SHOPSMITH

ShopMag

Fall 1 1956

in this issue:

How to TOOL UP for Built-ins...

Jigs and Fixtures Give You Production-Line Woodworking

Just about everyone wants built-ins—those containers for the things of living that are part of the house. But not everyone knows all the tricks and techniques that mechanize the work and make a storage wall no more of a project than a spice cabinet. Specifically, there are SHOPSMITH experts who don't know the jigs and fixtures they already have available or can make with little trouble.

Take the common problem of cutting dadoes back to back to hold shelves. The easy way is to use the "crosscut fence" pictured above. It consists simply of two strips of wood separated at each end by filler blocks of the same thickness as the stock to be cut.

Clamped in place, the fence rides the edge of the saw table. You just push the plank across, flop it over fence and all, and push it again. The cuts have to line up. The same device handles crosscutting of stock too wide for the miter

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ShopMag

TRADEMARK

A quarterly publication for today's home craftsman, edited by Githens & Newman, Inc., Consulting Editors, Westport, Conn. Editorial Director:

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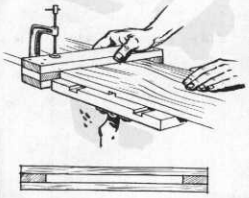


The crosscut fence is put together with a few pieces of scrap. To insure "squareness" make the sliding perpendicular pieces 4 to 6 inches wide.

The disc sander mounted on Shopsmith's quill is used with the fence for sanding many pieces to equal length.

gauge. Either edge of the saw table may be used as the guide. If the fence is made just loose enough to slide along the plank, and wide enough to provide a good perpendicular, it will be self-squaring and need only a C-clamp to hold it for the cut.

The "crosscut fence" is typical of the jigs and fixtures which let you tool up to make little jobs out of big ones. Technically, a jig is a guide for a tool (or a cutting action) as distinguished from a fixture which is a device for holding or supporting the work. But don't worry about mere names: the purpose of this article is to show you how you can use production-line principles to tool up once, and cut up a dozen shelves, drawer fronts, or other components of your built-ins. Once you are set up, the only difference between one clock shelf and a kitchen full of cabinets is the sawdust on the floor.

But before getting down to operations in the sawdust factory, let's back up for the broader picture of built-in building.

You might define a built-in as "shelves, drawers, and doors." But that definition applies to many articles of what we call furniture. The fact that a built-in is nailed into the old homestead, and that furniture is bought in a store and can leave in a moving van does not make the distinction.

Many a piece of good furniture has been home-built. And many a so-called built-in comes apart on the dotted lines for a rearrangement in another room or a trip out of town.

The practical distinction between furniture and built-ins is that the chests, seats, tables and cabinets we call furniture are constructed with a square to assure alignment of mating parts. Your built-in, whether attached or not, is constructed with the aid of a carpenter's level to fit a given space in your own home.

No house is ever really plumb and square. Walls, floors and ceilings don't come that way, however well built. And a built-in, by definition "fitted to the house," must accommodate itself to two or more surfaces that may have irregularities. Hence the level: once you have "levelled-in" any one side you can go ahead and saw on the square, secure in the knowledge that such parts as shelves and doors will fit.

Two kinds of planning must be considered, whether you want to wrap a couple of kids and their clothes in painted plywood, or set in a matched grain hi-fi breakfront:

1. **planning the unit in terms of its function, contents, materials used, type of construction, space occupied, and finishing touches.**
2. **planning the woodworking operations, sequences, jigs, fixtures, and assembly procedures.**

You can, of course, rush in where craftsmen fear to cut, and butcher a whole side of plywood into misfit shelves and costly sawdust. It is better to take a double look at that space you want to fill with glamorous woodenware.

In planning the unit you should take into account its function, which determines largely its materials and its method of construction. Of course you want quality, but quality is not measured by cost alone, but by fitness for the purpose. It is a waste of good wood to use mahogany for a small boy's built-in which he will outgrow in four or five years. It is equally wasteful to use cellar-shelving methods and materials for living room units.

Before you touch a tool, you should tool up your planning on paper; but before you touch a pencil, take a quick refresher course in the functions, methods and materials of built-ins. The best school for built-in builders is in the nearest shopping center.

In department stores and furniture shops you can gather ideas among the cabinets, counters, and displays. In the modern retail store you will find the best ways to handle books, dishes, apparel, hi-fi outfits, canned goods and tools.

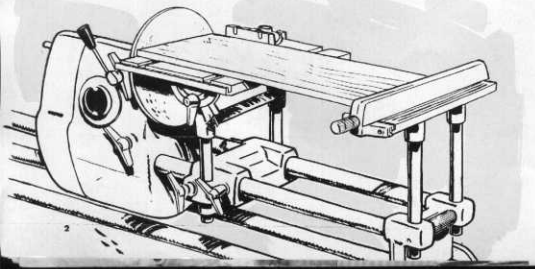
After all, the things the stores sell are the same things you buy—for which you want built-ins. Go backstage, too, in these places, into the workrooms and stockrooms, for ideas for your own shop and storage problems.

When you have seen for yourself how to handle plywood edges, how to make drawer joints, how to groove for Masonite bottoms with a router or dado, and how to hinge cupboard doors, you are better equipped to take an educated look at your own problem.

Don't try to think in inches at this point; think in terms of space and use. Go to the place where you want the built-in. With poles and string, get a rough, three-dimensional idea of how long, how wide, how high. Then you won't find out too late that your dream-shelf is perfect—except the hall door won't open.

