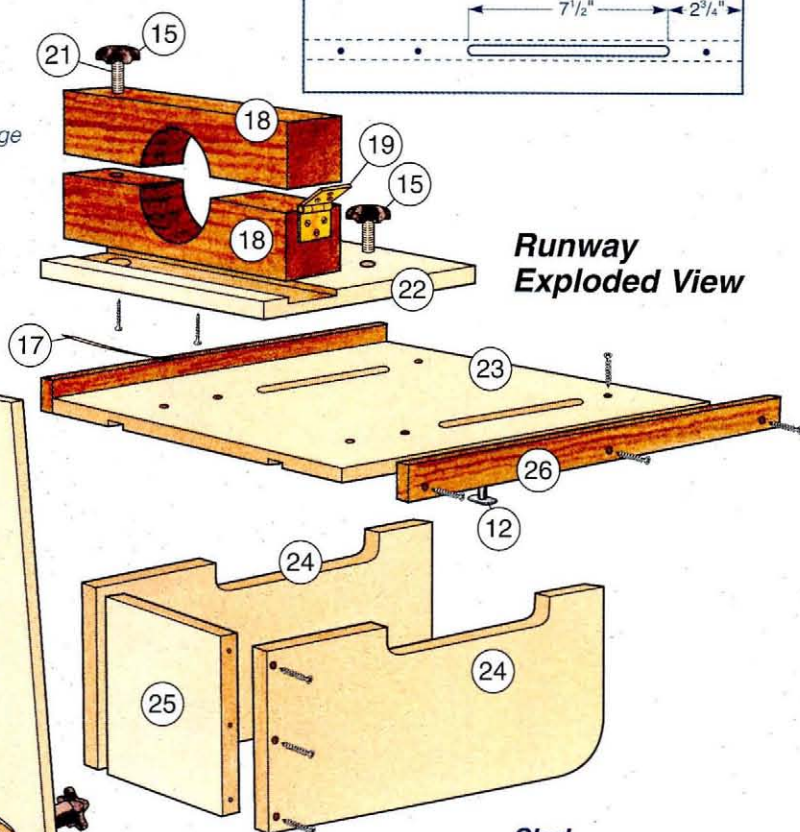
Rotating Fence (Front View)



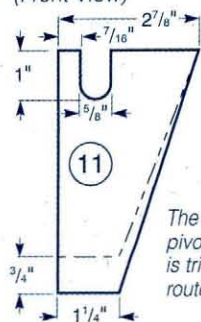
Runway Top (Top and Section Views)



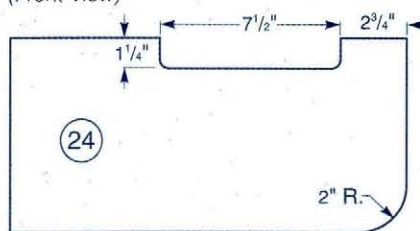
Runway Exploded View



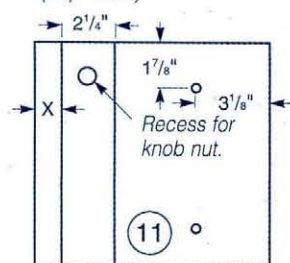
Router Table Plates (Front View)



Runway Sides (Front View)



Sled (Top View)



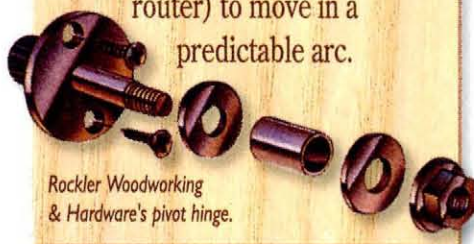
	T x W x L
15 Plastic Knobs (8)	5/16" - 18
16 Fence Handle (1)	3/4" x 1 3/8" x 25 1/2"
17 Self-stick Measuring Tape (1)	4', Left to right
18 Motor Mounting Block (1)	3/4" x 2 1/4" x 9 1/2"
19 Hinge (1)	1 1/2" x 2"
20 Router Motor (1)	Approx. 3 1/2" Dia.
21 Mounting Block Bolt (1)	5/16" - 20 x 7"

	T x W x L
22 Sled (1)	3/4" x 9 1/2" x 10"
23 Runway Top (1)	3/4" x 9 1/2" x 16 1/2"
24 Runway Sides (2)	3/4" x 8" x 16 1/2"
25 Runway Face (1)	3/4" x 5" x 7 7/8"
26 Runway Trim (2)	1/2" x 1 1/2" x 16 1/2"

Spin Doctoring

Often hardware is the solution to questions that you didn't even know to ask. The pivot hinge shown below was the perfect solution to a knotty problem:

how to raise and lower the router smoothly and accurately. The hinge is unbelievably strong and allowed the rotating fence (and its attached router) to move in a predictable arc.



Rockler Woodworking & Hardware's pivot hinge.

saw, cut it to the size shown in the *Material List*. Then, to lay out and cut the curve, we're going to use the pivot point. Locate this point using the illustration on page 87, and drill a 1/2" hole at this location.

The fence rotates on a Rockler pivot hinge (piece 14) and is secured with two star knobs (pieces 15) that thread onto T-bolts protruding through arched slots in the fence. To begin installing the hinge, use a Forstner bit to drill a recess in the back of the router table, as deep as the thickness of the large flange on the pivot hinge and centered on the square formed by the back ends of the brace and cleat. This is end grain, so a sharp 1 3/8" bit is in order. Change to a 1/2" bit to complete the stepped hole.

Now counterbore the 1/2" hole you drilled earlier in the fence, following the instructions for the hinge. This is a 1" counterbore in the back of the fence. As the 1" bit no longer has a center to grab, I drilled a 1" hole in some scrap plywood and used this template over the hole to guide the Forstner bit.

Assemble the hinge and install the fence. Then slide the table to the edge of your workbench, so the fence can pivot, and draw the three arcs on the front face (for the two slots, and the edge of the fence).

Cutting the Arched Slots

You can use the hole you drilled for the hinge as a pivot point to rout the grooves. To do this, you need to make a simple circle-cutting jig. Attach a router

near one end of a 30" long piece of scrap MDF. Chuck a 3/8" straight bit in the router, set the depth of cut for 1/4", and plunge it through the scrap.

On the rotating fence, measure the distance from the center of the pivot hole to the center of one of the arched slots. Then, on the bottom of your circle-cutting jig, center a 1/2" hole exactly that distance from the center of the bit.

The pivot hinges come in pairs, so slide the serrated end of the second one into the hole you just drilled in the bottom of the jig. Slide the nylon sleeve into the 1/2" pivot hole in the fence, and the threaded end of the hinge into the sleeve. On the

rotating fence, mark the start and stop spots for each slot. Then turn on the router and take several passes to complete each slot.

When you're using the horizontal router table, the bits emerge through a 1 3/8" hole in the fence.

Find its location on page 59, drill the hole and chamfer the edges. Remove the corner of the fence, then cut the hardwood handle (piece 16) to size. Round over one end of it with a belt sander and attach the handle to the bottom of the fence with glue and counter-sunk screws. Then apply melamine tape to the other edges of the fence.

The handle makes it easy to control the fence and thereby make small adjustments in the height of the bit. Add part of a self-adhesive tape measure (piece 17) to the curved outer edge of the fence and you can keep track of these minute adjustments. The section of tape can begin and end at any measurement: all you're after is the 1/16" increment marks.

Building the Motor Block

The mounting block for your router (piece 18) is made up of three layers of 3/4" x 4" x 20" hardwood, face-glued and clamped together. After the glue dries, dress all four sides on the jointer, then crosscut the block into two identical 9 1/2" halves. Clamp them edge to edge (no glue lines on the visible top faces), and draw the radius of your router motor on the top face. Band saw the two arcs and

Hard-to-find Router Table Supplies

The following supplies are available from *Woodworker's Journal*.

1 3/4" Screws (Pack) #54075.....	\$3.79
White Edge Tape* #91611.....	\$4.99
T-nuts (Pkg) #68379.....	\$6.79
T-bolts** #33939.....	\$1.19
Pivot Hinge Pair #51243.....	\$6.99
Star Knobs** #23812.....	\$9.99
T-handle Clamp #20752.....	\$11.99

*Two required. **Fourteen required.

To order your supplies, call 800-610-0883 and mention code W4123.

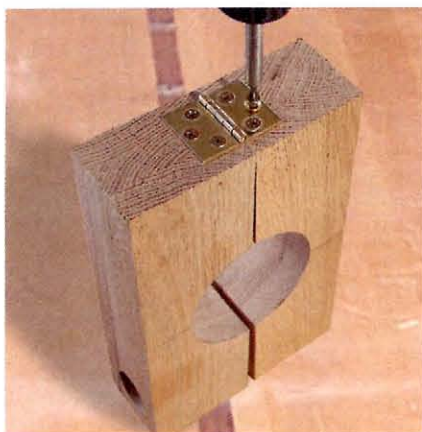


Figure 3: After gluing up 1 x 4 stock and crosscutting it to make the block halves, join them together with a large surface-mounted hinge.

sand to the center of the line with a drum sander chucked in your drill press.

Install a surface-mounted hinge (piece 19) on one end of the block, as shown in **Figure 3**. Then move to the jointer and take one pass along half of the inside face of each block, removing 1/16" of material. Start each cut at the arc and work away from the hinge. This will ensure a tight grip when you install the motor: the block will be full thickness at the hinge side, and 1/8" smaller at the other end.

Dry fit the motor (piece 20) in the block and make any necessary

adjustments for a perfect fit. Drill a 3/8" diameter hole in the block for the bolt (piece 21) which secures the motor. Counterbore the head of this bolt so it's below the surface, slide it in place and thread a star knob on the other end. Then tighten the knob to secure the motor.

Creating the Sled and Runway

After cutting the motor sled (piece 22) to size, plow a 2 1/4" wide by 1/8" deep dado all the way across the top, to accommodate the bottom of the motor mount. Drill a 1 3/8" hole in the dado to allow access to the head of the bolt. I ran a chamfering bit around this hole to prevent sharp edges. Glue and clamp the block into the dado and add three countersunk screws for good measure.

Drill two 5/16" holes through the sled at the locations shown on page 59. These will be used by T-bolts to lock the base in position during use.

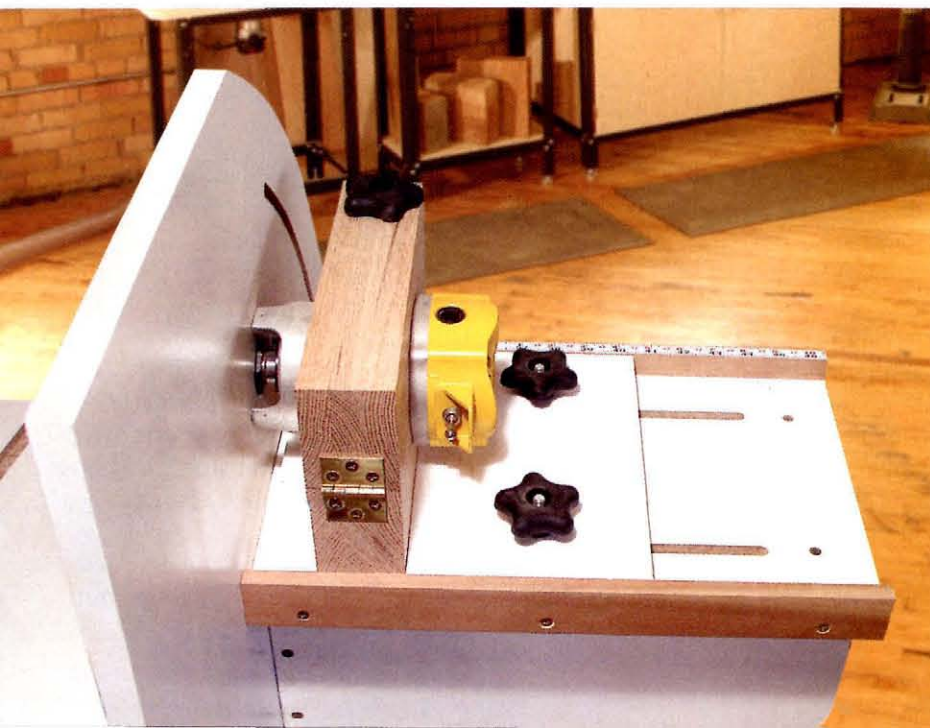
The sled sits on a runway which is made up of a top, two sides, a face and two lengths of trim (pieces 23 through 26). Cut the top to size, then set up a router and fence to plow two 3/8" wide stopped grooves in the top face, at the locations shown on page 59. Turn the part over, switch to a 3/4" straight bit and set the depth of cut to 3/16". Then use a clamped-on fence to



Figure 4: A pair of 3/4" grooves in the bottom of the runway accommodate both the heads of the T-bolts and the tops of the runway sides.

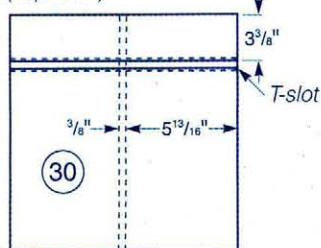
widen the slots to accommodate T-bolt heads. Make these cuts the full length of the runway top, as they will house the runway sides (**Figure 4**). Cut the sides to size and band saw them to shape, then sand the edges. Attach them with glue and screws.

Screw the face of the runway subassembly in place between the

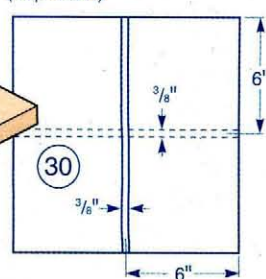


The versatility of this exceptional router system is enhanced by the ease with which depth and height of cut are adjusted.

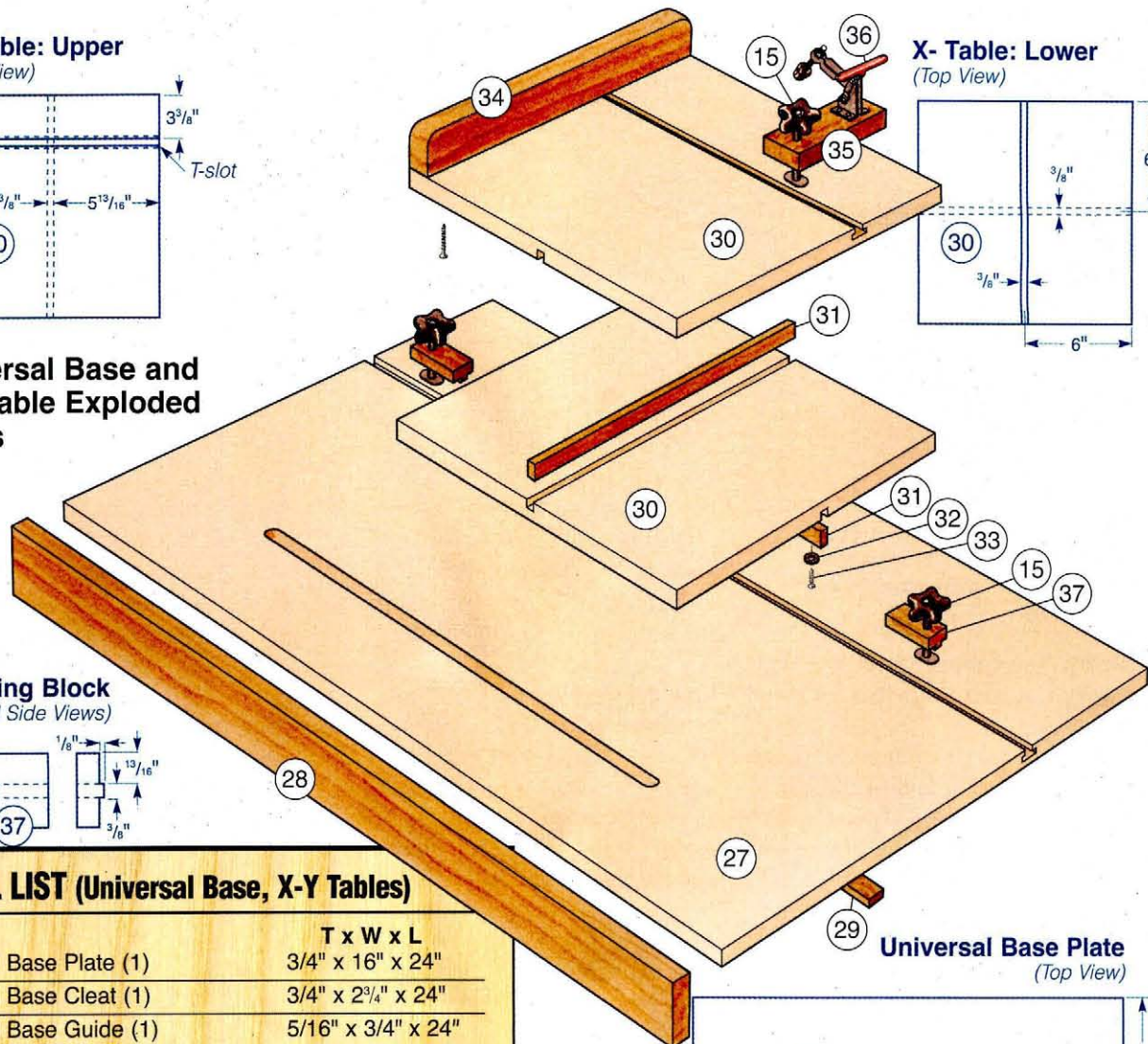
Y- Table: Upper
(Top View)



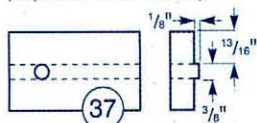
X- Table: Lower
(Top View)



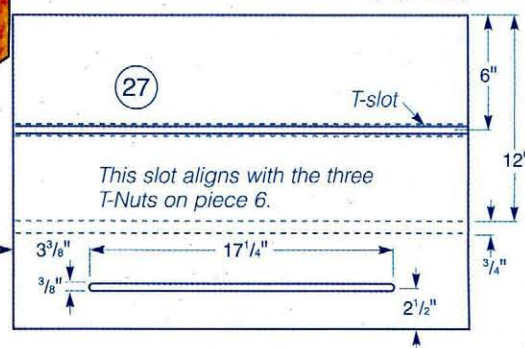
Universal Base and X-Y Table Exploded Views



Clamping Block
(Top and Side Views)



Universal Base Plate
(Top View)



MATERIAL LIST (Universal Base, X-Y Tables)

	T x W x L
27 Universal Base Plate (1)	3/4" x 16" x 24"
28 Universal Base Cleat (1)	3/4" x 2 3/4" x 24"
29 Universal Base Guide (1)	5/16" x 3/4" x 24"
30 X-Y Tables (2)	3/4" x 12" x 12"
31 X-Y Table Guides (2)	3/4" x 3/8" x 12"
32 X-Y Table Washers (2)	Size to fit
33 X-Y Table Screws (2)	1/2" x #4 Panhead
34 Y-table Fence (1)	3/4" x 1 3/4" x 12"
35 Clamping Block (1)	3/4" x 1 3/4" x 5"
36 T-handle Clamp (1)	
37 X-Y Table Stop (2)	3/4" x 2" x 3 1/2"

sides. Then attach the two pieces of hardwood trim with countersunk screws and glue. Make sure the sled slides easily between the trim pieces: there should be no sloppiness, but no resistance, either.

Use two more T-bolts and star nuts to secure the sled on the runway. Then clamp the runway assembly to the rotating fence so that the router chuck is visually centered in the opening in the fence and the top is parallel with the top of the fence. Secure the runway to the fence with

four 2" countersunk screws driven through the fence, and four 1 3/8" long screws driven through the runway face.

Adding Precision with X-Y Tables

While the horizontal router table is now fully assembled and operable, you can transform it into a precision milling machine by adding one or more pairs of X-Y sliding tables.

An X-table slides from left to right across the router table. A Y-table slides toward and away from the

fence. If you control their travel (and thereby control the length of cuts) with stop blocks, there's no limit to what this machine can do.

