

1995 TOOL BUYER'S GUIDE

AMERICAN WOODWORKER

How to Choose
The Best...

Tablesaws

Routers

Bandsaws

Cordless Drills

Circular Saws

Dust Collectors

Sanders

Jointers

and more...



PLUS

**Norm Abram
On Tooling Up**



U.S. \$3.95 CANADA \$4.95

AMERICAN WOODWORKER

Issue No. 41

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A WORD FROM THE PUBLISHER

WELCOME TO THE 1995 TOOL BUYER'S GUIDE

You hold in your hands the first-ever **AMERICAN WOODWORKER** Tool Buyer's Guide—a special once-a-year issue devoted entirely to wood-working tools and machines. Why a Buyer's Guide? It wasn't a tough decision. The number of tool and machinery manu-



the tool (or tools) that we feel is the best of the ones we've tested. The Best Buy award goes to the tool we feel offers the best combination of performance and price.

We wanted this guide to go beyond specs and individual tool and machine analysis, into

overall workshop planning. That's why we got Norm Abram, America's best-known woodworker and TV host of "The New Yankee Workshop," to write about outfitting your shop. Following up on Norm's advice, noted woodworking author Scott Landis tells how to improve your existing shop space or plan a new one from scratch. And we didn't feel right without some discussion of hand tools. Our West Coast editor and hand-tool aficionado Simon Watts shares his views on the essential ones. All this adds up to the most comprehensive short course you'll find anywhere on setting up and equipping a workshop.

With this issue, you've got a single sourcebook for all brands and models of power tools and machinery. For each tool or machine category, you'll find not only comprehensive specifications, but also concise advice that will enable you to pick the right tool for your needs and budget. This issue is your one-stop reference book for planning your major tool purchases.

We've covered 18 popular wood-working power tools and machines: routers, tablesaws, bandsaws, lathes, dust collectors, sanders, and more.

When the "Shop Tested" logo appears in an article, that means we tested that tool category in the AW shop and reviewed it in a recent issue of the magazine. These reviews have been updated and condensed for inclusion in the Buyer's Guide. Our "Editor's Choice" and "Best Buy" awards are based on the results of the original tests. The Editor's Choice is

Thanks are in order to Dave Sellers, Bob Flower, Linda Wieder, Julie Miller and Fred Zahradnik for their help with the enormous task of compiling our database of tools and equipment. We couldn't have produced the charts without their tireless efforts.

We hope you enjoy our 1995 Tool Buyer's Guide. Please let us know what you think. Call our "Letterline" at (610) 967-7776, or fax us your comments at (610) 967-7692.

David Sloan
Editor & Publisher

PLAY IT SAFE

Woodworking can be dangerous. Safety equipment such as guards, hold-downs, goggles, dust masks and hearing protection can greatly reduce your risk of injury. But even the best guard won't make up for poor judgment. Use common sense and caution in the workshop. If a procedure feels dangerous, don't try it, no matter how many other folks work that way. Figure out an alternative that feels safe. Your safety is your responsibility.

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by
Norm
Abram

Tooling Up

America's Most Popular Woodworker Picks the Power Tools and Machinery for Building a "Core" Workshop



A place for everything. Acquiring the tools is only half the battle. Norm saves time and aggravation by storing his portable power tools neatly under a long workbench.

Every week, millions of woodworkers tune in to their local public broadcasting stations to enjoy the whine of power tools and the swirling of sawdust. Now about to enter its seventh season, "The New Yankee Workshop" and its host, Norm Abram, have provided woodworkers new and old with fresh energy, interest, and inspiration. Cutting, shaping, and joining his way through projects that range from a child's rocking horse to a classic Shaker-style cupboard, Norm's well-crafted delivery reinforces the adage of using the right tool for the job. Though the extensive selection of machinery in "The New Yankee Workshop" might lead viewers to believe otherwise, the truth is that Norm began his woodworking career with a very basic selection of tools. Based on his own experience at "growing" a workshop tool by tool, Norm offers advice to woodworkers who need to get the most for their money.

PHOTOS THIS PAGE AND OPPOSITE BY RICHARD HOWARD

Organized for efficiency. With its cathedral ceiling and well-conceived layout, Norm's workshop is a model of wood-working efficiency. At right, the tablesaw has a central position, and Norm has increased its capacity by adding extension tables and an aftermarket rip fence. Below, a lumber rack keeps boards in order.



One of the most common questions I'm asked at trade shows and other events is what power tools I consider to be most important. Many of the people who pose this question are interested in building a "core" workshop of key power tools that will maximize their woodworking capabilities.

The concept of a "core" workshop is a good one. Very few woodworkers have the opportunity of starting out with the selection of machinery and portable power tools that I have in "The New Yankee Workshop." But this doesn't have to limit what you're able to do. The good thing about woodworking is that there are at least several ways to perform most operations. With a basic selection of tools and a combination of skill and patience, it's possible to achieve the same precise joinery you'd observe in more extensively equipped shops. The power tools I'll discuss here offer the versatility you need to take on just about any woodworking project. These are the "core" tools I'd choose if I were starting out today.

"Core" Tools & Accessories

The **tablesaw** is the most important power tool in just about any workshop. Because it's so important, it

makes sense to invest in a good one. A large, stationary saw like the one I use can cost more than \$1,800 (see photo, above right), but there are less expensive alternatives. A 10-in. saw (one that takes a 10-in.-dia. blade) is definitely preferable to an 8-in. saw, and the motor shouldn't be rated at less than 1½ HP. Better saws will have tables that are finely cast and then machined for flatness. Table size should allow for a rip capacity of at least 24 in.; this will enable you to rip to the center of a 4x8 sheet of plywood. The saw's rip fence should be easy to adjust and lock parallel to the blade. The miter gauge should slide smoothly in the table's slots, with little or no play to the right or left.

If an industrial-type cabinetmaker's saw like mine is out of reach, a contractor's saw is a good second choice. At a cost of \$700 or less, a good 10-in. contractor's tablesaw will outlast several "handyman" models and perform more accurately. Decide which model you want, then shop around for the best price.

Buying a good saw blade is almost as important as buying a good saw. I use a high-quality, carbide-tipped combination blade for most of my cut-

ting on the tablesaw. A "finish-cutting" blade with 40 to 60 teeth will give you the super-smooth edge that's required for most furniture-making projects.

A good tablesaw can do plenty of work straight out of the box, but its versatility increases significantly when you add a few key accessories. Used in combination or alone, table extensions and outfeed rollers let you cut large panels with a greater degree of safety and accuracy. A dado cutter is essential for all kinds of joinery work, from milling rabbets and dados to cutting out tenons. With a molding head and a basic selection of molding knives, you'll be able to use your tablesaw to mill different profiles, essentially duplicating the work you might do with a router or shaper.

After the tablesaw, the next machine I'd buy is a **jointer**. Straight, square edges are critical for just about every woodworking project, and the jointer excels at "trueing up" edges. It can also flatten the face of a board and plane a smooth, precise bevel.

The 6-in. jointer I use in "The New Yankee Workshop" does an excellent job, but its size and cost rule it out as





Drilling and driving. Finishing up a child's toy wagon, Norm uses a cordless drill to bore pilot holes and drive screws.

a purchase for some woodworkers. Fortunately, several manufacturers now offer benchtop jointers that are compact and affordable. Because their beds are relatively short, you may have to work a little harder to joint long boards. But for most jobs, a benchtop model will do just fine.

Next in the lineup is the **drill press**. As the least expensive machine in most workshops, the drill press more than earns its keep. I rely on my drill press to sand curved edges smooth and square, using different-diameter sanding drums. It's also the tool I use for cutting plugs to fit in counterbored holes and for doing all kinds of precise or repetitive boring.

Look in any mail-order or manufacturer's catalog and you'll see that drill presses come in all sizes. Whether you buy a benchtop model or a larger floor model, make sure to buy a machine large enough to hold a hollow-chisel bit and mortising attachment. Using your drill press to cut precise, square-shouldered mortises is a tremendous time-saver.

Before I added a **shaper** to my collection of stationary power tools, I milled curves and contours using a couple of **routers** and a basic selection of router bits. A router can do quite a bit as a hand-held tool, but its usefulness increases significantly if you also own a router table. If you're starting out with a single router, make it a plunge-type model with a 1/2-in.

collet and a motor that is rated at 3 HP or higher. Under-powered routers can't handle heavy-duty shaping work, and they don't perform well in router tables.

Another tool near the top of the list is the **power miter saw**, which most woodworkers call a "chop saw." Though considered a portable power tool, the chop saw really works like a stationary machine in my shop. It's set up at its own work station, with shop-made extensions for its fence and table. Fitted with a finish-cutting blade, this power tool is indispensable for precise cut-off work, whether you need miters, square cuts, or just a fraction of an inch

nibbled off a piece to get an exact fit.

The **portable electric drill** is the least expensive power tool in the workshop, but it plays an important role in nearly every project. For making furniture, a drill is just as important for driving screws as it is for drilling holes. The right drill to buy is a variable-speed model with a 3/8-in. chuck and a reversing switch.

To make curved cuts, you'll need either a **portable jigsaw** or a **bandsaw**. Although it's not as powerful or precise as a bandsaw, a good-quality jigsaw (with variable speed, tilting base and orbital cutting action) will do a fine job for most curve-cutting assignments. And remember, you'll be able to clean up curved cuts on your drill press if you invest in some sanding drums.

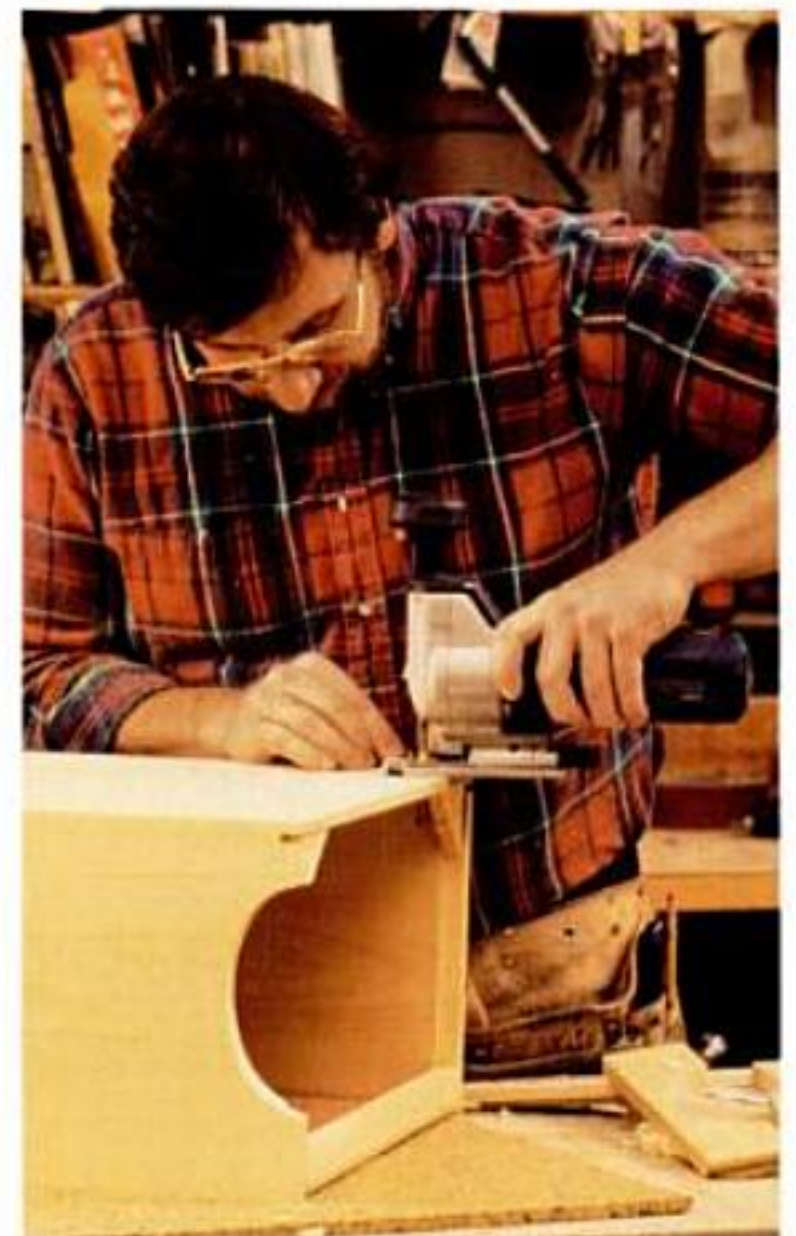
When I first started out making furniture, very few people had heard of a **biscuit joiner**. Today I can't imagine woodworking without one. This portable power tool has a small blade that plunges into the workpiece, milling a crescent-shaped groove that holds a football-shaped spline made of compressed hardwood. Biscuit-reinforced joints are quick and easy to make, invisible, and remarkably strong. If you plan to do a lot of woodworking, biscuit joinery will save you a great deal of time while also adding strength with each biscuit.

The **circular saw** also falls into the core tool category. This is especially

true if your shop space is too small to maneuver full-size (4x8) plywood panels and other sheet goods safely. With your circular saw, panels and other large materials can be cut to rough size before you move them inside. This is good practice even in larger workshops. If you have to cut plywood to finished size on the tablesaw, it's safer and easier to remove 1/4 in. of waste than to push a full sheet across the table while maintaining contact with the rip fence.

Finally, there are a couple of power tools that are crucial for sanding and finishing. If you don't yet have a planer for dimensioning solid wood to uniform thickness and removing surface irregularities, it's a good idea to have a **belt sander** on hand. Rough smoothing and shaping are this tool's specialty.

For general sanding as well as for finish-sanding, I like to use a **random-orbit sander**. When it's fitted with medium-grit sandpaper, this circular-disc sander will easily remove the scratches left by the belt sander. With finer sandpaper grades, it does an excellent job of creating a super-smooth, swirl-free surface that's ready for finish. I prefer the hook-and-loop attachment type of sanding disc over the pressure-sensitive, stick-on type.



Cutting curves. To handle curved cuts, Norm recommends a jigsaw first, then a bandsaw.

Hook-and-loop discs can be removed more easily, with no risk of damaging the disc. This means you can reuse discs that aren't worn out.

For all its versatility, the random-orbit sander has one important limitation: It can't sand inside corners. To do final or touch-up sanding inside cabinets and on shelves, I use a quarter-sheet orbital sander, also known as a **palm sander**.

Safety

Power tools offer significant advantages over hand tools in terms of speed and precision, but they're also more dangerous. Whenever you're involved in a woodworking project, let safety be your first priority. Be sure to observe the following precautions:

- **Wear eye protection.** If you wear glasses, like I do, make sure yours have shatterproof lenses. If you don't wear glasses, buy and use protective goggles that are approved for woodworking.

- **Protect your hearing.** Power tools are noisy, and I've met many woodworkers who wish they'd taken precautions against hearing damage. Keep protective ear plugs or hearing protectors accessible in your shop, and be sure to use them.

- **Check out your electrical system.** Outdated or undersized wiring and ungrounded circuits are serious hazards—especially in a workshop. If you have any doubts about the safety or capacity of your shop's electrical system, have an electrician check it out. Good lighting is another important safety measure. I like fluorescent lights for general illumination because they're inexpensive to operate, even when they're on all day. I complement these fixed overhead lights with a couple of movable spot lights that can be clamped in place where and when they're needed.

- **Use sharp tools.** Whether you're trimming with a chisel or milling an edge with a router, bits and blades are a pleasure to work with when they're sharp. Dull tools add frustration to a job, and often require hazardous amounts of extra force—applied by you and (if there's a power tool involved) the motor.

- **Get to know your tools.** To complete projects safely and successfully,



Finish-sanding. Using a random-orbit sander, Norm does some final smoothing on a teak garden bench. Saw blades live on the wall, behind the radial arm saw. The drill press occupies a corner, next to Norm's substantial supply of clamps.

you need a working familiarity with a variety of power tools. You need to know how to change bits or blades; how to adjust cutting height and fence location; how much pressure to apply when feeding different stock in the setup; and so on. Remember that it takes a while for a new tool to feel comfortable in your hands. So if you're unsure about a tool, be sure to study the owner's manual. And if a particular technique is new to you, spend some time practicing on scrap stock before you start working on the good wood you've set aside for a specific project.

Finally, remember that safety isn't just technique and equipment; it's an attitude. Accidents happen when you're tired, impatient or distracted. Use care and common sense when you're in the workshop, and you'll get the most out of every project. ▲

Norm Abram's books, The New Yankee Workshop: Classics from The New Yankee Workshop; Mostly Shaker; and The New Yankee Workshop Outdoor Projects (Little, Brown, and Company, 200 West St., Waltham, MA 02254) are available in bookstores nationwide.

Setting Up Shop

Well-Tested Solutions Help You Work Smarter, Not Harder

by **Scott Landis**



Crisscrossing the country numerous times over a five-year span to collect material for a pair of popular wood-working books (*The*

Workbench Book and *The*

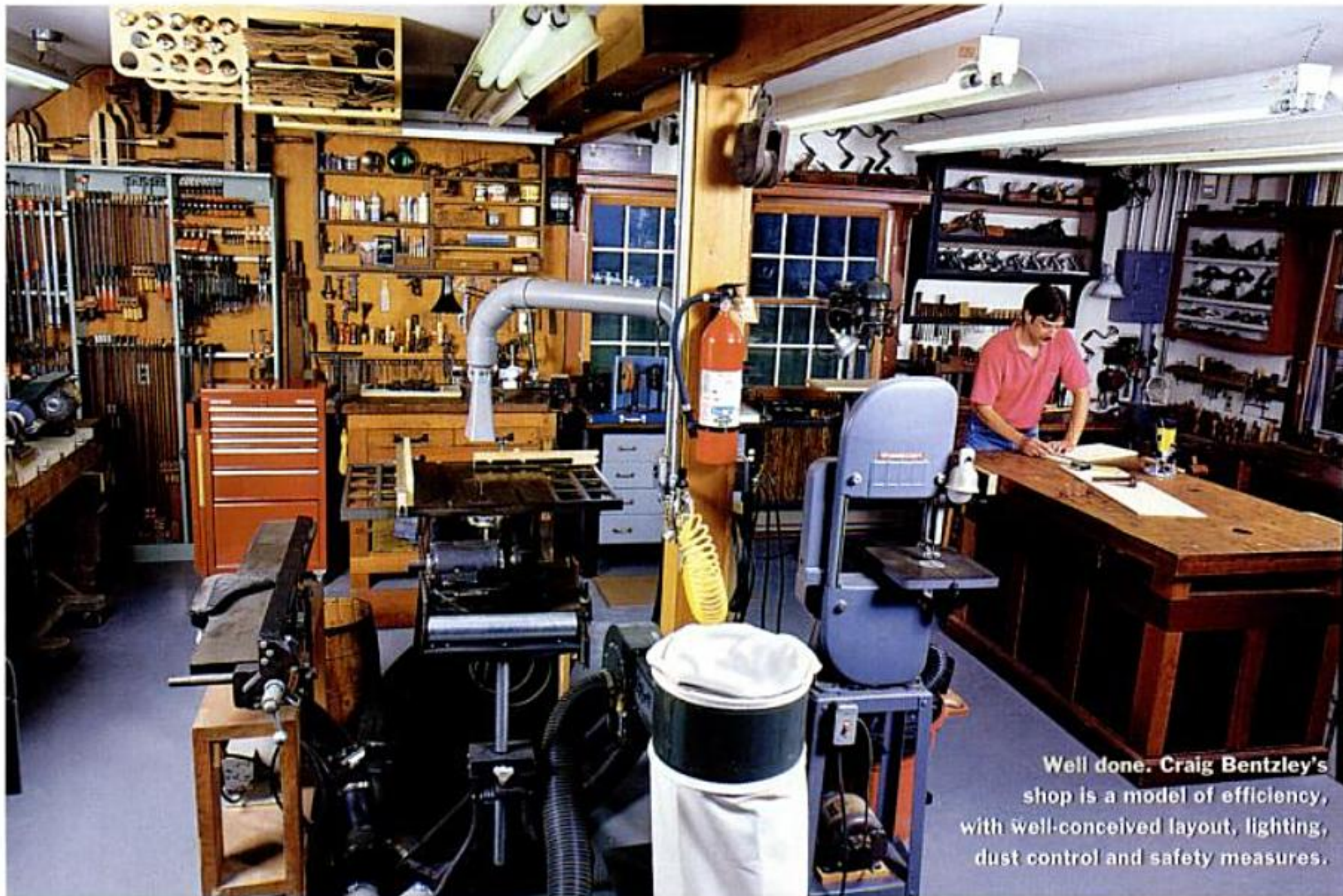
Workshop Book, published by Taunton Press), Scott Landis has visited more woodworkers in more different places than anyone. He's seen workshops in closets, basements, barns, garages—even in the backs of trucks. Here Landis shares what he's learned about setting up a workshop to maximize efficiency, safety, and satisfaction.

Shops are a lot like houses. They consist of a bewildering array of systems, from wall layout and floor plans to electrical wiring and lighting. When it comes to houses, we hire architects, electricians, and sometimes even engineers to help sort this stuff out. Yes, it's possible to have a specialist design your shop too, and I know a handful of woodworkers who have done just that. But many more have worked out their own solutions to lighting problems, limited space and difficult floor plans. You can, too. By considering each system, you can tailor your shop to suit your needs.

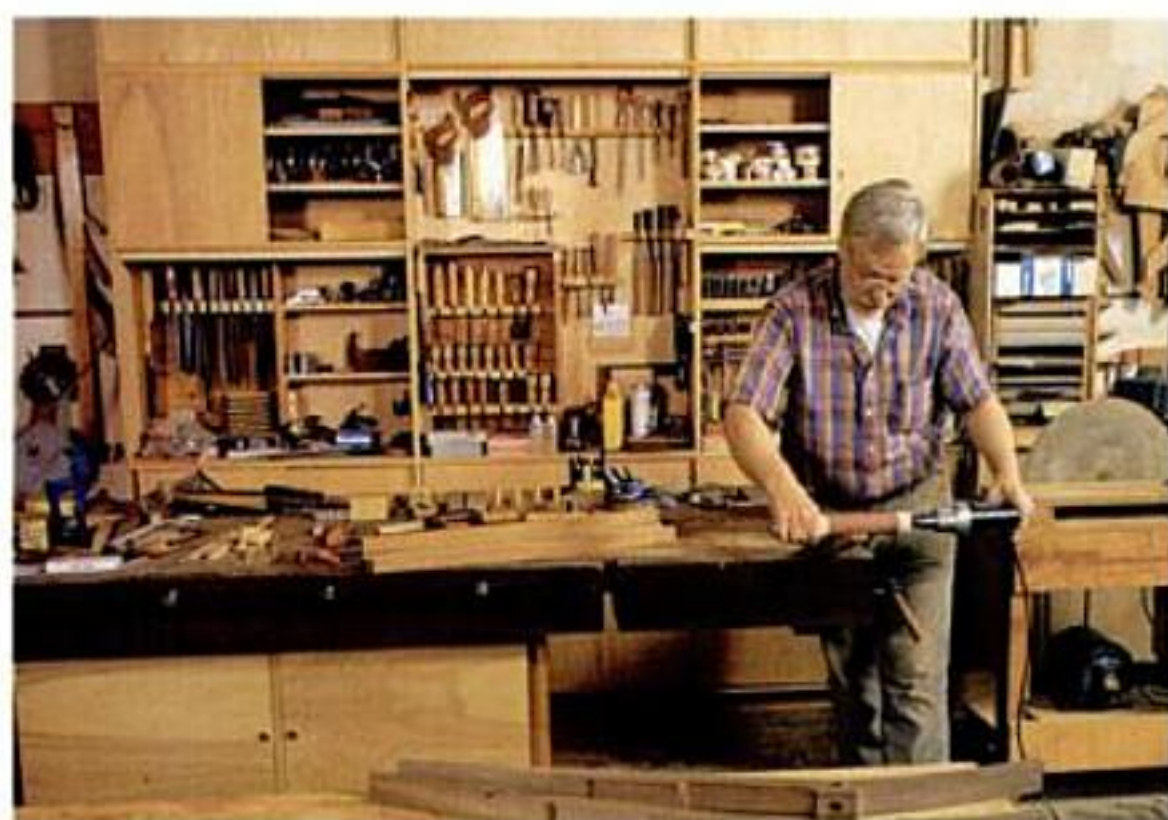
Location, Location, Location

This sacred tenet of the real-estate market holds true with workshops as well. Your shop's location will affect your woodworking pleasure more than any other decision you are likely to make.

Most of us begin with what we have, which usually means a basement or garage. (A recent survey reveals that the majority of AW readers work in 400 square ft. of



Well done. Craig Bentzley's shop is a model of efficiency, with well-conceived layout, lighting, dust control and safety measures.



A hand-tool plan. In a shop where hand-tool woodworking predominates, the work flows between the tool cabinet, the bench, and the setup table.

space, an area roughly the size of a two-car garage.) I won't dwell on the shop location, except to note a few important pros and cons of these two common alternatives. Once you know what you have to work with, you'll be better equipped to adapt the space or to find another.

A basement shop has the major benefit of easy access to your work and to essential household systems such as electricity, heat and plumbing. Of course, the easiest way to get what you need in a basement workshop is to plan way ahead, before the house is built. Whether this is your situation or not, read on. The factors discussed below will help you to get the most from your space.

Bringing power to a basement shop may involve little more than installing some additional outlets or perhaps adding a circuit to serve your power tools. If you need extra heat in the basement, an electric baseboard is a good option. Adding an extra duct off an existing forced-air system will also work, but remember that forced air can stir up sawdust.

Speaking of sawdust, there is a flip side to a basement workshop's advantages. Ventilation and dust control are important issues that may be troublesome to resolve. If your basement is totally below grade, it will be difficult and costly to add a window or an exhaust fan, not to mention a finishing room. Basement workshops benefit greatly from windows, however small, and from exterior access. If your basement doesn't have an exterior

or door, you'll have to lug equipment, supplies and finished projects up and down an interior stairway.

Most basement floors are concrete, which can be hard on your feet and back. If you prefer not to work on concrete, you'll have to cover the floor (or sections of it) with rubber mats, or install a wood floor.

The height of the basement ceiling can also be a serious limitation. With new construction, you can build in the headroom you need. Otherwise you'll have to live with what you have. If space allows, insulation against sound transmission is a good option to consider. Finishing off the ceiling with wall-board will keep dust from collecting overhead and slow its migration to other parts of the house.

Dampness can be a problem in basements, especially in older houses and houses built in humid areas. If your basement suffers from high humidity, invest in a dehumidifier. This will help lower the moisture content of wood stored or used in the shop; it will also help to reduce rust on steel tools and machinery.

The garage workshop offers the proximity of the basement without many of its drawbacks. An attached or freestanding garage shop provides more light and ventilation than the basement and much easier access for materials and machinery. What's more, the likelihood of dust and noise reaching the living space is greatly reduced or eliminated.

Once you resolve the issue of displacing the car (or cars), the trade-offs are mostly financial. In a separate, above-ground structure, the cost of insulation, heating and electricity will be greater than if these systems were shared with an existing building. Plumbing and telephone lines are options that will add to the expense of most garage-to-workshop conversions. And in areas with severe win-

ters, heating costs can climb to prohibitive levels. Still, the gain in headroom and the greater flexibility of a garage shop are hard to beat.

Layout

Apart from the location itself, the next most important issue you face is the organization of tools and materials within your workshop. Whether your space is small or large, the time and effort you put into planning its layout will pay handsome dividends in productivity, safety and enjoyment.

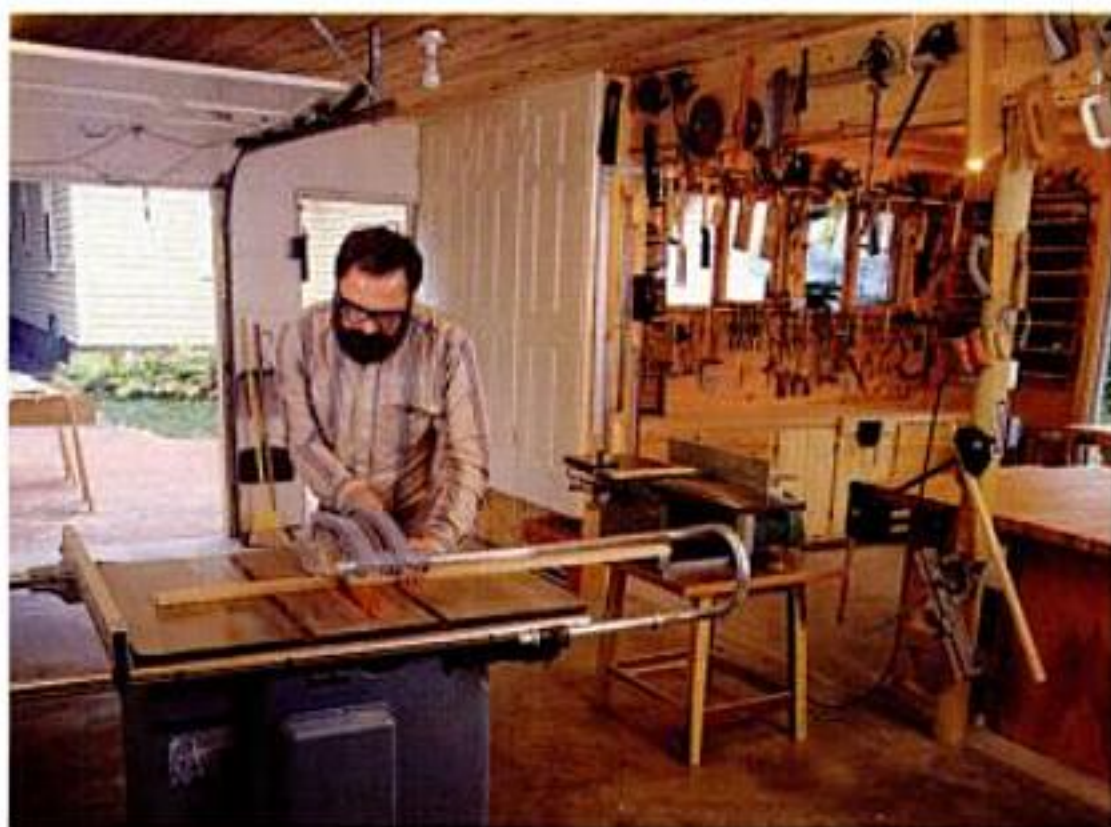
Increased space may offer some temporary relief in a cramped shop, but if you fail to plan for its use, you'll be looking for more in no time. Poor planning in a small shop will have you bumping into equipment and unable to feed stock to machinery. Even in a large shop, poor planning results in wasted energy and inefficiency.

Work flow and the floor plan—In a hand-tool shop, the workbench is the central piece of equipment around which all activity revolves. Work flows steadily between the bench, tool cabinet and setup table. (See photo, above.) When machinery is involved—as it is in most workshops—the layout of machines should reflect their importance, as well as their relationships to each other.

These relationships are best expressed in terms of *work triangles*, a concept borrowed from kitchen planners who analyze the traffic pat-



An efficient corridor. Not far from where lumber is off-loaded and stored, Kelly Mehler has work stations for dimensioning boards on their way to becoming furniture. Stock is cut to length on the radial arm saw, resawn on the bandsaw, and face-planed and jointed on the jointer.



Center stage. The tablesaw occupies a central position in most workshops because it's versatile and because it can require infeed or outfeed space on all four sides.

terns between the stove, sink and refrigerator. There are more variables in a woodworking shop than in most kitchens, and not all shop triangles have three sides. A functional work triangle in the woodshop may amount to a square, a trapezoid or a straight line.

Think about the sequence of tools and operations you employ on a typical project. Where do you put your wood when it enters the shop? Do you usually crosscut it to length first, and if so, how? If you like to spread your stock out to match grain before cutting it to rough length with a circular saw, you'll need a work station with ample floor space in the vicinity of your wood storage racks. The third station on this work triangle might be the planer.

If you use a radial arm or chop saw, consider the efficient arrangement of Kelly Mehler's "break-down" lane,

which makes the most of a long, narrow corridor. (See bottom photo, previous page.) At one end of the corridor, lumber is loaded onto storage racks through an overhead garage door; the other end of the corridor opens into the bench room of the shop. Centered along one wall against the lumber racks is Mehler's radial arm saw, the first step on the path to furniture. On the opposite wall a few ft.

away are Mehler's resaw bandsaw and a 12-in. jointer, the second and third steps in the stock-prep process.

Handling of heavy boards is kept to a minimum, and the bulk of scrap stays right where it started, near the front door of the shop. Once the lumber has been chopped to length, Mehler works easily back and forth between the bandsaw and the jointer, milling stock to rough dimensions. The milled blanks are loaded on rolling carts for transport to other work stations.

If you work mainly with solid wood, the bandsaw, jointer and thickness planer comprise one of the most useful work triangles in the shop. In a very small shop you might need to mount these machines on locking casters or aftermarket mobile bases. This way, each one can shifted from the sidelines to center stage as needed. Another

possibility is to invest in a combination machine that offers the functions of tablesaw, jointer and planer.

As you look around your shop, you're likely to notice other work triangles as well. For example, if you work mainly with plywood, your primary work triangle might consist of a vertical panel saw (or maybe a panel-cutting station that utilizes a circular saw and straightedge guide), a table-saw, and an assembly or glue-up area.

Locating tools—Some tools, such as the drill press, can go almost anywhere in the shop. Others have particular requirements. The tablesaw, for example, is the only machine in the workshop that requires infeed and outfeed space on all four sides. This requirement, combined with the tablesaw's versatility, explains why it often occupies the center of a workshop. (See photo, left.)

By contrast, the jointer and planer are more specialized machines that require infeed and outfeed room at both ends, but minimal space along the sides. Both machines can be comfortably situated next to a wall, as can the radial arm saw and bandsaw.

The lathe is another machine that can live against the wall. But think twice about hanging turning tools on the wall behind the lathe. It's easy to snag your shirt on a spinning workpiece when reaching for a tool. Instead, hang your most frequently used tools on an adjacent wall, and use the back wall for storing patterns and specialty tools.

Infeed, outfeed and vertical layout—Infeed and outfeed support are



Extending your reach. Extension rollers and tables are a must for handling oversized material, especially if you're working solo. In some cases, it makes sense to build permanent extension tables (left). Adjustable-height extension rollers (center) will adapt to most machines. At right, woodworker Scott McBride shows that it pays to be height-sensitive. A guide board, placed on a lower workbench, provides support for long boards. Ball-bearing rollers in a shop-made stand provide outfeed support.



Mobility and flexibility. Left: John Nyquist's assembly bench and shop-made router table can be moved anywhere in his shop, or stowed against a wall to make room for other work. Center: Planes, chisels, router bits, sandpaper, screws, straightedges—you name it, and Mac Campbell can claim it from his rolling tool chest. Mounted on heavy-duty casters, the chest can go to the work, adding a significant margin of flexibility to this basement workshop. At right: This drop-down clamping rack can be pulled up tight against the basement ceiling when not in use. Rack legs swing up when the rack is in storage mode.

very important issues when using woodworking machinery, especially when working long stock or large panels. (See photos below left.) There are several options for extra support. Wooden or steel rollers work well with narrow lumber, but they tend to track the work into or away from the cutter if they aren't positioned just right. To handle plywood and other wide panels, multidirectional ball bearings (available from most mail-order suppliers) are more effective. Adjustable stands topped with ball bearings or rollers have the advantage of mobility—you can move and adjust them to fit a particular machine. But sometimes it can be better to simply build permanent extension tables around a tool. This is particularly true for the tablesaw, radial arm saw, and chop saw.

If you've got a small shop, pay close attention to *vertical layout*—the heights of adjacent machine tables and work surfaces. These can be aligned so that one table provides infeed or outfeed support for another machine, or they can be staggered to allow work to pass over or under nearby obstructions. Depending on your shop layout, you may need to consider both strategies. Remember that if one surface is to serve as a part-time infeed or outfeed table, you'll need to keep it clear.

Alternatively, you can try Scott McBride's solution. McBride's bench-

top is slightly lower than his saw table, but a wooden batten placed on top of the bench makes up the difference in height and provides outfeed support. (See bottom right photo, opposite page.)

Making space—A good layout is more than just deciding where to put your stuff. In many shops it calls for flexibility. This is especially important in close quarters, where the same space may have to accommodate a variety of activities. Few shops can avoid some overlapping functions, no matter how ample the space is.

As I mentioned earlier, putting a machine or two on wheels is an excellent way to create more flexibility in your shop. But machines aren't the only items that can be mobilized. John Nyquist's portable assembly bench and his homemade router table enable him to work on chairs anywhere in the shop. (See photo, above left.) Likewise, a rolling tool chest like Mac Campbell's greatly increases efficiency and flexibility in a tight workspace. (See photo, above center.) In Campbell's basement shop, where every inch counts, a clamping rack suspended from the ceiling presents a convenient solution for gluing and clamping large panels. (See photo, above right.)

To try out different floor plans, start by making a scale drawing of your workshop space. Include all existing elements such as doorways, windows,

partition walls, built-in shelves, columns, and so on. On some cardboard or stiff paper, draw a plan view (in the same scale) of each machine and workbench. Cut out these elements, and on each one write down its basic infeed and outfeed requirements. Now you can play around with different layouts until you find one that suits your needs. A cardboard tablesaw is much easier to move around than the real thing.

Several woodworkers I know have gone even further. One made full-scale cardboard cutouts for each major tool and cabinet and pushed them around the empty shop floor until he was satisfied. "You can lie with drawings," he told me, "but you can't lie with a full-scale model." Others use a computer-aided design (CAD) program to explore all their options on screen.

Power to the Workshop

Sooner or later, just about every workshop needs improvements to its electrical system. If you're inexperienced with electrical wiring, it's best to let an electrician handle the job of bringing the "juice" just where you want it. A licensed electrician will know about code regulations, such as ground fault protection requirements and wiring type for workshop circuits. And in many municipalities, new wiring and changes to existing wiring require a permit and one or more inspections.



The right light. Ideal for overall illumination, fluorescent tubes (left) provide even light without consuming much electricity. Incandescent lights (right) remain the first choice for task lighting.

You may still be able to save money by doing some of the grunt work yourself: You install the boxes where you want them and snake the wire from box to box; the electrician makes the connections.

The number and size of electrical circuits in your shop will be determined mainly by your machinery. In a full-time workshop, every major machine should have its own circuit. This way, you can run more than one machine at a time without blowing a fuse or breaker. A 1-HP, 220-volt, single-phase motor requires a 25-amp circuit; larger motors require larger circuits. When estimating the load for each circuit, don't forget to calculate all the equipment (including lights, heaters, dust collectors and portable power tools) that may operate on the same circuit at once.

It's a good idea to put your wall outlets (or receptacles) and lighting fixtures on separate circuits, too. That way, the lights won't go out if you trip a breaker by overloading a wall outlet. If you wire banks of lights on separate switches you can save money by illuminating only that area of the shop in which you're working.

It's difficult to imagine a workshop with too many outlets. Keep this in mind as you plan outlet locations. Outlets behind the bench may be hard to reach, and a tangle of tool cords can get in the way of other work. Good alternatives are an outlet strip mounted beneath the benchtop, or a retractable cord reel hung from the ceiling. Many shops also use Plugmold, a component system of surface-mounted metal moldings that can provide an infinite number of outlet locations along its length.

Lighting

Lighting is perhaps the most vital workshop system of all. You can work wood in the cold and without machinery, but you can't work if you can't see. There are two basic types of light to be concerned with in the shop: ambient, or overall light, and task light, which is more specific. And there are two principal light sources: natural and artificial. The best shop lighting I've seen is a balanced mixture of both types and both sources.

Sunlight not only warms the spirit, it helps heat the shop. But direct sunlight is hard on the eyes and harder on a piece of wood. The best natural light comes from a northern exposure or from windows placed high on a south wall or shaded by a broad overhang. Such diffuse ambient light provides the color rendition you want at the bench or in a finishing area.

Fluorescent lamps comprise the guts of most artificial shop lighting systems. (See photo, above left.) The fixtures and tubes are relatively inexpensive and they are four to six times as efficient as conventional incandescents. They are also capable of uniformly illuminating a large area with very little shadow.

Many woodworkers who rely on fluorescent fixtures use either a combination of standard warm-white and cool-white bulbs, or "full-spectrum" fluorescents. The latter are quite a bit more expensive than conventional tubes, but their color temperature closely approximates that of daylight. Whatever fluorescent lamps you install—and there are dozens to choose from—it's a good idea to protect them with plastic guards. These clear, thin-walled sheaths slip onto the

tubes and prevent them from shattering on impact.

Incandescent bulbs are notoriously inefficient, but they're ideal for task lighting. (See photo, left.) I've seen everything from elegant (and expensive) track-lighting systems to task lamps made from beer cans. The articulated swivel-head student lamp and the spring-clamp, steel-reflector-type fixture are found in many workshops.

They're cheap, flexible and position easily almost anywhere. For more on lighting, see my article in AW #30.

