Number 26 Winter 1991

highland hardware

Wood News

Serving Woodworkers

A Supplement to the Highland Hardware Woodworking Tool Catalog

1991 Seminars at Highland Hardware

Jan. 19	Sharpening
Jan. 26	Using Hand Planes
Jan. 27	Hand Tool Joinery: Cutting Dovetails
Jan. 28	Drawing & Design Course Begins
Jan. 29	Basic Carving Course Begins
Feb. 2	Getting the Most Out of Your Scrollsaw
Feb. 9	How to Build a Workbench
Feb. 16	Getting the Most Out of Your Bandsaw
Feb. 23-24	Wood Turning with Rude Osolnik
March 2	Routers and Jigs
March 3	Advanced Router Techniques
March 9	Getting the Most Out of Your Table Saw
March 15-16 & 16-17	Making the Traditional Shaker Oval Box with John Wilson
March 22	Tage Frid Design Lecture
March 23-24	Bending, Veneering & Finishing Workshop with Tage Frid
April 13	Mastering the Incra Jig
April 19-23	Build a Windsow Chair with Michael Dunbar
April 27	Fundamental Wood Finishing
April 28	Finishing with Hydrocote
May 4-5	Chip Carving Workshop with Wayne Barton
May 11	Basic Turning

Attend the Atlanta Woodworking Show April 5-7, 1991

Thousands of area woodworkers will gather downtown at the Inforum exhibit hall April 5-7 for The Woodworking Show's annual spring visit to Atlanta.

First held in Atlanta in 1986, the show has been staged at the Atlanta Civic Center, the Georgia International Trade Center, and for the last two years, the Lakewood Fairgrounds.

Inforum is located at the intersection of Spring St. and Baker St., and is conveniently accessible to the Peachtree Center Marta station. Admission to the show is $6 per day.

Manufacturers and suppliers from around the country will join stores from Atlanta and the southeast to present an exciting exhibition of all that's new in woodworking tools and supplies. Expert woodworkers will be on hand teaching seminars and workshops.

Highland Hardware will have a large exhibit featuring many of our major product lines demonstrated by factory reps and our own tool specialists, plus we'll be offering great show specials on many of our most popular items.

For more information and to register for show seminars, call (800) 826-8257 between 8 am and 5 pm *Pacific Standard Time*.

INSIDE Wood News 26

Renowned author and furnituremaker Tage Frid returns to Highland Hardware March 22-24 for a slide lecture and weekend workshop. Details are on page 3. See also Jack Warner's article about Tage Frid on page 4.

You Can Order from *Wood News*

As a convenience to our customers who wish to order items from *Wood News* by mail, you'll note that we now include a tear-out order form with pre-addressed envelope similar to the one provided in our main catalog. The order form can be found between pages 24 and 25.

Orders charged to Visa, MasterCard or Discover can also be placed by phone toll free by calling (800) 241-6748. Charge card users can fax their orders to us at (404) 876-1941.

Wood News is provided free of charge to our mail order customers. Besides featuring news about our woodworking seminars and other events, *Wood News* also serves as a way for us to offer helpful advice on choosing new tools and on getting the most out of ones you already own.

In addition to providing in-depth coverage of a few selected tools in each issue, *Wood News* also presents many of our most useful and popular tools in standard catalog format.

Twice each year, we also publish a new edition of the full Highland Hardware catalog, which features over 2500 tools, books and supplies. If you don't yet have a copy, give us a call at (800) 241-6748, and we'll put one in the mail to you.

If you have ideas for topics you would like to see covered in future issues of *Wood News*, suggestions that you would like to pass along, or any comments at all, we'd appreciate receiving a short note. We value your opinion as well as your patronage.

Offers effective thru 2-28-91

Act Now to Receive Rebates & Reduced Prices on Selected Delta Tools

Only a short time remains to take advantage of big savings on many of our most popular Delta woodworking machines, including the Delta 14" bandsaw, the Delta Unisaw, and the Delta contractor's saw with Unifence. See pages 8-11 for details.

A special purchase has enabled us to reduce our price on Delta's model 28-283 14" enclosed-stand bandsaw with 3/4 HP motor from the $749.95 listed in our Fall 90/Winter 91 Catalog to only $699.95 (plus $40 shipping within 48 states). When you factor in Delta's $100 factory rebate, your cost (less shipping) is only ***$599.95!***

A Delta Unisaw can be bought for as low as ***$1199*** after rebate, and we'll pay the freight charge anywhere within the 48 states. See page 8 for more details.

And we've reduced the price of Delta's popular Contractor's Saw packaged with the new 30" Unifence (model 34-445) from $845 to $799.95 (plus $40 shipping within 48 states). Counting Delta's factory rebate, your cost (less shipping) is only ***$699.95!***

Hurry, rebates end 2-28-91. Sale prices good while supplies last.

1991 Seminars at Highland Hardware

Sharpening

- *Saturday, January 19* *9 am to 4 pm*
- *#S1* *Admission: $35.00*
- *Instructor: Zach Etheridge*

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

Using Hand Planes

- *Saturday, January 26* *9 am to 4 pm*
- *#HP1* *Admission: $35.00*

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

Hand Tool Joinery: Cutting Dovetails by Hand

- *Sunday, January 27* *9 am to 4 pm*
- *#DT1* *Admission: $35.00*

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

Drawing & Design Course

- *January 29- March 5*
- *Tuesday evenings* *7 pm to 9:30 pm*
- *#DD1* *Admission: $120.00*

This class is for those who would like to design and build a piece on their own, but are intimidated by the blank page.

Drawing is a fast and economical way of designing and developing your ideas. Translating ideas from your head onto paper is not as difficult as you may think.

In this class Tony Dileo will teach basic design elements and help develop your ability to "see." Drawing will include freehand as well as mechanical drawing, though emphasis will be on freehand sketching. Students will be asked to furnish a few simple drawing supplies.

Basic Woodcarving Course

- *January 30- March 6*
- *Wednesday evenings* *7 pm to 9:30 pm*
- *#BC1* *Admission: $120.00*

This course is geared for beginning to intermediate level carving students. Each participant will select a project and follow it to completion within the 6-week period. Tony Dileo will begin each class with a presentation on a topic relevant to the stage reached by students' projects. The bulk of each class will be devoted to hands-on work by students, with time allowed to handle questions and solve problems encountered while working. The fee includes enough wood to handle a moderate-sized project. (If you select a larger project, additional wood may be purchased from the store.) Tools must be supplied by each person. For those without tools, a list of recommended tools will be provided. Bench space and sharpening equipment will be provided at the class. Enrollment is limited to 12 students.

Register for seminars by visiting the store, or by mailing the order form found opposite page 24 of *Wood News* along with a check for the seminar fee. Visa, MasterCard, and Discover users may register by phone at (404) 872-4466.

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

Getting the Most Out of your Scrollsaw

- *Saturday, February 2* *9 am to 4 pm*
- *#SS1* *Admission: $35.00*

During the 1980s, the scrollsaw became one of the most popular woodworking machines. Great strides were made in tool design, and prices actually came down. In this seminar, Brad Packard will show scrollsaw owners a number of things not usually dealt with adequately in owner's manuals, including maintenance fundamentals, choosing and tensioning blades, and how to easily perform a variety of cuts, including interior cuts.

How to Build a Workbench

- *Saturday, February 9* *9 am - 4 pm*
- *#WB1* *Admission: $35.00*
- *Instructor: Zach Etheridge*

The workbench is not only one of the most fundamental of all woodworking tools, it's also a great woodworking project in its own right. In this class Zach Etheridge discusses the merits and demerits of various common workbench designs, and covers the process of designing a bench suited to your own needs and shop space. Building the base and attaching the top, installing Record vises and other traditional vise hardware, and building in a system of bench dogs will be covered in detail. Focus will be on practical bootstrap methods available to the small shop not already equipped with a good bench on which to do the work.

Getting the Most Out of your Bandsaw

- *Saturday, February 16* *9 am to 4 pm*
- *#BS1* *Admission: $35.00*

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

Wood Turning with Rude Osolnik

- *February 23-24*
- *Saturday 9 am - 4 pm Sunday 9 am - 3 pm*
- *#RO1* *Admission: $75.00*

Rude Osolnik, described by Dale Nish as one of America's most versatile woodturners, returns to Atlanta for a woodturning seminar. A professional who has been turning and teaching for over 45 years, Rude will cover regular bowl turning, natural edge bowl turning, various types of spindle turning, pressure turning, and mandrel turning. On his last visit in 1985, Rude taught us many new tricks of the turning trade, and we look forward with pleasure to his repeat visit. Register early as seating is limited.

Routers and Jigs Fundamentals and Beyond

- *Saturday, March 2* *9 am to 4 pm*
- *#RJ1* *Admission: $35.00*

This is a full day on the most versatile machine in the shop. Zach Etheridge starts you off with the basics of router operation and safety, and continues through shop-built jigs for cutting, shaping and joinery. You'll review the current state of the marketplace for routers and bits, both of which are in a state of rapid evolution. You'll get the basics of table-mounting your router and putting it to work for maximum productivity, including a detailed look at making drop-in sub-bases, fences and accessories.

Advanced Router Techniques

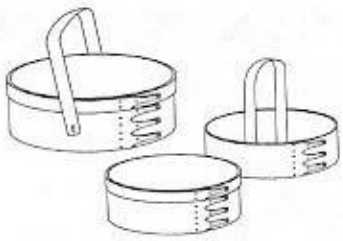
- *Saturday, March 3* *9 am to 4 pm*
- *#AR1* *Admission: $35.00*

In response to numerous requests, we're pleased to offer this new sequel to our popular Routers and Jigs class. Zach Etheridge will cover many more shop-built jigs, freehand table-mounted work, frame-and-panel construction, sliding dovetails, and operation of the Leigh Dovetail Jig for through and half-blind dovetails. Previous attendance in the Routers & Jigs class is not mandatory (though it is recommended), however, solid familiarity with router basics is essential for this advanced class.

Getting the Most Out of Your Table Saw

- *Saturday, March 9* *9 am to 4 pm*
- *#TS1* *Admission: $35.00*

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



Making the Traditional Shaker Oval Box

- *March 15-16 & 16-17*
- *Friday 6 pm - 10 pm Saturday 9 am - 4 pm and repeated*
  Saturday 6 pm - 10 pm Sunday 9 am - 4 pm
- *#SB1 & SB2 Admission: $90.00*

John Wilson, an expert boxmaker in the Shaker tradition, will teach this very popular hands-on class in which each participant will make several Shaker oval boxes. Five sizes can be made in the class, and most students can expect to complete a nest of five. Working from patterns, you'll learn to cut hardwood veneers, bend box bands, fit tops and bottoms, and form handles for carriers. The fee includes use of tools and cost of all necessary materials for making the boxes, including patterns. Sign up for either the Friday evening-Saturday session or the Saturday evening-Sunday session.

Design with Tage Frid An Entertaining Slide Lecture

- *Friday, March 22 7:30 pm*
- *#FL1 Admission: $5.00*
- *(free for those enrolled in weekend seminar)*

The most widely known and highly regarded woodworking teacher and author in the U.S. will share an evening of slides on woodworking and design, punctuated with his insightful commentary and penetrating wit.

Mr. Frid will show a large number of slides illustrating examples of what he considers both good and bad design, and explaining what makes each so. If you are interested in broadening your design perspective, or merely understanding woodworking in its broader context, you will find this event enlightening, satisfying and fun. Please reserve a space in advance.

Tage Frid Workshop on Bending, Veneering & Finishing

- *March 23-24*
- *Sat. 9 am - 4 pm Sunday, 9 am - 3 pm*
- *#TF1 Admission: $120 (incl. Fri. lecture)*

The inimitable Mr. Frid returns to Atlanta this spring for his eighth annual weekend seminar at Highland Hardware. This year Tage will cover a broad range of techniques for bending, including steam bending, laminated bends, and form-bending plywood. He'll then turn to veneering, demonstrating hammer veneering techniques using hot hide glue on edges and surfaces, and sandbag veneering for complicated surfaces such as bent plywood. He'll finish up with his favorite finishing techniques, including creative uses of aniline dyes and of course Frid's Fine Fast Finish.

Seating is limited, so register early to avoid missing a chance to see and hear a truly remarkable teacher performing woodworking demonstrations in an action-packed seminar.

Mastering the Incra Jig

- *Saturday, April 13 9 am to noon*
- *#IJ1 Admission: $20.00*

This will be a fun and creative morning of putting our most popular router jig through its paces. Zach Etheridge will show you how the Incra Jig can turn your router table into a precision joinery machine for making dovetails and box joints, "impossible"-looking decorative dovetails, sliding dovetails, and more. Demonstration will include use of the new Incra Fence as well as the usual shop-built table accessories.

Build a Windsor Chair with Michael Dunbar

- *April 19-23 Friday thru Tuesday*
- *Daily hours: 8:30 am - 5 pm*
- *#WC1 Admission: $450.00*

Each participant in this 5-day class will have the opportunity to build a complete sack-back Windsor chair under the guidance of Michael Dunbar, America's best-known Windsor chairmaker. The admission fee includes all necessary materials. ***Prior woodworking experience is required.*** Participants should provide their own hand tools, although a shared pool of tools will be available to borrow for those without certain tools. (A list of tools will be provided after registration). Each participant should read a copy of *Make a Windsor Chair with Michael Dunbar* (available from Highland Hardware for $13.95 plus $3.00 shipping) before the class begins.

Register by sending your deposit of $225.00 to Highland Hardware. (The balance of $225.00 is due no later than April 5, 1991.) Registration can also be done by phone using a charge card. Register early, as the class is limited to 14 students.

Fundamental Wood Finishing

- *Saturday, April 27 9 am to 4 pm*
- *#WF1 Admission: $35.00*

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

Finishing with HYDROCOTE

- *Sunday, April 28 1 pm to 4 pm*
- *#FH1 Admission: $15.00*
- *Instructor: Zach Etheridge*

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

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

Chip Carving Workshop with Wayne Barton

- *Sat. - Sun., May 4-5 9 am to 5 pm*
- *#CC1 Admission: $95.00*

The Swiss style of chip carving is the most decorative, functional, and enjoyable method of carving, and can be quickly learned by everyone. This hands-on class will cover all phases of the Swiss style. Students will practice the specific techniques for producing border designs, grid work, rosettes and lettering. What tools to use and how to sharpen will also be covered. (Tools are available to purchase for those who don't already have them). Carving blanks to practice on will be available at a nominal cost. Wayne Barton, the instructor, is Director of the Alpine School of Woodcarving, Ltd. of Park Ridge, Illinois. Please register early, as the class size is limited.

Basic Turning Techniques

- *Saturday, May 11 9 am to 4 pm*
- *#BT1 Admission: $35.00*

Tony Dileo of Highland Hardware will present a one-day introduction to woodturning which will include demonstration of basic techniques for spindle and bowl turning. Tool selection, sharpening and chucking methods will also be covered. This is an excellent opportunity for the novice woodturner to receive direction and inspiration towards learning a useful and satisfying craft.

WOOD NEWS 26 **Winter 1991**

1045 N. Highland Avenue, NE
Atlanta, Georgia 30306
(404) 872-4466

Editor . . . . . Chris Bagby
Assistant Editor . . . Zach Etheridge

Wood News is published twice a year. Subscription is free to Highland Hardware mail order customers, or begin a subscription by sending $2.00. You will also receive the Highland Hardware Tool Catalog.

Back issues of Wood News (issues 13-22 & 24-25) are available for $1.00 each postpaid.

Wood News solicits manuscripts contributed by our readers. We pay $50.00 (in tools) per newsletter page for material selected for use in Wood News. Enclose black and white or color photos. Submit material to Wood News Editor, c/o Highland Hardware. Deadline for next issue is March 15, 1991.

highland hardware

Guarantee

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

A Visit with Tage Frid

by Jack Warner

NORTH KINGSTOWN, R.I. — The morning breeze has a pleasant bite and the maples are wearing their brilliant fall coats in this land of long history and low stone fences.

In a neat two-story house near Ten Rod Road, America's most influential woodworker is enjoying the autumn of life—although if it were not for his vast store of rich memories and a tendency to work only five or six hours a day, Tage Frid would seem in the midst of eternal springtime.

The retired professor emeritus of furniture design at the Rhode Island School of Design, teacher of many prominent woodworkers around the country and author of the best, and best-selling, books on woodworking, is 75 this year.

When Casey Stengel was 75, a reporter asked him how it felt to be manager of the Mets. "Most people my age are dead," observed that great man.

Tage Frid, the Casey Stengel of furniture design, marked his 75th year with a $20,000 grant from the National Endowment of the Arts. "I promised not to make any pornography," he says.

What he will do is what he has always done, pursue the ideas that come to him as naturally as breathing and pass them on to the world. Tage Frid is a born teacher; he was called to it as surely as a preacher to the pulpit and he will never quit.

I may as well admit before we go any further that I love this man and his invincibly elegant wife, Emma. As far as I can see, Emma has no faults at all. The worst I've seen in Tage is a penchant for embarassing Emma occasionally with a salty story and a steadfast refusal to suffer fools, especially arrogant ones; the latter has gotten him into trouble occasionally.

Tage—it's pronounced Tay, as in hay—was born in Copenhagen. "I was not what you call an outstanding student," he recalls. His father was a silversmith and ran a candy store. By the time he was 13, his parents suggested he enter into an apprenticeship with a cabinetmaker. Tage—who recalls no mystic childhood compulsion to work wood—agreed, for want of anything better to do.

The first couple of years of the five-year apprenticeship were loathsome, he recalls—10-hour days, six days a week, with night school added to that. But gradually it became more congenial, and when the apprenticeship was finished, he had a thorough understanding of wood as a material and the methods of making furniture.

"I didn't learn much about designing, though," so after years of woodworking jobs here and there in Denmark he worked his way through the Vedins School and the School of Interior Design in Copenhagen, graduating in 1944 shortly after the Nazi occupation ended.

He decided to move to Iceland, and at his going away party in Copenhagen he met Emma Jacobsen, one of 13 children of a Jutland farmer; they were married not long after he moved.

The couple had not been long in Iceland, Tage recalls, when Aileen Webb, founder of the American Crafts Council, invited his silversmith friend Jack Prip to come to the United States and teach at the new School for American Craftsmen at Alfred, N.Y. She told Prip she'd also like to invite a woodworker, and asked him to recommend one. He recommended Tage, and they arrived in this country in 1948.

Tage's favorite story concerns his cool reception at Alfred, his dismay at the ineptness rampant in the woodworking department, and his growing realization that when his contract was over, all he was going to get was a ticket back to Denmark.

"I decided I might as well make some money, so one morning before the students went to class I asked a couple of them to help me get a mahogany plank out of the stock room. While they were in class that morning, I built a little table. When they came back to the shop, they looked at the table and said 'Is that the mahogany we helped you with this morning? You did that in one morning?' After that I got some respect."

Tage moved with the school when it was shifted to the Rochester Institute of Technology, and in 1962 he went to the Rhode Island School of Design to head its department of woodworking and furniture design until his retirement five years ago.

His contribution to woodworking in America over 47 years of teaching is incalculable. His own students are everywhere, in studios and teaching in universities; his books have sold a quarter of a million copies and have been translated into German. In his definitive book "Contemporary American Woodworkers," Michael A. Stone wrote that "Without a doubt, Frid represents the single greatest influence on American woodworking education today."

A Look Around the Frid Home

Tage's home is a museum of his own making. The modern, cedar-sided house where the great woodworker and his wife, Emma, live sits well back from the street, secluded by tall stands of trees from their neighbors.

Inside, there are five pieces of furniture Tage didn't make: two sofas, an antique desk, an antique crib, and a round, lathe-turned stool a student made. Everything else came from the shop of the great Dane—even the kitchen cabinets and the bathroom medicine cabinets.

Walking through the house, a visitor has constant shocks of recognition. Most of these pieces appeared in the final book of Tage's trilogy—"Tage Frid Teaches Woodworking: Book 3: Furnituremaking." Some were also featured in the pages of *Fine Woodworking* magazine; many have appeared in other books and versions of some are in museums.

In the living room is the famous jointless rocking chair; aluminum sandwiched between walnut and bolted together, with a seat and back of nylon parachute cord. It is remarkably comfortable.

Behind the rocking chair is the wonderful, catlike grandmother clock, all swooping concavities except for the door, which is worked into a demure pot belly. Tage always claims he was the model for that.

Tage is a deeply innovative designer of furniture, passionately committed to instilling that innovation in others.

There's the ebonized black coffee table into which are laid free-form stoneware tiles by the Frids' friend, the late ceramist Frans Wildenhain.

In the dining room is the great walnut trestle table, surrounded by the final version of the dining chairs first made for the Museum of Contemporary Craft, and later refined for the Boston Museum of Fine Arts.

On one wall is perhaps Tage's greatest design—the ineffably elegant pedestal sideboard. More than any other piece I know, it displays the thematic echoes at the heart of his design theory. The triangular shape of the pedestal is reflected in the triangle of the case, and repeated like fading notes of music in the raised segments of every surface, and in the dovetails that bind them.

On the other side of the room is the free-form coffee table with the cracks filled with rose metal. In a corner is the oval, tambour-doored liquor cabinet. In the breakfast area off the kitchen sits the walnut-veneered, round pull-out pedestal table. Around it are a set of chairs which sit on four turned legs arranged in a square, with the swooping, laminated piece that is the back and arms skewed so that there are two legs on either side, one leg in the front and one in the back. The upholstered seat is neither square nor round, but the extended oval of a guinea egg. You can sit sideways in one of these chairs with firm back support, or slouch down in it until you're almost horizontal without running out of seat.

"I made 12 backs for it before I got it right," Tage said. Typically, after he had the design worked out to his satisfaction, he made these four chairs and then moved on to new problems.

In the living room is the imposing mahogany cabinet on a stand and the lamptable featured in a recent *Fine Woodworking* issue. In upstairs guest rooms one can find one of the reversible beds—they can be stacked to make bunk beds—and drawing

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

Tage Frid mortising with a plunge router at his first Highland Hardware seminar, at which former President Jimmy Carter was a participant.

table desks designed for dormitories at the Rhode Island School of Design, and a chest of drawers made for a *Fine Woodworking* feature not yet printed. There is also the stand-up writing desk on which much of the "Tage Frid Teaches Woodworking" trilogy was written.

Throughout the house are examples in three sizes of what has become Tage's signature piece—the three-legged stool inspired by an afternoon sitting on a fence rail at a horse auction.

Probably the greatest disservice the world does to Tage is to consider him a woodworker; a cutter of great dovetails and sawyer of straight lines. That's like calling Leonardo da Vinci a hell of a draftsman.

Tage is a deeply innovative designer of furniture, passionately committed to instilling that innovation in others. The hundreds of young men and women who passed through his hands at the Rhode Island School of Design did not pay $20,000 a semester to learn how to cut good dovetails. They went into the world, the good ones did, with a fundamental grasp of how to design furniture that looks good, feels good and works properly—and minds trained to question, probe, and constantly wonder "what if..."

His Workshop

Tage Frid's workshop is a 10-minute drive from his house, past harvested fields a-honk with Canada geese on their way south and long, flat prairies of the turf farms.

It's a big room in a long, low building that houses two other wood shops, one of them very large and busy, an upholsterer, a machinist and a weaver. Outside the window by Tage's bench a small waterfall mutters.

He has some veneering projects in mind, and he's going to use some of his NEA grant to buy a vacuum press. Most of what he does here is still at the service of his greatest calling—teaching, through his articles in *Fine Woodworking* magazine. He does little work for sale.

A suggestion that there must surely be high-end furniture factories such as Knoll that would be delighted to pay handsomely for some of his designs is met with a shrug of indifference.

Tage has never, except in the hardest of times, pursued money. He and Emma live comfortably on his pension from the Rhode Island School of Design, his salary as contributing editor to *Fine Woodworking* and the royalties from his landmark "Tage Frid Teaches Woodworking" trilogy published by The Taunton Press.

After the success of these books, Tage proposed a fourth; it would have consisted of simple projects for part-time woodworkers, hobbyists, "people working in their basements."

But Tage says the editor of The Taunton Press's book division at that time turned it down because "it would lower me" to cater to hobbyists without elaborate equipment or top-notch skills. The fact is that Tage is anything but elitist; to him it's the results that count, not the method of achieving them, and the only thing that would demean him would be warmed-over projects without interest or good taste.

His byline has begun appearing more frequently in *Fine Woodworking*; he once again graced the cover of that august publication this summer and he's working on a series of relatively simple but tasty projects for the part-time hobbyist.

He and Emma live quietly. Tage was laid low a few years ago by Lyme disease, a terrible thing even for a young man. He has fought back from it remarkably well. Emma has a problem with one of her legs, but that doesn't even slow her down. This slender, indomitable woman gets around untiringly in public with no more than a cane and even manages without that in the house. She runs the house, and Tage's business affairs, with the vigor and grace of a woman half her age.

"Emma and I work together," Tage says. "She takes care of all the business, writing the letters, keeping the books. We're a team." He will not travel without her.

Tage, a gourmet cook in his own right, rises first each day and makes breakfast. Each evening—Emma usually cooks then—they eat by candlelight at the walnut trestle table in the dining room, or go to a favorite restaurant nearby, where the waiters know them by name and the same table is always ready for them.

Tage, an accomplished sailor, likes to drive over to the harbor at Wickford to watch the boats and the fishermen. He used to buy lobsters from one particular captain, but they worked out a deal the captain liked better—Tage usually brings a six-pack of beer to the dock now and trades it for the crustaceans.

Often they drive to Newport, 20 minutes away if it isn't rush hour, to visit their daughter Ann, her husband and their newest grandson. Ann is beginning to work at the lathe, much to Tage's delight.

Their son, Peter, his wife and two boys live in Alaska, where he runs a wide network of public television stations. Tage and Emma spend a considerable amount of each year traveling—to workshops and seminars Tage gives (they'll be in Atlanta for the eighth consecutive year in late March), to Alaska, and to St. Croix, the once-Danish jewel of the West Indies, where they always spend Christmas.

Sitting on the deck behind his house, listening to the stream that runs behind it tumble over the rocks, Tage looks back on a remarkable life and says "I've been very lucky."

"Oh, sure, I'm good at what I do. But I was, so many times, in the right place at the right time."

He chuckles, sips his gin and tonic, and leans forward with that familiar, impish grin.

"You know how people say if they had their life to live over, they'd do this and that different," he says. "I'll tell you, I wouldn't do a damn thing different. I've had a wonderful life."

Slicing Wood

How You Can Use Your Bandsaw to Produce Your Own Custom Thicknessed Lumber

by Zach Etheridge

THE ENTHUSIASTIC RESPONSE to our new Wood Slicer™ resawing bandsaw blades makes it clear that a lot of bandsaw owners rip or resaw lumber pretty regularly, and many are still looking for a better way to do the work. Resawing is the business of taking a sawn plank and sawing it into two or more thinner planks. Thus the cut runs through the width of the plank, which distinguishes it from a garden-variety rip cut that runs through a plank's thickness. Since resawing cuts, like ripping, always more or less follow the grain direction, the same techniques used for ripping on the bandsaw are used in cutting stock up to your saw's maximum thickness capacity. Carried to its extreme, resawing can be used to produce stock nearly as thin as veneer; more commonly, it's the most practical and economical way to produce lumber of appropriate thickness for small projects and delicate work.

The bandsaw is certainly the tool of choice for cutting stock 3" thick and up; it's both far more efficient and a whole lot safer than any other saw in the shop. Bandsaw blades typically waste about half as much wood as circular saw blades, and their cutting action tends to simply hold the workpiece down on the saw table rather than trying to accelerate it back at the operator. When you're presented with an opportunity to completely eliminate the possibility of kickback from a cutting job, it makes sense to seize that opportunity with enthusiasm. Of course there are plenty of occasions when the bandsaw is the only choice for the job, as when you're faced with sawing 10" stock like the slab pictured on our jacked-up Delta saw (**Figure 1**).

Two recent market events have given a big boost to resawing activity. One is the publication of Mark Duginske's *Bandsaw Handbook*, which presents a clear and detailed look at everything that goes into successful use of the bandsaw. Balancing the wheels, making them co-planar, truing the tires, tuning the guide support mechanisms and choosing the right blade are straightforward chores that Mark will guide you through pretty painlessly. If you haven't already taken all or most of these therapeutic measures, or if you've just

Zach Etheridge is Highland Hardware's Product Manager.

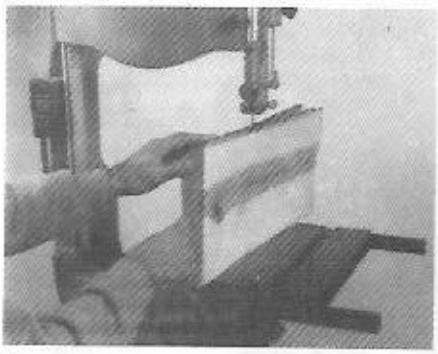


Figure 1

begun to wrestle with the mysteries of resawing technique, we'll highly recommend the *Bandsaw Handbook* to help you get the most out of your saw.

The second new force driving the surge in small-shop resawing is the proliferation of affordable, highly capable thickness planers. A high-quality lightweight planer provides the critical missing link in the process of producing your own lumber: the ability to quickly and accurately mill sawn stock. Many craftspeople initially buy a planer as their primary thicknessing tool, but after one or two rounds of wasting away most of a 4/4 plank, most discover that they're willing to try any alternative. Once they've gotten their resawing techniques figured out and running smoothly, their planer, if it's a good one like those by Ryobi, Makita or Delta, really comes into its own as a smoothing and final dimensioning tool rather than as a means of wasting enormous amounts of wood.

A hot new high-tech blade like the Wood Slicer™ will help any bandsaw resaw better, whether it's a souped-up late model 3/4 hp Delta 14" saw with riser block or a rickety old number that's never cut a straight line in its life. Blade quality is a very fundamental contributor to the success or failure of your adventures in resawing. Low-quality blades that dull quickly, or low-quality construction that leaves teeth unevenly set, welds that are out of straight so the blade moves back and forth as the saw runs, teeth missing or doubled up at the weld—any of these common problems can make the best-tuned bandsaw behave like a cantankerous nuisance. Even if it costs a few bucks more than a cheap one, choose the best blade for the job. For resawing you need a blade without too many teeth; you know there's going to be a lot of waste to clear because you're working in thick stock, and that waste will include a lot of bulky shavings along with finer dust because you're cutting with the grain. A blade with no more than three teeth per inch provides plenty of gullet space to carry waste through efficiently, allowing each tooth to take a hefty bite while minimizing drag and heat build-up. A blade width of 1/2" allows you to crank on enough tension to establish good stiffness and get the most support from the saw's dynamic tracking equilibrium—narrower blades won't have the beam strength to resist bowing under load, while most wider blades call for so much tension and take such a wide kerf that they're hard to track and quite inefficient.

Practically any old high-quality 1/2" 3 tpi blade will do a decent job of resawing, but if you're going to resaw more than once in a blue moon you'll find that a Wood Slicer™ blade will make the job easier than with any other blade, and easier to follow up on, too. Wood Slicers waste less wood than standard blades of .025" thickness due both to their thinner bodies and to the highly precise set of their teeth; in working with the new blades here at the store we've come to take it for granted that the resawn surface will clean up perfectly with one light pass through the thickness planer. Thin kerf and extraordinarily sharp teeth allow for noticeably faster than normal feed rates, while easily precise cutting lets us saw to within 1/16" or less of target thickness.

Having selected the blade, the next step is putting it on the saw and setting its tension properly. This is far more easily done than said—it's easy as pie to show somebody what "proper" tension feels like, but putting that feeling in print is a challenge we haven't seen met yet. Most writers seem to run aground on the need to share very exact standards; one fellow went so far as to suggest using a three-hundred-and-some-dollar tension gauge. Fortunately for us low-tech types, excruciating exactitude just isn't necessary. If you get your resawing blade tensioned well enough to do a good job, then you've got it right, and don't let anybody tell you differently.

Here's how we set tension for just about every blade we put on the bandsaw: First, get the lateral guide blocks and thrust bearings opened up and pushed back out of reach of the blade, and pop the throat insert out of the saw table if you haven't already done so. Center the blade on both upper and lower wheels, and begin winding on tension. Given a free span of roughly 20" between the wheels, which is fairly typical of saws with 6" max thickness capacity, we add tension until we can push, poke or prod the blade sideways about 1/4" in the center of the span (**Figure 2**). Interestingly enough, this technique works for just about any blade size; 1/16" blades will require a slightly less forceful poke, but the general idea remains the same. As you begin to feel a reasonable amount of tension on your 1/2" blade, give it a poke sideways and watch how far it moves. Pushed with a fingertip with moderate pressure (about 5 pounds) the blade deflects fairly easily at first and then seems to hit a wall, requiring a lot more pressure to move any further. Keep on adding tension until that movement is less than 3/8", and you'll probably be set adequately for resawing. Most of us tend to err at first on the side of too little tension—you don't want to get carried away, but there's no need to be shy; good blades and good saws are made to take it. The wood itself will tell you what you need to know about any further fine-tuning of

Figure 2

tension to eliminate flutter or harmonics that can leave a washboard surface or otherwise less than a prime cut.

With the tension set, bring up the lateral guides and thrust bearings for the best possible control over the blade. We use Cool Blocks to replace the factory standard steel guide blocks in our saw, and find them well worthwhile. The graphite-impregnated phenolic guides don't make blades heat up or wear like steel blocks do, which lets us tune them very close to the blade, helping to eliminate one source of wandering cuts and damp out flutter as well. The Cool Blocks actually polish the blade as it works, in turn reducing friction within the kerf, reducing noise level and limiting resin build-up to boot. Set your thrust bearings about 1/16" or so behind the blade. You don't want to leave an enormous gap, but letting the blade run completely out of contact with the bearing while idling helps it run cooler, lets the saw's tracking equilibrium soak up a little bit of thrust, and lets your thrust bearings last a lot longer too. Pushing too hard against the thrust bearings can make any blade begin to flutter violently; even with the best resawing blade, you need to be aware that almost all the energy you put into pushing a piece of wood gets transmitted directly to the thrust bearings.