Begin by making a universal base. This attaches to the router table with a couple of T-bolts and star nuts and can be moved left or right to expand the options with your tabletop: it lets you place jigs, stops or hold-downs exactly where you need them.

The first part of the universal base is a plate (piece 27), cut to size from

3/4" MDF. It should be exactly the depth of your router table, so place it on the table snug against the fence and mark the bottom edge where it overhangs the front edge of the table. Trim to this width, then edge band the ends and back of the plate and trim the excess tape.

Mill a T-slot across the plate's top surface at the location shown in the *Drawing* at left. Then switch to a 1/2" straight bit and rout a through stopped groove that lines up above the three T-nuts you embedded in the router table. Attach a hardwood cleat (piece 28) to the front edge of the plate with glue and clamps. Screw a hardwood guide (piece 29)



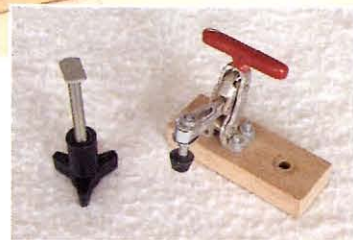
Figure 5: In the underside of the Y-table, a screw and washer in the hardwood guide run in the T-slot of the X-table to control lifting.

to the bottom face, lining it up with the miter gauge slot in the router table. Four countersunk screws will secure it.

Cut the X and Y-tables (pieces 30) to size and band all four edges. Plow a dado across the bottom face of the X-table, making it the same width as the smaller dimension of the T-slot you made in the universal base plate.



Figure 6: A hold-down clamp, secured by a T-bolt and star knob, keeps the workpiece tight against the fence of the Y-table, while a straight bit mills a tenon on the end of a cabinet rail.



Install a hardwood guide (piece 31) in the dado with glue and clamps. Attach a washer and screw (pieces 32 and 33) to the bottom of the hardwood guide, as shown in **Figure 5**: this will lock into the T-slot and prevent the X-table rising unexpectedly during milling operations. Then plow a T-slot in the top face of the X-table at the location shown on page 62.

Plow a T-slot in the top face of the Y-table at the location shown in the drawing, then plow a dado in the bottom face and install a hardwood cleat, screw and washer. Attach a hardwood fence (piece 34) on top of the left edge of the table, using countersunk screws driven up through the table.

To clamp workpieces to either table, I made up a clamping block. This is a short length of hardwood (piece 35) with a hole drilled in it for a T-bolt and star nut (see **Figure 6**). Bolt a T-handle clamp (piece 36) to the hardwood block.

I've built several other specialty tables and jigs for this machine. For

example, I made some long X-Y tables to help me handle edge-milling on long boards, such as chopping mortises in cabinet frames. And I made a special jig for milling mitered ends. You can see photos of these online at *Woodworker's Journal eZine* Web site.

John English is a contributing editor with Woodworker's Journal.

Once he realized how often he used his vertical router table, the author built a cabinet for it to save on bench space.



Woodworking at Home

Save steps and keep the kitchen clear of gawkers' traffic with this slick two-way drawer solution. Once you see how easy it is, we bet you'll find many uses for this ingenious sliding shuttle system.

By Ralph Bagnall

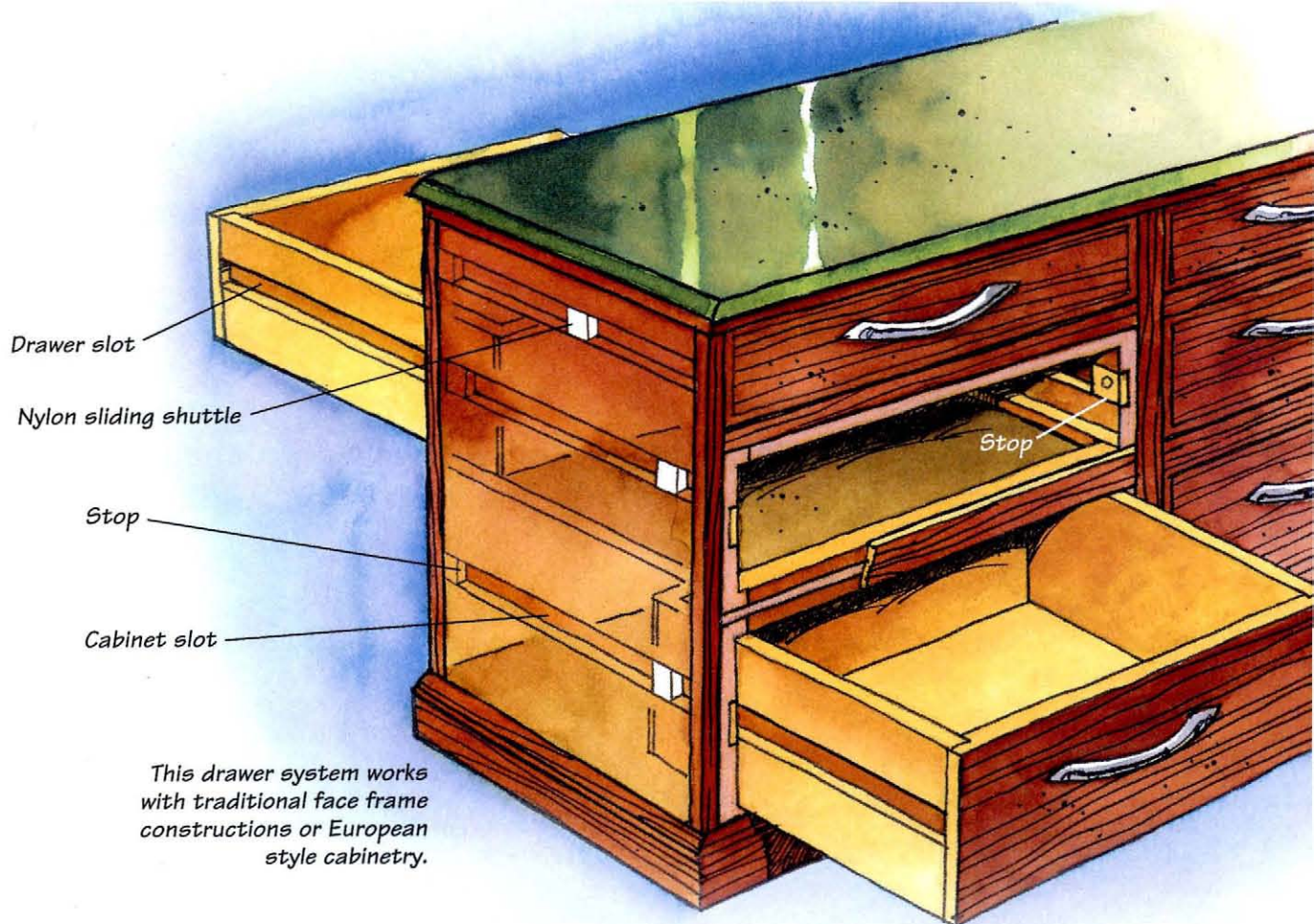
One of the goals in remodeling the kitchen in our home was to minimize unnecessary traffic flowing through the work area. The way my house is built, a counter separates the kitchen from the dining room: two rooms with separate tasks that still share some of the same "tools," if that's how you want to think of the silverware and dishes.

An Idea is Born

The idea I had to deal with this situation was to create a "double drawer" in the counter cabinets. Unfortunately, I wasn't able to come up with a way to make it have double the storage space inside as it does outside — the laws of physics can only be violated in "Dr. Who" reruns — but I was able to create a drawer that opens from either side. Someone in the kitchen can open the drawer from that side and stow the flatware and dishes away directly from the dishwasher, and, when it's time to set the table, there's no need for young helpers to "spoil the broth" as they get underfoot of the cook in the kitchen. Now they simply pull out the drawer on the dining room side for their table setting supplies.

Shuttle Technology

The "secret" to the success of this plan is a simple pair of nylon shuttle blocks. Made of a clear, self-lubricating material, they'll work with whatever wood and finish you choose — and, if you don't know they're there, are hardly visible, so you can impress your friends with your "magic" drawer.



What these shuttle blocks actually do is to ride in the drawer slide grooves and, when the drawer is at its full extension — in whichever direction — the little invisible block stops it from pulling any farther out. In other words, your shuttle, when it comes to the end of the groove, quits moving — and so does your drawer.

I milled a 1" wide, shallow slot that the drawer rides on (supported by the shuttle) as it travels back and forth — I used 1/4" as my depth, but it's not really critical — and then you have a matching 1" wide slot for the shuttle block in the walls of the cabinet. (See the *Drawing*, at right.) The critical measurement is that this depth of the cabinet slot must hold the shuttle 3/16" into the drawer slot to provide a proper fit for the shuttle. It's also important that both of these slots be straight and true for the drawer to operate properly. To finish up, a 1" x 1" wooden stop (as thick as the cabinet slot is deep) is secured (with a single screw) into both ends of each slot after the drawer is mounted in the cabinet.

The author's solution to a "traffic flow" problem saved the day in his household. How and where you will use this double-drawer slide system is up to you.

Style and Substance

You can apply this idea to drawers in many styles, whether those with a face frame or European cabinetry styles. It's the innards that count, not the outward appearance, so the basic idea will work in a kitchen of any style. It does help if your stock is well-seasoned, properly dried hardwood of a straight grain.

A point of style that is also a point of function relates to the finish you apply. Whatever you choose, make sure your finished finish is as smooth as possible: that way, your drawer will operate smoothly as well. A coat of bowling alley wax applied to both the slides and the drawer slides will also keep your drawer functioning smoothly.

More Options

In my kitchen, only one cabinet was equipped with these drawers. The door on this cabinet is full height, but has a false drawer front to maintain a uniform appearance with the rest of the cabinets.

In your kitchen — or, for that matter, in whatever room you wish to apply this idea — you can, of course, design one or many drawers of this style.

Such a system can be a solution to a problem or simply an addition to your style choices. This "double drawer" is easy to make, but impressive to use.

Ralph Bagnall is a New England woodworker and frequent contributor to Woodworker's Journal.

Jointing with a Router

By Carol Reed

Carol Reed, alias “The Router Lady,” creates a jig that makes squaring up an edge a snap. And when you’re done, the whole thing stores quickly and easily on a wall.

Want a jointer in your shop? Most of us do, but not all of us have enough floor space or a big enough wallet. However, if you have a router, almost any size, you can make a jointing jig that in my opinion does some tasks better than a “real” jointer.

The secret is a spiral-flute router bit that, unlike the knives of most conventional jointers, produces tearout-free jointing on squirrely grained or bird’s-eye figured wood. Even if you do have a jointer but often work in these lovely but difficult to machine woods — especially in smaller dimensions — a router-jointer jig will consistently create a smoother surface. The router-jointer jig also allows you to joint clean plywood edges and other composite or even plastic materials, a task that can quickly dull the knives of a conventional jointer, especially if the plies are bonded with a hard glue.

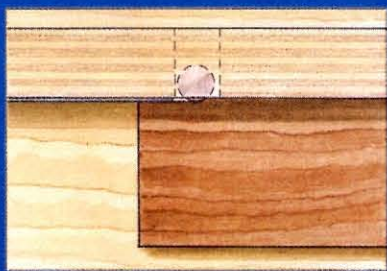
A conventional jointer will perform two operations. The most common operation is edge jointing. The other is face jointing. Many of us only edge joint because we buy our wood already surfaced (face jointed). This router jointer jig will yield smooth, accurate edges — safely, comfortably, and consistently — for the price of a long spiral bit and a few square feet of plywood. The jig has four components: a router, a spiral flute bit, the table and the fence. Ideally, the router should have a 1/2" collet because larger diameter bits run smoother and make

cleaner cuts than smaller diameter bits, assuming that speed of bit rotation and feed rate are the same. However, since the amount of stock removed is so small, a junior version could be made with a router with a 1/4" collet. This limits the thickness of the wood to be jointed to stock less than 3/4", but if you are a box maker working in thinner woods, this may be just the ticket for you.

The bit of choice has spiral flutes. Because the cutting edge of the bit’s flutes are in continuous contact with the wood and presented to the wood at an angle, a chatter-free, smooth edge is always produced. Just as

in hand planing, presenting an angled cutting edge to wood fibers produces a cleaner edge. An additional benefit is that the bit runs cooler, thereby staying sharp longer.

Spiral-flute router bits, now widely used in woodworking, were inspired by spiral-flute bits, called end mills, long used by machinists for metalworking. The router bits come in three configurations: upcut, downcut and compression. They are available from many woodworking supply stores and web sites. I use an end mill because I already have one on hand for mortising operations, but an upcut router bit would work just fine. My end mill is 3 1/2" long, 3/8" diameter, two-flute right-hand twist. Its cutting length is more than adequate for most edge jointing.



When you use a traditional jointer, the two beds of the tool offset to accommodate the depth of the cut you are making. On this jig, it is the fence that has the offset built into its design.

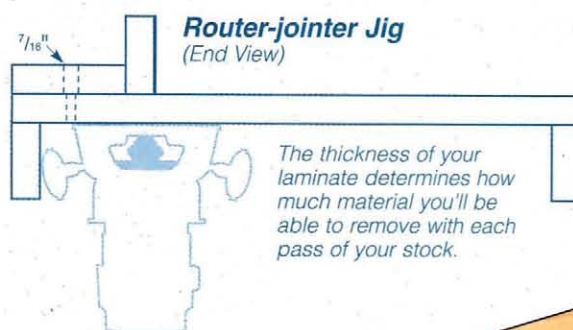
You create that offset using the thickness of the plastic laminate on the outfeed side of the fence. This same thickness determines the depth of cut.



MATERIAL LIST

	T x W x L
1 Table (1)	3/4" x 15" x 60"
2 Table Rails (2)	3/4" x 2" x 60"
3 Fence Face (1)	3/4" x 2" x 60"
4 Fence Bottom (1)	3/4" x 3" x 60"
5 Plastic Laminate (1)	1/16" x 2" x 33"
6 Star Knobs (2)	1/4" x 20

Additional Hardware: One each: 1/4" - 20 x 2 1/2" carriage bolt, 1/4" - 20 x 3" carriage bolt and two 1/4" fender washers.



The thickness of your laminate determines how much material you'll be able to remove with each pass of your stock.



Jig Design Considerations

The jig's table and fence are made so they may be stored by hanging on the wall or shelved when not in use.

An examination of a dedicated jointer's construction shows two flat surfaces — a split table and a fence — perpendicular to one another. It's true that a jointer's fence can be tilted, but since it is most commonly used with the fence at 90°, our router-jointing jig will be constructed to produce only 90° edges. The dedicated jointer has an infeed table and an outfeed table, separated by a cutterhead that rotates in a horizontal plane. The knives are set so they are exactly level with the outfeed table at the top of the cutting circle. The depth

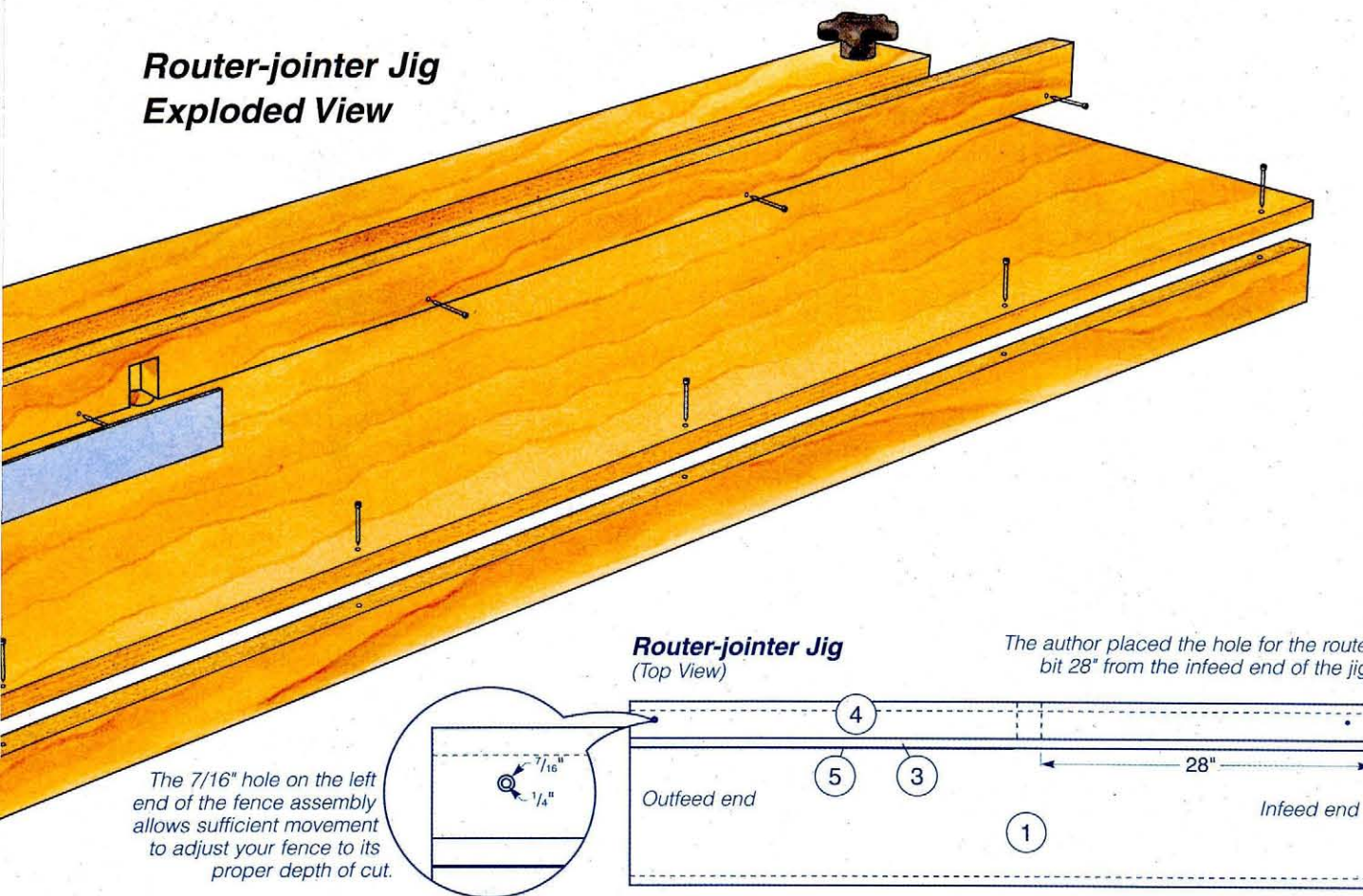


of cut is variable and is determined by adjusting the infeed table up or down.

The router-jointer may be seen as a modified jointer stood on its side. Its fence serves as the infeed and outfeed surfaces, and the bit rotates in a vertical plane. In the case of our jig, the depth of cut is fixed. The beauty of this configuration is that wood to be edge jointed

Mark the router base mounting holes by clamping the sub-base in the desired location and tapping the properly sized transfer punch with a small hammer. This impresses a small dimple in the exact center of the hole. Countersink the hole on the top side of the table.

Router-jointer Jig Exploded View



is moved past the cutter with its wide side face down on the table. I find this is much more comfortable and controlled than standing the wood on its edge and moving it past the cutter supported only on its edge.

To create infeed and outfeed surfaces on the one-piece continuous fence, I glued a piece of high pressure laminate (Formica® is a common brand name) to the outfeed side. The thickness of the laminate determines the depth of cut. Laminate is commonly found in thicknesses of about 1/32" or 1/16". This shallow cut removes just a small amount of stock, which is perfect for exceptionally squirrely-grained (twisted or wild-grained) woods.

The router is mounted on the horizontal surface, or the table, presenting the bit vertically. The upcut spiral bit or right-hand twist end mill exerts downward force, and actually helps to "hold" the work firmly on the table. This may sound contrary to common sense, but with the router mounted under the table, it is essentially upside-down, so an up-spiral bit or right-hand twist end mill is the proper cutter. Do not use a downcut spiral bit. It would work against you and might even lift the wood off the surface of the table.

