

## Rebates End June 30

## Act Now to Get \$100 Rebate on Delta's 6" Jointer or 14" Bandsaw

**O**NLY A SHORT TIME remains to take advantage of the large savings now available on Delta's acclaimed 14" bandsaw with enclosed stand and resilient-mounted 3/4 HP motor. Equally outstanding savings are available on Delta's industrial-duty 6" longbed jointer.

By purchasing before June 30, the bandsaw costs only \$549 (including rebate). The 6" jointer costs \$899 including rebate.

However, limited quantities are on hand, and units available at these low prices are subject to prior sale. Freight costs are extra. More information is on page 23.

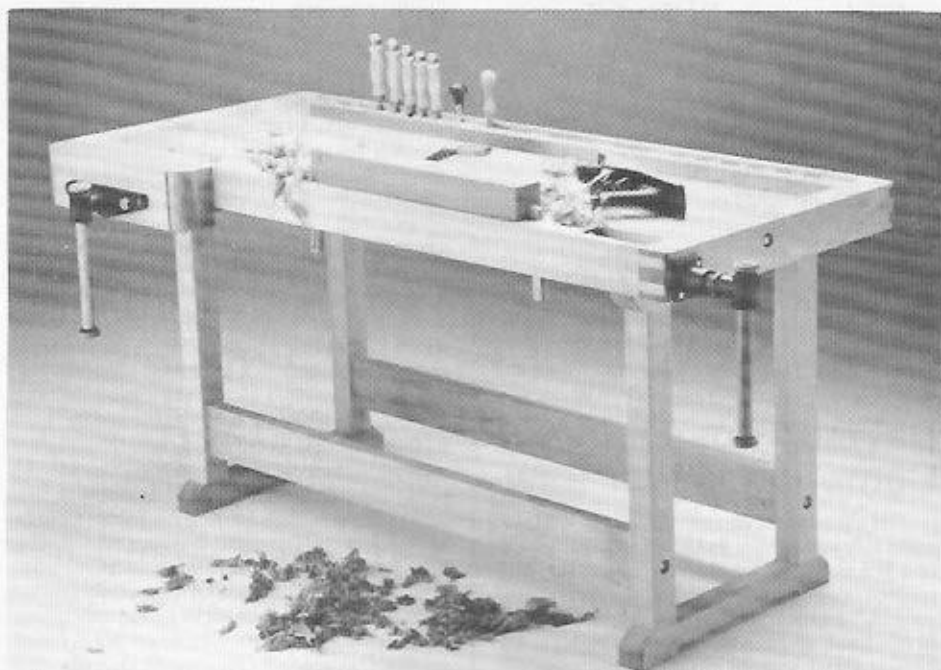
We also have a small quantity of Delta Unisaws with Unifences to offer for \$1599. No additional freight charges apply to Unisaws delivered within the 48 contiguous states, while current supplies last. See page 22 for more information.

Use our *Instant Credit Plan* (described on page 45) to take advantage of these low prices without having to tie up your cash or existing lines of credit.

## INSIDE

### Wood News 23

Products Just Arrived	2
Workbenches You Can Build	4
Improving the Delta Dust Collector	8
Hydrocote Update	10
A Look at Delta's 15" Scrollsaw	15
Liam O'Neill's Side Ground Gouge	16
Stationary Tool Q & A	18
Magna-Set Knife Setting Jigs	19
Using Sanders to Grind Metal	24
Chip Carving with Wayne Barton	26
Build John Wilson's Workhorse	29
The Freud Router Table	30
Router Fence Revisited	32
New Robland 12" Planer-Jointer	41
Biscuit Joinery	42
Credit Application	45
Order Form	46
The New Yankee Workshop	48



Our article on page 4 reviews plans for a number of workbenches you can build for your shop, with information on acquiring the hardware and other needed materials. (Photo courtesy Woodsmith Publishing Co.)

## Hydrocote Wins Governor's Award

**T**HE LATEST NEWS about Hydrocote water-based finishes is that we and thousands of our customers aren't the only people who thought they were on to something good.

On March 7, 1989, the national distributor of Hydrocote products, Amity Quality Restoration Systems, was honored with the third annual Wisconsin Governor's Award for excellence in Hazardous Waste Reduction, taking first place for contribution to a cleaner environment in the state of Wisconsin.

To earn its first-place award for Hydrocote finishes, Amity outperformed a high-tech pharmaceutical micro-coatings company, the University of Wisconsin, and Johnson Wax, among others.

Naturally we're pleased to learn of this recognition, and we congratulate Amity on a well-deserved award. We should point out that Hydrocote is making its contribution not only in Wisconsin, but all over the country as more and more finishers make the switch to non-hazardous finishing materials.

On page 10 of this issue, Zach Etheridge provides answers to the most commonly asked questions regarding Hydrocote application.

## Register to Win a FREE Delta Electronic 18" Scrollsaw (A \$749 Value)

**Y**OU ARE INVITED to enter Highland Hardware's contest drawing with a chance to win one of Delta's deluxe 18" electronic variable-speed scrollsaws.

No purchase is necessary. To enter, send us your name, address, and phone number on a 3x5 piece of paper, along with the slogan: "Delta Machinery, Building on Tradition."

Entries must be postmarked by August 31, 1989. Mail to: Delta Scrollsaw Giveaway, c/o Highland Hardware, 1045 N. Highland Avenue, Atlanta, GA 30306. One entry per household. The winner will be notified by mail. Offer void where prohibited.

## Hydrocote Seminars June 3

Because of many requests, Zach Etheridge will again demonstrate hand and spray application of Hydrocote finishes at two Highland Hardware seminars on Saturday, June 3.

Admission is \$10. Those attending will receive a complimentary Hydrocote sample.

Register by mailing us a check for \$10 along with your name, address & phone, or call us at (404) 872-4466 and charge your registration to Visa, MasterCard or Discover. Specify either 9 am to Noon or 2 pm to 5 pm.

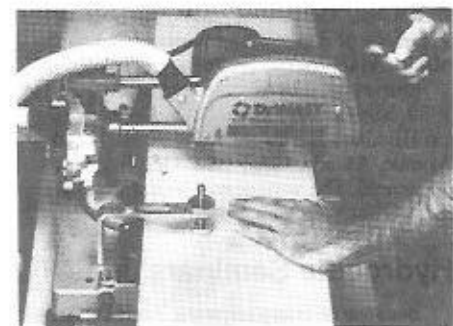
## Products Just Arrived



### DeWalt Crosscutter™ Compound Miter Saw

Get a load of these specs: this new 8-1/2" miter saw will chop a 2x10 in one pass at 90°, or a 2x6 at 45°, and will cut compound-mitered crown molding with about five seconds' set-up time. The saw can be carried in one hand, and can be backed up right against a wall without interfering with its operation. It offers the precision of a power miter box without its limitations on stock size, and the versatility of a radial arm saw without its inaccuracy or set-up time.

In fact, DeWalt's model 1707 Crosscutter is the most ingeniously designed cutting tool to come along in recent memory, and it will surely set an entirely new standard for chop saw capability. With the saw head locked in place for standard mitering and compound cuts, its precision is indistinguishable from that of first-class power miters. With the head unlocked and pulled all the way out on its extension arms, it will crosscut as cleanly as the big radial arm saws DeWalt is famous for.



#### Model 1707 Cutting Capacity

	90°	45°	45°	45° x 45°
	Crosscut	Miter	Bevel	Compound
Max. Height	2-1/4"	2-1/4"	1-3/4"	1-3/4"
Max. Width	9-7/8"	6-7/8"	9-7/8"	6-7/8"

The 1707 is designed to plunge-cut through wide stock and then finish the cut on the *push stroke* — a far safer way to saw than the typical radial arm climb cut. A special 24-tooth carbide blade with a -15° hook is standard equipment on the 1707; the negative hook means the blade won't try to lift your stock as it pushes through. A heavy-duty blade guard is retracted by squeezing a lever built into the handle. It's easy enough to get the guard out of the way that even a professional user might leave it on the saw, which would be a real innovation.

The 1707 is powered by an 11-1/2 amp, 6500 rpm belt-drive motor with electric brake, which is not only extremely efficient but significantly quieter than gear drive as well. The saw table pivots 45° left or right, with positive stops at 90°, 15°, 22.5°, 31.62° (for crown molding), and 45°. The head assembly tilts up to 45° left, with an accurate protractor scale for quick setting. Overall wt. is a mere 32 lbs.

Optional accessories include a work clamp which can be fitted right or left of the blade, and a highly adaptable extension support system which provides 19" of extra stock support left and right. The support system can be further extended as far as needed left or right with additional pairs of 19" threaded guide rods. Another useful add-on is a twin-pipe dust pick-up system for attaching your shop vac or dust collector; this system grabs dust both from the table and from within the blade housing. Also available is a 48-tooth negative-hook carbide blade for super clean cutting in wood, plastics and non-ferrous metals.

Saw is shipped via UPS for a \$6 charge.

1707	Compound Miter Saw	\$549.00
17075	Work clamp	36.50
DES	Extension Support system	79.50
17072	Extra 19" rods, pair	29.50
DDH	17-ft. Dust extraction hose	66.50
39923	48-tooth 8-1/2" blade	112.50

### DeWalt 3-Way Panel Saw

Any woodworker who processes a lot of sheet material already knows how productivity can be increased with a tool like this one. Crosscutting or ripping full sheets of plywood is as easy as placing them in the saw frame; the motor assembly is pulled across the sheet for cutting to length, or rotated 90° left or right and locked in place for ripping to width. A heavy-duty counterbalance spring makes crosscutting safe, smooth and predictable. Of course, you can also use the panel saw for gang processing solid lumber; it will accommodate up to 13 stacked 2x4s for simultaneous cutting to length. Nylon rollers at end of the frame make loading and ripping easier. Non-marring face boards let stock slide easily without scratching any material you might need to cut. Heavy steel guide rails, factory aligned for accuracy, let the saw head move smoothly and precisely across a maximum five-foot span. The entire unit mounts against a wall out of the way. The panel saw uses an 8" blade, powered by a 2 HP 115 volt motor. Shipping wt. is 197 lbs. *Shipped freight collect.*

3486 DeWalt Panel Saw \$995.00



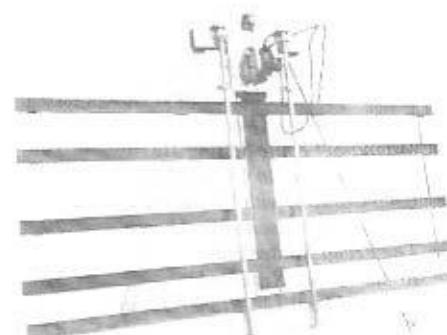
### DeWalt 7770 10" Radial Arm Saw

We're very pleased to round out our line of stationary tools with the addition of this rock-solid standard from DeWalt. The 7770 delivers everything you need in a professional-quality radial arm: stability, precision, power and size to handle a multitude of cut-off and joinery jobs. It's not an inexpensive saw; it's a very good one instead. Most of us at one time or another have experienced the frustration of trying to produce accurate work on inexpensive "homeowner" radial arm saws. It's hard to imagine the difference you'll feel in this industrial machine; it sets up as tightly and accurately as a first-class tablesaw, and cuts equally cleanly and precisely.

The DeWalt 7770 is equipped with a 1-3/4 HP continuous-duty motor with electric brake. The motor comes wired for 220v, but can be rewired for 110 volts if desired. Max depth of cut with a 10" blade at 90° is 2-7/8", or 1-5/8" at 45°. Max crosscut is 14-1/2" at full cutting depth. The very heavy motor-mounting yoke allows the head to swivel, tilt, and lock in any position. The 5/8" arbor will accommodate dados up to 13/16" max width for grooving and joinery work. Tilt and elevation controls are located at the front of the arm for convenient access and easy operation. The 7770 comes with a large work table, a heavy steel stand, and a steel crosscut blade as standard equipment. Shipping weight is 150 pounds. To get the most out of the saw, we recommend the Freud LU88 thin-kerf crosscut blade for superb efficiency, or the Forrest Woodworker I for the cleanest, smoothest cuts possible.

*Shipped freight collect.*

7770	10" Radial Arm Saw & Stand	\$880.00
05.20.46	Freud LU88 60T Thin-kerf Blade	57.95
05.60.11	Forrest 10" x 60T Blade	95.00



## Makita 2012 12" Portable Thickness Planer

Quick-set double-edged disposable knives, full 12" width and 6" depth capacity, and stable cutterhead design are some of the outstanding features of this new economy-priced thickness planer from Makita.

Weighing only 54 pounds, the 2012 is ideally suited to travelling with you to the job site as well as for full-time use in the shop at home. Non-marring, positive traction composition feed rollers move stock through the 2012 at a no-load speed of 26 feet per minute. With a cutterhead speed of 8000 rpm, this yields about 51 strokes per inch for clean, smooth planing on any kind of wood. Folding infeed and outfeed tables provide a total of 23-3/8" support under your stock. The smooth stainless-steel planer bed allows planing down to 1/8" minimum thickness without a backing board; wax and buff the bed and extension tables regularly to minimize friction and maximize motor efficiency.



The 2012 is powered by a 12-amp, 8000 rpm belt-drive motor which will handle a 3/32" depth of cut on the hardest wood. The cutterhead is easily accessed from above by removing the chip chute, which is especially designed for operator safety as well. Two double-edged high speed steel blades are held in position by the blade binders, which engage a groove in the surface of the blades. During installation, the blades are held in their proper position with two powerful magnets; the binder locates itself with lugs that nest into the cutterhead, and the head bolts then secure the assembly in place. When your edges are dull or damaged, it will take at most two or three minutes to remove them, turn them over to expose the unused edge, and replace them perfectly. Replacement blades are \$29.95.

Optionally available is Makita's cast dust collector hood, which bolts to the rear of the 2012 without modification to the machine, drawing to a 3" port out the left side.

The 2012 Portable Planer looks like another Makita success story: thoughtful design, quality construction, and reliable parts & service whenever they're needed. Also provided with every 2012 is Highland Hardware's customary support with user education, technical information, and anything else any customer of ours might need. *Shipped UPS.*

2012	Makita 12" Planer	\$549.00
2012-1	Replacement Knives	29.95
2012-2	Dust Chute	69.95

## Freud EB100 Edge Bander

Freud has done it again with this new economical production unit for veneering edges of all kinds of sheet materials. Costing half as much as nearly identical machines already on the market, the EB100 will apply wood or polyester-coated paper edge finishes up to 2-1/4" wide at feed rates up to approximately ten feet per minute. Any shop that routinely uses plywood, MDF, or other man-made board in cabinetry or other custom construction will find this system almost absurdly easy to use, and its efficiency will make the unit pay for itself almost immediately.

In our tests of the first EB100 to come in the door, we spent 15-20 minutes getting familiar with the tool and setting up the four independent components of the tape guide system. With that much prep, we promptly began turning out veneered edges every bit as well bonded and consistent as anything we've ever done by hand. The waffle-pattern hot-melt glue on Freud's veneers heats quickly without bubbling and bonds almost instantly, with a nearly invisible glue line.

The heart of the EB100 system is a variable-temperature hot-air gun, which can be set to accommodate whatever material you're working with at whatever feed rate you like. Two pairs of guides lead the tape past the gun nozzle and out to a pinch roller which presses the veneer against the edge of your board. In and outfeed fences help control your stock; the outfeed fence can be removed for veneering contoured edges. The laminate-covered stock support table can be easily removed and replaced with a larger surface if desired. A built-in guillotine lets you chop the tape and eliminate wastage as you approach the end of an edge. The entire machine measures 27" wide by 14" deep with the veneer roll support arms folded in for transport; total weight is just 27 pounds. It will need to be clamped down or built into a bench for vigorous work, though its adjustable rubber feet do offer enough traction for banding light stock wherever you need to do the job.

We stock six iron-on wood veneers and four polyester paper tapes for use with the EB100. Each is 13/16" wide, sold in 250-ft. rolls individually packed in a protective carton. When ordering, please specify the Freud stock number and species or color of your choice. *EB-100 is shipped UPS.*

EB-100	Freud Edge Bander	\$299.00
EB-005	Red Oak	42.95
EB-010	Birch	42.95
EB-015	White Oak	48.95
EB-020	Mahogany	42.95
EB-025	Walnut	57.95
EB-030	Cherry	42.95
EB-035	Ski White Polyester	32.95
EB-040	Almond Polyester	32.95
EB-045	Black Polyester	32.95
EB-050	Gray Polyester Polyester	32.95

### WOOD NEWS 23 Spring-Summer 1989

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# Workbenches You Can Build

by Chris Bagby

**A**RGUABLY the most fundamental tool in a woodworker's shop, the workbench has posed a dilemma for many woodworkers. How big should it be? How heavy? Which kind of vises? How to make it sufficiently sturdy? What about tool storage? Should I just buy a ready-made bench?

Where once it was difficult to find plans for a single style of bench, we are today blessed with a colossal amount of information on benches from various traditions, and there are measured drawings available for at least a dozen different designs. This article will survey some of the plans which are available, and also identify the hardware required (vises, bench screws, etc.) for some of the more popular designs.

A great resource is a recent book by Scott Landis entitled *The Workbench Book* (see box next page) which includes plans for five benches and also describes numerous others.

Other plans that we'll look at (and which are available from Highland Hardware) include the Scandinavian bench plan by Tage Frid first published in the fourth issue of *Fine Woodworking* magazine; two bench plans which were produced by Lee Valley Tools of Canada; the bench described in back issue #50 of *Woodsmith* magazine; and the bench featured on Norm Abram's PBS TV show *The New Yankee Workshop* (for which you can now buy a drawing, a book, and even a video to help you with the construction).

## Vise Hardware

First, however, we'll take a look at vise hardware. Regardless of which bench you decide to build, after you have selected a design, you should purchase your hardware before cutting a single piece of wood. Types and sizes of vise hardware vary, and each plan bases critical dimensions on the particular hardware called for. While it's often possible to substitute other hardware, some dimensions may need to be altered to accommodate the substitution. If you have the hardware in hand at the beginning, you can fit the wooden bench components around it more easily than trying to squeeze a vise screw that doesn't fit into an already-glued-up assembly.

While old-fashioned benches typically used large-diameter wooden bench screws in the vises, modern versions almost always rely upon vises with steel bench screws because of their strength and durability. The wooden



Record Quick-Action Vises

Catalog Number	VICE	Quick Action	Dog	Jaw Width	Jaw Opening	Weight	Price
01.11.01	52D	Yes	Yes	7"	8"	20 lbs.	\$89.95
01.11.02	52-1/2D	Yes	Yes	9"	13"	36 lbs.	119.95
01.11.05	53E	Yes	No	10-1/2"	15"	38 lbs.	126.95

screws are not generally available today in diameters large enough for serious use in workbench vises. Recently however, a customer of ours from North Carolina offered to investigate manufacturing them for us in a 2-1/4" diameter. If the economics of production and demand seem to be compatible, we may add them to our next catalog for those wishing to build authentic-style traditional benches. *If you would be interested in buying a wooden bench screw (which unfortunately will probably cost somewhat more, not less, than steel screws), please drop us a line to help us gauge demand.*

Vises generally fall into the categories of *front vises* (often called shoulder vises or face vises) and *tail vises* (sometimes called end vises).

The main function of the front vise is to hold a board vertically (one end up, as for sawing dovetails), or horizontally (one edge up, as for hand planing an edge). A long board held horizontally in the front vise may need additional support (e.g., a free-standing

support, or a peg placed in a row of holes in the leg at the other end of the bench).

The tail vise is generally used to hold a board face-up horizontally (such as for planing the surface of a board) by trapping it between two benchdogs, one of which is mounted in the movable jaw of the tail vise, and the other in a row of dog holes along the length of the bench. Some tail vises incorporate a very wide movable jaw combined with two rows of dog holes (one along each side of the bench) to permit wide panels and unusually shaped pieces to be gripped securely. Some tail vise designs permit workpieces (and auxiliary jigs) to be held vertically as well.

## Ready-Made Vises

Some vises, such as the large Record vises, come complete with cast iron jaws and are ready to be mounted under the bench right out of the box. Of course, the bench maker is expected to add wooden jaw liners to the

## Enhance Your Bench Vise with these Custom Liners and Pivoting Jaws



This jaw liner system provides new ways to clamp difficult objects. A steel bushing in each liner lets you instantly mount a pair of pivoting accessory jaws which grip tapered or oddly-shaped work, as well as holding small pieces where you can get at them.

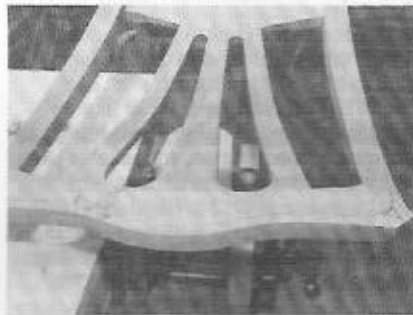
The hard maple jaw liners are faced with a layer of thick, long-wearing full-grain leather for a positive non-marring grip. The main faces are rabbetted all around, leaving a square-sided shelf for supporting stock to be planed, or for holding two pieces at an accurate right angle for marking, drilling, etc.

The pivoting jaws, like a carver's vise, provide clamping capability your bench vise

never had before. They're mounted on heavy steel angle fitted with 1/2" case-hardened shafts which fit into the main jaw's steel sockets. They're strong enough to hold a chair by one leg, and their leather-lined faces will grip the smallest workpieces without slipping.

The jaw liners are 11" wide, 3-3/4" high, and 1-3/8" thick. The pivoting jaws are 3-1/2" wide by 2-1/4" high. Mounting instructions and hardware are included.

*The Custom Vise Liners (01.60.01) are available from us for \$39.95 plus \$4 shipping.*



Chris Bagby is Editor of *Wood News* and President of Highland Hardware.



inside faces of the cast iron jaws so that workpieces gripped by the vise will not be marred. (If the wooden liners used are sufficiently thick, this also permits you to increase the surface area of the jaws).

We now offer for Record (and most other) vises custom vise liners that accommodate a removable set of pivoting jaws, which like a carver's vise, provide new ways of clamping odd-shaped objects that ordinary bench vises can't handle (see box at lower left).

A nice standard feature of the large Record vises is their "quick action." A half-nut on the screw can be disengaged by pressing a lever near the handle, allowing the movable jaw to be set at any position without taking the time and energy to crank the screw the entire way.

## Bench Screw Hardware

An alternative to buying a ready-made vise is to buy one of the vise screw assemblies which are available, and supply your own wooden jaws. Commonly available are shoulder vise screws and tail vise screws which come with threaded nuts, but require you to fabricate from wood the necessary assembly for guiding the motion of the

movable jaw. More sophisticated tail and shoulder vise screw assemblies are also available which provide either a pair of round steel guide rods or a set of machined steel plates to guide the action of the vise.

While one might assume that all vise hardware would automatically come complete with mounting instructions, for many years this was not the case, so a good deal of mystery and confusion has existed concerning which vise to use where and just how one gets the thing attached to the bench. The manufacturer of this type of vise hardware with whom we now deal is about to begin providing mounting instructions for all the bench screws it makes. These are certain to assist the user in visualizing the appropriate use of these types of bench hardware. Unfortunately they were not available to us as this issue of *Wood News* went to press. However, we hope to include more details and an illustration of these plans in the next issue.

Shown at right are the bench screws we carry employed in typical vise designs. On the next two pages, we specify which ones will work in the various bench plans that are available.

(continued on next page)

### Bench Screw Hardware Pricelist

(Add shipping charges listed on page 46)

Catalog Number	Item	Screw Diameter	Screw Length	Overall Length	Width	Wt. Lbs.	Price
A 01.97.06	Shoulder Vise Screw	1-1/4"	11"	14"	-	9	\$32.95
B 01.97.07	Tail Vise Screw	1-1/4"	19"	22"	-	9	32.95
C 01.97.03	Large Tail Vise	1-1/4"	17"	19"	4"	16	99.95
D 01.97.04	Small Tail Vise	1"	10"	14"	4"	14	68.95
E 01.97.01	Large Shoulder Vise	1-1/4"	16"	23"	10"	21	109.95
F 01.97.02	Small Shoulder Vise	1"	10"	17"	10"	15	59.95
G 01.97.10	Quick-Action Large Shoulder Vise	1"	19"	23"	10"	22	119.95

## The Workbench Book

by Scott Landis

Perhaps history's greatest addition to workbench literature was published by the Taunton Press in 1987. Scott Landis' ambitious work *The Workbench Book* traces the evolution of the workbench from Roman times through the present. Besides illustrating and examining countless designs of benches used by various woodworking trades over the centuries, Landis focuses on five particular benches, and devotes a chapter to each one.

The five selected include an 18th century French design (the Roubo bench), a 19th century Shaker bench, Franz Klausz' traditional Hungarian cabinetmaker's bench (whose vises are similar to the ones on Tage Frid's bench), a modern "hybrid" bench designed by Michael Fortune, and a stout-but-simple "no-frills" workbench used by the English woodworking teacher Ian Kirby.

The five chapters thoroughly explore the advantages, limitations and vagaries of each bench, dealing in detail with each component's distinguishing characteristics. (A 19-page appendix also provides detailed measured drawings for each of the five benches). Landis also includes a "workbench sampler" chapter which examines the interesting features of several other types of benches encountered during his visits to shops around the country while researching the book.

Rounding out the book are chapters on off-the-shelf bench

hardware, the Japanese approach, and traditional country shaves and brakes used in working green wood. There's even a chapter devoted to Black and Decker's ubiquitous Workmate, which at 20 million units is clearly the world's best-selling workbench.

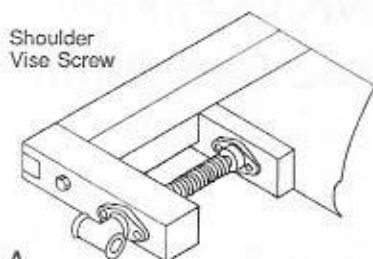
By the time you've worked your way through the entire book, you will either be bedazzled by the endless possibilities and variations, or else (if you're lucky) you'll have seen exactly what you want and be ready to build it.

*The Workbench Book*, our item #20.04.75 (247 pages, hardcover) is available from Highland Hardware for \$24.95 plus \$3.00 shipping.



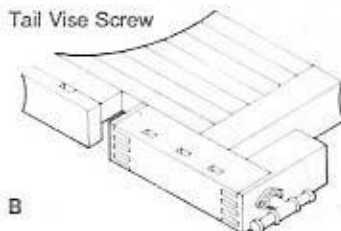
## Bench Screw Hardware

Shoulder Vise Screw



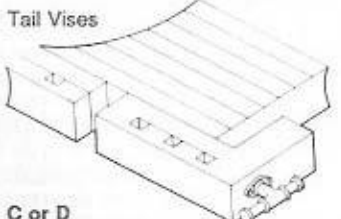
A

Tail Vise Screw



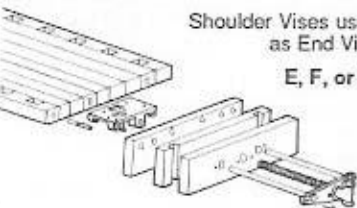
B

Tail Vises

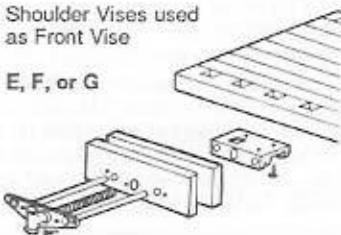


C or D

Shoulder Vises used as End Vise  
E, F, or G

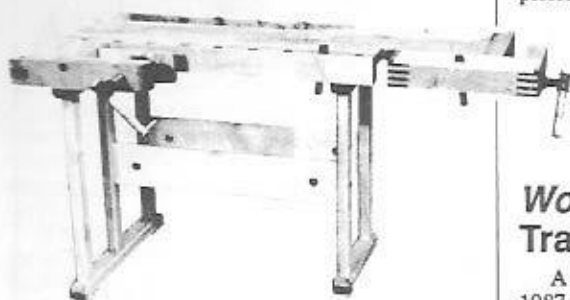


Shoulder Vises used as Front Vise  
E, F, or G



# Workbenches You Can Build

(continued from previous page)



## Tage Frid's Scandinavian Workbench

Many thousands of woodworkers attribute the early learning stages of their woodworking to the works of Tage Frid, whose trilogy of instructional books remains as popular today as it was when first published. Educated in the Danish tradition, Tage immigrated four decades ago and developed some of the U.S.'s first college-level programs on fine wood-working and design. He has been a contributing editor to *Fine Woodworking* since the magazine's beginning, and it was in the fourth issue (Fall, 1976) that his workbench design was featured. My guess is that thousands of these benches were built from that design and are in use today. Though that issue is now long out of print, the article appears in one of the "Fine Woodworking On" series, the one entitled *The Small Workshop* (\$7.95 plus \$3.00 shipping). Frid's workbench plan covers six pages, and includes a material list, measured drawings, vise details, several illustrations, as well as construction notes.

The text reads clearly, and seems to ring with Tage's accent and empathetic wit, as in "Take the time to make all of these fit right. Fitting the vise will drive you crazy at times, but be patient and worry about one section at a time and eventually it will all fit just right."

The front vise on the Frid bench is the traditional Scandinavian shoulder vise, which features the advantage of having no screws or guides located between its jaws, thus allowing a piece to be clamped all the way to the floor if necessary. The jaw can also pivot, allowing it to hold irregular shapes. The hardware required for the shoulder vise is our Shoulder Vise Screw (01.97.06).

The end vise is a sophisticated tail vise which can clamp pieces between dogs or between jaws in two places. The hardware used is our Tail Vise Screw (01.97.07).

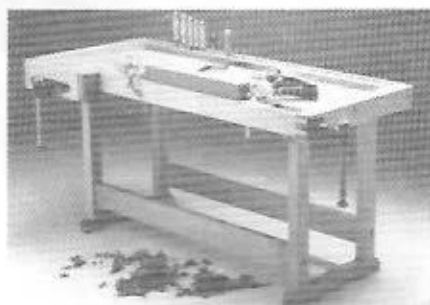
The bench's work surface measures 64" wide by 13-1/2" deep. A 5"-wide tool well runs along the back of the bench.

The main slab is 1-3/4" thick by 9-3/4" deep by 60-1/4" long. There is a 2-1/2" thick by 4" high front apron/dog block, and a 1" thick by 4" high back apron.

Primarily because of the complexity of the tail vise, I would rate Frid's bench one of the more difficult benches to construct, though countless beginners have begun and completed the project successfully.

## Woodsmith's Traditional Workbench

A popular plan which was published in 1987 occupies the entire issue #50 of *Woodsmith* magazine. Entitled "Traditional Workbench," the design features a large front vise (which utilizes our Quick-Action Large Shoulder Vise hardware, 01.97.10) and a tail vise which uses a short screw more commonly used on shoulder vises (we call it our Shoulder Vise Screw, 01.97.06). This short screw works fine in *Woodsmith's* hybrid tail vise, which serves primarily to activate the bench's single row of dog holes.



Overall size of the *Woodsmith* bench is 29-1/2" deep x 65" long x 34" high. Working surface is 18" x 65". It features an 11" tool well at the back which runs the length of the bench.