Think in terms of people as well as space; always remember that any built-in is a personal and human problem. It should be custom built to fit the space, the use, and the people involved. Now is the time to make the kitchen fit the wife.

Another way to visualize your wooden dream



is to use chalk lightly on the walls and floor. Or you can move directly into the next stage by using a big crayon on big paper: even newspaper will do. The idea is to think big, draw big, and make your full-size mistakes on paper rather than wood.

Now you are ready to make a picture of what you want. You don't have to be an artist, although it helps, to arrive at a better idea of what you want. Just make a picture. Start drawing as rough as you like. For the steps between the dull pencil sketch and the sharp pencil details, see SKETCHBOARD—the department of SHOPMAG for thinking with a pencil.

Got the picture? Externals established in your unit planning? Then the next decision is the type of framing best fitted to the unit.

There is solid (self-framed) construction in which top, bottom, and sides are themselves the frame. This is good for the heavier plywoods: the "dream" unit on ShopMag's cover is an example. Then there is open-framed construction, which starts with a skeleton like a house. This is good for the built-in that is permanently part of the house, like a storage wall, where the existing walls and ceiling serve as back, sides, and top of the unit.

Pick up your thinking-pencil again and draw your "explosion shot." Yes, you can do it, and no matter how crude, it will help you see the parts and dimensions involved. Just imagine that your unit has been cut and assembled dry, that a small bomb has blown the components apart. Again, see SKETCHBOARD.

Now establish your critical measurements. Try to work out the detailed dimensions of every part as visualized in the explosion drawing. It's the best place to think out those allowances for saw cuts, joints, trim, rabeted edges. This is where little errors can be fatal. If you have the slightest question, take your sketches back to the local "school" (the shopping center) and see how the experts do it. Frankly, it is not easy to plan three-dimensional work in the two dimensions of paper and pencil. That's why they build models of ships and power plants and aircraft.

At this stage, you must also keep functions in mind to avoid the built-in blunders you will never live down: the shelves on which the records stick out just a little . . . the bookcase with no tilt-room . . . the cupboards not quite deep enough for cereal cartons.

All through this unit planning stage, you have also done a certain amount of operations planning—for design, methods, and materials all modify one other. You have chosen the appropriate type of framing, decided on stock, dimensioned your shelves, drawers and doors, and counted the identical pieces.

You are now ready to think in sawdust, to break down the work into separate jobs in terms of tools and procedures, jigs, fixtures and shortcuts. That "crosscut fence" on the cover is only one of many ways by which the job in hand can be made easier and quicker.

Your first chore, as superintendent of your own woodworking factory, is to plan the work to utilize the facilities available with SHOPSMITH. It will help you, at this point, to remember that you are not now making a built-in, to be finished a piece at a time, but operating a mill set up to produce orders for so many pieces of such-and-such dimensions, tooled in this-and-such ways.

The following list of possibilities makes no claim to be complete; it is simply a check list for your own thinking in the sawdust department:

Crosscut fence: see explanation above for its uses.

Front table extension: very handy for the wide stock usually used for shelves; gives you 14 inches of table in front of the saw, enough for shelves of maximum depth.

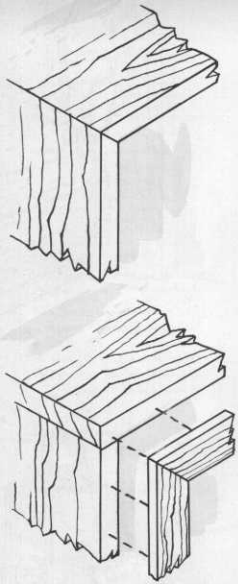
Saw on quill: with this feature, you can cut dadoes (cross-grain notches) but if you have orders for many, better get a dado set (of saws and chippers) or a Magna Dado.

Sander on quill: it's the one and only arrangement that lets you move the sanding disc into the work; this is the tool-up for end-sanding to make components of exactly the same length.

Fence as fixture: nothing like it to position the work while you saw to length (with stop-block) or sand to length; also useful as a guide for routing and drilling.

Miter gauge: it's a jig when it guides the work into the saw or dado blade. When locked in the

The scriber, in use above and below, is a simple compass-like instrument. The drawing below shows how to level in and then cut the piece to fit a wall, ceiling or floor.



Rather than miter cutting long shelf or cabinet top pieces, you can butt-join them and attach facing strips that have been miter cut.

slot of the table, it's a fixture to square the work for end-sanding or dowelling. With pistol-grip, it makes possible precision sawing at any angle.

Router bit: the easy way, guided by the fence, to rout grooves in front, back, and sides to let in drawer bottoms. Also the handy way to make many joints, such as drawer dovetails and mortise-tenon joints.

Cabinet door-lip cutter: cupboard doors can be easy with this tool; available on the molding head (saw position) or the shaper. Forms a finished door edge in one pass.

Mortising hold-down: mounted on the fence, which may be clamped on the extension table, it provides a "third hand" when sawing large pieces of plywood, keeps cut-off piece from falling down.

Hold-down kit: makes working with the shaper or molding head almost automatic; just set the steel fingers and push the work through.

Drill-jig: for repetitive drilling of equidistant holes, as for shelf fixtures; see page 6 in this issue.

Plywood jointing: with disc sander and cocked fence; see page 11 for details.

Planer blade: a good way to make the first cut in plywood the finished edge. But warn your friends with radial-arm saws they can't do it: hollow-ground blades need a lot of exposure above the work, and usually a slower speed to avoid burning.