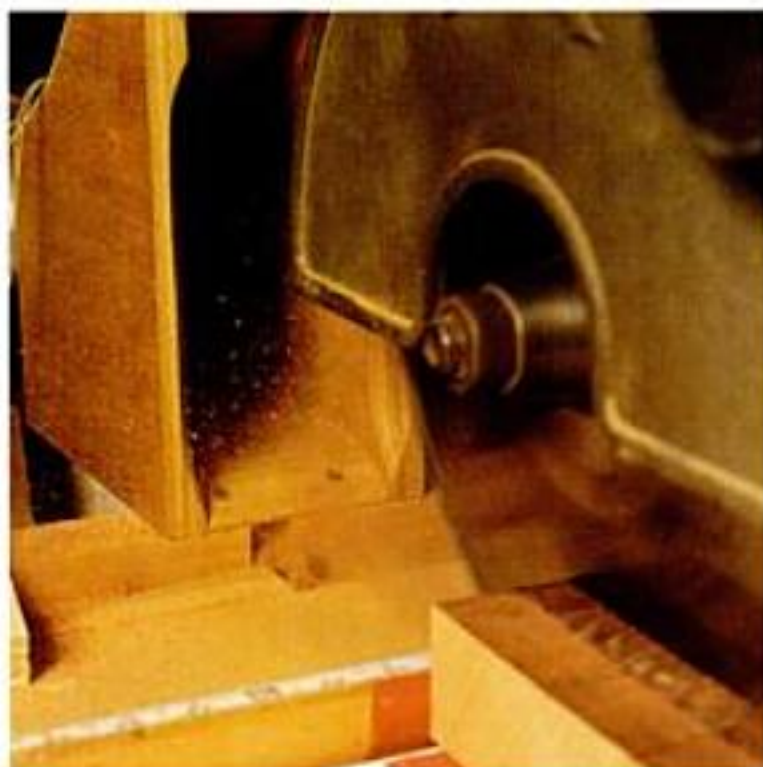
Dust Collection

If you work by yourself and don't do production work with power tools, you might get by with a portable shop vacuum as your dust collection system. But it doesn't take much to tip the scales in favor of more substantial dust collection—it might be the acquisition of a new machine, or a troublesome sinus infection. If you plan to spend the rest of your life working wood, it's probably time to bite the bullet and stop eating dust.

There are many different types and sizes of dust collectors on the market. Depending on your shop and machinery, you can install a basic one-stage collector for a few hundred dollars or an elaborate two-stage cyclone unit costing more than a thousand. (See page 102.) A clever scavenger can assemble an entire custom-made system—including blower, filter bags, collection pipe and pickups—for about the price of a used tablesaw.

Large or small, most dust collection systems consist of two major components: the collector itself, and the system of ductwork or pipe that brings the chips and sawdust to it. More complex systems will have branch lines serving different machines. Specialized intake hoods or fixtures help gather in debris, while blast gates can be opened or closed to direct suction pressure where it's needed.

Dust collectors are rated in cubic ft. per minute (cfm), the amount of air they can move at a given static pressure. The cfm of your collector



Improving dust collection efficiency. Left: Ductwork distances are short when the dust collector is positioned centrally, as in this basement shop. Center: A custom-made collection hood, like the one for this radial arm saw, increases the efficiency of your dust collector where it counts most—near the cutting edge. Right: Charlie Mastro's adjustable, drop-down hood serves as a combination dust collector and tablesaw blade guard. The clear plastic creation slides up and down inside a ceiling-mounted plywood box that is hooked up to the collector.

depends on how much resistance is created by your ductwork. Long runs, small diameters and sharp curves are all factors that increase the overall resistance to air flow. (For more technical information on dust-collection system design, see AW #37.)

To keep your pipe run short, you might want to arrange your machines around the perimeter of the shop and locate the dust collector near the center. Rick Stodola's basement shop is set up this way, and this enables Rick to have multiple intake points (router table, tablesaw, planer and jointer) served by a small, single-stage collector. (See photo, above left.)

Don't forget about safety when planning and installing a dust collection system. Your system must be grounded because of the static charge that builds up from the movement of dust and debris inside the ductwork. And to prevent sparks caused by nails and other metal debris, the blower motor's fan should be bronze.

Metal ductwork is more expensive than plastic pipe, but it's lighter than plastic and easier to ground. Flexible plastic pipe can be very useful in some situations, but it's smart to use it sparingly. This is because the ridges in this pipe increase resistance and tend to trap dust.

Even the fabric in your filter bags can have a major effect on the ability of the system to capture fine dust. The most efficient units are able to filter the most dangerous particles of dust, 5 microns or less in size. (See "Health Risks From Wood Dust," AW #37, page 52.) Empty your bags often to obtain maximum filtration.

Any dust collection system is no better than the pickup at each machine. You can buy ready-made pickups, but to trap the most dust you may have to devise custom-made hoods to fit your own equipment. (See center and right photos, above.) Sheet metal, tempered hardboard, and plastic all make good intake hoods.

The tablesaw is notoriously difficult to enclose for dust collection. As a result, much of the dust that spews off the saw blade ends up in the air. The nicest solution to this problem that I've seen combines two functions: It collects dust while serving as a blade guard. (See photo, above right.) Charlie Mastro built this pickup-guard from clear Lexan. The guard slides up and down inside a ceiling-mounted plywood box that is hooked up to the collector's ductwork.

To get the most suction out of your system, seal the joints between pipe sections (use duct tape or silicone caulk) and install blast gates at each machine. You can buy aluminum blast gates from any supplier of dust-collection hardware, or you can make your own. ▲

Parts of this article were adapted from The Workshop Book (1991, Taunton Press, Box 355, Newtown, CT 06470).

SHOP SAFETY

Use tool guards. Aftermarket guards are a good option if you don't like the original equipment.

Have running water nearby. Water is the first line of defense in a "Class A" fire; it's also useful for cleaning minor wounds and as an eye rinse.

Use hearing protectors. Foam plugs or protective earmuffs are inexpensive and easy to use.

Have fire extinguishers handy. ABC-type extinguishers will handle most workshop-related fires.

Finish safely. Follow manufacturers' instructions relating to ventilation and cleanup. Keep oily rags in an airtight bin, and dispose of used solvents and other materials through your local recycling program.

Use your head. Don't work when you're tired or distracted. Stay focused, alert, and aware of the particular safety requirements for different tools and procedures.

Hand Tools: A Guide to the Essentials

No Shop Is Complete
Without These Traditional Tools
That Go Where Machines
Fear To Tread

By Simon Watts



Hand tools are a pleasure to use and essential for many basic woodworking operations.

Shopping for hand tools is worse than buying a pair of shoes: Worn-out shoes are easily discarded but a bad choice in the tool department may survive to haunt you for years. Poor tools are not only an aggravation to use but take an inordinate amount of time to sharpen and adjust. Buying quality initially not only saves you time and money but greatly increases the pleasure of working with wood.

When purchasing a hand tool, remember that the human hand varies widely in size, shape and strength. A tool that feels good to one person may seem awkward and uncomfortable to another.

If at all possible, try actually working with a hand tool before buying it. Some tool stores have benches set up with sample tools for their customers to test. Or visit a

friend's workshop and get the feel of various tools before making a decision. When ordering by mail, read the fine print to see if you can return a tool you don't like. Some companies allow this and may even offer to pay return postage.

If you take the secondhand route—flea markets, tool swaps, etc.—you may be lucky and come away with some bargains. However, keep in mind that used tools come with no warranty, and getting parts may prove impossible.

The following is a list of the hand tools I consider essential for anyone getting started in woodworking. I've included approximate prices and the names of mail-order firms that carry quality hand tools. (See page 116.) If you can't afford all the items listed, I suggest starting with a few edge tools and the means to sharpen them.



1: Jack plane. 2: Bevel chisels. 3: Firmer chisel. 4: Japanese saw (with interchangeable blades). 5: Hand scraper. 6: Cabinet scraper. 7: Flat-soled spokeshave. 8: Rabbet plane. 9: Low-angle block plane.

Edge Tools

Planes, scrapers, spokeshaves, chisels and saws are the most important hand tools for actually working the wood. Here are my recommendations for a basic set:

Jack plane—Bench planes are available in several sizes, but I find the 14-in. jack plane to be the most useful. It is short enough for general work, yet long enough for edge jointing. Both Stanley and Record make jack planes. (\$40 to \$70) But you may be lucky enough to find an old Bailey—a beautiful plane with castings noticeably lighter than modern planes of the same size. Here's a case where I feel the used tool is the better value.

Low-angle block plane—I prefer the Stanley No. 60½ over the Record because, with its narrower sole, it fits more comfortably in an apron pocket. The adjustable throat and lateral blade adjustment are useful features. (\$32 to \$55)

Spokeshave—A spokeshave with a flat sole cuts like a plane but will follow curved surfaces. The Record A151 is marginally better than the comparable Stanley because the blade is surface-ground on both sides; Stanley grinds the blade only on the side that shows. (\$18 to \$21) The German firm Kunz makes the only adjustable-throat spokeshave, a favorite of many craftsmen. (\$25)

Rabbet plane—A Stanley No. 92 (¾ in. wide by 5½ in. long) or a No. 93 (1 in. wide by 6 in. long) would be my first choice. (\$64 to \$73)

Hand scraper—This unassuming piece of steel is indispensable. Once you get the knack of sharpening the blade you're close to eliminating the whole wretched sanding process. (\$6)

Cabinet scraper—Essentially a scraper with handles, this tool can scrape larger surfaces quite flat. Cabinet scrapers are available from both Stanley and Record. (\$30 to \$35) To give either type of scraper its wire edge, you'll need a round burnishing tool. (\$12 to \$14)

Wood-handled bevel chisels—I recommend these for general work. A starter set would include ¼-in., ⅜-in., ½-in.,

¾-in., and 1-in. widths. (\$100 to \$120 for all five) The intermediate sizes you can acquire later. I see little point in buying framing or mortising chisels (heavier-bodied chisels with no side bevels) unless you plan to do a lot of mortising by hand.

Firmer chisel—You will also find it useful to own one wide (1½-in.) firmer, or "socket," chisel. This should have a long enough handle to give plenty of control when paring. (\$30 to \$50)

Japanese saw—For many years I used conventional back saws or tenon saws; only recently have I learned to appreciate the advantages of Japanese saws, which cut on the pull stroke. Of the many brands available, I like the Zeta saws best (available from Tashiro's, 2939 4th Ave. S., Seattle, WA 98134, 206-621-0199). They come with comfortable rattan-wrapped handles into which fit any of a dozen interchangeable saw blades. These have no stiffening along the back edge so they can be flexed down flat on a surface for flush-cutting. The 265mm "joint" blade is a good general purpose blade. (\$28, including handle)

Coping saw—Look for one with a 6½-in. throat and wooden handle. This takes standard 6⅝-in. blades with pinned ends. (\$20 to \$25 with assorted blades)

Measuring and Marking Tools

Here are some tools for laying out your projects accurately:

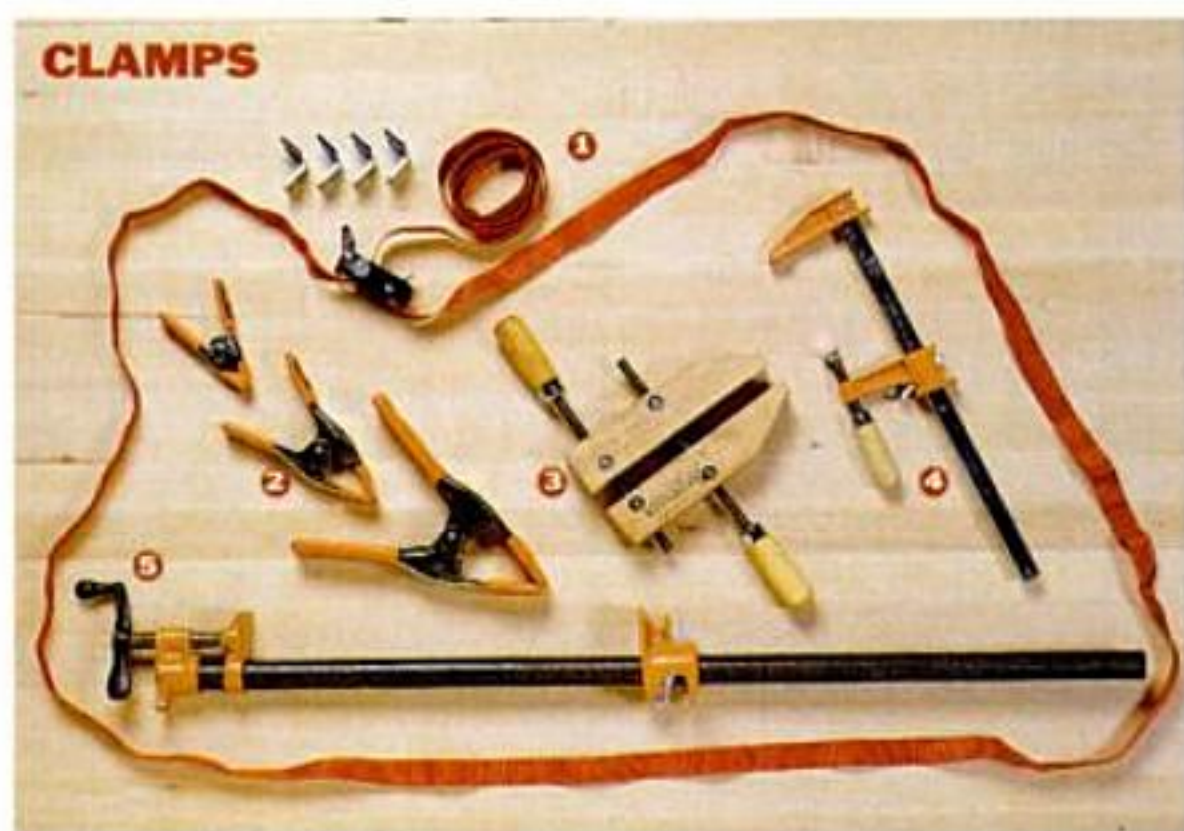
12-ft. steel tape measure—This will probably be your most-used measuring device. The 12-ft. size is light in weight and adequate for most shop purposes. Be alert for "end error," which is caused by a poorly adjusted slotted steel hook at the end. (\$8 to \$12)

3-ft. wooden folding rule—When working on the bench I prefer a rule over a steel tape. Rules have no end error and the straight edge is handy. When buying one, make sure it is quality hardwood—preferably boxwood—and not some mongrel mahogany. (Around \$20)

Marking gauge—I prefer the Stanley version with a beveled wooden beam and single pin. (\$29) I've adapted mine for use with a pencil by drilling a hole at the end



1: 12-ft. tape measure. 2: Framing square. 3: 4-in. sliding-blade square. 4: Cork-faced steel ruler. 5: 12-in. combination try square. 6: 3-ft. wooden folding ruler. 7: Adjustable sliding bevel. 8: Marking gauge. 9: Awl. 10: Pencil compass. 11: Marking knife. 12: 3-ft. straightedge.



1: Band clamp (with corner protectors). 2: Spring clamps. 3: Wooden handscrew. 4: "Quick" clamp. 5: Pipe clamp.

opposite the pin. (See "Tech Tips," AW #23.) I file the pin so it incises a fine line instead of scratching.

Marking knife—For marking, I use a plastic utility knife with snap-off blades. It's inexpensive and easy to lengthen or shorten the exposed blade according to need. (\$2 to \$3)

Adjustable sliding bevel—Get a metal bevel with the clamping screw projecting from the bottom of the handle. (\$11 to \$16) The fancy ones made of rosewood and brass have a projecting wing nut that invariably gets in the way.

Try square—Instead of buying both a 90° and a 45° square, it makes sense to get a 12-in. combination square. These come with a built-in level and scribe. (\$20 to \$60)

4-in. sliding-blade square—Made by Starrett, these miniature squares are enormously useful. I use mine as a try square and marking gauge (see "Tech Tips," AW #31) as well as a height and depth gauge. (\$35)

Pencil compasses—You can still buy these useful items cheaply at the local dime store. Get the type with a wing nut at the hinge if you can, and use it for striking arcs, scribing lines and transferring dimensions. For larger radii, buy **trammel points** and make your own beam compass. (\$23 per pair)

Awl—This needle-pointed marking tool with a beechwood handle is perfect for scribing fine lines as well as starting screw and drill holes. (\$9 to \$11)

Other layout tools—For general layout work, I recommend a 12-in. cork-faced steel rule, a framing square and a 3-ft. metal straightedge.

Clamps

No one type of clamp will do it all. Edge-gluing necessitates a quantity of bar or pipe clamps, and for laminations you need lots of C-type clamps. I've listed the sizes and types of clamps that I've found most useful for general woodworking. Most jobs require more than one clamp of the same type, so I'd suggest getting a minimum of four each. Fewer than that and you're always improvising—trying to make a clamp do what it was not designed for.

Pipe clamps—For edge joining, the Jorgensen "Pony" pipe clamp is still unrivaled. Mount the fixtures on 30- or 36-in. lengths of 3/4-in. black iron pipe. Thread them both ends, so you can connect them with 3/4-in. couplings to

make clamps of any length. (\$10 to \$14 per set, not including pipe)

"Quick" clamps—Equally useful are the quick-action clamps that have pretty much superseded the venerable C-clamp. These are available in light- and heavy-duty models in a variety of lengths. The 12-in. length with the 2 1/2-in. throat is the most versatile. (\$8 to \$12)

Wooden handscrews—Handscrews with a 6-in. or 8-in. capacity are also essential. They need no padding, you can angle the jaws, and they'll work in reverse when pushing joints apart. (\$13 to \$17)

Band clamps—These are useful for gluing up picture frames, leg-and-apron assemblies and irregularly shaped parts. They are available in several widths and lengths; I prefer 1-in. and 2-in. widths for most purposes. (\$10 to \$15)

Spring clamps—Available in steel or molded plastic with plastic-dipped tips, these are almost as good as an extra pair of hands in many situations. (\$2 to \$4)

Drill Bits

You'll want to acquire a varied selection of drill bits for use in both a drill press and a portable drill:

Twist drills—You can spend a lot of money on specialty bits, but I'd start with a good set of twist bits, with sizes from 1/16 in. to 3/8 in., in 1/16-in. increments. (\$35 to \$45)

Stanley "Powerbore" bits—I use these for larger holes in wood. Grinding the spur down doesn't seem to affect their performance but does increase their usefulness. (\$12 to \$15 each, at many home centers)

"Speedbor" paddle bits—These take up where twist bits leave off for holes over 1/2 in. dia. They're relatively cheap, cut much cleaner than other spade bits and can be lengthened with 6- or 12-in. extensions. (\$2 to \$3 each)

Tapered bits—Though expensive and difficult to sharpen, these are essential if you use a lot of wood screws. (\$5 to \$9 each)

Forstner bits—These rim-guided bits have the ability to drill virtually flat-bottomed holes as well as partial ones in the edges of workpieces. The larger sizes should be used only in a drill press. (\$15 to \$50 each)

Plug cutters—Get the type of plug cutters that have four cutting prongs, because you can sharpen them. The 3/8-



1: Forstner bits. 2: Twist drill set. 3: Taper drills. 4: Plug cutters. 5: "Powerbore" bits. 6: "Speedbor" bits.

MISCELLANEOUS TOOLS



- 1: "Crescent" wrench. 2: Vise-grip pliers. 3: Japanese saw-file.
4: Dowel centers. 5: "Dowl-it" doweling jig. 6: Mallet.
7: Cabinetmaker's hammer. 8: Sharpening stones.
9: Screwdrivers (slotted- and Phillips-head).

in., $\frac{7}{16}$ -in. and $\frac{1}{2}$ -in. sizes are the most useful, but you need a drill press. (\$8 to \$9 each)

Miscellaneous Tools

Following are some tools no shop should be without:

Screwdrivers—Choose different tip sizes for different-sized slotted-head and Phillips-head screws.

"Crescent" wrench—The 6½-in. size is handiest.

Vise-grip pliers: You'll find plenty of uses for both the regular and needle-nosed variety.

Hammer—A cabinetmaker's hammer traditionally has one slightly crowned face for nailing and one cross-peened face for starting small brads without hitting your fingers. (\$17 to \$20)

Mallet—Only woodcarvers and croquet players use round-headed mallets. Traditional woodworkers' mallets have a tapered, rectangular head weighing from 12 to 20 ounces. I use the hard end grain for striking chisels and the softer side grain for assembly, since it is less apt to mar finished surfaces. (To make your own, see AW #26, page 31.) Beechwood mallets come in three sizes. (\$11 to \$18)

Files and rasps—The Japanese saw-file is a good general purpose shaping tool. The waste falls through the file instead of clogging it. (\$10 to \$13)

Sharpening stones—You can't do good work with dull tools. Along with a bench grinder you'll need sharpening stones—natural or artificial, for use with either oil or water. I am a recent convert to the Japanese water stones. They cut fast, use no oil and are easy to dress flat when necessary. I'd recommend a basic set of three stones: 800 grit, 1,200 grit and 6,000 grit. (\$60 to \$80 for all three)

Doweling jig—Although many woodworkers now use biscuits to align and reinforce joints, I still like dowels because there are no power tools required. The "Dowl-it" jig is the quickest, most accurate one on the market. Add a wooden handle (see "Tech Tips," AW #29) and scribe the index lines through white paint for easy reading. (\$40)

Dowel centers—You need at least six each of the $\frac{1}{4}$ -in., $\frac{3}{8}$ -in. and $\frac{1}{2}$ -in. sizes. (\$11 to \$13)

Expanding Your Tool Collection

The direction in which you expand this basic tool kit depends on the kind of work that interests you. Here are some of the first additions I'd make:

Clamps—You can never have enough. A boatbuilder, for example, would immediately triple the number of clamps. The type I'd suggest buying next would be the heavier-duty quick clamps in various lengths, from 12 in. to 30 in. Several types of specialty clamps are also available, but I wouldn't add these until you have a project that calls for them.

Bench planes—Shorter ones, including scrub planes (8 in. long) and smoothing planes (10 in. to 12 in.), may be used for rough dressing of lumber. These have declined in popularity since the advent of portable thickness planers. Jointer planes (22 in. to 24 in.) are the longest hand planes. They are most useful for straightening edges of long stock and workpieces that are too heavy to be maneuvered onto a jointer.

Keyhole saw—I like the Japanese version, with teeth pointing toward the handle. Cutting on the push stroke inevitably cripples such a narrow blade. (\$10 to \$14)

And so on—I'd soon want to add more rasps, files and chisels, including a set of carving chisels. Then I'd buy some more Zeta saw blades—a 300mm crosscut and a 300mm rip blade come to mind—and a couple of extra handles so I didn't have to switch blades.

After that I'd enlarge the drill department with a set of brad-pointed bits, some of the larger sizes of Forstners and a set of Fuller or tapered bits. Then... well, by this time you are an experienced woodworker and know your own needs best. ▲

Don't Forget the Workbench

Your first project—if you don't already possess one—should be to make your own workbench. It must have a flat working surface of sufficient size and at a height you find comfortable. If space allows, I wouldn't make it less than 6 ft. long, 2 ft. wide and 34 in. to 38 in. high. The top should also be sturdy and heavy enough to take whatever pounding you give it without shaking or vibration. Fir 2x4s glued up on edge make an excellent benchtop. Add a vise, mount it on a trestle-type base and you're in business. For more on workbenches, I suggest reading *The Workbench Book* by Scott Landis (1987, Taunton Press, 52 Church Hill Rd., Newtown, CT 06470).

I recommend that you purchase quality vises with quick-release mechanisms and sliding dogs, but they're costly. You may not be able to afford both the tail vise and the face vise you'll eventually need. If this is the case, I suggest getting a small Record vise (8-in. capacity; \$85 to \$90) and using it initially as a face vise. You can then replace it with a larger vise, such as a Record Model 52½ or 53, and move the smaller one around the corner of your bench to serve as a tail vise.

—S.W.

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GUIDE

Tablesaws

The Most Important Machine in the Shop



No other machine can do so many jobs as well or as accurately as the tablesaw.

A tablesaw is the most important machine in the shop. It can rip, crosscut, rabbet, dado, miter, groove, mold and bevel, as well as cut tenons, lap joints, box joints—even dovetails. No other stationary tool can do so many jobs as well, or as accurately. A tablesaw sets the benchmark for accuracy in most shops.

But all tablesaws are not created equal. Low-priced benchtop models aren't in the same league as cabinetmakers' saws costing 10 times as much. Your objective when shopping for a tablesaw is to pick a saw that's appropriate for your woodworking needs—present *and* future. And while most of us have a budget to contend with, a tablesaw is no place to skimp on quality if you expect to do serious woodworking. You'll never outgrow a top-quality tablesaw (and you'll smile whenever you use it) but a clunker can make your life hell.

Match the Saw to Your Work

You have three basic types of tablesaws to choose from: portable "benchtop" models for light-duty work, mid-priced "contractors'" saws for more serious woodworking needs, and enclosed-base "cabinetmakers'" saws for the utmost in power and accuracy.

Combination machines are another way to go. Models such as Kity, Felder, Robland, Shopsmith and Total Shop incorporate table-

saws into their multifunction designs. The Felder, Kity and Robland machines have excellent tilting-arbor tablesaws. The small, tilting-table saws on the lathe-based combo machines can be awkward to use. (See AW #29 for a review of combination machines.)

Benchtop Saws

If your woodworking is limited to making small projects from small boards, or if you need a portable saw for ripping boards on the jobsite, a benchtop saw may be just the ticket.

On the plus side, these saws are inexpensive, and they're light enough to be carried by one person. Their small size and portability make them well-suited for woodworkers who have to deal with cramped workshop spaces. If you need to put away one power tool to use another, you need a benchtop tablesaw.

On the minus side, most benchtop saws are too small, lightweight and underpowered for cutting large or thick stock. Their universal motors bog down when cutting thick hardwoods. Because the motor driveshaft is also the blade arbor, motor burnout is more of a problem with benchtop saws. And when it comes to accuracy, few benchtop saws are built with the serious woodworker in mind. Many benchtop models sport flimsy rip fences and plastic miter gauges that just aren't durable or accurate



Small size and low price. Light enough to move around the shop, the benchtop saw is also the least expensive model in the tablesaw family. Vibration, noise, power and cutting depth are all limitations in a typical benchtop saw.

enough for precise cutting. Notable exceptions are the Ryobi BT3000, a larger benchtop saw with a belt-driven arbor and a built-in sliding table, and the Makita 2711, which also has a sliding table.

If a benchtop tablesaw suits your needs, you'll find that a 10-in. model (one that takes a 10-in.-dia. blade) will give you a greater depth of cut than an 8-in. or 8¼-in. model. Power and vibration are concerns with most benchtop models, so make sure you have a solid, stable stand for your saw. And consider using a good-quality thin-kerf blade, which will put less strain on the motor.

But if you make lots of furniture, kitchen cabinets and the like, or if you plan to work with sheets of plywood, particleboard or laminates, you'll find that small benchtop saws just aren't up to the job. You're better off with a full-sized tablesaw—either a contractor's model or a cabinetmaker's tablesaw.

Contractors' Saws

If benchtop saws are the "subcompacts" of the tablesaw family, contractors' saws are the mid-sized sedans. Full-sized tablesaws on a detachable base, these machines were designed as semi-portable jobsite saws for the building trades.

Contractors' saws have cast-iron or cast-aluminum tops, bolt-on table extensions (sheet steel or castings)

and belt-driven induction motors that hang out the back. (Some lower-priced models have direct-drive motors.)

Contractors' saws offer a compromise between price and performance. A better-quality model will feature a well-machined table, a solid rip fence and rail assembly and a durable, accurate miter gauge. This type of saw can meet most shops' demands for accuracy and versatility, for around \$900 or less.

On the minus side, the open base and back of a contractor's saw make dust collection a challenge, and the medium-sized motor and single-belt drive won't zip through thick maple as fast as you'd like.

Still, a high-quality contractor's saw can handle all but the heaviest ripping with ease. Accessories such as an aftermarket fence and extension rails enable you to get maximum performance from your machine. (See box, page 30.) If you're shopping for a contractor's saw, your best bet is one with a cast-iron table and a motor rated at 1½ HP or higher.



Belt drive and cast iron. The motor on a contractor's saw is usually suspended from the single belt which drives the arbor. These saws offer greater durability and capacity than most benchtop models.

Cabinetmakers' Saws

As the name implies, cabinetmakers' saws are designed to meet the needs of the professional cabinet shop. A cabinetmaker's saw has a cast-iron table on an enclosed base. A 2-, 3- or 5-HP motor (usually 220-volt) drives the blade with multiple V-belts to minimize slipping. Fences, rails, miter gauges, handwheels and switches are all heavy-duty, for the accuracy and durability required in a professional shop. The most popular size takes a 10-in.-dia. blade, but 12-in. and 14-in. models are also available.

A cabinetmaker's saw is the way to go if you want the utmost in accuracy, power and long-term durability. These saws are designed for production-shop use and will stand up to years of hard work.

Kicking the Tires

How can you spot a quality tablesaw? Here are some features to look for:

Table—Cast iron is first choice for tablesaw tables, cast aluminum second. No matter what it's made from,



The professional's choice. With a powerful motor, a multiple-belt drive and an enclosed base, the cabinetmaker's table saw represents the top of the line in table saws. The Powermatic saw shown here has an optional sliding table and an aftermarket rip fence, two accessories that increase capacity and enhance accuracy.

the table must be dead flat. Lay a straightedge across the table from corner to corner, from front to back and from side to side. You shouldn't see more than a crack of light between the table and the straightedge.

The table must also be large enough to safely support the stock being cut.

Solid rip fence and rails—The rip fence is the Achilles' heel of most table saws. It must move smoothly and easily across the table and lock parallel to the blade, without any coaxing. If the fence gets out of alignment, you should be able to adjust it easily. A fence that locks at both the front and rear of the table is more rigid than one that locks at one end only. Holes for attaching an auxiliary wooden fence will come in handy.

The rip fence is only as good as the guide rails on which it rides. The rails on professional-quality saws are usually heavy-gauge steel tubes or angles, rigid and strong—the more substantial the better.

Fit and finish—The blade-tilting mechanism should be solid, without any slope in the gears. Look for castings or forgings instead of stamped steel. The blade should stay put where you set it without any play and have a lock to hold the blade setting. Look for a degree scale that's easy to read, and look for adjustable angle

stops at 45° and 90°. You don't want to have to check the blade with a square every time you change the angle. The arbor itself should be long enough to hold a dado head.

The miter gauge must have an accurate scale and should have holes for screwing on an auxiliary wooden fence. The miter gauge should slide freely in the table slot without side-to-side play. Stops at 90° and 45° on the miter-gauge head are really handy.

The controls on table saws (handwheels, knobs, locking devices) vary considerably in quality and ease of use. Steer clear of flimsy plastic doodads that can break.

Motor—Don't be misled by impressive power ratings on some

home-shop table saws. These figures often refer to "peak" HP. A more useful measurement is a motor's "rated" or "continuous" HP. Pick the most powerful motor you can find in your price range, preferably one with built-in overload protection.

Safety features—The most important feature on any table saw is the "off" switch. If you get into trouble, you want to be able to hit that switch without looking and without having to grope around under the table. If you have small children, a lockable power switch is a must.

All table saws come with a safety guard that fits over the blade. Most standard guards combine kerf splitters, which keep the saw cut from pinching the blade, and anti-kickback pawls, which keep boards from shooting back at the operator. You want a guard that will swing up and stay there during blade-changing. Because the guard must come off for some table saw operations such as tenoning, finger jointing, dadoing, and grooving, look for one that's easy to remove and reinstall. Aftermarket blade guards are a big improvement over most standard guards.

Parts and service—Before you invest in one of these machines, make sure you consider what accessories, replacement parts, and service contracts are available. Reputable name-brand manufacturers back up their products with a full line of replacement parts, accessories and service. ▲

OPTIONS WORTH HAVING

- **Dado cutter.** Multiple-blade, carbide-tipped dado sets are the best—and also the most expensive. Along with the cutter, you'll need a dado throat plate or insert that fits your saw.
- **Aftermarket rip fence.** It's a good idea to buy the fence along with one or more table extensions.
- **Outfeed tables.** If you don't have room for permanent outfeed tables, consider buying (or making) some portable outfeed rollers.
- **Feather boards.** These safety devices are inexpensive; they're also easy to make.
- **Tenoning jig.** Like the dado cutter, a tenoning jig will expand your saw's joint-making capability.
- **Dust collection.** Connecting your saw to a centralized dust collector will save cleanup time and also improve workshop air quality.

Tablesaws



Makita 2711

BENCHTOP



Jet JWTS-10JF

CONTRACTOR-TYPE



Grizzly G1022

CABINET-TYPE



Enlon EN3202

Brand & Model	List Price	Blade Diameter (in.)	Maximum Cutting Depth (in.)	Maximum Rip Cpy. (in.)	Table W x D (in.)	Material	HP	Volts	Amps	Dust Collection Port	Weight (lbs.)	Comments
Craftsman 22168	\$140	8	1 ³ / ₄	12 ³ / ₄	30 x 17	AL	1 ¹ / ₂	115	7.8	N	41	Accepts dado heads.
Delta Sidekick 36-275	326	8 ¹ / ₄	2 ¹ / ₄	12	26 x 20	AL	NA	115	13	N	49	T-slot miter gauge groove.
Makita 2708W	585	8 ¹ / ₄	2 ¹ / ₂	11 ⁷ / ₈	26 x 14 ³ / ₄	AL	2	115	12	Y	38	Removable switch key.
Black & Decker 9442	314	10	3	11 ¹ / ₂	28 x 16	AL	2 ¹ / ₂	115	13	Y	37	3/16-in. dado capacity.
Craftsman 22174	180	10	2 ¹ / ₂	12	26 x 18	AL	1 ¹ / ₂	115	13	Y	53	Accepts dado heads.
Delta 36-540	220	10	3	9 ⁷ / ₈	26 x 16	AL	NA	115	13	N	40	Removable switch for safety.
Makita 2711	1,067	10	3 ⁹ / ₁₆	24 ¹ / ₄	28 ¹ / ₈ x 18 ¹ / ₂	AL	2	115	12	Y	72	Has sliding crosscut table.
Reliant D015	130	10	3	12	26 x 17	AL	2	115	13	N	41	Removable switch key.
Ryobi BT3000	600	10	3 ⁹ / ₁₆	30	41 x 27	AL	2 ³ / ₄	115	15	Y	75	Has sliding miter table.
Skil 3400	281	10	3	12	26 ⁵ / ₈ x 17 ⁵ / ₈	AL	2 ¹ / ₂	115	13	Y	36	ABS plastic base.
Craftsman 22690	330	10	2 ¹ / ₂	24	40 x 27	CI	1	115	11.5	N	150	Cast-iron table extensions.
Craftsman 29819	300	10	2 ¹ / ₂	24	40 x 27	AL	1	115	11.5	N	135	Steel table extensions.
AMT 4572	445	10	3 ¹ / ₈	24	40 ³ / ₈ x 27	CI	1 ¹ / ₂	115/230	18/9	N	225	Cast-iron table extensions.
Belsaw MC-10CS	659	10	3 ¹ / ₈	25	39 ¹ / ₂ x 27	CI	1 ¹ / ₂	115/230	20/10	N	242	Cast-iron table extensions.
Bridgewood TSC-10B	629	10	3 ¹ / ₄	40	40 x 27	CI	1 ¹ / ₂	115/230	16	N	287	Vega or Biesemeyer fence.
Craftsman 29876	400	10	3 ³ / ₈	24	44 x 27	CI	1 ¹ / ₂	115	13	N	220	Cast-iron table extensions.
Craftsman 29886	500	10	3 ³ / ₈	24	44 x 27	CI	1 ¹ / ₂	115/230	13/6.5	N	248	Micro-adj. rip fence.
Craftsman 29883	750	10	3 ³ / ₈	28	44 x 27	CI	1 ¹ / ₂	115/230	13/6.5	Y	276	Includes Biesemeyer fence.
Delta 34-444	770	10	3 ¹ / ₈	25	40 x 27	CI	1 ¹ / ₂	115/230	20/10	N	251	Steel extension wings.
Delta 34-670	462	10	3 ¹ / ₈	24	38 ³ / ₈ x 22 ¹ / ₄	CI	NA	115	15	N	153	T-slot miter gauge groove.
Enlon EN3201	375	10	3	25	41 x 27	CI	1 ¹ / ₂	115/230	16/8	Y	310	Dado insert standard.
Grizzly G1059	295	10	3	25	30 x 23	CI	1 ¹ / ₂	115/230	16/8	N	175	Aluminum table extensions.
Grizzly G1022	375	10	3 ¹ / ₈	25	40 ⁵ / ₈ x 27 ¹ / ₈	CI	NA	115/230	16/8	N	230	Cast-iron table extensions.
Jet JWTS-10JF	739	10	3 ¹ / ₈	30	40 x 27	CI	1 ¹ / ₂	115/230	18	Y	260	T-slot miter gauge groove.
Lobo TS-0010	399	10	3 ¹ / ₈	30	40 x 27	CI	1 ¹ / ₂	115	NA	N	245	
Powermatic 63	900	10	3 ¹ / ₈	26	40 x 27	CI	1 ¹ / ₂	115/230	18/9	Y	310	Vega fence standard.
Sunhill MS-10L	454	10	3 ¹ / ₈	30	40 x 27	CI	1 ¹ / ₂	115/230	20/10	Y	280	Cast-iron table extensions.
Transpower MS250	345	10	3 ¹ / ₄	30	40 x 27	CI	2	115/230	24/12	N	255	Micro-adj. rip fence.
Belsaw MC-12CS	793	12	4 ¹ / ₈	25	39 ¹ / ₂ x 27	CI	2	115/230	24/12	N	235	Cast-iron table extensions.
Hitachi C12Y	3,922	12	4 ¹ / ₈	25	36 x 27	CI	3	115/230	15/7.5	Y	330	Blade hand brake.
Delta 36-755	1,244	10	3 ¹ / ₈	25	36 x 27	CI	2	230	12	Y	288	Cast-iron trunnions.
Delta 36-820	2,099	10	3 ¹ / ₈	52	36 x 27	CI	3	230	17	Y	477	Includes Delta Unifence.
Enlon EN3202	840	10	3	26	36 x 27	CI	3	230	15	N	398	1-piece steel stand.
General 350-1	1,650	10	3 ¹ / ₈	25	36 x 28	CI	3	115/230	12/24	Y	450	Biesemeyer fence available.
Grizzly G1023	850	10	3 ¹ / ₈	26	36 ¹ / ₈ x 27	CI	3	230	18	N	420	Cast-iron table extensions.

Chart continued on next page.

See page 116 for listing of manufacturers.

KEY: Material: AL = aluminum, CI = cast iron, MG = magnesium, NA = information not available.

Tablesaws

Brand & Model	List Price	Blade Diameter (in.)	Maximum Cutting Depth (in.)	Maximum Rip Cpy. (in.)	Table W x D (in.)	Material	HP	Volts	Amps	Dust Collection Port	Weight (lbs.)	Comments
Jet JCS-10A	\$1,309	10	3 ¹ / ₈	30	40 x 27	CI	2	230	12	Y	353	Biesemeyer fence available.
Kity 619	1,495	10	3 ¹ / ₄	26	40 x 28	AL/MG	2 ¹ / ₂	230	11	Y	200	Micro-adj. rip fence.
North State MBS 250	1,150	10	3 ¹ / ₈	26 - 50	36 x 27	CI	3	230	16	Y	407	Ball-bearing rollers in fence.
Powermatic 66	2,300	10	3 ¹ / ₈	50	38 x 28	CI	3	230	17	Y	605	Blade tilts to left.
Shopsmith Sawsmith 2000	1,000	10	2 ¹ / ₂	24	40 x 27	AL	2 ¹ / ₂	115	NA	Y	190	Pulls blade through wood.
Sunhill MBS-250	1,145	10	3	49	36 x 27	CI	3	230	NA	Y	485	5-HP motor available.
Sunhill MS-10TK	834	10	3 ¹ / ₄	30	27 x 40	CI	2	230	12	Y	400	Dado insert standard.
Transpower TS200HA	790	10	4 ¹ / ₄	30	40 x 27	CI	3	230	18	Y	450	Cast-iron trunnions.
Transpower TS200HD	980	10	3	30	36 x 27	CI	3	230	18	Y	485	Fence has guide bearing.
Craftsman 22652	2,200	12	4	38	48 x 30	CI	3	230	14	Y	628	5/8-in. and 1-in. arbors supplied.
Inca 2100 SE	2,895	12	4	25	27 x 31	CI	3	230	14	Y	410	Many accessories available.
Mini-Max S300 Sliding	6,170	12	4	50	58 x 33	CI	6 ¹ / ₂	230	17	Y	1,040	Sliding table; scoring blade.
Mini-Max SC-3 Sliding	2,995	12	4	50	58 x 33	CI	3	230	10	Y	620	Sliding table; scoring blade.
Sunhill MBS-350	2,750	12	4	49	48 x 38	CI	5	230	NA	Y	1,000	7 ¹ / ₂ -HP motor available.
General 550-1	4,600	14	4 ⁷ / ₈	30	48 x 38	CI	3	115/230	12/24	Y	1,040	Biesemeyer fence available.



Powermatic 66



General 350-1

KEY: Material: AL = aluminum, CI = cast iron, MG = magnesium. NA = information not available.

See page 116 for listing of manufacturers.

The Last Time A Band Worked This Well, Ringo Played Drums.