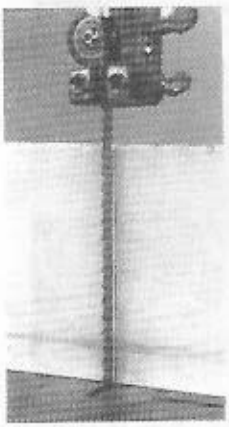


Figure 3

Take just a moment to check that your saw table is set dead square to the blade. The easiest and most accurate checking method we know of starts with a short, wide (perhaps 5" x 8") piece of smooth scrap with a straight square edge. Set the piece on the good edge, and make a shallow cut straight into the middle of one face. Turn off the saw and rotate the piece around the blade so the surface you just cut into now faces the rear of the blade, and see if the blade will nest neatly into its own kerf (**Figure 3**). Rotating the wood 180° around the blade doubles any deviation from square, and you'll be able to see even the tiniest amount of fine tuning required.

With all systems set up and ready to cut, the most important step left before going to work is finding out how the saw wants to do it. The single most common (and most easily solved) problem with resawing is that most bandsaw blades exhibit a tendency to cut a straight line along some direction unrelated to any ideas you might have about what that direction should be. If a blade wants to lead slightly to the right or left, for instance, but you feed your stock along a fence set square to the front edge of the table, you'll wind up with a cupped cut if you're able to complete it at all. The lateral guides keep the blade in one place at the top and bottom of the cut, but through the middle of the wood the blade goes where it wants to and makes a mess. The very best blades are sharpened and set precisely enough to minimize lead, but then other factors such as wheel and guide alignment on your saw might contribute to the problem even if the blade doesn't. So to live happily with this condition you must determine how the blade leads, and then set your rip fence to match the lead angle. Here's a simple way to do it.

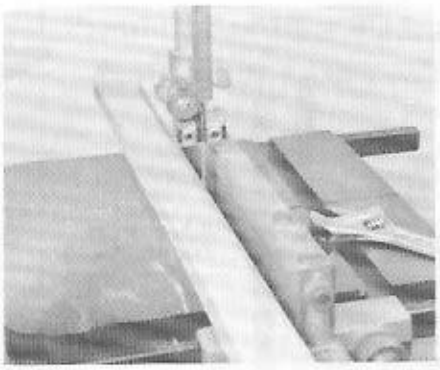


Figure 4

Take a piece of scrap 2 or 3 feet long and make one edge straight. Mark a line parallel to that edge, perhaps 1/4" in. Set your saw's upper guide fairly close to the surface of the stock, and begin ripping freehand along the line you marked, adjusting your feed direction as needed until you're cutting steadily straight down the line (**Figure 4**). Feed the wood at a reasonable pace; a very slow feed rate won't register blade lead the way you want to. Stop the cut and turn off the saw without letting the stock move, and either clamp the stock in place or pencil a line along its edge on the saw table for reference. Bring your rip fence on board, loosen the bolts that hold the fence to its clamp head, set the fence parallel to the test piece or pencil line, and retighten the head bolts. (This assumes you have a rip fence, of course, and that it can be adjusted to clamp out of square—if not, you can fake one pretty well with a straight 2 x 4 clamped to the table on edge.) Finish off the rip cut with the fence in place, just barely holding the stock against the fence; watch closely for any tendency for the stock to wander away from the fence or for the blade to bow away instead. Tweak the fence angle as needed to correct for either of these signs, and make another test cut to verify that you've got it nailed. Now you should be able to cut dead straight along any wood up to your saw's maximum thickness capacity, without binding, wandering, cupping or other delinquent behavior.

A hot new high-tech blade like the Wood Slicer will help any bandsaw resaw better, whether it's a souped-up late model 3/4 hp Delta 14" saw with riser block or a rickety old number that's never cut a straight line in its life.

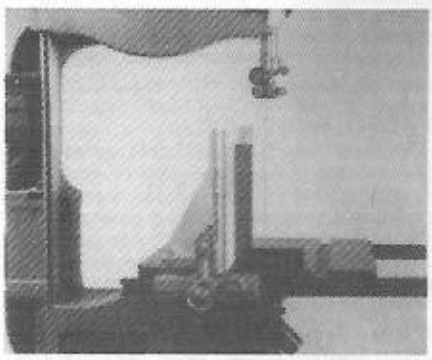


Figure 5

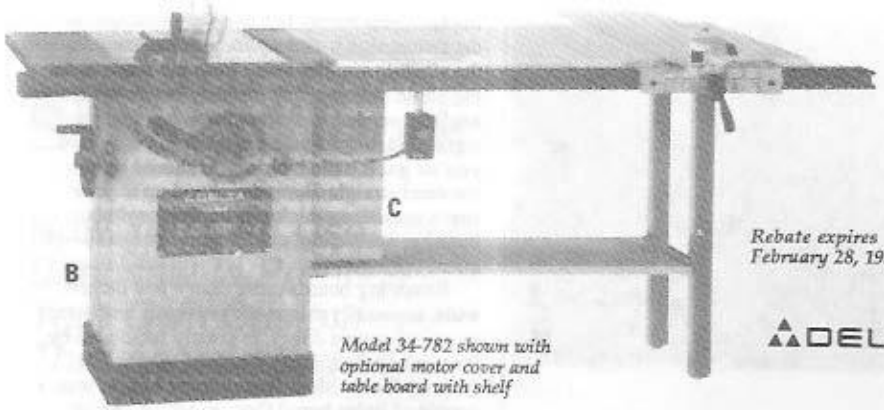
Resawing boards more than a few inches wide, especially thin stock or boards with rough or out-of-square edges, is greatly facilitated by the use of a high accessory face attached to your rip fence. Most fences come with at least a couple of holes bored through which can be used to screw a piece of plywood, particle board or MDF to either side of the fence. Make the high fence at least around 5" high for general use, or higher if you routinely resaw very wide stock. Check that the fence sits perpendicular to the table, adjusting the front mounting rail if necessary to square it up (**Figure 5**). It may be useful to attach a brace to the back of the high fence in order to hold it square against pressure, and some fences may need a block clamped to the saw table to help them maintain their direction under load.

So that's all there is to it, at least until you start putting these techniques to work. One more challenge you're likely to run across is suddenly diminishing returns when you're cutting highly resinous woods; junk can accumulate on the teeth, within the gullets, on the blade body and even on the bandsaw tires with dismaying rapidity, making hash of all your careful tune-up and tracking work. The bad news is that there's not much way to avoid this problem when working with green wood, pine or other really gummy stuff.

Dri-Cote cutting tool treatment makes a significant difference in rate of build-up and clean-up labor, but even the most carefully coddled blade is likely to need occasional cleaning. If you're willing to do it every few minutes you can usually get away without removing the blade from the saw: first, unplug the saw; then with one hand holding a scouring pad laced with mineral spirits and the other above it holding a rag, pull the blade up through the table and through the scouring pad, drying it off as you go to keep from getting goo all over the tires. Mostly, though, you'll probably keep on cutting until sterner measures are needed, and the blade will have to come off the saw. If a casual scrub with a little mineral spirits doesn't easily lift off the grime (and it probably won't), an excellent solution is to spray our Saw Blade Cleaner over the coated areas, wait a few minutes, then scrub it off with a toothbrush or brass stove brush. (The Saw Blade Cleaner works well on circular saw blades as well.) Before getting back to work, be sure to coat both sides of the blade with Dri-Cote.

Wood Slicer™ blades and Cool Blocks to fit popular-sized bandsaws are available from Highland Hardware. See pages 9 & 24 for details.

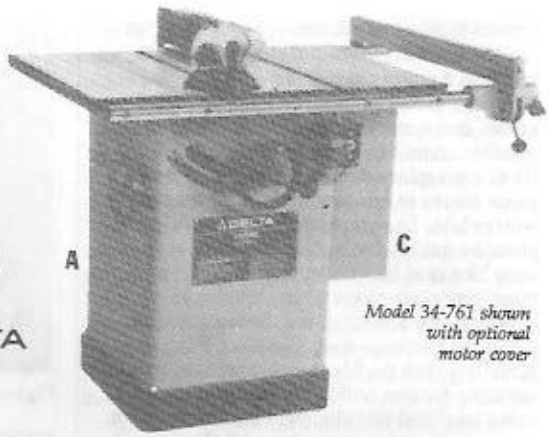
20.03.93	Bandsaw Handbook	$16.95
08.53.15	10 oz. Dri-Cote	9.95
08.53.19	Saw Blade Cleaner	5.95



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

Rebate expires February 28, 1991

DELTA



Model 34-761 shown with optional motor cover

Buy a Delta Unisaw for as Low as $1199 — Plus Get Free Freight*

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

UNISAW WITH UNIFENCE

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

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

UNISAW WITH JET-LOCK FENCE

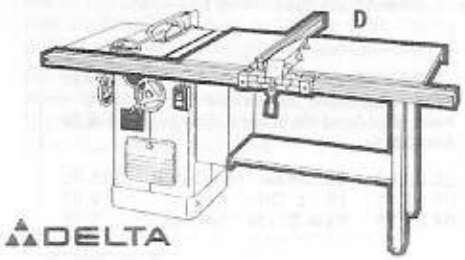
The standard Unisaw differs only slightly from the Unifence model described above. An extra cast iron extension brings table size to 36" wide by 27" deep; heavy tubular fence rails allow 25" rip capacity to the right of the blade. Overall width of the saw including fence rails is just over 45". Though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

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

			Our Price	Your Cost After Rebate
A	34-761	1-1/2 HP Jet-Lock Unisaw	$1349	$1199
	34-763	3 HP Jet-Lock Unisaw	$1599	$1449
B	34-782	3 HP Unisaw w/Unifence	$1749	$1599

**Delta Unisaws are shipped Freight Prepaid within the 48 states while current supplies last.*

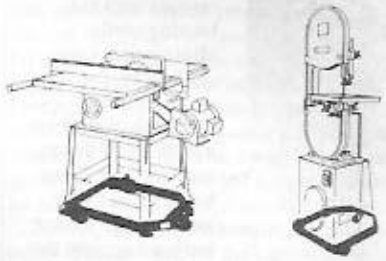
	HRS-10G	Mobile Base for Unifence Model	198.50
	HRS-10	Mobile Base for Jet-Lock Model	99.95
	34-254	Dado Insert for Unisaw	19.95
C	34-829	Motor Cover for Unisaw (fits only Unisaws manufactured after Sept. 1988.)	59.95



UNIFENCE SAW GUIDE

Owners of virtually any 10" table saw can improve accuracy and work support by replacing their existing fence with the Delta Unifence. A template & instructions are enclosed to ensure precise mounting. Unit includes fence, carriage assembly, front guide bar, table frame, legs & mounting hardware. (Table board and shelf board are available optionally, or can be fabricated by user). *Unifence is shipped by UPS.* *Sale quantity limited.* *Was $369.95*

D	34-897	Unifence Saw Guide SALE	329.95
	34-998	Table Board and Shelf	119.95



HTC MOBILE MACHINE BASES

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

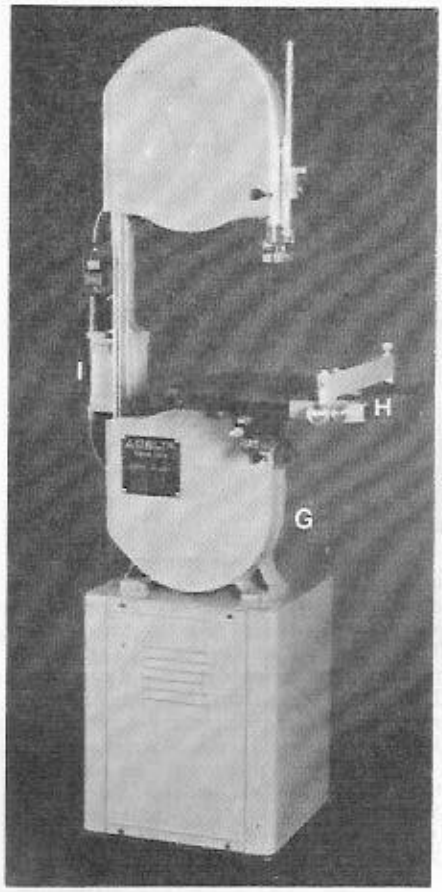
Of particular note is our Mobile Base for the Delta Unisaw with Unifence. Unlike an earlier model, our base is designed to work with the Unifence table leg and shelf system system, providing firm support for the right end of the extension table and allowing continued use of the utility shelf beneath.

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

All mobile bases listed below are shipped by UPS.

E MOBILE BASES

	For Use With Delta Machine:	
HRS-10G	Unisaw with Unifence	198.50
HRS-10	Standard Unisaw, HD Shaper	99.95
HRJ-8	DJ-20 8" Precision Jointer	148.50
HRJ-15	DJ-15 6" Precision Jointer	99.95
HRSS-18	18" Electronic Scrollsaw	99.95
HRBS-14	14" Bandsaw with Open Stand	99.95
HRD-14	14" Bandsaw or Belt/Disc Sander with Black-Band Enclosed Stand	99.95
HRLB-6	14" Bandsaw or Belt/Disc Sander with Old Model Enclosed Stand	99.95
HRD-10	10" Contractor's Saw (straight legs)	99.95
HRC-10	10" Contractor's Saw (curved legs)	99.95
HRD-10X	Contractor's Saw w/ Unifence	148.50



DELTA

$100 Delta Rebate
28-283 Cost after Rebate:
$599.95*
*Rebate ends 2-28-91

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.

G 28-283	Delta 14" 3/4 HP Bandsaw with Enclosed Stand	699.95*
HRD-14	Mobile Base for 28-283	99.95
08.60.01	Cool Blocks for Delta	11.95
34-895	Miter Guide	59.95
H 28-843	18" Rip Fence Assembly	74.95
28-845	32" Rip Fence Assembly	79.95
I 28-984	12" Riser Kit	82.95

**Quantity limited at this price. Rebate expires 2-28-91*
Shipped within 48 states for $40 freight charge.

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; 3/16"x 4 TPI for scrollcutting in stock up to your saw's max thickness capacity; & 1/8"x 14 TPI 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 40) in place of ordinary bandsaw guides.

Our 1/16" & 1/8" blades have standard raker teeth. The 1/4" and 1/2" blades have hook teeth for more aggressive cutting. The 3/16" blades are of skip tooth design.

Specify one of these bandsaw brands when ordering:

	Length	
Delta 14" (& Taiwan copies)	93-1/2"	(7' 9-1/2")
Delta 14" with riser kit*	104-1/2"*	(8' 8-1/2")
Sears 12"	80"	(6' 8")
Shopsmith 11"	72"	(6' 0")
Inca 10-1/2"	73"	(6' 1")

Premium Bandsaw Blades

	Width	Teeth per Inch	
08.34.21	1/16"	24	12.95
08.34.32	1/8"	14	10.95
08.34.35	3/16"	4	9.95
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.*

The Wood Slicer™

Extra-Durable, Precision Resawing Blades to Fit Popular Bandsaws

These new blades provide the smoothest, fastest resawing cuts we've ever produced with our Delta bandsaw. The Wood Slicer's half-inch, 3-tooth hook design is exactly what we always recommend for such work, but there's far more to these high-tech blades than meets the eye.

BLADES ARE THINNER, YET STRONGER

Carbon-manganese spring steel blade bodies are harder and have twice the tensile strength of conventional carbon steel blades, which allows us to specify a blade thickness of .022", better than 10% thinner than usual, without sacrificing the kind of stiffness and beam strength required for clean, accurate resawing. Thinner blades mean less waste and less work for the saw, which translates directly into easier, faster feed rates with less pressure on thrust bearings and lateral guides. Rear edges are smoothly rounded to ensure that sharp corners don't snag kerf walls and cause vibration, drag and rougher cutting. Wood Slicer blades are now available to fit Delta 14", Sears 12" Shopsmith 11" and Inca 10-1/2" saws.

PRECISION SET TEETH ARE INDIVIDUALLY FILED

A critical factor in the Wood Slicer's performance is the unusual way the teeth are shaped, set and sharpened. On most bandsaw blades, 30 to 40 layers of blade stock are stacked together and then milled with a rotating cutter that cuts the shape of a tooth into all the layers at once. The teeth are then set, with inevitable damage to some of the edges, and then they're hardened and sent out to market. The teeth on Wood Slicer blades, by contrast, are punched out to shape and then precision set to a tolerance of just ±.002", one of the reasons the blades cut so remarkably smoothly. Low-tolerance setting also nearly eliminates blade lead, a common phenomenon that can make set-up for accurate resawing far more challenging than it needs to be.

After setting, each tooth is individually filed. The process involves micro-machining that takes longer than milling; it's more expensive, but it results in teeth with sharper, less deformed and more consistent edges than is possible with milled teeth. Punching and filing also leave the blade edge within the gullet cleaner and smoother than milling, so Wood Slicer blades resist resin-coating and chemical corrosion better as well.

TEETH THAT REMAIN SHARP LONGER

After the teeth are formed and sharpened, another exotic treatment takes place before hardening: the teeth are bombarded with Titanium Carbide ions which form a micro-thin coating on the face and edges of every tooth. High-speed, ultra-precise impulse hardening then causes the TiC to bond chemically to the blade steel, resulting in teeth that are at least three times harder than conventional blades. The control afforded by impulse hardening means that only the cutting edge is hardened; hardening does not extend down into the gullet which would result in a more brittle, breakable tooth. Teeth thus hardened will outlast regular blades several times over.

Wood Slicer undergoing impulse hardening following Titanium Carbide bombardment.

EXCEPTIONAL WELDS

Finally, the finished blade stock is parted and welded to the lengths we specify. Here again the manufacturer uses the best technology available to provide extraordinary quality of work. The state-of-the-art method for joining bandsaw blade stock is called a flash-butt upset weld, which produces a quenched and tempered metallurgical structure identical with the structure of the filed blade steel. The technique is so effective that all Wood Slicer blade welds are *unconditionally guaranteed against breakage at the weld.*

If you mill lumber to custom thickness or routinely generate your own veneers, try a Wood Slicer blade for yourself. You'll get results you never thought your bandsaw could deliver, with straighter, truer, smoother cuts than you've gotten from any other blade. You'll feel as if you just installed a bigger motor on your saw, and the minimal finishing required on your resawn stock will be a delightful bonus. And your satisfaction is guaranteed.

Wood Slicer Resawing Blades

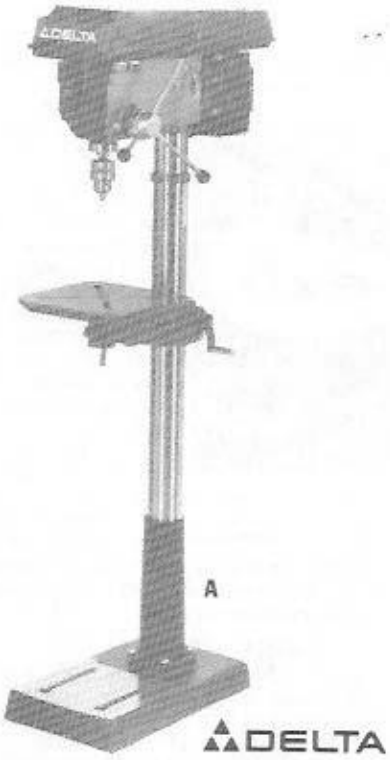
	To Fit Bandsaw	Length	
08.52.21	Delta 14" (& similar)	93-1/2"	29.95
08.52.22	Delta 14" with 12"Riser	104-1/2"	29.95
08.52.23	Sears 12"	80"	29.95
08.52.24	Shopsmith 11"	72"	29.95
08.52.25	Inca 10-1/2"	73"	29.95

DELTA TOOLS

A 16-1/2" FLOOR MODEL DRILL PRESS

This heavy-duty model is our most popular. 5/8" chuck, 3.3" stroke, adjustable locking depth stop, 3/4 HP 115/230V motor, 12 spindle speeds from 250 to 3000 rpm, and 190-lb. mass make this a best buy. The flanged and slotted 12 x 12" table tilts 90 degrees in either direction, and can swivel completely out of the way for drilling in large objects. *Shipped within 48 states for $40.00 charge. Sale qty limited.*

		SALE
17-900	Delta 16-1/2" Drill Press	369.95
17-905	Mortising Attachment	29.95
Mortise Chisels and Bits		
17-908	1/4"	36.50
17-909	5/16"	36.50
17-910	3/8"	39.50
17-911	1/2"	44.50



B NEW 12" BENCH DRILL PRESS

If floor space and budget demand your attention, this model is an easy choice. Heavy construction (72 lbs.), 1/2" chuck, 1/3 HP motor, adjustable depth lock with 2-3/8" stroke, 5 spindle speeds (620 - 3100 rpm) and compact dimensions make this an ideal compromise. Handles above mortise accessories. *Shipped within 48 states for $25.00 shipping charge.*

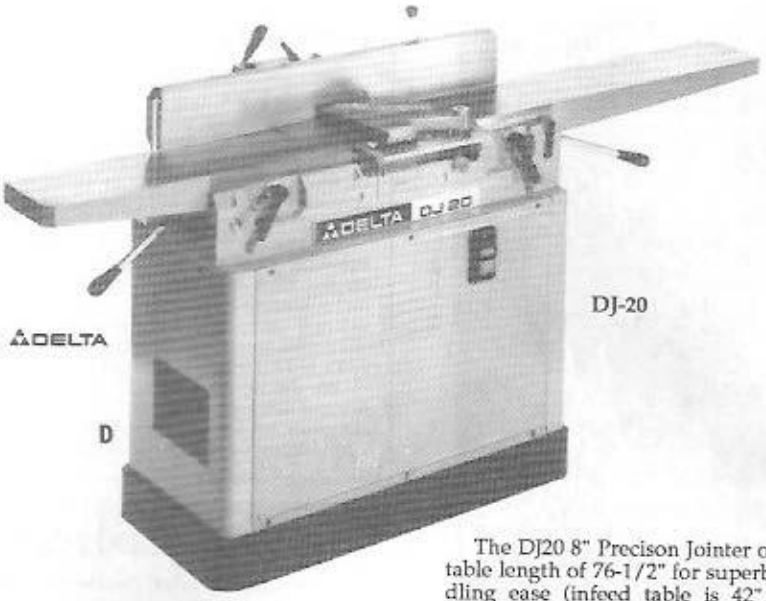
11-990	Delta 12" Drill Press	199.95

C 8" BENCH DRILL PRESS

If your work and workspace are small, but your need for accuracy and versatility is not, this economical entry deserves a look. 1/4 HP motor and 1/2" chuck let you do full-size work; five spindle speeds (620 - 3100 rpm), 2" stroke, tilting table, and 7 x 17 x 24" high dimensions combine function and unobtrusive convenience. Weighs 48 lbs. *Shipped UPS.*

11-950	Delta 8" Drill Press	149.95

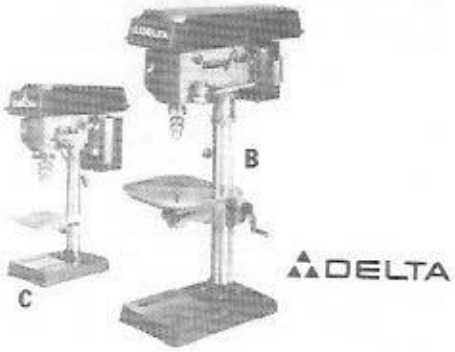
(A note about drill press nomenclature: the size listed indicates max. diameter that can be center drilled; distance from chuck to column is one half of listed size.)



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.

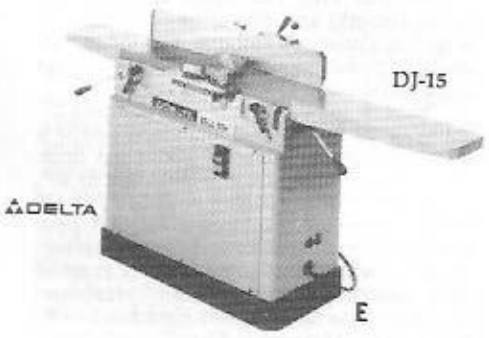


The DJ20 8" Precison Jointer offers a total table length of 76-1/2" for superb stock-handling ease (infeed table is 42" long). The jointer can be used for rabbeting to 5/8" deep. Tables stand 32" above the floor. The DJ-20 is supplied with enclosed stand and a 1-1/2 HP, 230-volt motor capable of handling 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 this price.

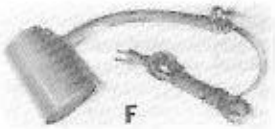
D	37-350	DJ-20 8" Jointer	1499.00
	C460	Spare Set 8" Knives	31.50
	HRJ-8	Mobile Base for 8" Jointer	148.50
E	37-154	DJ-15 6" Jointer	1099.00
	C390	Spare Set 6" Knives	24.95
	HRJ-15	Mobile Base for 6" Jointer	99.95



F FLEXIBLE WORK LIGHT

This handy lamp has a 9" flexible gooseneck for convenient positioning wherever extra illumination helps get the job done. The reflector will handle standard bulbs up to 40 watts. A horizontal flange is included for bolting the lamp to bandsaw, drill press, scrollsaw, or any other machine. Includes 8' power cord.

25-858	Flexible Work Light	34.95



$100 Delta Rebate
34-445 Cost after Rebate:
$699.95*
*Rebate ends 2-28-91

A

DELTA 1-1/2 HP CONTRACTOR'S SAW NOW AVAILABLE WITH 30" UNIFENCE

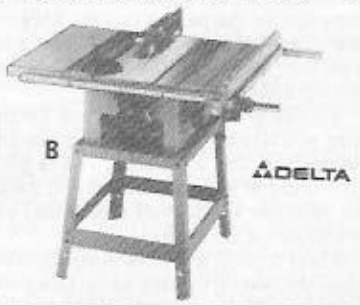
Delta's popular 10" Contractor's Saw sets the standard for full-capacity tablesaws designed for portability and utility. It's a traditional favorite for the basement woodworker who places a high value on economy, but who's looking for more capacity, more precision, and more reliability than is commonly found in inexpensive saws. The saw is now available with a custom-length Unifence, providing tremendous accuracy and efficiency without taking up much room in the shop.

The new Contractor's Unifence features the same cast T-square head with adjustable cursor found on the original Unifence (see page 8); the mounting rail with measuring scale has been shortened to 62", offering 30" rip capacity right of the blade. The two-position adjustable fence has likewise been shortened to 33-1/2". Mounting brackets and two heavy steel legs with adjustable feet are provided to support a table board board 32" wide by 27" deep (sold separately or user-provided), which replaces the saw's right extension wing, bringing overall table size to just over five feet wide. Note that the Contractor's Unifence, purchased separately, can be mounted on most other cast iron saw tables.

The standard Model 34-444 Contractor's Saw comes with Delta's Jet-Lock fence with 25" rip capacity, Auto-Set mitre guide with 20" cut-off capacity, a cast iron table with two steel extension wings measuring 40" wide overall by 27" deep, an open steel stand and 1-1/2 HP Delta motor. The saw weighs 265 lbs.

Either contractor's saw is shipped by truck within 48 states for a $40 charge. Fence alone is shipped UPS.

A	34-445	Contractor Saw with Unifence	799.95*
B	34-444	Contr. Saw with Jet-Lock Fence	625.00
	TK906	10" Freud thin-kerf Blade	44.95
	34-915	Contractor's Unifence Only	299.95
	34-914	Tableboard for Contr. Unifence	79.95



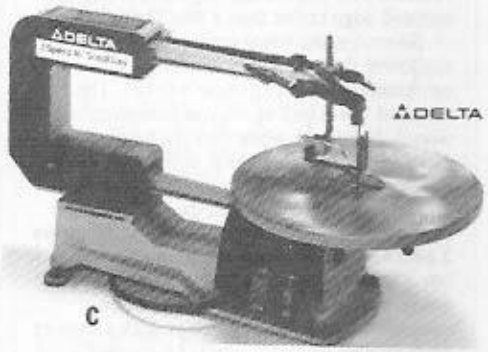
B

NEW DELTA 16" 2-SPEED SCROLLSAW

This brand new Delta saw may well have the best combination of design features any manufacturer's put together yet. Price, power, quality of cut, versatility and ease of use are all outstanding; we think this saw represents the most significant development in scrollsawing since Hegner introduced modern design to the U.S. many years ago. Rocking parallelogram arms and pivoting blade holders, both Hegner innovations, are responsible for allowing constant high blade tension, little or no blade breakage, a nearly perfect vertical stroke, and amazingly clean cutting. Delta has beaten the industry to the finishing line, however, by building in not only these features but also Delta's exclusive Quickset® blade installation system (introduced on their commercial-duty 18" variable-speed saw), two-speed operation to facilitate not just metal cutting but also the most delicate fretwork in any material, and, as important as all the rest put together, a believable price that's easy to understand and easy to afford.

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

Another challenge for scrollsaw enthusiasts has been dealing with changing and re-



C

installing blades, particularly when faced with a fretwork project with a seemingly endless number of interior cuts to be made. Delta's Quickset® system uses regular 5" plain-end blades, but makes their installation the straightforward work of just a few seconds. The Quickset system deals with both blade holding and tensioning right out on the end of the upper arm where you can get at everything easily. Blade tensioning is accomplished by pushing a lever on a cam; final tension is pre-adjusted with a screw that bears against the cam. To release a blade, just flip the lever toward you, then loosen the clamp screw in the blade holder. Delta has designed an ingenious new combination tool that both locks the blade holder in place and engages the clamp screw simultaneously, making a good system more convenient than ever. Insert the blade through your work and slip it back into the holder – no fidgety care required, just slip it between the wide jaws of the holder and retighten the clamp screw. Flip the tension lever back, and you're set. Another advantage of this system is that once you've set the table square to the blade it will always be square regardless of blade changes, and you can go back to work with never a worry about accurately square cuts.

The 40-560 features all cast-iron construction for mass and durability. Its circular table surface is 11-3/4" in diameter, providing plenty of support for your work through the entire range of your scrolling activities. The table tilts left to 45°, and includes an adjustable stop for reliable return to level. Throat depth from blade to rear frame is 16". An adjustable hold-down foot splits to wrap around both sides of the blade, controlling the workpiece even when you're cutting near edges and cutouts. A built-in blower keeps your pattern lines entirely free of dust and debris. The rocker arms ride smoothly and steadily on bronze bushings, which should provide nearly indefinite longevity. The pivot point on the arms has been very carefully engineered so that the blade moves back about 1/32" as it nears the bottom of its stroke, providing for dramatically improved chip clearance, cooler sawing in thick stock, and longer blade life. Both arms mount to a rigid one-piece casting which eliminates misalignment and helps control vibration as well. Delta's 1/10th HP 115 volt motor provides plenty of power for scrolling easily in any stock. Maximum stock thickness is 2". (It's important to note, however, that even with the 40-560's sophisticated stroke pattern, neither this nor any other saw with a stroke length of 1" or less is designed to cope happily with wood much over 1" to 1-1/2" thick.) The saw is backed by Delta's two-year parts and labor warranty. Weight is 46-1/2 lbs.

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

C	40-560	Delta 16" 2-speed Scrollsaw	199.95
	40-561	Assortment of 62 Blades	19.95
	40-604	Metal Stand	69.95
	31-055	Flexible Shaft	21.95

How to Sharpen Carving Gouges

SHARPENING is not something I enjoy. However, once I experienced the use of a tool that was truly sharp, I could not tolerate anything less. The following are some tips on sharpening carving gouges. I've also attempted to cover the "V" gouge, which is perhaps the most difficult to sharpen of all carving tools.

I'd like to begin by telling you the first thing you'll need. It is something you supply yourself and that is patience. You're gonna have to dig in your pocket and pull some out but the effort will be well appreciated when you go to use the tools.

I find it much more comfortable to sit when sharpening carving tools. In addition, I prefer to hold the sharpening stone and the tool. By doing this, I can sight down the stone and control the bevel much better. Most information shows the stone sitting on a work surface with the user above. This works fine for a flat cutting tool, but since gouges are curved, I find it difficult to control the bevel when looking from above.

My choice for sharpening stones are the Japanese waterstone slips. There are several reasons for this. First, they cut much faster than Arkansas stones—the sooner I can get the tools sharp, the sooner I can get back to carving. The second reason is that you can readily shape them with medium grit sandpaper (80-100 grit) or if you have the 180 grit slip, you can use it to shape the others. A slip stone is teardrop-shaped in cross-section, with one edge wide and the other narrow. The narrower edge is still too wide to clean the flutes of veiners or narrow gouges. However, by reducing their width you can clean the flute without disturbing the shape of the gouge.

On my own slips I shape one end to a narrow round for veiners and narrow gouges and the other end I shape into a "V" taper to clean out the flute of the "V" gouge (**Figure 1**). With the waterstone slips I can sharpen any carving tool.

The sharpening of a carving gouge consists of two steps. First you must sharpen the bevel and secondly (and just as important), you must polish the inside of the flute. To sharpen the bevel, hold the slip and sight down the flat face with the bevel of the tool touching. Move the tool side to side on the slip and at the same time roll the tool in your fingers to sharpen the entire cutting edge (**Figure 2**). You will have a natural tendency to exert more pressure either at the beginning or end of the stroke. As a result it is necessary that you regularly inspect the edge and compensate for what you're doing naturally. In addition if there is excess metal to remove on only a portion of the edge, you can sharpen only that area but follow it up with continuous sweeping strokes to even out and smooth the bevel.