Horizontal drilling: only SHOPSMITH lets you tool up for dowel joints with no need for individual measurements. The quill controls drilling depth. The miter gauge positions the work. For the usual two-dowel joint, you simply drill, flop the work, and drill again.

These are only some of the ideas you can use to tool up to produce the finished pieces that become the components of your built-in. And now that you are finally in the sawdust business, you will find that work goes quickly. That is because you spent enough time in planning the unit and the woodworking procedures. In fact, the longest part of any project utilizing modern production methods is normally the planning: it takes 24 months to plan the manufacture of an automobile that will come off the production line at one every 24 minutes.

The quick part of your built-in is the assembly. But don't let that "quick" mean sloppy. Too often, the hasty construction excused as "temporary" lives on in permanent shame! Do take the little extra time good craftsmanship demands, and enjoy the lasting pleasure it creates. With the proper know-how and mental approach, you can do things right the first time—and avoid living with your mistakes and makeshifts.

Whatever type of construction you have used, you will need to establish (1) the "wall" line, and (2) the "cut" line. The wall line is transferred to the stock (or a paper pattern) with a scriber. The cut line, set with the level, marks the vertical from which you will establish the horizontals. By using the level, you can be sure that the angle between a post and a horizontal member will be exactly 90°. This means you can cut a door perfectly square in the shop and be sure of a proper fit on the job.

In assembling your built-in, remember the old boat-in-the-cellar joke: if you plan to build a big section in your shop, make sure you can get it up the stairs and around the corners.

Be specially careful about those charming little alcoves where shelves will look lovely—but must be literally built in, piece by piece, because there is no wiggle-room whatever.

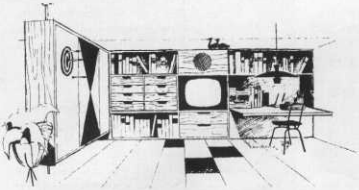
In planning your built-in, you probably decided on its finish. Whether painted to fit into the room, or stain-waxed, you should know that the finish can amplify rather than conceal errors and roughness. So take the little extra time for sanding tops and fronts and sides, for smoothing edges.

If you have used plywood, use one of the grain-tamers; fill the edges if you paint. For a stain or varnish job, you can get the new self-adhesive strips.

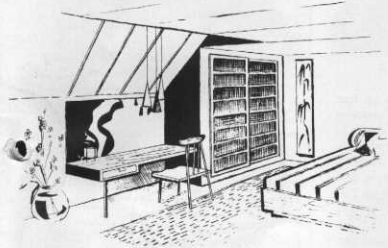
Once your built-in is in place, it's a good idea to stop all operations for at least two days to be sure that the last ideas have come out of the new woodwork. Sometimes, when you see the finished job, minds get changed—including yours. So wait. The family need and the empty space have met and married; you can afford to wait a couple of days to decide whether you really want to paint it or stain it. If you have run your factory right, you will have a good, well-fitted job that you can live with proudly for a long time. **END**

Inside *your Built-Ins*

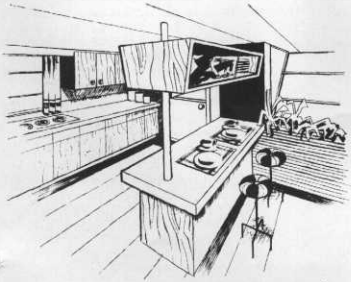
Your taste and skill determine what your built-in looks like outside, but the inside of every unit is governed by its use. Here are measurements of common items built-ins are tailored to contain. Design your storage around them.



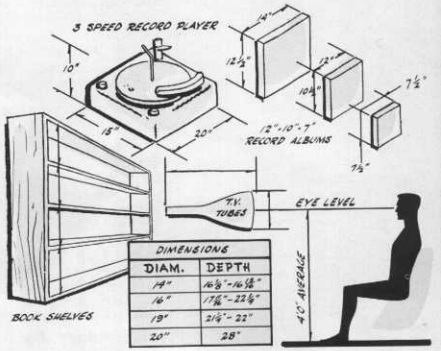
Playrooms, family rooms, dens and similar informal living areas afford many built-in possibilities. Besides the usual built-in bookcases, television and hi-fi sets, you can save floor space by building in desks, game closets, and cabinets.

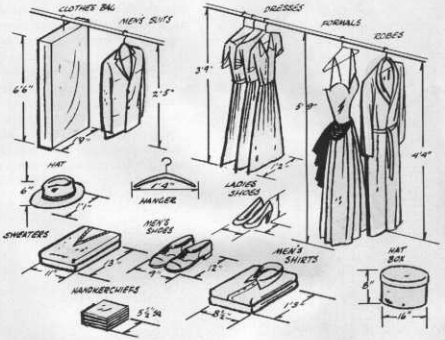


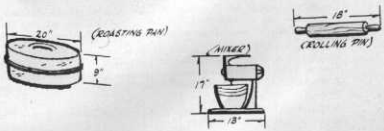
Bedrooms will take on added usefulness with built-in desks and bookcases. Closets and chests can provide more storage space with better arrangement if they are built in around their contents.

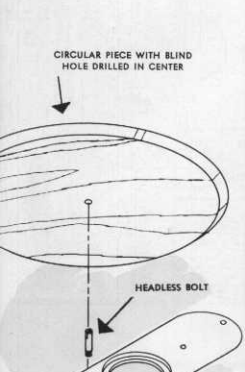


Today's kitchens, whether modern or modernized, are made much more attractive and efficient with the use of built-ins. Built-in storage can be designed for often-used items and appliances as well as for those that spend most of their time "out of the way."