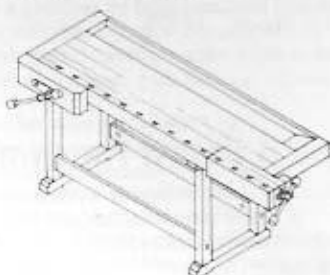
The top slab measures 12-1/4" by 60" by 1-5/8". To this is added a 2-1/2" wide by 3-5/8" high dog block along the front, plus a 13/16" by 3-1/2" apron at front and back.

Besides providing a bill of materials, helpful cutting diagrams, several detailed perspective drawings, and thorough, straightforward construction notes, the plan also covers making wooden bench dogs, gluing up the slab, mounting the vises, and building an optional storage cabinet with five drawers under the benchtop.

This plan has more text covering construction steps and more illustrations than any of the other bench plans we reviewed. Though a beginner will be challenged (building a good bench is a challenge), he or she probably won't get lost. Even if you decide not to build this particular bench, for \$3.95 (plus shipping), the plan makes good reading for the purpose of understanding some of the fundamentals of workbench construction.

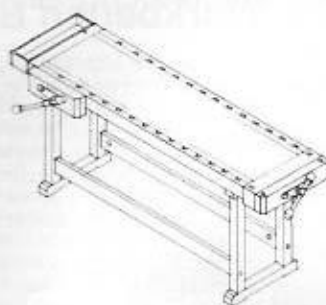
## Lee Valley's Modern and Traditional Benches

Like many other suppliers, Lee Valley Tools of Canada a few years ago found themselves selling vise hardware which came from the manufacturer with no written suggestions for how they could be used. To help out his customers, owner Leonard Lee commissioned plans drawn for two workbenches which could utilize a wide variety of the hardware. The two benches are designated "modern" and "traditional."



The traditional bench features a narrow tool well running the length of the bench, a single row of dog holes, and a heavy tail vise which uses steel guide plates. Either our Large Tail Vise (01.97.03) or Small Tail Vise (01.97.04) can be used. Both of these come with a set of three heavy steel guide plates. The front vise can be either of our regular European Shoulder Vises (Large is 01.97.01; small is 01.97.02), or our quick-action Large European Shoulder Vise (01.97.10). Alternatively, a large Record vise could also be used for the front vise. Overall size of the benchtop is 24" x 80", with a work surface 16" deep.

The main slab is 1-7/8" thick by 10-1/2" deep by 75" long. To this is added a 4" high by 5-1/2" thick dog block/apron at front and a 4" high by 1-3/4" thick apron at rear.



The modern bench puts a small tool well at the left end of the bench, allowing for a deeper work surface, which measures 24-1/2" x 71". Its main slab measures 1-7/8" thick by 17-1/2" deep by 71" long. To this is added a 3-1/2" x 3-1/2" dog block/apron at both front and rear.

Two rows of dog holes run the length of each side of the bench, providing clamping capacity for huge workpieces. The wooden jaw which you fabricate for the tail vise is as wide as the bench is deep (24-1/2"), to allow for the corresponding dog holes. In this case for the tail vise, we recommend using one of our

large European Shoulder Vises (regular is 01.97.01; quick-action is 01.97.10), although the small European Shoulder Vise (01.97.02) or the Record 53E vise (01.11.05) would also work. Any of these four would also be fine for the front vise.

The Lee Valley plans each come in the format of a traditional blue print, illustrating the details using plan (overhead) views, end views, elevations (side views), and cross-sections. Those not used to reading engineering drawings may experience some difficulty interpreting some of the more complicated details, for example the installation of the tail vise on the traditional plan. This difficulty will be lessened somewhat by the very thorough construction notes, which divides the work into sections (base structure, bench top, tool well, front vise, end vise, etc), describing each step in sequence. A bill of materials is included for each section.

Either Lee Valley plan is available from us for \$9.95 (plus shipping).



## Norm's New Yankee Workshop Bench

Premiering this past January was a new weekly series on PBS stations around the country which features Norm Abram, the carpenter/craftsman of *This Old House* fame. The second half-hour episode in the series was devoted to building an inexpensive workbench suitable for using in building the home wood-working projects featured in other segments of the series.

Needless to say, this workbench has become a very popular project for woodworkers around the country. Fortunately, the show's producers have also published a measured drawing of the bench, as well as a book which serves as a companion to the PBS TV series. A 12-page chapter of the book provides step-by-step illustrated construction details (as well as all the information contained in the measured drawing).



## Maple Benchtops

Benchtops are available from us in hard maple, either 1-3/4" thick for light and medium duty use, or 2-1/4" thick for all manner of heavy use. Six different sizes of each thickness are available (from 2' x 5' up to 3' x 8') to fit the size of your shop and the scope of your work.

Our benchtops are produced at a commercial operation whose custom equipment and quality control permit us to offer a one-year guarantee on the tops against any major delamination. In gluing up the tops, a sophisticated glue press automatically clamps the pieces of the top together while a high frequency electric charge is passed through the glue joints, fully curing the glue in a matter of minutes. After the tops are thickness planed, they are smoothed on successive passes through a drum thicknessing sander and sprayed with a thin protective coat of lacquer before being packed for shipment. The benchtop is delivered ready for mounting on an underframe constructed by you. Plans for building a sturdy underframe are included with the top.

Our benchtops are dead flat when they come from the manufacturer, but like anything made of wood they will tend to change shape as

the local humidity varies. Therefore you should check every now and then to see how your top is behaving, and re-flatten it if necessary. This is readily accomplished by planing straight across the grain with a good long hand plane such as the Record 07, removing stock from high spots revealed by straightedge and winding sticks. The top should then be scraped smooth and re-sealed with oil.

These benchtops are ideal for use with the large Record vises, or our other vise hardware.

### Heavy Duty Workbench Tops

Six sizes of these heavy duty bench tops are available to suit your work needs and space limitations. Each is a lamination of solid maple 2-1/4" thick and sanded smooth.

	Size	Wt. lbs.	Price
01.16.13	2' x 5' x 2-1/4"	79	200.00
01.16.14	2-1/2' x 5' x 2-1/4"	98	250.00
01.16.15	2-1/2' x 6' x 2-1/4"	118	275.00
01.16.16	3' x 5' x 2-1/4"	118	300.00
01.16.17	3' x 6' x 2-1/4"	143	350.00
01.16.18	3' x 8' x 2-1/4"	188	450.00

### Medium Duty Workbench Tops

Professionally manufactured laminations of the same top grade hard maple as the heavy duty bench tops, the medium duty tops are 1-3/4" thick, sanded smooth.

	Size	Wt. lbs.	Price
01.16.07	2' x 5' x 1-3/4"	61	150.00
01.16.08	2-1/2' x 5' x 1-3/4"	77	200.00
01.16.09	2-1/2' x 6' x 1-3/4"	92	225.00
01.16.10	3' x 5' x 1-3/4"	92	250.00
01.16.11	3' x 6' x 1-3/4"	110	275.00
01.16.12	3' x 8' x 1-3/4"	147	350.00

All medium duty and heavy duty workbench tops are shipped by truck freight collect. Allow up to 4-6 weeks delivery.

We now have available both the workbench measured drawing (\$6.00 postpaid) and the book (\$16.95 plus \$3 shipping). Happily, the half-hour show is also available in the form of a VHS video. (It sells for \$24.95 plus \$3 shipping, and includes a copy of the measured drawing.) The video takes a lot of the pain and mystery out of the construction process, since you can first watch the entire project from beginning to end, and then play back each section as many times as necessary for full understanding.

Norm built his bench's frame out of pine 2x4s, since they are readily available at a low cost. The bench can be made considerably stronger by substituting a hardwood for the frame, such as maple, oak, or birch.

For his top, Norm used a piece of 3/4"-thick plywood, covered by a 1/4"-thick piece of tempered masonite. The working surface is 19-1/2" x 63", and is bordered on the underside by the 2x4 framework. A narrow tool well runs the length of the bench.

The only vise included in the plan is an end vise with a single row of dog holes. Its design is nearly identical to the one in the *Woodsmith* plan, using the same bench screw (our #01.97.06 Shoulder Vise Screw).

Many people who build the bench will undoubtedly add a front vise as well. For this, any of the smaller models can be readily used.

For anyone who dislikes relying solely upon written material and printed illustrations for guidance, Norm's book/video combination offers a practical and energetic alternative.

*Note: a bench dimension shown at the top right of page 29 of the New Yankee Workshop book is in error. The distance from the left end of the base to the dado should be 1-1/2", not 3-1/2". The same error appears in the measured drawing.*

## Summary of Workbench Plans Available

20.04.75	The Workbench Book	\$24.95
01.20.01	Woodsmith's Traditional Bench	3.95
	Tag Frid's Scandinavian Bench	
20.04.41	(Included in <i>The Small Workshop</i> )	7.95
01.70.02	Lee Valley Modern Workbench	9.95
01.70.03	Lee Valley Traditional Workbench	9.95
	<i>The New Yankee Workshop Bench</i>	
20.05.78	Book	16.95
23.01.02	Measured Drawing	6.00 ppd.
22.01.02	VHS Video	24.95

Add shipping charges on p. 46 except where postpaid.



# Improving the Delta Dust Collection System

by Paul Lapinski

**C**HRISTMAS IS A BIG DEAL at our house. It should be. We raise Christmas trees on our farm. Actually, I should say that the trees raise themselves. We plant some but we also selectively cut others. It helps the woods if you weed out some of the trees, but you shouldn't get greedy and take too many.

We also make maple syrup and have honey bees. I make all of the bee hives. I gave up on milk cows nine years ago when I was sixty-five. I didn't like being tied down to milking twice a day. We have more freedom now. All we have today are a dozen chickens, a dog and a cat. Like a lot of other small farmers in Michigan, we heat mostly with wood. I save the good stuff for lumber. My cousin up the road has a mill my uncle and my dad built during the thirties.

Every family has rituals. Ours are fairly simple. I like to get tools for Christmas. I like things that I can use. My neighbor has grandchildren all over the country. He gets about ten ties each Christmas. He has enough ties to make a rug except some of the ties would be too ugly to use.

During the year, I leave catalogs laying around the house open to a page with a tool circled. Someone usually gets the hint and I get the tool for Christmas.

When it comes to playing Santa, no one beats my granddaughter. Ever since she was a little kid she would come and stay with us for part of the summer. She's always loved animals, and she always liked to help in the wood shop. Every summer we would work together and build her something. When she was little, we made a doll house and doll furniture. As she got older we made things like a desk and bookcases.

During high school and college, rather than waiting tables, she worked for me for her summer job. We built cabins, kitchens and everything else that our neighbors wanted.

Now she is a grown-up and a lawyer, but we still work together. A couple of days a month, when she can get off, she comes up and we work on one of her projects. She is redoing her house, so we work on that. We also make a lot of things for her office. She likes dovetailed drawers and it seems like everytime she comes, we make more drawers.

She gets just about every woodworking magazine that is published. Sometimes I think she gets them just so that she can bring them up to me. She reads them first and tells me

which articles she likes. We talk a lot about the articles.

To be perfectly honest with you, I'm running out of tools to circle for Christmas presents. Over the years, my granddaughter has gotten me a jointer-plane, a new tablesaw, an Inca bandsaw and a Hegner scroll saw. This last year she got me another dust collector. The one that she got me was the new Delta. She had seen it at a woodworking show and liked it.

The worst thing about woodworking is the sawdust. This is especially true of the sawdust and chips from the woodworking machines. The dust gets into everything including the machine switches and especially your lungs. After you get a couple of machines, especially a planer, you start to think about controlling the dust problem.

There are various solutions. You can build a system or you can buy one. Most people settle for buying a portable system. These are less expensive than a large permanent system and are adaptable to any change you might make in your shop. The idea is that you can move the system to where you need it. Since the greatest waste comes from the jointer and the planer, it is best to have the collector in that area.

Rather than using one central system I use a couple of systems. Since I use the bandsaw a lot, my bandsaw has a foot operated vacuum cleaner under it. This saves the time of having to turn the switch on and off. A foot switch is also a good idea for the router table. The worst thing you can do to a router is to run it without a load. It kills the bearings.

For a couple of years, I've been using a standard single-stage system. This I moved back and forth between my tools. The single-stage system has two bags, one on top of the

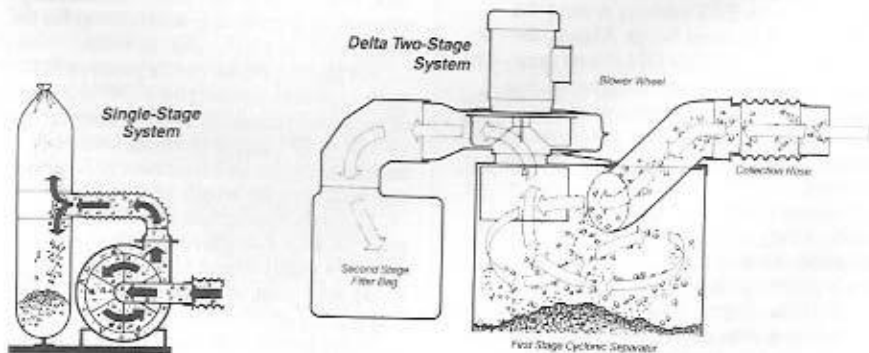


other. The idea is that the bottom bag which is plastic holds the sawdust and the top bag acts as a filter. In principle it's a great idea. That way you don't have to empty a barrel — everything goes right into the bag.

There are a couple of problems with the single-stage system though. When you empty the bag, it's hard not to have the dust from the top bag fly into the air. This defeats the whole purpose. Removing the bag frequently is a bother when there is a lot of light waste such as pine shavings. It's hard to compress the bulky shavings so you end up with a lot of bags which weigh very little.

The other problem is that the sawdust and chips go right through the fan. This can be very noisy and is also a potential hazard. Someone I know once sucked up a shop rag accidentally. He said it sounded like World War III had started when the fan blades got torn off. That rag literally destroyed his unit. The single stage unit is fine for sawdust from a tablesaw or radial saw but is not the best choice for using with a thickness planer because there's no good way to compress the bulky sawdust.

For Christmas last year I got the small new Delta two-stage unit. I use this one only for the jointer and planer. I like the unit. It's quiet and has plenty of power. The Delta is a two-stage system, and as the name implies, it has two different mechanisms. A vacuum is created in the barrel or container by the fan. Rather than being sucked through the fan, as



First stage cyclonic separator filters large dust and particles into container. Fine dust passes through blower wheel into second stage bag.

Paul Lapinski is 74 years old and has lived on the same farm in central Michigan all of his life.

in the single stage unit, the chips and sawdust are sucked into the container first. Only fine dust passes through the fan into the filter bag.

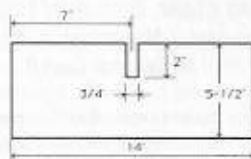
The unit works well, but there is one problem. After the container is full, it must be emptied, preferably into a bag. This defeats much of the advantage of using the system. It's not much fun, and it's a real problem if you're older like me and have a bad back.

Neither of the systems is perfect. The ideal system would combine both systems, and the best combination would be a two-stage unit which could use a disposable bag.

Simply putting a plastic bag in the Delta system doesn't solve the problem. If you put a bag in the container, it is instantly sucked up into the fan. A protective cover keeps the bag from contacting the fan, but the air flow is blocked and the unit is immobilized.



I was convinced that somehow one could change the Delta so that a bag could be used. As I struggled with the problem, my younger brother came to visit me. After discussing the idea with him, we decided to experiment. The first thing we did was to drill holes around the fan unit tube (see photo above). The purpose for this was to disperse the air flow. This made it harder for the bag to be sucked into the fan unit; however, it wasn't enough. After experimenting for a while, the next step was to put a baffle between the air inlet and the outlet (see photo below). This forced the sawdust to go down around the baffle, and forced the heavy pieces of waste to the bottom of the bag.



Dimensions for baffle (3/4" thick)



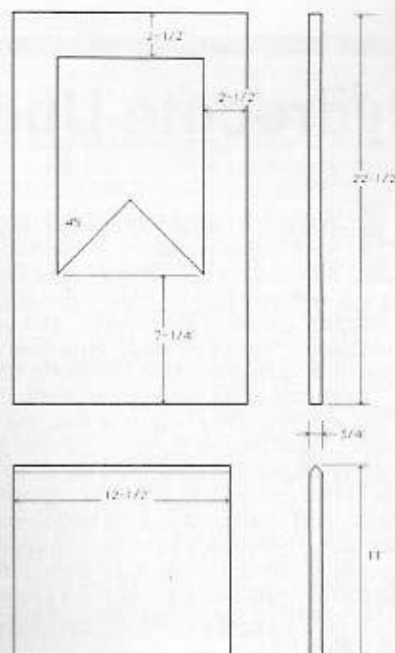
The holes and the baffle solved a great deal of the problem. However, the bag still had a tendency to constrict until it was about half full of sawdust. That constriction caused more of the sawdust to go through the fan into the filter bag. What was needed was a way to keep the bag from constricting. After more experimenting, I came up with a three piece removable framework that kept the bag open and also allowed the sawdust to fall behind the framework so that valuable space isn't wasted. Drywall screws are used to hold two pieces of the framework together (see photo above). When the bag is full it is easy to slip the framework out. When a new bag is put in, the framework is replaced.

The framework is made of scrap, and is designed for function and not for looks. The same with the baffle. Any 3/4" stock that you have laying around will do.

With the holes, baffle and framework, the unit functions with a disposable bag in the same way it does without the bag in place. For the system to function properly, you should be careful to keep the framework and the baffle from touching each other.



Another change also seems to help. You get less waste in the filter bag if you increase the back pressure. You can do this by folding the bag a couple of times and then holding it with a rope or a hose clamp, as pictured below.



Dimensions for framework that goes inside bag to help hold it open



One final improvement (pictured above) which I added was a quick-disconnect using 4" PVC pipe fittings, which ought to be available at your local hardware store. By cutting the hose near the inlet to the barrel and using large hose clamps to attach the PVC male and female connectors, I can now slip the hose right off when it comes time to open the dust collector to remove a bag that's gotten full.

**Delta's Model 50-179 Dust Collector** features 580 CFM air flow, 35-gallon capacity, cast-aluminum blower wheel, 3/4 HP lubricated-for-life ball bearing motor, and 4 stabilizing casters for easy portability.

It is available from Highland Hardware for \$348 plus \$6 shipping. Optional 10-ft hose extensions are \$28.95 each.

To order, use the order form on page 46, or charge to Visa, MasterCard or Discover by calling (800) 241-6748.

# Hydrocote Update

by Zach Etheridge

**I**MAGINE a lacquer finish both non-toxic and non-flammable, harder, clearer and more flexible than conventional nitrocellulose lacquer, and water rinsing to boot. Imagine a polyurethane varnish that can be wiped on with cheesecloth and re-coated in one hour or less, with very little odor and water clean-up. Too good to be true? For thousands of our customers, the nearly unbelievable is becoming commonplace as they put our new Hydrocote finishes to work in their shops. Hydrocote offers a complete water-based non-toxic finishing system, from filler and stain to sealer to finish coat, and the stuff works as advertised.

Hydrocote offers two kinds of finishes: acrylic lacquers in clear satin and clear gloss, and black and white gloss lacquer as well; and clear polyurethane in satin or gloss finish. Like nitrocellulose lacquer, Hydrocote lacquer offers an easily applied, inexpensive, and extremely tough finish suitable for use on all kinds of woodwork from kitchen cabinets to showpiece custom designs. Unlike nitrocellulose, Hydrocote is in no way harmful to your health. And where conventional lacquer's extreme flammability makes it a serious hazard in any shop, Hydrocote is so totally non-combustible that it actually acts as a flame-retardant coating wherever it's used. Like nitrocellulose, Hydrocote is partially self-dissolving, so successive coats melt together into a single tightly bonded layer of finish. Hydrocote lacquer cures up to 50% harder than nitrocellulose, resists yellowing better and remains more flexible as well.

Hydrocote polyurethane is likewise non-toxic, non-flammable, and user friendly. Sprayed or applied by hand, the poly is dry to touch in minutes, and can be recoated in one hour or less. It goes on thinner and much clearer than conventional polyurethanes, and unlike other polys it is partially self-dissolving and will always bond effortlessly to earlier coats. Like the competition, Hydrocote poly is an incredibly tough finish that cures to a practically inert film immune to damage from household chemicals and stains. And for a bonus, it also sets up harder than solvent polys.

A thorough introduction to Hydrocote finishes was published in the last issue of *Wood News* (#22). If you missed it and would like a copy, please mail us \$1 for postage & handling, and we'll send it to you promptly.

**S**IX MONTHS AFTER we introduced Hydrocote to our readers in *Wood News* #22, we have a considerable amount of good news about this exciting new line of finishing products. We were very pleased to learn that Hydrocote's national distributor earned a first-place Governor's Award for excellence in hazardous waste reduction in Wisconsin. This is the kind of recognition we think the product deserves, and we're proud to be the Georgia distributor (and a nationwide retailer) for a high-quality finishing system that can contribute to cleaner air and water for all of us.

Another piece of encouraging news is a recent lab report submitted to the Maple Flooring Manufacturers Association, Inc. The testing lab, Case Consulting Laboratories of Whippany, NJ, evaluated 23 critical characteristics of Hydrocote polyurethane, ranging from clarity and gloss to abrasion resistance and maintenance properties. Hydrocote poly *passed every single test requirement*, and the official conclusion submitted to the MFMA is that "subject sample **DOES** conform to the requirements of the specification." If it's good enough for a gym floor, there's little doubt Hydrocote poly will be tough enough for your living room, too. Though we already had a

pretty high opinion of the finish, supported by many customers' reports, it's a pleasure to receive additional objective verification. With our customers reporting an average coverage rate of well over five hundred square feet per gallon, it looks as though this may be one of the best floor finishes on the market, as well as a superb general-purpose polyurethane.

The best news of all isn't an award or a lab report, though. It's that during the last six months thousands of our customers have tried Hydrocote and have come back for more. During that time we've gone through a total immersion course in Hydrocote application, trouble-shooting and problem solving. We've talked to people who are using Hydrocote on everything from walking canes to faux-marbre glazes to plain old kitchen cabinets. Hundreds of calls and letters have described more kinds of successes and challenges than we knew were possible. We've learned a lot more about Hydrocote finishes, and we've learned a little more about human nature, too. In this article we'll list the dozen or so most common questions from our customers, and we'll pass along what we've learned from our own continuing use of the finishes and from all of you who've shared your experiences with us.

This may be the right kind of problem to have, but it is still occasionally a problem that Hydrocote's list of features and advantages is so impressive. We can't really fault anybody for being a bit dubious at first; we had the same feeling ourselves. We checked the product out the easy way: we bought some

and tried it. After a few trials, we developed application methods that worked pretty well, and we found that both Hydrocote Lacquer and Hydrocote Polyurethane went on clear, dried hard, and provided a finish of great durability. Now we have customers calling to order another hundred gallons of lacquer, or another five-gallon pail of polyurethane, and it's clear that they too have overcome their skepticism, mastered the learning process, and graduated to taking the stuff for granted.

## Practice

We should emphasize that there is a learning process to go through – our enthusiasm for Hydrocote seems to have lulled some users into thinking it not just good but downright miraculous. If you haven't used Hydrocote before, plan on investing a little time practicing its application until you get good at it. Using Hydrocote may be as easy as tying your shoes, but it will help to remember that you probably didn't master shoe-tying on your first attempt, either. Unfortunately, it's not always easy to remember during the heat of combat that a table you've put seventy-five hours of labor into is not the right place to fool around with an unfamiliar finish, no matter how good it sounds. Nor is your living room floor, or better yet somebody else's living room floor, the right place to perform chemical compatibility experiments. As we described it to one correspondent, "the intensity of the dismay caused by a failed experiment relates directly to the value of the object on which the experiment was carried out." We've distilled this into a maxim we cite frequently here at the store: **PRACTICE ON STOVEWOOD!** – that is, do your learning on something you won't mind throwing in the stove if your first efforts should somehow go awry.

The actual learning process is usually a brief and painless one, and almost everybody who uses these finishes finds that a little practice is all it takes to achieve consistently satisfactory results. Some folks, though, are fated to find the worm in any apple, and it's while helping them recover from their unsuccessful experiences that we learn the tips and techniques that can save the rest of us a lot of grief. Incidentally, if it falls to you to have a hard time with Hydrocote, we very sincerely request that you promptly give us a call for help – we can't help solve a problem until we know it exists, and it's from questions like the ones below that we learn how to make the product work in your shop as well as in everyone else's.

**Question:** *I'm uncertain about the differences between Hydrocote lacquer and polyurethane. If they're both clear, thin and tough, why not just use the poly, since it's the harder finish of the two?*

**Answer:** The main practical difference between the two finishes comes down to a matter of cost. If you'll be using a large volume of finish, the lacquer is an easy

*Zach Etheridge is Highland Hardware's Product Engineer.*



choice; it's a very good finishing material, both harder and more flexible than nitrocellulose lacquer, and it's a lot more economical than the polyurethane. On the other hand, if in your situation material expense is not a major concern, the poly provides an incredibly tough coating that's actually easier to apply by hand than the lacquer. Either finish can be sprayed beautifully, but in hand application the poly takes less rubbing out, and seems to go on tighter and flatter than the lacquer. And of course in some situations, such as floor finishing, you want the hardest film you can get, and hang the expense.

One very interesting note about Hydrocote polyurethane: unlike any poly we've heard of before, Hydrocote actually exhibits a significant degree of chemical fusion between coats. If it is recoated within 24 hours or less, burn-in is about 25%, the same as with Hydrocote lacquer. This will completely eliminate any possibility of air infiltration or delamination between coats, and it helps explain how the poly goes on so smooth and tight.

**Q: Can Hydrocote be put over previous finishes, and if so which? How can I tell if it's compatible with another coating?**

**A:** Hydrocote lacquer and poly will successfully overcoat most other finishes or surface treatments. Both finishes can be used over dyes, oil stains, glazes, lacquers and most latex or oil paints. One finish definitely *not* compatible with Hydrocote is shellac; one of Hydrocote's ingredients is ethanol, which can interact with a shellac finish with predictably awful results. Whenever topcoating over oils, such as Minwax stains, Watco finishes, pickling washes or other sealers, lean over backward to be sure the oil is absolutely dry before applying Hydrocote. For example, if you've treated a piece of oak with Watco or linseed oil, you already know you might see oil bleeding back out of the pores for up to a week, so don't plan on using Hydrocote any time soon. In any case, get out some stovewood and prove compatibility to your own satisfaction before committing to a major project. Coating over polyurethane is another major challenge. Here your best chance for success is to be very conscientious about your prep work: clean the surface thoroughly, sand it well or use a chemical deglosser with a scouring pad, and once again use up some stovewood before diving in.

**Q: I thought you said I could use Hydrocote over Artl dyes. I tried it, and the color bled all over the place and ruined the finish. What gives?**

**A:** We did say Hydrocote could be sprayed over water-soluble aniline dyes, but we didn't offer enough detail to guarantee your success. Hydrocote *can* be sprayed or hand-applied over Artl or other water-soluble dyes, but only

if you're very careful about applying the dye. After liberally sponging on the dye once or twice to achieve color saturation, let it soak in for a minute or two. Then wipe the surface with clean, dry rags until no color comes off on the cloth. Let dry thoroughly, and you'll have no trouble at all spraying either lacquer or poly onto the dyed wood. When finishing by hand, gently brush or wipe on a light coat of sanding sealer without too much violent scrubbing of the surface, and you'll see no problem with bleeding. Several users have been experimenting with mixing small quantities of Hydrocote sanding sealer with the dye solution to act as a mild binder to hold the dye against re-dissolving. This sounds like a good idea, particularly if you're working on a piece that's hard to wipe down very thoroughly.

**Q: My first attempts to spray Hydrocote lacquer left me with a rough, pebbly surface. Should I use Flow-Out or Reducer? Also, I'll be using poly as well as lacquer — are these additives compatible with both finishes?**

**A:** To answer in reverse order, yes, all the additives used in Hydrocote lacquer may be used in the polyurethane as well. Whether or not they'll solve your problem depends on your shop conditions and spray technique. If your gun is partially clogged by debris, it may not be capable of atomizing well enough to deliver a smooth finish. Be sure to strain both sanding sealer and all finishes before spraying. Rough finishes can result from inadequate flow-out, which is most likely due to spraying too little finish rather than to more exotic causes. If you spray too light a wet coat, the film can dry and cease to flow before it's had time to level out. You're erring on the right side, though; it's easier to spray a little more finish than it is to remove excess. More on that in a moment.

There are five additives for use in Hydrocote finishes. Reducer is Hydrocote's proprietary thinner, and thins the finishes like water does, except that it will not lengthen the product's drying time (and may in fact shorten it a little). Reducer is used primarily by spray finishers who find their viscosity running higher than the recommended 16 to 18 seconds. A shot of reducer might also be necessary for finishers using low-powered turbines (less than 70 cfm) or compressor-driven guns that don't want to atomize finely enough.

Flow-Out is used to increase sheeting action and self-leveling tendency. It's especially useful for those who are finishing by hand, and would be helpful when spraying in unusually low temperatures or extremely low humidity. Use Flow-Out sparingly; an overdose can result in a permanently softened finish.

Fish-Eye Eliminator is not particularly recommended for general-purpose use. We've had only two reports of problems with fish-eyes, and both came from finishers who had used the Eliminator on one job and then had copious fish-eyes on the next job when they

weren't using the stuff. Apparently traces of the silicone-based Eliminator left in their guns caused the problem. Many spray finishers routinely add fish-eye eliminator to their nitrocellulose lacquer, but it has not proven necessary with Hydrocote lacquer or poly, even on refinished furniture. If you know there's likely to be silicone contamination on a piece you're finishing, use it; otherwise, leave the Eliminator on the shelf.

Flattening Compound is used to control the degree of gloss in the final product. One to two ounces per quart of finish will yield anything from satin to matte. This lets you customize the white or black opaque finishes, which are stocked only in gloss, and lends an element of fine control over the degree of sheen of any of the finishes. Some users find that Hydrocote's satin finishes have a higher sheen than they're accustomed to, and will use a dab of Flattening Compound accordingly.

Rust Inhibitor is added to lacquer or poly for use on unfinished ferrous metals, to prevent corrosion during the brief period before the finish cures completely. Hydrocote finishes may be used on non-ferrous metals such as brass or aluminum with no additive required.

**Q: Can I use my \$100 airless electric paint sprayer to apply Hydrocote?**

**A:** Unfortunately, no. It takes more powerful and more controllable equipment to atomize and deliver the finish successfully. If you're not ready to spring for an EagleSpray or a more expensive compressed-air system, your best bet is to apply by hand, or of course drop in on a friend who happens to own a spray system.

**Q: From your first article, I gather that Hydrocote is being used outdoors. Is it in fact rated for exterior use?**

**A:** Not yet. Hydrocote clear lacquer has been in use in fully exposed outdoor applications for about three years now, the poly for a shorter time. So far, it's held up flawlessly. Ten-year aging simulations in a test chamber likewise show very good exterior durability, but the manufacturer wants to see at least five years' actual outdoor use before certifying either finish as exterior-rated.

**Q: What's the shelf life of Hydrocote finishes?**

**A:** At least a year, given reasonably careful storage. As with other finishing products, store Hydrocote in airtight containers in a cool, dark environment. Limit the amount of air stored with the finish; for instance, if you've used most of a gallon, store the remainder in a spare quart bottle.

