

Pre-Register Now to Save \$15 Off the Admission Price

Attend Atlanta's International Woodworking Fair Aug. 24-27

HIGHLAND HARDWARE will once again be among the more than one thousand companies exhibiting at the largest woodworking event in the Western Hemisphere. The International Woodworking Machinery & Furniture Supply Fair will take place at the Georgia World Congress Center in Atlanta Friday-Monday, August 24-27. Show hours are 9 am to 6 pm each day.

Everything from the latest in woodworking tools, supplies and accessories to some of the world's largest woodworking equipment will be displayed and demonstrated. While much of the exhibition is aimed at buyers for the furniture manufacturing industry, there will also be plenty of new and interesting items of appeal to small shops and hobbyists as well.

See us in Booth 3426

In booth 3426 (located on the north wall of exhibit hall C) Highland Hardware will exhibit three of its major woodworking lines, including Hydrocote water-based finishes, Performax stationary sanders for small shops and hobbyists, and the JDS Multi-Router and Accu-Miter. Show specials will be available on a number of the featured products.

To make it easy for you to attend, we have arranged to provide Pre-Registration Forms

for our customers. If you do not pre-register, admission at the door will be \$20. For those who do pre-register, admission is only \$5.

To receive a Pre-Registration Form, please stop by the store and request one, or send a self-addressed stamped envelope to us at:

Highland Hardware, IWF90
1045 N. Highland Avenue
Atlanta, GA 30306.

If after receiving your pre-registration form from us, you are unable to mail it before August 1, simply complete the form and bring it with you to the show. Submitting a completed pre-registration form at the door will still save you \$15 off the admission price.

Please note that no one under the age of 16 will be admitted to the show.

IWF90 is sponsored jointly by the American Furniture Manufacturers Association, the Wood Machinery Manufacturers of America and the Woodworking Machinery Importers Association.

Financing Available on Tool Purchases

AS A HIGHLAND HARDWARE customer, you are invited to apply for our SERVISTAR® Visa or MasterCard, offered in cooperation with PNC National Bank of Wilmington, DE. The card can give you immediate credit up to \$2000, subject to credit approval. Use it to finance a new stationary tool, or as a convenient way to charge hand tool purchases, and as a general-purpose charge card good wherever MasterCard and Visa are honored.

The cards feature an Annual Percentage Rate of 17.9%, although you can avoid any Finance Charges on your purchases if you pay your entire monthly balance in full.

Minimum monthly payment is 2.7% of your outstanding balance. If you use the card exclusively to finance a large purchase from us and make a monthly payment of 5% of the purchase amount, 24 months are required to complete payment.

You will also receive a 1/2% rebate on ALL PURCHASES charged to the card (subject to certain restrictions). There is no annual fee charged for the first year. After your first year, the annual fee is \$18.

For a credit application, see the back of the order form in our Spring/Summer Highland Hardware catalog, or phone or write Highland Hardware.



Timber framing students and staff of Upper Loft Design, Inc. are pictured at work erecting an Alpine farmhouse frame at a recent week-long workshop in Clayton, GA. Owner John Koenig will teach a weekend seminar on timber framing at Highland Hardware September 15-16. His article on the subject of timber framing appears on page 7.

Fall 1990 Seminars at Highland Hardware

September 8	Introduction to Woodworking
September 15-16	Timber Framing with John Koenig
September 22	Sharpening
September 29	Getting the Most Out of Your Tablesaw
October 6	Using Hand Planes
October 13	Hand Tool Joinery: Cutting Dovetails
October 20	Making Wood Boxes
October 27	Fundamental Wood Finishing
October 28	Finishing with Hydrocote
November 3-4	Inlaying and Veneering with Ben Covington
November 10 & 11	Wood Turning with Ernie Conover
November 17	Routers and Jigs
December 1	Getting the Most Out of Your Bandsaw

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Fall 1990 Seminars at Highland Hardware



Introduction to Woodworking

- Saturday, September 8 9 am to 4 pm
- #IW2 Admission: \$35.00

For anyone starting out in woodworking, this class will answer the 1001 most commonly asked questions about wood and the tools used to work it. We'll begin with a survey of fundamental wood technology, which is the essential basis for choosing woods, tools, construction techniques, and finishes. Next, we'll discuss the heart of the shop, the workbench - considering design, function, and hardware to meet the requirements of space, economy and practicality now and as your shop grows in the future.

Participants will get a comprehensive look at the tools of the trade: design resources; tools for measuring and marking; tools for stock preparation, joinery, assembly and finishing. If you're interested in woodworking and would like a shortcut toward the fundamental information you need, here's the place. Zach Etheridge is the instructor.

Introduction to Timber Framing with John Koenig

- September 15-16
- Saturday 9 am - 4 pm Sunday 9 am - 3 pm
- #TF2 Admission: \$60.00

Timber framing seems to be making a revival in today's homebuilding market, and the recent timber framing series on PBS's *This Old House* has helped to inspire and educate millions of viewers. This once popular method of building uses all the joinery familiar to cabinetmakers and amateur woodworkers, but of course on a much larger scale.

The weekend seminar will feature a demonstration of the design, cutting, and erection of a small timber frame work trestle, using the same size timbers and the same mortise and tenon joints used in timber frame house construction. Joint design for specific practical applications will be discussed, and examples of several joints will be constructed.

Tedd Benson's two books *Building the Timber Frame Home* and *The Timber-Frame Home: Design, Construction & Finishing* will be referred to often during the seminar, and both are recommended reading. (Both books are available from Highland Hardware.)

John Koenig, the instructor, is president of Upper Loft Design, Inc. In addition to building timberframe homes, the company also instructs hands-on workshops at its facility in Clayton, GA.

Zach Etheridge, a former professional woodworker and now Product Engineer at Highland Hardware, has taught seminars and workshops at Highland since 1982.

Brad Packard, known around southeastern trade shows as "Mr. Bandsaw," has been a professional furniture-maker, stationary tool sales rep, and is now Tool Sales Manager at Highland Hardware.

Sharpening

- Saturday, September 22 9 am to 4 pm
- #S2 Admission: \$35.00
- Instructor: Zach Etheridge

Sign up early; this one always sells out fast. Sharpening skills are absolutely essential, and are easier to acquire than you think. Emphasis is on sharpening plane irons and chisels using Japanese waterstones; any other kinds of tools will also be addressed. Bring along a few tools to work on, and bring your own stones if you have them - if you don't, use ours and find out how they work.

Register for seminars by visiting the store, or by mailing the order form found on page 31 of *Wood News* along with a check for the seminar fee. Visa, MasterCard, and Discover users may register by phone at (404) 872-4466.

(Fees are refundable if you cancel at least two weeks prior to the seminar.) Location for all events is our seminar room behind the store.

Getting the Most Out of Your Table Saw

- Saturday, September 29 9 am to 4 pm
- #TS2 Admission: \$35.00

Brad Packard will begin with fundamental table saw techniques, and continue through advanced applications. Fundamentals will include setting up and adjusting your saw, operating your saw safely, and producing accurate rips and crosscuts. Basic joinery, the role of the table saw in preparing stock, and useful jigs and fixtures which you can make for your table saw will also be covered. Advanced work will include making raised panels and decorative moldings on the table saw. Tage Frid's book, *Joinery: Tools and Techniques* will be referred to during the seminar, and is a good reference for participants to own.

Using Hand Planes

- Saturday, October 6 9 am to 4 pm
- #HP2 Admission: \$35.00

Making shavings with the noblest of hand tools is the topic in this popular hands-on class led by Zach Etheridge. Jointer planes, smoothing planes, block, rabbit, and combination planes will be discussed, demonstrated, and used by participants; emphasis is on joinery, finishing, and shaping by hand. Zach will also discuss tinkering with your planes to make them better than money can buy. Bring any planes you have, especially old and unusual ones. Some are available for those not yet equipped. *Sharpening skill is prerequisite.* Class size is limited, so sign up early.

Hand Tool Joinery: Cutting Dovetails by Hand

- Saturday, October 13 9 am to 4 pm
- #DT2 Admission: \$35.00

The dovetail joint stands for many woodworkers as the symbol of hand tool craftsmanship, and for most aspiring joiners is regarded as the most challenging test of their skills. Participants will practice all the fundamental skills of hand joinery: layout, sawing, chiseling and repairing the finished joint. Discussion will relate these skills to other joints such as mortise and tenon, but the main energy of the day will be devoted to successful dovetailing by one and all. Zach Etheridge instructs.

Making Small Boxes

- Saturday, October 20 9 am to 4 pm
- #SB2 Admission: \$35.00

Small boxes make excellent Christmas gifts. This one-day seminar taught by Brad Packard offers any woodworker the chance to learn how in time to take care of all those "hard-to-buy-for" friends and relatives.

The seminar will cover techniques for making a variety of boxes, including bandsaw boxes, boxes with raised panel lids, and boxes with more than four sides. Various methods will be presented for joining the sides (finger joint, miter joint, tongue and dado, doweled butt joint, dovetail) and for attaching the base and lid.

Brad will make and show examples of several different kinds of boxes as he demonstrates the various techniques. Come prepared to ask questions and take notes. Register now to reserve your space.

Fundamental Wood Finishing

- Saturday, October 27 9 am to 4 pm
- #WF2 Admission: \$35.00

Zach Etheridge will provide a day-long demo of finishing techniques covering many of the most popular and practical finishes: tung oil and Watco, oil-varnish mix, and other custom chemistry. Wood preparation (with special emphasis on using planes & scrapers), filling, staining, dyeing, and maintaining the finish will be covered. The focus will be on using simple methods to achieve consistently outstanding results.

Finishing with Hydrocote

- Sunday, October 28 1 pm to 4 pm
- #FH2 Admission: \$15.00
- Instructor: Zach Etheridge

Fast-drying, environmentally safe Hydrocote water-based lacquer and polyurethane finishes are revolutionizing the furniture finishing process at all levels, from the home shop to large production factories. The class will feature step-by-step demonstrations of the use of Hydrocote, including application by brushing or spraying. Time will be allowed to answer questions you have about Hydrocote.

Those attending will receive a complimentary sample of one of the Hydrocote products.

Inlaying and Veneering with Ben Covington

• Nov. 3-4 Sat. 9 am to 4 pm Sun. 9 am - 3 pm
• #IV2 Admission: \$85.00

Here is one you don't want to miss. The adornment of furniture has always been considered an art best left to trained professionals. However, most of the intricacies and processes can be achieved with a minimum complement of tools and experience.

During this weekend workshop, Ben will show you the ins and outs of making and applying your own inlays and medallions. You'll also learn to apply hard-to-manage veneers using a variety of methods, including hammer veneering, cold press and vacuum techniques. This class will add a whole new dimension to your woodworking.

Ben and his apprentices build 18th- and 19th-century furniture in his shop in Columbia, SC. A professional woodworker for 20 years, Ben has taught more than a hundred educational workshops. Ben's workshops are always packed with information, so come prepared to take plenty of notes and pictures, or risk leaving with a case of cranial overload trying to remember all that you've seen.

Register early to reserve a space.

Woodturning with Ernie Conover

• #WT21 Saturday, Nov. 10 9 am to 4 pm
or
• #WT22 Sunday, Nov. 11 9 am to 4 pm
• Admission either day: \$45.00

Ernie Conover, developer and manufacturer of the Conover lathe, will teach two one-day turning seminars at Highland Hardware. Ernie is an excellent turner and has taught seminars at countless woodworking shows and turning exhibitions.

Each day's session will include lively demonstrations of both spindle and bowl turning, as well as a discussion of lathe maintenance and troubleshooting. The spindle turning demo will cover correct use of the tools for shear cutting (rather than scraping), with emphasis on turning with speed and confidence along with the ability to duplicate—from 4 pieces to small production runs. The bowl turning demo will show how to turn a bowl directly from a green log. Use of the deep fluted bowl gouge will be covered along with the standard array of faceplate turning tools.

Response to Ernie's last seminar here was very positive, and we urge you to register early to ensure yourself a space. Please specify your preference for Saturday or Sunday.

Routers and Jigs

• Saturday, November 17 9 am to 4 pm
• #RJ2 Admission: \$35.00

This is a full day on the most versatile machine in the shop. Zach Etheridge will start with router basics, and continue through shop-built jigs for shaping and joinery, commercial dovetail jigs, and raised-panel construction. He'll take a look at what's new and exciting in the rapidly changing router marketplace. You'll also get the step-by-step on the unique table-mounting system developed here at Highland Hardware.

Getting the Most Out of your Bandsaw

• Saturday, December 1 9 am to 4 pm
• #BS2 Admission: \$35.00

"Mr. Bandsaw" himself, Brad Packard, offers this very popular class which will appeal to the beginner as well as the experienced bandsaw user. Included will be an organized approach to bandsaw setup covering blade tensioning, guide adjustment, tracking, & wheel alignment. Resawing, scrollwork and joinery will be discussed and demonstrated. The use of patterns in making cabriole legs on the bandsaw will also be demonstrated. Making jigs for your bandsaw will be discussed, along with safety considerations.

WOOD NEWS 25

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Wood News solicits manuscripts contributed by our readers. We pay \$50.00 (in tools) per newsletter page for material selected for use in Wood News. Enclose black and white or color photos. Submit material to Wood News Editor, c/o Highland Hardware. Deadline for next issue is October 15, 1990.



Guarantee

If for any reason you are not satisfied with any item purchased from Highland Hardware by mail or phone order, return it to us postage prepaid within 30 days of receipt and we will promptly replace it or refund the purchase price of that item, according to your preference.

New Inkra Fence System Now Available

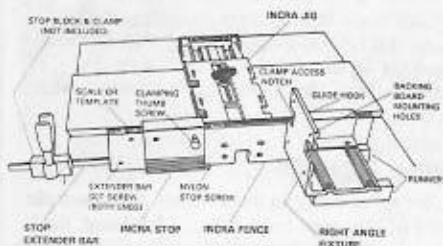
THOUSANDS of owners of Inkra Jigs will be delighted to learn that the makers of the now famous Inkra Jig have at last introduced the first genuine Inkra Fence System, an accessory which dramatically enhances the versatility and convenience of the Inkra Jig when used with a router table.

At the heart of the Inkra Fence System is the patented new aluminum Inkra Stop, which uses the same precision rack positioning technique found in the Inkra Jig to give you all the capabilities, and more, of having a second Inkra Jig mounted directly to your fence. Its ability to easily control the length of any cut with Inkra precision will make it the best stop block you've ever used.

Beyond the added convenience, the Inkra Stop's design also lets you make an infinite variety of decorative patterns for box lids, trays, door panels, cabinet fronts, etc. To show you how, templates and plans for making the Inkra Wave pattern illustrated here are included free when you buy the Inkra Fence.

The 18"-long Inkra Fence is made of solid aluminum flat to within 4 thousandths of an inch. Attached is a 17" sliding extender bar for clamping a user-furnished stop block up to 15 inches beyond either end of the fence, which comes in handy for making long mortises or slots on the router table.

An optional accessory to the Inkra Fence is the Inkra Right Angle Fixture, which holds



Inkra Fence with Inkra Jig and Right Angle Fixture

your work perpendicular to the table. This precision aluminum fixture is perfectly square to both the fence and the table. Its intelligent design includes many special features for high functionality and ease of use.

Included with the Inkra Fence is an extensive, fully illustrated manual covering all details and offering valuable tips.

The Inkra Fence System and the Right Angle Fixture can be bought separately, or as a package deal.

Visa, MasterCard & Discover users can order the Inkra Fence System by phone toll free, or see the order form on page 31 for info on ordering by mail.

08.53.31	Inkra Fence System	\$54.95
08.53.32	Right Angle Fixture	29.95
08.53.33	Fence & Right Angle Fixture Package Deal	79.95
08.53.11	Inkra Jig	32.95
08.53.25	Inkra Templates & Handbook	18.95
08.53.14	Inkra Gauge	15.95

Life After Sandpaper

Fast, Dustless and Cheap: Cabinet Scrapers' Secrets Revealed

by Zach Etheridge

ONE OF THE GREAT MYSTERIES of contemporary woodworking is that so many people use sanders as their only means of cleaning up, leveling and smoothing wood surfaces. It's not as if they enjoy sanding so much they've deliberately rejected all alternatives — there are relatively few craftspeople who are actually fond of sanding, and few of those who'll admit to it — it's just that in most cases, nobody knows there's any viable alternative to be had. There is an alternative, though—faster, quieter, dustless, and cheap: the cabinet scraper.

Once you know how to sharpen and burnish a scraper properly, you can use it for work that you'd otherwise do with anything from 60 to 220-grit paper. You can clean up glue squeeze-out, remove layout marks, smooth grain too squirrely for a hand plane, scrape lacquer finishes smooth between coats, or take a slab from thickness planer to fine finish in a matter of minutes. Sounds like an ad on late-night TV, doesn't it? Oddly enough, when they're working right scrapers do anything but scrape. They actually function as high-angle cutting tools with tiny cutting edges and radical chip-breaking effect, which accounts for their ability to take ultra-fine shavings from almost any grain structure with no tear-out.

Hand Scrapers

Scrapers come in three forms, one a simple piece of thin steel used entirely freehand, the second a blade in a spokeshave-like body with side handles, and the third a blade in a body like an oversize smoothing plane. The hand scraper is effective, inexpensive, and readily available, so that is where we'll start. Of all the hand scrapers sold, one—the Sandvik 475—is universally acknowledged as the standard against which all others are measured (and usually found wanting). The Sandvik scraper consists of a piece of high-quality tool steel, 2-1/2" by 5-7/8" by 1/32" thick. Curved scrapers are also available, sold in a set of two designed to handle a broad array of contoured surfaces. Preparing a scraper for use is a two-step process, starting with sharpening and proceeding to burnishing and turning a burr. Sandvik scrapers are packaged sharp and ready to burnish, so if you've just bought yours you may temporarily skip the paragraph on sharpening; once sharpened, the tool can usually be burnished and re-burnished several times before resharpening becomes necessary.

Zach Etheridge is Highland Hardware's Product Engineer.

Sharpening a cabinet scraper is not much of a chore. There's not a whole lot of edge to work on, and all you have to do is create crisp 90° edges anyway; no bevels, micro-bevels, hollow grinds or other fun things. Once the scraper's been re-burnished until performance drops off, the first sharpening step is to file the edge down to fresh steel. A standard mill bastard file 8" to 12" long will do a fast and effective job. Clamp the scraper blade in your vise with about 1/2" to 3/4" showing, just high enough so the file lying across the fingers of both hands can contact the edge as it slides along. Holding the file as shown in **Figure 1** makes it easy to keep it level and cut the edge quite reliably square. Skew the file so several inches of its length are lying along the edge; this will almost automatically cut the edge straight, which is as it should be. A crooked edge doth not a good finishing tool make.



Figure 1

During the first few strokes on a thoroughly used edge, the file may bite erratically, skating over some areas and cutting into others. Keep filing until it cuts smoothly and evenly along the full length of the edge, applying less and less pressure as you get closer to being done. You're aiming for a smooth, shiny edge with no appreciable burrs on either side. If it doesn't seem entirely easy to file your scraper well, take a hard look at your file—it should be both sharp and clean. If strong light shows you white highlights running along its length you're looking at dull teeth that won't cut well; get a new file. A file card, a handled brush with bristle on one side, steel wire on the other, will help clear debris from the file's teeth, especially if you've used it on soft stuff like aluminum or brass.

For some purposes, the scraper is now in suitable shape for burnishing immediately after filing. The edges aren't nearly as sharp as they could be, but if you're cleaning up glue squeeze-out or leveling a lacquer finish before recoating you can quickly establish a very functional burr without further ado. If, however, you're doing the final smoothing of a piece of wood or one last round of take-down before rubbing out a finish, you'll want to hone the scraper's edges before turning to the burnisher. Honing is extremely simple, thanks to the ease with which you can maintain the 90° angles involved. Make sure your sharpening stones are flat before you begin. Work the edge on a medium waterstone or fine Arkansas stone, holding the scraper as accurately vertical as possible. Here you can jig your fingers by letting them ride lightly on the surface of the stone, but don't get carried



Figure 2

away and grind yourself raw. Skew the scraper blade so it doesn't instantly groove the stone and round over its crisp edges (**Figure 2**). Now proceed to polish the faces of the scraper by laying one side flat on the stone, spreading your fingers to apply even light pressure all along the edge, and rubbing in a small circular motion. Don't press hard, or you'll mash the cutting edge down into the stone and damage it. Do the other face, and check the cutting edges critically; they've got to be sharp or the scraper won't make shavings no matter how well you burnish. If an edge feels anything less than crisp and sharp along its full length, spend a little more time getting it right. When you're satisfied that all edges are good cutting tools, you're ready to burnish.

So far we've been talking about prepping just one of the scraper's long edges, which is going to provide two cutting burrs and deliver a fair amount of work before you'll need to re-burnish. You can go ahead and prep both long edges, but you'll need to make yourself an edge guard to keep from lacing your fingers with very fine cuts (usually painless but cosmetically unsatisfactory) while you work. A length of plastic report binder or a 6" piece of split plastic tubing will make serviceable guards.

With sharpening complete, it's time to burnish the tool and turn the burr. Burnishing ("making shiny or lustrous by rubbing; polishing") can be done with practically any piece of smooth hard steel, such as the back of a good chisel or the butt end of a large-diameter high speed steel drill bit. There are tools made for the purpose, though, that are not only comfortable and efficient in use, but which will keep you from putting little nicks in the backs of your chisels which in turn put little nicks in your fingers whilst you pare. For most purposes a burnisher with a triangular cross-section is the most comfortable design. During the heavy part of the work your thumb



Figure 3

rests on one of the broad, flat faces, while the pressure you're applying is tightly focused at the smooth apex in contact with the scraper. Round and oval-section burnishers also work well, and may feel better suited to working on curved scrapers.

Unlike sharpening, burnishing involves no abrasion or cutting of steel; on the contrary, you want to make sure that your burnisher slides smoothly across the scraper with no chance of biting into it and roughing up the edge you've filed and sharpened. Before you pick up the burnisher, coat the scraper face you're about to work on with a liberal smear of heavy oil, such as 30-weight motor oil; very light oils such as honing oil will not do what needs to be done.

Lay the scraper on a stout flat surface such as the edge of your workbench. Place the blade of the burnisher flat on the scraper, with your thumb positioned directly over the scraper's edge (Figure 3). Press firmly (10 to 12 pounds if you have calibrated thumbs) and stroke the burnisher along the full length of the scraper's edge, in one direction only, through twenty strokes or so. This is not just rigamarole to placate the goddess of finishing; you're actually conditioning the steel along the edge, making it smoother and tougher so the tiny burr you're about to create will be able to stand up to the kind of hard work it's going to be subjected to. With one edge done, flip the scraper over, oil the face, and do the opposite edge. Then turn it round and do the other two edges if you want to.



Figure 4

The final step is just as simple as everything you've done so far. Hang the scraper's edge a little ways off the top of your bench, and make sure there's oil on the thin face of it. Bring your burnisher up perpendicular to the edge, then lean the upper end inward just 5°. Five degrees isn't much; be careful not to exaggerate the angle or the scraper won't work easily or at all. If your bench edge is thick enough, you can fence your fingers against it (Figure 4) to help maintain a fairly consistent low angle. This is the point where most of us who've tried to fake our way through prepping scrapers come to grief, so pay attention. You're working on a *sharp* edge—never mind the bevel angle is 90°—and like any sharp edge, it's very delicate. You're aiming to roll that sharp edge over just a little ways, creating a burr so tiny you can barely feel it; no massive hook as thick as your toenail or anything remotely that coarse.

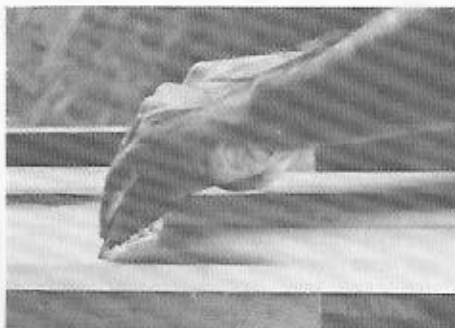


Figure 5

It takes very little pressure to roll a sharp edge over just a little, so take it easy. Give the edge five to ten strokes with no more than about eight ounces of pressure, and you're done. Wipe off the oil and feel the results: five strokes yields a burr so small you can barely feel it, while ten strokes yields a burr just big enough to feel but a lot smaller than you

The most important thing to remember about burnishing is that it's easy; if it makes you sweat you're working way too hard.

thought it would be anyway. The most important thing to remember about burnishing is that it's easy; if it makes you sweat you're working way too hard.

The acid test, of course, is making shavings on wood. Start out with a nice piece of straight-grained scrap—no sense wrestling with squirrely stuff at this point. Hold the scraper as shown in Figure 5, thumbs toward you and all eight fingers distributing pressure behind the cutting edge. Without bearing down hard at all, draw the scraper toward you, starting with the blade standing vertically and slowly leaning it toward you until it begins to bite. At something like 25° or 30° forward tilt, the scraper will suddenly and distinctly begin biting into the wood. If it begins cutting when it's much closer to vertical, it will likely be hard to control, tending to chatter and skip. Likewise if it doesn't begin to cut until it's leaned over quite steeply it will be hard to hold and will once again tend to chatter rather than cutting smoothly. What you should see when the tool is working right is a pile of extremely thin but distinct shavings piling up in front of the tool, not just a sprinkling of dust. If you don't get shavings, you could be



Figure 6

looking at an edge that wasn't sharp to begin with, or a burr that got burnished with too little pressure. If the edge feels sharp, try re-burnishing once with just a little more vigor.