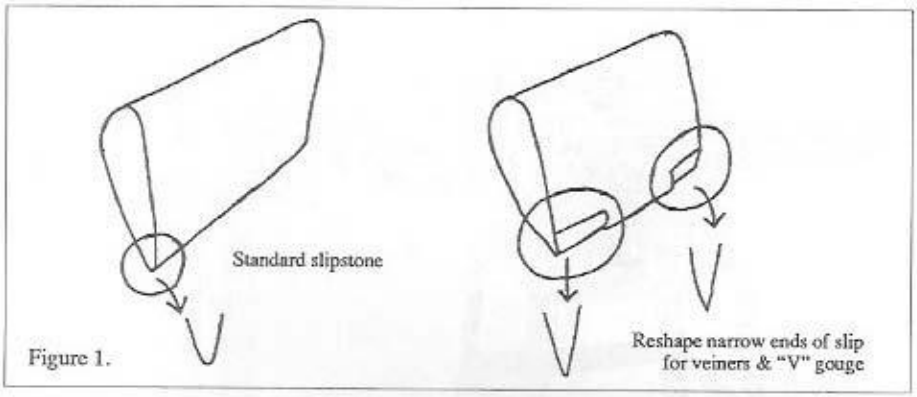


Figure 1.

As for the flute, there are three reasons for sharpening it as well. First and perhaps most significant is the fact that there are grinding marks in the flute from the factory. Some tools are worse than others, but all have them. If you don't remove these grinding marks, even though the bevel is sharpened properly, they continue into the cutting edge and you get a serrated edge rather than a true "knife" edge.

Secondly, the bevel on carving gouges is shallower than what you would find on a cabinetmaker's or carpenter's chisel. The standard bevel will serve you fine on softer woods. However, when carving hardwoods, establishing an inner bevel will be necessary. Putting an inner bevel on the tools increases the amount of steel behind the cutting edge, thus making it significantly stronger (**Figures 3 and 4**). In addition, by putting an inner bevel on a gouge, it allows you to use the gouge upside down (flute down) when matching the sweep of a gouge with a convex surface. One example would be carving a bead.

The final reason for sharpening the flute is to remove the burr produced when working the outside bevel.

Now, how do you know when the tool is sharp? The old sayings about being able to shave some hairs off your arm or the edge digging into your fingernail are good thoughts, but they won't tell you the whole story. Because gouges have curved cutting edges, and if you'll remember what I said about putting more pressure at the beginning or end of a stroke, the usual experience for people is that part of the tool is very sharp and the other part is dull. It is very important to regularly inspect the cutting edge to see if you are missing any spots. The truest indication of whether a tool is sharp is to do the following:

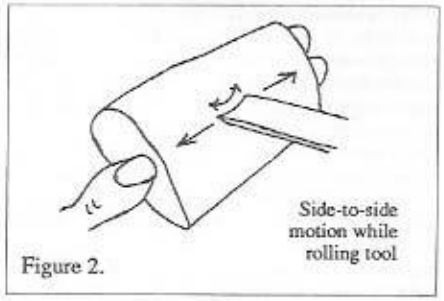


Figure 2.

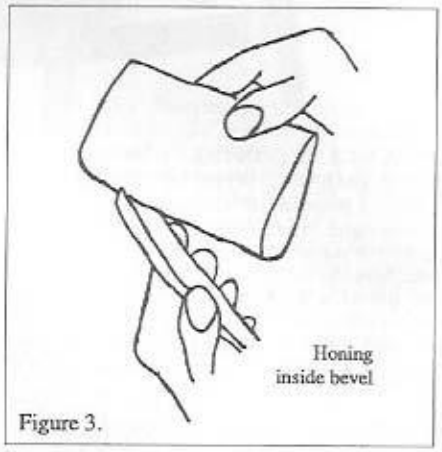


Figure 3.

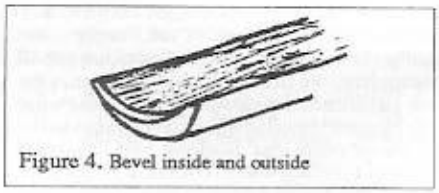


Figure 4. Bevel inside and outside

Hold the tool upright under an overhead light source. Look down on the cutting edge. Don't look at the bevel or the flute, but at the cutting edge itself. If there are any dull spots, they will reflect light. This is referred to as the line of light (**Figure 5**). If a tool is sharp, there will not be any surface to reflect light because the edge is forming a perfect point.

By using this method you'll know if the entire cutting edge is sharp. This is particularly important when utilizing the tool marks for texturing. Any dull spots on the cutting edge will show up in the tool mark. When using a tool for texturing, you want as crisp and clean a cut as possible.

Sharpening the "V" Gouge

Now to the most difficult tool to sharpen, the "V" gouge. Once you've spent the time sharpening one of these, you'll want to keep the tool wrapped in a towel when its not in use to protect the edge from accidental damage. For sharpening purposes, the "V" gouge is essentially two straight chisels joined along

Tony Dileo is a sculptor and woodturner in Atlanta, GA. He has worked part-time at Highland Hardware since 1981.

one edge. Sharpening each of the two wings is relatively easy, but dealing with the solid cross-section that joins the two is where more difficulty usually comes in. The sharpening motion for the "V" is to lay one wing on the stone and draw the tool away from the cutting edge, the same as if it were a straight chisel (**Figure 6**). Having done this, flip over to the other wing. Once again, it is important that you inspect the edge regularly. You want the two wings to be sharpened evenly.

There are two common problems that arise in sharpening the "V". First, if uneven pressure is applied to the wing, a thin spot may occur (**Figure 7a**). It can show itself during the sharpening process, or more frustrating, when you go to carve and the edge disintegrates. When this happens, you hold the tool perpendicular to the stone and grind the cutting edge away until you get below the thin area. Inspecting the cutting edge for the line of light will tell you when you've gone far enough. It will also show you where you've applied too much pressure. Having reached this point, you then sharpen the wings again, being more careful to apply even pressure.

The other common problem that occurs in sharpening the "V" gouge involves dealing with the cross-section where the two wings meet. It's important to realize that "V" gouges aren't actually supposed to cut an absolutely sharp-pointed V shape. The way the tool is ground and sharpened makes this impossible —if you look at a well-sharpened "V" gouge closely, you'll see that the bottom of the V is actually a rounded point rather than coming to a sharp line. This is the only practical way to make the bottom of the tool come up to meet the inside and form a sharp edge. When you work only on the main bevels on the two wings, you'll almost always wind up with a small nib sticking out at the bottom of the V (**Figure 7b**). To eliminate this nib you'll have to work on the third bevel (**Figure 7c**) where the bottom of the V comes up to meet the inside.

When you've produced a protruding nib, hold the tool perpendicular to your stone and grind away the nib only. Remember that by the time you've gotten to this point the wings are already sharp, so be careful not to take the nib right down to where you grind off the wings as well. When the nib is gone, inspect the edge and look for the line of light. This will show you how much metal you'll have to remove from the third bevel to sharpen the area the nib had occupied (**Figure 8a**).

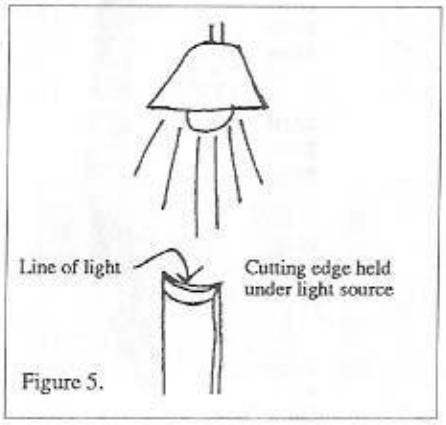


Figure 5.

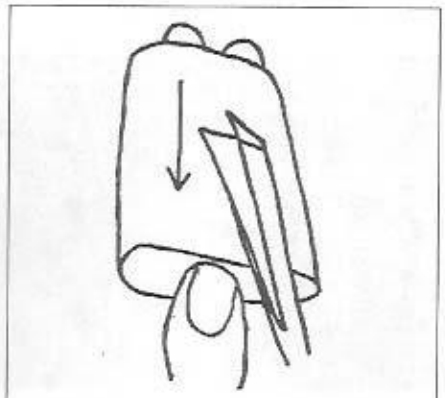


Figure 6. Sharpening wings of "V"

I perform this removal in 3 steps. The first step is to hold the third bevel on the stone and move it back and forth to remove most of the cross-section at the base of the V (**Figure 8b.**) Stop just short of eliminating the line of light.

The second stage is to lay the tool partly over to one side and remove more metal (**Figure 8c**). Lay it over to the other side and do the same, again stopping just shy of sharpening away the line of light.

Finally, gently round over the entire third bevel to feather it into the wing bevels (**Figure 8d**), eliminating the line of light and establishing a continuous sharp edge all across the front of the tool.

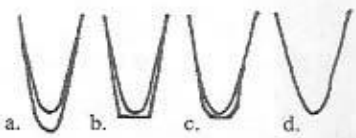


Figure 8. Stages for removing excess metal from bottom of "V" gouge

Just as with gouges, the flute of the "V" tool requires work as well. No "V" tool comes to a perfect "V" at the bottom; all are slightly rounded. The key is to not round it any more than how it came from the factory. In shaping your slipstone, hold it in the flute to make sure you shape it so that it will hit only one side at a time. Follow the same procedure as for gouges.

One final note on sharpening the "V" tool. The wings of the tool should either be square to the third bevel or leaning slightly forward. They should not be leaning back. The reason for this is that when you are making a cut, you want the wings to be cutting forward of the cut at the bottom of the "V." As a result, as the tool leaves the wood you are cutting the shoulders first, eliminating tear out.

In sharpening my tools, I use all four grits of slipstone, repeating work on both bevel and flute with each grit. The last thing I do is buff the tools with green rouge on a medium buffing wheel. I buff the bevel and the flute. Because the buff is a flexible surface there are two things to remember in using it.

First, when bringing the tool up to the buff, don't let the buff run across the cutting edge. This will dull the tool.

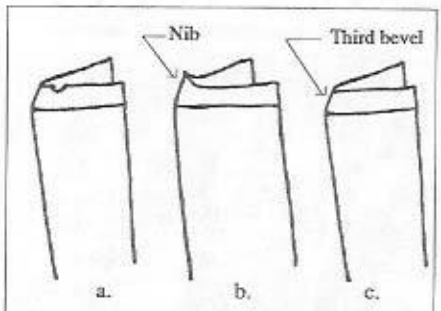


Figure 7.

The second is directly related to the first. Don't apply excessive pressure. To begin with, it's not necessary. More importantly, when applying excessive pressure, the buff will flex and run across the cutting edge, dulling the tool.

If you don't have a grinder/buffing wheel setup, you can buy a 3" buffing wheel along with an arbor for mounting on an electric drill.

When you're carving and the tool starts to get dull, you can take it to the buff and re-establish a keen edge. It is not necessary to go back to the stones yet. You can buff several times before going to the stones. At some point, you will have to go back to the stones, but examine the edge to determine which grit to start with. After several buffs, I will go back to the 4000 grit stone and then the 8000. Sooner or later, you will have to go back to the coarser stones to re-establish the bevel. With some practice, you'll get a sense of which grit is necessary.

One side note. Someone came in the store several years ago and purchased a gouge. About two weeks later, he returned and said he needed to buy another identical gouge. After I asked some questions, he informed me that every time the tool got dull, he would completely regrind the tool on a bench grinder. He had taken just two weeks exhausting the life of the gouge.

The only time I use a bench grinder is if I accidentally drop a tool or when the tool needs to be completely reshaped. When I do use it, it is sparingly and with a very light touch. The use of a water quench is necessary to help keep the tool cool also.

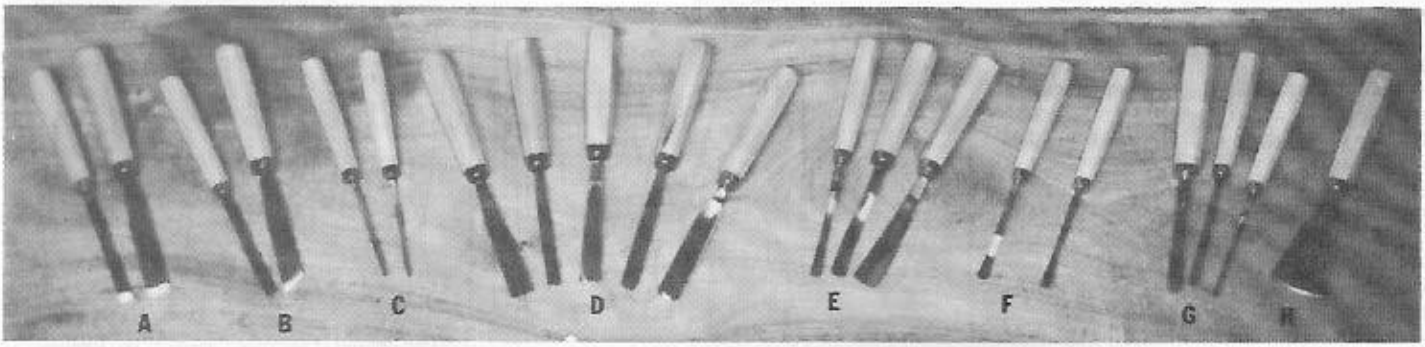
Once you have established a good bevel, maintaining the cutting edge is easy. When the tool becomes dull, you don't have to completely redo the edge. Periodic buffing and honing with the finer grit slips will keep the tools running for extended periods of time.

Tools for sharpening gouges can be ordered from Highland Hardware:

02.64.38	Set of 4 Slipstones	$34.95
02.64.31	180 Grit Slipstone	7.95
02.64.21	1000 Grit Slipstone	7.95
02.64.22	4000 Grit Slipstone	8.95
02.64.23	8000 Grit Slipstone	14.95
02.64.32	Green Buffing Stick	16.95
02.49.01	3" Buffing Wheel with Drill Arbor	7.50

Add shipping charges listed on order form.

CARVING TOOLS



HIRSCH Carving Tools

We are pleased to offer Hirsch brand carving tools, regarded by many as Europe's finest woodcarving tools. Manufactured in Germany continuously since 1780, the Hirsch tools are second to none in performance and quality.

Hand-forged of West Germany's finest high carbon tool steel and tempered to a Rockwell hardness of 61, these carving tools are known for their ability to take an edge that will remain sharp during long periods of demanding professional use. The tools are finely polished inside and the bevel carefully ground. Some honing may be necessary before use.

Each of the tools is fitted with an over-sized octagonal handle which allows for an exceptionally powerful and sturdy grip. Overall length of the tools averages 11". *Sizes listed are in mm. (3mm = approx. 1/8").*

Items marked with § are included as part of the Comprehensive 12-Tool Starter Set *(described on next page).*

A Straight Carving Tool

12.97.98	2mm	14.50
§ 12.97.31	6	14.50
12.97.32	14	17.50
12.97.33	18	19.95
12.97.34	25	24.95
12.97.35	40	39.95

B Skewed Carving Tool

§ 12.97.36	10	14.50
12.97.37	14	17.50
12.97.38	20	22.50
12.97.39	25	24.95

C Veiner Gouge

§ 12.97.96	1	29.50
12.97.97	2	29.50

#3 Straight Gouge

12.98.01	6	19.95
12.98.02	10	19.95
§ 12.98.03	14	22.95
12.98.04	20	27.95
12.98.05	25	32.50
12.98.06	35	39.95

#5 Straight Gouge

12.97.40	6	19.95
12.97.41	10	19.95
12.97.42	14	22.95
12.97.43	20	27.95
12.97.44	25	32.50
12.97.45	35	39.95

D #7 Straight Gouge

12.97.46	6	19.95
12.97.47	14	22.95
12.97.48	20	27.95
12.97.49	25	32.50
12.97.50	35	39.95

#9 Straight Gouge

12.97.51	6	22.50
§ 12.97.52	10	22.50
12.97.53	14	23.95
12.97.54	18	27.95
12.97.55	25	39.95
12.97.56	35	66.95

#11 Straight Gouge

12.97.57	6	22.50
12.97.58	10	22.50
12.97.59	14	23.95
12.97.60	18	27.95
12.97.61	25	39.95

#4 Bent Gouge

12.97.62	6	22.50
12.97.63	10	22.50
§ 12.97.64	14	23.95
12.97.65	25	38.95
12.97.66	35	49.95

E #6 Bent Gouge

12.97.67	6	22.50
12.97.68	10	22.50
12.97.69	14	23.95
12.97.70	25	38.95
12.97.71	35	49.95

#8 Bent Gouge

12.97.72	6	22.50
§ 12.97.73	10	22.50
12.97.74	14	23.95
12.97.75	25	38.95
12.97.76	35	49.95

#11 Bent Gouge

12.97.77	6	23.95
12.97.78	10	23.95
12.97.79	14	26.95
12.97.80	25	43.95
12.97.81	30	53.95

#3 Spoon Gouge

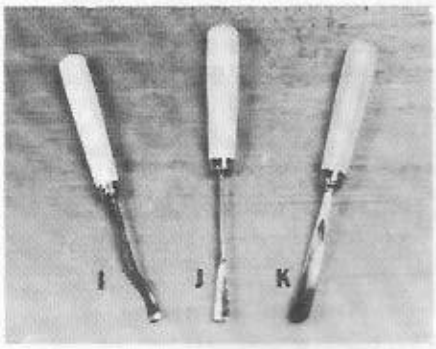
12.98.22	10	22.50
12.98.23	14	23.95
12.98.24	25	39.95

F #5 Spoon Gouge

§ 12.98.16	10	22.50
12.98.17	14	23.95
12.98.18	20	39.95

#8 Spoon Gouge

12.97.82	10	22.50
12.97.83	14	23.95
12.97.84	25	39.95



#39 V Gouge

12.97.85	4		28.95
§ 12.97.86	8		28.95
12.97.87	12		31.95

G #41 V Gouge

12.97.88	6		28.95
12.97.89	10		28.95
12.97.90	14		31.95

#45 V Gouge

12.97.91	4		28.95
12.97.92	8		28.95
12.97.93	12		31.95

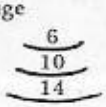
H 50mm Swiss Pattern Gouge

12.98.25	#1 Sweep	49.95
12.98.26	#3 Sweep	55.95
12.97.94	#5 Sweep	55.95
12.97.95	#7 Sweep	55.95

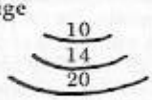
#3 Back Bent Gouge

12.98.27	6		22.50
12.98.28	10		22.50
12.98.29	14		23.95

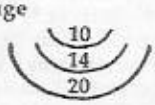
I #5 Back Bent Gouge

12.98.07	6		22.50
§ 12.98.08	10		22.50
12.98.09	14		23.95

J #6 Fishtail Gouge

12.98.13	10		21.95
§ 12.98.14	14		23.95
12.98.15	20		31.50

#8 Fishtail Gouge

12.98.219	10		21.95
12.98.20	14		23.95
12.98.21	20		24.95

K #39 Curved Parting Tool

12.98.10	6		31.95
12.98.11	10		31.95
12.98.12	14		36.95

Carving Tool Selection

Carving tools are identified according to their shapes by a universal numbering system. Regardless of who manufactured it, for example, a #1 tool is always a straight firmer chisel, a #2 is always a skew chisel, #3 and higher tools are gouges.

All gouges have a curved cutting edge which allows both with-grain and cross-grain cutting. This curve is referred to as the sweep. The shallowest sweep is the #3 and the deepest sweep is the #11. Generally speaking, the deeper the sweep, the greater the amount of wood you can remove. If you were working in sequence, the deeper gouge would be used for roughing out, and you would move to a shallower gouge for smoothing.

If you are relying on the mark left by the tool for texturing your workpiece, the choice of a specific sweep and width comes into play.

Likewise, if you are carving mouldings or reproducing an existing pattern, a specific sweep may be required to duplicate a radius.

Gouges are either straight or bent along their length. **Straight gouges** are used on flat or convex surfaces. **Bent gouges** are used for concave surfaces. The bent gouges are made in two variations: long bend and short bend (usually called a spoon gouge). The **spoon gouges** allow you to cut a concave surface with a tighter radius than the long bent gouges can handle. Spoon gouges are also used for undercutting in relief carving. The numbering of sweeps on the bent gouges is the same as for the straight gouges.

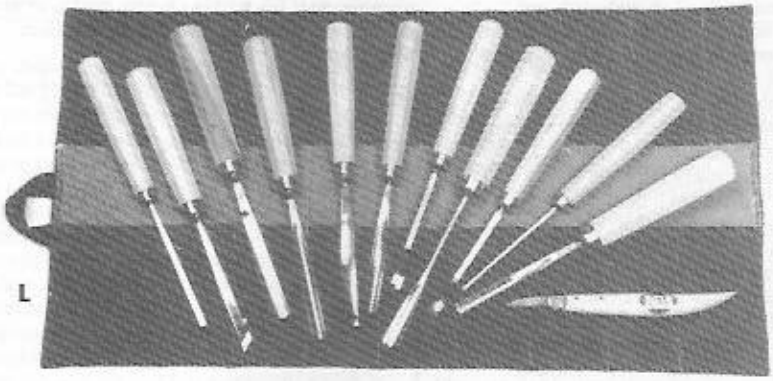
The tapering blade of the **fishtail gouge** allows access to areas of a carving that would be impossible to reach with a straight-sided gouge. The **back bent gouge** is utilized for undercutting in relief carving.

The **straight chisel** is used in relief work for setting and ground work, and flat cutting on convex surfaces.

The long point of the **skew chisel** allows you to cut into an area where access is limited to an angled approach.

The **"V" gouge** (or Parting Tool) produces a V-shaped mark. It is used for incising and texturing.

HIRSCH CARVING SETS



L COMPREHENSIVE 12-TOOL STARTER CARVING SET

This set allows you to do both carving in the round as well as relief carving, and is designed for intermediate to small size carvings. It includes a 6mm #1 straight chisel, 10 mm #2 skew chisel, 14mm #3 straight gouge, 10mm #9 straight gouge, 14mm #4 bent gouge, 10mm #8 bent gouge, 10mm #5 spoon gouge, 14mm #6 fishtail gouge, 10mm #5 back-bent gouge, 1mm veiner, 8mm #39 V-tool, and a whittling knife, all packed in a 12-pocket denim tool roll. To accommodate larger carvings, we recommend adding the Intermediate set of three 25 mm gouges.)

12.98.31 12-Tool Carving Set 219.95

CARVING GOUGE SETS

The three 3-gouge sets listed here are intended as basic starter sets for fully 3-dimensional carving. They are alike in that each set affords a range of sweeps for roughing out, intermediate smoothing, and smoothing. The sets differ from one another in terms of the size carving for which they are suited, from small scale up to life-size sculpture.

M BEGINNING GOUGE SET

For basic carving in the round on small to intermediate size projects (approximately 12" in dia. or smaller). It consists of three 6mm (1/4") gouges with sweeps of #3, #7, and #11, and comes packed in a 6-pocket denim roll.

12.98.35 **Beginning 3-Gouge Set** 56.95

N INTERMEDIATE GOUGE SET

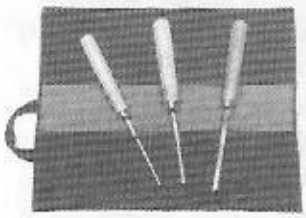
For carving in the round and sculpture larger than 12" in diameter. It includes three 25 mm (1") gouges in #3, #7, and #11 sweeps and a 6-pocket denim tool roll.

12.98.33 **Intermediate 3-Gouge Set** 99.95

O SCULPTOR'S GOUGE SET

For heavy stock removal on projects of human scale or larger. It features three #50 mm (2") Swiss pattern gouges with sweeps of #3, #5, and #7 and a 6-pocket denim roll.

12.98.34 **Sculptor's 3-Gouge Set** 156.95


M


N


O

Making a Drop-In Sub-Base For Table-Mounting Your Router

by Zach Etheridge

BACK IN *Wood News* 21 we published an article on router tables that we've been trying to finish ever since. In *Wood News* 23 we were compelled to share more detail on the fence we merely pictured originally, and now we're once again bowing to pressure to provide the step-by-step on drop-in sub-bases. For those who've tuned in late on this continuing story, the basic premise is that table-mounting your router by simply hanging it in the table on an oversize sub-base is the most effective mounting method we've come up with yet. With the right material for the sub-base, mounting and dismounting are child's play, very little of your router's potential depth of cut is sacrificed, bit installation can be done aboveboard, and you're never condemned to crawl around on the floor underneath the table while trying to get a job done.

Our favorite material for the drop-in sub-base is phenolic resin board, which combines great stiffness, durability, low friction and workability to be nearly the ideal stuff for the job. Phenolic a mere 1/4" thick is plenty strong and rigid enough to support any router without sagging or vibrating, while costing you as little lost depth of cut as possible. Clear plastics like acrylic or polycarbonate have to be 3/8" or 1/2" thick to offer close to the same stiffness, and with some bits, especially big panel-raising cutters, that extra thickness exceeds the bits' reach when the shank is safely inserted in the collet. This is more than a minor point; we've seen the results of trying to run a big bit with less than 3/4" of shank held within the collet, and all we can say is it's a miracle nobody we know has been seriously injured.

There are only three or four steps to making a drop-in insert. First is fitting the phenolic board to your router. Then there's cutting the center opening and making throat liners, and third there's cutting a hole in your router table to accept the drop-in insert. The fourth step, providing a starter pin, is a necessity if your ever do freehand routing on the table.

Attaching the Drop-In Sub-Base

Assuming it's removable, take the manufacturer's sub-base off your router and use it as a template for marking the phenolic blank. You might as well center-mount the router, though its exact location is usually not especially important. Nor is the precise orientation of the handles; you'll want them aligned more or less along the length of the sub-base to make it easier to slip the handles through the hole in your router table, and you'll want to be able to reach the height adjust knob, plunge lock lever, speed control and switch with minimum fuss.

Here's a simple way to center a circular sub-base on the rectangular phenolic blank, illustrated in **Figure 1**: Draw lines diagonally from corner to corner, so they cross at the center of the blank (a felt-tip pen makes the most easily visible marks). Measure your router sub-base's diameter, divide by 2, and mark that radius from center on each of the diagonal lines. Lay the sub-base on the phenolic so it fits within all four marks, orient the screws holes as needed, and mark them with your felt-tip pen.

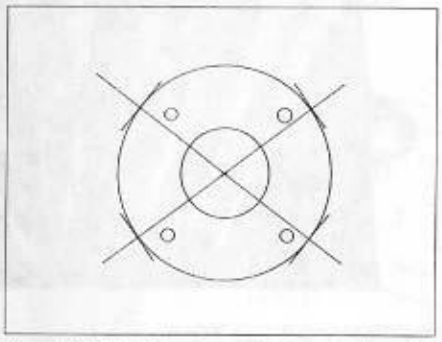


Figure 1. A simple way to center your router's sub-base for marking screw holes on the phenolic board.

When drilling the screw holes, first drill shallow countersinks with a regular twist bit 5/16" or larger (you may even use a real countersink if you wish), then drill through with a bit about 1/32" larger than the diameter of the screws, for example 3/16" holes for 4mm screws.

Center Hole and Throat Liners

If you never run anything other than fairly small bits, it might be appropriate to drill, rout or saw a center hole no bigger than the opening in your router sub-base. For many purposes, though, especially if you're mounting a big router, you'll want a bigger throat to accommodate monstrous shaping bits such as panel raisers that can run up to 3-1/2" in diameter; thus you'll want a center hole at least 3-5/8" in diameter, equipped with one or more removable throat liners with smaller openings for use with smaller bits. Liner stock should be about 1/8" thick, fairly stiff and tough enough to last. We stock 5" x 5" pieces of nominal 1/8" Lexan for this use; it's plenty stiff enough in such small sizes, it's unbreakable, and it adds a transparent element of high-tech flash to the most mundane router table.

The hole in the phenolic blank may be circular or square. Use your router and a circle-cutting trammel jig pinned on the blank's center point (*see box at right*), or lay out a square and cut it out carefully with a jig saw. For installing the removable liners you'll run a rabbet bit around the opening, set at 7/64" depth for our Lexan blanks (**Fig. 2**). Rabbet width should be 1/8" or more.

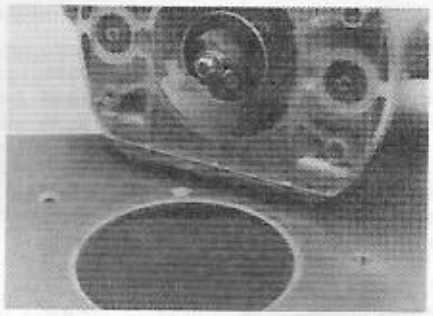


Figure 2. The center opening cut and rabbetted to accept throat liners.

For circular openings, use the same router trammel jig or a circle cutter in a drill press to cut the Lexan liner so it fits snugly in the rabbeted opening; for square holes, cut the liner to size on the table saw or mitre saw, and sand the corners round to match the radiused corners left by your rabbet bit. Rout, drill or saw the center hole to size. Two or three liners of varying throat openings, 2" and 1" for example, let you safely minimize the gap around smaller bits, and they make a through-the-fence vacuum system more effective as well.

Liners must be secured in the phenolic insert or they *will* come loose and get torn up. Two short 6-32 flat head machine screws will serve the purpose nicely. Put the liner in the insert and secure it with a strip of duct tape. On opposite sides, drill shallow countersinks centered directly over the line between liner and phenolic (**Fig. 3**). Drill through with a 7/64" bit, and tap the holes (a 5¢ 6-32 thread-cutting screw makes a fine fake tap if you don't already own the real thing). You'll probably have to cut or grind off the screws to just under 1/4" long. Fasten them just snugly, being careful not to overtighten and strip out the threads in the phenolic board.

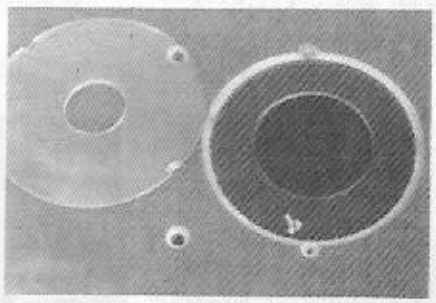


Figure 3. Two throat liners, with countersinks drilled for hold-down screws.

Zach Etheridge is Highland Hardware's Product Manager.

Fitting the Sub-Base In Your Table

First you'll need to decide where you want your router spindle located. Centered left to right, and forward of center front to back is the standard and reliable choice. Centering the router 8" to 10" from the front edge of the table gives you a work surface wide enough for most edge-shaping jobs, and if you ever need to work on very wide stock you can always turn the table around and work from the wider side. Of course if you're converting your table from a bolt-the-router-underneath mounting system to the drop-in system you'll have to be sure the new drop-in hole covers the old throat opening in any case.

This is a good place for a low-tech approach. First, determine the width of cut your rabbet bit delivers (3/8" is typical). Measure your phenolic blank, subtract twice the rabbet width from both width and length, and mark the resulting dimensions on your router table. For instance, if your phenolic board measures 9" x 11-3/4" and you have a 3/8" rabbet bit, you'll mark a rectangle 8-1/4" x 11" on your table top. Drill a starter hole and carefully saw inside the lines to remove the waste. With the rabbet bit in your router, set the depth of cut less than 1/4" and rabbet around the rectangular opening (**Fig. 4**). Sand the corners of the phenolic to match the radius left by the rabbet bit, and try the fit. If you've been careful, the phenolic will still be too big

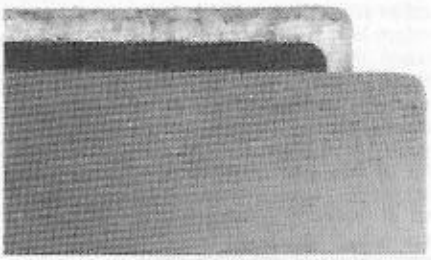


Figure 4. A rabbet bit leaves radiused inside corners in the table; sand the sub-base corners to match.

to drop into the rabbetted recess. You should be able to see exactly where you need to enlarge the opening; work on the edges of the hole with a rasp or coarse sandpaper, run the rabbet bit around again, and try the fit once more. The idea is to sneak up on the perfect fit until you hit it just right. Then set your depth of cut to match the thickness of the phenolic and finish the job. If you end up with a loose fit despite this approach, glue some veneer to the edges of the sub-base and sand off as much as needed to provide a snug fit. Take enough time to get the drop-in insert dead flush with the table table surface, and make sure it fits easily with no loose play at all.

Providing a Starter Pin

The starter pin (**Fig. 5**) provides a safe fulcrum from which you can control a workpiece as you begin a freehand cut with neither fence nor mitre guide used to control the stock. Simply shoving a piece of wood into a bit isn't safe; the bit will want to yank the piece out of your hands and blow it across the room. Once the workpiece comes up against the bit's ball bearing guide you're in good shape, but up to that point the starter pin does the job of helping you control the stock. The pin should be located to the right of the bit, just a tad forward of spindle center, and as close to the center hole in the phenolic sub-base as practical. In use, you'll slide your stock along the pin, aiming toward the ball bearing guide on your bit. The pin must of course be stout stuff and it must mount rigidly secure.

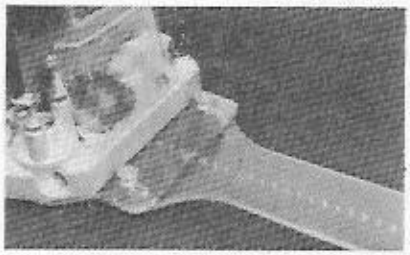
Here at the store we made a stout 2" starter pin from a 5/16" hex bolt which screws into a T-nut countersunk and epoxied into the underside of the sub-base. It's a very nice starter pin and we had fun making it, which is just as well because immediately afterward we learned we could have bought a ready-to use pin from Freud for a mere $5.95. Freud's is a 3/8" steel pin with a 1/4" stub turned on one end; the stub simply plugs through a clean 1/4" hole drilled through the sub-base. Disgustingly simple, and quite effective.