*(continued on next page)*

## Hydrocote Update

(continued from previous page)

**Q: My company would like to use Hydrocote lacquer, but we need a range of colors other than white or black. Can Hydrocote be tinted, and if so how?**

**A:** Hydrocote can be tinted to practically any color you might want. It can be mixed as a transparent cover stain or an opaque high-gloss paint. Water-soluble dyes such as our Arti line are fully compatible with Hydrocote, and can be used pre-mixed as thinner or, with Arti, dissolved directly in the finish or sanding sealer. We've talked to users who are heating the finish in a microwave oven (we could not recommend this with anything other than a totally non-hazardous finish) and adding their undiluted Arti dye directly to create a wide range of semi-transparent wood tones and colors. These can be used for effective cover-up repair work as well as even-color topcoating of different-toned woods.

Hydrocote's white lacquer is proving to be a versatile mixing base for practically any relatively light or pastel paint color. We've had excellent results using Universal Tinting Colorants (UTCs) from our paint mixing bench here at the hardware store, using much the same formulas specified in our paint chart. Though we haven't yet seen any data on maximum tinting limits, it's a safe guess that you can add any amount of tint specified for white mixing-base paint. Intense colors should be mixed in the clear finish rather than in the white lacquer. See the box at lower right for more details on UTCs and dispensers now available from Highland Hardware.

**Q: I started spraying Hydrocote lacquer this week, and all of my finishes have come out looking milky and soft. What's wrong?**

**A:** The most likely explanation is that you're laying it on too thick. Hydrocote's 35% solids content is more than twice that of nitrocellulose as it comes out of the gun. Equally thick wet coats of Hydrocote and nitrocellulose lacquer will put down radically different amounts of solids and leave more than twice as thick a dry film of Hydrocote as of nitrocellulose. When you shoot Hydrocote for the first time, don't be surprised if a "normal" wet coat skins over before it's dry all the way through, trapping solvents within and turning the finish cloudy. Many experienced sprayers have had this same problem — someone who hasn't sprayed before might actually have an advantage over you in that he or she has less to un-learn.

As you learn to spray Hydrocote, try to start off spraying very lightly, not much more than a mist coat, and be sure to achieve very fine atomization. With compressor-driven systems, this typically will require shooting at

higher pressure (around 45 psi), lowering your fluid-to-air mix somewhat, and possibly adding a bit of Reducer if the first two tricks don't suffice. If you produce the kind of rough, pebbly finish described earlier, good; you're not spraying it on too thick. Now spray a little heavier, and make a few more passes, trying to sneak up on the right wet coat thickness. Don't let the lacquer's lavender shade get too pronounced. By the time you've finished a half-dozen pieces of scrap you'll probably have it figured out. A good coat may look horrible right out from under the gun — cratered, bobby, or orange-peeled to death — but it will flow out beautifully smooth and level within just a few minutes. As you develop a feel for the right combination of wetness and rate of build-up, you'll be able to spray more aggressively and get the job done with increasing efficiency.

If you produce a blushed finish on a piece you can't throw in the stove, there are a couple of ways to effect a cure. Several users have reported that flashing the film with solvent lacquer thinner works like a charm to clear it up, unlikely though that might sound. One drawback to this procedure is that you'd be going back to the same old flammable solvents you're avoiding by using Hydrocote. Alternatively, scuff your clouded finish with sharp sandpaper, which can cut through the surface and release the solvents remaining underneath.

With all that said, it's also possible that a whitened or discolored finish might not be due to your technique. We've had very few proven cases of chemical incompatibility, but it could happen and it's something to be aware of. We mentioned earlier that oil finishes might cause trouble if not fully cured. It seems a reasonable precaution to be suspicious of any undercoat other than Hydrocote products, and

to test samples before proceeding with a valuable project.

Even a perfectly applied finish might blush if your shop has a heating or cooling fan blowing right across the work. Fast air movement can both cool and dry the film surface through accelerated evaporation, trapping solvents just as if the coat were too thick. If you need very fast drying, sunlight or heat lamps can provide very quick cure without blushing or cracking.

As we cruise into summer, it's an appropriate time to remind you that one cause of blushing you definitely won't have to worry about is high humidity, a traditional pain in the neck for lacquer finishers. Water-based Hydrocote is already saturated, of course, so it won't be bothered at all if the atmosphere's a steaming bog.

**Q: Your sanding sealer does a pretty good job of filling small open pores, but it can't cope with the red oak I'm using. What fillers are compatible with Hydrocote?**

**A:** Hydrocote Fast-Drying Pore Filler, naturally. This is the latest addition to the collection of Hydrocote water-based finishing products, and is of course fully compatible with everything else in the line. The Pore Filler comes in at 80% solids content — it's as stiff as half-dried mud — and dries very quickly indeed. We recommend thinning it with reducer, especially if you're working on fairly large surfaces. Application is the usual business of wiping or squeegeeing the stuff into the surface, letting set up briefly, and removing most excess by wiping across the grain with burlap or the coarsest cloth

## Universal Tinting Colorants

Now available from Highland Hardware is a broad selection of these versatile UTCs, consisting of very finely ground pigments in a soft fluid base. UTCs can be used to tint Hydrocote lacquer and polyurethane, as well as practically any other finishing materials, paints or stains. We stock a total of 34 different tints to provide the broadest possible range of mixing possibilities. They are sold in convenient 1-1/2-oz. tubes for \$1.95 each plus shipping. For a color chart, please mail \$1.00 to Highland Hardware. Charts are free with any UTC purchase.

Our UTC assortment which contains one tube each of twelve selected colors plus the color chart makes an excellent universal tinting kit for the shop alchemist and color enthusiast. It is available for \$19.95 plus \$3 shipping. Colors included are 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.

Our experiments here at the store showed that using these colorants in the amounts specified in our paint formula book let us mix Hydrocote White Lacquer to almost exactly the same colors shown on the store's paint chart. If you need to match an existing color, pay a visit to your friendly local neighborhood paint store and ask if you can look up a formula or two. If you're making up your own custom shades, anything goes.

To facilitate the kind of accurate measuring of very small quantities of tint typically called for in color formulas, we have located and now stock an inexpensive one ounce/30cc Graduated Dispenser Pump, which looks suspiciously like a large syringe (not needle compatible, incidentally) and works just as easily. We recommend that you get a dispenser for each different color you'll be using, to minimize waste and washing time.

UTC 12-color Assortment	\$19.95
Single 1-1/2 oz. Tube of UTC (specify color)	\$1.95
Color Chart (free with UTC purchase)	\$1.00
1 oz. Dispenser Pump	\$1.00
Pack of 6 Dispenser Pumps	\$4.95

(Add shipping charges listed on order form on page 46.)



available. The filler can be thinned 30% or more for spray application, too. Let dry just 15 minutes and sand smooth. Some woods may require two applications for perfect fill. Hydrocote filler has a neutral tan color which it retains as it dries. For darker woods, it may be tinted with water-based colorants (see box on UTCs on page 14).

Hydrocote finishes should also go over conventional pore fillers thinned with naphtha or mineral spirits with no problem; as usual, the main concern is to be dead sure the filler is dry all the way through — another job for your stovewood stash, to be sure.

**Q: I'm brushing Hydrocote polyurethane and having difficulty with bubbles left in the finish. How can I get rid of them?**

**A:** It takes a delicate touch to find just the right combination of speed and pressure in your stroke to avoid raising bubbles with a brush. It *can* be done, but frankly we've found it easier to drop the brush and do the job with cheesecloth or a cotton rag. The best tool for hand application, though, may be a pad painter. These are inexpensive plastic-handled pads, usually about 4"x6", with a very short synthetic nap. They should be commonly available in your neighborhood hardware store. Friends who've used them say they do a fine job of spreading a smooth coat without much bubbling (really tiny bubbles will disappear, so don't worry about them) and with minimal streaking, which begins to answer the next two questions.

**Q: We're trying some of your Hydrocote for the first time. The sanding sealer turns purple when you put it on, it looks like it's full of bubbles, and it leaves a very rough surface. How come?**

**A:** First, fear not the lavender tint that shows up as the sanding sealer or lacquer go on. Give it about two minutes, and the color fades away to completely clear. In the meantime it's a bonus, as it provides a clear indication of how heavy a coat you're putting down. The sealer you're applying might actually be full of bubbles if you're applying by hand; try again, with a little lighter and slower stroke. A fairly rough surface is to be expected whenever you put a water-based product on bare wood, because you'll inevitably be raising the grain. You can minimize the effect by careful sanding, finishing by hand lightly and with the grain using very fine paper, but there's no need to spend a lot of time at it. After putting down one or two coats of sanding sealer, you'll find you can quickly smooth off the roughened surface with 220-grit paper. The sealer is formulated to sand very easily, shearing off without much pressure and leaving a satin-smooth surface ready for topcoating. Once the surface has been sealed, you'll have no further grain-raising to deal with as you finish the piece.

**Q: I've been trying to create a gloss finish with Hydrocote lacquer, but everything I've tried leaves a real streaky surface that looks awful. Is there any way to get a gloss finish by hand?**

**A:** Good high-gloss finishes rarely come directly from under the brush, or rag, pad painter or what have you. Start by establishing a very smooth base, using pore filler if necessary, then one or more coats of sanding sealer sanded to perfection. Build up a suitable film thickness as well as you can, minimizing streaking by adding a judicious dose of Flow-Out to the lacquer, using a pad painter, and sanding smooth between coats. Let your final coat dry for at least twelve hours, and then sand it all the way up to 600 grit with wet-or-dry paper and a little water to prevent clogging. Then polish first with rubbing compound, then with polishing compound until the lacquer is as smooth as can be. Buff the surface with a soft dry cloth and enjoy.

**Q: I tried some of your black lacquer, and it took many coats to get a good solid-color finish. Is the stuff too thin?**

**A:** Well, it's probably going on too thin, anyway. The lacquer itself is quite opaque; the problem is knowing how much to put on. Several users have reported similar experiences, and the consensus seems to be that practicing with the clear finish is by far the easiest way to develop a good feel for effective wet coat thickness. Two coats of black or white lacquer should be plenty to establish an opaque color on a sealed surface. If you're coating smooth wood, Black Primer or White Primer will provide a sandable sealing coat with the color you need built in, letting you get away with as little as one good finish coat. On moderately open-pored woods, your best bet is to put down one or more coats of clear sanding sealer as filler; you could then prime to get a perfectly smooth base, or just go directly with the lacquer topcoat.



## Hydrocote Products

	Quart	Gallon	5 Gal.
Clear Gloss Lacquer	8.95	19.95	89.95
Clear Satin Lacquer	8.95	19.95	89.95
Sanding Sealer	8.95	19.95	89.95
Gloss Polyurethane	12.95	34.95	139.95
Satin Polyurethane	12.95	34.95	139.95
Gloss Black Lacquer	9.95	22.95	99.95
Gloss White Lacquer	9.95	22.95	99.95
Black Primer	9.95	22.95	99.95
White Primer	9.95	22.95	99.95

	Quart	Gallon	5 Gal.
Flow-Out Additive	5.95	14.95	64.95
Reducer	5.95	14.95	64.95

	1/2 Pint	Quart	Gallon
Flattening Compound	6.95	16.95	44.95
Rust Inhibitor	3.95	9.95	22.95
Rubbing Compound	2.95	6.95	17.95
Pro Polish	2.95	6.95	17.95
Fast Dry Pore Filler	4.95	11.95	29.95
Fish-Eye Eliminator, 8 oz.			14.95
Video on Spray Application			19.95

### SPRAY STARTER KIT

For professional shops, the Hydrocote Spray Kit includes a gallon each of Sanding Sealer and Gloss and Satin Lacquer; a quart each of Reducer and Flow-Out Additive; a half pint each of Rubbing Compound and Pro Polish; 2 oz. of Fish Eye Eliminator; a viscosity cup; 4 filters; & the instructional VHS video on spray application. The video is especially useful in making the switch from spraying nitrocellulose lacquer.

**Hydrocote Spray Starter Kit \$99.95**

### HAND STARTER KIT

For users who wish to apply Hydrocote Lacquer by brushing or wiping it on, the Hand Starter Kit includes one quart each of Gloss, Satin, and Sanding Sealer; a pint of Flow-Out additive; and a half pint each of Rubbing Compound and Pro Polish.

**Hydrocote Hand Starter Kit \$29.95**



### ANILINE DYE ASSORTMENT

To acquaint you with the deep, clear colors, simple application, and remarkable economy of ARTI dyes, this kit provides sufficient dye to mix a half pint each of 10 colors, plus our ARTI color chart of 24 colors. The kit includes Red, Blue, Green, Gray, Black, Rosewood, Light Mahogany, Light Oak, Medium Walnut & Dark Pear.

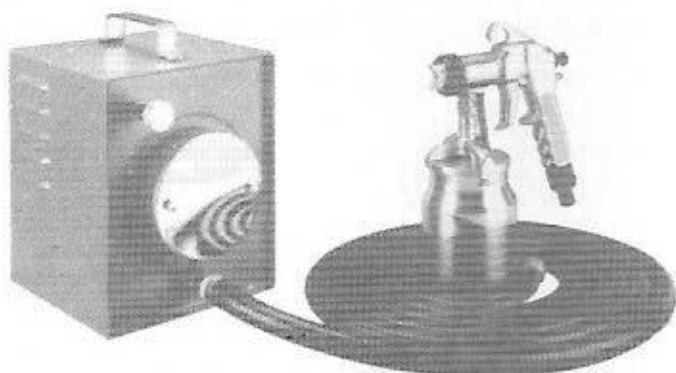
**ARTI Dye Assortment \$19.95**

Add shipping charges listed on order form on page 46



# EagleSpray Turbine-Driven Finishing Systems

by Zach Etheridge



**T**HESE NEW SPRAY SYSTEMS have really taken off since we introduced them last fall. Their high-efficiency delivery of dry air to the spray gun makes them remarkably easy to use with practically any kind of finish, and they are certainly ideally suited for spraying Hydrocote lacquers and polyurethanes.

It's almost hard to believe the difference in overspray between the EagleSpray units and any compressor-driven system; life in the spray booth is much easier to bear when the typical clouds of waste have been reduced by 2/3. EagleSprays will put 80% of your finishing material on the object being sprayed, versus about 35% efficiency for compressed air systems.

Life outside the booth is also possible, since their efficiency lets you use Eaglespray units for house painting and other on-site spray jobs. The fact that these systems are extremely compact and much less expensive than compressor systems of comparable quality doesn't hurt at all either.

## Model 1000

We offer a full line of EagleSpray 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 finishing material from paints and polyurethanes to lacquers and special automotive and aircraft coatings. An 850-watt, 110-volt motor drives a double filtered two-stage turbine delivering 96 cubic feet of air per minute (CFM) to the gun at 3 psi operating pressure. This low pressure is enough to pump fluid from the cup and atomize it at the gun's tip; the finish is then carried by a soft, warm flow, rather than blasted onto the surface being coated. Both EagleSpray models are designed with segregated motor cooling and gun supply air sources; the air delivered to the gun is slightly warmed as it's driven through the turbines, but there's no risk of its being overheated.

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

Model 2000 is a 1000 watt, three-stage turbine unit capable of driving two guns simultaneously for production finishing, delivering 77 cfm at 4-1/2 psi to one or two guns. The machine housing measures 16" x 12" x 12.5", and weighs 29 lbs. The 2000 can handle up to 60' of air hose for one gun, or 40' hose to two separate guns. Both models 1000 and 2000 are equipped with a 20-foot 3/4" i.d. air hose, quick-connect fitting for the gun, and a production-grade aluminum DeVilbiss spray gun with one-quart cup.

## Model 3000

A souped-up version of Model 2000 is also available for high-volume finishing shops: Model 3000 includes the 2000 turbine unit, a 2-gallon pressure pot, an oilless compressor, 20' air hose and 25' material hose, and the production gun all mounted on a custom mobile cart. The complete system weighs in at only 82 lbs. The 2000 can be upgraded to model 3000 at any time.

## DeVilbiss Spray Gun

The aluminum and stainless steel DeVilbiss spray gun supplied with EagleSpray units (\$250 if purchased separately) is a real strong point of the system. This gun was designed and built specifically for the EagleSpray's high volume, low pressure air delivery system. There are no constrictions in the gun that might cause air heating, and this together with the controlled-temp supply from the turbine means the gun never gets too hot to handle, a problem not uncommon in other units. The gun's soft trigger will be a real delight to anyone accustomed to stiff, full-pull triggers on most other guns. Material flow can be easily controlled from the trigger as well as from the adjustment knob at the rear of the gun. There's an unusual degree of control over fan shape and size, allowing the user to choose horizontal or vertical fans up to 12" wide, or to focus down to a 3/8" spot for detail work with no modification of the equipment.

Thus you can limit overspray even further by putting the finish only where it needs to go, be it on a tabletop, a jewelry box or a chair rung. The gun features not only precise fluid flow adjustment but airflow adjustment as well for special effects and unusual materials.

## Handling Different Viscosities

Optional Fluid Flow Set-ups (consisting of air cap, fluid tip, and needle assembly) are available to handle materials of different viscosities. The #4 Set-up that comes on the gun shoots Hydrocote finishes quite well, and can be used for conventional lacquer or solvent-based polyurethanes. A #3 Set-up is the choice for spraying conventional lacquer exclusively, and is also recommended for shooting wood stains. A #5 would be used for full-time spraying of polyurethanes, and will also handle adhesives, enamels and other fairly thick coatings. A #6 would be used for latex paints and primers, textured coatings and other heavy viscosity products.

## Remote Cup System

A popular option is a remote cup system, which allows more operator mobility with less fatigue; this includes a complete quart cup with lid and five feet of hose to connect to the gun. If you don't need the option of quickly shifting from remote to gun-mounted cup, the five-foot hose is available separately for use with the standard cup. Also available is an extra quart cup with storage lid; switching from sealer to finish and back is as easy as unclipping the cup.

Highland Hardware carries both Models 1000 and 2000 in stock and available for immediate delivery (Model 3000 is available by special order). Either model is provided with a split one-year warranty: six months' full replacement coverage, followed by six months' 50% repair coverage. Thus far we have no maintenance history on the EagleSprays because none of our customers has needed any service. The units are so simply designed that there's not much to go wrong: bearings are permanently sealed and lubricated, brushes are rated to last 2000 hours, and the permanent filters are easily removed for regular cleaning. *All models are shipped UPS.*

## EAGLESPray SYSTEMS

Model ES-1000	\$695.00
Model ES-2000	845.00
Model ES-3000	1495.00

Extra DeVilbiss SprayGun	250.00
Replacement Fluid Flow Set-up	
(specify #3, #4, #5 or #6)	58.00
Remote Cup & Hose	75.00
5' Hose only	14.95
Extra Quart Cup	12.00

(Add shipping charges listed on order form, p. 46)

# Affordable Scroll Saw Can Cut It Like the Big Ones

by Jack Warner

©1988 The Atlanta Journal and Constitution

A SCROLL SAW is surely the friendliest machine designed for cutting wood; unfortunately, it is also the least useful. It is a highly specialized machine intended for cutting extremely tight curves and making cuts on the interior of a piece of wood. It's the only machine that will do the latter.

I suspect most scroll saw purchases are inspired by the same thing that brought one into my shop — children and grandchildren. They're the machine of choice for puzzles and many toymaking operations.

Until very recently, scroll saws were preposterously expensive; the cheapest started at around \$600 and went all the way up to \$1,800. Considering that you can buy a beautifully appointed table saw for \$1,500 or less, that upper figure is difficult for me to understand.

Delta this year placed on the market a small scroll saw selling for about \$150 that woodworkers have been surprised to find is no toy. Properly set up, it gives a smoothness of cut that compares very favorably with the \$600 machines. It is a 15-inch saw, which means the saw's throat will accept a 15-inch board. That's surely adequate for most purposes.

I bought one of these, and so far I've been delighted with it. However, the machine does have some serious inadequacies as it comes out of the box. One gentleman told me he bought one of these saws from a home-handyman store and returned it in frustration. "It just didn't work," he said.

Thus I am going to do something I would normally never consider: suggest that if you want to purchase one of these scroll saws, you consider buying it from Highland Hardware in Atlanta.

## What the Manual Left Out

The reason is that Highland's product engineer, Zach Etheridge, recognized the potential of the saw and prepared a six-page supplement to Delta's 10 pages of instruction. It makes a huge difference.

The chief problem is with the hold-down mechanism. The hold-down should protect your fingers from the blade while holding the work firmly on the table.

The latter is important; without firm downward pressure, a scroll saw will cause a small workpiece to chatter wildly, making an accurate cut impossible.

The little plastic device that comes with the Delta saw does a respectable job of keeping your fingers away from the blade, but a very poor one of securing the workpiece.

Mr. Etheridge devised a shop-made hold-down and finger-protector using fairly standard hardware and a piece of wood. I can imagine that he went through quite a few trials before he arrived at this one; it's fairly complex, but it does a very fine job.

Once you see how it's done, you will see that it can be improved upon if you want to take it to a welder, or if you have welding skills and equipment, but it's fine the way it is and requires no exceptional equipment to build.

The supplement gives a complete description of the construction and a couple of illustrations; I hope the next edition will include an overall view from the top, which would help to explain the geometry.

The supplement, which is extremely well-written, also provides invaluable information on modifying the blade holder screw to make it more functional. There are also suggestions for better methods of replacing and tensioning blades.

## Add-ons & Extras

Highland, by the way, includes their own package of 62 assorted blades of the finest quality in the base price of the saw.

Before you turn it on, remove the blade that comes installed on the saw, throw it away and replace it with one of these.

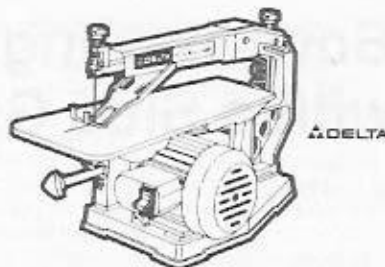
The store offers a little hardware kit that contains all the pieces you need to build the hold-down, including epoxy glue but excluding the wood, for \$7.95. I availed myself of that; it's worth it.

Another feature of expensive machines lacking in the little Delta scroll saw is the blower, which keeps the area of the workpiece just in front of the blade free of dust. This isn't as much of a luxury as it may seem; it's tough to cut a line you can't see.

Mr. Etheridge solved this one quite neatly. A little air pump intended for aquariums, coupled to some plastic and copper tubing, does the job quietly and well.

If you don't want to fool with finding the parts, Highland has them assembled in another kit for \$16.95.

So the saw is going to cost you closer to \$175 than \$150, if you add all these goodies, but as far as I'm concerned, they're essential. And when you've got it set up, you'll have a scroll saw that is virtually the functional equivalent of any scroll saw selling for three times the price or more.



## You Can Still Order our Delta Scroll Saw Package Deal for only \$149.95 (plus \$6 shipping)

More than a thousand customers took advantage of our Delta Scroll Saw Package Deal last year. We're happy to announce that we're extending the deal to our customers through Sept. 30, 1989.

The deal includes Delta's 15" Scroll Saw, our Scroll Saw User's Guide, an assortment of 62 premium blades, and two of our best-selling toymaking pattern books. The extra items add a bonus value of \$31.85.

<b>Delta Scroll Saw Package Deal</b>	<b>\$149.95</b>
Optional Hardware Kit for Hold-down	7.95
Optional Dust Blower Kit	16.95

For those who already own one of the Delta 15" saws, the extra items in the Package Deal can be bought separately:

Scroll Saw User's Guide	\$3.95
62 Assorted Blades	22.00
Books by Ed Sibbet, Jr.	
Easy-to-Make Articulated Wooden Toys	2.95
Wooden Puzzle Toys	2.95

Add shipping charges listed on order form, page 46.

## Lettering Guides at Reduced Prices

Highland Hardware now offers guides for 2"-high letters and numbers in the four patterns shown below. The unique "Name Train" pattern is offered in 3-1/2" height. Guides are tough .030" polycarbonate.

05.29.91	Cooper Black	\$29.95
05.29.92	Cooper Black Italic	29.95
05.29.93	Funky	29.95
05.29.94	Hobo	29.95
05.29.95	Name Train	29.95

Cooper Black	Cooper Black Italic
ABCDEFGHIJKLMN OPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 1234567890	ABCDEFGHIJKLMN OPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 1234567890

Funky	Hobo
ABCDEFGHIJKLMN OPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 1234567890	ABCDEFGHIJKLMN OPQRSTUVWXYZ abcdefghijklmnopqrstuvwxyz 1234567890

### Name Train



Jack Warner is an Atlanta woodworker who writes for The Atlanta Journal and Constitution. Reprinted with their permission.

# Bowl Turning with a Side Ground Gouge

By Liam O'Neill

*Liam O'Neill's side ground gouge is one of the more dramatic developments in gouge technology to occur in recent years. A full-time professional woodturner with over 20 years experience, Liam developed the side ground gouge in his effort to find the fastest way to achieve the bowl turning results he desired.*

*For the past four years, Liam has supplied these customized Sorby high speed steel tools directly to woodturners who attended his many workshops around the world, and the feedback from users has invariably been positive.*

*Since Liam's first seminar visit to Highland Hardware in 1986, we have been marketing the tools to our mail order customers, offering them in 1/2", 3/8", and 1/4" sizes. As more woodturners have discovered the advantages of Liam's side ground design, demand for the tools has grown. This article by Liam will explain how the tool works, and provide instructions on how to use the tool effectively.*

**T**HE SIDE GROUND GOUGE has three main cutting areas. The short angle bevel at the tip of the tool (A in Figure 1) has an angle of about 70° or 75°, and rides on the freshly cut wood behind the cut during roughing out operations. You can cut all the way to center on the inside of a bowl and still keep the nose bevel riding. The two side cutting areas (B & C) have very sharp edges, and a burr develops on the cutting edge when the tool is sharpened on a white 100-grit aluminum oxide stone on a regular bench grinder. Water wheels and belts are not recommended in this case.

You do not hone the inside of the flute after sharpening, since the burr is the actual cutting edge. This property of forming a good burr is one of the great advantages of modern high speed steel.

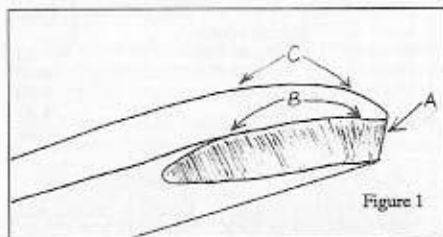


Figure 1

## Rough Turning the Outside

This is one of those jobs that one seeks to get done as quickly as possible, as the block of wood may be irregular and the lathe bouncing around a bit. Figure 2 gives an overhead view of the tool in action during this process. The tool rest is positioned level with the center of the revolving work and is fixed across the corner of the block of wood at an angle of 45° to the lathe ways.



Figure 2

The gouge is held almost horizontal, with the extra long handle held against the turner's side for support. Hold the tool down firmly on the rest and pull the cutting side edge C into the wood with the left hand. The gouge is over on its side with the flute facing in the direction in which you are cutting, and the short angle bevel at the tip A (see Figure 1) is riding flat on the freshly cut wood left behind by the cutting action. Don't rub the bevel too hard against the wood or you will cause ripples to appear on the surface and the tool will start bouncing off the wood.

The depth of cut depends on how much of the long side cutting edge that you use. In Figure 2, the middle size (3/8") gouge is being used and the tape measure gives an idea of how much wood is being removed. Figure 3 gives a close-up view of the action. You are looking at the back of the blade. Roll the gouge over on its side and it will be inclined to cut with less bite; roll it back upwards more and it wants to cut faster.

Preliminary roughing of the outside is completed and the base is flattened to receive a faceplate so that the inside can be worked



Figure 3

on. Figure 4 shows this cut where the tool is completely over on its side and the long side edge is being used to scrape the area clean. Next, mount the bowl on a small faceplate. There is no need to mount it dead center as further truing up of the outside can be done.

In Figures 5 & 6, we see that the gouge can be used to cut from the base up towards the rim, cutting with the grain and bringing the piece nearer to the desired shape. Notice that the bevel at the tip of the gouge (A) is riding on the wood as you go.



Figure 4



Figure 5



Figure 6





Figure 7

## Rough Turning the Inside

The cutting action of the gouge to rough out the inside works in the same way as for the outside. Turn the gouge over on its side with the flute facing in towards the center of the bowl. (see Figure 7). You will be using the side edge to cut the waste with the tip of the tool riding on the freshly cut wood behind the cut. Start near the center of the revolving bowl and aim to cut into the waste at 45°. Cutting into the face at 45° meets least resistance from the grain.

Ultimately the gouge can cut right down to the center of the bottom of the bowl on the inside with the bevel at the tip of the tool riding all the way and the gouge over on its side (see Figure 8).

Please note: The side ground gouge is used on the inside of a bowl only for roughing out the waste. Final shaping is done with a conventional gouge.



Figure 8

## Shear Scraping the Outside

Using the burr which forms on the edge when the tool is sharpened, a fine scraping action using the long side edges can be used to produce a fine surface which does not require a lot of sanding, especially on very hard burls.

Position the tool rest in close to the outside of the piece, and lay the gouge completely over on its side. (See Figures 9 & 10). The upper edge of the gouge is about 1/8" away from the spinning wood, and the lower edge is very gently laid on the wood. Do not use too much pressure, but give the burr time to cut. Use fine light brushing strokes from side to

side and be patient. Time spent using this technique will be saved fourfold later when sanding.

Sharpen often to keep the burr in good shape. When using this technique, do not roll the tool back on its back, or else the edge will catch and dig in.

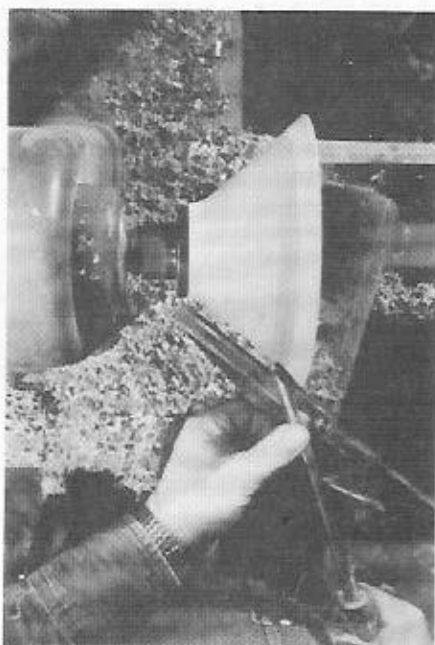


Figure 9



Figure 10

## Selecting the Right Gouge

As mentioned before, the side ground gouge is available in three flute sizes: 1/2", 3/8" and 1/4". I personally use all three for various operations.

I use the largest one, the 1/2", for roughing down pieces of 8" diameter and upwards, depending on the size of cuts required and the hardness of the wood.

The 3/8" medium width I use on pieces of 4" to 10" diameter, and the 1/4" smallest gouge I use on small or very hard pieces. I also use the small gouge for turning off the waste at the base when reverse chucking, especially between centers.

It is possible to cut with the nose bevel rubbing from the base up towards the rim thereby cutting the wood with the grain. When used for this operation, the small tool cuts cleanly and does not put pressure on the piece, which may only be held in place with a light touch of the point of a conical tail center.