Now that you've mastered the fine art of burnishing by hand, we must risk spoiling your day by mentioning that there is an easier way to do it. Ulmia of West Germany makes a simple wooden block with a steel guide plate and a hardened burnishing wheel that will prep a sharp scraper perfectly in two seconds flat. Oil the scraper as before, lay it on the guide plate, and stroke it lightly under the edge of the wheel (Figure 6). Presto! Instant burr, automatically turned to just the right angle, and you're off to work. The tool is designed to let you rotate the burnishing wheel to expose a fresh bit of edge whenever it becomes worn or grooved. The Ulmia burnisher costs an outrageous amount of money, so make sure you don't try one out—you'll have to get it anyway. If you use scrapers constantly, this tool will be a great timesaver and an indispensable convenience.

For most finishing purposes, holding the scraper for a full-width pulling stroke, as shown in Figure 5, will work fine. You'll have good control, you can reach right into corners, and you'll be finishing a 6" swath with every stroke. Sometimes, however, you'll want to bow the scraper slightly, narrowing the edge width that contacts the work and allowing you to focus on pretty specific areas,



Figure 7

such as glue lines, spot tear-out or other localized problems. If you've bought a new Sandvik 475, you'll notice that the package has cute little pictures that specifically prohibit pushing the scraper. Don't tell Sandvik, but you have our official permission to disregard those instructions and use the scraper any way you like. Pushing the scraper does almost automatically bow the blade and narrow its width of cut, but frequently enough circumstances make pushing the tool the most convenient thing to do (Figure 7). One genuine note of caution: scraping generates a lot of heat, and pushing the blade focuses all that heat right on your thumbs. Many a startled woodworker has been happily scraping away only to see wisps of smoke arising from his sizzling thumbs—beware!

Clean-up and spot-repair scraping is pretty straightforward: just do the work where it needs to be done. Scraping a large surface to a good finish, or scraping a finish itself, will require a bit of simple technique. The scraper will make shavings and leave a clean surface

(continued on next page)

Life After Sandpaper

(continued from previous page)

at almost any angle of attack, though severely reverse-grained woods or glue-ups will cut cleaner if the blade is skewed relative to the direction of travel. In fact skewing the tool is a good idea most of the time, as this will eliminate the washboard effect that can build up if you repeatedly scrape straight along a surface. Skew the blade left on one pass, then right on the next; you'll end up with a



Figure 8

completely flat surface even if the piece started off with thickness planer scallops all over. Getting started is about the only tricky part of the job, but once again skewing the blade will let you register half of it on the workpiece, lightly, so it can guide the other half smoothly onto the surface where it begins to cut (Figure 8). Exit the surface still skewed to keep cutting flat and avoid tearing the edge of the work. A good job of scraping can usually be finished off with a little quick hand sanding at 220 grit (and finer if desired, of course) to wipe out any tracks or minute tear-out, though if nature smiles and you're really good at it you can get a piece finished just about perfectly right out from under the tool.



Figure 9

When you're scraping a finished surface you'll have to pay a little more attention to the ends, where it tends to be hard to cut as deeply as on the rest of the surface. Start off with a few light strokes cutting right across each end of the piece (Figure 9), and then finish off with the usual skewed strokes along its full length. Scrape with a moderate touch and pace. A fast stroke or lots of pressure can generate enough heat to melt or burn a finish, causing it to drag, scar or soften. Between coats, scraping might be all you need to do to; after the final coat, following up with a fine Scotchbrite pad or 4/0 steel wool will deliver a satin finish or prep for further rubbing out.

Even given the quality of the tool and the beneficial conditioning of burnishing, a burr as tiny as the one you're working can't be expected to keep on cutting indefinitely. When you start producing more dust than shavings, you can very quickly recondition the burr and once again get perfect performance from it. Lay the scraper on your bench, bring on a smear of heavy oil, and gently lay the burr back out flat. Give it a few more strokes with more pressure, then hang the tool off the edge of your bench and turn the burr exactly like you did the first time. The bigger the burr you turn, the fewer times you'll be able to get away with simple re-burnishing; very small burrs can be re-burnished half a dozen times before the steel gets work-hardened and worn to the point of diminishing returns. At that point go all the way back to the file and resharpen.

Handled Scrapers

Handled scrapers have been around practically forever; the ninety-year-old Stanley #80 design is very closely modeled after wooden handled scrapers that were in use hundreds of years earlier yet. There are currently two #80 scrapers available, one from Kunz of West Germany, the other still being made by Stanley in England. The Kunz



Figure 10

version (Figure 10, top) is functional, though as is typical of Kunz castings a bit of finishing and fettling by the owner will make a big difference in performance. The Stanley #80 (Figure 10, bottom) is a very nicely made tool with smooth casting and good finishing work, and for many people its quality makes it easily worth the difference in price. #80 scrapers let you set whatever depth of cut you choose and then work as vigorously as you like without frying your fingers. For heavy take-down work and finishing large surfaces, they're hard to beat.

Sharpening and burnishing the #80 blade differs from the process already described in that the blade is first ground to a 25° or 30° bevel, like a chisel or plane iron. Kunz blades come square from the factory, ready for grinding; Stanley does that part for you. These blades are small enough to be hard to handle without help, but you can easily make a holder that takes care of that problem. A 1"-deep bandsaw or handsaw kerf in the end of a short piece of scrap will hold the blade securely; taper the nose so it's out of your way and shape the rest of the piece into a comfortable handle (Figure 11). Sharpen just as you would a chisel, right up to a fine polishing stone. Make sure the edge is straight, or perhaps even very slightly convex; a blade that's even slightly concave won't work at all.

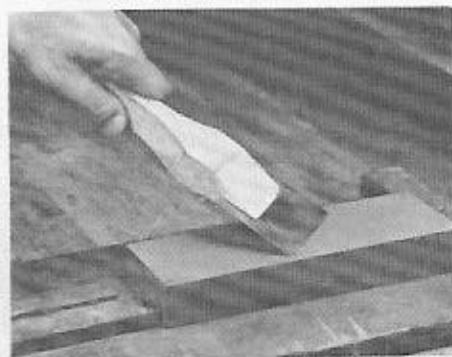


Figure 11

Burnishing takes even less effort than the little we prescribed for the Sandvik 475, since you don't bother with the twenty consolidating strokes to begin with, and turning the edge to form a cutting burr takes only a few ounces of pressure. As before, oil the edge to avoid damaging it with a dry burnisher. Bring your burnisher on at about 5° or 10° higher than the bevel angle, and gently stroke along the length of the bevel, rolling the cutting edge toward the back. You'll usually turn a somewhat more aggressive burr on a #80 than you would on a Sandvik, but still you don't want to get carried away and grind out some sort of hideous huge hook.

Set the #80 on a flat surface and slip the iron back into the scraper body, taking care not to damage the new edge on the retaining bar or throat opening. The flat back of the blade faces the front (curved) end of the tool. Make sure the thumb screw in back is completely out of the way. For fine finishing purposes, simply hold the blade so it rests flush with sole, and tighten the two screws on the retaining bar. Now use the thumb screw to bow the blade slightly, pushing the center section down so it protrudes below the sole. This system allows you enough control over depth of cut to take off as little material as you like, down to shavings a scant thousandth of an inch thick. For more aggressive take-down work, put a piece of paper under the nose of the scraper before installing the blade; this will set up a few thousandths' depth of cut right off the bat. The scraper is usually pushed, but can be pulled if that's what needs to be done.

Well, don't just sit there—rush down to the shop, get out that scraper you never could get to work right, and burnish up a storm. It's worth however much practice it takes, it's worth buying a new file or a fine sharpening stone, shoot—it's even worth being a beginner for a little while until you get the hang of it. Unless you just like sanding, of course.

Call toll free, or use the order form on page 31 to order:

03.15.01	Sandvik 475 Scraper	\$5.95
03.53.02	Pair Curved Scrapers	4.95
03.39.03	Kunz #80 Scraper	19.95
03.12.05	Stanley #80 Scraper	32.95
03.39.23	Triangular Burnisher	8.50
03.39.24	Round Burnisher	8.50
03.40.01	Ulmia Burnisher	49.95

Timber Framing Experiences a Revival

by John Koenig

OLD WAYS of working wood seem to bring a special tingle to any wood lover's heart. But how can one relate such an interest to the fast-paced wood industry of today?

At Upper Loft Design, a timber frame group located in the northeast Georgia mountains, woodworkers are successfully joining the craftsmanship of yesterday with the building industry of today.

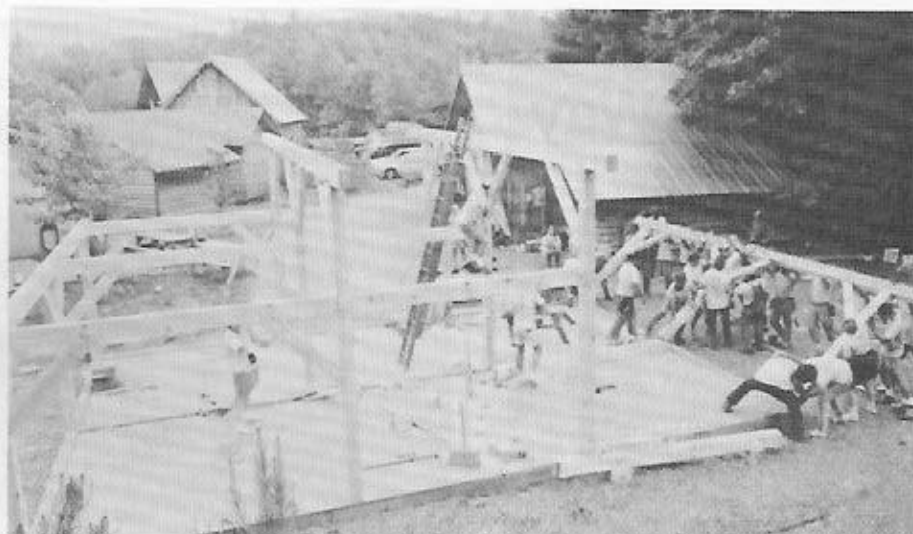
Timber framing is a refined method of post and beam construction utilizing traditional joinery. There are no "ferroc fasteners" in the connections. It is much like building fine furniture on an oversized scale. Since the revival of timber framing some twenty years ago, methods and techniques have been refined, but the basic practices which have allowed structures to stand for centuries are still followed.

As with any project, the first place to start is at the drawing board. Many shops rely upon stock plans, while others do exclusively specialty work. At Upper Loft Design, we provide in-house design through finished-frame service, giving our clients what we feel is the best of both approaches.

The next step of the project is material selection and preparation of stock. Timber selection is of key importance, and both North Carolina and Georgia mills are used to find the best timber at the best prices, finished to the client's specifications. For example, in cabinetry, a sixteenth of an inch discrepancy in material thickness cannot go unaccounted for. The same strict tolerances apply in timber framing. Whether the project is a modest cabin or a show place, the joinery must be cut to exacting specifications.

Many tools are used to perfect timber after it has been milled. Power planes are in common use in the shop, though sections of timber needing special surfacing, squaring or truing are often hand planed.

Though the joiners in our shop come from diverse backgrounds, all are here because of a sincere desire to achieve excellence. While power tools are used extensively in the rough cutting of joints, every connection is perfected and tuned with hand tools. Among hand tools,



Excitement runs high as everyone pitches in to raise the final section of this Alpine farmhouse at the end of a week-long Upper Loft Design workshop in Clayton, GA.

the chisel seems to be the timber framer's most prized instrument. Both Western- and Japanese-style chisels are commonly used. It is the special attention a joiner gives to finishing a joint that determines a quality job.

While power tools are used extensively in the rough cutting of joints, every connection is perfected and tuned with hand tools.

One could describe our approach as "Use power tools to shorten the time it takes to get to the hand work." Tenon cutters, mortising machines, various-sized circular saws, and routers all number in the menagerie of tooling that we use to approach the finished product.

Even with a set-up like this, it is important not to lose sight of the individual who wishes to do his or her own project. Many wonderful frames are cut each year by people who own only basic hand tools along with a half-inch drill and a circular saw. After all, up until this century, it was all hand work.

Once the frame is cut, all the pieces are taken to the site and assembled. Many specialty tools are used to pull, beat and persuade the snug joints together. When the joint is tight enough it is drilled and pegged. After assembly of the walls or "bents," the building is raised into the air one section at a time. This is a special time for all involved.

Timber framing has many aspects. Closing in a frame is another book in itself. There is a great deal of literature to be found on timber framing, perhaps the best of which are the two books by Tedd Benson. His first book, *Building the Timber Frame House*, is now regarded as a classic. His second book, *The Timber Frame Home—Design, Construction & Finishing* published by the Taunton Press, deals with many of the issues of planning and constructing around the needs and desires of the client, covering the complete process from beginning to end.

Also contributing to the revival was last season's series on timber framing featured on PBS's *This Old House* program.

For those who want to learn more, workshops are springing up around the country, including two each year in north Georgia taught by Upper Loft Design. Each concludes with a hand raising of the week's effort.

Timber framing is something worth learning about, for old-style quality has a way of staying with us.



John Koenig (pictured above demonstrating layout of a timber frame joint) will teach a weekend seminar at Highland Hardware September 15-16. The class is described on page 2 of Wood News.

Upper Loft Design's next week-long seminar in Clayton, GA will be offered November 11-17, 1990. For more information you can telephone them at (404) 782-5246, or write them at PO Box 1846, Clayton, GA 30525.

To order books, use the order form on page 31, or if using Visa, MasterCard or Discover, order toll free.

20.06.10	Building the Timber Frame House	\$16.95
20.04.71	The Timber Frame Home	19.95

John Koenig, a second generation timber framer with 12 years in the field, is President of Upper Loft Design, Inc. in Clayton, GA.

Sharp Edges the Easy Way

The Makita 9820-2 Electric Sharpener Does Them All

by Zach Etheridge

THE VENERABLE Makita Electric Sharpener has been enjoying something of a boom in popularity lately, which has inspired us to offer this review of an old favorite's fine performance features. The 9820-2 is a powered waterstone sharpener. If you've ever used Japanese waterstones for sharpening by hand, you've seen how terrifically efficient they are and how sharp an edge they can create; perhaps you can imagine how easy sharpening is when the stone does all the work for you at 560 rpm.

Makita designed the 9820-2 for sharpening jointer and planer blades up to 16" in length. It does that job beautifully, and the quality of its work makes a great difference in the quality of work you can expect from your machines. We take it for granted that our demo AP-10 thickness planer should turn out wood as smooth as a machine with a cutting rate twenty strokes per inch better, because we keep its knives (usually) considerably more than twice as sharp as any commercial service might make them. If you've never seen wood coming out of your planer shining as if you'd planed it by hand, maybe you ought to take a look at a sharpening system like this one.

The Makita sharpener's territory isn't limited to machine knives alone. Practically any hand tool in the shop can be ground and sharpened with ease; chisels and plane irons can be jigged and ground to a perfect bevel, while carving tools, turning tools, knives or any others tools you can think of can readily be sharpened free-hand. All your grinding and sharpening can be done with absolutely no risk of overheating an edge and drawing the tool's temper; a constant supply of water from a gravity-feed tank on the sharpener keeps stones from clogging or glazing and keeps a tool cool through even the most vigorous grinding.

Green Wheel

As you've probably noticed in our catalog, we're rather proud of having developed a coarse grinding wheel for the 9820-2, a stone that vastly enhances the machine's speed and general usefulness. Makita equips the sharpener with a 1000-grit wheel, a stone which provides a very good cutting edge—sharper than you've ever seen on a planer blade—but which is too fine to quickly waste

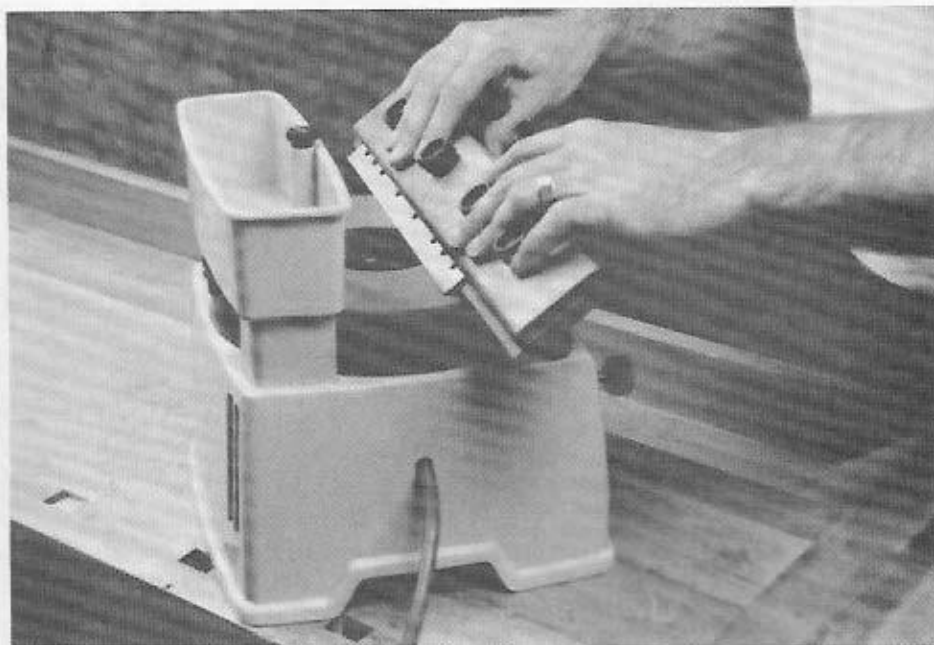


Figure 1. Makita 9820-2 is ideal for sharpening jointer and planer knives.

away the large amounts of steel you've got to remove when an edge is badly damaged or misshapen. Our Green Wheel, a silicon carbide stone of 120 grit, will grind the hardest steels as aggressively as a coarse wheel on a conventional bench grinder. In fact, the Green Wheel will even grind tungsten carbide blades, providing an edge about as good as what you're used to paying for, though it's certainly our preference to improve it a bit further with a medium diamond hone by hand.

Over the years since we introduced the Green Wheel, we've found that it's become the stone with which we do almost all of our work on the 9820-2. Jointer and planer knives are never just dull; they always have lots of nicks and chips blown out of the edge, and they inevitably need more than a light sharpening job to get them back into usable shape. Rather than spending ten or fifteen minutes on the 1000-grit wheel, we'll get the job done in a fraction of the time on the Green Wheel, then follow up with about sixty seconds' work at 1000 grit to polish the edge to perfection.

We expect to routinely turn out edges that are within a few thousandths of dead straight over twelve inches, with no bowing or distortion of the knife and absolutely minimal wastage of steel. We usually sharpen until just one or two of the deepest nicks are left just barely showing, then re-install the knives in the cutterhead with just enough offset to be sure no bead lines show up on the wood being planed. By being so parsimonious with our grinding, we've been able to re-grind knives a good dozen times when they'd normally last through no more than three commercial sharpenings before having to be replaced.

Mounting Machine Knives

The 9820-2 comes equipped with a stout cast-iron blade holder that can handle practically any known make of jointer or

planer knife up to about 16" long. If you're willing to ignore reasonable limits and work a little harder, you can sharpen 18" or even 20" knives pretty well, too. Jointer knives are a snap, since you can put two or three of them end-to-end in the holder and sharpen them all at once. Just set each knife so the cutting edge protrudes evenly about 5/16" (8 mm) beyond the front of the holder and they'll all come out straight and even. One of the reasons the machine works so well is its low-tech design; rather than building in a bunch of expensive but not-quite-precise-enough setting and calibration mechanisms, Makita leaves it up to you to measure accurately (which is hardly a major challenge) and achieve as much precision as you like.

Setting the Bevel Angle

The same goes for setting the angle of grind. The tool rest on the 9820-2 is adjustable in both angle and height, which allows you to set up any reasonable bevel angle you like. In fact, in all the years we've used and sold the sharpener we've run across only one planer knife from a weird old Belsaw or something with about a 70° bevel that we couldn't reproduce. With your planer or jointer knife in the holder, set the holder on the tool rest and lower its angle until the knife touches the surface of the stone. Get down and sight along the edge of the knife. Unless by accident the bevel won't be laying flat on the stone. If the cutting edge touches the stone but the back of the bevel is raised, you need to lower the tool rest and crank its angle up a little. If the heel of the bevel touches but the edge is raised, do the opposite: raise the rest and lower its angle. It will usually take about two tries to get yourself set very close to the original factory bevel angle, and one more step to get it dead on. Turn on the sharpener and stroke the knife about twice across the stone, then take a look at the bevel. You'll see exactly how close you are to grinding at the factory angle, and any

remaining fine adjustment needed will be immediately evident.

We'll admit there are a few details about the fine points of operating the tool that we're leaving out here, but we cover them all pretty clearly in one of our Highland Hardware user's guides that we provide with every sharpener we sell. The guide has worked pretty well for the last eight years or so—it's only two pages long, but it has helped over a thousand people master the sharpener's capabilities with no trouble at all.

Sharpening Hand Tools

We sharpen a lot of hand tools on the 9820-2, where routine maintenance of edges that are slightly dulled but otherwise in good condition takes only a few seconds on the 1000-grit wheel. Often enough, though, we turn to the sharpener when a tool needs more than a casual lick before going back to work, so once again the Green Wheel is the weapon of choice. We'll budget a few minutes to create a new bevel on a broken chisel or shape a new edge on a plane iron that just ate a nail, and then follow up at 1000 grit as always. Usually we finish by hand on 6000- and 8000-grit waterstones, but every now and then when we've got a whole pile of tools together for sharpening we'll break out the 6000-grit wheel that Makita offers for the 9820-2 and polish every edge in the shop right up to a mirror shine and a razor edge.



Figure 2. Highland Jig used with 9820-2 for accurate sharpening of a chisel.

The Highland Jig

Chisels and plane irons almost always get the benefit of being jigged in a simple aluminum fixture that we manufacture for the purpose. The Highland Jig, as we humbly call it, replaces the Makita tool holder but rides on the tool rest in similar fashion, allowing even easier set-up for correct grinding angle. It's also dead simple to grind a cutting edge back to square if a lot of hand sharpening has left it more skewed than you like. Take a good look at how far out of square the tool has become, and then simply put the high side of the edge into contact with stone, skewing the tool within the Highland Jig to raise the low side off the stone by just the distance you saw under your try square. By the time you've ground enough steel away to make the whole width of the bevel contact the stone, your edge

will automatically be square. We also use the sharpener on the backs as well as the bevels of some tools. Though we're fanatic enough to insist on using a lapping plate for flattening the backs of plane irons, we've found no faster or more effective way to polish the backs of chisels than on the 9820-2. It doesn't even matter especially that the stone be flat; by keeping the chisel moving all across the surface, you'll get its back quite flat and dress the stone nicely while you're at it.

One characteristic of sharpening on the flat surface of the wheel rather than on its edge is that we get flat, straight bevels rather than the kind of hollow (convex) grind that results from using a conventional bench grinder. Sometimes a hollow grind can truly come in handy on turning tools in particular, but there aren't too many other places where we've

The Makita sharpener's territory isn't limited to machine knives alone. Practically any hand tool in the shop can be ground and sharpened with ease.

found that shape to be an advantage. Hollow grinding is still routinely recommended in lots of sharpening instructions, but as far as we can tell it's only beneficial if you're using sharpening stones that take too long to do the rest of the honing job by hand. (If so, come talk to us about waterstone sharpening.) A flat bevel is stronger, needs regrinding less often, and of course it doesn't require the use of a bench grinder so you don't have to put your tools at risk of getting burned.

Having summarily swept that bit of traditional wisdom aside, let's go back to turning tools for just a moment. The 9820-2 can be used to grind turning tools, though they represent the one category of tools that are traditionally best worked on the bench grinder. We've had a number of professional turners demonstrate their skills in seminars here at the store, and without exception they all sharpen their tools on the bench grinder alone. These are people who do turning for a living, so their primary interest is efficiency; clearly it's their conclusion that an edge any sharper than the grinder provides is unnecessary, and in some cases even counterproductive. On scrapers in particular, the burr left by a grindstone lets the tool act like a cabinet scraper, actually giving a clean cut rather than a rough, tearing scrape. If the edge were sharpened any "better", the tool wouldn't work nearly as well. The Green Wheel can certainly be used on turning tools, reshaping gouges and skewers quickly as well as leaving a decent enough burr to let your scrapers shine.

Hand tools other than chisels and plane irons can be sharpened freehand far more easily than you might expect. The tool rest can be removed from the front of the sharpener, leaving the front 3/4 of the sharpening stone fully accessible. All you have to do is show the tool to the stone at whatever angle is called for, and let the stone do all the work.



Figure 3. Using the 9820-2 sharpener for freehand sharpening of a carving gouge.

Sharpening a carving gouge, for instance, is exactly as easy as placing the bevel on a flat object and simply rotating the tool so the full expanse of the bevel rolls across the surface. As usual, the sharpener will tell you promptly if you're holding the tool right or if you're missing a spot that calls for changing your technique just a little. Knives of all sorts are simply stroked lightly across the stone at a low angle; scissors likewise at a high angle. Drill bits, scraper blades, screwdriver blades and gardening tools can all be ground or sharpened with a few seconds' work and very little effort.

Proven Reliability

Well, gosh. Sounds too good to pass up—guess we'd rush out and order one ourselves if the 9820-2 we've been using for the past nine years weren't still perfectly sound. Still working on the original stones, too. The Makita sharpener is one of our top two or three all-time low-maintenance machines; we've had no more than two or three calls for help in all these years. If bells and whistles are where you get your jollies, there's bound to be something else out there that will make you happy. But if you're willing to settle for a sharpening machine that's just simple, effective and reliable, we've got your number. Give us a call.

To order, use the order form on page 31, or if using Visa, MasterCard or Discover, call toll free 24 hours (800) 241-6748.