Getting It Together

As you know, it's our custom to provide the materials we've persuaded you that you can't live without. Highland Hardware stocks phenolic resin board in nominal 1/4" x 9" x 12" pieces, 1/8" x 5" x 5" Lexan throat liner material, and Freud starter pins. If you're just starting on your table project, you might want to avail yourself of our **complete drop-in sub-base kit**, which includes a piece of piece of phenolic board, two throat liner blanks, one Freud starter pin, two 6-32 x 1/4" screws and a free thread-cutting screw.

Or, if you really just want to get right to work, our Freud Router Table, which takes about ten minutes to assemble, comes fitted with a phenolic drop-in board ready to mount on your router, equipped with a starter pin and one fitted throat liner with hold-down screws. As a valuable accessory for any new or existing router table, we'll highly recommend our own Router Table Fence Plan, which appeared in *Wood News* 23. That issue is out of print, but a reprint of the fence plan may be had for one dollar.

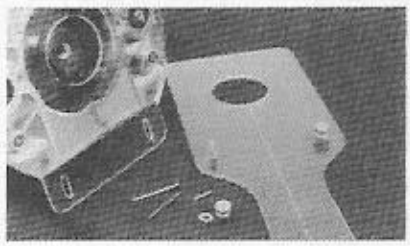
Figure 5. A starter pin in place for a bearing-guided panel raising cut. Note guard covering the exposed bit.



An Adjustable Circle-Cutting Jig

The router offers an easy and efficient way to cut practically any size hole larger than your largest drill bit, and lets you cut plugs of all sizes as well. A simple circle-cutting jig attached to the router base is all you need for cutting perfectly round holes from 1-1/2" to 10" or 15" in diameter; stouter jigs will let you cut holes or circles up to 6 feet or any other diameter you like. Along with the other 579 excellent ideas in *Router Jig & Techniques*, Pat Spielman shows a couple of easy-to-make circle cutting jigs; we made one and used it for a couple of years quite happily. Recently we took our jig one step further by attaching it to a custom sub-base designed to allow infinite radius adjustment, enabling an unprecendented degree of precision and flexibility.

The sub-base design simply adds a 1" wide lip on one side of the standard sub-base shape, where we cut a couple of 1/2" slots through which we attach the circle-cutting jig. Two screws epoxied into the circle jig fit through the slots and are secured with washers & knurled nuts. The jig is first pinned through the hole closest to the target radius, and then the router is moved as needed to bring the bit to the exact location required before the nuts are tightened down. Another tip from Spielman is using #16 wire brads for center pins; they fit snugly in 1/16" holes drilled about 3/8" apart along the circle jig and are plenty strong enough for the job.



Parts referred to in this article can be ordered from Highland Hardware. They are available separately or as a kit.

Visa/MasterCard/Discover users can order toll free by calling (800) 241-6748, or you may use the order form found opposite page 24.

10.20.09	**Drop-In Sub-Base Kit** *(includes 9x12 phenolic board, starter pin, two 5x5 lexan blanks, & mounting screws)*	**$19.95**
10.20.05	**9x12 Phenolic Resin Board**	**10.95**
10.20.10	**1/8" x 5" x 5" Lexan Throat Liner**	**1.95**
10.20.11	**Freud Starter Pin**	**5.95**
10.20.01	**Freud Router Table**	**169.95**
10.20.12	**Router Table Fence Plan**	**1.00**
20.03.84	**Router Jigs & Techniques**	**16.95**

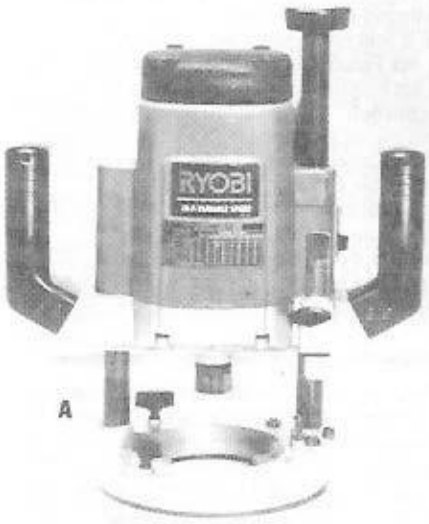
ROUTERS

During the first part of the 1980s, there began what was to become a major evolutionary transformation of the traditional woodworking router. Motors were made more and more powerful, 1/2" collets began appearing on hand-held machines, new applications and new techniques proliferated, and plunge-router design began to gain popular acceptance. Now, 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 features in common. Each comes equipped with a 1/2" collet, with provisions for handling 1/4" and 3/8" shanks as well. Each comes with an adjustable plunge stop rod which attaches to the motor housing, and each has a rotating turret on the base which lets different depth settings be selectively located under the stop rod.



RYOBI RE-600 ELECTRONIC VARIABLE SPEED PLUNGE ROUTER

This superb machine from Ryobi has caused 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.

SPECIAL BUY: Select $50.00 worth of router bits for FREE with purchase of a Ryobi RE-600 router, while current supplies last. Choose from among the large selection of bits on pages 20-21 of Wood News, or pages 30-35 of our Fall 90/Winter 91 Catalog.

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 safety.

Std. eqpt. includes a 3-piece guide set with micro-adjustable holder, straight fence and roller guide. Also included are 1/4" and 3/8" adapter sleeves for use in the standard 1/2" collet. Optional guide bushing adapter allows use of Black & Decker or Porter Cable guide bushings *(available on next page)*. Weighs 14 lbs.

A	RE600	Ryobi Var. Spd. Plunge Router	249.95
	6072503	Guide Bushing Adapter for B&D/Porter Cable Bushings	9.00

New Dust Extractor Attachment Now Available

ELU 3338 ELECTRONIC VARIABLE-SPEED PLUNGE ROUTER

This superb machine is a strong contender for the title of best-built plunge router on the market today. Elu's unique and totally precise depth setting system is the best by far, incorporating a graduated rack-and-pinion plunge stop rod with a magnified adjustable cursor (with parallax eliminator, no less). Electronic variable speed control is a wonderfully useful feature for all manner of routing situations: running really big bits, routing sheet materials, Corian and other synthetics, following patterns or using complex templates—all of these operations are safer, smoother and more efficient when you can run the router at appropriate cuts-per-inch and feed rates.

The 3338 features mid-sized upright handles that fill the hand for a secure and comfortable grip; the plunge lock lever can be reached by the fingers of your right hand without letting go of the handle. Also incorporated into the motor housing is an internal spindle lock for easy one-wrench bit installation. On the plunge return limit post at the left front of the machine there's a convenient quick-release nut which can be set instantly to limit the motor's upward travel, as needed when using very large bits or dovetail bits installed through guide bushings.

The 3338 operates at speeds from 8,000 to 20,000 rpm, drawing from 12 to 10 amps depending on the speed selected. It offers up to 2-5/8" of plunge travel, with precision- machined bronze bushings traveling smoothly and snugly on polished, case-hardened steel posts. The 1/2" collet supplied with the 3338 has an unusually long 1" grip length, and the spindle is bored 2-1/4" deep to accept even the longest shanks securely, bringing cutting edges close to the collet for maximum stability and safety. Standard equipment includes a straight edge guide with micro-adjust knob, and a bushing adapter to allow use of standard Black & Decker or Porter-Cable guide bushings. Net weight is 12-1/4 lbs.

New Dust Extractor Attachment

This ingenious vacuum hood mounts in the router base between the plunge posts, picking up waste and dust extremely well in hand-held or table-mounted work without getting in the way. Clear plastic lets you see what you're doing while the hood is installed; good design means the collet can still be plunged to within 3/8" of the base. Connects to standard 1-1/2" shop vac hose.

B	3338	ELU Var. Speed Plunge Router	299.00
	C40915	ELU Dust Extractor Attachment	59.95

See additional accessories at right on next page.

C

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 unequaled ease of use in joinery and surface-forming jigs.

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

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

C	10.10.09	3612B (Rectangular-Base)	199.95
	10.10.10	3612BR (Round-Base)	199.95
	10.10.55	Guideset for 3612B & BR	48.95

Sale quantity limited

ACCESSORIES FOR ELU 3338 ROUTER

C40902	1/4" Collet	29.95
C40904	3/8" Collet	29.95
C40966	Fine Height Adjuster	9.95

Porter Cable Guide Bushings (fit ELU)

C62943	5/16" o.d.	6.95
C62944	3/8" o.d.	6.95
C62945	7/16" o.d.	6.95
C62947	5/8" o.d.	6.95
C62942	Template Guide Nut *(reqd. 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	36.95
10.10.08	Guide Holder & Straight Guide only	28.95
10.10.04	Roller Guide only	9.30

MAKITA ROUTER GUIDE BUSHINGS

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

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

	Outside Diameter	*Bushing Height*	
10.10.32	3/8"	29/64"	18.00
10.10.56	7/16"	33/64"	22.00
10.10.57	1/2"	33/64"	22.00
10.10.58	5/8"	33/64"	11.00
10.10.34	25/32"	33/64"	18.00
10.10.35	1-1/16"	33/64"	9.00
10.10.44	Guide Bushing Adapter		16.00

D

BOSCH 1604 1-3/4 HP ROUTER

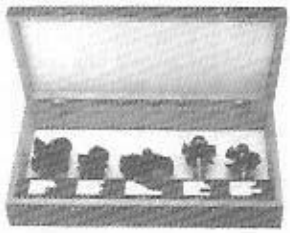
The Bosch 1604 is well known as a superb utility router for all manner of general-purpose shop work. Its 10-amp motor provides plenty of power for shaping and joinery work, and its interchangeable 1/4" and 1/2" collets will let you use all the bits you now own and most of the new ones on the market as 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.

D	10.16.01	Bosch 1604 Router	139.95
	10.16.02	Straight Guide	23.50
	10.16.08	3/8" Collet Cone	12.50
	10.16.03	Trammel Point	10.30
	10.16.05	7/16" Template Guide	10.55
	10.16.06	1/2" Template Guide	9.50
	10.16.07	5/8" Template Guide	10.25
	10.16.09	Router Vacuum Attachment	102.50

E



FREUD ROUTER PACKAGE DEAL

For $399, you can get Freud's Multi-Profile Router Bit, 5-piece Door Set, and the Most Powerful Plunge Router on the Market

Freud has packaged one of its most popular router bit sets with its most versatile one-piece router bit, and thrown in their 3-1/4 HP plunge router to boot!

Until Feb. 28, 1991, or while supplies last, order the package deal and save $366.70 off the list price of the items purchased separately. It's a great deal, and it buys you a quality plunge router whose 15 amp power rating makes it second to none, plus an assortment of high-quality Freud cutters which will equip your shop for countless doormaking and decorative molding jobs.

The router features an exceptionally long 1-3/8" (1/2"-diameter) collet with 6 constricting slots, permitting a solid grip on the bit. Convenient micro-adjustment depth control lets you set cutting depth quickly and easily. A large depth adjustment knob is easily accessible even when the router is mounted under a router table. Also features a shaft lock for easy bit changing, and on-off switch and plunge lock lever located within thumbs' reach of the side handles. No-load speed is 22,000 RPM. Maximum plunge depth is 2-3/4". 1/4" collet adapter is standard. Straight guide and guideholder are optional.

Freud's 1/2"-shank Multi-Profile bit allows you to produce countless patterns by varying fence setting, bit height and using multiple passes. The 5-piece router bit set includes a door lip cutter, glue joint cutter, 2-7/8"-diameter raised panel bit, and matching rail and stile cutters.

Also included with the package deal is R.J. DeCristoforo's booklet *How to Construct Paneled Doors with a Portable Router.*

Order now as sale quantities are limited.

E	FT2000KIT	Router Package Deal	399.00
	FT2000	Plunge Router Only	189.95
	10.10.08	Guide Holder & Guide	28.95

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.

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"	1/4"	12.90
10.14.02	1/8"	1/4"	1/4"	9.90
10.14.03	3/16"	7/16"	1/4"	9.90
10.14.04	1/4"	1"	1/4"	9.90
10.14.05	5/16"	1"	1/4"	10.80
10.14.06	3/8"	1"	1/4"	10.80
10.14.07	7/16"	1"	1/4"	11.90
10.14.08	1/2"	1"	1/4"	11.90
10.14.09	5/8"	3/4"	1/4"	11.90
10.14.10	3/4"	3/4"	1/4"	13.30
10.12.65	1/4"	3/4"	1/2"	11.90
10.12.66	5/16"	1"	1/2"	11.90
10.12.01	3/8"	1"	1/2"	11.90
10.12.02	7/16"	1-1/4"	1/2"	12.90
10.12.03	1/2"	1-1/4"	1/2"	11.90
10.12.04	1/2"	2"	1/2"	15.90
10.12.05	5/8"	1-1/4"	1/2"	14.50
10.12.06	11/16"	1-1/4"	1/2"	15.90
10.12.07	3/4"	1-1/4"	1/2"	14.90
10.12.08	7/8"	1-1/4"	1/2"	17.70
10.12.09	1"	1-1/4"	1/2"	18.90
10.12.10	1-1/2"	1-1/4"	1/2"	28.90
10.12.11	1-3/4"	1-1/4"	1/2"	42.90

B ROUND NOSE BITS

	Radius	Carbide Height	Shank	
10.14.13	1/16"	1/4"	1/4"	16.80
10.14.14	1/8"	1/4"	1/4"	17.60
10.14.15	3/16"	1/4"	1/4"	19.90
10.14.16	1/4"	5/16"	1/4"	19.90
10.14.17	5/16"	3/8"	1/4"	20.50
10.14.18	3/8"	1/2"	1/4"	20.90
10.14.19	1/2"	5/8"	1/4"	33.90
10.12.14	1/4"	1-1/4"	1/2"	29.90
10.12.15	3/8"	1-1/4"	1/2"	34.90
10.12.16	1/2"	1-1/4"	1/2"	48.90
10.12.17	5/8"	3/4"	1/2"	49.90

C V GROOVE BITS - 90° Angle

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

D COVE BITS

	Radius	Carbide Height	Shank	
10.14.20	3/16"	9/16"	1/4"	24.90
10.14.21	1/4"	9/16"	1/4"	24.90
10.14.22	3/8"	9/16"	1/4"	23.50
10.14.23	1/2"	3/4"	1/4"	28.50
10.12.18	3/8"	9/16"	1/2"	26.80
10.12.19	1/2"	3/4"	1/2"	29.80
47704F	Repl. 3/8" O.D. Bearing			3.80

E DOVETAIL BITS

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

F ROUNDING OVER BITS

	Radius	Carbide Height	Shank	
10.14.26	1/16"	1/2"	1/4"	23.70
10.14.27	1/8"	1/2"	1/4"	21.90
10.14.28	3/16"	1/2"	1/4"	21.90
10.14.29	1/4"	1/2"	1/4"	21.90
10.14.30	5/16"	1/2"	1/4"	23.70
10.14.31	3/8"	5/8"	1/4"	23.70
10.14.32	1/2"	3/4"	1/4"	26.50
10.12.23	1/4"	1/2"	1/2"	22.50
10.12.24	5/16"	1/2"	1/2"	24.50
10.12.25	3/8"	5/8"	1/2"	24.50
10.12.26	1/2"	3/4"	1/2"	28.50
10.12.27	3/4"	1"	1/2"	42.50
10.12.28	1"	1-1/4"	1/2"	90.00
10.12.29	1-1/4"	1-1/2"	1/2"	120.00
10.12.30	1-1/2"	1-7/8"	1/2"	128.00
47706F	Repl. 1/2" O.D. Bearing			3.80

G POINT CUTTING ROUND OVER BITS

	Radius	Point Width	Shank	
10.14.33	1/8"	1/8"	1/4"	17.60
10.12.31	1/4"	1/4"	1/2"	36.50

H FRENCH PROVINCIAL CLASSIC BITS

	Cutting Width	Carbide Height	Shank	
10.14.34	9/16"	5/8"	1/4"	54.95
10.12.32	9/16"	5/8"	1/2"	54.95

I OGEE BITS

	Cutting Width	Carbide Height	Shank	
10.14.35	5/16"	1/2"	1/4"	36.90
10.14.36	7/16"	11/16"	1/4"	39.90
10.12.33	5/16"	1/2"	1/2"	36.90
10.12.34	7/16"	11/16"	1/2"	39.90
47706F	Repl. 1/2" O.D. Bearing			3.80

J ROMAN OGEE BITS

	Cutting Width	Carbide Height	Shank	
10.14.37	5/16"	5/8"	1/4"	29.90
10.14.38	1/2"	7/8"	1/4"	30.90
10.12.35	5/16"	5/8"	1/2"	29.90
10.12.36	1/2"	7/8"	1/2"	30.90
47704F	Repl. 3/8" O.D. Bearing			3.80

K RABBETTING BITS

	Width of Rabbet	Diameter	Carbide Height	Shank	
10.14.39	1/4"	1"	9/16"	1/4"	26.50
10.14.40	3/8"	1-1/4"	1/2"	1/4"	22.60
10.12.37	3/8"	1-1/4"	1/2"	1/2"	22.60
47706F	Repl. 1/2" O.D. Bearing				3.80

L MORTISING BITS

	Diameter	Overall Length	Shank	
10.14.41	1/2"	1-3/4"	1/4"	10.80
10.14.42	5/8"	1-3/4"	1/4"	12.30
10.14.43	3/4"	2"	1/4"	13.80
10.12.38	1-1/4"	2-1/8"	1/2"	22.90

M FLUSH TRIM BITS

	Diameter	Carbide Height	Shank Diameter	
10.14.95	1/4"	1"	1/4"	20.80
10.14.96	3/8"	1"	1/4"	12.90
10.14.44	1/2"	1"	1/4"	12.50
10.12.39	1/2"	1"	1/2"	14.50
47706F	Repl. 1/2" O.D. Bearing			3.80

N BEVEL TRIM BITS

	Angle	Carbide Height	Shank Diameter	
10.14.45	7°	1/4"	1/4"	19.90
10.14.46	15°	1/4"	1/4"	14.20
10.12.40	15°	1/4"	1/2"	19.90

TWO-WING SLOT CUTTERS

	Thickness	Diameter	Slot Depth	
10.14.47	1/16"	1-7/8"	1/2"	10.90
10.14.48	1/8"	1-7/8"	1/2"	10.90
10.14.49	5/32"	1-7/8"	1/2"	10.90
O 10.14.50	1/4"	1-7/8"	1/2"	10.90
P 10.14.51	1/4" Arbor & Bearing			5.90
10.12.41	1/2" Arbor & Bearing			5.90
47708F	Repl. 7/8" O.D. 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"	23.50
47704F	Repl. 3/8" O.D. Bearing		3.80
10.14.53	11/16"	1/4"	34.90
10.12.43	11/16"	1/2"	34.90
47706F	Repl. 1/2" O.D. Bearing		3.80

R BEADING BITS

	Radius	Carbide Height	Shank	
10.14.54	1/16"	1/2"	1/4"	23.70
10.14.55	1/8"	1/2"	1/4"	21.80
10.14.56	3/16"	1/2"	1/4"	21.80
10.14.57	1/4"	1/2"	1/4"	21.80
10.14.58	5/16"	1/2"	1/4"	23.70
10.14.59	3/8"	5/8"	1/4"	23.70
10.12.44	1/4"	1/2"	1/2"	22.50
10.12.45	3/8"	5/8"	1/2"	24.60
10.12.46	1/2"	3/4"	1/2"	28.50
47702F	Repl. 3/8" O.D. Bearing			3.80

S LOCK MITER BIT

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

T FINGER JOINT BIT

	Diameter	Carbide Height	Overall Length	Shank	SALE
10.12.50	1-3/8"	1-9/16"	3-1/16"	1/2"	79.95

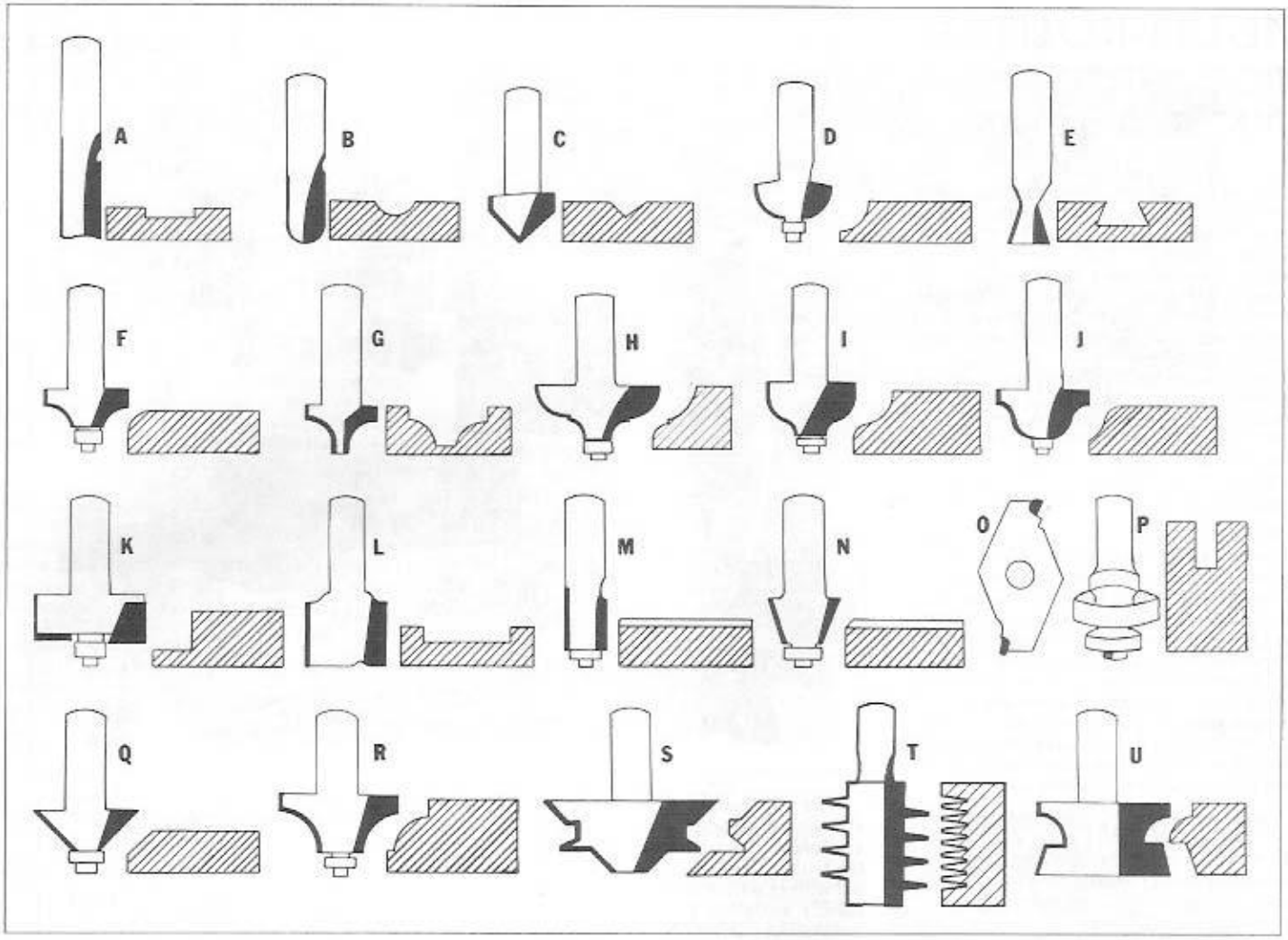
U CABINET DOOR LIP BIT

	Diameter	Stock Thickness	Shank	
10.12.49	2"	1/2" to 1-1/4"	1/2"	64.95

BALL BEARING GUIDES FOR ROUTER BITS

	Inside Diameter	Outside Diameter	
47723F	1/8"	1/4"	6.60
47704F	1/8"	3/8"	3.80
47702F	3/16"	3/8"	3.80
47706F	3/16"	1/2"	3.80
47720F	3/16"	3/4"	5.60
BR-02C	3/16"	1"	6.50
47708F*	5/16"	7/8"	3.80
47728F*	5/16"	1-9/64"	8.50
47727F*	5/16"	1-3/8"	8.50

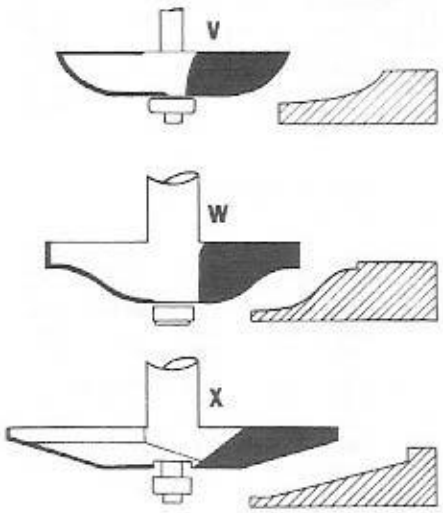
**Fits slot cutters only*



RAISED PANEL ROUTER BITS

	Diameter	Cutting Width	Carbide Height	Shank
Cove	2"	3/4"	3/8"	1/4"
Cove	2-1/2"	1"	5/8"	1/2"
Ogee Fillet	2-5/8"	1-1/16"	11/16"	1/2"
Provincial	3-3/8"	1-7/16"	1/2"	1/2"

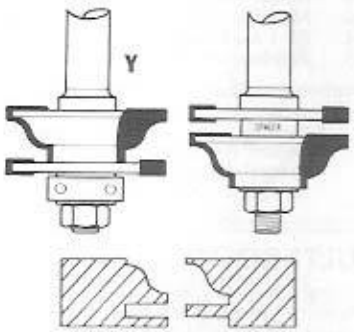
V 10.14.67 Cove Raised Panel, 1/4" shank 64.95
10.12.68 Cove Raised Panel, 1/2" shank 74.95
W 10.12.51 Ogee Fillet Raised Panel 79.50
X 10.12.52 Provincial Raised Panel 99.95



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

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

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



Y RAIL AND STILE BIT

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

10.12.53 Rail and Stile Bit 85.50
47708F Repl. 7/8" O.D. Bearing 3.80

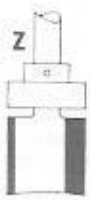
Z OVERHEAD-PILOT FLUSH TRIM BITS

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

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

Overhead-Pilot Flush Trim Bits

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



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.

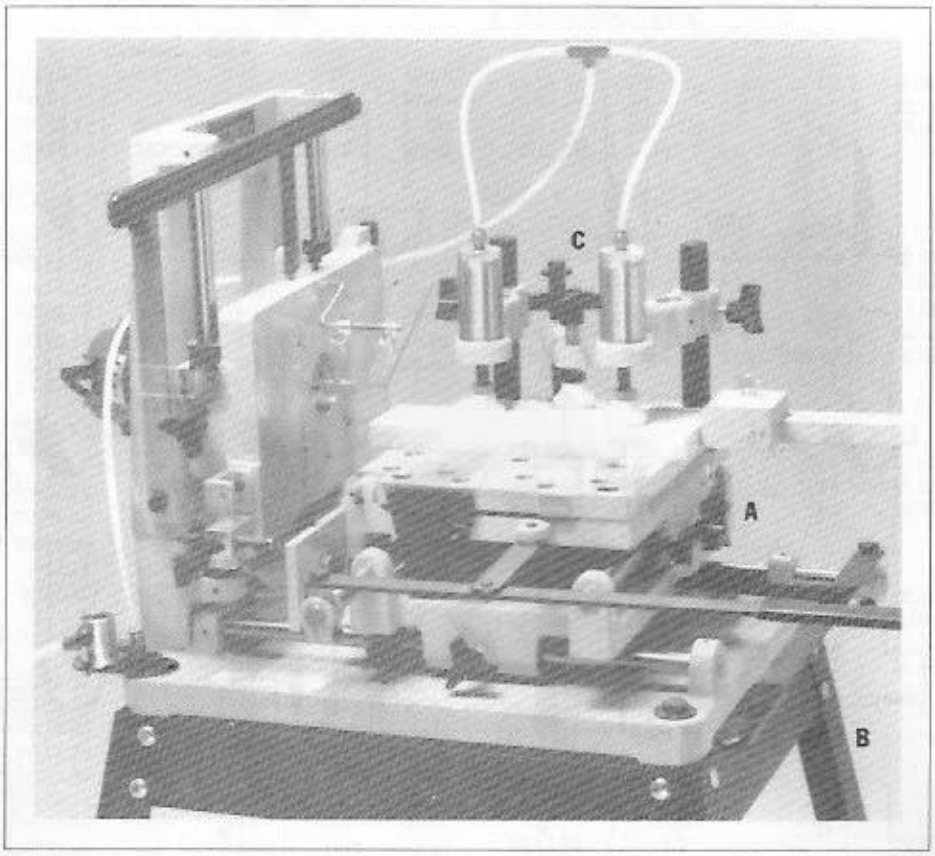
While its specialty is mortise and tenon joints (up to 1/2" x 3"), the Multi-Router also produces dovetails, box joints, splined miters, sliding dovetails, round stub tenons, and numerous decorative joints. The tilting work surface (0 to 45 degrees) makes both simple and compound-angle joints almost unbelievably easy. Mortises are 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.



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 avaialble; 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, Dovetail Pins & Tails, Mitered Dovetail, 2 Finger Joint, & All 4 Round Tenon Templates	356.00

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

Other Standard Templates

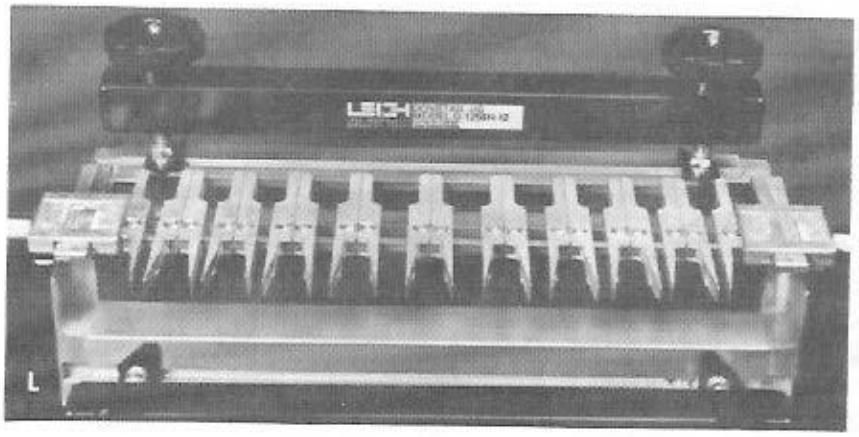
08.52.31	Dovetails (Pins and Tails)	36.50
08.52.35	Mitered Dovetail	18.50
08.52.32	1/4" Finger Joints	18.50
08.52.33	3/8" Finger Joints	18.50
08.52.34	Round Tenons, Each *(Specify size: 1/2 & 5/8; 3/4; 1; or 1-1/4")*	15.25

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

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 other dovetailing devices on the market, and they represent a sound investment for any shop where dovetails are commonly used in one-of-a-kind or production pieces.

The Leigh models will allow production of custom through or half-blind joints in stock from 1/4" to 1-1/4" thick (tail piece must be rabbeted to 1" max. thickness for through dovetails). There are two sizes available: Model D1258-12 with a 12" maximum width capacity, & Model D1258-24 with 24" capacity.

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

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

Both models come provided with a 1/2", 8° dovetail bit and a 5/16" straight bit (both carbide). Additional sizes of 8° carbide dovetail bits are listed below. Bushings to fit most routers are listed on pages 3 and 4.

A new 45-minute instructional video can be purchased to supplement the excellent new owner's manual. You may also rent the video as described for the Robland video

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

(new manual is included free with purchase of jig)

Leigh Dovetail Bits

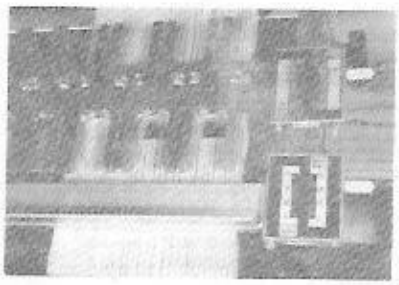
	Bottom Dia.	Angle	Carbide Height	Shank	Price
10.53.11	3/8"	8°	7/16"	1/4"	29.50
10.53.12	1/2"	8°	13/16"	1/4"	29.50
10.53.17*	1/2"	14°	9/16"	1/4"	29.50
10.53.13	11/16"	8°	1"	1/2"	39.50
10.53.14	13/16"	8°	1-1/4"	1/2"	49.50

**Features extra-long shank required for Leigh jigs*

NEW LEIGH MULTIPLE MORTISE & TENON ATTACHMENT FOR LEIGH DOVETAIL JIGS

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

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



M BEALL WOOD THREADING KITS

Wood threads can be produced on dowels on a production basis with a router using the Beall wood threading kit. Any router attaches to the housing, and as a dowel is fed through the appropriate sized insert, a HSS 60° spiral veiner bit cuts perfect, uniform threads. The only router adjustment required is setting the appropriate depth of cut. Manual taps are provided for cutting matching internal wood threads.

Sold as a complete outfit for three sizes of dowels (1/2", 3/4", and 1"), or choose one size to begin and add other sizes of inserts and taps later as needed. Taps and dies are available in either right- or lefthand threads. *Righthand will be provided unless lefthand is specified.*

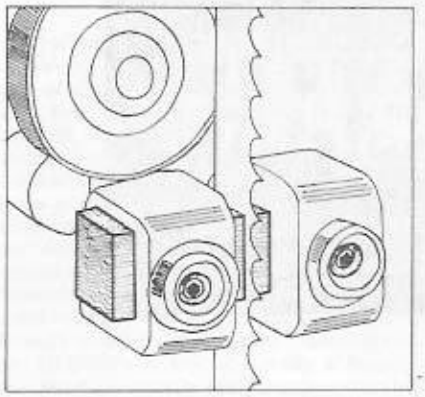
Included in a kit are molded plastic housing, threaded insert for appropriate size, matching tap, router bit, and instructions.