The tools can be used for such a wide variety of operations that it is not possible to cover all of them here, but future articles will cover end grain turning, reverse chucking, etc.

Rest assured that the tools will add further versatility to any tool set.

## Side Ground Gouges

Liam O'Neill's side ground gouges are available from Highland Hardware, and can be ordered by mail or phone. Add shipping charges listed on page 46.

Side Ground Gouges		
14.17.91	1/4"	\$45.00
14.17.92	3/8"	55.00
14.17.93	1/2"	65.00
14.17.94	Set of 3	150.00

Extra-Long Handles to Fit Side Ground Gouges		
14.17.95	1/4"	12.50
14.17.96	3/8"	17.50
14.17.97	1/2"	23.50
14.17.98	Set of 3	49.50

## Ask Liam O'Neill

Beginning in the next issue of *Wood News*, we will feature a new column in which Liam O'Neill will field your questions on all aspects of woodturning.

Send us your questions regarding tools, techniques, wood, sharpening, design, marketing your work, etc. If your question is selected for publication, we'll send you a free Highland Hardware T-shirt.

Mail your questions to:

Ask Liam O'Neill  
c/o Highland Hardware  
1045 N. Highland Avenue  
Atlanta, GA 30306

# Stationary Q & A

By Brad Packard

Mail your questions regarding stationary tools to *Stationary Q & A*, c/o Highland Hardware, 1045 N. Highland Avenue, Atlanta, GA 30306.

Selected questions will be answered in future issues as space permits. If your question is selected for publication, we'll send you a free Highland Hardware T-Shirt.

**Q:** I have a table saw with a 1 HP motor. When ripping 1-1/2" thick hardwood, the motor slows down considerably. Is there any way to improve my saw's performance?

**A:** I assume that you are using a sharp ripping or combination blade. If you are and this problem still persists, the best solution would be to try using a thin kerf blade. This should make cutting easier because the thin kerf blade removes about 30% less wood than an ordinary blade with a 1/8" kerf, thus reducing the strain on the motor.

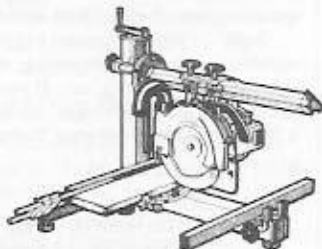
It is also important to keep your sawblade clean. Pitch buildup can be a blade's greatest enemy. An excess of pitch on the teeth causes the blade to get hotter during cutting. This dulls a blade much faster than would occur under normal conditions.

A good way to guard against pitch buildup is to coat your blade with Dri-Cote Lubricant. It is the best product I've seen for this purpose, and can also be used on router bits and shaper cutters.

#### Editor's note:

Dri-Cote Lubricant (#08.53.15) is available from Highland Hardware in a 10 oz. pump bottle for \$9.95 plus \$3.00 shipping.

Our new thin kerf 10" x 40T combination blade (#05.64.91) is available for \$39.95 + \$4 shipping. Other thin kerf blades are offered on page 63 of our 1989 catalog.



**Q:** When I raise and lower the upper blade guides on my bandsaw, they don't move parallel to the blade, so the side guides have to be re-adjusted each time I change the height. Is this a defect in my machine? How can I fix it?

**A:** This condition is most often seen in bandsaws that have a frame made from two castings bolted together, an upper and a lower, each with a wheel mounted on it. The castings are machined so the upper wheel will be directly over the lower wheel, with the centers of the wheels lying in a vertical line.

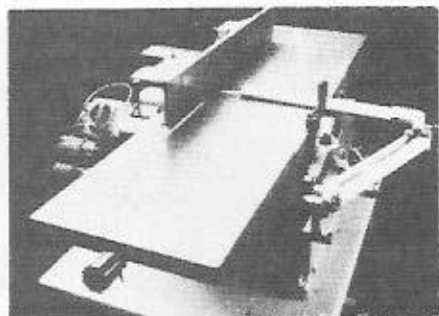
Any small error in machining the surfaces where the castings meet disturbs this wheel alignment.

To check the alignment, all you have to do is follow this procedure:

1. Lock your upper blade guide assembly so the guides are just above the saw table, and set one of the side guides so it is just touching the side of the blade (move the other guide block away from the blade).
2. Then raise the upper guide assembly so it is in its highest position and lock it in place.
3. Now look at the guide you set and see if there is a gap between it and the blade. If there is a gap, its size relates to the amount of error where the castings meet.
4. If there is no gap, loosen the guide block, and see if it slides sideways as you loosen it. If it does, the error is in the other direction, so repeat steps 1 through 3 using the other side of the guide to see the amount of the error.

To fix the problem, you simply install a shim between the upper and lower castings. (A shim is a thin strip of metal. It can be a piece of shim stock, or merely a strip sliced from a beer can). Position the shim on the side of the casting in which the gap was observed in step 3 or 4. Repeat the checking procedure until the thickness and position of your shim permits the guide blocks to remain parallel to the blade at both top and bottom positions.

Brad Packard has been a professional furniture maker, stationary tool sales rep, and is now Tool Sales Manager at Highland Hardware.



## INCA Planer-Jointers on Sale

Have you ever tried to get an accurate, safe cut on a warped board? The wide jointer section on this machine can solve this problem by allowing you to joint a flat surface on one face of the board (up to 10-1/4" wide) before thickness planing, letting you create straight, flat stock ready for further processing with your table saw, bandsaw, or router.

Two models of this superb machine are available. Model 570 features the revolutionary Swiss 3-knife Tensa cutterhead. It produces an incredible 18,000 cuts per minute, and uses disposable self-aligning double-edge planer knives which require just 30 seconds for accurate installation. Utilizing the 11 fpm feed rate (high speed is 16 fpm), the 570's cuts-per-inch ratio is a staggering 136, producing the smoothest machined finish on hardwoods this side of a super surfacer.

The model 550 is identical to the 570, except that it uses a 2-knife cutterhead with conventional knives whose height is adjusted up or down by turning set screws located near the end of each knife. At the lower feed rate, the 550 produces 91 cuts per inch, still an outstanding ratio for superbly smooth finishes.

As an automatic-feed thickness planer, either model handles material up to 10-1/4" wide and 6-1/4" thick. The stainless steel planer table requires no feed rollers, making possible a completely straight, even cut. As a jointer, it provides an amazing 10-1/4" wide cut, with a table length of 42". Height of both infeed and outfeed tables is adjustable.

Changeover from planer to jointer requires only a few seconds. Machines are equipped with 115v or 230v 2HP motor. Quantity limited.

Shipped Freight Collect. **SALE Regular**

570	10-1/4" Planer-Jointer	1995.00	2195.95
550	10-1/4" Planer-Jointer	1695.00	1895.95
3005	Stand for 550 or 570		129.90

## Limited Supply of INCA Model 810 9" Radial Arm Saw

We were saddened to learn last fall that this popular and unique saw (made for Inca by an Austrian company) is no longer available for distribution outside of Austria.

We have a very limited supply of the saw remaining. We have been assured that repair parts will continue to be available for the thousands of saws already in use in the U.S. Because it features a standard 5/8"-arbor, finding blades to fit will not be a problem.

No other radial arm saw in its price range comes close to matching the capacity and features of the 810. The optional long extension arm allows crosscutting panels an amazing 28" in width at 90° (18" at 45°). Without it, max cross-cut is 16" at 90°, 11-1/2" at 45°.

For miter work, the table is rotated, not the arm. As a result, crosscuts are exceptionally accurate. The saw motor, supported by a cast iron roller carrier with ball-bearing rollers, rides on the arm. Max depth of cut is 2" at 90° and 1" at 45°. Motor is 110v 3/4 HP.

An optional router carriage with a plate to support a router is a low-cost accessory which gives you unparalleled control of your router for cuts at any angle.

The saw is shipped UPS for a \$20 charge.

810	9" Radial Arm Saw	\$599.00
810.1	Extension Arm	119.95
810.2	Metal Stand	129.50
810.4	Router Carriage	119.50

# Magna-Set Instant Knife Setting Jigs

**A**SK ANY WOODWORKER what's the most frustrating adjustment to make on tools in his shop, and he will likely say "adjusting all three jointer (or planer) knives so that they each cut at the same height."

Invariably, one of the knives ends up too high or too low. Generally the reason for this is that one or more of the knives wants to squirm out of position as it is being tightened down. No matter how carefully you align them while they are loose, the last twist of the wrench creates torque (a twisting force) which transfers to the knife, forcing it to move out of position. The frustrating part of knife setting is the need to repeatedly reposition the knives by trial and error in an effort to compensate for that aggravating bit of torque.



To solve this problem and forever cure your frustrations, we are pleased to now offer the Magna-Set knife setting jig.

The Magna-Set uses powerful magnets to hold each knife in perfect alignment as you tighten the bolts which hold it in place. The entire process is so simple and foolproof that it can be completed in five minutes.

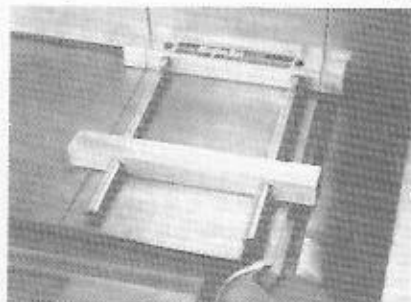
The Magna-Set can also solve another common problem. When you strike an embedded nail, or sometimes even just a hard knot with your jointer or planer, each knife develops a nick. These nicks then leave a ridge along the length of every board you plane thereafter, until you remove the knives and grind out the nicks.



Since Magna-Set makes absolute accuracy available in an instant, it's practical to shift the nicks in opposite directions so the nicks no longer line up with one another, thus eliminating the unwanted ridge on planed boards without having to resharpen.

## Jointer Jig

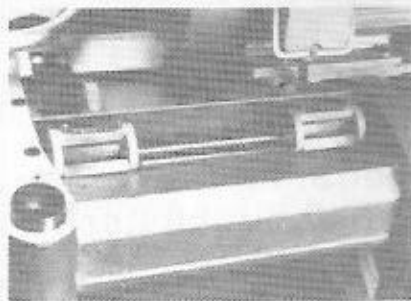
Magna-Set's Jointer Jig fits just about every American-made jointer on the market, including all models made by Delta. (The imported models which it does not fit, Inca, Makita and Ryobi, come with their own systems for rapidly adjusting knives.) For jointers using knives wider than 10", optional 12"-long extension rods are used with the jig.



The procedure for setting knives with the Jointer Jig is simple. To begin (with the power disconnected), find top-dead center of your cutterhead, and using a steel square, scribe a vertical line on the fence at this point.

Align the front mark on the Magna-Set with this line on the fence, and using a square, scribe lines on the fence and jointer table to correspond with the Magna-Set's rear mark.

This "indexing" procedure allows you to quickly position the Magna-Set each time you wish to adjust your knives. The jig is then ready to hold each knife in position (within plus or minus .002") while you lock it in place by turning the nuts or bolts with a wrench.



## Planer Jig

Magna-Set offers a separate Planer Jig for setting knives on thickness planers. It consists of a pair of C-shaped jigs, each with magnets for holding the jig to the cutterhead and the knife to the jig. These can be calibrated to fit any size cutterhead. The Magna-Set Planer Jig fits virtually all American-made machines. (As with the Jointer Jig, the Planer Jig is not compatible with planers by Makita, Inca, Hitachi, or Ryobi.)

With the power disconnected, each of the jigs is placed on the cutterhead, one near each

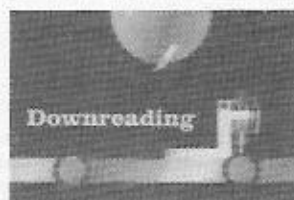
end, straddling the loosened knife. While the jig pair is in position with the knife edge maintaining contact with the ground magnets, the knife is held in the proper position to a tolerance of plus or minus .002". After tightening down the nuts or screws, repeat the process on each succeeding knife.



## Rotacator

Sets Rollers, Pressure Bar & Planer Bed

In response to demand for a device to aid planer owners accurately set planer feed rollers, bed rollers and pressure bars, Magna-Set offers a third device called the Rotacator. Since planer cutterheads are typically not adjustable but remain fixed or rigid relative to the machine frame, all other planer settings must be calibrated relative to the cutting arc of the knives. The Rotacator is a dial indicator designed especially for this purpose. The Rotacator is particularly useful for schools and commercial shops where planers receive heavy wear and tear, necessitating frequent re-adjustment of rollers, etc.



After setting the planer's knives with a Magna-Set Planer Jig, the Rotacator is used first to level up the planer bed in relation to the cutterhead. It is then used to set the bedrollers and overhead feed rollers at the heights recommended in your planer's operator's manual. It can then be used to adjust your planer's chip breaker and pressure bar.

## Magna-Set Knife Setting Jigs

JJ	Jointer Jig	\$49.95
EX-12S	12" Extension Rods (pair)	6.95
PJ2	Planer Jig (pair)	159.90
ROT-1	Rotacator	159.95

Add shipping charges listed on order form, page 46.





## Super 10 Table Saw

For the budget-minded woodworker with full-size projects in mind, Delta's popular Super 10 is a great combination of capacity and economy. One of the best features of this reasonably priced 10" saw is its 1-HP induction motor, which provides quiet, high-torque power for all kinds of sawing and joinery work. The Super 10's cast iron table with extension wing supplies a 22" x 37" work surface, with 24" right-side rip capacity and 10" table width in front of the fully raised blade. Heavy tubular steel rails support the reliable steel rip fence; Delta's positive-stop mitre guide is standard equipment. Max depth of cut at 90° is 2-9/16", 1-13/16" at 45°. The saw weighs 152 lbs. including the steel stand. It is furnished with a steel combination blade; count on picking up a good carbide blade to let you get the most out of the tool. For the Super 10 we recommend our new thin-kerf 40-tooth carbide combination blade; it's 3/32" kerf width will reduce the load on your saw by 25% while producing beautifully clean cuts on cross or rip. *Shipped by truck for a \$40 charge.*

34-710 Super 10 Table Saw \$399.00  
05.64.91 Thin kerf Comb. Blade 39.95



## Delta 10" Bench Bandsaw

If your needs don't compel you to spring for a big, expensive general-purpose bandsaw, this surprisingly capable little machine might be exactly the best tool for the work you have in mind. The saw's 1/5 HP motor can handle straight cuts or scrolling in stock up to 4" thick. Its three-wheel design provides a generous throat without large body size; you can cut to the center of a 22" width at 3/4" stock thickness, or to the center of 17" width at full 4" depth. Blade guides and thrust bearings above and below the table provide accurate control for cutting curves or resawing. Table size is 11-1/2" square; the table tilts right to 45° for bevel cutting. A mitre guide is included as standard equipment. Overall weight is 40 pounds. The saw is provided with Delta's two-year limited warranty. *Shipped UPS.*

The Delta 10" Bench Bandsaw uses 56" blades. A 1/4" blade is supplied with the tool. Replacement blades in 1/8", 1/4", and 3/8" widths are available separately.

28-160	10" Bandsaw	\$159.95
28-160-1	1/8" Blade	5.95
28-160-2	1/4" Blade	5.95
28-160-3	3/8" Blade	5.95



## BOESHIELD T-9 Penetrating Corrosion Inhibitor

Originally developed by Boeing for long-term protection of aircraft components, this new lubricant does a superb job of preventing corrosion on any metal surfaces in the shop. The T-9 formula penetrates deeply to displace any moisture already present, and then dries to a thin, waxy film to hold humidity at bay for months. For basement woodworkers anywhere, and particularly for tool users in the southern states, this may finally be the key to keeping your tools in working order. Bar clamps, saw blades, power nailers and anything else that rusts will all be better off under a coating of Boeshield T-9. 12-oz aerosol can.

Boeshield T-9 Spray \$6.95



## Delta 10" Contractors' Saw

Delta's popular 10" contractors' saw is available from us at a very attractive price, while limited sale quantities remain.

Furnished with a 1-1/2 HP Delta motor (wired for 115 volts), Jet-Lock fence with 25" rip capacity, two table extension wings and a sturdy open stand, the Contractors' Saw sets the standard for full-capacity tablesaws designed for portability and utility. This saw is traditionally a favorite for the basement woodworker who places a high value on economy and who's looking for more capacity, more precision, and more reliability than is commonly found in inexpensive saws.

Table size with extensions is 40" wide by 27" deep. The table offers over 12" of support in front of a fully raised blade; the mitre guide can handle 20" crosscut width. Max depth of cut at 90° is 3-1/8", 2-1/8" at 45°. The 5/8" arbor accepts dado sets up to 13/16" max width. A steel blade is provided with the saw; count on picking up a good carbide blade for best performance. Wt. is 265 lbs. *Sale quantity limited. Shipped via truck for a \$40 charge.*

34-444 10" Contractor's Saw \$599.00



## Delta 18" Variable-Speed Scrollsaw

Big 18" throat capacity, variable motor speed, and fine cutting performance make this Delta scrollsaw a good choice for serious work. Its smooth operation, fast and effective blade mounting and tensioning system, high power and maximum speed make it great for use in any kind of wood, while lower speeds let the user cut metals and plastics with ease.

Delta's electronic speed control includes a digital read-out that lets you select from 40 to 2000 strokes per minute, and provides constant torque to maintain the selected speed. Max thickness of cut is 2". Round cast-iron table is a generous 16" in diameter. Weight with included stand is 132 lbs. Includes 96 assorted blades. *Shipped within 48 states for \$30.*

40-601 18" Electronic Scrollsaw \$749.00



## New Delta Stationary Biscuit Joiner

Recognizing the accuracy and efficiency that a stationary-mounted biscuit machine offers woodworking shops both large and small, Delta has become the first manufacturer to offer one that's readily affordable. It's excellent for all manner of edge-to-surface, miter, corner and frame joining.

The blade-plunging mechanism is triggered by a spring-action foot pedal, leaving both hands free to handle workpieces. The 8" x 12" die-cast aluminum table raises and lowers up to 5" to handle even very thick workpieces. The table is slotted to accommodate an adjustable stock stop. A quick-set work clamp mounts to fence or table to securely hold material for edge or surface joining. An auxiliary 6" x 12-1/2" tilting table for bevel joining is included.

<b>32-100</b>	<b>Delta Stationary Joiner</b>	<b>\$499.00</b>
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	34.95



## Save with our Package Deal on Delta's 6" Dado and 10" Saw Blades

Here's an excellent way to equip your table saw with Delta's high quality 6" carbide-tipped stackable dado and two popular saw blades, a 50-tooth combination/cross-cutting blade and an 18-tooth ripping blade, all packed in a fitted wood case.

Included also is the dado insert which fits Delta Unisaws, Contractor Saw, and Tilting Arbor Bench Saw. (Or, if you wish, the package can be purchased without the insert.)

List price on all the items purchased separately is \$314.50. You save \$114.55.

<b>35-530</b>	<b>Blade/Dado Package Deal</b>	<b>\$199.95</b>
<b>35-530-1</b>	<b>Blade/Dado Deal w/o Insert</b>	<b>\$179.95</b>



## New Delta 8-1/4" Job-Site Table Saw

For contractors, hobbyists, and vacation-home carpenters, this ultra-light Delta table-saw offers excellent economy and unbeatable portability. Weighing under 38 pounds, the Bench Saw is equipped with a 13 amp, 4000 rpm motor providing plenty of power for any kind of general carpentry sawing. A 20-tooth carbide blade, included as standard equipment, cuts material up to 2-7/16" thick at 90°, or 1-7/8" thick at a 45° bevel. Table size is 26" wide by 20" deep, and can be expanded to 44" x 20" with the addition of optional extension wings. The T-square type fence accommodates ripping up to 12" right or 8-1/2" left of the blade; extension wings allow 24" rip on the right. Construction is SMC, a new thermo-setting plastic that won't spring or warp. Backed up by Delta's 2-year limited warranty. Shipped by UPS.

<b>34-330</b>	<b>Delta Job-Site Table Saw</b>	<b>\$249.95</b>
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## The Highland Hardware Leg-Stand System

These welded steel legs make stout, versatile stands for stationary tools, utility tables, assembly benches, and so on. Here at the store we use the legs for mounting the Delta 15" scrollsaw, several belt/disc sanders, Makita and Ryobi compact planers, a couple of mitre saws, a coffee pot, and anything else that needs to get off the floor.



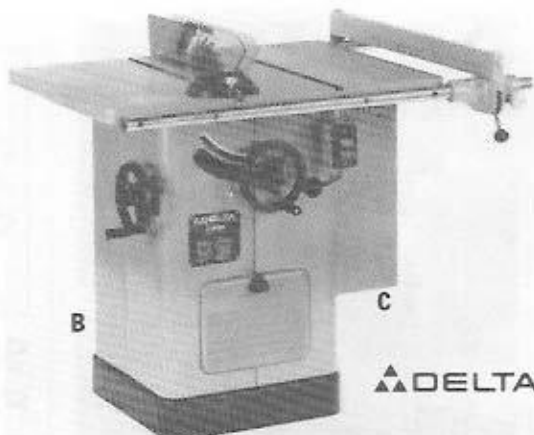
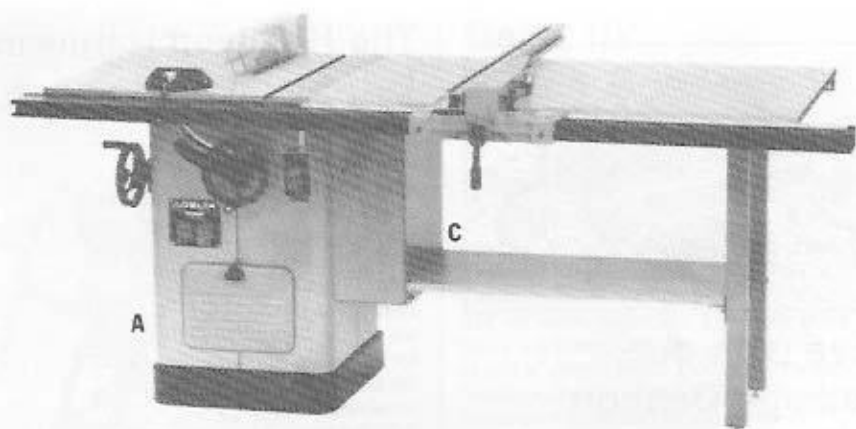
There aren't any laws about the "correct" height for any particular machine stand. To determine the height your stand should be, consider how the tool operates, what you'll be doing with it, and where your hands and eyes feel most comfortable while you're at work. A planer stand shouldn't make you lift your lumber any higher than you have to; a scrollsaw stand shouldn't make you hunch over and squint to do the job. We settled on 29" as the most broadly usable height for our legstand. It's low enough for machines such as the Makita and Ryobi portable planers or the mitre saws, but high enough to require only the simplest build-up for other tools such as the sanders. In most cases a single piece of 3/4" plywood is all it takes to assemble the legstand into a ready-to-use work station. When a tool needs to rest more than 30" off the floor, a plain open-fronted plywood box provides both an elevated mounting surface and a storage shelf as well. Any other modifications you can think of are encouraged, as long as you're sure that what you put together will do its job without falling over on you.

For moderate use under light to medium machinery, the legs can be mounted to your plywood surface with nothing more sophisticated than wood screws run in through the holes in the legs' mounting plates. If the stand is going to be moved frequently, or for use under heavy machines such as drill presses or 14" mitre saws, it will be a good idea to bolt through with carriage bolts to eliminate the chance of a screw tearing loose under stress. Let the plywood hang at least about 1" past the outside edge of the mounting flange so the outermost screws have plenty of material to hang onto. Be careful about mounting the legs parallel to each other, lest you create a wobbly problem. (Tip: after mounting one leg, put just one screw in the second leg's mounting plate, then measure from its feet to the other's to set them parallel.)

To make your stand as sturdy as possible, install a shelf across the braces 13" off the floor. This will lock the legstand into a rigid structure with considerably enhanced strength and safety. If, however, you're working on the usual lumpy, uneven floor, leaving one end of the shelf unattached will, within limits, allow the legs to "walk" themselves into a stable configuration.

<b>03.33.03</b>	<b>Legstand</b>	<b>\$39.95</b>
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DELTA

## DELTA Unisaw with Unifence \$1599 – 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 not only better than ever but more affordable as well. And they've made their excellent T-square Unifence part of the package at tremendous savings for a limited time. 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 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 Unifence 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, 220-volt 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 transmission 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 crosscutting up to 25" wide without twisting or falling out. The mitre guide has built-in adjustable stops at 90 and 45 degrees.

### STANDARD 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. Incorporated into the rear of the saw cabinet is a removable panel for optional dust collection hook-up.

*WHILE CURRENT SUPPLIES LAST, we are offering outstanding savings on these two models: 3 HP model with Unifence for \$1599, and 1-1/2 HP standard model with Jet-Lock Fence for \$1299. (Call for price and availability of other models.)*

A 34-782	3 HP Unisaw with Unifence	1599.00
HRS-10G	Mobile Base for Unifence Model	198.50
B 34-761	1-1/2 HP Standard Unisaw	1299.00
HRS-10	Mobile Base for Standard Model	109.00
34-254	Dado Insert for Unisaw	21.85
C 34-829	Motor Cover for Unisaw (fits only Unisaws manufactured after Sept. 1988.)	55.00

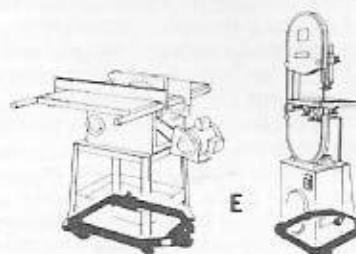
*\*Delta Unisaws are shipped freight prepaid within the 48 states while current supplies last.*

### 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	349.00
34-998	Table Board and Shelf	115.50



### 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 new Mobile Base for the Delta Unisaw with Unifence. Unlike an earlier model base still commonly available, our new 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.

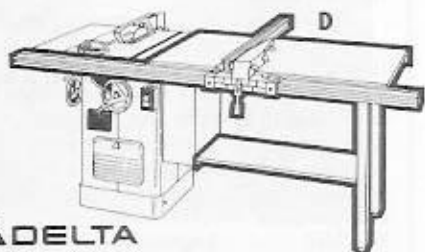
We also carry in stock Mobile Bases for the standard Unisaw, 8" and 6" Delta precision jointers, Delta 18" scrollsaw, Delta Heavy Duty Shaper, Delta Heavy Duty Belt/Disc Sander, and three models of Delta 14" bandsaw (open stand, old-style closed stand, and new black-band closed stand). Other styles are 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.*

### EMOBILE BASES

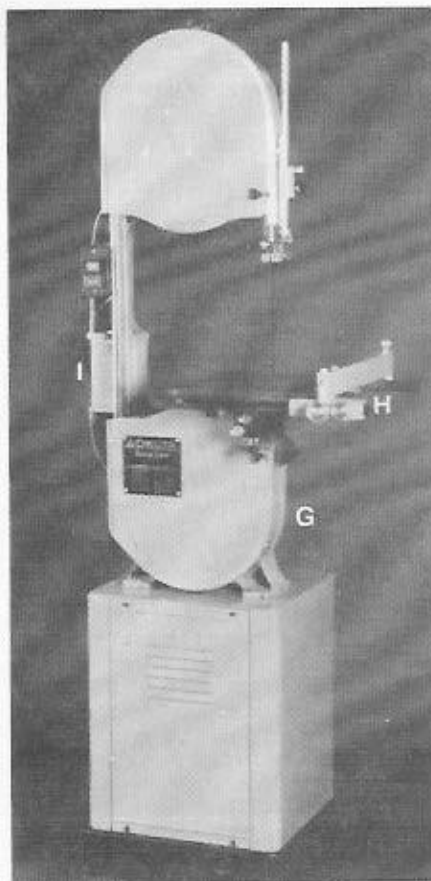
*For Use With Delta Machine:*

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



DELTA





**\$100 Delta Rebate**  
28-283 Cost after Rebate:  
**\$549.00\***

#### DELTA 3/4 HP 14" BANDSAW WITH ENCLOSED STAND

You will love this saw's exceptionally quiet, smooth, and powerful operation. Its wheels are balanced and true, and the special resilient motor mount transmits almost no noise or vibration to the stand.

The enclosed stand occupies a compact 25" x 17-1/2" of floor space. Standard height is 65-1/2", with the table 43" above the floor. Table size is 14" square and tilts right to 45°, left to 10°. Throat opening is 13-5/8", or 13" with the optional riser block installed. Upper and lower blade guides and thrust bearings are fitted with smooth-acting, easily reached micrometer-type setting knobs. Maximum thickness capacity under the guides is 6-1/4". Standard blade length is 93-1/2".

Optional accessories for the Delta bandsaw include a miter guide with stops at 45 and 90°, and a rip fence assembly with your choice of 18" or 32" fence rails. The fence is 17" long, and has built-in micro-adjust and rear locking knob. Also available is a 6" riser block kit which increases the saw's maximum thickness capacity to 12-1/4" under the guides.

<b>G</b>	28-283	Delta 14" 3/4 HP Bandsaw with Enclosed Stand	649.00*
	HRD-14	Mobile Base for 28-283	109.00
	08.60.01	Cool Blocks for Delta	9.95
	34-895	Miter Guide	49.95
<b>H</b>	28-843	18" Rip Fence Assembly	59.95
	28-845	32" Rip Fence Assembly	69.95
<b>I</b>	28-984	12" Riser Kit	69.95

\*Quantity limited at this price. Rebate expires 6-30-89. Shipped within 48 states for \$40 freight charge.



**\$100 Delta Rebate**  
DJ-15 Cost after Rebate:  
**\$899.00\***

DJ-15

\*Quantity limited at this price. Rebate expires 6-30-89. Shipped within 48 states for \$60 freight charge.

#### 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 fit the bill perfectly. Despite the difference in their widths and power ratings, the two models share a number of design features that make 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 three-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 item within 48 states is \$60.00. Quantity limited at sale price.

37-350	DJ-20 8" Jointer	SALE 1299.00
C460	Spare Set 8" Knives	43.50
HRJ-8	Mobile Base for 8" Jointer	148.50
37-154	DJ-15 6" Jointer	SALE 999.00*
C390	Spare Set 6" Knives	38.50
HRJ-15	Mobile Base for 6" Jointer	109.00



DJ-20

#### Premium Bandsaw Blades

Although many factors affect the quality of a bandsaw's cut, one of the most important remains the choice of a high-quality blade of the appropriate size and tooth style.

The weakest point of any bandsaw blade is its weld. Our blades have the strongest, most uniform welds in the industry, yielding longer blade life and smoother cutting.

We offer blades for popular bandsaws in the following sizes: 1/2"x 3 TPI for resawing and ripping thick material; 1/4"x 6 TPI for larger radius scrollwork, roughing out, and ripping up to 3 or 4" thick; and 1/8"x 14TPI for tight scrollwork and fine joinery.

We also offer a 1/16"x 24TPI blade for very fine and delicate scrollwork. This size blade will obviously not last as long as wider blades. For 1/16" blades, we strongly recommend the use of

Cool Blocks (see page 47) in place of ordinary bandsaw guides.

Our 1/16" & 1/8" blades have standard raker teeth. The 1/4" & 1/2" blades have hook teeth for more aggressive cutting.