The typical length of a small conventional jointer is 48", with the knives in the middle of the table. That presents about 24" on either side of the cutterhead. I like a longer

infeed surface and an even longer outfeed surface. Depending on the material used to construct this jig, you can make it as long as you wish, within reason.

I opted for a 5' long jig with the router positioned 28" from the infeed end. For my material, I selected 3/4" Baltic birch plywood (which comes in 5' square sheets, very convenient!). It is an ideal jig-making material as it's a high quality lay-up, with more plies per unit of thickness than standard plywood, and it has no voids. It's also much lighter than MDF or melamine. Since this jig is intended to be stored when not in use, weight is an important consideration.

Downward force on the table and sideways force on the fence is exerted when jointing, so the jig must be firmly secured while in use, to effectively oppose those forces. The most stable item in my shop is my bench. I simply clamp one end to the bench and the other end to a shop stand. For purposes of photography, I used a pair of sawhorses instead of my bench and a stand. This works well, but is a little low for my back. Choose the place to use your router-jointer based on a flat, sturdy surface that allows the router-jointer to be securely clamped and at a height that is comfortable for you. Remember that the router hangs down from the bottom of the table, so the jig cannot simply rest on your bench.



Spiral-flute bits produce superior cuts in a wide range of materials because their cutting edges are in continuous contact with the workpiece, slicing through the wood fibers at a shearing angle. In contrast, the cutting edge of a straight-flute bit contacts the workpiece intermittently and cuts into the entire width of the workpiece at a right angle. If the depth of cut and feed rate remain the same, more flutes will produce a better cut. That's why many woodworkers use end mills, a type of spiral-flute bit popular with machinists. They are commonly available with four flutes — and longer flute lengths.

Start the Jig Construction

There are two parts to make; the table and the fence. The width of the table is determined by the amount of desired work surface, plus the diameter of the router base and the overhang for the clamping system. Eight inches of work space is adequate for me. My router has a 6" diameter and I want at least 6" of overhang ... anyway, I ended up at 15".

Rip the table to its width and then measure 28" from the right end and $3\frac{3}{4}$ " in from the back edge for the router bit hole. Mark and drill the holes to mount the router base at the location of the router bit hole. Mount it so the tightening system is facing the front. Drill a $1\frac{1}{2}$ " hole for the router bit, and chamfer both sides.

Now rip the two rails to exactly 2". Make the cuts dead straight or the router-jointer jig will be twisted when you clamp it down, and you won't be able to edge joint at 90°.

Attach the rails to the bottom of the table with glue and brads. Be sure to countersink the brads so they can't mar the wood being jointed. Use a block plane to slightly chamfer all the edges to make the jig "splinter-free."

Rip the fence bottom and fence face. Mark the router bit recess at 28" from the right end and $1\frac{1}{8}$ " up from the bottom edge. Drill a $5/8$ " hole. Mark two lines tangent to the hole and perpendicular to the bottom edge. Carefully saw along the lines creating the U-shaped bit recess. Sand the sharp edges smooth.

Drill a $1/4$ " hole 2" in from the right end of the fence bottom and a $7/16$ " hole 2" in from the left end (for fence adjustment). See the *Drawings* on the previous page for details.

Glue the fence face to the fence bottom. I used brads to hold the two pieces while the glue dried. Again, be sure to countersink the brads. Glue a piece of high pressure laminate to the outfeed surface, extending from the bit recess to the end. Flush trim the laminate so no edges extend beyond the fence edges. Freshly cut laminate can slice your fingers, so file the edges smooth

to ease any sharp corners. Place the fence on the table in its proper position and use a pencil to mark the spots where you'll drill $1/4$ " holes for the carriage bolts.

Using the Jig

Fasten the router base to the bottom of the table. Install the cutter in the router. Raise the cutter to extend above the thickness of the wood you'll be jointing. Flip the table over and clamp it down. Now turn the bit until a flute is presented to the widest cutter arc. Tighten the fences' right knob, then rotate the fence forward so the bit is fully inside the recess. Place a straightedge firmly against the outfeed surface and carefully rotate the fence until the emerging bit just touches the straightedge. Tighten the left knob to lock the fence into final position. Because this setup guarantees that the cut equals the thickness of the laminate, the edge of the workpiece will be fully supported by the fence during the entire cut as it passes from the infeed surface to the outfeed surface, and the edge will be straight.

With the router on (use eye and ear protection), place the wood face down on the table and move the wood from the right to the left against the fence. At the start of the cut, hold the wood firmly against the infeed surface, gradually shifting pressure to the outfeed surface as the cut progresses. Repeat the operation until the edge is completely jointed. Try a test cut for straightness, and check for square as well. Squareness is not usually a problem because it depends on the router base and its relationship to the bit. If it is a problem, check that the base is firmly attached to the table bottom. One other point: if the face of your stock is not flat or is out of winding, your edge will be out of square ... it is always best to check, just to be sure.

Carol Reed is a teacher, a furniture designer and the author of Router Joinery Workshop, available from Lark Books.

The author checks out a tight, clean joint machined on her router-jointer jig. No muss, no fuss.



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Festool's High-powered Router

High power, low weight and constant speed are some of the features you'll find in Festool's new OF 2000 E Router. It exhibits 3½ HP of actual — not developed — power, almost all of which is transferred to the bits rather than being dissipated by vibration.

Heavy-duty construction belies the 11.2 pound weight, while electronics keep the 12,000 - 22,000 rpm speed constant once you set it and also give you smooth starts. The OF

2000 E has a 1/2" collet and a fiber baseplate to help prevent scratching on the material. You can set the routing depth to an accuracy of 1/256" (1/10 mm). Angled handle placement offers an easier hold, and you can also operate the on/off switch and plunge locking lever without taking your hands off these handles. The OF 2000 E comes with an 8 mm collet, 30 mm copying ring, M12 to 1/2" adapter, dust hood, side stop and an adjustment wrench, all within one of Festool's storage Systainers. It's priced at \$450. *For more info, call 888-337-8600 or visit www.festool-usa.com.*

Microplane Rotary Shaper

Want to make some fine cuts and get your sanding done at the same time?

The Microplane® Rotary Shaper Drill Attachment is a new option for your drill press that acts as a small shaper, but also cuts so fine that it's as if you're sanding while you cut.

The new 2" model (soon to be joined by a 1" version) has an improved, round shape featuring small holes that intermingle with the drill teeth for a finer edge. You'll get no clogging from cuts made with this attachment.

The 2" Microplane Attachment sells for \$14. *For more information, call 800-555-2767 or visit www.microplane.com.*





Black & Decker's Dragster Belt Sander

Vroom. Vroom. No, it's not drag racing. It's drag — sanding? Patterned after the low profile of dragster race cars, Black & Decker's 3" x 21" Dragster belt sander offers the means of getting speedy sanding in narrower places than before.

Pop the hood and expose the top of the belt to sand with three sides — the top, front end and bottom of the belt — in out-of-the-way places like under chair backs, along the fronts of dressers and inside curved woodworking projects. Or, just use that retractable locking hood function to sand with the front of the belt's curved surface for contouring and shaping.

The low profile front roller hugs the ground and sands more surface area, closer to vertical surfaces like baseboard, than standard belt sanders. The Dragster's sleek design also means you can sand between spindles or other narrow spaces.

Put the Dragster in the right gear for your project with the three-position adjustable locking handle. When you rev up it up, you'll find a 6 amp high performance motor that reaches sanding speeds of 800 feet per minute.

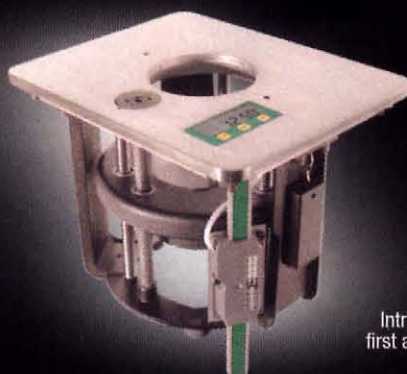
Street price of the Dragster is about \$70. For more info, call 800-544-6986 or visit them on the web at www.blackanddecker.com.



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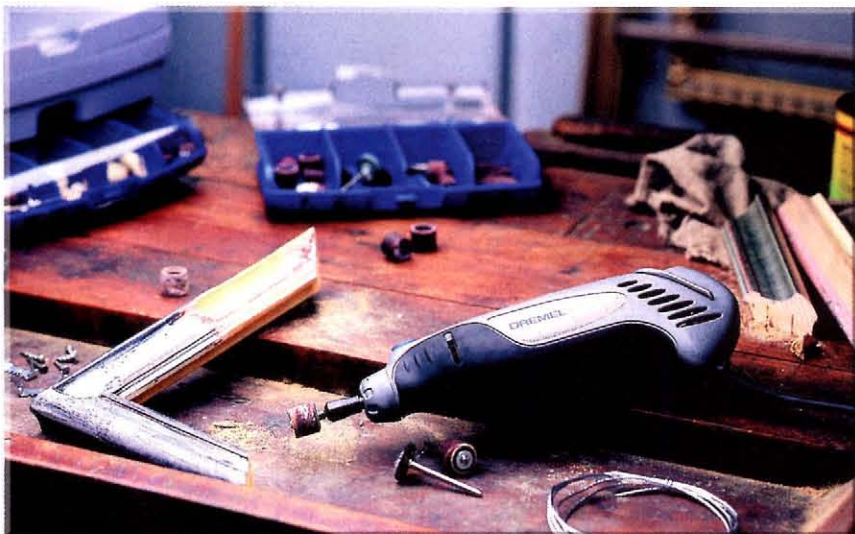
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I. Total	298,248	308,099
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16. This statement of ownership will be printed in the November/December 2004 issue of this publication. I certify that the statements made by me above are correct and complete. Larry Stoiakien, Editor in Chief - 09/13/04.

Dremel's Next Generation Now Available

Dremel's 400 Series XPR is "the next generation" in rotary tools. A permanent magnet type motor allows the 400 Series XPR to maintain its full motor performance at both high speed (for routing) and low speed (for precise cuts and intricate projects). You set the speed of the tool with a numbered speed control dial, separate from the on/off switch, which goes from 5,000 to 35,000 rpm. Stop and start the tool at the same speed setting—there's no need to change the dial again or to work back up to the speed you wanted.



The Dremel 400 Series XPR accepts all attachments and accessories from previous versions of the rotary tool, and comes with two new ones. (The new attachments don't work on the previous tools.)

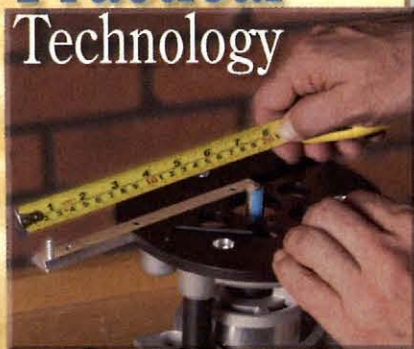
The XPR Planer allows you to produce a smooth surface on materials up to 2 1/4" wide. The cutting bit comes with a 90° fence guide to ensure square and uniform cuts.

The XPR MultiSaw attachment reaches cutting speeds up to 3,900 strokes per minute and can cut

material up to 1 1/2" thick. A pivoting foot provides control, stability and a tight turning radius to cut scroll patterns, while visual sight markings aid in making straight cuts. The universal blade holder accepts standard U- and T-shank jigsaw blades.

The 400 Series XPR also comes with a newly redesigned storage case with snap-in containers for additional accessory kits. It's priced between \$80 and \$100. *For more info, call 800-437-3635 or visit www.dremel.com.*

Practical Technology



The Multi-Function Router Base Plate and Circle Jig is Practical Technologies' "practical" answer to a circle-cutting jig. Its infinitely adjustable Edge Guide and Circle Jig can cut perfect circles from 2" to 19" in diameter, while its footprint is only 7". Designed to work with major brand plunge routers, it accepts Porter-Cable type template bushings or can be used without any attachment as a conventional base plate: no need to change base plates when changing jobs. You can cut either a hole or a wheel with this Base Plate and Circle Jig, which sells for \$50. For more info, visit www.practical-technologies.com.

Ryobi goes quiet on dust

Smooth adjustment — and silent dust collection — are two key features in Ryobi's new benchtop BS1001SV 10" Band Saw with Silent Vac™ dust collection.

A radial fan in the lower wheel of the 1/2 HP band saw creates a gasket-sealed, 98 percent efficient, dust collection system that pushes dust into the included dust bag and makes no noise beyond that of the saw itself.

Rack-and-pinion blade-guide height adjustments contribute to the smooth operation of the saw whose 10" throat allows it to cut sizeable tasks at a 3,000 rpm rate. Independent upper and lower ball bearing blade guides and an illuminated blade-tracking window which lets you watch the blades it accommodates — up to 1/2" wide — are also part of the saw's features.

Weighing 82 pounds and selling for approximately \$200, the BS1001SV's table tilting saw table expands to the right of the blade for an 18 1/2" cutting capacity. A heavy-duty rip fence with scale indicator eliminates the need for outfeed support.

For more info, call 800-525-2579 or visit www.ryobitools.com.



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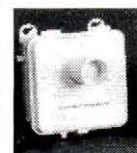
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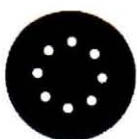
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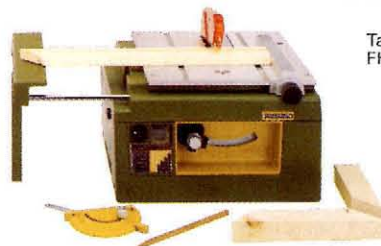


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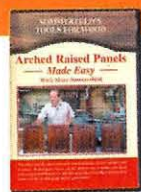
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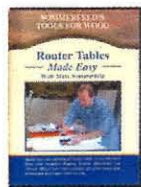


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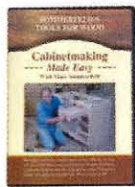
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Three Unusal Router Accessories

By Bill Hylton

Tired of humdrum and run-of-the-mill router add-ons? Here are three accessories that are anything but ordinary.

Every router user has some favorite gizmo or doodad that, for them, expands the utility of the woodshop's most versatile power tool. And every router user is on constant alert for seductive new router gadgets.

I've got shelves creaking under the weight of router jigs, fixtures and accessories. Some I built myself; others I bought. A few I use on a regular basis, while others are primarily supplements to my shop-wide, low-tech dust collection system.

Most router gizmos are modest. In size, if not in cost, devices like edge guides are small, though they have a myriad of applications.

Every now and then, some router-oriented Godzilla crashes down the shop door. Look at me, look at me! I'm big and flashy. I break down barriers. I cost a lot and do a lot. Pay me some attention.

Three of these rout-a-zillas forced their way into my shop recently, taking up space, making noise and sawdust, demanding my attention. All were intimidating at first, but once I got to know them, each turned out to be a top-flight helper in the shop.

The Leigh FMT

The Leigh Frame Mortise and Tenon Jig (FMT) is the least ostentatious of the shop invaders.

It does one job — it enables you to cut mortises and tenons with a plunge router. What's unique about it is that it produces mortises and perfectly matched tenons with the same basic setup. Because the mortises are routed, they have rounded ends. But so do the tenons!

The trick is in the template that guides the router. With the guide pin in the slot inside the template, the router cuts the mortise. The template slot only allows side-to-side movement of the router, so the mortise width is determined by the diameter of bit you use. With the guide pin sliding around the perimeter of the template, the router cuts the tenon. The template's outside dimensions and shape are tailored to produce a matching tenon — with rounded ends — using the same bit.

Legacy Ornamental Mill



Both the edge of the template and the shank of the guide pin are tapered. By altering the depth of the pin, you change the sizes of both the mortise and tenon that are formed. You can adjust the fit in thousandths of an inch.

How easy is it to set up and use? Simpler than Leigh's dovetail jig, in my opinion. The jig, with a basic assortment of templates and an up-spiral bit, arrives in a single carton. There's little assembly to do, and what there is, is explained in the manual.

The biggest chore is mounting your plunge router on the oddly shaped subbase. There's a way to mount just about any brand or model; you simply have to identify the method to use for your particular router.

The jig itself is very reminiscent of the common "mortising block." The top and face are at right angles to each other. The face has movable, adjustable clamps to hold the workpiece in whatever orientation is needed.

On the mortising blocks I've made, the top surface supports the router, and there are guides and stops to control its movement. The top of the FMT is actually a separate piece, and it plays a sophisticated role on the unit's operation.

The big cast aluminum plate overhangs the face of the jig, and it has a window through which the bit projects when cutting. The top slides fore and aft, as well as left and right. It has stops built in so you can trap it in one position or move it back and forth between two positions (for twin or double or quadruple joints). It has a built-in, retractable sight to simplify positioning the work and aligning the top for the cuts.

Sounds complicated, right? Not so. When you have the device in front of you, and you have a specific joint to cut, the operation is logical and progressive.

First of all, you only move the top when setting up. When you are making a cut, the top is fixed. Only the router moves, and it is confined by the template and guide pins.

Work to be mortised is tucked up against the underside of the FMT top, with the mortise site exposed in the bit window. A piece to be tenoned is held vertically against the jig face, its end directly under the bit window. In both cases, movable toggle clamps hold the workpiece.

The only layout necessary is a crosshair to delineate the exact center of the mortise or tenon.

(The dimensions of the joint are determined by the template and bit.) As you clamp the work in position, line up the crosshair under the retractable sight.

Select the proper template, and snap it into place in the jig top. Fit the proper bit in the router, and set the plunge depth stop. Set the router on the jig, with the right guide pin in the fixed guide slot on the right side of the jig top. If you are doing a mortise, the left guide pin must be in the slot in the template. If you are doing a tenon, that guide pin must be outside the template, so it can ride around its outer edge. Make the cut.

The settings of the router and jig are the same for either cut. Only the clamp positions change.

If you want to cut twins or doubles, you use the top's stop system.

All these operations, as well as cutting a triple joint, joints longer or shorter than "permitted" by the templates, angled joints, offset joints or haunched tenons, even boring dowel holes, are covered in the manual.

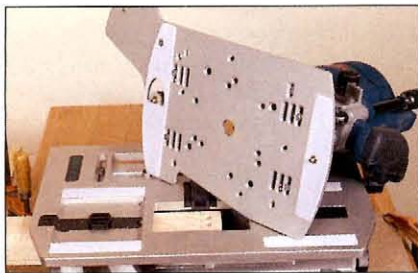
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WoodRat

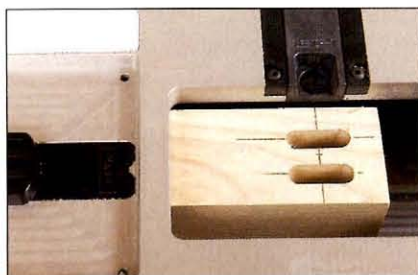


Leigh FMT

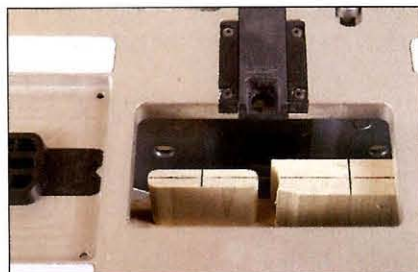




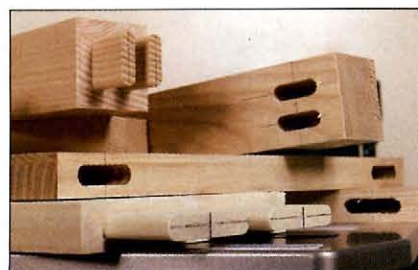
Stable footing for the router is provided by the Leigh FMT's oversized subbase. But it also incorporates two tiny guide pins — roughly centered in the light gray Teflon® pads — to control the movement of the tool.



Twin mortises can easily be cut with Leigh FMT's router accessory.



Shift the jig's top from side to side when cutting double tenons. Here, the first tenon has been cut and the top is being moved so the second can be cut. The sight isn't needed, because the top's stops were set before starting to cut.