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Jointers

By Tom Begnal

Put a Straight Face and a Smooth Edge on Your Work

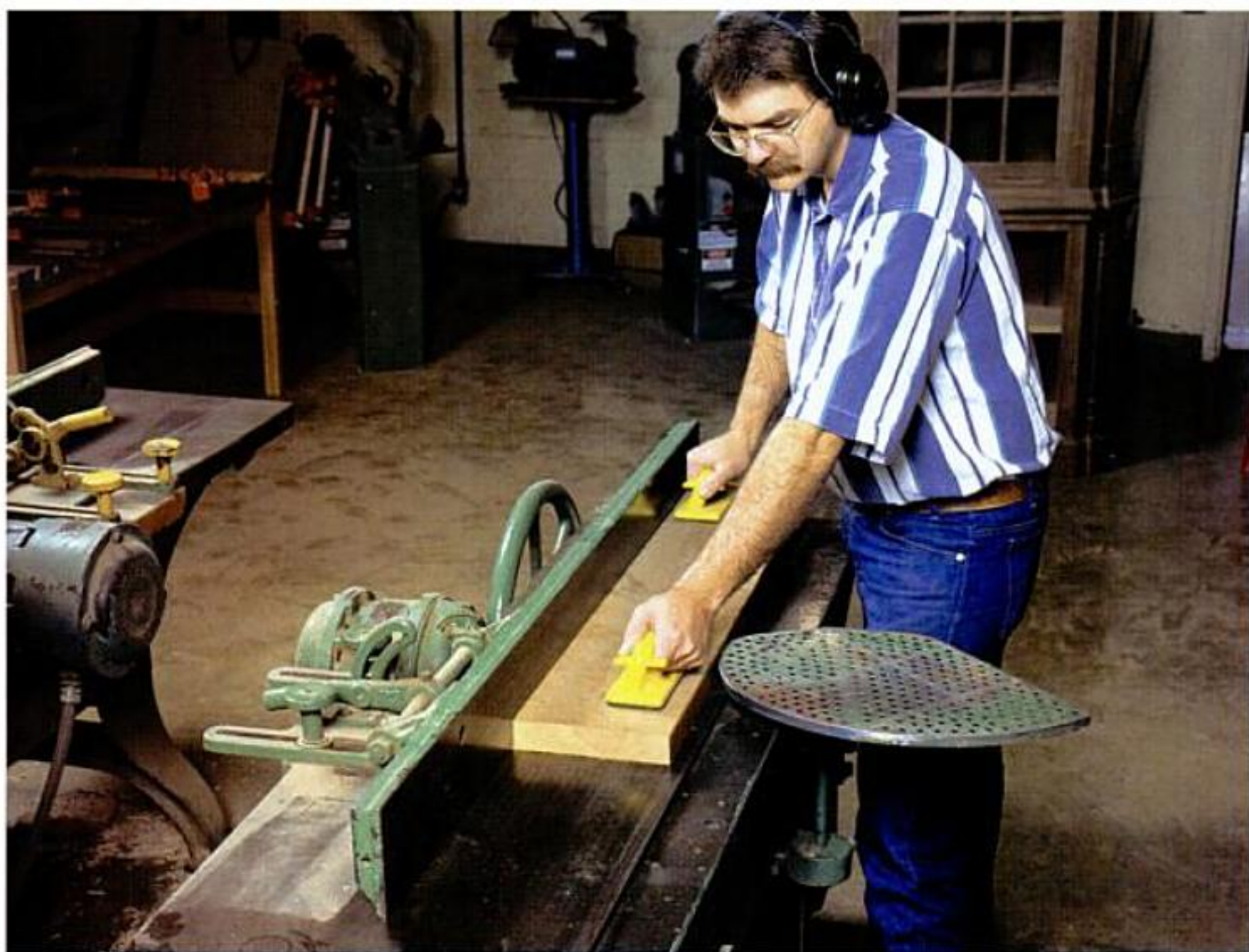


PHOTO BY JOHN HAMMILL

To produce boards with square and straight edges, flattened faces and smooth bevels, nothing beats a jointer.

The jointer's most common use is trueing up edges—planing the edges of boards straight and square. But with its fence adjusted at an angle, the jointer can plane super-smooth bevels, too. Sometimes referred to as "jointer-planers," jointers can also face-plane boards.

Using a jointer, you can transform a rough-sawn surface into a smooth one, or plane a cupped board flat on one side, thereby readying it for the thickness planer. (For more on thickness planers, see page 38.) When a board is a bit too wide or thick, the jointer can remove stock in tiny increments, yielding the final dimension or fit that you're after. The jointer will even cut tapers; and if your jointer has a rabbeting ledge, you can use it to cut both rabbets and tongues.

Anatomy, Speed, Power and Size

The heart of this machine is its cutterhead. This fast-spinning steel cylinder holds two, three or four blades—called knives—that do the cutting. The length of the knives determines the size of the jointer, the width of the infeed and outfeed "bed," and the maximum width of stock that can be planed. A 6-in. jointer will have 6-in.-long knives, and will be capable of

face-planing boards up to 6 in. wide. Jointers are made in sizes up to 24 in., but most small shops use 6-in. or 8-in. models.

There's no mystery to the way these machines work. An infeed table, its level adjusted relative to the cutterhead, guides the stock into the knives. An outfeed table—usually positioned level with the cutting radius—guides the stock after it's been cut. The jointer's fence also guides the stock along both infeed and outfeed tables. (See photo, above.)

The specifications in the chart on page 36 reveal some important differences between jointers. Note the differences in the "No. of Knives x Rpm" column. Multiplying a machine's rpm by its number of knives yields cuts per minute. Higher cuts per minute will produce smoother cuts.

A cutterhead with two knives has to turn twice as fast to match the cuts per minute of a four-knife cutterhead. This is why most two-knife cutterheads on benchtop jointers are powered by high-rpm universal motors, which tend to be noisier than the induction motors found on most stationary machines. For medium- and heavy-duty work, you'll do better with a jointer powered by an induction motor that drives a cutterhead with three or four knives.



Rabbeting on the jointer. Rabbits and tongues can be milled on jointers equipped with a rabbeting ledge.

PHOTO BY TOM BEGNAL



Portable and affordable. A benchtop jointer has a shorter bed but is less expensive and more portable than a floor model.

PHOTO COURTESY OF DELTA

Important Features

The jointer's fence and infeed and outfeed tables should be high-quality castings machined for flatness. Center-mount fences are generally more stable than fences that mount on the end of the infeed table. But infeed-mounted fences usually have angle settings that are well-marked and easy to read. Better fences of either type should have positive stops at 45° and 90°.

Check to see if the model you're interested in has a rabbeting ledge. This extension of the infeed table makes it possible to mill rabbets and tongues on the jointer. (See left photo, above.) Depending upon the manufacturer or model, the jointer's outfeed table may be either fixed or adjustable. An adjustable outfeed table is definitely preferable, mainly because it's easy to position level with the cutting radius when the knives are changed. If your jointer's outfeed table is the fixed type, you'll have to set the knives just right in the cutterhead. This can be difficult to do, especially if you don't have a knife-setting jig. (See box, right.)

The guard is an important safety feature on any jointer. This spring-activated plate covers the cutterhead before, during and after jointing and planing operations. It should operate smoothly and easily.

When buying a jointer, find out whether or not a base comes with the machine. This is the case with most floor models, but there are excep-

tions. For convenience and safety, a planer needs a solid, stable base with a dust chute and dust collection port. Building your own base will require extra time and money.

If you work on large-scale projects involving long stock, you'll want at least a 6-in. or 8-in. machine. For extra-long stock, look for a model with long bed length. (See the "Bed Length" column on the chart.) As you might expect, you'll pay more for longer beds and for a wider planing capacity. The type of woodworking you do, the space available in your workshop, and your budget will all figure into the equation when choosing a jointer.

The Benchtop Option

Jointers used to come in only one variety: heavy, cast-iron machines that were meant to stay put once they were assigned a position in the workshop. Today's crop of benchtop jointers brings jointing and planing capability to woodworkers with small shops and limited budgets. (See right photo, above.)

Several portable and affordable benchtop machines are now available, including the AMT 4800, Delta's 37-070, Ryobi's JP155, and the Craftsman models 23632 and 23624.

The Delta and Ryobi machines represent the high end in the benchtop category. Both are well-designed and built to close tolerances. They also have variable speed (VS) control, a feature not found on other jointers.

VS control makes these machines capable of super-smooth cuts in wood and plastic.

Benchtop jointers have one major limitation: Their abbreviated infeed and outfeed tables make it difficult to joint and plane long boards. You can compensate for this shortcoming to some degree by using extension rollers, or by using table extensions that bolt to infeed and outfeed tables (available as accessories on some models). But for small and medium-scale projects, a benchtop machine will give excellent results. ▲

OPTIONS WORTH HAVING

- **Push blocks.** Aftermarket blocks are available, or you can make your own. Either way, push blocks add a significant margin of safety for jointing and planing operations.
- **Knife-setting jig.** If your jointer doesn't come with its own jig for changing knives, this magnet-based alignment tool will make it much easier to reinstall knives after they've been sharpened.
- **Extension rollers or supports.** If you don't have a long-bed jointer, adjustable rollers or supports will help when jointing or planing long stock.
- **Extra knives.** With an extra set of knives, your down time is minimized when knives get dull or nicked.

Jointers

For jointer-planers, see next page.



Craftsman 23632



Enlon EN3104



Delta 37-190



Powermatic 50

Brand & Model	List Price	Max. Cutting Width (in.)	Bed Length (in.)	No. of Knives x Rpm	HP	Volts	Dust Coll. Port	Weight (lbs.)	Comments
Craftsman 23624	\$159	4 $\frac{1}{8}$	22 $\frac{5}{8}$	2 x 9,000	$\frac{5}{8}$	115	Y	35	Push blocks included.
AMT 4800	199	5 $\frac{1}{8}$	25 $\frac{1}{8}$	2 x 9,000	$\frac{7}{8}$	115	Y	45	Push blocks included.
Craftsman 23632	199	5 $\frac{1}{8}$	26 $\frac{3}{4}$	2 x 9,000	$\frac{7}{8}$	115	Y	44	Push blocks included.
Delta 37-070	337	6 $\frac{1}{8}$	30	2 x 6,000 - 11,000	NA	115	N	35	Variable speed.
Ryobi JP155	350	6 $\frac{1}{8}$	28	2 x 8,000 - 16,000	NA	115	Y	27	Variable speed.
AMT 4124	379	6	46	3 x 5,000	1	115	N	220	Push blocks included.
Belsaw MC-6JT	610	6	45 $\frac{1}{2}$	3 x 4,500	$\frac{3}{4}$	115/230	Y	251	Center-mounted fence.
Bridgewood BW-6J	299	6	45 $\frac{1}{2}$	3 x 4,500	1	115/230	N	193	Handwheel adjusts table height.
Bridgewood BW-6R	399	6	45 $\frac{1}{2}$	3 x 4,500	1	115/230	Y	239	Handwheel adjusts table height.
Delta DJ-15 37-154	1,451	6	55 $\frac{1}{2}$	3 x 5,500	$\frac{3}{4}$	115/230	Y	328	Counterbalanced table support.
Delta 37-190 Deluxe	554	6	46	3 x 4,800	$\frac{3}{4}$	115/230	Y	210	Center-mounted fence.
Enlon EN3104	380	6	47	3 x 4,850	1	115/230	Y	223	Fence has table slide protector.
General 1180-1	680	6	54	3 x 4,200	$\frac{3}{4}$	115/230	Y	210	Magnetic knife-adjusting gauge.
Grizzly G1182	375	6	47	3 x 5,000	1	115/230	N	210	Center-mounted fence.
Lobo JT-1006	299	6	42 $\frac{1}{2}$	3 x 4,500	1	115	N	194	Handwheel adjusts table height.
Powermatic 50	1,517	6	56	3 x 7,000	$\frac{3}{4}$	115/230	Y	434	Fence can be skewed for shear cuts.
Powermatic 53	660	6	45 $\frac{1}{2}$	3 x 4,500	$\frac{3}{4}$	115/230	Y	198	Cutterhead design reduces kickback.
Reliant DD39C	370	6	45 $\frac{1}{2}$	3 x 4,500	1	115/230	Y	214	Includes knife-setting gauge.
Sunhill CT-60L	389	6	52	3 x 4,500	1	115	Y	220	Center-mounted fence.
Transpower JT650	250	6	42	3 x 4,500	1	115	Y	198	End-mounted fence.
Transpower JT680	325	6	46	3 x 4,500	1	115	Y	225	Center-mounted fence.
Woodtek 801589	395	6	42 $\frac{1}{2}$	3 x 6,000	1	115/230	Y	191	Front and rear guards.
Jet JJ-6CS	613	6 $\frac{1}{16}$	46	3 x 4,800	$\frac{3}{4}$	115/230	Y	258	Center-mounted fence.
Craftsman 23221	400	6 $\frac{1}{8}$	36	3 x 1,290	1	115	N	150	Single knob adjusts table height.
Bridgewood BW-8J	950	8	66	4 x 4,500	1 $\frac{1}{2}$	115/230	Y	420	Handwheel adjusts table height.
Craftsman 20651	1,580	8	66	3 x 4,500	1 $\frac{1}{2}$	230	Y	476	Rollers extend table to 88 in. long.
Delta DJ-20 37-350	1,336	8	76 $\frac{1}{2}$	3 x 5,500	1 $\frac{1}{2}$	115/230	N	335	Stand and motor cost extra.
Enlon EN3105	660	8	65	3 x 5,000	1 $\frac{1}{2}$	115/230	Y	450	Fence has table slide protector.
Grizzly G1018	650	8	65	3 x 5,000	1 $\frac{1}{2}$	230	N	445	Center-mounted fence.
Jet JJ-8CS	1,399	8	66	3 x 4,500	2	230	Y	398	Center-mounted fence.
Lobo JT-1008	659	8	66	3 x 4,500	2	115/230	Y	410	Double V-belt drive.
North State CT 200	795	8	68	3 x 4,500	2	230	Y	512	Includes knife-setting gauge.
Powermatic 64	1,985	8	72	3 x 7,000	1 $\frac{1}{2}$	115/230	Y	547	Skew fence for shear cuts.
Seco SK-0008JT	920	8	66	3 x 4,500	2	230/460	Y	400	Double V-belt drive.
Sunhill CT-204L	859	8	72	4 x 4,500	2	230	Y	500	Handwheel adjusts table height.
Transpower JT860	615	8	65	3 x 4,500	2	115/230	Y	475	Handwheel adjusts table height.
Transpower JT980	725	8	67	4 x 4,500	3	230	Y	485	Handwheel adjusts table height.
Reliant DD40	695	8 $\frac{1}{8}$	66	3 x 4,500	2	230	Y	400	Center-mounted fence.

BENCHTOP

FLOOR-MODEL

See page 116 for listing of manufacturers.

KEY: NA = information not available.

Jointer-Planers

For jointers, see previous page.
For planers, see page 40.

	Brand & Model	List Price	Maximum Stock H x W (in.)	Jointer Max. Cutting Width (in.)	Jointer Bed Length (in.)	No. of Knives x Rpm	HP	Volts	Dust Collection Port	Weight (lbs.)	Comments
BENCHTOP	Kity Woodster III	\$795	4 x 6	6	28	2 x 6,000	1½	115	Y	75	Hard anodized Al/Mg tables.
	Makita 2030SC	NA	6½ ¹⁶ x 12¼	6½	49	2 x 9,000	NA	115	OPT	106	Jointer removable.
	Hitachi P12RA	2,018	6½ ⁸ x 12½ ³²	6½	28½ ³²	2 x 10,400	2	115	OPT	99	Jointer removable.
FLOOR-MODEL	Inca 570	2,295	6¾ x 10¼	10¼	42	3 x 6,000	2	115/230	Y	180	Quick-change knives; bed extension kit.
	Kity 637	1,495	7¾ x 10½	10¼	48	2 x 7,320	2½	230	Y	220	Hard anodized Al/Mg tables.
	Mini-Max FS30	2,880	8 x 11¼ ⁴⁸	11¼	58½	3 x 5,000	3	230	N	528	Quick-change from planer to jointer.
	Hitachi F-1000A	4,600	6¾ ³² x 12½ ³²	6¾ ³²	63½	2 x 10,400	2¾ ¹⁰	115	Y	320	Collapsible jointer bed extensions.
	Makita 2030N	2,861	7¾ x 12½	6½	59	2 x 7,000	2	115	OPT	330	Electric brake.
	Mini-Max FS350	3,990	9¾ x 13¾	13¾	71	3 x 4,500	3	230	N	700	Quick-change from planer to jointer.



Hitachi P12RA



Makita 2030N

KEY: NA = information not available. OPT = optional.

See page 116 for listing of manufacturers.

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CIRCLE NO. 75 ON PRODUCT INFORMATION FORM

Thickness Planers

By Tom Begnal

The First Stop for Roughsawn Stock



PHOTO BY JOHN HAMEL

The thickness planer does a smooth and precise job of dimensioning solid wood to uniform thickness.

With a thickness planer in your shop, you're never limited by standard stock thicknesses. A planer will transform a pile of random-thickness boards into smooth-surfaced stock of any thickness within the machine's capacity range. And instead of paying top dollar for surfaced lumber, you can buy roughsawn stock at lower prices and use your planer to turn out boards that are ready for woodworking.

As woodworking machines go, the thickness planer is one of the easiest to use. You simply turn a crank to adjust the cutting depth, and then feed the stock into the machine. An infeed roller engages the top surface of the board and pushes it forward into the cutterhead. Holding from two to four straight, sharp knives and spinning at high rpm, the cutterhead planes the wood surface smooth and flat. An outfeed roller pushes the board free of the machine.

Before you get too far into planer evaluation, make sure that you're not a candidate for a jointer-planer purchase. If you have neither jointer nor planer in your shop, it might make sense to buy a single machine that combines these functions. (See bottom left photo, opposite page.) Combination machines utilize one motor to power both jointing and planing operations. They take up less space than sepa-

rate machines, and sacrifice little in the way of features. (See chart, page 37.) With some models, however, it takes a few moments to switch from one operation to another.

Size and Power

A planer's size is given in inches and tells you the maximum workpiece width the machine can handle. Every planer also has a maximum stock thickness specification. (See chart.) Taken together, these two measurements tell you the maximum workpiece size (width and thickness) the machine will plane. Planer sizes range from 10-in. portable machines to industrial models 20 in. and up that weigh half a ton or more. The most popular size for small shop owners is 12½ in.

Many of the smaller planers are dubbed "portable" by their manufacturers. But this classification can seem dubious when the machine's weight starts to exceed 60 pounds. (See top right photo, opposite page.) Attracted by low prices and satisfied with power and capacity, many woodworkers buy portable planers but treat them like stationary machines, creating a permanent work station with ample infeed and outfeed space. If you only need a planer for light- or medium-duty work, a portable model offers good value, whether or not you move it around.



The heavyweight. Cast-iron construction, an induction motor, bed rollers, and a steel stand are standard features on most of these machines. Stationary planers are well-suited to production surfacing work.

PHOTO COURTESY OF POWERMATIC

Before you set your sights on a portable model, however, there are a few disadvantages to consider. Most portable planers are powered by universal motors. Universal motors are far noisier than the induction motors found on larger machines, but they supply the high rpm necessary for cutterheads equipped with only two knives. Cutterheads with three or four knives don't need to turn as fast as cutterheads with only two knives to produce the same number of cuts per minute. Lower rpm means quieter operation and longer life for a planer's moving parts.

In addition to checking out the specifications of a planer's motor, you should check out the machine's maximum cutting depth—another

important indication of a planer's power. This figure will range from $\frac{1}{8}$ in. to $\frac{5}{16}$ in.

If you're into heavy production work that involves a lot of surfacing, your best bet is a stationary planer with an induction-motor maximum-cut specification of at least $\frac{1}{4}$ in. You won't want to plane off $\frac{1}{4}$ in. very often, but the added power will come in handy when you have a lot of roughsawn stock to surface.

Details Make a Difference

If you've settled on size, capacity, power and price, you're close to finding the right machine. But there are still some other specifics to sort out.

The bed—Consider the bed material and whether or not bed rollers are included. To handle heavy stock and hard use, look for a machine that has both a cast-iron bed and bed rollers. The rollers help to keep heavy stock moving through the machine; the cast-iron bed is less likely to flex under heavy loads. If you won't be planing long, large-dimension stock, then a polished-aluminum or steel bed will serve your needs.

Infeed rollers—The type of infeed roller may also figure in your planer choice. Steel rollers are serrated or otherwise textured to grip the board and push it forward into the cutterhead. Marks in the workpiece from this type of infeed roller are usually planed off as the wood passes through the cutterhead, but marks



Portable planers. Many of these machines offer good capacity and power at an affordable price. On this Ryobi model, rollers fold down to extend bed length.

PHOTO COURTESY OF RYOBI

can remain if the pass (depth of cut) is very light.

Rubber-coated infeed rollers leave no marks on the wood, regardless of cutting depth. But they wear out sooner and don't usually grip as well as steel rollers. The greater gripping power of a steel infeed roller is valuable when planing large or heavy lumber. If you plan on planing smaller-dimension stock, rubber rollers may be adequate. ▲

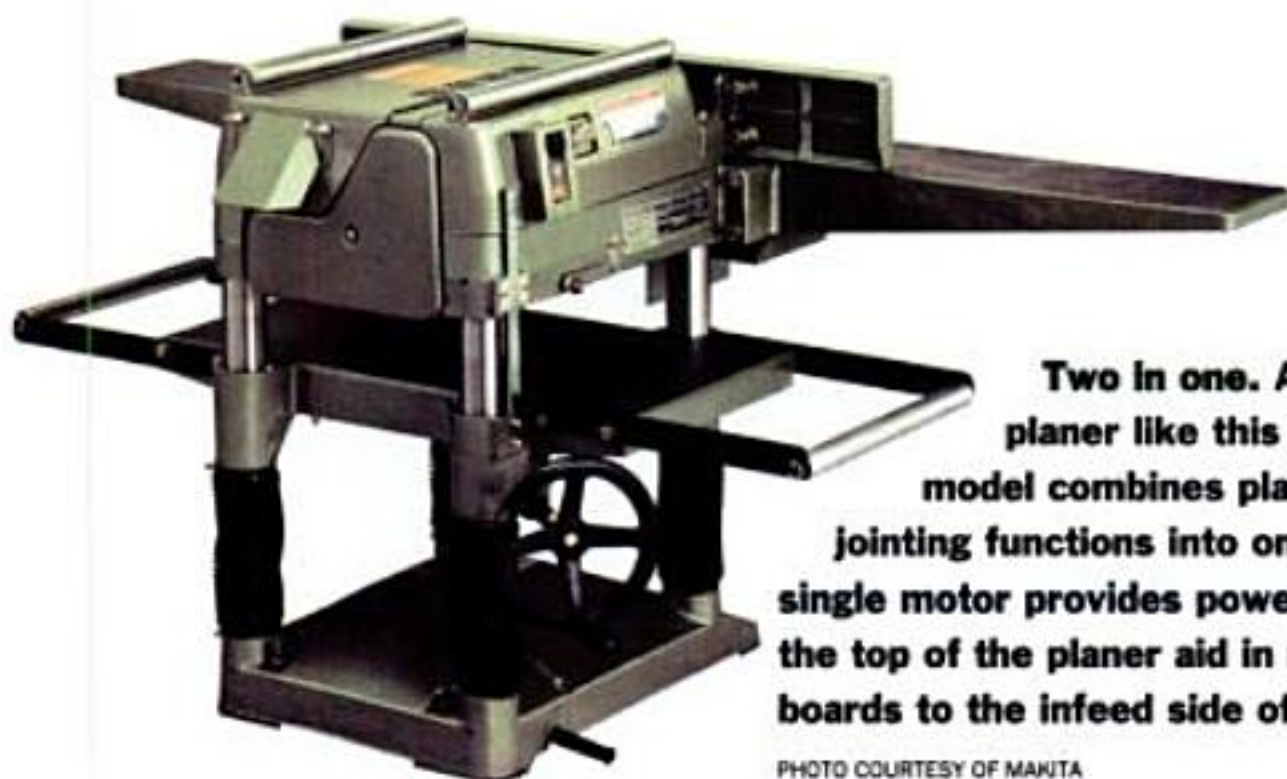
OPTIONS WORTH HAVING

■ **Extra set of knives.** A spare set is important in a production shop, or for anyone with an aversion to down time.

■ **Knife-setting jig.** An aftermarket jig will pay off in accuracy and time savings if your planer doesn't come with its own jig.

■ **Support stand.** Steel aftermarket stands are available, or you can make your own. Add locking casters and you'll be able to move the machine out of the way when it's not in use.

■ **Outfeed rollers.** If you're working solo, and especially if you're planing long or heavy boards, outfeed rollers will take the place of a helper on the other side of the machine.



Two in one. A jointer-planer like this Makita model combines planing and jointing functions into one unit. A single motor provides power. Rollers on the top of the planer aid in returning boards to the infeed side of the planer.

PHOTO COURTESY OF MAKITA

Thickness Planers



Delta 22-540



Bridgewood BW-12P



Grizzly G1033

Brand & Model	List Price	Max. Stock H x W (in.)	Max. Cutting Depth (in.)	No. of Knives x Rpm	HP	Volts	Dust Coll. Port	Weight (lbs.)	Comments
Williams & Hussey W7S	\$1,019	8 x 7	1/4	2 x 3,450	2	115/230	Y	85	Straight & curved molding capability; motor not incl.
Makita LP1812C Wood Surfer	2,990	6 3/32 x 7 3/32	*	*	1 3/4	115	N	95	Belt moves wood under blade.
Reliant NN910	270	5 x 10	1/8	2 x 8,000	2	115	N	58	Top carrying handle.
AMT 4651	355	6 x 12	1/8	2 x 8,000	2	115	N	65	Smooth top for easy stock return.
Bridgewood BW-12P	380	6 x 12	1/16	2 x 8,000	NA	115	OPT	64	Extension table rollers.
Delta 22-540	539	6 x 12	3/16	2 x 8,000	NA	115	N	68	4-column support for cutterhead.
Grizzly G1017	395	5 1/2 x 12	1/16	2 x 8,500	2	115	OPT	84	4-column support for cutterhead.
Makita 2012	959	6 x 12	3/32	2 x 8,000	2	115	OPT	53	Disposable double-edged blades.
Reliant NN912F	380	6 x 12	1/8	2 x 8,000	2	115	N	63	Top carrying handle.
Lobo WP-0012	369	6 x 12 1/8	1/8	2 x 1,600	2	115	OPT	63	Top carrying handle.
Hitachi P12R	1,529	6 5/8 x 12 9/32	3/32	2 x 1,040	2	115	N	83	4-column cutterhead support.
Ryobi AP12	450	6 x 12 5/16	1/8	2 x 8,000	NA	115	OPT	63	Double-edged knives.
Craftsman 23373	459	6 x 12 1/2	3/32	2 x 8,000	2	115	OPT	73	Top rollers for easy stock return.
Craftsman 23383	700	5 x 12 1/2	3/32	3 x 4,500	2 1/2	115	OPT	123	Molding capability.
Jet JWP-12	606	6 x 12 1/2	3/32	2 x 8,000	2	115	OPT	61	Extension table rollers.
Penn State Super 125	349	6 x 12 1/2	3/32	2 x 8,000	2	115	N	68	Extension table rollers.
Sunhill CT-318	359	6 x 12 1/2	1/8	2 x 8,000	NA	115	OPT	70	Knife-setting gauge incl.
Transpower AP150	345	6 x 12 1/2	1/8	2 x 8,000	2	115	OPT	75	Extension table rollers.
Powermatic 100	3,213	5 x 12	1/4	3 x 5,300	3	230	N	612	Pressure bar eliminates snipe.
RBI 812	899	8 x 12	3/16	3 x 5,500	3	230	Y	250	Molding, drum sanding capabilities.
Robland XSD 31	2,575	9 x 12	1/4	3 x 6,000	3	230	Y	650	Variable speed control available.
Shopsmith Professional Planer	1,100	4 x 12	1/8	3 x 5,750	1 3/4	115	Y	151	Separate motors for feed & cutterhead.
Woodmaster 712	1,299	7 x 12 5/16	3/16	3 x 4,200	5	230	N	300	Molding, drum sanding capability.
Belsaw VP-1	1,799	6 x 12 1/2	3/16	3 x 4,500	5	230	N	350	Molding, drum sanding capability.
Delta DC-33 22-661	1,513	6 x 13	3/32	3 x 6,100	2	230	N	320	Oil-bath gear box drive system.
General 130-1	3,900	6 x 14	1/8	3 x 4,500	3	115/230	N	610	Adjustable infeed & outfeed rollers.
AMT 4490	890	6 x 15	1/8	3 x 4,800	2	230	Y	446	Lever adjusts feed rate.
Bridgewood BW-15P	895	6 x 15	1/8	3 x 4,500	3	230	Y	446	Top rollers for easy stock return.
Craftsman 23374	1,300	6 x 15	1/4	3 x 5,000	2	230	Y	319	Top rollers for easy stock return.
Enlon EN-PN15	860	6 x 15	1/8	3 x 4,500	3	115/230	Y	475	Adjustable extension table rollers.
Grizzly G1021	765	6 x 15	1/8	3 x 4,500	2	230	Y	480	Oil-bath gear box drive system.
Jet JWP-15HO	1,699	6 x 15	1/8	3 x 4,500	3	230	Y	480	Adjustable extension table rollers.
Lobo WP-0015	889	6 x 15	1/8	3 x 4,500	3	115/230	Y	480	Top rollers for easy stock return.
North State 315	859	6 1/2 x 15	3/16	3 x 5,000	3	230	Y	485	Triple V-belt drive.
Powermatic 15	1,708	6 x 15	1/8	3 x 4,500	3	230	Y	484	Top rollers for easy stock return.
Reliant DD37	895	6 x 15	1/8	3 x 4,500	3	230	Y	469	Top rollers for easy stock return.
Sunhill CT-38B	879	6 x 15	1/4	3 x 4,500	3	230	Y	506	Triple V-belt drive.
Transpower AP850	790	8 x 15	3/16	3 x 5,600	3	230	Y	500	Triple extension rollers.
Woodtek 875001	1,075	6 x 15	1/8	3 x 4,850	2	230	Y	470	Adjustable extension table and feed rollers.
Bridgewood BW-16PV	2,495	7 x 16	1/4	3 x 5,600	3	230	Y	748	Anti-kickback fingers.

Chart continued on page 42.

See page 116 for listing of manufacturers.

KEY: NA = information not available. OPT = optional. *Single stationary knife takes very thin shaving.

Thickness Planers



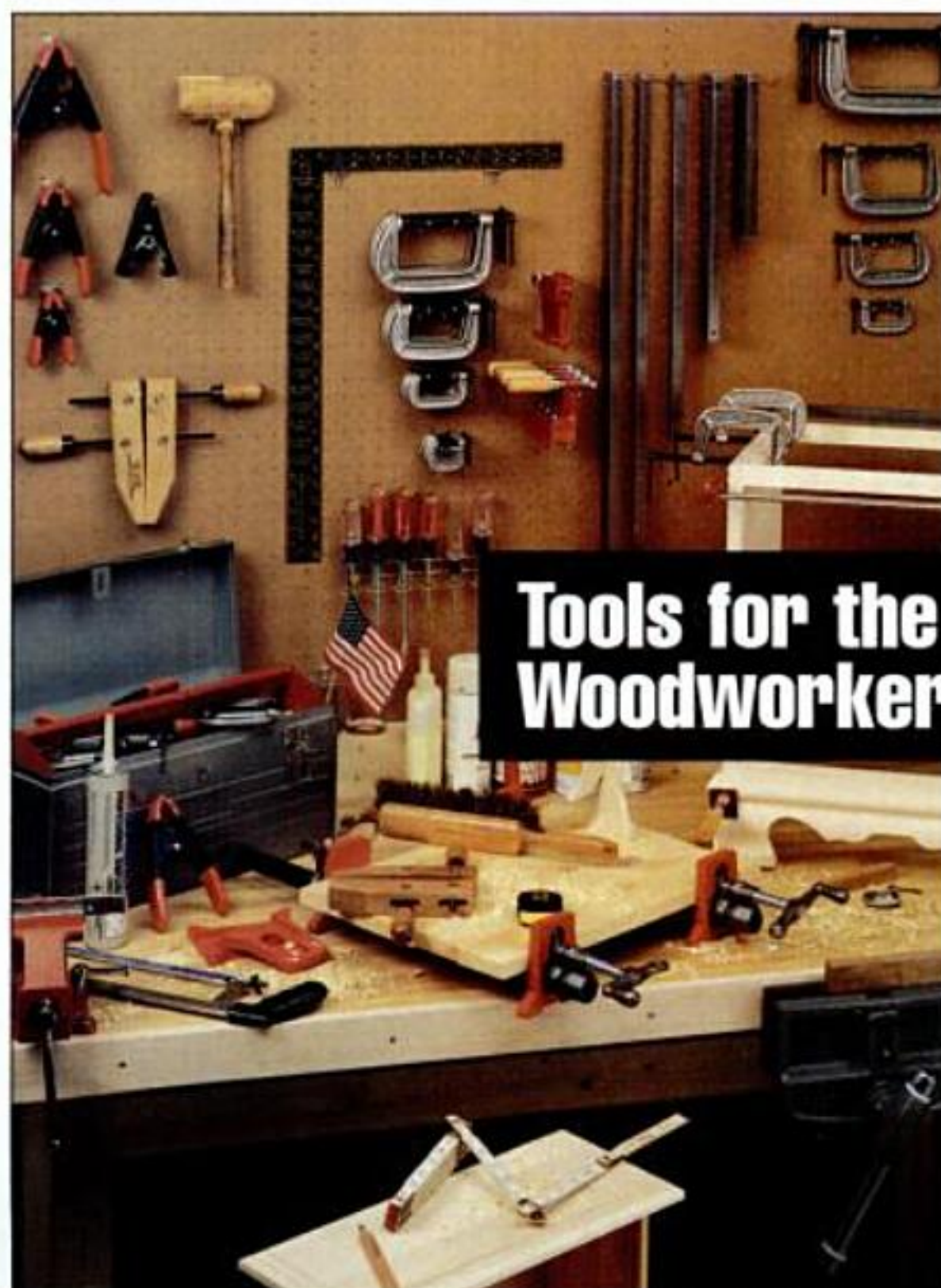
Powermatic 180

Brand & Model	List Price	Max. Stock H x W (in.)	Max. Cutting Depth (in.)	No. of Knives x Rpm	HP	Volts	Dust Coll. Port	Weight (lbs.)	Comments
RBI 816	\$1,575	8 x 16	3/16	4 x 4,700	5	230	Y	375	Molding & drum sanding capability.
Transpower AP800	740	8 x 16	3/16	3 x 5,600	3	230	Y	480	Triple extension rollers.
Powermatic 180	6,747	6 x 18	1/2	3 x 4,800	5	230/460	N	1,523	Feed pressure adjustment.
Woodmaster 718	1,695	7 x 18 1/2	3/16	3 x 4,200	5	230	N	420	Molding & drum sanding capability.
Bridgewood BW-200P	2,300	6 1/2 x 20	1/4	3 x 5,000	5	230	Y	780	Anti-kickback fingers.
Bridgewood BW-20PV	3,295	7 x 20	1/4	3 x 5,600	5	230	Y	857	Anti-kickback fingers.
Bridgewood BW-508	4,195	9 x 20	1/4	3 x 5,200	5	230	Y	1,370	Separate motors for stock feed, cutterhead.
Grizzly G1033	1,195	8 x 20	3/16	4 x 4,833	3	230	Y	700	Oil-bath gear box drive system.
Lobo WP-0020	1,395	8 x 20	1/4	4 x 5,000	3	115/230	Y	780	Top rollers for easy stock return.
Mini-Max SP1	4,995	9 3/4 x 20	5/16	4 x 4,500	9	230/460	Y	1,450	Dust covers on table lift screws.
North State CT-508	1,360	8 1/2 x 20	1/4	4 x 5,000	5	230	Y	882	Feed pressure adjustment.
RBI 820	1,775	8 x 20	5/16	4 x 4,700	5	230	Y	480	Molding & drum sanding capability.
Sunhill CM-510	3,675	9 x 20	5/16	3 x 5,000	5	230	Y	1,500	Quick-set bed rollers.
Sunhill CT-508	1,395	8 x 20	1/4	4 x 5,000	3	230	Y	925	Triple V-belt drive.
Transpower AP200	1,950	8 x 20	1/4	4 x 5,200	5	230	N	1,100	Top rollers for easy stock return.
Transpower AP200A	1,245	8 x 20	1/4	4 x 5,600	5	230	Y	882	Extension table rollers.
Woodtek 816427	2,199	7 x 20	3/16	3 x 6,000	3	230	Y	1,000	Top rollers for easy stock return.

FLOOR-MODEL

See page 116 for listing of manufacturers.

KEY: NA = information not available. OPT = optional.



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to Size**



PHOTOS BY MITCH MANDEL

When you can't take the wood to the saw, take the saw to the wood. First cuts are often done with the circular saw.

Ask a woodworker for a list of favorite portable power tools, and you probably won't find the words "circular saw" written down. Held in high esteem by framing contractors and other building tradespeople, the circular saw is a tool that many woodworkers take for granted—until there are panels to cut down, long boards to size, or 2x lumber to cut.

In a woodworking shop, the circular saw is indispensable for cutting sheet goods, boards, and other material to rough size. For solo woodworkers, this preliminary cutting makes it quite a bit safer and more convenient to handle stock on stationary machines. But the circular saw can also do precise work, especially if you have a few useful accessories. (See box, opposite page.)

Worm-Drives, "Sidewinders" and Cutting Capacity

The first circular saws, developed some 70 years ago, were worm-drive models. In this type of saw, the motor's driveshaft is at a right angle to the blade arbor. (See top photo, opposite page.) Worm-drive gears transmit the power from motor to blade. The durability and high torque of the worm-drive mechanism has earned this type of saw a bulletproof reputation among carpenters. And a worm-drive saw has its blade mounted to the left of the motor,

which makes the blade and cut line more visible when the saw is in use. But worm-drive saws are also expensive and overweight. (See chart, page 46.) This is why many people prefer helical-gear models, which are commonly called "sidewinders." On this type of circular saw, the motor is mounted sideways, parallel to the arbor.

For woodworkers and others who don't expect heavy, everyday use from a circular saw, a good-quality helical-gear model is probably the way to go. In addition to being lighter than worm-drive saws, sidewinders spin the blade faster than worm-drives do (5,000+ rpm vs. 4,000+ rpm), which means you can get a smoother cut with a sidewinder.

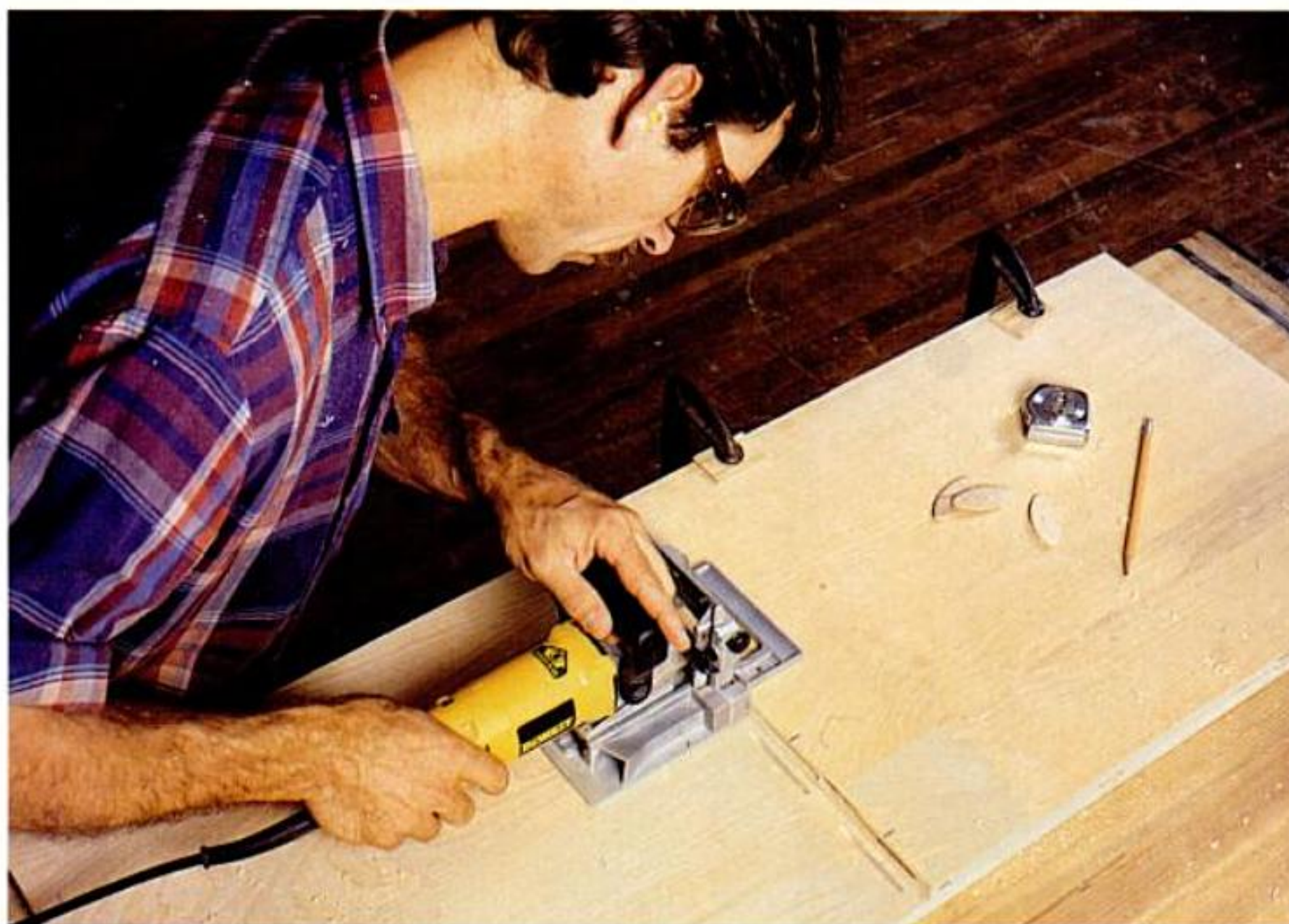
Once you've decided whether you want a worm-drive saw or a helical-gear model, your next decision shouldn't be too difficult: cutting capacity. Circular saws come in a wide range of sizes based on blade diameter. Trim saws, which typically use 4½-in.-dia. blades, are designed for cutting thin stock—especially plywood panels. Models with large blade capacities—8 in., 10 in., and above—are aimed at carpenters who regularly cut thick material. The most common size for circular saws is 7¼ in. Saws designed for this blade diameter have sufficient depth of cut for 2x lumber; they're also capable of doing plenty of general-purpose cut-

Biscuit Joiners

**Serving Up
Joints With
Speed and
Efficiency**

**SHOP
TESTED**

AMERICAN WOODWORKER
ISSUE #34 • OCTOBER 1993



**Biscuit joinery offers
a quick, efficient and
versatile way to join
solid wood, plywood,
and particleboard.**

Biscuit joiners are a hot item on the menu of tools available to today's woodworkers. Invented only three decades ago, they provide an easy way to make joints in solid wood, plywood, and particleboard. Though biscuit joinery is not as elegant as dovetailing or as sturdy as mortise-and-tenon joinery, this modern method of spline-joining is quick, efficient, and versatile. It is particularly well-suited to joining case tops, sides, and shelves of plywood and particleboard. It is also useful for aligning boards when edge-gluing and when making butt, corner, and miter joints in frame work.