02.10.01	9820-2 Sharpener	\$219.95
02.26.01	Highland Jig	12.95
02.64.30	120 Grit Green Wheel	49.50
02.10.03	1000 Grit Med. Wheel	39.95
02.10.04	6000 Grit Fine Wheel	49.95
02.10.05	Spare Wrench for 9820-2	3.50

Add shipping charges listed on page 31.

Hide Glue

*Ancient Technology Joins
Modern Woodworking—and
Practically Everything Else*

by Zach Etheridge

OLD-FASHION HIDE GLUE is one of the oldest kinds of adhesives on the planet, but even in this age of snazzy high-tech super glues it remains a highly useful, sometimes indispensable addition to the woodworker's arsenal of stickums. The more you know about hide glue, the better—up to a point. As with sausage, just don't get too curious about where it comes from. In fact, it's not so far from the truth to say that what they can't make into sausage, they make into glue instead. The stuff is a protein-based glue; the protein comes from melted-down cow hides, hooves and whatnot.

The glue is workable when it's hot—140° to 145°F—and adhesive when it cools, which doesn't take very long at all. Full strength is reached when it's dry, and that can take 24 hours, but the strength of the barely-cooled glue is more than enough to hold a joint together without clamps. Its full-cure strength is considerably greater than that of yellow glue, and yet it can be reactivated at any time with moist heat, allowing joints to be disassembled, repaired, and put back together with no trouble at all. Hide glue sets up hard when cured, so it can be sanded or machined cleanly, and it will not extrude from stressed joints or exhibit other symptoms of cold creep. Water resistance is low, so don't put your furniture in the bathtub.

By the way, we should take a moment to avoid any possible confusion concerning the kind of hide glue we're talking about. This is *not* liquid hide glue sold in a bottle ready to use. That stuff does not share many of the real thing's excellent working properties, and it is not the subject of this review. Old-fashion hide glue is sold in dry beads or flakes (ours is in bead form), and must be dissolved in water and heated for use.

Melt-Down

Using hide glue is easy, once you've figured out a way to heat it to about 145° and reliably keep it there. A hot plate, a double boiler and a meat thermometer can be coaxied into working pretty well, but if you're going to be using the glue regularly it will be worth investing in an electric pot made for the purpose. Working with Tage Frid during many of his seminars here at the store, we've used the glue pot like a hybrid double boiler: rather than dissolving the glue directly in the quart pot, we put the glue in a can which we set in the pot, surrounding it up to its neck with water. The pot heats the water, the water heats the can and melts the glue, the pot stays clean and we have a ready source of hot water for thinning the glue as evaporation slowly causes it to thicken.

Start off by putting one or two handfuls of dry glue into the can, and add cool water until the glue is just covered. Stir well and go away. During the next hour or so the glue soaks up the water, swells considerably, and turns into a



Photo from Tage Frid Teaches Woodworking: Shaping, Veneering & Finishing, courtesy of the Taunton Press.

thick goo. Now turn on the heat, and eventually, with plenty of stirring, the glue melts down into a liquid that should be a little thinner than typical yellow glue but not too runny. Add hot water as needed to arrive at a good consistency.

Tage always has us start the glue two days before a class. The first day, we get it melted down and establish a good consistency, then we let it cool overnight. By morning it's a solid mass, but heating it up re-liquifies it with no difficulty. We'll use some glue on day two, making jigs, sizing veneer and so on, and generally making sure it's in good condition. Every few minutes we stir the can pretty well. If we use up a lot of glue, we might occasionally throw in some fresh beads and a little more water. Once again we turn it off overnight. Then on day three as the class begins we reheat to produce a batch of hide glue that Tage feels is ideally conditioned for use during the next two days. We've seen claims, and you might have too, that hide glue should be mixed, used and thrown out all in the same day, or maybe you could use it over two days max. Tage's system departs pretty far from that formula, but it has worked just fine for the last fifty years or so anyway.

Super Glue

Hide glue isn't perfect for every application; there are lots of glue-ups where it would be next to impossible to keep it hot while everything gets put together. There are many situations, though, where there's nothing else on the market that comes close to working as easily and conveniently. One classic application is in the assembly of chairs. If your joints fit well, you can do the whole glue-up without clamps, and end up with glue joints whose strength is about midway between yellow glue and plastic resin. And then way down the road when some of those joints begin to fail, as chair joints inevitably will, you can release all of the joints by steaming them or wrapping them in a blazing hot damp towel, then clean them up and re-glue as good as new.

Hide glue can frequently be used almost like a "super glue", allowing you to assemble joints in a matter of seconds with no more than hand pressure. Whenever you've got an assembly in progress that allows you to glue one joint at a time, you can brush hide glue onto one of the surfaces to be joined, rub the two surfaces together fairly hard to wet both thoroughly and squeeze out excess glue, then just hold the joint together firmly for a minute or less until the glue has cooled enough to hold the joint closed on its own. We've made 2x2

mitre joints this way that we couldn't break by hammering them on the floor 24 hours later.

Tage Frid also specifies hide glue for bonding canvas to wood when you're making your own tambour doors. He feels that contact cement's elasticity may eventually cause operating problems for the tambour or even bond failure; with hide glue, each tambour strip is going to stay exactly where you put it. And if one or more strips should ever need repair or replacement, once again that will be not only possible but easy to do.

Cover the World

Veneer may be the best of all hide glue applications. You can get veneers down on flat or contoured edges and surfaces without worrying about perfect placement as you must with contact cement. You can create perfect edge joints by cutting them after the veneers are down, you can repair any bubbles easily and positively, and you can do the whole job without clamps. Veneering with hide glue may be doing yourself or your customers a favor in more ways than one. When a piece of furniture suffers damage that calls for repairing or replacing some of the veneer, the owner or repair specialist can simply iron over a damp towel on the veneer, melting the glue and allowing easy removal of the entire piece.

Tage claims that with a household iron, an adequate supply of veneer, a large glue pot and a veneer hammer, you could veneer the entire planet. The veneer hammer looks like a cross between a hammer and a squeegee; the hammer head is used as a hand hold, and the smoothly blunted blade is used to press the veneer down firmly and squeeze out excess glue. Edges can usually be done hot; large surfaces may be done at your leisure, reheating the glue with an iron set between wool and cotton on the heat dial. The hammer-veneering process is covered in clear detail in the book *Tage Frid Teaches Woodworking: Shaping, Veneering, & Finishing*.

Hide glue is manufactured in lots of different grades which provide varying degrees of strength and setting time. The glue we sell is a light-colored high grade (gram strength = 192) with moderately slow setting time; we've found it quite satisfactory as a general-purpose adhesive for all the jobs described above. *Fine Woodworking* magazine published a good article on the technical side of hide glue in issue #57, and you can find more information on using the glue, particularly for veneering and making tambour, in *Shaping, Veneering, Finishing*. If you've never used hide glue, let us encourage you to try it out the next time you have an assembly or veneering job where it sounds appropriate. There's something special about using a technology that's thousands of years old, particularly when it's still the best stuff for the job.

To order, refer to the order form on page 31:

16.60.11	1 lb. Hide Glue	\$5.50
16.60.12	5 lb. Hide Glue	25.00
16.60.13	25 lb. Hide Glue	95.00
16.53.01	Electric Glue Pot	79.95
21.39.01	Veneer Hammer	24.50
05.39.04	Veneer Saw	6.95
20.04.19	Tage Frid: Shaping, Veneering, & Finishing	21.95

The Jointer

By Avery Johnson

WHEN MOST PEOPLE think of woodworking they think of circular saw blades and the sawing process. This is perhaps because the saw blade, especially when crosscutting, determines the final dimension of the board. However, there is a lot of work before the final crosscut is made.

A finished board has six surfaces and only the two ends are made by crosscutting. The other four sides are prepared with the jointer and the planer. If the unglamorous task of stock preparation is not done correctly and with care the wood will not be straight and square. Since the saw uses both face and edge of the board as reference, if either is not straight the crosscut will not be square. The goal is to make the wood as accurately flat, straight and square-edged as possible because any error will be compounded as the wood is processed. Joint cutting, the final and most critical step, is totally dependent on the initial accuracy of the wood. Thus the first square edge is as critical as the last dovetail and takes the same attention and skill.

The first chore is to make the board straight and square which is the work of the jointer. The jointer looks like a simple tool because it doesn't have a lot of parts; in fact the cutterhead and infeed table are the only moving parts. The simple design belies the machine's true complexity. It consists of two (ideally) parallel tables with a revolving cutterhead between them. The knives in the cutterhead are set at exactly the height of the outfeed table. In use, the infeed table is set lower than the outfeed table by the desired depth of cut. The wood rests on the infeed table and is fed into the cutterhead, the material is removed and the fresh straight surface is supported by the outfeed table. After this process is done a number of times, one surface of the board is straight, flat and out of twist. The straight side is then held against the fence and another series of cuts is made creating a straight edge square to the trued surface.

The successful use of the jointer requires a couple of different skills. Adjusting the machine requires mechanical skill. The tables must be flat and parallel and the knives must be adjusted to the height of the outfeed table, which can be the single most aggravating task in woodworking. My neighbor says that he can adjust his knives in only a couple of minutes. The waves on the edge of his board show that only one of three knives is cutting. He didn't seem to like it when I asked him if all those big waves were a decoration.

The other skill that the jointer requires is woodworking savvy. It is possible to have a perfectly adjusted jointer and still not get a straight edge. For best results, the concave

side of the board should rest on the table so the ends are jointed first. As the ends are cut the resulting flat spot on each end provides a stable surface and the board doesn't rock. Material from each end is removed until the high spot in the middle is reached leaving a straight surface. On the other hand, if a convex surface is resting on the table and the board is passed over the cutterhead the board rocks (like a rocking chair) perpetuating the convex curve. If you have no choice but to joint the convex side of the board, start in the middle to create a small flat spot. Use the flat spot on the infeed table to stabilize the board for consecutive cuts.

The primary consideration is to successfully deal with the curve of the board. A secondary consideration is the direction of the grain. Whenever possible the jointer should cut with the grain. At times, especially when squaring a board from rough stock, the correct way to joint the board may mandate that the board be cut against the grain. In a situation like that it is best to leave enough material for a finish pass with the grain after the board is square and its two sides made parallel with the planer.

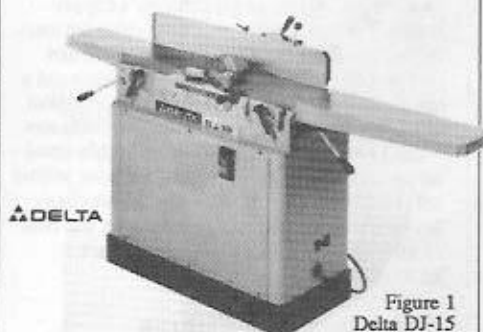


Figure 1
Delta DJ-15
6\" Jointer

Jointer Design

There are two basic jointer designs. The traditional industrial design has an adjustable outfeed table. This version in the six inch width from Delta (model DJ-15, shown in Figure 1) generally sells for around \$1100. The outfeed table is adjustable in height and this gives you the option of sharpening the knives without removing them from the cutterhead. Another theoretical use of the adjustable outfeed table is that the height of the table can be changed to create a concave or a convex cut. In the old days woodworkers thought that a concave or "spring joint" was a good idea. If two edges are slightly concave the boards touch on the end but not in the middle. The idea is that when glue and pressure are applied the ends are guaranteed to close tightly. The current theory is to make the boards perfectly straight before gluing, and to use even clamping pressure which gives a good result. This saves the time of making the spring joint but it doesn't add any extra stress to the wood. (In any case, lowering the outfeed table can make the jointer extremely hazardous—as a general rule, *don't do it.*)

The alternative to the adjustable outfeed table is the design with the fixed outfeed table. Here the knives are always set to the height of the outfeed table, rather than vice versa, and they must be removed from the cutterhead for sharpening. Because the design is simpler the cost of construction is also lower. The version



Figure 2. Delta 37-280 6\" Jointer

that Delta makes (model 37-280, shown in Figure 2) with a non-adjustable outfeed table sells for less than \$400.00, less than half the cost of the adjustable outfeed table model. (Of course, there's a significant difference in quality which also has something to do with the price.) Recently I purchased the less expensive Delta model after selling my older Sears jointer.

Although my new Delta and the old Sears jointer are roughly the same size and both have fixed outfeed tables, there are two huge differences in their designs. The Sears machine, with a design typical of many inexpensive jointers, has the outfeed table and base cast together in one piece. The infeed table has a pair of inclined ways cast under the end of the table near the cutterhead, and these ride on a mating pair of ways built into the base casting. Only the infeed table can be realigned to make sure the two tables lie in the same plane, and the process can be a very tricky one.

Delta's infeed table, on the other hand, is mounted on a movable parallelgram suspension. This design virtually eliminates wear and inaccuracy from dust build-up that occurs between sliding ways, but it also makes it impossible to realign the infeed table's plane. Instead, Delta has made it not only possible but relatively easy to realign the outfeed table if this should ever be required. The outfeed table is a separate casting bolted to the base casting that holds the cutterhead. There are three attachment points, two up front near the cutterhead and one centered at the outfeed end.

Tuning the Jointer

The first task in making sure your jointer is in good working condition is to verify that the tables lie in the same plane. Tools for the job are simple: a straightedge and a carpenter's level should be all you need for a careful inspection. The longer your straightedge the better. If all you have is a 24\" edge, you can make it work all right if you're careful. If you're buying one for this job, get a three-foot model because it will be a lot easier to see what's going on. First, check each table by itself to see how close to flat it is. Minor deviations of a few thousandths of an inch are common, and shouldn't be a problem. A slight dip in cast tables is almost always present, but it won't keep you from making edges straight. Deviations greater than a few thousandths, though, can be a problem, and if you see any major high spots you may need to grind them

(continued on next page)

Avery Johnson is a retired mechanic from suburban Chicago. He now does woodworking about 40 hours a week.

The Jointer

(continued from previous page)

out. A finishing sander with 150- or 220-grit silicon carbide paper, or even a belt sander with a medium belt will make reasonably quick work of taking down the worst places.

You also need to check each table for twist, and this is done with any two straightedges three or four feet long. A carpenter's level makes a good second straightedge for this purpose. Remove the jointer fence. Set one straightedge across the table at the cutterhead end, and set up the other at the far end. Make sure they're both sitting accurately square across the table. Back off six feet or more and sight across the tops of the straightedges. With three-foot tools you've multiplied the six-inch jointer surface by a factor of six, and you'll be able to clearly see even a tiny amount of twist. Check both tables the same way. Very slight twist might not be a problem, but if you see more than about 1/16" of twist showing across 36" of straightedge, you might want to check with the manufacturer for help.

With the tables in good condition, put half of your straightedge on the outfeed table, and raise the infeed table until it first contacts the other half of the edge. If the two tables are aligned perfectly, contact will happen all along the straightedge at the same time, but if there's any misalignment you'll see it right away. Check both sides, near the fence and out near the other end of the cutterhead. Check the tables for twist in relation to each other, using straightedges just as you did for each table separately. Any necessary adjustments will be easy to make by adding or removing shim washers from one or two of the outfeed table's three mounting points.

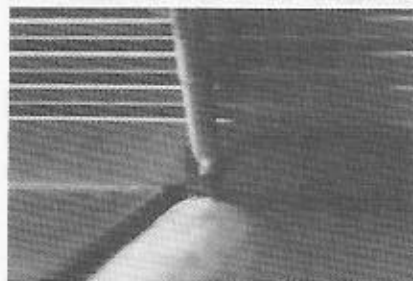


Figure 3. Lower the infeed table until your straightedge just contacts the cutterhead, and carefully mark the point of contact.



Figure 4. Use a square to mark top dead center on the fence.

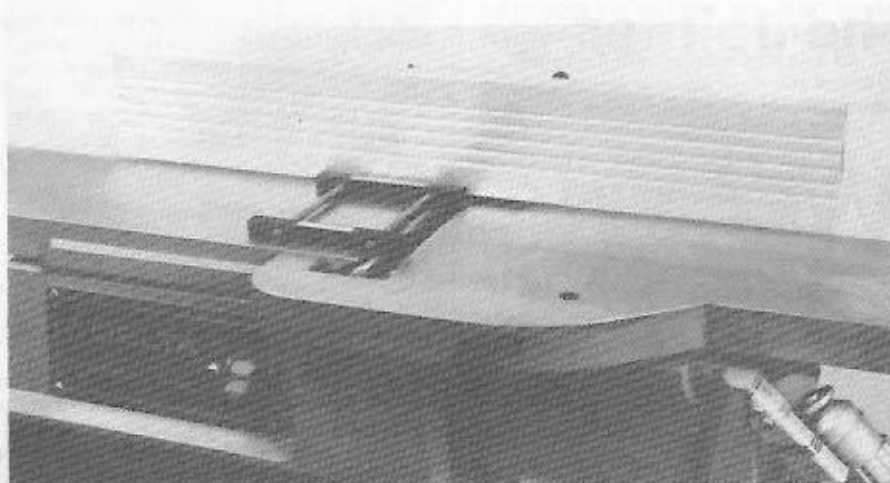


Figure 5. The Magna-Set jig has two adjustable bars which rest on the jointer outfeed table and extend over the cutterhead.

Shim stock (usually brass) in 1/1000" and greater thicknesses can be found at some hardware stores or at a machinist's supply house. You can make your own shim washers by sandwiching the shim material between two pieces of posterboard and punching out a center hole with a paper hole punch, then cut out the washer shape with household scissors. Shim as needed to get the outfeed table lined up parallel to the infeed table, and your jointer will be tuned to work perfectly. Mine, thank heaven, was perfect as it came out of the box, so all I had to do was set it up and start jointing wood.

Adjusting the Knives

This is a chore you should get a lot of practice at. Resetting the knives in the Delta jointer is reasonably easy, at least the way I do it, and it's something you'll need to do pretty often because the jointer works about 20 times better with sharp knives than with the usual dull abominations most of us are used to running. Sending knives out for sharpening is a nuisance, but it's less so if you have a spare set on hand to keep you jointing while the first set is out. Or you can sharpen the knives yourself. There's only one machine I know of that makes this easy—that's the Makita 9280-2 electric sharpener that comes set up for doing jointer and planer knives. It works beautifully, and though you have to pay for it up front, it's easily worth it in the long run.

The first step toward setting the knives in your jointer is to find the point in the rotation of the cutterhead where the knife is at the highest point of its arc. At top dead center the knife should be just in line with the level of the outfeed table. Finding the top dead center point is easy. Rotate the cutterhead so that neither knife is exposed. Raise the infeed table all the way, and lay a short straightedge, such as the bar of a combination square, along the infeed table so it extends over the cutterhead. Slowly lower the table until the straightedge just contacts the cutterhead; the point of contact is top dead center. Mark this point, being careful not to let the cutterhead move at all. Now set your combination square to transfer this mark to the fence (Figure 3),

using an awl or other sharp point to scratch a distinct line at the bottom of the fence that you'll be able to see easily as you re-set your knives in the future.

Magna-Set Jointer Jig

To align the knives properly in my Delta jointer's cutterhead, I use a Magna-Set jointer jig. It consists of two straight bars with strong magnets in each end, held together by two rods that let you set the bars as far apart as needed. The Magna-Set makes accurate knife installation simple and easy, which is saying a lot. Some jointers have jack screws to help set the knives in place, but on my little Delta I don't know how I'd do the job without this jig.

One pair of magnets holds the jig firmly on the outfeed table, while the other pair holds the knife in the right plane, level and parallel to the table. There's a mark scribed on the end of the Magna-Set bars that holds the knife; when this mark is lined up directly over the cutting edge and right at the top dead center mark on the fence, the knife is ready to be locked into place.

Now the fun begins. The trick is to slowly tighten the gib (a steel bar which distributes



Figure 6. To work correctly, the mark on the Magna-Set and the knife edge must be aligned to the top dead center mark on the fence.

pressure from the head bolts and acts as a chip breaker as well) against the blade until the blade barely moves. At this point you are ready to tighten the blade in place. Hold the jig down firmly with one hand and alternately tighten the middle bolts gradually. Tighten the outside bolts last. The problem with tightening the knives is that as the gib increases the pressure on the knife it moves slightly. Most of the time it moves outward from the cutterhead thus increasing the height of the edge at top dead center. Holding down on the jig lessens the tendency of the knife to squirm but even with pressure on the jig the knife will move up. The amount of excess height can be measured with a feeler gauge at the edge of the outfeed table (see Figure 7).

This tendency to raise the knife can be an advantage if the excess height is consistent

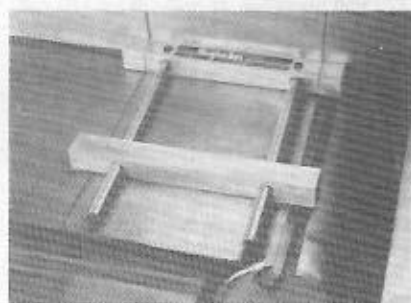
and not too great. The ideal situation is to have the knives anywhere from .001" to .005" higher than the outfeed table. This is too little to affect the accuracy of the cut but enough so that the knives are not too low once the edge begins to wear. With a little practice I have been able to consistently set the knives within this range.

When I got my new jointer, I reset each knife about two or three times until I got comfortable with the technique. One can greatly increase one's woodworking skill by consciously practicing a difficult task. As a mechanic for 40 years I learned this the hard way. It is important to be patient and develop skill instead of being too goal-oriented and getting frustrated when things do not work the first time.

§



Figure 7. Most often the knife will rise out of the cutterhead slightly as it is tightened. This effect can be minimized by holding the Magna-Set down on the table as the knife is tightened. The difference between the height of the knife and the outfeed table can be measured under the jig with a feeler gauge. It is ideal to have the knife at top dead center .001" to .005" above the outfeed table.



Magna-Set Knife Setting Jig

Most of us have been frustrated by the struggle to re-install jointer knives. Inevitably they want to squirm out of position as you tighten the bolts. The Magna-Set jig reduces this irksome task to 5 minutes or less, as powerful magnets hold the knives in perfect alignment (within plus or minus 2 thousandths of an inch) while you tighten the bolts. Fits jointers up to 10" wide.

08.53.21 Magna-Set Jointer Jig \$49.95

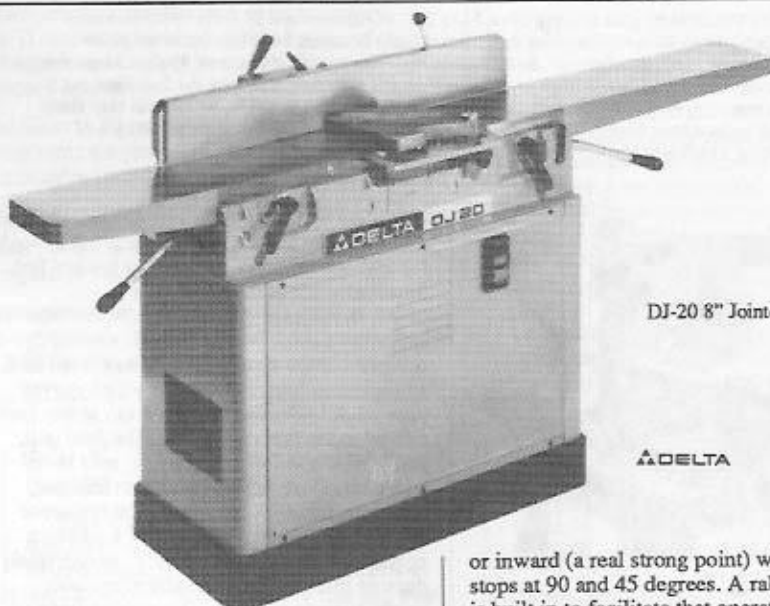


Delta 6" Motorized Jointer

This is a compact, economical jointer with full-size features. Delta's 3/4 HP motor drives the 3-knife cutterhead at 4300 rpm, delivering 12,900 cuts per minute for clean, smooth jointing on edges or surfaces. Center-mounted fence tilts in or out, with positive stops at 90 and 45°. Max depth of cut is 3/8"; a built-in ledge assists in rabbeting to to that depth. Cast iron bed totals 35-1/2" long. 143 lbs.

Shipping charge on this item within 48 states is \$40.00. Quantity limited at this price.

37-280 6" Motorized Jointer \$369.95



DJ-20 8" Jointer

DELTA

Delta Precision Jointers

A good jointer is one of the most fundamental stationary tools, for it is the tool that prepares stock for planing, joining, cutting, and shaping. It's a machine that's used every day, on every job, and frequently it is the quality of work done on the jointer that determines the quality of the finished workpiece. A tool this important ought to be as reliable as the sunrise, capable of doing its job accurately and easily time after time for years to come.

Delta's 8" and 6" precision jointers are each an outstanding value. Infeed and outfeed tables are mounted on a new parallelogram support system which eliminates wear and binding problems, and which moves each bed in the same arc as the cutterhead, maintaining the smallest possible gap between bed and blade at any depth setting. Torsion springs counterbalance the table supports to provide extremely smooth, easy adjustment. Infeed tables are extra-long for maximum efficiency and ease of handling large stock. The 5" high, 36" long fence is center-mounted for rigidity and setting convenience; it can be moved all the way out for rabbeting, and can tilt outward

or inward (a real strong point) with positive stops at 90 and 45 degrees. A rabbeting ledge is built in to facilitate that operation. The 3-knife cutterhead is equipped with jack screws to simplify installation and adjustment of each knife; it rotates at 5500 rpm (16500 cuts per minute) for smooth, tearout-free jointing.

The DJ20 8" Precision Jointer offers a total table length of 76-1/2" for superb stock-handling ease (infeed table is 42" long). The jointer can be used for rabbeting to 5/8" deep. Tables stand 32" above the floor. The DJ-20 is supplied with enclosed stand and a 1-1/2 HP, 230-volt motor capable of handling full-width surface jointing as well as any depth of edge jointing with ease. The DJ-20 weighs 466 lbs.