A sampling of joints cut using the FMT includes a single mortise and tenon, surely the most commonplace form, as well as a twin mortise and tenon suitable for post and rail constructions, and a double joint, used with wide stiles.

WoodRat

The next of my shop's invaders turned out, once I got used to it hanging on the wall, to be a very practical joinery cutter.

Woodworkers are always on the lookout for easier, faster, more accurate — and, yes, more foolproof — means of cutting joints. The router is a great tool for this work, but each joint usually requires a different setup, a different jig — router table, dovetail jig, mortise and tenon jigs and on and on.

Though fairly expensive (about \$700) exclusive of the router and bits, the WoodRat might be what you're looking for. It cuts dadoes and rabbets, sliding dovetails, mortises and tenons, laps, through and half-blind dovetails and box joints.

But what is it? you ask. It's a mounting for a plunge router that gives you a range of movement in three axes.

As much as 40" of side-to-side movement is provided by an extruded aluminum beam assembly that's hung on the wall. The main channel fixes the unit, providing a reference point for all the movement. Nested into the face of the channel is the sliding bar. Two parallel vertical fences, each

opposed by an adjustable cam clamp, enable you to secure work to the sliding bar, and a crank and cable mechanism allows you to move the sliding bar left and right, taking the work with it. This is the first axis of movement.

The router itself is mounted on a plate that's attached to the top of the channel and cantilevers over its face and the sliding bar. This complex mounting can be shifted in and out and raised slightly (using shims), and it can be twisted left and right. The router can be immobilized or allowed to slide fore and aft. This is the second axis of movement. The router's plunge gives you a little vertical movement, the third axis.

Tool Review continues on page 84 ...

Leigh Frame Mortise and Tenon Jig

Function: Cuts mortises and tenons

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TOOL REVIEW

How does all this go to work for the woodworker? Depends on the operation.

Notable is the 'Rat's function as a duplicating machine, used in cutting dovetails and box joints. What this means is that you use the WoodRat's controlled side-to-side movement to "follow" a pattern and duplicate it.

Trace a sample cut made with the bit in use directly on the beam; this tracing is "The Mark." Then you clamp a pattern — marked for the cuts you want — in the cam clamp below it. When you move the sliding bar to align individual cuts on the pattern with The Mark, you are, at the same time, also moving the workpiece secured in the cam clamp just below the router.

Once the pattern mark is aligned, pull the router to cut the workpiece. This makes repeated cuts — like those box joints — easy. More than that, it enables you to vary the cut width and cut spacing. An asymmetrical or completely random layout is easily duplicated.

Blend in the ability to angle the router, and you can produce dovetail



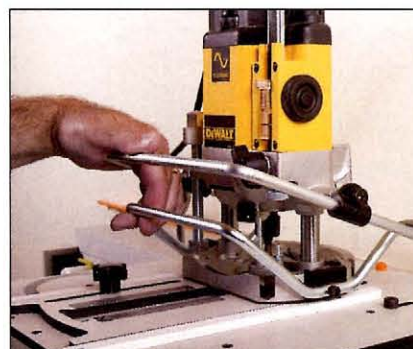
The plunge router, mounted on the router plate and equipped with the PlungeBar accessory, sits on the base plate. It can slide fore and aft, pivot or be locked down.



The spirals flanking the router plate control the angle. Twist the router against the spiral and slide it forward, then back to make a cut.



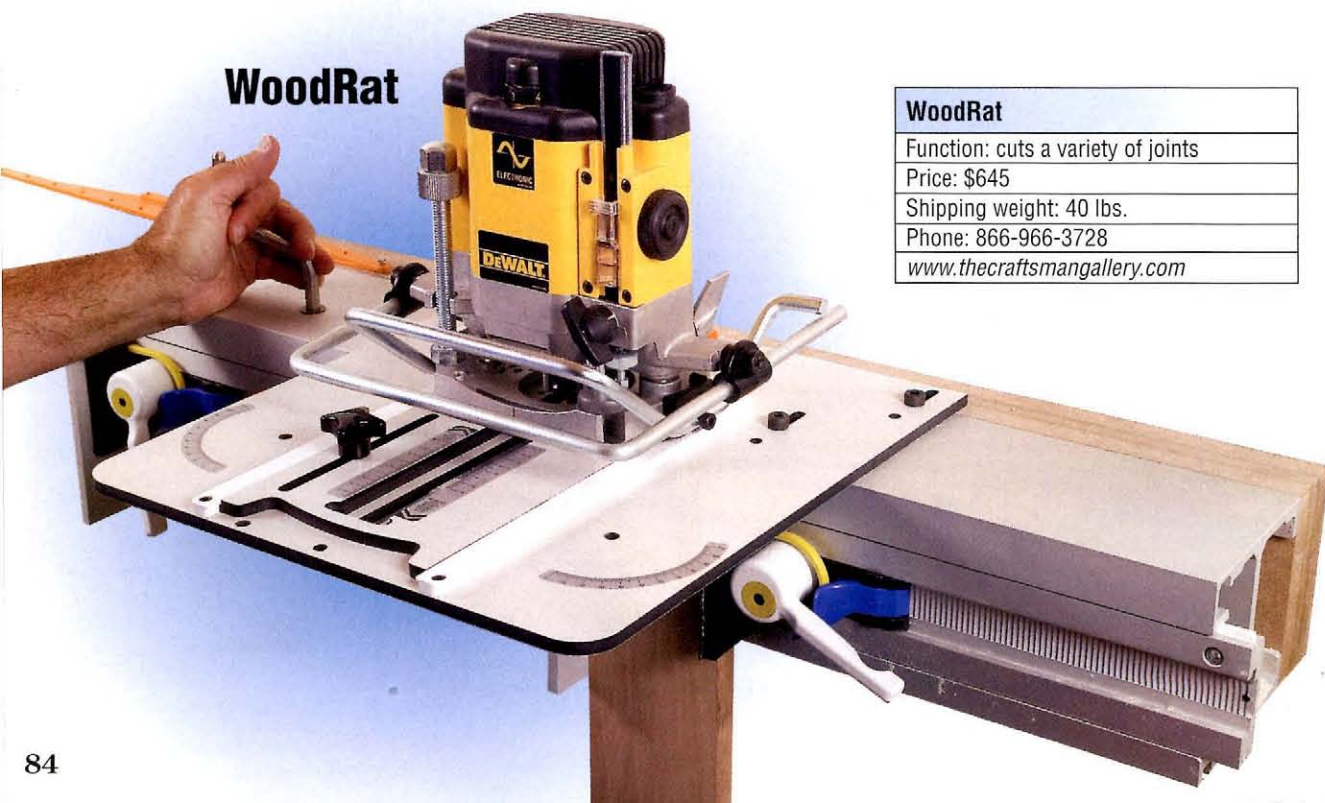
To dado with the 'Rat, you tuck the workpiece up under the mounting plate and use "the brush" to hold it. Once the piece is aligned for the cut, apply a clamp to secure it to the plate.



The PlungeBar accessory, available for most plunge routers, enables you to plunge the router with one hand.

Tool Review continues on page 86...

WoodRat



WoodRat

Function: cuts a variety of joints

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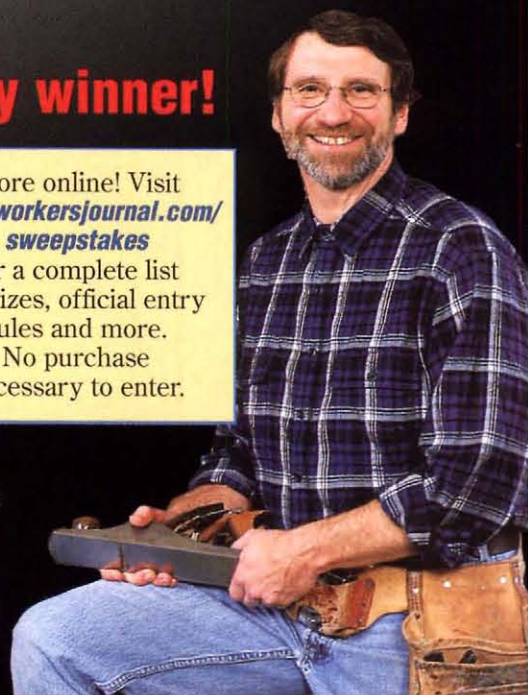
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TOOL REVIEW

pins of any size or taper. To enhance this capability, use the WoodRat narrow-neck high-speed steel dovetail bits. The joints you cut with them come closer to a hand-cut look than any other setup I've used.

The 'Rat doesn't stop at that, of course. For routing grooves or profiling edges, the 'Rat simply immobilizes the router and serves as a guide. You position the work against the beam, tight against the underside of the base plate, and you feed the workpiece through the cut. It's like an upside-down (and thus somewhat inconvenient) router table.

Alternatively, you can power-feed through such a cut, provided the workpiece is under 30" long. Capture a carrier bearing the workpiece in the two cam clamps, then crank the sliding bar through its range of travel. Using this approach you can mortise and groove stiles and

groove rails for doors and other frame-and-panel assemblies.

Enlist that same power-feed capability to rout tenons, tails for sliding dovetails and half-flaps.

For routing dadoes and sliding dovetails in workpieces up to 9" wide, you clamp the board to the underside of the base plate, then pull the router through the cut. Aligning the cut is a cinch with a centering gauge, and you can see the cut being made.

Regardless of the operation, the WoodRat approach is just a little bit different. If you have ways of cutting specific joints, or doing specific operations, you may have to revamp your mindset to thrive with the WoodRat.



A large router isn't really required for milling stock, routing turnings and spirals, cutting flutes and beads. The 2HP model 1 used worked fine.

This gizmo is well-made, versatile, and reasonably easy to master. Just don't start with dovetails.

I had two problems with the 'Rat: the documentation and bit changing.

The manual is written in British English (it's a British product), and

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“Woodworkers are always on the lookout for easier, faster, more accurate — and, yes, more foolproof — means of cutting joints.”

— Bill Hylton

I just didn't understand some of it. Too many salient details are glossed over. The DVD demo is nice, but too often it shows the bit cutting rather than what the operator is doing to direct the cut. The U.S. distributor, The Craftsman Gallery, has improved instructions posted on its web site (www.thecraftsmangallery.com), and according to Lewis Stepp of the Gallery, a new manual should be available when you read this.

With the router positioned on the 'Rat, changing bits takes three hands — one to keep the bit from dropping out of the collet onto the floor, and two to work the wrenches and/or spindle lock. I ended up pulling the router off the WoodRat and making the swaps on the benchtop.

A better solution would have been to use a Porter-Cable router fitted with an RC Eliminator chuck (the sort

favored by the Legacy folks). Too bad this excellent accessory isn't available for other router brands.

Legacy Ornamental Mill

This flamboyant red and silver behemoth takes over. Squatting on your workbench, it grabs your shirt — figuratively, figuratively! — demanding you to try it out. Spiral turnings, it says. Spiral turnings! And by that I mean spiral turnings

in virtually any size, any proportion.

That's the attention-grabbing capability of this tool. But it is far from the only thing you can do with it.

Primarily, it is a router-based turning machine that produces spindles — straight and tapered and contoured, with flat or rounded surfaces. It is

particularly good at indexed work, that is, spindles with evenly spaced flutes or beads parallel to the axis of the work.

Depending on which of the five sizes of mill you buy, you can produce batches of identical turned chair or table legs, balusters, bedposts, even architectural columns.

While you've got a spindle suspended in the mill, you can cut

Tool Review continues on page 88...

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joinery in it, such as mortises, sliding dovetail slots or ordinary grooves.

Covering the mill's headstock and tailstock with a flat panel enables you to use the mill for flattening and tapering stock, or for profiling and ornamenting flat material. Locate a pivot pin in this flat bed and you can use it to cut and profile rounds, like tabletops. Use a template and the mill's follower to cut duplicate parts.

There's more it can do, of course.

The Legacy Ornamental Mill is the biggest, most expensive, and maybe the most versatile of the router-based monsters that I tried.

The 900 model is the smallest of the mills that will do spirals. It'll take

spindles up to 9" in diameter and 48" long. Without a router or bits, the 900 costs more than \$1,000. Accessories like additional gears, expanded indexing plates, electric motors and various vises and supports, can more than double your investment. And then there's the router and all the bits you'll need.

The mill arrived in three cartons. Opened, the boxes yielded aluminum extrusions, steel channels, mysterious ... ahhh ... assemblies, steel gears and countless plastic bags stuffed with cap screws, washers, nuts, doodads and stuff. There's even a small pouch of grease for lubing shafts and bushings during assembly.

Assembly took several hours, and for me involved a couple of do-overs and two calls to Legacy's 800 number (one a Homer Simpson-esque D'ohhh!, the other prompting an overnight shipment of a new part). As daunting as that pile of parts and fasteners looked, assembly was not at all difficult. All the parts fit well; the

action and movements were smooth and precise.

The assembly instructions are very good, though they haven't completely kept up with the continuing evolution of the machine. Videos help you get started, but there is no operating manual. Fortunately, it is pretty intuitive to use. Too, it's the sort of tool that stimulates ideas. One application leads to another.

The machine consists of two nesting beds, bristling with gears and threaded rods and cranks. The inside bed has the headstock and adjustable tailstock. The outer one supports a carrier for a router, preferably a plunge router. The carrier can be moved from one end of the bed to the other (the X-axis), and from one side to the other (the Y-axis).

Obviously, the router's bit will work whatever blank is suspended between the headstock and tailstock.

The inside bed can be set flush and level with the outside one, or dropped as much as 5" below it, or tilted so the

Legacy Ornamental Mill

Legacy 900 Ornamental Mill

Function: Turns spindles

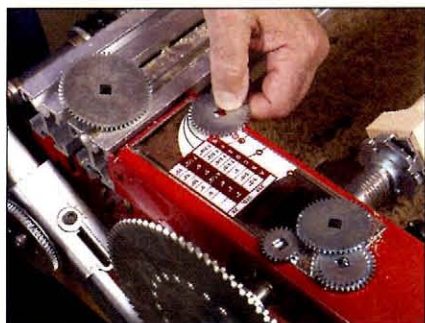
Price: \$1,195

Shipping weight: 95 lbs.

Phone: 800-279-4570

www.legacywoodworking.com





The distance the router moves per spindle rotation is controlled by the drive gear. Use the sizing diagram on the headstock to select from the seven drive gears supplied with the basic mill package.



Shaped turnings, such as this double-bobbin chair leg, are formed with the help of a template (on the far left) and the mill's template follower (mounted under the red plate over the template). Use a straight bit set to cut along the side of the blank.



With the inner bed lowered — here it's tilted — and covered with an MDF, the mill can be used to plane stock, cut profiles or rout flutes.

headstock is higher or lower than the tailstock. To turn a fat column or post, you drop the bed. To taper a blank, you tilt the bed. Pretty basic, pretty simple.

It's all those gears and rods and cranks that make the Legacy look complex. Their main collective function is to move the carrier (in a controlled way) as the spindle rotates.

Individual parts do other jobs. Some examples: You can mount a crank directly on the headstock to rotate the spindle. You can tighten stops on a threaded rod to lock the carrier in a specific position. You can use the index gear and the headstock's indexing pin to cut evenly spaced flutes.

To make a simple turning, mount the blank between the headstock and tailstock. Install a bottom cleaning bit in the router. Mount a crank on the spindle shaft. As you crank the spindle, push the carrier along the spindle axis. Chips fly. After a few passes, with the bit cutting progressively deeper, you'll have a round, smooth cylinder.

Rest assured that it's a lot easier to do than it is to describe.

To cut a profile around the spindle, you lock the carrier in position. Set up the router with the appropriate bit, plunge it to the desired depth, and back the carrier off-center, so the bit is clear of the spindle. Turn on the router, start cranking the spindle, and bring the spinning bit into the

workpiece. Keep cranking that spindle. Then back off the carrier to move the bit out of the cut.

There's no freehand. There's no fluid, let's-just-see-what-develops kind of creativity involved, as there is with spindle-turning on a lathe. That's both a blessing and a curse, I think. Your turnings must be mapped out on paper, so you can select the bits, locate the centers of cuts, and so on. If the spindle is to have curvature (other than balls and rings formed by a pass with a router bit), a template must be laid out and cut.

One benefit is that you can reproduce a complex turning exactly.

Oh, and did I mention that you can do spiral turnings? Turned spirals, also known as rope, twist, screw and barley-sugar turnings, traditionally are hand-carved. A master carver can invest hours and hours into these flamboyant works. The Legacy literally can turn them out in minutes.

To do them, you select and install the appropriate drive gear. Set up the router, and position and lock the router carrier onto the X-axis shaft. Bring the bit into the cut and start cranking. As the spindle rotates, the carrier moves along the bed, and the cut winds around the spindle.

You can mount any router on the Legacy, though a plunge router is the obvious choice. The Legacy folks favor the biggest Porter-Cable plunger, not least because it accommodates the RC Eliminator

chuck. This replacement collet assembly allows you to open and close the collet with an Allen wrench.

Surrender or Fight?

Is the FMT worth the big (about 800) bucks? How about the WoodRat? Or a Legacy mill?

That depends upon how deep your pockets are, and how badly you want to do the sorts of work these machines are designed for. All are well designed, and well-made. Support from the manufacturers is good; when you call for help, you get an experienced user of the contraption to help you solve your problem.

The Legacy is the only one of these rout-a-zillas that does unique work — those spiral turnings. But it is versatile and stretches your imagination.

The FMT does only one job, and it does it extremely well. But there are other ways to do that job. You have to decide whether you'll use mortises and tenons enough to make the FMT a good buy.

The WoodRat does few things that can't be done in other ways. Initially, the approaches seem contrary. But with practice, you can master the WoodRat, and it grows on you. It's actually the least costly of these rout-a-zillas.

Bill Hylton is a regular contributor to the Journal and author of Woodworking with the Router from Reader's Digest.

Shop Storage Solutions

By Chris Marshall



Wrangle clutter and create a more functional, safer shop with these nifty storage options.

Never mind those other resolutions you'll make next month about losing a few pounds or visiting the relatives more often. This time, why not set a personal goal you'll actually want to keep?

If your shop looks like a bomb hit it (and that's on a good day), maybe 2005 should be the year to get organized. There's a bounty of great products out there to help you clear the floor and turn wall space into hard-working storage space. Don't wait till the ball drops to start planning that shop makeover. Here's a hit list of some great options.

Tool Dock™ offers the durability of steel cabinets and convenience of removable inserts. Mount your benchtop tools on interchangeable fiberboard inserts and swap one tool for the next in the tops to make versatile tool workstations.

Small Tool and General Supply Storage

Nothing beats cabinets for storing finishing supplies, locking up tools or stashing items that just can't be hung on the wall. When it comes to shop cabinetry these days, the name of the game is modular. Last summer, Craftsman unveiled a new line of modular cabinets intended specifically for organizing the shop. Among the options, you can buy floor-standing wall lockers, wall-mounted upper cabinets or rolling base cabinets equipped with adjustable shelving or drawers. All feature steel I-Frame® construction with tubular steel frames on the top and bottom to add rigidity. Side walls are punched with pegboard grids for even more storage and ventilation. The steel doors have 3" deep shelving and hang on zero-clearance hinges so the cabinets can be mounted flush to the wall or another cabinet without affecting door swing. For an integrated system, Craftsman



Craftsman offers a full line of floor-standing, wall-mounted or rolling base cabinets for storing virtually any small tool or supply in your shop. The cabinets are lockable and have zero-clearance hinges for added convenience in tight spaces.

also sells 5' or 8' steel workbenches with 1½"-thick fiberboard tops. Base cabinets can be stowed underneath the bench, and an optional steel pegboard back wall is available

for hanging the wall cabinets and other tools. See the new cabinet line in the 2004 - 2005 *Craftsman Power and Hand Tools Catalog* or by visiting the company web site.