Nearly all biscuit joiners on the market are portable hand-held models, but there are also a couple of stationary benchtop models available. (For an extensive shop-test of 13 models rated for quality, features, and price, see AW #34.)

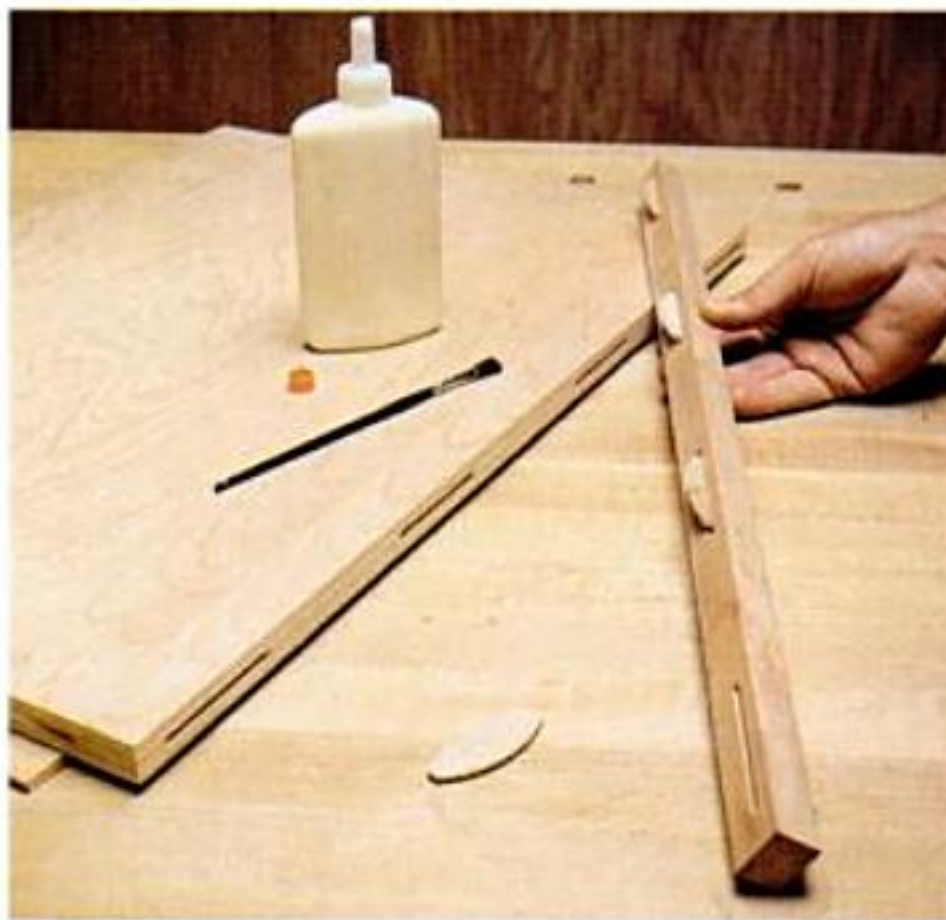
Biscuit joiners are all similar in operation: You plunge the tool's cutter into the mating workpieces to make matching semicircular slots. Next, you slip flat, football-shaped splines called biscuits into the glue-coated slots (see photo, right) and assemble the pieces. The compressed-wood biscuits swell from the glue's moisture and tighten in the joint.

The slots are slightly longer than the biscuits, so they allow for as much as $\frac{3}{32}$ in. lengthwise adjustment—a distinct advantage over doweling and other forms of non-adjustable joinery.

Fence Adjustments

The choice of a biscuit joiner should first be based on its slot-locating accuracy. This is determined by the fence, which is adjustable in two ways: height and angle.

Fence-height adjustment—vital for good joint alignment—is easiest on models that feature fences with lock levers. These include the AMT, Lamello, Ryobi and Virutex. Fence-setting



Joint alignment. Biscuits are great wherever accurate alignment is important. Use them for glue-ups of shelf edging, tabletops, and other edge-to-edge joints.



Fence-angle adjustments. Biscuit-joiner fences work in different ways to align cuts in miter joints. At left: A fixed 45° fence registers against the inside face of the work. Center and right: Adjustable fences capture the beveled edge of the miter.

mechanisms that involve loosening and retightening Allen screws while trying to hold the fence at its setting can be inaccurate and troublesome. Most machines provide a scale to help you set the fence height while keeping it parallel to the blade. DeWalt goes a step further with a rack-and-pinion height-adjustment mechanism that keeps the fence parallel as you adjust and lock it.

For setting angles, there are two types of fences: fixed and adjustable. (See photos, above.) Fixed fences come with the AMT, Freud, Japson, Porter-Cable, Skil, and both the Lamello Cobra and Standard 10. These fences have a 90° side for straight cuts and a 45° side for miters. To cut miters, you install the fence with its 45° side facing down to register against the face of the work, and then make a plunge cut into the beveled edge.

If you plan to join boards at odd angles, you will want to consider a biscuit joiner with a continuous protractor scale, which lets you set the fence to any angle over a 90° range. (See chart, page 50.)

Depth-of-Cut Adjustment

All but one of the machines we examined have preset blade-depth stops to suit the three standard biscuit sizes: #0 (16mm by 47mm), #10 (20mm by 52mm), and #20 (24mm by 58mm). Some have additional presets to accommodate special knockdown fasteners, joint clamps, and hardware.

Features Worth Having

Some special considerations include switch placement, anti-slip devices, and slip clutches. The Porter-Cable's vertical handle gives it a top-heavy feeling and makes it more likely to tilt.

We liked the big, bottom-mounted trigger switch on the DeWalt. Slide switches on the left of the machine body, like those on the AMT, Freud, Ryobi, and Skil, may be difficult for left-handers.

All the machines in our test except the Skil had some kind of anti-slip device on the fence to keep it from slipping sideways off the mark when the blade bites into the wood. Most used either two small retractable pins or two small rubber pads. Since the pins and pads are spaced a few inches apart, they're of little help when slotting the ends of narrow pieces of wood. The full-width rubber pad on the Ryobi fence worked the best, gripping even small workpieces. The slip clutch on the Lamello Top 10 is a worthwhile feature. If the blade jams, the clutch reduces wear on the motor while also providing an extra measure of safety.

Stationary Biscuit Joiners

We also tested two stationary joiners: one made by Delta and one by CFW. Unlike hand-held biscuit joiners, stationary joiners are bolted to a benchtop, so your hands are free to hold on to the workpiece. This is a considerable asset when you're dealing with small workpieces in a production sit-

uation. However, feeding large stock onto these machines can be awkward. You also can't cut slots in the middle of large panel faces as needed when joining a shelf midway down a cabinet side.

The rugged, cast-iron Delta has an adjustable-height table which tilts from 90° to 45° and comes with a miter gauge. To cut the biscuit slots, you register the workpiece against the fence and step on a foot pedal to drive the blade into the piece.

The CFW 100 is made of particle-board and aluminum. It looks like a conventional router table and, in fact, it uses a router to cut the biscuit slots. The cutter is activated by pushing the workpiece against the spring-loaded fence, which triggers a microswitch. Because of its small slots and biscuits, the machine can join cabinet face frames with rails as narrow as 1½ in.

Editors' Choices

Of the biscuit joiners we tested, two were selected by our editors for their overall superior design and construction: the Lamello Top 10 and the DeWalt DW682K. The Lamello, with its dead flat and square base and fence, was machined to high tolerances overall, and offered particularly smooth fence adjustments and plunging action. We chose the DeWalt for its comfortable handle and switch, protractor angle adjustment, rack-and-pinion fence-height adjustment, sound construction, and reasonable price. ▲

Biscuit Joiners

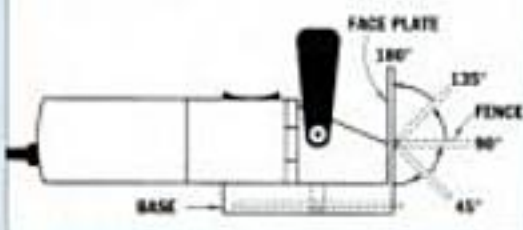


Freud JS100



Delta 32-100

FENCE-ANGLE ADJUSTMENTS



See page 116
for listing of manufacturers.

Brand & Model	List Price	Fence Angle Adjustment*	No. of Depth Stops	Anti-Slip Device	Amps	Dust Collection	Weight (lbs.)	Comments
AMT 4960	\$165	Fixed 90°, 135°	3	FP	6	DB	6.75	Fence locks with 2 levers.
Bosch B1650K	289	Adj. 0°-90°	3	RU	5.8	VP, DB	10	Steel case.
Craftsman 17501	100	Adj. 90°-135°	3	RU	6	DB	7	Plastic housing and fence.
DeWalt DW682K	429	Adj. 90°-180°; notch for 45°	4	RP	6.5	VP, DB	6.6	Rack-and-pinion fence height adjustment.
Freud JS100	333	Fixed 90°, 135°	6	RU	5	VP, DB	6.2	Anti-kickback blade.
Freud JS102	355	Fixed 90°, 135°; adj. 90°-180°	6	RU	5	VP, DB	6.3	Anti-kickback blade.
Jepson 7204	230	Fixed 90°, 135°	3	RP	6	DB	4.5	
Lamello Cobra 10	485	Fixed 90°, 135°; notch for 45°	6	RU	2.2	VP	5.5	High-rpm motor compensates for low torque.
Lamello Standard 10	569	Fixed 90°, 135°; notch for 45°	6	RU	5.9	VP	6.6	Slip clutch on blade.
Lamello Top 10	789	Fixed 90°, 135°; adj. 90°-180°	6	RU	6.5	VP	7	Slip clutch on blade.
Porter-Cable 555	320	Fixed 45°, 90°	3	FP	5	—	6	Vertical handle.
Porter-Cable 556	340	Adj. 90°-180°	3	FP	5	—	6	Vertical handle.
Ryobi JM-100K	250	Adj. 45°-180°	3	RU	5.3	DB	7.3	Wide fence angle adjustment.
Skil HD1605:02	240	Fixed 90°, 135°	3	RU	6	VP, DB	6.6	Fence adjusts with Allen wrench.
Virutex AB-11C	285	Adj. 90°-180°	3	RU	6	VP	7	Fence locks with 2 levers.
CFW 100	515	Fixed 90°	1	SS	3.8	VP	35	Designed for face frames.
Delta 32-100	340	Adj. 90°-135°	3	WC	10	VP	39.6	Foot pedal operates blade plunging mechanism.

KEY: Anti-Slip Device: FP = fixed pins, RP = retractable pins, RU = rubber, SS = stock stops, WC = work clamps. DB = dust bag, VP = vacuum port. — = not applicable. *See illustration at left.

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Cordless Drills

Everyone's
Must-Have
Power Tool

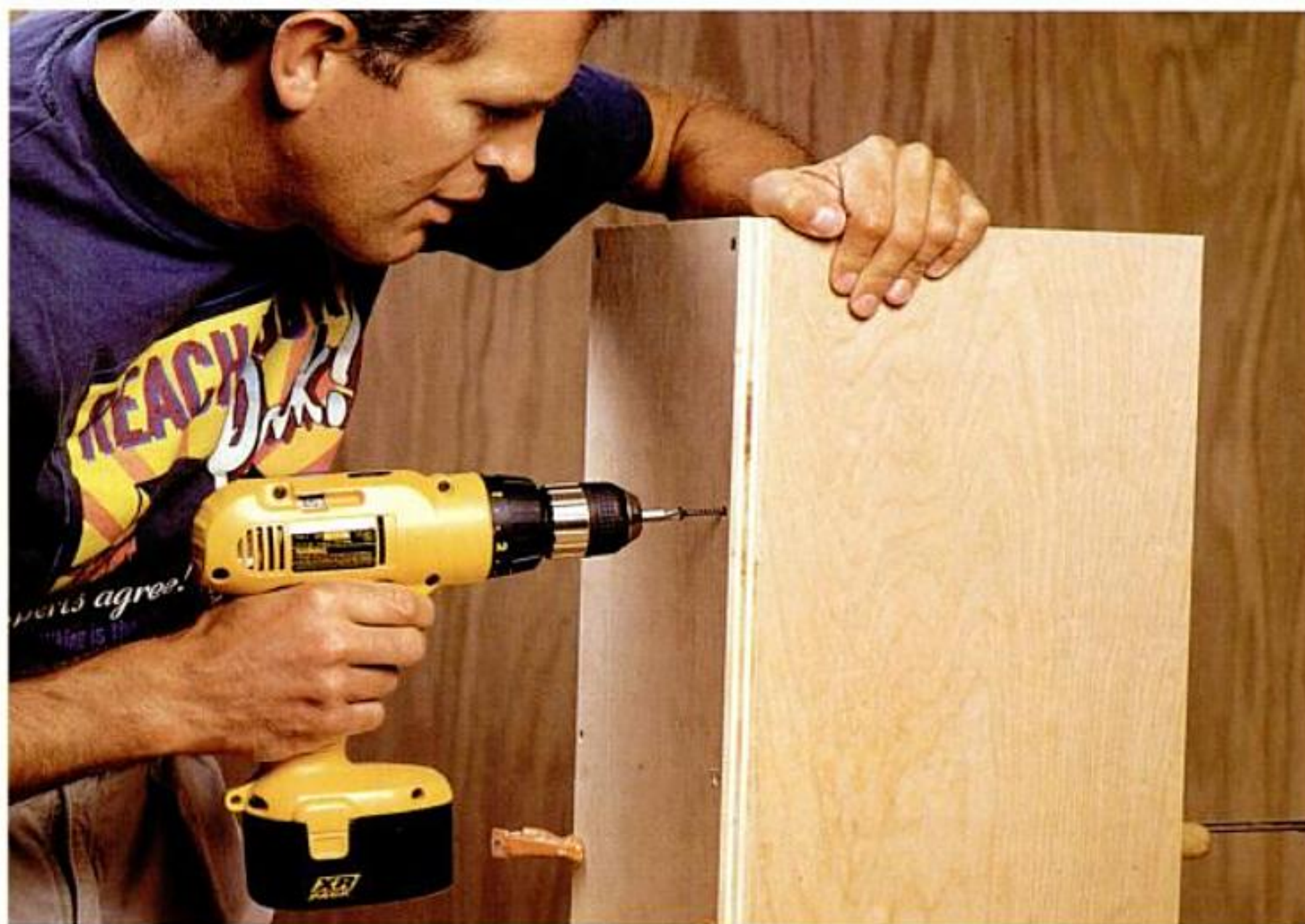
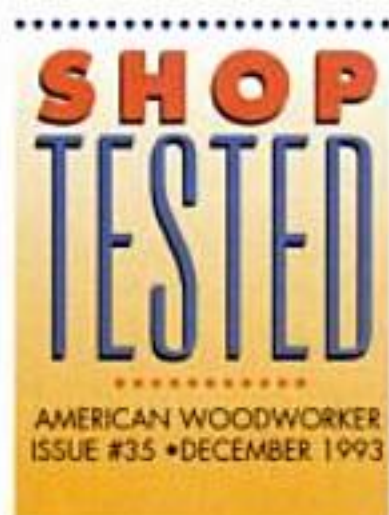


PHOTO BY JOHN HAMEL

Cordless drills are convenient to use and powerful enough to tackle even the heaviest drilling and screwdriving tasks.

Cordless electric drills, first introduced in 1961, have become the hottest-selling power tools on the market today. Last year, nearly 1.6 million units were sold in North America, and sales continue to increase by about 15 percent per year.

Why are cordless drills so popular? For one thing, they're "crossover" tools, used by woodworkers, tradespeople and homeowners alike. But the main reason is that they're cordless: You can drill holes or drive screws anywhere.

Unlike early models, which were no match for plug-in drills, today's heavier-duty cordless drills pack enough power for most jobs, including the most demanding ones. And innovations such as clutches, variable speed control and keyless chucks have made these tools even more versatile and convenient to use.

If you're shopping for a cordless drill, the choice can be bewildering: There are more than 80 models available ([see chart, page 54](#)), with different features and capabilities. As with most tool purchases, cost is a factor, but the most important considerations are power and ergonomics.

Power

All cordless drills will drill holes and drive screws, but there are major differences in performance between models with different volt-

age ratings. A 7.2- or 9.6-volt drill may suffice for occasional or light-duty use in the shop, but for heavy or extended work, you'll want a heftier drill of 12 or more volts. The difference in power is striking. In our 1993 tests (see AW #35), one 12-volt drill bored 42 1/2-in. holes through 1 3/8-in.-thick beech before the battery ran out. As for driving power, another drill sank nearly 200 3-in. screws into the edge of a fir 2x4. But extra power costs more. While new developments in battery technology have made heavyweights more practical, you can expect to pay \$160 or more for a good, heavy-duty drill, including charger and batteries.

Related to power are speed and torque. As a rule, the higher a drill's rated speed, the less torque it will deliver, and vice versa. So, if sinking screws or drilling large-diameter holes are on your agenda, you'll want a high-torque drill with modest speed. Or if you only plan on drilling small holes or driving small screws, you need a faster drill with relatively less torque. The choice doesn't have to be an either/or proposition; many drills offer two speed ranges, with greater torque in the lower range.

Ergonomics

Power counts for a lot, but a drill also should feel good in the hand, even after extended use. This is a quality that you can't read about on a

tool's specification plate. Instead, it's best to get your hands on the drills yourself. You can do that much in a home center or building supply outlet.

Handle placement is one of the first things you'll notice when hefting a few cordless models. The conventional "pistol-grip" design places the handle at the back of the tool, while a "T-handle" model has its handle under the center of the drill's body. (See photo, below right.)

Each handle design has its advantages and drawbacks. The pistol-grip design lets you grip the tool high on the handle and push directly in line with the bit. This arrangement provides more stability, also allowing you to lean into the work. On the downside, a pistol-grip drill tends to be front-heavy because most of the tool's weight is in front of the handle. T-handle drills are generally more compact than pistol-grip models, so they're easier to maneuver in awkward spaces. But because it's harder to apply force in line with the business end of the tool, there's a greater chance you'll break a small bit or come off the head of the screw you're driving.

Weight and handle size are also important ergonomic factors. Woodworkers with smaller hands may appreciate lighter models—under 4 pounds—and those with grips they can comfortably reach around.

Controls

The position and feel of the trigger and other controls may seem relatively trivial the first time you pick up a drill. But the importance of control design is magnified over periods of extended use.

There is considerable variation among tools on this score. Most manufacturers place the reversing switch at the top of the trigger switch, allowing you to reverse the tool quite easily without shifting your grip. But there's also the chance you will unintentionally click into reverse when picking up the drill. A reversing switch at the back of the handle may be awkward

to reach, while one on the left side of the handle won't be handy for south-paw woodworkers.

Trigger guards are another issue. While a trigger guard makes it harder to drop the tool, you may feel that it gives you fewer options for changing your grip.

The Chuck

Next to drilling and driving screws, the most frequent activity with a cordless drill is changing bits, so chuck operation is very important. The chuck should center a bit easily and hold it tightly.



Get a grip. T-handle drills (left) concentrate their weight over the handle for better balance. They are generally more compact than conventional "pistol-grip" drills (right). Conventional drills let you grip the handle high to exert pressure directly in line with the bit, and they offer more options for hand placement.

Traditional keyed chucks let you apply more tightening force, a plus for large-diameter drill bits. But keys are inconvenient and always seem to get lost. This is why keyless chucks are so popular. However, keyless chucks may slip, especially on larger-diameter bits with small shanks. And if you're into "speed-chucking" (running the drill while holding the chuck collar), you may find some keyless chucks make it hard to center the bit.

Other Features to Consider

There are a few other features you will appreciate in a cordless drill, especially if you plan to use it for driving screws:

Variable speed—Many drills offer infinitely variable speeds, often in two speed ranges. You control the speed within a range by varying pressure on the trigger switch.

Clutches—The majority of today's cordless models have adjustable clutches, which means you can select the desired torque for driving screws to a precise depth. Most clutches have at least five torque settings (one has 66 settings!—see chart) plus a "locked" setting for drilling and for driving larger-than-average screws. Models offered by Black & Decker and DeWalt offer a "Versa Clutch" that engages the clutch only when you push on the bit. This lets you get a boost of torque just by pushing harder on the bit. Bosch models use electronic clutches that simply cut power to the drill when a particular torque is reached.

Electronic brakes—Roughly half of the cordless drills on the market come with electronic brakes. These stop the bit from spinning as soon as you release the trigger, so you don't have to pause before driving the next screw or changing bits.

The Best From Our Test

When AW tested all the big cordless drills in December 1993, we gave our Editors' Choice awards to four models: The top-rated Freud EDS132, the well-balanced Bosch 3054VSR, the compact Panasonic EY6100EQK, and the loud-but-powerful Makita 6911 impact driver. However, so many new models have been introduced since then that you would be wise to use our recommendations only as a basis for comparison. ▲

OPTIONS WORTH HAVING

- **Extra battery.** This is the first accessory to buy. It will enable you to keep working when your first battery runs out of power.
- **Drill holster.** You'll look a bit like a cowpoke, but you'll always have your drill ready for action.
- **Fast charger.** This type of charger, which comes standard on some drills, cuts charging time down to 10 to 15 minutes.

Cordless Drills

Brand & Model	List Price	Battery Volts	Fast Charge	Max. Rpm * (Low Range, High Range)	Chuck Type	Chuck Capacity (in.)	No. of Clutch Settings	Handle Type	Weight (lbs.)	Comments
AEG ABSE 13	\$288	9.6	N	370, 1,000	KL	1/2	10	PG	3.1	Hex-shank adaptor.
Black & Decker BD2300	89	9.6	N	300, 700	KL	3/8	6	PG	4	Built-in level.
Black & Decker BD2305	99	9.6	N	700	KL	3/8	6	PG	5	Built-in level.
Bosch 3000VSRK	261	9.6	OPT	400, 900	KY	3/8	0	PG	3.3	Extra battery pack.
Bosch 3001VSRK	271	9.6	OPT	400, 900	KL	3/8	0	PG	3.3	Extra battery pack.
Bosch 3050VSRK	288	9.6	OPT	400, 900	KY	3/8	5	PG	3.8	Extra battery pack.
Bosch 3051VSRK	299	9.6	OPT	400, 900	KL	3/8	5	PG	3.8	Extra battery pack.
Bosch B2100	256	9.6	OPT	400, 900	KL	3/8	42	PG	3.6	Electronic clutch.
Craftsman 11189	120	9.6	N	600	KL	3/8	4	PG	NA	Built-in level.
Craftsman 27189	150	9.6	N	600	KY	3/8	4	PG	3.8	Built-in level.
DeWalt DW944K-2	303	9.6	N	350, 1,200	KL	3/8	24	PG	4	Versa Clutch. (See text.)
DeWalt DW952K	280	9.6	N	400, 1,100	KL	3/8	16	TH	3.7	Fan-cooled motor.
DeWalt DW961K-2	324	9.6	N	400, 1,200	KL	3/8	16	PG	3.9	Anti-slip grip.
DeWalt DW962K-2	324	9.6	N	400, 1,200	KL	3/8	16	TH	4	Anti-slip grip.
DeWalt DW964K-2	324	9.6	N	400, 1,200	KL	3/8	24	TH	4.3	Versa Clutch. (See text.)
Fein DSSKE 315	410	9.6	N	320, 2,200	KL	3/8	5	PG	3.4	Pressure-operated clutch.
Freud EDS96	296	9.6	N	375, 1,300	KL	3/8	5	PG	3.9	Hex-shank adaptor.
Freud EDS96B	326	9.6	N	375, 1,300	KL	3/8	5	PG	3.9	Hex-shank adaptor.
Hitachi D10DF2K	295	9.6	N	400, 1,100	KL	3/8	5	TH	3.7	Reversible.
Hitachi D10DF2KBE	320	9.6	N	400, 1,100	KL	3/8	5	TH	4.1	Extra battery pack.
Hitachi D10DFKBE	325	9.6	N	400, 1,100	KL	3/8	5	TH	4.1	Extra battery pack.
Jepson 2416K	220	9.6	N	400, 1,100	KY	3/8	5	PG	2.7	Reversible.
Makita 6012HDW	255	9.6	OPT	400, 1,100	KY	3/8	10	PG	3.5	Plastic case standard.
Makita 6092DW	257	9.6	OPT	400, 1,100	KY	3/8	0	PG	3.5	Overload-protected motor.
Makita 6093DL	336	9.6	OPT	400, 1,100	KY	3/8	12	PG	3.8	Kit includes battery-powered flashlight.
Makita 6093DW	283	9.6	OPT	400, 1,100	KY	3/8	12	PG	3.8	Plastic case standard.
Makita 6095DW	291	9.6	OPT	400, 1,100	KL	3/8	12	PG	3.8	Plastic case standard.
Makita 6200DW	283	9.6	OPT	400, 1,100	KL	3/8	12	TH	3.7	High-capacity battery.
Makita 6201DW	310	9.6	OPT	350, 1,100	KL	3/8	12	TH	3.7	High-capacity battery.
Makita 6400DW	303	9.6	N	450, 1,200	KL	3/8	12	DH	3.5	High-capacity battery.
Metabo 0096	259	9.6	OPT	300, 850	KL	3/8	6	PG	4	Rubber ring on chuck.
Metabo 0118	274	9.6	OPT	300, 850	KL	3/8	6	PG	4.2	Rubber ring on chuck.
Milwaukee 0396	279	9.6	N	350, 1,000	KL	3/8	6	PG	3.5	2-finger switch w/brake.
Panasonic EY6181CRKW	307	9.6	OPT	350, 1,000	KL	3/8	22	TH	3.3	Compact size.
Panasonic EY62821DKW	307	9.6	OPT	350, 1,000	KL	3/8	6	TH	3.6	Extra battery pack.
Panasonic EY6282EQK	309	9.6	Y	350, 1,000	KL	3/8	6	TH	3.6	High-capacity battery.
Porter-Cable 9840	289	9.6	N	350, 1,000	KL	3/8	6	TH	3.7	Extra battery pack.
Porter-Cable 9841	309	9.6	Y	350, 1,000	KL	3/8	6	TH	3.7	Plastic case standard.
Ryobi TFD170VR	150	9.6	N	400, 1,200	KL	3/8	6	PG	3.8	Oversized reverse switch.
Makita 6300DW	429	10.8	N	450, 1,200	KY	1/2	0	DH	5.7	Oversized battery.
AEG ABSE 15	399	12	N	370, 1,100	KL	1/2	10	PG	3.5	Hex-shank adaptor.
Bosch 3052VSRK	306	12	OPT	500, 1,100	KY	3/8	6	PG	4	Extra battery pack.
Bosch 3053VSRK	316	12	OPT	500, 1,100	KL	3/8	6	PG	4	Extra battery pack.
Bosch 3054VSRK	330	12	OPT	500, 1,100	KL	3/8	38	PG	4	Electronic clutch.
Bosch B2300	282	12	OPT	450, 1,000	KL	3/8	42	PG	3.8	Electronic clutch.
Craftsman 27139	160	12	N	350, 1,000	KL	3/8	6	PG	4.2	Built-in level.
DeWalt DW945K-2	333	12	N	400, 1,300	KL	3/8	24	PG	4.5	Versa Clutch. (See text.)
DeWalt DW953K	306	12	OPT	400, 1,200	KL	3/8	16	TH	4	Fan-cooled motor.
DeWalt DW972K-2	352	12	N	450, 1,400	KL	3/8	16	TH	4.2	Anti-slip grip.
DeWalt DW973K-2	352	12	N	450, 1,400	KL	3/8	24	PG	4.6	Versa Clutch. (See text.)
DeWalt DW974K-2	352	12	N	450, 1,400	KL	3/8	24	TH	4.6	Versa Clutch. (See text.)

Chart continued on next page.

See page 116 for listing of manufacturers.

KEY: Chuck Type: HX = hex, KL = keyless, KY = keyed. Handle Type: DH = D-handle, PG = pistol-grip, TH = T-handle.  Editors' Choice. NA = information not available. OPT = optional. * All speed ranges are variable, except on Makita 6012HDW and Wen 498AC.

Cordless Drills

Brand & Model	List Price	Battery Volts	Fast Charge	Max. Rpm * (Low Range, High Range)	Chuck Type	Chuck Capacity (in.)	No. of Clutch Settings	Handle Type	Weight (lbs.)	Comments
DeWalt DW974KQ	\$378	12	Y	450, 1,400	KL	3/8	24	TH	4.6	Versa Clutch. (See text.)
DeWalt DW977K	372	12	N	2,000	HX	1/4	66	TH	4.6	Impact driver; electronic clutch.
Freud EDS120	349	12	N	375, 1,300	KL	3/8	5	PG	4.1	Hex-shank adaptor.
Freud EDS120B	379	12	N	375, 1,300	KL	3/8	5	PG	4.1	Hex-shank adaptor.
Hitachi DS10DVAK	360	12	N	400, 1,600	KL	3/8	5	TH	4	Case standard.
Hitachi DS10DVAKBE	417	12	N	400, 1,600	KL	3/8	5	TH	4.5	Extra battery pack.
Makita 6011DW	314	12	N	450, 1,350	KL	3/8	6	PG	4.2	Also accepts 9.6V battery.
Makita 6211DW	335	12	N	370, 1,150	KL	3/8	12	TH	4	High-capacity battery.
Makita 6311DW	353	12	N	370, 1,150	KL	1/2	12	TH	4.3	High-capacity battery.
Makita 6911DW	369	12	OPT	1,800	HX	1/4	0	TH	4	Impact driver.
Metabo 0126	409	12	OPT	3,000, 850	KL	3/8	6	PG	4.5	Rubber ring on chuck.
Milwaukee 0401	305	12	N	350, 1,000	KL	3/8	6	PG	3.8	2-finger switch w/brake.
Panasonic EY6100CRKW	361	12	OPT	350, 1,300	KL	3/8	22	TH	3.5	Compact size.
Panasonic EY6100EQK	378	12	Y	350, 1,300	KL	3/8	22	TH	3.8	High-capacity battery.
Panasonic EY6205EQK	372	12	Y	350, 1,000	KL	3/8	6	TH	4.1	High-capacity battery.
Panasonic EY6207EQK	442	12	Y	350, 1,300	KL	1/2	6	TH	4.4	High-capacity battery.
Porter-Cable 9852	280	12	N	350, 1,000	KY	3/8	6	PG	4.5	Dust-sealed switch.
Porter-Cable 9853	280	12	N	350, 1,000	KL	3/8	6	PG	4.5	Dust-sealed switch.
Porter-Cable 9853S	330	12	N	350, 1,000	KL	3/8	6	PG	4.5	Extra battery pack.
Porter-Cable 9855	335	12	N	350, 1,000	KL	1/2	6	PG	4.7	Dust-sealed switch.
Ryobi TFD220VR	150	12	N	400, 1,300	KL	3/8	6	PG	4.1	Oversized reverse switch.
Skil HD2735:02	230	12	N	500, 1,650	KY	3/8	5	PG	3.9	Case included.
Skil HD2735:04	260	12	N	500, 1,650	KY	3/8	5	PG	3.9	Extra battery pack.
Skil HD2736:02	237	12	N	500, 1,650	KL	3/8	5	PG	3.9	Case included.
Skil HD2736:04	266	12	N	500, 1,650	KL	3/8	5	PG	3.9	Extra battery pack.
Wen 498AC	110	12	N	340, 720	KL	3/8	0	PG	2.7	Lightest-weight drill.
Freud EDS132	385	13.2	N	400, 1,400	KL	3/8	5	PG	4.2	Hex-shank adaptor.
Freud EDS132B	415	13.2	N	400, 1,400	KL	3/8	5	PG	4.2	Extra battery pack.
DeWalt DW991K	370	14.4	N	450, 1,400	KL	3/8	16	TH	4.9	High-capacity battery.
DeWalt DW994KQ	430	14.4	Y	450, 1,400	KL	3/8	24	TH	5.3	High-capacity battery.



DeWalt DW991K



Porter-Cable 9853



Freud EDS132

KEY: Chuck Type: HX = hex, KL = keyless, KY = keyed. Handle Type: DH = D-handle, PG = pistol-grip, TH = T-handle.  Editors' Choice. NA = information not available. OPT = optional. * All speed ranges are variable, except on Makita 6012HDW and Wen 498AC.

See page 116 for listing of manufacturers.

Routers

A Power Tool
Packed With
Possibilities

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PLUNGE ROUTERS
AMERICAN WOODWORKER
ISSUE #33 • AUGUST 1993

No tool can match the cutting, shaping, and joint-making capabilities of the plunge router.

Compared to other power tools, routers lead the pack in sheer woodworking potential. Though you'll find a few specialized models such as laminate trimmers, most routers are designed to do a wide range of edging and shaping work. One reason for this versatility is the fact that a router can be used as a hand-held tool, or it can be mounted upside down in a router table, where it functions more like a shaper. In either mode, the availability of hundreds of bits means that all kinds of edge treatments, molding work and joinery are possible—from simple chamfers, rabbets and dados to finger joints, dovetails, and raised panels. To get the most from your router, consider buying one or more of the useful accessories listed in the box on the opposite page.

Routers can be divided into two main categories: fixed-base routers and plunge routers. (See photos, right and opposite.) Recognizing the greater versatility of the plunge cutters, tool manufacturers have expanded their respective lines of plunge routers to the point that these models now outnumber fixed-base versions. Here we'll focus on plunge routers because of their popularity. Quite a few considerations will also apply if you're in the market for a fixed-base router, however.

Despite the number of plunge routers available and the variation in size, power and cost,

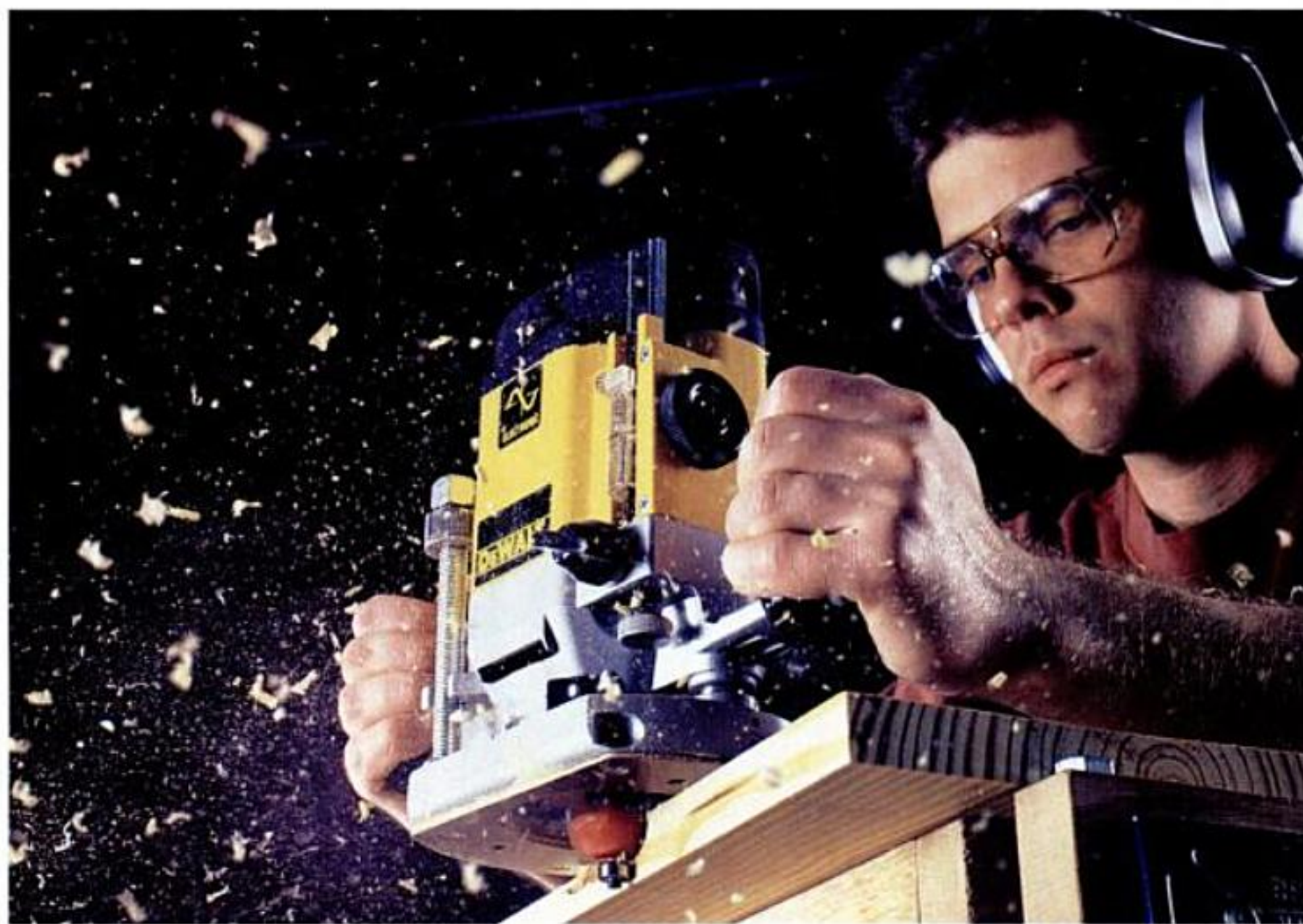
all of these tools work basically the same way. The motor housing can move up and down on a pair of spring-actuated posts that are connected to the router base. The capability of plunging into and out of the work makes these tools ideal for cutting stopped grooves, mortises, and routed letters. When not plunge-cutting, these tools can work just like fixed-base routers.

Power and Size

With plunge routers, power, size, and weight are all directly related. The smallest machines



Edges only. With a fixed-base router, the cutting depth can't change once the tool is turned on. Fixed-base machines are good for routing edges and for use in router tables.



PHOTOS BY MITCH MANDEL

have motors rated at 1 HP to 1½ HP and weigh between 6 and 11 pounds. In this category, all routers save two (the Bosch 1613 and Porter-Cable 693) have ¼-in. collets. Routers in the median range (2 HP to 2½ HP) all accept ½-in. bits, as well as smaller (¼-in. and ⅜-in.) bits. In the most powerful category, HP ratings are between 3 and 3½. These machines weigh between 12 and 18 pounds.

The ideal choice for your shop may be a *pair* of plunge routers: a small model for edge routing, inlay work and other hand-held operations, and a heavy-duty router to use in a router table for raising panels, milling moldings, and other shaping jobs. If your budget allows just a single router, concentrate on the mid-size models rated between 2 and 2½ HP.

While testing dozens of models for our comprehensive Buyer's Guide feature (see AW #33), we found many similarities among routers of similar size. We also found some important differences.

Plunging, Locking and Switching

In our tests, DeWalt routers proved to have the smoothest plunge action, followed by the Porter-Cable models. Generally, we preferred to have the lock lever and on-off switch on opposite handles. And we liked spring-actuated plunge lock levers that are always locked until you pull on them, a feature found on the Porter-Cable and Bosch machines; you plunge the router and release the lever to lock it automatically. The norm is a lever that must be locked by pushing and unlocked by pulling. We also liked the one-of-a-kind locking knob of the DeWalt DW615, which doubles as a handle.

Handle-mounted trigger switches are more convenient and also potentially safer than body-mounted toggle or rocker switches. Things change when the router is mounted upside down in a table, however. In this position, a trigger switch may be more difficult to reach than a rocker switch mounted on the body. The

Porter-Cable 7538 solves this problem by having both trigger and rocker switches.

Depth Stops and Depth Scale

Plunge routers are often used to make repeated passes, with depth increases at each pass. This is made possible by a control rod that stops against a multilevel turret. Bosch routers have refined this system by adding an independent micro-positioning knob for fine depth adjustments—a plus in such precision jobs as inlay work and making dovetails with a jig.

We preferred plunge depth scales on which you can “zero” the depth control rod to the scale once the bit is positioned against the work surface. The Freud, Ryobi and small Skil machines were the only models that didn't have this feature. A rack-and-pinion mechanism, found on the Black & Decker, DeWalt and Hitachi, made setting the depth rod particularly easy.

Pick of the Plungers

In our shop tests of nearly three dozen plunge routers, five models distinguished themselves in overall quality, precision, and ease of use. Our Editors' Choices included a pair of DeWalts, the DW625 EVS and DW615 EVS; a pair of Porter-Cables, the 7539 and 693; and the Bosch 1613 EVS.

The DeWalt DW625 EVS scores high in power and in plunge action smoothness. The smaller DeWalt



Taking the plunge. A pair of plunge posts are common to all plunge routers. These machines can lock at any point on their plunge range. A three-step turret, combined with a depth-control rod mounted above it, facilitates plunge cuts to different depth settings.

DW615 EVS features a knob that doubles as a twist-lock depth control. Micro-positioning capability is what sets the Bosch 1613 apart from other comparably sized machines. All three of these machines have electronic speed control. With five speeds and a 15-amp motor, the Porter-Cable 7539 is a good choice for heavy-duty production work. And the Porter-Cable 693 features a plunge base that can be used to house other routers with 3½-in.-dia. bodies. ▲

OPTIONS WORTH HAVING

- **Edge guide.** If your router doesn't come with one, buy it as an accessory. The edge guide is essentially an adjustable fence that attaches to the router base, enabling you to do all kinds of edging and straight-line work, including mortising.
- **Router table.** To make your own router table, see the cover story of AW #24. If you don't want to build one, you can choose from quite a few after-market tables, available at home centers and through mail-order catalogs.
- **Dust collection.** Routers create plenty of sawdust. Dust collection can be difficult with freehand router use, but it's straightforward on a router table, as long as the fence has a dust-collection port.
- **Variable speed control.** Many of the more expensive routers come with electronic speed control, a feature that allows you to tailor rpm to particular cutting loads. A separate variable speed control is available for single-speed routers, from MLCS (800-533-9298).