Specify one of these bandsaw brands when ordering:

	Length
Delta 14" (and Taiwan copies)	93-1/2"
Delta 14" with riser kit*	104-1/2"
Sears 12"	80"
Shopsmith 11"	72"
Inca 10-1/2"	73"

#### Premium Bandsaw Blades

	Width	Teeth per Inch	
08.34.21	1/16"	24	12.95
08.34.32	1/8"	14	10.95
08.34.33	1/4"	6	9.95
08.34.34	1/2"	3	9.95

\* Price per blade is \$1.00 higher for 104-1/2" blades.

# Using Sanding Machines for Grinding

by Mark Duginske

**I**N THE LAST ISSUE of *Wood News*, I talked about some of the uses of sanding machines. The article focused on ways of using three of Delta's low-priced bench tools to sand various wood profiles. In this article, the emphasis will be on using the sanding machines to shape metal.

When using a sanding machine to shape or smooth metal, no changes in the machine's setup are required. The same sandpaper can be used for either wood or metal, though for metal a finer grit seems to work best.

For the average woodworker, the metal grinding procedure used most often is the sharpening of tools.

Sharpening tools involves two processes. The first step (grinding) is to grind the blade's edge to approximately the right shape. The next step (honing) is to make this edge extremely sharp, a process generally accomplished by hand using a sharpening stone.

To sharpen things well, one must develop a system. This article is about one system that has worked well for me, and will deal primarily with the first aspect of sharpening, which is grinding.

The goal of grinding is to remove a layer of metal from the tool so that a new finish surface can be established by honing. Although the ground surface is not the finished surface, grinding should be done as accurately as possible to minimize the amount of material that must be removed during the slower honing process.

For grinding there are three common methods. One option is to do the grinding by hand with a stone (or with a metal plate and powdered abrasive, which is the Japanese method). The second option is to use a stone which is powered. This can either be the traditional rotating vertical stone or a horizontal stone, which is also part of the Japanese system.

A third option is to use sandpaper to do the grinding. This can either be a belt or a disk. The system that we are discussing in this article uses a sanding belt.

There are several advantages to using a sanding belt to shape metal, and many manufacturing and machining processes have come to depend on this method.

The primary advantage is that it is cooler than grinding with a wheel. The last thing that you ever want is to get the tool too hot. Once

the tool turns blue or black on the point which is being ground, it is ruined. The sander grinds much cooler than a grinding wheel. It is also more efficient than a grinding wheel, allowing more cutting in less time.

The second advantage is that it is easier to maintain control. Part of the reason for this is because the entire belt is traveling at the same speed. This is not true with the horizontal water wheel and the disk sander. Also because the surface is flat, you don't have to worry about where the tool is in relationship to a curved surface such as a grinding wheel. With the round grinding wheel, it is easy to be too high or too low. When using a grinding wheel, a curve is created in the blade's bevel. This curve is called a "hollow grind." When blades are hollow ground, the curve should be in the middle of the bevel. However, when re-grinding, it is often very hard to maintain the correct position of the curve.

The third advantage is that the bevel is flat rather than being hollow ground. The flat surface can then serve as a reference while honing, making it easier to do without a tool holder or honing guide.

It is interesting to note that the Japanese system uses a flat bevel rather than a hollow grind. Hollow grinding a Japanese tool would leave the very hard but fragile tool end unsupported and unacceptably weak.

One advantage of the hollow grind is that there is less material to remove during the honing process. This is mainly important if you are honing with oil stones, which cut very slowly. It is much less important when using the much faster-cutting water stones. The flat bevel that you get from grinding with a sander is very compatible for honing with Japanese water stones.



Figure 1

Most grinding is done so that the bevel formed is 25 to 30 degrees from the back of the blade. (See Figure 1.) Some people prefer to use a secondary bevel, which is a small bevel added to the primary bevel. The secondary bevel is usually 30 to 35 degrees.



Figure 2

The table on most sanders only tilts to 45 degrees. To create a higher bevel, it's necessary to fabricate a tool rest which elevates the end of the tool from the table to create the desired grinding angle. (Such a tool rest is similar to the tool rest that is used to support a turning tool in woodturning.)

You can make a grinding toolrest for yourself out of hardwood scrap. (See Figures 2 & 3.) The one pictured is being used on Delta's model 31-340 1 x 42" belt sander. (Unfortunately the platen on their smaller 1 x 30" belt sander [model 31-050] is too short to work well with a toolrest of this design.)

The top of the tool rest should be rounded to make it easier when you need to raise or lower the tool in relationship to the sanding belt.

There are two alternatives for holding the tool while grinding. One option is to grind the

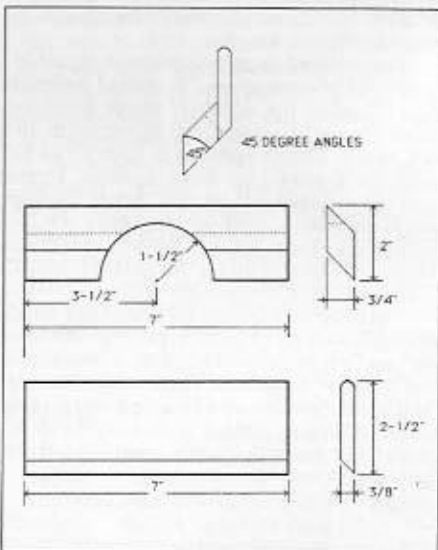


Figure 3

*Mark Duginske is a woodworker, teacher and author from Wausau, Wisconsin. His new book on bandsaws is being published by Sterling Publishers and is due out this fall.*

tool freehand, holding the tool against the belt without a device to guide its position. (See Figure 4). This requires skill. It is important to move the tool gently back and forth. Be careful not to move the tool up or down, or you will round over the bevel.

Occasionally you must remove the tool from the belt or stone. This is done for two reasons. First you will want to see what kind of result that you are getting, and second, it is the best way to keep the tool from overheating. The biggest problem with freehand grinding is to return the tool to exactly the same place it was before you removed it. You may want to hold one finger against the tool rest while grinding. By maintaining that finger at the same position on the tool while examining it, you can resume grinding at the same point that you left off.



Figure 4

An alternative to freehand grinding is to use a jig which holds or supports the tool, such as the Highland Jig. (See Figures 5 & 6.) The jig's purpose is to provide a memory of the tool's proper location in relation to the belt or stone. If the tool gets too hot and you withdraw it from the grinding process to let it cool, you can easily start grinding again in exactly the same spot. This is especially important for people who don't have a lot of grinding skill.

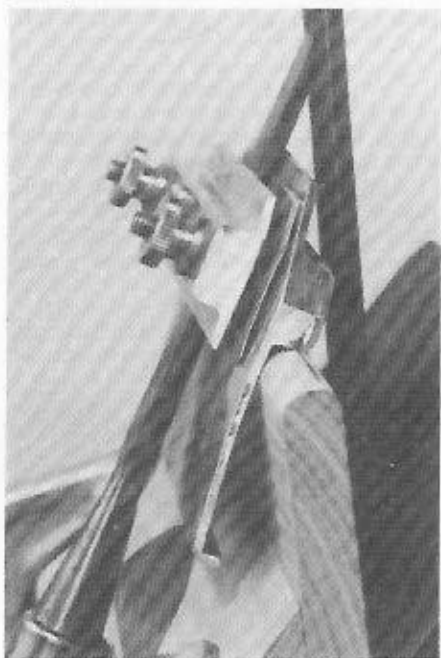


Figure 5

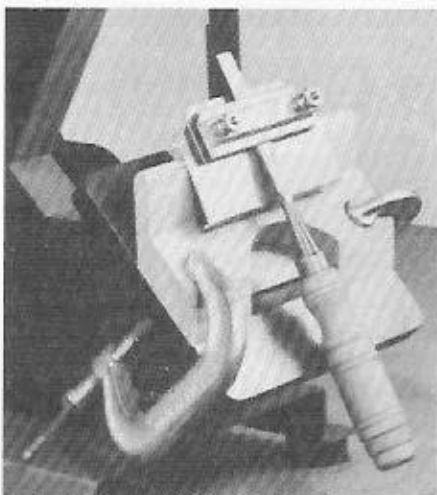


Figure 6

The tool rest works best if its top is rounded with a radius of about  $3/16"$ . This allows you to push down or pull up on, for example, the handle of a chisel, and maintain solid contact on the rest. As with freehand grinding, it is best if you do not hold the tool in the same place, but move it slowly back and forth.

For years, I have used the Makita horizontal water system for grinding, and have gotten adequate results. I prefer that system to a

vertical grinding wheel (which I still use sometimes for rough grinding).

However, using the wooden tool rest with the new Delta 1 x 42" belt/8" disc sander (Model 31-340), I now have a system that gives me the advantages of both. I get a straight bevel without bothering to set up the water grinder.

Grinding takes practice. It is best to practice on a cheap chisel in case you ruin it by getting it too hot. Never let the tool get so hot that you can't touch it. If the tool becomes hot enough to discolor the metal, it might still be good for scraping dirt off garden tools, but that's about it.

After the grinding is done, you are ready to hone the tool. I prefer waterstones for this process. Once you are experienced, you can hone freehand. If you are not experienced, you will benefit from using a honing guide, which will hold the tool at the correct angle and prevent rounding over the bevel.

Grinding and honing are important woodworking skills. Developing these skills requires patience, time, and commitment.

*The Highland Jig, which can be used with most grinders and sharpeners, is available from Highland Hardware for \$12.95 plus \$3.00 shipping.*



#### DELTA 1" X 42" BELT/ 8" DISC SANDER COMBINATION

This surprisingly affordable new machine (illustrated above) is destined to make life easier in countless woodworking shops both large and small.

The 1" x 42" belt sander's 6-1/8" x 7-1/8" cast iron work table tilts 45° forward for chamfering and mitering. The 8" disc sander's 4" x 10" table also tilts 45°. Both are slotted for a miter guide, which is included.

A powerful 1/3 HP induction motor gives plenty of power for heavy sanding jobs. The disc sander runs 1725 rpm. Belt sander speed is 3000 SFM. Sawdust can be vented through a 1-1/2" dust collector port. The unit stands 19-1/2" high x 15" wide x 25-1/4" deep. The machine weighs a hefty 62 lbs. Shipped UPS. Add shipping charges on p. 46.

31-340	1"x42" Belt/8" Disc Sander	\$189.95
008	8" Stick-on Discs, Box of 3 (specify 50, 80, or 120 grit)	6.50
Sanding Belts, Box of 5 (specify 80, 120, or 150 grit)		
0542	1/2" width	3.80
1042	1" width	5.80



# The Art of Chip Carving

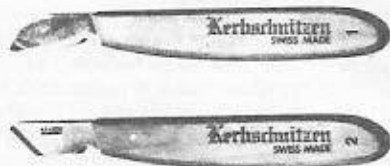
by Wayne Barton



**T**here are several very good reasons why one would find chip carving a marvelous way to express oneself in wood. For those who thirst for the easiest, most decorative, functional and fastest method of carving, this is your cup of tea. For the beginning carver, achieving pleasing and impressive results in a short period of time can be exciting. (The experienced carver will appreciate this, too).

Also high on the list would be relatively small investment in tools and materials. Another advantage is not needing a strong background in art or artistic expression, as chip carving is accomplished by the understanding of its technique of execution.

Because of the simplicity of tools used, and the fact that you work best in your lap, most chip carvers (including myself) take their craft with them wherever they go. No need for a special bench, setup, or room. And finally, one of the best advantages of chip carving is its application. This form of carving is used more widely than any other I know. From decorating simple objects such as coat hangers, coasters, spoons, breadboards, butter molds, and broaches to larger projects such as wall plaques, ceiling beams, moldings, and furniture. It can be used also for very fine and intricate carving with names, initials, and dates on wooden boxes and plates that render them one-of-a-kind heirlooms to be handed down from generation to generation. A more fitting justification for excitement about this style of carving would be hard to find.



## Tools

So how does one get started? Let's start with the tools. Most people who have become discouraged at trying to carve have done so primarily because they tried to use cheap, inferior tools. Besides often being shaped poorly, cheap tools will not hold an edge. When it comes to chip carving, this is critical. The finest chip carving knives on the market are the ones I use, and I suggest you use them

too. After all, you're only going to need two. Why not use the best?

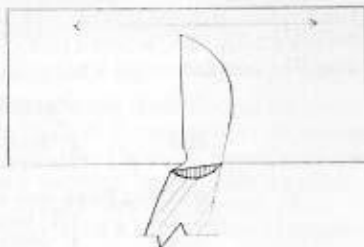
The chip carving knives I use are made in Switzerland of a high carbon alloy hardened to Rockwell 45. Their shape is quite different from most knives, as are their very comfortable handles. As mentioned, there are only two; the cutting knife which is the primary knife used for the removal of all wood, and the stab knife which is used to decorate or enhance the carving by making any variety of "impressions" in the wood. It is designed to cut and spread the wood at the same time.

## Sharpening

The thought of sharpening often intimidates new students more than the actual carving. There is no secret or mystery to it. A few hints will get you through nicely. In carving, there is no substitute for an extremely sharp edge. The edges of the chip carving knives must not only be sharp, but also straight and honed at the proper angle.

To achieve this, I recommend that you use flat ceramic sharpening stones. Here again, you only need two; a medium grade for shaping and sharpening, and an ultra-fine grade for polishing and keeping the edges of your knives fresh. Ceramic sharpening stones are of the same composition as a sapphire, the hardest natural stone next to a diamond. This hardness will prevent the ceramics from "dishing." Its flatness will remain constant, which is important for keeping your blade edge straight. You also do not need water or oil when sharpening which makes the whole process a lot less messy.

To begin, place the cutting knife blade flat on the medium stone and raise the back of it no more than 10 degrees (no more than that which is necessary to slip a dime under). Putting equal pressure on the heel and tip of the blade, slide it back and forth on the stone first on one side and then the other. This method will bring the blade to sharp without causing a heavy burr.



Check for a burr by running your finger on the flat of the blade on either side toward the edge. If you can feel a drag or scraping on your finger, you have a burr. This can be eliminated by continuing sharpening in the same manner but with less pressure, working the burr from one side to the other until it finally disappears or falls off.

You will know your knife is sharp and ready for final honing or polishing when you no longer can see any light reflecting off the edge. This can be checked by holding the knife under a strong light with your finger on the tip of the blade. Sight the blade at approximately a 45° angle and rock it slowly from side to side. If no light reflects from the edge (it will appear as a thin line), you're ready for final honing. It is necessary to polish the blade right behind the edge to make the knife slide smoothly through the wood. The minute scratches caused by the medium stone will cause a drag if not polished out. To do this, place the blade on the ultra fine stone and repeat the same process used on the medium. It will polish the blade to a mirror finish.

Under normal use, you will only need to freshen up your edge on the ultra fine ceramic stone. You'll know when you're ready to do so because you'll find yourself using more pressure to get the same results as you did initially. (Also, light will reflect from the edge). Frequency of sharpening will depend on the type of wood you're carving (some are grittier than others), and type of cutting (deeper and curved cuts wear an edge more quickly).

The stab knife is sharpened in the same manner as the cutting knife and the angle at which it is sharpened is just as important. When sharpening the stab knife, be sure to maintain an angle of 30°.

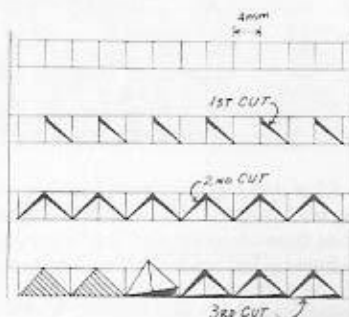


This may seem like an inordinate amount of time dedicated to sharpening, but for the novice, this information is sometimes hard to acquire. I have also encountered from time to time experienced carvers who sharpen their tools improperly. There is absolutely no substitute in carving for a truly sharp tool.

## Borders

Chip carving is at its best when the layout of patterns and designs receives as much attention as does the carving itself for clean and crisp execution. Before actual carving begins, precise measurement of reference lines is essential. This will not only insure the finished work to be satisfactory, it will also give you the courage and confidence to proceed to that end because you will know exactly where you are going with your work and what you should do next.

One of the main characteristics of chip carving is that, unlike chisel carving, once you have committed your blade to the wood, rarely can you alter or cover up a mistake or change



in heart. I refer to the layout of a design as having or being reference lines because what is drawn does not necessarily represent what actually be cut. Rather it represents divisions of the area to be carved. This is particularly true when carving borders.

Because the border is a repeated design, a few extra minutes given to its layout will save time in its carving. There seems to be almost a magical proportion for the borders illustrated here. If you use the dimensions shown, you'll do fine. If borders are designed too small, they won't give enough contrast of light and shadow. If drawn too large, they become overbearing on the work as a whole. For most borders, the dimensions shown will do best.

2 mm	_____
4 mm	_____
4 mm	_____
2 mm	_____

The same layout is used for a variety of different border patterns such as the positive diamond, negative diamond, double diamond, rope, flower, and combination double diamond and flower.

## The Cutting Knife

To begin, hold the cutting knife in the first position, place the tip at the corner of a square in the layout and push straight down to the opposite corner of that square. Your thumb should be on your work at all times.

Now switch the knife to the second position and place the tip at the same corner as you did originally. Turning your work slightly, press straight down to the opposite corner of the square adjacent to the first one. The knuckle of your first finger should always rest on your work while executing the second position.

For the third cut which relieves the chip completely, switch the knife back to the first position. Place the tip on the uncut side of the

chip with the blade edge parallel to your last cut. In one motion, pull the knife toward you along the line of the uncut side simultaneously pressing down until you have run along the entire third side. If executed correctly, the chip will pop right out. Upon examination, you will also notice that the three sides of your cut have automatically met in the middle at the bottom of your cut.

The positive diamond is the basis for the double diamond. Simply cut a negative diamond within the positive. The positive diamond is also the basis for the flower. In this case it will help if you divide the diamond into quarters as shown. Using a flip-flop motion from the first position to the second position, cut on either side of the lines forming a small wedge-shaped chip. You will prevent splitting if you make the cut with the grain first.

To make the rope border, draw the additional reference lines as shown. Your first cut will follow the dotted line. Your second cut will parallel your first from the reverse side held approximately 1mm apart. The knife is held in the first position for both of these cuts. As a matter of fact, the second position is used only when making the second cut of a triangular chip or a flip-flop cut. The first position is used under all other conditions.

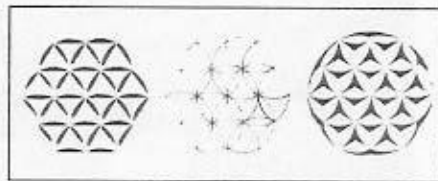
The lace and double lace borders are easily cut if laid out in 3 cm. segments. The first cut will be made on the line. The opposing cut creates a "curved moon" chip with the center about 3mm wide and the ends pointed. A word of caution: Do not insert the blade any further into the wood than what is necessary to relieve the chip. To do so will undercut your design and you disappointedly will lift out your work. Never cut deeper than you have to. This rule is particularly true when doing very intricate carving on rosettes. Complete the lace border by adding the negative diamonds.

To finish the borders, a straight-line cut on either side of the design will set it all in the wood nicely. The first cut is always on the reference line and made away from the design, that is, the work already completed. The opposing cut is made parallel to the first and held approximately 1-1/2mm from it.

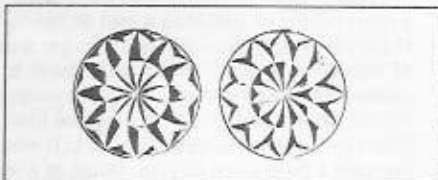
Here is a helpful hint on cutting straight lines. Train your eye to look directly in front of the blade while you're cutting. Do not look at where the blade is in the wood or where it has just been. Your eye will direct your hand where to go. It's the same principle as driving an automobile - keep your eyes on the road ahead and you'll automatically get to where you're going.

When designing rosettes, you usually get two different carvings for every design, one the positive and the other the reverse or

negative. An excellent example of this would be a simple rosette of interlocking circles, as illustrated. You can see that when carved, you'd have to look twice to tell that both carvings are from the same design. Included is another slightly more complex example. You can readily see that all the fun is not just in the carving.



The possibilities for designing rosettes are quite endless. When designing them, or designing in general, a balance should be kept between carved and uncarved areas. With very few exceptions, over-carving a work will detract from its final effectiveness. Rosettes may be simple or complicated in design. What makes an attractive rosette is the balance of carved and uncarved areas and a clean and crisp execution. As you work your chips out, be sure you go from point to point in your design. Don't let the knife fall short of what you've actually laid out. If the chip does not come out with single cuts all around, chances are that it's holding on the side that cuts across the grain. When you go back to cut again, keep your blade on the same plane as the first cut. Otherwise, the carving will appear as though the chips were hacked out rather than cut smoothly with a single stroke. Avoid leaving small unrelieved pieces of wood in the bottom and corners of your work. Cleaning them out will really make the work look smart and sharp.

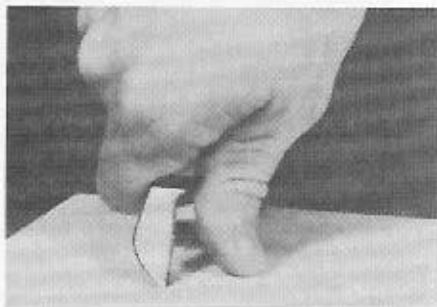


As a rule of thumb when carving rosettes, start by removing the largest chips first. These require more pressure to remove and will be easier to do if you are not trying to maneuver around more delicate work that has already been cut.

Another rule that will help give smooth, clean cuts is that the smaller the radius of a curve, the more vertical you should hold the blade edge to the wood while cutting. By doing this you will reduce the amount of metal in the wood and find that you may be able to make extremely small curved cuts. In fact, when the curve becomes very small, this is the only way you will be able to make the cut. The opposite of this rule becomes true when cutting straight lines. More blade edge in the wood, because of a slanted angle, will give you more control and help steady your hand.

One last word on design selection - be sure you haven't created a chip so large that it would cause you to pierce the wood. It may seem elementary, but it's really quite easy to do.

(continued on next page)



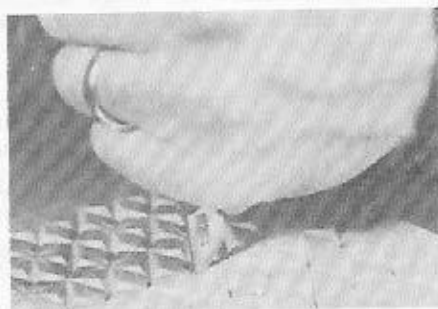
First Position



Second Position



## The Art of Chip Carving *(contd.)*



### The Stab Knife

Now that we've covered how to hold and use the cutting knife, it's time to do the same with the second of the two knives — the stab knife.

As mentioned earlier, the function of the stab knife is to enhance or create a design by impressing a permanent mark, not a cut, into the wood. Your stab knife is never used for cutting or removing wood. It is held quite differently than the cutting knife. For best results, thrust straight down with the knife perpendicular to the wood, and the length of the stab will be determined by how far you rock the knife towards you. Be sure you thrust deep enough with the point or tip of the blade to go beyond the bevel of the edge. This will give the wood a good spread from the stab leaving a more distinctive mark.

### Grids

Your stab knife can be used most effectively to fill in or complete a grid design. Grids are designs used to cover a larger area of wood with smaller cuts, usually linear in nature as opposed to circular. In many cases, a simple straight line grid with diagonal lines forming diamonds is most attractive. It won't compete with the rest of your design in a way that would make the end result too busy.

When laying out a grid, you need only to draw a single line even though you are going to actually make two cuts to relieve the wood. You don't have to draw a line for every cut you are going to make. This would take much more time and may make your work confusing to execute. Keep it simple. When cutting straight line grids, make your first cut on the line away from the center first. Make your second cut right along side of the first, held parallel about 1 to 1-1/2mm apart. As in drawing and creating rosettes, the variations for grids are endless. Just let your imagination go and experiment a little.

### Lettering

Now let's take up the consideration of lettering. Putting dates, names, initials, or special letters on your work can make it not only unique but can also help create an heirloom that is proudly handed down from generation to generation in a family. Dates, names, and initials lend themselves quite

nicely to chip carving and chip carving design. This practice has been very common in Europe for centuries. It is done on everything from bread boards to furniture; from ceiling beams to the exterior of houses and from milk pails to fine jewelry boxes.

Almost any style of lettering can be used. Those that are easy to read and to execute are probably your best choices, although this should not discourage you from experimenting with others you may like to try. One of the best styles of lettering for chip carving is the Roman style. When done correctly, it is clean, crisp, and gives a good variation of shadow. We will give this style first consideration.



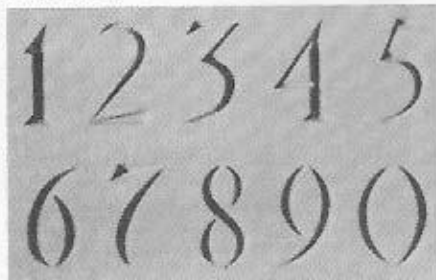
For those letters that are straight legged such as A, H, and N, make the end cuts first, making sure your end cuts are long enough to include the serifs. Then cut the large legs 2nd, the small ones 3rd, and all the serifs last.

When cutting the serifs, aim the point of your knife so that it meets the center of the leg groove. Doing this with both serifs on either side of the leg will finish the letter off neatly. The real secret to having your letters look sharp is to hold your cutting angle at the same degree for both sides of the chip. This will put the groove dead center in your letters giving them a very clean appearance.



When cutting the round or curved letters such as C, D, and G, make the end cuts first as you did with the straight letters. Then cut the curved part of the letter, cutting the outside curve first, and the inside curve second. Because the first cut of a chip usually takes more pressure and the outside curve is easier to make, you will find this procedure best.

The same method for cutting letters applies when cutting numerals. Those numerals that have an end or stop cuts, make them first. The outside of a curved chip is cut before the inside. You will find the numerals illustrated here quite easy to cut. However, there are many other styles that you may also wish to try. The more designs and variations you do, the greater your skill will become.



After doing Roman style lettering, you may wish to try your hand at Old English. When done correctly, Old English is quite ornamental and lends itself well to designs. It may be a bit more of a challenge because the capitals have more of a flourish, with a very contrasting regular lower case.



Another form of lettering that is pleasing and fun to do is the cursive or script style. Script lettering adapts very nicely to making monograms. All script letters will vary when you use them in monograms because each letter will fit and intertwine with each of the others differently. For me, however, monograms are one of the more pleasing types of carving to do. It not only satisfies the carving needs, but the artistic needs as well.

More information on chip carving is available in Wayne Barton's book *Chip Carving Techniques and Patterns* and his popular one-hour Taunton Press video *Chip Carving with Wayne Barton*. These are available from Highland Hardware, along with his premium knives and ceramic sharpening stones.

20.03.90	Book	\$9.95
22.04.11	Video	29.95
12.59.01	Pair of Knives	25.00
12.59.02	Pair of Stones	39.95
12.59.03	Complete Kit	99.95

(includes book, video, 2 knives & 2 stones)

Add Shipping Charges shown on page 46.



Wayne Barton is the foremost authority on chip carving in North America. Trained in Switzerland, Wayne is the Director of the Alpine School of Woodcarving in Park Ridge, IL. He is pictured here during a 1989 seminar held at Highland Hardware.



# Easy-to-Build Work Horse

## A Comfortable Place to Handsaw Dovetails

©1987 by John Wilson

**W**HEN I BEGAN teaching seminars in traditional dovetailing several years ago, I needed a portable bench with a vise that each participant could use. They had to be light enough to haul fifteen around in my van, and at the same time, not bust my pocketbook making them. The result is this work horse that may very well suit your needs in the home shop.

I prefer to use inch-thick hard maple. You can buy 5/4 stock, but that may be more expensive than necessary. 4/4 No. 1 common hard maple is readily available in our area for less than a dollar per board foot. If you just skim the rough milling off (called planing hit or miss) to leave the maximum stock, you can arrive at the size which gives the thickest board. Actually, most any hardwood will do. Even 1-1/2" framing lumber can work, in which case use 3" drywall screws. There is a big difference in the density of framing lumber. Try to pick a piece of slow growth wood with tight annual rings.

The legs are let into the top board to give a smooth edge to the top. Unlike many saw horse plans, the legs are not splayed front to back so that the front vise can be vertical. Joints are glued and screwed using 2" or 2-1/2" drywall screws. The cross pieces on the legs are rabbetted for added strength.

Making the legs all even to the floor can be done after assembly. With the horse set on a level surface, scribe a line around the long leg using a scribe setting equal to the amount of gap between the short leg and the floor.

The front upright needs to be especially rigid. I first used 3/4" yellow pine plywood, and it vibrated too much when sawing. Your choice depends on what's on hand. Doubled up 3/4" plywood glued together, hardwood more than an inch thick, or a good dense 2 x 12 of doug fir or yellow pine all would work. The upright is offset to the right of center for right handed riders. Mine are drilled to be reversible for either right or left handers. Attach the vise to the head board with two 1/2" x 5" carriage bolts with washers and wing nuts. For improved leverage in working the vise, braze a three-inch piece of steel rod on the nut for a handle.

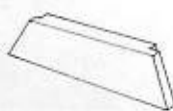
Now you are ready to mount up for work. The capacity of the vise is limited to the distance between the carriage bolts. This is eight inches on mine. The work is held vertically with the kind of support needed for cutting dovetails. To chop the waste, slide back to the end and work on the middle surface of the horse.

Happy trails to you.

Let legs into top board so they are even with edge



Joints are best rabbetted:



Fasten with glue and 2" or 2-1/2" drywall screws

2 carriage bolts 1/2" x 5" with wing nuts to operate vise

Upright face board must be of rigid stock - pick a dense board

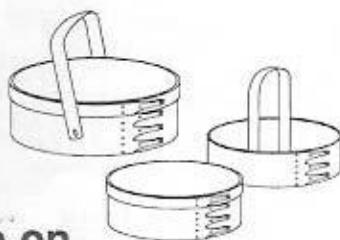
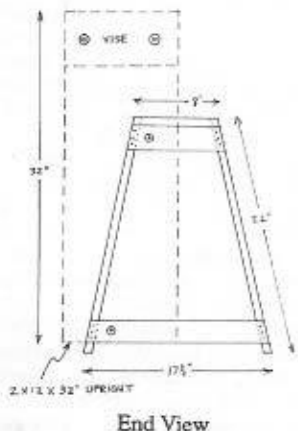
2 carriage bolts 5/16" x 3" to fasten face board to horse

For wood, use 4/4 maple planed hit or miss to leave as nearly 1" of stock as possible. (1-1/2" softwood, e.g. Douglas fir or yellow pine can be substituted.)

Note: Faceboard is offset to right or left of center to accommodate the worker's handedness

### Bill of Materials

Quantity	Description
4 Legs	1" x 5" x 22" hardwood (or 1-1/2" x 5-1/2" Doug fir)
1 Top	1" x 8" x 36"
2 End Braces	1" x 3-1/2" x about 10-1/2"
1 End Brace	1" x 5" x about 17"
1 Face Board	1-1/2" x 11-1/4" x 32"
1 Vise Board	1-1/2" x 5-1/2" x 11-1/4"
30	Drywall Screws (2" or 2-1/2" long)
2	5/16" x 3" Carriage Bolts, with Washers & Nuts
2	1/2" x 5" Carriage Bolts, with Washers & Wing Nuts



## John Wilson's New Video on Making Shaker Oval Boxes Now Available

One of the most popular hands-on seminars held at Highland Hardware in recent years has been John Wilson's weekend of making Shaker oval boxes, which has become an annual spring event.