Pivot Sanding Jig

A disc sanding jig can be easily set up that will avoid the size limitations of circle sanding using the miter gauge. You will also be able to keep the pivot point off the spindle center-line when sanding large circular pieces, a condition not possible when using the rip fence hole. Use the shaper insert on the saw table and the fulcrum pin as the pivot point. If you do not wish a through hole in the work, use a short ⅜-in. headless bolt in the fulcrum pin hole for your pivot with a "blind" hole in the work.

Sanding is done around the periphery of the workpiece using the down side of the sanding disc. The off-center placement of the pivot point avoids the spinning effect given the work when the pivot and arbor are directly in line.

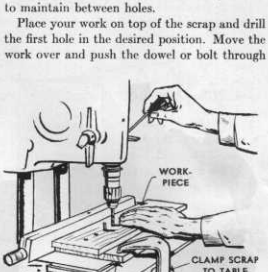
When the circular workpiece is set on the pivot, the quill, with attached sanding disc, is then moved in the required distance.

Drilling Equidistant Holes

A cheap, expendable setup for drilling equidistant holes needs only a piece of scrap wood, a clamp, and a dowel or bolt of the same diameter as the hole to be drilled.

First drill a hole in the scrap and then clamp it to the table. Have the drilled hole set to the right or left of the bit, at the distance you wish to maintain between holes.

Place your work on top of the scrap and drill the first hole in the desired position. Move the work over and push the dowel or bolt through

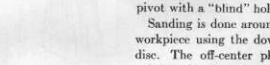


the hole in the work into the hole in the scrap. You may then drill as many additional equidistant holes as you wish by moving the work and replacing the dowel each time.

The scrap under your drill bit will not provide a good back-up for much soft wood drilling; you must be careful to avoid feathering or burring soft wood. Hard wood should not be too difficult to work with in this respect, but care must be taken. For soft wood, extra dowel holes can be easily drilled in the scrap.

This jig is particularly useful for repetitive drilling operations, such as making holes for adjustable clips for shelves.

Tom Riley
Atherton, California



Announcing:

SILVER SHOPSMITH AWARDS

Created especially for ShopMag, in heavy non-tarnishable rhodium plate as a tie clip. The SILVER SHOPSMITH is not for sale at any price. It is awarded only for contributions to home craftsmanship meriting publication.

ShopMag awards The SILVER SHOPSMITH, and pays $10, for the know-how hints, kinks, and letters published in "ShopMag How-To" and "ShopTalk of People & Projects." ShopMag also awards The SILVER SHOPSMITH on presentation of evidence of publication of similar material in other magazines.

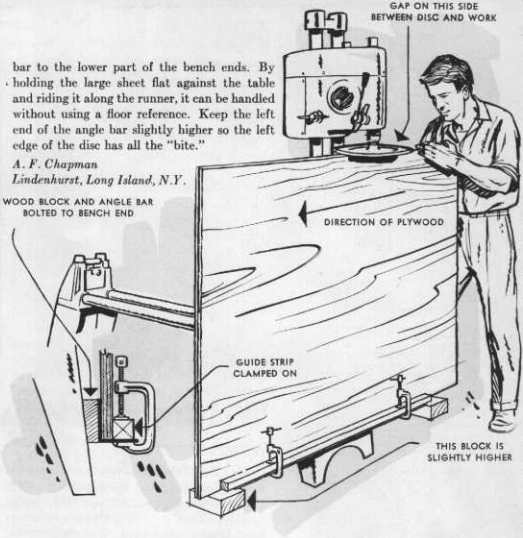
Address all material, enclosing stamped, self-addressed envelope where return is desired, to:

Editors, ShopMag
1 Homewood Place
Menlo Park, Calif.

Sand away the wobble in table legs by using your SHOPSMITH in the drill press position as a disc sander. The quill feed dial stop will automatically allow you to sand legs, whether slanted or straight, to equal length.

bar to the lower part of the bench ends. By holding the large sheet flat against the table and riding it along the runner, it can be handled without using a floor reference. Keep the left end of the angle bar slightly higher so the left edge of the disc has all the "bite."

A. F. Chapman
Lindenhurst, Long Island, N.Y.



Texturing With Wire Brushes

Texturing woods, plywoods and those open-grained stocks of non-uniform density, has become a popular way to produce attractive, unusual finishes. Remember always to wear goggles when doing this kind of work.

Wire brushes can be mounted on the main spindle or you can work with large pieces by attaching a brush to the flexible shaft. A coarse brush operated at the slow end of the recommended speed range will give heavy textures, while a fine brush and higher speeds produce more delicate textures on turnings or flat work. Finish texturing *with* the wood grain.

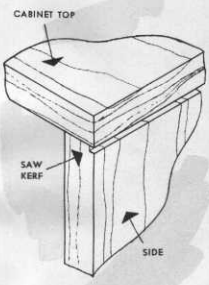
You will need the full power made available by a ½ to ¾ horsepower motor to do these texturing jobs properly: ¼-in. drills won't work.

Edging Sheets of Plywood

Large sheets of plywood can be accurately edged or jointed by using the same principle employed horizontally on the saw table.

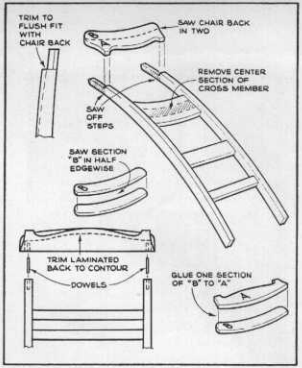
Swing the disc sander into the drill press position, with the table vertical. Attach an angle

Overhead drilling in rafters and I-beams up to 7 feet high is possible with SHOPSMITH! Reverse the headstock on the ways and use the quill feed to drill upside down. Raise SHOPSMITH on blocks if necessary.