The DJ-15 6" Precision Jointer has a total table length of 55-1/2", with a 30" infeed table. Max depth of cut is 1/2". Includes stand and 3/4 hp motor, wired for your choice of 115 or 230 volts. The DJ-15 weighs 328 lbs.

Shipping charge on either machine within 48 states is \$60. Quantity limited at these prices.

37-154	DJ-15 6" Jointer	\$1099.00
C390	Spare Set 6" Knives	38.50
HRJ-15	Mobile Base for DJ-15	109.00

37-350	DJ-20 8" Jointer	\$1499.00
C460	Spare Set 8" Knives	43.50
HRJ-8	Mobile Base for DJ-20	148.50

Performax Drum Sanders

AFTER TAKING A HARD LOOK at these tools, we're pleased to introduce them to you as some of the best new machines in our catalog. Performax sanders do an impressive job of meeting your need for finishing and dimensioning wide stock—up to 24" width on the commercial-duty (5 HP) Super-Max, or as much as 44" through the open-sided S/T and Pro-Max II models. With sandpaper grits ranging from 36 to 240, these machines can take your stock from rough-sawn to beautifully finished in a matter of minutes, and your dust collector or shop vac can make the entire operation virtually dust-free to boot.

Our first reaction to Performax sanders was frankly skeptical. It's hard if not impossible for a photo and a written description to reassure you that the cantilevered arm won't give too much, that the drum will have enough power, or that the power feed won't tear up or stall out. Operating any of the Performax models, though, is a revelation. They work amazingly well, and even the inexpensive Performax S/T that mounts on your radial-arm saw column is rigid, effective and precise. Under load the heavy arm casting (or the saw table) might allow as much as 1/100" of an inch deflection across the 22" width of the drum, but light settings leave a piece totally flat even when it's too wide to sand in one pass. Powered by a 1 HP or larger radial arm saw motor, or by the 1-1/2 HP motor that comes with the Pro-Max II, coarse paper can take 1/32" per pass off wide hardwood panels with no trouble. One especially good performance feature is that Performax sanders (unlike thickness planers) can easily true up cupped and even twisted stock. And any wood, be it birds-eye maple or ribbon-stripe mahogany, can be sanded to a dead-smooth 240-grit finish with no tear-out, no splintering, and no end snipe.

Abrasives are available in grits ranging from 36 to 240. A standard roll 3" wide by 35 feet long provides enough material to cover the drum three times. Slide fasteners built into the drum allow positive attachment of sanding strips with no tools required. The manufacturer says it takes 3 minutes to change from one grit to another, though in our experience it only took that long the first time out. The abrasive is commercial-quality cloth-backed resin bonded aluminum oxide, which will stay sharp and effective for quite a long time if it's kept clean. An abrasive belt cleaner will do a good job of eliminating routine dust build-up.



Performax S/T

The most economical unit is the Performax S/T, which is designed to mount onto the column of your radial arm saw, using your saw's motor as its power source. Minimum stock thickness is about 1/32" (yes, you can sand veneers), using the optional power feed unit to move the stock smoothly. Maximum thickness depends on the design of your saw; with the power feed unit installed on our Dewalt 7770 10" radial arm, max thickness is about 1-1/8". Optional shortened leg brackets on the cantilever arm provide an extra inch of thickness capacity. Maximum practical stock width will be about 43" if you do a fairly careful job of lining up wide pieces on the power feed surface.

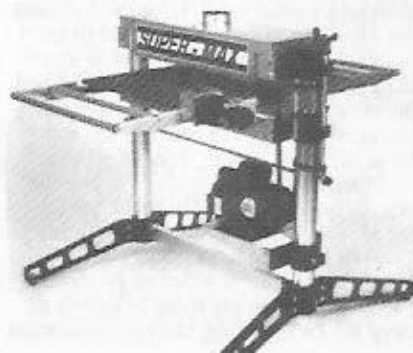
The Performax S/T mounts easily on your saw column, and can be removed in about 30 seconds to go back to working with the saw. After you've set it up and calibrated it the first time, re-mounting the unit takes less than a minute even for a brand-new user. The mounting mechanism fits column diameters from 2-5/8" to 3-1/8", which covers practically every 10" & 12" radial arm on the market. The 5" x 22" sanding drum is driven by a V-belt running over a pulley (provided) which replaces the blade on your saw arbor; belt ten-

sion is set by pivoting the arm as needed. The sanding drum rotates at 1200 rpm, fast enough for aggressive rough sanding but not too fast for clean work at the finest grits.

As an optional but nearly indispensable accessory for the Performax S/T, we highly recommend the Performax Power Feed unit, an ingenious conveyor device which moves your stock under the sanding drum at any feed rate up to ten feet per minute. The feed unit, just 1" thick, mounts directly on your radial arm table, along with its built-in variable-speed fractional-horse motor. The conveyor surface is a 23" wide belt of 3M's amazing polyester-film 120-grit abrasive, an extremely durable material which totally eliminates stock slippage and doesn't mar even finished surfaces. The power feed offers a 30" long support surface under your stock.

We provide as standard equipment Performax's high-volume dust hood, designed to fit 2-1/2" shop vac hose. A good vac or dust collector should be considered a required accessory for any of the Performax models, which would otherwise fog any shop in a few seconds' work. *Performax S/T and power feed unit are shipped via UPS.*

08.40.01	Performax S/T	\$299.95
08.40.02	Power Feed Unit	329.95
08.40.11	Short Leg Brackets	15.00



Pro-Max II

Another popular model is the Pro-Max II, a free-standing, motorized version of the S/T with several added features that enhance both precision and productivity. The drum is powered by a 1-1/2 HP motor which comes wired for 220 volt operation, re-wirable for 110 volts if preferred. The power feed unit is built in as standard equipment, including double infeed and outfeed rollers which extend total stock support length to 54". The drum mount is equipped with tension rollers to ensure uniform contact between conveyor surface and even the thinnest stock, allowing sanding of pieces as short as 2-1/4" without sniping or loss of control. Also built into the drum is an alignment lever which allows quick fine-tuning for perfect sanding. A depth gauge attached to the main support column makes set-up and thicknessing operations fast and convenient. Maximum stock thickness with standard drum mounting brackets is 2-1/4", or 3-1/4" with the optional short leg brackets. The Pro-Max II comes fully assembled and ready to run. *The Pro-Max II is shipped by truck FREIGHT PREPAID within 48 states for no additional charge.*

08.40.03	Pro-Max II	\$1495.00
08.40.11	Short Leg Brackets	15.00

PERFORMAX ABRASIVES, 3" x 35 ft rolls (One roll covers sanding drum 3 times)		
08.40.36	36 Grit	\$25.00
08.40	Other Grits	20.00
(specify 60, 80, 120, 180 or 240 Grit)		

Super-Max

The Super-Max is a commercial-duty drum sander designed for high production rates and maximum stability under load. Two-post design makes for rigid drum mounting, while a 220-volt, single phase 5 HP (21 amp) motor lets you take off 1/16" or more per pass for fast abrasive thicknessing. An upgraded gear motor on the power feed unit provides variable feed up to 20 feet per minute. Maximum sanding width is 24", though clearance between the posts allows stock as wide as 28-1/2" to pass under the drum. Maximum stock thickness is 4". The drum cover is fitted with a 4" port for attachment to standard dust collector hose. Like the Pro-Max II, the Super-Max comes assembled and ready for use. *The Super-Max is shipped by truck FREIGHT PREPAID within 48 states for no additional charge.*

08.40.04	Super-Max	\$2195.00
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More Price Reductions on Elu Tools

IN EUROPE the Elu name has been synonymous with superior quality in power tools for over 60 years. Available in the U.S. for the past 3 years, Elu tools have already established a reputation for themselves as the ultimate premium in quality and performance. As distribution has expanded in the U.S. through a handful of carefully selected dealers, and economies of scale have been achieved in production, prices have recently been reduced on a number of these superb tools.

After two extremely successful years of selling the exquisite Elu 3338 plunge router (described in detail on page 22), Highland Hardware has now expanded its Elu line to include a number of other fine Elu tools.

As testimony to their high performance and reliability, we are pleased to offer a *four-way guarantee* for all Elu woodworking power tools purchased from Highland Hardware.

THIRTY DAY REPLACEMENT. Any Elu woodworking tool found defective in material or workmanship may be returned to Highland Hardware (postage prepaid) for free replacement within 30 days from date of purchase.

FULL ONE YEAR WARRANTY. Elu woodworking tools are warranted for one year from date of purchase. Tools with defects due to faulty material or workmanship will be repaired without charge. Tools can be sent to any of the more than 120 Black & Decker factory-owned service centers nationwide, or any B & D authorized service station listed under "Tool-Electric" in the yellow pages. The warranty does not apply to accessories or damage caused where repairs have been made or attempted by others.

ONE YEAR FREE MAINTENANCE. In addition to the normal one year tool warranty provided by other companies, Elu woodworking tools are protected by a One Year Free Maintenance Plan, offering coverage against normal wear for one year from date of purchase. Anytime within the first year after purchase, you may take or send your Elu tool to one of Black & Decker's 120 company-owned service centers where it will be thoroughly checked and serviced at no charge to you. (The plan does not apply when failure results from misuse, abuse, neglect or when repairs have been attempted or made by others.)

FAST SERVICE. If your Elu woodworking power tool should ever require service, send or bring it to the nearest Black & Decker factory-owned service center and it will automatically be repaired in 4 hours *shoptime or less*. This is Elu's commitment to you, the woodworker.



Elu 3375 Electric Hand Planer

This is the first lightweight 3-1/8" planer with enough power to do serious work quickly and well. Its high-efficiency 7.2 amp motor outguns its nearest competition by at least 25%, providing enough torque for up to 1/4" depth of cut per pass. Double-edged disposable carbide knives (reasonably priced!) eliminate the aggravation of quickly-dulled high speed steel, and reversing or replacing them takes only a few seconds. The 3375 features an adjustable rabbetting stop for up to 7/8" depth of cut, and a straight edge guide for precisely controlled work. Bevel guide is optional. The planer weighs 7.2 pounds.

	List price \$298	SALE
3375	Elu 3-1/8" Hand Planer	\$159.95
3375-1	Pair Rev. Carbide Knives	9.95
3375-2	Optional Bevel Gauge	11.95
3375-3	Optional Dust Bag	14.95

Elu 4024 Electr. Var. Speed 3 x 21 Belt Sander

This is one of the lightest, most versatile belt sanders on the market. Variable speed allows sanding a wide variety of materials with total control over sanding rate and heat build-up. Choose higher speeds for maximum material removal, medium speeds for sanding metals or between coats of paint, or low speeds for heat-sensitive surfaces, paints, varnishes, synthetic resin lacquers, and some plastics and fillers.

Its extreme light weight (only 6.2 lbs.) makes sanding of vertical and overhead surfaces effortless. A dust bag is included as standard equipment. Belt speed ranges from 475 to 1100 fpm. Motor is rated 4.2 to 5.2 A.

The optional sanding frame, a very popular accessory, effectively prevents gouging of the work surface, and is ideal for edge sanding.

	List price \$307	SALE
4024	Elu 3x21 Belt Sander	\$179.95
4024-1	Sanding Frame	49.95



Elu 3380 Biscuit Joiner

The Elu 3380 is a versatile, precision engineered power tool designed for use in furniture manufacturing, cabinetry work, shop fitting, custom remodeling and other general woodworking applications. Unlike other biscuit joiners, the 3380 can also be used for grooving and parallel scribing applications found in common drawer construction, or for trimming and cutting material to size.

Used as a biscuit joiner, the 3380 employs a large right-angle adjustable base for rigid support in both vertical and horizontal planes. 45° and 90° joints are easily and accurately accomplished using standard equipment.

Its unique configuration allows it to be used as a groover, with fine adjustment knobs provided for setting depth-of-cut, thickness of stock and width of groove. Likewise, it can also be used as a small trim saw for cutting stock up to 7/8" thick, where it is particularly useful in cramped and awkward locations.

5 amps, 8500 rpm. Standard equipment includes metal case, side fence, miter fence, side handle, carbide blade, and wrenches.

	List price \$516	SALE
3380	Elu Biscuit Joiner	\$279.95
Joining Plates, Box of 1000		
17.90.02	#0 9/16" wide	\$29.95
17.90.03	#10 3/4" wide	29.95
17.90.04	#20 1 5/16" wide	29.95
17.90.98	Assortment of 3 sizes	29.95



Elu 4015 1/2-Sheet Sander

This new Elu product is certain to give other half-sheet finishing sanders a run for their money. Powered by a powerful 3.0 amp motor, the 4015 features enhanced counterbalancing for the lowest vibration of any half-sheet sander on the market.

Its extra-heavy-duty flexible coupling and all-metal housing ensure long-lasting durability. Brushes are readily accessible for easy replacement. The sander's high density neoprene closed cell rubber pad will accept regular or pressure-sensitive sandpaper. Speed is 10,000 orbits per min. Weighs 7.5 lbs.

	List price \$195	SALE
4015	Elu Half-Sheet Sander	\$125.00



Delta's New 2 HP 10" Tablesaw

THIS NEW cabinet-style saw is designed to neatly fill the niche between the Delta's Contractor's Saw and the commercial Unisaw. Price, horsepower, size and ease of use all come

together to make this a very attractive saw for any hobbyist or small-shop woodworker whose needs and budget don't extend all the way to the Unisaw, but who'd nonetheless like to get a good, solid piece of quality equipment.

The slim enclosed cabinet base is the most striking new feature on this saw: smaller than the Unisaw cabinet, but definitely a long step up from the open stand of the Contractor's Saw. A large vent in the left side of the cabinet makes dust control easy with or without a dust collector. The cabinet also makes operation quieter and smoother than with an open-stand saw; this new saw sounds very good and runs virtually vibration-free. The 2 HP motor (220 volts) is another nice improvement, providing plenty of power to handle 8/4 hardwood with ease.

Two other features are worthy of mention. Setting the stops on the tilt mechanism ranges from challenge to nuisance on most tilt-arbor saws, but on this model Delta has made the stops reachable from the saw table; to calibrate accurate 90° and 45° tilt stops, just use an allen wrench to adjust two set screws recessed into the table top. We've never seen a simpler, more usable design. Another outstanding contribution to convenience and safety is the magnetic

safety switch, mounted where it's easy to reach without looking, and designed to make accidental starts virtually impossible. It's a relatively costly feature, but one that ought to be on every stationary tool.

The new 2 HP saw can be purchased with any of three different fence configurations. You may choose Delta's Jet-Lock fence (25" rip right of the blade), their standard for the last thirty or forty years, or you may specify that the saw come equipped with either the popular new 30" Unifence or the original 52" Unifence. The Jet-Lock model comes with two steel extension wings providing a total table size of 40" wide by 27" deep. The Unifence editions eliminate the right-side steel wing, replacing it with an optional table board either 32" or 48" wide. Table boards (and lower shelf for the 52" Unifence only) may be purchased separately or fabricated in the shop. *Saws are shipped freight prepaid in 48 states for a \$40 charge.*

36-755	Saw w/ Jet-Lock Fence	\$899.00
36-751	Saw with 30" Unifence	1099.00
36-752	Saw with 52" Unifence	1199.00
34-914	30" Table Board	79.95
34-998	52" Table Board & Shelf	119.95

New Delta 43-355 1-1/2 HP Shaper

THIS INTRIGUING new Delta shaper is designed for those woodworkers who've gone beyond the production capacity of a big table-mounted router but who still don't particularly need to lay out \$1500 or more for a large commercial machine. The 43-355 does all the critical things that most economical shapers don't: it has a solid, double-ended 3/4" & 1/2" spindle for running a very wide range of cutters; its 1-1/2 HP, 2-speed (7,000 & 10,000 rpm) reversible motor has all the power you need for doing any job efficiently; and it can handle rail & stile cutters, multi-form moulding cutters, and even big 5" diameter raised panel cutters easily and safely.

There are three innovative features on this shaper that are so new their patents haven't even been issued yet. First is the double-ended spindle, a solid, heavy piece of hardware supported between two sealed ball bearing in a one-piece casting for excellent control of runout and vibration. Changing spindle sizes is the work of one minute—no more need for bushings and inserts.

Another new feature that will make set-up a lot easier is a spindle height adjustment handwheel mounted up front and center just below the table surface, where you'll never have to bend over and fumble around out of sight while trying to read measurements on your depth gauge.

The third new idea is the unique stacked-element fence system, which allows custom fitting of the fence opening around cutters, guards and rub collars. The system looks pretty strange at first glance. Each independently adjustable half of the fence consists of a stack of asymmetrical L-shaped fingers made



of a fiberglass-reinforced composite. When tightened in place with clamp screws at top rear, the stack presents a smooth vertical face to the work. Loosened, individual fingers can be slid sideways as desired to minimize open space around the cutterhead and guard, significantly increasing stock control and operator safety. Each fence half can also be adjusted 1" forward to support full-profile cuts in forward or reverse; the whole system adjusts up 1" forward as well, allowing fence positioning up to 2" forward of the spindle center. The fence support structure incorporates a covered housing and a waste chute which can easily be fitted for dust collector connection.

The powerplant is a 1-1/2 horsepower Delta motor that comes prewired for 115-volt operation (15 amps), re-wirable for 230 volts if required. The spindle is driven at your choice of 7,000 or 10,000 rpm by a high-efficiency flat belt which eliminates vibration and allows full power transmission to the cutterhead. Speed change is done manually by

moving the drive belt from one pulley to another; tension is set and released by an easily accessible crank. Rpm or spindle diameter changes that must be done under the table are greatly simplified by the cabinet's simple drop-front design—just flip a locking lever and the whole front panel swings out of the way. The main power switch is located on an arm mounted at the rear of the shaper table. For most operations this arm may be left standing vertically for instant access to the switch, but if large panels are to be shaped the arm may be pivoted to horizontal, setting it just below table level and leaving the switch easy to reach at the right side. A separate switch for reverse rotation is mounted directly on the motor housing.

A few more specs: table size is 18" by 30". Spindle travel is 2", with 3-1/4" under the nut on the 3/4" spindle, or 2-1/2" on the 1/2" spindle. The table opening is supplied with two filler inserts, offering opening diameters of 1-3/8", 3-1/2" and 5". A tapered steel starter pin is provided, with two mounting holes in the table adjacent the opening. Also standard is a ball-bearing-mounted see-through guard with bushing for mounting on either spindle. The 43-355 comes with an open steel stand that put the table height at 34" for comfortable edge or surface shaping. Weight is 180 lbs.

Our overall impression of this new shaper is that Delta has really accomplished what they set out to do. This isn't an inexpensive machine, and that's just as well; it's far more sophisticated and capable than any low-end shaper we've seen. And yet it clearly offers a lot of a tool for the money; if you're doing less than heavy production woodworking for a living, this may well be all the shaper you'll ever need. *Shipped freight prepaid in 48 states for a \$40 charge.*

43-355	1-1/2 HP Shaper	\$699.00
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Bosch 3283DVS Random-Orbit Disc Sander

RANDOM-ORBIT sanding is very quickly becoming the hottest new finishing gig in woodworking. Anybody who works in a production shop tooled up for air can tell you that a jitterbug pneumatic sander is the fastest thing going for commercial finishing. Anyone not equipped with a big compressor, though, has until recently been left out in the cold with the traditional array of belt, half-sheet and quarter-sheet finishing sanders. In the autumn of 1989 Porter-Cable put the first electric random-orbit sander on the U.S. market (see page 27), leading a whole crowd of manufac-

turers who are scrambling to get on the bandwagon. Now Bosch has claimed the second-comers spot with their new 3283DVS, a very impressive little sander that is going to be hard for late arrivals to beat.

Random-orbit sanding is hard to talk about without getting carried away. Imagine a disc sander that doesn't gouge and doesn't leave swirl marks, and has dust pick-up built in to boot. Imagine a half-sheet sander with a two-horse motor, or a palm sander after a year on steroids; random-orbits are like all those rolled into one. Slap on a 60 or 80 grit disc and you've got something rivaling the performance of a 3 x 21 belt sander. Wheel on up through 240 grit and you can't tell the work apart from a palm sander's finest effort.

The 3283DVS has a fairly small orbit, about 1/8" diameter versus Porter-Cable's 3/8" swing. This lets the Bosch sander run much smoother and finish better at the finest grits, the tradeoff coming at the coarsest grits where P-C's big orbit really gets aggressive. Bosch's smaller orbit also makes it easy to run the disc flat on a surface, where the Porter-Cable needs to be edged up just a little with average grits to keep from dancing down the street. The 3283DVS also offers variable speed between 8,000 and 11,000 o.p.m. Bosch's design is outstandingly comfortable, with two handles for secure, balanced grip right up close to the action. They've equipped the machine to use velcro-backed perforated discs of heavy-weight resin-bonded abrasive that will outlast A-weight papers many times over. The holes allow a built-in vacuum system to draw dust right through the disc, and the system actually works quite well. A

dust bag is standard equipment. The sander comes with an assortment of five discs from 60 to 320 grit.

The Porter-Cable 7334 random-orbit sander remains a best buy for those who especially need heavy take-down capability; remodeling and repainting are two chores where it really shines, and it does a reputable job of general-purpose finishing as well. If your job is finishing new wood, however, the Bosch 3283DVS is going to be the tool we'll recommend. It's fast enough with coarse grits to be plenty respectable, and its performance through the medium range and into finishing grits is phenomenal.

Accessories for the 3283DVS include a soft backing pad for use on contoured surfaces and for buffing & polishing, and a hard pad for heavy work on flat surfaces. Bosch's Air-Sweep hose with shop vac adapter can be used to replace the dust bag for greater dust collection efficiency. Sanding discs are available in packs of five discs of a single grit, or in a five-disc assortment like the one that comes with the sander.

3283DVS	Random-Orbit Sander	\$119.95
RS018	Opt. Soft Backing Pad	12.95
RS020	Opt. Hard Backing Pad	12.95
1273-2	16 Ft. Dust Hose	19.95
Velcro-backed Sanding Discs, Pack of 5		
RS060	60 Grit	\$3.95
RS080	80 Grit	3.95
RS120	120 Grit	3.95
RS240	240 Grit	3.95
RS320	320 Grit	3.95
RS500	Assorted (1 each of above)	3.95

New Panasonic Cordless Drills

WELL, WE DIDN'T believe it could happen, but we've found a line of cordless drills we might end up liking even better than our long-time favorites from Makita. Panasonic, with vast experience in electronics and avant-garde battery technology but relatively new in the power tool market, has disregarded traditional drill design and come up with the best-balanced, fastest-charging and most powerful cordless driver/drills we've ever tested.

The very first thing you'll notice when you pick up a Panasonic is that it sits level and perfectly balanced in your hand. It must have taken a serious effort to overcome the idea of the traditional pistol-grip design, but the result is a hand tool actually made to be held comfortably. Handle size also seems just right; solid and substantial but not too big for a wraparound grip. The drills are remarkably light, or maybe their perfect balance makes them so easy to hold they just feel lighter than what you're used to.

The second thing you'll notice about these drills is that there's no place for a chuck key. Panasonic's keyless chucks are positive, reliable, and nearly effortless to use. You won't even need to use any of your own power to lock a bit in place or remove it afterward —



just grab the chuck and run the drill briefly in forward or reverse as needed. Any bit shape or size up to 3/8" diameter can be installed in about two seconds flat.

Now pull the trigger, and you'll discover yet another great feature: electronic variable speed in a cordless tool. At 50 rpm in low-range mode, you simply can't stall the chuck with your hand. Every bit of energy from either 9.6-volt or 12-volt batteries is available at any speed, 50-350 rpm in low range or 150-1000 rpm in high range. For driving screws or any other operation this constant-torque capability offers more control and more power at low speeds than you've ever experienced with a cordless drill.

Tired of superlatives yet? Ok, take a fifteen-minute break while we recharge the battery from completely dead to fully charged — just quarter of the time required for other batteries. And if you can't wait even that long, Panasonic offers no objection to giving the battery a three-minute jolt to pump in about

20% of its full capacity, letting you squeeze out enough work to finish a job without delay. The battery will not be harmed by occasional partial charging, nor will you risk its forming a "memory" that keeps it from charging fully in the future.

Highland Hardware stocks 3 models of Panasonic cordless drills, two 9.6V and one 12V. The 12V Model 6205B comes standard with a "coffee break" battery and 15-minute charger. Model 6281B comes with a 9.6V coffee break system, while Model 571B comes with a standard one-hour charger and 9.6V battery. Note that Panasonic chargers may be used with either 9.6V or 12V batteries of the same charge time.

All three models feature Panasonic's top-of-the-line dual-range electronic variable speed control, and 3/8" keyless chuck. Each includes a six-position clutch for allowing very precise selection of desired torque. Model 6205B weighs 4.1 lbs. Models 6281B and 571B weigh 3.65 lbs.

Panasonic Cordless Drills

571B	9.6V Drill with Battery and One-Hour Charger	\$149.95
6281B	9.6V Drill with Battery and 15-Minute Charger	199.95
6205B	12V Drill with Battery and 15-Minute Charger	219.95
7020	Optional Steel Case	29.95

HYDROCOTE® WATER-BASED FINISHES

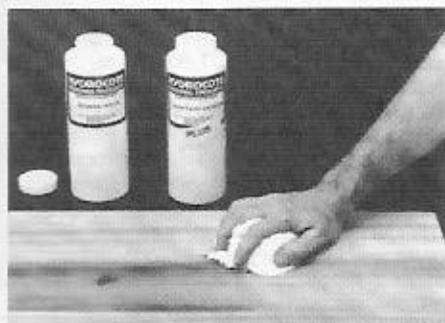
HYDROCOTE WATER-BASED FINISHES represent a radical and much-needed step forward in finishing technology. They are non-toxic, completely non-flammable and nearly odorless, eliminating in one stroke the worst drawbacks of today's most commonly used finishes. Hydrocote's emission of volatile organic compounds (VOC) is so low that all three kinds of finish already exceed the EPA's tough 1994 standards for the most stringently regulated areas in the country. The clean-up chemical for brushes and spray equipment is plain tap water. By using Hydrocote finishes, any shop can dramatically reduce health hazards, risk of fire, toxic waste disposal problems and air pollution — and enjoy dramatically lower insurance rates to boot.