Optional bottoming taps are available for threading to the bottoms of stopped holes.

Beall Wood Threading Kits

10.53.51	3 Size Kit Complete	99.95
10.53.52	1/2" Kit Complete	59.95
10.53.53	3/4" Kit Complete	59.95
10.53.54	1" Kit Complete	59.95
10.53.55	1/2" Tap & Insert Only	33.50
10.53.56	3/4" Tap & Insert Only	33.50
10.53.57	1" Tap & Insert Only	33.50
10.53.62	Carbide Router Bit	27.95
10.53.59	1/2" Bottoming Tap	27.95
10.53.60	3/4" Bottoming Tap	27.95
10.53.61	1" Bottoming Tap	27.95

TOOL ACCESSORIES



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.

COOL BLOCKS, Set of 4

	Bandsaw	*Cool Block Size*	*Price*
08.60.01	Delta 14"	1/2"x1/2"x3/4" (1 beveled)	11.95
08.60.05	Taiwan 14"	1/2"x1/2"x3/4"	11.95
08.60.02	Sears 12"	3/8" x 3/8"x3/4"	11.95
08.60.08	Sears Tilt-Head	(slotted trapezoid)	16.95
08.60.06	Old Sears	1/4" round x 3/4"	11.95
08.60.07	Old Sears	5/16" round x 3/4"	11.95
08.60.09	Delta 16"	5/16" square x 3/4"	11.95
08.60.03	Inca 10-1/2"		11.95
08.60.04	Shopsmith 11"		12.95

DELUXE FEATHER STICK

Feather sticks have been used for years as shopmade jigs for holding difficult stock and more importantly for preventing kickback. Until now, it was difficult to clamp a feather stick to the saw table. With a quick turn of the knob, this new feather stick locks securely in the miter slot of your tablesaw, bandsaw, or shaper. (Fits slots 3/4" x 3/8" wide).

The clamping device can easily be refitted with other wooden feather sticks you make yourself to fit special needs.

08.53.01 Deluxe Feather Stick 24.95

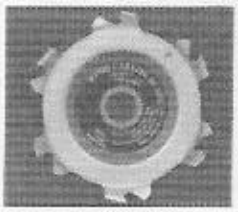
XL-90™ RUST FIGHTER SHEETS

Effective dry protection for tools in frequent use

This new product will positively keep your tools from rusting for up to two years even in tropical humidity, and that includes your basement. Use XL-90 paper as a drawer liner, in your toolbox, in hardware containers or under cover on your stationary tools. With no coating to wash off or greasy film to remove, your tools, clamps, saw blades and so on are always ready to use, and then can be safely stored again with no danger of corrosion. XL-90 is sold in a re-sealable pack of twelve 9" x 14" sheets.

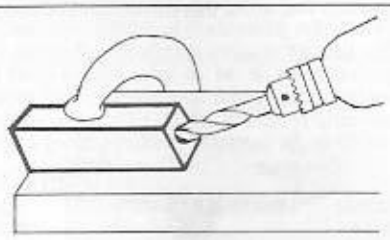
XL-90 Pack of 12 Rust Fighter Sheets 6.95

WOODCARVER SCULPTING BLADE FOR 4" & 5" ANGLE GRINDERS



This is an astonishingly effective power tool accessory that makes short work of wasting enormous amounts of wood. It's a 4" steel blade (22mm arbor hole supplied with 5/8" bushing) with anti-kickback chainsaw-shaped teeth that can cut forward, up or down to allow tremendously flexible angles of attack and your choice of safe heavy wasting or surprisingly clean finish work. Sculptors, carvers, chairmakers and woodworkers of any ilk who do a lot of freehand shaping will find this blade quickly becoming their favorite roughing tool.

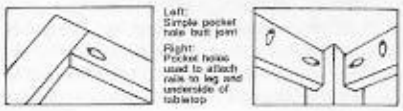
12.33.01 Wood Carver Blade 39.95
9501BZ Makita 4" Angle Grinder 79.95



Pocket Hole Drill Guide

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

07.52.11 Pocket Hole Guide 12.95

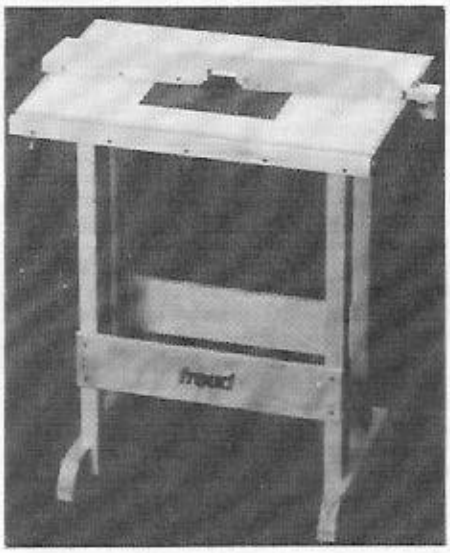


FINE HEIGHT ADJUSTER KNOBS FOR PLUNGE ROUTERS

Most plunge router owners are more than familiar enough with the challenge of adjusting depth of cut while the router is mounted in a table, since most plunge routers simply don't offer an easy way to get the job done. Now we're pleased to offer this line of easily attached, easily used height adjuster knobs to fit practically any plunge router on the market. Just remove the stop nuts from your router's threaded plunge-return stop rod and screw on the adjuster; presto! You've got micro-adjustable cutting depth built in. Great for precise set-up for hand-held work as well.

Fine Height Adjusters

	To Fit Router Model	
811	Makita 3612B, 3612BR	18.95
812	Hitachi TR-12	18.95
813	Bosch 1611	18.95
815	Bosch 1611EVS	18.95
817	Porter Cable #6931 Base	18.95

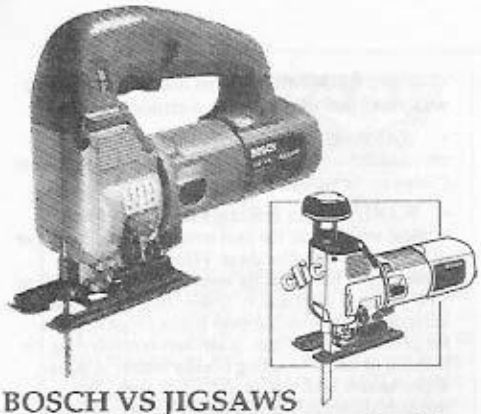


FREUD ROUTER TABLE

The Freud router table's huge popularity over the years is testimony to its impressive functionality and its extreme affordability.

The table's hardwood-trimmed, melamine coated work surface measures a generous 30-3/4" x 21". Its up-to-date design includes a 1/4" phenolic drop-in sub-base system for mounting your router efficiently—and giving you instant access to it in right-side-up position for changing bits and setting depth of cut. The fence is cleverly designed for easy positioning and positive lock-down without the use of slots which might weaken the tabletop. Freud includes a see-through free-form guard and a steel pivot pin for starting freehand work safely. Also included is a unique mitre-guide slot assembly, designed to be custom-fitted to any guide bar, again without cutting into the table surface. The router table's hardwood leg stand sets the top at a 36-3/4" working height, and is easily customized to suit the stature of any owner. Assembly of the leg stand, assisted by clear instructions in the owner's manual, is quick and easy; all necessary hardware is included. *Shipped UPS.*

10.20.01 Freud Router Table 169.95



BOSCH VS JIGSAWS

Use a Bosch jigsaw just one time and you'll know why it's widely recognized as the best there is. Steady, precise control and clean, accurate sawing are effortless – it's almost hard to believe that reciprocating action can be engineered to be so smooth.

New this year is Bosch's **1582VS Clic** (shown above right), a barrel-grip saw featuring a blade locking system built in right into the front knob, allowing blade changes with no tools required at all. The 1582VS Clic's specs are identical to those of the 1581VS below.

For years, the standard of the industry has been Bosch's **Model 1581VS**, the top-handled saw shown above left. Features include electronic constant-torque variable speed from 500 to 3100 strokes per minute, four blade orbit settings from nil to quite aggressive, variable dust blower, and a blade support bearing that helps ensure vertical cuts with no blade wandering. Orbital blade action swings the blade forward into the work during the up stroke, then swings it back for efficient chip clearance during the idle down stroke, making for very fast, low-heat cutting in any stock thickness.

The saw base can be tilted left or right to 45°, with positive detents at 45° and 0° – a feature you'll surely appreciate if you've ever tried to set any other jigsaw's base back to square and keep it that way. If needed, the base can be repositioned rearward to allow cutting nearly flush to a vertical surface using standard blades. A replaceable throat insert provided with the saw can be used to virtually eliminate tearout on brittle or delicate surfaces.

Bosch jigsaws use bayonet-style blades which have no screw holes in the shank. Users uniformly claim "you can't break the blades" – surely it's possible, but we haven't broken one yet either. Blades are installed by simply slipping them into the spindle, rotating them 90° to face forward, and tightening a hold-down screw. On the 1581VS you use a screwdriver (provided); as mentioned earlier, the 1582VS Clic has a built-in locking system.

Both saws are powered by a 4.8-amp industrial duty motor. Stroke length is 1". The 1581VS weighs 5.5 pounds, the 15182VS just 5.1 lbs. Both tools are solidly backed up by Bosch's 1-year money-back warranty.

1581VS	Bosch D-Handle Jigsaw	149.95
1582VS	Bosch Clic Jigsaw	149.95
05.16.06	Steel Carrying Case	29.95
05.16.02	Rip Fence/Circle Guide	9.70
05.16.03	Repl. Blade Locking Screw	.95
05.16.07	Repl. Blade Inserts, pk of 5	1.95

Bosch Jigsaw Blades, Pack of 5

	Length	*tpi*	*Application*	*Price*
T144D	4"	6	Fast rough cut	5.50
T244D	4"	6	Fast rough scroll cut	6.95
T101B	4"	10	Very clean cutting	5.95
T119BO	3"	12	Tight scroll cutting	5.95
T101BR	4"	10	Downcut; laminates	5.95
T127DF*	4"	8	Metals up to 1/4" thick	9.95
T144DF *	4"	6	Nail-resistant rough-in	9.95

** Bi-metal blades with HSS edge*

NEW DELTA MODEL 22-540 12" PORTABLE THICKNESS PLANER

It's the Most Powerful Lightweight Planer on the Market

With four cutterhead support posts (six if you count the elevating screws) and bench-mounted outrigger stock support tables, this new entry from Delta lays a solid claim on being the stablest "mini-planer" on the market. It's certainly the first we've used that can actually be persuaded to do totally snipe-free planing, and that's no mean trick for a planer of any size. The bed is stationary, and the cutterhead assembly can be raised to a maximum 6" height. The stock support tables, incidentally, simply keyhole onto the planer base; they can be instantly removed and set as far from the planer as your flat work surface permits for supporting long stock.

Delta's 15 amp, 115 volt motor also lays claim to being the most powerful in its class, and can deliver depths of cut up to 1/8" on stock of moderate width. As with most portables, though, cutterhead and knife design make gentler work preferable; the 22-540 will comfortably handle a routine 1/16" depth on

any wood. 8,000 rpm cutterhead, hard neoprene feed rollers and 26 foot-per-minute nominal feed rate provide 50 cuts per inch and the same clean, smooth tear-out free surfaces we've come to expect from the best of Delta's competition. The motor has also been harnessed to force-feed its cooling air through the exhaust chute around the cutterhead, significantly enhancing waste clearance and alleviating the common problem with loose chips landing on and embossing the workpiece as it passes under the outfeed roller. A dust collector hood is not yet available as this catalog goes to press, but there is one in the works and it should be out before long. We'll keep you posted.

The cutterhead presents another interesting innovation: the two knives are double-edged and reversible. Though most people will regard them as disposable and discard them after both edges become dull, they could be resharpened once or twice on a sharpening machine the quality of the Makita 9820-2 (see page 46), although probably not at a regular sharpening service. Cutterhead design is a fairly conventional slot and gib set-up, with spring supports for the knives and a simple non-magnetic setting jig, provided as standard equipment, which holds the knife in place while the gib is tightened against it.

22-540	Delta 12" Planer	449.95
22-547	Spare Set of Knives	22.40

11/2/90

Gentlemen,

I wear glasses and had not been able to find a dust mask that would not fog up my glasses until I ordered your Dustfoe 66 mask. Now my glasses do not fog.

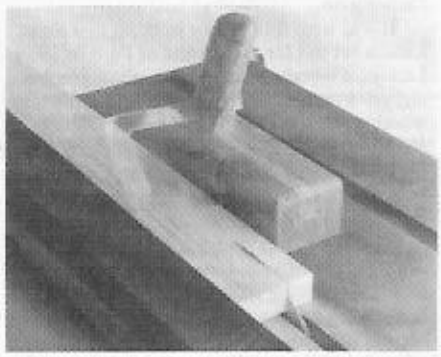
I think you should state this in your catalog as there are a lot of fogged glasses out there.

R.M., Owensboro, KY

DUSTFOE 66 INDUSTRIAL DUST MASK

OSHA and insurance companies have come to see airborne wood dust as a serious health hazard, and it's time for the rest of us to do something about it. Designed for use in coal mines, the Dustfoe 66 is a light, comfortable, and effective mask rated to handle any situation from a heavy particle fog to the finest mists. With a soft, flexible rubber gasket, two adjustable elastic straps, and only 4 oz. net weight, this mask sits lightly on the face and yet provides an excellent seal – a bonus is that you'll have no more fogged safety glasses. The filter is folded into a compact wedge which offers large surface area (8-1/2 sq. in.) without undue bulk; exhalation valves keep the filter dry and easy breathing for efficient use. Six replacement filters come with the mask.

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



MAGNETIC FEATHER BOARD

This is one of those rare tools so cleverly conceived and so purely functional that all we can say is "wish we'd thought of it ourselves." The 80-lb. magnet in the base of this feather board lets you set it instantly wherever you need it on any steel surface, and it won't move until you force it to—that magnet is *strong*! Unbreakable polycarbonate wings provide plenty of lateral pressure left or right (25 lbs. nominal, though it feels like a lot more to us) and an adjustable, removable polycarbonate blade which can also be mounted left or right provides firm hold-down pressure on stock from 1/4" to 2" thick. One or two of these feather boards on your table saw or jointer will improve precision and productivity while greatly reducing the chance of kickback or loss of control. Sharp side pressure on the handle pops the featherboard loose for re-positioning.

08.60.24	Magnetic Feather Board	29.95

Woodworkers Alliance for Rainforest Protection

Founding Conference in Amherst Establishes Goals and Sets Agenda

by Phil Colson and Zach Etheridge

PLANET EARTH'S tropical forests are being destroyed at the rate of up to 100 acres a minute—over 140,000 acres per day, or about 70,000 square miles annually. Imagine burning down and bulldozing every square foot of the combined area of Connecticut, Rhode Island, Massachusetts, Vermont, New Hampshire *and* the state of Maine every year. By contrast, the 1988 fires in Yellowstone, massive as they were, burned off less than one and a half percent of the amount of forest voluntarily destroyed in the tropics that year. At this rate, the richest and most diverse forests on the planet could be extinct within half a century. Many American woodworkers have a direct personal interest in the availability of exotic woods, and even those who have never used any tropical timbers are inevitably affected by the global consequences of such an unprecedented catastrophe.

It was with this reality in mind that Scott Landis set out for the forests of Peru in 1989. Landis, a woodworker, writer, photographer and environmentalist (perhaps best known to woodworkers as author of *The Workbench Book*), traveled to the Palcazú valley in central Peru to visit the Yanesha Forestry Cooperative, where several local Indian communitites are participating in an experimental forestry project. The "strip shelterbelt" system they use involves clear-cutting narrow strips of forest, simulating natural openings left by the fall of very large trees and allowing rapid natural hetereogeneous reseeding from the surrounding forest. The project seems to offer some real hope for the future of sustainable tropical forestry, but the political and economic challenges facing the Yanesha Indians as well as every other group working in the tropics make success anything but certain.

Landis returned to the U.S. to describe his experience in "Managing a Rain Forest", an article published in the June 1990 issue of *Fine Woodworking* magazine. He also set about helping to create the Woodworkers Alliance for Rainforest Protection (WARP) a non-profit coalition of woodworkers, wood suppliers and leading figures in the woodworking community. In November 1990 WARP members met at the University of Massachusetts to constitute the organization

Phil Colson is a horticulturist, amateur wood-worker and founding member of the Woodworkers' Guild of Georgia. He has been with Highland Hardware for 6 years. Zach Etheridge is Highland Hardware's Product Manager.

Logged rainforest, Indonesia ©1990 Ivan Ussach/Rainforest Alliance

and begin setting up an agenda. Those attending included cabinetmakers, luthiers, turners, boatbuilders, architects, academics, representatives of major environmental groups, magazine publishers, furniture manufacturers, tool makers, dealers and lumber suppliers. Highland Hardware was represented by Phil Colson.

Why the fuss about forests thousands of miles away from us? Tropical forests play a crucial role in maintaining the stability of our global climate, and they are the single greatest contributor to a breathable atmosphere on planet Earth. They are vitally important sources of chemical and biological diversity, much of which remains to be discovered. They are a vast natural laboratory capable of providing potent new drugs to fight diseases, as well as biological agents to resist blight and natural pest control methods to enhance crop production without poisoning the world in the process. Local populations harvest fruits, nuts and raw materials such as latex which are exported for worldwide distribution. Almost incidentally, the forests provide many of the most beautiful woods for the furnishings in our homes and businesses. Sound reasons for concern, and for action.

This was the impetus for the WARP conference. Through presentations, films, panel discussions and workshops members shared research, resources and ideas. Through discussion and debate, always challenging and at times downright contentious, they developed an agenda and statement of goals for the organization, as follows:

- WARP works to protect entire forest ecosystems for the benefit of forest inhabitants, the woodworking community, and future generations.
- WARP explores methods of sustainable-yield timber harvesting and supports projects engaged in such activities.
- WARP educates members of its own community to act as responsible timber consumers and encourages them to educate their clients and colleagues.
- WARP acknowledges the non-sustainable nature of many temperate-zone forestry practices [such as those practiced in our Pacific Northwest and the Tongass National Forest], but attaches particular urgency to the protection of the tropical rainforest, which is markedly less resilient.

Upon further debate this mission statement was amended to add these additional points:

- WARP will work to produce a list of woods obtained through sustainable-yield forestry practices ("sustainable woods").
- WARP does not feel that a ban or boycott of tropical woods is in the best interests of the forests or of the people who live there. [Though timber harvesting is held directly responsible for some 10 to 15% of forest destruction, timber users may be able to exercise more influence over future forest use than the percentages indicate. Slash-and-burn clearing for farming or cattle ranching usually results in barren, unproductive land within just a few years, but research shows that sustainable-yield use of forest products can provide *much* higher economic benefit per acre in the near term as well as in the long run. Thus perhaps the most powerful contribution timber users can make is to provide every possible economic incentive for responsible forest use. A boycott would simply abdicate that responsibility.]
- WARP will collaborate with other organizations to establish certifiable and verifiable sources of sustainable woods.
- WARP will attempt to establish links with rainforest projects engaged in sustainable harvest practices.

If you feel less than utterly satisfied with the conference's achievements to this point, then you have an inkling of the frustration many of the delegates felt as the conference drew toward its conclusion. Founding a non-profit organization is always a chore, and when the issue being addressed involves national governments, third-world poverty, international economics and global over-population, it's especially difficult to move from general goals toward specific, practical means of coming to grips with the problem. With the roots of the crisis embedded in such enormous and intractable issues, and the stakes no less than the future of the climate and quality of life on Earth, it takes a great deal of energy and vision to find a focus that encourages involvement within the scope—so seemingly microscopic—of individual woodworkers.

There is certainly no single, simple solution to the problem of rainforest destruction. Appropriate and effective responses must come from many sources, and are likely to be as complex and diverse as the forest itself. What the woodworking community needs is creative, realistic ideas about how each one of us can take a meaningful first step toward the ideals articulated at the conference. Nick Gibbs of the British magazine *Woodworker* expressed the problem succinctly: the mission statement and all WARP's hopes and intentions are certainly admirable, but what are you going to *do* on Monday morning? Nick then offered a challenge designed to encourage members' active involvement at every level (see box next page).

The WARP Challenge was received with acute relief by all present, who felt that at last the conference had achieved the objective for which it had been convened. The delegates adopted Nick Gibbs' proposal without debate and the conference was adjourned.

Accepting the Challenge

Highland Hardware accepts the WARP Challenge. We're pleased to report almost immediate changes in a few of the products we sell: Conover wooden spokeshaves are now being made in hard maple rather than

The WARP Challenge

- Woodworkers: Make one piece from sustainable timber, or from a lesser-known species whose use might be considered beneficial to the forest of its origin. Report on the search for and source of your material, as well as its structural and design features. A commissioned piece would be preferable to speculative work, since a commission presents the opportunity to actively engage the customer in the process and spirit of the project.
- Architects (and Specifiers): Incorporate a significant quantity of sustainable wood or lesser-known species in at least one major project, and report on your success to colleagues and to WARP.
- Organizations: Produce a document that clarifies the issue of rainforest destruction and explains what you (and other groups) are doing to address it. Develop a wood certification program in cooperation and consultation with all major environmental organizations currently active in the tropical rainforest.
- Journalists: Produce at least one article on the use of lesser-known species or on a related forest-use issue. Try to have it published in a journal to which you do not regularly contribute.
- Biologists: Coordinate or contribute to a document that presents the findings of several forest researchers working in related rainforest fields.
- Tool Dealers: Offer (or produce) a selection of tools that utilize sustainable timber or that introduce lesser-known species or other alternative materials. Describe your efforts in your catalog and/or through a display in your stores.
- Wood Dealers: Gather information on the sources of the timber you stock (i.e., sustainability, method of harvest, tropical or temperate, etc.) and attempt to develop alternative and sustainable sources. Describe your efforts to your customers and encourage them to make efficient use of all woods, and tropical rainforest woods in particular.
- Galleries: Encourage your artists to provide work made from sustainable timber and ask them to supply information about the source and sustainability of the material used in any pieces you sell. Make this information available to the public and actively promote or participate in [a proposed] WARP Challenge exhibition, which will raise funds and raise public awareness about sustainable timber and the use of lesser-known species.

rosewood, and Bridge City Tool Works has announced that they too will seek an alternative to rosewood for use in their wood-and-brass layout tools. The only imported wood we sell here at the store is South American mahogany, and we will immediately begin seeking and encouraging responsible sourcing for this wood.

This brings up an important point about the use of "exotic" woods in general. We agree in principle with WARP's repudiation of a ban or boycott of all imported woods, but with some specific exceptions. When a species is known to be in imminent danger of extinction, we can imagine no rationale for its continued use. When the evident economic opportunity created by the demand for such woods leads to the creation of non-destructive plantations or other sustainable timber sources such as the Yanesha project, then we'll happily support such endeavors. In the meantime, we strongly urge all woodworkers to simply quit using any of the woods listed below, and we encourage you to share this sense of urgency with customers, friends, and fellow woodworkers. The following table is reproduced from *First Cut: A Primer on Tropical Wood Use and Conservation*, a pamphlet published by the Rainforest Alliance (copies available on request, see address at right).

Endangered Tropical Hardwoods*

Afrormosia *Pericopsis elata* (AF)	Furniture
Ebony *Diospyros spp.* (AF, SA)	Musical instruments, inlay, brush backs
Iroko *Chlorophora excelsa, C. regia*	Veneer, furniture
Mahogany *Khaya spp.* (AF)	Furniture, paneling, turnery, door frames
Padauk *Pterocarpus soyauxii, P. spp.* (AF, SA)	Joinery, veneer, furniture
Rosewood *Dalbergia stevensonii, D. nigra, D.latifolia* (LA, SA)	Joinery, handles, furniture, musical instruments

**The information on the conservation of these woods is limited and should not be considered definitive. The list is far from complete—a wood's absence from it in no way implies favorable conservation status.*

AF=Africa SA=South America LA=Latin America

We also encourage you to accept the WARP Challenge and to participate in the effort to save what's left of our home planet's tropical forest resources. It isn't going to be easy. After all, if no more than 1/10th of one percent of the remaining forest is being in some way managed for sustainable yield (and even that figure is subject to dispute) how can an individual woodworker, not to mention a manufacturer whose needs run to a million board feet a year, discover responsible sources of wood for the Challenge project? Well, you might not build that piece next month, or even next year, but you *can* make a start. Ask your lumber suppliers about their sources, ask them to find out more, and ask them again. Let your customers know why you won't build a piece in rosewood or padauk or ebony, and exercise your influence to direct their wants toward other woods. Look for some of those "lesser-known" exotics that grow here in our own backyard—mulberry, sassasfras, persimmon, osage orange, and so on. In *The Woodwright's Shop* Roy Underhill describes a number of now-uncommon American woods and their traditional uses; while you're looking for sustainable timber, look for small lumber mills that might be willing to help locate and mill limited quantities of such woods.

As we see it, WARP's chief duty to its membership, and our responsibility to you, is to gather and share as much information as possible about additional steps that individuals and grassroots organizations can take to make a difference. The proposed list of woods available through sustainable forestry practices strikes us as an especially practical way to help individuals use tropical wood responsibly. There's legislation being proposed in Congress, there are negotiations in progress between the U.S. and other governments, and there are experiments being undertaken by other groups like the Yanesha Forest Project, all of which WARP will monitor and report on. We'll keep you updated on WARP's progress in future issues of *Wood News*. WARP has an enormous task ahead, and the organization can certainly use your help. We invite you to join Highland Hardware as a member of WARP; individual membership costs $20, none of which goes toward salaries; at this time all of WARP's people provide their services voluntarily.

Another step you can take right now, if you haven't already, is to request information from and lend your support to one or more of the groups currently active on the large scale. Included among the delegates to the WARP conference were representatives of the World Wildlife Fund, The Nature Conservancy, Greenpeace, the Sierra Club, the Rainforest Alliance—organizations which have already accomplished very tangible, large scale successes such as debt-for-nature swaps, the creation of national parks and preserves in tropical forest areas, and more. These organizations work both internationally and here at home, attacking the problem from every angle. They can use your help, and they'll willingly share their ideas with you. You can also maximize your influence by writing to your senators and to your congressional representative. A single letter won't save the rainforest, but when politicians hear from enough of their constituents they are capable of doing the most extraordinary things.

To move the world we need a fulcrum strong enough, a lever long enough, and a place on which to stand. The fulcrum we have; it's the prospect of an impoverished biosphere and a climate out of control by our own doing. The place to stand has been ready for a long time; we call it Mother Earth. The lever must be the energy and commitment of every individual fortunate enough to know what's happening and realistic enough to care.

Organizations

Here is a list of organizations you can contact for more information on what's being done to stop the destruction of tropical forest resources and how you can be involved:

WARP, Box 133, Coos Bay, OR 97420
The Nature Conservancy, 1815 N. Lynn St., Arlington, VA 22209
World Wildlife Fund, 1250 24th St. NW, Washington, DC 20037
Sierra Club (Larry Williams), 408 C St. NE, Washington, DC 20002
Rainforest Alliance, 250 Lafayette St., #512, NY, NY 10012
Greenpeace (Meg Ruby, Tropical Forest Campaign), 1436 U St. NW, Washington, DC 20009
The Wilderness Society, 1400 Eye St. NW, Washington, DC 20005

How to Contribute to WARP

If you are interested in becoming a member of WARP, you can do so by sending your name and address along with a check for $20 to cover the annual dues to:

WARP
Box 133
Coos Bay, OR 97420

If you are placing an order with Highland Hardware, you can make a $1.00 (or more) donation to WARP through Highland Hardware by "ordering" item #WARPS and including payment. We will forward your contribution to WARP for you.

Another way to contribute to WARP is by purchasing from us a sweatshirt which features the WARP logo. Order item #WSS ($29.95 plus shipping) and specify M, L, or XL size. 100% of the proceeds will be returned to WARP.

The Delta 32-100 Biscuit Joiner

by Hugh Foster

Figure 1
Delta 32-100 Biscuit Joiner

UNTIL RECENTLY, all biscuit joiners available to American woodworkers have been hand-held tools. While you're almost sure to prefer a portable if you can have only one biscuit joiner, you are sure to appreciate the convenience of the Delta 32-100, the first affordable stationary joiner available in this country.

Delta's 32-100 is loaded with convenient features. There are quick-release threads on the height adjust and hold-down screws. A table height micro-adjuster makes precise positioning possible. These components make easy the ultimate convenience: accuracy. While Delta cautions the user to tighten the right-side knob first to keep the work table parallel to the blade, I found the table locks parallel whichever way I tightened it.

The hold-down clamp is so easy to use that I actually use it! The 8" x 12" adjustable table and the face on which it rides have both been machined to accept the clamp's tight-fitting square base; thus clamping work either horizontally or vertically is possible. Clamping work firmly to the table is one of the "secrets" that leads to the unit's very accurate work. On some bevel joining, you may prefer to use another kind of clamp to hold the work down, as in Figure 2. Additionally, when joining bevels, it is good practice to clamp a back-up stop block to the angle fence to take the place of Delta's adjustable stop stock on the regular table.

Figure 2

What looks like the tool's miter gauge is actually an adjustable stock stop which can be positioned anywhere on the table with either right- or left-hand reference, and then screwed into place from the underside of the table. If you adjust this regularly, it will be a convenience to remove the angle guide rather than leaving it hanging under the main work table as the owner's manual recommends.

The angle guide is a steel tilting table provided for joining beveled work. This is far handier than all but the flip-fence of the Lamello Standard and Top 10, and, since the work can still be clamped to the table, this may be more accurate even than that. Note that the levers that lock the tilting table in place are spring loaded, so they can easily be positioned out of the way. It may be worth noting that most portable biscuit joiners work best at 45 or 90°, but the 32-100, like the Lamello Top 10 will cut handily at any angle.

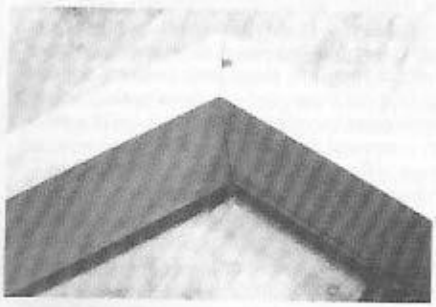


Figure 3

A ribbed "Super-Torque" belt transfers the power from the motor to the cutter. The motor and blade assembly are plunged forward to make a cut by stepping on a heavy-duty foot pedal, leaving both hands free to control the work. A spring returns the blade from the plunge cut without jarring the machine even slightly. The 12"-wide machined face is marked for width as well as center line of #20, #10, and #0 biscuits, which lets you visually confirm whether or not a given biscuit size is suitable for a particular workpiece (see Fig. 3).

The tool's noise level measures 89-90 dB from 3 feet away, making it the quietest joiner on the market. The tool can be locked "off" by installing a padlock through the switch block.

Joinery is even easier with this machine than with a standard biscuit joiner, especially when you're cutting a production run of joints into end grain or near the end of a workpiece. Just mark out the first piece, clamp the board and lock the stop in place next to it; after the first cut is made, just clamp the next board in place against the stop. If the boards being joined are not the same thickness, they must be positioned on the joiner face side down.

Edge-to-edge joining is done much the same with this machine as with any of the hand-held models, except that with all but the largest boards, it is easier to bring the material to the joiner rather than vice versa. That is the real beauty of this stationary machine.

One joint cannot be made with this machine. Figure 4 shows a photo of a framing type joint. More than 5" from either end of the board or on long stock, these joints must be made with a hand-held joiner. The 32-100's advantages in so many other circumstances make this a minor problem.

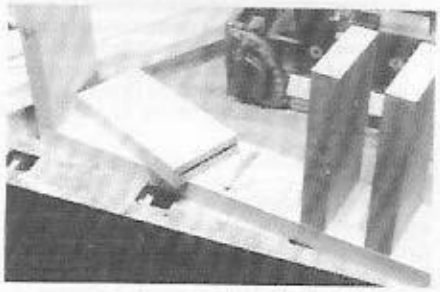


Figure 4

When floor space is at a premium, it may be most convenient to bolt the joiner to a board which can be clamped to your workbench during use, then hung on the wall out of the way. Be careful not to crimp the foot pedal cable if you use the tool this way.

The question ultimately comes down to this: does this Delta joiner make portable joiners like the Lamello Top 10 or the Freud JS100 obsolete? I'd have to say "no." There are times when the portability of the tool is a major consideration.

However, now that it's been in my shop for a little over a year, I find myself reaching for the Delta more and more often, even for small jobs where I once would have relied on my Lamello. I'm extremely pleased with the repeatable accuracy the 32-100 brings to my joining, and at today's price, it's a steal.

Hugh Foster is a woodworker, English teacher and writer who lives in Manitowoc, Wisconsin. He is the author of the Biscuit Joiner Handbook. This article is reprinted from Wood News 24.