Plunge Routers

For fixed-base routers, see page 62.



DeWalt DW614



Bosch 1613EVS



Makita 3620



Hitachi M12V

Brand & Model	List Price	HP	Amps	Speeds (rpm)	Collet Sizes (in.)	Max. Plunge Depth (in.)	Weight (lbs.)	Comments
Bosch 1614	\$245	1	7.5	27,000	1/4	2**	7.8	Fine depth adj. at any plunge position.
Hitachi M8V	317	1 1/5	7.3	10,000 - 25,000*	1/4	2**	6.4	3-position adj. handles.
Black & Decker Quantum BD6200	238	1 1/4	5.4	24,000	1/4	2	6.5	Turn handle for plunge lock.
Bosch 1614EVS	283	1 1/4	7.8	12,000 - 23,000*	1/4	2**	7.9	Fine depth adj. at any plunge position.
DeWalt DW614	250	1 1/4	6.6	24,000	1/4	1 15/16	6	Turn handle for plunge lock.
DeWalt DW615	290	1 1/4	8	8,000 - 24,000*	1/4	1 15/16	6.2	Turn handle for plunge lock.
Makita 3620	220	1 1/4	7.8	24,000	1/4	1 3/8	5.3	Switch built into contoured handle.
Makita 3620A	280	1 1/4	7.8	24,000	1/4	1 3/8	5.3	Electric brake.
Black & Decker 7615	145	1 1/2	9	25,000	1/4	2	9	Built-in worklight.
Hitachi M8V	317	1 1/2	7.3	10,000 - 25,000*	1/4	2	6.4	3-position adj. handles.
Porter-Cable 693	320	1 1/2	10	23,000	1/4, 1/2	2 1/2	9	Plunge lever locks position when released.
Bosch 1613	316	1 3/4	10.4	25,000	1/4, 1/2	2**	9.8	Fine depth adj. at any plunge position.
Ryobi R175	100	1 3/4	9	25,000	1/4	2**	8.1	Fine depth adj. at any plunge position.
Ryobi RE175	150	1 3/4	9	15,000 - 25,000*	1/4	2**	8.1	Fine depth adj. at any plunge position.
Bosch 1613EVS	359	2	11	12,000 - 22,000*	1/4, 1/2	2**	10.1	Fine depth adj. at any plunge position.
Bosch B1450	349	2	11	12,000 - 22,000*	1/4, 1/2	2**	10.1	Fine depth adj. at any plunge position.
Craftsman 27505	190	2	12	25,000	1/4, 1/2	2 1/2**	11.5	Plunge lock lever in handle.
Skil HD1870	289	2 1/4	12	23,000	1/4, 1/2	2 1/2	9.5	Lock-on trigger switch.
Skil HD1875	342	2 1/4	11.5	10,000 - 23,000*	1/4, 1/2	2 1/2	9.5	Lock-on trigger switch.
Bosch 1615	430	3	14	25,000	1/4, 1/2	3	12	220V model available.
Bosch B1550	425	3	14	25,000	1/4, 1/2	3	12	Template guide adaptor plate.
DeWalt DW624	441	3	15	22,000	1/4, 1/2	2 7/16**	11.3	Rack-and-pinion depth-stop adj.
DeWalt DW625	511	3	15	8,000 - 22,000*	1/4, 1/2	2 7/16**	11.3	Rack-and-pinion depth-stop adj.
Hitachi TR12	412	3	12.2	22,000	1/2	2 3/8	11	3 plunge stops.
Jepson 7412	321	3	14	23,000	1/2	1 1/2**	13	3 plunge stops.
Makita 3612BR	383	3	14	23,000	1/4, 1/2	2 9/16**	12.7	Chip deflector.
Makita 3612BRA	524	3	14	23,000	1/4, 1/2	2 9/16**	12.7	Electric brake.
Ryobi RE600	275	3	15	10,000 - 22,000*	1/4, 1/2	2 3/8**	13.6	Straight guide included.
Bosch 1615EVS	505	3 1/4	15	12,000 - 19,000*	1/4, 3/8, 1/2	3**	12.3	Template guide adaptor plate.
Freud FT2000E	410	3 1/4	15	8,000 - 22,000*	1/4, 1/2	2 3/8**	12.9	Quick-release depth-stop adj.
Hitachi M12V	505	3 1/4	15	8,000 - 20,000*	1/2	2 7/16	11.7	3-position adj. handles.
Porter-Cable 7538	445	3 1/4	15	21,000	1/2	3	17.3	Plunge lever locks position when released.
Porter-Cable 7539	510	3 1/4	15	10,000 - 21,000*	1/2	3	17.3	Electronic 5-speed.
Craftsman 27506	250	3 1/2	15	10,000 - 25,000*	1/4, 1/2	2 1/2**	13	Plunge lock lever in handle.

Chart [continued on page 62](#).

See page 116 for listing of manufacturers.

KEY: *Electronic variable-speed control. **Has fine depth-adjustment knob. ● Editors' Choice.

Fixed-Base Routers

For plunge routers, see page 60.



Porter-Cable 690



Bosch 1606A

Brand & Model	List Price	HP	Amps	Speeds (rpm)	Collet Sizes (in.)	Depth Adjustment Range (in.)	Weight (lbs.)	Comments
Jepson 7210	\$147	3/4	5	23,000	1/4, 3/8	1 1/8	5.3	Contoured handles.
Porter-Cable 100	190	7/8	6.5	22,000	1/4	1 3/4	6.8	Calibrated depth-adj. ring.
Makita 3606	180	1	7	30,000	1/4	3	5.5	Calibrated depth-adj. ring.
Porter-Cable 630	235	1	6.8	22,000	1/4	1 1/4	7.5	Calibrated depth-adj. ring.
Craftsman 17470	60	1 1/8	7	25,000	1/4	1 1/2	4.6	Calibrated depth-adj. ring.
Makita 3601B	288	1 3/8	8.5	23,000	1/4, 1/2	1 7/8	7.7	Calibrated depth-adj. ring; D-handle.
Black & Decker 7613	128	1 1/2	9	25,000	1/4	1 1/2	9	Rack-and-pinion depth adj.
Bosch B1350	240	1 1/2	9	25,000	1/4, 1/2	1	7.8	Captive template guide system.
Craftsman 17471	70	1 1/2	8	25,000	1/4	1 1/2	7.5	Calibrated depth-adj. ring.
DeWalt DW610	274	1 1/2	9	25,000	1/4, 1/2	2 3/8	7.3	Rack-and-pinion depth adj.
Milwaukee 5660	352	1 1/2	10	24,500	1/4	3	8.5	Calibrated depth-adj. ring.
Porter-Cable 690	260	1 1/2	10	23,000	1/4, 1/2	1 1/4	8	Calibrated depth-adj. ring.
Porter-Cable 691	285	1 1/2	10	23,000	1/4, 1/2	1 3/4	9.3	Calibrated depth-adj. ring; D-handle.
Bosch 1604A	250	1 3/4	11	25,000	1/4, 1/2	1	7.8	Captive template guide system.
Bosch 1606A	295	1 3/4	11	25,000	1/4, 1/2	1	7.8	Captive template guide system; D-handle.
Craftsman 17472	90	1 3/4	8.5	15,000 - 25,000*	1/4	1 1/2	8.3	Worklight.
Craftsman 17473	110	2	9	15,000 - 25,000*	1/4	1 1/2	9.1	Depth-adj. ring.
Jepson 7112	212	2	10	25,500	1/4, 3/8, 1/2	1 1/8	10.3	D-handle.
Milwaukee 5680	362	2	12	26,000	1/4, 1/2	2 1/4	8.8	Calibrated depth-adj. ring.
Porter-Cable 7536	365	2 1/2	13	24,000	1/2	2 1/4	14.5	Calibrated depth-adj. ring.
Porter-Cable 7537	385	2 1/2	13	24,000	1/2	2 1/4	14.5	Calibrated depth-adj. ring.
Bosch 90300	606	3 1/4	15	22,000	1/2	1	15.5	Extra-large handles.
Porter-Cable 7518	510	3 1/4	15	10,000 - 21,000*	1/2	2 1/4	14.5	5 speeds with soft-start.
Porter-Cable 7519	445	3 1/4	15	21,000	1/2	2 1/4	15	Calibrated depth-adj. ring.

See page 116 for listing of manufacturers.

KEY: *Electronic variable-speed control.

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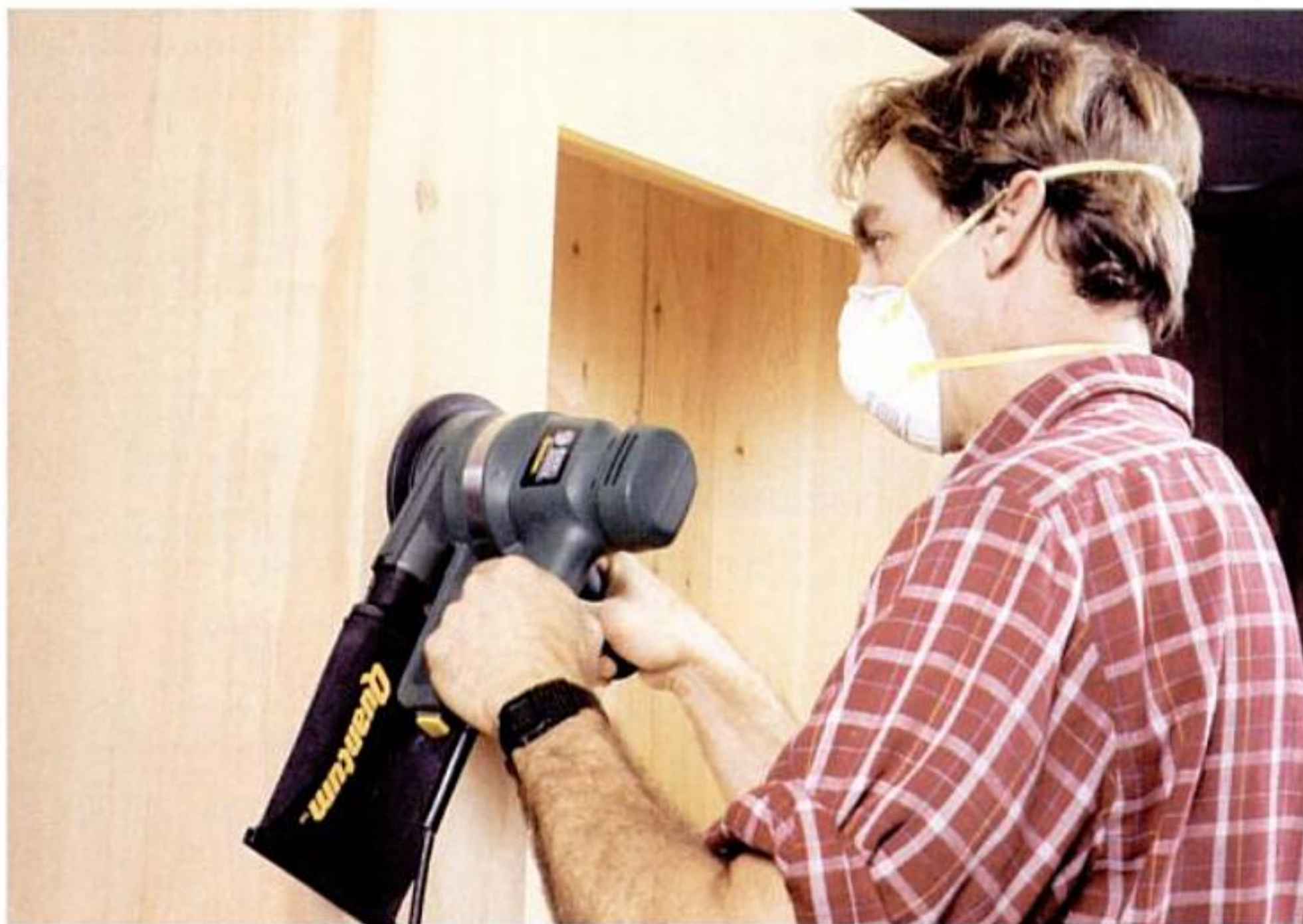


PHOTO BY ELLIS VALENTINE

Random-orbit sanders work well for flat and contour sanding, and leave a virtually scratch-free surface.

As all woodworkers know, sanding is one of the necessary evils of the trade. Unless you're a purist who believes only in scraped or planed surfaces, chances are you spend a significant amount of time sanding your projects. Manufacturers have responded over the years by offering a procession of portable sanders—disc sanders, belt sanders, orbital sanders—to make the job go faster. But all these sanders had drawbacks. They either cut too slowly or they left patterns of scratches and gouges on the surface of the wood. With the introduction of random-orbit sanders, sanding has taken another significant leap forward.

Random-orbit sanders, evolved from the air-powered sanders long used for auto-body work, excel at many kinds of sanding. They'll attack heavy-duty jobs where fast stock removal is the objective, yet they have the finesse needed for finish work, even on delicate veneered surfaces. They work quickly and produce virtually scratch-free surfaces because of the combined rotary and orbital rotation of their pads. While unable to sand into corners, their round, flexible pads make them a natural choice for contour sanding. You can even enjoy scratch-free results when sanding across the grain, as when going over assembled face frames. And since they remove material so efficiently, you may even find yourself skipping

some intermediate grits of sandpaper without affecting surface quality.

Random-orbit sanders are available in both electric and pneumatic models. In our tests (see AW #39) we found the pneumatic sanders to be smoother yet more aggressive than their electric counterparts, but impractical for many small shops since they require a large (5-HP or larger) air compressor to run them efficiently.

Eccentric Orbits

The secret of the random-orbit sander's scratch-free sanding is that its sanding pad freewheels on a shaft which is eccentric from the motor shaft, so the pad is forever shifting in an orbit of its own, canceling out the scratches produced by prior rotations.

The size of this orbit, or *offset*, varies from one model to another. In general, the larger a sander's offset, the more aggressively it removes stock. But aggressive sanders tend to be harder to control, and they produce somewhat rougher surfaces than those models with smaller offsets.

Types of Random-Orbit Sanders

Though they all operate on the same basic principle, there are three major types of random-orbit sander which differ from one another in appearance and performance:



Three styles to choose from. Right-angle sanders (left) are the most powerful, but harder to control. In-line sanders (center) are well-balanced because the motor is positioned vertically over the sanding pad. Palm-grip sanders (right) are compact and easy to control for fine finish-sanding.

Right-angle sanders look like angle grinders and operate similarly. A horizontal motor transmits power to the pad's driveshaft via bevel gears. As a rule, these models are more powerful than the other two types and have larger orbits, so they can be counted on to sand more rapidly and to maintain speed when you apply pressure for faster results. Yet, with very fine-grit paper, they can produce a smooth, swirl-free surface.

On the minus side, their gear trains made them the loudest of the sanders we tested, and they tended to vibrate more than the other types. The vibration made the right-angle sanders more difficult to control and left our hands tingling. And because their motors are offset from their sanding pads, they're not as well-balanced as the other types. Our Editors' Choice among right-angle sanders was the Porter-Cable 7336, a smooth operator with good power and relatively little vibration.

In-line sanders have their motors directly above the sanding pad, for quieter running and better balance. In our tests, we found in-line models smooth enough to operate with one hand when necessary. Power varies, from beefy units that approach right-angle sanders, to lightweights in the league of palm-grip sanders. Overall, their blend of moderate power and smooth operation make in-line sanders the most versatile of the three sander types. Our Editors' Choices in this category were the smooth-running, easy-to-control Bosch 3283 DVS

and the powerful AEG TXE 150.

Palm-grip sanders can be described as small in-line sanders without a handle. With their moderate power and excellent balance, they're well-suited to fine finish-sanding. Our



Breathe easier. Dust collection options include (clockwise from top left) dust canisters, dust boxes, vacuum ports and dust bags. All require perforated sandpaper to work.

Editors' Choice here was the particularly smooth DeWalt DW421, which has a dust collection canister and a pad brake to control freewheeling.

Worthwhile Features

Here are some features we found desirable in a random-orbit sander:

Dust collection—Many of the models we looked at incorporate built-in dust collectors, both to reduce dust in the shop and to help keep the abrasive from clogging. These tools draw dust through holes in the sanding disc and pad and blow it into a dust bag or canister. Alternately, you can hook up a hose from a central dust-collection system or shop vacu-

um to the sander's vacuum port.

Pad brake—Several manufacturers have introduced versions of this feature, which helps keep the sanding pad from freewheeling too quickly—a problem that can create swirl marks when you set the spinning pad on your workpiece.

Variable speed—Consider sanders with variable speed control if you'll want to slow the orbits for delicate sanding jobs such as feathering a finish or buffing. (Some sanders offer polishing pads as accessories.) On a few models, the speed control is separate from the trigger switch, so you can change speed while sanding.

Hook-and-loop discs—Sanding discs attach with either pressure-sensitive adhesive (PSA) or a "hook-and-loop" system. Hook-and-loop discs are more expensive than the PSA variety, and you may face the added cost of eventually replacing the sander's worn-out hook-and-loop pad. But you will waste less sandpaper, because hook-and-loop discs can be removed and reused several times. They also make it easier to change back and forth between grits. ▲

OPTIONS WORTH HAVING

- **Replacement pad.** With this pad, you'll be able to switch between PSA and hook-and-loop, giving you more flexibility for different sanding operations.
- **Polishing pads.** These are useful if you plan to buff finishes.

Random-Orbit Sanders



DeWalt DW443



Metabo 0125

	Brand & Model	List Price	Pad Dia. (in.)	Pad Type	Pad Brake	Orbits per Minute	Dust Collection	Amps	Weight (lbs.)	Comments
RIGHT-ANGLE	Porter-Cable 7334	\$225	5	PSA	N	6,000	VP	3.7	5.5	Dust skirt optional.
	Milwaukee 6127	270	5	PSA	N	10,000	VP	5.5	5.5	Paddle switch.
	Porter-Cable 7335	245	5	PSA	N	2,500 - 6,000	VP	3.7	5.5	Dust skirt optional.
	Bosch 1370 DEVS	427	6	HL	Y	4,800 - 12,000	VP, DB	5	5	Adjusts for straight or slip drive.
	DeWalt DW441	240	6	PSA	Y	6,800	VP, DC	4.3	5.6	Rubber-covered gear case.
	DeWalt DW443	266	6	HL	Y	4,000 - 6,800	VP, DC	4.3	5.7	Rubber-covered gear case.
	DeWalt DW444	266	6	PSA	Y	4,000 - 6,800	VP, DC	4.3	5.7	Rubber-covered gear case.
	Fein MSf 636-1	695	6	HL	Y	7,500	VP	3.6	3.7	Dust extraction through and around pad.
	Milwaukee 6126	250	6	PSA	N	10,000	—	5.5	5.2	Paddle switch.
	Porter-Cable 7336	250	6	PSA	N	6,000	VP	3.7	5.8	Dust skirt optional.
IN-LINE	Craftsman 11604	60	4½	PSA	N	11,000	DB	2	4	Removable front handle.
	Ryobi RS-115	70	4½	HL	N	11,000	DB	2	3	Buffing pad optional.
	Skil 7384	91	4½	HL	N	11,000	VP, DB	1.8	3.1	Removable front handle.
	Black & Decker BDS200	160	5	HL	Y	7,500 - 10,000	VP, DB	2.8	4.5	Side handle adjusts to any position.
	Black & Decker Quantum BD5100	140	5	HL	Y	10,000	VP, DB	2.8	4.5	Side handle adjusts to any position.
	Bosch 3283DVS	169	5	HL	N	8,000 - 11,000	VP, DB	2.3	4	Adjustable front handle.
	Bosch B7250	169	5	HL	N	8,000 - 11,000	VP, DB	2.3	4	Adjustable front handle.
	Metabo 0125	223	5	HL	N	5,000 - 12,000	VP, DB	1.8	5.2	Adjustable side handle.

Chart continued on next page.

See page 116 for listing of manufacturers.

KEY: Pad Type: HL = hook-and-loop, PSA = pressure-sensitive adhesive.
Dust Collection: DB = dust bag, DC = dust canister, VP = vacuum port. — = not applicable. Editors' Choice.

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Random-Orbit Sanders

	Brand & Model	List Price	Pad Dia. (in.)	Pad Type	Pad Brake	Orbits per Minute	Dust Collection	Amps	Weight (lbs.)	Comments
IN-LINE	Skil HD7750	\$159	5	HL	N	8,000 & 11,000	VP, DB	2.3	4	Adjustable front handle.
	Wen 18	90	5	HL	N	13,000	DC	2.5	3.2	Auxiliary handle.
	AEG TXE 150	275	6	HL	Y	8,000 - 11,000	DB	3.5	5.5	Dust extraction through and around pad.
PALM-GRIP	Craftsman 27714	40	4½	PSA	N	11,000	—	2	3.3	Sealed rocker switch.
	Ryobi RS112	50	4½	HL	N	11,000	—	2	2.1	Sealed rocker switch.
	Makita B0 5000	120	5	HL	N	10,000	VP	1.7	2.9	Optional vacuum.
	DeWalt DW420	120	5	PSA	Y	12,000	—	2	3	Sealed rocker switch.
	DeWalt DW421	138	5	HL	Y	12,000	VP, DC	2	3.2	Sealed rocker switch.
	Jepson 6250	90	5	HL	Y	11,000	DB	1.9	3	
	Porter-Cable 332	120	5	PSA	Y	12,000	—	1.7	3.2	HL pad available.
	Porter-Cable 333	135	5	HL	Y	12,000	VP, DC	1.7	3.5	Rotating dust canister.
	Porter-Cable 334	135	5	PSA	Y	12,000	VP, DC	1.7	3.5	Rotating dust canister.
	Wen 15	70	6	PSA	N	3,000	—	2.5	3.5	Tall profile.



Porter-Cable 333



Makita B0 5000

KEY: Pad Type: HL = hook-and-loop, PSA = pressure-sensitive adhesive.
Dust Collection: DB = dust bag, DC = dust canister, VP = vacuum port. — = not applicable. Editors' Choice.

See page 116
for listing of manufacturers.



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general-purpose and
specialized cutting.**

The bandsaw isn't usually the first stationary tool a woodworker buys. But this saw's great versatility makes it an all-but-indispensable machine. With its endless blade, the bandsaw can negotiate delicate curves, resaw wide stock, and do plenty of work in between.

Bandsaws aren't complex machines, but there are important differences between models. In our test of more than 20 bandsaws from 16 different manufacturers (see AW #38), we evaluated these differences in detail. You can use our findings to determine which machine in the chart on page 70 is best for you.

Two or Three Wheels

Bandsaws are sized according to their *throat capacity*, the distance between the blade and the housing that connects the upper and lower wheels. Throat capacity tells you the maximum width of cut you can make on a given saw. On two-wheel models, throat capacity is determined by the wheel diameters. On three-wheel bandsaws, the extra wheel—located at the side of the machine—is used to increase throat capacity. (See top left photo, opposite page.)

While they offer large throat capacity, three-wheel bandsaws place more strain on blades. With few exceptions (Inca's model 710, for example), three-wheel saws aren't designed to handle blades wider than $\frac{3}{8}$ in or $\frac{1}{2}$ in. These

machines are best suited to light-duty work—projects that involve intricate curves in stock that isn't too thick.

Benchtop or Floor Model?

While you can do small work on a large bandsaw, you can't tackle large work on a small one. For this reason, a good rule of thumb is to buy the largest machine you can afford.

If budget or space dictate a smaller saw, you may want to consider a benchtop model. Whether they're two-wheel or three-wheel models, benchtop bandsaws are typically lighter and less powerful than floor models. But this isn't to say benchtops are inferior; they excel at light-duty cutting and scroll work.

If you plan on cutting curves in thicker stock and doing occasional resaw work, focus on a medium-size floor model. These bandsaws have throat capacities in the 10- to 15-in. range and motors rated between $\frac{1}{2}$ HP and 1 HP. For heavy-duty resawing or continuous production use, look for 16-in. to 18-in. saws with frames and motors suited to wider blades.

A Guide to Guides

To keep its blade on track, a bandsaw relies on guide assemblies: one above the table and one below it. Each assembly has a thrust bearing and a pair of blade guides. As the workpiece is fed



Three wheels. These bandsaws increase throat capacity by creating a triangular blade path.

into the saw, the thrust bearings keep the blade from shifting backward and jumping off the wheels. The guides reduce side-to-side blade twist, which causes bowed or wandering cuts.

The lower guide assembly is fixed. The upper guides are mounted on a post that can be moved up and down above the workpiece, adjusting to different thicknesses. On a good-quality bandsaw, the guide post will lock firmly in position and stay that way as the cut is made. And as the post is raised and lowered, the guides should remain parallel to the blade.

As for the guides themselves, there are several different types (See photos, right.) Metal guide blocks require clearance between the blade and the guides, but this means the blade may twist slightly in the cut. Metal guides also tend to run hot. "Cool Blocks®" aftermarket guides can be set right against the blade to eliminate twisting. (See box, below.) Ball-bearing guides also eliminate twist because they bear

OPTIONS WORTH HAVING

■ **Cool Blocks®.** These replacement guide blocks are made of graphite-impregnated phenolic laminates and help eliminate blade twisting (available from Garrett Wade, 800-221-2942).

■ **Task light.** A magnetic or clip-on light gives an extra measure of illumination for close work.

against the blade. They come in two types: the "European" guides (see bottom photo, right) are easier to adjust than the more common "American" guides (see center photo, right).

Quality Matters

The frame must be rigid to avoid blade twist and wander. Cast-iron frames tend to be more rigid than aluminum ones, but the aluminum frame on the Kity 613 was an exception to the rule.

The table is also important. Look for a big table if you work with oversized stock often. Tables that tilt in two directions instead of just one are more versatile, especially for cutting dovetails on the bandsaw. The trunnion assembly that allows the table to tilt and also secures it to the frame should do its job without flexing. Angle adjustments should lock firmly.

In terms of power, our tests showed that a bandsaw's cutting performance is not as closely correlated to motor rating as you might think. This is because there are many ways in which power is lost en route from motor to blade. Wheel balance, bearing quality, runout, and blade-guide adjustment all influence cutting efficiency.

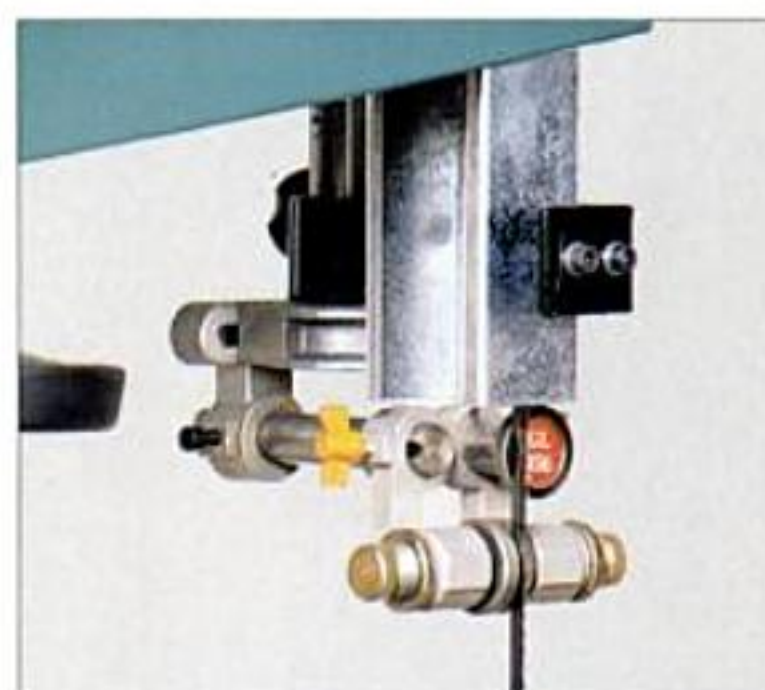
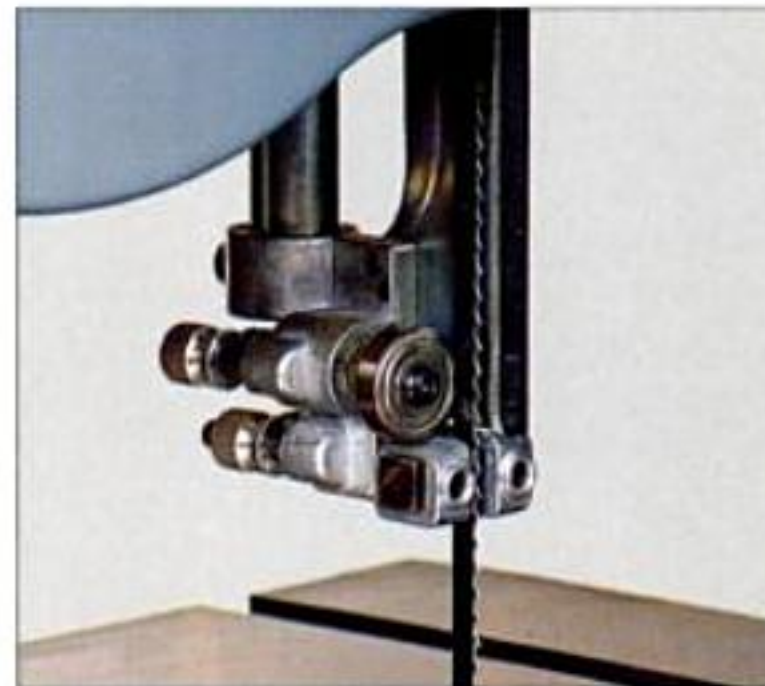
If you buy a "bargain" bandsaw, don't expect it to run like it should straight out of the box. You may get the power and cutting capacity you're after, but the saw will probably require some tweaking to operate smoothly (See "Tuning a New Bandsaw," AW #38, page 43.)

Picks From Our Tool Test

We tested 21 bandsaws in our AW #38 review, and of these we gave five models our Editors' Choice award for superior performance and features in their class. (See chart.)

In the benchtop category, we picked the 10-in. Dremel 1120. In the three-wheel category, our favorite was the well-made Inca 710. Tops in the medium-duty category were the 12-in. Kity 613 and the 15-in. General 490-1. And for production shops or for woodworkers who do a lot of resawing, we liked the Bridgewood PBS440B.

Two saws earned our Best Buy award—most features and best performance for the price. These were the 12-in. Delta 28-190 (street price around \$399) and, with a caveat, the 16-in. Grizzly G1073 (street price around \$550). We had to replace the motor and a guide post bracket on our test saw to get it running right—repairs we felt most woodworkers could do. ▲



Types of blade guides. Metal guide blocks (top) run hot and allow the blade to twist in the cut. Ball-bearing guides eliminate blade twist and run cooler. "European" guides (bottom) are easier to adjust than "American" ones (center).

Bandsaws



Ski HD3640



General 490-1



Delta 28-245

Brand & Model	List Price	Size (in.)	Resaw Capacity (in.)	Table Tilt Left, Right (°)	Blade Guide Type	Maximum Blade Width (in.)	HP	Volts	Dust Collection Port	Weight (lbs.)	Comments
Delta 28-180	\$216	8	5	0, 45	M	3/8	1/5	115	Y	35	Safety sliding blade guard.
Ryobi BS900	179	9	3 1/4	45, 45	M	3/8	1/3	115	Y	30	Built-in wheel brush.
Black & Decker 9443	305	10	3 7/8	0, 45	M	3/8	1/5	115	N	33	3-wheel saw.
Craftsman 24453	200	10	3	0, 45	M	1/4	1/5	115	Y	28	3-wheel saw; variable speed.
Craftsman 24460	140	10	3	0, 45	M	1/4	1/5	115	Y	43	3-wheel saw.
Dremel 1120	365	10	7	0, 45	P	1/2	1/2	115	Y	65	2 speeds for metal cutting.
Ski HD3640	498	10	7	50, 6	P	1/2	1/2	115	Y	64	Double-hinged ABS plastic cover.
Inca 340	795	10 1/2	6 1/4	45, 0	CB	1/2	3/4	115	Y	75	Accepts scrolling and resaw blades.
Laguna Tools LT 13	595	13	6 1/4	2, 45	CB	3/4	3/4	115	Y	130	Cast-iron wheels.
Craftsman 24835	330	12	6	NA	M	1/2	5/8	115	Y	130	Head tilts 45° instead of table.
Delta 28-190	465	12	6	3, 45	M	1/2	1/2	115	Y	120	Work light included.
Kity 613	995	12	8	0, 45	RB	1	1 1/2	115	Y	175	Micro-adjust blade guides.
AMT 4113	299	14	6	NA, 45	M	3/4	1	115	N	160	Motor not included.
Belsaw MC-14BS-2	609	14	5 3/4	10, 45	M	3/4	3/4	115	N	190	Riser block kit optional.
Bridgewood BW-14BS	299	14	6	10, 45	M	3/4	3	115	N	189	Riser block kit optional.
Bridgewood BW-14BSMW	349	14	6	10, 45	M	3/4	3	115	N	205	3 speeds for metal cutting.
Delta 28-245	719	14	6 1/4	10, 45	M	3/4	1/2	115	Y	201	Micro-adjust blade guides.
Delta 28-283	966	14	6 1/4	10, 45	M	3/4	3/4	115	Y	224	Micro-adjust blade guides.
Grizzly G1019	295	14	6	10, 45	M	3/4	3/4	115/230	N	185	Circle-cutting attachment.
Hitachi CB75F	4,500	14	11 13/16	0, 45	BB	3	2 7/10	115	Y	309	Designed for resawing.
Jet JWBS-14CS	677	14	6	10, 45	P	3/4	1	115	Y	185	Micro-adjust top blade guides.
Jet JWBS-14MW	739	14	6	10, 45	P	3/4	1	115	Y	194	Micro-adjust top blade guides; 3 speeds for metal cutting.
Jet JWBS-14OS	577	14	6	10, 45	P	3/4	3	115	Y	172	Micro-adjust top blade guides.
Powermatic 043	848	14	7 1/2	15, 45	BB	3/4	3/4	115/230	Y	166	Square steel guide post.
Powermatic 141	1,711	14	6 1/2	15, 45	BB	3/4	3/4	115/230	Y	375	1-piece cast-iron frame.
Reliant DD90	270	14	5 3/4	10, 45	M	3/4	1	115/230	N	168	4 speeds for metal cutting.
Sunhill VBS-14	359	14	6	15, 45	M	1/2	1	115	N	200	Open stand.
Transpower SB500	250	14	6	10, 45	BB	3/4	1	115	N	195	3 speeds for metal cutting.
Craftsman 24393	700	15	8 1/2	0, 45	M	3/4	3/4	115	Y	260	Built-in wheel brush.
General 490-1	980	15	6 3/4	10, 45	M	3/4	3/4	115/230	N	320	Micro-adjust blade guides; 1-piece cast-iron frame.
Enlon EN-BS16	495	16	9 1/2	5, 45	M	1	1 1/2	115/230	N	218	3 speeds for metal cutting.
Grizzly G1073	550	16	7 1/4	10, 45	M	1	1 1/2	115/230	Y	320	Micro-adjust blade guides.
Laguna Tools LT 16	1,195	16	9	5, 45	BB	1	1 4/5	115	Y	270	2 dust collection ports.
Lobo BS-0163	549	16	10	10, 45	BB	1	1 1/2	115/230	N	270	3 speeds for metal cutting.
Reliant EE166	450	16	10 1/2	5, 45	M	1	1 1/2	115/230	N	286	3 speeds for metal cutting.

Chart [continued on page 72](#).

See page 116 for listing of manufacturers.

KEY: Blade Guide Type: BB = ball bearing, CB = Cool Blocks®, M = metal, P = plastic, RB = roller bearing, W = wood. NA = information not available. Editors' Choice. Best Buy.

Bandsaws



Laguna LT 18



Grizzly G1073

See page 116
for listing of manufacturers.

Brand & Model	List Price	Size (in.)	Resaw Capacity (in.)	Table Tilt Left, Right (°)	Blade Guide Type	Maximum Blade Width (in.)	HP	Volts	Dust Collection Port	Weight (lbs.)	Comments
Transpower SB600	\$475	16	10 1/2	10, 45	BB	1	1 1/2	115	N	325	3 speeds for metal cutting.
Bridgewood PBS-440B	1,595	18	9	5, 45	BB	1 3/16	2	230	Y	395	Foot brake; rack-and-pinion guide post.
Craftsman 24396	1,300	18	11	0, 45	M	1	1	115	Y	294	Built-in wheel brush.
Grizzly G1012	645	18	9 1/2	10, 45	M	1 1/2	2	230	N	320	3 speeds for metal cutting.
Laguna Tools LT 18	1,695	18	12	5, 45	BB	1	3	230	Y	390	Micro-adjust blade guides; foot brake.
Lobo BS-0183	669	18	9 1/2	10, 45	BB	1 1/4	2	115/230	N	370	3 speeds for metal cutting.
Mini-Max S45	1,590	18	10	0, 45	BB	1	1 1/2	230	Y	330	Quick-set top roller bearing guides.
Reliant DD18	630	18	9 3/4	5, 45	M	1 1/2	2	115/230	N	366	3 speeds for metal cutting.
Sunhill VBS-18	795	18	12	15, 45	M	1 1/4	2	115/230	N	450	Open stand.
Transpower SB800	625	18	10 1/2	10, 45	BB	1 1/2	2	115/230	Y	425	3 speeds for metal cutting.
Inca 710	1,695	20	8	45, 0	BB	1	1 1/2	115/230	Y	160	3-wheel saw; accepts scrolling and resaw blades.

FLOOR-MODEL

KEY: Blade Guide Type: BB = ball bearing, CB = Cool Blocks®, M = metal, P = plastic, RB = roller bearing, W = wood.
NA = information not available. Editors' Choice. Best Buy.

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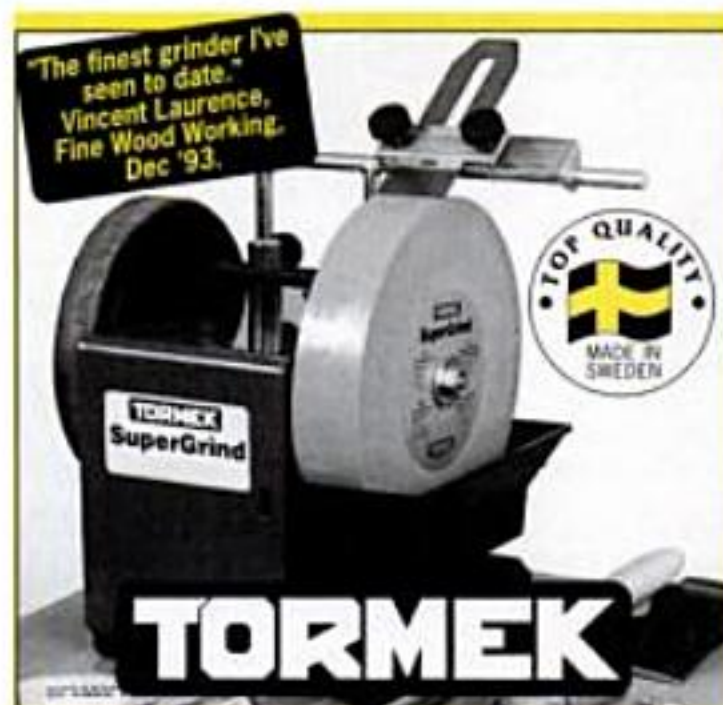


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Portable Belt Sanders

By Jim Barrett

**Belting Out
A-Flat in
Double Time**

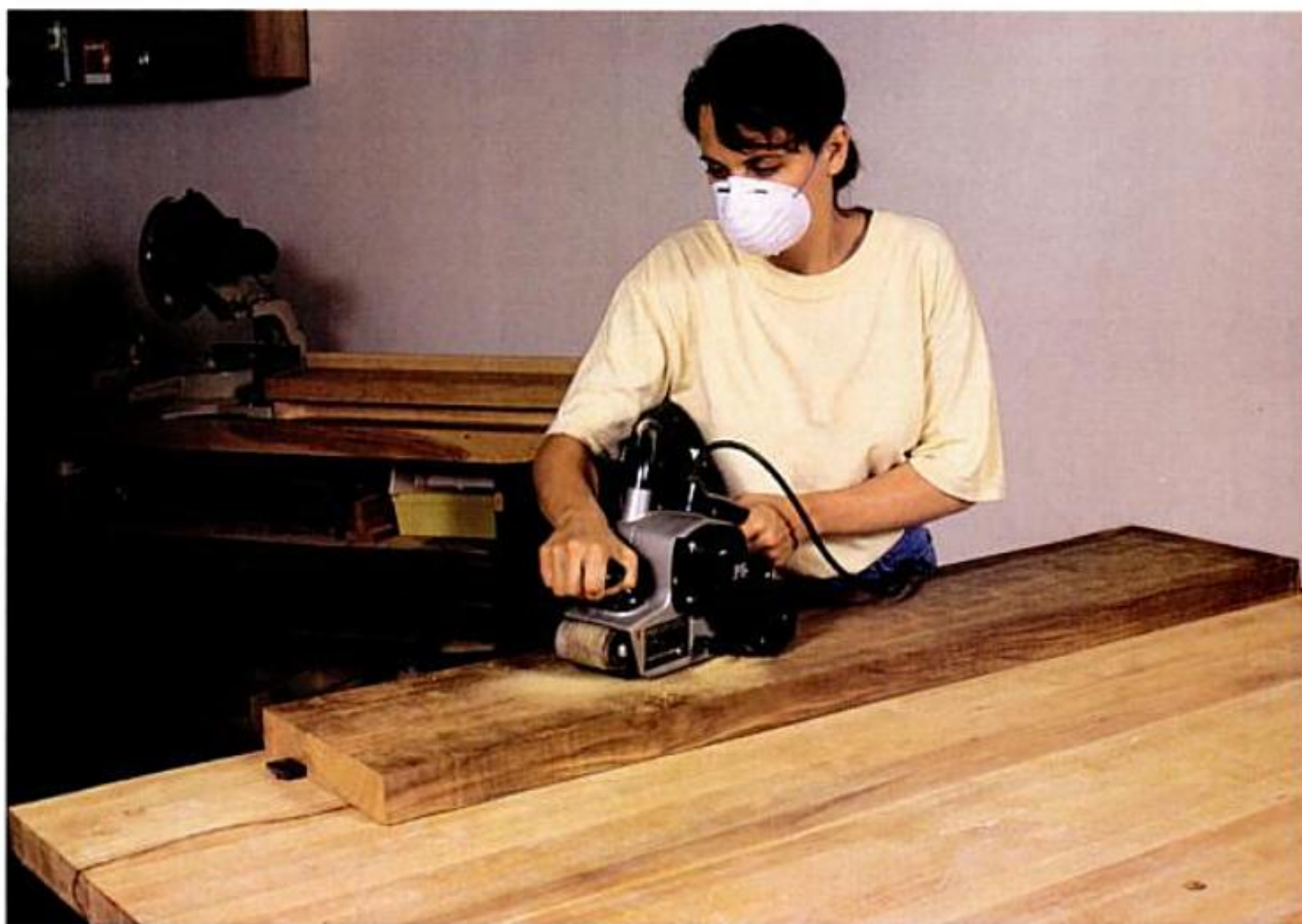


PHOTO BY ANDY RAE

The belt sander aggressively removes nicks and scratches and flattens stock quickly.