Important as these health and safety benefits are, it's equally important that Hydrocote finishes work easily in spray or hand application to produce beautiful, durable finishes that compete successfully with conventional finishes in practically every category of performance. Hydrocote lacquers are both harder and more flexible than nitrocellulose lacquer; Hydrocote polyurethane is not only harder and clearer than most oil-based polys, but also covers better and dries much faster; Hydrocote Polyshield provides a non-yellowing exterior finish as clear as water and as tough as the finest marine spar varnishes. Whether you do basement woodworking for fun or production cabinetmaking for a living, you owe it to yourself to give Hydrocote a try.

HYDROCOTE LACQUERS

Hydrocote clear finishes are designed to offer finishers the same kind of easily applied and effective finish that has made nitrocellulose lacquer a standard in millions of shops despite its high level of toxicity and flammability. Hydrocote lacquer, environmentally safe and incapable of supporting combustion, resembles nitrocellulose in ease of spray application, but it is in many other ways a better finishing product. A fresh coat of Hydrocote will usually be tack-free in about ten minutes, and ready for re-coating in 1/2 hour. In many cases, however, a second coat will not be required. Ready to use at 35% solids content (more than twice that of typical nitrocellulose lacquers), Hydrocote requires no thinning and offers much faster build and easily doubled coverage per gallon. As with any lacquer, Hydrocote is partially self-dissolving; successive coats melt into one another, completely avoiding problems with clarity or adhesion that layering might cause. Repair is likewise simplified, as a dab of new lacquer fuses with the old surface and can be rubbed out with no possibility of delamination or overlap marks. Excellent flow-out and self-leveling properties also make Hydrocote easy to apply by hand in shops not equipped for spray finishing. A small dose of Flow-Out Additive, used to extend drying time, allows the finisher to apply the lacquer with brush, pad painter or even cheesecloth. And if anything should go wrong during hand or spray application, not to worry—just wipe off the finish with a wet rag, let dry and give it another go.

Hydrocote lacquer can be sprayed with compressed air, commercial airless or air-assisted airless equipment, or with commercially rated high-volume, low pressure (HVLP) turbine sprayers. Many of our customers have begun doing spray finishing for the first time thanks to Hydrocote's safety features. Even the simplest shop set-up can handle the spray-booth requirements (especially with high-efficiency equipment such as our HVLP EagleSprays on the facing page). A fair number of our customers who finish professionally are finding that they can easily save thousands of dollars by not having to make their spray booths satisfy local fire in-



spectors' tough new standards for handling flammable finishes. Spray finishers will also be happy to note that water-based Hydrocote lacquer is nearly blush-proof; it goes on crystal clear when high temperature and humidity would make other products unusable.

Hydrocote lacquer is available in Clear Satin or Clear Gloss, and in White Gloss and Black Gloss as well. Clear and White finishes can be tinted to custom shades using universal tinting colorants (UTCs) such as those listed on the next page.

Hydrocote Sanding Sealer should be used as a first coat on bare wood, since it is formulated to sand smooth quite easily (after just 1/2 hour drying time). Sealer is also used as a clear filler on close-pored woods, with one or two coats providing a completely smooth base for gloss top coats. On stained or previously finished woods, Hydrocote lacquer may usually be applied directly without raising the grain or requiring much sanding.

Reducer is the thinner of choice for Hydrocote lacquers (water can also be used, of course, but it does tend to extend drying time, while Reducer doesn't). It is used to lower viscosity if needed for spray application, and for final cleaning of equipment after use. If shop or spray conditions produce a blushed finish, Reducer can be used to flash the surface and clear it up quickly.

Flow-Out Additive is used as a retarder to extend the time available for self-leveling. It's recommended for hand application, and will also be useful if shop temperature can't be held above the suggested 60° minimum.

Fish-Eye Eliminator is used when silicone or other contamination is known or strongly suspected to exist on a piece to be finished. Hydrocote does not fish-eye easily, and the eliminator does not need to be used as a matter of course.

Rubbing Compound and Pro Polish are used in sequence to rub the finish out to any desired level of smoothness and sheen. Rubbing Compound is used first to cut fairly aggressively; it will leave a low sheen. Pro Polish takes the finish up to a fairly high semi-gloss by hand, or to a high gloss with a buffer.

Hydrocote Fast-Drying Filler is used to fill open pores and surface texture prior to establishing a mirror-smooth finish. It has a very high solids content, and dries in 1/2 hour or less after application. Fast-Drying Filler dries to a neutral off-white which can be tinted with UTCs for use under clear finishes.

Hydrocote Pickling Stain is a high-solids semi-transparent white stain which allows excellent user flexibility in choosing the exact amount of pickling effect desired; it too can be tinted with UTCs for custom color washes. Pickling Stain should always be finished with a top coat of Hydrocote lacquer, polyurethane or Polyshield.

STARTER KITS

An excellent way to get acquainted with Hydrocote finishes is to purchase one of our starter kits. For users who wish to apply Hydrocote Lacquer by brushing or wiping it on, the Hand Starter Kit contains a quart each of Gloss, Satin, and Sanding Sealer; a pint of Flow-out; and a half pint each of Rubbing Compound and Pro Polish.

For professional shops, the Hydrocote Spray Kit includes a gallon each of Sanding Sealer and Gloss and Satin Lacquer; one quart of Reducer/Flow-Out; a half pint each of Rubbing Compound and Pro Polish; 2 oz. of Fish Eye Eliminator; a viscosity cup; & 4 filters for straining prior to spraying.

19.61.08 Hydrocote Hand Starter Kit 29.95
19.61.10 Hydrocote Spray Starter Kit 79.95

HYDROCOTE LACQUER PRODUCTS

Cat. No.	Item	Quart	Gallon	5 Gal.
GL	Clear Gloss Lacquer	8.95	19.95	89.95
SL	Clear Satin Lacquer	8.95	19.95	89.95
SS	Sanding Sealer	8.95	19.95	89.95
GB	Gloss Black Lacquer	9.95	22.95	99.95
GW	Gloss White Lacquer	9.95	22.95	99.95
FO	Flow-Out Additive	5.95	14.95	64.95
RE	Reducer	5.95	14.95	64.95
PS	White Pickling Stain	7.95	17.95	79.95
Cat. No.	Item	1/2 Pint	Quart	Gallon
RC	Rubbing Compound	2.95	6.95	17.95
PP	Pro Polish	2.95	6.95	17.95
PF	Fast-Dry Pore Filler	4.95	11.95	29.95
FC	Flattening Compound	6.95	16.95	44.95
RI	Rust Inhibitor	3.95	9.95	22.95
FE	Fish-Eye Eliminator		1/2 Pint	14.95
VC	Viscosity Cup, Each			3.95
SF	Pack of 20 Straining Filters			2.95

Please note that Hydrocote products must not be allowed to freeze. When ordering during winter months, please be sure to provide a shipping address where *someone* will be present to receive your delivery; the material may be ruined if it's left out on your doorstep in very cold weather.

HYDROCOTE POLYURETHANE

Like Hydrocote lacquer, this polyurethane is a non-toxic, non-flammable water-based finish with very little odor and remarkably fast drying time—it can usually be sanded and re-coated in just one hour. It has only a hint of the amber tone characteristic of oil-based polys, and it yellows less over time as well. Like conventional polyurethanes, Hydrocote Poly provides an incredibly tough finish which resists damage from water, alcohol or other stains and spills even through prolonged exposure. Unlike any other poly we're aware of, Hydrocote Polyurethane, like lacquer, actually exhibits a degree of chemical fusion between coats, thus solving the single thorniest problem in repairing or re-coating polyurethane finishes. It can be used over most stains and finishes, given that they are completely dry, clean, and properly prepared for topcoating.

Formulated specifically for extreme hardness and abrasion resistance, Hydrocote Poly is a superb finish for any high-wear situation, and it's one of the best products you can use for new or refinished floors in home or commercial settings. It's even tough enough for gym floors; Hydrocote Poly meets or exceeds all performance and maintenance specifications of the National Maple Flooring Manufacturer's Association. Hydrocote Poly goes on without the thick plastic build-up typical of solvent polys, and it goes farther, too. Coverage on floors is conservatively figured at 550 square feet per gallon.

Hydrocote Polyurethane is outstandingly easy to apply by hand. It can be brushed, wiped, sponged or squeegeed as desired, flowing out to a smooth, even coat that goes tack-free in 20 minutes or less. It also lends itself quite well to spray application where a furniture finish even tougher than Hydrocote lacquer is called for, as in bars, countertops, kitchen tables and so on. It is more tolerant of cool shop temperatures than most other polys or lacquers, going on with no trouble at temperatures as low as 50°F. Water or reducer may be used for thinning and clean-up.

Cat. No.	Item	Quart	Gallon	5 Gal.
GP	Gloss Polyurethane	12.95	34.95	139.95
SP	Satin Polyurethane	12.95	34.95	139.95

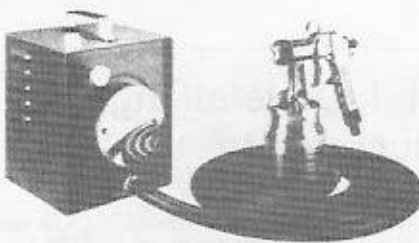
AMBER ADDITIVE

The oil-free clarity of Hydrocote Polyurethane makes it a much cooler-looking finish than conventional polys. If you prefer the warmth of an oiled-wood look, Amber Additive lets you build in as much color as you like. It can also be used with other Hydrocote finishes. Use 1 oz. per quart of finish.

Cat. No.	Item	1/2 Pint	Quart	Gallon
AA	Amber Additive	3.95	7.95	21.95

HYDROCOTE EXTERIOR POLYSHIELD™

This exterior-rated polyurethane provides a finish of extraordinary clarity, flexibility, and hardness. Polyshield goes on water-clear and stays that way—it does not yellow at all with age or exposure to sunlight, making it the ideal finish for use on light-colored or painted woods, pickled floors and cabinets, or wherever a hard finish which adds no color is desired. A cured film of Polyshield is so tough it's hard to believe until you put it to the test, but you'll find it almost impossible to stain, tear, or even scratch the surface. Spill alcohol on a Polyshield finish, or leave water puddled for hours—no problem. Drag furniture across it, drop your cordless drill on it, or punch it with



EAGLESPRAY Turbine-Driven HVLP Finishing Systems

Spray finishing, the most efficient way to do a good job of coating wood, has been made far more effective and a lot more economical with the introduction of high volume, low pressure (HVLP) spraying systems. Typical compressed-air spray systems routinely manage to put no more than around 30% of your finishing material on the object you're trying to finish; the rest is wasted as overspray and bounce-back. Our Eagle Spray systems, on the other hand, use HVLP technology to achieve 80% transfer efficiency, costing you less than half as much in finishing material and greatly reducing the hassles and hazards within your spray booth. The fact that Eagle Spray systems cost much less and are far more compact than compressed-air systems of comparable quality doesn't hurt at all either.

We offer Eagle Spray systems to suit the needs of shops both large and small. Model 1000 is an economical commercial-duty unit made to handle practically any kind of sprayable material from lacquers, paints and polyurethanes to contact adhesives to special automotive and aircraft coatings.



spike heels; you might dent the wood underneath, but you won't ruin the Polyshield.

Polyshield gets its great outdoor durability from two sources. Its polyurethane resin is transparent to ultraviolet light, and does not degrade under prolonged exposure to direct sun. Also built into the finish is a highly effective UV absorber and stabilizer, which prevents UV radiation from damaging anything beneath the finish.

Like Hydrocote interior polyurethane, Polyshield lends itself beautifully to hand application with pad painters, poly brushes, or fine bristle brushes. It can also be sprayed quite successfully, and once again a single coat will suffice in many circumstances. Drying time between coats is about two hours. Thinning and cleaning is done with water or Reducer. Polyshield can be used over bare, stained, or previously finished wood, with this word of advice: as with oil-based polys, Polyshield depends for adhesion on good mechanical bonding with any substrate; be conscientious about cleaning and scuff sanding any existing coating before applying the poly and you should have no trouble at all.

Cat. No.	Item	Quart	Gallon	5 Gal.
GE	Gloss Polyshield	16.95	44.95	179.95
SE	Satin Polyshield	16.95	44.95	179.95

An 850-watt (7-3/4 amp), 110-volt motor drives a two-stage turbine delivering 96 cubic feet of air per minute (CFM) to the gun at 5 psi operating pressure. This low pressure is enough to pump fluid from the cup and gently but thoroughly atomize it at the gun's tip; this is where overspray is nearly eliminated since the finish isn't being blasted out of the gun in a wild cloud of high-speed particles. The atomized finish is then carried by a warm, dry, high-volume air flow which delivers it to the object being finished quickly but without violent bounce-back. Model 1000's double-walled all-metal cabinet measures 12" x 9" x 12.5", and weighs just 19 lbs. The unit can handle up to 40' air hose length.

Model 2000 is a 1000 watt (9 amp), 3-stage turbine unit capable of driving 2 guns simultaneously for production finishing, delivering 77 cfm at 4-1/2 psi to both guns, or over 100 cfm to a single gun. The turbine housing measures 16" x 12" x 12.5", and weighs 29 lbs. The 2000 can handle up to 60' of hose to one gun, or 40' each to two guns. Both models 1000 and 2000 are equipped with two permanent washable air filters, 20 feet of 3/4" i.d. air hose with a quick-connect fitting for the gun, and a production-grade spray gun with a one-quart cup.

Highland Hardware carries both models 1000 and 2000 in stock and available for immediate delivery via UPS. Each is provided with a split one-year warranty: six months' full replacement coverage, followed by six months' 50% repair coverage. We also stock parts and accessories.

ES-1000	Turbine Sprayer	695.00
ES-2000	Turbine Sprayer	845.00
19.61.11	Extra Spray Gun	250.00
19.61.12	Extra 20 Ft. Air Hose	40.00

A UNIVERSAL TINTING COLORANTS

Consisting of very finely ground pigments in a soft fluid base, these versatile UTCs manufactured by Sheffield can be used to tint or shade practically any finishing materials from oils and varnishes to fillers and waxes to water-based Hydrocote lacquer and polyurethane. We stock a total of 34 different colors to provide the broadest range of mixing possibilities. They are sold in convenient 1-1/2 oz. tubes with screw caps. A color chart and mixing guide is provided free with any purchase of UTCs, or may be purchased separately for \$1.00 postpaid.

Our 12-color assortment makes an excellent universal tinting kit for the shop alchemist and custom color enthusiast. Colors include: Light Yellow, Yellow Ochre, Raw Sienna, Burnt Umber, Raw Umber, Lamp Black, Burnt Sienna, Venetian Red, American Vermilion, Medium Green, Prussian Blue and Flake White.

19.49.01	UTC 12-color Assortment	19.95
19.49.02	Single 1-1/2 oz. tube (specify color from chart)	1.95
19.49.03	UTC Color Chart	1.00 ppd.

UTC DISPENSER PUMPS

These one ounce/30cc capacity graduated pumps are indispensable for accurate, repeatable measurement of the small quantities of UTCs typically called for in paint color formulas. Sold individually, or in a pack of six (which minimizes waste and washing time when using several colors).

B19.49.04	1 Oz. Dispenser Pump	1.00
19.49.05	Pack of 6 Pumps	4.95

Prices Lowered on Leigh Dovetail Jigs, Mortise and Tenon Attachments

LEIGH INDUSTRIES, the Canadian manufacturer of the world-famous Leigh Dovetail Jigs, recently announced a price reduction on its major products, the D1258R 12" and 24" dovetail jigs and the recently introduced MMTA 12" and 24" multiple mortise and tenon attachments. Leigh reported that sales and distribution of their products in North America and offshore markets have increased sufficiently to realize new economies of scale, making the price reduction possible.

The lowered costs have enabled Highland Hardware to reduce the price of the popular 24" Leigh Dovetail Jig from \$349.95 to \$329.95. The 12" jig now sells for \$279.95, down from \$299.95.

The Multiple Mortise and Tenon Attachments are available as optional accessories for the dovetail jigs, and prices are now significantly lower. Highland Hardware now sells the 24" attachment for \$169.95 (down from \$250.00) and the 12" attachment for \$149.95 (down from \$225.00).

Anticipating a spurt in demand for both the Dovetail Jigs and the MMT attachments, Highland Hardware has stocked up on all units, and expects to supply immediate delivery on all Leigh items.

Model D1258-12 with a 12" maximum width capacity, & Model D1258-24 with 24" capacity.

In through-dovetail mode, the D1258s are designed to cut dovetails at 8° (about a 1:7 pitch), providing a sleek, custom look which is especially attractive in thick stock, where a more conventional 14° bit tends to give a rather clunky-looking joint. Note that another advantage of this slim angle is extraordinary depth of cut, allowing router-fast production in stock far thicker than ordinary bits can handle. 8° dovetail bits from 3/8" to 13/16" maximum diameter are available and listed below. 3/8" and 1/2" dovetail bits are paired with 5/16" straight bits and used with a 7/16" o.d. guide bushing in your router. The 11/16" dovetail bit is paired with a 1/2" straight bit; the 13/16" dovetail with a 7/16" straight. All run with a 5/8" bushing.

In half-blind mode, both halves of the joint are cut with the same dovetail bit (much like the operation of conventional half-blind jigs); thus any bit angle will be usable (7, 8, 9, 14, 15 or any other degrees). This is a distinct advantage when you're working in thin stock, where operation will be just a bit simpler if you choose a 14° bit.

Both models come provided with a 1/2", 8° dovetail bit and a 5/16" straight bit (both carbide). Additional sizes of 8° carbide dovetail bits are listed below.

A new 45-minute instructional video can be purchased to supplement the excellent new owner's manual.

New Prices

10.53.03	D1258-12 Leigh Jig	\$279.95
10.53.04	D1258-24 Leigh Jig	\$329.95
10.53.15	Instructional Video	29.95
10.53.16	New Owner's Manual	9.95

(new manual is included free with purchase of jig)

Leigh Dovetail Bits

	Bottom Dia.	Angle	Height	Shank	Price
10.53.11	3/8"	8°	7/16"	1/4"	\$29.50
10.53.12	1/2"	8°	13/16"	1/4"	29.50
10.53.17	1/2"	14°	9/16"	1/4"	29.50
10.12.22	3/4"	14°	13/16"	1/2"	49.50
10.53.13	11/16"	8°	1"	1/2"	39.50
10.53.14	13/16"	8°	1-1/4"	1/2"	49.50

*Features extra-long shank required for Leigh jigs

See page 24-25 for straight bits.

See order form on page 31 for shipping charges and ordering instructions.

Leigh Router Dovetail Jigs

During the past few years Leigh dovetail jigs have revolutionized the business of cutting dovetails with a router. Leigh (pronounced "lee") jigs offer variable size and spacing of both pins and tails in either through or half-blind joints. Set-up is surprisingly easy, and once set these jigs provide a degree of precision that has to be seen to be believed — with a little practice & a few minutes' calibration, you can routinely produce joints that are so good you might as well call them perfect. Though Leigh jigs are not inexpensive tools, they are certainly more affordable than many other dovetailing devices on the market, and they represent a sound investment for any shop where dovetails are commonly used in one-of-a-kind or production pieces.

The Leigh models will allow production of custom through or half-blind joints in stock from 1/4" to 1-1/4" thick (tail piece must be rabbeted to 1" max. thickness for through dovetails). There are two sizes available:



New Leigh Multiple Mortise & Tenon Attachment for Leigh Dovetail Jigs

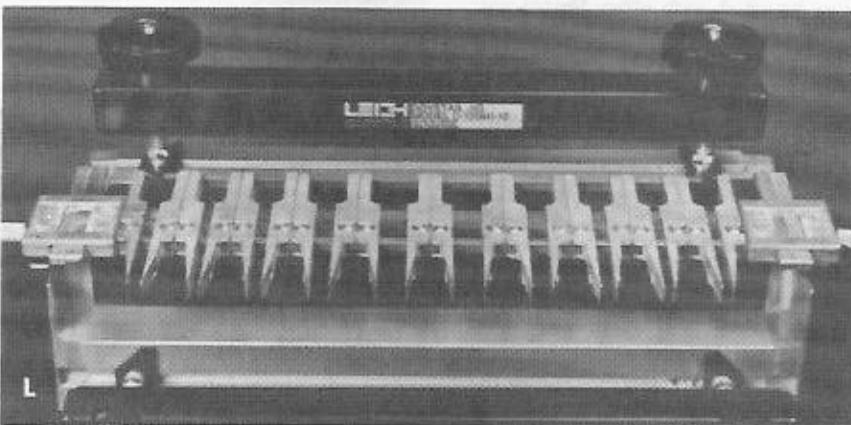
This new attachment for Leigh Dovetail Jigs lets you cut one of the most challenging joints there is with ease and precision. The multiple mortise and tenon is traditionally considered the strongest as well as the most dramatically attractive way to join a shelf or a partition to a carcass; and the fully adjustable Leigh MMT attachment enables you to cut this classic joint in virtually any size or spacing arrangement you like. You can cut flush or raised tenons, and through or blind mortises — with round corners or square (with a little chiseling in the mortises) — in any stock up to 24" wide, from 5/16" to 1-1/2" thick. Joints can be cut using a 1/2" spiral end mill router bit with 5/8" o.d. guide bushing.

New Prices

10.53.23	12" MMT Attachment	\$149.95
10.53.24	24" MMT Attachment	169.95



12" Leigh Dovetail Jig with Multiple Mortise and Tenon Attachment Installed



12" Leigh Dovetail Jig

Multi-Router Production Joinery Machine

This American-made jointmaker is a dream machine for commercial-duty production of almost any solid-wood joint imaginable. Extraordinarily heavy aluminum alloy castings, low-tolerance computer-controlled surface machining, and complete X-Y-Z axis control with linear ball bearings on solid steel ways make the Multi-Router the smoothest, most precise and most versatile joinery device we've ever seen. An excellent video-tape presentation is available to provide an in-depth view of the machine at work in a shop environment — details below. Equipped with the optionally available pneumatic clamp system, the Multi-Router will be equally at home on the factory floor or in a one-man custom shop.

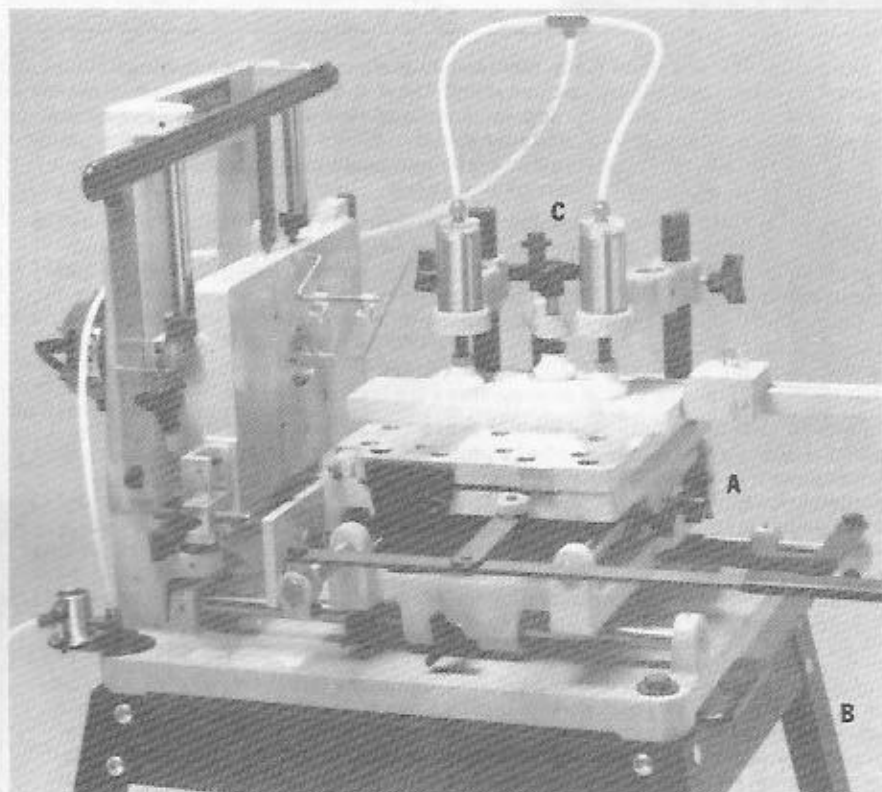
While its specialty is mortise and tenon joints (up to 1/2" x 3"), the Multi-Router also produces dovetails, box joints, splined miters, sliding dovetails, round stub tenons, and numerous decorative joints. The tilting work surface (0 to 45 degrees) makes both simple and compound-angle joints almost unbelievably easy. Mortises are set up and milled using built-in stops for control in every dimension. All other joint components are produced under template control; once set up, the machine will mill anything from one to a thousand parts with no further adjustment.

The work mounting table rides on four 3/4" diameter hardened steel ways which offer 8" of side-to-side and in-and-out travel. Thompson linear bearings assure tight, precise movement with almost dreamlike ease and smoothness. 20" lever handles move the table along both axes with positive control and excellent mechanical advantage. The vertical platen serves as router mount and positioning jig for stock set-up and some milling operations. It is bored for mounting either a Bosch 1604 router or a Makita 3612BR, and most other makes and models can be mounted with additional boring. The platen offers 6" of vertical travel, and is equipped with a gas-cylinder return which completely offsets the weight of any router, a great safety feature as well as an indispensable convenience.