For another unique take on modular cabinet storage, Tool Dock™ offers a full line of base cabinets with removable inserts on top. You can mount benchtop tools like miter saws, grinders, sanders or a drill press to the inserts to turn the cabinets into interchangeable tool

workstations. The inserts slide into racks for storing the tools when not in use. Tool Dock™ offers six different base units in styles that include a corner cabinet, a low-standing multi-station for table saw or planing applications, a router table, mobile station, tall tool rack and workbench. Each is made of 18-gauge steel with thick, fiberboard tops. The cabinets also have dust port openings. Visit the Tool Dock™ web site to learn more or find them in the *Craftsman Power and Hand Tools Catalog*.

If you need to take small tools and supplies with you, check out www.bucketboss.com to view the variety of Bucket Boss® bag and bucket organizers. They're chock-full of pockets and pouches for storing hand tools and all the essential accessories, plus other tools in one place. Or, have a look at Rockler's nicely sized canvas tool bag.

Today's Shop continues on page 92 ...



Rockler's Modular Shop Stands feature a universal design that lets you build up to 15 different sizes of shop stands. The legs and stretchers are all pre-drilled and even feature square holes to accommodate carriage bolts. The legs are heavy-duty 1/8" steel and are available in two lengths.

Heavy-duty magnetic strips offer another option for storing metal tools. You can use the strips directly on the sides of metal cabinets or mount them on shop walls.



Storic provides versatile wall storage system using polymer panels molded with L-shaped channels. Shelving, hooks, bins and racks clip into the channels.



Plastic panels with square-hole grids provide a convenient means of mounting hooks, racks and other specialized storage accessories on Nikota USA's SS3 wall system.



Wall Organizers

Where would wall storage be without the venerable (and sometimes reviled) pegboard? If you're tired of losing the hooks each time you pull a tool off the wall, both Rockler Woodworking and Hardware and Hartville Tool have the solution. They sell unbreakable, nylon pegboard hooks in numerous styles that lock in place with a pair of anchors and a push-in screw. The hooks can be removed with a screwdriver and used again and again.

For another take on pegboard storage, Nikota USA offers either 21" x 24" polymer or 21" x 42" brushed metal wall panels with square grids. Specialized racks, hooks and bins lock in place on the panels. Kits are available for both workshop and garage storage, complete with several panels and a selection of individualized organizers for either application. You can also buy add-on wall panels with more hooks and racks to expand the system.

Or, just say no to grids and organize your shop using the storeWALL System sold by Rockler and others. This ingenious take on wall storage uses PVC panels with rows of L-shaped channels that hold specialized organizers. It's similar to the wall displays you've probably seen in retail stores. The panels are 15" tall, either 4' or 8' long, and come in five neutral color options.

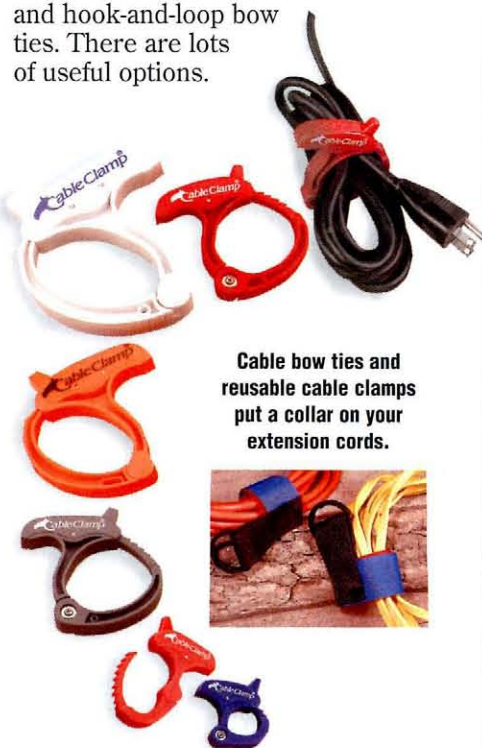
The panels lock together on their ends and the top and bottom edges fit together tongue-and-groove style for a seamless look. You can cut the panels with ordinary saws and mount them to walls with color-matched drywall screws. The companies sell the panels in bulk or packaged into kits with a selection of organizers. A range of bins, racks and hooks are also sold separately, as are cabinets that mount on the L-channels. See Rockler's web site or call for complete details.

If your shop walls have exposed studs instead of drywall, you can turn those empty stud bays into useful storage space with Stud Buddy™ instant shelves. The shelving is made of 18-gauge steel and manufactured to fit between 2 x 4 or 2 x 6 wall studs spaced 16" on center. Drive a couple of screws through the tabs on each end of the shelves and you're done. Several shelf options are available and install in minutes.

For another wall storage option, don't forget those magnetic bars that screw to wall studs or stick to the sides of metal cabinets. They're ideal for hanging small metal squares, rules, paint scrapers, chisels (provided the tips are covered) and other metal tools. Nearly every woodworking supplier sells them. They're reasonably priced and surprisingly powerful.

Power Cord and Air Hose Winders

Where would we be without electric tools? Trouble is, it still takes extension cords to power most of them up. If you're tired of tripping over or untangling your extension cords, look for the Wonder Winder (amazon.com) or check some of the woodworking sites. You can buy cord winders, retractable reels or low-cost and reusable cable clamps and hook-and-loop bow ties. There are lots of useful options.



Cable bow ties and reusable cable clamps put a collar on your extension cords.

Crank 150 feet of cord in less than a minute with this Wonder Winder, available at amazon.com. The basket keeps the cord from tangling or knotting.



Keep your air compressor hose tucked away and always neatly coiled inside this air hose reel. Find one of several styles from PeeGee Products (peegeeproducts.com).

Another culprit of the snake pit on the floor is a cantankerous air hose. You won't have to wrestle yours again if you follow the lead of auto mechanics and switch to a retractable air hose reel. PeeGee of Canada (peegeeproducts.com) sells several different models that include 50' of 3/8" air hose. They're not cheap, but sometimes convenience is worth every penny to eliminate a hassle. You can also buy a basic wind-up reel to stow the hose you have now.

Rolling Machine Bases

If you're not already a believer in rolling machine bases, you're probably part of the minority with oversized shops. For the rest of us, rolling tool bases are essential for maximizing the floor space of a small shop. You can move even the heaviest cabinet saw or lathe yourself without breaking a sweat. HTC Products offers a full line of rolling bases to fit nearly all floor-standing machinery.



"Stationary" doesn't have to mean "stuck" if you mount your tools on a rolling tool base. This one, available through Rockler, features casters that detach easily to transfer to any other mobile base frame.

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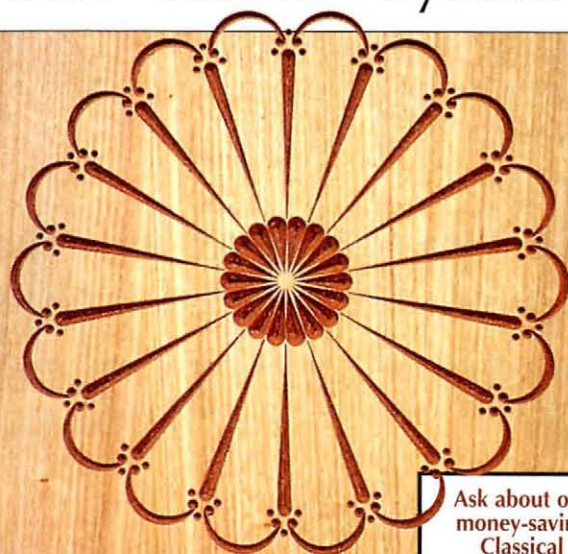
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(Circle No. 20 on PRODUCT INFORMATION form)



Here's how the Aussies store lumber — on powder-coated tubular brackets and standards. You can find this rack, made by Triton, at tritonwoodworking.com.



Several suppliers offer this heavy-duty standard and bracket system for storing lumber. The galvanized brackets are fully adjustable and virtually indestructible.

Lumber Racks

We all know that lumber is best stored off the floor and on a rack, especially if the floor is damp. A rack is also safer than standing boards on end against a wall, especially if you have small children scurrying around the shop. Shop-made lumber racks aren't difficult to build, but it's tough to make them adjustable and

they definitely need to be strong. For a Herculean grade lumber rack (actually the same one we featured on the "Rolling Lumber Cart" project in the *December 2003* issue), I really like the 3/16" thick galvanized steel system sold by Lee Valley Tools and Hartville Tool. The rack configures just like ordinary household shelf standards

and brackets, only these babies are indestructible. The shelf brackets come in 10", 14" or 18" lengths — perfect for even the widest lumber — and they're rated to hold up to 300 pounds at the tip. The brackets mount with a T-fitting into 24" or 55" standards that bolt to wall framing. The slots are spaced 1 1/2" apart on the standards so you can adjust the bracket spacing to your heart's content.

For a lighter duty and less expensive option, the Australian-made Triton wood rack also consists of wall standards and brackets.

Today's Shop continues on page 96 ...

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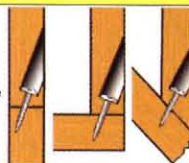


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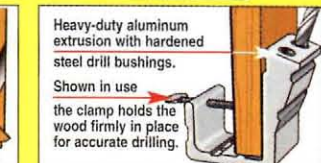
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WOOD Magazine - Dec. 2003



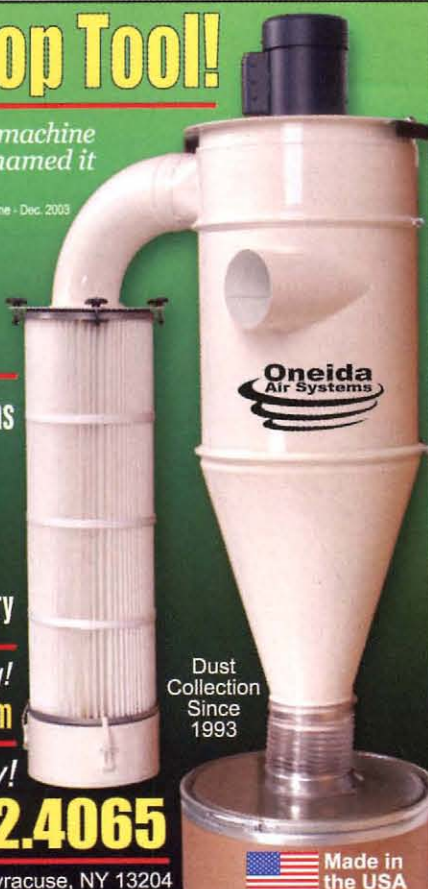
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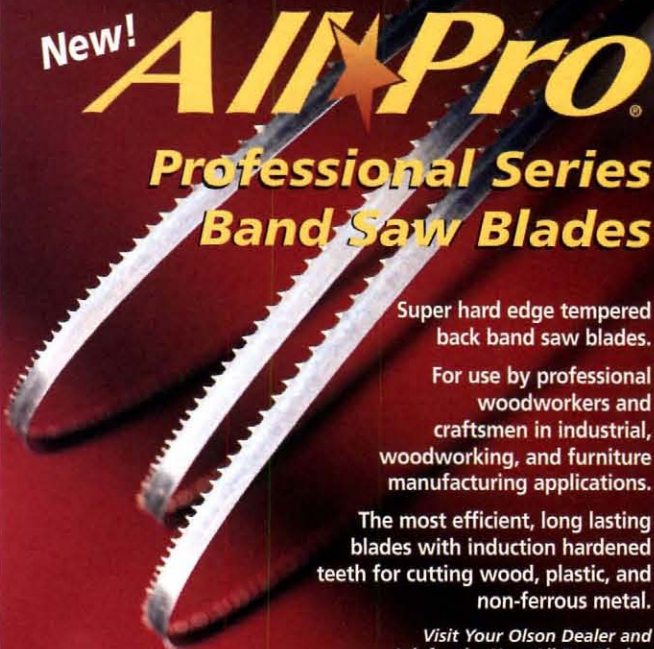


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(Circle No. 42 on PRODUCT INFORMATION form)



The rack is made of powder-coated steel tubing and provides six levels of storage. Each level of brackets will hold 110 lbs. of lumber. The brackets are almost 13" long and the standards are 41". To find out more, check Triton's web site (tritonwoodworking.com).

Blade, Bit and Clamp Storage

It doesn't take many projects to spend a fortune on router bits or a few good saw blades. The quickest way to chip those carbide tips, next to dropping them, is to toss blades and bits in a drawer. Protect your investment and keep your router bits organized by buying a few bit and blade holders. Rockler sells downright handsome wooden storage boxes with foam liners that hold eight, 20 or 50 router bits. You can buy just the perforated liners if you want to make your own box.

Keep your inventory of router bits accessible and safely protected inside a variety of router bit cases from Rockler.

Woodcraft offers wall-mounted router bit cases that hold either 24 or 36 bits in removable shelves. The cases have clear plastic doors so the bits are easy to see. There's even a storage drawer for keeping extra bit bearings or tiny Allen wrenches from disappearing.

Woodcraft also sells plastic blade holders for 10" saw blades. The holders have a wing nut for securing the blade, which fits into a shallow recess to protect the teeth. It's too bad saw blades don't come with these helpful accessories.

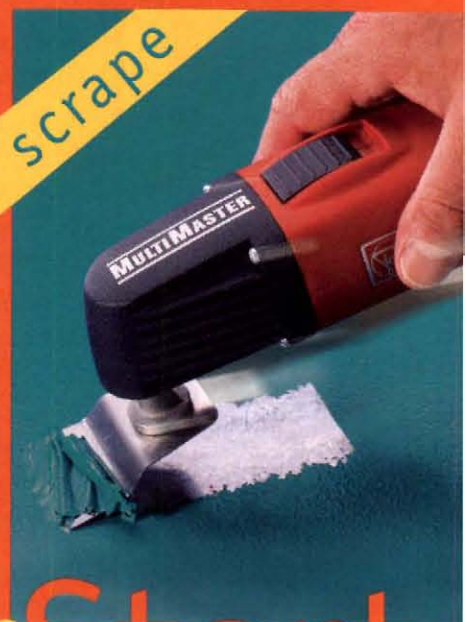
While the shop adage about never having too many clamps is true, sooner or later you need to organize them. Woodcraft's version of a clamp



Keep your 10" saw blades organized and protected with plastic blade holders (above) from Woodcraft, which also carries a convenient clamp rack (right).



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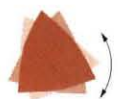
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Storage Suppliers

To learn more about the products featured here and obtain current pricing, call these suppliers or visit their web sites.

Craftsman: 800-377-7414; www.sears.com/craftsman

Festool: 888-337-8600; www.festool-usa.com

Hartville Tool: 800-345-2396; www.hartvilletool.com

HTC Products: 800-624-2027

Lee Valley and Veritas: 800-871-8158; www.leevalley.com

McFeely's Square Drive Screws: 800-443-7937; www.mcfeelys.com

Nikota USA: 626-336-1128; www.nikotausa.com

Peegee Products Inc.: 519-855-9430; www.peegeeproducts.com

Rockler Woodworking and Hardware: 800-279-4441; www.rockler.com

Storic Storage Systems: 512-263-0997; www.storic.com

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Leave it to Festool's German ingenuity to come up with fully modular and expandable Sortainer storage boxes. Each multi-drawer box fits and locks onto any other Sortainer of Festool's Systainer toolboxes

rack amounts to a 36"-long galvanized steel rail that attaches to three wall studs. Forked steel clamp holders slip over the rail and hold the bar clamps. With a little ingenuity, you could probably fabricate other clamp holders to fit the same rail for storing other clamps.

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Lee Valley sells powder-coated metal storage drawers in 1", 2" or 3" depths that you can fit into a simple wooden cabinet you build. Or, you can modify your pound-sized coffee cans and five gallon buckets with low-cost, stackable organizer trays from McFeely's. A coffee can will hold three stacks, and a bucket will take four to five trays, depending on the tray depth.

Now that you're in the know about the latest and best storage stuff, what's holding you back? Go ahead and get a jump on the new year and organize for 2005.

NOTE: Photos courtesy of suppliers; reprinted with their permission

Chris Marshall is a Woodworker's Journal contributing editor.



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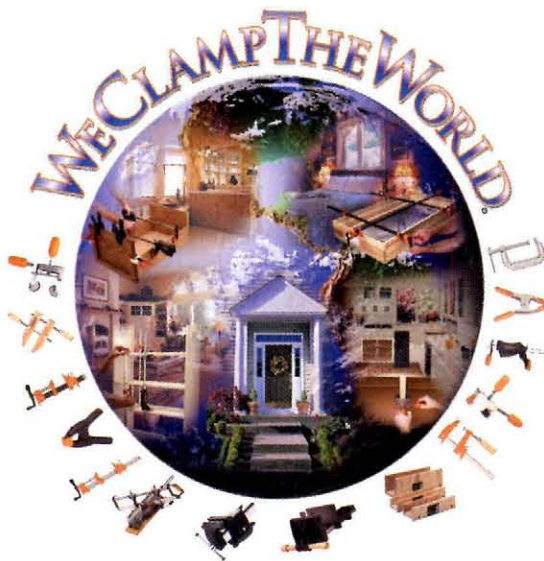
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Popping the Grain: Bringing out the Best in Wood

By Michael Dresdner

If you're like me, you'll choose the most stunning lumber you can find (and afford) for your projects, as much to display the wood as to show off your skills with it. When the time comes, you want to be sure the finish you apply helps showcase its character, making the figure and grain even more pronounced.

Not all finishing techniques and materials are best for all situations. Here are some recommendations for your consideration.

Clear Coatings

Clear coatings can add richness and depth to wood, but some clear materials intensify figure much more than others. The key difference has to do with molecular weight. Low molecular weight liquids (made up of smaller molecules)

penetrate more deeply into the wood, whereas high molecular weight molecules may sit on top of the wood. The better the penetration or "wetting," the more depth and shimmer they add.

Oils, Danish oil, and dewaxed shellac are all low molecular weight liquids, and all three do a nice job of bringing out figure. I use boiled linseed oil or Watco® Natural, both of which not only wet nicely, but add just a touch of amber color, which further delineates figure in light-colored wood. In the photo (above, right), quilted maple, plain walnut and curly koa were all treated with boiled linseed oil.

As you can see, the oil made a significant difference in the depth and intensity in both flat grain and curly figured woods. Here's how I do it: Flood boiled linseed oil or Watco® onto the wood liberally. Make sure it stays wet for 10 or 15 minutes. If any areas of the wood absorb all the oil during that time, add more. After fifteen minutes, wipe off all the oil you can, then let it dry for two days before continuing with the next coats of finish. The process for shellac is much faster. Flood the shellac on liberally, then wipe it off immediately. Wait only two hours before finishing.

When freshly sanded, purpleheart has a grayish cast, but exposure to the air will bring back its dark color in a few days.



Top: Quilted maple. Lower left: plain walnut. Lower right: curly koa. The left side of each wood sample was sealed with waterbased polyurethane; the right side was treated with boiled linseed oil.

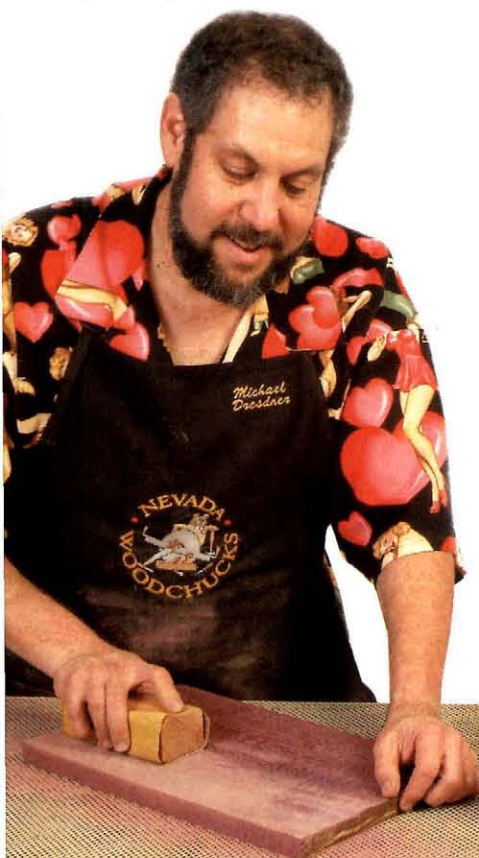


From left to right: walnut, maple, rosewood. Dyes mimic the sun's aging to bring golden highlights to walnut and rosewood, and add subtle grain enhancement to figured maple.