Most woodworkers consider sanding a chore, and rank it right up there with taking out the garbage, which—in a sense—it is. It's taking out the scratches, nicks, and milling marks left by various tools. Well, portable belt sanders can help with this nasty job. They remove stock quickly, clean up rough surfaces, and flatten glued-up tabletops and panel assemblies. Though they can't beat hand planes when it comes to perfectly flattening stock, belt sanders will smooth woods with wavy, interlocking, troublesome figure without tearing out the grain. In skilled hands, they're capable of finer work too, although belt-sanded surfaces usually require additional smoothing (with an orbital or random-orbit sander) before finish is applied.

In addition to flattening large work, some belt sanders can be mounted upside down or vertically on the bench to serve as stationary sanders for shaping and smoothing small parts.

How They Work

To remove wood, belt sanders use a continuous abrasive belt which is held in tension around two rollers. A universal (brush-type) motor drives the rear roller and thus the belt. A flat platen between the two rollers serves as a backing plate for the belt where it contacts the workpiece, helping the belt sander produce flat

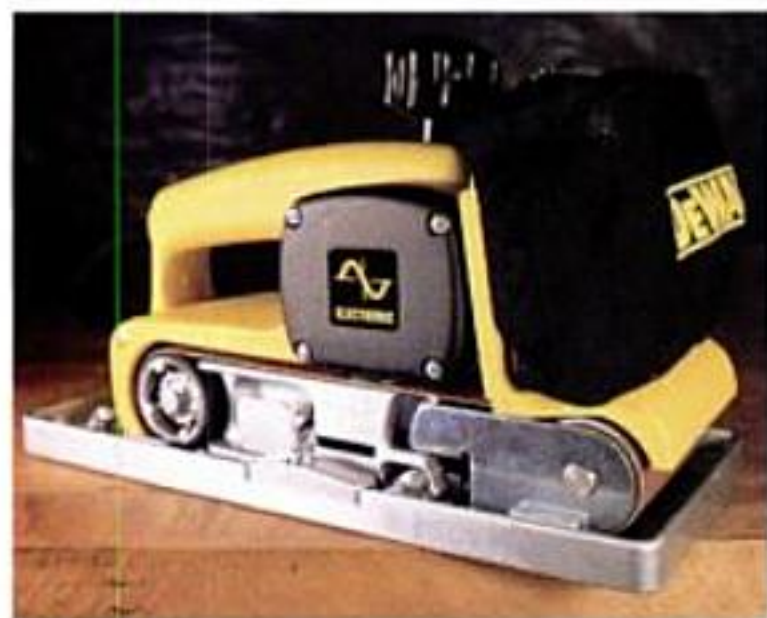
surfaces. The spring-loaded, freewheeling front roller retracts for changing belts.

A tracking mechanism, usually operated by a knob on the side of the sander, adjusts the angle of the front roller to keep the belt centered on the rollers and platen. Several lightweight consumer models from Black & Decker, Skil, and Sears have an automatic tracking system that requires no user adjustment. On heavier models, though, the belts are under too much tension to make these devices efficient.

Size, Speed and Efficiency

A belt sander's size is determined by the width and length of its belt. The most common sizes are 3 x 21 in., 3 x 24 in., and 4 x 24 in. Smaller sanders generally don't remove stock as aggressively as larger models—but they're lighter, easier to handle, and generally less expensive. The smaller belts also cost less. Larger models are more useful if you do a lot of panel-sanding and flattening of wide, glued-up assemblies. The sanding efficiency of any model, however, really depends on four factors: belt speed, motor power, weight, and platen size.

Belt speed is measured in surface feet per minute (sfpm) and affects how fast the sander removes stock. Variable speed control allows you to slow down the belt for better control when sanding plywood and other veneered



Tipping prohibited. A sanding frame, which adjusts for amount of stock removal, acts like the sole of a plane, skipping over low spots and removing the high ones.

stock. Slower speeds will also help prevent burning of the workpiece when using fine-grit belts. Most electronic variable-speed tools have "smart" electronic feedback circuitry that maintains a constant belt speed under varying loads.

As a rule, larger sanders have more powerful motors. Within any given size range, however, it's best to have the most powerful motor you can get. While similar sanders may run at the same no-load speed, the one with the more powerful motor will maintain speed better under load without bogging down. Look at amp ratings rather than HP ratings to get an accurate idea of motor power.

Belt sanders weigh anywhere from 4 to 16 pounds. When sanding horizontal surfaces, the weight of a heavier machine provides stability and a more aggressive cut. If you need to do much vertical sanding, though, you would be better off with one of the lighter models. The use of light, tough plastic components in modern belt sanders has enabled manufacturers to pack lots of power in a relatively small, lightweight package.

All platens are at least as wide as the belt, but some are longer than others. Longer platens put more of the belt surface in contact with the work, removing stock more quickly. While the 3-in.-wide and 4-in.-wide platens have nearly the same surface area, the wider base on the latter makes the tool less tipsy when sanding wide, flat

surfaces (and more tipsy when sanding narrow work such as face frames). Some sanders are designed so that one edge of the belt is flush with the side of the tool. This is useful for sanding right up next to an abutting surface, such as inside a cabinet.

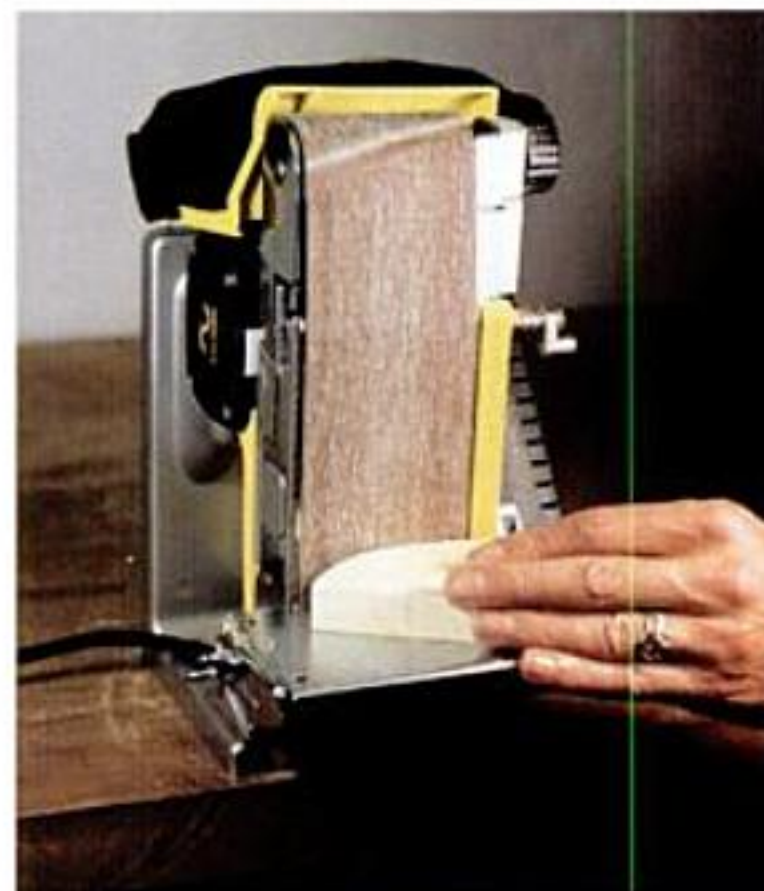
Other Features to Consider

Here are a few other considerations when shopping for a sander:

Handles—If possible, get your hands on the tool to check out its feel and heft before buying it. A sander's handles should feel comfortable and should balance the tool so the platen area lands flat as it is lowered onto the work surface. The front handles on some models detach, allowing you to squeak the tool into tight spots.

Switches and controls—The switch on any sander locks for continuous use. The lock needs to release easily in case of an emergency. The belt-release lever should be easily accessible and not pinch your fingers when changing belts (some snap back like a mousetrap). The levers on some larger machines will be harder to release because of their greater spring tension. The belt tracking knob should be easy to turn and the tracking mechanism should not need frequent readjustment while sanding.

Power cord—The power cord should be heavy-duty enough to stand



Sitting up at the table. Some models, like the DeWalt machine shown here, have inversion stands that let you mount the sander horizontally or vertically on your bench.

up to abuse and long enough to give the tool room to move on a large project. Cords that connect at an upward angle near the top of the rear handle let you comfortably sling the cord over your shoulder to keep it out of the way when sanding.

Dust collection—Since belt sanders kick up clouds of fine dust, you'll want one with efficient dust control. Most models come with standard or optional dust bags—a feature you shouldn't do without. Some sanders have dust ports that can be hooked up to a shop vacuum. Although the hookup can make for awkward sanding in some cases, it's worth it.

Check out the location of the dust bag. Front- or rear-mounted bags are generally less obtrusive than side-mounted bags, although the side-mounted bag on the Porter-Cable 351 conveniently swings out of the way to either side of the machine. Narrow, low-profile bags won't obscure your view of the work or get in the way when sanding in tight spots.

Noise—Some belt sanders are screamers. A long sanding session can leave your ears ringing unless you wear ear protection. If possible, compare the noise levels of the sanders you're considering buying. ▲

OPTIONS WORTH HAVING

- **Sanding frame.** Available for some models, this accessory makes it easier to sand plywood and other veneers, and prevents gouging caused by sander tilt. (See photo, above left.)
- **Bench-mount clamps or inversion stand with fence.** These conversion accessories, if available, turn your belt sander into a stationary model for small workpieces. (See photo, above right.)
- **Carrying case.** This nifty unit, which doubles as a lunchbox, protects your truck bed's paint from 80-grit scratches.

Portable Belt Sanders



AEG HBSE 75 S



Porter-Cable 352VS



Makita 9924DB



Hitachi SB75

Brand & Model	List Price	Belt Width x Length (in.)	Belt Speed (ft./min.)	Amps	Dust Collection	Weight (lbs.)	Comments
Skil 7313	\$87	3 x 18	700	4.5	DB	5.3	Auto-tracking belt control.
Wen 3600	86	3 x 18	1,000	4	VP	6.8	1-piece gear case.
AEG HBSE 75 S	359	3 x 21	490 - 1,040	7.8	DB	8.4	Quick-release belt tension lever.
Black & Decker Quantum BD5500	189	3 x 21	600 - 950	5.2	VP, DB	8	Quick-release belt tension lever.
Bosch 3270DVS	279	3 x 21	550 - 1,100	5	VP, DB	7.1	Removable front handle.
Bosch B7350	279	3 x 21	550 - 1,100	5	VP, DB	7.9	Removable front handle.
Craftsman 11712	60	3 x 21	1,100	4.7	—	7.8	Front auxiliary grip.
Craftsman 11713	80	3 x 21	1,300	7	—	11.4	Front auxiliary grip.
DeWalt DW430	291	3 x 21	1,100	5.2	DB	6.2	Automatic belt tensioning.
DeWalt DW431	331	3 x 21	475 - 1,100	5.2	DB	6.2	Automatic belt tensioning.
Hitachi SB75	297	3 x 21	1,180 - 1,475	8.7	DB	9.7	Quick-release belt tension lever.
Makita 9900B	344	3 x 21	1,180	7.8	DB	10	Replaceable ceramic wear plate.
Makita 9901	278	3 x 21	1,246	6.7	DB	7.7	Quick-release belt tension lever.
Metabo 0775	318	3 x 21	1,300	5.5	DB	11.5	Ceramic guide blocks.
Porter-Cable 351	280	3 x 21	1,300	7	—	10	Quick-release belt tension lever.
Porter-Cable 352	290	3 x 21	1,300	7	DB	12.5	Quick-release belt tension lever.
Porter-Cable 352VS	305	3 x 21	850 - 1,300	7	DB	12.5	Fingertip belt-tracking knob.
Skil HD7625	279	3 x 21	550 - 1,100	5	VP, DB	7.1	Removable front handle.
Bosch 1272D	375	3 x 24	1,550	10.5	VP, DB	14	Replaceable ceramic wear plate.
Makita 9924DB	329	3 x 24	1,300	7.8	DB	10.2	Quick-release belt tension lever.
Milwaukee 5925	449	3 x 24	1,400	10	DB	13.8	Lock-on switch control.
Porter-Cable 360	365	3 x 24	1,500	10.5	DB	14.5	Fingertip belt tracking knob.
Porter-Cable 361	345	3 x 24	1,550	10.5	DB	13.8	Quick-release belt tension lever.
Porter-Cable 503	655	3 x 24	1,500	9	DB	15	Quick-release belt tension lever.
Porter-Cable 504	635	3 x 24	1,600	9	VP	15.5	Fingertip belt-tracking knob.
Craftsman 11792	110	4 x 21	1,300	7.5	DB	12.5	Quick-release belt tension lever.
Bosch 1273DVS	415	4 x 24	1,150 - 1,550	10.5	VP, DB	14.8	Replaceable ceramic wear plate.
Bosch B7450	375	4 x 24	1,550	10.5	VP, DB	14.8	Replaceable ceramic wear plate.
Hitachi SB10T	403	4 x 24	1,150 - 1,380	8.7	DB	11.7	Quick-release belt tension lever.
Makita 9401	378	4 x 24	1,150	8.5	DB	16	Replaceable ceramic wear plate.
Milwaukee 5936	449	4 x 24	1,400	10	DB	14.5	Lock-on switch control.
Ryobi BE424	200	4 x 24	755 - 1,150	5.4	DB	7.9	Quick-release belt tension lever.

See page 116 for listing of manufacturers.

KEY: Dust Collection: VP = vacuum port, DB = dust bag, — = not applicable.

Drill Presses

By Jim Michaud

**More
Than Just
A Boring Tool**

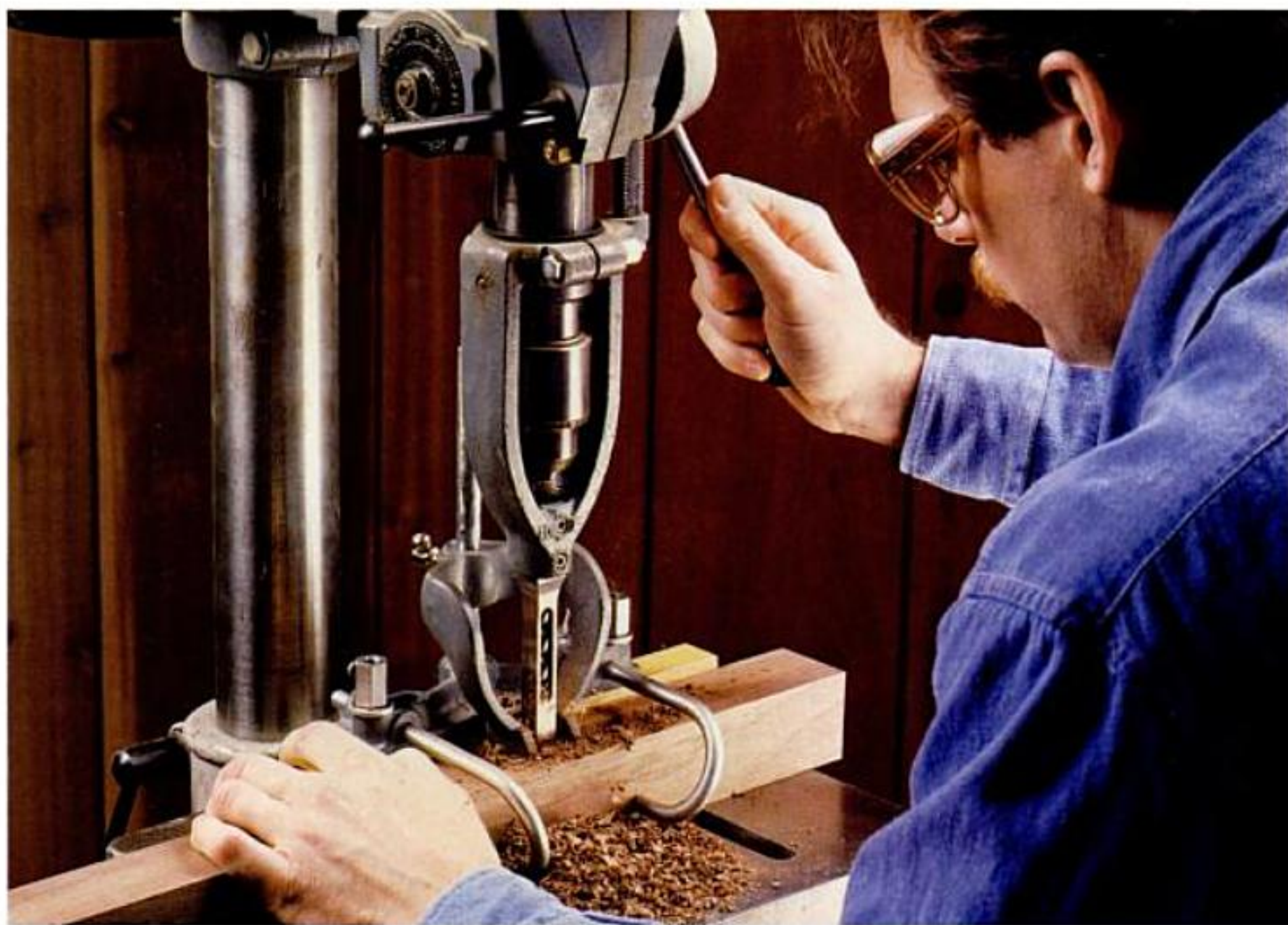


PHOTO BY MITCH MANDEL

Equipped with a hollow-chisel mortising attachment and bit, the drill press makes quick work of drilling precisely aligned, square-shouldered mortises.

The drill press may not be the first tool you'd buy for your woodworking shop, but the truth is, no workshop could be complete without one. Its principal function is precision drilling and boring—cutting accurately centered holes to precisely controlled angles and depths.

Some of the functions of the drill press can be emulated with a variety of angle and depth-control guides designed for use with a portable electric drill. But these accessories don't offer the precision or versatility you'll enjoy with a good drill press.

The drill press can also be put to work doing auxiliary tasks such as mortising (see photo, above), drum sanding, and powering cutters of all kinds, from plug and circle cutters to rotary planers. Set your drill press up with a jig or fence for a repeatable operation, and it becomes a time-saving machine for production runs. And if you do any kind of metalworking, the drill press should jump to the top of your shopping list—it's a top-priority tool for that kind of work.

Size and Power

Drill presses are simple machines. Although they vary greatly in size and cost (see left photo, opposite page), all drill presses share the same basic features within any given size

category. All models except the radial drill press (see right photo, opposite page) have a work table that adjusts up and down on its support column. Many tables also tilt by rotating on a pivot. All models have multiple speeds to cover a variety of applications and materials. And most models share the same basic mechanisms that allow you to set a positive depth stop at any point in the quill stroke (the vertical distance the chuck travels from full up to full down), and lock the quill at any point along the stroke.

The designated size of a drill press is expressed as double the throat capacity (the throat is the clearance between the drill center and the column). A 10-in. press has a 5-in. throat; this means that you'll be able to drill to the center of a 10-in. workpiece. Sizes for the building trades and home shops range from 8 in. to larger than 20 in.

Horsepower ratings on drill presses may appear very low for such large machines. A full-size drill press that you couldn't lift without help may be rated at $\frac{1}{2}$ HP—about the same rating as for a laminate trimmer that can fit in your back pocket. But geared down to its low speed ranges (starting at around 250 rpm for most mid-sized machines), that $\frac{1}{2}$ -HP motor will torque your biggest Forstner bit through hardwood stock.

Choosing the Right Machine

Capacities and clearances are more important than power in choosing the right drill press for your shop. The smallest drill presses don't have much to recommend them. With under 5 in. of throat capacity, minimal quill travel, and a 1/2-in. chuck, these miniature machines are simply too small for anything other than miniature work.

If budget allows, your best bet is a floor model. A freestanding drill press demands less floor space than any other stationary machine in the shop. It's got the capacity to handle after-market mortising attachments and plenty of power for turning the attachments that bog down small benchtop machines: circle cutters, wheel and rosette cutters and large Forstner bits.

As shown in the chart on page 80, there are larger benchtop drill presses with specifications (power, speeds, chuck capacity, quill stroke, etc.) that match or exceed those of some floor models. However, most of the larger benchtop machines are too hefty to be considered portable. In other

words, you won't want to be lifting the machine on and off the workbench all the time. And even a full-featured benchtop drill press can't compete with a floor model when it comes to vertical clearance under the chuck.

If you plan to bore through thick stock frequently, look for a model with a long quill stroke. Table size and adjustment are also

important considerations. A large table will provide extra support for oversized work and extra purchase for clamps and jigs.

The number of speeds and the choice between stepped and variable speed will depend on your budget and on the type of woodworking you do. A standard five- or six-speed model is adequate for most woodworking operations. If you plan to do a lot of drum-sanding, circle-cutting, or rosette work, a greater selection of speeds will help you tailor your rpm to the material, minimizing burning and tear-out. Variable speed control is less troublesome than the standard procedure of changing the drive belts' positions on the pulley assemblies. However, the belt-and-pulley system can't be beat for simplicity and durability.

Going Radial

If your projects involve complex angle-boring, you may want to consider a radial drill press. (See photo, above right.) On this type the work table remains flat, while the head (which houses the motor, quill and pulleys) is adjusted to direct the bit or attachment at just about any angle you want. The head is mounted on a horizontal tube (called a "ram") that can move in and out (toward or away from the column) and also rotate in both directions.



The radial drill press. The tube which holds the head assembly can spin on its column and tilt in either direction, making this type of drill press extremely versatile.

For difficult angle-boring, the radial drill press offers obvious advantages over a standard model, especially on large stock that would be difficult to clamp to a standard table. It's even possible to tilt the head to 90° for horizontal boring in long stock. Increased throat capacity is another advantage. As shown in the chart, radial models have throat capacities in the 16-in. range. These machines aren't powerful, but they're far more versatile than their conventional counterparts. ▲

OPTIONS WORTH HAVING

- **Cross-slide vise.** With screw-controlled east-west and north-south adjustment, the cross-slide vise offers micro-adjustment of the work. It can also serve as a quick-change adjusting clamp for shop-built jigs and fences, and it's the safest way to hold small work.
- **Hollow-chisel mortising attachment and bits.** Cutting square-edged mortises is quick, accurate and easy with this accessory. A selection of hollow-chisel bits will enable you to cut mortises of different widths. Make sure the attachment you buy will fit your drill press.
- **Light.** An inexpensive flexible-arm lamp (with clamp or magnet mount) will provide an extra measure of clarity when aligning bits and attachments over the work.
- **Sanding drums.** A set of different-diameter drums will enable you to smooth all kinds of curved work.
- **V-block.** This shop-made jig is nothing more than a block of wood with a V-shaped groove cut down its middle. You can use the V-block to brace dowels for boring.

Small and large. The work table on this Craftsman floor-model drill press holds a miniature benchtop model.

Drill Presses



Grizzly G1199



Delta 17-900



AMT 4910

Brand & Model	List Price	Throat Capacity (in.)	Chuck Capacity (in.)	Quill Travel (in.)	Spindle Speed (rpm)	HP	Volts	Amps	Weight (lbs.)	Comments		
BENCHTOP	Craftsman 21320	\$110	4	1/2	2	620 - 3,100	1/8	115	2.5	43	Table tilts.	
	Delta 11-950	179	4	1/2	2	620 - 3,100	1/4	115	5.9	49	Table tilts.	
	Ryobi DP80	130	4	1/2	2	540 - 3,600	1/4	115	5.9	44	Table tilts.	
	Skil 3380	215	4	1/2	2	620 - 3,100	1/4	115	5.9	47	Drill bit storage.	
	Woodtek 829785	109	4	1/2	2	620 - 3,100	1/4	115	5.6	40	Table tilts.	
	Reliant JDP3	100	4 3/32	1/2	1 7/8	700 - 3,000	1/4	115	3	53	1 7/8-in.-dia. column.	
	Black & Decker 9400	266	4 3/8	1/2	2	620 - 3,100	1/8	115	2.2	47	Table tilts.	
	Bridgewood BW-1012BA	129	5	1/2	2 3/8	690 - 3,000	1/3	115/230	8/4	77	Table tilts and adjusts w/crank.	
	Craftsman 21309	200	5	1/2	2 3/8	480 - 3,000	1/4	115	3.2	64	Table tilts and adjusts w/crank.	
	Ryobi DP100	160	5	1/2	2 3/8	620 - 3,100	1/4	115	5.9	68	Table tilts.	
	Delta 11-990	260	6	1/2	2	620 - 3,100	1/3	115	7.2	71	Table tilts and adjusts w/crank.	
	AMT 4592	198	6 1/4	5/8	3 1/4	250 - 3,100	3/4	115	10	100	Worklight.	
	Reliant DD50	160	6 1/2	1/2	3	580 - 3,890	1/3	115	3.3	143	Table tilts and adjusts w/crank.	
	Skil HD3580	424	6 1/2	5/8	3 3/8	500 - 3,100	1/3	115	6	102	Includes fence.	
	Transpower DP130	165	6 3/4	1/2	3 1/8	500 - 3,760	1/2	115	9.8	99	Table tilts and adjusts w/crank.	
Bridgewood BW-1412BA	199	7	1/2	3 5/16	480 - 2,120	1/2	115/230	7/3.5	132	Table tilts, rotates, adjusts w/crank.		
Grizzly G1199	235	7	5/8	3	250 - 3,100	1/2	115	9	150	Table tilts; worklight.		
FLOOR-MODEL	AMT 4562	245	6 1/4	5/8	3 1/4	250 - 3,100	3/4	115	10	120	Worklight.	
	Craftsman 21313	250	6 1/2	1/2	3 1/4	500 - 3,100	1/3	115	6	131	Table tilts and adjusts w/crank.	
	Enlon EN-DP13F	210	6 1/2	5/8	3	230 - 3,200	1/3	115	7.5	112	Table tilts and adjusts w/crank.	
	Transpower RX160	195	6 3/4	5/8	3 1/8	300 - 3,700	3/4	115	13.8	130	Table tilts and adjusts w/crank.	
	Delta 14-070	377	7	5/8	3 1/3	250 - 3,000	1/2	115	9.8	157	Table tilts and adjusts w/crank.	
	Grizzly G1200	295	7	5/8	3	250 - 3,100	1/2	115	9	150	Table tilts; worklight.	
	Penn State DPF	220	7	5/8	3 1/8	600 - 3,720	1/2	115	7	128	Table adjusts w/crank.	
	Powermatic 1140	428	7	1/2	3 5/16	250 - 3,100	3/4	115/230	13	170	Removable key switch.	
	Craftsman 21315	300	7 1/2	5/8	3 1/4	250 - 3,100	1/2	115	8	132	Table tilts and adjusts w/crank.	
	General 34-01	680	7 1/2	1/2	4 1/2	460 - 4,910	3/4	115/230	8	210	Table tilts.	
	Powermatic 1150-A	2,387	7 1/2	1/2	6	475 - 4,800	1	115/230	16	325	Infinitely variable speeds.	
	Lobo DP-016F	199	8	5/8	3 1/2	240 - 3,800	3/4	115	NA	135	T-slot in table.	
	Delta 17-900	462	8 1/4	1/2	3.35	250 - 3,000	3/4	115	13.8	194	Table tilts and adjusts w/crank.	
	Woodtek 816805	369	8 1/4	5/8	3 1/4	250 - 3,000	3/4	115/230	10/5	165	Table tilts.	
	Bridgewood BW-1758FA	299	8 1/2	5/8	3 1/8	350 - 3,900	3/4	115/230	11/5.5	163	Table tilts and adjusts w/crank.	
	Craftsman 21317	400	8 1/2	5/8	3 1/4	200 - 3,630	3/4	115	10	165	Table tilts and adjusts w/crank.	
	Reliant DD55	270	8 1/2	5/8	3 1/4	340 - 2,800	3/4	115	5.3	194	Table tilts and adjusts w/crank.	
	Transpower RX180	225	8 1/2	5/8	3 5/16	240 - 3,800	1	115	16	178	Worklight.	
	Grizzly G1201	445	9	5/8	5	150 - 2,470	3/4	115	12	300	Table tilts; worklight.	
	Brand & Model	List Price	Throat Capacity (in.)	Chuck Capacity (in.)	Quill Travel (in.)	Spindle Speed (rpm)	HP	Volts	Amps	Weight (lbs.)	Ram Travel (in.)	Head Tilt Left, Right (°)
	Delta 11-090	\$376	16	1/2	3 3/8	580 - 3,450	1/3	115	7.2	82	11 1/2	90, 45
AMT 4910	324	17	1/2	3 5/16	540 - 3,600	1/3	115	4.5	90	17	90, 45	
Craftsman 21334	299	17 1/8	1/2	3 5/16	540 - 3,600	1/3	115	4.5	80	12 3/4	45, 90	

See page 116 for listing of manufacturers.

Jigsaws

By Jim Barrett

**To Boldly Go
Where No
Saw Has
Gone Before**

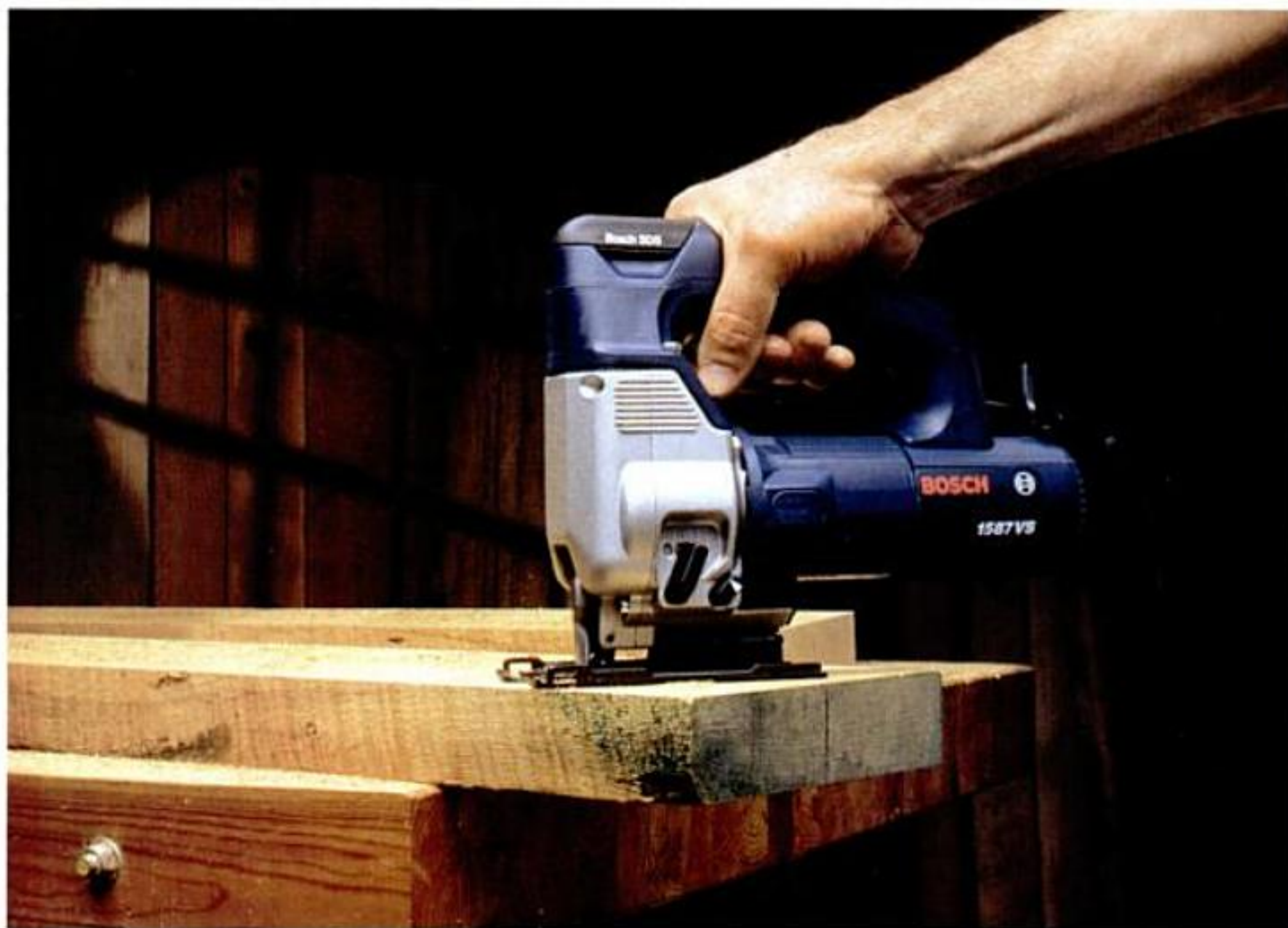


PHOTO COURTESY OF S.B. POWER TOOL CO.

Today's jigsaws make smooth, fast cuts in materials up to 2 in. thick.

The jigsaw, sometimes called a saber saw or bayonet saw, could easily be dubbed "the poor man's bandsaw" because of its curve-cutting ability. And a jigsaw really shines in the shop because it performs tasks that no bandsaw, scroll saw or coping saw can.

With a jigsaw, you can cut workpieces that are too bulky or heavy to lift onto a stationary saw. Also, since you're not limited to a particular throat depth, you can saw into workpieces of any width or length. And a jigsaw cuts a wide variety of materials: wood, plastics, even metal. In addition, most jigsaws have tilting bases that let you make bevel cuts up to 45°.

How Much Saw Do You Need?

Before you shop for a jigsaw, look at what kind of work you'll ask of it—and how often you'll be using it. Better saws have heavier, finely machined components, ball bearings instead of sleeve bearings, good balance, and smooth operating controls, all of which adds up to smoother cuts, greater user comfort, and longer tool life.

While most jigsaws have roughly the same depth-cutting capacity—between 2 in. and 2¾ in.—the thickness and density of the material you can cut depends largely on motor power. To determine power, check the amperage rating of the motor. A 4-amp tool usually provides

enough juice for most cutting chores, including cutting through 1½-in.-thick hardwoods.

The better jigsaws have a roller guide just above the baseplate which supports the blade during cutting. Most of these guides consist of a grooved roller behind the blade that prevents side-to-side and backward blade deflection, for truer cuts and less blade breakage. Some AEG and Porter-Cable models also sport guides on both sides of the blade much like the blade guides on a bandsaw.

A few saws are designed to blow air on the cut line, helping to remove chips and dust as you saw. (See chart, page 84.) Some models are more efficient than others.

Shopping for Saws

So which jigsaw is for you? Here are some features to check out:

Orbital vs. straight-line action—Early jigsaws cut only in a straight up-and-down motion. Recently, more models have become available with an orbital blade action. The orbital action moves the blade slightly forward and backward during the cut, resulting in a more aggressive cutting action. Most orbital-type jigsaws have four-position switches to vary the orbit action, from no orbit (straight-line motion) for smoother, cleaner cuts, to maximum orbit for an extremely fast cutting action.



Two grip styles. Body styles include top-handle (left) and barrel-grip (right).

Orbital motion not only increases cutting efficiency, it also keeps the blade cooler for longer life.

Speed control—While you'll still find a few single-speed and two-speed saws on the market, the majority have electronic variable-speed (EVS) control. Reducing speed gives greater control when cutting thin or delicate materials. On some saws, you control the speed directly through the on-off trigger switch; others have a separate calibrated dial, which enables you to maintain a precise speed. The latter is useful for long, continuous cutting operations. Better saws include a lock-on switch for continuous use.

Some saws also have "smart" electronic feedback circuitry that maintains a constant speed under varying loads, such as when you need to plow through a knot in wood.

Body design—Jigsaws come in two basic body styles: barrel-grip and top-handle. (See photo, above.) Aficionados of the barrel-grip like this handle style for its maneuverability when cutting curves. On some saws, you can remove the front knob to squeak the saw into tight places. Other woodworkers prefer top-handle



Stationary sawing. This bench-mounted inversion table turns a jigsaw into a sawing station.

saws because the design puts your hand over the work for greater control when cutting thick or dense materials. Those of you with small hands may find it harder to get a good grip on some of the fatter barrel-grip tools.

The baseplate—A jigsaw's baseplate plays an integral role in cutting accuracy, providing support for the saw while keeping the blade at a fixed angle to the work. Look for a thick, sturdy plate that won't flex under load.

Most baseplates tilt up to 45° to the left for making angled cuts; on some saws, the plate tilts 45° in both directions. If you expect to make a lot of angled cuts, look for a tilting mechanism with notches, or detents, that provide a positive 90° setting as well as commonly used angles such as 30° and 45°. In general, don't expect extreme accuracy when making angled cuts. Porter-Cable makes its saws with fixed baseplates, with the idea that most cuts are made at 90°.

Blade-changing—On most saws you change blades by loosening and tightening a setscrew in the blade holder with an Allen wrench or screwdriver. AEG saws have a simpler setup, with a blade lock/release lever that requires no tools. Bosch has a similar "quick-change" blade system on its newer saws.

Will one manufacturer's saw blades fit another manufacturer's saw? Yes—and no. Most jigsaws accept universal blades, which have one or two holes in the blade shank. These are available at most hardware stores and from tool catalogs. Hitachi, Makita and Ryobi use a slightly wider version of the universal blade that fits their saws only. AEG and Bosch saws use bayonet-shank, or "Bosch-style" blades, that fit only AEG or Bosch saws. Porter-Cable makes a hook-style blade. Both bayonet and hook designs eliminate the hole found in universal blades, which is the weak point where the blade usually breaks. Bayonet, hook and the wide-universal-style blades are available from catalogs or at industrial supply houses. Some saws accept more than one or all of the above blades. (See chart.)



Blade choices. Manufacturers' blade shanks vary. Left to right: universal-type blade; wide-universal Makita blade; bayonet-type blade; hook-style blade.

Scrolling feature—Some consumer-model jigsaws have a "scroll" curve-cutting feature that allows you to rotate the blade 360° without moving the saw body; instead, you turn a twist knob at the front end of the saw. With this feature you can do some fairly intricate scrolling in a limited amount of space. However, keep in mind that you won't find roller guides on saws that have the scrolling feature.

Cordless saws—As of this writing, Makita and Metabo offer cordless jigsaws that cut between 35 and 40 ft. of ½-in. plywood on a one-hour battery charge. To increase run time, pick up a spare battery so you can keep one on the charger while the other is in service. ▲

OPTIONS WORTH HAVING

- **Baseplate cover.** Protect your work from scratches by covering the metal baseplate with this plastic pad.
- **Anti-splinter insert.** Attach this plastic plate between the blade and baseplate to reduce tear-out in splintery materials.
- **Bench-mounted saw table.** This steel or aluminum plate attaches to a workbench and holds a jigsaw upside down for stationary sawing.
- **Edge guide with circle cutter.** Attached to your saw, this straight-edge will guide your cuts and can also be used as a trammel for circle-cutting.