A variety of optional templates is available for production of standard tenons, box (or finger) joints, 14 degree dovetails, mitred dovetails, and round tenons. An optional ball-bearing-tipped guide stylus is required for use with any of the templates. Standard tenon templates are very easy to use, as the stylus is completely controlled within a closed track.

Variable-size tenon templates are available to provide complete assurance that your tenons can be made to fit even if your mortises come out slightly over or under absolute dimension (such as will occur after your bits have been sharpened, or if they weren't perfectly sized to begin with). All the variable-size templates are used in a master insert holder; each tenon size set comes with three inserts to change tenon size in very small increments.

The comprehensive template set we offer includes all the templates *except* the std. tenon templates. It includes the master insert holder and all sizes of variable-size tenon templates.



The pneumatic Power Clamps are available either as original equipment or as an accessory system for those who already own the Multi-Router. If you're not already outfitted with an air compressor, low-cost units are readily available; the clamps require only minimal S.C.F.M. at 70 PSI. The machine can of course be used without the Power Clamp system, as it comes provided with two manual hold-down clamps which mount in any of the work table's 14 sockets.

Whether you want a machine for commercial mass production of chair parts, or if you're just looking for the ultimate router jig, you will find the Multi-Router to be an outstanding combination of ingenious design and meticulous execution. *The Multi-Router is shipped by truck freight collect. Shipping weight is 99 pounds.*

08.52.01	Multi-Router	\$1495.00
08.52.03	Machine Stand	88.00
08.52.04	PC-1 Air Clamps	255.00
08.52.05	Ball-bearing Follower Stylus	49.50

Comprehensive Template Set

08.52.63	Master Insert Holder, Set of 3 each Var. Size Tenon Inserts in All 14 Sizes, Dovetail Pins & Tails, Mitred Dovetail, 2 Finger Joint, & All 4 Round Tenon Templates	356.00
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MULTI-ROUTER Video

Seeing is believing, and we encourage you to borrow the instructional video and get a first-hand look at the Multi-Router in operation. To receive the video for up to 30 days, send us a check for \$20 (or charge by phone toll free 800-241-6748) to cover a \$15 refundable deposit and \$5 handling fee.

If you buy a Multi-Router during those 30 days, we'll credit your \$20 toward the purchase and let you keep the video manual.

Tenon Sizes Available (Inches):

1/4 x 1	3/8 x 1	1/2 x 1-1/2
1/4 x 1-1/2	3/8 x 1-1/2	1/2 x 2
1/4 x 2	3/8 x 2	1/2 x 2-1/2
1/4 x 2-1/2	3/8 x 2-1/2	1/2 x 3
1/4 x 3	3/8 x 3	

Variable-Size Tenon Templates

08.52.61	Master Insert Holder for Variable-size Tenon Inserts	25.00
08.52.62	Set of 3 Var.-Size Tenon Inserts (Specify one of fourteen nominal set sizes from tenon size chart above).	13.50

Standard Tenon Templates

08.52.11	Std. Tenon Templates, Ea.	15.25
	(Specify size from chart above)	

Other Standard Templates

08.52.31	Dovetails (Pins and Tails)	36.50
08.52.35	Mitred Dovetail	18.50
08.52.32	1/4" Finger Joints	18.50
08.52.33	3/8" Finger Joints	18.50
08.52.34	Round Tenons, Each	15.25
	(Specify size: 1/2 & 5/8; 3/4; 1; or 1-1/4")	

Precision Spiral End Mill Bits

High Speed Steel

	Diameter	Cutting Length	Shank	Overall Length	Price
0225H	1/4"	5/8"	3/8"	2-7/16"	14.70
0237H	3/8"	3/4"	3/8"	2-1/2"	14.70
1225H	1/4"	1-1/4"	3/8"	3-1/16"	16.85
1237H	3/8"	1-1/2"	3/8"	3-1/4"	16.85
1250H	1/2"	2"	1/2"	4"	24.15

Titanium Nitride Coated (stays sharp 6x longer)

0225T	1/4"	5/8"	3/8"	2-7/16"	20.70
0237T	3/8"	3/4"	3/8"	2-1/2"	20.70
1225T	1/4"	1-1/4"	3/8"	3-1/16"	22.85
1237T	3/8"	1-1/2"	3/8"	3-1/4"	22.85
1250T	1/2"	2"	1/2"	4"	30.15

ROUTERS

During the first part of the 1980s, there began what was to become a major evolutionary transformation of the traditional woodworking router. Motors were made more and more powerful, 1/2" collets began appearing on hand-held machines, new applications and new techniques proliferated, and plunge-router design began to gain popular acceptance. In the late 80s, new router models are being introduced by practically every manufacturer – and most of them are plunge routers.

Plunging capability is an outstandingly useful feature. It allows vertical entry into the work, as needed for surface forming, routing mortises, or cutting stopped grooves or edge treatments. It lets the user pre-set final and intermediate cutting depths with great precision, and then reach any setting almost instantly. And, perhaps almost accidentally, the plunge feature offers greatly increased safety in most hand-held operations. Once installed in the collet, most common bits will be withdrawn above the router base when the motor housing is fully raised, allowing the router to be set down securely on its base while waiting for the bits to stop rotating after a cut is completed.

Powerful new motors drawing from 12 to as much as 15 amps (all commonly described as 3 horsepower) have also had a profound effect on routing. Conventional bits, such as those for rounding over, grooving, rabbeting and so on, can be used almost effortlessly for full-depth one-pass cutting that is cleaner and smoother than ever; high power keeps the bit rotating at high rpm for reduced chatter, tearout, and overload burning. Dependable 1/2" collets on these big new motors have prompted a rush to large 1/2"-shank bits increasingly capable of performing joinery, shaping and moulding functions formerly reserved for stationary tools or hand planes. More and more owners do most of their work with their router mounted in a table, enjoying the versatility, precision, and greatly boosted productivity a good table system can provide.

Highland Hardware now carries heavy plunge routers from four different manufacturers. Each model has its own particular strong points, but all have several important features in common. Each comes equipped with a 1/2" collet, with provisions for handling other shank sizes. Each comes with an adjustable depth stop rod attached to the motor housing, and each has a three-stage rotating turret on the base which lets adjustable stop screws be selectively located under the stop rod. Each has parallel holes passing horizontally through the base casting, which accept twin steel rods used to mount edge-guide hardware – and which enable the user to construct a table-mounting system unmatched for ease and efficiency of use. *We provide the plans for this mounting system with each plunge router we sell.*



RYOBI RE-600 ELECTRONIC VARIABLE SPEED PLUNGE ROUTER

This new entry from Ryobi is causing quite a stir out there in routerland. Somehow Ryobi has managed to create a big, powerful, soft-start variable-speed machine, load it with features, specs, and accessories, and bring it to market for an astonishingly low price. The RE-600 is very nearly the ideal router for table-mounted use. Of all the routers we sell, this is the only one that comes factory equipped for

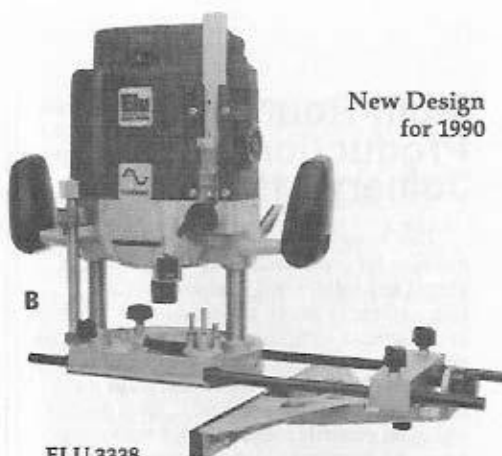
easy and positive under-table depth of cut adjustment, for accepting bits up to 3-3/8" diameter without special add-on sub-bases, and for operating at low rpm with enough power for any kind of cutting in any kind of material you might have in mind.

The RE-600 is powered by a 15 amp motor which operates at any speed from 10,000 to 22,000 rpm. It is equipped with large, stout handles which offer solid control for hand-held use; toggle switch and plunge lock lever are reached on the right side without releasing the handle. Max plunge depth is 2-3/8". A large height adjustment knob can be used for micro-adjusting depth of cut, and it works exceptionally well for effortless depth setting with the router mounted in a table. The base is round, 6-5/8" in diameter, with a 3-1/2" opening in the sub-base. A chip deflector shield can be placed at front or rear as needed for operator safety.

Standard equipment includes a 3-piece guide set with micro-adjustable holder, straight fence and roller guide. Also included are 1/4" and 3/8" adapter sleeves for use in the standard 1/2" collet. Optional guide bushing adapter allows use of Black & Decker or Porter Cable guide bushings (available on next page).

The RE-600 weighs 14 lbs.

- A RE600 Ryobi Var. Spd. Plunge Router 249.95**
6072503 Guide Bushing Adapter 9.95
 for B&D/Porter Cable Bushings



New Design for 1990

ELU 3338 ELECTRONIC VARIABLE-SPEED PLUNGE ROUTER

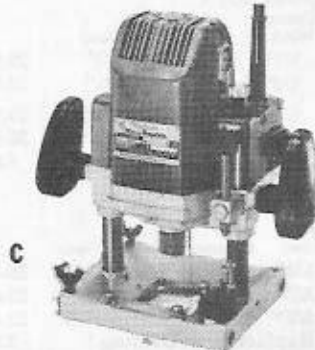
Elu has just issued a new edition of its renowned variable-speed plunge router, featuring five changes to the original design which will make the 3338 easier to use and more productive than ever. Unchanged is Elu's unique and superbly precise depth setting system, incorporating a graduated rack-and-pinion plunge stop rod with a magnified adjustable cursor (with parallax eliminator, no less). Likewise untouched is the 8000-20,000 RPM electronic constant-torque variable speed control, a wonderfully useful feature for all manner of routing situations: running really big bits; routing Corian and other synthetics; following intricate patterns or using complex templates – all these operations are safer, smoother and more efficient when you can run the router at appropriate cuts-per-inch and feed rates.

New for 1990 are larger, upright handles that fill the hand for a comfortable and secure grip. The plunge lock lever has been freed (originally this lever was self-locking) and it is now the user's choice to have the router locked or unlocked on its posts. (Unfortunately, the new locking lever cannot be retro-fitted onto older models of the 3338.) Also incorporated into the new motor housing is an internal spindle lock for secure one-wrench bit installation. On the plunge return limit post at the left front of the machine, the double nuts used to limit the router's upward travel have been replaced with a snazzy little nut with built-in quick release. Finally, the 3338's thin phenolic sub-base is now attached with screws rather than being cemented onto the base casting.

The Elu 3338 operates at any speed from 8000 to 20,000 rpm, drawing from 12 to 10 amps depending on the speed selected. It offers a maximum of 2-5/8" of plunge travel, with precision-machined bronze bushings moving smoothly on polished, case-hardened steel posts. The 1/2" collet supplied with the machine has an unusually long 1" grip length for holding any bit shank securely, and the spindle is bored 2-1/4" deep to accept even the longest shanks. 1/4" and 3/8" replacement collets are available as options, as is a fine height adjuster required for table-mounted operation. A straight edge guide system, now including a micro-adjust feature as standard equipment, is provided with the router. The 3338 has a modified circular base 6-5/8" in diameter with the front edge chopped off straight 2-1/4" from center. A bushing adapter is provided to enable use of any standard Black & Decker or Porter Cable guide bushings. Net weight is 12-1/4 lbs.

See accessories at right on next page.

- B 3338 ELU Var. Speed Plunge Router 299.00**



MAKITA 3612 PLUNGE ROUTERS

The 3612 routers are among the most durable, most versatile, and most powerful routers ever made. Their great success has inspired users and manufacturers alike; many of the features that are now standard on every plunge router first appeared on Makita machines a decade ago. Even in the face of good, innovative competition, the Makita 3612 routers remain a sound and secure choice for any woodworker who demands precision, power, and an unbeatable track record from his or her tools. Having sold thousands of Makita plunge routers during the past ten years, we're happy to report that these are among the most reliable power tools you can buy.

There are two models in the 3612 series: our old favorite 3612B with its rectangular base, and the 3612BR which is the round-base edition of the same machine. Other than for base configuration, the two models are identical in powerplant and fittings. The rectangular base measures 6-5/8" by 5-1/2", while the round base is 6-1/4" in diameter; this gives the rectangular base about 13% more surface area than the round base and makes it a bit easier to control during hand-held routing. In fact, the 3612B has a larger footprint (36.44 sq. in.) than any other router we carry, giving it unexcelled stability in edge-forming work and unequalled ease of use in joinery and surface-forming jigs.

The 3612 routers offer 2-1/2" of plunge depth with a micro-adjustable stop rod. The rod is threaded through a spring-loaded half-nut; press the release button to instantly move the stop rod close to the desired setting, then rotate it up or down to precisely set final depth of cut. The micro-adjust system doesn't interfere with the motor's upward travel, so bits can still be retracted after depth of cut is set.

Specifications common to both models are: universal 14-amp, 23,000 rpm motor rated for commercial use; externally accessible brushes; 1/2" collet with 1/4" adapter sleeve included; internal spindle lock for one-wrench bit change; chip deflector shield on base; right-hand toggle switch and plunge lock lever. Weight is approximately 13 lbs. **SALE**

C10.10.09	3612B (Rectangular-Base)	199.95
10.10.10	3612BR (Round-Base)	199.95
10.10.55	Guideset for 3612B & BR	48.95

ACCESSORIES FOR ELU 3338 ROUTER		
C40902	1/4" Collet	29.95
C40904	3/8" Collet	29.95
C40966	Fine Height Adjuster	9.95
Porter Cable Guide Bushings (also fit ELU)		
C62943	5/16" o.d.	6.95
C62944	3/8" o.d.	6.95
C62945	7/16" o.d.	6.95
C62947	5/8" o.d.	6.95
C62942	Template Guide Nut (req'd. for guide bushings above)	2.95

GUIDE SYSTEM FOR 3612B & BR

This 3-piece set consists of a guide holder, a straight guide, and a roller guide for following contoured edges. A notched flange in each guide fits over an indentation in the guide holder's adjust screw, allowing positive micro-adjustment of the guide after the holder has been locked down within 1/2" or so of the desired position. Bits can be positioned up to 6" from the edge of a workpiece or template.

10.10.55	Guideset for 3612B & BR	48.95
10.10.02	Guide Holder only	29.95
10.10.03	Straight Guide only	12.80
10.10.04	Roller Guide only	9.30

MAKITA ROUTER GUIDE BUSHINGS

Makita guide bushings screw directly to the router. The Makita guide bushing adapter allows use of 2-piece guide bushings from Black & Decker or Porter Cable.

Guide Bushings for Makita 3612B, 3612BR and 3620 Routers			
	Outside Diameter	Bushing Height	
10.10.32	3/8"	29/64"	18.00
10.10.56	7/16"	33/64"	22.00
10.10.57	1/2"	33/64"	22.00
10.10.58	5/8"	33/64"	11.00
10.10.34	25/32"	33/64"	18.00
10.10.35	1-1/16"	33/64"	9.00
10.10.44	Guide Bushing Adapter		16.00



BOSCH 1604 1-3/4 HP ROUTER

The Bosch 1604 is well known as a superb utility router for all manner of general-purpose shop work. Its 10-amp motor provides plenty of power for shaping and joinery work, and its interchangeable 1/4" and 1/2" collets will let you use all the bits you now own and most of the new ones on the market as well. 25,000 rpm operating speed assures the cleanest, smoothest cutting possible. 6-inch diameter base, 7-3/4 lb. weight, low center of gravity handles and good visibility through the base make hand-held operation unusually easy.

The 1604 incorporates Bosch's remarkably good depth of cut adjustment system, in which the entire motor housing rotates within and registers on the spiral-rim base assembly, allowing smooth and precise setting. Cast index marks show 1/32nd-inch depth increments.

Optional equipment includes a straight guide, trammel point for circle cutting, and Bosch's unique and exceptional Air-Sweep™ vacuum attachment, which comes with a custom sub-base for the 1604, an edging attachment, a template-guide sub-base, and 10 feet of 1-1/2" flex hose.

D10.16.01	Bosch 1604 Router	139.95
10.16.02	Straight Guide	23.50
10.16.08	3/8" Collet Cone	12.00
10.16.03	Trammel Point	10.30
10.16.05	7/16" Template Guide	10.55
10.16.06	1/2" Template Guide	7.30
10.16.07	5/8" Template Guide	10.25
10.16.09	Router Vacuum Attachment	102.50



SAVE DURING OUR INVENTORY REDUCTION SALE on the BOSCH 1611 220-Volt Electronic Variable Speed Plunge Router

This is without a doubt the most powerful router we've ever used. Its soft-start 220-volt motor gets more torque out of 7 amps than any 110-volt machine gets out of twice the amperage, and Bosch's electronic variable speed control means all that torque is available regardless of where you set the rpm. Speed range is from 12,000 to 18,000 rpm, adjustable with the motor on or off. In addition to horsepower, the 1611 EVS has several other features that make it well suited to commercial use.

The 1611 EVS offers 3" of plunge travel, self-locking plunge lock lever and plunge stop rod with built-in cursor. A lockable trigger switch is built into the right handle; the speed control dial is on the upper left motor housing. The router comes with a 1/2" collet, with external spindle lock for easy bit changing. The spindle is bored 2-1/2" deep to accept even the longest shanks and make sure any bit's cutting edge is up close to the collet for maximum stability.

1/4" and 3/8" collets are available separately if you need to run smaller shanks. If needed, the collet can actually be plunged as much as 3/8" below the base of the router, making up for any depth of cut lost to sub-bases for table-mounting or other custom base structures.

The 1611 EVS has a modified round base 6-3/4" in diameter, chopped straight along the front edge 2-1/4" from center to allow routing unusually close to vertical surfaces. Standard equipment includes a bushing adapter plate which allows use of standard Bosch bushings, listed at left with the Bosch 1604 router. Net weight is 12-1/2 pounds.

A good edge guide is available optionally, offering 10-1/2" reach with adjustable straight fence faces.

Order now while sale quantities are available for immediate shipment.

Sale quantity limited		Was \$319.95
		SALE
E1611E-2	Bosch 220v EVS Router	269.95
82993	Edge Guide for 1611	23.50
499503	1/4" Collet for 1611	12.50
499502	3/8" Collet for 1611	12.50

CARBIDE TIPPED ROUTER BITS

In this, our largest selection yet, we offer a comprehensive line of high-quality carbide tipped router bits for professional and amateur alike. These are not the cheapest bits on the market; instead they are among the best available, offered at very competitive prices and backed up by experienced and reputable manufacturers. These bits are tipped with machine-brazed C-2 carbide for the best combination of toughness and edge-holding ability. They are polished with 400-grit diamond abrasive to a very sharp edge for clean cutting with fast feed rates and minimal tearout.

Throughout these pages you'll note many new, special-purpose and oversize bits, designed primarily for use with the new generation of heavy 1/2"-collet routers now dominating a large share of the market. We're not forgetting about those of you with 1/4" collets, however, and you'll see several excellent new bits now available with 1/4" shanks. For the first time ever we have 1/4"-shank bits for rail & stile cutting, and likewise a panel-raising bit with 1/4" shank (for use with table-mounted router). Our new full bead and flute cutting bits are also available with 1/4" shanks.

Whenever possible, we offer both 1/4" and 1/2" shanks, usually at very little difference in price. If you own a large router, the larger shank size will give you greatly increased stability and safety in use; a 1/2" shank is about four times stronger than a 1/4" shank. Many of the largest bits we sell are intended for use in table-mounted routers, where the fence and other safety & control devices help minimize the risk in running huge cutters.

Router bits can easily represent a greater investment than you have in your router. We're persuaded that it makes sense to invest in bits you can rely on for precision and durability, and we offer these high-quality bits with confidence that they will meet your most exacting standards.

Throughout these listings, "Carbide Height" is a vertical measurement regardless of edge profile.

A STRAIGHT BITS

Cutter Diameter	Carbide Height	Shank Diameter	
10.14.01	1/16"	1/4"	12.90
10.14.02	1/8"	1/4"	9.90
10.14.03	3/16"	7/16"	9.90
10.14.04	1/4"	1"	9.90
10.14.05	5/16"	1"	10.80
10.14.06	3/8"	1"	11.90
10.14.07	7/16"	1"	11.90
10.14.08	1/2"	1"	11.90
10.14.09	5/8"	3/4"	11.90
10.14.10	3/4"	3/4"	13.30
10.12.65	1/4"	3/4"	11.40
10.12.66	5/16"	1"	11.40
10.12.01	3/8"	1"	11.40
10.12.02	7/16"	1-1/4"	11.90
10.12.03	1/2"	1-1/4"	11.90
10.12.04	1/2"	2"	15.90
10.12.05	5/8"	1-1/4"	13.80
10.12.06	11/16"	1-1/4"	15.30
10.12.07	3/4"	1-1/4"	14.90
10.12.08	7/8"	1-1/4"	17.70
10.12.09	1"	1-1/4"	18.90
10.12.10	1-1/2"	1-1/4"	28.90
10.12.11	1-3/4"	1-1/4"	42.90

B V GROOVE BITS - 90° Angle

Diameter	Carbide Height	Shank	
10.14.11	1/4"	3/8"	10.50
10.14.12	1/2"	1/2"	23.30
10.12.12	5/8"	1/2"	29.80
10.12.13	3/4"	5/8"	35.90

C ROUND NOSE BITS

Radius	Carbide Height	Shank	
10.14.13	1/16"	1/4"	16.80
10.14.14	1/8"	1/4"	17.60
10.14.15	3/16"	1/4"	19.90
10.14.16	1/4"	5/16"	19.90
10.14.17	5/16"	3/8"	20.50
10.14.18	3/8"	1/2"	20.90
10.14.19	1/2"	5/8"	33.90
10.12.14	1/4"	1-1/4"	26.90
10.12.15	3/8"	1-1/4"	32.90
10.12.16	1/2"	1-1/4"	44.90
10.12.17	5/8"	3/4"	49.90

D COVE BITS

Radius	Carbide Height	Shank	
10.14.20	3/16"	9/16"	24.90
10.14.21	1/4"	9/16"	24.90
10.14.22	3/8"	9/16"	23.50
10.14.23	1/2"	3/4"	28.50
10.12.18	3/8"	9/16"	26.80
10.12.19	1/2"	3/4"	29.80
10.14.84	Replacement Bearing		3.80

E DOVETAIL BITS

Bottom Diameter	Angle	Carbide Height	Shank	
10.14.24	3/8"	9°	3/8"	13.90
10.14.25	1/2"	14°	1/2"	14.50
10.12.20	3/8"	9°	3/8"	14.90
10.12.21	1/2"	14°	1/2"	15.90
10.12.22	3/4"	14°	13/16"	49.50

F ROUNDING OVER BITS

Radius	Carbide Height	Shank	
10.14.26	1/16"	1/2"	23.70
10.14.27	1/8"	1/2"	21.90
10.14.28	3/16"	1/2"	21.90
10.14.29	1/4"	1/2"	21.90
10.14.30	5/16"	1/2"	23.70
10.14.31	3/8"	5/8"	23.70
10.14.32	1/2"	3/4"	26.50
10.12.23	1/4"	1/2"	22.50
10.12.24	5/16"	1/2"	24.50
10.12.25	3/8"	5/8"	24.50
10.12.26	1/2"	3/4"	28.50
10.12.27	3/4"	1"	42.50
10.12.28	1"	1-1/4"	90.00
10.12.29	1-1/4"	1-1/2"	120.00
10.12.30	1-1/2"	1-7/8"	128.00
10.14.86	Replacement Bearing		3.80

G POINT CUTTING ROUND OVER BITS

Radius	Point Width	Shank	
10.14.33	1/8"	1/8"	17.60
10.12.31	1/4"	1/4"	36.50

H FRENCH PROVINCIAL CLASSIC BITS

Cutting Width	Carbide Height	Shank	
10.14.34	9/16"	5/8"	54.95
10.12.32	9/16"	5/8"	54.95

I OGEE BITS

Cutting Width	Carbide Height	Shank	
10.14.35	5/16"	1/2"	36.90
10.14.36	7/16"	11/16"	39.90
10.12.33	5/16"	1/2"	36.90
10.12.34	7/16"	11/16"	39.90
10.14.86	Replacement Bearing		3.80

J ROMAN OGEE BITS

Cutting Width	Carbide Height	Shank	
10.14.37	5/16"	5/8"	29.90
10.14.38	1/2"	7/8"	30.90
10.12.35	5/16"	5/8"	29.90
10.12.36	1/2"	7/8"	30.90
10.14.84	Replacement Bearing		3.80

K RABBETTING BITS

Width of Rabbet	Diameter	Carbide Height	Shank	
10.14.39	1/4"	1"	9/16"	26.50
10.14.40	3/8"	1-1/4"	1/2"	22.60
10.12.37	3/8"	1-1/4"	1/2"	22.60
10.14.86	Replacement Bearing			3.80

L MORTISING BITS

Diameter	Overall Length	Shank	
10.14.41	1/2"	1-3/4"	10.80
10.14.42	5/8"	1-3/4"	12.30
10.14.43	3/4"	2"	13.80
10.12.38	1-1/4"	2-1/8"	19.90

M FLUSH TRIM BITS

Diameter	Carbide Height	Shank Diameter	
10.14.44	1/2"	1"	12.50
10.12.39	1/2"	1"	14.50
10.14.86	Replacement Bearing		3.80