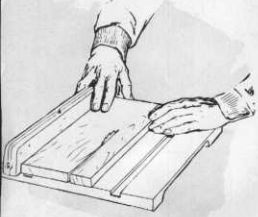
A simple saw kerf along the top edge of butt-joined cabinet sides provides a truly professional look, and simplifies alignment problems when joining and gluing tops.

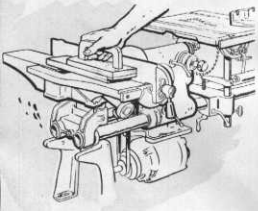
Typical project feature, just as it appears in Popular Science, *shows before-and-after photos, procedure sketches.*



Writing the How-to Article

by Perry Githens*





In tool-action shots, be sure to follow safe and proper shop practice: you now share editor's responsibility to show only right way to do things.

Into a score of magazine editorial rooms come hundreds of how-to articles every day. All of them, I can assure you, get read. That not all are accepted and paid for is not because editors aren't looking for material. With the home the center of modern living, the demand for words and pictures about how you make it, or how we did it, is great.

There's gold in the how-to hills for those who will learn the simple necessities and avoid the common errors. Your good how-to "shorts" bring $5 to $15, and acceptable project-features run from two to three figures after the dollar sign. Anyway, after you've enjoyed the satisfaction and counted the savings in creating something worthy of your home, it costs only time and postage to try.

To begin with, keep a log of your major projects for your own benefit whether or not you ever put them into words and pictures for sale.

Keep track of the materials used, the time and money spent; save your sketches—from doodles to drawings. You don't need to be an expert to shoot "memo" photos with a Brownie Flash.

Many of the best subjects involve the contrast between "before" and "after." You would be amazed how many really beautiful built-ins, for example, are unusable in print because nobody thought to take the "before" pictures.

The best way to handle this situation is to walk around with a flash-camera and shoot everything you might some day do something about. You will see your home with new eyes, too, in this journey of discovery.

Now try to look at magazines the same way. Read them not only for what you get out of them, but for what gets into them. Really reading the magazines dedicated to the education and encouragement of the homeowner, you will find that there are three major varieties of how-to articles.

One is the how-to short: the quick trick, try-it-this-way hint usually handled in a paragraph and/or a picture. Historically, these little nuggets of know-how run back to Poor Richard's Almanac.

Some magazines handle such a volume of how-to shorts that they cannot return unused items, or enter into correspondence about them. It's a good idea to submit several items at once; if you get a check, it will specify those used, and you can send the others to another magazine.

There is no doubt that typewritten material stands a better chance of being accepted and paid for. Type your name and address in the upper left corner or invest in a rubber stamp. In the upper right corner, type, "Submitted at regular rates." Halfway down the page, type the title; don't try to "write" it as you might think it should appear, just make it a label for the idea. Skip a few lines and start your text. Always double-space, and always keep a carbon

* As editor of *Popular Science*, Mr. Githens bought more than a million dollars worth of how-to articles, artwork, and photography.

copy: editors get tired of hunting for "my only copy" in their paper haystacks.

Another kind of how-to article is the big feature-length treatment. This involves so much editorial expense that the subject must justify the space needed to handle it. The 12-story birdhouse is not likely to qualify.

Generally speaking, you should not attempt to "package" the bigger feature articles about major home remodelling jobs, building a week-end house, or constructing a family-size boat.

When allocating so much valuable space, a magazine probably will want to assign its own writer, usually a staff member. Most magazines also want to shoot their own pictures, tailor plans and assembly sketches to their own requirements.

Professionals always get off a "query." Suppose you aim to close in your porch, break out a wall, and thus enlarge your living room next summer. You should query the magazines using such material months before you start the work. Don't try to write a "story," just write a letter to the Managing Editor describing your intentions, enclosing snapshots and rough plans.

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Between this full four-color treatment and the one-idea, one-paragraph-or-picture short, fall many projects you can "package." An example is the remodelling of the typical golden-oak, straight-back chair illustrated.

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2. **The "before" and "after" photos were taken from exactly the same angle.**
3. **The drawings detailing construction, produced by the magazine's art department, were based on sketches and descriptions supplied by the contributor.**

All that remains to be handled in the text is the "why" of the project, and the "how" of the new seat and finish. This is the minimum treatment of such a subject.

Applying this approach to the story of your built-in, for example, this is the package:

1. **The "before" picture of the place where the built-in will be, taken from the same angle from which the finished job will look best.**
2. **Rough sketches plus "after" photo.**
3. **The documentary photos of the "tool-ups" you used to make the job easier.**
4. **The "story"—the simple description of what to do and how to do it.**
5. **The 9" x 12" mailing envelope to carry the manuscript flat. Enclose sketches, photos (4 x 5's are good enough, but 8 x 10's are better) with a cardboard stiffener. Don't forget the stamped, self-addressed 9 x 12 return envelope. Mail the whole thing First Class, at the Post Office: editors don't like "postage due" either.**

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Even in close-ups of tools in action, be sure the camera is far enough back to allow room to crop the print. Use plenty of light and stop down for depth of focus. Keep in a little sawdust for realism, but avoid the clutter always exaggerated by the camera.

The same thinking applies to the working sketches you will need for your own use anyway. Don't try to draw them fit to print: just make sure your dimensions add and subtract to the right totals to allow for joints, saw cuts, and all the mousetraps for the careless projecteer.