John tours the U.S. year-round, offering about 40 workshops in which participants walk away with a completed collection of these attractive, practical handmade boxes.

A Shaker Oval Box is a graceful and useful container made from thin bands of straight-grained hardwood and quarter-inch thick top and bottom boards. The wood is held together with a dozen very small copper tacks and

wood pegs - that's all - a thing of beauty and utility crafted in the simple manner of the community known for such qualities, the Shakers.

We are pleased to offer to all those unable to attend one of these seminars a new one-hour video, in which John covers the entire boxmaking process step-by-step in his Home Workshop in Charlotte, Michigan.

*The video can be ordered from Highland Hardware for \$29.95 plus \$3 shipping.*

# Assembling and Using the Freud Router Table

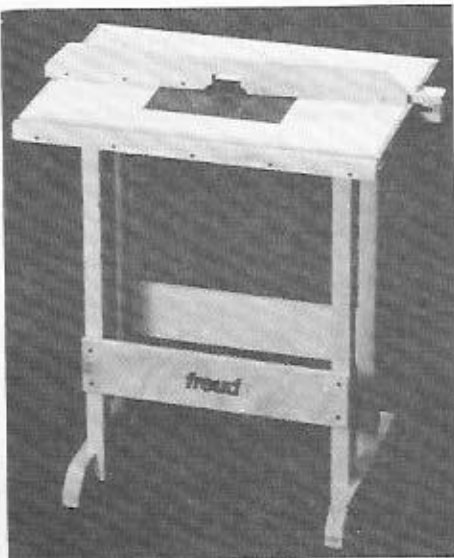
©1989 by Hugh Foster

**W**E'VE ALL SEEN the designs for exotic router tables in the magazines; most of them look as though they'd require 30 or more hours of careful work to cut out and assemble. Since those are hours I'd really rather spend working on a project rather than a shop-aid, I never built one even though a router table or a shaper would be a desirable addition to my shop.

When I saw the Freud FRT-2000 router table on display, it appeared to have most of the desirable features of the shop-built models without the drawback of requiring thirty hours to fabricate. Since Freud's table can be assembled in under an hour, building your own from scratch pays minimum wage at best — if you make absolutely no errors. My "hobby" time is worth a good deal more than that, so I selected Freud's router table for my shop.

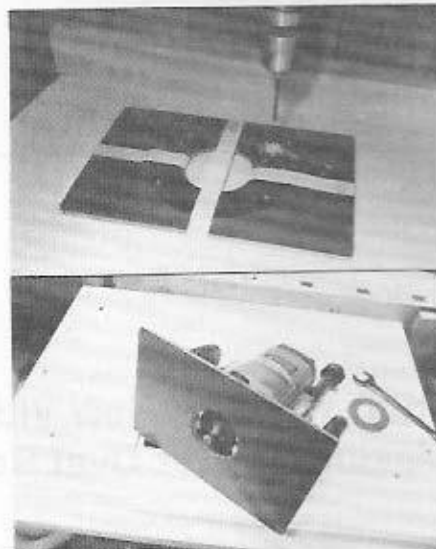
It comes in a neatly tied bundle; anything that can be reasonably preassembled has been preassembled. You'll spend almost as much time reading the excellent operations manual as you will assembling the table. Since the manual is so good, the assembly is easy. The hardwood stand can be assembled in the time it takes to drive 12 self-tapping screws into pre-drilled pilot holes. (I used a "Yankee" screwdriver, but a battery-powered screw gun would be at least as handy). If you wanted to shorten the table from its 36-3/4" height, unscrewing the base's top bracket, cutting off the desired amount, and re-attaching the bracket might add five or ten minutes to the task. Only if you are markedly shorter than average would you want to reduce the height of the stand. A lot of research seems to have gone into the layout of this router table, so think before you cut it.

Were I building mine again, I would proceed in a different order than the manufacturer's directions suggests, and install the miter gauge's channel unit before I installed the top. The directions would have you attach the top and then install the unit, but when I tried this, using only the pre-drilled pilot holes, I discovered that its underside ran into the base's top bracket long before the channel was narrow enough for my miter gauge. So I removed the top from the base, in the process scarring the melamine at three of the four screw holes. Then I measured the width of the



bar on my Unisaw's miter gauge: exactly 3/4" (as they are on most miter gauges). I clamped a 3/4" piece of scrap and a single thickness of wax paper in the channel and screwed the channel to the top with the five short self-tapping screws Freud provided. Then I set the top back on the base so the channel stock just met the top brackets and screwed it into place.

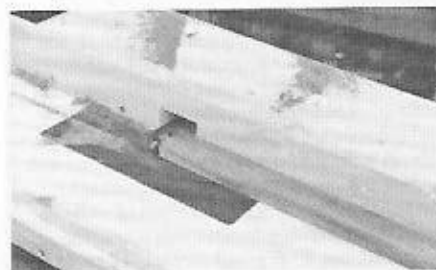
A powerful router with a half-inch collet is necessary for most table routing tasks, and a plunge router makes those tasks easier. Variable speed helps some operations go more smoothly; if you don't have a variable speed router, you might consider the Lutron SpeedDial, which is described on the next page.



Mounting my Ryobi RE-600 router to the table's phenolic insert was easy. First I removed the router's base and taped it to the phenolic in exactly the middle. Then the base's screw holes guided my drilling; uniform countersinking is best done on the drill press; you're likely to find that you will have to countersink a bit deeper on the phenolic insert than your router manufacturer had to do on the base, simply because the phenolic is thicker than the router's base.

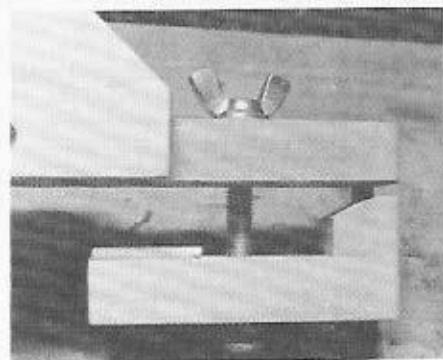
The advantage of insert-type router tables is that the router can be removed from the table for adjustment. In fact, if you center the router properly in the phenolic, you can leave the router in this larger base for most routing operations. And, when you are using the router table, rather than have to crawl around under the table to make your adjustments, you can set up the router out on the table, then set it cord first into the hole.

Having a 4.5 square foot table (nominally 21 by 32 inches) makes your router handier, but the fence which mounts from any of three positions on the table makes it even more useful. As the photos show, the clamp is both sure and positive. It's worth noting that the fence is shaped in such a way that it permits (or causes?) excellent chip clearance to the rear; a photo illustrates the "wake" through which the chips travel. Even simple tasks like rabbeting are made much easier with this fence. And because the fence is wood, auxiliary jigs, clamps, and stop blocks can be readily attached.



With an entire assembly time of under an hour, even with the modifications I made to the system, I was anxious to put the table to work to see what sort of results I might expect from it. A router table like this is exactly what's needed to take full advantage of many of the new specialty bits on the market which I am lusting after, such as the rail and stile, raised panel, drawer lock, and the like. For this article, however, I had to get by with the bits I already had on hand.

A project that needed doing urgently was to produce a piece of picture framing stock. I began by using the Freud table's shaping pin for guiding my work against the ball-bearing round-over bit. This showed me that the pin makes cutting against a bearing a good deal easier than it otherwise sometimes is; with the pin in place, starting the cut is much easier, and there is less damage to the very end of the stock. Freud's see-through Lexan freehand guard provides a large measure of peace of



*Hugh Foster is a woodworker, English teacher, author, and frequent contributor to Wood News. His new book Biscuit Joiner Handbook was recently published by Sterling Publishers (offered on page 43 of this issue).*

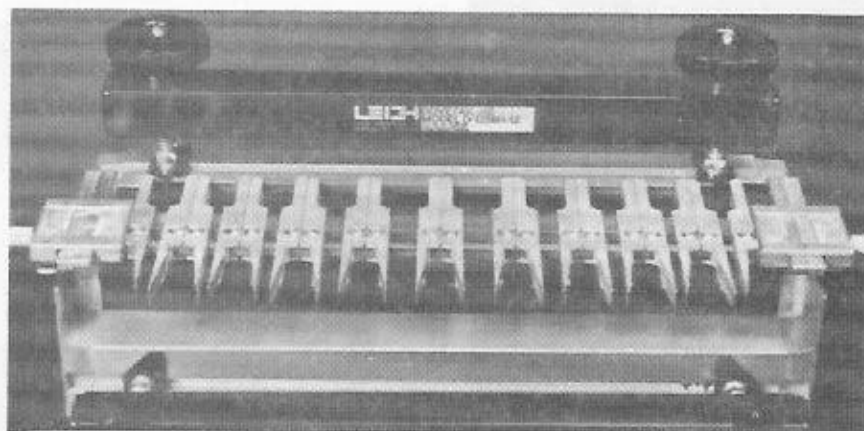
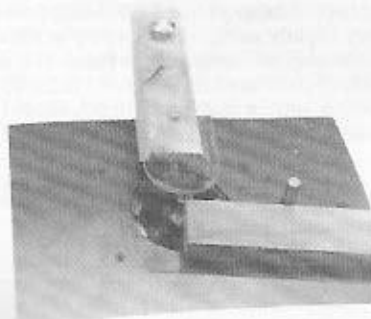
The Freud Router Table (our item #10.20.01) is available from Highland Hardware for \$149.95 plus \$6.00 shipping. (Shipped via UPS).

mind while doing this sort of routing (that it can be installed even more easily than the fence ought to mean that more of us will use it as well). After completing that cut, it was simple to set up the fence and use a straight bit for rabbetting the insert where the glass and the picture will go.

The number and variety of bits being made for the modern high-powered router is almost mind-boggling; the second half of Freud's manual is devoted to describing operations possible with a number of bits that will improve the way we build many of our projects. I just ordered half a dozen of them. As my collection of bits grows, I will be able to make ever more professional-looking projects in my shop.

With the addition of my Freud router table, the unaffordable shaper becomes ever more irrelevant in a hobby shop like mine.

I'm convinced that after you have tried the Freud router table for the first time, you'll agree that it adds tremendous versatility to your router (while making it safer to use), as well as streamline the production in your shop.



## 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.

Leigh has discontinued their original models, which produced through dovetails only, in favor of their new-generation D1258 models, which 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: 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" and 13/16" dovetail bits (with 1/2" shanks) are paired with 1/2" and 7/16" straight bits respectively, and are used 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. Bushings for Makita and Bosch routers are listed on pages 17 and 23.

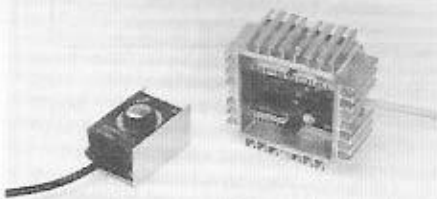
A new 45-minute instructional video can be purchased to supplement the excellent new owner's manual. (Manual is free with jig purchase.)

10.53.03	D1258-12" Leigh Jig	\$269.95
10.53.04	D1258-24" Leigh Jig	319.95
10.53.15	Instructional Video	29.95
10.53.16	New Owner's Manual	9.95

	8° Dovetail Bits		Max.	
	Diameter	Depth	Shank	
10.53.11	3/8"	7/16"	1/4"	29.50
10.53.12	1/2"	13/16"	1/4"	29.50
10.53.13	11/16"	1"	1/2"	39.50
10.53.14	13/16"	1-1/4"	1/2"	49.50

See page 36-37 for straight bits and other dovetail bits.

## SPEEDIAL Router Speed Controls



These heavy-duty speed controls are designed for use with universal (brush-type) AC-DC motors, such as those used in routers, drills, sanders and so on. Made in USA, every unit is tested before it leaves the factory, and is backed by a one-year warranty against defects in materials or workmanship. Used with the hand-held or table-mounted router, these speed controls let you select the rpm best suited to the material, the feed rate, and the bit doing the work. Routing in plastics, using templates, or following intricate patterns will be easier and provide better results; panel-raising bits and other huge new cutters can be operated more safely and comfortably when you are in charge of their rpm.

The MK-3 Speedial will handle tools rated up to 10 amps; it will be ideal for controlling routers up to about 1-3/4 HP, or any drill or sander/

polisher. Measuring only 2-3/4" wide by 4" high by 2-1/4" deep, the MK-3 can be carried on its built-in belt clip or mounted on your router table or other work station. A grounded outlet is built into the control.

The commercial-duty MK-15 Speedial is rated for use on tools drawing up to 15 amps, which covers any heavy-duty router you're likely to own, as well as practically all other universal motor tools. This is a large (6x6"), ruggedly built unit with a cast aluminum housing and four aluminum heat sinks to keep the unit cool under load. A feedback sensor feeds more power to the router as load increases, maintaining the rpm you've chosen.

MK-3	10 Amp Speed Control	\$59.95
MK-15	15 Amp Speed Control	129.95



# Router Table Fence Plan

by Zach Etheridge

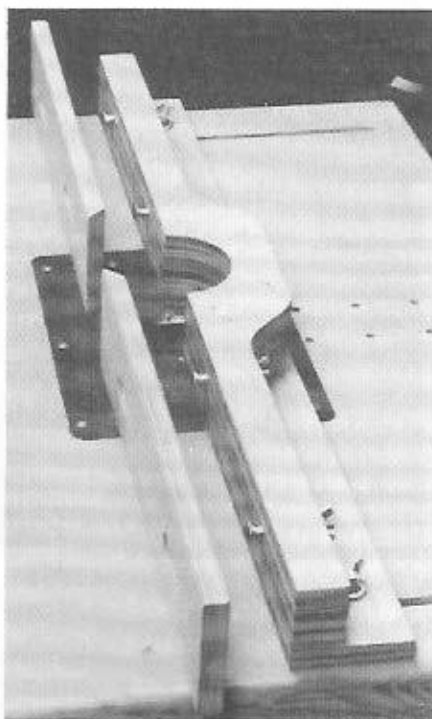
**W**ELL, it looks as though our readers won't let us get away with anything anymore. In *Wood News #21* we published an article on router tables in which we attempted to discuss fences without actually drawing plans for the one we pictured. Oh, boy – did we ever catch some grief for that. The fence is one of the most critical elements in a good table design, so in this issue we'll finish the job and share the drawings for our stout and functional fence.

These drawings are actually accessories after the fact; the fence itself was mostly drawn on the saw, drill press and sander. The dimensions listed were chosen because they fit our table and because that's how much scrap plywood we had lying around. If your table is larger or smaller than ours, or if you've got more or less scrap available, please feel free to adjust the measurements accordingly. The semi-circular bit enclosure is designed to handle the largest bits you'll ever use, while the adjustable faces can be closed down to provide as little gap as possible around even the smallest bits. The 4" height of the fence faces seems about right: high enough to handle stock on edge or standing up, without being too massive to cope with. Keep the bottom piece of the fence body at least three inches wide for stability. Make the faces at least an inch higher than the body to leave room for clamping on feather sticks or other accessories.

We'll recommend that you use birch plywood (or another good quality hardwood ply) throughout. Birch ply, typically with poplar core, provides stiffness, dimensional stability and durability, not to mention suave good looks when finished. You may substitute whatever other materials you have on hand, as long as they get the job done – for instance, you could make the body of the fence from fir plywood and the faces of straight-grained hardwood.

## Materials required

Qty	Item
4	3-1/2" x 36" x 3/4" plywood
2	4" x 17" x 3/4" plywood
4 ea.	5/16" x 2-1/2" carriage bolts, flat washers, lock washers, & wing nuts
2 ea.	3/8" carriage bolts, washers, lock washers and wing nuts; length sufficient to pass through fence base and your table top
1	3-1/2" x 6" or longer piece of 1/4" plywood, phenolic board, lexan, etc. (for bit enclosure cover)



## Construction Notes

**Assembling the fence body:** If you have a bandsaw, glue three of the 3-1/2" x 36" pieces together face to face before laying out and cutting them to the shape shown in the plan. Sand the back if you're going to, then glue this stack to the 3-1/2" x 36" bottom piece before cutting the 4" diameter bit enclosure. Lacking a bandsaw, cut each piece to shape, including the bit enclosure, with jigsaw or coping saw before gluing them up. There's no functional need to sand or finish the back of the body or the inside of the bit enclosure, but

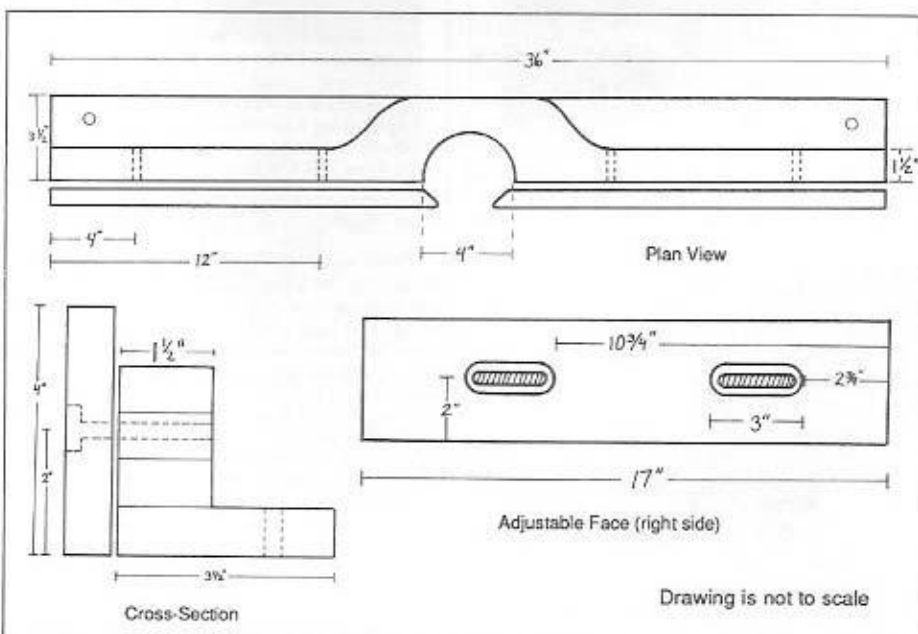
for aesthetic appeal this is easily accomplished with a drum sander in your drill press or hand-held drill.

The only critical feature of the body is that the base be very precisely perpendicular to the front. If you have a jointer, tune it up carefully and hold the base firmly against the jointer fence while you cut the face square (sharp knives and shallow passes!). Lacking a jointer, use your bandsaw, belt sander or hand plane to do the job. This is the right place to take your time and be finicky; if your fence body isn't straight and square it isn't worth owning.

With drill press or hand drill, bore four 5/16" holes through the fence body at 4" and 12" in from either end, 2" on center from the bottom edge. Drill two 3/8" holes through the fence's bottom piece for use in mounting it to your table – the spacing of these holes will depend on exactly how your table is built.

The substantial mass of the structure around the bit opening insures that your fence will remain straight under pressure. It will also allow you to cut an opening right through the bottom layer without sacrificing stiffness, and this is what you'll want to do for dust collection. We cut a notch just big enough to admit our shop vac's crevice tool, and the system worked beautifully (see photo upper right). You might want to create a slightly larger opening if you're going to be hooking up a dust collector.

**Making the adjustable faces:** Use your router or drill press to make the counterbores and through slots in the fence faces. The counterbores should be about 3" long by 3/4" wide, deep enough (about 1/4") to accommodate the heads of your 5/16" carriage bolts. The through slots should be 5/16" wide, perhaps very slightly enlarged with a rasp or file to allow easy movement of the faces. The inside ends of both faces should be cut off at 45° as shown, and the sharp ends lightly sanded round.



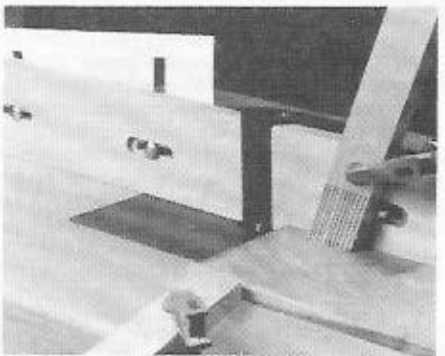


**Covering the bit enclosure:** We used a scrap of 1/4" phenolic resin board for this purpose, though lexan, plexiglas, or plywood would work just as well. The cover serves two purposes. It prevents accidental injury from flying debris or from simply putting your hand down onto a bit, and it helps to focus airflow around the bit if you hook up a dust collection system. Cut the cover to match the shape of the fence body, and attach it with glue or screws or both.

**Finishing:** To get the most show-off potential out of your new fence, oil it well with your favorite finishing oil. Wax the adjustable faces and buff them well to minimize friction in use.

**Mounting the fence:** The standard method would be to cut 3/8" wide slots parallel to the edges of your table, long enough for the fence to be positioned anywhere from 1-1/2" forward of the router collet to as far toward the rear as possible. Wax the slots so your 3/8" carriage bolts will slide readily. This system provides both convenience and a reliable locking mechanism for the fence. If your table design would be weakened by such slots, either reinforce the table or simply clamp the fence in position.

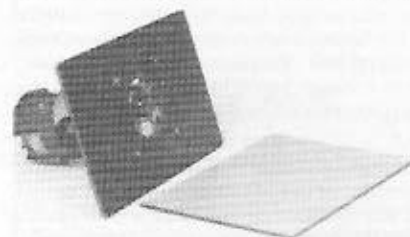
It's possible to offset the left-hand fence (to make up for stock width lost to a full edge-relief cut), by inserting a simple shim (shown partially inserted below) behind the fence face and re-tightening the locking screws.



Please refer to "The Well-Tempered Router Table" in *Wood News* #21 for more ideas on using your router table and fence safely and creatively. Back issues of *Wood News* from #13 - 22 are available from Highland Hardware for \$1 each ppd.

See also Patrick Spielman's excellent *Router Jigs & Techniques*, 377 pages of ideas and ingenuity that will inspire any router owner.

## Phenolic Resin Board and Clear Lexan® for Router Tables & Accessories



We've been witnessing a steady increase in the demand for sheet materials used in router accessories and table-mounting devices. Our phenolic resin board really blasted off recently with the publication of a *Workbench Magazine* article on router tables—it was right on about phenolic as the stuff of choice for making drop-in sub-bases for instant mounting of any router in practically any table design. Though we've also added Lexan sheets to our inventory, our 1/4" phenolic board remains your best bet for great stiffness, scratch resistance, and friction-free stock handling. We stock the board in 9" x 12" pieces which are easily drilled and cut to fit your router.

For innumerable other jigs and shop-made accessories, clear Lexan is as close

to an ideal material as there is. It's virtually indestructible, but easily worked with woodworking machines and hand tools. It's plenty stiff enough for many special-purpose sub-bases, clear enough to see through for template and freehand design work, and durable enough for use as production template material. Polycarbonate will scratch under abrasive use, but interestingly enough you'll still be able to see through it just fine if the scratches aren't too big and the cloudy surface is in contact with the stuff you need to see. Also, it can be buffed back to complete clarity with a sharp polishing compound such as our *Green Rouge* (page 44 in our 1989 catalog). Anybody who's looked through Patrick Spielman's *Router Jigs & Techniques* will already know a hundred different uses for Lexan; by the time you get through building Spielman's jigs you'll probably have thought of a hundred more yourself. We stock 1/4" clear Lexan in nominal 12" x 12" sheets (actual dimensions may be about a kerf-width less each way).

10.20.05	9x12 Phenolic Resin Board	\$10.95
10.20.06	12x12 Lexan sheet	12.95
02.64.32	Green Rouge	16.95
20.03.84	Router Jigs & Techniques	14.95



## Fiber Collet Adapters

Many owners of hefty 1/2"-collet routers have discovered the hard way that steel adapter sleeves for using 1/4" or 3/8" shank bits are not necessarily goof-proof. If everything isn't perfectly clean, smooth, and karmically balanced, the adapter sleeve may not grip reliably, and will occasionally allow a bit to creep slowly out of the collet while in use. Not your average wonderful experience, to be sure.

Our new precision-made fiber adapters appear to be the solution to this problem. They are considerably more compressible than steel, and offer a much more reliable hold on small shanks. They also help to absorb and eliminate vibration, a problem hard to avoid with 1/4" shanks. Undoubtedly, the best way to securely hold a router bit is with a collet matched to the shank diameter. Several popular routers, however, don't offer down-sized replacement collets, and an adapter sleeve is the only means available for getting the job done. When that's your situation, these fiber adapters are the best tool we've found for the purpose.

10.20.07	1/4" Fiber Collet Adapter	\$8.95
10.20.08	3/8" Fiber Collet Adapter	8.95

## Hot Stuff™ Adhesives



Hot Stuff is a non-toxic "super-glue"-like adhesive which has dozens of useful applications for woodworkers. This cyanoacrylate liquid sets up hard in less than a minute (almost instantly when Accelerator is sprayed on) and creates powerful, permanent bonds in wood, metal, plastic, and most other materials.

Already a favorite of woodturners for repairing cracks and punky areas in interesting woods, Hot Stuff is increasingly used as a general-purpose instant clamp in jig making, repair work, prototyping, toymaking & more.

We stock three kinds of Hot Stuff in 2-oz. bottles: Original Hot Stuff, about as runny as water and used primarily on non-porous materials; Super T, a thicker formula that is the turner's choice; and Special T, fairly viscous and ideal for bonding of wood and other porous stuff. Hot Shot Accelerator comes in a pump spray bottle for easy application. We highly recommend Hot Stuff Solvent; the adhesive, like all the "super glues," can bond flesh almost instantly.

Also available as a package which includes each item listed above at a savings of 25%.

14.61.01	Original Hot Stuff	\$9.95
14.61.02	Super T Hot Stuff	9.95
14.61.03	Special T Hot Stuff	11.50
14.61.04	3-oz. Accelerator	3.95
14.61.05	Hot Stuff Solvent	4.95
14.61.06	Package Deal	29.95

# ROUTERS

During the first part of the 1980's, 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 already 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

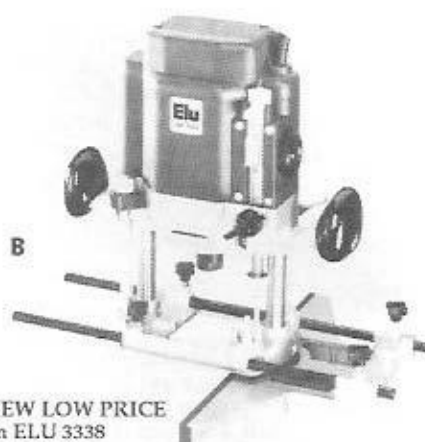
factory equipped for easy and positive under-table depth of cut adjustment, for accepting bits up to 3-3/8" diameter without special add-on sub-bases, and for operating at low rpm with enough power for any kind of cutting in any kind of material you might have in mind.

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 guide bushings (available on next page).

The RE-600 weighs 14 lbs.

<b>A RE600</b>	Ryobi Var. Spd. Plunge Router	229.00
6072503	Guide Bushing Adapter for Black & Decker Bushings	9.00



**NEW LOW PRICE on ELU 3338**

**Electronic Variable Speed Plunge Router**

This superb machine is a strong contender for the title of finest plunge router on the market today. Its variable speed control is a wonderfully useful feature for all manner of routing situations: running big bits, 2-1/2" and more in diameter; routing Corian and other plastics; following intricate patterns and using complex templates – all these operations are safer, smoother, cleaner and more efficient when you can run the router at a slower speed. The electronic control monitors rpm, and feeds more voltage to the motor as needed to maintain the selected rpm as load increases. A soft-start feature is incorporated in the control which brings the motor up to speed over the space of about one second, almost totally eliminating start-up torque even with very large bits in use. The 3338 runs quieter than most other large routers, and at low rpm is the quietest router we've ever heard.

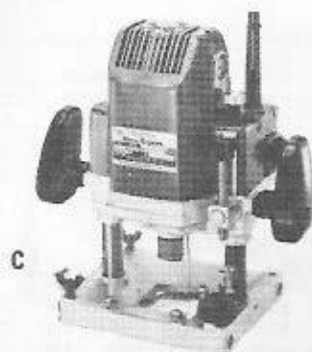
Other excellent features set Elu apart. One exclusive design element is a rack-and-pinion actuated depth stop rod with micro-adjustable tip and adjustable magnified cursor for very easy and precise pre-setting depth of cut. This system is without a doubt the best we've seen yet, and it works equally well when using end-cutting or piloted bits. An optional height adjuster makes table-mounted depth of cut setting just as easy and accurate. The motor housing is fitted with bronze bushings 2-3/4" long, giving the 3338 the tightest, smoothest and most reliable plunging action of any router on the market. Elu's plunge lock lever is self-locking; the motor is firmly locked on the posts until the operator chooses to free it for plunging, and releasing the lever once again fixes the motor in place. The 1/2" collet supplied with the machine is an unusual 1-3/8" in length, enough to securely hold any shank. And the motor spindle is bored 2-1/4" deep, so that even the longest shanks can be inserted far enough to bring the bit's cutting edge up close to the collet for safest and steadiest cutting.

The Elu 3338 operates at any speed from 8,000 to 20,000 rpm, drawing from 10 to 12 amps depending on the speed selected. It offers up to 2-5/8" of plunge travel. 1/4" & 3/8" replacement collets are available optionally, as is the fine height adjuster for table-mounted operation. A straight edge guide and mounting rods (10-1/2" max reach) are standard equipment. The router 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 guide bushings. The 3338 weighs 11-1/4 lbs.

See accessories at right on next page.

<b>B 3338</b>	ELU Var. Speed Plunge Router	299.00
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### 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.

C10.10.09	3612B (Rectangular-Base)	219.95
10.10.10	3612BR (Round-Base)	219.95
10.10.55	Guideset for 3612B & BR	39.95

### ACCESSORIES FOR ELU 3338 ROUTER

40902	1/4" Collet	29.95
40904	3/8" Collet	29.95
40966	Fine Height Adjuster	9.95

### Black & Decker (ELU) Guide Bushings

C62943	5/16" o.d.	6.95
C62944	3/8" o.d.	6.95
C62945	7/16" o.d.	6.95
C62947	39/64" o.d. (approx. 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.