Portable Jigsaws



AEG BSPE 100 X



Black & Decker Quantum BD4200



Makita 4307DW



Bosch 1587DVS

Brand & Model	List Price	Blade Mount Type	Roller Guide	Orbital Action	Stroke Length (in.)	Cuts per Minute	Amps	Dust Collection	Weight (lbs.)	Comments
AEG BSPE 100 X	\$320	B*	Y	Y	1	450 - 3,100	5.7	VP	5.1	Side blade guides.
AEG BSPE 100 XL	298	B*	Y	Y	1	450 - 3,100	5.7	VP	5.1	Opt. base cover.
AEG FSPE 100 X	320	B*	Y	Y	1	450 - 3,100	5.7	VP	5.1	Side blade guides.
AEG FSPE 100 XL	298	B*	Y	Y	1	450 - 3,100	5.7	VP	5.1	Opt. base cover.
Black & Decker 7568	81	U	Y	N	1 1/16	800 - 3,200	3.5	—	4	Chip deflector.
Black & Decker 7588	102	U	N	N	1 1/16	800 - 3,200	3.5	—	4	Scrolling feature.
Black & Decker Quantum BD4200	176	U	Y	Y	3/4	800 - 3,200	3.5	VP, DB	6	Opt. anti-splinter insert.
Bosch 1584DVS	300	B*	Y	Y	1	500 - 3,100	5	CB, VP	5.5	Base cover; anti-splinter insert.
Bosch 1584VS	285	B*	Y	Y	1	500 - 3,100	5	CB	5.5	Anti-splinter insert.
Bosch 1587DVS	310	B*	Y	Y	1	500 - 3,100	5	CB, VP	5.8	Base cover; anti-splinter insert.
Bosch 1587VS	295	B*	Y	Y	1	500 - 3,100	5	CB	5.8	Anti-splinter insert.
Bosch B4050	199	B*	Y	Y	5/8	300 - 3,000	3.6	—	2	
Bosch B4100	210	B*	Y	Y	5/8	300 - 3,000	4.8	VP	5.3	Anti-splinter insert.
Bosch B4200	285	B*	Y	Y	1	500 - 3,100	4.8	CB	5.5	Opt. anti-splinter insert.
Bosch B4300	275	B*	Y	Y	1	500 - 3,100	4.8	CB	5.5	Opt. anti-splinter insert.
Craftsman 1714	25	U	N	N	1/2	2,600/3,000	2.5	—	3.8	
Craftsman 1716	35	U	N	N	1/2	0 - 3,000	2.5	CB	3.9	
Craftsman 17204	40	U	N	N	5/8	0 - 3,000	2.5	—	4.5	Revers. dual-throat base.
Craftsman 17207	50	U	N	N	5/8	0 - 3,000	2.5	—	5	Scrolling feature; revers. dual-throat base.
Craftsman 17211	80	U	N	N	5/8	0 - 3,000	2.5	—	5.4	Scrolling feature.
Craftsman 27251	140	U	Y	Y	1	0 - 3,100	4.5	—	6.2	
DeWalt DW318K	277	U	Y	Y	1	0 - 3,100	4.5	—	6.2	Revers. dual-throat base.
DeWalt DW313	247	U	Y	N	1	0 - 3,100	4.5	—	6.2	Revers. dual-throat base.
Fein Aste 638	600	U	N	N	13/16	1,050 - 2,600	4.3	VP	4.8	Adj. base for close work.
Hitachi CJ65V2K	374	WU, B	Y	Y	1	700 - 3,200	5.2	DB	5.5	Opt. anti-splinter insert.
Hitachi CJ65VA2K	374	WU, B	Y	Y	1	700 - 3,200	5.2	DB	5.3	Opt. anti-splinter insert.
Makita 4301BV	292	WU, B	Y	Y	1	0 - 3,100	3.5	CB	6	Steel case.
Makita 4302C	351	WU, B	Y	Y	1	1,000 - 3,000	6	—	5.5	Soft-start motor.
Makita 4320	156	WU	Y	N	1 1/16	0 - 3,200	2.9	CB	2.9	
Makita JV2000	302	WU, B	Y	Y	3/4	0 - 3,400	3.2	CB	3.5	Circle guide.
Makita 4307DW	194	WU	Y	N	9/16	0 - 2,200	7.2V	—	3.1	Cordless.
Metabo E452	189	U, B	Y	N	3/4	500 - 3,000	4	CB	5	Anti-splinter insert.
Metabo EP455	215	U, B	Y	Y	3/4	500 - 3,000	4	CB	5.9	Anti-splinter insert.
Metabo EP564	279	U, B	Y	Y	1	500 - 3,000	5	CB	6.4	Anti-splinter insert.
Metabo EP565	279	U, B	Y	Y	1	500 - 3,000	5	CB	6.2	Anti-splinter insert.
Metabo EP140	319	U, B	Y	Y	5/8	700 - 2,500	9.6V	—	3.9	Cordless.
Milwaukee 6256	264	U	Y	N	1	0 - 3,100	3.8	—	5.7	
Milwaukee 6266	305	B*	Y	Y	1	450 - 3,100	5.7	VP	5.3	Base cover; anti-splinter insert.
Porter-Cable 548	355	H	Y	N	7/16	0 - 4,500	3.5	CB	6.5	Fixed base.
Porter-Cable 7349	205	U, WU, B, H	Y	Y	1	0 - 3,200	4	CB	6	Side blade guides.
Porter-Cable 7649	270	U, WU, B, H	Y	Y	1	500 - 3,200	4.8	CB	6	Side blade guides.
Porter-Cable 7549	270	U, WU, B, H	Y	Y	1	0 - 3,200	4.8	CB	6	Side blade guides.
Ryobi JS45	45	WU	N	N	5/8	0 - 3,000	2.5	—	3.1	Blade storage.
Ryobi JS045	90	WU	Y	Y	5/8	0 - 3,000	3	—	3.5	Revers. dual-throat base.
Skil 4235	61	U	N	N	5/8	0 - 3,200	3	—	3.6	Blade storage.
Skil 4355	72	U	N	N	5/8	0 - 3,200	3	—	3.9	Scrolling feature.
Skil 4395	78	U	N	Y	5/8	0 - 3,200	3.2	—	4	Scrolling feature.
Skil HD4560	145	U	N	N	13/16	0 - 3,200	3.5	CB	5.5	Scrolling feature.
Skil HD4580	162	U	N	Y	13/16	0 - 3,200	3.5	CB	5.6	

See page 116 for listing of manufacturers.

KEY: Blade Mount Type: B = bayonet, H = hook, U = universal, WU = wide universal. *Has quick-change feature. Dust Collection: CB = chip blower, DB = dust bag, VP = vacuum port. — = not applicable.

Belt/Disc Sanders

**The Versatile
Combination
Machine for
Sanding and
Shaping**



A combination belt/disc sander can handle all sorts of wood-shaping and light metal-grinding tasks.

A combination belt/disc sander will handle a multitude of wood-shaping and light metal-grinding tasks. It's hard to imagine just how versatile this machine is until you've worked in a shop that has one.

The abrasive belt comes in handy for sanding flat or convex surfaces. You also can sand concave shapes on the "end" of the belt where it passes over the pulley. Tilt the table and you can sand angles. The belts on most models adjust to both horizontal and vertical positions.

The belt sander is also useful for grinding chisels, plane irons and turning tools when a hollow grind isn't desired. The relatively slow speed of the abrasive belt produces less friction and heat than a high-speed grinding wheel, which means you don't have to worry so much about burning an edge. (*Caution:* Grinding sparks can ignite wood dust and cause a fire. Before grinding metal on a belt/disc sander, always be sure to vacuum up nearby sawdust and disconnect the machine from any dust collection system.)

The abrasive disc is capable of sanding with great precision. It's perfect for squaring up edges and sanding accurate angles. Most models feature a miter gauge and groove on the disc-sander table to keep your angles accurate. Tilting the table allows you to sand compound angles. If your miter joints are just a hair off, a light touch on the disc can trim things to fit. And no other tool leaves as smooth a finish on end grain.

The disc sander can also be used for pattern sanding. For this operation, an oversized workpiece is tacked on top of a pattern and then sanded to shape. The pattern rides against a strip of wood or metal clamped just in front of the sanding disc. This is a great technique for doing production runs of odd-shaped parts such as the bottoms and lids of oval boxes. (See AW #11, November/December 1989, page 24.)

By installing a pivot point on the disc-sander table, you can also sand accurate circles. This is especially useful for trueing up circles that have been cut to rough size on the bandsaw, or with



Versatile and precise. The belt sander on most models can be used in both horizontal and vertical positions. The disc table's miter slot and gauge make it possible to sand angles precisely. A stable stand is important for any belt/disc sander.

PHOTO COURTESY OF AMT



Belt/disc sander and then some. The Delta Sanding Center features a power takeoff spindle for mounting optional accessories: pneumatic sanding drum, flap wheel and flex shaft. An optional table allows circle-sanding up to 48 in. dia.

PHOTO COURTESY OF DELTA

a portable jigsaw. One belt/disc sander model, the Delta Sanding Center, features a built-in circle-sanding attachment for sanding circles with diameters up to 24 in. An optional extension accessory increases circle-sanding capacity to 48 in. dia. (See photo, above right.)

Shopping for a Sander

Capacity is the first point to consider, and on these sanders it's stated in terms of belt width and disc diameter. These two figures determine the maximum size of the work you can do. For the serious woodworker we recommend a 6-in. by 48-in. belt and a 9- or 12-in.-dia. disc. Abrasive belts and discs in these sizes are available from mail-order suppliers, or at building supply outlets.

A good belt/disc sander will have separate tables for the belt and the disc. Some bargain-priced sanders come with only one table instead of two. You have to move it back and

forth from the disc to the belt—a nuisance and a waste of time.

The tables themselves should be solid and well-machined. Likewise for the *trunnions*—the semicircular, under-table supports that let you adjust the table to different angle settings. A good table and trunnion assembly will lock securely at all angle settings, and won't flex under load, allowing you to support the work securely and precisely.

Good machining should also be evident in the *platen*—the flat metal area under the sanding belt—and in the steel or aluminum sanding disc. It's important that these two parts be flat. The sanding disc should also be balanced to minimize vibration.

A locking device on the belt-tracking adjustment knob is an essential feature on a belt/disc sander. It keeps the belt from drifting from side to side when the sander is turned on.

Finally, don't buy a sander that doesn't have a dust collection port.

These machines spew out plenty of dust. A dust collection hookup will let you breathe easier when using the machine, and when you've finished, you won't have to search for workshop items beneath a layer of freshly fallen sawdust. Because of the dust factor, it's also important to have a totally enclosed motor.

Street prices for combination belt/disc sanders run the gamut from less than \$100 for a small benchtop sander with a 4-in. by 36-in. belt and a 6-in.-dia. disc, up to \$1,200 or more for a top-of-the-line production sander with a 6-in. by 48-in. belt and a 12-in.-dia. disc. ▲

OPTIONS WORTH HAVING

■ **Abrasive cleaner stick.** Made of natural or synthetic rubber, these sticks renew clogged sanding belts and discs by removing abraded material.

6" x 48" Belt/Disc Sanders



Enlon EN-SN69



Delta 31-280

	Brand & Model	List Price	Disc Diameter (in.)	Disc Speed (rpm)	Belt Speed (ft./min.)	HP	Volts	Dust Collection Port	Weight (lbs.)	Comments
BENCHTOP	Powermatic 83	\$568	10	2,000	2,500	3/4	115/230	Y	120	Quick-change belt tension lever.
	Grizzly G1183	425	12	3,450	5,000	1	115/230	Y	160	Quick-change belt tension lever.
	Jet JSG-6	809	12	1,725	2,500	1 1/2	115/230	Y	150	Quick-change belt tension lever.
	Sunhill SB-12	449	12	1,750	2,925	1	115/230	N	160	Quick-change belt tension lever.
	Transpower VH120	450	12	2,800	2,800	2	115/230	N	275	Quick-change belt tension lever.
FLOOR-MODEL	AMT 4450	219	9	2,215	1,740	1	115	N	100	Motor not included.
	Belsaw MC-6/98D	451	9	1,725	2,100	3/4	115/230	N	106	Quick-change belt tension lever.
	Bridgewood BW-SB9	299	9	1,725	1,356	3/4	115	Y	130	One work table for belt or disc.
	Craftsman 22594	300	9	2,700	2,100	3/4	115	Y	133	Quick-change belt tension lever.
	Enlon EN-SN69	190	9	1,975	2,100	3/4	115/230	N	104	Open stand.
	Grizzly G1014	195	9	1,720	2,323	3/4	115/230	N	114	Quick-change belt tension lever.
	Jet JSG-96	459	9	1,725	1,525	3/4	115/230	Y	119	Open stand.
	Lobo SD-0069	199	9	1,800	2,323	3/4	115	N	130	Enclosed stand.
	Penn State S69-Q	230	9	1,720	1,800	3/4	115/230	Y	110	Quick-change belt tension lever.
	Reliant DD79	180	9	3,450	2,100	3/4	115/230	N	115	One work table for belt or disc.
	Transpower SD650	185	9	2,700	1,750	1	115	N	135	Quick-change belt tension lever.
	Woodtek 814253	269	9	1,725	2,100	3/4	115/230	Y	131	Fence stop.
	Bridgewood BW-64812	795	12	2,400	3,260	1 1/2	115/230	N	217	Enclosed stand.
	Delta 31-280	909	12	2,500	1,971	1 1/2	115/230	Y	182	Many optional accessories.
	Delta 31-730	1,006	12	2,100	3,030	1 1/2	115/230	N	158	Enclosed stand optional.
	Lobo SD-0612	499	12	1,800	2,323	1 1/2	115/230	Y	170	Enclosed stand.
	Powermatic 31	1,541	12	2,400	2,850	1 1/2	115/230	Y	308	Belt adjusts to 4 positions.
	Reliant DD126	399	12	2,000	1,576	1 1/2	115	N	320	One work table for belt or disc.
	General 100-5*	2,100	16	1,800	3,700	2	230	Y	610	Drum sanding optional.

See page 116
for listing of manufacturers.

KEY: *60-in. belt.

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CIRCLE NO. 102 ON PRODUCT INFORMATION FORM

Radial Arm Saws

By Roger Cliffe

A Carriage and Column Saw for Crosscutting and More

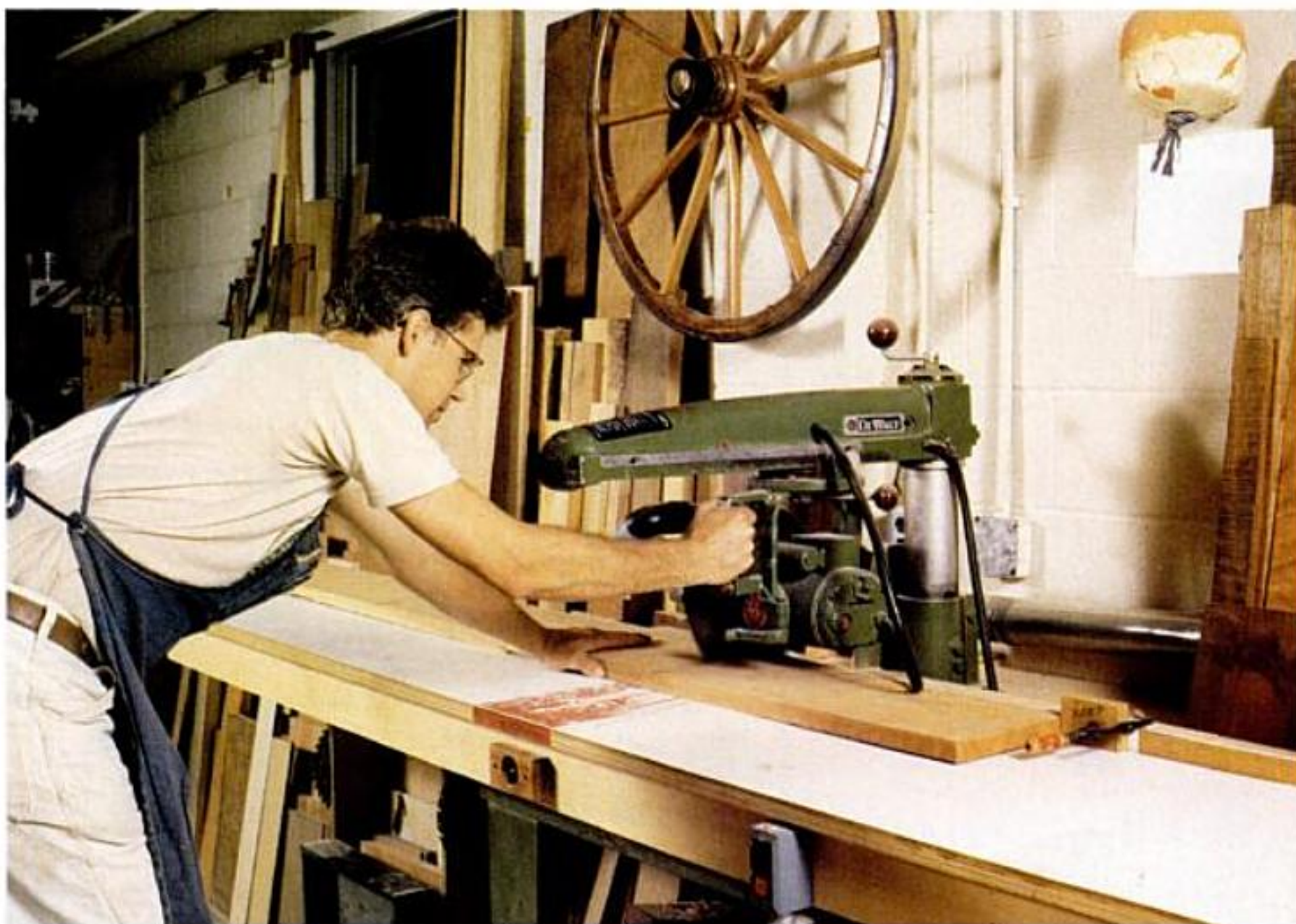


PHOTO BY ANDY RAE

The radial arm saw is the preferred tool for crosscutting and mitering long or heavy stock.

Since its invention in 1922 by Raymond DeWalt, the radial arm saw has found a central place in many woodshops. The radial arm saw is often used as a complement to the tablesaw, but many woodworkers, given the choice of only one, would choose the radial arm saw.

The radial arm saw is *the* tool to use for crosscutting or mitering long or heavy stock that would be too unwieldy to maneuver on the tablesaw. On a radial arm saw, instead of pushing the workpiece through the blade as you would on a tablesaw, you pull the overhead motor and blade through the workpiece, which rests on the table and is aligned by the fence. (See photo, above.) This design makes the radial arm saw a favorite of carpenters, who often bring one to the jobsite for cutting studs, rafters, and joists.

But this versatile saw is also capable of ripping, dadoing, coving, panel raising, jointing, and a host of other operations. And with the proper attachments, radial arm saws can be set up to do shaping and sanding as well.

Column, Arm, Carriage and Motor

All radial arm saws share a basic common anatomy and operation. The saw's arm pivots radially on a vertically adjustable column at the

rear of the saw. The motor and carriage assembly are suspended from the arm by a set of bearings which ride along a track in the arm. The yoke, which is part of the carriage assembly, holds the motor.

Of the several types of radial arm saws on the market, single-arm models are the most common. Their limitation is that, on left-hand mitering, the saw motor often overreaches the table. Industrial double-arm or "turret" models, such as the Delta 33-890, allow the saw to rotate 360°, giving full table capacity for mitering. (See left photo, opposite page.) Eumenia offers an unusual 8½-in. "closed-frame" model with a vertical front bar for greater upper-arm rigidity. (See center photo, opposite page.) On this model, the table pivots instead of the arm.

For crosscutting, the motor carriage is pulled along the arm through the workpiece. For ripping, the yoke is rotated 90° on the carriage, the carriage is locked in place on the arm at a selected point, and the workpiece is fed through the blade. You can tilt the motor on the yoke for mitering and beveling. And you can combine adjustments to cut compound angles, too.

Sizing Up Your Needs

A radial arm saw's size is designated by the diameter of the largest blade it is designed to use. As with a tablesaw or portable circular



Turret arm. Radial arm saws with a double, or "turret" arm offer full table capacity for mitering.

PHOTO COURTESY OF DELTA



A closed-frame saw. On the Eumenia 811, a vertical bar provides greater upper-arm rigidity.

PHOTO COURTESY OF GARRETT WADE



The benchtop option. This single-arm Ryobi has a carriage-advance control that also retracts the motor after a cut.

PHOTO COURTESY OF RYOBI

saw, a larger blade indicates greater depth-of-cut capability. It's also generally true that larger radial arm saws will have increased capacity for ripping and crosscutting.

If you're in the market for one of these saws, first decide whether you want a portable, or benchtop model, or a floor model. As you'll see in the chart on page 92, benchtop models have either 8½-in. or 8¼-in. blade capacity and weigh under 80 pounds.

Floor models sacrifice portability, but these are the machines of choice for heavy-duty production work. Most 10-in. radial arm saws will crosscut 12 to 16 in. and rip up to 25 in. (just past the center of a 49-in. panel).

If you're planning to use a dado set with your radial arm saw, make sure the saw arbor is long enough to

accept the stacked blades. Also consider the availability and price of different accessories you might want. (See box below.)

Safety and Dust Collection

All radial arm saws come with blade guards and anti-kickback pawls. Other safety features to look for include a blade brake—which may be manual or electronic—and a magnetic switch. The location of the switch is a consideration as well. Although switches on the carriage handle are more convenient when you're crosscutting, those on the end of the overhead arm are more accessible when you're doing ripping operations.

Dust-collection capability is also an issue when assessing these dust-throwing machines. Most radial arm

saws have dust-ejection ports located on the blade guard that can be connected to a vacuum.

What to Look For

So, what fine points distinguish quality in a radial arm saw? On more expensive saws you can expect to find a secure, well-mounted arm that will resist deflection. Carriage bearings should be of high quality and ride in a straight, well-machined track in the arm. These features will give you the smooth, slop-free carriage advance you need to make precise cuts time after time.

Some models sport other features that make basic cutting operations easier. The Ryobi RA202 has a unique feature which controls the advance speed of the carriage and retracts it after the cut. (See right photo, above.) And U-shaped carriage yokes on the Ryobi provide motor-mounting at two points instead of one, reducing motor vibration and giving rigidity for heavy cutting.

On any well-designed saw, detents and stops for beveling, mitering, and square cutting should be positive and solid. All adjustments should operate smoothly. You should be able to change the blade easily, and blade-guard operation should be trouble-free in any position.

As for motor power, a good 115-volt saw that draws 12 to 15 amps should give you all the power you need when used with the correct blade. ▲

OPTIONS WORTH HAVING

- **Low-hook angle blades.** These blades provide an extra measure of safety in radial arm saws because they're less likely to climb into the workpiece.
- **Dado head.** A chip-limiting dado head such as the Freud or CMT will reduce climbing when cutting dados.
- **Extension tables.** Added on both sides of the saw, table extensions provide support for long stock and a place for mounting stops for repeated crosscuts.
- **Molding head and guard.** With this accessory and a selection of molding knives, you'll be able to mill different profiles.
- **Sanding disc.** Replace the blade with a sanding disc, and you have an effective disc sander.
- **Sanding spindles.** Depending on the saw, spindles (good for sanding curves and contours) can be mounted on the blade arbor, on an auxiliary arbor, or in a chuck attached to either arbor.
- **Spindle chuck.** For saws equipped with an accessory shaft, a spindle chuck can hold bits for boring or routing and spindles for sanding curves.

Radial Arm Saws



Craftsman 19633



General V154

Brand & Model	List Price	Blade Dia. (in.)	Crosscut Capacity (in.)	Cutting Depth (in.) @ 90°	Table Size W x D (in.)	HP	Volts	Amps	Dust Collection Port	Weight (lbs.)	Comments
Craftsman 23470	\$300	8 1/4	12	2 3/4	30 x 21 1/2	2 1/2	115	13	N	76	Portable.
Ryobi RA202	450	8 1/4	10 15/16	2 1/8	21 3/8 x 27 1/2	NA	115	12.5	Y	65	Feed speed control device.
Eumenia 810	625	8 1/2	12	2	23 x 5 1/4	3/4	115	9	Y	68	Table rotates instead of arm.
Eumenia 811	749	8 1/2	24	2	23 x 5 1/4	3/4	115	9	Y	74	Table rotates instead of arm.
Transpower RS415	1,200	12	20 1/8	4	31 7/8 x 26	3	230	18	Y	385	Avail. Dec. '94.
Craftsman 19633	500	10	15 1/2	3	40 x 27	1 1/2	115/230	12/6	N	181	Carriage tracks replaceable.
Craftsman 19642	600	10	15 1/2	3	40 x 27	1 1/2	115/230	13/6.5	N	192	Carriage tracks replaceable.
Delta 33-990 Deluxe	804	10	12 3/4	3	42 x 24 3/4	1	115/230	16/8	Y	178	Blade brake.
Delta 33-890	1,829	12	14 3/8	4	25 1/2 x 30	1 1/2	115/230	20/10	Y	300	Turret arm rotates 360°.
General V154	3,900	12	25	3 5/8	41 1/2 x 28 1/2	3 1/2	230	10	N	550	Carriage tracks replaceable.
North State RS420	2,300	14	27 3/4	4 1/2	46 x 35	5	230	20	Y	500	Carriage tracks replaceable.
The Original 3531	3,770	14	16	4 1/8	46 x 33	3	230	18	Y	450	Automatic carriage return.
The Original 3536	3,965	14	24	4 1/8	46 x 33	3	230	18	Y	490	Automatic carriage return.

BENCHTOP

FLOOR-MODEL

See page 116 for listing of manufacturers.

KEY: NA = information not available.

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CIRCLE NO. 82 ON PRODUCT INFORMATION FORM

Lathes

By Stephen H. Blenk

Rounding Out Your Woodworking Options



PHOTO BY JOHN HAMEL

A lathe provides an enjoyable way to turn out a wide array of round wooden projects, from bowls to table legs and balustrade parts.

Most things round and wooden were born on a wood lathe. This time-honored tool provides a world of woodworking project options: chair and balustrade parts, custom table legs, finials and split-turned moldings, bowls, vessels, toys, cabinet pulls, and more. Lathes are versatile and fun to use, and the working principle is simple. You shape the workpiece as it spins, cutting into it with a variety of sharp tools.

The body of a lathe is basically made up of three parts: the headstock, the tailstock, and the bed. The headstock, which holds a powered shaft, or *spindle*, is fixed to one end of the bed. The tailstock, adjustable along the length of the bed, holds an unpowered spindle. The bed provides clamping surface along its length for the tool rest.

Serious turners should look for a machine with a cast-iron body—important for its great rigidity and vibration-dampening qualities. Lathes with beds of steel angle or pipe will flex in use, causing vibration and frustrating smooth cutting. Lathe stands need to be solid as well, whether commercial or shop-made.

Working Capacity

A lathe's size is designated by the *swing*, the maximum diameter of work it will handle. The spindles on a 12-in. lathe are centered 6 in.

above the lathe bed. The *distance between centers* refers to the longest stock that the tool will handle with the tailstock at maximum extension. Before buying a lathe, consider the largest-diameter bowl and the longest spindle you're likely to turn. For those just starting out and unclear on their future needs, I recommend a 12-in. general-purpose lathe with at least 36 in. between centers.

For those primarily interested in faceplate turning, there are short-bed or no-bed lathes designed to swing large-diameter work. These feature lower variable-speed ranges, larger-diameter spindles, and specialized tool rests. Some general-purpose lathes have outboard turning capability, which means you can turn large faceplate work on the outer end of the headstock spindle. (Outboard turning spins the work in the opposite direction and requires left-hand-threaded faceplates.) Avoid outboard-capacity lathes that don't provide an attached extension bed for the tool rest; freestanding rests are dangerous and hard to use.

Those mainly interested in spindle turning might want one of the longer-bed, smaller-swing lathes with an upper speed range of 3,000 to 4,000 rpm. ([See chart, page 96.](#)) Very long stock can be turned on a lathe such as the Conover; its headstock and tailstock are designed to be mounted on a wood beam of any length.



Benchtop economy. A benchtop lathe is an economical choice for the occasional turner, but capacity and stability are limited.

Spindles

Look for a lathe with tapered spindles. The tapers, conical-shaped recesses in the ends of the spindles, accept interchangeable *centers* between which the workpiece is mounted. A No. 2 Morse taper will accept many common accessories, including drive centers, live centers and chucks.

The drive spindle is threaded on the outside to accept faceplates and chucks. I like the 1-in.-dia., 8-threads-per-in. (tpi) spindle—the standard Delta/Rockwell thread. It's time-tested and accommodates many accessories.

Variable Speeds and Drive Systems

Lower turning speeds are better for large bowl work; spindle work requires higher speeds. For general turning, get a machine with a range from 400 rpm (or less) to 2,500 rpm

electronic variable speed. Step-pulley systems are adequate but limit you to a few fixed speeds that are changed manually with the motor stopped. Easy to use and maintain, but generally too fast for large-diameter work, these drives are best for spindle work and small faceplate work.

Mechanical variable-speed systems, or Reeves drives, allow infinite speed adjustment within the tool's range: You turn a crank or lever while the lathe is running. These systems usually give good service, but low speeds tend to be too fast for large work, or else they bog down under load. Vibration and belt slippage can also be problems, and the system may need frequent adjustment.

Electronic variable-speed (EVS) control allows infinite speed adjustment within the tool's range at the simple turn of a knob. Low-speed torque is excellent with EVS, and on some models, spindle direction is easily reversed. Unfortunately, these direct-current, or "DC" drives can cost as much as \$800. (For more on DC drives, see AW #34.)

As for power, though a ¾-HP motor will do, I recommend a 1-HP motor as a minimum.

Special Features and Specialty Lathes

Some lathes have attractive features such as spindle locks, which make it easier to remove faceplates and

(or more). My bowl lathe will turn at 50 rpm and my production spindle lathe at 3,600 rpm.

Several drive systems are used to power lathes: step-pulleys, mechanical variable speed, and

chucks. Some come with tool-rest holders that tighten quickly using a cam lock instead of a bolt. Some have a handy indexing feature that locks the work at graduated increments, allowing accurate layout of clock faces and spirals.

Swiveling headstocks get around the limitations in turning diameter created by the bed, and they also provide a different form of outboard turning which works reasonably well.

There are also a few different types of specialty lathes available, including miniature models and copy lathes. Miniature lathes, such as the Klein or Carbatec (see chart), have many of the same features you find on full-size machines and are quite capable with-



EVS control. Some lathes, like this cast-iron stationary model, offer electronic variable speed.

in their size limitations. Copy or "duplicator" lathes are designed for quantity spindle reproduction, and they're excellent for their designed function. However, they often fall short as general-purpose lathes, and they're also expensive.

Cost

You can expect to pay about \$500 for a good, full-size, general-purpose lathe without accessories. A top-of-the-line model will run you about \$3,000.

For beginners, my advice is to spend some time with an accomplished turner, take some lessons, and get a feel for the type of turning you'd like to do. Then invest in a good basic lathe and purchase your accessories as you need them. ▲

OPTIONS WORTH HAVING

- **Live center for tailstock.** With this spinning center, you'll avoid burning the tailstock end of your workpiece.
- **Jacobs-type drill chuck.** You can use this chuck to hold small workpieces, or to hold drill bits for horizontal boring.
- **Screw chuck.** This chuck provides a convenient way to mount workpieces for faceplate turning.
- **Three- or four-jaw chuck.** These adjustable faceplate chucks grasp the workpiece with several jaws.
- **Curved bowl rest.** This rest provides close-vicinity chisel support for turning bowls.

Lathes



Woodfast M408-V



AMT 4370



General 260



Conover Master Turner

Brand & Model	List Price	Capacity, Swing x Length (in.)	Spindle Dia. (in.) x tpi	Bed Type	Outboard Turning	Drive Type	Rpm	HP	Weight (lbs.)	Comments
Klein Lathe Long Bed	\$349	5 x 12	3/4 x 16	AL	N	SP-6	500 - 5,200	—	12	Motor not included.
Carbatec Mini-Lathe	230	6 x 12	3/4 x 16	CI	N	SP-4	800 - 3,475	—	28	Motor not included.
Record RPML300C	499	8 1/2 x 12	3/4 x 16	CI	Y	SP-3	540 - 2,400	1/3	77	Swiveling headstock.
Reliant DD70	170	10 x 20	3/4 x 10	TS	N	SP-4	980 - 3,010	1/2	50	
Myford Mystro	1,500	11 x 40	1 1/8 x 12	TS	Y	SP-5	420 - 2,880	3/4	35	Swiveling headstock.
AMT 373	94	12 x 41	3/4 x 16	TS	N	SP-3	862 - 3,450	—	40	Motor not included.
AMT 4370	246	12 x 36	3/4 x 16	CI	N	SP-5	275 - 3,065	—	100	Motor not included.
Bridgewood BW-1240	220	12 x 37	3/4 x 16	TS	Y	SP-5	575 - 3,580	3/4	80	
Craftsman 22816	300	12 x 36	3/4 x 16	TS	N	SP-4	875 - 3,450	1/2	84	
Craftsman 22836	200	12 x 36	3/4 x 16	CI	N	SP-4	875 - 3,450	1/2	50	
Delta 46-204M	1,359	12 x 39	1 x 8	CI	Y	SP-4	915 - 3,260	3/4	170	
Delta 46-221	1,745	12 x 39	1 x 8	CI	Y	SP-4	915 - 3,260	3/4	305	
Delta 46-541	1,962	12 x 39	1 x 8	CI	Y	RD	340 - 3,600	3/4	410	
Delta 46-612	3,292	12 x 38	1 x 8	CI	Y	RD	340 - 3,200	1	588	
Delta 46-700	518	12 x 36	1 x 8	CI	Y	RD	500 - 2,000	3/4	125	Swiveling headstock.
General 160-2	1,450	12 x 38	1 x 8	CI	Y	RD	500 - 3,000	3/4	310	4-sp. pulleys available.
General 260-1	2,300	12 x 38	1 1/4 x 8	CI	Y	RD	375 - 3,300	1	610	4-sp. pulleys available; optional 16-in. swing.
Jet JWL-1236	734	12 x 34 1/2	1 x 8	CI	Y	RD	550 - 3,000	3/4	183	Swiveling headstock.
Powermatic 45	3,303	12 x 39	1 x 8	CI	Y	RD	330 - 2,100	3/4	553	4-sp. pulleys available.
Record CL3/36	1,059	12 x 36	3/4 x 16	CI	Y	SP-5	510 - 2,400	3/4	190	Swiveling headstock.
Record CL3/48	1,165	12 x 48	3/4 x 16	CI	Y	SP-5	510 - 2,400	3/4	200	Swiveling headstock.
Vega 1200	550	12 x 37	3/4 x no threads*	TS	N	SP-8	275 - 3,900	1/2	115	Reverses for sanding.
Woodtek 829806	999	12 x 37 1/2	1 x 8	CI	Y	RD	360 - 2,100	3/4	285	
Enlon EN-WL10	610	14 x 40	1 x 12	CI	Y	RD	810 - 3,690	3/4	250	Sanding disc and table.
Grizzly G1174	395	14 x 40	1 1/8 x 12	ST	Y	SP-3	860 - 3,096	1/2	180	Copy lathe and sanding disc.
Grizzly G1495	625	14 x 40	1 x 12	CI	Y	RD	810 - 3,690	3/4	300	Disc & drum sander.
Lobo CL-0040	339	14 x 40	1 1/8 x 12	TS	Y	SP-3	860 - 3,090	1/2	170	Sanding disc.
Lobo CL-1140	599	14 x 40	1 x 12	CI	Y	RD	560 - 3,600	3/4	280	Sanding disc.
Transpower CP1000	320	14 x 40	1 1/8 x 12	CI	Y	SP-3	860 - 3,096	3/4	180	Copy lathe and sanding disc.
Transpower HD150	625	14 x 39	1 x 12	CI	Y	SP-6	560 - 3,500	1	480	Sanding disc.
Bridgewood BW-1539	795	15 x 39	1 x 8	TS	N	SP-5	660 - 3,000	1	230	Spindle brake.
Grizzly G1025	155	15 x 40	1 x 8	ST	N	SP-4	850 - 2,510	1/2	105	
Vega 1553	1,625	15 x 53	30 mm. x no threads*	TS	Y	RD	320 - 3,400	1	285	Reverses for sanding.
Vega 1596	2,500	15 x 96	30 mm. x no threads*	TS	Y	RD	320 - 3,400	1 1/2	380	Extra length capacity.
Hapfo AP-2000-ES	2,467	15 3/4 x 40	1 5/16 x 6	CI	N	ED	340 - 4,000	3/4	330	
Conover Deluxe	2,195	16 x unlim.	1 1/2 x 8	WO	Y	SP-4	600 - 2,600	1 1/2	350	Wood bed, any length.
Conover Master Turner	2,645	16 x unlim.	1 1/2 x 8	WO	Y	ED	50 - 2,600	1 1/2	350	Wood bed, DC drive.
Woodfast M408-V	2,365	16 x 16	1 1/4 x 8	CI	Y	ED	250 - 2,750	1	450	5-sp. pulleys available.
Woodfast M908-V	2,575	16 x 39	1 1/4 x 8	CI	Y	ED	250 - 2,750	1	520	5-sp. pulleys available.
Mini-Max T124	2,790	16 1/2 x 47	29.5 mm x 8	TS	Y	SP-4	680 - 3,000	1	375	Copy lathe.
Woodfast M910-V	2,895	20 x 39	1 1/4 x 8	CI	Y	ED	250 - 2,750	1 1/2	540	Available without base.
Vega 24 Bowl Lathe	450	24 x none	3/4 x no threads*	ST	N	SP-8	200 - 2,900	1/2	105	Designed for bowl-turning.

See page 116 for listing of manufacturers.

KEY: Bed Type: AL = aluminum, CI = cast iron, ST = steel, TS = tubular steel, WO = wood. Drive Type: ED = electronic drive, RD = Reeves drive, SP-# = step pulleys - number of speeds. — = not applicable. *Faceplates and chucks secured with set screw.

Power Miter Saws

By Jim Barrett

The Benchtop Tool for Fast and Precise Crosscuts



PHOTO BY JOHN HAMEL

Sliding compound saws are the newest generation of power miter saws. They handle wide stock and can make compound cuts, mitering and beveling at the same time.

When it comes to making smooth, exact cutoffs at different angles, no tool can match the power miter saw, also known as a chop saw. Precise and also portable, this tool is popular with on-site carpenters as well as with woodworkers.

Today, you can choose between three basic types of miter saws: conventional miter saws, compound miter saws, and sliding compound saws. Your choice depends on the types of cuts you want to make and the size of the stock you'll be working with.

Conventional miter saws—First introduced by Rockwell in 1967 as the "motorized miter box," these mitering machines make cuts from 0° to 45°, or more on some models. To set the cutting angle, you rotate the head, or motor/blade assembly, and the turntable to which it is attached. This positions the blade at an angle to the stationary base-and-fence assembly. You make the cut by pivoting the blade down into the work in a chopping motion—hence the term "chop saw."

The width and thickness of stock you can cut depends largely on the size of the saw blade. Miter saws are available with 8¼-in., 8½-in., 10-in., 12-in., 14-in., and 15-in. blades. Most 10-in. saws (the most popular size) can cut a nominal 2x6 or 4x4 at 90° and a 2x4 at 45°. (See chart, page 100.)

Compound miter saws—With this type of saw, the head assembly not only turns to make cuts at different angles; it also tilts up to 45° (or more) to one side to make bevel cuts. This enables you cut compound angles. (See center photo, opposite page.) Blade sizes and cutting capacities are similar to conventional chop saws, although you can bevel-cut wider stock because the cut is made with the stock flat on the work table, rather than on edge.

Compound miter saws are more versatile than conventional miter saws. They're especially useful for cutting crown molding and other cornice treatments that require compound cuts. Expect to pay more for a compound saw than for a comparably sized conventional model.

Sliding compound-miter saws—The next phase in the miter saw's evolution was to mount the head assembly on a sliding carriage to increase crosscutting capacity. This is what Hitachi did when it introduced the first sliding compound-miter saw in 1988. Since then, other manufacturers have followed suit. (See chart.)

Like compound miter saws, these tools have a head assembly that rotates and tilts, and the assembly is mounted on a sturdy sliding carriage (single-rail on the Makita saws, twin-rail on the rest) that extends crosscutting capacity to just over 12 in. on some models. Two new saws from Hitachi (available spring 1995; see



Conventional miter saw. On this type of miter saw, the blade swings left or right to the desired angle and pivots down to make cuts.

PHOTO BY JIM BARRETT



Compound miter saw. A compound miter saw's blade pivots and swings like a conventional saw's and can also tilt to cut compound angles.

PHOTO BY JIM BARRETT



Sliding compound-miter saw. On a sliding compound-miter saw, the blade swings, tilts and pivots like a compound miter saw but also slides to cut wider stock.

PHOTO COURTESY OF HITACHI

photo, opposite right) and Makita (Model LS1211) tilt both left and right.

To operate a sliding compound-miter saw, you pull the blade toward you in its elevated position, pivot it down into the front edge of the stock, then push it back toward the fence to complete the cut. This "chop and push" motion prevents the blade from jerking unexpectedly toward you, as can happen with radial arm saws.

Occupying their own category are Delta's Sidekick and Sawbuck Frame-and-Trim saws, whose motors (and blades) ride on two rails that you tilt for bevel cuts. The entire table-and-rail assembly rotates for angled cuts.

Finding the Right Saw

Once you've decided which type of miter saw you want, it's time to start kicking the tires of the various models within that category. Here are some specifics to check out:

Adjustments—Look for accessible, easy-to-operate miter and bevel adjustments. On most saws, you position the turntable by means of a convenient lock knob at the front of the table. The table, tilt mechanism, and sliding carriage (on sliding saws) should operate smoothly and without play. Miter saws have stops, or detents, at commonly used angles: 0°, 22½°, and 45°, left and right. On good saws, the detents click firmly in place. On compound-type saws, look for detents at 31.6° (left and right) and marks on the bevel scale at 33.9°, allowing easy setting for compound cuts on standard crown moldings.

Better saws also include a spindle lock (for one-wrench blade changing) and a lock-down device that holds the

motor and blade assembly for easy transport. Slide-type saws also have a sliding-carriage lock for transporting the saw or for making chop cuts in narrow stock. Another feature to look for on compound saws is a depth-stop mechanism, which comes in handy for making cuts to a precise depth.

Power—Except for the AEG with its quiet induction motor, all miter saws have universal motors. On most saws I tested, motor power was well-matched to blade size. If you plan to cut thick or dense stock, look for a saw with a high amp rating.

Fences—All miter saws have a two-piece fence design with a gap in the middle for mitering and beveling. On many saws the gap is too wide to adequately support short stock. A few saws have adjustable fences that can be moved closer together as needed, and some of the saws with fixed fences have optional plastic or wood fence attachments to close the gap. If necessary, you can attach homemade wooden fence extensions; check the saw's fence to make sure it has mounting holes.