One big DON'T: don't ever submit the same article to more than one magazine at a time. Magazines, which compete with each other, want to buy only "originals."

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The demand for how-to material is such that one day you will almost surely get a check. Top publications pay on acceptance, and endorsement is your acceptance of the conditions of sale. Your endorsement also means that you are now a professional—one of the many craftsmen-writers who have a valuable by-product of their woodwork—money!

END

	How-To Stories	Features	"Package" Features
AMERICAN HOME 300 Park Avenue New York 22, New York	yes	yes Q	yes Q
BETTER HOMES AND GARDENS 1714 Locust Street Des Moines 3, Iowa	yes	yes Q	yes Q
CAPPER'S FARMER 912 Kansas Avenue Topeka, Kansas	yes	no	no
EVERYWOMAN'S 16 East 40th Street New York 17, New York	yes	no	no
FAMILY HANDYMAN 211 East 37th Street New York 36, New York	yes	Q	yes
FIELD & STREAM 383 Madison Avenue New York 17, New York	no	no	no
HOME CRAFTSMAN 115 Worth Street New York, New York	yes	Q	yes
HOUSE & GARDEN 420 Lexington Avenue New York 17, New York	no	Q	Q
HOUSE BEAUTIFUL 572 Madison Avenue New York 22, New York	no	no	no
HOUSE BEAUTIFUL'S BUILDING MANUAL 572 Madison Avenue New York 22, New York	yes	Q	Q
HOUSEHOLD MAGAZINE 912 Kansas Avenue Topeka, Kansas	no	no	Q
LADIES' HOME JOURNAL Independence Square Philadelphia 5, Penn.	no	Q	no
LIVING for Young Homemakers 575 Madison Avenue New York 22, New York	no	Q	Q
McCALL'S 230 Park Avenue New York 17, New York	no	no	no
MECHANIX ILLUSTRATED 67 West 44th Street New York 36, New York	yes	Q	Q
OUTDOOR LIFE 353 Fourth Avenue New York 10, N.Y.	yes (obviously, sporting and outdoor activities only)	yes	yes
POPULAR HOMECRAFT MAGAZINE 143 East Erie Street Chicago 11, Illinois	yes	Q	yes
POPULAR MECHANICS 200 East Ontario Street Chicago 11, Illinois	yes	yes Q	yes Q
POPULAR SCIENCE 353 Fourth Avenue New York 10, New York	yes	yes Q	yes Q
SCIENCE AND MECHANICS 460 East Ohio Street Chicago 11, Illinois	yes	yes Q	yes
SPORTS AFIELD 959-8th Avenue New York 19, New York	yes	no	no
SUCCESSFUL FARMING Des Moines, Iowa	yes	no	no
WOMAN'S DAY 19 West 44th Street New York 36, New York	yes	Q	no
WOMAN'S HOME COMPANION 640 Fifth Avenue New York 19, New York	no	Q	Q

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copy: editors get tired of hunting for "my only copy" in their paper haystacks.

Another kind of how-to article is the big feature-length treatment. This involves so much editorial expense that the subject must justify the space needed to handle it. The 12-story birdhouse is not likely to qualify.

Generally speaking, you should not attempt to "package" the bigger feature articles about major home remodelling jobs, building a week-end house, or constructing a family-size boat.

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OUTDOOR LIFE 353 Fourth Avenue New York 10, N.Y.	yes (obviously, sporting and outdoor activities only)	yes	yes
POPULAR HOMECRAFT MAGAZINE 141 East Erie Street Chicago 11, Illinois	yes	Q	yes
POPULAR MECHANICS 200 East Ontario Street Chicago 11, Illinois	yes	yes Q	yes Q
POPULAR SCIENCE 353 Fourth Avenue New York 10, New York	yes	yes Q	yes Q
SCIENCE AND MECHANICS 450 East Ohio Street Chicago 11, Illinois	yes	yes Q	yes
SPORTS AFIELD 959-8th Avenue New York 19, New York	yes	no	no
SUCCESSFUL FARMING Des Moines, Iowa	yes	no	no
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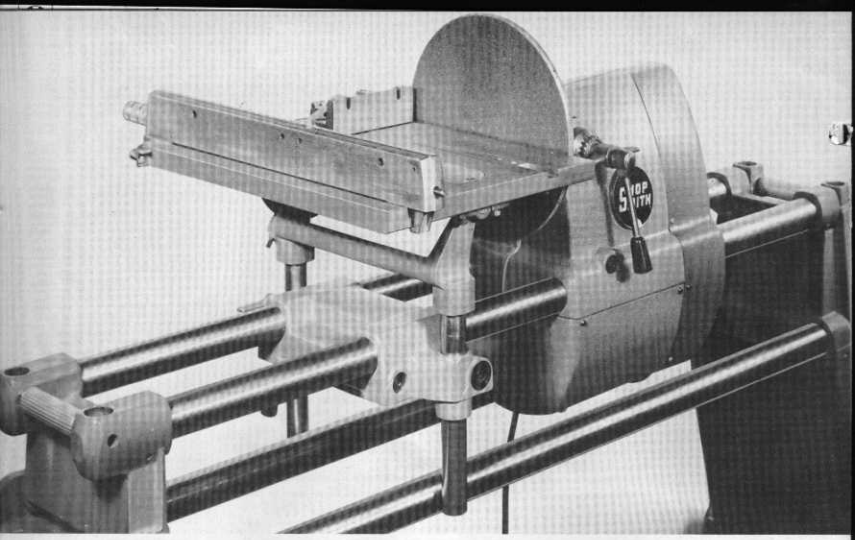
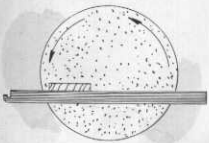
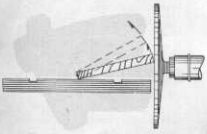


Sanders Are Tools, too . . .