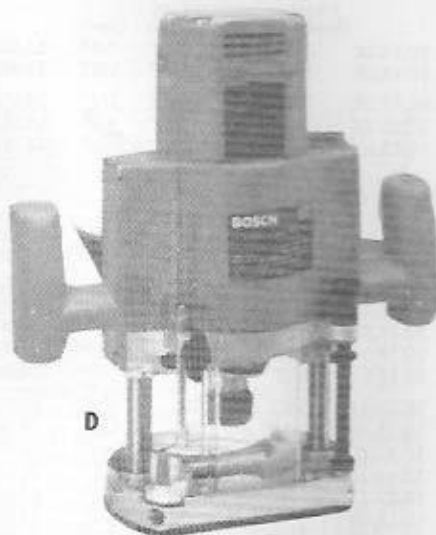
10.10.55	Guideset for 3612B & BR	39.95
10.10.02	Guide Holder only	24.95
10.10.03	Straight Guide only	9.95
10.10.04	Roller Guide only	7.95

### 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.

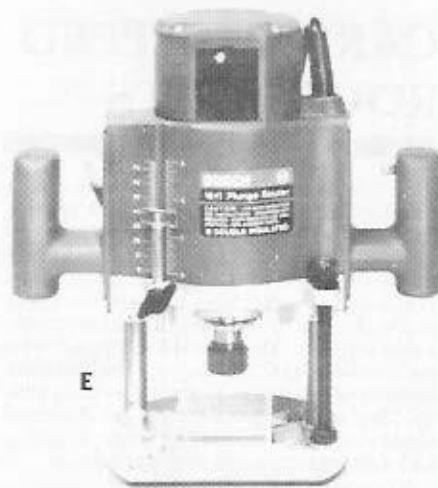
### Guide Bushings for Makita 3612B, 3612BR and 3620 Routers

	Outside Diameter	Bushing Height	
10.10.32	3/8"	29/64"	15.00
10.10.56	7/16"	33/64"	18.00
10.10.57	1/2"	33/64"	18.00
10.10.58	5/8"	33/64"	9.00
10.10.34	25/32"	33/64"	15.00
10.10.35	1-1/16"	33/64"	7.00
10.10.36	1-9/64"	19/64"	15.00
10.10.37	1-3/16"	33/64"	11.00
10.10.38	1-37/64"	29/64"	8.00
10.10.44	Guide Bushing Adapter		13.00



### NEW BOSCH 1611EVS ELECTRONIC VARIABLE-SPEED PLUNGE ROUTERS

With this new edition of their heavy-duty plunge router, Bosch has gone all out to produce the most powerful and most usable routers on the market. While leaving unchanged most of the features of the already familiar Model 1611 plunge router (see description above right), Bosch has added a variable speed control which incorporates both soft start and constant torque power supply. If you've used the 1611-220, the soft-start feature will be the first thing you notice about the 1611EVS; the dramatic start-up kick furnished by 220 volts has been completely tamed, and you can now fire up even big panel-raising bits with impunity. Variable speed (12,000 to 18,000 rpm on either 110-volt or 220-volt models) will furthermore let you run those big bits without fear of tearing the roof off, while the constant-torque circuitry insures that all of the router's



### BOSCH 1611 220-VOLT PLUNGE ROUTER

This is without a doubt the most powerful router we've ever used. It's a big, beefy machine with oversize handles for good control, 3" of total plunge travel, and a 7 amp, 220-volt, 22,000 rpm motor that runs even the biggest bits without blinking. If you need a machine for heavy production routing, this is the one to look at.

The 1611 has a self-locking plunge lock lever, a plunge stop rod with built-in cursor, an external spindle lock, and a lockable trigger switch in the right handle. A 1/2" collet is standard; 1/4" and 3/8" replacements are available. The spindle is bored 2-1/2" deep to accept even the longest shanks without difficulty. The collet can actually be plunged as much as 3/8" below the base, so when the router is mounted under a table it can compensate for what would otherwise be lost depth of cut. Optional edge guide includes steel rods for up to 10-1/2" reach, with adjustable-face straight fence. The 1611 has a modified round base 6-3/4" in diameter, chopped straight along the front edge 2-1/4" from center. A bushing adapter is included which allows use of guide bushings for the Bosch 1604 router (see page 44). Net wt. of the 1611 is 12-1/2 lbs.

E 1611-220	Bosch 220V Plunge Router	269.95
82993	Edge Guide for 1611	23.50
499503	1/4" Collet for 1611	12.40
499502	3/8" Collet for 1611	10.75

power is available at any speed under any load.

The only visible design changes on the 1611EVS are the pumped-up motor housing on the 220v model and a new depth-stop turret. The latter is a clever innovation featuring a stair-step rim that does away with the traditional 3 adjustable screws in favor of a simpler multiple-choice design.

With the addition of variable speed capability, the Bosch 1611EVS combines enormous power with all the control you need for using any bits in hand-held or table-mounted modes. The 110-volt model, drawing 14 amps, is a fine all-around performer. The 220-volt machine (7 amps) is designed to meet the most demanding requirements in any shop where production is the first order of business.

D 1611EVS-110	Bosch VS Router	299.95
1611EVS-220	Bosch VS Router	319.95

# 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"	9.90
10.14.02	1/8"	1/4"	9.90
10.14.03	3/16"	1/4"	9.90
10.14.04	1/4"	1/4"	9.90
10.14.05	5/16"	1/4"	10.80
10.14.06	3/8"	1/4"	10.80
10.14.07	7/16"	1/4"	11.90
10.14.08	1/2"	1/4"	11.90
10.14.09	5/8"	3/4"	11.90
10.14.10	3/4"	1/2"	13.30
10.12.65	1/4"	1/2"	11.40
10.12.66	5/16"	1/2"	11.40
10.12.01	3/8"	1/2"	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"	25.90
10.12.11	1-3/4"	1-1/4"	41.90

## B V GROOVE BITS - 90° Angle

Diameter	Carbide Height	Shank	
10.14.11	1/4"	3/8"	9.80
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"	24.95
10.12.15	3/8"	1-1/4"	31.50
10.12.16	1/2"	1-1/4"	42.60
10.12.17	5/8"	3/4"	49.30

## 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"	24.90
10.14.23	1/2"	3/4"	27.90
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"	13.90
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"	21.90
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"	23.30
10.14.31	3/8"	5/8"	23.30
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"	1/4"	17.60
10.12.31	1/4"	1/2"	35.90

## 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"	18.95

## 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"	17.90
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"	9.90
10.14.48	1/8"	1/2"	10.90
10.14.49	5/32"	1/2"	10.90
0 10.14.50	1/4"	1/2"	10.90
P 10.14.51	1/4" Arbor & Bearing		5.50
10.12.41	1/2" Arbor & Bearing		5.50
10.14.88	Replacement Bearing		3.80

## Q CHAMFER BITS - 45° ANGLE

	Carbide Height	Shank Diameter	
10.14.52	1/2"	1/4"	22.50
10.12.42	1/2"	1/2"	22.50
10.14.84	Replacement Bearing		3.80
10.14.53	11/16"	1/4"	29.95
10.12.43	11/16"	1/2"	29.95
10.14.86	Replacement Bearing		3.80

## R BEADING BITS

Radius	Carbide Height	Shank	
10.14.54	1/16"	1/2"	21.80
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"	23.30
10.14.59	3/8"	5/8"	23.30
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

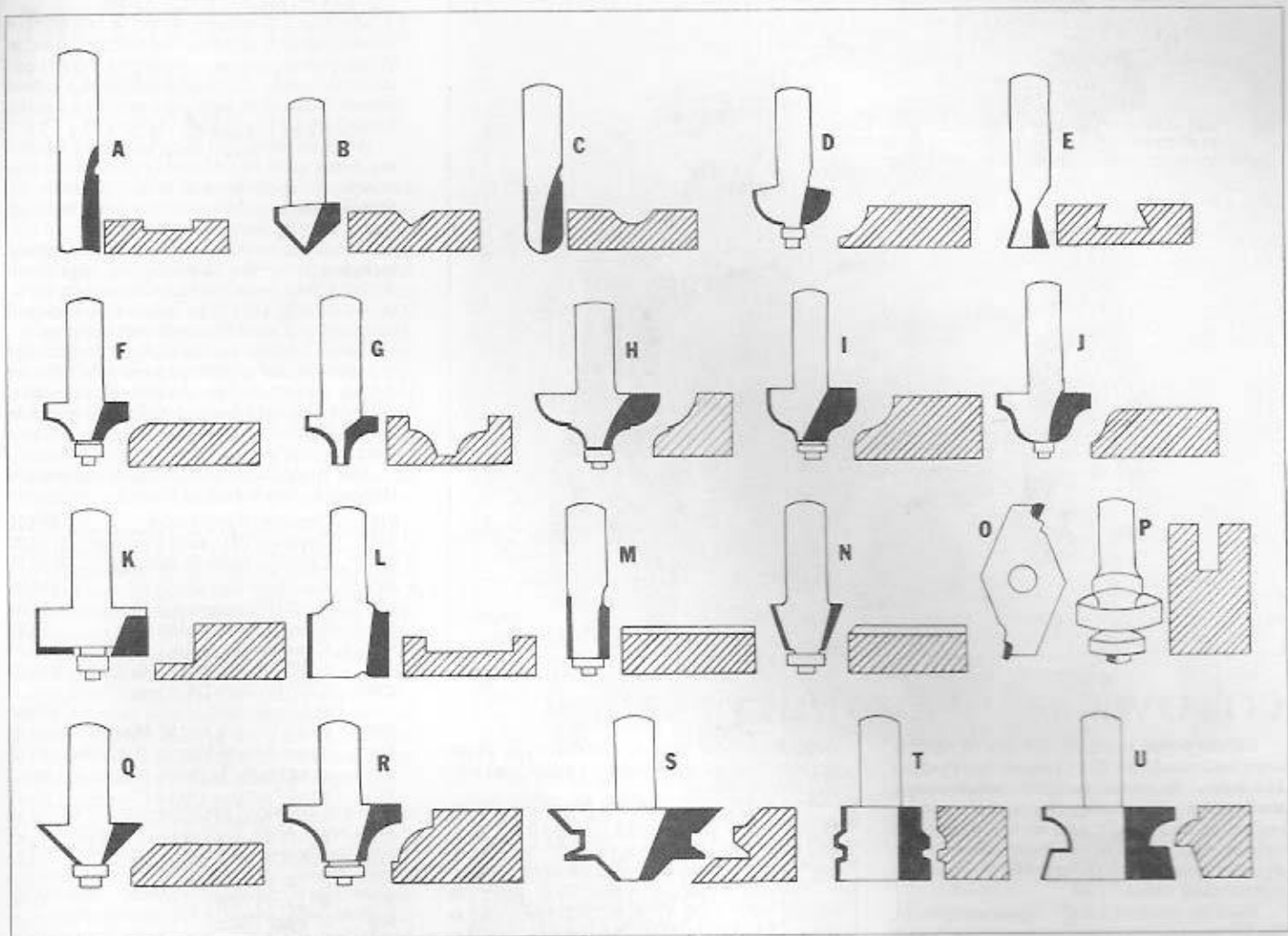
Diameter	Stock Thickness	Shank	
10.12.47	2-3/4"	1/2" to 1-1/8"	89.95

## T REVERSIBLE GLUE JOINT BIT

Diameter	Stock Thickness	Shank	
10.12.48	1-1/2"	1/2" to 1-1/4"	49.95

## U CABINET DOOR LIP BIT

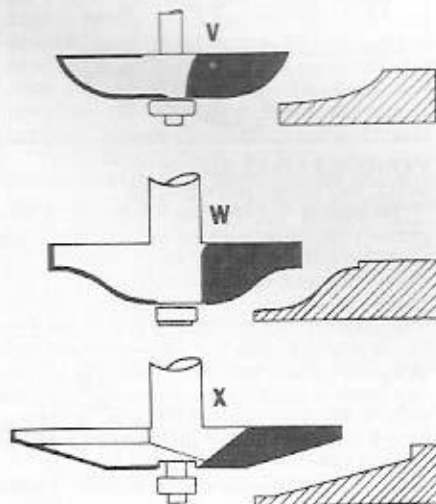
Diameter	Stock Thickness	Shank	
10.12.49	2"	1/2" to 1-1/4"	54.95



#### 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"

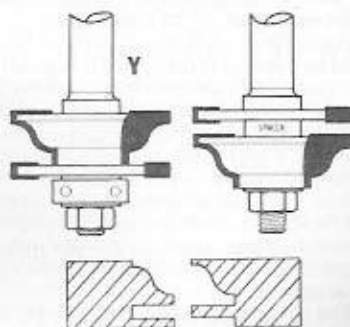
V 10.14.67	Cove Raised Panel, 1/4" shank	64.95
10.12.68	Cove Raised Panel, 1/2" shank	74.95
W 10.12.51	Ogee Fillet Raised Panel	69.90
X 10.12.52	Provincial Raised Panel	92.40



#### 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 \$115.30.

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	78.40
10.14.89	Replacement Bearing	9.00

#### 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.

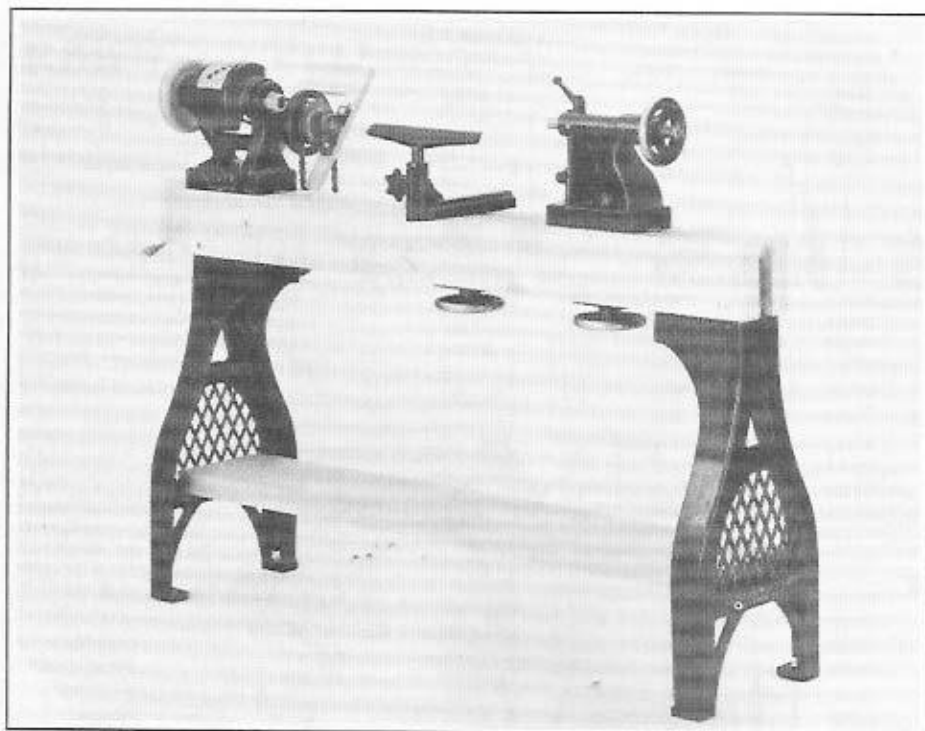
The 1/2" and 3/4" bits have 1/4" shanks for use in any router. The 1" bit has a 3/8" shank, and the huge 1-1/8" bit has a 1/2" shank. Please note that the maximum cutting depth listed below may vary slightly depending on the design of your router.

#### Overhead-Pilot Flush Trim Bits

	Diameter	Carbide Height	Maximum Depth	
10.14.61	1/2"	11/16"	1-1/4"	19.95
10.14.62	3/4"	3/4"	1-1/2"	21.95
10.14.63	1"	1"	2"	23.95
10.12.60	1-1/8"	2-9/16"	4"	119.95







## 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 works 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	1750.00
031	Conover Deluxe Package	2199.00
535	Cast Iron Leg Set	399.00
498	1-1/2 HP 110/220V AC Motor	219.00
499	Switch for AC Motor	29.95
540	Counter Shaft Kit	149.95
428	1 HP 110V DC Motor & Contr.	499.00
429	1-1/2 HP 220V DC Motor & Controller	599.00
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

# MULTI-ROUTER Production Joinery Machine

This new 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.

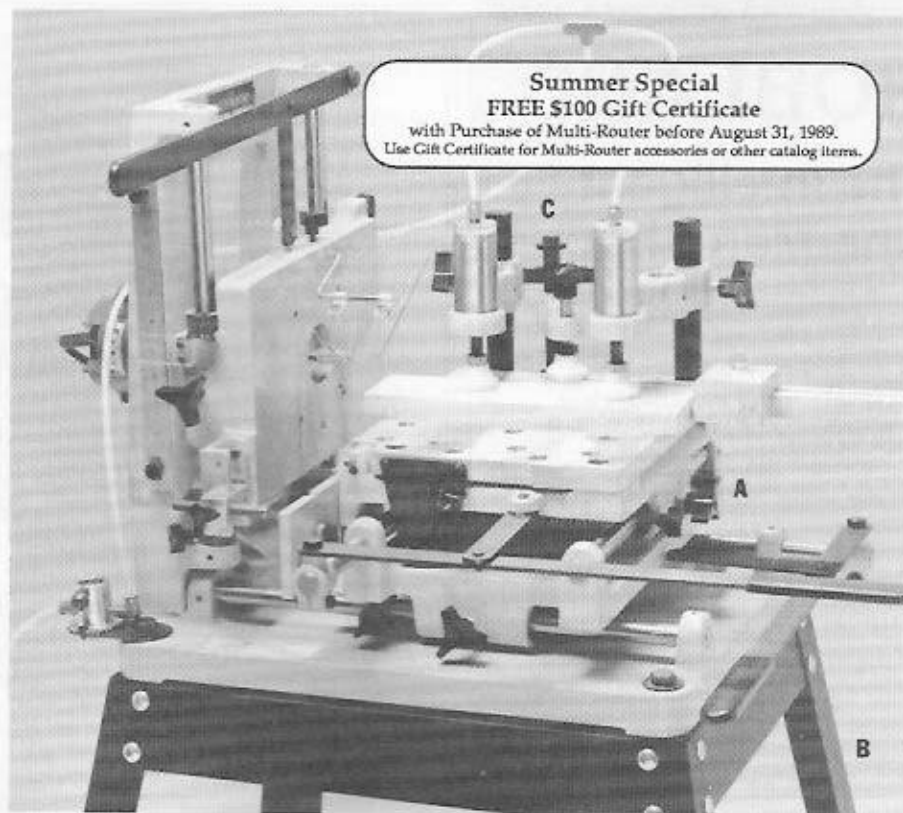
While its specialty is mortise and tenon joints (up to 1/2" x 3"), the Multi-Router also produces dovetails, box joints, splined miters, sliding dovetails, round stub tenons, and numerous decorative joints. The tilting work surface (0 to 45 degrees) makes both simple and compound-angle joints almost 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, mitered 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 standard tenon templates. It includes the master insert holder and all sizes of variable-size tenon templates.



**Summer Special**  
**FREE \$100 Gift Certificate**  
with Purchase of Multi-Router before August 31, 1989.  
Use Gift Certificate for Multi-Router accessories or other catalog items.

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 wt. is 99 lbs.

## MULTI-ROUTER

A 08.52.01	Model 101-L Multi-Router	1495.00
B 08.52.03	Machine Stand	88.00
C 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, 3 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, Each (Specify size from chart above)	15.25
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## Other Standard Templates

08.52.31	Dovetails (Pins and Tails)	36.50
08.52.35	Mitered 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 (Specify size: 1/2 & 5/8; 3/4; 1; or 1-1/4")	15.25

## 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



# ROBLAND

## The Intelligent One-Man Shop

For many years we have seen European combination machines exhibited at trade shows and offered in magazine ads. Each one we looked at seemed to have several basic weaknesses, either in practicality, safety, or value for money.

At a recent International Woodworking Fair in Atlanta, we got our first look at the new Robland X31 Woodworking Machine, designed and built with the American market in mind.

We were impressed by its overall quality of design and construction, its practicality, and particularly its use of standard U.S. sizes, such as the 5/8" table saw arbor. And its price is 30% less than that of five individual tools of the same capacity and quality.

The Robland machine offers a practical solution for the person with substantial stationary tool requirements who is limited by a small workspace.

**M**ANUFACTURED in Belgium by the world's largest maker of multi-function woodworking machines, the Robland machine combines 10" table saw, 12" autofeed thickness planer, 12" jointer, shaper, and mortise table. The machine is imported by Laguna Tools in California, an organization whose staff includes more than one savvy tool expert with practical experience in woodworking applications and machine troubleshooting – the kind of people we like to deal with.

The tool's power plant consists of three separate 220-volt 3 HP industrial-duty induction motors. Conversion from one operation to another is quite simply and quickly accomplished. There are no belts to change or gears to adjust. No operation change requires more than 30 seconds (for a user, not just the salesman). A switch selector allows you to start the appropriate motor. (Two motors cannot be accidentally started simultaneously). Stop buttons are located conveniently near each operating position.

All work tables are made of carefully ground heavy iron castings. All spindles run in sealed-for-life bearings. The unit weighs approximately 1000 lbs. Despite its bulk, an optional mobility kit makes it quite portable on smooth floors, enabling you to move your shop out of the way in a couple of minutes when necessary.

The 10" table saw features an excellent sliding table assembly which comes as standard equipment. The sliding table provides a remarkable crosscut capacity of 50", making it

possible (assuming external work support is provided) to accurately halve 4x8 plywood without even having to worry about maintaining contact with the rip fence. The 10" saw blade can be instantly retracted below table level or raised to its maximum 3-3/16" depth of cut position. The blade tilts up to 45 degrees, with micro-adjustment of cutting angle. Speed is 3200 rpm. The jointer tables can be positioned at the same height as the saw table providing good work support to the right of the blade.

The thickness planer handles work up to 12-1/4" wide by 9" thick. A 3-knife cutterhead rotates at 5500 rpm, providing 16,500 cuts per minute. Feed rate is 19 feet per minute, yielding 72 strokes per inch, sufficient for smooth finish planing. A dust collector head is built in.

The 12" jointer uses the same cutterhead, and features a table length of 55". Height of both infeed and outfeed tables can be finely adjusted, and the fence tilts up to 45 degrees, with stops at 45 and 90 degrees.

The shaper features a heavy-duty 6000 rpm spindle which features up to 5" of vertical travel. The lower portion of the spindle is 1-1/4" diameter, while the upper portion is 3/4" diameter, permitting use of either standard size cutter without the need to change spindles. A spring-loaded spindle locking device enables quick setup of cutters. Fully adjustable fence assembly includes vertical and horizontal work hold-downs. The sliding table provides a safe and efficient method of feeding difficult workpieces.

The Mortiser is a heavy-duty unit featuring a 5/8" diameter chuck. Table size is 8" x 17", with travel up to 6-1/2" wide by 5-1/2" deep x 3-1/2" high. Spindle speed is 5500 rpm. (The mortiser is easily removed from the main unit to provide better access when doing a large volume of jointing, though it is quite possible to use the jointer on moderate sized workpieces without removing the mortiser).

In addition to the instruction manual, a clearly illustrated 118 page book is included which covers in detail the operation of each part of the machine.

Robland has sold more than 50,000 combination machines around the world. Each machine is backed by a one year factory warranty covering parts and labor.

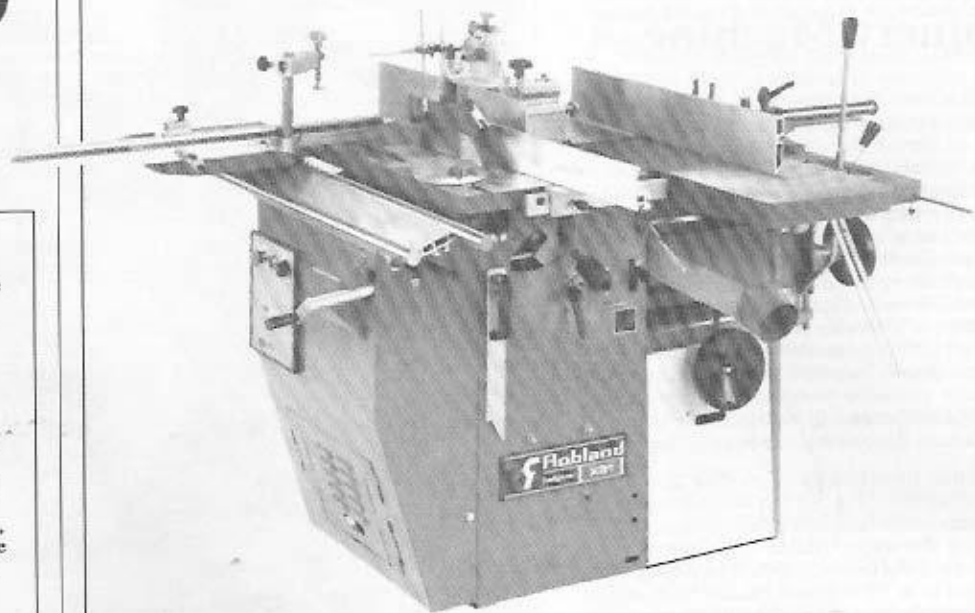
If your shop space is limited but your need for quality equipment is not, ask us for a demonstration of the Robland machine on your next visit to Highland Hardware.

*The Robland machine is shipped FOB Laguna Beach, California.*

X31	Robland Machine	\$4950.00
XMK	Mobility Kit	125.00

### Video Demo

If you are interested in seeing the Robland machine and cannot visit our store, we have available in VHS format a video which shows the machine in action. To receive it for up to 30 days, send a check for \$20 (to cover a \$15 refundable deposit plus \$5 handling charge), or call us at (800) 241-6748 and charge the payment on Visa, MasterCard or Discover.





## New Robland Video Demo Now Available

Though a video which showed the Robland Combination Machine in use has been available for quite a while, it was not one which generated rave reviews by those who saw it. (On the contrary, we even got a few unhappy letters complaining about it.)

We are pleased to announce that a new video has been produced, and it is indeed a tremendous improvement over the old one.



### Robland Model 310 12" Jointer/Planer

**T**HIS IS an impressive new machine from the makers of our largest stationary tool, the Robland combination machine. Weighing in at 550 pounds, driven by a 3 HP 220-volt single phase motor, the Model 310 offers auto-feed production thickness planing at 12" width with a huge 9" maximum stock thickness, and surface jointing at the same 12" width along very heavy cast-iron jointer beds totalling 55" in length.

The luxury of a 12" jointer is hard to overstate. It allows truing of practically any solid stock you work with, as well as smooth and easily-controlled edge jointing. The fence is enormous, 31-1/2" long by 6" high. It can be fixed at any position across the full width of the cutterhead, and can be set to 45° or back to 90° almost instantly. Massive though the beds are, they adjust smoothly with little effort. Maximum depth of cut is 7/32". The three-knife cutterhead, running at 5500 rpm, delivers 275 strokes per second to insure clean jointing under practically any conditions.

For thickness planing, both infeed and outfeed jointer beds are unlocked and pivoted out of the way. The built-in dust-collector hood swings up to do double duty as cutterhead safety cover, leaving access to the planer table as easy as with any other

If you are considering adding one or more stationary tools to your shop, it would be an extremely worthwhile investment to rent the new video, and see an expert show you the powerful features which the Robland offers.

In terms of dollar volume, the Robland machine was the leader in stationary machine sales at Highland Hardware during the month of April. While many prospective buyers have been cautious about investing in combination equipment for many years, the Robland's quality construction and sensible features have made it a logical machine to consider when large capacity is needed where shop space is limited. Details for renting the new video are listed at lower left.

planer on the market. Typical of European design, the planer bed is a solid steel surface with no bed rollers; regular waxing is required to minimize friction, while in trade one can plane practically any size lumber without sniping and without vibration-induced chatter or tearout. Heavily spring-loaded feed rollers move stock through the planer at a little over 19-1/2 feet per minute, yielding about 70 strokes per inch. The 310 can easily handle a 1/8" depth of cut on the hardest lumber.

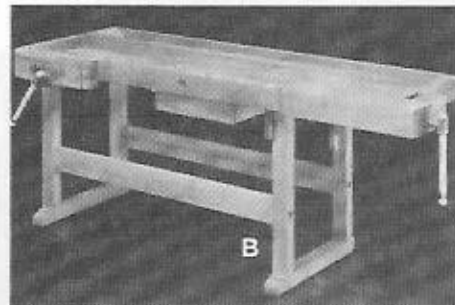
The engineering that goes into setting the knives in a cutterhead, especially when there are three knives to set, can make or break a planer or jointer. If it takes hours of awkward labor to re-set the knives, it gets harder and harder to remember the good features that led you to acquire the tool in the first place. Robland uses what looks very much like a conventional cutterhead design with knives and gibs set into slots, held in place with trapped bolts. A simple but ingenious modification makes the setting process dead easy: each knife rests on springs which hold it up against a setting gauge (standard equipment) while the bolts are tightened. Installing all three knives perfectly can be a matter of just a few minutes' work.

For the millwork shop looking to get the most out of the 310, Robland's optional heavy-duty mortiser can be attached in thirty seconds by fastening two nuts on its mounting plate. Like the jointer/planer itself, the mortiser is built like a tank, intended to provide durable reliability under the demands of commercial production. The mortiser table, measuring 7-3/4" deep by 16-3/4" wide, is controlled by extra-long levers that offer positive and precise control. A heavy cam clamp holds stock in place for mortising or boring. Table travel is 8" sideways, 5-1/2" along the boring axis, and 3-1/2" vertical. A quick-locking 5/8" capacity industrial chuck which mounts onto the 310 cutterhead is included with the mortiser package.

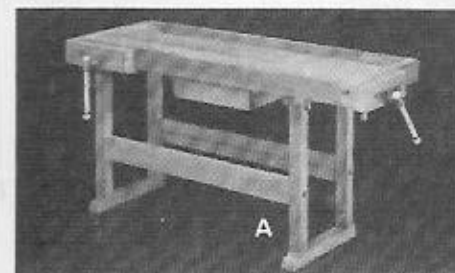
*The Robland 310 12" jointer-planer is available from Highland Hardware for \$2300. The mortiser unit sells for \$350. Both are shipped freight collect FOB Laguna Beach, CA.*

## European Workbenches

**T**HESE BEAUTIFUL West German benches should make a proud addition to any shop. Solid, steady, versatile and attractive, they will appeal to any woodworker who appreciates traditional design and sound workmanship. Benchtops and base frames are constructed of kiln-dried red beech for stability and long wear. All working surfaces are protected with an oil finish. Base frames come disassembled for shipping. Re-assembly is easy, and all necessary hardware is provided. Vises come already mounted.



The large bench offers a work surface 18" x 78-1/2". Its weight (220 lbs.) and stability are commensurately high for ease in handling even quite massive workpieces. Both vises are likewise designed to accommodate large-scale work: the shoulder vises' 18" wide by 5-1/4" deep jaw opens to 9-3/8"; the tail vise's 5-1/2" x 4-1/2" jaw opens to 9-3/8". Two steel dogs can efficiently secure a workpiece up to 83" long for shaping, chiseling or finishing. A tool well, 3" deep by 68" long, keeps tools in use within arm's reach but out of harm's way.



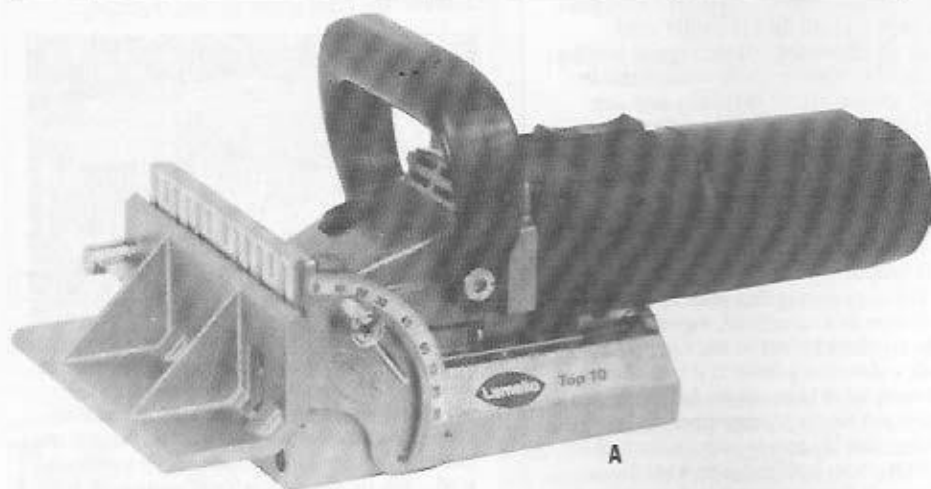
The small workbench provides a 14" x 57" work surface; it is a fine bench for carvers, modelers, and others who are mostly engaged in relatively compact work, and also would make an excellent side bench in any shop. Front & side vises feature 16" & 13" jaw width respectively, each with 4-3/8" opening. A sturdy wooden drawer mounts underneath the table. Top is 1-3/4" thick. Weighing 121 lbs. this bench is light enough to be moved as needed, but solid enough to stay put in the meantime. Given the quality of its construction and the versatility of its design, the small bench is surprisingly affordable. Both workbenches are shipped by truck, freight collect.