N BEVEL TRIM BITS

Angle	Carbide Height	Shank Diameter	
10.14.45	7°	1/4"	19.90
10.14.46	15°	1/4"	14.20
10.12.40	15°	1/4"	19.90

TWO-WING SLOT CUTTERS

Thickness	Slot Depth	
10.14.47	1/16"	1/2"
10.14.48	1/8"	1/2"
10.14.49	5/32"	1/2"
10.14.50	1/4"	1/2"

10.14.51	1/4" Arbor & Bearing	5.90
10.12.41	1/2" Arbor & Bearing	5.90
10.14.88	Replacement Bearing	3.80

Q CHAMFER BITS - 45° ANGLE

Carbide Height	Shank Diameter	
10.14.52	1/2"	1/4"
10.12.42	1/2"	1/2"
10.14.84	Replacement Bearing	3.80
10.14.53	11/16"	1/4"
10.12.43	11/16"	1/2"
10.14.86	Replacement Bearing	3.80

R BEADING BITS

Radius	Carbide Height	Shank	
10.14.54	1/16"	1/2"	23.70
10.14.55	1/8"	1/2"	21.80
10.14.56	3/16"	1/2"	21.80
10.14.57	1/4"	1/2"	21.80
10.14.58	5/16"	1/2"	23.70
10.14.59	3/8"	5/8"	23.70
10.12.44	1/4"	1/2"	22.50
10.12.45	3/8"	5/8"	24.60
10.12.46	1/2"	3/4"	28.50
10.14.82	Replacement Bearing		3.80

S LOCK MITER BIT

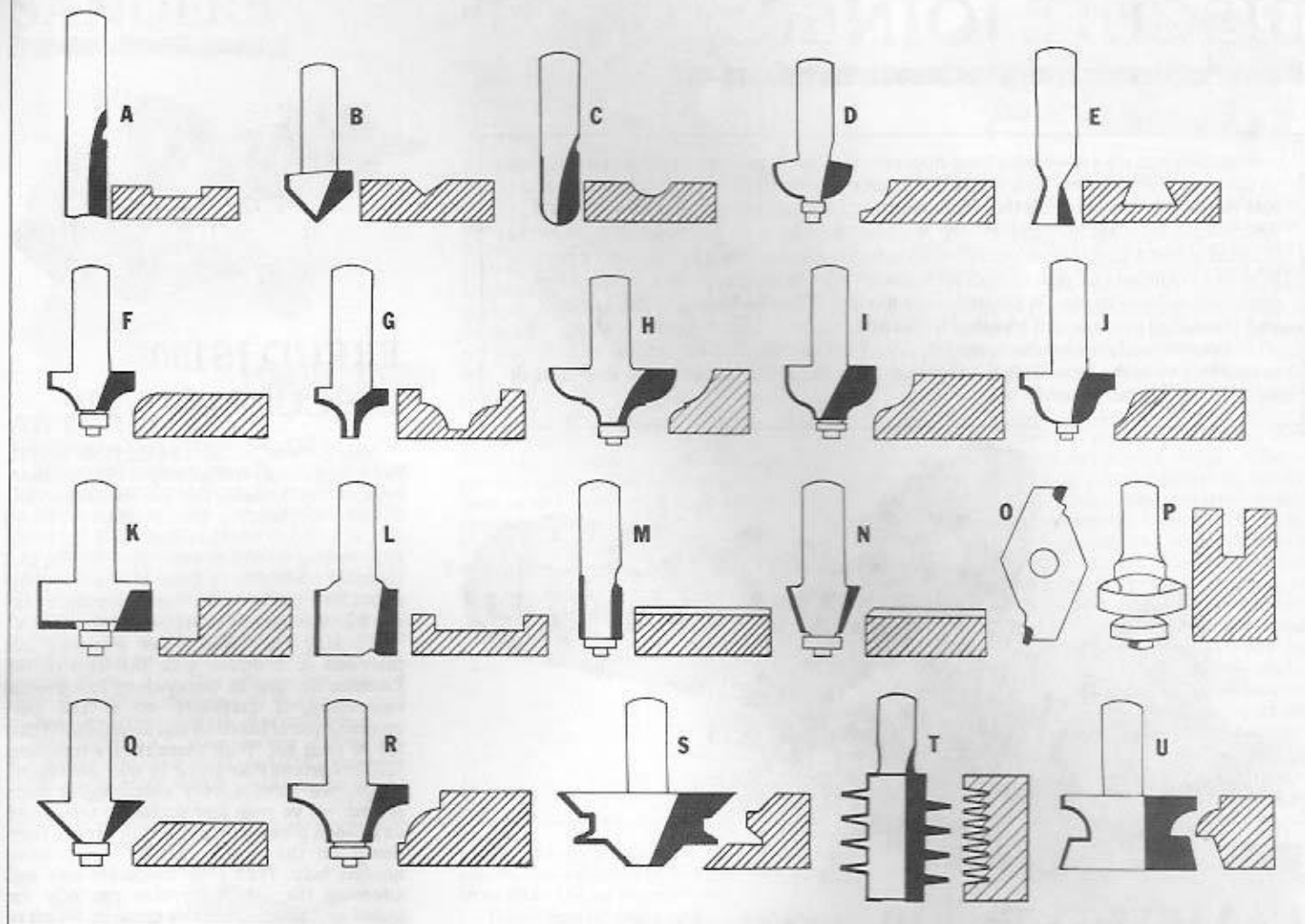
Diameter	Stock Thickness	Shank	
10.12.47	2-3/4"	1/2" to 1-1/8"	99.95

T FINGER JOINT BIT

Diameter	Carbide Height	Overall Length	Shank	SALE
10.12.50	1-3/8"	1-9/16"	3-1/16"	79.95

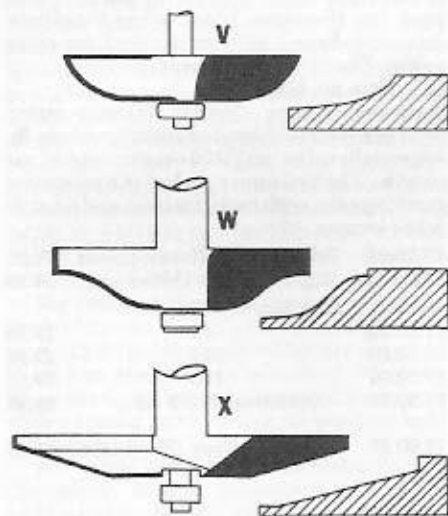
U CABINET DOOR LIP BIT

Diameter	Stock Thickness	Shank	
10.12.48	2"	1/2" to 1-1/4"	64.95



RAISED PANEL ROUTER BITS

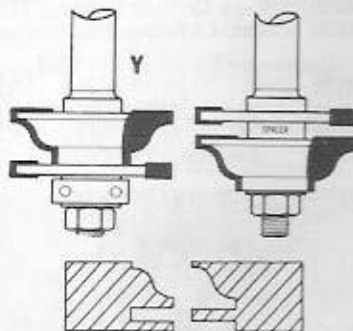
	Diameter	Cutting Width	Carbide Height	Shank
Cove	2"	3/4"	3/8"	1/4"
Cove	2-1/2"	1"	5/8"	1/2"
Ogee Fillet	2-5/8"	1-1/16"	11/16"	1/2"
Provincial	3-3/8"	1-7/16"	1/2"	1/2"
V 10.14.67	Cove Raised Panel, 1/4" shank			64.95
10.12.68	Cove Raised Panel, 1/2" shank			74.95
W 10.12.51	Ogee Fillet Raised Panel			79.50
X 10.12.52	Provincial Raised Panel			99.95



6-PIECE 1/2" SHANK CARBIDE ROUTER BIT SET

This assortment (not pictured) of six popular, premium-quality bits was selected to meet the needs of someone who has recently purchased a large plunge router or other router with 1/2" collet capacity. It includes 3/8" and 1/2" straight bits, 3/8" radius round-over bit, 1-1/4" diameter rabbeting bit, 5/32" radius Roman ogee bit, and 1/2" dia. flush trim bit. Sold individually, the bits would cost \$114.80.

10.12.97 6-Pc. Set of 1/2"-shank Bits 99.95



Y RAIL AND STILE BIT

This remarkable carbide bit reconfigures to cut both a rail and matching stile in 3/4" to 7/8" thick stock. 1-3/4" diameter. 3/8" cutting width. 1/2" shank.

10.12.53	Rail and Stile Bit	85.50
10.14.88	Replacement Bearing	3.80

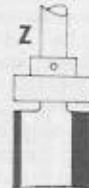
Z OVERHEAD-PILOT FLUSH TRIM BITS

Like conventional flush trimmers, these overhead bits are ideal for final template-guided shaping of roughed-out stock, pattern duplication, edge truing, and so on. In many situations, however, the bearing on the bottom of the conventional bit gets in the way, and that's where these overhead-pilot bits really shine. Note that the maximum depth of cut will be considerably greater than the bits' cutting length, for as soon as part of the workpiece has been trimmed the template can be removed and the work itself used as a guide.

The 1/2" and 3/4" bits have 1/4" shanks for use in any router. The 1" bit has a 3/8" shank. The 1-1/8" bit has a 1/2" shank. Please note that the maximum cutting depth listed below may vary slightly depending on the design of your router.

Overhead-Pilot Flush Trim Bits

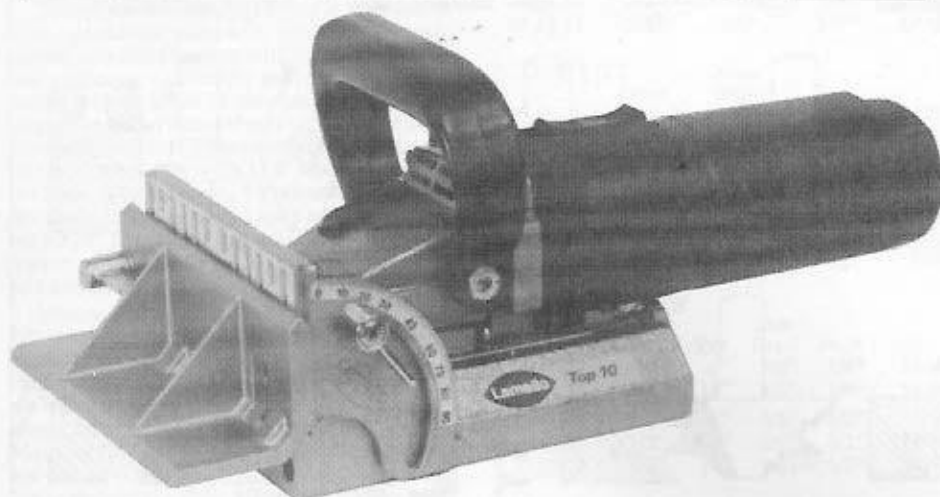
	Diameter	Carbide Height	Maximum Depth	
10.14.61	1/2"	1"	1-1/4"	19.95
10.14.62	3/4"	1"	1-1/2"	21.95
10.14.63	1"	1"	2"	24.95
10.12.84	1-1/8"	1-1/2"	2-1/2"	49.95



BISCUIT JOINERY

Not long ago we answered a long-distance call from a customer who wanted to tell us about the Lamello Top he had purchased from us the week before. Of course we'd told him about the Lamello's incredible efficiency and ease of use, and how it would dramatically increase his productivity. But since he was an empirical kind of fellow, he decided to run a fairly objective test on a custom cabinet job he had ready for assembly. First he assembled one cabinet unit with dowels, just as he always had. Elapsed time from start to glue-up was 56 minutes – not too bad. Then he turned on the Lamello and assembled another unit identical to the first. Elapsed time: two minutes!

In the words of another customer who's had his Lamello Top for years now, assembling with the Lamello is the next best thing to having someone else do the work for you, and it's faster, too.



LAMELLO Top 10 SALE \$499

The world-famous Lamello Top biscuit joiner was given a new look and a new name in 1989. It remains fundamentally the same superb, industrial-quality tool that earned its reputation in the first place, but now the Top 10 incorporates a more powerful 700-watt, 10,000 rpm motor, along with several new design elements that make it easier to use than ever before. When you need the best, there's no doubt that the Lamello Top 10 is the tool to choose.

The Top 10 retains Lamello's unique hinged nosepiece, an outstanding feature which insures virtually foolproof accuracy and makes this joiner easier to use hand-held than any of its competition (except the Lamello Standard, of course). The fence can be flipped forward and locked in horizontal position, guaranteeing perfect surface alignment across flat butt joints, or it can be set at any angle between horizontal and vertical for aligning mitres, coopered staves, or other angled joints. Locked in its vertical position, the fence forms a nosepiece machined to precisely 90° from the base for vertical plunge cutting. A scale built into the fence's pivot lock lets you set the fence to any angle with 1° accuracy. A new accessory fence clamps to the vertical nosepiece to allow blade alignment up to 2" from the surface of a workpiece; the accessory fence is self-squaring and locks positively with a single lever.

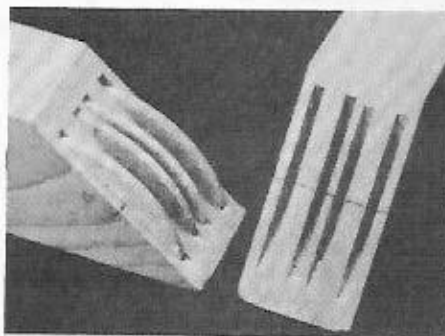
Other new features include a compact quick-setting depth stop dial conveniently located up front near the fence, with no jam nuts that might loosen and change your depth

of cut. The base of the tool has been redesigned to allow nearly instant removal for access to the blade, and an exhaust port has been added that directs chips out the right rear of the machine. A spindle lock atop the motor housing allows use of a single wrench for blade change. As always, the machine comes with a stout wooden case with separate compartments for accessories and tools. The Top 10 weighs 7 lbs. *Sale Quantity Limited*

SALE 499.00

17.90.01	Lamello Top 10	Was 569.00
17.90.05	Repl. Carbide Cutter	62.00
17.90.06	Dust Collector Adapter	50.00

Lamello Joining Plates, Box of 1000		
17.90.02	0 9/16" wide	29.95
17.90.03	10 3/4" wide	29.95
17.90.04	20 15/16" wide	29.95
17.90.98	Assortment of 3 sizes	29.95



FREUD JS100 BISCUIT JOINER

When Freud introduced the JS100 in 1986, the tremendous productivity of biscuit joinery became so affordable that just about everyone could experience it for themselves. Small shops, custom woodworkers and hobbyists snapped up tens of thousands of JS100s, and demand continues to grow as word spreads about how the tool makes dead accurate joinery the easiest and fastest part of your work.

Though the Freud joiner is clearly not intended to compete with the likes of the Lamello for use in heavy-duty commercial situations, it certainly offers the best combination of function and affordability that we've seen yet. With more than a thousand JS100s currently at work in our customers' shops, we have a very encouraging track record: we've seen few problems occur, and have been pleased with prompt service from Freud on the rare occasions when we've needed help. With only moderate care and attention the JS100 provides precisely the speed and accuracy we've come to expect of biscuit joinery at its best.

All Lamello accessories listed here are compatible with the JS100; the glue bottle, KD, K-20, and C-20 splines, and the Paumelle hinges will add convenience and versatility to your Freud system.

The JS100 uses a fence design somewhat different from the Lamello's, trading some of the Lamello's convenience for a bit more versatility, particularly on mitred work. A fixed vertical nosepiece works with a sliding horizontal fence for vertical-axis positioning. Angled vanes on the on the back of the horizontal fence allow it to be flipped over and used for 45-degree joints, while shop-built accessory fences will be required for other angles. The fence can be set at any distance up to 2" from the blade.

Pre-set cutting depths, 550-watt motor with conveniently located switch, and six-lb. net weight make the JS100 easy to use and get used to. The tool comes packed in a protective carrying case, with tools, manual, and a handful of sample splines.

17.20.01	Freud JS100 Biscuit Joiner	179.95
17.20.02	Repl. Carbide Cutter	54.95

Joining Plates, Box of 1000		
17.90.02	#0	29.95
17.90.03	#10	29.95
17.90.04	#20	29.95
17.90.98	Assortment of 3 sizes	29.95

17.90.07	Lamello Glue Dispenser	21.95
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PORTER-CABLE
PROFESSIONAL POWER TOOLS

PORTER-CABLE 7334 RANDOM-ORBIT DISC SANDER

This new machine from Porter-Cable borrows a successful idea from pneumatic tooling to create a very aggressive sander that provides remarkably smooth, swirl-free surfaces. The 7334 sands almost as cleanly as a good half-sheet orbital sander, leaving very little finishing required even on the finest work. And yet it also sands almost as quickly as a disc or belt sander, so when you're looking for fast work without tearing up the wood, this is the perfect choice. The 7334 sands even painted surfaces with no clogging of the paper, and without gouging, melting or scratching.

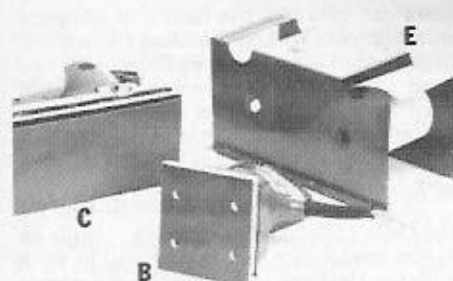
The 7334's 3.7 amp motor drives the 5" sanding disc at six thousand 3/8"-diameter orbits per minute, which accounts for the its

aggressive cutting action. The disc is mounted on a free-wheeling shaft which rotates as a result of its orbital motion, rather than being directly driven by the motor. The rotation rate varies considerably depending on pressure, contact angle, and so on; the result is that any given point on the disc travels in a truly random pattern, insuring that no uniform swirls or other consistent scratch patterns show up on the wood.

The 7334 comes equipped with 3M's standard 5" Stikit™ backing pad for use with self-adhesive sanding discs. This is a firm foam pad with just enough give to avoid gouging when using the edge of the disc; the sander is normally used flat on a surface, but can be angled for tight areas or heavy spot sanding. A removable side handle, mountable right or left, is provided to facilitate control in any position. The 7334 weighs 5 pounds.

5" Stikit sanding discs (offered at left) are sold in bulk rolls costing less than 25¢ a disc. Grits range from 80 to 220. We also carry 60-grit self-adhesive discs in packs of 10 - our tests of the 7334 sander showed that it can easily handle paper that coarse for very fast work on hard wood or painted surfaces.

H 7334	Random-Orbit Disc Sander	139.95
15.10.70	60-grit 5" Discs, pack of 10	3.80



3M STIKIT™ SANDING SYSTEM

One of America's most creative companies has come up with yet another boon for the woodworker: the Stikit family of self-adhesive sandpapers and sanding tools. For hand or machine sanding, Stikit paper is tough, sharp silicon carbide grit bonded to A weight paper with a reliable pressure-sensitive backing, available in a range of grits to cover all your finishing needs. Changing grits on your finish sander or disc sander takes only seconds, and you'll never have to hassle with paper slippage again - but perhaps the best feature of the Stikit system is its economy. Remarkably, Stikit paper for a Makita palm sander costs less than 14-1/2 cents a sheet, less than the cost of full-size silicon-carbide sheets you cut yourself.

For finish sanders, 3M offers two options. For Makita and Porter Cable palm sanders, we carry Stikit backing pads which are designed to replace the sanders' standard felt pads. These are metal-backed closed-cell foam pads with a special fabric facing for positive hold and durability.

For other sanders, the adhesive-backed Conversion Facing measures 4-1/2" x 11", large enough for 1/3- or 1/2-sheet sanders. Stikit finishing-sander paper is sold in rolls

4-1/2" wide by 10 yards long, enough for 90 4" sheets. It is available in a range of seven grits from 80 to 320, as listed below.

When you're doing a lot of sanding, the double-roll dispenser for 4-1/2"-wide Stikit paper will come in handy. Stores two rolls, with a crisp cutting edge for each. Just pull out the length you need and tear.

For sanding round, highly contoured or very delicate pieces, the Stikit hand pad is a great help. It's a 4-1/2" x 4-1/4" soft neoprene pad with a finger strap on the back and facing fabric on the front; it moulds easily to any shape, providing support to keep paper from tearing or crimping, and insulating against heat build-up as well. The hand pad uses the same 4-1/2" wide paper as described above for finishing sanders.

STIKIT SANDING ACCESSORIES

B 15.61.01	Backing Pad for Makita BO4510 Palm Sander	5.95
15.61.02	Backing Pad for Porter Cable Palm Sander	5.95
C 15.61.04	Conversion Facing for all Finishing Sanders	3.95
D 15.61.05	Stikit Hand Sanding Pad	4.25
E 15.61.06	Two-Roll Dispenser	14.95
4-1/2" WIDE STIKIT ROLLS (10 yds.)		
15.61.11	80 grit	12.95
15.61.12	100 grit	12.95
15.61.13	120 grit	12.95
15.61.14	150 grit	12.95
15.61.15	180 grit	12.95
15.61.16	220 grit	12.95
15.61.17	320 grit	12.95



RYOBI BE-321 ELECTRONIC VARIABLE-SPEED 3 X 21 BELT SANDER

In a contest for most versatile belt sander, this new entry from Ryobi is the hands-down winner. Constant-torque variable belt speed (from 755 to 1148 feet per minute) lets you choose the best rate for sanding hard woods or soft, veneers, painted surfaces, metal, or anything else that needs sanding. The 321's "locomotive"-style design assures excellent center balance and allows sanding flush to the right side of the machine. Lever-actuated belt tensioning, a powerful vacuum system and dust bag are standard equipment. Weighs 8 lbs.

An outstanding popular accessory for the BE-321 is a simple but totally effective sanding frame, which converts the hand-held tool into a surface leveling machine with adjustable depth of cut. The frame, which can be installed or removed in seconds, prevents gouging or cutting too deep, and makes it easy to sand even veneered surfaces with precision and safety. The sanding frame measures 5-3/8" by 13", and weighs 1-1/2 lbs. Another useful option is a pair of custom C-clamps for mounting the sander upside down on your bench for use as a variable-speed stationary belt sander.

K 15.33.01	BE-321 3x21 Belt Sander	149.95
L 15.33.02	Sanding Frame for BE-321	49.95
15.33.03	Mounting Clamps	19.95



F STIKIT SANDING DISCS

For disc sanders, we carry both 5" and 6" Stikit discs in rolls at less than 24 cents a disc. They may be applied directly to any 5" or 6" rubber sanding disc, with no special interface required. Available in 80, 120, and 220 grits.

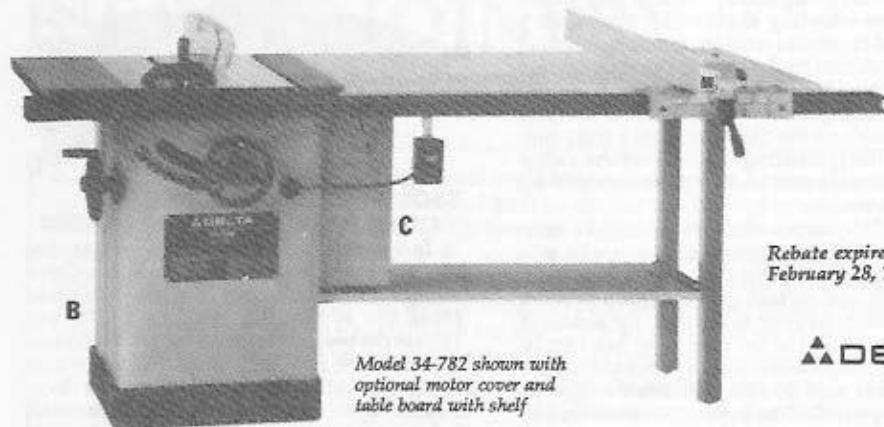
Rolls of Stikit Sanding Discs

	Diameter	Grit	Discs per Roll	
15.61.31	5"	80	125	23.00
15.61.32	5"	120	125	21.00
15.61.33	5"	220	250	45.00
15.61.34	6"	80	125	30.00
15.61.35	6"	120	125	28.00
15.61.36	6"	220	250	55.00

G STIKIT SANDING BLOCK

For hand sanding, 3M's sanding block is one of the most comfortable we've tried and is also very convenient. It has a firm felt surface 3-1/4" wide by 5" long; the curved end can be used in contoured areas, while the square end will sand right into corners. Rolls of paper are stored in and dispensed from a holder built into the block. 3-1/4" wide Stikit paper rolls are available in four grits listed below.

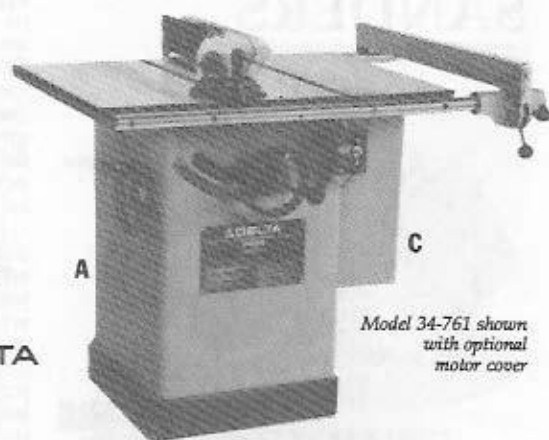
15.61.21	Stikit Sanding Block	9.95
15.61.22	55" roll of 100 grit paper	2.50
15.61.23	70" roll of 120 grit paper	2.50
15.61.24	80" roll of 150 grit paper	2.50
15.61.25	95" roll of 220 grit paper	2.50



Model 34-782 shown with optional motor cover and table board with shelf

Rebate expires February 28, 1991

DELTA



Model 34-761 shown with optional motor cover

\$150 Factory Rebate on Delta Unisaws— Plus Get Free Freight*

Fifty years of tradition have gone into making the Unisaw the nation's most popular heavy-duty 10" tablesaw. Now, with modernized production facilities and ongoing design improvements, Delta has made the Unisaw better than ever, and they're backing up their quality construction with a new two-year warranty. They've also made their excellent T-square Unifence part of the package for significant savings. We feel the 3-HP Unisaw with Unifence is the best tablesaw value on the market, and we're proud to include this great American tradition in our catalog.