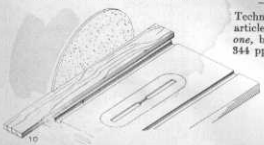
They Grind Wood to Shape, Ready It for Final Finishing



Always sand on the "down" side of the disc's rotation to avoid lifting the work, as in the drawings above and below.



Even when much material is to be removed, keep the feed light and smooth. Excessive pressure may burn the wood.



You might not think of sand as a cutting tool, as sharp as any in the shop. Then you remember how sand, carried by wind or water, has shaped mountains and scoured canyons out of the rock. Sand in motion is also an important woodworking tool which can sculpture wood to make a chair leg—or sharpen a pencil.

Power sanding—with disc, drum or belt—gives you thousands of tiny chisels that form wood—to square an edge, rough a circle, or smooth a surface. Power sanding is also the best way to prepare wood for the final finish that makes "do-it-yourself" a matter of pride rather than apology. In fact, paint, stain or lacquer are likely to magnify the imperfections of sanding that mar many a well-designed and well-constructed project.

The sand you use in woodworking, of course, isn't just what you mix with cement or walk on at the beach. It runs from the flint coating of the cheapest sandpapers, good enough for filing your nails or sanding by hand, to the harder natural grains like garnet, which can stand up under power sanding.

Even some good craftsmen think about sanding in terms of the price of sandpaper. In power sanding, the most expensive paper you can buy costs less than the cheapest flint paper, because cost is determined by how much wood is removed per pennyworth of paper. Literally, price is better measured by dust than by dollars.

Good sanding involves the combination of the right abrasive with the right sanding tool for the job in hand.

The Right Abrasive—There are really three factors to consider in selecting the right abrasive for the particular job of sanding:

1. **the TYPE of abrasive**
2. **the DENSITY of the coat**
3. **the GRIT—coarse to fine**

The type of abrasive, in power sanding, is vital because the working life of the sandpaper depends on its hardness. Flint, adequate for hand-sanding, will clog or tear under power.

Technical material and illustrations used in this article are from *Power Tool Woodworking for Everyone*, by R. J. De Cristoforo: Magma Publications, 344 pp., $4.95.

Garnet, a natural mineral abrasive like flint, is better for general use.

The density of the coat is also a factor in fitting the abrasive to the job. What is called a "closed" coat has the abrasive grains closely spaced. An "open" coat has the grains farther apart to avoid clogging in rough work or removing old finish.

The grit is the third dimension in sanding. It runs from coarse to fine. Each gradation has its place in the progression from rough to smooth, especially in sanding for finishing. Whatever the sanding tool you use, it is more efficient and economical to reserve each grit for its special purpose. The different grits can be slipped on and off the drum and belt sanders quickly. On the disc sander, however, the abrasive paper is cemented to the disc. But extra sanding discs cost so little, it is economical to have coarse, medium and fine papers ready-mounted on separate discs.

The Right Sanders—Your SHOPSMITH accommodates all three major sanding tools: disc, drum, and belt sander. While there are certain overlaps in usage, there is usually one "right" kind of sanding tool for the job.

The Disc Sander, as everyone who uses it knows, is a most versatile tool. With it, you can square an edge, or round a corner, or make a bevel. You can mount coarse and fine discs on two spindles (on Mark 5) for simultaneous sanding.

You have, with SHOPSMITH, the only disc sander mounted on a quill for precise setting, and forward-feed sanding to a predetermined point, when used in combination with the Depth Control Dial. This is especially useful when producing identical parts.

Tips on Disc Sanding—When teaching someone to use the disc sander, stress these points: 1. Sanding is always done on the "down" side of the disc's rotation; 2. Keep the top of the table a little below the center line of the disc to utilize maximum abrasive surface; 3. Always feed the work lightly to avoid burning. Touch the work to the disc several times rather than force the work to the finish line all at once.

Sanding to Exact Length is a simple matter using the forward feed on the disc, with the rip fence as a backstop. Move the table so the end of the work is about ¼ inch from the disc. Once the quill setting is made, it is maintained by the depth control dial so there is no danger of sanding some pieces shorter than others. Use the miter gauge to keep work square to the disc.

Circular Pieces can be sanded with a pivot jig. You can set a pin into the free end of the miter gauge bar, or use a short bolt in the shaper table insert (see page 6).

Round Corners are best handled by sawing or coarse-sanding them first to 45° angles, using the miter gauge. The job can then be finished freehand by swinging the work left and right against the disc.

Miters and Bevels can be formed by moving the work against the disc, or by feeding the disc forward. The miter gauge positions the work on the table. When beveling, simply tilt the table to the required angle and use the rip fence to hold and square the work as desired.

Curved Work that must be of uniform width throughout its length can be handled by using a pointed guide stick clamped to the table to gauge the width of the stock. Pass the work between the stick and the disc, keeping the curve of the work tangent to the disc. Such work should have its inside face sanded first on

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The drum sander, shown sanding a cabriole leg in the drawing at the right, is best used for such elaborate contours, for sanding inside curves, and also for precise dimensioning of thin workpieces.