Dyes

Color can also enhance the grain, both by adding bright highlights and by intensifying grain patterns. Each of the samples in the photo above used dye to add character, but a slightly different technique on each created a particular look.

On the left, I took a rather plain piece of walnut, which sported an unfortunate grayish cast, and livened it up by flooding on and wiping off a fairly dilute yellow-



orange dye. The result is the mellow warmth that sun aging eventually imparts to walnut. In the center, I used a weak, reddish-brown dye to bring out the curl in figured maple. After flooding the dye on and wiping it off, I waited until the wood dried, then sanded it well with 180-grit paper. Sanding removed the dye from all but the end grain that forms the curl figure, and made the wood's pattern stand out without substantially altering the overall color.

The third sample is a bit different and more complicated. Over time, sunlight changes Indian rosewood from a dark purple to a much lighter blaze of golds, reds and dark contrasting grain lines. To mimic that effect, I first bleached the wood using two-part wood bleach. This process removes background color, but leaves the dark lines intact. After the bleach dried, an amber dye brought out

"You want to be sure the finish you apply helps showcase the wood's character, making the figure and grain even more pronounced."

the bright highlights and deeper contrast.

Dry Brushing

Dry brushing, sometimes called "dirty brushing," is one of those rarely used coloring techniques that gives the finisher tremendous control of stain. Unlike staining, which floods color all over the wood, dry brushing allows you to place color only where you want it, even in impossibly small areas such as a single wood pore.

In the photo on the following page, I am dry brushing an otherwise monochromatic piece of ash to add

subtle definition only to the grain. Dry brushing works particularly well on woods with large pores, including mahogany, ash and oak, but will also add character to cherry, poplar and a host of other small pore woods.

Start by mixing burnt umber or raw umber Japan color with a small amount of mineral spirits or naphtha to make a thick liquid, about the consistency of heavy cream. Place a dollop of stain on a piece of cardboard, and "load" only the tips of a China bristle brush by rubbing them gently through the stain on the cardboard until it is just shy of dry. You'll have a small amount of almost-dry stain clinging to the ends of your brush's bristles. If the brush is too wet, it will leave unsightly dark streaks on the wood, so practice this technique first on scrap.

With smooth, gentle passes, stroke the dirty bristle tips over the wood.

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(Circle No. 77 on PRODUCT INFORMATION form)

Before I make a mistake, what type of finish do you recommend for salad bowls and cutting boards? I have heard

of using walnut oil, but some people are allergic to nuts. I have also heard of using mineral oil. What are the pros and cons of various finishes that will be in contact with food?

*Marty Mandelbaum
Mt. Sinai, New York*



Before you commit to oil, consider leaving the wood raw.

Unfinished wood has a long history of food contact, from the ancient wood platters called "trenchers" that gave us the term "trencherman" for a hearty eater, to the unfinished spoons and spatulas in most kitchens today.

Admittedly, both drying and non-drying oils bring out the figure and color in wood, but there is a difference between the two. Drying oils cure to a solid film after being absorbed into the wood.

Oils pressed from nuts are typically drying oils, and include walnut, linseed and tung oils, among others. Most cure very slowly. Once fully cured, they form an inert plastic, and will not impart flavor to food, nor will they wash off easily. Whether a person can have an allergic reaction to cured oil depends on that person's degree of allergy.

Vegetable and mineral oils are non-drying and remain wet indefinitely. Thus, they impregnate wood, but will wash off with detergents, and can impart flavors to foods. We usually avoid vegetable oils because they can become rancid.

Mineral oil, derived from petroleum, is edible and has no discernable taste, making it an acceptable alternative for food contact items.

— Michael Dresdner



For simply sending in his question on food safe oils, Marty Mandelbaum of Mt. Sinai, New York wins the **Olympic Interior Wood Finishing Kit** shown at left.



The small amount of almost-dry pigment clinging to the tips of my brush brings out the grain of this rather plain ash.

As each tiny bristle catches on a grain line, it will deposit a small spot of color, enhancing the grain without changing the overall color significantly. To make it a bit easier, sand the wood, then flood it with hot water to raise the grain. Don't sand after the wood dries, but instead allow the slightly rough raised grain to pick up color from the dry brush.

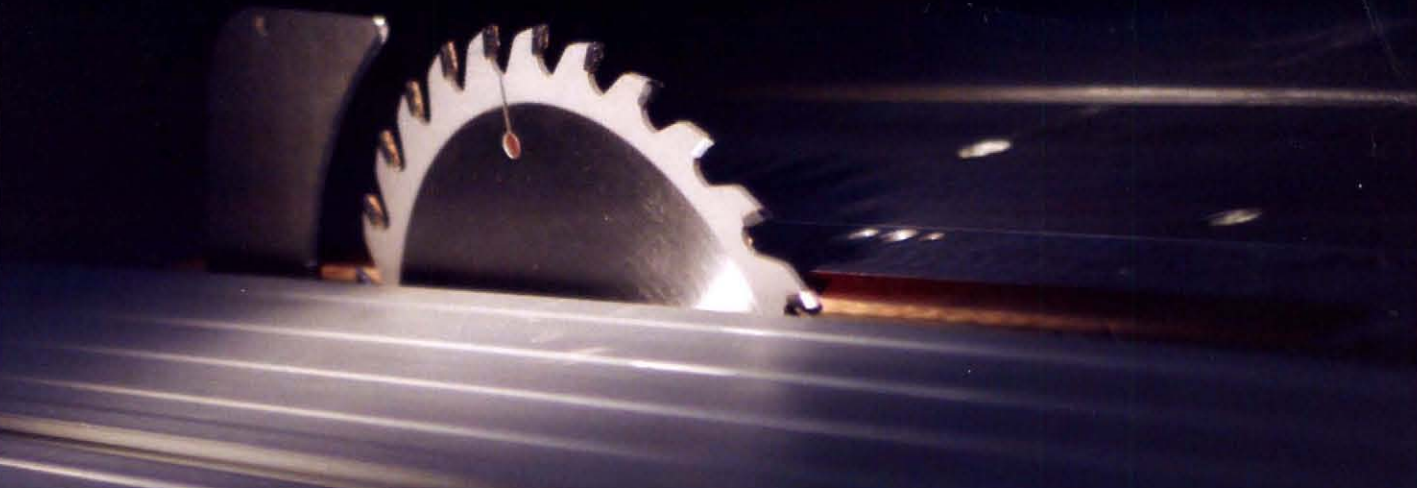
Oxidation

Purpleheart is a tree with deep purple heartwood; however, it has a curious quirk. When you machine or sand it, the wood loses its deep color and instead turns a drab grayish purple. In the lead photo, you can see the color difference in the small section I sanded.

Normally, we try to sand or machine as close to the time we apply finish as possible, since long exposure to air prior to coating causes adhesion problems; however, with purpleheart we make an exception. Exposure to oxygen in the air will restore the color of purpleheart in just a day or two, so wait until the color returns before you apply the finish. Don't expose it to sunlight, as that will cause the purple to fade.

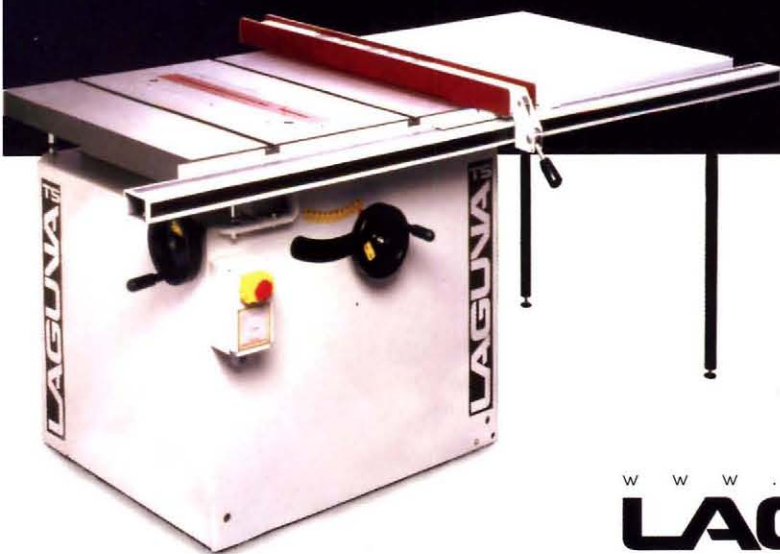
When it's time to finish, choose a clear coating, but not amber over time. Any yellow tint will turn purpleheart brown. Both blonde shellac and waterbased coatings are good choices, as they are both clear and neither will yellow over time.

Michael Dresdner's latest book, *Wood Finishing Fixes: Quick Answers to Over 175 Most Frequently Asked Questions*, is available from Taunton Press.

A close-up, low-angle shot of a table saw blade. The blade is partially visible, showing its teeth and the circular guard mechanism. The lighting is dramatic, with strong highlights on the blade's surface and deep shadows in the surrounding area.

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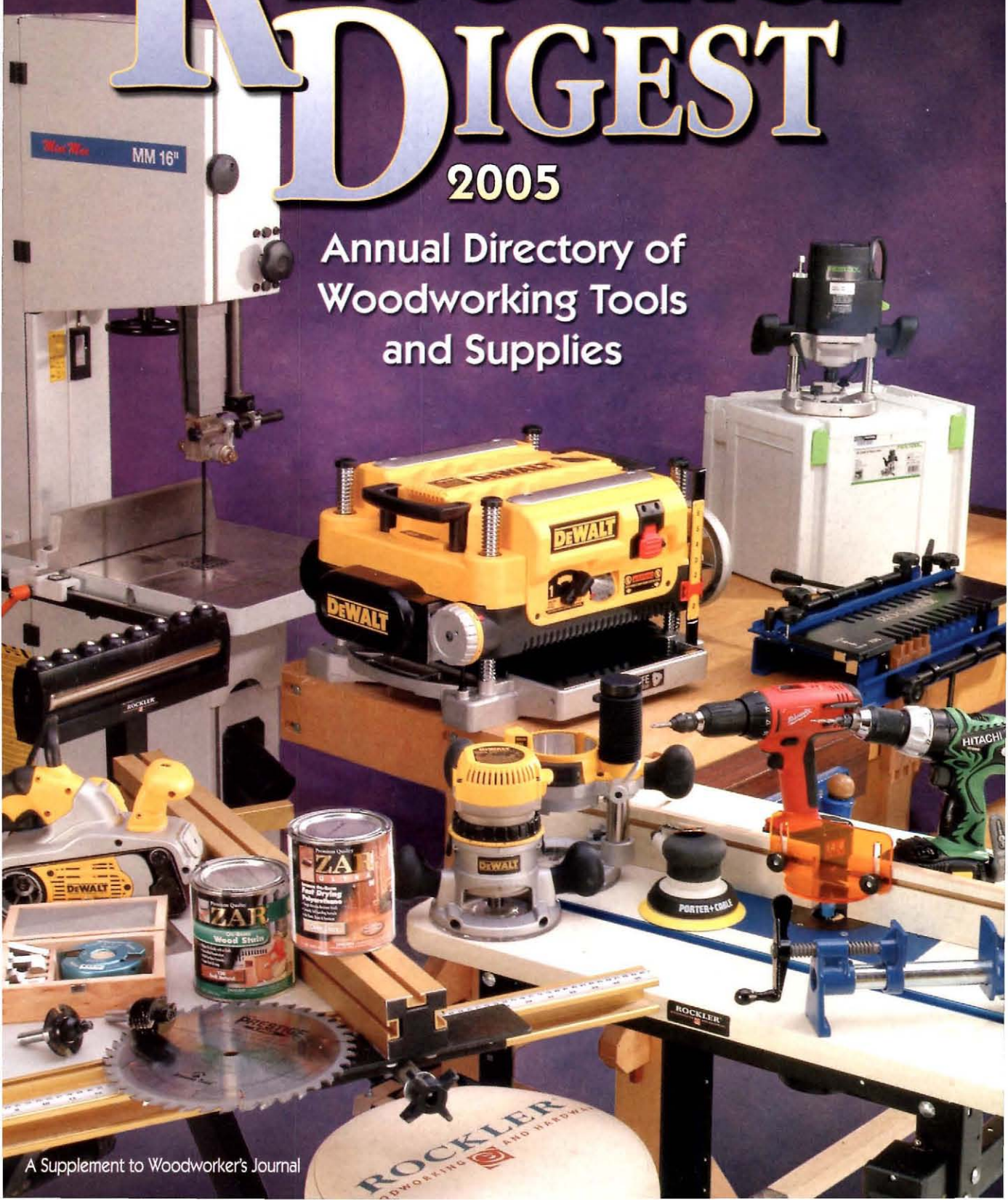
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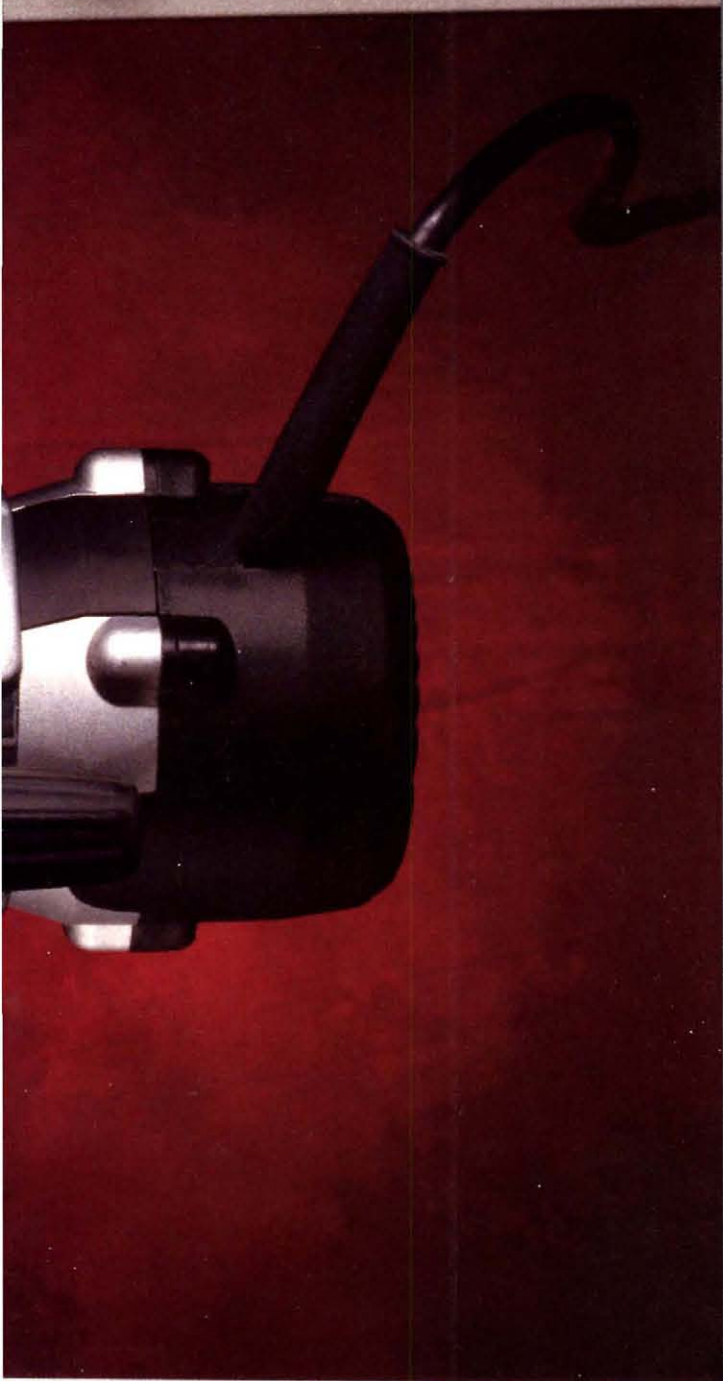


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Rob Johnstone

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We hope our annual *Resource Digest* is the first place you look for all things woodworking. Each year, we do our best to include a wider range of suppliers organized by categories that are easy to navigate, with phone numbers and web sites for your convenience. So take check it out

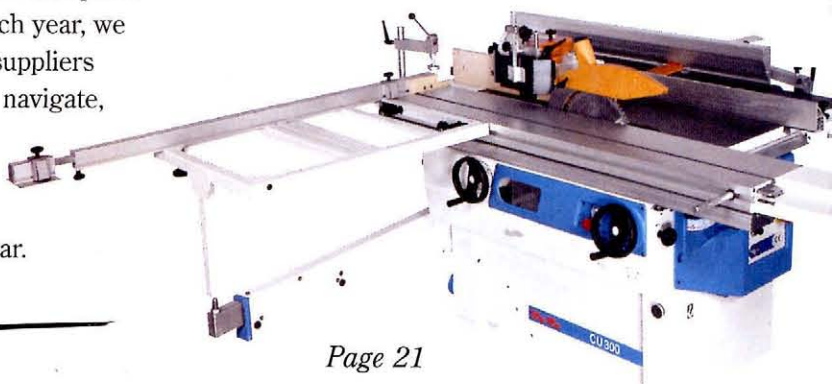
and then wear it out as you work through the year.



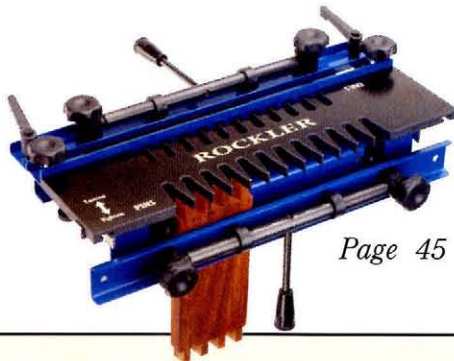
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Hot New Products for 2005

By Rob Johnstone

One of the perks of my job is that I get a sneak peek at the latest and greatest tools and supplies for the coming year. This year my staff and I visited a number of trade shows and press events where some exciting new products were unveiled. Take a quick look at just a few of them.

A few years ago, you may have heard the buzz about a revolutionary new blade-stopping technology developed by SawStop. Maybe you even read editorials about the "hot dog test." Turns out, the major saw manufacturers took a pass on adding this technology to their product lines, so the folks at SawStop said they would design and build their own table saws.

Well, I'm excited to say the wait is over. For around \$800 and \$2,500, respectively, you can now own a SawStop 10" contractor's or cabinet saw and boost your odds of keeping all 10 fingers for good. The saws feature 1½ HP and 3 HP motors, cast-iron tops, precision fence systems and, most important to me, European style riving knives that move up and down with the blade.

The blade braking system consists of a brake cartridge with a built-in microprocessor that drives a spring-loaded brake into the blade. It takes just a fraction of the same second the blade contacts skin to stop things cold. The demo I saw recently was simply impressive. Once the brake activates, you'll need to replace the cartridge (about \$60), and the blade as well — it's embedded in the aluminum brake — instead of your hand. 'Course that seems to be a small price to pay for what the manufacturer



One+ System™

Ryobi launched their One+ System™ around their 18-volt battery. Any Ryobi 18-volt tool will be supported by the program. Everything from ingenious hangers that plug into the battery's socket to a new scope of 18-volt cordless tools sold individually will hit the market soon.

claims will probably amount to a Band-Aid® sized injury.

Ryobi One+ Cordless Tools

Ryobi has offered a complete line of 18-volt cordless saws and drills for some time, but many of these tools were available only in combination kits. Now, they're selling 20 different 18-volt tools and accessories independently,

as well as in combo kits. The company has also reduced the price of the 18-volt batteries to just \$20 apiece — a paltry sum compared to the wallet drain of competitor-priced batteries.

Speaking of Ryobi, I followed up my trip to the International Woodworking Fair in Atlanta by going to an event Ryobi

continues on page 10 ...

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Hybrid Technology

The hot new hybrid table saw from Craftsman brings many of the benefits and features of a traditional cabinet saw to woodworkers at a more affordable cost. Competing against DeWalt's and JET's hybrids, the Craftsman and Delta newcomers create additional options.