UNISAW WITH UNIFENCE

The Unisaw features a heavily ribbed cast-iron work surface measuring 28" wide by 27" deep, with 18" of table surface to the left of the blade. Equipped with a shop-built table surface (or the optional table board and shelf, #34-998) on the Unifence frame, it offers a working surface 27" deep by 76" wide, providing 51" rip capacity right of the blade and plenty of support for full-size sheet material. The 43"-long fence can be used in either vertical (3-1/2" high) or horizontal (1/2" high) position; changing from one position to the other takes just a few seconds. The fence can be locked onto the T-square clamp head anywhere along its length, allowing the user to choose the best arrangement for the job at hand. The clamp head incorporates an adjustable cursor, calibration screws and leveling glides; once set up precisely, the fence can be set smoothly and locked with totally reliable accuracy at any desired distance from the blade.

Equipped with Delta's 3 horsepower, 220v (13.5 amp) single phase motor, the Unisaw has all the power you need for ripping, crosscutting, or dadoing in any stock thickness. 3-belt drive system guarantees full power transmis-

sion to the blade regardless of load. Max thickness at 90 degrees is 3-1/8", 2-1/8" at 45 degrees. The tablesaw surface has T-slots on both sides of the blade; the mitre guide can be pulled beyond the front of the table for cross-cutting up to 25" wide without twisting or falling out. The mitre guide has built-in adjustable stops at 90 and 45 degrees.

UNISAW WITH JET-LOCK FENCE

The standard Unisaw differs only slightly from the Unifence model described above. An extra cast iron extension brings table size to 36" wide by 27" deep; heavy tubular fence rails allow 25" rip capacity to the right of the blade. Overall width of the saw including fence rails is just over 45". Though the Jet-Lock fence may not feature all the precision and sophistication of the Unifence, it is nonetheless a reliably functional fence, with the advantage of a built-in micro-adjuster for exact setting. A low-voltage safety switch is standard on all 3-HP models; Unisaws with 1-1/2 HP motors are equipped with a pushbutton switch with built-in overload protection.

DELTA will send you a \$150 cash rebate when you purchase any model Unisaw between now and February 28, 1991.

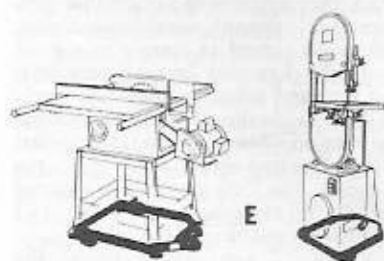
		Our Price	Your Cost After Rebate
A	34-761 1-1/2 HP Jet-Lock Unisaw	\$1399	\$1249
	34-763 3 HP Jet-Lock Unisaw	\$1649	\$1499
B	34-782 3 HP Unisaw w/Unifence	\$1799	\$1649
*Delta Unisaws are shipped Freight Prepaid within the 48 states while current supplies last.			
	HRS-10G Mobile Base for Unifence Model		198.50
	HRS-10 Mobile Base for Jet-Lock Model		109.00
	34-254 Dado Insert for Unisaw		24.95
C	34-829 Motor Cover for Unisaw (fits only Unisaws manufactured after Sept. 1988.)		59.95

UNIFENCE SAW GUIDE

Owners of virtually any 10" table saw can improve accuracy and work support by replacing their existing fence with the Delta Unifence. A template and instructions are enclosed to ensure precise mounting. Unit includes fence, carriage assembly, front guide bar, table frame, legs and mounting hardware. (Table board and shelf board are available optionally, or can be fabricated by user.)

Unifence is shipped by UPS.

D	34-897 Unifence Saw Guide	369.00
	34-998 Table Board and Shelf	119.95



HTC MOBILE MACHINE BASES

For any shop with more machinery than floor space, our collection of wheeled machine bases can give you the luxury of adequate working room without building a new shop. Each welded steel base is equipped with two fixed wheels and one steerable wheel; both fixed wheels have built-in braking knobs to securely lock the machine in position. Wheel housings are arranged so as to raise a machine only 3/4" off the floor.

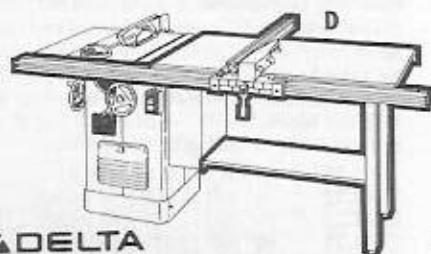
Of particular note is our Mobile Base for the Delta Unisaw with Unifence. Unlike an earlier model, our base is designed to work with the Unifence table leg and shelf system, providing firm support for the right end of the extension table and allowing continued use of the utility shelf beneath.

We also carry in stock Mobile Bases for the standard Unisaw, 8" and 6" Delta precision jointers, Delta 18" scrollsaw, Delta Heavy Duty Shaper, Delta Heavy Duty Belt/Disc Sander, and three models of Delta 14" bandsaw (open stand, old-style closed stand, and new black-band closed stand). Other styles are available by special order to fit most stationary tools—check with us for price and delivery.

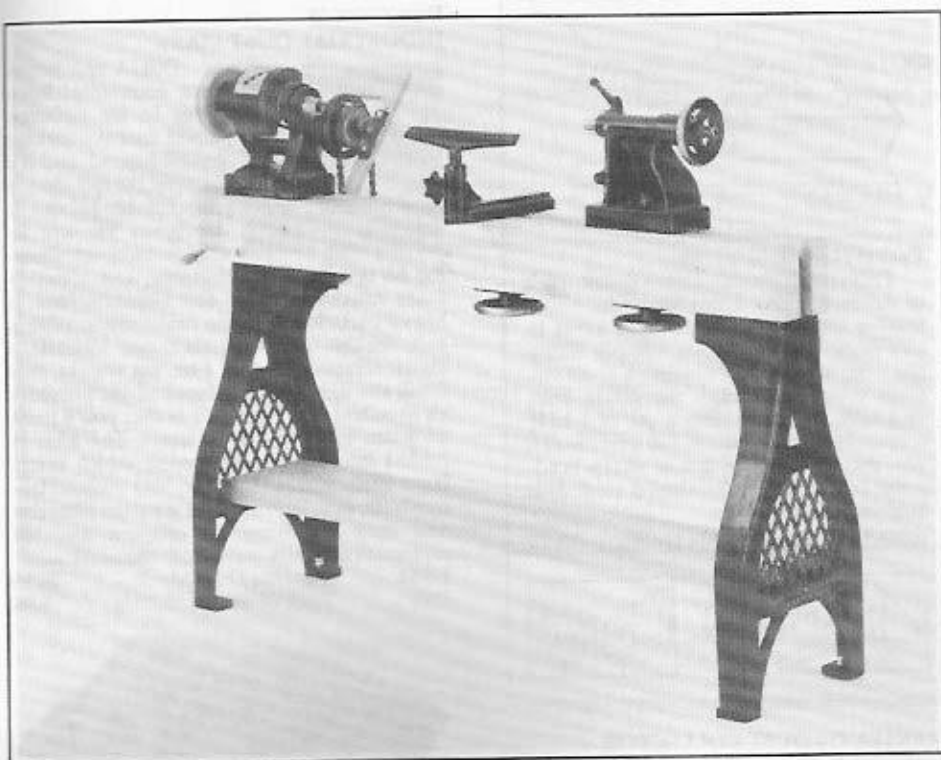
All mobile bases listed below are shipped by UPS.

E MOBILE BASES

For Use With Delta Machine:		
HRS-10G	Unisaw with Unifence	198.50
HRS-10	Standard Unisaw, HD Shaper	109.00
HRJ-8	DJ-20 8" Precision Jointer	148.50
HRJ-15	DJ-15 6" Precision Jointer	109.00
HRSS-18	18" Electronic Scrollsaw	109.00
HRBS-14	14" Bandsaw with Open Stand	109.00
HRD-14	14" Bandsaw or Belt/Disc Sander with Black-Band Enclosed Stand	109.00
HRLB-6	14" Bandsaw or Belt/Disc Sander with Old Model Enclosed Stand	109.00
HRD-10	10" Contractor's Saw (straight legs)	109.00
HRC-10	10" Contractor's Saw (curved legs)	109.00
HRD-10X	Contractor's Saw w/ Unifence	148.50



DELTA



CONOVER 16" HEAVY-DUTY LATHE

We are proud to add to our line of turning tools and machines the Conover heavy-duty 16" lathe. Its robust cast iron construction, meticulous machining, large 16" swing, unlimited bed length, and its variable speed option make it one of the most versatile and appealing lathes on the market. It is also an outstanding value.

With its massive 1-1/2" diameter spindle, the Conover lathe is ideal for the serious turner for both large faceplate work as well as spindle turning. While other new "heavy-duty" lathes have settled for a 1" spindle diameter (such as one finds on smaller lathes), the Conover's spindle is one of the largest in the marketplace. Its cross-sectional area is more than twice that of a 1" spindle, thus control of large workpieces is far more stable.

The spindle is held in heavy Timken™ tapered roller bearings. Unlike ordinary ball bearings, roller bearings can handle both radial and axial loads well and can be preloaded. A ball bearing must have some "play" to work. At certain harmonics this play prints out into your work. Because roller bearings are opposing cones, they can be preloaded, or brought to a condition of zero play. By turning the nut at the rear of the spindle, the preload may be adjusted at any time to accommodate wear and the needs of the turner.

The Conover lathe's headstock, tailstock, and toolrest, as well as the optional legs, are heavy iron castings poured for Conover by a small foundry located in Ohio. The timber bed for the lathe is supplied by the user (two 2" x 6" planks are required), permitting you to choose whatever length is appropriate for your work up to 12 feet. Weight of the lathe including cast iron legs, timber bed, and typical motor is about 400 lbs.

Weighing nearly 150 lbs, the optional pair of Conover cast iron legs greatly simplifies bed building and yields a rock-solid lathe of classic beauty. There are provisions for including two shelves or a box section for sand. We highly

recommend the leg set. Alternatively, plans are included with the lathe for building a leg-stand from wood.

The 1-1/2"-8 tpi spindle is bored for a #3 Morse Taper. The tailstock spindle is a #2 MT, and is hollow, allowing up to 3/8" "gun drilling" of workpieces mounted between centers.

The drive pulley offers four principle speeds (600, 1100, 1725, & 2600 rpm) and is indexed to 24 positions. An optional counter shaft kit provides an additional range of lower speeds for large diameter work. With it, the four principle speeds are reduced to 1/3 normal, yielding a low speed of 200 rpm.

Many purchasers choose to outfit the lathe with the Variable Speed DC Motor option, permitting continuous speed control down to a remarkable 50 rpm, a distinct advantage for serious bowl turners.

Outboard turning is possible by moving it to the end of the bed, eliminating the need for extra lefthand faceplates. (An optional extra set of motor mount brackets is recommended for ease in relocating the motor assembly when setting up for outboard work).

An optional walnut outboard hand wheel fitted on a precision machined hub greatly aids screwing and unscrewing heavily laden faceplates onto the spindle, and is useful in turning working for inspection and as a brake.

An optional full length tool rest kit includes a stepped cast iron pin which fits into the toolrest base and a threaded right angle pin which screws into the tailstock, allowing mounting of a user fabricated wood rest of any length to facilitate production spindle turning situations.

The optional Conover 3-Jaw Scroll Chuck provides a quick way to perfectly center objects up to 4" diameter. Supplied with two sets of jaws for both inside and outside holds. Allows feeding of up to 3/4" dowel through the head stock spindle. Work can be chucked and unchucked frequently to within .003" accuracy.

CONOVER LATHE PACKAGES

The lathe is offered either in component fashion, or as a standard or deluxe package. When purchasing as components, the headstock, tailstock, 12" tool rest and base, motor mount, belt and motor pulley are offered as the Basic Lathe.

When ordering the Basic Lathe, the following items must be ordered or provided separately: drive center and tailstock center for spindle turning, faceplate for bowl turning, motor, switch, and legstand.

Our Standard Package includes the items included with the Basic Lathe, plus these items: #3MT 2-spur center, Conover live center, 1-1/2 HP 1725 rpm AC motor, enclosed toggle switch, and Conover cast iron legs.

Our Deluxe Variable Speed Package includes the Basic Lathe plus the #3MT 2-spur center, Conover live center, 3" faceplate, outboard handwheel, 1-1/2 HP Variable Speed 220V DC motor and controller, and Conover cast iron legs.

The Basic Lathe and Lathe Packages are shipped by truck Freight Collect.

011	Conover Basic Lathe	999.00
021	Conover Standard Package	1799.00
031	Conover Deluxe Package	2250.00
535	Cast Iron Leg Set	399.00
498	1-1/2 HP 110/220V AC Motor	269.00
499	Switch for AC Motor	29.95
540	Counter Shaft Kit	149.95
428	1 HP 110V DC Motor & Contr.	525.00
429	1-1/2 HP 220V DC Motor & Controller	645.00
430	Shop Wiring of DC Motor	47.95
411	Spare Motor Mount Brackets	15.95
509	#3MT 2-Spur Drive Center	29.95
510	#3MT 4-Spur Drive Center	29.95
511	#3MT Mini Drive Center	34.95
520-2	#2MT Conover Live Center	74.95
513	#2MT Cup Center	29.95
501	3" Face Plate	29.95
502	4" Face Plate	33.95
503	6" Face Plate	35.95
514	Screw Center	47.95
521	#2MT Drill Chuck	39.95
505-4	4" 3-Jaw Scroll Chuck	199.00
560-1	Outboard Hand Wheel	88.50
306-6	6" Tool Rest	27.95
306-12	Spare 12" Tool Rest	29.95
209	Full-Length Tool Rest Kit	24.95



CONOVER LIVE CENTER WILL IMPROVE ANY LATHE

Necessary for the serious turner, a live center eliminates burning and chatter while allowing much higher tailstock pressure. The Conover model fits any lathe with #2MT tailstock, and is equipped with four interchangeable points. The extended cup point is used for turning tool handles and for getting into such things as goblets and weed pots. The normal cup point is used for most turning. The core point is inserted into a 3/8" hole, providing secure holding of large items. The 60 degree point is used for small, delicate turnings.

520-2 #2MT Conover Live Center 74.95

GREAT BUYS



SAVE ON MAKITA'S NEW 12" PORTABLE THICKNESS PLANER

This new Makita planer features full 12" width capacity with 6" maximum stock thickness. Two quick-set disposable blades deliver 51 strokes per inch for clean, smooth and efficient planing. The blades are double-edged, so when one pair of edges is due for replacement, the blades are simply removed, turned over and re-installed. The whole process will take no more than 3 or 4 minutes. The blades, which are solid high-speed steel, offer excellent edge life. When they've taken a few of the inevitable nicks that happen while planing, the blades can be loosened and offset sideways just a little to cancel tracks on your stock without needing to replace the blades at all.

The 2012 is powered by a 12A, 2 HP 8000 rpm belt-drive motor which can handle a 1/16" depth of cut across the hardest woods. The cutterhead is easily accessed from above by removing the chip chute; an automatic cutterhead lock makes loosening and retightening the head bolts a snap. Folding in and outfeed table extensions provide 23-3/8" of support under your stock to help minimize snipe and ensure smooth feeding. Two composition feed rollers provide positive, non-marring traction to move stock through the planer at a no-load rate of 26 feet per minute. The entire machine weighs just 54 lbs., making it totally portable for use on the jobsite as well as in the shop. Shipped via UPS.

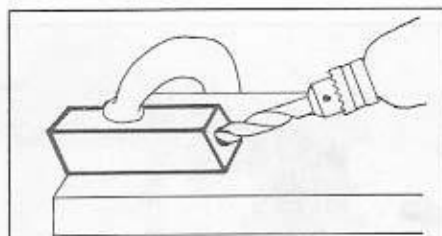
Sale quantity limited List Price \$895		SALE
2012	Makita 12" Planer	499.95
2012-1	Replacement Knives	29.95
2012-2	Dust Chute	69.95



ACCUMITER™ DELUXE MITER GUIDE

This new miter gauge is designed to provide all the precision and convenience you've ever needed but been unable to achieve with the guide that came on your saw. The precision-cast miter head can be mounted to your own guide bar (probably requiring drilling and tapping one or two new mounting holes), or it may be mounted on an optional 3/8" x 3/4" x 23-1/2" steel guide bar (with washer for T-slot grooves). A spring-loaded shot pin provides positive stops at 15°, 22-1/2°, 30°, 45°, and 90°; a precise cast scale and scribe line allow reliable setting to any other angle.

The Accu-Miter's adjustable fence is an outstanding feature. The standard fence, 18"



Pocket Hole Drill Guide

This simple fixture makes quick work of drilling pocket holes for clean, unobtrusive screw assembly of butt joints in any stock 3/4" or thicker. Simply clamp the jig to your work using a C-clamp, slide your bit through the guide hole, and drill. 18° angle allows use of 1-1/4" screws to join 3/4" stock. For best results, we recommend the use of sharp brad-point bits. Features hardened steel drill bushing for long wear.

07.52.11 Pocket Hole Guide 12.95



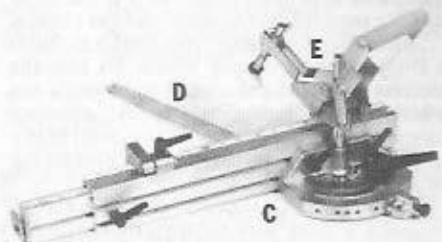
MAKITA 410 DUST COLLECTOR

We are very pleased to offer a high-quality Makita machine (pictured below left) which will economically meet the needs of small shops where power tools (particularly thickness planers and drum sanders) are used.

The model 410 dust collector is a compact, portable, and extremely effective unit capable of handling the requirements of machines as large as a 16" planer. Its 9 amp, 10,000 rpm motor drives a high-efficiency centrifugal fan for a peak air flow of over 300 cfm through a 3" hose, providing high velocity (6253 fpm) and a very large static pressure (20") for minimal clogging under heavy load. The collector comes with large, 8 cu.ft. dust bag with built-in window for monitoring load. It can also be ducted into other collection containers as desired. The unit weighs only 20 lbs., and can easily be moved from one machine to another.

Eight feet of heavy-duty flexible 3" hose is provided. Ready-made dust hoods for current models of Makita planers are available. Dust hoods for other makes of planers and stationary tools in general can easily be fashioned using sheet metal or plywood. Shipped UPS.

Sale quantity limited. List Price \$510		SALE
08.10.40	Makita Dust Collector	269.95
08.10.41	Extra 8 Ft. Length of Hose	69.95
08.10.42	16 Ft. Length of Hose	99.95



long, has a built-in measuring scale, a sliding drop stop for repeat cut-offs and controlled mitering, and a sliding inner rail with pivoting stop that extends out to 34". The fence extrusion can be set for exact measurement from the

DUSTFOE 66 INDUSTRIAL DUST MASK



OSHA and insurance companies have come to see airborne wood dust as a serious health hazard, and it's time for the rest of us to do something about it. Designed for use in coal mines, the Dust-

foe 66 is a light, comfortable, and effective mask rated to handle any situation from a heavy particle fog to the finest mists. With a soft, flexible rubber gasket, two adjustable elastic straps, and only 4 oz. net weight, this mask sits lightly on the face and yet provides an excellent seal - a bonus is that you'll have no more fogged safety glasses. The filter is folded into a compact wedge which offers large surface area (8-1/2 sq. in.) without undue bulk; exhalation valves keep the filter dry and easy breathing for efficient use. Six replacement filters come with the mask.

DF66	Dustfoe Dust Mask	24.95
DF6	Pack of 5 Repl. Filters	6.95



VERITAS STONE POND

This clever device from Lee Valley of Canada is both storage tray and work station for your Japanese waterstones. The Stone Pond's tough ABS plastic case has enough room in the well (8" x 11-1/2") to store 3 or more full-size waterstones in water, ready for immediate use. (Stones are not included.) Two support rails with quick-action stops let you set up two stones at once, a 1000 and a 6000 for instance, for fast and convenient sharpening with water right where you need it. You can even use the support rail in a special mounting slot to hang your wooden-base finish stones upside down, immersing only the stone without soaking the base. Raised ribs in the bottom of the tray hold your flat stones above any sludge that accumulates during use.

The Stone Pond comes with a light plastic cover to keep your stones clean, but better yet it also comes with an 8-1/2" x 14-1/4" tempered plate glass top to be used as a lapping plate for flattening all your stones after use.

02.70.01	Veritas Deluxe Stone Pond	49.95
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blade, or can be adjusted left or right as desired, a tremendously useful feature in many joinery operations. If you work in long stock lengths, the Accu-Miter is also available with a 24" miter fence whose inner rail reaches to 46".

Optionally available for the Accu-Miter are 2 clamping systems. One, a heavy-duty manual clamp, will reach up to 3-1/2" forward of the fence and can handle 4-3/4" maximum stock thickness. The other is a pneumatic clamp, with cylinder, mounting bracket and supply hose, for production cut-off work.

C 08.52.81	Accu-Miter (18"-34" model)	149.00
08.52.82	Accu-Miter (24"-46" model)	164.00
D 08.52.83	3/4" x 3/8" Bar	14.95
E 08.52.84	Manual Clamp	29.95
08.52.85	Pneumatic Clamp	159.00

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Delta's New 16" 2-Speed Scrollsaw

THIS BRAND NEW DELTA saw may well have the best combination of design features any manufacturer's put together yet. Price, power, quality of cut, versatility and ease of use are all outstanding; we think this saw represents the most significant development in scrollsawing since Hegner introduced modern design to the U.S. many years ago. Rocking parallelogram arms and pivoting blade holders, both Hegner innovations, are responsible for allowing constant high blade tension, little or no blade breakage, a nearly perfect vertical stroke, and amazingly clean cutting.

Delta has beaten the industry to the finishing line, however, by building in not only these features but also Delta's exclusive Quickset® blade installation system (introduced on their commercial-duty 18" variable-speed saw), two-speed operation to facilitate not just metal cutting but also the most delicate fretwork in any material, and, as important as all the rest put together, a believable price that's easy to afford.

The 40-560's simple speed selector switch allows scrolling at your choice of 1725 or 850 strokes per minute. For most general sawing in wood, the higher speed, together with a full 7/8" stroke length, will provide fast, aggressive cutting in any stock thickness with little or no need for sanding cut surfaces. One problem with conventional scrollsaws has been that aggressive cutting is not what you need when the work gets really delicate; when you're cutting very thin stock or doing airy fretwork, the 40-560's slower stroke speed will let you work as carefully and precisely as you must without burning, chattering, or cutting through your pattern lines. And of course the slower stroke rate will also let you cut brass, aluminum, and even mild steel in moderate thickness with no trouble at all.

Install Blades in Seconds

Another challenge for scrollsaw enthusiasts has been dealing with changing and re-installing blades, particularly when faced with a fretwork project with a seemingly endless number of interior cuts to be made. Delta's Quickset® system uses regular 5" plain-end



blades, but makes their installation the straightforward work of just a few seconds. The Quickset system deals with both blade holding and tensioning right out on the end of the upper arm where you can get at everything easily. Blade tensioning is accomplished by pushing a lever on a cam; final tension is pre-adjusted with a screw that bears against the cam. To release a blade, just flip the lever toward you, then loosen the clamp screw in the blade holder. Delta has designed an ingenious new combination tool that both locks the blade holder in place and engages the clamp screw simultaneously, making a good system more convenient than ever. Insert the blade through your work and slip it back into the holder - no fidgety care required, just slip it between the wide jaws of the holder and retighten the clamp screw. Flip the tension lever back, and you're set, with total down time of no more than 10 or 15 seconds. Another advantage of this system is that once you've set the table square to the blade it will always be square regardless of blade changes, and you can go back to work with never a worry about accurately square cuts.

The 40-560 features all cast-iron construction for mass and durability. Its circular table surface is 11-3/4" in diameter, providing plenty of support for your work through the entire range of your scrolling activities. The table tilts left to 45°, and includes an adjustable stop for reliable return to level. Throat depth from blade to rear frame is 16". An adjustable hold-down foot splits to wrap around both sides of the blade, controlling the

workpiece even when you're cutting near edges and cut-outs. A built-in blower keeps your pattern lines entirely free of dust and debris. The rocker arms ride smoothly and steadily on bronze bushings, which should provide nearly indefinite longevity. The pivot point on the arms has been very carefully engineered so that the blade moves back about 1/32" as it nears the bottom of its stroke, providing for dramatically improved chip clearance, cooler sawing in thick stock, and longer blade life. Both arms mount to a rigid one-piece casting which eliminates misalignment and helps control vibration as well. Delta's 1/10th HP 115 volt motor provides plenty of power for scrolling easily in any stock. Maximum stock thickness is 2". (It's important to note, however, that even with the 40-560's sophisticated stroke pattern, neither this nor any other saw with a stroke length of 1" or less is designed to cope happily with wood much over 1" to 1-1/2" thick.) The saw is backed by Delta's two-year parts and labor warranty. Weight is 46-1/2 lbs.

We're very, very impressed by this new saw, and it's a safe bet that a whole lot of other people will be too. We expect that Delta will have a difficult time keeping the 40-560 in stock this year, and suggest that you order now to assure early delivery. Shipped via UPS for a \$6.00 charge.

40-560	Delta 16" 2-spd. Scrollsaw	\$199.95
40-561	Assortment of 62 Blades	19.95
40-604	Metal Stand	69.95
31-055	Flexible Shaft Attachment	21.95


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