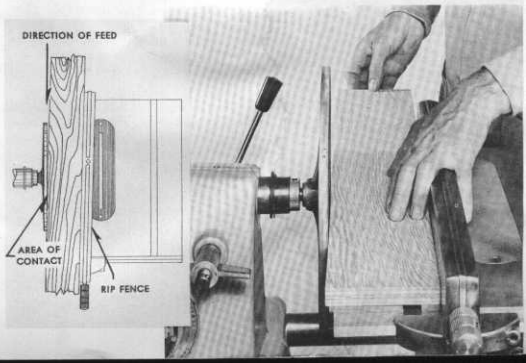
Special expandable drums that hold abrasive sleeves are made in various diameters. The most popular size is the 3-in. diameter drum, shown mounted on Shopsmith.

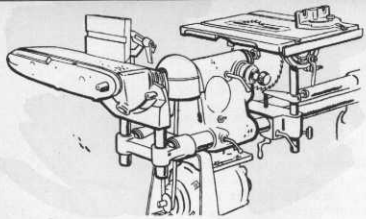
An inset nut at one end, when tightened, expands the drum to grip the sleeve. When loosened, the sleeve can be removed for replacement. Drum sanders are usually run between I and L on the Speed-Dial (1800 to 2000 rpm). As with all sanders, speed must not be excessive.

Surface sanding is done by placing the table under the drum and raising it until the work just touches the abrasive sleeve. Feed the work against the drum's rotation.

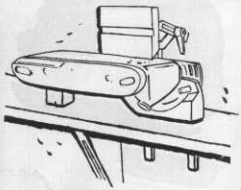
The inside corners of rabbets and similar cuts can be smoothed with the drum sander in either the vertical or horizontal position. The sanding drum can also be recessed below the level of the table by fitting the drum into the center hole of the shaper insert.

BELOW: Long, straight edges can be jointed by offsetting the fence slightly to provide greater bite on the "down" side of the sanding disc.





With the Power-Mount Adapter the belt sander mounts on Model 10 ER.



A simple wall bracket provides convenient storage for the belt sander.

the drum sander for a smooth edge to ride against the guide stick.

The Belt Sander—Every accomplished craftsman knows the stationary belt sander as the ultimate in versatility and ease of use. With it, you can do end and edge work, drum sanding; you can round off knobs on the flexible back. And only the belt sander gives you straight-line sanding particularly useful for surface finishing parallel with the grain.

Essentially, the belt sander is an endless belt of abrasive running on two drums. The Magna 6" belt sander, which couples quickly to SHOPSMITH (and was developed by the same engineering organization which created both the 10 ER and the Mark 5), has several new features. One of them is automatic one-hand tensioning of the sanding belt, which lets you change belts easily to use the right grit. Another, a safety feature, keeps the belt edges covered. A dust scoop has a nozzle which fits the ordinary vacuum cleaner hose.

The big 6" belt totals 100 sq. in. over the back-up plate. This means that wide and long work can be surface sanded without end marks.

The belt sander is used both in the vertical and horizontal position. In the horizontal position there is no interference with the headstock so even a desk top can be sanded handily.

Tips on Belt Sanding—These are points to watch in running the belt sander: 1. Keep speeds between E and K on the Speed-Dial, 915 to 1830 surface feet per minute. 2. Loosening the big knob slackens the belt for changing; tightening it tensions belt automatically. The only other adjustment, with an Allen wrench, "tracks" the belt to keep it centered on the drums. 3. When sanding a large area, especially when surface sanding, always set the Speed-Dial at the slower end of the speed range to provide greater power.

End, Miter, and Cross-Bevel sanding is just a matter of placing the work on the table, with the tilt or angle desired, and moving it forward into the belt. Use miter gauge to position the work. Avoid excessive pressure as with the disc sander.

Surface sanding is best done with the belt sander in the horizontal position. To provide a guide and support when sanding long stock, the table may be locked parallel to either side of the belt. Using it for a support, keep the work snug against the table as you move it against the rotation of the belt. When using a hold-down clamp hold the work snugly against the table and pass it slowly and steadily under the spring blades. Be sure the blades won't snap down to the platen when the work has passed through or you might tear your belt. The table can be removed if you wish to make the passes freehand.

Edges are sanded with the machine in the horizontal position with the table locked parallel to the belt. The pass is made as it was in surface sanding, except that it is the edge of the stock that's on the belt and the surface that's against the table. Sanding cross-grain is similarly accomplished when the stock is very wide.

Knobs, Round Ends, and Similar Curves can be sanded on the slack area of the belt. Use the center of the belt for this operation and keep the pressure light to avoid shifting the belt off center, removing too much material, or wearing the belt excessively in one spot.

Other Sanding Tools—You can make spindle sanders by cementing a strip of abrasive spirally around dowels. These "sanding rods" can be chucked in the drill press, or in the jigsaw for reciprocal action, when sanding small inside curves.

Your lathe is also a sander in which the work moves while you hold the abrasive paper. This is the way to smooth a bowl inside and out, or finish a spindle turning. To sand a tapered or straight cylinder leg, leave it in the lathe and use your big sanding disc as a block, moving it back and forth along the axis.

In any kind of sanding, remember you are using a precision tool which should not be abused. Don't bear down too hard. Don't wear out good abrasives on coarse work like removing thick paint—use a paint remover first. Keep disc sanders face down on a shelf. Hang up drums and sanding belts on pegs. When abrasive sheets, discs, or belts become too worn for power sanding, cut them up for hand use. Work slower in the final stages: sanders are sharp, and even the finest grit can ruin a job in a moment of carelessness. **END**