Blades—I recommend replacing the usual standard steel blade with a carbide-tipped, finish-cutting crosscut

blade. A 10-in. blade with 60 or more teeth and a low hook angle makes glass-smooth cuts in moldings and thin stock. For sliding compound saws, get a blade with a 0° or 5° negative hook. (For more on blades, see AW #32.)

Dust busting—Most saws come with a dust bag, but with some saws more dust ends up on the bench or floor than in the bag. Models that can be hooked up to a shop vacuum will be more efficient.

Safety Features

On some saws, the blade guard automatically retracts when the blade pivots into the work. With saws that rely on the workpiece to push the guard up, make sure the guard retracts smoothly.

All modern miter saws have an electric blade brake that stops the blade when you release the on-off switch or press a button. Work clamps that attach to the saw make cutting short pieces of stock safer. And to keep the saw from starting accidentally, some models have a safety button that must be depressed before you can pull the trigger. Saws with top-mounted safety buttons are equally convenient for left- or right-hand use. ▲

OPTIONS WORTH HAVING

- **Table extensions and adjustable stops.** Extension rails support long work, and stops attached to the rails let you make repetitive cuts to the same length.
- **Work clamps.** These clamps will accommodate large or small work, securing your stock on the table or against the fence for safe, precise cuts.
- **Auxiliary fences.** These close the gap where the blade cuts, supporting your work more firmly.
- **Table inserts.** Replaceable plastic inserts fit in the turntable, and help to prevent tear-out on the underside of the cut.

Power Miter Saws



Delta 36-090



Porter-Cable 7700



Craftsman 23512



Makita LS1211

MITER

Brand & Model	List Price	Blade Dia. (in.)	Maximum Crosscut T x W (in.)	Maximum Miter Cut T x W (in.)	Maximum Bevel Cut T x W (in.)	Amps	Dust Collection	Weight (lbs.)	Comments
Black & Decker 1701	\$316	10	3 ¹ / ₈ x 4 ³ / ₄	3 ¹ / ₈ x 3 ³ / ₈	—	10	—	26	Adjustable miter detents.
Delta 34-080	265	10	2 ¹ / ₂ x 5 ³ / ₄	3 ¹ / ₂ x 2 ⁷ / ₈	—	13	VP	55	Replaceable table insert.
Delta 36-090 Sidekick	278	10	2 ¹ / ₂ x 5 ¹ / ₂	2 ¹ / ₂ x 3 ⁷ / ₈	—	12	DB	30	Adjustable handle.
Jepson 9211	378	10	3 ¹ / ₈ x 4 ⁵ / ₁₆	3 ¹ / ₈ x 3 ¹ / ₈	—	15	VP	59	Table insert.
Makita LS1020	630	10	2 ³ / ₄ x 4 ³ / ₄	2 ³ / ₄ x 3 ¹ / ₂	—	12	DB	40	Quick-release work clamp.
Makita LS1030	428	10	2 ³ / ₄ x 4 ⁶ / ₁₆	2 ³ / ₄ x 3 ¹ / ₂	—	12	DB	23	Quick-release work clamp.
Milwaukee 6490	459	10	3 ¹ / ₂ x 3 ⁷ / ₈	3 ¹ / ₂ x 2 ³ / ₄	—	15	VP, DB	32	Extra-tall fence.
Milwaukee 6491	532	10	3 ¹ / ₂ x 3 ⁷ / ₈	3 ¹ / ₂ x 2 ³ / ₄	—	15	VP, DB	32	Extra-tall fence.
Milwaukee 6492	596	10	3 ¹ / ₂ x 3 ⁷ / ₈	3 ¹ / ₂ x 2 ³ / ₄	—	15	VP, DB	32	Extra-tall fence.
Porter-Cable 7700	634	10	3 ¹ / ₂ x 5 ¹ / ₂	3 ¹ / ₂ x 3 ¹ / ₂	—	13	DB	36	Laser line-of-cut indicator.
Ryobi TS254	250	10	3 ⁹ / ₁₆ x 5 ⁹ / ₁₆	3 ⁹ / ₁₆ x 3 ⁷ / ₈	—	12.5	VP	34	Optional work clamp.
Skilsaw 3810	394	10	3 ¹ / ₂ x 4 ¹ / ₄	3 ¹ / ₂ x 3 ¹ / ₂	—	15	DB	37	
DeWalt DW704	570	12	2 ¹ / ₂ x 7 ⁷ / ₈	2 ¹ / ₂ x 5 ¹ / ₂	—	13	DB	38	Extra-tall fence.
Makita LS1440	969	14	4 ³ / ₄ x 6	4 ³ / ₄ x 4 ¹ / ₂	—	12	DB	66	Quick-release work clamp.
Hitachi C15FB	1,320	15	4 ³ / ₄ x 7 ⁹ / ₃₂	4 ³ / ₄ x 5 ¹⁵ / ₃₂	—	15	DB	55	Extra-tall fence.

COMPOUND MITER

Craftsman 23468	160	8 ¹ / ₄	2 ¹ / ₁₆ x 5 ¹ / ₂	2 ¹ / ₁₆ x 3 ³ / ₄	1 ³ / ₄ x 5 ¹ / ₂	9	VP	38	Cast-iron base.
Delta 36-040	190	8 ¹ / ₄	2 ¹ / ₈ x 5 ¹ / ₈	2 ¹ / ₈ x 3 ¹ / ₂	1 ¹ / ₂ x 5 ¹ / ₈	9	DB	16	Table insert.
Craftsman 23477	200	10	2 ⁵ / ₈ x 5 ³ / ₄	2 ⁵ / ₈ x 4 ¹ / ₄	1 ⁷ / ₈ x 5 ³ / ₄	15	VP	68	Work clamp; cast-iron base.
Craftsman 23489	240	10	2 ⁵ / ₈ x 5 ³ / ₄	2 ⁵ / ₈ x 4 ¹ / ₄	1 ⁷ / ₈ x 5 ³ / ₄	15	VP	65	Cast-iron base.
Delta 36-210 Sidekick	323	10	2 ¹ / ₂ x 5 ⁵ / ₈	2 ¹ / ₂ x 4	1 ⁵ / ₈ x 5 ⁵ / ₈	13	DB	30	Adjustable handle.
Delta 36-220	304	10	2 ³ / ₄ x 5 ¹ / ₈	2 ³ / ₄ x 3 ¹ / ₂	1 ³ / ₄ x 5 ¹ / ₈	15	DB	60	Work clamp.
Hitachi C10FC	480	10	2 ⁵ / ₈ x 5 ³ / ₄	2 ³ / ₄ x 3 ¹ / ₂	1 ³ / ₄ x 5 ¹ / ₈	15	DB	32	Table extension on left side.
Milwaukee 6494-6	550	10	3 ¹ / ₂ x 3 ⁷ / ₈	3 ¹ / ₂ x 2 ³ / ₄	2 ¹ / ₄ x 4 ³ / ₄	15	VP, DB	39	Adjustable fence.
Ryobi TS260	250	10	3 ⁹ / ₁₆ x 5 ³ / ₁₆	3 ⁹ / ₁₆ x 3 ¹¹ / ₁₆	2 ³ / ₁₆ x 3 ¹¹ / ₁₆	15	DB	52	Adjustable fence; work clamp.
Craftsman 23512	300	12	3 ⁷ / ₈ x 5 ⁷ / ₈	3 ⁷ / ₈ x 4 ¹ / ₈	2 ³ / ₄ x 5 ⁷ / ₈	15	VP	45	Vernier on miter scale.
DeWalt DW705	706	12	2 ¹ / ₂ x 7 ⁷ / ₈	2 ¹ / ₂ x 5 ¹ / ₂	1 ³ / ₄ x 7 ⁷ / ₈	13	DB	40	Extra-tall fence.
Delta 33-060 Sidekick	510	6 ¹ / ₂	1 ³ / ₄ x 12	1 ³ / ₄ x 9 ¹ / ₂	1 ⁵ / ₈ x 9 ¹ / ₂	12	—	42	Frame-and-trim saw.
Delta 33-055 Sawbuck	759	8	2 ³ / ₄ x 16	1 ³ / ₄ x 12	1 ³ / ₄ x 16	15	—	96	Frame-and-trim saw.
Craftsman 23488	450	8 ¹ / ₄	2 ¹ / ₂ x 12	2 ¹ / ₂ x 8 ⁵ / ₈	1 ³ / ₄ x 12	10	VP	70	Cast-iron base, work clamp.
Hitachi C8FB2	1,250	8 ¹ / ₂	2 ⁹ / ₁₆ x 12	2 ⁹ / ₁₆ x 8 ⁵ / ₈	1 ²⁵ / ₃₂ x 12	9.5	DB	39	Adjustable fence; work clamp.
Ryobi TSS220	500	8 ¹ / ₂	2 ¹⁵ / ₁₆ x 12	2 ¹⁵ / ₁₆ x 8 ¹¹ / ₁₆	1 ¹⁵ / ₁₆ x 12	10	DB	44	
AEG SKS 300	1,119	10	2 ¹ / ₁₆ x 11 ³ / ₄	2 ¹ / ₈ x 8 ⁵ / ₁₆	2 ¹ / ₁₆ x 11 ³ / ₄	9.5	VP	46	Induction motor.
Makita LS1011	946	10	2 ¹⁵ / ₁₆ x 12	2 ¹⁵ / ₁₆ x 8 ¹⁵ / ₃₂	1 ⁹ / ₁₆ x 12	12	DB	35	Single sliding rod.
Makita LS1211	1,550	12	3 ¹¹ / ₁₆ x 12 ³ / ₁₆	3 ¹¹ / ₁₆ x 8 ⁵ / ₈	2 ¹ / ₄ x 11 ⁷ / ₁₆	15	DB	51	Bevels left & right; single sliding rod.

SLIDING COMPOUND-MITER

See page 116 for listing of manufacturers.

KEY: Dust Collection: DB = dust bag, VP = vacuum port, — = not applicable.

Dust Collectors

Choosing the Right System for Your Shop



PHOTO BY KURT WILSON

A dust collector makes your shop a cleaner, safer and more pleasant place to work.

Wood dust is more than a nuisance, it's a health hazard. Studies have linked long-term exposure to wood dust to respiratory problems like sinusitis, asthma and emphysema. A good dust collector will make your shop a cleaner, more pleasant and healthier place to work in.

Depending on your shop space and budget, you can connect a roll-around portable unit to your stationary machines with a flexible hose, or you can install a more permanent system by hooking up a central dust collector with a network of metal or PVC ducts to collect the dust at each machine. (For more on designing a central dust-collection system, see AW #37.)

Dust and Debris

Woodworking machines produce debris ranging in size from shavings and chips to microscopic dust particles. Most dust collectors propel enough air flow (measured in cubic ft. per minute, or cfm) to adequately gather the largest debris and most of the nuisance dust. But collectors differ in their ability to filter out the tiny particles that pose the greatest health hazard.

This variation is tied to the collector's filter bag. The average filter bag traps dust particles down to about 50 microns in size; the rest escape back into the air. To capture the most dangerous dust—particles smaller than 10

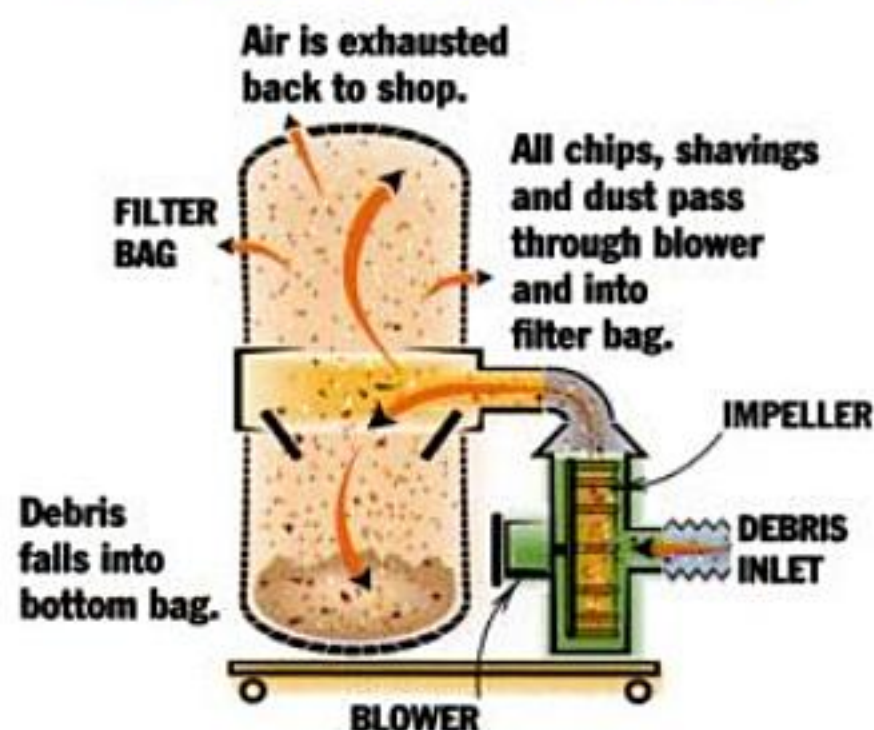
microns (about one-tenth the diameter of a human hair) in size—you need a super-efficient dust bag with a very fine weave. (Custom-made polyester felt bags that can trap particles down to 1 micron are available from Oneida Air Systems, 315-476-5151.)

Four Types of Collectors

There are four basic types of dust-collection units: shop vacuums, single-stage blower-and-bag collectors, two-stage blower-and-bag collectors, and cyclone pre-collectors.

Shop vacuums—Shop vacuums offer dust collection at the most basic level, but they're

HOW A ONE-STAGE COLLECTOR WORKS



ILLUSTRATIONS BY SCOTT MACNEILL

SHOP VACUUM



PHOTO COURTESY OF BOSCH

SINGLE-STAGE BLOWER-AND-BAG COLLECTOR



PHOTO COURTESY OF GRIZZLY

TWO-STAGE BLOWER-AND-BAG COLLECTOR



PHOTO COURTESY OF DELTA

CYCLONE PRE-COLLECTOR



PHOTO BY JOHN HAMEL

really best used to clean up dust rather than to capture it at its source. A shop vacuum works well for light-duty dust collection from a router or sander. But with its modest air flow and small hose diameter, it can be overwhelmed by the chips and shavings disgorged by a planer or jointer. And a shop vacuum's universal motor is less powerful than the induction motors used on the dedicated dust collectors described below. Also keep in mind that a universal motor has a shorter service life, on average, than an induction motor.

Single-stage collectors—Single-stage blower-and-bag units are the next step up in price and performance. These units have the power to handle large quantities of dust and chips, and the more powerful among them can be used to run a central dust-collection system.

A single-stage dust collector typically uses a pair of bags. The bag on the bottom gathers large debris before the air stream exits through the upper filter bag. (See drawing, opposite page.)

The chief drawback to a single-stage collector is that dust and chips pass directly through the impeller,

causing wear and tear on the parts.

Two-stage collectors—Two-stage blower-and-bag collectors commonly have a collection drum with the blower mounted on top. (See drawing, below left.) The major difference between two-stage collectors and their single-stage cousins is that on two-stage collectors, large chips and shavings fall into the drum and do not pass through the impeller. This reduces wear and tear on the blower. Fine dust collects in the filter bag.

Small two-stage collectors make ideal roll-around units, and more powerful models can run a central dust-collection system.

One drawback to two-stage collectors is that you have to lift the heavy blower housing in order to empty the waste drum.

Cyclone pre-collectors—In this type of dust collector, the air-stream first enters a tall metal "cyclone" housing where the debris is spun around in a vortex as it drops down the sides. (See drawing, below right.) This cyclone action separates most of the debris and deposits it in the waste container below. Then the air stream reverses direction to exit through the

top of the cyclone. Only the finest dust passes through the blower and into the filter bag.

Cyclone pre-collectors are ideal for central dust-collection systems in larger shops and can handle large volumes of dust and chips.

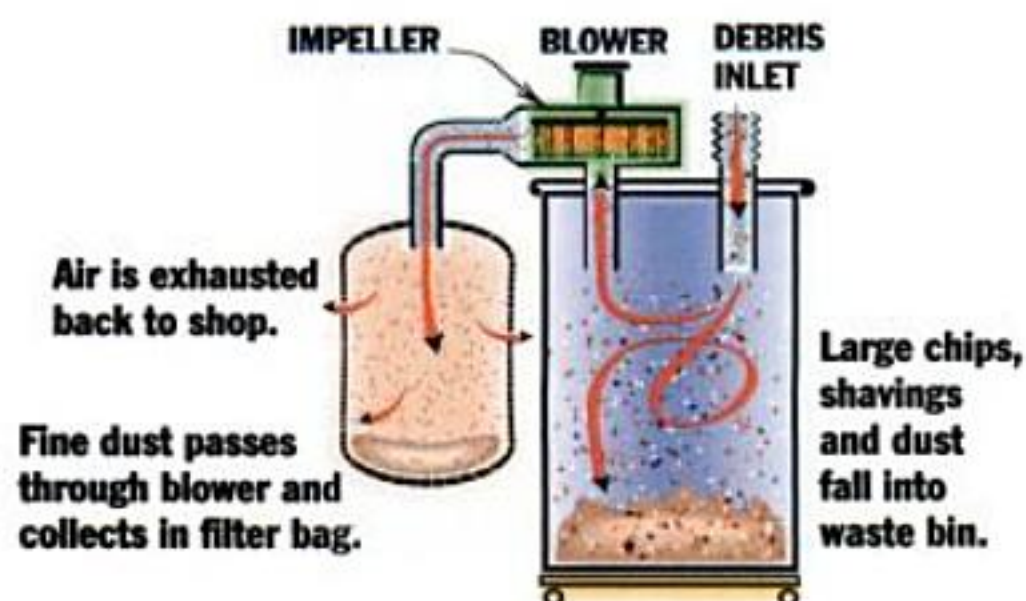
(For more detailed discussions of all four kinds of collectors, see AW #37.)

How Dust Collectors Are Rated

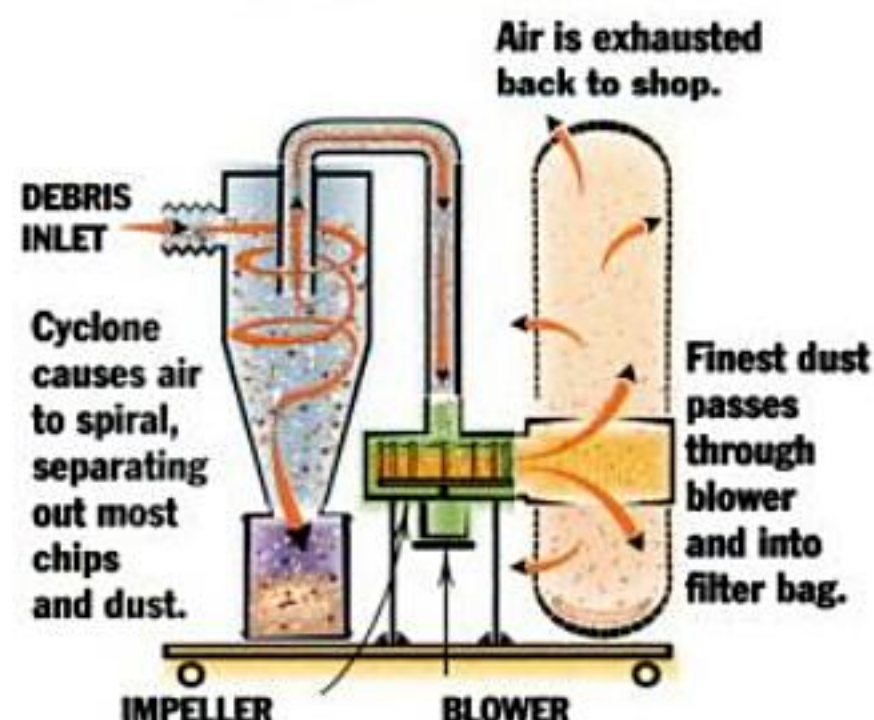
Dust collectors are rated by the volume of air they can move (cfm) at a given static pressure (resistance to air flow measured in "inches of water"). Unfortunately, catalogs for many small-shop dust collectors don't list cfm and static pressure (sp) realistically. They'll list the collector's maximum or "free-flow" cfm with no resistance at all (when it's not connected to a duct system—0 sp), and they'll list the collector's maximum sp with the inlets blocked so that no air can flow (0 cfm).

The key to a realistic rating is the symbol "@." For example, if a collector is rated "500 cfm @ 8 in. sp," that's what it will deliver under real load conditions. ▲

HOW A TWO-STAGE COLLECTOR WORKS



HOW A CYCLONE WORKS



Dust Collectors



Woodtek 864367



Enlon EN-DC20

Brand & Model	List Price	HP	Max. Cfm	Max. sp* (in. of water)	Sawdust Capacity (cu. ft.)	No. of Inlet Ports	Inlet Port Dia. (in.)	Volts	Weight (lbs.)
Kity 695	\$695	1/2	600	4	3.2	1	4	115	75
RBI 821	345	1/2	680	4.4	7.4	1	4	115	75
Shopsmith DC3300	500	1/2	330	NA	4	3	2 1/2	115	64
Bridgewood BW-015	255	1	750	6	3	2	4	115/230	110
Bridgewood BW-015A	195	1	700	5.5	2.4	1	4	115/230	95
Craftsman 29978	300	1	650	8.5	1.5	1	4	115	72
Grizzly G1032	189	1	450	2.8	2.2	1	4	115/230	78
Grizzly G1028	265	1	610	5.5	5.7	1	4	115/230	116
Hitachi RW200	1,908	1	700	NA	1.1	1	4	115	66
Jet DC-650	294	1	650	8.5	2.1	1	4	115	84
Lobo DC-1190	199	1	710	2.8	5.5	1	4	115	80
Seco UFO-40	150	1	500	4.5	1.5	1	4	230	40
Seco UFO-70F	225	1	655	5.5	2.5	1	4	115/230	88
Seco UFO-90	190	1	610	5.5	2.5	1	4	115/230	75
Sunhill UFO-90	169	1	610	5.5	2.5	1	4	115/230	70
Woodtek 802124	229	1	650	5.5	2.5	2	4	115/230	85
Woodtek 864367	199	1	650	8.7	4	2	4	115	47
Penn State DC2-5	325	1 1/2	900	8.5	2.9	2	4	115/230	130
Powermatic 73	444	1 1/2	900	8	3.5	2	4	115	125
Bridgewood BW-002A	295	2	1,059	9.1	5.8	2	4	115/230	123
Enlon EN-DC20	275	2	1,059	5	5.4	3	4 & 5	230	126
Grizzly G1029	275	2	1,182	9.1	4.4	2	5	230	124
Jet DC-1200	539	2	1,200	9.5	5.3	2	4	230	143
Lobo DC-101	299	2	1,300	9.1	5.2	2	4	115/230	150
Murphy Rodgers MRT-5B	1,030	2	908	8	7	1	5	115/230	1,240

SINGLE-STAGE

Chart continued on next page.

See page 116 for listing of manufacturers.

KEY: NA = information not available. *Static pressure. (See text.)

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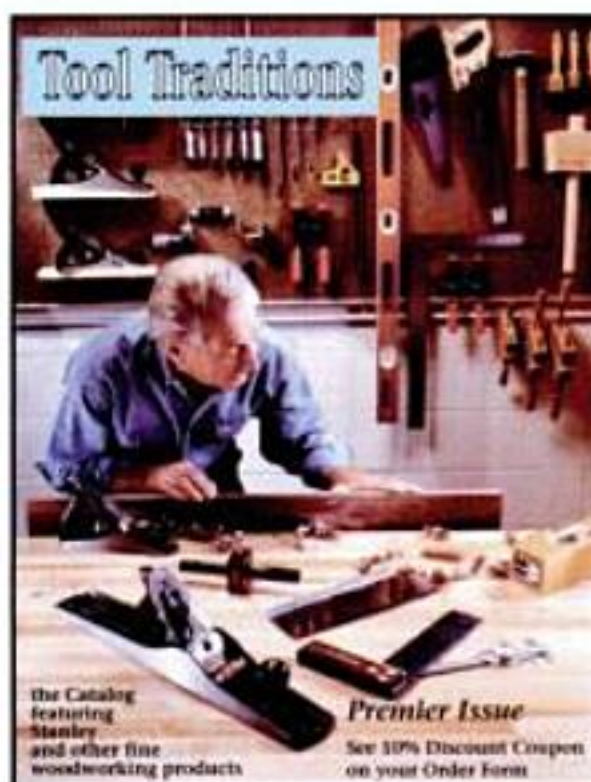
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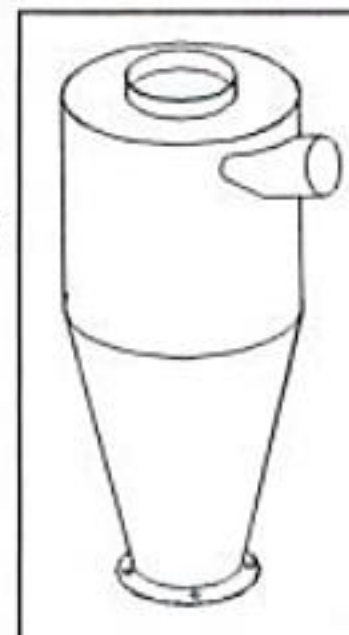
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Dust Collectors

	Brand & Model	List Price	HP	Max. Cfm	Max. sp* (in. of water)	Sawdust Capacity (cu. ft.)	No. of Inlet Ports	Inlet Port Dia. (in.)	Volts	Weight (lbs.)
SINGLE-STAGE	North State UFO-101	\$295	2	1,182	9.5	5.4	3	4 & 5	115/230	140
	Seco UFO-101	300	2	1,182	7.5	5.2	1	5	230	134
	Sunhill UFO-101	299	2	1,182	7.5	5.2	2	4	115/230	143
	Woodtek 805930	399	2	1,200	8.3	5.2	2	5	115/230	150
	Grizzly G1030	445	3	1,883	5.8	8.7	3	6	230	160
	North State UFO-1023	485	3	1,883	9.5	5.4	4	5 & 6	230	180
	Sunhill UFO-102B	439	3	1,883	9.1	10.5	3	4	230	181
	Woodtek 864381	499	3	1,900	8.6	10.5	3	6	115/230	194
TWO-STAGE	Delta 50-179	435	¾	580	7	4.7	1	4	115/230	53
	Delta 50-180	570	1	700	4.5	7.4	1	5	115/230	72
	Transpower DC747	175	1½	740	5.5	2	1	4	115	65
	Delta 50-181	835	2	1,100	8.5	7.4	1	6	230	97
	Transpower DC2000	275	2	1,200	9.1	4	3	8	115/230	128
	Delta 50-182	980	3	1,300	10	7.3	1	6	230/460	113
	Transpower DC3000	345	3	1,850	5.6	5.3	3	8	230	178
	Transpower DC4000	450	3	1,968	5.8	6.7	4	6	230	250
CYCLONE	Torit & Day Model 13	2,000	¾	540	5.6	4.8	1	4-6	230	255
	Oneida 1 HP Portable	495	1	350	5.5	1.2	1	6	115/230	130
	Dustvent 12T1½	1,700	1½	1,000	8	7.3	To suit	6-8	115/230	225
	AGET Dustkop 11SN51-D1	2,100	2	1,200	10	7.4	1	6	115/230	400
	Oneida 2 HP Industrial	1,045	2	950	10	**	1	7	115/230	170
	Oneida 2 HP Portable	745	2	600	10	5	1	6	115/230	196
	Torit & Day Model 19	2,400	2	1,200	7.9	4.8	1	6-8	230	340
	Dustvent 15T3	1,900	3	1,600	12	7.3	To suit	8-9	230	375
	Dustvent 19T3	2,100	3	1,600	12	7.3	To suit	9-11	230	680
	Oneida 3 HP Industrial	1,636	3	1,250	11	**	1	8	230	200

KEY: NA = information not available. *Static pressure. (See text.) **User supplies waste drum.



Hitachi RW200



Delta 50-180

See page 116 for listing of manufacturers.

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See article on dust helmets in American Woodworker (Aug. '93, pg. 24)

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CIRCLE NO. 44 ON PRODUCT INFORMATION FORM

Scroll Saws

By Jim Barrett

Simple
Precision
for Intricate
Cutting



PHOTO BY ANDY RAE

Scroll saws are designed for intricate cutting, from jigsaw puzzles to chair backs.

Many serious woodworkers consider scroll saws to be nothing more than expensive hobbyist "toys," good only for cutting out jigsaw puzzles and knickknacks. In truth, most modern scroll saws are precision machines capable of cutting ornamental fretwork, marquetry and other intricate patterns in everything from thin veneers to 2-in.-thick maple. They can even cut dovetails.

Simple in design, scroll saws employ an upper and lower arm to hold a blade which passes through the saw's table. The arms reciprocate in tandem to power the blade, which can also be disconnected and passed through a hole in the work to make inside cuts. The thin, fine-tooth blades can produce very smooth cuts in wood and other materials.

Types of Scroll Saws

There are several types of scroll saws, each with its own method of driving the blade. Old-fashioned *rigid-arm* saws relied on a spring at one end of the blade to hold it in tension. Blades often broke, since they varied in tension throughout the stroke.

Modern scroll saws use one of three different arm designs, all of which move in tandem and hold the blade in constant tension. The most common type is the *parallel-arm* saw. On this design, the arms are connected at their back

ends by a threaded rod, but pivot separately on the saw frame, producing a vertical saw cut. On *C-frame* saws, the blade is connected between the two ends of a single C-shaped casting which reciprocates for cutting. This moves the blade in a slight cutting arc, resulting in a more aggressive but slightly rougher cutting action. Excalibur offers a new *double-parallel link* design which employs small, pivoting levers at the ends of the arms to hold the saw blade. Instead of moving up and down, the arms slide forward and backward horizontally, pushing and pulling on the levers, which drive the blade up and down for a vertical cut.

Blade Changing and Tensioning

Scroll saw blades must be changed frequently due to wear and breakage. They must also be disconnected and reattached when making inside cutouts. So, you'll want blade-changing to be quick and easy. On all scroll saws, you install the blade between blade clamps that pivot on the end of the saw arm. Some saws provide removable clamps to ease blade installation.

There are two different types of blades and clamps to hold them: *plain-end* and *pin-end*. Plain-end blades—available in a greater variety than pin-ends—are pinched between blade clamps with an Allen wrench or other tool. A few saws come equipped with "quick-release"

blade clamps that make blade-changing a snap. (See photo, right.) Tool-less clamps are also sold as aftermarket accessories for Delta, Hegner, and RBI models. (Called "quick clamps," they are available by mail from Seyco Sales, Box 472749, Garland, TX, 75047, 800-462-3353.) Pin-end blades are used more often on less expensive saws, and they're easier to mount and less prone to slippage than plain-end blades. They feature cross pins which are simply cradled in the blade locks.

The scroll saw blade is tensioned between the saw's arms either by tediously turning a knob or, on better saws, by throwing a lever.

Features to Consider

Throat depth—Scroll saw sizes are designated by *throat depth* (measured from the blade to the back arm of the saw). Sizes range from 13-in. bench-top models up to 26-in. floor models. The throat depth determines how far in from the edge of a workpiece the saw will cut.

Cutting depth—This is the distance between the saw table and the bottom of the upper blade holder when the saw arm is at the bottom of its cutting stroke. It ranges from 1 in. on the smallest saws to 2½ in. on the largest, with the most common being 2 in. The thickest stock that the saw will accommodate is slightly less than this measurement.

Cutting speed—Scroll saws are available in single-, multiple-, and variable-speed models, ranging from about 200 to 2,000 spm (strokes per minute). (See chart, page 108.) Generally, the saws cut wood most efficiently at maximum speed. Lower speeds, however, are good for cutting plastics and metals or when making intricate cuts in thin stock or delicate veneers.

Some two-speed models change speeds with a rocker switch. On a few of the models that offer from two to five speeds, you change the speed by manually repositioning the drive belt on a step pulley. Many manufacturers offer electronic variable speed (EVS), which provides infinite adjustment



Blade-changing made easy. Finger-operated blade clamps allow tool-free blade-changing.

within the tool's range. All EVS models have electronic feedback circuitry that enables the motor to maintain constant speed under varying loads.

Table tilt—A tilting table is essential for making beveled cuts. Nearly all tables tilt at least 45° in one direction, and some tilt both ways. On better saws, the table is supported by sturdy dual trunnions that adjust smoothly and lock firmly.

Vibration—Scroll saws vibrate due to their reciprocal motion. Excessive vibration, however, contributes to inaccurate cuts, frequent blade breakage, and operator fatigue. It also provokes premature wear on bearings and other moving parts. To help overcome these problems, better saws employ precision bearings, well-balanced drive systems and precisely aligned arms. (Some saws provide an adjustment for fine-tuning arm alignment.) The sheer mass of some of the heavier saws helps dampen vibration.

Saw stands affect vibration as well. Generally, scroll saws vibrate least when mounted on their factory-supplied stands. If a stand is not available, mount the saw firmly to a sturdy bench.

Power—Motor power isn't a major purchase consideration since the delicate blade will break before the motor bogs down. Even many of the largest saws have small, 3-amp-or-less induction (brushless) motors.



Stress relief. A quick-tension-release lever at the rear of saw arms facilitates blade tensioning.

Switch, guard, and blower—An easily accessible on-off switch located toward the front of the saw will aid safety and convenience. The hold-down/blade-guard assembly should adjust easily, lock positively, and press the stock firmly against the table without obscuring the cut line. Virtually all scroll saws incorporate blowers to clear dust away from the cut line, aiding visibility.

If you're new to scroll-sawing, I suggest you start with an under-\$200 model, then upgrade to a more expensive machine when your projects require a saw with greater speed, precision and cutting capacity. ▲

OPTIONS WORTH HAVING

- **Electronic variable speed (EVS).** This is useful for clean, precise cutting of various materials.
- **Stand.** A good stand will help reduce vibration.
- **Aftermarket tool-less blade clamps.** These are standard on some saws, and make for easy blade-changing.
- **Foot switch.** This remote switch will free up your hands for controlling the workpiece.
- **Plain-end blade adaptors.** If your saw comes equipped for pin-end blades, these adaptors will increase your versatility.

SCROLL SAWS



Hegner Multimax 18V



Ryobi SC162VS



Grizzly G1572

Brand & Model	List Price	Throat Cpy. (in.)	Max. Stock Thickness (in.)	Arm Type	Strokes per Min.	Table Tilt Range Left-Right (°)	HP	Dust Coll. Port	Weight (lbs.)	Comments
Craftsman 23613	\$80	13	1	CA	1,700*	45-0	1/16	N	29	Blade can mount sideways.
Delta 40-130	110	13	1 3/4	PA	1,700*	45-0	NA	N	22	Blade can mount sideways.
Bridgewood SS-15B	109	15	2	PA	1,725*	45-0	1/8	N	38	Dust blower.
Delta 40-150	142	15	2	PA	1,725*	45-0	1/10	N	37	Dust blower.
Dremel 1571	144	15	1	PA	3,450*	45-45	1/30	N	28	Optional power access.
Grizzly G1572	99	15	2	PA	1,725*	0-45	1/8	N	37	Dust blower.
Penn State Super VS-15	170	15	2	PA	400-1,800	0-45	1/12	N	35	Dust blower.
Powermatic 93	180	15	2	PA	1,725*	45-0	NA	N	42	Dust blower.
AMT 4602	169	16	2	PA	890/1,780	45-0	1/8	N	45	Dust blower.
Craftsman 23558	110	16	2	PA	1,700*	45-0	1/7	N	40	Blade can mount at 90°.
Craftsman 23626	160	16	2	PA	500-1,500	45-0	1/10	N	28	Dust blower.
Delta 40-560 Type 2	249	16	2	PA	850/1,725	45-0	1/10	N	47	Dust blower.
Dremel 1671	302	16	2	PA	890/1,790	45-0	1/10	Y	45	Dust blower.
Dremel 1672	302	16	2	PA	890/1,790	45-0	1/10	Y	45	Quick-release tension lever.
Dremel 1695	408	16	2	PA	200-2,000	45-0	1/7	Y	40	LED speed readout.
Ryobi SC160	150	16	2	PA	1,725*	45-0	NA	N	44	Dust blower.
Ryobi SC162	170	16	2	PA	1,725*	45-13.5	NA	Y	24	Dust blower.
Ryobi SC162VS	200	16	2	PA	400-1,600	45-15	NA	Y	24	Dust blower.
Skil 3330	211	16	2	PA	1,725*	0-45	NA	Y	38	Dust blower.
Delta 40-640 Type 2	378	20	2	PA	400-1,800	45-0	1/6	N	62	Dust blower.
Jet JSS-20VS	399	20	2	PA	400-1,800	45-0	NA	Y	54	Blade storage case.
Enlon EN-SC22	155	22	2	CA	1,725*	30-5	1/8	N	60	Dust blower.
Grizzly G1060	149	22	2	CA	1,720*	0-30	1/8	N	57	Dust blower.
Lobo JS-0022	169	22	2	CA	1,720*	15-45	1/4	N	65	Dust blower.
AMT 4671	320	23	2	PA	825/1,725	45-0	1/8	N	84	Dust blower.

BENCHTOP

Chart continued on page 110.

See page 116 for listing of manufacturers.

KEY: Arm Type: CA = C-arm, FA = fixed arm, PA = parallel arm, PL = parallel link. NA = information not available. *Saw has only one speed.

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6211DWE 12 Volt Cordless Drill w/2 Batteries	\$168.95
6095DWL 9.6 Volt Cordless Drill w/Flashlight	\$149.95
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5007NBK 7 1/4" Circular Saw w/Case	\$129.95
2708W 8 1/4" Table Saw	\$298.95
122700-A Porta Table For Model 2708	\$208.95
122720-A Outfeed Table for Model 2708	\$ 99.95
LS-1011 10" Slide Compound Saw	\$529.95
LS-1211 12" Slide Compound Saw	\$799.95
DCS 520i 18" Chain Saw	\$299.95

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4301BV Jig Saw w/Case	\$149.95
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CIRCLE NO. 96 ON PRODUCT INFORMATION FORM

CIRCLE NO. 86 ON PRODUCT INFORMATION FORM

SCROLL SAWS



Delta 40-601



Reliant DD26



Enlon EN-SC22

Brand & Model	List Price	Throat Cpy. (in.)	Max. Stock Thickness (in.)	Arm Type	Strokes per Min.	Table Tilt Range Left-Right (°)	HP	Dust Coll. Port	Weight (lbs.)	Comments
Hegner Multimax 14-E	\$499	14	2	PA	1,700*	45-0	NA	N	30	Oversized blade clamp screws.
Hegner Multimax 14-V	899	14	2	PA	400-1,700	45-0	NA	Y	35	Choice of 2 stroke lengths.
RBI Hawk 16	799	16	2 1/8	PA	350-1,450	45-45	1/6	N	70	Quick-change blade holder.
Delta 40-601	1,003	18	2	CA	40-2,000	30-45	NA	N	132	LED speed readout.
Hegner Multimax 18S	799	18	2 5/8	PA	1,700*	45-15	NA	Y	45	Table tilts left and right, front and back.
Hegner Multimax 18V	999	18	2 5/8	PA	400-1,700	45-15	NA	Y	42	Slotted table for fast blade changing.
Reliant AL18	200	18	2	CA	850/1,720	30-0	1/8	N	90	Dust blower.
Excalibur EX19VS	959	19	2	PL	1,500*	45-45	1/8	N	80	Dust blower.
Craftsman 23640	400	20	2	CA	300-2,000	35-45	1/10	N	143	Dust blower.
Hegner Polymax	2,199	20	2	PA	700-1,600	45-0	NA	Y	100	Built for industrial use.
RBI Hawk 20	999	20	2 1/2	PA	300-1,700	45-45	1/8	N	90	Quick-change blade holder.
Shopsmith 555272	800	20	2	PA	500-1,450	45-45	1/8	Y	85	Pin holds blade-mounting blocks.
Sakura Scrollmate SKS-21	685	21	2	PA	170-1,370	45-30	NA	N	85	Dust blower.
Woodtek 826398	399	21	2	PA	170-1,370	45-15	1/8	N	85	Dust blower.
Hegner Multimax 22V	1,199	22	2 5/8	PA	400-1,700	45-15	NA	Y	50	Front & rear tensioning mechanism.
Powermatic 95	1,819	24	1 3/4	FA	807-1,653	15-45	1/3	N	220	Fixed-arm saw; 115/230V.
Hegner Multimax 25V	1,799	25	2 3/8	PA	400-1,700	45-0	NA	Y	90	Oversized bronze bushings.
RBI Hawk 26	1,299	26	2 1/2	PA	300-1,700	45-45	1/8	N	110	Quick-change blade holder.
Reliant DD26	250	26	2	CA	1,720*	30-0	1/8	N	120	Dust blower.

FLOOR-MODEL

See page 116 for listing of manufacturers.

KEY: Arm Type: CA = C-arm, FA = fixed arm, PA = parallel arm, PL = parallel link. NA = information not available. *Saw has only one speed.

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For more information on the tools featured in this issue, contact the manufacturers listed below.

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(517) 263-5781
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AMT

American Machine & Tool Co.
(610) 948-0400
Circle #603

Belsaw Company

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Circle #604

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S.B. Power Tool Co.
(312) 286-7330
Circle #606

Bridgewood

Wilke Machinery Co.
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Klein Design
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Laguna Tools Inc.
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Colonial Saw Co. Inc.
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Circle #630

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(800) 786-5626
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Makita USA Inc.

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Russ Zimmerman
House Of Woodturning
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Trend-Lines Inc.
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Sakura

Amana Tool Corp.
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Woodworking Machinery Div.
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Skil

S.B. Power Tool Co.
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Sunhill Machinery
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Torit & Day, Donaldson Co.
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