A 01.42.03 Small Workbench \$395.00  
B 01.42.04 Large Workbench 899.00

# 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.



## New LAMELLO Top 10 SALE \$499

The world-famous Lamello Top biscuit joiner has been given a new look and a new name for 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.

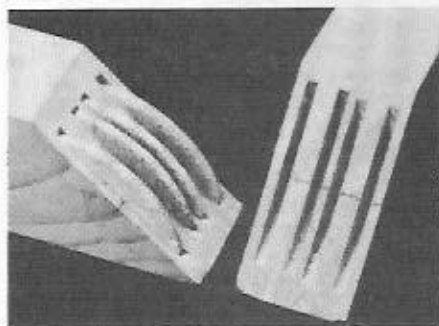
The Top 10 retains Lamello's unique hinged nosepiece, an outstanding feature which insures virtually foolproof accuracy and makes this joiner easier to use hand-held than any of its competition (except the Lamello Standard, of course). The fence can be flipped forward and locked in horizontal position, 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**

A 17.90.01	Lamello Top 10	569.00
17.90.05	Repl. Carbide Cutter	62.00
17.90.06	Dust Collector Adapter	72.00
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	34.95



## LAMELLO Standard SALE \$399

The new Lamello Standard incorporates most of the excellent features that have made its big brother the finest joiner on the market. Foremost among them is the hinged front fence that has always set Lamello apart; for hand-held joinery, there's never been a better design. Not just the fence but the entire base casting is inherited from the original Lamello Top. Tough aluminum alloy die castings are ground perfectly flat, and the nose is likewise ground at precisely 90° to the base. Tolerances are very tight; there's no loose play in the fence, or between motor and base as the blade is plunged forward into the work. The base is cast with two holes through the rear which will help mount the tool for jugged production work.

The Standard differs from the Top 10 in powerplant and transmission systems. The motor operates at 500 watts, but even in aggressive use it's difficult to notice much limitation on cutting efficiency. And there's no spindle lock built in, so on the rare occasion when it's time to remove the blade you'll use two wrenches instead of one. The switch is a toggle recessed into the rear of the motor housing, where the Top 10's is a thumb slide up front and center. The Standard comes with a right-angle accessory fence that can be bolted to vertical nosepiece for deeper than normal reach. The machine comes with a plastic carrying case, including wrenches, spring removal tool, oiler, and a sample handful of splines. Net weight is 6 lbs.

In all, the Lamello Standard is probably the Top 10's most serious competitor on the market; it is certainly built to higher standards than any of the lower-priced machines we've seen. If your shop environment is a little less intense than a factory floor, but your need for quality and productivity no less acute, then the Standard may well be the best investment you can make. *Sale Quantity Limited*

**SALE 399.00**

B 17.90.09 Lamello Standard 499.00



## LAMELLO Video

For those unfamiliar with (and perhaps mystified by) biscuit joinery, we are happy to provide a useful tool for understanding it. This professional 30-minute video in VHS format clearly illustrates and describes the step-by-step process of joint assembly made possible by Lamello (and similar) machines. It also explains the various Lamello accessories, providing concise lessons in the installation of Paumelle hinges and KD fittings, and clamping with the Lamello Spanner.

17.90.24 Lamello VHS Video 19.95





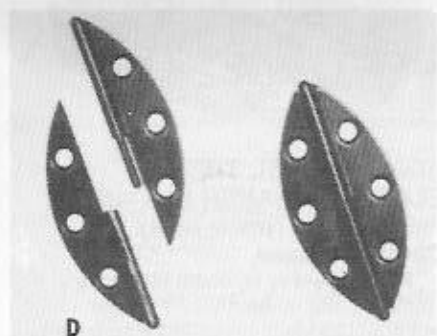
## THE BISCUIT JOINER HANDBOOK

by Hugh Foster. If biscuit joinery still sounds to you like some kind of cooking for woodworkers, or if your shiny new joiner still spends most of its time on the shelf, this substantial new review was written for you.

In this volume you'll have a look at what biscuit joinery is and why it works so well, where it came from, where it stands today and where it's likely to go tomorrow. Foster provides detailed descriptions of practically every joiner on the market, with first-hand analysis of their working characteristics, advantages and drawbacks. If you're in the market, this section will be a great help.

There's a chapter on commercially available accessories, complemented of course by another chapter on accessories you can make yourself. And then there's putting the tool to work, with chapters on using biscuit joiners for just about every kind of butt joint you can think of. If it's ever occurred to you that there must be a better way to join wood than with dowels, then head for the phone and order a copy of *The Biscuit Joiner Handbook*. You'll find you were right: there is a better way. 192 pages.

20.03.89 Biscuit Joiner Handbook 14.95

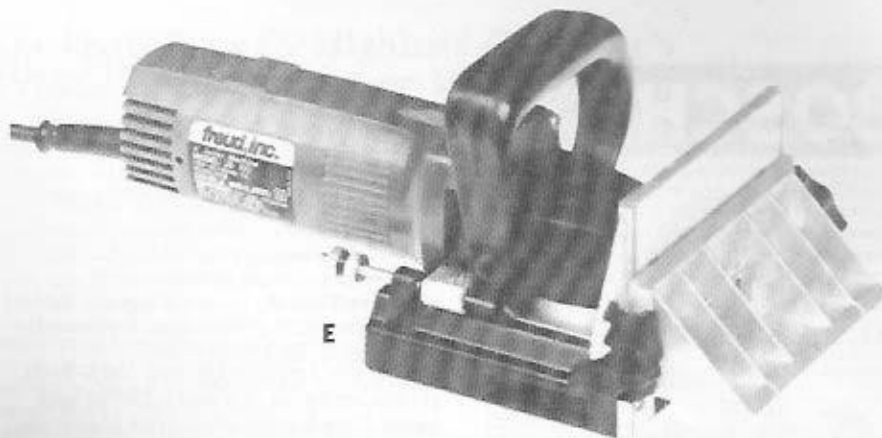


## DPAUMELLE HINGES

Paumelle hinges are another great convenience made possible by Lamello. The slip-pin hinges are the size and shape of a #20 spline; installation is as simple and foolproof as making one plunge cut with a biscuit joiner. The hinges are available in left- and right-hand configurations to allow removable or permanent panel attachments. Available in bright steel and black finishes (both heavy aluminum construction) & also in polished solid brass. Screws are included.

### PAUMELLE HINGES, Pack of 10

17.90.31	Bright Finish, Left	20.00
17.90.32	Bright Finish, Right	20.00
17.90.33	Black Finish, Left	20.00
17.90.34	Black Finish, Right	20.00
17.90.35	Solid Brass, Left	25.00
17.90.36	Solid Brass, Right	25.00



## 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 mitered work. A fixed vertical nosepiece works with a sliding horizontal fence for vertical-axis positioning. Angled vanes 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.

E 17.20.01	Freud JS100 Biscuit Joiner	169.95
17.20.02	Repl. Carbide Cutter	39.95
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	34.95



## B LAMELLO GLUE DISPENSER

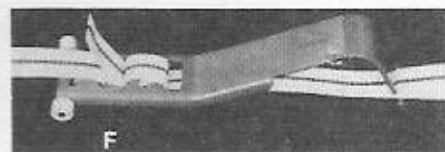
This cleverly-designed glue bottle has a double-orifice tip that gets glue where it's needed on the side walls of a Lamello mortise. A heavy, stable base allows the bottle to be stored nose-down, so glue is always at the tip and ready to go. The Lamello glue dispenser can also be used with fingertip control as a general-purpose glue dispenser for edges and surfaces in general glue-up work.

17.90.07 Lamello Glue Dispenser 21.95

## C-20 PLASTIC SPLINES

These new Lamello splines are designed for joining Corian, Avonite, Fountainhead and other solid surfacing materials. They have a milky-white semi-translucent color that transmits light like Avonite or Fountainhead, and are compatible with the appropriate adhesives. Available only in size #20.

17.90.14 Box of 250 C-20's 29.95



## F LAMELLO SPANNER CLAMPS

These are quick-acting high strength web clamps for use on any polygonal objects from carcasses to chair frames to cat boxes. The steel cam-action handle features nylon rollers to avoid damaging the work, a reliable double-pass buckle, and a keeper notch that locks the handle in tightened position. The set comes with two handles and two 16-foot nylon belts.

17.90.08 Lamello Spanner 52.00



# BOSCH



## 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.

10.16.01	Bosch 1604 Router	\$129.95
10.16.02	Straight Guide	23.50
10.16.08	3/8" Collet Cone	10.75
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



## BOSCH PANTHER RECIPRO SAW

Bosch recently joined the reciprocating saw market with a heavy-duty entry, the Bosch Panther. Its 8.4 amp motor outpowers Milwaukee, Makita, Porter-Cable & AEG for rugged performance capability. Model 1632VSK has 0-2400 rpm variable speed range plus 4-position orbital action control. 1632VSK VS Orb. Recipro Saw \$149.95

## BOSCH 1581VSK JIGSAW WITH METAL CARRYING CASE

Use this saw one time, and you'll know why it is universally acknowledged as the finest there is. Steady, precise control is virtually effortless - in fact, it's hard to believe that reciprocating action can be engineered to be so smooth. Includes 4 orbital-action settings and a speed range from 500 to 3100 strokes per minute. 4.8 amp industrial-duty motor. Blower keeps cut line free of sawdust.

Available equipped with our metal carrying case, or without. *Saw List Price \$235*  
 1581VSK Orbital Jigsaw & Case \$159.00  
 1581VS Orbital Jigsaw Only 139.00  
 05.16.06 Metal Case Only 29.95

### Bosch Jigsaw Blades, Pack of 5

	Length	tpi	Application	
T144D	4"	6	Fast rough cut	5.00
T244D	4"	6	Fast rough scroll cut	6.45
T101B	4"	10	Very clean cutting	5.50
T119B0	3"	12	Tight scroll cutting	5.50
T101BR	4"	10	Laminates	5.50
T127DF	4"	8	Metals up to 1/4" thick	8.70
T144DF	4"	6	Nail-resistant rough-in	9.55



## NEW BOSCH 1273DVS 4" X 24" VARIABLE SPEED BELT SANDER

Now you can choose the appropriate belt speed to match the job at hand whether you are rapidly removing stock or sanding for a fine finish. Superbly balanced body also features a dustbag for clean operation. 10.5 amp. 14.8 lbs. Belt speed 1150-1550 SFPM.

15.16.01 1273DVS V.S. Belt Sander \$229.95



## EXTRAORDINARY BUY on Bosch's Powerful 9.6V Cordless Drill Model 920VSR

Dual-Range Variable Speed Reversible Drill Includes Free Carrying Case

A limited-time special from Bosch lets us pass along a great buy on this heavy-duty cordless driver/drill. Two variable speed ranges, 0-400 and 0-900 rpm, let you choose the best combination of torque and efficiency for the job at hand, be it driving screws in softwood or drilling holes in steel. The 920VSR comes with a removable quick-charge 9.6-volt battery and Bosch's new multi-voltage charger, which will handle any of Bosch's NTC battery packs. *List Price \$207*  
 920VSR Bosch Cordless Drill \$109.95



## BOSCH MODEL 3258 ELECTRIC PLANER Features Inexpensive Throw-Away Carbide Knives

For a limited time, Bosch is running a promotion that enables us to offer this powerful hand-held planer at a superb price. The most outstanding feature of the 3258 is its double-edged, self-setting, inexpensive carbide blade system - when edges finally gets dull, just slip the blades out of the cutterhead, turn them over and slip 'em back in. When both edges are shot, replacement blades cost only \$9.95 a pair, which strikes us as a remarkable bargain. The 3258's 5.7-amp motor is the most powerful in its class, and can handle a 1/16" depth of cut across the full 3-1/4" blade width. The tool's design allows rabbetting to 3/4" max depth, and the fence provided as standard equipment facilitates chamfering or beveling up to 45°. The 3258 is compact (11" long) and light enough at 6.6 pounds for easy hand-held use wherever the job needs to get done. *List Price \$205*

3258 Bosch 3-1/4" Planer \$149.95  
 2607000096 Pair of Replacement Carbide Knives 9.95

## We Invite You to Apply Now for Highland Hardware's new SERVISTAR MasterCard or Visa Card

We want to make it easy and convenient for you to finance your purchases. The new SERVISTAR® MasterCard® or Visa® Card (offered in cooperation with PNC National Bank of Wilmington, DE) can give you immediate credit up to \$2000 or more (subject to credit approval). Use it with us 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.

Our card comes with an Annual Percentage Rate of 17.9%, lower than most other credit cards. This applies to purchases or cash advances. Also, you can avoid any Finance Charges on your purchases if you pay your entire monthly balance in full.

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

**HERE'S A WAY TO SAVE.** Every purchase you make with your SERVISTAR Visa or MasterCard (regardless of where the purchase is made) earns you a 1/2% rebate in Starbucks™. Here's how it works. Twice a year, your purchases on the card will be totaled, and if they are \$500 or more, we'll send you Starbucks. If your purchases are less than \$500, we'll carry them over until your total reaches \$500. Starbucks are redeemable in merchandise at Highland Hardware, or any of the other 3000 SERVISTAR Hardware Stores around the country.

No annual fee for the SERVISTAR MasterCard or Visa is charged for the first year. You have your choice of either a MasterCard or Visa account and a second card of the same type at no additional charge. Whichever card you choose, after your first year, the Annual Fee is \$18.

To apply, complete the application below and return it to Highland Hardware.

If you are in a rush and you are placing an order worth \$100 or more, specify "INSTANT CREDIT", and we will expedite processing of your application, and notify you within a few days. (Otherwise, it normally takes 2 to 3 weeks to receive your card).

Businesses are eligible for a non-revolving SERVISTAR Visa or MasterCard account, but must complete a special business application, rather than the one below. Call or write us for a copy.

### Disclosure Summary

Annual Percentage Rate	17.9%
Annual Fee	\$18.00
Grace Period	25 days on purchases
Finance Charge Minimum	50¢ when a Finance Charge is due on purchases.

Mail application to: **Highland Hardware**  
1045 N. Highland Ave.  
Atlanta, GA 30306

<b>Please tell us about yourself</b>					
Type of account		Check one			
<input type="checkbox"/> Individual		<input type="checkbox"/> New Visa Account			
<input type="checkbox"/> Joint		<input type="checkbox"/> New MasterCard Account			
<b>Cash Advance Checks</b>					
I want to pay off my other credit card balances which total about \$_____ Please send me cash advance checks so I can pay off these balances.					
First name		Last name (indicate Jr., Sr., etc.)		Date of birth	
Home street address		City		State	
How long?		Previous home address (including City, State, and Zip Code)		Zip Code	
Yrs. Mos.		Yrs. Mos.		Home telephone	
<input type="checkbox"/> own <input type="checkbox"/> with parents <input type="checkbox"/> other		Name and address of nearest relative not living with you		Relationship	
Highest level of education completed		Name of business or employer		Type of business	
<input type="checkbox"/> High School <input type="checkbox"/> College <input type="checkbox"/> Graduate school		Position		How long?	
Yrs. Mos.		Yrs. Mos.		Check if <input type="checkbox"/> self-empl. <input type="checkbox"/> retired	
Gross monthly salary		Business street address		City	
\$		State		Zip code	
Business telephone		Previous employer		Address	
Yrs. Mos.		Position		How long?	
Yrs. Mos.		Yrs. Mos.		Gross monthly amount	
Name and address of source of other income		Name and address of source of other income		Gross monthly amount	
Yrs. Mos.		Yrs. Mos.		\$	
<b>Please tell us about your co-applicant</b>					
First name		Last name (indicate Jr., Sr., etc.)		Date of birth	
Home street address (if different than applicant's)		City		State	
Name of business or employer		Type of business		Position	
How long?		Yrs. Mos.		Check if <input type="checkbox"/> self-empl. <input type="checkbox"/> retired	
Gross monthly salary		Business street address		City	
\$		State		Zip code	
Business telephone		Previous employer		Address	
Yrs. Mos.		Position		How long?	
Yrs. Mos.		Yrs. Mos.		Gross monthly amount	
Name and address of source of other income		Name and address of source of other income		Gross monthly amount	
Yrs. Mos.		Yrs. Mos.		\$	
<b>Please give us some financial information</b>					
Type of account		Name of institution		Account number	
<input type="checkbox"/> Checking <input type="checkbox"/> Savings <input type="checkbox"/> Other <input type="checkbox"/> Money Market		Name of institution		Account number	
Name of current <input type="checkbox"/> Mortgage holder <input type="checkbox"/> Landlord		Purchase price		Current market value	
Balance owed		Monthly payment or rent		Monthly payment	
\$		\$		\$	
List ALL Applicant's AND Co-Applicant's credit references (including installment loans, charge accounts, and credit cards). If none, so state. Attach separate sheet if necessary.		Name of creditor and city		Type of credit (e.g., auto loan)	
Unpaid balance		Monthly payment		Relationship	
\$		\$		\$	
\$		\$		\$	
\$		\$		\$	
\$		\$		\$	
\$		\$		\$	
AUTHORIZED USER. There is no extra charge for the first two cards issued on each account. Additional cards are provided at a one-time cost of \$10 each. Please issue a card on my/our account to:					
AGREEMENT. I certify that the information contained in this application is complete and accurate and authorize PNC National Bank ("Bank") to: (1) check my credit and employment history and answer questions about its credit experience with me; (2) retain this application; and (3) exchange financial information with any of Bank's affiliates or correspondents. If the application is approved, I agree to pay the Annual Membership Fee and to be bound by the terms of Bank's Credit Card Agreement as is in effect from time to time, and also authorize Bank to provide my name and address to SERVISTAR Corporation and/or its dealer owners.					
Applicant's Signature		Date		Co-Applicant's Signature	
X		X		X	
<b>BANK USE ONLY</b>					
P A B S SE L C SC F					
# _____ X# _____ Q _____					
ON 4330 EN C 02115					



IF AN ITEM IS OUT OF STOCK:  
☐ Back order and ship as soon as possible  
☐ Cancel order for that item

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**HIGHLAND HARDWARE**  
 1045 N. Highland Ave., NE  
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<b>ORDERED BY:</b> <small>(Please use self-stick address label from back cover)</small> NAME _____ ADDRESS _____ CITY _____ STATE _____ ZIP _____ PHONE (DAY): (____) _____ (NIGHT): (____) _____	<b>SHIP TO:</b> NAME _____ STREET _____ CITY _____ STATE _____ ZIP _____  DATE OF ORDER _____
--	--

PAYMENT MUST ACCOMPANY ORDER. WE DO NOT SHIP C.O.D.

PAID BY: ☐ Discover  
☐ Check ☐ Visa  
☐ Money Order ☐ MasterCard

CARD NUMBER 

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MO YR  
 EXP DATE 

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SIGNATURE \_\_\_\_\_ Bank No. \_\_\_\_\_

Quantity Ordered	Quantity Shipped	Quantity Back Ordered	Catalog Number	Description	Price Each	Amount

Prices in Wood News 23 valid through Aug. 31, 1989 except where noted.  
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**SUB-TOTAL**  
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If your merchandise totals: **ADD SHIPPING CHARGE \***  
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 \$30.01 to \$60.00 ..... 4.00  
 \$60.01 to \$90.00 ..... 5.00  
 \$90.01 and Over ..... 6.00

**TOTAL**  
 Amount Enclosed

\* Above shipping charges apply to UPS shipments only. If you require shipping via U.S. Mail, please specify, and add an additional \$5.00 to the UPS charge.

Above shipping charges do not apply to machines and workbenches, which are shipped either freight collect, freight prepaid (Unisaw special only), or for a flat rate, as indicated in the catalog description of the items.

NOTE: If ordering HYDROCOTE products during cold-weather months, please give a shipping address where *someone will be present* to receive your delivery. This will help to eliminate the possibility of the product freezing due to being left at your doorstep by UPS.



# Hot Items!

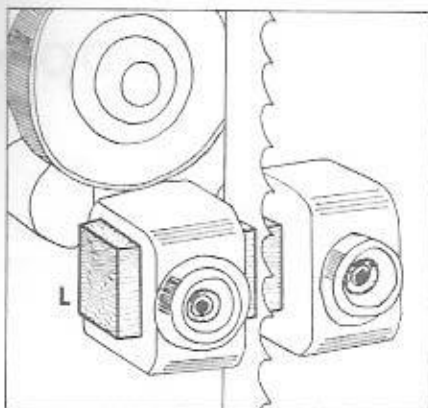
## NEW BANDSAW "COOL BLOCKS" PROLONG BLADE LIFE & INCREASE ACCURACY

Cool Blocks are made to replace the original metal guide blocks which came with your bandsaw. They are made of special composite phenolic resins impregnated with graphite, and can be set closer to your blade than metal blocks, thus offering a more stable, guided cut. Conventional metal guide blocks create friction and heat by their metal-to-metal contact with the blade, leading to blade fatigue and premature breakage. Cool Blocks eliminate this problem so blades run cooler with less friction and last longer.

The dry lubricant in Cool Blocks is formulated to give sufficient blade lubrication but will not stain the wood. The blade will run smoother and quieter. Cool Blocks pay for themselves quickly by extending the life of your bandsaw blades.

### L COOL BLOCKS, Set of 4

Band Saw	Cool Block Size	Price
08.60.01 Delta 14"	1 1/2" x 1 1/2" x 3/4" (t beveled)	9.95
08.60.05 Taiwan 14"	1 1/2" x 1 1/2" x 3/4"	9.95
08.60.02 Sears 12"	3/4" x 3/8" x 3/4"	9.95
08.60.06 Old Sears 14"	round x 3/4"	9.95
08.60.07 Old Sears 5/16"	round x 3/4"	9.95
08.60.03 Inca 10-1/2"		9.95
08.60.04 Shopsmith 11"		9.95



## MAKITA 6093DW Cordless 2-Speed VSR Driver/Drill

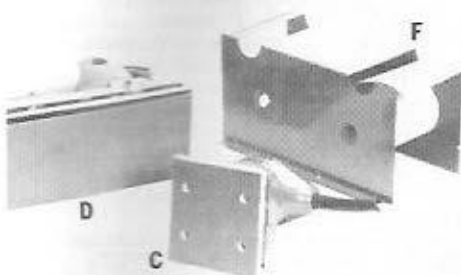
This may well be (for the time being) Makita's ultimate 9.6-volt cordless drill. The 6093DW features variable speed within two distinct ranges, 0-400 rpm or 0-1000, allowing the user to maximize torque for heavy screw-driving or large diameter boring, or to opt for maximum installation or drilling speed. The tool also offers a six-stage variable-torque clutch for total control over screwdriving force. The 6093DW comes with removable one-hour fast-charge battery, 110-volt charger, a double-ended #2 Phillips bit and a tool case.

M 07.10.41	6093DW Cordless Drill	139.95
07.10.12	Spare 9.6V Battery	48.00
07.10.13	Replacement Charger	58.00

## Makita 6010DWK Cordless Driver/Drill

This is the cast-iron skillet of Makita's cordless drills. Single-speed, reversible, lightweight and comfortable in the hand, virtually indestructible, the 6010DWK is one of the best-loved power tools we've ever sold. It is well suited to drilling in wood or metal, and is a powerful and easily controlled screwdriver in the shop and around the house. Fingertip reversing toggle, clip-mounted chuck key, manual-reset overload button, quick-charge 7.2-volt battery, charger, plastic tool case and double-ended Phillips screwdriver bit are all standard equipment. Weighs 2 lbs. 10 ounces.

N 07.10.02	6010DWK Cordless Drill	89.95
07.10.03	Spare 7.2V Battery	40.00
07.10.04	Replacement Charger	48.00



## 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 slip-page 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.

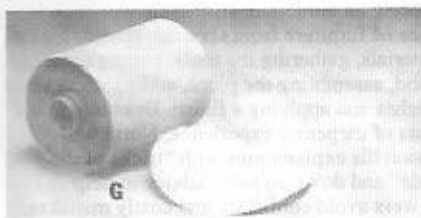
For sanding round, highly contoured or very delicate pieces, the Stikit hand pad is a great help. It's a 4-1/2" x 4-1/4" soft neoprene pad with a finger strap on the back and facing fabric on the front; it moulds easily to any shape, providing support to keep paper from tearing or crimping, and insulating 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

C 15.61.01	Backing Pad for Makita Palm Sanders	4.95
15.61.02	Backing Pad for Porter Cable Palm Sander	4.95
D 15.61.04	Conversion Facing for all Finishing Sanders	2.95
E 15.61.05	Stikit Hand Sanding Pad	3.75
F 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	11.95
15.61.13	120 grit	11.95
15.61.14	150 grit	11.95
15.61.15	180 grit	11.95
15.61.16	220 grit	11.95
15.61.17	320 grit	11.95



## G 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

## H 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 five grits listed below.

15.61.21	Stikit Sanding Block	8.95
15.61.22	55" roll of 100 grit paper	2.20
15.61.23	70" roll of 120 grit paper	2.20
15.61.24	80" roll of 150 grit paper	2.20
15.61.25	95" roll of 220 grit paper	2.20

# The New Yankee Workshop with Norm Abram

**M**ASTER CARPENTER Norm Abram, who for ten years has helped guide intrepid do-it-yourselfers through home renovation projects on the popular PBS series *This Old House*, now has his own show, this time devoted to showing viewers how to build simple, elegant furniture at home. *The New Yankee Workshop* picks up where *This Old House* leaves off.

Highland Hardware is pleased to be the new series' underwriter at Atlanta's PBS affiliate, WPBA. Premiering in January 1989, the show began with a 13-week series airing on Saturdays at 2 pm. The series is scheduled to repeat on WPBA (Channel 30) beginning Saturday, June 17, running until September 9.

The show attempts to reflect the time-honored traditions of honest workmanship and good value while taking advantage of state-of-the-art techniques and tools. "The series will present practical, easy-to-follow lessons in making quality furniture that any amateur craftsman with persistence, patience and the proper tools can build," according to executive producer Russell Morash.

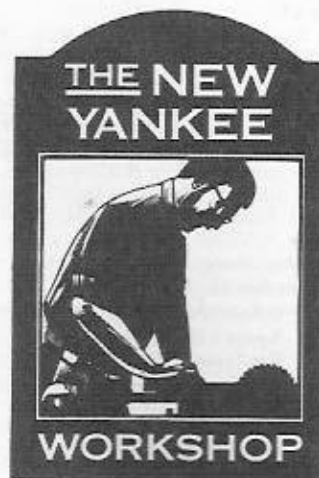
Each week on *The New Yankee Workshop*, Norm Abram will offer complete, step-by-step instructions for one woodworking project. Through time-lapsed taping, Norm will take the home woodworker through the process of creating an attractive, affordable and durable piece of furniture from scratch: buying the materials, gathering the tools, cutting the wood, assembling the piece, adding decorative touches and applying a finish. Drawing on his years of carpentry experience, Norm will season his explanations with "tricks of the trade" and down-to-earth advice to help viewers avoid confusion and costly mistakes, much as he's done (and will continue to do) on *This Old House*.

The collection of projects Norm demonstrates in the first season of *The New Yankee Workshop* includes: a medicine cabinet, a workbench, a drop-leaf table, a blanket chest, a bedside table, a bathroom vanity, a trestle table, a bookcase, a chest of drawers, a candle stand, a hutch, a writing desk and a corner cupboard. The series begins with simpler pieces and progresses to more complex projects as the season continues.

Norm's designs for most of the collection draw their inspiration from furniture built by the Shakers, a communal religious order that flourished in 18th- and 19th-century New

England. The Shakers earned a lasting reputation for the impeccable design and sterling workmanship of their furniture and handicrafts. The simple, elegant style they favored remains popular today.

To trace the historical origins of each piece he builds, Abram takes his viewers on video field trips to the Hancock Shaker Village in western Massachusetts, to a sea captain's house on the island of Nantucket off the Massachusetts coast, and to Old Sturbridge Village, a "living history" museum in Sturbridge, Massachusetts.



If the show were to be appraised from a critical point of view, it would be said that its approach leans heavily in the direction of the beginning woodworker, although people who are well underway on a woodworking hobby will find many of the projects amply appealing and sufficiently challenging.

Norm brings to the workshop a lifetime of experience as a master carpenter (that is, as a housebuilder). For him, making furniture is somewhat of a new endeavor. Some of the ways he uses a tablesaw may make your high school shop teacher cringe. When watching the show, keep in mind that Norm has had a lifetime of practice using the tablesaw as only a full-time carpenter knows how. Always be extremely cautious yourself, and follow your saw manufacturer's safety instructions exactly.

The series exhibits very nice taste in terms of the projects selected, and provides an excellent place for a budding woodworker to

begin and develop his career. The overall construction of the projects is good and sturdy, though in some cases more consideration might have been given to wood's tendency to move during changes in humidity.

Here is a list of the first 13 projects, and the dates they are scheduled to appear this summer on WPBA/Channel 30 in Atlanta. (This schedule is tentative and subject to change. Other areas check local listings.) Each show airs in Atlanta Saturday at 2 pm.

June 17	Medicine Cabinet
June 24	Workbench
July 1	Drop-Leaf Table
July 8	Blanket Chest
July 15	Bedside Table
July 22	Bathroom Vanity
July 29	Trestle Table
August 5	Bookcase
August 12	Chest of Drawers
August 19	Candle Stand
August 26	Hutch
September 2	Writing Desk
September 9	Corner Cupboard

## New Yankee Workshop Book, Plans & Videos

A companion book, *The New Yankee Workshop*, written by Norm Abram, provides detailed information on the woodworking projects featured in the TV episodes, including construction notes, drawings and dimensions of the projects. It provides excellent help in planning and carrying out each project, and is generously and clearly illustrated.

The book is available from Highland Hardware for \$16.95 plus \$3 shipping.

Also available are individual measured drawings of each project. These can be purchased for \$6 each postpaid.

Highland Hardware also makes available each of Norm's half-hour shows on VHS videos. (Included with each video is the corresponding measured drawing). Videos can be purchased for \$24.95 each (plus shipping), or they can be rented.

Rental is for a period of up to 30 days, and costs \$14.95 for the first tape rented, plus \$10.00 for each additional tape rented on the same order. The rent includes delivery to you. You pay return postage. A refundable deposit equal to the total cost of the tapes rented is required in advance. (This may be charged to your Visa, MasterCard, or Discover Card). An order form is on page 46 of *Wood News*.



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