Festool introduced their TDK cordless drill with the innovative Centrotek quick-change chuck that makes putting hex bits in and out a snap.

hosted. The surprise of the trip came early when we were told that Ryobi's parent company, TTI, had purchased Milwaukee Tools. I think "Big Red" has found a good home.

Table Saws: Holy Hybrids!

If you're contemplating one of those hybrid style table saws, your options just expanded. Late last summer, Craftsman unveiled three new 10" table saws, all with TEFC induction motors, cast-iron tops, left-tilt arbors and oversized cast-iron trunnions. Models 22104 and 22114 feature 1½ HP motors enclosed in a three quarter length cabinet, similar to the JET and DeWalt hybrid saws currently on the market. The

brand-new Professional model 22124 has a full cabinet, 1¾ HP motor and a Beisemeyer fence with 30" ripping capacity. Street prices range from \$530 to \$950 for these sweet saws. But Craftsman is not the only new kid on the block, Delta has a slick new hybrid offering hitting the market in the last months of 2004.

New Festool and Fein Drill Lines

If this is the year to retire your cordless drill/driver, Festool has a pair of new TDK 15.6- and 12-volt drills to offer. Both feature a slick Centrotek quick-change chuck that provides snap-in, snap-out bit changes using Festool's hex-shank drill and driver bits (or other standard hex-drive bits). These nicely balanced drills also come with a single-sleeve, tool-free chuck for using conventional drill bits. Or, you can pop on Festool's FastFix right-angle or eccentric

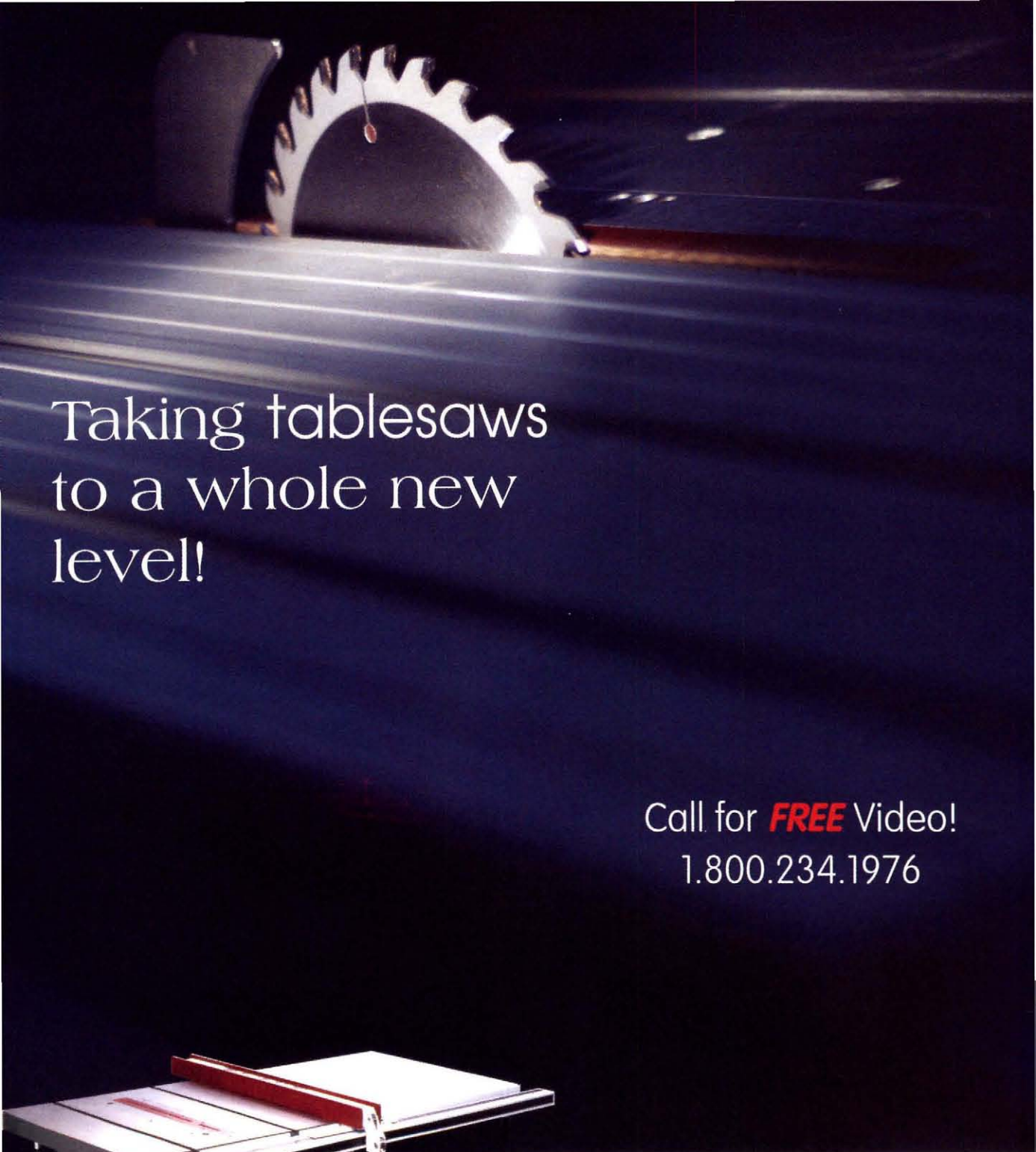
chucks as accessories — all these chuck options install on the TDK drills without tools.

Fein just stepped into the drill/driver market this past summer with six HandyMaster drill options, ranging from 9.6 to 18 volts. The drills come standard with NiCad batteries, or you can order a Nickel-metal hydride option. The 14.4- and 18-volt models are available as either standard-drive or hammer drill/driver styles.

New Fisch Stationary Tools

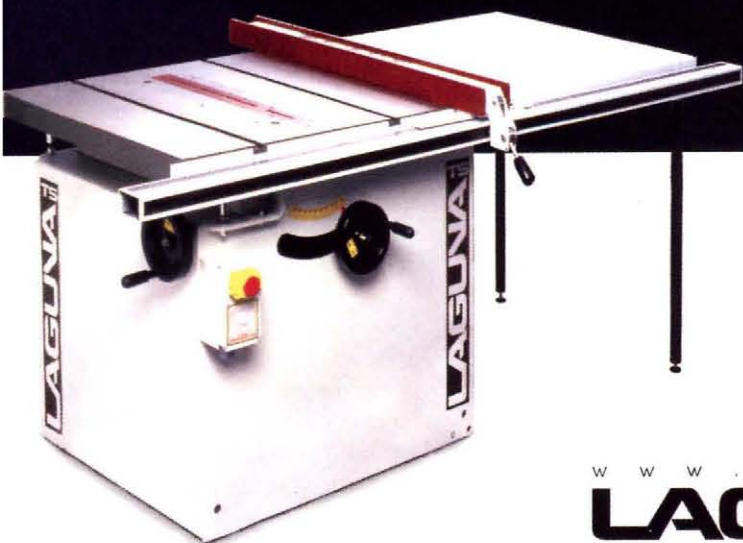
A number of noteworthy new tools are coming soon from Fisch. Among them, I saw a promising 16" Euro-style band saw with 12" of resaw capacity. The company also rolled out a new mini-lathe with a variable-speed DC motor and LED readout. It has a 15" bed capacity and 10" swing. Early this year we'll also see a compact, 1½ HP two-speed shaper that accepts 1/2" or 3/4" spindles.

continues on page 12 ...



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The new Laguna TS table saw is setting a new high standard by which all others will be measured. With all the features of a traditional cabinet saw, the TS also comes with its own line of bonus 'Laguna' features.

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Trends To Look For ...

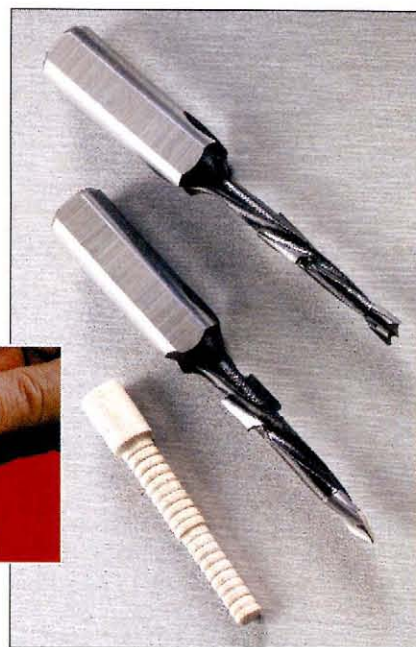
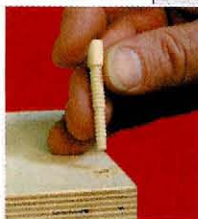
Grizzly's 6" Spiral Cutterhead Jointer

If you (like me) hate to sharpen or set jointer knives, give some serious thought to Grizzly's new anniversary edition G0526 6" Jointer with spiral cutterhead. Spiral cutterheads are usually found only on industrial sized jointers, and they amount to rows of tiny indexable carbide inserts rather than single-edged blades. Thanks to Grizzly, this convenience is now standard on a home shop-sized machine. The carbide inserts have four edges each. Once a chip develops, just loosen a screw and flip the insert to a fresh edge. No need for time-consuming knife height adjustments or downtime for sharpening. The jointer's street price is \$850.

Carter Eases Tension Headaches

Speaking of maintenance, wouldn't it be great to know the exact blade tension of your 14" band saw blades instead of flat-out guessing or measuring deflection? Blade makers say we'd get more mileage and better performance out of our blades, with proper tensioning.

We all know about Carter Products' precision blade guides and quick releases, but the company now has added an Electronic Tension Gauge (ETG) to help with tensioning hassles. A sensor mounts beneath the upper flywheel spring, and a digital display provides continuous blade tension readout in ft/lbs. The ETG will sell for \$199 and fits 14" JET, Delta and similar saws.



Miller Dowel put a new shape to dowel joinery a few years ago, and now they are thinking small with their new Mini-X.

Miller Dowel Adds Species

Several years ago, Miller Dowel Company introduced a revolutionary dowel joinery system using tee-shaped, stepped dowels that are installed with a matched drill bit. The system is a breeze to use, and now Miller has added more wood species and sizes to its product line. New for 2005, you can buy Miller dowels made of weather-resistant black locust, ipe, mahogany, purpleheart, teak and white oak, as well as the already available birch, cherry, red oak and walnut options. If you work with 1/2" stock, Miller has also added a Mini-X line of dowels just 1 5/8" long and 1/4" diameter at the cap.

A Couple of Noteworthy Trends

Spend enough time walking miles of trade show aisles, and you start to see trends. Since last year's *Resource Digest*, we've noticed a couple of rising stars in the woodworking tool market: cordless

impact drivers and cordless nailers. Impact drivers work like a cross between an impact wrench and a drill/driver for driving screws and bolts. As the chuck rotates, an impact action engages when it meets resistance, boosting rotational torque exponentially. Oftentimes, you won't even need to predrill before driving even large fasteners with one of these babies. Deck and framing contractors are already on the impact driver bandwagon, and the fervor is only growing among woodworkers, too.

Along these lines, cordless finish nailers continue to gain popularity. This year, DeWalt released a new line of 12-, 14.4- and 18-volt XRP 16-gauge cordless nailers. Senco, Porter-Cable and Paslode already offer cordless nail guns of one sort or another. Is this the beginning of the end of compressors and hoses? We'll have to wait and see ...

Rob Johnstone is the editor of Woodworker's Journal. Fellow editors Joanna Werch Takes and Chris Marshall helped in the preparation of this article.



Makita was a trendsetter in the growing world of impact drivers. These drivers deliver mighty screw driving power from a small package.

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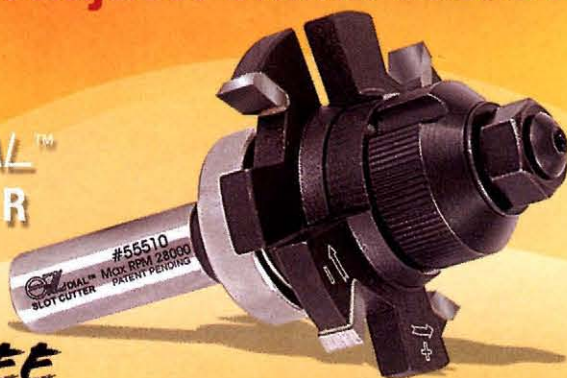
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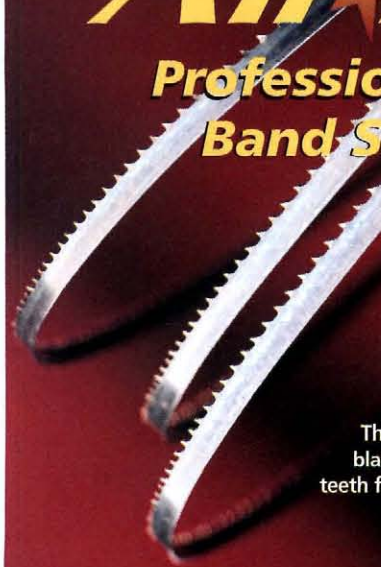
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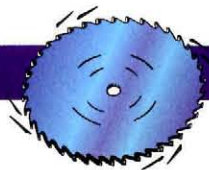
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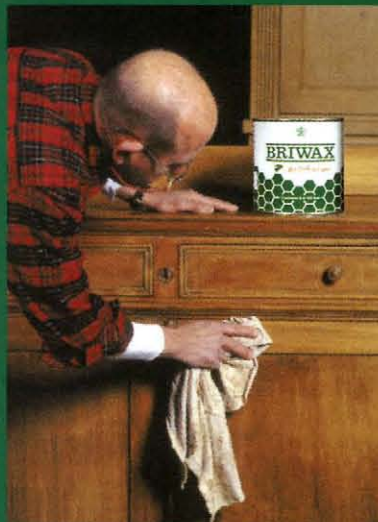
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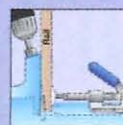
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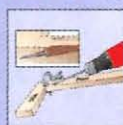
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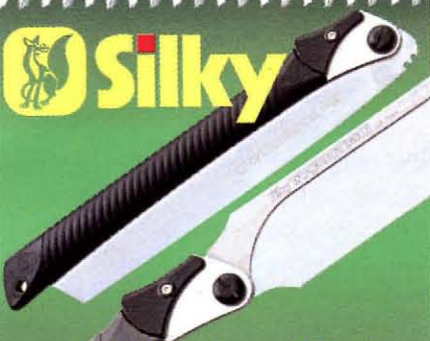
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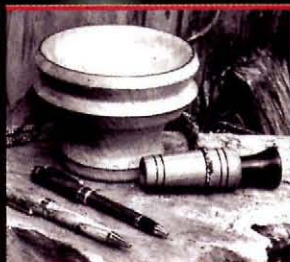
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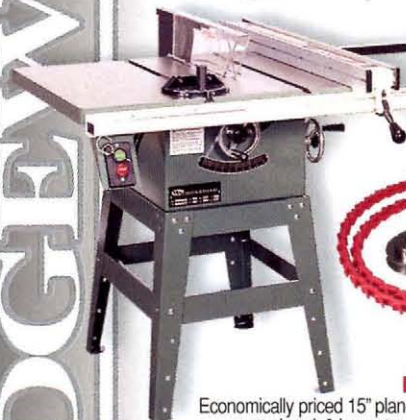
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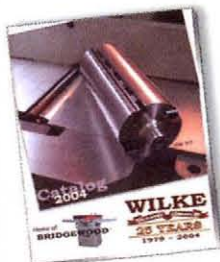
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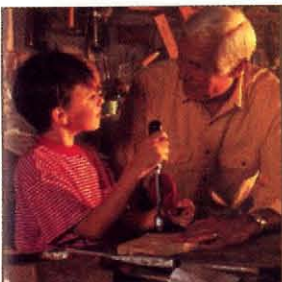
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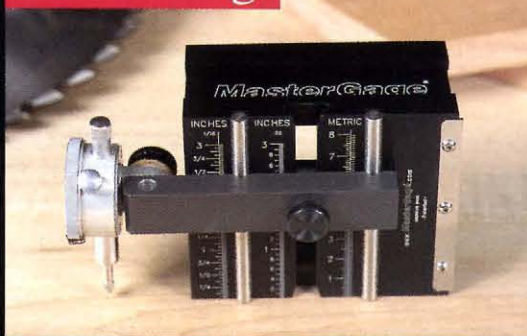
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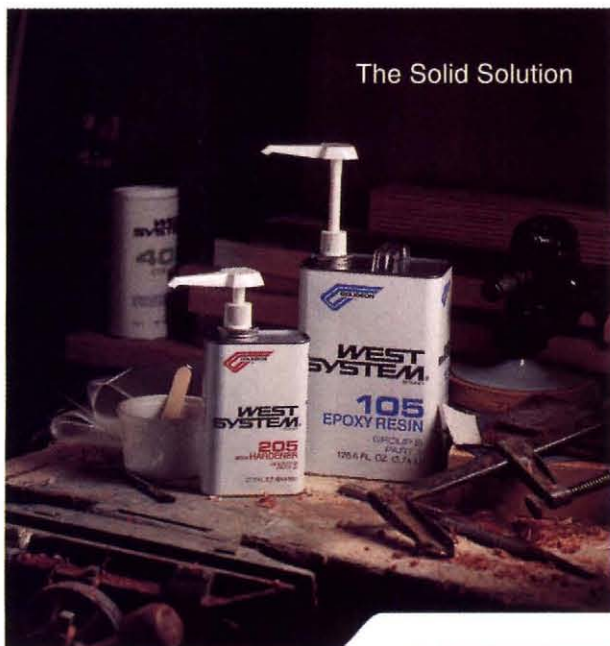
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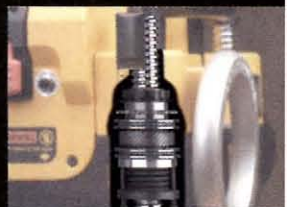
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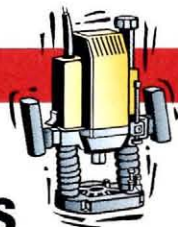
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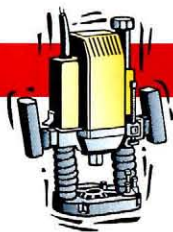
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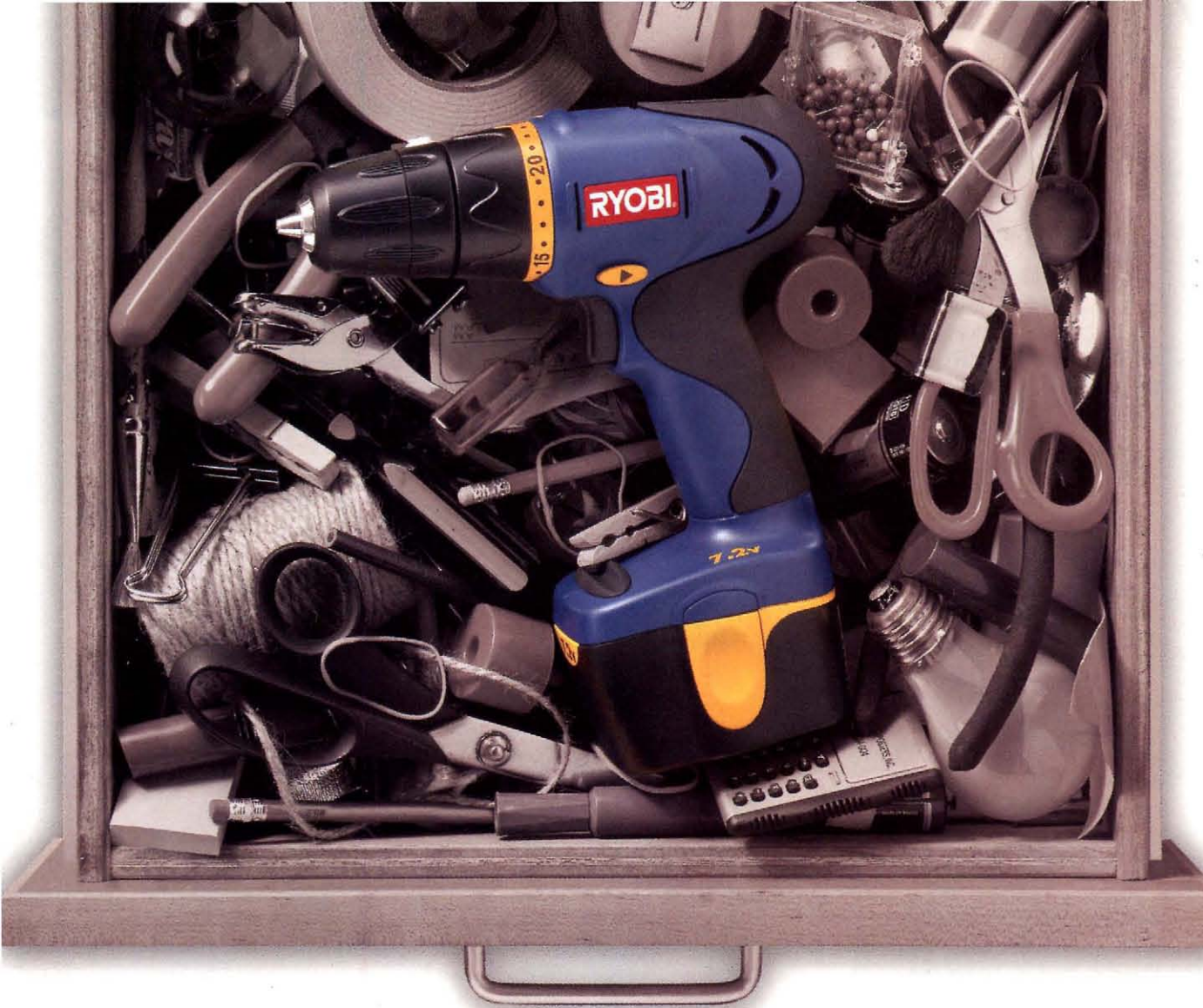
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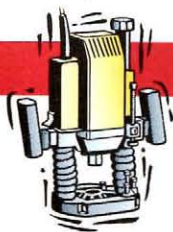
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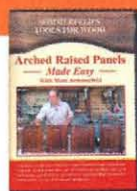
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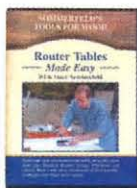
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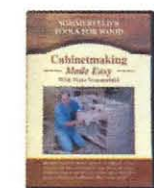
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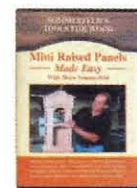
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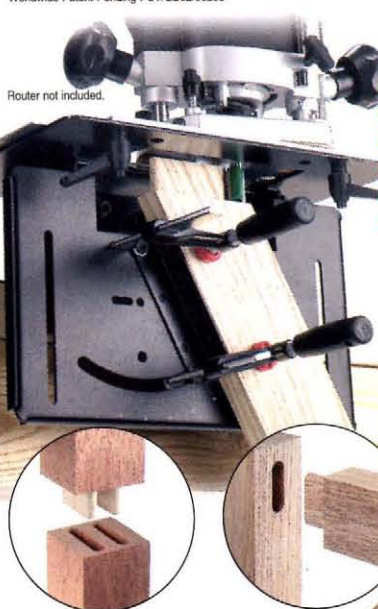
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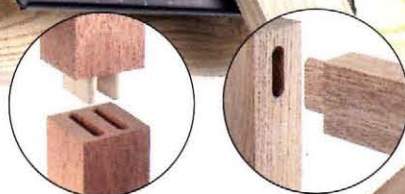
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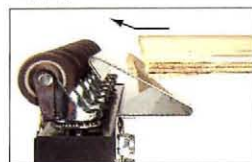
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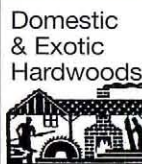
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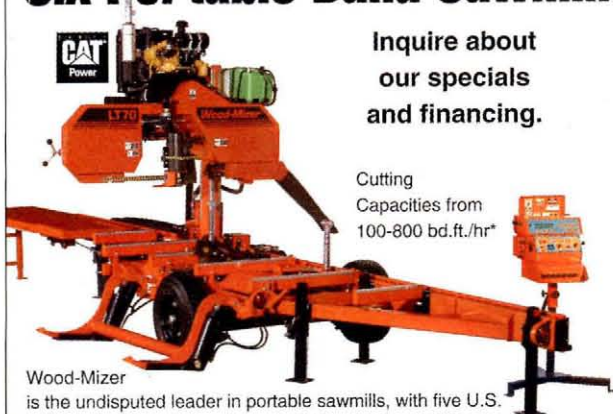
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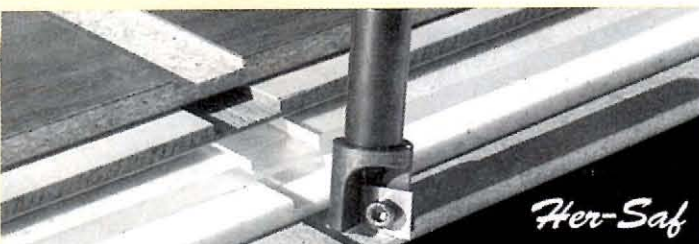
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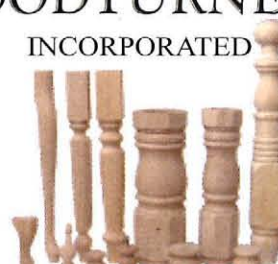