Was $499.00

Sale price good while limited supplies last		SALE
32-100	Delta Stationary Joiner	$299.95
20.03.89	Biscuit Joiner Handbook	14.95
Joining Plates, Box of 1000		
17.70.02	#0	29.95
17.90.03	#10	29.95
17.90.04	#20	29.95
17.90.98	Assortment of 3 sizes	29.95

(Add shipping charges listed on order form)

ROBLAND Woodworking Machine

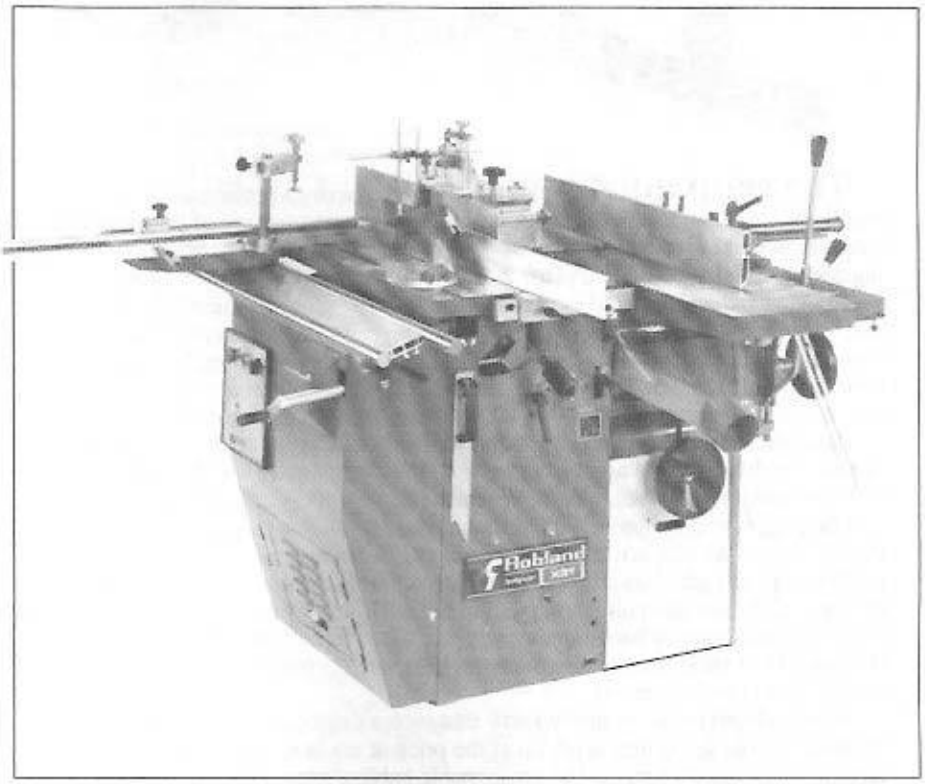
The Intelligent One-Man Shop

If your shop space just can't accommodate the four or five fundamental stationary tools you need to do the kind of woodworking you want to do, you've probably considered purchasing some kind of combination machine. And you probably haven't seen one yet that looks like it was really designed to be powerful, precise, versatile and above all easy to use in a real shop environment.

We hadn't seen one either until a few years ago, when we first ran across the Belgian-made Robland X31, a compact 5-function machine that is outstandingly well thought out and very competently put together. This is clearly a machine designed from the ground up, not just another kludge of unrelated tools welded together in random order. You'll never have to lean over one part of the machine to use another; you'll never have two cutting tools running when you're only using one.

We've now sold a fair number of Robland X31s, so we've gotten plenty of field testing feedback. The machine comes assembled, and there's little finishing or calibrating for a new owner to confront. We've not had a single complaint about set-up, power, convenience, or size.

And nobody's complained about saving roughly 30% over the price of separate stationary, tools either. If you need substantial machinery in a small shop, we encourage you to take a thorough look at a Robland.



MANUFACTURED 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. Arbor size is 5/8". 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**	**$5250.00**
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 new video in which an expert thoroughly explains how it operates. 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.

The crisp quiet sound of clean shavings peeling from the wood, the rhythm of stroke after stroke and the gleaming surface of the piece all conspire to make working with planes one of the most pleasant of all woodworking chores. With a well-tuned plane and a sharp iron you can create a finish better than sandapaper could ever achieve, or cut edge joints so nearly perfect that you can for an amazing moment join two pieces with mere water. For four thousand years woodworkers have experienced planes as the living link between their hands and the wood they work on, and even in the late twentieth century we've found no more fulfilling way to bond the craftsman to the craft.

Hand planes and precision are inseparable subjects, as the following contribution shows. It's a natural association, given the easy ability of a well-tuned plane to do extraordinarily precise work. When one can routinely create shavings so thin they seem to defy gravity, it's difficult not to think that measurements of thousandths of an inch are legitimately part of the discussion of a plane's performance and ideal condition. Over the years we've observed a steady current of concern, debate and publication on the subject of highly accurate after-purchase machining or hand lapping of plane soles; figures of one or two thousandths of inch, sometimes even less, are routinely mentioned as if critical aspects of a plane's function.

Yet woodworkers must surely know that such a degree of precision is as irrelevant to the wood they work on as the price of tea in China. We're all familiar with wood's normal and unstoppable habit of changing shape as routinely as breathing; we also know that wood is a plastic, flexible, compressible medium that can be shaped to some extent by mere willpower. Anybody who uses planes, for instance, knows that you can double the thickness of a shaving simply by leaning on your plane a little harder, or that you can square an edge just by pressing harder along the high side. A woodworker may feel the need for great precision, but wood itself suffers no such compulsion.

There's nothing wrong in principle with wanting a tool to be in excellent condition. Seymour Shortzcopft's story makes it painfully clear, however, that there can be unhappy consequences when we focus so tightly on a tool that we lose sight of the work it's supposed to do. This is not to excuse shoddy work at the factory; it's certainly possible for a tool to be in such lousy shape that it really can't work well no matter how good you are with it. And it's definitely possible to make almost any tool easier and more rewarding to use. As Seymour discovered, however, tools don't have to be "perfect" before a craftsman can do fine work, because it's not just the tool but the material and the user as well that make results what they are.

Especially for those fortunate enough to be amateurs, and to some extent for those who earn a living by their work, it's important to remember that you do woodworking voluntarily. It's a reasonable assumption that you choose to work with wood because it's rewarding (you might even say *fun*) in one way or another: the wood itself is beautiful stuff, the tools are neat, the results of your labor are immediate, tangible, and durable — there are plenty of rewards to be had, and rarely any unavoidable unpleasantness. So it's really too bad when someone like Mr. Shortzcopft gets tangled up in frustration, embarrassment and all kinds of unhappiness just because a tool doesn't measure up to some arbitrary standard of perfection that turns out to be irrelevant in any event. If there's a moral to his tale, it's this: fooling around with your tools is as fine a way to pass the time as any other, as long as it makes you happy. If you find yourself burdened with notions that make you miserable instead, let's hope you're as fortunate as he was to discover a point of view that refocuses on fun.

Perfecting the Steel Plane

by Seymour Shortzcopft

The Folly of Youth

Many years ago, in the dim dark ages of my impressionable youth, I accepted as gospel a load of wisdom about steel planes—wisdom which, through a torturous twist of fate, turned out to be the most egregious nonsense but which nonetheless brought me eventually to my present happy state. What follows is not the gospel but merely a long-winded story about a simple idea, and how hard it was to realize how simple it was.

I was told, you see, that in order for a plane to be really right (and for any gadgetophile worth his salt a tool must really be right) its sole must be flat, dead flat. And that from the factory plane soles did not come dead flat, but fell so woefully short of that condition as to be a perpetual thorn in the side of even the most slovenly perfectionist. And furthermore that of the two ways of making a plane sole flat, one (going to a machine shop) was for helpless wimps, and the other (doing it yourself) was for the virile square-jawed conqueror of new worlds. Purely out of curiosity, you understand, I inquired as to the proper method of doing it myself. The prescription that followed was of that class of absurdity so improbable one assumes there must be some secret reason for it—and besides, I was young and impressionable.

The Slough of Despond

Not long afterward I was to be found down in the shop, brow covered with honest sweat, grinding away on the sole of my prized jointer plane. My Number 7 was my pride and joy, the first plane I'd ever learned to use even half decently and the first with which I could make invisible edge joints, shiny surfaces, and all those things planes are made for doing. Since my straightedge proved that my jointer's sole wasn't perfectly flat, I was transported by dreams of the work it would do after I'd gotten it really right. After about twelve hours of unremitting toil I paused for a moment and thought to check my progress. According to my faithful straightedge, a point about an inch or two behind the throat now stood a good, solid 32nd of an inch higher than the rest of the sole, which dropped off in confounding convexity toward each end as if the tool were made for coopering six-person hot tubs. The sole was also now several degrees out of square to the sides. Hmm, something of a setback. Upon further examination I was amazed to discover how much gray iron one could remove from so large a surface in so short a time, for the sole of my plane, though not exactly paper thin, bore little resemblance to the heavy artifact it once had been. As I calmly analyzed the situation, I realized that the method I'd been using for flattening my plane was one of the silliest things I'd ever heard of and was in fact incapable of working correctly within the lifetime of this universe. With a little sigh I set the plane aside and went upstairs to drown my sorrows.

Some months later, having swallowed a great deal of my pride, I set out to find a machine shop that could make my plane dead flat. Some months later, having swallowed a great deal of sarcastic abuse and other common expressions of negative thinking, I finally found a shop whose foreman, a kindred spirit, accepted the challenge with confidence and vowed to meet my highest expectations. So it was a bit of a disappointment that it took four visits to the shop over the course of a month before the job was done, and it came as something of a setback that it cost exactly as much as a new jointer plane. But now my plane would be better than new, and damn the torpedoes anyway — shirk no sacrifice in the pursuit of perfection, right? Well, fine, except that this time my straightedge said the sole was hardly any worse than it had been before, only just a little more convex and no more out of square at all. So much for the supremacy of the machine, eh? At least back in those days it was only $10 to stop payment on a check.

At this point I'm embarrasssed to admit that I succumbed to discouragement, put the plane up on a back shelf and went off to consider more uplifting matters such as taxes and mutually assured destruction.

Time passed.

Revelations

A year or two later, having recovered a measure of my equanimity and being also older and wiser, I came up with a clever idea and set out to salvage the poor old 07. I bought a $40 diamond stone (no 59¢ garden-variety sandpaper for *my* plane, by golly), removed all removable parts from the plane, dug out my straightedge and square, and sat down on the front porch with a cold drink at hand and a gleam in my eye. With the plane lying upside down across my knees I could see exactly where my grinding work was taking place, and could check easily and frequently to be sure I wasn't getting carried away and botching the job even worse than before. I commenced by determining the highest spots on the sole by means of straightedge and square, and then set about grinding them down with the water-lubricated diamond stone, working only the high spots and conscientiously avoiding the rest. The sun shown brightly, the breeze zephyred coolly along, comely lasses strolled by to my constant distraction, and the work proceeded most pleasantly. Within just two or three hours and two or three of those cold drinks the sole of my dear old jointer plane was close enough to flat to be called functional. O frabjous day, indeed.

Now fear not; "close enough" doesn't mean that I'd simply given up on getting the plane really right. During the dark years of my frustration I'd been using a variety of other planes, learning more and more respect for their capabilities and learning to use them better, too. Every now and then, after a plane performed a particularly fine job, I would (just for fun) check the condition of the sole — and would invariably find it grotesquely curved, twisted, rough or otherwise patently incapable of working at all. Had it not been for the results there staring me in the face, I'd have thrown the thing away in disgust and dismay. But the work was right! Hmm.

Comprehension didn't begin to set in until one day as I sat watching a Japanese master craftsman first carefully flatten the soles of his wooden planes, then quite deliberately hollow them slightly in several places. The work he produced with these out-of-flat tools was as close to perfect as I shall ever be privileged to witness, I'm sure. As he whipped forth joint after joint and one finished surface after another, there grew until it seemed to burst within me a sense of understanding that I'd got something essential the wrong way round very early on: the *plane* which has become the name of a tool is a condition one can create in wood with that tool, and not a requisite condition of the tool itself. Planes exist to cut wood in a flat plane, and if they can accomplish that task then their own condition is right, really right, whatever it might be.

Nothing Succeeds Like Excess

Having gotten my 07 back into good working condition, I realized that all my labors had in fact materially improved the tool's performance after all, for its smooth sole slid along much more easily than it had as it had come from the factory. As that summer seemed blessed with fine weather and an outstanding crop of comely lasses wandering the sidewalks, I took myself back to the front porch where I spent a few more happy hours polishing that sole finer and finer. Gray iron won't come up to a shine the way tool steel can, but it will get awfully smooth when the breeze is right and the environment sufficiently congenial.

When I finally put the plane back together and tried it out, it practically slid right off the bench of its own accord. (By the way, I suggest that you ignore any wisdom you might hear about leaving all the hardware on the plane while working on it; I took off the frog, handles and everything else within reach and found it made not a whit of difference in the end.) The effort now required to make shavings with my jointer plane had been cut in half, and I couldn't help but notice that planing had become much more enjoyable. In the light of my novel understanding of the tool, I found myself looking at it as if it were practically anything else, a piece of wood for instance, that I might choose to pick up and handle and touch and work with. I had at the time a large project coming up and was in need of a focus for my preliminary procrastination, so as if it were a piece of wood I set about making my plane a joy to hold and behold.

I began with a file and sandpaper to soften, smooth and round over every edge and corner on the plane's body (smoothly rounded bodies being their own best reward, naturally), and worked until it was a pleasure to hold the tool in my hands. I carefully polished the surface of the frog, which the makers had ill graced with a coarse grinder, and buffed the face of the iron where it rests on the frog, with the result that even with the lever cap lashed down tight the iron could still be adjusted with delightfully smooth, gentle precision. In keeping with my new credo, I was mindful of not attempting to fix that which was not broken; when the frog's toes were seen to be unevenly ground it was sorely tempting to make them right, but in the nick of time I remembered that the frog sat just as it should within the plane, requiring no well-meant mischief from me to keep on working as it should.

After all this work on steel, it occurred to me that the wooden handles, which were not especially comfortable, were also fine candidates for a bit of tinkering. The first step was simple removal of the thick plastic finish applied at the factory. The front knob, polished fine, oiled and buffed, was soon acceptable, but the rear handle needed sterner measures. As typical fin de siècle products of Western civilization, my hands are quite a bit larger than those of my forebears for whom plane handles were first designed; though I'm hardly a giant, my little finger and the web between thumb and forefinger were both squeezed unmercifully. A round rasp and a half-round wood file, wielded with vigor, soon removed enough wood to make the handle so comfortable that I was moved to replace it with one made of rosewood, similiarly shaped to my hand, polished to the gloss of a satin sheet with no finish other than its own aromatic oils.

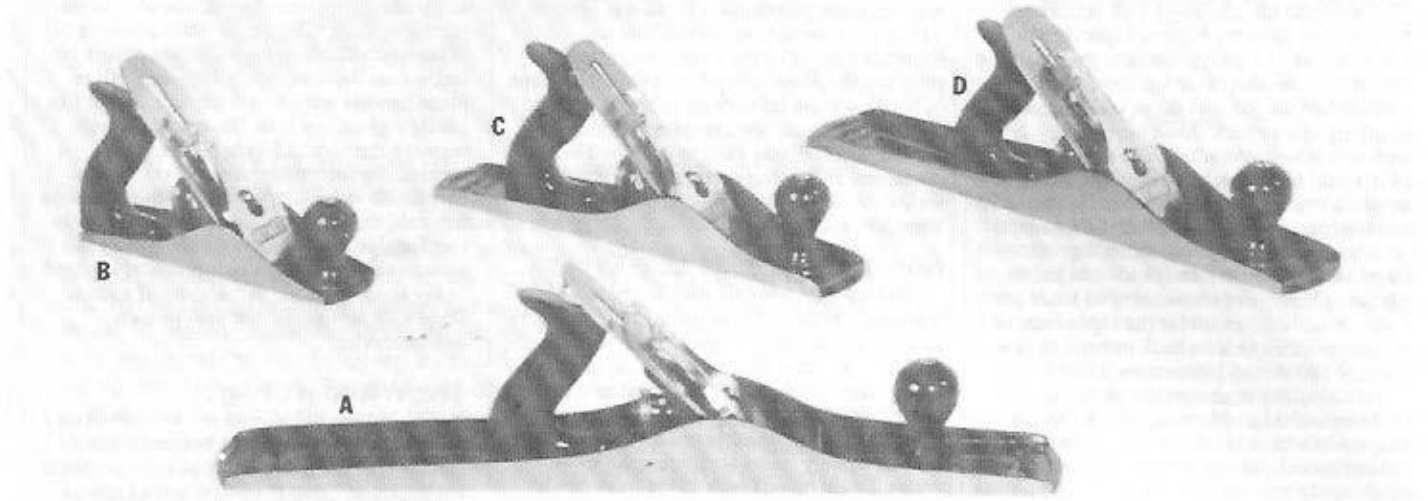
The Wisdom of Age

Since those halcyon days I've worked on a few more planes, and have become wiser (cheaper, if you must) in my selection of tools for the work. From the $40 diamond stone I switched to a $3 combination waterstone, whose coarse side cuts even faster than the diamond stone and whose small size makes it easy to work exactly where the need is greatest. Finally I've begun using silicon carbide sandpaper wrapped around a small block of scrap wood, which seems to work as well as anything else and costs 59¢ per sheet. I use the grinding marks from the factory as an index to monitor my work; if the plane is flat enough to need only polishing, all I must do to keep it flat is make sure that the deepest factory grind marks still show uniformly all over the sole, and I can rest assured I've done nothing amiss. Likewise if I've become aware of a high spot or two, I'll be sure to work those spots right down to smooth iron while some grinding marks still show everywhere else, making the sole flatter as a mere by-product of the polishing work. Only once or twice have I seen a sole so far gone as to call for drastic measures — though I've never done it, I understand that one great craftsman recommends taking the offending thing to the belt sander for some real discipline. A thin coat of high quality wax applied to all iron surfaces and buffed assiduously is the final step, protecting the plane from the ravages of corrosion and providing wonderfully frictionless work as well.

Paradise Gained

Thus having begun working on my planes for the wrong reason and by a woefully stupid method, I've arrived nonetheless at that perfect state of practical satisfaction and domestic tranquillity to which all woodworkers aspire. Based on this rewarding conclusion, I highly recommend the exercise to one and all. The successful modification of a well-liked plane helps to build a sense of physical competence, creates a tool of greatly enhanced worth and sublimely improved utility, and certainly helps keep the shop clean while you're not in there working. The suntan and the comely lasses are optional, but I wouldn't do without them for the world.

PLANES



If woodworking handtools were to be ranked in order of importance, the bench plane would surely be at the head of almost every woodworker's list. Its versatility, accuracy, efficiency, and the sheer pleasure to be had from its use have for centuries made it the very symbol of fine tools and fine craft.

When the new industrial revolution following World War II began to make power planers and jointers available to small-scale woodworking operations, the status of the bench plane declined considerably in the face of the new faith in machines. Those machines and their sophisticated descendants have undeniably brought woodworking into a new era of vastly increased productivity, accessibility to craftsmen and public alike, as well as more uniform (and probably overall improved) quality. For a time machines were viewed as the ultimate tools for almost every shop operation, but in recent years more and more craftsmen have come to understand that while a machine may indeed be the most efficient choice for 95% of their work, it is the other 5% of the work, done by hand, that makes the difference between a good result and a great one.

Indeed it might come as a surprise to learn that a plane can produce a straighter edge, a tighter, stronger joint, or a smoother surface than the finest jointer or planer or sander is capable of - and in many cases do it faster as well.

A well-tuned plane provides not only superb results but also a supremely rewarding woodworking experience - don't be surprised if you find yourself occasionally making shavings just for the joy of it.

For amateur and professional alike, the bench plane is once again coming into its own, and we are proud to contribute to this renaissance by offering a wide selection of fine planes from Record Tools of Sheffield, England.

RECORD BENCH PLANES

Record bench planes feature very hard tungsten-vanadium steel cutting irons, precision-milled bodies and soles, smooth-acting knurled brass depth-of-cut adjust knob, adjustable frog, and beech handles. They are cast in the classic Bailey pattern which has been the industry standard for over seventy years.

A 07 JOINTER PLANE

Most popular in the series is the 07 Jointer plane, 22" long with a cutter 2-3/8" wide. As the name implies, this is the classic tool for making dead-straight edges for joining, and for producing surfaces that are flat in length and width. If you own only one bench plane, this should be the one.

03.11.07	07 Jointer Plane	119.95

LAMINATED PLANE IRONS

The superb edge-holding characteristics of Japanese planes are now available in irons to fit most Record and Stanley planes. A thin layer of extremely hard steel is laminated to the back of the iron, providing a cutting edge of about Rc65; it will still be razor sharp when other irons would have lost their edge entirely. Sharpen to a micro-bevel to keep the edge strong. Available in 2" and 2-3/8" widths.

03.64.13	2" Japanese Iron	29.95
03.64.14	2-3/8" Japanese Iron	29.95

CORRUGATED SOLE PLANES

Five models of bench planes are available with corrugated soles (grooves cut lengthwise) for reduced friction and easier handling. All other specifications are the same as for the other bench planes.

03.11.10	03C Corrugated	69.95
03.11.11	04C Corrugated	79.95
03.11.12	05C Corrugated	89.95
03.11.13	06C Corrugated	129.95
03.11.16	07C Corrugated	149.95

B SMOOTH PLANES

The 03, 04, and 04-1/2 Smooth planes are used for surface finishing after stock has been prepared using the larger planes. Where absolute surface flatness is not a necessity, these planes are ideal because their relatively short lengths (9", 9-1/2", and 10-1/4") allow them to follow slightly irregular contours, and they are the tools of choice for planing small workpieces. The 03 and 04 have cutters 1-3/4" and 2" wide; with its 2-3/8" wide cutter and stable handling, the 04-1/2 is the most popular of the lot.

03.11.01	03 Smooth Plane	59.95
03.11.02	04 Smooth Plane	59.95
03.11.03	04-1/2 Smooth Plane	64.95

C JACK PLANES

The 05 and 05-1/2 Jack planes are general purpose tools used for rough work and heavy stock removal. Their irons are usually ground to a convex edge for taking down rough-sawn lumber. They are also an excellent addition to a remodeler's toolbox. They are 14" and 15" long with cutters 2" and 2-3/8" wide respectively.

03.11.04	05 Jack Plane	74.95
03.11.05	05-1/2 Jack Plane	84.95

D 06 FORE PLANE

The 06 Fore plane, 16" long with 2-3/8" cutter, is so named because it is traditionally used before the jointer plane for the relatively rough work of bringing stock close to the desired dimensions, saving the sharp iron of the jointer for the finishing work. The function of the 06 has today been largely superseded by the power jointer, but if you don't have that machine this is a very useful plane to add to your collection.

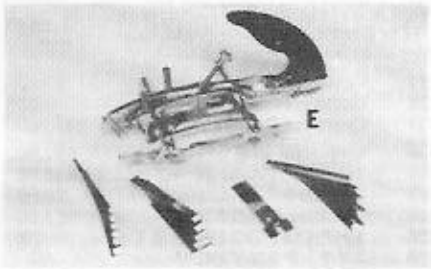
03.11.06	06 Fore Plane	109.95

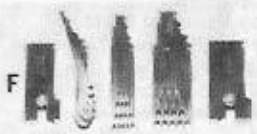
RECORD
Combination Plane

Record's combination plane will cut dadoes, rabbets, fillisters, edge beads, center beads, and matching tongue and grooves with precision. The plane can handle any of the cutters used by the now out-of-production model 405 multiplane, with the exception of the slitting cutter.

The combination plane features a depth stop, beading stop, and two cross-grain spurs. 18 cutters are provided, including 12 plough (straight) cutters 1/8" through 7/8", five beading cutters 1/8" through 1/2", and a 1/4" tongue cutter. Additional cutters are available below.

E 03.11.21 Combination Plane 229.95





F 16 ADDITIONAL CUTTERS

These special purpose cutters can be used on the combination plane above, or on Record's 405 multiplane, or Stanley's 45 and 55 multiplanes. Included are six fluting cutters 3/16" to 3/4", 1-1/2" and 1-3/4" sash cutters, four 1/8"-bead cutters 1/4" to 5/8", and four 1/4"-bead cutters 1/2" to 1–1/4" wide.

03.11.22 16 Extra Cutters 145.00

N RECORD 060-1/2 Low-Angle Block Plane

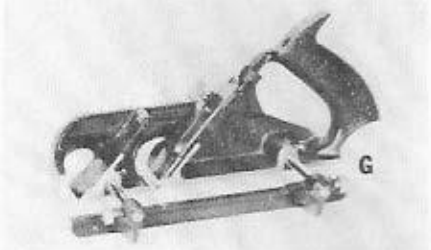
The extremely low angle (12-1/2°) of this beautifully-made plane makes it ideal for the cleanest work on end grain of any kind of wood. Its small size (2" x 6"), light weight (1-1/2 lbs.) and fully adjustable throat also make it the tool of choice for smoothing tight places and planing small or delicate work without tearout. Depth of cut is mechanically adjusted. Brass and polished steel fittings make the 060-1/2 as attractive as it is useful.

03.11.50	Record 060-1/2 Plane	54.95
03.11.51	Replacement Cutter	7.95

G 778 RABBET PLANE

This is a heavy duty plane for cutting rabbets up to 1-1/2" wide with or across the grain. A hardened steel spur incises the grain ahead of the cut for crisp results. The fence may be fitted to either side and is attached with two arms for rigidity. The cutter can be positioned on either of two frogs for standard or bullnose work. 9" long. Cutter width is 1-1/2". Weighs 4 pounds.

03.11.17	778 Rabbet Plane	79.95
03.11.43	Spare Cutter 778	8.50



H CIRCULAR PLANE

The flexible sole of the 020C Circular plane is adjustable to match the contour of either concave or convex surfaces. This makes it possible to bring the quality and efficiency of a plane finish to wood which would otherwise have to be sanded, such as bent wood, curved laminates, round-surface edges, etc. Cutter adjusts as in bench planes. 10" long with cutter 1-3/4" wide.

03.11.18	020C Circular Plane	189.95
03.11.35	Spare Cutter 020C	10.95

REPLACEMENT BLADES for Bench Planes

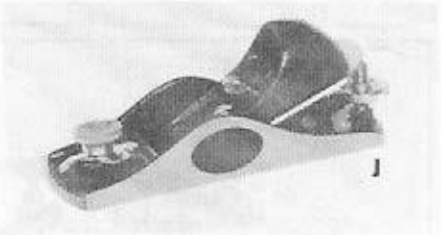
Three sizes of plane irons to fit the various Record Bench planes are available here. The 1–3/4" cutter fits the 03 Smooth plane as well as the 020C Circular plane. The 2" cutter fits the 04 Smooth plane and the 05 Jack plane. The 2-3/8" cutter fits the 04-1/2 Smooth plane, the 05-1/2 Jack plane, the 06 Fore plane, and the 07 Jointer plane. All are made from highest quality tungsten vanadium steel.

03.11.35	1-3/4" Cutter	10.95
03.11.36	2" Cutter	11.50
03.11.37	2-3/8" Cutter	14.50

I BENCH REBATE PLANE

The 010 Bench Rebate plane is basically a light jack plane featuring blade exposure along both edges of the body as well as at the sole, allowing the production of straight, crisp rabbets, or perhaps more common today, smooth, fast and accurate clean-up of rabbets cut with router or saw. 13" long, 2-1/8" cutter.

03.11.09	010 Rebate	129.95
03.11.39	Spare Cutter 010	11.50



J 09-1/2 RECORD BLOCK PLANE

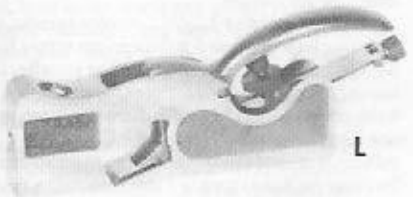
This well-constructed plane features careful machining for fine work. A screw adjustment raises or lowers the cutter, and a lever adjusts it laterally. The mouth is adjustable for fine or coarse work. The iron is set at 20° for good general purpose work. 6" long, 5-5/8" cutter. Weighs 1-1/2 pounds.

03.11.30	09-1/2 Block Plane	59.95
03.11.44	Spare Cutter	7.90

K 077 BULLNOSE RABBET PLANE

A very handy plane for fine rabbetting which features detachable nose for alternate use as a chisel plane in very tight quarters. Overall length is 4". Cutter width is 1-1/8". Weighs 2 lbs.

03.11.15	077 Bullnose Rabbet	74.50
03.11.42	Spare Cutter 077	8.95



L 073 SHOULDER RABBET PLANE

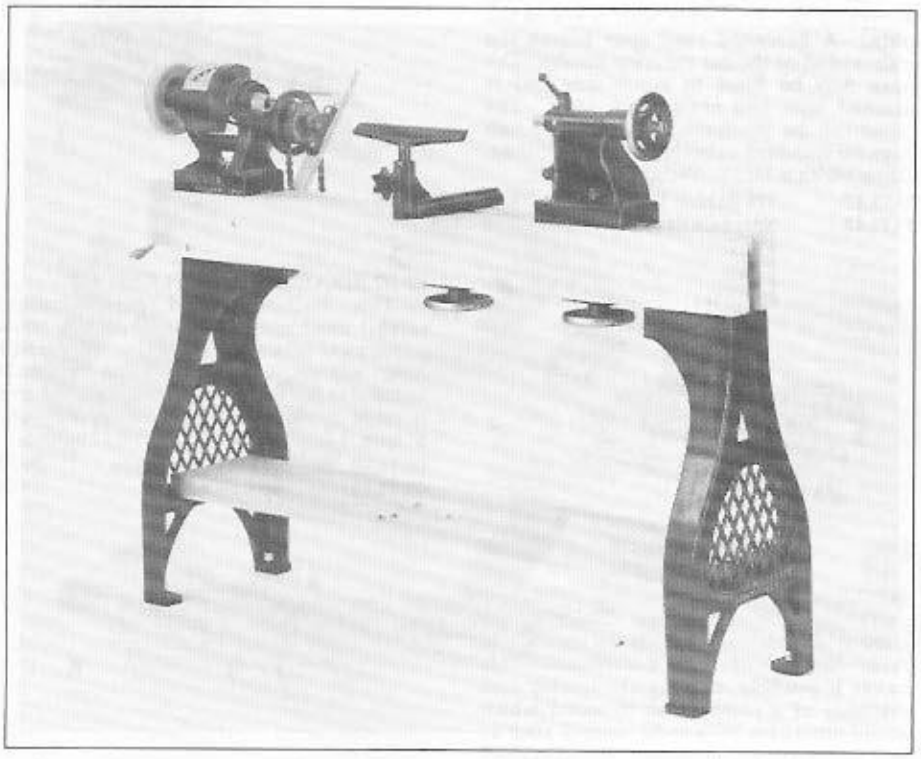
This is a fairly large rabbet plane 8–1/8" long with a 1-1/4" wide cutter. It is carefully machined for use on side or sole. Screw adjustment controls the size of the mouth and cutter position. Weighs 4 lbs.

03.11.14	073 Rabbet Plane	129.95
03.11.41	Spare Cutter for 073	9.95

M LOW-ANGLE BLOCK PLANE

This Stanley plane has its cutter set at just 12° for extremely clean work on end grain. The 1-3/8" cutter is fully adjustable as is the throat opening. 7" long. 1-1/2 lbs.

03.12.01	60-1/2 Plane	39.50
03.12.02	#503 Spare Cutter (pre-1988)	8.50
03.12.07	#504 Spare Cutter (post-1988)	8.50



Conover 16" Heavy-Duty Lathe

We are proud to have as part of 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 variable speed option make it one of the most versatile and appealing lathes on the market.

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

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

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

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

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

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

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

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

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

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

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

CONOVER LATHE PACKAGES

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

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

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

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

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

011	Conover Basic Lathe	$1199.00
021	Conover Standard Package	2099.00
031	Conover Deluxe Package	2499.00
535	Cast Iron Leg Set	499.00
498	1-1/2 HP 110/220V AC Motor	269.00
499	Switch for AC Motor	29.95
540	Counter Shaft Kit	159.95
428	1 HP 110V DC Motor & Contr.	550.00
429	1-1/2 HP 220V DC Motor & Controller	675.00
430	Shop Wiring of DC Motor	49.95
411	Spare Motor Mount Brackets	16.95
509	#3MT 2-Spur Drive Center	32.50
510	#3MT 4-Spur Drive Center	32.50
511	#3MT Mini Drive Center	37.50
520-2	#2MT Conover Live Center	99.95
513	#2MT Cup Center	32.50
501	3" Face Plate	32.50
502	4" Face Plate	36.50
503	6" Face Plate	38.50
514	Screw Center	52.50
521	#2MT Drill Chuck	44.95
505-4	4" 3-Jaw Scroll Chuck	212.50
560-1	Outboard Hand Wheel	94.50
306-6	6" Tool Rest	29.95
306-12	Spare 12" Tool Rest	32.50
209	Full-Length Tool Rest Kit	26.95
QRL	Quick Release Lever	49.95

Conover Live Center

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 99.95

Stabilax

Woodturning Skew Holder

by Nick Cook

THE SKEW is probably the most intimidating tool found in any woodturner's assortment. Though extremely useful for all sorts of spindle projects such as rolling beads, turning coves or truing cylinders, the skew has a reputation of being hard to use.

Even in the hands of an experienced turner, the skew has a tendency to dig in and create a spiral or helix over the length of a spindle. Its shape and how it must be held are the source of the problem. To be properly used, the skew must be rolled up on its edge, making it very difficult to balance while sliding along the tool rest.

The Stabilax has now changed all that, and the skew can now be made much more user friendly. Designed by Richard Lukes of Beech Street Tools in California, this slotted steel bar can be mounted on a skew (or a scraper as well) to provide a more "stable axis" for better tool control. This puts support directly under the downward force of the cutting edge. The cylinder shape allows the tool to be rolled more safely and smoothly as well as gliding along the tool rest. The additional weight of the Stabilax gives your tool better balance and eliminates much of the chatter caused by vibration. The Stabilax is available in two sizes to fit most skews and scrapers. Model 1125 attaches to skews up to about 1" wide and 1/4" thick. Model 1500 is for larger skews and scrapers over 1" wide up to just under 3/8" thick. Held in place with a set screw, the tool has a 30° angle at one end and a 45° angle at the other.