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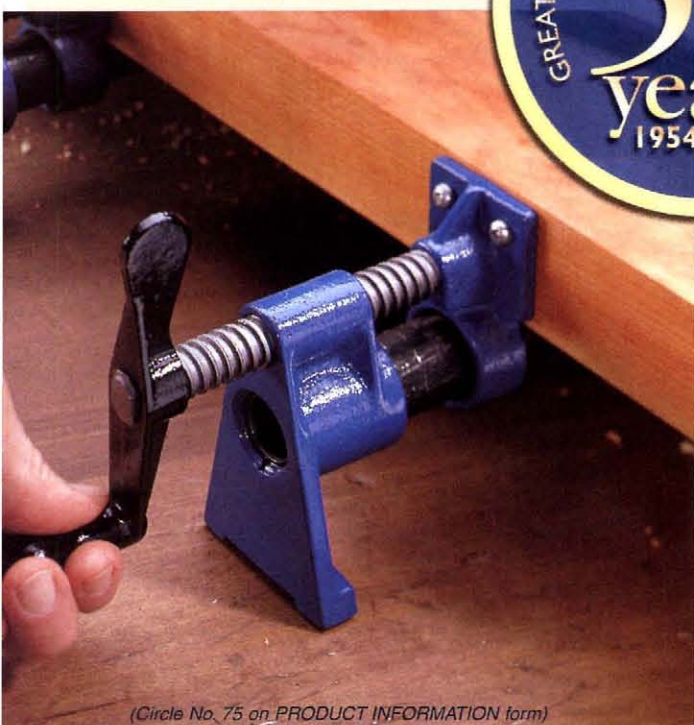
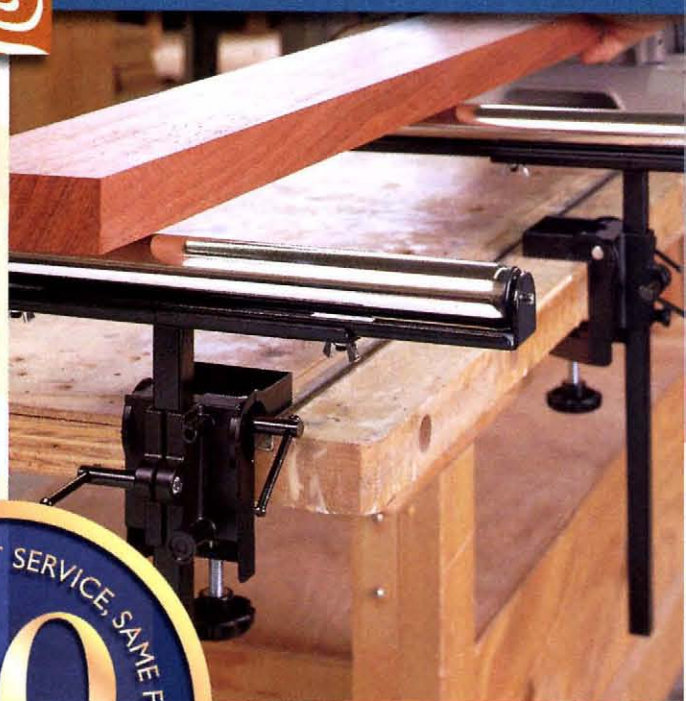
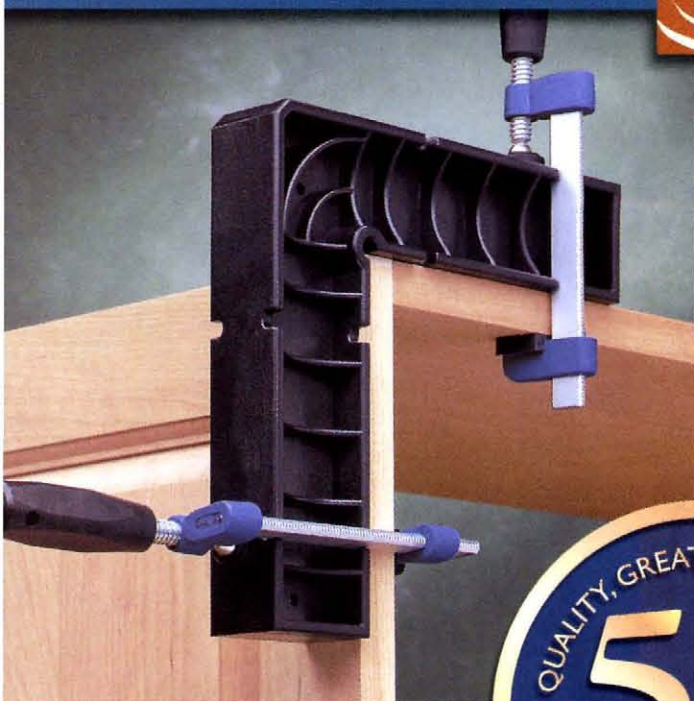
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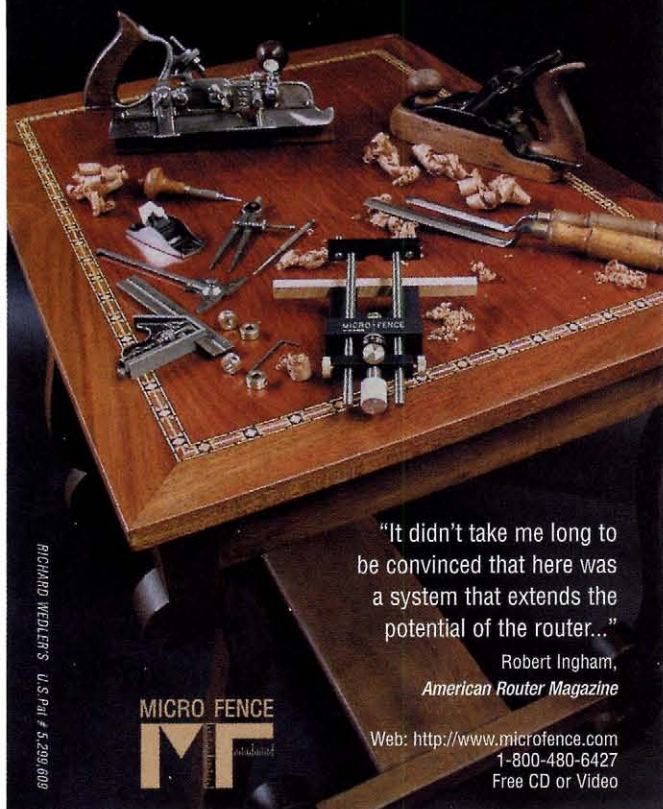
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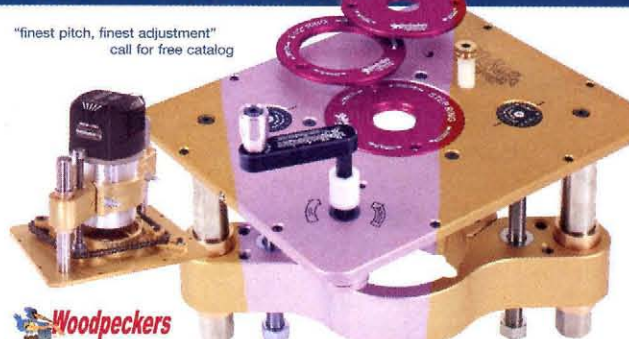
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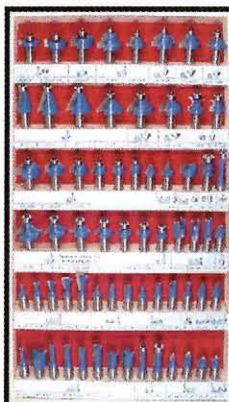
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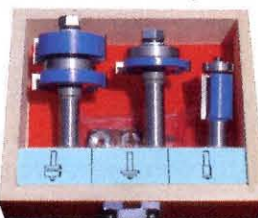
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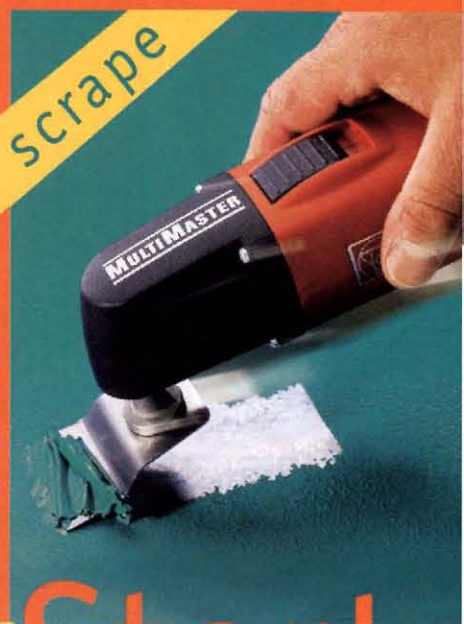
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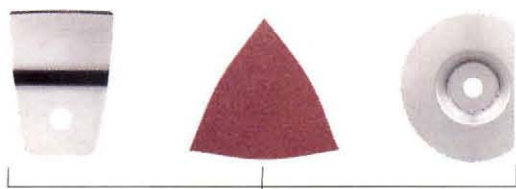
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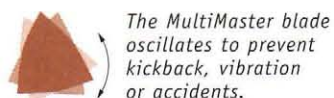
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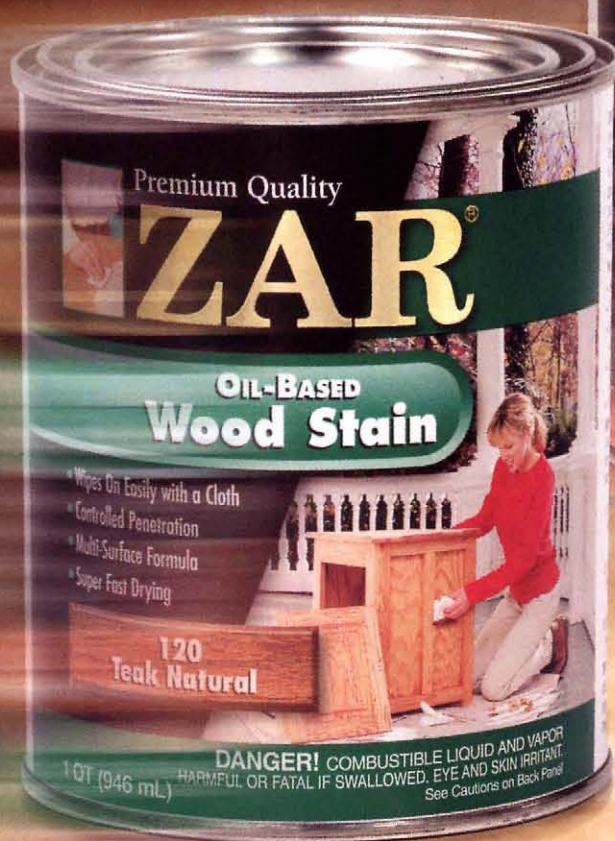


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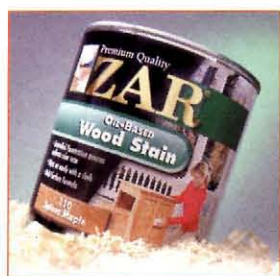
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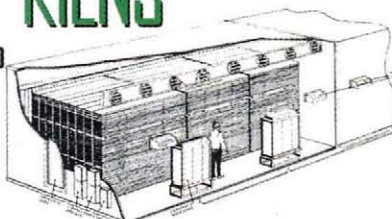


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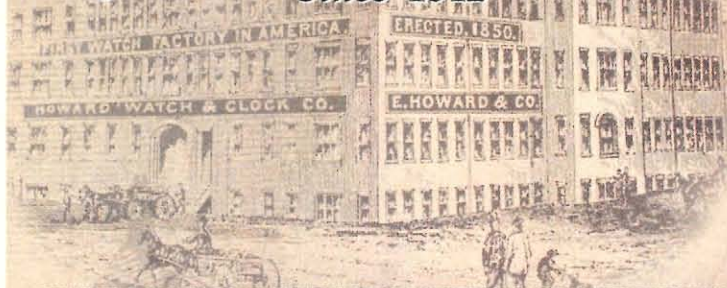
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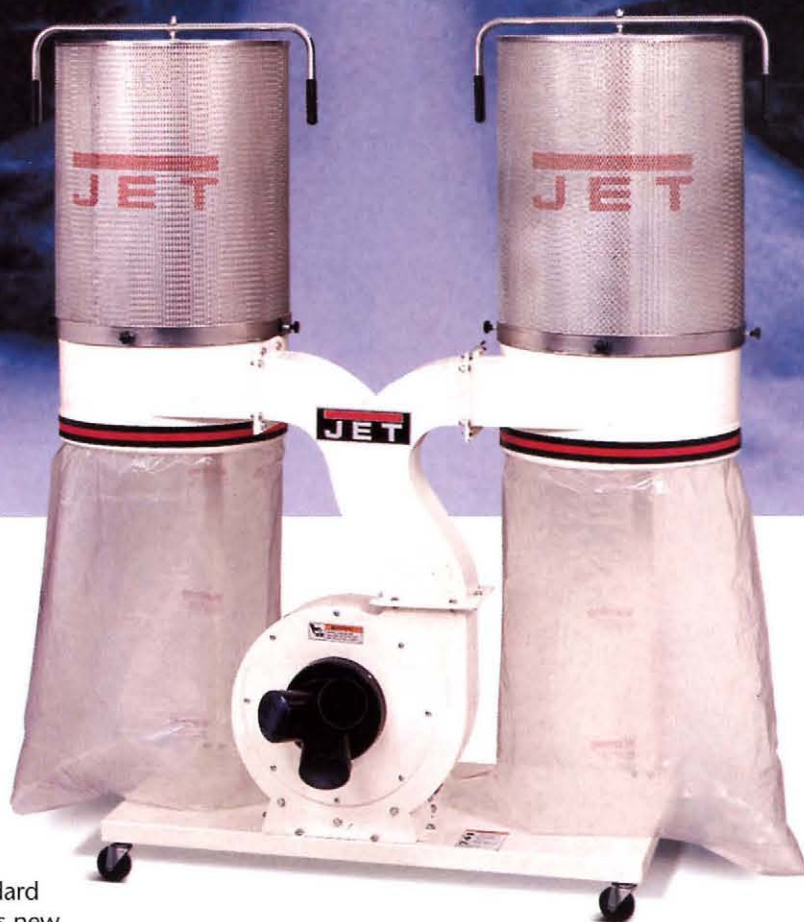


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