I recommend it as a great accessory for both novice and experienced woodturners.

Nick Cook, a woodturner who lives in Los Angeles, frequently teaches turning seminars at woodworking shows around the country.

Figure 1. The Stabilax reduces the tendency for a skew to dig in on the workpiece.

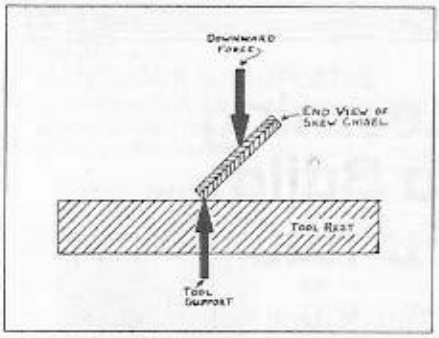


Figure 2. Cross-section of a skew illustrating its inherent instability on the tool rest.

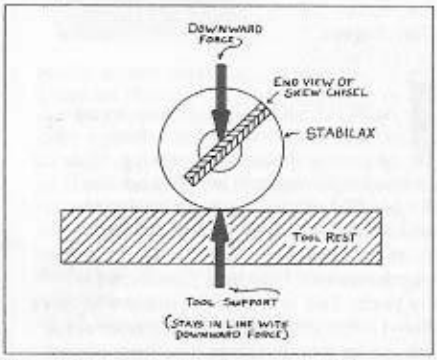


Figure 3. Same view of a skew with Stabilax installed, providing exceptional support and stability.

14.50.01	**Model 1125 Stabilax**	**$24.95**
14.50.02	**Model 1500 Stabilax**	**24.95**

Add shipping charges listed on order form.

Woodturning for Cabinetmakers

By Michael Dunbar.

This new book teaches exactly the kind of turning techniques that most woodworkers need to complement their furniture-making skills. Historically, many standard furniture pieces have incorporated turned parts—chair legs, frames and back spindles, table legs, balusters, columns and architechtural trim—parts which were once obtained ready-made from specialty turning shops. Today such shops are gone, replaced by factories equipped with high-volume duplicating lathes. Thus the small-shop woodworker has been left largely without access to quality custom turnings, with the expectable result that most woodworkers these days never build anything that calls for turned parts. If you want to build reproductions or do first-class repair and restoration, you must either learn to turn the parts you need or find yourself effectively cut off from many popular, attractive styles and common designs.

This terrible state of affairs has led Dunbar to put together a book for non-turners, designed to teach the fundamental spindle-turning techniques required to make the furniture parts you need.

There's only the barest mention of faceplate turning, and nothing at all on turning stuff that would have to be described as art for lack of other utility. Furniture parts are almost always spindles of one form or another, so it's spindles Mike will show you how to make. He starts off with the assumption that you may hardly even know what a lathe is, what its various parts are called, or how they work together to let you create the shapes you need. He provides a straightforward review of the machine, the basic tools you'll need and the specific techniques required for sharpening them.

Shaping wood on the lathe is fundamentally easy to do, and Dunbar's presentation is carefully designed not to obscure this simple fact. Roughing out, using gouges, cutting in details and planing with a skew, using a parting tool—these are all easily learned and practiced with the help of drawings, photos, and easily followed text. One chapter's study and a few pieces of wood turned into shavings will endow you with the skills required to get on with making something useful, and that is what the rest of the book is about.

Turning furniture parts differs from the kind of faceplate turning currently in vogue in several significant ways. Spindle forms express many classic shapes and motifs, repetitions, decorations and symmetries that are rarely concerns of the bowl turner. Spindles also are almost always called for in sets; four for chair legs, four or more for tables, or fifty at one blow for stair railings. Thus the cabinetmaker must learn to see and feel shape, weight and balance, and must also learn to create very similar pieces with minimal investment in time and hardware. Dunbar reviews how to make the transition from square sections to round, how to cut beads and coves, vases, urns and tapers, astragals and discs, balls, bobbins and bamboo, and lamb's tongues, with or without fillets to order. There's a chapter on practical and expeditious duplicating methods, a chapter on riving and turning green wood, and then it's onward to advanced techniques.

These include off-center or double-center turning, such as is used for making simulated cabriole legs and other "bent" turnings. Next comes the production of reeded and fluted work, and here again Mike's unassuming step-by-step approach makes the required carving seem positively simple. With straight and tapered reeding and fluting made plain, even the next step, those mind-boggling spirals and twists that never looked possible before, comes to look like a straightforward job of marking and shaping. On that basis alone Mike deserves some sort of an award; any book that makes hollow barley twists look recreational has accomplished something extraordinary.

The contents are rounded out with an interesting jig for turning angled chair legs, and a look at basic faceplate work for discs, knobs, pulls and so on. This is a successful and effective book, which will meet quite handily many woodworkers' search for a skill rarely addressed in any other venue. For any straight-line woodworker who's thinking about getting a lathe or who already has one lying about the shop, *Woodturning for Cabinetmakers* is just the thing.

—Reviewed by Zach Etheridge

20.03.98	**Woodturning for Cabinetmakers**	**$14.95**

Learning to Build Furniture

Atlanta's Jack Harich Offers a Personal Approach to Teaching Woodworking

by Chris Bagby

JACK HARICH is an Atlanta woodworker who doesn't mind sharing what he knows about woodworking. Visit his shop most any weekend, and you are likely to find a handful of students each hard at work building a project of his own under Jack's close supervision.

A customer of Highland Hardware for many years, Jack is one of the many who have received inspiration and guidance from some of the master woodworkers who have passed through over the years teaching seminars here. Although some of their influence can be seen in the designs which he builds, Jack's own distinctive style is also quite evident.

The shop where his classes are taught is located in a most unusual structure high atop a hill at the corner of N. Highland Avenue and Amsterdam Avenue (about 3 blocks north of Highland Hardware). The stone and wood tower rises to a height of four stories. Most of the woodworking equipment is on the second floor. Though one wonders how a building permit could ever have been issued for such a building, Jack laughs and says the building inspector always got a real kick out of making his inspections, and even returned after his official visits to show disbelieving colleagues something a bit different from the normal residential undertaking.

Jack's woodworking classes emphasize "understanding, patience and quality." To keep learning at a high level, he limits the classes to a maximum of 4 students, permitting plenty of time for direct discussions, demonstrations and supervision, as well as a very personal approach to learning.

Students are permitted to use all of Jack's shop tools, including table saw, bandsaw, planer, jointer, drill press, lathe, drills, jigsaw, beltsander, grinders, router and orbital sanders. Hand tools are available, but due to their personal nature and frequent use, Jack recommends that each student bring his own, and provides a list of what's needed for each course. He provides necessary materials to students at cost.

Safety is emphasized throughout, particularly on stationary tools. Jack and his students have a perfect safety record, but he knows that accidents can happen. All students sign a waiver, carry accident insurance, follow established safety rules in class, and wear ear, eye and breathing protective gear appropriate to the tool being used.

Chris Bagby is the Editor of Wood News.

Jack Harich (left) assists student Ralph McCluggage in gluing up a Demilune desk.

Jack welcomes phone calls from people who are seriously interested in having an in-depth hands-on woodworking learning experience, and is willing to discuss personal goals, present skill level, and other considerations in attempting to tailor classes to individual needs. Classes run from 9 am to 6 pm, and vary in number of days depending on the subject.

Here is a description of some of the courses Jack offers:

Fundamentals of Fine Woodworking

6 days, intermediate level. This covers the basics of technical design and construction of fine wood furniture, and assumes familiarity with some shop tools and technique. Students should have already built at least one piece, subscribe to *Fine Woodworking*, have studied numerous woodworking books, and have good mechanical aptitude and a love of woodworking. The course progresses in the sequence of constructing a typical piece of furniture. In this case, each student will build a small corner table which incorporates edge joints, fan lamination, tapered lamination, dovetails, doweled butt joint, biscuits, mortise and floating tenons, hand shaping, lathe work, and of course flawless sanding and finishing.

The class will start with fundamentals of shop machines, including safety, use, maintenance and basic stock preparation. Powered hand tools, traditional hand tools and bench vises will also be covered. Sharpening theory will be discussed, demonstrated and practiced using a 1/2" chisel. Then a hand plane will be sharpened, adjusted and used. Sharpening of brad point bits, scrapers, turning tools, carving tools and knives will also be covered.

The heart of the class is developing an understanding of the theory of joinery and mastering the construction of four widely-used joints: the edge joint, doweled butt joint, mortise and tenon, and dovetails. After each joint is explained and demonstrated it is practiced.

After joinery and assembly come shaping, sanding and finishing. Shaping is done with bandsaw cuts, 5" disc sander and rasps. Finishing involves an oil finish which you mix yourself and vary the proportions to get the working properties you want. After six days, you will have both a piece of furniture and an understanding of how to make more.

Dovetail Intensive

2 days, intermediate level. One of Jack's trademarks is his curved dovetails, prominently used in drawer fronts, desks, coffee tables, and table legs. The weekend will start with a discussion on dovetail theory, design and use, with inspection of several of Jack's pieces.

Layout of dovetails in 4/4 stock will be followed by cutting the dovetails with a router and Leigh dovetail jig. Two methods of cutting "perfect" pins will be shown, using the bandsaw and a router jig. Then marking and cutting tails from pins will be done, using the pocketknife, bandsaw and chisels.

On the second day, your glued-up dovetails will be rounded, sanded and finished, after which each student will design a table leg, build the pin jig, cut the pins with router and jig, mark and cut the tails on the bandsaw, chop out with a block and 1/2" chisel, pare to fit with a 1" chisel and pocketknife, and glue up. Correctly sharpened 1/2" and 1" chisels and pocketknife are required. A 2-hour sharpening lesson will be held well before the class begins. Materials are provided.

Jack Harich's Maloof-style chair along with walnut table featuring curved dovetails.

Building a Sam Maloof-style Chair

6 days, intermediate level. Prior construction of at least two pieces of furniture or Fundamentals Course is required.

Sam's style, attitude, and craftsmanship have made him a pioneer of "designer/builder" wood furniture. Most famous are his chairs. One of Jack's designs is an armless lowback chair with the "feel" of Sam's work and a much simpler seat-to-leg joint.

Working in walnut, each member of the class will build this chair from scratch. First the seat will be tackled, using Sam's "hanging" bandsaw cuts to pre-shape it before glue-up. Then come the legs with a simple doweled butt joint, the seat-to-leg dadoed-and-doweled butt joint, and then the difficult crest fitting. After glue-up and overnight curing, shaping brings out the form of the design. You may shape your chair to fit you personally. Sanding and finishing bring out the real beauty of the wood. Estimated cost of wood is $80.

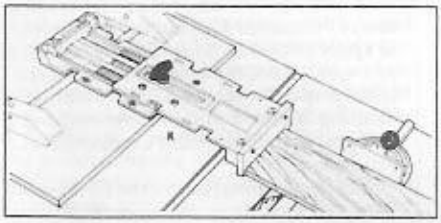
Some of Jack's other courses include: Building a Shellback Rocker (10 days, intermediate level) and Building a Demilune Desk (14 days, advanced level).

For more information on any of Jack Harich's woodworking courses, give him a call at (404) 876-6732.

The Incra Jig

DO YOUR SLIDING DOVETAILS always work the first time? If you forget to cut one of forty-two box joint corners, can you set up again in a few seconds and cut the joint perfectly? With the Incra positioning jig, challenges like those are dealt with so easily it almost seems like cheating. This simple, inexpensive jig enables you to set a fence or stop block in 1/32" increments over eight inches of total travel, to set and lock in any position with better than 1/250" accuracy, and to return to any previously set position with less than 1/1000" error. When precise stock positioning is mandatory, Incra makes it virtually effortless.

Clear, straightforward instructions show you how to set up the jig for use on the tablesaw or bandsaw, with your router table, or (especially with two jigs) for X - Y axis positioning on the drill press table. For positioning stock, use the jig alone or install a hardwood fence up to 24" long. Even at full extension the jig is rigid enough to provide complete stability so long as the fence itself resists flexing. Once you've set up the Incra on your router or saw table, you'll find you no longer have to reach for a ruler every time you move the fence; a ruler is built in to the jig to provide accurate measurement at a glance.



Incredibly durable precision-cast acrylic racks provide the Incra jig's repeatable accuracy; fiberglass-reinforced polystyrene makes the body light, stable and tough. For those who work in decimal inches or the metric system, there are optionally available racks in 1/20" and 1mm steps, along with a self-adhesive rulers in the appropriate scales. The jig's only moving part is the knob that tightens the racks on each other—not a lot to go wrong. This jig is destined to be a popular and enduring tool.

08.53.11	Incra Jig	$32.95
08.53.12	1/20" Racks & Rule	8.95
08.53.13	1mm Racks & Rule	8.95

See page 3 for info about Highland Hardware's upcoming seminar on using the Incra Jig.

The Complete Incra Jig Video

Chris Taylor, inventor of the Incra Jig, has announced that production is nearing completion on a one-hour instructional video covering all aspects of the Incra Jig, including the Incra Fence and use of the Incra templates. Provided with each copy of the video will be a free template and plans for making a double-double box joint using the Incra Jig. The video can be ordered now, and is expected to be shipped in early February.

08.53.20 Incra Jig Video $19.95

THE OFFICIAL INCRA JIG HANDBOOK & TEMPLATES

by Chris Taylor, inventor of the Incra Jig. This eagerly-awaited handbook will help every Incra Jig owner get the most out of this popular, versatile and extremely accurate positioning device – and while you're at it, you'll create some amazingly intricate and beautifully decorative joints. The 92-page handbook contains detailed information on set-up and operation of the jig, and chapters on box joints, dovetails (through and half blind), double dovetails, and variations of your own. There are plans for 17 joints, including an end-to-end double dovetail. And for each of the 17 joints there are reusable adhesive-backed measurement templates which can be placed directly on your jig so you're ready to cut the joints with no further layout work. If you don't own an Incra Jig, but enjoy exposed joinery which is both functional and decorative, let this book inspire you to new efforts. And if you already own a jig, get ready to give it a real workout!

08.53.25 Incra Book & Templates $18.95

ROUTER BITS FOR USE WITH INCRA HANDBOOK & TEMPLATES

We offer premium-quality router bits for cutting each of the seventeen joints described in *The Official Incra Jig Handbook & Templates* (offered above). The bits can be bought individually, and where possible, we offer you a choice of 1/4" or 1/2" shanks.

The bits are also offered in two sets. The 1/4" shank set contains the six bits necessary for 15 of the joints, including all of the 17 except the 5/8" and 3/4" through dovetails.

The five-piece 1/2" shank set covers 14 of the joints, providing the bits needed for all of the 17 except the 5/8" through dovetails and the 1/4" and 5/16" half-blind dovetails.

All bits are industrial-duty carbide tipped except the 1/4" 7-1/2° dovetail bit, which is high speed steel.

Router Bits for Incra Jig Templates

10.14.98	Set of six 1/4"-shank bits	$69.95
10.12.96	Set of five 1/2"-shank bits	79.95

Individual Bits		Angle	Shank	
10.14.91	1/4" Dovetail	7½°	1/4"	$6.95
10.14.92	5/16" Dovetail	9°	1/4"	18.95
10.14.24	3/8" Dovetail*	9°	1/4"	14.90
10.14.25	1/2" Dovetail	14°	1/4"	15.90
10.14.04	1/4" Straight	-	1/4"	9.90
10.14.06	3/8" Straight	-	1/4"	10.80
10.12.20	3/8" Dovetail	9°	1/2"	14.90
10.12.21	1/2" Dovetail	14°	1/2"	15.90
10.12.82	5/8" Dovetail	7°	1/2"	28.95
10.12.83	3/4" Dovetail	7°	1/2"	28.95
10.12.65	1/4" Straight	-	1/2"	11.40
10.12.01	3/8" Straight	-	1/2"	11.40

**The Incra Jig Handbook refers to this bit as a 7° bit. However, the author indicates that in the next printing of the book, it will be identified as a 9° bit. The bit we are providing is the exact item which the Handbook specifies.*

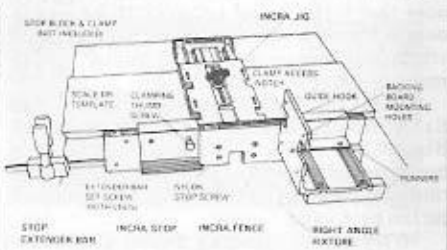
New Incra Fence Now Available for Incra Jig

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

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

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

The 18"-long Incra Fence is made of solid aluminum flat to within 4 thousandths of an inch. Attached is a 17" sliding extender bar for clamping a user-furnished stop block up to 15 inches beyond either end of the fence,



Incra Fence shown with Incra Jig and Right Angle Fixture

which comes in handy for making long mortises or slots on the router table.

An optional accessory to the Incra Fence is the Incra Right Angle Fixture, which holds your work perpendicular to the table. This precision aluminum fixture is perfectly square to both the fence and the table. Its intelligent design includes many special fea-tures for high functionality and ease of use.

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

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

08.53.31	Incra Fence	$54.95
08.53.32	Right Angle Fixture	29.95
08.53.33	Fence & Right Angle Fixture Package Deal	79.95

HYDROCOTE®
WATER-BASED FINISHES

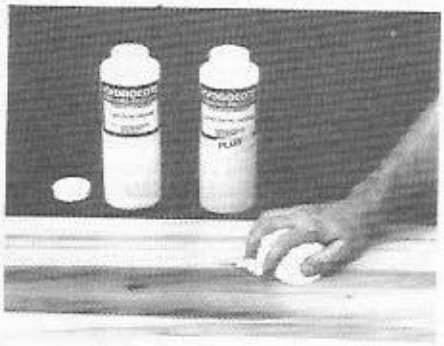
HYDROCOTE WATER-BASED FINISHES represent a radical and much-needed step forward in finishing technology. They are non-toxic, completely non-flammable and nearly odorless, eliminating in one stroke the worst drawbacks of today's most commonly used finishes. HYDROCOTE 's emission of volatile organic compounds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

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

HYDROCOTE LACQUERS

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

HYDROCOTE lacquer can be sprayed with compressed air, commercial airless or air-assisted airless equipment, or with commercially rated high-volume, low pressure (HVLP) turbine sprayers. Many of our customers have begun doing spray finishing for the first time thanks to HYDROCOTE 's safety features. Even the simplest shop set-up can handle the spray-booth requirements (especially with high-efficiency equipment such as our HVLP EagleSprays on page 14). A fair number of our customers who finish professionally are finding that they can easily save thousands of dollars by not having to make their spray booths satisfy local fire inspectors'



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

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

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

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

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

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

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

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

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

STARTER KITS

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

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

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

HYDROCOTE LACQUER PRODUCTS

Cat. No.	Item	Quart	Gallon	5 Gal.
GL	Clear Gloss Lacquer	8.95	19.95	89.95
SL	Clear Satin Lacquer	8.95	19.95	89.95
SS	Sanding Sealer	8.95	19.95	89.95
GB	Gloss Black Lacquer	9.95	22.95	99.95
GW	Gloss White Lacquer	9.95	22.95	99.95
FO	Flow-Out Additive	5.95	14.95	64.95
RE	Reducer	5.95	14.95	64.95
PS	White Pickling Stain	7.95	17.95	79.95

Cat. No.	Item	1/2 Pint	Quart	Gallon
RC	Rubbing Compound	2.95	6.95	17.95
PP	Pro Polish	2.95	6.95	17.95
PF	Fast-Dry Pore Filler	4.95	11.95	29.95
FC	Flatting Compound	6.95	16.95	44.95
RI	Rust Inhibitor	3.95	9.95	22.95

		1/2 Pint
FE	Fish-Eye Eliminator	14.95
VC	Viscosity Cup, Each	3.95
SF	Pack of 20 Straining Filters	2.95

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

FLOOR FINISH APPLICATORS

These lambswool pads are ideal for applying HYDROCOTE Polyurethane, Watco, or other fine finishes on floors and panelling. The 10" wide pad comes clamped in a hardwood head fitted with a standard threaded socket that will accept roller extensions, broomsticks or other household threaded poles (the head is supplied without handle). Use a paint roller tray to wet down the wool, then gently stroke finish over 8 or more square feet at a time. Pads may be rinsed and re-used through several coats; refill pads (without wooden head) are available as well.

19.57.01	Floor Finish Applicator	12.95
19.57.02	Replacement Pad	7.95

HYDROCOTE POLYURETHANE

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

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

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

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

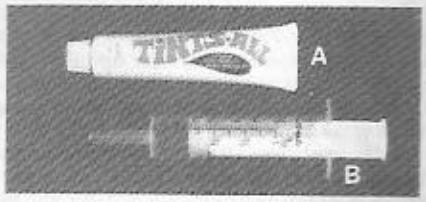
HYDROCOTE EXTERIOR POLYSHIELD™

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

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

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

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



A UNIVERSAL TINTING COLORANTS

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

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

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

EAGLESPRAY TURBINE-DRIVEN HVLP FINISHING SYSTEMS

While there are many methods for successfully applying HYDROCOTE finishes, the most efficient is spraying it on using a high volume, low pressure (HVLP) turbine sprayer. Our reliable EagleSpray HVLP units quickly pay for themselves in reduced finish costs by greatly reducing wasteful overspray and bounce-back common to conventional compressed-air spray systems. Complete details are provided on the next page.

HYDROSHIELD™ MARINE SPAR VARNISH

This newest addition to HYDROCOTE's family of water-based finishes is designed to meet the extreme requirements of finishing in a marine environment, while of course doing as little as possible to harm that environment in the process. Hydroshield is a hard, flexible, highly abrasion resistant reinforced polyurethane finish with a very heavy dose of ultraviolet radiation blockers built in. Like Polyshield, the finish goes on virtually water clear, and resists yellowing and degrading even under long-term full exposure to sunlight, salt, and weather of all descriptions. It is not intended for below-waterline applications.

Hydroshield may be applied directly to bare wood, or may be used over oil stains or previous coatings as long as they are completely clean, sound and properly prepared for refinishing. Drying time is about one hour; recoat in two. The finish may be brushed or sprayed, self-leveling beautifully even if you don't manage a perfect job of application the first time out. Hydroshield is available in satin or gloss finish, sold in quarts, gallons, and five-gallon pails.

Cat. No.	*Item*	*Quart*	*Gallon*	*5 Gal.*
GM	Gloss Hydroshield	24.95	74.95	295.00
SM	Satin Hydroshield	24.95	74.95	295.00

AMBER ADDITIVE

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

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

UTC DISPENSER PUMPS

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

B 19.49.04	1 Oz. Dispenser Pump	1.25
19.49.05	Pack of 6 Pumps	5.95

HIGH VOLUME, LOW PRESSURE FINISHING SYSTEMS

Affordable EagleSpray® HVLP turbines and new AccuSpray® guns deliver the highest efficiency in spray finishing

It might seem upside-down at first glance, but it's a fact that HVLP systems, which are among the most economical commercial-rated finish sprayers available, provide higher transfer efficiency than *any* other spray system in use today. Our EagleSpray turbine sprayers routinely deliver up to 80% of your finishing material to the object you're putting it on; by contrast, typical compressed-air systems do no better than 25 to 35%. It doesn't take a math degree to figure out that an EagleSpray will cost far less in the long run than even the cheapest alternative: for every $100 worth of finish you shoot, an EagleSpray could save you as much as $45 to $65!

Economy like that is certainly nice, but what you'll be far more aware of when using an EagleSpray is that you can actually see your way around in the spray booth. The tremendous reduction in overspray that well-engineered HVLP achieves is a guaranteed source of amazement for anyone accustomed to the roiling clouds of waste generated by high-pressure spraying. Here at the store we routinely spray HYDROCOTE lacquers in a "spray booth" consisting mostly of a fan and a couple of furnace filters; that's all it takes to pick up the minimal overspray dust our AccuSpray gun generates. Many of our customers are spraying finish for the first time in their small shops thanks to the ease with which waste can be collected and controlled.

EAGLESPRAY TURBINES

The real bottom line, of course, is that EagleSpray systems do an excellent job of finishing with stains, enamels, paints, HYDROCOTE lacquers and polyurethanes, or nitrocellulose lacquers if you're still using those. In fact, it appears that either EagleSpray model can handle just about anything sprayable: aircraft and automotive coatings, contact cement (without halogenated solvents), latex house paints, and so on. The high-speed turbine at the heart of the system generates a flow of clean, dry, warm air at a minimum of 90 cubic feet per minute (CFM) at 5 pounds per square inch (psi) pressure. Since the air supply is not subject to intense compression, there's no problem with moisture accumulation and there's no cylinder to cause oil contamination either, so fisheyes and surface blushing are less of a problem with any kind of finish. Intake air is filtered for dust on the way into the turbine, where mechanical action and motor cooling will heat the air to as much as 40 or 50F° above ambient temperature; there's certainly no need for an expensive finish-warming outfit here! An EagleSpray can be used together with a pressure pot for material supply; all you'll need is enough of a compressor to run the pot at about 5 psi.

Highland Hardware offers two EagleSpray models. Our basic unit, **Model 1000**, features a two-stage turbine that delivers 90 cfm at 5 psi, more air at higher pressure than many competing units that cost much more. The motor draws 9.7 amps at 110 volts, plenty of juice but no problem for any household circuitry. These specs enable the unit to handle up to 40 feet of air hose for highly mobile finishing capability. Model 1000 will handle anything from occasional painting to commercial finishing work. Net weight is 28 lbs.

Model 2000 is equipped with a three-stage turbine (11 amps, 110 volts) that cranks out 95 cfm at 6 psi, enough to let the unit power two guns simultaneously for high-volume production. A single gun can be run with up to 60 feet of air hose; two guns with up to 40 feet each. A simple Y connector on the turbine housing is all that's required to switch from one to guns as needed. Net weight is 29 lbs.

Both models are supplied with the AccuSpray HVLP gun described below, equipped with a fluid flow set-up (or atomizing set, as AccuSpray calls it) ideal for spraying HYDROCOTE finishes, stains, or nitrocellulose lacquers. Supplied with the gun is a one-quart aluminum cam-lock cup, and 20 feet of flexible, reinforced 3/4" i.d. air hose with a quick-connect fitting. Turbine housings are 20-gauge galvanized steel; they are fitted with a heavy steel carrying handle and an easily replaced automotive-type paper air filter.

ACCUSPRAY HVLP SPRAY GUNS

EagleSpray units are now being supplied with a superb spray gun by AccuSpray. This is a lightweight (16 oz.) extraordinary-looking gun made of a high-tech carbon-fiber ABS composite, the same stuff used to build fighter aircraft wings these days. (Does that mean this gun can do better than Mach 1? You betcha.) Non-corroding housing and all stainless steel internal working parts make for low maintenance, easy clean-up and almost indefinite long-term durability. With smooth, low-turbulence air and fluid passages designed and engineered from scratch for HVLP spraying, this gun offers extremely thorough, uniform atomization across full fan width even at very low pressure and delivery rates. Like conventional high-quality guns, it offers both fluid flow and fan width controls at the rear of the pistol for maximum convenience and precision. Any pattern from a full 12" fan to a 3/8" round spot can be dialed in without even taking your finger off the trigger. The pistol grip is slim, nicely finished and comfortable in the hand through extended periods of production finishing.

As mentioned above, our AccuSpray guns are supplied with an atomizing set appropriate for use with most light viscosity finishing materials, with a fluid tip diameter of .036". Atomizing sets for heavier materials may be purchased separately. An .051" set is recommended for high viscosity lacquers, oil or latex enamels, varnishes and polyurethanes; an .072" atomizing set is for very heavy materials such as latex house paints, gels, adhesives, and many pigmented finishes.

ES-1000	Turbine Sprayer	695.00
ES-2000	Turbine Sprayer	845.00
19.61.12	Extra 20 Ft. Air Hose	59.00
AS036	.036" Atomizing Set	84.00
AS051	.051" Atomizing Set	84.00
AS072	.072" Atomizing Set	84.00

CONVERTING COMPRESSED AIR TO HVLP

If your shop is already fully tooled up for finishing with compressed air, you can reap the benefits of HVLP spraying (including compliance with EPA guidlines for low VOC emissions) without having to invest in all new equipment. Using your compressor and our AccuSpray HVLP conversion set-up, you can achieve the same radical improvement in efficiency and productivity as described above with EagleSpray systems. Just connect the AccuSpray no-bleeder gun to your air line via the compact regulator supplied with the gun and you're ready to spray at efficiencies up to 80%. Air delivery requirement is the lowest for any conversion gun we know of; your compressor need only supply 10 cfm at 100 psi to the regulator, which should be adjusted to feed the gun at 4 to 5 psi (a precision low-range pressure gauge is included along with the regulator). Even a 3 HP compressor can easily meet these requirements—a significant advantage over competing conversion guns, which realistically require 5 HP or larger compressors with commensurately greater operating costs.

General Motors has over 300 AccuSpray conversion guns in use on their finishing lines; DuPont top-rates the gun for its superb, consistent atomization. With that kind of solid commercial recognition, you know you can't go wrong putting the AccuSpray system to work in your shop. As you'd expect of premium equipment like this, it isn't cheap, but bear in mind that aside from all the environmental and user comfort benefits, an AccuSpray conversion gun's material transfer efficiency will pay for the gun in less time than it takes to shoot a drum of finish.

ACG	Conversion Gun without Cup	399.00
ACGC	AccuSpray Conversion Gun with One-Quart Cup	455.00

RANDOM-ORBIT DISC SANDERS

Random-orbit sanding combines the aggressive efficiency of a disc sander with the fine finishing capability of an orbital sander, providing in a single tool both speed and quality of finish that have never before been achievable in hand-held electric sanders. We offer random-orbit sanders by Porter-Cable and Bosch, with individual specs listed below and at right. What the two share is a drive system design that results in swirl-free, extraordinarily effective finishing from coarse through very fine grits.

Each of these tools features a 5" freewheeling sanding disc attached off-center to the motor spindle; as the motor rotates, the orbital action of the disc mount causes it to spin. The disc's rpm changes as you vary your pressure and contact angle, so the orbit is in fact truly random and you will not see swaths of uniform swirl marks as you'd expect from a straight disc sander.

Random-orbit means sanding without directional bias, and this is one of the great advantages of the design. You can sand right across joints where grain direction changes without cross-grain scratching or texture and color change. So you can flush up rails and stiles as well as glued-up panels with 60 or 80 grit instead of using the belt sander, and then use the same tool to take the work all the way to a 220 or 320 grit finish. These sanders are also very well suited to buffing and polishing finished surfaces.

PORTER-CABLE 7334
RANDOM ORBIT SANDER

The 7334 features a conventional angle-grinder style body with side handle (right or left), which together with its 3/8" orbit diameter lends itself well to really aggressive sanding with coarse or medium grits. The 5" backing pad, made by 3M, is designed for use with their Stikit brand self-adhesive sanding discs (most other pressure-sensitive 5" discs work well too). We've found this machine ideally suited to remodeling and other heavy work, particularly for sanding resinous woods or painted surfaces that usually trash your paper long before it's dull; the inexpensive Stikit discs can be replaced in a couple of seconds flat once they're beyond salvage. The 7334 is powered by a 3.7 amp motor that runs at 6,000 rpm; it weighs 5 pounds. Optional accessories include a soft backing pad for use on contoured surfaces, and a tie-on polishing bonnet for finish buffing.

7334	Random-Orbit Disc Sander	139.95
13701	Soft Backing Pad	15.95
29740	Polishing Bonnet	3.25
15.10.70	60-grit 5" Discs, pack of 10	3.80

BOSCH 3283DVS
RANDOM ORBIT SANDER

With its relatively small 3/16" orbit, dustless operation, high variable speed (8,000 to 11,000 rpm), and selection of optional accessories, this new Bosch sander is awfully close to being the ideal general-purpose sander. The 3283DVS is equipped for use with heavyweight Velcro-backed sanding discs which are readily attached, removed or re-used; their resin-bonded abrasive outlasts lightweight self-adhesive discs many times over. Each disc has a ring of die-cut holes through which dust is vacuumed right through the base of the sander, being vented either into the standard-equipment dust bag or directly into your shop vac via the optional Air-Sweep hose. Folding front handle, rear D handle with lockable trigger switch and sculpted motor housing offer any number of comfortable and convenient ways to hold the tool. Its small orbit makes it easy to run the disc flat on a surface for very fast fine finishing. The 3283DVS draws 2.3 amps, and weighs 4.4 pounds.

Sanding discs are sold in packs of five of a single grit, or in an assortment with one each of the five grits offered. Optional accessories include: a non-marring suction hood used to maximize dust pick-up; Bosch's flexible, crush-proof Air-Sweep hose with shop vac adapter (no adapter required for attachment to the sander); hard and soft backing pads for sanding flat or contoured surfaces (medium pad is standard); a sponge applicator pad for rubbing out finishes; and a buffing pad for final polishing of fine finishes.

In our use here at the store, we've also discovered that Scotchbrite pads adhere quite reliably to the Bosch backing pads. Household scissors easily cut 5" discs from our 6" x 9" hand pads (p. 16 of our Fall 90/Winter 91 catalog), which are perfect for powered wet or dry scouring, rubbing and polishing.

3283DVS	Random-Orbit Sander	119.95
RS015	Suction Hood	4.50
RS018	Opt. Soft Backing Pad	12.95
RS019	Repl. Med. Backing Pad	12.95
RS020	Opt. Hard Backing Pad	12.95
RS013	Sponge Applicator Pad	6.95
RS014	Buffing Pad	6.95
1273-2	16 Ft. Dust Hose	19.95

Velcro-backed Sanding Discs, Pack of 5

RS060	60 Grit	3.95
RS080	80 Grit	3.95
RS120	120 Grit	3.95
RS240	240 Grit	3.95
RS320	320 Grit	3.95
RS500	Assorted *(1 each of above)*	3.95

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.

Optional 1"-diameter 16-ft. crush-proof dust hose connects sander's dustport to any shop vac featuring a std. 2-1/2" opening.

A	1273DVS	Bosch V.S. Belt Sander	229.95
	1273-2	Vacuum Dust Hose	19.95

BOSCH SANDING FRAME
FOR 1273DVS

This is a commercial-duty frame designed to provide effortless control over the Bosch 1273DVS belt sander. The sander clips into the frame with no tools or modifications required, and can then be set to sand as lightly or as aggressively as you like. The frame's generous 15-1/2" x 9" footprint insures flat, even sanding; 264 bristle feet let the frame slide smoothly and easily under load without marring your stock. A 7" wide front handle makes controlling the sander exceptionally easy. The sanding frame weighs 4-1/4 lbs.

[Note: *older models* of the 1273DVS may need to be modified at a Bosch service center.]

B	1273-1	Bosch Sanding Frame	99.95

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

In a contest for most versatile belt sander, this new entry from Ryobi is the hands-down winner. Constant-torque variable belt speed (from 755 to 1148 ft./min.) lets you choose the best rate for sanding hard woods or soft, veneers, painted surfaces, metal, or anything else that needs sanding. The 321's "locomotive"-style design assures excellent center balance and allows sanding flush to the right side of the machine. Lever-actuated belt tensioning, a powerful vacuum system and dust bag are standard equipment. Weighs 8 lbs. 6.0 amps.

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

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

PERFORMAX Stationary Drum Sanders

AS WE APPROACH the end of our first year as a distributor for Performax drum sanders, we are pleased to recommend them to you as some of the best machines in our catalog. Performax sanders do an impressive job of meeting your need for finishing and dimensioning wide stock—up to 24" width on the commercial-duty (5 HP) Super-Max, or as much as 44" through the open-sided S/T and Pro-Max II models. With sandpaper grits ranging from 36 to 240, these machines can take your stock from rough-sawn to beautifully finished in a matter of minutes, and your dust collector or shop vac can make the entire operation virtually dust-free to boot.

Our own reaction upon our first look at Performax sander advertising material was frankly skeptical. It's hard if not impossible for a photo and a written description to reassure you that the cantilevered arm won't give too much, that the drum will have enough power, or that the power feed won't tear up or stall out.

Operating any of the Performax models, however, is a revelation. They work amazingly well, and even the inexpensive Performax S/T that mounts on your radial-arm saw column is rigid, effective and precise. Under load the heavy arm casting (or the saw table) might allow as much as 1/100th of an inch deflection across the 22" width of the drum, but light settings leave a piece totally flat even when it's too wide to sand in one pass. Powered by a 1 HP or larger radial arm saw motor, or by the 1-1/2 HP motor that comes with the Pro-Max II, coarse paper can take 1/32" per pass off wide hardwood panels with no trouble.

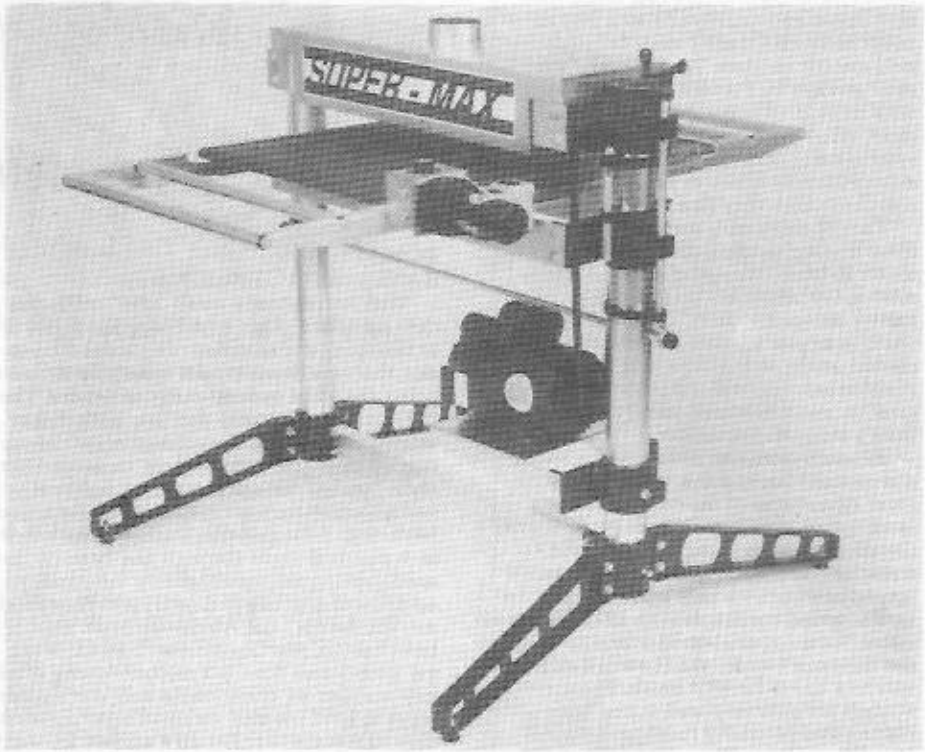
One especially good performance feature is that Performax sanders (unlike thickness planers) can easily true up cupped and even twisted stock. And any wood, be it birds-eye maple or ribbon-stripe mahogany, can be sanded to a dead-smooth 240-grit finish with no tear-out, no splintering, and no end snipe.

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

PERFORMAX ABRASIVES, 3" x 35 ft rolls
(One roll covers sanding drum 3 times)

08.40.36	36 Grit	$25.00
08.40	Other Grits	20.00

(specify 60, 80, 120, 180 or 240 Grit)



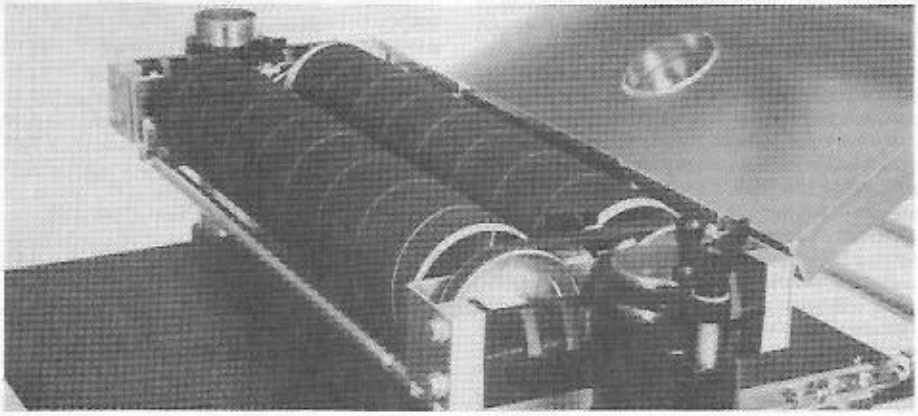
Super-Max Single and Dual-Drum Production Sanders

Super-Max sanders are commercial-duty machines for high production rates and absolute stability under load. Heavy two-post construction makes for rigid drum mounting on either model, while a 220V 5 HP motor provides plenty of power for aggresive abrasive thicknessing as well as fast finishing work. With 36-grit abrasive installed, for instance, you can thickness any stock nearly as efficiently as with a large planer, cutting out cup and warp while you're at it. On the 25x2, the second drum can be equipped with finer grit and independently set just enough deeper than the first drum to allow one-pass sanding through 2 different grits.

Both models include a heavily reinforced power feed bed with outriggers providing a total of 54" of support under your stock. In and outfeed tension rollers keep even very short stock under control; even the 25x2 can handle material as short as 3". A heavy-duty motor on the power feed unit provides 0-20 feet per minute feed rates for complete control of finish quality. The hinged steel drum cover is fitted with a 4" port for connection to standard dust collector hose. Drums are 25" wide x 5" diameter. Maximum stock thickness is 4", minimum is about 1/32". Both models come fully assembled. Single drum unit weighs 225 lbs.; Dual drum model is 250 lbs.

Both are shipped by truck FREIGHT PREPAID within 48 states for no additional charge.

08.40.04	Super-Max (Single Drum)	$2195.00
08.40.05	Super-Max (Dual Drum)	2595.00

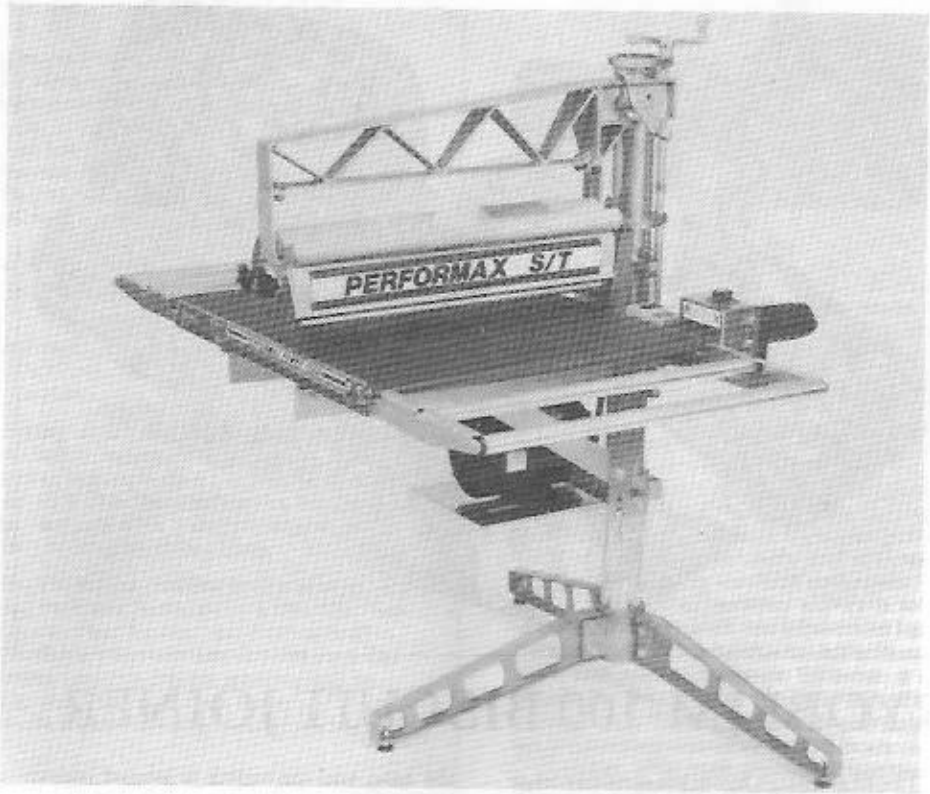


Pro-Max II

A popular model is the Pro-Max II (shown at right), a free-standing, motorized version of the S/T with several added features that enhance both precision and productivity. The drum is powered by a 1-1/2 HP motor which comes wired for 115V operation, re-wirable for 220V if preferred. The power feed unit is built in as standard equipment, including double infeed and outfeed supports which extend total stock support length to 54". The drum mount is equipped with tension rollers to ensure uniform contact between conveyor surface and even the thinnest stock, allowing sanding of pieces as short as 2-1/4" without sniping or loss of control. Also built into the drum is an alignment lever which allows quick fine-tuning for perfect sanding. A depth gauge attached to the main support column makes set-up and thicknessing operations fast and convenient. Max stock thickness with standard drum mounting brackets is 2-1/4", or 3-1/4" with the optional short leg brackets. The Pro-Max II comes fully assembled and ready to run. *The Pro-Max II is shipped by truck FREIGHT PREPAID within 48 states for no additional charge.*

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

(fit Pro-Max II and Performax S/T)



Performax S/T

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

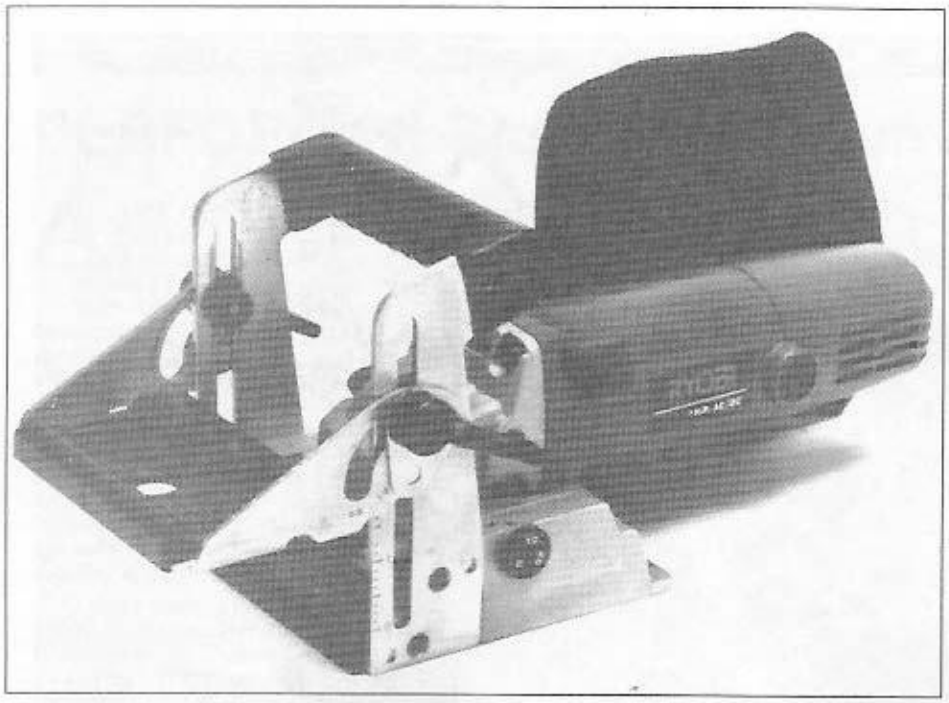
The Performax S/T mounts easily on your saw column, and can be removed in about 30 seconds to go back to working with the saw. After you've set it up and calibrated it the first time, re-mounting the unit takes less than a minute even for a brand-new user. The mounting mechanism fits column diameters from 2-5/8" to 3-1/8", which covers practically every 10" & 12" radial arm on the market (except Sears 1989 & later models). The 5" x 22" sanding drum is driven by a V-belt running over a pulley (provided) which replaces the blade on your saw arbor; belt tension is set by pivoting the arm as needed. The sanding drum rotates at 1200 rpm, fast enough for aggressive rough sanding but not too fast for clean work at the finest grits.

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

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

08.40.01	**Performax S/T**	**$299.95**
08.40.02	**Power Feed Unit**	**329.95**
08.40.21	**Spare Conveyor Belt**	**35.00**

(fits all models)



RYOBI JM-100 BISCUIT JOINER

It looks as though Ryobi has scored another coup with the introduction of the first mid-priced, genuinely commercial-quality biscuit joiner. For many years now Lamello has had an unchallenged lock on the title of most usable joiner; though a bit pricey, its nearly perfect reliability and the incomparable ease of use of its fence design have made it well worth the investment for any professional shop. Now there's a new joiner on the market whose fence seriously rivals Lamello's for ease and accuracy—at just half the cost.

Before we get carried away describing the fence, we should cover several other noteworthy features of the Ryobi joiner. The JM-100 is a third-generation joiner, incorporating many of the best design ideas of earlier models and many all-new ideas as well. It uses a 4" diameter carbide blade with 4mm (5/32") kerf, which allows use of standard #0, #10 and #20 splines. Access to the blade is the easiest anyone's come up with yet, requiring no disassembly of the tool: pop out a cover plate in the base, press the built-in spindle lock and remove the arbor screw with an allen wrench, then simply slip the blade out the front of the tool with no further ado. The machine runs at 9,000 rpm, drawing 5.3 amps (600 watts). Depth of cut is set with a dial on the left side of the base, and the switch is located conveniently off center, directly under a right-hander's thumb. The tool cuts beautifully; you can slam a #20 cut into oak or maple without binding or bogging down, and the non-marring rubber-coated nosepiece effortlessly eliminates slippage in fenced or nose-down work even on narrow stock.

Another new idea is a dust bag provided as standard equipment—it works very efficiently to eliminate the standard faceful of sawdust with every cut. A short piece of 1/2" PVC pipe makes a serviceable connector for Bosch's Air Sweep vacuum hose (page 41), which can be hooked directly to your shop vac for totally dust-free operation. The JM-100 weighs 7.15 pounds, and comes with a lined steel case.

EXCEPTIONAL FENCE

The single most significant feature of biscuit joinery, the thing that makes it not just different but truly revolutionary, is *speed*. A good joiner lets the woodworker do rapid-fire, highly precise joinery with a totally portable hand-held tool. You don't have to clamp your stock down (with most joiners, that is), you don't have to spend time aligning pieces for marking with care, and you don't even have to do the work on your bench, which might not happen to be clean and dead flat anyway. By registering the joiner's fence or nosepiece on the work itself, you can do the cutting for strong, perfectly aligned joints in just a few seconds, wherever the workpiece happens to be located in the shop or on the jobsite. That's why we put so much emphasis on fence design; a good one lets you easily and safely control both tool and workpiece with one hand while making the plunge cut with the other. Joiners can be fixed on your bench and jigged for mass production, of course, but in most cases hand-held work is biscuit joinery at its best—it's not merely convenient; it's absolutely fantastic.

The JM-100's fence, like Lamello's, is hinged to flip down parallel to the base for edge joinery work, and can be set at any angle required for joining bevels as well. Unlike the Lamello fence, Ryobi's will pivot down past 90° to 135°, letting you trap beveled ends or edges securely and register the cut from the outside of the joint, which is more often than not the show side of the piece. A raised rib on the back of the generously proportioned fence makes positive one-handed control of both tool and stock easier than with any other joiner on the market.

Large twin locking levers make the fence completely immovable at any angle setting, and they also ensure that it won't change height when you don't want it to—a particularly important feature, since this fence, like the one on the Freud JS-100 and most other biscuit joiners, can slide vertically to allow cutting at any distance up to 2-3/8" from a surface. **This is the only fence on the market that combines adjustable angle with adjustable height in a one-piece unit.** A scale stamped into the frame makes set-up at any height easy to do without otherwise measuring or jigging, and a notch in the side of the nosepiece shows you exactly where the blade will emerge, making quick visual set-up a snap.

In short, we think the Ryobi JM-100 offers the best joiner value now available. The Lamello Top 10 remains a totally reliable choice for full-on production assembly, and it's still hard to beat the Freud JS-100 for functional economy. But for any woodworker, hobbyist or pro, the Ryobi joiner offers excellent performance and superb ease of use at a very reasonable price.

JM-100	Ryobi Biscuit Joiner with Steel Case		249.95
Joining Plates, Box of 1000			
17.90.02	0	9/16" wide	29.95
17.90.03	10	3/4" wide	29.95
17.90.04	20	15/16" wide	29.95
17.90.98	Assortment of 3 sizes		29.95

MAKITA 2012 12" THICKNESS PLANER

This quality Makita planer features full 12" width capacity with 6" maximum thickness. Two quick-set, double-edged disposable blades deliver 51 strokes per inch for clean, smooth planing. The 2012 is powered by a 2 HP (110v, 12A), 8000 rpm belt-drive motor which will handle a 1/16" depth of cut on the hardest woods. The cutterhead is easily accessed from above by removing the chip chute; changing blades is extremely simple, with precision assured by Makita's innovative design. Folding in and outfeed tables provide 23-3/8" of support under your stock to help minimize snipe and insure smooth feeding. Two composition feed rollers provide positive, non-marring traction to move stock through the planer at a no-load speed of 26 feet per minute. The entire machine weighs just 54 pounds, making it totally portable for use on the jobsite as well as in the shop. *Shipped UPS.*

Sale quantity limited	*List Price $895*	SALE
2012	Makita 12" Planer	499.95
2012-1	Replacement Knives	29.95
2012-2	Dust Chute	74.95

EXPANDED SELECTION OF ELU TOOLS

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

After two extremely successful years of selling the exquisite Elu 3338 plunge router (described in detail on page 28), Highland Hardware has now expanded its Elu line to include a number of other fine Elu tools.

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

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

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

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

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

ELU 3380 BISCUIT JOINER

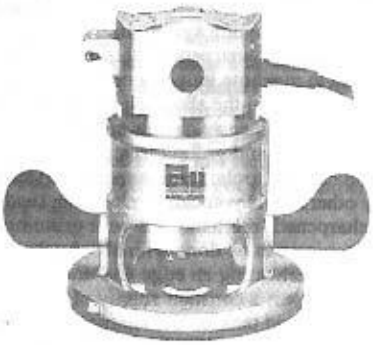
The Elu 3380 is a versatile, precision engineered power tool designed for use in furniture manufacturing, cabinetry work, shop fitting, custom remodeling and other general woodworking applications. Unlike other biscuit joiners, the 3380 can also be used for grooving and parallel scribing applications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

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

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

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

Sale quantity limited	*List price $516*	SALE
3380	Elu Biscuit Joiner	279.95
Joining Plates, Box of 1000		
17.90.02	#0 9/16" wide	29.95
17.90.03	#10 3/4" wide	29.95
17.90.04	#20 15/16" wide	29.95
17.90.98	Assortment of 3 sizes	29.95

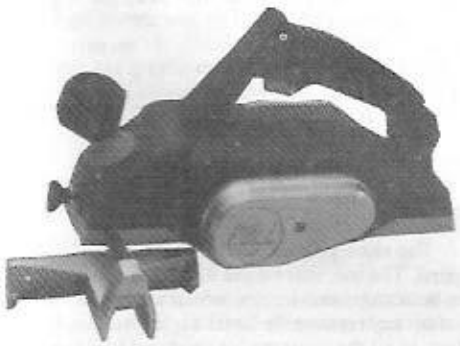


ELU 2721 1-1/2 HP ROUTER

This new Elu 1-1/2 HP utility router features the same exceptional 1/2" collet that is used with the popular Elu 3338 plunge router, featuring extra-long 1" grip length for holding any bit securely and extra-deep spindle bore for handling long shanks. Superb rack and pinion depth adjustment is calibrated in 1/64" increments for precise settings.

Base and motor housing are die-cast aluminum for durability, with non-marring phenolic sub-base. Uses std. Porter Cable guide bushings (p. 29). Powerful 9 amp motor features 100% ball bearing construction and externally accessible brushes. 25,000 rpm. Weighs 6.5 lbs.

Sale quantity limited	*List price $266*	SALE
2721	Elu 1-1/2 HP Router	149.95
76230	Straight & Circle Guide	16.95
C40902	1/4" Collet	29.95
C40904	3/8" Collet	29.95



ELU 3375 ELECTRIC HAND PLANER

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

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

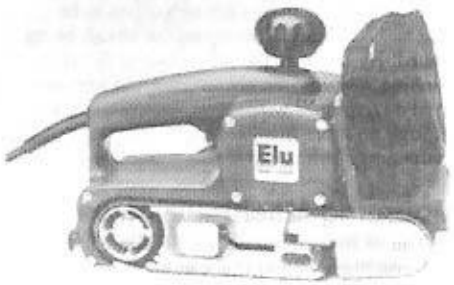
ELU 4024 Electronic Variable Speed 3 X 21 BELT SANDER & Sanding Frame

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

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

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

Sale quantity limited	*List price $307*	SALE
4024	Elu 3x21 Belt Sander	179.95
4024-1	Sanding Frame	49.95



Sharp Edges the Easy Way

The Makita 9820-2 Electric Sharpener Does Them All

by Zach Etheridge

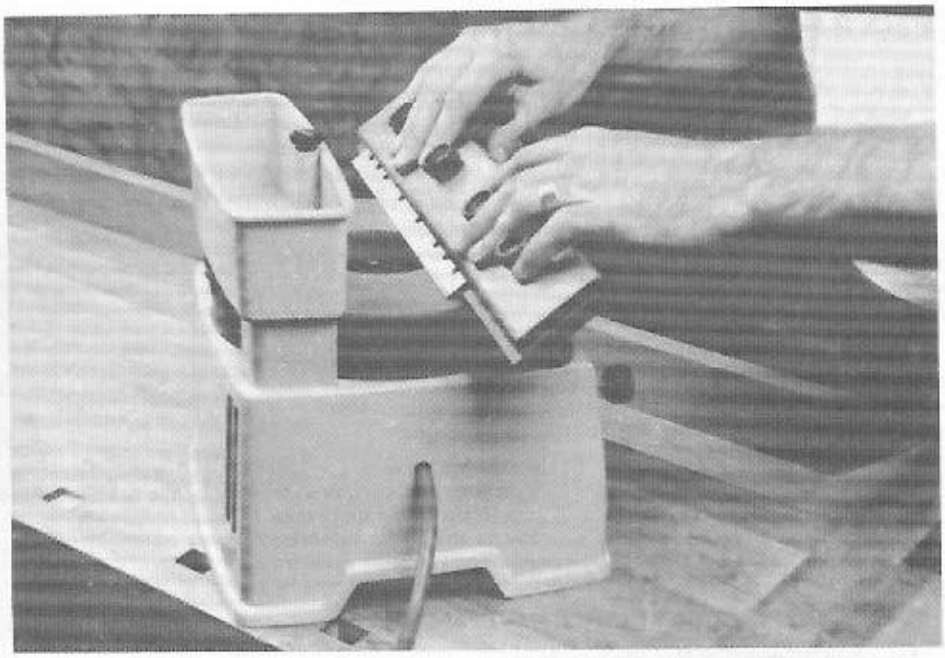


Figure 1. Makita 9820-2 is ideal for sharpening jointer and planer knives.

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

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

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

Green Wheel

As you'll notice on page 73 of our catalog, we're rather proud of having developed a coarse grinding wheel for the 9820-2, a stone that vastly enhances the machine's speed and general usefulness. Makita equips the sharpener with a 1000-grit wheel, a stone which provides a very good cutting edge—sharper than you've ever seen on a planer blade—but which is too fine to quickly waste away the large amounts of steel you've got to remove when an edge is badly damaged or misshapen. Our Green Wheel, a silicon carbide stone of 120 grit, will grind the hardest steels as aggressively as a coarse wheel on a conventional bench grinder. In fact, the Green Wheel will even grind tungsten carbide blades, providing an edge about as good as what you're used to paying for, though it's certainly our preference to improve it a bit further with a medium diamond hone by hand.

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

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

Mounting Machine Knives

The 9820-2 comes equipped with a stout cast-iron blade holder that can handle practically any known make of jointer or planer knife up to about 16" long. If you're willing to ignore reasonable limits and work a little harder, you can sharpen 18" or even 20" knives pretty well, too. Jointer knives are a snap, since you can put two or three of them end-to-end in the holder and sharpen them all at once. Just set each knife so the cutting edge protrudes evenly about 5/16" (8 mm) beyond the front of the holder and they'll all come out straight and even. One of the reasons the machine works so well is its low-tech design; rather than building in a bunch of expensive but not-quite-precise-enough setting and calibration mechanisms, Makita leaves it up to you to measure accurately (which is hardly a major challenge) and achieve as much precision as you like.

Setting the Bevel Angle

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

Zach Etheridge is Highland Hardware's Product Engineer. Reprinted from Wood News 25.

remaining fine adjustment needed will be immediately evident.

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

Sharpening Hand Tools

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

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

The Highland Jig

Chisels and plane irons almost always get the benefit of being jigged in a simple aluminum fixture that we manufacture for the purpose. The Highland Jig, as we humbly call it, replaces the Makita tool holder but rides on the tool rest in similar fashion, allowing even easier set-up for correct grinding angle. It's also dead simple to grind a cutting edge back to square if a lot of hand sharpening has left it more skewed than you like. Take a good look at how far out of square the tool has become, and then simply put the high side of the edge into contact with stone, skewing the tool within the Highland Jig to raise the low side off the stone by just the distance you saw under your try square. By the time you've ground enough steel away to make the whole width of the bevel contact the stone, your edge will automatically be square. We also use the sharpener on the backs as well as the bevels of some tools. Though we're fanatic enough to insist on using a lapping plate for flattening the backs of plane irons, we've found no faster or more effective way to polish the backs of chisels than on the 9820-2. It doesn't even matter especially that the stone be flat; by keeping the chisel moving all across the surface, you'll get its back quite flat and dress the stone nicely while you're at it.

One characteristic of sharpening on the flat surface of the wheel rather than on its edge is that we get flat, straight bevels rather than the kind of hollow (concave) grind that results from using a conventional bench grinder. Sometimes a hollow grind can truly come in handy on turning tools in particular, but there aren't too many other places where we've found that shape to be an advantage. Hollow grinding is still routinely recommended in lots of sharpening instructions, but as far as we can tell it's only beneficial if you're using sharpening stones that take too long to do the rest of the honing job by hand. (If so, come talk to us about waterstone sharpening.) A flat bevel is stronger, needs regrinding less often, and of course it doesn't require the use of a bench grinder so you don't have to put your tools at risk of getting burned.

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

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

Hand tools other than chisels and plane irons can be sharpened freehand far more easily than you might expect. The tool rest can be removed from the front of the sharpener, leaving the front 3/4 of the sharpening stone fully accessible. All you have to do is show the tool to the stone at whatever angle is called for, and let the stone do all the work. Sharpening a carving gouge, for instance, is exactly as easy as placing the bevel on a flat object and simply rotating the tool so the full expanse of the bevel rolls across the surface. As usual, the sharpener will tell you promptly if you're holding the tool right or if you're missing a spot that calls for changing your technique just a little. Knives of all sorts are simply stroked lightly across the stone at a low angle; scissors likewise at a high angle. Drill bits, scraper blades, screwdriver blades and gardening tools can all be ground or sharpened with a few seconds' work and very little effort.

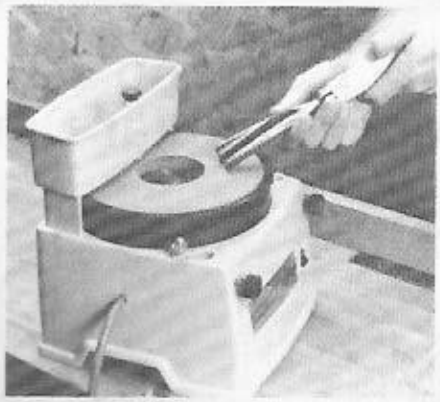


Figure 3. Using the 9820-2 sharpener for freehand sharpening of a carving gouge.

Proven Reliability

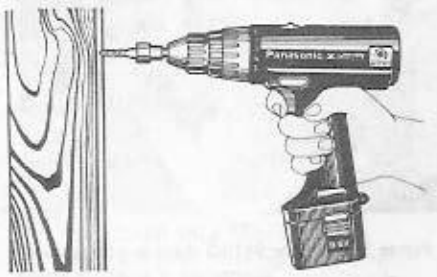
Well, gosh. Sounds too good to pass up—guess we'd rush out and order one ourselves if the 9820-2 we've been using for the past nine years weren't still perfectly sound. Still working on the original stones, too. The Makita sharpener is one of our top two or three all-time low-maintenance machines; we've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

§

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

02.10.01	9820-2 Sharpener	$219.95
02.26.01	Highland Jig	14.95
02.64.30	120 Grit Green Wheel	49.95
02.10.03	1000 Grit Med. Wheel	39.95
02.10.04	6000 Grit Fine Wheel	49.95
02.10.05	Spare Wrench for 9820-2	3.50

Act Now and Get Fantastic Savings on our Most Popular Cordless Drills and Plunge Router!



PANASONIC Cordless Drills

Panasonic, with vast experience in electronics and avant-garde battery technology, has disregarded traditional drill design and come up with the best-balanced, fastest-charging and most powerful cordless driver/drills we've ever tested.

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

The second thing you'll notice about these drills is that there's no place for a chuck key. Panasonic's keyless chucks are positive, reliable, and nearly effortless to use. You won't even need to use any of your own power to lock a bit in place or remove it afterward—just grab the chuck and run the drill briefly in forward or reverse as needed. Any bit shape or size up to 3/8" diameter can be installed in about two seconds flat.

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

Model 571BC uses a 9.6-volt battery which recharges in one hour. While supplies last, we are including ***a spare battery at no extra charge*** when you purchase the drill with carrying case.

Model 6205BC uses a powerful 12-volt battery which recharges in only 15 minutes. While supplies last, ***we are taking $40.00 off*** our catalog price of $239.95, making it an incredible buy at only $199.95, including carrying case.

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

Included as standard equipment with both models is a molded carrying case with space for the charger & 2 batteries.

SPECIAL BUY: *Get a* ***FREE spare battery*** *($49.95 value) with the purchase of a model 571BC 9.6V drill with carrying case.*

or

Take $40.00 off *our catalog price ($239.95) on the model 6205BC 12V, 15 minute-recharge drill with case. You pay only* ***$199.95!*** *Offer good while supplies last.*

PANASONIC CORDLESS DRILLS

		SALE
571BC	9.6V Drill with 2 Batteries, 1-Hour Charger & Case	$169.90
6205BC	12V Drill with 1 Battery, 15-Minute Charger & Case	199.95

RYOBI RE-600 Electronic Variable Speed Plunge Router

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 3 HP 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 safety.

Standard equipment includes a 3-piece guide set with micro-adjustable holder, straight fence and roller guide. Also included are 1/4" and 3/8" adapter sleeves for use in the standard 1/2" collet. Optional guide bushing adapter allows use of Black & Decker or Porter Cable guide bushings *(see page 19)*. Router weighs 14 lbs.

RE600 Ryobi Plunge Router $249.95

SPECIAL BUY: *Select $50.00 worth of router bits for FREE with purchase of a Ryobi RE-600 router, while current supplies last. Choose from among the large selection of bits on pages 20-21 of Wood News, or pages 30-35 of our Fall 90/Winter 91 Catalog.*

highland hardware

1045 N. Highland Ave, NE
Atlanta, Georgia 30306

Information (404) 872-4466
Orders (800) 241-6748

Postmaster: *Please Deliver to Current Resident*

BULK RATE
U.S. POSTAGE
PAID
ATLANTA, GA
Permit No. 2596